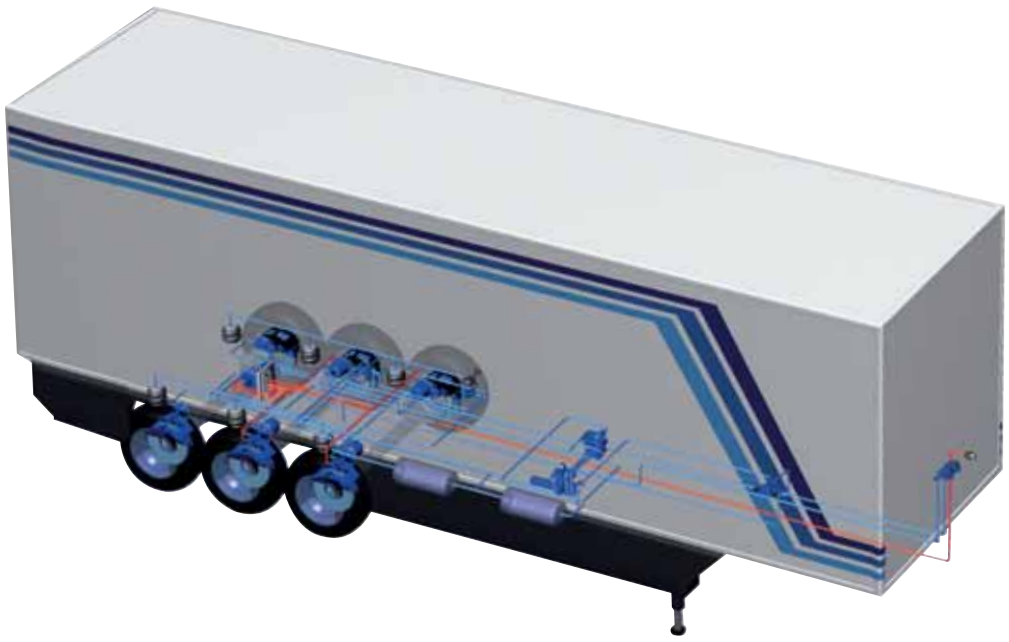
Product Catalogue

Brake and Air Suspension Products for Trailers



KNORR-BREMSE

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

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 brake valves, ABS, EBS, actuation, air disc brake and air suspension/lift axle control. In each section, we have shown a selection of popular part numbers and their technical details. Finally, we include a section containing data sheets for Trailer brake calculations and System design.

From time to time, we will update and re-issue these sections to those people having registered catalogue ownership using the card provided.

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technicalsupport@en.knorr-bremsesfn.com

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0. Index

Section No.: K002452-002
Doc. No.: Y011335-EN-002

Catalogue No.: K001561-EN

0. Index

Section No.: K002452-002
Doc. No.: Y011335-EN-002

Catalogue No.: K001561-EN

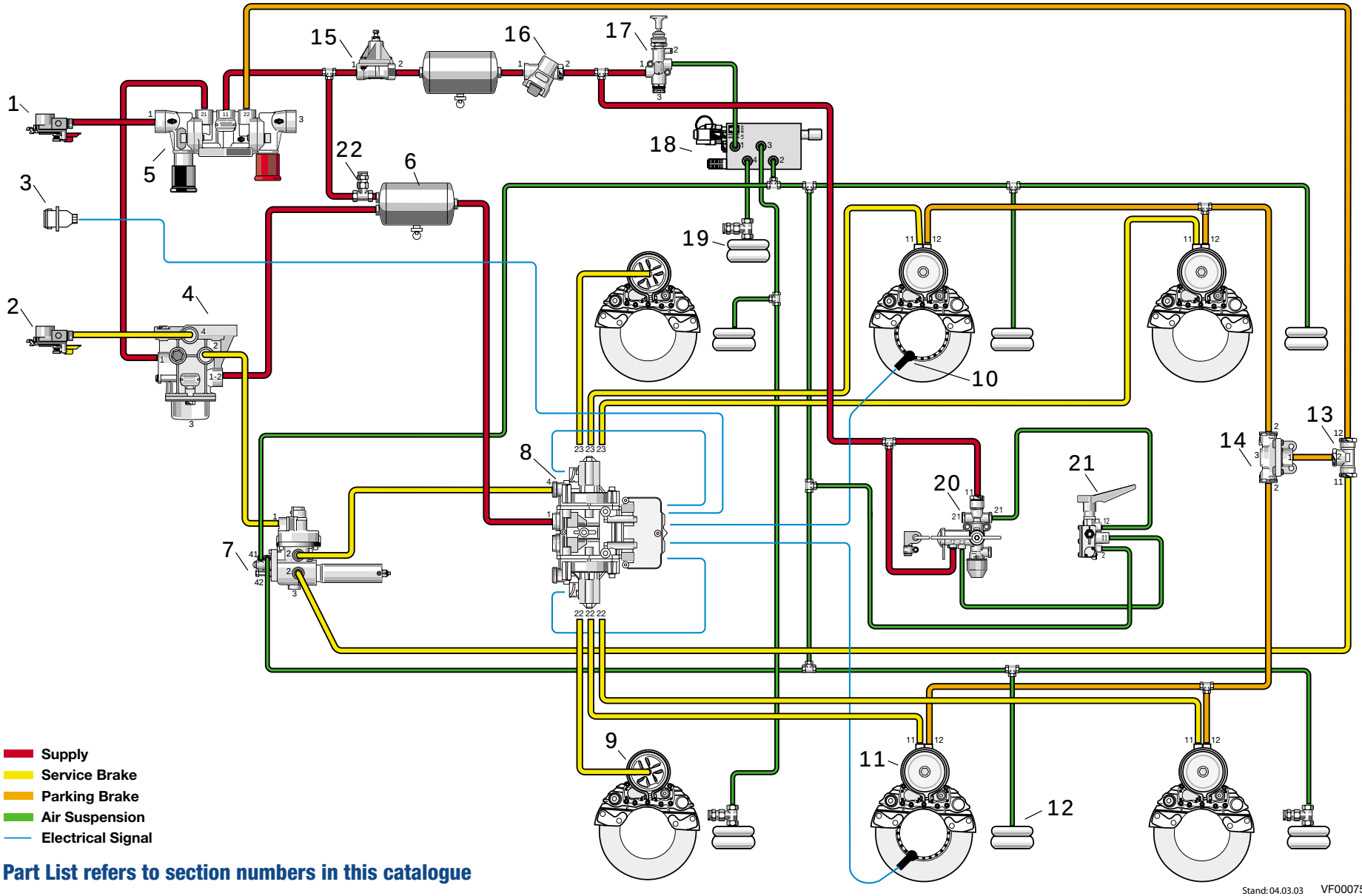
0. Index (alphabetical)

Section No.: K002452-002
Doc. No.: Y011335-EN-002

Catalogue No.: K001561-EN

KNORR-BREMSE
Systems for Commercial Vehicles

Semi-trailer Brake and Air Suspension Systems with ABS



Part List refers to section numbers in this catalogue

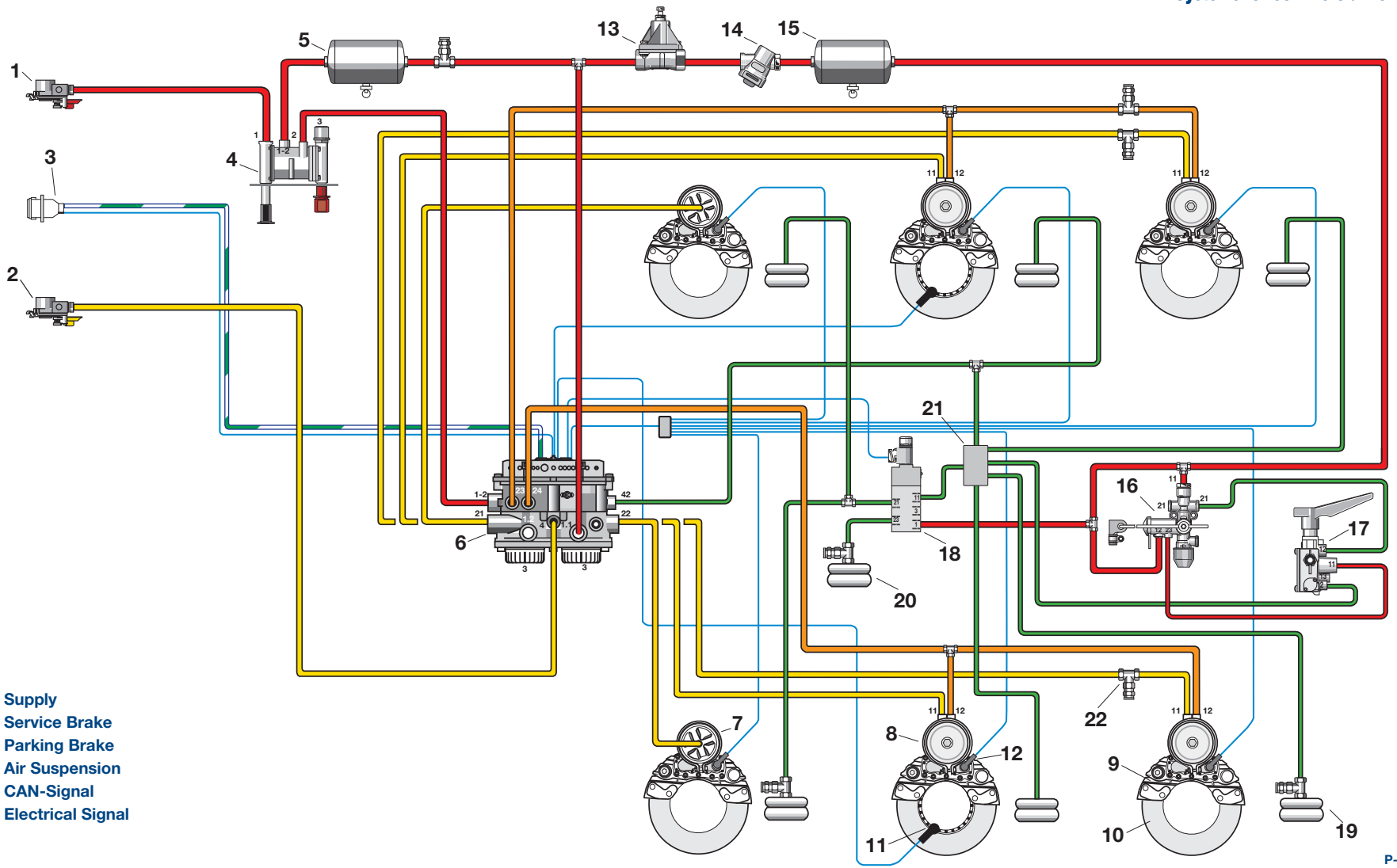
1	Coupling Head with Filter "Supply"	2	6	Air Reservoir	22	11	Spring Brake	54, 55	16	In-Line Filter	3	20	Levelling Valve	70
2	Coupling Head with Filter "Control"	2	7	Load Sensing Valve	8	12	Air Spring Bellow		17	3/2 Control Valve	78	21	Raise/Lower Valve	71, 72
3	ABS Connector ISO 7638	30	8	ABS Trailer Module	34	13	Double Check Valve	19	18	Lift Axle Control Valve, pneumatically controlled	74	22	Test Connector	
4	Relay Emergency Valve	4	9	Brake Chamber	51	14	Quick Release Valve	21						
5	Park/Shunt Valve	16	10	Sensing Ring and Speed Sensor	32	15	Charging Valve without feedback	77	19	Lift Bellows				

Stand: 04.03.03 VF00075/226 EN

Section No.: K002453-000
Doc. No.: Y011336-EN-000
Catalogue No.: K001561-EN

Knorr-Bremse Electronic Braking System for Trailers

KNORR-BREMSE
Systems for Commercial Vehicles



P-00302/EBS Anh EN

1 Coupling Head with Filter ÓSupplyÓ
2 Coupling Head with Filter ÓControlÓ
3 EBS Connection ISO 7638
4 Park / Shunt Valve with Emergency Function
5 Air Resevoir

6 EBS Trailer Module
7 Brake Chamber
8 Spring Brake
9 Air Disc Brake
10 Brake Disc

11 Sensing Ring and Speed Sensor
12 Wear Sensor
13 Pressure Protection Valve
14 Line Filter
15 Air Reservoir, Suspension

16 Levelling Valve
17 Raise / Lower Valve
18 Lift Axle Valve
19 Air Spring Bellows
20 Lift Bellows

21 Junction Block
22 Test Connector

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function

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

Coupling Heads are colour coded to indicate the Control (Yellow) and Supply (Red) air line connections and are designed as defined in DIN ISO 1728 to prevent wrong connection.

GrF 0155

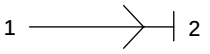
Technical Features

Maximum Operating Pressure:	8,5 bar
Operating Temperature Range:	-40 °C to +80 °C
Medium:	Compressed air
Approximate weight:	0,2 kg

Yellow and Red Coupling Heads are not interchangeable.

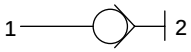
Standard Symbol as DIN ISO 1219

for Trailer



KU 13..

for Towing Vehicle



KU 41..

Product overview

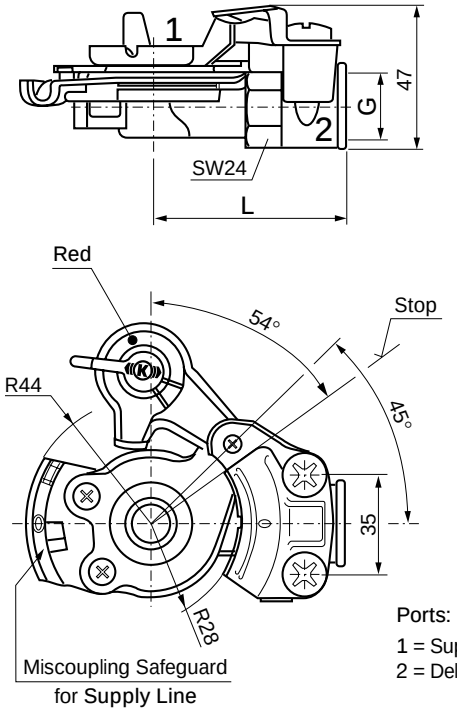
Type No.	Application / Colour	Thread G[3]	Dimension L[3] [mm]	Vehicle Application
KU1304	Control Line/Yellow	M22x1,5	Max. 65,5	Trailer[1]
KU1305	Supply Line/Red		Max. 65,5	
KU1310	Supply Line/Red	M16x1,5	Max. 65,5	Trailer[1]
KU1311	Control Line/Yellow		Max. 65,5	
KU4124	Supply Line/Red	M16x1,5	50	Towing Vehicle[2]
KU4128	Control Line/Yellow		50	

[1] without Self-Sealing Valve
[2] with Self-Sealing Valve
[3] see page 1.2

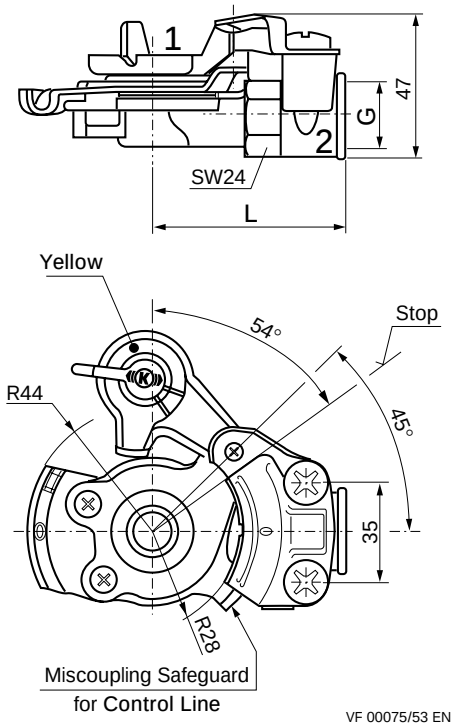
Section No.: K002455-000
Doc. No.: Y011338-EN-000
Catalogue No.: K001561-EN

Dimensions, Trailer Coupling (Without Self-Sealing Valve)

KU1305
KU1310



KU1304
KU1311

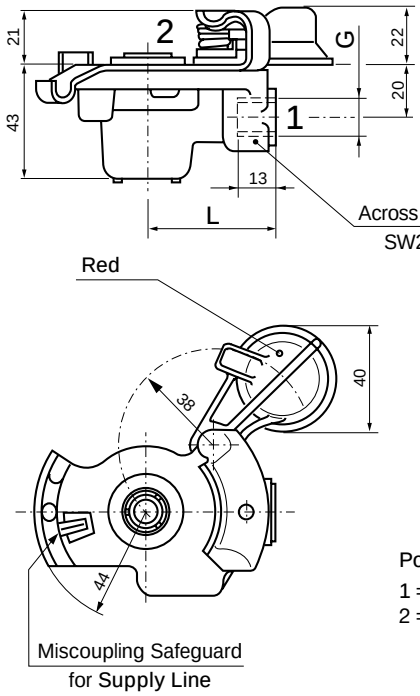


Ports:
1 = Supply
2 = Delivery

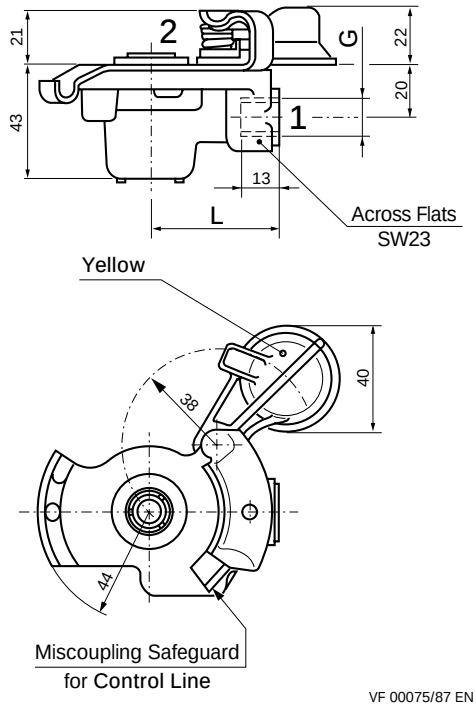
VF 00075/53 EN

Dimensions, Towing Vehicle Coupling (With Self-Sealing Valve)

KU4124



KU4128



Ports:
1 = Supply
2 = Delivery

VF 00075/87 EN

Section No.: K002455-000
Doc. No.: Y011338-EN-000
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

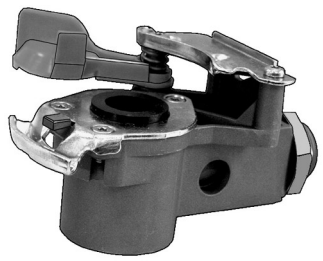
Function

Coupling Heads are used to connect the braking systems of the towing vehicle and trailer. An integral filter protects the air brake system and the auxiliary systems of the trailer from contamination.
To prevent a blocked filter trapping air pressure in the Supply or Control lines, a by-pass feature allows air to flow back through the valve.

Coupling Heads are colour coded to indicate the Control (Yellow) and Supply (Red) air line connections and are designed as defined in DIN ISO 1728 to prevent wrong connection.

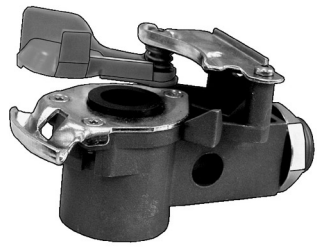
The versions for semi-trailers are designed to prevent the rotation of the coupling head when connecting or disconnecting the air line.

KU1400



VF 00199_161

KU1410



VF 00199_162

Technical Features

Maximum Operating Pressure:	8,5 bar
Operating Temperature Range:	-40°C to +80°C
Medium:	Compressed air
Filter:	Integrated
Approximate weight:	0,3 kg

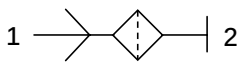
Yellow and Red Coupling Heads are not interchangable.

Product overview

Type No.	Part No.	Application/ Colour	Pneumatic Thread (internal)	Mounting Thread	Test Connector	Typical Vehicle Application
KU1400[1)]	K000952	Supply/Red	M16x1,5	M24x1,5	-	Semi-trailers
KU1410[1)]	K000954	Control/Yellow	M16x1,5	M24x1,5	-	
KU1412[1)]	K000956	Control/Yellow	M16x1,5	M24x1,5	With	
KU1401	K000953	Supply/Red	M16x1,5	-	-	Centre Axle and Drawbar trailers
KU1411	K000955	Control/Yellow	M16x1,5	-	With	
KU1413	K000957	Control/Yellow	M16x1,5	-	-	

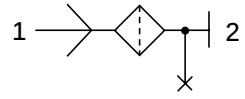
Standard Symbol as DIN ISO 1219

KU1400, KU1401,
KU1410, KU1413



KU 1400

KU1411, KU1412



KU 1412

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.

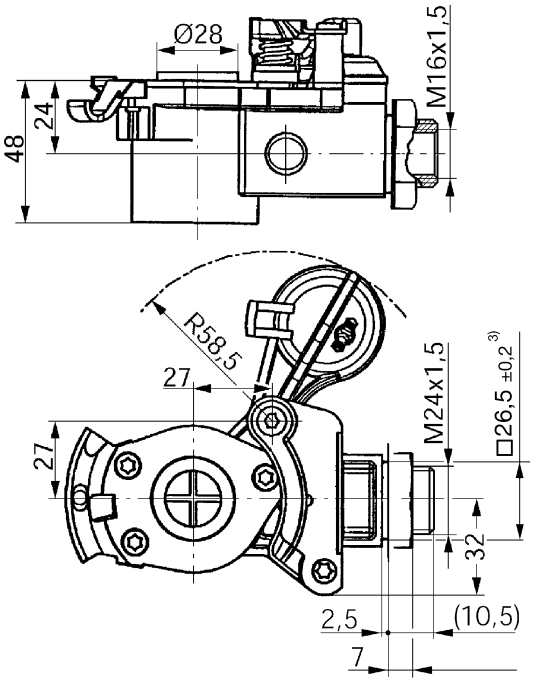
Tightening torques:
M16x1,5: 45 Nm
M24x1,5: 60 Nm

[1)] Locknut and shim plate supplied

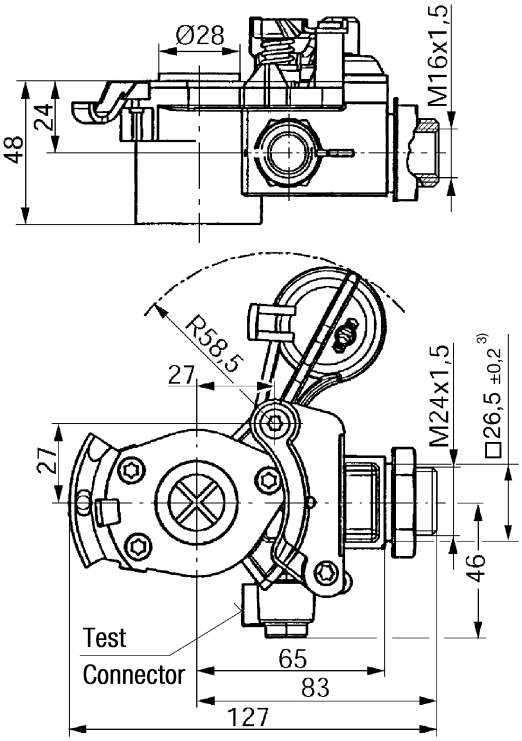
Section No.: K002456-002
Doc. No.: Y011339-EN-002
Catalogue No.: K001561-EN

Dimensions

KU1400
KU1401 [1]



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



1) No mounting thread
2) No test connector
3) Square part in the console sheet metal: □27 mm

VF00075/132 EN ÄI02

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Quattro-Matic Coupling Head

Function

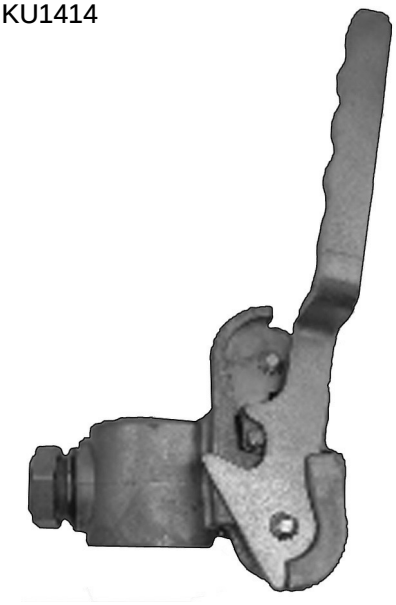
The Quattro-Matic coupling is used to connect the braking systems of the towing vehicle and trailer.

In the housing of the Quattro-Matic Coupling Head the ports for Supply and Control line as well as two in-line air filters are combined into one unit

Internal filters protect the air braking system and the auxiliary systems of the trailer from contamination.
To prevent a blocked filter trapping air pressure in the Supply or Control lines, a by-pass feature allows air to flow back through the valve. In the same way, the releasing of the brake is ensured in case of a blocked filter, which means that the filter opens in both directions.

The Quattro-Matic Coupling Head is available in a version for semi-trailers as well as for drawbar and centre axle trailers. It is normally compatible with similar design coupling heads of other manufacturers.

KU1414



VF00199_300

KU1415

VF00199_301

Technical Features

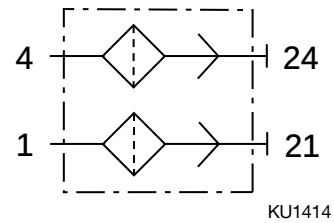
Maximum Operating Pressure:		max. 10 bar
Operating Temperature Range:		-40°C to +80°C
Medium:		Compressed air
Filter:		Integrated, opens in both directions
Approximate Weight:	KU1414	0,920 kg
	KU1415	0,463 kg

Product overview

Type No.	Part No.	Pneumatic Thread (internal)	Mounting Thread	Further technical details	Vehicle Application
KU1414	K002640	M16x1,5	M22x1,5	Y010964	Semi-trailers
KU1415	K002641	M16x1,5	M22x1,5	Y011011	Centre Axle and Drawbar trailers

Standard Symbol as DIN ISO 1219

KU1414, KU1415



KU1414

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.

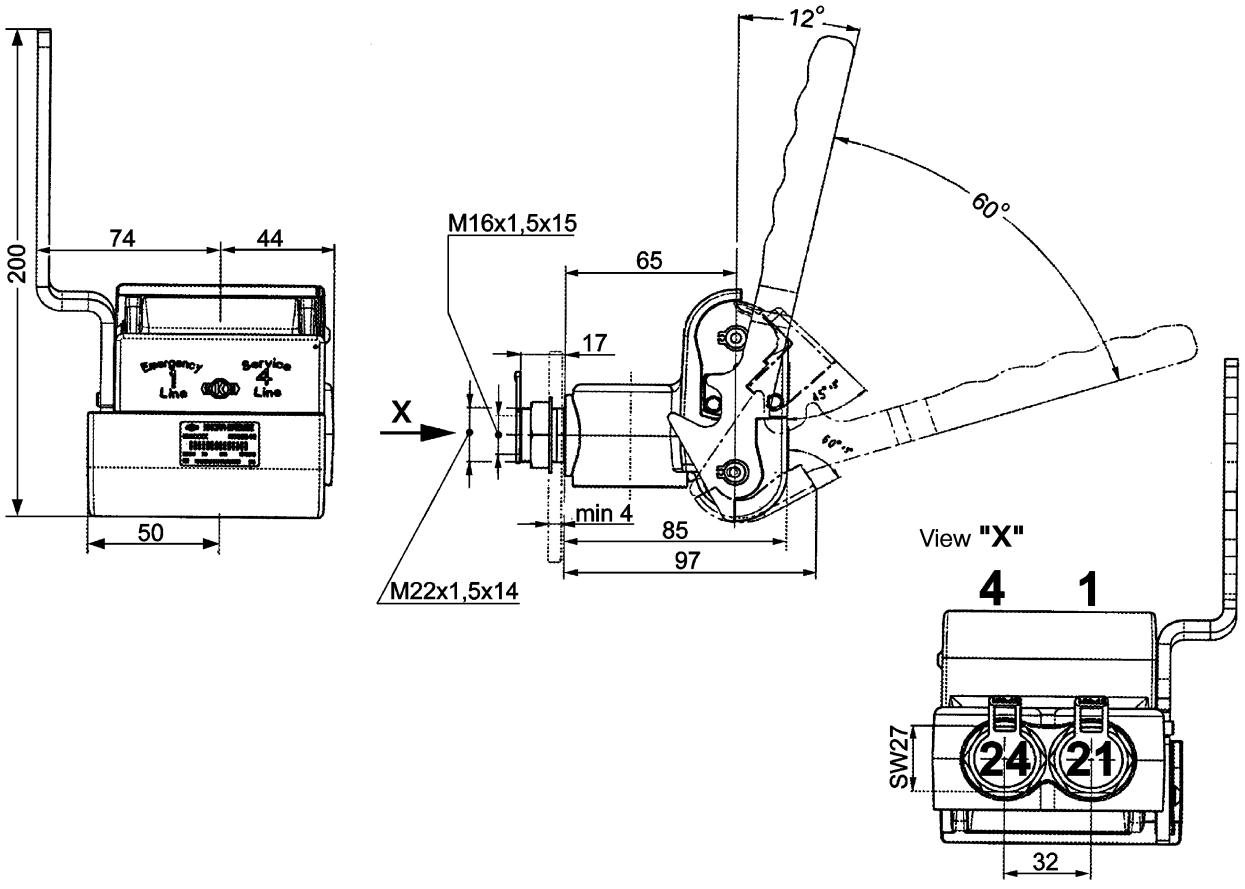
Max. Tightening torques:
M16x1,5: 45 Nm

Section No.: K002456-002
Doc. No.: Y011339-EN-002
Catalogue No.: K001561-EN

Quattro-Matic Coupling Head

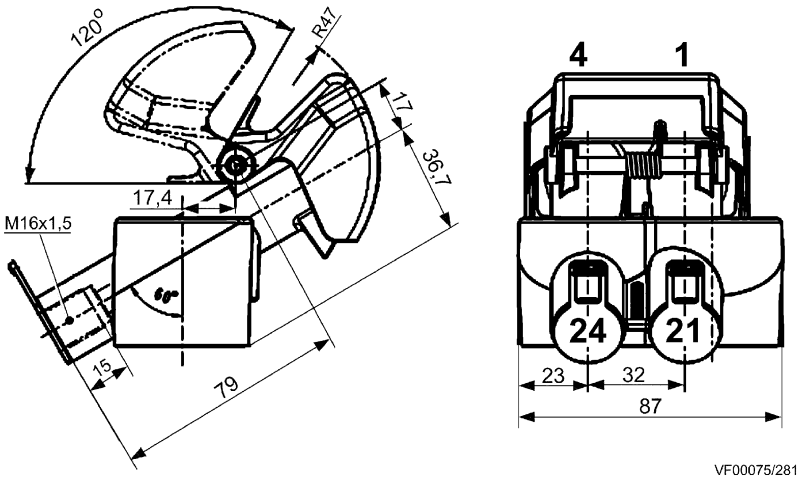
Dimensions

KU1414



VF00075/282 EN

KU1415



VF00075/281

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

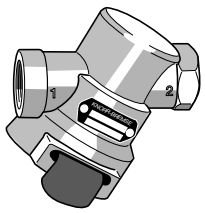
Function

The In-Line Air Filter is used in air brake systems to protect sensitive pneumatic devices from contamination.

It is typically fitted in the Supply and Control lines on trailers to protect the trailer brake 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.

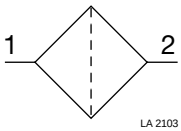
To stop a blocked filter trapping air pressure in the Supply or Control lines, the Valve has a by-pass feature which allows air to flow back through the valve unfiltered.

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



GrF 0349

Standard Symbol as DIN ISO 1219



LA 2103

Technical Features

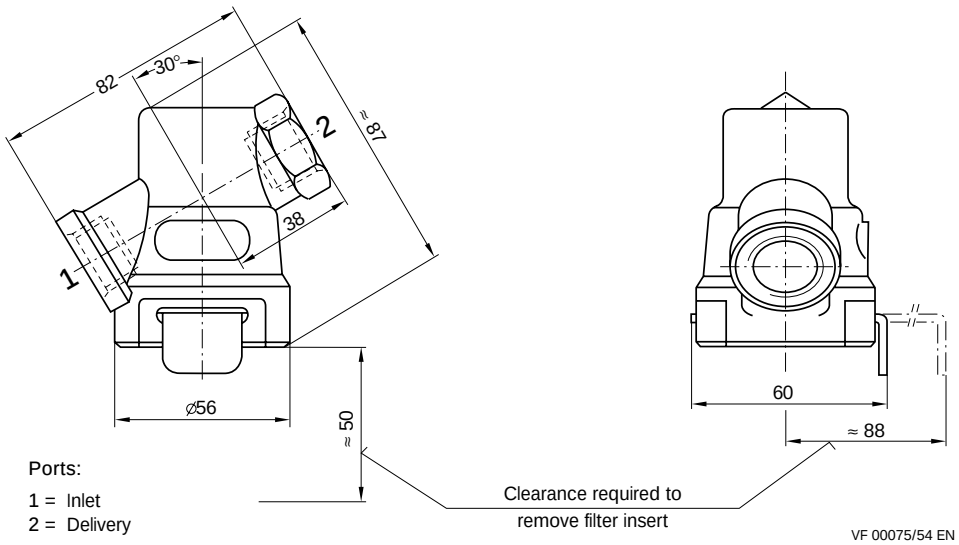
Maximum Operating Pressure:	20 bar
Operating Temperature Range:	-40 °C to +80 °C
Medium:	Compressed air
Approximate weight:	0,2 kg

Product overview

Type No.	Port Threads
LA2103	M22x1,5 - 13

Note: An In-Line Air Filter is already integrated in Coupling Heads KU14..

Dimensions



VF 00075/54 EN

Section No.: K002457-000
Doc. No.: Y011340-EN-000
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function

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

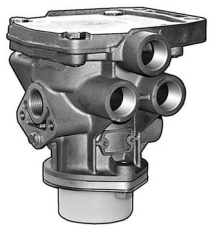
In the event of a loss of pressure in the trailer Supply (Red) line, for example from an intentional or accidental uncoupling, the emergency feature of the valve will automatically apply the trailer service brakes using the air stored in the trailer reservoir. This function is also apparent when charging 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 4.2.

Most Relay Emergency Valves have a Predominance feature that generates a pressure to the service (port 2) brakes higher than signal (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 Chambers.

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 drawing 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.

AS3000A



VF 00199_110

AS3100A

VF 00199_106

Technical Features

Maximum operating pressure:	10 bar
Operating Temperature Range:	-40 °C to +80 °C
Maximum torque for fittings M22x1,5:	60 Nm
Approximate weight:	1,6 kg

Product overview

Type / Part No.	Predominance Adjustment range [2] [bar]	Predominance Pre-set to [bar]	Ports 1, 1-2, 4	Ports 2	Manoeuvring Valve
AS3000A	0 - 0,5	0	M22x1,5	M22x1,5	–
AS3018 SEB00409	0 - 0,5	0	M22x1,5	[1]	–
AS3050A	without	0	M22x1,5	M22x1,5	–
AS3100A	0 - 0,5	0	M22x1,5	M22x1,5	With [3]

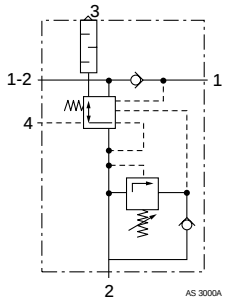
[1] 4x M16x1,5 and 2x M22x1,5

[2] ***Caution:*** *The predominance must not be adjusted to higher than 0,5 bar*

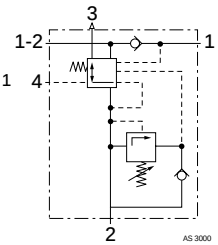
[3] The Manoeuvring Valve has the Type Number AE4232

Standard Symbol as DIN ISO 1219

AS3000A

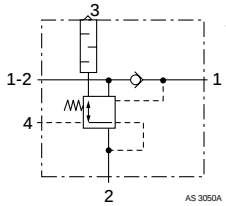


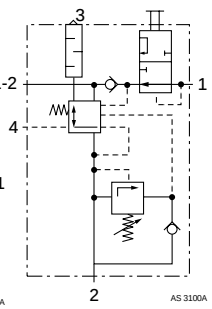
AS3018



AS3100A

AS3050A





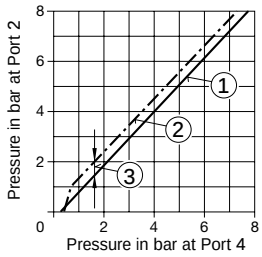
Section No.: K002458-001
Doc. No.: Y011341-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

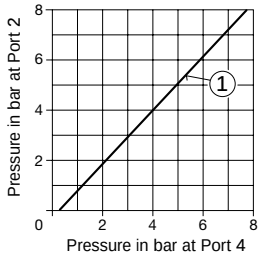
Performance Charts

Service Braking

AS3000A, AS3018
AS3100A

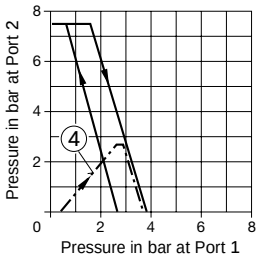


AS3050A



Emergency Braking

AS3000A, AS3018
AS3050A, AS3100A

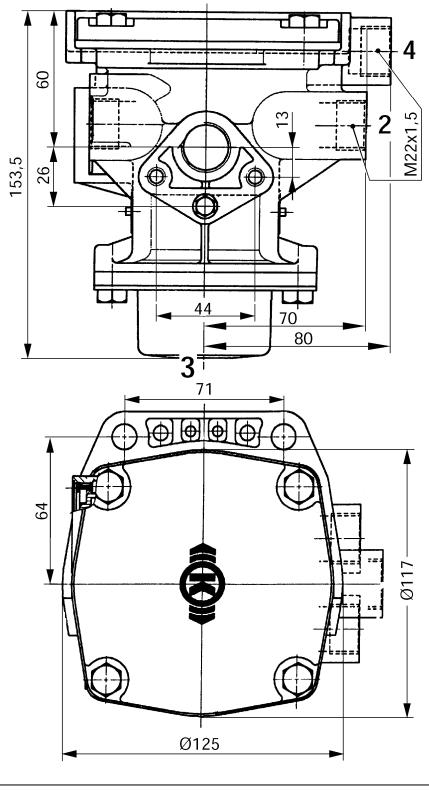


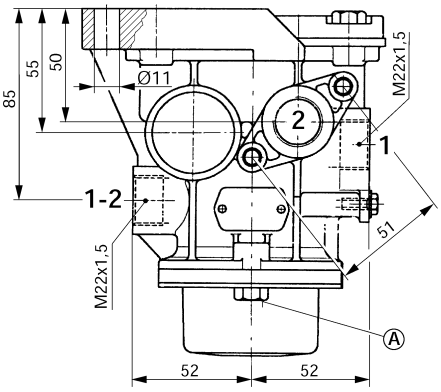
① = Predominance at 0 bar
② = Predominance at 0.5 bar
③ = Predominance Setting Range
④ = Initial charging

VF 00075/128 EN

Dimensions

AS3000A
AS3050A





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

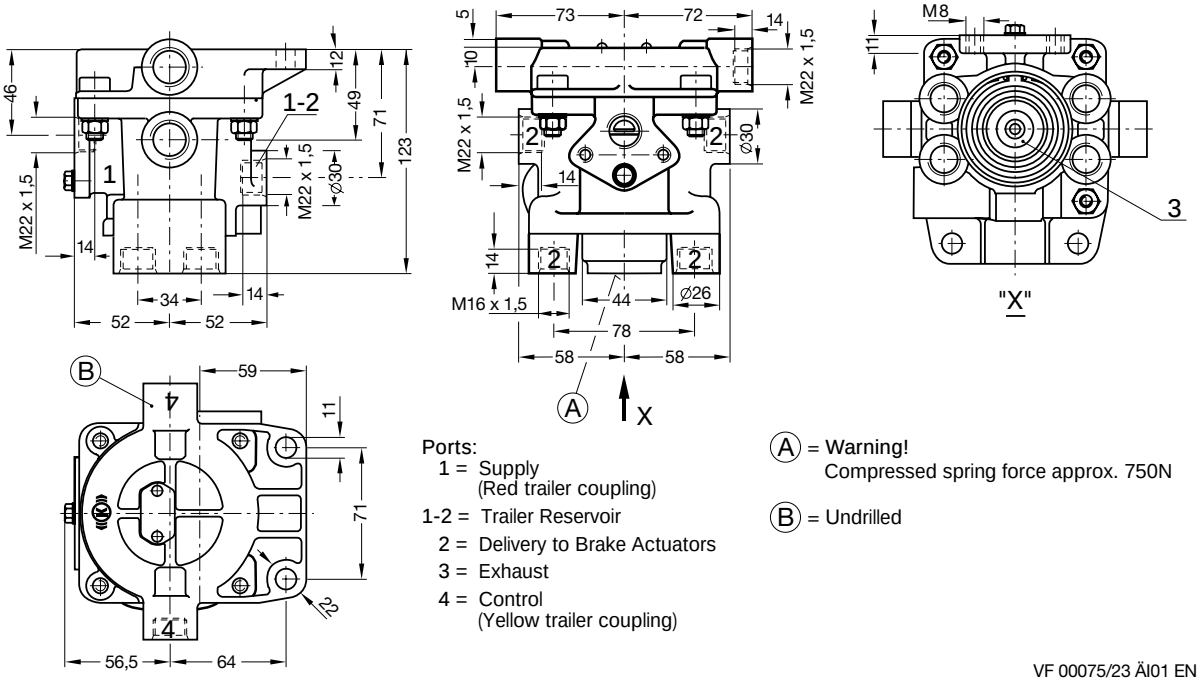
Ports:
1 = Supply (Red trailer coupling)
1-2 = Trailer Reservoir
2 = Delivery to Brake Actuators
3 = Exhaust
4 = Control (Yellow trailer coupling)

VF 00075/127 EN

Section No.: K002458-001
Doc. No.: Y011341-EN-001
Catalogue No.: K001561-EN

Dimensions

AS3018



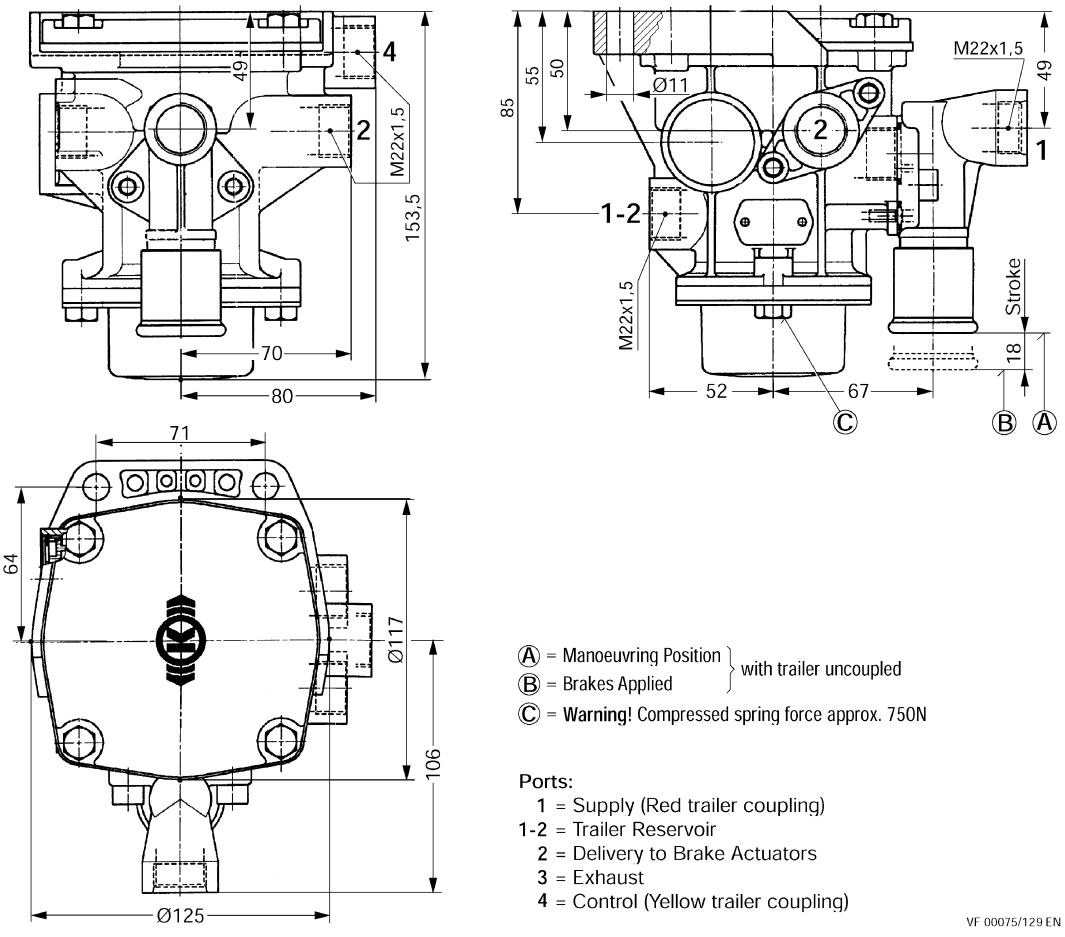
Ports:
- 1 = Supply (Red trailer coupling)
- 1-2 = Trailer Reservoir
- 2 = Delivery to Brake Actuators
- 3 = Exhaust
- 4 = Control (Yellow trailer coupling)

Ⓐ = Warning! Compressed spring force approx. 750N

Ⓑ = Undrilled

VF 00075/23 ÄI01 EN

AS3100A



Ⓐ = Manoeuvring Position
Ⓑ = Brakes Applied
} with trailer uncoupled

Ⓒ = **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)

VF 00075/129 EN

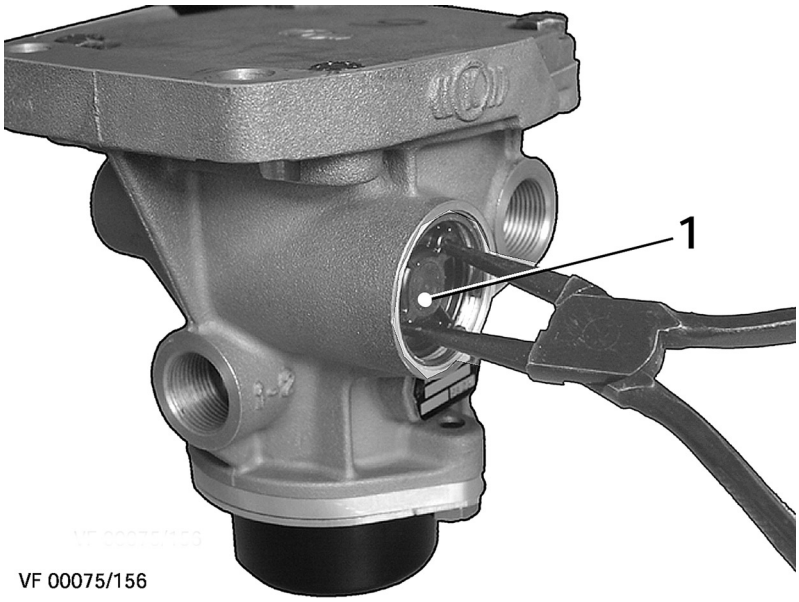
Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Testing and Setting

Testing of the Predominance feature

- 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 levels are specified with 2.0 bar at port 4.
- Predominance is present if the pressure at Port 2 is greater than the pressure at port 4.

Adjustment of the Predominance feature:



VF 00075/156

- No pressure at port 4
- Insert a key (to DIN 3116) or small pincer (see graphic) into the plastic disc (1) to adjust the predominance.
- 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.

Section No.: K002458-001
Doc. No.: Y011341-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function, Technical Features, Performance Charts and Dimensions

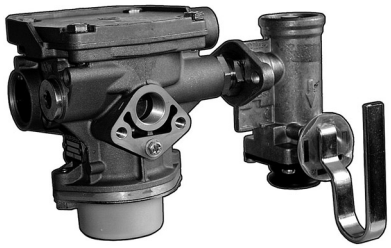
for AS3000A: see "Relay Emergency Valve AS3..." (page 4.1)
for BR1305: see "Load Sensing Valve BR13.." (page 6.1).

Type No. for the combination is AS7000A.

When the trailer is not coupled, its brakes can be released by moving the Load Sensing Valve lever to the 'Brake Released position'.

For details of the version with Manoeuvring Valve see AS71.. (page 5.2).

Combination
Relay Emergency Valve AS3000A
with Load Sensing Valve BR1305



VF00199_171

Standard Symbol as DIN ISO 1219

AS3000A see:
"Relay Emergency Valve AS3..."
(page 4.1)

and BR1305 see:
"Load Sensing Valve BR13.."
(page 6.1)

Section No.: K002459-000
Doc. No.: Y011342-EN-000

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function, Technical Features, Performance Charts and Dimensions

For AS3100A: see "Relay Emergency Valve AS3..." (page 4.1)
For BR1306: see "Load Sensing Valve BR13.." (page 6.1).

Type No. for the combination is AS7100A.

When the trailer is not coupled, its brakes can be released by pressing in the black button on valve AS3100A.

When the Supply (Red) Line is re-connected, the black button will automatically 'pop out' returning it to the drive position.

Combination
Relay Emergency Valve AS3100A
with Load Sensing Valve BR1306

VF00199_172

Standard Symbol as DIN ISO 1219

AS3100A see:
"Relay Emergency Valve AS3..."
(page 4.1)

and BR1306 see:
"Load Sensing Valve BR13.."
(page 6.1)

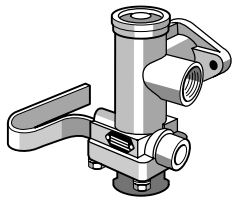
Section No.: K002459-000
Doc. No.: Y011342-EN-000

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

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.



GrF 0304

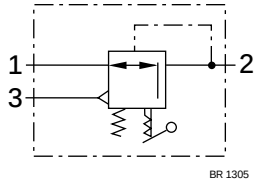
Technical Features

Maximum Operating Pressure:	8,5 bar
Operating Temperature Range:	-40 °C to +80 °C
Medium:	Compressed air
Approximate weight:	0,6 kg

Options

Type No.	Brakes Released position	Possible range of pressure adjustment at port 2 [bar] in lever position		
		Unladen	Half laden	Fully laden
BR1305	With	1,8-2,5	3,0-4,5	[1]
BR1306	Without	1,8-2,5	3,0-4,5	[1]

Standard Symbol as DIN ISO 1219



BR 1305

[1] 1:1 Regulation up to tank pressure

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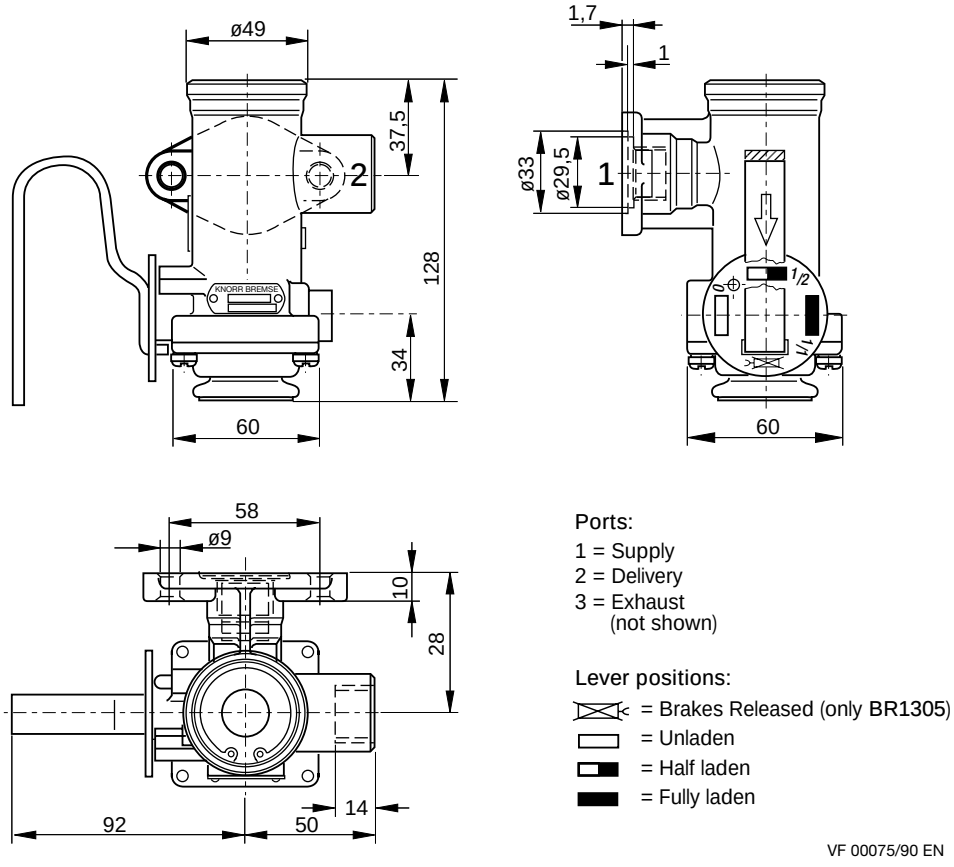
Section No.: K002460-000
Doc. No.: Y011343-EN-000
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions

BR1305
BR1306



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

Lever positions:
= Brakes Released (only BR1305)
= Unladen
= Half laden
= Fully laden

VF 00075/90 EN

Section No.: K002460-000
Doc. No.: Y011343-EN-000

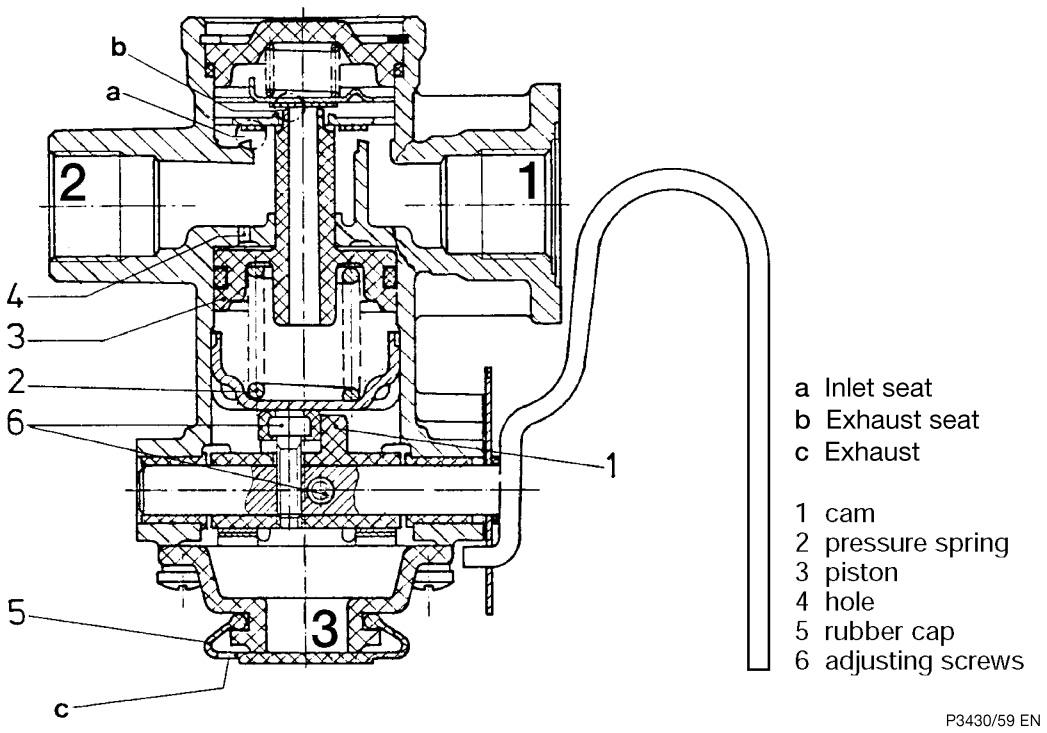
Catalogue No.: K001561-EN

Adjustment of the Unladen and Half laden pressure

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.



Section No.: K002460-000
Doc. No.: Y011343-EN-000
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function

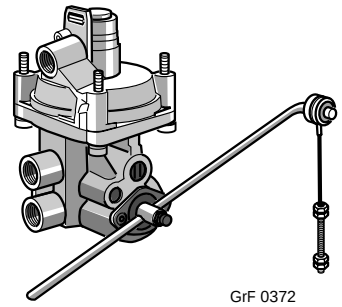
The Load Sensing Valve is used to adjust the applied service brake pressure in relation to the load imposed on the vehicle's axles. The mechanical suspension Load Sensing Valve uses the movement between the vehicle's chassis and axle to "sense" the load imposed on the axles.

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 Valve are available with standard relay or relay emergency feature and with static or dynamic operation. 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.

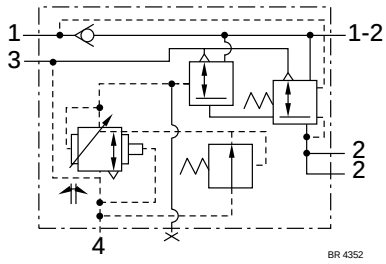
To adjust the rate of change of control ratio due to change in axle load, the effective length of the lever can be adjusted.

A trailer Data Plate showing the setting of the Load Sensing Valve is required by law.

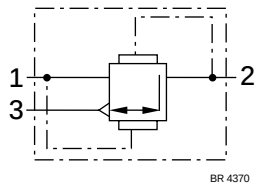


Standard Symbol as DIN ISO 1219

BR4352



BR4370



Technical Features

Maximum Operating Pressure:	8,5 bar
Operating Temperature Range:	-40 °C to +80 °C
Medium:	Compressed air
Working Angle :	20°
Approximate weight:	2,3 kg

Options

Type No.	Operation Type	Relay Emergency Valve	Relay feature
BR4352	dynamic	With	With
BR4370	static	Without	Without

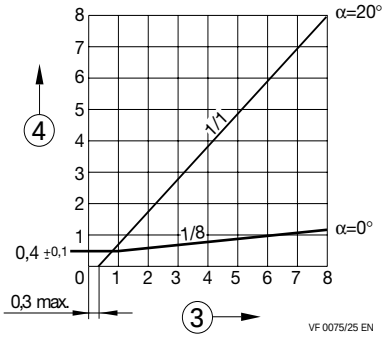
Type No.	Air Port Threads					Remark
	1	1-2	2	3	4	
BR4352	M16x1,5	M22x1,5	M16x1,5 (4x) M22x1,5 (2x)	M22x1,5	M16x1,5	With cable pull
BR4370	M22x1,5	–	M16x1,5 (4x)		–	

Maximum adjustable lever length: 300 mm.
Part number for lever with cable pull: SEB01263

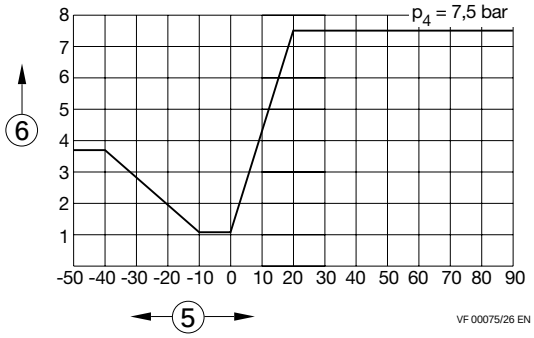
Section No.: K002461-001
Doc. No.: Y011344-EN-001
Catalogue No.: K001561-EN

Functional diagram

Control ratio

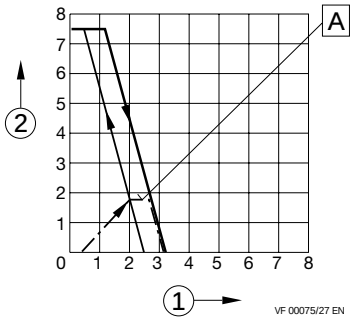


Delivery Pressure vs Angle



Automatic braking

(only BR4352)



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

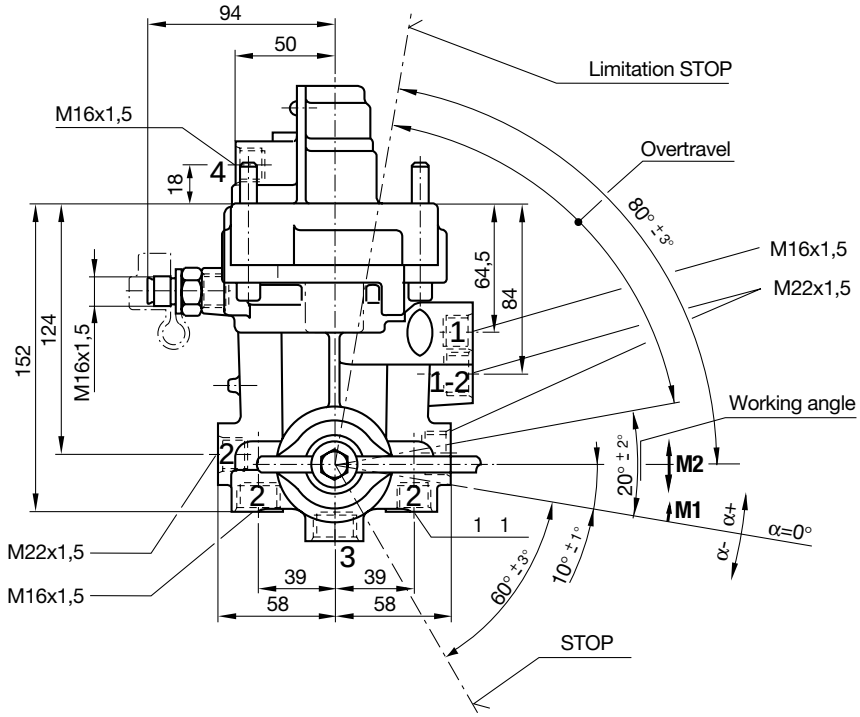
VF 00075/28 EN

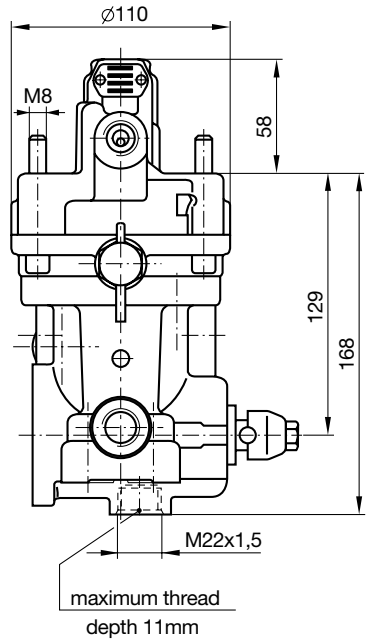
Section No.: K002461-001
Doc. No.: Y011344-EN-001

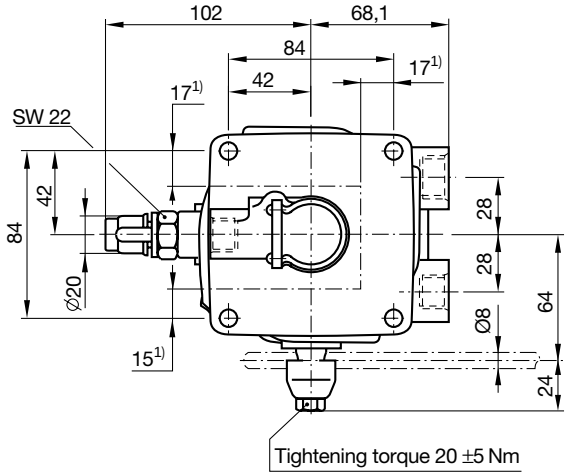
Catalogue No.: K001561-EN

Dimensions

BR4352







Ports:

1 = Supply
(from Red Trailer Coupling)

1-2 = Trailer reservoir

2 = Delivery
(to Brake Actuator)

3 = Exhaust

4 = Signal
(from Yellow Trailer Coupling)

M1 = Torque required to move the lever = 2 Nm

M2 = Max torque required to move the lever = 20 Nm

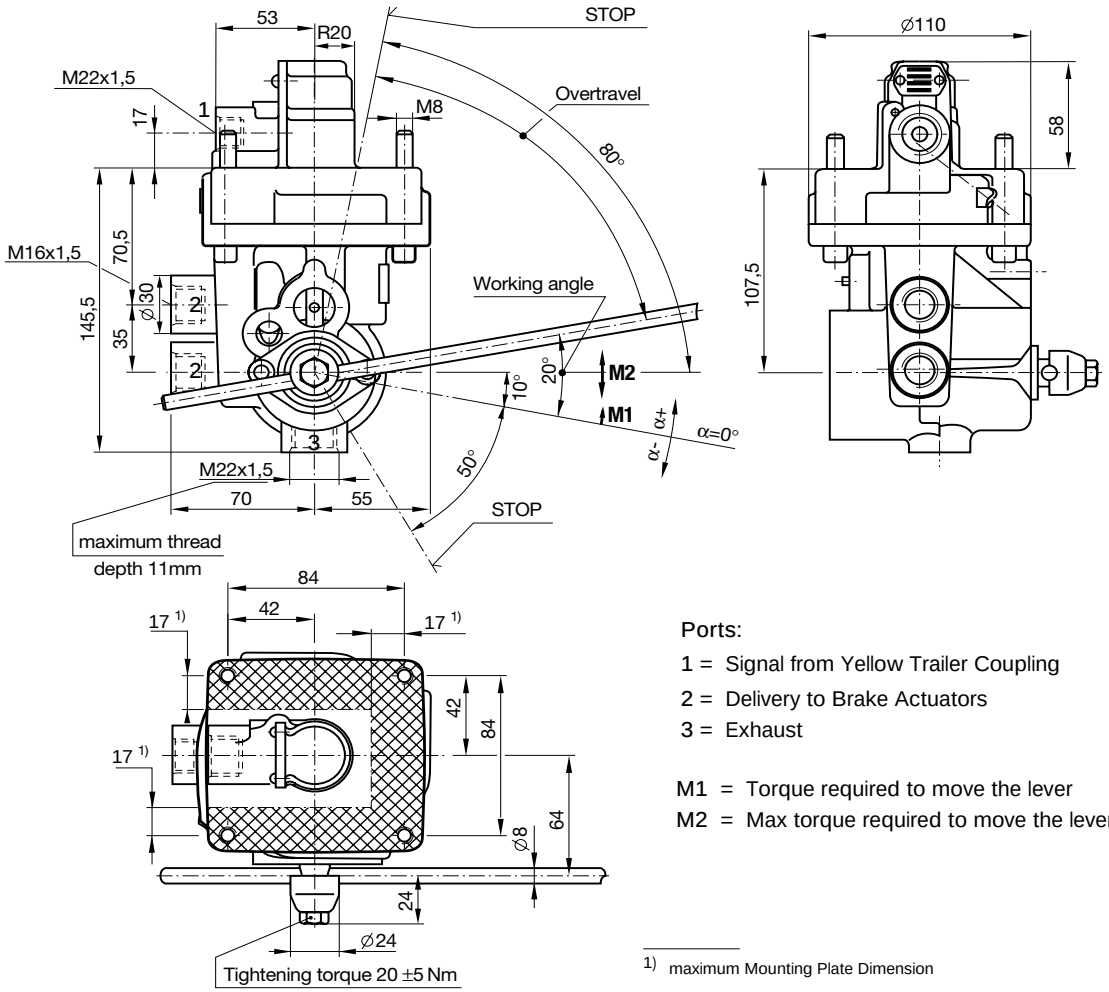
1) maximum Mounting Plate Dimension

VF 00075/29 EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions

BR4370



Ports:

1 = Signal from Yellow Trailer Coupling

2 = Delivery to Brake Actuators

3 = Exhaust

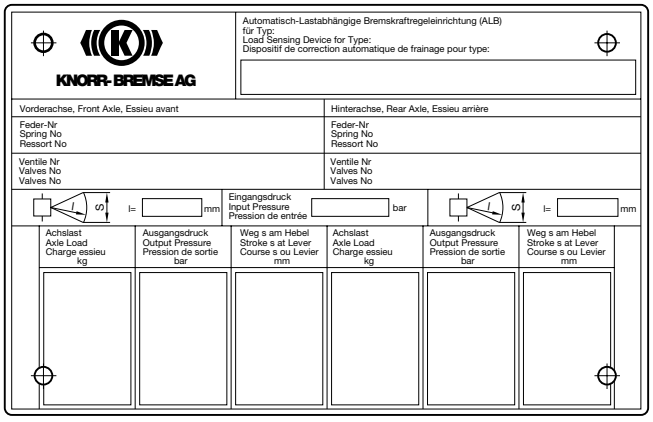
M1 = Torque required to move the lever = 2 Nm

M2 = Max torque required to move the lever = 20 Nm

1) maximum Mounting Plate Dimension

VF 00075/30 EN

Load Sensing Valve Data Plate (DIN 74267-C) mechanical suspension, BR43.. – Part No.: 3EB01629

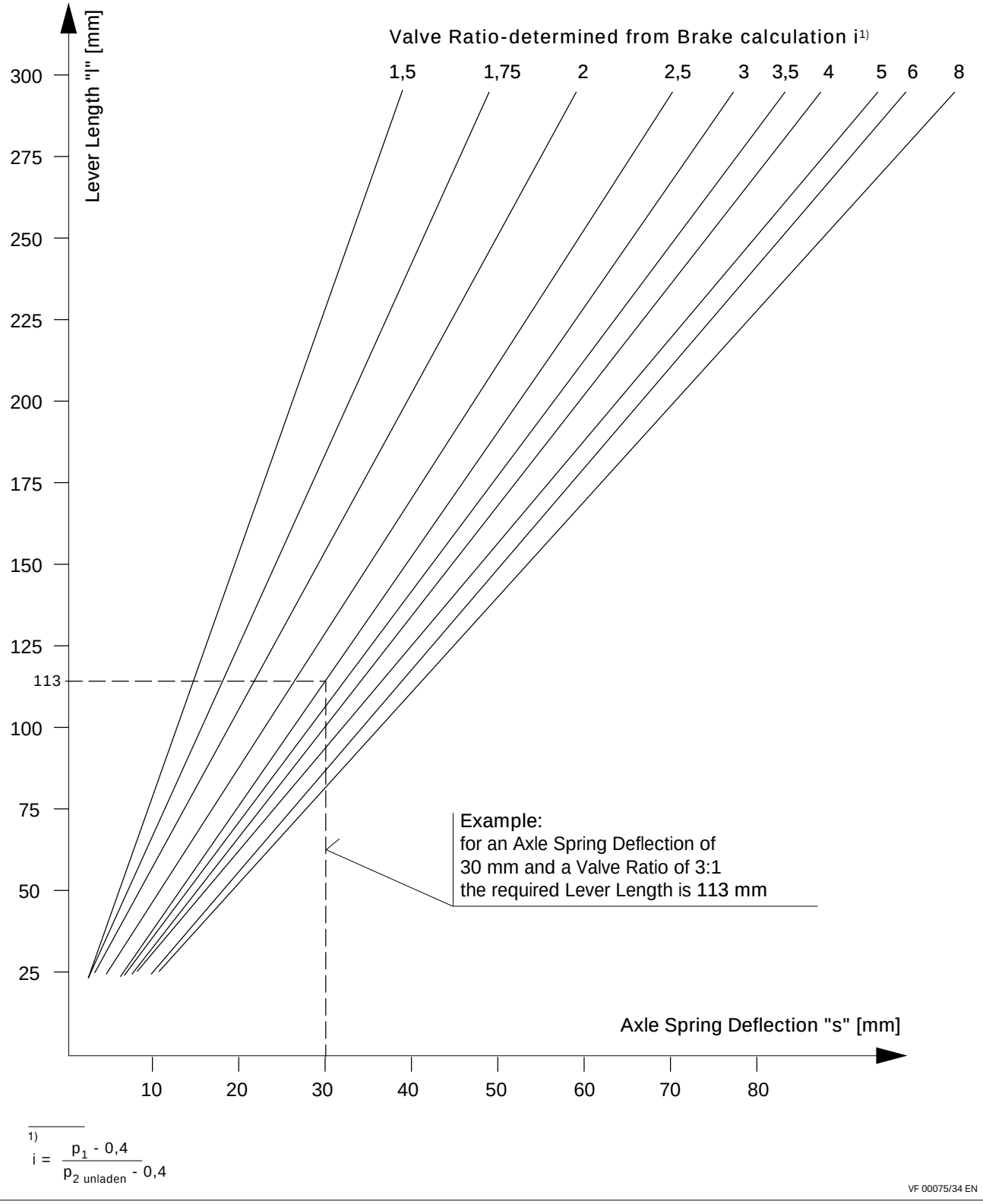


VF 00075/31

Section No.: K002461-001
Doc. No.: Y011344-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Determining the Lever Length "l" (graphical)



Section No.: K002461-001
Doc. No.: Y011344-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Determining the Lever Length "l" (arithmetical)

Axle Spring Deflection:	s [mm] =	
Control (Yellow) Line pressure - 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]:	$l = \frac{\text{Axle Spring Deflection}}{\text{Secondary variable C}} =$	

A computer calculation program is available on request.

