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Brake and Air Suspension Products for Trailers






PRODUCT CATALOGUE

KNORR-BREMSE

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Revision Details

Rev. 006	August 2015	Documents deleted:		PD-200-120	PD-430-451	
		Documents added:		System Diagram Y183282		PD-112-800
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Introduction and Disclaimer

Introduction

This catalogue is designed to provide an overview of the range of products for trailer air braking and suspension systems available from Knorr-Bremse. The catalogue is divided into sections relating to product groups including air supply, valves, electronic brake control, actuation and air disc brake, air suspension/lift axle control plus miscellaneous products. In each section a selection of popular part numbers and their technical details are shown. Finally, there is a section containing data sheets for trailer brake calculations and system design.

From time to time, we may update individual sections. The latest version of documents can be found on our website: www.Knorr-BremseCVS.com where they can be downloaded free of charge.

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Note: *The safety advice listed below is applicable to general service and diagnostic work on braking systems. Also observe any recommendations from the axle or vehicle manufacturer concerning towing, jacking-up and securing the vehicle.*

CAUTION: *KNORR-BREMSE IS NOT LIABLE FOR ANY INJURIES OR DAMAGES CAUSED BY IMPROPER USE OF SPECIFIED SERVICE KITS AND/OR SERVICE TOOLS. FURTHERMORE, MISUSE OF TOOLS OR INCORRECT INSTALLATION OR APPLICATION OF SERVICE KITS MAY RESULT IN DAMAGE OR POTENTIALLY UNSAFE VEHICLE OPERATIONS. IN THIS CASE, KNORR-BREMSE DOES NOT HAVE ANY WARRANTY OBLIGATIONS.*

Before and during working on or around compressed air systems and devices, the following precautions should be observed:

1 Always wear safety glasses when working with air pressure.

2 Never exceed the vehicle manufacturer's recommended air pressures.

3 Never look into air jets or direct them at anyone.

4 Never connect or disconnect a hose or line containing pressure; it may whip as air escapes.

5 When removing or servicing a product, ensure all pressure related to the specific system it is contained in has been depleted to 0 bar. Be aware that if the vehicle is equipped with an air dryer system, it can also contain air pressure along with its purge reservoir, if fitted, even after pressure has been drained from the other reservoirs.

6 If it is necessary to drain the air pressure from reservoirs, etc., keep away from brake actuator push rods and levers since they may move as system pressure drops. On vehicles fitted with air suspension, it is advised when undertaking such work, to support the chassis from sudden lowering and therefore prevent any possibility of being trapped between the chassis and axle or ground.

7 Park the vehicle on a level surface, apply the parking brakes, and always chock the wheels as depleting vehicle air system pressure may cause the vehicle to roll.

8 When working under or around the vehicle, and particularly when working in the engine compartment, the engine should be shut off and the ignition key removed. Where circumstances require that the engine be running, EXTREME CAUTION should be taken to prevent personal injury resulting from contact with moving, rotating, leaking, heated or electrically charged components. Additionally, it is advisable to place a clear sign on or near the steering wheel advising that there is work in progress on the vehicle.

9 When working on vehicles equipped with air suspension, to guard against injury due to unexpected downward movement of the chassis caused by sudden pressure loss in the suspension system, ensure that the vehicle chassis is mechanically supported with a 'prop' between the chassis and the axle or between the chassis and the ground.

10 Examine all pipework for signs of kinks, dents, abrasion, drying out or overheating. Be aware that kinks in pipework may result in air pressure being trapped in the pipework and associated equipment. Replacement hardware, tubing, hose, fittings, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems. Check the attachment of all pipework; it should be installed so that it cannot abrade or be subjected to excessive heat.

11 Components with stripped threads or damaged/corroded parts must be replaced completely. Do not attempt repairs requiring machining or welding unless specifically stated and approved by the vehicle or component manufacturer.

12 Never attempt to install, remove, disassemble or assemble a device until you have read and thoroughly understood the recommended procedures. Some units contain powerful springs and injury can result if not properly dismantled and reassembled. Use only the correct tools and observe all precautions pertaining to use of those tools.

13 Before removing any device note its position and the connections of all pipework so that the replacement/serviced device can be properly installed. Ensure that adequate support or assistance is provided for the removal/installation of heavy items.

14 Only use genuine replacement parts, components and kits as supplied by Knorr-Bremse or the vehicle manufacturer. Only use the recommended tools as specified in related Knorr-Bremse instructions.

15 The serviced or replaced product must be checked for correct function and effectiveness.

16 If products have been dismantled, serviced or replaced, whose performance could affect braking performance or system behaviour, this should be checked on a roller dynamometer. Bear in mind that a lower performance may be experienced during the bedding-in phase if new brake pads/linings and/or brake discs/drums have been fitted.

17 The use of impact screwdrivers or impact wrenches in conjunction with Knorr-Bremse service tools for air disc brakes is not permitted. The service tools are not designed for such use. It is likely that the tools or the vehicle will be damaged and there is a serious risk of injury – see **Caution** on previous page.

18 Do not use compressed air to clean the disc brake. Avoid air contamination of brake dust.

19 Prior to returning the vehicle to service, make certain that all components and the complete brake systems are leak free and restored to their proper operating condition.

Welding

To avoid damage to electronic components when carrying out electrical welding, the following precautions should be observed:

1 In all cases, before starting any electrical welding, remove all connections from any electronic control units or modules, noting their position and the order in which they are removed.

2 When re-inserting the electrical connectors (in reverse order) it is essential that they are fitted to their correct assigned position - if necessary this must be checked by PC Diagnostics.

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

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Doc. No. Y011334 (EN - Rev. 002)
July 2015

Brake System Diagrams

PD No.	Product	Type/Part No. family
	Brake System Diagram - ABS	
	Brake System Diagrams - TEBS G2.1	
	Brake System Diagrams - TEBS G2.2 with iLvl	

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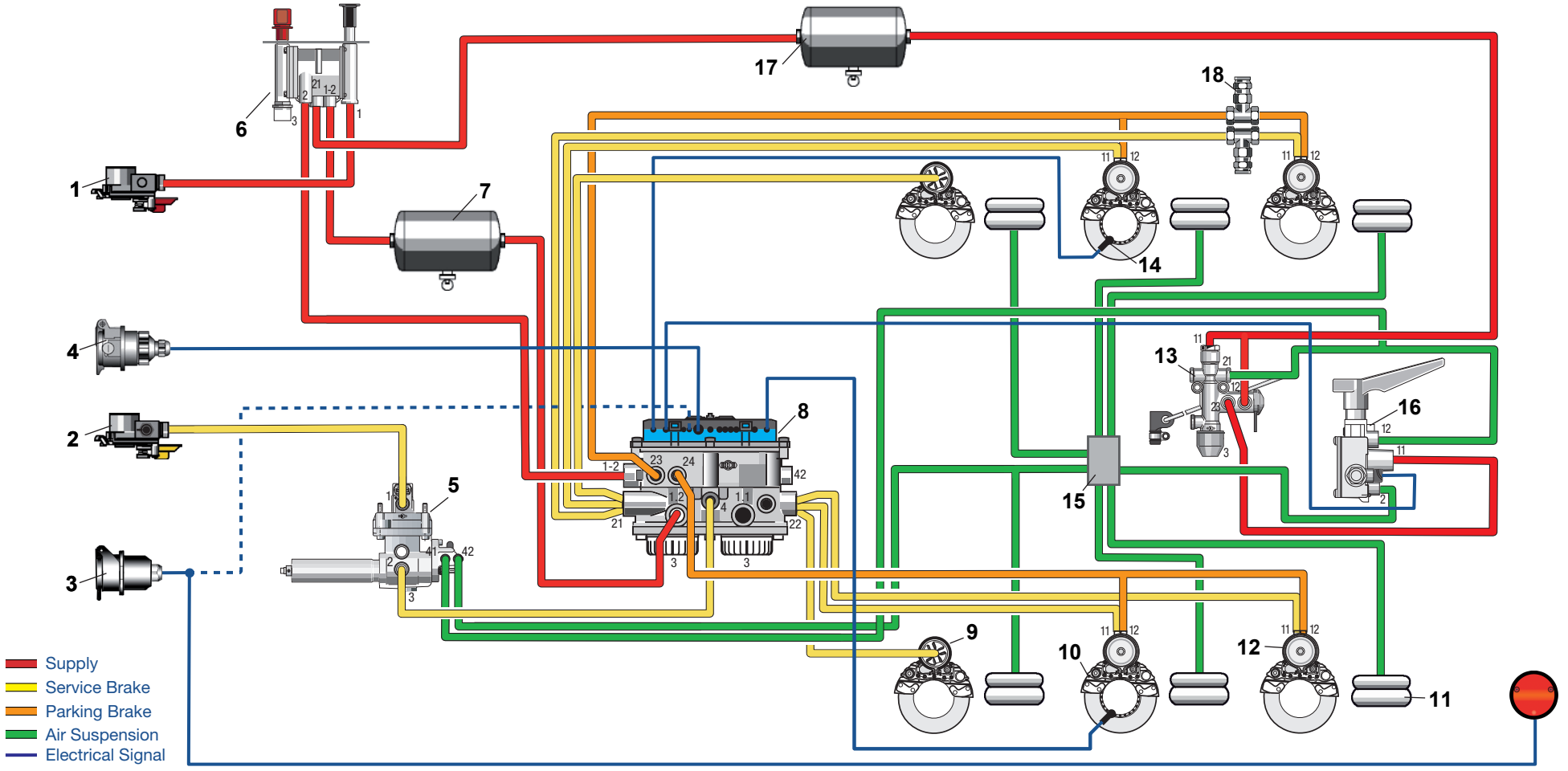
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Semi-trailer Air Brake and Suspension System with KB4TA ABS

(2S/2M brake system and air suspension system with raise/lower valve)

Y011336 (Rev. 002)
September 2011

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1 Coupling Head “Supply” with Filter
2 Coupling Head “Control” with Filter and Test Connector
3 ISO 1185 Connector (24N)
4 ISO 7638 Connector (ABS)
5 Load Sensing Valve
6 Park/Shunt Valve with integral Emergency Function and Charging Valve
7 Air Reservoir (Service and Parking)
8 KB4TA Brake Module
9 Brake Chamber
10 Air Disc Brake
11 Air Suspension Bellows
12 Spring Brake
13 Levelling Valve with Height Limitation
14 Sensing Ring and Wheel Speed Sensor
15 Manifold Block
16 Raise/Lower Valve with Speed Pulse reset to ride height
17 Air Reservoir (Air Suspension)
18 Test Connector

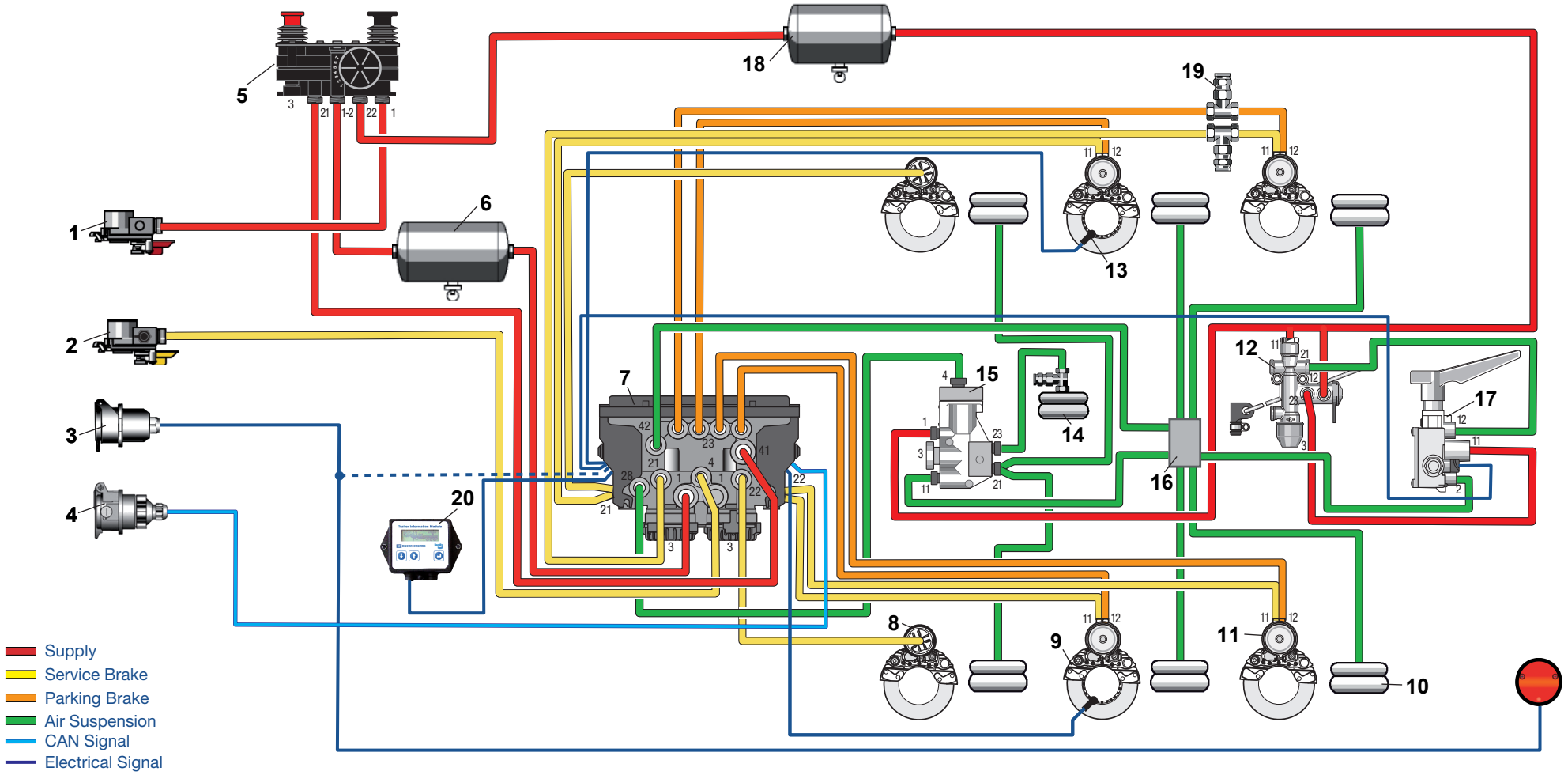
Item No. K002453

Semi-trailer Air Brake and Suspension System with TEBS G2.1

(2S/2M brake system and suspension system with air controlled lift axle)

Y011337 (Rev. 003)
October 2013

KNORR-BREMSE



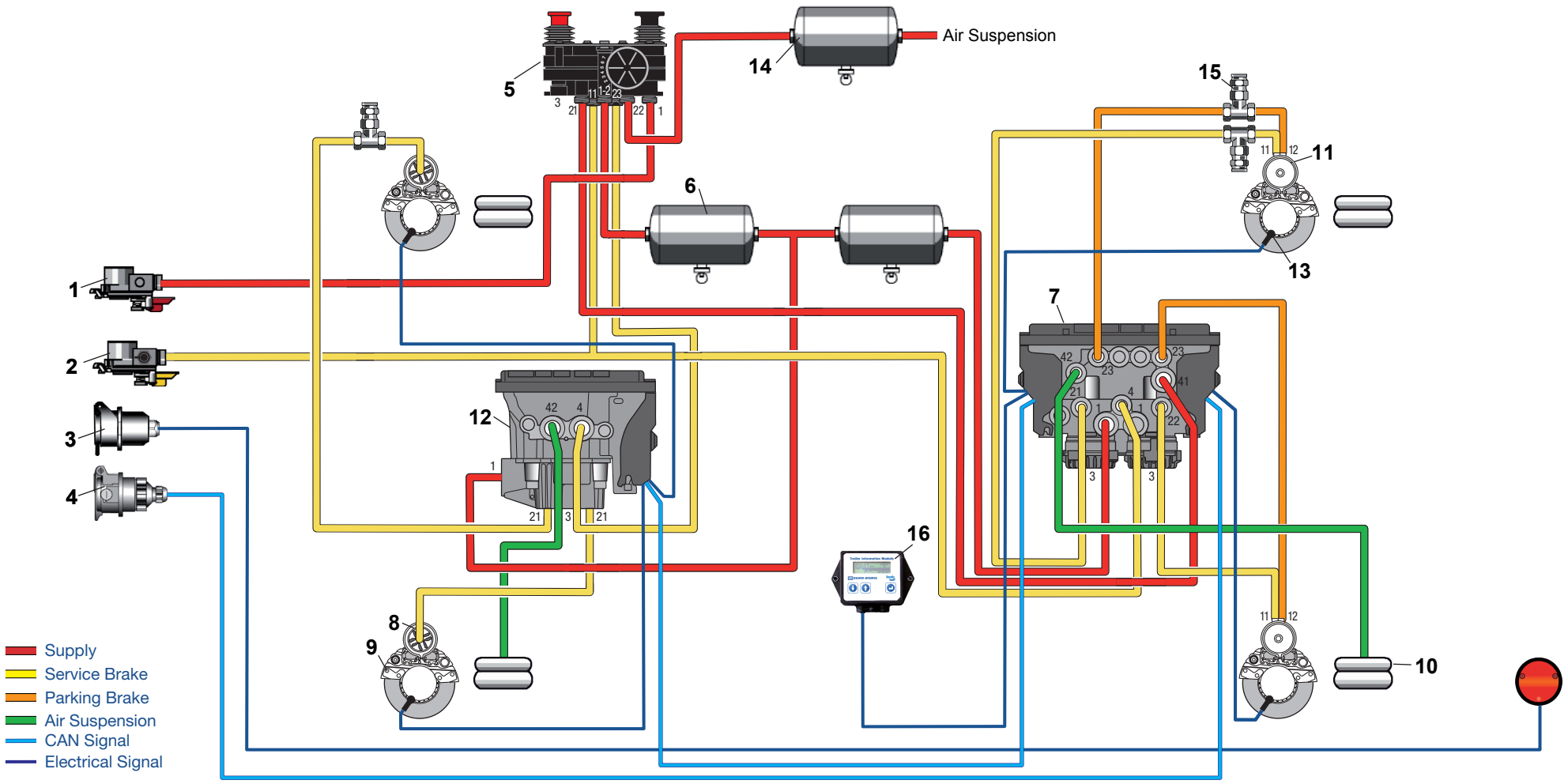
1 Coupling Head “Supply” with Filter	6 Air Reservoir (Service and Parking)	11 Spring Brake	16 Manifold Block
2 Coupling Head “Control” with Filter and Test Connector	7 TEBS G2 Brake Module	12 Levelling Valve with Height Limitation	17 Raise/Lower Valve with Speed Pulse reset to ride height
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4 ISO 7638 Connector (EBS)	9 Air Disc Brake	14 Lift Bellows	19 Test Connector
5 Park/Shunt Valve with integrated Charging Valve	10 Air Suspension Bellows	15 Lift Axle Control Valve	20 Trailer Information Module (TIM G2)

Item No. K002454

Drawbar Trailer Air Brake System with TEBS G2.1
(4S/3M brake system)

Y011337 (Rev. 003)
October 2013

KNORR-BREMSE



1 Coupling Head “Supply” with Filter
2 Coupling Head “Control” with Filter and Test Connector
3 ISO 1185 Connector (24N)
4 ISO 7638 Connector (EBS)
5 Park/Shunt Valve with integrated Charging Valve and Front Axle Release Valve
6 Air Reservoir (Service and Parking)
7 TEBS G2.1 Brake Module
8 Brake Chamber
9 Air Disc Brake
10 Air Suspension Bellows
11 Spring Brake
12 Trailer Electro-Pneumatic Module Premium (TEPM-P)
13 Sensing Ring and Wheel Speed Sensor
14 Air Reservoir (Air Suspension)
15 Test Connector
16 Trailer Information Module (TIM G2)

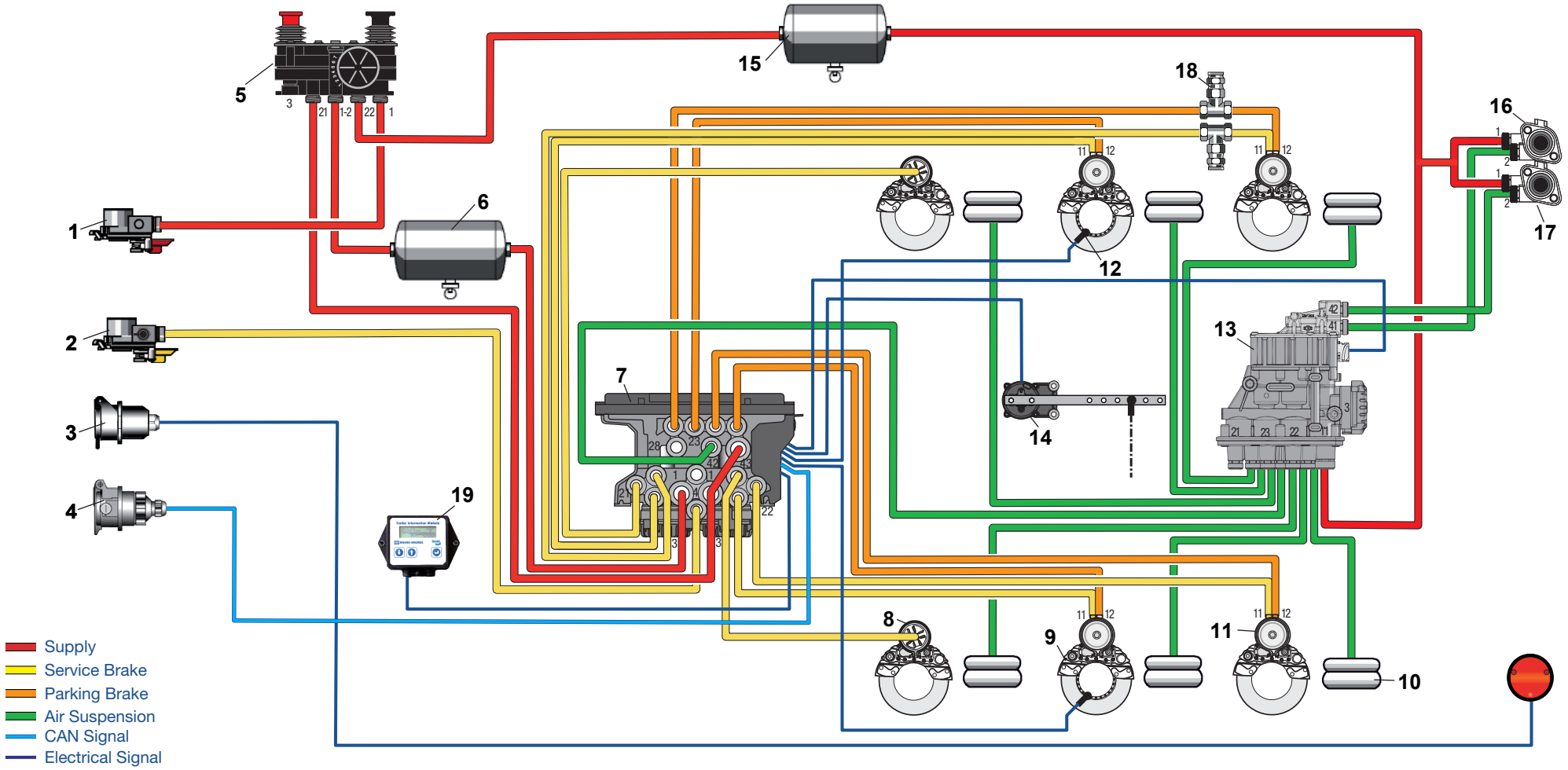
Item No. K002454

Semi-trailer Air Brake and Suspension System with TEBS G2.2 Standard Plus

(2S/2M brake system with iLvl controlled suspension system and pneumatic 'raise/lower')

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Y183282a (Rev. 000)
October 2014



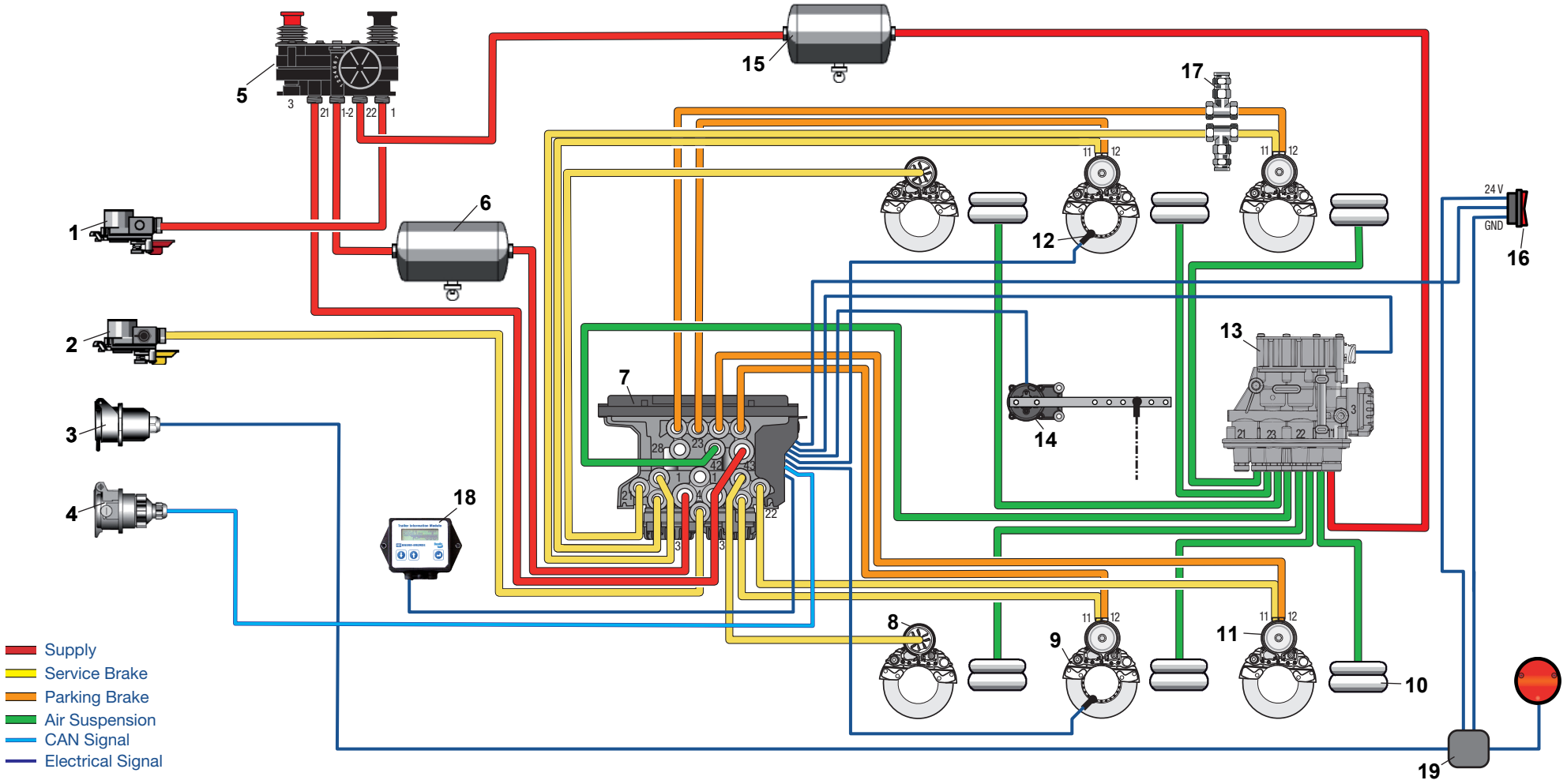
1 Coupling Head "Supply" with Filter
2 Coupling Head "Control" with Filter and Test Connector
3 ISO 12098 Connector
4 ISO 7638 Connector (EBS)
5 Park/Shunt Valve with integrated Charging Valve
6 Air Reservoir (Service and Parking)
7 TEBS G2.2 Brake Module
8 Brake Chamber
9 Air Disc Brake
10 Air Suspension Bellows
11 Spring Brake
12 Sensing Ring and Wheel Speed Sensor
13 iLvl Valve with Pneumatic Backup
14 iLvl Level Sensor
15 Air Reservoir (Air Suspension)
16 Pneumatic 'Raise' Button
17 Pneumatic 'Lower' Button
18 Test Connector
19 Trailer Information Module (TIM G2)

Semi-trailer Air Brake and Suspension System with TEBS G2.2 Standard Plus

(2S/2M brake system with iLvl controlled suspension system and electrical 'raise/lower')

KNORR-BREMSE

Y183282b (Rev. 000)
October 2014



1 Coupling Head "Supply" with Filter
2 Coupling Head "Control" with Filter and Test Connector
3 ISO 12098 Connector
4 ISO 7638 Connector (EBS)
5 Park/Shunt Valve with integrated Charging Valve
6 Air Reservoir (Service and Parking)
7 TEBS G2.2 Brake Module
8 Brake Chamber
9 Air Disc Brake
10 Air Suspension Bellows
11 Spring Brake
12 Sensing Ring and Wheel Speed Sensor
13 iLvl Valve without Pneumatic Backup
14 iLvl Level Sensor
15 Air Reservoir (Air Suspension)
16 'Raise' and 'Lower' Rocker Switch
17 Test Connector
18 Trailer Information Module (TIM G2)
19 Junction Box

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Doc. No. Y011334 (EN - Rev. 002)
July 2015

Air Supply

PD No.	Product	Type/Part No. family
PD-053-200	In-line Air Filter	**LA2103**
PD-074-000	Charging Valves	**DR4...**

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Product DATA

LA2103
In-line Air Filter

Doc. No. Y011340 (Rev. 001)
March 2011

PD-053-200

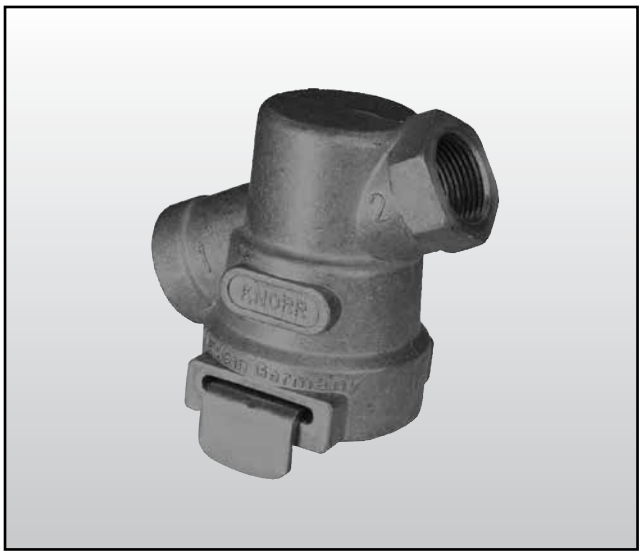
Function

Air filters are used in air braking systems to protect sensitive pneumatic devices from contamination.

The **LA2103 In-line Air Filter** is typically fitted in the 'supply' and 'control' lines on trailers to protect the trailer braking system from contamination that may be present in the air supply from the towing vehicle, particularly as a result of coupling and uncoupling of the lines.

To stop a blocked filter element trapping air pressure in the 'supply' or 'control' lines, the **LA2103 In-line Air Filter** has a by-pass feature which allows air to flow through unfiltered.

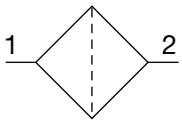
The condition of the filter element should be checked regularly and cleaned if necessary.



Note: An in-line air filter is already integrated in coupling heads KU14..

Standard Symbol as DIN ISO 1219

LA2103

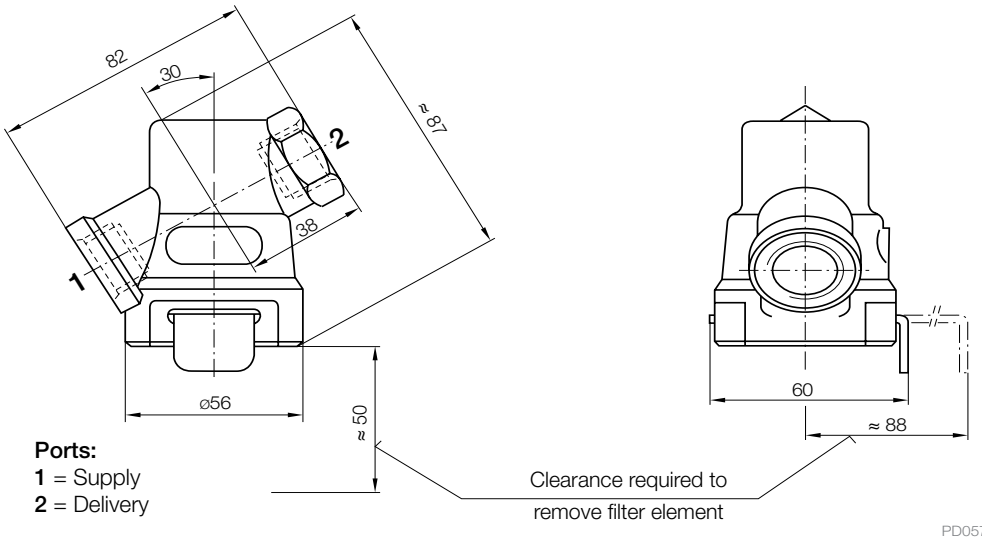


Technical Features

Maximum operating pressure:	20 bar
Operating temperature range:	-40 °C to +80 °C
Weight:	0.2 kg approx.

Part No.	Type No.	Port Threads
I99660	LA2103	M22x1.5 - 13

Dimensions



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Item No. K002457

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Doc. No. Y011340 (Rev. 001)
March 2011

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Item No. K002457

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Product DATA

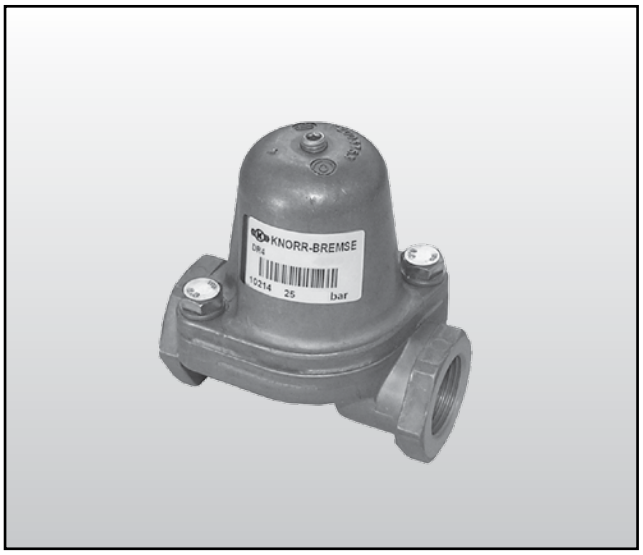
DR41.., DR42.., DR43..

Charging Valves

Doc. No. Y011382 (Rev. 003)
May 2015

PD-074-000

Function



A **Charging Valve** is used where a protected air supply pressure or pressure sensitive signal is required.

Charging Valves are typically used to provide charging priority to the brake system reservoirs (known as sequential charging), i.e. the **Charging Valve** prevents suspension and auxiliary system reservoirs being charged before the brake system reservoirs are adequately charged.

The valves stop air pressure being delivered until a set opening pressure is reached. Once the supply pressure falls below the closing pressure of the valve the pressure must build up again to the opening pressure before any further delivery to the system takes place.

Charging Valves fall into three main categories:

Charging Valves with full feedback (e.g. DR4150). Once the valve is open, air can flow unrestricted in both directions through the valve down to the closing pressure of the valve. If supply pressure drops further, delivered pressure will feed back through the by-pass check valve and this will continue until both supply and delivery pressures are equalised.

This type of valve can be used to control the load-dependent lowering of the lifting axle if the lift axle control valve AE1124 is used (see PD-503-100, Document No. *Y011380*).

Charging Valves with limited feedback (e.g. DR4256). Once the valve is open, air can flow unrestricted in both directions through the valve down to the closing pressure of the valve. However if the supply pressure drops below the closing pressure of the valve the downstream pressure will no longer feed back and the delivered pressure is isolated from the supply pressure.

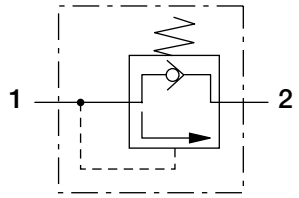
This type of valve is generally used in the supply to auxiliary air reservoirs on trucks and buses to ensure charging priority is initially given to the service brake reservoirs but where these air reservoirs are required to “back up” the service brake reservoirs down to the closing pressure of the valve.

Charging Valves without feedback (non-feedback) (e.g. DR43..). Once the valve is open, air can flow through the valve to increase the downstream pressure. However, if the supply pressure drops, a check valve prevents the return flow of air.

This type of valve can be used in the supply to the air suspension reservoirs to ensure charging priority is initially given to the service brake reservoirs and then, once the air suspension reservoirs are charged, the pressure in the reservoirs is unaffected by any change in the pressure of the service brake reservoirs.

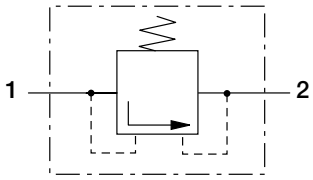
Standard Symbol as DIN ISO 1219

DR4150 - full feedback



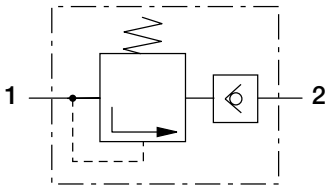
DR 4125

DR4256 - limited feedback



DR 4232

DR4370, DR4378 - non-feedback



DR 4341

Technical Features

Maximum operating pressure:	20 bar
Operating temperature range:	-40 °C to +80 °C
Weight:	0.2 kg approx.

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

DR41.., DR42.., DR43..

Charging Valves

Doc. No. Y011382 (Rev. 003)
May 2015

Range Overview

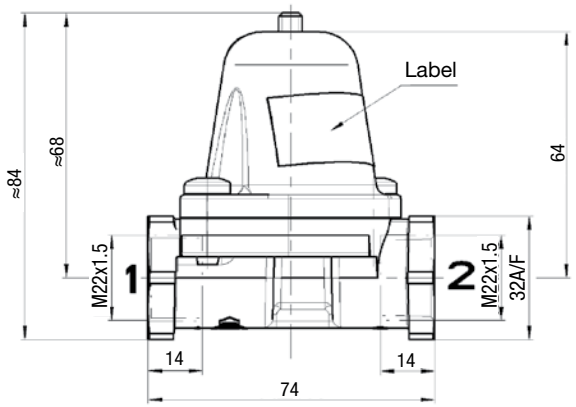
Part No.	Type No.	Opening Pressure [bar]	Closing Pressure [bar]	Feedback	Port Threads
K000613	DR4150	[1]	[2]	Full	M22x1.5-14
K000630	DR4256	6.0	5.0	Limited	
K000636	DR4370	[1]	[2]	None	
K000644	DR4378	6.0	5.2	None	

[1] Setting Range 1 to 12 bar. After setting, mark the opening pressure on label.
[2] Closing pressure is dependent on the setting of the opening pressure.

Some other pressure settings are available.

Dimensions

DR4150
DR4256
DR4370
DR4378



Revision Details

Rev. 002	March 2011	Revised format for new Trailer Catalogue.
Rev. 003	May 2015	Replaced valves deleted on page 2.

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Doc. No. Y011334 (EN - Rev. 002)
July 2015

Valves

PD No.	Product	Type/Part No. family
PD-102-000	Load Sensing Valve - manual (for Relay Emergency Valves)	**BR13..**
PD-103-000	Load Sensing Valve - mechanically controlled	**BR43..**
PD-104-000	Load Sensing Valves (Air Suspension)	**BR55..**
PD-106-000	Relay Valve	**AC574...**
PD-107-000	Relay Emergency Valves	**AS3..., AS7...**
PD-108-000	Pressure Limiting Valves	**DB11..**
PD-109-000	Coupling Heads	**KU13.., KU14.., KU41..**
PD-110-000	Pressure Proportioning Valves	**DB21..**
PD-110-200	Adapter Valves	**DB21..**
PD-110-300	Pressure Retaining Valves	**DB21..**
PD-111-400	Quick Release Valves	**RE2118, KX2..., 1186892**
PD-112-100	Single Check Valves	**AE51..**
PD-112-200	Double Check Valves	**AE4105, 295358**
PD-112-400	Throttle Check Valve	**SEB00778**
PD-112-800	Select Low Valve	**K060386**
PD-113-110	Manoeuvring Valve (Semi-trailer)	**AE4261**
PD-113-120	Manoeuvring Valves (Drawbar Trailers)	**AE4211, AE4257**
PD-113-210	Park/Shunt Valves	**AE424.**
PD-113-220	Park/Shunt Valves with Integrated Emergency Function	**AE431.**
PD-113-230	Park/Shunt Valve with Integrated Charging Valve	**AE437.**
PD-113-300	Trailer Park Valves	**AE4262, AE4264**
PD-120-321	3/2 Control Valves	**AE4265, AE4266**
PD-121-000	Solenoid Valves	**AE9120, EA1152**
PD-122-000	Shut-Off Valves	**AE21..**

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Product DATA

BR13..

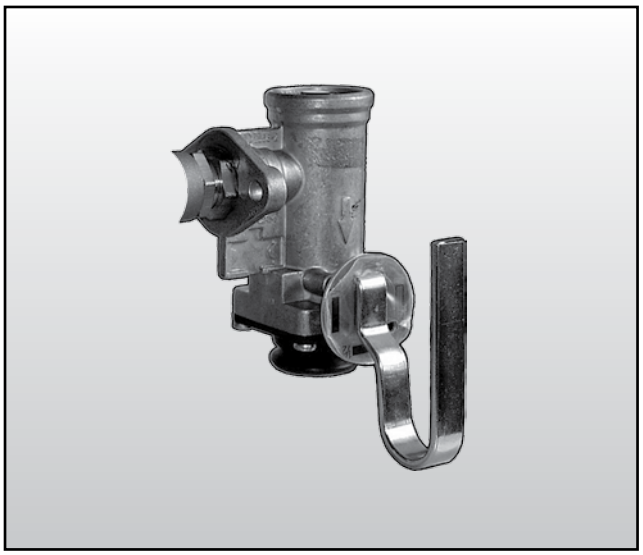
Load Sensing Valve - manual

Doc. No. Y011343 (Rev. 001)
March 2011

PD-102-000

Function

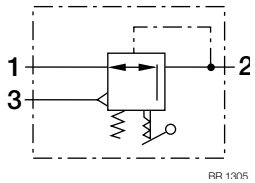
The **manually operated Load Sensing Valve**, in connection with a Relay Emergency Valve, is used to adjust the applied service brake pressure in relation to the load imposed on the trailer‘s axles



Technical Features

Maximum Operating Pressure:	8.5 bar
Operating Temperature Range:	-40 °C to +80 °C
Weight:	0.6 kg approx.

Standard Symbol as DIN ISO 1219



Range Overview

Part No.	Type No.	Brake Released position	Possible range of pressure adjustment at port 2 [bar] in lever position: Unladen	Half Laden	Fully Laden
I84575	**BR1305**	with	1.8 - 2.5	3.0 - 4.5	[1]
I84576	**BR1306**	without	1.8 - 2.5	3.0 - 4.5	[1]

[1] 1:1 Regulation up to tank pressure

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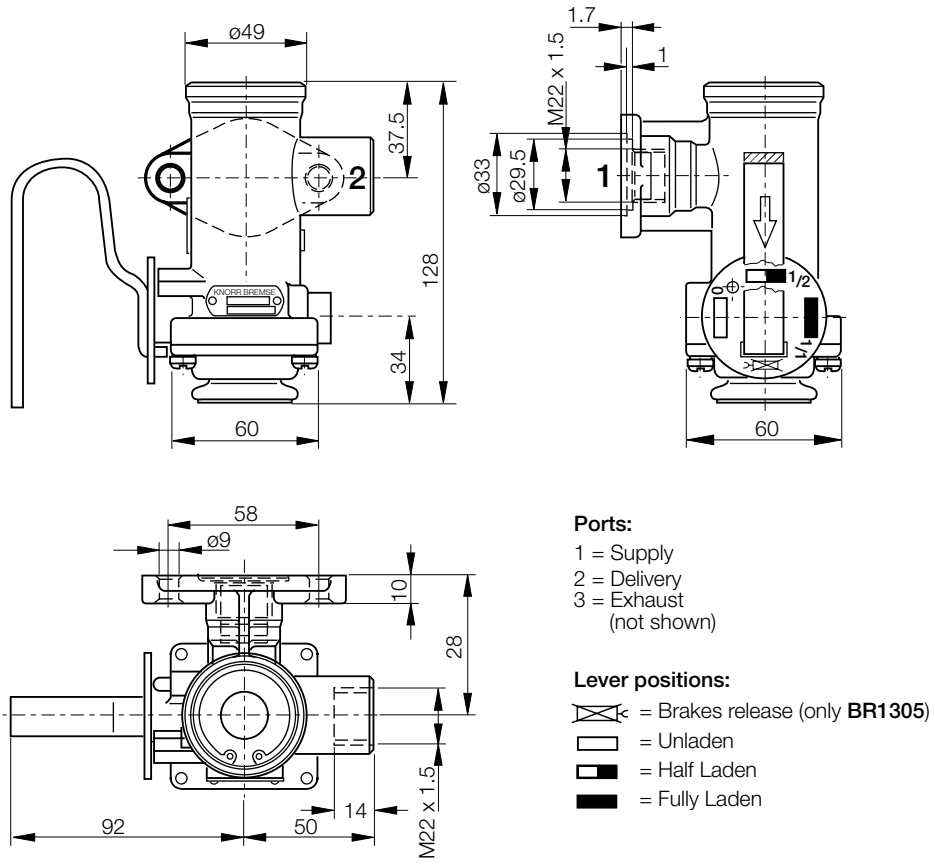
BR13..

Load Sensing Valves - manual

Doc. No. Y011343 (Rev. 001)
March 2011

Dimensions

BR1305
BR1306



Ports:

1 = Supply
2 = Delivery
3 = Exhaust
(not shown)

Lever positions:

= Brakes release (only **BR1305**)
= Unladen
= Half Laden
= Fully Laden

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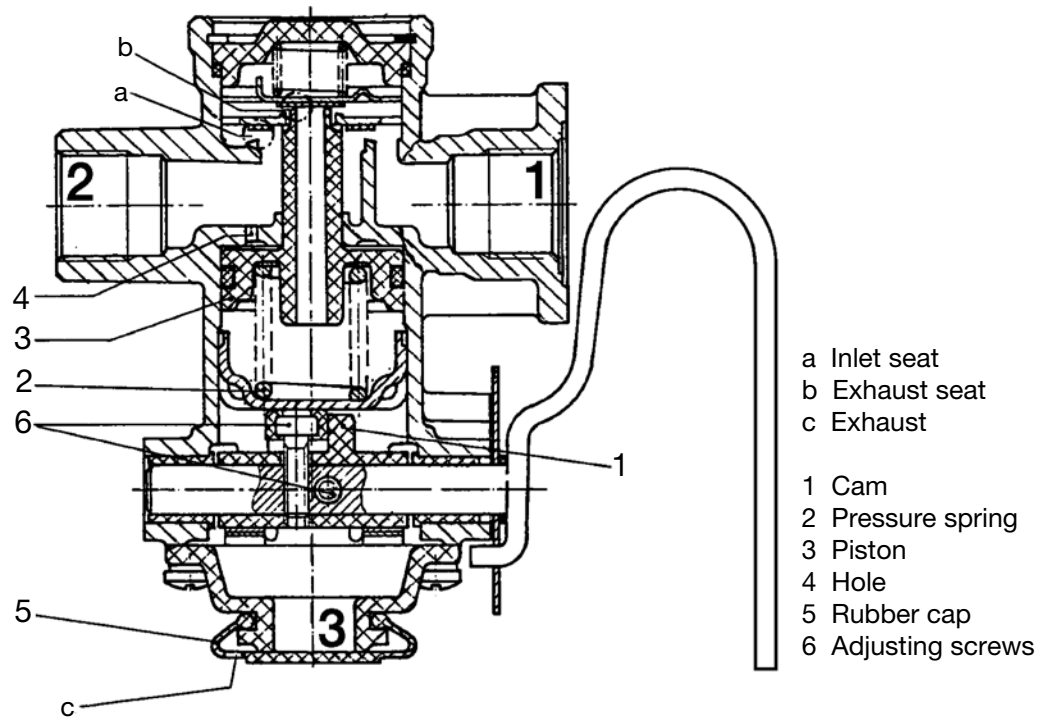
Doc. No. Y011343 (Rev. 001)
March 2011

Adjustment of the Unladen and Half Laden Pressures

After removing the rubber cap (5) from port **3** use a 4mm hexagon key to adjust the unladen and half laden pressure on each adjusting screw (6) independently. Change the position of the lever to gain access to the screws (6) relevant to each lever position.

Rotation of the screws (6):

Clockwise direction to reduce pressure.
Anti-clockwise direction to increase pressure.



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Item No. K002460

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

BR43..

Load Sensing Valve - mechanically controlled

Doc. No. Y011344 (EN - Rev. 005)
May 2015

PD-103-000

Function

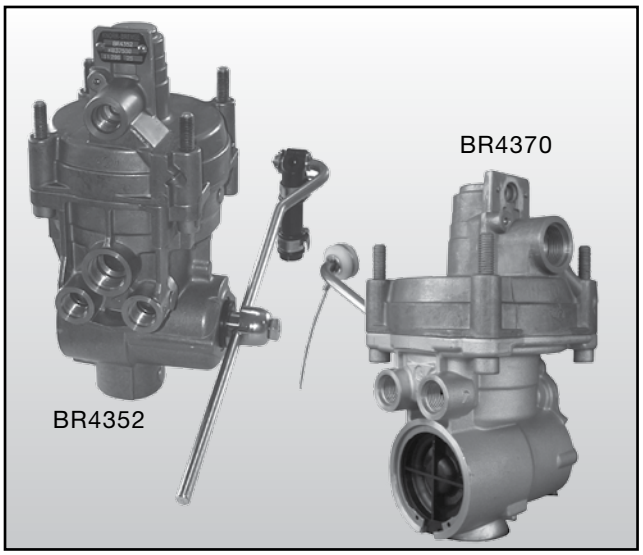
The **Load Sensing Valve** is used to adjust the applied service brake pressure in relation to the load imposed on the vehicle's axles. The mechanical suspension **Load Sensing Valve** uses the movement between the vehicle's chassis and axle to "sense" the load imposed on the axles.

The valve is installed on the chassis and a linkage is required to connect the control arm of the valve to the axles. Any movement of the chassis changes the position of the valve's control arm which, in turn, alters the ratio of input pressure to output pressure.

Versions of the **Load Sensing Valve** are available with standard relay or relay emergency feature and with static or dynamic operation. The relay emergency feature provides automatic braking on a trailer in the event of a breakaway. A static valve uses the braking ratio at commencement of braking throughout the brake application. A dynamic valve adjusts the braking ratio throughout the brake application to counteract the effect of axle load change due to load transfer.

To adjust the rate of change of control ratio due to change in axle load, the effective length of the lever can be adjusted.

A vehicle data plate showing the setting of the **Load Sensing Valve** is required by law.



Technical Features

Maximum Operating Pressure:	8.5 bar
Operating Temperature Range:	-40 °C to +80 °C
Working Angle:	20°
Weight:	2.3 kg approx.

Range Overview

Part No.	Type No.	Operation Type	Relay Emergency Valve	Relay Function	Remark
K037590 [1]	BR4352	dynamic	with	with	with rigid link
SEB00933	BR4370	static	without	without	with cable link

Part No.	Type No.	Port Threads				
		1	1-2	2	3	4
K037590 [1]	BR4352	M16x1.5	M22x1.5	M16x1.5 (4x) M22x1.5 (2x)	-	M16x1.5
SEB00933	BR4370	M22x1.5	-	M16x1.5 (2x)	-	-

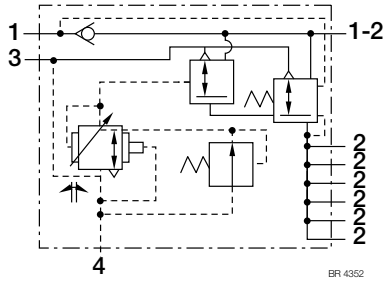
Other versions are available.

Maximum adjustable lever length: 300 mm.

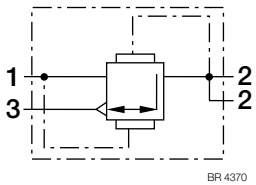
[1] The part number will carry a suffix "N00" which defines that it is supplied without packaging.

Standard Symbol as DIN ISO 1219

BR4352



BR4370



Service Parts:

Lever with Rubber Links for BR4352: **SEB01068**

Lever with Cable Link for BR4370: **SEB01263**

Accessories:

Tandem Axle Linkage **K051015** [1]

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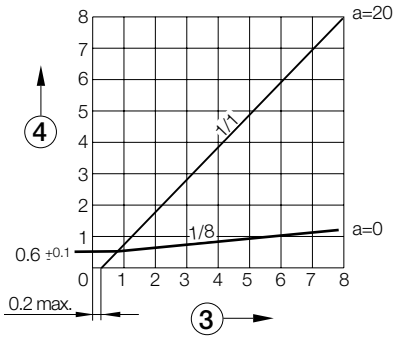
BR43..

Load Sensing Valve - mechanically controlled

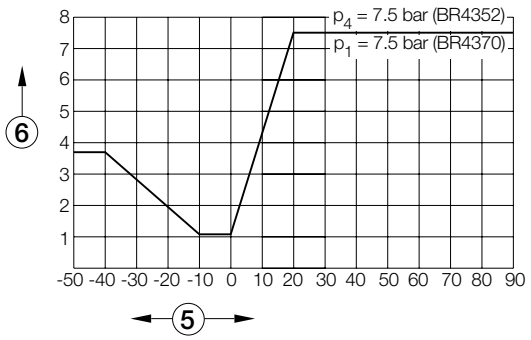
Doc. No. Y011344 (EN - Rev. 005)
May 2015

Functional Diagrams

Control ratio

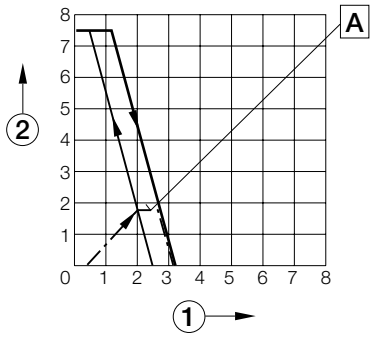


Delivery Pressure vs Angle



Automatic braking

(only **BR4352**)



(1) = Pressure in the Supply Line [bar]
(2) = Pressure in the Brake Actuators [bar]
(3) = Signal pressure p_4 (BR4352), p_1 (BR4370) [bar]
(4) = Delivery pressure p_2 [bar]
(5) = Lever deflection α [°]
(6) = Delivery pressure p_2 [bar]
[A] = Initial charging

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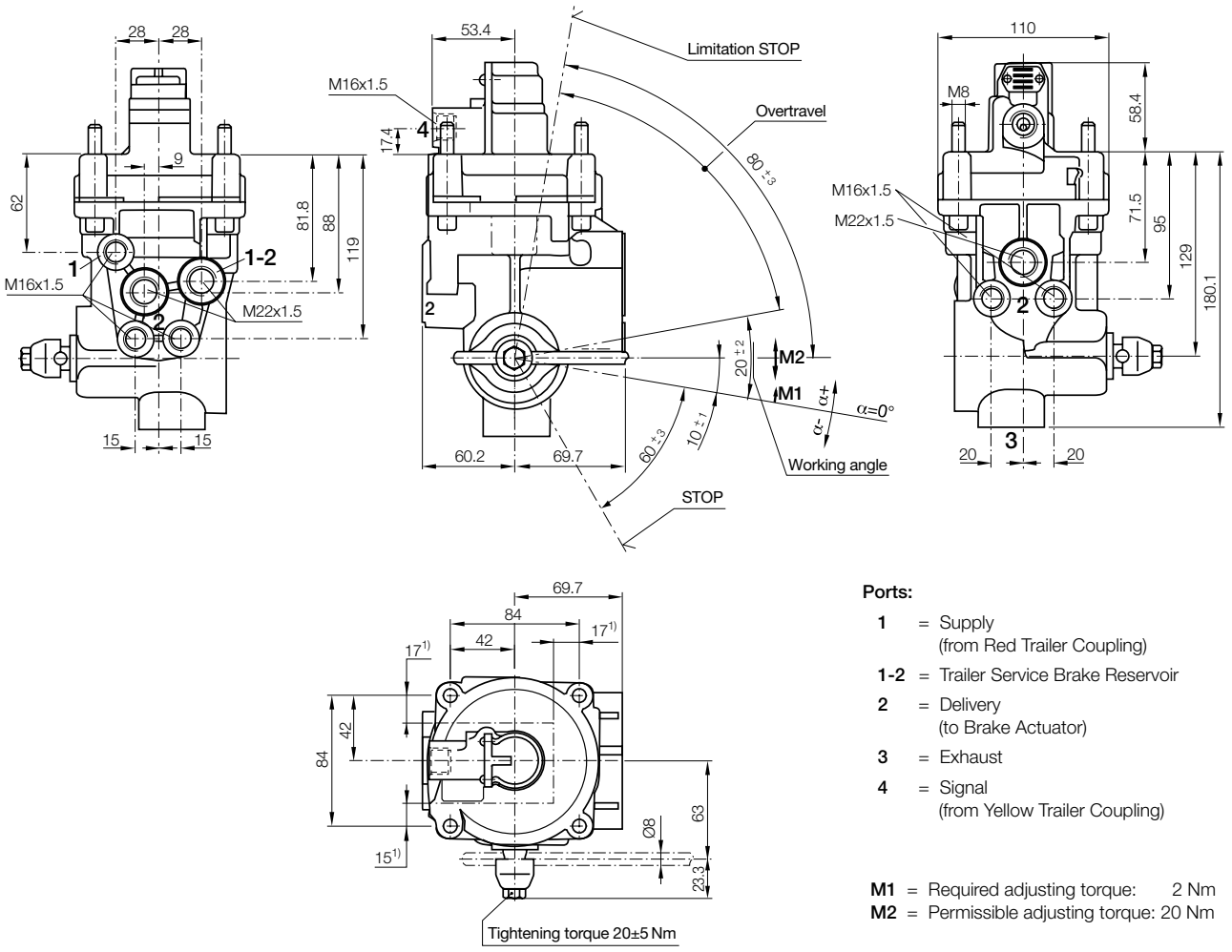
BR43..

Doc. No. Y011344 (EN - Rev. 005)
May 2015

Load Sensing Valve - mechanically controlled

Dimensions

BR4352 - K037590



Ports:

- **1** = Supply (from Red Trailer Coupling)
- **1-2** = Trailer Service Brake Reservoir
- **2** = Delivery (to Brake Actuator)
- **3** = Exhaust
- **4** = Signal (from Yellow Trailer Coupling)

M1 = Required adjusting torque: 2 Nm
M2 = Permissible adjusting torque: 20 Nm

1) maximum Mounting Plate Dimension

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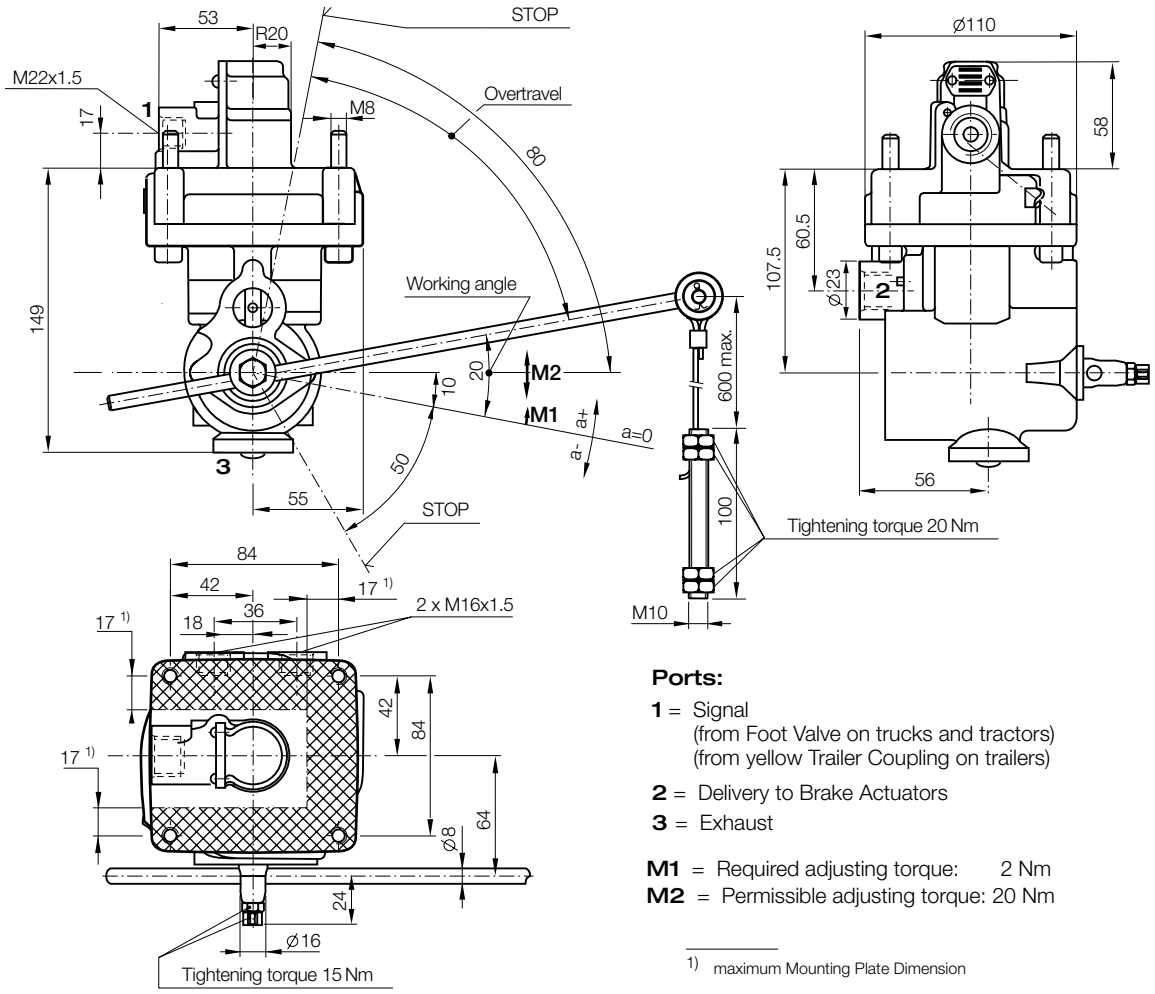
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

BR43..

Load Sensing Valve - mechanically controlled

Doc. No. Y011344 (EN - Rev. 005)
May 2015

BR4370 - SEB00933



Ports:

1 = Signal
(from Foot Valve on trucks and tractors)
(from yellow Trailer Coupling on trailers)

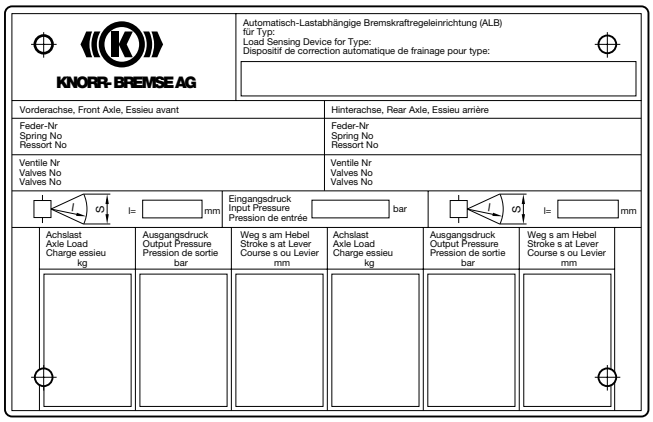
2 = Delivery to Brake Actuators

3 = Exhaust

M1 = Required adjusting torque: 2 Nm
M2 = Permissible adjusting torque: 20 Nm

1) maximum Mounting Plate Dimension

Load Sensing Valve Data Plate



DIN 74267-C for mechanically controlled suspension, **BR43..**:

Part No.: **EB01629**

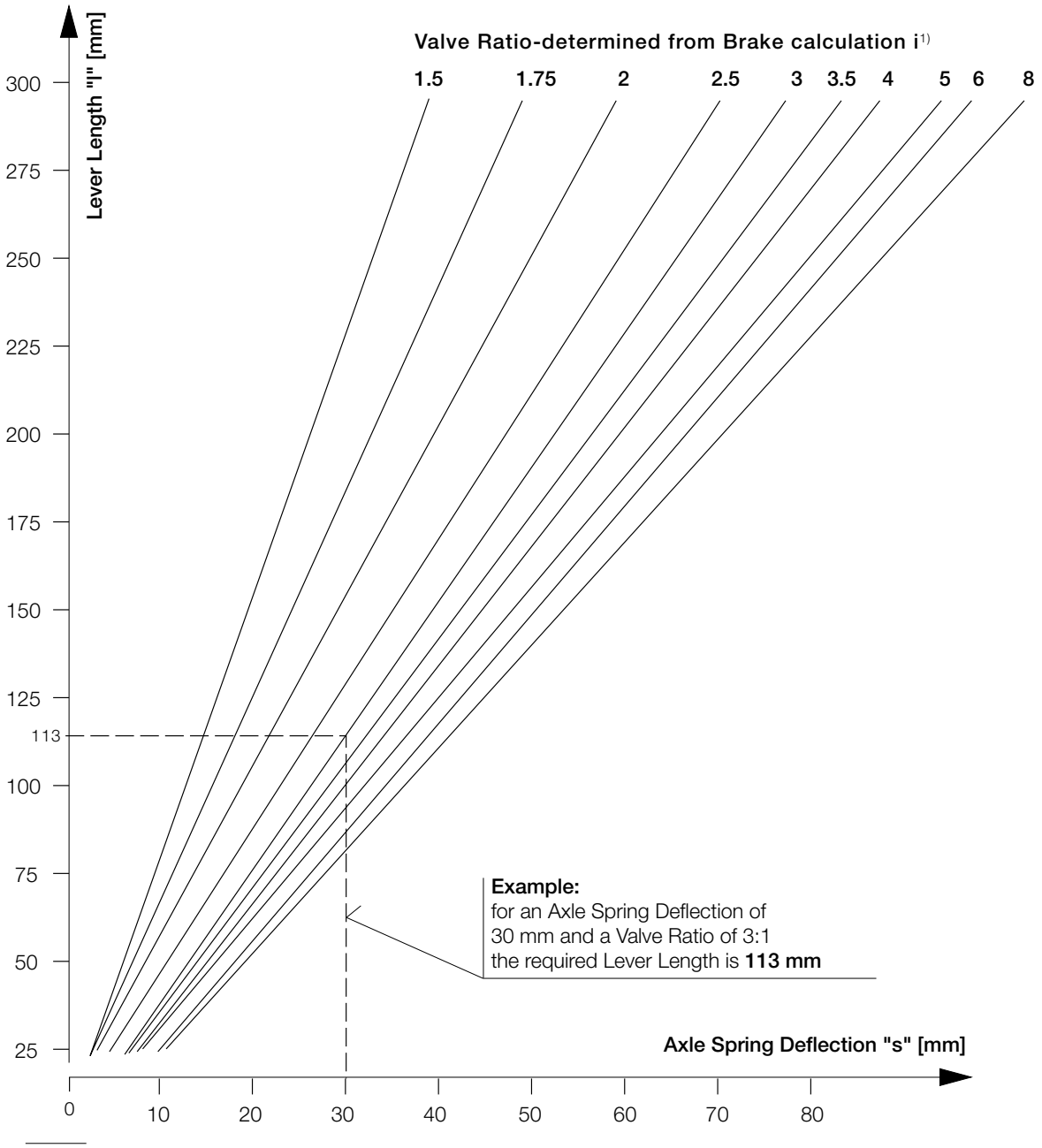
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May 2015

Determining the Lever Length "l" - graphical method

Lever Length Diagram for mechanical Control Load Sensing Valves:
BR4352, BR4370



1) $i = \frac{p_1 - 0.4}{p_{2\ unladen} - 0.4}$

Important Note:

The graphical method should only be used when the ratio for the laden trailer is 1:1.

If the ratio for the laden trailer is not 1:1, use the arithmetic method or contact your Knorr-Bremse representative for guidance.

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Load Sensing Valve - mechanically controlled

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Determining the Lever Length "l" - arithmetic method

Axle Spring Deflection: s [mm] =	
Foot Valve delivery pressure on trucks and tractors Control (Yellow) Line pressure on trailers - input: p_1 [bar] =	
Load dependent brake actuator pressure - unladen: $p_{2\ unladen}$ [bar] =	
Load dependent brake actuator pressure - laden: $p_{2\ laden}$ [bar] =	

Valve Ratio (unladen): $i_L = \frac{p_{2\ unladen} - 0.4}{p_1 - 0.4} =$	
Valve Ratio (laden): $i_v = \frac{p_{2\ laden} - 0.4}{p_1 - 0.4} =$	

Secondary variable A [angle degree]: $A = 22.8 \times i_L - 12.8 =$	
Secondary variable B [angle degree]: $B = 22.8 \times i_v - 12.8 =$	
Secondary variable C: $C = \sin(A) - \sin(B) =$	

Lever Length " l " [mm]: $l = \frac{\text{Axle Spring Deflection s}}{\text{Secondary variable C}} =$	

A computer calculation program is available on request.

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How to adjust a mechanically controlled Load Sensing Valve BR43..

- Determine the lever length with the help of the brake calculation, the nomogram and the formula.
- Fit the Cable attachment on the lever at this length.
- Write the following data on the Load Sensing Valve Data Plate: input pressure; output pressure of the Load Sensing Valve, unladen and laden, axle load, unladen and laden; lever length and spring deflection.
- With the lever of the Load Sensing Valve horizontal, the connecting link should be at right angles to it. The length of the link can be adjusted using the clamp screw.
- Ensure that the vehicle is on level ground and chock the wheels.
- Axle weight must be according to the data of the axle manufacturer for an unladen vehicle.
- Check that sufficient service pressure is available.
- Connect pressure gauges to the control input of the Load Sensing Valve and to the output (Brake Actuators).
- Apply input pressure as stated on the Data Plate.
- Read the output pressure on the gauge and correct if necessary (shorten the link to give lower unladen brake pressure and vice versa).
- See Attention note below.
- Disconnect the cable and with reference to a suitable measuring device, raise the lever a distance „s“, i.e. the distance of spring deflection as taken from the data plate.
- Apply input pressure as stated on the Data Plate.
- Read the output pressure and check that it is the same as the Laden pressure as defined on the data plate. If it is not then correct by adjusting the lever length (shorten to increase output pressure and vice versa). Check and adjust until both unladen (with cable fitted) and laden settings are correct.
  See Attention note below.

After finishing the test ensure that the lever and cable clamps are tightened securely.

Attention:

To adjust valve BR4370 with static characteristic the supply pressure must be released to make any adjustment and then the output pressure re-checked.

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BR43..

Load Sensing Valve - mechanically controlled

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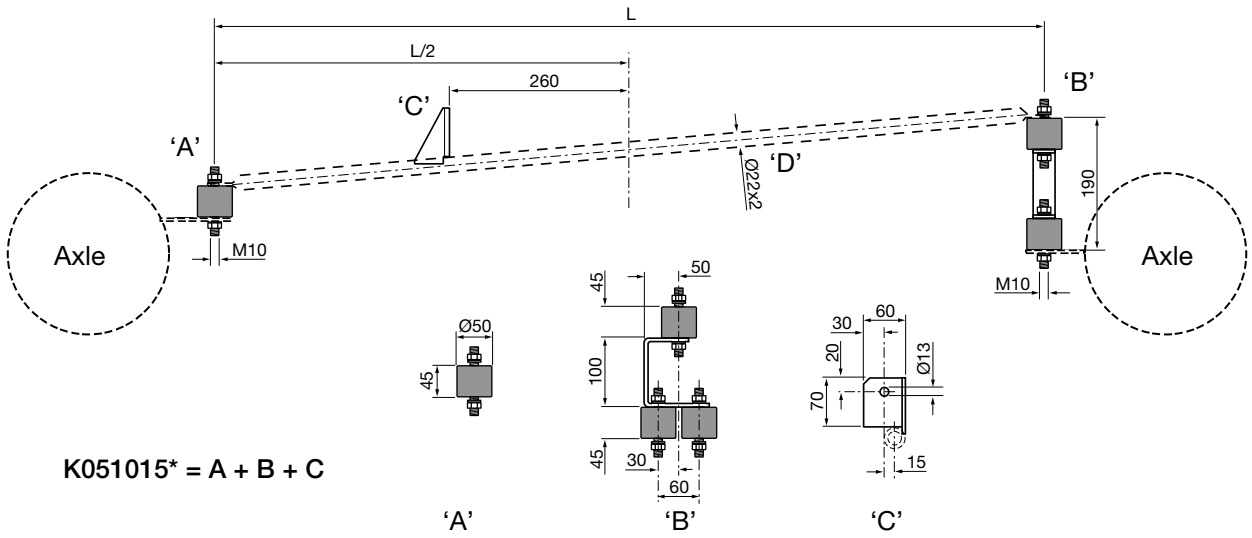
Rubber mounting for suspension equalisation

Function

Rubber mounts are used in mechanically suspended tandem bogies to get an elastic connection between the axles. The arrangement as shown below, 'averages' the movements of both axles.

Installation recommendation

Use the tandem axle mounting kit K051015 (see drawing) to connect the linkage of the Load Sensing Valve to the axles. Attach mounting brackets to the axles for the rubber mountings ("**A**" and "**B**"). The rubber mountings are connected to each other using a tube or angle section link "**D**". Part "**C**" provides an attachment point on link "**D**" for the Load Sensing Valve linkage.



K051015* = A + B + C

Note: Item **"D"** is not supplied by Knorr-Bremse and must be manufactured by the installer to the necessary dimensions.

[1] The part number will carry a suffix "N00" which defines that it is supplied without packaging.

For further information contact your Knorr-Bremse distributor.

Servicing

The **Load Sensing Valves BR4352** and **BR4370** are not serviceable.

Revision Details

Rev. 003	October 2013	Correction - details of Port 1-2 added to diagrams, Part Nos. for data plate and tandem axle linkage kit updated.
Rev. 004	March 2014	Important Note added to page 5.
Rev. 005	May 2015	Replaced valves removed. Text amended to cover use in more catalogues.

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Product DATA

BR55..

Load Sensing Valves (Air Suspension)

Doc. No. Y011345 (EN - Rev. 005)
May 2015

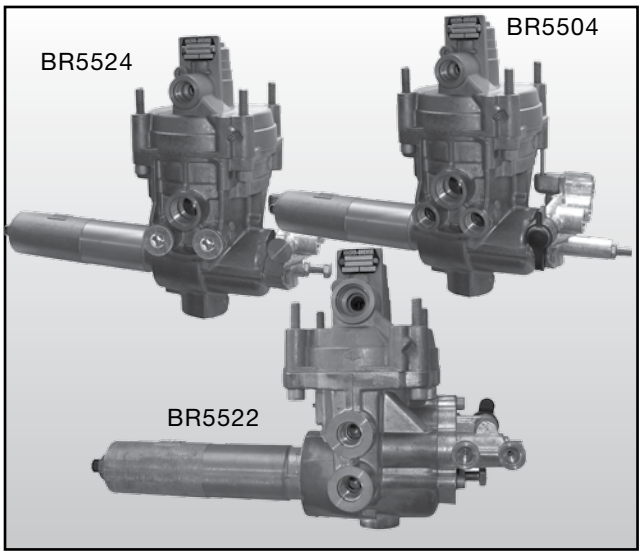
PD-104-000

Function

The **Load Sensing Valve** is used to modify the applied service brake pressure in relation to the load imposed on the vehicle's axles. The air suspension **Load Sensing Valve** uses the pressure in the air suspension bags to 'sense' the load imposed on the axles and determine the valve's braking ratio.

Versions of the valve are available with and without relay and relay emergency features, also with static or dynamic operation. The relay emergency feature provides automatic braking on a trailer in the event of a breakaway. A static valve uses the braking ratio at commencement of braking application. A dynamic valve adjusts the braking ratio throughout the brake application to help counteract the effect of load transfer.

A data plate, showing the settings of the vehicle's **Load Sensing Valve**, is required by law (See page 3).



Technical Features

Maximum Operating Pressure:	8.5 bar
Operating Temperature Range:	-40 °C to +80 °C
Weight:	see table

Range Overview

Part No.	Type No.	Operation	Relay Emergency Valve	Relay feature	Weight approx. [kg]
K037584 [1)]	BR5504	static or dynamic	with	with	3.1
II36836	BR5522	static	without	without	2.1
K037587 [1)]	BR5524	dynamic	with	with	3.0

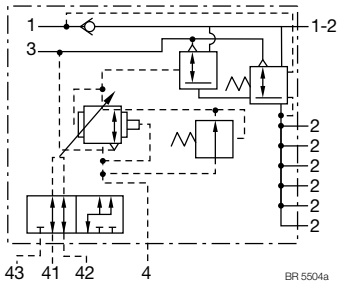
Part No.	Type No.	Test Point connection "43"	Air Suspension connection	basic setting	
				unladen	laden
K037584 [1)]	BR5504	with	p_{41} / p_{42}	p_1/p_{1-2}=8 bar; p_4=6.5 bar	
				p_{41}/p_{42}=0.8 bar p_2=2 bar	p_{41}/p_{42}=5.1 bar p_2=6.5 bar
II36836	BR5522	with	p_{41} / p_{42}	p_1=6.5 bar	
				p_{41}/p_{42}=0.6 bar p_2=2.6 bar	p_{41}/p_{42}=4.6 bar p_2=6.5 bar
K037587 [1)]	BR5524	without	p_{42}	p_1/p_{1-2}=8 bar; p_4=6.5 bar	
				p_{42}=0.5 bar p_2=2 bar	p_{42}=4.4 bar p_2=5.2 bar

Other versions are available.

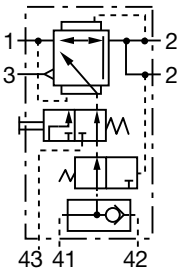
[1)] The part number will carry a suffix "N00" which defines that it is supplied without packaging. Example K037584N00.

Standard Symbol as DIN ISO 1219

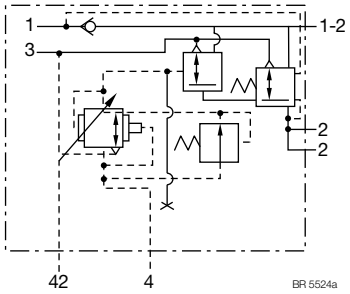
BR5504



BR5522



BR5524



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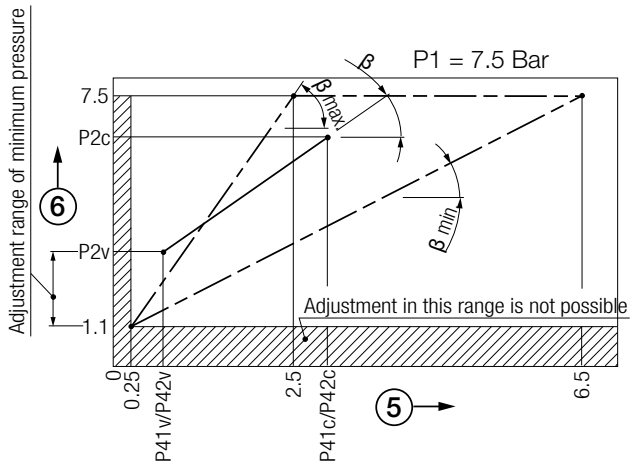
Load Sensing Valves (Air Suspension)

Doc. No. Y011345 (EN - Rev. 005)
May 2015

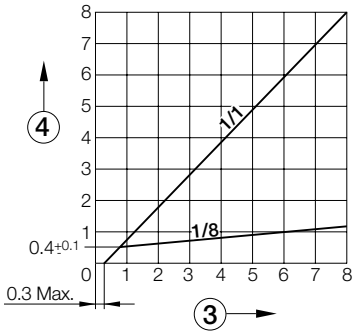
Part No.	Type No.	Air Port Threads				
		1	1-2	2	4	41/42 or 42
K037584	BR5504	M16x1.5	M22x1.5	M16x1.5 (4x) M22x1.5 (2x)	M16x1.5	M12x1.5
II36836	BR5522	M22x1.5	–	M16x1.5 (2x)	–	M12x1.5
K037587	BR5524	M16x1.5	M22x1.5	M22x1.5 (2x)	M16x1.5	M12x1.5

Performance charts

Typical Setting



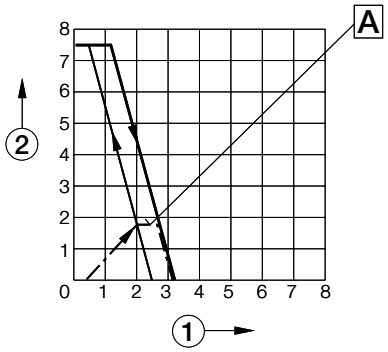
Control Ratio



Legend:

(1) = Pressure in the Supply Line [bar]
(2) = Pressure in the Brake Actuators [bar]
(3) = Signal Pressure p [bar]
(4) = Delivery Pressure p_2 [bar]
(5) = Control Pressure p_{41} p_{42} [bar]
(6) = Delivery Pressure p_2 [bar]
[A] = Initial Charging

Emergency Braking



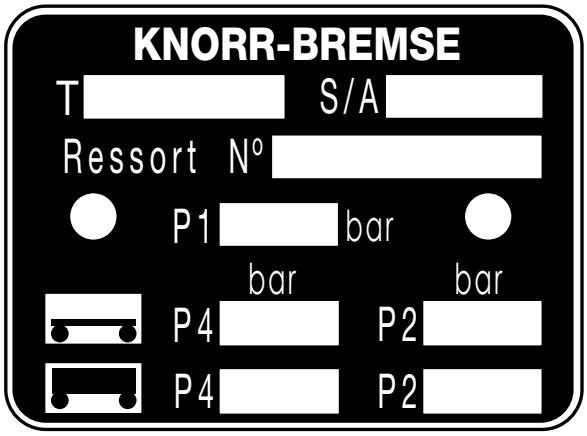
only for **BR5504** and **BR5524**

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Doc. No. Y011345 (EN - Rev. 005)
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Load Sensing Valve Data Plate for pneumatic Load Sensing Valve **BR55..**
Part No.: EB00669



Supplied with:

II36836 - BR5522
K037587 - BR5524

The fitting of the data plate is essential to ensure that the optimum performance from the **Load Sensing Valve** can be maintained once the vehicle is in service.

The plate should be stamped with the following data:

T	=	Part No. of the Load Sensing Valve fitted to the vehicle
S/A	=	Date of fitting (Week/Year).
P1	=	The inlet pressure at the Load Sensing Valve (used for setting unladen & laden valve ratios)
P2	=	The outlet pressures required when the Load Sensing Valve is set correctly (unladen & laden)
P4	=	The air suspension bag pressures for the unladen & laden weights.

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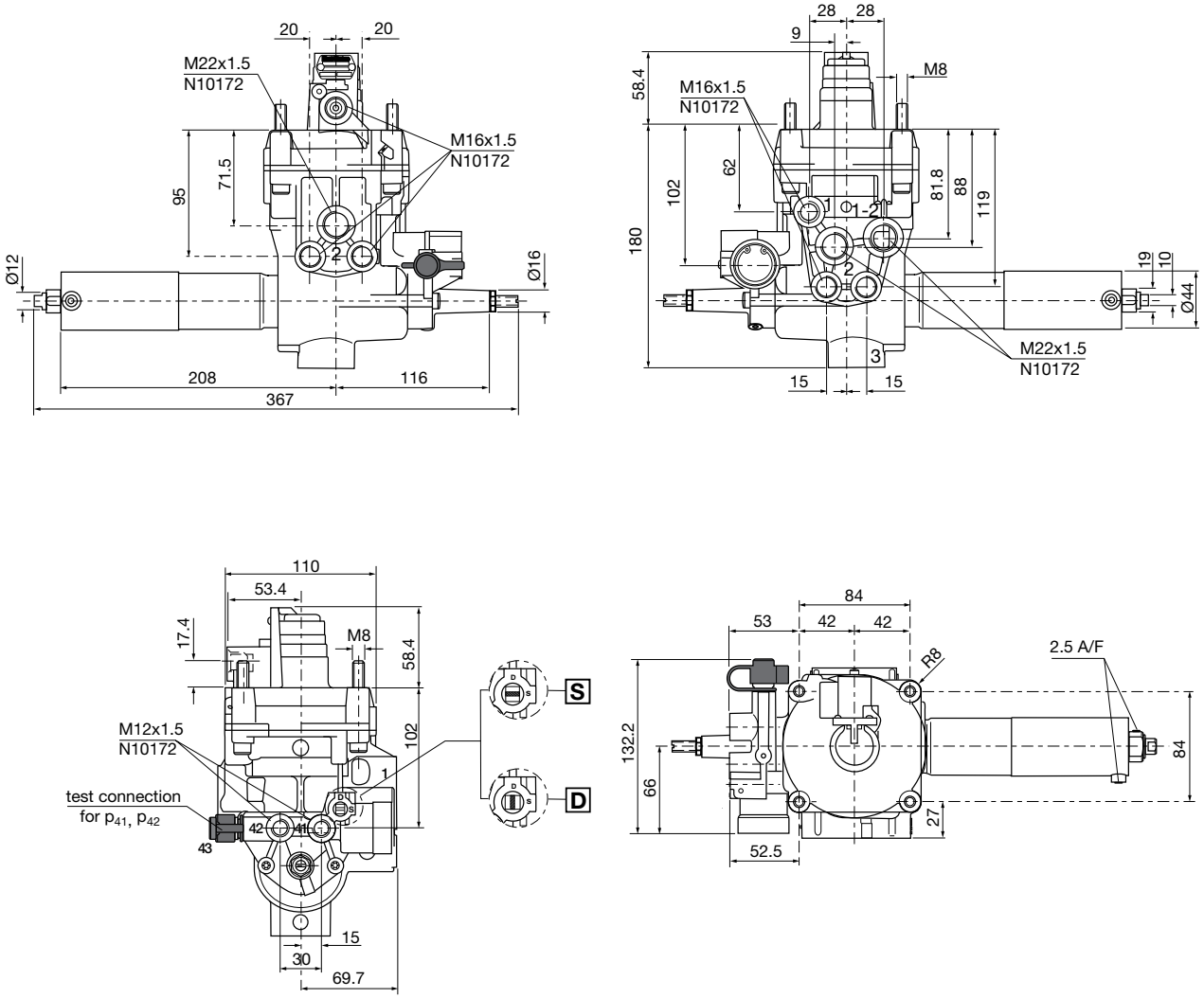
BR55..

Load Sensing Valves (Air Suspension)

Doc. No. Y011345 (EN - Rev. 005)
May 2015

Dimensions

BR5504 - K037584



Ports:

1	=	Supply (from red trailer coupling)
1-2	=	Trailer reservoir
2	=	Delivery to brake actuators
3	=	Exhaust
4	=	Signal (from yellow trailer coupling)
41	=	Signal (from air suspension)
42	=	Signal (from air suspension)
43	=	Test connection

S = "Static" setting

D = "Dynamic" setting

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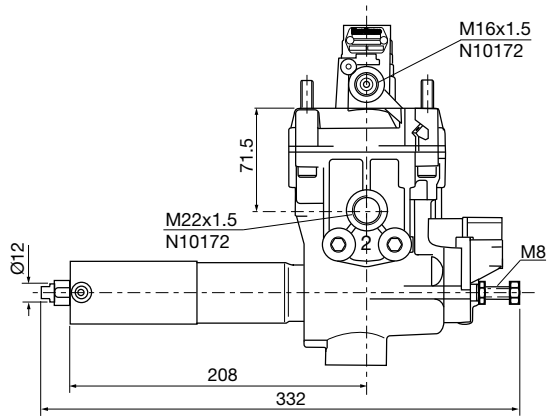
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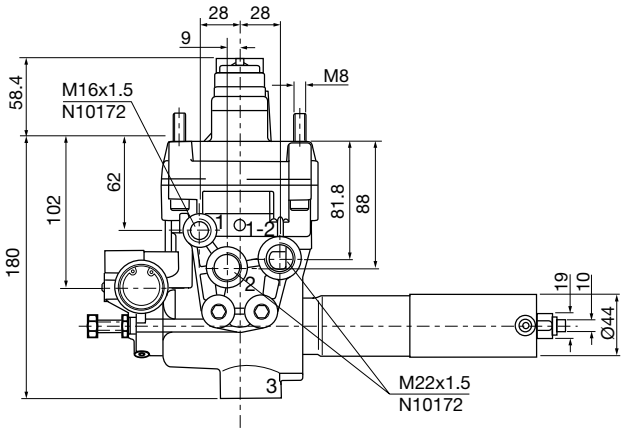
BR55..

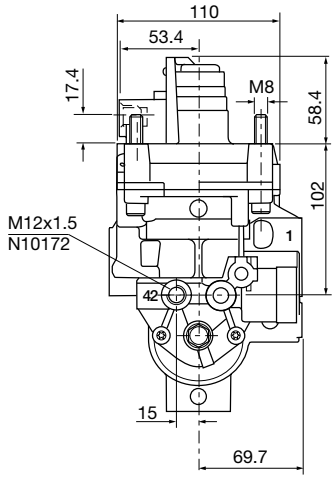
Doc. No. Y011345 (EN - Rev. 005)
May 2015

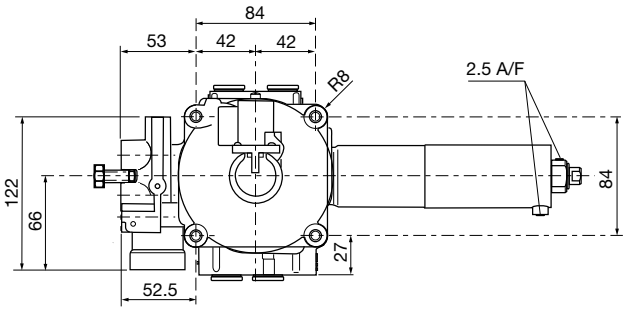
Load Sensing Valves (Air Suspension)

BR5524 - K037587









Ports:

1	=	Supply (from red trailer coupling)
1-2	=	Trailer reservoir
2	=	Delivery to brake actuators
3	=	Exhaust
4	=	Signal (from yellow trailer coupling)
42	=	Signal (from air suspension)

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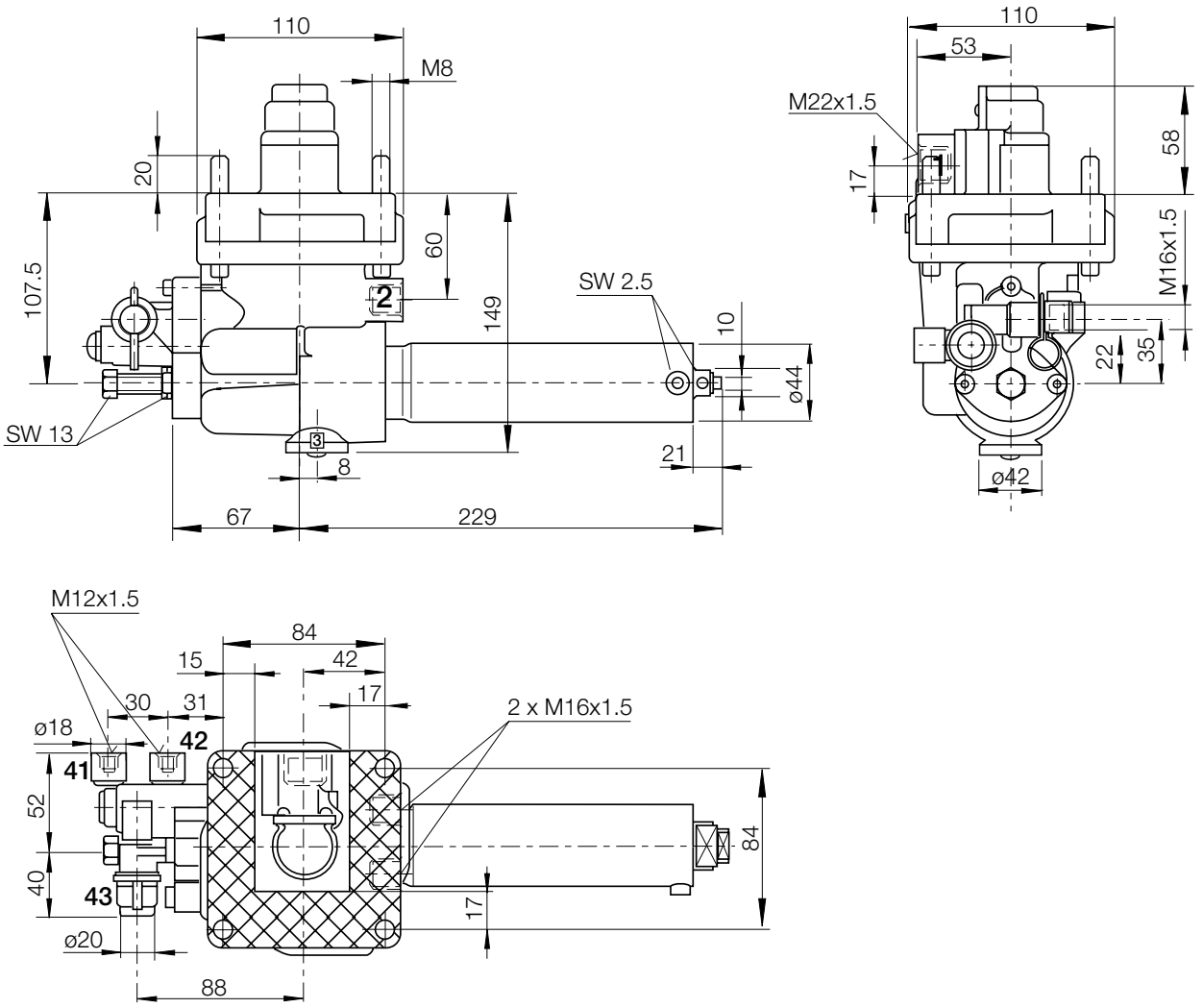
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BR55..

Load Sensing Valves (Air Suspension)

Doc. No. Y011345 (EN - Rev. 005)
May 2015

BR5522 - II36836



Ports:

- **1** = Signal (from Foot Valve on trucks and tractors)
  (from Relay Emergency Valve on trailers)
- **2** = Delivery to brake actuators
- **3** = Exhaust
- **41** = Signal (from air suspension)
- **42** = Signal (from air suspension)
- **43** = Test Fitting

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Checking and adjustment

Part No.	Type No.	Operation	Relay Emergency Valve	Relay feature	Air Port Threads		
					41	42	43
K037584	**BR5504**	Static/Dynamic	with	with	X	X	X
II36836	**BR5522**	Static	without	without	X	X	X
K037587	**BR5524**	Dynamic	with	with	–	X	–

Explanation of the port characteristic

Port **1**	• Supply pressure in valves with Relay feature. Connected to Reservoir • Signal pressure in valves without Relay feature • Supply pressure in valves with integrated Relay Emergency Valve. Connected to Supply (Red) Line
Port **1-2**	Supply pressure (in valves with integrated Relay Emergency Valve). Connected to Reservoir
Port **2**	Controlled output pressure
Port **4**	Signal pressure (only valves with Relay feature). Connected to Foot Valve or Control (Yellow) Line on trailers
Port **41/42**	Air suspension bellows pressure
Port **43**	Simulation port (allows simulated bellows pressure for adjusting the load sensing valve)

For adjusting the valve ratio, the following steps are necessary:

1. Set “static” or “dynamic” (only **BR5504**).
2. Adjust output brake pressure p2 **“unladen**”.
3. Calculation and adjustment of the **average** value of the characteristic.
4. Check the output brake pressure p2 “**laden**”.
5. Check the responsiveness.
6. Adjustment of the minimum brake pressure.

Following tools are needed to adjust the load sensing valve:

- Open ended spanners sizes 10, 13 and 19 mm
- Hexagon Allen Key size 2.5 mm
- Slot-head screwdriver

Important notes:

- Read the pressure values from the Load Sensing Valve Plate or from the brake calculation
- Keep the type label free of paint
- Pressurise the ports from 0 bar up to the required pressure. If the charging is interrupted or if the required pressure is not reached, repeat the charging from 0 bar up to the required pressure
- When adjusting the valve, the signal pressures (input and air suspension) must be reduced to zero
- The exhaust port must point downwards.
- Ensure the exhaust is masked during any painting of the vehicle.

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BR55..

Load Sensing Valves (Air Suspension)

Doc. No. Y011345 (EN - Rev. 005)
May 2015

1. Adjustment “static/dynamic” (BR 5504 only)

Exhaust any pressure in Port 4, test valve is not connected.

static: push in screw “E” and turn in clockwise direction from “D” to “S” (90°)
dynamic: push in screw “E” and turn in anti-clockwise direction from “S” to “D” (90°))

2. Adjustment of the brake output pressure p2 “unladen”

- Refer to pages 9 & 10 - Release lock nut “a”, undo screw “A” for **BR5504** up to dimension 24 mm and for **BR552.** up to dimension 45 mm. Tighten lock nut “a”.
- Loosen grub screws “b” and “c”.
- Supply quoted “unladen” suspension pressure to port **42**.
- Supply input pressure to port **1** (**BR5522**) or port **4** (**BR5504, BR5524**) with quoted input pressure and check quoted “unladen” output brake pressure is achieved.
- If value is not correct, remove input pressure and turn screw „B” whilst holding screw “C” (clockwise to increase pressure)
- Re-apply input signal pressure and check delivered pressure. Repeat as necessary.

3. Calculation and adjusting the average value of the characteristic line

Formula: p2 average value = (p2 laden + p2 unladen)) / 2
p41/42 average value = (p41/p42 laden + p41/42 unladen)) / 2

Example: p2 average value = (6.5 + 2.4) / 2 = 4.45
p41/42 average value = (3.6 + 0.4) / 2 = 2.0

Adjusting the average value:

- Supply calculated “average” suspension pressure to port **42**.
- Supply input pressure to port **1** (**BR5522**) or port **4** (**BR5504, BR5524**) with quoted input pressure and check calculated “average” output brake pressure is achieved.
- If value is not correct, remove input pressure and turn screw “C” whilst holding screw “B” (clockwise to decrease pressure)
- Re-apply input pressure and check delivered pressure. Repeat as necessary.

4. Checking of the brake pressure p2 “laden”

- Supply quoted “laden” suspension pressure to port **42**.
- Supply input pressure to port 1 (**BR5522**) or port **4** (**BR5504, BR5524**) with quoted input pressure and check quoted “laden” output brake pressure is achieved.
- If value is not correct, remove input pressure and turn screw “C” whilst holding screw “B” (clockwise to decrease pressure)
- Re-apply input pressure and check delivered pressure. Repeat as necessary..

5. Checking the responsiveness

- Supply pressure to the suspension signal port(s) or test valve at a value 0.3 bar higher than the quoted “unladen” suspension.
- Supply input pressure to port **1** (**BR5522**) or port **4** (**BR5504, BR5524**) with quoted input pressure and check that output brake pressure is slightly higher than the quoted “unladen” value.
- If the output pressure is not higher repeat adjustment, see item 2.

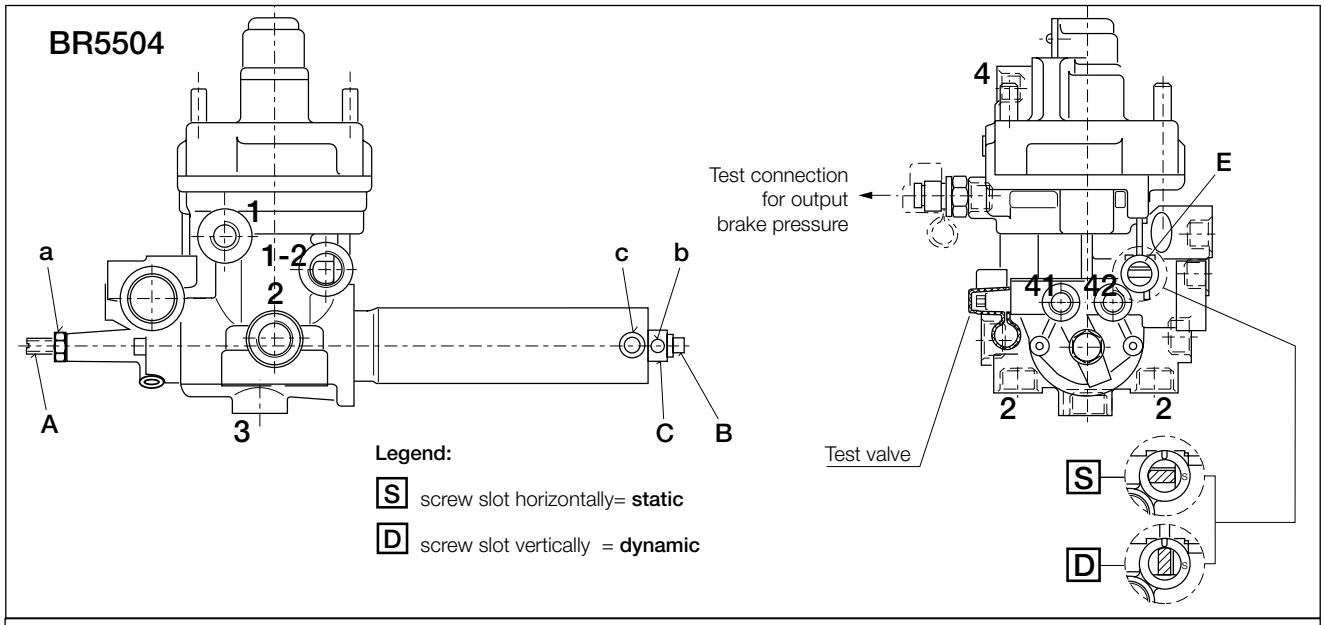
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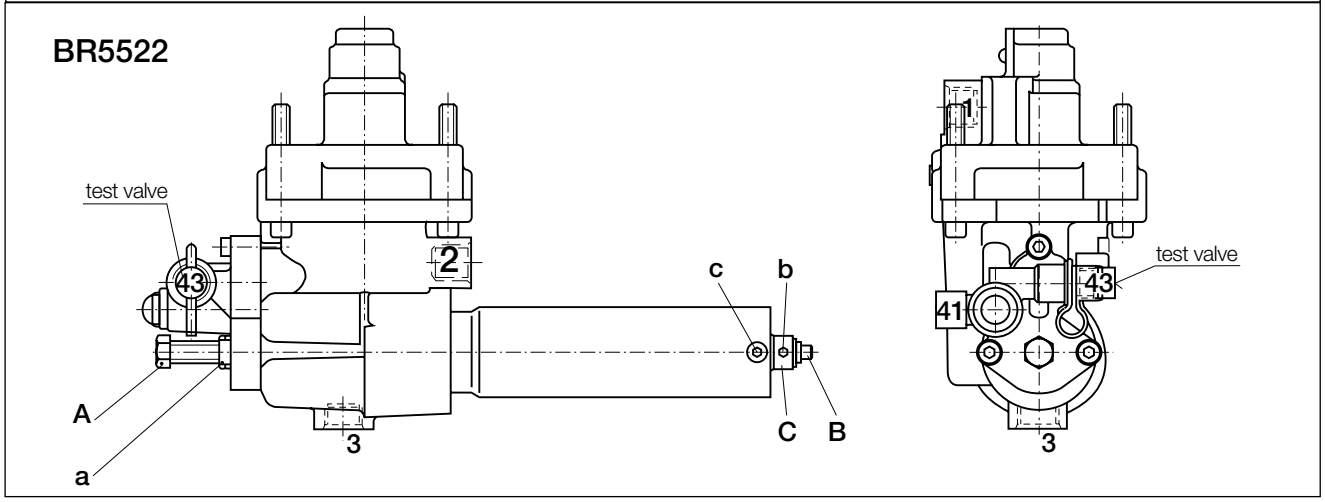
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

- Supply pressure to the suspension signal port(s) or test valve at a value 0.3 bar lower than the quoted “laden” suspension.
- Supply input pressure to port **1** (**BR5522**) or port **4** (**BR5504, BR5524**) with quoted input pressure and check that output brake pressure is slightly lower than the quoted “laden” value.
- If the output pressure is not lower repeat adjustment, see item 3.
- Tighten screws b and c with 1.5 Nm after exhausting the suspension signal port(s) or test valve.
- Repeat the unladen, laden and responsiveness checks.

6. Adjusting the minimum brake pressure

- Ensure there is no pressure at the suspension signal port(s) or test valve.
- Supply input pressure to port **1** (**BR5522**) or port **4** (**BR5504**, **BR5524**) with quoted input pressure and check that the output pressure is 0.1 - 0.2 bar lower than the quoted “unladen” value.
  This represents the minimum brake pressure in the event that the suspension pressure is lost.
- If necessary release lock nut “a” and adjust the minimum brake pressure by turning screw “A” (clockwise rotation = pressure increase).
- Tighten lock nut “a”.





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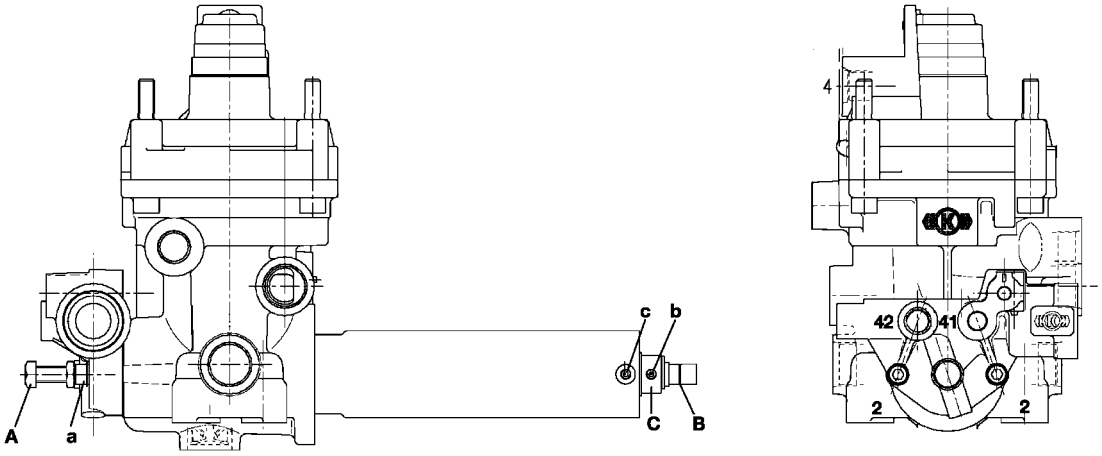
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BR55..

Load Sensing Valves (Air Suspension)

Doc. No. Y011345 (EN - Rev. 005)
May 2015

BR5524



Servicing

The **Load Sensing Valves BR5504, BR5522** and **BR5524** are not serviceable.

Revision Details

Rev. 003	August 2011	Details of Trailer Data Plate updated. Replacement valves for BR5504 and BR5524 added.
Rev. 004	January 2015	Text amended on page 1. Table on page 9 corrected.
Rev. 005	May 2015	Text amended to cover use in more catalogues. BR5523 and replaced valves deleted.

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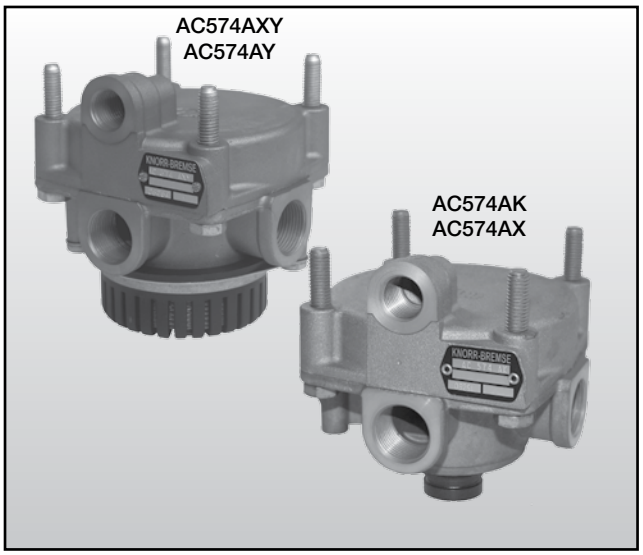
AC574...
Relay Valve

Doc. No. Y011357 (EN - Rev. 002)
May 2015

PD-106-000

Function

In response to an air pressure signal from a control valve, the **Relay Valve** will speed up brake applications by providing rapid and precise control of a large volume of air.



Technical Features

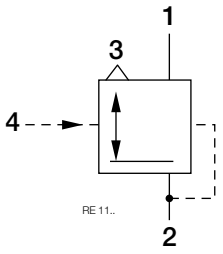
Maximum operating pressure:	8.5 bar
Operating Temperature Range:	-40 ºC to +80 ºC
Nominal way through:	13 mm
Weight:	1.1 kg approx.

Range Overview

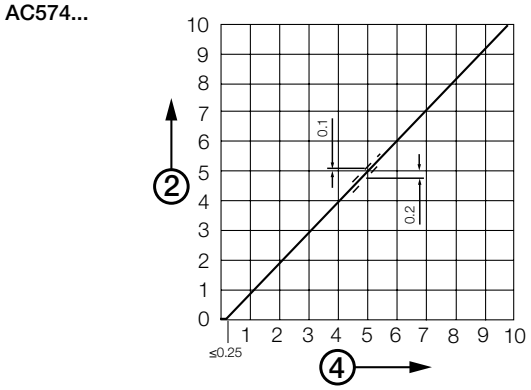
Part No.	Type No.	Air Port Threads			
		1	2	3	4
AC574AK	-	M22x1.5	M22x1.5 (2x)	(Snap-on*)	M16x1.5
AC574AX	-	M22x1.5#	M22x1.5 (2x)	(Snap-on*)	M16x1.5
AC574AXY	-	M22x1.5#	M22x1.5 (2x)	(Silencer)	M16x1.5
AC574AY	-	M22x1.5	M22x1.5 (2x)	(Silencer)	M16x1.5

* with exhaust flap fitted # with integral filter

Standard Symbol as DIN ISO 1219



Performance Chart



② = Delivery Pressure [bar] ④ = Signal Pressure [bar]

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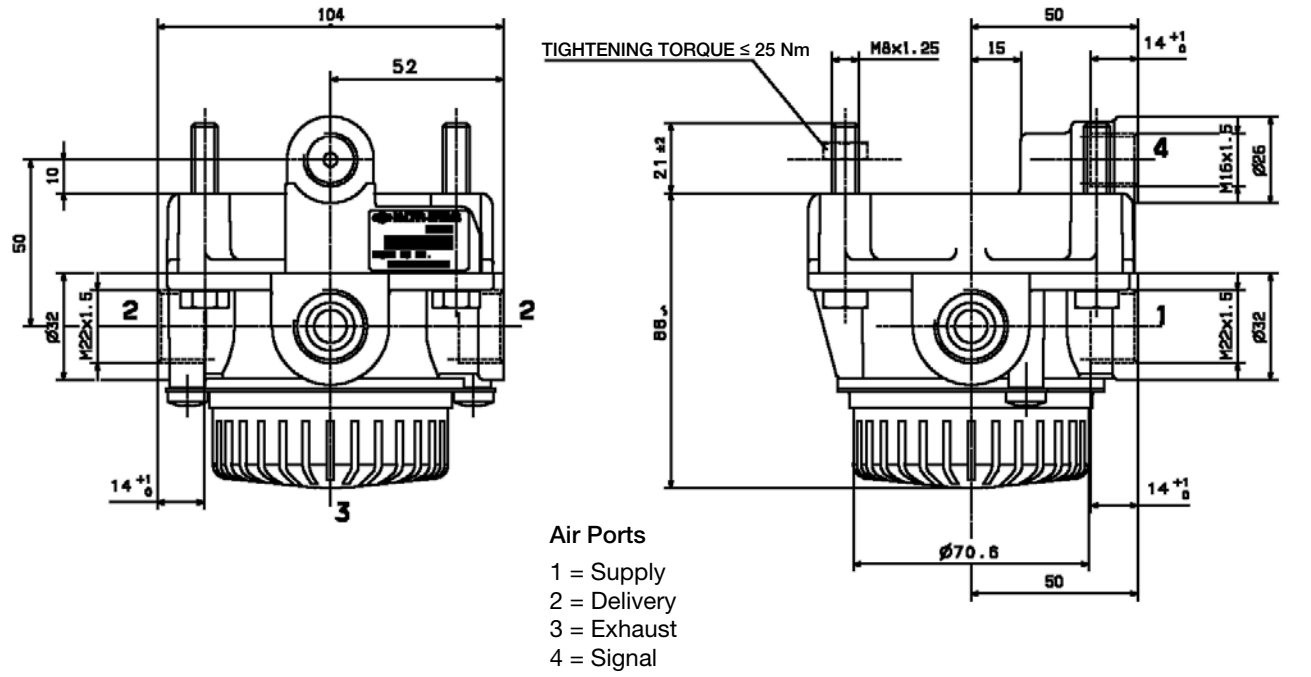
AC574...

Relay Valve

Doc. No. Y011357 (EN - Rev. 002)
May 2015

Dimensions

AC574AY, AC574AXY



Air Ports

1 = Supply
2 = Delivery
3 = Exhaust
4 = Signal

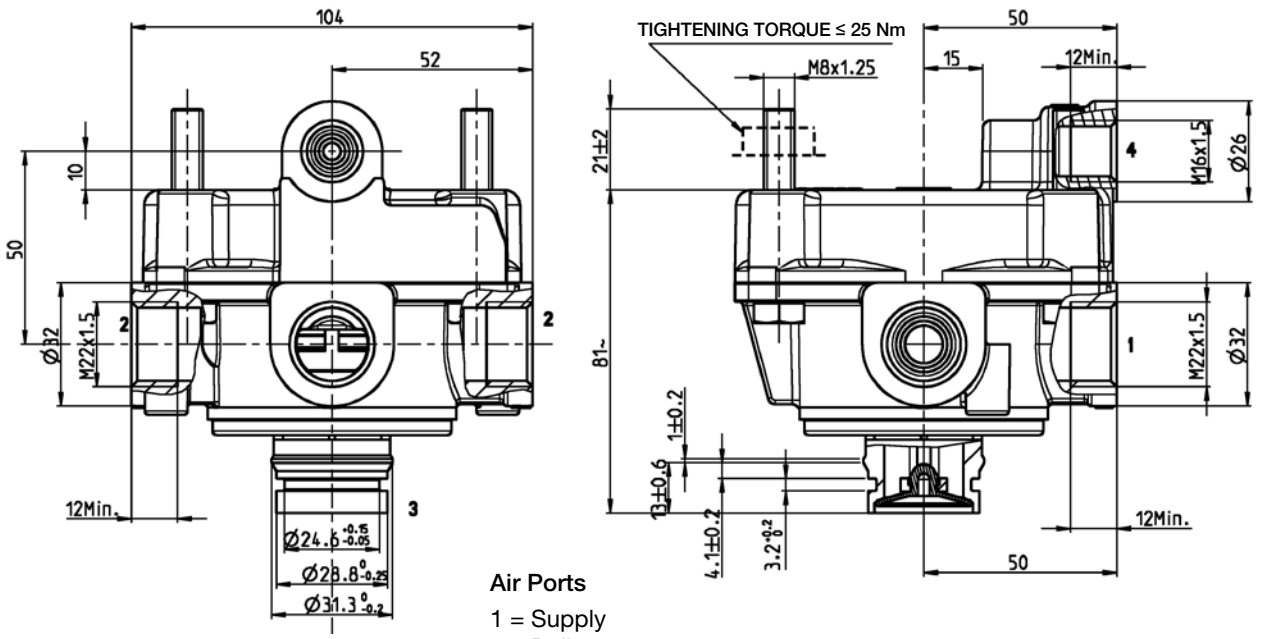
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Doc. No. Y011357 (EN - Rev. 002)
May 2015

AC574AK, AC574AX



Air Ports

1 = Supply
2 = Delivery
3 = Exhaust
4 = Signal

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AC574...

Relay Valve

Doc. No. Y011357 (EN - Rev. 002)
May 2015

Installation

1) Mount the **Relay Valve** upright in a protected position and ensure that the piping runs do not allow moisture to drain into the valve.
2) Never block the exhaust port or allow it to be close to any part of the vehicle.

> **Note** - ensure that the silencer is masked during any painting of the vehicle.

Servicing

Relay Valves are not serviceable.

Revision Details

Rev. 000	December 2002	New document.
Rev. 001	March 2011	AC574AY added.
Rev. 002	May 2015	AC574AK, AC574AX and AC574AXY added. RE1121 and RE1131 deleted. Notes added on page 4.

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Product DATA

AS3..., AS7...

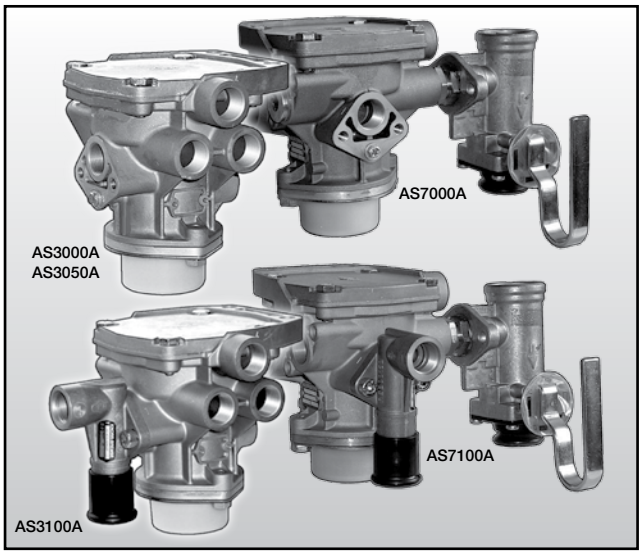
Relay Emergency Valves

Doc. No. Y011341 (EN - Rev. 003)
October 2013

Function

The **Relay Emergency Valve** transmits the brake demand of the driver to the trailer's service brakes.

In the event of a loss of pressure in the trailer supply (red) line, for example from an intentional or accidental uncoupling, the emergency feature of the valve will automatically apply the trailer service brakes using the air stored in the trailer's reservoir. This function is also present when charging the trailer from zero pressure; the trailer service brakes will be partially applied until the charge pressure exceeds approximately 3.0 bar – see "Emergency Braking" graph on page 2.



Most **Relay Emergency Valves** have a predominance feature that generates a pressure to the service brakes (port **2**) higher than the signal pressure (port **4**). This feature is used to compensate for threshold pressure losses through the trailer braking system and aims to ensure equal pressure at the control (yellow) line and brake actuators.

The **AS3100A** version incorporates a manoeuvring valve that allows the release and application of the trailer service brakes when the trailer is not coupled to the towing vehicle. If the reservoir pressure is below approximately 2.5 bar the service brakes cannot be released. The manoeuvring valve returns automatically to the driving position when the supply (red) line is recoupled.

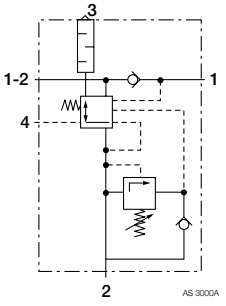
The **Relay Emergency Valves AS3000A, AS3050A and AS3100A** have an integrated exhaust silencer

The **Relay Emergency Valve AS7000A** is a combination of AS3000A and manual load sensing valve BR1305 (see PD-102-000, Document No. Y011343). With this valve, when the trailer is not coupled its service brakes can be released by moving the load sensing valve lever to the "brake release" position.

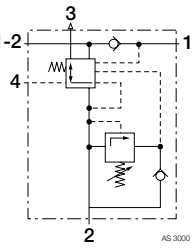
The **Relay Emergency Valve AS7100A** is a combination of AS3100A and manual load sensing valve BR1306 (see PD-102-000, Document No. Y011343). With this valve, when the trailer is not coupled its service brakes can be applied and released by pressing the black button on the manoeuvring valve (see **AS3100A** above).

Standard Symbol as DIN ISO 1219

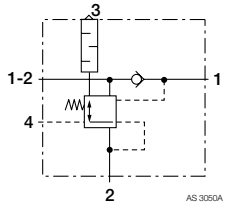
AS3000A



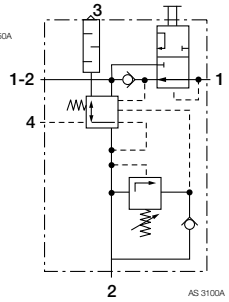
AS3018



AS3050A



AS3100A



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Item No. K002458

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

AS3..., AS7...

Relay Emergency Valves

Doc. No. Y011341 (EN - Rev. 003)
October 2013

Technical Features

Maximum operating pressure:	**AS3...**	10.0 bar	**AS7...**	8.5 bar
Operating temperature range:	-40 °C to +80 °C			
Weight (approx.):	**AS3000A**	1.6 kg	**AS3050A**	1.6 kg
	AS3018	1.7 kg	**AS3100A**	1.9 kg
	AS7000A	2.3 kg	**AS7100A**	2.5 kg

Range Overview

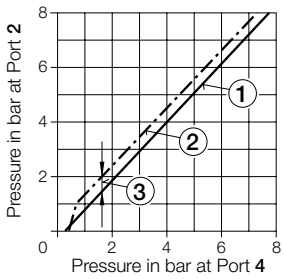
Part No.	Type No.	Predominance		Manoeuvring Valve	Manual Load Sensing Valve	Ports	
		Adjustment range [bar] [1)]	Preset to [bar]			1, 1-2, 4	2
AS3000A	-	0 - 0.5	0	None	None	M22 x 1.5	M22 x 1.5 (3x)
SEB00409	**AS3018**	0 - 0.5	0	None	None	M22 x 1.5	M16 x 1.5 (4x) M22 x 1.5 (2x)
AS3050A	-	without	-	None	None	M22 x 1.5	M22 x 1.5 (3x)
AS3100A	-	0 - 0.5	0	II36133 AE4232	None	M22 x 1.5	M22 x 1.5 (3x)
AS7000A	-	0 - 0.5	0	None	I84575 BR1305	M22 x 1.5	M22 x 1.5 (1x)
AS7100A	-	0 - 0.5	0	II36133 AE4232	I84576 BR1306	M22 x 1.5	M22 x 1.5 (1x)

[1)] see Warning note on page 6

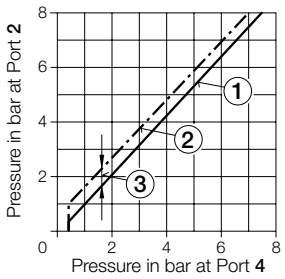
Performance Charts

Service Braking

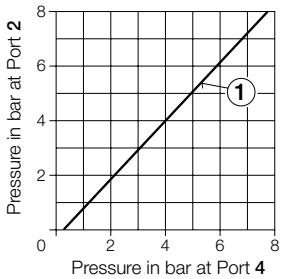
AS3000A, AS3100A



AS3018



AS3050A



(1) = Predominance at 0 bar
(2) = Predominance at 0.5 bar
(3) = Predominance Setting Range

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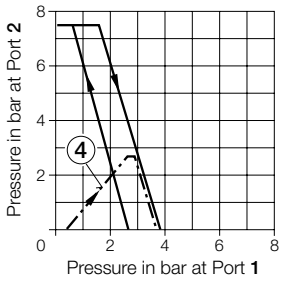
Item No. K002458

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

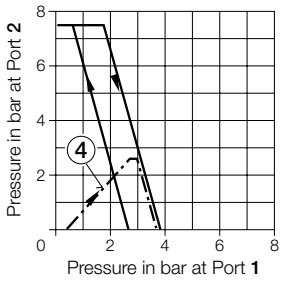
Doc. No. Y011341 (EN - Rev. 003)
October 2013

Emergency Braking

AS3000A, AS3050A
AS3100A



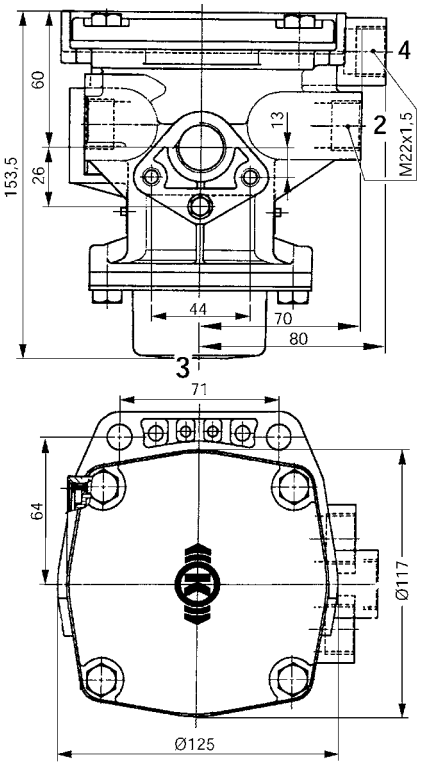
AS3018

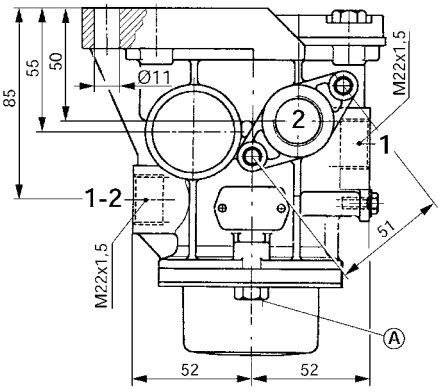


④ = Initial charging

Dimensions

AS3000A
AS3050A





Ⓐ = **Warning!** Compressed spring force approx. 750N

Ports:
1 = Supply (Red trailer coupling)
1-2 = Trailer Reservoir
2 = Delivery to Brake Actuators
3 = Exhaust
4 = Control (Yellow trailer coupling)

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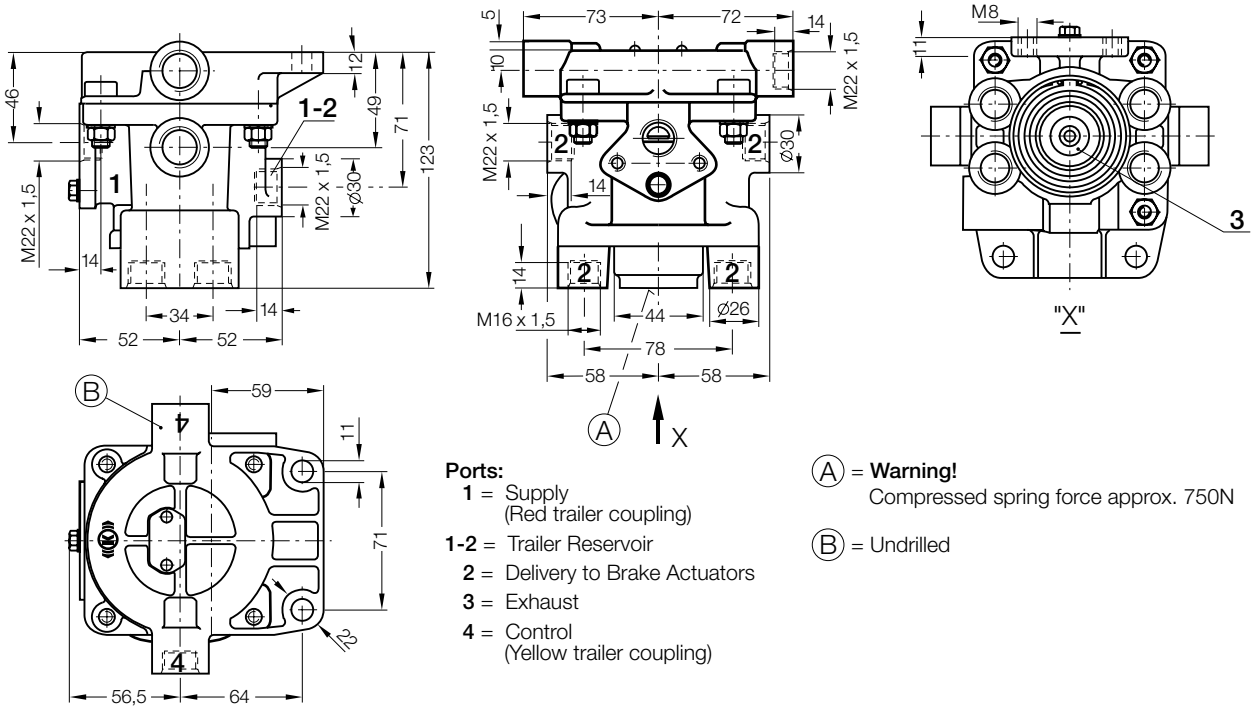
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

AS3..., AS7...

Relay Emergency Valves

Doc. No. Y011341 (EN - Rev. 003)
October 2013

AS3018

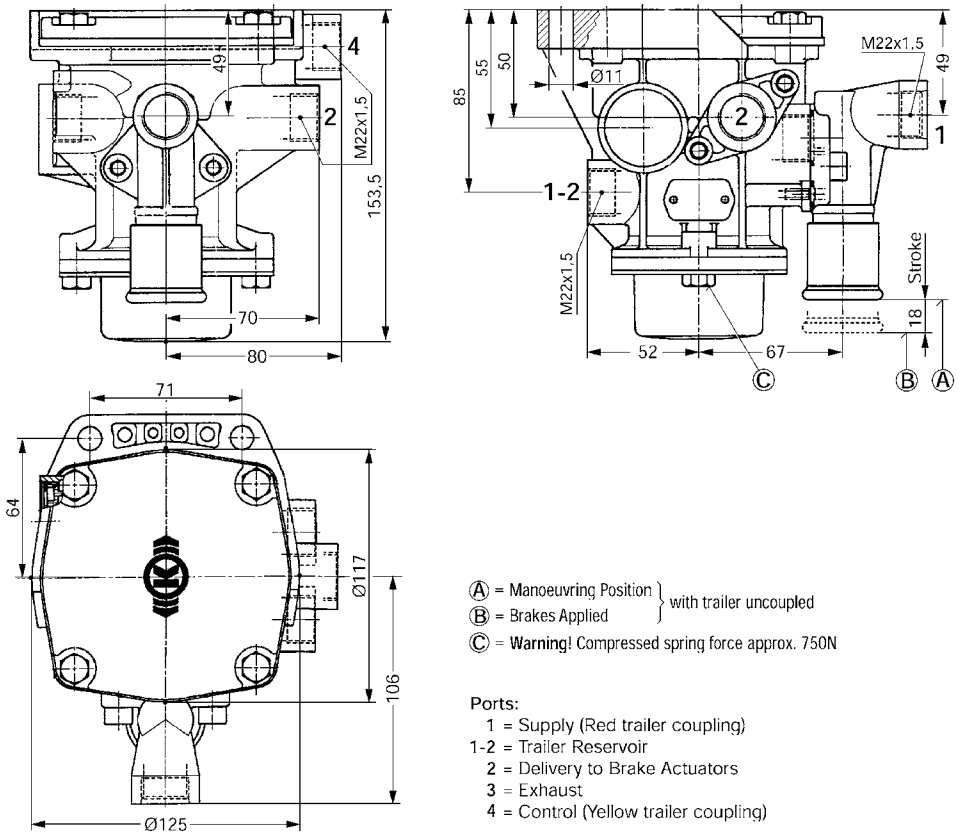


Ports:
- **1** = Supply (Red trailer coupling)
- **1-2** = Trailer Reservoir
- **2** = Delivery to Brake Actuators
- **3** = Exhaust
- **4** = Control (Yellow trailer coupling)

Ⓐ = **Warning!** Compressed spring force approx. 750N

Ⓑ = Undrilled

AS3100A



Ⓐ = Manoeuvring Position } with trailer uncoupled
Ⓑ = Brakes Applied }
Ⓒ = **Warning!** Compressed spring force approx. 750N

Ports:
- 1 = Supply (Red trailer coupling)
- 1-2 = Trailer Reservoir
- 2 = Delivery to Brake Actuators
- 3 = Exhaust
- 4 = Control (Yellow trailer coupling)

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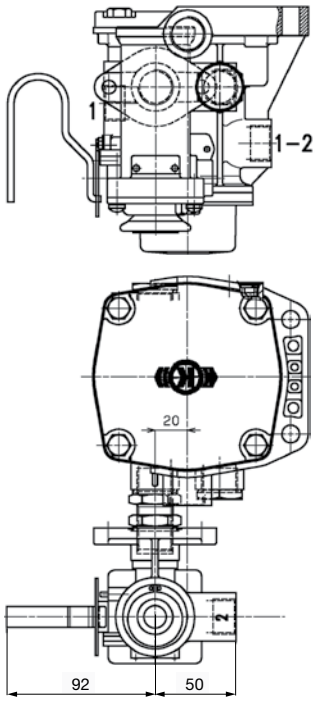
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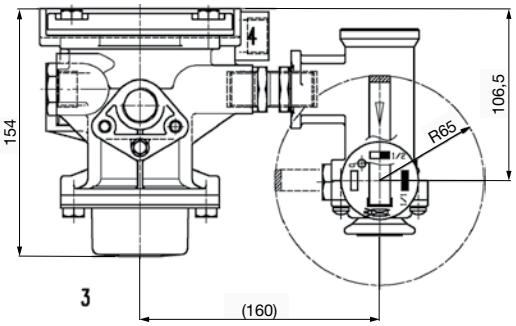
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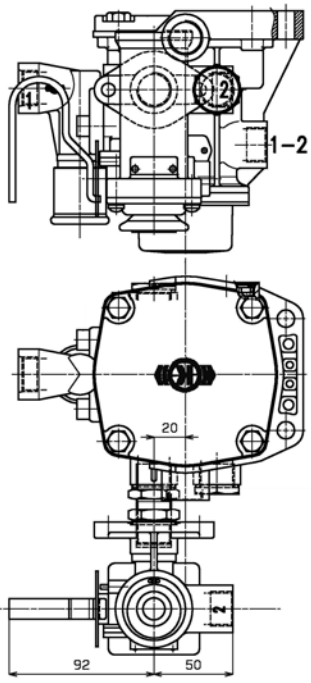
Doc. No. Y011341 (EN - Rev. 003)
October 2013

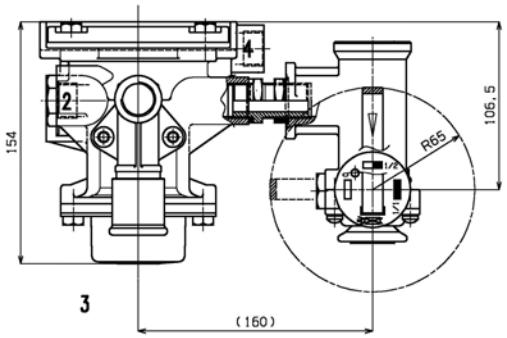
AS7000A





AS7100A





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Item No. K002458

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

AS3..., AS7...

Relay Emergency Valves

Doc. No. Y011341 (EN - Rev. 003)
October 2013

Testing and Setting

Testing of the Predominance pressure

- Connect air pressure gauges to Ports **2** and **4** of the valve.
- With a constant air pressure (>6 bar) at Port **1** and a constant 2.0 bar pressure at Port **4**, measure the pressure at Port **2**.
- Predominance is present if the pressure at Port **2** is greater than the pressure at port **4**.
- Predominance levels are specified with 2.0 bar at Port **4**.

Adjustment of the Predominance pressure:



VF00075_156

- No pressure at port 4
- Insert a key (to DIN 3116) or small pair of circlip pliers (see photo) into the plastic disc (1).
- Turn the disc clockwise to increase the predominance or anticlockwise to reduce the predominance - see **WARNING** below.
- Apply 2.0 bar pressure to Port **4** and measure the pressure at Port **2**, repeat procedure if required, remembering to remove the pressure from Port **4** before each adjustment.

WARNING:

The predominance is only allowed to be set within the legal bands.

Additionally it should only be set in accordance with the vehicle manufacturer's instructions.

The predominance must not exceed 0.5 bar.

Revision Details

Rev. 001	July 2011	Part Nos. for AS3000A, AS3050A and AS3100A removed
Rev. 002	August 2011	New document format, AS7000A and AS7100A added
Rev. 003	October 2013	Separate performance graphs for AS3018 added

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Item No. K002458

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

DB11..

Pressure Limiting Valves

Doc. No. Y011348 (Rev. 001)
March 2011

PD-108-000

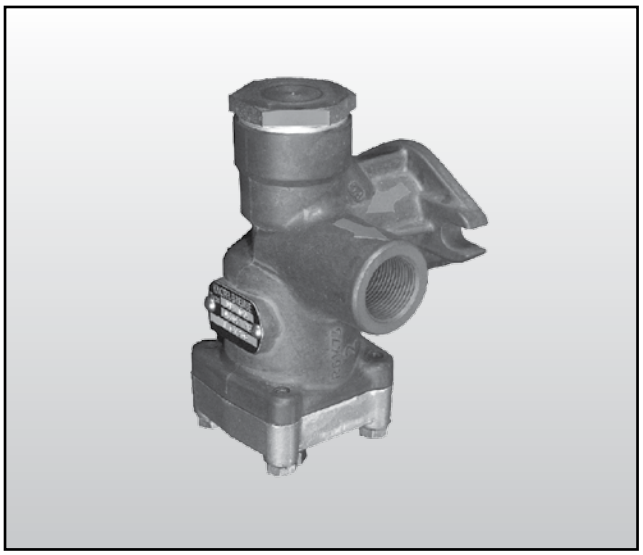
Function

A **Limiting Valve** is used to limit the downstream (delivered) pressure to a value less than the main system pressure.

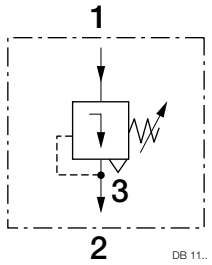
In a braking system a typical use of the valve is to limit the pressure on the rear axle of a drawbar trailer as well as in the air suspension or auxiliary systems.

The valves are fully adjustable, the limited output pressure is changed by turning the adjusting screw on the bottom of the valve.

For ease of installation, the DB11.. range of valves has an integral mounting bracket



Standard Symbol as DIN ISO 1219



Technical Features

Maximum operating pressure:	12 bar
Operating Temperature Range:	-30 °C to +80 °C
Weight:	0.5 kg approx.

Range Overview

Part No.	Type No.	Limited pressure [bar]	Adjustment range [bar]	Air port threads
I61235	DB1102	5.7	0 to 10	M22x1.5
I61236	DB1103	5.3		
I61237	DB1105	4.8		
I97953	DB1147	1.8		

Other variants are available.

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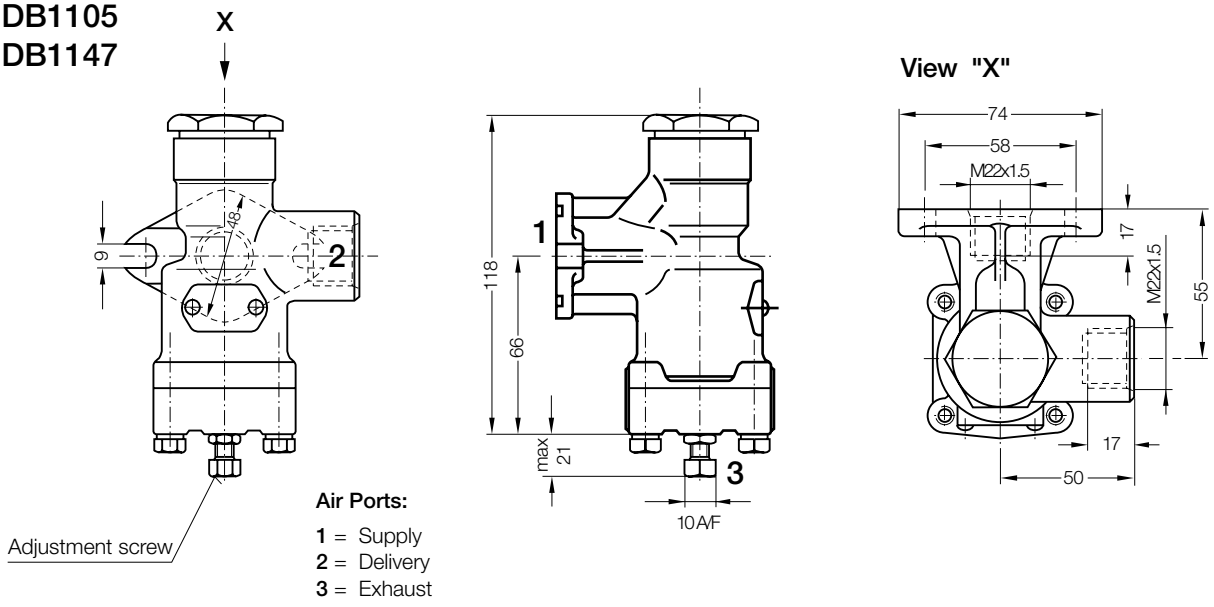
DB11..

Pressure Limiting Valves

Doc. No. Y011348 (Rev. 001)
March 2011

Dimensions

DB1102
DB1103
DB1105
DB1147



Air Ports:

1 = Supply
2 = Delivery
3 = Exhaust

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Product DATA

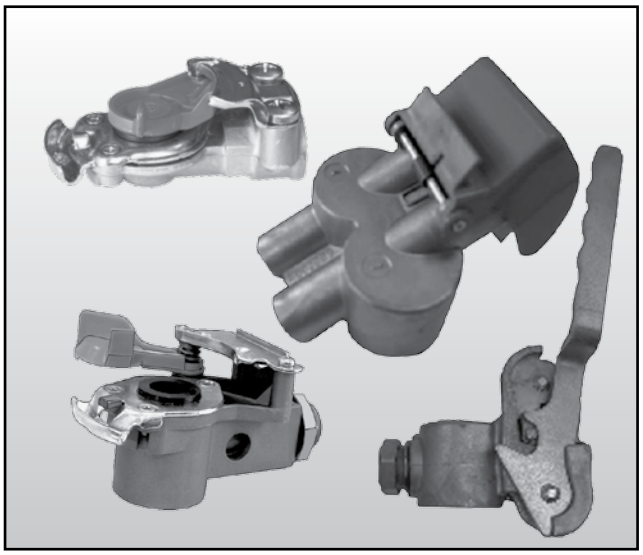
KU13.., KU14.., KU41..

Coupling Heads

Doc. No. Y011338 (Rev. 002)
January 2015

PD-109-000

Function



Coupling heads are used to connect the braking systems of the towing vehicle and trailer.

Coupling heads are generally colour coded to indicate the 'supply' (red) and 'control' (yellow) air line connections and are designed as defined in DIN ISO 1728 to prevent incorrect connection.

KU13 and KU14 Coupling Heads are designed for use on trailers and semi-trailers. **KU41 Coupling Heads** are designed for use on towing vehicles. See table on page 2 for details.

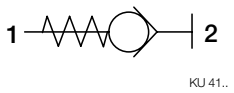
The **KU14 Coupling Heads** have an integral filter to protect the air braking and auxiliary systems of the trailer from contamination. To prevent a blocked filter element trapping air pressure in the 'supply' or 'control' line, a by-pass feature allows air to flow through unfiltered. Some of these versions are also fitted with an ISO test connector to facilitate measurement of the line pressure.

The **KU14 Coupling Heads** for semi-trailers have a mounting thread and are supplied with a lock nut to prevent the rotation of the coupling head when connecting or disconnecting the air line.

The **KU1414/KU1415 Coupling Heads** are known as **'Quattro-matic' Coupling Heads** and they incorporate the connections for both 'supply' and 'control' lines. These couplings are normally compatible with similar design coupling heads from other manufacturers.

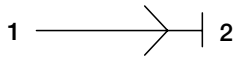
Standard Symbol as DIN ISO 1219

For towing vehicles:
KU41..



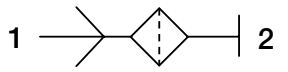
KU 41..

For trailers:
KU13..



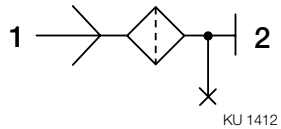
KU 13..

KU1400, KU1401,
KU1410, KU1413



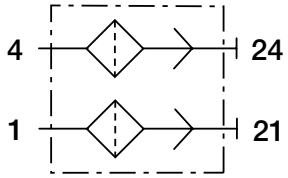
KU 1400

KU1411, KU1412



KU 1412

KU1414, KU1415



KU 1414

Technical Features

KU13.. and KU41..

Maximum operating pressure:	8.5 bar
Operating temperature range:	-40 °C to +80 °C
Filter:	not integrated
Weight:	0.2 kg approx.

KU1400 - KU1413

Maximum operating pressure:	8.5 bar
Operating temperature range:	-40 °C to +80 °C
Filter:	integrated
Weight:	0.3 kg approx.

KU1414 and KU1415

Maximum operating pressure:		10.0 bar
Operating temperature range:		-40 °C to +80 °C
Filter:		integrated
Weight:	KU1414	0.9 kg approx.
	KU1415	0.5 kg approx.

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

KU13.., KU14.., KU41..

Coupling Heads

Doc. No. Y011338 (Rev. 002)
January 2015

Range Overview

Part No.	Type No.	Port Thread (F)	Mounting Thread (M)	Filter	Test Point	Self-sealing	Application (Colour)	Vehicle Application	For further details see
I59070	KU1303	M22x1.5	-	No	No	No	General/no cover	General No miscoupling safeguard	-
II33262	KU1304						'Control' (yellow)	Semi-trailer and full trailer	-
II33263	KU1305						'Supply' (red)		
II17354	KU1310	M16x1.5					'Supply' (red)		
II17355	KU1311						'Control' (yellow)		
K000952	KU1400	M16x1.5	M24x1.5	Yes	No	No	'Supply' (red)	Semi-trailer	-
K000953	KU1401		-				'Supply' (red)	Centre-axle and drawbar trailer	
K000954	KU1410		M24x1.5				'Control' (yellow)	Semi-trailer	
K000955	KU1411	M16x1.5	-	Yes	Yes	No	'Control' (yellow)	Centre-axle and drawbar trailer	-
K000956	KU1412		M24x1.5				'Control' (yellow)	Semi-trailer	
K000957	KU1413		-		No		'Control' (yellow)	Centre-axle and drawbar trailer	
K002640	KU1414	M16x1.5	M22x1.5	Yes	No	No	'Supply' and 'Control'	Semi-trailer	Y010964
K002641	KU1415							Centre-axle and drawbar trailer	Y011011
K004229	KU4124	M16x1.5	-	No	No	Yes	'Supply' (red)	Towing vehicle	For further details please contact your local Knorr-Bremse representative or the relevant vehicle manufacturer
K004231									
K013662									
K018111									
K004152	KU4128						'Control' (yellow)		
K004230									
K013661									
K013663									

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

KU13.., KU14.., KU41..

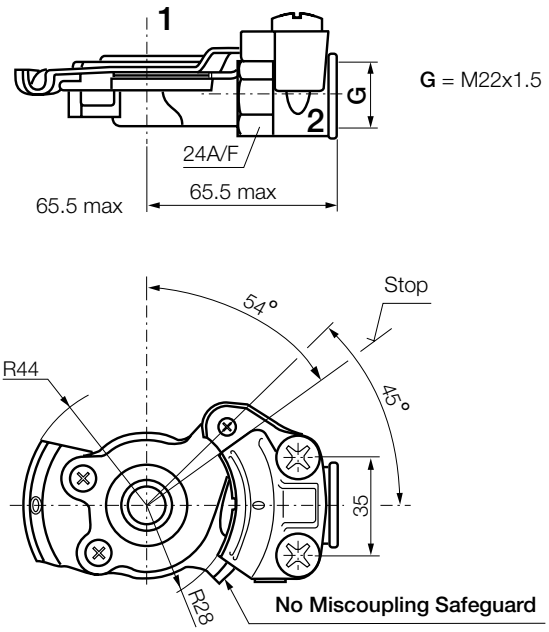
Coupling Heads

Doc. No. Y011338 (Rev. 002)
January 2015

Dimensions

Trailer Coupling Heads (without Filters)

KU1303

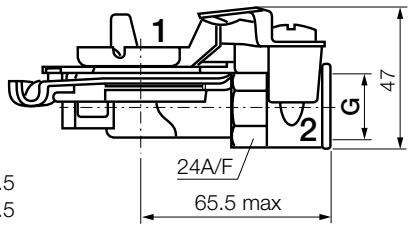


G = M22x1.5

Ports:
1 = Supply
2 = Delivery

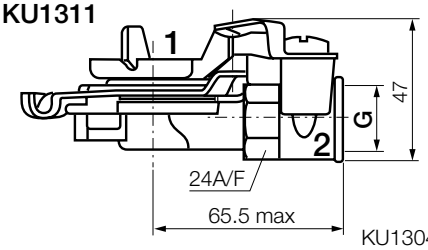
PD109_001

KU1305
KU1310

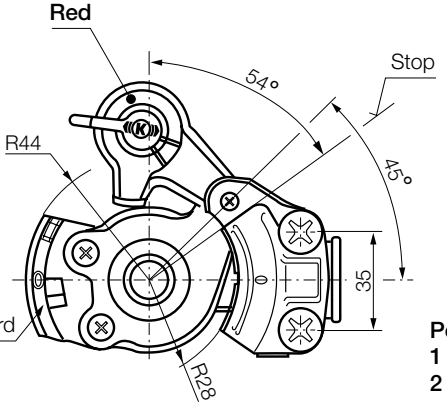


KU1305 - **G** = M22x1.5
KU1310 - **G** = M16x1.5

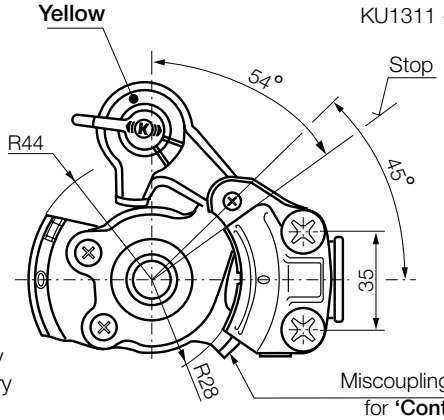
KU1304
KU1311



KU1304 - **G** = M22x1.5
KU1311 - **G** = M16x1.5



Miscoupling Safeguard
for **'Supply' Line**



Miscoupling Safeguard
for **'Control' Line**

Ports:
1 = Supply
2 = Delivery

PD109_001

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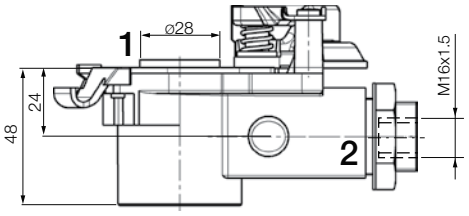
KU13.., KU14.., KU41..

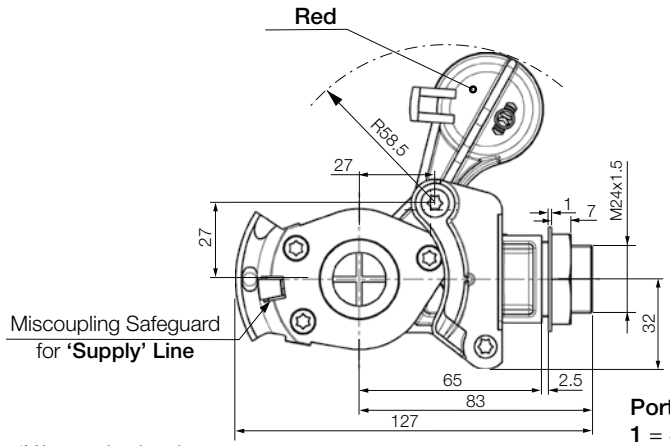
Coupling Heads

Doc. No. Y011338 (Rev. 002)
January 2015

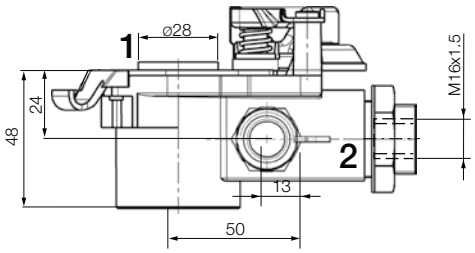
Trailer Coupling Heads (with Filters)

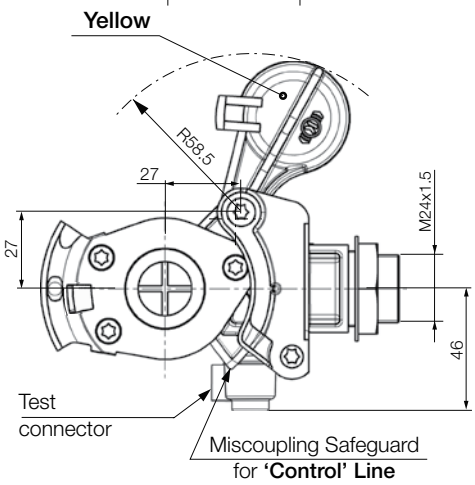
KU1400
KU1401 [1]





KU1410 [2] **KU1411** [1]
KU1412 **KU1413** [1], [2]





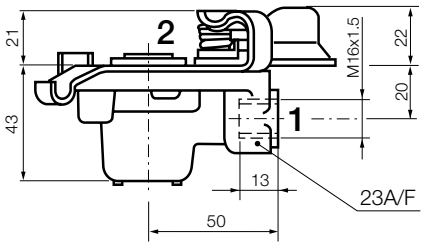
Ports:
1 = Supply
2 = Delivery

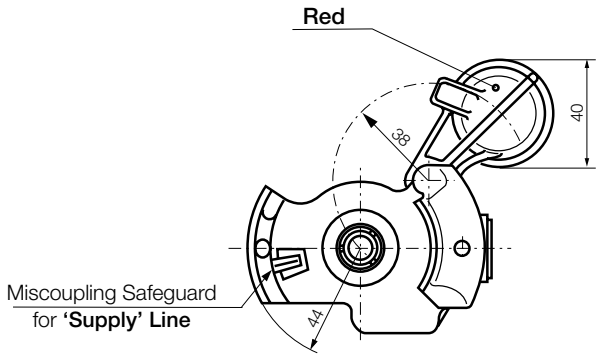
1) No mounting thread
2) No test connector

PD109_003

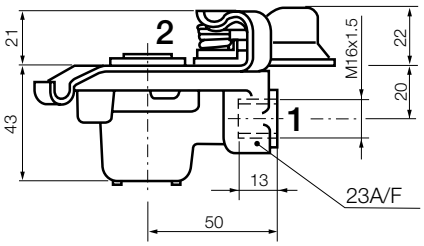
Towing Vehicle Coupling Heads (Self-sealing)

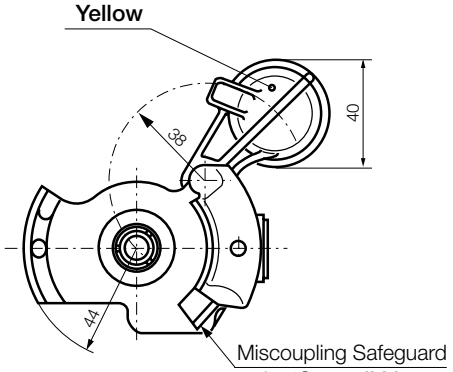
KU4124





KU4128





Ports:
1 = Supply
2 = Delivery

PD109_002

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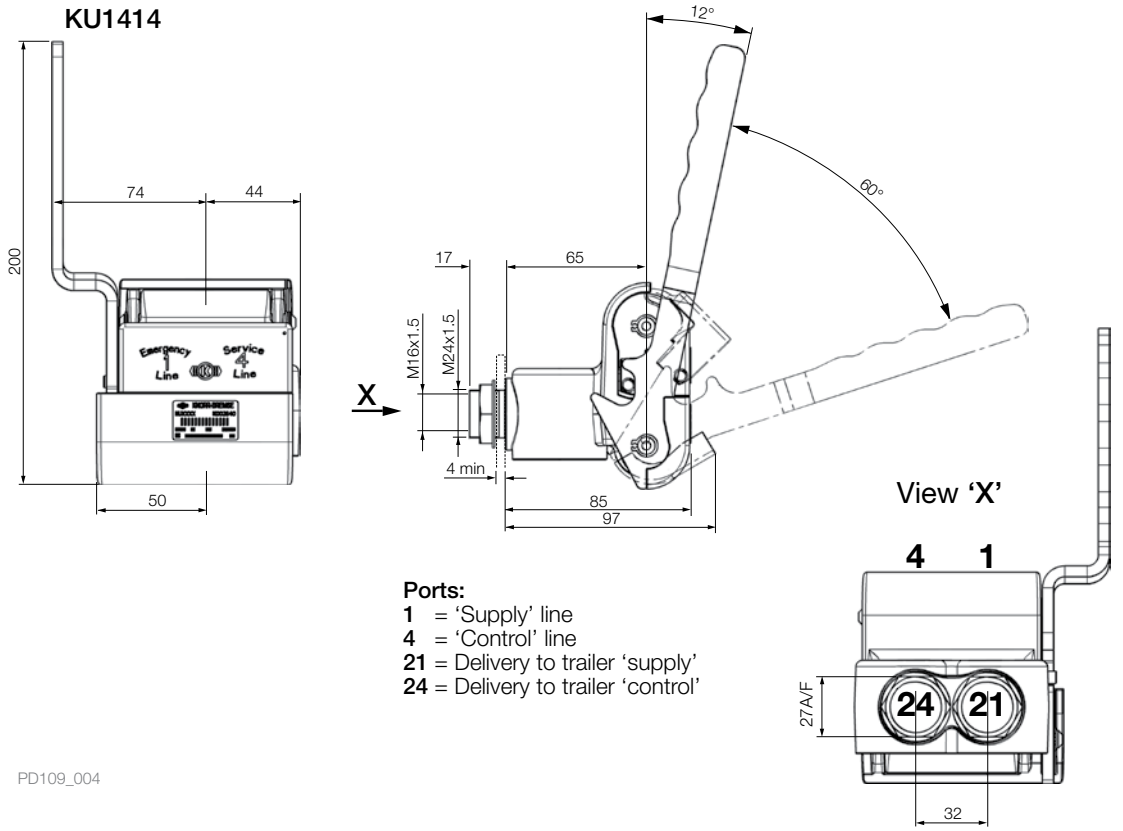
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

KU13.., KU14.., KU41..

Coupling Heads

Doc. No. Y011338 (Rev. 002)
January 2015

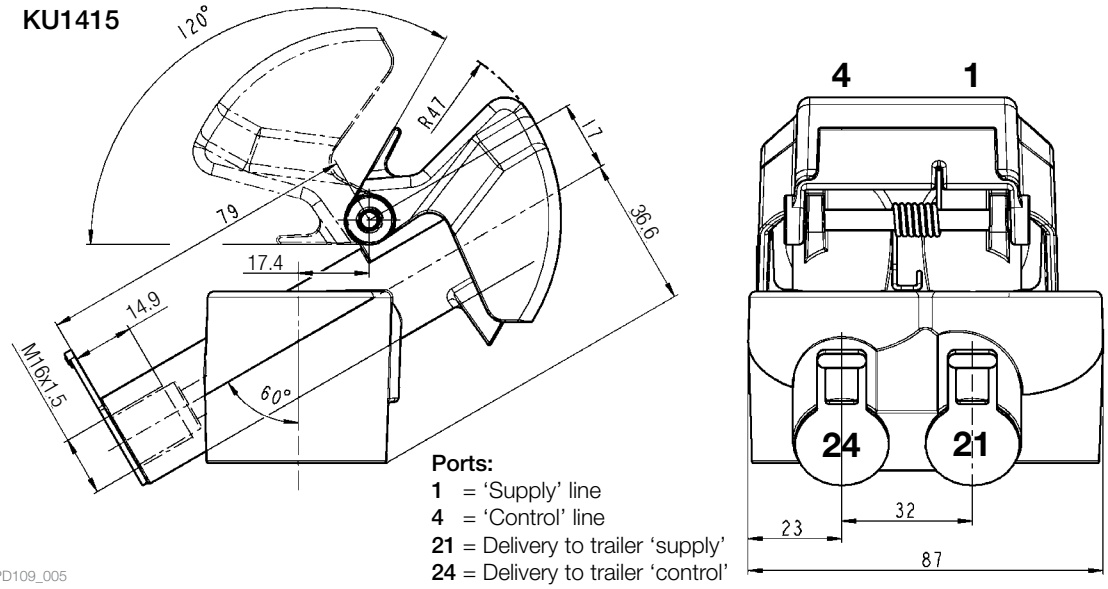
KU1414



Ports:
1 = 'Supply' line
4 = 'Control' line
21 = Delivery to trailer 'supply'
24 = Delivery to trailer 'control'

PD109_004

KU1415



Ports:
1 = 'Supply' line
4 = 'Control' line
21 = Delivery to trailer 'supply'
24 = Delivery to trailer 'control'

PD109_005

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KU13.., KU14.., KU41..

Coupling Heads

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January 2015

Installation Instructions

Max. Tightening torques:	M16x1.5:	45 Nm
	M22x1.5:	60 Nm
	M24x1.5:	70 Nm

Maintenance Advice

In service, the filter can be easily inspected for contamination without having to disassemble the body of the air filter.

If the filter is heavily contaminated, the bayonet type lock on the bottom of the filter must be pushed in and turned by 90° anti-clockwise at the same time. The filter can then be removed and washed out if necessary.

Re-assembly of the filter is carried out in reverse order.

Revision Details

Rev. 001	March 2011	Updated layout for new Trailer Catalogue
Rev. 002	January 2015	KU1303 added

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Product DATA

DB21..

Pressure Proportioning Valves

Doc. No. Y011347 (EN - Rev. 002)
May 2015

PD-110-000

Function

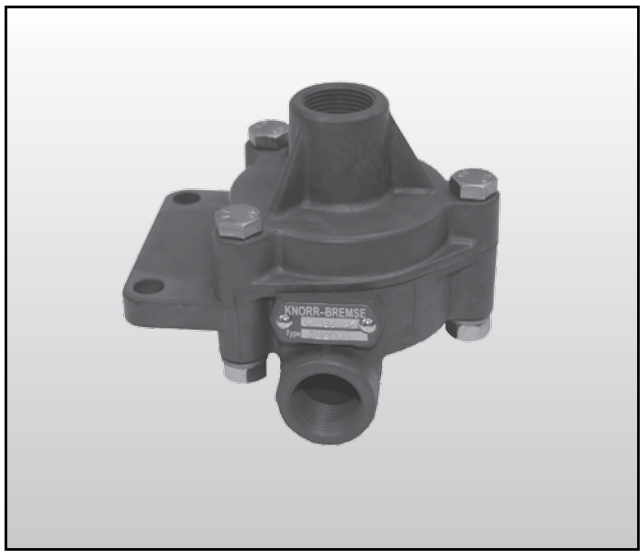
A **Pressure Proportioning Valve** is used to reduce the downstream (delivered) pressure by a fixed ratio relative to the supply pressure.

The valve has a quick release function to speed up the exhaust of delivered air.

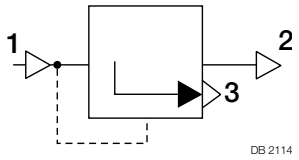
A typical application on trucks, tractors and trailers would be to provide finer control of the service brake when using larger actuators than the maximum axle load would require.

Note: These valves should not be used in combination with EBS since it would cause a conflict between electrical and pneumatic control systems.

The valve has an integral mounting bracket for easy installation.



Standard Symbol as DIN ISO 1219



Technical Features

Maximum operating pressure:	10 bar
Operating Temperature Range:	-40 °C to +80 °C
Air port threads:	M22 x 1.5
Weight:	0.6 kg approx.

Range Overview

Part No.	Type No.	Reduction ratio	Pressure [bar]	
			Supply Port 1	Delivery Port 2
I86153	**DB2114**	2.00:1	6.5	3.1
I86154	**DB2115**	1.50:1		4.1
I86155	**DB2116**	1.15:1		5.4
I86156	**DB2118**	1.35:1		4.6
I86157	**DB2121**	1.80:1		3.4
I86158	**DB2122**	1.25:1		5.0
I86159	**DB2123**	2.70:1		2.3

Valves are also available with exhaust silencers fitted.

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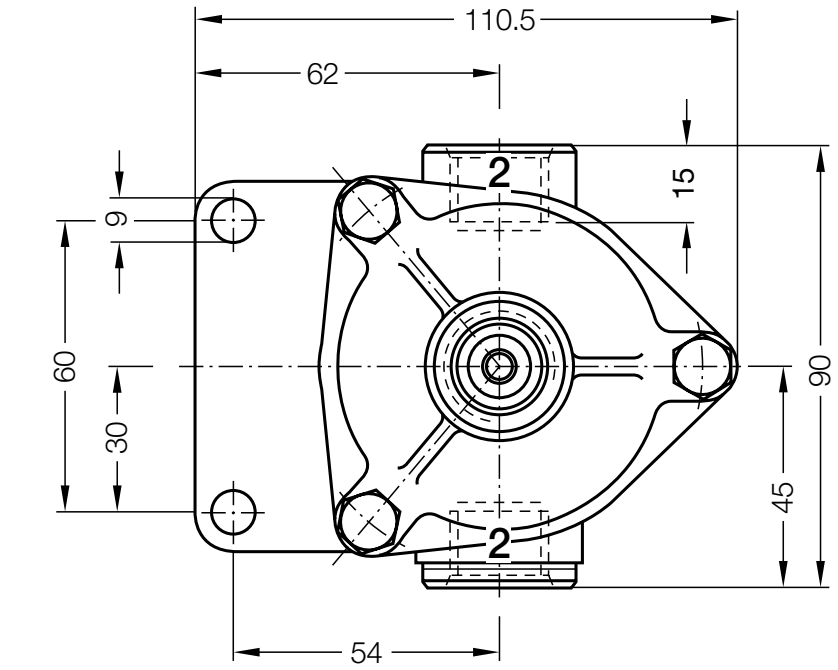
DB21..

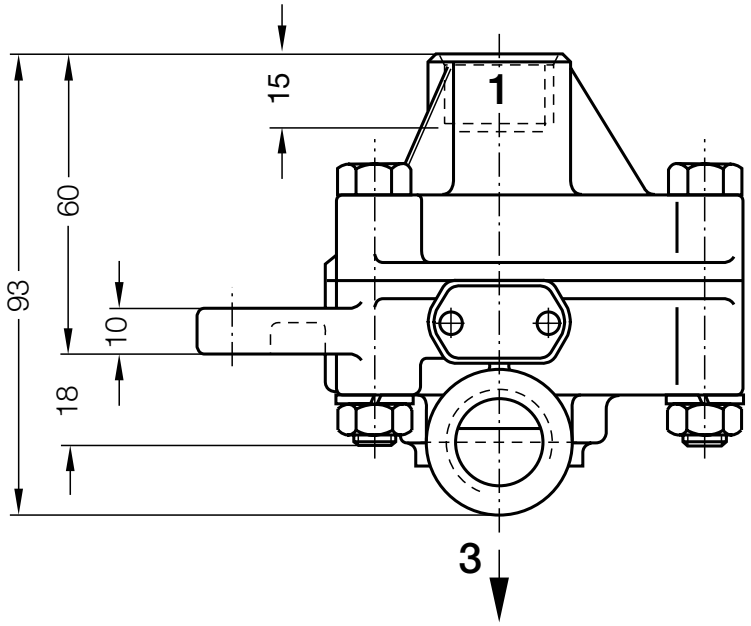
Pressure Proportioning Valves

Doc. No. Y011347 (EN - Rev. 002)
May 2015

Dimensions

DB2114
DB2115
DB2116
DB2118
DB2121
DB2122
DB2123





Air Ports:
1 = Supply
2 = Delivery
3 = Exhaust

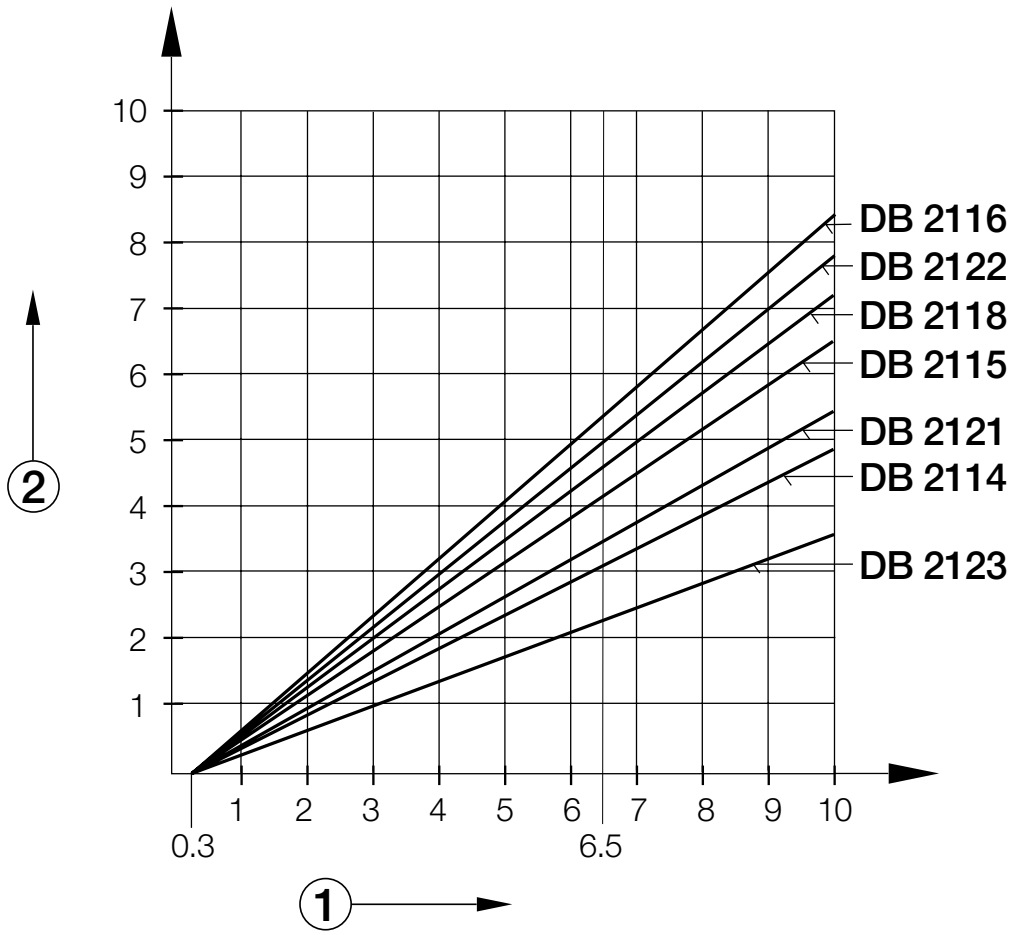
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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Doc. No. Y011347 (EN - Rev. 002)
May 2015

Performance Graphs



(1) = Supply Pressure at Port **1** [bar]
(2) = Delivery Pressure at Port **2** [bar]

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Installation

1) Mount the Pressure Proportioning Valve in an upright position, exhaust port 3 facing downwards.

2) Never block the exhaust port or allow it to be close to any part of the vehicle.

Note - ensure that the exhaust or silencer (if fitted) is masked during any painting of the vehicle.

Servicing

For information on the servicing of Pressure Proportioning Valves refer to the Product Search area of the website www.Knorr-BremseCVS.com.

Revision Details

Rev. 000	December 2003	New document
Rev. 001	March 2011	Revised layout for new Trailer Catalogue
Rev. 002	May 2015	Paragraph added relating to truck and tractors on page 1, dimensions diagram rotated and expanded on page 2, Installation and Servicing text added on page 4.

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

DB21..

Adaptor Valves

Doc. No. Y092386 (EN - Rev. 001)
May 2015

PD-110-200

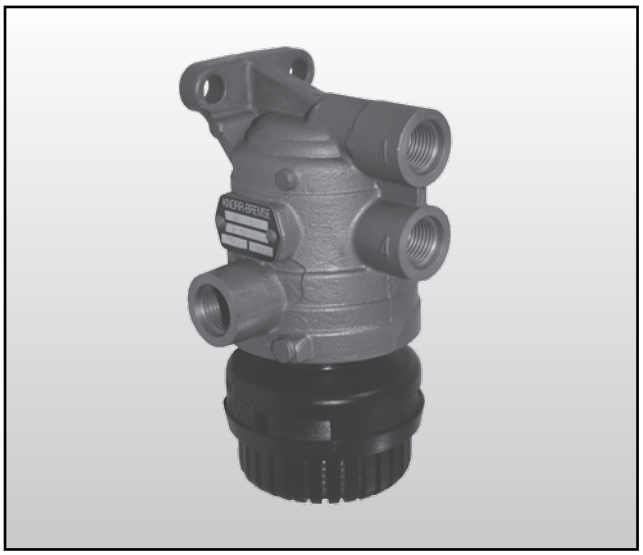
Function

During low pressure brake applications, the **Adapter Valve** reduces the downstream (delivered) pressure to a value less than the supplied pressure. The valve is typically installed in the service brake system to help balance the lining wear between front and rear axle(s), for example on the front axle of a drawbar trailer.

At higher brake pressure applications, there is no reduction in delivered pressure.

The valve incorporates a quick release feature to speed up the exhaust of the brakes.

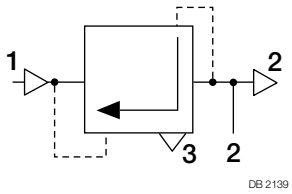
The valve is not adjustable.



Technical Features

Maximum operating pressure:	10 bar
Operating Temperature Range:	-40 °C to +80 °C
Weight:	0.56 kg approx.

Standard Symbol as DIN ISO 1219



Range Overview

Part No.	Type No.	Characteristic		Air Port Threads		
		Supply [bar]	Delivery [bar]	1	2	3
SEB01538	DB2144	0.45 / 3.5 / 5.7	0.1 / 1.8 / 5.7	M16x1.5	M16x1.5	M22x1.5 with silencer
K001893	DB2145	0.45 / 5.1 / 6.0	0.1 / 3.65 / 6.0			

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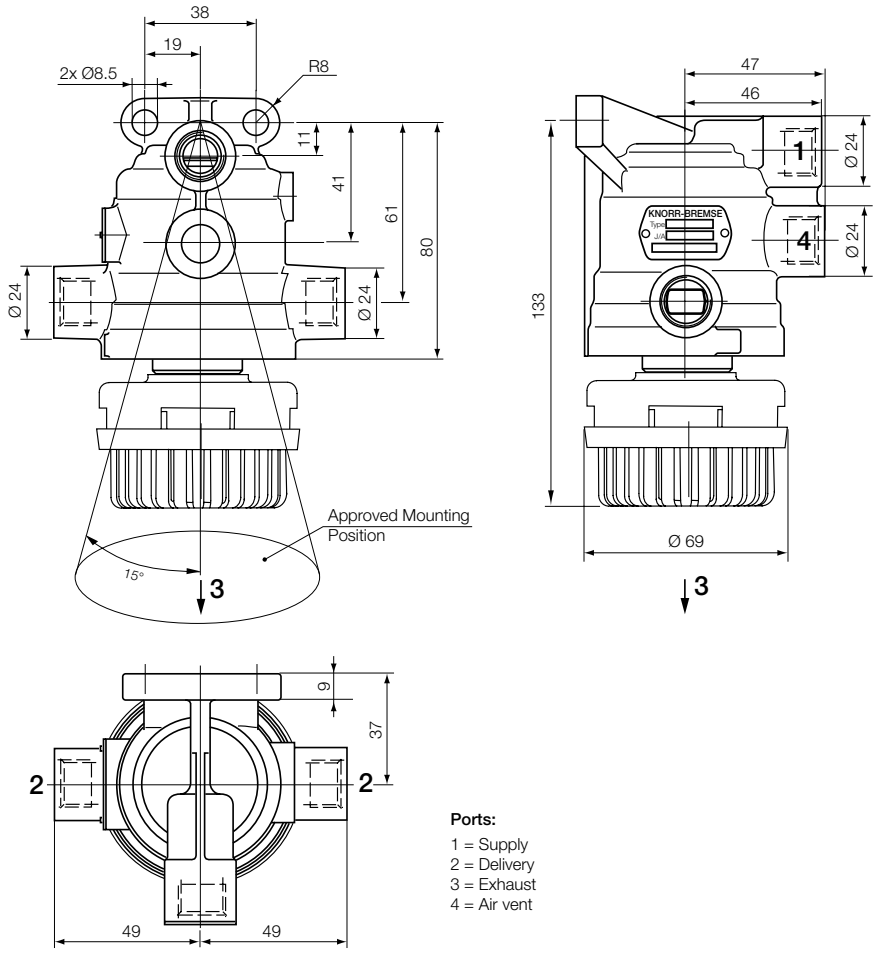
DB21..