Section No.: K002461-001
Doc. No.: Y011344-EN-001

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

How to adjust a mechanical suspension 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 cable should be at right angles to it. The length of the connecting cable 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 Line input of the Load Sensing Valve and to the output (Brake Actuators).
- Apply input (Control Line) pressure as stated on the Data Plate.
- Read the output pressure on the gauge and correct if necessary (shorten the cable 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 (Control Line) pressure as stated on the Data Plate.
- Read the output pressure and check 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.

Section No.: K002461-001
Doc. No.: Y011344-EN-001

Catalogue No.: K001561-EN

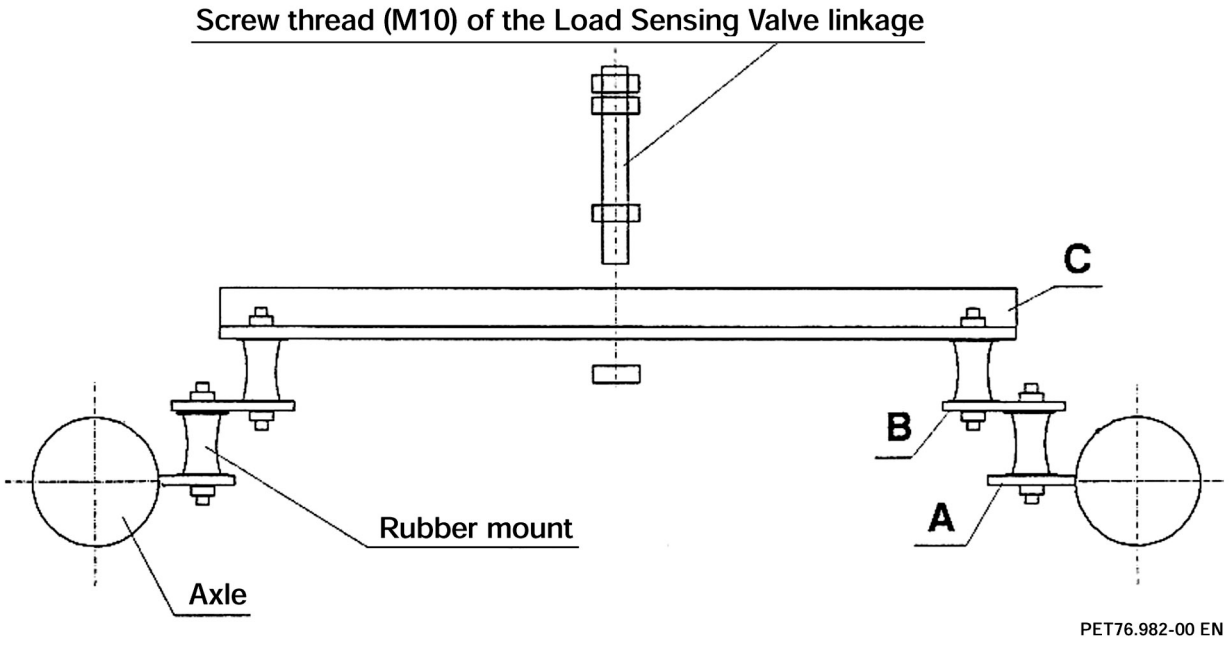
Rubber mounting for brake equalisation PET 76.982-00

Function

Rubber mounts are used in mechanically suspended tandem bogies to get an elastic connection between the axles. The arrrangement as shown below, 'averages' the movements of both axles. Fix the Load Sensing Valve linkage to the middle of the cross linkage.

Installation recommendation (See note)

Fix a rubber mount (A) to each axle. If necessary, connect two rubber mount's together with joiner (B).
Inter-connect axles with tube or an angle section cross linkage (C).
The fixing point for the Load Sensing Valve must be in the middle of cross linkage (C). Thread M10.



Note: Items "A", "B", and "C" are not supplied by Knorr-Bremse and must be manufactured by the installer to the necessary dimensions.

Section No.: K002461-001
Doc. No.: Y011344-EN-001
Catalogue No.: K001561-EN

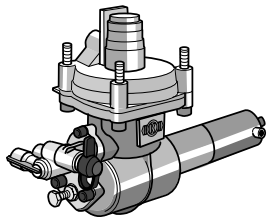
Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

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 pneumatic suspension Load Sensing Valve uses the pressure in the Suspension Air 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 emergency features and with static or dynamic operation. 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.

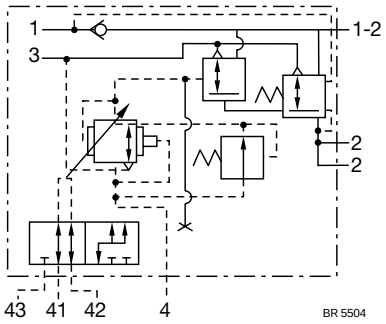
A Trailer Data Plate, showing the settings of the Load Sensing Valve, is required by law (See page 8.4).



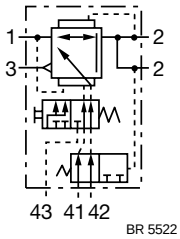
GrF 0358

Standard Symbol as DIN ISO 1219

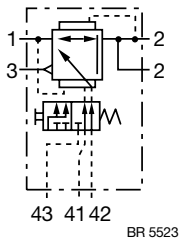
BR5504



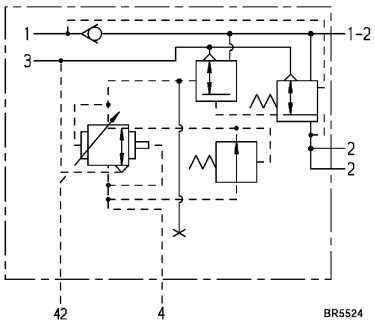
BR5522



BR5523



BR5524



Technical Features

Maximum Operating Pressure:	8,5 bar
Operating Temperature Range:	-40 °C to +80 °C
Medium:	Compressed Air
Approx. Weight:	2,4 kg to 3,1 kg

Options

Type No.	Part No.	Operation	Relay Emergency Valve	Relay feature	Test valve connection "43"
BR5504	SEB00651	Static/Dynamic	With	With	With
BR5522	SEB01326	Static	Without	Without	With
BR5522	II36836	Static	Without	Without	With
BR5523	SEB01344	Dynamic	Without	Without	With
BR5524	SEB01241	Dynamic	With	With	Without
BR5524	SEB01509	Dynamic	With	With	Without
BR5524	SEB01510	Dynamic	With	With	Without

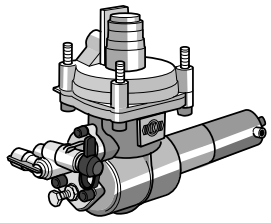
Section No.: K002462-001
Doc. No.: Y011345-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Options - *continued* -

Type No.	Part No.	Test Point connection "p_2"	Air Suspension connection	basic setting unladen	basic setting laden
BR5504	SEB00651	With	p_{41} / p_{42}	p_1/p_{1-2}=8bar; p_4=6,5bar	
				p_{41}/p_{42}=0,8bar p_2=2bar	p_{41}/p_{42}=5,1bar p_2=6,5bar
BR5522	SEB01326	Without	p_{41} / p_{42}	p_1=6,5bar	
				p_{41}/p_{42}=0,5bar p_2=2,3bar	p_{41}/p_{42}=3,2bar p_2=6,5bar
BR5522	II36836	Without	p_{41} / p_{42}	p_1=6,5bar	
				p_{41}/p_{42}=0,7bar p_2=2,4bar	p_{41}/p_{42}=4,6bar p_2=6,5bar
BR5523	SEB01344	Without	p_{41} / p_{42}	p_1=6,5bar	
				p_{41}/p_{42}=0,5bar p_2=2,3bar	p_{41}/p_{42}=3,2bar p_2=6,5bar
BR5524	SEB01241	Without	p_{42}	p_1/p_{1-2}=8bar; p_4=6,5bar	
				p_{42}=0,5bar p_2=2bar	p_{42}=4,4bar p_2=5,2bar
BR5524	SEB01509	Without	p_{42}	p_1/p_{1-2}=8bar; p_4=6,5bar	
				p_{42}=0,7bar p_2=3,8bar	p_{42}=2,4bar p_2=6,5bar
BR5524	SEB01510	Without	p_{42}	p_1/p_{1-2}=8bar; p_4=6,5bar	
				p_{42}=0,5bar p_2=2bar	p_{42}=3,6bar p_2=6,5bar

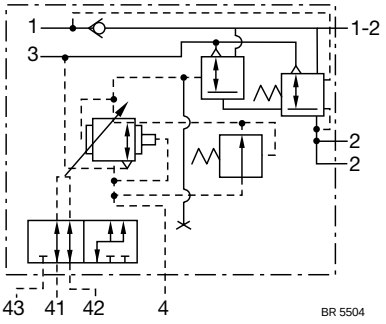
Type No.	Part No.	Air Port Threads 1	1-2	2	4	41 / 42 or 42
BR5504	SEB00651	M16x1,5	M22x1,5 –	M16x1,5 (4x) M22x1,5 (2x)	M16x1,5	M12x1,5
BR5522	SEB01326	M22x1,5	–	M16x1,5 (2x)	–	M12x1,5
BR5522	II36836	M22x1,5	–	M16x1,5 (2x)	–	M12x1,5
BR5523	SEB01344	M22x1,5	–	M16x1,5 (2x)	–	M12x1,5
BR5524	SEB01241	M16x1,5	M22x1,5	M22x1,5 (2x)	M16x1,5	M12x1,5
BR5524	SEB01509	M16x1,5	M22x1,5	M22x1,5 (2x)	M16x1,5	M12x1,5
BR5524	SEB01510	M16x1,5	M22x1,5	M22x1,5 (2x)	M16x1,5	M12x1,5



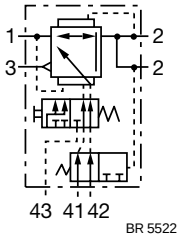
GrF 0358

Standard Symbol as DIN ISO 1219

BR5504



BR5522



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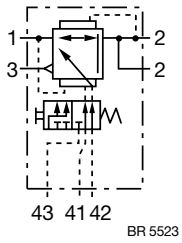

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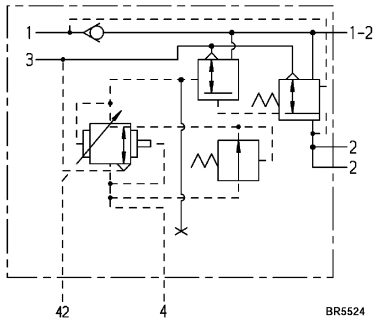
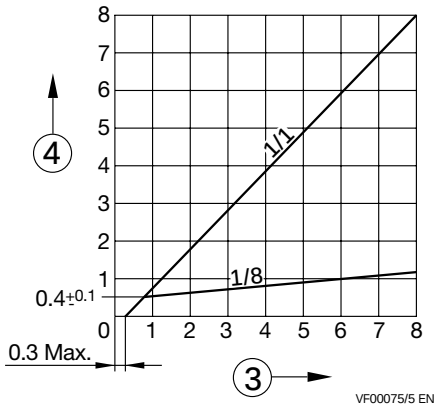


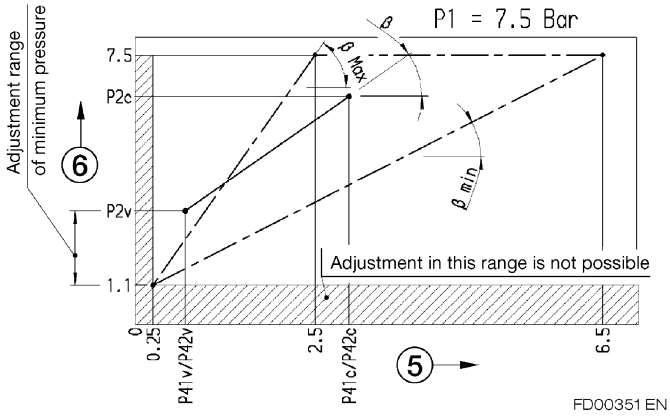
Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Performance charts

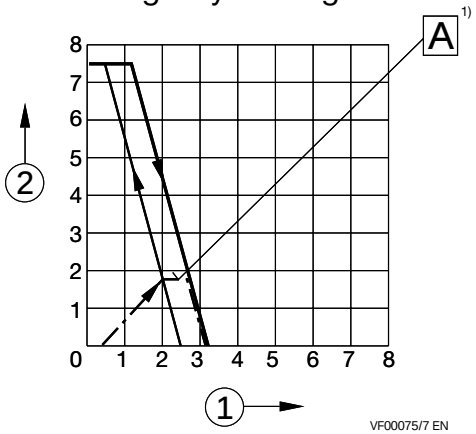
Control Ratio



Typical Setting



Emergency Braking



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

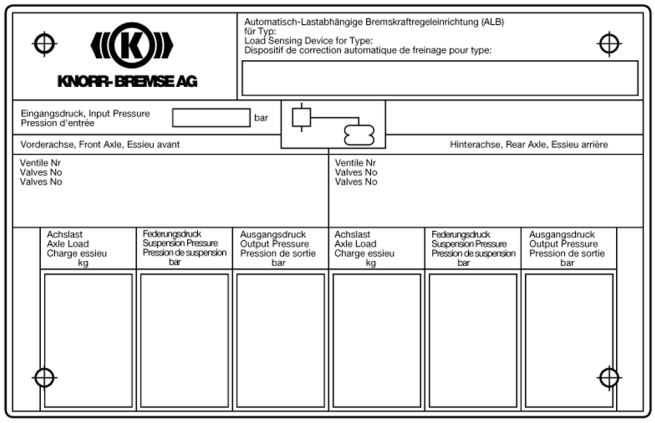
VF00075/8 EN

1) only for BR5504 and BR5524

Section No.: K002462-001
Doc. No.: Y011345-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Load Sensing Valve Data Plate (DIN 74267-C) for pneumatic Load Sensing Valve BR55.. – Part No.: 3EB01630



VF00075/9

The fitting of the Load Sensing Valve Data Plate is essential to ensure that the optimum performance from the Load Sensing Valve can be maintained once the trailer is in service.

The plate should be stamped with the following data:

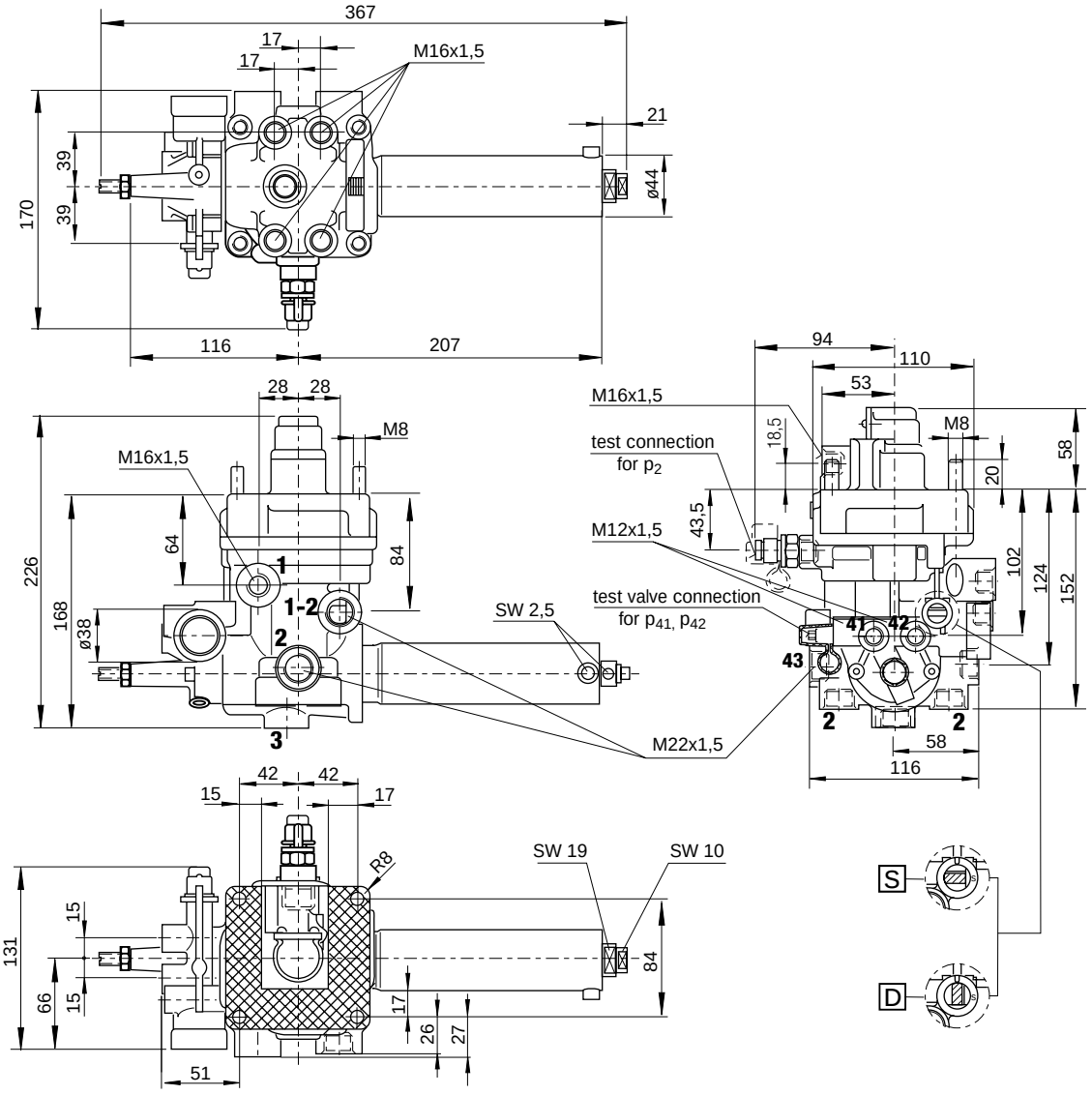
Valves No. = Part No. of the Load Sensing Valve fitted to the trailer
Axle Load = Unladen & laden axle weights (used for setting the valve ratio)
Input pressure = The inlet pressure at the Load Sensing Valve (used for setting unladen & laden valve ratios)
Output pressure = The outlet pressures required when the Load Sensing Valve is set correctly (unladen & laden)
Suspension pressure = The air suspension bag pressures for the stated axle weights (unladen & laden)

Section No.: K002462-001
Doc. No.: Y011345-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions

BR5504



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 fitting

S = "Static" setting

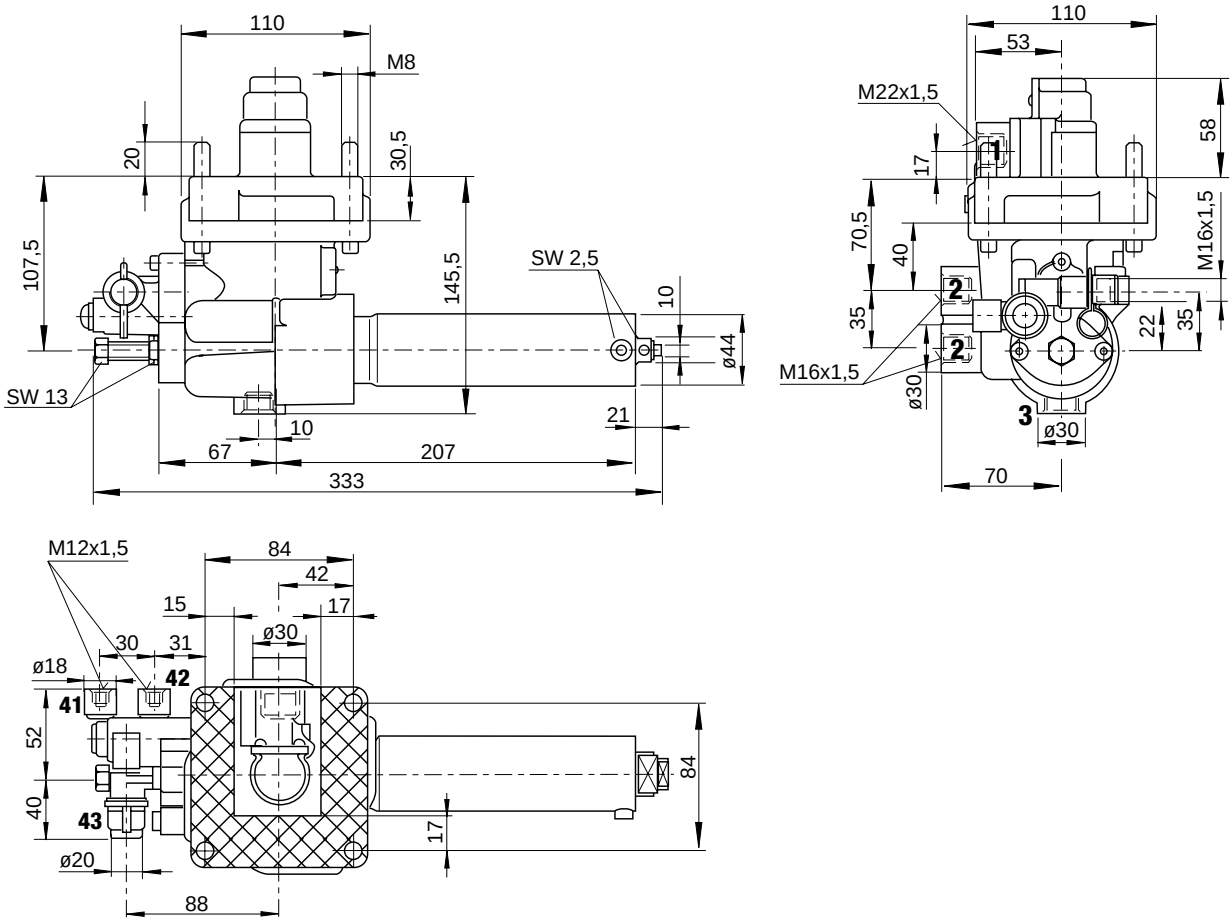
D = "Dynamic" setting

VF00075/10 EN

Section No.: K002462-001
Doc. No.: Y011345-EN-001
Catalogue No.: K001561-EN

Dimensions

BR5522
BR5523



Ports:

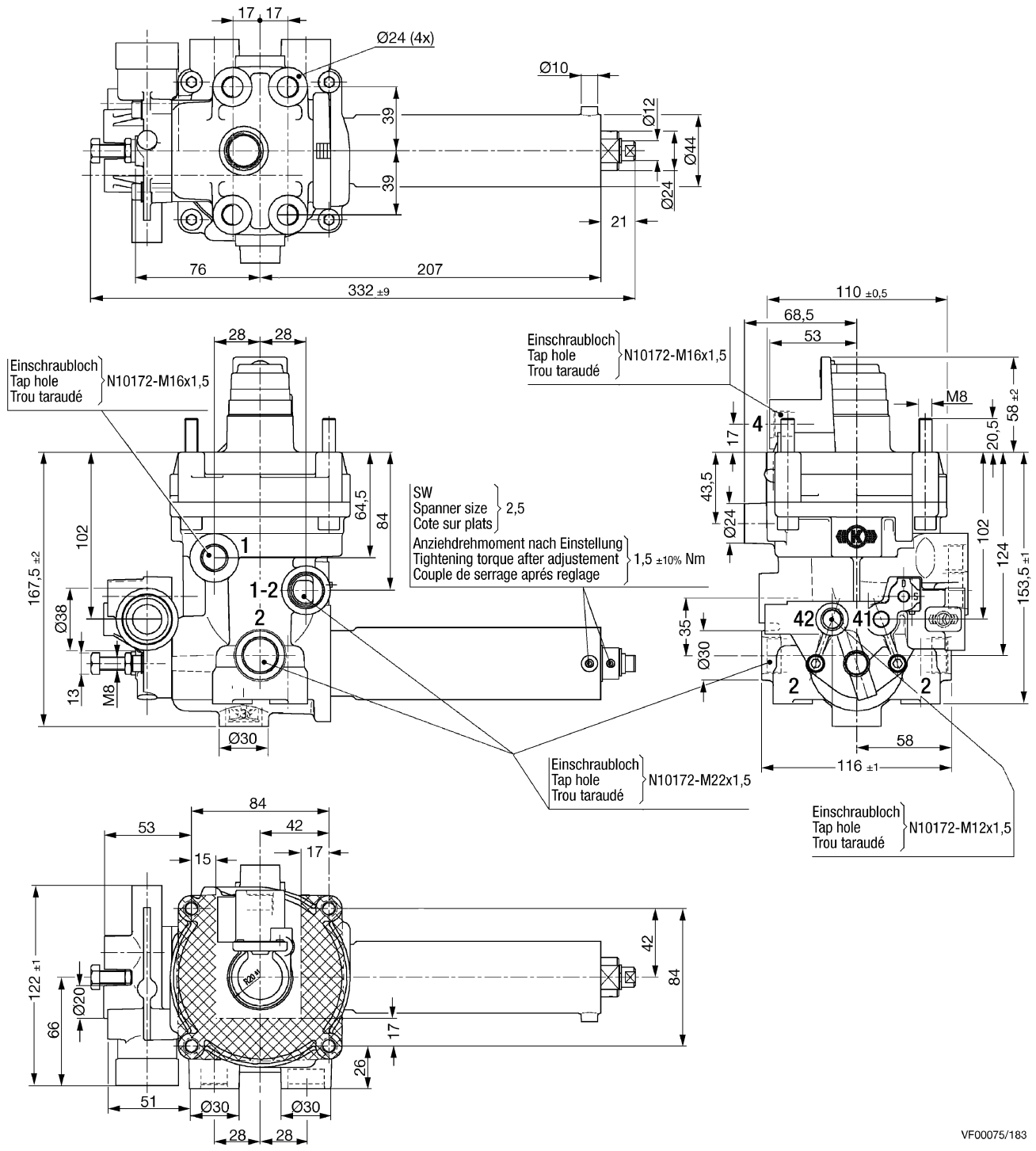
- 1 = Signal (from REV)
- 2 = Delivery to brake actuators
- 3 = Exhaust
- 41 = Signal (from air suspension)
- 42 = Signal (from air suspension)
- 43 = Test Fitting

VF00075/11 EN

Section No.: K002462-001
Doc. No.: Y011345-EN-001
Catalogue No.: K001561-EN

Dimensions

BR5524



Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Checking and adjustment

Type No.	Operation	Relay Emergency Valve	Relay feature	Air Port Threads		
				41	42	43
BR5504	Static/Dynamic	With	With	X	–	X
BR5522	Static	Without	Without	X	X	X
BR5523	Dynamic	Without	Without	X	X	X
BR5524	Dynamic	With	With	–	X	–

Explanation of the port characteristic

Port 1	• Supply pressure in valves with Relay feature. Connected to Trailer 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 Trailer Reservoir
Port 2	Controlled output pressure
Port 4	Signal pressure (only valves with Relay feature). Connected to Control (Yellow) Line
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 19mm
- Hexagon Allen Key size 2,5mm
- 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

Section No.: K002462-001
Doc. No.: Y011345-EN-001
Catalogue No.: K001561-EN

Checking and adjustment - *continued* -

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 page 8.10 & 8.11 - 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, BR5523) 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 "output" average value = (p2 laden + p2 unladen) / 2
p41/42 "suspension" average value = (p41/p42 laden + p41/42 unladen) / 2

Example: p2 "output" average value = (6,5 + 2,4) / 2 = 4,45
p41/42 "suspension" 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, BR5523) 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, BR5523) 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.

Section No.: K002462-001
Doc. No.: Y011345-EN-001

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Checking and adjustment - *continued* -

5. Checking the responsiveness

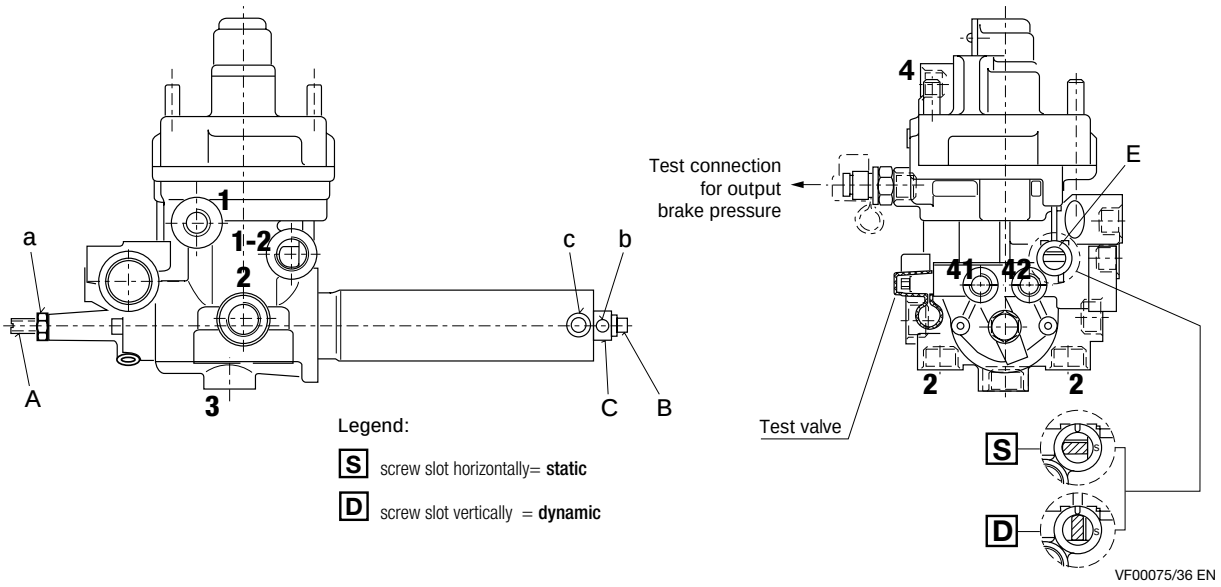
- Supply pressure to the suspension signal port(s) or test valve at a value 0,3 bar higher than the quoted "unladen" suspension.
- Supply input pressure to port 1 (BR5522, BR5523) or port 4 (BR5504, BR5524) with quoted input pressure and check that output brake pressure is slightly higher than the quoted "unladen" value.
- If the output pressure is not higher repeat adjustment, see item 2.
- 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, BR5523) 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 vavle.
- Supply input pressure to port 1 (BR5522, BR5523) 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".

Maintenance:
The Load Sensing Valve is maintenance-free.

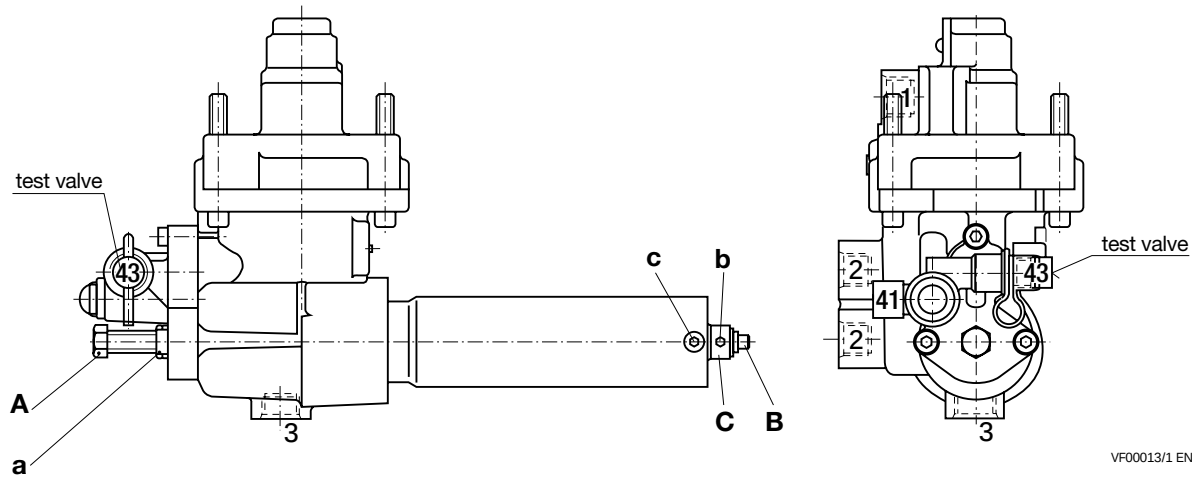
BR5504



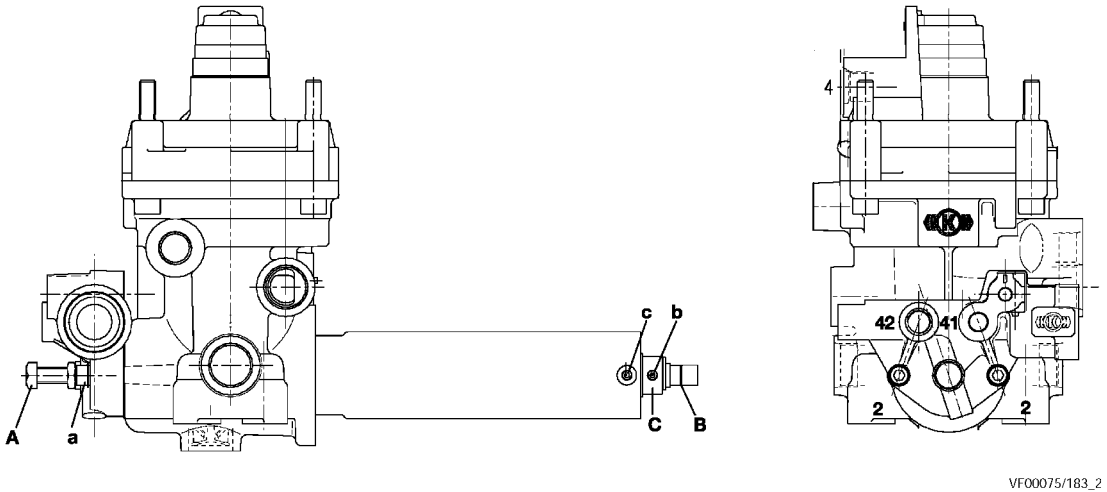
Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Checking and adjustment *- continued -*

BR5522
BR5523



BR5524



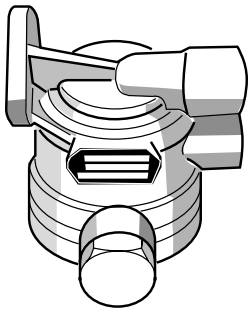
Application and Function

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 of the front axle of a drawbar trailer to help balance the lining wear between front and rear axle(s).

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.

These valves are not adjustable.



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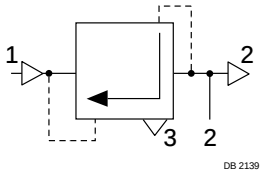
Standard Symbol as DIN ISO 1219



DB 2139

Technical Features

Maximum Operating Pressure:	10 bar
Operating Temperature Range:	-40 °C to +80 °C
Medium:	Compressed air
Approx. weight:	0.6 kg

Options

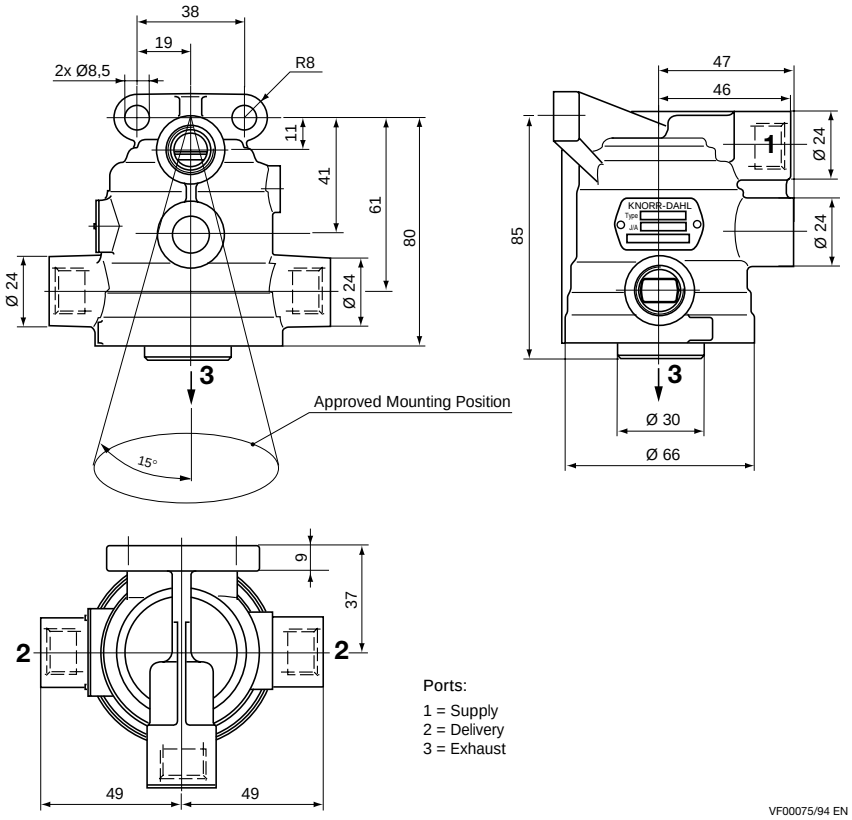
Type No.	Characteristic		Air Port Threads		
	Supply [bar]	Delivery [bar]	1	2	3
DB2139	0,6/2,1/3,5	0,6/1,2/3,5	M16x1,5	M16x1,5	Without Thread

Section No.: K002463-001
Doc. No.: Y011346-EN-001

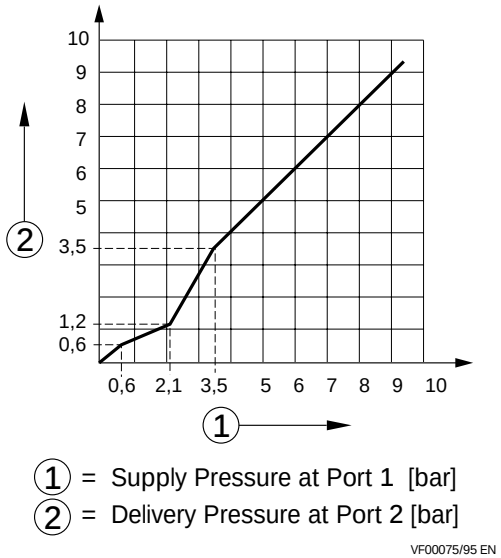
Catalogue No.: K001561-EN

Dimensions

DB2139



Performance Chart



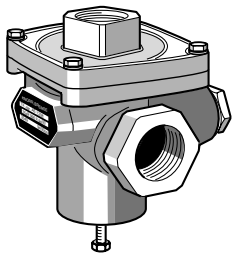
Application and Function

A Retention Valve is typically installed on a drawbar trailer front axle where the brake chambers are larger than those on the rear axle. At low braking pressures, overbraking of the front axle can sometimes occur.

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.

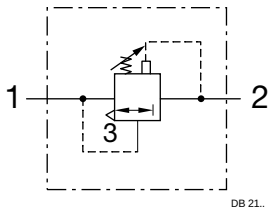
The Valve incorporates a quick release feature to hasten the exhaust of the brakes.

Valves with varying ratio and Run-out Pressures are available to suit most applications.



GrF 0119

Standard Symbol as DIN ISO 1219



Technical Features

Maximum Operating Pressure:	8,0 bar
Operating Temperature Range:	-25 °C to +60 °C
Medium:	Compressed air
Approx. weight:	0.5 kg
Maximum retention pressure:	1,8 bar (adjustable)

Options

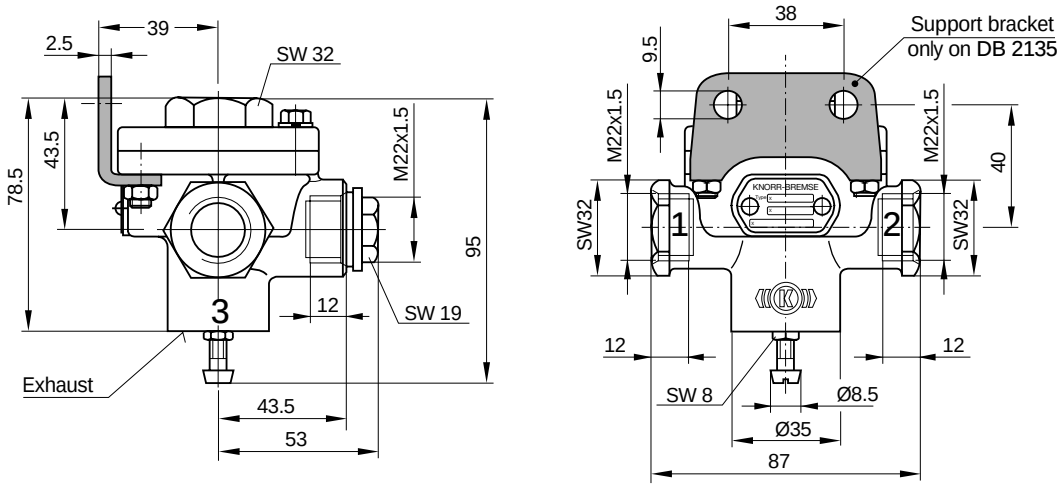
Type No.	Threshold Pressure [bar]	Reference Pressure [bar]	Output Pressure [bar]	Air Port Threads	Support Bracket
DB2110	0,5	1,6	1,5	M22x1,5	–
DB2111	0,9	1,6	0,9		–
DB2112	1,4	1,6	0,3		–
DB2113	0,6	1,6	1,3		–
DB2135	0,5	1,6	1,5		With
DB2146	0,8	1,6	1,0		–

Section No.: K002463-001
Doc. No.: Y011346-EN-001

Catalogue No.: K001561-EN

Dimensions

DB2110
DB2111
DB2112
DB2113
DB2135
DB2146

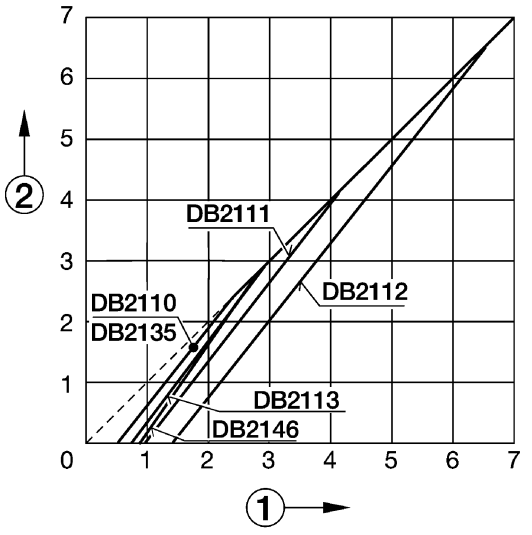


Ports:

1 = Supply
2 = Delivery
3 = Exhaust

VF00075/49 EN

Performance Chart



(1) = Pressure at port **1** [bar]
(2) = Pressure at port **2** [bar]

VF00075/50 EN ÄI01

Section No.: K002463-001
Doc. No.: Y011346-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Application and Function

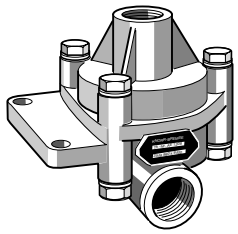
A Pressure Proportioning Valve is used to reduce the downstream (delivered) pressure by a fixed ratio relative to the supply pressure.

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

A typical application would be on trailers where larger actuators are used than the maximum axle load would require.

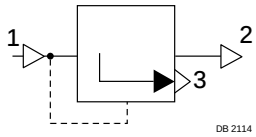
Note: These valves should be not used in combination with EBS since it would cause a conflict between electrical and pneumatic control systems.

The valve has an integral mounting bracket for ease of installation.



GrF 0120

Standard Symbol as DIN ISO 1219



Technical Features

Maximum Operating Pressure:	10 bar
Operating Temperature Range:	-40 °C to +80 °C
Medium:	Compressed air
Air Port Threads:	M22 x 1,5
Approx. weight:	0,6 kg

Valves are not adjustable

Options

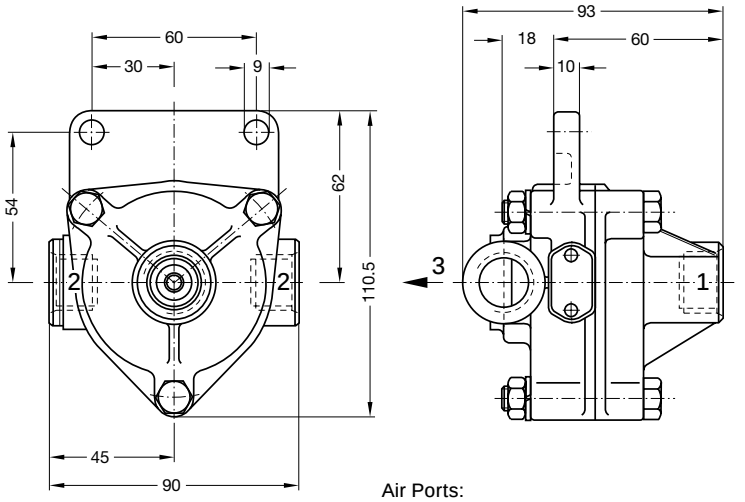
Type No.	Reduction ratio	Pressure [bar]	
		Control	Delivery[1)]
DB2114	2,00:1	6,5	3,1
DB2115	1,50:1		4,1
DB2116	1,15:1		5,4
DB2118	1,35:1		4,6
DB2121	1,80:1		3,4
DB2122	1,25:1		5,0
DB2123	2,70:1		2,3

[1)] Calculation of delivery pressure: $D_p = \frac{6,5 - 0,3 + \text{Predominance of REV}}{\text{Reduction ratio}}$

Section No.: K002464-000
Doc. No.: Y011347-EN-000
Catalogue No.: K001561-EN

Dimensions

DB2114
DB2115
DB2116
DB2118
DB2121
DB2122
DB2123

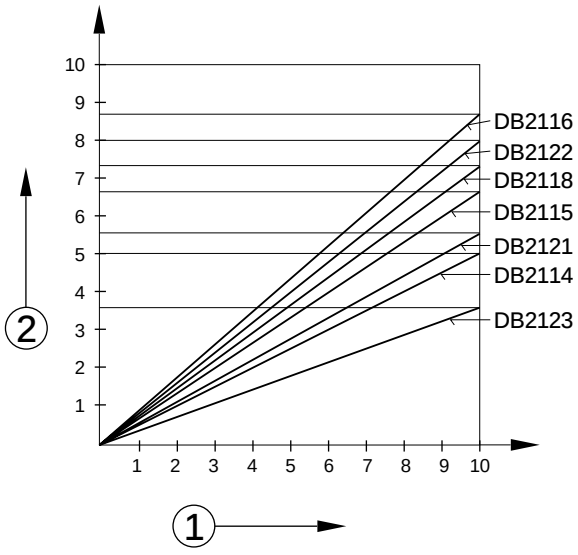


Air Ports:

1 = Supply
2 = Delivery
3 = Exhaust

VF 00075/51 EN

Performance Chart



1 = Supply Pressure at Port 1 [bar]
2 = Delivery Pressure at Port 2 [bar]

VF 00075/52 EN

Section No.: K002464-000
Doc. No.: Y011347-EN-000
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

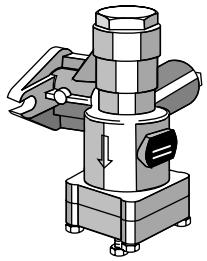
Application and Function

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.

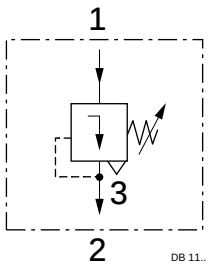
The valves are fully adjustable, the limited output pressure is changed by turning the adjusting screw on the bottom of the valve.

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



GrF 0116

Standard Symbol as DIN 74253



Technical Features

Maximum Operating Pressure:	12 bar
Operating Temperature Range:	-25 °C to + 60 °C
Medium:	Compressed air
Approx. weight:	0.5 kg

Options

Type No.	Limited Pressure [bar]	Adjustment Range [bar]	Air Port Threads
DB1102	5,7	0 to 10	M22x1,5
DB1103	5,3		
DB1105	4,8		
DB1147	1,8		

Other variants are available.

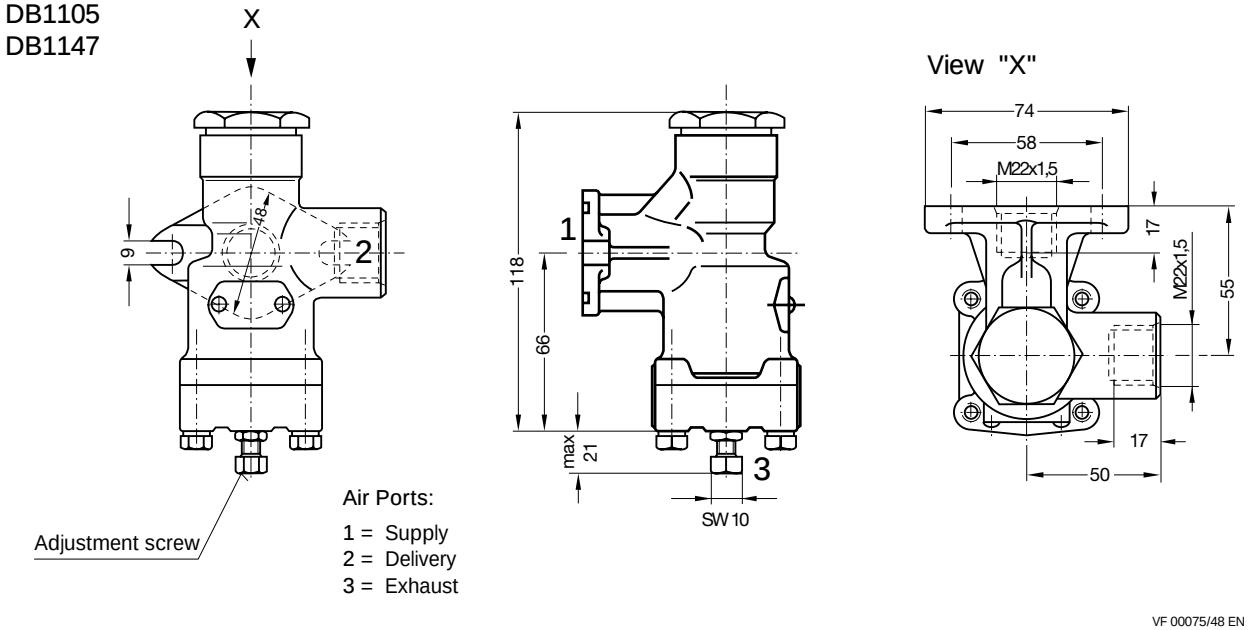
Section No.: K002465-000
Doc. No.: Y011348-EN-000

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions

DB1102
DB1103
DB1105
DB1147



Section No.: K002465-000
Doc. No.: Y011348-EN-000
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Release Valves for the Front Axle of Drawbar Trailers

Application and Function

The Release Valve, also called Manoeuvring Valve, is used on drawbar trailers.

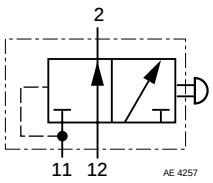
This Valve allows front axle service brakes of an un-coupled, and therefore braked trailer to be released for manoeuvring/ "shunting" purposes by pushing in the control button.

By pulling out the control button, air is able to once again pass from the trailer reservoir to the brake chambers and the brakes are therefore re-applied.

When the trailer is re-coupled, connection of the Supply (Red) Line will cause the control button to automatically return to the 'Drive' position.

GrF 0072

Standard Symbol as DIN ISO 1219



Technical Features:

Maximum Operating Pressure:	8,5 bar
Operating Temperature Range:	-40 °C to +80 °C
Medium:	Compressed air
Approx. weight:	0,5 kg

Options

Type No.	Air Port Threads	Control Button
AE4257	M22x1,5	Round, black

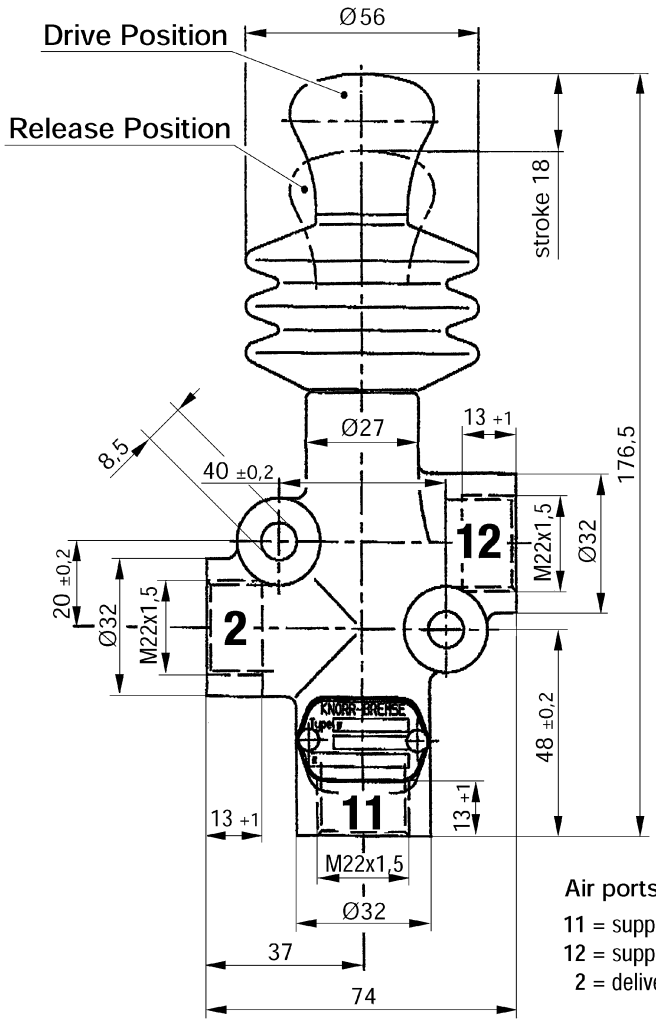
Section No.: K002466-001
Doc. No.: Y011349-EN-001

Catalogue No.: K001561-EN

Release Valves for the Front Axle of Drawbar Trailers

Dimensions

AE4257



Section No.: K002466-001
Doc. No.: Y011349-EN-001

Catalogue No.: K001561-EN

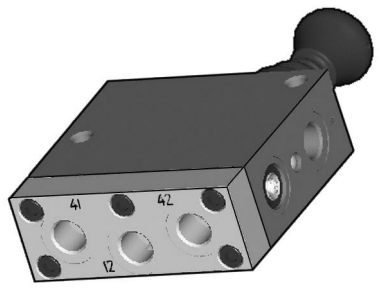
Release Valves for the Front Axle of Drawbar Trailers, for use with AE4311

Application and Function

This valve is used on drawbar trailers in combination with the Park / Shunt Valve AE4311. Uncoupling the Supply Line causes the front axle of the drawbar trailer to be braked by pressurising the service brake actuators.

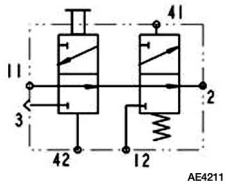
By pushing in the control button of the Release Valve the brake of the front axle is released allowing the drawbar to be manoeuvred. By pulling out the button the brake on the front axle will be re-applied.

If the Supply (Red) Line of the trailer is re-coupled and pressurised, the actuating valve automatically switches the Release Valve into driving position.



VF00199_299

Standard Symbol as DIN ISO 1219



Technical Features

Maximum Operating Pressure:	max. 10 bar
Operating Temperature Range:	-40°C to +80°C
Medium:	Compressed air
Mounting Position:	[1]
Approximate Weight:	1 kg

Product overview

Type No.	Part No.	Air Port Threads (internal)	Mounting Thread	Further technical details
AE4211	K006368	M16x1,5	M8	Y018659

Max. Tightening torques:
M16x1,5: 45 Nm
M8: 20 Nm

[1] Mainly in the manoeuvring area of the drawbar, port 3 should point down!

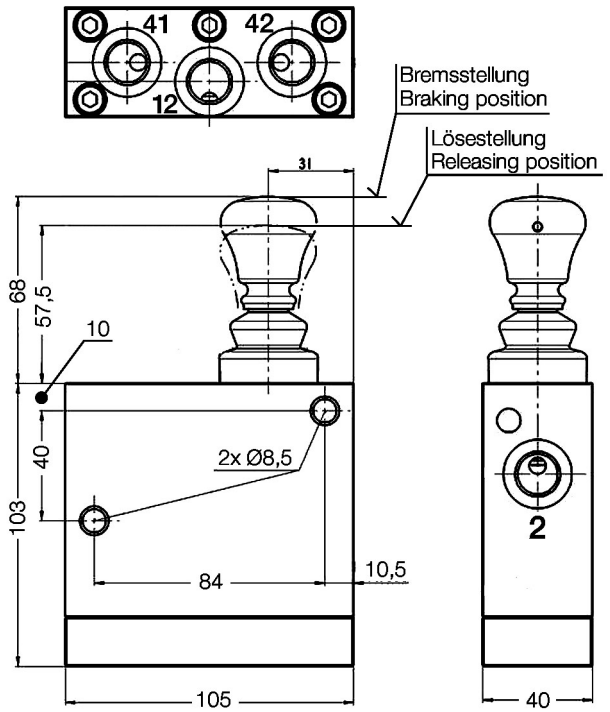
Section No.: K002466-001
Doc. No.: Y011349-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Release Valves for the Front Axle of Drawbar Trailers, for use with AE4311

Dimensions

AE4211

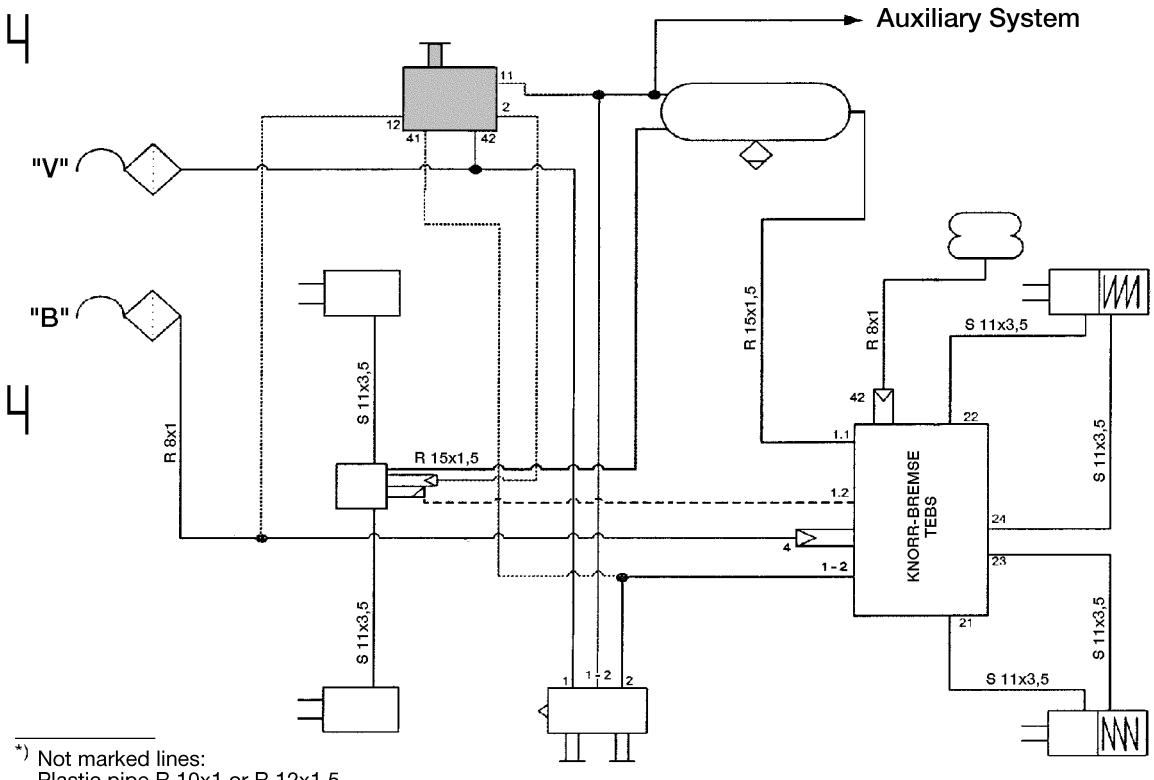


Ports:

11 Supply from the air reservoir
12 Supply from the service brake line
2 Delivery
41 Control signal from the combined manoeuvring valve
42 Control signal from the supply pressure
3 Exhaust

VF00075/283

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



*) Not marked lines:
Plastic pipe R 10x1 or R 12x1,5

VF00075/284 EN

Application and Function

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

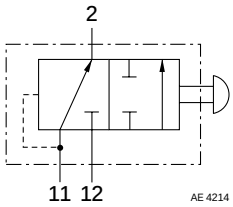
In the absence of Supply (Red) Line pressure to the trailer, depressing the Control Button allows air pressure from the Trailer Reservoir to feed the Relay Emergency Valve thus automatically releasing the service brakes.

When the trailer is re-coupled, connection of the Supply (Red) Line will cause the Control Button to automatically return to the 'Drive' position.

Caution: Always ensure that after manoeuvring, the Valve´s button is pulled out and the Trailer Park Valve is correctly applied.

VF00119_170

Standard Symbol as DIN ISO 1219



Technical Features

Maximum Operating Pressure:	8,0 bar
Operating Temperature Range:	-40 °C to +80 °C
Way Through:	4,5mm
Medium:	Compressed air
Approx. weight:	0,5 kg

Options

Type No.	Air Port Threads	Mounting	Control Button
AE4261	M16x1,5	In Supply Line or via a Mounting Plate	Round, black with function symbol

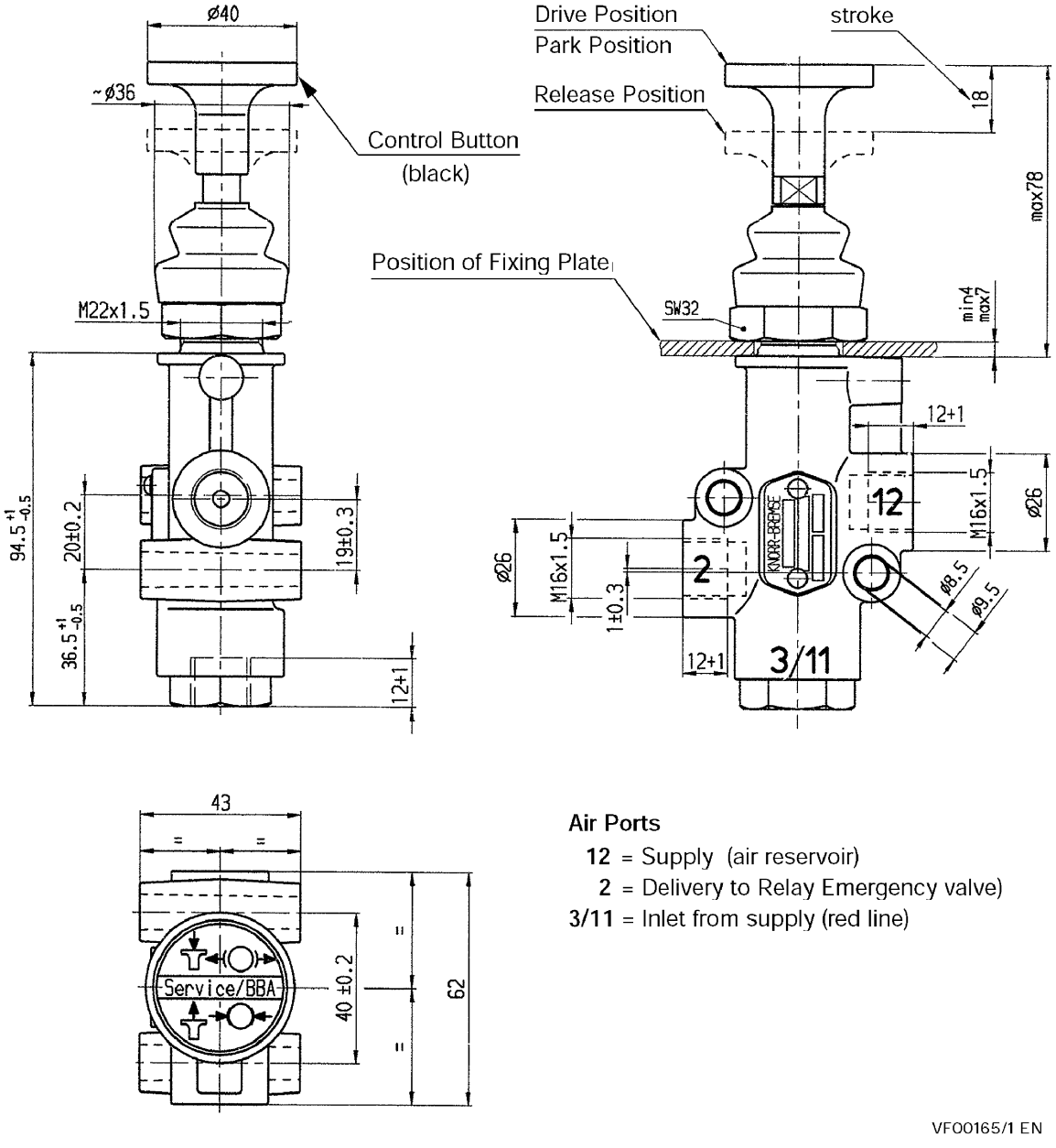
Type No.	Lock in place (in end position)	Non- return Valve (port 12)
AE4261	With	Without

Section No.: K002467-000
Doc. No.: Y011350-EN-000

Catalogue No.: K001561-EN

Dimensions

AE4261

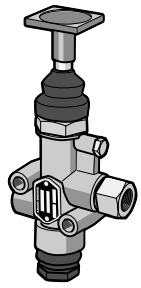


Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Application and Function

The Trailer Park Valve operates the parking brake function of trailers equipped with Spring Brake Actuators.
Whether coupled or uncoupled, the 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.

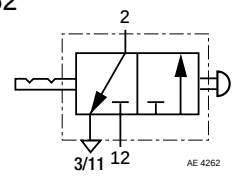
Caution: Always ensure that the red Control Button is pulled out and the trailer is correctly parked, before coupling or uncoupling the trailer.



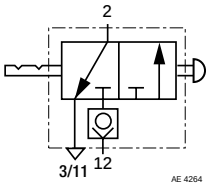
GrF 0534

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)
Medium:	Compressed air
Approx. weight:	0,5 kg

Options

Type No.	Air Port Threads	Mounting	Control Button
AE4262	M16x1,5	In Supply Line or via a Mounting Plate	Red, square, with function symbol
AE4264			

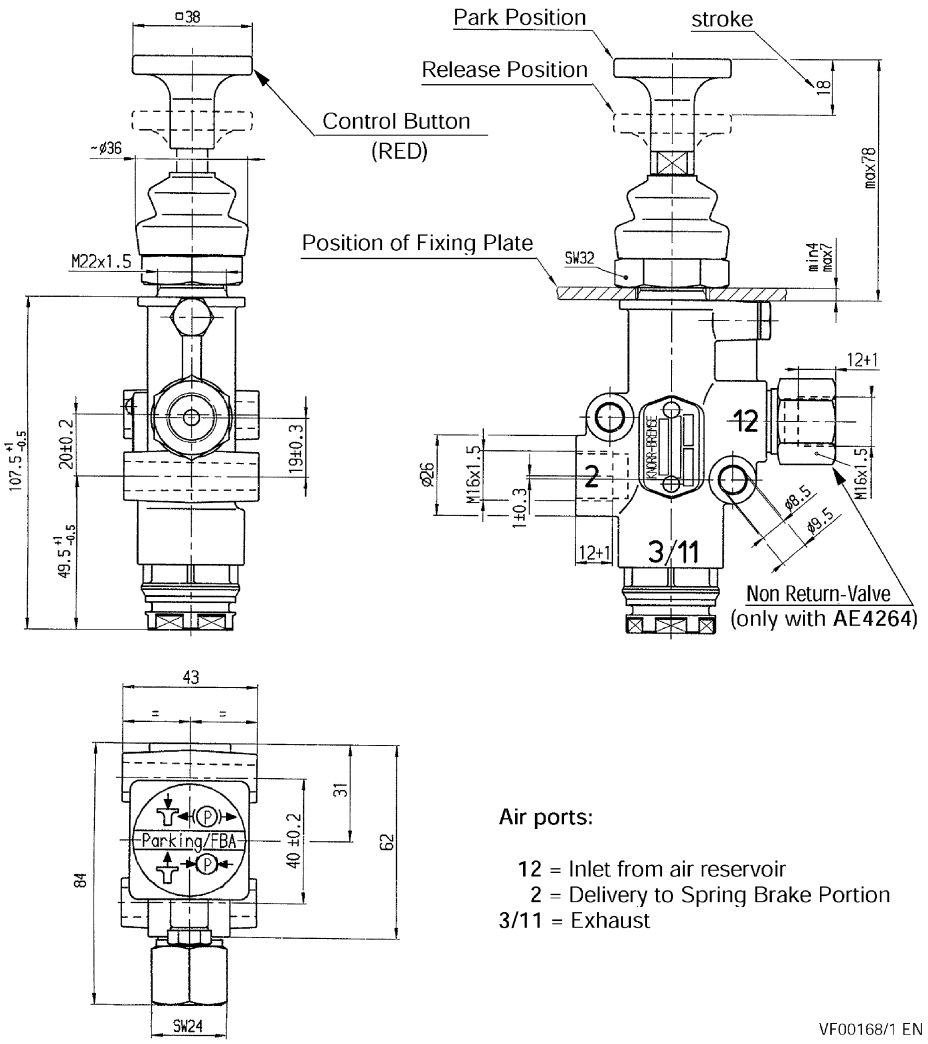
Type No.	Lock in place (in end positions)	Non- return Valve (port 12)
AE4262	With	Without
AE4264		With

Section No.: K002468-000
Doc. No.: Y011351-EN-000

Catalogue No.: K001561-EN

Dimensions

AE4262
AE4264



Air ports:

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

VF00168/1 EN

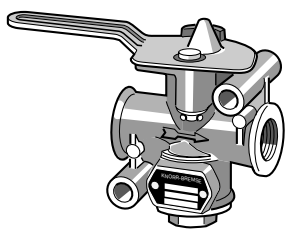
Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Application and 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.

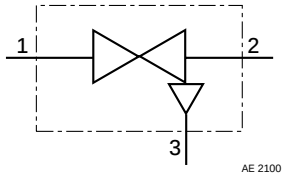


GrF 0064

Technical Features

Maximum Operating Pressure:	10,0 bar
Operating Temperature Range:	-40 °C to +80 °C
Medium:	Compressed air
Approx. weight:	0,4 kg

Standard Symbol as DIN 74253



AE 2100

Options

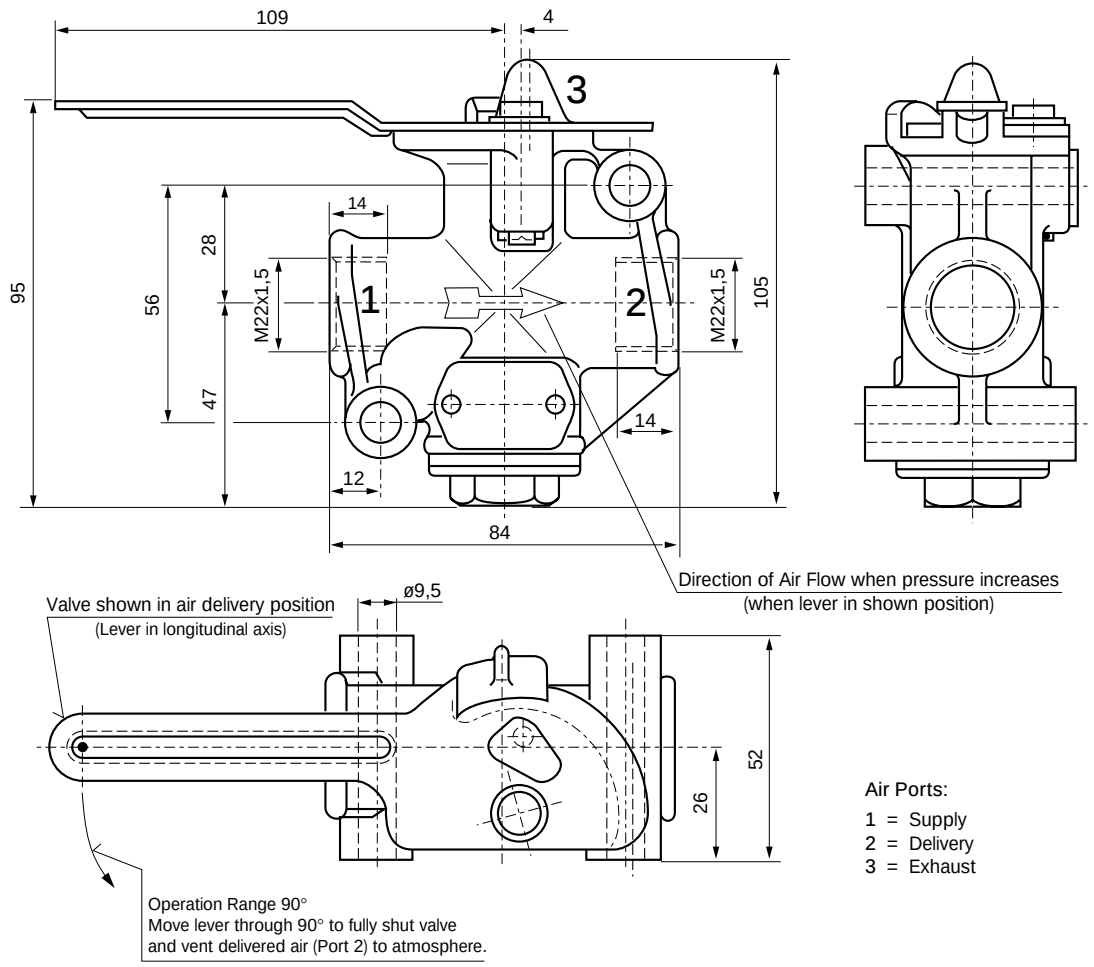
Type No.	Air Port Threads	design
AE2100	M22x1,5	With exhaust
AE2110	M22x1,5	With exhaust and two shut-off positions

Section No.: K002469-000
Doc. No.: Y011352-EN-000

Catalogue No.: K001561-EN

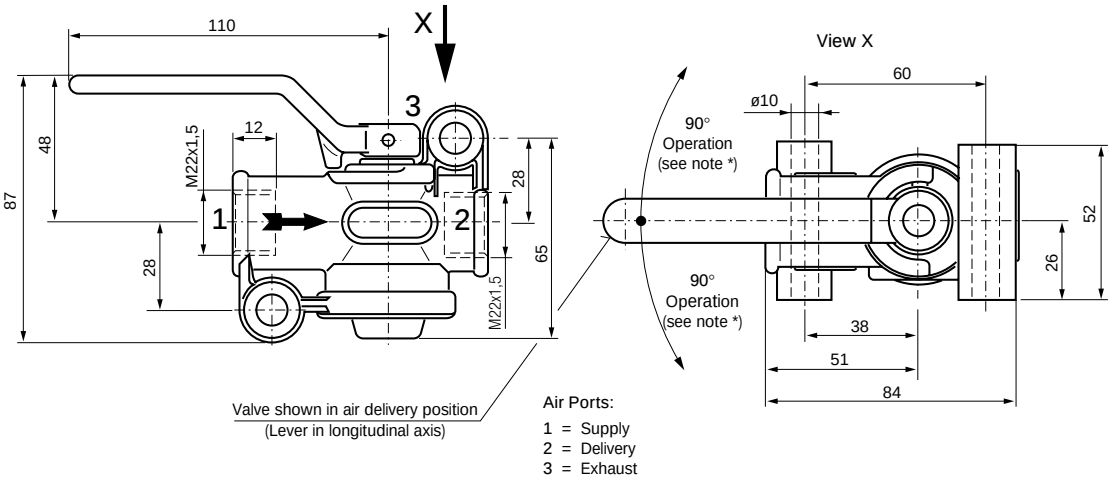
Dimensions

AE2100



VF 00075/80 EN

AE2110



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

VF 00075/81 EN

Section No.: K002469-000
Doc. No.: Y011352-EN-000
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function

The Combined Manoeuvring Valve incorporates the Park and Shunt functions for use on Trailers equipped with Spring Brake Actuators.

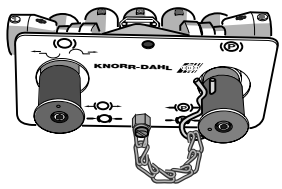
The Park Valve operates the trailer's parking brake function by supplying and releasing pressure to the Spring Portions of the Spring Brake Actuators. When the Trailer is parked, the security pin should be inserted behind the Red Park Button to avoid accidental release of the Spring Brakes. Whether coupled or uncoupled, the Red Button must be pulled out to correctly park the Trailer on its Spring Brakes.

The 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, depressing the Red Button to release the park brake and then depressing the Black Button allows air pressure from the Trailer Reservoir to feed the Emergency Valve and thereby release the Service Brakes. If the Black Button is left depressed, when the trailer is re-coupled, air pressure in the Supply (Red) Line will re-set the button so that the Relay Emergency Valve is once again supplied by towing vehicle pressure.

Versions of the Combined Manoeuvring 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.

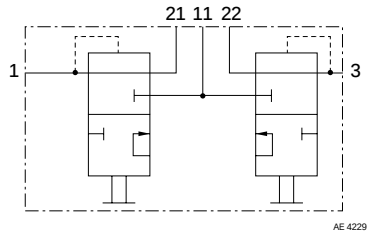
When using a Valve with integral Non-Return Valve, extreme care should be taken to ensure that the trailer is correctly parked using the Red Button. If the trailer is parked on Service air pressure, e.g. only Supply (Red) line disconnected, and the Trailer air pressure depletes, the Spring Brakes cannot 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.

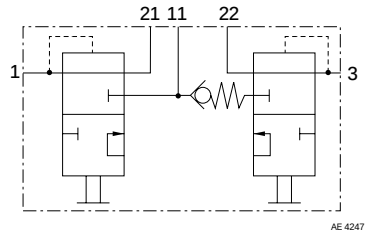


Standard Symbol as DIN ISO 1219

AE4246 - II36125
AE4247 - II36129



AE4246 - II36126
AE4247 - II36131



Technical Features

Operating Pressure:	8,5 bar
Maximum Operating Pressure:	10 bar
Operating Temperature Range:	-40 ºC to +80 ºC
Medium:	Compressed Air
Approx. weight:	0,9 kg
Symbol label:	3EB02234

Options

Type No.	Part No.	Air Port Threads 1 and 3	Non-Return Valve	Information Plate & Security Pin
AE4246	II36125	M22x1,5	Without	With
AE4246	II36126	M22x1,5	With	With
AE4247	II36129	M16x1,5	Without	With
AE4247	II36131	M16x1,5	With	With

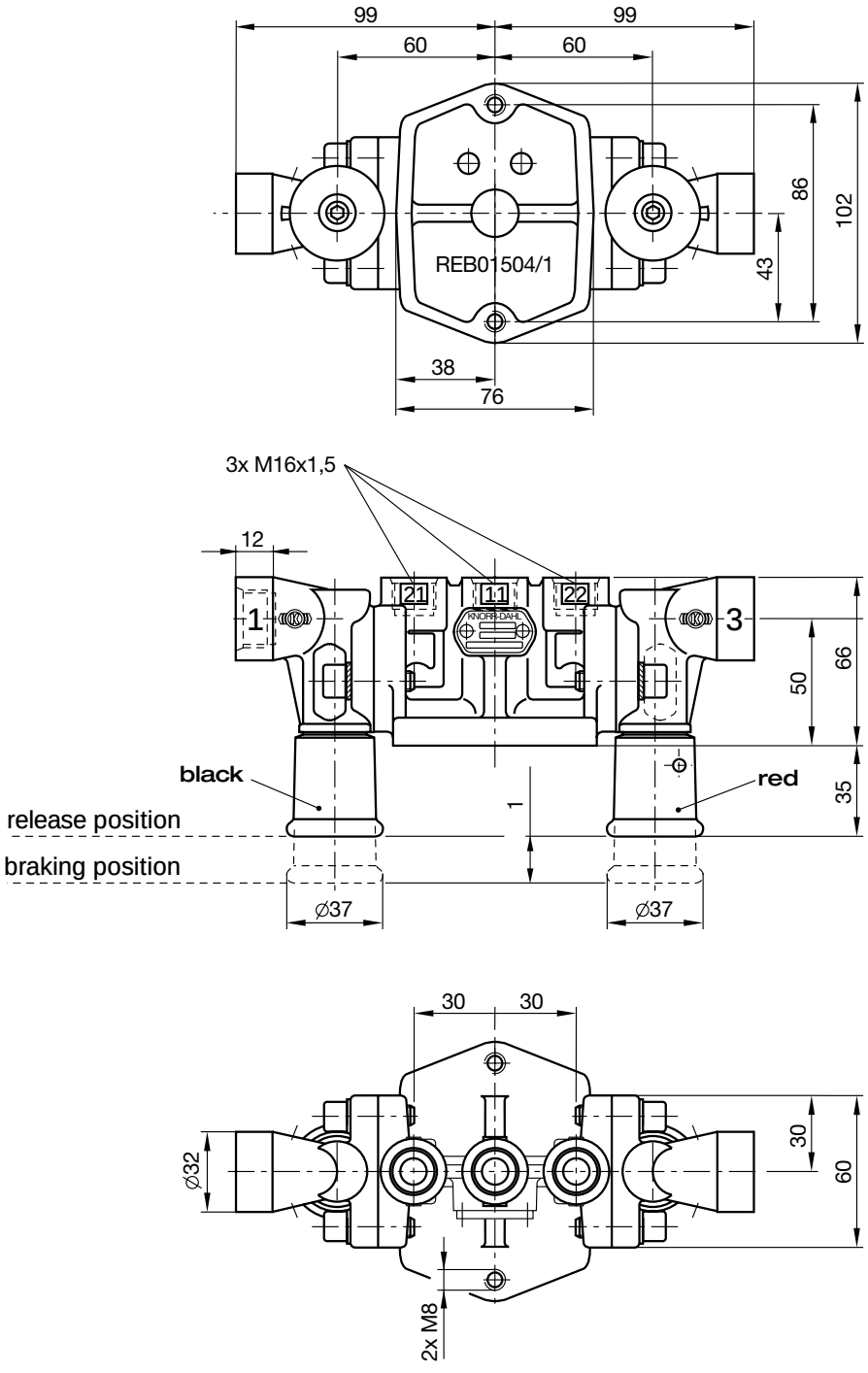
Note: The manoeuvring valve (black button) has the Type No. AE4233

Section No.: K002470-000
Doc. No.: Y011353-EN-000
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions

AE4246
AE4247



Air ports:

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

VF 00075/16 EN

Section No.: K002470-000
Doc. No.: Y011353-EN-000
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function:

The Park / Shunt Valve with Integrated Emergency Function is used on trailers that are equipped with Spring Brakes. It is connected to the Supply (Red) Line and enables the manual release and application of the trailer Spring Brakes.
Additionally, the AE431. has an integrated emergency function and in the event of loss of pressure in the trailer Supply (Red) Line resulting from uncoupling or failure of the Supply Line whilst driving, this feature will automatically apply the trailer's Spring Brakes by exhausting their air supply and not by applying the trailer's service brakes as with traditional Relay Emergency Valves (REV). This means there is no longer a need for a separate Relay Emergency Valve and ensures that the vehicle is safely braked 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.

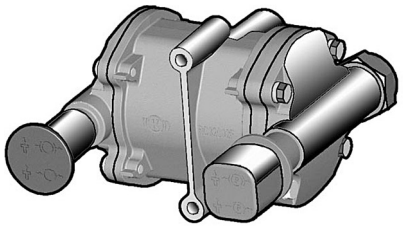
This feature of the valve also reduces the possibility of air leakage when the trailer is uncoupled.
In contrast to trailers with a REV, nearly all pipes and hoses are exhausted giving reduced risk of reservoir air leakage.

Both buttons of the AE431. control the Spring Brakes

The red button is used to operate the parking brake. It has a safety function that protects against unintentional operation and must be operated by pulling the locking sleeve.

The black button is used for manoeuvring the uncoupled trailer. However, in contrast with conventional release valves, it operates the Spring Brakes. Note, it can only be pushed in when the trailer is uncoupled and re-connection of the Supply (Red) Line will cause it to automatically return to the driving position.

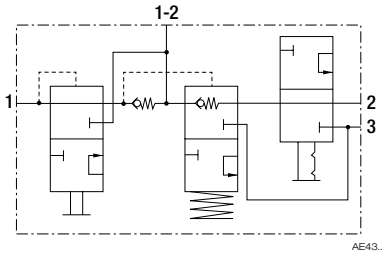
The mounting plate Z006845 (see page 17.2) explains the operation of the two buttons.



VF 00199_51

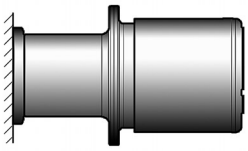
Standard Symbol as DIN ISO 1219

AE4310
AE4311

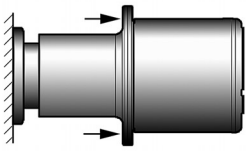


Operation of the parking brake
- red button -

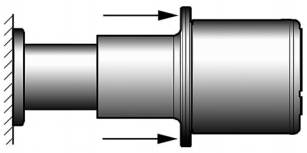
Parking brake released



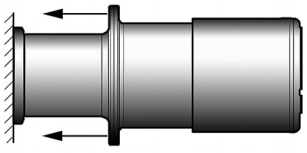
Unlock



Pull out



Parking brake applied



VF 00075/147

Technical Features

Operating Pressure:	8,5 bar
Maximum Operating Pressure:	10 bar
Operating Temperature Range:	-40 °C to +80 °C
Medium:	Compressed Air
Approx. weight:	1,45 kg

Service Brake Priority:
When charging the reservoir the service brake 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.

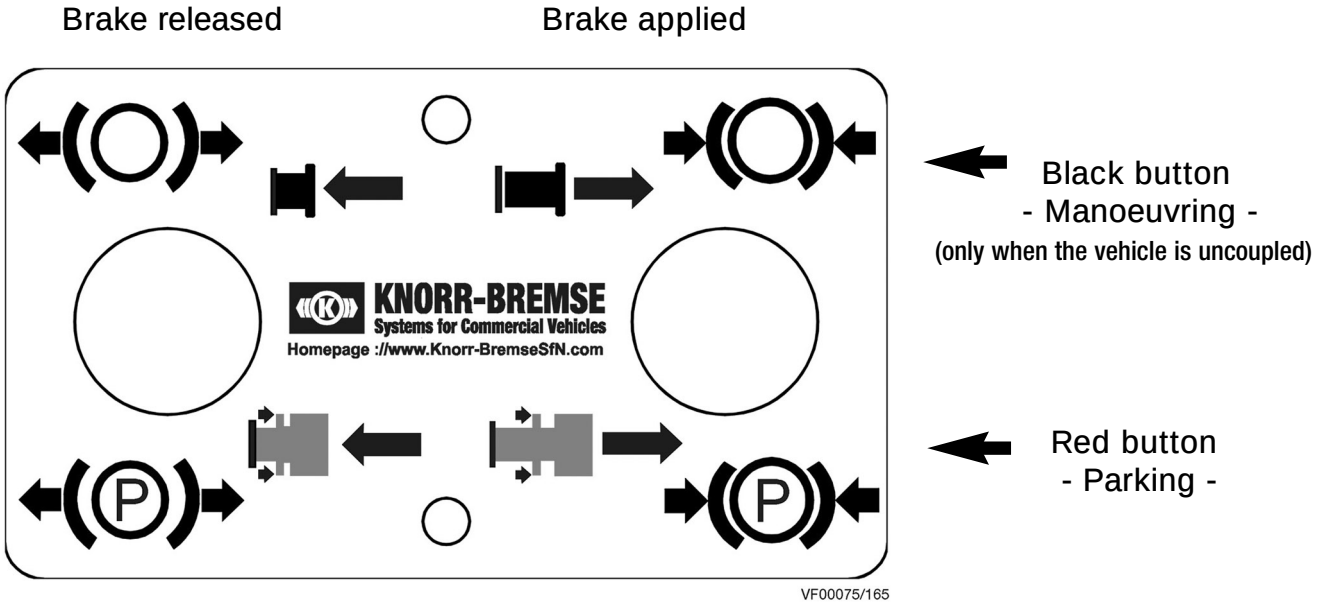
Section No.: K002471-001
Doc. No.: Y011354-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Product Overview

Type No.	Part No.	Air Port Threads	Exhaust
AE4310	II36229	M16x1,5 - DIN 3852	With Silencer
AE4311	K000896	M16x1,5 - DIN 3852	With rubber flap
AE4311	K001664	M16x1,5 - DIN 3852	With rubber flap With Plate Z006845

Mounting Plate



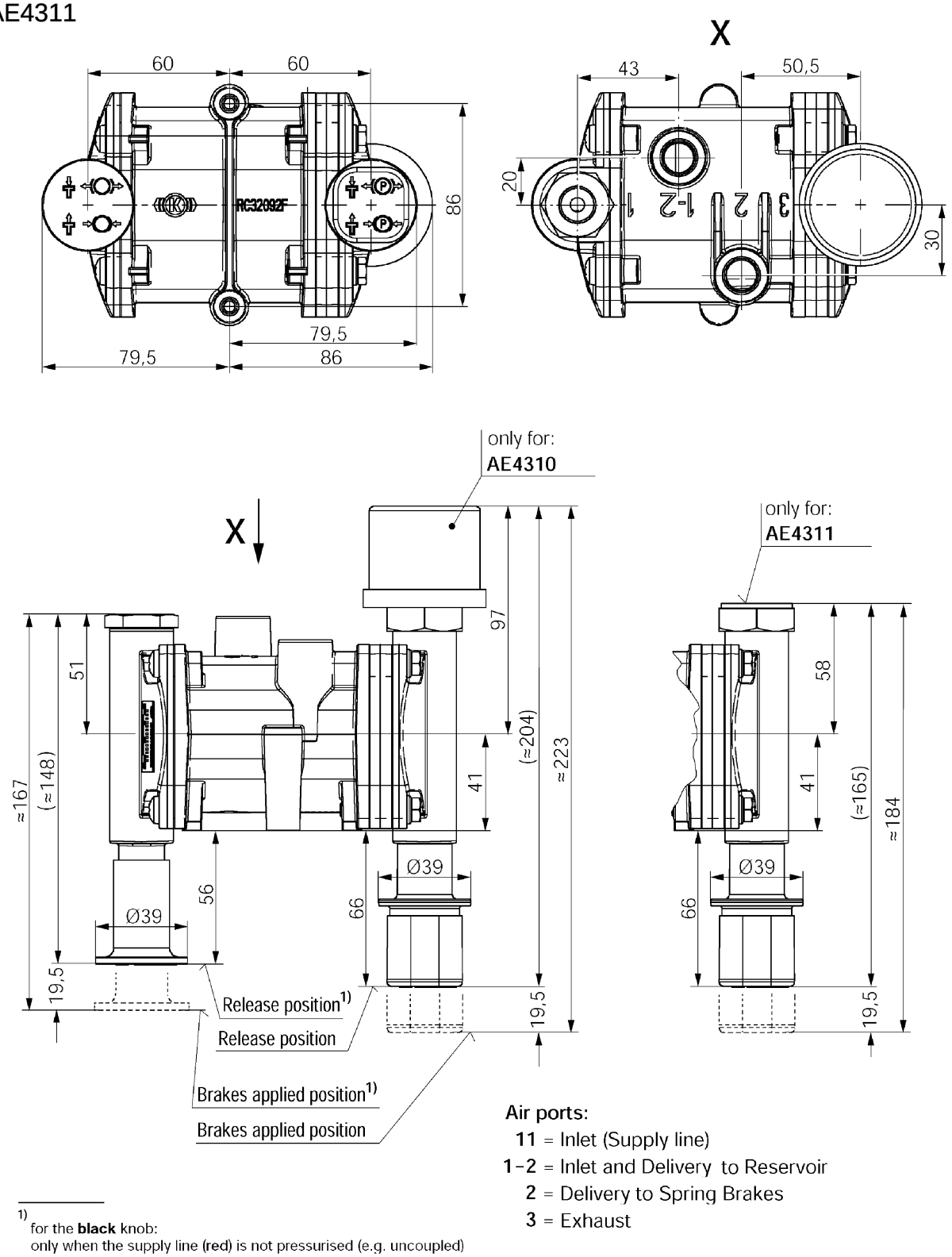
The plate Z006845 can be ordered separately, or delivered with the Park / Shunt Valve AE431. (for installation dimensions see page 17.3).

Section No.: K002471-001
Doc. No.: Y011354-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions

AE4310
AE4311



Air ports:

11 = Inlet (Supply line)
1-2 = Inlet and Delivery to Reservoir
2 = Delivery to Spring Brakes
3 = Exhaust

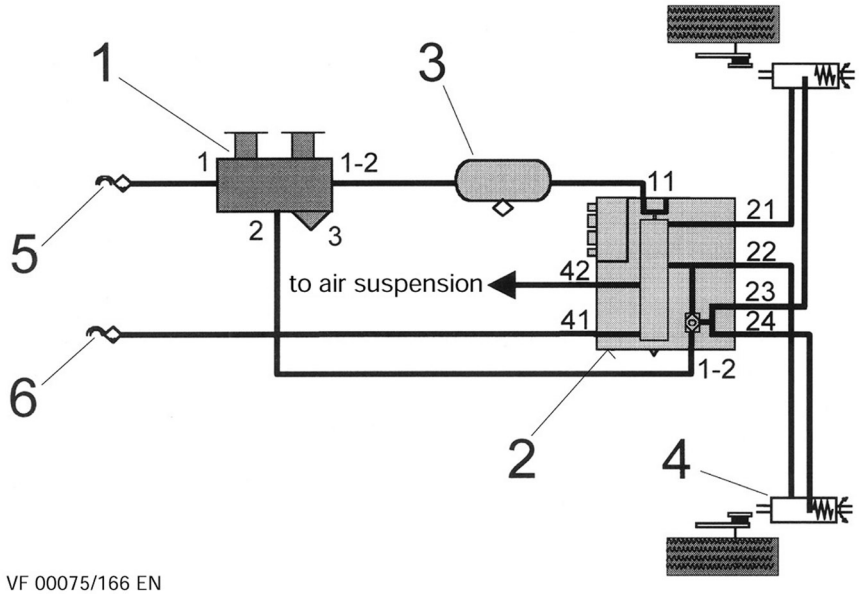
1) for the **black** knob:
only when the supply line (**red**) is not pressurised (e.g. uncoupled)

VF00075/149 EN ÄI01

Section No.: K002471-001
Doc. No.: Y011354-EN-001
Catalogue No.: K001561-EN

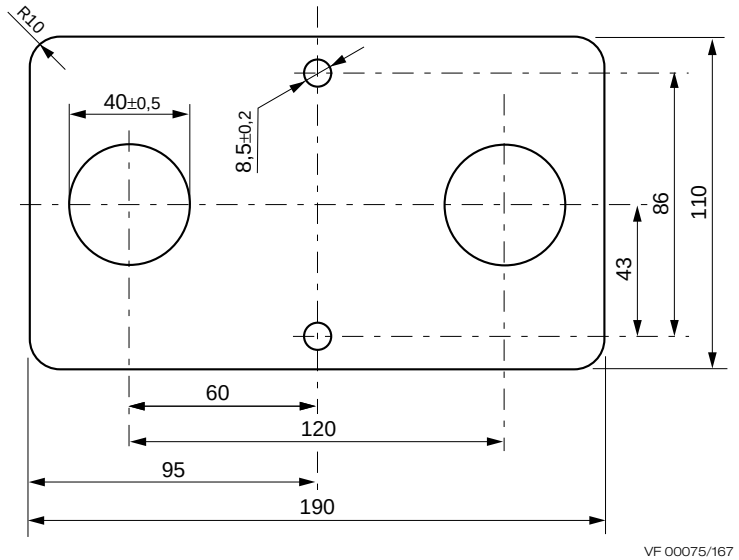
Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Installation example AE4311 with EBS



Item	Designation
1	Park / Shunt Valve AE4311
2	EBS-Module ES2...
3	Reservoir VB....
4	Brake Actuator BS.... or BX.... or BZ....
5	Coupling Head with filter, Supply - Red - KU14..
6	Coupling Head with filter, Control - Yellow - KU14..

Dimensions of the Mounting Plate



Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function

The Non-Return Valve ensures air pressure flows in one direction only.

Technical Features

- AE5102 only

Maximum operating pressure:	22 bar
Operating Temperature Range:	-45 °C to +160 °C
Flow diameter:	8mm dia.
Medium:	Compressed air
Approx. weight:	0,15 kg

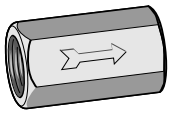
- AE5131 only

Maximum operating pressure:	13 bar
Operating Temperature Range:	-45 °C to +80 °C
Flow diameter:	9 mm dia.
Medium:	Compressed air
Approx. weight:	0,1 kg

Options

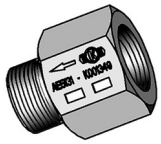
Type No.	Air Port Thread - Depth / Length	Design
AE5102	M22x1,5 (Internal) - 14	Light alloy, hexagon
AE5131	M22x1,5 (Internal) - 12 M22x1,5 (External) - 14	

AE5102



GrF 0075

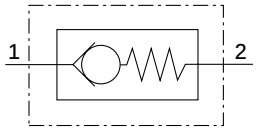
AE5131



VF00199_169

Standard Symbol as DIN ISO 1219

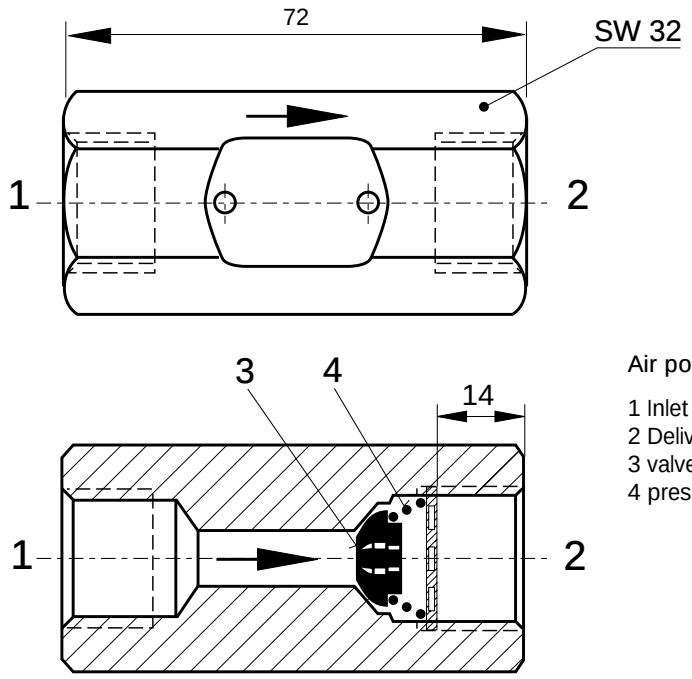
AE5102
AE5131



AE 5102

Dimensions

AE5102

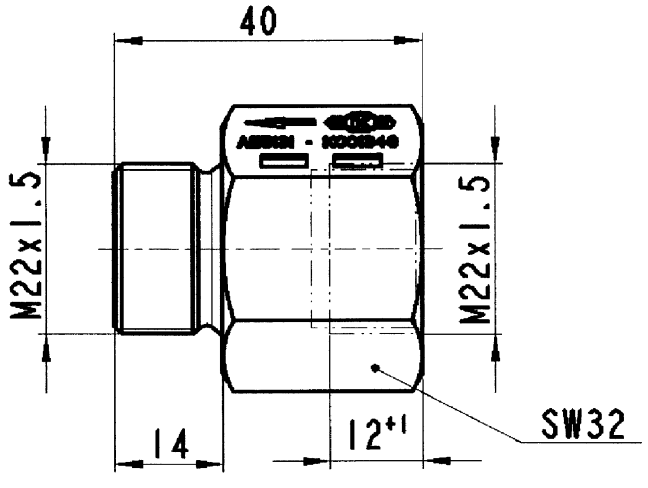


Air ports:

1 Inlet
2 Delivery
3 valve cone
4 pressure spring

VF 00075/89 EN

AE5131



VF00075/216

Section No.: K002472-000
Doc. No.: Y011355-EN-000
Catalogue No.: K001561-EN

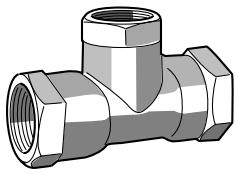
Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

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.

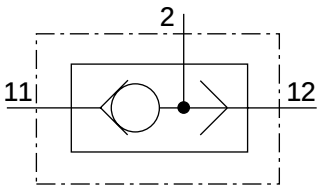
The Double Check Valve is often used as an anti-compounding device for trailers equipped with Spring Brake Actuators.

If a trailer 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 trailer's foundation brakes.



GrF 0066

Standard Symbol as DIN ISO 1219



AE 4100

Technical Features

Maximum operating pressure:	10 bar
Flow diameter:	
AE4100	8-16 mm
AE4105	14 mm
295358	11 mm
Minimal differential pressure:	Δ 0,15 bar
Operating Temperature Range:	-40 ºC to +80 ºC
Medium:	Compressed air
Approx. weight:	0,15 kg

Options

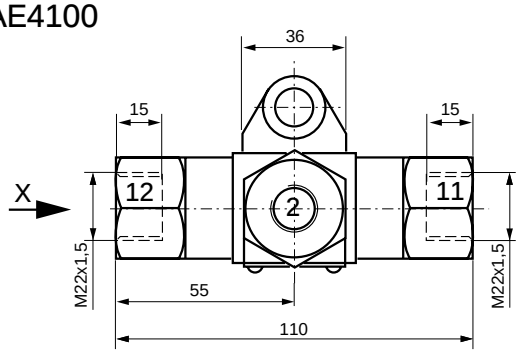
Type No.	Air Port Threads	Design
AE4100	M22x1,5	With mounting
AE4105	M22x1,5	Without mounting, short design
295358	M16x1,5	With mounting

Section No.: K002473-000
Doc. No.: Y011356-EN-000

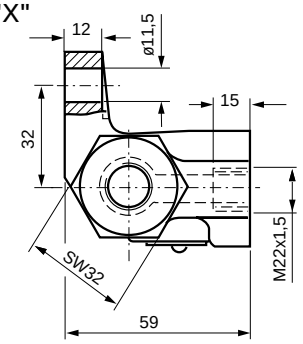
Catalogue No.: K001561-EN

Dimensions

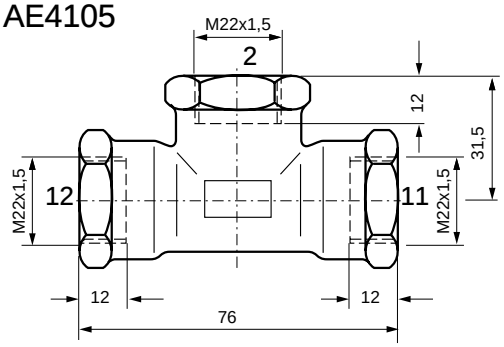
AE4100

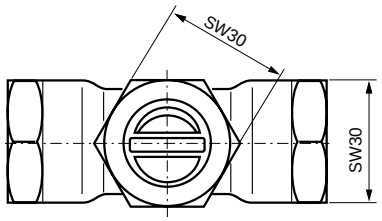


View "X"



AE4105



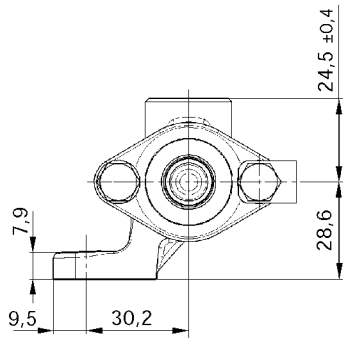


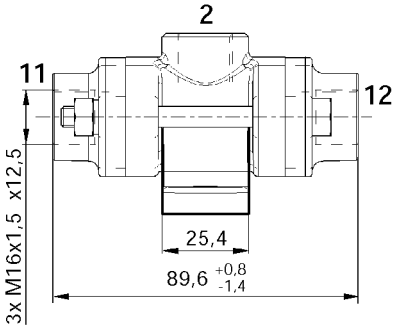
Air ports:

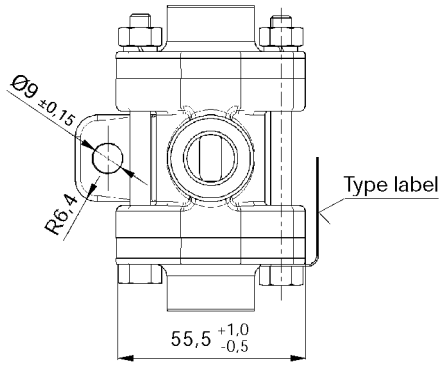
11 = Inlet
12 = Inlet
2 = Delivery

VF 00075/82 EN

295358





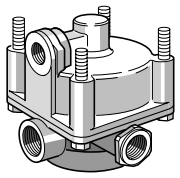


VF00075/127 EN

Section No.: K002473-000
Doc. No.: Y011356-EN-000
Catalogue No.: K001561-EN

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.

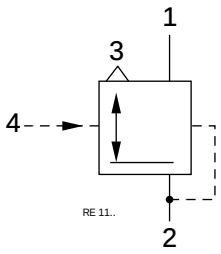


GrF 0196

Technical Features

Maximum operating pressure:	8,5 bar
Operating Temperature Range:	-40 ºC to +80 ºC
Flow Diameter:	13mm
Medium:	Compressed air
Approx. weight:	1,1 kg

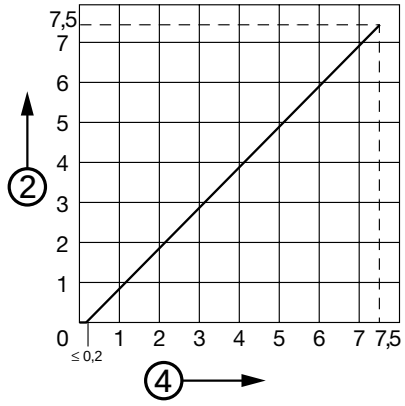
Standard Symbol as DIN ISO 1219



Options

Type No.	Air Port Threads		
	1	2	4
RE1121	M22x1,5	M16x1,5	M16x1,5
RE1131		M22x1,5	

Performance Chart



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

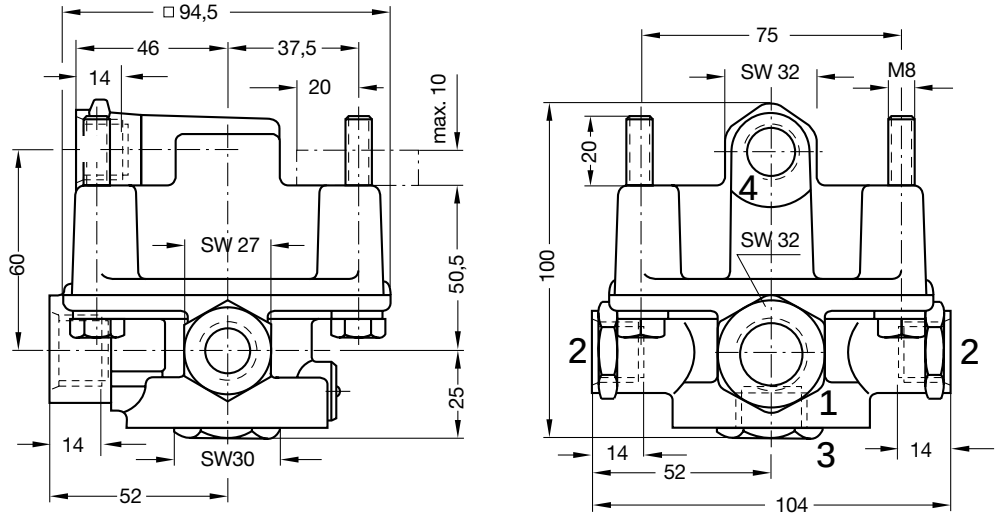
VF 00075/179 EN

Other types are available on request.

Section No.: K002474-000
Doc. No.: Y011357-EN-000
Catalogue No.: K001561-EN

Dimensions

RE1121
RE1131



Air Ports:

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

VF 00075/178 EN

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) To help installation, the top cover may be turned in 90° steps so as to point in any one of four directions. This enables the pipework to be run clear of any local obstructions.

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

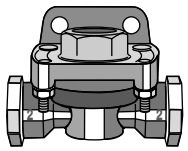
Section No.: K002474-000
Doc. No.: Y011357-EN-000

Catalogue No.: K001561-EN

Function

A Quick Release Valve is used to speed up the exhaust of a large volume of air.

The Valve is generally used in the supply to the Spring Portion of Spring Brake Actuators to speed up the application of the trailer parking brake.

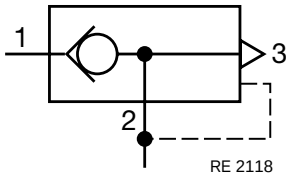


GrF 0197

Technical Features

Maximum operating pressure:	10 bar
Operating Temperature Range:	-40 °C to +80 °C
Medium:	Compressed air
Approx. weight:	0,4 kg

Standard Symbol as DIN ISO 1219



RE 2118

Options

Type No.	Air Port Threads	
	1	2
RE2108[1)] RE2118	M22x1,5	M22x1,5

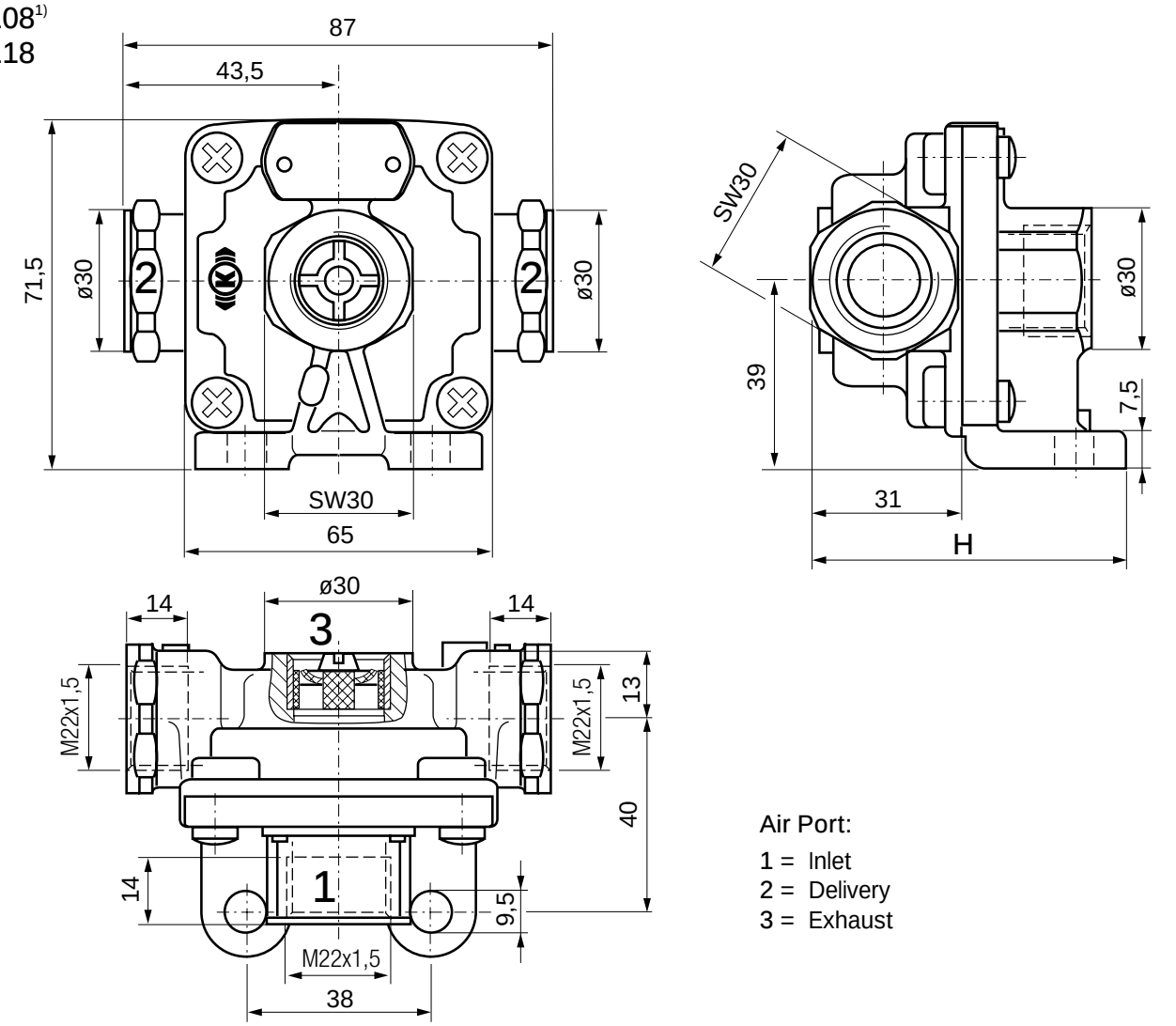
[1)] Residual delivery pressure exhausts through port 1

Section No.: K002475-000
Doc. No.: Y011358-EN-000

Catalogue No.: K001561-EN

Dimensions

RE2108[1)]
RE2118



Air Port:

1 = Inlet
2 = Delivery
3 = Exhaust

1) Residual delivery pressure exhausts through port 1

VF 00075/57 EN

Installation instructions:

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

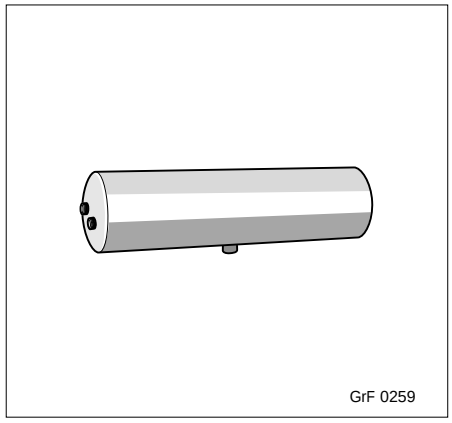
2) Never block the exhaust port or allow it to be close to any part of the vehicle.

Section No.: K002475-000
Doc. No.: Y011358-EN-000

Catalogue No.: K001561-EN

Air Reservoirs (Steel)

Function


GrF 0259

Air Reservoirs are used to store the compressed air for the vehicle air braking and auxilliary systems.
They are available in steel - see this page, or aluminium - see page 22.2 and 22.3

Note: aluminium reservoirs are approximately 60% lighter than steel reservoirs of the same capacity.

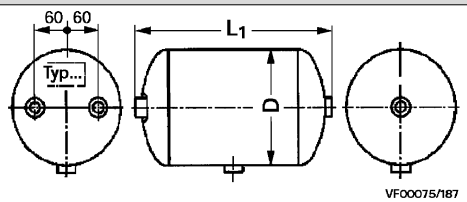
Technical Features

Pressure rating:	EN 286-2, with CE-symbol
Maximum Operating Pressure:	12,5 bar
Operating Temperature Range:	-40 °C to +100 °C
Medium:	Compressed air
Material:	Steel, black primed
Air Port Threads:	M22x1,5; DIN 74281

Options

Type No.	Volume [l]	D [mm]	L1 [mm]	Weight [kg]
VB3301/206	10	206	370	4,8
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
VB3337/246	37	246	869	11,9
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
VB3308/396	80	396	750	21,1
VB33085/276	85	276	1543	23,8
VB3310/396	100	396	915	25,4
VB3312/396	120	396	1089	29,4
Drain Valve: EE1100				

Fixing Straps are available to suit each reservoir diameter:

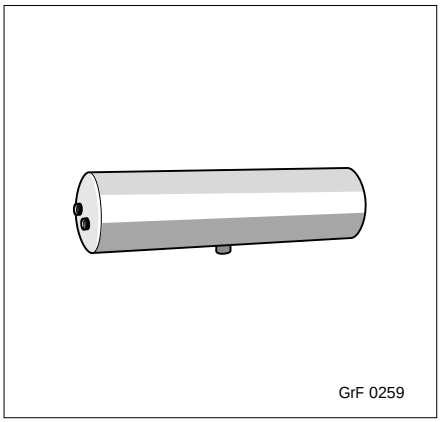
Type No.	Reservoir diameter [mm]	Dimension
VB1206 VB1246 VB1276 VB1310 VB1396	206 246 276 310 396	

Section No.: K002476-002
Doc. No.: Y011359-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Air Reservoirs (Aluminium)

Function


GrF 0259

Air Reservoirs are used to store the compressed air for the vehicle air braking and auxilliary systems.
They are available in aluminium - see this page and page 22.3, or steel - see page 22.1.

Note: aluminium reservoirs are approximately 60% lighter than steel reservoirs of the same capacity.

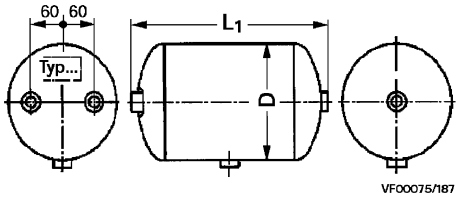
Technical Features

Pressure rating:	EN 286-2, with CE-sign
Maximum Operating Pressure:	D=206, 246, 276mm 12,5bar D=310, 396mm 11bar
Operating Temperature Range:	-40 °C to +65 °C
Medium:	Compressed air
Material:	Aluminium
Air Port Threads:	M22x1,5; DIN 74281

Options

Type No.	Volume [l]	D [mm]	L1 [mm]	Weight [kg]
VB4301/206	10	206	375	2,3
VB43015/206	15	206	535	3,1
VB4302/206	20	206	695	4,0
VB4302/246	20	246	505	3,5
VB4302/276	20	276	415	3,3
VB4303/246	30	246	724	4,9
VB4303/276	30	276	590	4,5
VB4337/246	37	246	880	5,9
VB4304/246	40	246	945	6,2
VB4304/276	40	276	766	5,8
VB4304/310	40	310	620	5,5
VB4306/246	60	246	1390	9,0
VB4306/276	60	276	1115	8,2
VB4306/310	60	310	900	7,7
VB4306/396	60	396	585	7,4
VB4308/396	80	396	755	9,3
VB4310/396	100	396	920	10,8
VB4312/396	120	396	1094	13,0
Drain Valve: EE1100				

Fixing Straps are available to suit each reservoir diameter:

Type No.	Reservoir diameter [mm]	Dimension
VB1206 VB1246 VB1276 VB1310 VB1396	206 246 276 310 396	

Section No.: K002476-002
Doc. No.: Y011359-EN-002
Catalogue No.: K001561-EN

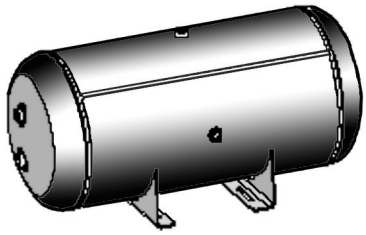
Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Air Reservoir (Aluminium) with mounting bracket

Function

Air reservoirs are used to store the compressed air for the vehicle air braking and auxiliary systems.
They are available in aluminium - see this page and page 22.2 - or steel - see page 22.1.
Due to the welded mounting brackets the reservoirs can be mounted directly without Fixing Straps.

Note: Aluminium reservoirs are approximately 60% lighter than steel reservoirs of the same capacity.



VF00199_304

Technical Features

Pressure rating:	EN 286-2, with CE-sign
Maximum Operating Pressure:	D=206, 246, 276mm 12,5bar D=310, 396mm 11bar
Operating Temperature Range:	-40 °C to +65 °C
Medium:	Compressed Air
Material:	Aluminium
Air Port Threads:	M22x1,5; DIN 74281

Options

Type No.	Volume [l]	D [mm]	L1 [mm]	Weight [kg]
VB7302/246	20	246	505	4,3
VB7303/246	30	246	724	5,7
VB7304/276	40	276	766	6,8
VB7306/310	60	310	900	8,7
VB7306/396	60	396	585	8,7
VB7308/396	80	396	755	10,4
VB7310/396	100	396	920	12,0
Drain Valve:	EE1100			

Section No.: K002476-002
Doc. No.: Y011359-EN-002

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Plastic Pipes and Coils

Function

Plastic Pipes are used to interconnect the air braking and auxilliary equipment.
See also page 22.4

VF00199_175

Technical Features

Maximum Operating Pressure:	15 bar
Operating Temperature Range:	-40 °C bis +60 °C
Medium:	Compressed air
Material:	Polyamid 12; DIN 73378
Supply Dimension:	100m roll

Options

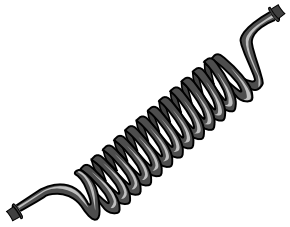
Type No.	Outside dia. x Wall thickness [mm]	Standard
KR1006-100	6 x 1,0	DIN 73378
KR1008-100	8 x 1,0	
KR10101-100	10 x 1,0	
KR1012-100	12 x 1,5	
KR1015-100	15 x 1,5	
KR1018-50	18 x 2,0	

Coils are typically used to connect the drawing vehicle and the trailer air systems.

Technical Features

Material:	Polyamid 12
Outside dia. [mm]:	12
Wall thickness [mm]:	1,5

Available in various lengths, colours and with different coupling connections.



GrF 0044

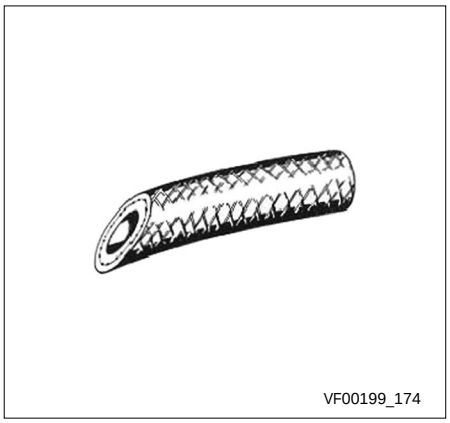
Section No.: K002476-002
Doc. No.: Y011359-EN-002

Catalogue No.: K001561-EN

Brake Hoses

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 to +70 °C
Medium:	Compressed air
Material:	• Rubber brake hose DIN 74310, or • Elastomer with textile layer, TÜV-approved

Options

Type No.	Inside dia. x Wall thickness [mm]	Outside dia. [mm]
BS1100	11 x 3,5	18
BS1300	13 x 6,0	25

Section No.: K002476-002
Doc. No.: Y011359-EN-002

Catalogue No.: K001561-EN

Solenoid Valve (Normally 'Open', Exhausts when powered)

Function

The Solenoid Valve is an electro-pneumatic device 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.

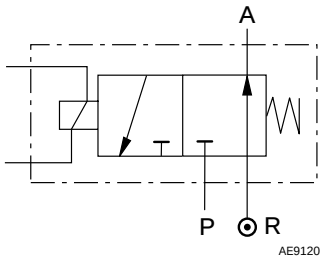
A typical application for AE9120 is to deflate Spring Brake Actuators that are used for locking steering axles or to lower lift axles (see page 74.7).
AE9120 is delivered with an electrical connector, that can be used with standard cables with open looms.

VF00199_195

Technical Features

Operating Pressure:	10 bar
Operating Temperature Range:	-40 °C to +45 °C
Voltage:	24V ±10%
On-time:	100%
Power Input:	10W
Degree of Protection:	IP 65
Medium:	Compressed Air
Approximate weight:	0,5 kg
Flow Diameter:	1,9 mm

Standard Symbol as DIN ISO 1219



AE9120

Product Overview

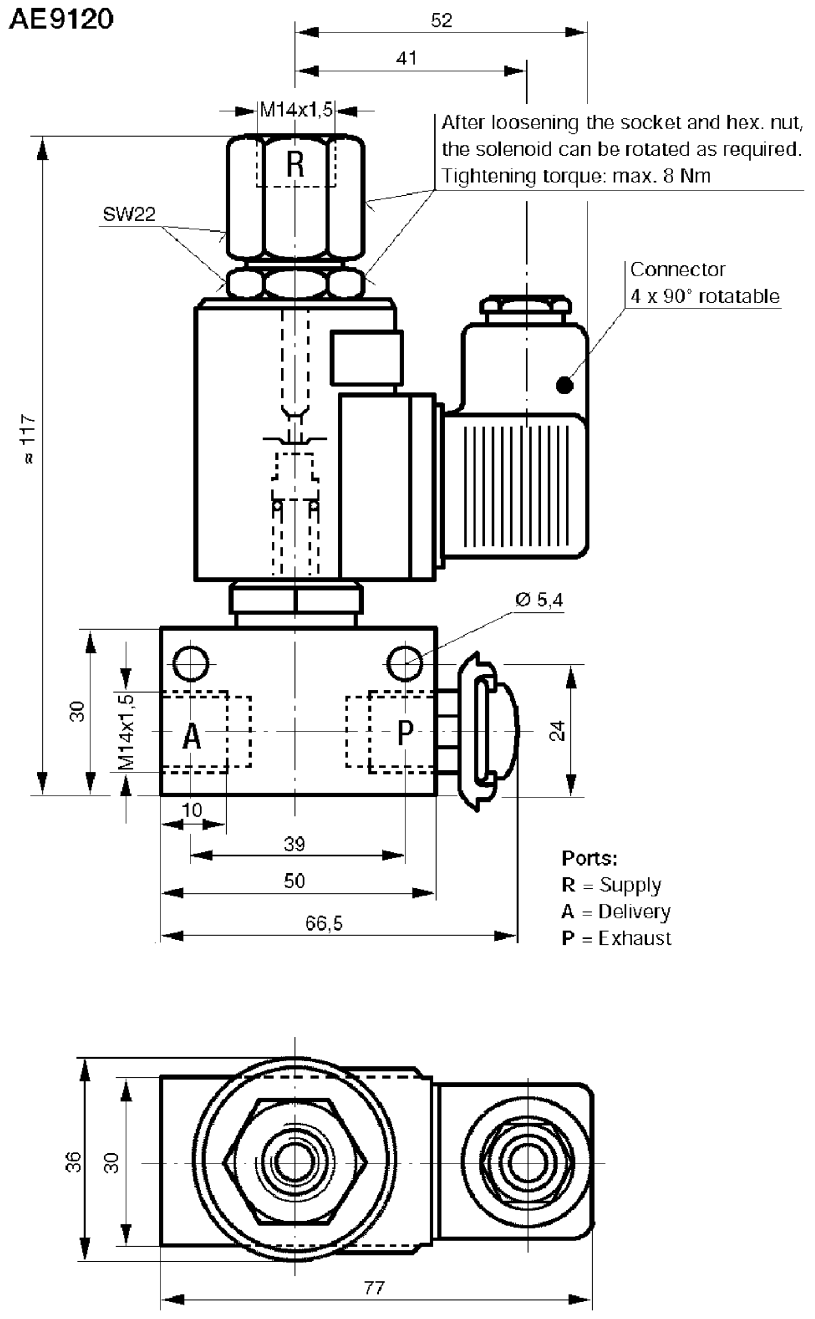
Type No.	Air Port Threads			Remark
	R (supply)	A (delivery)	P (exhaust)	
AE9120	M14 x 1,5	M14 x 1,5	With filter	With Connector

Section No.: K002477-001
Doc. No.: Y011360-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Solenoid Valve (Normally 'Open', Exhausts when powered)

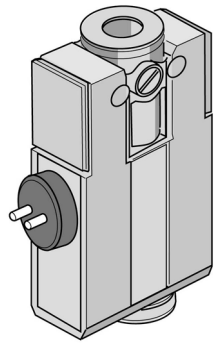
Dimensions



Solenoid Valve (Normally 'Closed', Delivers when powered)

Function

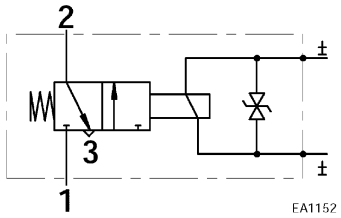
The Solenoid Valve is an electro-pneumatic device used to control the supply of air to other pneumatic equipment. When the solenoid is powered with 24V, the valve deliveres air from port 2. Removal of the electical power causes the valve to vent the delivered air to atmosphere through the exhaust port 3.


GrF 0542

Technical Features

Operating Pressure:	10 bar
Operating Temperature Range:	-40 °C to +80 °C
Voltage:	24V +20% -10%
On-time:	100%
Nominal current:	0,65A
Protection Rating:	IP 68
Medium:	Compressed Air
Approximate weight:	0,9 Kg
Flow Diameter:	4 mm

Standard Symbol as DIN ISO 1219



Product Overview

Type No.	Air Port Threads 1	2	3	Remark
EA1152	M12 x 1,5	M12 x 1,5	–	Without Connector

Notes:

The Cables with the connectors have to be ordered separately.

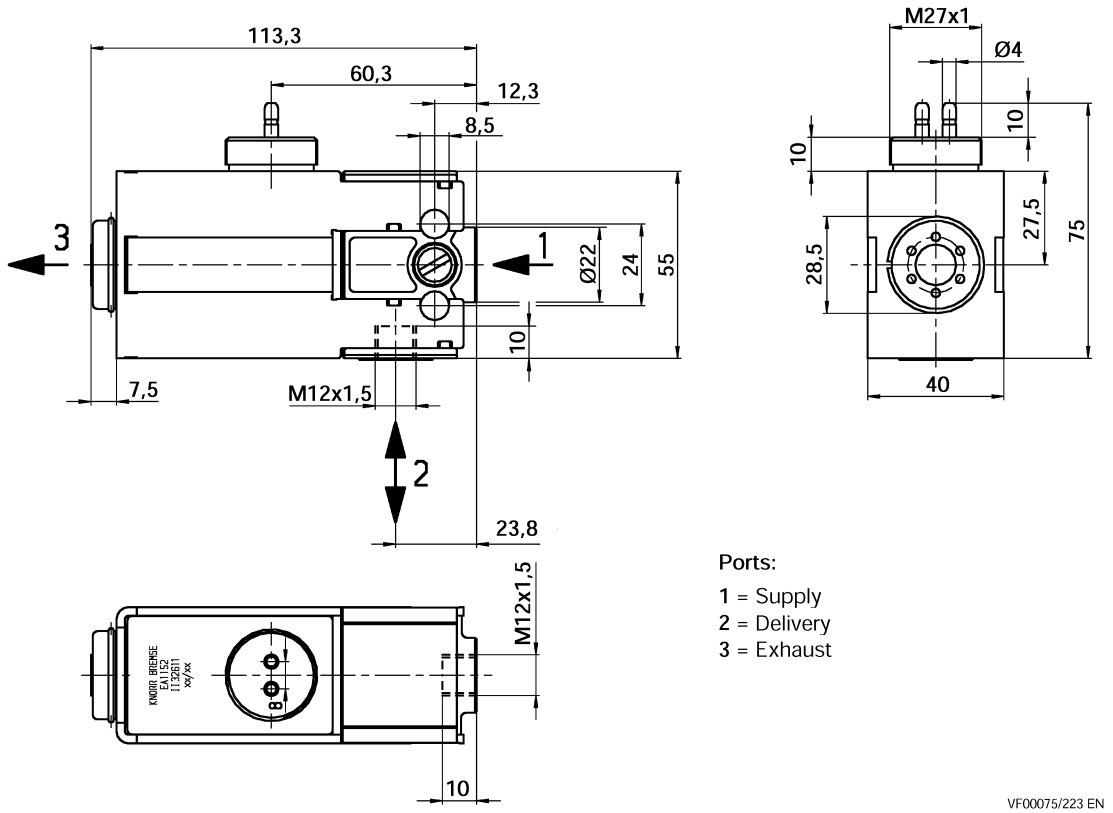
Cable

Part No.	Length [m]	Connector
I87047	6	With normal connector
I87970	6	With angle connector

Section No.: K002477-001
Doc. No.: Y011360-EN-001
Catalogue No.: K001561-EN

Solenoid Valve (Normally 'Closed', Delivers when powered)

Dimensions



Function

The KB3-TA generation of Anti-lock Braking Systems (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.

For 4S/2M and 2S/2M versions, Power Supply and Sensor Extension Cables are required to complete the KB3-TA System. For 4S/3M, an additional Single Modulator and Modulator Cable will also be required.

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

The Electronic Control Unit (ECU) compares the signals received from the Wheel Speed Sensors 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.

The KB3-TA ECU 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).

All ECU's have automatic recognition of lift or steering axles and can easily be 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.

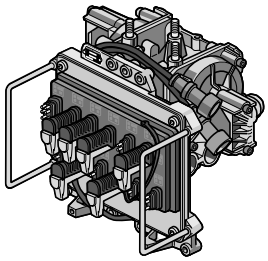
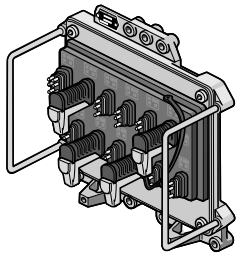
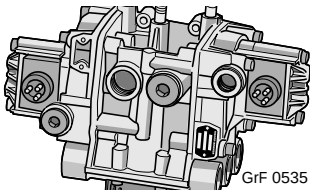
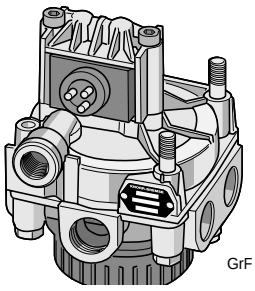
The ES1210 ECU has an output connection for Retarder Control (RET) or Velocity Output (VT). The Velocity Output can be analog or pulsed. The ECU also has Intelligent Operating Data Acquisition (IODA) which incorporates an odometer and differential odometer.

Technical Features

Operating Temperature Ranges ECU:	-40 °C to + 75 °C
Wheel Speed Sensors:	-40 °C to + 160 °C
Cables:	-40 °C to + 180 °C
Plug:	-40 °C to + 80 °C
Medium:	Compressed Air
Maximum Operating Pressure:	10 bar
Approximate weight:	3,7 kg
Nominal voltage:	24V DC

Section No.: K002478-002
Doc. No.: Y011361-EN-002
Catalogue No.: K001561-EN

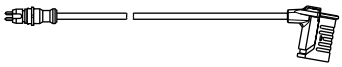
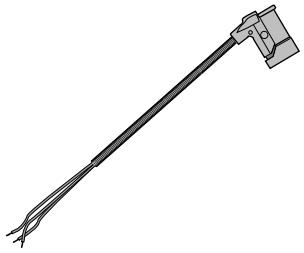
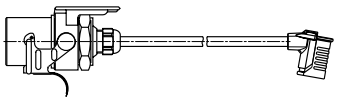
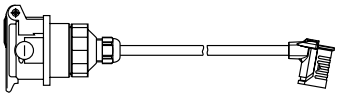
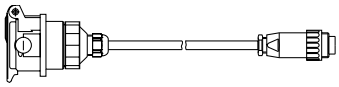
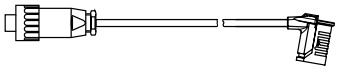
Options

Sequ. No.	Name	Type No. – Part No.	Picture
1	Trailer Module (consists of 1.1 and 1.2)	ES2001 – II36383 power supply: ISO 7638 4S/3M max. or ES2002 – II36384 power supply: ISO 1185 or ISO 7638 4S/2M max.	 GrF 0533
1.1	Electronic Control Unit	ES1210 – II33581 power supply: ISO 7638 4S/3M max. or ES1215 – II33582 power supply: ISO 1185 or ISO 7638 4S/2M max.	 GrF 0537
1.2	Modulator (ABS Dual Relay Valve)	BR9231 – II30522 Electrical Connection threaded M24x1	 GrF 0535
1.3	Modulator (ABS Relay Valve) Mounting Bracket for Modulator (not pictured)	BR9232 – II32614 (replaces BR9200) Electrical Connection threaded M24x1 C56918	 GrF 0536

Section No.: K002478-002
Doc. No.: Y011361-EN-002

Catalogue No.: K001561-EN

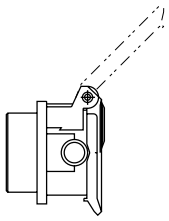
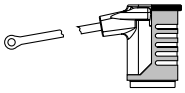
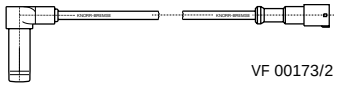
Options - *continued* -

Sequ. No.	Name	Type No. – Part No.	Picture
2	Modulator Cable available lengths: 0,5 / 2 / 3 / 3,5 / 4 / 5 / 6 / 7 / 8 / 10 / 12 and 15 m	EK3013 – II35417.. Electrical Connection threaded M24x1	 VF 00173/1
3	Extension Cable for Wheel Speed Sensors available lengths: 2 / 3 / 3,5 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 12 and 15 m	EK3003 – II35416..	 VF 00173/3
4	Power Supply Cable with open ends (conforming to ISO 1185 for ECU ES1215 or Trailer Module ES2002 or Connection Cable for "RET/VT" for ECU ES1210 or Tailer Module ES2001) available lengths: 3 / 4 / 5 / 8 and 12 m	EK3040 – II33587..	 VF 00199/38
5	Power Supply Cable with plug (conforming to ISO 7638 for drawbar and centre axle trailers) available lengths: 6 / 8 / 9 / 10 / 12 / 15 and 23 m	EK3022 – II35415..	 VF 00173/5
6	Power Supply Cable (conforming to ISO 7638 with socket for semi-trailers) available lengths: 8 / 9 / 10 / 12 / 13 and 15 m	EK3027 – II33588..	 VF 00173/6
7	Power Supply Cable (split version – part A) with socket for semi-trailers available lengths: 8 / 9 / 10 / 12 and 14 m	EK3028 – II36417..	 VF 00173/8
8	Power Supply Cable (split version – part B) length: 0,5 m	EK3029 – II36418500	 VF 00173/9

Section No.: K002478-002
Doc. No.: Y011361-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Options - *continued* -

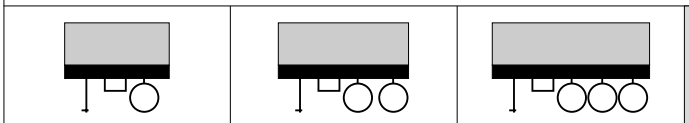
Sequ. No.	Name	Type No. – Part No.	Picture
9	Dummy Socket for drawbar and centre axle trailers Mounting Clamp for Dummy Socket (not pictured)	I88007 B86617	 VF 00173/10
10	Closing Cap (only as spare part)	II36744	 VF 00173/11
11	Closing Cap for Diagnostic Port (only as spare part)	II36386	 VF 00173/12
12	Wheel Speed Sensor	see page 32.1	 VF 00173/2
13	Sensor Bush	II16774	 GrF 0323
14	Additional documentation: Installation manual System specification ES1210 System specification ES1215 System description Approval document	 C14404 C16225 C16226 C14405 EB 118.E, FTP98/24952/A/03	

Section No.: K002478-002
Doc. No.: Y011361-EN-002

Catalogue No.: K001561-EN

System Variants

Semi-trailer

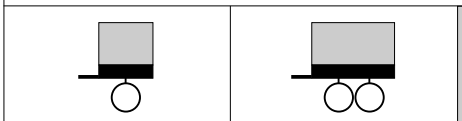


2S/2M

4S/2M

4S/3M

Centre axle trailer

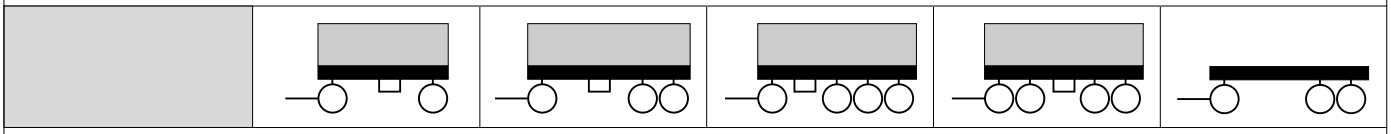


2S/2M

4S/2M

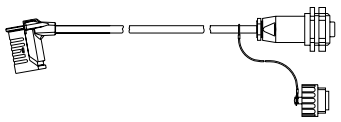
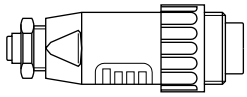
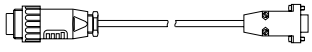
4S/3M

Drawbar trailer



4S/3M

Components for Diagnostics

Sequ. No.	Name	Type No. – Part No.	Picture
1	Diagnostic Cable (suitable for assembly onto the chassis) available lengths: 1/ 3 / 4 / 5 and 8 m	EK3050 – II35418..	
2	Blink Code Switch (to connect to cable EK3050)	EZ1022 – II36381	
3	Adapter Cable (to connect to a laptop or PC) Length: 3 m	EZ1020 – II354343000	
4	3,5" Disc (diagnostic software for PC)	II36390	
5	Diagnostic Set (consisting of Nos. 1 to 4)	EZ1025 – II36391	

Section No.: K002478-002
Doc. No.: Y011361-EN-002
Catalogue No.: K001561-EN

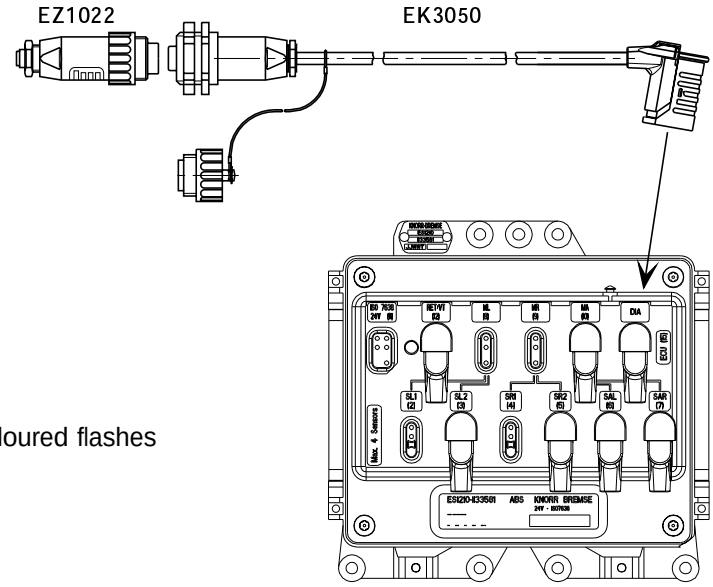
Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Diagnostics

The ECU of the KB3-TA system 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 shutdown all braking functions revert to standard 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



P-3448/4

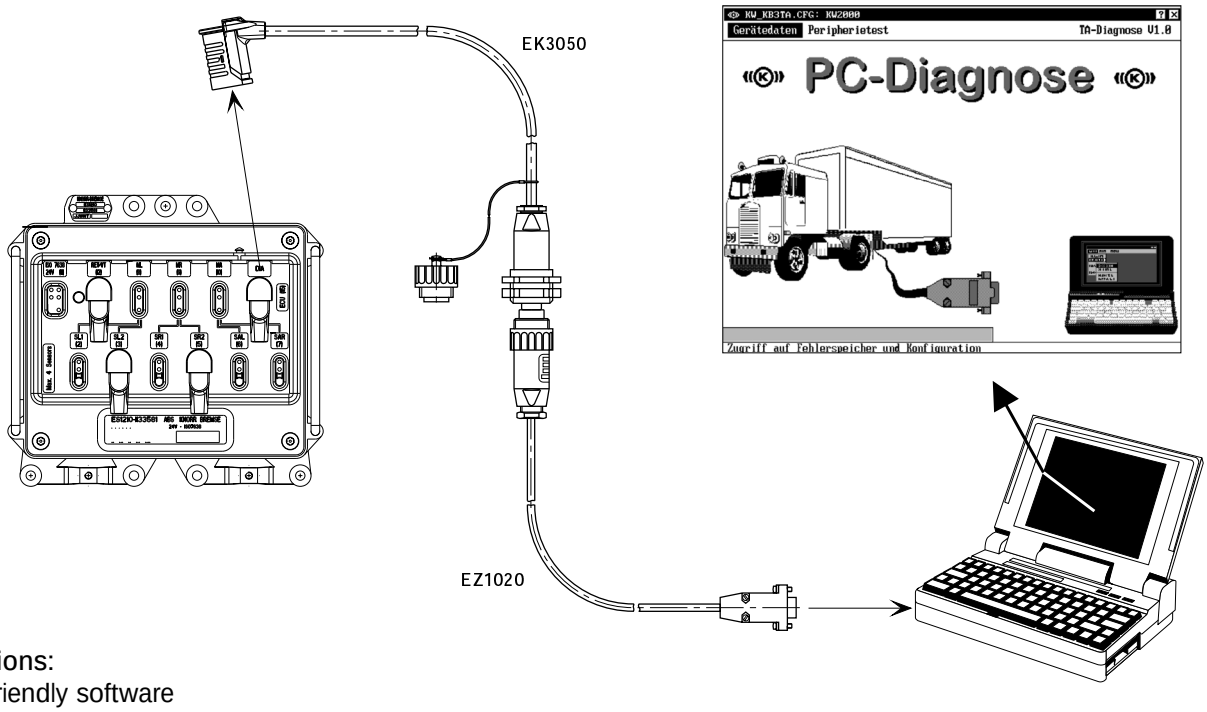
Functions:
Information is shown in three blocks of Coloured flashes of an LED on the ECU
- Change / read System Configuration
- Installation Test
- Read / delete fault code memory

A full blink code list is provided.