Adaptor Valves

Doc. No. Y092386 (EN - Rev. 001)
May 2015

Dimensions

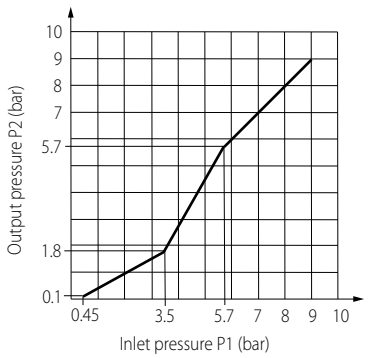
DB2144
DB2145



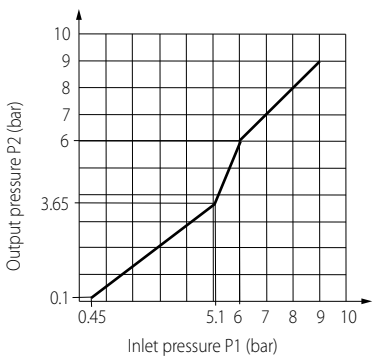
Ports:
1 = Supply
2 = Delivery
3 = Exhaust
4 = Air vent

Performance Graphs

DB2144



DB2145



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Doc. No. Y092386 (EN - Rev. 001)
May 2015

Installation

1) Mount the Adaptor Valve in an upright position ±15°, silencer facing downwards.

2) Never block the silencer or allow it to be close to any part of the vehicle.

Note - ensure that the silencer is masked during any painting of the vehicle.

Servicing

For information on the servicing of Adaptor Valves refer to the Product Search area of the website www.Knorr-BremseCVS.com.

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DB21..

Adaptor Valves

Doc. No. Y092386 (EN - Rev. 001)
May 2015

Revision Details

Rev. 000	March 2011	New document.
Rev. 001	May 2015	Installation and Servicing information added.

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Product DATA

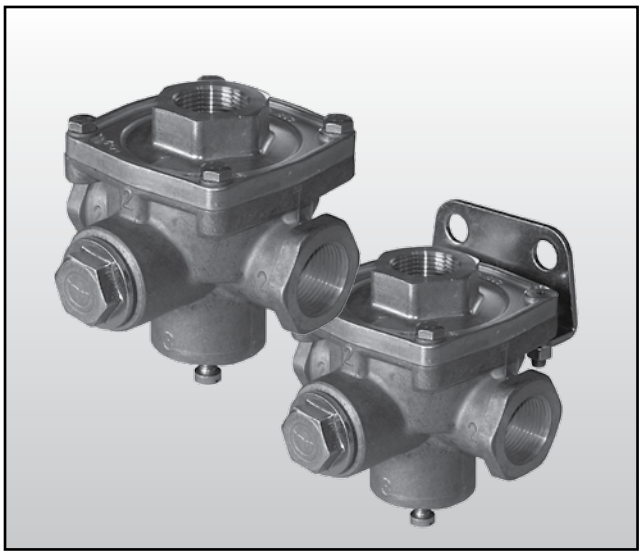
DB21..

Pressure Retaining Valves

Doc. No. Y092387 (EN - Rev. 002)
May 2015

PD-110-300

Function



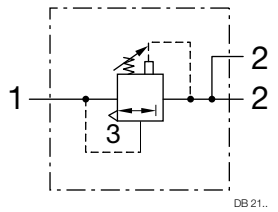
A **Retention Valve** is typically installed on an axle where the brake chambers are larger than those on the other axle(s). At low braking pressures, overbraking of the this axle can sometimes occur. For example, on a drawbar trailer the front axle may often have brake chambers that are larger than those on the rear axle.

A **Retention Valve** is used to reduce pressure by a specific ratio until the supply pressure rises above the valve's run-out pressure (where the input to output ratio of the valve returns to 1:1). The retention (threshold) pressure is the pressure at which the valve starts to deliver air to the service brake actuators and this pressure is adjustable.

The valve incorporates a quick release feature to hasten the exhaust of the brakes.

Valves with varying ratios and run-out pressures are available to suit most applications.

Standard Symbol as DIN ISO 1219



Technical Features

Maximum operating pressure:	8.0 bar
Operating Temperature Range:	-25 °C to +60 °C
Weight:	0.5 kg approx.

Range Overview

Part No.	Type No.	Threshold Pressure [bar]	Reference Pressure [bar]	Output Pressure [bar]	Air Port Threads		Support Bracket
					1	2	
I43387	DB2110	0.5	1.6	1.5	M22x1.5	2 x M22x1.5	–
I50402	DB2111	0.9	1.6	0.9			–
II14891	DB2135	0.5	1.6	1.5			with
K001939	DB2146	0.8	1.6	1.0			with

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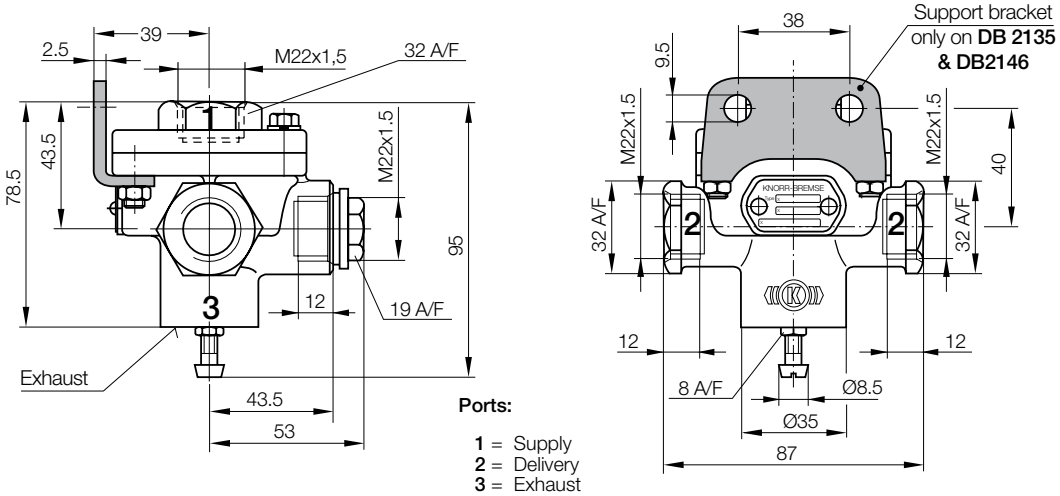
DB21..

Pressure Retaining Valves

Doc. No. Y092387 (EN - Rev. 002)
May 2015

Dimensions

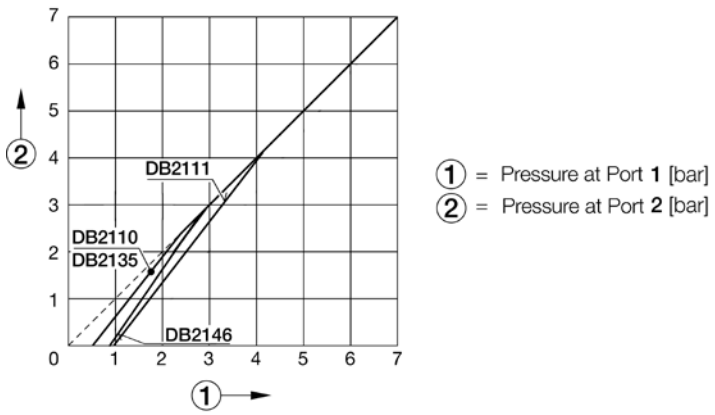
DB2110
DB2111
DB2135
DB2146



Ports:

1 = Supply
2 = Delivery
3 = Exhaust

Performance Graphs



Servicing

For information on the servicing of Pressure Retaining Valves refer to the Product Search area of the website www.Knorr-BremseCVS.com.

Revision Details

Rev. 000	March 2011	New document.
Rev. 001	March 2014	DB2113 deleted. Mounting bracket added to DB2146.
Rev. 002	May 2015	Text amended to suit other catalogues.

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Product DATA

RE2118, KX2..., 1186892

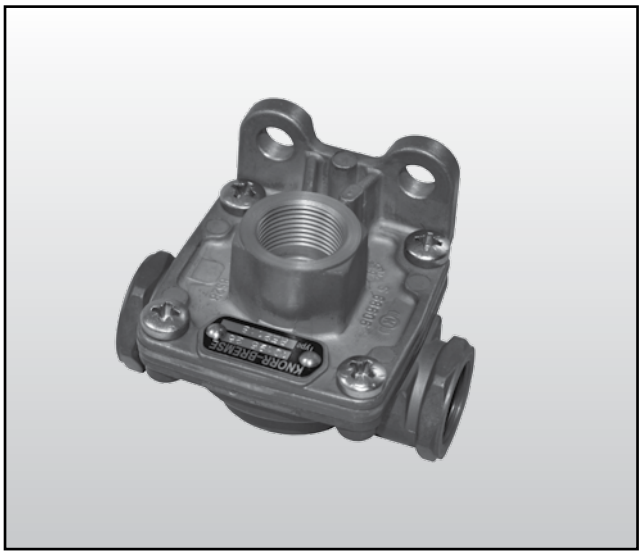
Quick Release Valves

Doc. No. Y011358 (EN - Rev. 002)
May 2015

Function

The **Quick Release Valve** is generally used in the supply to the spring portions of spring brake actuators to speed up the application of the parking brake.

The **Quick Release Valve** KX2552/3 with by-pass can be useful in air suspension systems by ensuring the complete venting of the air bag.



Technical Features

Maximum operating pressure:	10 bar
Operating Temperature Range:	-40 °C to +80 °C
Weight:	see table

Range Overview

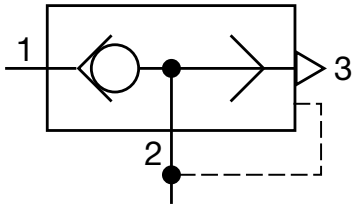
Part No.	Type No.	Air Port Threads		
		1	2	3
I92200	RE2118	M22x1.5	2 x M22x1.5	Exhaust flap in M22x1.5
KX2000/1*	-	M22x1.5	2 x M22x1.5	M22x1.5*
KX2552/3*	-	M22x1.5	2 x M16x1.5	M22x1.5*
1186892*	-	M22x1.5	2 x M16x1.5	M22x1.5*

Part No.	Type No.	By-pass	Weight (kg) approx.
I92200	RE2118	-	0.3
KX2000/1*	-	-	0.3
KX2552/3*	-	Ø 2.0 mm	0.3
1186892	-		0.3

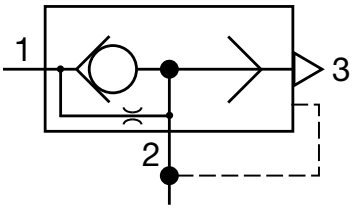
***** without Exhaust Flap **I46367** in Port 3. It can be purchased separately.

Standard Symbol as DIN ISO 1219

RE2118
KX2000/1
1186892



KX2552/3



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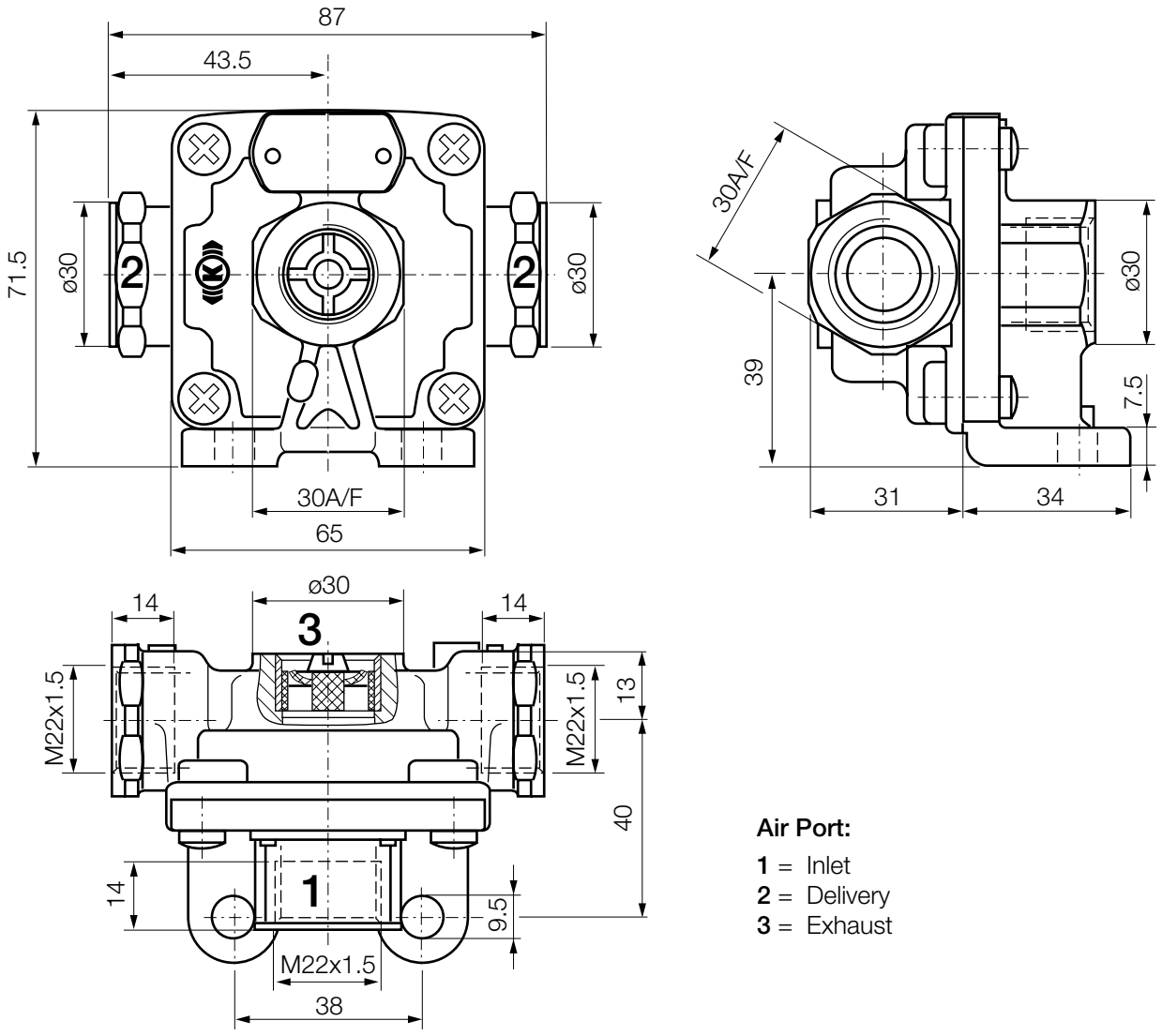
RE2118, KX2..., 1186892

Quick Release Valves

Doc. No. Y011358 (EN - Rev. 002)
May 2015

Dimensions

RE2118



Air Port:

1 = Inlet
2 = Delivery
3 = Exhaust

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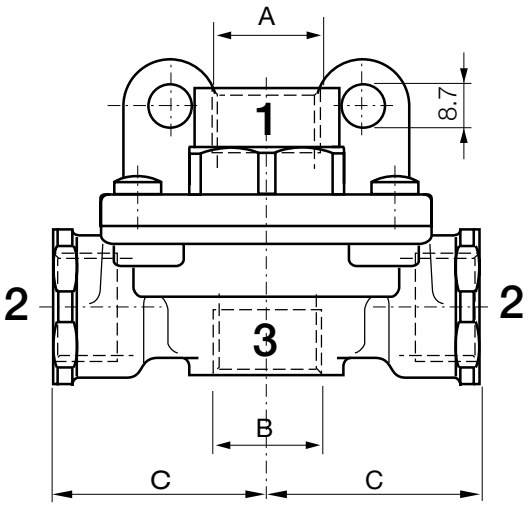
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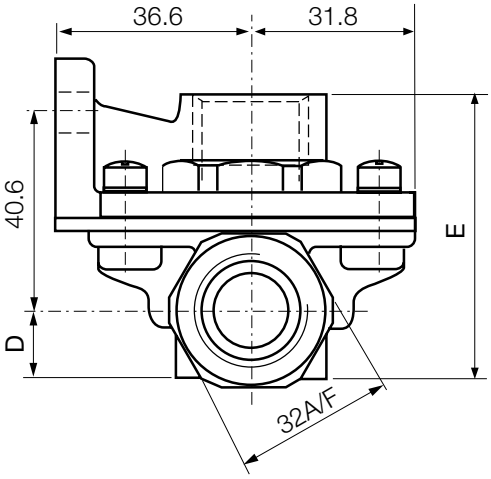
RE2118, KX2..., 1186892

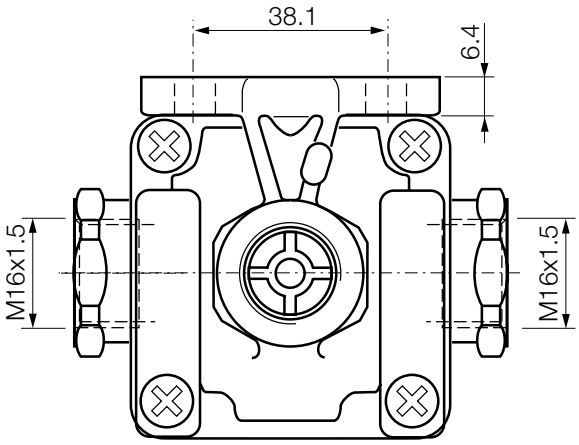
Doc. No. Y011358 (EN - Rev. 002)
May 2015

Quick Release Valves

KX2552/3
1186892







Air Port:

1 = Inlet
2 = Delivery
3 = Exhaust

Part No.	A	B	C	D	E
KX2552/3	M22x1.5	M22x1.5	41.9	14.5	44.3
1186892	M22x1.5	M22x1.5	41.6	14.0	43.9

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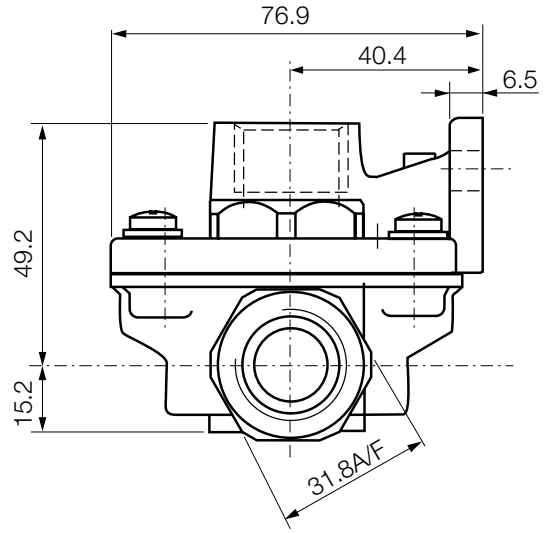
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

RE2118, KX2..., 1186892

Quick Release Valves

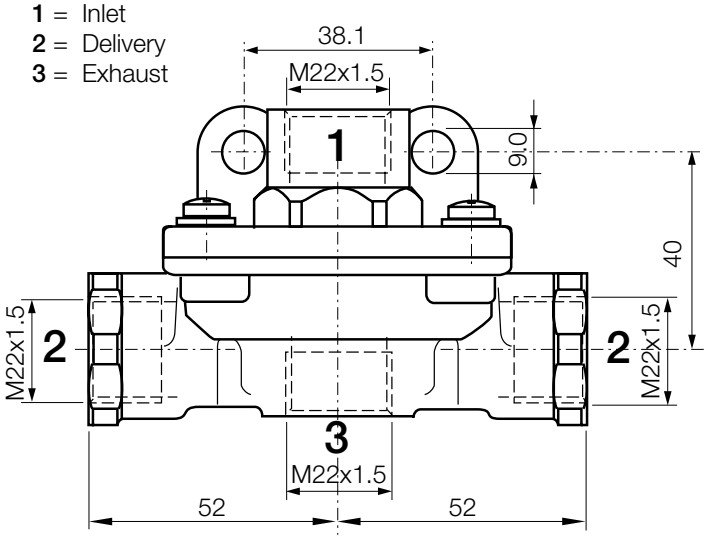
Doc. No. Y011358 (EN - Rev. 002)
May 2015

KX2000/1



Air Port:

1 = Inlet
2 = Delivery
3 = Exhaust



Installation

1) Mount the Quick Release Valve in an upright position, exhaust port 3 facing downwards.
2) Never block the exhaust port or allow it to be close to any part of the vehicle.

Note - ensure that the exhaust is masked during any painting of the vehicle.

Servicing

For information on the servicing of Quick Release Valves refer to the Product Search area of the website www.Knorr-BremseCVS.com.

Revision Details

Rev. 001	February 2012	Updated format for new Trailer Catalogue.
Rev. 002	May 2015	1186892 added, RE2108, RE2113, KX1294/2/4, KY2196/1 and 1194339 deleted. Servicing added on page 4.

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

AE51..

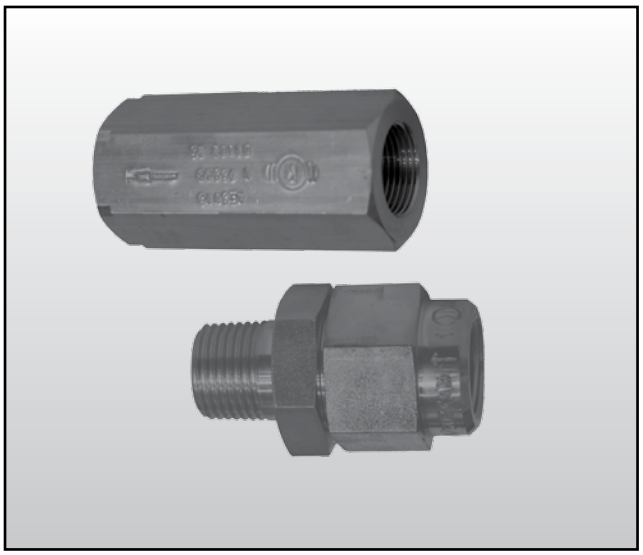
Single Check Valves

Doc. No. Y011355 (EN - Rev. 002)
May 2015

PD-112-100

Function

The **Single Check Valve** ensures air pressure flows in one direction only.

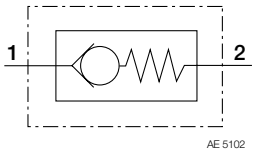


Technical Features

	AE5102	AE5131
Maximum operating pressure:	22 bar	13 bar
Operating Temperature Range:	-45 °C to +160 °C	-45 °C to +80 °C
Way through:	8 mm dia.	9 mm dia.
Weight:	0.15 kg approx.	0.06 kg approx.

Standard Symbol as DIN ISO 1219

AE5102
AE5131



Range Overview

Part No.	Type No.	Air Port Thread - Depth / Length	Design
I60422	**AE5102**	M22x1.5 (Internal)- 14	Light alloy, hexagon
K001349	**AE5131**	M22x1.5 (Internal)- 12 M22x1.5 (External)-14	

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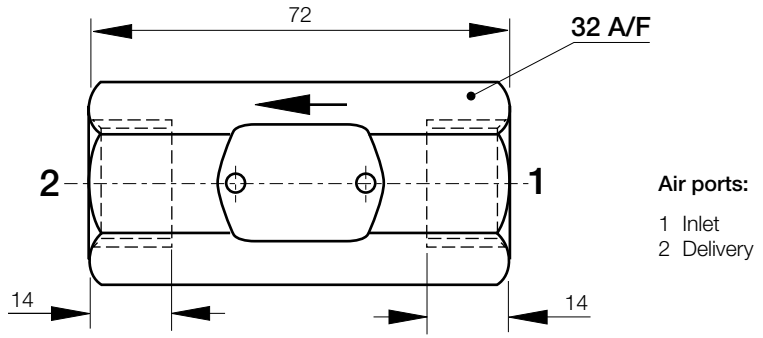
AE51..

Single Check Valves

Doc. No. Y011355 (EN - Rev. 002)
May 2015

Dimensions

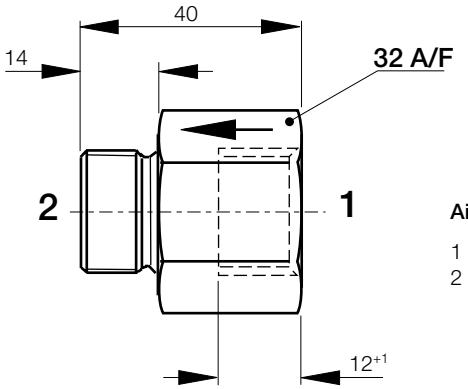
AE5102



Air ports:

1 Inlet
2 Delivery

AE5131



Air ports:

1 Inlet
2 Delivery

Installation

The Single Check Valve **AE5102** is suitable for in-line mounting, **AE5131** is designed to be installed in a valve or reservoir port.

Servicing

Single Check Valves are not serviceable.

Revision Details

Rev. 001	March 2011	Updated layout for new Trailer Catalogue.
Rev. 002	May 2015	Installation and Servicing sections added page 2.

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

AE4105, 295358

Double Check Valves

Doc. No. Y011356 (EN - Rev. 002)
May 2015

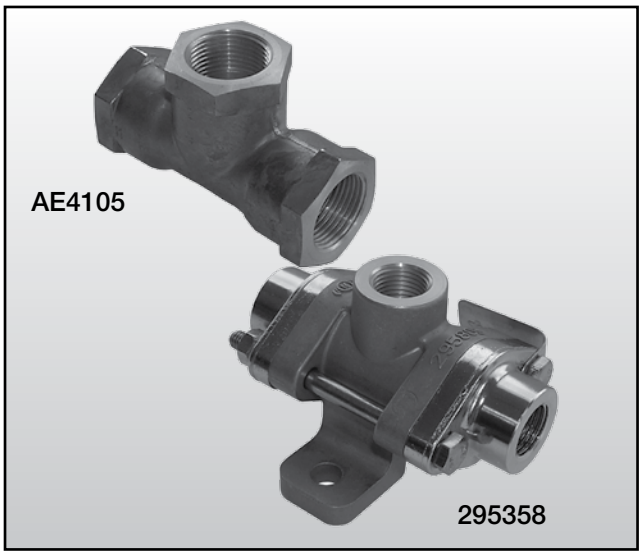
PD-112-200

Function

A **Double Check Valve** can accept signal pressures from two separate sources, the higher pressure will be delivered and the lower pressure will be isolated.

The **Double Check Valve** is often used as an anti-compounding device for vehicles equipped with spring brake actuators.

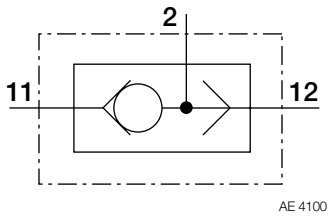
If a vehicle is parked (no pressure in spring portions of the spring brake actuators) and the service brake is subsequently applied, the **Double Check Valve** directs service pressure into the spring portions of the spring brake actuators. This eliminates the compounding force of a simultaneous parking brake and service brake application which can damage the vehicle's foundation brakes.



Technical Features

Maximum operating pressure:	10 bar
Operating Temperature Range:	-40 °C to +80 °C
Way through:	
I**40405-AE4105**	Ø 14 mm
295358	Ø 11 mm
Minimum pressure differential:	0.15 bar
Weight:	
I**40405-AE4105**	0.10 kg approx.
295358	0.32 kg approx.

Standard Symbol as DIN ISO 1219



Range Overview

Part No.	Type No.	Air Port Threads	Design
I**40405**	**AE4105**	M22x1.5	Without bracket
295358	**-**	M16x1.5	With bracket

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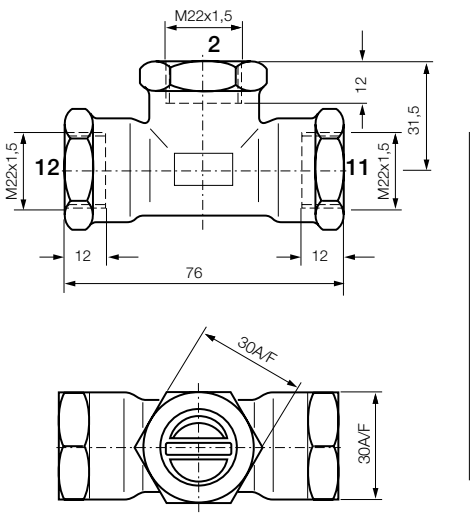
AE4105, 295358

Double Check Valves

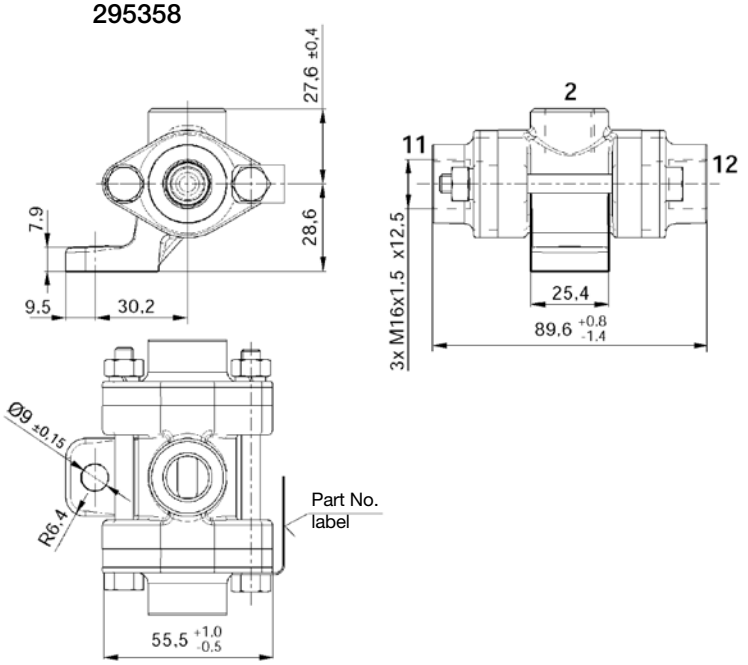
Doc. No. Y011356 (EN - Rev. 002)
May 2015

Dimensions

AE4105



295358



Air ports:
11 = Inlet
12 = Inlet
2 = Delivery

Installation

Double Check Valves are designed to be in-line or bracket mounted.

Servicing

Double Check Valves are not serviceable.

Revision Details

Rev. 001	March 2011	Updated layout for new Trailer Catalogue.
Rev. 002	May 2015	AE4100 and 1111419000 deleted. Installation and Servicing sections added.

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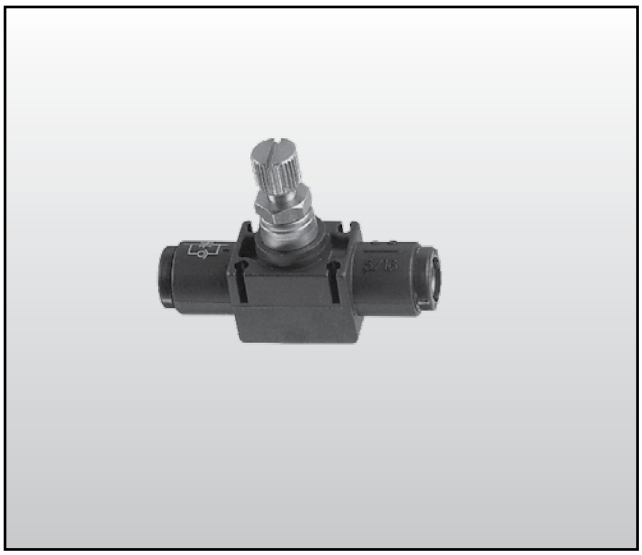
Product DATA

SEB00778
Throttle Check Valve

Doc. No. Y011384 (Rev. 002)
March 2011

PD-112-400

Function



The **Throttle Check Valve** is used in air systems to control the rate of air flow in one direction whilst allowing full flow in the other direction.

The valve is typically used on trailers in combination with a small reservoir prior to the charging valve in the control line of an axle lifting valve AE1124 (see PD-503-100, Document No. *Y011380*).

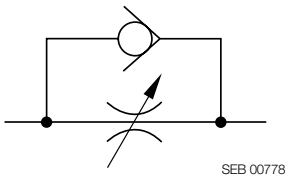
The **Throttle Check Valve** and reservoir act to dampen any pressure variations (caused by cornering or rough road surface) in the non-lift axle suspension systems that can otherwise cause the lift axle of a semi-laden trailer to lower.

As the load imposed on the non-lift axle suspension is reduced, air pressure from the damping reservoir can flow un-throttled back into the suspension system.

The flow rate through the valve is adjustable using the 'setting screw'. The valve is supplied complete with pre-installed "push-in" pipe fittings.

Standard Symbol as DIN ISO 1219

SEB00778

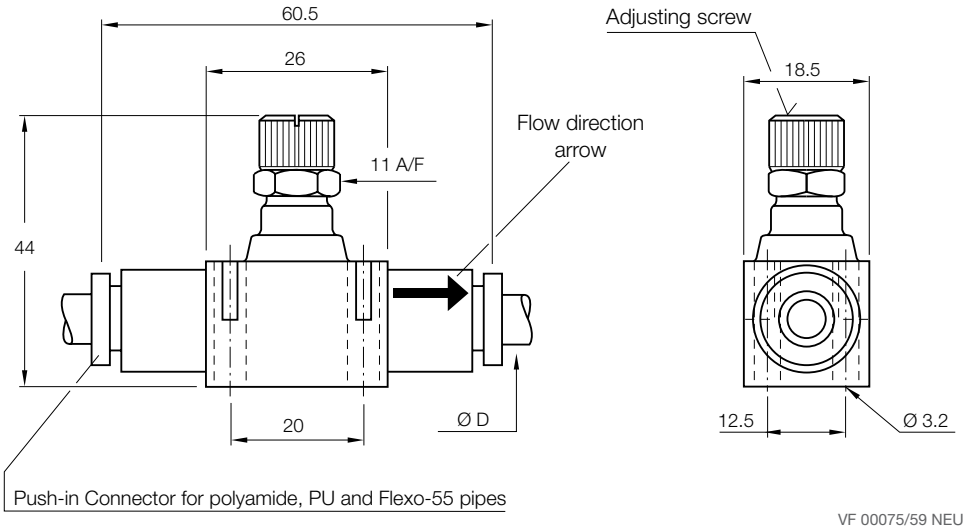


Technical Features

Maximum operating pressure:	10 bar
Operating temperature range:	-40 °C to +80 °C
Maximum 'way through'	Ø 2.5 mm
Weight:	0.05 kg approx.

Part No.	Type No.	Fittings for Pipe Diameter "D"
SEB00778	-	8 mm

Dimensions



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Item No. K002501

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Doc. No. Y011384 (Rev. 002)
March 2011

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Item No. K002501

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

K060386

Select Low Valve (Double Cut-off Valve)

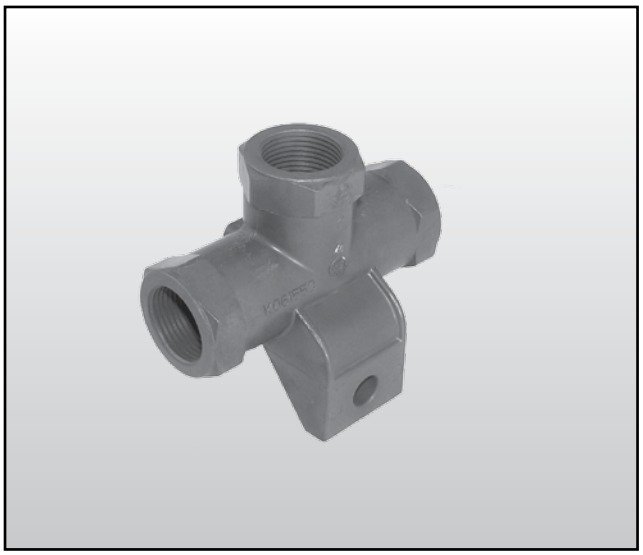
Doc. No. Y207330 (EN - Rev. 000)
May 2015

Function

The **Select Low Valve** can accept signal pressures from two separate sources, the lower pressure will be delivered and the higher pressure will be isolated.

On trucks and tractors the **Select Low Valve** is often used in Antilock Braking Systems (ABS) on tag axles which do not have wheel speed sensors fitted. The valve prevents locking of the tag axle wheels.

On vehicles with independent ABS control on steering axles the **Select Low Valve** is often used to avoid a differential torque being introduced into the steering system.



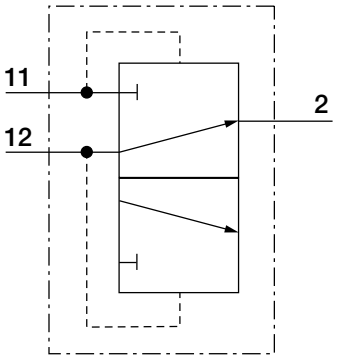
Technical Features

Maximum pressure:	13 bar
Normal operating pressure:	10 bar
Operating Temperature Range:	-40 °C to +80 °C
Maximum Temperature;	+110 °C for one hour (not operating)
Way through:	Ø 8 mm
Weight:	0.32 kg approx.

Part No.	Type No.	Air Port Threads	Design
K060386 [1)]	**-**	M22x1.5	With bracket

[1)] The part number will carry a suffix "N00" which defines that it is supplied without packaging.

Standard Symbol as DIN ISO 1219



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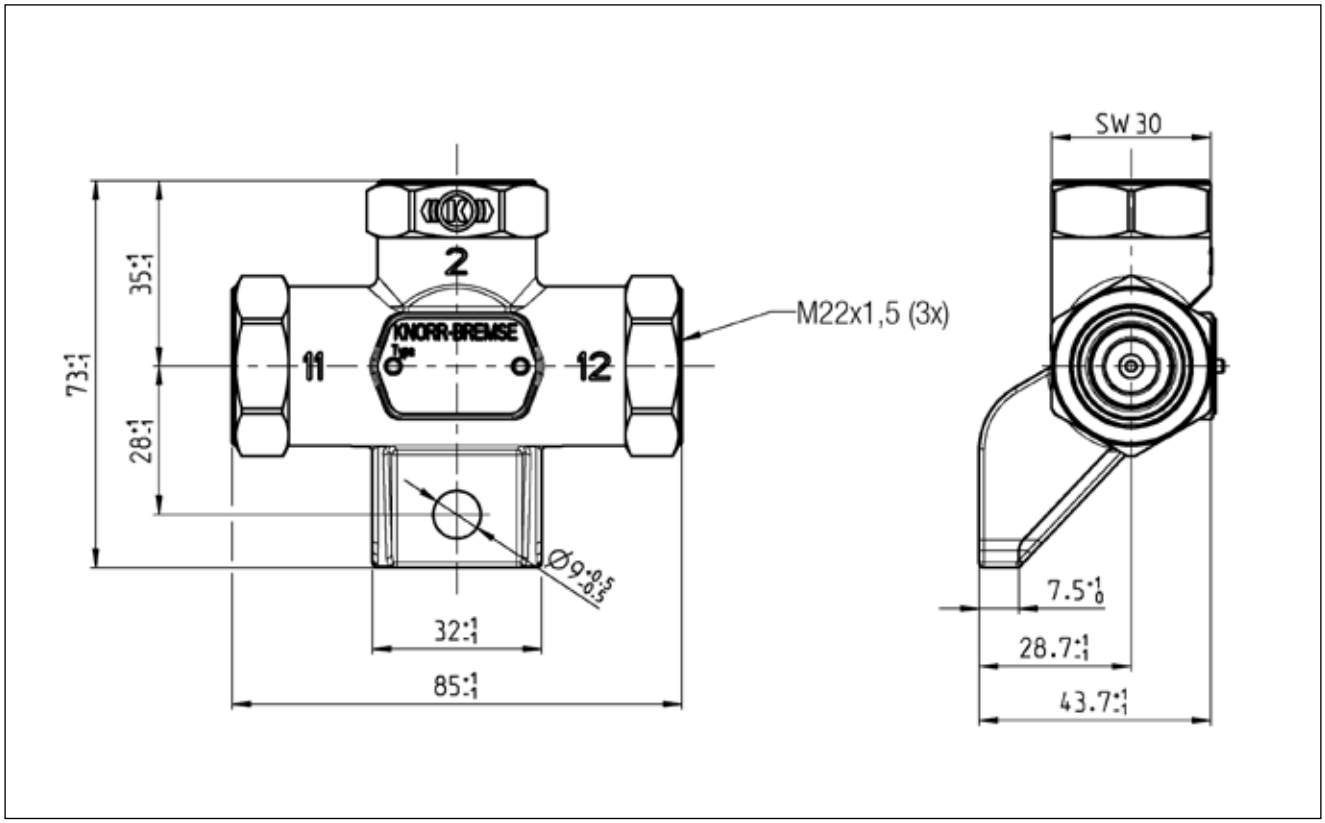
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

K060386

Select Low Valve (Double Cut-off Valve)

Doc. No. Y207330 (EN - Rev. 000)
May 2015

Dimensions



Installation

1) Mount the **Select Low Valve** inside the chassis.
2) Fix with: 1 x M8 bolt. Tightening torque max. 20 Nm.
3) Maximum tightening torque for pipe fittings = 60 Nm.

Servicing

The **Select Low Valve K060386** is not serviceable.

Revision Details

Rev. 000	May 2015	New document.

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

AE4261

Manoeuvring Valve (Semi-trailer)

Doc. No. Y011350 (EN - Rev. 002)
July 2015

PD-113-110

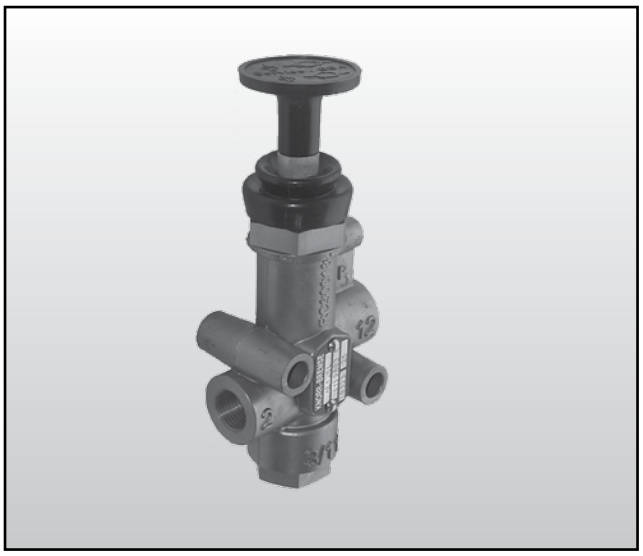
Function

The **Manoeuvring Valve** on the trailer allows the service brakes of an un-coupled trailer to be released for manoeuvring/"shunting" purposes by pushing in the knob.

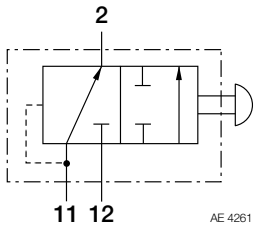
When the supply (red) line is disconnected pushing in the knob of the **Manoeuvring Valve** allows air pressure from the trailer reservoir to be fed to the relay emergency valve thus automatically releasing the service brakes.

When the trailer is re-coupled, connection of the supply (red) line will cause the knob to automatically return to the 'driving' position.

Caution: Always ensure that after manoeuvring, the valve's knob is pulled out and the trailer park valve is correctly applied.



Standard Symbol as DIN ISO 1219



Technical Features

Maximum operating pressure:	8.0 bar
Operating temperature range:	-40 °C to +80 °C
Air port threads:	M16x1.5
Way through:	Ø 4.5 mm
Weight:	0.5 kg approx.

Part No.	Type No.	Mounting	Lock in place (in end position)	Non-return Valve (port **12**)	Knob
II19803	**AE4261**	2 x M8 Screws or with Mounting Bracket (see page 2)	with	without	Round, black with function symbol

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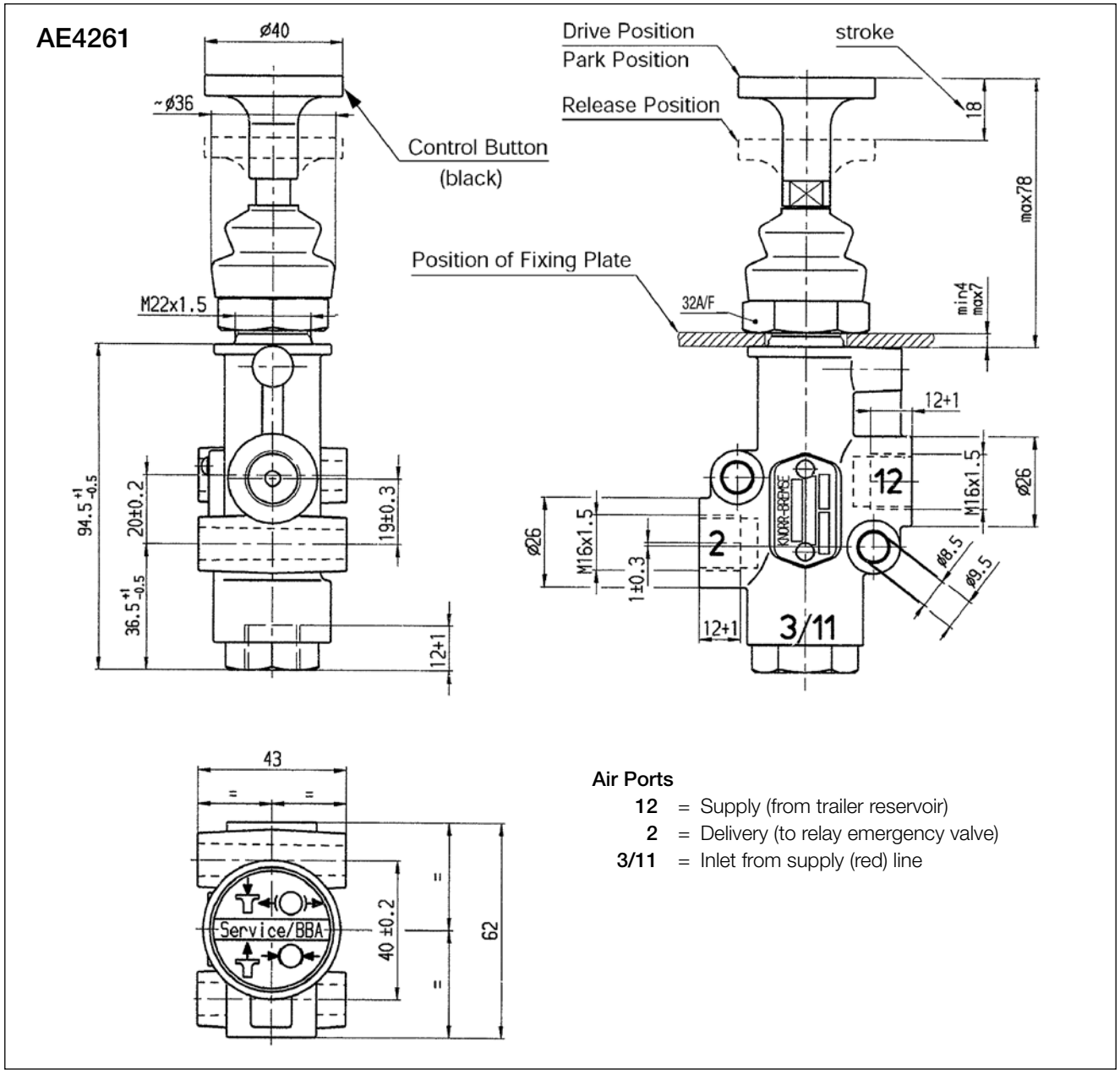
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AE4261

Manoeuvring Valve (Semi-trailer)

Doc. No. Y011350 (EN - Rev. 002)
July 2015

Dimensions



Air Ports

12	=	Supply (from trailer reservoir)
2	=	Delivery (to relay emergency valve)
3/11	=	Inlet from supply (red) line

Revision Details

Rev. 001	March 2011	Revised format for new Trailer Catalogue.
Rev. 002	July 2015	Mounting clarified.

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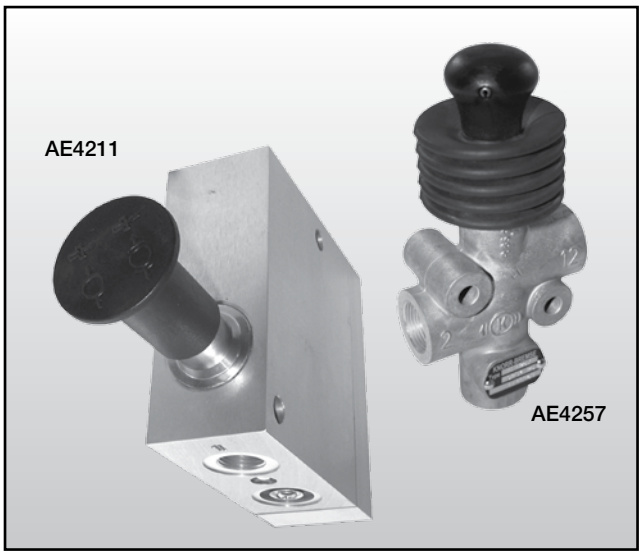
Product DATA

AE4211, AE4257

Manoeuvring Valves (Drawbar Trailers)

Doc. No. Y011349 (Rev. 002)
March 2011

Function



The **Manoeuvring Valve** (also known as Release Valve or Shunt Valve) is used on drawbar trailers. Uncoupling the supply (red) line to the trailer causes all of the brake actuators to be applied through the action of the emergency function on the trailer. The **Manoeuvring Valve** is used to temporarily release the brakes to enable manoeuvring of the uncoupled trailer.

Drawbar trailers fitted with a relay emergency valve and an ABS system use **Manoeuvring Valve AE4257**. When the black knob is pushed in the emergency function is reset and the service brakes on all axles are released to give full trailer manoeuvrability.

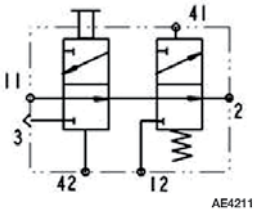
Drawbar trailers fitted with TEBS use **Manoeuvring Valve AE4211** in combination with a park/shunt valve with integrated emergency function AE4311 (see PD-113-220, Document No. *Y050820*). These trailers are normally fitted with brake chambers on the front axle and spring brakes on the rear axle(s):

- To release the front axle service brakes to facilitate uncoupling and re-coupling of the trailer push in only the knob of the **Manoeuvring Valve AE4211**.
- To achieve release of all the brakes thus providing full manoeuvrability push in only the black knob of AE4311. This will release the spring brakes and signal **AE4211** to release the service brakes on the front axle.

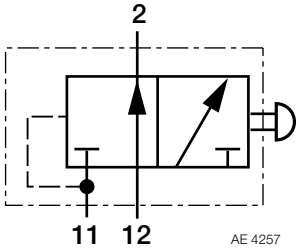
For both types of **Manoeuvring Valve**, when the supply line of the trailer is re-coupled and pressurised an internal actuating valve automatically returns the knob to the driving position.

Standard Symbol as DIN ISO 1219

AE4211



AE4257



Technical Features

Maximum operating pressure:	8.5 bar
AE4211	
Operating temperature range:	-40 °C to +80 °C
Weight:	1.1 kg approx.
AE4257	
Operating temperature range:	-25 °C to +80 °C
Weight:	0.5 kg approx.

Range Overview

Part No.	Type No.	Port Threads	Torque max.	Mounting Holes	Torque max.
K006368	**AE4211**	M16x1.5	45 Nm	2 x Ø8.5	20 Nm
II18068	**AE4257**	M22x1.5	60 Nm	2 x Ø8.5	20 Nm

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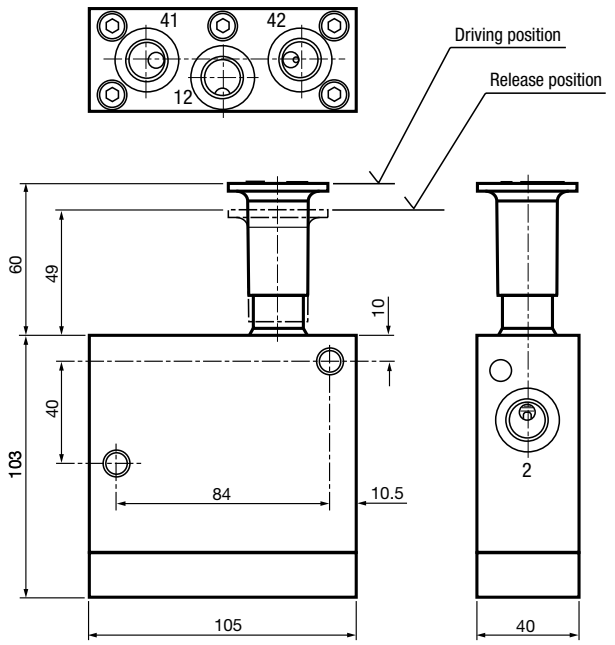
AE4211, AE4257

Manoeuvring Valves (Drawbar Trailers)

Doc. No. Y011349 (Rev. 002)
March 2011

Dimensions

AE4211



Ports:

11 Supply from the trailer air reservoir
12 Supply from the 'Control' line
2 Delivery
41 Signal from the combined park/shunt valve
42 Signal from the 'Supply' line
3 Exhaust

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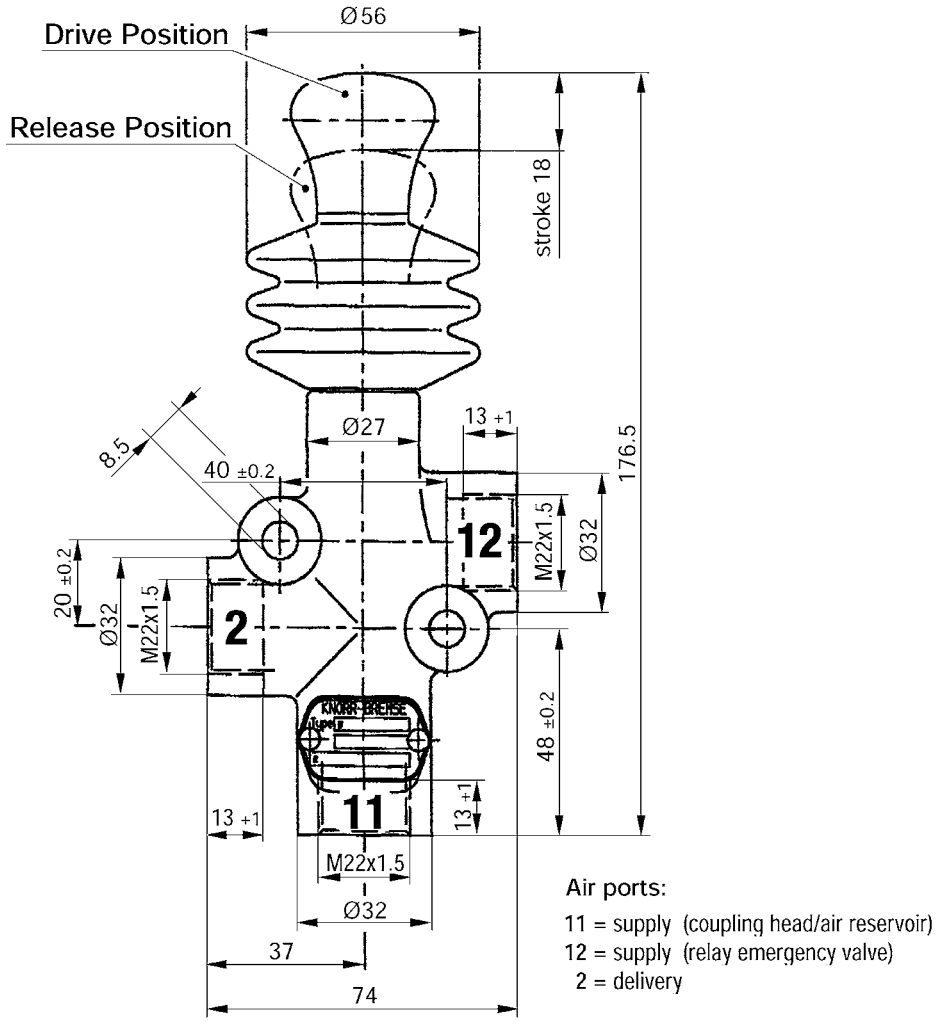
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AE4211, AE4257

Manoeuvring Valves (Drawbar Trailers)

Doc. No. Y011349 (Rev. 002)
March 2011

AE4257



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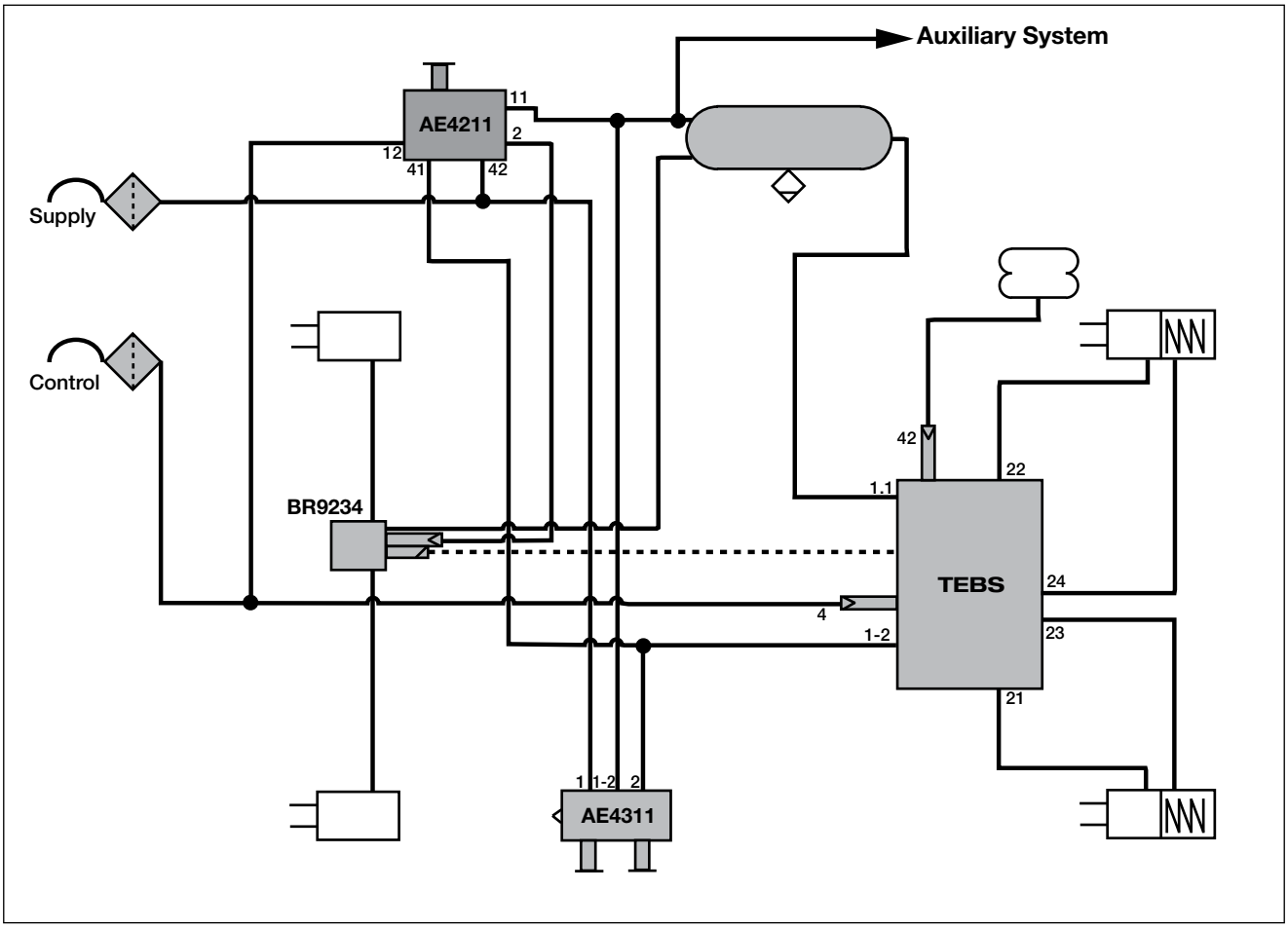
AE4211, AE4257

Manoeuvring Valves (Drawbar Trailers)

Doc. No. Y011349 (Rev. 002)
March 2011

Installation Example

Installation Example - AE4211, 2-Axle Drawbar Trailer with Spring Brakes and TEBS4



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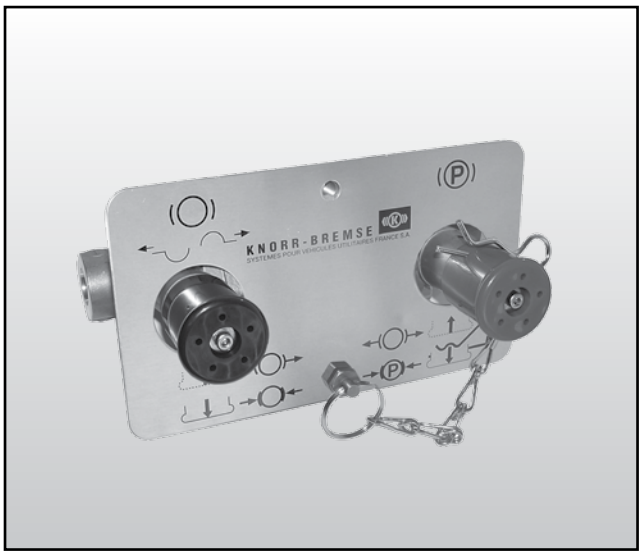
Product DATA

AE424.
Park/Shunt Valves

Doc. No. Y011353 (Rev. 001)
March 2011

PD-113-210

Function



The **Park/Shunt Valve** incorporates the park and shunt (manoeuvring) functions for use on trailers equipped with spring brake actuators.

The park function of the **Park/Shunt Valve** supplies and releases pressure to the spring portions of the spring brake actuators. When the trailer is parked, the security pin should be inserted behind the red park button to avoid accidental release of the spring brake actuators. Whether coupled or uncoupled, the red button must be pulled out to correctly park the trailer using its spring brake actuators.

The shunt function of the **Park/Shunt Valve** allows the service brakes of an uncoupled trailer to be released for manoeuvring purposes. In the absence of supply (red) line pressure to the trailer, pushing in the red button to release the parking brakes and then pushing in the black button supplies air pressure from the trailer reservoir to the emergency valve and thereby releases the service brakes. If the black button is left pushed in, when the trailer is re-coupled, air pressure in the supply (red) line will re-set the button to the 'driving' position so that the emergency valve is once again supplied with pressure from the towing vehicle.

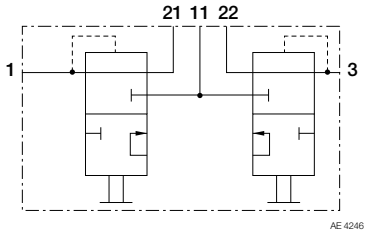
Versions of the **Park/Shunt Valve** are available with an integral non-return valve. This has been introduced to overcome the problem of spring brakes starting to apply in the event of reduced trailer reservoir pressure during prolonged ABS cycling.

When using a **Park/Shunt Valve** with integral non-return valve, extreme care should be taken to ensure that the trailer is correctly parked using the red button. If the trailer is parked on service brakes only, i.e. only supply (red) line is disconnected, and the trailer air pressure depletes, the spring brake actuators will not apply as the non-return valve holds the pressure in the spring portions.

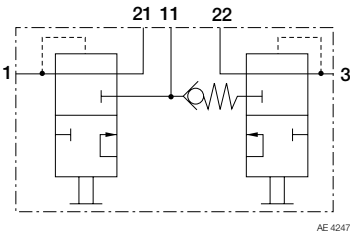
Caution: **Always ensure that the Red Button is pulled out and the trailer is correctly parked, before coupling or uncoupling the trailer.**

Standard Symbol as DIN ISO 1219

AE4246 - II36125
AE4247 - II36129



AE4247 - II36131



Technical Features

Operating pressure:	8.5 bar
Maximum operating pressure:	10.0 bar
Operating temperature range:	-40 °C to +80 °C
Weight:	0.9 kg approx.
Label:	**EB02234**

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AE424.

Park/Shunt Valves

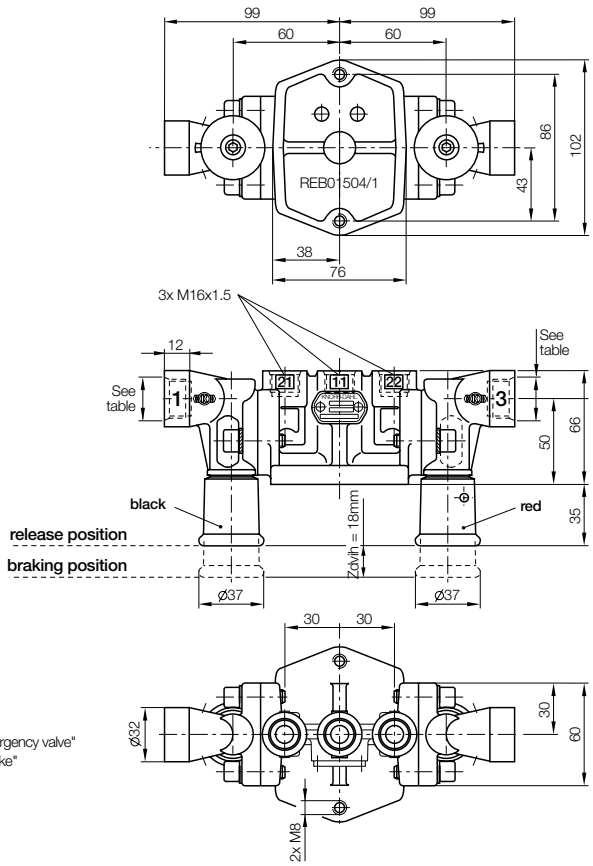
Doc. No. Y011353 (Rev. 001)
March 2011

Range Overview

Part No.	Type No.	Air Port Threads **1** and **3**	Non-Return Valve	Information Plate & Security Pin
II**36125**	**AE4246**	M22x1.5	without	with
II**36129**	**AE4247**	M16x1.5	without	with
II**36131**	**AE4247**	M16x1.5	with	with

Dimensions

AE4246
AE4247



Air ports:

1 = Inlet "supply line"
11 = Inlet "reservoir"
21 = Delivery "Relay emergency valve"
22 = Delivery "Spring brake"
3 = Exhaust

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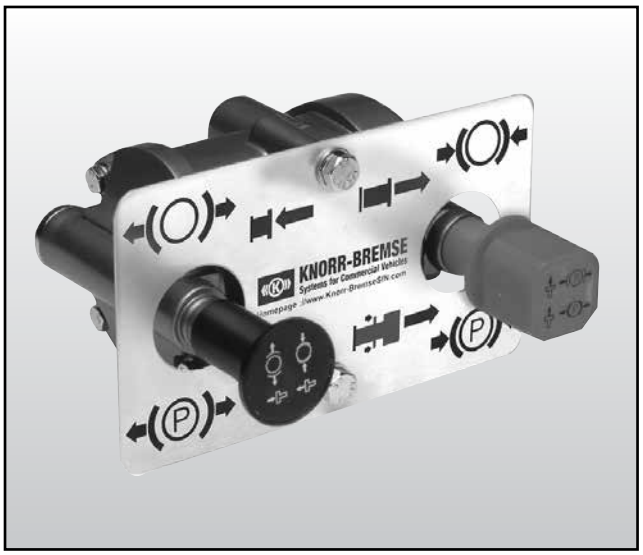
Product DATA

AE431.
Park/Shunt Valves with Integrated Emergency Function

Doc. No. Y050820 (Rev. 001)
March 2014

PD-113-220

Function



The **Park/Shunt Valve AE431.** is used on trailers that are equipped with spring brakes. It is connected to the supply line (red) and enables the manual release and application of the trailer spring brakes. The **AE431.** valve's emergency function ensures that, in the event of loss of pressure in the supply line (red) resulting from uncoupling or failure of the supply line whilst driving, the trailer's spring brakes will automatically be applied by exhausting their air supply and not by applying the trailer's service brakes as with traditional relay emergency valves (REVs). This means there is no longer a need for a separate relay emergency valve and ensures that the trailer is safely parked using the spring brakes, especially when the air pressure depletes.

An additional benefit of this functionality is that the spring brakes are automatically applied every time the trailer is uncoupled. This helps the spring brakes to retain their output force since the springs do not remain compressed for long periods of time.

This feature also reduces the possibility of air leakage when the trailer is uncoupled since, in contrast with trailers with a REV, nearly all pipes and hoses are exhausted.

Some variants of the **Park/Shunt Valve** are available with an integrated charging valve and push-to-connect fittings. This means that these valves have two additional delivery ports, e.g. for the air suspension which will simplify the piping work.

The charging valve ensures the priority charging of the brake reservoir before supplying pressure to the auxiliary circuit (air suspension). In the event of pressure loss in the brake system or auxiliary circuit the valve will protect the pressure in the intact circuit.

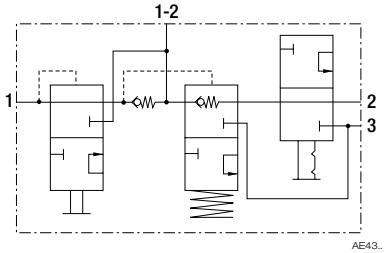
Both knobs of the **AE431.** control the spring brakes:

- The red knob is used to operate the parking brake. It has a safety function incorporating a locking sleeve that protects against unintentional operation.

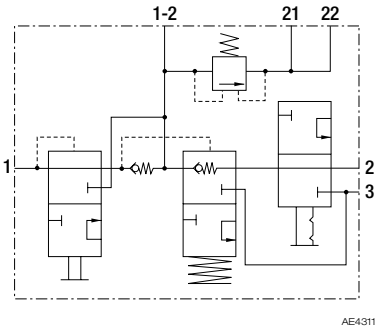
- The black knob is used for manoeuvring the uncoupled trailer. However, in contrast with conventional release valves, it operates the spring brakes. It can only be pushed in when the trailer is uncoupled and re-connection of the supply line (red) will cause it to pop out automatically returning it to the driving position.

Standard Symbols as DIN ISO 1219

Without integrated charging valve



With integrated charging valve



The mounting plate **Z006845** (see page 2) explains the operation of the two knobs and can be ordered separately.

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Item No. K050466

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

AE431.

Park/Shunt Valves with Integrated Emergency Function

Doc. No. Y050820 (Rev. 001)
March 2014

Technical Features

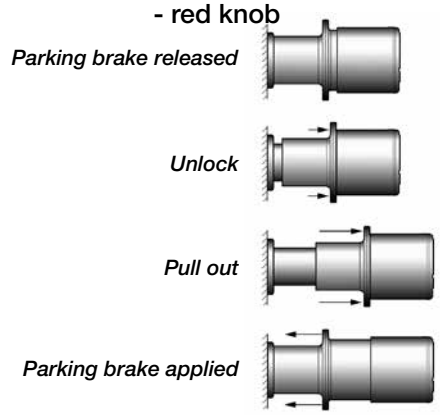
Maximum Operating Pressure: 10 bar
Operating Temperature Range: -40 °C to +80 °C
Weight: 1.45 kg approx.

Charging Valve function:
Opening Pressure: 6.0 bar
Closing Pressure: 5.2 bar

Service Brake Priority:
When charging the trailer's air systems the service brake reservoir is given priority up to a pressure of 3.0 bar.

Emergency function:
In the event of a pressure drop at port **1** below 2.6 bar, the spring brakes are automatically applied.

Operation of the parking brake - red knob



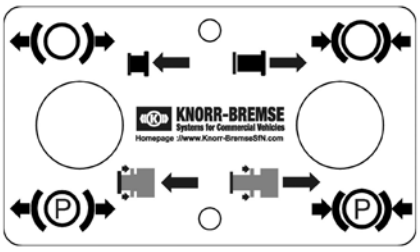
Range Overview

Part No.	Type No.	Air Ports			Remark	Charging Valve	Fittings supplied (push to connect)
		1, 1-2,	21, 22	2			
K015849	**AE4311**	M16x1.5	-	M22x1.5	With rubber flap	No	No
K015380		M16x1.5	M16x1.5	M22x1.5		Yes	No
K020123		PTC 8x1	PTC 8x1	PTC 12x1.5		Yes	Yes

Port	Use for	Thread	Push-to-Connect Fittings to suit pipe size
1	Supply (from red supply line)	M16x1.5 - DIN 3852	8x1
1-2	Supply/delivery (from/to reservoir)	M16x1.5 - DIN 3852	8x1
2	Delivery (to spring portions of Spring Brakes)	M22x1.5 - DIN 3852	12x1.5
3	Exhaust	-	-
21	Delivery (to auxiliaries)	M16x1.5 - DIN 3852	8x1
22	Delivery (to auxiliaries)	M16x1.5 - DIN 3852	8x1

Mounting Plate (Part No. Z006845)

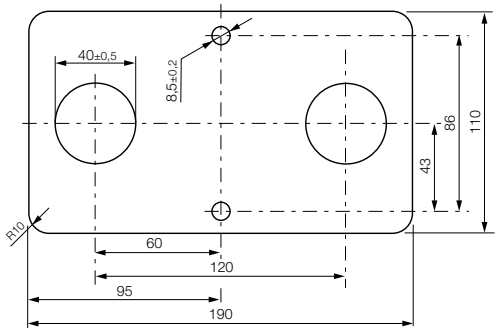
Brake released Brake applied



Black knob - Manoeuvring
(only when the vehicle is uncoupled)

Red knob - Parking

Dimensions



Service Parts

Blanking Plug for 8 mm pipe (Port 21 or 22, PTC) **K064101**

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Item No. K050466

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PD-113-220

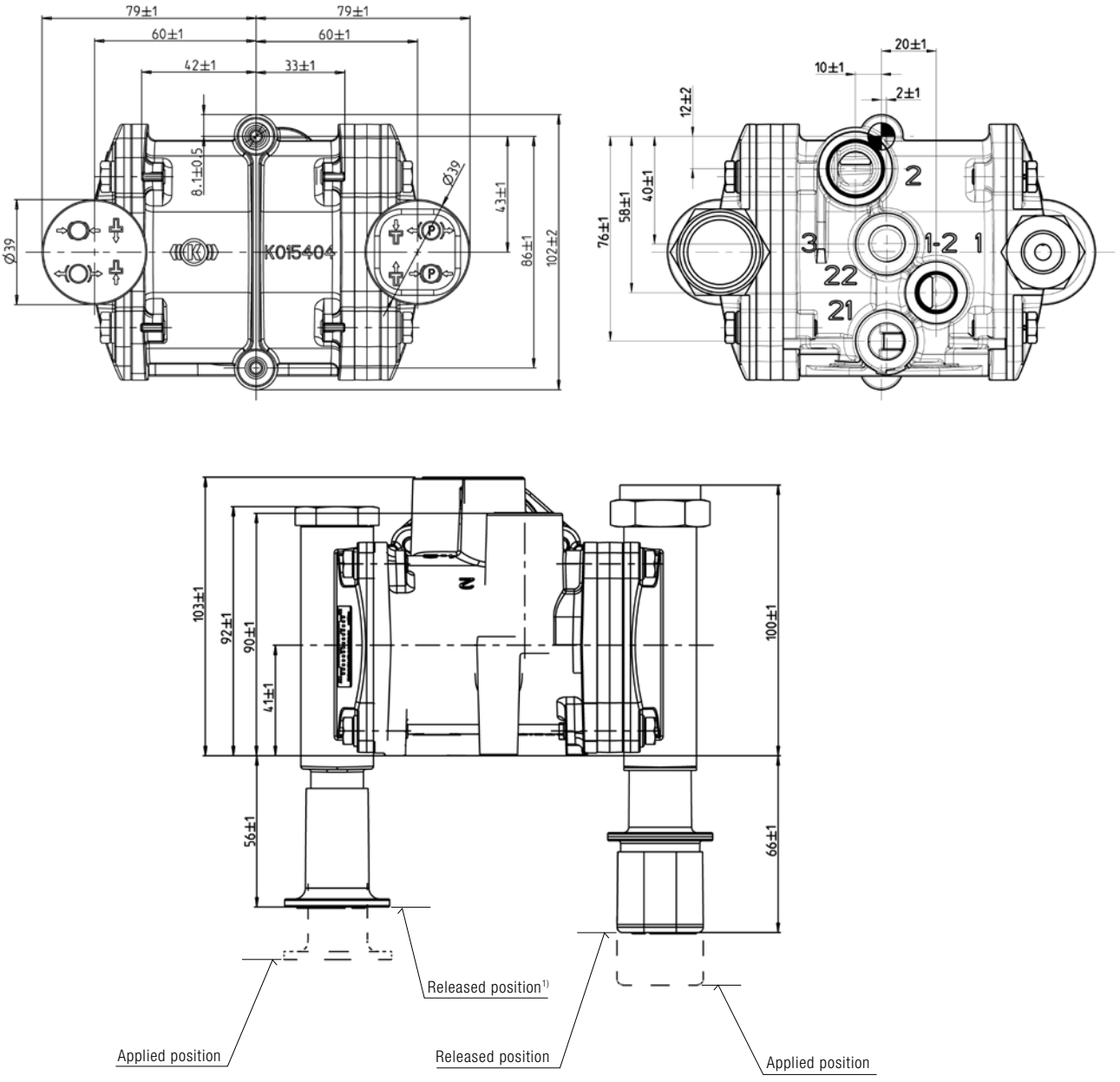
AE431.

Park/Shunt Valves with Integrated Emergency Function

Doc. No. Y050820 (Rev. 001)
March 2014

Dimensions

AE4311 – K015849



Air ports:

1 = Supply (from red supply line)
1-2 = Supply/delivery (from/to reservoir)
2 = Delivery (to spring portions of Spring Brakes)
3 = Exhaust

1) For the **black** knob:
only possible when the supply line (red) is not pressurised

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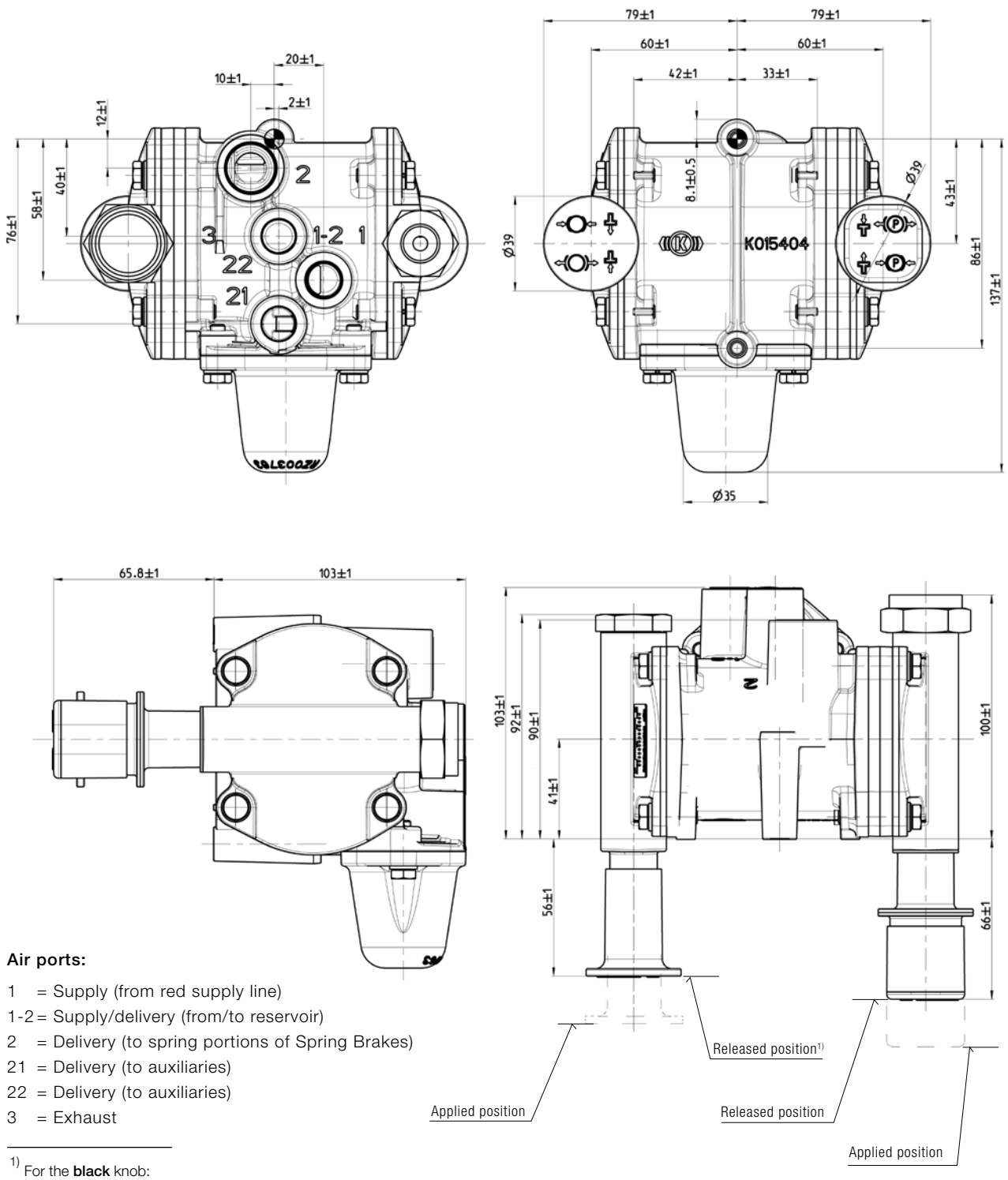
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

AE431.

Park/Shunt Valves with Integrated Emergency Function

Doc. No. Y050820 (Rev. 001)
March 2014

AE4311 – K015380



Air ports:

1 = Supply (from red supply line)
1-2 = Supply/delivery (from/to reservoir)
2 = Delivery (to spring portions of Spring Brakes)
21 = Delivery (to auxiliaries)
22 = Delivery (to auxiliaries)
3 = Exhaust

1) For the **black** knob:
only possible when the supply line (red) is not pressurised

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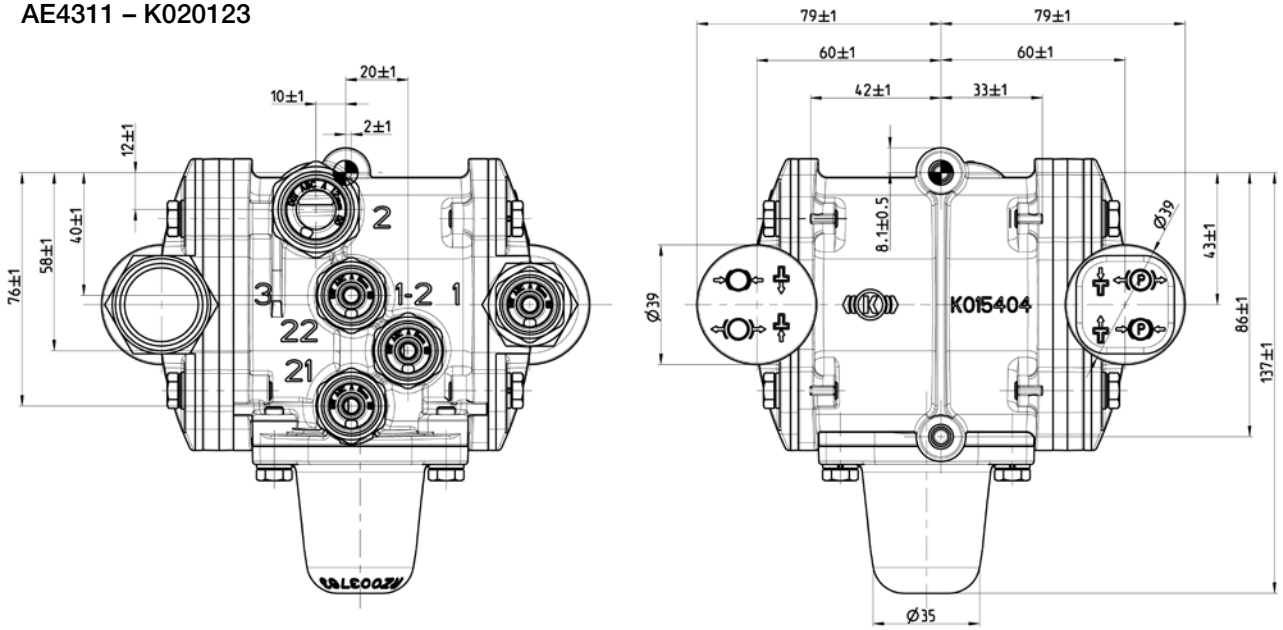
PD-113-220

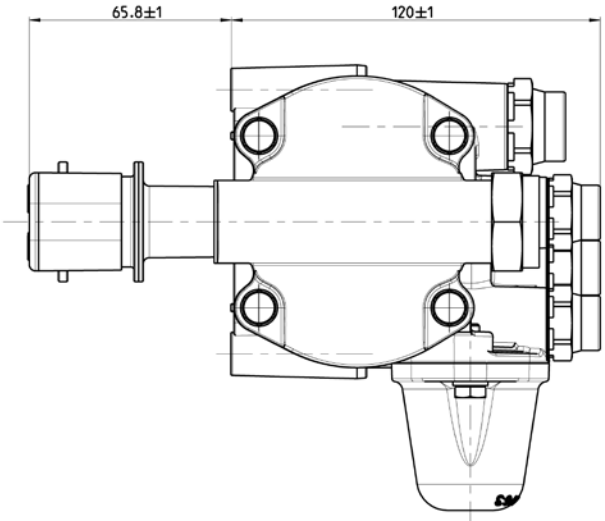
AE431.

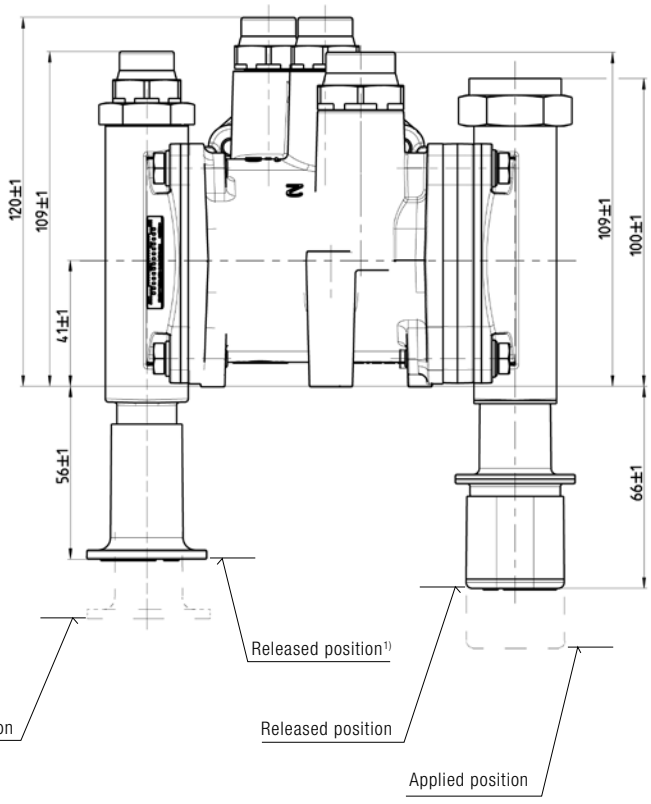
Park/Shunt Valves with Integrated Emergency Function

Doc. No. Y050820 (Rev. 001)
March 2014

AE4311 – K020123







Air ports:

1 = Supply (from red supply line)
1-2 = Supply/delivery (from/to reservoir)
2 = Delivery (to spring portions of Spring Brakes)
21 = Delivery (to auxiliaries)
22 = Delivery (to auxiliaries)
3 = Exhaust

1) For the **black** knob:
only possible when the supply line (red) is not pressurised

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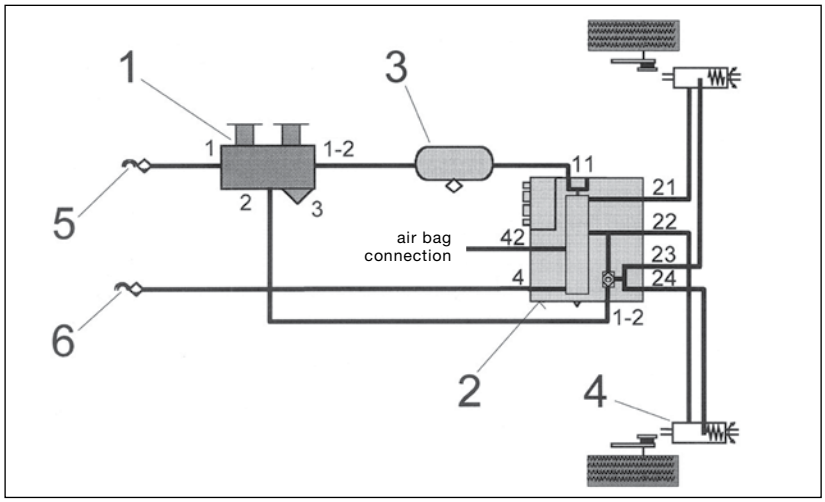
AE431.

Park/Shunt Valves with Integrated Emergency Function

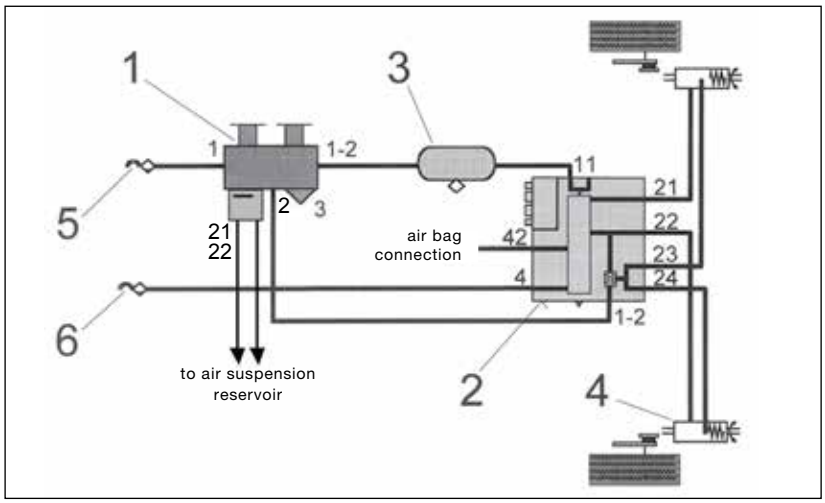
Doc. No. Y050820 (Rev. 001)
March 2014

Installation example AE4311 with EBS

Park / Shunt Valve without Integrated Charging Valve



Park / Shunt Valve with Integrated Charging Valve



Item	Designation
1	Park / Shunt Valve with integrated emergency function
2	TEBS / TEBS G2 brake module
3	Reservoir
4	Spring Brake Actuator
5	Coupling Head with filter. Supply - Red
6	Coupling Head with filter. Control - Yellow

Revision Details

Rev. 000	March 2011	New document
Rev. 000	October 2013	Correction to pages 2 and 3 - ports amended. Service parts added. Correction to page 6 - connections to air suspension clarified
Rev. 001	March 2014	Paragraph concerning charging valve function added on page 1.

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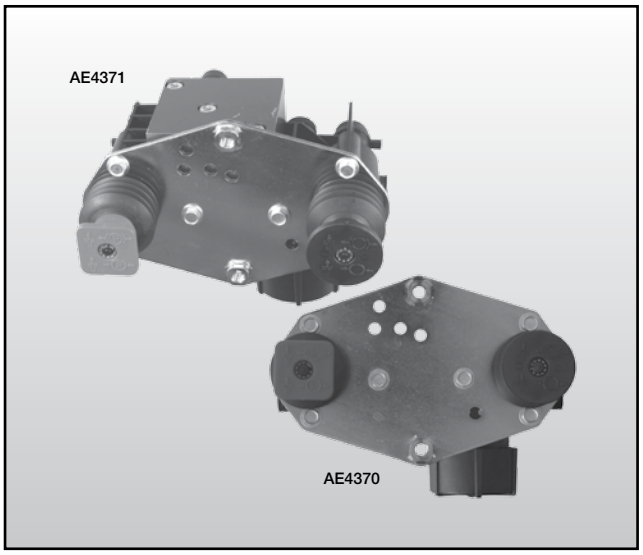
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

AE437.
Park/Shunt Valve with Integrated Charging Valve

Doc. No. Y095829 (EN - Rev. 000)
October 2013

Function



The **Park/Shunt Valve AE437.** enables the manual release and application of the trailer brakes. This variant is designed to be used with the TEBS G2.1 Brake Module which incorporates the automatic brake function to improve its response time.

The **Park/Shunt Valve AE437.** is built with a plastic housing and equipped with an integral charging valve and push-to-connect fittings.

The plastic housing protects against corrosion and ensures a long life.

The charging valve ensures the priority charging of the brake reservoir before supplying pressure to the auxiliary circuit (air suspension). In the event of pressure loss in the brake system or auxiliary circuit the valve will protect the pressure in the intact circuit.

The **Park/Shunt Valve AE4370** for semi and centre-axle trailers has the following functionality:

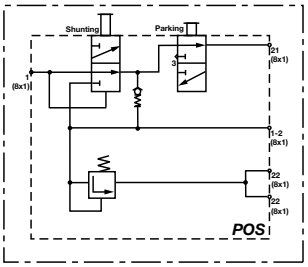
- Manual control of the parking brake (red knob).
- Manoeuvring (shunt) function for use when the trailer is uncoupled (black knob).

The **Park/Shunt Valve AE4371** for drawbar trailers has an integral front axle valve. This valve ensures that the service brakes on the front axle of a drawbar trailer are applied when the supply line is disconnected.

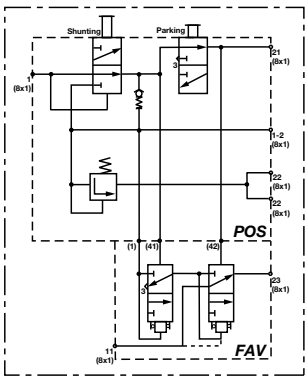
By pulling out the red knob and pushing in the black knob, the brakes on the front axle will be released for coupling the drawbar trailer to the truck.

Standard Symbol as DIN ISO 1219

AE4370



AE4371



Technical Features

Maximum operating pressure:	10.0 bar	
Operating temperature range:	-40 °C to +80 °C	
Weight:	**AE4370**	1.1 kg approx.
	AE4371	2.0 kg approx.

Service Brake Priority:
When charging the trailer's air systems the service brake reservoir is given priority up to a pressure of 3.0 bar.

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Item No. K053290

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

AE437.

Park/Shunt Valve with Integrated Charging Valve

Doc. No. Y095829 (EN - Rev. 000)
October 2013

Range Overview

Part No.	Type No.	Integral Charging Valve	Integral Front Axle Valve	Number of Connections	Push-to-Connect Fittings supplied
K025700 [1]	**AE4370**	Yes	No	5	Yes
K025699 [1]	**AE4371**	Yes	Yes	7	Yes

Information Plate: K056570 [1]

[1] The part number will carry a suffix, "N##" which defines the packaging requirements of different market sectors, e.g. N00, N50. Example: K025700N00 - is supplied without packaging.

Port	Valve		Connection	Push-to-Connect Fittings (to suit pipe size)
	AE4370	AE4371		
1	**X**	**X**	Supply (from red line)	8 x 1
1-2	**X**	**X**	Supply/Delivery (from/to brake reservoir)	8 x 1
11		**X**	Supply (from yellow line)	8 x 1
21	**X**	**X**	Delivery (to TEBS G2.1 Brake Module)	8 x 1
22	**X**	**X**	Delivery (to auxiliaries)	8 x 1
23		**X**	Delivery (to front axle service brakes)	8 x 1
3	**X**	**X**	Exhaust	

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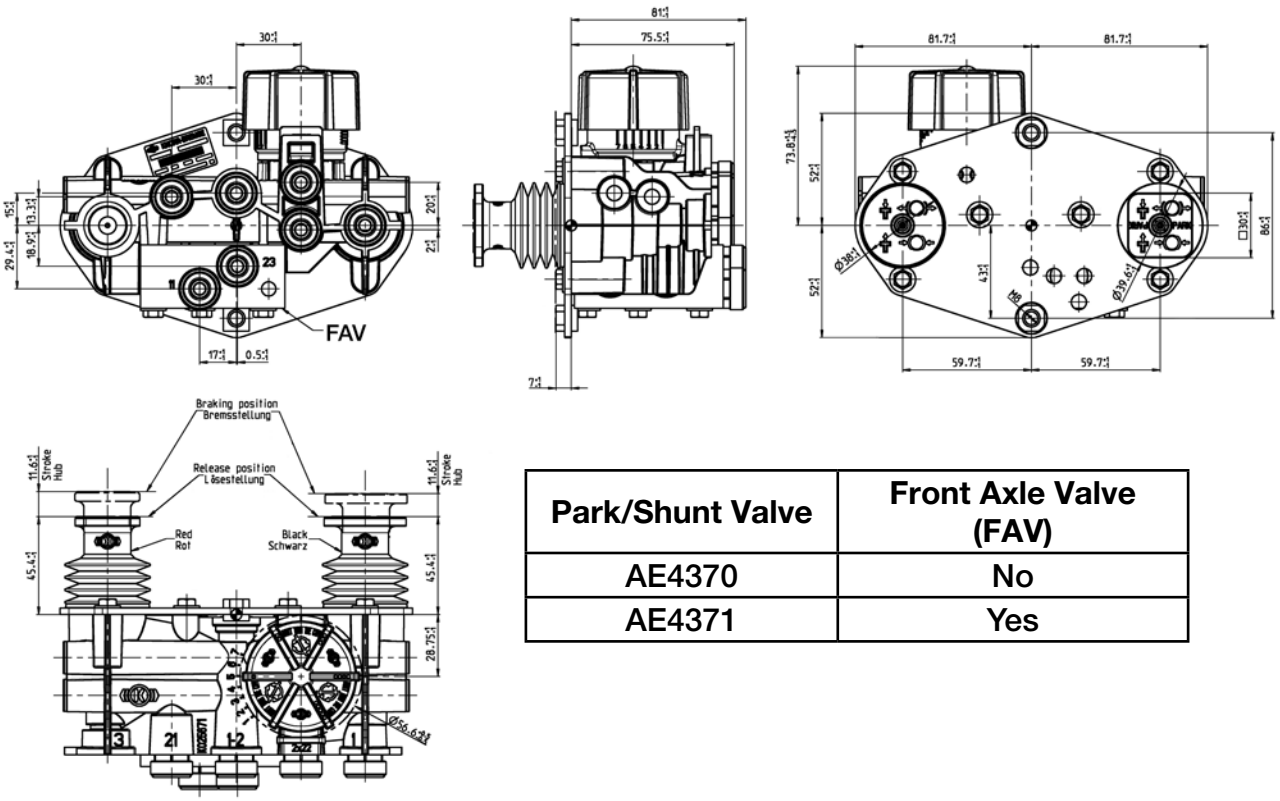
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October 2013

Park/Shunt Valve with Integrated Charging Valve

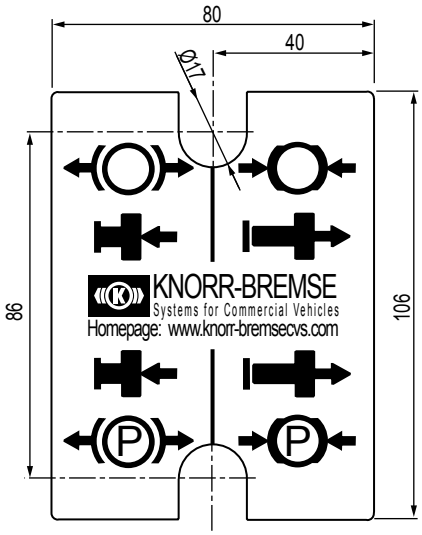
Dimensions

AE4370
AE4371



Park/Shunt Valve	Front Axle Valve (FAV)
AE4370	No
AE4371	Yes

K056570



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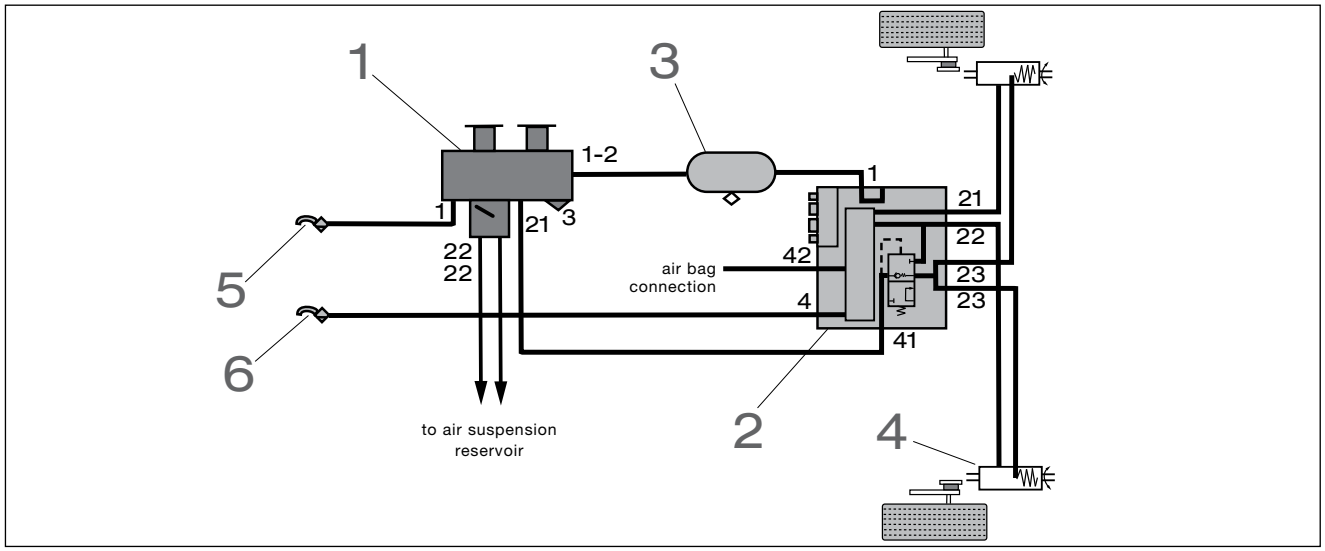
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AE437.

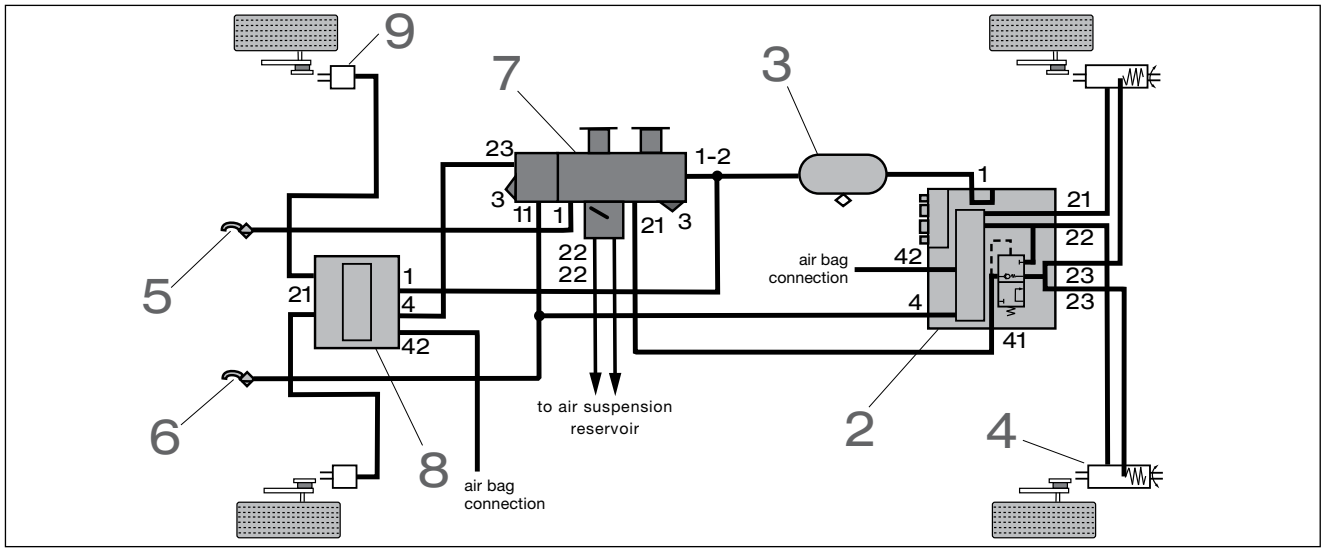
Park/Shunt Valve with Integrated Charging Valve

Doc. No. Y095829 (EN - Rev. 000)
October 2013

Installation example AE4370 with TEBS G2.1



Installation example AE4371 with TEBS G2.1 and TEPM-P



Item	Description	Item	Description
1	Park/Shunt Valve with integrated charging valve	6	Coupling head with filter (Control) - Yellow
2	TEBS G2.1 brake module	7	Park/Shunt Valve with integrated charging valve and integral front axle valve
3	Brake reservoir		
4	Spring brake actuator	8	Trailer Electro-Pneumatic Module Premium (TEPM-P)
5	Coupling head with filter (Supply) - Red	9	Brake chamber

Revision Details

Rev. 000	March 2011	New document
Rev. 000	October 2013	Correction to page 4 - connections to air suspension clarified

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Item No. K053290

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

AE4262, AE4264
Trailer Park Valves

Doc. No. Y011351 (Rev. 001)
March 2011

PD-113-300

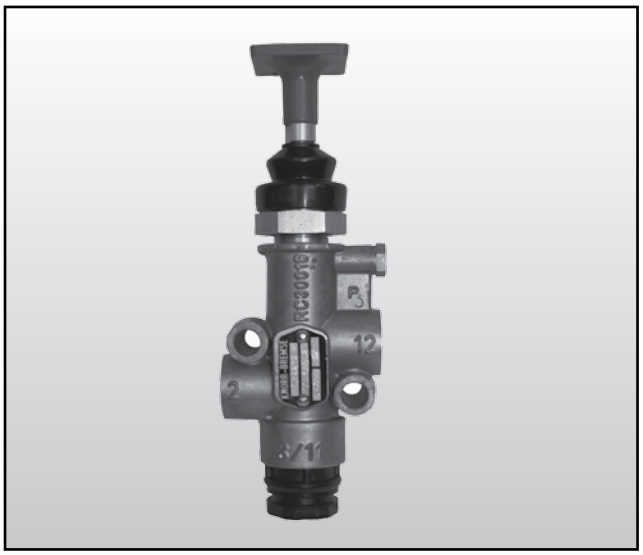
Function

The **Trailer Park Valve** operates the parking brake function of trailers equipped with spring brake actuators.

Whether coupled or uncoupled, the red control button must always be pulled out to correctly park the trailer.

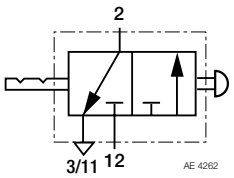
By pushing in the control button, the spring portions of the spring brake actuators are supplied with air so that the parking brake is released.

Caution: Always ensure that the red control button is pulled out and the trailer is correctly parked, before coupling or uncoupling the trailer.

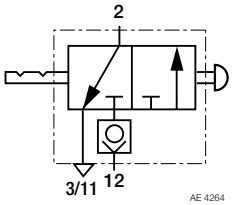


Standard Symbol as DIN ISO 1219

AE4262



AE4264



Technical Features

Maximum operating pressure:	8.0 bar
Operating temperature range:	-40 °C to +80 °C
Way through	4.5 mm (for **AE4262**)
	3.8 mm (for **AE4264**)
Weight:	0.5 kg approx.

Range Overview

Part No.	Type No.	Air Ports **12** and **2**	Mounting	Control Button	Lock in place (in end positions)	Non-return Valve (port **12**)
II19802	**AE4262**	M16x1.5	in Supply Line	red, square with function symbol	with	without
II36055	**AE4264**					with

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Item No. K002468

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

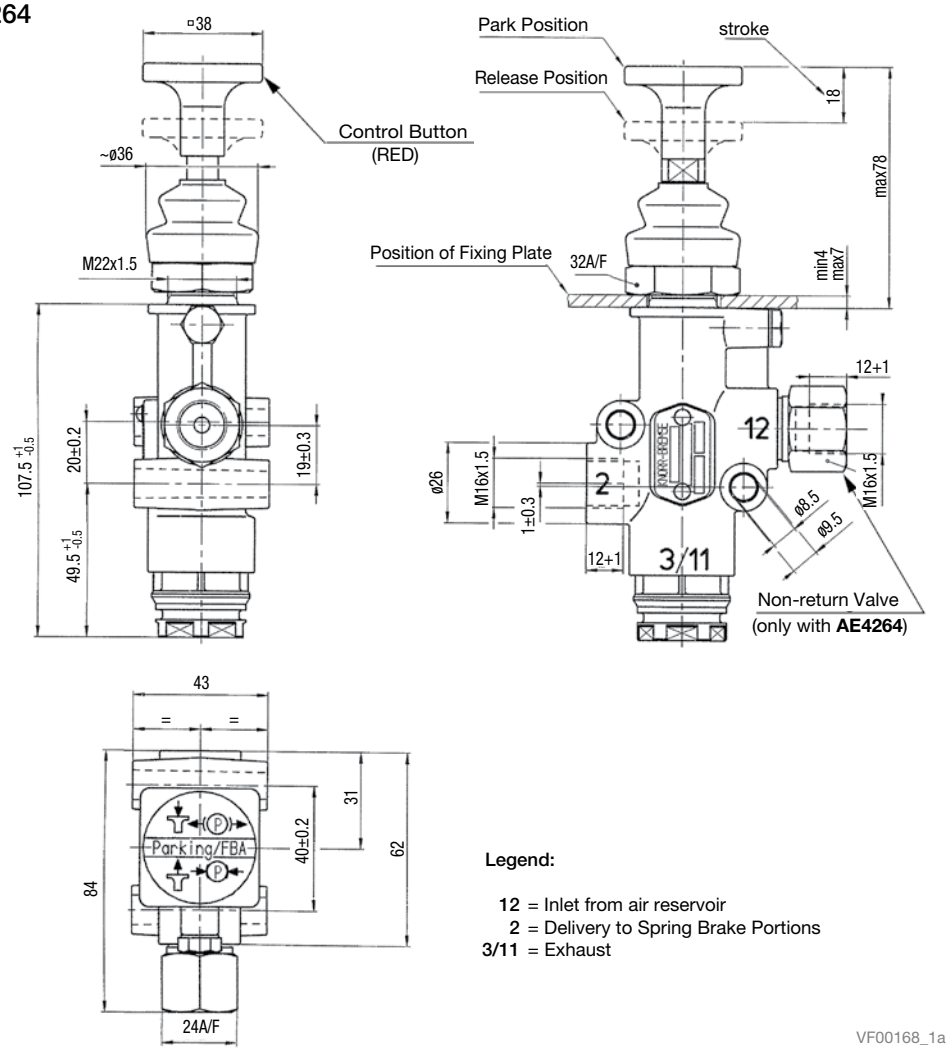
AE4262, AE4264

Trailer Park Valves

Doc. No. Y011351 (Rev. 001)
March 2011

Dimensions

AE4262
AE4264



Legend:

12 = Inlet from air reservoir
2 = Delivery to Spring Brake Portions
3/11 = Exhaust

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Item No. K002468

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

AE4265, AE4266

3/2 Control Valves

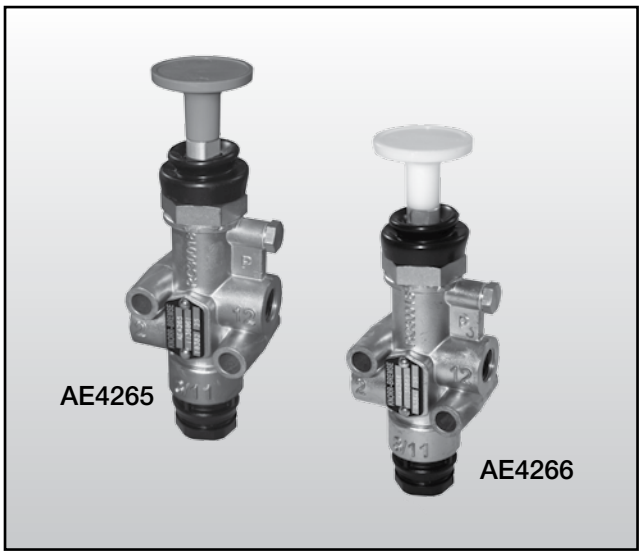
Doc. No. Y011383 (Rev. 001)
March 2011

PD-120-321

Function

These **3/2 Control Valves** are used for auxiliary systems on trailers. By pushing in the knob, port 2 is pressurised; by pulling out the knob, port 2 is exhausted.

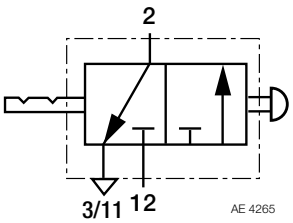
The valve exists in two versions that differ in the colour of the knob - only for identification purposes regarding its function on the vehicle. The valve with the green knob is typically used to lower lift axles on unladen vehicles (see PD-503-200, Document No. *Y011379*), the one with the white knob is used for auxiliary functions that are not related to lift axle control (e.g. operating cylinders). Both valves have detents in the end positions.



Technical Features

Maximum operating pressure:	8.0 bar
Operating temperature range:	-40 °C to +80 °C
Way through:	Ø 4.5 mm
Weight:	0.4 kg approx.

Standard Symbol as DIN ISO 1219



Range Overview

Part No.	Type No.	Air Port Threads **12** and **2**	Knob	
			Colour	Shape
II**36061**	**AE4265**	M16x1.5	Green	Round, **without** symbols
II**36062**	**AE4266**		White	

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Item No. K002500

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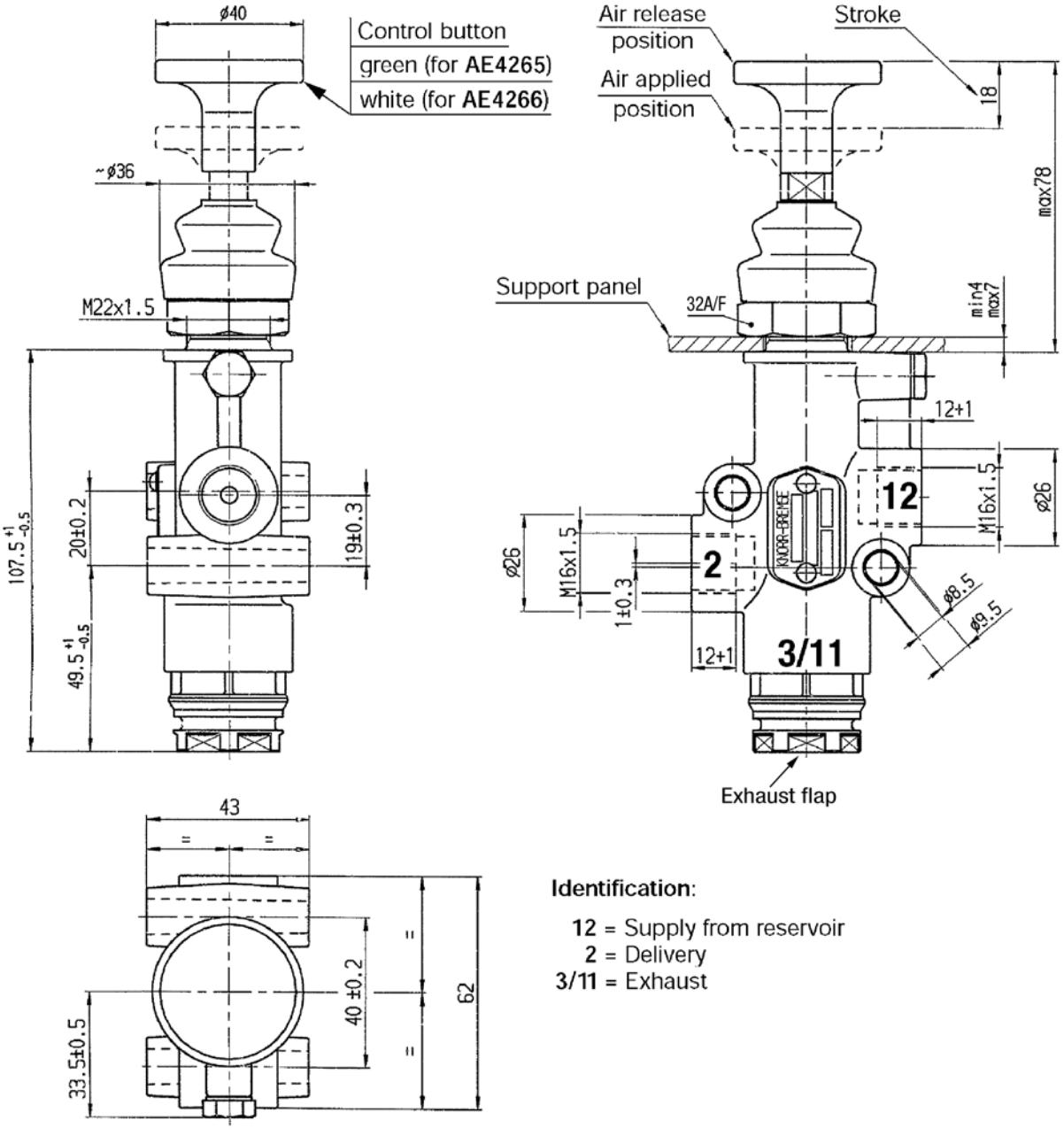
AE4265, AE4266

3/2 Control Valves

Doc. No. Y011383 (Rev. 001)
March 2011

Dimensions

AE4265
AE4266



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Item No. K002500

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

AE9120, EA1152

Solenoid Valves

Doc. No. Y011360 (Rev. 002)
March 2011

PD-121-000

Function



AE9120 Solenoid Valve (normally 'open')

The **AE9120 Solenoid Valve** is an electro-pneumatic device which is normally 'open' (exhausts when powered) and is used to control the supply of air to other pneumatic equipment. When the solenoid is powered with 24V, the valve exhausts air from port **A** through the exhaust port **P**. Removal of the electical power causes the valve to deliver air from port **A**.

A typical application for **AE9120** is to exhaust spring brake actuators that are used for locking steering axles or to lower lift axles (see PD-503-200, Document No. Y011379).

AE9120 is delivered with an electrical connector, that can be used with standard cables with bare ends.

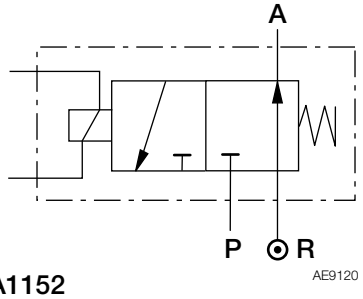
EA1152 Solenoid Valve (normally 'closed')

The **EA1152 Solenoid Valve** is normally 'closed' (delivers when powered). When it is powered with 24V, the valve delivers air from port **2**. Removal of the electical power causes the valve to vent the delivered air to atmosphere through the exhaust port **3**.

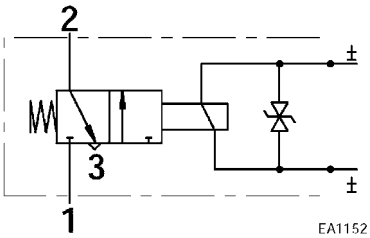
EA1152 has an M27x1 threaded electrical connector for which adapter cables are available.

Standard Symbol as DIN ISO 1219

AE9120



EA1152



Technical Features

	AE9120	EA1152
Operating Pressure:	10 bar	10 bar
Operating Temperature Range:	-40 °C to +45 °C	-40 °C to +80 °C
Voltage:	24 V ±10 %	24 V +20 % - 10 %
On-time:	100 %	100 %
Power Input:	10 W	15.6 W
Degree of Protection:	IP 65	IP 68
Weight:	0.5 kg approx.	0.9 kg approx.
Flow Diameter:	1.9 mm	4 mm

Product Overview

Part No.	Type No.	Air Port Threads			Remark
		R (supply)	A (delivery)	P (exhaust)	
I63411024	AE9120	M14x1.5	M14x1.5	With filter	With cable gland

Part No.	Type No.	Air Port Threads			Remark
		1 (supply)	2 (delivery)	3 (exhaust)	
II32611	EA1152	M12x1.5	M12x1.5	With filter	M27x1 connector

Cables for EA1152

Part No.	Length [m]	M27x1 Connector
I87047	6	With straight connector
I87970	6	With 90° connector

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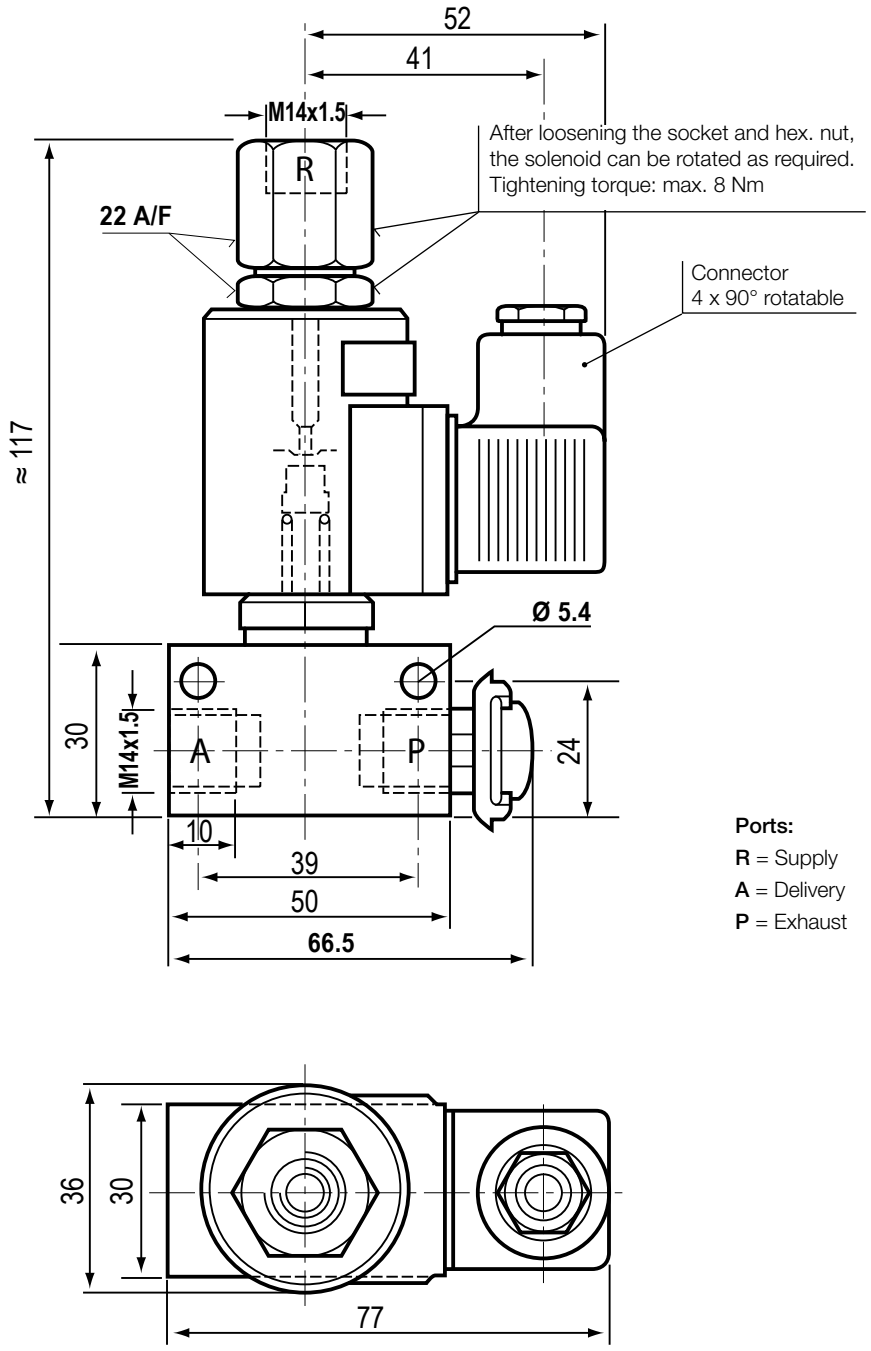
AE9120, EA1152

Solenoid Valves

Doc. No. Y011360 (Rev. 002)
March 2011

Dimensions

AE9120



PD121-1-001

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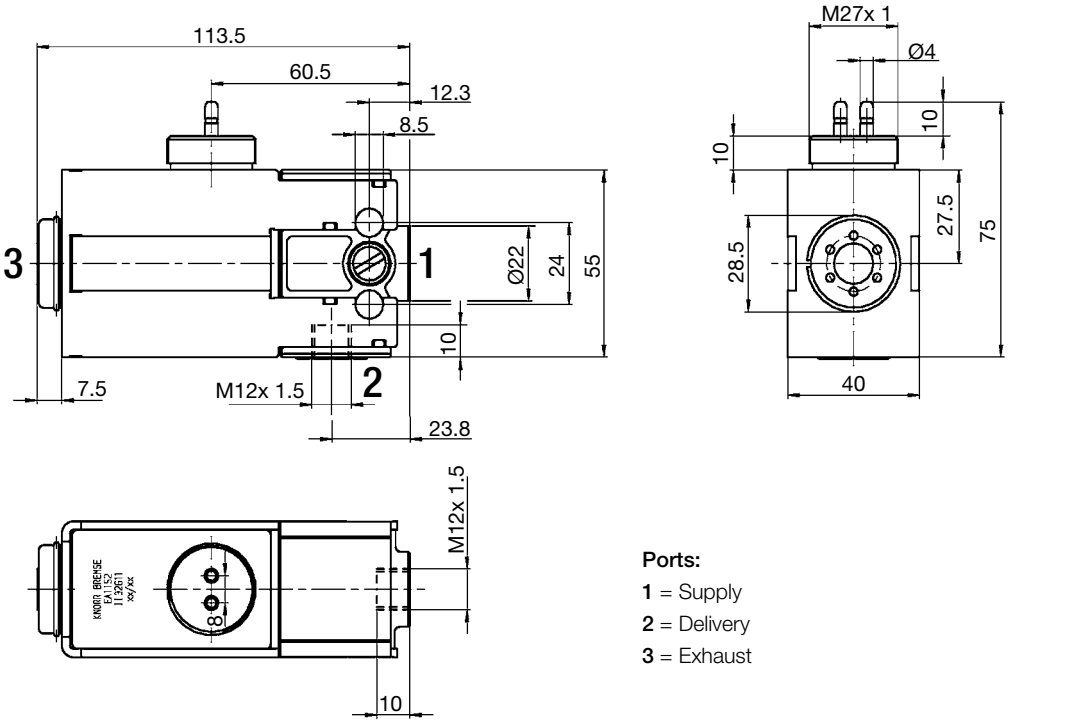
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

AE9120, EA1152

Solenoid Valves

Doc. No. Y011360 (Rev. 002)
March 2011

EA1152



Ports:

1 = Supply
2 = Delivery
3 = Exhaust

PD121-1-002

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Item No. K002477

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

AE21..
Shut-off Valves

Doc. No. Y011352 (Rev. 001)
March 2011

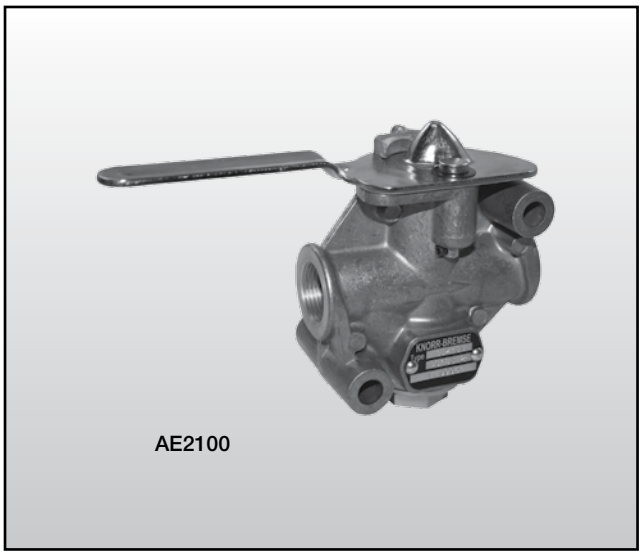
PD-122-000

Function

The **Shut-Off Valve** is used in air systems to control the supply of air.

The valve is manually operated via a lever which, when rotated, shuts off the delivery pressure from the valve.

The delivered pressure exhausts back through the valve to atmosphere.

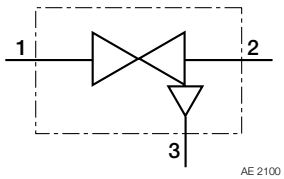


AE2100

Technical Features

Maximum operating pressure:	10 bar
Operating temperature range:	-40 °C to +80 °C
Weight:	0.4 kg approx.

Standard Symbol as DIN ISO 1219



Range Overview

Part No.	Type No.	Port Threads	Remarks
I28323	AE2100	M22x1.5	With exhaust
II33261	AE2110	M22x1.5	With exhaust and two shut-off positions

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Item No. K002469

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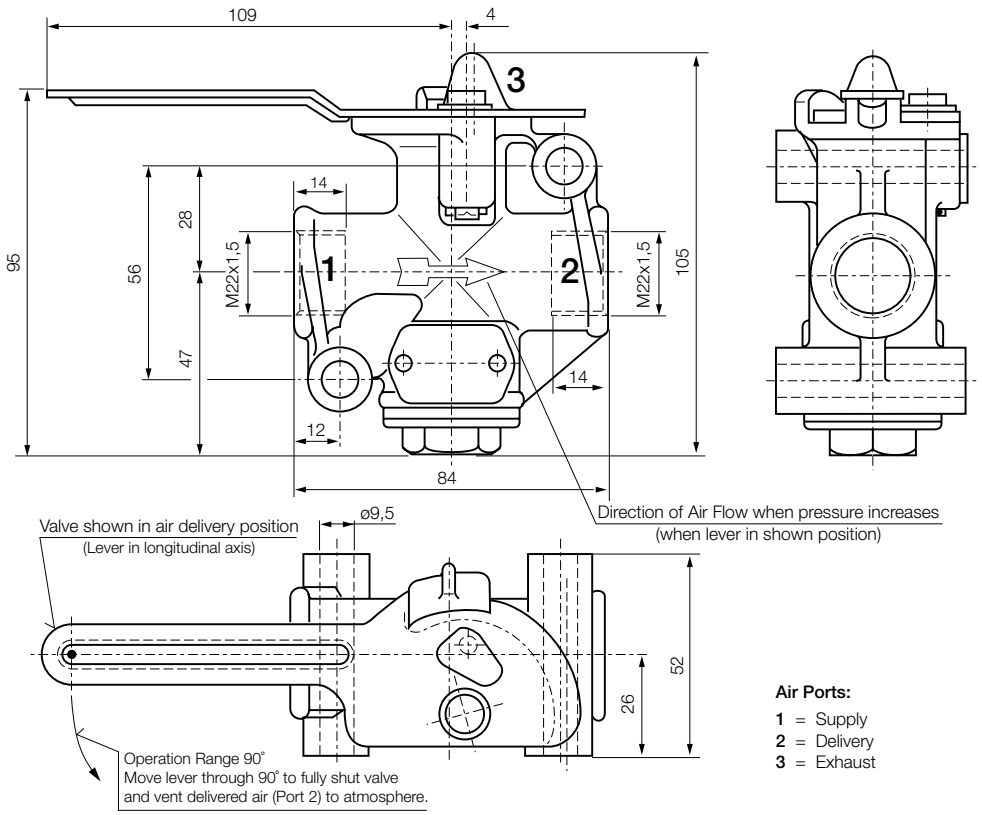
AE21..

Shut-off Valves

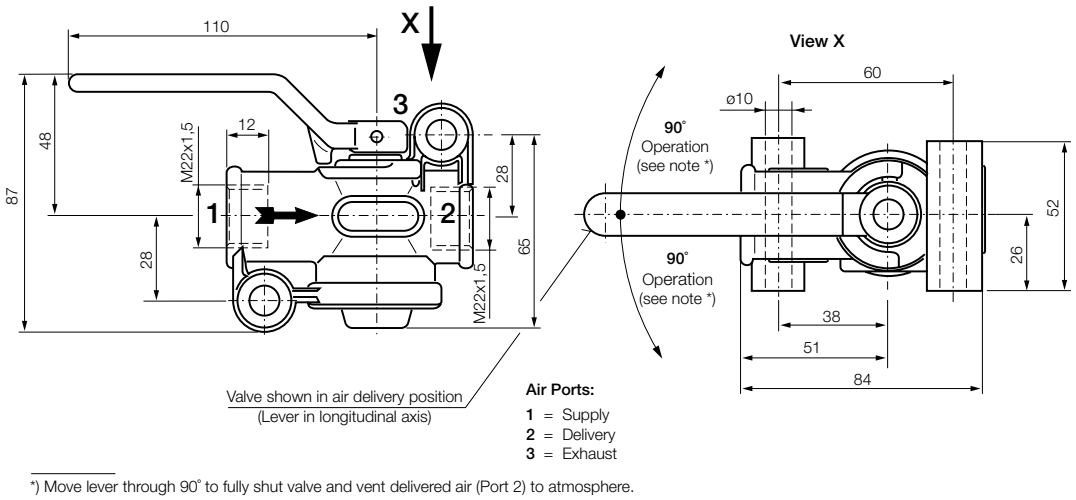
Doc. No. Y011352 (Rev. 001)
March 2011

Dimensions

AE2100



AE2110



*) Move lever through 90° to fully shut valve and vent delivered air (Port 2) to atmosphere.

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Item No. K002469

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Doc. No. Y011334 (EN - Rev. 002)
July 2015

Electronic Brake Control

PD No.	Product	Type/Part No. family
PD-200-150	Pressure Control Valve (PCV)	**K038468**
PD-200-200	ABS Relay Modulator Valves	**BR92..**
PD-203-100	Trailer ABS (KB3-TA)	**ES200.**
PD-203-200	Trailer ABS (A18)	**ES2005**
PD-203-300	Trailer ABS (KB4TA)	**ES1305**
PD-214-100	TEBS4 Brake Module	**ES205.**
PD-214-200	TEBS G2/G2.1 Brake Module	**ES2060**
PD-214-300	TEBS G2.2 Standard Brake Module	**ES2090**
PD-214-325	TEBS G2.2 Standard Plus Brake Module	**ES2090**
PD-214-350	TEBS G2.2 Premium Brake Module	**ES2095**
PD-214-600	Trailer Electro-Pneumatic Module (TEPM-S / TEPM-P)	**ES207.**
PD-214-800	Trailer Roadtrain Module (TRM)	**EZ2085**
PD-261-000	Wheel Speed Sensors	**04860001..,** **04860010..**
PD-262-200	Pressure Sensor	**K060758**
PD-264-100	Level Sensor	**K025259**
PD-264-200	Deflection Sensor	**K026919**
PD-264-300	Level Sensor for use with iLvl	
PD-272-010	Cables for Trailer ABS	
PD-272-020	Cables for Trailer EBS (TEBS4)	
PD-272-025	Cables for Trailer EBS (TEBS G2)	
PD-272-030	Diagnostic Cables for Trailer ABS and TEBS4	
PD-272-035	Diagnostic Cables for TEBS G2	
PD-273-920	Trailer Information Module (TIM G2)	**K009166**
PD-273-940	iTAP Wireless Interface	**EZ2040**
PD-280-450	iLvl Valves	
PD-280-700	iLvl Push Button	**CP6PLF**

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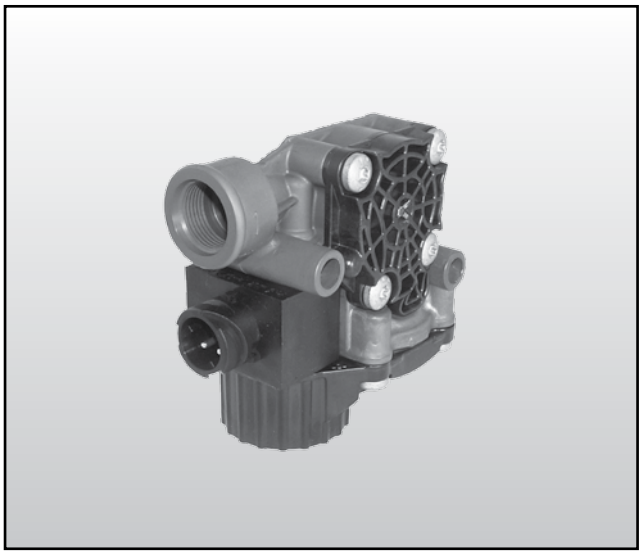
Product DATA

K038468
Pressure Control Valve (PCV)

Doc. No. Y209394 (EN - Rev. 000)
May 2015

PD-200-150

Function

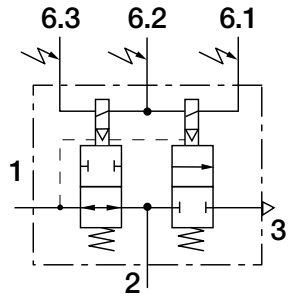


The **Pressure Control Valve (PCV)** consists of two electrically signalled 2-way valves which enable the pressure in the delivery from the valve to be increased, decreased or held constant at any pressure up to its supply pressure.

Pressure Control Valve K038468 is used in conjunction with the Electronic Brake Module (see PD-216-100, Document No. *Y209186*) to provide ABS control of the brakes on agricultural and other off-highway vehicles.

Pressure Control Valve K038468 is used for dynamic axle load and 'effective' wheelbase adjustment on trailers fitted with the iCargo function (see Document No. *Y109235*). The adjustments occur when electrical signals from the TEBS G2 Brake Module result in the **Pressure Control Valve** reducing, maintaining or increasing the pressure in the air suspension bellows of the axle controlled by iCargo until the required weight distribution is achieved. The valve is fitted in the air suspension system on the axle controlled by the iCargo function.

Standard Symbol as DIN ISO 1219



Technical Features

Maximum operating pressure:	10.2 bar
Maximum pressure:	13 bar
Nominal way through:	Ø7 mm Port 1 to Port 2 Ø11 mm Port 2 to Port 3
Operating temperature range:	-40 °C to +80 °C
Nominal voltage:	12 V DC
Nominal resistance:	5.2 Ohm
Nominal current:	2.3 A
Environmental protection:	IP 6K6K/ IP 6K9K complete valve IP 6K7 Electrical Connector
Weight:	0.6 kg approx.

Part No.	Type No.	Port threads		Electrical connection
		1	2	
K038468 [1]	-	M22x1.5	M22x1.5	Bayonet DIN72585

[1] will carry the suffix N00 which denotes that it is supplied without packaging.

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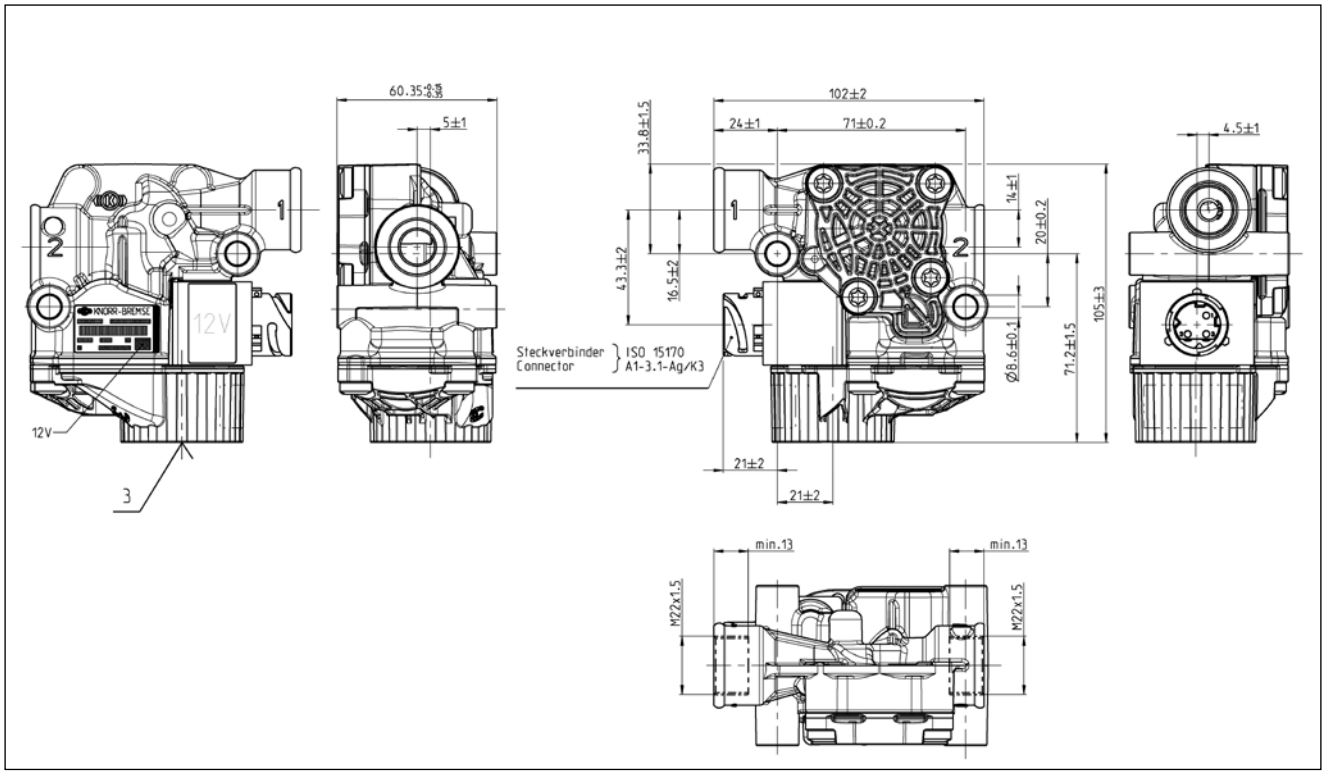
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K038468

Pressure Control Valve (PCV)

Doc. No. Y209394 (EN - Rev. 000)
May 2015

Dimensions



Installation

The Pressure Control Valve should be mounted on the vehicle frame using two M8 bolts. The valve should be mounted with the exhaust pointing downwards ±30°. In deciding the location of the PCV on the vehicle care must be taken to avoid the valve being subjected to radiated heat (e.g. from the exhaust pipe or turbocharger).

Note - ensure that the exhaust is masked during any painting of the vehicle.

Servicing

The Pressure Control Valve K038468 is not serviceable.

Revision Details

Rev. 000	May 2015	New document.

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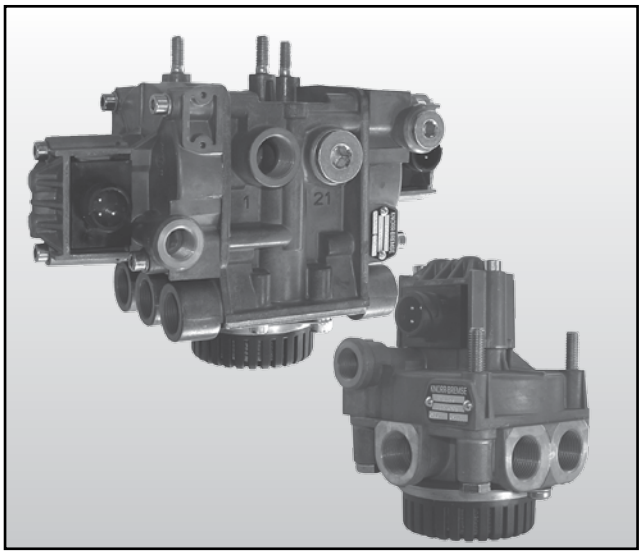
BR92..

ABS Relay Modulator Valves

Doc. No. Y011362 (EN - Rev. 003)
July 2015

PD-200-200

Function



The **Relay Modulator Valve** is a modulator with integrated relay valve and is used on trailers with ABS/EBS to control the service brake pressure in one or more brake actuators.

In a trailer air brake system, under non-ABS conditions, the **Relay Modulator Valve** acts as a standard relay valve and in response to an air pressure signal, speeds up brake applications by providing rapid and precise control of large volumes of air.

However, if during braking, the anti-lock braking system´s ECU detects that a sensed wheel is decelerating too rapidly and wheel lock is imminent, it sends electronic signals to the **Relay Modulator Valve** controlling that wheel. The modulator valve then rapidly modulates the braking pressure between the three states of “release”, “hold” and “apply”. This continues until the risk of wheel lock is overcome.

The **Relay Modulator Valve** is available in both single and dual relay form. The **Dual Relay Modulator Valve** can be used as an alternative to two single valves fitted across the axle. The **Dual Relay Modulator Valves** use a single signal and a single supply port with the delivery ports independently controlled by their respective modulators.

The **Dual Relay Modulator Valve** is used as a part of the Trailer Module Assemblies ES200. (See PD-203-100, Document No. Y011361 and PD-203-200, Document No. Y011365).

The **Single Relay Modulator Valve** can also be used as a third modulator in systems using TEBS4 (See PD-215-100, Document No. Y011366).

Please note that valves are supplied complete with exhaust silencers.

Standard Symbol as DIN ISO 1219

See page 4

Technical Features

Maximum operating pressure:	10 bar	Operating temperature range:	-40 °C to +75 °C
Weight - Single modulator:	1.2 kg approx.	Dual modulator:	2.9 kg approx.
Nominal voltage:	24 V DC		

Range Overview

Part No.	Type No.	Modulator type	Port threads			Electrical connection	Used in Trailer Module Assembly		
			1	2	4		System	Part No.	Type No.
II30522	BR9231	Dual	M22x1.5	(22) 3 x M22x1.5 (23) 3 x M22x1.5	M16x1.5	Threaded M24x1	KB3-TA	II36383 II36384	ES2001 ES2002
II37090 [1)]	BR9233	Dual	M22x1.5	(22) 3 x M22x1.5 (23) 3 x M22x1.5	M16x1.5	Bayonet DIN72585	A18	II36413	ES2005
Part No.	**Type No.**	**Modulator type**	**Port threads**			**Electrical connection**	**Used in Brake System**		
			1	**2**	**4**				
II32614	BR9232	Single	M22x1.5	4 x M22x1.5	M16x1.5	Threaded M24x1	KB3-TA		
II37091 [1)]	BR9234	Single	M22x1.5	4 x M22x1.5	M16x1.5	Bayonet DIN72585	TEBS4		

[1)] will carry the suffix N00 which denotes that it is supplied without packaging.

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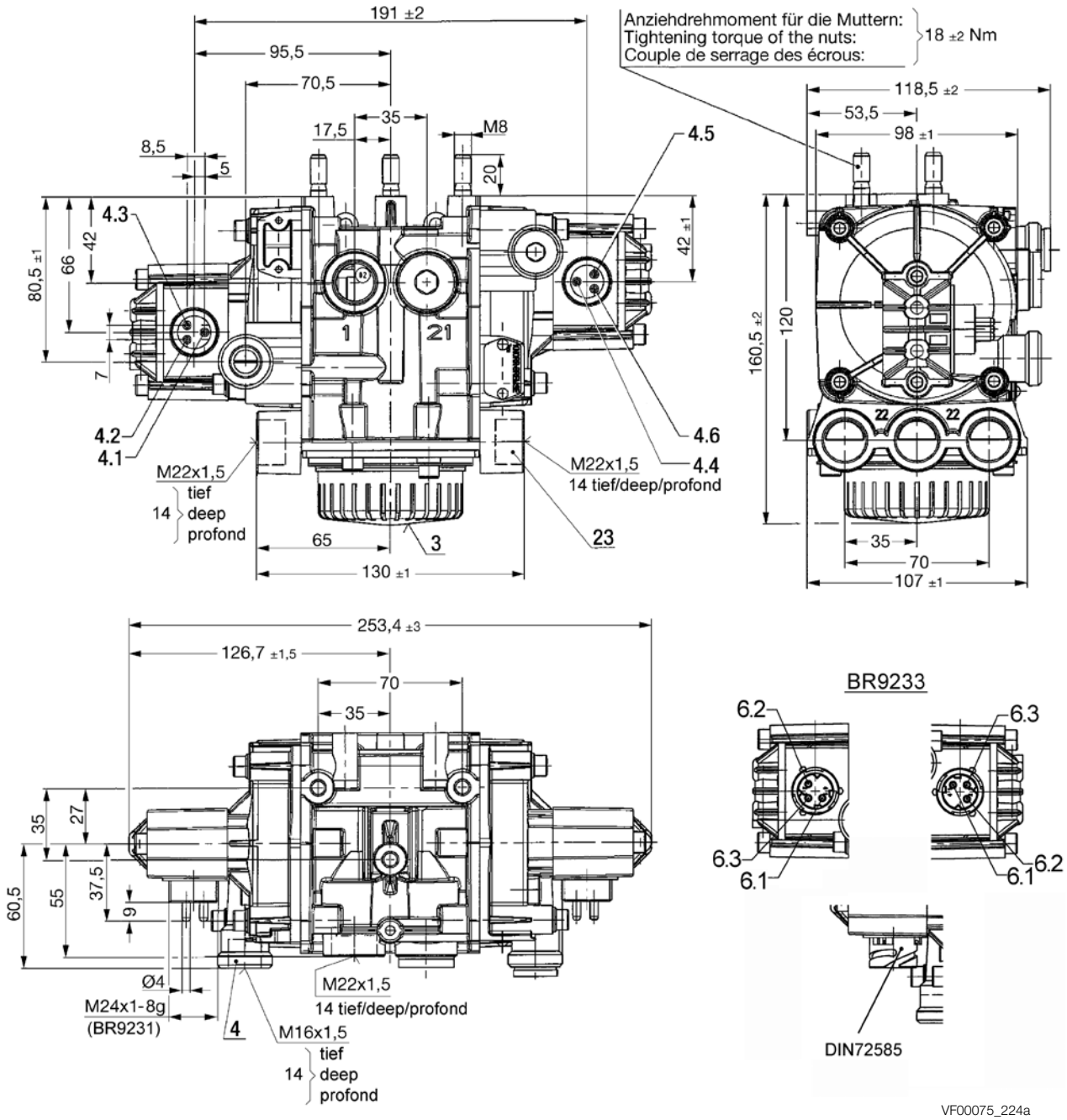
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ABS Relay Modulator Valves

Doc. No. Y011362 (EN - Rev. 003)
July 2015

Dimensions

BR9231
BR9233

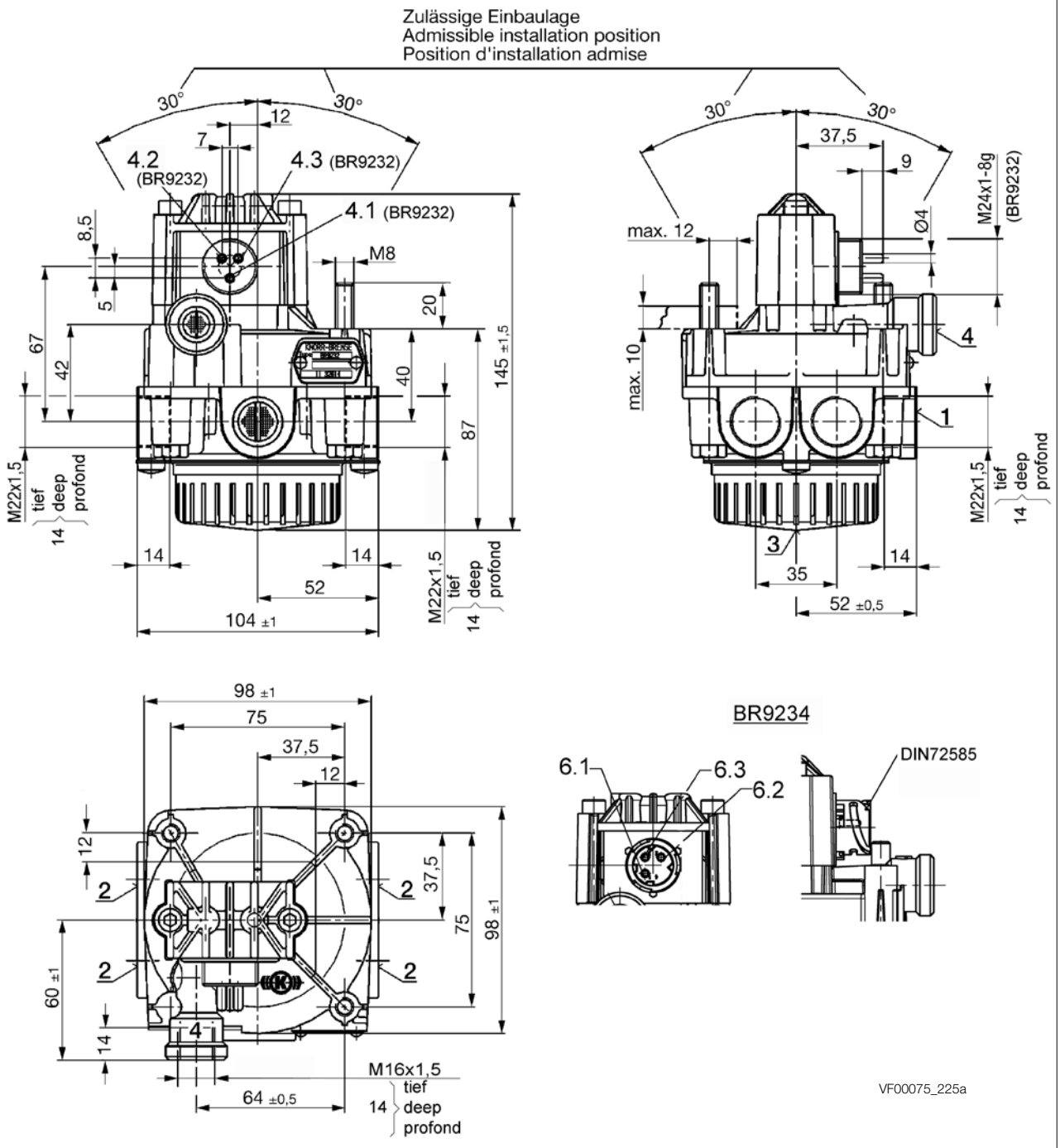


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BR9232
BR9234



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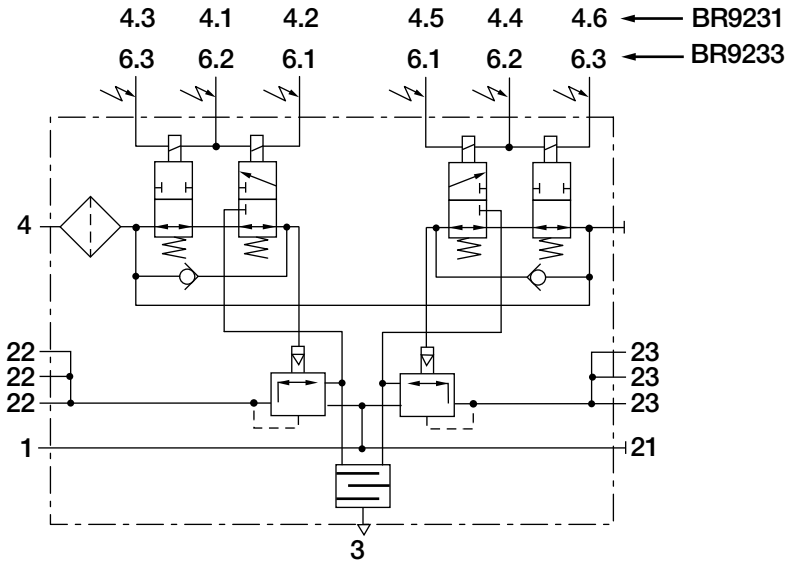
BR92..

ABS Relay Modulator Valves

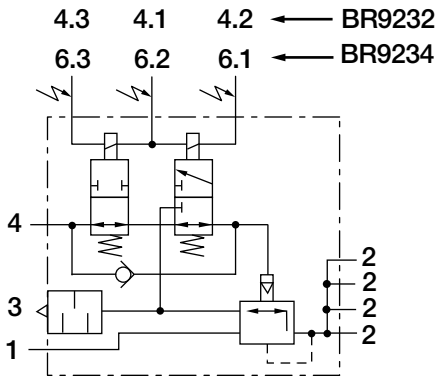
Doc. No. Y011362 (EN - Rev. 003)
July 2015

Standard Symbols as DIN ISO 1219

BR9231
BR9233



BR9232
BR9234



Revision Details

Rev. 002	April 2011	Revised format for new Trailer Catalogue.
Rev. 003	July 2015	Table on page 1 updated.

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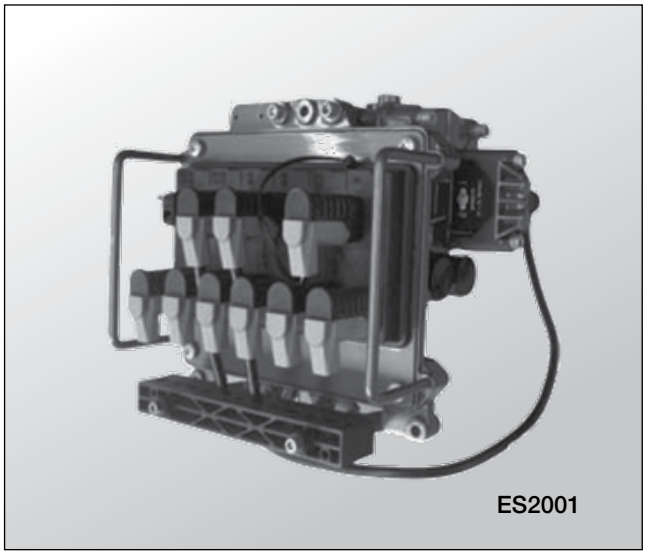
ES200.

Trailer ABS (KB3-TA)

Doc. No. Y011361 (Rev. 003)
March 2011

PD-203-100

Function


ES2001

The **KB3-TA** generation of anti-lock braking system (ABS) is used on trailers with air brake systems working with disc or drum brakes. The trailer module is a combination of a KB3-TA electronic control unit (ECU) with a dual relay modulator valve and modulator cables.

The ECU of **KB3-TA** is available in 2S/2M, 4S/2M and 4S/3M configurations with 2 power supply variations to suit a wide range of applications. The ECU can be powered via ISO 7638 only, or a combination of ISO 7638 and ISO 1185 (24N).

For 4S/2M and 2S/2M versions, power supply and sensor extension cables are required (see PD-272-000, Document No. *Y095697*) to complete the **KB3-TA** system. For 4S/3M, an additional single modulator (see PD-200-200, Document No. *Y011362*) and modulator cable (see PD-272-000, Document No. *Y095697*) will also be required.

The **KB3-TA** system complies with 71/320 EWG, annex X and ECE-R13.

The ECU compares the signals received from the wheel speed sensors (see PD-261-000, Document No. *Y011363*) with its pre-programmed internal logic.

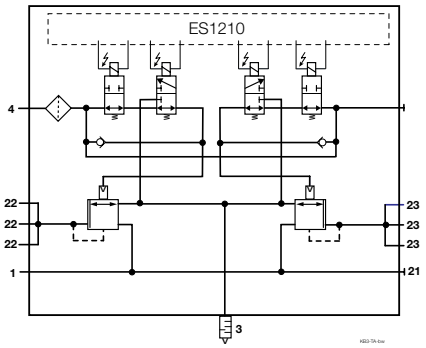
If, whilst braking, the ECU detects that a sensed wheel is decelerating too rapidly and wheel lock is imminent, it sends electrical signals to the modulator valve controlling that wheel. The modulator valve then rapidly modulates the braking pressure between the 3 states of “release”, “hold” and “apply”. This continues until the risk of wheel lock is overcome.

All ECUs have automatic recognition of lift or steering axles and can be easily set to reconfigure themselves to other specifications. Trailer and service history data can be stored and retrieved via PC diagnostics from the memory of the ECU. The ECU has a non-volatile memory so that stored information is not lost when power is removed.

The **ES1210** ECU has an output connection for retarder control (RET) or velocity output (VT). The velocity output can be analog or pulsed. The ECU also has intelligent operating data acquisition (IODA) which incorporates an odometer and differential odometer.

Standard Symbol as DIN ISO 1219

ES2001



Technical Features

Maximum operating pressure:	10 bar
Operating temperature range:	-40 °C to +75 °C
Weight:	3.7 kg approx.
Nominal Voltage:	24 V DC

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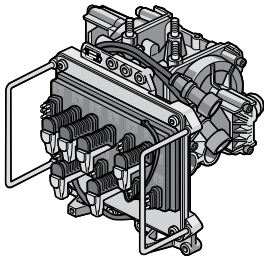
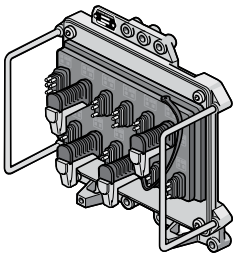
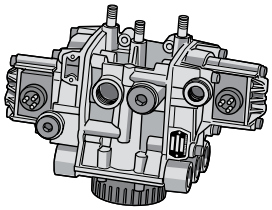
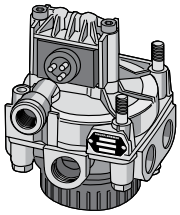
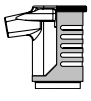
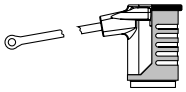
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ES200.

Trailer ABS (KB3-TA)

Doc. No. Y011361 (Rev. 003)
March 2011

Range Overview

Part No.	Type No.	Description	Image
		Trailer Module (consists of Electronic Control Unit ES121. and Modulator - ABS Dual Relay Valve BR9231)	
II36383	**ES2001**	Power supply: ISO 7638 4S/3M max.	
II36384	**ES2002**	Power supply: ISO 1185 or ISO 7638 4S/2M max.	
		Electronic Control Unit	
II33581	**ES1210**	Power supply: ISO 7638 4S/3M max.	
II33582	**ES1215**	Power supply: ISO 1185 or ISO 7638 4S/2M max.	
II30522	**BR9231**	**Modulator** (ABS Dual Relay Valve) Electrical Connection threaded M24x1	
II32614	**BR9232** (replaces **BR9200)**	**Modulator** (ABS - Relay Valve) Electrical Connection threaded M24x1	
C56918	-	**Mounting Bracket for Modulator** (not pictured)	
II36744	-	**Closing Cap** (only as spare part)	
II36386	-	**Closing Cap for Diagnostic Port** (only as spare part)	

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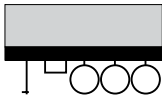
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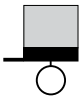
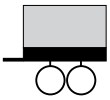
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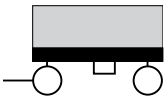
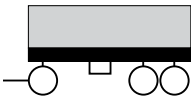
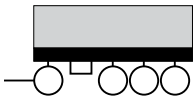
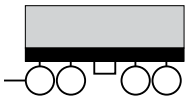
Trailer ABS (KB3-TA)

Doc. No. Y011361 (Rev. 003)
March 2011

System Variants

Semi-trailer		
		
2S/2M		
	4S/2M	
	4S/3M	

Centre axle trailer	
	
2S/2M	
	4S/2M
	4S/3M

Drawbar trailer				
				
4S/3M				

Additional documentation (available from your Knorr-Bremse representative)**:**

Installation manual	*C14404*
System specification **ES1210**	*C16225*
System specification **ES1215**	*C16226*
System description	*C14405*
Approval document	*EB 118.E.FTP98/24952/A/03*

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Item No. K002478

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

ES200.

Trailer ABS (KB3-TA)

Doc. No. Y011361 (Rev. 003)
March 2011

Diagnostics

The ECU of the **KB3-TA** system is self-diagnosing. In the event of a fault, the towing vehicle´s “in-cab” and/or the trailer headboard warning light will illuminate and all components detected as defective are shut down either selectively or in total. In the event of any ABS shutdown all braking functions revert to standard (non-ABS) operation.

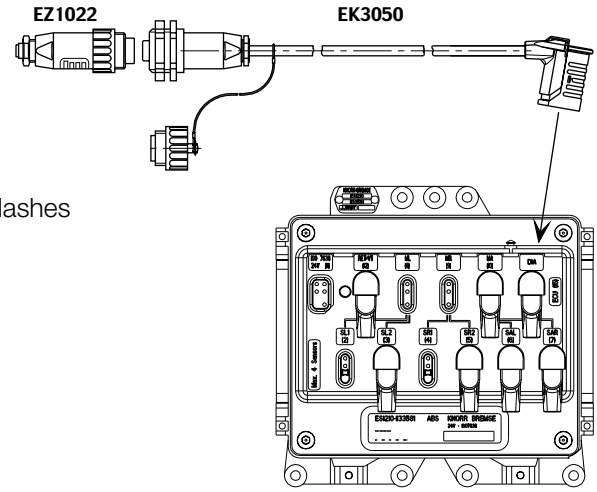
To ensure fast and effective trouble shooting, the ECU is provided with a universal diagnostic interface which allows connection to a hand held blink code switch or to a personal computer (PC) with extended functions.

Once a fault has been rectified, the resetting of the ECU is achieved simply by removing and re-applying power to the unit. Faults are stored in the ECU memory and can be recalled and erased as required.

The ECU integrated test modules check the following components of the ABS system

- connected components (wheel speed sensors, modulators)
- complete wiring (extension cables and connecting cables to the wheel speed sensors and modulators, and power supply cables) and plug connections to the peripheral components.

Blink Code Diagnostics



Functions:
Information is shown in three blocks of coloured flashes of an LED on the ECU

- Change / read “system configuration”
- Installation test
- Read / delete fault code memory

A full blink code list is available.

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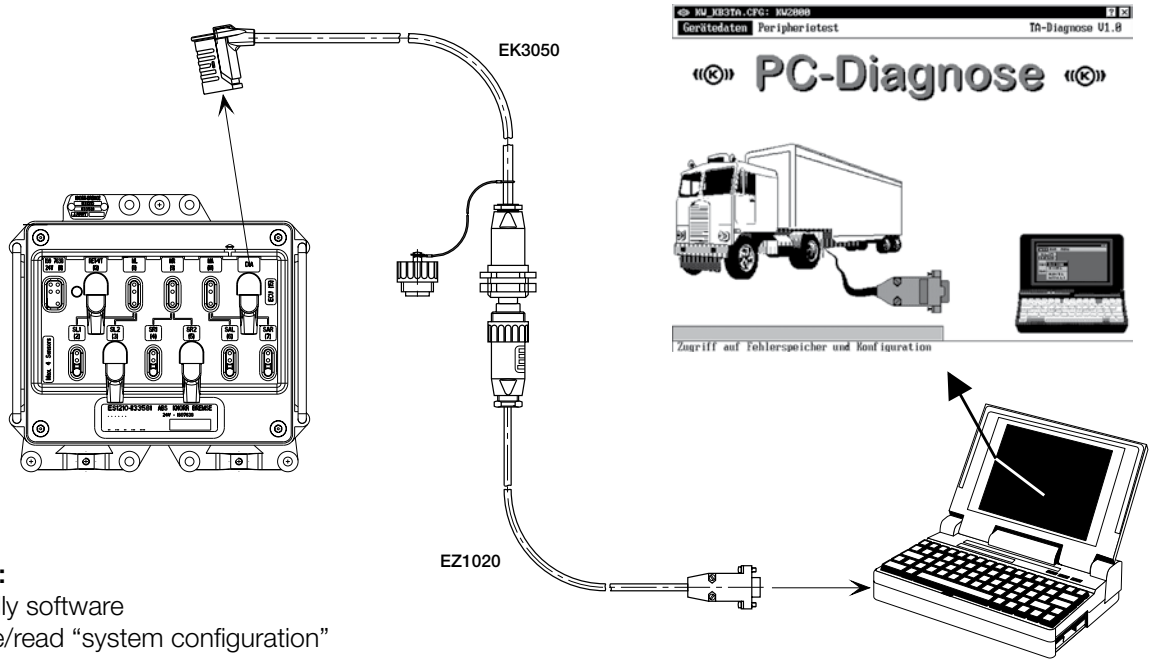
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Doc. No. Y011361 (Rev. 003)
March 2011

PC Diagnostics



Functions:
User friendly software

- Change/read “system configuration”
- Installation test
- Read/delete fault code memory
- Read further information: odometer, differential odometer, retarder control, velocity output

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ES200.

Trailer ABS (KB3-TA)

Doc. No. Y011361 (Rev. 003)
March 2011

Test Report (record of system check using blink code adaptor)

Test Report

Knorr-Bremse ABS KB 3 TA or A 18 for Trailers

The system check took place using onboard diagnosis (blink code diagnosis) with blink code adapter **EZ1022** – II36361 acc. to installations instruction C16226, C16228 and installation instructions for the A18 / ES2005.

Vehicle Type	Vehicle manufacturer
Vehicle Identification-No.	
Chassis-No.	

1. Installed system variant

(please tick the appropriate boxes)

Configuration and sensing	4S/3M	☐
	4S/2M	☐
	2S/2M	☐
Power supply	ISO 7638	☐
	ISO 1185	☐

A system configuration of the above variant was

successfully executed ☐

not successfully executed ☐
(use in original configuration)

2. Installed ECU

(please tick the appropriate boxes)

ES1210	(ES2001)	☐
ES1215	(ES2002)	☐
ES1216	(ES2003)	☐
0 486 105 002 100	(ES2005)	☐

3. Installation test

(please tick the appropriate boxes)

(Correct function of the sensors and correct allocation of the modulators)

SL 1	☐
SL 2	☐
SR 1	☐
SR 2	☐
SAL	☐
SAR	☐

Checked:

Date Stamp / Signature

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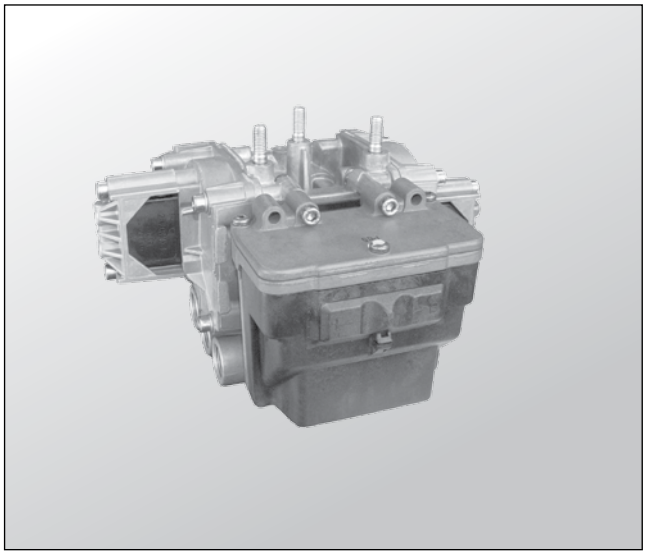
Product DATA

ES2005

Trailer ABS (A18)

Doc. No. Y011365 (Rev. 002)
March 2011

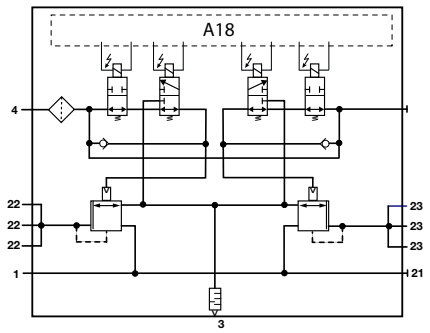
Function



The **A18** generation of anti-lock braking system (ABS) is used on trailers with air brake systems working with disc or drum brakes. The trailer module assembly **ES2005** is the assembly of an **A18** electronic control unit (ECU) and dual relay modulator valve **BR9233** (see PD-200-000, Document No. *Y011362*). The ECU's 2S/2M configuration suits semi-trailer and centre axle trailer applications. The ECU can be powered via ISO 7638 only or a combination of ISO 7638 and ISO 1185 (24N).

The ECU requires a power supply / diagnostic wiring harness and a modulator / sensor wiring harness (see PD-272-010, Document No. *Y095697*) to complete the **A18** Anti-Lock Braking System. Installation is simple compared to other systems since only two plugs have to be connected to the ECU. The modulator and sensor cables are colour coded to ensure ease of identification.

Standard Symbol as DIN ISO 1219



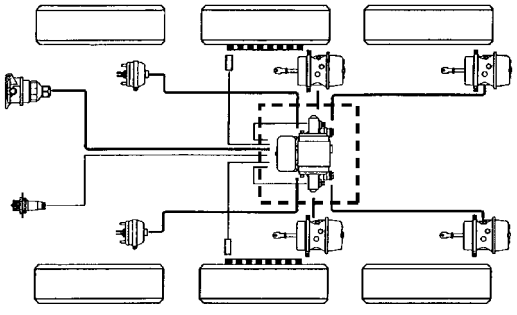
For trailer management purposes the **A18** ECU has "intelligent operating data acquisition" (IODA) which incorporates an odometer.

The **A18** ECU has a "velocity output" (VT) connection which can be used to signal an external device at a predetermined speed. This is preset to switch on at 15 km/h but can be adjusted in 5 km/h increments between 0 and 125 km/h. It is also possible to program the hysteresis and the kind of signal (permanent or pulsed) via diagnostic software ECU*talk*®.

The **A18** ECU is self-diagnosing. In the event of a fault, the towing vehicle´s "in-cab" or the trailer headboard warning light will illuminate and all components detected as defective are shut down either selectively or in total. In the event of a total ABS shut down all braking functions revert to standard operation.

To ensure fast and effective trouble shooting, the ECU is provided with a universal diagnostic interface which, with diagnostic software ECU*talk*®, allows connection to a personal computer (PC) for fault diagnosis, odometer reading and velocity output parameter setting. Alternatively, a diagnostic blink code switch (**EZ1022**) can be connected to the interface and, via its integral light, can be used to display the diagnostic blink code. This can be achieved by depressing the switch for two seconds.

Compact assembly unit:
ECU and Dual Relay Modulator Valve



Once a fault has been rectified, the resetting of the ECU is simply achieved by removing and re-applying power to the unit. All faults are stored in the ECU memory and can be recalled and erased as required. When the system has been installed, manufacturers can perform an "end of line" (EOL) test using a PC and the diagnostic software. The **A18** ECU is available as a separate item or as a part of the trailer module assembly **ES2005**.