Section No.: K002478-002
Doc. No.: Y011361-EN-002
Catalogue No.: K001561-EN

Diagnostics - *continued* -

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

P-3448/5

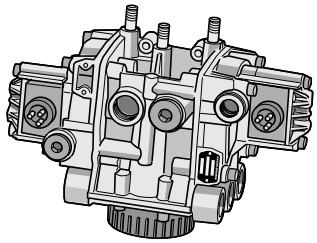
See diagnostic set EZ1025, function description

Section No.: K002478-002
Doc. No.: Y011361-EN-002
Catalogue No.: K001561-EN

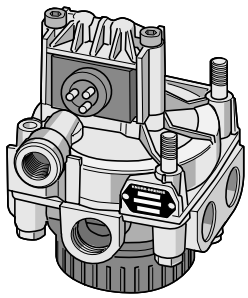
Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function

The Modulator with integrated Relay Valve is used on trailers with ABS 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 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.).
Please note that valves are supplied complete with Exhaust Silencers.



GrF 0535



GrF 0536

Standard Symbol as DIN ISO 1219
see page 31.4

Technical details

Brake pressure max.	10 bar
Relay function	Yes
Medium	Compressed Air
Operating Temperature Range	-40 °C to +75 °C
Nominal voltage	24V DC
Weight	Single modulator: approximately 1,2 Kg Dual modulator: approximately 2,9 kg

Options

Type No.	Connections	Mounting Bracket[1)]	Comment
BR9231	Electrical Connector - M24x1 (threaded) Delivery Ports - 6x M22x1,5	–	
BR9233	Electrical Connector - Bayonet Socket Delivery Ports 6x M22x1,5	–	
BR9232	Electrical Connector - M24x1 (threaded) Delivery Ports - 4x M22x1,5	Part No. C56918	Replacement for BR9200

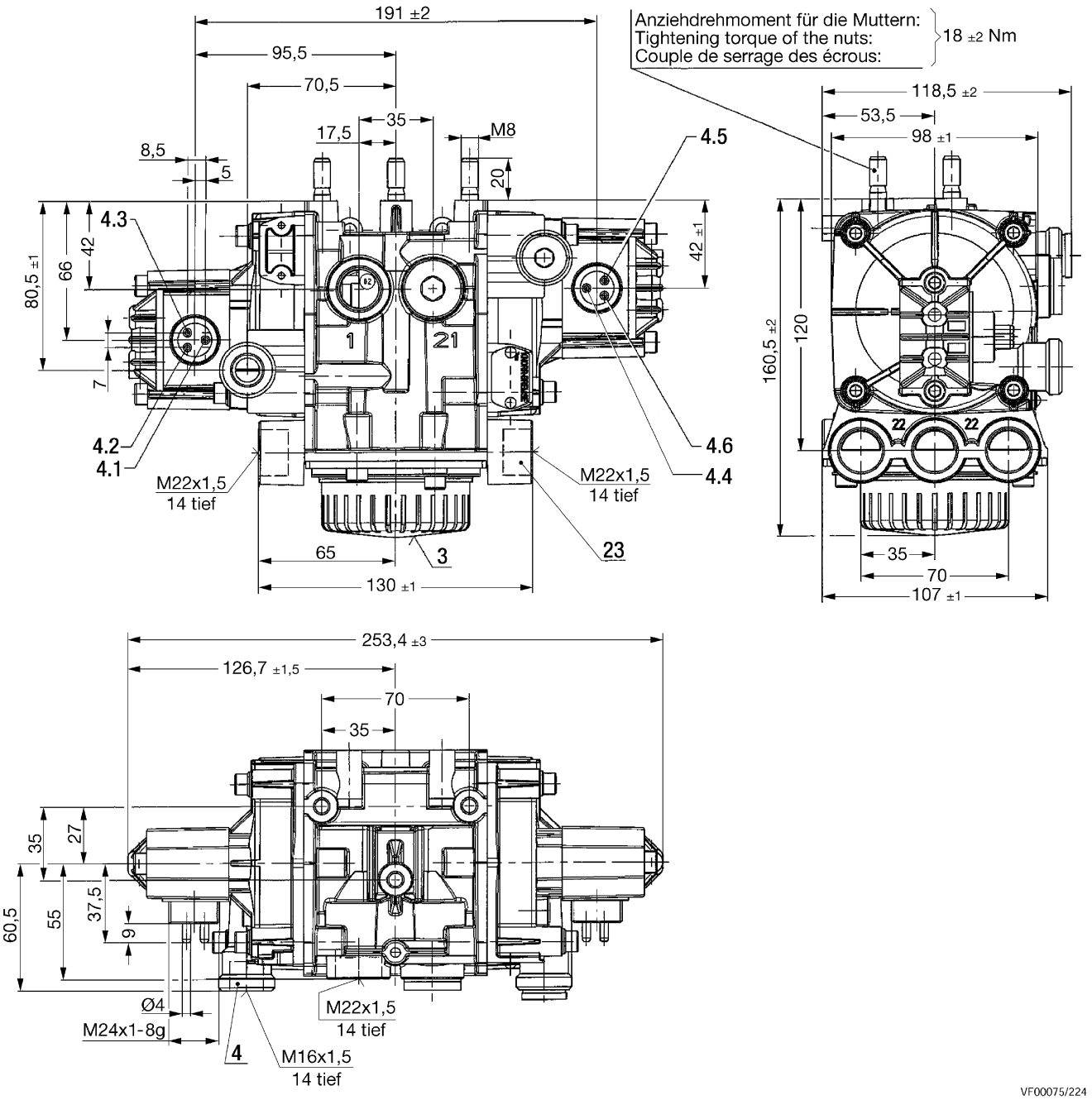
1) Not supplied with the valves

Section No.: K002479-001
Doc. No.: Y011362-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions

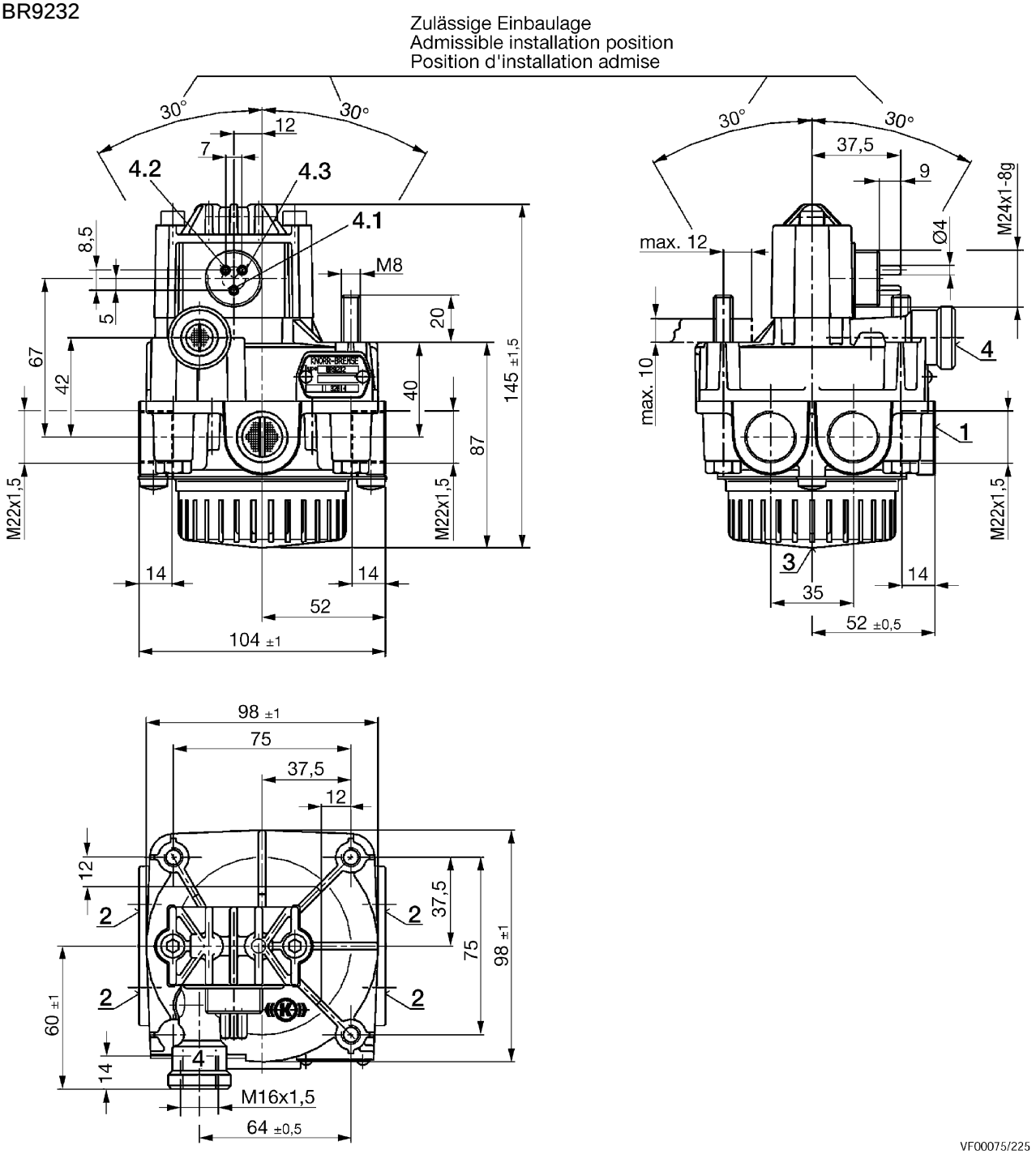
BR9231
BR9233



Section No.: K002479-001
Doc. No.: Y011362-EN-001
Catalogue No.: K001561-EN

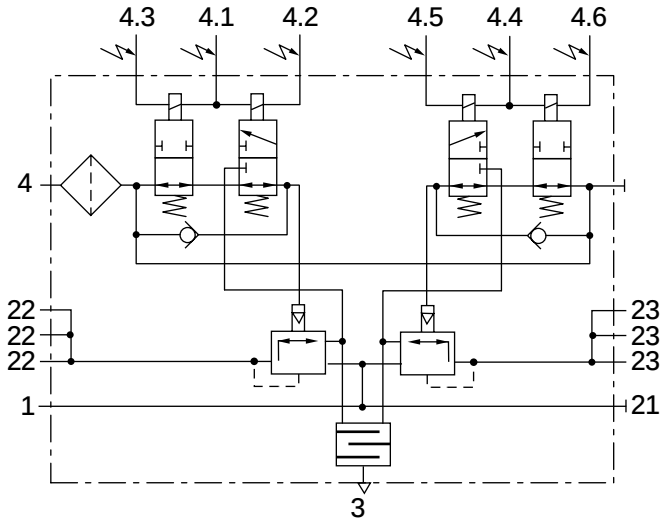
Dimensions - *continued* -

BR9232

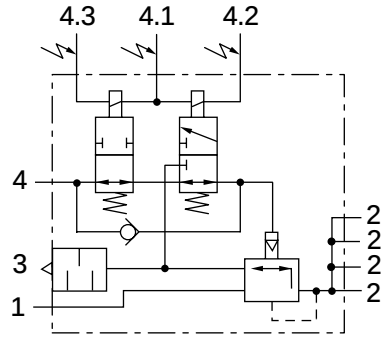


Symbol drawing, acc. to DIN ISO 1219

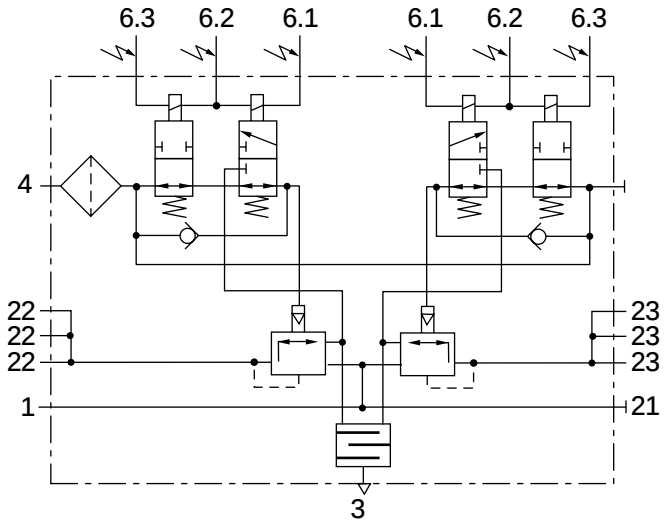
BR9231



BR9232



BR9233



Section No.: K002479-001
Doc. No.: Y011362-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function

When fitted in conjunction with, but not in contact with, a Pole Wheel (Toothed Sensing Ring), the Wheel Speed Sensor supplies the ECU of the trailer's ABS with precise wheel speed information.

The Wheel Speed Sensor is available in four cable lengths and is supplied with a standard two pin socket for connection to a Sensor Extension Cable.
Please note, for installation, a Sensor Bush **II16774** will be required.

The Wheel Speed Sensor is held in the mounting hole by the Sensor Bush. When fitting a new sensor always fit a new bush - Note: bush may not be supplied with sensor

Radial

GrF 0299

Axial

VF00199_173

Technical details

Operating Temperature Range:

- Speed Sensor -40 °C to +160 °C
- Cable -40 °C to +180 °C
- Plug -40 °C to +80 °C

Options

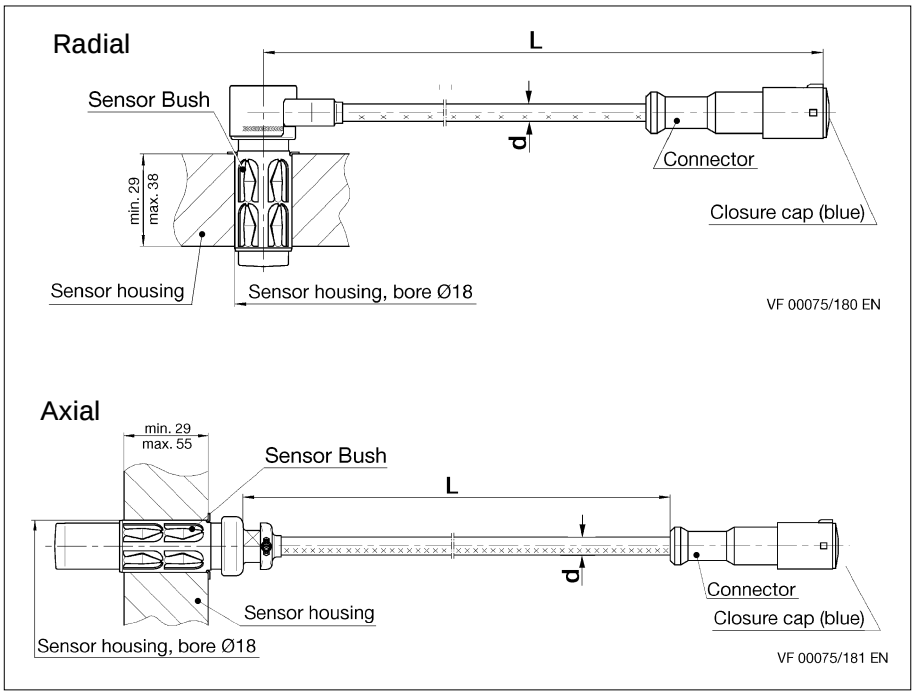
Type No. Part No.	L [mm]	d [mm]	Radial	Axial	Plug
Old types: *replaced in 2nd quarter 2004*					
0265050104	400	5,4	X	–	With
0265050108	2000	6,2	X	–	Without
0265050131	1000	5,4	X	–	With
0265050150	1000	5,4	X	–	[1]
0486001029	300	6,2	–	X	With
New types:					
0486001032	350	4,4	–	X	With
0486001033	1000	4,4	–	X	With
0486000126	400	4,4	X	–	With
0486000128	1000	4,4	X	–	With
0486000130	2000	4,4	X	–	Without
0486000136	1000	4,4	X	–	[1]

[1] With Sensor Bush

Section No.: K002480-001
Doc. No.: Y011363-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions

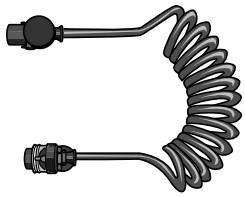


Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function

The ABS Connection Cable makes sure that the power supply is connected between Truck and Semi-trailer.

The Cable is to ISO 7638 standard and contains 7 cores making it suitable for ABS and EBS.



GrF 0242

Technical details

Operating Temperature Range: -40 ºC to +80 ºC

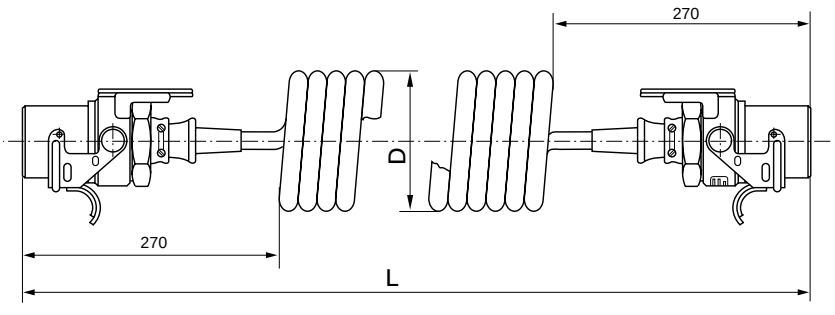
Options

Type No.	Part No.	Trailer type	D [mm]
EK3150	K004098	Semi-trailer	55

Type No.	L [mm]	Comment
EK3150	Approx. 1.000 to 4.000	Approx. 25 coils

Dimensions

EK3150



VF 00075/66

Section No.: K002481-001
Doc. No.: Y011364-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

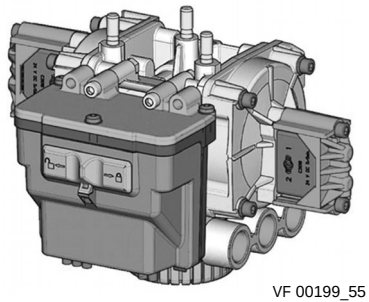
Function

The Trailer Module is the assembly of an A18 Electronic Control Unit (ECU) and Dual Relay Modulator Valve. The A18 ECU is available as a 2S/2M configuration to suit 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 2S/2M version requires a Power Supply / Diagnostic Wiring Harness and a Modulator / Sensor Wiring Harness 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.
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 velocity.
The A18 ECU provides a preset output signal at 15 km/h which 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.
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 (B 265 052 918), allows connection to a Personal Computer (PC) for fault diagnosis, odometer reading and velocity output parameter setting. Alternatively, a diagnostic Blink Code Switch (Type No. 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.

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" 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.

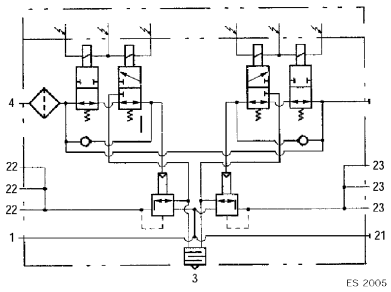
Diagnosis is possible via a PC or Blink Code Switch. A trailer mounted warning display can also be connected to the diagnostic port. This display is called a "Magic Eye" and switches automatically to red when a fault in the ECU is detected.


VF 00199_55

Technical details

Operating Pressure, max.:	10 bar
Approved Pressure, max.:	12,5 bar
Operating Temperature Range:	-40 °C to +75 °C
Medium:	Compressed Air
Degree of Protection:	DIN 40050 part 9
Nominal Voltage:	24V DC
Operating Voltage:	19V to 30V DC
Approx. Weight:	3,4 kg
Approx. ECU Weight:	0,5 kg
Max. Uni Output Signal:	1A

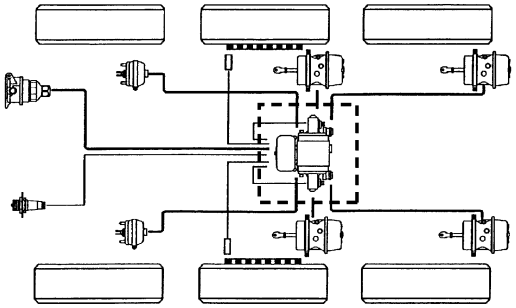
Standard Symbol as DIN ISO 1219



Section No.: K002482-001
Doc. No.: Y011365-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Compact assembly unit:
ECU and Dual Relay Modulator Valve



Options

Electronics

Part No.	Configuration	Power supply
0486105002	2S/2M	ISO 7638 & ISO 1185

ABS Modulator

Type No. Part No.	Port threads	Number of Ports	Tightening torque
BR9233 II37090	Supply: M22x1,5 acc. to DIN 3853	2	60 Nm
	Control: M16x1,5 acc. to DIN 3853	2	45 Nm
	Delivery: M22x1,5 acc. to DIN 3853	6	60 Nm

Compact Assembly Unit (Electronics + ABS Modulator)

Type No. – Part No.	Configuration	Power supply
ES2005 – II36413	2S/2M	ISO 7638 & ISO 1185

Additional documentation:
- Technical Documents for Customer: Y489M0063
- Service Documents: 0486105002

The compact unit is connected with the following cables:
- Power Supply Cable acc. to ISO 7638
- Cable loom with connector for ISO 7638, diagnostic cable and - as an option - connecting cable for Stop Light powering acc. to ISO 1185
- Cable loom with extention cable for the Wheel Speed Sensors and with connecting cable for the ABS Relay Modulator Valves

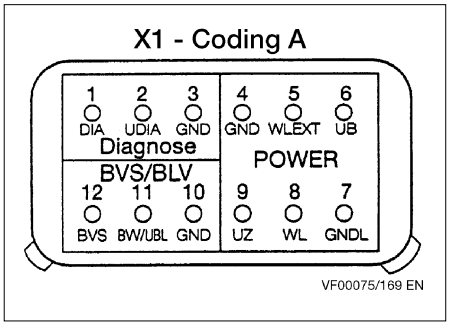
The description of the different cable variants can be found on the following pages.

Section No.: K002482-001
Doc. No.: Y011365-EN-001
Catalogue No.: K001561-EN

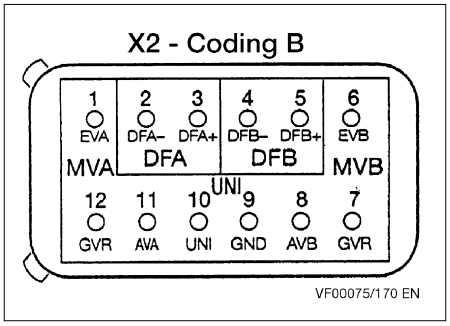
Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

PIN configuration

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



Blink Code diagnostics

The Blink Code Switch can be connected to the diagnostic socket.
The blink code output is visible at the Blink Code Switch (integrated LED) and at the warning light in the towing vehicle.

Magic Eye

A trailer mounted warning display, known as a "Magic Eye", can aslo be connected to the diagnostic port. Under normal conditions, it has a black display; as soon as a fault in the ECU is detected, the display automatically changes from black to red. This condition is held, even if the trailer is uncoupled, as long as the fault is present. As a result of this, a parked vehicle can be checked very quickly, even if no towing vehicle is available. After the fault has been rectified and the ECU has been powered, the Magic Eye display will switch back to a black display automatically.

Section No.: K002482-001
Doc. No.: Y011365-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Calling up the Blink Codes

To call up the blink codes, follow these instructions:
- Switch on ignition
- 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

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

[1] Having detected too big a gap between speed sensor and impulse 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.

Section No.: K002482-001
Doc. No.: Y011365-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Test and Start Up

After complete system installation on the vehicle:
• the correct allocation of the components connected to the ECU's plugs
• the function of the pneumatic devices
must be checked

Furthermore the ECU must be initialised:
The ECU checks independently which components are connected to the wiring harness (configuration run). If the sensed configuration is different from the desired one or if a fault has been detected and memorised, the components must be checked or changed and/or the wiring must be checked and corrected, as necessary. After this the fault memory must be deleted. After a re-configuration (see below) the ECU must be re-initialised and the fault memory must be read. If the fault memory displays no further fault, the vehicle is permitted to move. If then the warning light continues to indicate no fault, the ABS is ready for operation.

ECU Reconfiguration

1. Ignition off
2. Unplug wiring harness B (Wheel Speed Sensor and Modulator solenoid connections)
3. Depress Blink Code Switch
4. Ignition on
5. Wait at least five seconds
6. Ignition off
7. Release switch
8. Plug in wiring harness B
9. Depress switch
10. Ignition on
11. Wait at least two seconds
12. Release switch
13. Read blink code (Block 1) and check new configuration

If there are no further faults in memory, the system puts out the blink code (Block 2) for "system OK”.

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

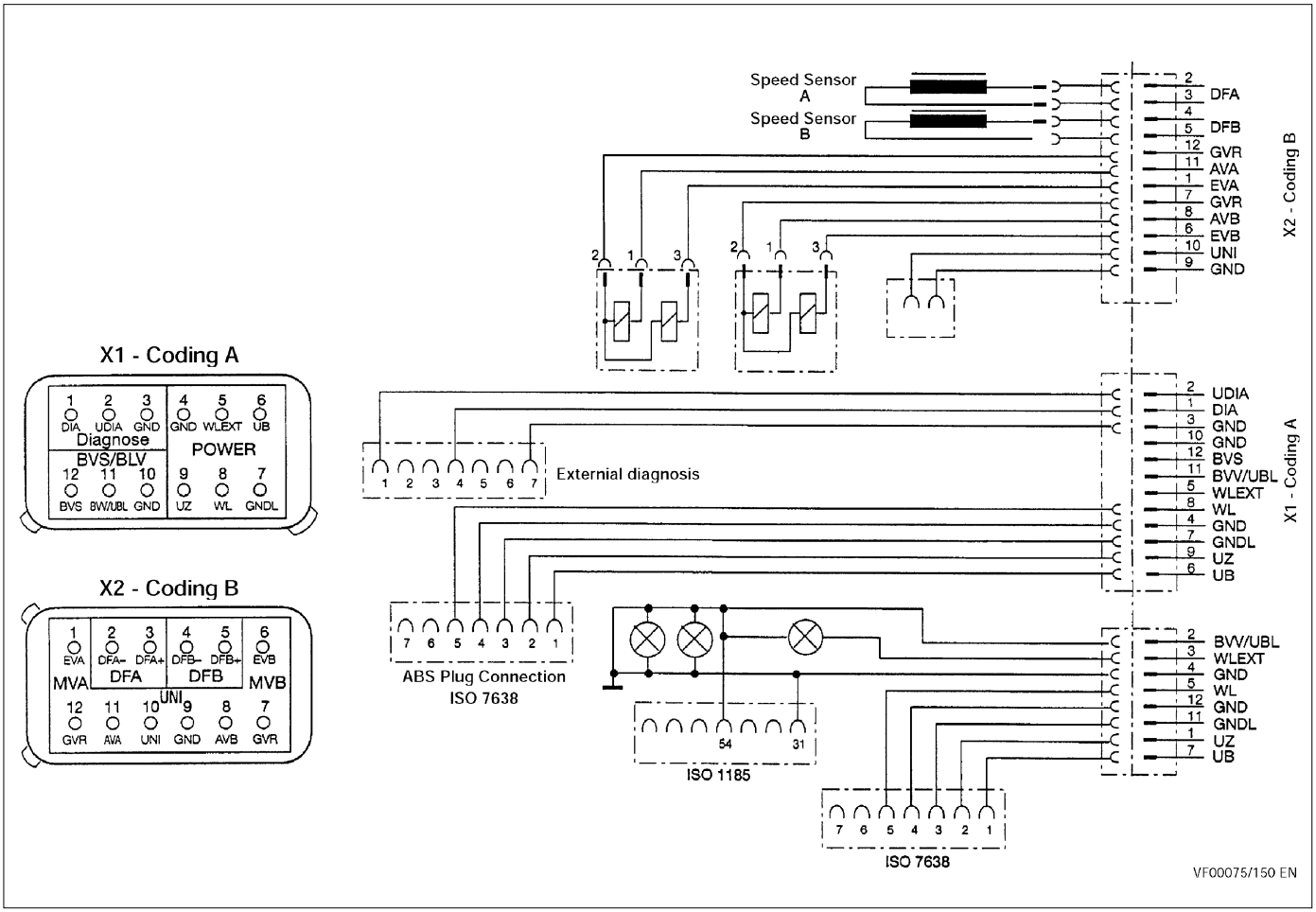
The ECU´s integrated blink code diagnostics
cannot be used for this purpose because
it senses only electrical faults in external components and
does not sense the correct allocation of the Wheel Speed Sensors and Solenoid Valves to the corresponding wheels.

In principle this check is possible via ISO diagnosis.

Section No.: K002482-001
Doc. No.: Y011365-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

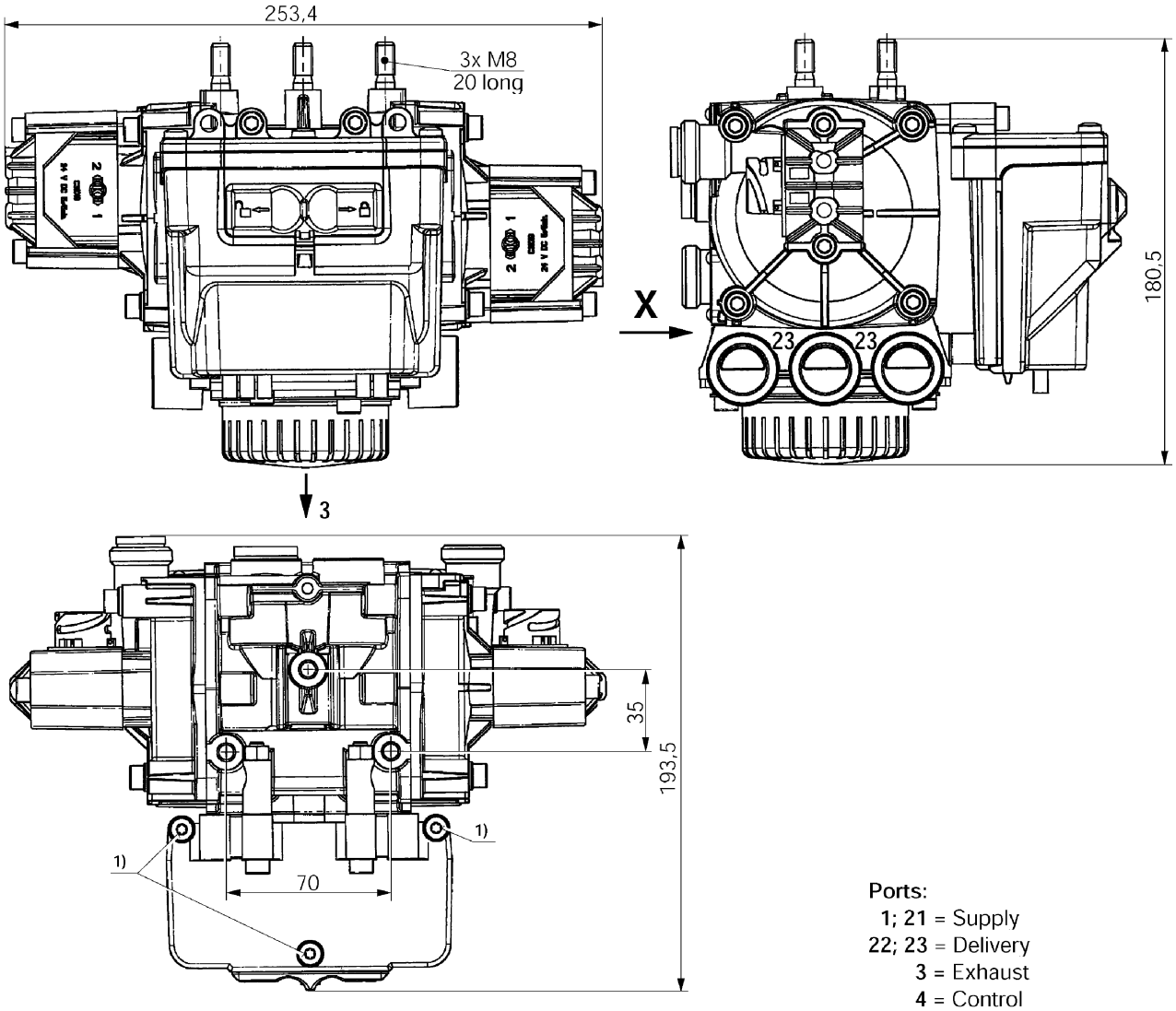
Wiring System, drawing



Section No.: K002482-001
Doc. No.: Y011365-EN-001

Catalogue No.: K001561-EN

Dimensions



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

VF00075/153 EN

Section No.: K002482-001
Doc. No.: Y011365-EN-001
Catalogue No.: K001561-EN

Components:

Name		Type No. – Part No.
Electronic Control Unit (ECU)		0486105002
Single Relay Modulator Valve		BR9234 - II37091
Dual Relay Modular Valve		BR9233 - II37090
ABS Trailer Module		ES2005 - II36413
Wheel Speed Sensor with bush	0,4 m 1,0 m 2,0 m	0265050148 0265050150 0265050149
Wheel Speed Sensor without bush	0,4 m 1,0 m 2,0 m	0265050104 0265050131 0265050130

The PC software is available on request.

Test Devices

Naming	**Type No.** - Part No.
Blink Code Adapter	EZ1022 - II36381
Interface converter for DOS-diagnostics	B265052913
Interface converter and cable for Windows-diagnostics	EZ1031 - II39809F + EZ1032 - II39812F
PC-Software for Windows-diagnosis (at present only the English version is available)	II39785F
Magic Eye	EZ1028 - II40396F

Wiring Harness A for ES2005

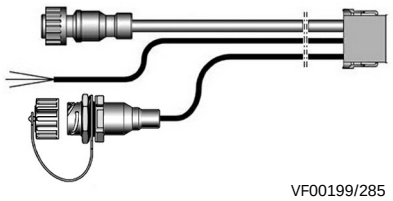
Includes ISO 7638 Connector, Diagnostic Cable with ISO 1185 and Power supply cables

Function

This wiring harness is the link between the vehicle's ISO 7638 Power Supply Connection and the ECU.
The following connection cables are wired into the one plug:
- Connector for power supply (ISO 7638)
- Diagnostics Cable
- Connection cable for additional Stop Light supply (ISO 1185)

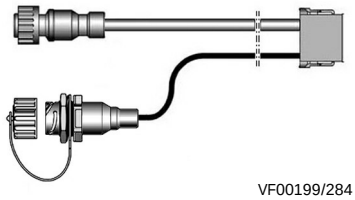
The cables are available in different lengths.

Wiring harness with ISO 1185:



VF00199/285

Wiring harness without ISO 1185:



VF00199/284

Technical details:

Operating Temperature Range: -40 °C to +100 °C

Options

Part No.	ISO 7638	ISO 1185	Diagnostics
2264462391[1)]	0,5 m	–	3 m
2264462392[1)]	0,5 m	–	5 m
2264462393[1)]	0,5 m	–	12 m
2264462394[1)]	0,5 m	13 m	5 m
2264462395[1)]	0,5 m	13 m	12 m
2264462402[1)]	0,5 m	1,5 m	5 m

[1)] Adapter cable K006096 necessary for the connection of EZ1022 or B265052913

Section No.: K002482-001
Doc. No.: Y011365-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Power Supply Cable according to DIN ISO 7638:

Function

The Power supply cable with ISO 7638 plug or socket is designated for the supply to the ABS Module ES2005. It is connected with a bayonet connector to the wiring harness A.
The cable is available in different lengths.

Technical details:

Operating Temperature Range: -40 °C to +80 °C

Options:

Power Supply cables with socket (for semi-trailers)

Part No.	Lengths	
2264462396	8,0 m	
2264462397	12,0 m	
2264462398	14,0 mm	

Power supply cable with plug
(for drawbar trailers and center axle trailers)

Part No.	Lengths	
2264462399	8,0 m	
2264462400	10,0 m	

Cable with socket

VF 00199_150

Cable with plug

VF 00199_151

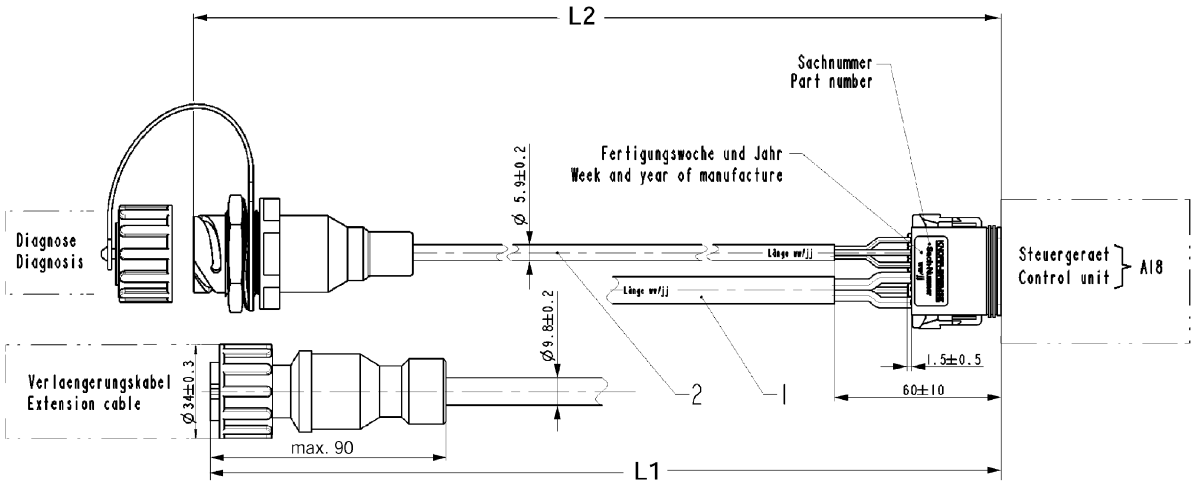
Section No.: K002482-001
Doc. No.: Y011365-EN-001

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions

Wiring harness A, without power supply acc. to ISO 1185 (Stop Light)

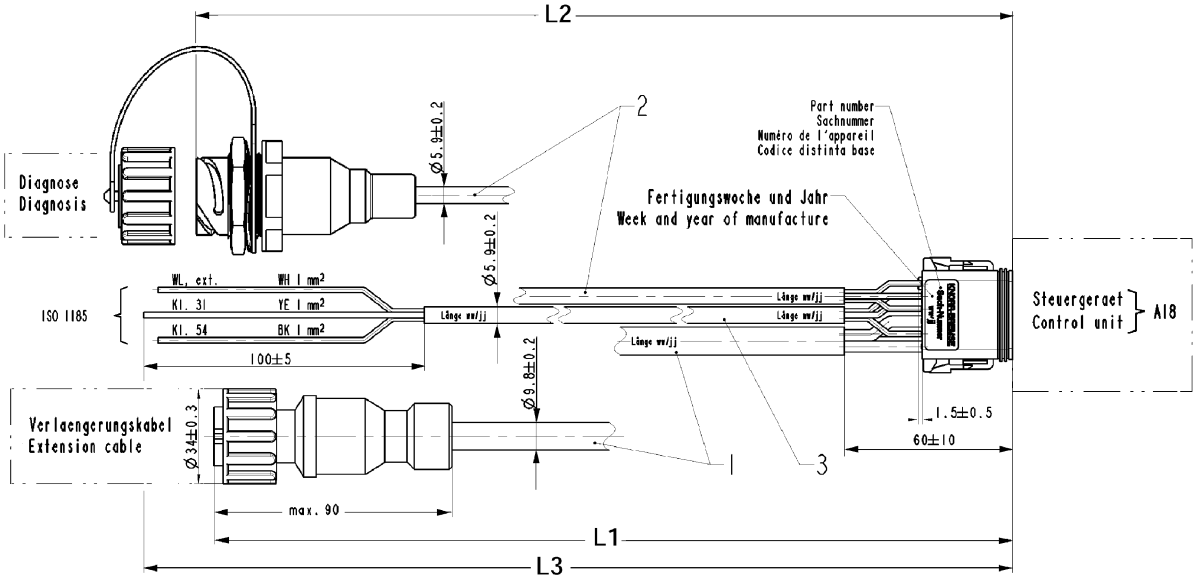


Kabel Cable	1	2
Leitung Cable	PUR/Cu-Litze 2 x 4 mm² 3 x 1.5 mm²	PUR/Cu-Litze 3 x 1.0 mm²
Biegeradius Kabel (statisch) Bend radius cable (static)	min. R50 ∠ 90°	min. R30 ∠ 90°

2 264 462 393	500 ± 100	12000 ± 100
2 264 462 392	500 ± 100	5000 ± 100
2 264 462 391	500 ± 100	3000 ± 100
Sach-Nummer	L1 [mm]	L2 [mm]

VF00075/270

Wiring harness A, with power supply acc. to ISO 1185 (Stop Light)



Kabel Cable	1	2	3
Leitung Cable	PUR/Cu-Litze 2 x 4 mm² 3 x 1.5 mm²	PUR/Cu-Litze 3 x 1.0 mm²	PUR/Cu-Litze 3 x 1.0 mm²
Biegeradius Kabel (statisch) Bend radius cable (static)	min. R50 ∠ 90°	min. R30 ∠ 90°	min. R30 ∠ 90°

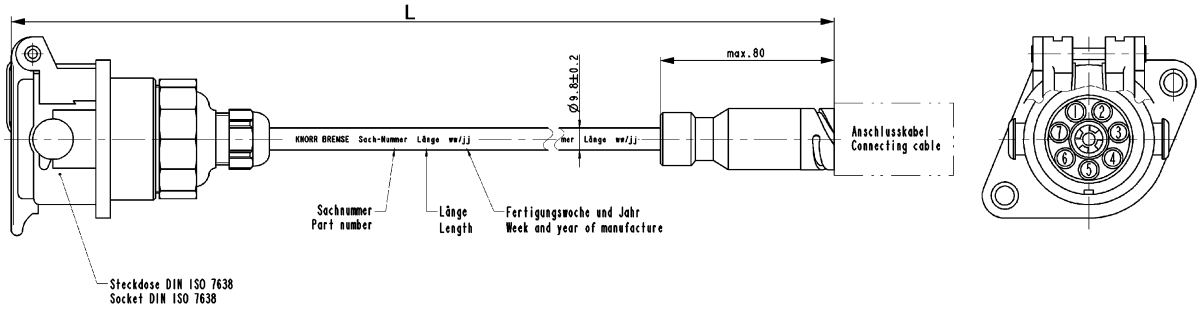
2 264 462 402	500 ± 100	5000 ± 100	1500 ± 100
2 264 462 395	500 ± 100	12000 ± 100	13000 ± 100
2 264 462 394	500 ± 100	5000 ± 100	13000 ± 100
Sach-Nummer	L1 [mm]	L2 [mm]	L3 [mm]

VF00075/271

Section No.: K002482-001
Doc. No.: Y011365-EN-001
Catalogue No.: K001561-EN

Dimensions

Power supply cable for semi-trailers



DIN ISO 7638

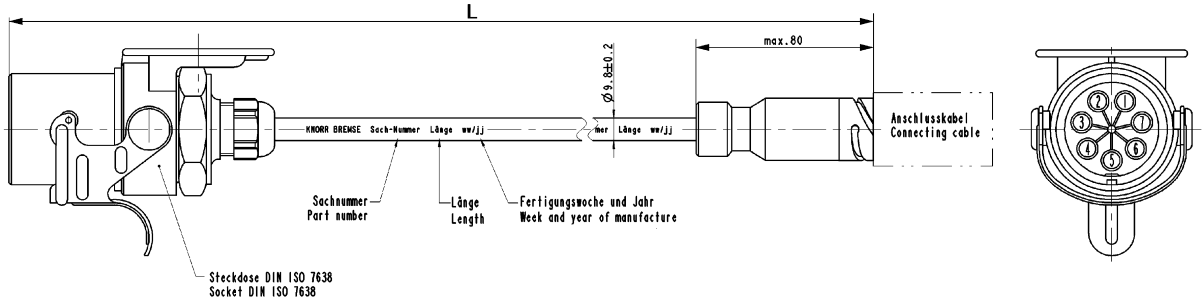
1	RD	4 mm²
2	BK	1.5 mm²
3	YE	1.5 mm²
4	BN	4 mm²
5	WH	1.5 mm²
6		
7		

BK = Schwarz / Black BN = Braun / Brown RD = Rot / Red WH = Weiß / White YE = Gelb / Yellow

2 264 462 398		14000 ± 100		03064
2 264 462 397		12000 ± 100		03062
2 264 462 396		8000 ± 100		03058
Sach-Nummer		L [mm]		Elkatec Nr.

VF00075/173

Power supply cable for drawbar trailers and centre axle trailers



DIN ISO 7638

1	RD	4 mm²
2	BK	1.5 mm²
3	YE	1.5 mm²
4	BN	4 mm²
5	WH	1.5 mm²
6		
7		

BK = Schwarz / Black BN = Braun / Brown RD = Rot / Red WH = Weiß / White YE = Gelb / Yellow

2 264 462 400		10000 ± 100		03040
2 264 462 399		8000 ± 100		03038
Sach-Nummer		L [mm]		Elkatec Nr.

VF00075/174

Section No.: K002482-001
Doc. No.: Y011365-EN-001
Catalogue No.: K001561-EN

Wiring Harness B for A18 with Wheel Speed Sensor extension cable, Modulator Relay Valve cable and cable for UNI output

Function

Wiring Harness B connects the following cables to a plug for connection to the ECU:
- Connecting cables for the ABS Relay Valves
- Wheel Speed Sensor extension cables
- As an option: connecting cable for the speed sensing signal (UNI output).

The cables are available in different lengths.

Colour Coding of the Modulator and Wheel Speed Sensor Cables ensure ease of installation. It is recommended that blue coded cables are used on the left hand side (seen in forward driving direction) and yellow coded cables on the right hand side of the trailer.

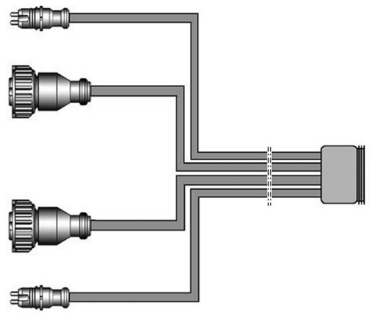
Technical details:

Operating Temperature Range: -40 °C to +100 °C
Approx. Weight: See table

Options

Part No.	Modulator	Speed Sensor	UNI output	Weight
2264462373	0,5 m	3,0 m	-	0,6 kg
2264462374	0,5 m	4,0 m	-	0,8 kg
2264462375	0,5 m	6,5 m	-	1,0 kg
2264462376	1,5 m	3,0 m	-	0,8 kg
2264462377	1,5 m	4,0 m	-	1,0 kg
2264462378	1,5 m	6,5 m	-	1,2 kg
2264462379	3,0 m	3,0 m	-	1,1 kg
2264462380	3,0 m	4,0 m	-	1,3 kg
2264462381	3,0 m	6,5 m	-	1,5 kg
2264462382	6,0 m	3,0 m	-	1,4 kg
2264462383	6,0 m	4,0 m	-	1,6 kg
2264462384	6,0 m	6,5 m	-	1,8 kg
2264462403	0,5 m	3,0 m	6,5 m	1,6 kg

Wiring harness B

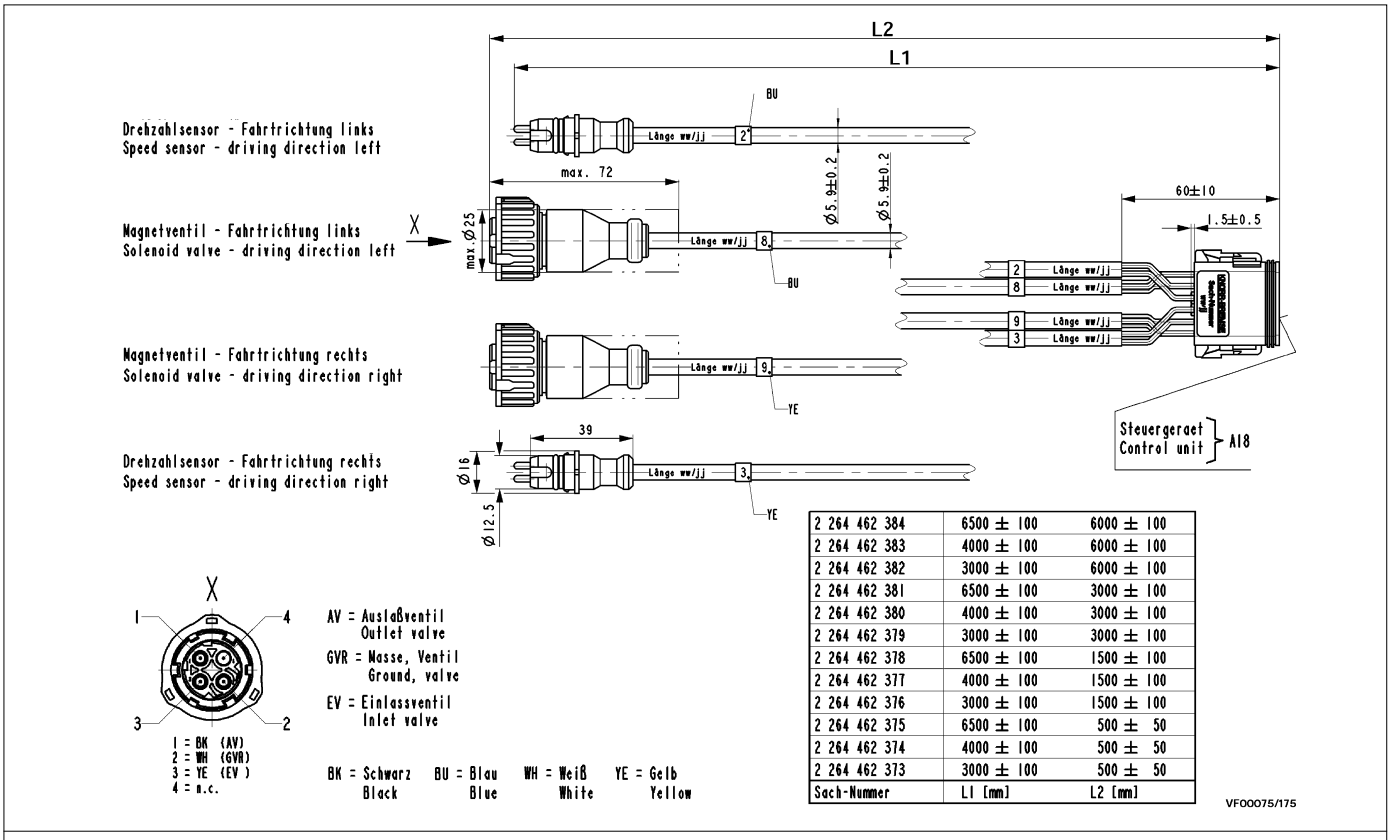


VF 00199_152

Section No.: K002482-001
Doc. No.: Y011365-EN-001

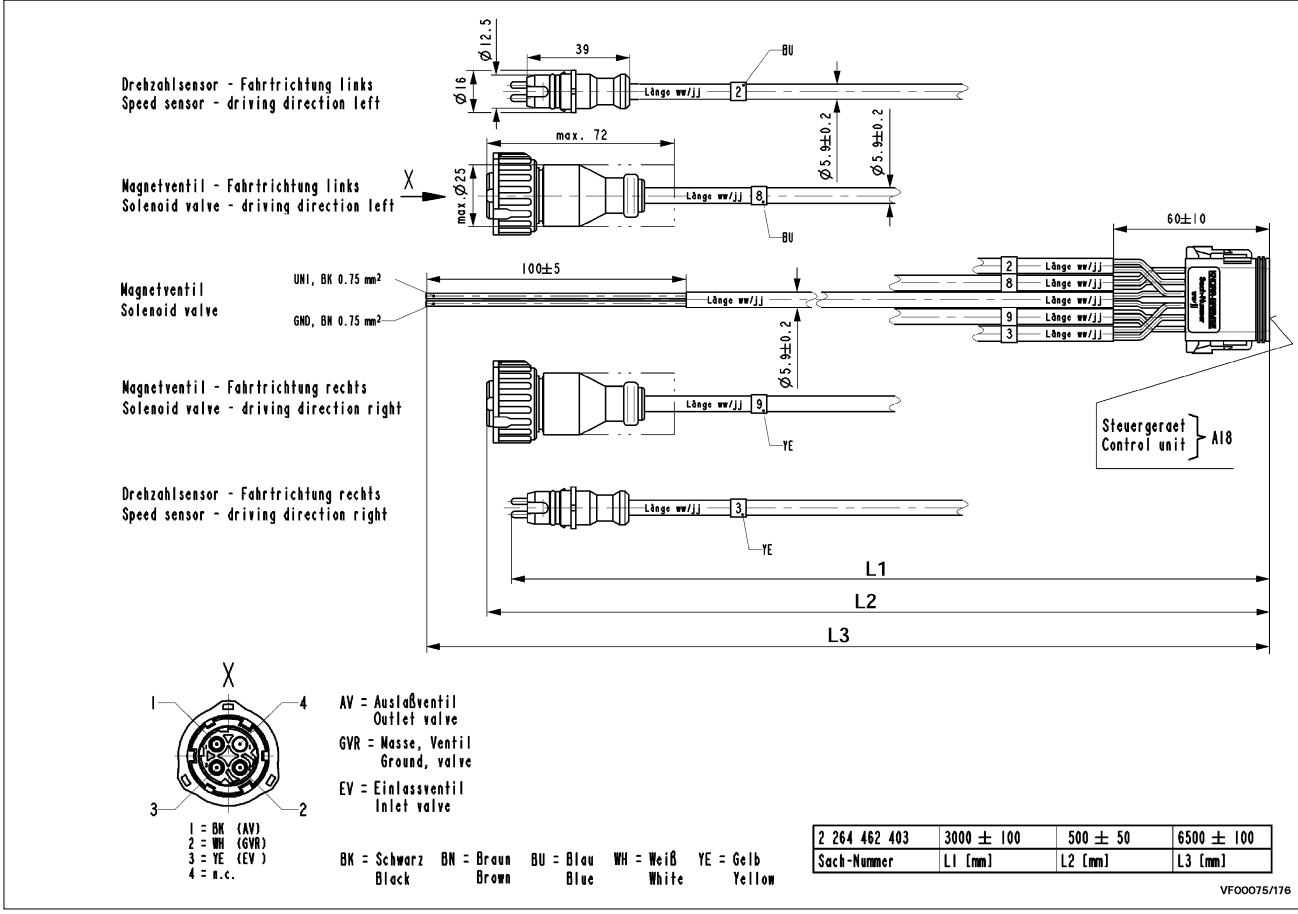
Catalogue No.: K001561-EN

Dimensions



Sach-Nummer	L1 [mm]	L2 [mm]
2 264 462 384	6500 ± 100	6000 ± 100
2 264 462 383	4000 ± 100	6000 ± 100
2 264 462 382	3000 ± 100	6000 ± 100
2 264 462 381	6500 ± 100	3000 ± 100
2 264 462 380	4000 ± 100	3000 ± 100
2 264 462 379	3000 ± 100	3000 ± 100
2 264 462 378	6500 ± 100	1500 ± 100
2 264 462 377	4000 ± 100	1500 ± 100
2 264 462 376	3000 ± 100	1500 ± 100
2 264 462 375	6500 ± 100	500 ± 50
2 264 462 374	4000 ± 100	500 ± 50
2 264 462 373	3000 ± 100	500 ± 50

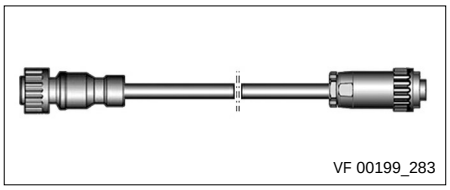
VF00075/175



Sach-Nummer	L1 [mm]	L2 [mm]	L3 [mm]
2 264 462 403	3000 ± 100	500 ± 50	6500 ± 100

VF00075/176

Diagnostics Adapter Cable


VF 00199_283

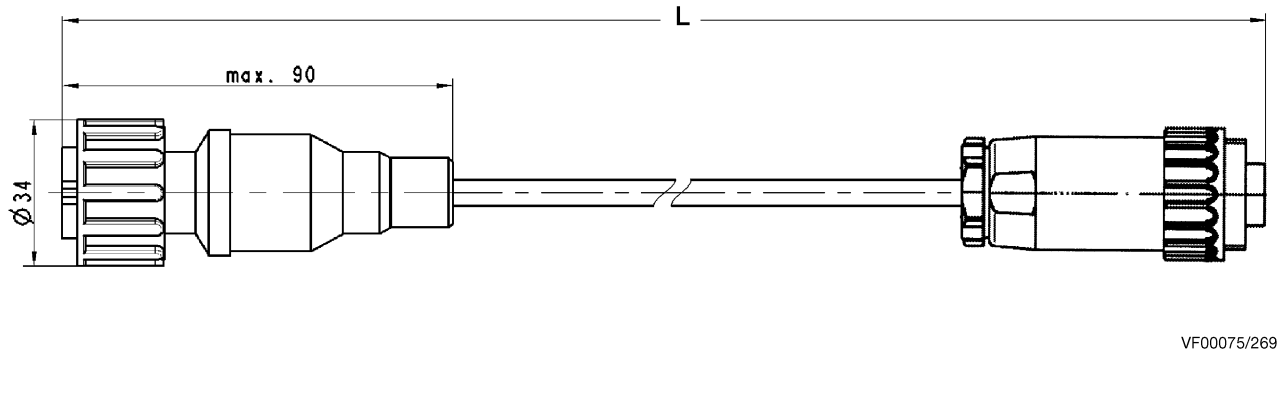
Function

If Blink Code Switch EZ1022 or the interface converter for DOS-diagnostics B265052913 should be connected, this adapter cable is required.

Options

Type No.	Part No.	Cable length "L" [m]
	K006096[1)]	0,5

Dimensions



VF00075/269

Section No.: K002482-001
Doc. No.: Y011365-EN-001

Catalogue No.: K001561-EN

[1)] Cable not deliverable before quarter 3/2004

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Test Report

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 Switch 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)

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

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

Checked:

Date

Stamp / Signature

VF00075/177 EN ÄI01

Section No.: K002482-001
Doc. No.: Y011365-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function

VF00199_176

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

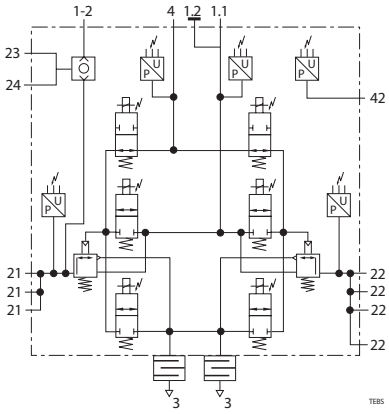
The braking functions of anti-lock and load sensing control are both electronically managed within the module as integrated features. This provides more accurate and consistent control of the generated braking force including reduced hysteresis compared to a conventional braking system, thereby improving 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.

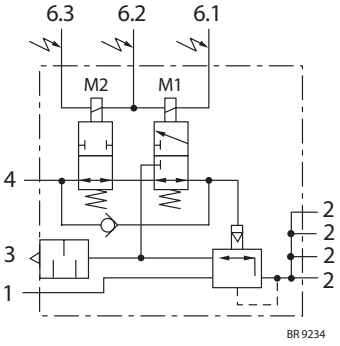
As an additional option, the function **R**oll **S**tability **P**rogram (RSP) is available. Should a driver underestimate the vehicle speed when carrying out a manoeuvre, particularly when the trailer is laden with a high centre of gravity, there is a real danger that the trailer will become unstable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

Standard Symbol as DIN ISO 1219



only for BR9234



The following Auxiliary Functions may be configured to the associated Auxiliary connections of the TEBS:

1. Standard Auxiliary Functions:

1.1 Outputs

- **Fully Automatic Life 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.
- **ISS (Integreated 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 0V to 24V or 24V to 0V.
  The hysteresis, i.e. the difference between switch on and switch off speeds, can be adjusted in four steps between 10% and 80%.

Section No.: K002483-000
Doc. No.: Y011366-EN-000
Catalogue No.: K001561

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function - *continued* -

- 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 can be accessed via PC Diagnostics, Magic Eye 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. Axle overload and speed restrictions apply when this function in operational.
- Disable Lift Axle Control: signals the lift axle(s) to lower in the unladen case; this is activated by a signal transmitted by the towing vehicle or by an electrical switch mounted on the trailer.

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 Light powering:

To obtain full functionality, any trailer electronic braking system requires a permanent power supply (achieved by using the legally specified ISO7638 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 ECU can be installed so that it will continue to operate by taking power from the Stop Light circuit and thereby load sensing and anti-lock functions remain active.

Note:

Stop Light 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 conector is not legal.

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Technical Features

Operating pressure:	10,0 bar
Max. permissable pressure:	12,5 bar
Operating temperature range:	-40 °C to +65 °C
Medium:	Compressed air
Approx. weight:	5,7 kg (BR9234: 1,2 kg)
Nominal voltage:	24 V DC

Requirements for Towing Vehicle

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

Options

Type No.	Part No.	Possible ABS Configu-ration	Auxiliary Functions				RSP
			X1 connector[1] Total Auxiliaries: 2		X2 connector		
			Max. Out	Max. In	Max. Out	Max. In	
ES2041[4]	II39783F[3]	2S/2M	2	1[2]	0	0	No
ES2050	II39798[3]	2S-4S/2M	1	1[2]	3	2	No
ES2050	II397984S3M	2S-4S/2M	1	1[2]	3	2	No
		4S/3M	1	1[2]	1[5]	2	No
ES2053	II39782[3]	2S-4S/2M	1	1[2]	3	2	Yes
		4S/3M	1	1[2]	1[5]	2	Yes

Type No. for Repair Kit
Cover: II36750

[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 suffix F004 can optionally be added to each Part Number, except for ES2041. There, attach only 004. The Module will then be supplied in a single package with a system plate and an information sticker “EBS power supply”
[4] Replaces ES2050 - II36419
[5] Two of the X2 Auxiliary Outputs are required to power the external ABS Modulator Valve (BR9234) in the 4S/3M system

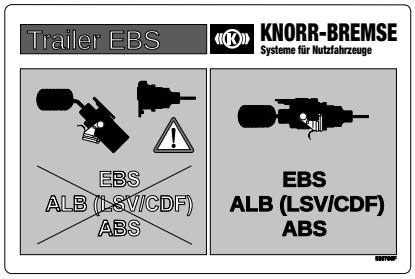
Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Option - *continued* -

Pneumatic Ports:				
port	number	use for	M22x1,5	M16x1,5
1.1[1)]	1	Supply to Reservoir	X	
1.2[1)]	1	Supply	X	
1-2	1	To AE43.. Park / Shunt Valve	X	
21	3	Delivery to brake chambers, right	X	
22	3	Delivery to brake chambers, left	X	
22	1	Test connector		X
23	1	Delivery to parking brake		X
24	1	Delivery to parking brake		X
4	1	Brake demand (Yellow Line)		X
42	1	Air spring pressure		X

Information sticker, TEBS power supply
Part No.: II39796F
Size [mm]: 150 x 100



VF00075/188

EBS-System Plate[2)]:
Part No.: II39797F
Size [mm]: 170 x 110

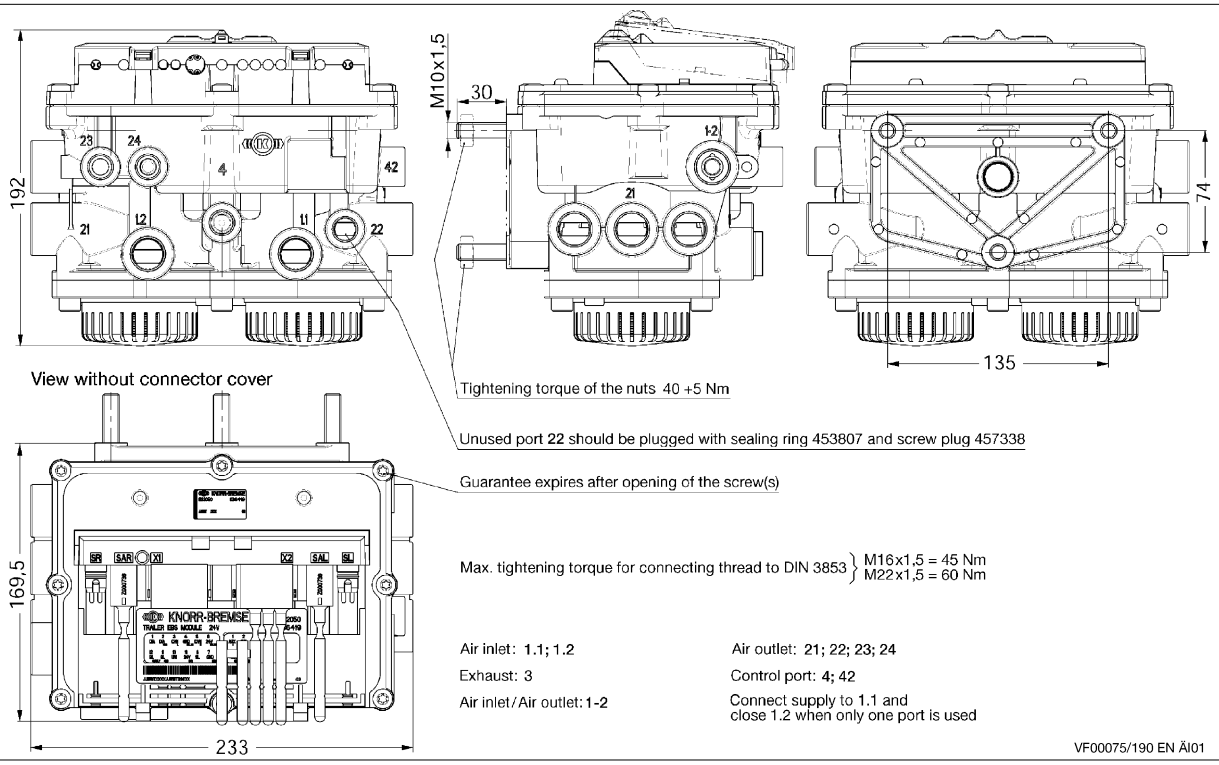
VF00075/189

[1)] If only one supply port is required, 1.1 must be used and 1.2 must be plugget.
[2)] 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.

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

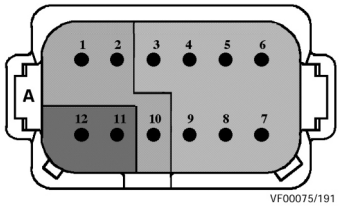
Dimensions

ES2041
ES2050
ES2053



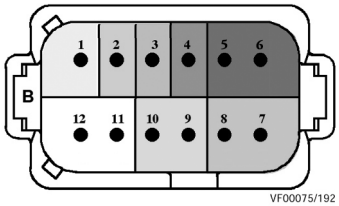
Electrical connections

X1 - connector



Pin	Diagnose via K-Line or TIM or Magic Eye	Diagnose via CAN
1	Diagnostics	AUX 5 (24V)[1] or Input C - signal
2	Diagnostics - ground	ground
3	ISO 11992 CAN low	*(ISO7638: 1,5 mm² WH / BN)*
4	Modulator – ground	*(ISO7638: 4,0 mm² BN)*
5	ISO 11992 CAN high	*(ISO7638: 1,5 mm² WH / GN)*
6	Modulator – 24 V	*(ISO7638: 4,0 mm² RD)*
7	ECU – ground	*(ISO7638: 1,5 mm² YE)*
8	Warning Lamp	*(ISO7638: 1,5 mm² WH)*
9	ECU - 24 V	*(ISO7638: 1,5 mm² BK)*
10	Diagnostics - 24 V	AUX 4 (24V)
11	Stop Light - ground	*(ISO1185: 1,0 mm² BK)*
12	Stop Light - 24 V	*(ISO1185: 1,0 mm² YE)*

X2 - connector



Pin	2S / 2M 4S / 2M	4S / 3M
1	AUX 1 (24V)	External ABS Modulator (BR9234) - Hold Valve *(1,0 mm² YE)*
2	AUX 2 (24V)	External ABS Modulator (BR9234) - Release Valve *(1,0 mm² BK)*
3	AUX 3 (24V)	
4	Input supply (5V)	
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)*

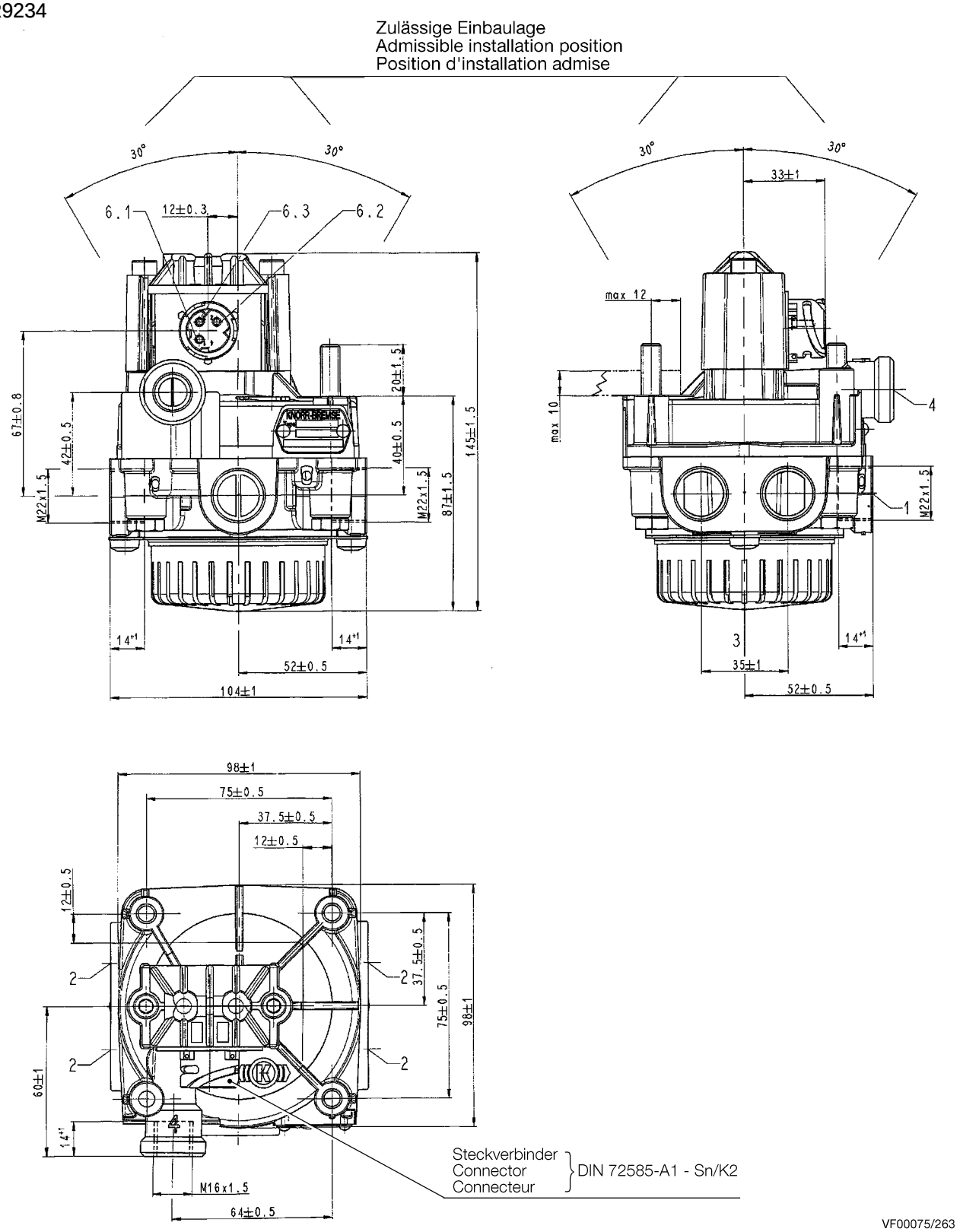
[1] Only available for ES2041

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions

BR9234



Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

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).

Additional Documents

Documentation is available which gives detailed information about the Electronic Braking System such as a system description and detailed installation instructions. Please ask your Knorr-Bremse technical sales representative for these documents or send an order with the respective part numbers:

Information document	C16427
Installation manual TEBS, German	Y002324, DE
Installation manual TEBS, English	Y002324, EN
Product information TEBS	P-3528 German, English, French, Italian, Hungarian
User's manual for PC Diagnostics ECU Talk	Available as a PDF File on the CD-ROM - II39785F

TEBS - Wiring Harnesses

The following cables are needed for the use of TEBS:
- Power Supply Cable
- Cable for the X1 connector
- Cable for the X2 connector (for auxiliary functions or 4S/3M axle modulator)
- Two or four sensor extension cables (depending on the ABS configuration)

Technical Features

Operating temperature range: -40 °C to +80 °

1. Wiring Harness, pre-assembled
1.1 Power Supply Cable

Function

Power Supply Cables, with plug or socket according to ISO 7638 + CAN, must only be used for the power supply of the braking equipment of the trailer.

The cables are available in various lengths and are supplied with a bayonet connector to ensure easy and safe connection.

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Options

Power Supply Cable with socket (mainly for semi-trailers)

Type No.	Part No.	Cable Length "L" [m]
EK3110	II367419000	9,0
EK3110	II3674112000	12,0
EK3110	II3674115000	15,0


VF00199_150

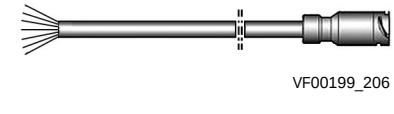
Power Supply Cable with plug
(mainly for drawbar and centre axle trailers)

Type No.	Part No.	Cable Length "L" [m]
EK3115	II397938000	8,0
EK3115	II3979310000	10,0
EK3115	II3979312000	12,0


VF00199_151

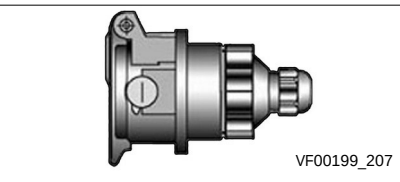
Power Supply Cable without socket or plug
(cable ends are with pins and colour coded)

Type No.	Part No.	Cable Length [m]
–	K002288	13,0
–	K002289	17,5
–	K004775	23,5


VF00199_206

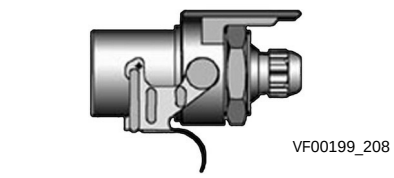
Connector kit "socket" with all contacts colour coded
(mainly for semi-trailers)

Type No.	Part No.
–	K002290


VF00199_207

Connector kit "plug" with all contacts colour coded
(mainly for drawbar and centre axle trailers)

Type No.	Part No.
–	K002291

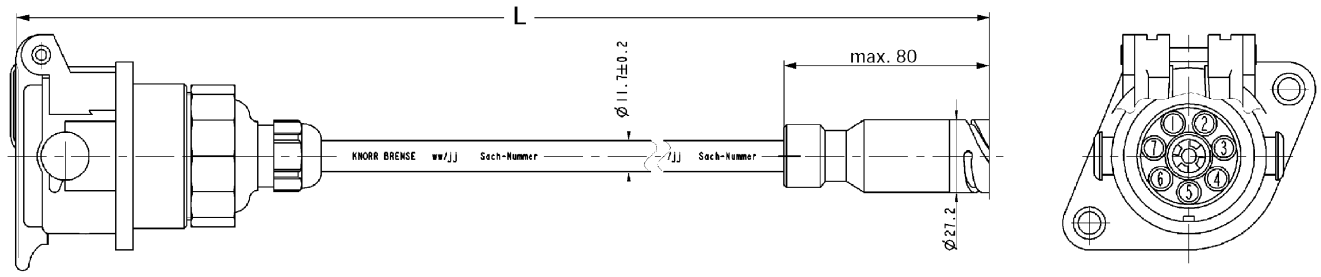

VF00199_208

Section No.: K002483-002
Doc. No.: Y011366-EN-002

Catalogue No.: K001561-EN

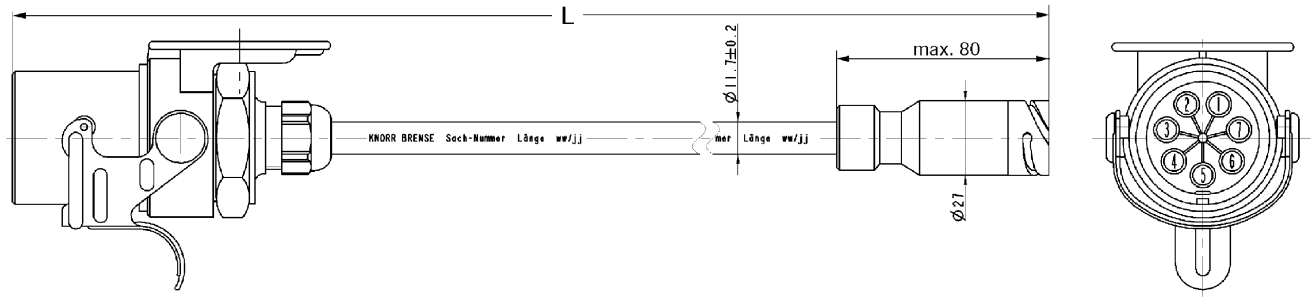
Dimensions

EK3110



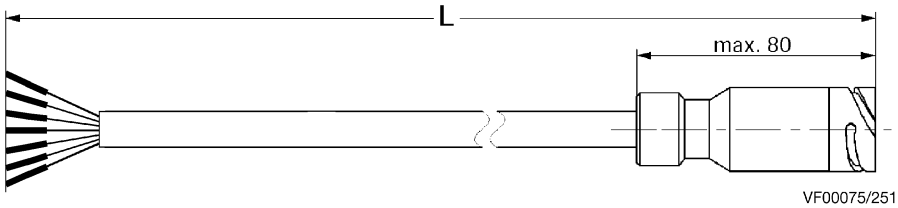
VF00075/193

EK3115



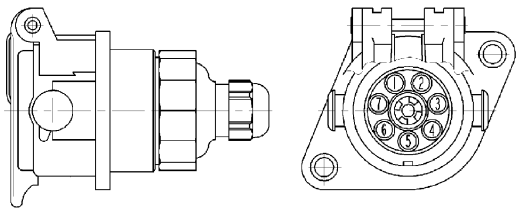
VF00075/194

K002288
K002289
K004775



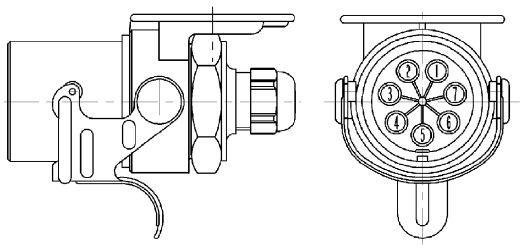
VF00075/251

K002290



VF00075/252

K002291



VF00075/253

Pin	Cable colour [1]	Cross section [mm²]	Function
1	Red	4,0	Power Solenoid Valves
2	Black	1,5	Power ECU
3	Yellow	1,5	Ground ECU
4	Brown	4,0	Ground Solenoid Valves
5	White	1,5	Warning Lamp
6	White / Green	1,5	CAN High
7	White / Brown	1,5	CAN Low

[1] Only for original K-B systems

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

1.2 Cables for X1 connector

Function

The wiring harness for the X1 connector consists of a combination of the following cables:

- Power supply according to ISO 7638
- Diagnostic cable with bayonet connector (optional)
- Stop Light power supply according to ISO 1185
- Output - AUX 4 (24V)
  (only available, if no diagnostics port is required)
- Output - AUX 5 (24V)
  (only available in combination with ES2041 and if no diagnostics port is required)
- Signal intput C
  (only available, if no diagnostics port is required)

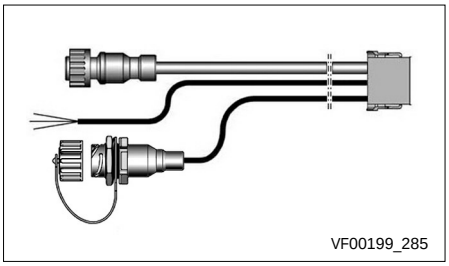
Function / Type No.:	Permanent power supply according to ISO 7638	Stop Light power supply according to ISO 1185	Diagnostics (bayonet connector)	AUX 4
EK3100	X	X	X	–
EK3101	X	–	X	–
EK3102	X	X	–	X
EK3107	X	X	X	–
EK3108	X	X	–	–

The available cable lengths are listed on the following pages.

Options

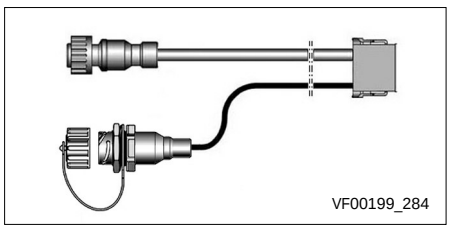
Wiring Harness with Diagnostic Cable (bayonet connector) and Stop Light power supply
Open leads: **Yellow** = 24V; **Black** = ground

Type No.	Part No.	Cable length [m] Connector ISO 7638 "L_1"	Diagnostics "L_2"	ISO 1185 "L_3"
EK3100	II367391	0,5	4,0	1,0
EK3100	II367393	0,5	6,0	1,0
EK3100	II367395	0,5	4,0	12,0
EK3100	II367397	0,5	6,0	12,0


VF00199_285

Wiring Harness with Diagnostic Cable (bayonet connector)

Type No.	Part No.	Cable length [m] Connector ISO 7638 "L_1"	Diagnostics "L_2"
EK3101	II367381	0,5	4,0
EK3101	II367383	0,5	6,0


VF00199_284

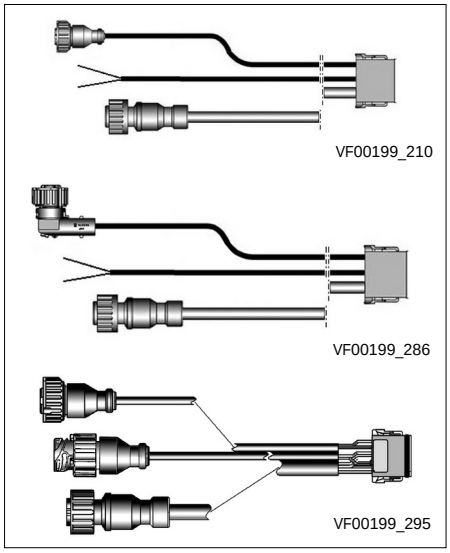
Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Options - *continued* -

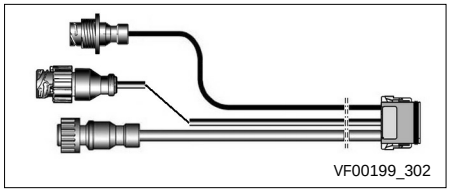
Wiring Harness without Diagnostic Cable, with Stop Light power supply and one auxiliary function controlled by TEBS.
Typical application: • No TIM, no Magic Eye
• Output AUX 4: Reset to Ride (6m) or Lift Axle Control (2m)
Open leads: Yellow = 24V; Black = ground

Type No.	Part No.	Cable Length [m] Connector ISO 7638 "L_1"	ISO 1185 "L_2"	Aux-4 "L_3"
EK3102	K002945	0,5	1,0	2,0
EK3102	K002946	0,5	6,0	2,0
EK3102	K002947	0,5	12,0	2,0
EK3102	K002948	0,5	1,0	6,0
EK3102	K002949	0,5	6,0	6,0
EK3102	K002950	0,5	12,0	6,0
EK3102	K004754	0,5	1,0	4,0
EK3102	K004755	0,5	6,0	4,0
EK3102	K004756	0,5	12,0	4,0
EK3102[1)]	K005684	0,5	6,0	6,0
EK3102[2)]	K007524	0,5	1,0	4,0



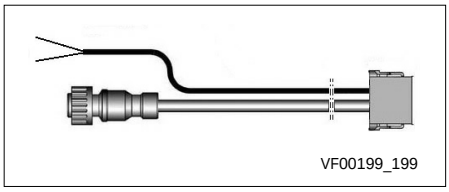
Wiring Harness with Diagnostic Cable (bayonet connector) and Stop Light power supply.
Typical application: • Connect TIM or Magic Eye

Type No.	Part No.	Cable Length [m] Connector ISO 7638 "L_1"	Diagnostic "L_2"	ISO 1185 "L_3"
EK3107[2); 3)]	K007525	0,5	4,0	1,0



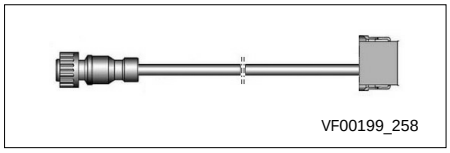
Wiring Harness without Diagnostic Cable, with Stop Light power supply
Open leads: Yellow = 24V; Black = ground

Type No.	Part No.	Cable Length [m] Connector ISO 7638 "L_1"	ISO 1185 "L_2"
EK3108	II40391F1	0,5	1,0
EK3108	II40391F2	0,5	12,0



Wiring Harness with power supply as ISO 7638

Type No.	Part No.	Cable Length [m] Connector ISO 7638 "L_1"
–	K002286	0,5



1) Output Aux 4 with elbow DIN bayonet connector
2) Connection ISO 1185 with DIN bayonet pin connector
3) A mounting kit (Part No: K005378, consisting of a closure cap, a spring ring and a nut) may be used

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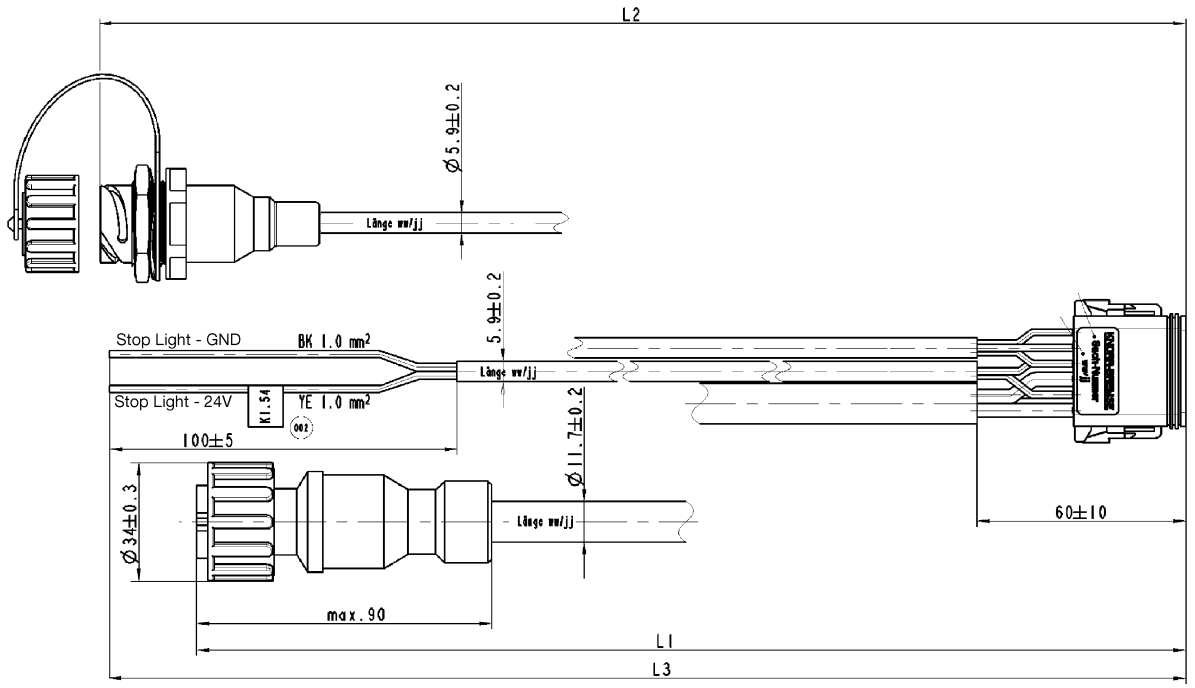
Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

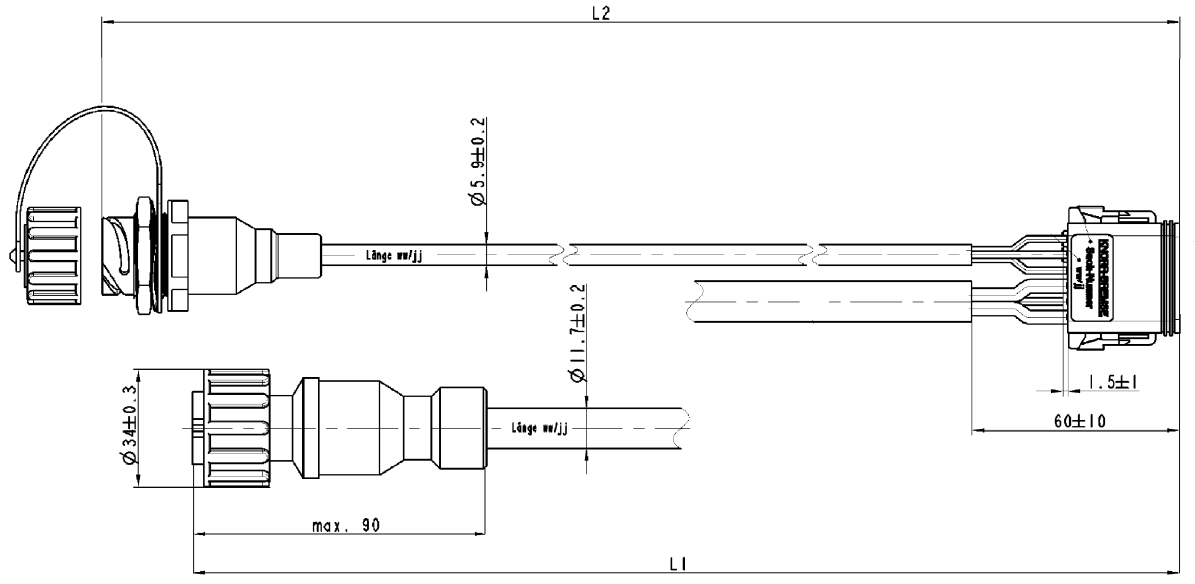
Dimensions

EK3100



VF00075/272

EK3101



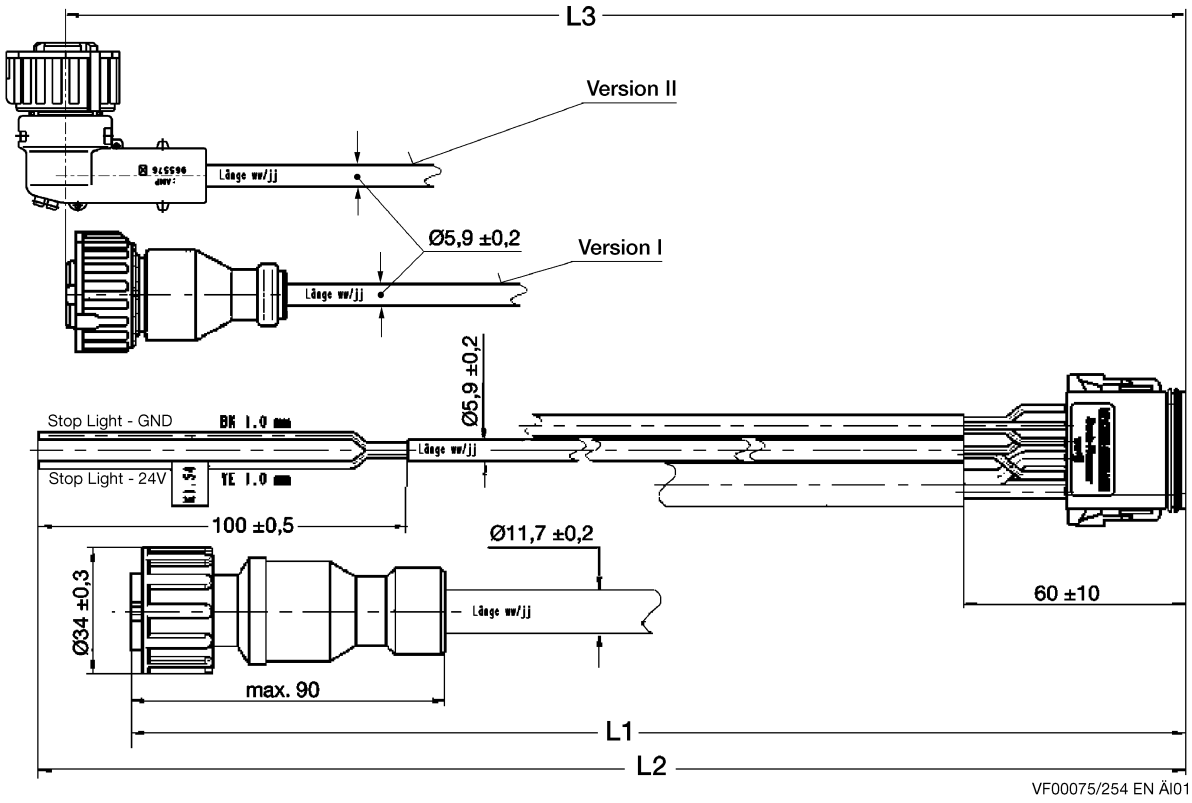
VF00075/273

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

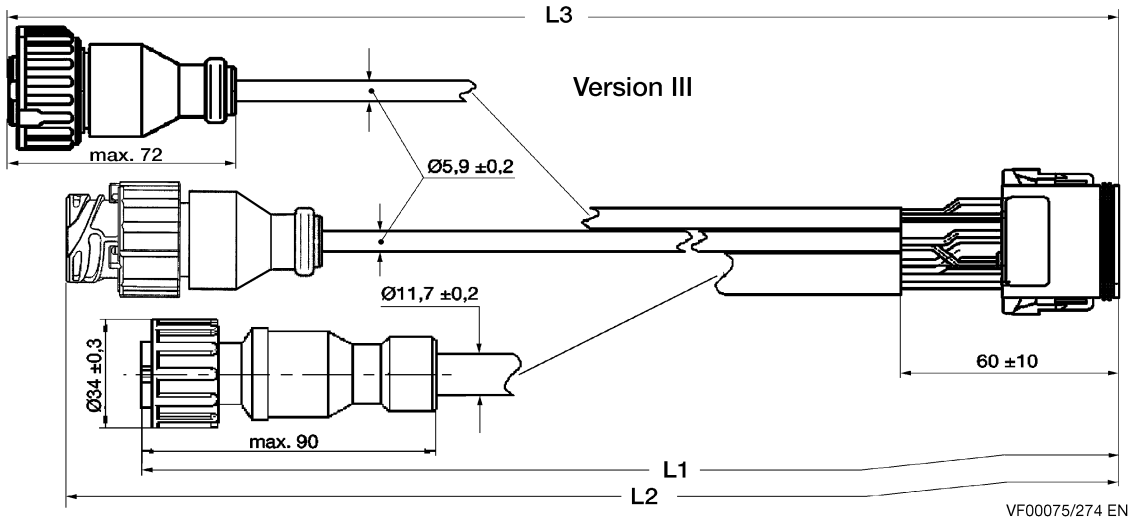
Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions - *continued* -

EK3102



EK3102

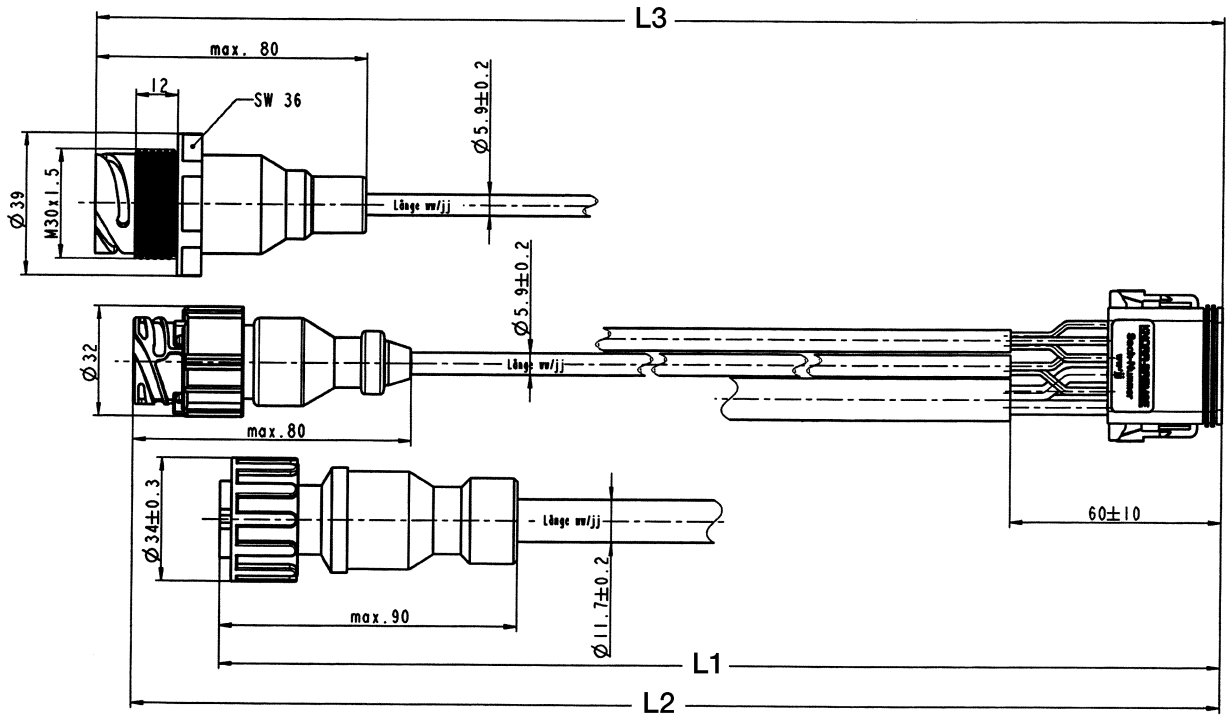


Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

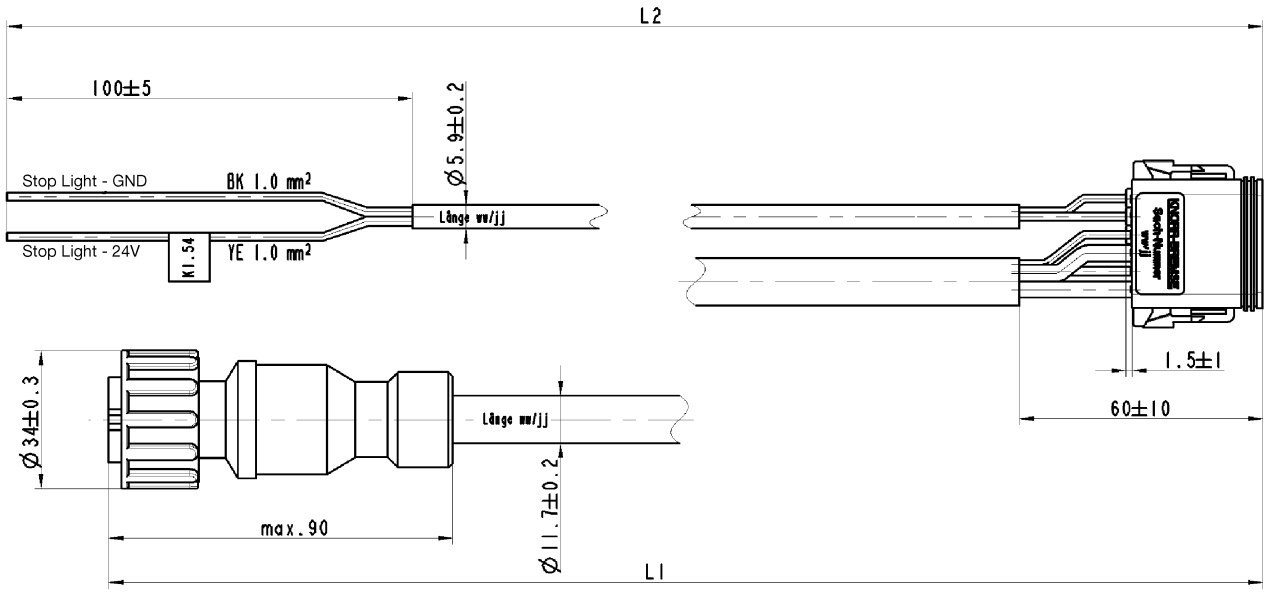
Dimensions - *continued* -

EK3107



VF00075/213 ÄI02

EK3108



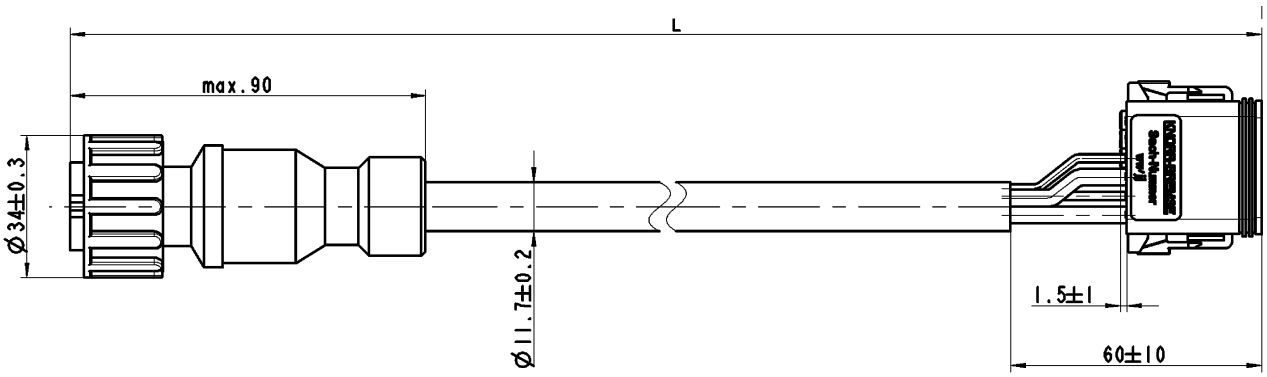
VF00075/214

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

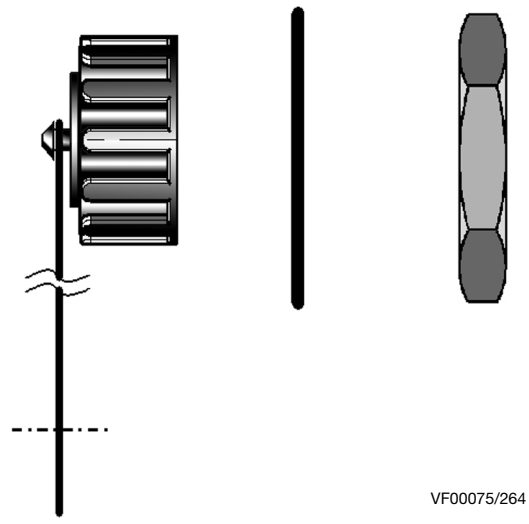
Dimensions - *continued* -

K002286



VF00075/265

K005378



VF00075/264

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

1.3 Cables for the X2 connector

Function

The wiring harnesses for the X2 connector consists of a combination of the following cables:
- Output AUX 1 (24V)
- Output AUX 2 (24V) with or without bayonet connector
- Output AUX 3 (24V)
- Signal input A and
- Signal input B

The cables are available in different lengths and combinations according to requirements:

Function / Type No.	AUX 1	AUX 2	AUX 3	Sensor A	Sensor B
EK3122	(B2)	(B2)	–	–	–
EK3123	(B2)	–	–	–	–
EK3125	(B2)	(o3)		(o2)	(o2)
EK3126[1)]	(B3)		(B2)	(o2)	(o2)
EK3127	(B2)	(B2)	–	(o2)	(o2)
EK3129	(o3)		(B2)	(o2)	(o2)
EK3140[2)]	(B3)		(B-S)	–	–
EK3141	(B3)		(B2)	–	–
EK3142	(B3)		–	–	–
EK3147	–		(B2)	(o2)	–

Explanations: (o2) or (o3) = no connector (2-pin) or (3-pin) supplied
(B2) or (B3) = bayonet connector (2-pin) or (3-pin) supplied
(B-S) = "bayonet-splitter" -connector (5-pin) supplied

- The auxiliary outputs (AUX 1 to AUX 3) can be used to control different auxiliary functions (see page 40.1).
- The cables for the signal inputs (Sensor A and B) can be used to "detect" information for functions not automaticlly controlled by TEBS (see page 40.1).
- The respective tables are shown on the following pages with the corresponding part numbers and dimensions:

Options - *see next page* -

Section No.: K002483-002
Doc. No.: Y011366-EN-002

Catalogue No.: K001561-EN

[1)] For use in 4S/3M-systems in semi-trailer (the 3-pin-connector is for the connection of the modulator BR9234)
[2)] The cable K002285 from the modular system is additionally required

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Options

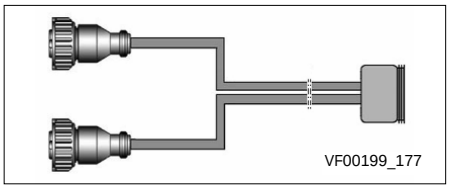
1.3.1 For ABS Configuration 2S/2M and 4S/2M

1.3.1.1 Wiring Harness for two auxiliary outputs controlled by TEBS

Typical application:

- Semi-trailers or centre axle trailers
- Output AUX 1: Reset to Ride
- Output AUX 2: Lift Axle Control

Type No.	Part No.	Cable Length [m]	
		Output AUX 1 "L_1"	Output AUX 2 "L_2"
EK3122	II397874	6,0	2,0
	Cable ends	*Bayonet*	*Bayonet*

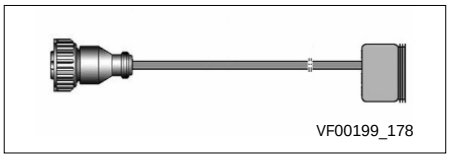


1.3.1.2 Wiring Harness for one auxiliary output controlled by TEBS

Typical application:

- Semi-trailers or centre axle trailers
- Output AUX 1: Reset to Ride (6m) or Lift Axle Control (2m)

Type No.	Part No.	Cable Length [m] Output AUX 1 "L_1"
EK3123	II397883	6,0
EK3123	II397884	2,0
	Cable ends	*Bayonet*

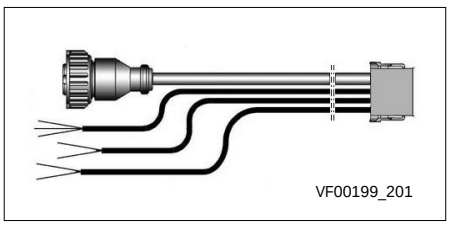


1.3.1.3 Wiring Harness for the connection of three outputs and two inputs controlled by TEBS

Typical application:

- Semi-trailers
- Output AUX 1: Reset to Ride
- Outputs AUX 2+3: Lift Axle Control for two lift axles (Splitter-Box for ground cable is required)
- Input A: Traction Help
- Input B: Disable Lift Axle Control

Type No.	Part No.	Cable Length [m]			
		Output 1 "L_1"	Output 2, 3 "L_2"	Input A	Input B
EK3125	II397951	4,0	1,0	1,0[1)]	1,0[1)]
EK3125	II397952	6,0	1,0	1,0[1)]	1,0[1)]
	Cable ends	*Bayonet (2-wire)*	*Open 3-wire*	*Open 2-wire*	*Open 2-wire*



[1)] Black = 24V; Yellow = ground

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Section No.: K002483-002
Doc. No.: Y011366-EN-002

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

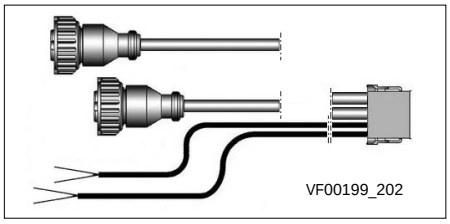
Options - *continued* -

1.3.1.4 Wiring Harness for the connection of two outputs and two inputs controlled by TEBS

Typical application:

- Semi-trailers
- Output AUX 1: Reset to Ride
- Output AUX 2: Lift Axle Control
- Input A: Traction Help
- Input B: Disable Lift Axle Control

Type No.	Part No.	Cable Length [m]			
		Output 1 "L_1"	Output 2 "L_2"	Input A "L_3"	Input B "L_4"
EK3127	II39814F1	6,0	2,0	15,0[1)]	7,0[1)]
	Cable ends	*Bayonet (2-wire)*		*Open 2-wire*	*Open 2-wire*

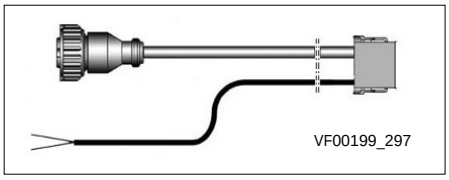


1.3.1.5 Wiring Harness for the connection of one output and one input controlled by TEBS

Typical application:

- Semi-trailers
- Output AUX 3: Lift Axle Control
- Input A: Disable Lift Axle Control or Traction Help

Type No.	Part No.	Cable Length [m]	
		Output 3 "L_1"	Input A "L_1"
EK3147	K007735	1,2	1,2
	Cable ends	*Bayonet (2-wire)*	*Open 2-wire*



Options - *continued, see next page* -

Section No.: K002483-002
Doc. No.: Y011366-EN-002

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Options - *continued* -

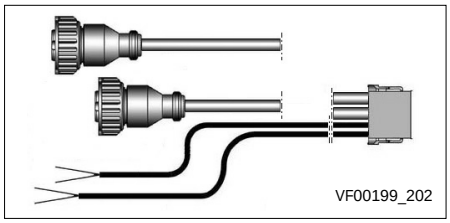
1.3.2 For the ABS Configuration 4S/3M

1.3.2.1 Wiring Harness for the connection of axle modulator cable.
One output, two inputs in 4S/3M-systems,
controlled by TEBS.

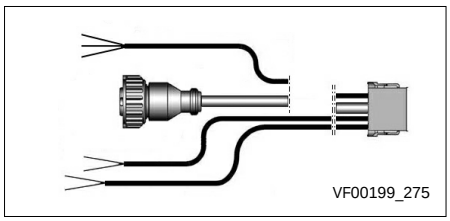
Typical application:

- Semi-trailers with steering axle
- Output AUX 1+2: Cable for axle modulator
- Output AUX 3: Reset to Ride (6m) or Lift Axle Control (1,2 m)
- Input A: Traction Help
- Input B: Disable Lift Axle Control

Type No.	Part No.	Cable Length [m]			
		Output 1, 2 "L_1"	Output 3 "L_2"	Input A "L_3"	Input B "L_4"
EK3126	II39802F1	2,0	6,0	1,0 [2]	1,0 [2]
EK3126	II39802F2	2,0	6,0	7,0 [2]	7,0 [2]
	Cable ends	*Bayonet (3-wire)*	*Bayonet (2-wire)*	*Open 2-wire*	*Open 2-wire*



Type No.	Part No.	Cable Length [m]			
		Output 1, 2 "L_1"	Output 3 "L_2"	Input A "L_3"	Input B "L_4"
EK3129	K004569	1,0	1,2	1,0 [2]	1,0 [2]
	Cable ends	*Bayonet (3-wire)*	*Bayonet (2-wire)*	*Open 2-wire*	*Open 2-wire*

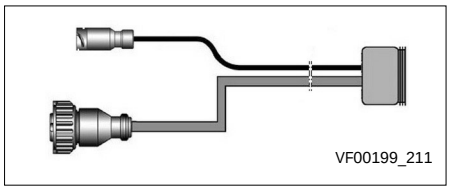


1.3.2.2 Wiring Harness for the connection of one auxiliary function in 4S/3M systems (drawbar trailer) controlled by TEBS.

Typical application:

- Drawbar trailers
- Output AUX 1+2: Cable for Axle Modulator
- Output AUX 3: Reset to Ride[1]

Type No.	Part No.	Cable Length [m]	
		Output AUX 1, 2 "L_1"	Output AUX 3 "L_2"
EK3140[1]	K002951	9,0	6,0
	Cable ends	*Bayonet (3-wire)*	*Bayonet splitter*

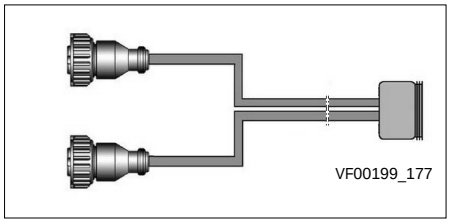


1.3.2.3 Wiring Harness for the connection of one auxiliary function in 4S/3M systems (semi-trailer) controlled by TEBS.

Typical application:

- Semi-trailers with steering axle
- Output AUX 1+2: Cable for Axle Modulator
- Output AUX 3: Reset to Ride

Type No.	Part No.	Cable Length [m]	
		Output AUX 1, 2 "L_1"	Output AUX 3 "L_2"
EK3141	K002952	3,0	6,0
	Cable ends	*Bayonet (3-wire)*	*Bayonet (2-wire)*



[1] The cable K002285 from the modular system is additionally required
[2] Black = 24V; Yellow = ground

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Options - *continued* -

1.3.2.4 Wiring Harness for the connection of TEBS 4S/3M system configuration on full, semi and centre axle trailers (no auxiliary function available)

Typical application:

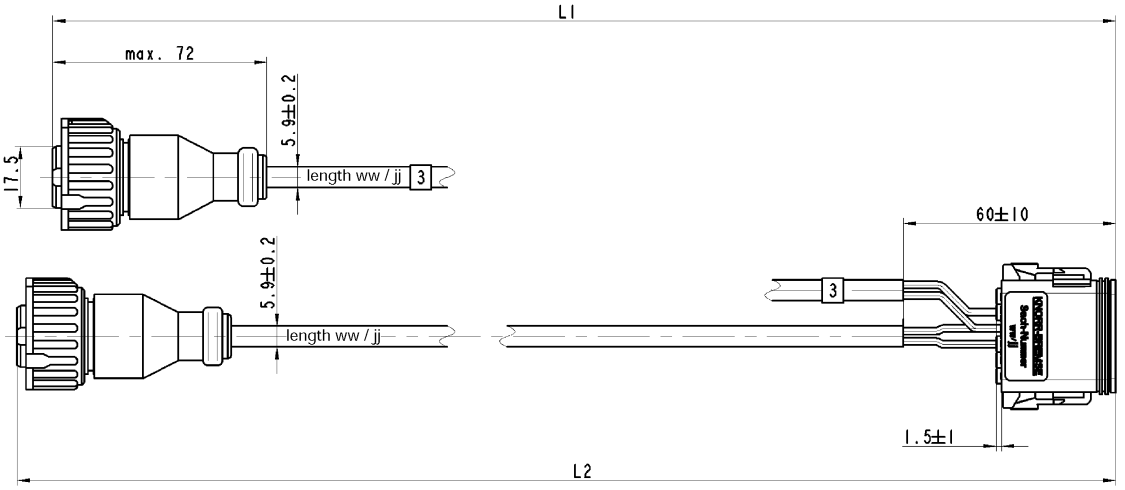
- Drawbar trailers without axilliary functions
- Semi-trailers with steering axles and without auxilliary functions

Type No.	Part No.	Cable Length [m] Output AUX 1, 2 "L_1"
EK3142	K002953	3,0
EK3142	K002954	9,0
	Cable ends	*Bayonet (3-wire)*

VF00199_178

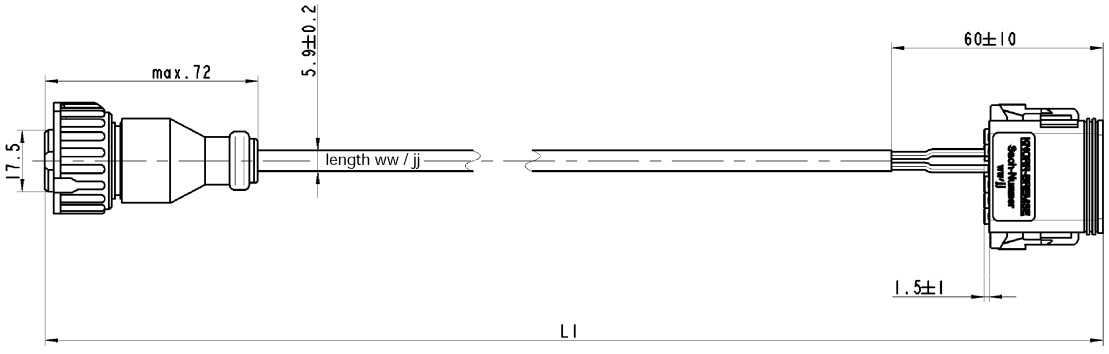
Dimensions

EK3122
EK3141



VF00075/197 EN

EK3123
EK3142



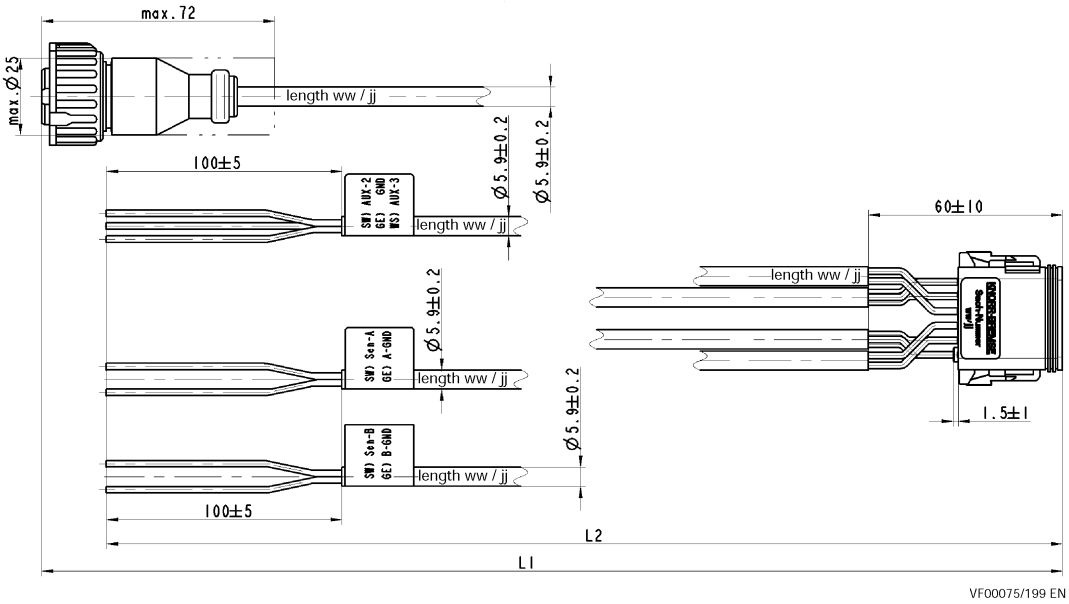
VF00075/198 EN

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

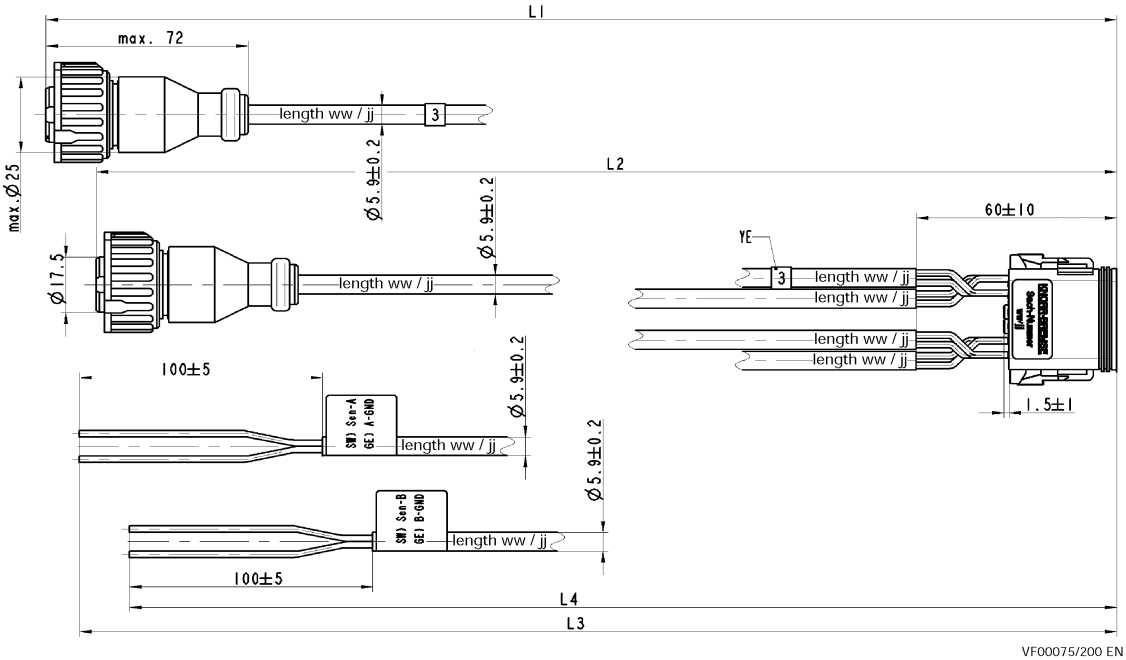
Dimensions - *continued* -

EK3125



VF00075/199 EN

EK3126
EK3127



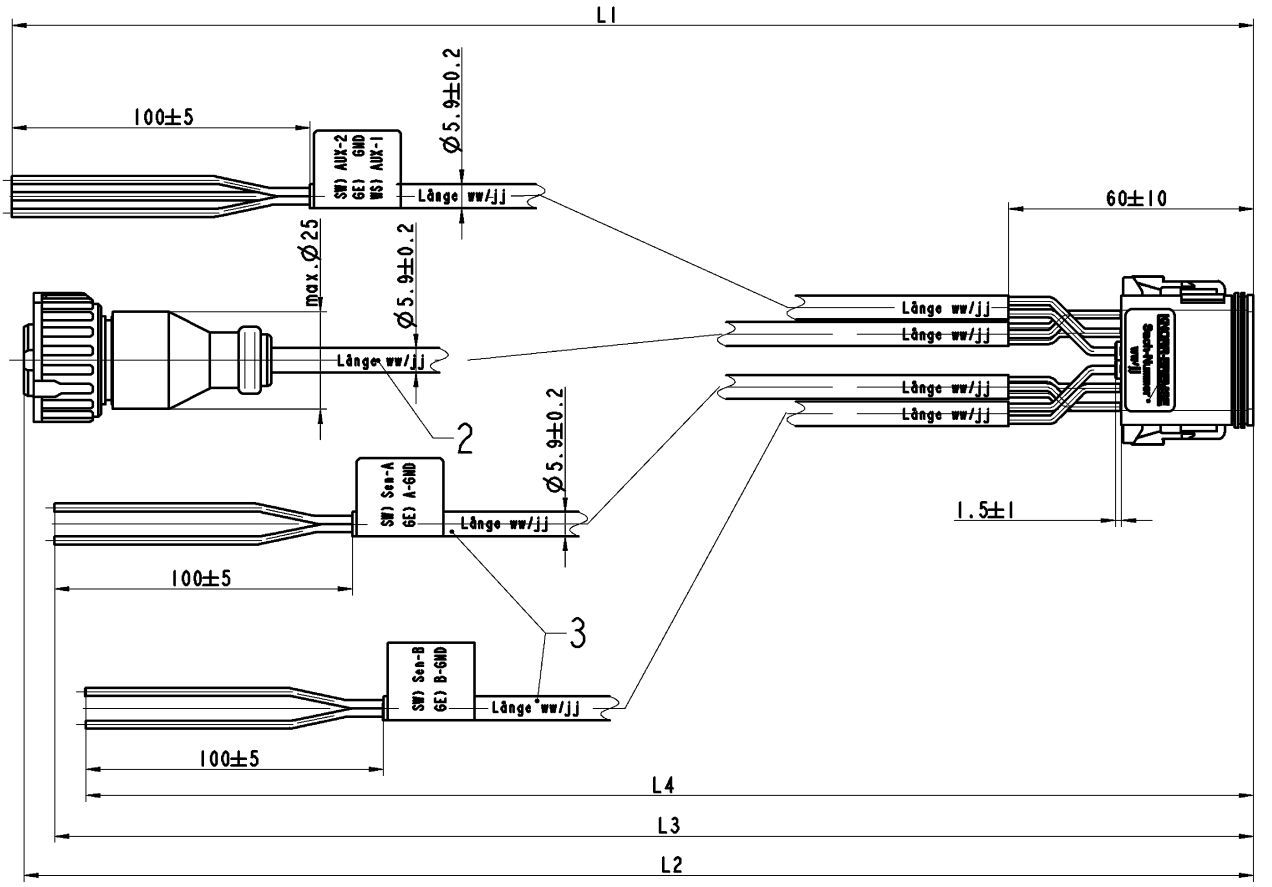
VF00075/200 EN

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

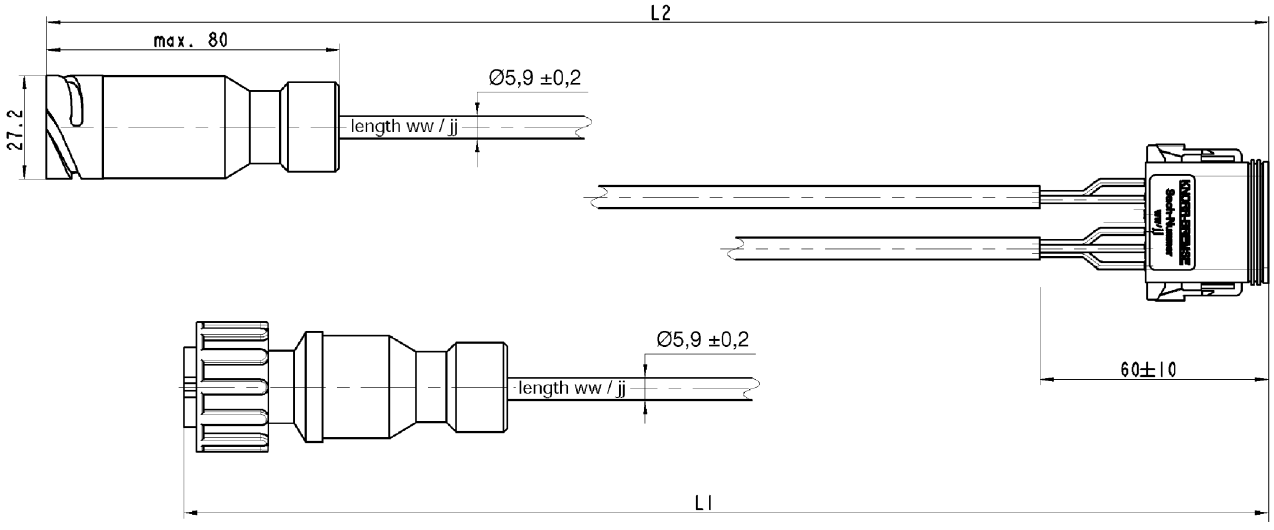
Dimensions - *continued* -

EK3129



VF00075/266

EK3140

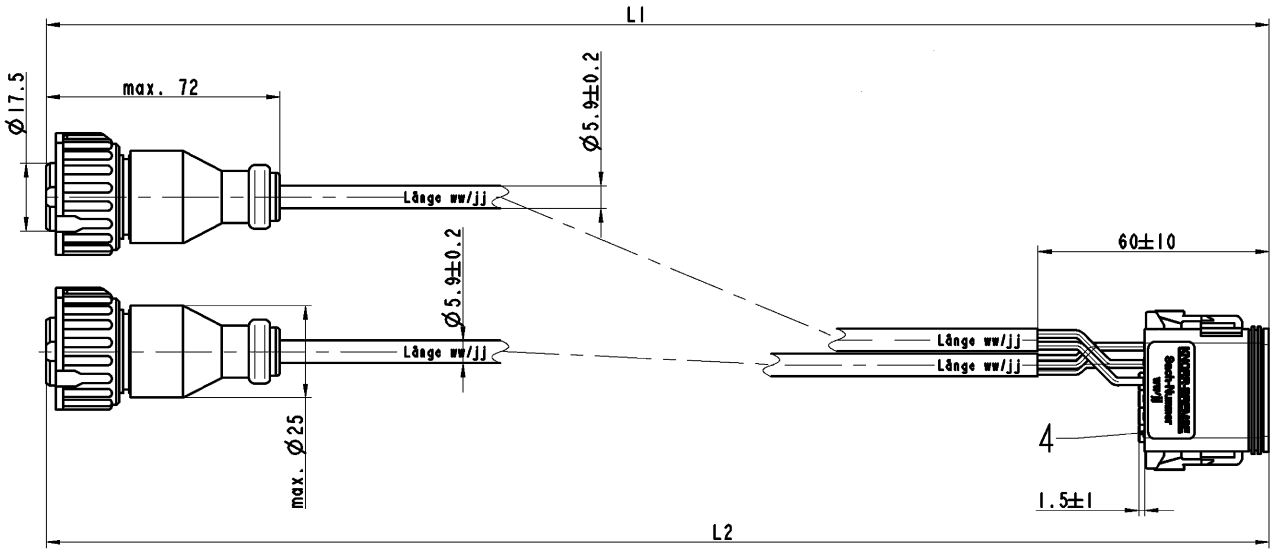


VF00075/255 EN

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

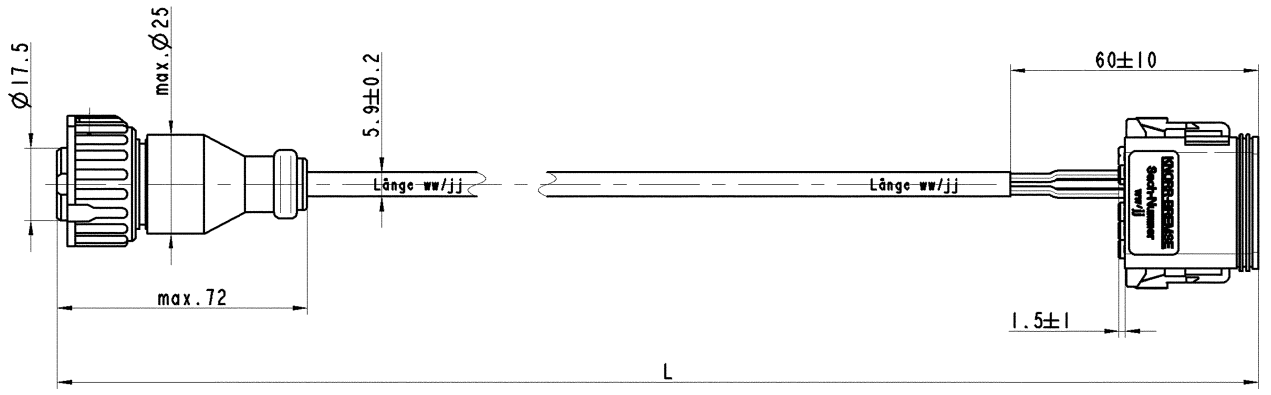
Dimensions - *continued* -

EK3141



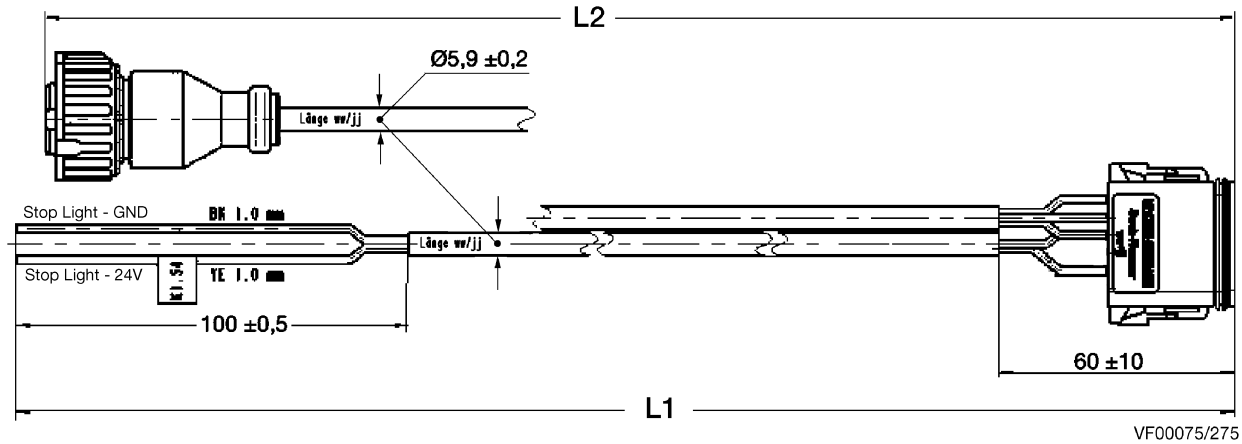
VF00075/267

EK3142



VF00075/268

EK3147



VF00075/275

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

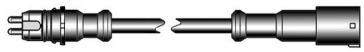
1.4 Sensor Extension Cable, Sensor Extension Cable with socket and plug

Function

These cables are only to be used for the extension of the Wheel Speed Sensor cables.
The cables are available in various lengths and are supplied with a 2-pin socket and a 2-pin plug to ensure easy and safe connection.

Options

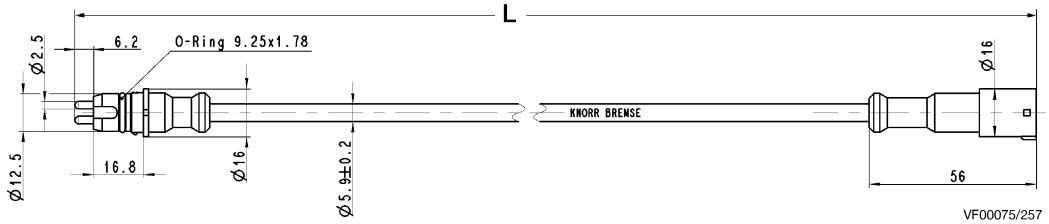
Type No.	Part No.	Cable Length "L" [m]
EK3130	II367562000	2,0
EK3130	II367563000	3,0
EK3130	II367564000	4,0
EK3130	II367565000	5,0
EK3130	II367566000	6,0
EK3130	II367568000	8,0
EK3130	II3675610000	10,0
EK3130	II3675612000	12,0
EK3130	II3675615000	15,0



VF00199_212

Dimensions

EK3130



VF00075/257

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

2. Wiring Harness, Modular System

Function

If an X1- or X2-cable is required, that is not included in the standard cables (see page 40.10 to 40.19), this can be produced using a modular assembly system to provide a given functionality (see pos. 1 to 11 on the next page).
In all cases a Power Supply Cable EK3110 (semi-trailers) or EK3115 (full and centre axle trailers) is required.

Additional documents

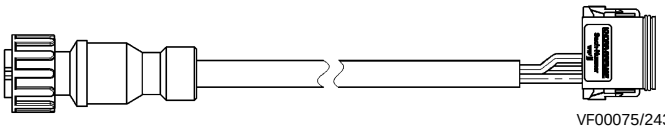
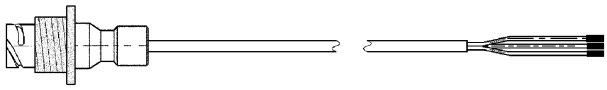
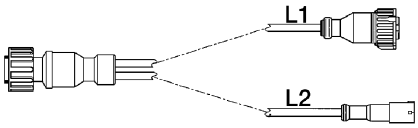
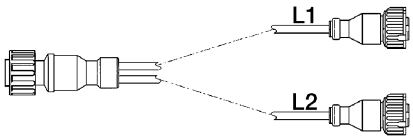
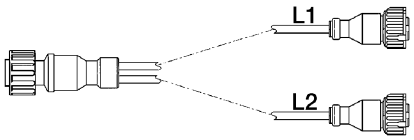
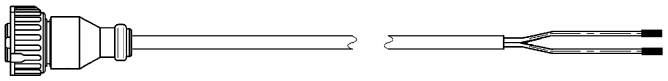
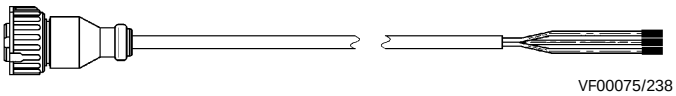
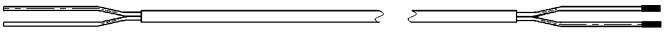
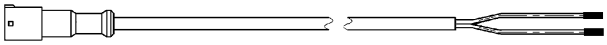
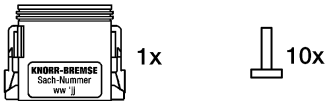
When producing a harness using the modular cable assembly system, the procedure defined in the following documents should be followed:
Instruction manual, German Y011788, DE
Instruction manual, English Y011788, EN
Copies of the above may be obtained from your local Knorr-Bremse technical representative or direct from Knorr-Bremse:

Options and Dimensions - *see next page* -

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Options and Dimensions

Pos.	Part No.	Length [m]	Description	Picture
1	K002286	0,5	Power Supply Cable with assembled X1-connector	 VF00075/243
2	K002270[2)] K002271[2)] K002272[2)]	2 6 15	Diagnosis connection or "Bayonet Splitter" (3-pin) Application: e. g. Splitting of a ground pin for two auxiliary functions	 VF00075/235 ÄI01
3	K002283[1)]	3 (L1) 1 (L2)	Connection cable for AUX 4 and Sensor C Application: e. g. Reset to Ride and Brake Wear Monitoring	 VF00075/241
4	K002284	4 (L1) 2 (L2)	Connection cable for AUX 1+2 or AUX 2+3 or AUX 4+5 (only with ES2041) Application: e. g. Reset to Ride and Lift Axle Control	 VF00075/242
5	K002273	6	"Bajonett Splitter" (2-pin) Application: Duplicating the signal of one auxiliary function	 VF00075/236
6	K002285	0,5 (L1) 0,5 (L2)	Connection cable for 2x RTR (L1/L2)	 VF00075/242
7	K002274 K002275 K002276	2 6,5 10	RTR / LAC Connection	 VF00075/237
8	K002277 K002278 K002279	3 9 15	Axle Modulator Connection	 VF00075/238
9	K002280 K002281	7 15	Sensor / RTR / LAC Connection	 VF00075/239
10	K002282[1)]	1	"Spider" Connection	 VF00075/240
11	K002287		Parts kit for X2-connector (all components in a package)	 VF00075/244

[1)] For the connection of EK3133 - II39807F to TEBS

[2)] A mounting kit (Part No: K005378 consisting of a closure cap, a spring ring and a nut) may be used

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www.knorr-bremse.com www.knorr-bremsesfn.com

Section No.: K002483-002
Doc. No.: Y011366-EN-002

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

3. Cable for Brake Pad Wear sensing
3.1 Standard Design "Spider" for 3-Axle Semi-Trailers EK3133 - II39807F

Function

To achieve this function, each brake caliper must have In-pad Wear Sensors and these must be connected in series to the TEBS via an additional dedicated wiring loom (see illustration below). The wear status of the brakes can then be assessed via the PC Diagnostics, TIM or Magic Eye. 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).

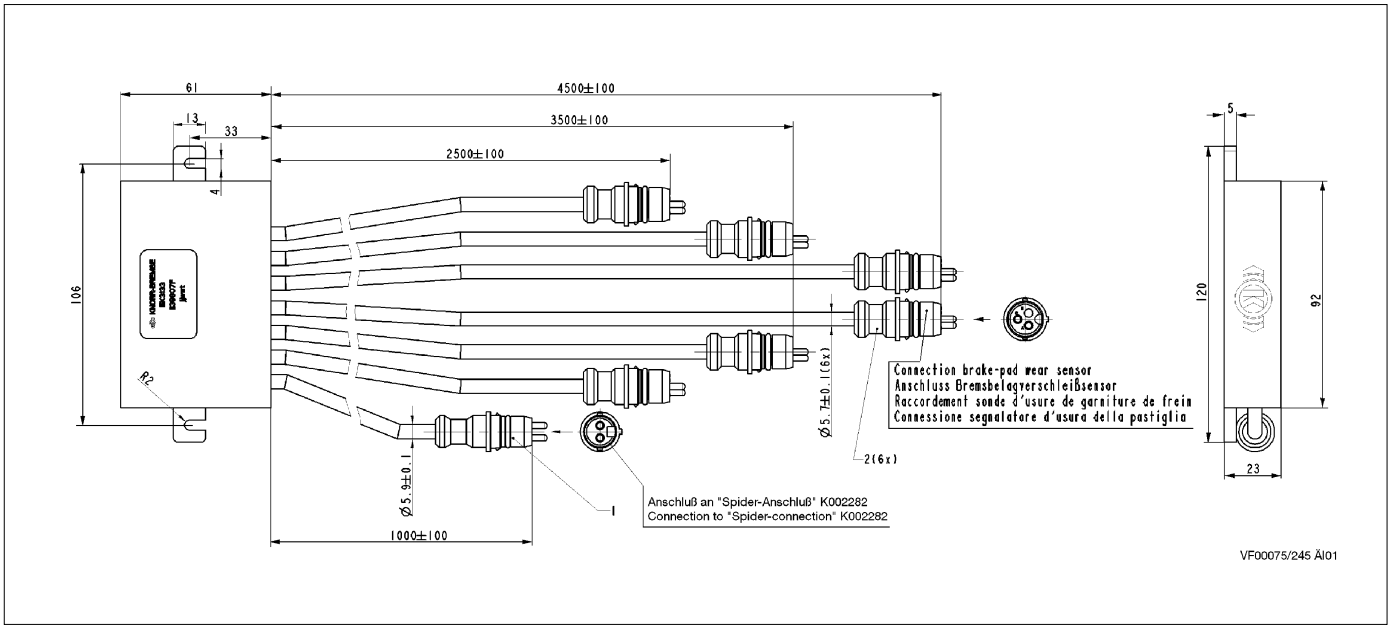
For the fitting on single- or two-axle semi-trailers end connector (K003848) is needed.
For further information, please also see page 61.1 and 61.2 in the chapter "Air Disc Brake".

The connections of the "Spider" Cable EK3133 – II39807F, can be extended with extension cables of the modular design (K007217, K007218 or K007219) if necessary.

Technical Features

Operating temperature range:	-40 °C to +80 °C
Approx. weight:	1,3 kg
Nominal voltage:	24V DC

Dimensions



Section No.: K002483-002
Doc. No.: Y011366-EN-002

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

3.2 Modular Assembly System for Brake Pad Wear sensing

Function

To achieve this function, each brake caliper must be have In-Pad Wear Sensors and these must be connected in series to the TEBS via an additional dedicated wiring harness (consisting of the components Pos. 1 to Pos. 4).

The wear status of the brake pads can then be assessed via the PC Diagnostics, TIM or Magic Eye. 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.

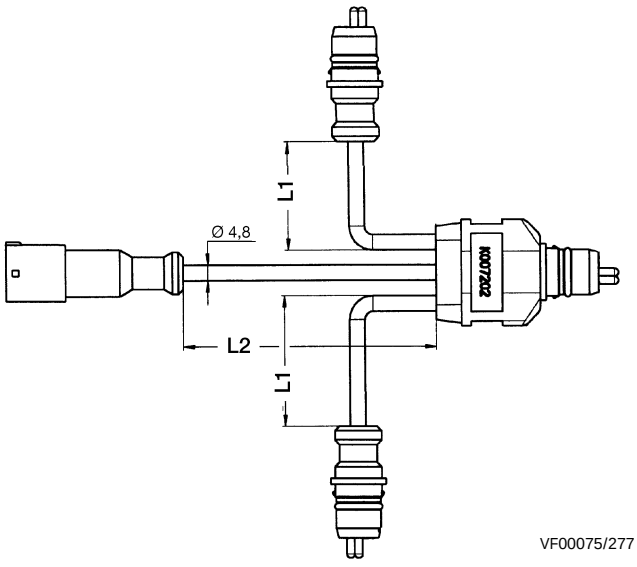
Modular Design

The modular design allows an arrangement to be made using the building block principle. With one axle module (K007202) per axle and the matching extension cables (K007217, K007218 or K007219), the connection of the Brake Pad Wear Sensor can be achieved for any trailer variant.
For further information, please also see page 61.1 and 61.2 in the chapter "Air Disc Brake".