A trailer mounted warning display can also be connected to the diagnostic port. This display is called a "magic eye" and switches automatically to red when a fault in the ECU is detected.

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Item No. K002482

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

ES2005

Trailer ABS (A18)

Doc. No. Y011365 (Rev. 002)
March 2011

Technical Features

Operating pressure:	10.0 bar
Max. permissable pressure:	12.5 bar
Operating temperature range:	-40 °C to +75 °C
Weight:	**ES2005** 3.4 kg approx. **0486105002** 0.5 kg approx.
Degree of Protection:	DIN 40050 part 9
Nominal voltage:	24 V DC
Max. Uni Output Signal:	1A

Range Overview

Part No.	Type No.	Description	Configuration	Power Supply
II36413	ES2005	Compact Assembly Unit (ECU + ABS Modulator)	2S/2M	ISO 7638 & ISO 1185
0486105002	-	ECU only	2S/2M	ISO 7638 & ISO 1185

Part No.	Type No.	Port	Used for	Port threads	Number of ports	Tightening torque
II36413	ES2005	1	Supply	M22x1.5	1	60 Nm
		12	Supply	M22x1.5	1 (plugged)	60 Nm
		22	Delivery to service brake actuators	M22x1.5	3	60 Nm
		23	Delivery to service brake actuators	M22x1.5	3	60 Nm
		4	Control	M16x1.5	2 (1 plugged)	45 Nm

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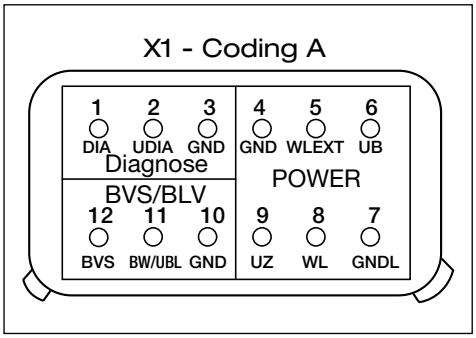
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ES2005
Trailer ABS (A18)

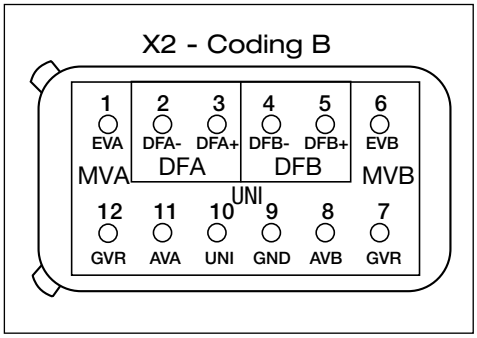
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Electrical connections

Pin	Signal	Description
X1-1	DIA	input/output level converter/ diagnosis
X1-2	UDIA	output supply level converter/ diagnosis
X1-3	GND	output earth level converter/ diagnosis
X1-4	GND	input earth control unit
X1-5	WLEXT	output external warning light for Stop Light supply
X1-6	UB	input supply control unit battery
X1-7	GNDL	input earth control unit
X1-8	WL	output warning light
X1-9	UZ	input supply control unit ignition
X1-10	GND	output earth Stop Light supply
X1-11	BVV/UBL	input supply Stop Light supply
X1-12	BVS	no configuration



Pin	Signal	Description
X2-1	EVA	output inlet valve A
X2-2	DFA-	input speed sensor A
X2-3	DFA+	input speed sensor A
X2-4	DFB-	input speed sensor B
X2-5	DFB+	input speed sensor B
X2-6	EVB	output inlet valve B
X2-7	GVR	output earth valve B
X2-8	AVB	output outlet valve B
X2-9	GND	output earth universal output
X2-10	UNI	output universal output
X2-11	AVA	output outlet valve A
X2-12	GVR	output earth valve A



Diagnostics

The X1 Connector has pins dedicated for diagnostics. It is normal to have a diagnostic socket on the trailer connected to these pins.

A blink code switch or PC with the ECU*talk*® diagnostic software can be connected to the diagnostic socket.

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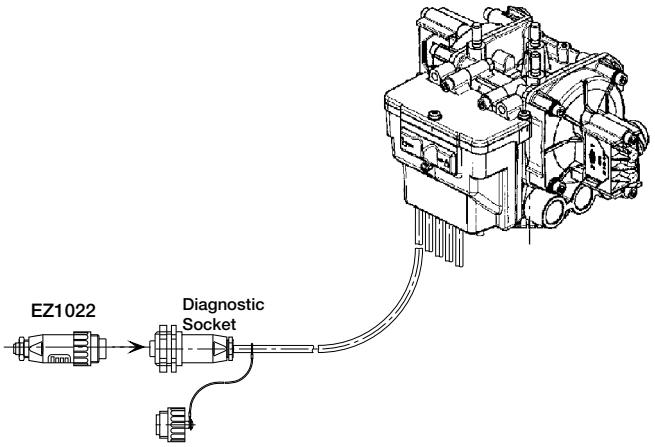
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ES2005
Trailer ABS (A18)

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March 2011

Blink Code diagnostics

With a blink code switch (**EZ1022**) connected to the diagnostic socket the blink code output is visible at the blink code switch (which has an integrated LED) and on the warning light in the towing vehicle.



Calling up the Blink Codes

To call up the blink codes, follow these instructions:

- Switch ignition **ON**
- Connect Blink Code Switch to the external diagnostic plug
- Depress the switch for at least two seconds
- Release the switch
- Count the number of blink pulses of the LED (two blocks of pulses).

The blink code is decoded from the two blocks:

- The first block provides information about the actual system configuration
- The second block provides information about the kind of malfunction or the faulty component.

Block 1		Block 2	
Configuration	**Blink Pulses**	**ABS fault**	**Blink Pulses**
2S/2M	2	ABS OK	1
		Speed sensor DFA [2)]	2 [1)]
		Speed sensor DFB [2)]	3 [1)]
		Solenoid valve MVA [2)]	8
		Solenoid valve MVB [2)]	9
		GVR, GNDL (earth)	11
		Power Supply	12
		Universal output	13
		Control unit internal	14

1) Having detected too big a gap between speed sensor and sensing ring, the last blink impulse will appear with doubled time (0.4 sec).

2) An even number of blink pulses refers to a component (DFA/MVA) or cable on the left, an odd number of blink pulses refers to a component (DFB/MVB) on the right side of the vehicle seen in forward driving direction.

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Delete fault code memory

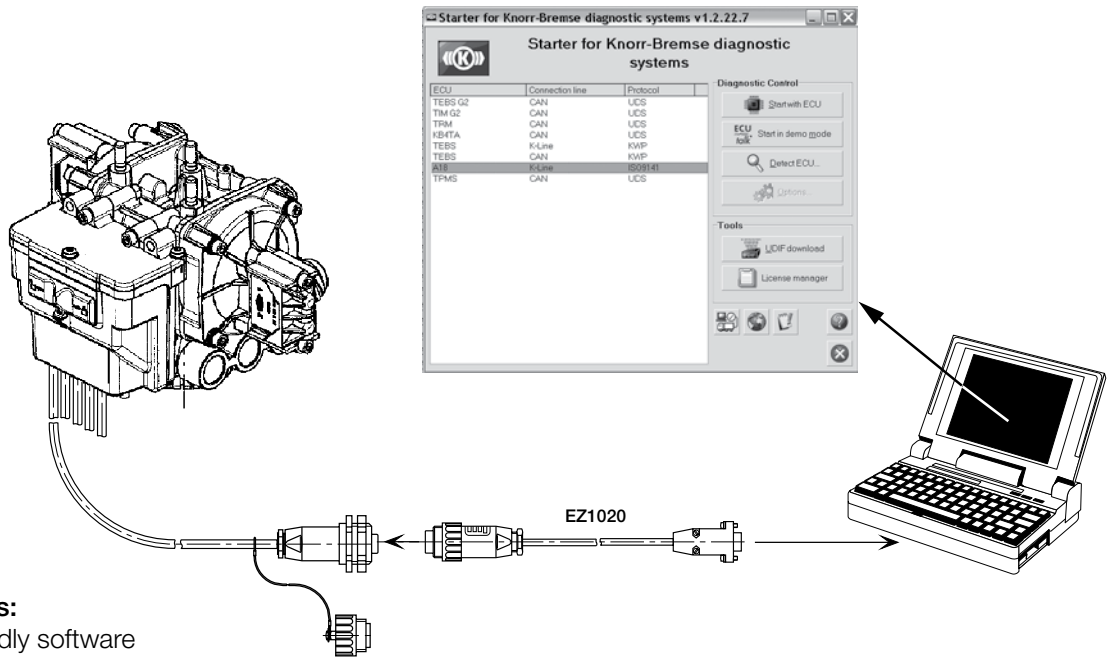
After the fault has been eliminated, the fault code memory must be deleted.

- Ignition **OFF**
- Depress Blink Code Switch
- Ignition **ON**
- Wait for at least two seconds
- Release switch
- LED flashes continuously ==> system OK
- Check the blink code again

Please note that we advise for initial installation and End of Line checks the use of Knorr-Bremse's PC Diagnostics Program 'ECUtalk®'.

The ECU´s integrated blink code diagnostics cannot be used for this purpose because it senses only electrical faults in external components and does not sense the correct allocation of the wheel speed sensors and solenoid valves to the corresponding wheels.

PC Diagnostics



Functions:
User friendly software

- Change/read System Configuration
- Installation Test
- Read/delete fault code memory
- Read further information: odometer, differential odometer, velocity output

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Item No. K002482

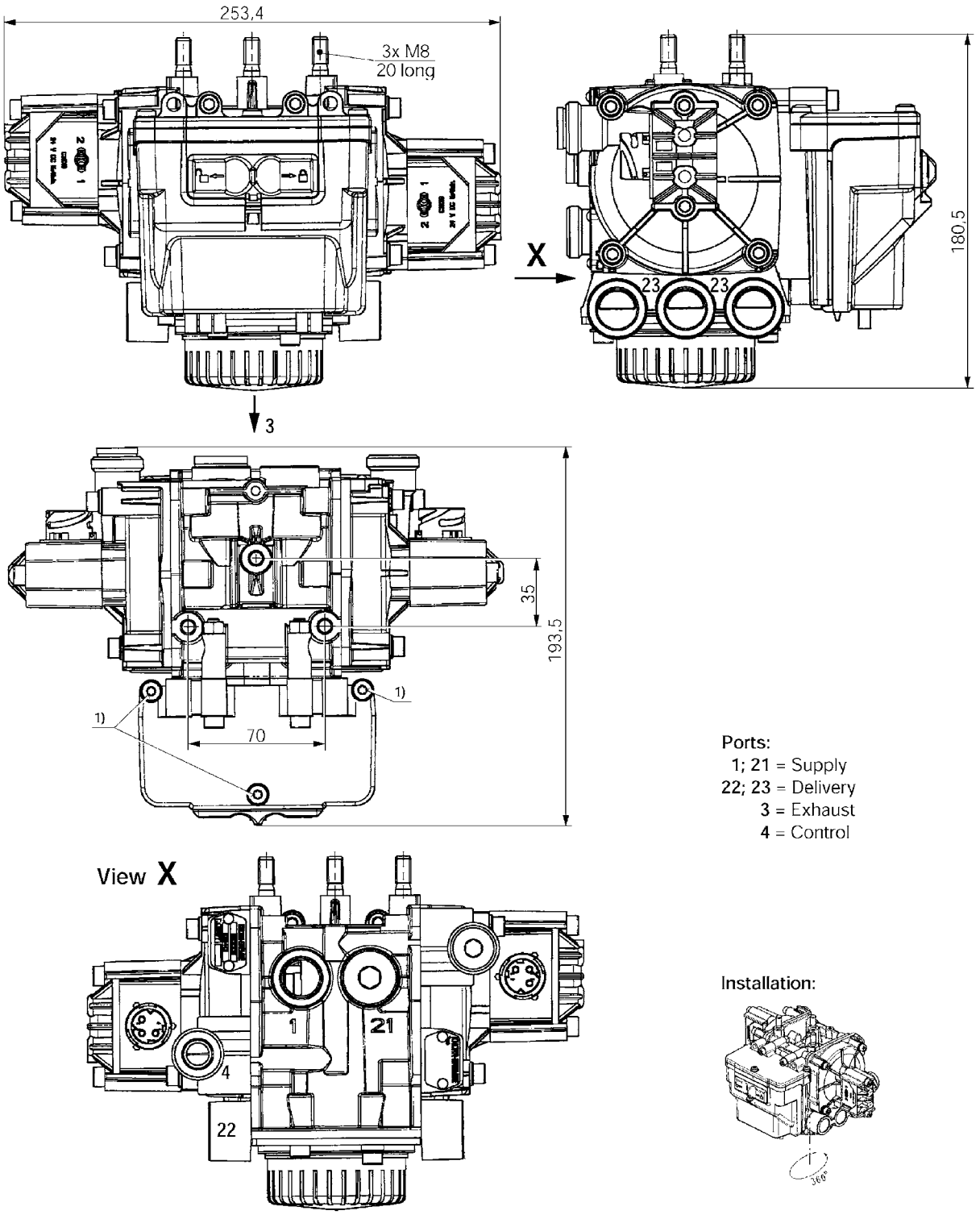
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

ES2005

Trailer ABS (A18)

Doc. No. Y011365 (Rev. 002)
March 2011

Dimensions



1) WARNING - removal of this screw will invalidate the Warranty

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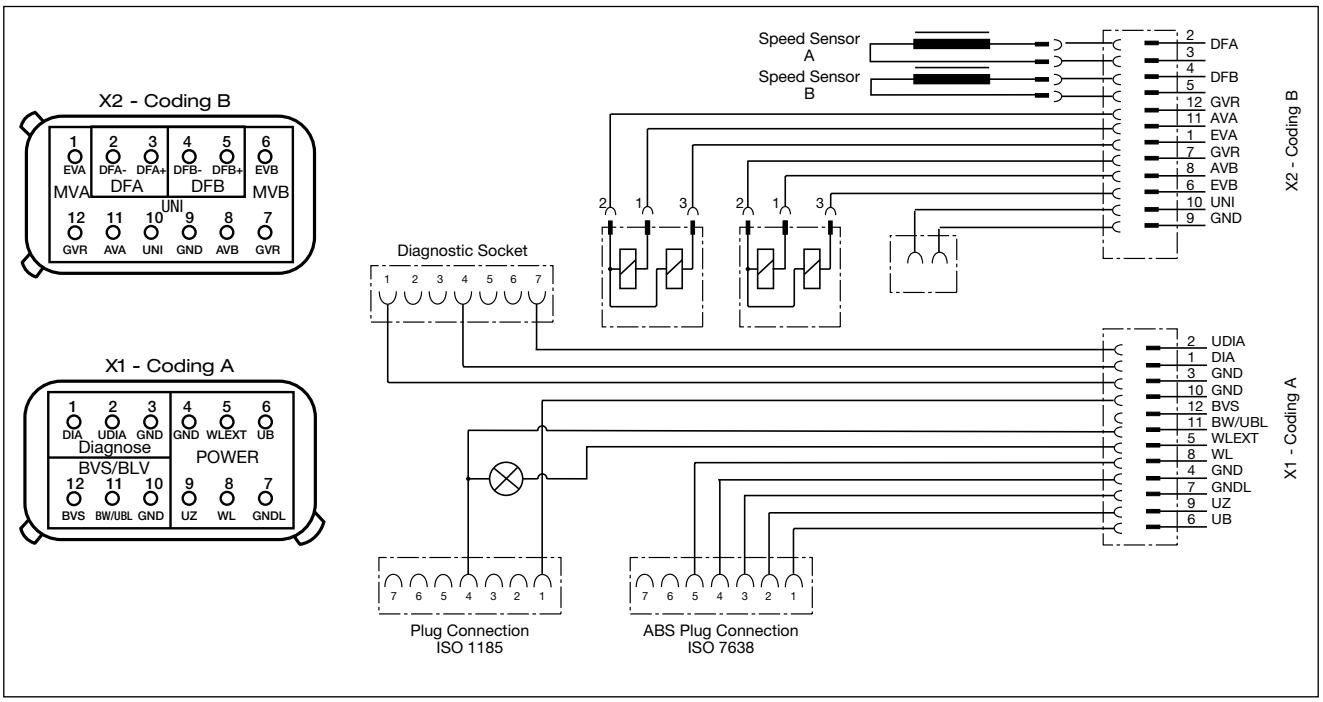
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Trailer ABS (A18)

Doc. No. Y011365 (Rev. 002)
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Wiring Diagram



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ES2005

Trailer ABS (A18)

Doc. No. Y011365 (Rev. 002)
March 2011

Test Report (record of system check using blink code adaptor)

Test Report

Knorr-Bremse ABS KB 3 TA or A 18 for Trailers

The system check took place using onboard diagnosis (blink code diagnosis) with blink code adapter **EZ1022** – II36361 acc. to installations instruction C16226, C16228 and installation instructions for the A18 / **ES2005**.

Vehicle Type	Vehicle manufacturer
Vehicle Identification-No.	
Chassis-No.	

1. Installed system variant

(please tick the appropriate boxes)

Configuration and sensing	4S/3M	☐
	4S/2M	☐
	2S/2M	☐
Power supply	ISO 7638	☐
	ISO 1185	☐

A system configuration of the above variant was

successfully executed ☐

not successfully executed ☐

(use in original configuration)

2. Installed ECU

(please tick the appropriate boxes)

ES1210	(ES2001)	☐
ES1215	(ES2002)	☐
ES1216	(ES2003)	☐
0 486 105 002 100	(ES2005)	☐

3. Installation test

(please tick the appropriate boxes)

(Correct function of the sensors and correct allocation of the modulators)

SL 1	☐
SL 2	☐
SR 1	☐
SR 2	☐
SAL	☐
SAR	☐

Checked:

Date Stamp / Signature

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Product DATA

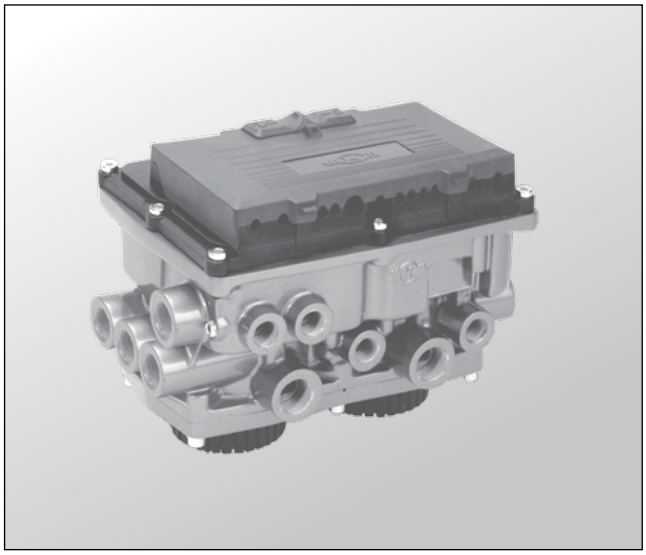
ES1305

Trailer ABS (KB4TA)

Doc. No. Y095835 (Rev. 001)
March 2014

PD-203-300

Function



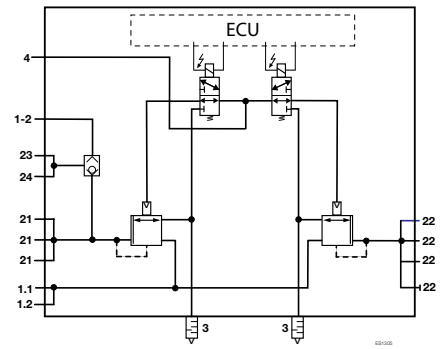
The Knorr-Bremse **KB4TA module ES1305** is an integrated ABS electronic control unit and dual modulator valve for air braked trailers with mechanical or air suspension.

KB4TA is powered via ISO 7638. As an additional safety feature the ISO 1185 connection is included as standard so, in the event that there is no ISO 7638 powering, the ABS function is maintained.

Note: Stop lamp powering should only be considered as a backup in the event of failure of the ISO 7638 connection.

The **KB4TA** module is designed for all normal system variants from 2S/2M up to 4S/3M. The configuration as supplied is 2S/2M, but with the integrated auto-configuration the module detects additional sensors and adjusts upward to 4S/2M automatically. Other configurations and additional functions can be quickly and effectively achieved using PC Software ECU*talk*®. For 4S/3M applications an additional external (third) ABS modulator (BR9234) is necessary (see PD 200-200, Document No. *Y011362*).

Standard Symbol as DIN ISO 1219



Depending on the version, the **KB4TA** ECU has the option of various auxiliary functions:

- Odometer/trip counter/service interval
- Reset to Ride (RtR)
- Independent Speed Switch (ISS)
- ABS Active
- Brake wear monitoring
- Stop lamp powering
- Headboard warning lamp [1)]
- 24V output

The **KB4TA** module incorporates an anti-compounding feature. If the service and parking brakes are applied at the same time, the anti-compounding feature prevents compounding of the forces applied to the foundation brake and possible damage.

To ensure fast and effective trouble shooting, the **KB4TA** ECU can be used with a universal diagnostic interface which, with diagnostic software ECU*talk*®, allows connection to a personal computer (PC) for fault diagnosis, odometer reading and velocity output parameter setting. Alternatively, a diagnostic blink code can be displayed on the towing vehicle's "in-cab" and/or the trailer headboard warning light. This can be activated via the stop lamp supply by depressing the foot brake valve in the towing vehicle.

The **KB4TA** module is designed to be used as the service replacement part for the Knorr-Bremse KB3TA, A9 & A18 trailer ABS modules.

[1)] **The use of a headboard mounted warning lamp is prohibited on vehicles approved to ECE Regulation 13 unless national requirements specifically allow the installation.**

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Item No. K057932

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

ES1305

Trailer ABS (KB4TA)

Doc. No. Y095835 (Rev. 001)
March 2014

Technical Features

Max. operating pressure:	12.5 bar
Operating temperature range:	-40 °C to +65 °C
Weight:	5.7 kg approx.
Degree of Protection:	DIN 40050 part 9 IP69K
Nominal voltage:	24 V DC

Range Overview

Part No.	Type No.	As supplied		
		Configuration	Stop Lamp Power	AUXIO 1
K004236	ES1305	2S/2M	Enabled	Return to ride height
K004246*	ES1305	2S/2M	Enabled	Headboard warning lamp

* Will be replaced by K004236.

Depending on the module and configuration, up to two outputs are available:

ES1305	Configuration	
	2S/2M - 4S/2M	4S/3M
With stop lamp powering	1 output or 1 input	-
Without stop lamp powering	2 outputs or 1 ouput + 1 input	1 output or 1 input

Parameterisation possible:

Outputs	K004236	K004246
Off	√	√
24 V	√	√
Trailer headboard warning lamp	√	√
RtR	√	
ISS	√	
ABS active	√	
Inputs	**K004236**	**K004246**
Brake pad wear sensing	√	√

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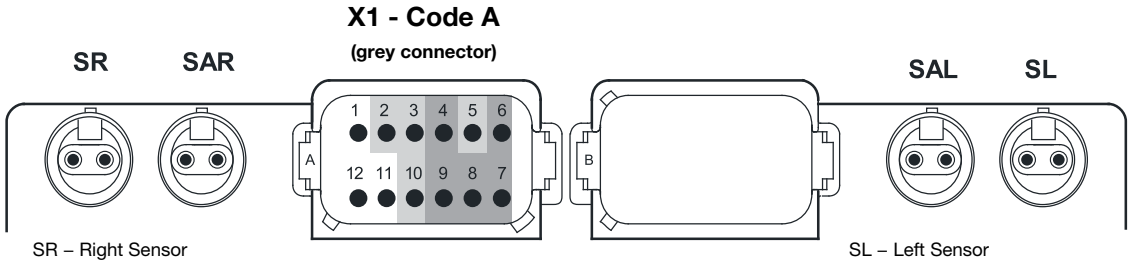
ES1305
Trailer ABS (KB4TA)

Pneumatic Connections

Port	Used for	Port threads	Number of ports	Tightening torque max.
1.1[1)]	Supply	M22x1.5	1	60 Nm
1.2[1)]	Supply	M22x1.5	1	60 Nm
1-2	Connection to park/shunt valve	M22x1.5	1	60 Nm
21	Delivery to brake chambers (service brake)	M22x1.5	3	60 Nm
22	Delivery to brake chambers (service brake)	M22x1.5	3	60 Nm
	Test Connector (optional)	M16x1.5	1	45 Nm
23	Delivery to parking brake	M16x1.5	1	45 Nm
24	Delivery to parking brake	M16x1.5	1	45 Nm
4	Control	M16x1.5	1	45 Nm
42	Not used (plugged)	-	1	-

[1)] If only one port is used: use port 1.1 and plug port 1.2.

Electrical connections



SR – Right Sensor
SAR – Additional Right Sensor for 4S/2M and 4S/3M configurations

SL – Left Sensor
SAL – Additional Left Sensor for 4S/2M and 4S/3M configurations

Pin	Signal	Connection
X1-1	AUXI01	Auxiliary Input/Output (4S/3M: Valve 3rd Modulator)
X1-2	AUXRET23	Return Line for AUXI02 and AUXI03 (Diagnostics Ground)
X1-3	TI_CANL	5V-CAN Low for Diagnostics
X1-4	GND_M	System Ground (ISO 7638 - ABS connector - Pin 4)
X1-5	TI_CANH	5V-CAN High for Diagnostics
X1-6	BAT	Valve Supply Voltage (ISO 7638 - ABS connector - Pin 1)

Pin	Signal	Connection
X1-7	GND_H	Warning Lamp Ground (ISO 7638 - ABS connector - Pin 3)
X1-8	WL	Warning Lamp (ISO 7638 - ABS connector - Pin 5)
X1-9	IGN	ECU Supply Voltage (ISO 7638 - ABS connector - Pin 2)
X1-10	AUXI03 (DIA)	Auxiliary Input/Output (Diagnostics Supply Voltage)
X1-11	AUXI02/ GND_BL	Auxiliary Input/Output (Stop lamp ground)
X1-12	AUXRET1/BL	Return Line for AUXI01 (Stop lamp Supply) (4S/3M: Return Line 3rd Modulator)

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ES1305
Trailer ABS (KB4TA)

Doc. No. Y095835 (Rev. 001)
March 2014

Diagnostics

KB4TA offers two independent possibilities for diagnostics:

- Blink Code diagnostics (ABS warning lamp in the cab and/or headboard warning lamp). 4S/3M configuration and end of line testing (EOL) is not possible with this option
- direct access to the module via PC and software ECU*talk*® (all relevant configurations and EOL are possible)

Blink Code diagnostics

The **KB4TA** module provides diagnostic and configuration functions through Blink Code diagnostics. This means that a technician, even without diagnostic tools, can read a series of 'blinks' of the ABS warning lamp(s) (in the cab of the towing vehicle and/or on the trailer headboard) to access the fault codes being generated. However to enter this diagnostic mode the **KB4TA** module must be wired to accept both permanent (ISO 7638) and stop lamp (ISO 1185) power supplies.

Calling up the Blink Codes

To call up the blink codes, follow these instructions:

- Vehicle must be stationary with brakes released.
- Switch ignition "**ON".**
- Wait until the system has completed its start-up (static) test.
- In the towing vehicle, apply and release the service (foot) brake within the first 15 seconds after switching ON the ignition:

Number of times to apply and release the service (foot) brake	Function displayed on warning lamp(s) (Note: The codes will be displayed after a delay of 5 secs.)
3	Active faults
4	Inactive faults
5	Erase stored faults
6	ABS configuration
7	Odometer 'mileage'

Note:
If stop lamp power is applied continuously (foot brake applied continuously) for more than five seconds, blink code diagnostics will be disabled until the next time the ignition is switched ON.

- The fault blink code(s) will be displayed in two blocks, record the blink code(s) and refer to the blink code chart.
- The ABS configuration blink code will be displayed in three blocks, the first shows the number of wheel speed sensors (2 or 4), the second shows the number of modulators (2 or 3) and the third shows the control mode which can be ignored.
- The odometer blink code will display the 'mileage' (distance in km) to the nearest 1,000 km. For example: 152,431 km will be displayed as 152; i.e. one blink (pause), five blinks (pause), two blinks. Zeros will be displayed by the ABS warning lamp blinking twice rapidly. Odometer 'mileage' cannot be altered with blink code diagnostics. Complete odometer information can be retrieved using the PC diagnostic tool ECU*talk*®.
- After display of the blink codes the warning lamp(s) will remain on for five seconds and then return to the normal operating mode.

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Trailer ABS (KB4TA)

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March 2014

Blink Code Label

1st Blink Code		2nd Blink Code	
Code	Location	Code	Description
1	All	1	No faults present
2	Sensor SL	1	Wheel speed sensor air gap too big
3	Sensor SR	2	Loss of wheel speed sensor signal
4	Sensor SAL	3	Noisy wheel speed sensor signal
5	Sensor SAR	4	Short or open circuit wheel speed sensor
		5	Tyre size differential out of range
		6	Wheel speed sensor configuration error
6	Power	1	Voltage too high
		2	Voltage too low
		3	Excessive resistance on ISO 7638 Pin1
7	Modulator 22	2	Exhaust solenoid short or open circuit
8	Modulator 21	3	ABS valve installation error
9	AUXIO1 / Modulator 2	4	Valve configuration error
10	Common	1	Internal short to ground
		2	AUXIO1 or Modulator 2 short to ground
		3	ABS valve dynamic error – all valves
		4	Excessive ABS activity
		5	AUXIO1 or Modulator 2 short to battery
11	ECU	1	Internal error
		2	Configuration error
12	AUXIO1	1	Short or open circuit
13	AUXIO2		
14	System	2	Service interval exceeded

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Trailer-ABS KB4TA

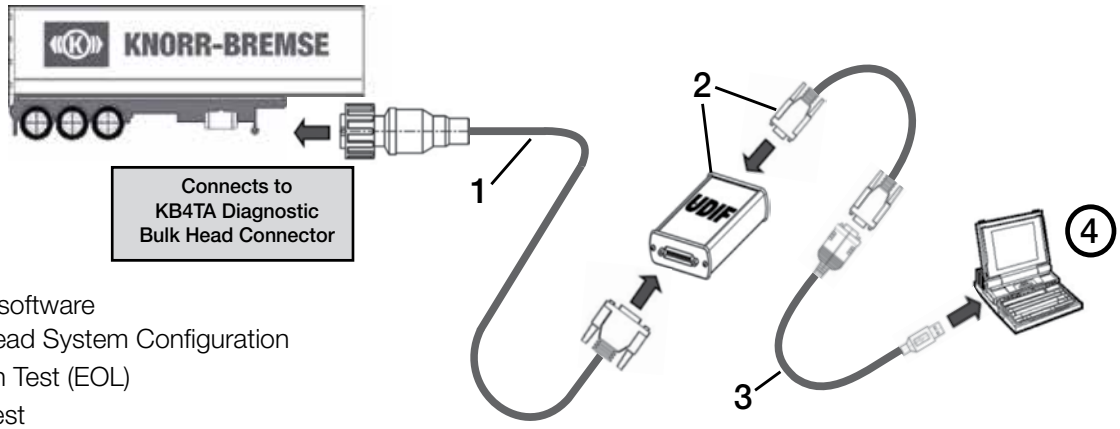
To read current and stored faults:

1. Ensure that the ABS is powered via the ISO 7638 connection.
2. Apply and release the brake pedal at 1 second intervals:
   a) 3 times to read current faults
   b) 4 times to read stored faults.
3. After a period of 5 seconds the blink codes will be displayed.
4. Observe the trailer ABS lamp in the towing vehicle and record the blink code sequence.
5. A description of each blink code is shown in the table.
6. After rectifying any faults, check that the trailer ABS warning lamp in the towing vehicle is not illuminated after turning the ignition off and on. This may necessitate driving the vehicle at a speed >10km/h.

Note: Blink code information is only available when the Stop Lamp power option and either 2S/2M or 4S/2M ABS are configured.

Bendix

PC Diagnostics



Functions:

User friendly software

- Change/read System Configuration
- Installation Test (EOL)
- System Test
- Read/delete fault code memory
- Read/reset further information: odometer, trip counter, service interval

Pos.	Description	Part No.	Type No.	Details
1	Diagnostic cable (blue marking)	K010837	EZ1037	length = 3m
2	Diagnostic Set Universal Diagnostic Interface (UDIF)	II39809F	EZ1031	includes connecting cable Z005474 (9-pin sub-D-plug and 9-pin sub D-socket)
3	Connecting cable	Z007887		optional for USB-connection to PC
4	Diagnostic software “ECU*talk*®”			Download from www.knorr-bremsecvs.com

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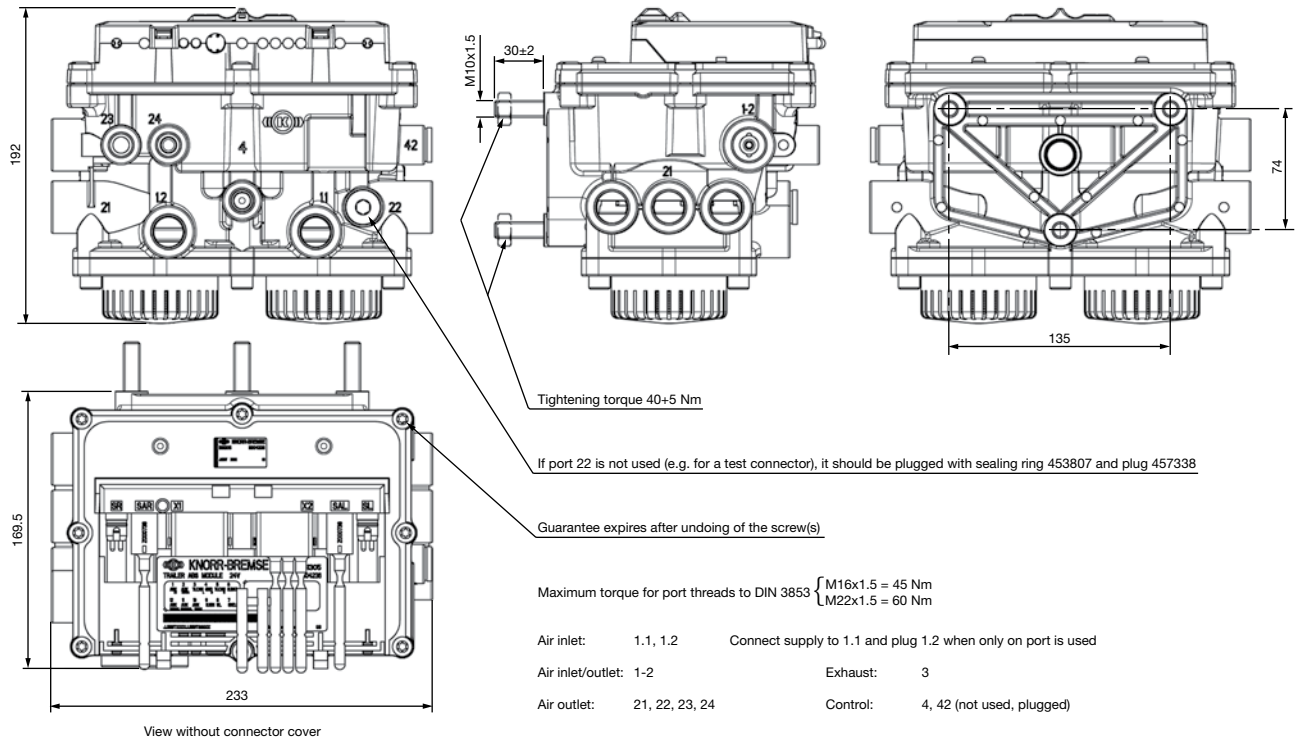
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ES1305

Trailer ABS (KB4TA)

Doc. No. Y095835 (Rev. 001)
March 2014

Dimensions



View without connector cover

Load Sensing Valve Data Plate [1]:
Part No.: II**39797F**
Size [mm]: 170 x 110



[1] The Data Plate is a sticker which can be printed via the ECU*talk*® software and a laser printer.
Caution! A laser printer must be used but do not print more than 5 stickers at a time.

Other Documentation

See also KB4TA System and Installation Instructions *Y026787*

Revision Details

Rev. 000	February 2012	New document.
Rev. 001	March 2014	Load Sensing Valve Data Plate added on page 6.

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Item No. K057932

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

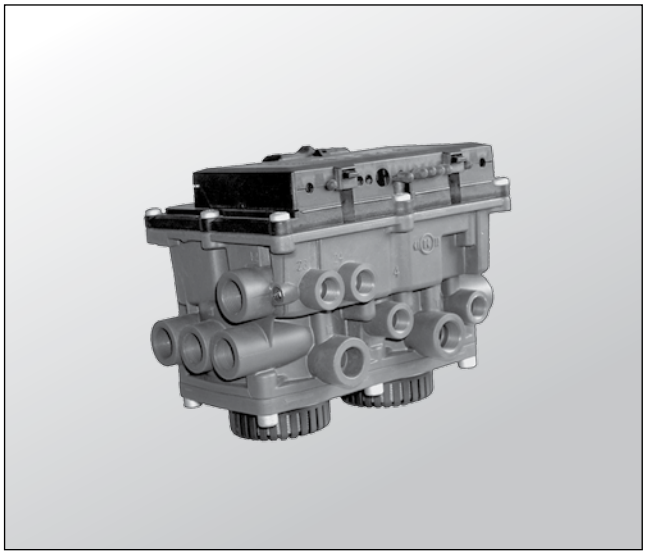
Product DATA

ES205.

TEBS4 Brake Module

Doc. No. Y011366 (EN - Rev. 005)
October 2014

Function



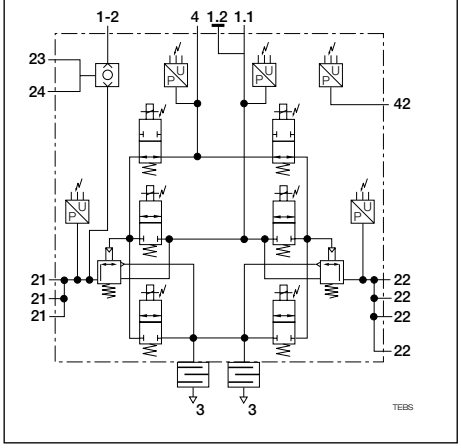
The electronic braking system for trailers (**TEBS**) combines, in one compact **Brake Module**, the electronic control unit, the sensor technology and the pneumatic control.

The braking functions of anti-lock and load sensing control are both electronically managed within the module as integrated features. This provides more accurate and consistent control of the generated braking force including reduced hysteresis compared to a conventional braking system, thereby improving tractor-trailer compatibility, optimising the brake pad wear and helping to reduce the overall operating costs of the trailer.

The anti-compounding function is also housed within the module.

As an additional option, the function Roll Stability Program (RSP) is available. Should a driver underestimate the vehicle speed when carrying out a manoeuvre, particularly when the trailer is laden with a high centre of gravity, there is a real danger that the trailer will become unstable and roll over. Even if the driver becomes aware of the condition of the trailer, it is normally too late to prevent an accident.

Standard Symbol as DIN ISO 1219



The RSP function of TEBS helps to avoid this by automatically applying the brakes of selected trailer wheels. By monitoring lateral acceleration, load and speed, the system is able to determine when an unstable condition is imminent. Should this condition arise, the brakes are automatically applied to reduce vehicle speed and hence lateral acceleration, thereby enhancing vehicle stability. When the threat of instability is no longer present, the brakes are automatically released and the system reverts to normal operation. RSP is available as an option within TEBS and can be realised without any additional components having to be installed on the trailer. Operation of the TEBS and RSP function is independent of the specifications of the tractor.

RSP is available for semi-trailers, centre-axle, and drawbar trailers.

The following auxiliary functions may be configured to the associated auxiliary connections of the TEBS:

1. Standard Auxiliary Functions:

1.1 Outputs

- **Fully Automatic Lift Axle Control:** The ECU provides an electrical signal for the Knorr-Bremse lift axle control valve **AE114**. and ensures that the legal requirements are fulfilled by preventing overloading of the axles. The TEBS electronics can control up to two lift axle control valves, each valve may then be connected to 1 or 2 lifting axles
- **RtR ("Reset to Ride"):** In conventional suspension control systems, the raise/lower valve is often not reset to the drive position before the vehicle is moved and damage can be caused to the suspension and brakes. To prevent this happening, the TEBS ECU can be programmed to supply an electrical signal to a raise/lower valve with suitable functionality such that when the vehicle exceeds a pre-determined threshold speed, this signal causes the raise/lower valve to automatically switch to the drive position.

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Item No. K002483

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- **ISS (Integrated Speed Switch):** The TEBS provides an electrical output signal when a pre-programmed vehicle speed has been reached.
  This signal may be used to fulfil numerous operational requirements such as locking of steering axles etc.
  The signal can be programmed to switch from 0 V to 24V or 24V to 0 V.
  The hysteresis, i.e. the difference between switch on and switch off speeds, can be adjusted to 10%, 20%, 40% or 80%.
- **24 V Supply:** Provides a permanent power supply that may be used to power additional brake and running gear systems / functions on the trailer.
- **ABS active:** When the ABS of the trailer is active, a 24V signal is transmitted by the ECU. Typically this function may be used to switch off a retarder installed on the trailer while ABS is active.
- **RSP active:** When the RSP of the trailer is active, a 24V signal is transmitted by the ECU.
- **TOC (Trailer Occurrence Counter):** Every kilometre travelled, the ECU transmits a 24V signal for a period of time and this may be used to trigger an external mileage counter.

1.2 Inputs:

The TEBS ECU has the ability to evaluate and/or react to three sensor inputs as follows:

- **Brake Pad Wear control:** When an input is received that the wear limit of at least one brake has been reached, the information is stored by the ECU and can be displayed by a Magic Eye or the information can be accessed at a later date via PC diagnostocs or TIM. In addition, an electrical signal will be transmitted to the towing vehicle via pin 5 of the ISO 7638 connector causing the yellow warning lamp to flash each time the system is initially powered and the vehicle is stationary.

  A CAN signal is also transmitted via pins 6 and 7 of the ISO 7638 which may be used in the driver‘s information display (if the towing vehicle has such a device).
- **Traction Assist:** Raises the front lift axle when the trailer is laden to increase the imposed load on the towing vehicle’s drive axle to improve traction. Axle overload and speed restrictions apply when this function in operational.
- **Disable Lift Axle Control:** Signals the lift axle(s) to lower when raised; this allows manual activation via a signal transmitted by the towing vehicle or by an electrical switch mounted on the trailer. This can be used to assist manoeuvring or for rolling road testing.

2. Non-Standard Auxiliary Functions (via ADL):

Should a customer require a function, other than those normally available, it is possible to create a non-standard function by the use of a special program file known as Auxiliary Design Language (ADL) produced by Knorr-Bremse.
Should such a function be required, contact must be made through the local Knorr-Bremse representative. When available, the special file needed to fulfil the function can be written to the ECU via the PC Diagnostic Program.

3. Stop Lamp powering:

To obtain full functionality, any trailer electronic braking system requires a permanent power supply (achieved by using the legally specified ISO 7638 connection in 5 or 7 pin format); this ensures load sensing, anti-lock control (ABS) and all auxiliary functions are automatically maintained. In the event of a failure of this power supply, whilst trailer braking will be maintained via the pneumatic back-up function, all electronically controlled functionality would no longer be active. Continued operation of the vehicle without electrical power to the ECU and so without load sensing and ABS, may therefore result in tyre flat spotting, trailer instability and higher brake operating temperatures leading to increased brake pad wear. To overcome this problem, the TEBS ECU can be installed so that it will continue to operate by taking power from the Stop Lamp circuit and thereby load sensing and anti-lock functions remain active.

NOTE:

Stop Lamp powering should only be considered as a back-up function to ensure some safety features are retained. Operation of the vehicle over a longer period without a fully functioning ISO 7638 connector is not legal.

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Doc. No. Y011366 (EN - Rev. 005)
October 2014

ES205.
TEBS4 Brake Module

Technical Features

Operating pressure:	10.0 bar
Max. permissable pressure:	12.5 bar
Operating temperature range:	-40 °C to +65 °C
Weight:	**ES2050, ES2053** 5.7 kg approx.
Nominal voltage:	24 V DC

Towing vehicle requirements

Trailers fitted with an Electronic Braking System (TEBS) only comply with the legal requirements of Regulations 98/12/EC and ECE Regulation 13/09 Supplement 08, when the towing vehicle is equipped with an electrical interface of the following specification:

ISO 7638: 1985	5 Pin
ISO 7638: 1997 Part 1 (24 V)	5 Pin
ISO 7638: 1997 Part 1 (24 V)	7 Pin

Range Overview

Part No.	Type No.	Possible ABS Configuration	Auxiliary Functions				RSP
			X1 connector [1] Total Auxiliaries: 2		X2 connector		
			Max. Out	Max. In	Max. Out	Max. In	
II39798[3]	**ES2050**	2S-4S/2M	1	1[2]	3	2	No
II39782[3]	**ES2053**	2S-4S/2M	1	1[2]	3	2	Yes
II39782N50[4]		4S/3M	1	1[2]	1[5]	2	Yes

[1] Only possible if TIM or Magic Eye are **not** used; maximum number of configurable Auxiliaries on X1 connector: 2

[2] No “Traction Help”, no “Disable Lift Axle Control”

[3] The part number may have the suffix F004 in which case the Module will be supplied with a system plate and an information sticker.

[4] Replaces II**36419** - **ES2050 and** II**39783F** - **ES2041.** The part number will carry a suffix “N50” which defines that it is supplied with packaging.

[5] Two of the X2 Auxiliary Outputs are required to power the external ABS Modulator Valve (**BR9234** - see PD-200-200, Document No. *Y011362*) in the 4S/3M system

Service Parts:

K102802K50	Connector Cover
K108643K50	Port Filter (contains 20 Filters)
K101835K50	Silencer Kit (two kits required per module)
K101836K50	Blanking Plug for X2 Connector
K103003K50	Blanking Plug for WSS Connector

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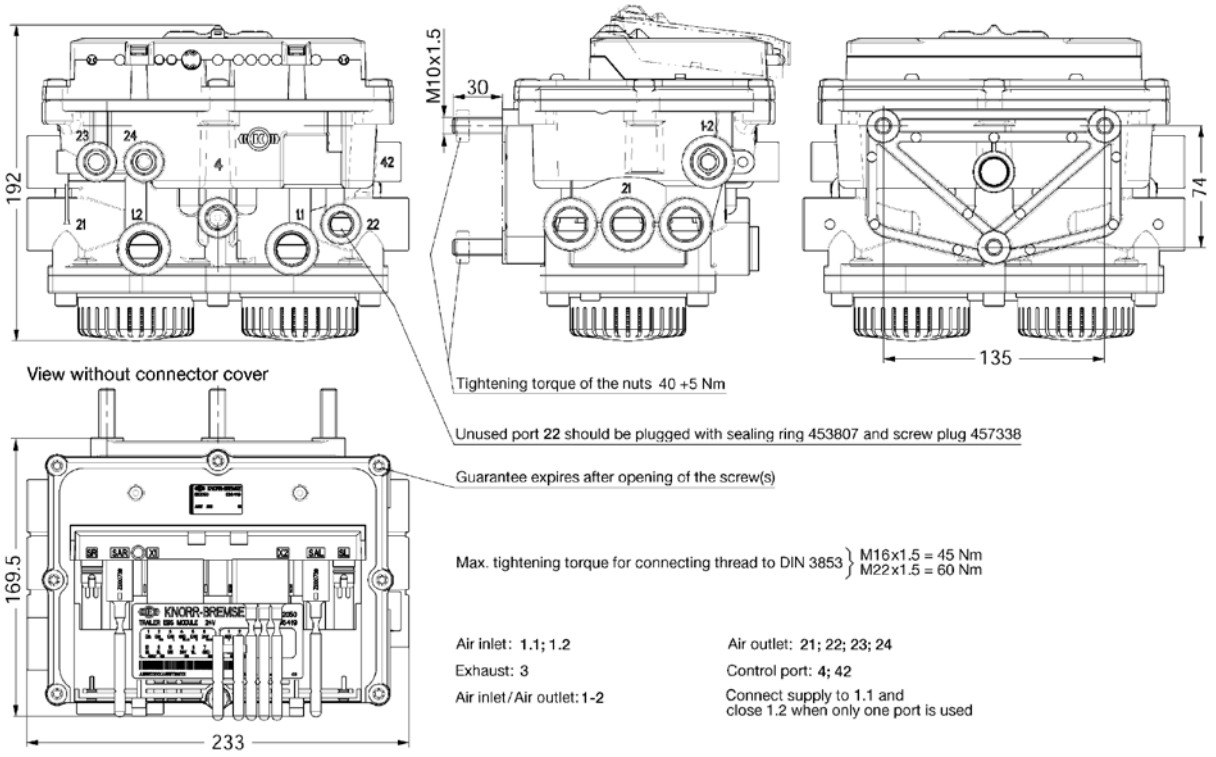
ES205.

TEBS 4 Brake Module

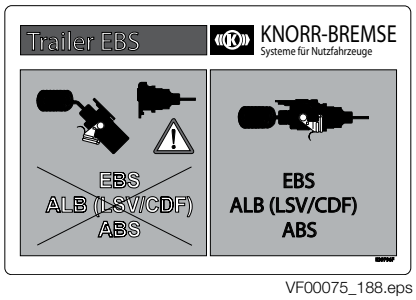
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Dimensions

ES2050
ES2053



Information sticker, TEBS power supply
Part No.: II**39796F**
Size [mm]: 150 x 100



VF00075_188.eps

EBS-System Plate [1]:
Part No.: II**39797F**
Size [mm]: 170 x 110



VF00075_189.jpg

[1] The System Plate is a sticker which can be printed via the ECU*talk*® software and a laser printer.
Caution! A laser printer must be used but do not print more than 5 stickers at a time.

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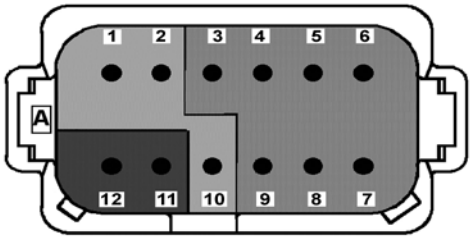
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TEBS4 Brake Module

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Electrical connections

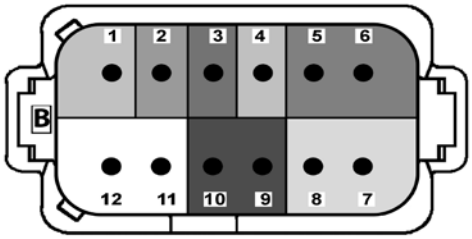
X1 - connector - Code 'A'



VF00075/191

Pin	Diagnosis via K-Line or TIM or Magic Eye	Diagnosis via CAN
1	Diagnostics	Input C - signal
2	Diagnostics - ground	ground
3	ISO 11992 CAN low	*(ISO 7638: 1,5 mm² WH / BN)*
4	Modulator - ground	*(ISO 7638: 4,0 mm² BN)*
5	ISO 11992 CAN high	*(ISO 7638: 1,5 mm² WH / GN)*
6	Modulator - 24 V	*(ISO 7638: 4,0 mm² RD)*
7	ECU - ground	*(ISO 7638: 1,5 mm² YE)*
8	Warning Lamp	*(ISO 7638: 1,5 mm² WH)*
9	ECU - 24 V	*(ISO 7638: 1,5 mm² BK)*
10	Diagnostics - 24 V	AUX 4 (24 V)
11	Stop Lamp - ground	*(ISO 1185: 1,0 mm² BN)*
12	Stop Lamp - 24 V	*(ISO 1185 1,0 mm² YE)*

X2 - connector - Code 'B'



VF00075/192

Pin	2S / 2M 4S / 2M	4S / 3M
1	AUX 1 (24 V)	External ABS Modulator **(BR9234)** - Hold Valve *(1,0 mm² YE)*
2	AUX 2 (24 V)	External ABS Modulator **(BR9234)** - Release Valve *(1,0 mm² BK)*
3	AUX 3 (24 V)	
4	Input supply (5 V)	
5	Input A - signal	
6	Input A - ground	
7	Input B - ground	
8	Input B - signal	
9	-	
10	-	
11	ground	
12	ground	External ABS Modulator **(BR9234)** - Ground *(1,0 mm² WH)*

Pneumatic connections

Port	Qty	Used for	Port Thread
1.1[1)]	1	Supply to reservoir	**M22 x 1.5**
1.2[1)]	1	Supply to reservoir	**M22 x 1.5**
1-2	1	To **AE431.** park/shunt valve	**M22 x 1.5**
21	3	Delivery to brake chambers, right side	**M22 x 1.5**
22	3	Delivery to brake chambers, left side	**M22 x 1.5**
22	1	Test connector	**M16 x 1.5**
23	1	Delivery to spring portions of spring brakes, right side	**M16 x 1.5**
24	1	Delivery to spring portions of spring brakes, left side	**M16 x 1.5**
4	1	Brake demand - Control (Yellow) Line	**M16 x 1.5**
42	1	Air suspension bag pressure	**M16 x 1.5**

[1)] If only one supply port is required, **1.1** must be used and **1.2** must be plugged.

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TEBS 4 Brake Module

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Additional Documentation

Documentation is available from your Knorr-Bremse technical sales representative and/or on the Knorr-Bremse website **www.knorr-bremsecvs.com** which gives detailed information about the electronic braking system such as a system description and detailed installation instructions.

Customer News	ECU*talk*® Download	**Y049770**
Information Document	TEBS4 Homologation Document	**C16427**
Installation Instructions	TEBS4	**Y002324**
Product Data	ABS Relay Modulator Valves (PD-200-200)	**Y011362**
Product Data	Cables for Trailer ABS and EBS (PD-272-000)	**Y095697**
Product information	Electronic Braking System for Trailers	**P-3528**
Product News	ECU*talk*® Vista compatibility	**Y055547**
Service Information	Identification of TEBS Module	**Y018096**
Service News	TEBS4 Installation/Storage/Maintenance	**Y025056**
Service News	TEBS4 Update Package SW521.17	**Y052195**
User Manual	ECU*talk*® Diagnostics	**Y031901**

Legal Requirements

TEBS has been approved in accordance with the requirements of Annex XIV of the Directive 98/12/EC and Annex 19 of ECE Regulation 13 with respect to ABS performance (see approval report EB 130 and the information document C16427/E).

The system also fulfils the requirements of the ECE regulation 13/09 Supplement 8 with respect to the prescribed requirements for vehicles with an electric control line and electric control transmission. (See approval report No. EB 133 and the information document C16428/E).

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TEBS4 Brake Module

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Diagnostics

Universal Diagnostic Interface (UDIF)



Function

In order to configure the TEBS, carry out End Of Line testing and system checks, special hardware and software is required.

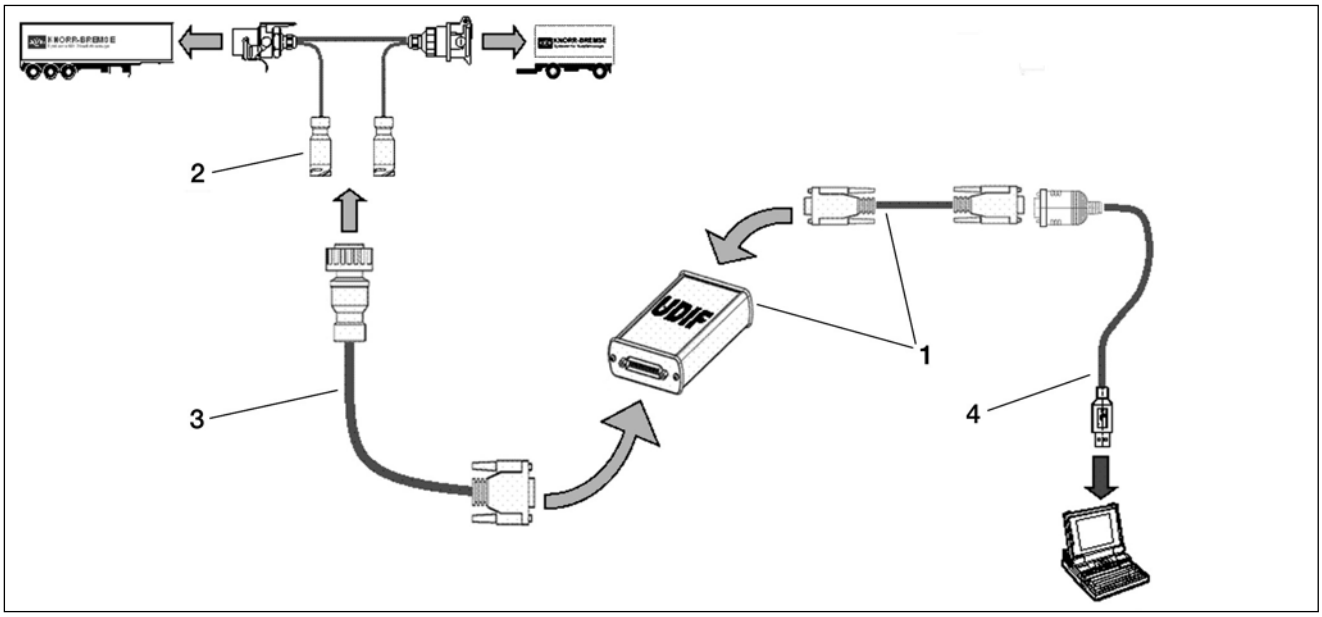
The hardware consists of a diagnostic interface and cables to connect TEBS electronics to the PC. Two different versions of software are available; a full version for the trailer manufacturer and a diagnostic version specifically designed for workshops. The software ECU*talk*® can be downloaded free of charge from the Internet. To use the software a PIN is required, which can be purchased over the Internet after appropriate training has been completed.

Options

The later generations of TEBS do not require a specific diagnostic connection at the side of the trailer as PC diagnostic can be carried out via pins 6 and 7 of the ISO 7638 interface (CAN connection).

This diagnostic interface can be connected to the TEBS via an adapter cable, which is also connected to a standard ISO 7638 connection (5 pin or 7 pin) to power the TEBS.

Pos.	Name	Part No.	Type No.	Remarks
1	Diagnostic Set UDIF	II**39809F**	**EZ1031**	Including connection cable **Z005474** (9-pin sub-D-plug and 9-pin sub-D-socket)
2	Adapter cable	II**39808F**	**EZ1034**	See PD-272-030, Document No. *Y107796*
3	Diagnostic cable	II**39812F**	**EZ1032**	See PD-272-030, Document No. *Y107796*
4	Connection cable	**Z007887**	-	Optional for USB-connection to PC
5	Diagnostic software	-	-	Download from *www.knorr-bremseCVS.com*



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ES205.

TEBS 4 Brake Module

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October 2014

Diagnostics (*contd.*)

Trailer Information Module (TIM) (II39810F - EZ1035)

Function



The Trailer Information Module (TIM) is a trailer mounted display for direct reading of diagnostic and trailer related information. It may also be used as a hand held diagnostic tool. It enables access to information available within the TEBS ECU without using PC diagnostics.

The display is made up of 4 lines each having 20 characters. Operation is simple by means of three buttons (see picture). In addition to diagnostic and checking functions, TIM offers access to the following information:

- Active/stored faults
- System voltage
- Pad Wear
- Mileage
- Frequency of RSP activity
- Axle Load

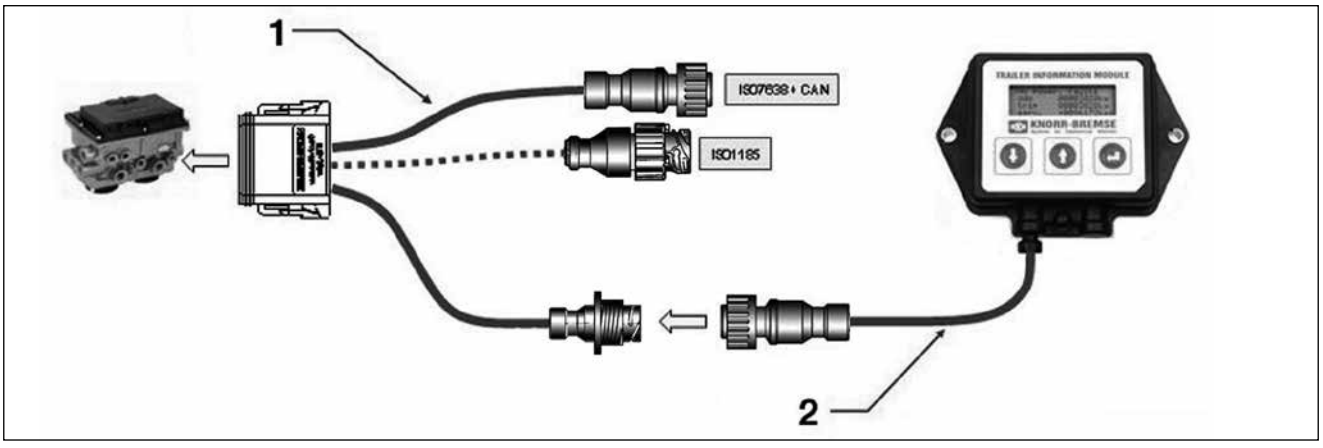
Note: As with Magic Eye, when using a TIM, no Input C or Output AUX 4 / Output AUX 5 functionality is possible via the X-connector as an external diagnostic connection is required.

Technical features

Operating temperature range:	-20 °C to +70 °C
Weight:	**EZ1035** 0.4 kg approx
Nominal voltage:	24 V DC

Options

Pos.	Description	Part No.	Type No.	Remarks
1	Connection cable	**K007525**	**EK3107**[1)]	ISO 7638 + CAN and ISO1185, see PD-272-020, Document No. *Y107795*
		II40394F	**EK3109**[1)]	ISO 7638 + CAN, see PD-272-020, Document No. *Y107795*
2	TIM	**II39810F**	**EZ1035**	Cable length = 1m



[1)] A Mounting Kit (Part No: **K005378**), consisting of a closure cap, a spring ring and a nut, may be used

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Item No. K002483

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

ES205.
TEBS4 Brake Module

Doc. No. Y011366 (EN - Rev. 005)
October 2014

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ES205.

TEBS 4 Brake Module

Doc. No. Y011366 (EN - Rev. 004)
October 2014

Revision Details

Rev. 003	February 2012	New format for Trailer Catalogue
Rev. 004	March 2014	Service Parts updated
Rev. 005	October 2014	Drawing of X2 Connector on page 5 corrected

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Product DATA

ES2060

TEBS G2.0/G2.1 Brake Module

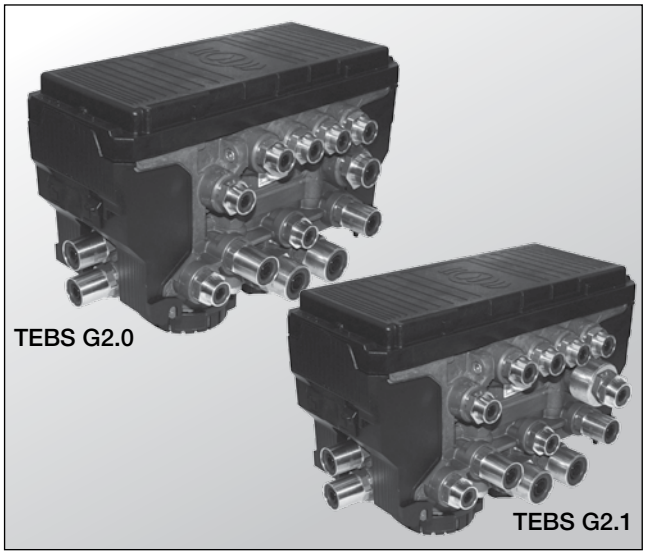
Doc. No. Y050635 (Rev. 003)
November 2014

Function

The Knorr-Bremse electronic braking systems for trailers (**TEBS G2.0/G2.1**) combine, in one compact assembly, the electronic control unit, the sensor technology and the pneumatic control.

The braking functions of anti-lock and load sensing control are both electronically managed within the module as integrated features. This provides more accurate and consistent control of the generated braking force including reduced hysteresis compared to a conventional braking system, thereby improving tractor-trailer compatibility, optimising the brake pad wear and helping to reduce the overall operating costs of the trailer.

The anti-compounding function is also housed within the module offering four delivery ports to the spring brake actuators.



The **TEBS G2.0 Brake Module** offers the following additional features compared with the first generation (TEBS4):

- an optional pneumatic auxiliary port (P28) which can be programmed to support all available auxiliary functions.
- variants of the module are available with push-to-connect (PTC) fittings.
- all electrical connections face downwards for improved accessibility.

The **TEBS G2.1 Brake Module** is similar to the **TEBS G2.0 Brake Module** except that in place of the anti-compounding double check valve it has:

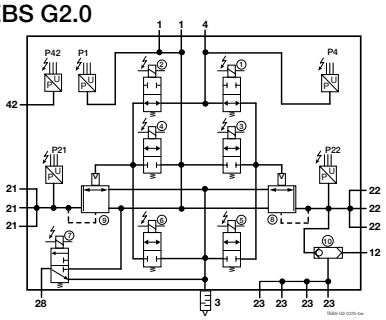
- an integrated emergency valve to provide the automatic brake function. The integrated emergency valve vents the spring brakes directly at the **TEBS G2.1 Brake Module** ensuring faster response. The emergency valve also performs the anti-compounding function.

When using the **TEBS G2.1 Brake Module** the park/shunt valve is connected to port 41 (in the same position as port 12 on the **TEBS G2.0 Brake Module**).

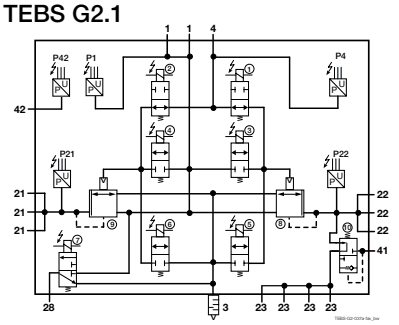
The service-proven anti-roll system, RSP (Roll Stability Program), is included as standard in all **TEBS G2 Brake Modules.**

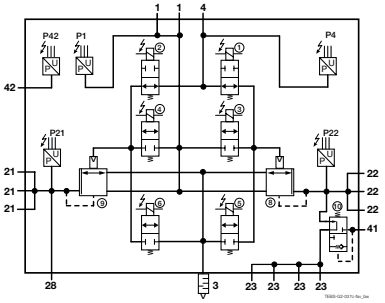
Standard Symbol as DIN ISO 1219

TEBS G2.0



TEBS G2.1





Technical Features

Operating pressure:	10.5 bar
Max. permissible pressure:	12.5 bar
Operating temperature range:	-40 °C to +65 °C
Weight:	5.7 kg approx.
Nominal Voltage:	9 to 32 V DC

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ES2060

TEBS G2.0/G2.1 Brake Module

Doc. No. Y050635 (Rev. 003)
November 2014

Towing vehicle requirements

Trailers fitted with an electronic braking system (TEBS) only comply with the legal requirements of regulations 98/12/EC and ECE R13/11 supplement 8, when the towing vehicle is equipped with an electrical interface of any of the following specifications:

ISO 7638: 1985	5 Pin
ISO 7638: 1997 Part 1 (24 V)	5 Pin
ISO 7638: 1997 Part 1 (24 V)	7 Pin

Auxiliary Functions

The following auxiliary functions may be configured to the associated auxiliary connections of the **TEBS G2.0/G2.1 Brake Modules**:

1. Standard Auxiliary Functions:

1.1 Outputs

- **Tilt Angle:** This signal can be utilised to switch off a lifting device for the tipping body. See PD-214-F201, Document No. *Y136126.*
- **Fully Automatic Lift Axle Control**: The module can control up to two lift axle control valves, each valve may then be connected to 1 or 2 lifting axles. See PD-214-F101, Document No. *Y136118.*
- **Speed Pulse (SP):** When the vehicle exceeds a predetermined threshold speed, a signal of programmable duration is activated. This signal causes the Raise / Lower valve to automatically switch to the “drive” position. See PD-214-F106, Document No. *Y136123.*
- **Integrated Speed Switch (ISS):** This signal may be used to fulfil numerous operational requirements such as locking of steering axles etc. See PD-214-F107, Document No. *Y136124.*
- **Steering Axle Lock (SAL):** This signal can be utilised to lock the steering axle in the ‘straight-ahead’ condition. It is similar to ISS but can also be triggered from an input, e.g. Back-up Light (Reversing Lamps). See PD-214-F251, Document No. *Y136130.*
- **24 V Supply**: provides a permanent power supply that may be used to power additional brake and running gear systems / functions on the trailer. See PD-214-F006, Document No. *Y136112.*
- **ABS active:** Typically this function may be used to directly control a retarder installed on the trailer. See PD-214-F004, Document No. *Y136110.*
- **RSP active:** When the Roll Stability Program (RSP) of the trailer is active, a 24 V or a pneumatic output (depending on configuration) is transmitted by the brake module. See PD-214-F005, Document No. *Y136111.*
- **SLR:** When a function of TEBS causes the brakes to be applied a Stop Lamp Request signal can be generated. See PD-214-F401, Document No. *Y137240.*
- **P_{out}:** Brake modules that have the P_{28} function available, which can be programmed to provide a pneumatic output for any of the above functions or a constant pressure supply. See PD-214-F006, Document No. *Y136112.*

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1.2 Inputs:

The TEBS G2 brake module can be programmed to receive inputs on various connectors. See page 6 for more information on the connections. Typical inputs are described below:

- **Brake pad wear control (PW) :** Input is received that the wear limit of at least one brake has been reached. See PD-214-F351, Document No. *Y136131.*
- **TH:** Traction Help actuated by a manual switch. See PD-214-F102, Document No. *Y136119.*
- **MH:** Manoeuvring Help actuated by a manual switch. See PD-214-F103, Document No. *Y136120.*
- **LL_ALL / LL_LAC1 / LL_LAC2_:** These functions lower lift axles as a result of a signal from a manual switch. See PD-214-F101, Document No. *Y136118.*
- **LLTH - Advanced Lift Axle Control:** This is a combined function which offers lift axle lowering and traction help via the same input. See PD-214-F101 and PD-214-F102, Document Nos. *Y136118* and *Y136119.*
- **Road Laying Function (RLF)**: This function is typically used when the trailer is working with a road laying machine. See PD-214-203, Document No. *Y136128.*
- **Body Lift Sensor (BLS)**: This sensor is used with tipping trailers. See PD-214-F201, Document No. *Y136126*, PD-214-F202, Document No. *Y136127 and* PD-214-F203, Document No. *Y136128.*
- **Trailer Brake Release (TBR)**: This function is typically used with extendable trailers. See PD-214-F301, Document No. *Y137238.*
- **Trailer Suspension Release (TSR)**: This input is used when raise/lower valves are installed. See PD-214-F108, Document No. *Y137237.*
- **Back-up Light (Reversing Lamp (RL))**: This takes an input from the reversing lamps and is typically used with the Steering Axle Lock function. See PD-214-F251, Document No. *Y136130.*

2. Non-Standard Auxiliary Functions:

Should a customer require a function other than those normally available it is possible to create a non-standard function by the use of a special file known as ADL (Auxiliary Design Language) produced by Knorr-Bremse following contact through one of its representatives. Once created, the special file can be written to the ECU of the brake module via the PC Diagnostic Program ECU*talk*®. The module offers a possibility to have an interface to the service braking system, under certain circumstances.

3. Stop lamp powering:

To obtain full functionality, any trailer electronic braking system requires a permanent power supply (achieved by using the legally specified ISO 7638 connection in 5 or 7 pin format); this ensures load sensing, anti-lock control and all auxiliary functions are automatically maintained. In the event of a failure of this power supply, whilst trailer braking will be maintained via the pneumatic back-up function, all electronically controlled functionality would no longer be active.

Continued operation of the vehicle without electrical power, irrespective of axle load, may therefore result in higher brake operating temperatures leading to increased brake pad wear, tyre flat spotting and trailer instability. To overcome this problem, the TEBS G2 ECU can be installed so that it will continue to operate by taking power from the stop lamp circuit and thereby load sensing and anti-lock functions remain active.

Note: ***Stop lamp powering should only be considered as a backup function to ensure some safety features are retained in the event of failure of the ISO 7638 connection.***

Note: ***When stop lamp powering is in operation in a 4S3M or 6S3M system configuration the module will switch to 2S2M operation.***

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ES2060

TEBS G2.0/G2.1 Brake Module

Doc. No. Y050635 (Rev. 003)
November 2014

Legal Requirements

TEBS G2.0/G2.1 has been approved in accordance with the requirements of annex XIV of the Directive 98/12/EC and annex 19 of ECE Regulation 13 with respect to ABS performance. The system also fulfils the requirements of the ECE Regulation 13/11 Supplement 8 with respect to the prescribed requirements for vehicles with an electric control line and electric control transmission.

Approval	ECE Report No.	Knorr-Bremse Document No.
ABS approval	EB 154	Y038142
Electronics approval	EB 155	Y038143
RSP approval	EB 166	Y080682
Use of AC574AY Relay Valve with long pipes	EB 154 extension	Y158131

Additional Documentation

Documentation is available on the Knorr-Bremse website **www.knorr-bremseCVS.com** which gives detailed information about the electronic braking system such as a system description and detailed installation instructions.

TEBS G2 Family Product Manual *Y037243*

Options

All module variants offer:

- RSP.
- Operating voltage range 9 - 32 Volts.
- Four pneumatic ports to the spring brake actuators.
- Internal J1939 CAN (5 V TI CAN)
- Configuration of different braking characteristics for the CAN and pneumatic brake demands.

Additionally:

- “Standard” variants provide ABS configuration 2S/2M and “Premium” variants (TEBS G2.0 after internal Software version V03) offer up to 6S/3M (see page 5).
- TEBS G2.1 has an integrated automatic brake function.

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November 2014

ES2060
TEBS G2.0/G2.1 Brake Module

Range Overview

The following table shows possible variants:

Part Number[1)]	Type Number	Module	P_{28}	PTC Fittings	ABS	Integrated Emergency Function	To be used with Park/ Shunt Valve	IAM Part Number[1)]
K019300	ES2060	G2.0 Premium	PS	no	2S/2M 4S/2M 4S/3M [2)] 6S/3M	no	AE4311	K019309
K019302	ES2060	G2.0 Premium	PS	yes	2S/2M 4S/2M 4S/3M [2)] 6S/3M	no	AE4311	K019309
K019309	ES2060	G2.0 Premium	PS	no	2S/2M 4S/2M 4S/3M [2)] 6S/3M	no	AE4311	K019309
K019310	ES2060	G2.1 Premium	PS	no	2S/2M 4S/2M 4S/3M [2)] 6S/3M	yes	AE4370 or AE4371[3)]	K019319
K019312	ES2060	G2.1 Premium	PS	yes	2S/2M 4S/2M 4S/3M [2)] 6S/3M	yes	AE4370 or AE4371[3)]	K019319
K019319	ES2060	G2.1 Premium	PS	no	2S/2M 4S/2M 4S/3M [2)] 6S/3M	yes	AE4370 or AE4371[3)]	K019319
K019340	ES2060	G2.0 Standard	TP	no	2S/2M	no	AE4311	K019349
K019342	ES2060	G2.0 Standard	TP	yes	2S/2M	no	AE4311	K019349
K019349	ES2060	G2.0 Standard	TP	no	2S/2M	no	AE4311	K019349
K019350	ES2060	G2.1 Standard	TP	no	2S/2M	yes	AE4370	K019359
K019352	ES2060	G2.1 Standard	TP	yes	2S/2M	yes	AE4370	K019359
K019359	ES2060	G2.1 Standard	TP	no	2S/2M	yes	AE4370	K019359

PS = Pneumatic signal
TP = Test point port

1) The part number of the module will carry two suffices, firstly “V##” which represents the software revision of the product, e.g. V01, V02 etc., and secondly “N##” which defines the packaging requirements of different market sectors, e.g. N00, N50. Example: K019300V02N50 - is supplied with software to revision 02 and packaged as described below.
Note: The N50 variant will be shipped in a box containing the data labels II39797F, II39796F and II40392F. These data labels may also be ordered separately.

2) Dependent of system configuration.

3) AE4370 for semi-trailers and centre-axle trailers. AE4371 for drawbar trailers.

Service Parts:

Silencer:	K000847K50 (two required per module)
Blanking Plug for 8 mm pipe:	96210008
Blanking Plug for 12 mm pipe:	96210012
Blanking Plug for 15 mm pipe:	96210015
Blanking Plug for In-Out Connector	K026197V01N00
Blanking Plug for WSS Connector	K103003K50 (two required per module)
Side Cover:	K023401K50
Port Filters	K108643K50 (contains 20 filters for Port 4)

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Pneumatic Connections

Port	Thread	Number	Used for	PTC Fittings [1] (to suit pipe size)
1.1	M22x1.5	1	Supply to Reservoir	15x1.5
1.2	M22x1.5	1	Supply to Reservoir	15x1.5
12 [2]	M22x1.5	1	Park/Shunt Valve	12x1.5
21	M16x1.5	3	Delivery to brake chambers on the side of the trailer with wheel speed sensors D and F	12x1.5
22	M16x1.5	3	Delivery to brake chambers on the side of the trailer with wheel speed sensors C and E	12x1.5
23	M16x1.5	4	Delivery to parking brake	8x1
4	M16x1.5	1	Brake demand (Yellow Line)	8x1
41 [3]	M16x1.5	1	Park/Shunt Valve	8x1
42	M16x1.5	1	Air spring pressure	8x1
28	M16x1.5	1	Test point or Pneumatic signal	8x1

1) Not all part numbers are supplied with a set of fittings.
2) TEBS G2.0 modules only.
3) TEBS G2.1 modules only.

Pipe sizes

The following table defines the minimum bore of piping to be used to connect the reservoir to the module and the module to the respective brake actuators.

Pipe size for the connection between the air reservoir and the module		
Plastic pipe	Minimum inside diameter 12 mm It is recommended that both Supply ports are used and each is connected to the reservoir.	
Pipe size for the connection between the module and the service brake actuators		Maximum length
Plastic pipe	Minimum inside diameter 9 mm	5 m
Rubber hose	Minimum inside diameter 11 mm	

Pneumatic Backup

If all electrical power supplies to the TEBS G2.0/G2.1 Brake Module are lost the system reverts to the Pneumatic Backup mode which provides the facility for the trailer to maintain normal pneumatic braking albeit without the load sensing and anti-lock functions.

The TEBS G2.0/G2.1 Brake Module has the ability to switch itself to the Pneumatic Backup mode and does so if the reservoir pressure drops below 2.5 bar. The module will switch back to normal operation when the reservoir pressure is restored.

The TEBS G2.0/G2.1 Brake Module also switches to Pneumatic Backup mode whenever the trailer is stationary and the service brake pressure is greater than 4.5 bar. This is to reduce electrical power consumption. The module will switch back to normal operation as soon as service brake pressure drops below 4.25 bar.

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Electrical Connections

All module variants offer the following possible electrical connections for auxiliary equipment:

- AUXIO 1 electrical output (6, 12 or 24 V) or digital input
- AUXIO 2 electrical output (6, 12 or 24 V) or digital input
- AUXIO 3 electrical output (24 V) or digital input
- SENS_SUP external sensor supply or Tri-state input
- SENS_IN1 external sensor input or Tri-state input
- Input S-E digital input or Tri-state input
- Input S-F digital input or Tri-state input

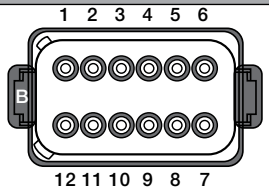
Note: Tri-state inputs allow control using a single wire connection where the following conditions will be recognised as requiring a change of state:

- change from open circuit to 12 / 24 V
- change from open circuit to ground

Note: When configuring inputs it is recommended that the tri-state inputs on pins 4 and 5 are used first followed by sensor inputs S-E and S-F and then AUXIO connections on pins 1, 2 and 3.

Note: Some variants also offer the possibility to use the port P_{28} to control pneumatic auxiliary equipment (see table on page 5).

In - Out Connector



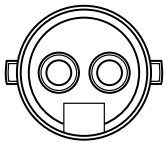
Pin Number	Function
1	AUXIO 1
2	AUXIO 2
3	AUXIO 3
4	Sensor Supply [SENS_SUP] (5V or Tri-state Input)
5	Sensor Input 1 [SENS_IN1] (Analogue or Tri-state)
6	Sensor Ground or Magic Eye or C3
7	Stop Lamp Supply (+)
8	Stop Lamp Ground (-)
9	J1939 CAN (5 V) Low
10	J1939 CAN (5 V) High
11	AuxRet 12 (Return for AUXIO 1 & 2)
12	AuxRet 3

Power Connector



Pin Number	Function
1	Battery Supply (+)
2	Electronic Supply (+)
3	Electronic Ground (-)
4	Battery Ground (-)
5	Warning Lamp
6	ISO 11992 CAN (24 V) High
7	ISO 11992 CAN (24 V) Low

Wheel Speed Sensor Connector



System	Connector	Function
2S/2M	S-C	Wheel Speed Sensor
	S-D	
	S-E	Optional Aux Input (Digital or Tri-state)
	S-F	
4S/2M 4S/3M	S-C	Wheel Speed Sensor
	S-D	
	S-E	
	S-F	

Note: If no connections on the In-Out Connector are used a blanking plug (K026197V01N00) must be installed to prevent the ingress of moisture to the ECU.

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ES2060

TEBS G2.0/G2.1 Brake Module

Doc. No. Y050635 (Rev. 003)
November 2014

Installation and Mounting

General installation guidelines

- The protective covers for the electrical connections of the TEBS G2.0/G2.1 Brake Module must be fitted at all times when the vehicle is in use.
- During assembly the ports and electrical connections of the TEBS G2.0/G2.1 Brake Module and cabling must be protected against the ingress of contamination, e.g. sand blasting particles.
- The TEBS G2.0/G2.1 module must never be stored or transported with the exhaust ports pointing upwards.
- If a TEBS G2.0/G2.1 module has been damaged in transit or during the assembly, e.g. dropped on the floor, it must not, under any circumstances, be fitted to the vehicle.

Note:

If at any time the vehicle is to be welded using an electric welding tool the following has to be observed:

- Remove the “Power” and “In-Out” connectors from the module(s).
- Remove the wheel speed sensor connectors, ensure that when reassembling the sensors they are reconnected to the correct positions. Knorr-Bremse recommends that an End of Line (EOL) test is run using the diagnostic program ECU*talk*® following reassembly of the wheel speed sensors to ensure correct fitment.

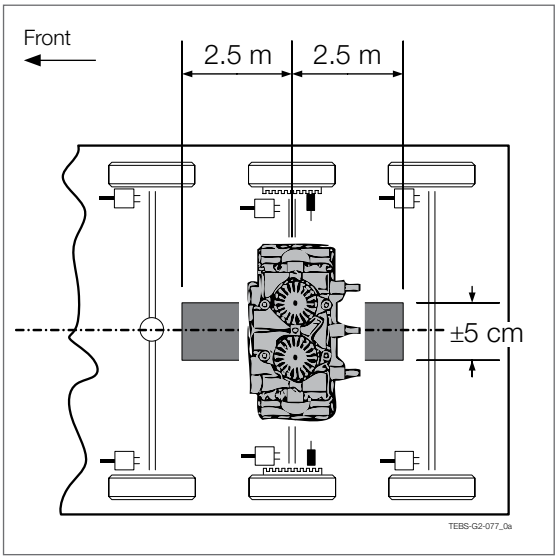
Installation of the TEBS G2.0/G2.1 Brake Module

The following provides a guide to the installation of the TEBS G2.0/G2.1 Brake Module.

In the longitudinal direction, the deviation from centre of the bogie may be a maximum of ± 2.5 m however the maximum permitted pipe length of 5 m to the brake actuators must be observed.

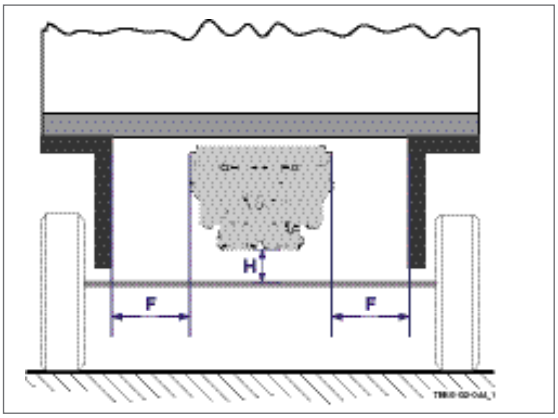
Note: when a self-steering or command steered axle is fitted the ‘centre of the bogie’ is deemed to be between the fixed axles.

An ideal installation would be where the TEBS G2.0/G2.1 Brake Module is laterally positioned within 5 cm of the centre of the trailer (see figure), this would result in the respective pipe lengths being approximately equal for each axle. However it is possible to mount the TEBS G2.0/G2.1 Brake Module in other positions dependent on the design of the trailer and space available.



If the Roll Stability Program (RSP) is configured, special restrictions apply. See PD-214-F005, Document No. *Y136111.*

During installation, consideration must be given to being able to access the electrical connections and a minimum clearance must be observed (F > 50 mm) to ensure that covers can be removed. For the TEBS G2.0/G2.1 Brake Module a clearance (H > 25 mm) must be ensured below the exhaust silencers at the base of the valve; this must be checked when the suspension is deflated and on its bump stops (see figure).



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TEBS G2.0/G2.1 Brake Module

Cables

For information on suitable cables see PD-272-020, Document No. *Y107795* and for cable installation guidelines see PD-272-005, Document No. *Y136137*.

Parameterisation

Before a trailer can be used on the road its braking performance must have been verified by a testing authority and be type approved. Part of this process is the requirement to fulfil the prescribed compatibility limits which means a number of braking parameters must be specified. This is normally achieved by means of a brake calculation taking into account the physical characteristics of the trailer and the recorded performance of braking components defining the respective brake chamber pressures to fulfil laden and unladen requirements. For the TEBS G2.0/G2.1 equipped trailer this would be carried out using the Knorr-Bremse brake calculation program BSD which has been specifically developed for this purpose. The main parameters which control the braking performance of the trailer are:

- Laden and unladen air spring pressures
- Laden and unladen axle loads
- Laden and unladen brake actuator delivery pressures for a control line pressure of 6.5 bar.
- Coupling head pressure when braking should commence.
- Inshot pressure generated when braking should commence.
- Dynamic tyre size

The diagnostic program ECU*talk*® is the primary means by which the parameters can be written to the TEBS G2.0/G2.1 Brake Module. This can be achieved by either entering individual parameters into the required fields or by reading the parameter values from a file produced by the brake calculation program BSD; the latter option being more reliable as the possibility of error has been removed. When a TEBS G2.0/G2.1 module is produced, default parameters are defined so that, in the event that a trailer is inadvertently not parameterised, a level of braking performance will always be available. When a data set of parameters is written to the TEBS G2.0/G2.1 Brake Module the operators PIN will also be written and stored as a finger print to identify who carried out the parameterisation.

Knorr-Bremse makes available four levels of PIN code access to PC Diagnostics ECU*talk*® as follows:

- Full version for OEMs
- EOL version for OEMs
- Service Plus for workshops
- Service Version for workshops

Load Sensing Plate

Following installation and parameterisation of the TEBS G2.0/G2.1 Brake Module it is possible to generate a load sensing plate by using the diagnostic program ECU*talk*®. Legislation requires that such a plate is fitted to all trailers. The plate generated by ECU*talk*® will not only contain information to carry out a check of the load sensing settings but also define additional TEBS G2 Brake Module configuration data and trailer related information. See section on “Stickers” and PD-214-F002, Document No. *Y136109.*

Diagnostics

The Knorr-Bremse diagnostic program ECU*talk*® is the primary means by which diagnosis of the TEBS G2.0/G2.1 Brake Module can be undertaken. For further details see PD-214-F355, Document No. *Y136135*.

Note:

For more information on ECU*talk*® see the Product Information Document No. *Y051496* available at www.Knorr-BremseCVS.com.

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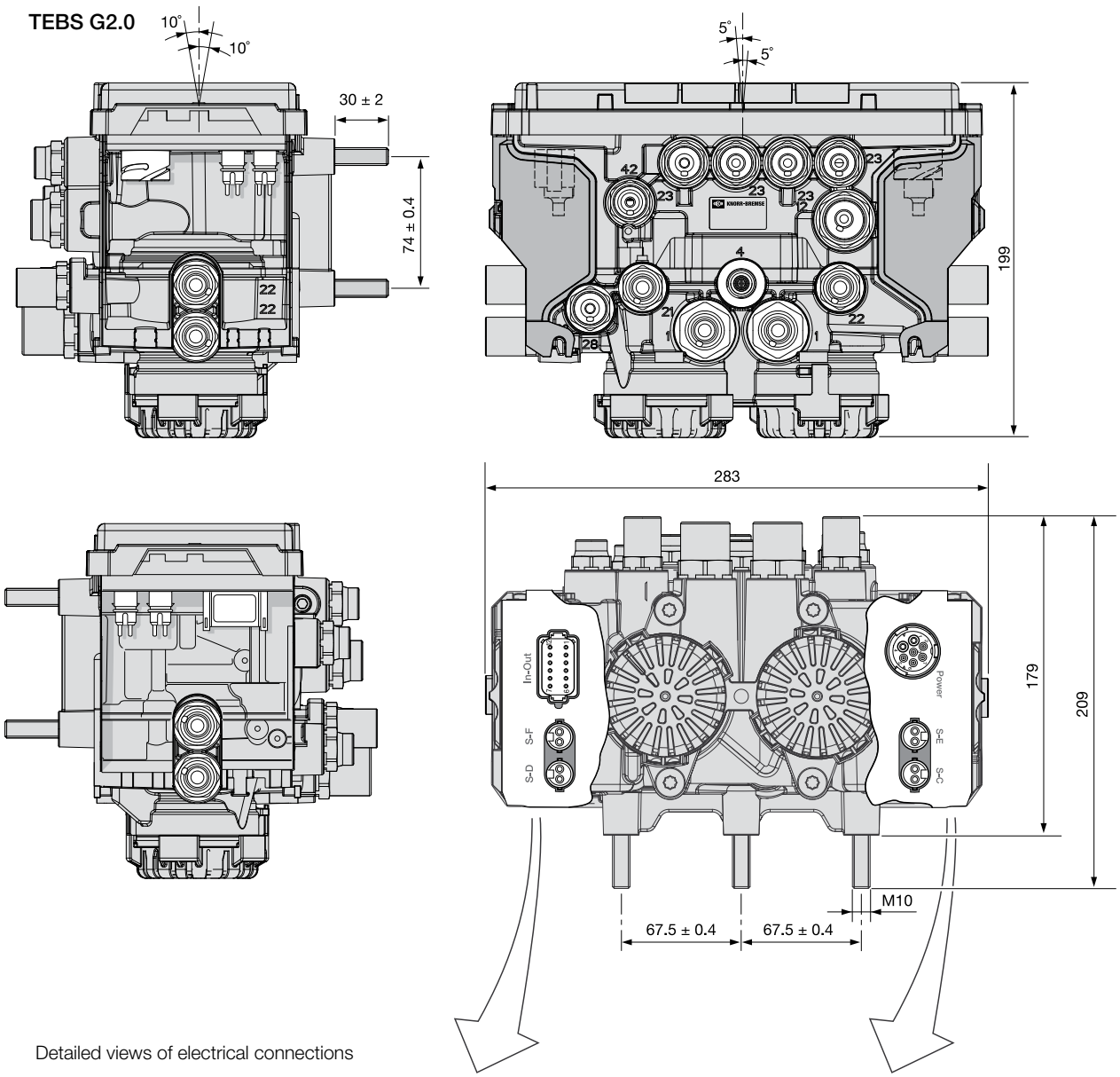
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TEBS G2.0/G2.1 Brake Module

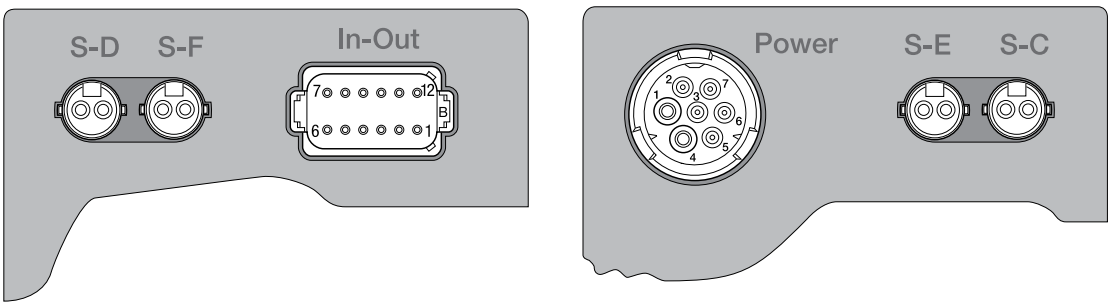
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Dimensions

TEBS G2.0



Detailed views of electrical connections



NOTE: For information on individual connections and pin function, see table on page 7

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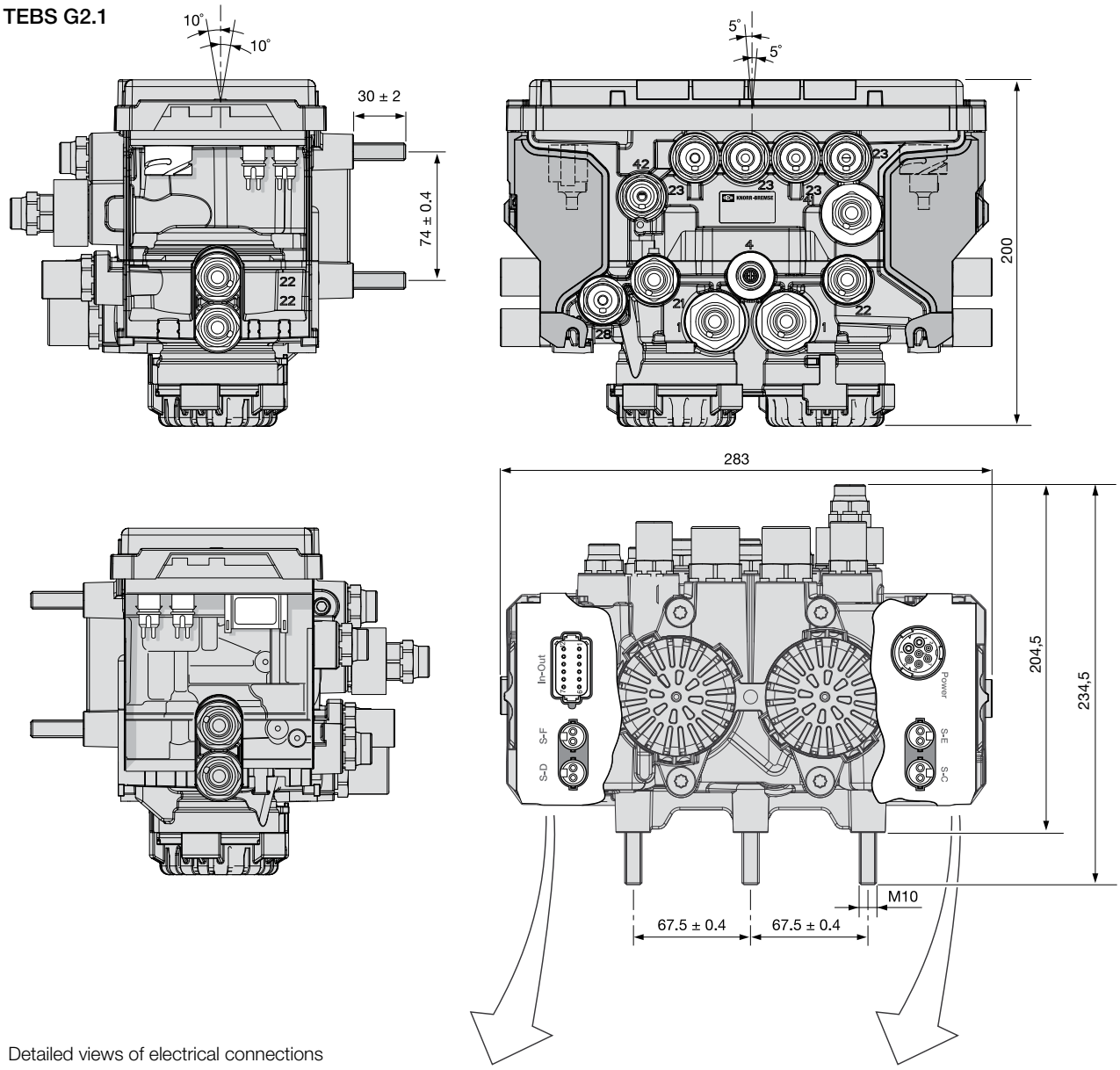
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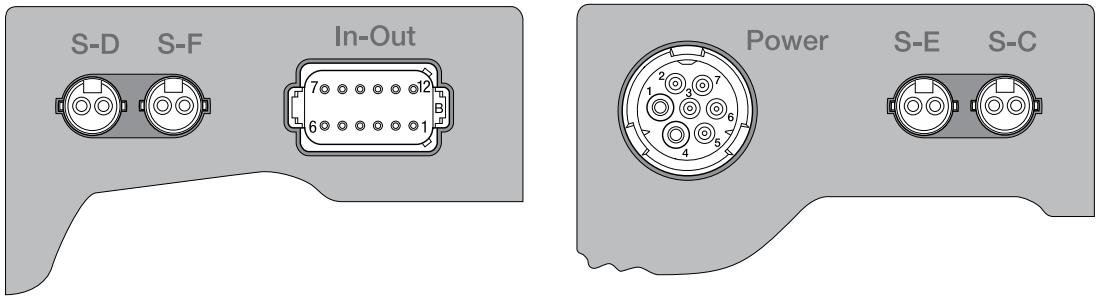
TEBS G2.0/G2.1 Brake Module

Doc. No. Y050635 (Rev. 003)
November 2014

TEBS G2.1



Detailed views of electrical connections



NOTE: For information on individual connections and pin function, see table on page 7

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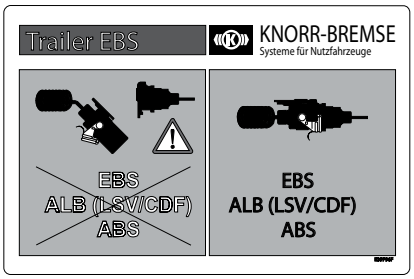
ES2060

TEBS G2.0/G2.1 Brake Module

Doc. No. Y050635 (Rev. 003)
November 2014

Stickers

Information sticker, TEBS power supply
Part No.: II**39796F**
Size [mm]: 150 x 100



VF00075_188.eps

EBS-System Plate [1]:
Part No.: II**39797F**
Size [mm]: 170 x 110



VF00075_189.jpg

[1] The System Plate is a sticker which can be printed via the ECU*talk*® software and a laser printer. **Caution!** A laser printer must be used but do not print more than 5 stickers at a time.

Revision Details

Rev. 001	May 2013	Correction to bring Service Parts in line with other language versions.
Rev. 002	December 2013	ISO 7638: 1997 Part 2 changed to Part 1 on page 2. Approval extension added on page 4. Standard and Premium terminology added on pages 4 and 5. More Service Parts added to page 5. Longitudinal tolerance on installation changed to 2.5 m (page 8).
Rev. 003	November 2014	Note added to Stop Lamp Powering on page 3. K108643K50 added to Service Parts on page 5. Correction to DIN ISO 1219 symbols on page 1.

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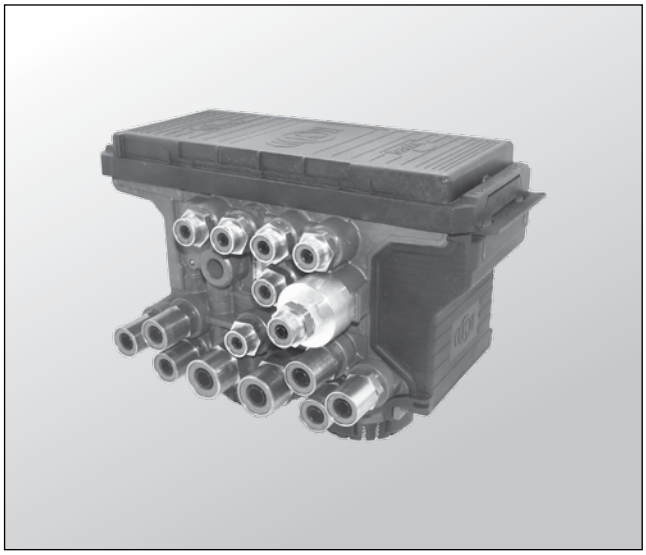
Product DATA

ES2090

TEBS G2.2 Standard Brake Module

Doc. No. Y136107 (EN - Rev. 002)
July 2015

Function



The Knorr-Bremse electronic braking system for trailers (**TEBS G2.2**) combines, in one compact assembly, the electronic control unit, the sensor technology and the pneumatic control.

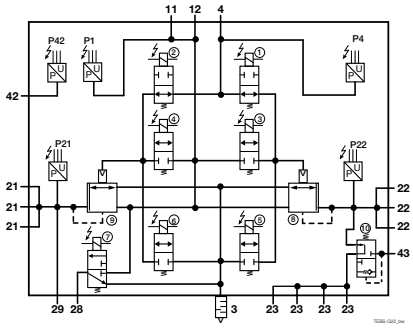
The braking functions of anti-lock and load sensing control are both electronically managed within the module as integrated features. This provides more accurate and consistent control of the generated braking force including reduced hysteresis compared to a conventional braking system, thereby improving tractor-trailer compatibility, optimising the brake pad wear and helping to reduce the overall operating costs of the trailer.

The anti-compounding function is also housed within the module offering four delivery ports to the spring brake chambers.

The **TEBS G2.2 Brake Module** is capable of working on trailers coupled to towing vehicles equipped with pneumatic only braking, pneumatic braking plus ABS or EBS systems. To achieve the full capability of the module the trailer should be connected to an EBS equipped towing vehicle fitted with an ISO 7638 7-pin connector.

Standard Symbol as DIN ISO 1219

TEBS G2.2



The **TEBS G2.2 Standard Brake Module** offers the following features in common with the TEBS G2.1 brake module:

- the modules are available with push-to-connect (PTC) fittings.
- all electrical connections face downwards for ease of accessibility.
- integrated emergency valve to provide the automatic brake function. The integrated emergency valve vents the spring brakes directly at the **TEBS G2.2 Standard Brake Module** ensuring faster response. The emergency valve also performs the anti-compounding function.

In addition the **TEBS G2.2 Standard Brake Module** offers the following new features:

- an optional pneumatic auxiliary port which can be programmed to support all available auxiliary functions, in addition to an optional test point port.
- all pneumatic connections are on one face of the module.

The service-proven anti-roll system, RSP (Roll Stability Program), is included as standard in all **TEBS G2.2 Standard Brake Modules.**

Technical Features

Operating pressure:	10.5 bar
Max. permissible pressure:	12.5 bar
Operating temperature range:	-40 °C to +65 °C
Maximum temperature:	+110 °C for 1 hour (non-operational)
Weight:	5.7 kg approx.
Nominal Voltage:	9 to 32 V DC

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TEBS G2.2 Standard Brake Module

Doc. No. Y136107 (EN - Rev. 002)
July 2015

Towing vehicle requirements

Trailers fitted with an electronic braking system (TEBS) only comply with the legal requirements of regulations 98/12/EC and ECE R13/11 Supplement 8, when the towing vehicle is equipped with a electrical interface of one of the following specifications:

ISO 7638: 1985	5 Pin	ISO 7638: 1997 Part 1 (24 V)	7 Pin
ISO 7638: 1997 Part 1 (24 V)	5 Pin		

Standard Auxiliary Functions

The following auxiliary functions may be configured to the associated auxiliary connections of the TEBS G2.2 Standard Brake Module:

Outputs

- **Tilt Angle:** This signal can be utilised to switch off a lifting device for the tipping body. See PD-214-F201, Document No. *Y136126.*
- **Fully Automatic Lift Axle Control**: The module can control up to two lift axle control valves, each valve may then be connected to 1 or 2 lifting axles. See PD-214-F101, Document No. *Y136118.*
- **Speed Pulse (SP):** When the vehicle exceeds a predetermined threshold speed, a signal of programmable duration is activated. This signal causes the Raise / Lower valve to automatically switch to the “drive” position. See PD-214-F106, Document No. *Y136123.*
- **Integrated Speed Switch (ISS):** This signal may be used to fulfil numerous operational requirements such as locking of steering axles etc. See PD-214-F107, Document No. *Y136124.*
- **Steering Axle Lock (SAL):** This signal can be utilised to lock the steering axle in the ‘straight-ahead’ condition. It is similar to ISS but can also be triggered from an input, e.g. Back-up Light (Reversing Lamps). See PD-214-F251, Document No. *Y136130.*
- **24 V Supply**: provides a permanent power supply that may be used to power additional brake and running gear systems / functions on the trailer. See PD-214-F006, Document No. *Y136112.*
- **ABS active:** Typically this function may be used to directly control a retarder installed on the trailer. See PD-214-F004, Document No. *Y136110.*
- **RSP active:** When the Roll Stability Program (RSP) of the trailer is active, a 24 V or a pneumatic output (depending on configuration) is transmitted by the brake module. See PD-214-F005, Document No. *Y136111.*
- **SLR:** When a function of TEBS causes the brakes to be applied a Stop Lamp Request signal can be generated. See PD-214-F401, Document No. *Y137240.*
- **P_{out}:** Brake modules that have the P_{28} function available, which can be programmed to provide a pneumatic output for any of the above functions or a constant pressure supply. See PD-214-F006, Document No. *Y136112.*

Inputs:

The TEBS G2.2 Brake Modules can be programmed to receive inputs on various connectors. See page 5 for more information on the connections. Typical inputs are described below:

- **Brake pad wear control (PW) :** Input is received that the wear limit of at least one brake has been reached. See PD-214-F351, Document No. *Y136131.*
- **TH:** Traction Help actuated by a manual switch. See PD-214-F102, Document No. *Y136119.*

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- **MH:** Manoeuvring Help actuated by a manual switch. See PD-214-F103, Document No. *Y136120.*
- **LL_ALL / LL_LAC1 / LL_LAC2:** These functions lower lift axles as a result of a signal from a manual switch. See PD-214-F101, Document No. *Y136118.*
- **LLTH - Advanced Lift Axle Control:** This is a combined function which offers lift axle lowering and traction help via the same input. See PD-214-F101 and PD-214-F102, Document Nos. *Y136118* and *Y136119.*
- **Road Laying Function (RLF)**: This function is typically used when the trailer is working with a road laying machine. See PD-214-F203, Document No. *Y136128.*
- **Body Lift Sensor (BLS)**: This sensor is used with tipping trailers. See PD-214-F201, Document No. *Y136126* and PD-214-F202, Document No. *Y136127.*
- **Trailer Brake Release (TBR)**: This function is typically used with extendable trailers. See PD-214-F301, Document No. *Y137238.*
- **Trailer Suspension Release (TSR)**: This input is used when raise/lower valves are installed. See PD-214-F108, Document No. *Y137237.*
- **Back-up Light**: This takes an input from the reversing lamps and is typically used with the Steering Axle Lock function. See PD-214-F251, Document No. *Y136130.*

Auxiliary Design Language (ADL) - Non-standard Auxiliary Functions

Should a customer require a function other than those normally available it is possible to create a non-standard function by the use of a special file known as ADL (Auxiliary Design Language) produced by Knorr-Bremse. See PD-214-F950, Document No. *Y136136.*

Stop Lamp Powering

To obtain full functionality, any trailer electronic braking system requires a permanent power supply (achieved by using the legally specified ISO 7638 connection in 5 or 7 pin format); this ensures load sensing, anti-lock control and all auxiliary functions are automatically maintained. In the event of a failure of this power supply, whilst trailer braking will be maintained via the pneumatic back-up function, all electronically controlled functionality would no longer be active.

Continued operation of the vehicle without electrical power, irrespective of axle load, may therefore result in higher brake operating temperatures leading to increased brake pad wear, tyre flat spotting and trailer instability. To overcome this problem, some versions of the TEBS G2.2 Brake Module will continue to operate by taking power from the stop lamp circuit and thereby load sensing and anti-lock functions remain active.

Note: ***Stop lamp powering should only be considered as a backup function to ensure some safety features are retained in the event of failure of the ISO 7638 connection.***

Legal Requirements

TEBS G2.2 has been approved in accordance with the requirements of annex XIV of the Directive 98/12/EC and annex 19 of ECE Regulation 13 with respect to ABS performance. The system also fulfils the requirements of the ECE Regulation 13/11 Supplement 8 with respect to the prescribed requirements for vehicles with an electric control line and electric control transmission:

Approval	ECE Report No.	Knorr-Bremse Document No.
ABS approval	EB 154	Y038142
Electronics approval	EB 155	Y038143
RSP approval	EB 166	Y080682
Use of AC574AY Relay Valve with long pipes	EB 154 extension	Y158131

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Options

All TEBS G2.2 - Standard variants offer:
- **ABS configurations 2S/2M only**.
- RSP.
- Operating voltage range 9 - 32 Volts.
- Four pneumatic ports to the spring brake actuators.
- Internal J1939 CAN (5 V TI CAN).
- Configuration of different braking characteristics for the CAN and pneumatic brake demands.
- Integrated automatic brake function.
- The choice of a programmable pneumatic output from Port 28 (P_{28}) and/or a test point Port 29 (P_{29}).

The following table shows possible variants which differ concerning the options and fittings provided:

Part Number[1)]	Type Number	P_{28}	P_{29}	PTC Fittings	Stop Lamp Powering	IAM Part No.[2)]
K055342	ES2090	no	no	yes	no	K055369
K055352	ES2090	no	yes	yes	yes	K055369
K055362	ES2090	yes	no	yes	no	K055369
K055369	ES2090	yes	yes	no	yes	K055369

1) The part number of the module will carry two suffices, firstly “V##” which represents the software revision of the product, e.g. V01, V02 etc., and secondly “N##” which defines the packaging requirements of different market sectors, e.g. N00, N50, N99, etc. Example: K055342V02N99 - is supplied with software to revision 02 and packaged as described below.
Note: The N99 variant will be shipped in a box containing the data labels II39797F, II39796F and II40392F. These data labels may also be ordered separately. The N49 variant is for OE use only and the N99 variant is for IAM use only.

2) IAM versions (which require configuration) have a grey top cover, whereas OE versions have a black top cover.

Additional Parts:

Silencer	K000847K50 (two required per module)
Side Cover	K092404K50
Port Filters	K004904K50 (contains 10 conical filters for Ports 11 and 12)
	K108643K50 (contains 20 flat filters for Port 4)
Blanking plug for 8 mm pipe	96210008
Blanking plug for 12 mm pipe	96210012
Blanking plug for 15 mm pipe	96210015
Self-adhesive TEBS label	K112780N00 (supplied with the TEBS Module for mounting on the trailer)
Information sticker	II39796F (TEBS power supply)
EBS-System Plate	II39797F

Pneumatic Connections

Port	Thread	Qty	Used for	PTC Fittings [3)] (to suit pipe size)
11	M22x1.5	1	Supply to Reservoir	15x1.5
12	M22x1.5	1	Supply to Reservoir	15x1.5
21	M16x1.5	3	Delivery to brake chambers to wheel speed sensor D	12x1.5
22	M16x1.5	3	Delivery to brake chambers to wheel speed sensor C	12x1.5
23	M16x1.5	4	Delivery to parking brake	8x1
28	M16x1.5	1	Programmable pneumatic signal	8x1
29	M16x1.5	1	Test point	8x1
4	M16x1.5	1	Brake demand (Yellow Line)	8x1
42	M16x1.5	1	Air spring pressure	8x1
43	M16x1.5	1	Park/Shunt Valve	8x1

3) Not all part numbers are supplied with a set of fittings.

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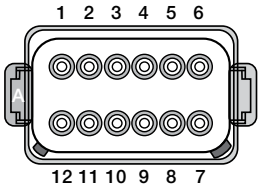
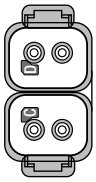
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Electrical Connections

See PD-214-F006, Document No. *Y136112* for details of all of the Input and Output configurations.

In - Out Connector		Power Connector		Wheel Speed Sensor Connector		
						
Pin Number	**Function**	**Pin Number**	**Function**	**System**	**Connector**	**Function**
1	AUXIO 1	1	Battery Supply (+)	2S/2M	S-C	Wheel Speed Sensor
2	AUXIO 2	2	Electronic Supply (+)		S-D	
3	AUXIO 3	3	Electronic Ground (-)			
4	Sensor Ground	4	Battery Ground (-)			
5	Sensor Input 1 [SENS_IN1] (Tri-state Input)	5	Warning Lamp			
6	Sensor Supply [SENS_SUP] (Tri-state Input)	6	ISO 11992 CAN (24 V) High			
7	Stop Lamp Supply (+) [1]	7	ISO 11992 CAN (24 V) Low			
8	Stop Lamp Ground (-) [1]					
9	J1939 CAN (5 V) Low					
10	J1939 CAN (5 V) High					
11	AuxRet 3					
12	AuxRet 12 (Return for AUXIO 1 & 2)					

[1] Dependent on Part No..

Note:

If no connections on the In-Out Connector are used, a blanking plug must be installed to prevent the ingress of moisture to the ECU.

Pneumatic Backup

If all electrical power supplies to the TEBS G2.2 Brake Module are lost the system reverts to the Pneumatic Backup mode which provides the facility for the trailer to maintain normal pneumatic braking albeit without the load sensing and anti-lock functions.

The TEBS G2.2 Standard Brake Module has the ability to switch itself to the Pneumatic Backup mode and does so if the trailer reservoir pressure drops below 2.5 bar. The module will switch back to normal operation when the reservoir pressure is restored.

The TEBS G2.2 Standard Brake Module also switches to Pneumatic Backup mode whenever the trailer is stationary and the service brake pressure is greater than 4.5 bar. This is to reduce electrical power consumption. The module will switch back to normal operation as soon as service brake pressure drops below 4.25 bar.

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Installation and Mounting

General installation guidelines

- The protective covers for the electrical connections of the TEBS G2.2 Brake Module must be fitted at all times when the vehicle is in use.
- During assembly the ports and electrical connections of the TEBS G2.2 Brake Module and cabling must be protected against the ingress of contamination, e.g. sand blasting particles.
- The TEBS G2.2 module must never be stored or transported with the exhaust ports pointing upwards.
- If a TEBS G2.2 module has been damaged in transit or during the assembly, e.g. dropped on the floor, it must not, under any circumstances, be fitted to the vehicle.

Note:

If at any time the vehicle is to be welded using an electric welding tool the following has to be observed:

- Remove the “Power” and “In-Out” connectors from the module(s).
- Remove the wheel speed sensor connectors, ensure that when reassembling the sensors they are reconnected to the correct positions. Knorr-Bremse recommends that an End of Line (EOL) test is run using the diagnostic program ECU*talk*® following reassembly of the wheel speed sensors to ensure correct fitment.

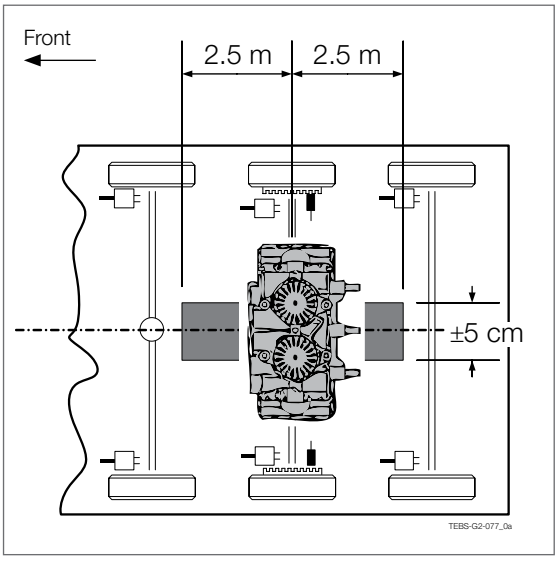
Installation of the TEBS G2.2 Brake Module

The following provides a guide to the installation of the TEBS G2.2 Brake Module.

In the longitudinal direction, the deviation from centre of the bogie may be a maximum of ± 2.5 m however the maximum permitted pipe length of 5 m to the brake actuators must be observed.

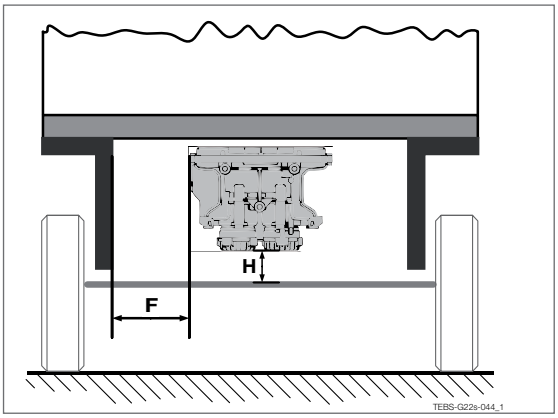
Note: when a self-steering or command steered axle is fitted the ‘centre of the bogie’ is deemed to be between the fixed axles.

An ideal installation would be where the TEBS G2.2 Brake Module is laterally positioned within 5 cm of the centre of the trailer (see figure), this would result in the respective pipe lengths being approximately equal for each axle. However it is possible to mount the TEBS G2.2 Brake Module in other positions dependent on the design of the trailer and space available.



If the Roll Stability Program (RSP) is configured, special restrictions apply. See PD-214-F005, Document No. *Y136111.*

During installation, consideration must be given to being able to access the electrical connections and a minimum clearance must be observed (F > 50 mm) to ensure that cover can be removed. For the TEBS G2.2 Brake Module a clearance (H > 25 mm) must be ensured below the exhaust silencers at the base of the valve; this must be checked when the suspension is deflated and on its bump stops (see figure).



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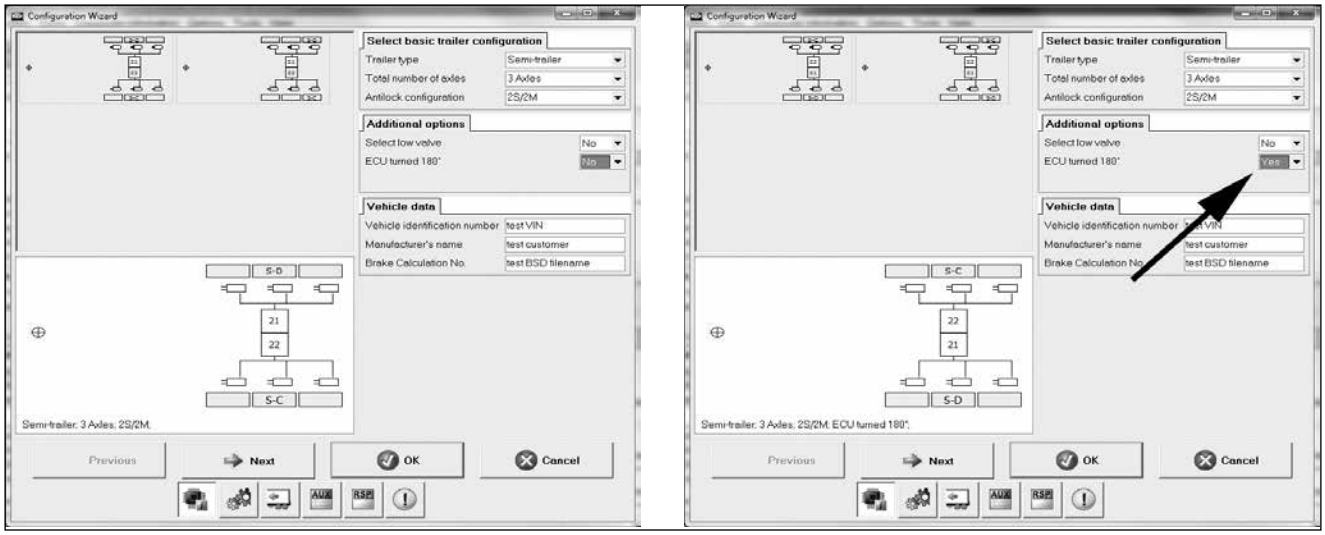
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Orientation

It is normal to mount the TEBS G2.2 Brake Module with the mounting studs towards the rear of the vehicle with the brake actuators on the left side supplied by Port 22 and on the right side by Port 21 (the ports closest to the actuators). However, it is permissible to mount the module with the mounting studs towards the front of the vehicle providing that the orientation is changed in ECU*talk*® under the “Information” tab and “Change configuration”. The actuators connections must then be reversed, i.e. the brake actuators on the left side supplied by Port 21 and the brake actuators on the right side supplied by Port 22.



Wheel Speed Sensor Connection

When the TEBS G2.2 Brake Module is installed, irrespective of its orientation, the Wheel Speed Sensors should be connected as below:

Connection S-C	connect the Wheel Speed Sensor fitted to the side of the axle on which the brake actuators are supplied by Port 22 on the module.
Connection S-D	connect the Wheel Speed Sensor fitted to the side of the axle on which the brake actuators are supplied by Port 21 on the module.

Cables

For information on suitable cables see PD-272-025, Document No. *Y142784* and for cable installation guidelines see PD-272-005, Document No. *Y136137*.

Pipe sizes

The following table defines the minimum bore of piping to be used to connect the reservoir to the module and the module to the respective brake actuators.

Pipe size for the connection between the air reservoir and the module		
Plastic pipe	Minimum inside diameter 12 mm It is recommended that both Supply ports are used and each is connected to the reservoir.	
Pipe size for the connection between the module and the service brake actuators		Maximum length
Plastic pipe	Minimum inside diameter 9 mm	5 m
Rubber hose	Minimum inside diameter 11 mm	

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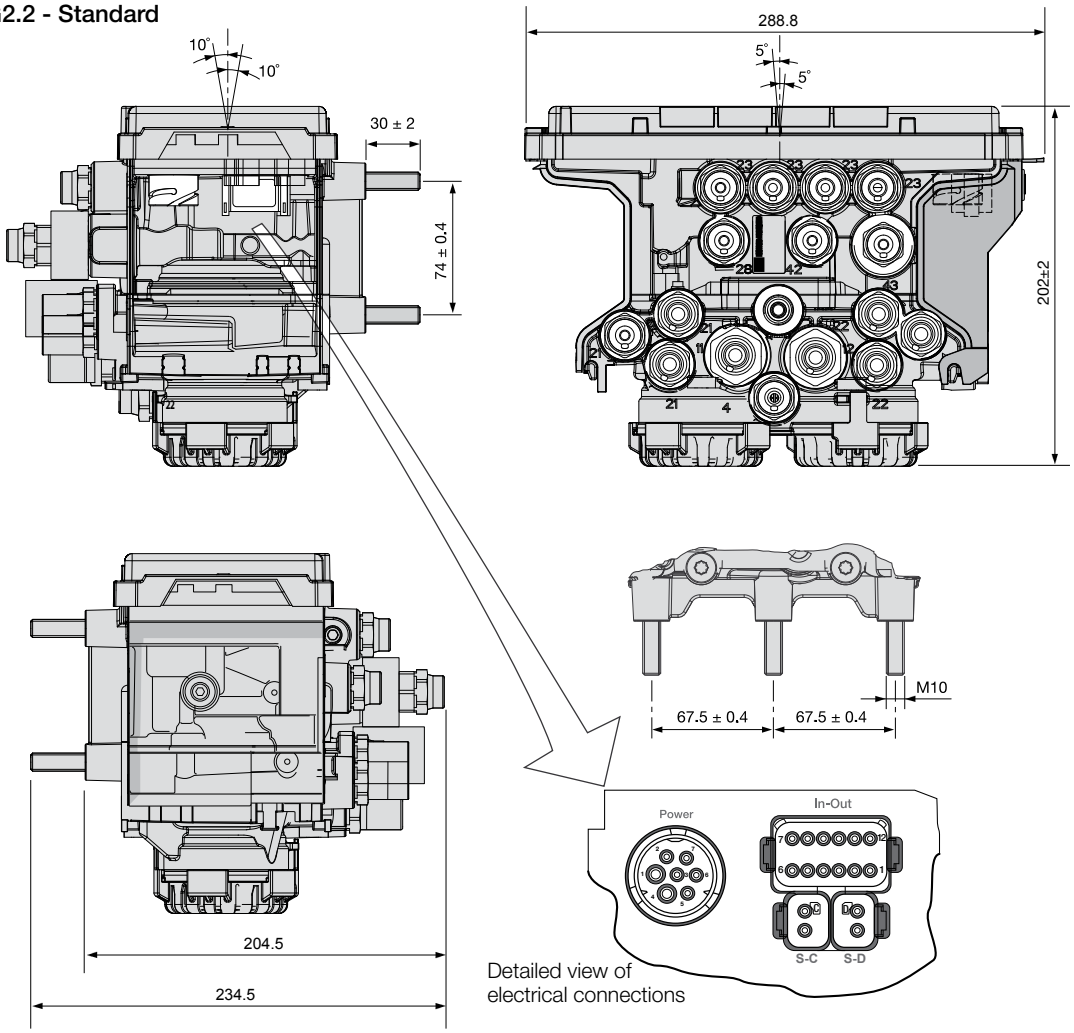
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Dimensions

TEBS G2.2 - Standard



NOTE: For information on individual connections and pin function, see table on page 5

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Parameterisation

Before a trailer can be used on the road its braking performance must have been verified by a testing authority and be type approved. Part of this process is the requirement to fulfil the prescribed compatibility limits which means a number of braking parameters must be specified. This is normally achieved by means of a brake calculation taking into account the physical characteristics of the trailer and the recorded performance of braking components defining the respective brake chamber pressures to fulfil laden and unladen requirements. For the TEBS G2.2 equipped trailer this would be carried out using the Knorr-Bremse brake calculation program BSD which has been specifically developed for this purpose. The main parameters which control the braking performance of the trailer are:

- Laden and unladen air spring pressures.
- Laden and unladen axle loads.
- Laden and unladen brake actuator delivery pressures for a control line pressure of 6.5 bar.
- Coupling head pressure when braking should commence.
- Inshot pressure generated when braking should commence.
- Dynamic tyre size.

The diagnostic program ECU*talk*® is the primary means by which the parameters can be written to the TEBS G2.2 Brake Module. This can be achieved by either entering individual parameters into the required fields or by reading the parameter values from a file produced by the brake calculation program BSD; the latter option being more reliable as the possibility of error has been removed. When a TEBS G2.2 module is produced, default parameters are defined so that, in the event that a trailer is inadvertently not parameterised, a level of braking performance will always be available. When a data set of parameters is written to the TEBS G2.2 Brake Module the operators PIN will also be written and stored as a finger print to identify who carried out the parameterisation.

Knorr-Bremse makes available four levels of PIN code access to PC Diagnostics ECU*talk*® as follows:

- Full version for OEMs.
- EOL version for OEMs.
- Service Plus for workshops.
- Service Version for workshops.

Load Sensing Plate

Following installation and parameterisation of the TEBS G2.2 Brake Module it is possible to generate a load sensing plate by using the diagnostic program ECU*talk*®. Legislation requires that such a plate is fitted to all trailers. The plate generated by ECU*talk*® will not only contain information to carry out a check of the load sensing settings but also define additional TEBS G2 Brake Module configuration data and trailer related information. See PD-214-F002, Document No. *Y136109.*

Diagnostics

The Knorr-Bremse diagnostic program ECU*talk*® is the primary means by which diagnosis of the TEBS G2.2 Brake Module can be undertaken. For further details see PD-214-F355, Document No. *Y136135*.

Note:

For more information on ECU*talk*® see the Product Information Document No. *Y051496* available at www.Knorr-BremseCVS.com.

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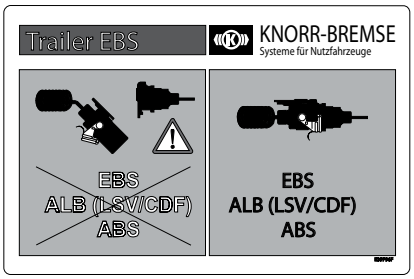
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Labels

Information sticker, TEBS power supply
Part No.: II**39796F**
Size [mm]: 150 x 100



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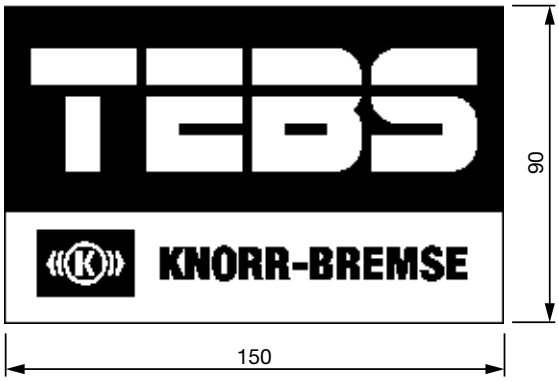
EBS-System Plate [1]:
Part No.: II**39797F**
Size [mm]: 170 x 110



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[1] The System Plate is a sticker which can be printed via the ECU*talk*® software and a laser printer.
Caution! A laser printer must be used but do not print more than 5 stickers at a time.

K112780



Revision Details

Rev. 001	December 2013	ISO 7638: 1997 Part 2 changed to Part 1 on page 2. Extension to Approval EB 154 added on page 3. More Service Parts added to page 4. Subsections “Orientation” and “Wheel Speed Sensor Connection” added on page 7. Diagram on page 8 amended. Longitudinal tolerance on installation changed to 2.5 m (page 8).
Rev. 001	December 2014	Correction to DIN ISO 1219 symbol on page 1.
Rev. 002	July 2015	Amendment to Part No. table and Additional Parts added on page 4. Labels section added on page 10.

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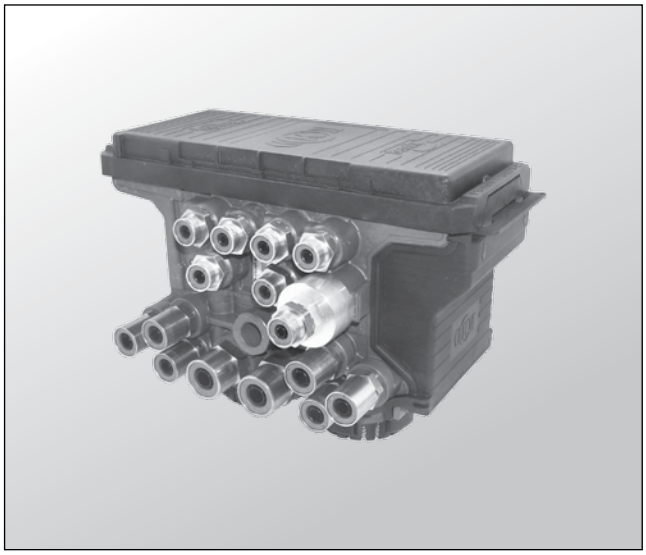
Product DATA

ES2090

TEBS G2.2 Standard Plus Brake Module

Doc. No. Y172339 (EN - Rev. 000)
December 2014

Function



The Knorr-Bremse electronic braking system for trailers (**TEBS G2.2**) combines, in one compact assembly, the electronic control unit, the sensor technology and the pneumatic control.

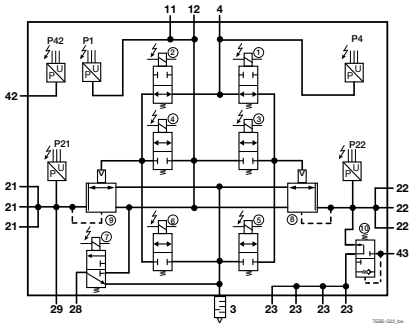
The braking functions of anti-lock and load sensing control are both electronically managed within the module as integrated features. This provides more accurate and consistent control of the generated braking force including reduced hysteresis compared to a conventional braking system, thereby improving tractor-trailer compatibility, optimising the brake pad wear and helping to reduce the overall operating costs of the trailer.

The anti-compounding function is also housed within the module offering four delivery ports to the spring brake chambers.

The **TEBS G2.2 Brake Module** is capable of working on trailers coupled to towing vehicles equipped with pneumatic only braking, pneumatic braking plus ABS or EBS systems. To achieve the full capability of the module the trailer should be connected to an EBS equipped towing vehicle fitted with an ISO 7638 7-pin connector.

Standard Symbol as DIN ISO 1219

TEBS G2.2



The **TEBS G2.2 Standard Plus Brake Module** offers the following features in common with the TEBS G2.2 Standard brake module (see PD-214-300, Document No. *Y136107*):

- the modules are available with push-to-connect (PTC) fittings.
- all electrical connections face downwards for ease of accessibility.
- integrated emergency valve to provide the automatic brake function. The integrated emergency valve vents the spring brakes directly at the module ensuring faster response. The emergency valve also performs the anti-compounding function.

In addition the **TEBS G2.2 Standard Plus Brake Module** offers the following new features:

- software upgrade to support the iLvl suspension control system (see PD-214-F010, Document No. *Y172340*).
- additional electrical inputs on pins 7 and 8 , replacing the stop lamp supplies on the TEBS G2.2 Standard brake module, i.e. the **Standard Plus** does not have stop lamp powering capability.

The service-proven anti-roll system, RSP (Roll Stability Program), is included as standard in all **TEBS G2.2 Brake Modules.**

Technical Features

Operating pressure:	10.5 bar
Max. permissible pressure:	12.5 bar
Operating temperature range:	-40 °C to +65 °C
Maximum temperature:	+110 °C for 1 hour (non-operational)
Weight:	5.7 kg approx.
Nominal Voltage:	9 to 32 V DC

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Towing vehicle requirements

Trailers fitted with an electronic braking system (TEBS) only comply with the legal requirements of regulations 98/12/EC and ECE R13/11 Supplement 8, when the towing vehicle is equipped with a electrical interface of one of the following specifications:

ISO 7638: 1985	5 Pin	ISO 7638: 1997 Part 1 (24 V)	7 Pin
ISO 7638: 1997 Part 1 (24 V)	5 Pin		

Standard Auxiliary Functions

The following auxiliary functions may be configured to the associated auxiliary connections of the TEBS G2.2 Standard Plus Brake Module:

Outputs

- **Tilt Angle:** This signal can be utilised to switch off a lifting device for the tipping body. See PD-214-F201, Document No. *Y136126.*
- **Fully Automatic Lift Axle Control**: The module can control up to two lift axle control valves, each valve may then be connected to 1 or 2 lifting axles. See PD-214-F101, Document No. *Y136118.*
- **Speed Pulse (SP):** When the vehicle exceeds a predetermined threshold speed, a signal of programmable duration is activated. This signal causes the Raise / Lower valve to automatically switch to the “drive” position. See PD-214-F106, Document No. *Y136123.*
- **Integrated Speed Switch (ISS):** This signal may be used to fulfil numerous operational requirements such as locking of steering axles etc. See PD-214-F107, Document No. *Y136124.*
- **Steering Axle Lock (SAL):** This signal can be utilised to lock the steering axle in the ‘straight-ahead’ condition. It is similar to ISS but can also be triggered from an input, e.g. Back-up Light (Reversing Lamps). See PD-214-F251, Document No. *Y136130.*
- **24 V Supply**: provides a permanent power supply that may be used to power additional brake and running gear systems / functions on the trailer. See PD-214-F006, Document No. *Y136112.*
- **ABS active:** Typically this function may be used to directly control a retarder installed on the trailer. See PD-214-F004, Document No. *Y136110.*
- **RSP active:** When the Roll Stability Program (RSP) of the trailer is active, a 24 V or a pneumatic output (depending on configuration) is transmitted by the brake module. See PD-214-F005, Document No. *Y136111.*
- **SLR:** When a function of TEBS causes the brakes to be applied a Stop Lamp Request signal can be generated. See PD-214-F401, Document No. *Y137240.*
- **P_{out}:** Brake modules that have the P_{28} function available, which can be programmed to provide a pneumatic output for any of the above functions or a constant pressure supply. See PD-214-F006, Document No. *Y136112.*
- **iLvl valve:** When iLvl is configured in ECU*talk*® the iLvl valve outputs are automatically assigned to pins 1 and 2 (AUXIO1 and AUXIO2). See PD-214-F010, Document No. *Y172340.*

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Inputs:

The TEBS G2.2 Standard Plus Brake Modules can be programmed to receive inputs on various connectors. See page 5 for more information on the connections. Typical inputs are described below:

- **Brake pad wear control (PW) :** Input is received that the wear limit of at least one brake has been reached. See PD-214-F351, Document No. *Y136131.*
- **TH:** Traction Help actuated by a manual switch. See PD-214-F102, Document No. *Y136119.*
- **MH:** Manoeuvring Help actuated by a manual switch. See PD-214-F103, Document No. *Y136120.*
- **LL_ALL / LL_LAC1 / LL_LAC2_:** These functions lower lift axles as a result of a signal from a manual switch. See PD-214-F101, Document No. *Y136118.*
- **LLTH - Advanced Lift Axle Control:** This is a combined function which offers lift axle lowering and traction help via the same input. See PD-214-F101 and PD-214-F102, Document Nos. *Y136118* and *Y136119.*
- **Road Laying Function (RLF)**: This function is typically used when the trailer is working with a road laying machine. See PD-214-F203, Document No. *Y136128.*
- **Body Lift Sensor (BLS)**: This sensor is used with tipping trailers. See PD-214-F201, Document No. *Y136126* and PD-214-F202, Document No. *Y136127.*
- **Trailer Brake Release (TBR)**: This function is typically used with extendable trailers. See PD-214-F301, Document No. *Y137238.*
- **Trailer Suspension Release (TSR)**: This input is used when raise/lower valves are installed. See PD-214-F108, Document No. *Y137237.*
- **Back-up Light**: This takes an input from the reversing lamps and is typically used with the Steering Axle Lock function. See PD-214-F251, Document No. *Y136130.*
- **iLvl Level sensor:** When iLvl is configured in ECU*talk*® the level sensor is automatically assigned to pins 5 and 6 (SENS_IN1 and SENS_SUP). See PD-214-F010, Document No. *Y172340.*

Auxiliary Design Language (ADL) - Non-standard Auxiliary Functions

Should a customer require a function other than those normally available it is possible to create a non-standard function by the use of a special file known as ADL (Auxiliary Design Language) produced by Knorr-Bremse. See PD-214-F950, Document No. *Y136136.*

Legal Requirements

TEBS G2.2 has been approved in accordance with the requirements of annex XIV of the Directive 98/12/EC and annex 19 of ECE Regulation 13 with respect to ABS performance. The system also fulfils the requirements of the ECE Regulation 13/11 Supplement 8 with respect to the prescribed requirements for vehicles with an electric control line and electric control transmission:

Approval	ECE Report No.	Knorr-Bremse Document No.
ABS approval	EB 154	Y038142
Electronics approval	EB 155	Y038143
RSP approval	EB 166	Y080682
Use of AC574AY Relay Valve with long pipes	EB 154 extension	Y158131

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TEBS G2.2 Standard Plus Brake Module

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Options

All TEBS G2.2 Standard Plus variants offer:

- **ABS configurations 2S/2M only**.
- RSP.
- Operating voltage range 9 - 32 Volts.
- Four pneumatic ports to the spring brake actuators.
- Internal J1939 CAN (5 V TI CAN).
- Configuration of different braking characteristics for the CAN and pneumatic brake demands.
- Integrated automatic brake function.
- The choice of a programmable pneumatic output from Port 28 (P_{28}).

The following table shows possible variants which differ concerning the options provided:

Part Number[1)]	Type Number	P_{28}	PTC Fittings	Stop Lamp Powering
K055332	ES2090	no	yes	no
K055372	ES2090	yes	yes	no

1) The part number of the module will carry two suffices, firstly “V##” which represents the software revision of the product, e.g. V01, V02 etc., and secondly “N##” which defines the packaging requirements of different market sectors, e.g. N00, N50, N99, etc. Example: K055372V02N99 - is supplied with software to revision 02 and packaged as described below.

Note: The N99 variant will be shipped in a box containing the data labels II39797F, II39796F and II40392F. These data labels may also be ordered separately. The N49 variant is for OE use only and the N99 variant is for IAM use only.

Service Parts:

Silencer	K000847K50 (two required per module)
Side Cover	K092404K50
Port Filter	K004904K50

Pneumatic Connections

Port	Thread	Qty	Used for	PTC Fittings (to suit pipe size)
11	M22x1.5	1	Supply to Reservoir	15x1.5
12	M22x1.5	1	Supply to Reservoir	15x1.5
21	M16x1.5	3	Delivery to brake chambers to wheel speed sensor D	12x1.5
22	M16x1.5	3	Delivery to brake chambers to wheel speed sensor C	12x1.5
23	M16x1.5	4	Delivery to parking brake	8x1
28	M16x1.5	1	Programmable pneumatic signal	8x1
4	M16x1.5	1	Brake demand (Yellow Line)	8x1
42	M16x1.5	1	Air spring pressure	8x1
43	M16x1.5	1	Park/Shunt Valve	8x1

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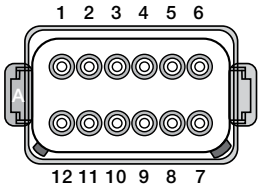
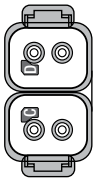
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TEBS G2.2 Standard Plus Brake Module

Electrical Connections

See PD-214-F006, Document No. *Y136112* for details of all of the Input and Output configurations.

In - Out Connector		Power Connector		Wheel Speed Sensor Connector		
						
Pin Number	**Function**	**Pin Number**	**Function**	**System**	**Connector**	**Function**
1	AUXIO 1	1	Battery Supply (+)	2S/2M	S-C	Wheel Speed Sensor
2	AUXIO 2	2	Electronic Supply (+)		S-D	
3	AUXIO 3	3	Electronic Ground (-)			
4	Sensor Ground	4	Battery Ground (-)			
5	Sensor Input 1 [SENS_IN1] (tri-state or analogue input)	5	Warning Lamp			
6	Sensor Supply [SENS_SUP] (tri-state or analogue input)	6	ISO 11992 CAN (24 V) High			
7	TRI_IN (tri-state input)	7	ISO 11992 CAN (24 V) Low			
8	DIG_IN (digital input)					
9	J1939 CAN (5 V) Low					
10	J1939 CAN (5 V) High					
11	AuxRet 3					
12	AuxRet 12 (Return for AUXIO 1 & 2)					

Note:

If no connections on the In-Out Connector are used, a blanking plug must be installed to prevent the ingress of moisture to the ECU.

Pneumatic Backup

If all electrical power supplies to the TEBS G2.2 Brake Module are lost the system reverts to the Pneumatic Backup mode which provides the facility for the trailer to maintain normal pneumatic braking albeit without the load sensing and anti-lock functions.

The TEBS G2.2 Standard Plus Brake Module has the ability to switch itself to the Pneumatic Backup mode and does so if the trailer reservoir pressure drops below 2.5 bar. The module will switch back to normal operation when the reservoir pressure is restored.

The TEBS G2.2 Standard Plus Brake Module also switches to Pneumatic Backup mode whenever the trailer is stationary and the service brake pressure is greater than 4.5 bar. This is to reduce electrical power consumption. The module will switch back to normal operation as soon as service brake pressure drops below 4.25 bar.

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Installation and Mounting

General installation guidelines

- The protective covers for the electrical connections of the TEBS G2.2 Brake Module must be fitted at all times when the vehicle is in use.
- During assembly the ports and electrical connections of the TEBS G2.2 Brake Module and cabling must be protected against the ingress of contamination, e.g. sand blasting particles.
- The TEBS G2.2 module must never be stored or transported with the exhaust ports pointing upwards.
- If a TEBS G2.2 module has been damaged in transit or during the assembly, e.g. dropped on the floor, it must not, under any circumstances, be fitted to the vehicle.

Note:

If at any time the vehicle is to be welded using an electric welding tool the following has to be observed:

- Remove the “Power” and “In-Out” connectors from the module(s).
- Remove the wheel speed sensor connectors, ensure that when reassembling the sensors they are reconnected to the correct positions. Knorr-Bremse recommends that an End of Line (EOL) test is run using the diagnostic program ECU*talk*® following reassembly of the wheel speed sensors to ensure correct fitment.

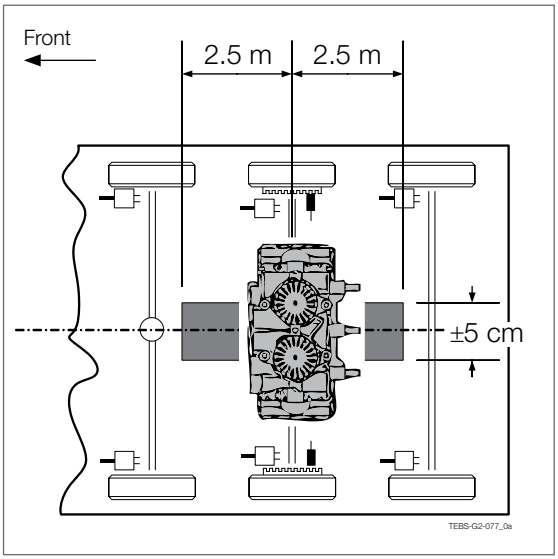
Installation of the TEBS G2.2 Brake Module

The following provides a guide to the installation of the TEBS G2.2 Brake Module.

In the longitudinal direction, the deviation from centre of the bogie may be a maximum of ± 2.5 m however the maximum permitted pipe length of 5 m to the brake actuators must be observed.

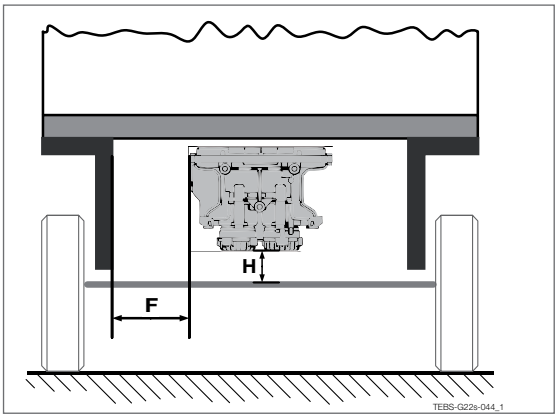
Note: when a self-steering or command steered axle is fitted the ‘centre of the bogie’ is deemed to be between the fixed axles.

An ideal installation would be where the TEBS G2.2 Brake Module is laterally positioned within 5 cm of the centre of the trailer (see figure), this would result in the respective pipe lengths being approximately equal for each axle. However it is possible to mount the TEBS G2.2 Brake Module in other positions dependent on the design of the trailer and space available.



If the Roll Stability Program (RSP) is configured, special restrictions apply. See PD-214-F005, Document No. *Y136111.*

During installation, consideration must be given to being able to access the electrical connections and a minimum clearance must be observed (F > 50 mm) to ensure that cover can be removed. For the TEBS G2.2 Brake Module a clearance (H > 25 mm) must be ensured below the exhaust silencers at the base of the valve; this must be checked when the suspension is deflated and on its bump stops (see figure).



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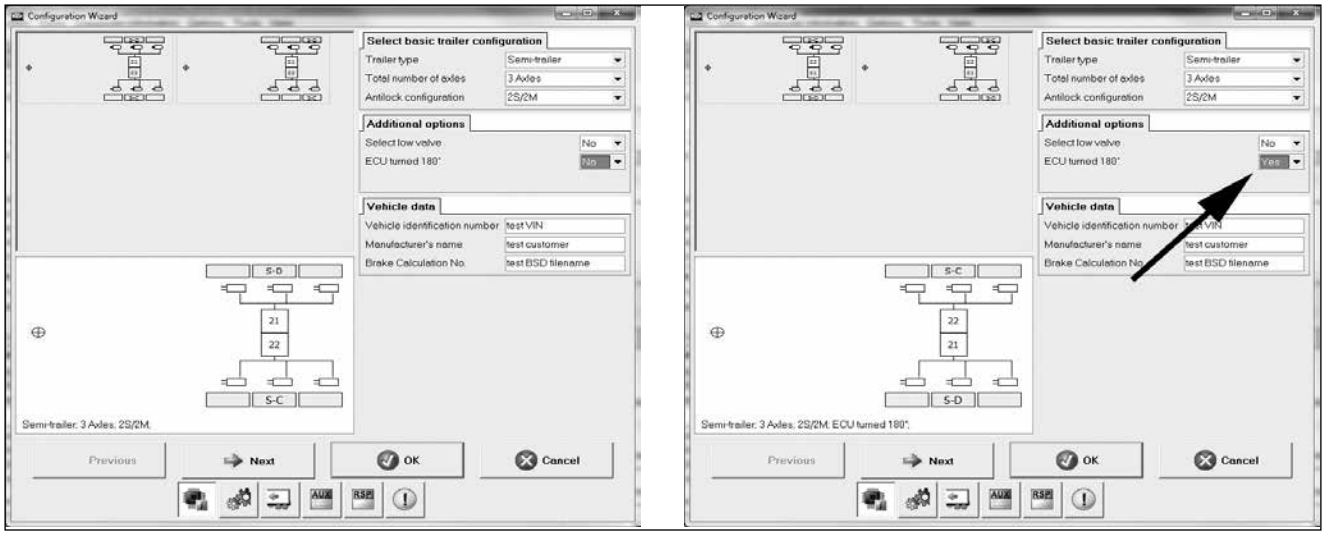
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TEBS G2.2 Standard Plus Brake Module

Orientation

It is normal to mount the TEBS G2.2 Brake Module with the mounting studs towards the rear of the vehicle with the brake actuators on the left side supplied by Port 22 and on the right side by Port 21 (the ports closest to the actuators). However, it is permissible to mount the module with the mounting studs towards the front of the vehicle providing that the orientation is changed in ECU*talk*® under the "Information" tab and "Change configuration". The actuators connections must then be reversed, i.e. the brake actuators on the left side supplied by Port 21 and the brake actuators on the right side supplied by Port 22.



Wheel Speed Sensor Connection

When the TEBS G2.2 Brake Module is installed, irrespective of its orientation, the Wheel Speed Sensors should be connected as below:

Connection S-C	connect the Wheel Speed Sensor fitted to the side of the axle on which the brake actuators are supplied by Port 22 on the module.
Connection S-D	connect the Wheel Speed Sensor fitted to the side of the axle on which the brake actuators are supplied by Port 21 on the module.

Cables

For information on suitable cables see PD-272-025, Document No. *Y142784* and for cable installation guidelines see PD-272-005, Document No. *Y136137*.

Pipe sizes

The following table defines the minimum bore of piping to be used to connect the reservoir to the module and the module to the respective brake actuators.

Pipe size for the connection between the air reservoir and the module		
Plastic pipe	Minimum inside diameter 12 mm It is recommended that both Supply ports are used and each is connected to the reservoir.	
Pipe size for the connection between the module and the service brake actuators		Maximum length
Plastic pipe	Minimum inside diameter 9 mm	5 m
Rubber hose	Minimum inside diameter 11 mm	

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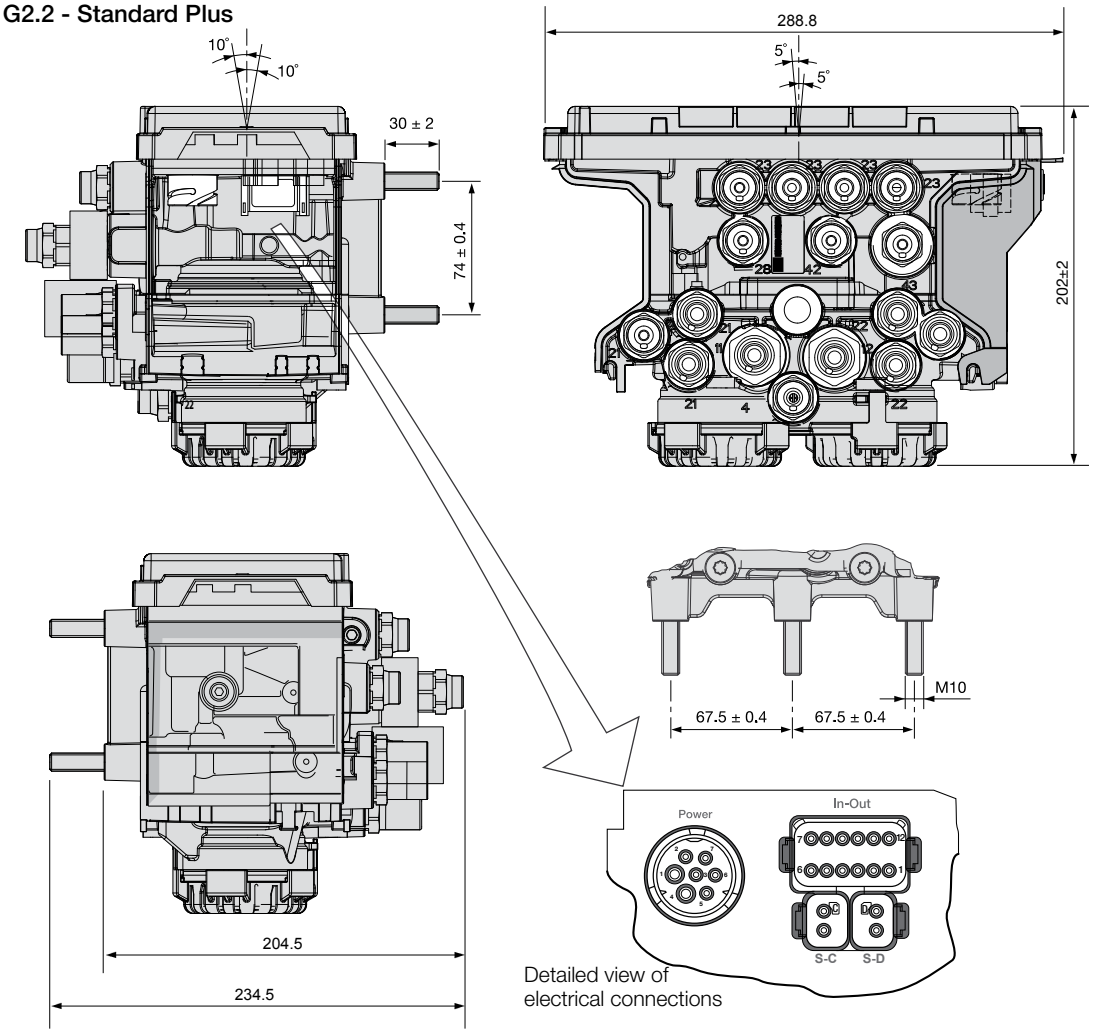
ES2090

TEBS G2.2 Standard Plus Brake Module

Doc. No. Y172339 (EN - Rev. 000)
December 2014

Dimensions

TEBS G2.2 - Standard Plus



NOTE: For information on individual connections and pin function, see table on page 5

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ES2090
TEBS G2.2 Standard Plus Brake Module

Parameterisation

Before a trailer can be used on the road its braking performance must have been verified by a testing authority and be type approved. Part of this process is the requirement to fulfil the prescribed compatibility limits which means a number of braking parameters must be specified. This is normally achieved by means of a brake calculation taking into account the physical characteristics of the trailer and the recorded performance of braking components defining the respective brake chamber pressures to fulfil laden and unladen requirements. For the TEBS G2.2 equipped trailer this would be carried out using the Knorr-Bremse brake calculation program BSD which has been specifically developed for this purpose. The main parameters which control the braking performance of the trailer are:

- Laden and unladen air spring pressures.
- Laden and unladen axle loads.
- Laden and unladen brake actuator delivery . pressures for a control line pressure of 6.5 bar.
- Coupling head pressure when braking should commence.
- Inshot pressure generated when braking should commence.
- Dynamic tyre size

The diagnostic program ECU*talk*® is the primary means by which the parameters can be written to the TEBS G2.2 Brake Module. This can be achieved by either entering individual parameters into the required fields or by reading the parameter values from a file produced by the brake calculation program BSD; the latter option being more reliable as the possibility of error has been removed. When a TEBS G2.2 module is produced, default parameters are defined so that, in the event that a trailer is inadvertently not parameterised, a level of braking performance will always be available. When a data set of parameters is written to the TEBS G2.2 Brake Module the operators PIN will also be written and stored as a finger print to identify who carried out the parameterisation.

Knorr-Bremse makes available four levels of PIN code access to PC Diagnostics ECU*talk*® as follows:

- Full version for OEMs.
- EOL version for OEMs.
- Service Plus for workshops.
- Service Version for workshops.

Load Sensing Plate

Following installation and parameterisation of the TEBS G2.2 Brake Module it is possible to generate a load sensing plate by using the diagnostic program ECU*talk*®. Legislation requires that such a plate is fitted to all trailers. The plate generated by ECU*talk*® will not only contain information to carry out a check of the load sensing settings but also define additional TEBS G2 Brake Module configuration data and trailer related information. See PD-214-F002, Document No. *Y136109.*

Diagnostics

The Knorr-Bremse diagnostic program ECU*talk*® is the primary means by which diagnosis of the TEBS G2.2 Brake Module can be undertaken. For further details see PD-214-F355, Document No. *Y136135*.

Note:

For more information on ECU*talk*® see the Product Information Document No. *Y051496* available at www.Knorr-BremseCVS.com.

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Revision Details

Rev. 000	December 2013	New document
Rev. 000	December 2014	Correction to DIN ISO 1219 symbol on page 1.

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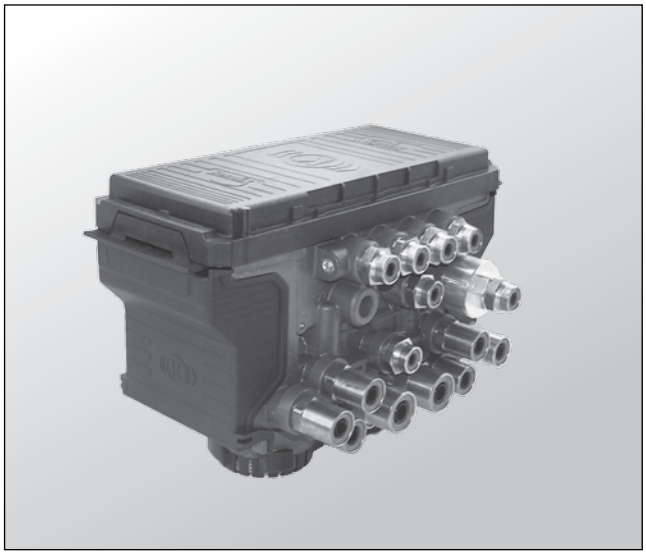
Product DATA

ES2095

TEBS G2.2 Premium Brake Module

Doc. No. Y200882 (EN - Rev. 001)
June 2015

Function



The Knorr-Bremse electronic braking system for trailers (**TEBS G2.2**) combines, in one compact assembly, the electronic control unit, the sensor technology and the pneumatic control.

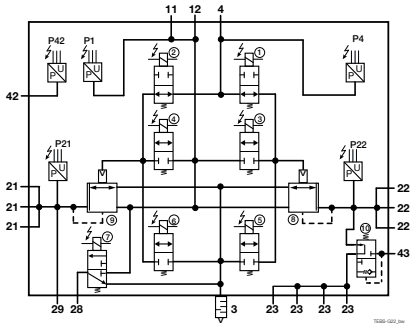
The braking functions of anti-lock and load sensing control are both electronically managed within the module as integrated features. This provides more accurate and consistent control of the generated braking force including reduced hysteresis compared to a conventional braking system, thereby improving tractor-trailer compatibility, optimising the brake pad wear and helping to reduce the overall operating costs of the trailer.

The anti-compounding function is also housed within the module offering four delivery ports to the spring brake chambers.

The **TEBS G2.2 Brake Module** is capable of working on trailers coupled to towing vehicles equipped with pneumatic only braking, pneumatic braking plus ABS or EBS systems. To achieve the full capability of the module the trailer should be connected to an EBS equipped towing vehicle fitted with an ISO 7638 7-pin connector.

Standard Symbol as DIN ISO 1219

TEBS G2.2



The **TEBS G2.2 Premium Brake Module** offers the following features in common with the TEBS G2.2 Standard Plus brake module (see PD-214-325, Document No. *Y172339*):

- the modules are available with push-to-connect (PTC) fittings.
- all electrical connections face downwards for ease of accessibility.
- integrated emergency valve to provide the automatic brake function. The integrated emergency valve vents the spring brakes directly at the module ensuring faster response. The emergency valve also performs the anti-compounding function.
- iLvl suspension control system (see PD-214-F010, Document No. *Y172340*).

In addition the **TEBS G2.2 Premium Brake Module** offers the following features:

- supports 4S2M, 4S3M and 6S3M system configurations.
- more input and output connections.
- second J1939 (Brake) CAN for improved safety and reliability.
- stop lamp powering.

The service-proven anti-roll system, RSP (Roll Stability Program), is included as standard in all **TEBS G2.2 Brake Modules.**

Technical Features

Operating pressure:	10.5 bar
Max. permissible pressure:	12.5 bar
Operating temperature range:	-40 °C to +65 °C
Maximum temperature:	+110 °C for 1 hour (non-operational)
Weight:	5.7 kg approx.
Nominal Voltage:	9 to 32 V DC

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TEBS G2.2 Premium Brake Module

Doc. No. Y200882 (EN - Rev. 001)
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Towing vehicle requirements

Trailers fitted with an electronic braking system (TEBS) only comply with the legal requirements of regulations 98/12/EC and ECE R13/11 Supplement 8, when the towing vehicle is equipped with a electrical interface of one of the following specifications:

ISO 7638: 1985	5 Pin	ISO 7638: 1997 Part 1 (24 V)	7 Pin
ISO 7638: 1997 Part 1 (24 V)	5 Pin		

Standard Auxiliary Functions

The following auxiliary functions may be configured to the associated auxiliary connections of the TEBS G2.2 Premium Brake Module:

Outputs

- **Tilt Angle:** This signal can be utilised to switch off a lifting device for the tipping body. See PD-214-F201, Document No. *Y136126.*
- **Fully Automatic Lift Axle Control**: The module can control up to two lift axle control valves, each valve may then be connected to 1 or 2 lifting axles. See PD-214-F101, Document No. *Y136118.*
- **Speed Pulse (SP):** When the vehicle exceeds a predetermined threshold speed, a signal of programmable duration is activated. This signal causes the Raise / Lower valve to automatically switch to the “drive” position. See PD-214-F106, Document No. *Y136123.*
- **Integrated Speed Switch (ISS):** This signal may be used to fulfil numerous operational requirements such as locking of steering axles etc. See PD-214-F107, Document No. *Y136124.*
- **Steering Axle Lock (SAL):** This signal can be utilised to lock the steering axle in the ‘straight-ahead’ condition. It is similar to ISS but can also be triggered from an input, e.g. Back-up Light (Reversing Lamps). See PD-214-F251, Document No. *Y136130.*
- **24 V Supply**: provides a permanent power supply that may be used to power additional brake and running gear systems / functions on the trailer. See PD-214-F006, Document No. *Y136112.*
- **ABS active:** Typically this function may be used to directly control a retarder installed on the trailer. See PD-214-F004, Document No. *Y136110.*
- **RSP active:** When the Roll Stability Program (RSP) of the trailer is active, a 24 V or a pneumatic output (depending on configuration) is transmitted by the brake module. See PD-214-F005, Document No. *Y136111.*
- **SLR:** When a function of TEBS causes the brakes to be applied a Stop Lamp Request signal can be generated. See PD-214-F401, Document No. *Y137240.*
- **P_{out}:** Brake modules that have the P_{28} function available, which can be programmed to provide a pneumatic output for any of the above functions or a constant pressure supply. See PD-214-F006, Document No. *Y136112.*
- **iLvl valve:** When iLvl is configured in ECU*talk*® the iLvl valve outputs are automatically assigned to pins 1 and 2 (AUXIO1 and AUXIO2). See PD-214-F010, Document No. *Y172340.*

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Inputs:

The TEBS G2.2 Premium Brake Modules can be programmed to receive inputs on various connectors. See page 5 for more information on the connections. Typical inputs are described below:

- **Brake pad wear control (PW) :** Input is received that the wear limit of at least one brake has been reached. See PD-214-F351, Document No. *Y136131.*
- **TH:** Traction Help actuated by a manual switch. See PD-214-F102, Document No. *Y136119.*
- **MH:** Manoeuvring Help actuated by a manual switch. See PD-214-F103, Document No. *Y136120.*
- **LL_ALL / LL_LAC1 / LL_LAC2_:** These functions lower lift axles as a result of a signal from a manual switch. See PD-214-F101, Document No. *Y136118.*
- **LLTH - Advanced Lift Axle Control:** This is a combined function which offers lift axle lowering and traction help via the same input. See PD-214-F101 and PD-214-F102, Document Nos. *Y136118* and *Y136119.*
- **Road Laying Function (RLF)**: This function is typically used when the trailer is working with a road laying machine. See PD-214-F203, Document No. *Y136128.*
- **Body Lift Sensor (BLS)**: This sensor is used with tipping trailers. See PD-214-F201, Document No. *Y136126* and PD-214-F202, Document No. *Y136127.*
- **Trailer Brake Release (TBR)**: This function is typically used with extendable trailers. See PD-214-F301, Document No. *Y137238.*
- **Trailer Suspension Release (TSR)**: This input is used when raise/lower valves are installed. See PD-214-F108, Document No. *Y137237.*
- **Back-up Light**: This takes an input from the reversing lamps and is typically used with the Steering Axle Lock function. See PD-214-F251, Document No. *Y136130.*
- **iLvl Level sensor:** When iLvl is configured in ECU*talk*® the level sensor is automatically assigned to pins 5 and 6 (SENS_IN1 and SENS_SUP). See PD-214-F010, Document No. *Y172340.*

Auxiliary Design Language (ADL) - Non-standard Auxiliary Functions

Should a customer require a function other than those normally available it is possible to create a non-standard function by the use of a special file known as ADL (Auxiliary Design Language) produced by Knorr-Bremse. See PD-214-F950, Document No. *Y136136.*

Stop Lamp Powering

To obtain full functionality, any trailer electronic braking system requires a permanent power supply (achieved by using the legally specified ISO 7638 connection in 5 or 7 pin format); this ensures load sensing, anti-lock control and all auxiliary functions are automatically maintained. In the event of a failure of this power supply, whilst trailer braking will be maintained via the pneumatic back-up function, all electronically controlled functionality would no longer be active.

Continued operation of the vehicle without electrical power, irrespective of axle load, may therefore result in higher brake operating temperatures leading to increased brake pad wear, tyre flat spotting and trailer instability. To overcome this problem, some versions of the TEBS G2.2 Brake Module will continue to operate by taking power from the stop lamp circuit and thereby load sensing and anti-lock functions remain active.

Note: ***Stop lamp powering should only be considered as a backup function to ensure some safety features are retained in the event of failure of the ISO 7638 connection.***

Note: ***When stop lamp powering is in operation in a 4S3M or 6S3M system configuration the module will switch to 2S2M operation.***

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ES2095

TEBS G2.2 Premium Brake Module

Doc. No. Y200882 (EN - Rev. 001)
June 2015

Legal Requirements

TEBS G2.2 has been approved in accordance with the requirements of annex XIV of the Directive 98/12/EC and annex 19 of ECE Regulation 13 with respect to ABS performance. The system also fulfils the requirements of the ECE Regulation 13/11 Supplement 8 with respect to the prescribed requirements for vehicles with an electric control line and electric control transmission:

Approval	ECE Report No.	Knorr-Bremse Document No.
ABS approval	EB 154	Y038142
Electronics approval	EB 155	Y038143
RSP approval	EB 166	Y080682
Use of AC574AY Relay Valve with long pipes	EB 154 extension	Y158131

Options

All TEBS G2.2 Premium variants offer:

- **ABS configurations 2S/2M, 4S/2M, 4S/3M and 6S/3M**.
- RSP.
- Operating voltage range 9 - 32 Volts.
- Four pneumatic ports to the spring brake actuators.
- Two internal J1939 CANs (5 V TI CAN and Brake CAN).
- Configuration of different braking characteristics for the CAN and pneumatic brake demands.
- Integrated automatic brake function.
- A programmable pneumatic output from Port 28 (P_{28}) and a test point Port 29 (P_{29}).

The following table shows the part number of the available module:

Part Number[1)]	Type Number	P_{28}	P_{29}	PTC Fittings	Stop Lamp Powering
K110612	ES2095	yes	yes	yes	yes

1) The part number of the module will carry two suffices, firstly “V##” which represents the software revision of the product, e.g. V01, V02 etc., and secondly “N##” which defines the packaging requirements of different market sectors, e.g. N00, N49, N50, N99, etc. Example: K110612V02N50 - is supplied with software to revision 02 and packaged as described below.

Note: The N00 and N49 variants will be supplied without packaging.The N50 and N99 variants will be shipped in a box containing the data labels II39797F, II39796F and II40392F. These data labels may also be ordered separately. The N49 and N99 variants are for OE use only and the N00 and N50 variants are for IAM use only.

Additional Parts:

Silencer	K000847K50 (two required per module)
Side Cover	K092404K50 (two required per module)
Port Filters	K004904K50 (contains 10 conical filters for Ports 11 and 12) K108643K50 (contains 20 flat filters for Port 4)
Blanking plug for 8 mm pipe	96210008
Blanking plug for 12 mm pipe	96210012
Blanking plug for 15 mm pipe	96210015
Self-adhesive TEBS label	K112780N00 (supplied with the TEBS Module for mounting on the trailer)
Information sticker	II39796F (TEBS power supply)
EBS-System Plate	II39797F

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Pneumatic Connections

Port	Thread	Qty	Used for	PTC Fittings (to suit pipe size)
11	M22x1.5	1	Supply to Reservoir	15x1.5
12	M22x1.5	1	Supply to Reservoir	15x1.5
21	M16x1.5	3	Delivery to brake chambers to wheel speed sensor D	12x1.5
22	M16x1.5	3	Delivery to brake chambers to wheel speed sensor C	12x1.5
23	M16x1.5	4	Delivery to parking brake	8x1
28	M16x1.5	1	Programmable pneumatic signal	8x1
29	M16x1.5	1	Test point	8x1
4	M16x1.5	1	Brake demand (Yellow Line)	8x1
42	M16x1.5	1	Air spring pressure	8x1
43	M16x1.5	1	Park/Shunt Valve	8x1

Pneumatic Backup

If all electrical power supplies to the TEBS G2.2 Brake Module are lost the system reverts to the Pneumatic Backup mode which provides the facility for the trailer to maintain normal pneumatic braking albeit without the load sensing and anti-lock functions.

The TEBS G2.2 Premium Brake Module has the ability to switch itself to the Pneumatic Backup mode and does so if the trailer reservoir pressure drops below 2.5 bar. The module will switch back to normal operation when the reservoir pressure is restored.

The TEBS G2.2 Premium Brake Module also switches to Pneumatic Backup mode whenever the trailer is stationary and the service brake pressure is greater than 4.5 bar. This is to reduce electrical power consumption. The module will switch back to normal operation as soon as service brake pressure drops below 4.25 bar.

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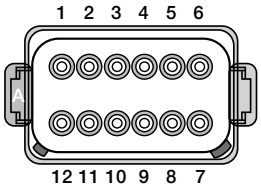
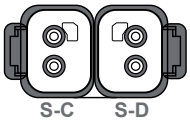
ES2095

TEBS G2.2 Premium Brake Module

Doc. No. Y200882 (EN - Rev. 001)
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Electrical Connections

See PD-214-F006, Document No. *Y136112* for details of all of the Input and Output configurations.

In - Out Connector		Power Connector		Wheel Speed Sensor Connector		
						
Pin Number	**Function**	**Pin Number**	**Function**	**System**	**Connector**	**Function**
1	AUXIO 1	1	Battery Supply (+)	2S/2M 4S/2M 4S/3M	S-C	Wheel Speed Sensor
2	AUXIO 2	2	Electronic Supply (+)			
3	AUXIO 3	3	Electronic Ground (-)		S-D	
4	Sensor Ground	4	Battery Ground (-)			
5	Sensor Input 1 [SENS_IN1] (tri-state or analogue input)	5	Warning Lamp			
6	Sensor Supply [SENS_SUP] (tri-state or analogue input)	6	ISO 11992 CAN (24 V) High			
7	Stop Lamp Supply (+)	7	ISO 11992 CAN (24 V) Low			
8	Stop Lamp Ground (-)					
9	J1939 TI CAN (5 V) Low					
10	J1939 TI CAN (5 V) High					
11	AuxRet 3					
12	AuxRet 12 (Return for AUXIO 1 & 2)					

Note:

If no connections on the In-Out Connector are used, a blanking plug (K026197V01N00) must be installed to prevent the ingress of moisture to the ECU.

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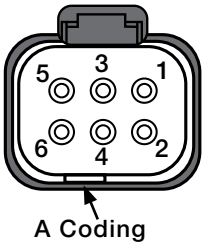
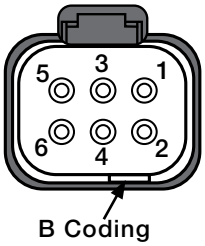
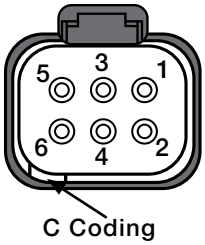
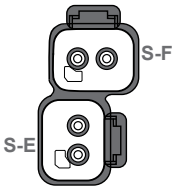
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June 2015

ES2095
TEBS G2.2 Premium Brake Module

2.3 Connector		2.4 Connector		2.5 Connector		Wheel Speed Sensor Connector		
 A Coding		 B Coding		 C Coding				
Pin Number	**Function**	**Pin Number**	**Function**	**Pin Number**	**Function**	**System**	**Connector**	**Function**
1	AUXIO 4 (typically 3rd modulator)	1	Sensor Supply [SENS_SUP2] (tri-state or analogue input)	1	Not connected	2S/2M	S-E	Optional Aux Input (Digital or Tri-state)
2	AuxRet 4	2	Sensor Ground2	2			S-F	
3	AUXIO 5	3	AUXIO 6	3		4S/2M 4S/3M	S-E	Wheel Speed Sensor
4	AuxRet 5	4	AuxRet 6	4			S-F	
5	J1939 Brake CAN (5 V) Low	5	Sensor Input 2 [SENS_IN2] (analogue input)	5				
6	J1939 Brake CAN (5 V) High	6	Not connected	6				

Note:

If no connections on the 2.3 or 2.4 Connector are used, a blanking plug (Z005861) must be installed to prevent the ingress of moisture to the ECU.

If the Wheel Speed Sensor connections are not used, two blanking plug (Z005860) must be installed to prevent the ingress of moisture to the ECU.

5 V J1939 TI CAN

The TEBS G2.2 Premium Brake Module has two 5 V J1939 CAN connections. This enables the separation of CAN ‘data’ inputs/outputs from those dedicated to brake control (third modulator). This improves both safety and reliability of the TEBS system.

The ‘Data’ TI CAN is connected to the In/Out Connector and the ‘Brake’ CAN is connected to the 2.3 Connector.

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TEBS G2.2 Premium Brake Module

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Installation and Mounting

General installation guidelines

- The protective covers for the electrical connections of the TEBS G2.2 Brake Module must be fitted at all times when the vehicle is in use.
- During assembly the ports and electrical connections of the TEBS G2.2 Brake Module and cabling must be protected against the ingress of contamination, e.g. sand blasting particles.
- The TEBS G2.2 module must never be stored or transported with the exhaust ports pointing upwards.
- If a TEBS G2.2 module has been damaged in transit or during the assembly, e.g. dropped on the floor, it must not, under any circumstances, be fitted to the vehicle.