Technical Features

Operating temperature range: -40 °C to +80 °C

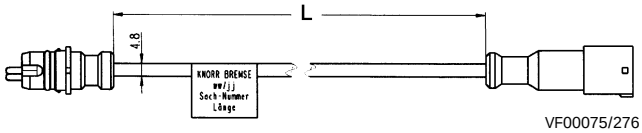
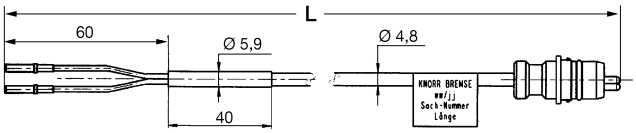
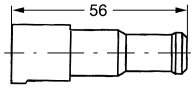
Options and Dimensions

Pos.	Part No.	Length [m]	Description	Picture
1	K007202	2 (L1) 2 (L2)	Axle module Application: Connection brake Pad wear sensor	

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Options and Dimensions - *continued* -

Pos.	Part No.	Length [m]	Description	Picture
2	K007217 K007218 K007219	1 3 5	Extension Cable Application: Extension between the axle modules or between axle module and wear sensor	 VF00075/276
3	K007205	1	Connecting Cable Application: Connection to TEBS	 VF00075/278
4	K003848	–	End Connector Application: Contact bridge	 VF00075/279

Module Structure

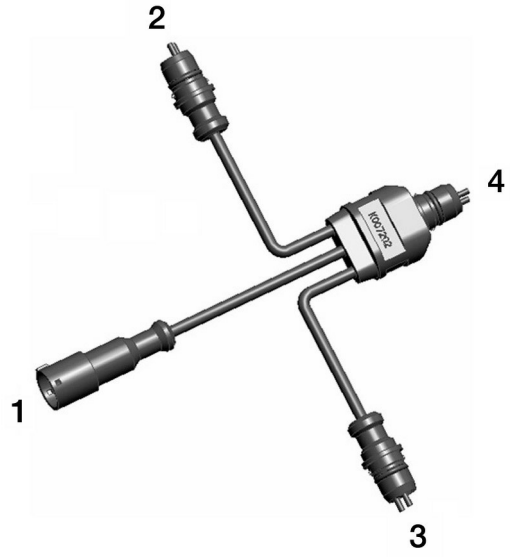
Legend:

1 = Connection to a further axle module or to TEBS (K007205 necessary)

2 = Connection to brake pad wear sensor

3 = Connection to brake pad wear sensor

4 = Connection to a further axle module or to a connecting plug (K003848 necessary)

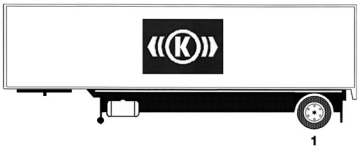


VF00199_298

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

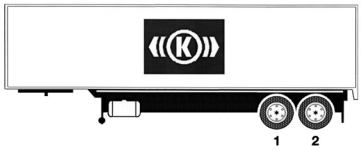
Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Overview of Installation Examples

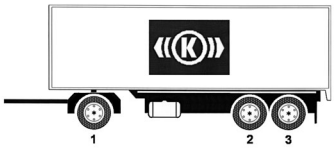


1x Pos. 1
1x Pos. 3
1x Pos. 4

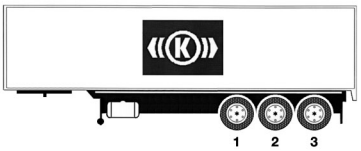
2x Pos. 1
1x Pos. 2
1x Pos. 3
1x Pos. 4



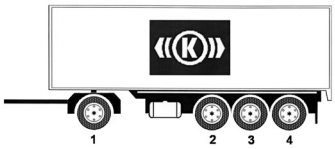
2x Pos. 1
1x Pos. 3
1x Pos. 4



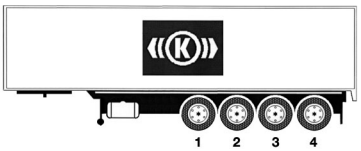
3x Pos. 1
1x Pos. 2
1x Pos. 3
1x Pos. 4



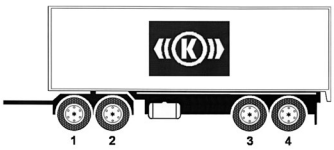
3x Pos. 1
1x Pos. 3
1x Pos. 4



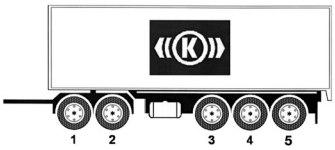
4x Pos. 1
1x Pos. 2
1x Pos. 3
1x Pos. 4



4x Pos. 1
1x Pos. 3
1x Pos. 4

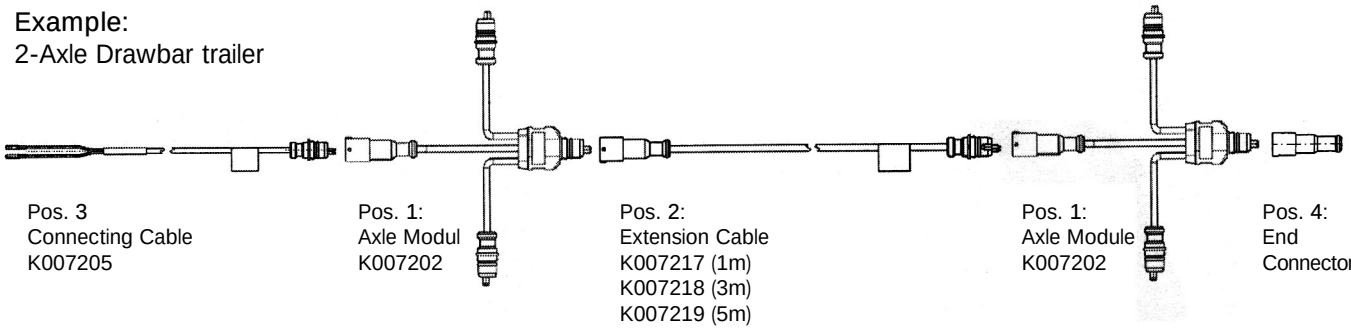


4x Pos. 1
1x Pos. 2
1x Pos. 3
1x Pos. 4



5x Pos. 1
1x Pos. 2
1x Pos. 3
1x Pos. 4

Example:
2-Axle Drawbar trailer



Pos. 3
Connecting Cable
K007205

Pos. 1:
Axle Modul
K007202

Pos. 2:
Extension Cable
K007217 (1m)
K007218 (3m)
K007219 (5m)

Pos. 1:
Axle Module
K007202

Pos. 4:
End
Connector

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

4. Diagnostics:

4.1 "UDIF" (Universal Diagnostic Interface)

VF00199_270

Function

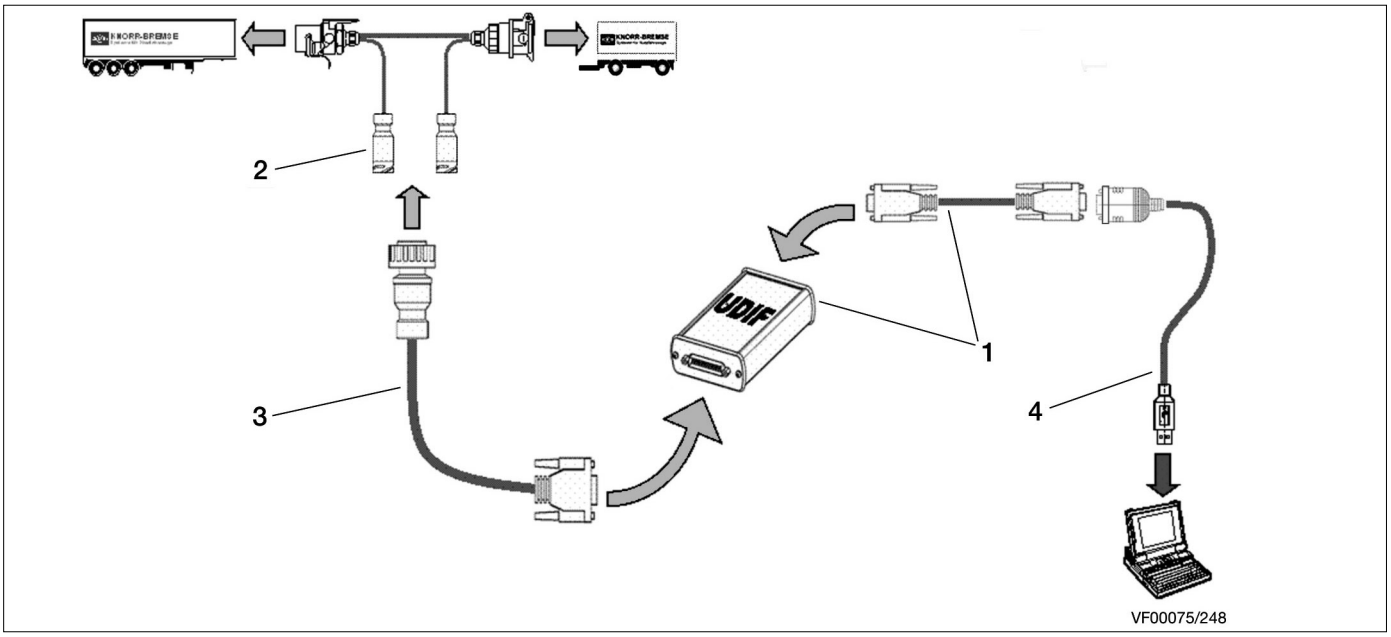
In order to configure the TEBS, carry out End Of Line testing and system checks, special hardware and software is required.

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 will only be made available after the 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	Type No.	Part No.	Remarks
1	Diagnostic Set UDIF	EZ1031	II39809F	Including connection cable Z005474 (9-pin sub-D-plug and 9-pin sub D-socket)
2	Adapter cable	EZ1034	II39808F	
3	Diagnostic cable	EZ1032	II39812F	
4	Connection cable		Z007887	Optional for USB-connection to PC
5	Diagnostic software		II39785F	Item not shown



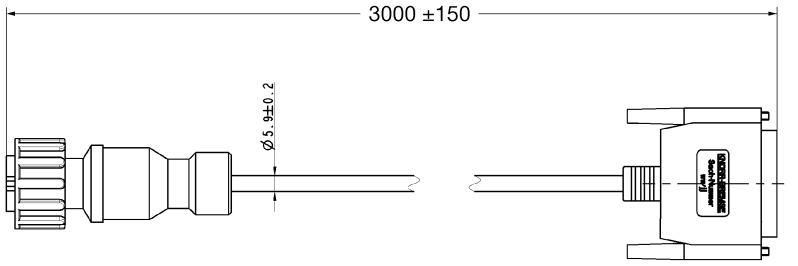
VF00075/248

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

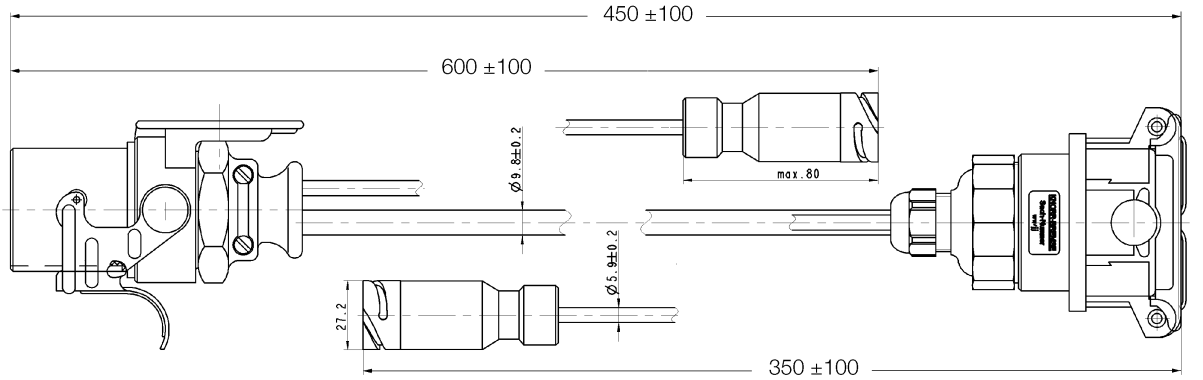
Dimensions

EZ1032



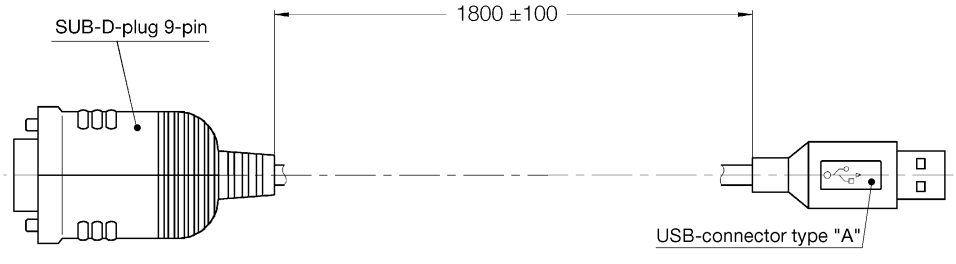
VF00075/206 EN ÄI01

EZ1034



VF00075/207 EN ÄI01

Z007887

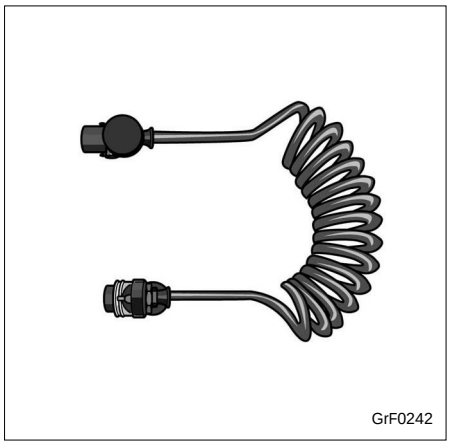


VF00075/247 EN

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

4.2 EBS Connection Cable (Spiral)


GrF0242

Function

The EBS Connection Cable is used to provide the power supply to ISO 7638 between the towing vehicle and semi-trailer.

On EBS vehicles, the CAN-Signal is transmitted via pin 6 and 7 of this cable.

Technical details

Operating Temperature Range: -40 °C to +80 °C

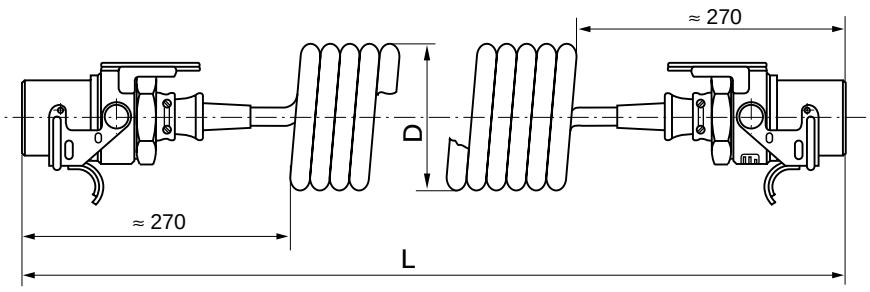
Options

Type No.	Part No.	Trailer type	D [mm]
EK3150	K004098	Semi-trailer	55

Type No.	L [m]	Comment
EK3150	Approx. 1 to 4	Approx. 25 coils

Dimensions

EK3150



VF00075/66 ÄI01

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

4.3 Trailer Information Module (TIM) (EZ1035 – II39810F)

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:

- Pad Wear
- Mileaqe
- Frequency of RSP activity
- Axle Load

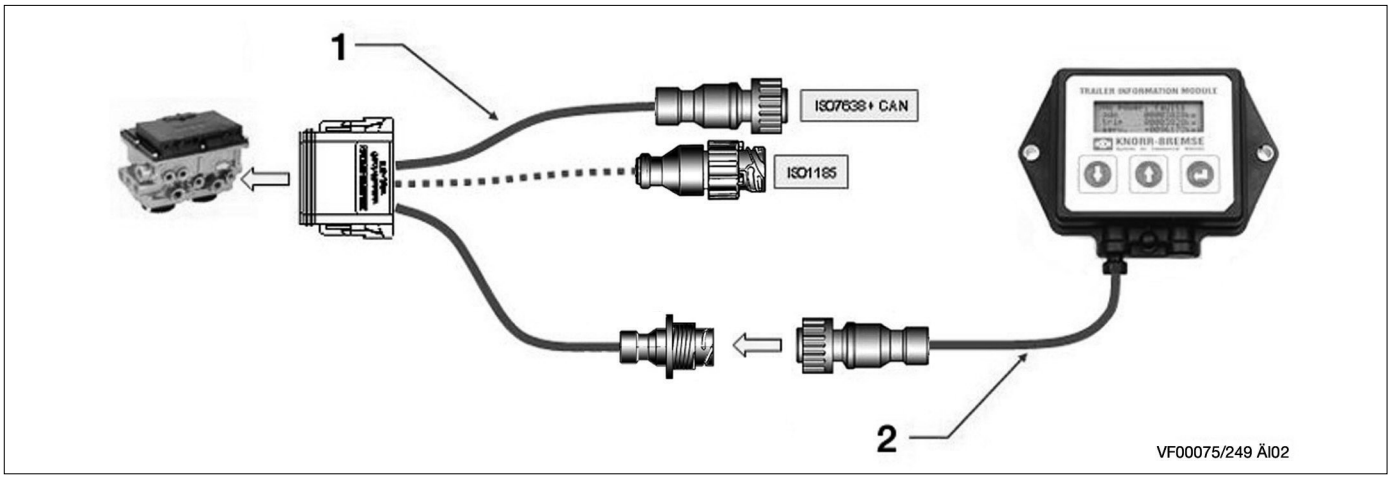
Note:
As with Magic Eye, when using a TIM, no Input C or Output AUX 4 / Output AUX 5 functionality is possible via the X-connector as an external diagnostic connection is required.

Technical features

Operating temperature range:	-20 °C to +70 °C
Approx. weight:	0,4 kg
Nominal voltage:	24V DC

Options

Pos.	Name	Type No.	Part No.	Remarks
1	Connection cable	EK3107[1)]	K007525	ISO 7638 + CAN and ISO 1185
		EK3109[1)]	II40394F	ISO 7638 + CAN
2	TIM	EZ1035	II39810F	Cable length = 1m



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

Menu Structure

Initial Menu:

Fault Status
Odo (km)
Trip (km)
Service (km)
Pad Depth (%) *
Main Menu
.....
TIM Information

Main Menu:

Fault Information
Distance Information
System Information
TEBS Information
TEBS Configuration

EXIT

TIM Information
Production Data
Test LCD
Test Keypad
EXIT

Fault Information
Active Faults
Stored Faults
Clear Faults
EXIT

Distance Information
Distance (km)
Trip (km)
Service (km)
Reset Trip
Set Next Service
EXIT

System Information
Wheel Sensor Info
Pressure Info
Voltage Info
Pad Depth*
Load Information***
RSP Info**
EXIT

TEBS Information
Software Ver. Main
Software Ver. Sub
Serial Number
Part Number
Production Week
EXIT

TEBS Configuration
LSF Configuration
ABS Configuration
AUX Configuration
EXIT

Wheel Speed Information
SAL (km/h)
SAR (km/h)
SL (km/h)
SR (km/h)
EXIT

Pressure Information
P Demand
P ASPR
P Left
P Right
P System
CAN P Dem.
EXIT

Voltage Information
7638-pin 1 (V)
7638-pin 2 (V)
EXIT

Pad Depth Information
*
Pad-Depth-A
Pad-Depth-B
EXIT

Load Information
***
Axle (kg)
Bogie (kg)
EXIT

RSP Information
**
Test Pulses
Step 1
Step 2
EXIT

Production Data
Part No.
Prod. Day
Prod. Year
Software Version
Sub Software Version
EXIT

The marked functions are only available with the following TEBS software:

* 510
** 512
*** 520

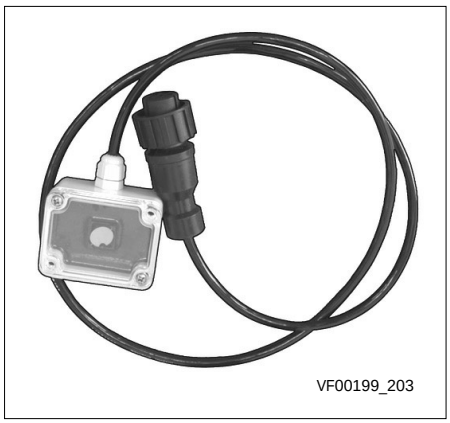
LSF Config.
Onset Pm
Inshot P
ASPR min
ASPR max
Pdel Min
Pdel Max
MP Comp
EXIT

ABS Config.
ABS Config.
Tone Ring Size
Tyre Size
EXIT

AUX Config.
AUX1 Conf.
AUX2 Conf.
AUX3 Conf.
IP (A) Conf.
IP (B) Conf.
RSP Enabled
EXIT

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

4.4 Magic Eye (EZ1028 – II40396F)


VF00199_203

Function

The Magic Eye is an external trailer mounted display that is connected to the diagnostic output of the X1 connector of the TEBS.
Under normal operation when no fault is present the display is black. Depending on configuration, should a fault condition be present or a given status be realised, the TEBS transmits a signal to the Magic Eye which results in the display changing from black to red. The red display will remain as long as the condition that generated the signal is present even though the trailer may be disconnected from a towing vehicle. Once a given fault or status has been rectified the Magic Eye when next powered will automatically return to the black display.

The Magic Eye can be programmed via the PC diagnostics to provide a warning for any one or more of the following conditions:

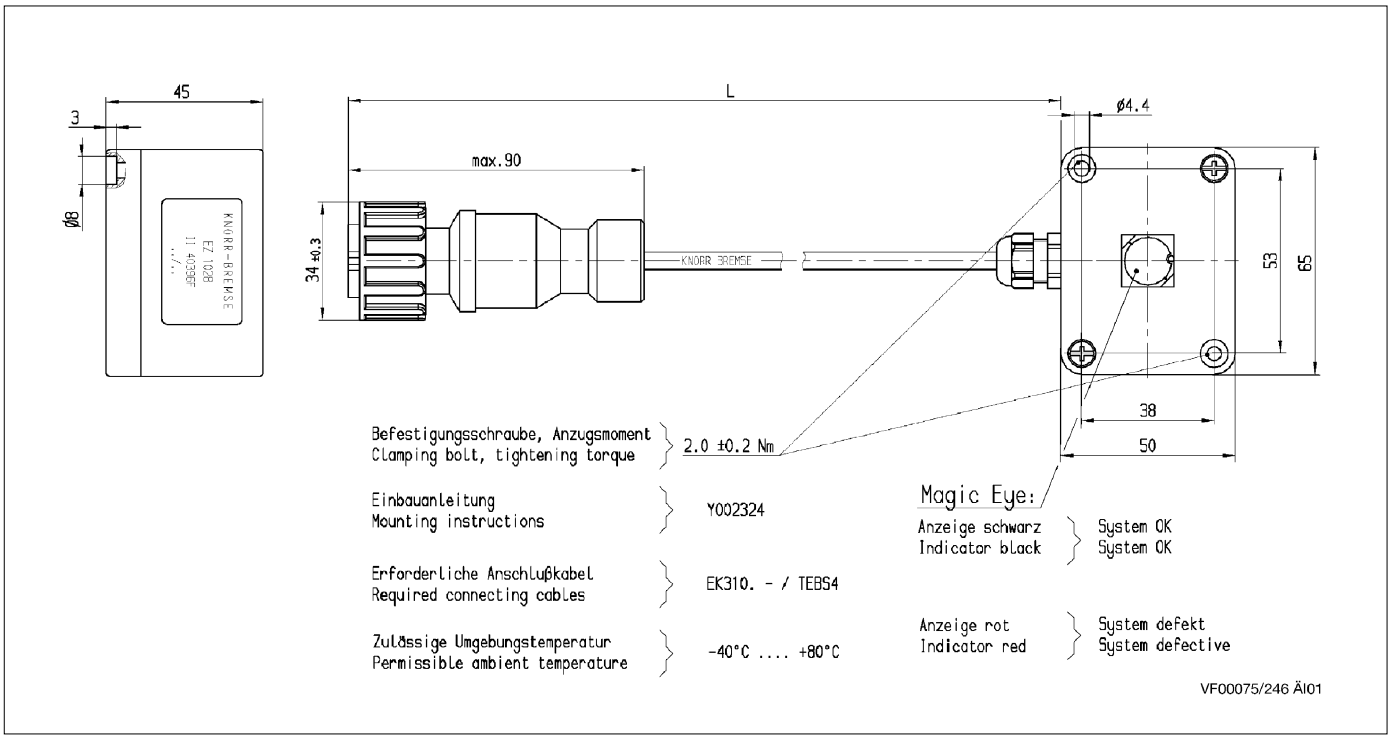
- Braking system fault
- Auxiliary function fault
- Pad Wear Limit reached
- Service interval exceeded
- ADL application

Note:
As with TIM, when using a Magic Eye, no Input C or Output AUX4 / Output AUX5 functionality is possible via the X1-connector as an external diagnostic connection is required.

Technical Features

Operating temperature range:	-40 °C to +80 °C
Approx. weight:	0,2 kg
Nominal voltage:	24V DC

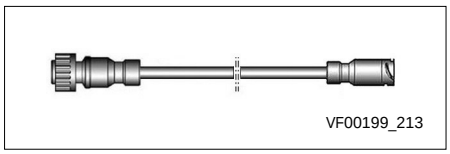
Dimensions



Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

4.5 Diagnostic Extension Cable


VF00199_213

Function

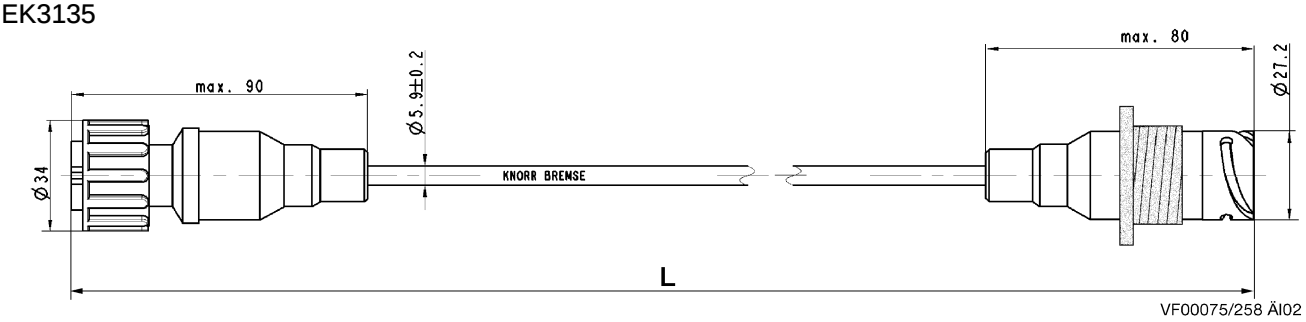
If the Trailer Information Module - TIM (EZ1035) or Magic Eye (EZ1028) is mounted on the front bulkhead, this extension cable is required.

Options

Type No.	Part No.	Cable Length "L" [m]
EK3135[1)]	K002301	10,0

Dimensions

EK3135



VF00075/258 ÄI02

[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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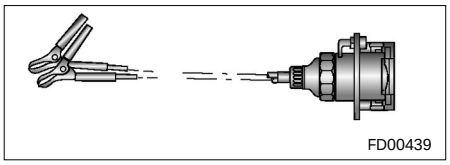
Section No.: K002483-002
Doc. No.: Y011366-EN-002

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

4.6 Extension Cable for Batteries for Diagnosis


FD00439

Function

If there is no towing vehicle, during PC diagnosis the trailer can be supplied with power via a 24V battery by using the cable I93436.

On drawbar and centre axle trailers it can be directly connected with the ABS or EBS power supply cable, on semi-trailers an additional spiral cable (EK3150, see page 33.1) must be used.

The red LED integrated in the connector of the cable is controlled by pin 5 and consequently simulates the trailer ABS warning light of the towing vehicle.

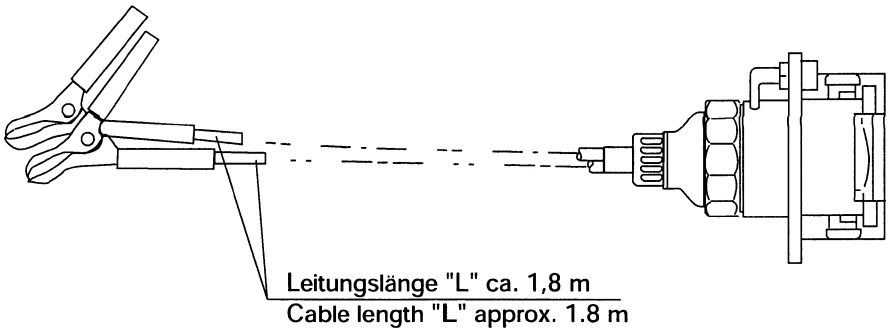
Technical Features

Approximate Weight: Approx. 0,5 kg
Nominal voltage: 24V DC

Options

Type No.	Part Nr.	Cable Length "L" [m]
–	I93436	1,8

Dimensions

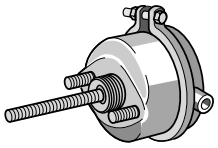


FD00438

Section No.: K002483-002
Doc. No.: Y011366-EN-002
Catalogue No.: K001561-EN

Function

This range of Brake Chambers is used on axles fitted with drum brakes. The single diaphragm cylinder provides the service (and secondary) brake function.

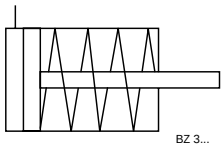


GrF 0280

Technical features

Maximum operating pressure	8,5 bar
Operating temperature range	-40 °C to +80 °C
Push rod stroke	75mm
Surface treatment	Powder coated
Medium	Compressed air
Approx. weight	See table

Standard Symbol as DIN ISO 1219



Ptoduct overview

Type No.	Part No.	Type [sq in]	Connection (c)entre, (s)ide	Approx. Weight (kg)
BZ3261	II39908FA	12	c, s M16X1,5 (2X)	2,1
BZ3370	II33198A	16	c, s M16X1,5 (2X)	2,7
BX3417	II33479A	20	c, s M16X1,5 (2X)	3,2
BX3534	II33441A	24	c, s M16X1,5 (2X)	3,5
BX3605	II33445A	30	c, s M16X1,5 (2X)	4,3
BZ3263	II40324FA	12	c, s M16X1,5 (2X)	2,1
BX3416	II33458A	20	c, s M16X1,5 (2X)	3,2
BX3535	II33442A	24	c, s M16X1,5 (2X)	3,5
BX3604	II33444A	30	c, s M16X1,5 (2X)	4,3

Type No.	Part No.		Comments	
	Round Hole Clevis	Long Hole Clevis		
BZ3261	SEB01321	SEB01322	With Sealing Washer	Characteristics to DIN 74060
BZ3370	SEB01321	SEB01322	With Sealing Washer	
BX3417	SEB01315	SEB01316	With Sealing Washer	
BX3534	SEB01315	SEB01316	With Sealing Washer	
BX3605	SEB01315	SEB01316	With Sealing Washer	
BZ3263	SEB01321	SEB01322	With Rubber Boot	
BX3416	SEB01315	SEB01316	With Rubber Boot	
BX3535	SEB01315	SEB01316	With Rubber Boot	
BX3604	SEB01315	SEB01316	With Rubber Boot	

Further versions are available.

Section No.: K002484-002
Doc. No.: Y011367-EN-002

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

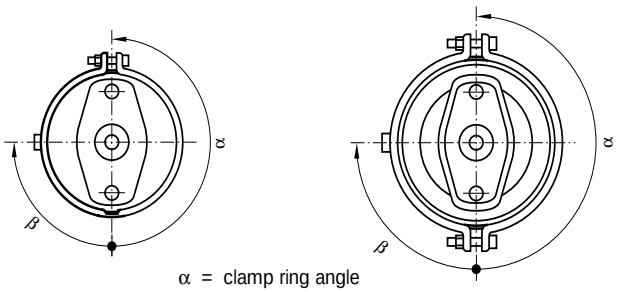
Mounting position

Design: I

Type 12"-24"
Type with single piece clamp ring

Design: II

Type 30"
Type with two piece clamp ring

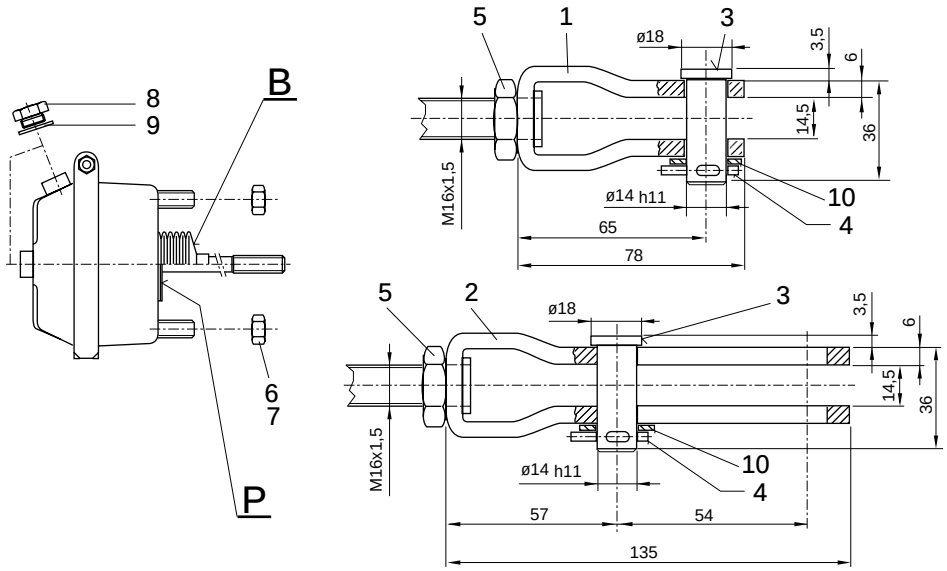


α = clamp ring angle
β = air port angle

VF 00075/37 EN

Type No.	Type [sq in]	Angle Clamp Ring α	Angle Air Port β	Design	Remark
BZ3261	12	135°	0°	I	With Plate and Sealing Washer "P" (see sketch below)
BZ3370	16			I	
BX3417	20			I	
BX3534	24			I	
BX3605	30			II	
BZ3263	12	135°	0°	I	With Rubber Boot "B" (see sketch below)
BX3416	20			I	
BX3535	24			I	
BX3604	30			II	

Installation kit for BX3..., BZ3...



Legend:

1 Clevis, round hole
2 Clevis long hole
3 Bolt
4 Split pin
5 Plain nut
6 Plain nut M12[1)]
7 Plain nut M16
8 Screw plug
9 Sealing ring
10 Washer

B Rubber Boot
P Plate and Sealing Washer

VF00075/38 EN ÄI01

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 corresponding TÜV report.

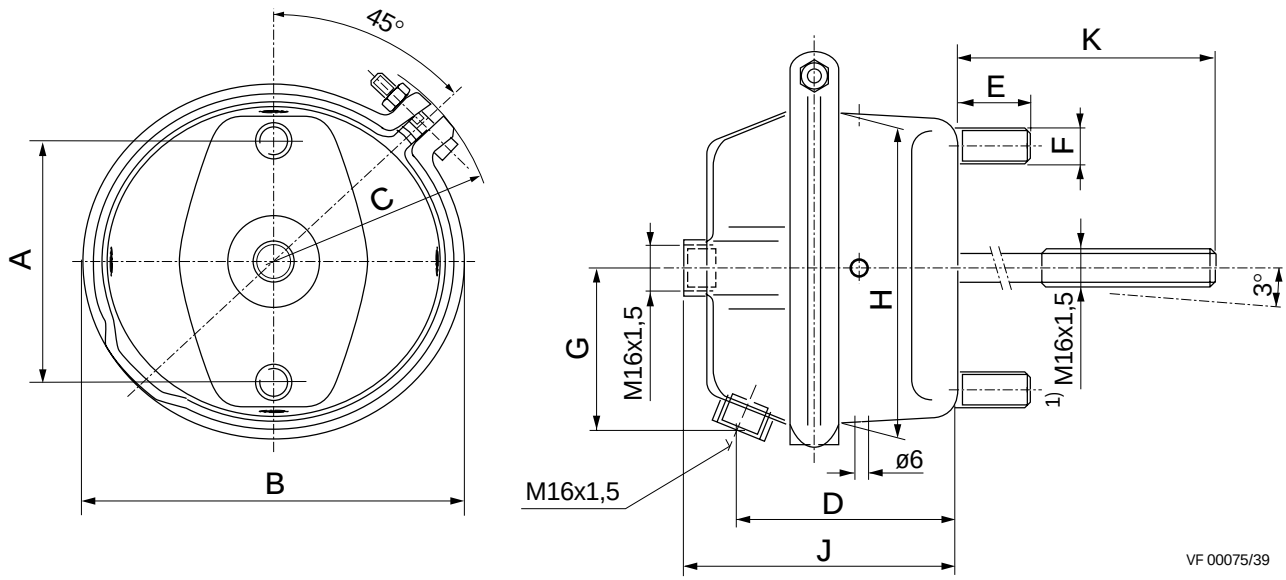
TÜV Inspection Report	Type	Th_A [kN] at 6,5 bar	S_p [mm] at 6,5 bar	V [l]
361-0024-04-FBKV	12"	4,64	68,00	0,5
361-0024-04-FBKV	16"	6,92	68,88	0,75
361-0024-04-FBKV	20"	8,11	66,88	0,85
361-0024-04-FBKV	24"	9,30	71,00	0,93
361-0024-04-FBKV	30"	12,60	74,50	1,3

[1)] for Typ 12" and 16"

Section No.: K002484-002
Doc. No.: Y011367-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions



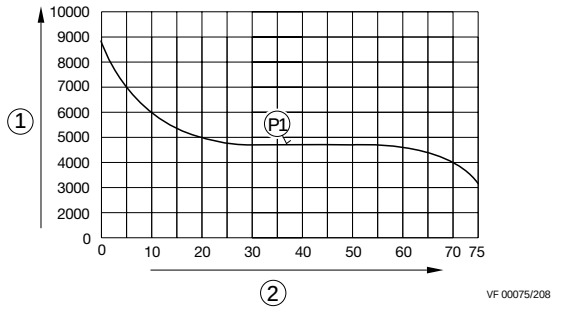
Type No.	Typ [sq in]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	J [mm]	K [mm]
BZ3261	12	76,2	145	92	95	37	M12x1,75	65	121	127	190
BZ3263	12	76,2	145	92	95	37	M12x1,75	65	121	127	190
BZ3370	16	76,2	167	101	99	38	M12x1,75	76	141	132,5	190
BX3416	20	120,7	175	105	100	43,2	M16x1,5	82	149	132,5	190
BX3417	20	120,7	175	105	100	43,2	M16x1,5	82	149	132,5	190
BX3534	24	120,7	188	111	100	43,2	M16x1,5	90	161	133,0	190
BX3535	24	120,7	188	111	100	43,2	M16x1,5	90	161	133,0	190
BX3604	30	120,7	209	121	106	42,7	M16x1,5	99	184	139,5	190
BX3605	30	120,7	209	121	106	42,7	M16x1,5	99	184	139,5	190

Section No.: K002484-002
Doc. No.: Y011367-EN-002

Catalogue No.: K001561-EN

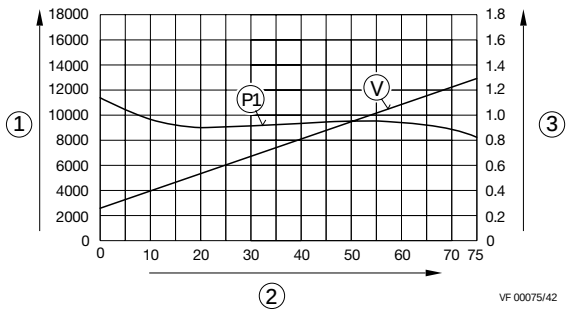
Performance Chart

Typ 12"



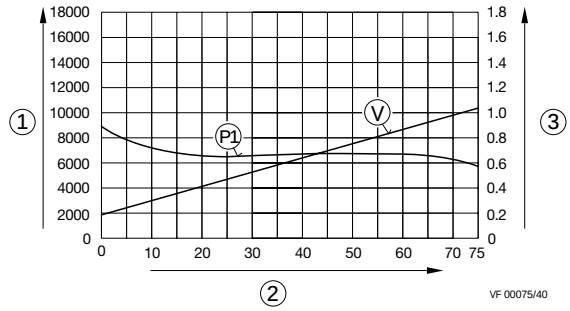
VF 00075/208

Typ 24"



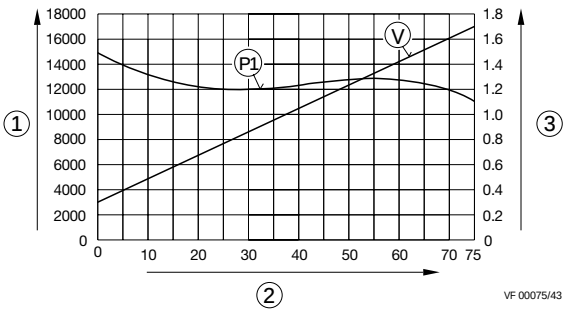
VF 00075/42

Typ 16"



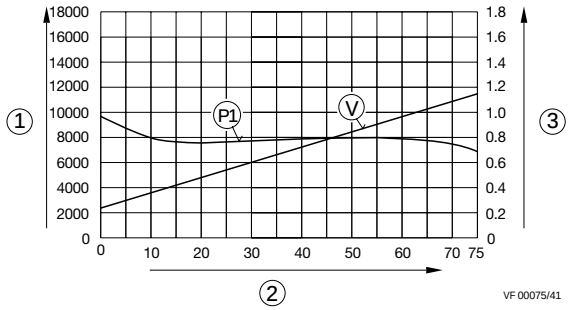
VF 00075/40

Typ 30"



VF 00075/43

Typ 20"



VF 00075/41

(1) = Output force [N]
(2) = Stroke [mm]
(3) = Volume [l]
(P1) = Nominal Output at 6,5bar
(V) = Nominal Volume

VF 00075/44 EN

Section No.: K002484-002
Doc. No.: Y011367-EN-002

Catalogue No.: K001561-EN

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 final coated
- 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 Clevis to insert the Clevis 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, use only self locking nuts without washers of any kind.
- General requirements of mechanical engineering concerning stepwise 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 Brake Chamber, axle or trailer manufacturer.

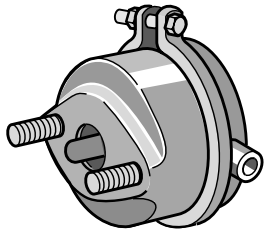
Section No.: K002484-002
Doc. No.: Y011367-EN-002

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function

This range of Brake Chambers is used on axles fitted with air disc brakes and provides the service (and secondary) brake functions. The chambers have a mounting seal integrated in the non-pressure housing which prevents the entry of dirt or water into the caliper.

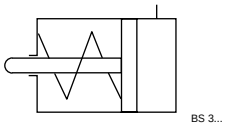


GrF 0340

Technical Features

Maximum operating pressure	10bar
Operating temperature range	-40 °C to +80 °C
Push rod stroke	57mm
Sealing of non-pressure housing	Rubber Boot
Pivoting angle of Piston Rod in all directions	4°
Approx. Weight	See table

Standard symbol as DIN ISO 1219



BS 3...

Product overview

Type No.	Part No.	Type [sq in]	TÜV-Inspection Report	Approx. Weight [kg]
BS3251	II31782	14	353-432-97FBTN	3,1
BS3300	II14535	16	BZ.102.0	3,1
BS3315	II37140	16	BZ.103.0	3,1
BS3350	II15229	18	353-434-97FBTN	3,1
BS3404	II31098	20	356-308-94FBTN	3,2
BS3453	II31099	22	356-309-94FBTN	3,4
BS3509	II30618	24	356-310-94FBTN	3,5
BS3551	II31100	27	356-311-94FBTN	4,5
BS3601	II31101	30	356-312-94FBTN	4,7

Further versions are available.

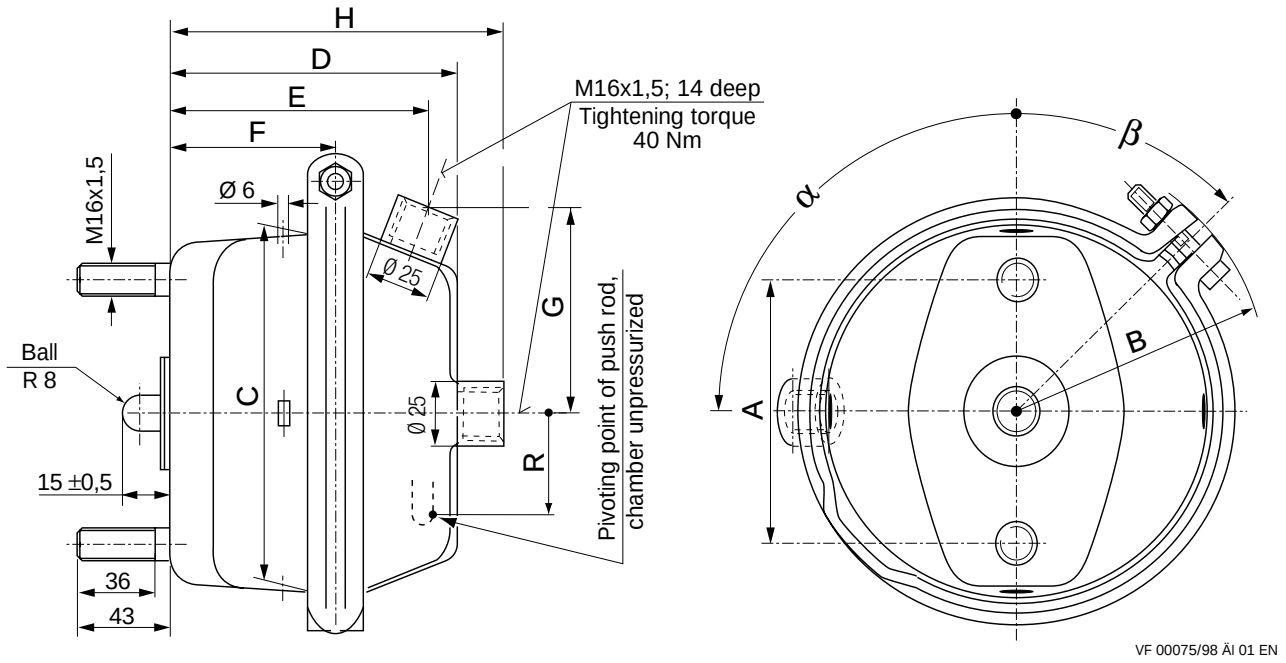
Actuator Mounting Kit available comprising 2 off self-locking nuts:
Part Number II36860.

Section No.: K002485-001
Doc. No.: Y011368-EN-001

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions



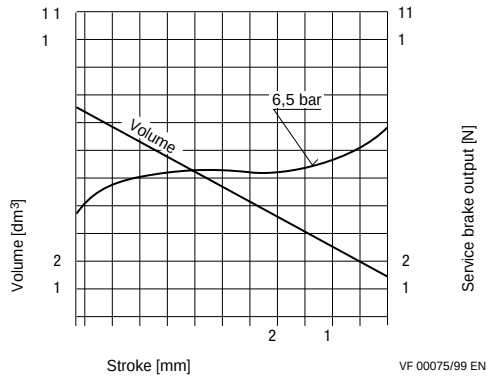
Type No.	Type [sq in]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	R [mm]	α [°]	β [°]
BS3251	14	120,7	101	144	104	97,5	66	76	-	42	90	45
BS3300	16	120,7	106	144	104	93,5	66	83	-	47	90	45
BS3315	16	120,7	106	144	104	-	66	-	122,5	45	-	90
BS3350	18	120,7	106	144	104	93,5	66	83	-	50	90	45
BS3404	20	120,7	111	145	104	98	66	81	-	52	90	45
BS3453	22	120,7	111	145	104	94,5	66	85,9	-	52	90	45
BS3509	24	120,7	117	155	113	97,5	66	91	-	57,5	90	45
BS3551	27	120,7	123	185,5	115	97,5	67	98	-	58	0	45
BS3601	30	120,7	123	185,5	115	97,5	67	98	-	65	90	45

Section No.: K002485-001
Doc. No.: Y011368-EN-001

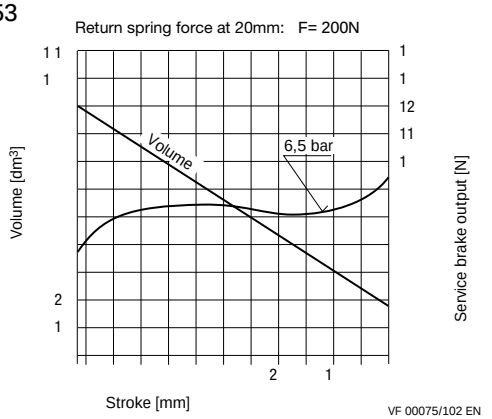
Catalogue No.: K001561-EN

Performance Charts

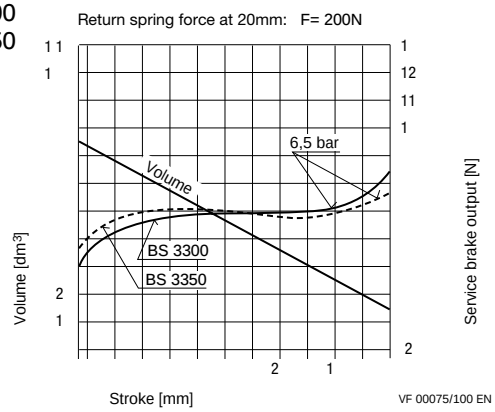
BS3251



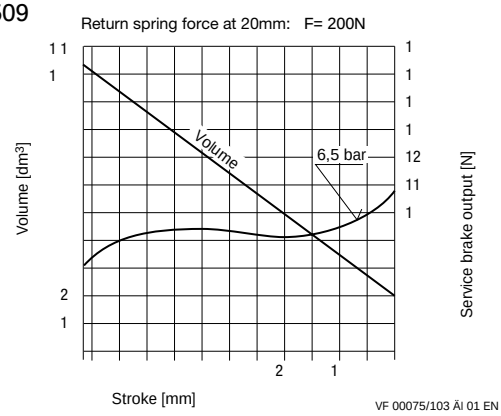
BS3453



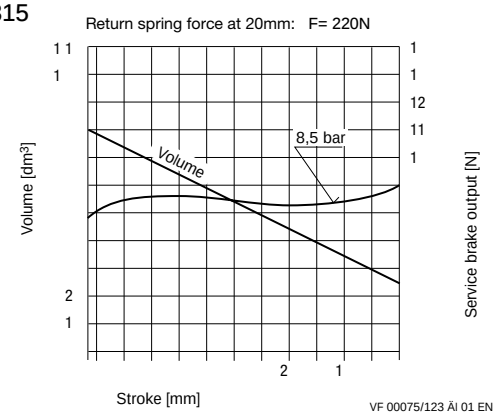
BS3300 BS3350



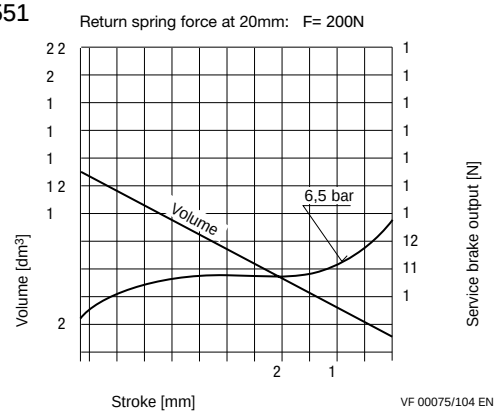
BS3509



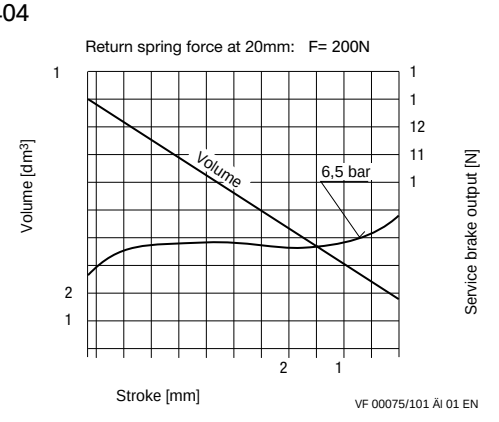
BS3315



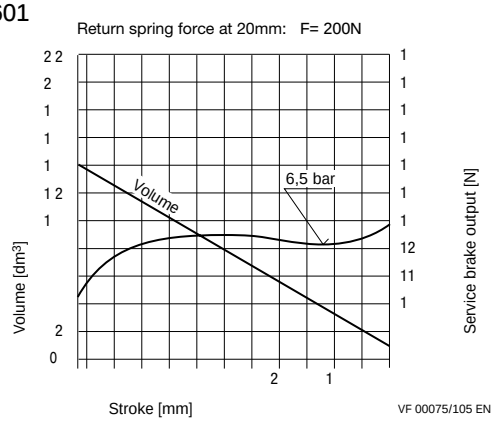
BS3551



BS3404



BS3601



Section No.: K002485-001
Doc. No.: Y011368-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

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).

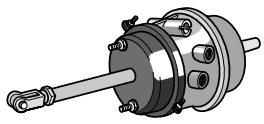
Section No.: K002485-001
Doc. No.: Y011368-EN-001

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

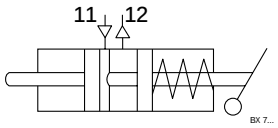
Function

This range of Spring Brake Actuators is used on axles fitted with drum brakes to provide the service (and secondary) and parking brake functions.
The internal wind off mechanism allows the parking brake force to be removed if air pressure is no longer present.



GrF 0343

Standard symbol as DIN ISO 1219



Technical Features

Maximum operating pressure	8,5bar
Operating temperature range	-40°C to +80°C
Medium	Compressed air
Approx. Weight	See table

Product overview

Type No.	Size Service Brake [sq in]	Size Parking Brake [sq in]	Stroke [mm]	A [mm]	B [mm]	Approx. Weight [kg]
BX7401	20	24	57	218	150	7,7
BX7402	20	24	57	218	150	7,7
BX7408	20	30	76	264	161	9,1
BX7409	20	30	76	264	161	9,1
BX7514	24	30	64	230	161	8,9
BX7515	24	30	76	264	161	9,4
BX7516	24	24	64	230	137	8,1
BX7518	24	30	64	230	161	8,9
BX7523	24	30	76	264	161	9,1
BX7525	24	30	76	264	161	9,1
BX7611	30	30	64	232	161	9,3
BX7612	30	30	64	232	161	9,3

Type No.	C [mm]	D [mm]	E [mm]	a [º]
BX7401	227	285	86	90
BX7402	227	227	86	90
BX7408	235	227	93	135
BX7409	235	227	93	45
BX7514	235	250	93	90
BX7515	235	272	93	135
BX7516	237	280	86	90
BX7518	235	227	93	90
BX7523	235	250	93	135
BX7525	235	227	93	135
BX7611	260	280	93	90
BX7612	260	227	93	90

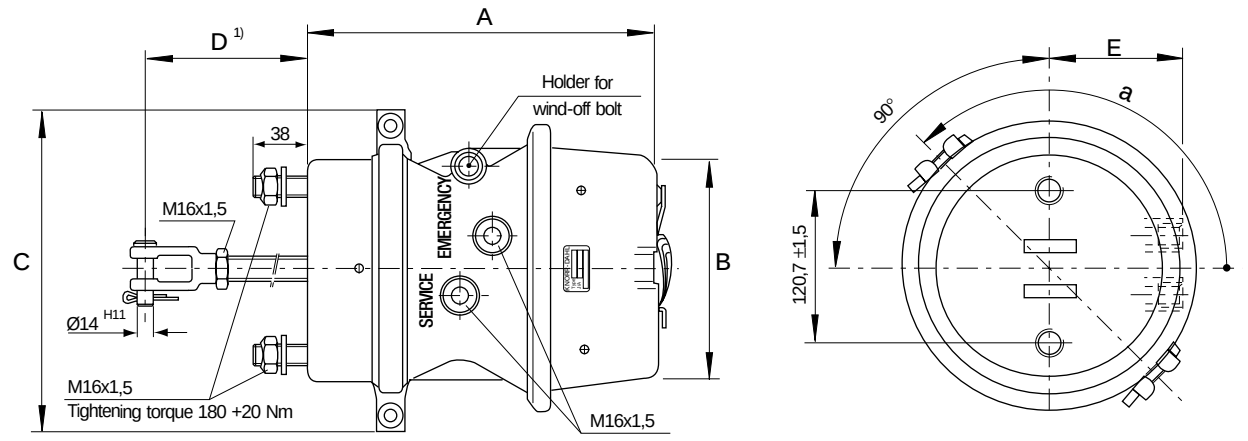
Further versions are available.

Section No.: K002486-001
Doc. No.: Y011369-EN-001

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions



1) Condition as delivered or driving condition

VF 00075/45 EN

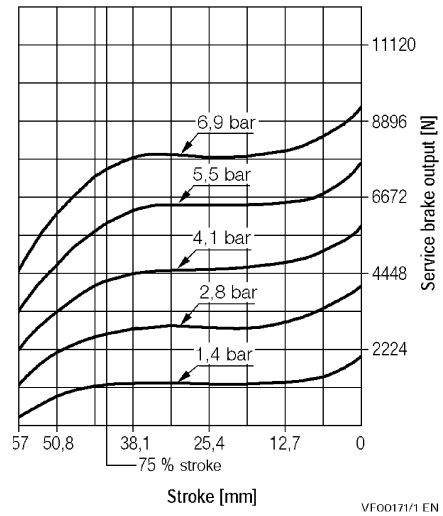
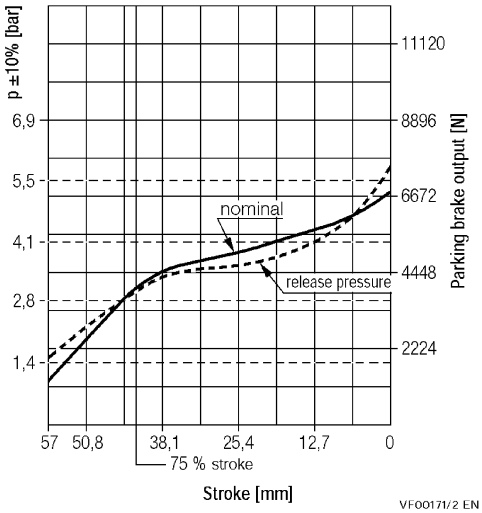
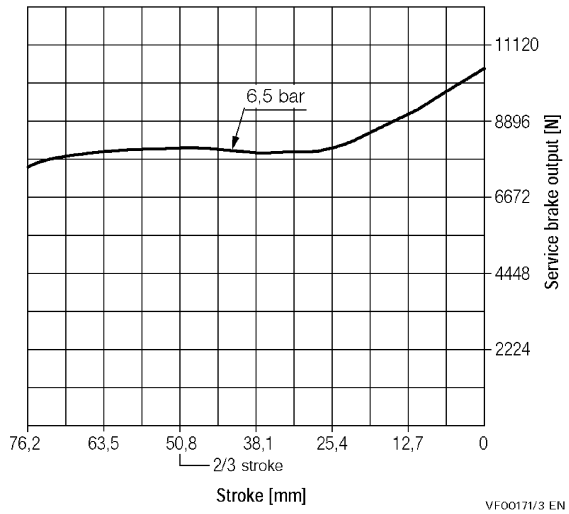
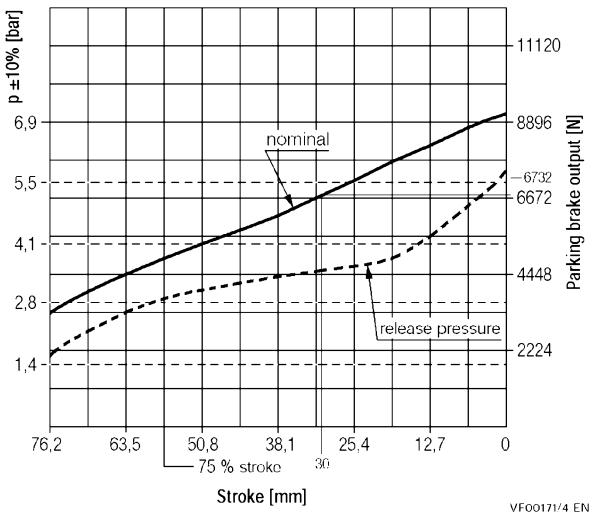
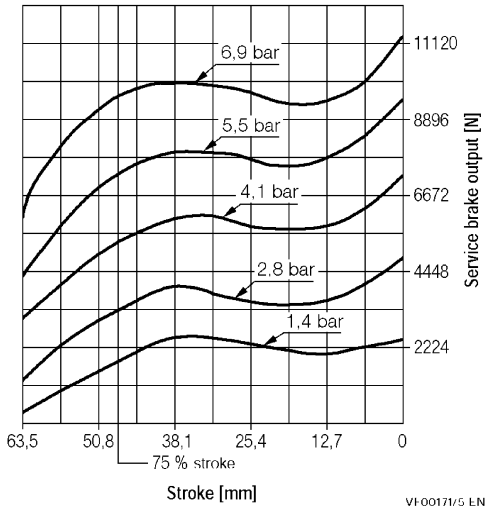
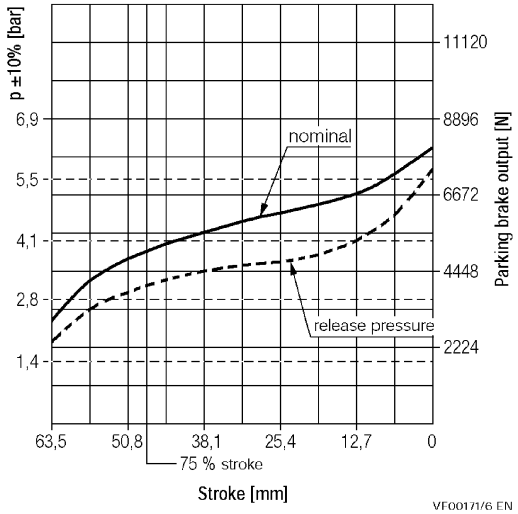
Type No.	Size Service Brake [sq in]	Size Parking Brake [sq in]	Stroke [mm]	TÜV-Inspection Report
BX7401	20	24	57	356-391-94 FBTN
BX7402	20	24	57	356-391-94 FBTN
BX7408	20	30	76	KO 200.0 / KO 200.1
BX7409	20	30	76	KO 200.0 / KO 200.1
BX7514	24	30	64	356-61-95 FBTN
BX7515	24	30	76	356-393-94 FBTN
BX7516	24	24	64	356-392-94 FBTN
BX7518	24	30	64	356-61-95 FBTN
BX7523	24	30	76	KO 199.0 / KO 199.1
BX7525	24	30	76	KO 199.0 / KO 199.1
BX7611	30	30	64	356-394-94 FBTN
BX7612	30	30	64	356-394-94 FBTN

Type No.	ThA at 6,5 bar [N]	S_p at 6,5 bar [mm]	Parking Brake Output at 30 mm Stroke [N]
BX7401	7535	46,8	5400
BX7402	7535	46,8	5400
BX7408	8045	75,7	6732
BX7409	8045	75,7	6732
BX7514	9498	52,2	5800
BX7515	8858	78,0	6732
BX7516	9412	52,8	5400
BX7518	9498	52,2	5800
BX7523	8858	52,2	6732
BX7525	8858	52,2	6732
BX7611	11728	55,4	5700
BX7612	11728	55,4	5700

Section No.: K002486-001
Doc. No.: Y011369-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

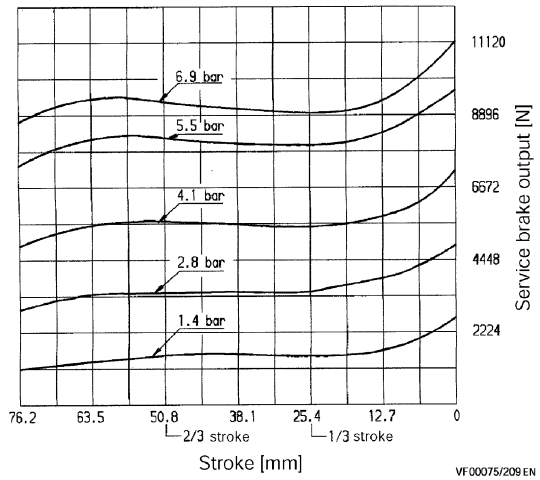
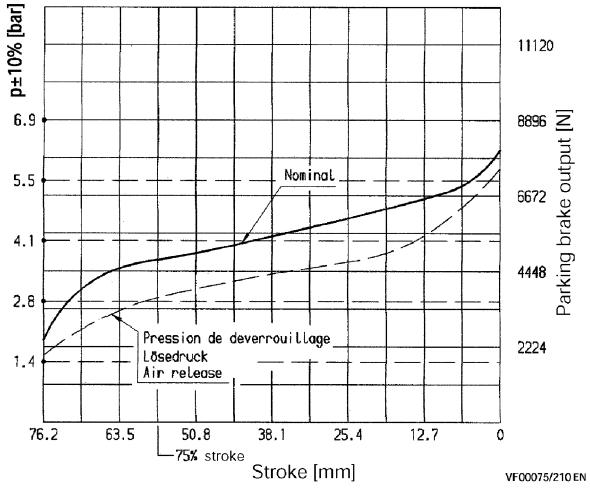
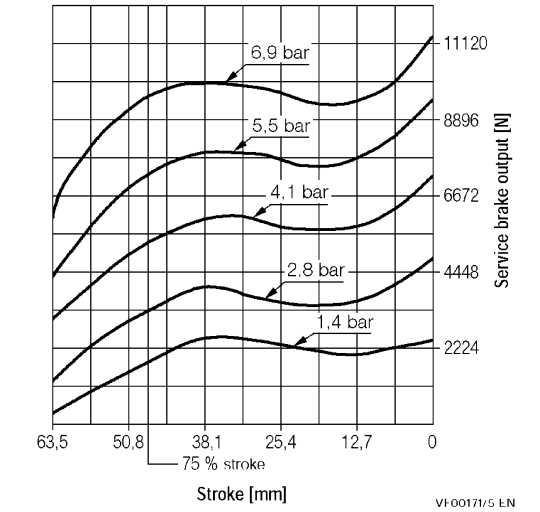
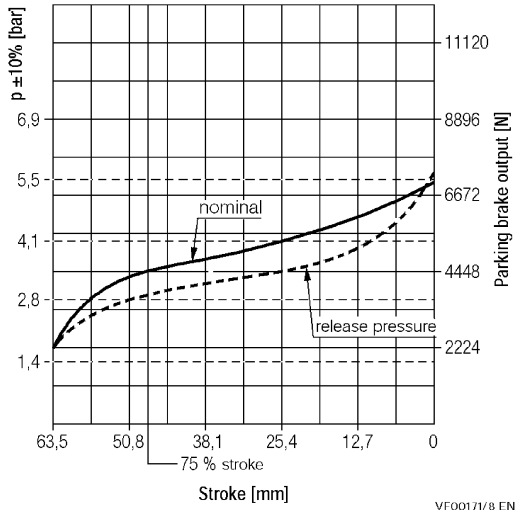
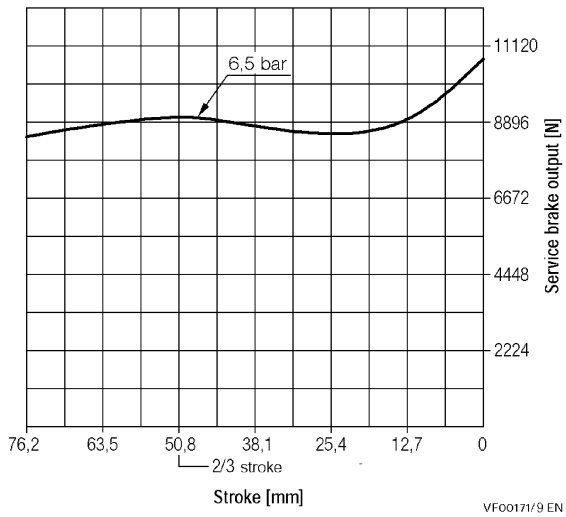
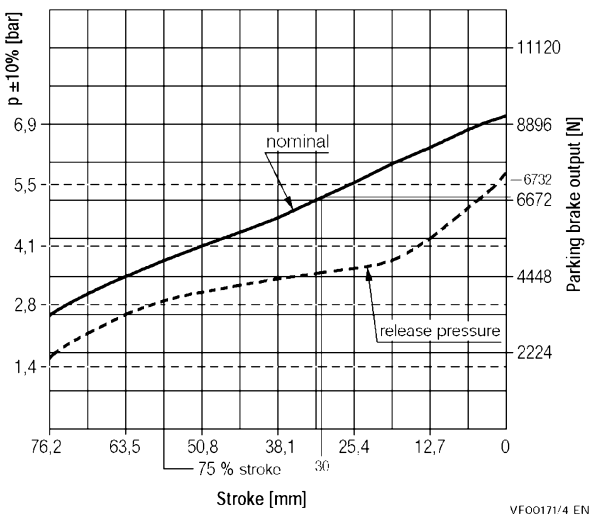
Performance Charts

Service Brake		Parking Brake
	BX7401 BX7402	
	BX7408 BX7409	
	BX7514 BX7518	

Section No.: K002486-001
Doc. No.: Y011369-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

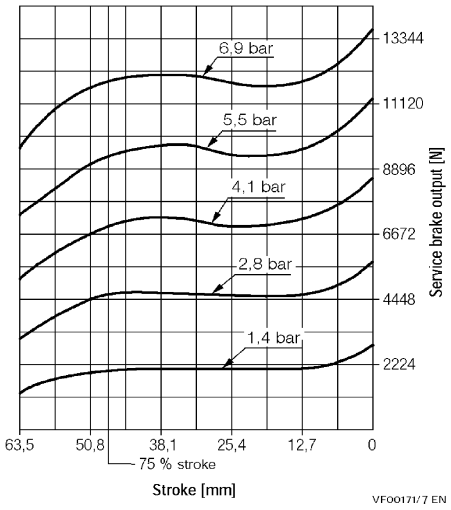
Performance Charts - *continued* -

Service Brake		Parking Brake
	BX7515	
	BX7516	
	BX7523 BX7525	

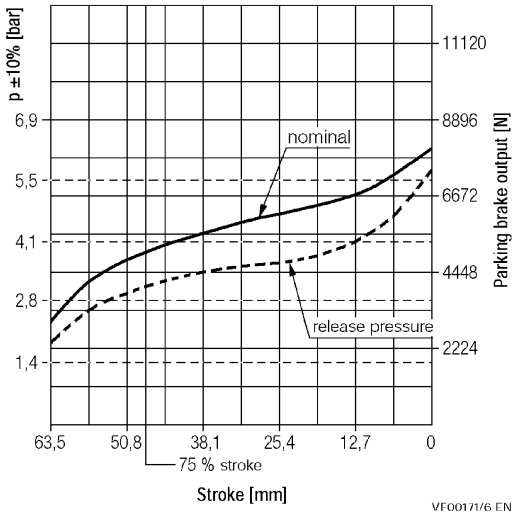
Performance Charts - *continued* -

BX7611
BX7612

Service Brake



Parking Brake



Section No.: K002486-001
Doc. No.: Y011369-EN-001

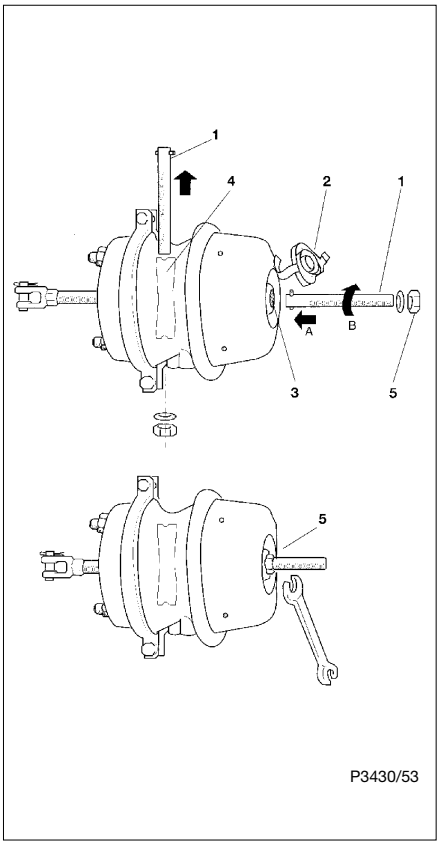
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

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 0,1mm), 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 Clevis to insert the Clevis 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+20Nm
- For further information please contact the Spring Brake, axle or trailer manufacturer.