Note:

If at any time the vehicle is to be welded using an electric welding tool the following has to be observed:

- Remove the “Power” and “In-Out” connectors from the module(s).
- Remove the wheel speed sensor connectors, ensure that when reassembling the sensors they are reconnected to the correct positions. Knorr-Bremse recommends that an End of Line (EOL) test is run using the diagnostic program ECU*talk*® following reassembly of the wheel speed sensors to ensure correct fitment.

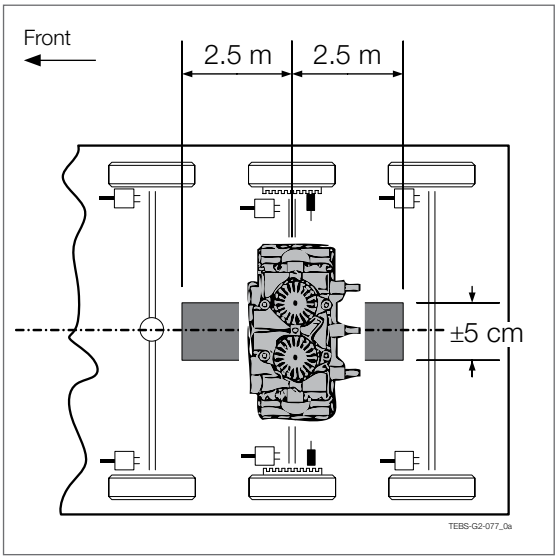
Installation of the TEBS G2.2 Brake Module

The following provides a guide to the installation of the TEBS G2.2 Brake Module.

In the longitudinal direction, the deviation from centre of the bogie may be a maximum of ± 2.5 m however the maximum permitted pipe length of 5 m to the brake actuators must be observed.

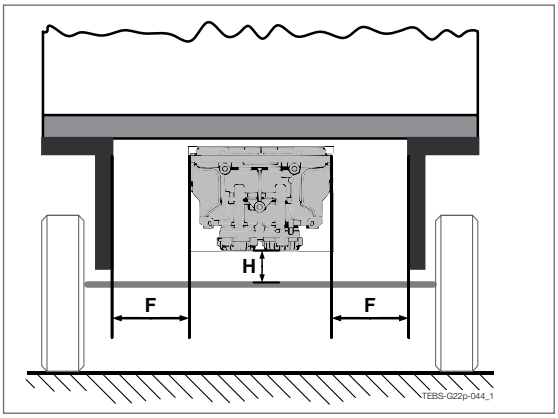
Note: when a self-steering or command steered axle is fitted the ‘centre of the bogie’ is deemed to be between the fixed axles.

An ideal installation would be where the TEBS G2.2 Brake Module is laterally positioned within 5 cm of the centre of the trailer (see figure), this would result in the respective pipe lengths being approximately equal for each axle. However it is possible to mount the TEBS G2.2 Brake Module in other positions dependent on the design of the trailer and space available.



If the Roll Stability Program (RSP) is configured, special restrictions apply. See PD-214-F005, Document No. *Y136111.*

During installation, consideration must be given to being able to access the electrical connections and a minimum clearance must be observed (F > 50 mm) to ensure that cover can be removed. For the TEBS G2.2 Brake Module a clearance (H > 25 mm) must be ensured below the exhaust silencers at the base of the valve; this must be checked when the suspension is deflated and on its bump stops (see figure).



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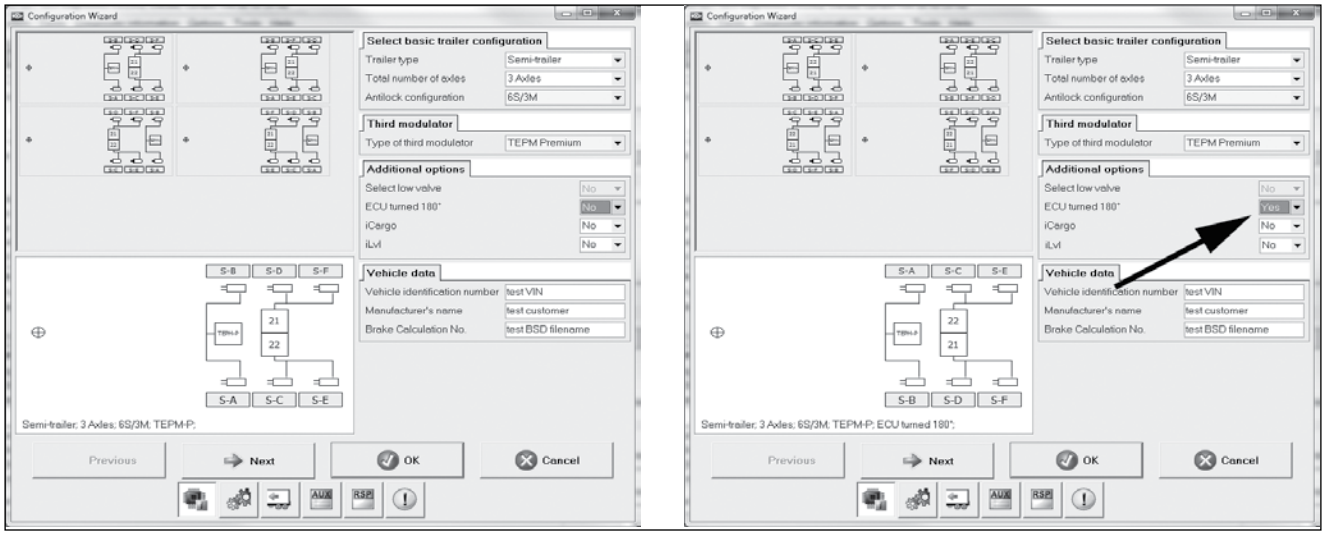
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Orientation

It is normal to mount the TEBS G2.2 Brake Module with the mounting studs towards the rear of the vehicle with the brake actuators on the left side supplied by Port 22 and on the right side by Port 21 (the ports closest to the actuators). However, it is permissible to mount the module with the mounting studs towards the front of the vehicle providing that the orientation is changed in ECU*talk*® under the "Information" tab and "Change configuration". The actuators connections must then be reversed, i.e. the brake actuators on the left side supplied by Port 21 and the brake actuators on the right side supplied by Port 22.



Wheel Speed Sensor Connection

When the TEBS G2.2 Brake Module is installed, irrespective of its orientation, the Wheel Speed Sensors should be connected as below:

Connection S-C (all) and S-E (4S systems)	connect the Wheel Speed Sensor fitted to the side of the axle on which the brake actuators are supplied by Port 22 on the module.
Connection S-D (all) and S-F (4S systems)	connect the Wheel Speed Sensor fitted to the side of the axle on which the brake actuators are supplied by Port 21 on the module.

Cables

For information on suitable cables see PD-272-025, Document No. *Y142784* and for cable installation guidelines see PD-272-005, Document No. *Y136137*.

Pipe sizes

The following table defines the minimum bore of piping to be used to connect the reservoir to the module and the module to the respective brake actuators.

Pipe size for the connection between the air reservoir and the module		
Plastic pipe	Minimum inside diameter 12 mm It is recommended that both Supply ports are used and each is connected to the reservoir.	
Pipe size for the connection between the module and the service brake actuators		Maximum length
Plastic pipe	Minimum inside diameter 9 mm	5 m
Rubber hose	Minimum inside diameter 11 mm	

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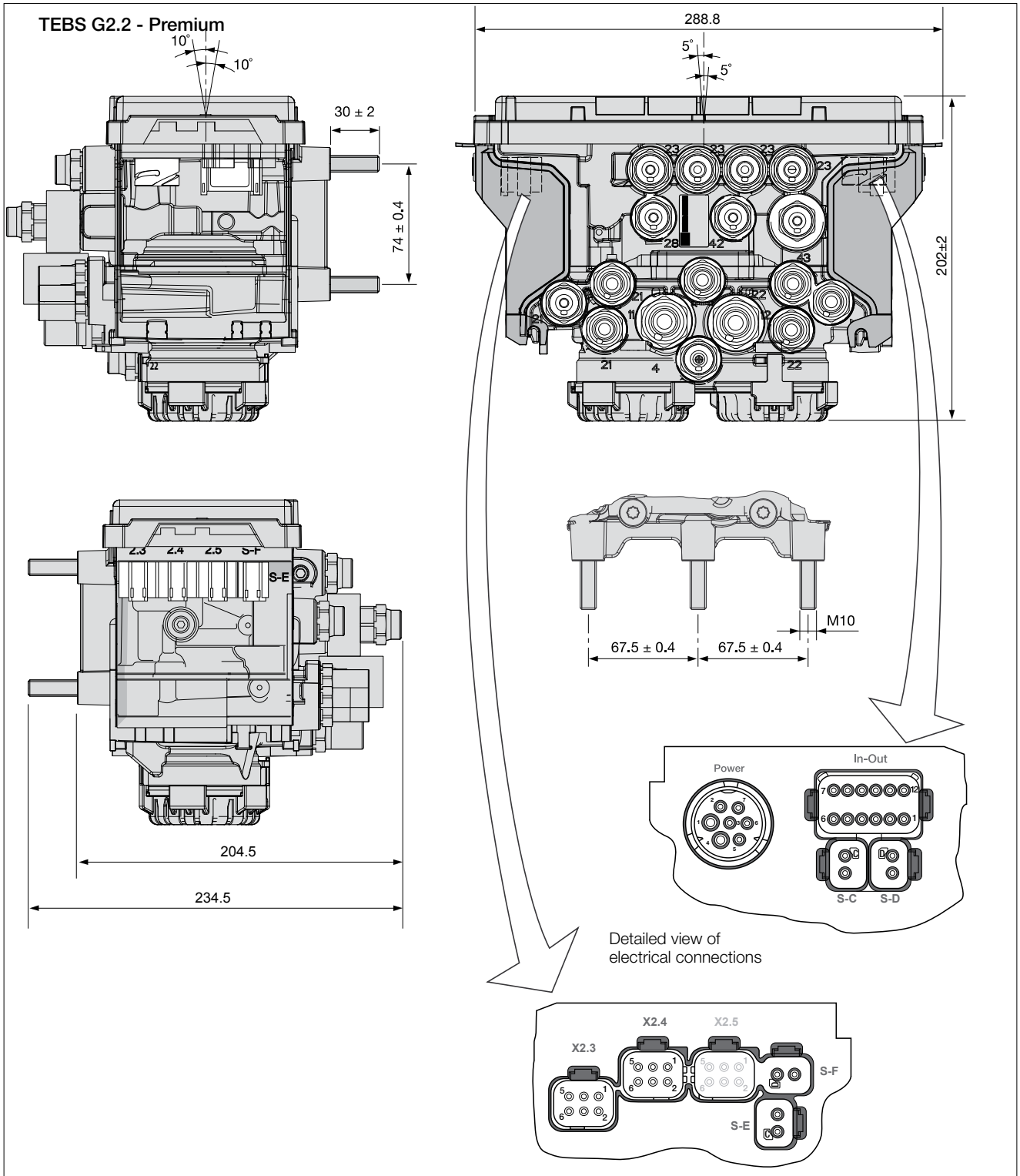
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TEBS G2.2 Premium Brake Module

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June 2015

Dimensions



NOTE: For information on individual connections and pin function, see table on page 5

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ES2095
TEBS G2.2 Premium Brake Module

Parameterisation

Before a trailer can be used on the road its braking performance must have been verified by a testing authority and be type approved. Part of this process is the requirement to fulfil the prescribed compatibility limits which means a number of braking parameters must be specified. This is normally achieved by means of a brake calculation taking into account the physical characteristics of the trailer and the recorded performance of braking components defining the respective brake chamber pressures to fulfil laden and unladen requirements. For the TEBS G2.2 equipped trailer this would be carried out using the Knorr-Bremse brake calculation program BSD which has been specifically developed for this purpose. The main parameters which control the braking performance of the trailer are:

- Laden and unladen air spring pressures.
- Laden and unladen axle loads.
- Laden and unladen brake actuator delivery . pressures for a control line pressure of 6.5 bar.
- Coupling head pressure when braking should commence.
- Inshot pressure generated when braking should commence.
- Dynamic tyre size

The diagnostic program ECU*talk*® is the primary means by which the parameters can be written to the TEBS G2.2 Brake Module. This can be achieved by either entering individual parameters into the required fields or by reading the parameter values from a file produced by the brake calculation program BSD; the latter option being more reliable as the possibility of error has been removed. When a TEBS G2.2 module is produced, default parameters are defined so that, in the event that a trailer is inadvertently not parameterised, a level of braking performance will always be available. When a data set of parameters is written to the TEBS G2.2 Brake Module the operators PIN will also be written and stored as a finger print to identify who carried out the parameterisation.

Knorr-Bremse makes available four levels of PIN code access to PC Diagnostics ECU*talk*® as follows:

- Full version for OEMs.
- EOL version for OEMs.
- Service Plus for workshops.
- Service Version for workshops.

Load Sensing Plate

Following installation and parameterisation of the TEBS G2.2 Brake Module it is possible to generate a load sensing plate by using the diagnostic program ECU*talk*®. Legislation requires that such a plate is fitted to all trailers. The plate generated by ECU*talk*® will not only contain information to carry out a check of the load sensing settings but also define additional TEBS G2 Brake Module configuration data and trailer related information. See PD-214-F002, Document No. *Y136109.*

Diagnostics

The Knorr-Bremse diagnostic program ECU*talk*® is the primary means by which diagnosis of the TEBS G2.2 Brake Module can be undertaken. For further details see PD-214-F355, Document No. *Y136135*.

Note:

For more information on ECU*talk*® see the Product Information Document No. *Y051496* available at www.Knorr-BremseCVS.com.

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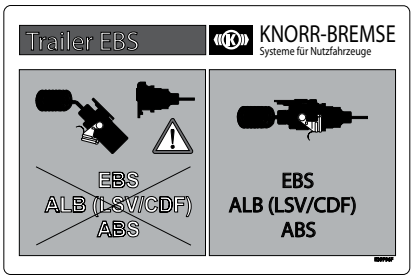
ES2095

TEBS G2.2 Premium Brake Module

Doc. No. Y200882 (EN - Rev. 001)
June 2015

Labels

Information sticker, TEBS power supply
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Size [mm]: 150 x 100



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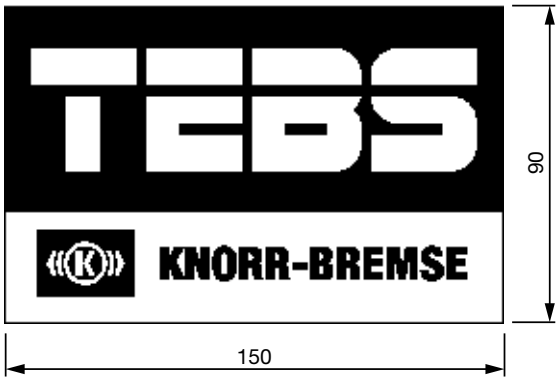
EBS-System Plate [1]:
Part No.: II**39797F**
Size [mm]: 170 x 110



VF00075_189.jpg

[1] The System Plate is a sticker which can be printed via the ECU*talk*® software and a laser printer. **Caution!** A laser printer must be used but do not print more than 5 stickers at a time.

K112780



Revision Details

Rev. 000	January 2015	Correction to pin terminology on 2.4 (page 7)
Rev. 001	May 2015	Labels section added.
Rev. 001	June 2015	Correction to kit contents on page 4. Connector terminology changed from X2 to 2.

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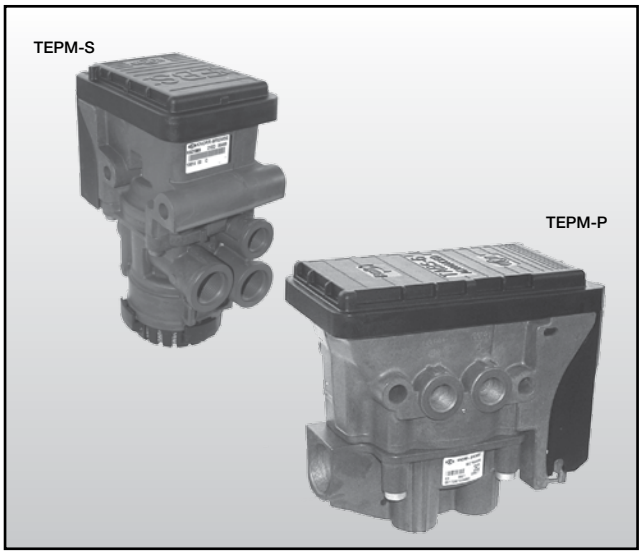
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Product DATA

ES207.
Trailer Electro-Pneumatic Module (TEPM-S / TEPM-P)

Doc. No. Y095618 (EN - Rev. 003)
June 2015

Function



The **Trailer Electro-Pneumatic Module** is used as a 3rd modulator to extend the functionality of the TEBS G2 Family Brake Module to cover full trailers, semi-trailers and centre-axle trailers that require 4S/3M or 6S/3M configurations.

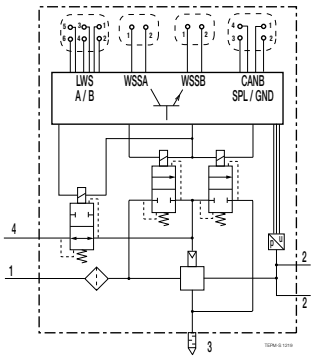
The **Trailer Electro-Pneumatic Modules** have pressure control channels with internal pressure sensors and also provide connection for wheel speed sensor inputs which are processed and sent via the J1939 CAN to the TEBS G2 Family Brake Module. The modules receive the required brake demand over the J1939 CAN from the TEBS G2 Family Brake Module which is responsible for both load sensing and ABS functions.

The **Trailer Electro-Pneumatic Module - Standard (TEPM-S)** has an internal pressure sensor and three solenoids controlled by an electronic controller. The module also provides connection for two wheel speed sensor inputs.

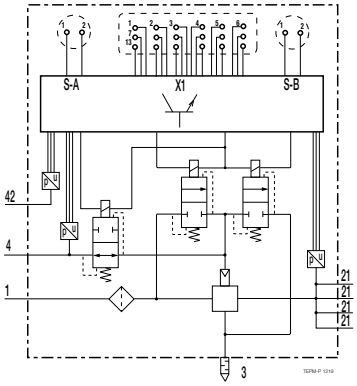
The **Trailer Electro-Pneumatic Module - Premium (TEPM-P)** extends the functionality provided by the TEPM-S by providing two additional internal pressure sensors (suspension load and brake demand) and two additional delivery ports. The module also provides two additional auxiliary input/output pins (AUXIO), which can be used to expand the existing capability provided by the TEBS G2 Family Brake Module. In addition the module has provision for two analogue inputs allowing external load and brake demand sensors to be connected as required. The integrated ECU is designed for 12 V and 24 V systems to suit worldwide applications.

Standard Symbol as DIN ISO 1219

TEPM-S



TEPM-P



Technical Features

TEPM-S

Maximum operating pressure:	12.5/10.0 bar
Operating temperature range:	-40 °C to +80 °C
Weight:	1.70 kg approx.
Nominal voltage:	24 V
Operating voltage:	18 to 32 V

TEPM-P

Maximum operating pressure:	10.0 bar
Operating temperature range:	-40 °C to +85 °C
Weight:	2.35 kg approx.
Nominal voltage:	12/24 V
Operating voltage:	9 to 32 V

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ES207.

Trailer Electro-Pneumatic Module (TEPM-S / TEPM-P)

Doc. No. Y095618 (EN - Rev. 003)
June 2015

Range Overview

Part No.	Type No.	Model	Installation fixings	Recommended Torque
K021940 [1)]	**ES2070**	**TEPM-S**	2 x Ø8.5	20 ± 4 Nm
K027900 [1)]	**ES2071**	**TEPM-P**	2 x Ø10.2	40 ± 5 Nm

[1)] The part number of the module will carry two suffices, firstly "V##" which represents the software revision of the product, e.g. V01, V02 etc., and secondly "N##" which defines the packaging requirements of different market sectors, e.g. N00, N50. Example: K021940V00N00 - is supplied with software to revision 00 and is supplied without packaging.

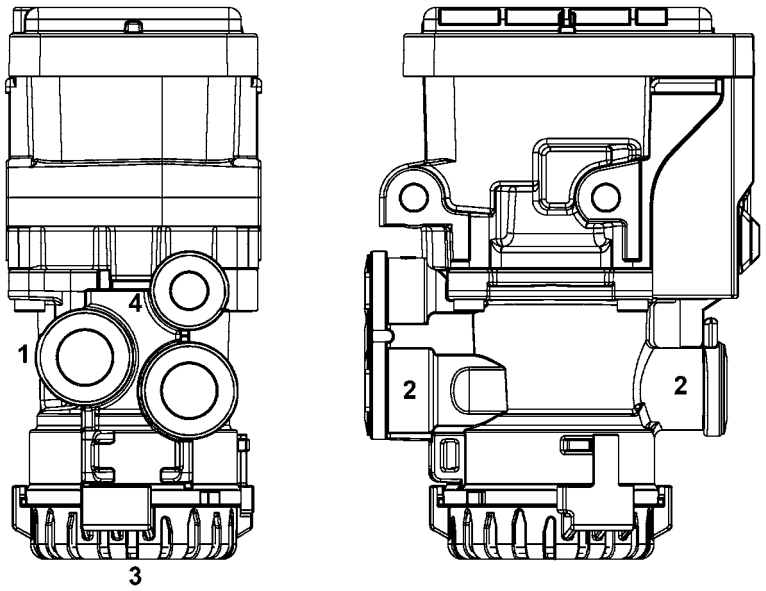
Service Parts:	**TEPM-S**	**TEPM-P**
Silencer	K000847K50	-
Side Cover	K000846K50	K017877K00
Port Filters	K004904K50 *	K004904K50 *
		K108643K50 **

* contains 10 conical filters for Port 1 of TEPM-S or TEPM-P

** contains 20 flat filters for Ports 4 & 42 of TEPM-P

Pneumatic Connections

TEPM-S

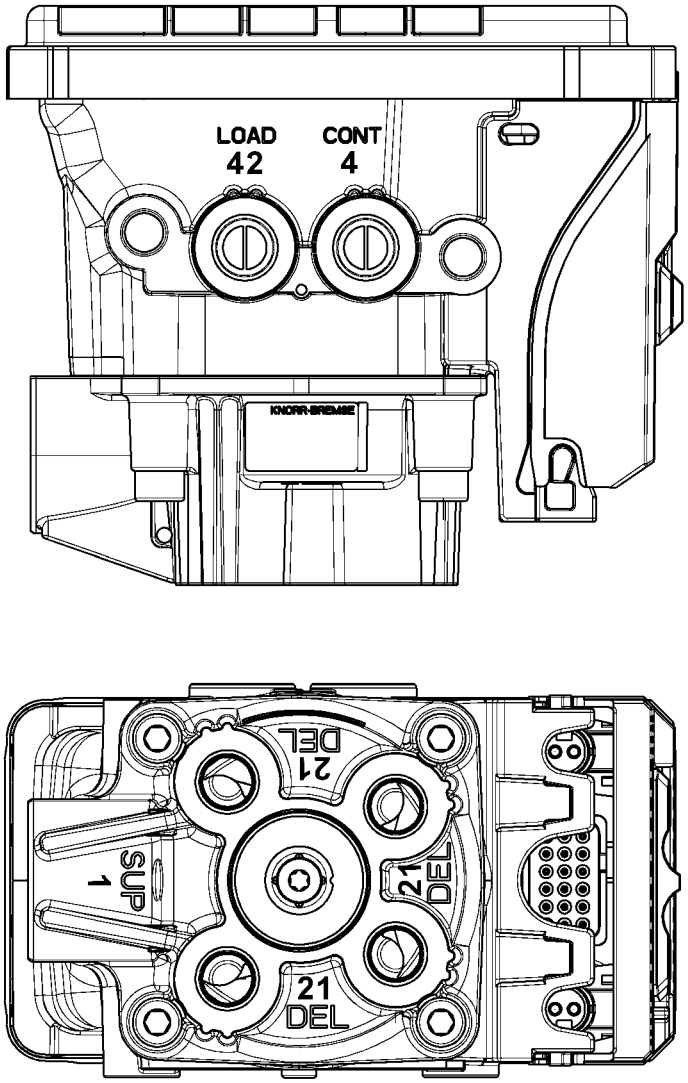


Port	Number of ports	Connection/remarks	Thread	Recommended Torque
1	1	Supply from reservoir	M22x1.5	60 Nm
2	2	Delivery to brake chambers (max. 2 x Type 30)	M22x1.5	60 Nm
4	1	Signal pressure from control (yellow) line	M16x1.5	45 Nm

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TEPM-P



Port	Number of ports	Connection/remarks	Thread	Recommended Torque
1	1	Supply from reservoir	M22x1.5	60 Nm
21	4	Delivery to brake chambers (max. 4 x Type 30)	M16x1.5	45 Nm
4	1	Signal pressure from control (yellow) line	M16x1.5	45 Nm
42	1	Air suspension	M16x1.5	45 Nm

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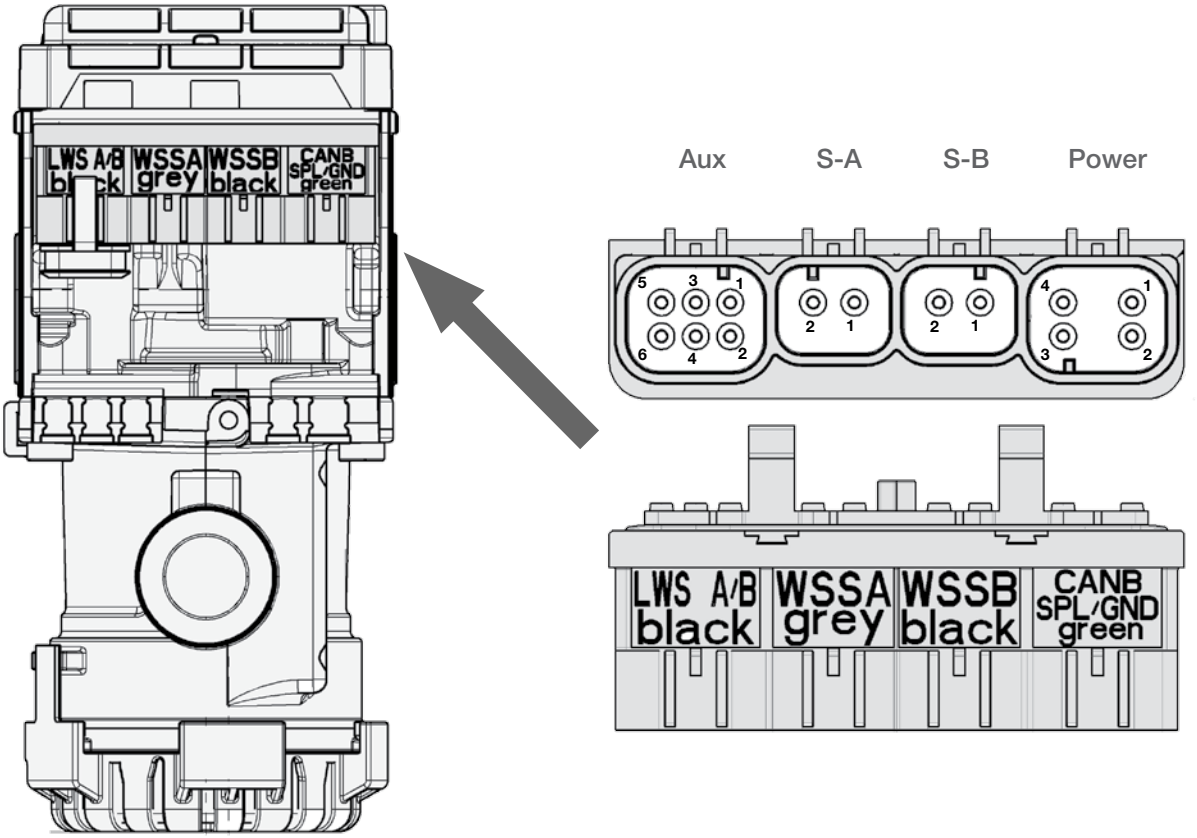
ES207.

Trailer Electro-Pneumatic Module (TEPM-S / TEPM-P)

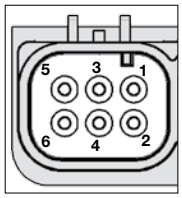
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June 2015

Electrical Connections

TEPM-S

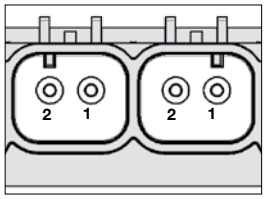


Aux



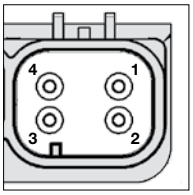
Pin No.	Function
1	- Optional external load sensing connection - When not used blanking plug fitted to the Aux connector
2	
3	
4	
5	
6	

S-A S-B



S-A	Wheel speed sensor inputs for 4S/3M and 6S/3M configurations
S-B	

Power



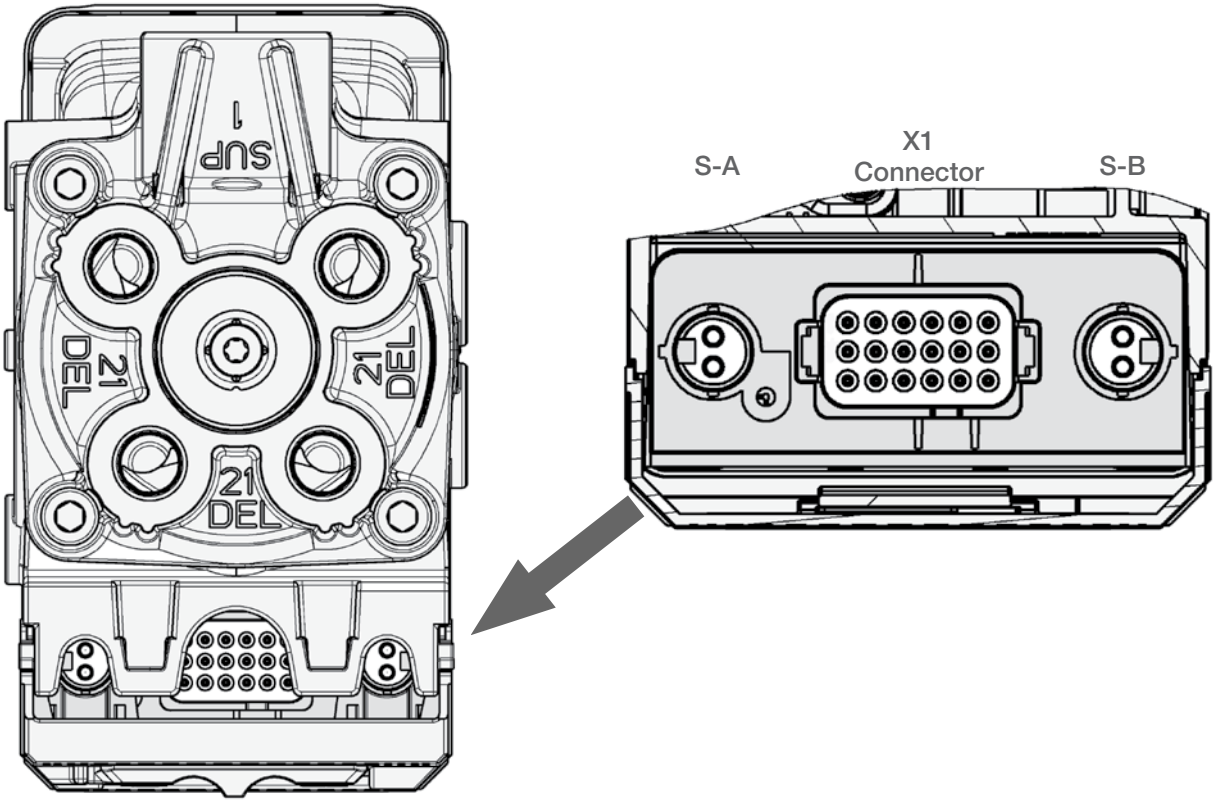
Pin No.	Function
1	Battery ground
2	Battery supply
3	J1939 CAN (5 V) High
4	J1939 CAN (5 V) Low

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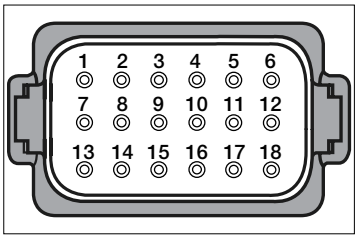
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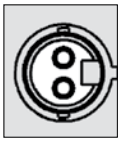
TEPM-P



X1
Connector



S-A
S-B



Pin No.	Function	Pin No.	Function
1	J1939 CAN (5 V) Low	10	Ground Sensor 1
2	Not used	11	Supply Sensor 2
3	Not used	12	Not used
4	Supply Sensor 1	13	Not used
5	Not used	14	AUXIO1
6	Supply	15	Ground AUXIO 1 and 2
7	J1939 CAN (5 V) High	16	Ground Sensor 2
8	AUXIO2	17	Input Sensor 2
9	Input Sensor 1	18	Ground

S-A	Wheel speed sensor inputs for 4S/3M and 6S/3M configurations
S-B	

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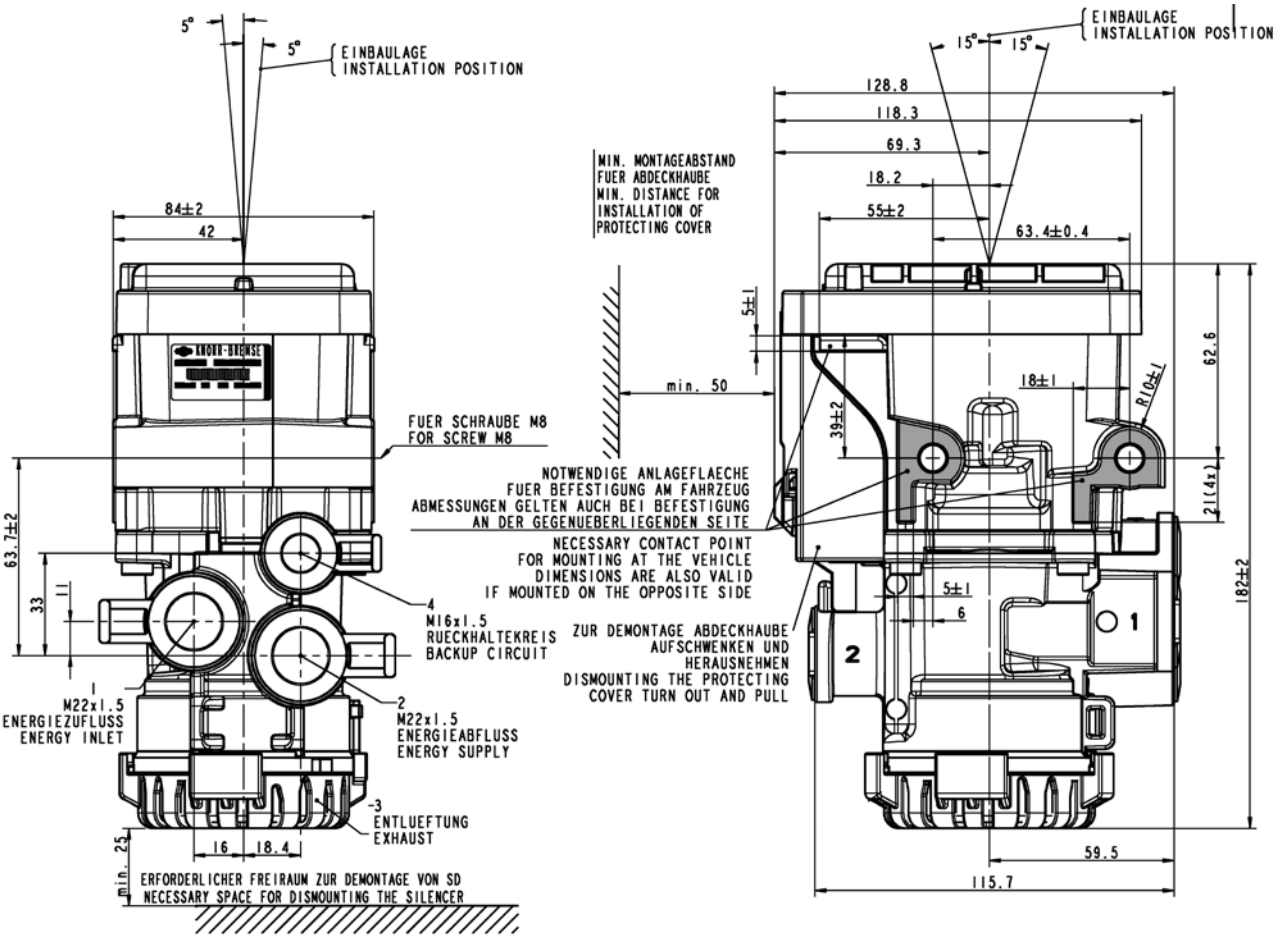
ES207.

Trailer Electro-Pneumatic Module (TEPM-S / TEPM-P)

Doc. No. Y095618 (EN - Rev. 003)
June 2015

Dimensions

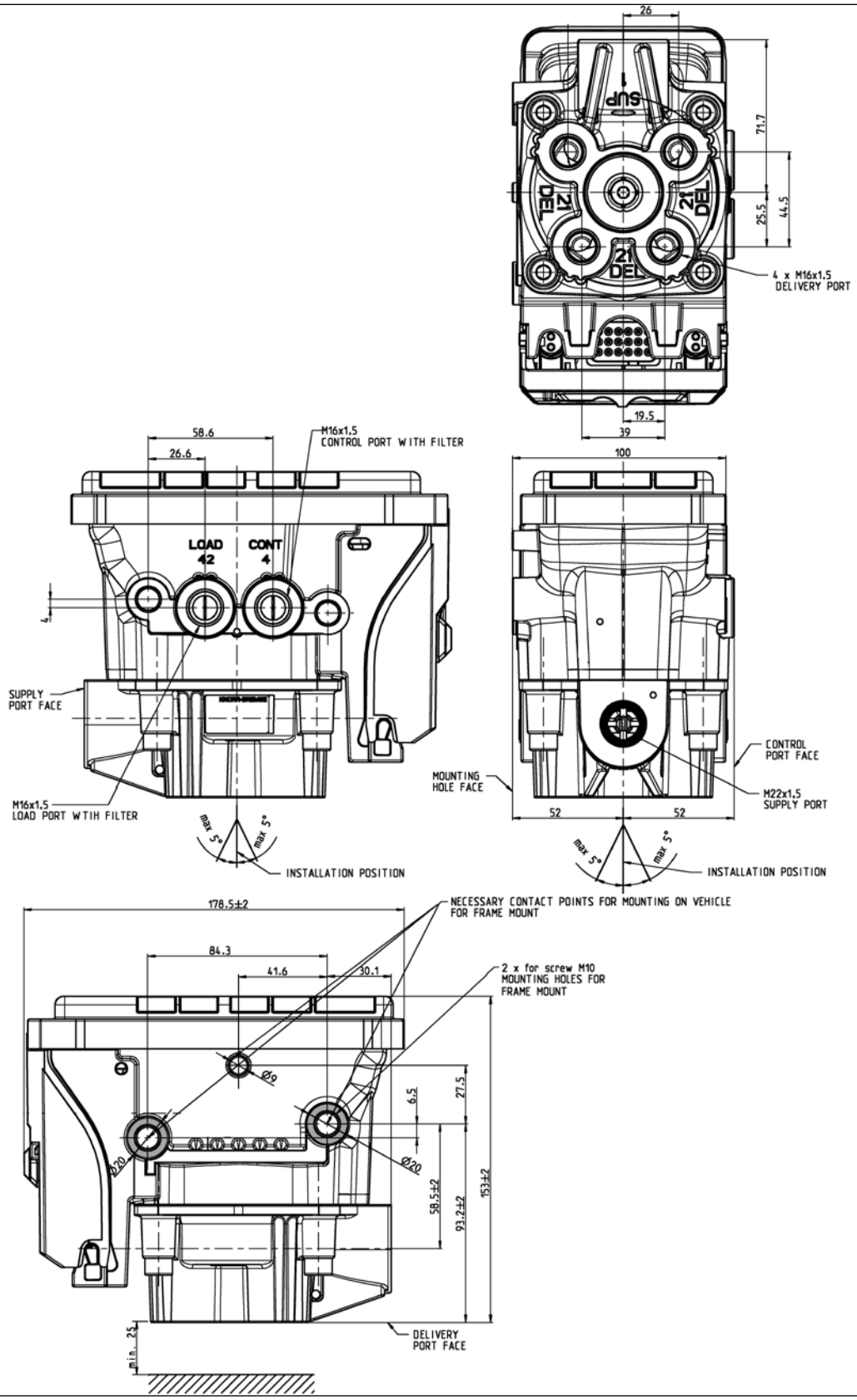
TEPM-S



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TEPM-P



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ES207.

Trailer Electro-Pneumatic Module (TEPM-S / TEPM-P)

Doc. No. Y095618 (EN - Rev. 003)
June 2015

Using a Trailer Electro-Pneumatic Module on the Front Axle of a Drawbar Trailer

If a Trailer Electro-Pneumatic Module (TEPM-S or TEPM-P) is used to control the front axle brakes on a drawbar trailer it is important that certain steps are taken to ensure the response times required by legistaion are met:

- The Manoeuvring Valve or Park/Shunt Valve with Front Axle Release Valve must be mounted near the front of the vehicle to keep the piping between it and the TEPM as short as possible.
- The pipe between the reservoir and the TEPM must be 15 mm O/D.

Revision Details

Rev. 002	September 2013	Correction - pin numbering on TEPM-S Power Connector (pages 1 and 4)
Rev. 003	March 2015	Service parts added on page 2. Information added concerning use on a drawbar trailer on page 8
Rev. 003	June 2015	Correction to service parts.

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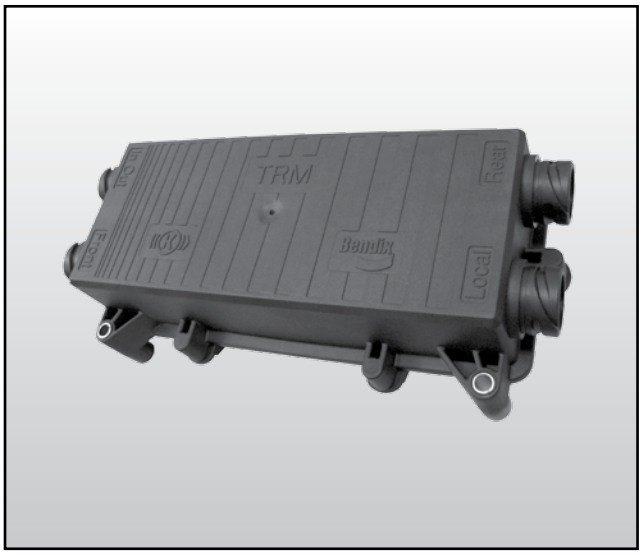
Product DATA

EZ2085

Trailer Roadtrain Module (TRM)

Doc. No. Y095620 (EN - Rev. 002)
July 2015

Function



The **Trailer Roadtrain Module (TRM**) is used as an amplifier or splitter for the ISO 11992 CAN bus. Using the TRM enables the realisation of a braking CAN bus of more than 40m.

See PD-214-F300, PD-214-F301, PD-214-F302, PD-214-F303 and PD-214-F304, Document Nos. *Y138838, Y137238, Y144314, Y144317* and *Y144343* for more information on the use of TRM on extendible and multiple trailers.

All four electrical connections use a bayonet connector for the power supply of electronic braking systems. The incoming Power Supply Line /CAN ("Front") from the ISO 7638 is distributed to the outgoing ports "Local" and "Rear". Each of those ports can be used to connect a TEBS G2 system.

The fourth port "In-Out" can be used to connect two external **Pressure Sensors** (see PD-262-200, Document No. *Y095830*) in the "Control" line. The information derived from the sensors is then transformed into a corresponding CAN signal. By doing so the TRM creates a reliable CAN brake demand for the connected TEBS G2 systems.

Technical Features

TRM

Operating temperature range:	-40 °C to +80 °C
Weight:	1.15 kg approx.
Voltage range:	9 to 32 V DC

Pressure sensor

Operating temperature range:	-45 °C to +80 °C
Weight:	0.07 kg approx.
Input pressure range:	0.6 to 13.0 bar
Nominal output voltage:	0.574 V at 0.6 bar 4.480 V at 13.0 bar

Range Overview

Part No.	Type No.	Description	Bayonet Connectors	Pins
K036198 [1)]	**EZ2085**	Trailer Roadtrain Module (TRM)	4	7

Part No.	Type No.	Description	Used for
K027817 [2)]	-	Closure cap	Closing unused bayonet connectors
K060758 [2)]	-	Pressure sensor	Monitoring the pneumatic brake demand and converting it into an electric signal

1) The part number of the module will carry two suffices, firstly "V##" which represents the software revision of the product, e.g. V01, V02 etc., and secondly "N##" which defines the packaging requirements of different market sectors, e.g. N00, N50. Example: K036198V00N00 - is supplied with software to revision 00 and is supplied without packaging.

2) The part number will carry a suffix, "N##" which defines the packaging requirements of different market sectors, e.g. N00, N50. Example: K060758N00 - is supplied without packaging.

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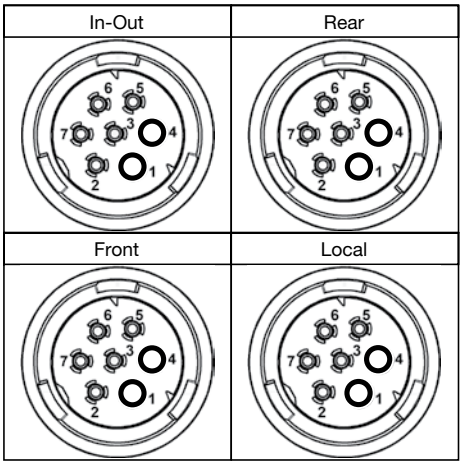
EZ2085

Trailer Roadtrain Module (TRM)

Doc. No. Y095620 (EN - Rev. 002)
July 2015

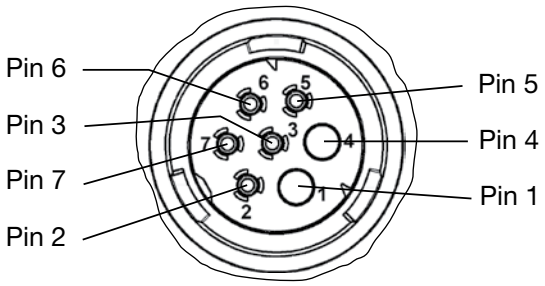
Connectors

TRM

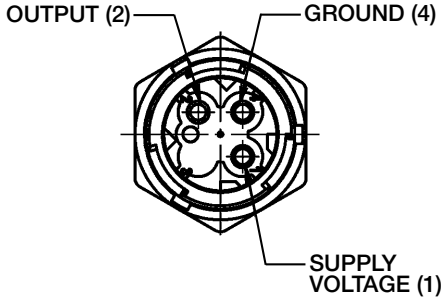


Pin Configuration

Pin	"Rear" Connector	"Front" Connector	"Local" Connector	"In-Out" Connector
1	Battery supply	Battery supply	Battery supply	SENS_SUP 1
2	ECU supply	ECU supply	ECU supply	SENS IN 1
3	ECU ground	ECU ground	ECU ground	SENS IN 2
4	Battery ground	Battery ground	Battery ground	Ground
5	Warning lamp signal	Warning lamp signal	Warning lamp signal	Tri-state_IN
6	ISO 11992 CAN High	ISO 11992 CAN High	ISO 11992 CAN High	AUXIO
7	ISO 11992 CAN Low	ISO 11992 CAN Low	ISO 11992 CAN Low	n.n.



Pressure sensor



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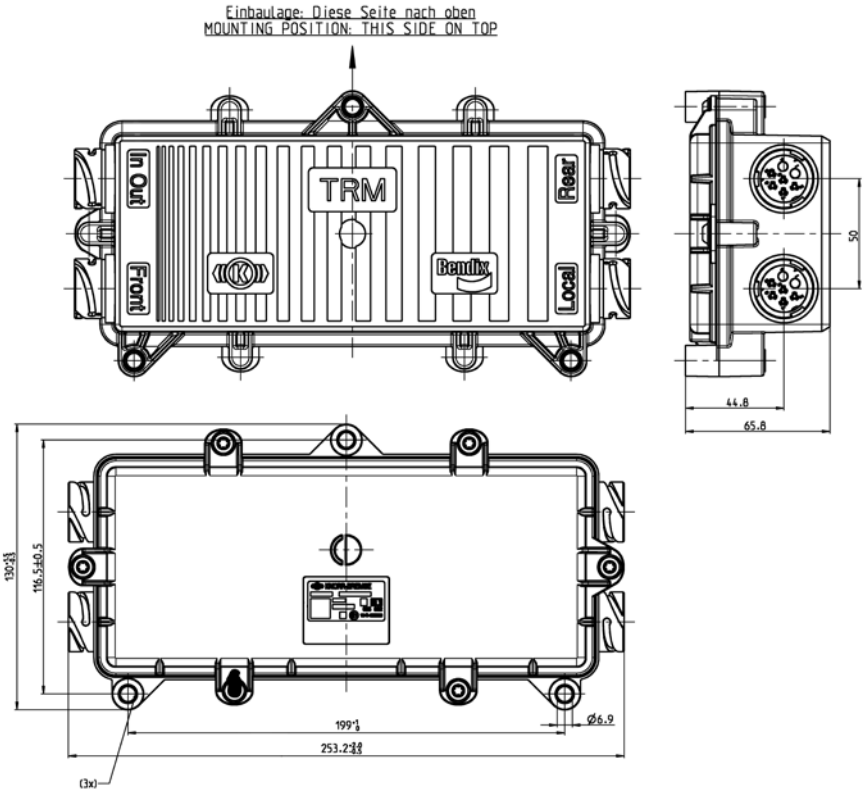
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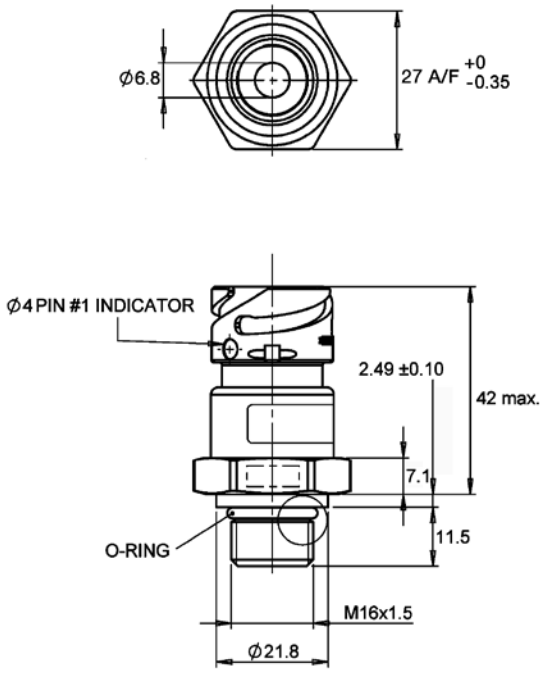
EZ2085
Trailer Roadtrain Module (TRM)

Dimensions

TRM



Pressure sensor



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Trailer Roadtrain Module (TRM)

Doc. No. Y095620 (EN - Rev. 002)
July 2015

Installation

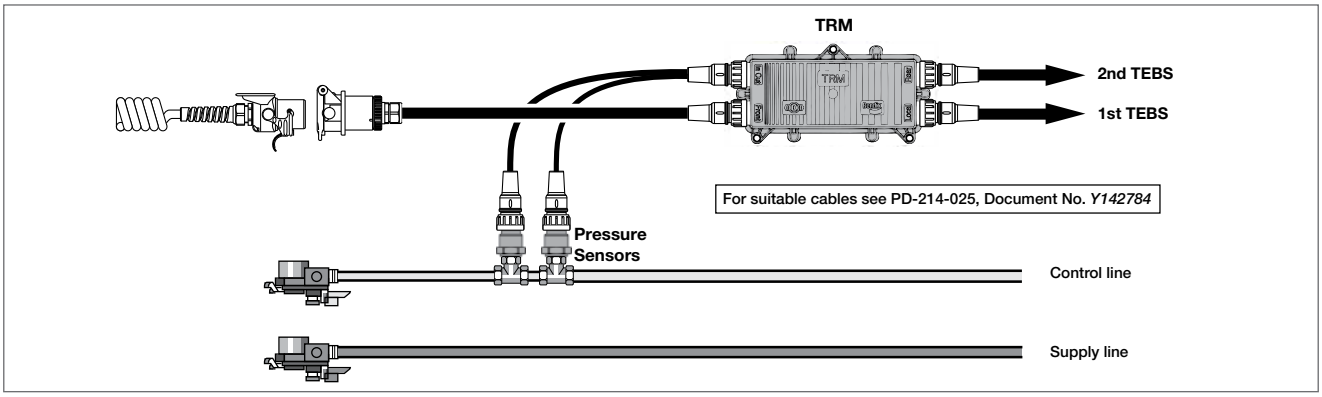
TRM

- Only use M6 (8.8) fixing screws.
- Tightening torque 7.8 Nm ± 0.2 Nm.
- A self-locking nut must be used on every fixing screw.
- A grommet must be used between the TRM and the chassis and between the chassis and the nut.
- If a connector on the TRM is not used then it must be fitted with a closure cap - part number K027817.
- Only mount the TRM directly onto the vehicle frame. The installation position must be agreed with Knorr-Bremse.
- The TRM must be mounted on a flat 'closed' surface. Other mountings are possible only with the approval of Knorr-Bremse.
- The vent orifice on the rear face of the TRM must not be blocked or obstructed.
- Cables must not be connected with voltage applied.
- Mounting and environtmental conditions must be in accordance with the Knorr-Bremse specification.

Pressure sensor

- The recommended mounting is with the pressure supply port pointing downwards (maximum +/- 15º from vertical axis).
- Tightening torque for pressure supply port 30 Nm ± 6 Nm.

Typical Installation



Revision Details

Rev. 000	March 2011	New document
Rev. 001	September 2012	Drawings on pages 2 and 3 enlarged. Note and drawing on page 4 added
Rev. 002	July 2015	Pressure Sensor K015173 replaced by K060758.

KNORR-BREMSE

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

04860001.., 04860010..

Wheel Speed Sensors

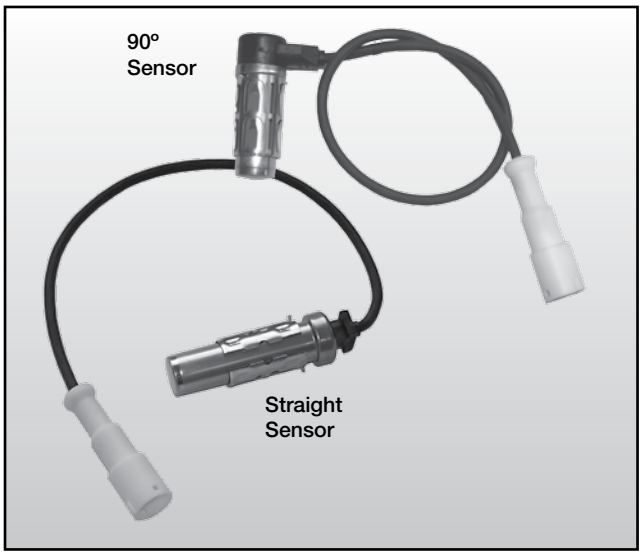
Doc. No. Y011363 (EN - Rev. 003)
May 2015

Function

When fitted in conjunction with a toothed sensing ring (pole wheel), the passive **Wheel Speed Sensor** supplies the ECU of the vehicle's ABS with precise wheel speed information.

The **Wheel Speed Sensor** is available in various cable lengths and is supplied with a standard two pin socket for connection directly to the brake module or to a sensor extension cable (see PD-272-010, Document No. *Y095697,* PD-272-020, Document No. *Y107795,* PD-272-025, Document No. *Y142784* or PD-272-250, Document No. *Y209441*).

The **Wheel Speed Sensor** is held in the mounting hole on the axle by the sensor bush. When fitting a new sensor always fit a new bush. Note: the bush may not be supplied with the sensor (see table below).



Technical Features

Operating Temperature Range:

Speed Sensor	-40 °C to +160 °C
Cable	-40 °C to +160 °C
Plug	-40 °C to +80 °C

Range Overview

Part No.	Type No.	Length [m]	90° Sensor	Straight Sensor	Bush and Grease
0486000126100	-	0.4	✓		
0486000128100	-	1.0	✓		
0486000129100	-	2.0	✓		
0486000134000	-	0.4	✓		✓
0486000135000	-	2.0	✓		✓
0486000136000	-	1.0	✓		✓
0486000294N00	-	1.5	✓		
0486001032100	-	0.3		✓	
0486001033100	-	1.0		✓	
0486001066100	-	1.7		✓	
0486001078000	-	0.3		✓	✓
0486001079000	-	1.7		✓	✓
0486001087000	-	2.0		✓	

Other versions are available.

Additional Parts:

Sensor Bush: II**16774**
Assembly Grease: I**90693**

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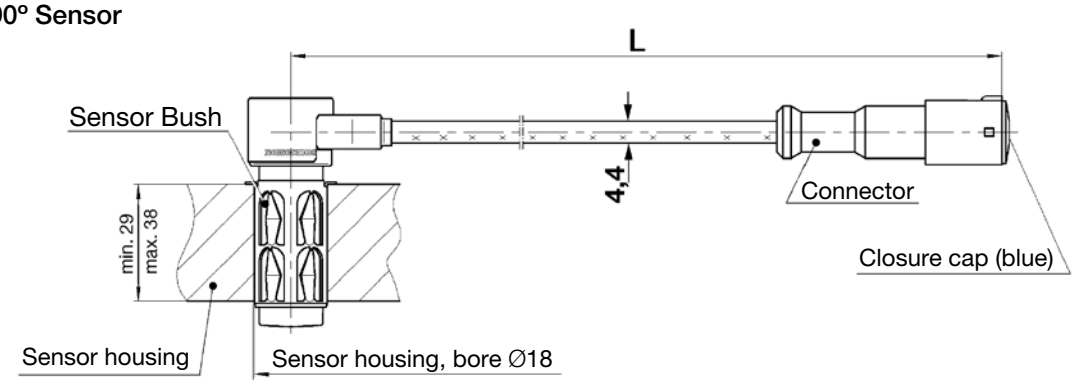
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Wheel Speed Sensors

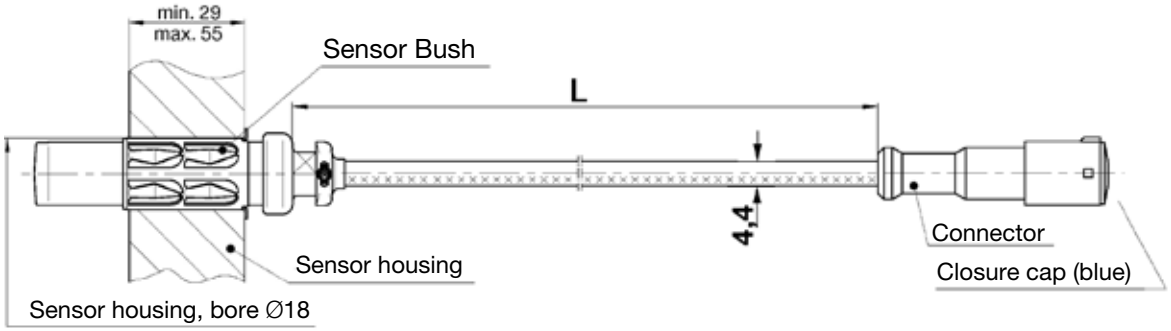
Doc. No. Y011363 (EN - Rev. 003)
May 2015

Dimensions

90° Sensor



Straight Sensor



Installation

The Wheel Speed Sensor must be inserted into a suitably sized housing using a Sensor Bush and the correct grease. The cable must be supported to prevent damage with suspension and steering movement.

Note: the head of the Wheel Speed Sensor may be immersed in oil.

Servicing

Wheel Speed Sensors are not serviceable.

Revision Details

Rev. 001	October 2010	Part numbers added to tables.
Rev. 002	March 2011	New layout for revised format Trailer Catalogue.
Rev. 003	May 2015	Table revised and part numbers added for new Agricultural Catalogue.

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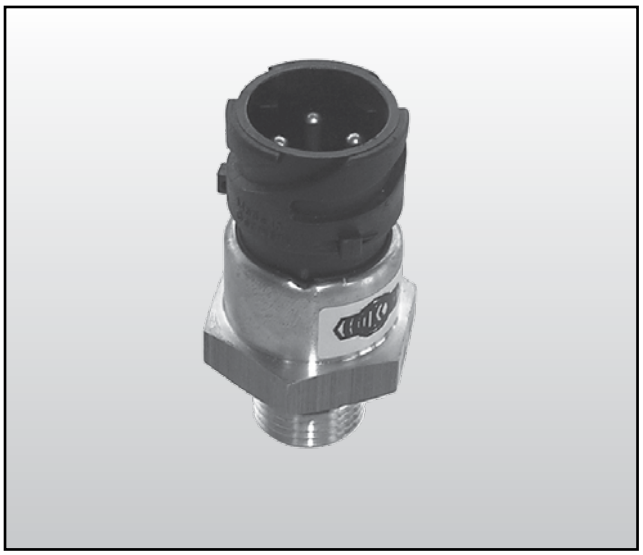
Product DATA

K060758

Pressure Sensor

Doc. No. Y095830 (EN - Rev. 002)
May 2015

Function



The **Pressure Sensor** is used to measure air pressure and supply this information in an electrical form to the appropriate electronic device.

The **Pressure Sensor K060758** has many applications:

- on trucks and towing vehicles:
  - to measure the pressure in the brake or auxiliary reservoirs and pressures in controlled circuits.
- on trailers fitted with Trailer EBS (TEBS) systems:
  - to measure the pressure in the Control (yellow) line on trailers fitted with the Trailer Roadtrain Module (TRM) (see PD-214-800, Document No. *Y095620*). When used in this application two **Pressure Sensors** are used to ensure 'electrical redundancy' (continued operation should there be no signal from one sensor).
  - to provide an external load input from the trailer suspension system when it is not practical to connect this pneumatically to the TEBS brake module.
  - to provide an external load input from the trailer suspension system to the Trailer Electro-Pneumatic Module - Standard (TEPM-S) (see PD-214-600, Document No. *Y095618*) in a 4S/3M system.

For details of suitable cables see PD-272-025, Document No. *Y142784* or PD-272-250, Document No. *Y209441.*

Technical Features

Maximum operating pressure:	13 bar
Nominal input voltage:	5 V ± 0.25 V DC
Operating Temperature Range:	-45 °C to +80 °C
Weight:	0.07 kg approx.
Environmental protection:	IP 6K9K

Part No.	Type No.	Pneumatic connection	Electrical connection	Output Voltage [% of Supply Voltage]	
				at 0.6 bar	at 13 bar
K060758 [1)]	-	M16x1.5	Bayonet DIN72585	8.5 %	91.5%

1) Part No. will carry the suffix N00 denoting that it is supplied without packaging.

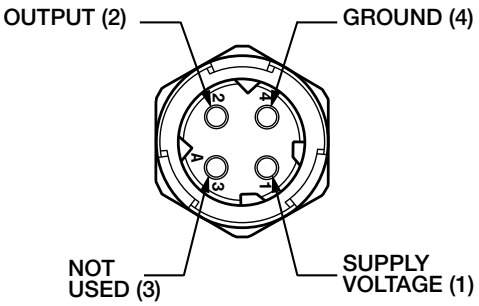
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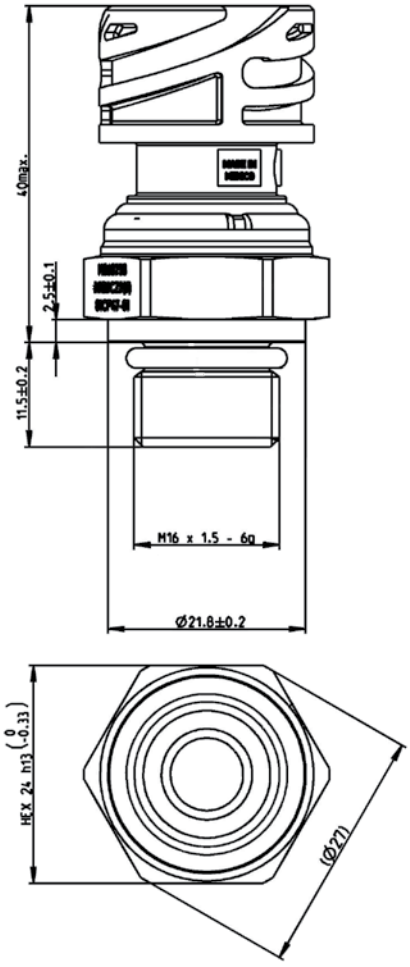
K060758
Pressure Sensor

Doc. No. Y095830 (EN - Rev. 002)
May 2015

Electrical Connections



Dimensions



The recommended mounting is with the pressure supply port pointing downwards (maximum +/- 15° from vertical axis).

Tightening torque for pressure supply port 30 Nm ± 6 Nm.

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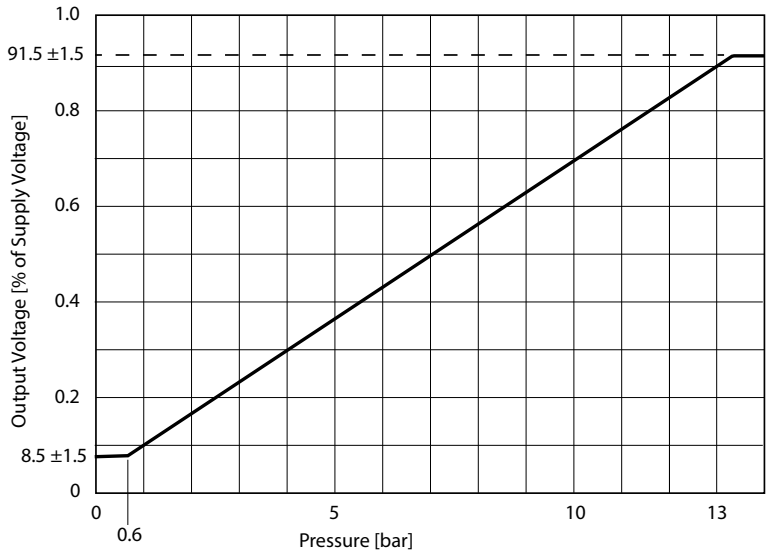
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May 2015

K060758
Pressure Sensor

Characteristics



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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

K060758
Pressure Sensor

Doc. No. Y095830 (EN - Rev. 002)
May 2015

Revision Details

Rev. 000	September 2011	New document.
Rev. 001	September 2012	Drawings on pages 2 and 3 added. Note on page 2 added.
Rev. 002	May 2015	K060758 added and K015173 deleted. Diagram on page 2 deleted.

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

K025259
Level Sensor

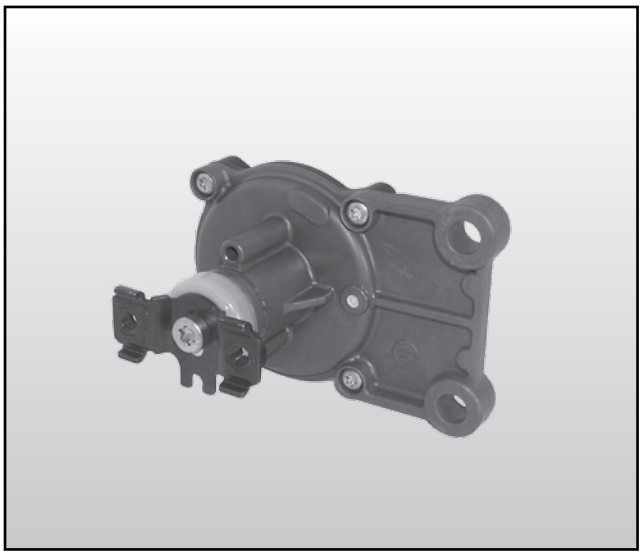
Doc. No. Y160684 (EN - Rev. 000)
June 2013

Function

The **Level Sensor K025259**[1)] is used on trailers which require electronic data concerning the status of the suspension system. Using a linkage to the axles, the sensor measures the deflection of the suspension and supplies this information as an electrical signal to the TEBS G2 brake module.

For use on mechanically suspended trailers with TEBS G2 brake systems, the **Level Sensor** is combined with an adjustable mechanical linkage to create Deflection Sensor K026919[2)]. See PD-264-200, Document No. *Y095832*.

For use on air suspended trailers with TEBS G2 brake systems and the iLvl suspension control system, the **Level Sensor** is combined with a flat lever. See PD-264-300, Document No. *Y160685*.



Technical Features

Level sensor

Nominal input voltage:	5 V ± 0.5 V DC
Nominal output voltage:	5 V at -45°
	0 V at +45°
Maximum permissable load	0.3 W
Nominal operating angle:	-40° to +40°
Operating Temperature Range:	-45 °C to +85 °C
Weight	0.23 kg approx.

1) The part number will carry a suffix “N00”which defines that it is supplied without packaging.

2) Part No. will carry the suffix B90 denoting that it is a collection of products sold under one part number.

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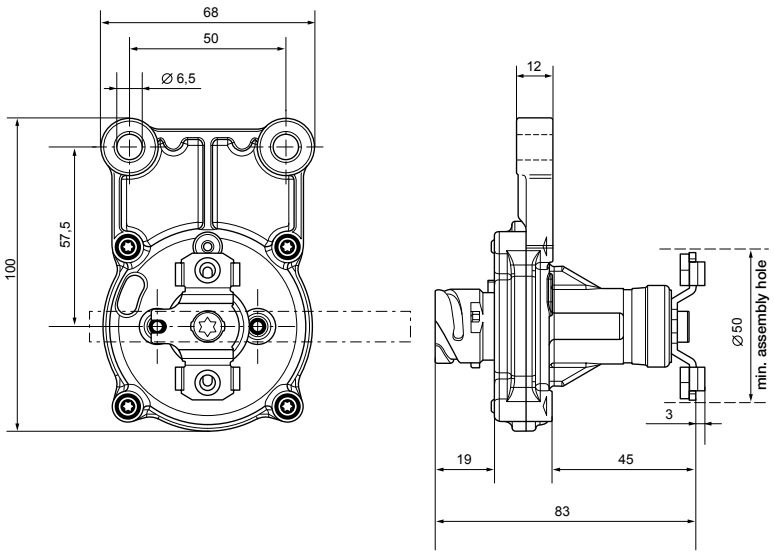
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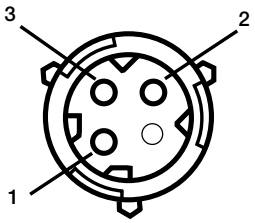
K025259
Level Sensor

Doc. No. Y160684 (EN - Rev. 000)
June 2013

Dimensions



Pin Configuration



Bayonet socket
DIN 72585

Pin	Connection
1	Supply (+)
2	Ground (-)
3	Output

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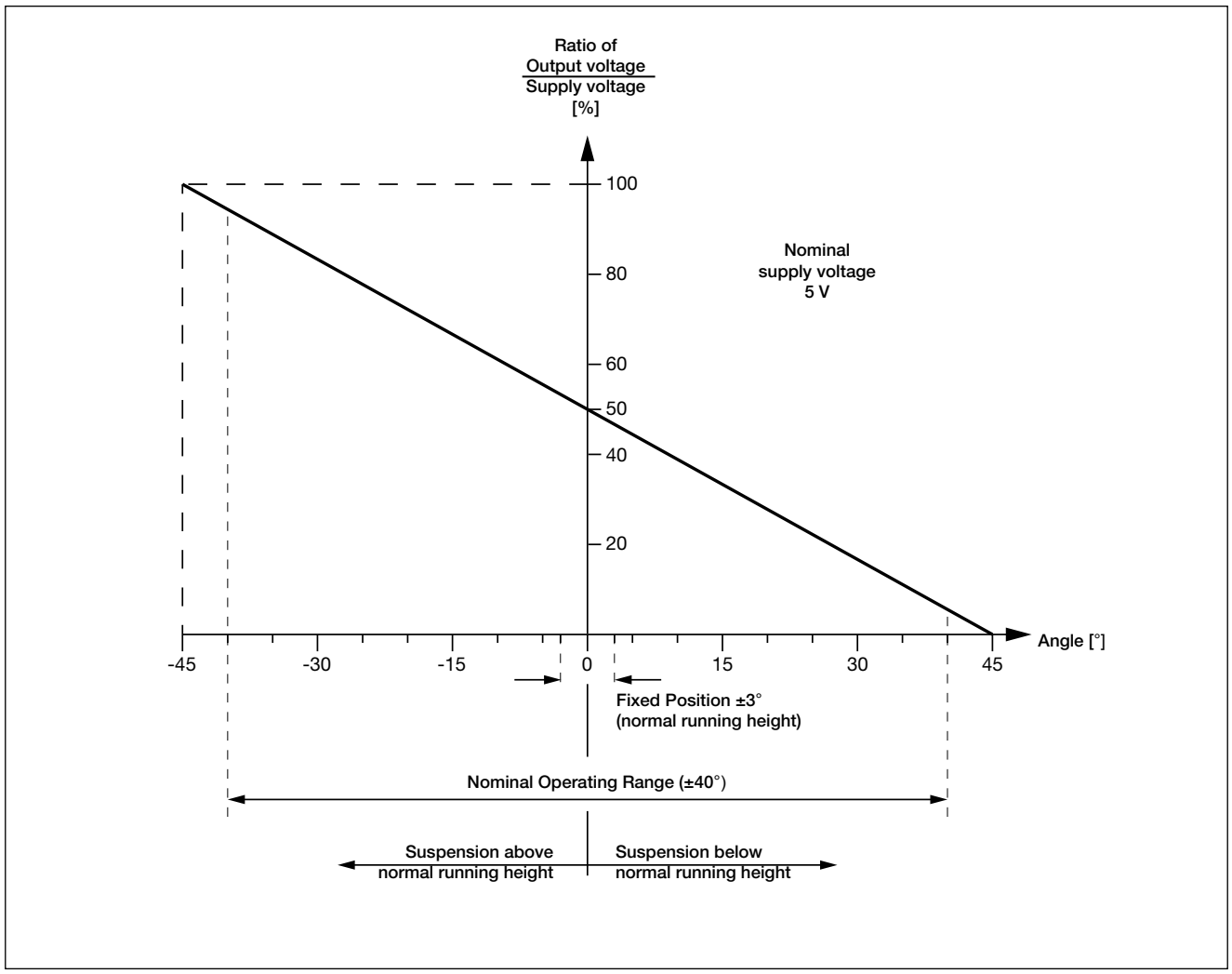
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Doc. No. Y160684 (EN - Rev. 000)
June 2013

K025259
Level Sensor

Output Characteristic



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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

K025259
Level Sensor

Doc. No. Y160684 (EN - Rev. 000)
June 2013

Revision Details

Rev. 000	June 2013	New document

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

K026919

Deflection Sensor

Doc. No. Y095832 (EN - Rev. 003)
December 2013

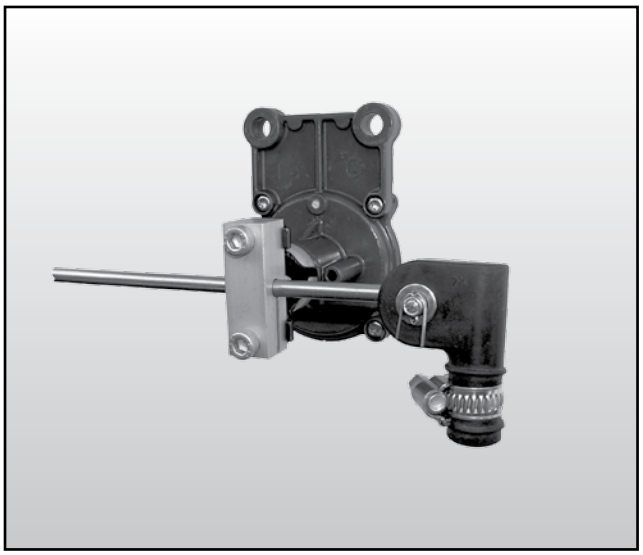
Function

The **Deflection Sensor** is used on trailers with mechanical suspension. Using the linkage to the axles, the sensor measures the deflection of the suspension and supplies this information as an electrical signal to the TEBS brake module or Trailer Electro-Pneumatic Module - Premium (TEPM-P).

Note - the **Deflection Sensor** cannot be used with a Trailer Electro-Pneumatic Module - Standard (TEPM-S).

The **Deflection Sensor K026919**[1)] comprises a level sensor with an attached adjustable mechanical linkage. The connection from the linkage to the axle (K001406)* must be created separately.

For detailed information on installation and setting up of the **Deflection Sensor** see Service Manual *Y053529*.



* not supplied.

Technical Features

Weight:	0.38 kg approx.
Level sensor	
Nominal input voltage:	5 V ± 0.5 V DC
Nominal output voltage:	5 V at -45° 0 V at +45°
Nominal operating angle:	-40° to +40°
Operating Temperature Range:	-45 °C to +85 °C

Range Overview

Part No.	Type No.	Description	Linkage
K026919 [1)]	**-**	Deflection Sensor	II19422 included
K025259 [2)]	**-**	Level Sensor	II19422 not included
II19422	**ZB3131**	Linkage (Level Sensor)	-
K001406	**-**	Axle Joint Kit (Rubber Link with axle attachment)	-

1) Part No. will carry the suffix B90 denoting that it is a collection of products sold under one part number.

2) The part number will carry a suffix "N00"which defines that it is supplied without packaging. See PD-264-100, Document No. *Y160684* for information on the Level Sensor.

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Item No. K057930

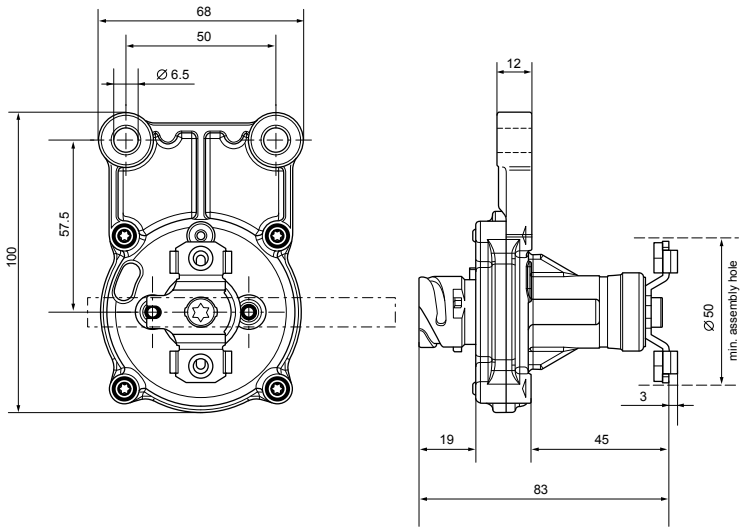
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

K026919
Deflection Sensor

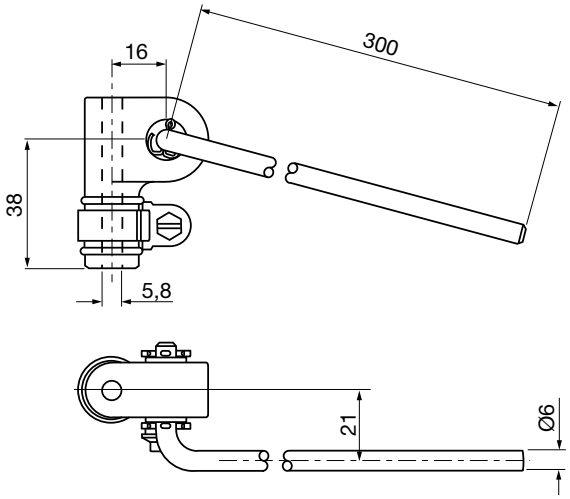
Doc. No. Y095832 (EN - Rev. 003)
December 2013

Dimensions

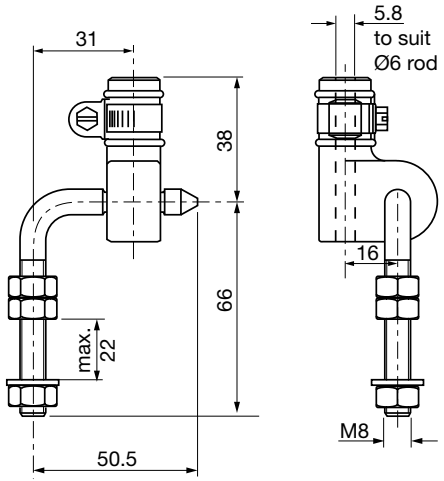
Level Sensor
K025259



Linkage
II19422 - ZB3131



Axle Joint Kit
K001406



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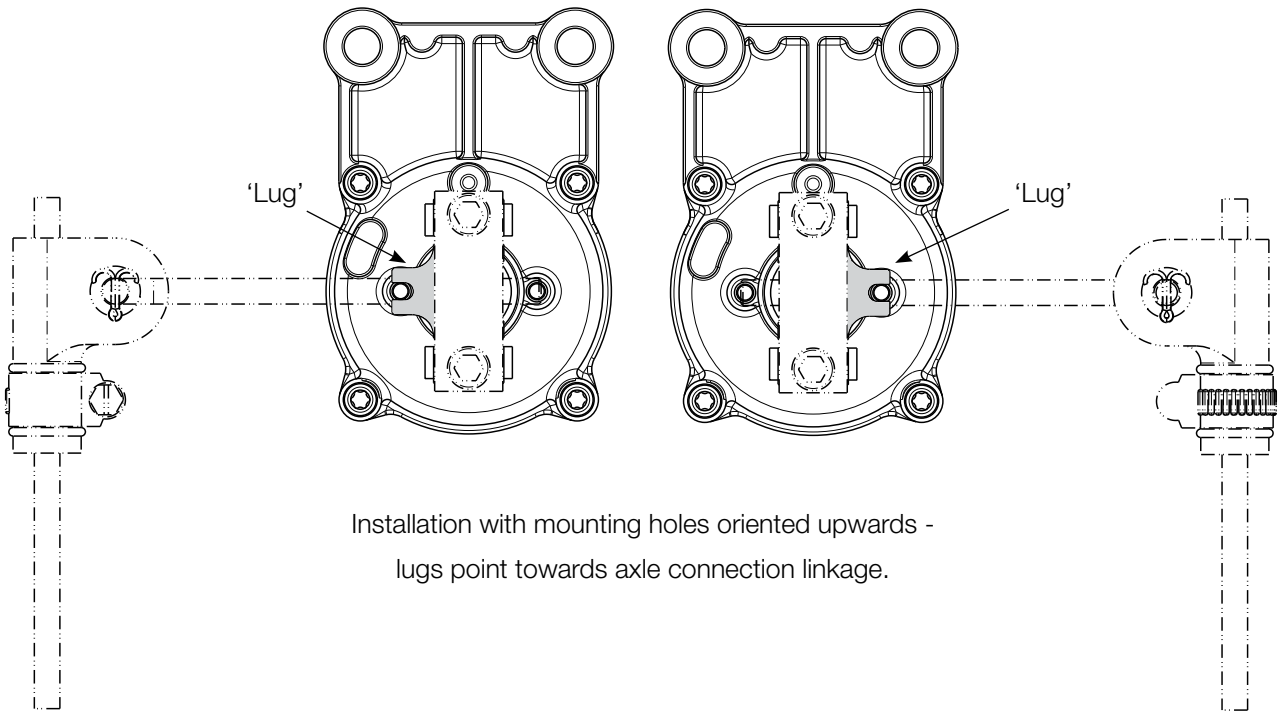
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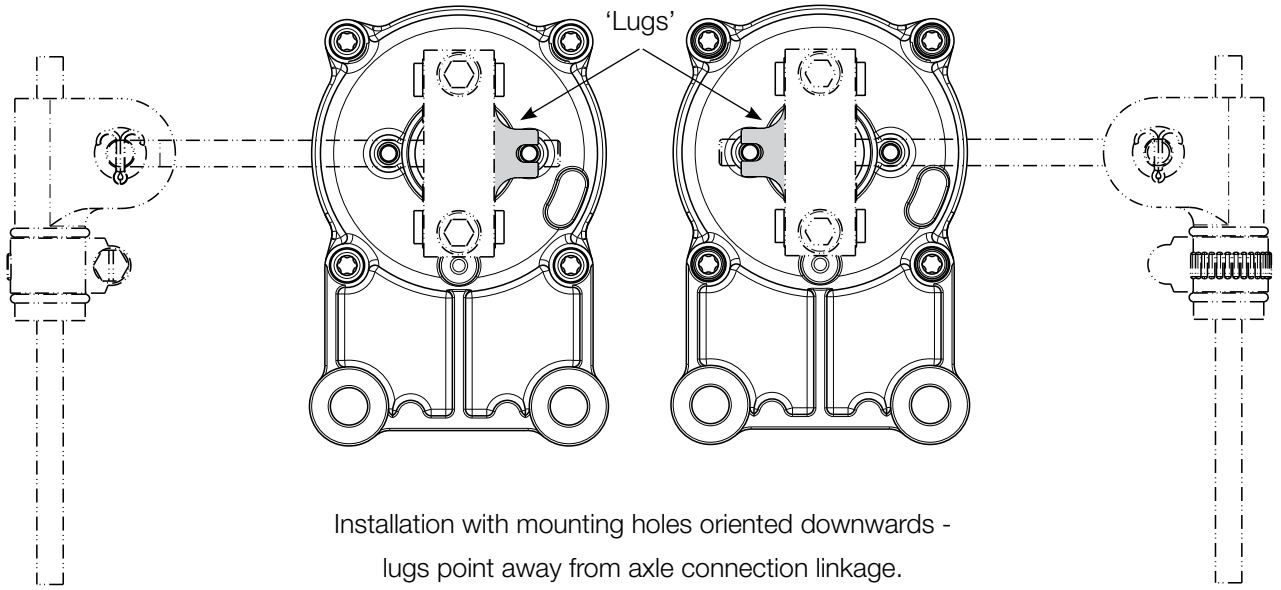
Doc. No. Y095832 (EN - Rev. 003)
December 2013

K026919
Deflection Sensor

Mounting Positions with 'round' lever



Installation with mounting holes oriented upwards -
lugs point towards axle connection linkage.



Installation with mounting holes oriented downwards -
lugs point away from axle connection linkage.

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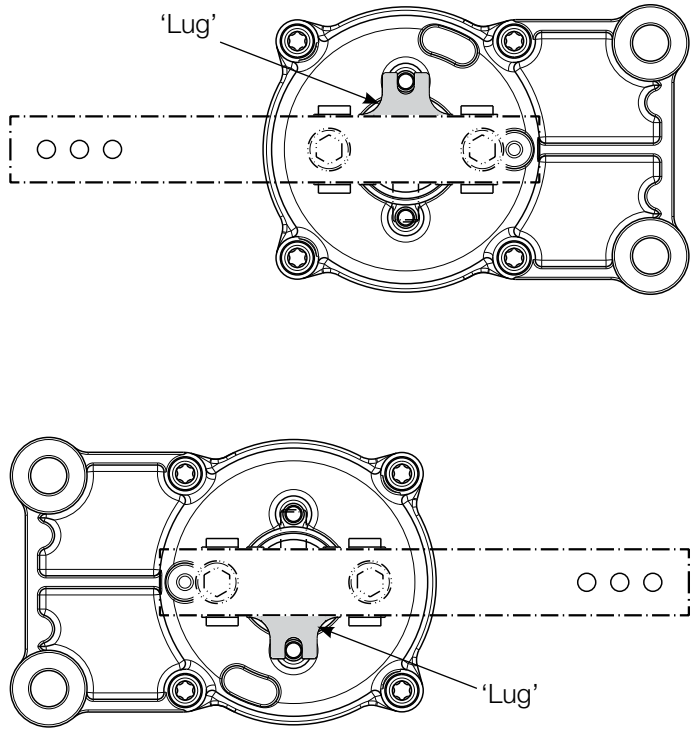
Item No. K057330

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

K026919
Deflection Sensor

Doc. No. Y095832 (EN - Rev. 003)
December 2013

Mounting Positions with ‘flat’ lever



Installation with mounting holes oriented vertically

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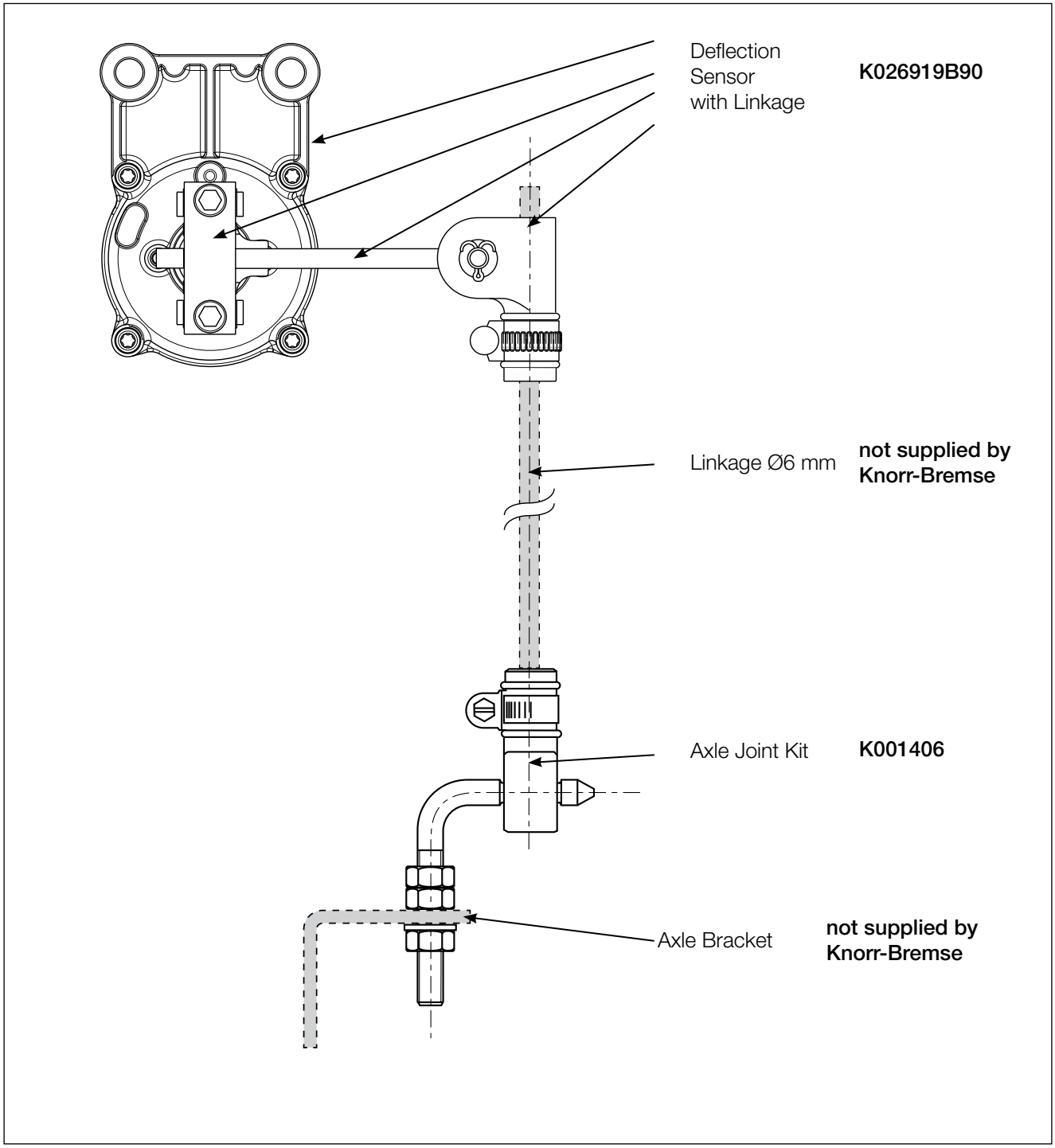
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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Doc. No. Y095832 (EN - Rev. 003)
December 2013

K026919
Deflection Sensor

Mounting - General



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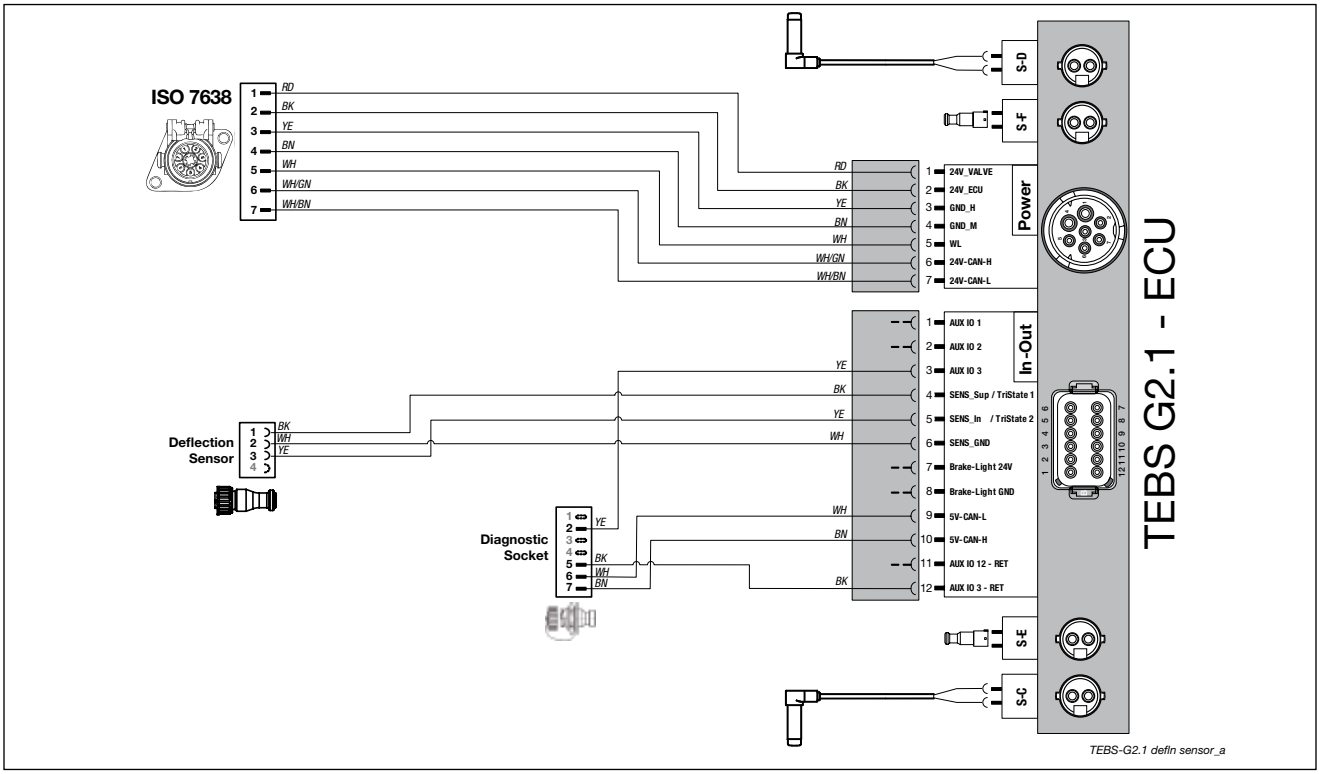
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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

K026919
Deflection Sensor

Doc. No. Y095832 (EN - Rev. 003)
December 2013

Typical Wiring Diagram - *TEBS G2.1 semi-trailer with Mechanical Suspension*



Revision Details

Rev. 001	September 2012	Mounting positions and note on page 4 added
Rev. 002	August 2013	Note added re: use with TEPM-S on page 1. Added reference document for Level Sensor on page 1.
Rev. 003	December 2013	K001406 added. Diagrams added on pages 5 and 6.

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Item No. K057930

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

TEBS G2
Level Sensor for use with iLvl (iLvl Sensor)

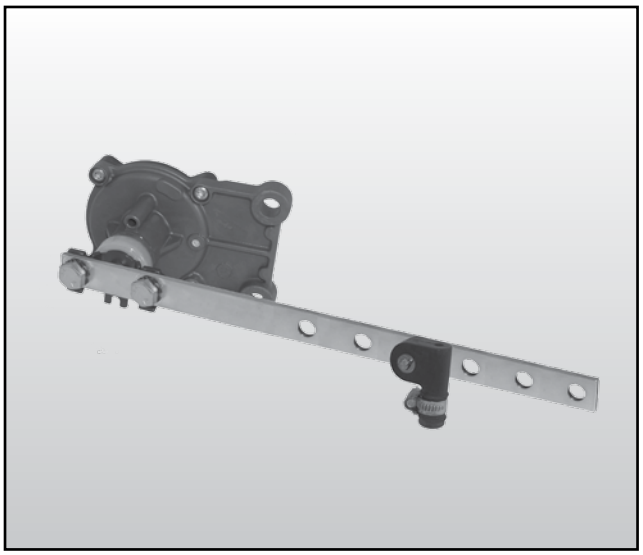
Doc. No. Y160685 (EN - Rev. 001)
August 2014

Function

The **iLvl Sensor** is used on trailers equipped with the TEBS G2.2 brake system and iLvl air suspension control system. Using a linkage to the axles, the sensor measures the movement of the suspension and supplies this information as an electrical signal to the TEBS brake module which controls the iLvl system.

The **Level Sensor K025259**[1)] is used together with a flat lever and rubber links to connect to the axle. The connection between the rubber links is not supplied and must be produced separately.

For detailed information on the **Level Sensor K025259** see PD-264-100, Document No. *Y160684.*



Technical Features

Weight:	0.38 kg approx.
Level sensor	
Nominal input voltage:	5 V ± 0.5 V DC
Nominal output voltage:	5 V at -45°
	0 V at +45°
Nominal operating angle:	-40° to +40°
Operating Temperature Range:	-45 °C to +85 °C

Range Overview

Part No.	Type No.	Description
K025259 [1)]	**-**	Level Sensor
K095917 [1)]	**-**	Sensor Linkage Kit (Lever with Rubber Link)
K001406	**-**	Axle Joint Kit (Rubber Link with axle attachment)
K097070 [1)]	**-**	In-Out Cable for connecting Sensor to TEBS G2.2 Module

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging.

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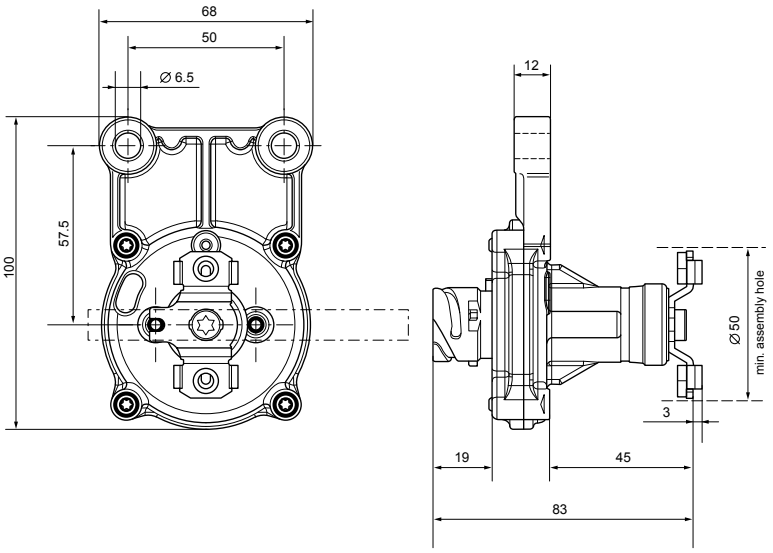
TEBS G2

Level Sensor for use with iLvl (iLvl Sensor)

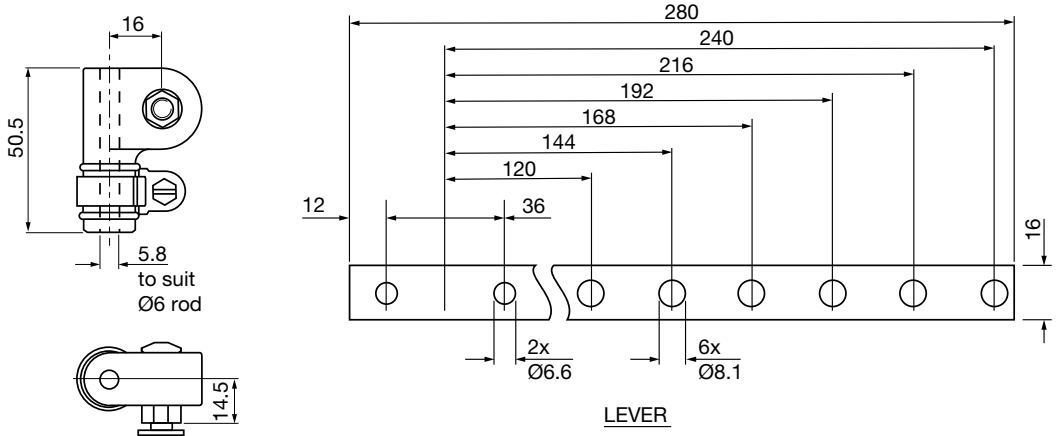
Doc. No. Y160685 (EN - Rev. 001)
August 2014

Dimensions

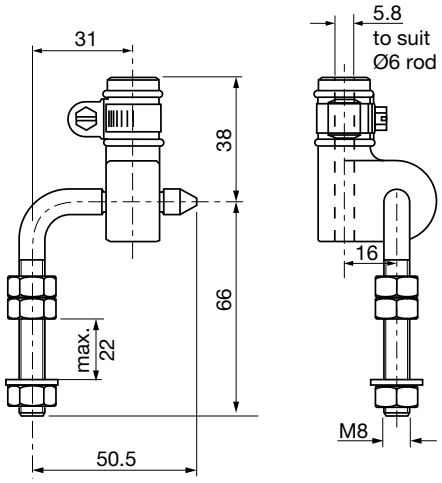
Level Sensor K025259



Sensor Linkage Kit K095917



Axle Joint Kit K001406



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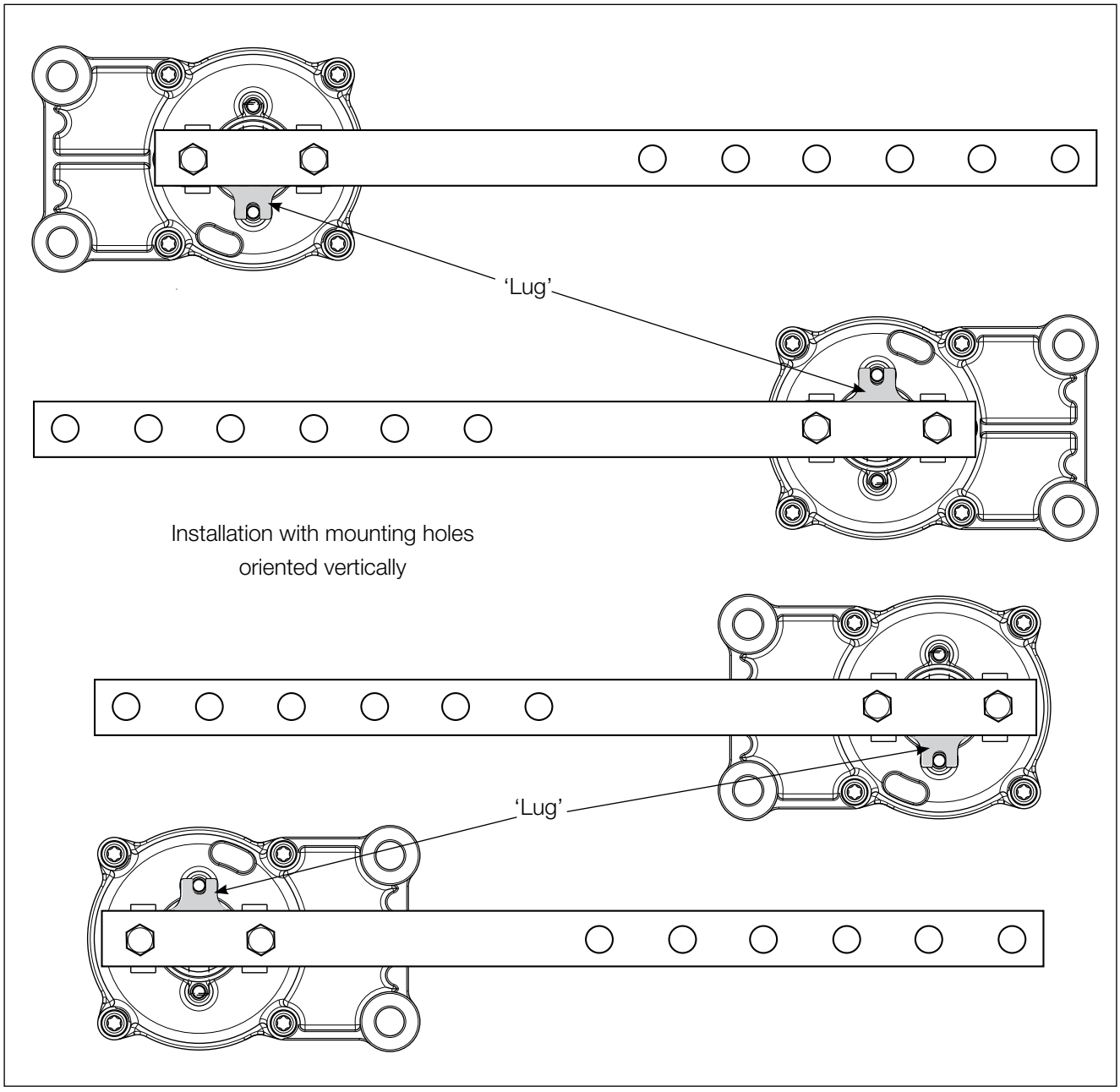
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August 2014

TEBS G2
Level Sensor for use with iLvl (iLvl Sensor)

Mounting Positions with ‘flat’ lever



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TEBS G2

Level Sensor for use with iLvl (iLvl Sensor)

Doc. No. Y160685 (EN - Rev. 001)
August 2014

Installation of the iLvl Sensor

The iLvl Sensor must be installed with the mounting holes vertical. It can be mounted either way round as the system will respond to either increasing or decreasing voltage from the sensor.

The iLvl Sensor should be positioned as close to the centre line of the trailer as possible and above the axle being monitored. In the case of a bogie, ensure that the Level Sensor is connected to a non-lifting axle.

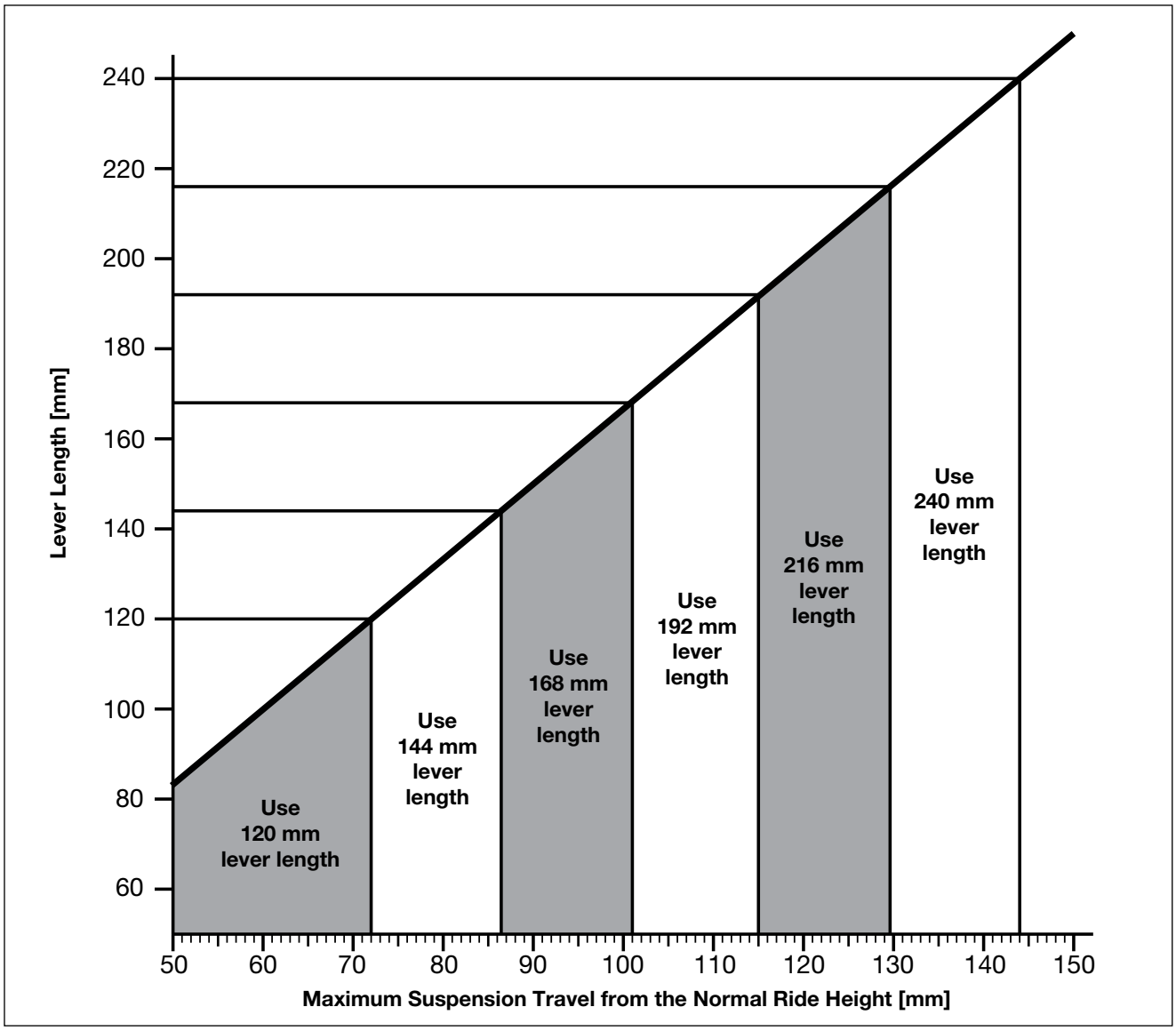
The Axle Joint Kit must be attached to the axle by means of a suitable bracket (not supplied) welded to the axle casing.

After installation the rod (not supplied) connecting the Sensor Link and the Axle Link should be as close to vertical as possible when the trailer is at its normal ride height.

Setting up the iLvl Sensor

Determining the Lever Length

Use the diagram below to determine the lever length required.



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Measure or calculate the maximum suspension travel from the normal ride height.

Example:

Normal ride height = 1120 mm

Minimum height (laden vehicle on bump stops) = 1000 mm. This is 120 mm below normal ride height

Height with air bags at maximum extension = 1230 mm. This is 110 mm above normal ride height.

Take the higher suspension travel, i.e 120 mm.

Read the corresponding lever length required from the graph. The lever is supplied with holes at 120 mm, 144 mm, 168 mm, 192 mm, 216 mm and 240 mm, and the lever length above the value from the graph should be used (216 mm in the example).

Assembly and Connecting Procedure

1. Assemble the sensor operating lever from the sensor linkage kit K095917 to the sensor using the two screws supplied in the kit. Apply a good quality, propriety thread lock to the screw threads before assembly. Tighten to 10 Nm.
2. Install the rubber joint from the sensor linkage kit K095917 into the hole determined above.

   Note: The lever length is measured from the centre line of the sensor to the fixing bolt of the rubber joint.
3. Attach a suitable bracket (not supplied) to the centre of the axle being monitored. Fix the axle joint kit to this bracket and tighten the locking nuts to 10 Nm.
4. Attach the sensor assembly to the trailer chassis (bracket may need to be used - not supplied) in a position above the monitored axle such that the vertical link between the two rubber joints is as vertical as possible at the normal ride height.
5. Use a 6 mm o/d rod or tube (not supplied) to create the vertical link between the two rubber joints. With the trailer at its normal ride height hold the sensor operating lever horizontal (the sensor can be temporarily fixed in this position by using a 4 mm o/d pin through the lug into one of the two datum holes in the body of the sensor) and clamp the vertical link in both rubber joints. Ensure that any excess length of the vertical link beyond the rubber joints is removed. Remove the pin in the lug (if used).

   Note: It is recommended that the vertical link should not be shorter than 200 mm.

6 Connect the sensor to the TEBS G2.2 brake module using cable K097070. The cable marked “Sens” must be connected to the sensor.

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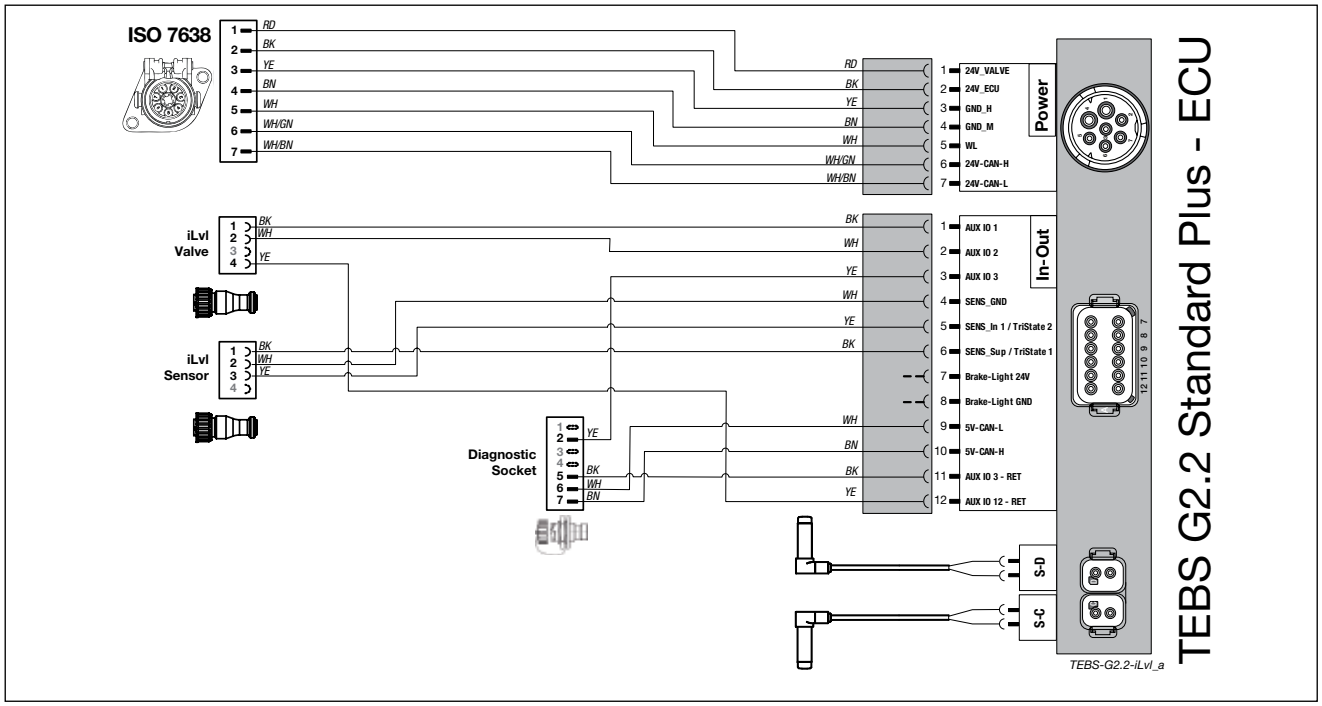
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TEBS G2

Level Sensor for use with iLvl (iLvl Sensor)

Doc. No. Y160685 (EN - Rev. 001)
August 2014

Typical Wiring Diagram - *TEBS G2.2 semi-trailer with iLvl and Diagnostic Socket*



Revision Details

Rev. 001	October 2013	Cable marking changed to “Sens” (point 6 on page 5)
Rev. 001	December 2013	Correction - page 1 [2)] changed to [1)] against K095917 and note deleted
Rev. 001	August 2014	Correction - title brought in line with other languages.

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Product DATA

PD-272-010

Cables for Trailer ABS

Doc. No. Y095697 (EN - Rev. 000)
September 2011

Function



Cables are used in trailer ABS systems to:

- provide electrical power to the components in the system.
- communicate signals to the ABS ECU from sensors monitoring trailer characteristics.
- communicate control commands from the ABS ECU to modulators to enable any required braking intervention.

Power Supply Cables are used to distribute electrical power from the towing vehicle to electrically powered braking and auxiliary equipment of the trailer. The main power supply to the trailer is through a plug or socket according to ISO 7638.

The cables are available in various lengths and are normally supplied with a bayonet connector to ensure easy and safe connection.

Modulator Cables are used to supply electrical power from the ABS ECU:

- to the primary (first and second) modulators on systems where the connection is external (KB3-TA and A18)
- to the external third modulator on 4S/3M systems.

The cables are available separately for the KB3-TA system and as part of a wiring harness for the A18 systems.

Wheel Speed Sensor Cables are used to connect the ECU to the wheel speed sensors so that their wheel speed signals can be sent. The wheel speed sensor is supplied with only a short length of cable and so will often require a **Wheel Speed Sensor Extension Cable** to enable connection.

NOTE: *In this document the cables are divided into sections:*

- *Each section covers the system for which the cables are intended (KB4TA, A18 and KB3-TA).*
- *To help in finding the right cable, at the head of each page is a photograph of the ABS module from the relevant system*
- *Cables which can be used in more than one system have photographs of all relevant modules at the head of the page*
- *Each section starts with details of power supply cables, then shows modulator cables, wheel speed sensor cables and auxiliary cables.*

Technical Features

Operating Temperature Range: -40 °C to +80 °C

See tables for other features.

Colour Coding used in this document

BK	Black	GN	Green	YE	Yellow
BN	Brown	RD	Red		
BU	Blue	WH	White		

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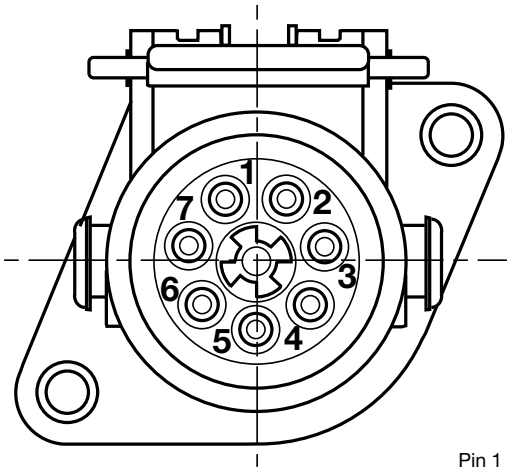
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Cables for Trailer ABS

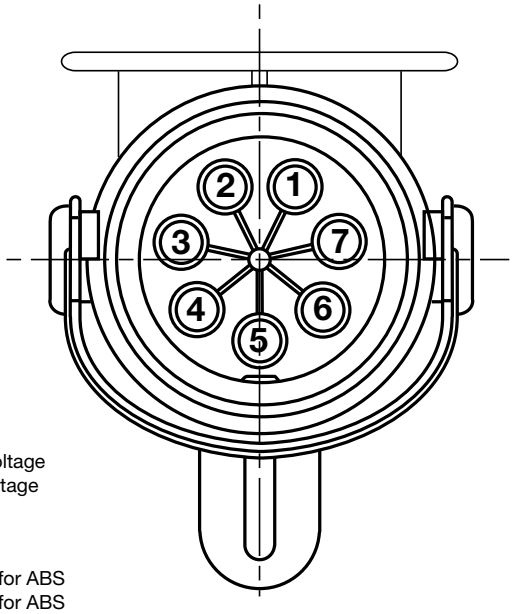
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Pin Configurations

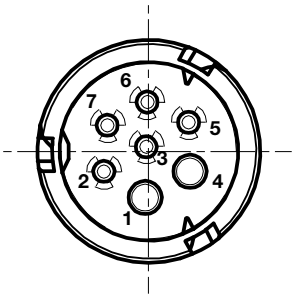


ISO 7638 Socket
(24 V)

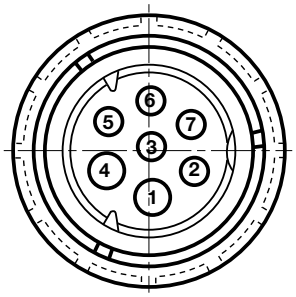
Pin 1	red	Valve supply voltage
Pin 2	black	ECU supply voltage
Pin 3	yellow	ECU ground
Pin 4	brown	Valve ground
Pin 5	white	Warning lamp
Pin 6	-	not connected for ABS
Pin 7	-	not connected for ABS



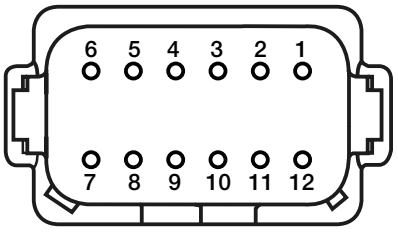
ISO 7638 Plug
(24 V)



Bayonet Socket

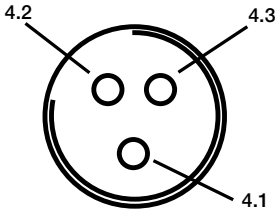


Bayonet Plug



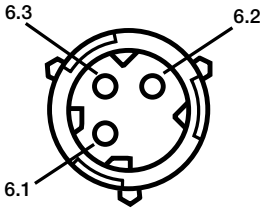
Deutsch Plug

Modulator connectors



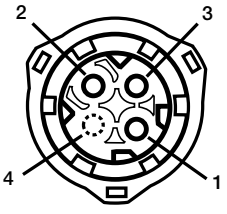
M24x1 Connector - Socket

4.1 - Common
4.2 - Release Valve
4.3 - Hold Valve



DIN72585 Bayonet Socket

6.1 - Release Valve
6.2 - Common
6.3 - Hold Valve



DIN72585 Bayonet Plug

1 - Release Valve
2 - Common
3 - Hold Valve
4 - not connected

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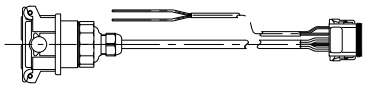
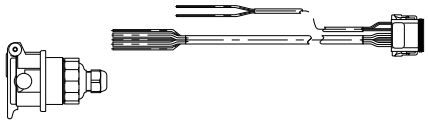
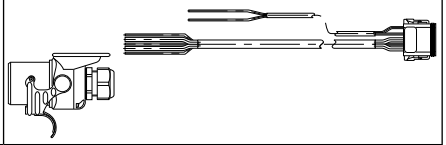
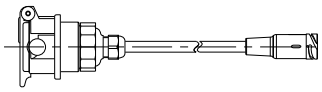
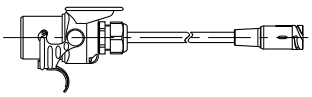
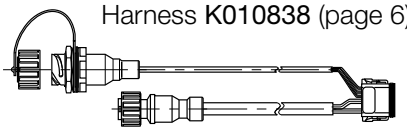
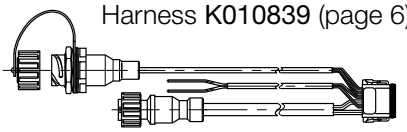
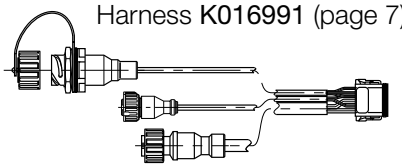
Cables for Trailer ABS

Range Overview - *KB4TA Cables*



KB4TA ABS Module

Power Supply Cable Options

		Trailer	
		Semi-trailer	**Drawbar or Centre-axle Trailer**
ISO 7638 Connector direct to KB4TA ABS Module			
ISO 7638 Connector + ISO 1185 connection	either	Cable **K015313** (page 4) 	-
	or	Cable **K015468** (page 5) + ISO 7638 Socket **K002290** (page 12) 	Cable **K015468** (page 5) + ISO 7638 Plug **K002291** (page 12) 
ISO 7638 Connector to KB4TA ABS Module via intermediate connector			
ISO 7638 Connector to intermediate connector		Cable **K022269** / **70** / **71** (page 4) 	Cable **K022273** / **74** (page 5) 
plus	**Intermediate connector to KB4TA module + diagnostic socket**	Harness **K010838** (page 6) 	
or plus	**Intermediate connector to KB4TA module + diagnostic socket + ISO 1185 connection**	Harness **K010839** (page 6) 	
or plus	**Intermediate connector to KB4TA module + diagnostic socket + 3rd modulator connection**	Harness **K016991** (page 7) 	

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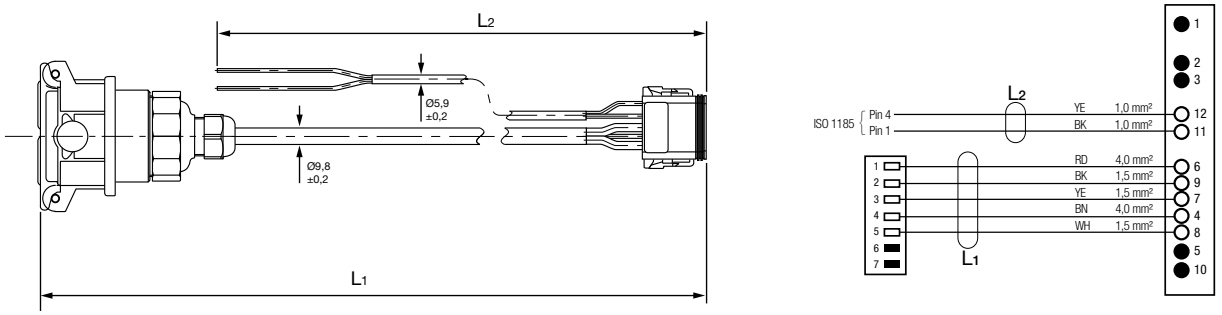
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Range Overview - *KB4TA Cables (contd.)*



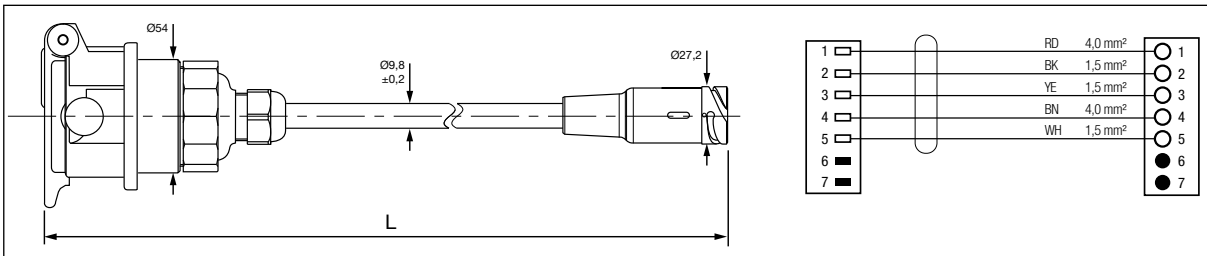
KB4TA ABS Module

Power Supply Cable (for semi-trailers) with ISO 7638 Socket and ISO 1185 Connection



Part No.	Type No.	Cable length L [m]	Comments
K015313 [1)]	-	L_1 = 12.0 L_2 = 12.0	L_1 = power supply (ISO 7638) L_2 = stop lamp supply (ISO 1185)

Power Supply Cable (for semi-trailers) with ISO 7638 Socket



Part No.	Type No.	Cable length L [m]	Comments
K022269 [1)]	-	8.0	Use with Power Supply Wiring Harness (page 6 and 7)
K022270 [1)]	-	12.0	
K022271 [1)]	-	14.0	

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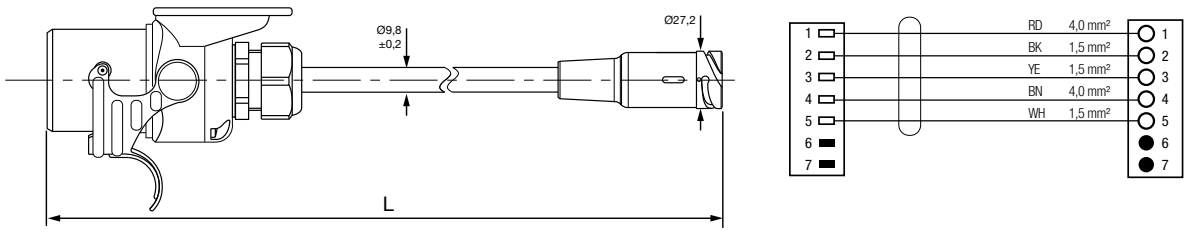
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Range Overview - *KB4TA Cables (contd.)*



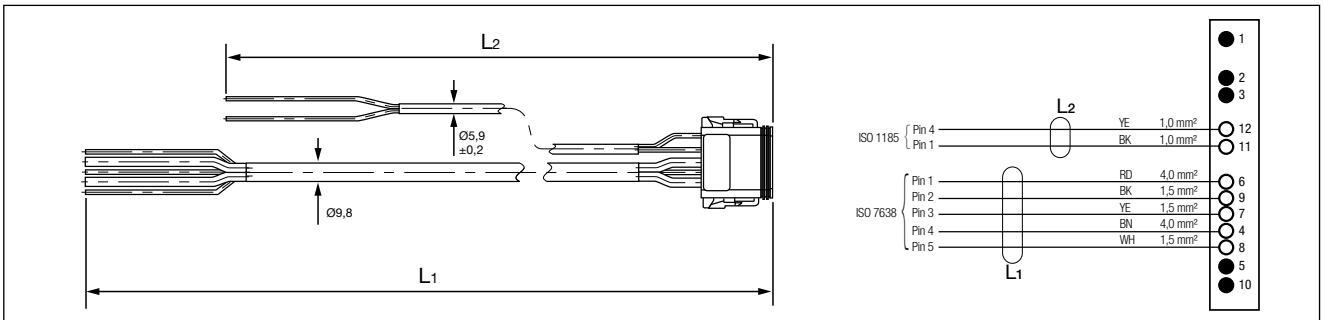
KB4TA ABS Module

Power Supply Cable (for drawbar and centre-axle trailers) with ISO 7638 Plug



Part No.	Type No.	Cable length L [m]	Comments
K022273 [1)]	-	8.0	Use with Power Supply Wiring Harness (page 6 and 7)
K022274 [1)]	-	10.0	

Power Supply Cable with ISO 7638 and ISO 1185 Connections



Part No.	Type No.	Cable length L [m]	Comments
K015468 [1)]	-	L_1 = 12.0 L_2 = 12.0	L_1 = power supply (ISO 7638) L_2 = stop lamp supply (ISO 1185) Use with ISO 7638 Plug or Socket (page 11)

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K015468N00

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Cables for Trailer ABS

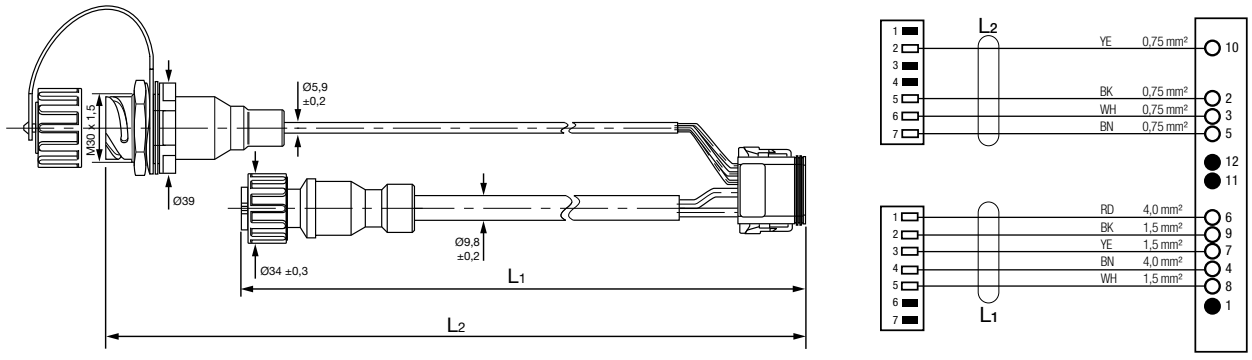
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Range Overview - *KB4TA Cables (contd.)*



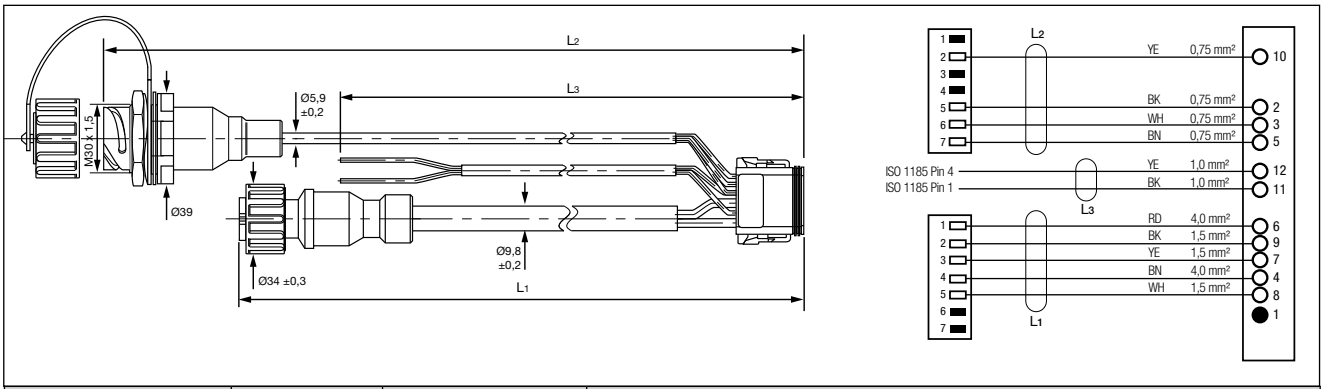
KB4TA ABS Module

Power Supply Wiring Harness (ISO 7638 only) with Diagnostic Socket



Part No.	Type No.	Cable length L [m]	Comments
K010838 [1)]	-	L_1 = 0.5 L_2 = 6.0	L_1 = power supply (ISO 7638) L_2 = diagnostic socket Use with Power Supply Cable (page 4 and 5)

Power Supply Wiring Harness (ISO 7638 and ISO 1185) with Diagnostic Socket



Part No.	Type No.	Cable length L [m]	Comments
K010839 [1)]	-	L_1 = 0.5 L_2 = 6.0 L_3 = 8.0	L_1 = power supply (ISO 7638) L_2 = diagnostic socket L_3 = stop lamp supply (ISO 1185) Use with Power Supply Cable (page 4 and 5)

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K010839N00

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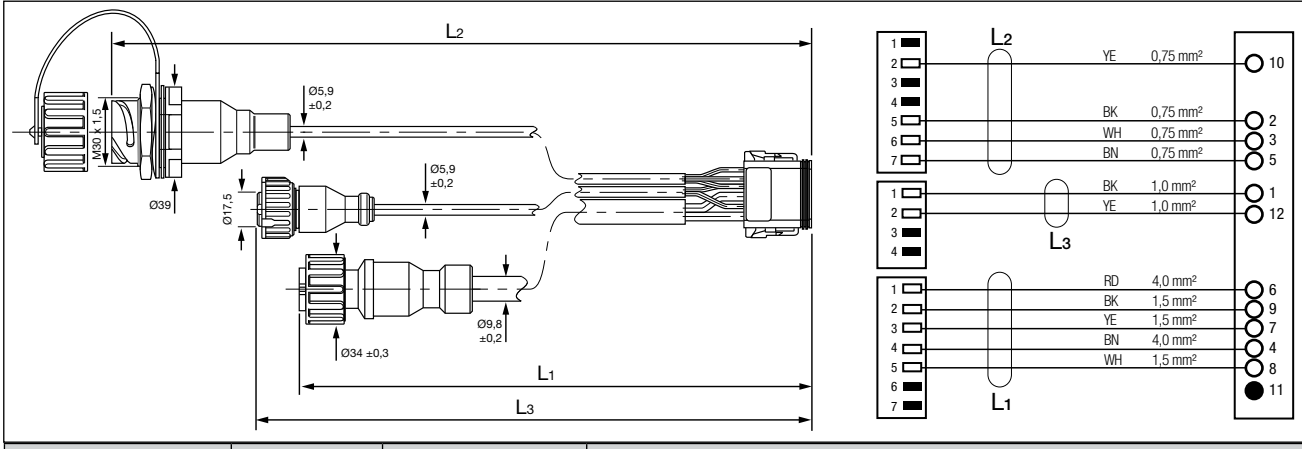
Cables for Trailer ABS

Range Overview - *KB4TA Cables (contd.)*



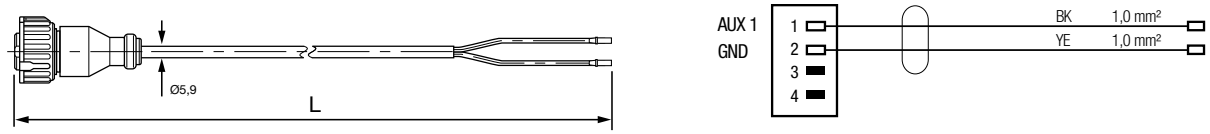
KB4TA ABS Module

Power Supply Wiring Harness (ISO 7638 only) with Diagnostic Socket and 3rd Modulator



Part No.	Type No.	Cable length L [m]	Comments
K016991 [1]	-	L_1 = 0.5 L_2 = 6.0 L_3 = 10.0	L_1 = power supply (ISO 7638) L_2 = diagnostic socket L_3 = 3rd modulator (4S/3M system) Use with Power Supply Cable (page 4 and 5)

3rd Modulator cable



Part No.	Type No.	Cable length L [m]	Comments
K002274 [1]	-	2.0	Open ends for connecting to Deutsch Connector Black wire to Pin 1 Yellow wire to Pin 12
K002275 [1]	-	6.5	
K002276 [1]	-	10.0	
K017003 [1]	-	15.0	

[1] The part number will carry a suffix "N00" which defines that it is supplied without packaging. Example K017003N00

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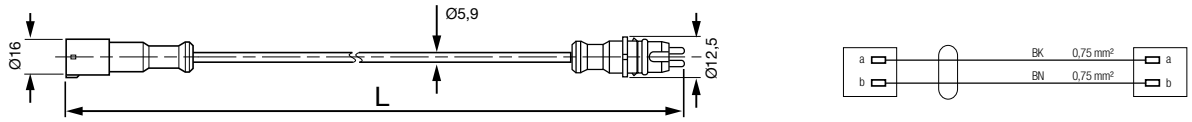
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Range Overview - *KB4TA Cables (contd.)*



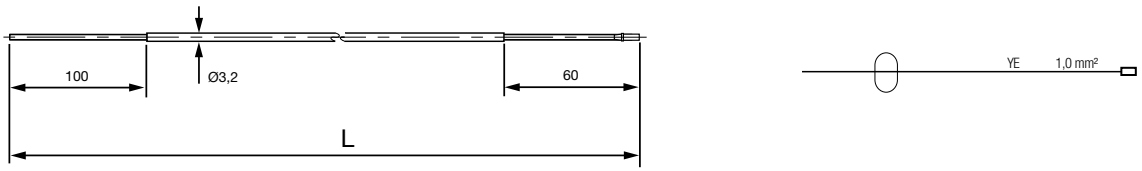
KB4TA ABS Module

Wheel Speed Sensor Extension Cable



Part No.	Type No.	Cable length L [m]	Comments
II367562000	EK3130	2.0	Use to connect KB4TA ABS module with wheel speed sensor
II367563000		3.0	
II367564000		4.0	
II367565000		5.0	
II367566000		6.0	
II367568000		8.0	
II3675610000		10.0	
II3675612000		12.0	
II3675615000		15.0	

External Warning Lamp Cable



Part No.	Type No.	Cable length L [m]	Comments
K016629 [1)]	-	7.0	Open end for connecting to Deutsch Connector Pin 1 - AuxIO 1 or Pin 11 - AuxIO 2
K016630 [1)]	-	15.0	

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K016630N00

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tem No. K057 409

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Doc. No. Y095697 (EN - Rev. 000)
September 2011

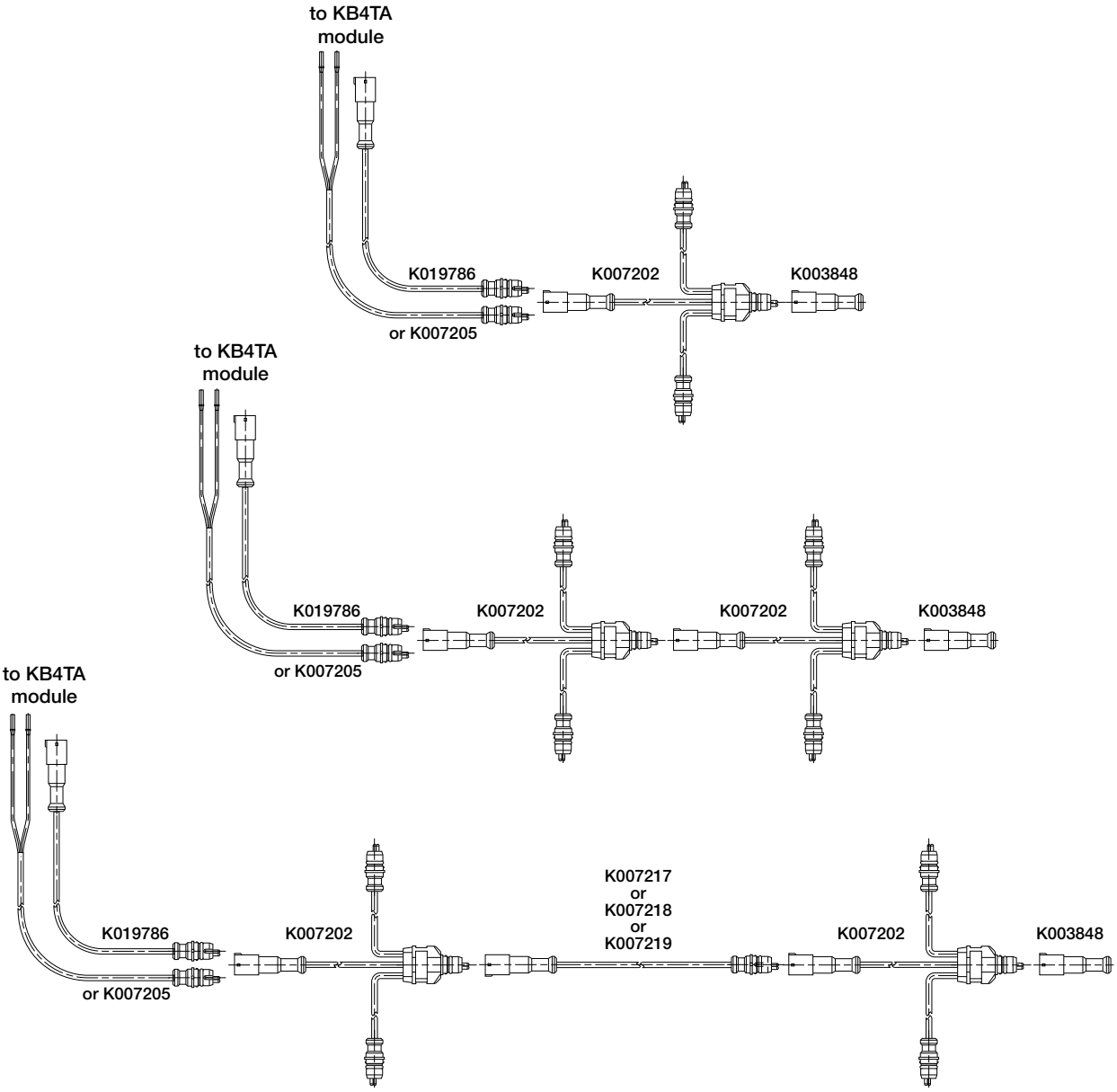
Cables for Trailer ABS

Range Overview - *KB4TA Cables (contd.)*



KB4TA ABS Module

Pad Wear Sensing - Installation examples



Note: further Axle Modules K007202 may be added as necessary

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Cables for Trailer ABS

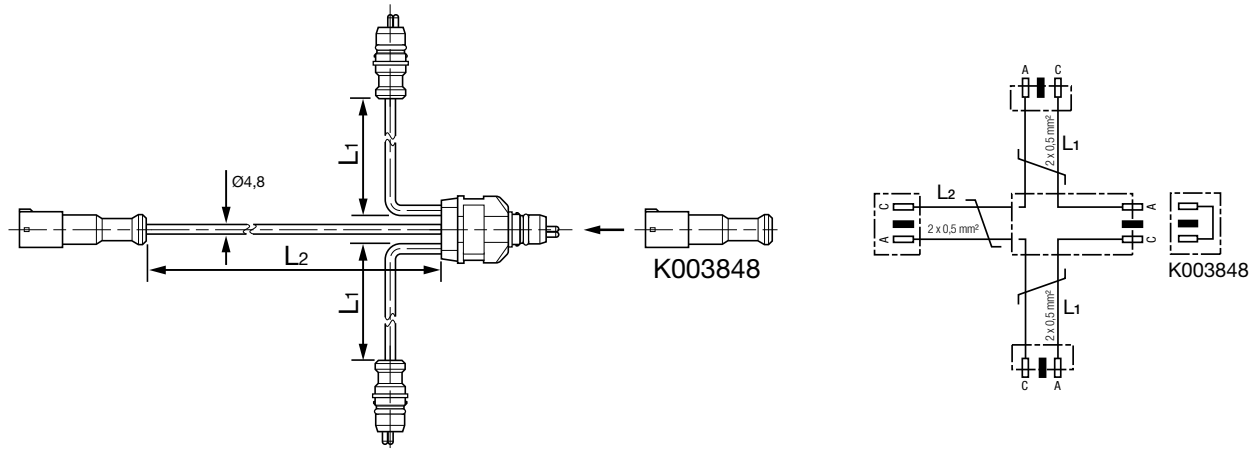
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Range Overview - *KB4TA Cables (contd.)*



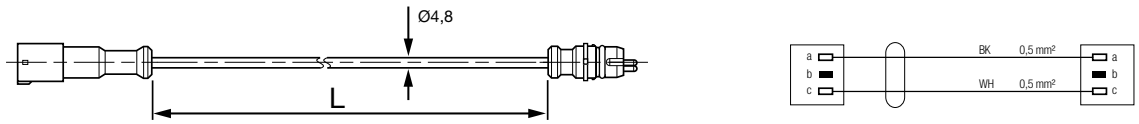
KB4TA ABS Module

Axle Module for Pad Wear Sensing



Part No.	Type No.	Cable length L [m]	Comments
K007202	-	L_1 = 2.0 L_2 = 2.0	L_1 = pad wear sensor L_2 = connecting or extension cable
K003848	-	-	Closure Cap for Axle Module K007202

Extension Cable for Pad Wear Sensing



Part No.	Type No.	Cable length L [m]	Comments
K007217	-	1.0	To connect two Axle Modules K007202 together
K007218	-	3.0	
K007219	-	5.0	

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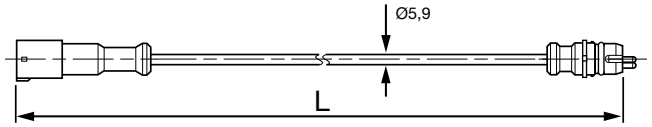
Cables for Trailer ABS

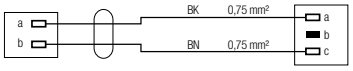
Range Overview - *KB4TA Cables (contd.)*



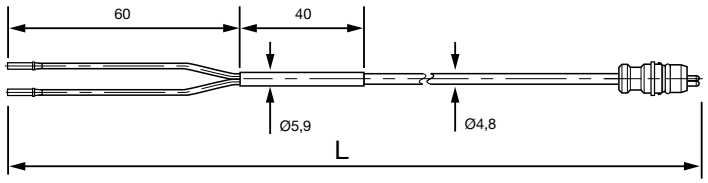
KB4TA ABS Module

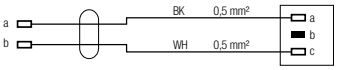
Connecting Cable for Pad Wear Sensing





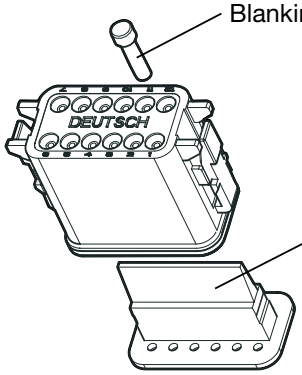
Part No.	Type No.	Cable length L [m]	Comments
K019786 [1)]	-	1.0	To connect Axle Module K007202 to KB4TA ABS Module (SAL or SAR)





Part No.	Type No.	Cable length L [m]	Comments
K007205	-	1.0	To connect Axle Module K007202 to KB4TA ABS Module (Deutsch plug)

Accessories



Part No.	Type No.	Description
K002287 [1)]	-	12-pin Deutsch Plug (includes: 1x Deutsch plug 1 x Locking wedge 12 x Blanking plugs

[1)] The part number will carry a suffix "N00" which defines that it is supplied without packaging. Example K002287N00

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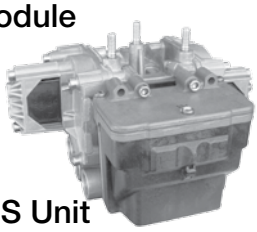
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Range Overview - Accessories for *KB4TA, A18 and KB3-TA*

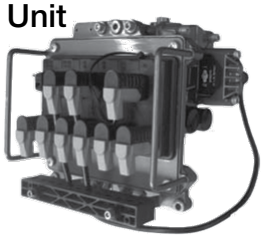
KB4TA ABS Module



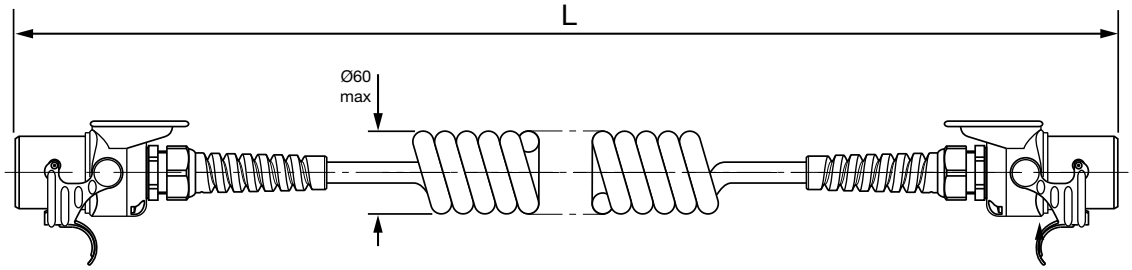
A18 ABS Unit



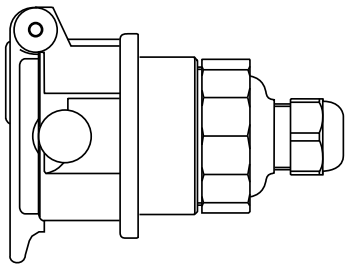
KB3-TA ABS Unit



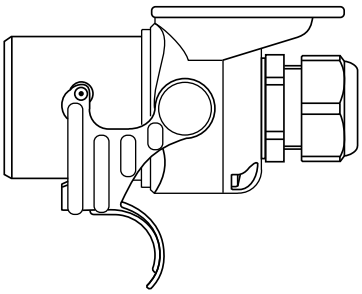
"Susie" Cable for towing vehicle to trailer connection



Part No.	Type No.	Cable length L [m]	Comments
K004098 [1)]	**EK3150**	1.0 - 4.0	With 7 pin connectors, for connecting ABS or EBS With buckling protection



Part No.	Type No.	Description
K002290	-	ISO 7638 Socket (7 pin)



Part No.	Type No.	Description
K002291	-	ISO 7638 Plug (7 pin)

[1)] The part number will carry a suffix "N00" which defines that it is supplied without packaging. Example K002287N00

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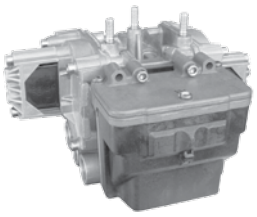
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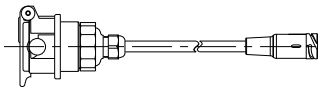
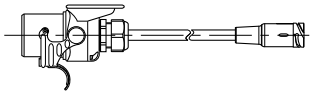
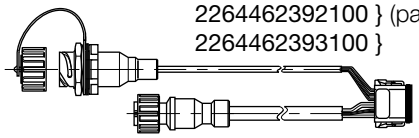
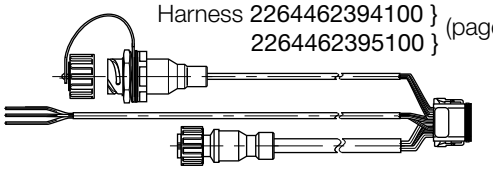
Cables for Trailer ABS

Range Overview - *A18 Cables*



A18 ABS Unit

Power Supply Cable Options

		Trailer	
		Semi-trailer	Drawbar or Centre-axle Trailer
ISO 7638 Connector to A18 ABS Unit via intermediate connector			
ISO 7638 Connector to intermediate connector		Cable K022269 / 70 / 71 (page 14) 	Cable K022273 / 74 (page 14) 
plus	Intermediate connector to A18 ABS Unit + diagnostic socket	Harness 2264462391100 } 2264462392100 } (page 15) 2264462393100 } 	
or plus	Intermediate connector to A18 ABS Unit + diagnostic socket + ISO 1185 connection	Harness 2264462394100 } 2264462395100 } (page 15) 	

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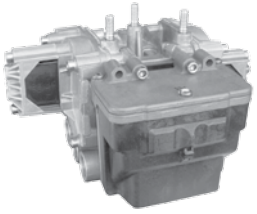
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Cables for Trailer ABS

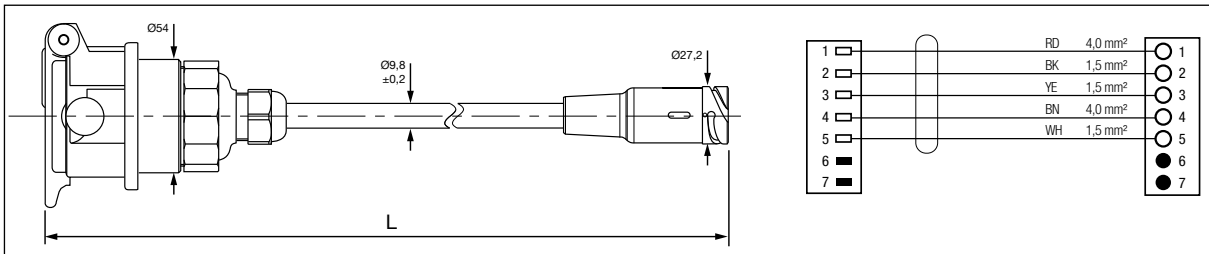
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Range Overview - *A18 Cables (contd.)*



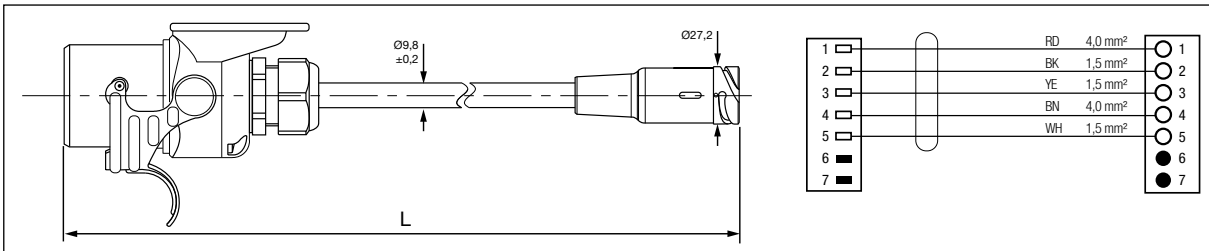
A18 ABS Unit

Power Supply Cable for semi-trailers with ISO 7638 Socket



Part No.	Type No.	Cable length L [m]	Comments	
K022269 [1]	-	8.0	replaces **2264462396100**	Use with Power Supply Wiring Harness (page 15)
K022270 [1]	-	12.0	replaces **2264462397100**	
K022271 [1]	-	14.0	replaces **2264462398100**	

Power Supply Cable for drawbar trailers with ISO 7638 Plug



Part No.	Type No.	Cable length L [m]	Comments	
K022273 [1]	-	8.0	replaces **2264462399100**	Use with Power Supply Wiring Harness (page 15)
K022274 [1]	-	10.0	replaces **2264462400100**	

[1] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K022274N00

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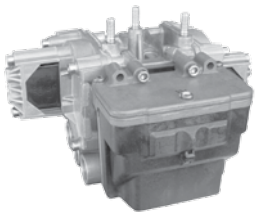
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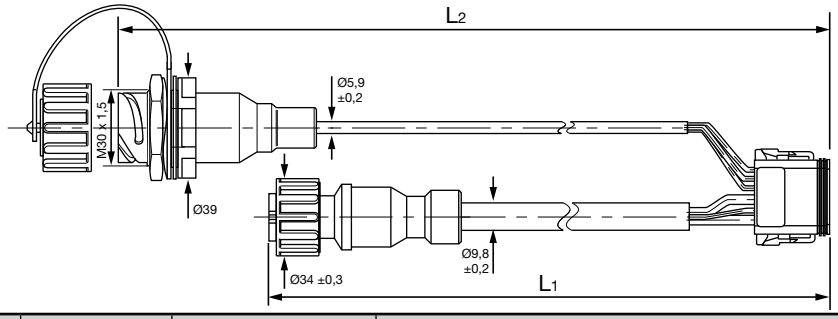
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Range Overview - *A18 Cables (contd.)*



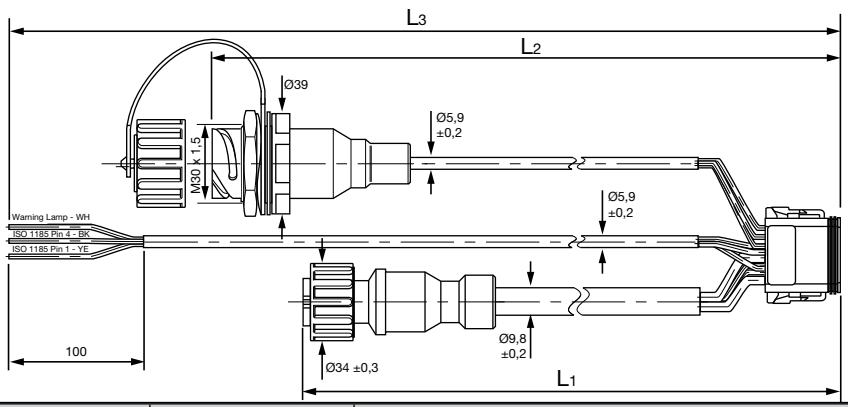
A18 ABS Unit

Power Supply Wiring Harness (ISO 7638 only) with Diagnostic Socket



Part No.	Type No.	Cable length L [m]	Comments
2264462391100	-	L_1 = 0.5 L_2 = 3.0	L_1 = power supply (ISO 7638) L_2 = diagnostic socket (Bayonet) Use with Power Supply Cable (page 14)
2264462392100	-	L_1 = 0.5 L_2 = 5.0	
2264462393100	-	L_1 = 0.5 L_2 = 12.0	

Power Supply Wiring Harness (ISO 7638 and ISO 1185) with Diagnostic Socket



Part No.	Type No.	Cable length L [m]	Comments
2264462394100	-	L_1 = 0.5 L_2 = 5.0 L_3 = 13.0	L_1 = power supply (ISO 7638) L_2 = diagnostic socket (Bayonet) L_3 = stop lamp supply (ISO 1185) Use with Power Supply Cable (page 14)
2264462395100	-	L_1 = 0.5 L_2 = 12.0 L_3 = 13.0	

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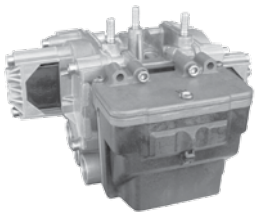
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Cables for Trailer ABS

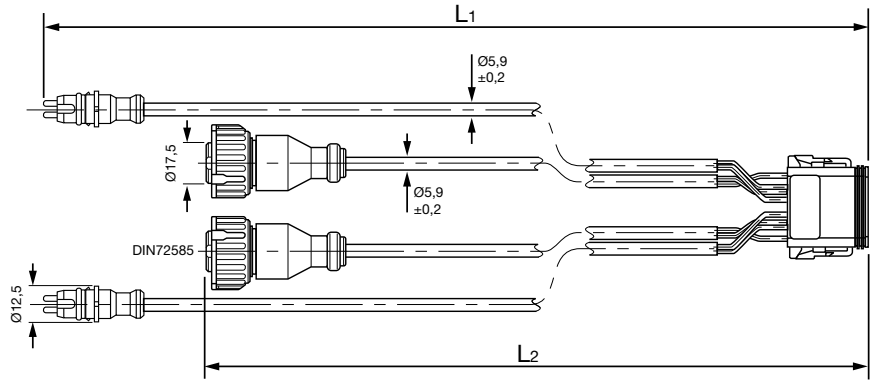
Doc. No. Y095697 (EN - Rev. 000)
September 2011

Range Overview - *A18 Cables (contd.)*



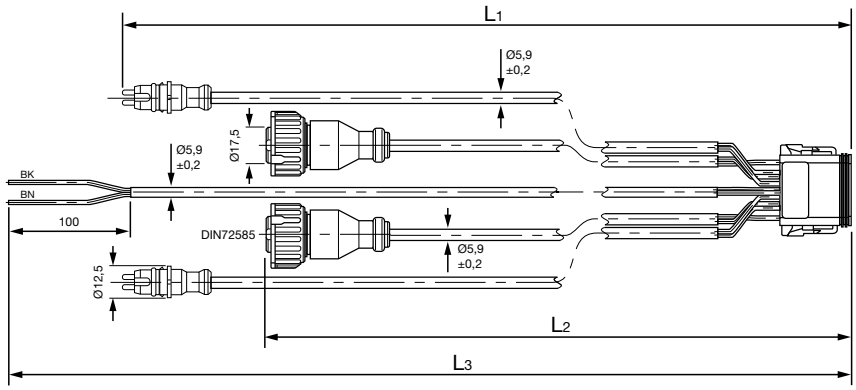
A18 ABS Unit

Modulator Wiring Harness with Wheel Speed Sensor Extension Cables



Part No.	Type No.	Cable length L [m]	Comments
2264462374100	-	L_1 = 4.0 L_2 = 0.5	L_1 = wheel speed sensors L_2 = modulators
2264462375100	-	L_1 = 6.5 L_2 = 0.5	

Modulator Wiring Harness with Wheel Speed Sensor Extension Cables and UNI output



Part No.	Type No.	Cable length L [m]	Comments
2264462403100	-	L_1 = 3.0 L_2 = 0.5 L_3 = 6.5	L_1 = wheel speed sensors L_2 = modulators L_3 = UNI output

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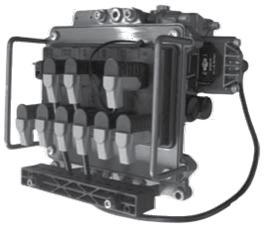
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tem No. K057 409

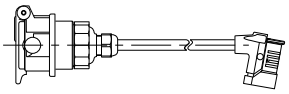
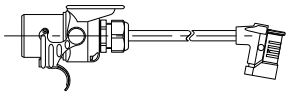
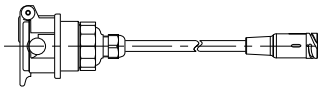
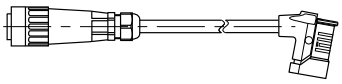
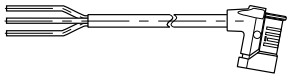
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Range Overview - *KB3-TA Cables*



KB3-TA ABS Unit

Power Supply Cable Options

	Trailer	
	Semi-trailer	**Drawbar or Centre-axle Trailer**
ISO 7638 Connector direct to KB3-TA ABS Unit		
ISO 7638 Connector only	Cable **EK3027** (page 18) 	Cable **EK3022** (page 18) 
ISO 7638 Connector to KB3-TA ABS Unit via intermediate connector		
ISO 7638 Connector to intermediate connector	Cable **EK3028** (page 19) 	-
plus **Intermediate connector to KB3-TA unit + diagnostic socket**	Cable **EK3029** (page 19) 	-
ISO 1185 Connection direct to KB3-TA ABS Unit		
ISO 1185 Connection only	Cable **EK3040** (page 19) 	

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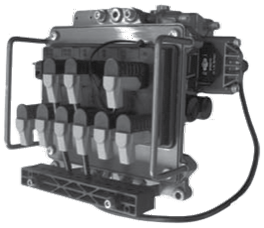
Item No. K057409

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Cables for Trailer ABS

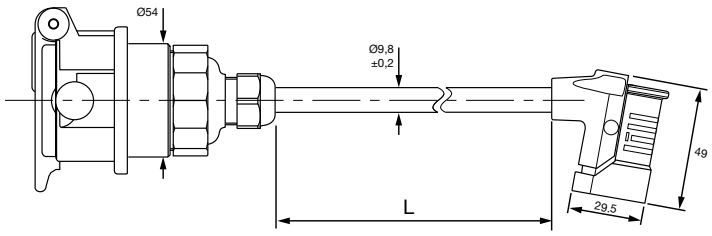
Doc. No. Y095697 (EN - Rev. 000)
September 2011

Range Overview - *KB3-TA Cables (contd.)*



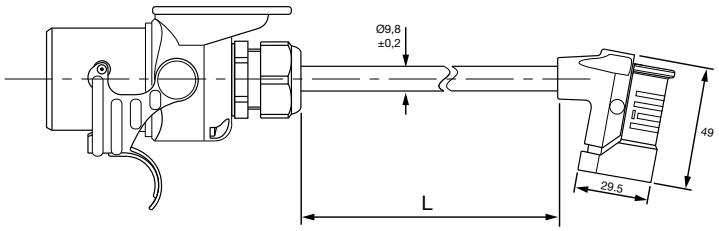
KB3-TA ABS Unit

Power Supply Cable for semi-trailers with ISO 7638 Socket



Part No.	Type No.	Cable length L [m]	Comments
II335888000	EK3027	8.0	
II3358810000		10.0	
II3358812000		12.0	
II3358813000		13.0	
II3358815000		15.0	

Power Supply Cable for drawbar trailers with ISO 7638 Plug



Part No.	Type No.	Cable length L [m]	Comments
II354156000	EK3022	6.0	
II354158000		8.0	
II354159000		9.0	
II3541523000		23.0	

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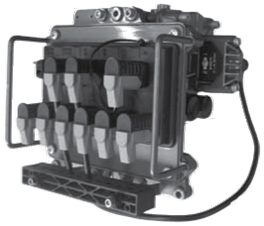
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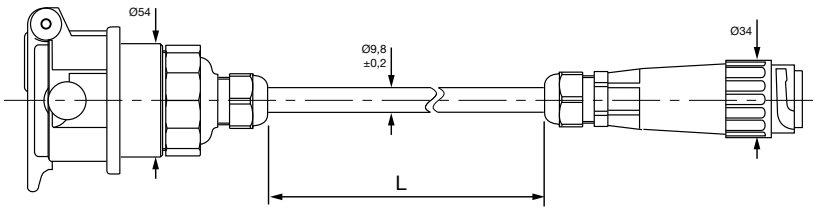
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Range Overview - *KB3-TA Cables (contd.)*



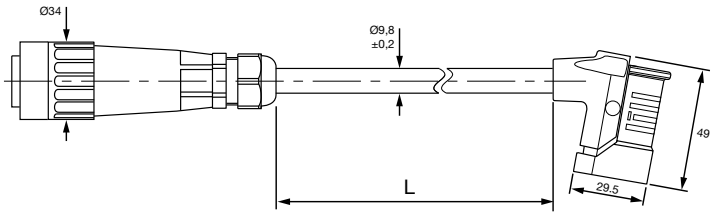
KB3-TA ABS Unit

Power Supply Cable (Split) for semi-trailers with ISO 7638 Socket



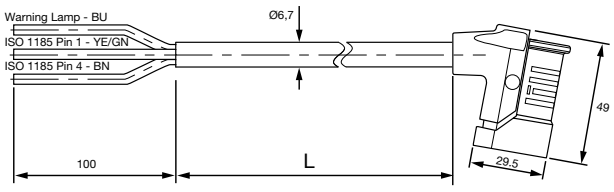
Part No.	Type No.	Cable length L [m]	Comments
II3641712000	EK3028	12.0	Use with EK3029 (see below)

Power Supply Cable (Split) for semi-trailers with ISO 7638 Socket



Part No.	Type No.	Cable length L [m]	Comments
II36418500	EK3029	0.5	Use with EK3028 (see above)

Power Supply Cable for ISO 1185 Connection



Part No.	Type No.	Cable length L [m]	Comments
II335874000	EK3040	4.0	Use with ECU ES1215 / Trailer Module ES2002
II335878000		8.0	
II3358712000		12.0	

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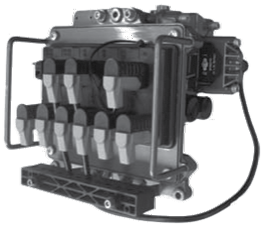
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Cables for Trailer ABS

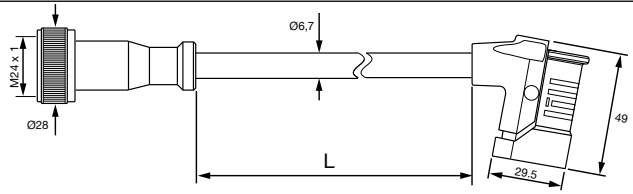
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Range Overview - *KB3-TA Cables (contd.)*



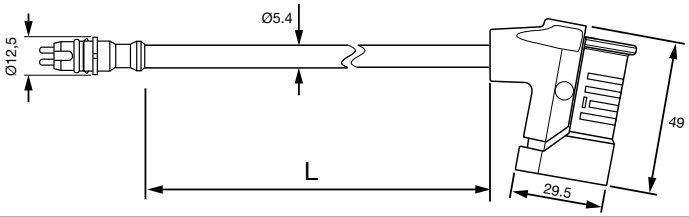
KB3-TA ABS Unit

Modulator Cable



Part No.	Type No.	Cable length L [m]	Comments
II35417500	EK3013	0.5	M24x1 Modulator Connection
II354172000		2.0	
II354173000		3.0	
II354174000		4.0	
II354178000		8.0	
II3541710000		10.0	
II3541712000		12.0	

Wheel Speed Sensor Extension Cable



Part No.	Type No.	Cable length L [m]	Comments
II354162000	EK3003	2.0	
II354163000		3.0	
II354163500		3.5	
II354165000		5.0	
II354169000		9.0	
II3541612000		12.0	
II3541615000		15.0	

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Product DATA

TEBS4

Cables for Trailer EBS (TEBS4)

Doc. No. Y107795 (EN - Rev. 001)
August 2015

Function



Cables are used in trailer EBS systems to:

- provide electrical power to the components in the system.
- communicate signals to the ECU from sensors monitoring trailer characteristics.
- communicate control commands from the ECU to modulators/modules to enable any required braking intervention.
- communicate control commands from the towing vehicle.

Power Supply Cables are used to distribute electrical power from the towing vehicle to electrically powered braking and auxiliary equipment on the trailer. The main power supply to the trailer is through a plug or socket according to ISO 7638. The ISO 7638 connection carries the CAN signal from/to the towing vehicle and so the EBS **Power Supply Cables** also provide the CAN signal to the ECU.

The cables are available in various lengths and are normally supplied with a bayonet connector to ensure easy and safe connection.

Modular Cables / Wiring Harnesses are available in many configurations and are used to supply electrical signals and power to auxiliary equipment including the external third modulator on 4S/3M systems.

Wheel Speed Sensor Cables are used to connect the ECU to the wheel speed sensors so that their wheel speed signals can be sent. The wheel speed sensor is supplied with only a short length of cable and so will often require a **Wheel Speed Sensor Extension Cable** to enable connection.

NOTES: *The text in the 'Comments' columns describes the typical usage. Other connections are possible for most cables.*

- *The document starts with details of power cables, then shows modulator cables, wheel speed sensor cables and auxiliary cables*.

Technical Features

Operating Temperature Range: -40 °C to +80 °C

See tables for other features.