Winding-off the Power Spring

In case of failure in the air system, to release the actuator's spring force:

- Ensure wheels are chocked.
- Remove Wind-off Bolt (1) from its holder (4).
- Unclip closure cap (2).
- Fully insert "T" drive end of Wind-off Bolt into actuator end (3) and engage with internal slot.
- Fit washer and nut (5).
- Rotate the nut (A/F 3/4") in a clockwise direction.

Attention: Use only the correct sized ring or open-ended spanner!

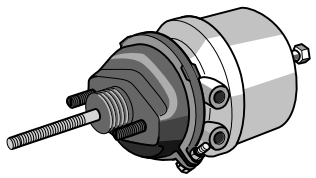
Attention: The Spring Brake contains very high spring loads and it is strongly recommended that you do not undertake any disassembly work. If this is to be undertaken, use only the correct tools.

Section No.: K002486-001
Doc. No.: Y011369-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

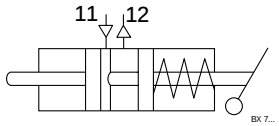
Function

This range of Spring Brake Actuators is used on axles fitted with drum brakes to provide the service (and secondary) 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 Brake Actuator is supplied with a Clevis Set (Type No. SEB 00536). It consist of a clevis, a lock nut, a bolt, a split pin and two plain nuts.



GrF 0392

Standard symbol as DIN ISO 1219



Technical features

Maximum operating pressure	Port 11; 10bar Port 12; 8,5bar
Maximum release pressure	5,4bar
Operating temperature range	-40 °C to +80 °C
Release device	Mechanical
Approx. Weight	See table

Product overview

Type No.	Size Service Brake [sq in]	Size Parking Brake [sq in]	Stroke [mm]	A [mm]	B [mm]	C [mm]	Approx. Weight [kg]
BZ9317 [1]	16	24	57	240	175	190	7,3
BZ9318 [2]	16	24	57	240	175	190	7,3
BZ9319 [2]	16	24	57	240	175	190	7,3
BZ9442 [1]	20	24	57	240	175	190	8,3
BZ9443 [1]	20	30	57	256	190	206	9,7
BX9502 [1]	24	24	57	240	175	190	8,5
BX9504 [1]	24	30	57	256	190	206	10,5
BX9509 [3]	24	24	64	254	175	190	8,6
BZ9646 [1]	30	30	64	272	190	206	12,0

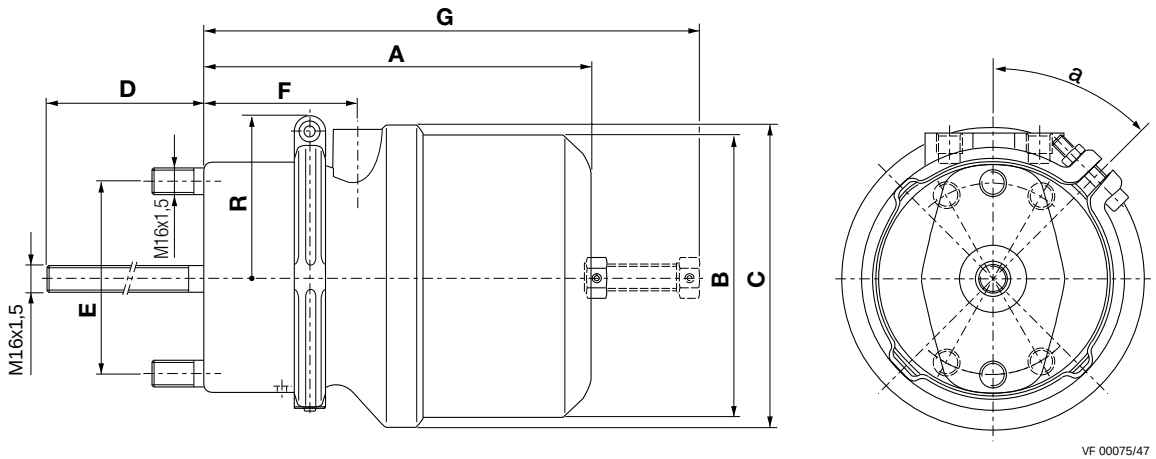
Type No.	D [sq in]	E [sq in]	F [mm]	G [mm]	R [mm]	a [°]
BZ9317 [1]	300	120,7	96	318	103	45
BZ9318 [2]	60	120,7	96	318	103	45
BZ9319 [2]	60	120,7	96	318	103	315
BZ9442 [1]	300	120,7	96	318	108	45
BZ9443 [1]	300	120,7	96	335	108	45
BX9502 [1]	300	120,7	96	318	114	45
BX9504 [1]	300	120,7	96	335	114	45
BX9509 [3]	200	120,7	103	300	114	45
BZ9646 [1]	300	120,7	104	357	123	45

Further versions are available.

[1] without Rubber Boot
[2] with Rubber Boot and Clevis
[3] with Rubber Boot

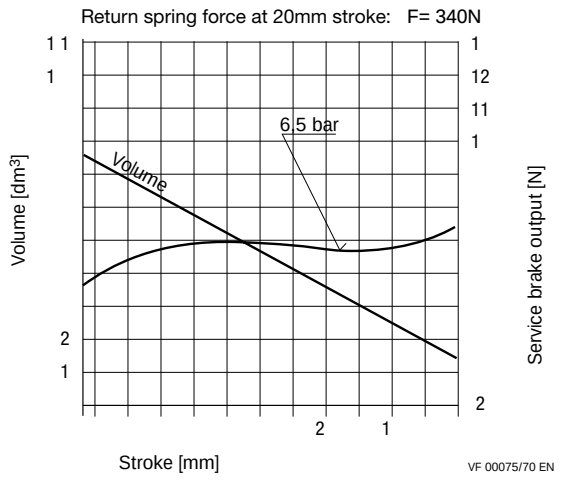
Section No.: K002487-002
Doc. No.: Y011370-EN-002
Catalogue No.: K001561-EN

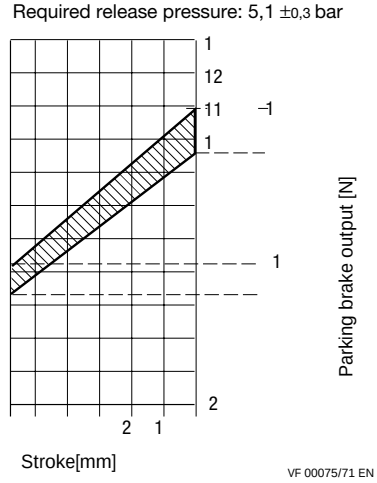
Dimensions



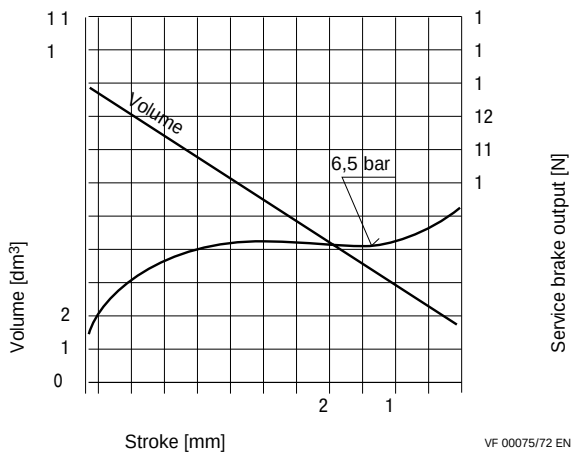
Performance Charts

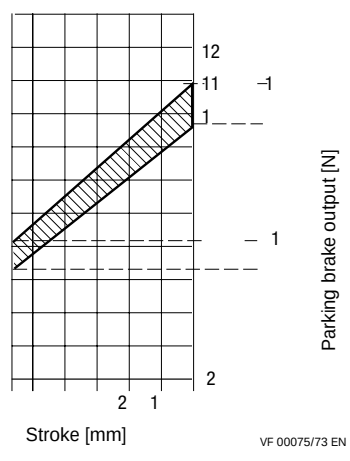
Service Brake		Parking Brake
Return spring force at 20mm stroke: F= 340N	BZ9317 BZ9318 BZ9319	Required release pressure: 5,1 ±0,3 bar





Return spring force at 20mm stroke: F= 340N	BZ9442	Required release pressure: 5,1 ±0,3 bar

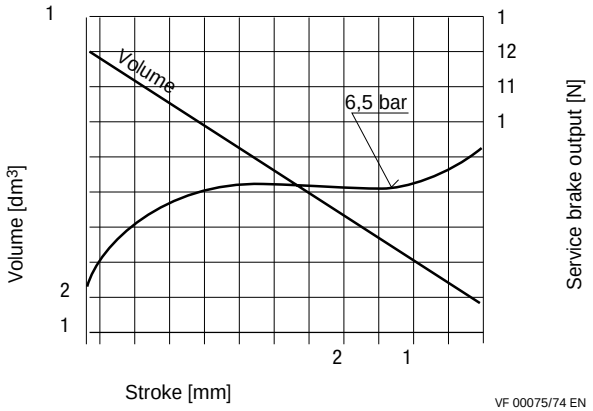
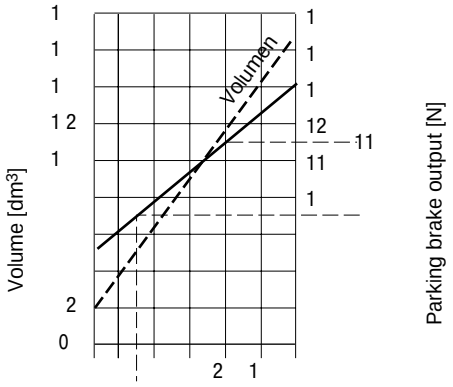
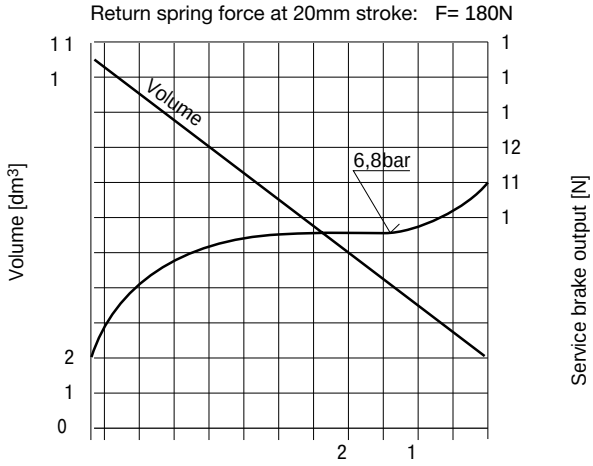
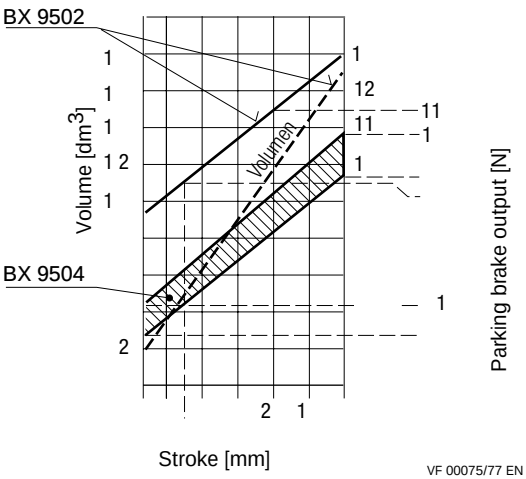
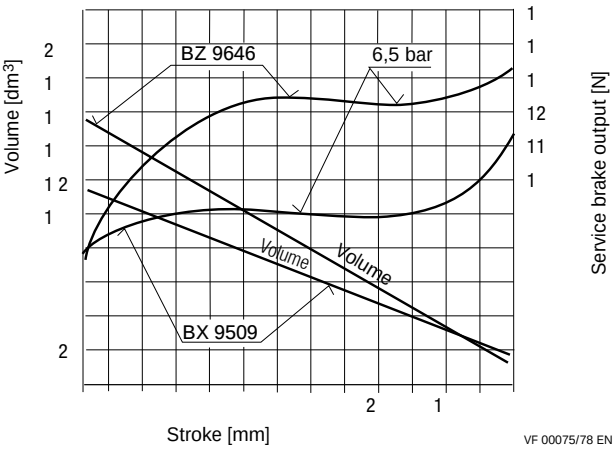
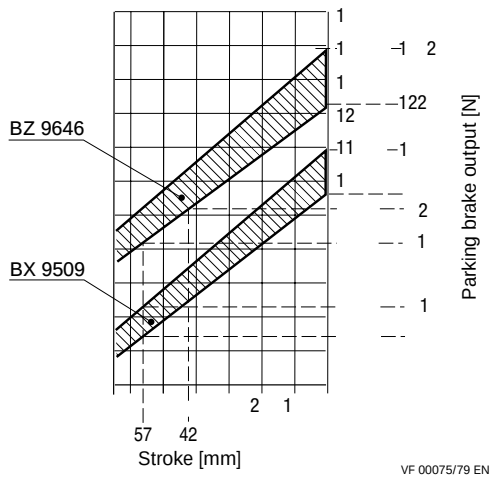




Section No.: K002487-002
Doc. No.: Y011370-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Performance chart - *continued* -

Service Brake		Parking Brake
Return spring force at 20mm stroke: F= 340N	BZ9443	Required release pressure: 5,1 ±0,3 bar
 VF 00075/74 EN		 VF 00075/75 EN
Return spring force at 20mm stroke: F= 180N	BX9502 BX9504	Required release pressure: 5,5 ±0,3 bar
 VF 00075/76 EN		 VF 00075/77 EN
Return spring force at 20mm stroke: F= 300N	BX9509 BZ9646	Required release pressure: 5,1 ±0,3 bar
 VF 00075/78 EN		 VF 00075/79 EN

Section No.: K002487-002
Doc. No.: Y011370-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

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 0,1mm), 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 Clevis to insert the Clevis 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+20Nm
- For further information please contact the Spring Brake, 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 24mm) at the rear of the actuator in an anti-clockwise direction.

Attention: Use only the correct sized ring or open-ended spanner!

Attention: The Spring Brake contains very high spring loads and it is strongly recommended that you do not undertake any disassembly work. If this is to be undertaken, use only the correct tools.

Section No.: K002487-002
Doc. No.: Y011370-EN-002

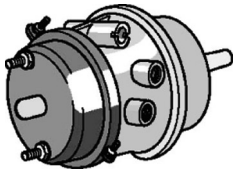
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function

This range of Spring Brakes is used on axles fitted with air disc brakes and provides the service (and secondary) 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.

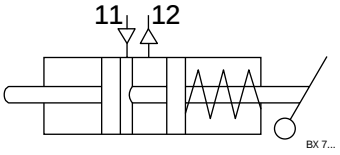


VF 00199_6

Technical Features

Maximum operating pressure	10 bar
Operating temperature range	-40 °C to +80 °C
Sealing of secondary chamber	Rubber Boot
Pivoting angle of piston rod in all directions	4°
Maximum required release pressure	5,5 bar
Release device	Mechanical
Maximum release torque	47 Nm
Approx. weight	See table

Standard symbol as DIN ISO 1219



Product overview

Type No.	Part No.	Type [sq in]	Approx. Weight [kg]	TÜV-Inspection Report
BS7304	II38524F	16/24	6,9	BZ 105.0
BS7305	II38564F	16/24	7,0	BZ 105.0
BS7309	II39355F	16/24	7,0	BZ 114.1
BS7351	II38525F	18/24	7,0	BZ 105.0

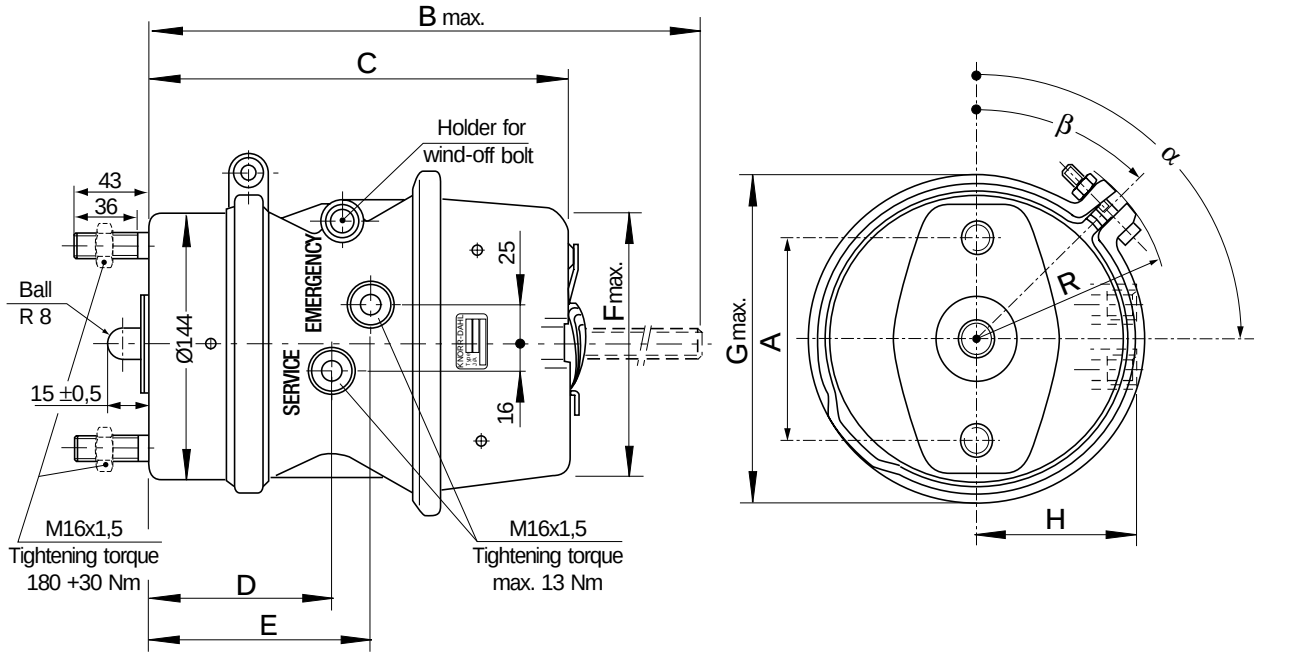
Further versions are available.

Actuator Mounting Kit available comprising 2 off self-locking nuts:
Part Number II36860.

Section No.: K002488-002
Doc. No.: Y011371-EN-002

Catalogue No.: K001561-EN

Dimensions



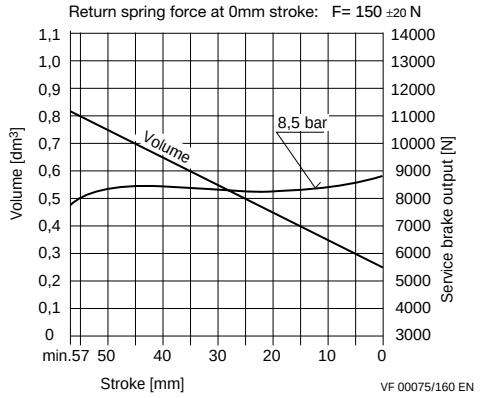
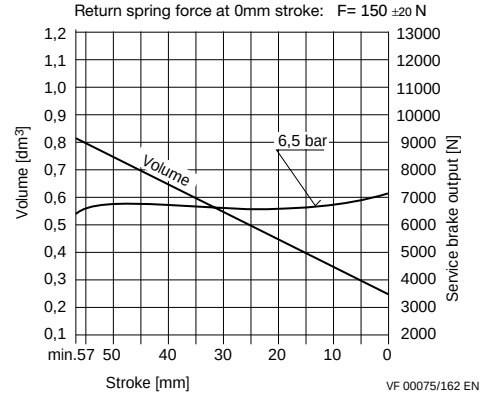
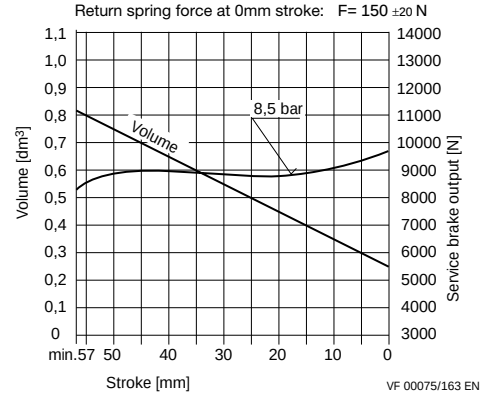
Type No.	Type [sq in]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	R [mm]	α [°]	β [°]
BS7304	16/24	120,7	330	226	95	120	149,4	191,3	86	106	90	270
BS7305	16/24	120,7	330	226	95	120	149,4	191,3	86	106	-90	0
BS7309	16/24	120,7	330	226	95	120	149,4	191,3	86	106	90	270
BS7351	18/24	120,7	330	226	95	120	149,4	191,3	86	106	90	270

Section No.: K002488-002
Doc. No.: Y011371-EN-002

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Performance Charts

Service Brake	Parking Brake
	BS7304 BS7305 Parking brake output stroke 30 mm: 5926N
	BS7309 Parking brake output stroke 30 mm: 5736N
	BS7351 Parking brake output stroke 30 mm: 5736N

Section No.: K002488-002
Doc. No.: Y011371-EN-002

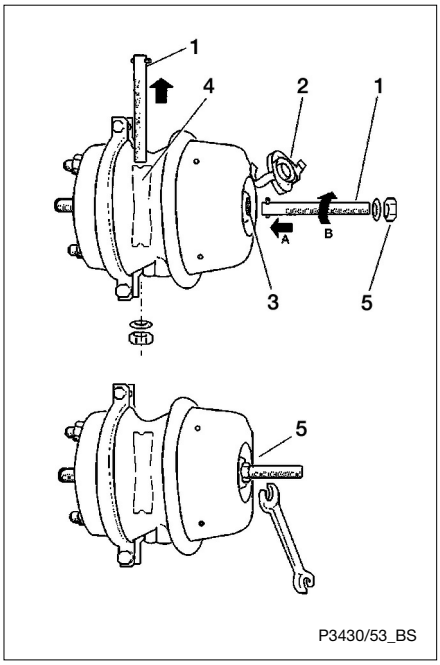
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

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).



Winding-off the Power Spring

In case of failure in the air system, to release the actuator's spring force:

- Ensure wheels are chocked.
- Remove Wind-off Bolt (1) from its holder (4).
- Unclip closure cap (2).
- Fully insert "T" drive end of Wind-off Bolt into actuator end (3) - and engage with internal slot.
- Fit washer and nut (5).
- Rotate the nut (A/F 3/4") in a clockwise direction.

Attention: Use only the correct sized ring or open-ended spanner!

Attention: The Spring Brake contains very high spring loads and it is strongly recommended that you do not undertake any disassembly work. If this is to be undertaken, use only the correct tools.

Section No.: K002488-002
Doc. No.: Y011371-EN-002

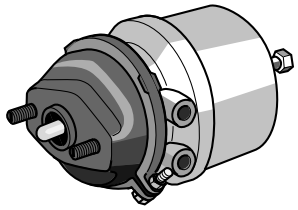
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function

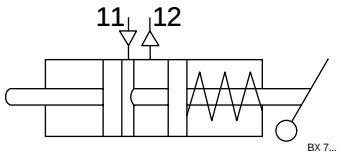
This range of Spring Brakes is used on axles fitted with air disc brakes and provides the service (and secondary) and parking brake functions.
The internal wind-off mechanism allows the parking brake force to be removed if air pressure is no longer present.

The Spring Brakes have a mounting seal integrated in the non-pressure housing which prevents the entry of dirt or water into the caliper.



GrF 0367

Standard symbol as DIN ISO 1219



Technical Features

Maximum operating pressure	Connection 11, 10,2 bar Connection 12, 8,5 bar
Operating temperature range	-40 °C to +80 °C
Sealing of non-pressure housing	Rubber Boot
Pivoting angle of piston rod in all directions	4°
Maximum required release pressure	5,1 bar
Release device	Mechanical
Maximum release torque	35 Nm
Approx. Weight	See table

Product overview

Type No.	Part No.	Type [sq in]	Weight [kg]	TÜV-Inspection Report
BS9297	II31783000	14/16	6,9	353-437-97FBTN
BS9304	II30619000	16/24	7,4	353-440-97FBTN
BS9349	II31663000	18/16	6,9	353-439-97FBTN
BS9397	II31227000	16/16	6,8	353-438-97FBTN
BS9503	II31408000	24/24	7,7	356-310-94FBTN
BS9404	II31407000	20/24	7,9	356-314-94FBTN
BS9451	II31226000	22/24	7,5	356-309-94FBTN

Further versions are available.

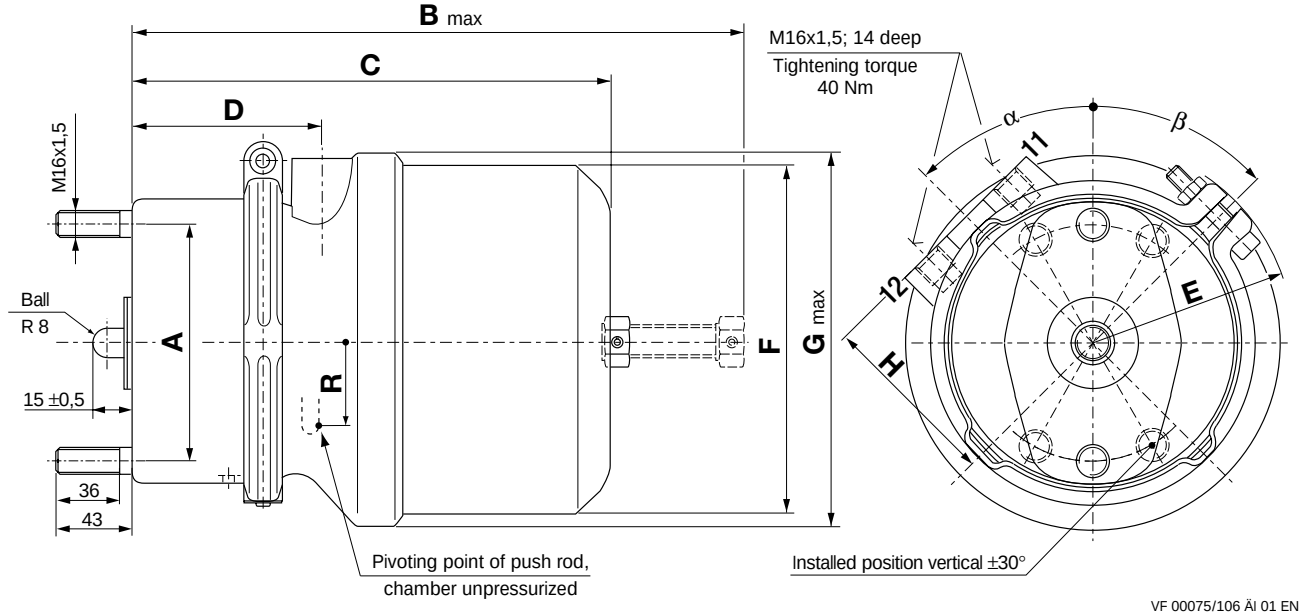
Actuator Mounting Kit available comprising 2 off self-locking nuts:
Part Number II36080.

Section No.: K002489-002
Doc. No.: Y011372-EN-002

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions

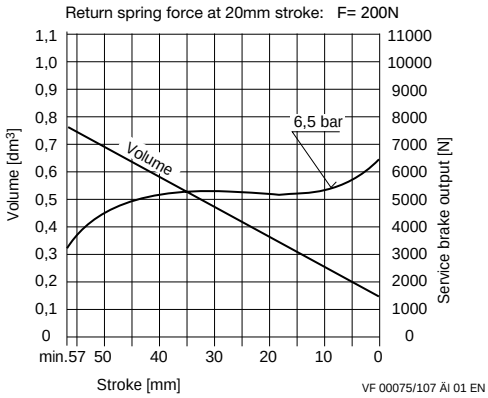
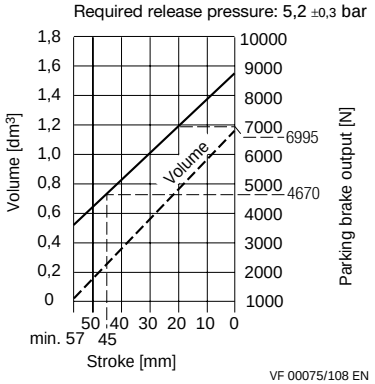
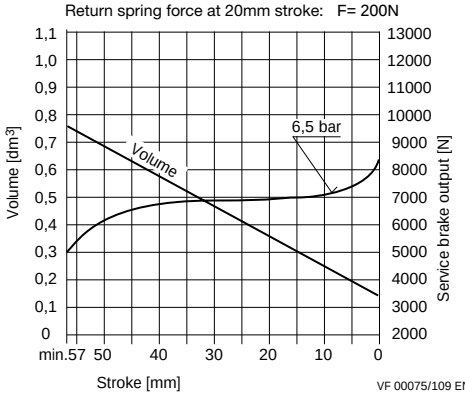
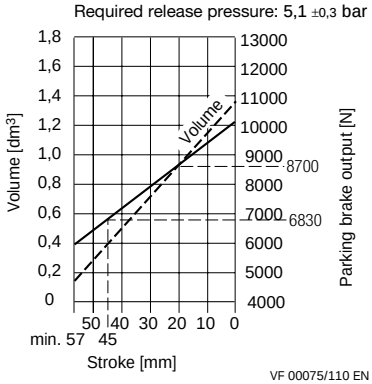
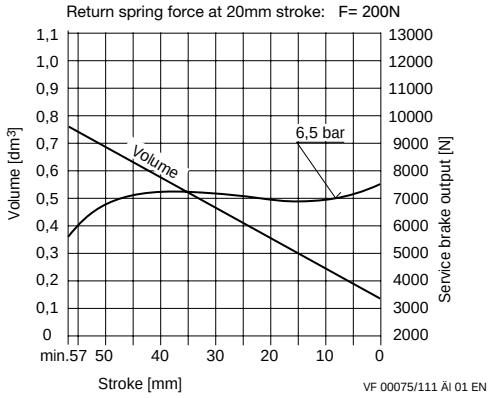
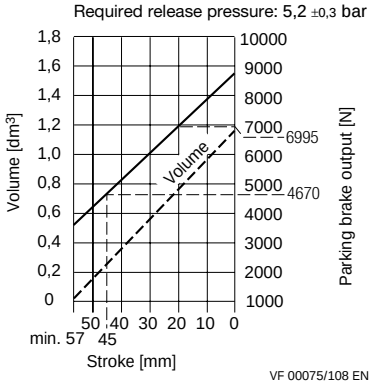
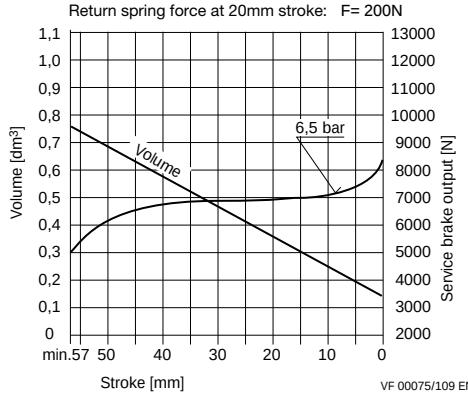
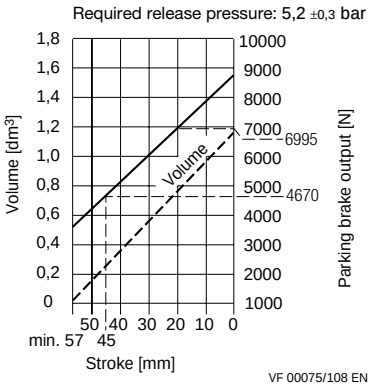


Type No.	Typ [sq in]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	R [mm]	α [°]	β [°]
BS9297	14/16	120,7	327	246	96	106	160	176	81	43	90	45
BS9304	16/24	120,7	318	240	96	106	175	191	90	43	90	45
BS9349	18/16	120,7	327	246	96	106	160	176	81	50	90	45
BS9397	16/16	120,7	327	246	96	106	160	176	81	47	90	45
BS9404	20/24	120,7	318	240	96	111	175	191	90	52	90	45
BS9451	22/24	120,7	318	240	96	108	175	191	90	54	90	45
BS9503	24/24	120,7	318	240	96	117	175	191	90	57,5	90	45

Section No.: K002489-002
Doc. No.: Y011372-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

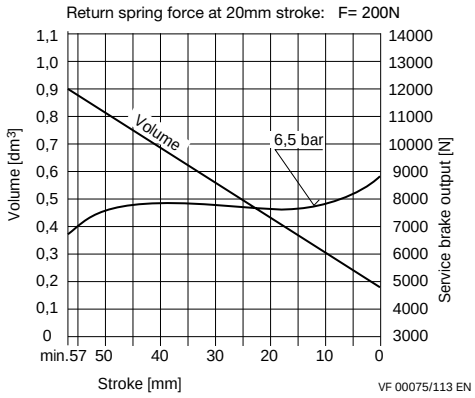
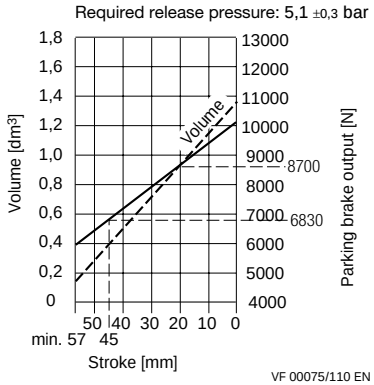
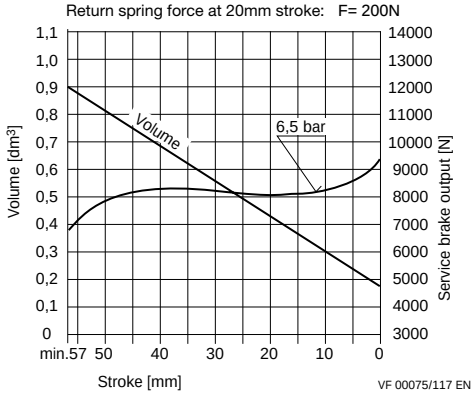
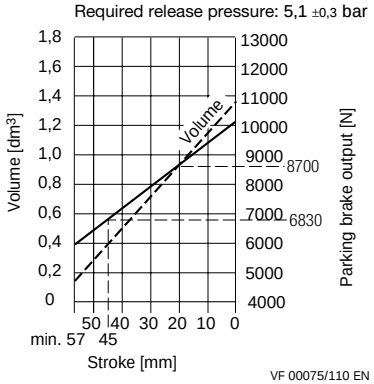
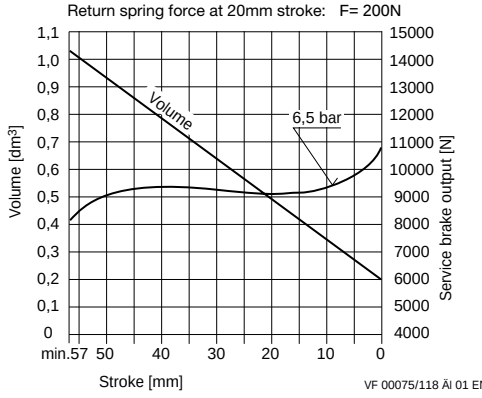
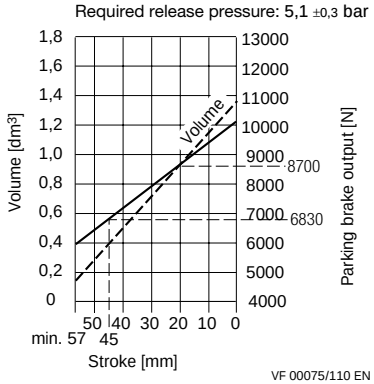
Performance Charts

Service Brake		Parking Brake
	BS9297	
	BS9304	
	BS9349	
	BS9397	

Section No.: K002489-002
Doc. No.: Y011372-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Performance Charts - *continued* -

Service Brake		Parking Brake
	BS9404	
	BS9451	
	BS9503	

Section No.: K002489-002
Doc. No.: Y011372-EN-002

Catalogue No.: K001561-EN

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 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 (A/F 24mm) at the rear of the actuator in an anti-clockwise direction.

Attention: Use only the correct sized ring or open-ended spanner!

Attention: The Spring Brake contains very high spring loads and it is strongly recommended that you do not undertake any disassembly work. If this is to be undertaken, use only the correct tools.

Section No.: K002489-002
Doc. No.: Y011372-EN-002

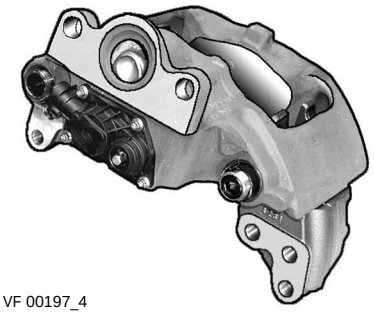
Catalogue No.: K001561-EN

Function

The SN range of Disc Brakes is a natural evolution of the SB range.
The brake is 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.

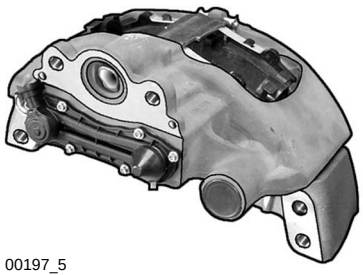
For trailers with a wheel size of 22,5", an Air Disc Brake has been designed specifically for trailer applications.
This brake is called SK7... and its main features are high fade resistance and low weight. Additionally, the SK7... has 2mm more brake pad thickness compared with the SN6... and SN7... versions.

SN5...



VF 00197_4

SN6..., SN7..., SK7...



VF 00197_5

Main features

- Monobloc body
- Compact design
- Reduced weight
- Optimised sealing at the caliper to actuator interface and the fixed Guide Pin
- Optimised protection of the Guide Pins
- Interchangeability between SN and SB
- Possibility of pad wear control via Pad Wear Indicators

Technical features

	SN5...	SN6...	SN7...	SK7...
Suitable for wheel rim size [inch]	17,5	19,5	22,5	22,5
Internal transmission ratio	10	15,6	15,6	15,6
Rotor disc diameter [mm]	335	377	430	430
Rotor disc thickness (new) [mm]	34	45	45	45
Rotor disc thickness (min) [mm]	28	37	37	37
Pad friction material thickness (new) [mm]	19	21	21	23
Pad friction material thickness (min) [mm]	2	2	2	2
Brake efficiency [%]	95	95	95	95
Weight without Disc, including pads [kg]	23	33,5	44,6	35,7
Seal Diaphragm (caliper to cylinder interface)	Yes	Yes	Yes	Yes

*Further information about Air Disc Brakes, Discs and Actuators, as well as Brake Pads, Service Kits and Service Tools can be found in the Disc Brake Catalogue (identification number **Y000875**), in the Service Manual (identification number **Y006471**), and in the CD product catalogue (identification number **Y001627**).*

Section No.: K002490-002
Doc. No.: Y011373-EN-002
Catalogue No.: K001561-EN

Function

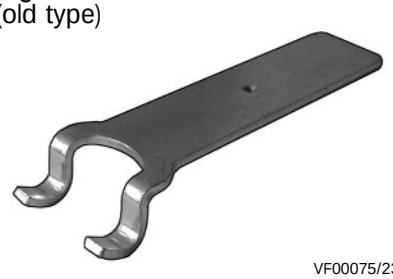
The Brake Pad Wear Indicator Kit is used for monitoring the Pad friction material thickness.

Wear is "monitored" via two sensors which are located directly into the cut-outs of the inner and outer Brake Pads.

When the wear limit (2mm remaining pad thickness) is reached, the sensors contact the Brake Disc and, depending on the version, make or break an electrical circuit. This electrical change can be used by the Electronic Braking System for pad wear control or simply to provide a visual warning in the cab that the Pads must be replaced.

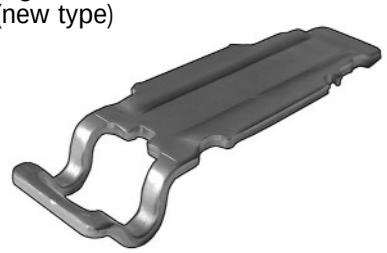
There are different warning displays for pad wear control, that can be mounted on the trailer (see page 40.2, 40.26 and 40.28)

Figure 1
(old type)



VF00075/232

Figure 2
(new type)



VF00075/233

Product overview

Versions	Part Number	for Disc Brake:	
Pad Wear Kit for retrofitting (long version)	K000461	SB7... / SN7...	See Figure 1
	K000670	SB6... / SN6... / SK7...	
Pad Wear Kit for pad change (long version) and for retrofitting SN....	K000937	SB7... / SN7... / SK7...	See Figure 2
Pad Wear Kit for pad change (short version) and for retrofitting SN....	K000938	SB6... / SN6...	

Section No.: K002491-002
Doc. No.: Y011374-EN-002

Catalogue No.: K001561-EN

Contents of Kits K000...

Contents	Item	...461	...670	...932	...933	...937	...938
Pad Wear Kit (682mm)	101	X	X	–	–	X	–
Pad Wear Kit (294mm)	101	–	–	X	X	–	X
Cable Guide	104	X	X	X	X	X	X
Protection Plate	105	X	X	X	X	X	X
Pad Retainer Kit	11	X	X	X	X	–	–
	26	X	X	X	X	–	–
	44	X	X	X	X	–	–
	45	X	X	X	X	–	–
List of contents	–	X	X	X	X	X	X
Packing	–	X	X	X	X	X	X
To be used for pad retainer type	See Figure 1					See Figure 2	

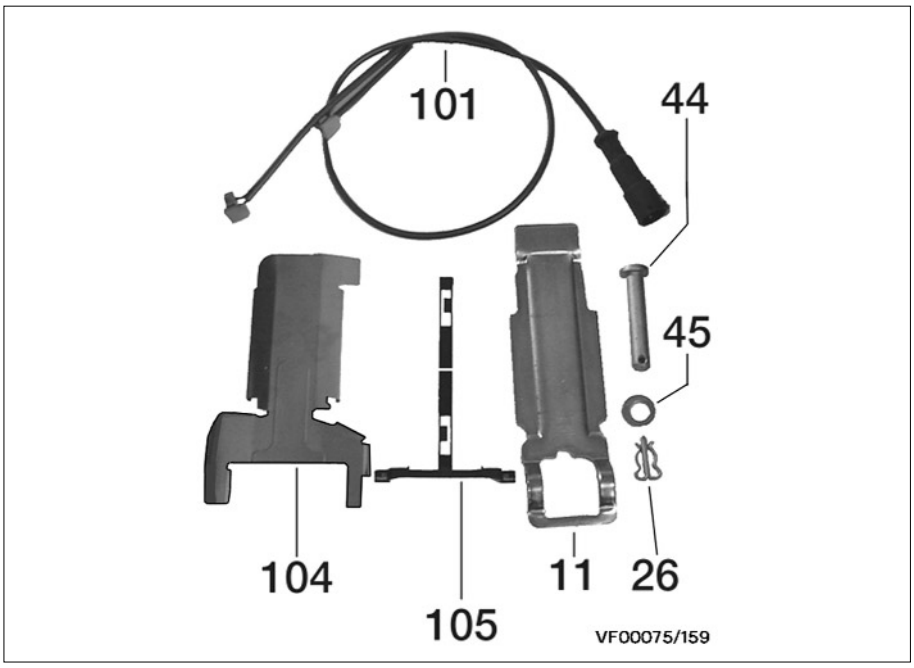


Figure 1
(old type)

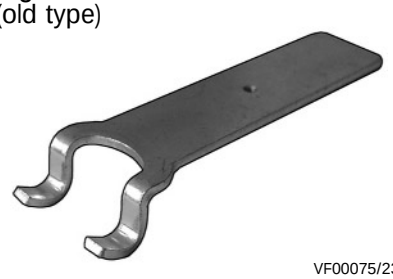
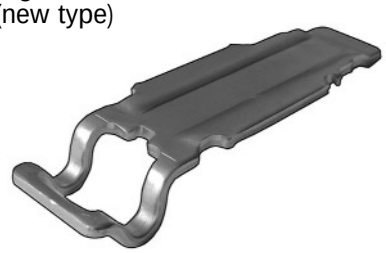


Figure 2
(new type)



TÜV - Report:
No.: TÜH ATC-TB 2003 - 080.80

Section No.: K002491-002
Doc. No.: Y011374-EN-002

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

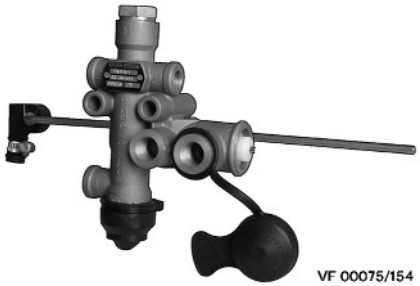
Function

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.

Versions with the "Height Limitation" feature prevent the chassis height being manually raised above a set limit.

Versions 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
Approximate weight:	0.7Kg
Lever length:	300 mm
Lever design:	Round, with rubber joint
Medium:	Compressed Air

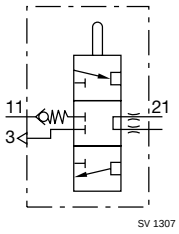
Product Overview

Type No.	Part Number	Replaces	Second Ride Height (pre- set)	Height Limitation (adjustable)	Secondary Exhaust
SV1395[1)]	II19425	SV1307	–	–	–
SV1418[2)]	I99633	–	–	–	–
SV1441	II30531	–	12°	–	–
SV1447	II34910	–	17,5°	–	–
SV1460[3)]	II36088	–	–	–	–
SV1465	II36114	SV1440, 61	12°	20°-50° [4)]	With
SV1466	II36115	SV1410, 63	–	20°-50° [4)]	With
SV1485	K000367	–	10°	20°-50° [4)]	With
SV1485[5)]	K002647	–	10°	20°-50° [4)]	With

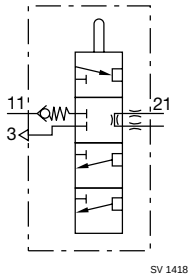
The rubber joint at the lower end of the vertical linkage is available separately. Part Number: K001406

Schaltzeichen nach DIN ISO 1219

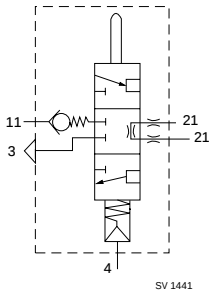
SV1395
SV1460



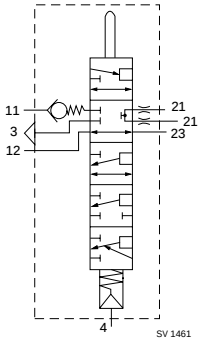
SV1418



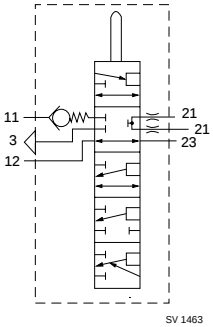
SV1441
SV1447



SV1465
SV1485



SV1466



[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

Section No.: K002492-001
Doc. No.: Y011375-EN-001
Catalogue No.: K001561-EN

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.
(reference pages 70.3, 70.4)

The adjustment is done as follows:

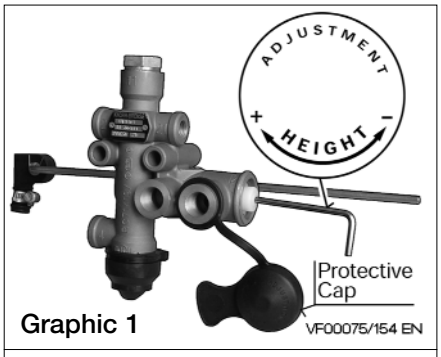
1. Pressurise ports 11 and 12 with minimum 6 bar
2. Pull off the protection cap from the adjustment screw. See Graphic 1
3. Raise the chassis with the Raise/Lower valve See Graphic 2
4. Is the maximum permitted height being exceeded?
   - no
   - yes
5. Raise Chassis until height limitation becomes active See Graphic 2
6. Leave Raise/Lower Valve in "Raise"-position
7. Turn adjustment screw - see NOTE: - with a 4mm Allen Key
   - 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 Graphic 2
10. Replace protection cap and ensure correct fitting See Graphic 1

4a. Immediately move Raise/Lower Valve to "**STOP**" positionSee Graphic 2

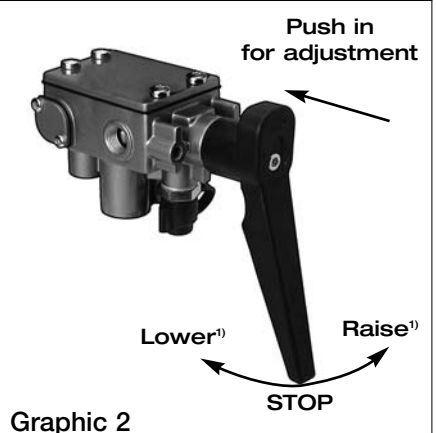
4b. Lower the chassis several cm See Graphic 2

4c. Turn the adjustment screw - see **NOTE**: - of the levelling valve with a 4mm Allen Key for half a turn anti-clockwise See Graphic 1

NOTE: Caution! Max. torque 1.2 Nm! Turning the screw by 360° is equivalent to approximately 11° change of the lever angle



Graphic 1



Graphic 2

[1)] For some part numbers the control logic is vice versa

Section No.: K002492-000
Doc. No.: Y011375-EN-000
Catalogue No.: K001561

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

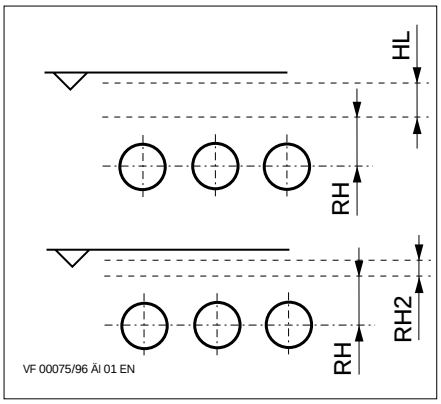
Second Ride Height and Height Limitation features: Calculation of the correct lever length

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 70.2). 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	$1{,}3 \le \frac{L}{HL} \le 2{,}9$
SV1466	–	$1{,}3 \le \frac{L}{HL} \le 2{,}9$
SV1485	L = 5,8 x RH2	$1{,}3 \le \frac{L}{HL} \le 2{,}9$
SV1441	L = 4,8 x RH2	–
SV1447	L = 3,3 x RH2	–



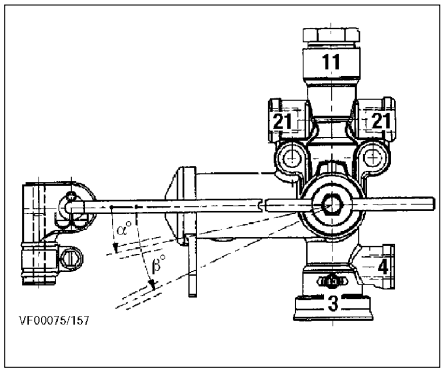
Example:
Second Ride Height for SV1485:
RH2 (requested) = 40 mm
HL (requested) = 100 mm
L = 5,8 x 40mm = 232 mm

$$\frac{L}{HL} = \frac{232\ mm}{100\ mm} = 2{,}32$$

$1{,}3 \le 2{,}32 \le 2{,}9$

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)

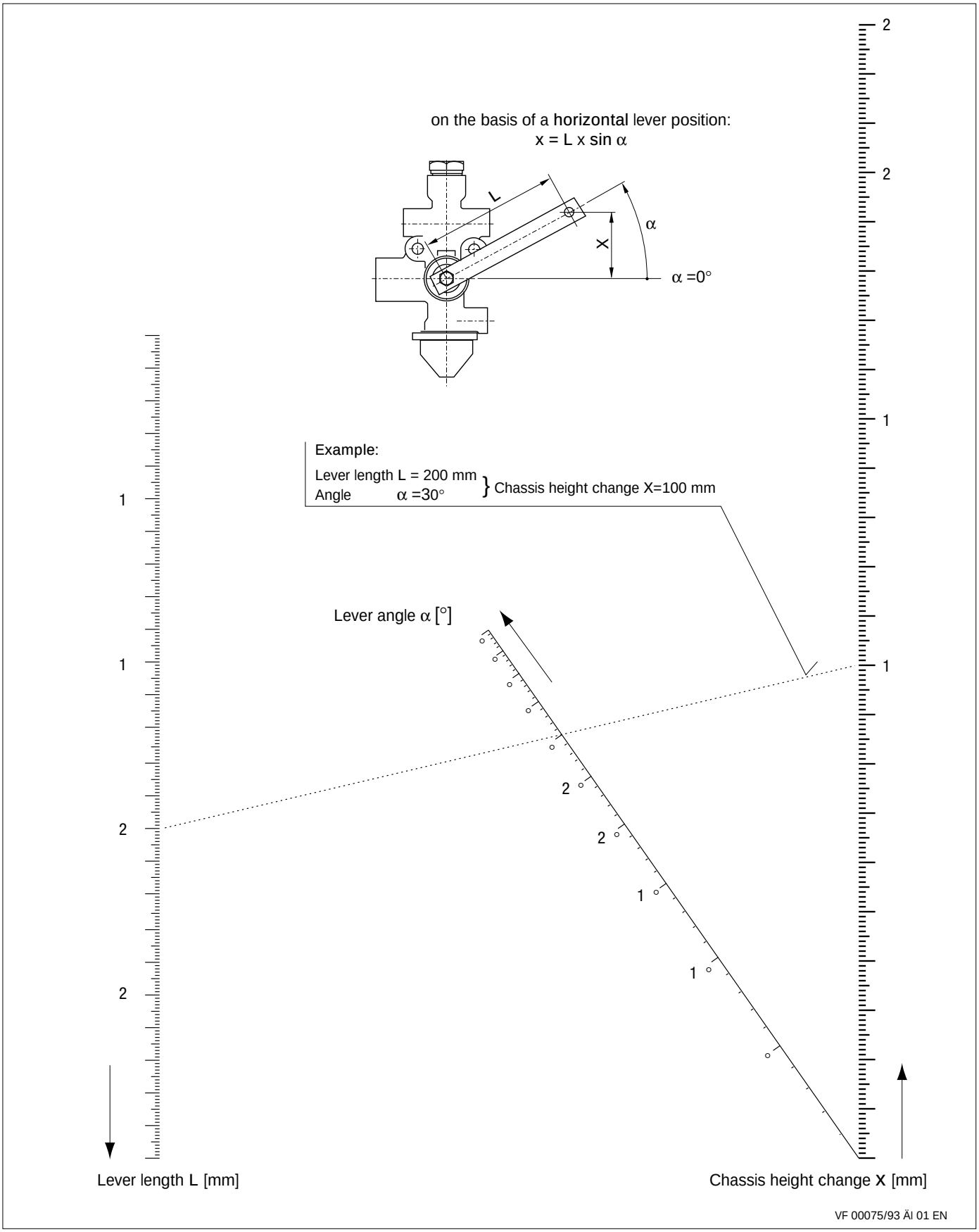
RH2 = **Second Ride Height** (increased chassis height above RH when pressurising port 4, e.g. when driving with a lift axle raised)

HL = **Height Limitation** (maximum possible chassis height above RH when operating the Raise/Lower Valve)

Section No.: K002492-001
Doc. No.: Y011375-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Graphic Diagram for determining the Chassis height change "X" and the lever length "L"

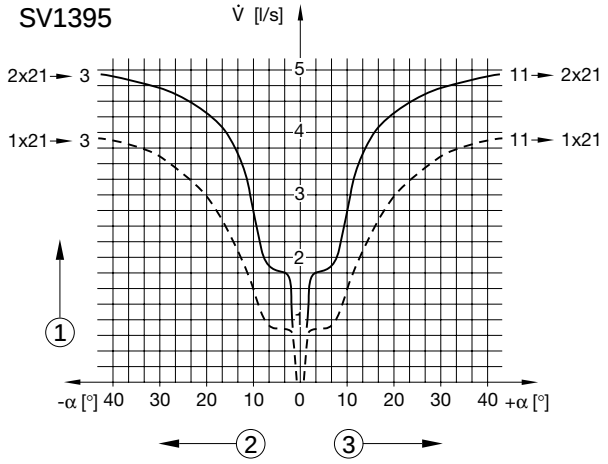


Section No.: K002492-001
Doc. No.: Y011375-EN-001
Catalogue No.: K001561-EN

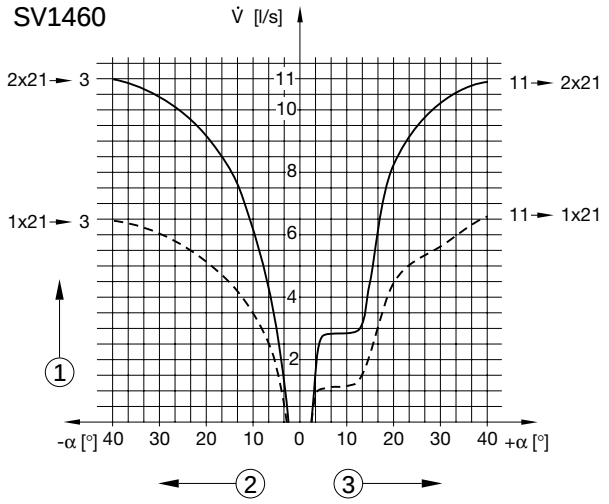
Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Performance Chart

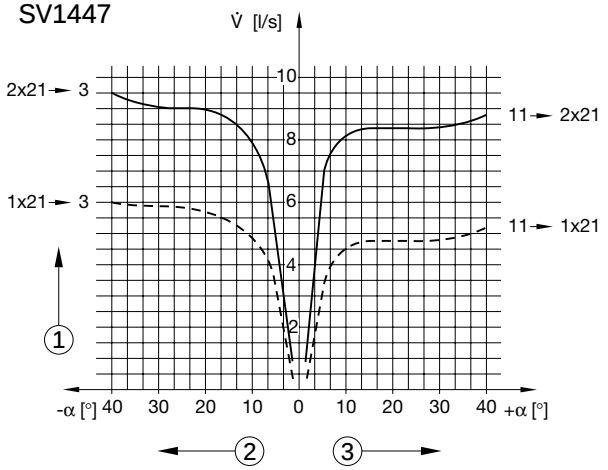
SV1395



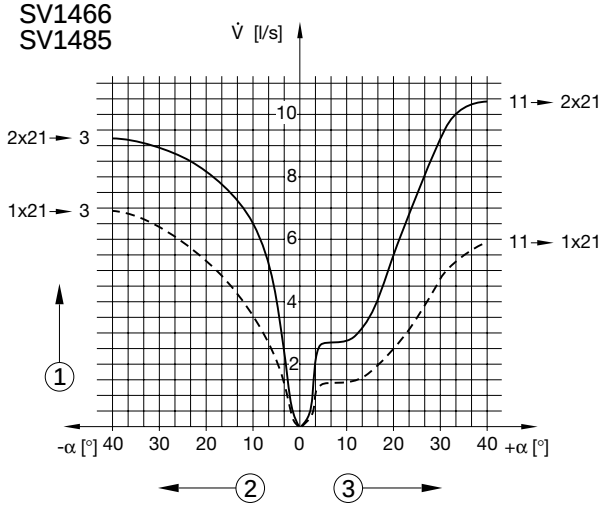
SV1460



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 [°]

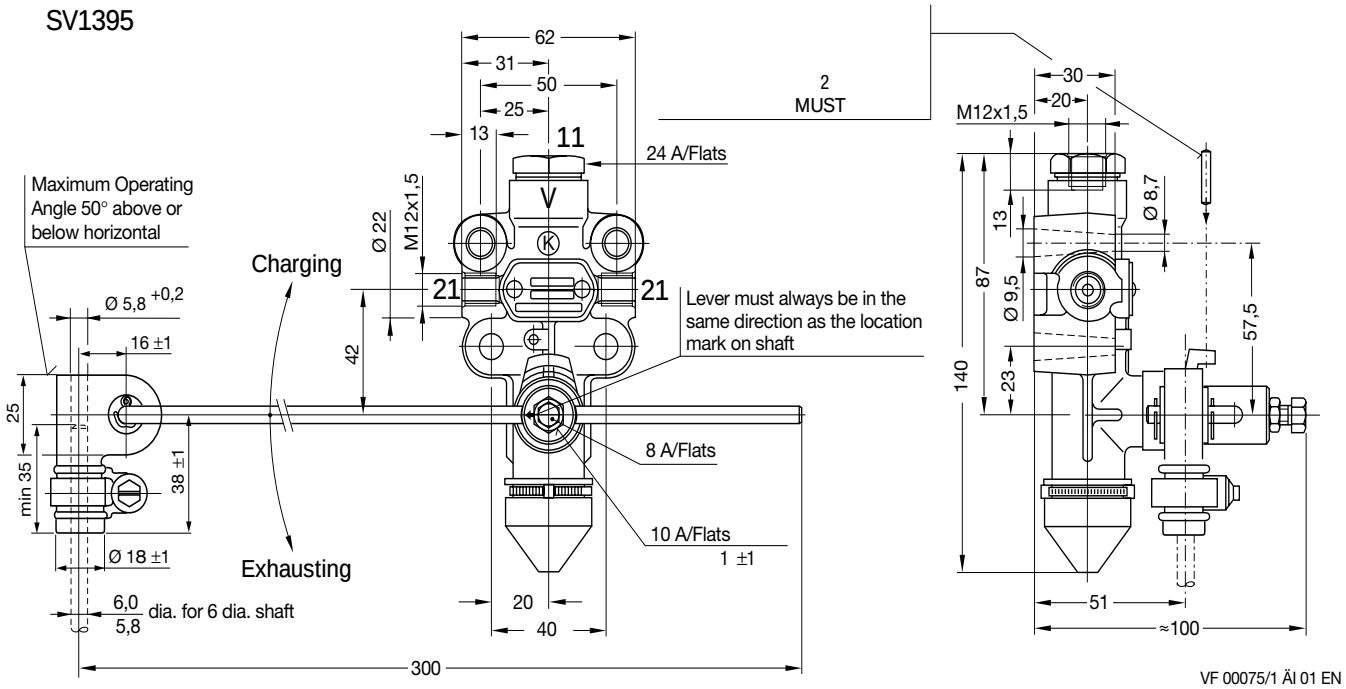
--- = Volume of flow through one port
—— = Volume of flow through two ports
} at 6 bar supply pressure

VF 00075/124 EN

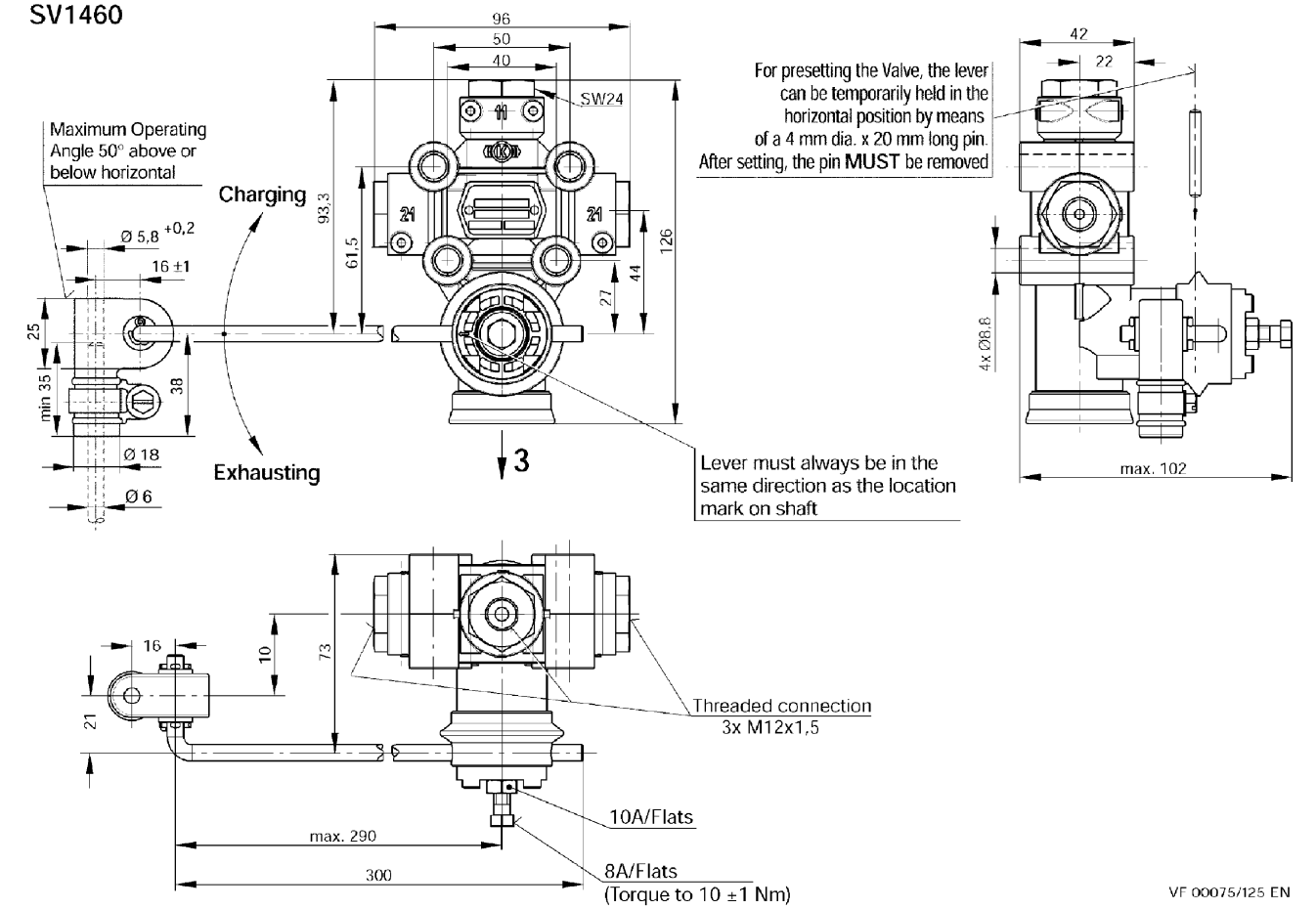
Section No.: K002492-001
Doc. No.: Y011375-EN-001
Catalogue No.: K001561-EN

Dimensions

SV1395

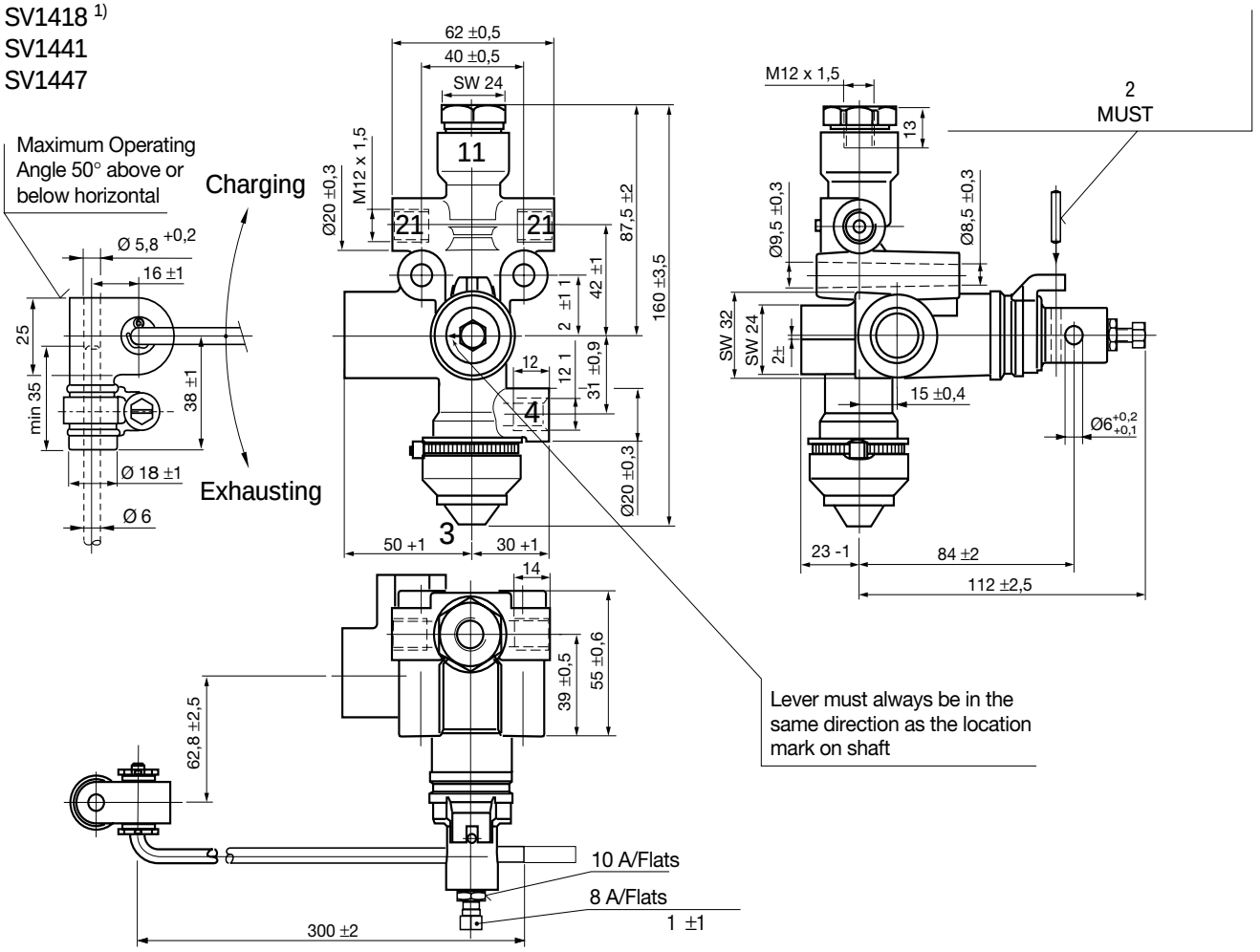


SV1460



Dimensions - *continued* -

SV1418 [1)]
SV1441
SV1447



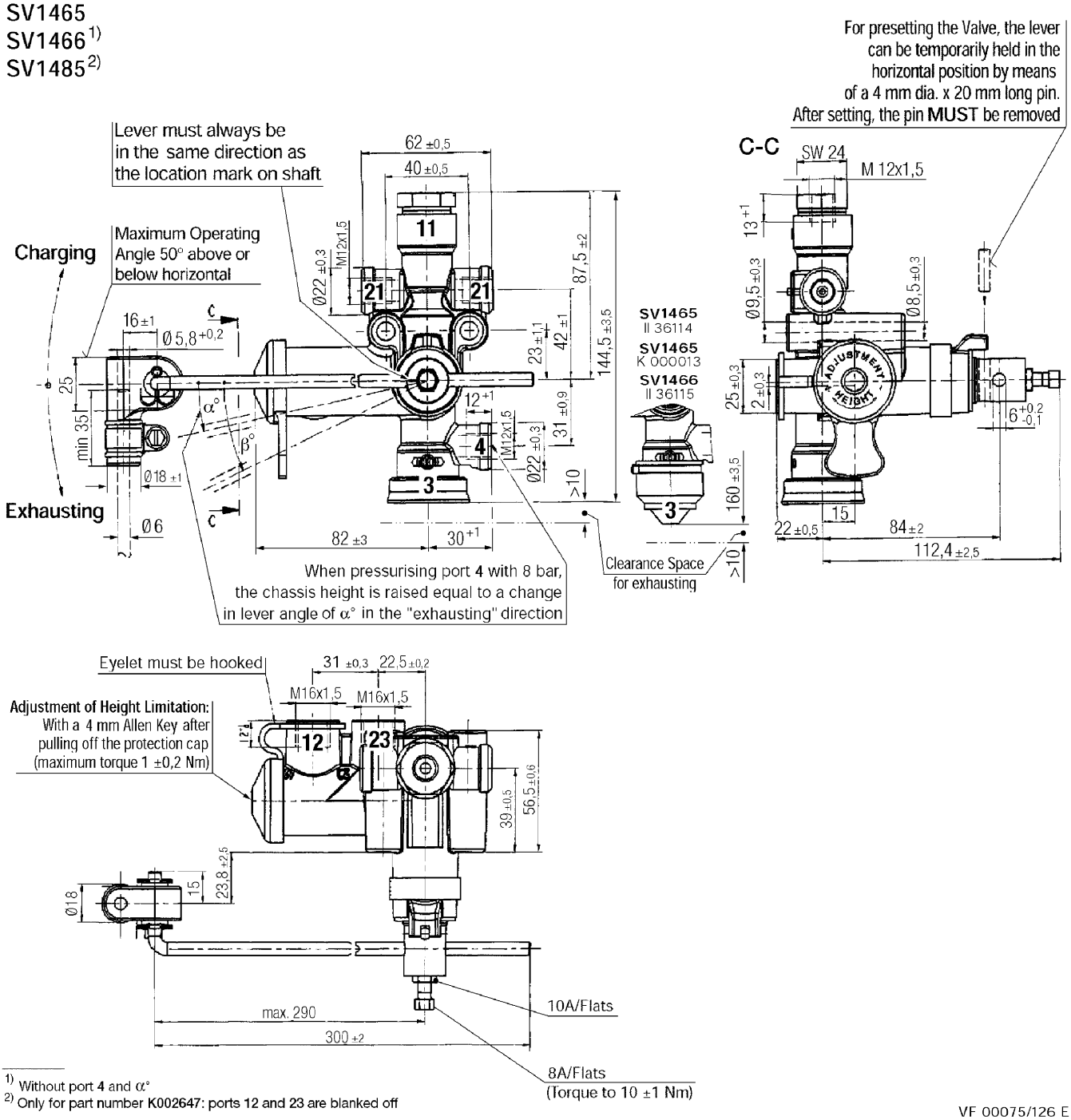
[1)] Port 4 not used

VF00075/2 EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions - *continued* -

SV1465
SV1466 [1)]
SV1485 [2)]



[1)] Without port **4** and α°
[2)] Only for part number **K002647**: ports **12** and **23** are blanked off

VF 00075/126 EN

Section No.: K002492-001
Doc. No.: Y011375-EN-001
Catalogue No.: K001561-EN

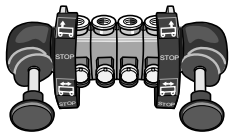
Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

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. For safe operation, valves can be supplied with a "dead man's handle" (automatic return to the "STOP" position).