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TEBS4

Cables for Trailer EBS (TEBS4)

Doc. No. Y107795 (EN - Rev. 001)
August 2015

Colour Coding used in this document

BK	Black	GN	Green	YE	Yellow
BN	Brown	RD	Red		
BU	Blue	WH	White		

Other Documentation

For information on systems and components mentioned in this document please refer to:

ABS Relay Modulator Valves	PD-200-200, Document No. *Y011362*
TEBS4 Brake Module	PD-214-100, Document No. *Y011366*
Wheel Speed Sensors	PD-261-000, Document No. *Y011363*
Pressure Sensor	PD-262-200, Document No. *Y095830*
Deflection Sensor	PD-264-200, Document No. *Y095832*
Cables for TEBS G2	PD-272-025, Document No. *Y142784*
Diagnostic Cables for Trailer ABS/EBS	PD-272-030, Document No. *Y107796*
Diagnostic Cables for TEBS G2	PD-272-035, Document No. *Y138839*
Tyre Pressure Monitoring System (TPMS)	PD-551-000, Document No. *Y095833*

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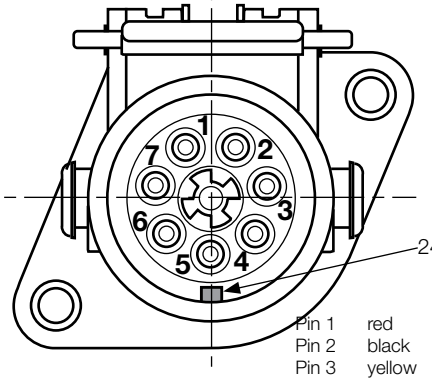
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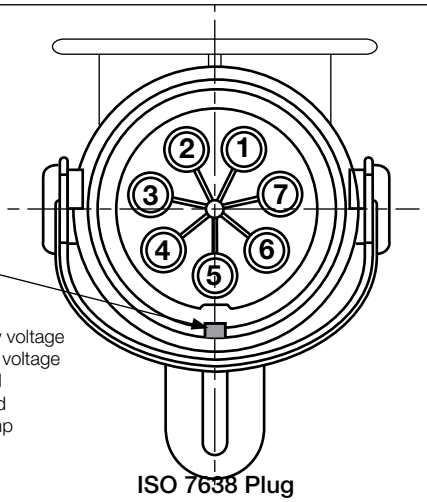
Pin Configurations



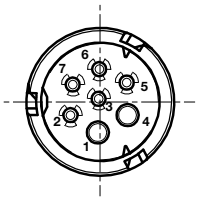
ISO 7638 Socket
(24 V)

24 V coding

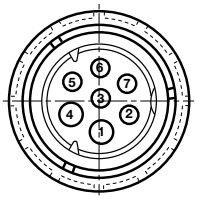
Pin 1	red	Valve supply voltage
Pin 2	black	ECU supply voltage
Pin 3	yellow	ECU ground
Pin 4	brown	Valve ground
Pin 5	white	Warning lamp
Pin 6	white/green	CAN-Hi
Pin 7	white/brown	CAN-Lo



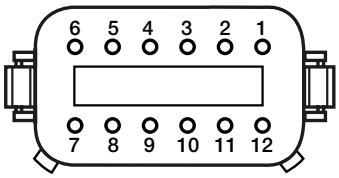
ISO 7638 Plug
(24 V)



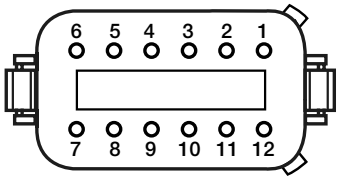
7-pin Bayonet Socket
(ISO 7638 Power)



7-pin Bayonet Plug
(ISO 7638 Power)

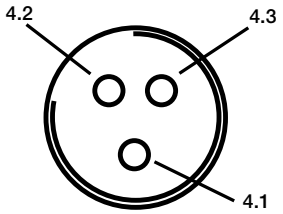


Deutsch Plug
Code 'A' (X1)
(Grey)



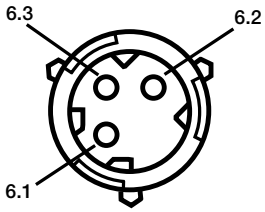
Deutsch Plug
Code 'B' (X2)
(Black)

Modulator connectors



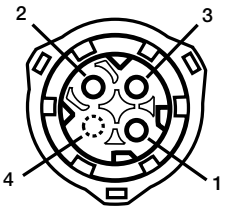
M24x1 Connector - Socket

4.1 - Common
4.2 - Release Valve
4.3 - Hold Valve



DIN72585 Bayonet Socket

6.1 - Release Valve
6.2 - Common
6.3 - Hold Valve



DIN72585 Bayonet Plug

1 - Release Valve
2 - Common
3 - Hold Valve
4 - not connected

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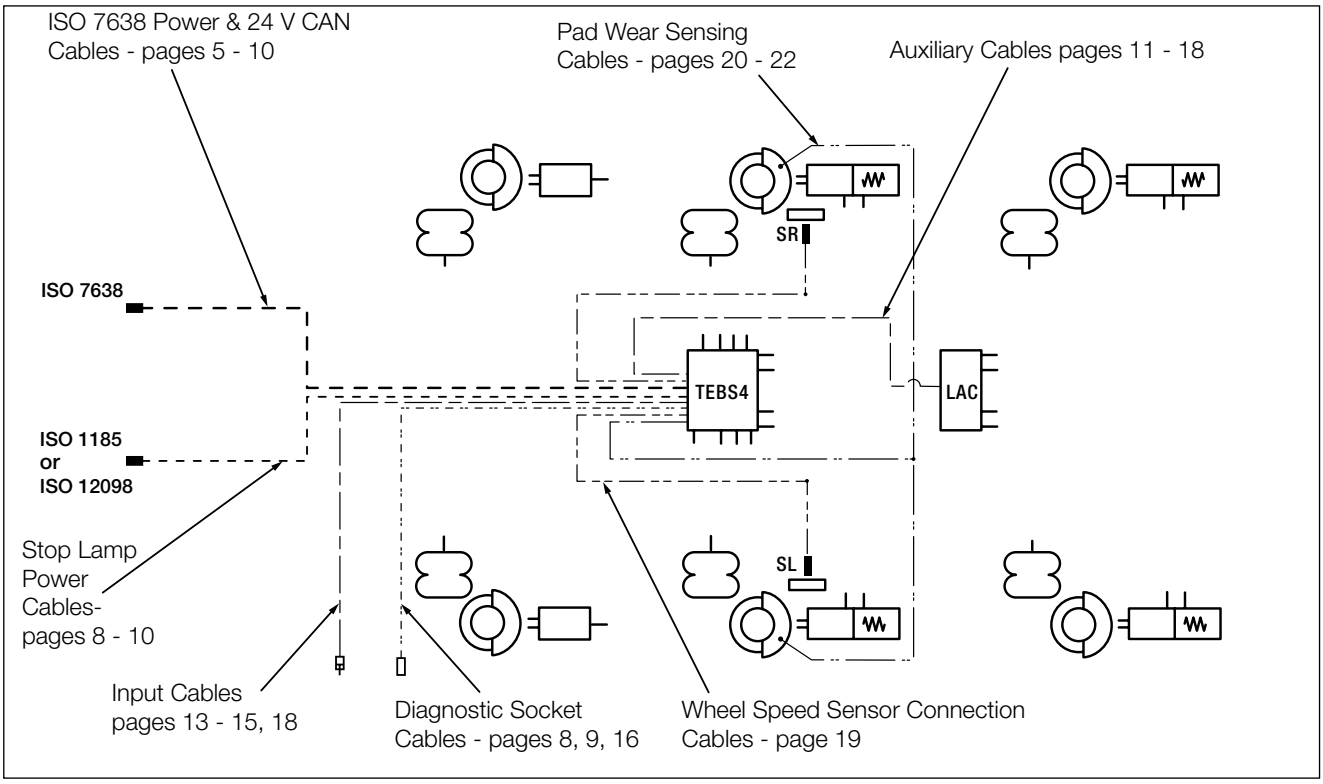
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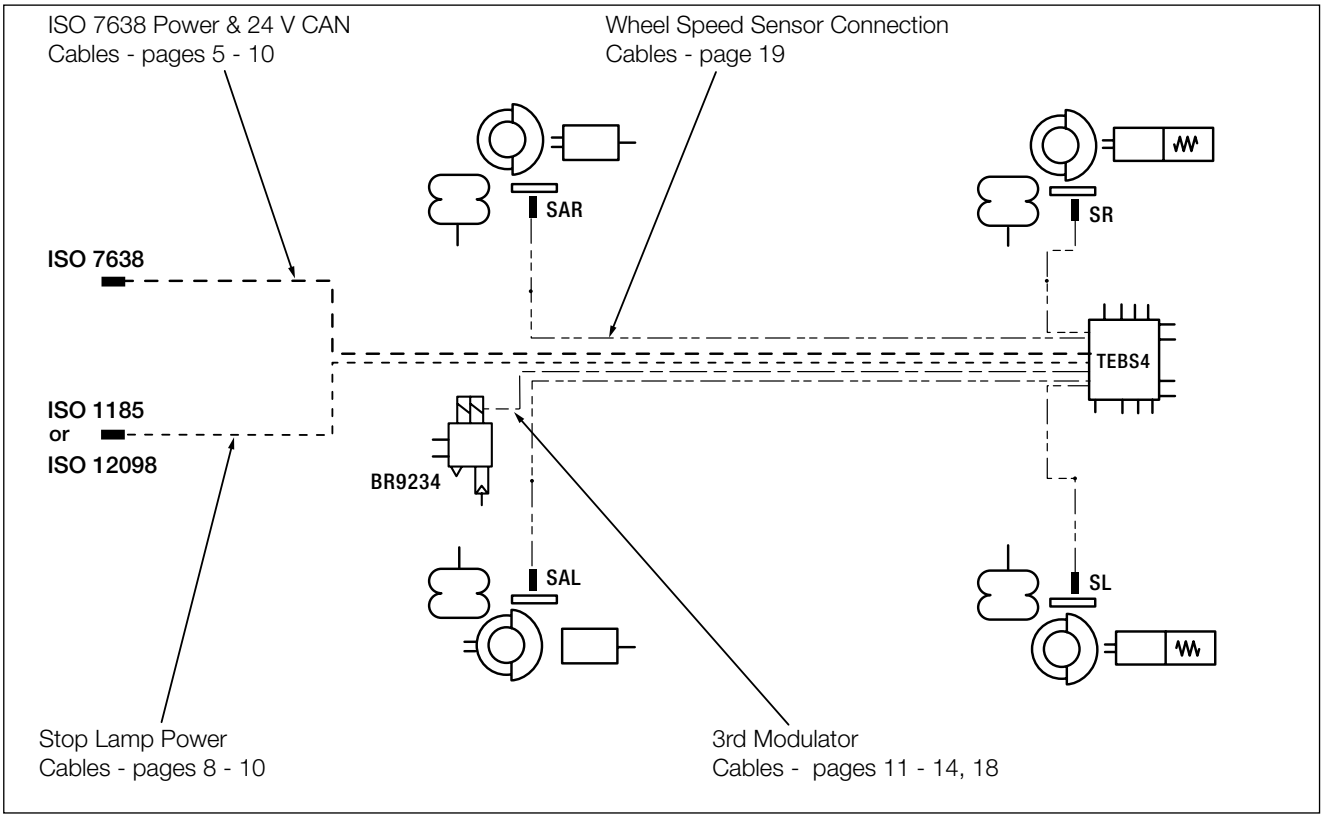
TEBS4

Cables for Trailer EBS (TEBS4)

Doc. No. Y107795 (EN - Rev. 001)
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Cable Selection Guide - TEBS4 (typical systems)





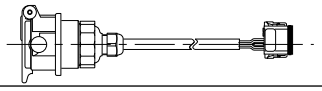
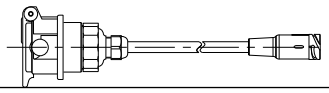
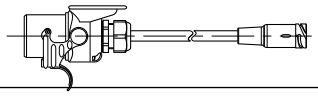
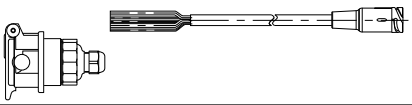
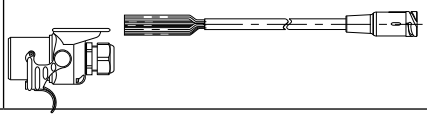
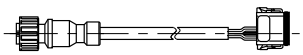
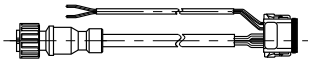
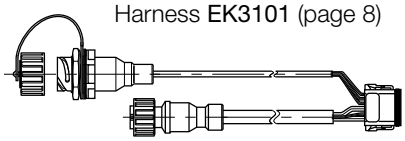
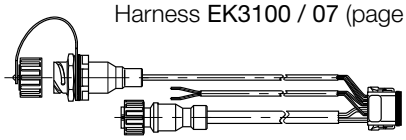
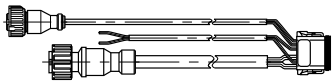
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TEBS4
Cables for Trailer EBS (TEBS4)

Power Supply Cable Options

	Trailer	
	Semi-trailer	**Drawbar or Centre-axle Trailer**
ISO 7638 Connector direct to TEBS4 Brake Module		
ISO 7638 Connector only	Cable **K002294** (page 6) 	–
ISO 7638 Connector to TEBS4 Brake Module via intermediate connector		
ISO 7638 Connector to intermediate connector – **either**	Cable **EK3110** (page 6) 	Cable **EK3115** (page 7) 
ISO 7638 Connector to intermediate connector – **or**	Cable **K002288 / 89 / K004775** (page 7) + ISO 7638 Socket **K002290** (page 23) 	Cable **K002288 / 89 / K004775** (page 7) + ISO 7638 Plug **K002291** (page 23) 
plus – **Intermediate connector to TEBS4 module (ISO 7638 only)**	Cable **K002286** (page 10) 	
or plus – **Intermediate connector to TEBS4 module + ISO 1185 connection**	Harness **EK3108** (page 10) 	
or plus – **Intermediate connector to TEBS4 module + diagnostic socket**	Harness **EK3101** (page 8) 	
or plus – **Intermediate connector to TEBS4 module + diagnostic socket + ISO 1185 connection**	Harness **EK3100 / 07** (page 8, 9) 	
or plus – **Intermediate connector to TEBS4 module + ISO 1185 connection + auxiliary socket**	Harness **EK3102** (page 9) 	

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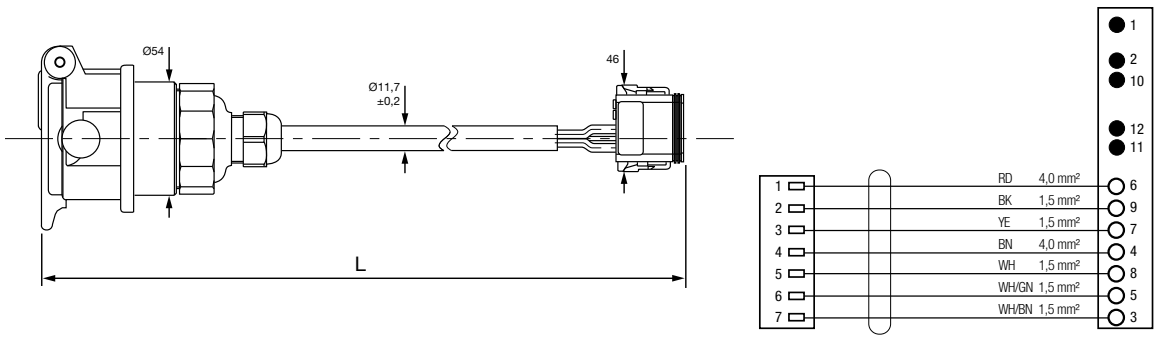
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TEBS4

Cables for Trailer EBS (TEBS4)

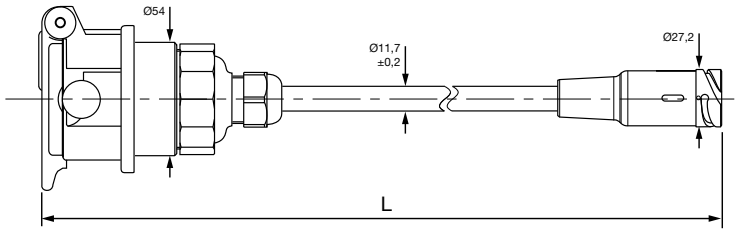
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Power Cable (for semi-trailers) with ISO 7638 Socket and X1 Connector



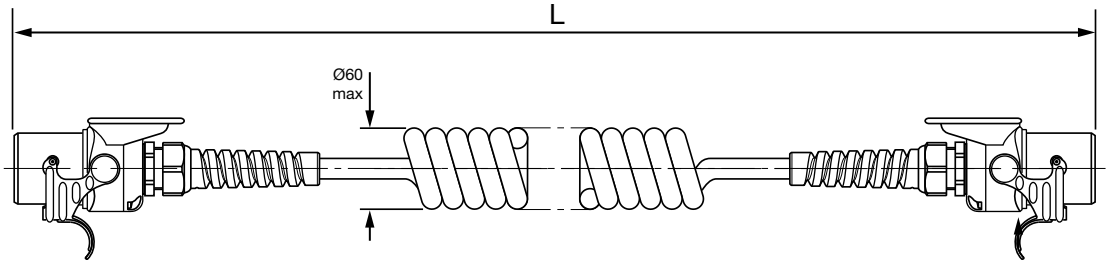
Part No.	Type No.	Cable length L [m]	Comments
K002294 [1)]	-	12.0	

Power Cable (for semi-trailers) with ISO 7638 Socket



Part No.	Type No.	Cable length L [m]	Comments
II367419000	EK3110	9.0	Use with X1 Power Supply Harness (pages 8 to 10)
II3674115000		15.0	

Power Connecting Cable - towing vehicle to trailer



Part No.	Type No.	Cable length L [m]	Comments
K004098 [1)]	EK3150	1.0 - 4.0	With 7 pin connectors, for connecting ABS or EBS With buckling protection

[1)] The part number will carry a suffix "N00" which defines that it is supplied without packaging. Example K004098N00

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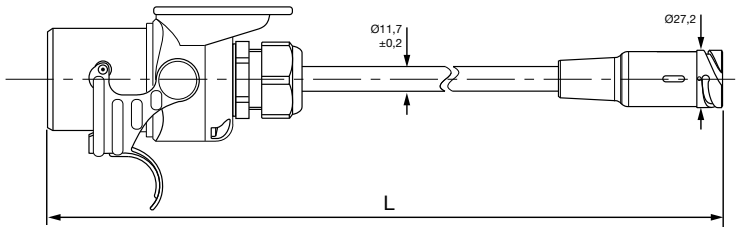
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TEBS4

Cables for Trailer EBS (TEBS4)

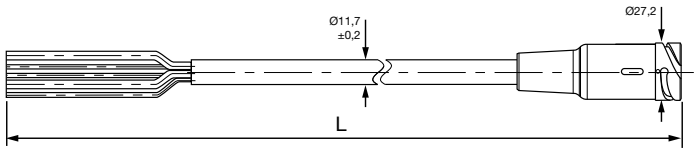
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Power Cable (for drawbar and centre-axle trailers) with ISO 7638 Plug



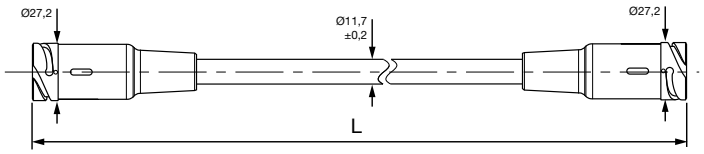
Part No.	Type No.	Cable length L [m]	Comments
II397938000	EK3115	8.0	Use with X1 Power Supply Harness (pages 8 to 10)
II3979310000		10.0	
II3979312000		12.0	

Power Cable without plug



Part No.	Type No.	Cable length L [m]	Comments
K002288 [1)]	-	13.0	Use with separate ISO 7638 socket/plug (page 23) and X1 Power Supply Harness (pages 8 to 10)
K002289	-	17.5	
K004775	-	23.5	

Power Connecting Cable



Part No.	Type No.	Cable length L [m]	Comments
K010712 [1)]	-	0.5	Adapter to connect TEBS G2 Power Cable to TEBS4

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K010712N00

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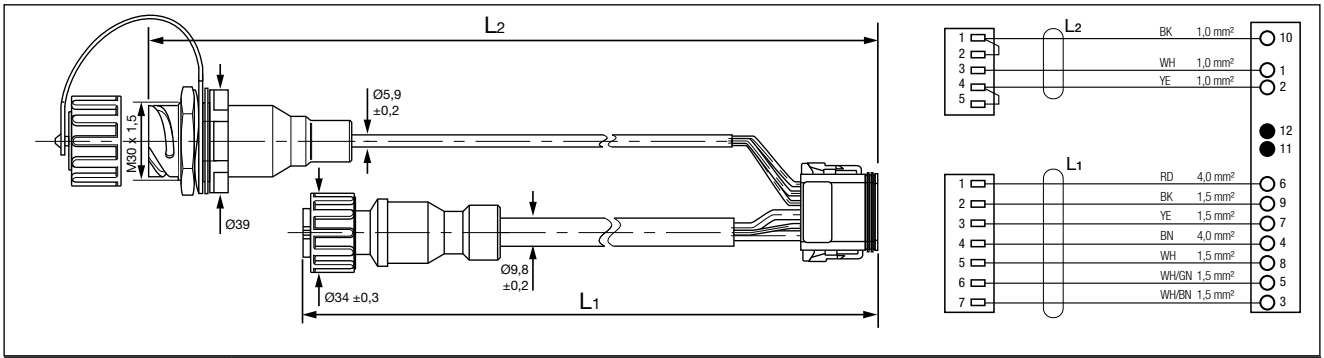
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TEBS4

Cables for Trailer EBS (TEBS4)

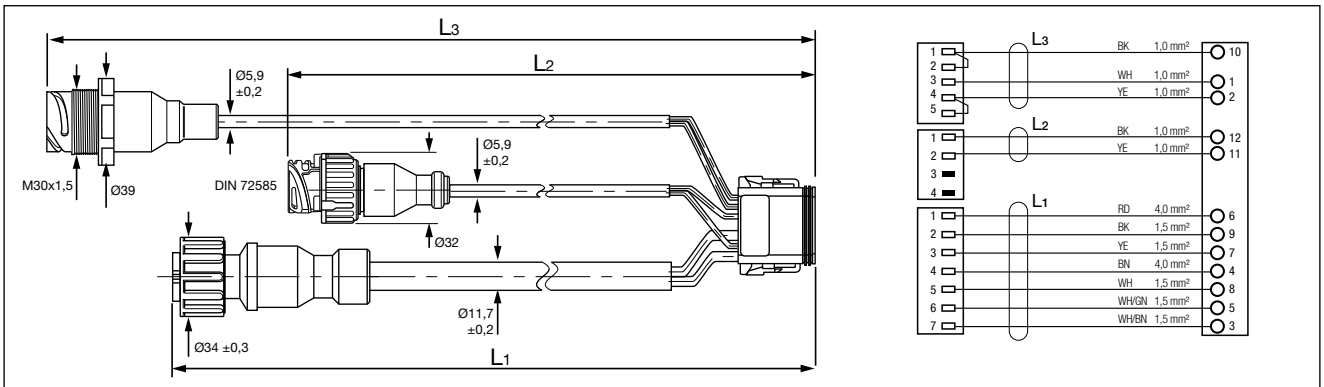
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X1 Power Supply Harness (ISO 7638 only) with Diagnostic Socket



Part No.	Type No.	Cable length L [m]	Comments
II367381	EK3101	L_1 = 0.5 L_2 = 4.0	L_1 = power supply (ISO 7638) L_2 = diagnostic socket Use with Power Supply Cable (page 6 and 7)

X1 Power Supply Harness (ISO 7638 and ISO 1185) with Diagnostic Socket



Part No.	Type No.	Cable length L [m]	Comments
K007525	EK3107	L_1 = 0.5 L_2 = 1.0 L_3 = 4.0	L_1 = power supply (ISO 7638) L_2 = stop lamp supply (ISO 1185) L_3 = diagnostic socket (without mounting kit) Use with Power Supply Cable (page 6 and 7)

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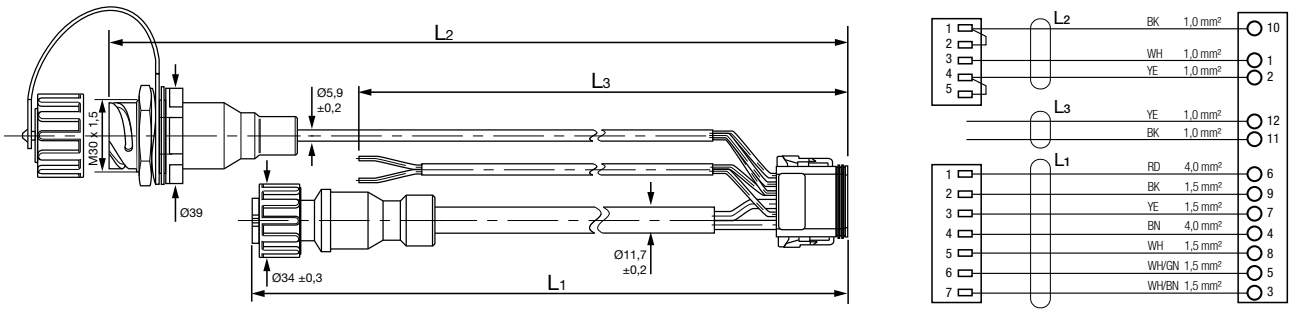
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TEBS4

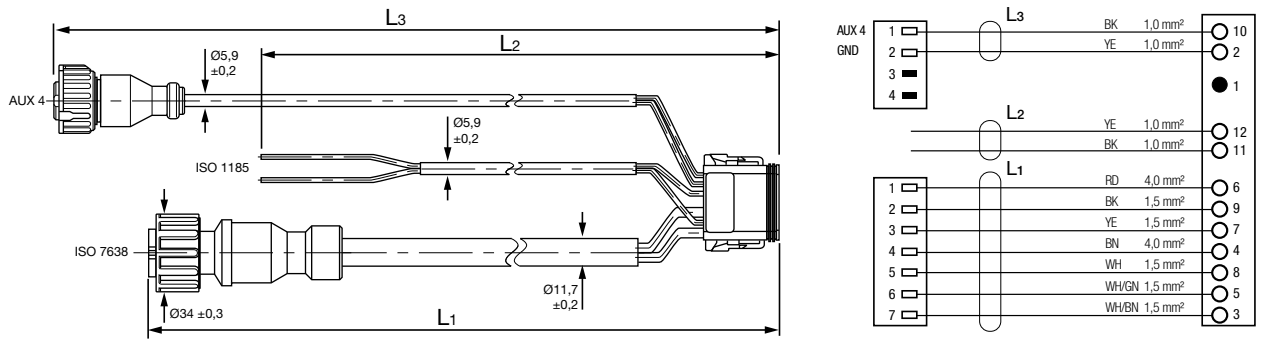
Cables for Trailer EBS (TEBS4)

X1 Power Supply Harness (ISO 7638 and ISO 1185) with Diagnostic Socket *(contd.)*



Part No.	Type No.	Cable length L [m]	Comments
II367391	EK3100	L_1 = 0.5 L_2 = 4.0 L_3 = 1.0	L_1 = power supply (ISO 7638) L_2 = diagnostic socket L_3 = stop lamp supply (ISO 1185) Use with Power Supply Cable (page 6 and 7)
II367393		L_1 = 0.5 L_2 = 6.0 L_3 = 1.0	
II367395		L_1 = 0.5 L_2 = 4.0 L_3 = 12.0	
II367397		L_1 = 0.5 L_2 = 6.0 L_3 = 12.0	

X1 Power Supply Harness (ISO 7638 and ISO 1185) with Auxiliary Socket (Aux 4)



Part No.	Type No.	Cable length L [m]	Comments
K002950	EK3102	L_1 = 0.5 L_2 = 12.0 L_3 = 6.0	L_1 = power supply (ISO 7638) L_2 = stop lamp supply (ISO 1185) L_3 = auxiliary socket (Aux 4) Use with Power Supply Cable (page 6 and 7)
K004754		L_1 = 0.5 L_2 = 1.0 L_3 = 4.0	
K004756		L_1 = 0.5 L_2 = 12.0 L_3 = 4.0	

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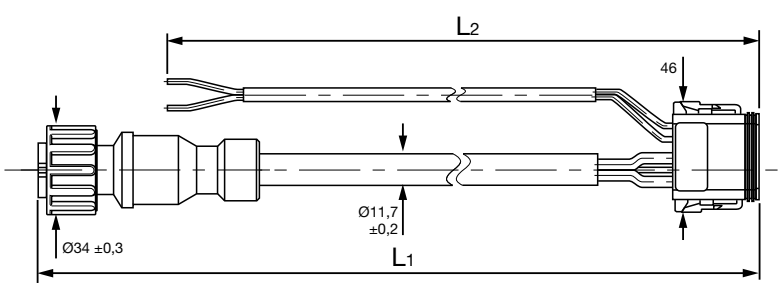
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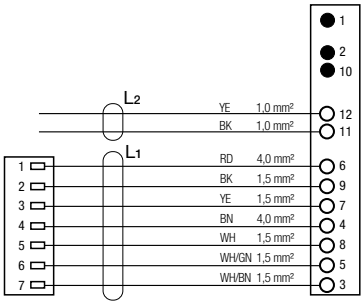
TEBS4

Cables for Trailer EBS (TEBS4)

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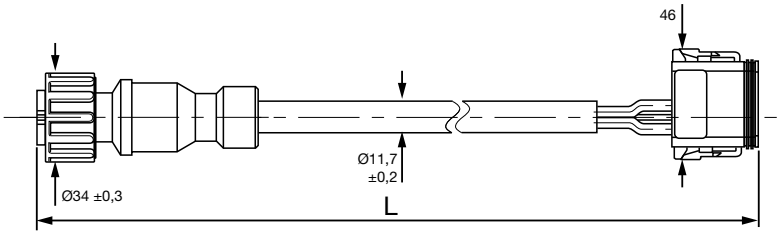
X1 Power Supply Harness (ISO 7638 and ISO 1185)

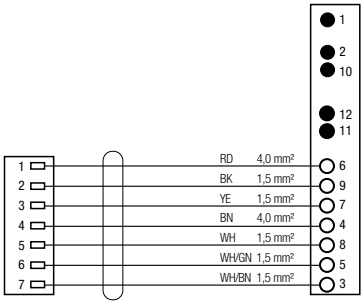




Part No.	Type No.	Cable length L [m]	Comments
II40391F1	EK3108	L_1 = 0.5 L_2 = 1.0	L_1 = power supply (ISO 7638) L_2 = stop lamp supply (ISO 1185) Use with Power Supply Cable (page 6 and 7)
II40391F2		L_1 = 0.5 L_2 = 12.0	

X1 Power Supply Harness (ISO 7638)





Part No.	Type No.	Cable length L [m]	Comments
K002286 [1)]	-	0.5	L = power supply (ISO 7638) Use with Power Supply Cable (page 6 and 7)

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K002286N00

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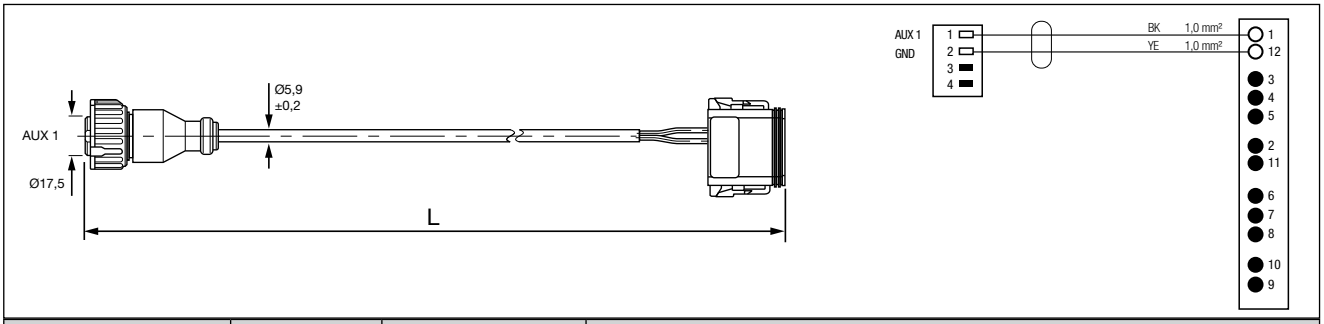
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

TEBS4

Cables for Trailer EBS (TEBS4)

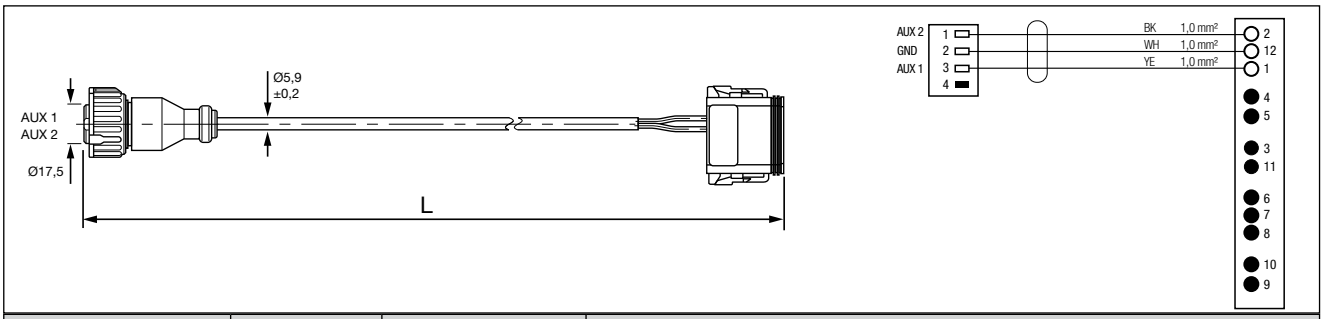
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X2 Connector Harness with Auxiliary Connector (Aux 1)



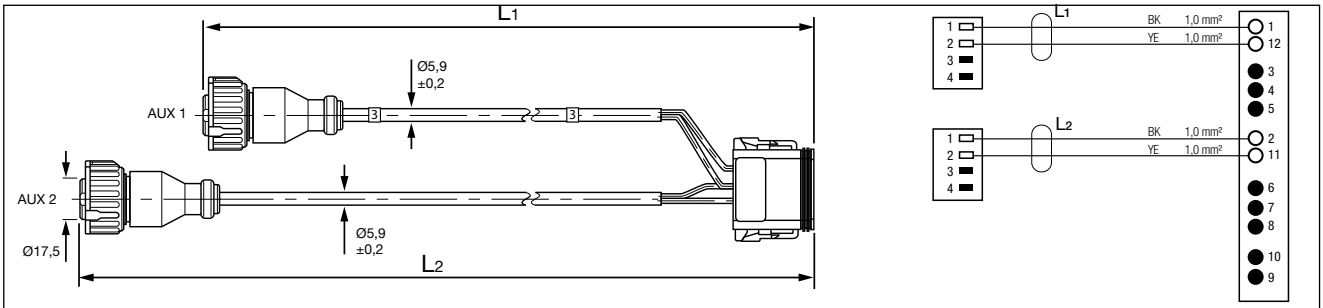
Part No.	Type No.	Cable length L [m]	Comments
II397882	EK3123	4.0	
II397883		6.0	
II397884		2.0	

X2 Connector Harness with Auxiliary Connector (3rd Modulator or Aux 1 & 2)



Part No.	Type No.	Cable length L [m]	Comments
K002954	EK3142	9.0	for connecting 3rd modulator BR9234 or other Aux 1/2 devices

X2 Connector Harness with Auxiliary Connectors (Aux 1 and Aux 2)



Part No.	Type No.	Cable length L [m]	Comments
II397874	EK3122	L_1 = 6.0 L_2 = 2.0	L_1 = Aux 1 L_2 = Aux 2

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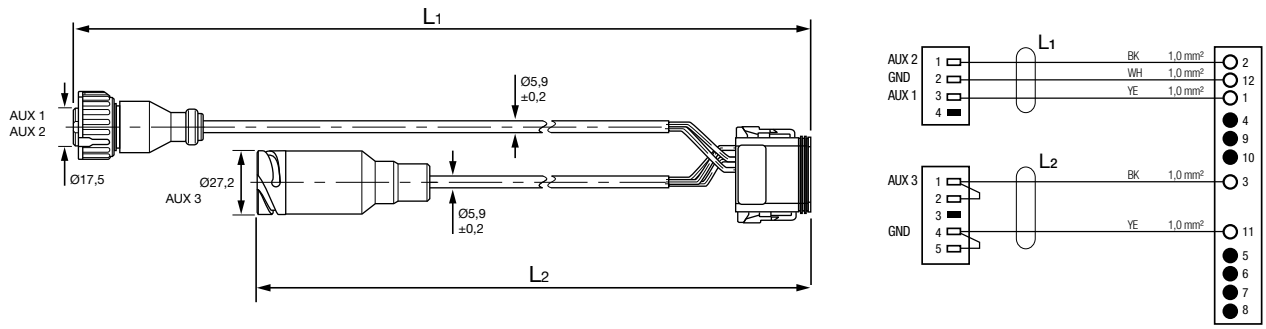
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TEBS4

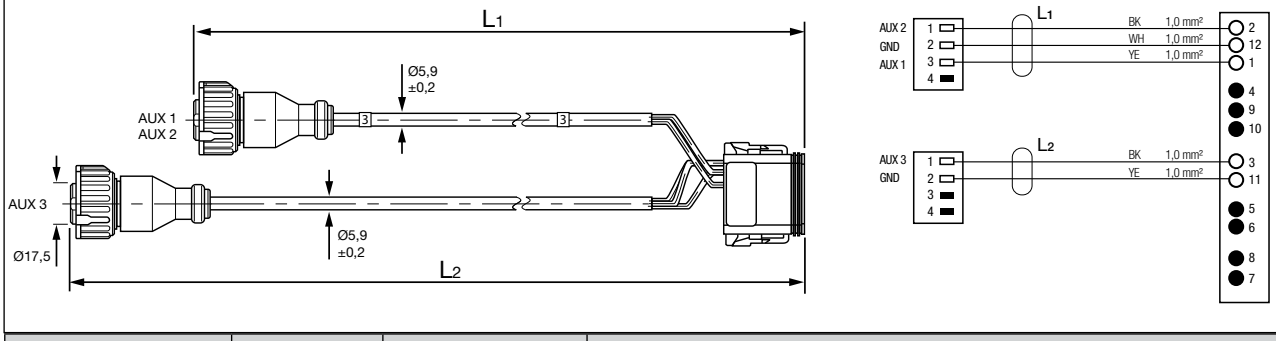
Cables for Trailer EBS (TEBS4)

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August 2015

X2 Connector Harness with Auxiliary Connectors (3rd Modulator or Aux 1, Aux 2 and Aux 3)



Part No.	Type No.	Cable length L [m]	Comments
K002951	EK3140	L_1 = 9.0 L_2 = 6.0	L_1 = BR9234 or other Aux 1/2 devices L_2 = Aux 3 - bayonet splitter



Part No.	Type No.	Cable length L [m]	Comments
K002952	EK3141	L_1 = 3.0 L_2 = 6.0	L_1 = BR9234 or other Aux 1/2 devices L_2 = Aux 3

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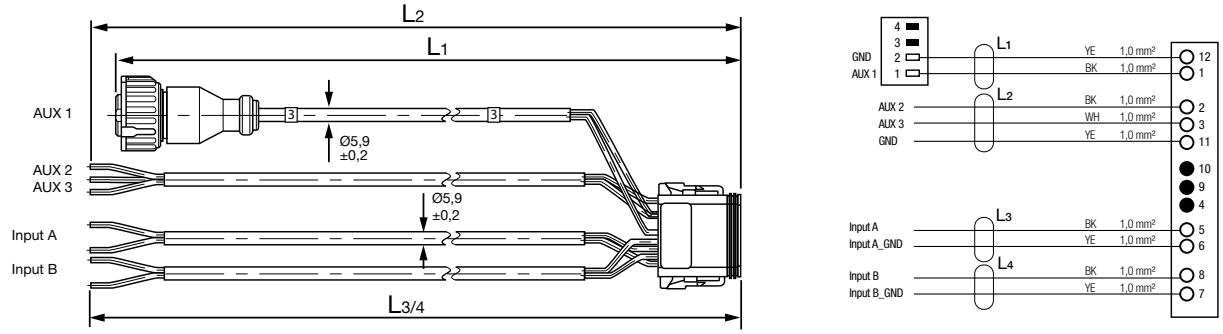
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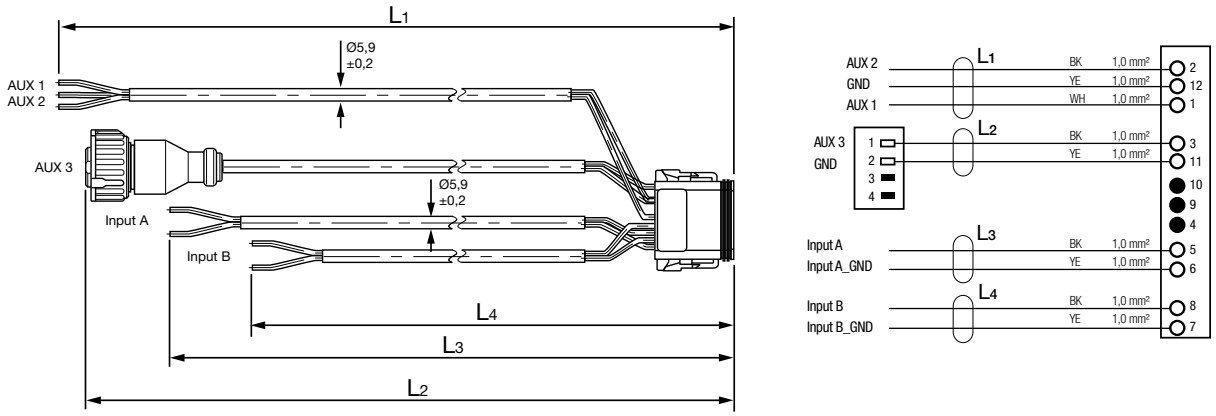
Cables for Trailer EBS (TEBS4)

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X2 Connector Harness with Auxiliary Connectors and input cables



Part No.	Type No.	Cable length L [m]	Comments
II397951	EK3125	L_1 = 4.0 L_2 = 1.0 L_3 = 1.0 L_4 = 1.0	L_1 = Aux 1 L_2 = Aux 2 & 3 L_3 = Input A L_4 = Input B
II397952		L_1 = 6,0 L_2 = 1,0 L_3 = 1,0 L_4 = 1,0	



Part No.	Type No.	Cable length L [m]	Comments
K004569	EK3129	L_1 = 1.0 L_2 = 1.2 L_3 = 1.0 L_4 = 1.0	L_1 = Aux 1 & 2 or BR9234 L_2 = Aux 3 L_3 = Input A L_4 = Input B

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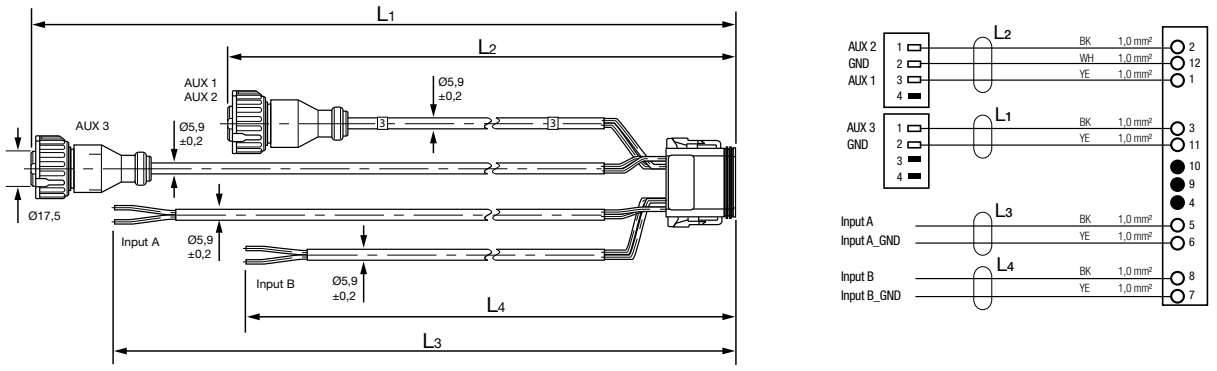
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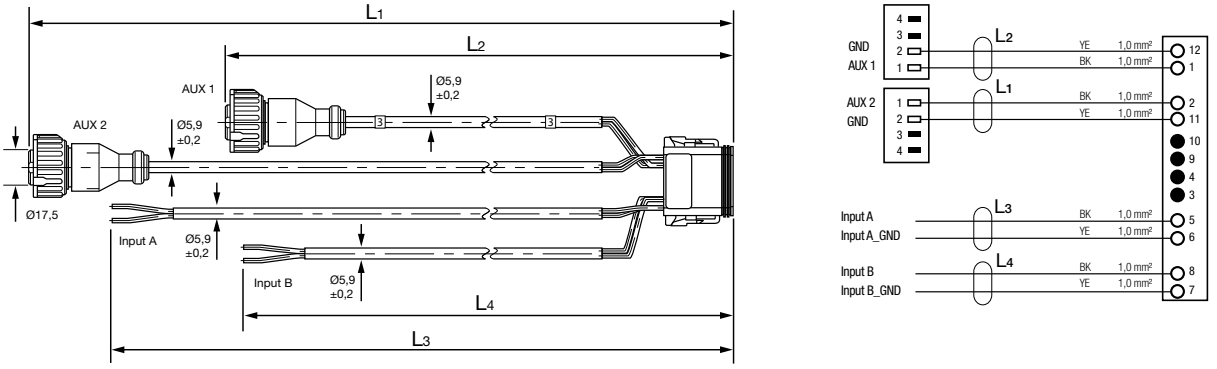
Cables for Trailer EBS (TEBS4)

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X2 Connector Harness with Auxiliary Connectors and input cables *(contd.)*



Part No.	Type No.	Cable length L [m]	Comments
II39802F1	EK3126	L_1 = 2.0 L_2 = 6.0 L_3 = 1.0 L_4 = 1.0	L_1 = Aux 3 L_2 = Aux 1 & 2 or BR9234 L_3 = Input A L_4 = Input B



Part No.	Type No.	Cable length L [m]	Comments
II39814F1	EK3127	L_1 = 6.0 L_2 = 2.0 L_3 = 15.0 L_4 = 7.0	L_1 = Aux 2 L_2 = Aux 1 L_3 = Input A L_4 = Input B
II39814F2		L_1 = 6.0 L_2 = 2.0 L_3 = 6.0 L_4 = 6.0	

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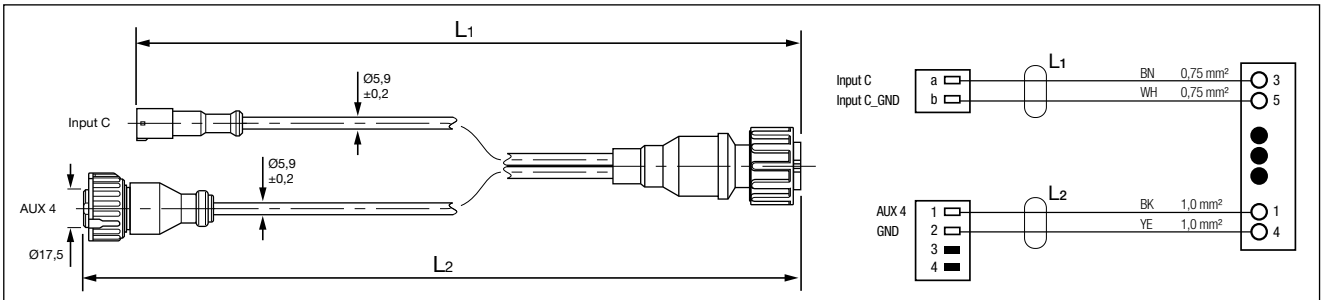
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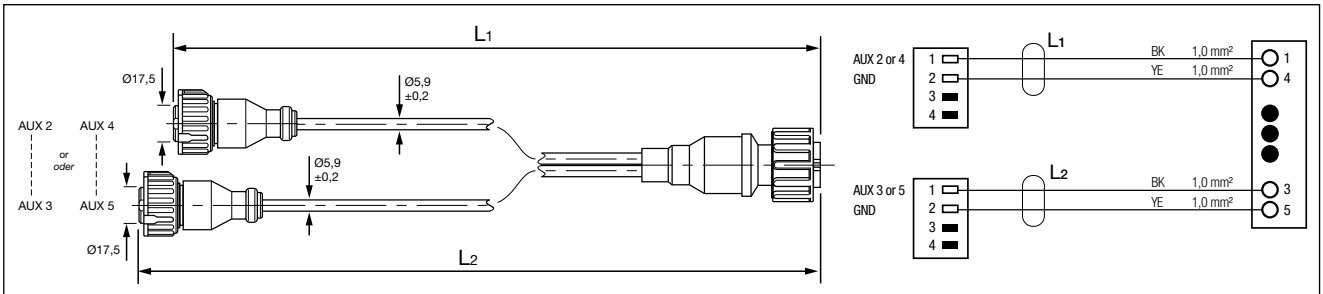
Cables for Trailer EBS (TEBS4)

Connecting Cable for Aux 4 and Input C



Part No.	Type No.	Cable length L [m]	Comments
K002283	-	L_1 = 1.0 L_2 = 3.0	L_1 = Input C L_2 = Aux 4 Used in conjunction with K002270/71/72

Connecting Cable - Bayonet Splitter



Part No.	Type No.	Cable length L [m]	Comments
K002284	-	L_1 = 1.0 L_2 = 3.0	L_1 = Aux 2 or Aux 4 L_2 = Aux 3 or Aux 5 Used in conjunction with K002270/71/72

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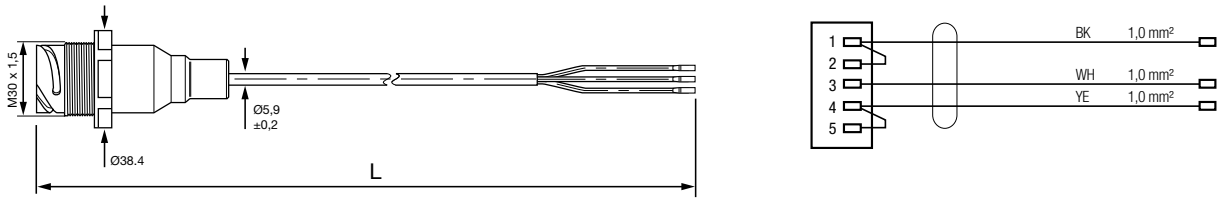
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TEBS4

Cables for Trailer EBS (TEBS4)

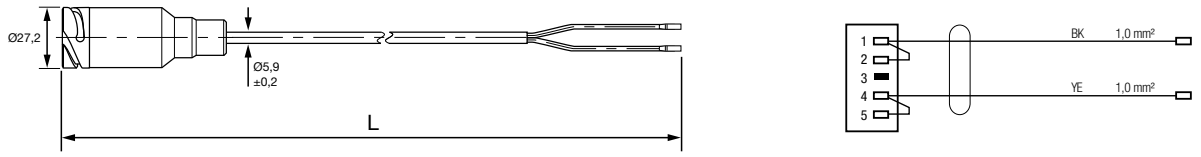
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Connecting Cable for Diagnostic Socket



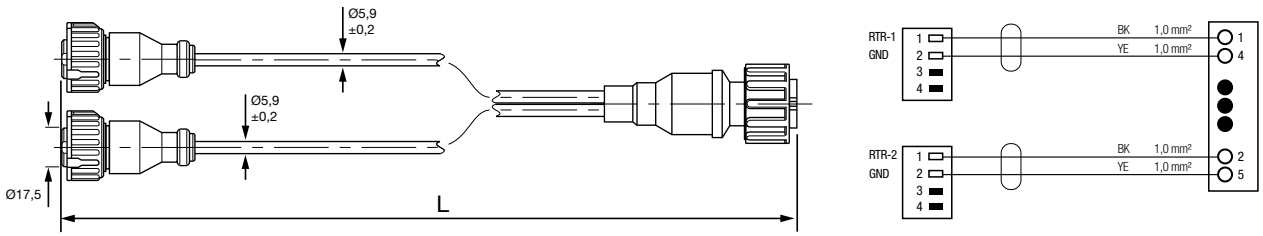
Part No.	Type No.	Cable length L [m]	Comments
K002270 [1]	-	2.0	Diagnostic Socket without mounting kit or AUX 4 and Input C or several AUX
K002271 [1]	-	6.0	
K002272 [1]	-	15.0	

Connecting Cable - Bayonet Splitter



Part No.	Type No.	Cable length L [m]	Comments
K002273	-	6.0	Used in conjunction with K002285

Connecting Cable - 2 x reset to ride height outputs



Part No.	Type No.	Cable length L [m]	Comments
K002285	-	0.5	Used in conjunction with K002273

[1] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K002272N00

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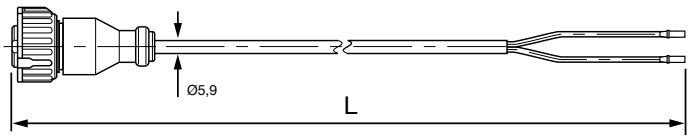
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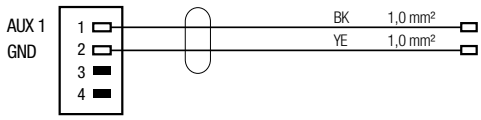
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TEBS4

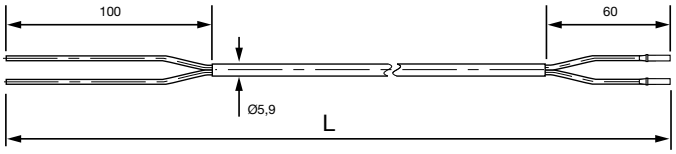
Cables for Trailer EBS (TEBS4)

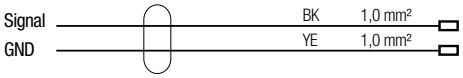
Connecting Cable for auxiliaries (2 pins)





Part No.	Type No.	Cable length L [m]	Comments
K002274 [1)]	-	2.0	with one end open (with pins to suit the Deutsch connector) for several AUX connections
K002275 [1)]	-	6.5	
K002276 [1)]	-	10.0	
K017003 [1)]		15.0	





Part No.	Type No.	Cable length L [m]	Comments
K002280 [1)]	-	7.0	with two ends open (one with pins to suit the Deutsch connector) for several AUX connections
K002281 [1)]	-	15.0	

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K002281N00

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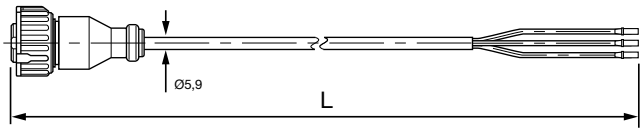
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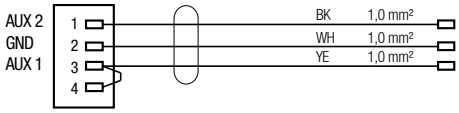
TEBS4

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August 2015

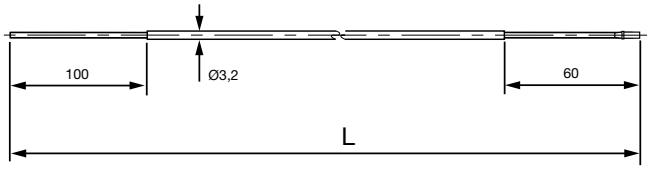
Connecting Cable for auxiliaries with Bayonet Connector (3 pins)

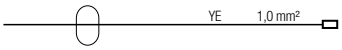




Part No.	Type No.	Cable length L [m]	Comments
K002277 [1)]	-	3.0	for 3rd modulator (BR9234) connection
K002278 [1)]	-	9.0	
K002279 [1)]	-	15.0	

Cable with open ends





Part No.	Type No.	Cable length L [m]	Comments
K016629 [1)]	-	7.0	for Stop Lamp (for example)
K016630 [1)]	-	15.0	

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K016630N00

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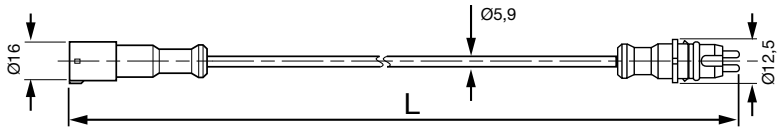
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TEBS4

Cables for Trailer EBS (TEBS4)

Doc. No. Y107795 (EN - Rev. 001)
August 2015

Wheel Speed Sensor Extension Cable



Part No.	Type No.	Cable length L [m]	Comments
II367562000	EK3130	2.0	For extending the wheel speed sensor cable to enable connection to the brake module
II367563000		3.0	
II367564000		4.0	
II367565000		5.0	
II367566000		6.0	
II367568000		8.0	
II3675610000		10.0	
II3675612000		12.0	
II3675615000		15.0	

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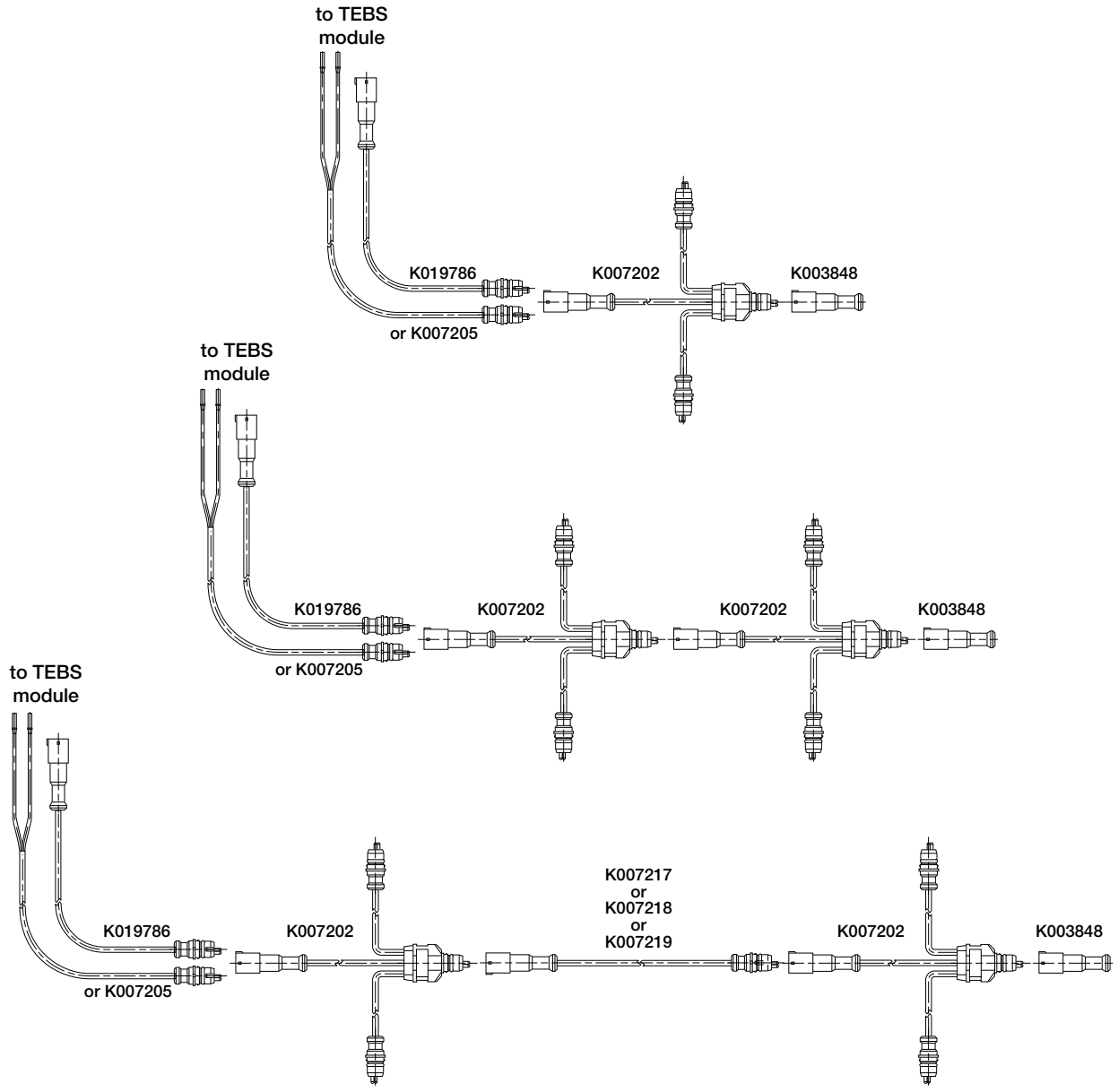
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Cables for Trailer EBS (TEBS4)

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Pad Wear Sensing - Installation examples



Note: further Axle Modules K007202 may be added as necessary

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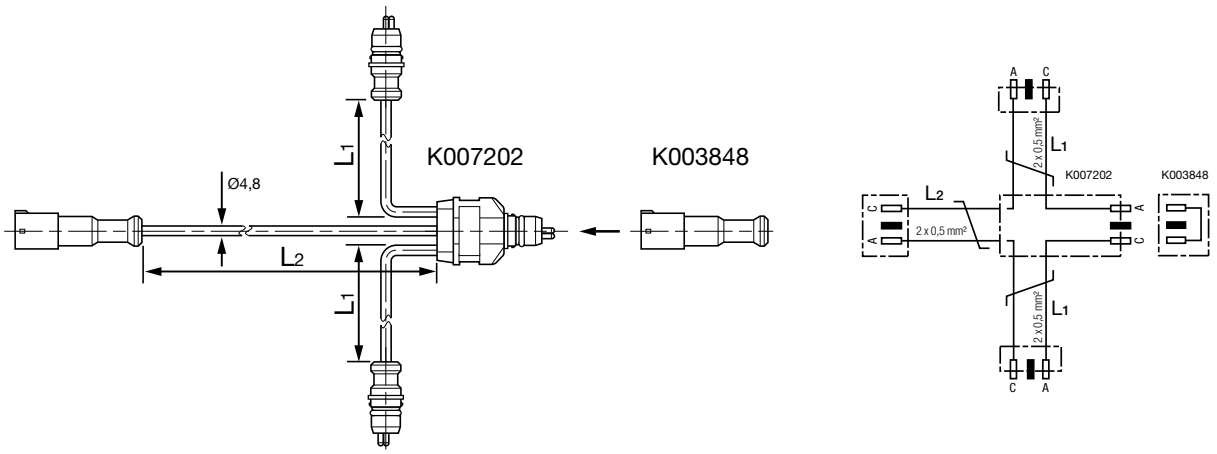
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Cables for Trailer EBS (TEBS4)

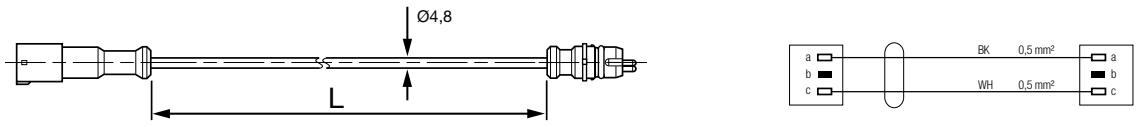
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Axle Module for Pad Wear Sensing



Part No.	Type No.	Cable length L [m]	Comments
K007202	-	L_1 = 2.0 L_2 = 2.0	L_1 = pad wear sensor L_2 = connecting or extension cable
K003848	-	-	Closure Cap for Axle Module K007202

Extension Cable for Pad Wear Sensing



Part No.	Type No.	Cable length L [m]	Comments
K007217	-	1.0	To connect two Axle Modules K007202 together
K007218	-	3.0	
K007219	-	5.0	

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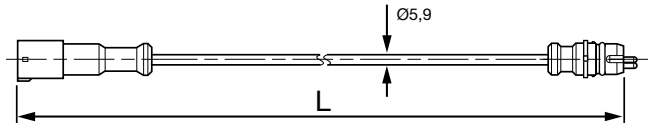
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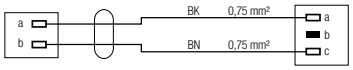
TEBS4

Cables for Trailer EBS (TEBS4)

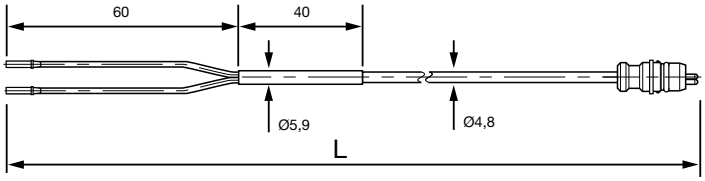
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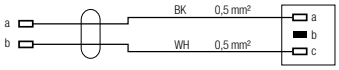
Connecting Cable for Pad Wear Sensing





Part No.	Type No.	Cable length L [m]	Comments
K019786 [1)]	-	1.0	To connect Axle Module K007202 to TEBS Module (TEBS4 Module - SAL or SAR)





Part No.	Type No.	Cable length L [m]	Comments
K007205	-	1.0	To connect Axle Module K007202 to TEBS Module (Deutsch plug)

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K019786N00

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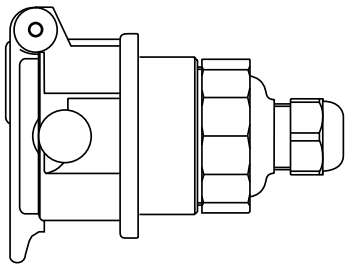
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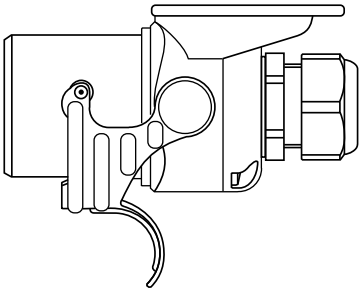
TEBS4

Cables for Trailer EBS (TEBS4)

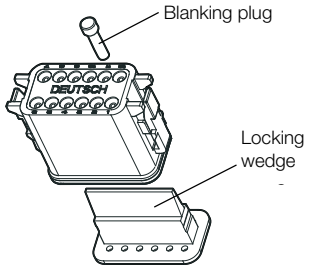
Accessories



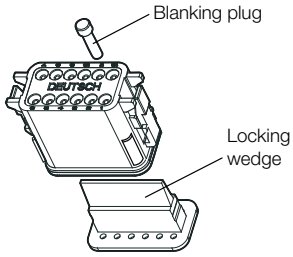
Part No.	Type No.	Description
K002290	-	ISO 7638 Socket (7 pin)



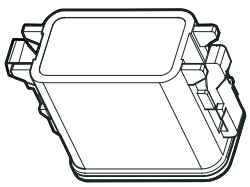
Part No.	Type No.	Description
K002291	-	ISO 7638 Plug (7 pin)



Part No.	Type No.	Description
K002287 [1)]	-	12-pin Deutsch Plug (**Code B** for X2) includes: 1 x Deutsch plug 1 x Locking wedge 12 x Blanking plugs



Part No.	Type No.	Description
K091439 [1)]	-	12-pin Deutsch Plug (**Code A** for X1) includes: 1 x Deutsch plug 1 x Locking wedge 10 x Blanking plugs



Part No.	Type No.	Description
K026197V01 [1)]	-	Blanking Plug for all Deutsch 12-way and 18-way Sockets (no coding)

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K026197V01N00

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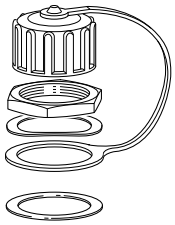
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TEBS4

Cables for Trailer EBS (TEBS4)

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August 2015

Accessories *(contd.)*



Part No.	Type No.	Description
K005378	-	Mounting kit for Diagnostic Socket

Revision Details

Rev. 000	March 2012	New document
Rev. 001	May 2015	Amended to include only TEBS4 cables. Obsolete part numbers deleted.
Rev. 001	August 2015	Correction to K091439..

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Product DATA

TEBS G2

Cables for TEBS G2

Doc. No. Y142784 (EN - Rev. 003)
August 2015

PD-272-025

Function



Cables are used in trailer EBS systems to:

- provide electrical power to the components in the system.
- communicate signals to the ECU from sensors monitoring trailer characteristics.
- communicate control commands from the ECU to modulators/modules to enable any required braking intervention.
- communicate control commands from the towing vehicle.

Power Supply Cables are used to distribute electrical power from the towing vehicle to electrically powered braking and auxiliary equipment on the trailer. The main power supply to the trailer is through a plug or socket according to ISO 7638. The ISO 7638 connection carries the CAN signal from/to the towing vehicle and so the EBS **Power Supply Cables** also provide the CAN signal to the ECU.

The cables are available in various lengths and are normally supplied with a bayonet connector to ensure easy and safe connection.

Modular Cables / Wiring Harnesses are available in many configurations and are used to supply electrical signals and power to auxiliary equipment including the external third modulator on 4S/3M systems.

Wheel Speed Sensor Cables are used to connect the ECU to the wheel speed sensors so that their wheel speed signals can be sent. The wheel speed sensor is supplied with only a short length of cable and so will often require a **Wheel Speed Sensor Extension Cable** to enable connection.

NOTES: *The text in the 'Comments' columns describes the typical usage. Other connections are possible for most cables.*

In this document the cables are divided into sections:

- *Each section covers the system for which the cables are intended (TEBS G2.0/G2.1/G2.2).*
- *To help in finding the right cable, at the head of each page is a photograph of the module from the relevant system.*
- *Cables which can be used in more than one system have photographs of all relevant modules at the head of the page.*
- *Each section starts with details of power cables, then shows modulator cables, wheel speed sensor cables and auxiliary cables.*
- *If you need cables for 12 V systems, please contact your Knorr-Bremse representative.*

Technical Features

Operating Temperature Range: -40 °C to +80 °C

See tables for other features.

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TEBS G2

Cables for TEBS G2

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August 2015

Colour Coding used in this document

BK	Black	BU	Blue	RD	Red	YE	Yellow
BN	Brown	GN	Green	WH	White		

Identification of Module Types

Base Part Number	Type Number	Brake Module Type	Stop Lamp Powering
K019300	ES2060	TEBS G2.0 Premium	yes
K019302	ES2060	TEBS G2.0 Premium	yes
K019309	ES2060	TEBS G2.0 Premium	yes
K019310	ES2060	TEBS G2.1 Premium	yes
K019312	ES2060	TEBS G2.1 Premium	yes
K019319	ES2060	TEBS G2.1 Premium	yes
K019340	ES2060	TEBS G2.0 Standard	yes
K019342	ES2060	TEBS G2.0 Standard	yes
K019349	ES2060	TEBS G2.0 Standard	yes
K019350	ES2060	TEBS G2.1 Standard	yes
K019352	ES2060	TEBS G2.1 Standard	yes
K019359	ES2060	TEBS G2.1 Standard	yes
K021940	ES2070	Trailer Electro-Pneumatic Module - Standard (TEPM-S)	no
K027900	ES2071	Trailer Electro-Pneumatic Module - Premium (TEPM-P)	no
K055332	ES2090	TEBS G2.2 Standard Plus	no
K055342	ES2090	TEBS G2.2 Standard	no
K055352	ES2090	TEBS G2.2 Standard	yes
K055359	ES2090	TEBS G2.2 Standard	yes
K055362	ES2090	TEBS G2.2 Standard	no
K055369	ES2090	TEBS G2.2 Standard	no
K055372	ES2090	TEBS G2.2 Standard Plus	no
K110612	ES2095	TEBS G2.2 Premium	yes

Other Documentation

For information on systems and components mentioned in this document please refer to:

Pressure Control Valve for iCargo	PD-200-120, Document No. *Y114019*
Diagnostic Cables for TEBS G2	PD-272-035, Document No. *Y138839*
Pressure Sensor	PD-262-200, Document No. *Y095830*
Deflection Sensor	PD-264-200, Document No. *Y095832*
TEBS G2.0/G2.1 Brake Module	PD-214-200, Document No. *Y050635*
TEBS G2.2 Brake Module Standard	PD-214-300, Document No. *Y136107*
TEBS G2.2 Brake Module Standard Plus	PD-214-325, Document No. *Y172339*
TEBS G2.2 Brake Module Premium	PD-214-350, Document No. *Y200882*
Trailer Electro-Pneumatic Module (TEPM-S/TEPM-P)	PD-214-600, Document No. *Y095618*
Level Sensor for iLvl (iLvl Sensor)	PD-264-300, Document No. *Y160685*
iTAP Wireless Interface (ECU)	PD-273-940, Document No. *Y202588*
iLvl Valve	PD-280-450, Document No. *Y172342*
Tyre Pressure Monitoring System (TPMS)	PD-551-000, Document No. *Y095833*
Wheel Speed Sensors	PD-261-000, Document No. *Y011363*

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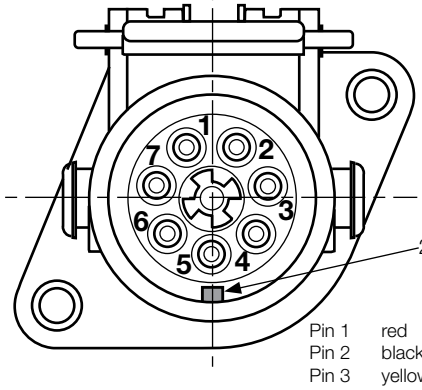
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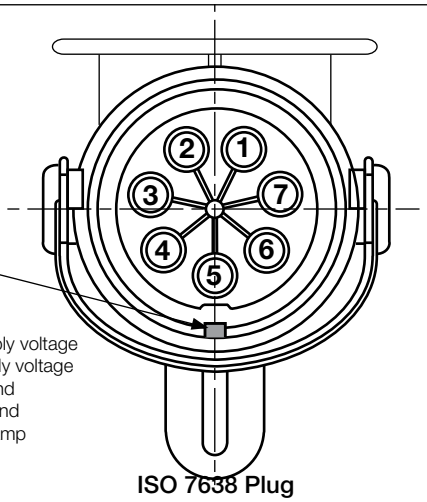
TEBS G2
Cables for TEBS G2

Pin Configurations

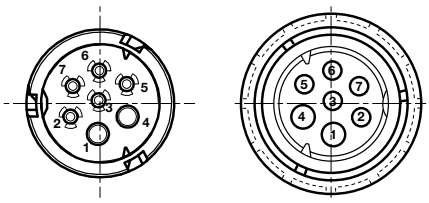


Pin 1	red	Valve supply voltage
Pin 2	black	ECU supply voltage
Pin 3	yellow	ECU ground
Pin 4	brown	Valve ground
Pin 5	white	Warning lamp
Pin 6	white/green	CAN-Hi
Pin 7	white/brown	CAN-Lo

ISO 7638 Socket (24 V)

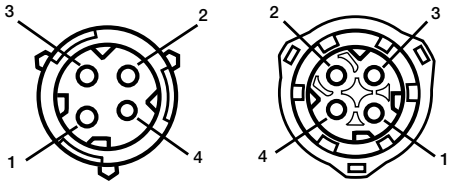


ISO 7638 Plug (24 V)



7-pin Bayonet Socket (ISO 7638 Power)

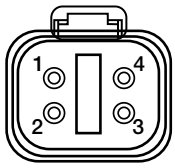
7-pin Bayonet Plug (ISO 7638 Power)



4-pin Bayonet Socket

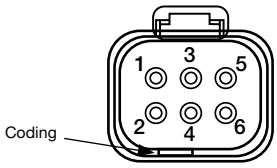
4-pin Bayonet Plug

Deutsch 4-way Plug



Fits the TEBS G2.2 Premium 6-way Socket
(No Coding for 3rd Modulator)

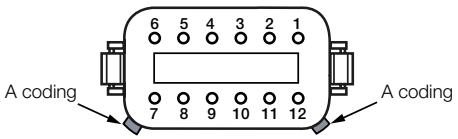
Deutsch 6-way Plug



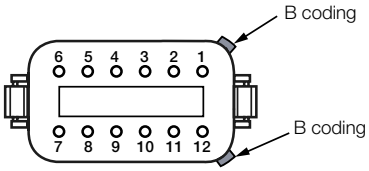
TEBS G2.2 Premium uses the 6-pin Plug
(A and B Coding)

Deutsch 12-way Plug

TEBS G2.2 uses a Code A Plug (Grey)

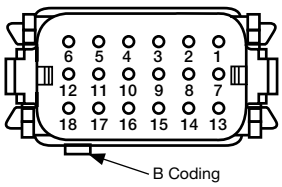


TEBS G2.0/G2.1 uses a Code B Plug (Black)

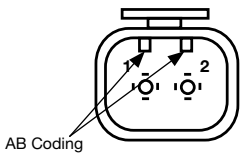


Deutsch 18-way Plug

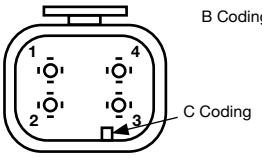
TEPM-P uses the 18-way Plug



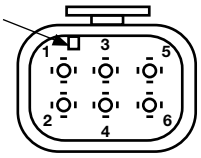
MKS PLUS 2-pin Plug



MKS PLUS 4-pin Plug



MKS PLUS 6-pin Plug



TEPM-S uses the 2-pin, 4-pin and 6-pin Plug

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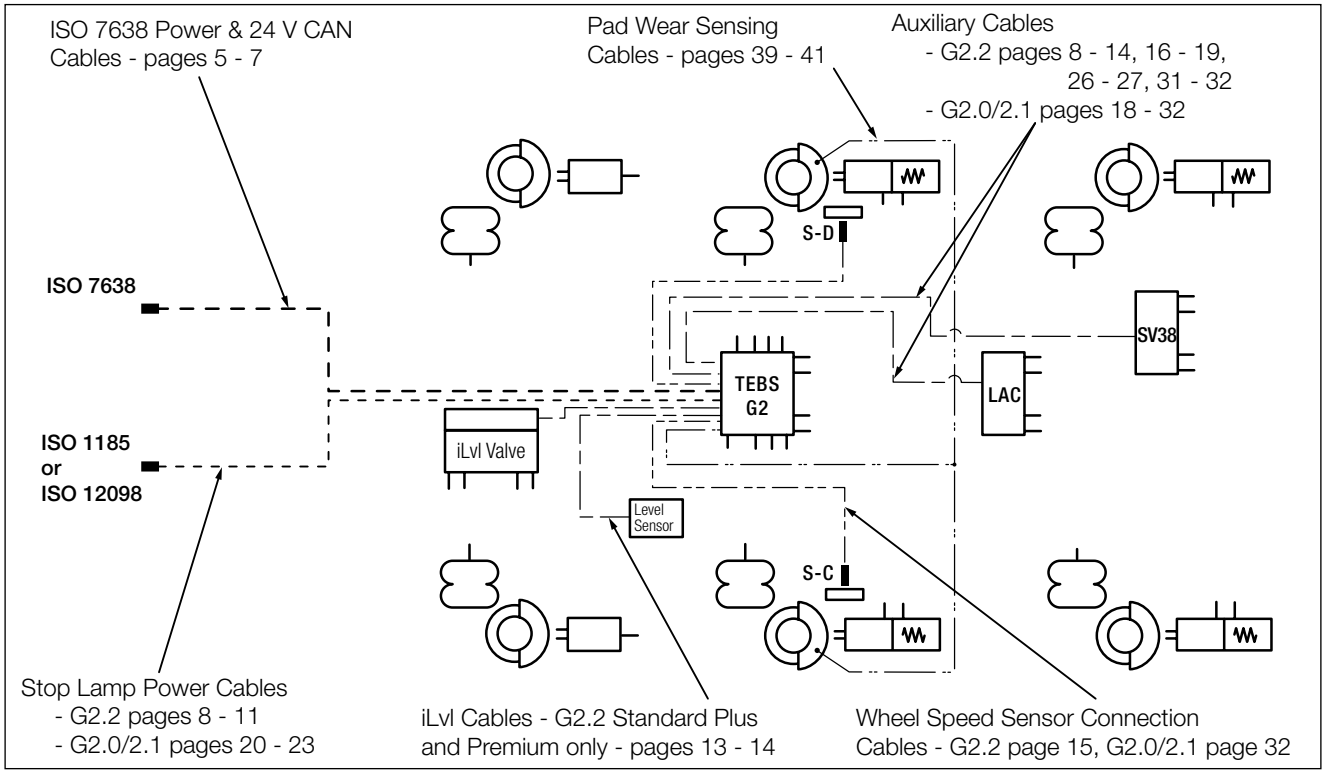
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

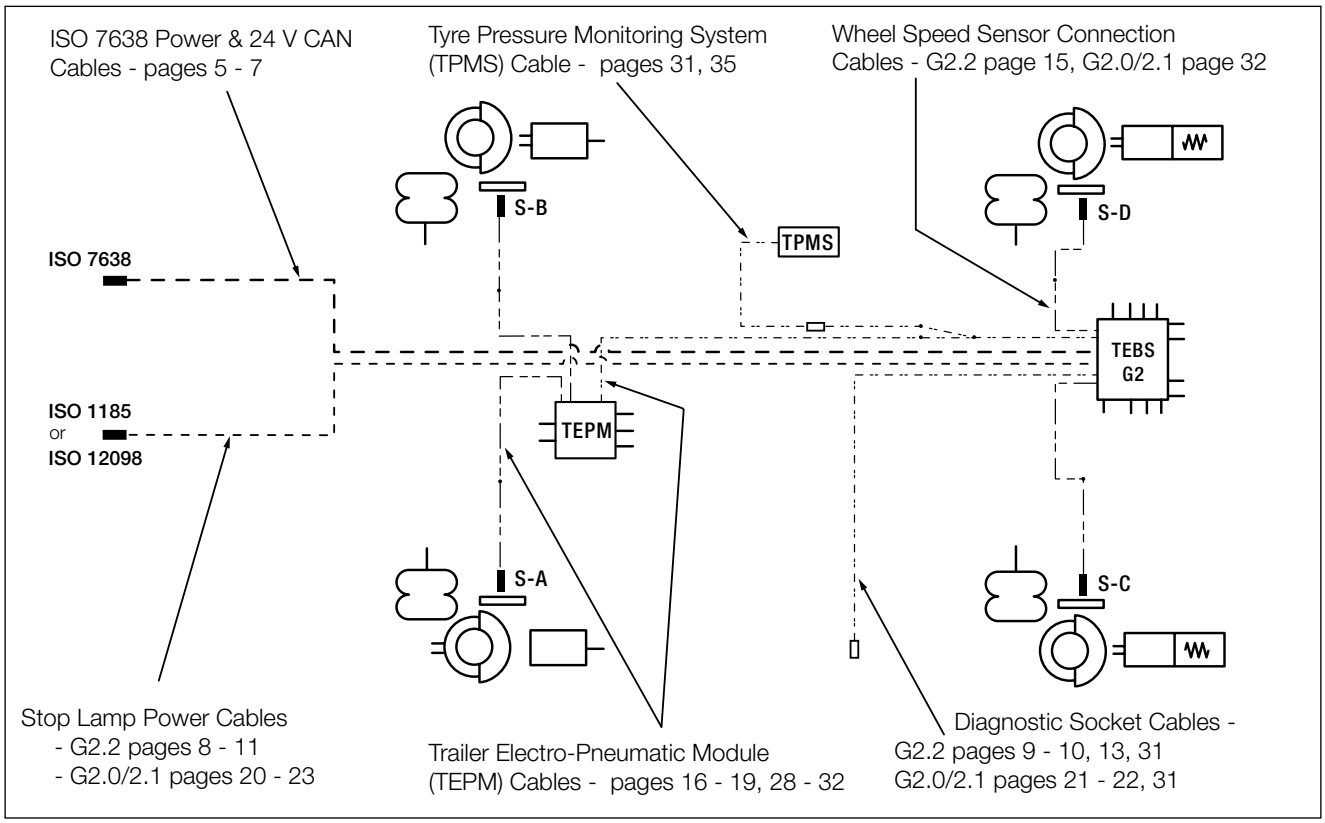
TEBS G2

Cables for TEBS G2

Doc. No. Y142784 (EN - Rev. 003)
August 2015

Cable Selection Guide - TEBS G2 (typical systems)





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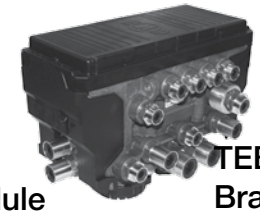
TEBS G2

Cables for TEBS G2

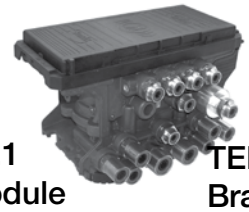
Range Overview - *TEBS G2 Cables*

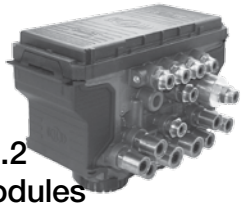


TEBS G2.0
Brake Module



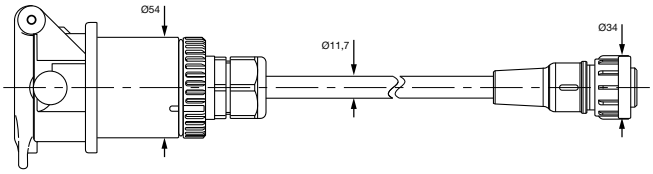
TEBS G2.1
Brake Module

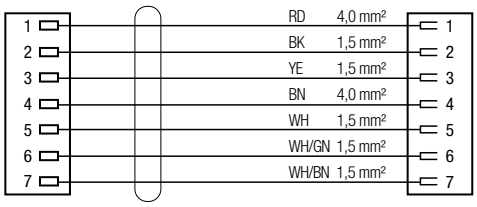




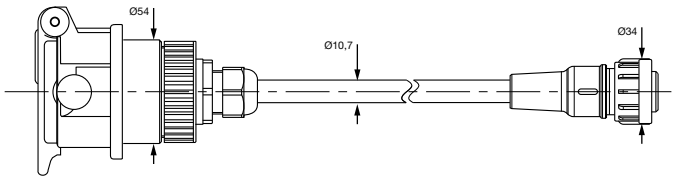
TEBS G2.2
Brake Modules

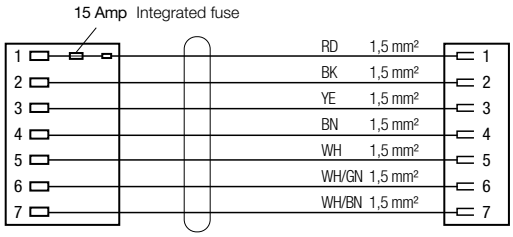
Power Cable (for semi-trailers) with ISO 7638 Socket and Power Connector





Part No.	Type No.	Cable length [m]	Comments
K028491 [1)]	-	0.5	
K008430 [1)]	-	10.0	
K008431 [1)]	-	13.0	





Part No.	Type No.	Cable length [m]	Comments
K019288 [1)]	-	13.0	Fused socket Note - Replacement Fused Pin K068781K50 Replacement Socket K061967K50

Note: The fuse in this power cable limits the number of output devices connected to the TEBS Brake Module. See PD-214-F006, Document No. *Y136112* for full details.

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K019288N00

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TEBS G2

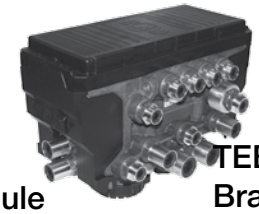
Cables for TEBS G2

Doc. No. Y142784 (EN - Rev. 003)
August 2015

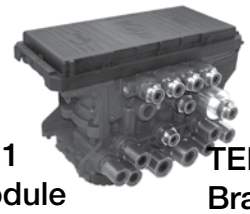
Range Overview - *TEBS G2 Cables (contd.)*

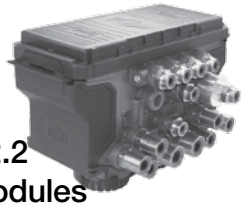


TEBS G2.0
Brake Module



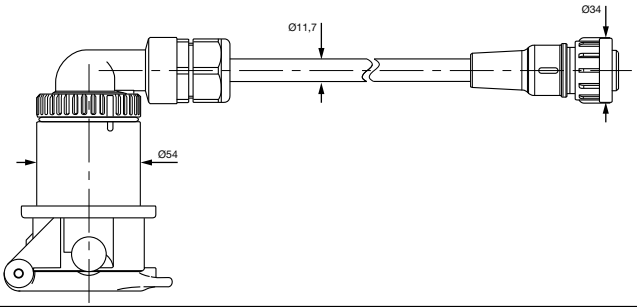
TEBS G2.1
Brake Module

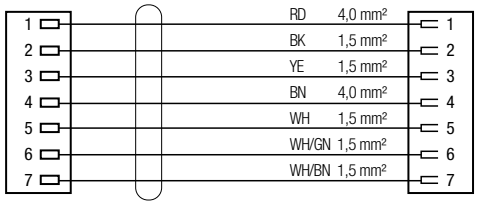




TEBS G2.2
Brake Modules

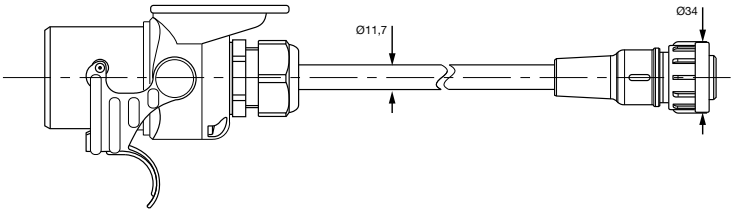
Power Cable (for semi-trailers) with ISO 7638 Socket and Power Connector *(contd.)*

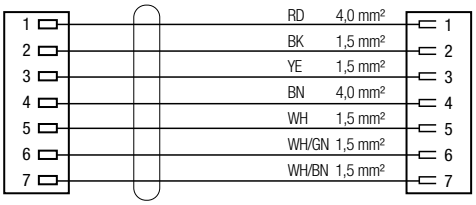




Part No.	Type No.	Cable length [m]	Comments
K028583 [1)]	-	13.0	
K008432 [1)]	-	16.0	

Power Cable (for drawbar and centre-axle trailers) with ISO 7638 Plug and Power Connector





Part No.	Type No.	Cable length [m]	Comments
K010710 [1)]	-	10.0	
K010711 [1)]	-	13.0	

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K010711N00

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TEBS G2

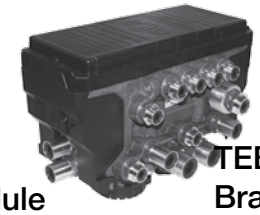
Cables for TEBS G2

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August 2015

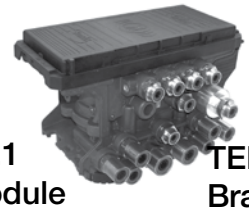
Range Overview - *TEBS G2 Cables (contd.)*

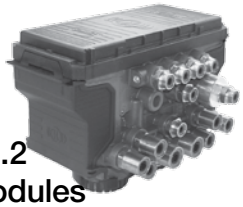


TEBS G2.0
Brake Module



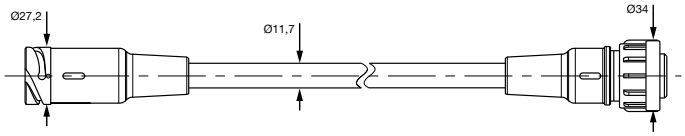
TEBS G2.1
Brake Module





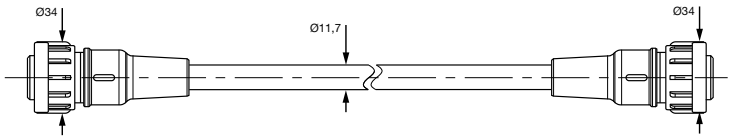
TEBS G2.2
Brake Modules

Power Extension/Trailer Electro-Pneumatic Module (TEPM) Connecting Cable



Part No.	Type No.	Cable length [m]	Comments
K028000 [1)]	-	2.0	Power extension cable or (TEPM) connecting cable
K021138 [1)]	-	4.0	
K028001 [1)]	-	10.0	
K027826 [1)]	-	11.0	
K027827 [1)]	-	13.0	

Power Connecting Cable



Part No.	Type No.	Cable length [m]	Comments
K010718 [1)]	-	0.5	Adapter to connect TEBS4 Power cable

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K010718N00

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TEBS G2

Cables for TEBS G2

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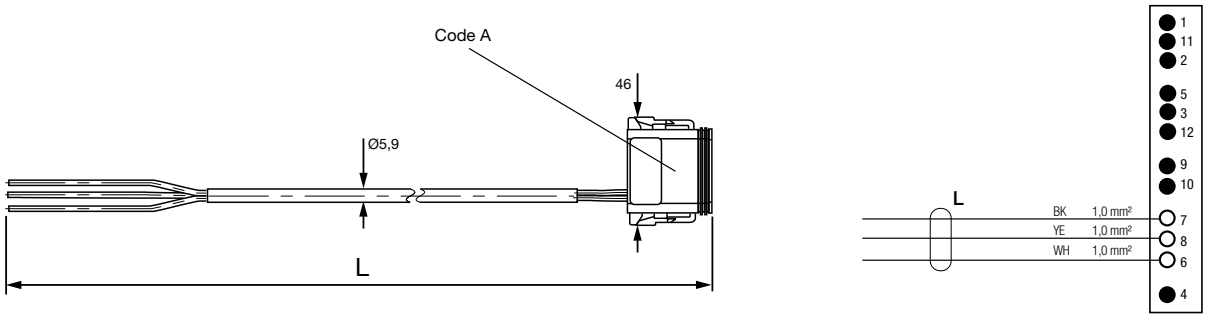
Range Overview - *TEBS G2.2 Cables*



TEBS G2.2
Brake Modules

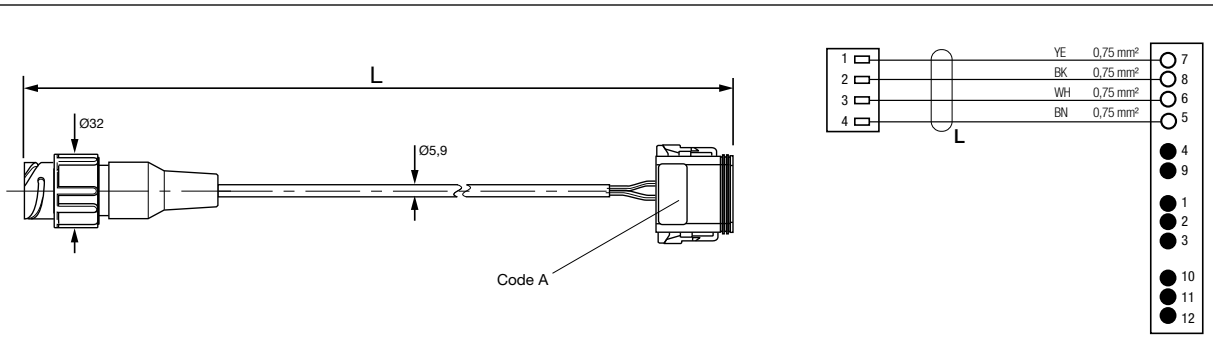


In-Out Cable for ISO 1185 Connection



Part No.	Type No.	Cable length L [m]	Comments
K027861 [1)]	-	7.0	For ISO 1185 (TEB G2.2 Standard and Premium) and input (with open ends)
K027862 [1)]	-	15.0	

In-Out Cable with Bayonet Connector



Part No.	Type No.	Cable length L [m]	Comments
K097079 [1)]	-	1.5	For ISO 1185 (TEB G2.2 Standard and Premium) and inputs

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K097079N00

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TEBS G2

Cables for TEBS G2

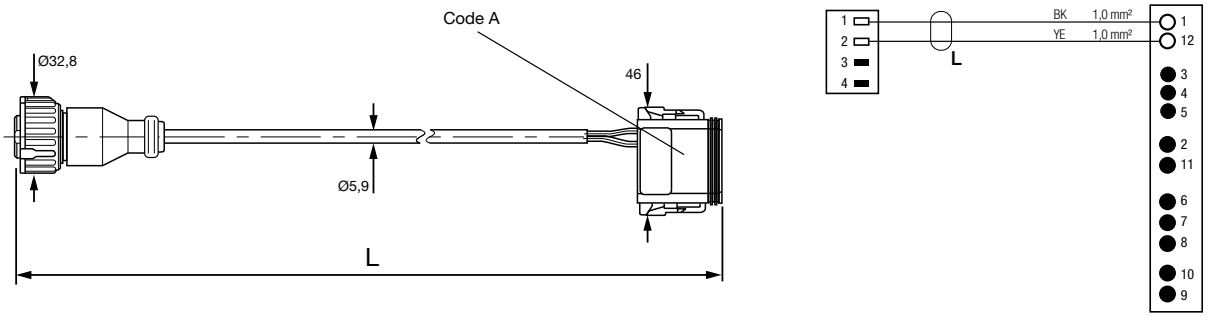
Range Overview - *TEBS G2.2 Cables (contd.)*



TEBS G2.2
Brake Modules

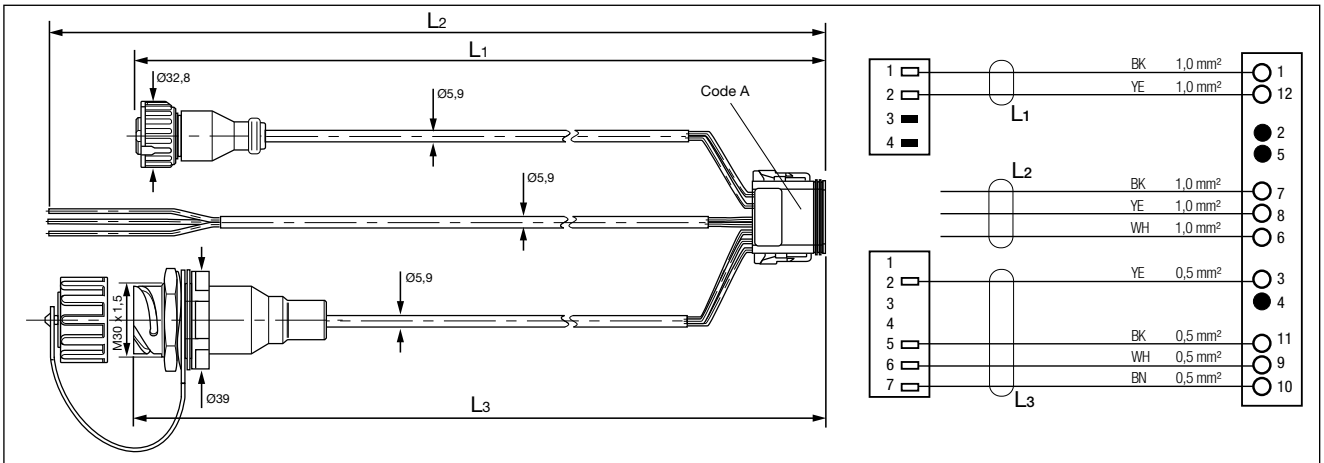


In-Out Cable for Speed Pulse/RtR



Part No.	Type No.	Cable length L [m]	Comments
K027860 [1)]	-	6.5	Speed Pulse/RtR (AUXIO 1)

In-Out Cable for ISO 1185 Connection, Speed Pulse/RtR or Lift Axle Control and Diagnostic Socket



Part No.	Type No.	Cable length L [m]	Comments
K027867 [1)]	-	L_1 = 6.5 L_2 = 7.0 L_3 = 6.0	L_1 = Speed Pulse/RtR or lift axle control (AUXIO 1) L_2 = Stop lamp supply (ISO 1185 - TEBS G2.2 Standard and Premium) and input (with open ends) L_3 = diagnostic socket

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K027867N00

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

TEBS G2

Cables for TEBS G2

Doc. No. Y142784 (EN - Rev. 003)
August 2015

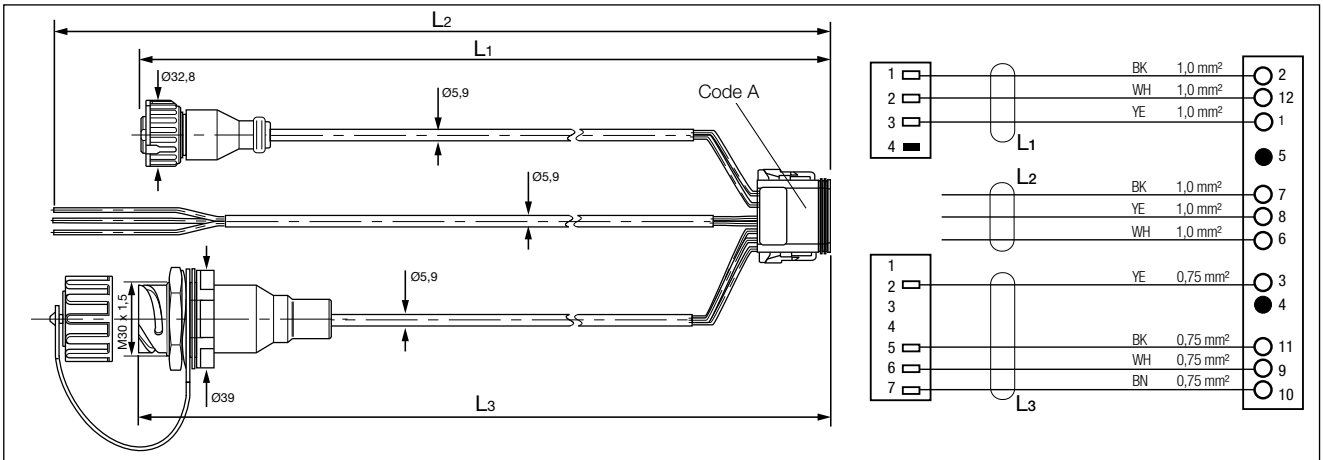
Range Overview - *TEBS G2.2 Cables (contd.)*



TEBS G2.2
Brake Modules

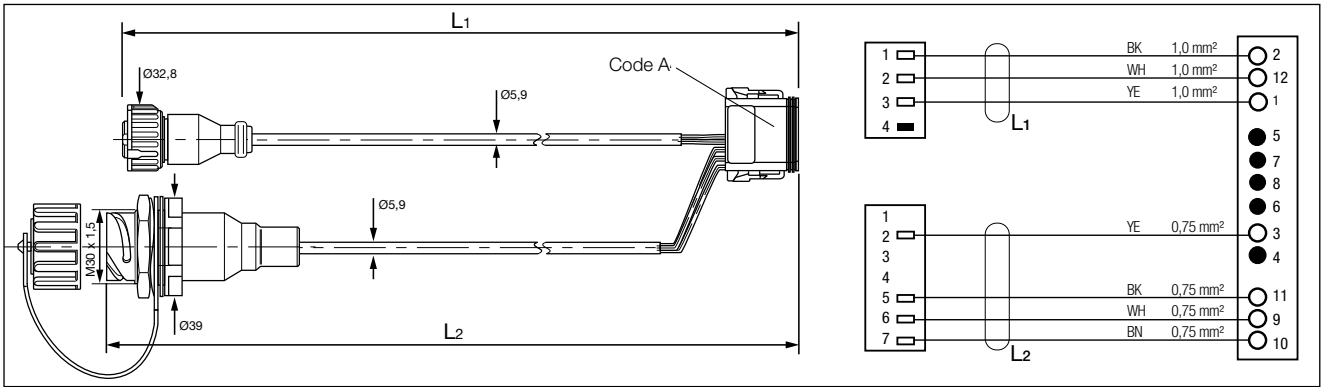


In-Out Cable for ISO 1185 Connection, Speed Pulse/RtR or Lift Axle Control and Diagnostic Socket *(contd)*



Part No.	Type No.	Cable length L [m]	Comments
K027869 [1)]	-	L_1 = 2.0 L_2 = 7.0 L_3 = 6.0	L_1 = Speed Pulse/RtR and/or lift axle control (AUXIO 1 & 2) L_2 = Stop lamp supply (ISO 1185 - TEBS G2.2 Standard and Premium) and input (with open ends) L_3 = diagnostic socket

In-Out Cable for Speed Pulse/RtR or Lift Axle Control and Diagnostic Socket



Part No.	Type No.	Cable length L [m]	Comments
K027859 [1)]	-	L_1 = 2.0 L_2 = 7.0	L_1 = Speed Pulse/RtR and/or lift axle control (AUXIO 1 & 2) L_2 = diagnostic socket

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K027859N00

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August 2015

TEBS G2

Cables for TEBS G2

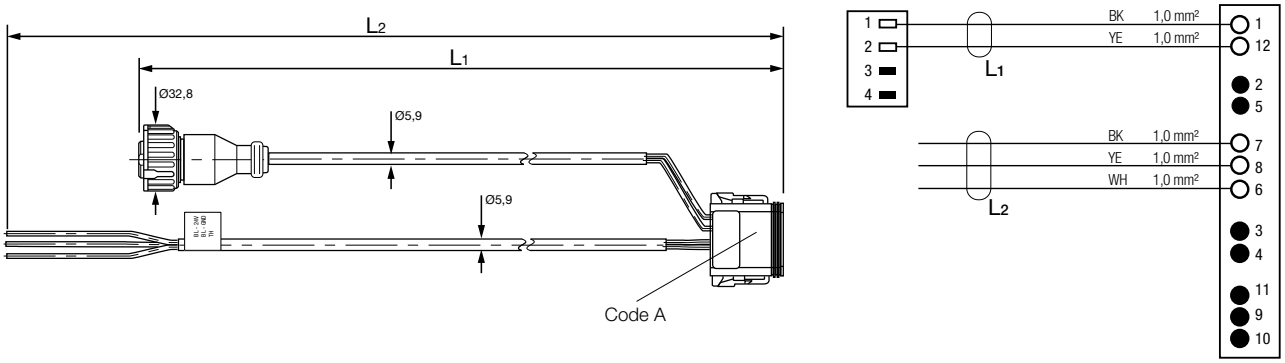
Range Overview - *TEBS G2.2 Cables (contd.)*



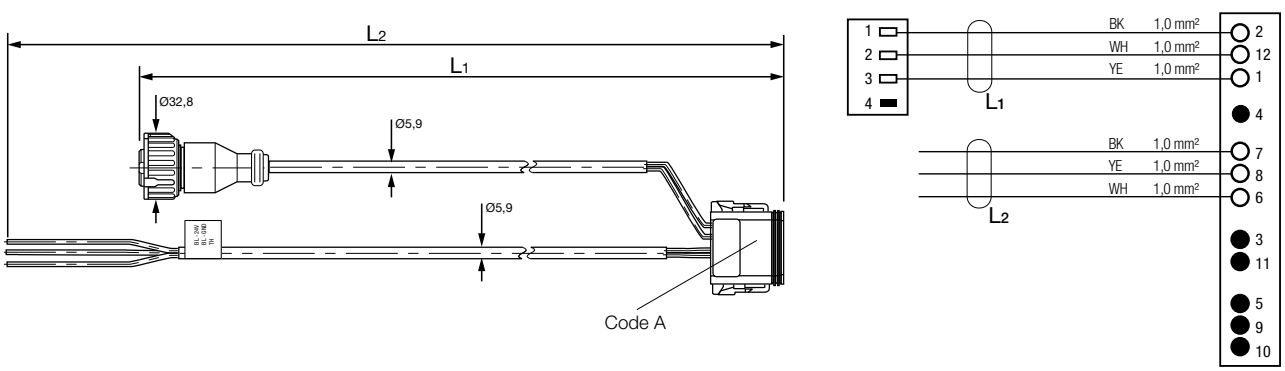
TEBS G2.2
Brake Modules



In-Out Cable for ISO 1185 Connection and Speed Pulse/RtR or Lift Axle Control Connection



Part No.	Type No.	Cable length L [m]	Comments
K027863 [1]	-	L_1 = 6.5 L_2 = 7.0	L_1 = Speed Pulse/RtR or lift axle control (AUXIO 1) L_2 = Stop lamp supply (ISO 1185 - TEBS G2.2 Standard and Premium) and input (with open ends)
K027864 [1]	-	L_1 = 6.5 L_2 = 15.0	



Part No.	Type No.	Cable length L [m]	Comments
K027865 [1]	-	L_1 = 2.0 L_2 = 7.0	L_1 = Speed Pulse/RtR/lift axle control (AUXIO 1 & 2) L_2 = Stop lamp supply (ISO 1185 - TEBS G2.2 Standard and Premium) and input (with open ends)

[1] The part number will carry a suffix "N00" which defines that it is supplied without packaging. Example K027865N00

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TEBS G2

Cables for TEBS G2

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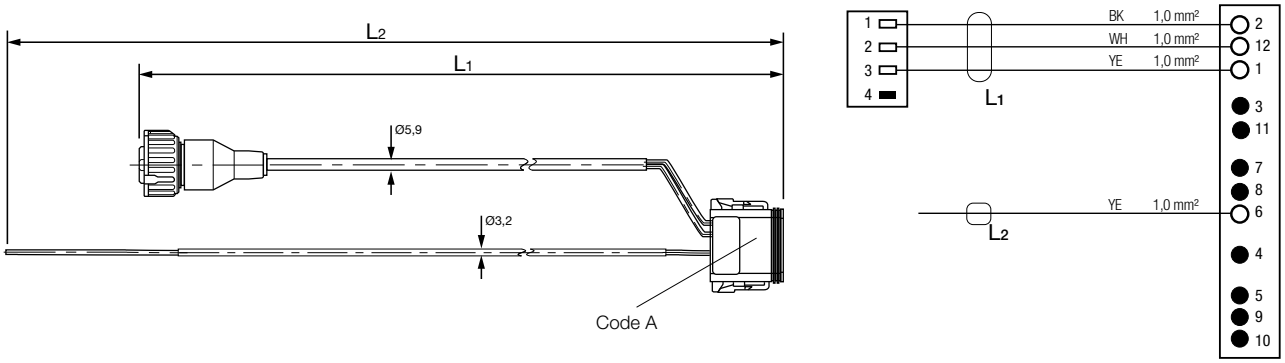
Range Overview - *TEBS G2.2 Cables (contd.)*



TEBS G2.2
Brake Modules

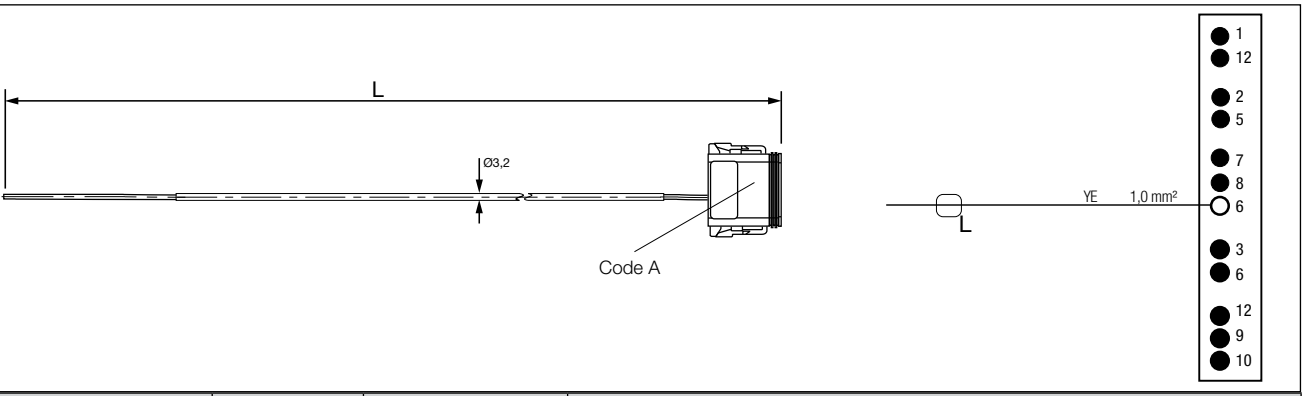


In-Out Cable for Lift Axle Control Connection, Speed Pulse/RtR and Traction Help



Part No.	Type No.	Cable length L [m]	Comments
K027857 [1)]	-	L_1 = 2.0 L_2 = 15.0	L_1 = lift axle control and/or speed pulse/RtR (AUXIO 1 & 2) L_2 = input with open end (e.g. Traction Help)

In-Out Cable for Input



Part No.	Type No.	Cable length L [m]	Comments
K027855 [1)]	-	L = 15.0	L = input with open end (e.g. Traction Help)

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K027857N00

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TEBS G2

Cables for TEBS G2

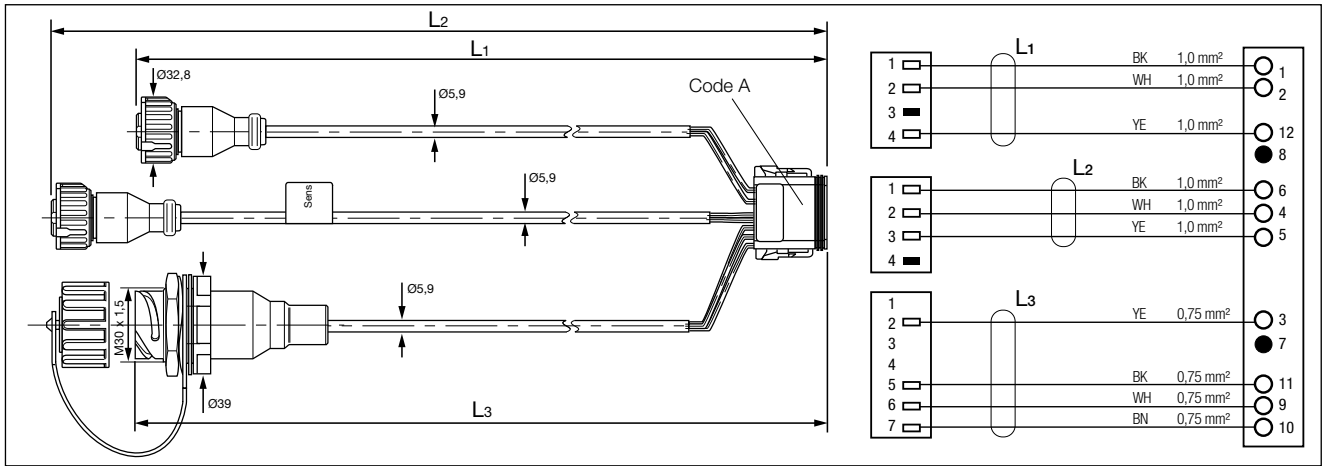
Range Overview - *TEBS G2.2 Cables (contd.)*



TEBS G2.2
Brake Modules

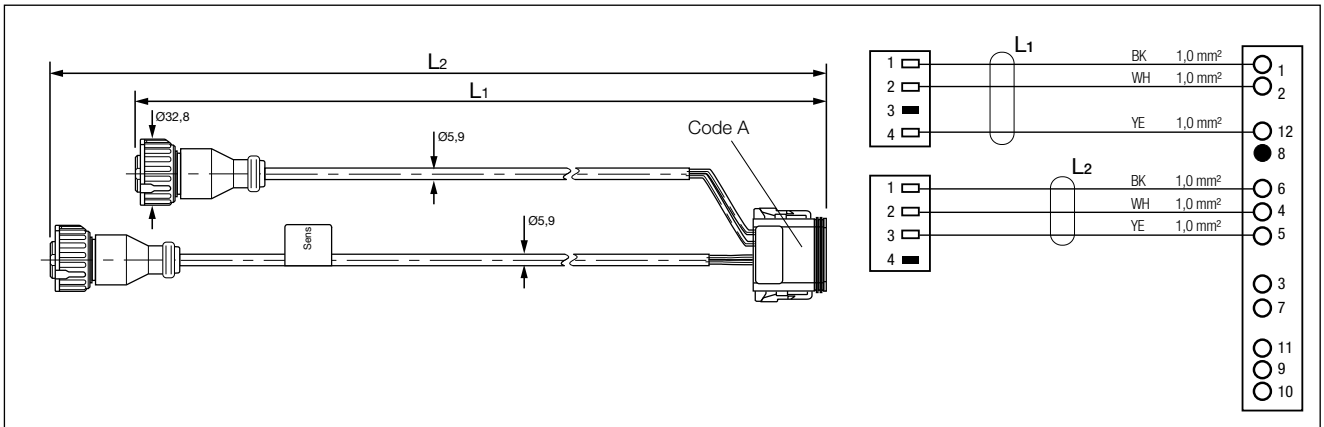


In-Out Cable for iLvl (TEBS G2.2 Standard Plus and Premium only) and Diagnostic Socket



Part No.	Type No.	Cable length L [m]	Comments
K097070 [1)]		L_1 = 3.0 L_2 = 3.0 L_3 = 6.0	L_1 = iLvl valve L_2 = iLvl level sensor (with label) L_3 = diagnostic socket

In-Out Cable for iLvl (TEBS G2.2 Standard Plus and Premium only)



Part No.	Type No.	Cable length L [m]	Comments
K097071 [1)]		L_1 = 3.0 L_2 = 3.0	L_1 = iLvl valve L_2 = iLvl level sensor (with label)

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K097071N00

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TEBS G2

Cables for TEBS G2

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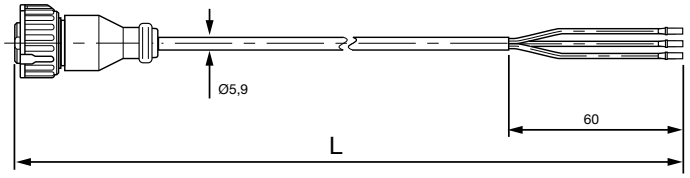
Range Overview - *TEBS G2.2 Cables (contd.)*

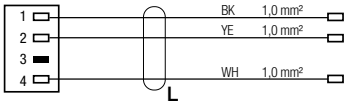


TEBS G2.2
Brake Modules



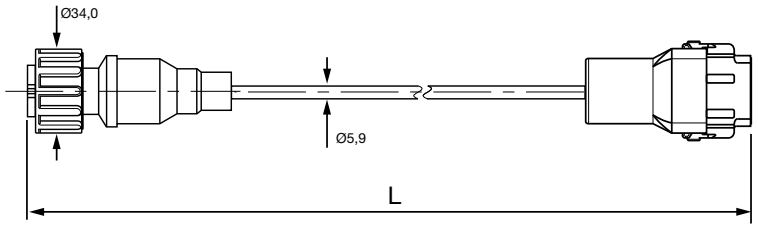
Modular Cable for various uses

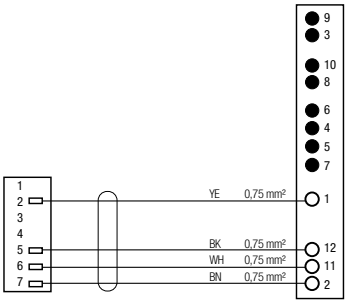




Part No.	Type No.	Cable length L [m]	Comments
K110195 [1)]	-	3.0	with open ends for various uses e.g. for iLvl Valve with TEBS G2.2 Standard Plus or Premium
K110198 [1)]	-	9.0	

Auxiliary Cable for iTAP Wireless Interface





Part No.	Type No.	Cable length L [m]	Comments
K097075 [1)]	-	0.5	
K097076 [1)]	-	4.0	

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K097076N00

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TEBS G2

Cables for TEBS G2

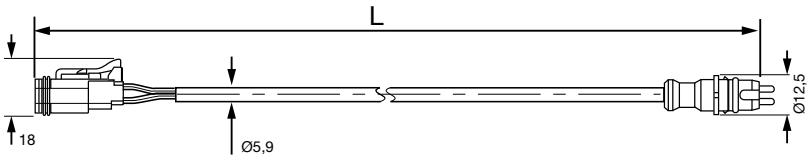
Range Overview - *TEBS G2.2 Cables (contd.)*



TEBS G2.2
Brake Modules



Wheel Speed Sensor Connecting Cable



Part No.	Type No.	Cable length L [m]	Comments
K0278322000	-	2.0	For connecting the wheel speed sensor to the brake module. Note: these cables have both C and D coding and so can be used in either S-C or S-D connections. Note: if an extension cable is required use the II36756... series (see page 32)
K0278323000		3.0	
K0278324000		4.0	
K0278325000		5.0	
K0278326000		6.0	
K02783210000		10.0	

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TEBS G2

Cables for TEBS G2

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Range Overview - *TEBS G2.2 Cables - 4S3M System*



TEBS G2.2
Premium
Brake Module

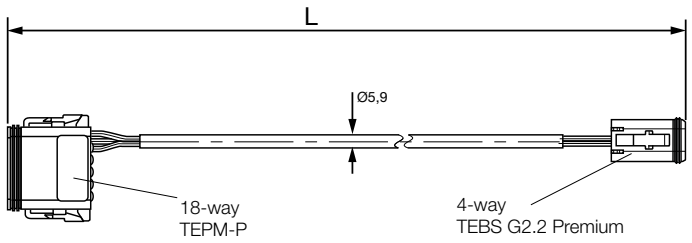


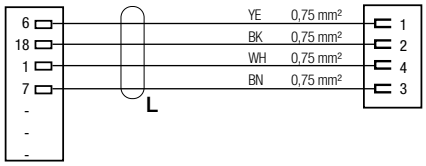
TEPM-S

TEPM-P



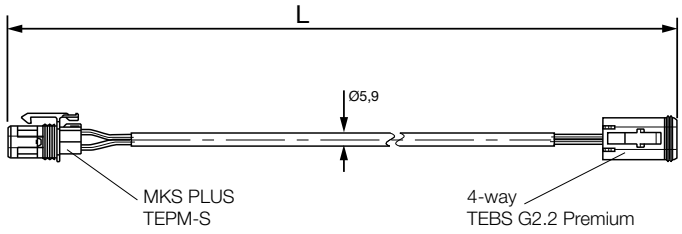
Auxiliary Cable for Trailer Electro-Pneumatic Module Premium (TEPM-P)

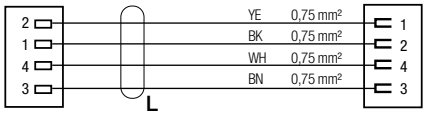




Part No.	Type No.	Cable length L [m]	Comments
K097065 [1)]	-	3.0	with 4-way plug to fit Connector 2.3
K097066 [1)]	-	9.0	

Auxiliary Cable for Trailer Electro-Pneumatic Module Standard (TEPM-S)





Part No.	Type No.	Cable length L [m]	Comments
K097067 [1)]	-	3.0	with 4-way plug to fit Connector 2.3
K097069 [1)]	-	9.0	

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K097069N00

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TEBS G2

Cables for TEBS G2

Range Overview - *TEBS G2.2 Cables - 4S3M System (contd.)*

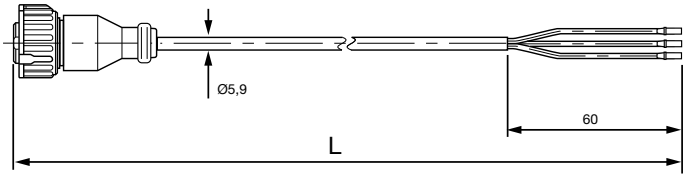


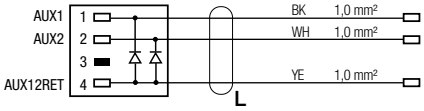
TEBS G2.2 Premium Brake Module

TEPM-P



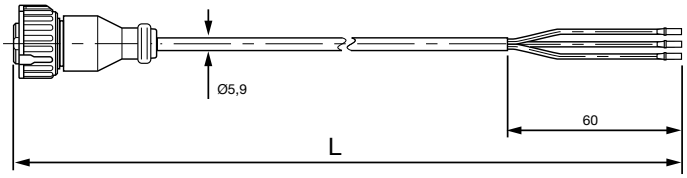
TEPM-P Modular Cable for iLvl Valve (with diodes)

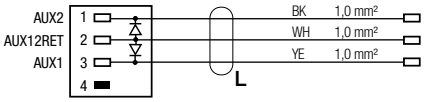




Part No.	Type No.	Cable length L [m]	Comments
K111594 [1)]	-	2.0	with open ends Plug with diodes for pulse-width modulation control of 12V iLvl Valve on front axle

TEPM-P Modular Cable for iCargo Pressure Control Valve (with diodes)





Part No.	Type No.	Cable length L [m]	Comments
K095321 [1)]	-	1.5	with open ends Plug with diodes for pulse-width modulation control of the 12V pressure control valve

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K095321N00

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TEBS G2

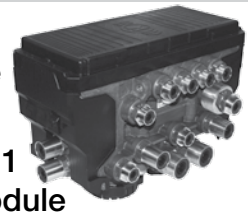
Cables for TEBS G2

Doc. No. Y142784 (EN - Rev. 003)
August 2015

Range Overview - *TEBS G2.0/2.1 & G2.2 Premium Cables - 4S/3M System*

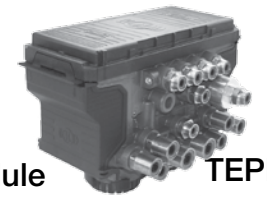


TEBS G2.0
Brake Module



TEBS G2.1
Brake Module

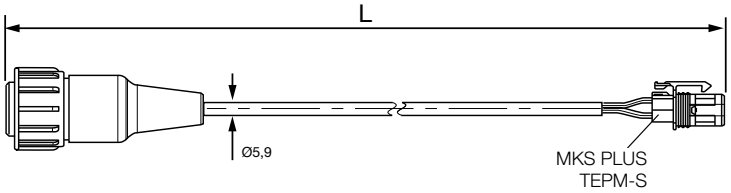
TEBS G2.2
Premium
Brake Module

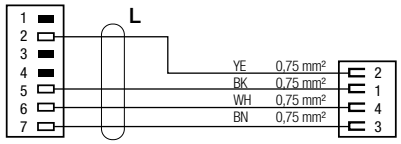




TEPM-S

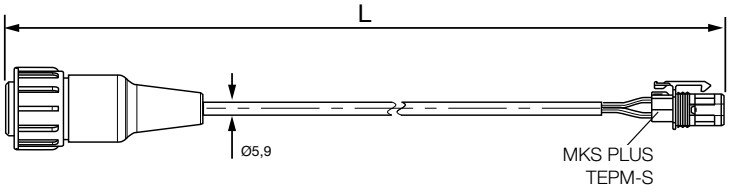
Power and CAN Connecting Cable for Trailer Electro-Pneumatic Module (TEPM-S)

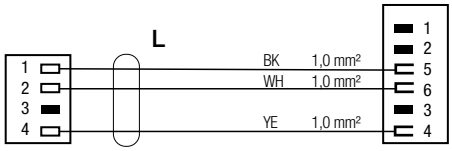




Part No.	Type No.	Cable length L [m]	Comments
K027813 [1)]	-	3.0	for Trailer Electro-Pneumatic Module Standard (TEPM-S) via K022272 or K022279 (see page 31) connected to TEBS G2.0/G2.1/G2.2 Premium Brake Module

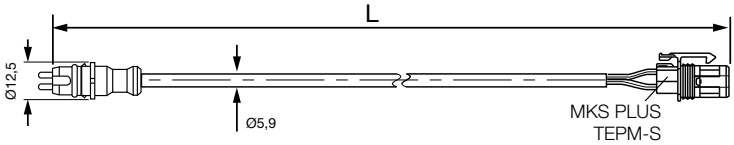
Auxiliary Cable - TEPM-S

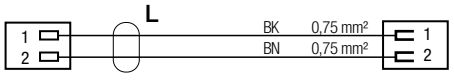




Part No.	Type No.	Cable length L [m]	Comments
K044708 [1)]	-	3.0	for Pressure Sensor

Wheel Speed Sensor Extension Cable - TEPM-S





Part No.	Type No.	Cable length L [m]	Comments
K027811 [1)]	-	2.0	
K027836 [1)]	-	3.0	
K027833 [1)]	-	6.0	

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K027811N00

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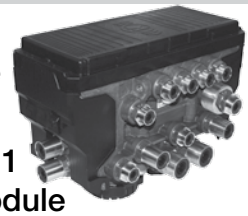
Doc. No. Y142784 (EN - Rev. 003)
August 2015

TEBS G2
Cables for TEBS G2

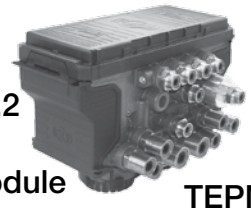
Range Overview - *TEBS G2.0/2.1 & G2.2 Premium Cables - 4S/3M System (contd.)*



TEBS G2.0
Brake Module



TEBS G2.1
Brake Module

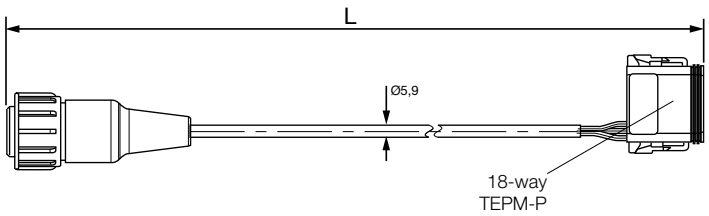


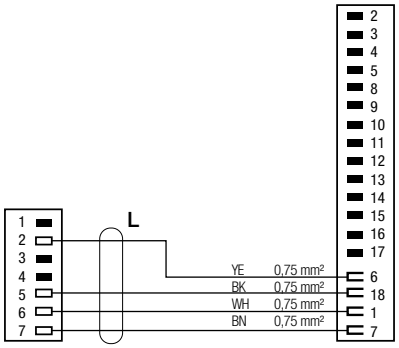
TEBS G2.2
Premium
Brake Module



TEPM-P

Power and CAN Connecting Cable for Trailer Electro-Pneumatic Module (TEPM-P)





Part No.	Type No.	Cable length L [m]	Comments
K027814 [1)]	-	3.0	for Trailer Electro-Pneumatic Module Premium (TEPM-P) via K022272 or K022279 (see page 31) connected to TEBS G2.0/G2.1/G2.2 Premium Brake Module
K027831 [1)]	-	6.0	

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K027831N00

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TEBS G2

Cables for TEBS G2

Doc. No. Y142784 (EN - Rev. 003)
August 2015

Range Overview - *TEBS G2.0 and G2.1 Cables*

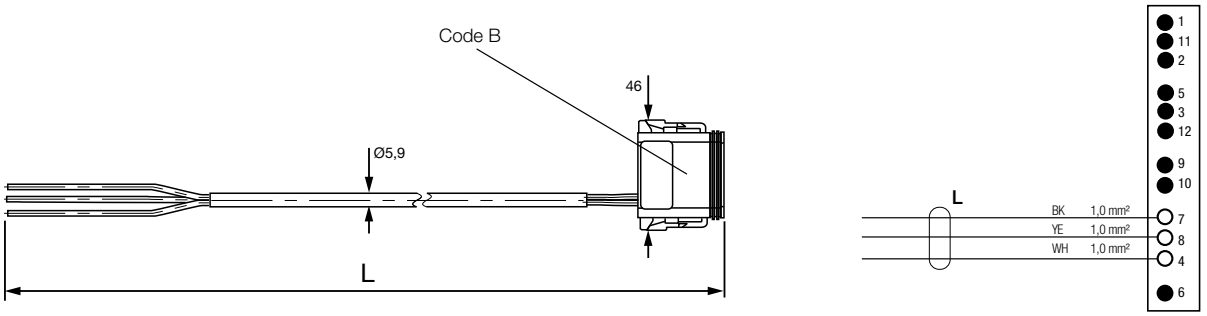


TEBS G2.0 Brake Module

TEBS G2.1 Brake Module

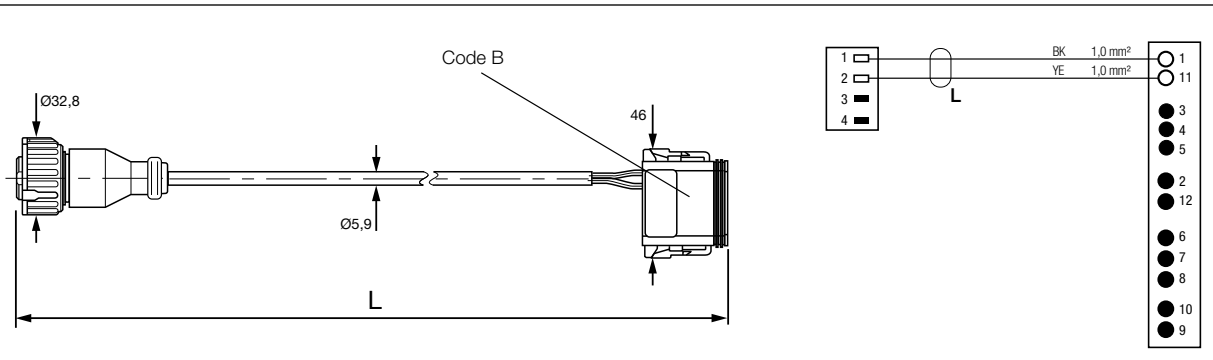


In-Out Cable for ISO 1185 Connection



Part No.	Type No.	Cable length L [m]	Comments
K021345 [1]	-	7.0	For ISO 1185 and tri-state input (with open ends)
K021346 [1]	-	15.0	

In-Out Cable for Speed Pulse/RtR



Part No.	Type No.	Cable length L [m]	Comments
K021335 [1]	-	6.5	Speed Pulse/RtR (AUXIO 1)

[1] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K021335N00

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TEBS G2

Cables for TEBS G2

Range Overview - *TEBS G2.0 and G2.1 Cables (contd.)*

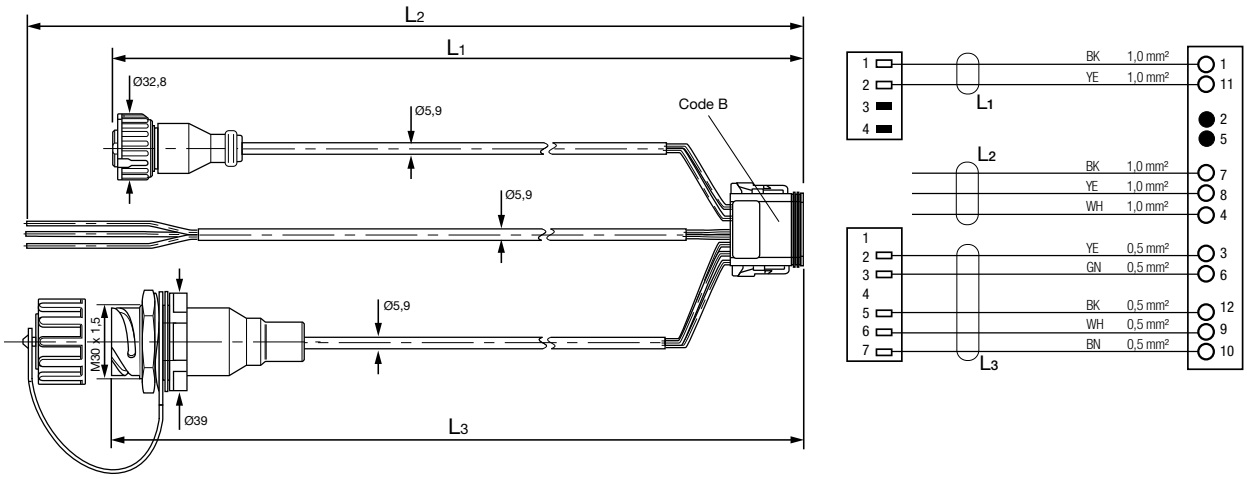


TEBS G2.0 Brake Module

TEBS G2.1 Brake Module



In-Out Cable for ISO 1185 Connection, Speed Pulse/RtR or Lift Axle Control and Diagnostic Socket



Part No.	Type No.	Cable length L [m]	Comments
K021340 [1)]		L_1 = 6.5 L_2 = 7.0 L_3 = 6.0	L_1 = Speed Pulse/RtR or lift axle control (AUXIO 1) L_2 = Stop lamp supply (ISO 1185) and tri-state input (with open ends) L_3 = diagnostic socket
K021341 [1)]		L_1 = 6.5 L_2 = 15.0 L_3 = 6.0	

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K021341N00

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TEBS G2

Cables for TEBS G2

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Range Overview - *TEBS G2.0 and G2.1 Cables (contd.)*

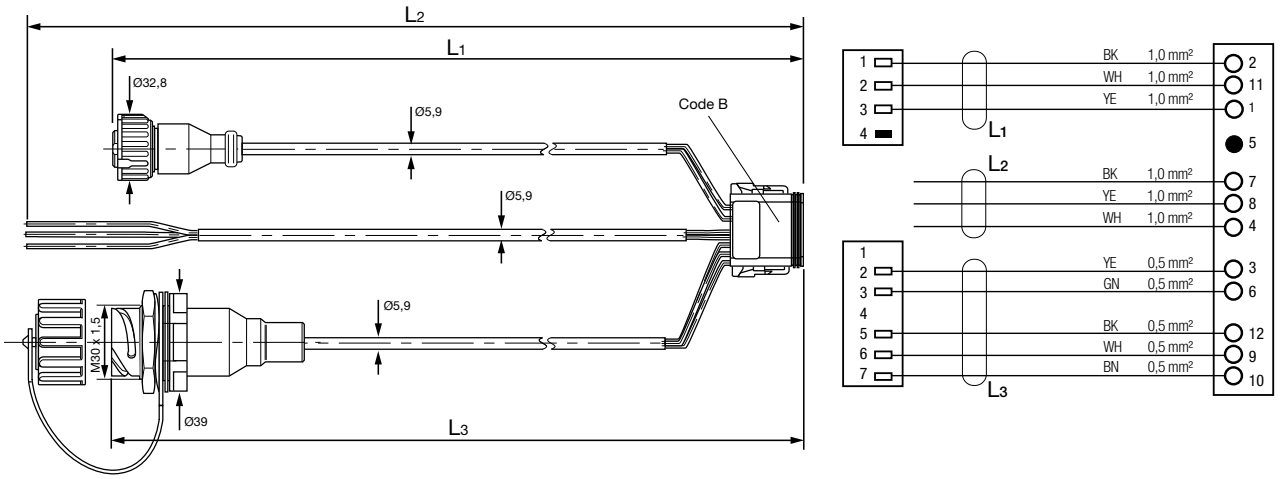


TEBS G2.0 Brake Module

TEBS G2.1 Brake Module



In-Out Cable for ISO 1185 Connection, Speed Pulse/RtR or Lift Axle Control and Diagnostic Socket *(contd)*



Part No.	Type No.	Cable length L [m]	Comments
K021343 [1)]	-	L_1 = 2.0 L_2 = 15.0 L_3 = 6.0	L_1 = Speed Pulse/RtR and/or lift axle control (AUXIO 1 & 2) L_2 = Stop lamp supply (ISO 1185) and tri-state input (with open ends) L_3 = diagnostic socket

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K021343N00

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TEBS G2

Cables for TEBS G2

Range Overview - *TEBS G2.0 and G2.1 Cables (contd.)*

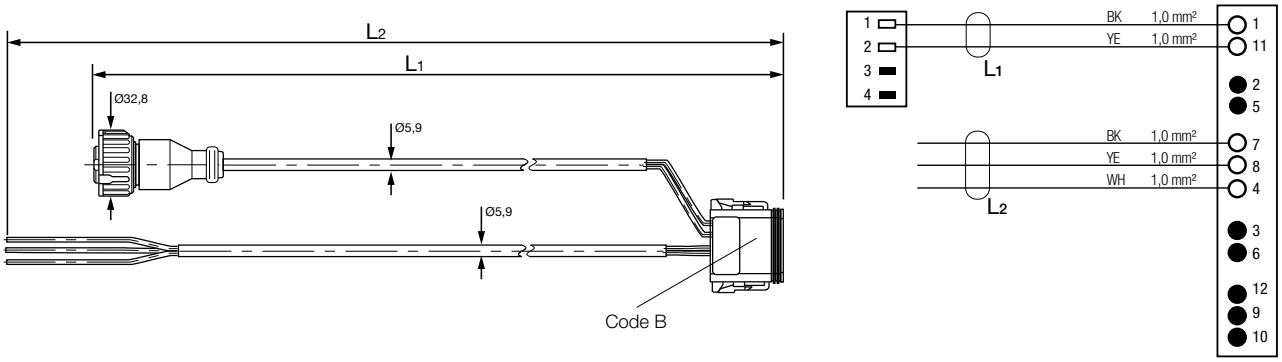


TEBS G2.0 Brake Module

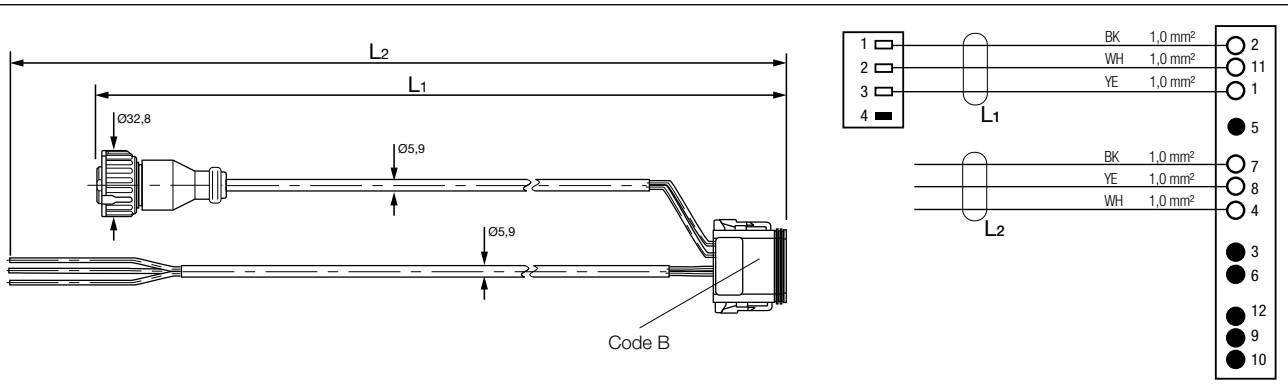
TEBS G2.1 Brake Module



In-Out Cable for ISO 1185 Connection and Speed Pulse/RtR or Lift Axle Control Connection



Part No.	Type No.	Cable length L [m]	Comments
K021336 [1)]	-	L_1 = 6.5 L_2 = 7.0	L_1 = Speed Pulse/RtR or lift axle control (AUXIO 1) L_2 = Stop lamp supply (ISO 1185) and tri-state input (with open ends)
K021337 [1)]	-	L_1 = 6.5 L_2 = 15.0	



Part No.	Type No.	Cable length L [m]	Comments
K021338 [1)]	-	L_1 = 2.0 L_2 = 7.0	L_1 = Speed Pulse/RtR and/or lift axle control (AUXIO 1 & 2) L_2 = Stop lamp supply (ISO 1185) and tri-state input (with open ends)

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K021338N00

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TEBS G2

Cables for TEBS G2

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August 2015

Range Overview - *TEBS G2.0 and G2.1 Cables (contd.)*

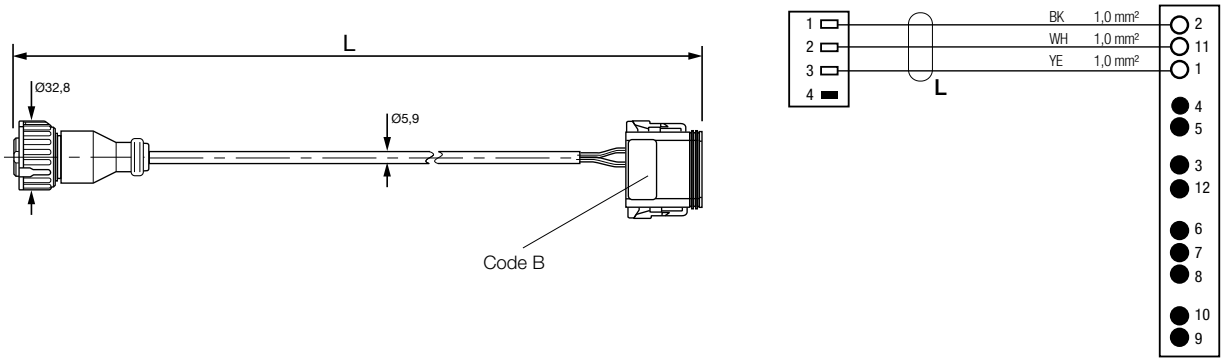


TEBS G2.0Brake Module

TEBS G2.1 Brake Module

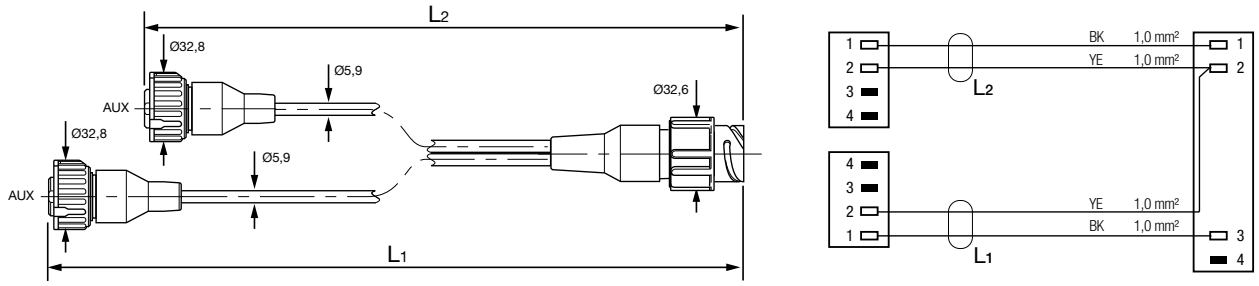


In-Out Cable with Bayonet Connector



Part No.	Type No.	Cable length L [m]	Comments
K028585 [1)]	-	2.0	for use with Bayonet Splitter K027542 (AUXIO 1 & 2) (see below)

Bayonet Splitter



Part No.	Type No.	Cable length L [m]	Comments
K027542 [1)]	-	L_1 = 4.5 L_2 = 1.0	for use with In-Out Cable K028585 (see above)

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K027542N00

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TEBS G2

Cables for TEBS G2

Range Overview - *TEBS G2.0 and G2.1 Cables (contd.)*

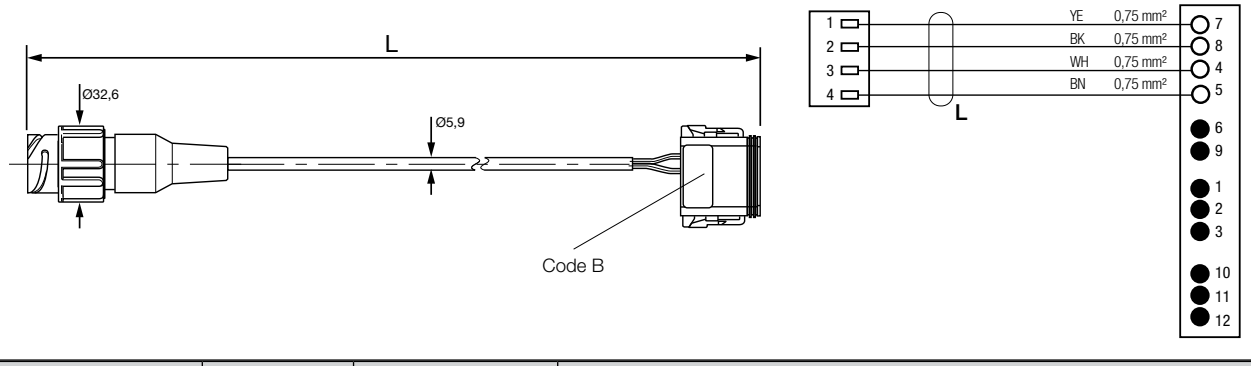


TEBS G2.0 Brake Module

TEBS G2.1 Brake Module



In-Out Cable with Bayonet Connector



Part No.	Type No.	Cable length L [m]	Comments
K028586 [1)]	-	1.5	for Stop Lamp and tr-istate

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K028586N00

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TEBS G2

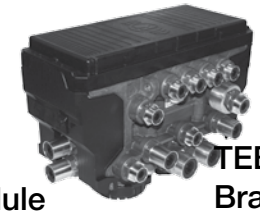
Cables for TEBS G2

Doc. No. Y142784 (EN - Rev. 003)
August 2015

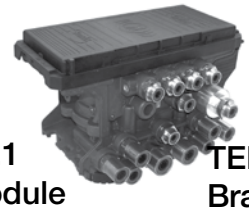
Range Overview - *TEBS G2 Cables*

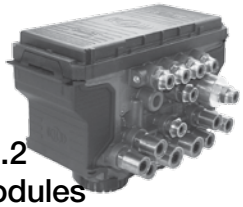


TEBS G2.0
Brake Module



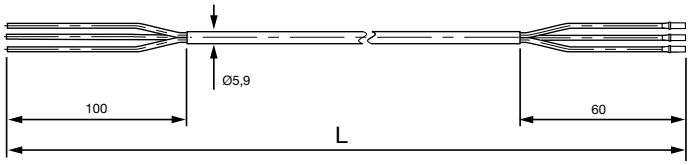
TEBS G2.1
Brake Module

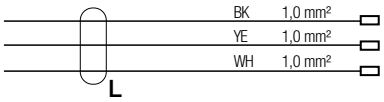




TEBS G2.2
Brake Modules

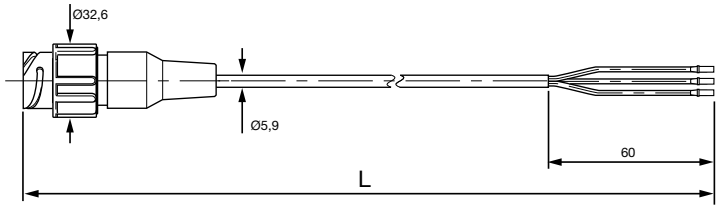
Modular Cable with open ends

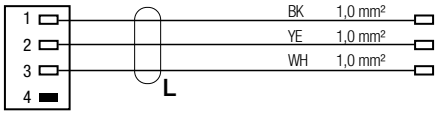




Part No.	Type No.	Cable length L [m]	Comments
K021643 [1]	-	7.0	for several connections such as Stop Lamp or Tri-state
K021644 [1]	-	15.0	

Modular Cable with Bayonet Connector





Part No.	Type No.	Cable length L [m]	Comments
K010715 [1]	-	1.0	for Stop Lamp or Traction Help (TH) or advanced Lift Axle Control (LLTH) with open ends
K010716 [1]	-	7.0	

[1] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K010716N00

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August 2015

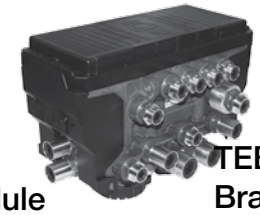
TEBS G2

Cables for TEBS G2

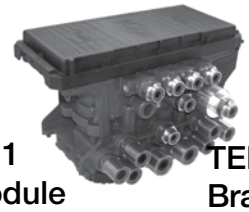
Range Overview - *TEBS G2 Cables (contd.)*

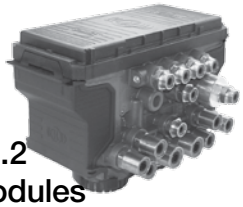


TEBS G2.0
Brake Module



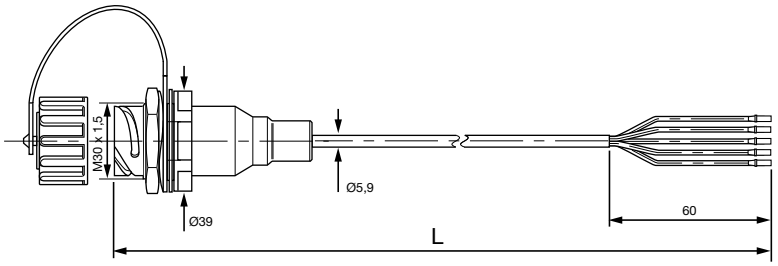
TEBS G2.1
Brake Module

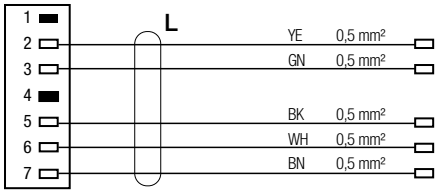




TEBS G2.2
Brake Modules

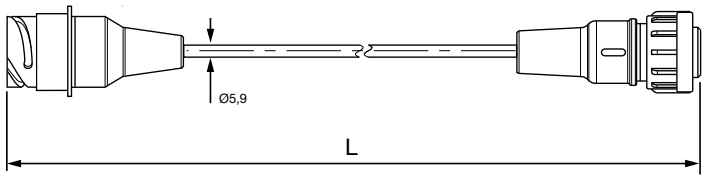
Modular Cable with Diagnostic Socket (5 pin)

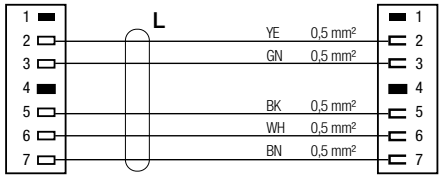




Part No.	Type No.	Cable length L [m]	Comments
K010713 [1]	-	6.0	e.g. for Magic Eye (TEBS G2.0/G2.1 only)

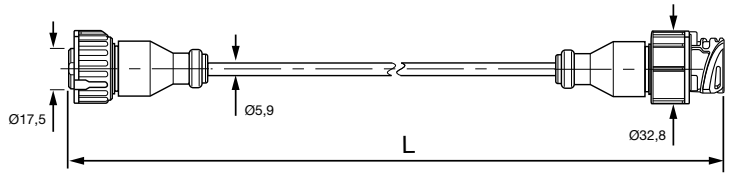
Diagnostic Socket Extension Cable (5 pin)

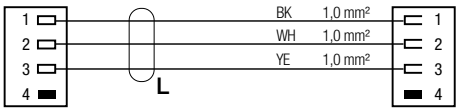




Part No.	Type No.	Cable length L [m]	Comments
K010714 [1]	-	11.0	extension cable for diagnostic cable K010713

Bayonet Connector (3 pin) Extension Cable





Part No.	Type No.	Cable length L [m]	Comments
K013218 [1]	-	4.0	for several features

[1] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K013218N00

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TEBS G2

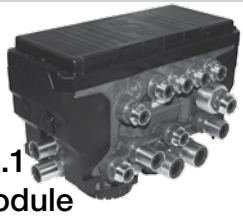
Cables for TEBS G2

Doc. No. Y142784 (EN - Rev. 003)
August 2015

Range Overview - *TEBS G2.0 and G2.1 Cables - 4S/3M System*



TEBS G2.0
Brake Module

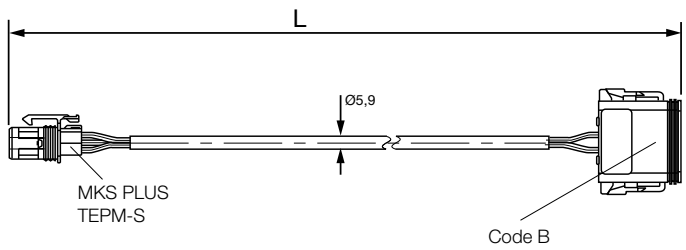


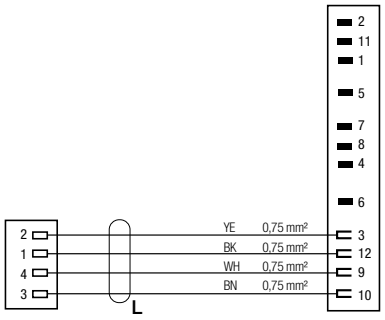
TEBS G2.1
Brake Module



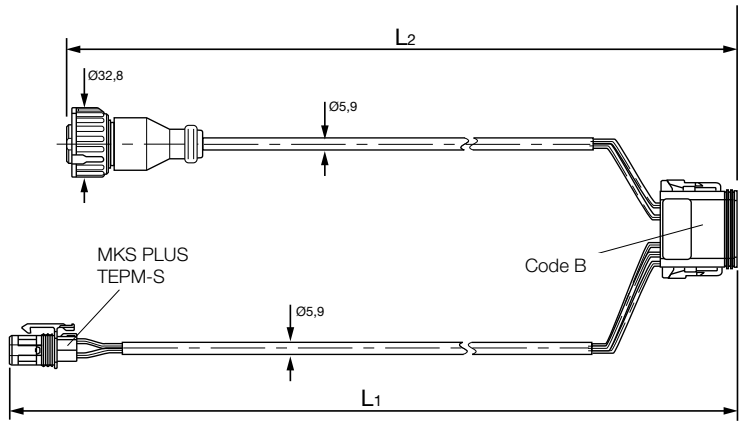
TEPM-S

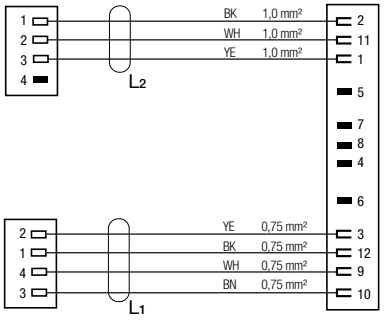
In-Out Cables for TEPM-S





Part No.	Type No.	Cable length L [m]	Comments
K058332 [1)]	-	2.0	For connecting TEBS G2.0/G2.1 with third modulator (TEPM-S)
K058333 [1)]	-	7.0	
K058334 [1)]	-	9.0	





Part No.	Type No.	Cable length L [m]	Comments
K058340 [1)]	-	L_1 = 3.0 L_2 = 2.0	L_1 for connecting TEBS G2.0/G2.1 with third modulator (TEPM-S) L_2 for AUXIO 1 & 2 connections

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K058340N00

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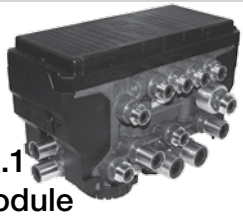
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Range Overview - *TEBS G2.0 and G2.1 Cables - 4S/3M System (contd.)*



TEBS G2.0
Brake Module

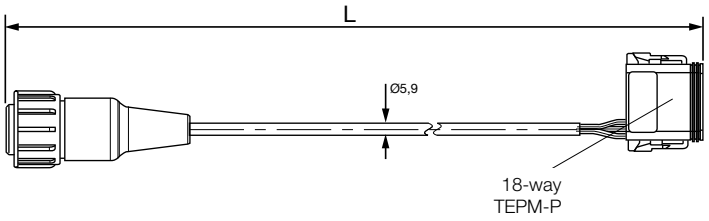


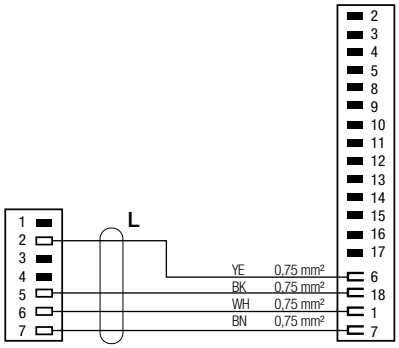
TEBS G2.1
Brake Module

TEPM-P



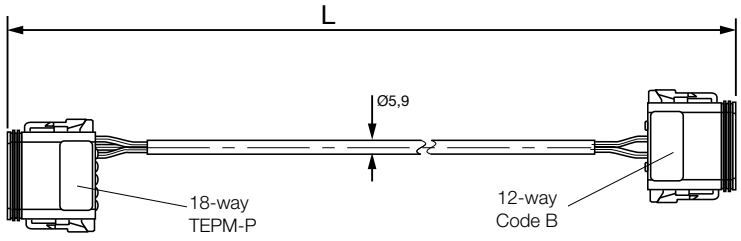
Power and CAN Connecting Cable for Trailer Electro-Pneumatic Module (TEPM-P)

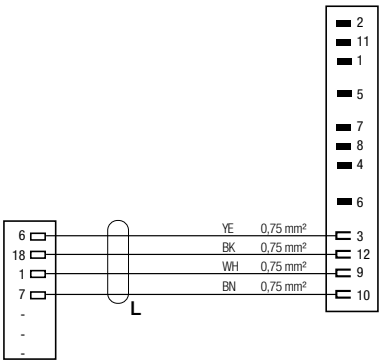




Part No.	Type No.	Cable length L [m]	Comments
K027814 [1)]	-	3.0	for Trailer Electro-Pneumatic Module Premium (TEPM-P) via K022272 or K022279 (see page 31) connected to TEBS G2.0/G2.1 Brake Module

Power Supply Cables for TEPM-P





Part No.	Type No.	Cable length L [m]	Comments
K058249 [1)]	-	7.0	For connecting TEBS G2.0/G2.1 with third modulator (TEPM-P)
K058250 [1)]	-	9.0	

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K058250N00

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TEBS G2

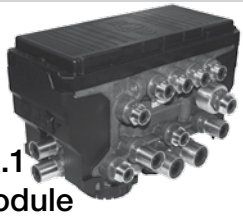
Cables for TEBS G2

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August 2015

Range Overview - *TEBS G2.0 and G2.1 Cables - 4S/3M System (contd.)*



TEBS G2.0
Brake Module

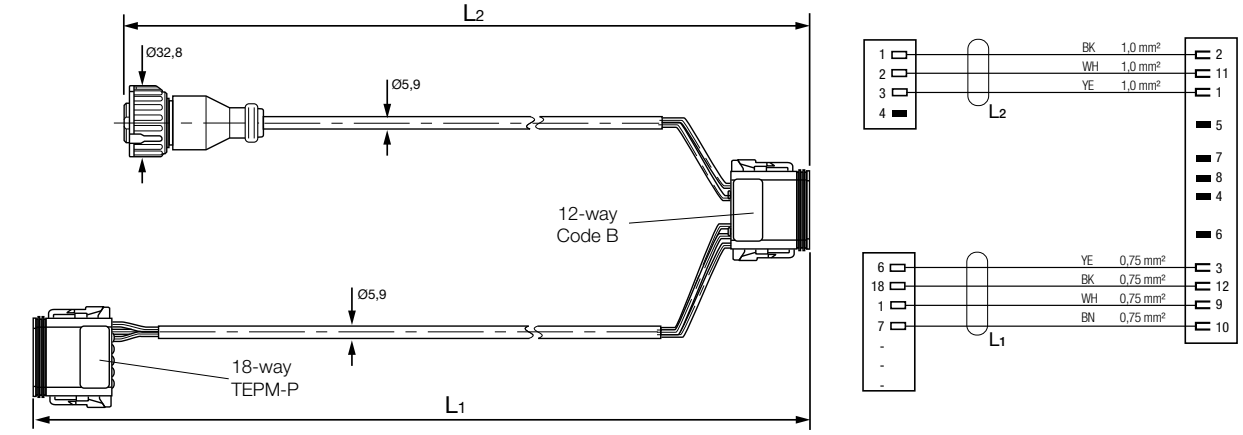


TEBS G2.1
Brake Module

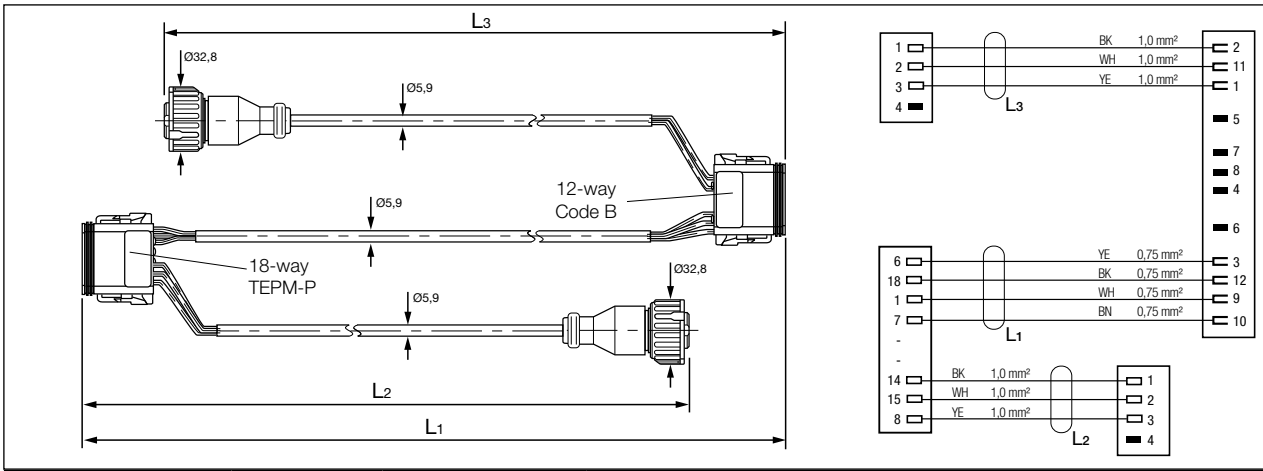
TEPM-P



Power Supply and In-Out Cable for TEPM-P



Part No.	Type No.	Cable length L [m]	Comments
K058256 [1]	-	L_1 = 9.0 L_2 = 6.5	L_1 for connecting TEBS G2 with third modulator (TEPM-P) L_2 for AUXIO 1 & 2 connections



Part No.	Type No.	Cable length L [m]	Comments
K058344 [1]	-	L_1 = 3.0 L_2 = 6.5 L_3 = 3.0	L_1 for connecting TEBS G2 with third modulator (TEPM-P) L_2 for TEPM-P AUXIO connections L_3 for AUXIO connection, e.g. iCargo PCV

[1] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K058344N00

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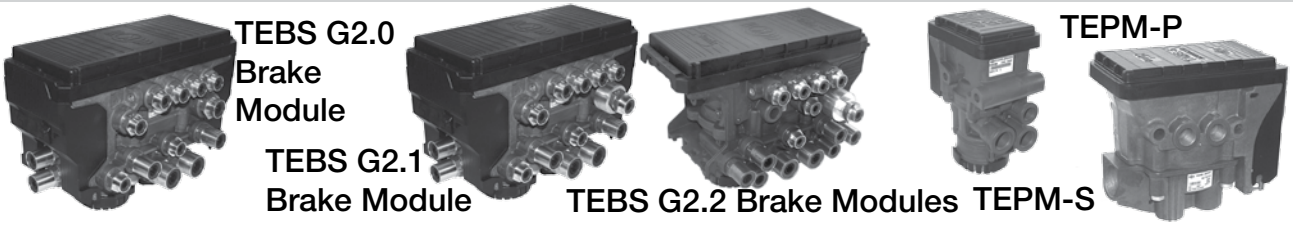
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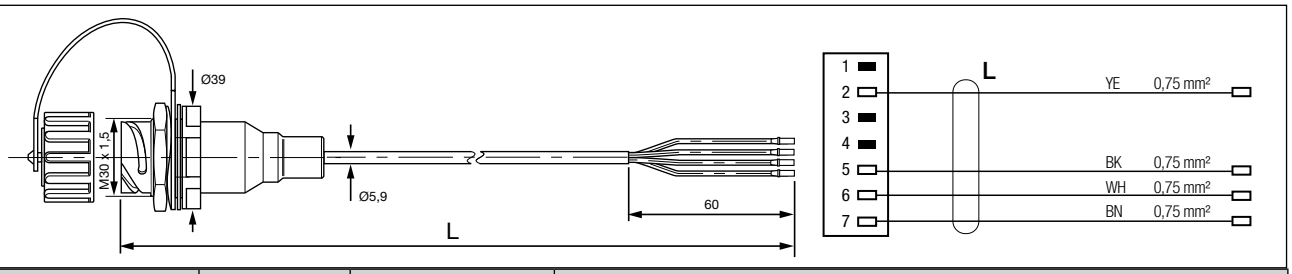
Doc. No. Y142784 (EN - Rev. 003)
August 2015

TEBS G2
Cables for TEBS G2

Range Overview - *TEBS G2 Cables - 4S/3M System and other connections*

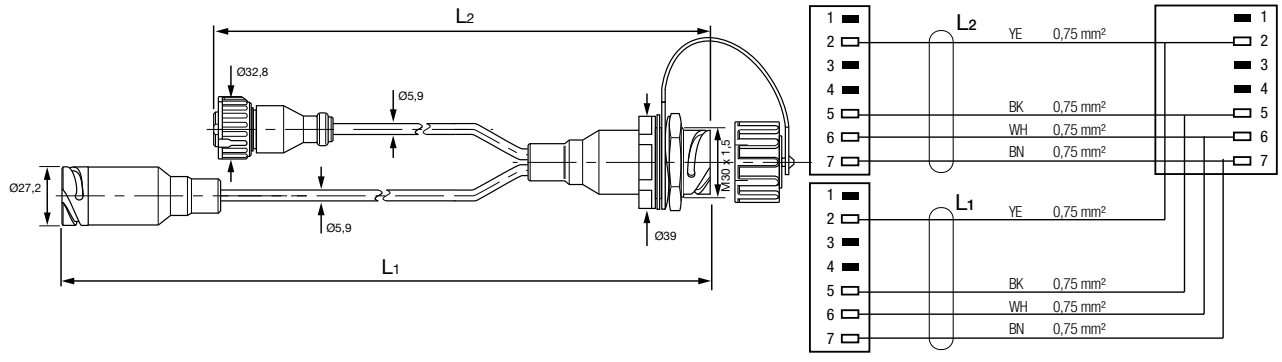


Auxiliary Cables



Part No.	Type No.	Cable length L [m]	Comments
K022272 [1)]	-	4.0	For: TEPM in 4S/3M system (TEBS G2.0/G2.1/G2.2 Premium only) or Tyre Pressure Monitoring System (TPMS) (all TEBS Modules) or Diagnostics/TIM G2 (all TEBS Modules) or iTAP (TEBS G2.2 only)
K022279 [1)]	-	6.0	

5 V CAN Splitter Cable



Part No.	Type No.	Cable length L [m]	Comments
K027815 [1)]	-	L_1 = 3.0 L_2 = 1.0	For: TEPM in 4S/3M system (TEBS G2.0/G2.1/G2.2 Premium only) and/or Tyre Pressure Monitoring System (TPMS) (all TEBS Modules) and/or Diagnostics/TIM G2 (all TEBS Modules) or iTAP (TEBS G2.2 only)

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K027815N00

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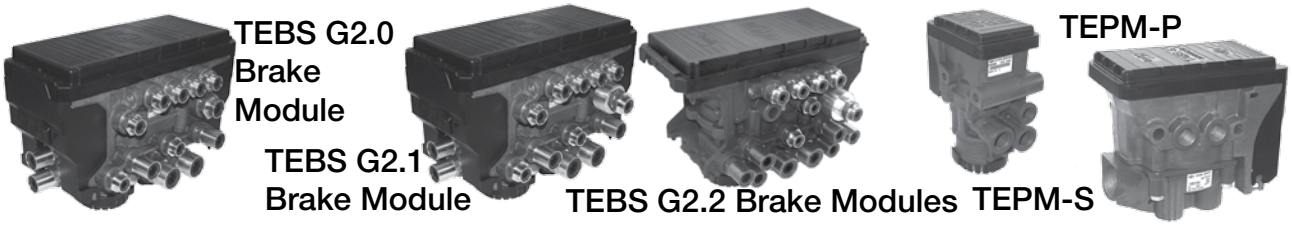
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

TEBS G2

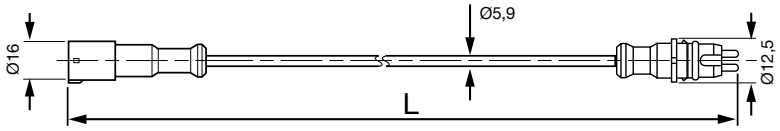
Cables for TEBS G2

Doc. No. Y142784 (EN - Rev. 003)
August 2015

Range Overview - *Auxiliary Cables for TEBS G2.0/G2.1/G2.2, TEPM-P and TEPM-S*



Wheel Speed Sensor Extension Cable



Part No.	Type No.	Cable length L [m]	Comments
II367562000	EK3130	2.0	**TEBS G2.0, TEBS G2.1, TEPM-P and TEPM-S** For extending the wheel speed sensor cable to enable connection to the brake module. **TEBS G2.2** For extending the connecting cable from the wheel speed sensor (see page 15).
II367563000		3.0	
II367564000		4.0	
II367565000		5.0	
II367566000		6.0	
II367568000		8.0	
II3675610000		10.0	
II3675612000		12.0	
II3675615000		15.0	

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TEBS G2

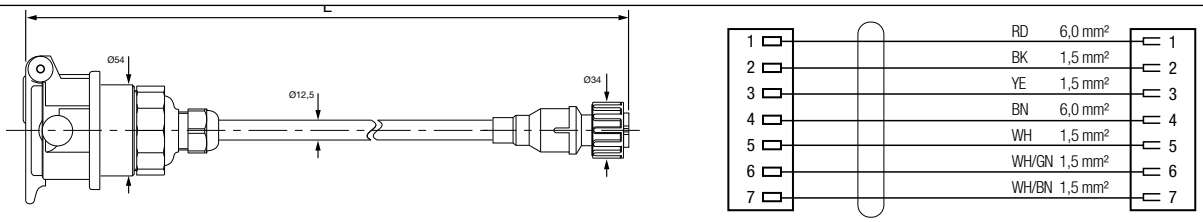
Cables for TEBS G2

Range Overview - *TEBS G2 Cables - Trailer Roadtrain Module (TRM)*



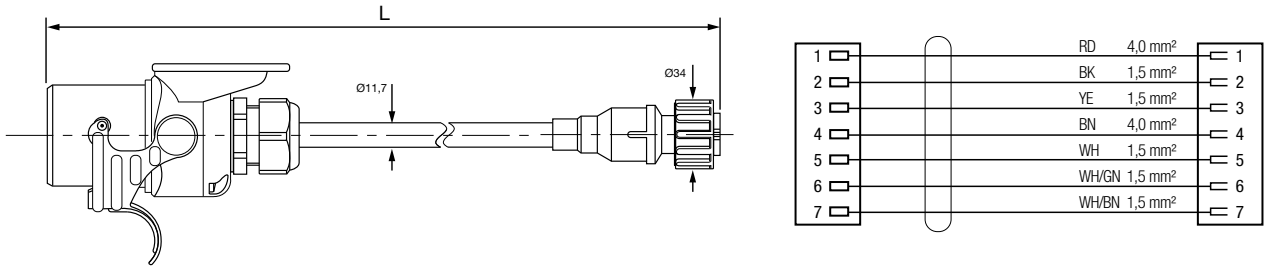
Trailer Roadtrain Module

Power Cable (for semi-trailers) with ISO 7638 Socket



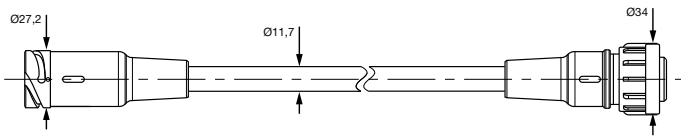
Part No.	Type No.	Cable length [m]	Comments
K027841 [1]	-	6.0	with 6 mm² cable for pins 1 and 4

Power Cable (for drawbar and centre-axle trailers) with ISO 7638 Plug



Part No.	Type No.	Cable length [m]	Comments
K027840 [1]	-	6.0	

Power Extension Cable



Part No.	Type No.	Cable length [m]	Comments
K027842 [1]	-	18.0	with 6 mm² cable for pins 1 and 4

[1] The part number will carry a suffix "N00" which defines that it is supplied without packaging. Example K027842N00

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TEBS G2

Cables for TEBS G2

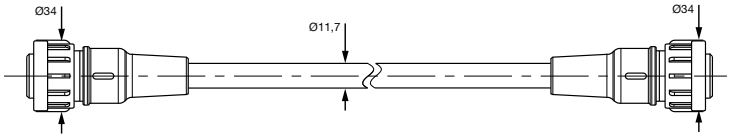
Doc. No. Y142784 (EN - Rev. 003)
August 2015

Range Overview - *TEBS G2 Cables - Trailer Roadtrain Module (TRM) (contd.)*



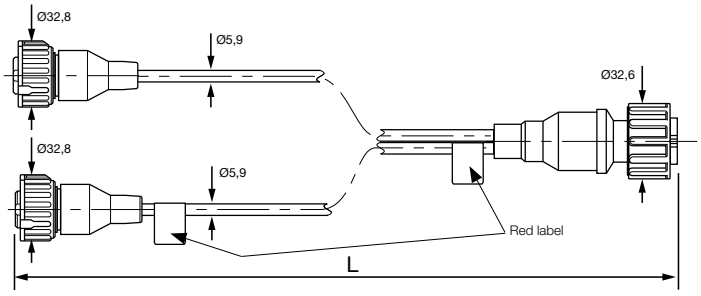
Trailer Roadtrain Module

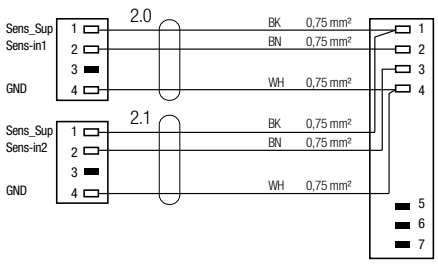
Power Extension Cable (contd.)



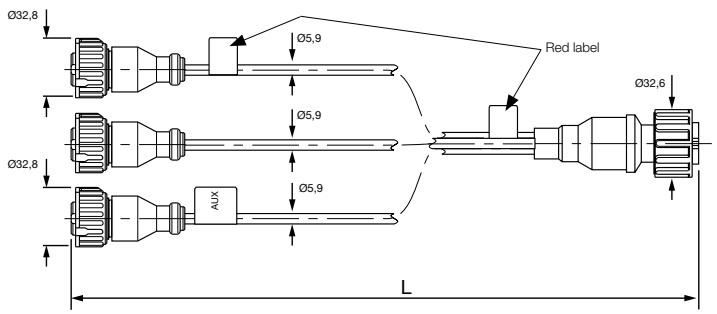
Part No.	Type No.	Cable length [m]	Comments
K027843 [1)]	-	2.0	

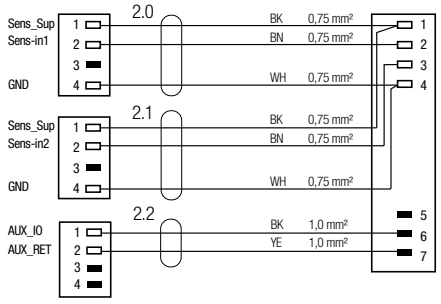
Bayonet Splitter





Part No.	Type No.	Cable length L [m]	Comments
K027838 [1)]	-	3.0	For Pressure Sensors





Part No.	Type No.	Cable length L [m]	Comments
K027839 [1)]	-	3.0	For Pressure Sensors and other auxiliary input

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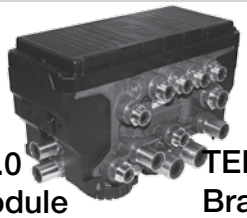
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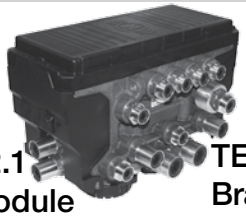
TEBS G2

Cables for TEBS G2

Range Overview - *TEBS G2 Cables - Tyre Pressure Monitoring System (TPMS)*



TEBS G2.0 Brake Module



TEBS G2.1 Brake Module

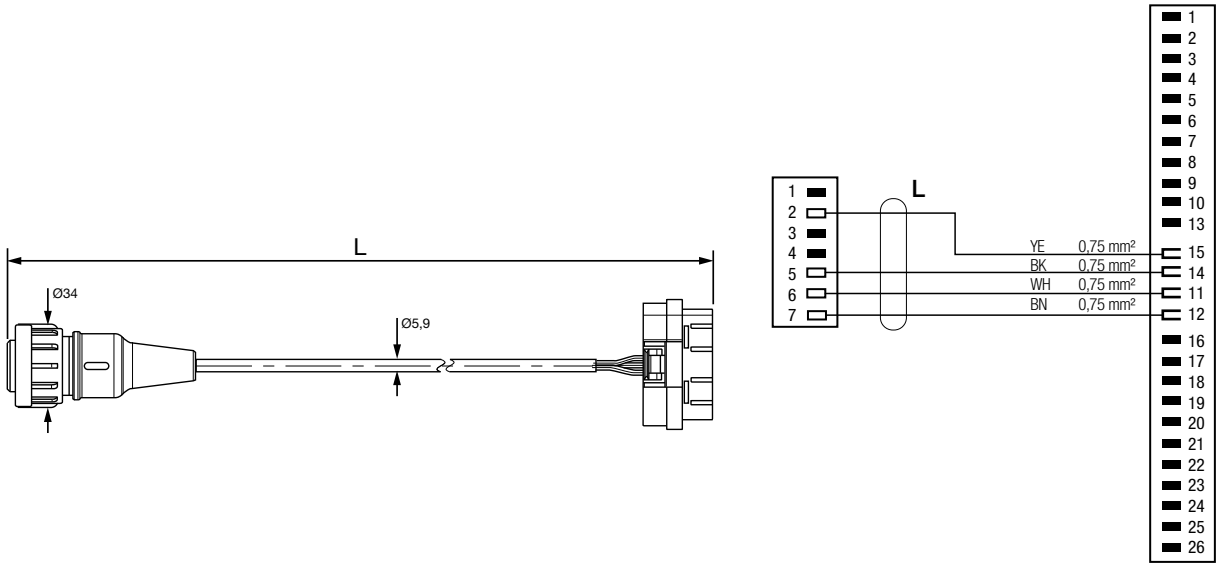


TEBS G2.2 Brake Modules



TPMS Wireless Gateway Receiver

Connecting Cable



Part No.	Type No.	Cable length L [m]	Comments
K027823 [1)]	-	0.9	to connect the TPMS module via K027815 and K022272 or K022279 (see page 31) to the TEBS G2 Brake Module

Note:

See also TPMS cables for TEBS G2.0, G2.1 and G2.2 on page 31.

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K027823N00

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TEBS G2

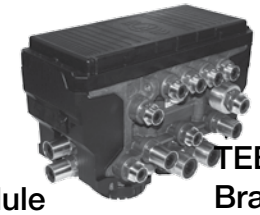
Cables for TEBS G2

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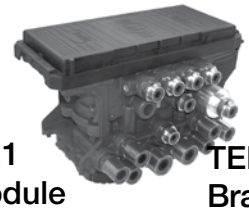
Range Overview - *Auxiliary Cables for TEBS G2*

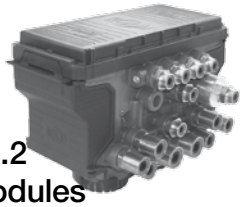


TEBS G2.0
Brake Module



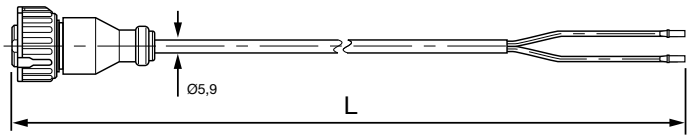
TEBS G2.1
Brake Module

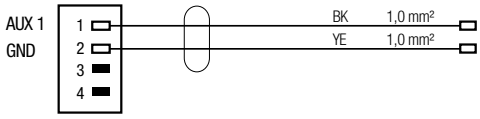




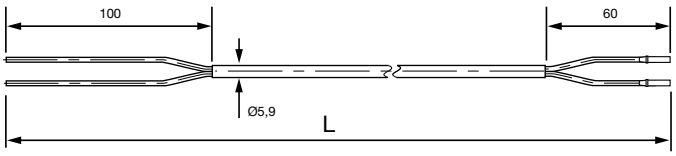
TEBS G2.2
Brake Modules

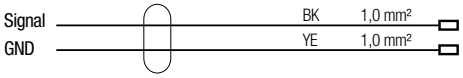
Connecting Cable for auxiliaries (2 pins)





Part No.	Type No.	Cable length L [m]	Comments
K002274 [1)]	-	2.0	with one end open (with pins to suit the Deutsch connector) for several AUX connections
K002275 [1)]	-	6.5	
K002276 [1)]	-	10.0	
K017003 [1)]		15.0	





Part No.	Type No.	Cable length L [m]	Comments
K002280 [1)]	-	7.0	with two ends open (one with pins to suit the Deutsch connector) for several AUX connections
K002281 [1)]	-	15.0	

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K002281N00

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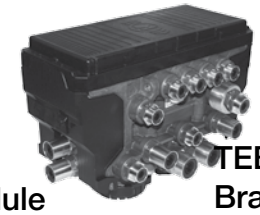
TEBS G2

Cables for TEBS G2

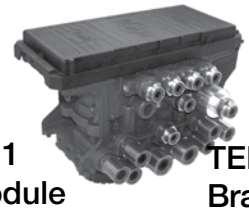
Range Overview - *Auxiliary Cables for TEBS G2 (contd.)*

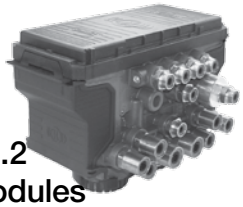


TEBS G2.0
Brake Module



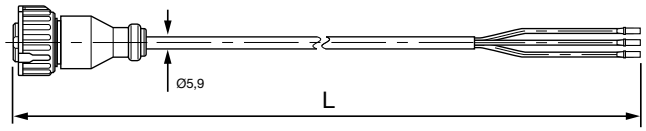
TEBS G2.1
Brake Module

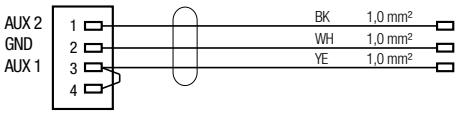




TEBS G2.2
Brake Modules

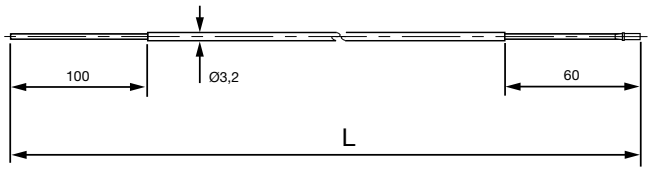
Connecting Cable for auxiliaries with Bayonet Connector (3 pins)





Part No.	Type No.	Cable length L [m]	Comments
K002277 [1)]	-	3.0	for sensor input from mechanical, pneumatic or hydraulic suspension
K002278 [1)]	-	9.0	
K002279 [1)]	-	15.0	

Cable with open ends





Part No.	Type No.	Cable length L [m]	Comments
K016629 [1)]	-	7	for Stop Lamp (for example)
K016630 [1)]	-	15	

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K016630N00

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TEBS G2

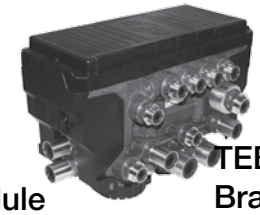
Cables for TEBS G2

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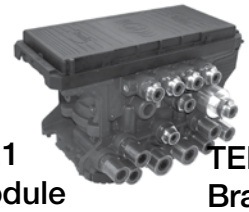
Range Overview - *Auxiliary Cables for TEBS G2 (contd.)*

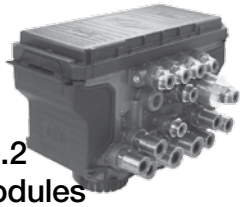


TEBS G2.0
Brake Module



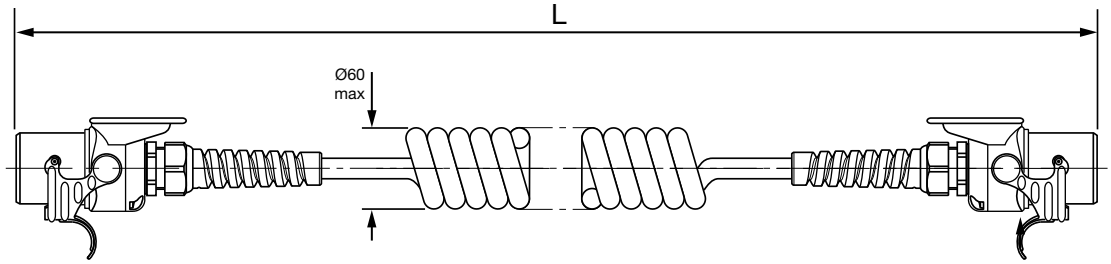
TEBS G2.1
Brake Module





TEBS G2.2
Brake Modules

Connecting Cable - towing vehicle to trailer



Part No.	Type No.	Cable length L [m]	Comments
K004098 [1)]	**EK3150**	1.0 - 4.0	With 7 pin connectors, for connecting ABS or EBS With buckling protection

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K004098N00

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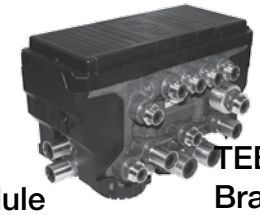
TEBS G2

Cables for TEBS G2

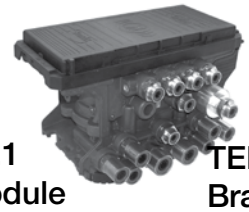
Range Overview - *Auxiliary Cables for TEBS G2 (contd.)*

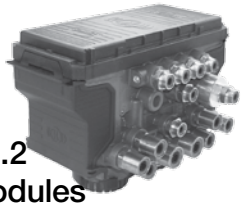


TEBS G2.0
Brake Module



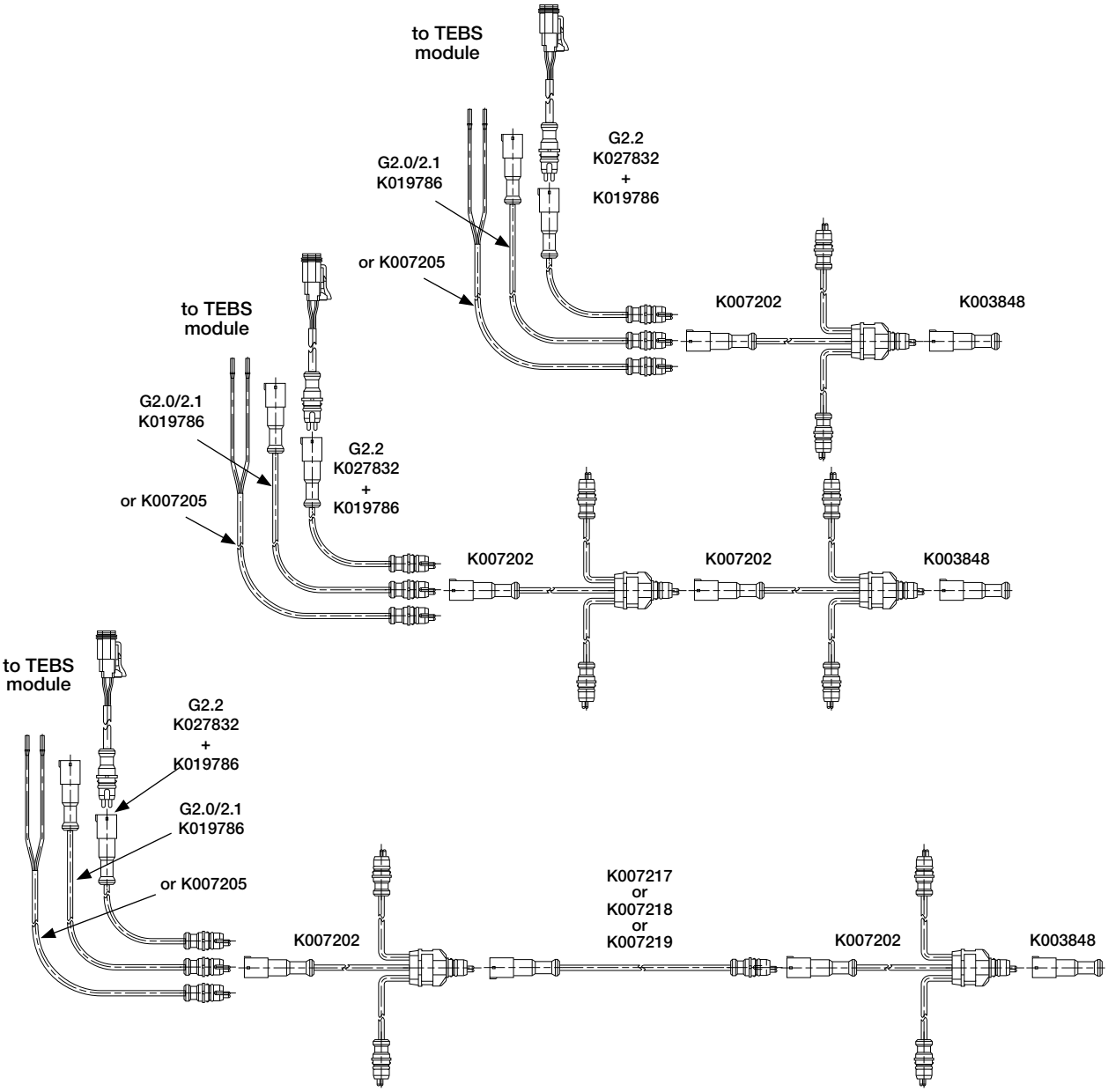
TEBS G2.1
Brake Module





TEBS G2.2
Brake Modules

Pad Wear Sensing - Installation examples



Note: further Axle Modules K007202 may be added as necessary

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TEBS G2

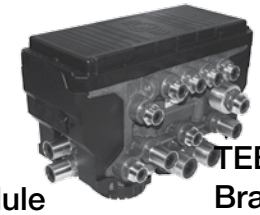
Cables for TEBS G2

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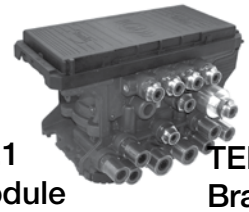
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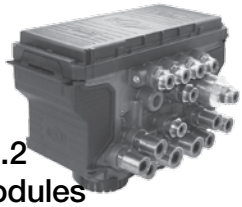


TEBS G2.0
Brake Module



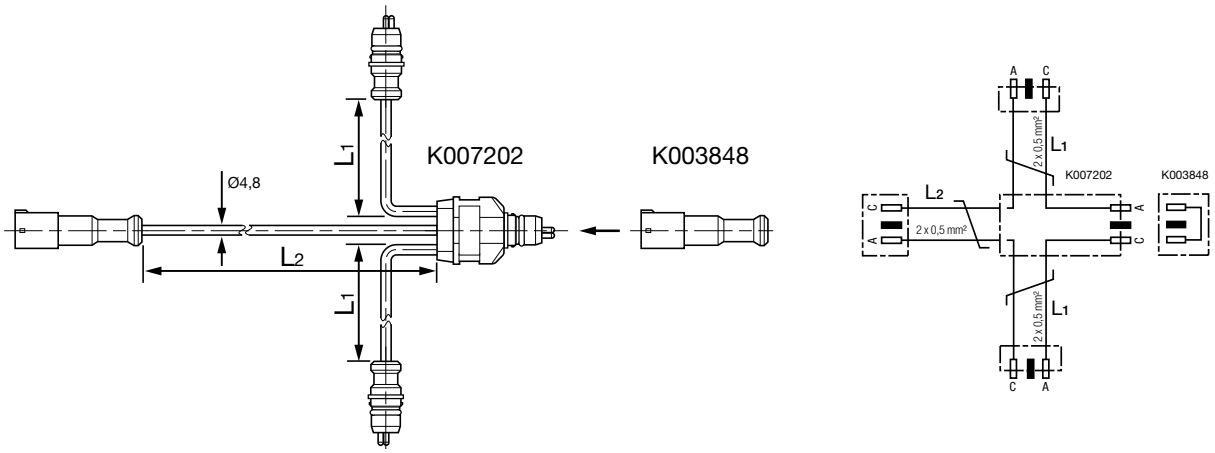
TEBS G2.1
Brake Module





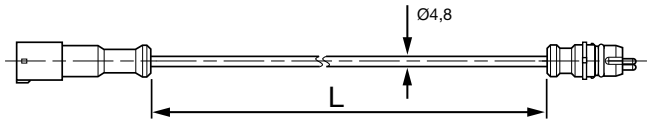
TEBS G2.2
Brake Modules

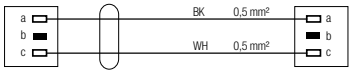
Axle Module for Pad Wear Sensing



Part No.	Type No.	Cable length L [m]	Comments
K007202	-	L_1 = 2.0 L_2 = 2.0	L_1 = pad wear sensor L_2 = connecting or extension cable
K003848	-	-	Closure Cap for Axle Module K007202

Extension Cable for Pad Wear Sensing





Part No.	Type No.	Cable length L [m]	Comments
K007217	-	1.0	To connect two Axle Modules K007202 together
K007218	-	3.0	
K007219	-	5.0	

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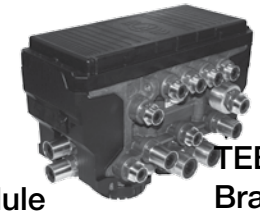
Doc. No. Y142784 (EN - Rev. 003)
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TEBS G2
Cables for TEBS G2

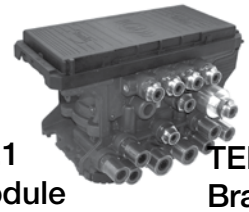
Range Overview - *Auxiliary Cables for TEBS G2 (contd.)*

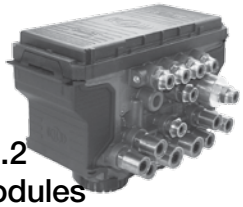


TEBS G2.0
Brake Module



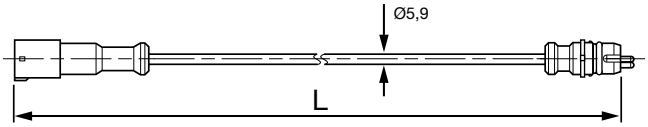
TEBS G2.1
Brake Module

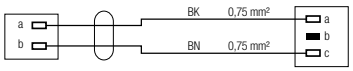




TEBS G2.2
Brake Modules

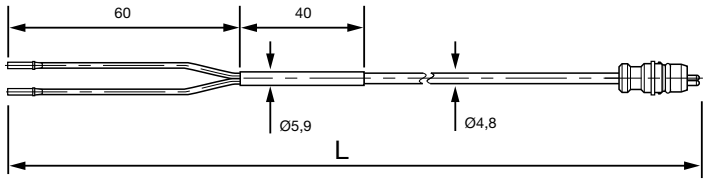
Connecting Cable for Pad Wear Sensing (only TEBS G2.0/G2.1)

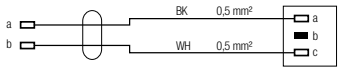




Part No.	Type No.	Cable length L [m]	Comments
K019786 [1)]	-	1.0	To connect Axle Module K007202 to TEBS G2.0/G2.1 Module (S-E or S-F)

Connecting Cable for Pad Wear Sensing (TEBS G2.0/G2.1/G2.2)





Part No.	Type No.	Cable length L [m]	Comments
K007205	-	1.0	To connect Axle Module K007202 to TEBS G2 Module (Deutsch plug)

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K019786N00

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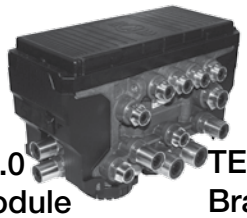
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TEBS G2

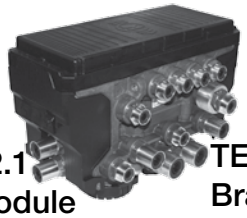
Cables for TEBS G2

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August 2015

Range Overview - *Accessories for TEBS G2*



TEBS G2.0 Brake Module



TEBS G2.1 Brake Module

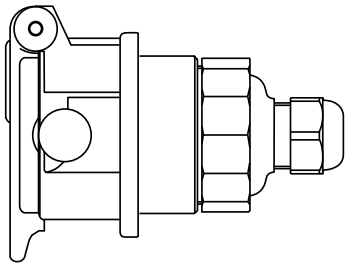


TEBS G2.2 Brake Modules

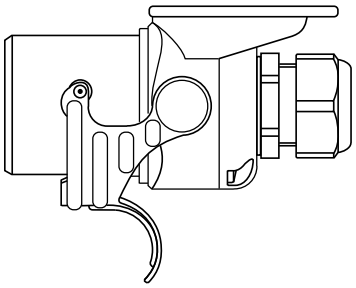


Trailer Roadtrain Module

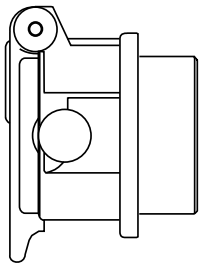
Accessories



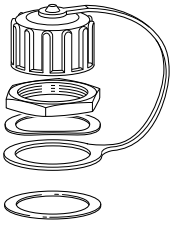
Part No.	Type No.	Description
K002290	-	ISO 7638 Socket (7 pin)



Part No.	Type No.	Description
K002291	-	ISO 7638 Plug (7 pin)



Part No.	Type No.	Description
I88007	-	ISO 7638 Dummy Socket (Mounting Bracket Part No. B86617)



Part No.	Type No.	Description
K005378	-	Mounting kit for Diagnostic Socket



Part No.	Type No.	Description
K027817 [1)]	-	Closure Cap for Trailer Roadtrain Module (TRM)

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K027817N00

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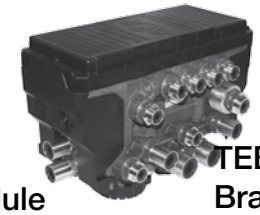
TEBS G2

Cables for TEBS G2

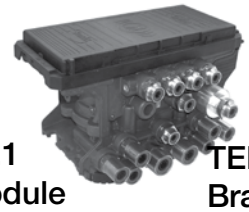
Range Overview - *Accessories for TEBS G2 (contd.)*

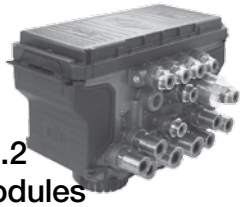


TEBS G2.0 Brake Module



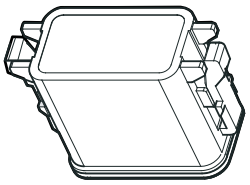
TEBS G2.1 Brake Module



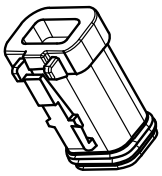


TEBS G2.2 Brake Modules

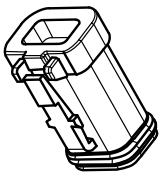
Accessories *(contd.)*



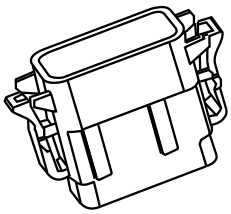
Part No.	Type No.	Description
K026197V01 [1]	-	Blanking Plug for all Deutsch 12-way and 18-way Sockets (no coding)



Part No.	Type No.	Description
Z005860	-	Blanking Plug for WSS Connectors on TEBS G2.2 Premium (no coding)



Part No.	Type No.	Description
Z005861	-	Blanking Plug for 2.3 & 2.4 Connectors on TEBS G2.2 Premium (no coding)



Part No.	Type No.	Description
K108022 [2]	-	Blanking Plug for iTAP Wireless Interface (Code B)

[1] The part number will carry a suffix “N00” which defines that it is supplied without packaging. Example K026197V01N00
[2] The part number will carry a suffix “N49” which defines that it is supplied without packaging and is for OE use only.

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TEBS G2

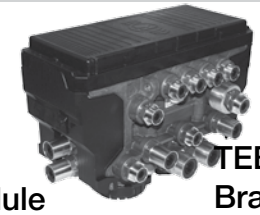
Cables for TEBS G2

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August 2015

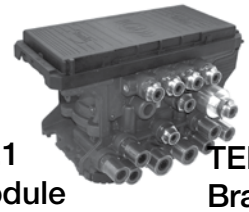
Range Overview - *Accessories for TEBS G2 (contd.)*

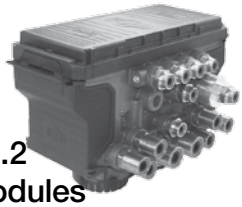


TEBS G2.0 Brake Module



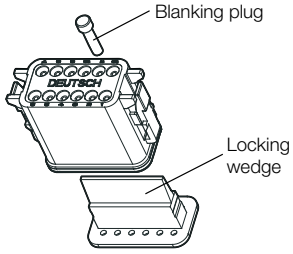
TEBS G2.1 Brake Module



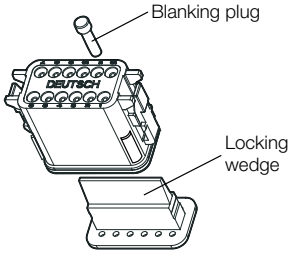


TEBS G2.2 Brake Modules

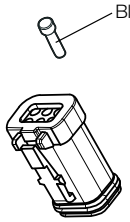
Accessories *(contd.)*



Part No.	Type No.	Description
K002287 [1)]	-	12-pin Deutsch Plug (**Code B** for In-Out Connector on TEBS G2.0/2.1 only) includes: 1 x Deutsch plug 1 x Locking wedge 12 x Blanking plugs



Part No.	Type No.	Description
K091439 [1)]	-	12-pin Deutsch Plug (**Code A** for In-Out Connector on TEBS G2.2 only) includes: 1 x Deutsch plug 1 x Locking wedge 10 x Blanking plugs



Part No.	Type No.	Description
K092215 [1)]	-	4/6-pin Deutsch Plug (green - **no coding** for X2.3 & X2.4 Connectors on TEBS G2.2 Premium only) includes: 1 x Deutsch plug 4 x Blanking plugs

[1)] The part number will carry a suffix "N00" which defines that it is supplied without packaging. Example K092215N00

Revision Details

Rev. 003	May 2015	Clarification/expansion of applications on many cables
Rev. 003	June 2015	Correction to text on K110195 (page 14) and cable colours on K111594 (page 17)
Rev. 003	August 2015	Correction to K091439 (page 44)

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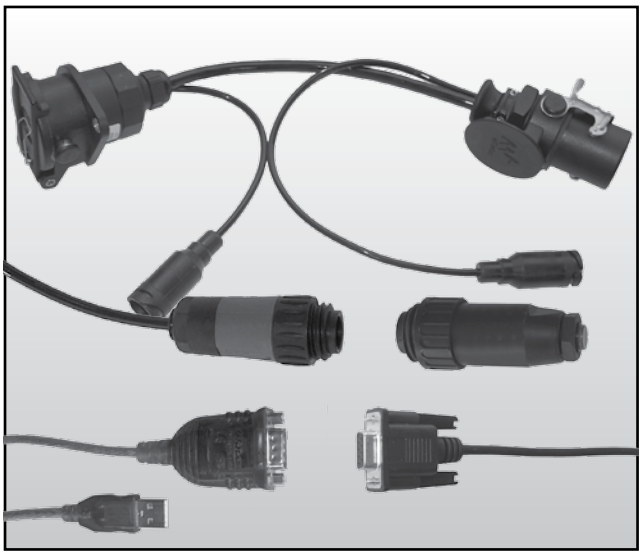
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

TABS/TEBS
Diagnostic Cables for Trailer ABS and TEBS4

Doc. No. Y107796 (EN - Rev. 001)
May 2015

Function



Diagnostic Cables are used in trailer ABS and EBS systems to:

- provide electrical power to the diagnostic equipment where necessary
- supply status information to the diagnostic equipment

Newer EBS-equipped trailers can be diagnosed through the ISO 7638 connection. Older EBS-equipped trailers and newer ABS-equipped trailers will have a diagnostic socket installed. Details of the cables/harnesses with diagnostic socket are shown in PD-272-010, Document No. *Y095697* for ABS systems and PD-272-020, Document No. *Y107795* for TEBS4 systems.

Included in this document are details of various diagnostic cables and the Universal Diagnostic Interface which is required to diagnose KB4TA ABS and TEBS4 systems using the Knorr-Bremse ECU*talk*® diagnostic software.

Technical Features

Operating Temperature Range: -40 °C to +80 °C

See tables for other features.

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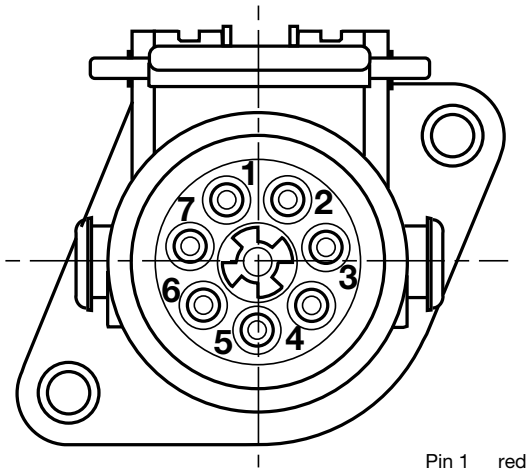
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TABS/TEBS

Diagnostic Cables for Trailer ABS and TEBS4

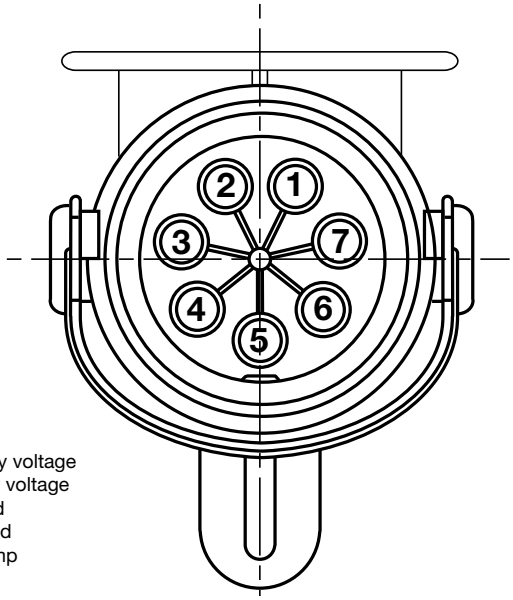
Doc. No. Y107796 (EN - Rev. 001)
May 2015

Pin Configurations



ISO 7638 Socket
(24 V)

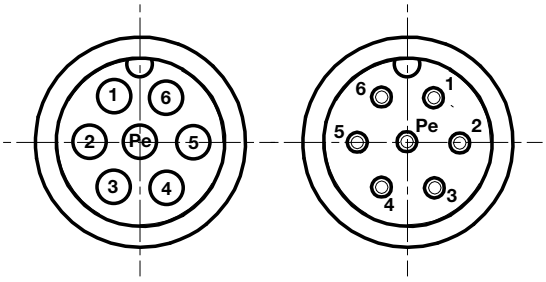
Pin 1	red	Valve supply voltage
Pin 2	black	ECU supply voltage
Pin 3	yellow	ECU ground
Pin 4	brown	Valve ground
Pin 5	white	Warning lamp
Pin 6	white/green	CAN-Hi
Pin 7	white/brown	CAN-Lo



ISO 7638 Plug
(24 V)

DIAGNOSTIC CONNECTORS

Older Amphenol Connector



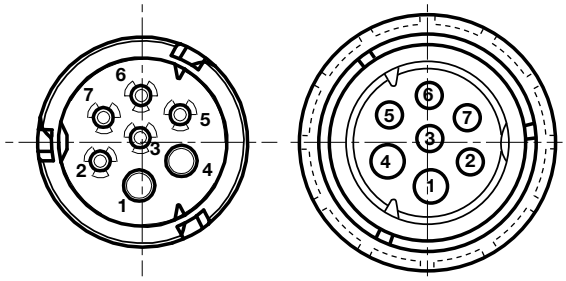
Diagnostic Socket

1 - 24 V
2 - not connected
3 - 24 V (linked to Pin 1)
4 - DIA-K
5 - DIA-K (linked to Pin 4)
6 - DIA-K (linked to Pin 4)
Pe - GND

Diagnostic Plug

1 - 24 V
2 - not connected
3 - not connected
4 - DIA-K
5 - not connected
6 - not connected
Pe - GND

Later Bayonet Connector



Diagnostic Socket

Diagnostic Plug

1 - not connected
2 - 24 V
3 - DIA-K
4 - not connected
5 - GND
6 - CAN-L
7 - CAN-H

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PD-272-030

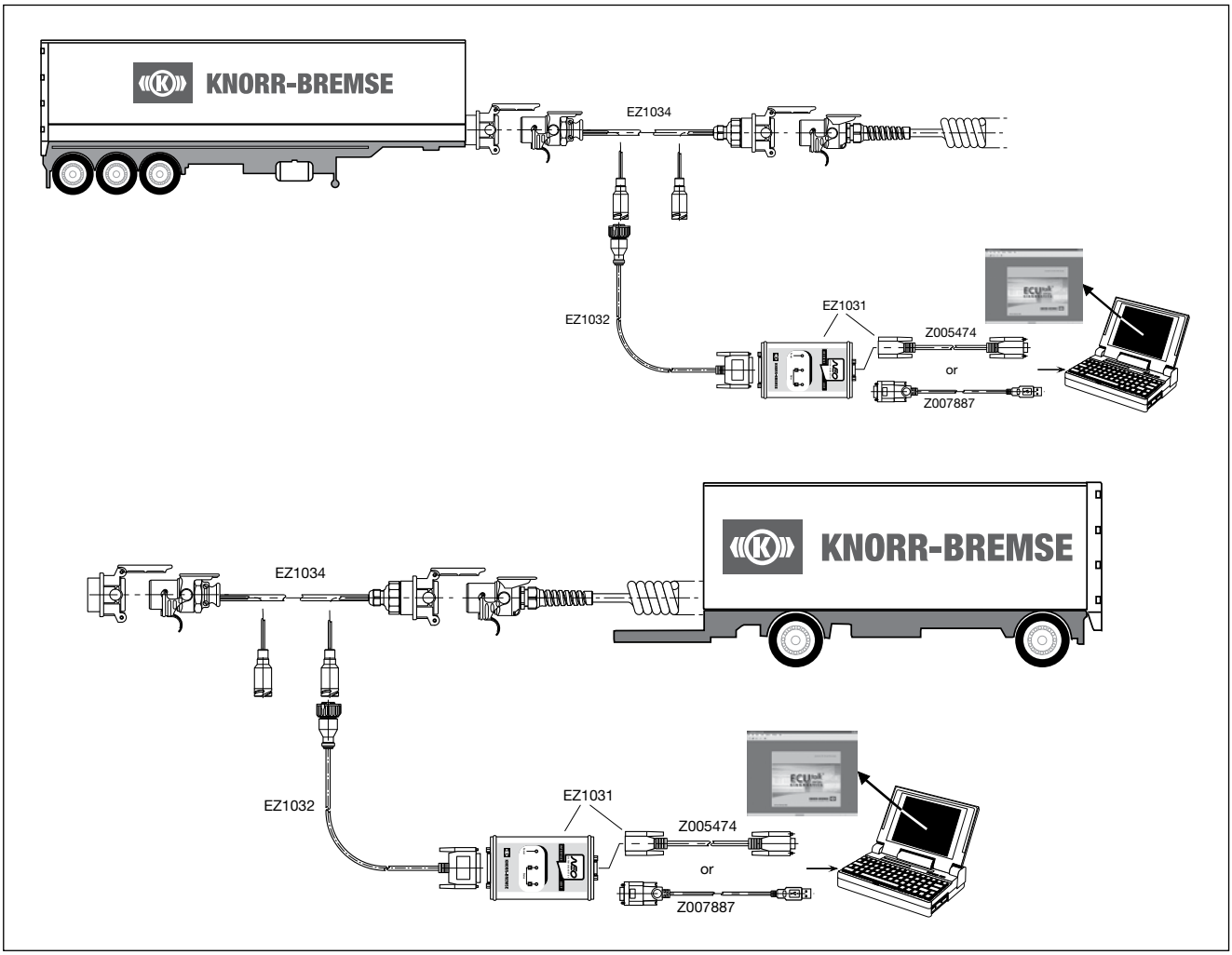
TABS/TEBS

Diagnostic Cables for Trailer ABS and TEBS4

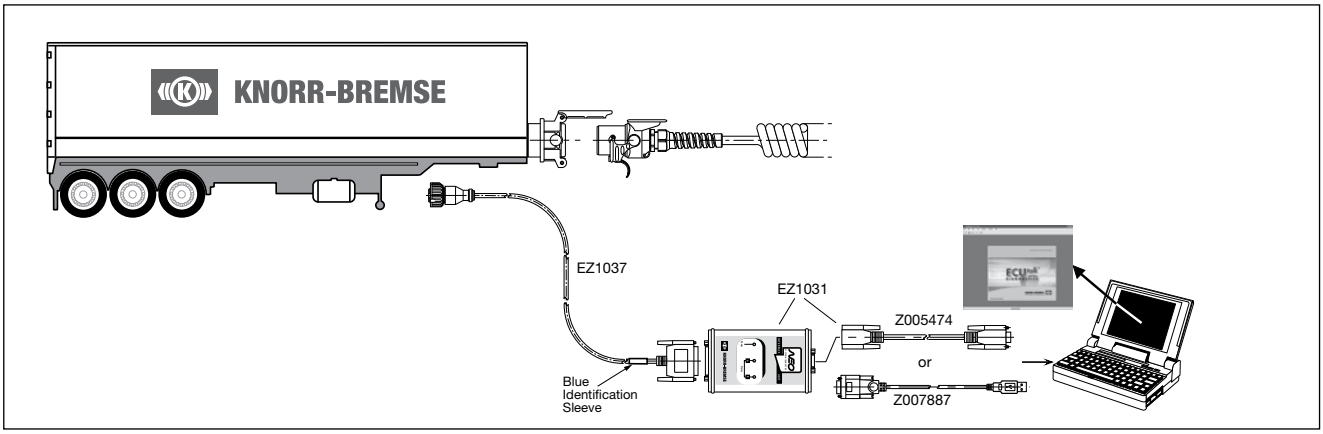
Doc. No. Y107796 (EN - Rev. 001)
May 2015

Diagnostic set up

PC Diagnostics via 24 V CAN - TEBS4



PC Diagnostics via Diagnostic Socket (Bayonet 5 V CAN) - KB4TA



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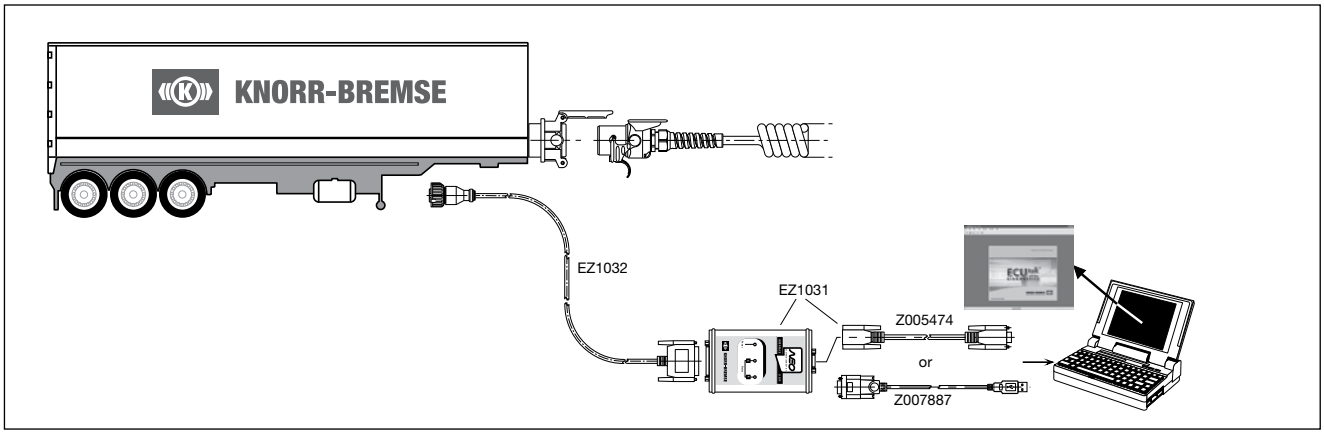
TABS/TEBS

Diagnostic Cables for Trailer ABS and TEBS4

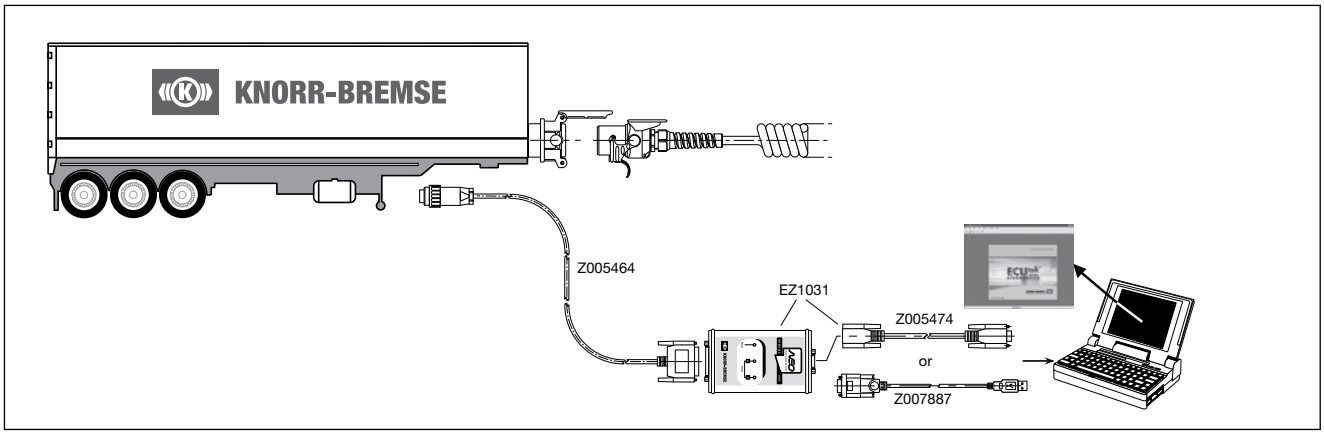
Doc. No. Y107796 (EN - Rev. 001)
May 2015

Diagnostic set up (contd.)

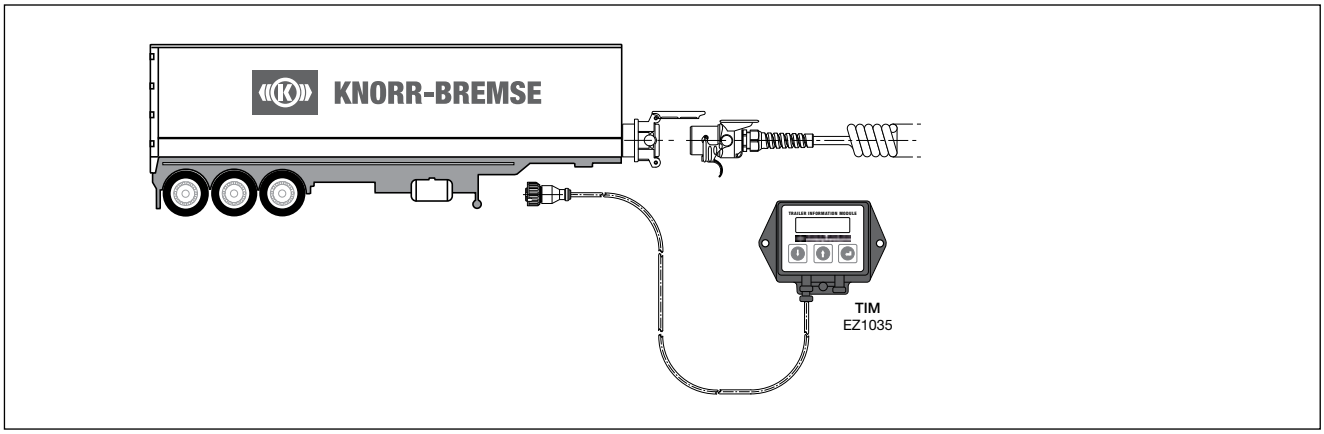
PC Diagnostics via Diagnostic Socket (Bayonet K-Line) - TEBS4 and A18



PC Diagnostics via Diagnostic Socket (Amphenol K-Line) - TEBS4 and A18



TIM Diagnostics via Diagnostic Socket (Bayonet K-Line) - TEBS4



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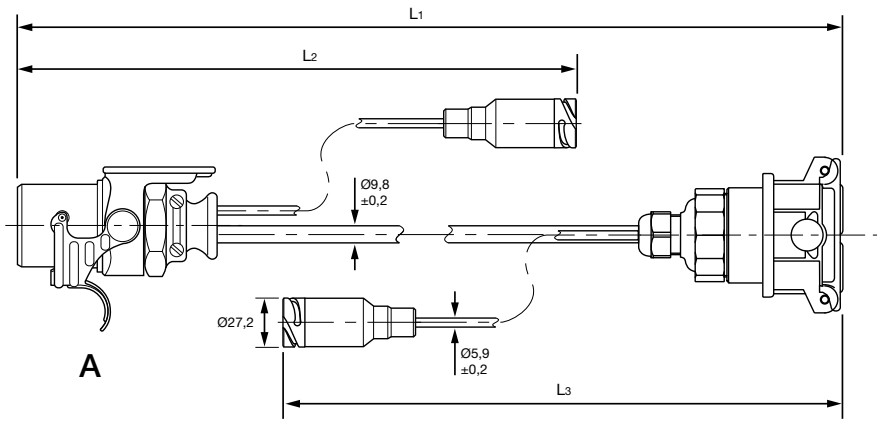
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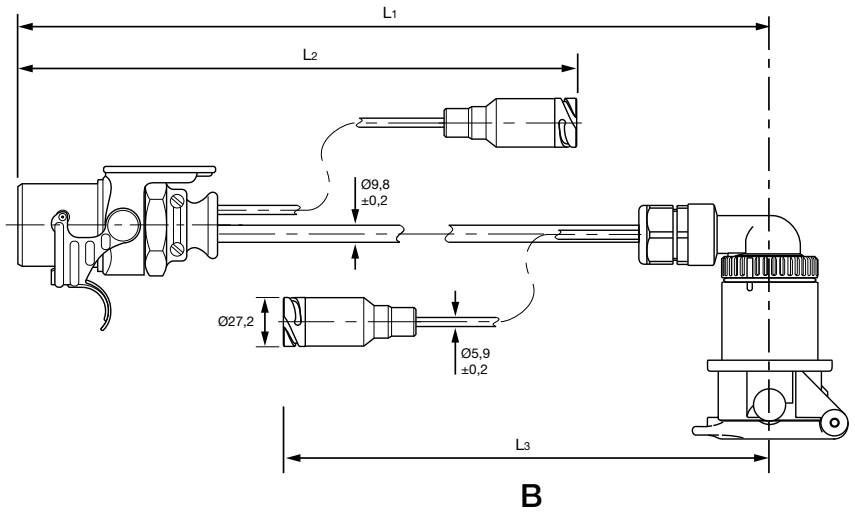
TABS/TEBS

Diagnostic Cables for Trailer ABS and TEBS4

Range Overview - *Diagnostic Cables*

ISO 7638 Plug/Socket 24 V CAN Adaptor Cable - TEBS4





Part No.	Type No.	Cable length [m]	Drawing	Comments
II39808F	**EZ1034**	L_1 = 0.45 L_2 = 0.60 L_3 = 0.35	A	Suits all types of trailer with 24 V system
K028584		L_1 = 0.60 L_2 = 0.45 L_3 = 0.35	B	Suits all types of trailer with 12 V system

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TABS/TEBS

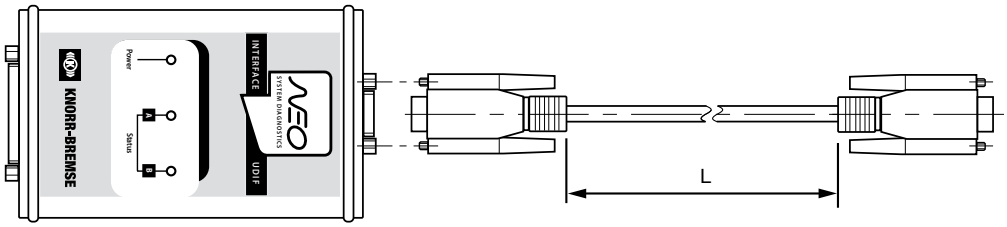
Diagnostic Cables for Trailer ABS and TEBS4

Doc. No. Y107796 (EN - Rev. 001)
May 2015

Range Overview - *Diagnostic Cables (contd.)*

Universal Diagnostic Interface (UDIF) and Cable - TEBS4, KB4TA and A18

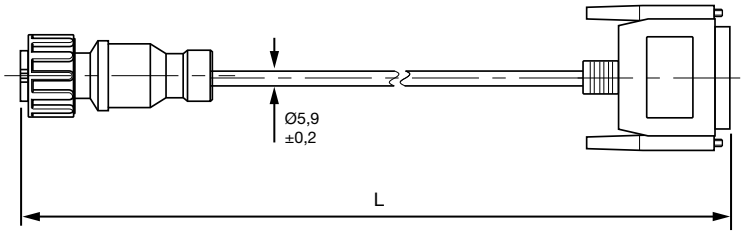
A



Part No.	Type No.	Cable length [m]	Drawing	Comments
II39809F	EZ1031	1.5	A	Includes UDIF **K018631** and Cable **Z005474** with RS232 Sub-D 9-pin Connectors

24 V CAN to UDIF Cable - TEBS4

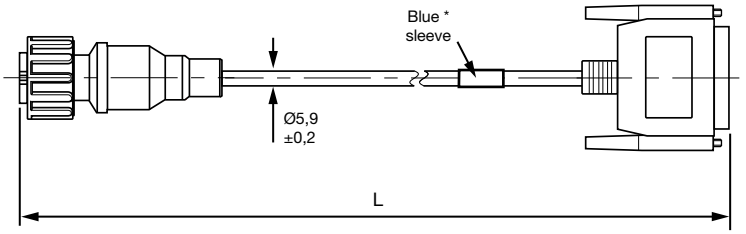
A



Part No.	Type No.	Cable length [m]	Drawing	Comments
II39812F	EZ1032	3.0	A	For use with Adaptor Cable II39808F-EZ1034 UDIF Connector is Sub-D 25-pin

Diagnostic Plug (Bayonet) to UDIF Cable - KB4TA

A



Part No.	Type No.	Cable length [m]	Drawing	Comments
K010837 [1)]	EZ1037	3.0	A	* Blue identification sleeve on cable UDIF Connector is Sub-D 25-pin

[1)] The part number will carry a suffix "N00"which defines that it is supplied without packaging. Example K010837N00

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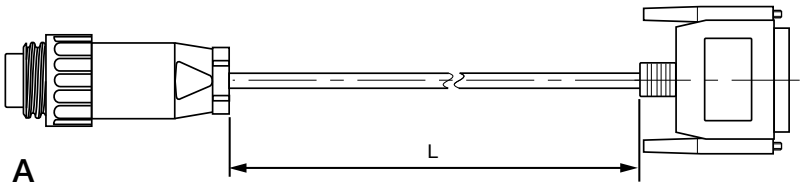
TABS/TEBS

Diagnostic Cables for Trailer ABS and TEBS4

Doc. No. Y107796 (EN - Rev. 001)
May 2015

Range Overview - *Diagnostic Cables (contd.)*

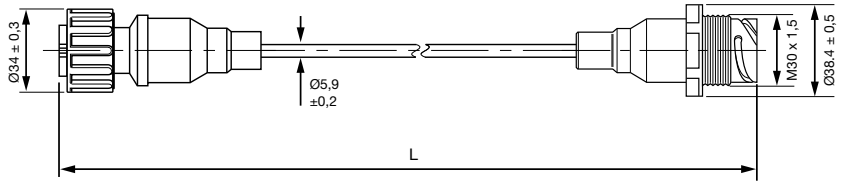
Diagnostic Plug (Amphenol) to UDIF Cable - TEBS4 and A18



A

Part No.	Type No.	Cable length [m]	Drawing	Comments
Z005464	-	3.0	A	for Amphenol Diagnostic Socket

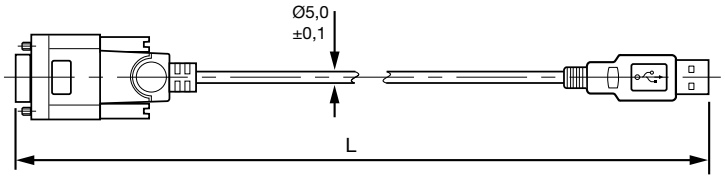
Diagnostic Socket (Bayonet) Extension Cable - TEBS4, KB3-TA and A18



A

Part No.	Type No.	Cable length [m]	Drawing	Comments
K002301	**EK3135**	10.0	A	

RS232 Sub-D 9-pin Connector to PC USB Adaptor Cable - TEBS4, KB4TA and A18



A

Part No.	Type No.	Cable length [m]	Drawing	Comments
Z007887	-	1.8	A	For use with UDIF and Cable II39809F-EZ1031

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TABS/TEBS

Diagnostic Cables for Trailer ABS and TEBS4

Doc. No. Y107796 (EN - Rev. 001)
May 2015

Revision Details

Rev. 000	September 2011	New document
Rev. 001	May 2015	References to TEBS G2 removed. Obsolete parts removed.

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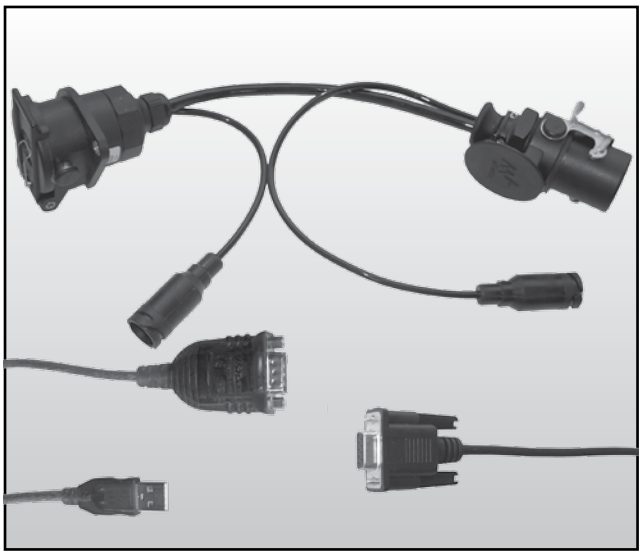
Product DATA

TEBS G2

Diagnostic Cables for TEBS G2

Doc. No. Y138839 (EN - Rev. 001)
December 2013

Function



Diagnostic Cables are used in trailer EBS systems to:

- provide electrical power to the diagnostic equipment where necessary
- supply status information to the diagnostic equipment

Newer EBS-equipped trailers can be diagnosed through the ISO 7638 connection. Older EBS-equipped trailers will have a diagnostic socket installed. Details of the cables/harnesses with diagnostic socket are shown in PD-272-025, Document No. *Y142784* for EBS systems.

Included in this document are details of various diagnostic cables and the Universal Diagnostic Interface which is required to diagnose TEBS systems using the Knorr-Bremse ECU*talk*® diagnostic software.

Technical Features

Operating Temperature Range: -40 °C to +80 °C

See tables for other features.

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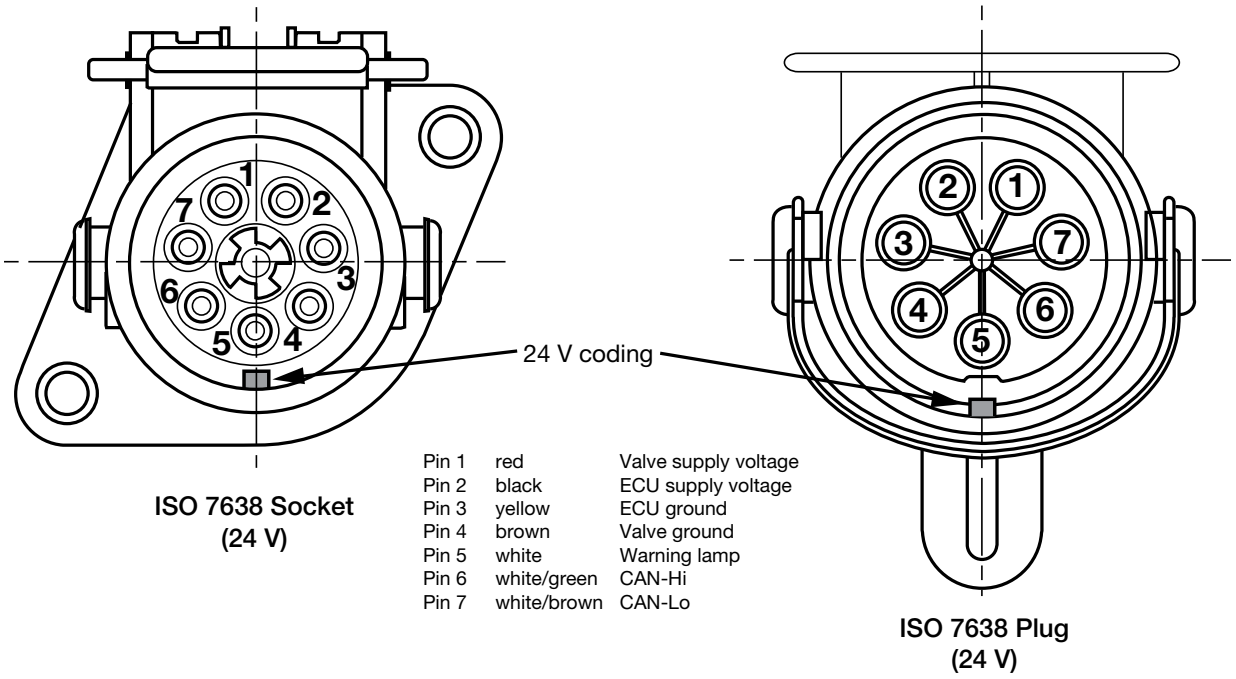
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TEBS G2

Diagnostic Cables for TEBS G2

Doc. No. Y138839 (EN - Rev. 001)
December 2013

Pin Configurations



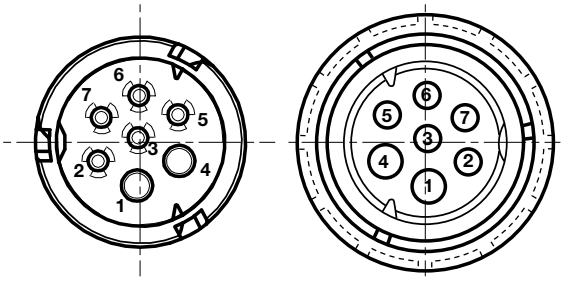
ISO 7638 Socket
(24 V)

Pin 1	red	Valve supply voltage
Pin 2	black	ECU supply voltage
Pin 3	yellow	ECU ground
Pin 4	brown	Valve ground
Pin 5	white	Warning lamp
Pin 6	white/green	CAN-Hi
Pin 7	white/brown	CAN-Lo

ISO 7638 Plug
(24 V)

DIAGNOSTIC CONNECTOR

Bayonet Connector



Diagnostic Socket

Diagnostic Plug

1 - not connected
2 - 24 V
3 - DIA-K
4 - not connected
5 - GND
6 - CAN-L
7 - CAN-H

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PD-272-035

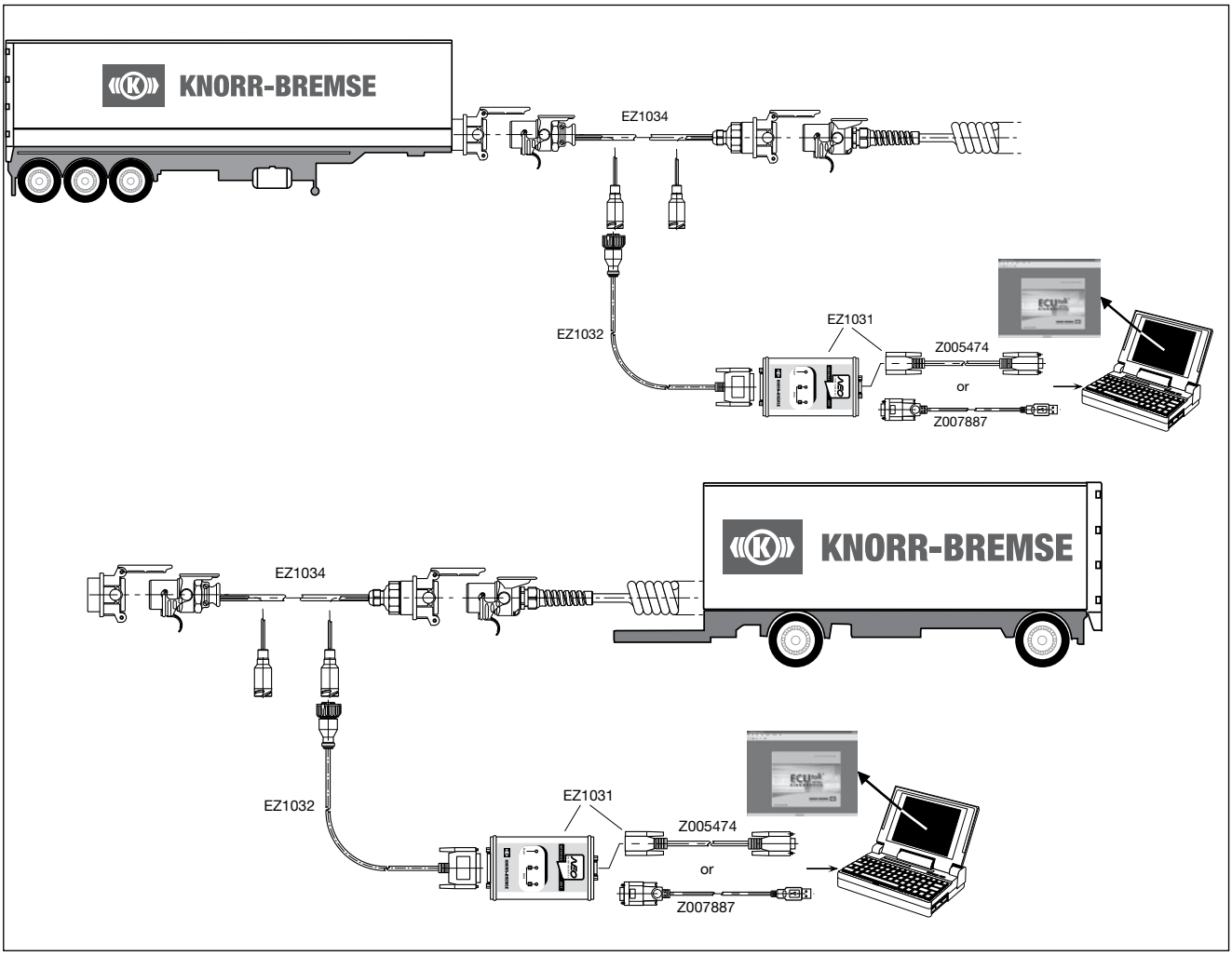
TEBS G2

Diagnostic Cables for TEBS G2

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Diagnostic set up

PC Diagnostics via 24 V CAN



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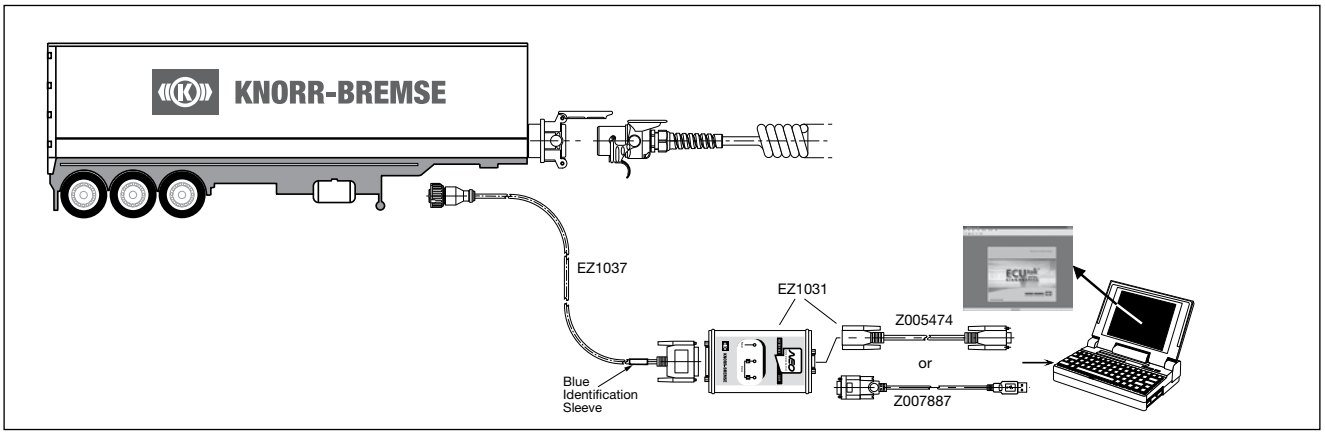
TEBS G2

Diagnostic Cables for TEBS G2

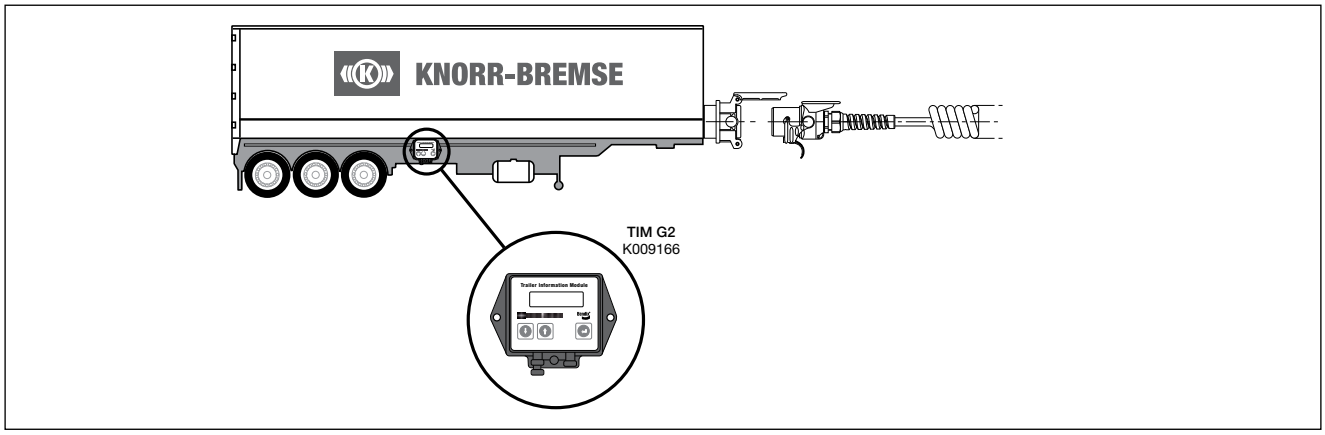
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December 2013

Diagnostic set up (contd.)

PC Diagnostics via Diagnostic Socket (Bayonet 5 V CAN)



TIM G2 Diagnostics via Diagnostic Socket (Bayonet - 5 V CAN)



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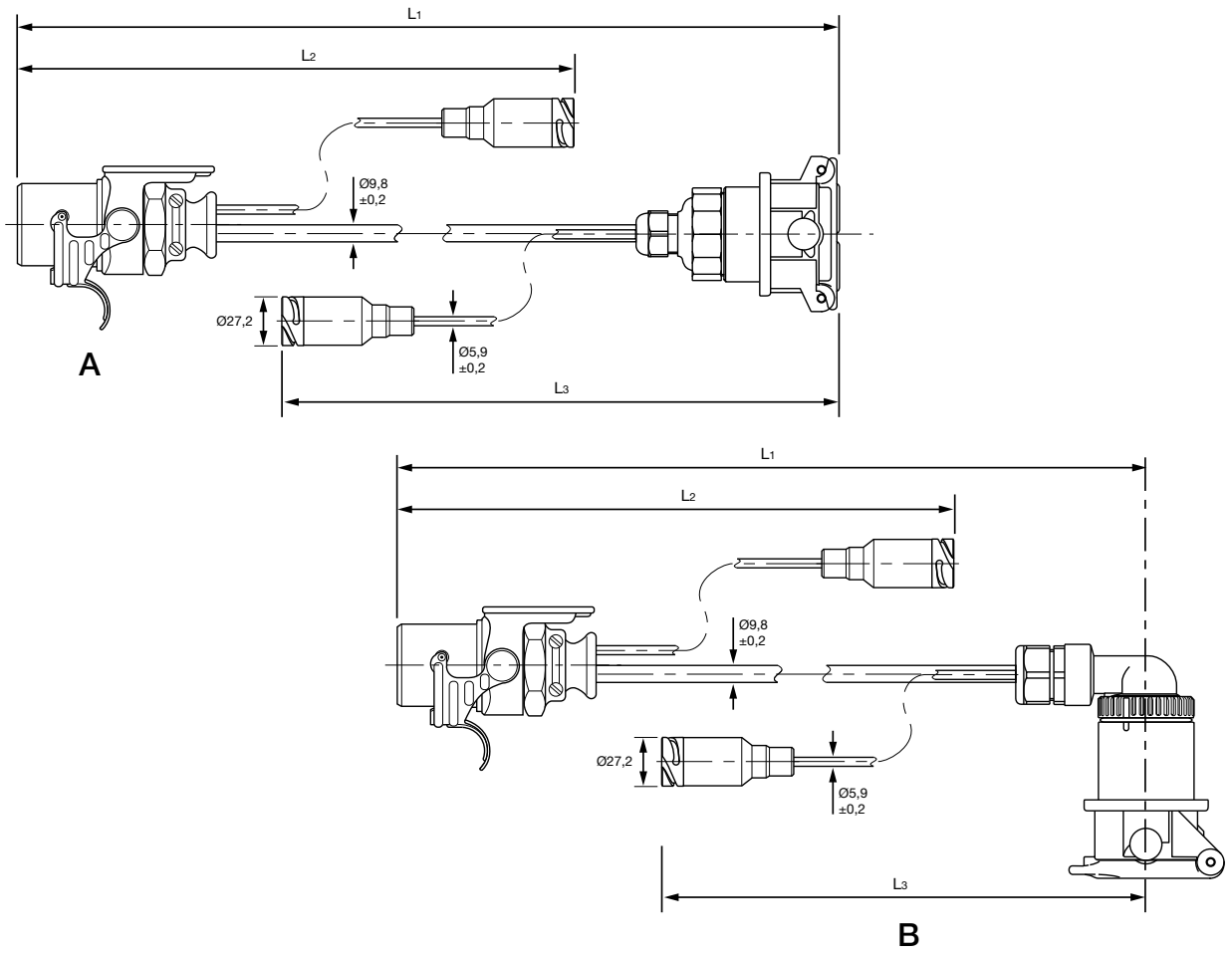
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December 2013

TEBS G2
Diagnostic Cables for TEBS G2

Range Overview - *Diagnostic Cables*

ISO 7638 Plug/Socket 24 V CAN Adaptor Cable



Part No.	Type No.	Cable length [m]	Drawing	Comments
II39808F	**EZ1034**	L_1 = 0.45 L_2 = 0.60 L_3 = 0.35	A	Suits all types of trailer with 24 V system
K028584		L_1 = 0.60 L_2 = 0.45 L_3 = 0.35	B	Suits all types of trailer with 12 V system

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TEBS G2

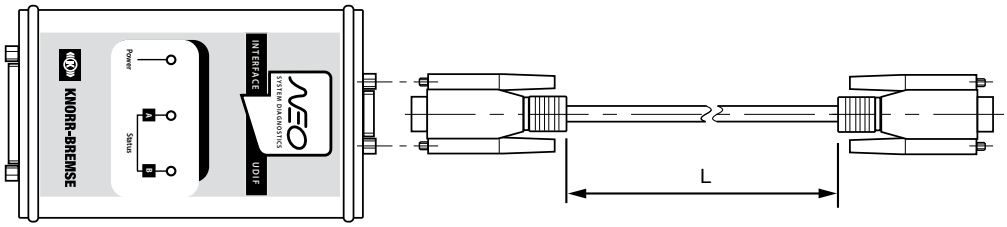
Diagnostic Cables for TEBS G2

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December 2013

Range Overview - *Diagnostic Cables (contd.)*

Universal Diagnostic Interface (UDIF) and Cable

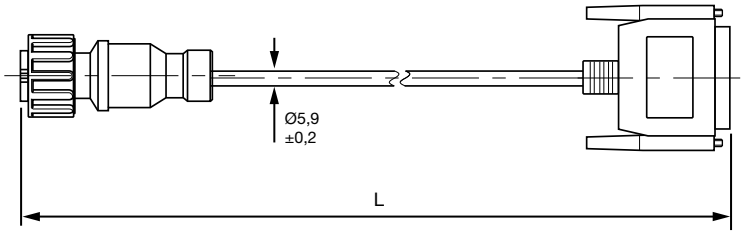
A



Part No.	Type No.	Cable length [m]	Drawing	Comments
II39809F	EZ1031	1.5	A	Includes UDIF **K018631** and Cable **Z005474** with RS232 Sub-D 9-pin Connectors

24 V CAN (Bayonet) to UDIF Cable

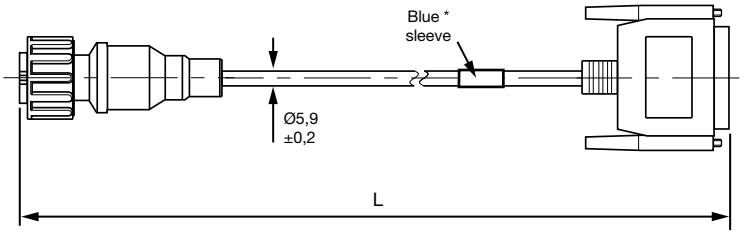
A



Part No.	Type No.	Cable length [m]	Drawing	Comments
II39812F	EZ1032	3.0	A	For use with Adaptor Cable II39808F-EZ1034 UDIF Connector is Sub-D 25-pin

Diagnostic Plug (Bayonet - 5 V CAN) to UDIF Cable

A



Part No.	Type No.	Cable length [m]	Drawing	Comments
K010837 [1)]	EZ1037	3.0	A	* Blue identification sleeve on cable UDIF Connector is Sub-D 25-pin

[1)] The part number will carry a suffix "N00"which defines that it is supplied without packaging. Example K010837N00

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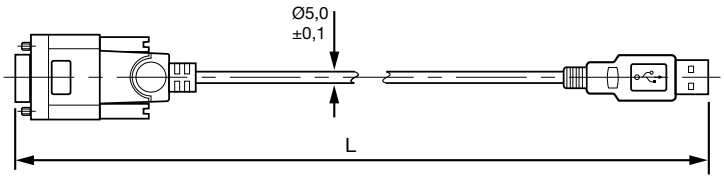
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December 2013

TEBS G2
Diagnostic Cables for TEBS G2

Range Overview - *Diagnostic Cables (contd.)*

RS232 Sub-D 9-pin Connector to PC USB Adaptor Cable

A



Part No.	Type No.	Cable length [m]	Drawing	Comments
Z007887	-	1.8	A	For use with UDIF and Cable II39809F-EZ1031

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TEBS G2

Diagnostic Cables for TEBS G2

Doc. No. Y138839 (EN - Rev. 001)
December 2013

Revision Details

Rev. 000	September 2012	New document
Rev. 001	December 2013	Bayonet profiles for EZ1032 and EZ1037 updated.

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Product DATA

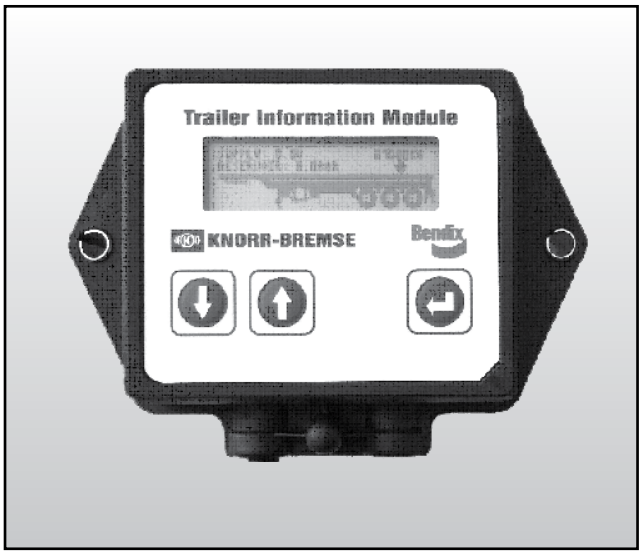
K009166

Trailer Information Module (TIM G2)

Doc. No. Y050665 (EN - Rev. 003)
February 2015

PD-273-920

Function



The **Trailer Information Module (TIM G2)** is a trailer mounted display for direct reading of diagnostic and trailer related information. It may also be used as a hand held diagnostic tool. It enables access to information available within the ECUs of the TEBS G2 brake module and other Knorr-Bremse systems, such as SmarTire, without using PC diagnostics.

The **TIM G2** provides a graphical display with back light and the same menu structure as the previous **TIM**. The operation is simple by means of three buttons (see picture). In addition to diagnostic and checking functions, **TIM G2** offers access to a wide range of information and the following key features:

- Real Time Clock
- User interface can be customised (initial menu)
- Activation of input functions (e.g. Traction Help, lowering of lift axles, iLvl, etc.)
- Optional Trailer Data Recorder (TDR)
- Internal battery allows access to fault and service information when trailer is unpowered (K009166)
- Up to 7 languages available from the menu

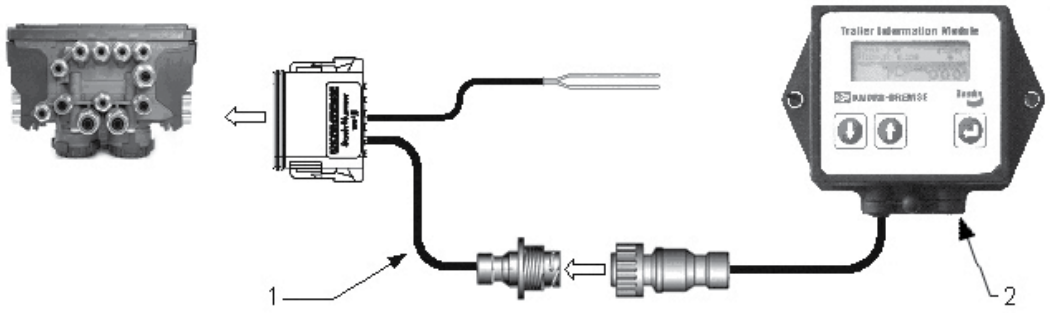
Technical Features

Operating temperature range:	-20 °C to +70 °C
Weight:	0.4 kg approx.
Voltage range:	9 to 32 V DC

Options

Pos.	Name	Part No.	Type No.	Remarks
1	Connection cable			For information on suitable cables see PD-272-025, Document No. *Y142784*
2	TIM G2	**K009166** [1)]	**EZ1035**	Cable length = 1m, with internal battery
	TIM G2	**K070605** [1)]	**EZ1035**	Cable length = 1m, without internal battery - for ADR applications

[1)] The part number of the module will carry two suffices, firstly “V##” which represents the software revision of the product, e.g. V01, V02 etc., and secondly “N##” which defines the packaging requirements of different market sectors, e.g. N00, N50. Example: K070605V00N00 - is supplied with software to revision 00 and is supplied without packaging.



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K009166
Trailer Information Module (TIM G2)

Doc. No. Y050665 (EN - Rev. 003)
February 2015

Menu Structure



Initial Menu

<Active Faults> [1]
ODO:
Srv Km:
Load Rear:
Brake pads: [2]
Set Drive1 level [3]
Set Drive2 level [3]
Set Mem1 level [3]
Set Mem2 level [3]
Inst. Test Missing [4]
TPMS Info [2]
Main Menu
Exit

Main Menu

Stored Faults
Distance & Serv.
Operating Info
System Info
ECU Info
TIM Info
Exit

Stored Faults
Activate faults:
none
Inactive faults:
none
Clear faults
Exit

Distance & Srv
ODO:
Trip:
Reset Trip
Srv Date:
Srv Km:
Set Next Service
Exit

Operating Info
Info Total
Info Period
Exit

ECU Info
Part num:
SW:
Exit

System Info
TPMS Setup [2]
Load Info
Pressure Info
Tilt Angle:
Installation Test
Lift axle control
Exit

TIM Info
Lang.:
Set LCD Contrast
Manufacturing Info
Exit

(Page 3)

Set Next Service
Date Based
Distance Based
Exit

Info Total
ABS Events:
RSP Interventions
Load History
Brake History
System Powering
Exit

Info Period
Period Km:
ABS Events:
RSP Interventions
Load History
Brake History
System Powering
Reset Period Data
Exit

(Page 3)

Date Based
Year:
Month:
Day:
Save & Exit
Exit

Distance Based
Srv Km:
Save & Exit
Exit

TPMS Setup
Learn Sensor
Delete Sensor
Exit

Load Info
Front Axle Group [2]
Bogie Load: [2]
Rear Axle Group
Bogie Load:
Exit

Pressure Info
Dem P4:
Dem CAN:
Susp P42:
Pcyl P21:
Pcyl P22:
Pcyl P2:[2]
Res P1:
Exit

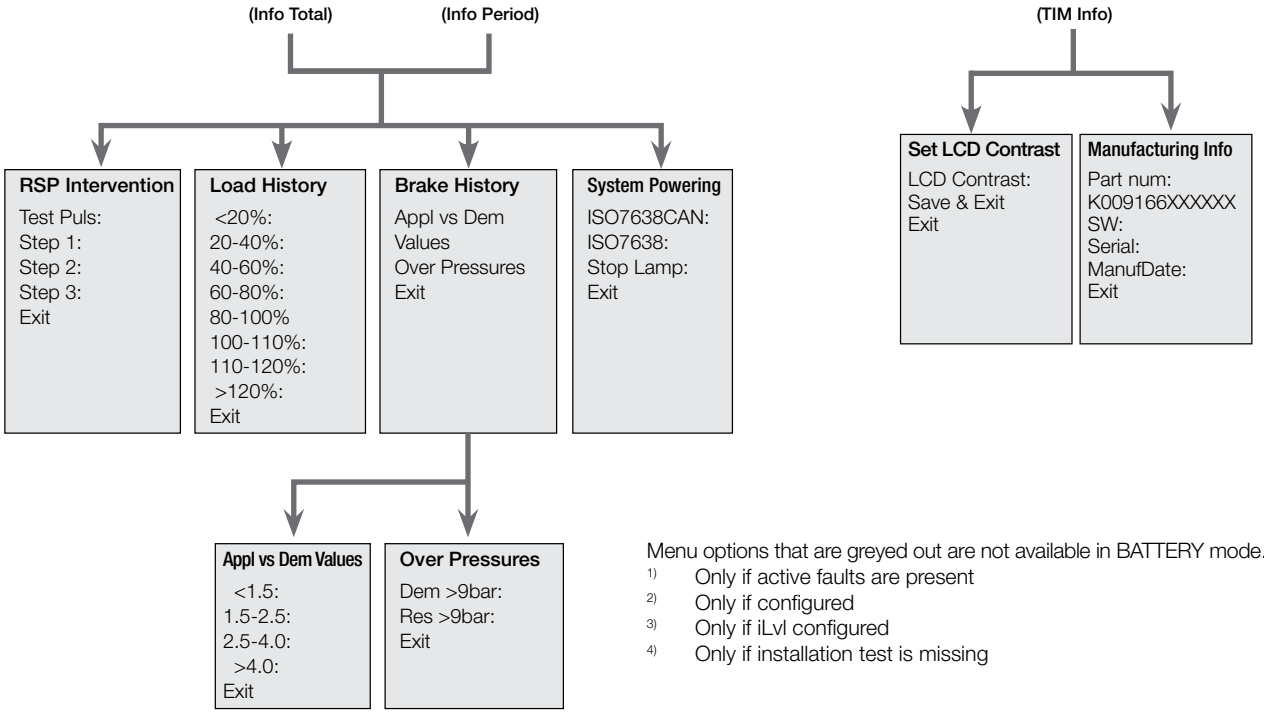
Installation Test
Start Inst. Test
Install. Check:
Reserv. Press.
S-A Sensor [2]
S-B Sensor [2]
S-C Sensor
S-D Sensor
S-E Sensor [2]
S-F Sensor [2]
Demand Press:
Parking Brake:
Exit

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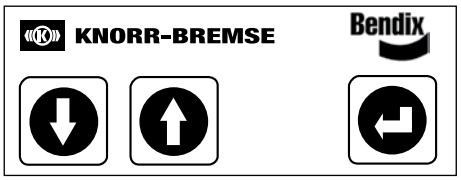


Menu options that are greyed out are not available in BATTERY mode.

1) Only if active faults are present
2) Only if configured
3) Only if iLvl configured
4) Only if installation test is missing

Operating Instructions

Operation of the TIM G2 menu is possible by means of three buttons (Fig. 1). Using the “scroll up” / “scroll down” buttons, the cursor can be moved up or down respectively in the menu; the “ENTER” button is used to select the required option.



“scroll down” “scroll up” “ENTER”

Fig. 1

The “Exit” option at the bottom of every menu allows the user to return to the previous menu.

The graphical display of the TIM G2 is limited to four lines, therefore a scroll bar is displayed on the right hand side to indicate the position of the cursor within the current menu listing.

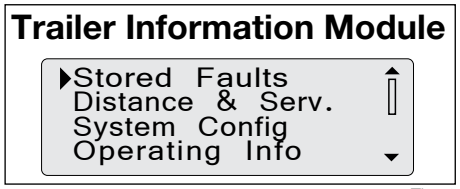


Fig. 2

If the option where the cursor is located has a sub-menu the cursor is a solid triangle (Fig.2), if the option is a parameter the cursor is an open triangle (Fig.3).

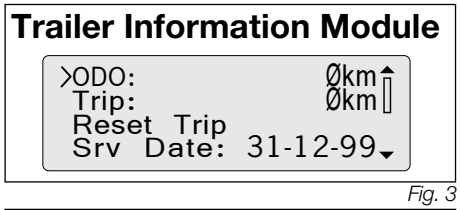


Fig. 3

Whenever the TIM G2 is reading data from the brake module a symbol is displayed for all the parameters showing that the updating process is still in progress.

The TIM G2 can be used as a trailer monitoring system for tyre pressure and temperature (Fig. 4) (See PD-551-000, Document No. *Y095833).*

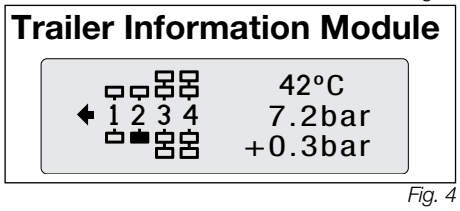


Fig. 4

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

K009166
Trailer Information Module (TIM G2)

Doc. No. Y050665 (EN - Rev. 003)
February 2015

Software update

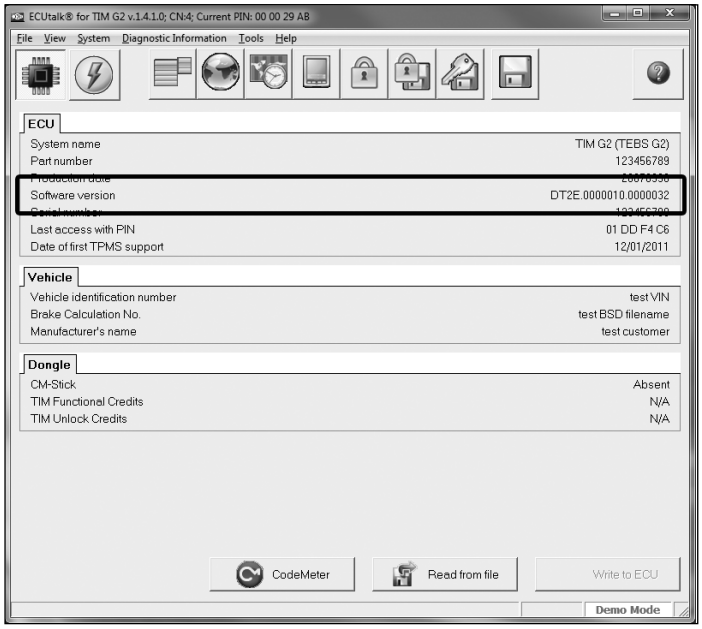
The revision level of the software in the TIM G2 can be found in the menu structure under:

TIM Info ⇨ Manufacturing Info ⇨ SW:

The software revision listed will be displayed as:

0000010.0000032 (Example: this is software revision 10.32)

When a computer with the program 'ECU*talk*® for TIM G2' running is connected to a TEBS system with a TIM G2 the software version of the TIM G2 will be displayed on the opening screen:



If the revision of the software stored on the computer is later than that stored in the TIM G2, when the TEBS system is first connected a window will appear informing the user of this and asking if an update is wanted. To update the software, simply click on "Yes".



If "Yes" is selected, the update will be carried out automatically.

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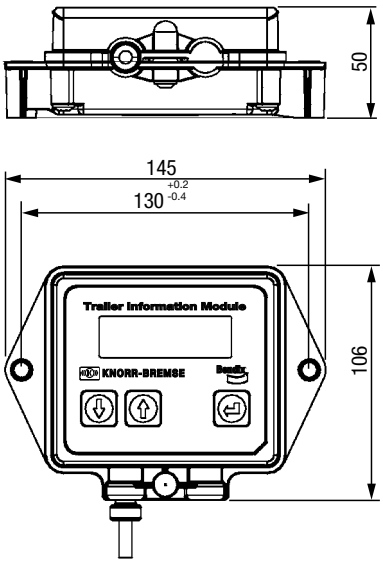
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Doc. No. Y050665 (EN - Rev. 003)
February 2015

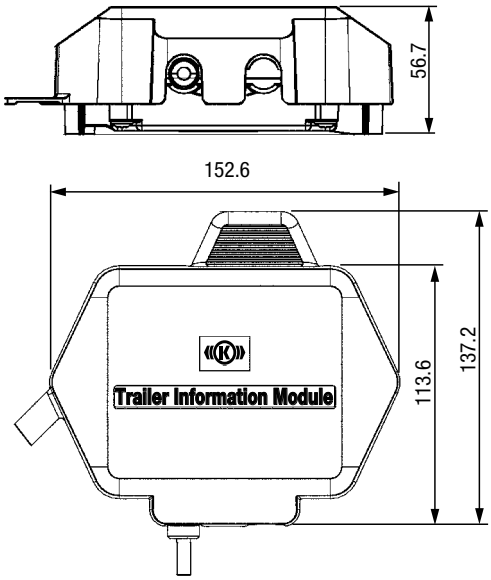
K009166
Trailer Information Module (TIM G2)

Dimensions

Without cover



Including cover



Note:

For advanced configuration of the TIM G2, Knorr-Bremse software "ECU*talk*® for TIM G2" is available. For more information see the User Manual No. *Y051983* available at www.Knorr-BremseCVS.com.

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

K009166
Trailer Information Module (TIM G2)

Doc. No. Y050665 (EN - Rev. 003)
February 2015

Revision Details

Rev. 001	September 2012	Note on Smart Update added to page 2, additional menu information added to page 3 and note added to page 4
Rev. 002	December 2013	K070605 added to table on page 1. Note on Smart Update deleted from page 2, additional menu information added concerning iLvl and ‘Software Update’ section added to page 4.
Rev. 003	February 2015	Lift Axle Control deleted from main menu

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

EZ2040

iTAP Wireless Interface (ECU)

Doc. No. Y202588 (EN - Rev. 002)
August 2015

Function

The **iTAP ECU** is a trailer mounted interface allowing the iTAP App, installed on a mobile device such as a 'smart phone', to be used to control certain brake and air suspension functions of the TEBS G2.2 system on the trailer.

The **iTAP ECU** is installed at the front of the trailer and is connected to the TEBS G2.2 Brake Module using suitable cabling (see PD-272-025, Document No. *Y142784)*.

For information on downloading and the functions of the iTAP App see PD-214-F501, Document No. *Y204659* and the iTAP User Manual, Document No. *Y181590*.



Technical Features

Operating temperature range:	-30 °C to +65 °C
Weight:	0.27 kg approx.
Voltage range:	8 to 32 V DC

Part No.	Type No.	Remarks
K100440 [1)]	**EZ2040**	iTAP ECU 24 V (complete with Blanking Plug K108022 and Label K112779)
K108022 [2)]	**-**	Blanking Plug
K112779 [3)]	**-**	iTAP Label (self-adhesive - for mounting on the trailer)

1) The part number of the module will carry two suffices, firstly "V##" which represents the software revision of the product, e.g. V01, V02 etc., and secondly "N##" which defines the packaging requirements of different market sectors, e.g. N00, N50. Example: K100440V01N50 - is supplied with software to revision 01 and is supplied with packaging.

2) The part number will carry a suffix "N49" which defines that it is for OE use only.

3) The part number will carry a suffix "N00" which defines that it is supplied without packaging.

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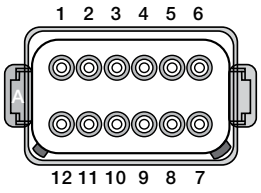
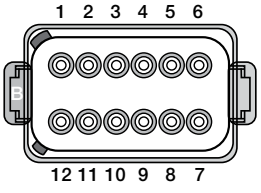
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EZ2040
iTAP Wireless Interface (ECU)

Doc. No. Y202588 (EN - Rev. 002)
August 2015

Electrical Connections

X1 (Code A)		X2 (Code B)	
			
Pin Number	**Function**	**Pin Number**	**Function**
1	Battery Supply (+)	1	Not connected
2	J1939 CAN (5 V) High	2	
3	Not connected	3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11	J1939 CAN (5 V) Low	11	
12	Battery Supply (-)	12	

Dimensions

K112779



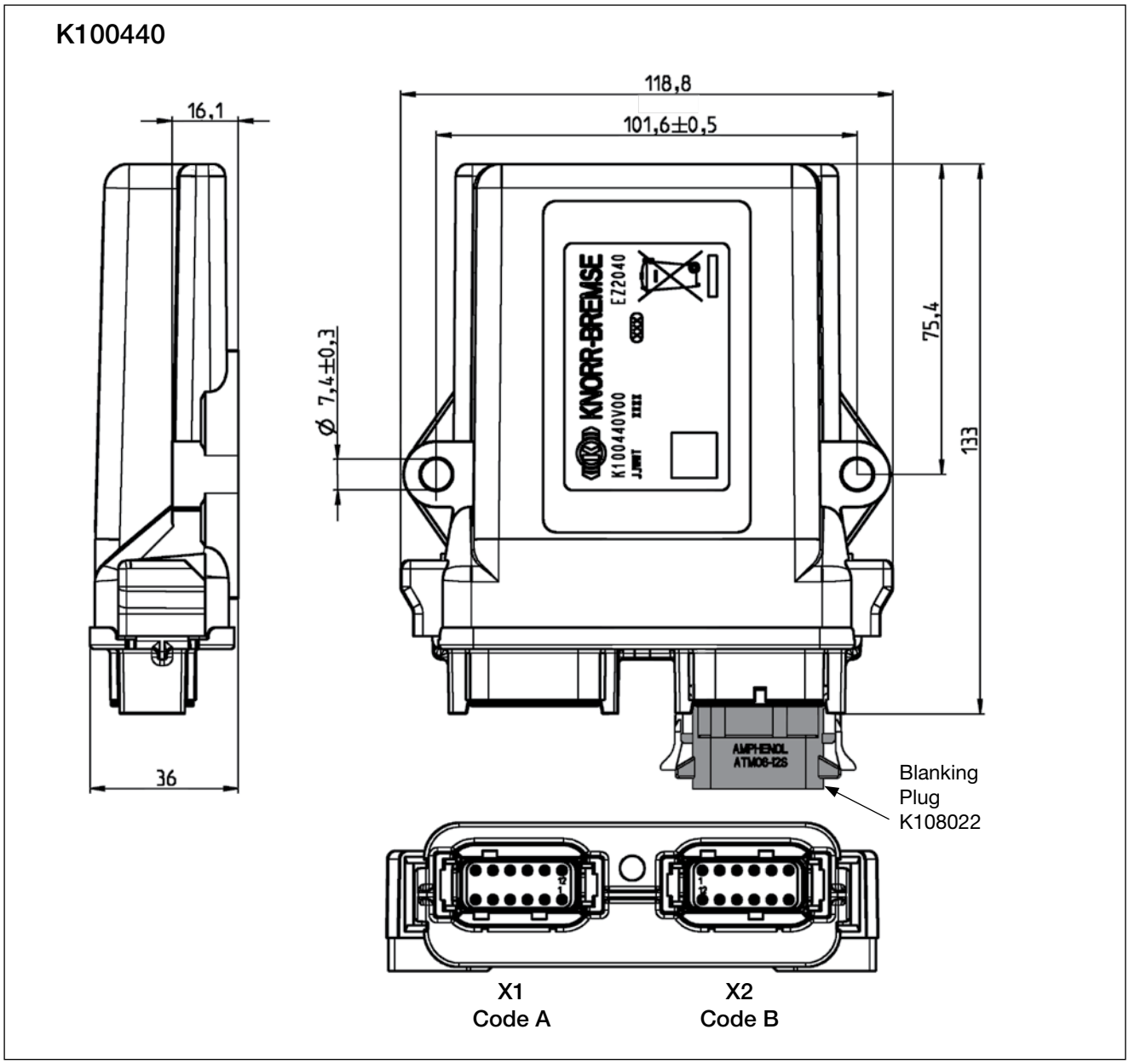
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Doc. No. Y202588 (EN - Rev. 002)
August 2015

EZ2040
iTAP Wireless Interface (ECU)



Installation and Mounting

- Follow the Installation Instructions, Document No. *Y182151*.
- Ensure that the electrical supply to the trailer is disconnected before installing the ECU.
- Avoid touching the electrical connector pins on the ECU.
- Always fit a blanking plug in connector X2 when not used.
- Read the iTAP User Manual Y181590 before using the iTAP ECU.
- A full list of safety guidelines can be found on Document No. *Y075876*.

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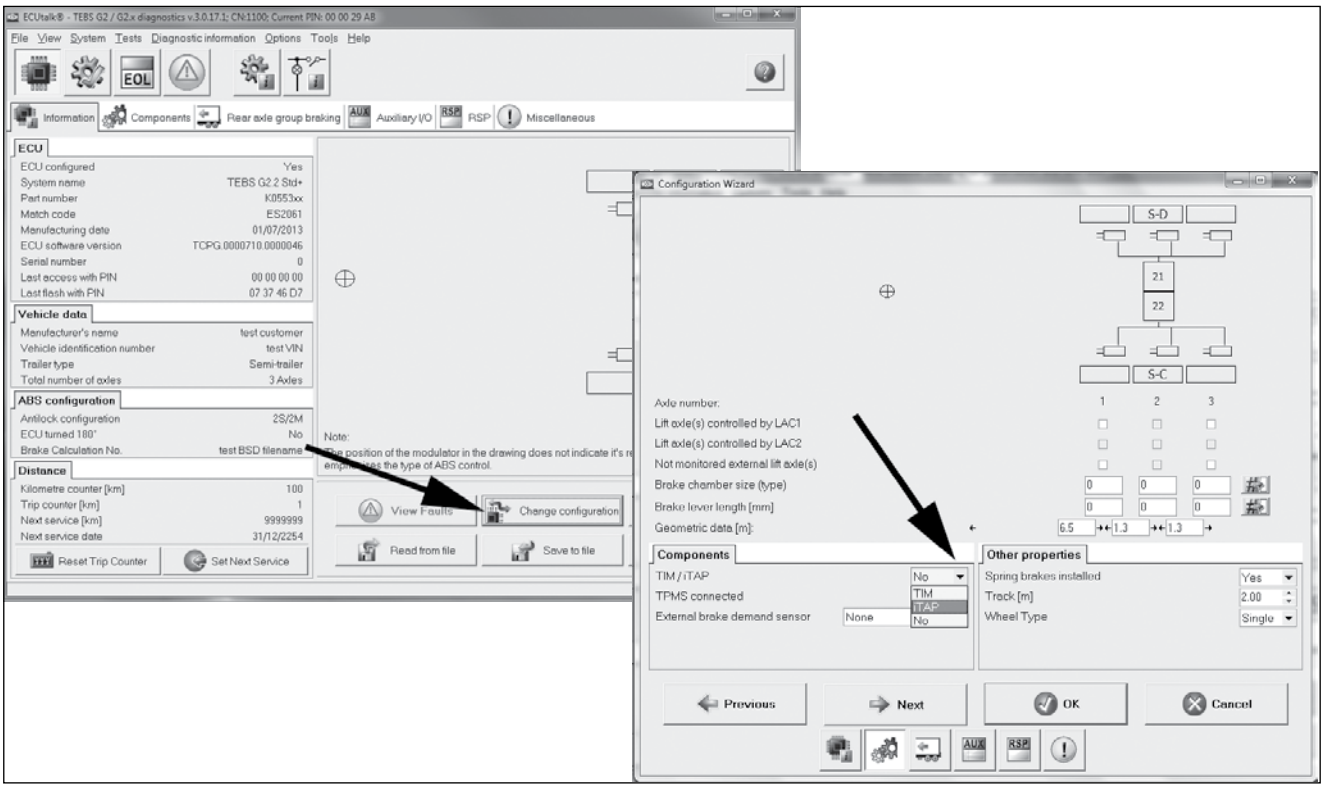
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

EZ2040
iTAP Wireless Interface (ECU)

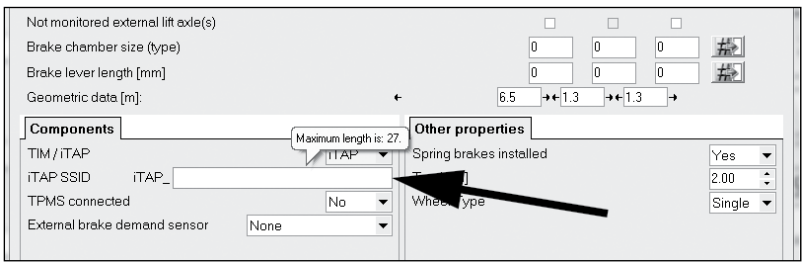
Doc. No. Y202588 (EN - Rev. 002)
August 2015

Configuration in ECU*talk*®

The iTAP ECU is configured using the Knorr-Bremse diagnostic software ECU*talk*®. Firstly, under the “Information” tab, click on the “Change configuration” button and from the drop down list against “TIM/iTAP” select the “iTAP” option.



Once the “iTAP” option has been selected a “iTAP SSID” window will appear. In this window create a **unique** network name for the iTAP wireless connection (e.g. Chassis Number).



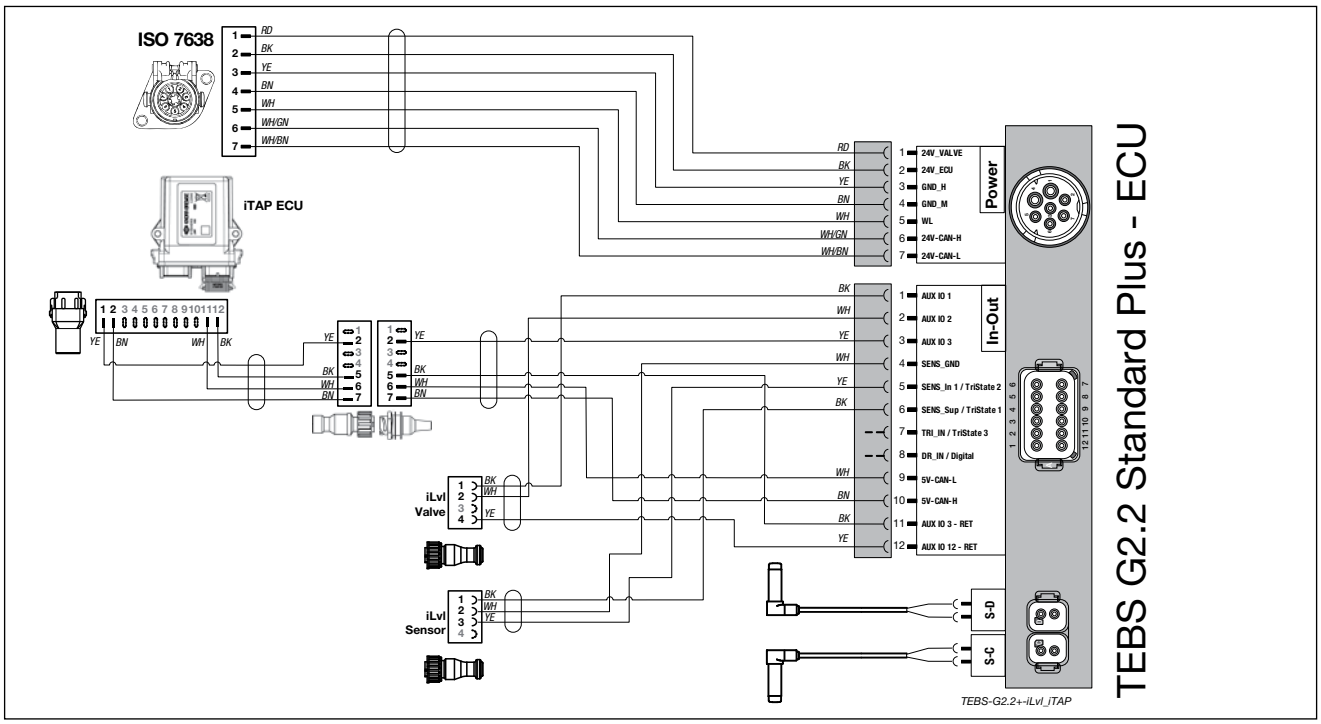
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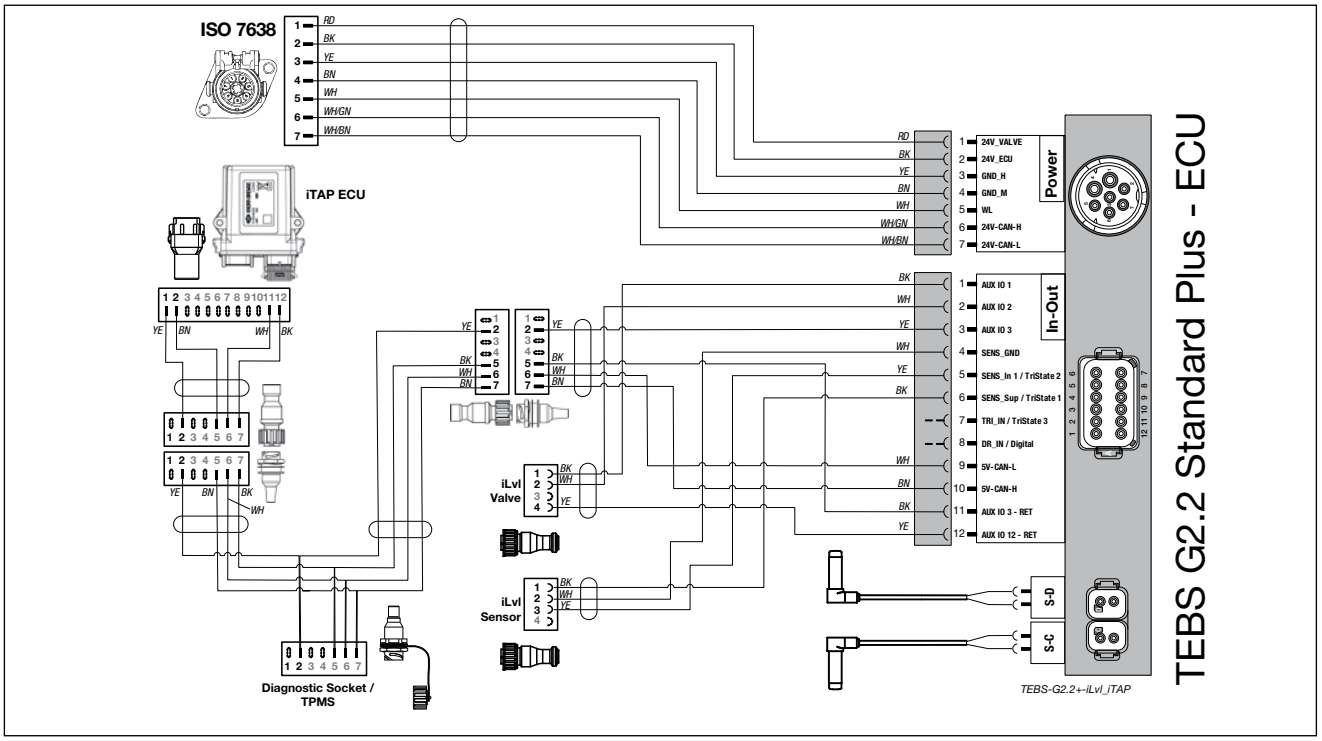
Doc. No. Y202588 (EN - Rev. 002)
August 2015

EZ2040
iTAP Wireless Interface (ECU)

Typical Wiring Diagram - *TEBS G2.2 Standard Plus with One-Point iLvl and iTAP*



Typical Wiring Diagram - *TEBS G2.2 Standard Plus with One-Point iLvl, iTAP and TPMS*



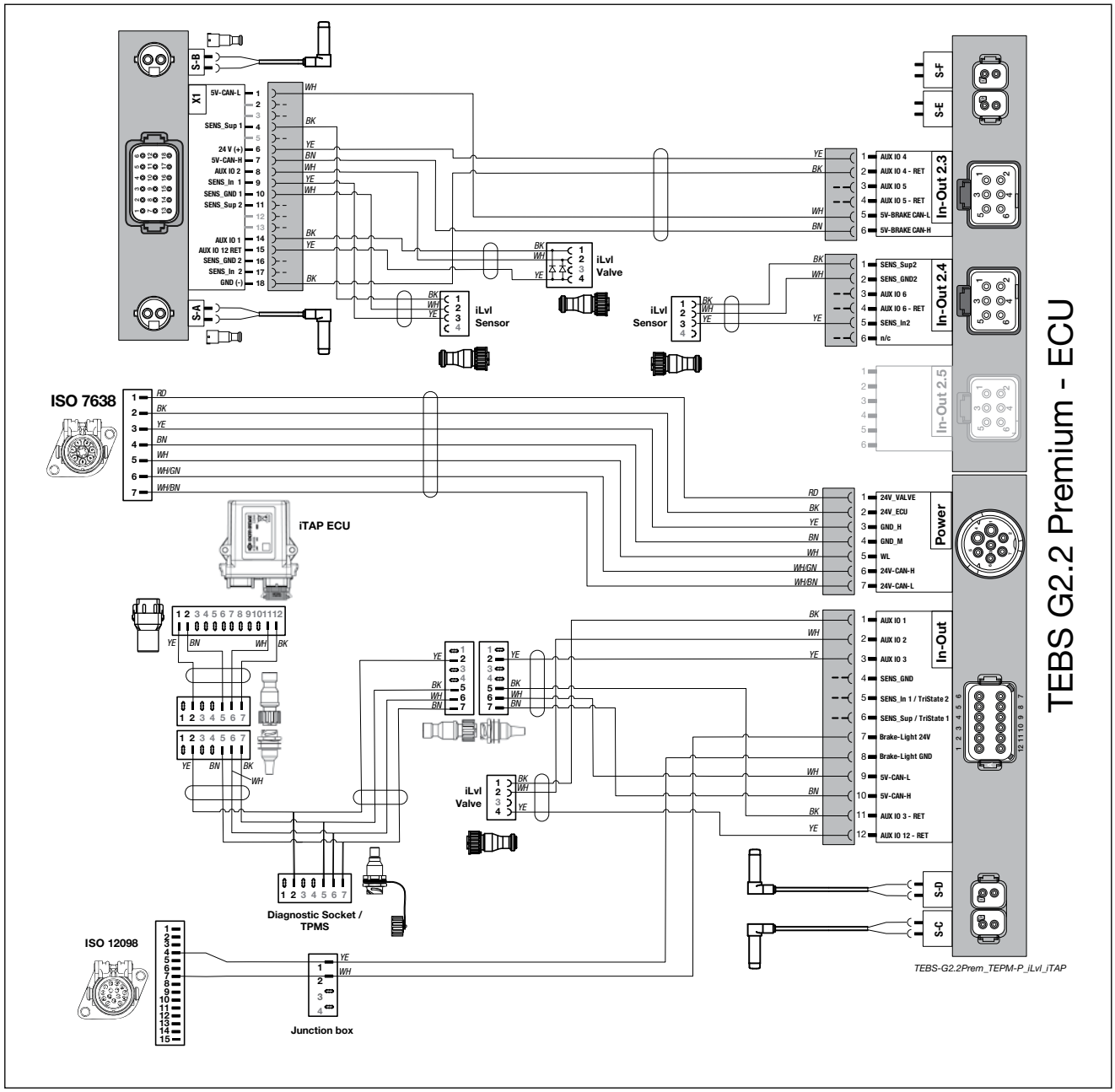
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EZ2040
iTAP Wireless Interface (ECU)

Doc. No. Y202588 (EN - Rev. 002)
August 2015

Typical Wiring Diagram - *TEBS G2.2 Premium 4S3M Drawbar with Two-Point iLvl, iTAP, diagnostic socket and stop lamp powering*



Revision Details

Rev. 001	January 2015	Configuration added (transferred from Y204659)
Rev. 002	May 2015	Label K112779 added.
Rev. 002	August 2015	Correction to Wiring Diagram on page 6.

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

TEBS G2

iLvl Valve

Doc. No. Y172342 (EN - Rev. 000)
June 2015

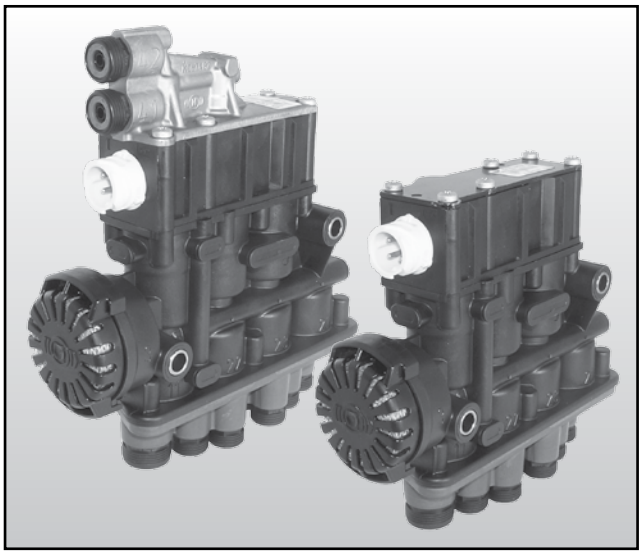
PD-280-450

Function

The **iLvl Valve** forms part of the iLvl suspension control system which operates with TEBS G2.2 Standard Plus and Premium brake modules to control the air suspension system of trailers.

The **iLvl Valve** receives electrical signals from the TEBS G2.2 brake module and in response to these it supplies or exhausts air to the suspension air bags in order to raise or lower the chassis height to achieve desired setting.

There are two variants, one with “pneumatic backup” having the ability to receive pneumatic inputs from manual push button valves which override the normal drive height. The other does not have this backup function.



Technical Features

Maximum operating pressure:	10.0 bar
Operating temperature range:	-40 °C to +85 °C
Nominal voltage:	12 V
Operating voltage:	10 to 16 V
Weight:	see table

Range Overview

Part No.	Type No.	Pneumatic Backup	Weight [kg approx.]
K058032 [1)]	-	Yes	1.24
K066949 [1)]	-	No	1.20

[1)] The part number will carry a suffix “N00” which defines that it is supplied without packaging.

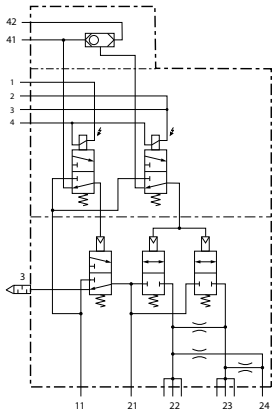
Service Parts: Blanking Plug for 8 mm pipe 96210008

Note:

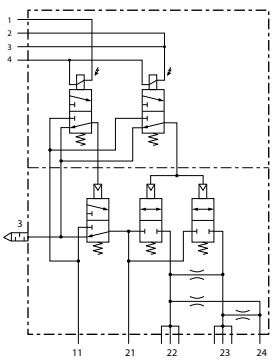
The valve has ‘cross-throttling’ between the outputs for the left and right air bags which provides effective separation between the two sides of the suspension when in operation. There is also throttling between the air bag outputs and the signal to the TEBS brake module in order to minimise operational fluctuations in pressure.

Standard Symbol as DIN ISO 1219

With Backup



Without Backup



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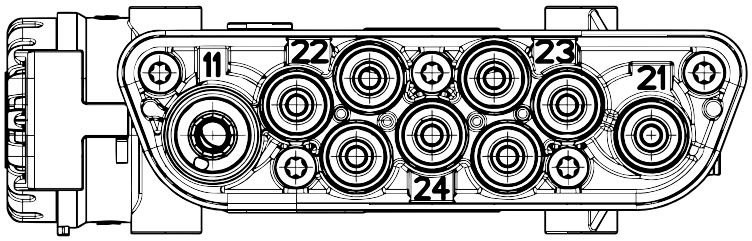
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TEBS G2

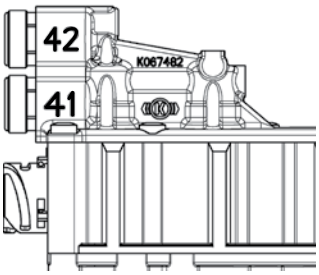
iLvl Valve

Doc. No. Y172342 (EN - Rev. 000)
June 2015

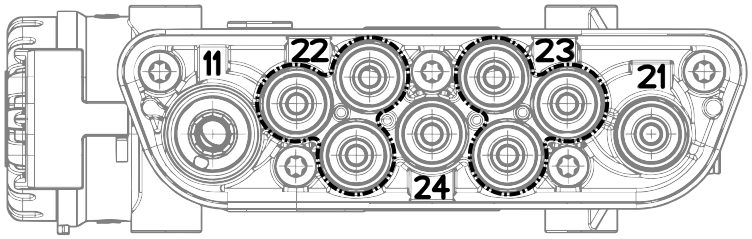
Pneumatic Connections



Ports 22 and 23



K058032 only



Port	Number of ports	Connection/remarks	Push-to-connect (PTC) Fitting (to suit pipe O/D)
11	1	Supply from reservoir	12x1.5
21	1	Delivery to slave iLvl Valve, (if fitted)	8x1.0
22	3	Delivery to air bags on one side of the trailer	8x1.0
23	3	Delivery to air bags on the other side of the trailer	8x1.0
24	1	Delivery to TEBS G2.2 brake module (air suspension signal)	8x1.0
3	1	Exhaust (via silencer)	-
41	1	'Raise' signal from manual push button valve (if fitted)	8x1.0
42	1	'Lower' signal from manual push button valve (if fitted)	8x1.0

Important notes:

If the valve with pneumatic backup is fitted then pneumatic push buttons **must be** fitted as the ports 41 and 42 must not be plugged (sealed) and they cannot be left open as this would risk water and dirt ingress into the valve.

If a slave valve is not fitted port 21 **must be** plugged.

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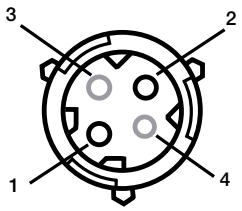
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TEBS G2
iLvl Valve

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June 2015

Electrical Connections



Bayonet Socket
DIN 72585

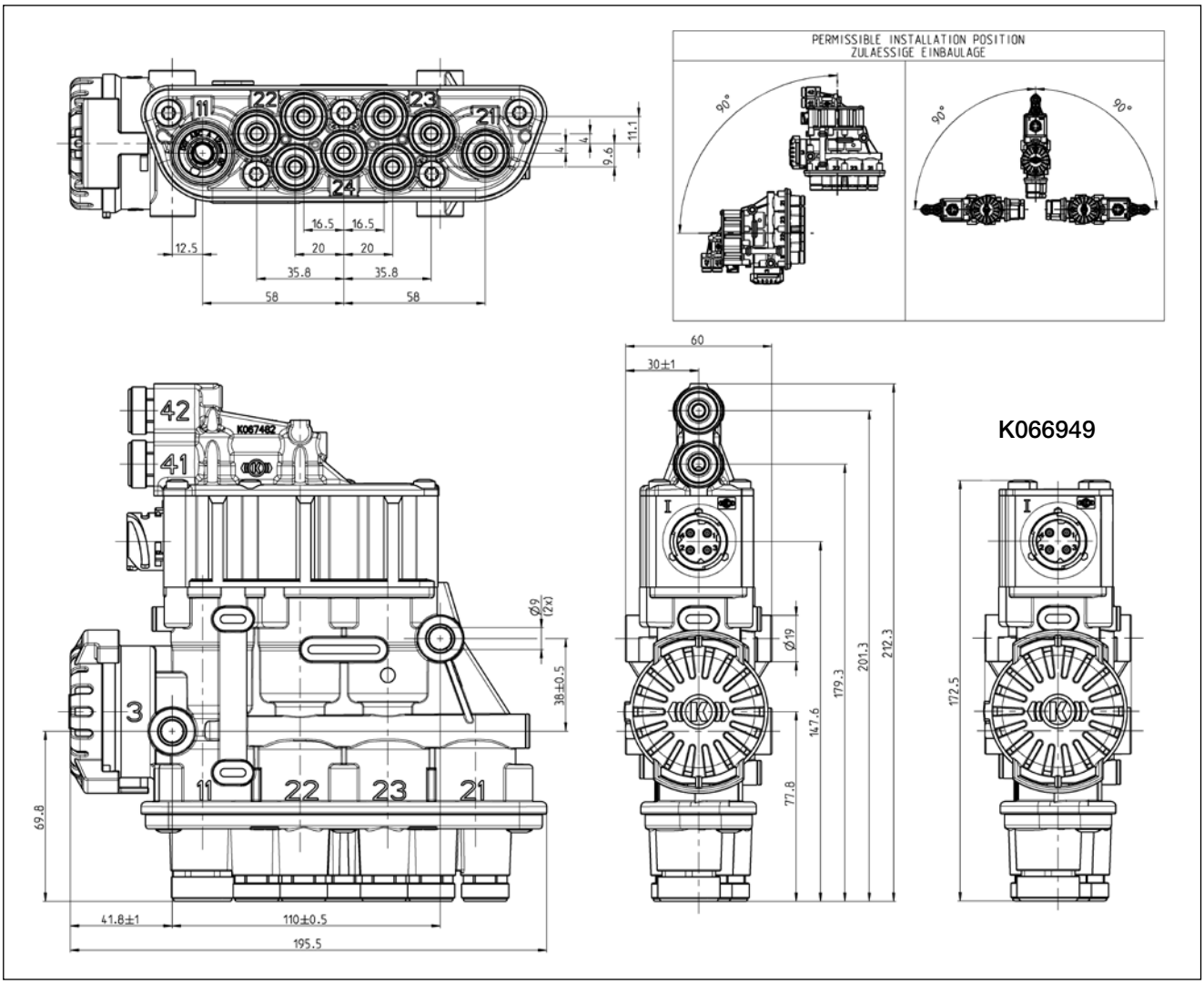
Pin No.	Function
1	Solenoid 1 supply
2	Solenoid 2 supply
3	(internal link to pin 2)
4	Ground

To raise the suspension solenoids 1 and 2 are energised.

To lower the suspension solenoid 2 only is energised.

A special cable part number K097070N00 is available to connect the iLvl valve to the TEBS G2.2 brake module (see PD-272-025, Document No. *Y142784* for details).

Dimensions



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TEBS G2

iLvl Valve

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Installation

Mount the valve with the exhaust silencer pointing horizontally or vertically downwards (see drawing on page 3) and as close to the axle/bogie as possible in order to keep the pipes to the air suspension bags as short and as equal in length as possible.

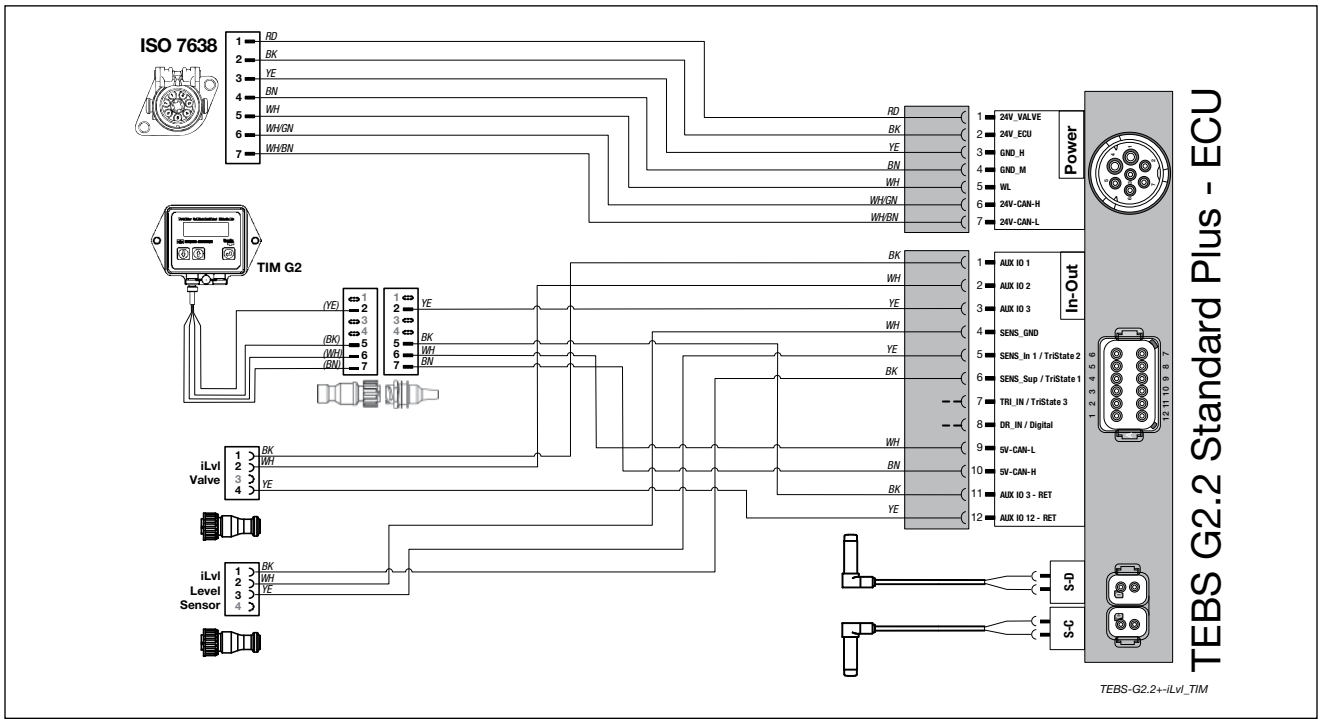
Use M8 bolts in the mounting holes provided with a maximum tightening torque of:

18 ± 2 Nm if plain washers are used

24 ± 4 Nm if no washers are fitted

Ensure that there is adequate clearance around the exhaust silencer for maintenance.

Typical Wiring Diagram - *TEBS G2.2 Standard Plus with iLvl and TIM G2*



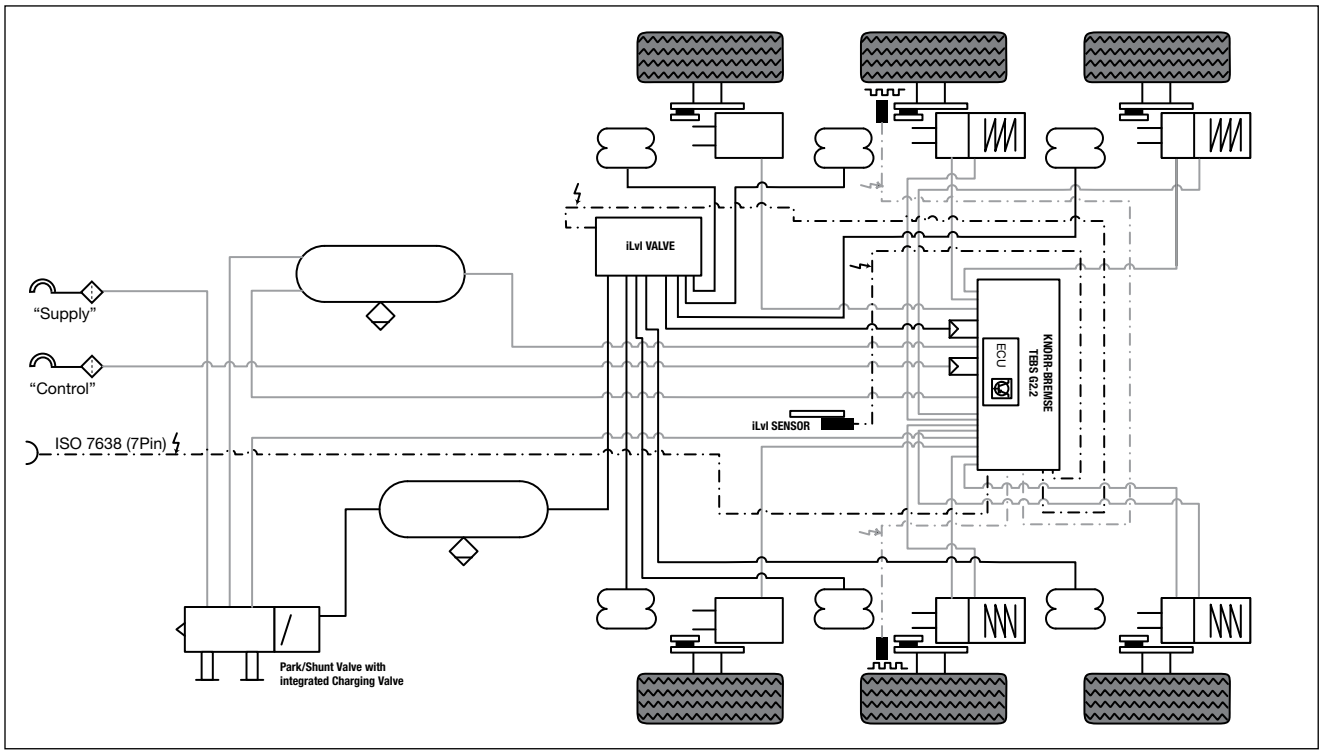
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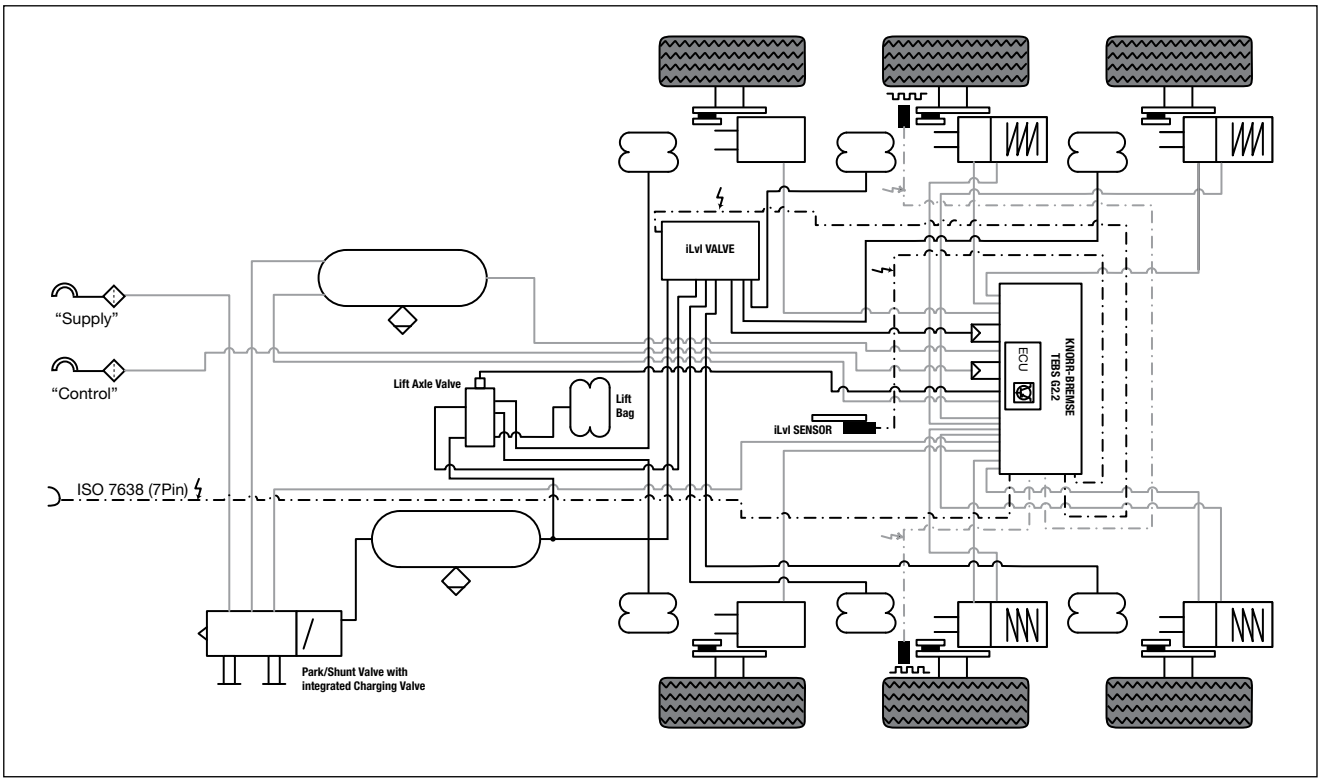
Doc. No. Y172342 (EN - Rev. 000)
June 2015

TEBS G2
iLvl Valve

Typical System Diagram - *TEBS G2.2 Standard Plus with 1-point iLvl system*



Typical System Diagram - *TEBS G2.2 Standard Plus with iLvl and Lift Axle*



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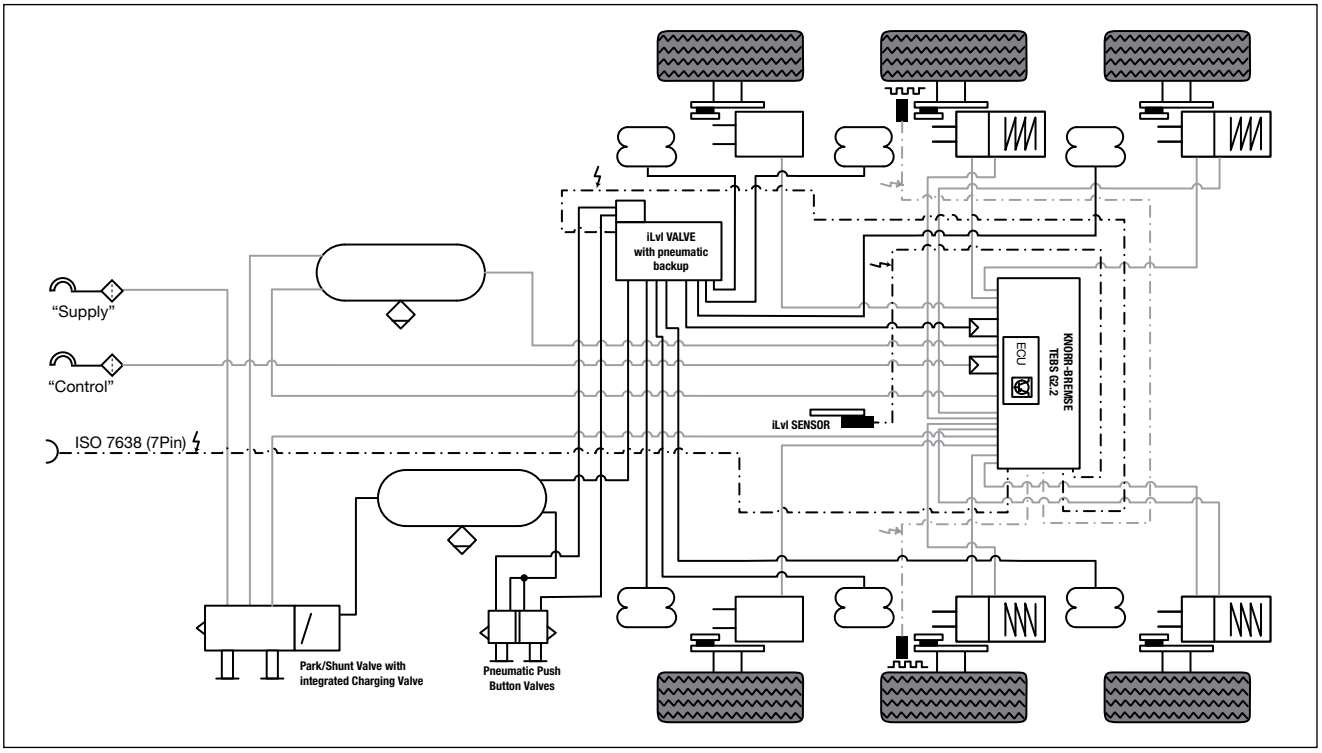
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TEBS G2

iLvl Valve

Doc. No. Y172342 (EN - Rev. 000)
June 2015

Typical System Diagram - *TEBS G2.2 Standard Plus with iLvl and Pneumatic Backup*



Important note:

If more than one set of push button valves are to be installed, the 'Raise' valves and the 'Lower' valves **must be** linked via double check valves - see PD-280-700, Document No. *Y172343*.

Revision Details

Rev. 000	December 2013	New document.
Rev. 000	August 2014	Correction - valve drawing on page 3 brought in line with possible installations.
Rev. 000	June 2015	Correction - "Standard Plus and Premium" omitted from page 1.

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Product DATA

TEBS G2
iLvl Push Button

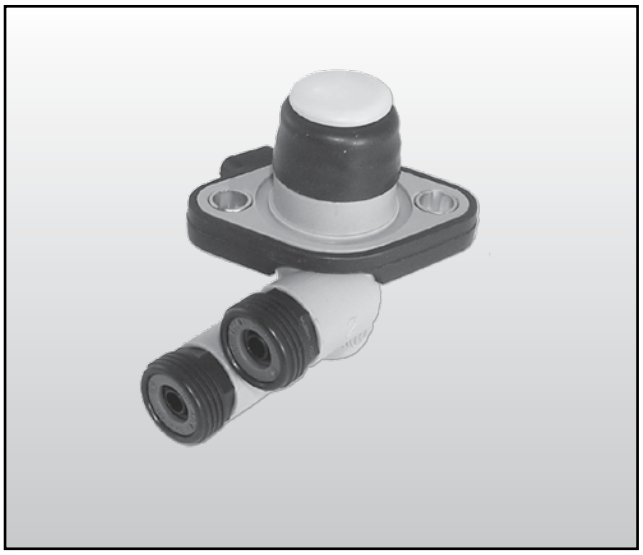
Doc. No. Y172343 (EN - Rev. 001)
June 2015

PD-280-700

Function

The **iLvl Push Button** forms part of the iLvl suspension control system which operates with TEBS G2.2 Standard Plus and Premium Brake Modules to control the air suspension system of trailers.

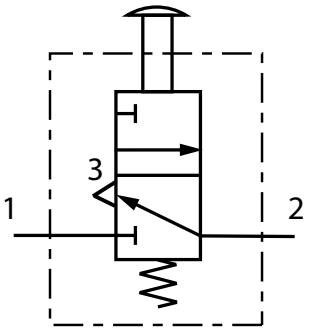
Two **iLvl Push Buttons K064890** are used with Label K102853 (supplied separately) to provide 'pneumatic backup' (manual, pneumatic override) of the suspension control system to allow an operator to adjust the chassis height of a stationary vehicle to suit specific loading/unloading requirements.



Note:

The **iLvl Push Button K064890** has sealing which makes it suitable for both internal and external applications. Valves designed for internal (cab mounting) applications must not be used in its place.

Standard Symbol as DIN ISO 1219



Technical Features

Maximum operating pressure:	13.0 bar
Operating temperature range:	-40 °C to +80 °C
Way through:	Ø4 mm
Stroke:	5 mm
Weight:	0.06 kg

Part No.	Type No.	Push-to-connect (PTC) Fitting (to suit pipe O/D)
K064890 [1)]	**CP6PLF**	**8 mm**

[1)] The part number will carry a suffix "N00" which defines that it is supplied without packaging.

Label Part No. K102853 is available separately (see page 2)

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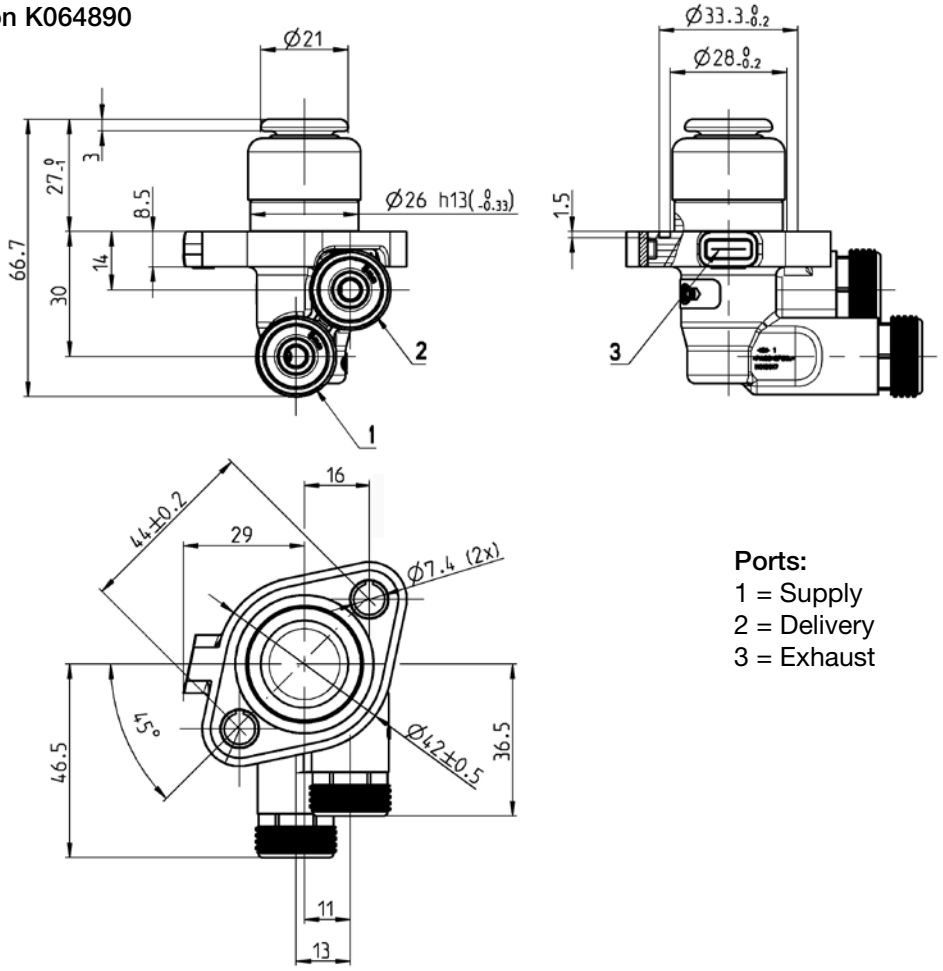
TEBS G2

iLvl Push Button

Doc. No. Y172343 (EN - Rev. 001)
June 2015

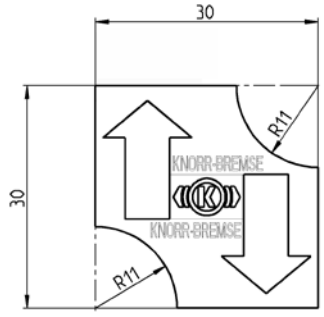
Dimensions

Push Button K064890



Ports:
1 = Supply
2 = Delivery
3 = Exhaust

Label K102853



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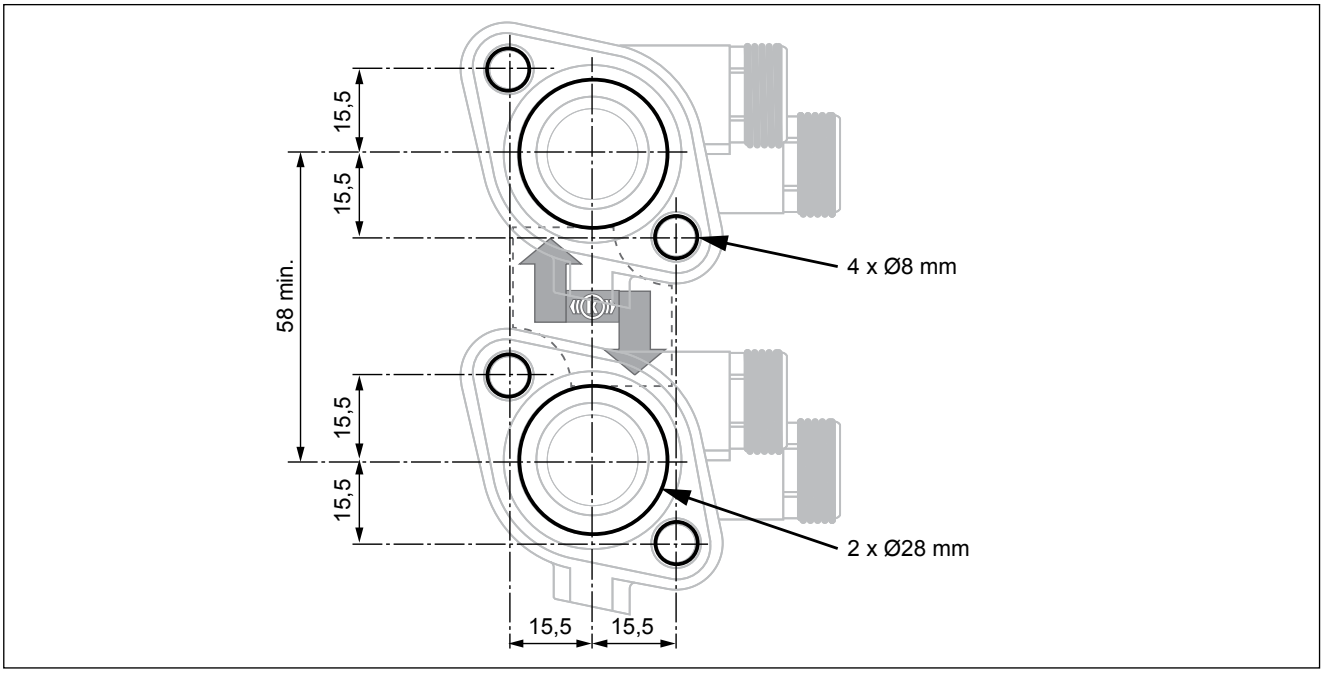
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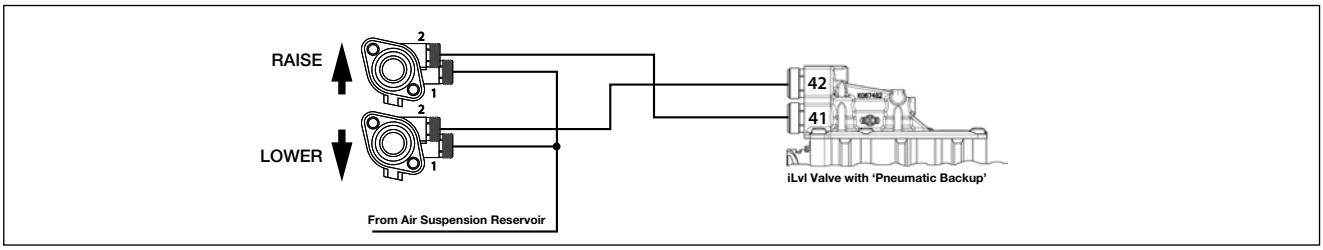
TEBS G2
iLvl Push Button

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June 2015

Installation and Mounting

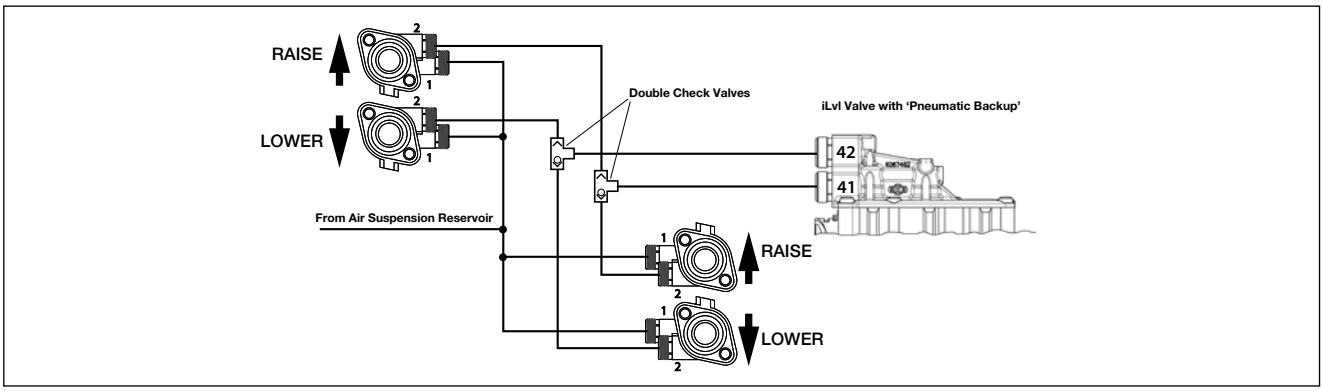
Two **iLvl Push Buttons K064890** are used in the pneumatic backup system. The **iLvl Push Button K064890** can be installed in any orientation, but when used with Label K102853 they should be installed with the pipes to the valves being horizontal. The preferred mounting is with the exhaust port 3 pointing downwards. The drawing below shows the holes required for installation.





Important note:

If more than one set of push button valves are to be installed, the 'Raise' valves and the 'Lower' valves **must be** linked via double check valves.



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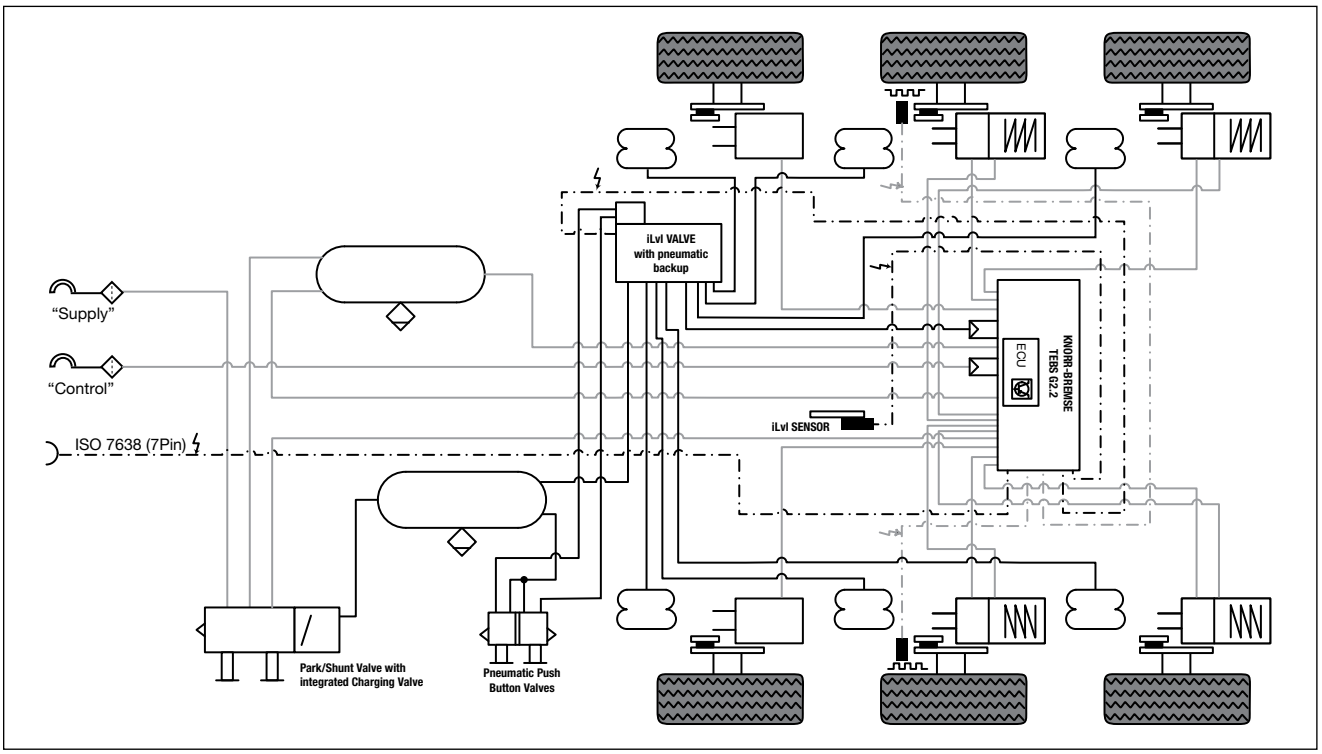
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TEBS G2

iLvl Push Button

Doc. No. Y172343 (EN - Rev. 001)
June 2015

Typical System Diagram - *TEBS G2.2 Standard Plus with iLvl and Pneumatic Backup*



Revision Details

Rev. 000	December 2013	New document.
Rev. 001	June 2015	TEBS G2.2 Premium added

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Doc. No. Y011334 (EN - Rev. 002)
July 2015

Wheel Brake

PD No.	Product	Type/Part No. family
PD-400-000	Diaphragm Brake Chambers for Trailers (Overview)	
PD-403-200	Brake Chambers (S-cam), long stroke	**BX3..., BZ3...**
PD-405-000	Brake Chambers (Disc) - with Clamp Ring	**BS3...**
PD-405-100	Brake Chambers (Disc) - OBC generation	**BS3...**
PD-413-000	Spring Brake Actuators for Trailers (Overview)	
PD-413-100	Spring Brakes (S-cam) - diaphragm/piston	**BZ9..., BX9...**
PD-413-200	Spring Brakes (S-cam) - diaphragm/diaphragm	**BX7...**
PD-415-100	Spring Brakes (Disc) - diaphragm/piston	**BS9...**
PD-415-200	Spring Brakes (Disc) - diaphragm/diaphragm	**BS7...**
PD-420-000	Air Disc Brakes	**SN5..., SN6..., SN7..., SK7..., ST7...**

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Product DATA

BS3..., BX3..., BZ3...

Diaphragm Brake Chambers for Trailers

Doc. No. Y115383 (Rev. 000)
August 2011

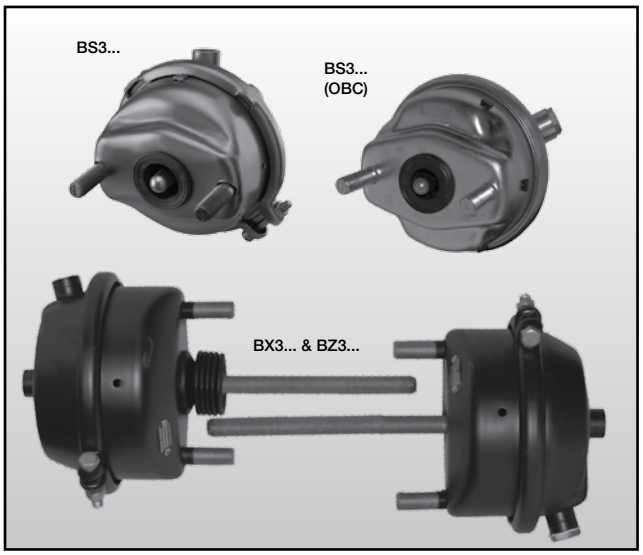
Function

Diaphragm Brake Chambers are used to provide the input force to actuate the vehicle's foundation brake and provide the service brake force.

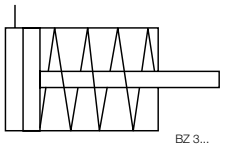
The input force for the service brake is achieved by air pressure acting on an internal synthetic rubber diaphragm which generates a force transmitted through a push plate and push rod.

Diaphragm Brake Chambers are available to suit all types of foundation brake:

- Brake chambers of the BX3... and BZ3... series are designed for S-Cam drum brakes, which have been used traditionally on trucks and trailers.
- Brake chambers of the BS3... series are designed for disc brakes, which are generally standard fitment on modern trucks and trailers. The new generation of OBC (optimized brake chamber) BS3... brake chambers are identified by the rolled joint between the two halves of the unit.



Standard Symbol as DIN ISO 1219



Further Documentation

Further information can be found on documents:

PD-403-200	Brake Chambers (S-cam), long stroke (for trailers)	Document No. *Y011367*
PD-405-000	Brake Chambers (Disc) - with Clamp Ring (for trailers)	Document No. *Y011368*
PD-405-100	Brake Chambers (Disc) - OBC generation (for trailers)	Document No. *Y103245*

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Item No. K064232

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Doc. No. Y115383 (Rev. 000)
August 2011

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Item No. K064232

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

BX3..., BZ3...

Brake Chambers (S-cam), long stroke

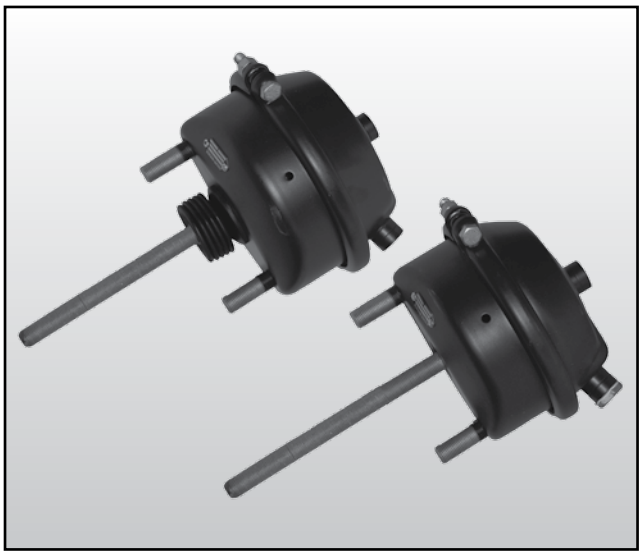
Doc. No. Y011367 (Rev. 005)
January 2015

Function

This range of **Brake Chambers** is used on axles fitted with drum brakes. The single diaphragm cylinder provides the service brake function.

In addition **Brake Chamber BX3621** has no central air port, so its air pressure plate is flat and it is often used in interlock systems on trailers.

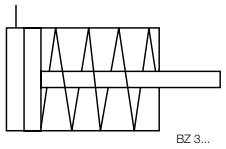
See PD-400-000, Document No. *Y115383* for the full range of **Brake Chambers** for trailers.



Technical Features

Maximum Operating Pressure:	8.5 bar
Operating Temperature Range:	-40 °C to +80 °C
Push rod stroke:	75 mm
Air ports:	M16x1.5 centre & side
Surface treatment:	Powder coated
Weight:	See table

Standard Symbol as DIN ISO 1219



Range Overview

Part No.	Type No.	Type	Push Rod Seal	TÜV Inspection Report	Weight approx. [kg]
II39908FA	BZ3261	12	Sealing Washer	361-0024-04-FBKV	2.1
II33198A	BZ3370	16			2.7
II33479A	BX3417	20			3.2
II33441A	BX3534	24			3.5
II33445A	BX3605	30			4.3
K115276A	BX3621	30			4.3
II40324FA	BZ3263	12	Rubber Boot		2.1
II33458A	BX3416	20			3.2
II33442A	BX3535	24			3.5
II33444A	BX3604	30			4.3

Other versions are available.

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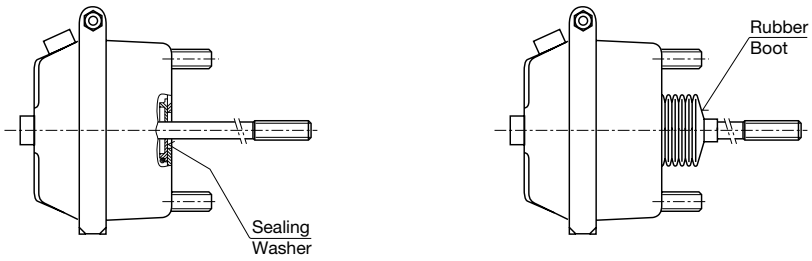
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

BX3..., BZ3...

Brake Chambers (S-cam), long stroke

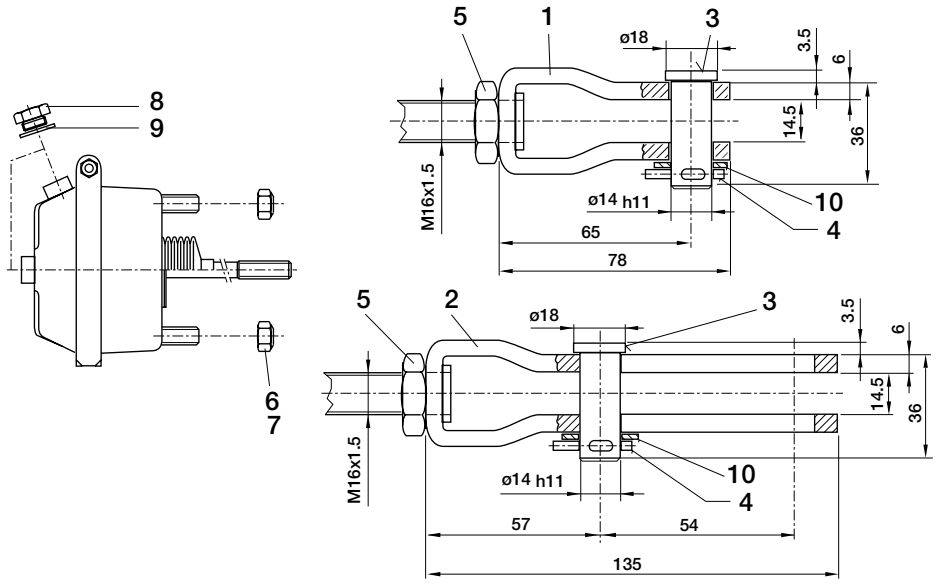
Doc. No. Y011367 (Rev. 005)
January 2015

Push Rod Seal



Installation Kits/Yokes for BX3..., BZ3...

Part No.	Yoke type	Description
SEB01321	Round hole	Installation Kit with Yoke to suit Types 12 and 16
SEB01322	Slotted hole	
SEB01314	Round hole	Forged Yoke for Types 20, 24 and 30
SEB01315	Round hole	Installation Kit with Yoke to suit Types 20, 24 and 30
SEB01316	Slotted hole	



Legend:

1 **Yoke, round hole (SEB01315, SEB01321)**
2 **Yoke, slotted hole (SEB01316, SEB01322)**
3 **Bolt**
4 **Split pin**
5 **Plain nut**
6 **Self-locking nut M12**[1)]
7 **Self-locking nut M16**
8 **Screw plug**
9 **Sealing ring**
10 **Washer**

[1)] for Typ 12" and 16"

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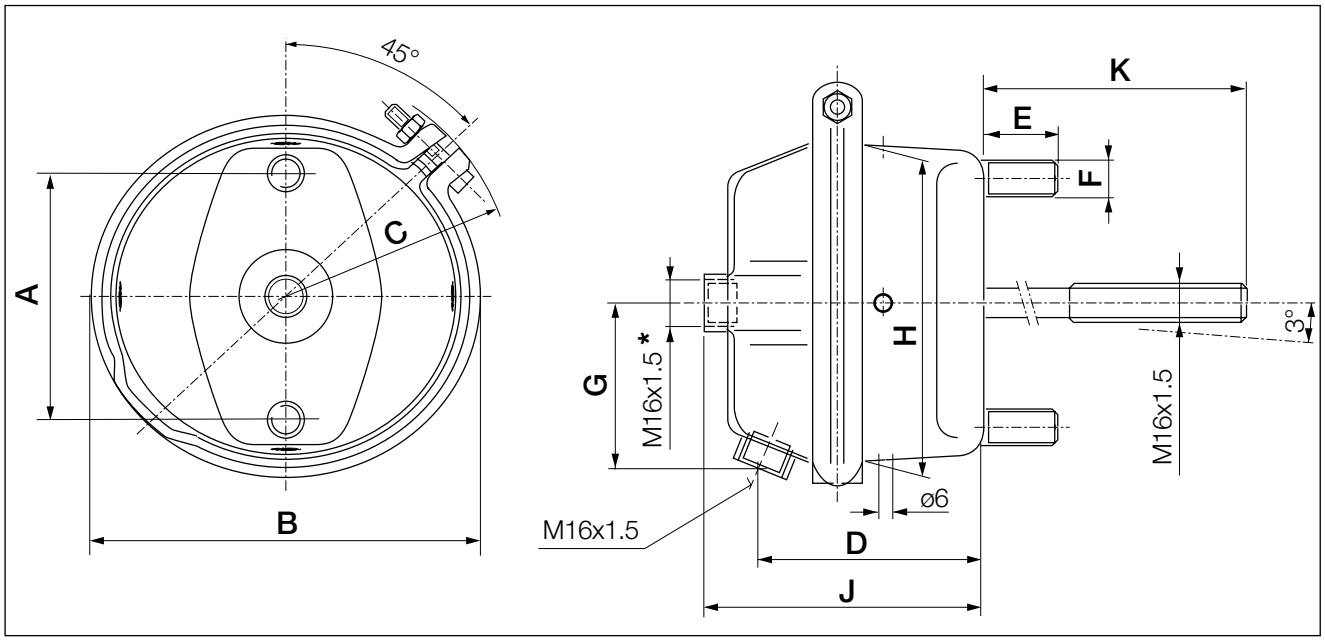
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BX3..., BZ3...

Doc. No. Y011367 (Rev. 005)
January 2015

Brake Chambers (S-cam), long stroke

Dimensions



Part No.	Type No.	Type [sq in]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F	G [mm]	H [mm]	J [mm]	K [mm]
II39908FA	BZ3261	12	76.2	145	92	95	37	M12x1.75	65	121	127	190
II40324FA	BZ3263	12	76.2	145	92	95	37	M12x1.75	65	121	127	190
II33198A	BZ3370	16	76.2	167	101	99	38	M12x1.75	76	141	132.5	190
II33458A	BX3416	20	120.7	175	105	100	43.2	M16x1.5	82	149	132.5	190
II33479A	BX3417	20	120.7	175	105	100	43.2	M16x1.5	82	149	132.5	190
II33441A	BX3534	24	120.7	188	111	100	43.2	M16x1.5	90	161	133.0	190
II33442A	BX3535	24	120.7	188	111	100	43.2	M16x1.5	90	161	133.0	190
II33444A	BX3604	30	120.7	209	121	106	42.7	M16x1.5	99	184	139.5	190
II33445A	BX3605	30	120.7	209	121	106	42.7	M16x1.5	99	184	139.5	190
K115276A	BX3621	30	120.7	212	128	100	42.0	M16x1.5	-	-	-	190

* not for K115276A-BX3621

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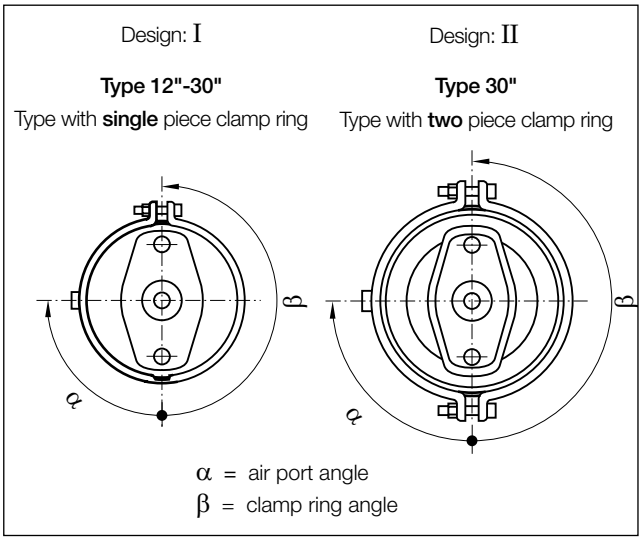
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

BX3..., BZ3...

Brake Chambers (S-cam), long stroke

Doc. No. Y011367 (Rev. 005)
January 2015

Mounting Position



Part No.	Type No.	Type [sq in]	Air Port Angle α	Clamp Ring	
				Angle β	Design
II39908FA	BZ3261	12	0°	135°	I
II40324FA	BZ3263	12			I
II33198A	BZ3370	16			I
II33458A	BX3416	20			I
II33479A	BX3417	20			I
II33441A	BX3534	24			I
II33442A	BX3535	24			I
II33444A	BX3604	30			II
II33445A	BX3605	30			II
K115276A	BX3621	30			I

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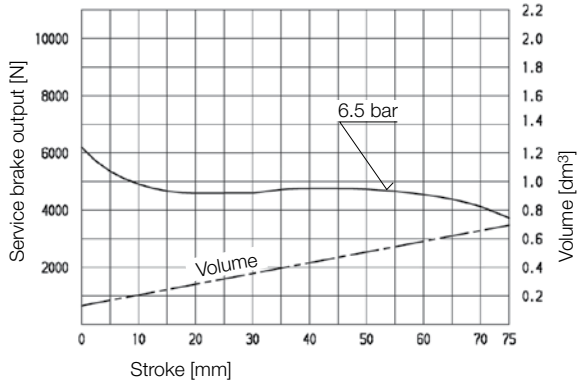
BX3..., BZ3...

Brake Chambers (S-cam), long stroke

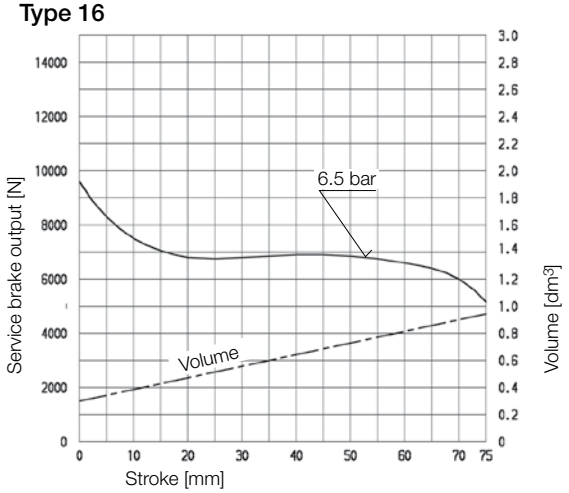
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January 2015

Performance Charts

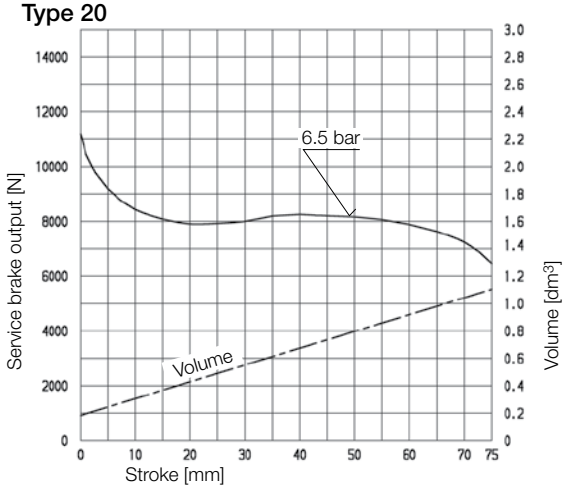
Type 12



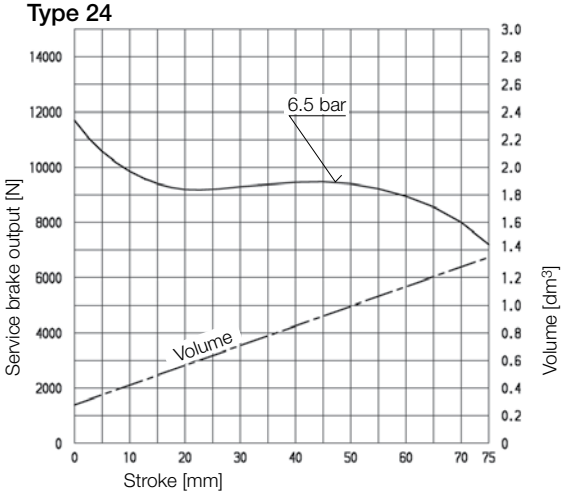
Type 16



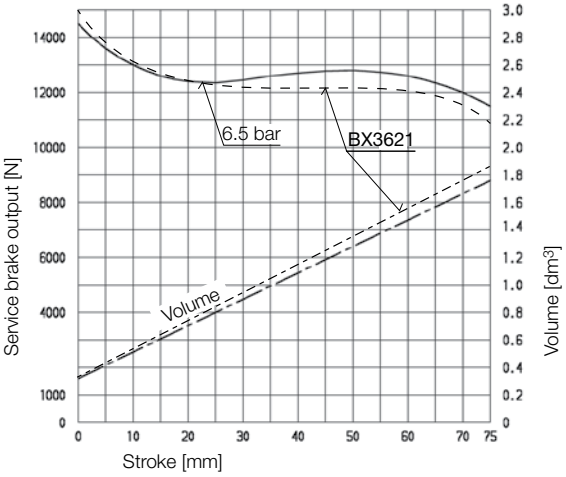
Type 20



Type 24



Type 30”



The output forces correspond to the requirements of DIN 74060

- **Th_A** = Piston force, average
- **S_P** = Effective piston stroke
- **V** = Volume at 2/3 of stroke

as seen in the TÜV report 361-0024-04-FBKV.

Type	Th_A [KN] at 6.5 bar	S_P [mm] at 6.5 bar	V [l]
12	4.64	68.00	0.50
16	6.92	68.88	0.75
20	8.11	68.88	0.85
24	9.30	71.00	0.93
30	12.60	74.50	1.30

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BX3..., BZ3...

Brake Chambers (S-cam), long stroke

Doc. No. Y011367 (Rev. 005)
January 2015

Installation and Mounting instructions

For reliable and safe mounting of brake chambers, please note the following points:

- Use suitable mounting bracket with adequate stability (material thickness).
- Hole dimensions according to DIN.
- Plain mounting face, only primed (maximum thickness 0.1mm), not finish painted.
- Direct contact of the full surface of the brake chamber mounting face must be made with the mounting bracket. No spacing washers, adapter plates or other elements are allowed.
- Check length of push rod, it may need to be shortened.
- The angle between push rod and slack adjuster and between push rod and mounting bracket should be approximately 90 deg. when the push rod is at its mid-stroke position.
- During installation, the slack adjuster should be rotated towards the yoke to insert the yoke pin. On no account should the push rod be pulled out from the brake chamber to meet the slack adjuster.
- Maximum pivoting angle of push rod in all directions = 3°.
- For mounting studs, use only self-locking nuts without washers of any kind.
- General requirements of mechanical engineering concerning progressive tightening must be followed.
- Tightening torque 180 $^{+30}$ Nm for M16 x 1.5 thread.
- Tightening torque 75 $^{+15}$ Nm for M12 x 1.75 thread.
- For further information please contact the Knorr-Bremse, the axle or trailer manufacturer.

Revision Details

Rev. 004	September 2011	Revised for new Trailer Catalogue layout
Rev. 005	January 2015	K115276A-BX3621 added.

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Product DATA

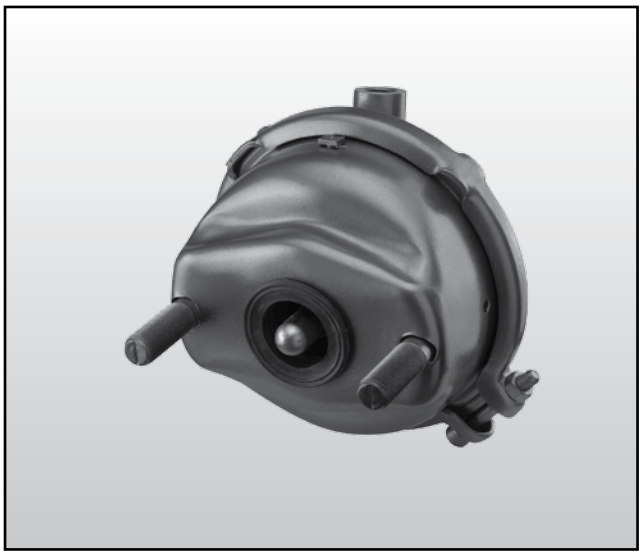
BS3...
Brake Chambers (Disc) - with Clamp Ring

Doc. No. Y011368 (Rev. 003)
September 2011

Function

This range of **Brake Chambers** is used on axles fitted with air disc brakes and provides the service brake function. The chambers have a mounting seal integrated in the non-pressure housing which prevents the entry of dirt or water into the caliper.

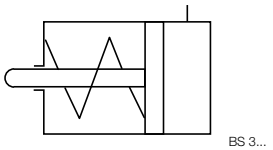
See PD-400-000, Document No. *Y115383* for the full range of **Brake Chambers** for trailers.



Technical Features

Maximum operating pressure:	10 bar
Operating temperature range:	-40 °C to +80 °C
Push rod stroke:	57 mm
Air ports:	M16x1.5
Sealing of non-pressure housing:	Rubber Boot
Pivoting angle of piston rod:	4° in all directions
Weight:	See table

Standard Symbol as DIN ISO 1219



Range Overview

Part No.	Type No.	Type	TÜV-Inspection Report	Weight approx. [kg]
II31782	BS3251	14	353-432-97FBTN	3.1
II14535	BS3300	16	BZ.102.0	3.1
II37140	BS3315	16	BZ.103.0	3.1
II38466F	BS3326	16	353-433-97FBTN	3.1
II15229	BS3350	18	353-434-97FBTN	3.1
II38924F	BS3361	16	BZ.103.0	3.2
II31098	BS3404	20	356-308-94FBTN	3.2
II38528F	BS3436	20	356-308-94FBTN	3.2
II31099	BS3453	22	356-309-94FBTN	3.4
II38529F	BS3462	22	356-309-94FBTN	3.4
II30618	BS3509	24	356-310-94FBTN	3.5
II38530F	BS3547	24	356-310-94FBTN	3.6
II31100	BS3551	27	356-311-94FBTN	4.5

Other versions are available.

NOTES:

This range will be superseded by the "Optimised Brake Chamber" (OBC) Generation (see PD-405-100, Document No. *Y103245*). TÜV-Comparison Report No. TÜV-361-0046-05-FBKV comparing this generation with the OBC generation is available.

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Item No. K002485

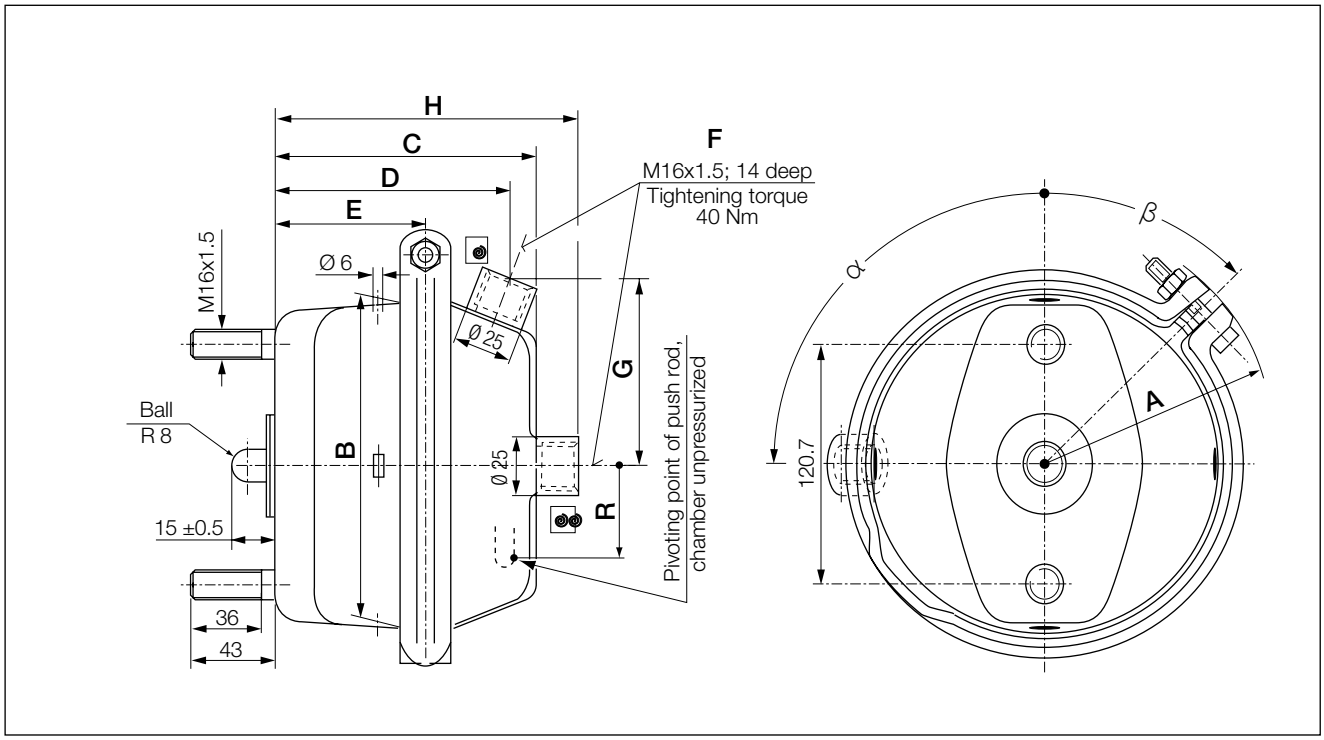
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

BS3...

Brake Chambers (Disc) - with Clamp Ring

Doc. No. Y011368 (Rev. 003)
September 2011

Dimensions



Part No.	Type No.	Type [sq in]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F	G [mm]	H [mm]	R [mm]	α [°]	β [°]
II31782	BS3251	14	101	144	104	97.5	66	I	76	–	42	90	45
II14535	BS3300	16	106	144	104	93.5	66	I	83	–	47	90	45
II37140	BS3315	16	106	144	104	–	66	II	–	122.5	45	–	90
II38466F	BS3326	16	106	144	104	–	66	II	–	122.5	45	–	90
II15229	BS3350	18	106	144	104	93.5	66	I	83	–	50	90	45
II38924F	BS3361	16	106	144	104	–	66	II	–	122.5	45	–	90
II31098	BS3404	20	111	145	104	98	66	I	81	–	52	90	45
II38528F	BS3436	20	111	145	104	–	66	II	–	122.5	52	–	90
II31099	BS3453	22	111	145	104	94.5	66	I	85.9	–	52	90	45
II38529F	BS3462	22	111	145	104	–	66	II	–	122.5	52	–	90
II30618	BS3509	24	117	155	113	97.5	66	I	91	–	57.5	90	45
II38530F	BS3547	24	117	155	113	–	66	II	–	122.5	57.5	–	90
II31100	BS3551	27	123	185.5	115	97.5	67	I	98	–	58	0	45

NOTE:

This range will be superseded by the new OBC Generation (see PD-405-100, Document No. *Y103245*)

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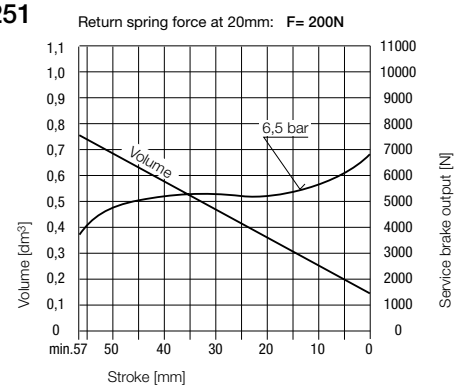
BS3...

Doc. No. Y011368 (Rev. 003)
September 2011

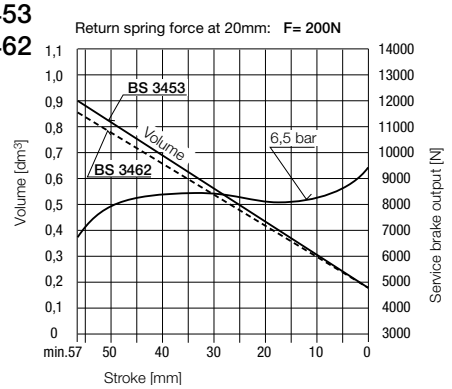
Brake Chambers (Disc) - with Clamp Ring

Performance Charts

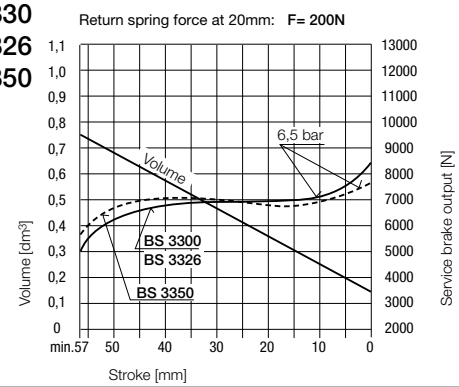
BS3251



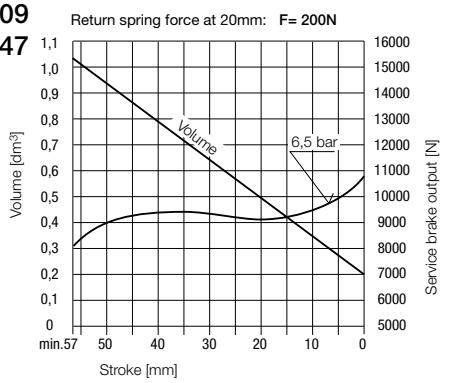
BS3453
BS3462



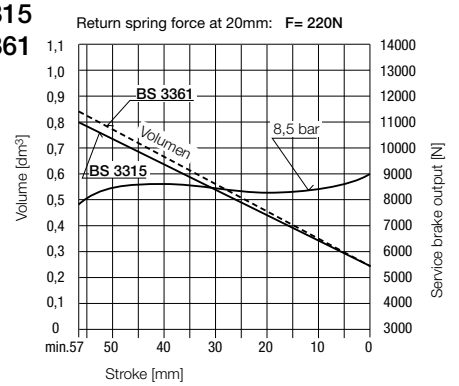
BS3330
BS3326
BS3350



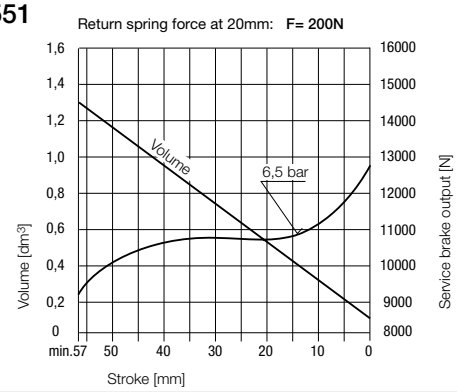
BS3509
BS3547



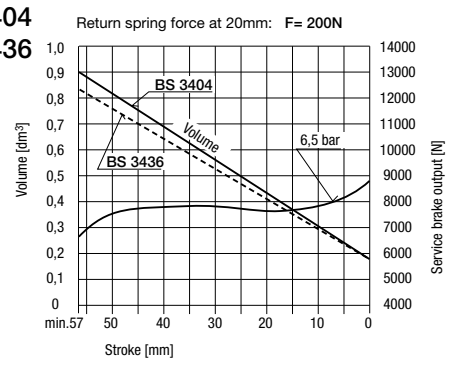
BS3315
BS3361



BS3551



BS3404
BS3436



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Item No. K002485

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

BS3...

Brake Chambers (Disc) - with Clamp Ring

Doc. No. Y011368 (Rev. 003)
September 2011

Installation and Mounting instructions

Detailed information concerning the mounting of disc brake actuators can be found in the Service Manual for Air Disc Brakes *Y006471*.

Special Note: If the actuator is supplied with the drain holes plugged, remove lowest plug (as viewed when the actuator is installed).

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Item No. K002485

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

BS3...
Brake Chambers (Disc) - OBC generation

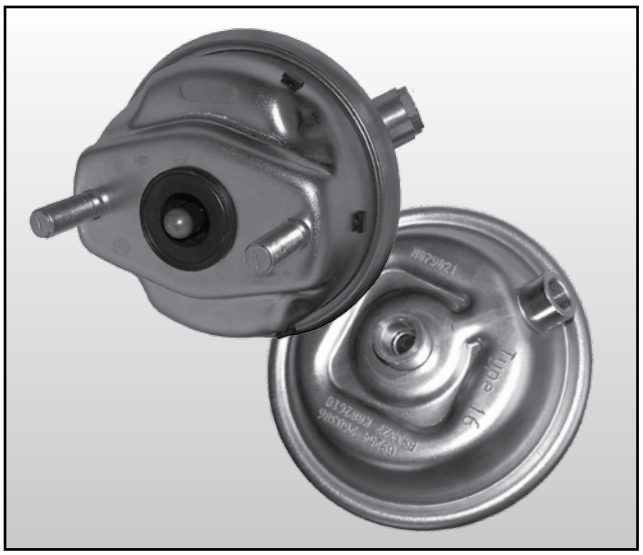
Doc. No. Y103245 (Rev. 001)
September 2011

Function

This range of **Brake Chambers** is used on axles fitted with air disc brakes and provides the service brake function. The chambers have a mounting seal integrated in the non-pressure housing which prevents the entry of dirt or water into the caliper.

The **OBC ('Optimised Brake Chamber') Brake Chambers** have a rolled joint between the front and rear pressings, i.e. there is no clamp ring. This provides improved leakage protection and reduced weight.

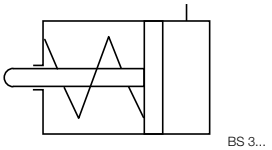
See PD-400-000, Document No. *Y115383* for the full range of **Brake Chambers** for trailers



Technical Features

Maximum Operating Pressure:	10 bar
Operating Temperature Range:	-40 °C to +80 °C
Push rod stroke:	57 mm
Air ports:	M16x1.5
Sealing of non-pressure housing:	Rubber Boot
Pivoting angle of Piston Rod:	4° in all directions
Weight:	See table

Standard Symbol as DIN ISO 1219



Range Overview

Part No.	Type No.	Type	TÜV-Inspection Report	Weight approx. [kg]
K003979	**BS3263**	14	361-0046-05-FBKV	2.9
K004583	**BS3300**	16		2.8
K004631	**BS3326**	16		2.8
K004664	**BS3758**	18		2.8
K005814	**BS3436**	20		3.0
K005816	**BS3862**	22		3.1
K005817	**BS3547**	24		3.5

Other versions are available.

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Item No. K056573

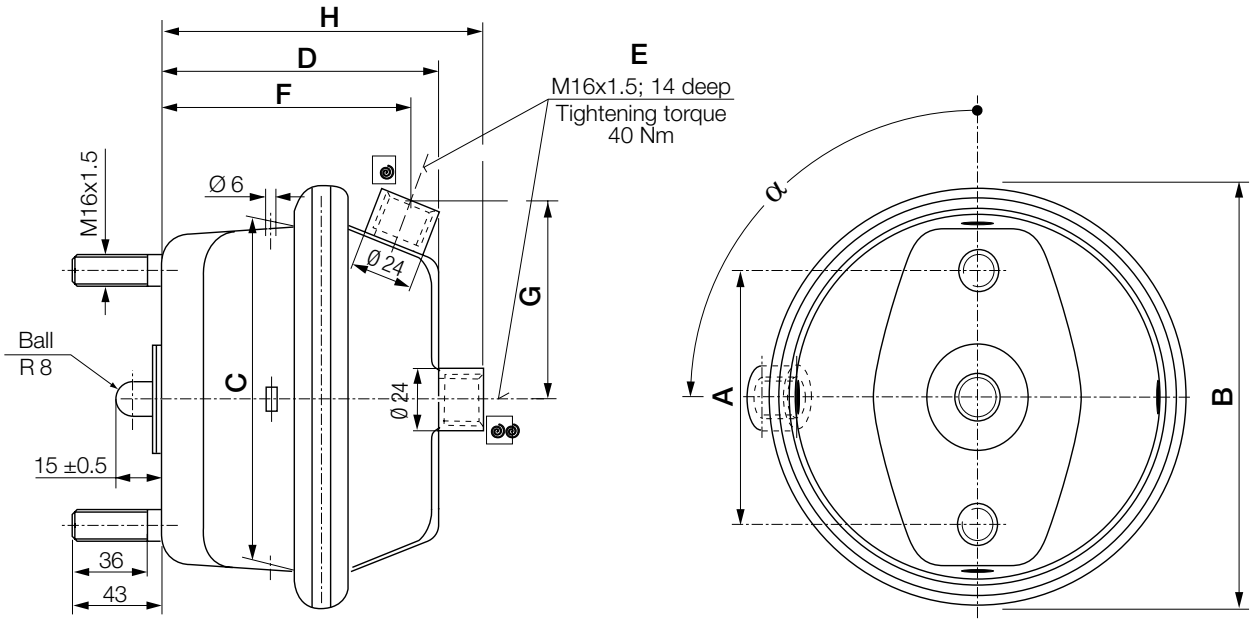
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

BS3...

Brake Chambers (Disc) - OBC generation

Doc. No. Y103245 (Rev. 001)
September 2011

Dimensions



Part No.	Type No.	Type [sq in]	A [mm]	B [mm]	C [mm]	D [mm]	E (port)	F [mm]	G [mm]	H [mm]	α [°]
K003979	**BS3263**	14	120.7	169	144	100.7	I	94.2	72.5	–	270
K004583	**BS3300**	16	120.7	169	144	100.7	I	94.2	72.5	–	90
K004631	**BS3326**	16	120.7	169	144	100.7	II	–	–	114.7	-
K004664	**BS3758**	18	120.7	169	144	100.7	II	–	–	114.7	-
K005814	**BS3436**	20	120.7	177	145	101.7	II	–	–	115.7	-
K005816	**BS3862**	22	120.7	177	145	101.7	II	–	–	115.7	-
K005817	**BS3547**	24	120.7	189	155	101.7	II	–	–	115.7	-

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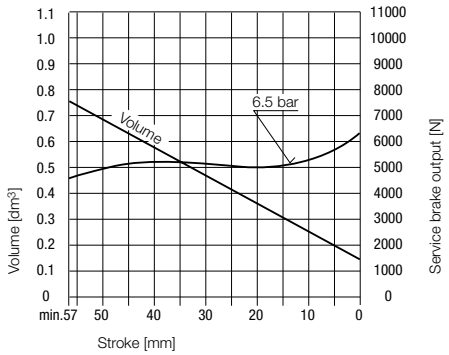
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Performance Charts

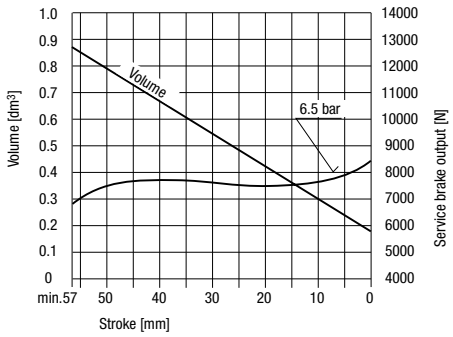
BS3263

Return spring force at 0mm: **F= 220N**



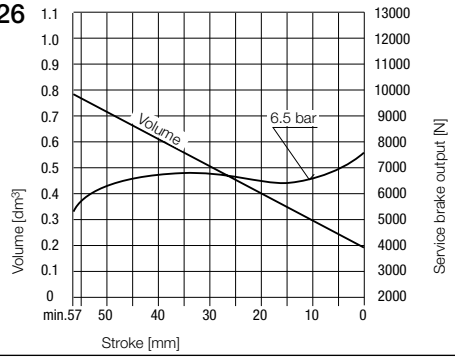
BS3436

Return spring force at 20mm: **F= 200N**



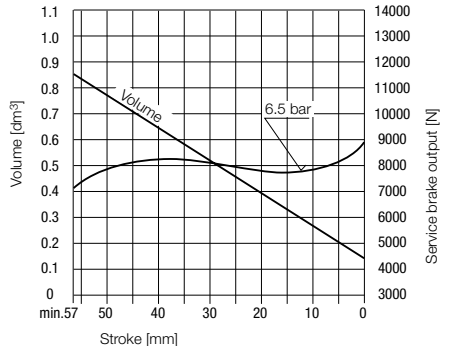
BS3300
BS3326

Return spring force at 0mm: **F= 150N**



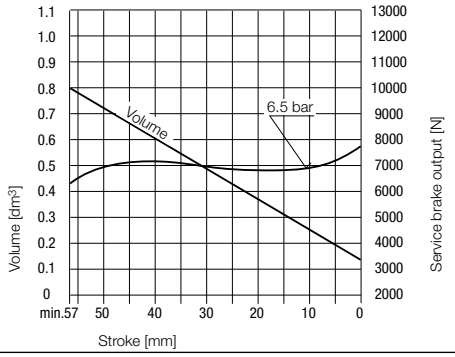
BS3862

Return spring force at 20mm: **F= 200N**



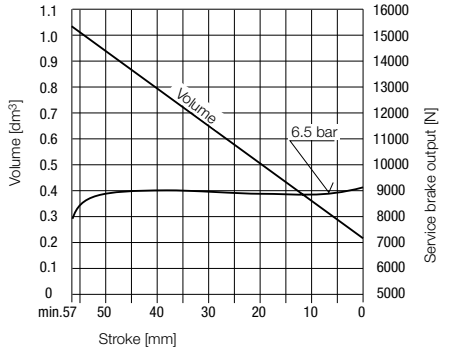
BS3758

Return spring force at 20mm: **F= 200N**



BS3547

Return spring force at 20mm: **F= 200N**



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BS3...

Brake Chambers (Disc) - OBC generation

Doc. No. Y103245 (Rev. 001)
September 2011

Installation and Mounting instructions

Detailed information concerning the mounting of disc brake actuators can be found in the Service Manual for Air Disc Brakes *Y006471*.

Special Note: If the actuator is supplied with the drain holes plugged, remove lowest plug (as viewed when the actuator is installed).

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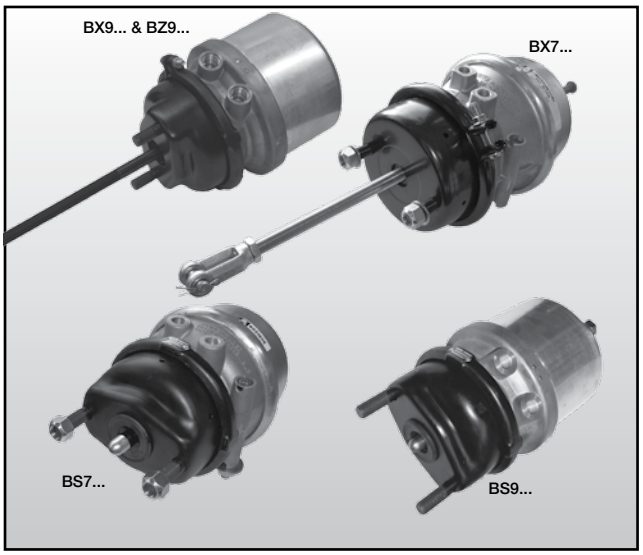
Product DATA

BS7&9..., BX7&9..., BZ9...

Spring Brake Actuators for Trailers

Doc. No. Y115384 (Rev. 000)
October 2011

Function

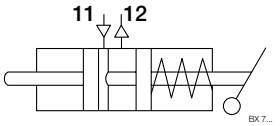


Spring Brake Actuators are used to provide the input force to actuate the vehicle's foundation brake and provide the service brake force and the parking brake force.

The input force for the service brake is achieved by air pressure acting on an internal synthetic rubber diaphragm which generates a force transmitted through a push plate and push rod. This part of the spring brake performs the same function as a brake chamber.

The input force for the parking brake is provided by an internal power spring (in the spring portion) acting through the same push rod. During normal operation this spring is held compressed by air pressure acting on either a synthetic rubber diaphragm or a piston. The force is applied by releasing this air pressure.

Standard Symbol as DIN ISO 1219



Spring Brake Actuators are available to suit all types of foundation brakes used on trailers:

- **Spring Brake Actuators** of the BX7..., BX9... or BZ9... series are designed for S-Cam drum brakes have been used traditionally on trucks and trailers. The BX7... series have a diaphragm holding the power spring compressed, and the BX9... and BZ9... series have a piston holding the power spring compressed.
- **Spring Brake Actuators** of the BS7... and BS9... series are designed for disc brakes, which are generally standard fitment on modern trucks and trailers. The BS7... series have a diaphragm holding the power spring compressed and the BS9... series have a piston holding the power spring compressed.

Further Documentation

Further information can be found on documents:

PD-413-100	Spring Brakes (S-cam), diaphragm/piston for trailers	Document No. *Y011370*
PD-413-200	Spring Brakes (S-cam), diaphragm/diaphragm for trailers	Document No. *Y011369*
PD-415-100	Spring Brakes (Disc), diaphragm/piston for trailers	Document No. *Y011372*
PD-415-200	Spring Brakes (Disc), diaphragm/diaphragm for trailers	Document No. *Y011371*

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October 2011

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Item No. K064234

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

BX9..., BZ9...

Spring Brakes (S-cam), diaphragm/piston

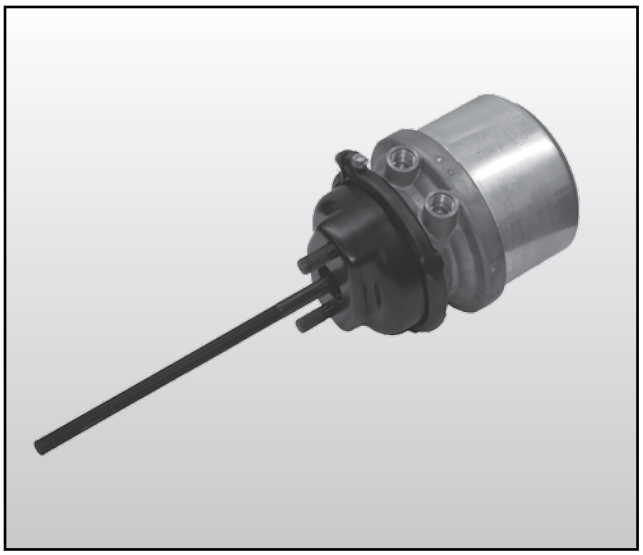
Doc. No. Y011370 (EN - Rev. 005)
March 2014

Function

This range of **Spring Brakes** is used on axles fitted with drum brakes to provide the service and parking brake functions.

The internal wind-off mechanism allows the parking brake force to be removed if air pressure is no longer present.

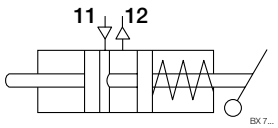
See PD-413-000, Document No. *Y115384* for the full range of **Spring Brakes** for trailers.



Technical Features

Maximum operating pressure:	Port **11**; 10 bar Port **12**; 8.5 bar
Full hold-off pressure:	5.5 bar
Operating temperature range:	-40 °C to +80 °C
Push rod stroke:	See table
Port threads:	See table
Release device:	Mechanical
Weight:	See table

Standard Symbol as DIN ISO 1219



Range Overview

Part No.	Type No.	Size: Service Brake [Type]	Size: Parking Brake [Type]	Port Threads	Stroke [mm]	TÜV-Inspection Report	Weight approx. [kg]
II**31997** 1)4)	**BZ9317**	16	24	M16x1.5	57	Service Brake 361-0132-05-FBKV Spring Brake 361-0133-05-FBKV	7.8
II**33453** 2)	**BZ9318**	16	24	M16x1.5	57		8.0
II**33454** 2)	**BZ9319**	16	24	M16x1.5	57		8.0
II**37274** 1)5)	**BX9400**	20	24	M22x1.5 Voss 5)	57		8.1
II**37276** 1)5)	**BX9402**	20	30	M22x1.5 Voss 5)	57		9.4
II**17092** 2)	**BZ9502**	24	24HF 6)	M16x1.5	57		8.2
II**32718** 1)4)	**BX9504**	24	30	M16x1.5	57		9.5
II**37277** 1)5)	**BX9519**	24	24	M22x1.5 Voss 5)	57		8.1
II**32128** 1)4)7) **K041990** 1)3)4)	**BZ9646**	30	30	M16x1.5	64		10.9

1) without rubber boot 2) with rubber boot and welded yoke 3) will carry the suffix N00 denoting that it is supplied without packaging
4) with installation kit SEB00536 5) with installation kit II37099 6) HF = high force 7) K041990 replaces II32128

Other versions are available.

Installation kit **SEB00536** contains: Yoke, yoke pin, split pin, lock nut for yoke, hexagon self-locking mounting nut (2x)

Installation kit II**37099** contains: Port adapter (M22x1.5 to M16x1.5) (2x), yoke, yoke pin, split pin, lock nut for yoke, hexagon self-locking mounting nut (2x)

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Item No. K002487

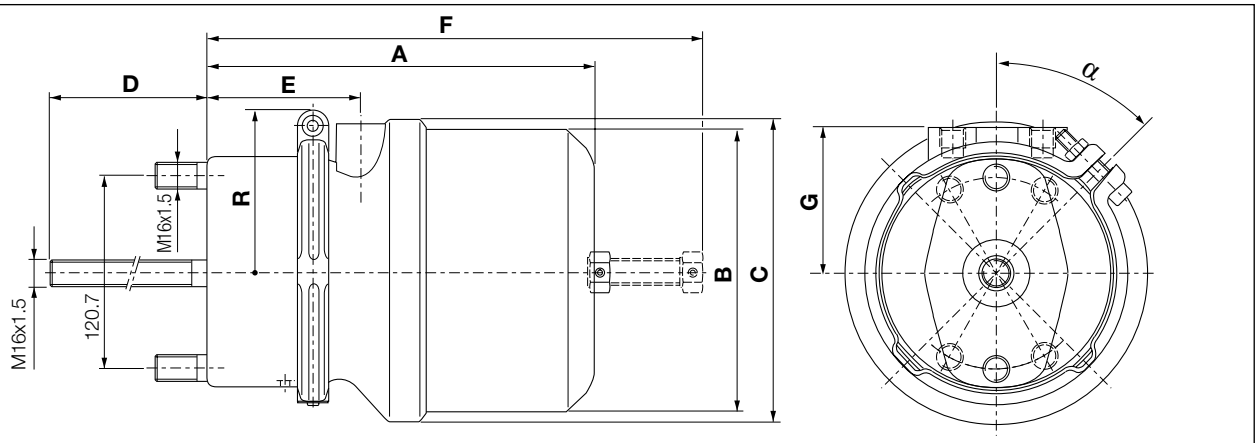
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

BX9..., BZ9...

Spring Brakes (S-cam) , diaphragm/piston

Doc. No. Y011370 (EN - Rev. 005)
March 2014

Dimensions



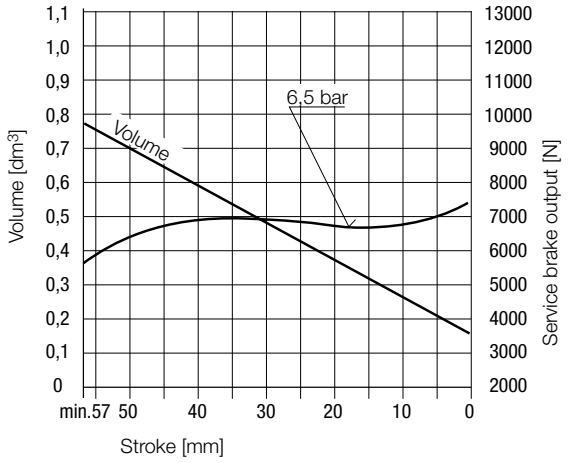
Part No.	Type No.	A [mm]	B [mm]	C [mm]	D [sq in]	E [mm]	F [mm]	G [mm]	R [mm]	α [°]
II31997	BZ9317	240	175	190	300	96	318	90	106	45
II33453	BZ9318	240	175	190	60	96	318	90	106	45
II33454	BZ9319	240	175	190	60	96	318	90	106	315
II37274	BX9400	240	175	190	300	96	318	90	111	45
II37276	BX9402	256	190	106	300	96	335	97	111	45
II17092	BZ9502	240	175	190	300	96	318	90	114	45
II32718	BX9504	256	190	206	300	96	335	97	114	45
II37277	BX9519	254	175	190	200	103	300	90	114	45
II32128 K041990	BZ9646	272	190	206	300	104	357	102.5	123	45

Performance Charts

Service Brake

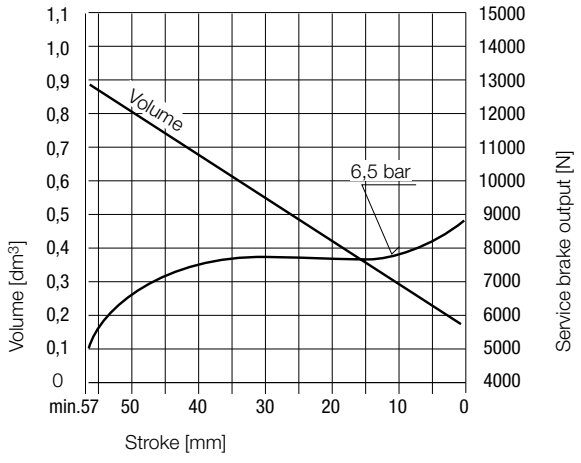
BZ9317, BZ9318, BZ9319

Return spring force at 20mm stroke: **F= 340N**



BX9400

Return spring force at 20mm stroke: **F= 340N**



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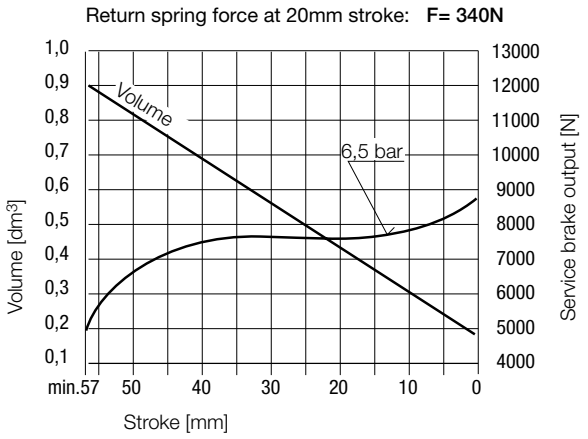
Item No. K002487

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

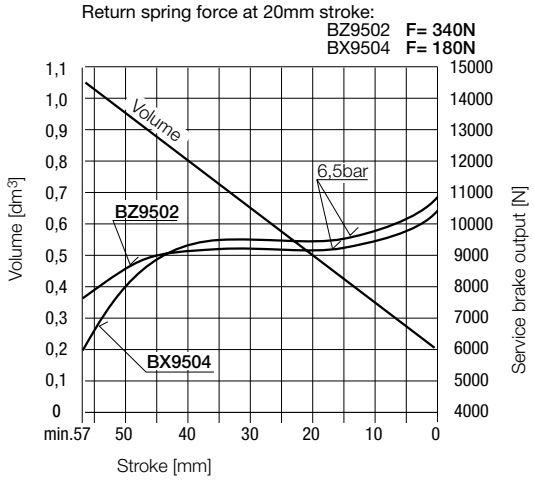
Performance Charts (continued)

Service Brake

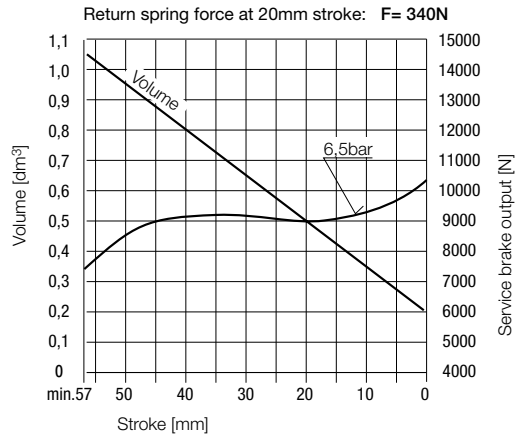
BX9402



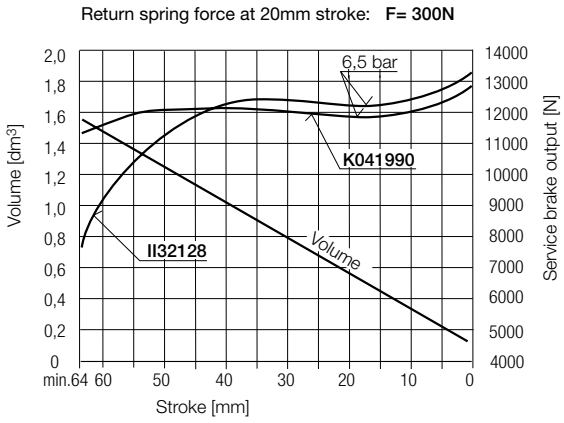
BZ9502, BX9504



BX9519



BZ9646



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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

BX9..., BZ9...

Spring Brakes (S-cam) , diaphragm/piston

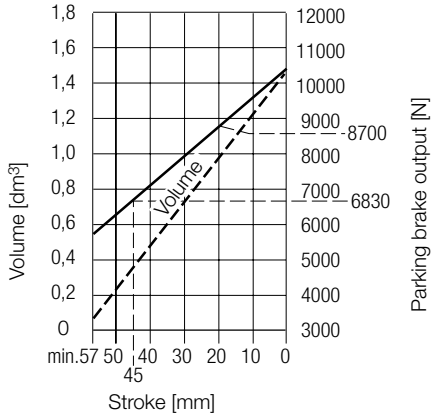
Doc. No. Y011370 (EN - Rev. 005)
March 2014

Performance Charts (continued)

Parking Brake

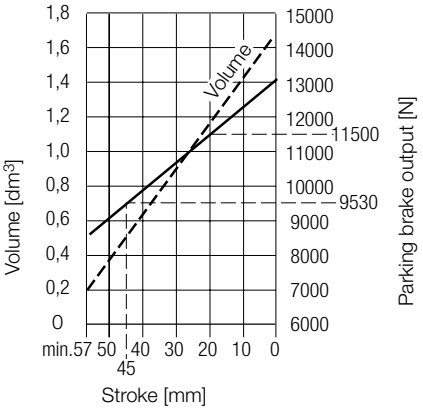
BZ9317, BZ9318, BZ9319, BX9400, BX9519

Required hold-off pressure: 5.1 ±0,3 bar



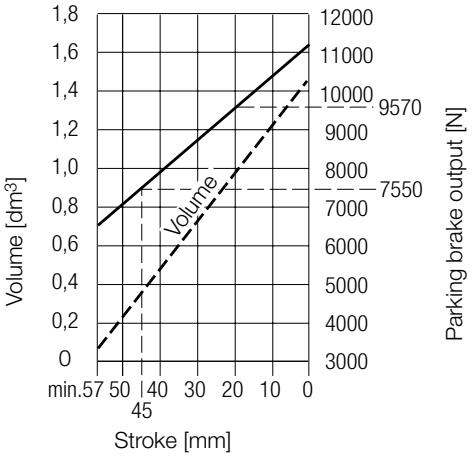
BX9402, BX9504, BZ9646

Required hold-off pressure: 5,1 ±0,3 bar



BZ9502

Required hold-off pressure: 5,5 ±0,3 bar



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Item No. K002487

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Installation and Mounting instructions

For reliable and safe mounting of spring brakes, please note the following points:

- Use suitable mounting bracket with adequate stability (material thickness)
- Hole dimensions according to DIN
- Plain mounting face, only primed (maximum thickness 0,1 mm), not final coated
- Direct contact of the full surface of the spring brake mounting face must be made with the mounting bracket. No spacing washers, adapter plates or other elements are allowed.
- Ensure adequate clearance is provided behind the actuator to allow the wind-off bolt to be unscrewed.
- Check length of push rod, it may need to be shortened.
- The angle between push rod and slack adjuster and between push rod and mounting bracket should be approximately 90 deg. when the push rod is at its mid-stroke position.
- During installation, the slack adjuster should be rotated towards the yoke to insert the yoke pin. On no account should the push rod be pulled out from the actuator to meet the slack adjuster.
- Maximum pivoting angle of push rod in all directions = 3°
- For mounting studs, nuts and plain washers must be used.
- General requirements of mechanical engineering concerning stepwise tightening must be followed
- Tightening torque 180+20 Nm
- For further information please contact Knorr-Bremse, the axle or trailer manufacturer.

Winding-off the Power Spring

In case of failure in the air system, to release the actuator's spring force:

- Turn nut (A/F 24 mm) at the rear of the actuator in an anti-clockwise direction (max. 35 Nm).

Attention: Use only the correct sized ring or open-ended spanner!

Attention: The parking brake portion of the **Spring Brake** contains a very high spring load and it is strongly recommended that you do not attempt any disassembly of this portion. This should also be taken into consideration when disposing of spring brakes of any type.

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Item No. K002487

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

BX9..., BZ9...

Spring Brakes (S-cam) , diaphragm/piston

Doc. No. Y011370 (EN - Rev. 005)
March 2014

Revision Details

Rev. 004	Septembre 2011	New layout for revised Trailer Catalogue.
Rev. 005	March 2014	Page 1 - stroke of II37277 corrected and note added concerning II32128.

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Item No. K002487

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

BX7...

Spring Brakes (S-cam), diaphragm/diaphragm

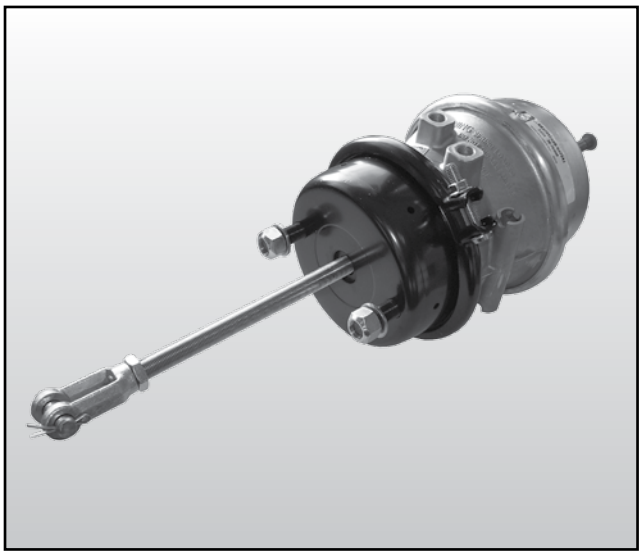
Doc. No. Y011369 (EN - Rev. 003)
September 2011

Function

This range of **Spring Brakes** is used on axles fitted with drum brakes to provide the service and parking brake functions.

The internal wind off mechanism allows the parking brake force to be removed if air pressure is no longer present.

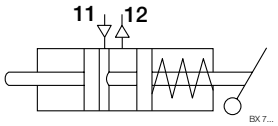
See PD-413-000, Document No. *Y115384* for the full range of **Spring Brakes** for trailers.



Technical Features

Maximum operating pressure		8.5 bar
Full hold-off pressure:	T24	7.0 bar
	T30	5.5 bar
Operating temperature range		-40 °C to +80 °C
Push rod stroke		See table
Port threads;		M16x1.5
Release device:		Mechanical
Weight		See table

Standard Symbol as DIN ISO 1219



Range Overview

Part No.	Type No.	Size Service Brake [Type]	Size Parking Brake [Type]	Stroke [mm]	TÜV-Inspection Report	Weight approx. [kg]
K031736 [1]	**BX7401**	20	24	57	Service Brake 361-0134-05-FBKV Spring Brake 361-0135-05-FBKV	7.8
K031737 [1]	**BX7402**	20	24	57		7.7
K031733 [1]	**BX7408**	20	30	76		8.8
K031734 [1]	**BX7409**	20	30	76		8.8
K031748 [1]	**BX7514**	24	30	63.5		9.5
K037970 [1]	**BX7515**	24	30	76		9.7
K031738 [1]	**BX7516**	24	24	63.5		8.2
K038536 [1]	**BX7518**	24	30	63.5		9.5
K031739 [1] [2]	**BX7523**	24	30	76		9.7
K031740 [1]	**BX7525**	24	30	76		9.7
K031744 [1]	**BX7611**	30	30	63.5		9.4
K031745 [1]	**BX7612**	30	30	63.5		9.3

[1] The part number will carry a suffix, "N##" which defines the packaging requirements of different market sectors, e.g. N00, N50.
Example: K031736N00 - is supplied without packaging.

[2] Replaces BX7515

Other versions are available.

Service Parts:

K037837	yoke (round)
K040394K50	release tool
K050194K50	closure cap

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Item No. K002486

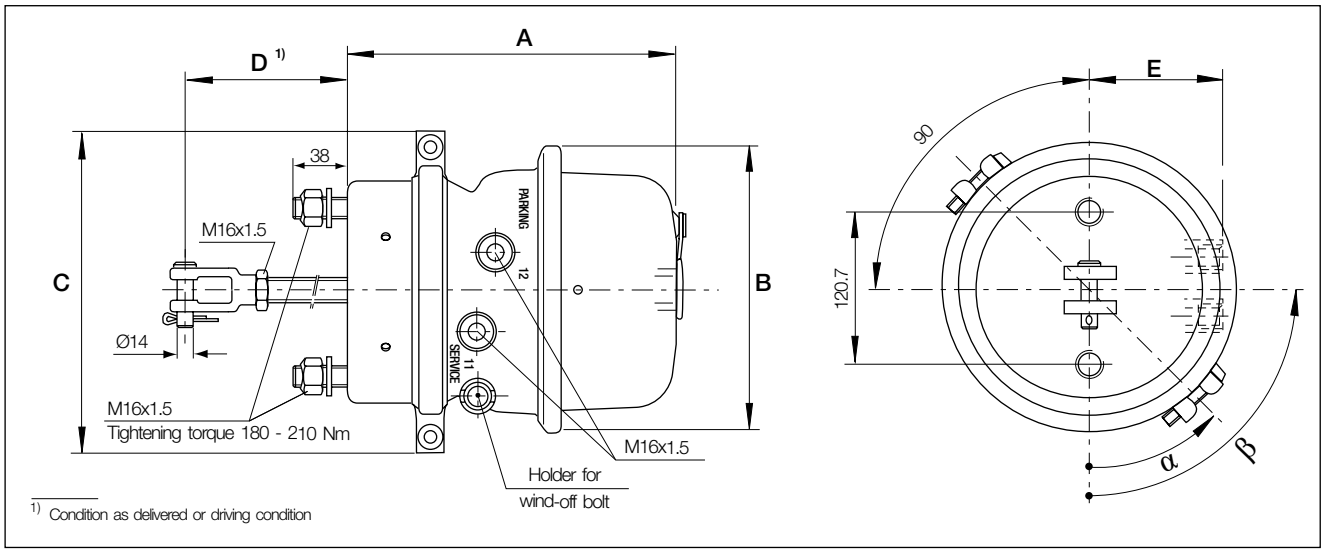
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

BX7...

Spring Brakes (S-cam) , diaphragm/diaphragm

Doc. No. Y011369 (EN - Rev. 003)
September 2011

Dimensions



Part No.	Type No.	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	α [°]	β [°]
K031736 1)	**BX7401**	230	187	218	285	89	0	90
K031737 1)	**BX7402**	230	187	218	227	89	0	90
K031733 1)	**BX7408**	279	206	234	227	94	-45	90
K031734 1)	**BX7409**	279	206	234	227	94	-45	0
K031748 1)	**BX7514**	255	206	234	250	91	0	-90
K037970 1)	**BX7515**	270	206	234	250	94	-45	90
K031738 1)	**BX7516**	241	187	234	280	89	0	-90
K038536 1)	**BX7518**	255	206	234	227	91	0	-90
K031739 1) 2)	**BX7523**	270	206	234	250	94	-45	90
K031740 1)	**BX7525**	270	206	234	227	94	-45	90
K031744 1)	**BX7611**	240	206	254	280	100	0	-90
K031745 1)	**BX7612**	240	206	254	227	100	0	-90

1) The part number will carry a suffix, “N##” which defines the packaging requirements of different market sectors, e.g. N00, N50.
Example: K031736N00 - is supplied without packaging.

2) Replaces BX7515

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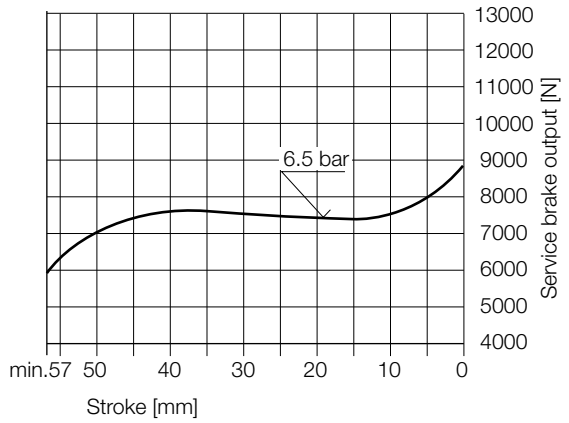
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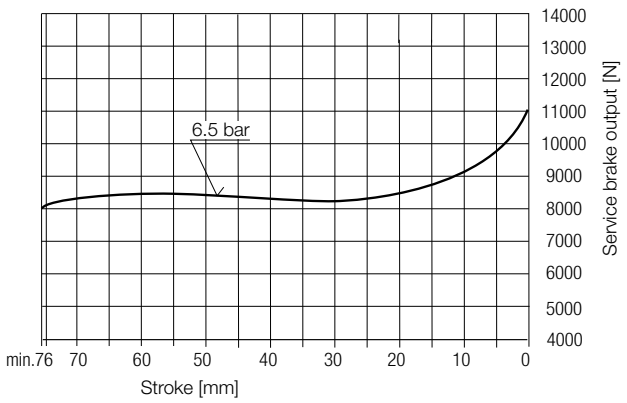
Performance Charts

Service Brake

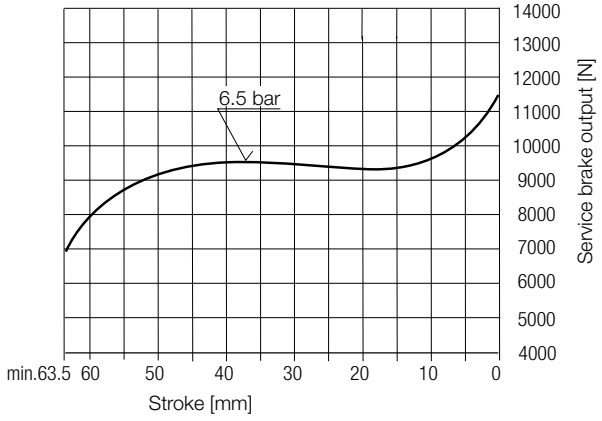
BX7401, BX7402



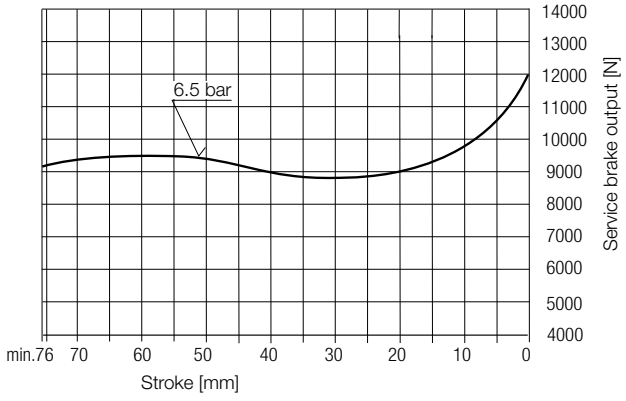
BX7408, BX7409



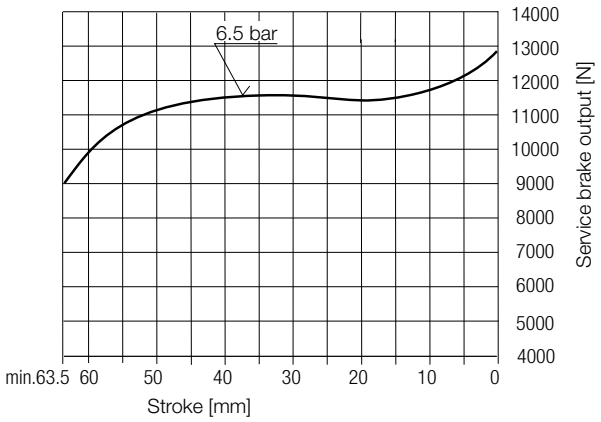
BX7514, BX7516, BX7518



BX7515, BX7523, BX7525



BX7611, BX7612



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BX7...

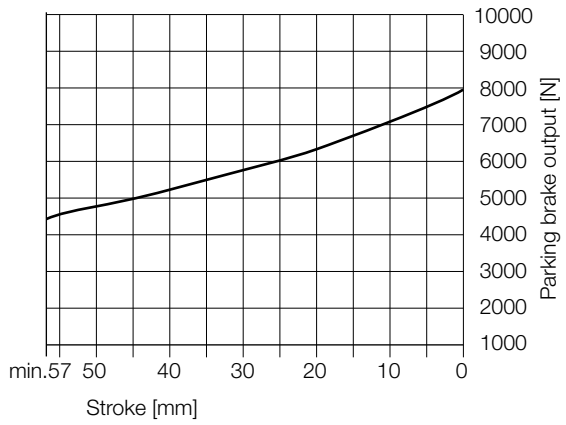
Spring Brakes (S-cam) , diaphragm/diaphragm

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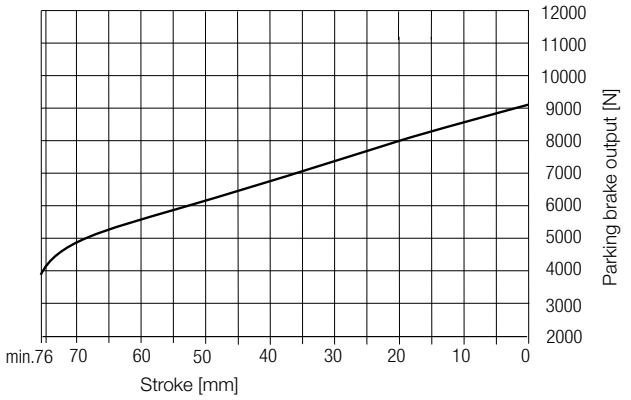
Performance Charts (continued)

Parking Brake

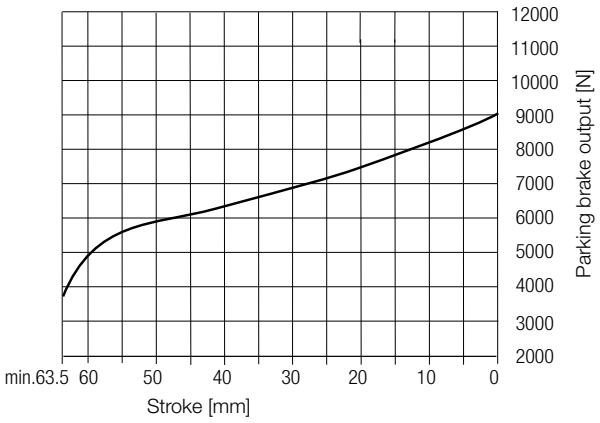
BX7401, BX7402



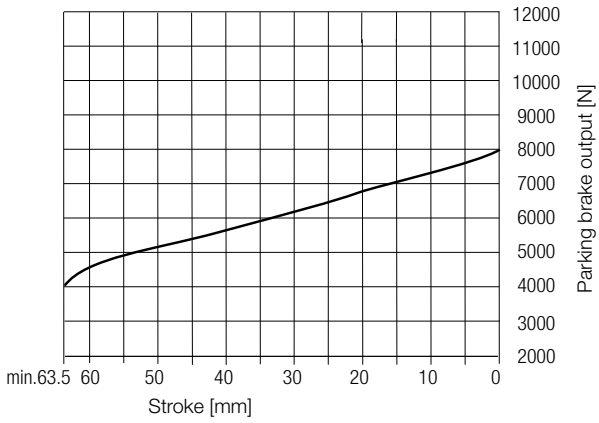
BX7408, BX7409, BX7515, BX7523, BX7525



BX7514, BX7518, BX7611, BX7612



BX7516



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September 2011

Spring Brakes (S-cam) , diaphragm/diaphragm

Installation and Mounting instructions

- Use suitable mounting bracket with adequate stability (material thickness)
- Hole dimensions according to DIN
- Plain mounting face, only primed (maximum thickness 0.1 mm), not final coated
- Direct contact of the full surface of the spring brake mounting face must be made with the mounting bracket. No spacing washers, adapter plates or other elements are allowed.
- Ensure adequate clearance is provided behind the actuator to allow the wind-off bolt to be removed
- Check length of push rod, it may need to be shortened.
- The angle between push rod and slack adjuster and between push rod and mounting bracket should be approximately 90 deg. when the push rod is at its mid-stroke position.
- During installation, the slack adjuster should be rotated towards the yoke to insert the yoke pin. On no account should the push rod be pulled out from the actuator to meet the slack adjuster.
- Maximum pivoting angle of push rod in all directions = 3°
- For mounting studs, nuts and plain washers must be used.
- General requirements of mechanical engineering concerning progressive tightening must be followed.
- Tightening torque 180+30 Nm
- For further information please contact Knorr-Bremse, the axle or trailer manufacturer.

Winding-off the Power Spring



1 2 3 4 5

In case of failure in the air system, to release the actuator's spring force:

- Ensure wheels are chocked.
- Remove release bolt from its holder (Figs. 1 & 2)
- Unclip closure cap (Fig. 3).
- Fully insert "T" end of the release bolt into the spring portion and rotate to engage in the internal slot (Fig. 4)
- Fit washer and nut.
- Rotate the nut (19 mm AF) in a clockwise direction (Fig. 5). Max. torque 68 Nm.

Attention: Use only the correct sized ring or open-ended spanner!

Attention: The parking brake portion of the **Spring Brake** contains a very high spring load and it is strongly recommended that you do not attempt any disassembly of this portion. This should also be taken into consideration when disposing of spring brakes of any type.

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Product DATA

BS9...

Spring Brakes (Disc), diaphragm/piston

Doc. No. Y011372 (EN - Rev. 004)
September 2011

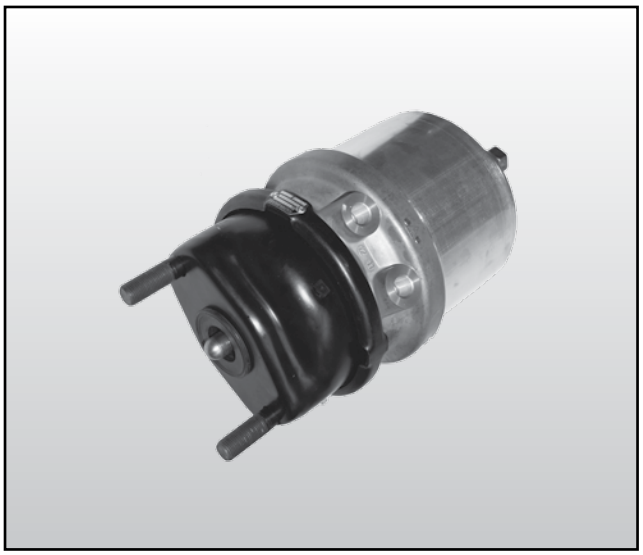
Function

This range of **Spring Brakes** is used on axles fitted with air disc brakes to provide the service and parking brake functions.

The internal wind-off mechanism allows the parking brake force to be removed if air pressure is no longer present.

The **Spring Brakes** have a mounting seal integrated in the non-pressure housing which prevents the entry of dirt or water into the caliper.

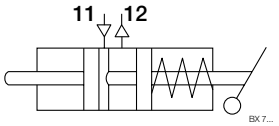
See PD-413-000, Document No. *Y115384* for the full range of **Spring Brakes** for trailers.



Technical Features

Maximum operating pressure	Port **11**; 10.2 bar Port **12**; 8.5 bar
Full hold-off pressure	5.2 bar
Operating temperature range	-40 °C to +80 °C
Sealing of the non-pressure housing	Rubber boot
Push rod stroke:	57 mm
Port threads:	M16x1.5
Release device	Mechanical
Weight	See table

Standard Symbol as DIN ISO 1219



Range Overview

Part No.	Type No.	Size: Service Brake [Type]	Size: Parking Brake [Type]	TÜV Inspection Report	Weight approx. [kg]
II37520	**BS9193**	12	16	Service Brake 361-0130-05-FBKV Spring Brake 361-0131-05-FBKV	6.9
II36338	**BS9196**	12	16		6.9
II31783	**BS9297**	14	16		6.9
II30619	**BS9304**	16	24		7.3
II38110F	**BS9335**	16	24		7.3
II38467F	**BS9338**	16	24		7.4
II31663	**BS9349**	18	16		6.7
II38578F	**BS9376**	16	16		6.9
II38465F	**BS9379**	16	16		6.9
II31227	**BS9397**	16	16		6.8
II31407000	**BS9404**	20	24		8.0
II31226	**BS9451**	22	24		8.0
II38533F	**BS9479**	20	24		7.5
II38581F	**BS9485**	20	24		7.5
II31408	**BS9503**	24	24		7.7

Other versions are available.

Installation kit **II36860** contains: Hexagon lock nut (2x)

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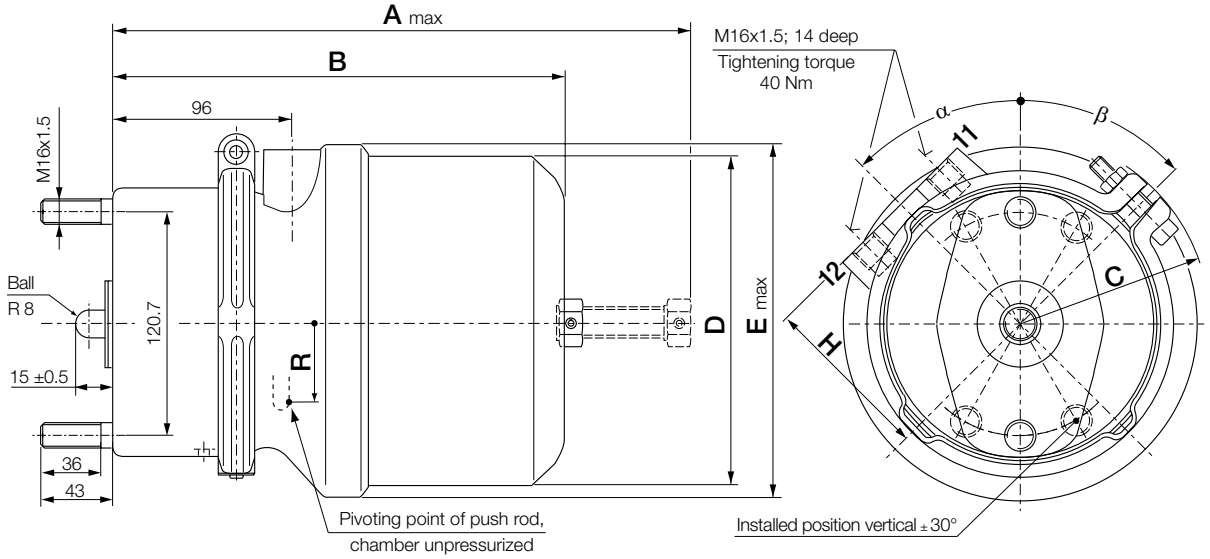
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BS9...

Spring Brakes (Disc) , diaphragm/piston

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Dimensions



Part No.	Type No.	A max. [mm]	B [mm]	C [mm]	D [mm]	E max. [mm]	H [mm]	R [mm]	α [°]	β [°]
II37250	BS9193	327	246	106	161	176	81		43	90
II36338	BS9196	327	246	106	161	176	81		-43	-90
II31783	BS9297	327	246	106	161	176	81	43	90	45
II30619	BS9304	318	240	106	176	191	90	43	90	45
II38110F	BS9335	318	240	106	176	191	90	43	0	0
II38467F	BS9338	318	240	106	176	191	90	43	90	90
II31663	BS9349	327	246	106	161	176	81	50	90	45
II38578F	BS9376	327	246	106	161	176	81	47	0	0
II38465F	BS9379	327	246	106	161	176	81	47	90	90
II31227	BS9397	327	246	106	161	176	81	47	90	45
II31407000	BS9404	318	240	111	176	191	90	52	90	45
II31226	BS9451	318	240	111	176	191	90	54	90	45
II38533F	BS9479	318	240	111	176	191	90	52	90	90
II38581F	BS9485	318	240	111	176	191	90	52	0	0
II31408	BS9503	318	240	117	176	191	90	57.5	90	45

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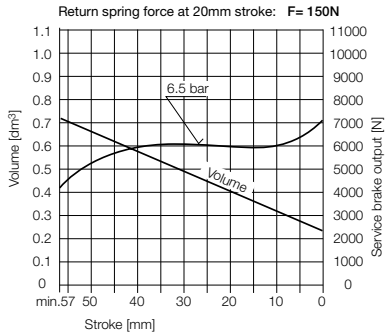
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Spring Brakes (Disc) , diaphragm/piston

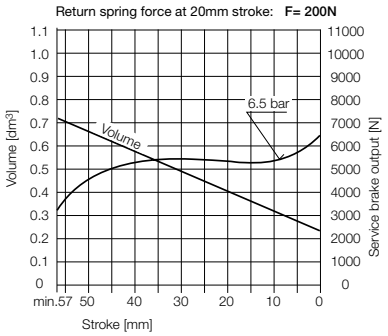
Performance Graphs

Service Brake

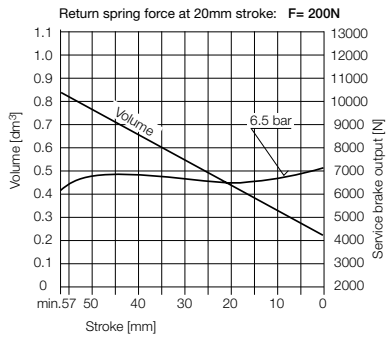
BS9193, BS9196



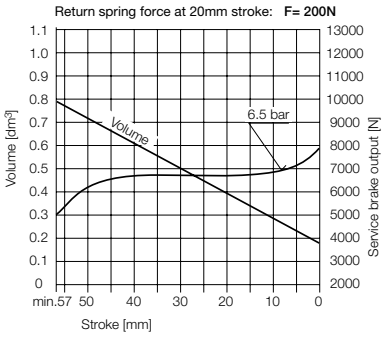
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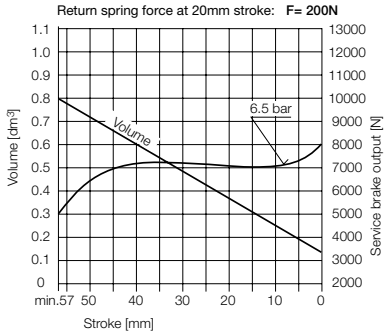
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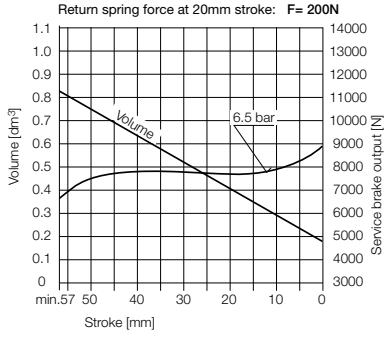
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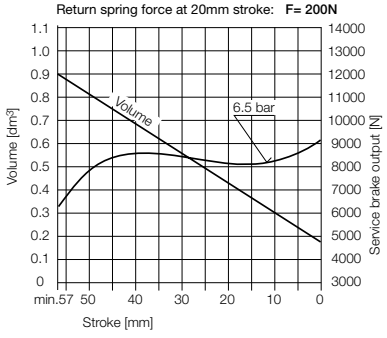
BS9349



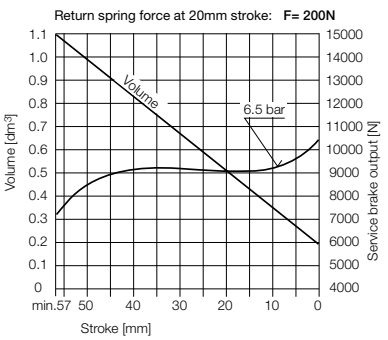
BS9404, BS9479, BS9485



BS9451



BS9503



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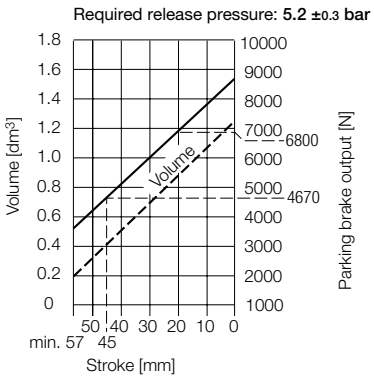
Spring Brakes (Disc) , diaphragm/piston

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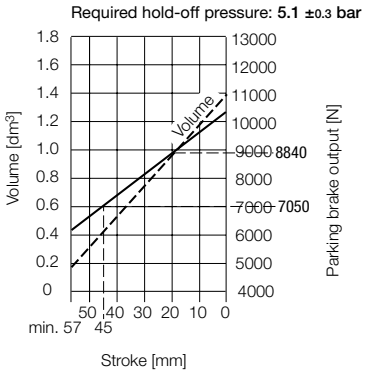
Performance Graphs (continued)

Parking Brake

BS9193, BS9196, BS9297, BS9349, BS0376, BS9379, BS9397



BS9304, BS9335, BS9338, BS9404, BS9451, BS9479, BS9485, BS9503



Installation and Mounting instructions

Detailed information concerning the mounting of brake actuators on disc brakes can be found in the service manual ***Y006471***.

Special Note: If the actuator is supplied with the drain holes plugged, remove lowest plug (as viewed when the actuator is installed).

Winding-off the Power Spring

In case of failure in the air system, to release the actuator's spring force:

- Ensure wheels are chocked
- Turn nut (24 mm A/F) at the rear of the actuator in an anti-clockwise direction (max. 35 Nm).

Attention: Use only the correct sized ring or open-ended spanner!

Attention: The parking brake portion of the **Spring Brake** contains a very high spring load and it is strongly recommended that you do not attempt any disassembly of this portion. This should also be taken into consideration when disposing of spring brakes of any type.

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Item No. K002489

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

BS7...

Spring Brakes (Disc), diaphragm/diaphragm

Doc. No. Y011371 (EN - Rev. 005)
May 2015

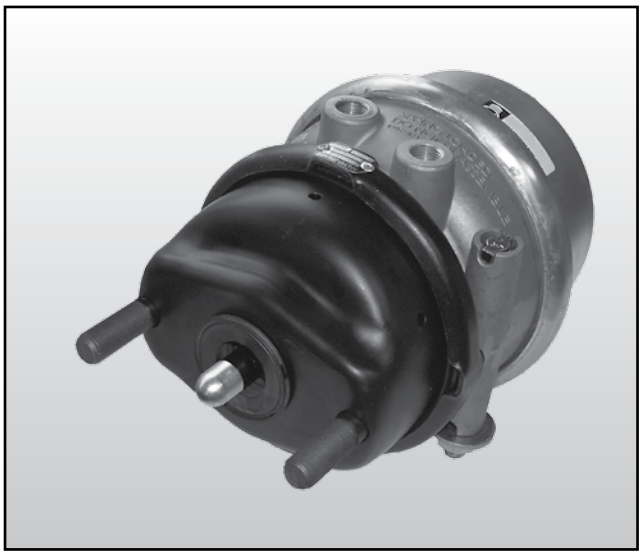
Function

This range of **Spring Brakes** is used on axles fitted with air disc brakes and provides the service and parking brake functions.

The internal wind off mechanism allows the parking brake force to be removed if air pressure is no longer present.

The **Spring Brakes** have a mounting seal integrated in the non-pressure housing which prevents the entry of dirt or water into the disc brake caliper.

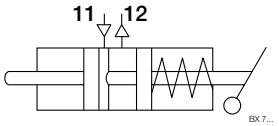
See PD-413-000, Document No. *Y115384* for the full range of **Spring Brakes** for trailers.



Technical Features

Maximum operating pressure:	10.3 bar
Full hold-off pressure:	5.5 bar
Operating temperature range:	-40 °C to +80 °C
Sealing of secondary chamber:	Rubber Boot
Push rod stroke:	See table
Port threads:	M16x1.5
Release device:	Mechanical
Weight:	See table

Standard Symbol as DIN ISO 1219



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Spring Brakes (Disc), diaphragm/diaphragm

Doc. No. Y011371 (EN - Rev. 005)
May 2015

Range Overview

Part No.	Type No.	Size		Stroke [mm]	TÜV Inspection Report	Weight approx. [kg]
		Service Brake [Type]	Parking Brake [Type]			
K026894 1)	BS7304	16	24	57	BZ 105.0	6.9
K026896 1)	BS7309	16	24	57	Service Brake 361-0136-05-FBKV Spring Brake 361-0137-05-FBKV	6.9
K026900 1)	BS7318	16	24	57		6.9
K026901 1)	BS7319	16	24	57		6.9
K026903 1)	BS7751	18	24	57		6.9
K026904 1)	BS7755	18	24	57		6.9
K026905 1)	BS7756	18	24	57		6.9
K045570 1)2)	BS7402	20	24	57		7.1
K121104 1)2)		20	24	64		7.1
K045718 1)3)	BS7403	20	24	57		7.1
K121105 1)3)		20	24	64		7.1
K045719 1)4)	BS7404	20	24	57		7.1
K121106 1)4)		20	24	64		7.1

1) The part number will carry a suffix, "N##" which defines the packaging requirements of different market sectors, e.g. N00, N50. Example: K026894N00 - is supplied without packaging.

2) K045570N00 will be replaced by K121104N00.

3) K045718N00 will be replaced by K121105N00.

4) K045719N00 will be replaced by K121106N00.

Actuator mounting kit available comprising 2 off hexagon lock nuts: Part Number II**36860***

* must be ordered separately !

Note: when spring brakes are replaced, ensure that the units on both sides of the axle have the same stroke capability.

Other sizes are available.

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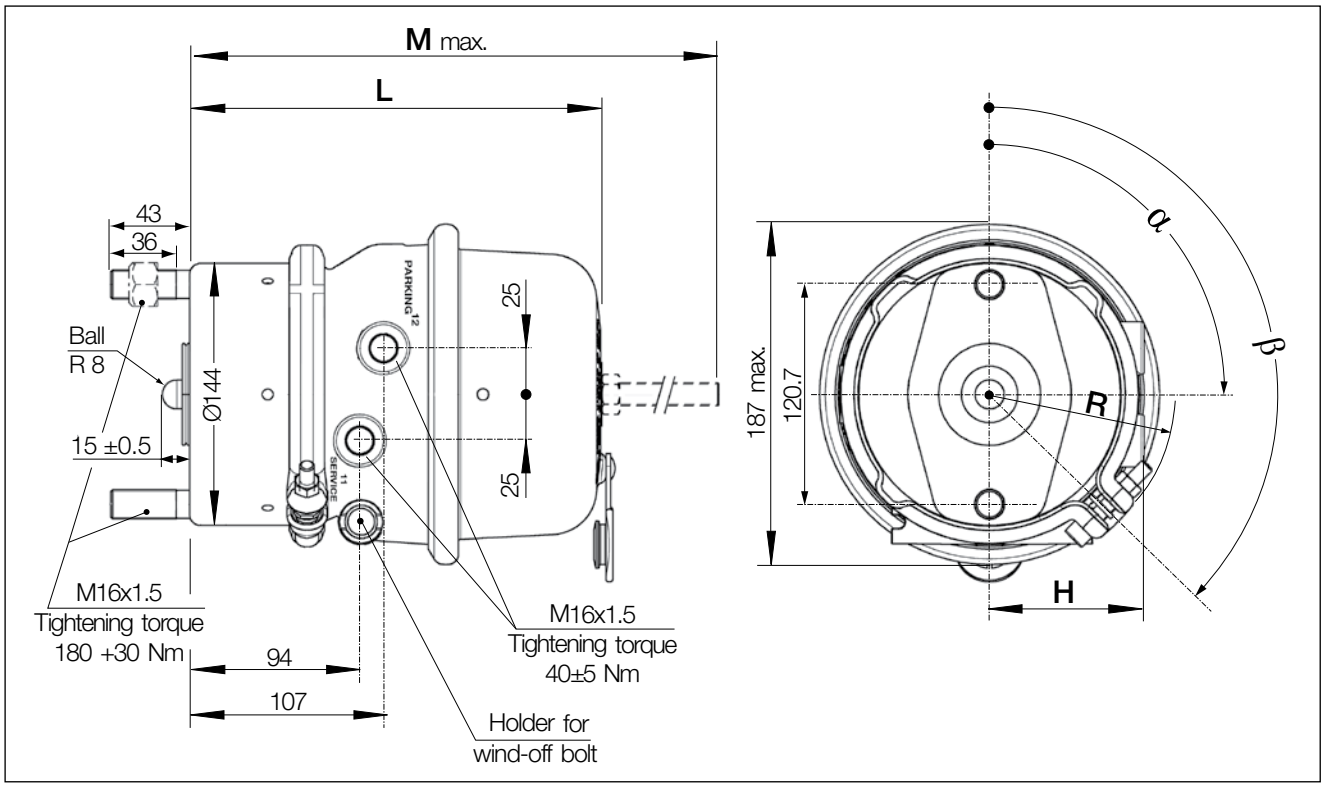
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

BS7...

Doc. No. Y011371 (EN - Rev. 005)
May 2015

Spring Brakes (Disc), diaphragm/diaphragm

Dimensions



Part No.	Type No.	H [mm]	L [mm]	M [mm]	R [mm]	α [°]	β [°]
K026894 [1]	BS7304	85	240	342	106	90	270
K026896 [1]	BS7309	85	240	342	106	90	270
K026900 [1]	BS7318	85	240	342	106	120	120
K026901 [1]	BS7319	85	240	342	106	60	60
K026903 [1]	BS7751	85	240	342	106	90	270
K026904 [1]	BS7755	85	240	342	106	120	120
K026905 [1]	BS7756	85	240	342	106	60	60
K045570 [1][2]	BS7402	89	240	342	111	90	0
K121104 [1][2]		89	250	350	111	90	0
K045718 [1][3]	BS7403	89	240	342	111	120	150
K121105 [1][3]		89	250	350	111	120	150
K045719 [1][4]	BS7404	89	240	342	111	60	60
K121106 [1][4]		89	250	350	111	60	60

[1] The part number will carry a suffix, "N##" which defines the packaging requirements of different market sectors, e.g. N00, N50. Example: K026894N00 - is supplied without packaging.

[2] K045570N00 will be replaced by K121104N00.

[3] K045718N00 will be replaced by K121105N00.

[4] K045719N00 will be replaced by K121106N00.

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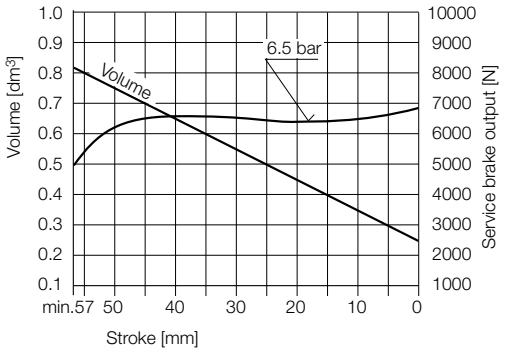
Spring Brakes (Disc), diaphragm/diaphragm

Doc. No. Y011371 (EN - Rev. 005)
May 2015

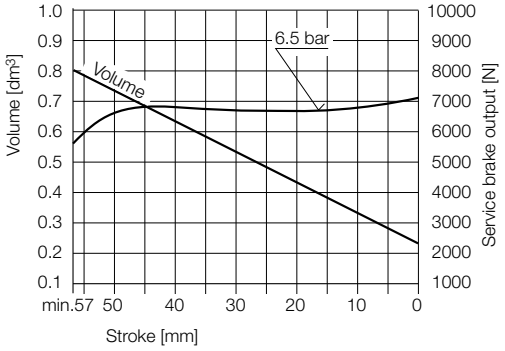
Performance Charts

Service Brake

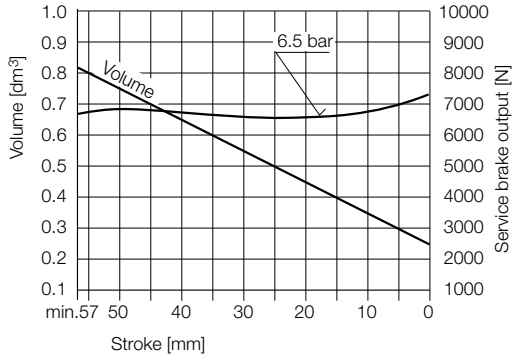
BS7304



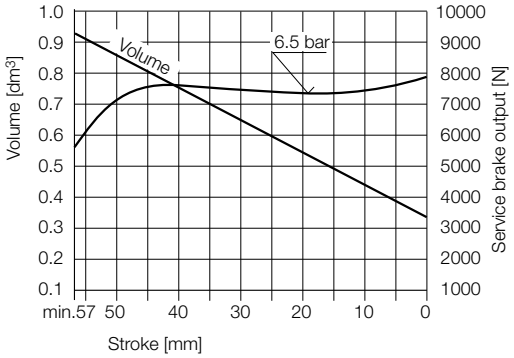
BS7309, BS7318, BS7319



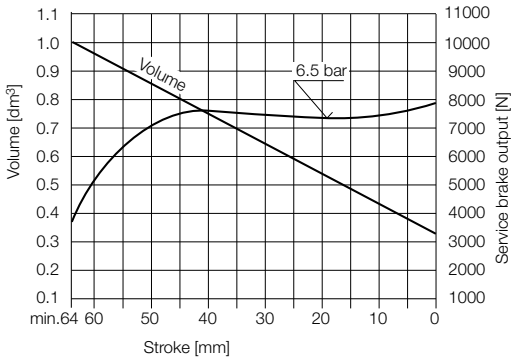
BS7751, BS7755 BS7756



BS7402, BS7403, BS7404 57 mm Stroke



BS7402, BS7403, BS7404 64 mm Stroke



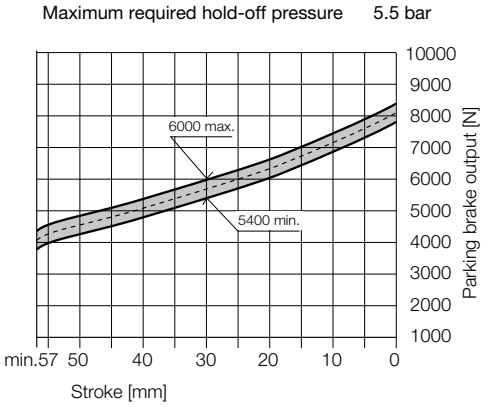
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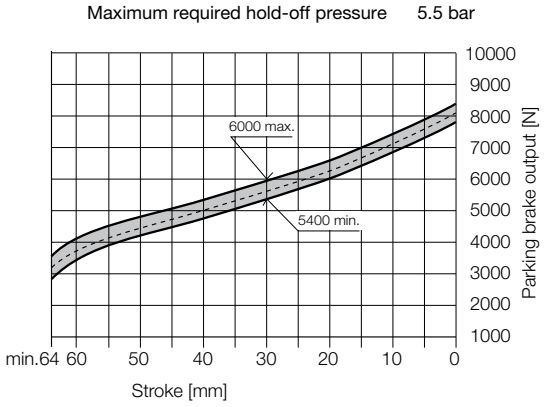
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Parking Brake

BS7304, BS7309, BS7318, BS7319, BS7402, BS7403, BS7404, BS7751, BS7755, BS7756 57 mm Stroke



BS7402, BS7403, BS7404 64 mm Stroke



Installation and Mounting instructions

Detailed information concerning the mounting of disc brake actuators can be found in the service manual ***Y006471***.

Special Note: If the actuator is supplied with the drain holes plugged, remove the lowest plug (as viewed when the actuator is installed).

Note: when spring brakes are replaced, ensure that the units on both sides of the axle have the same stroke capability.

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BS7...

Spring Brakes (Disc), diaphragm/diaphragm

Doc. No. Y011371 (EN - Rev. 005)
May 2015

Winding-off the Power Spring



1 2 3 4 5

In case of failure in the air system, to release the actuator's spring force:

- Ensure wheels are chocked.
- Remove release bolt from its holder (Figs. 1 & 2)
- Unclip closure cap (Fig. 3).
- Fully insert "T" end of the release bolt into the spring portion and rotate to engage in the internal slot (Fig. 4)
- Fit washer and nut.
- Rotate the nut (19 mm AF) in a clockwise direction (Fig. 5). Max. torque 68 Nm.

Attention: Use only the correct sized ring or open-ended spanner!

Attention: The parking brake portion of the **Spring Brake** contains a very high spring load and it is strongly recommended that you do not attempt any disassembly of this portion. This should also be taken into consideration when disposing of spring brakes of any type.

Revision Details

Rev. 003	March 2011	Format changed to new layout and part number list revised.
Rev. 004	September 2011	Reference to PD-413-000 added. Port threads added to Technical Features.
Rev. 005	May 2015	64 mm stroke units added.

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

SN5..., SN6..., SN7..., SK7..., ST7...

Air Disc Brakes for Trailers

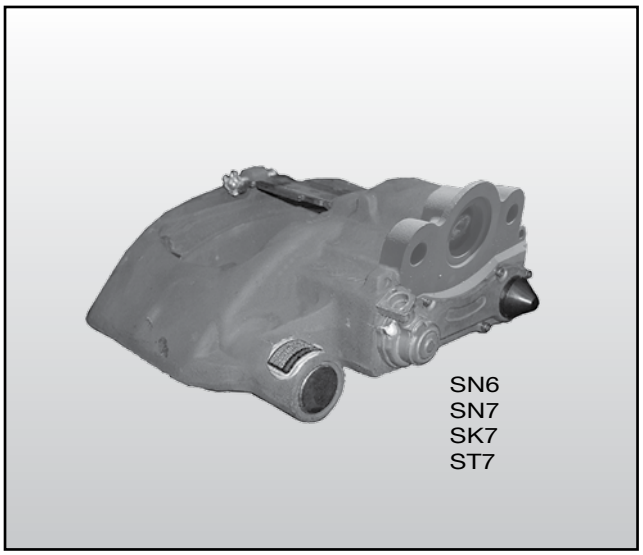
Doc. No. Y011373 (EN - Rev. 004)
March 2015

Function

All **Air Disc Brakes** are designed with a floating caliper and can be activated by either a brake chamber to provide the service brake function or a spring brake to provide the service and parking brake functions.

This range covers all vehicle applications with wheel sizes of 17.5" (SN5), 19.5" (SN6) and 22.5" (SN7, SK7 and ST7).

The new ST7 brake type is the further development of the SK7 to reduce more weight specifically for trailer applications with wheel sizes of 22,5". This brake, similar to the SK7, has 2 mm more brake pad thickness compared with the SN6 and SN7 versions.



SN6
SN7
SK7
ST7

Main Features

- Monobloc caliper
- Compact design
- Reduced weight
- Optimised sealing at the caliper to actuator interface and the fixed guide pin
- Optimised protection of the guide pins, both bearings totally closed (SN7 / SK7 / ST7)
- Interchangeability between SN and SB
- Possibility of pad wear control via pad wear indicators

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

SN5..., SN6..., SN7..., SK7..., ST7...

Air Disc Brakes for Trailers

Doc. No. Y011373 (EN - Rev. 004)
March 2015

Technical Features

	SN5	SN6	SN7	SK7	ST7
Suitable for wheel rim size [inch]	17.5	19.5	22.5	22.5	22.5
Internal transmission ratio	10.0	15.6	15.6	15.6	15.6
Brake disc diameter [mm]	335	374	430	430	430
Brake disc thickness (new) [mm]	34	45	45	45	45
Brake disc thickness (min.) [mm]	28	37	37	37	37
Pad friction material thickness (new) [mm]	19	21	21	23	23
Pad friction material thickness (min.) [mm]	2	2	2	2	2
Brake efficiency [%]	≥95	≥95	≥95	≥95	≥95
Weight without disc, including pads [kg] (may alter depending on variant)	24.0	33.5	41.5	36.6	31.5
Sealing boot (disc brake caliper to actuator interface)	Yes	Yes	Yes	Yes	Yes

Further information on air disc brakes, discs and actuators, as well as brake pads, service kits and service tools can be found in:

*Service Manual SN5 (Document No. Y015044**
*Service Manual SN6, SN7, SK7 (Document No. Y006471**
*Service Manual ST7 (Document No. Y173241**

** - Refer to website www.knorr-bremsecvs.com for latest revision.*

Revision Details

Rev. 003	March 2011	New layout for revised Trailer Catalogue
Rev. 004	March 2015	ST7 added

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Doc. No. Y011334 (EN - Rev. 002)
July 2015

Air Suspension

PD No.	Product	Type/Part No. family
PD-500-500	Levelling Valves	**SV13.., SV14..**
PD-501-000	Raise/Lower Valves (conventional)	**SV31..**
PD-501-050	Raise/Lower Valves (single circuit)	**SV32..**
PD-501-100	Raise/Lower Valve (with Speed Pulse function)	**SV3801**
PD-501-150	Raise/Lower Valve (with RtR function)	**SV32..**
PD-503-100	Lift Axle Valve - Manual/Pneumatic	**AE1124**
PD-503-200	Lift Axle Valves - Pneumatic	**LS1..., LS2..., LS3...**
PD-503-400	Lift Axle Valves - TEBS controlled	**AE1141**
PD-504-000	Height Limiting Valve (Air Suspension)	**AE1103**

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

SV13.., SV14..
Levelling Valves

Doc. No. Y011375 (Rev. 003)
March 2011

PD-500-000

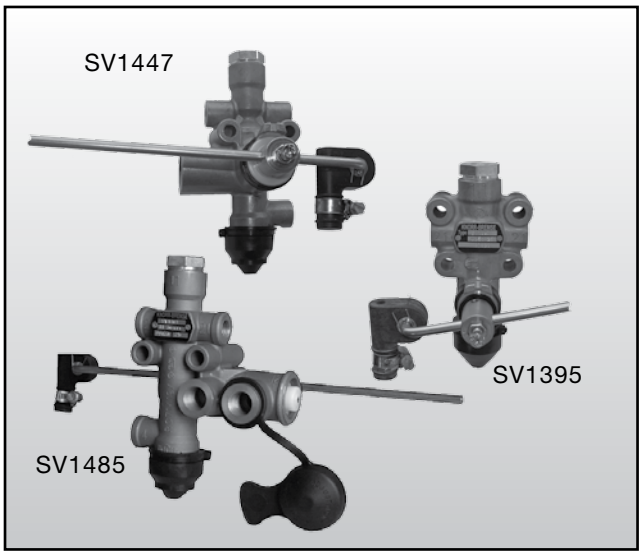
Function

On vehicles fitted with air suspension, the **Levelling Valve** ensures that the axle suspension air bags maintain a constant chassis height irrespective of the vehicle load.

Levelling Valves with the "Height Limitation" feature prevent the chassis height being manually raised above a set limit.

Levelling Valves with the "Second Ride Height" feature allow the driver to pneumatically signal the valve and raise the chassis to an alternative ride height.

Cross Throttling prevents the rapid flow of air between the two outlet ports **21** (left and right side of the vehicle).



Technical Features

Maximum Operating Pressure:	12 bar
Operating Temperature Range:	-40 °C to +80 °C
Weight:	0.7 kg approx.
Lever length:	300 mm
Lever design:	Round, with rubber joint

Range Overview

Part No.	Type No.	Replaces	Second Ride Height (preset)	Height Limitation (adjustable)	Secondary Exhaust
II19425 [1]	**SV1395**	SV1307	–	–	–
I99633 [2]	**SV1418**	–	–	–	–
II30531	**SV1441**	–	12°	–	–
II34910	**SV1447**	–	17.5°	–	–
II36088 [3]	**SV1460**	–	–	–	–
II36114	**SV1465**	SV1440, 61	12°	20°-50° [4]	with
II36115	**SV1466**	SV1410, 63	–	20°-50° [4]	with
K000367	**SV1485**	–	10°	20°-50° [4]	with
K002647 [5]	**SV1485**	–	10°	20°-50° [4]	with

The rubber joint at the lower end of the vertical linkage is available separately: Part Number: **K001406**

[1] Standard valve without additional features

[2] Without additional features, higher volumetric flow

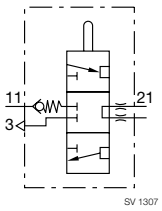
[3] Standard valve without additional features, plastic body

[4] Height Limitation adjustable, see adjustment instructions

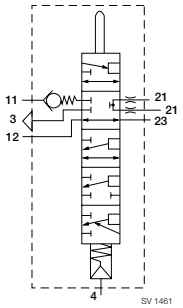
[5] Ports **12** and **23** are fitted with blanking plugs

Standard Symbol as DIN ISO 1219

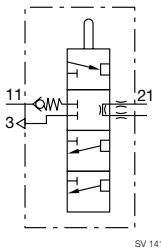
SV1395
SV1460



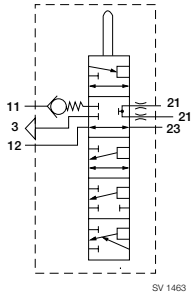
SV1465
SV1485



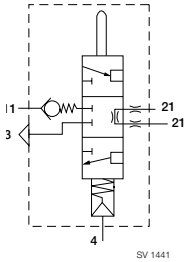
SV1418



SV1466



SV1441
SV1447



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Item No. K002492

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

SV13.., SV14..

Levelling Valves

Doc. No. Y011375 (Rev. 003)
March 2011

Instructions for adjusting the height limitation
(applies to the following levelling valves: **SV1461, SV1462, SV1463, SV1466** and **SV1485**)

Levelling valves with Height Limitation shut off the air supply to the Raise/Lower valve at a certain angle of the lever and thereby limit the maximum chassis height. This angle is supplied pre-set to 25° but can be adjusted within the range 20° to 50°. Note: If the adjustment range is not sufficient, the lever length can be changed (see pages 3 and 4).

The adjustment is carried out as follows:

1. Pressurise ports **11** and **12** with minimum 6 bar

2. Pull off the protection cap from the adjustment screw. See Fig. 1

3. Raise the chassis with the Raise/Lower valve. See Fig. 2

4. Is the maximum permitted height being exceeded?

no

5. Raise chassis until height limitation becomes active. See Fig. 2

6. Leave Raise/Lower Valve in “Raise”-position

7. Turn adjustment screw with a 4mm Allen Key - see NOTE:
- clockwise to increase maximum chassis height
- counter-clockwise to decrease maximum chassis height

8. Re-check the adjusted height limitation by lowering the chassis and raising it again

9. Move Raise/Lower Valve lever back to driving position. See Fig. 2

10. Replace protection cap and ensure correct fitting. See Fig. 1

yes

4a. Immediately move Raise/Lower Valve to “**STOP**” position. See Fig. 2

4b. Lower the chassis several cm. See Fig. 2

4c. Turn the adjustment screw of the levelling valve with a 4mm Allen Key for half a turn anti-clockwise - see **NOTE.** See Fig. 1

NOTE:
Caution! Max. torque 1.2 Nm!
Turning the screw by 360° is equivalent to approximately 11° change of the lever angle

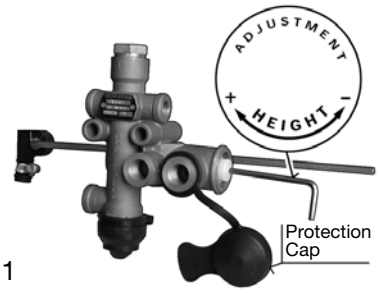


Fig. 1

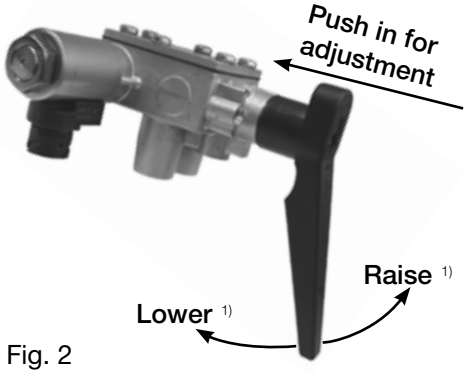


Fig. 2

1) For some part numbers the control logic is vice versa

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Item No. K002492

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Doc. No. Y011375 (Rev. 003)
March 2011

Second Ride Height and Height Limitation features: Calculation of the correct lever length

When the Second Ride Height feature is activated, further angular travel of the lever is permitted and the chassis rises to a higher position; the increase in angle is a fixed value for each valve. If the lever length is changed, the second ride height can be further adjusted.

The Height Limitation feature is adjusted using the integrated hexagon socket (see instructions on page 2). For cases where the adjustment range is not sufficient, additional height can be achieved by increasing the lever length. The quotient of Lever Length and Height Limitation must be in the range 1.3 to 2.9.

The following formulae for calculating the lever length will give an approximate value for the static condition.

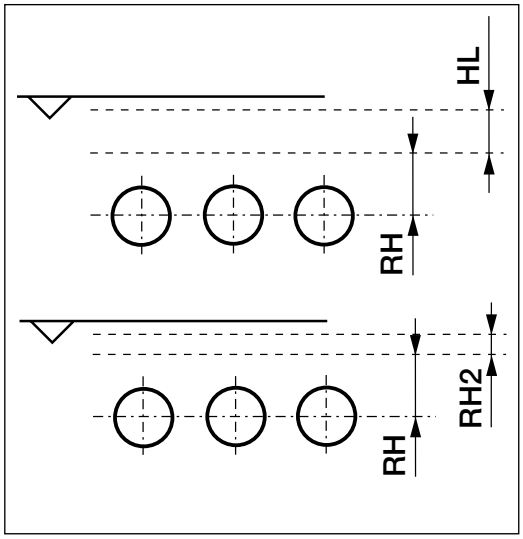
Type No.	Second Ride Height (RH2)	Height Limitation (HL)
SV1465	L = 4.8 x RH2	$1.3 \leq \frac{L}{HL} \leq 2.9$
SV1466	–	$1.3 \leq \frac{L}{HL} \leq 2.9$
SV1485	L = 5.8 x RH2	$1.3 \leq \frac{L}{HL} \leq 2.9$
SV1441	L = 4.8 x RH2	–
SV1447	L = 3.3 x RH2	–

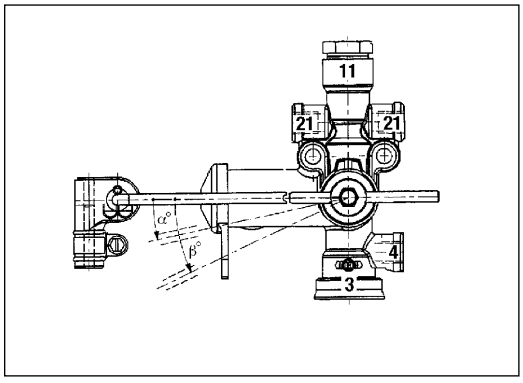
Example:
Second Ride Height for **SV1485**:
RH2 (requested) = **40 mm**
HL (requested) = **100 mm**
L = 5.8 x 40mm = **232 mm**

$$\frac{\mathbf{L}}{\mathbf{HL}} = \frac{232\ mm}{100\ mm} = \mathbf{2.32}$$

$1.3 \leq \mathbf{2.32} \leq 2.9$

When the angle of the height limitation is reached, the valve is in the following condition:
- connection **11** – **21** closed
- connection **12** – **23** closed
- secondary exhaust for **23** open





Type No.	Second Ride Height [α]	Height Limitation [β]
SV1441	12°	–
SV1447	17.5°	–
SV1465	12°	20° - 50°
SV1466	–	20° - 50°
SV1485	10°	20° - 50°

Legend:

L = **Lever length** of Levelling Valve

RH = **Ride Height** (height of the chassis while driving with the Levelling Valve lever in the horizontal position)

RH2 = **Second Ride Height** (increased chassis height above **RH** when pressurising port **4**, e.g. when driving with a lift axle raised)

HL = **Height Limitation** (maximum possible chassis height above **RH** when operating the Raise/Lower Valve)

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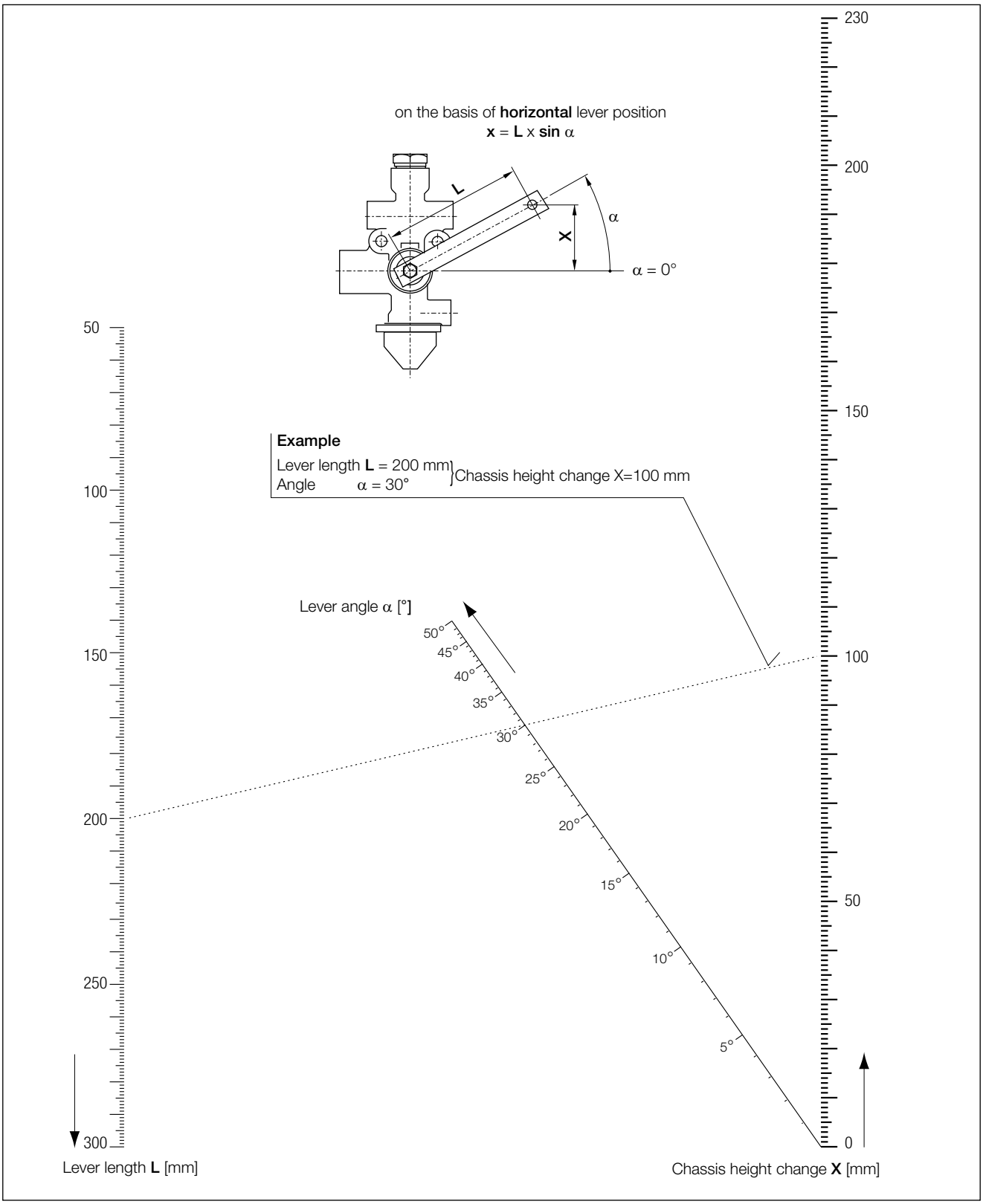
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

SV13.., SV14..

Levelling Valves

Doc. No. Y011375 (Rev. 003)
March 2011

Graphic Diagram for determining the Chassis height change “X” and the lever length “L”



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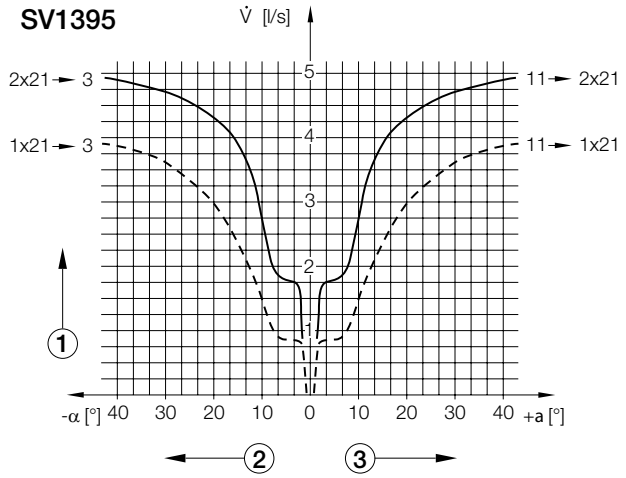
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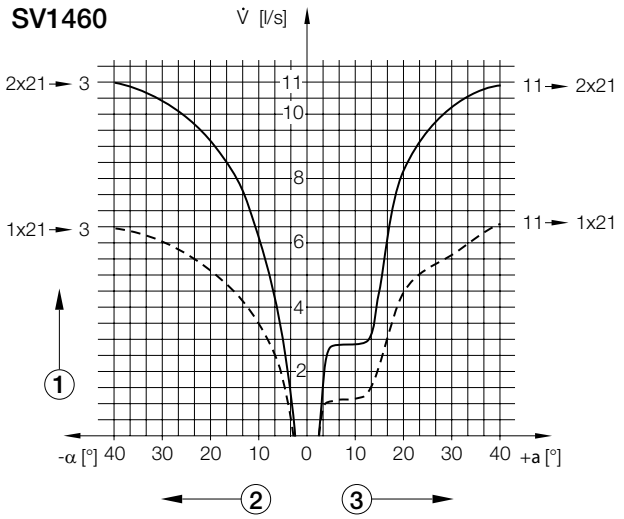
Doc. No. Y011375 (Rev. 003)
March 2011

Performance Charts

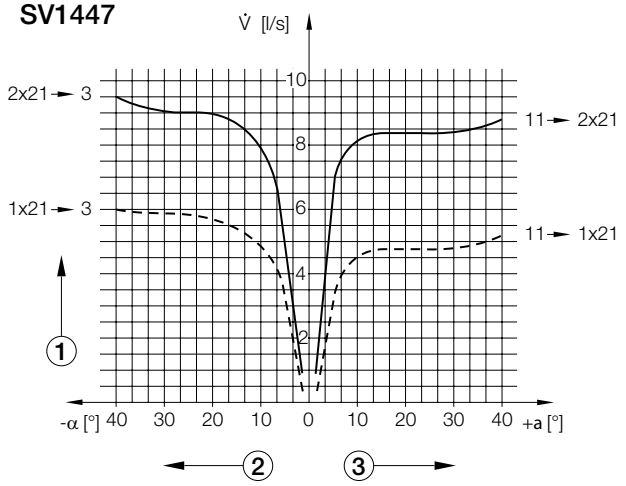
SV1395



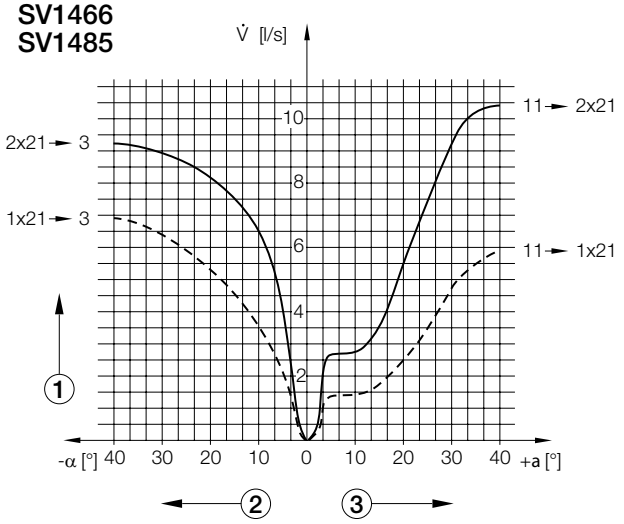
SV1460



SV1418
SV1441
SV1447



SV1465
SV1466
SV1485



Legend:

(1) = Free Air in Litres/sec. [l/s]
(2) = Lever Deflection in degrees when exhausting [°]
(3) = Lever Deflection in degrees when charging [°]

--- = Volume of flow through one port
—— = Volume of flow through two ports
} at 6 bar supply pressure

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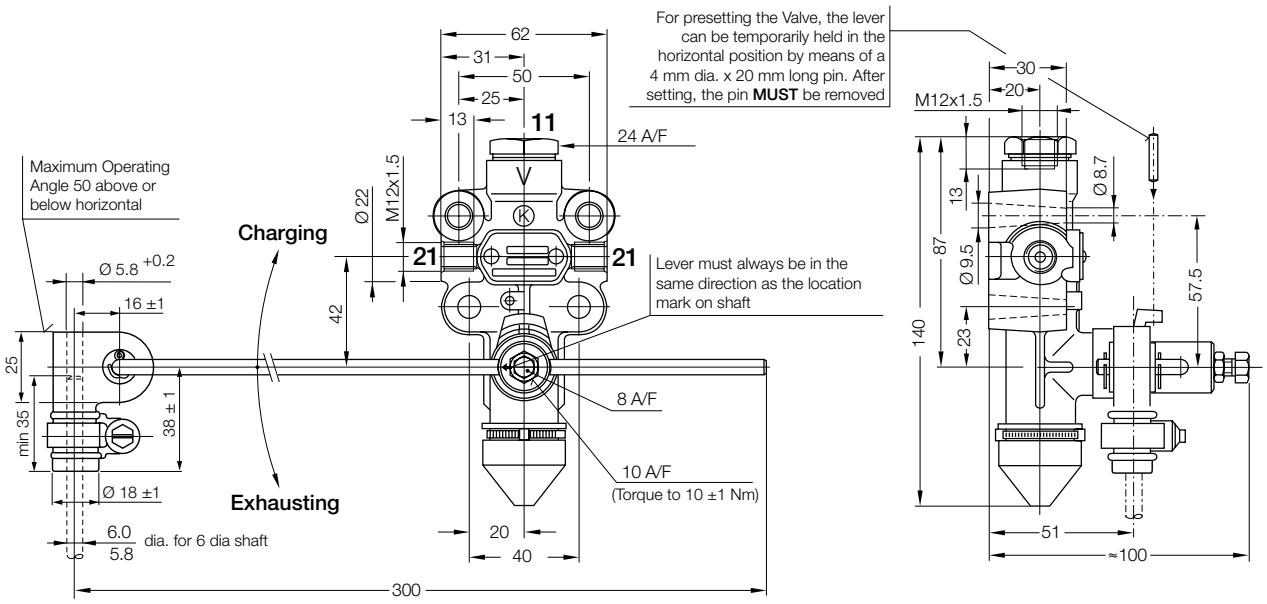
SV13.., SV14..

Levelling Valves

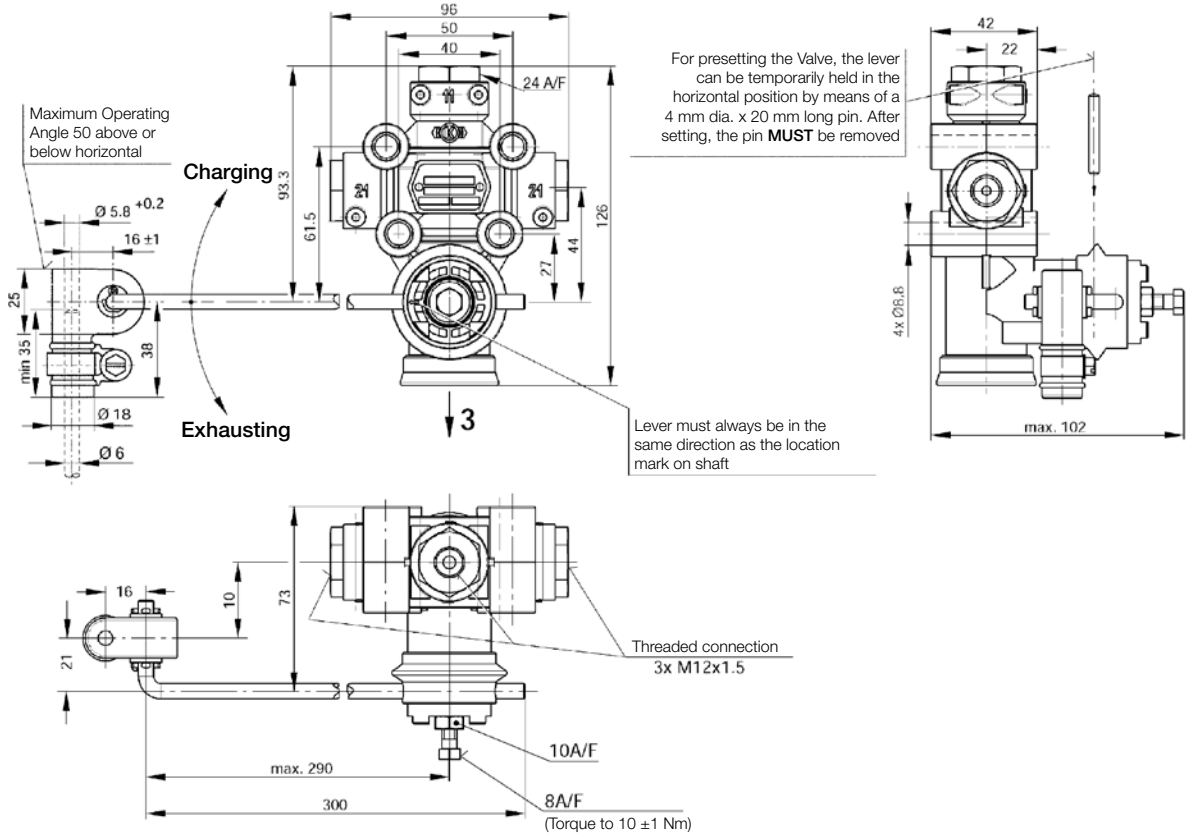
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March 2011

Dimensions

SV1395



SV·



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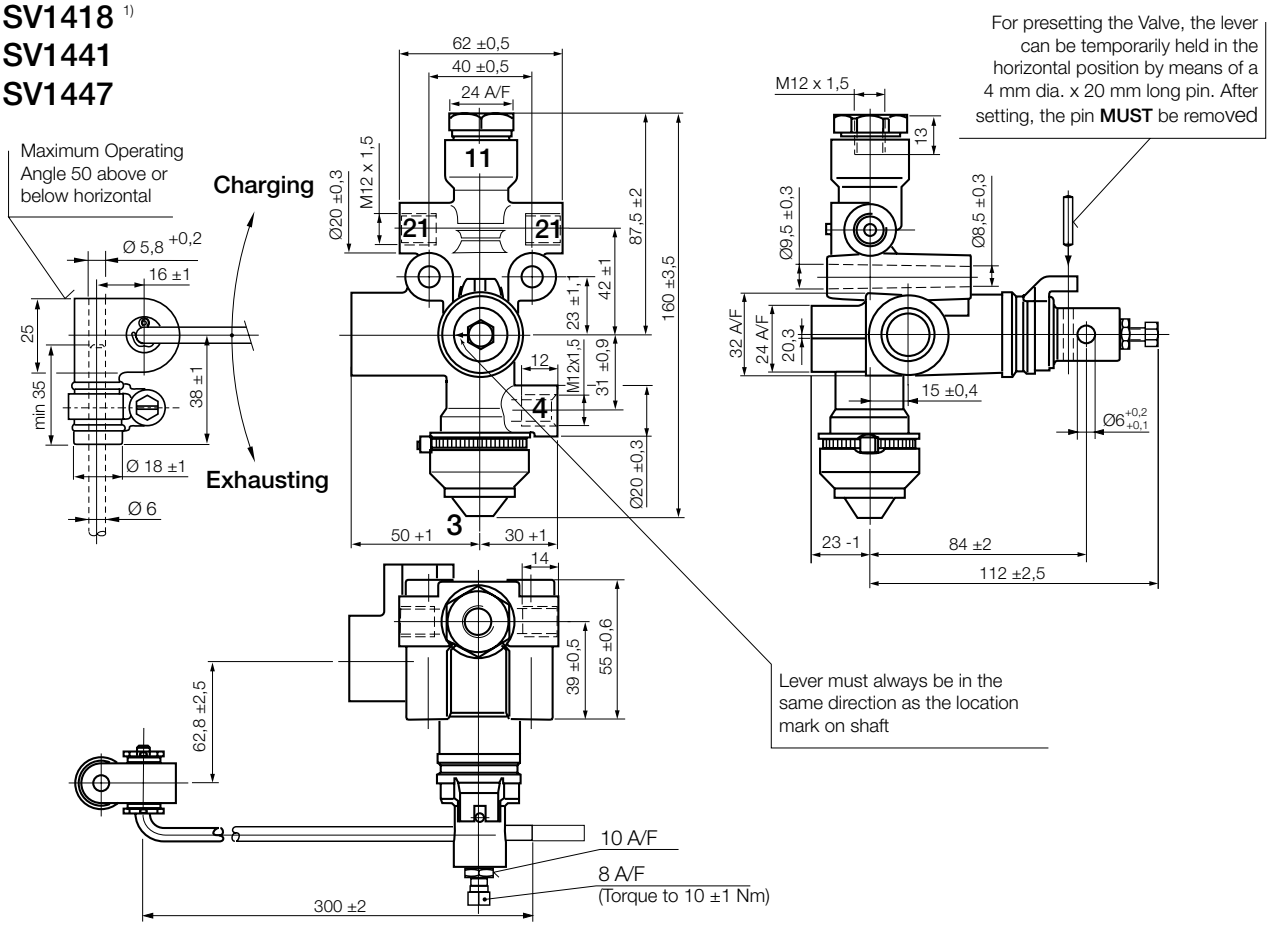
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SV13.., SV14..

Levelling Valves

Doc. No. Y011375 (Rev. 003)
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SV1418 [1)]
SV1441
SV1447



[1)] Port **4** not used

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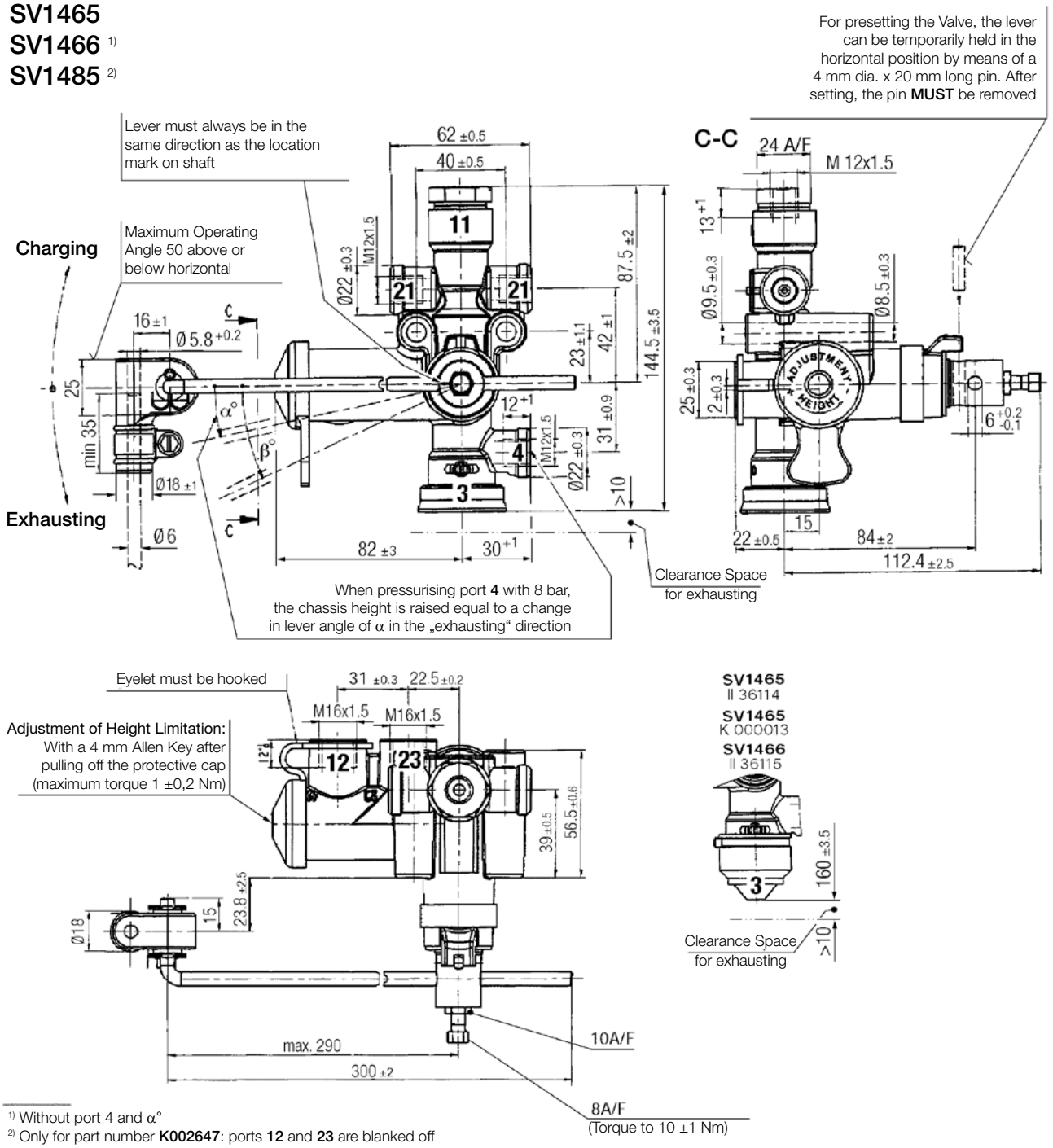
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

SV13.., SV14..

Levelling Valves

Doc. No. Y011375 (Rev. 003)
March 2011

SV1465
SV1466 [1]
SV1485 [2]



[1] Without port 4 and α°
[2] Only for part number **K002647**: ports **12** and **23** are blanked off

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Item No. K002492

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

SV31..

Raise/Lower Valves (conventional)

Doc. No. Y011376 (EN - Rev. 003)
March 2014

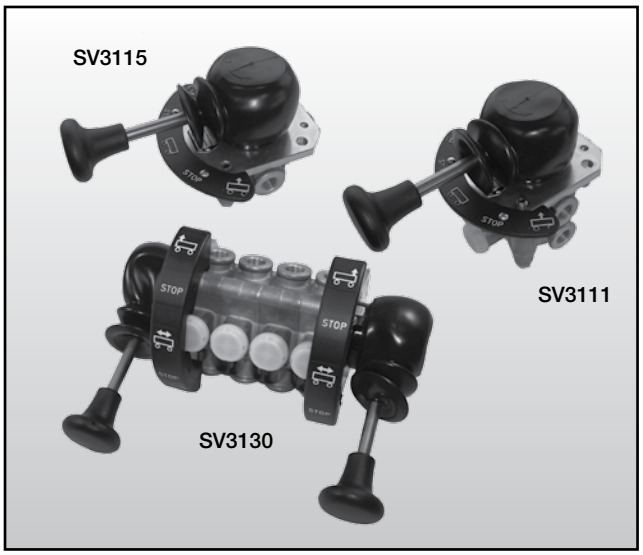
PD-501-000

Function

Raise/Lower Valves are fitted on vehicles with air suspension and allow manual control of air bag volume to raise or lower the vehicle chassis as required.

The valve is available with 1,2 or 4 control circuits to suit different suspension configurations. If required valves can be supplied with a “dead man‘s handle” (automatic return to the “STOP” position).

Raise/Lower Valves SV3161 to **SV3164** have an increased flow diameter to reduce the time taken to raise a tandem or tri-axle chassis.



Technical Features

Maximum Operating Pressure:		18 bar
Operating Temperature Range:		-40 °C to +80 °C
Weight:	One Circuit:	1.1 kg approx.
	Two Circuits:	1.5 kg approx.
	Four Circuits:	3.0 kg approx.
Single circuit air suspension:	RWTÜV-report:	AL232.OE
	RWTÜV-report:	112 IR 03 001 Rev. 01
	DEKRA-report:	200 208 105

Range Overview

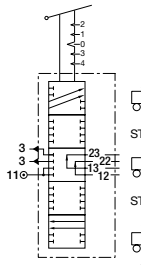
Part No.	Type No.	No. of Levers	No.of Control Circuits	Number of Control Circuits on		“Dead Man`s Handle”	Flow Dia.
				Lever I	Lever II		
I83153	SV3111	1	2	2	–	–	5 mm
I86024	SV3115	1	1	1	–	–	5 mm
I90969	SV3130	2	4	2	2	–	5 mm
II36043	SV3133	1	2	2	–	with	5 mm
II36069	SV3161	1	1	1	–	with	6 mm
II36075 [1)]	SV3162	1	1	1	–	–	6 mm
II36107	SV3164	1	1	1	–	–	6 mm

Mounting Bracket Part No. 3111DK

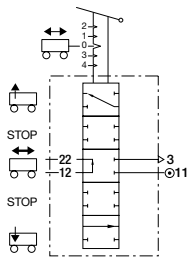
[1)] Without symbol plate

Standard Symbol as DIN ISO 1219

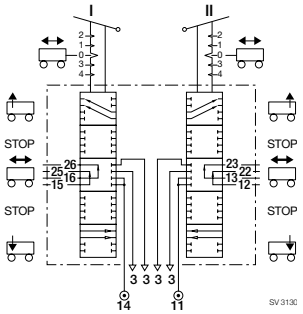
SV3111, SV3133



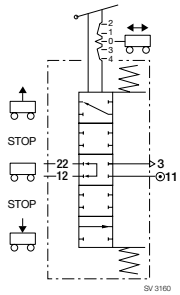
SV3115



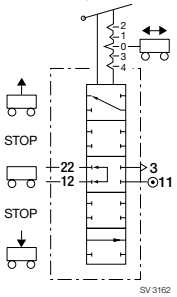
SV3130



SV3161



SV3162, SV3164



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Item No. K002493

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

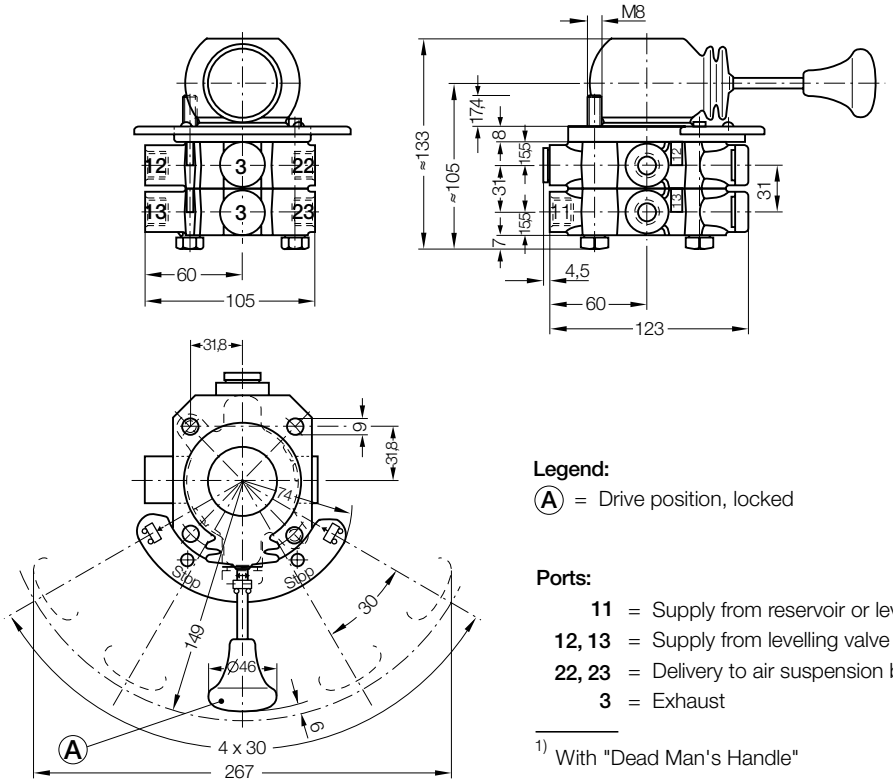
SV31..

Raise/Lower Valves (conventional)

Doc. No. Y011376 (EN - Rev. 003)
March 2014

Dimensions

SV3111
SV3133[1)]



Legend:
(A) = Drive position, locked

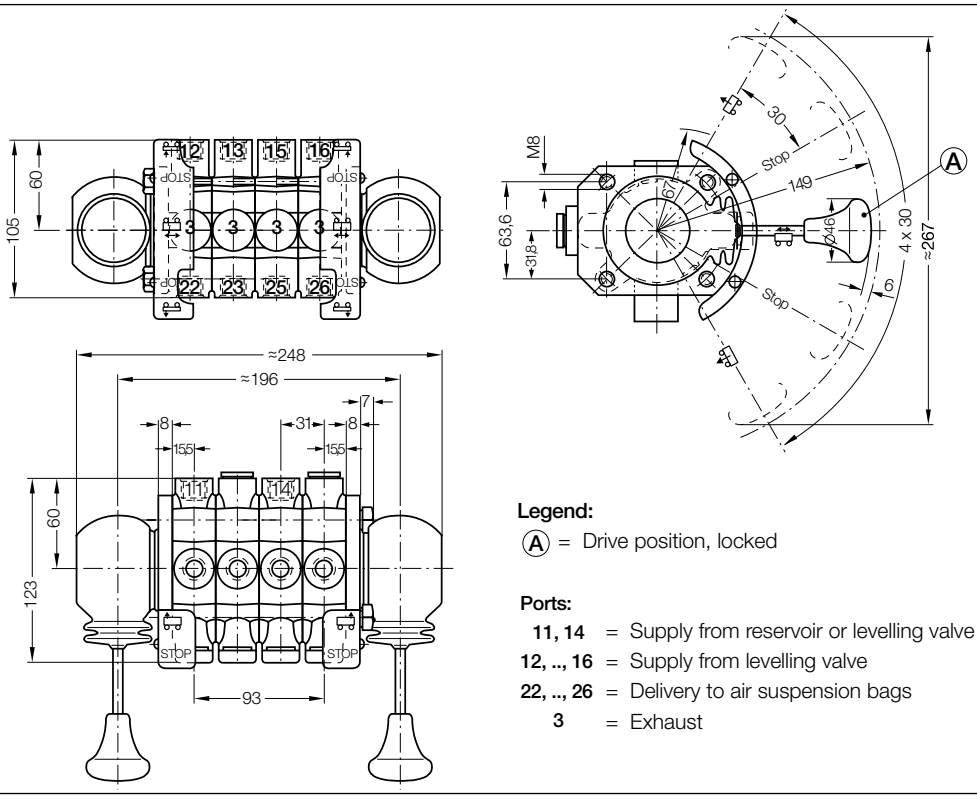
Ports:

11	=	Supply from reservoir or levelling valve
12, 13	=	Supply from levelling valve
22, 23	=	Delivery to air suspension bags
3	=	Exhaust

[1)] With "Dead Man's Handle"

VF00075_13ÄI01EN

SV3130



Legend:
(A) = Drive position, locked

Ports:

11, 14	=	Supply from reservoir or levelling valve
12, .., 16	=	Supply from levelling valve
22, .., 26	=	Delivery to air suspension bags
3	=	Exhaust

VF00075_14ENÄI01

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Item No. K002493

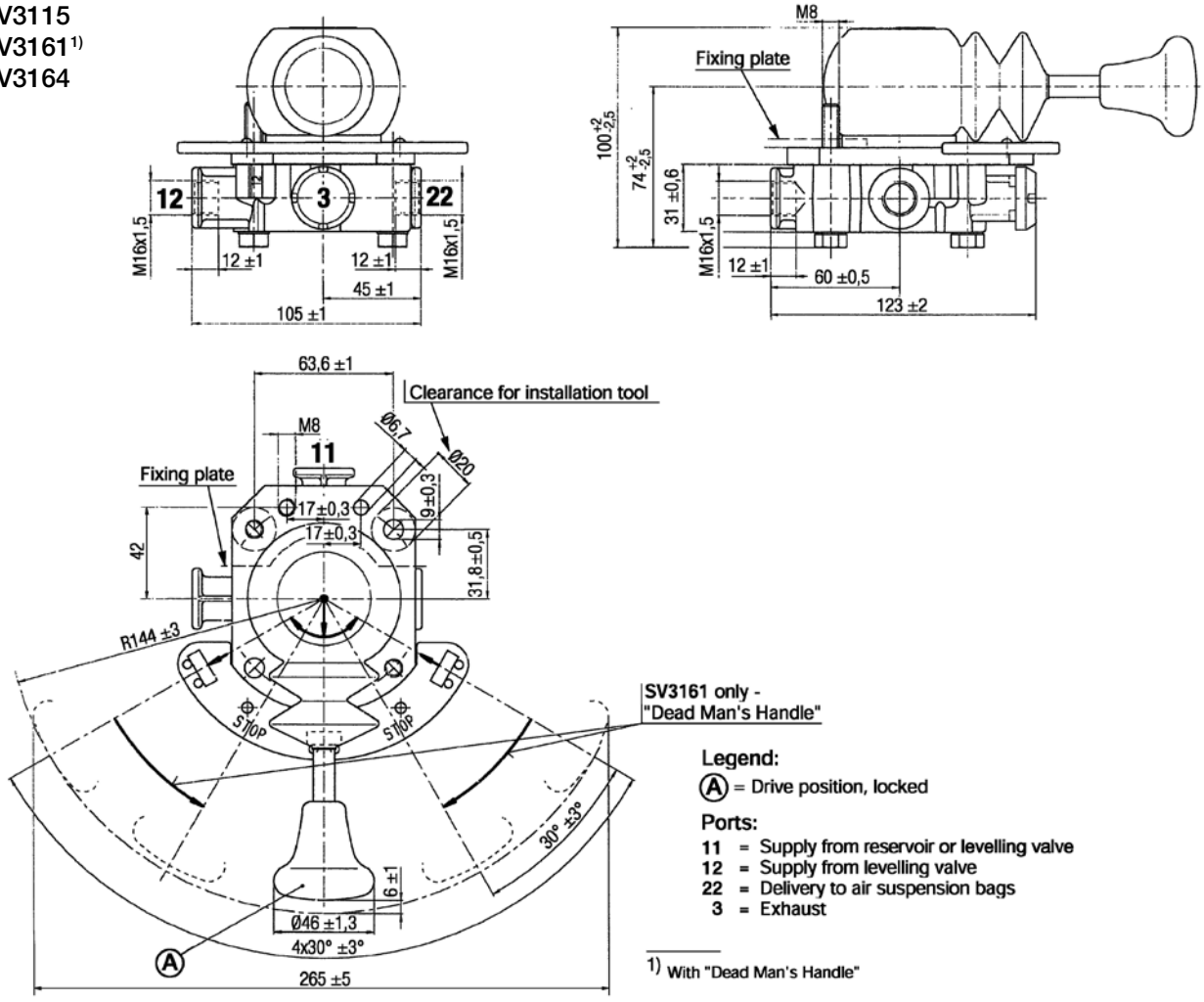
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

SV31..

Doc. No. Y011376 (EN - Rev. 003)
March 2014

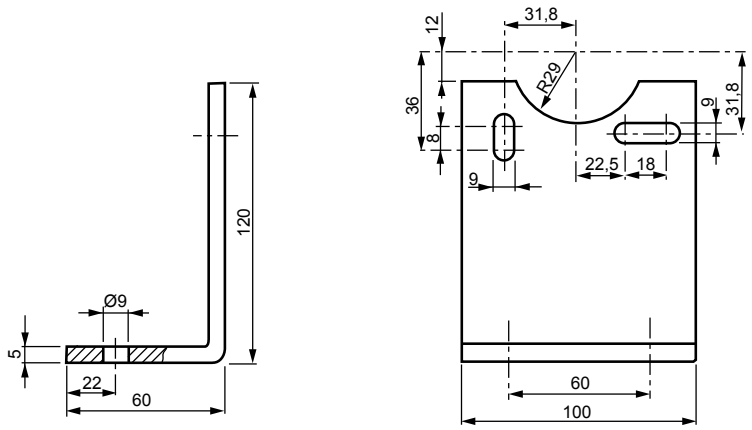
Raise/Lower Valves (conventional)

SV3115
SV3161[1)]
SV3164



VF00170_2ENÄI01

3111DK



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Item No. K002493

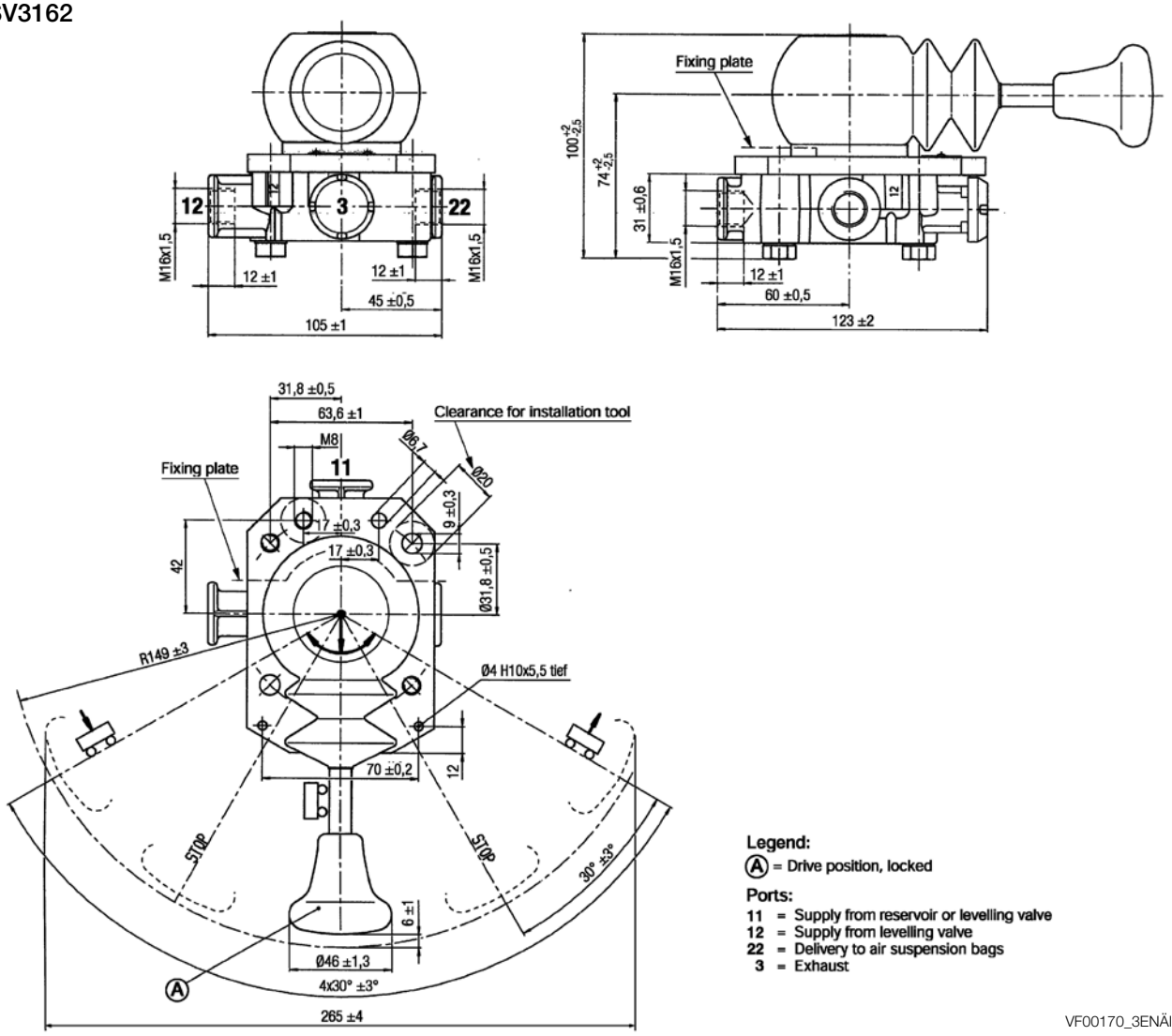
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

SV31..

Raise/Lower Valves (conventional)

Doc. No. Y011376 (EN - Rev. 003)
March 2014

SV3162



Revision Details

Rev. 001	March 2007	TÜV-report Nos. added on page 1.
Rev. 002	February 2012	New document layout. SV3134 removed.
Rev. 003	March 2014	Mounting Bracket added.

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Product DATA

SV32..

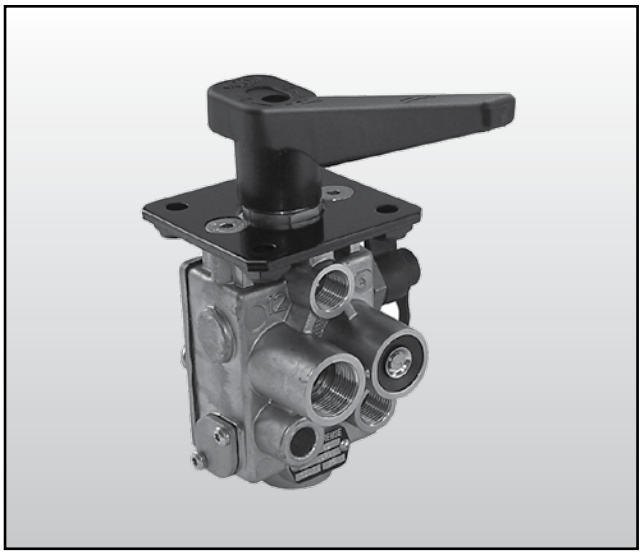
Raise/Lower Valves (single circuit)

Doc. No. Y011377 (EN - Rev. 003)
October 2011

Function

Raise/Lower Valves are fitted on vehicles with air suspension and allow manual control of air bag volume to raise or lower the vehicle chassis as required.

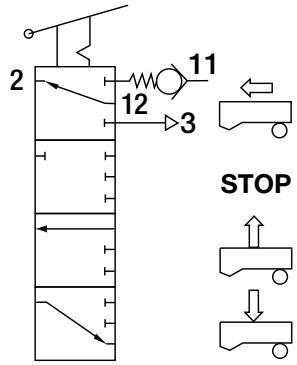
Some valves are fitted with a test connector to permit easy measurement of the air bag pressure.



Technical Features

Maximum operating pressure:	13.0 bar
Maximum suspension pressure:	10.0 bar
Operating temperature range:	-40 °C to +60 °C
Weight:	0.8 kg approx.
Test reports:	RWTÜV-report: AL232:OE
	RWTÜV-report: 112IR 03 001 Rev. 01
	DEKRA-report: 200 208 105

Standard Symbol as DIN ISO 1219



Range Overview

Part No.	Type No.	Test Connector	Adaptor Plate II40998F	Legend Plate Z006844
II36145	**SV3200**	No	No	No
II36225	**SV3240**	Yes	Yes	No
K002018	**SV3240**	Yes	Yes	Yes

Port	Thread	Connection	Max. torque
11	M22x1.5	Supply (from air reservoir or levelling valve port 23)	60 Nm
12	M16x1.5	From levelling valve port 21	45 Nm
2	M16x1.5	Delivery to air bags	45 Nm
3	-	Exhaust	

Part No. for Service Kit:
Lever and screw: II**36226004**
Tightening torque: 4 Nm

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Item No. K002494

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

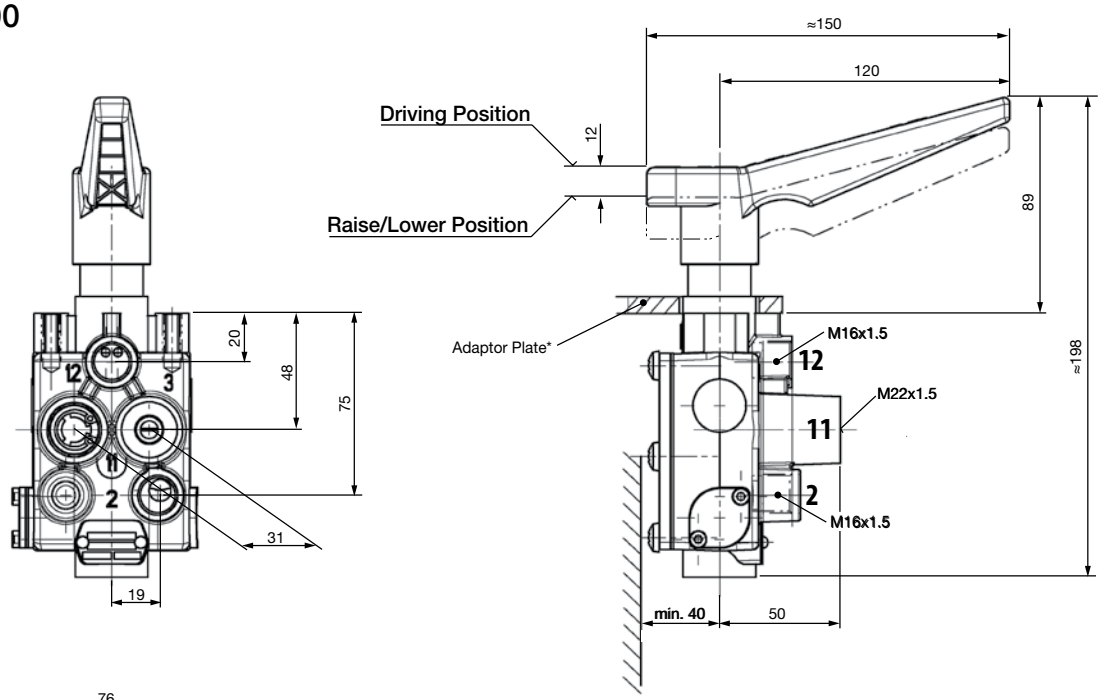
SV32..

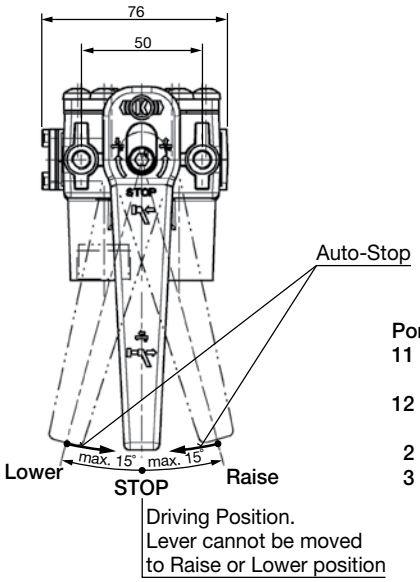
Raise/Lower Valves (single circuit)

Doc. No. Y011377 (EN - Rev. 003)
October 2011

Dimensions

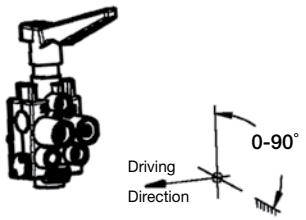
SV3200





Driving Position.
Lever cannot be moved
to Raise or Lower position

Mounting Position:



Ports:

11 = Supply from Reservoir or Air Suspension Levelling Valve port **23**
12 = Supply from Air Suspension Levelling Valve port **21**
2 = Delivery to Air Suspension Bellows
3 = Exhaust

* for dimensions see 'Adaptor Plate'

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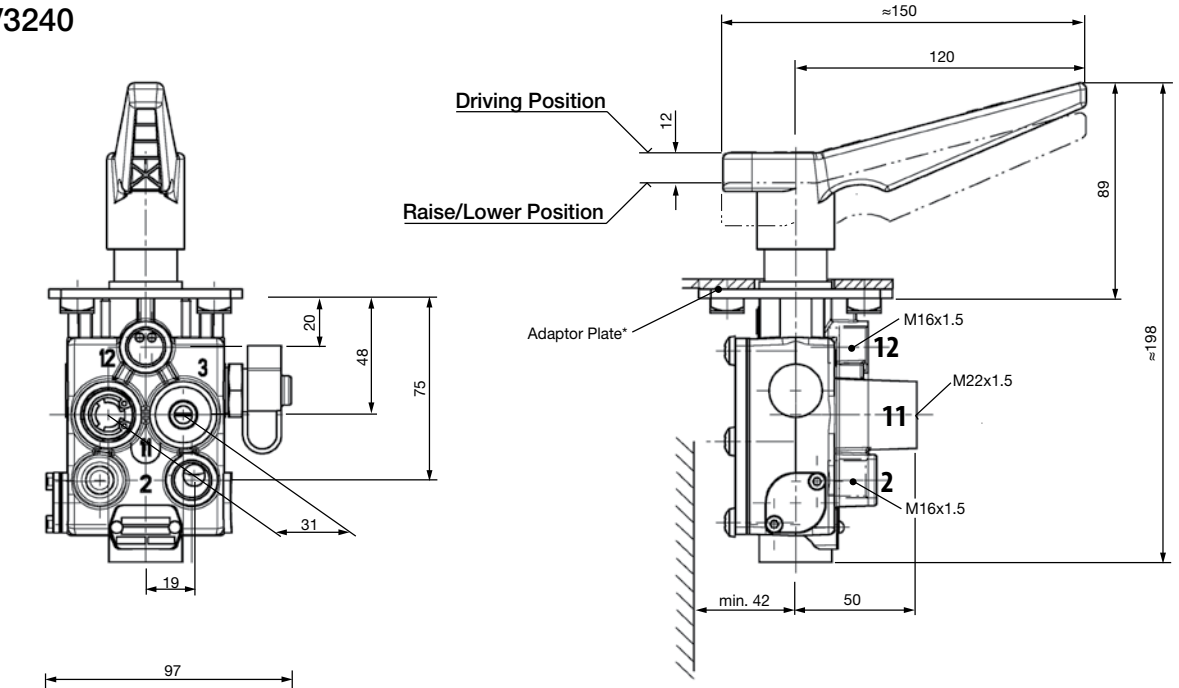
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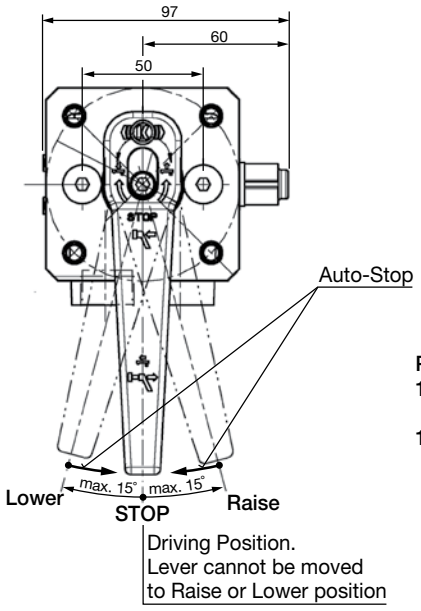
Doc. No. Y011377 (EN - Rev. 003)
October 2011

SV32..

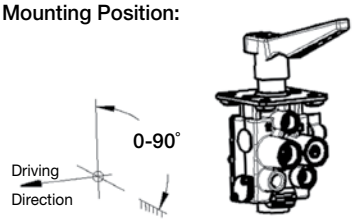
Raise/Lower Valve (single circuit)

SV3240





Mounting Position:



Ports:

11 = Supply from Reservoir or Air Suspension Levelling Valve port **23**
12 = Supply from Air Suspension Levelling Valve port **21**
2 = Delivery to Air Suspension Bellows
3 = Exhaust

* for dimensions see 'Adaptor Plate'

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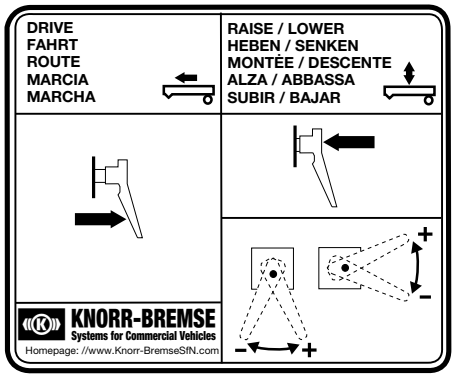
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

SV32..

Raise/Lower Valves (single circuit)

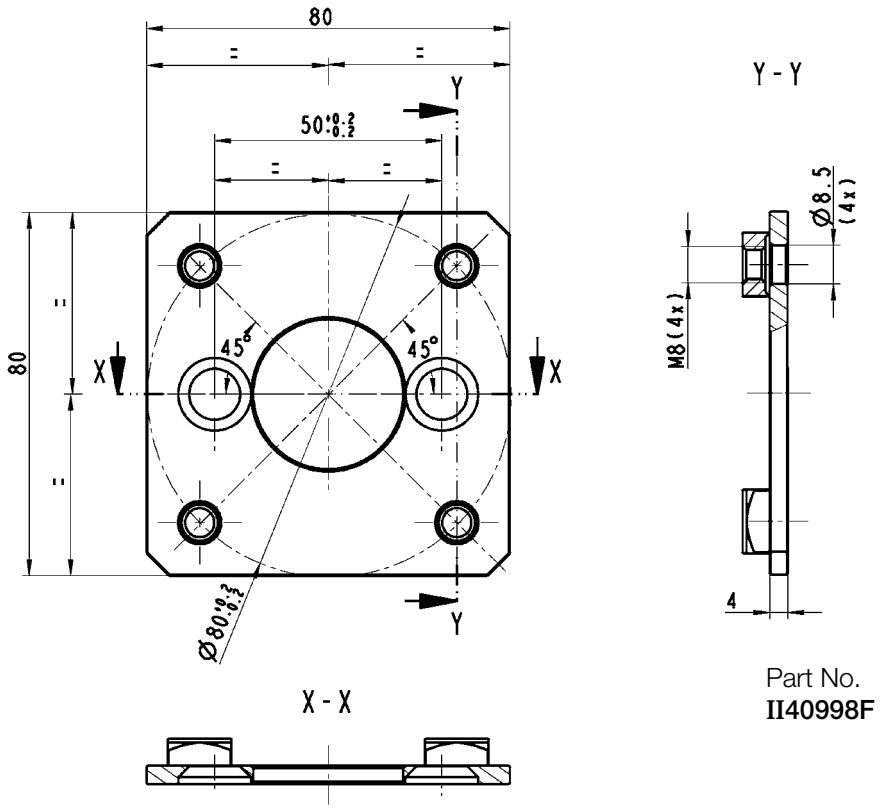
Doc. No. Y011377 (EN - Rev. 003)
October 2011

Legend Plate



Part No.
Z006844

Adaptor Plate



Part No.
II40998F

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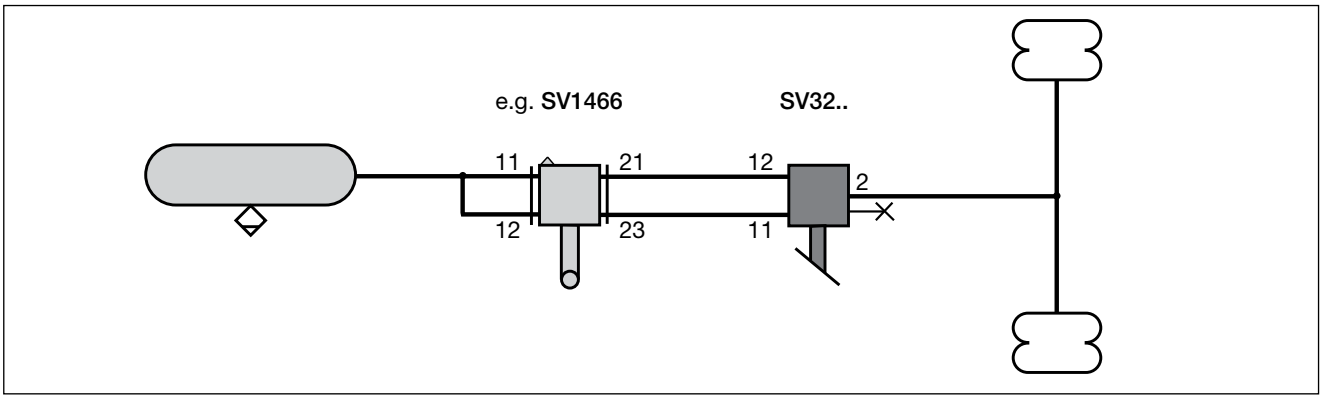
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October 2011

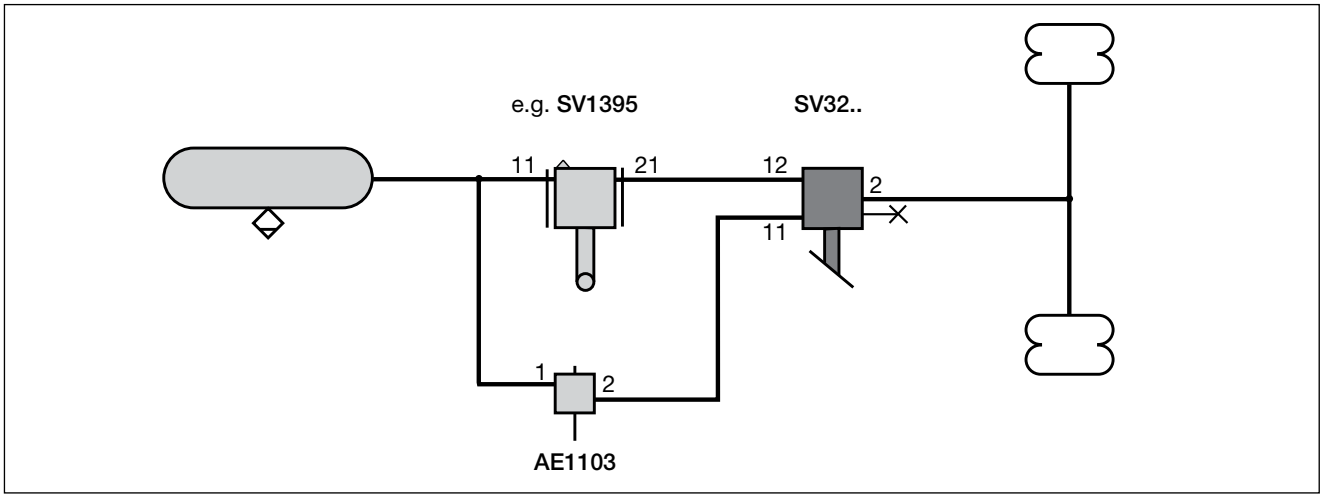
SV32..
Raise/Lower Valve (single circuit)

Installation examples

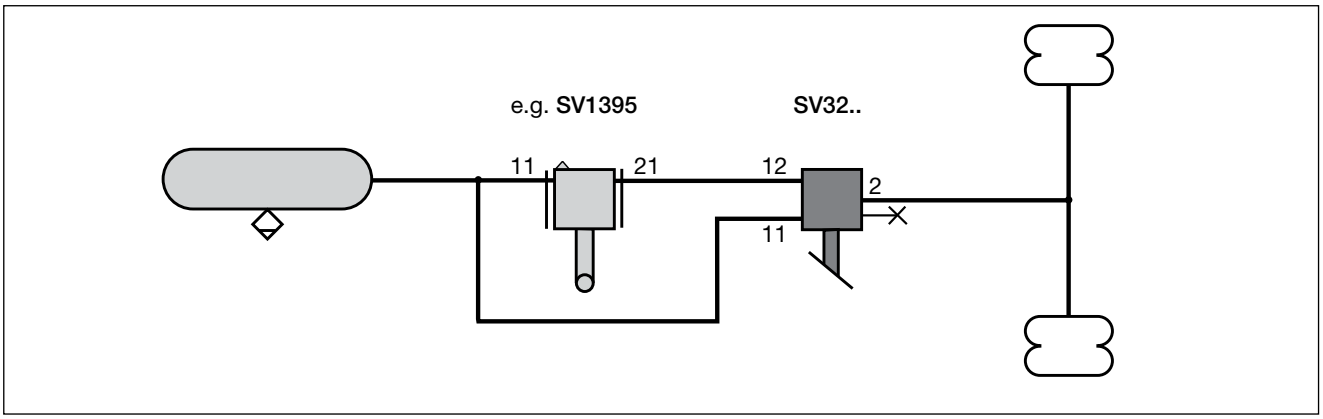
Air suspension system with lift axle, Levelling Valve with height limitation



Air suspension system with lift axle, Levelling Valve with separate Height Limiting Valve



Air suspension system with lift axle, without height limitation



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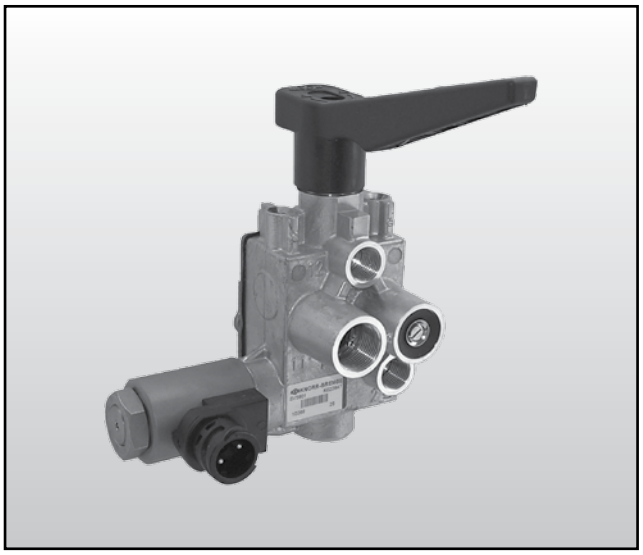
SV3801

Raise/Lower Valve (with Speed Pulse function)

Doc. No. Y095621 (EN - Rev. 001)
February 2012

PD-501-100

Function

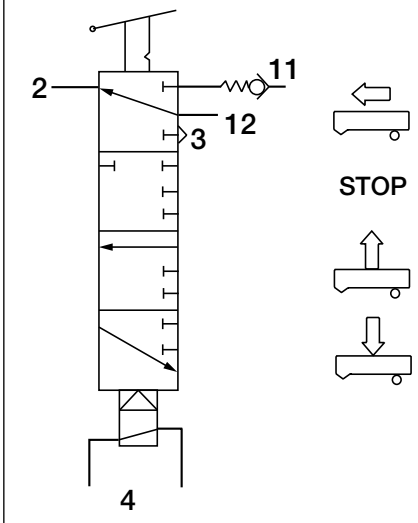


Raise/Lower Valves are fitted on vehicles with air suspension and allow manual control of air bag volume to raise or lower the vehicle chassis as required.

The **SV3801** version is available with a "speed pulse" activated function to provide the 'reset to ride height' function. When the "speed pulse" is activated, the valve reverts to the driving position restoring the air bags to the normal running condition and the chassis moves back to the normal ride height to avoid possible suspension damage. This also ensures that the correct air suspension pressure is used to control the load sensing function.

The "speed pulse" is provided by a programmable function within the ECU of the ABS or EBS which monitors wheel speed sensor signals.

Standard Symbol as DIN ISO 1219



Technical Features

Maximum operating pressure:	13.0 bar
Maximum suspension pressure:	10.0 bar
Nominal voltage:	24 V
Power rating:	45 W
Operating temperature range:	-40 °C to +60 °C
Weight:	1.3 kg approx.
Test reports:	RWTÜV-report: AL232:OE
(for single circuit air suspension)	RWTÜV-report: 112IR 03 001 Rev. 01
	DEKRA-report: 200 208 105

Part No.	Type No.	Electrical Connector	Push-to-Connect Fittings supplied
K022847 [1)]	**SV3801**	Bayonet DIN 72585	No

[1)] The part number will carry a suffix "N00" which defines that it is supplied without packaging.

Connection		Used for	Max. torque
11	M22x1.5	Supply (from air reservoir)	60 Nm
12	M16x1.5	From levelling valve	45 Nm
2	M16x1.5	Delivery to air bags	45 Nm
3	-	Exhaust	
4	Bayonet DIN 72585	Auto reset	

Part No. for Service Kit:
Lever and screw: II**36226004**
Tightening torque: 4 Nm

Solenoid: **K022901K50**
Tightening torque: 6±1 Nm

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Item No. K053429

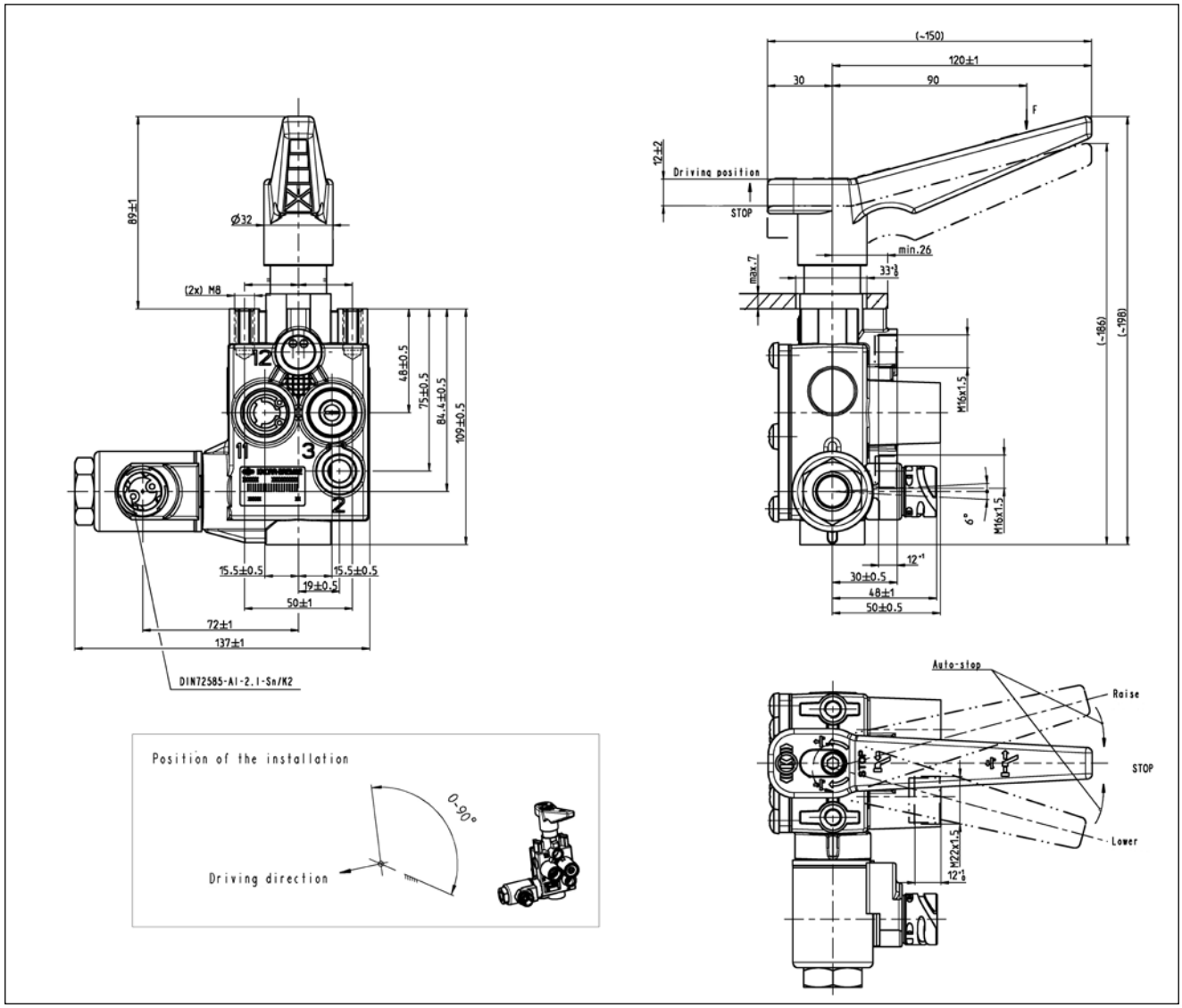
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

SV3801

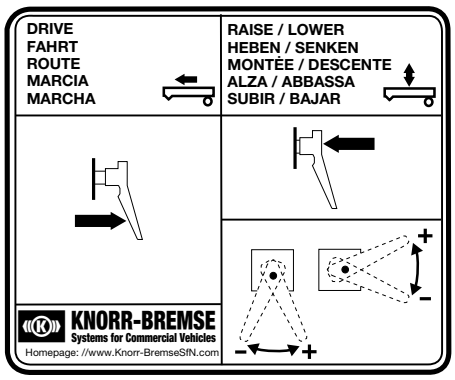
Raise/Lower Valve (with Speed Pulse function)

Doc. No. Y095621 (EN - Rev. 001)
February 2012

Dimensions



Legend Plate



Part No.
Z006844

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Item No. K053429

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Doc. No. Y095621 (EN - Rev. 001)
February 2012

SV3801

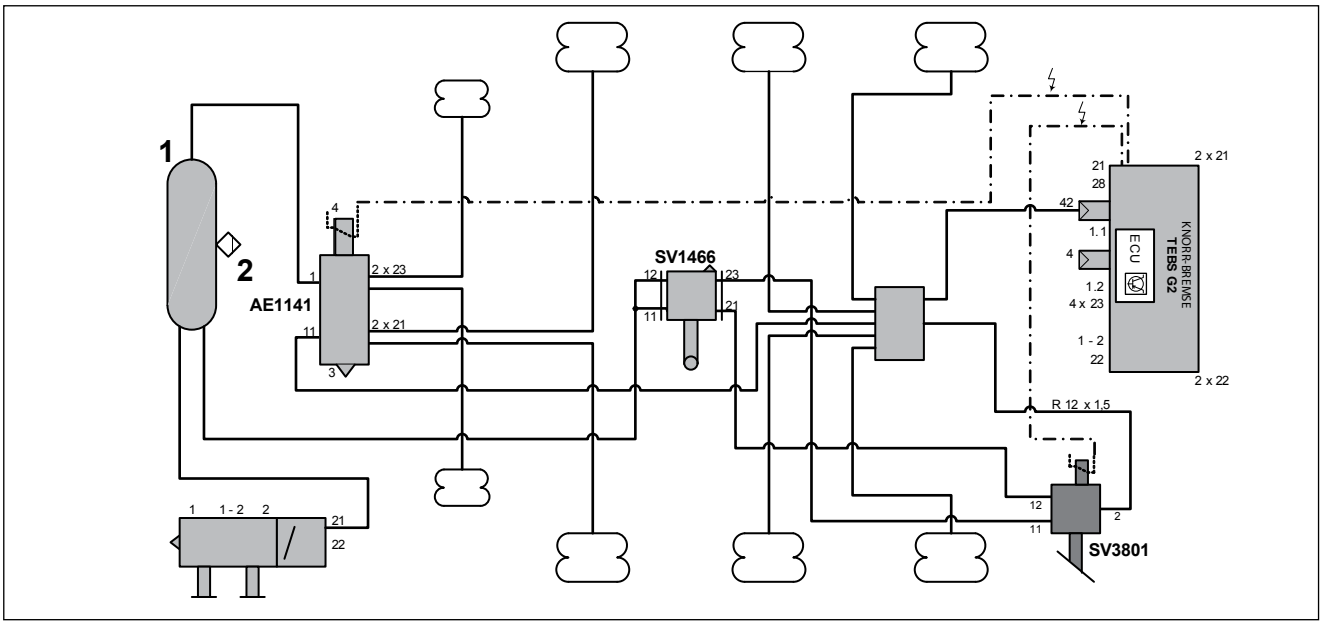
Raise/Lower Valve (with Speed Pulse function)

Installation examples

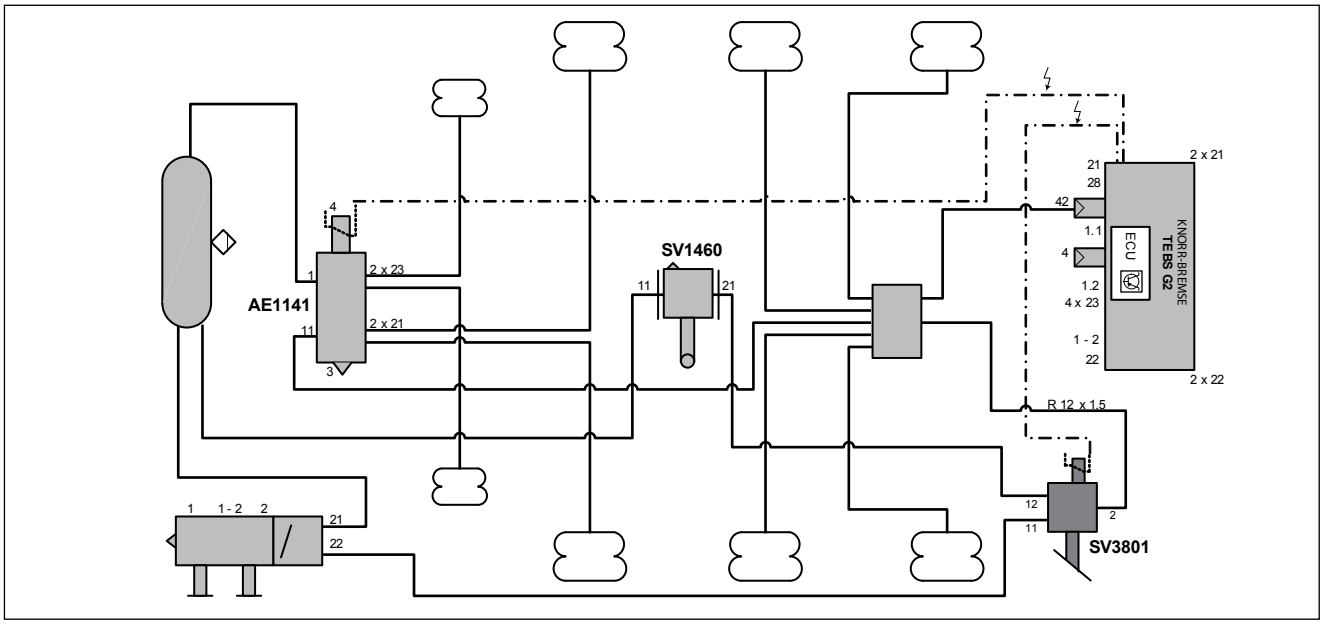
The Raise / Lower Valve SV3801 with “speed pulse“ function is used in air suspension systems both with and without height limitation.

This replaces the older Raise/Lower Valves which required a special version of the valve if the system had height limitation.

Air suspension system with lift axle, with height limitation



Air suspension system with lift axle, without height limitation



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Item No. K053429

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

SV32..

Raise/Lower Valves (with Reset-to-Ride function)

Doc. No. Y183920 (EN - Rev. 000)
December 2014

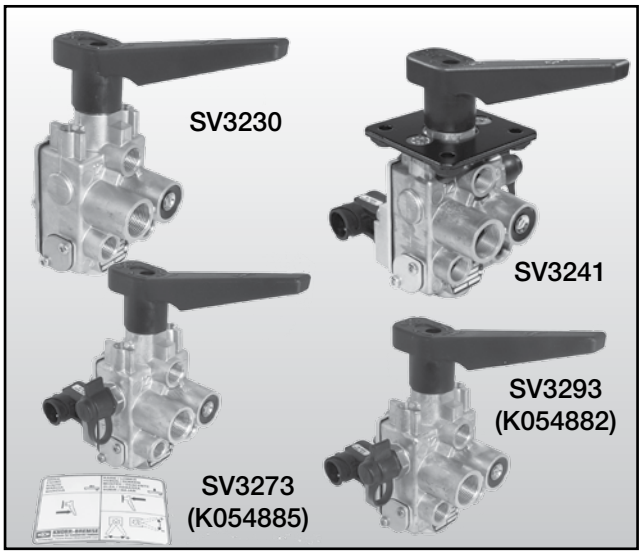
PD-501-150

Function

Raise/Lower Valves are fitted on vehicles with air suspension and allow manual control of air bag volume to raise or lower the vehicle chassis as required.

Some of the **SV32.. Raise/Lower Valves** are available with a “speed pulse” activated function to provide the ‘Reset-to-Ride height’ function. When the “speed pulse” is activated, the valve reverts to the driving position restoring the air bags to the normal running condition and the chassis moves back to the normal ride height to avoid possible suspension damage. This also ensures that the correct air suspension pressure is used to control the load sensing function when braking.

The “speed pulse” is provided by a programmable function within the ECU of the ABS or EBS which monitors wheel speed sensor signals.



Versions with the secondary air supply port 13 (e.g. **SV3241, SV3242** or **SV3293**) ensure that the solenoid valve is able to reset the valve when the integrated Height Limitation in a Levelling Valve (e.g. SV1466) has been reached and cut the primary supply of air pressure to the Raise / Lower valve.

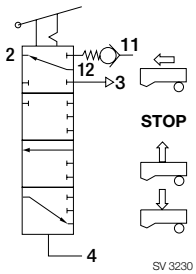
Versions without the secondary air supply port 13 (e.g. **SV3260** or **SV3273**) can be used in combination with Levelling Valves without Height Limitation (e.g. SV1460). In this case the maximum height of the suspension is limited only by a mechanical end stop.

Versions that have a port 4, (e.g. **SV3230**) incorporate a pneumatically controlled “Reset-to-Ride” function. When port 4 is pressurised, the chassis automatically returns to its normal ride height. The pressure at port 4 can be controlled by P_{28} from the TEBS Brake Module or a solenoid valve mounted remotely.

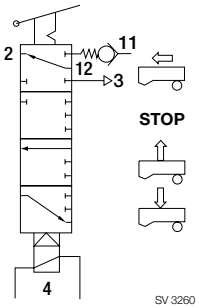
Some valves are fitted with a test connector to permit easy measurement of the air bag pressure.

Standard Symbol as DIN ISO 1219

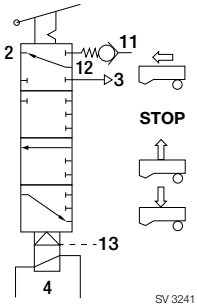
SV3230



SV3260, SV3273



SV3241, SV3242, SV3293



Technical Features

Maximum operating pressure:	13.0 bar
Maximum suspension pressure:	10.0 bar
Minimum reset pressure:	3.5 bar (**SV3230**)
Nominal solenoid voltage:	24 Volt DC
Operating temperature range:	-40 °C to +80 °C
Weight:	**SV3230** 0.80 kg approx.
	SV3241 1.19 kg approx.
	SV3242 1.14 kg approx.
	SV3260 0.96 kg approx.
	SV3273 1.02 kg approx.
	SV3293 1.02 kg approx.
Test reports:	RWTÜV-report: AL232:OE
	RWTÜV-report: 112IR 03 001 Rev. 01
	DEKRA-report: 200 208 105

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

SV32..

Raise/Lower Valves (with Reset-to-Ride function)

Doc. No. Y183920 (EN - Rev. 000)
December 2014

Range Overview

Part No.	Type No.	Test Connector	Port 13	Port 4	Electrical connection Bayonet DIN 72585	Adaptor Plate II40998F	Legend Plate Z006844
II36151	SV3230	-	-	X	-	-	-
K054888[1)]	SV3241	right side	X	-	X	X	-
K054887[1)]	SV3242	-	X	-	X	X	-
K054886[1)]	SV3260	-	-	-	X	-	-
K054884[1)]	SV3273	left side	-	-	X	-	-
K054885[1)2)]		left side	-	-	X	-	X
K054882[1)]	SV3293	left side	X	-	X	-	-
K054883[1)3)]		left side	X	-	X	-	X

1) The part number of the valve will carry a suffix "N00" which defines that it is supplied without packaging.

2) SV3273-K054885 replaces SV3273-K002019.

3) SV3293-K054883 replaces SV3293-K002020.

Service Parts:
Lever and screw: II**36226004**
Tightening torque: 4 Nm

Solenoid Kit: **K016334K50** (for **SV3241**-K054888, **SV3242**-K054887, **SV3260**-K054886, **SV3273**-K054884; K054885 and **SV3293**-K054882; K054883)

Pneumatic Connections

Port	Thread	Connection	Max. torque
11	M22x1.5	Supply (from air reservoir or levelling valve port 23)	60 Nm
12	M16x1.5	From levelling valve port 21	45 Nm
13	M16x1.5	From air reservoir	45 Nm
2	M16x1.5	Delivery to air bags	45 Nm
3	-	Exhaust	
4	M16x1.5	From Solenoid Valve or TEBS Brake Module P28	45 Nm

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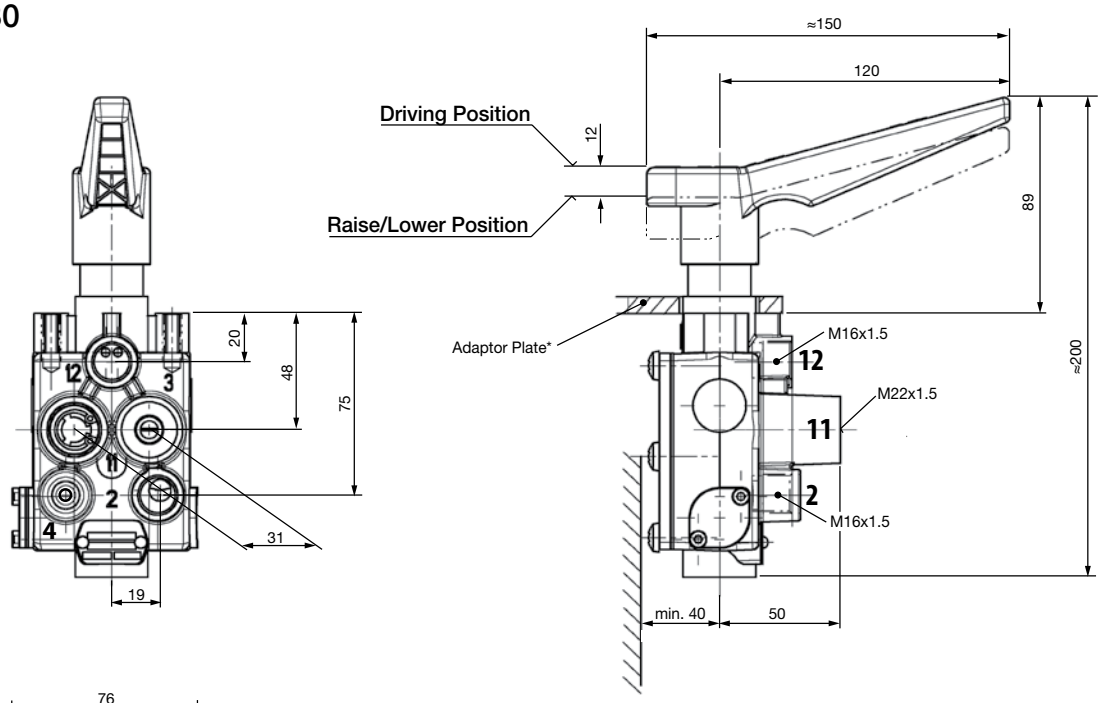
SV32..

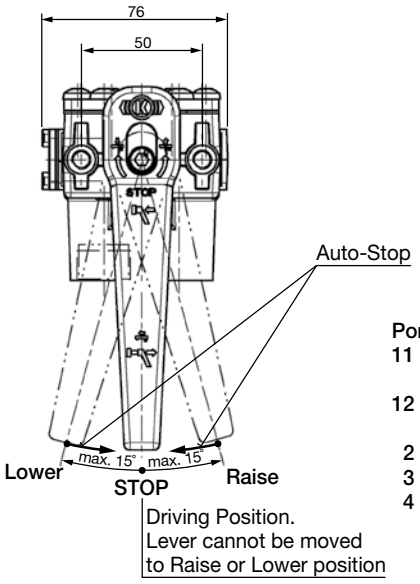
Doc. No. Y183920 (EN - Rev. 000)
December 2014

Raise/Lower Valve (with Reset-to-Ride function)

Dimensions

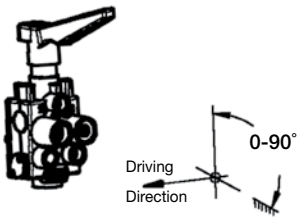
SV3230





Driving Position.
Lever cannot be moved
to Raise or Lower position

Mounting Position:



Ports:

11 = Supply from Reservoir or Air Suspension Levelling Valve port **23**
12 = Supply from Air Suspension Levelling Valve port **21**
2 = Delivery to Air Suspension Bellows
3 = Exhaust
4 = Auto-reset

* for dimensions see 'Adaptor Plate'

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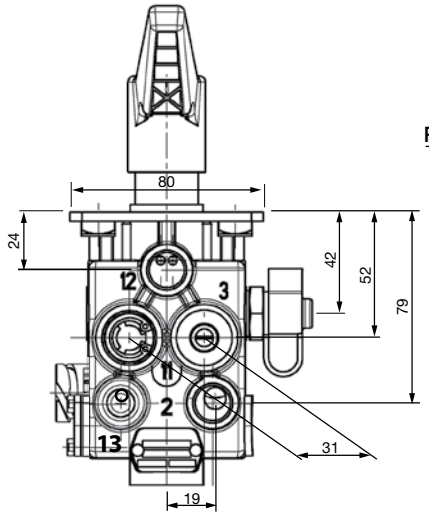
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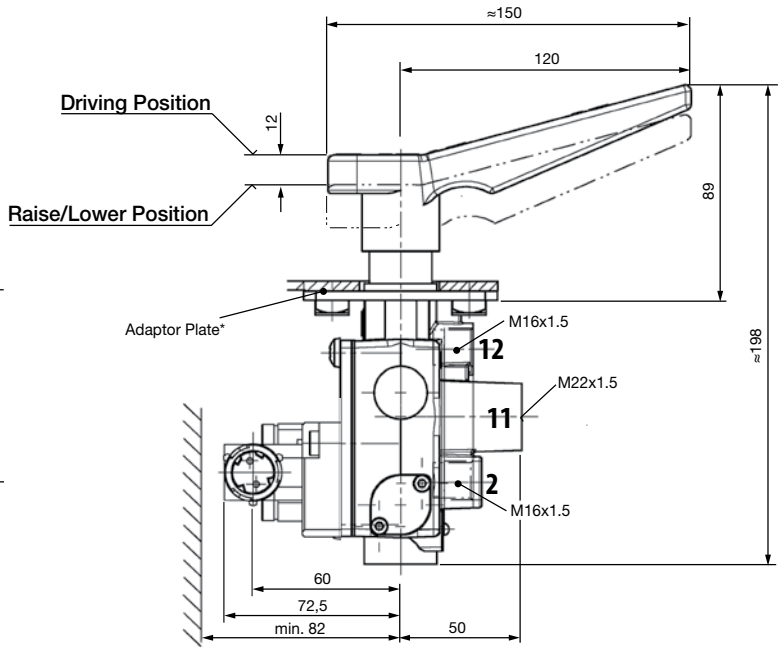
SV32..

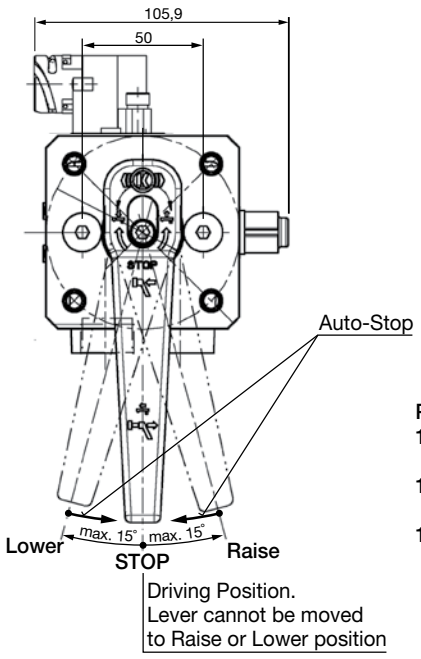
Raise/Lower Valves (with Reset-to-Ride function)

Doc. No. Y183920 (EN - Rev. 000)
December 2014

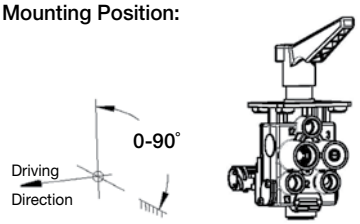
SV3241







Mounting Position:



Ports:

11 = Supply from Reservoir or Air Suspension Levelling Valve port **23**
12 = Supply from Air Suspension Levelling Valve port **21**
13 = Supply from Reservoir
2 = Delivery to Air Suspension Bellows
3 = Exhaust

* for dimensions see 'Adaptor Plate'

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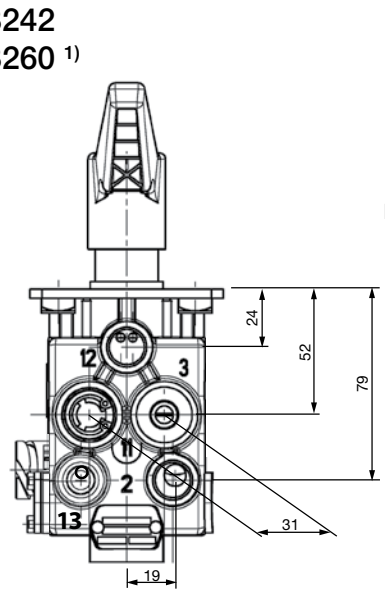
PD-501-150

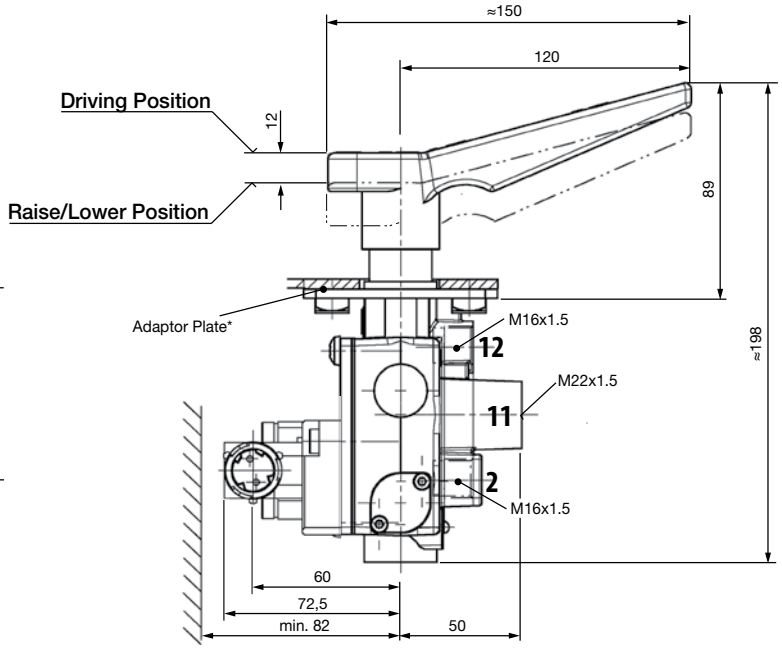
SV32..

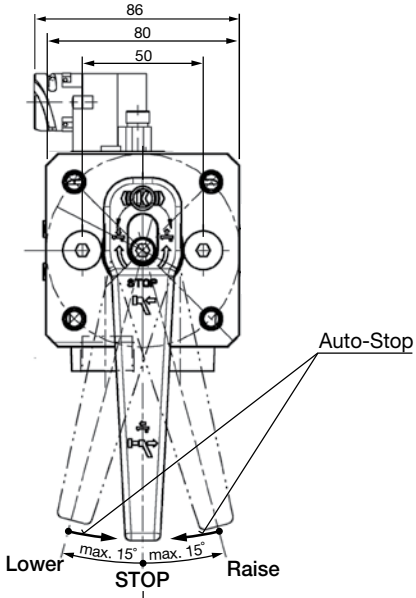
Doc. No. Y183920 (EN - Rev. 000)
December 2014

Raise/Lower Valve (with Reset-to-Ride function)

SV3242
SV3260 [1)]

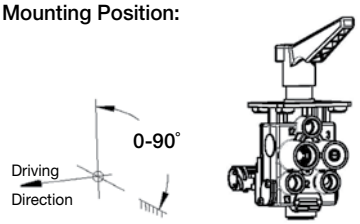






Driving Position.
Lever cannot be moved
to Raise or Lower position

Mounting Position:



Ports:

11 = Supply from Reservoir or Air Suspension Levelling Valve port **23**
12 = Supply from Air Suspension Levelling Valve port **21**
13 = Supply from Reservoir
2 = Delivery to Air Suspension Bellows
3 = Exhaust

* for dimensions see 'Adaptor Plate'
[1)] without port **13**

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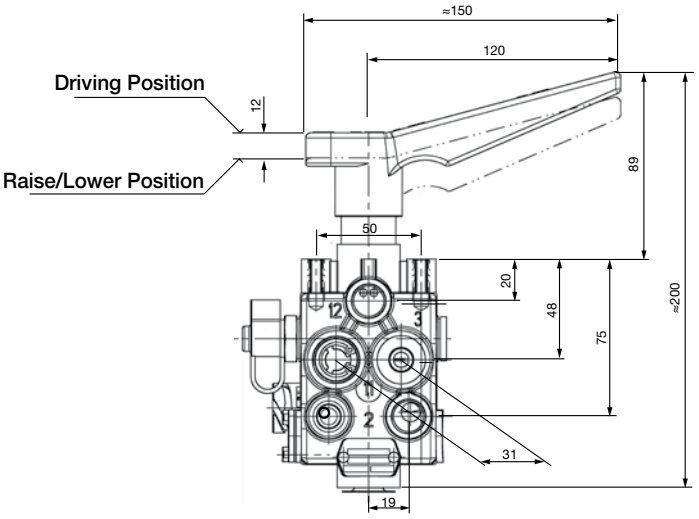
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

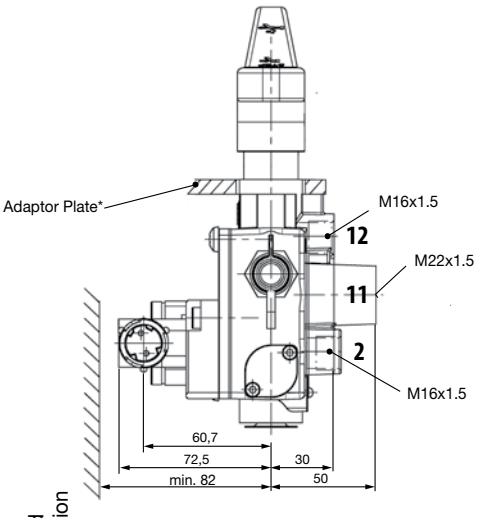
SV32..

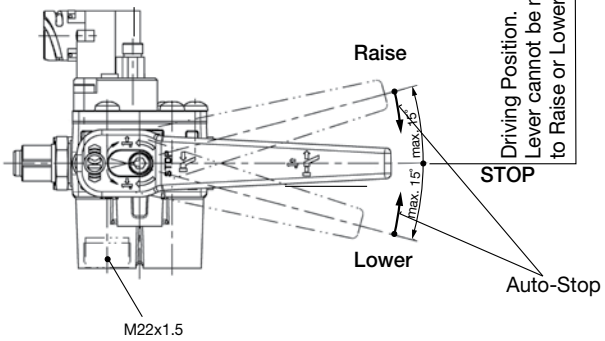
Raise/Lower Valves (with Reset-to-Ride function)

Doc. No. Y183920 (EN - Rev. 000)
December 2014

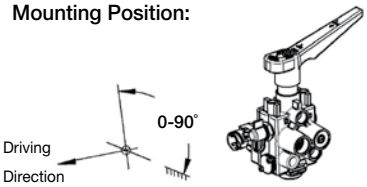
SV3273







Mounting Position:



Ports:

11 = Supply from Reservoir or Air Suspension Levelling Valve port **23**
12 = Supply from Air Suspension Levelling Valve port **21**
2 = Delivery to Air Suspension Bellows
3 = Exhaust

* for dimensions see 'Adaptor Plate'

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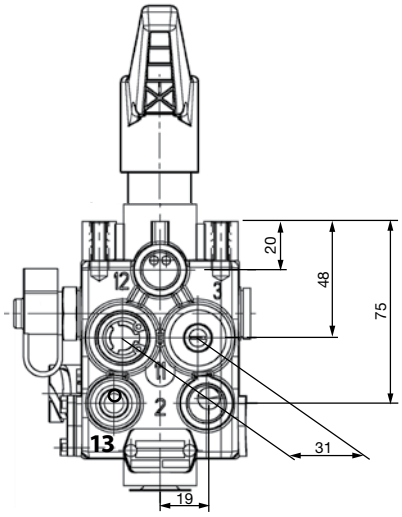
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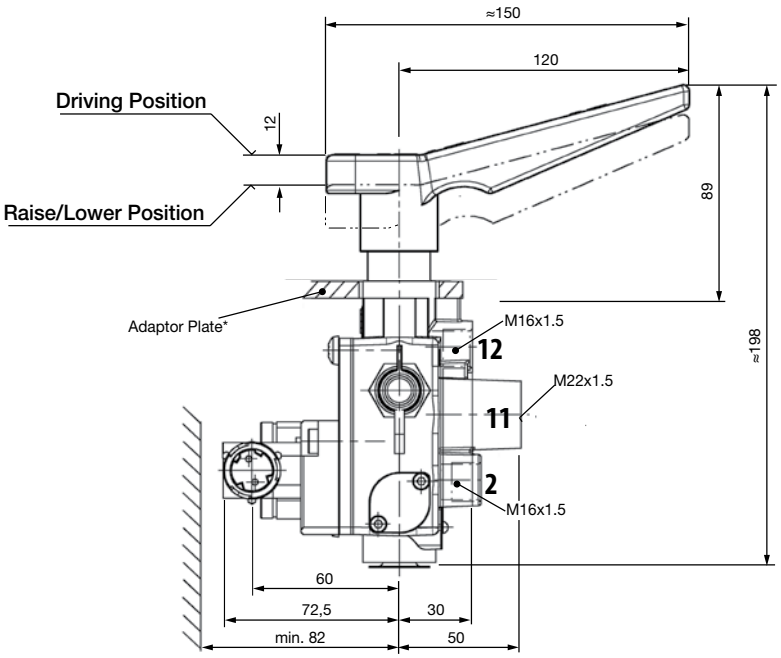
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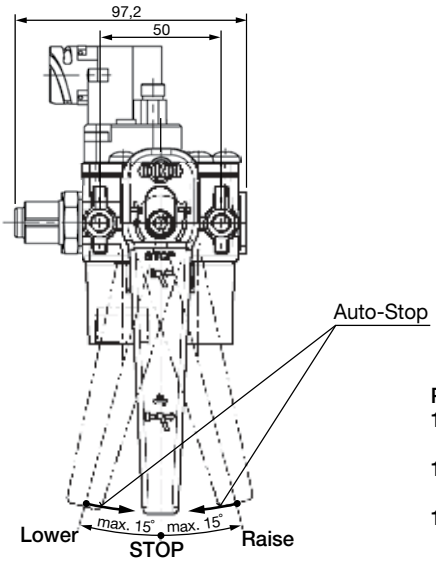
SV32..

Raise/Lower Valve (with Reset-to-Ride function)

SV3293

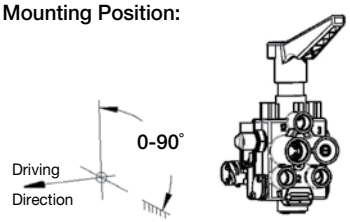






Driving Position.
Lever cannot be moved
to Raise or Lower position

Mounting Position:



Ports:

11 = Supply from Reservoir or Air Suspension Levelling Valve port **23**
12 = Supply from Air Suspension Levelling Valve port **21**
13 = Supply from Reservoir
2 = Delivery to Air Suspension Bellows
3 = Exhaust

* for dimensions see 'Adaptor Plate'

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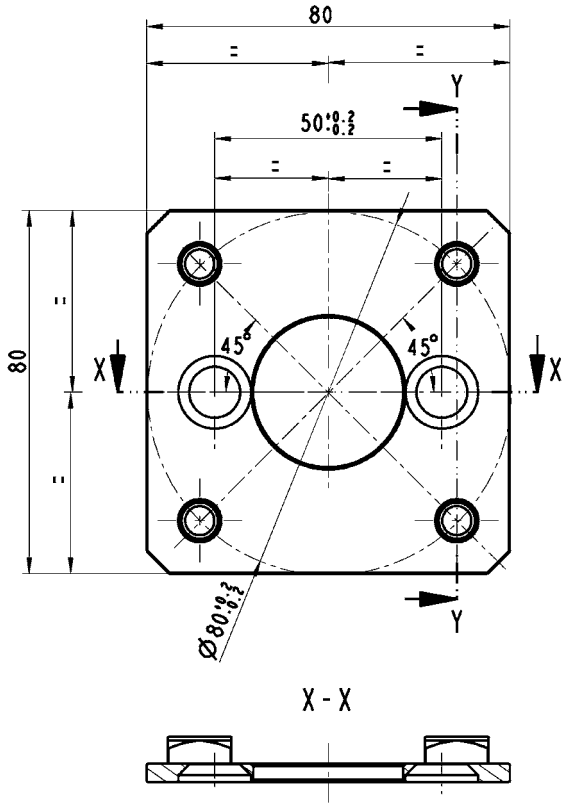
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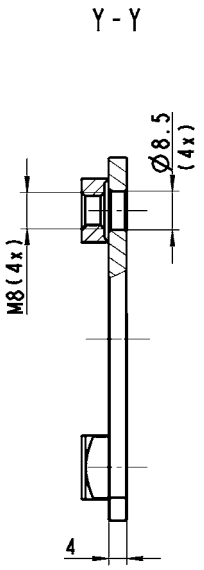
SV32..

Raise/Lower Valves (with Reset-to-Ride function)

Doc. No. Y183920 (EN - Rev. 000)
December 2014

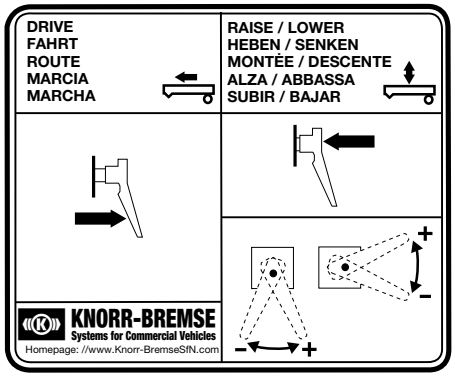
Adaptor Plate





Part No.
II40998F

Legend Plate



Part No.
Z006844

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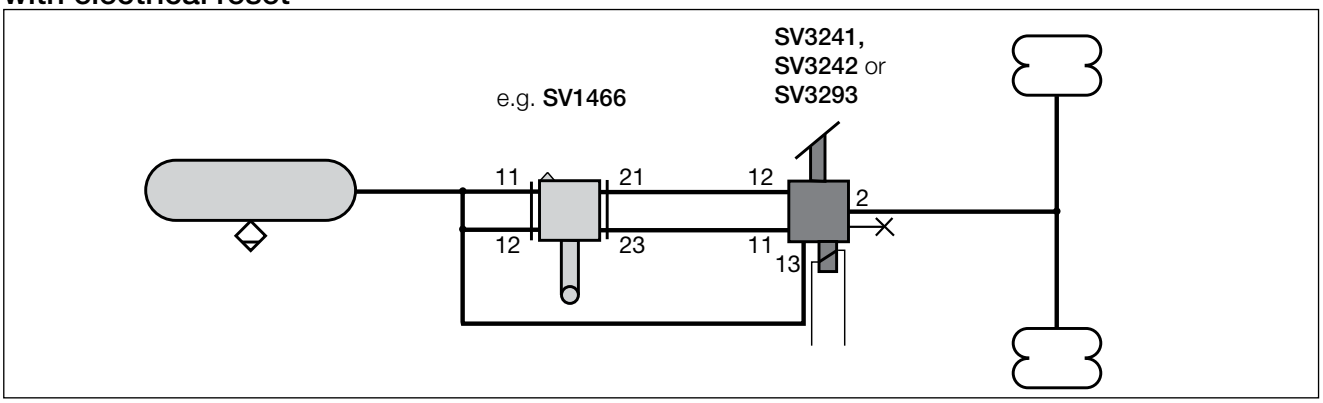
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December 2014

SV32..

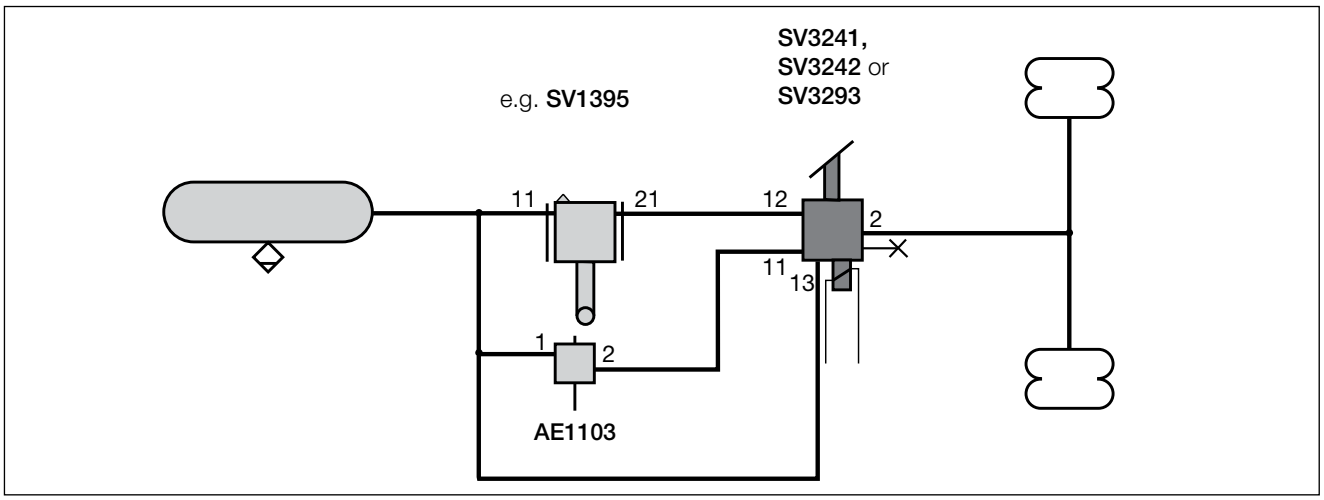
Raise/Lower Valve (with Reset-to-Ride function)

Installation examples

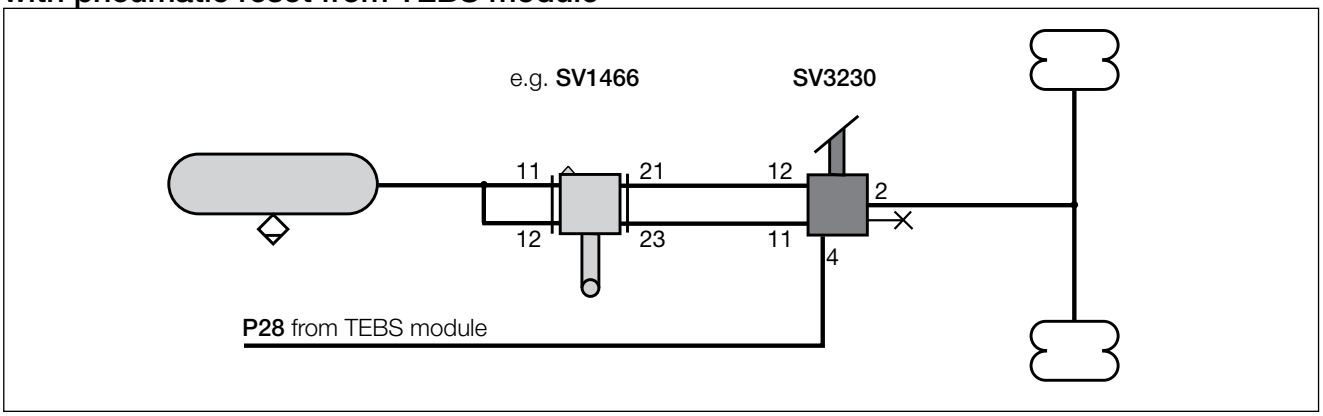
Air suspension system with Levelling Valve with height limitation and Raise/Lower Valve with electrical reset



Air suspension system with Levelling Valve plus separate Height Limiting Valve and Raise/Lower Valve with electrical reset



Air suspension system with Levelling Valve with height limitation and Raise/Lower Valve with pneumatic reset from TEBS module



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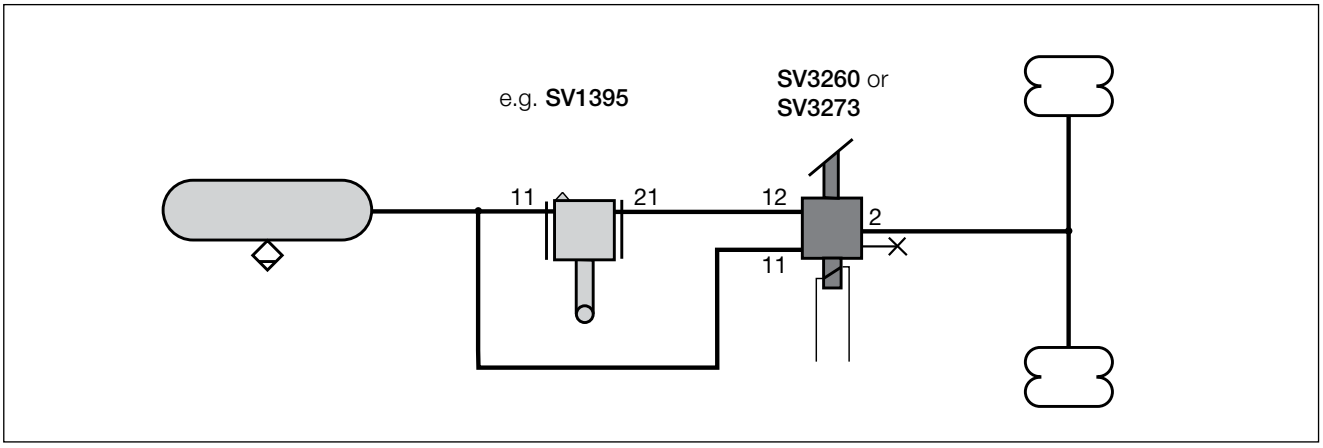
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

SV32..

Raise/Lower Valves (with Reset-to-Ride function)

Doc. No. Y183920 (EN - Rev. 000)
December 2014

Air suspension system with no height limitation and Raise/Lower Valve with electrical reset



Revision Details

Rev. 000	April 2014	New document.
Rev. 000	December 2014	Correction on page 1 - reference to Height Limiting Valve changed to Height Limitation in line with German document.

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

AE1124

Lift Axle Valve - Manual/Pneumatic

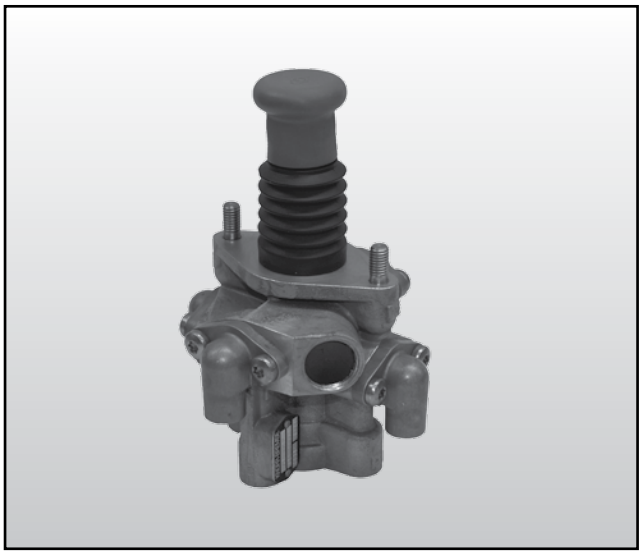
Doc. No. Y011380 (Rev. 001)
March 2011

Function

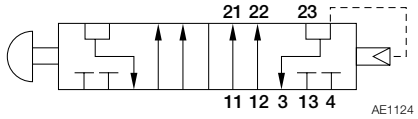
The **Lift Axle Valve** is generally used in conjunction with a charging valve having full feedback (see PD-074-000, Document No. *Y011382*) on vehicles with air suspension to raise and lower a lift axle (see system diagram on page 3).

When the vehicle is sufficiently laden, pressure in the non-lift axle suspension system exceeds the opening pressure of the charging valve and air flows to signal the **Lift Axle Valve**. The lift axle bellows are then automatically exhausted, the lift axle is lowered and its air bags are connected to the non-lift axle suspension system.

When the vehicle is unladen, the lift axle can be manually raised by depressing the push button on the **Lift Axle Valve** and lowered by pulling it out again.



Standard Symbol as DIN ISO 1219



Technical Features

Maximum operating pressure:	8.5 bar
Operating temperature range:	-40 °C to +80 °C
Maximum way through:	Ø 6.0 mm
Weight:	1.1 kg approx.

Range Overview

Part No.	Type No.	Port Thread 11, 12, 13, 21, 22, 23, 4	Pressure Retention Valve	Comments
SEB00662	**AE1124**	M12x1.5	-	
SEB00667	**AE1125**	M12x1.5	SEB01237	Obsolete - replaced by SEB00662 plus SEB01237

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Item No. K002497

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

AE1124

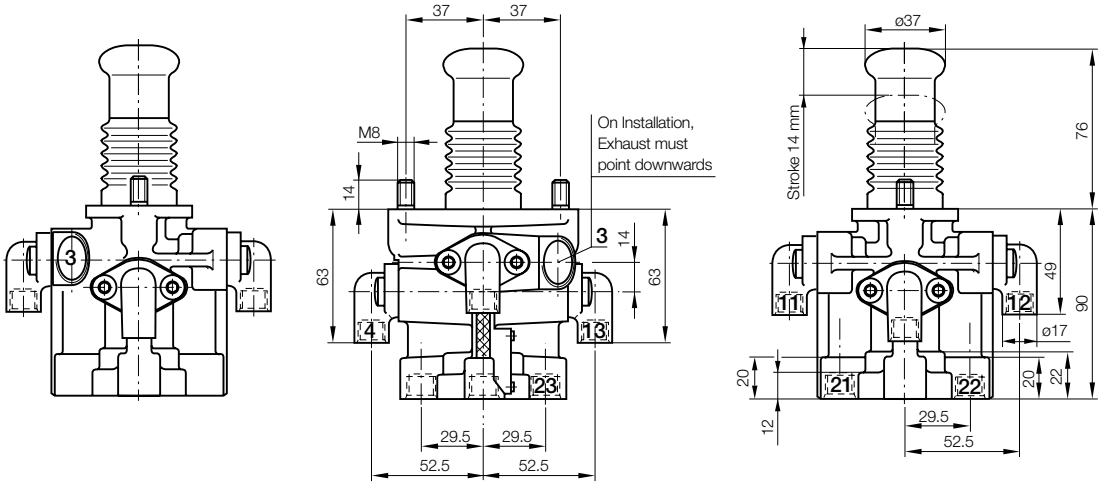
Lift Axle Valve - Manual/Pneumatic

Doc. No. Y011380 (Rev. 001)
March 2011

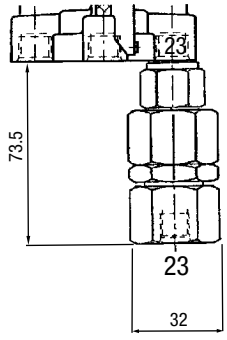
Dimensions

Air Port Identification:

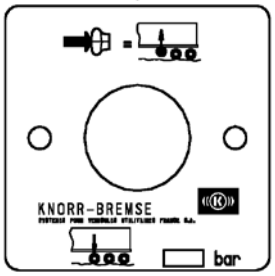
11 = Right side air supply from levelling valve / non-lift axle air bag(s)
12 = Left side air supply from levelling valve / non-lift axle air bag(s)
13 = Air supply for lifting bellows from suspension reservoir
3 = Exhaust
21 = Right side air delivery to lift axle air bag
22 = Left side air delivery to lift axle air bag
23 = Air connection for lifting bellows
4 = Signal from Charging Valve



Pressure Retention Valve
SEB01237



Operation Instruction Plate
Part Number EB01505
(no longer in production)



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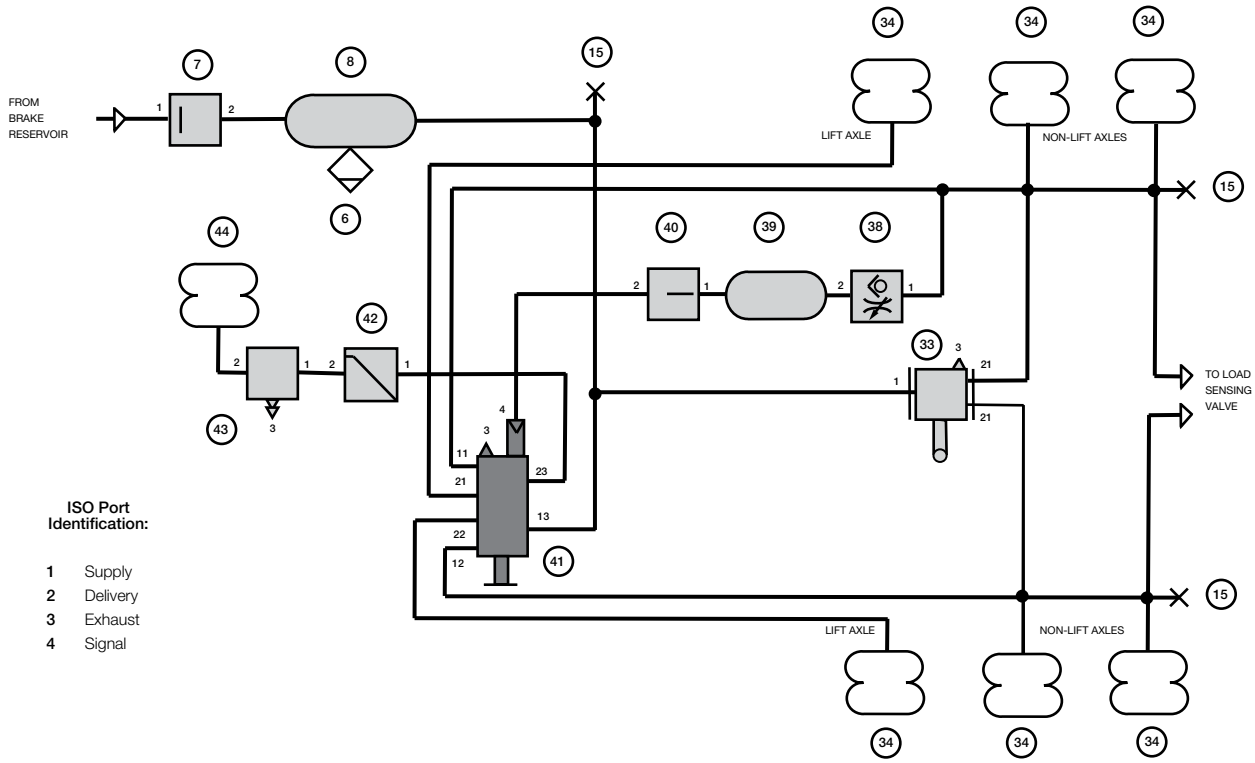
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

AE1124

Doc. No. Y011380 (Rev. 001)
March 2011

Lift Axle Valve - Manual/Pneumatic

System Diagram: Example on a 3-axle semi-trailer



ISO Port Identification:

1 Supply
2 Delivery
3 Exhaust
4 Signal

Component Key:

6 Drain Valve
7 Charging Valve (non-feedback)
8 Suspension Reservoir
15 Test Point
33 Levelling Valve
34 Suspension Air Bag
38 Throttle Check Valve
39 Damping Reservoir
40 Charging Valve (full feedback)
41 Lift Axle Valve
42 Pressure Limiting Valve
43 Quick Release Valve
44 Axle Lifting Bellows

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Item No. K002497

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

LS1..., LS2..., LS3...

Lift Axle Valves - Pneumatic

Doc. No. Y011379 (Rev. 003)
March 2011

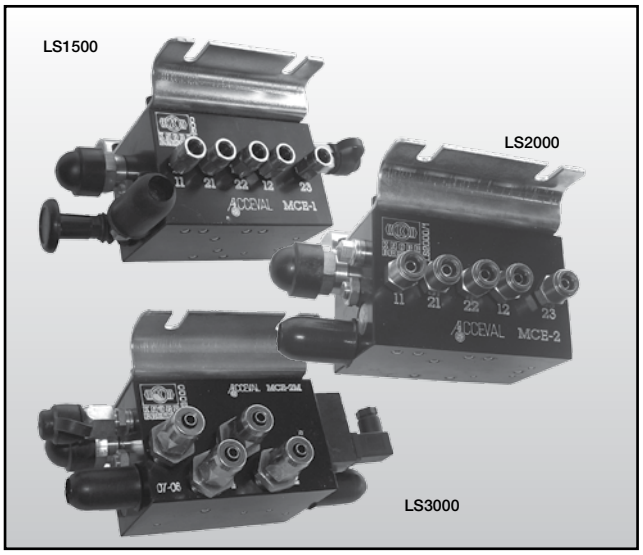
PD-503-200

Function

Pneumatic Lift Axle Control Valves are used for the semi-automatic or fully automatic control of air suspended lift axles.

All valves automatically lower the lift axle when a pre-determined pressure is reached in the suspension air bags of the non-lift axle(s). The pressure at which the valve lowers the lift axle is fully adjustable. Versions with single and dual circuit control are available.

With the additional use of a solenoid valve, a version of the valve is available which allows temporary lifting of the laden axle. This feature is signalled electronically from the tractor cab and is designed to provide additional traction capability on the tractor's drive axles since, when the trailer lift axle is raised, the drive axle will see an increase in load. Note: The national legal requirements for this function must be taken into account!



Pneumatic Lift Axle Control Valves are supplied complete with pre-installed "push-in" fittings.

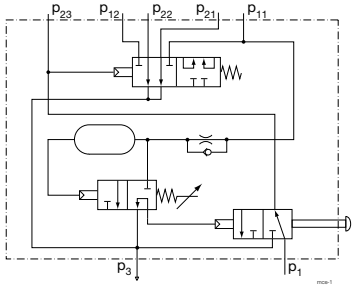
A mounting support is also included with the valve.

Technical Features

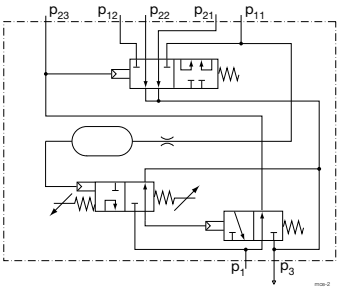
Maximum operating pressure:	14.0 bar
Operating temperature range:	-35 °C to +80 °C
Weight:	0.9 kg approx.
"Push-In" fittings:	Ø 8.0 mm
Nominal way through:	Ø 5.0 mm
Adjusting range - automatic lower:	2.3 to 5.8 bar
Adjusting range - automatic raise:	0.9 to 2.7 bar
Damping reservoir:	Integral
Test Report:	TÜV Report No. 390-0582-96

Standard Symbol as DIN ISO 1219

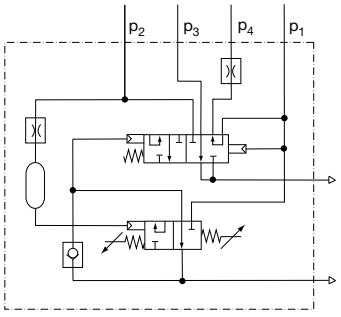
LS1500



LS2000



LS3000



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Item No. K002496

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

LS1..., LS2..., LS3...

Lift Axle Valves - Pneumatic

Doc. No. Y011379 (Rev. 003)
March 2011

Range Overview

Part Number	Semi-automatic: Manual Raise Automatic Lower	Fully Automatic: Automatic Raise Automatic Lower	Temporary Raise of Laden Axle *	Manual Lower of Unladen Axle **	Control of two lift axles by two valves	Number of control circuits
LS1500	Standard	-	-	-	Standard	2
LS2000	-	Standard	Option	Option	Standard	2
LS3000	-	Standard	Option	Option	Standard	1

* see Traction Assist section - page 6
** see Lowering the Lift Axle section - page 7

Optional Accessories

Part Number/ *Type Number*	Description	For use with	Comments
LS2510	Solenoid valve to temporarily raise laden axle	**LS2000** **LS3000**	See Traction Assist section - page 6
I**63411024** ***AE9120***	Solenoid valve to lower unladen axle	**LS1500** **LS2000** **LS3000**	See Lowering the Lift Axle section - page 7
II**36061** ***AE4265*** [1] **0481007043** [2]	Manual push/pull valve and solenoid valve to lower unladen axle	**LS2000** **LS3000**	See Lowering the Lift Axle section - page 7
LS1051	Lift bag pressure retention valve, retains a pressure of 0.5 bar and thereby protects the lift bag from damage	**LS1500** **LS2000** **LS3000**	If requested by the trailer manufacturer
DB11..	Lift bag pressure limiting valve		

1) AE4265 = push/pull valve
2) 0481007043 = valve with rotating button

Maintenance

The synthetic exhaust filter must be changed annually.
Part Number: **LS2888**

Mounting Position

The valve must be mounted in a way that no water can enter the exhaust filter.

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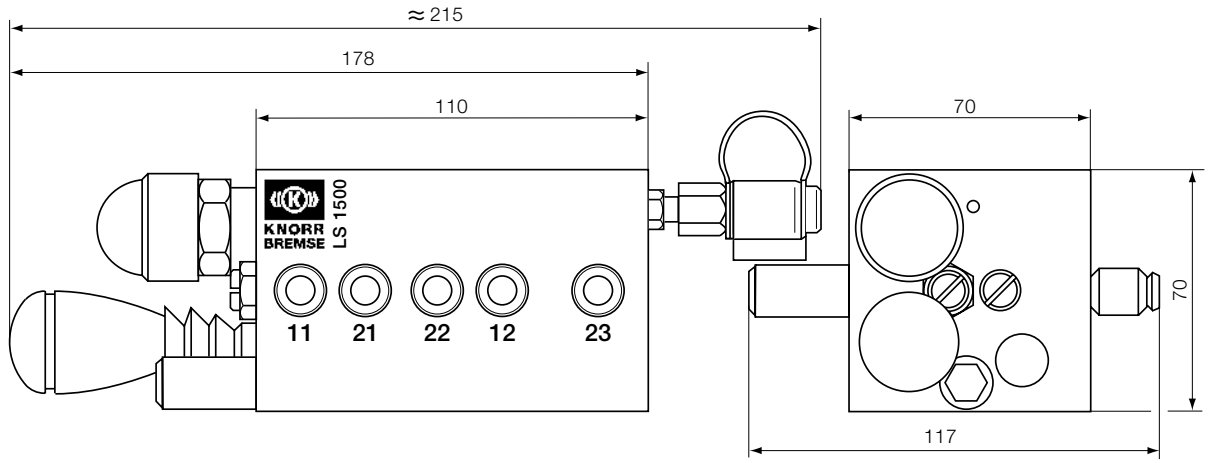
LS1..., LS2..., LS3...

Lift Axle Valves - Pneumatic

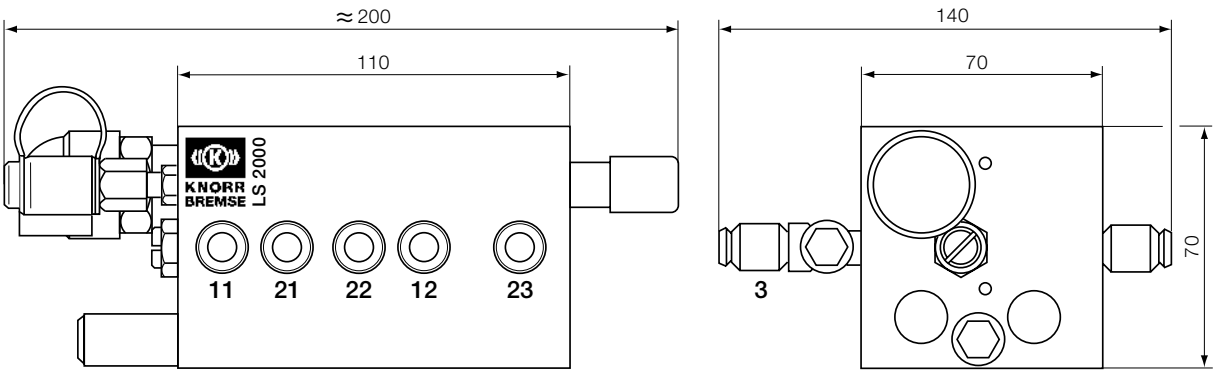
Doc. No. Y011379 (Rev. 003)
March 2011

Dimensions

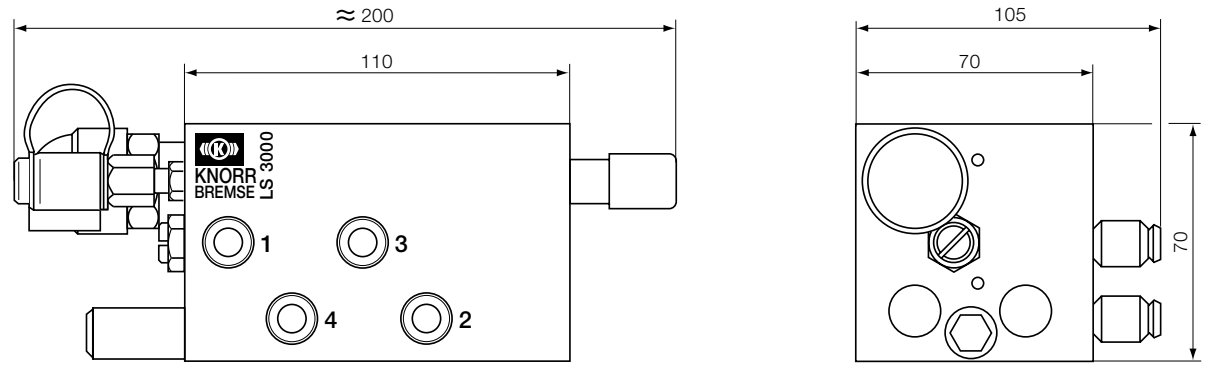
LS1500



LS2000



LS3000



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LS1..., LS2..., LS3...

Lift Axle Valves - Pneumatic

Doc. No. Y011379 (Rev. 003)
March 2011

Setting Procedure

Note: The default settings are:

Automatic “Lower Lift Axle” pressure	3.4 bar
Automatic “Raise Lift Axle” pressure	1.7 bar

1. Connect the valve according to the system diagram on the test bench or on the vehicle.
2. Inflate port **1** with supply pressure (min. 6.5 bar).
3. Connect a pressure regulating valve to the “Test and Simulation” port to simulate the switching pressures for “Lower” and “Raise”.

Set pressure for Automatic “Lower Lift Axle”

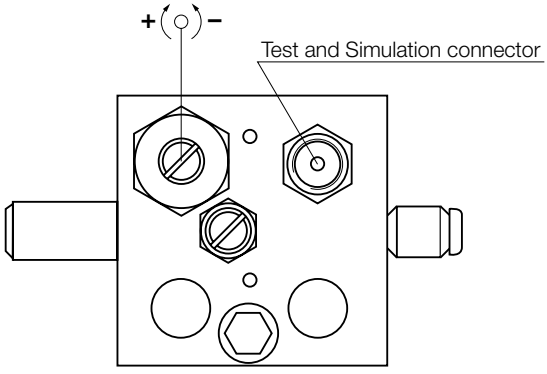
4. Slacken locknut (27 mm A/F under the black protection cap), whilst holding the slot-headed screw.
5. Turn the slot-headed screw: clockwise = increase the pressure at which the axle is lowered
   anticlockwise = decrease the pressure at which the axle is lowered
6. Whilst holding the slot-headed screw, tighten the locknut and replace protection cap.

Adjust pressure for Automatic “Raise Lift Axle” (LS2000 and LS3000 only)

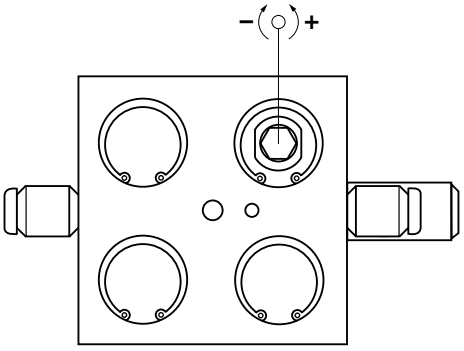
7. If automatic “Lower Lift Axle” pressure has been adjusted, the automatic “Raise Lift Axle” pressure will have changed by a similar amount, i.e. a 0.5 bar increase in “Lower Lift Axle” pressure will result in an increase of approximately 0.5 bar in the “Raise Lift Axle” pressure.
8. If the automatic “Raise Lift Axle” pressure needs to be adjusted remove the yellow protection cap.
9. See the Control Pressure Diagram for the possible range of adjustment of this pressure.
10. Turn the internal hexagon socket: clockwise = decrease the pressure at which the axle is raised
    anticlockwise = increase the pressure at which the axle is raised.
11. Replace the yellow protection cap.

Adjusting Screws:

Screw for setting the pressure for lowering
(automatic lowering of the lift axle)



Screw to adjust the control range
(automatic raising of the lift axle)



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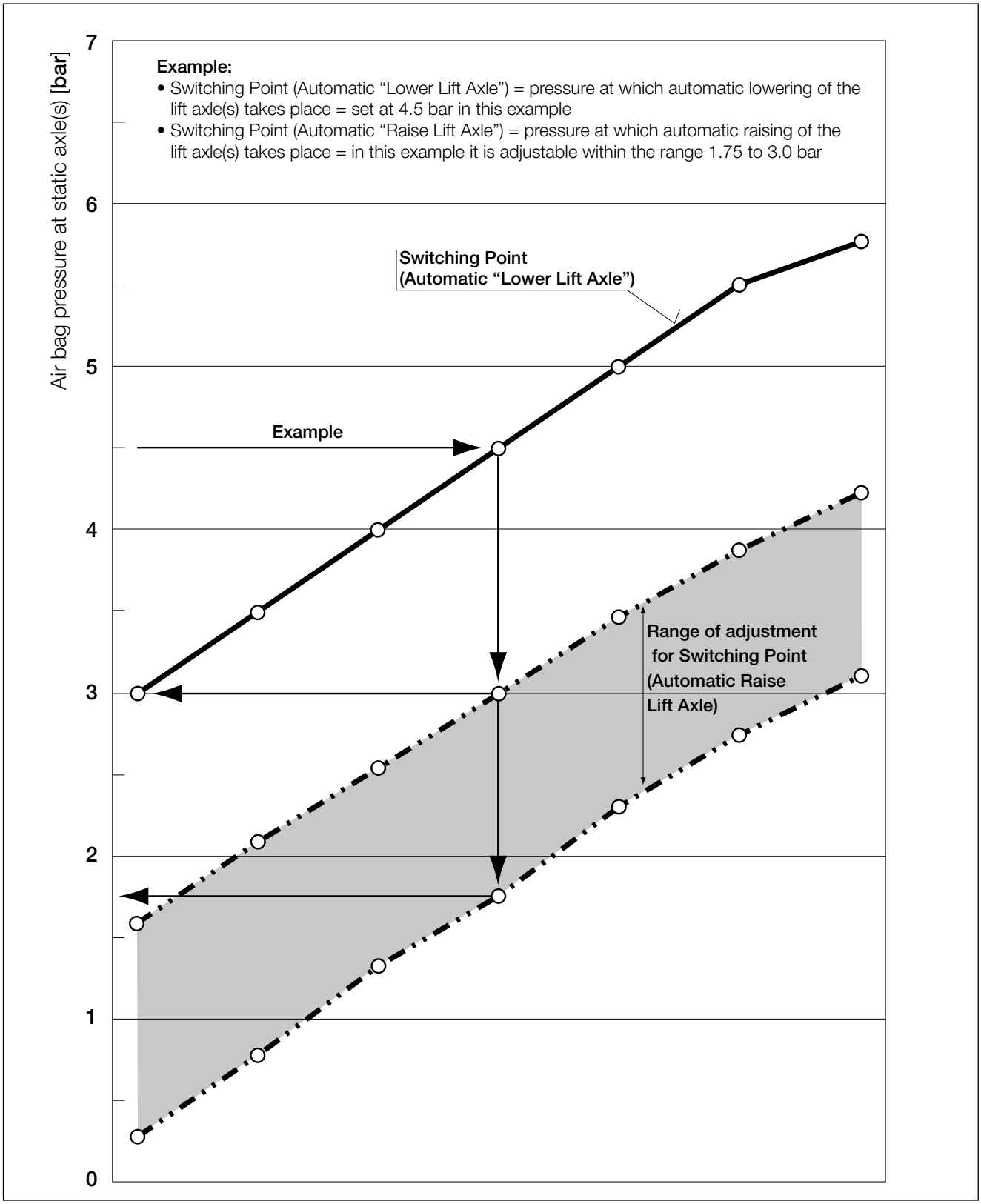
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Control Pressure Diagram



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LS1..., LS2..., LS3...

Lift Axle Valves - Pneumatic

Doc. No. Y011379 (Rev. 003)
March 2011

Traction Assist

The “Traction Assist” function allows temporary lifting of a laden axle on a semitrailer. This will result in an increase in load on the tractor’s drive axle and therefore improved traction.

The use of “Traction Assist” must adhere to any national legal requirements.

The control device in the tractor should be a spring return tip switch.

“Traction Assist” is achieved by upgrading LS2000 or LS3000.

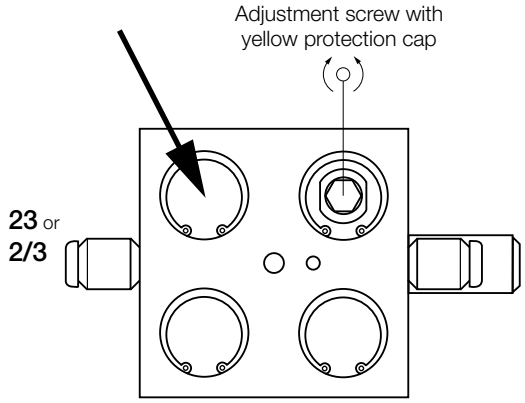
- Additional component required:

  One Solenoid Valve LS2510 (ready for assembly)

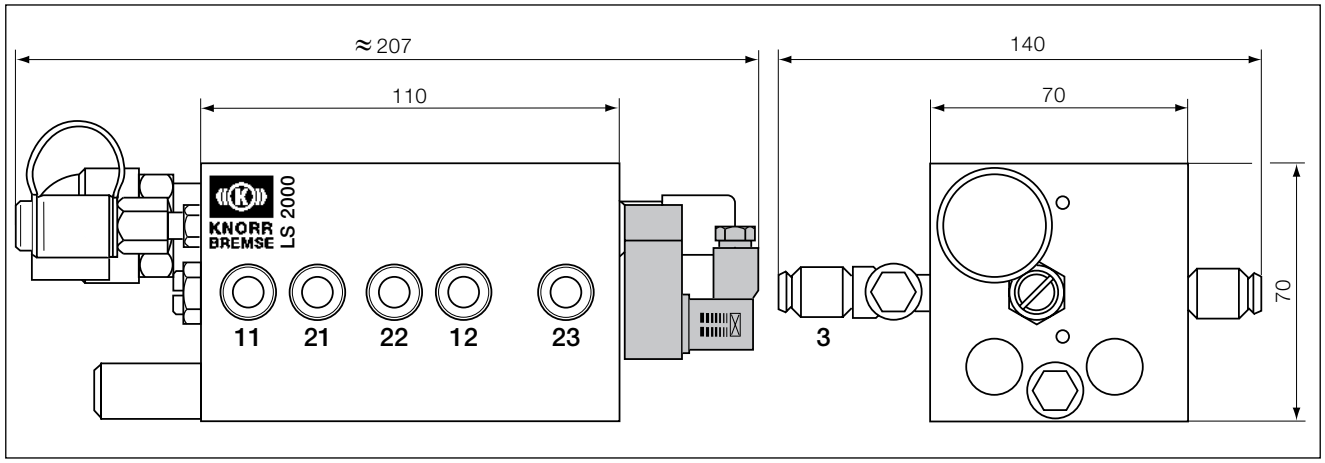
  Please order separately!

Assembly:

- On LS2000 and LS3000 remove circlip holding the blanking plate (see arrow).
- Insert the Solenoid Valve LS2510 (with pre-assembled plate and circlip).
- Connect the control cable to the solenoid valve. The cable should then be securely attached to the chassis leading to the point where it is to be connected to the tractor interface (normally via the 24S electrical trailer connection).



Dimensions, with solenoid for “Traction Assist”



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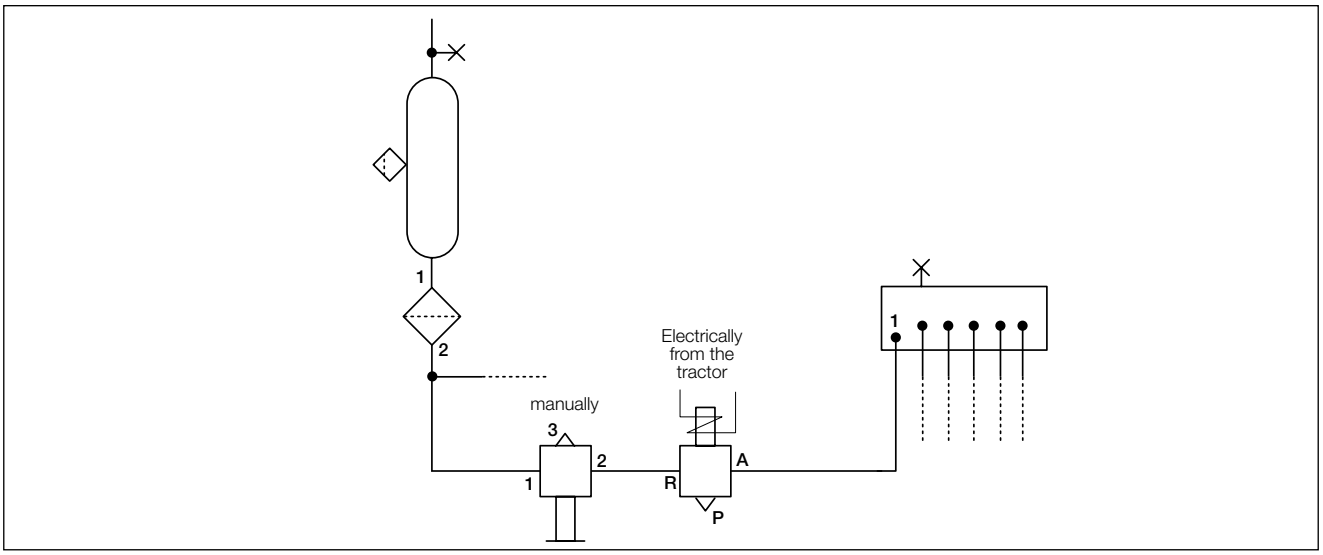
Lowering the Lift Axle

When using the fully automatic valves, LS2000 or LS3000, the lift axle is always raised when the vehicle is unladen. However, there may be situations when the lift axle needs to be lowered when the vehicle is unladen.

For example:

- When checking the brakes on a rolling road
- When parking the vehicle
- To reduce the turning radius (by reducing the effective wheelbase)

The required 3/2 Valves can be installed individually or in-line in the supply line to port **1** of the **Lift Axle Valve.**



Examples:

II**36061 (*AE4265)***	3/2 Valve with push button to lower lift axle manually
0481007043	3/2 Valve with turning button to lower lift axle manually
I**63411024 (*AE9120)***	3/2 Valve to lower lift axle electrically (signalled from the towing vehicle)

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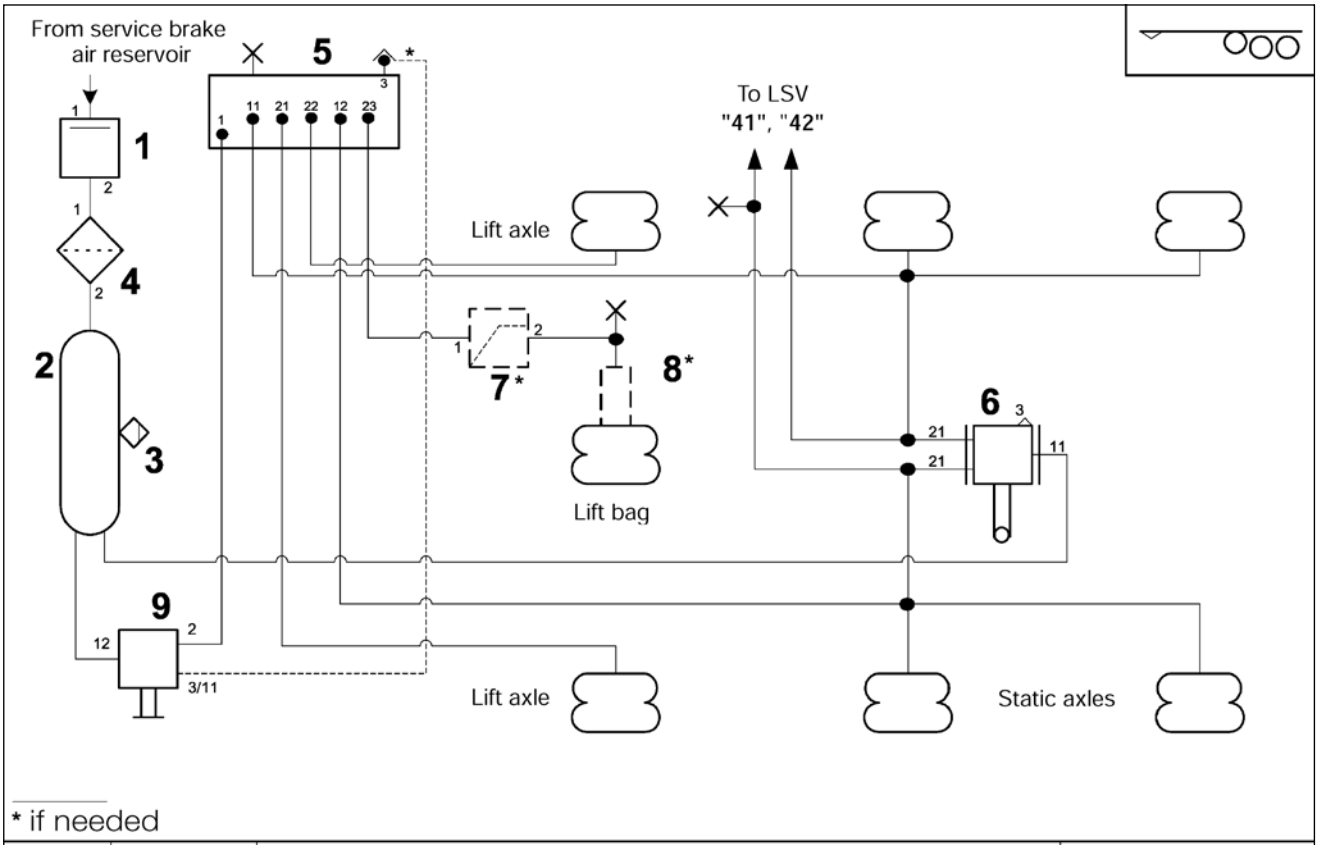
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LS1..., LS2..., LS3...

Lift Axle Valves - Pneumatic

Doc. No. Y011379 (Rev. 003)
March 2011

System Diagram Example, dual circuit: 3-axle bogie without Raise / Lower Valve
1 Lift Axle with fully automatic control



* if needed

Pos.	Quantity	Name of component	Type No.
1	1	Charging Valve "Non Feedback"	DR4378
2	1(2)(3)	Air reservoir V = ...l; Ø = ... mm	VB33..
-	2(4)(6)	Mounting clamps	VB1...
3	1(2)(3)	Drain valve	EE1100
4	1	In-line filter	LA2103
5	1	Fully-automatic Lift Axle Control	LS2000
6	1	Levelling valve	SV1395/1460
-	1	Rubber Joint for SV1...	K001406
7	1	Pressure Limiting Valve	DB11..
8	1	Pressure Retention Valve	LS1051
9	1	3/2 valve, manual control	AE4265

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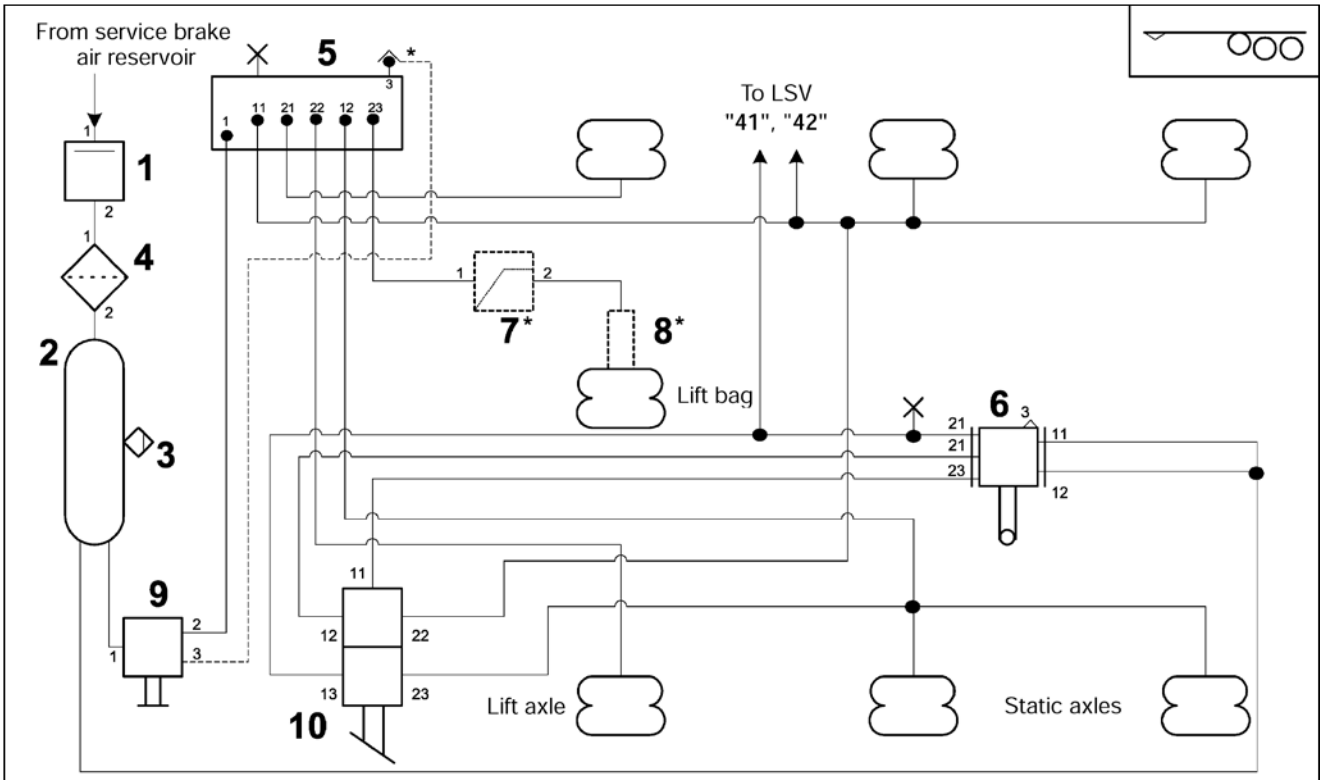
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LS1..., LS2..., LS3...

Lift Axle Valves - Pneumatic

Doc. No. Y011379 (Rev. 003)
March 2011

System Diagram Example, dual circuit: 3-axle bogie with Raise / Lower Valve
1 Lift Axle with fully automatic control



* if needed

Pos.	Quantity	Name of component	Type No.
1	1	Charging Valve "Non Feedback"	DR4378
2	1	Air reservoir V = ...l; Ø = ... mm	VB33..
-	2	Mounting clamps	VB1...
3	1	Drain valve	EE1100
4	1	In-line filter	LA2103
5	1	Fully-automatic Lift Axle Control	LS2000
6	1	Levelling valve with height limitation	SV1466
-	1	Rubber Joint for SV1...	K001406
7	1	Pressure Limiting Valve	DB11..
8	1	Pressure Retention Valve	LS1051
9	1	3/2 valve, manual control	AE4265
10	1	Raise / Lower Valve	SV3111
-	1	Mounting Bracket for SV 31..	3111DK

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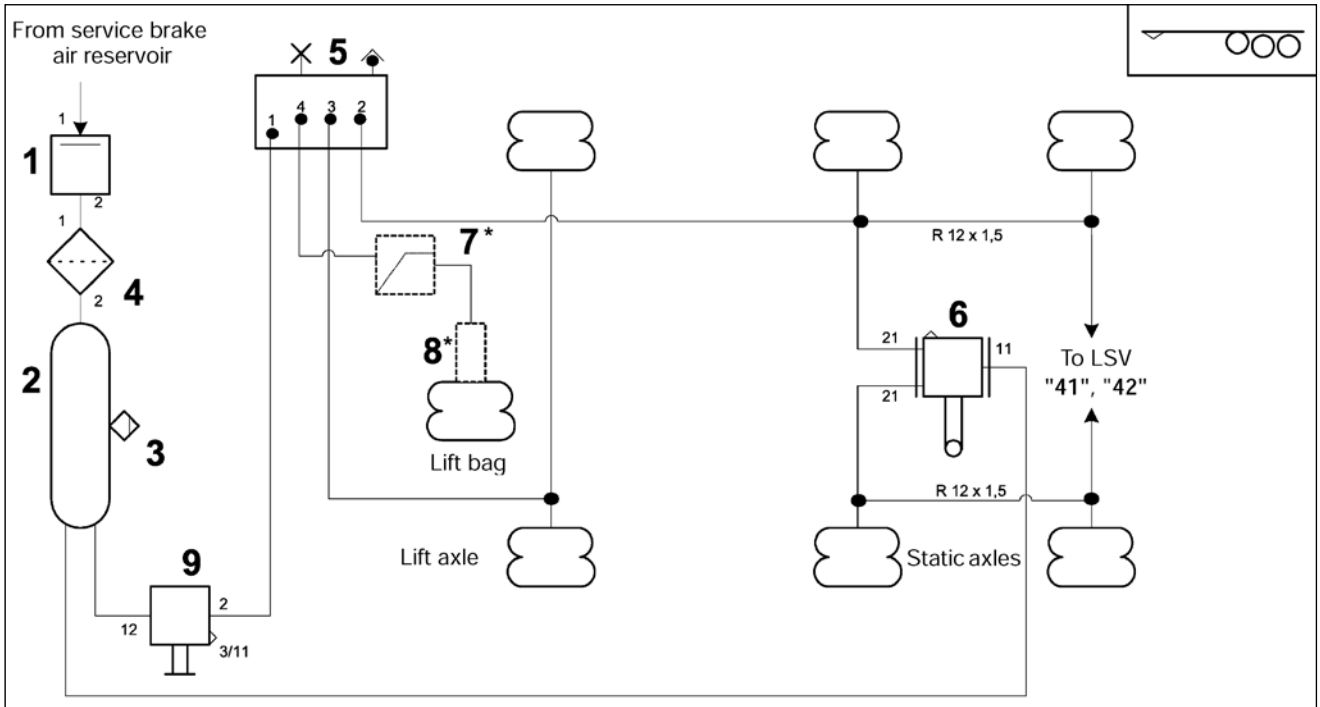
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LS1..., LS2..., LS3...

Lift Axle Valves - Pneumatic

Doc. No. Y011379 (Rev. 003)
March 2011

System Diagram Example, single circuit: air suspension system for 3-axle semi-trailer with fully automatic control lift axle control



* if needed

Pos.	Quantity	Name of component	Type No.
1	1	Charging Valve "Non Feedback"	DR4378
2	1	Air reservoir V = ...l; Ø = ... mm	VB33..
-	2	Mounting clamps	VB1...
3	1	Drain valve	EE1100
4	1	In-line filter	LA2103
5	1	Fully-automatic Lift Axle Control, single circuit	LS3000
6	1	Levelling valve	SV1395/1460
-	1	Rubber Joint for SV1...	K001406
7	1	Pressure Limiting Valve	DB11..
8	1	Pressure Retention Valve	LS1051
9	1	3/2 valve, manual control	AE4265

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Item No. K002496

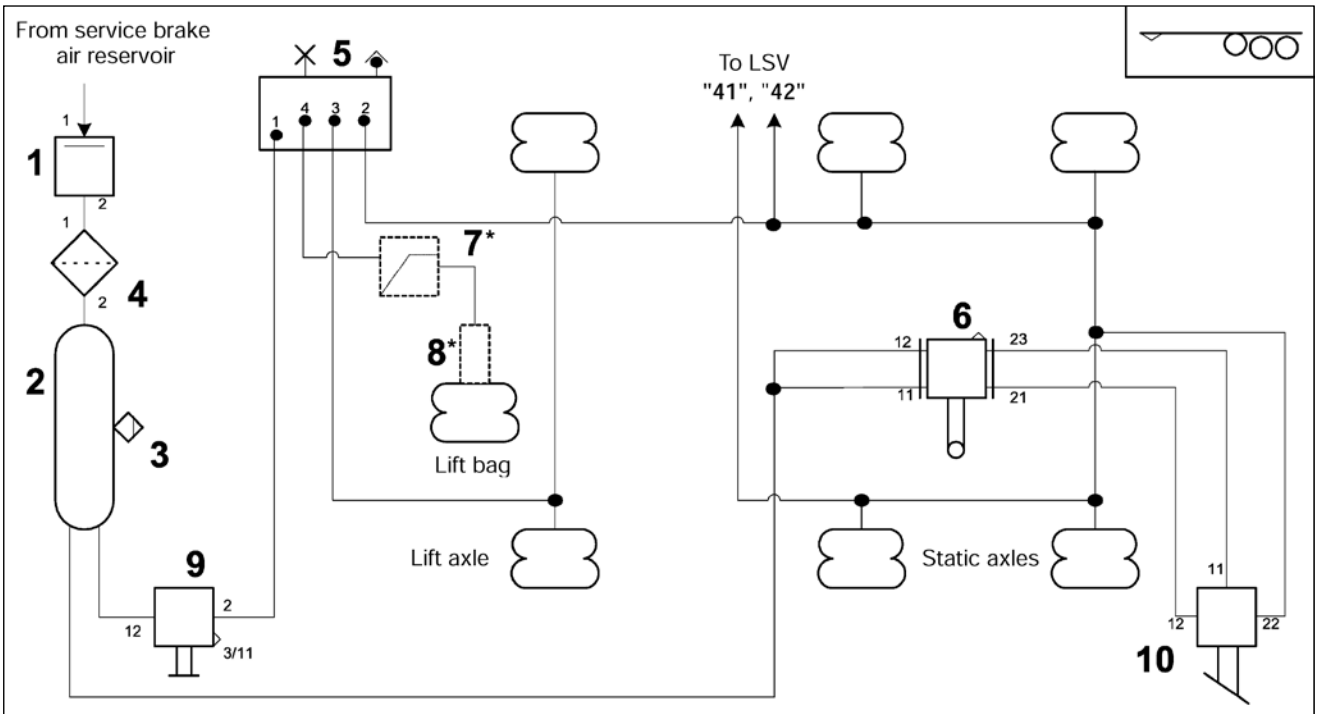
Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

LS1..., LS2..., LS3...

Lift Axle Valves - Pneumatic

Doc. No. Y011379 (Rev. 003)
March 2011

System Diagram Example, single circuit: air suspension system for 3-axle semi-trailer with fully automatic control lift axle control, with raise/lower function



* if needed

Pos.	Quantity	Name of component	Type No.
1	1	Charging Valve "Non Feedback"	DR4378
2	1	Air reservoir V = ...l; Ø = ... mm	VB33..
-	2	Mounting clamps	VB1...
3	1	Drain valve	EE1100
4	1	In-line filter	LA2103
5	1	Fully-automatic Lift Axle Control, single circuit	LS3000
6	1	Levelling valve	SV1466
-	1	Rubber Joint for SV1...	K001406
7	1	Pressure Limiting Valve	DB11..
8	1	Pressure Retention Valve	LS1051
9	1	3/2 valve, manual control	AE4265
10	1	Raise Lower Valve, single circuit	SV316./SV32...

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Item No. K002496

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

AE1141

Lift Axle Valves - TEBS controlled

Doc. No. Y050267 (EN - Rev. 003)
July 2015

Function

The TEBS controlled **Lift Axle Valve AE1141** is used for trailers with electronic braking systems to control the lift axle(s) fully automatically according to the vehicle load.

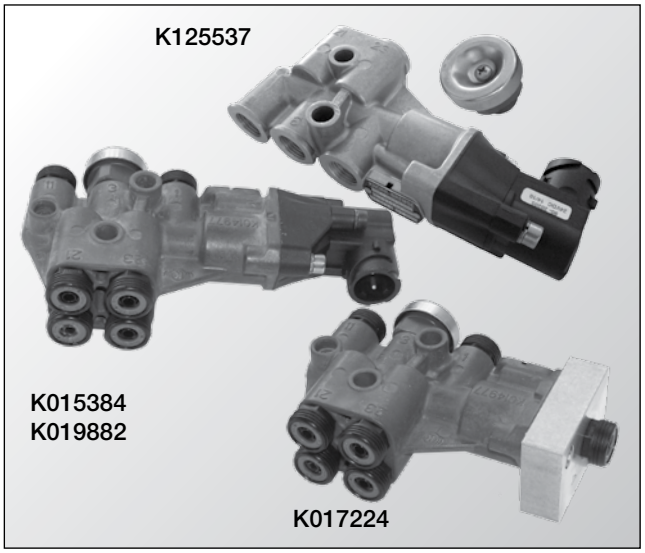
Within the product range there are variants available with a solenoid and those where control is purely pneumatic. Some variants are delivered with push-to-connect (PTC) fittings, these variants have two ports "**21**" and two ports "**23**" to simplify the piping work.

The load sensing and the electronic control functions are achieved by the TEBS brake module via port "**42**". Without electric power supply, any lift axles are lowered.

The lift axle(s) can be lowered manually if the vehicle is unladen e.g. with the **3/2 Control Valve AE4265.**

(**Note:** This is not permissible if the TEBS incorporates RSP. In this case the lift axle is lowered by an electrical or pneumatic signal sent from the TEBS brake module; see page 2)

The valve can also be used as a solenoid valve for other applications as lift axle control. System diagram examples can be found on page 3.

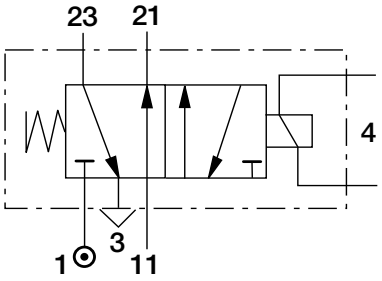


Technical Features

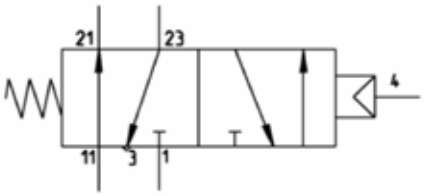
Maximum operating pressure:	10 bar
Operating temperature range:	-40 °C to +80 °C
Nominal voltage:	See table
Weight:	See table
Min. switching pressure for pneumatic version:	5 bar

Standard Symbol as DIN ISO 1219

K015384
K019882
K125537



K017224



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AE1141

Lift Axle Valves - TEBS controlled

Doc. No. Y050267 (EN - Rev. 003)
July 2015

Product Overview

Part No.	Type No.	Solenoid	Port 1 and 11	Port 21 and 23	Port 3	Port 4	Electrical Connection	Weight approx.
K125537#)	AE 1141	24 V	M16 x 1.5	M16 x 1.5	M16 x 1.5 (exhaust valve supplied but not fitted)	-	Bayonet DIN72585	0.40 kg
K015384#)		24 V	PTC* for R8x1	2 x PTC R8x1	M16 x 1.5 with exhaust valve	-	Bayonet DIN72585	0.55 kg
K017224#)		-		2 x PTC R8x1		PTC R8x1	-	0.55 kg
K019882#)		12 V		2 x PTC R8x1		-	Bayonet DIN72585	0.55 kg

#) Part No. will carry the suffix N00 denoting that it is supplied without packaging * PTC = push-to-connect

Additional Parts:

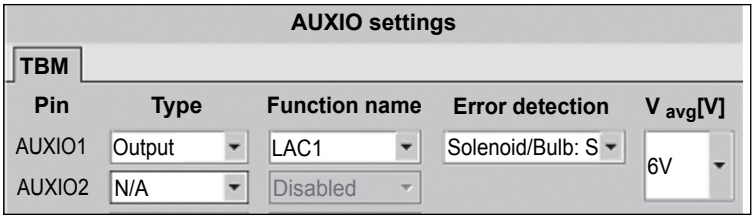
Blanking Plug for 8 mm pipe: **96210008**
PTC Release Tool (plastic) for 8 mm pipe: **96608010**
PTC Release Tool (metal) for 8 mm pipe: **96608020**

Part No. for Service Kit:

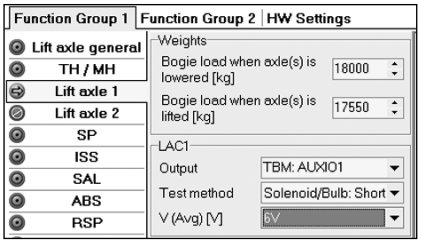
Solenoid - 12V: **K020018K50**
Solenoid - 24V: **K016334K50**

Installation Instructions

For electrically controlled valves:
When using the AE1141 – K019882 in conjunction with the TEBS G2 brake module, this valve needs to be connected to AUXIO1 or 2. The output voltage for these ports has to be set to 6 V (**Note:** This is necessary to protect the 12 V solenoid against overheating).

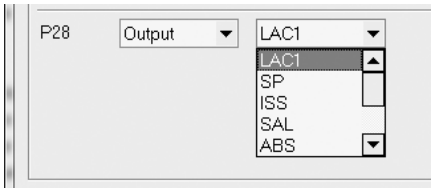


Screenshot from the diagnostic program ECU*talk*®:
- TEBS G2.0/G2.1/G2.2 Standard

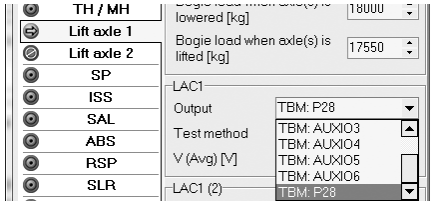


Screenshot from the diagnostic program ECU*talk*®:
- TEBS G2.2 Standard Plus and Premium

For pneumatically controlled valves:



Screenshot from the diagnostic program ECU*talk*®:
- TEBS G2.0/G2.1/G2.2 Standard



Screenshot from the diagnostic program ECU*talk*®:
- TEBS G2.2 Standard Plus and Premium

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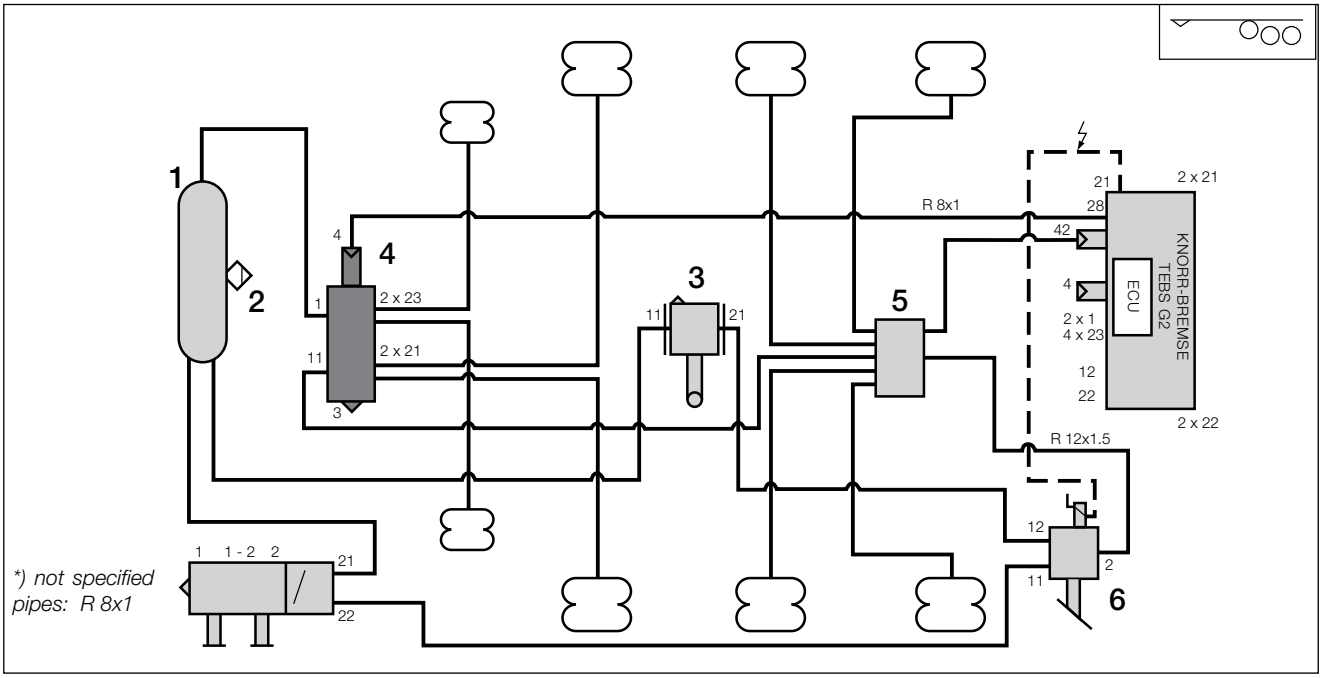
AE1141

Doc. No. Y050267 (EN - Rev. 003)
July 2015

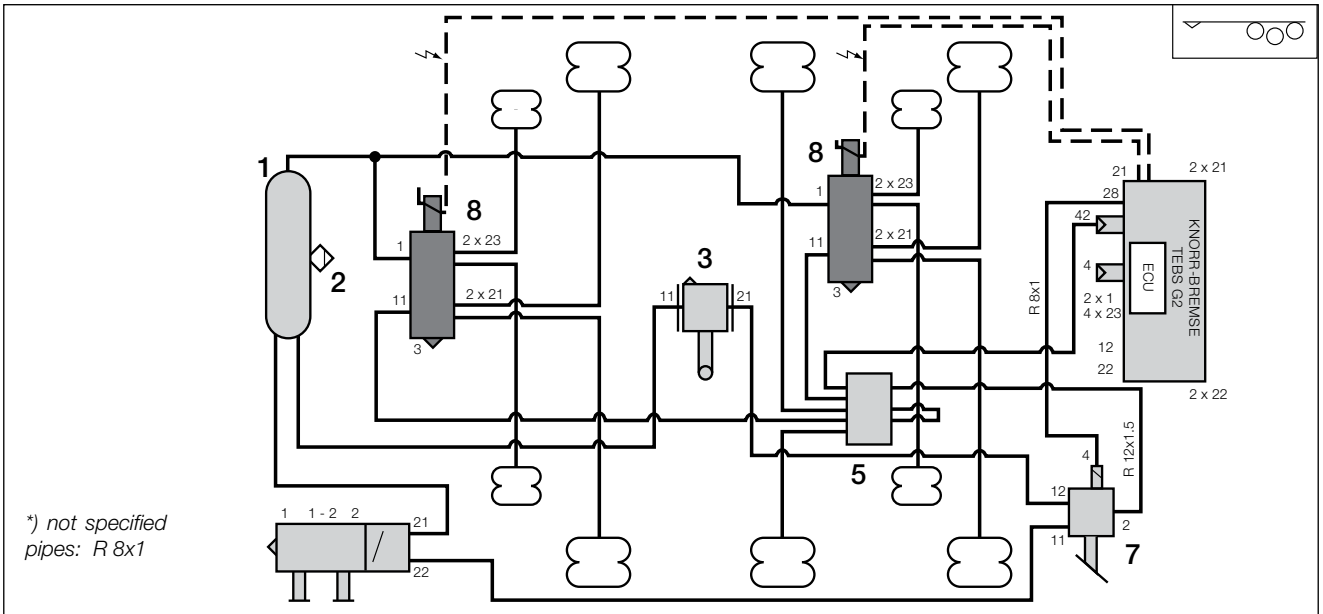
Lift Axle Valves - TEBS controlled

System Diagrams

Air suspension system for a 3 axle semi-trailer with raise/lower function, one fully automatic lift axle controlled by the TEBS G2 brake module.



Air suspension system for a 3 axle semitrailer with raise/lower function, two fully automatic lift axles controlled by the TEBS G2 brake module.



Pos.	Qty	Description	Pos.	Qty	Description
1	-	Reservoir	5	1	Distributor block
2	-	Drain Valve	6	1	Raise/Lower Valve, electrically controlled
3	1	Leveling Valve without height limitation	7	1	Raise/Lower Valve, pneumatically controlled
4	1	Lift Axle Valve, pneumatically controlled	8	1	Lift Axle Valve, electrically controlled

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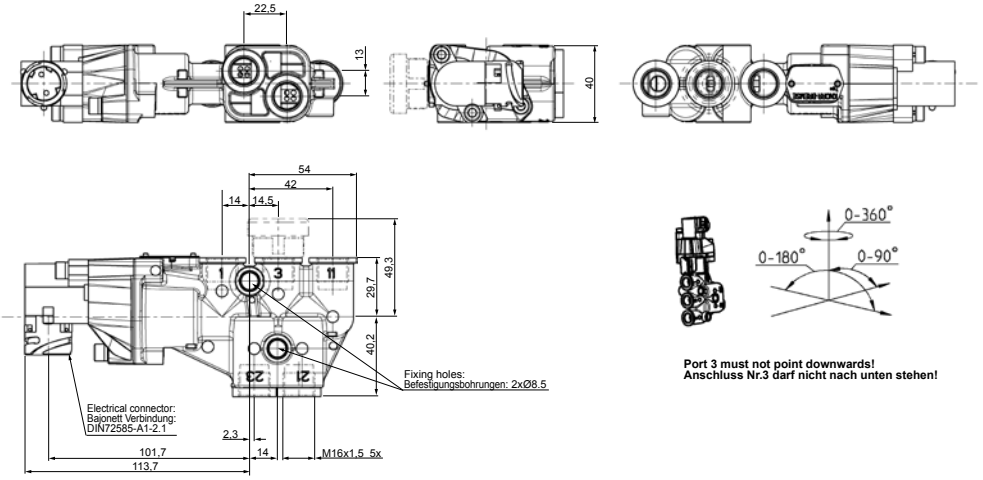
AE1141

Lift Axle Valves - TEBS controlled

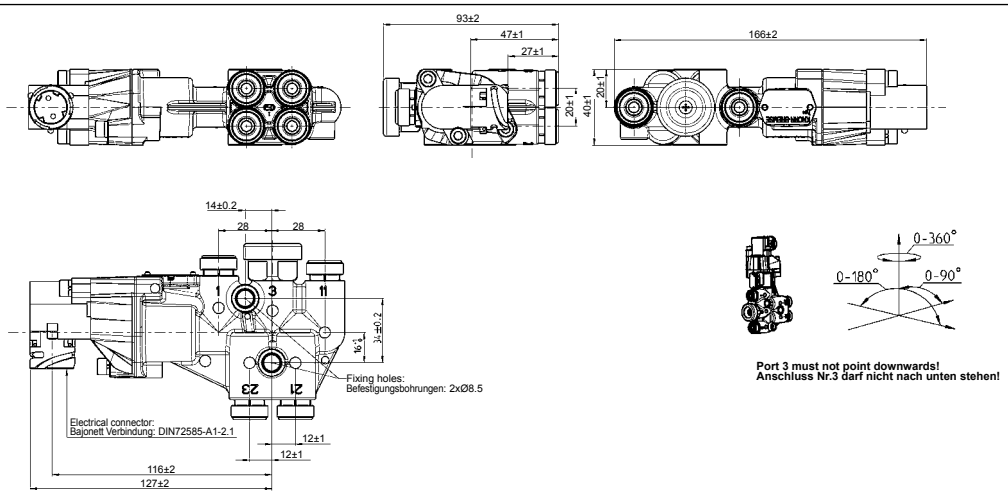
Doc. No. Y050267 (EN - Rev. 003)
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Dimensions

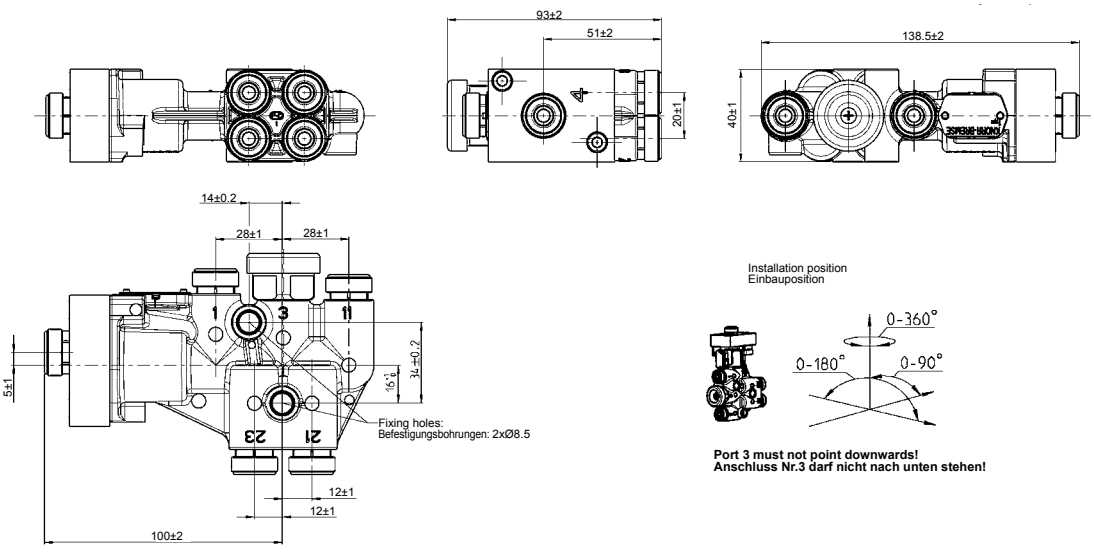
K125537



K015384
K019882



K017224



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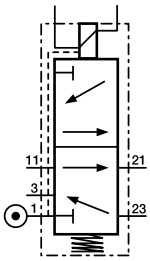
Lift Axle Valves - TEBS controlled

Doc. No. Y050267 (EN - Rev. 003)
July 2015

System Diagrams

Lift Axle Valves, electrically controlled

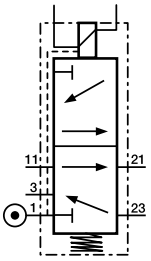
Supplied with current: Charged



Legend:

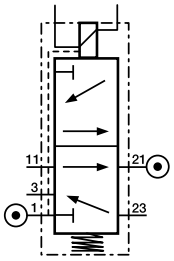
1 = Supply
23 = Output
3 = Exhaust
11 = To lock
21 = To lock

Supplied with current: Exhausted



1 = Supply
23 = To lock
3 = Exhaust
11 = Input
21 = Output

Supplied with current: Alternated circuit



1 = Supply
23 = To lock
3 = Output
11 = Output
21 = Input

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Revision Details

Rev. 001	August 2011	Diagrams updated.
Rev. 002	January 2015	Table reformatted and Service Parts added on page 1.
Rev. 003	July 2015	K035570 replaced by K125537.

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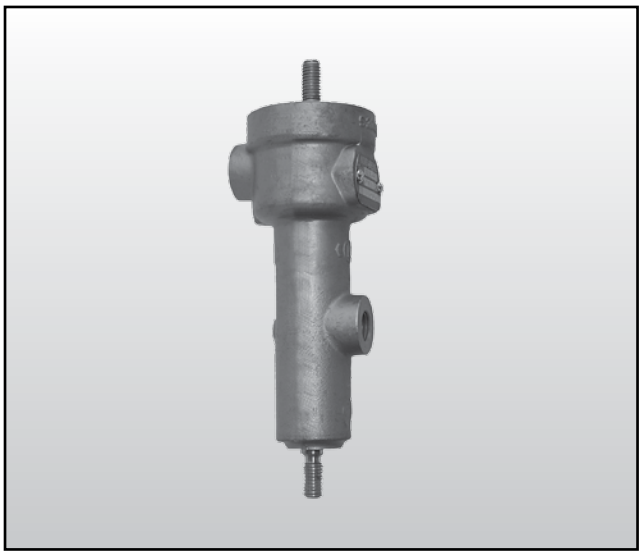
Product DATA

AE1103

Height Limiting Valve (Air Suspension)

Doc. No. Y011378 (Rev. 002)
March 2011

Function



The **AE1103 Height Limiting Valve** is used on trailers with air suspension when a levelling valve without integrated height limitation feature (see PD-500-000, Document No. *Y011375*) is installed in combination with a raise / lower valve and the suspension has no mechanical limit stop. The **Height Limiting Valve** protects the air suspension bellows and other mechanical parts from damage caused by over inflation.

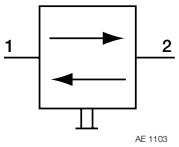
The valve is connected in the supply line of the raise / lower valve and is attached to the vehicle's chassis and an axle via a linkage[1)].

In the "RAISE" position, the raise / lower valve increases the volume in the air suspension bellows to increase the chassis height. As the height increases, the linkage attached to the valve's stem becomes taut. The chassis height will increase until the valve's stem is pulled and the supply of air to the raise / lower valve is cut off.

The number of valves required depends on the load distribution on the trailer. If the load is distributed equally on the trailer, one valve is enough for two levelling valves, if distributed unequally, two **Height Limiting Valves** are needed for two levelling valves. On drawbar trailers, one **Height Limiting Valve** has to be used for the front axle and a second valve for the rear axle.

Standard Symbol as DIN ISO 1219

AE1103



Technical Features

Maximum operating pressure:	10 bar
Operating temperature range:	-40 °C to +80 °C
Weight:	0.7 kg approx.

Range Overview

Part No.	Type No.	Port Threads	Way through
I60496	**AE1103**	M12x1.5	10 mm dia.

1) Please note that the linkage is not supplied by Knorr-Bremse

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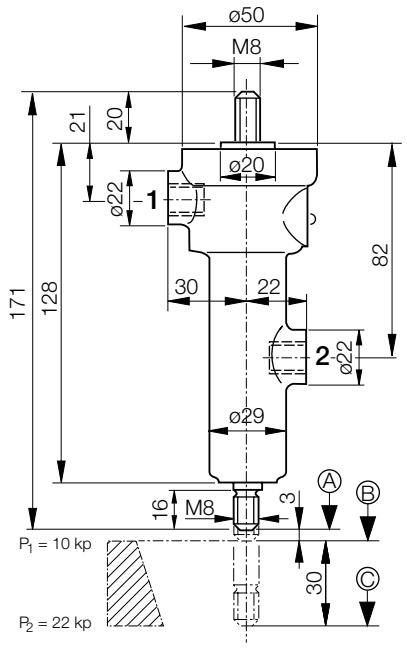
AE1103

Height Limiting Valve (Air Suspension)

Doc. No. Y011378 (Rev. 002)
March 2011

Dimensions

AE1103



Ports:
1 = Supply (M12x1.5-12)
2 = Delivery (M12x1.5-12)

Legend:
A = Normal driving position
B = Suspension Raise **"STOP"** position
C = Maximum overstroke

PD504_001

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Item No. K002495

Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Doc. No. Y011334 (EN - Rev. 002)
July 2015

Miscellaneous

PD No.	Product	Type/Part No. family
PD-520-700	Manifold Block	**LS50.., LS60..**
PD-523-200	Brake Hose	**BS....**
PD-523-400	Plastic Pipe Coils	**PET...**
PD-523-600	Plastic Pipe	**KR....**
PD-524-000	Air Reservoirs	**VB....**
PD-551-000	Tyre Pressure Monitoring System (TPMS)	**SmarTire**

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

LS600..

Manifold Block

Doc. No. Y011385 (EN - Rev. 004)
January 2015

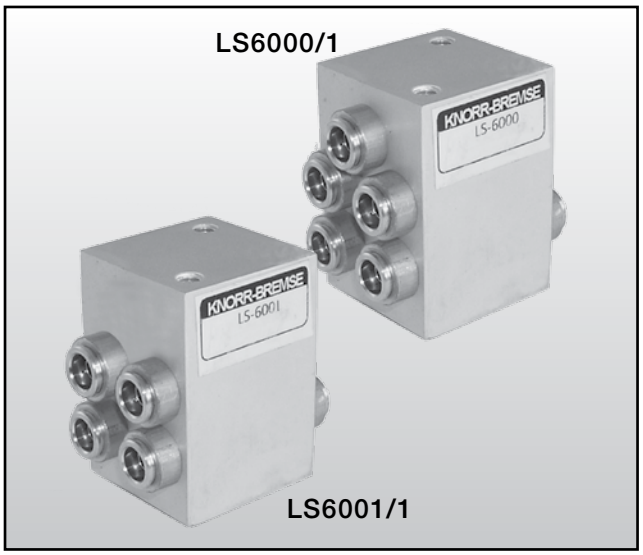
PD-520-700

Function

The **Manifold Block** is used in single-circuit air suspension systems on semi-trailers or centre-axle trailers, where it is used for connecting the air suspension bags to the Raise/Lower Valve and the Lift Axle Control Valve (optional).

The **Manifold Block** is delivered with push-in fittings saving the installer a significant number of connectors and installation time.

The **Manifold Block LS6000/1** is normally used on 3-axle semi-trailers without lift axle and **LS6001/1** on 3-axle semi-trailers with one lift axle.

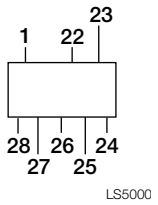


Technical Features

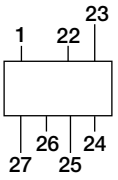
Maximum Operating Pressure:	10 bar
Operating Temperature Range:	-40 °C to +60 °C
Weight:	0.4 kg approx.
Surface treatment:	Elox

Standard Symbol as DIN ISO 1219

LS6000/1



LS6001/1



Range Overview

Part No.	Supply Connection (Push-in Fitting)	Delivery Connections (Push-in Fitting)	Comment
LS6000/1	1 x 12x1.5	7 x 8x1	Replaces LS5000 and LS6000
LS6001/1	1 x 12x1.5	6 x 8x1	Replaces LS5001 and LS6001

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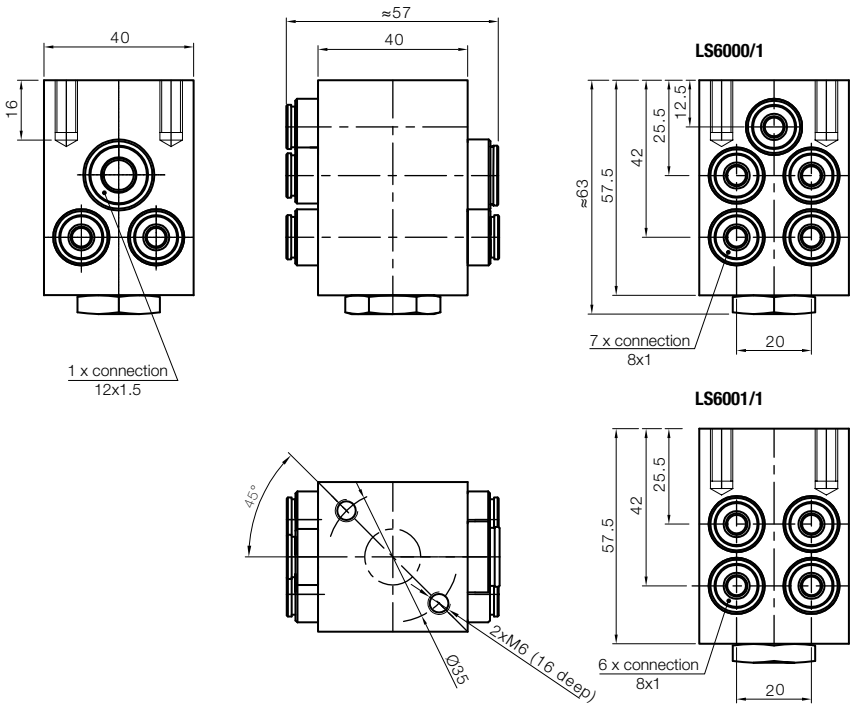
LS600..

Manifold Block

Doc. No. Y011385 (EN - Rev. 004)
January 2015

Dimensions

LS6000/1
LS6001/1



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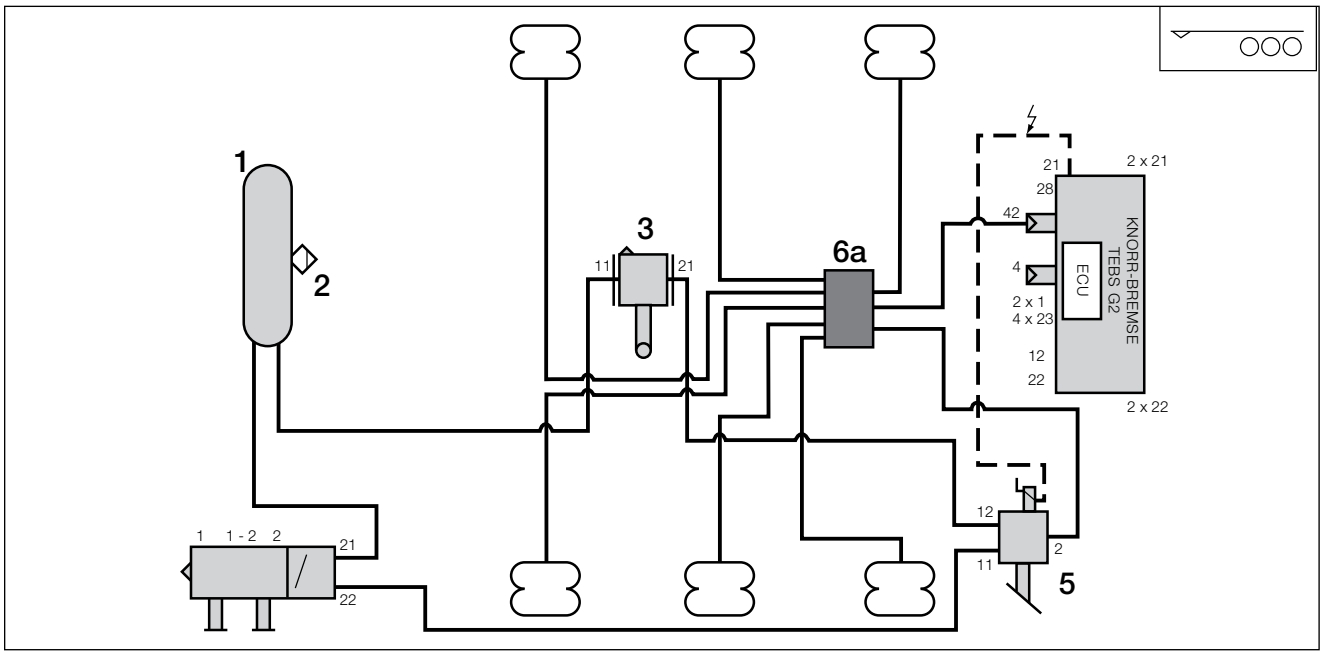
LS600..

Manifold Block

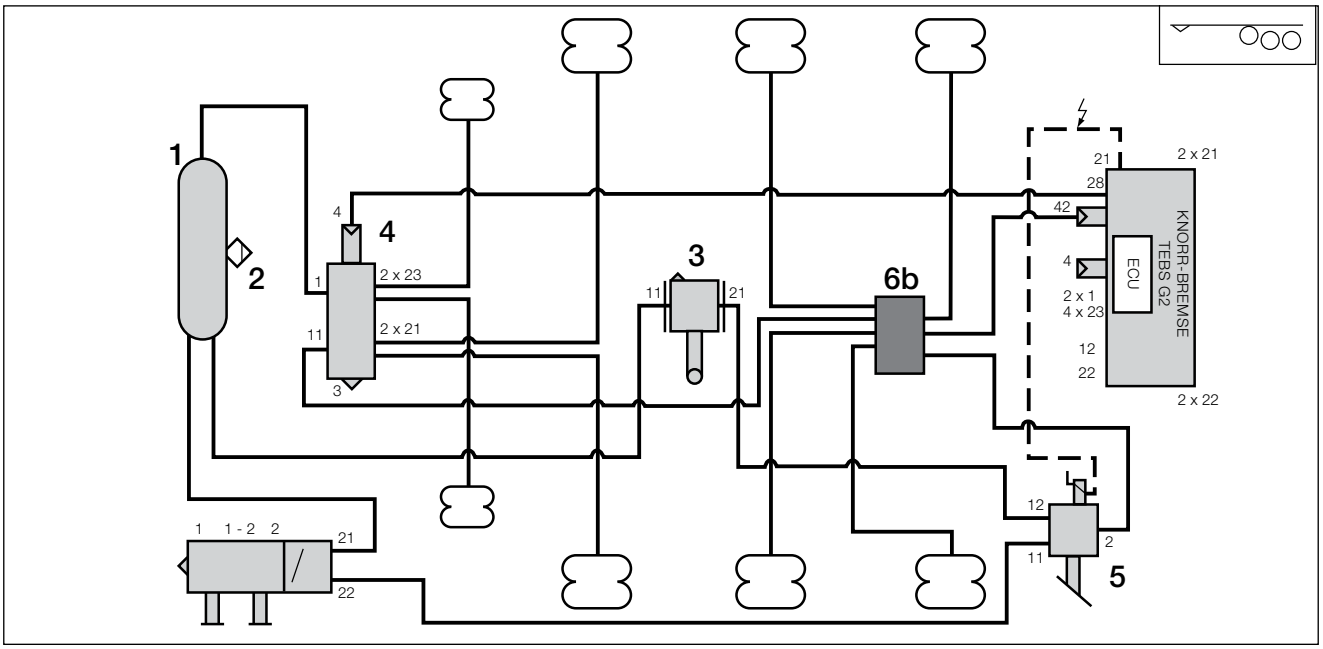
Doc. No. Y011385 (EN - Rev. 004)
January 2015

System Diagram

Air suspension system for a 3 axle semi-trailer with raise/lower function (no lift axle).



Air suspension system for a 3 axle semi-trailer with raise/lower function and one fully automatic lift axle.



Pos.	Description	Pos.	Description
1	Reservoir	4	Lift Axle Valve, pneumatically controlled
2	Drain Valve	5	Raise/Lower Valve, electrically controlled
3	Levelling Valve without height limitation	6	Manifold Block, 6a = LS6000/1, 6b = LS6001/1

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LS600..

Manifold Block

Doc. No. Y011385 (EN - Rev. 004)
January 2015

Revision Details

Rev. 003	September 2011	New layout for Trailer Catalogue
Rev. 004	January 2015	LS6000/1 and LS6001/1 added as replacements.

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Product DATA

BS....

Brake Hose

Doc. No. Y095694 (Rev. 000)
March 2011

PD-523-200

Function

Brake Hoses are typically used to connect to the brake actuators since they offer a high degree of flexibility - necessary due to suspension deflection.



Technical Features

Maximum Operating Pressure:	10 bar
Operating Temperature Range:	-40 °C bis +70 °C
Material:	Rubber brake hose DIN 74310, or Elastomer with textile layer, TÜV-approved
Supply Dimension:	40 m roll

Range Overview

Part No.	Inside dia. x Wall thickness [mm]	Outside dia. [mm]	Textile layer
BS1100	11 x 3.5	18	Premium reinforcement
BS1100/1	11 x 3.5	18	Standard reinforcement
BS1300	13 x 6.0	25	Premium reinforcement
BS1300/1	13 x 6.0	25	Standard reinforcement

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Item No. K057326

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Doc. No. Y095694 (Rev. 000)
March 2011

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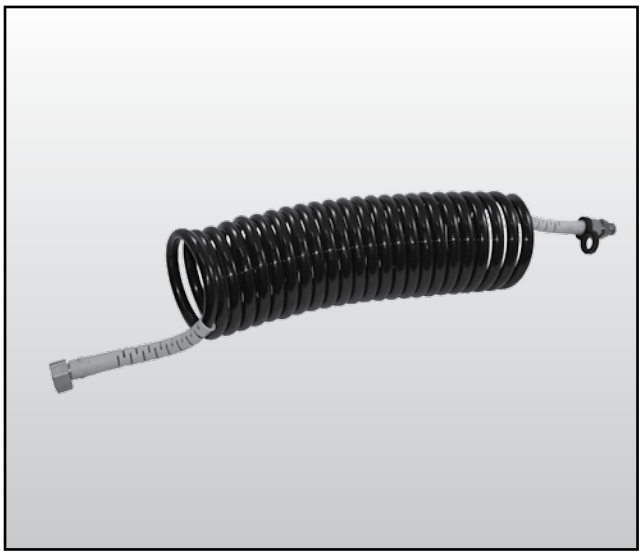
Product DATA

PET...
Plastic Pipe Coils

Doc. No. Y213201 (EN - Rev. 000)
June 2015

Function

Coils are typically used to connect the drawing vehicle and the trailer air systems. Available in various lengths, colours and with different coupling connections.



Technical Features

Maximum Operating Pressure:	15 bar
Operating Temperature Range:	-40 °C to +60 °C
Material:	see table
Outside dia.:	12.0 mm
Wall thickness:	1.5 mm

Range Overview

Part No.	Type No.	No. of coils	Connector Thread	Sleeve Colour	Standard (Material)
PET.76.900-10	-	16	M16x1.5	Yellow	DIN 73378 (Polyamid 12)
PET.76.901-10	-	16	M16x1.5	Red	
PET.76.900-30	-	20	M22x1.5	Yellow	
PET.76.901-30	-	20	M22x1.5	Red	
PET.76.900-31	-	20	M16x1.5	Yellow	
PET.76.901-31	-	20	M16x1.5	Red	
PET.76.900-35	-	23	M22x1.5	Yellow	
PET.76.901-35	-	23	M22x1.5	Red	
PET.76.900-36	-	23	M16x1.5	Yellow	
PET.76.901-36	-	23	M16x1.5	Red	

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PET...

Plastic Pipe Coils

Doc. No. Y213201 (EN - Rev. 000)
June 2015

Revision Details

Rev. 000	June 2015	New document

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Product DATA

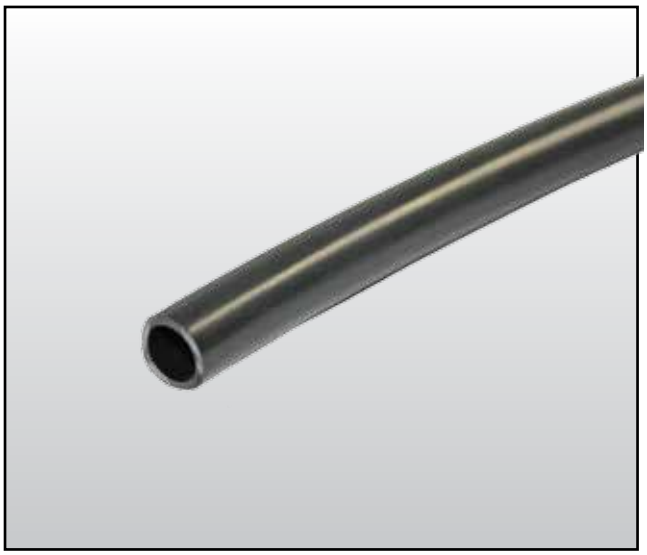
KR....
Plastic Pipe

Doc. No. Y095692 (EN - Rev. 002)
May 2015

PD-523-600

Function

Plastic Pipes are used to interconnect the air braking and auxilliary equipment.



Technical Features

Maximum Operating Pressure:	15 bar
Operating Temperature Range:	-40 °C to +60 °C
Material:	see tables
Supply Dimension:	roll - see table

Range Overview - *plastic pipe (black)*

Part No.	Type No.	Outside dia. x Wall thickness [mm]	Roll size [m]	Standard (Material)
KR1006-100	-	6 x 1.0	100	DIN 73378 (Polyamid 12)
KR1008-100	-	8 x 1.0		
KR10101-100	-	10 x 1.0		
KR1012-100	-	12 x 1.5		
KR1015-100	-	15 x 1.5		
KR1018-50	-	18 x 2.0	50	

Part No.	Type No.	Outside dia. x Wall thickness [mm]	Roll size [m]	Standard (Material)
KR206100-100	-	6 x 1.0	100	ISO 7628 (Hytrel 8163)
KR208100-100	-	8 x 1.0		
KR210100-100	-	10 x 1.0		
KR212150-100	-	12 x 1.5		
KR215150-100	-	15 x 1.5		
KR218200-50	-	18 x 2.0	50	

Other sizes are available on request.

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KR....

Plastic Pipe

Doc. No. Y095692 (EN - Rev. 002)
May 2015

Revision Details

Rev. 000	November 2011	New document.
Rev. 001	January 2015	Addition of note on page 1.
Rev. 002	May 2015	Coils transferred to Document Y213201.

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Product DATA

VB....
Air Reservoirs

Doc. No. Y095687 (EN - Rev. 003)
May 2015

PD-524-000

Function

Air Reservoirs are used to store the compressed air for the vehicle air braking, suspension and auxiliary systems.

They are available in steel or aluminium. Some reservoirs are supplied with welded mounting brackets. Reservoirs without mounting brackets need to be mounted with suitable mounting straps.

Note: aluminium reservoirs are approximately 60% lighter than steel reservoirs of the same capacity.



Standard Symbol as DIN ISO 1219



S-VB-02

Technical Features

Pressure rating:		**EN 286-2, with CE-symbol**
Material:		Steel, black primed or Aluminium
Maximum Operating Pressure;		
Steel		12.5 bar
Aluminium	206, 246, 276 mm dia.	12.5 bar
	310, 396 mm dia.	11.0 bar
Operating Temperature Range:		
Steel		-40 °C to +100 °C
Aluminium		-40 °C to +65 °C
Air Port Threads:		M22x1.5
Weight:		see tables

Range Overview - *mounting straps for steel and aluminium reservoirs*

Part No.	Type No.	Reservoir diameter [mm]	Type
VB2310	-	310	Two piece, zinc plated, black
VB2396	-	396	
VB3206/2	-	206	Two piece, zinc plated, powder coated
VB3246/2	-	246	
VB3276/2	-	276	
VB3310/2	-	310	
VB3396/2	-	396	

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

VB....

Air Reservoirs

Doc. No. Y095687 (EN - Rev. 003)
May 2015

Range Overview - *steel reservoirs without mounting brackets*

Part No.	Type No.	Volume [l]	Dia (D) [mm]	Length (L) [mm]	Weight approx. [kg]	Ports	Manufacturer Country Code
VB3301/206	**-**	10	206	370	4.8	4 x M22x1.5	DE
VB33015/206	**-**	15	206	530	6.4		
VB3302/206	**-**	20	206	690	8.2		
VB3302/246	**-**	20	246	500	7.3		
VB3302/276	**-**	20	276	416	7.0		
VB3303/246	**-**	30	246	720	10.0		
VB3303/276	**-**	30	276	585	9.4		
VB3304/246	**-**	40	246	940	12.8		
VB3304/276	**-**	40	276	760	11.8		
VB3304/310	**-**	40	310	620	11.3		
VB3306/246	**-**	60	246	1369	18.1		
VB3306/276	**-**	60	276	1110	16.7		
VB3306/310	**-**	60	310	895	15.6		
VB3306/396*	**-**	60	396	580	16.8		
VB3308/310*	**-**	80	310	1170	19.6		
VB3308/396*	**-**	80	396	750	21.1		
VB33085/276	**-**	85	276	1543	23.8		
VB3310/396*	**-**	100	396	915	25.4		

*** - note - Maximum Operating Pressure 10.0 bar**

Part No.	Type No.	Volume [l]	Dia (D) [mm]	Length (L) [mm]	Weight approx. [kg]	Ports	Manufacturer Country Code
VB34005/206	**-**	5	206	215	3.3	4 x M22x1.5	GB
VB3401/206	**-**	10	206	370	4.5		
VB3402/206	**-**	20	206	690	7.8		
VB3402/246	**-**	20	246	500	7.5		
VB3403/246	**-**	30	246	720	10.0		
VB3403/276	**-**	30	276	585	10.2		
VB3404/246	**-**	40	246	940	12.8		
VB3404/276	**-**	40	276	760	12.4		
VB3406/246	**-**	60	246	1352	18.5		
VB3406/276	**-**	60	276	1110	17.5		
VB3406/310	**-**	60	310	895	17.8		
VB3406/396	**-**	60	396	580	16.4		
VB3408/310	**-**	80	310	1162	21.6		
VB3408/396	**-**	80	396	750	20.5		
VB3410/396	**-**	100	396	915	24.5		

Drain Valve:

Part No.	**I94095** (without seal)	**VSM2215A** (with integral seal)
Type No.	**EE1100**	**-**

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Y007570: 006: EN: Released: Mon Sep 07 19:09:44 CEST 2015:

Doc. No. Y095687 (EN - Rev. 003)
May 2015

Range Overview - *steel reservoirs with mounting brackets*

Part No.	Type No.	Volume [l]	Dia (D) [mm]	Length (L) [mm]	Weight approx. [kg]	Ports	Manufacturer Country Code
I97269	**VB1005**	5	154	342	3.5	2 x M22x1.5	DE
K011307 **K011308**	**VB6304/276** **VB6306/310**	40 60	276 310	758 893	13.9 18.1	5 x M22x1.5	DE

Drain Valve:

Part No.	**I94095** (without seal)	**VSM2215A** (with integral seal)
Type No.	**EE1100**	**-**

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VB....

Air Reservoirs

Doc. No. Y095687 (EN - Rev. 003)
May 2015

Range Overview - *aluminium reservoirs without mounting brackets*

Part No.	Type No.	Volume [l]	Dia. (D) [mm]	Length (L) [mm]	Weight approx. [kg]	Ports	Exterior finish
VB4302/206	**-**	20	206	695	4.0	4 x M22x1.5	Natural
VB4302/246	**-**	20	246	505	4.3		
VB4303/246	**-**	30	246	724	5.7		
VB4303/276	**-**	30	276	590	4.5		
VB4304/246	**-**	40	246	945	6.2		
VB4304/276	**-**	40	276	766	6.8		
VB4304/310	**-**	40	310	620	5.5		
VB4306/276	**-**	60	276	1115	8.2		
VB4306/310	**-**	60	310	900	8.7		
VB4306/396	**-**	60	396	585	8.7		
VB4308/396	**-**	80	396	755	10.4		
VB4310/396	**-**	100	396	920	12.0		
VB8306/396	**-**	60	396	585	7.8	4 x M22x1.5	Powder coated - black
VB8308/396	**-**	80	396	755	9.5		

Manufacturer Country Code: DE

Range Overview - *aluminium reservoirs with mounting brackets*

Part No.	Type No	Volume [l]	Dia (D) [mm]	Length (L) [mm]	Weight approx. [kg]	Ports	Exterior finish
K010890	**VB7302/246**	20	246	510	4.3	5 x M22x1.5	Natural
K010893	**VB7306/310**	60	310	898	8.7		
K010894	**VB7306/396**	60	396	592	8.7		
K010895	**VB7308/396**	80	396	750	10.4		
K010896	**VB7310/396**	100	396	909	12.0		

Manufacturer Country Code: DE

Drain Valve:

Part No.	**I94095** (without seal)	**VSM2215A** (with integral seal)
Type No.	**EE1100**	**-**

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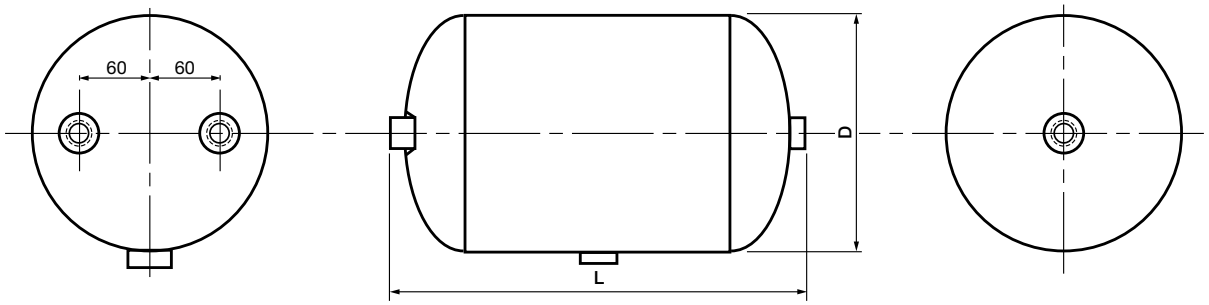
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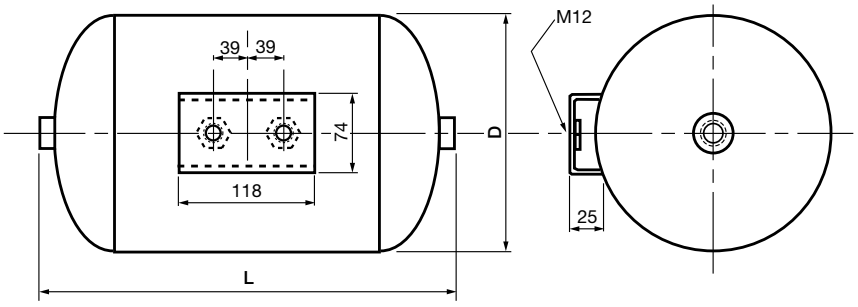
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May 2015

Dimensions

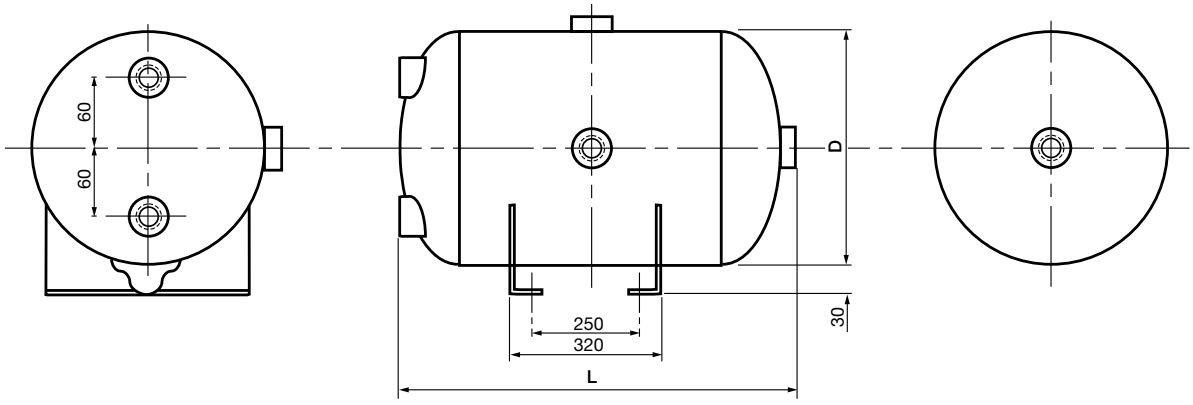
VB33.., VB34.., VB43.., VB83..



VB1005



VB63.., VB73..



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VB....

Air Reservoirs

Doc. No. Y095687 (EN - Rev. 003)
May 2015

Revision Details

Rev. 001	September 2011	One piece mounting straps removed.
Rev. 002	October 2014	VB34.. series of Reservoirs added, VB37.. series deleted.
Rev. 003	May 2015	VB34005/206 added. Country Codes and note on page 4 added.

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Product DATA

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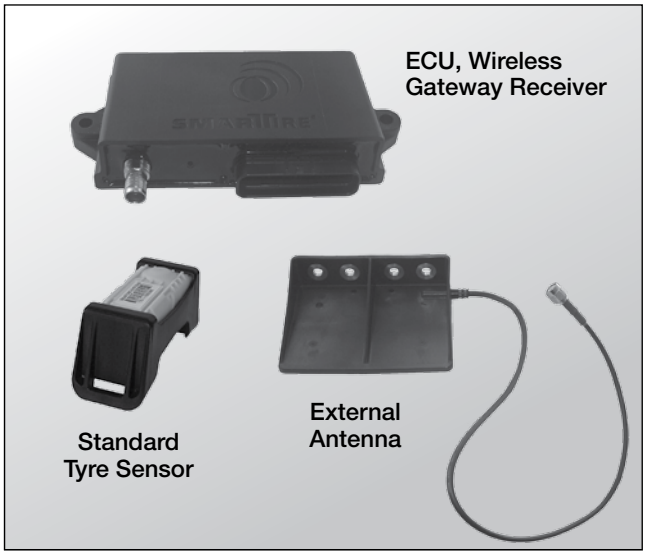
Tyre Pressure Monitoring System (TPMS)

Doc. No. Y095833 (EN - Rev. 003)
July 2015

Function

The **Tyre Pressure Monitoring System (TPMS)** is a system to alert the driver if any monitored tyre runs under its normal pressure or above its normal temperature. To do this a battery powered pressure sensor is rim mounted in each tyre. The sensor measures tyre pressure and temperature and sends the data wirelessly to a chassis mounted electronic control unit (ECU, Wireless Gateway Receiver). The ECU interprets the data from each tyre sensor and sends it to various user-selected devices. Possibilities are:

- via TEBS G2 * CAN on the trailer to the truck and then shown on the display
- via TEBS G2 * to a stand alone display
- via RS232 to an installed Telematic unit
- ECU*talk*® Diagnostics
- TIM G2



Simultaneous communication with different systems is possible.

Using an external antenna optimises the wireless data transmission from sensor to final receiver.

The design and installation of the system means that all sensors are separately initialized. This prevents a false sensor signal and ensures that no signals from other systems on the trailer will be registered by the ECU.

* TPMS is supported by:

- TEBS G2.0 and TEBS G2.1 Brake Modules with “V04” in the Part Number or modules ‘flashed’ to Software version 700.124.1.8 or above
- All TEBS G2.2 Brake Modules

Technical Features

ECU, Wireless Gateway Receiver

Operating temperature range:	-40 °C to +85 °C
Weight:	0.4 kg approx.
Voltage range:	9 to 36 V DC

Tyre Sensor

Operating temperature range:	-40 °C to +125 °C
Weight:	0.05 kg approx.
Pressure range:	0 to 13 bar

External antenna

Operating temperature range:	-40 °C to +85 °C
Weight:	0.2 kg approx.

Maintenance hand tool

Operating temperature range:	-20 °C to +70 °C
Weight:	1.2 kg approx.

LF tool

Operating temperature range:	-25 °C to +70 °C
Weight:	0.4 kg approx.

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SMARTIRE

Tyre Pressure Monitoring System (TPMS)

Doc. No. Y095833 (EN - Rev. 003)
July 2015

Range Overview

Part No.	Type No.	Description	
090.0011 [1]	-	Maintenance Tool	
090.0021 [1]	-	LF Tool	
115.0005 [2]	-	Kit - Tyre Sensor/Transmitter (yellow), with Cradle (ADR approved)	
201.0007 [2]	-	Tyre Sensor/Transmitter (yellow), with Cradle	
201.0014 [3]	-	ECU - Wireless Gateway Receiver with UDS trailer	
240.0162	-	External Antenna	
260.0270	-	Coaxial cable 10FT TNC F / TNC M	Length 3 m
260.0254	-		Length 6 m
260.0266	-		Length 9 m
260.0232	-		Length 12 m
264.0228	-	Cradle	
264.0332	-	Strap, stainless steel clamp, max. length to suit 578 mm dia.	
269.0155	-	Label, rim	
K092282	-	TNC T-piece to connect two antennae	

[1] The part number may carry a suffix “F”.

[2] Tyre Sensor/Transmitter 201.0007 will be available until all stock is depleted and then it will be replaced by Tyre Sensor/Transmitter Kit 115.0005 which contains the sensor/transmitter plus ADR approval documentation.

[3] The part number of the module will carry two suffices, firstly “V##” which represents the software revision of the product, e.g. V01, V02 etc., and secondly “N##” which defines the packaging requirements of different market sectors, e.g. N00, N50. Example: 201.0014V00N00 - is supplied with software to revision 00 and is supplied without packaging.

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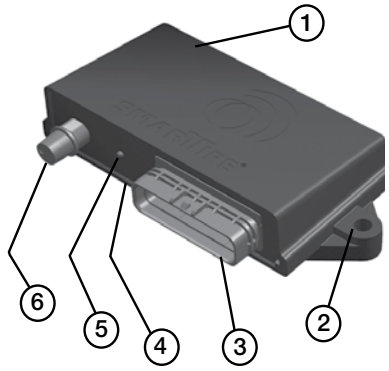
Doc. No. Y095833 (EN - Rev. 003)
July 2015

SMARTIRE

Tyre Pressure Monitoring System (TPMS)

Features

ECU, Wireless Gateway Receiver (201.0014VxxNxx)



1) Housing
Robust black nylon 6/6 plastic housing

2) Mounting
2 x Ø7.5 mm reinforced holes for chassis mounting

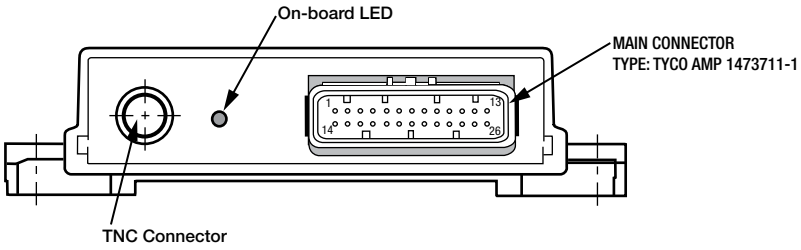
3) Connector
26-way TYCO AMP Superseal

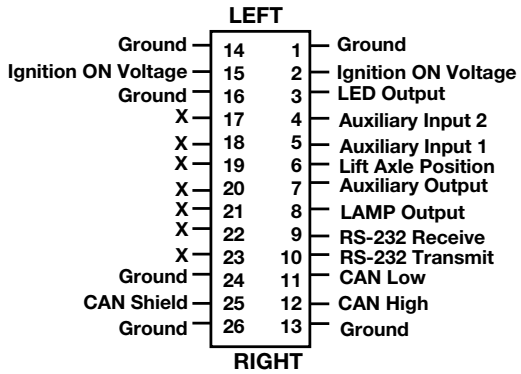
4) Potting
Polyurethane material to ensure IP67 protection

5) Diagnostic LED
Red LED with blink codes for various diagnostic conditions

6) Antenna connection
TNC threaded connection to connect supplementary antenna

- Communication via J1939 interface (J1708 option)
- RS232 interface option (e.g. to Telematics unit, third party ECU or for testing)
- 3 control outputs to drive LED warning light, incandescent bulb, buzzer, or other control function (2 x 2A high-side, 1 x 100mA low-side)
- Weather-proof, robust chassis-mount enclosure (IP67 rating)
- Tested to SAE J1455 standards. Radio and EMC approvals in NAFTA, EU
- Retains alerts after power down and has on-board LED for advanced diagnostics
- Programmable pressure and temperature alert levels including temperature compensation
- Internal antenna plus connection for external antenna





Line colours versus Pin Numbers for SmartWave Harnesses (configuration may vary by harness in terms of populated pins):

Pin	1	2	3	4	5	6	7	8	9	10	11	12	13
Line Colour	Black	Red	Orange	Red	Grey	Pink	White & Red	Purple	White	Blue	Green	Yellow	Black
Pin	14	15	16	17	18	19	20	21	22	23	24	25	26
Line Colour	Black	Red	Black	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Black	Clear or White	Black

The general purpose I/O lines are:

- 3 digital inputs 0 - 32 V (pins 4, 5 and 6)
- 2 high-side drivers, 2 A max. each (pins 7 and 8)
- 1 low-side LED driver, 0.15 A max. (pin 3)
- Pins 1, 14, 24, 26, 13: Common Grounds

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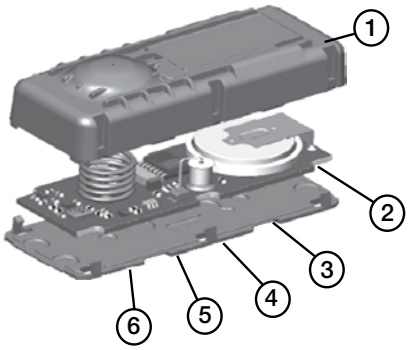
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Tyre Pressure Monitoring System (TPMS)

Doc. No. Y095833 (EN - Rev. 003)
July 2015

Tyre Pressure and Temperature Sensor/Transmitter (without Cradle)



1) Housing
Lightweight, 2 piece plastic housing

2) Battery
BR2450 lithium battery

3) Centrifugal switch
Senses motion to change transmission modes

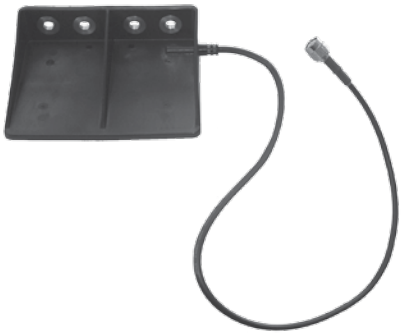
4) ASIS
Application Specific Integrated Sensor – pressure and temperature sensor that also provides the processing of the data

5) LF Coil
Acts as pick-up for the hand-tool signal to cause an activation of a transmission or change modes

6) Helical antenna
Optimizes signal transmission throughout the full rotation of the wheel

- Measures air pressure, temperature, internal battery voltage and detects motion of the wheel
  - Operating pressure accuracy ±0.17 bar (±2.5 psi)
  - Operating temperature accuracy ±3 °C @ 0 to 50 °C
- Sensor function:
  - measures pressure & temperature every 12 seconds; transmits immediately if pressure difference is greater than 0.2 bar (3 psi), otherwise every 3 to 5 minutes
- Universal attachment to wheel via stainless steel strap
- Self contained lithium battery power with life >5 yrs
- Transmits data to receiver wirelessly on 433.92 MHz
- Tested and proven with unmatched environmental resistance
- Can be activated by hand-tool for manual pressure checks
- Optional sensors with other functions are available

External Antenna (240.0162)



- Receives the RF data from the wheel modules and transmits to the receiver
- Robust, easy to install and inexpensive solution

Antenna T-piece (K092282)



- Permits two antennae to be linked on trailers where the body or load may diminish the signal, such as steel carrying vehicles

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Maintenance Tool (090.0011) [1)]



- Robust service and maintenance tool to support the TPMS
- Used in conjunction with sensors to check pressure and temperature of tyre
- Displays and records sensor ID, pressure, temperature and battery status
- Can be used to learn new sensor IDs and program them into the receiver
- Adaptable for altitude compensation
- Ability to add new features via software upload

LF Tool (090.0021) [1)]



- Robust Service Tool for the TPMS
- Activation of the sensors to transmit pressure and temperature. Report is displayed on the tool.
- Activation of the sensors for start-up (allocation of the sensors in relation to the tyres)

Cradle (0264.0228)



- Replacement Cradle for Tyre Sensor/Transmitter

Rim Label (0269.0155)



- Fix to the wheel rim adjacent to the sensor



Note:

When working on a trailer ensure that all typical safety instructions are followed - see Document No. *Y075876*. For further instructions and information please contact your Knorr-Bremse representative.

1) The part number may carry a suffix “F”.

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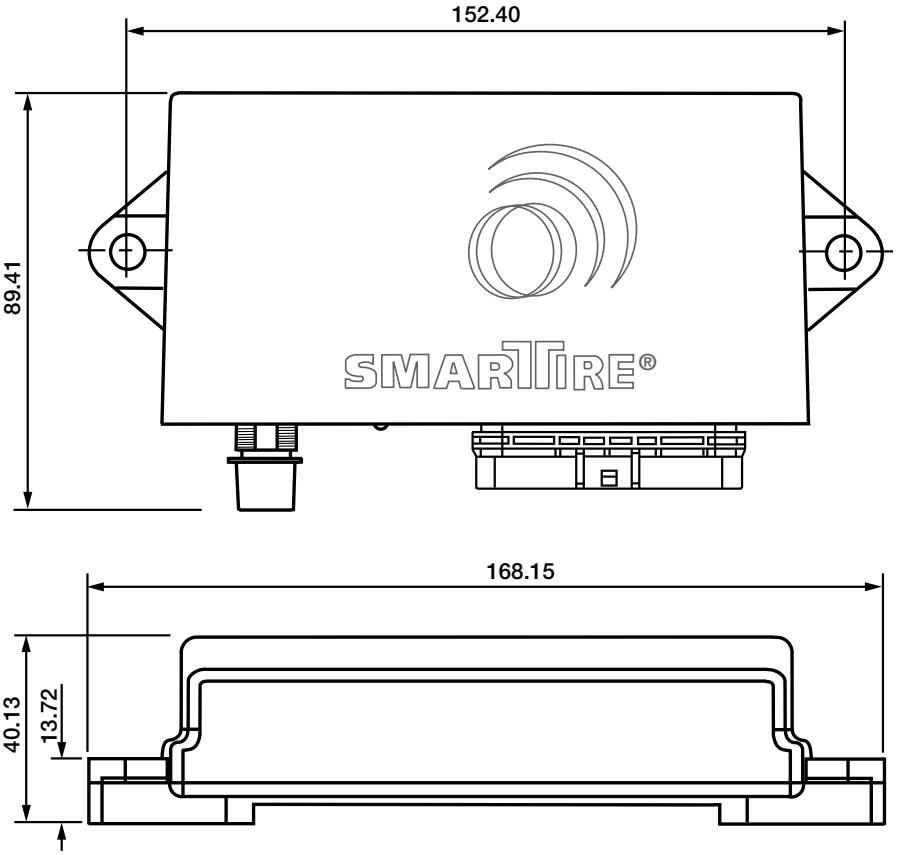
SMARTIRE

Tyre Pressure Monitoring System (TPMS)

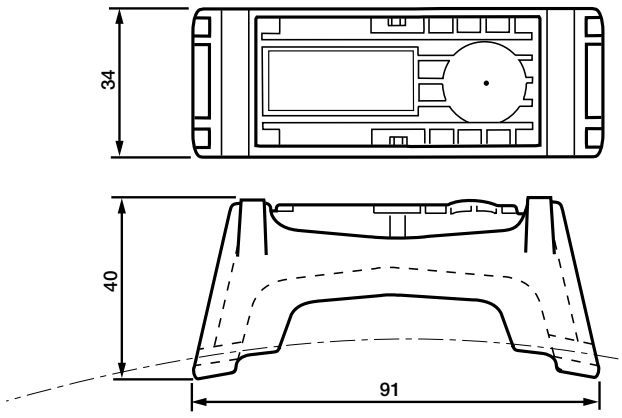
Doc. No. Y095833 (EN - Rev. 003)
July 2015

Dimensions (mm)

ECU, Wireless Gateway Receiver (201.0014VxxNxx)



Tyre Sensor, Transmitter with Cradle (201.0007)



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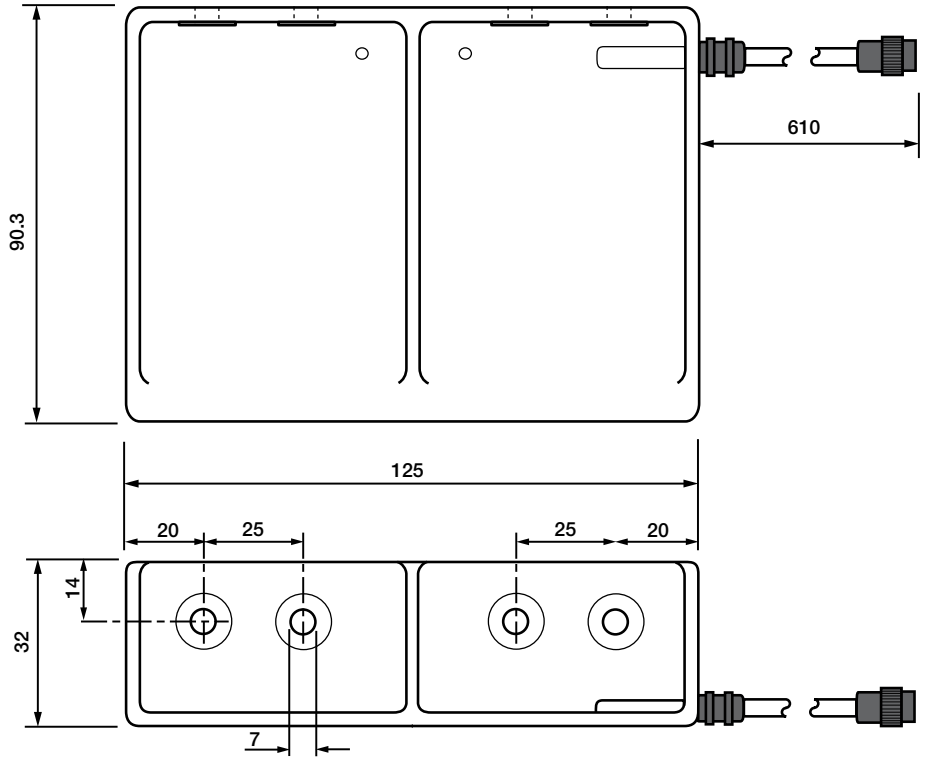
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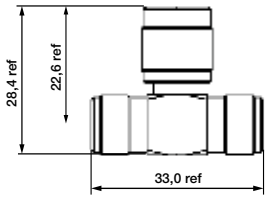
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External Antenna (240.0162)



Antenna T-piece (K092282)



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Tyre Pressure Monitoring System (TPMS)

Doc. No. Y095833 (EN - Rev. 003)
July 2015

Monitoring/Diagnostic

Several methods of monitoring the tyre pressure and temperature are available:

Directly on the trailer



- Knorr-Bremse offers the TIM G2 (Part No. K009166; see PD-273-920, Document No. Y050665) as a trailer monitoring system for tyre pressure and temperature
- Graphical display
- Simple operation (3 buttons)
- Individual tyre pressure read out
- Tyre temperature
- Deviation from nominal pressure (incl. temperature compensation)

and / or

Via TEBS G2.0 / G2.1 / G2.2 and CAN to display in the cab

- If you require this variant, for further information please contact your truck partner or local Knorr-Bremse representative.

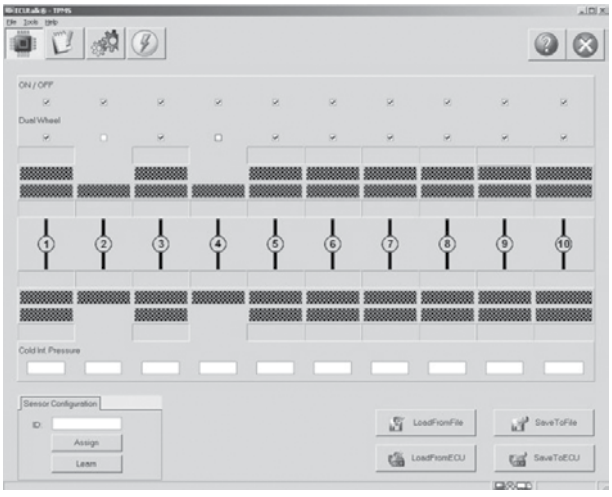
and / or

Via Telematic link

- There are two posibilities:
  - via RS232 (by arrangement with your Telematic supplier - additional cables required)
  - via J1939 (by arrangement with your Telematic supplier - installation required)

and

Diagnostics via ECU*talk*®



- This platform runs all Knorr-Bremse diagnostic programs (for TEBS4, TEBS G2, TIM, TIM G2, TRM, etc.) and from Version 2.2.4.3 via this diagnostic tool it is possible to access the tyre pressure monitoring system.
- To do this it is necessary to obtain the Knorr-Bremse diagnostic hardware and software and additionally a PIN for using the ECU*talk*®
- Diagnostic platform for programming via 9-pin J1939 connection
- Program new pressure sensors
- Changing tyre pressure and temperature parameters
- Fault report

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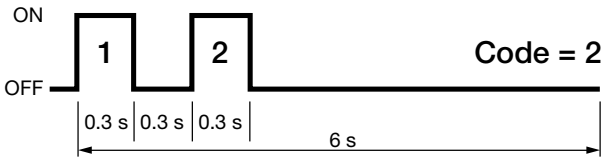
Diagnostics directly at the ECU, Wireless Gateway Receiver

- If there is no ECU*talk*® available, you also can diagnose the system at the ECU directly. An LED for that purpose is installed.
- If the LED is blinking and there is no data being transmitted from the receiver, but the display is powered and has initialized, check the blink code:

Alarms	Priority	On-board LED	Solution
No alarm	0	Off	
Second level low pressure (SAL)	13	Off	
Previous SAL	13	Off	
SAL cleared	0	Off	
First level high pressure (FAL)	11	Off	
First level low pressure (FAL)	11	Off	
FAL cleared	0	Off	
High temperature	9	Off	
Previous high temperature	9	Off	
High temperature cleared	0	Off	
RF sub-section fault	7	Pattern flashing code: 7	Replace ECU, Wireless Gateway Receiver
Internal error	7	Pattern flashing code: 7	Replace ECU, Wireless Gateway Receiver
ROM to both copy performed	5	Pattern flashing code: 5	Check settings with DDT
Set up fault	5	Pattern flashing code: 5	Check settings with DDT
Sensor fault set	3	Pattern flashing code: 3	Diagnose sensor fault
Previous sensor fault	3	Pattern flashing code: 3	Diagnose sensor fault
Sensor fault cleared	0	Off	
Factory to custom copy performed	1	Pattern flashing code: 1	Normal operation
Custom to factory copy performed	1	Pattern flashing code: 1	Normal operation
Black box initialized	1	Pattern flashing code: 1	Normal operation
Watchdog reset	1	Pattern flashing code: 1	Normal operation
Autolearn complete	1	Pattern flashing code: 1	Normal operation

Note: The flash pattern will have periods of 0.3 seconds ON and 0.3 seconds OFF repeating every 6 seconds. The number of ON phases in every 6-second period will identify the code.

Example



Note:

For further instructions and information please contact your Knorr-Bremse representative.

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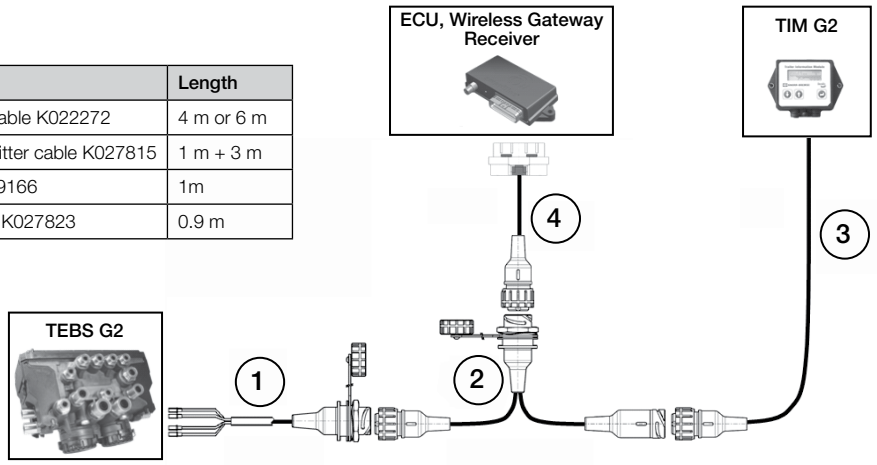
Tyre Pressure Monitoring System (TPMS)

Doc. No. Y095833 (EN - Rev. 003)
July 2015

System Configurations

For standard semi- and centre-axle trailers

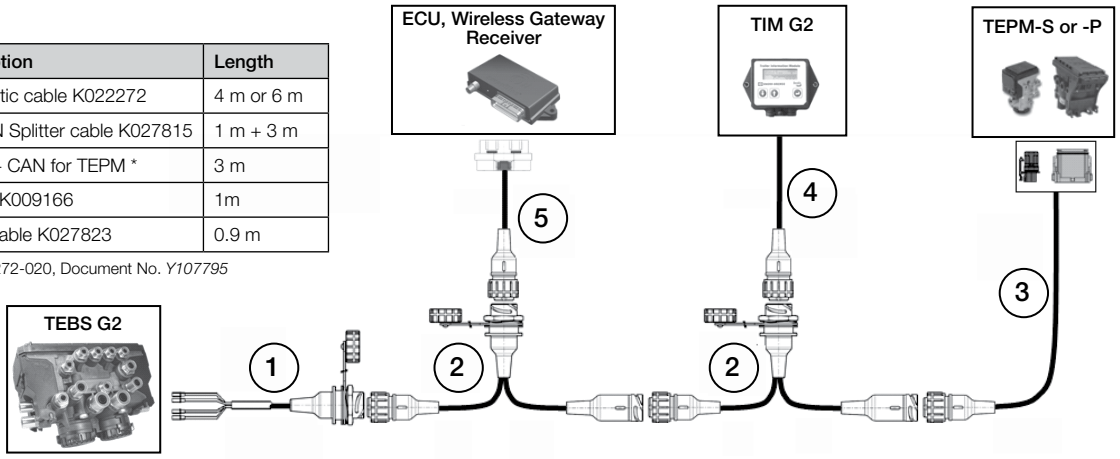
No.	Description	Length
1	Diagnostic cable K022272	4 m or 6 m
2	5 V CAN Splitter cable K027815	1 m + 3 m
3	TIM G2 K009166	1m
4	TPMS cable K027823	0.9 m



For drawbar trailers

No.	Description	Length
1	Diagnostic cable K022272	4 m or 6 m
2	5 V CAN Splitter cable K027815	1 m + 3 m
3	Power + CAN for TEPM *	3 m
4	TIM G2 K009166	1m
5	TPMS cable K027823	0.9 m

* See PD-272-020, Document No. *Y107795*



Revision Details

Rev. 001	March 2013	Details of Tyre Sensor Kit added to page 2 and of Rim Label added to page 4, in line with other languages.
Rev. 002	January 2015	Note added concerning tool part numbers on page 2. T-piece K092282 added. Note added on page 7 concerning End of Line testing.
Rev. 003	July 2015	Note on page 7 concerning End of Line testing deleted.

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Doc. No. Y011334 (EN - Rev. 002)
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Data Sheets

PD No.	Product	Type/Part No. family
PD-150-100	Data Sheet for Brake Calculations	
PD-150-150	Data Sheet for Brake System Design	

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Product DATA

Data Sheet for Brake Calculations

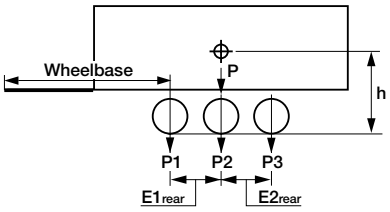
Doc. No. Y011386 (EN - Rev. 002)
June 2015

PD-150-100

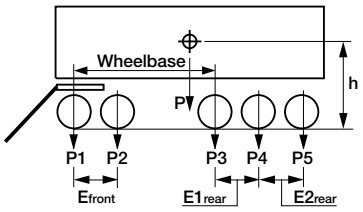
TRAILER DATA REQUIRED FOR BRAKE CALCULATIONS

Trailer Manufacturer:			Model No./Type:
Contact:	Tel.:		Email:

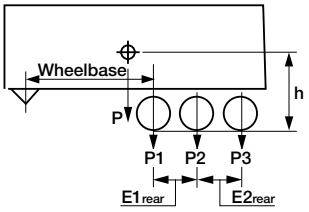
☐ Centre Axle Trailer



☐ Drawbar Trailer



☐ Semi-Trailer

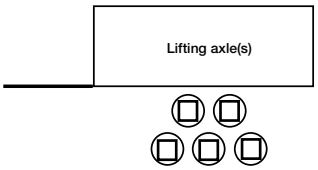


		Unladen weight [kg]	Laden weight [kg]	Brake Actuators Make/Service & Parking size
Total	P			
Axle 1	P1			
Axle 2	P2			
Axle 3	P3			
Axle 4	P4			
Axle 5	P5			
Height of Centre of Gravity [mm]	h	Unladen:	Laden:	
Wheelbase [mm]:			E1rear [mm]:	
Efront [mm] (drawbar only):			E2rear [mm]:	
Tyre Size or Dynamic Tyre Radius:				
Trailing steer axle		☐ Yes	☐ No	
Suspension type		☐ Air suspension	☐ Mechanical suspension	
Spring deflection (mechanical suspension) - unladen to laden travel [mm]:				
Suspension type		☐ Balanced (non-reactive)	☐ Not balanced (reactive)	

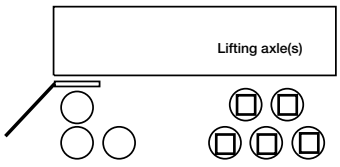
Air Suspension manufacturer and Type No.:	Air Spring Bellows diameter [mm]:	Suspension arm lengths [mm]: L_1 = L_2 =	Bellows pressure [bar]: unladen = laden =

Position of Lift Axle(s) (please identify position and order of lifting with 1, 2, etc. in relevant box/boxes or 'X' if no order)

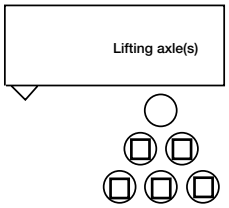
☐ Centre Axle Trailer



☐ Drawbar Trailer



☐ Semi-Trailer



To help Knorr-Bremse complete your brake calculation quickly and efficiently, please complete all relevant sections of the Data Sheet

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June 2015

Data Sheet for Brake Calculations

TRAILER DATA REQUIRED FOR BRAKE CALCULATIONS (contd.)

Trailer Manufacturer:		Model No.:	
Axle Manufacturer:			Axle Type:
Brake Manufacturer/Type:			Test Report No.: (if not available, provide technical data)
Preferred slack adjuster lever length (S-cam brake):			
☐ Without ABS	$V_{max.}$ [km/h]:		
☐ With ABS	**Desired ABS configuration**		
☐ With TEBS	☐ 2S/2M	☐ 4S/2M	☐ 4S/3M ☐ 6S/3M
Number of teeth on the sensing ring:			
With separate REV	☐ Yes		☐ No
Spring brake parking	☐ Yes		☐ No
Air suspension control	☐ Single circuit		☐ Dual circuit

To help Knorr-Bremse complete your brake calculation quickly and efficiently, please complete all relevant sections of the Data Sheet

If necessary, please provide additional data (sketches, etc.)

Knorr-Bremse makes every effort to ensure that the calculation produced from the data supplied meets the requirements of EEC legislation at the time the calculation is undertaken. It is the customer's responsibility to verify the calculation by completing a physical test.

See also Data Sheet Y217331 for brake and air suspension system design.

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June 2015

Data Sheet for Brake and Air Suspension Design

TRAILER DATA REQUIRED FOR BRAKE AND AIR SUSPENSION DESIGN

To be used in conjunction with the data supplied on Data Sheet Y011386

Trailer Manufacturer:	Model No.:	
Contact:	Tel:	Email:
Stop lamp powering	Yes ☐	No ☐
Combined park/shunt valve, with int. charging valve	Yes ☐	No ☐
Release valve for the front axle(s) (Drawbar trailers)	Separate ☐ None ☐	Integrated in park/shunt valve ☐
iTAP (Intelligent Trailer Access Point)	Yes ☐	No ☐
iLvl suspension control ☐	**Conventional air suspension** ☐	
1-point system ☐ 2-point system ☐	Levelling valve with height limitation ☐	
Electrical backup (override) (rocker switch) ☐	Datum height adjustment (2nd ride height) ☐	
Pneumatic backup (override) ☐	Rapid exhaust of the air suspension bellows ☐	
Raise/lower valve with automatic reset to ride height	**Raise/lower valve without automatic reset to ride height**	
Speed Pulse (SP) SV3801 ☐	With automatic handle return ☐	Without automatic handle return ☐
Reset to Ride (RtR) SV32.. with electrical reset ☐ with pneumatic reset (P_{28}) ☐	With increased flow diameter ☐	Without increased flow diameter ☐
Separate lowering of front and rear axles (Drawbar trailer)	Yes ☐	No ☐
With lift axle(s) ☐	**Without lift axle(s)** ☐	
Lift axle control via TEBS ☐	Conventional lift axle control (pneumatic): fully automatic (LS2000/LS3000) ☐ semi-automatic (LS1500) ☐	
Forced lowering of the lifting axle(s) electrical ☐	manual ☐ both ☐ none ☐	
iCargo Yes ☐ No ☐	iCorner Yes ☐ No ☐	
Traction Help	Yes ☐	No ☐
RSP	Yes ☐	No ☐
Trailer Information Module (TIM G2)	Yes ☐	No ☐
Pad Wear Sensing (PW)	Yes ☐	No ☐
Tyre Pressure Monitoring System (TPMS)	Yes ☐	No ☐
'Ramp Docking System' (Reversing System) using ADL2025	Yes ☐	No ☐
If the trailer is not easy to describe, please provide additional data (sketches)		

Knorr-Bremse makes every effort to ensure that the brake system produced from the data supplied meets the requirements of EEC legislation at the time the design is undertaken. It is the customer's responsibility to verify any design by completing a physical test.

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July 2015

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PD No.	Product	Type/Part No. family

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Product	Type/Part No.	PD No. family
3/2 Control Valves	**AE4265, AE4266**	**PD-120-321**
ABS Relay Modulator Valves	**BR92..**	**PD-200-200**
Adapter Valves	**DB21..**	**PD-110-200**
Air Disc Brakes	**SN5, SN6, SN7, SK7**	**PD-420-000**
Air Reservoirs	**VB....**	**PD-524-000**
Brake Chambers (Disc) - OBC generation	**BS3...**	**PD-405-100**
Brake Chambers (Disc) - with Clamp Ring	**BS3...**	**PD-405-000**
Brake Chambers (S-cam), long stroke	**BX3..., BZ3...**	**PD-403-200**
Brake Hose	**BS....**	**PD-523-200**
Cables for Trailer ABS		**PD-272-010**
Cables for Trailer EBS (TEBS4)		**PD-272-020**
Cables for Trailer EBS (TEBS G2)		**PD-272-025**
Charging Valves	**DR4...**	**PD-074-000**
Coupling Heads	**KU13.., KU14..., KU41..**	**PD-109-000**
Deflection Sensor	**K026919**	**PD-264-200**
Diagnostic Cables for TEBS G2		**PD-272-035**
Diagnostic Cables for Trailer ABS and TEBS4		**PD-272-030**
Diaphragm Brake Chambers for Trailers (Overview)		**PD-400-000**
Double Check Valves	**AE41.., 1111419000, 295358**	**PD-112-200**
Height Limiting Valve (Air Suspension)	**AE1103**	**PD-504-000**
iLvl Push Button		**PD-280-700**
iLvl Valve		**PD-280-450**
In-line Air Filter	**LA2103**	**PD-053-200**
iTAP Wireless Interface (ECU)	**EZ2040**	**PD-273-940**
Level Sensor	**K025259**	**PD-264-100**
Level Sensor for use with iLvl (iLvl Sensor)		**PD-264-300**
Levelling Valves	**SV13.., SV14..**	**PD-500-000**
Lift Axle Valve, Manual/Pneumatic	**AE1124**	**PD-503-100**
Lift Axle Valves - Pneumatic	**LS1..., LS2..., LS3...**	**PD-503-200**
Lift Axle Valves - TEBS controlled	**AE1141**	**PD-503-400**
Load Sensing Valves (Air Suspension)	**BR55..**	**PD-104-000**
Load Sensing Valves - manual (for Relay Emergency Valves)	**BR13..**	**PD-102-000**
Load Sensing Valve, mechanically controlled	**BR43..**	**PD-103-000**
Manifold Block	**LS50.., LS60..**	**PD-520-700**
Manoeuvring Valve (Semi-trailer)	**AE4261**	**PD-113-110**
Manoeuvring Valves (Drawbar Trailers)	**AE4211, AE4257**	**PD-113-120**
Park / Shunt Valves	**AE424.**	**PD-113-210**
Park / Shunt Valve with Integrated Charging Valve	**AE437.**	**PD-113-230**
Park / Shunt Valves with Integrated Emergency Function	**AE431.**	**PD-113-220**
Plastic Pipe	**KR....**	**PD-523-600**
Plastic Pipe Coils	**PET..**	**PD-523-400**
Pressure Control Valve (PCV)	**K038468**	**PD-200-150**
Pressure Limiting Valves	**DB11..**	**PD-108-000**
Pressure Proportioning Valves	**DB21..**	**PD-110-000**
Pressure Retaining Valves	**DB21..**	**PD-110-300**
Pressure Sensor	**K015173**	**PD-262-200**
Quick Release Valves	**RE21.., KX...., 1194339**	**PD-111-400**
Raise / Lower Valve (with Speed Pulse function)	**SV3801**	**PD-501-100**

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Product	Type/Part No.	PD No. family
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Raise / Lower Valves (single circuit)	**SV32..**	**PD-501-050**
Relay Emergency Valves	**AS3..., AS7...**	**PD-107-000**
Relay Valve	**AC574..., RE11..**	**PD-106-000**
Select Low Valve (Double Cut-off valve)	**K060386**	**PD-112-800**
Shut-Off Valves	**AE21..**	**PD-122-000**
Single Check Valves	**AE51..**	**PD-112-100**
Solenoid Valves	**AE9120, EA1152**	**PD-121-000**
Spring Brake Actuators for Trailers (Overview)		**PD-413-000**
Spring Brakes (S-cam) - diaphragm/diaphragm	**BX7...**	**PD-413-200**
Spring Brakes (S-cam) - diaphragm/piston	**BX9..., BZ9...**	**PD-413-100**
Spring Brakes (Disc) - diaphragm/diahpragm	**BS7...**	**PD-415-200**
Spring Brakes (Disc) - diaphragm/piston	**BS9...**	**PD-415-100**
TEBS G2/G2.1 Brake Module	**ES2060**	**PD-214-200**
TEBS G2.2 Standard Brake Module	**ES2090**	**PD-214-300**
TEBS G2.2 Standard Plus Brake Module	**ES2090**	**PD-214-325**
TEBS G2.2 Premium Brake Module	**ES2095**	**PD-214-350**
TEBS4 Brake Module	**ES205.**	**PD-214-100**
Throttle Check Valve	**SEB00778**	**PD-112-400**
Trailer ABS (A18)	**ES2005**	**PD-203-200**
Trailer ABS (KB3-TA)	**ES200.**	**PD-203-100**
Trailer ABS (KB4TA)	**ES1305**	**PD-203-300**
Trailer Electro-Pneumatic Module (TEPM-S / TEPM-P)	**ES207.**	**PD-214-600**
Trailer Information Module (TIM G2)	**K009166**	**PD-273-920**
Trailer Park Valves	**AE4262, AE4264**	**PD-113-300**
Trailer Roadtrain Module (TRM)	**EZ2085**	**PD-214-800**
Tyre Pressure Monitoring System (TPMS)		**PD-551-000**
Wheel Speed Sensors	**04860001.., 04860010..**	**PD-261-000**

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