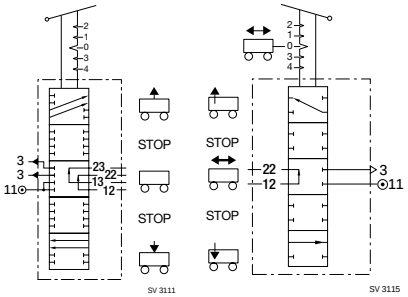
Valve Types SV3161 to SV3164 have an increased flow diameter to reduce the time taken to raise a tandem or tri-axle chassis.



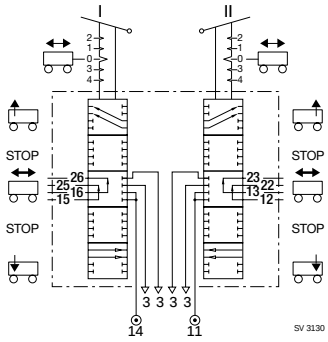
GrF 0217

Standard Symbol as DIN ISO 1219

SV3111
SV3134

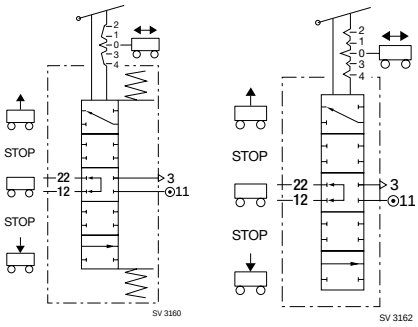


SV3130



SV3161

SV3162
SV3164



Technical Features

Maximum Operating Pressure:		18 bar
Operating Temperature Range:		-40 ºC to +80 ºC
Medium:		Compressed Air
Approx. Weight:	One Circuit:	1,1 kg
	Two Circuits:	1,5 kg
	Four Circuits:	3,0 kg
Single circuit air suspension:	RWTÜV-report:	AL232.OE
	RWTÜV-report:	112 IR 03 001 Rev. 01
	DEKRA-report:	200 208 105

Options

Type No.	Number of Levers	Number of Control Circuits	Number of control circuits at Lever I	Lever II	"Dead man's Handle"	Flow Dia-meter
SV3111	1	2	2	–	–	5 mm
SV3115	1	1	1	–	–	5 mm
SV3130	2	4	2	2	–	5 mm
SV3133	1	2	2	–	With	5 mm
SV3134	1	2	2	–	–	5 mm
SV3161	1	1	1	–	With	6 mm
SV3162[1)]	1	1	1	–	–	6 mm
SV3164	1	1	1	–	–	6 mm

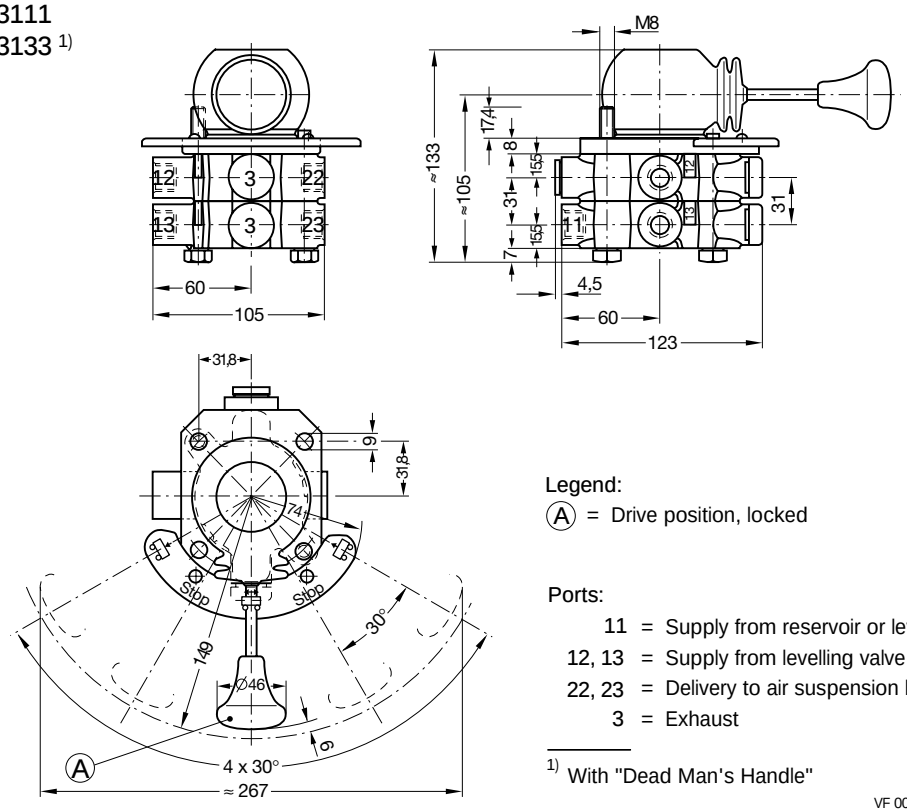
[1)] Without symbol plate

Section No.: K002493-001
Doc. No.: Y011376-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions

SV3111
SV3133 [1]



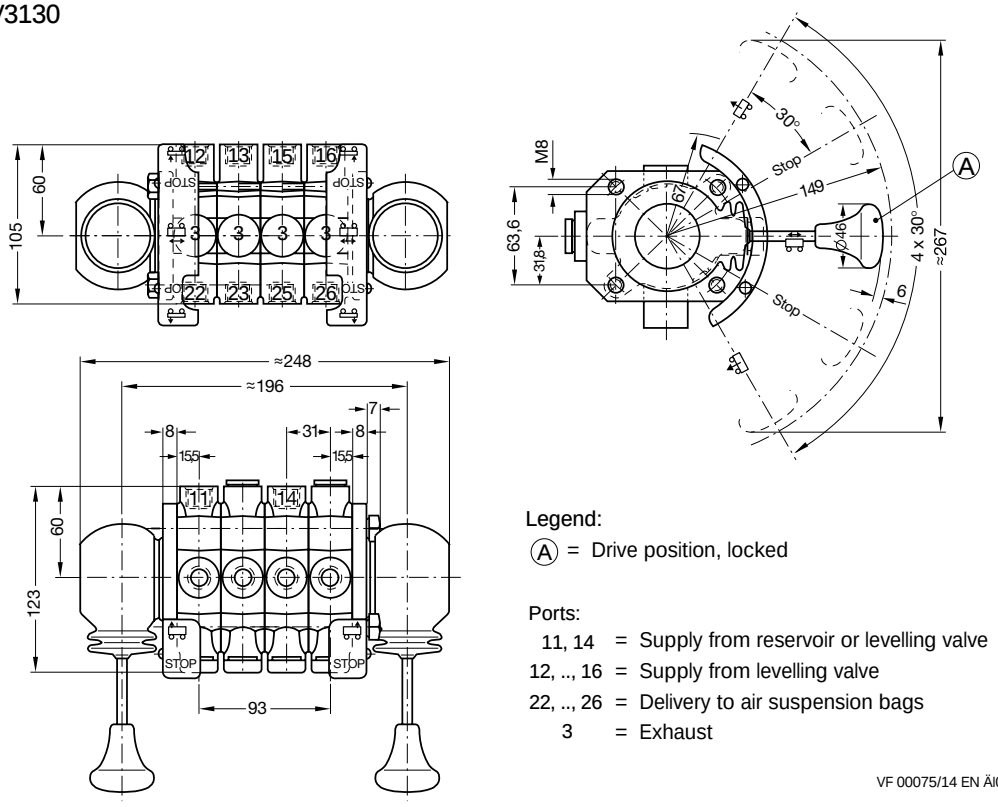
Legend:
Ⓐ = Drive position, locked

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"

VF 00075/13 EN Äl01

SV3130



Legend:
Ⓐ = 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

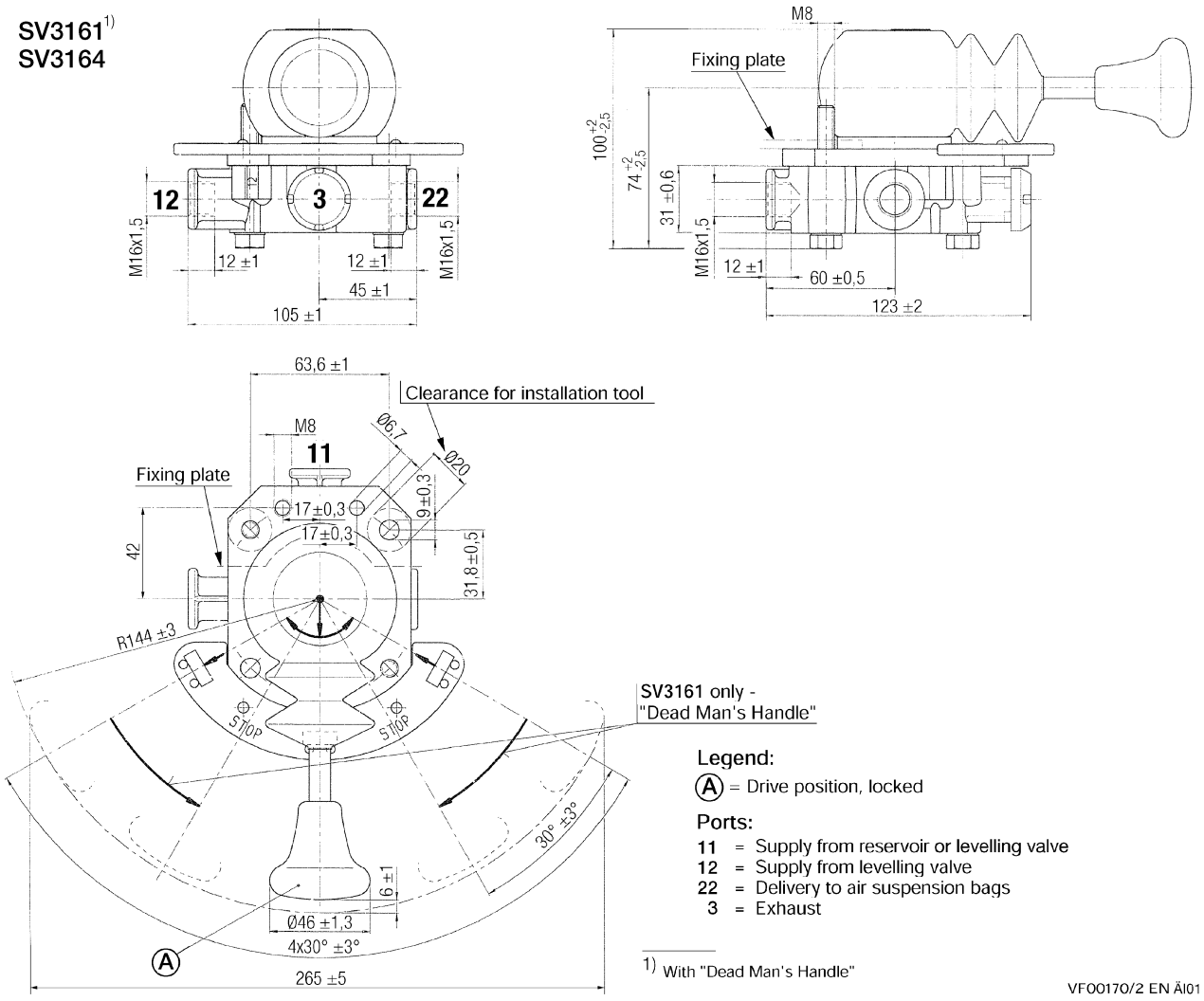
VF 00075/14 EN Äl01

Section No.: K002493-001
Doc. No.: Y011376-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions - *continued* -

SV3161[1)]
SV3164



Legend:

Ⓐ = Drive position, locked

Ports:

11 = Supply from reservoir or levelling valve
12 = Supply from levelling valve
22 = Delivery to air suspension bags
3 = Exhaust

1) With "Dead Man's Handle"

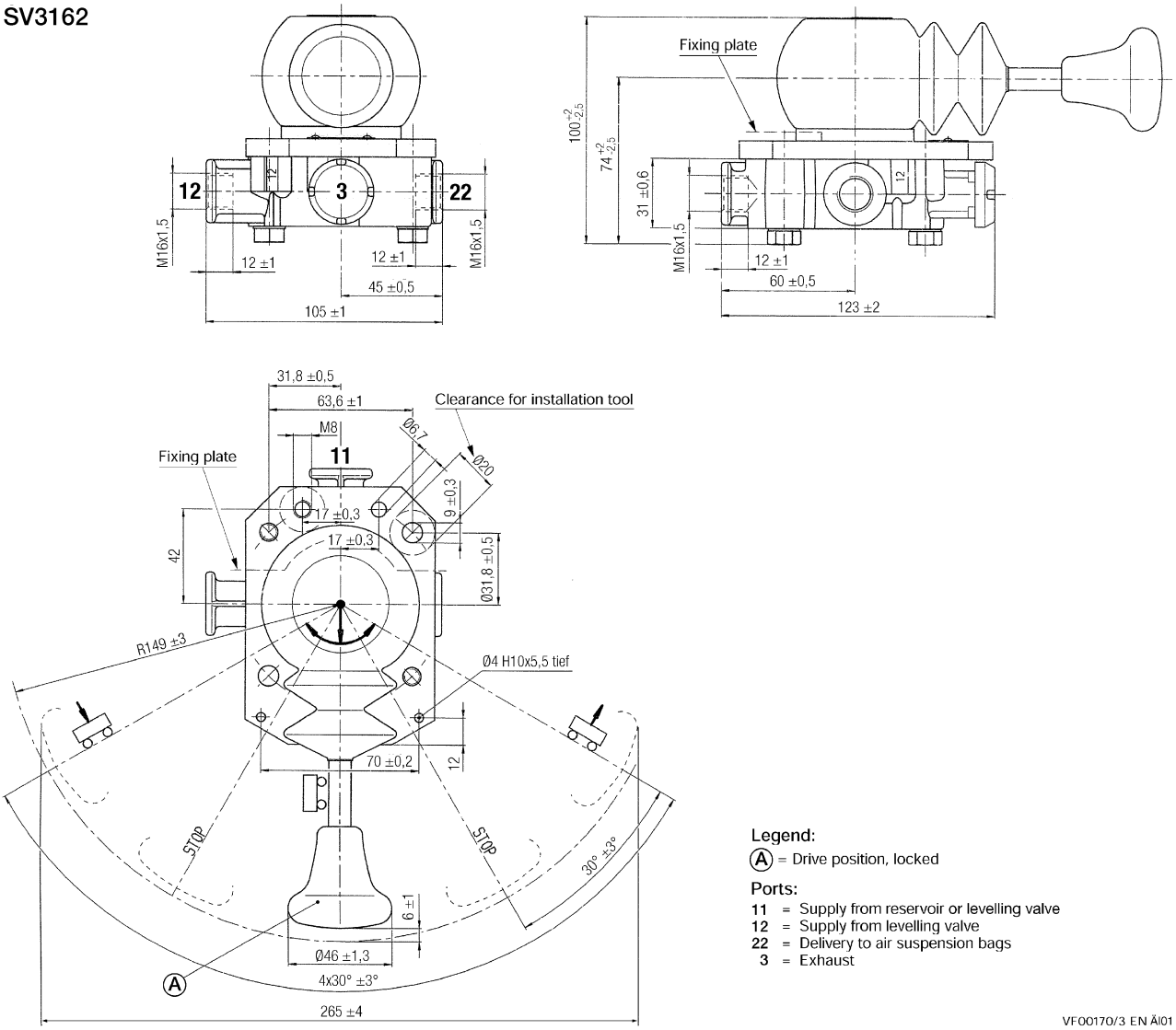
VF00170/2 EN ÄI01

Section No.: K002493-001
Doc. No.: Y011376-EN-001

Catalogue No.: K001561-EN

Dimensions - *continued* -

SV3162



Legend:

(A) = Drive position, locked

Ports:

11 = Supply from reservoir or levelling valve
12 = Supply from levelling valve
22 = Delivery to air suspension bags
3 = Exhaust

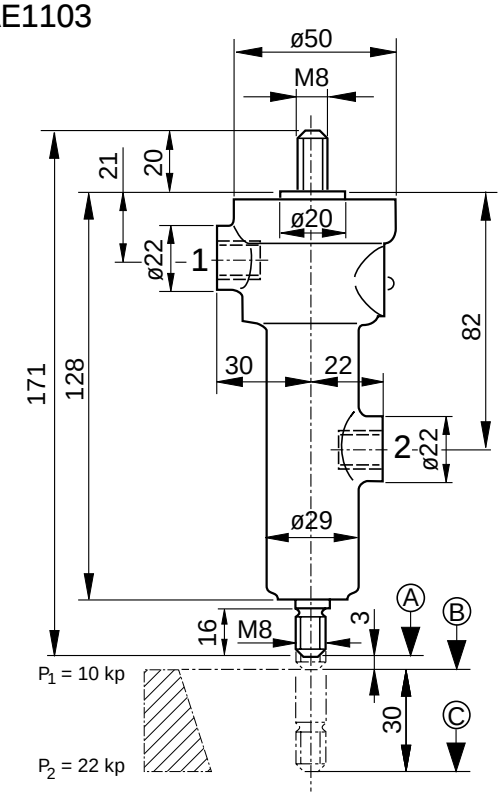
VF00170/3 EN Äl01

Section No.: K002493-001
Doc. No.: Y011376-EN-001

Catalogue No.: K001561-EN

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

VF 00075/91 EN

Section No.: K002495-001
Doc. No.: Y011378-EN-001

Catalogue No.: K001561-EN

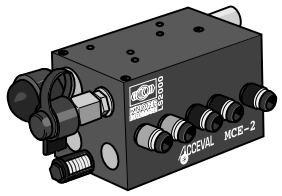
Function

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 non-lift axle suspension air bags. The pressure at which the Valve lowers the lift axle is fully adjustable. Versions with single and dual circuit control are available.

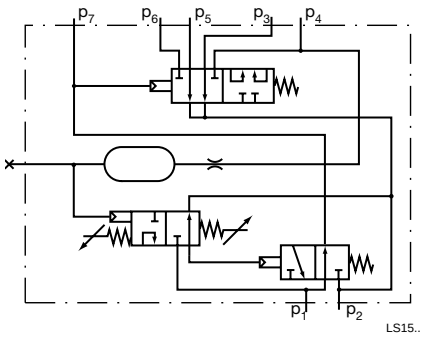
With the additional use of a Solenoid Valve, a version of the valve is available which allows temporary lifting of the laden axle. This feature is signalled electronically from the tractor cab and is designed to provide additional traction capability on the tractor's drive axles since, when the trailer 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!

The valves are supplied complete with pre-installed "push-in" fittings suitable for 8.0 mm OD Pipe. A mounting support is also included with the Valve.



GrF 0405

Standard Symbol as DIN ISO 1219



Technical Features

Maximum Operating Pressure:	14.0 bar
Operating Temperature Range:	-35 °C to +80 °C
Medium:	Compressed Air
Approximate Weight:	0.9 kg
"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

Options

Type No.	LS1500	LS2000	LS3000
Semi-automatic Manual Raise Automatic Lower	Standard		
Fully Automatic Automatic Raise Automatic Lower		Standard	Standard
Temporary Raise of Laden Axle (see section: "Traction Assist")		Option	Option
Manual Lower of Unladen Axle (see section: "Unladen Override")		Option	Option
Control of two lift axles By two valves	Standard	Standard	Standard
Number of control circuits	2	2	1

Section No.: K002496-002
Doc. No.: Y011379-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Optional Accessories

Type No.	Description	For use with	Remark
LS2510	Solenoid Valve to temporarily raise laden axle	LS2000 LS3000	See section "Traction Assist" page 74.6
AE9120	Solenoid valve to lower Unladen Axle	LS1500 LS2000 LS3000	See section **"Lowering the Lift Axle"** page 74.7
AE4265 0481007043	Manual Push/Pull Valve and Solenoid Valve to lower unladen axle	LS2000 LS3000	See section **"Lowering the Lift Axle"** page 74.7
LS1051	Lift Bag Pressure Retention Valve, retains a pressure of 0.5 bar and thereby protects the lift bag from being "torn off" and damaged	LS1500 LS2000 LS3000	If requested by the the manufacturer
DB11..	Lift Bag Pressure Limiting Valve		

Maintenance

The synthetic filter must be changed annually.
Part Number: LS2888

Mounting position

The valve must be mounted in a way that no water can enter the filter.

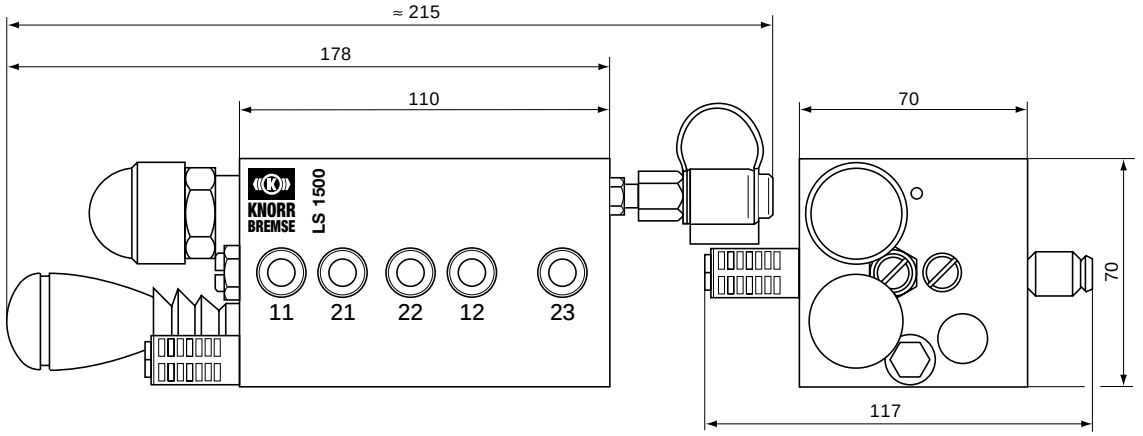
Section No.: K002496-002
Doc. No.: Y011379-EN-002

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

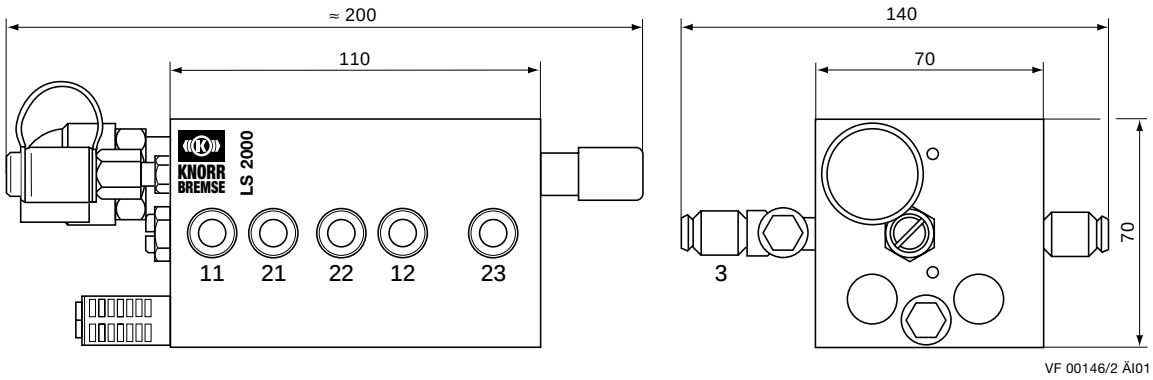
Dimensions

LS 1500



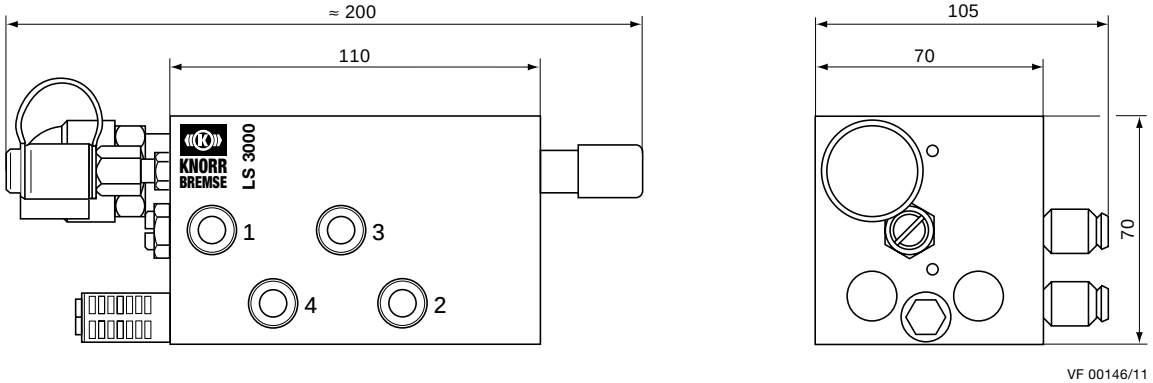
VF 00146/1 ÄI01

LS 2000



VF 00146/2 ÄI01

LS 3000



VF 00146/11

Section No.: K002496-002
Doc. No.: Y011379-EN-002
Catalogue No.: K001561-EN

Setting procedure:

- Connect the valve according to the system diagram on the test bench or on the vehicle
- Inflate port 1 with supply pressure (min. 6.5 bar)
- 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"

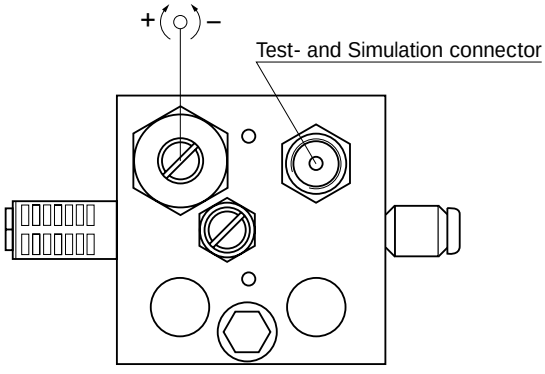
- Slacken locknut (A/F 27 mm under the black protection cap), whilst holding the slotted-head screw
- Turn the slotted-head screw: clockwise = increase the axle's lowering pressure
  anticlockwise = decrease the axle's lowering pressure
  default setting = 3.4 bar
- Whilst holding the slotted screw, tighten the locknut and replace protection cap

Set pressure for Automatic "Raise Lift Axle" (LS2000 and LS3000 only)

- This setting (to be done under the yellow protection cap) needs to be done if required (see pressure diagram)
- Turn the internal hexagon socket: clockwise = decrease the axle's raising pressure
  anticlockwise = increase the axle' s raising pressure
  default setting: Δp = 1.7 bar
- Replace yellow protection cap

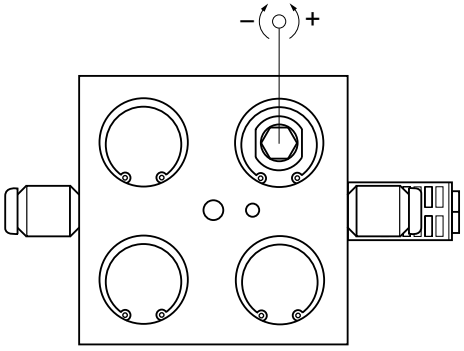
Setting Options:

Screw for setting the pressure for Lowering
(Automatic Lowering of the lift axle)



VF 00146/12 EN

Screw to adjust the control range
(Automatic Raising of the lift axle)

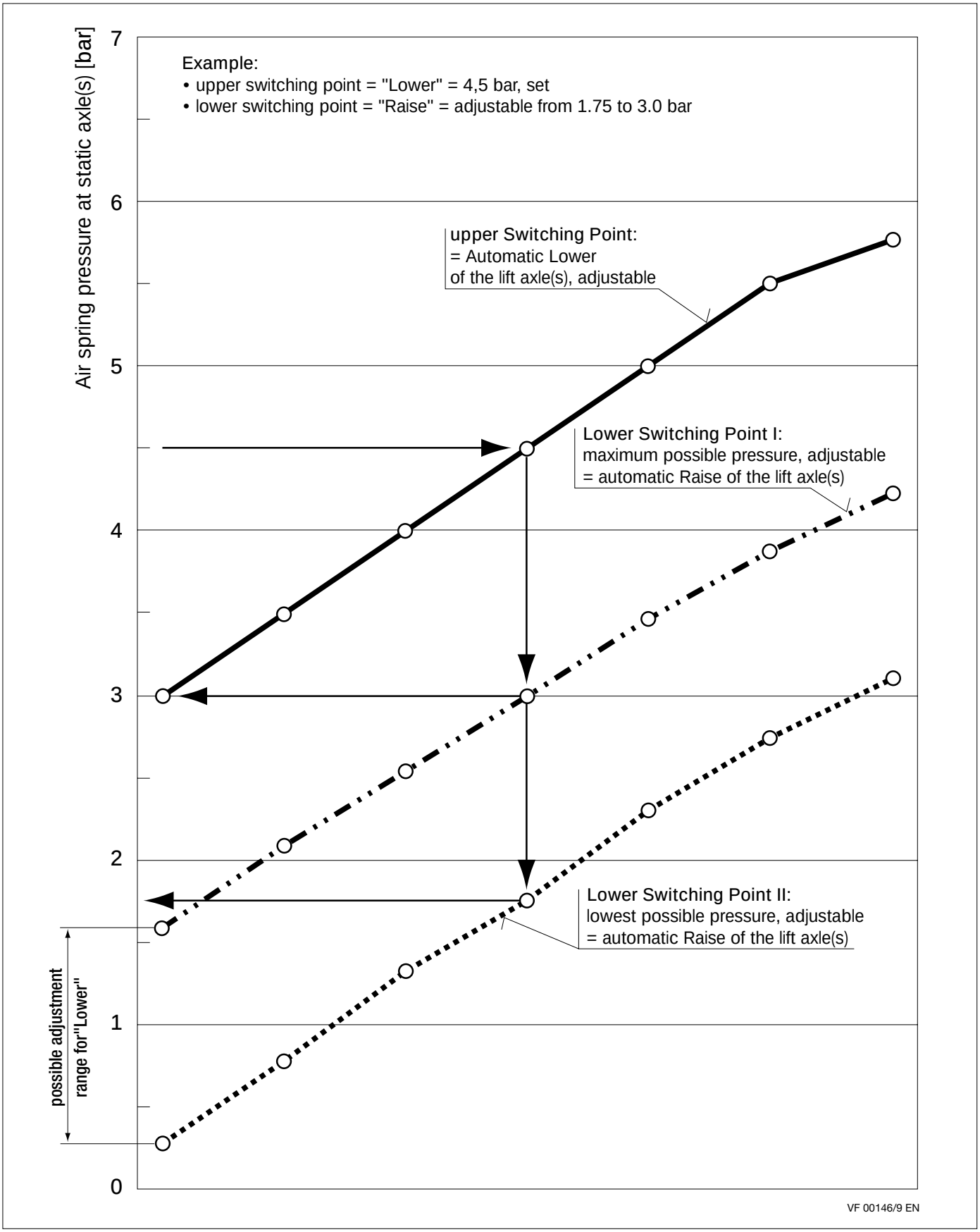


VF 00146/13 EN

Section No.: K002496-002
Doc. No.: Y011379-EN-002

Catalogue No.: K001561-EN

Control pressure Diagram



Section No.: K002496-002
Doc. No.: Y011379-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

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.

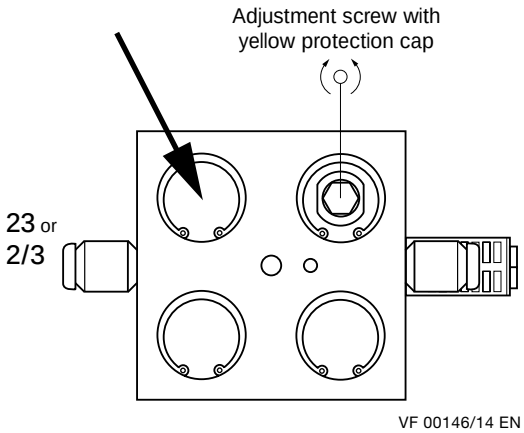
The control device in the tractor should be a spring return tip switch.

Traction Assist is achieved by upgrading LS2000 or LS3000.

- Additional component required:
  One Solenoid Valve LS2510 (ready for assemble)
  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).



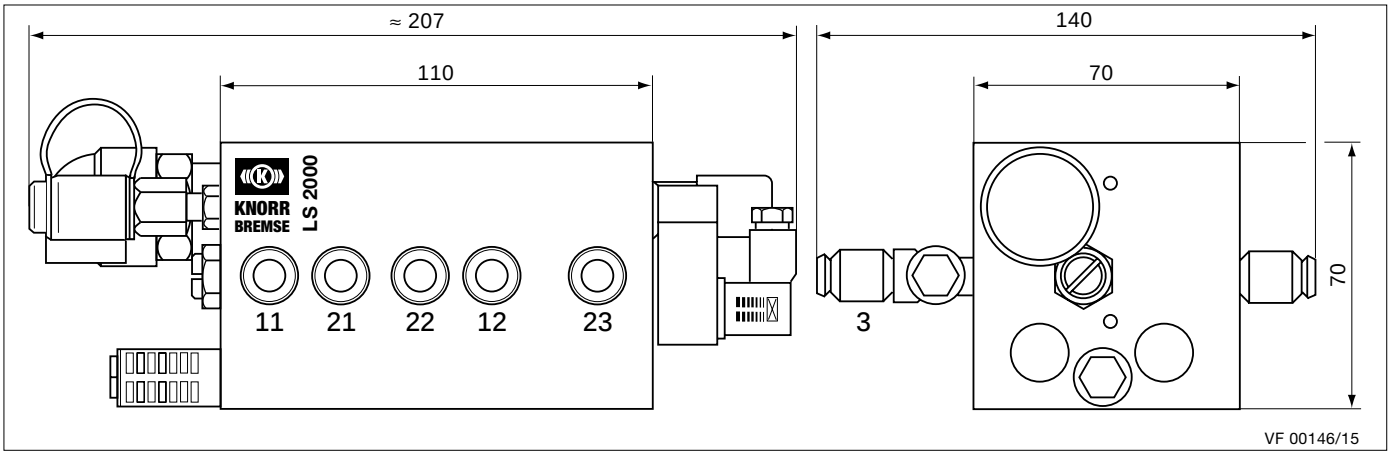
VF 00146/14 EN

Section No.: K002496-002
Doc. No.: Y011379-EN-002

Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Dimensions, with Solenoid Valve for Traction Assist

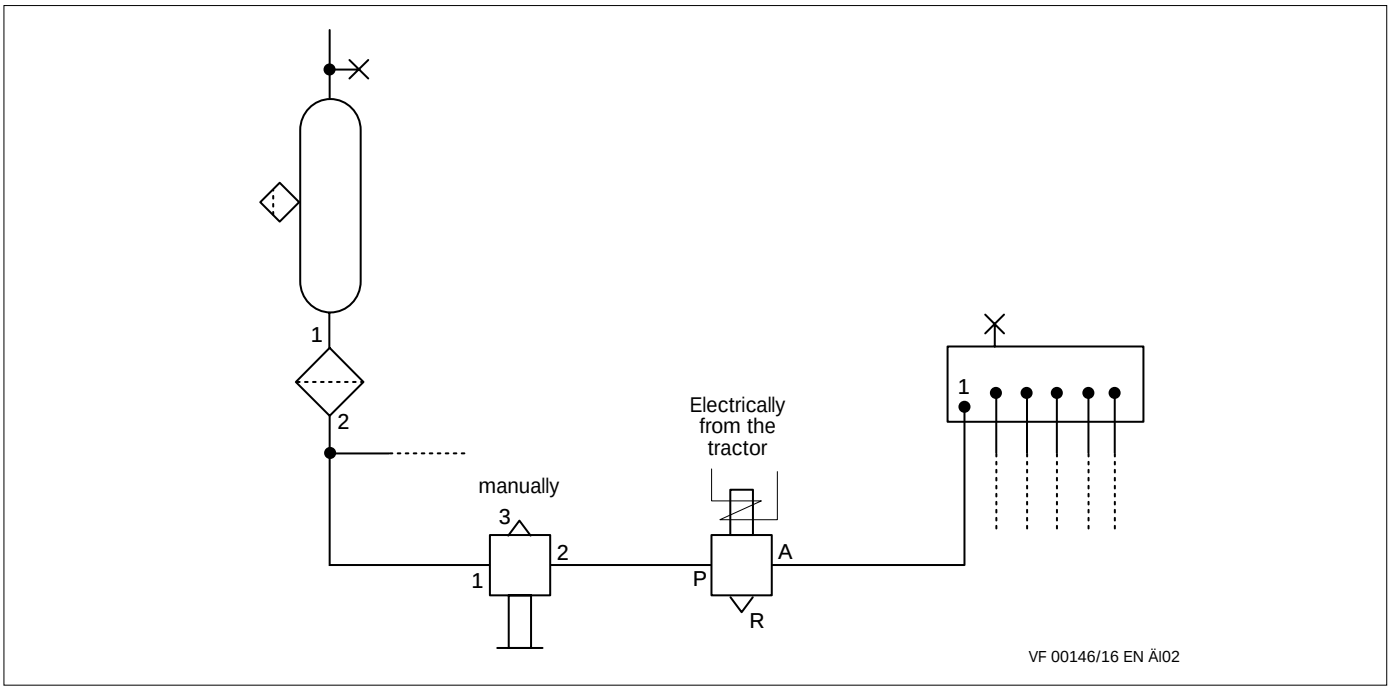


Lowering the Lift Axle

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 Control Valve.

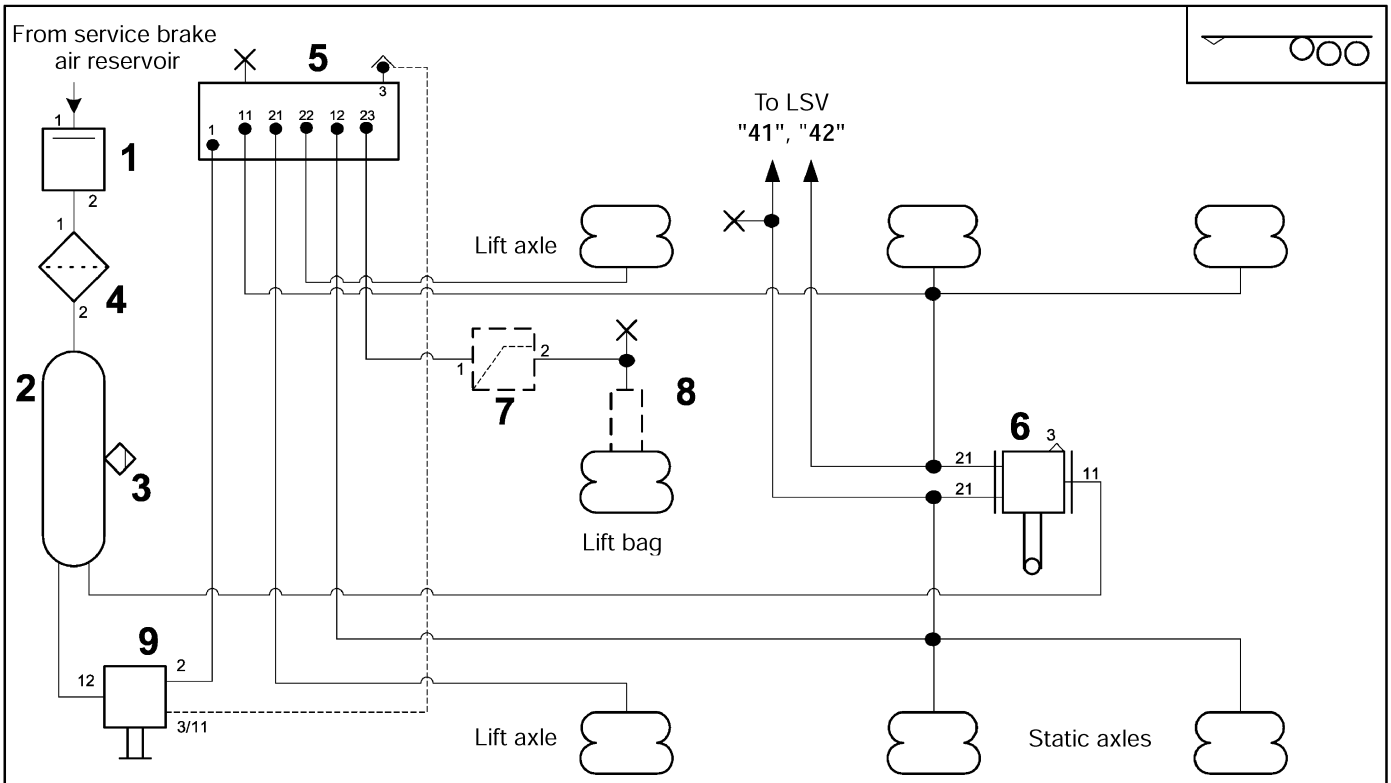


Examples:

AE4265	3/2 Valve with push button to lower lift axle manually
0481007043	3/2 Valve with turning button to lower lift axle manually
AE9120	3/2 Valve with push button to lower lift axle electrically

Section No.: K002496-002
Doc. No.: Y011379-EN-002
Catalogue No.: K001561-EN

System Diagram Example, dual circuit: 3-axle bogie without Raise / Lower Valve
1 Lift Axle with fully automatic control



*) plastic pipes: 8x1

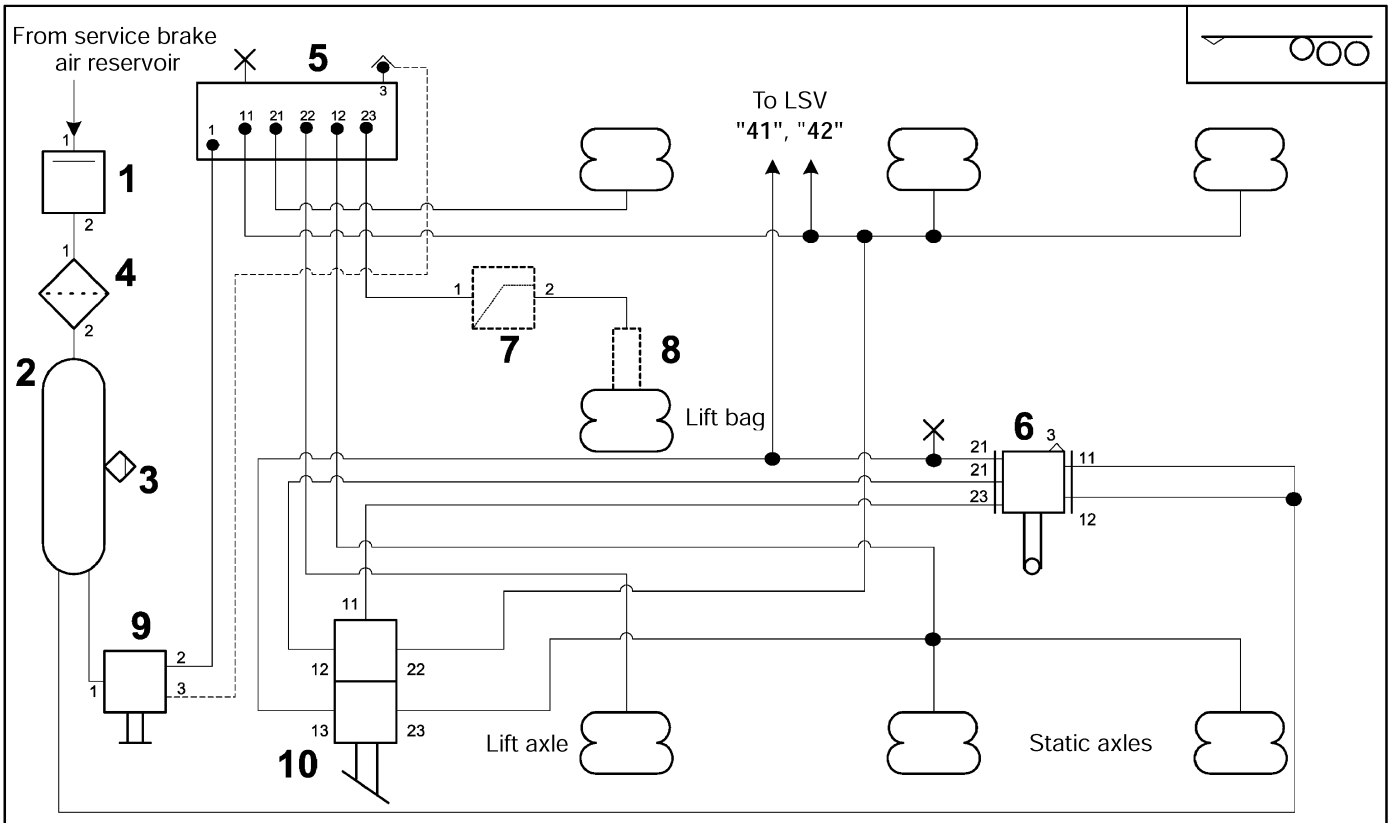
Pos.	Quantity	Name of component	Type No.
1	1	Charging Valve "Non Feedback"	DR4378
2	1(2)(3)	Air Reservoir V = ...l; Ø = ... mm	VB33..
-	2(4)(6)	Mounting clamps	VB1...
3	1(2)(3)	Drain Valve	EE1100
4	1	In-line Filter	LA2103
5	1	Fully-automatic Lift Axle Control	LS2000
6	1	Levelling Valve	SV1395/1460
-	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

VF00075/259 EN

Section No.: K002496-002
Doc. No.: Y011379-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

System Diagram Example, dual circuit: 3-axle bogie with Raise / Lower Valve
1 Lift Axle with fully automatic control



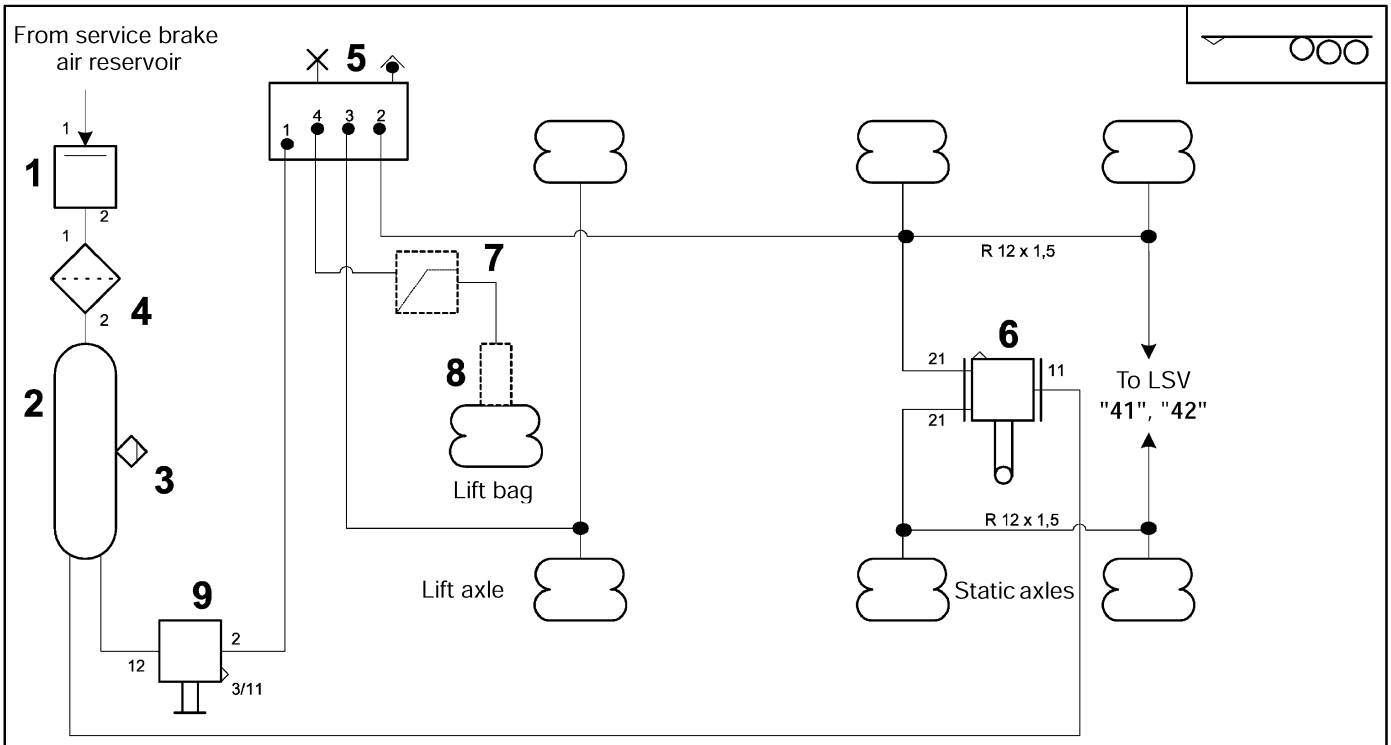
*) plastic pipes: 8x1

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 Retention Valve	LS1051
8	1	Pressure Limiting Valve	DB11..
9	1	3/2 Valve, manual control	AE4265
10	1	Raise / Lower Valve	SV3111
-	1	Mounting Bracket for SV 31..	-- 3111

VF00075/260 EN

Section No.: K002496-002
Doc. No.: Y011379-EN-002
Catalogue No.: K001561-EN

System Diagram Example, single circuit: Air suspension System for 3 axle semi-trailer with fully automatic Lift Axle control



*) not marked plastic pipes: 8x1

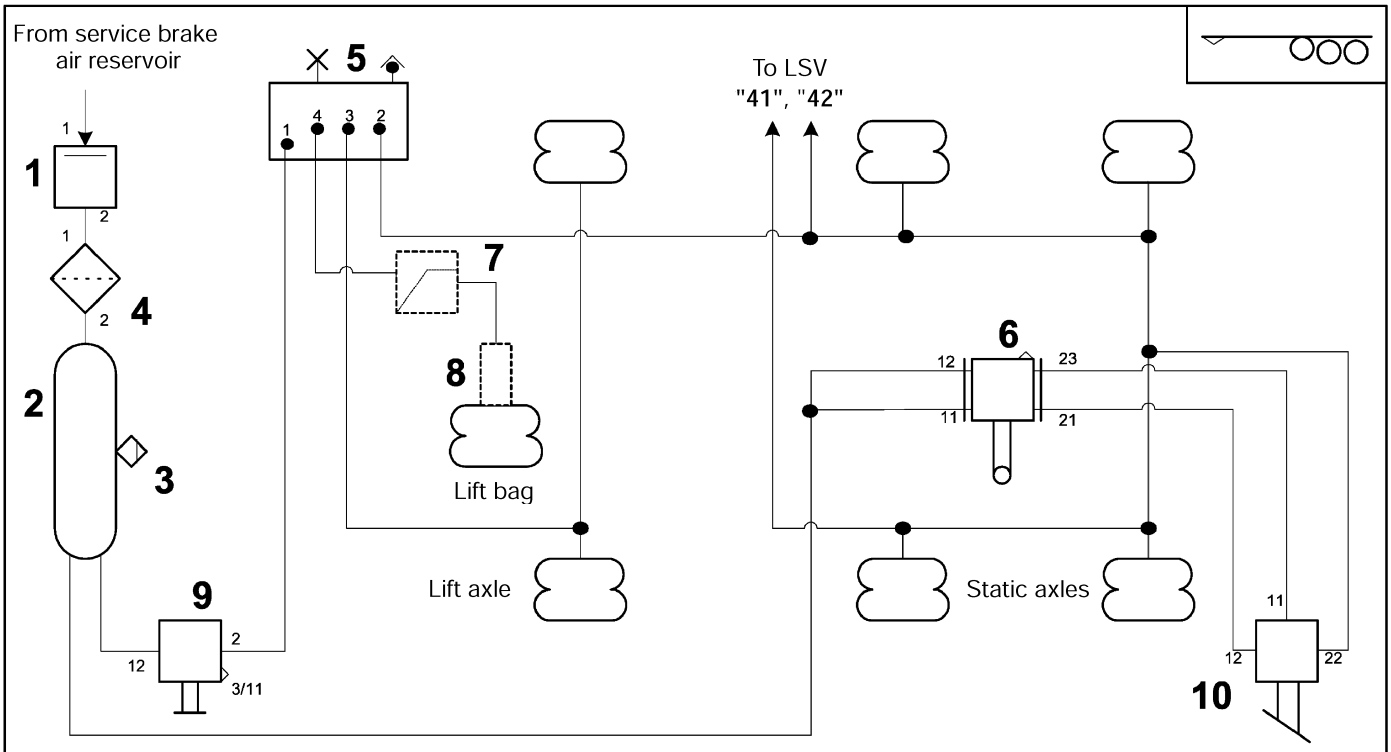
Pos.	Quantity	Name of component	Type No.
1	1	Charging Valve "Non Feedback"	DR4378
2	1	Air Reservoir V = ...l; Ø = ... mm	VB33..
-	2	Mounting clamps	VB1...
3	1	Drain Valve	EE1100
4	1	In-line Filter	LA2103
5	1	Fully-automatic Lift Axle Control, single circuit	LS3000
6	1	Levelling Valve	SV1395/1460
-	1	Rubber Joint for SV1...	K001406
7	1	Pressure Retention Valve	LS1051
8	1	Pressure Limiting Valve	DB11..
9	1	3/2 Valve, manual control	AE4265

VF00075/261 EN

Section No.: K002496-002
Doc. No.: Y011379-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

System Diagram Example, single circuit: Air suspension System for 3 axle semi-trailer with fully automatic Lift Axle control, with Raise / Lower Function



*) plastic pipes: 8x1

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 Retention Valve	LS1051
8	1	Pressure Limiting Valve	DB11..
9	1	3/2 Valve, manual control	AE4265
10	1	Raise Lower Valve, single circuit	SV316./SV32...

VF00075/262 EN

Section No.: K002496-002
Doc. No.: Y011379-EN-002
Catalogue No.: K001561-EN

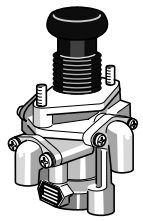
Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function

The Lift Axle Valve is generally used in conjunction with a "full feedback" Charging Valve (see page 77.1) on vehicles with air suspension to raise and lower a lift axle (see system diagram page 75.3).

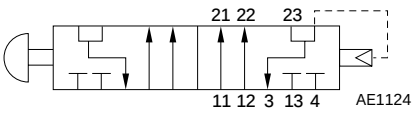
When the vehicle is laden, pressure in the non-lift axle suspension system exceeds the opening pressure of the Charging Valve and air flows to signal the Lift Axle Valve. The lift axle bellows are then automatically exhausted and its air bags are connected to the non-lift axle suspension system.

When the vehicle is unladen, the lift axle can be manually raised by depressing the push button and lowered by pulling it out again
.



GrF 0032

Standard Symbol as DIN ISO 1219



Technical Features

Maximum Operating Pressure:	8.5 bar
Maximum Temperature Range:	-40 °C to +80 °C
Medium:	Compressed Air
Maximum way through:	Ø 6.0 mm
Approximate Weight:	1.1 kg

Options

Type No.	Air Port Threads
AE1124	M12x1,5 – 12

Section No.: K002497-000
Doc. No.: Y011380-EN-000

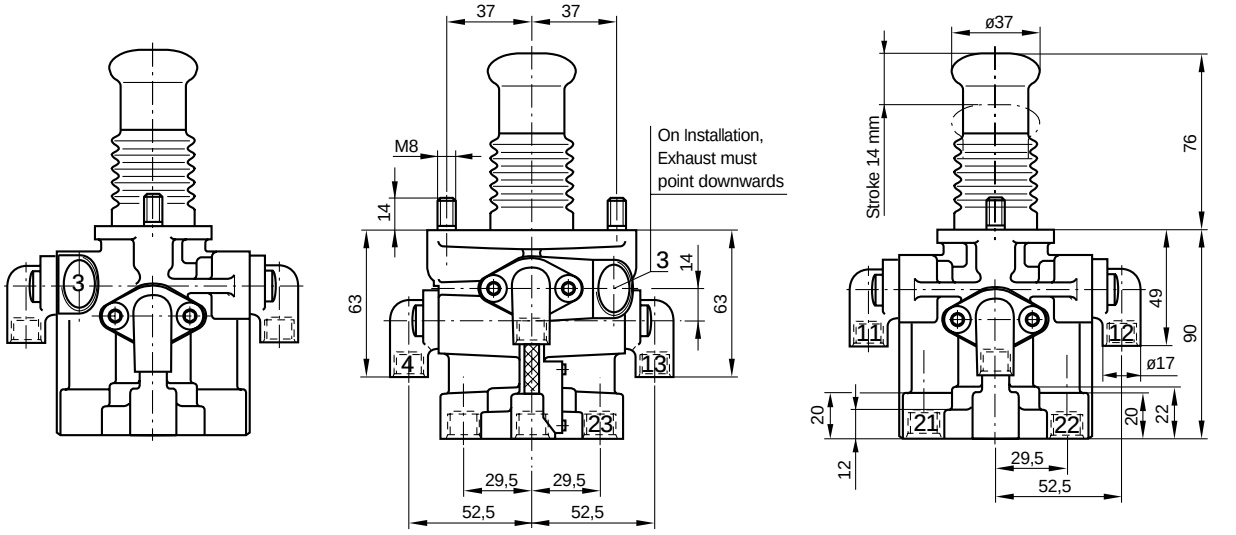
Catalogue No.: K001561-EN

Dimensions

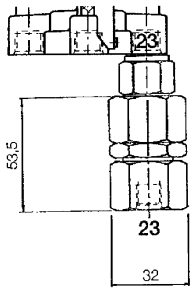
AE1124

Air Port Identification:

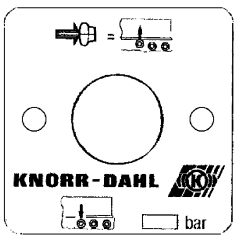
11	Right air supply from levelling velve / non-lift axle air bag(s)	21	Right air delivery to lift axle air bag
12	Left air supply from levelling valve / non-lift axle air bag(s)	22	Left air delivery to lift axle air bag
13	Air supply for lifting bellows from suspension reservoir	23	Air connection for lifting bellows
3	Exhaust	4	Signal from Charging Valve



Pressure Retention Valve

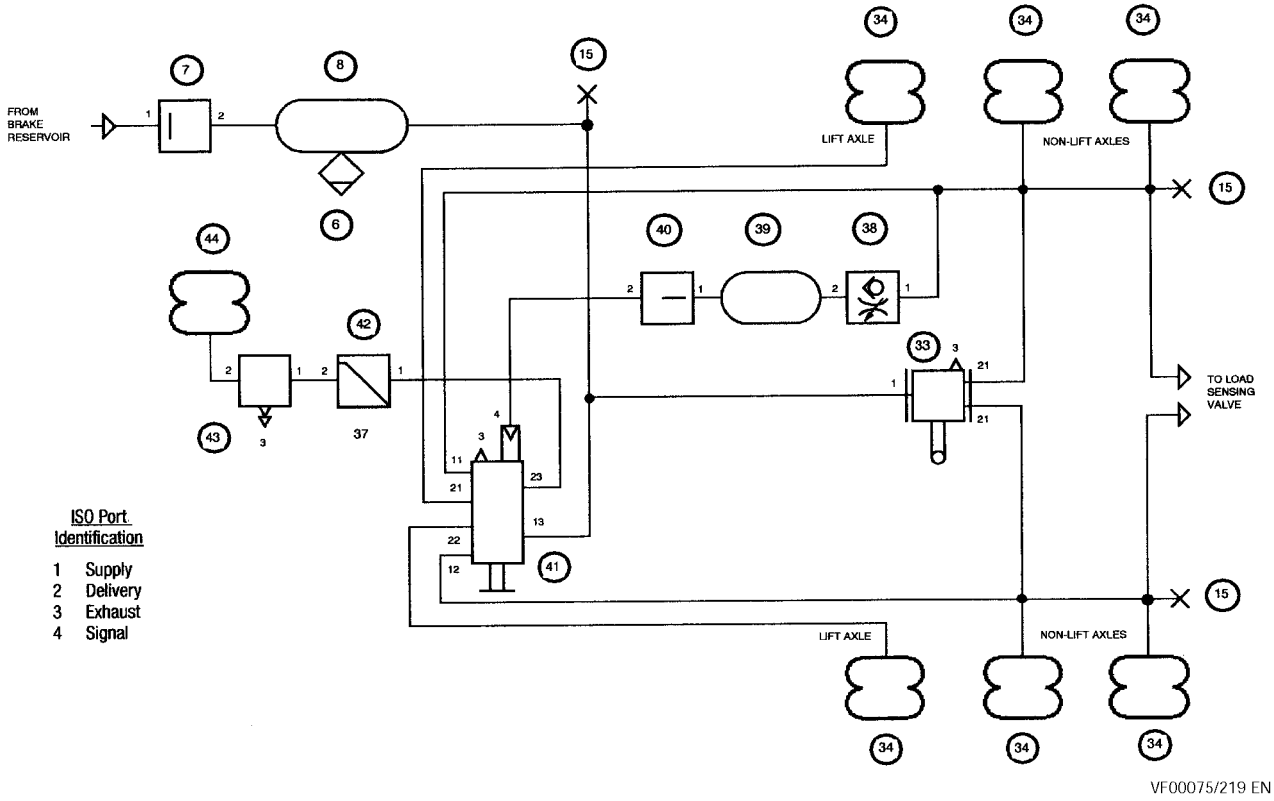


Operation Instruction Plate
Part Number 3EB01505



Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

System Diagram: Example on a 3 Axle Semi-trailer



Component Key:

6 Drain Valve
7 Charging Valve
8 Suspension Reservoir
15 Test Point
33 Levelling Valve
34 Suspension Air Bag
38 Throttle Check Valve
39 Damping Reservoir
40 Charging Valve
41 Lift Axle Valve
42 Pressure Limiting Valve
43 Quick Release Valve
44 Axle Lifting Bellows

Section No.: K002497-000
Doc. No.: Y011380-EN-000
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

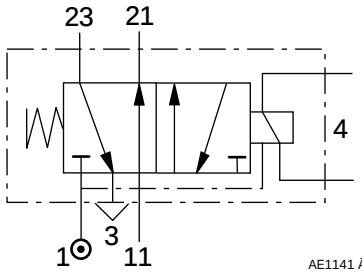
Function

The electrically controlled Lift Axle Valve is used for trailers with electronic braking systems to control the lift axle(s) fully automatically according to the vehicle load.
The load sensing and the electronic control functions are achieved by the EBS. Without electric power supply, the lift axle is lowered.

The lift axle 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 EBS incorporates RSP! In this case the lift axle is lowered by an electrical signal sent to the EBS; see page 40.2)
The valve can also be used as a solenoid valve for other applications as lift axle control. System diagram examples can be found an page 76.3.

VF 00199_303

Standard Symbol as DIN ISO 1219



AE1141 ÄI01

System Diagrams
see page 76.3

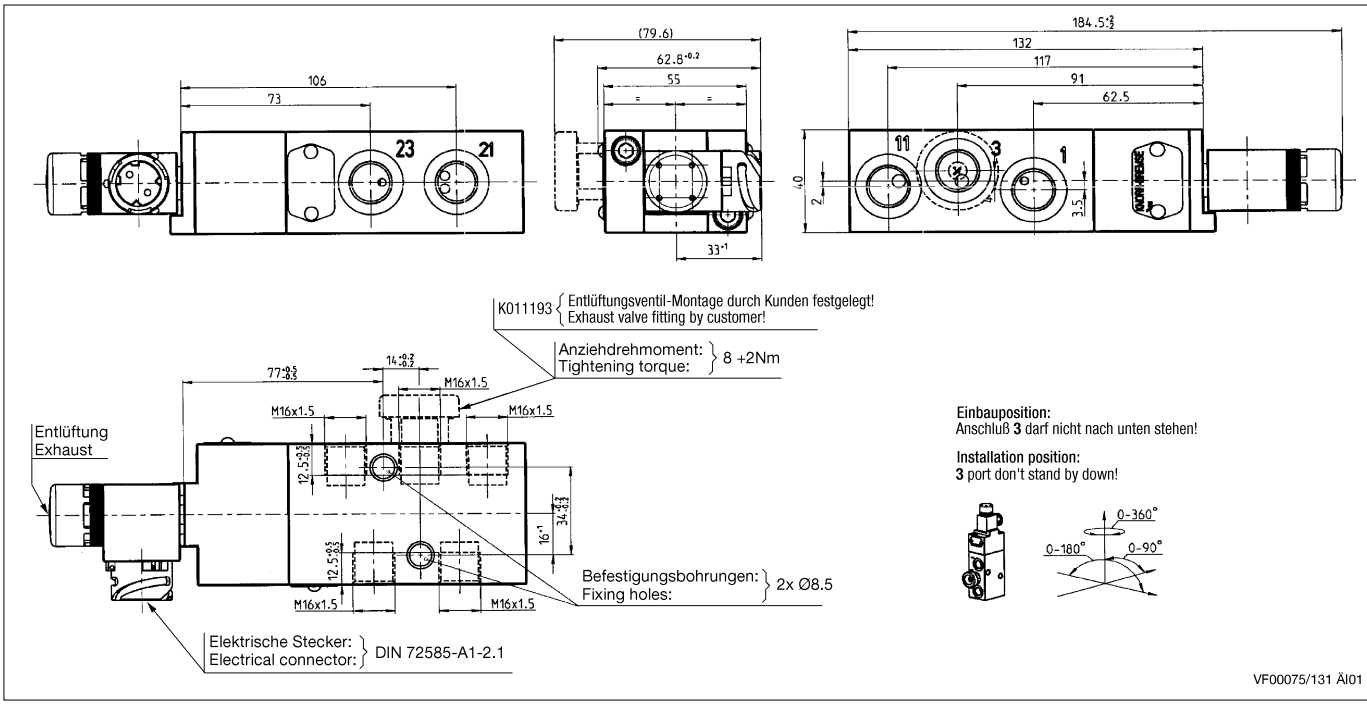
Technical Features

Maximum Operating pressure.:	10 bar
Operating Temperature Range:	-40 °C to +80 °C
Nominal Voltage:	24^{+8}_{-6} V DC
Medium:	Compressed Air
Approximate Weight:	0,8 kg

Product Overview

Type No.	Part No.	Ports 1, 11, 21, 23	Port 3
AE1141	K008546	M16x1,5	Thread M16x1,5

Dimensions

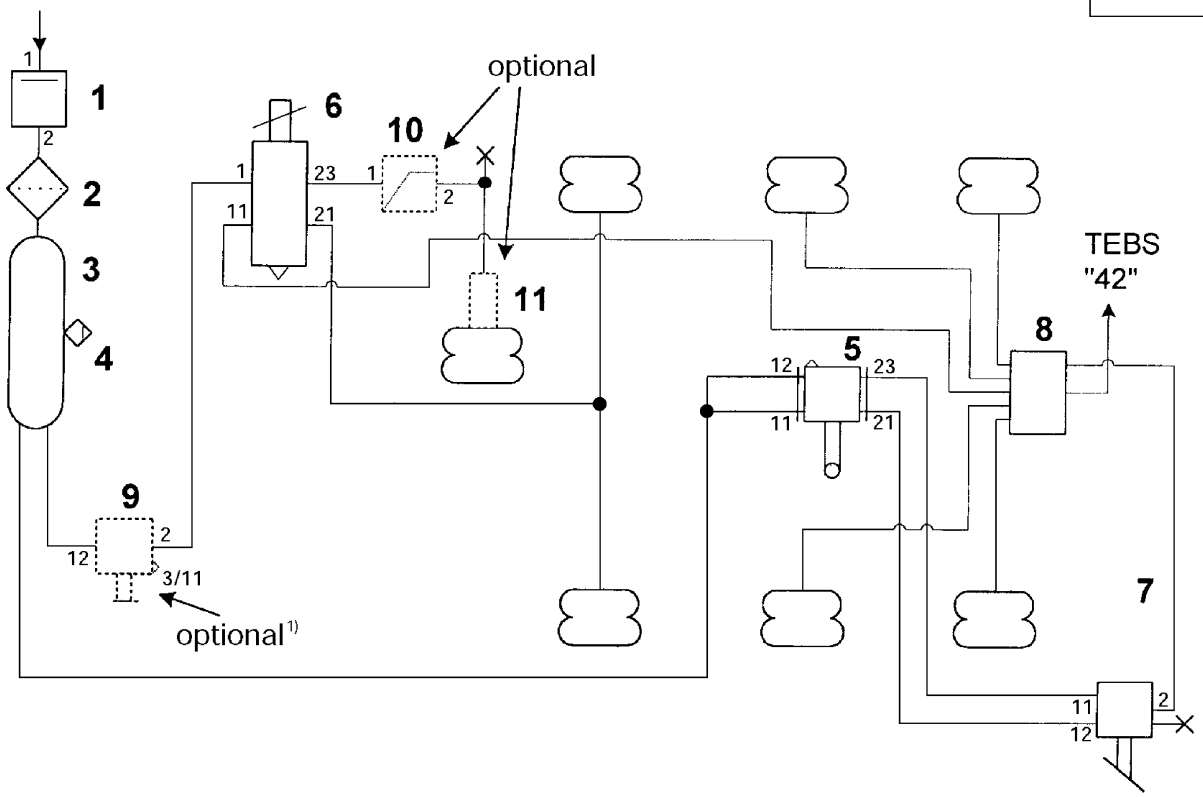


VF00075/131 ÄI01

Section No.: K002498-002
Doc. No.: Y011381-EN-002
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

System Diagram



1) not permissible if the **EBS** incorporates **RSP**

VF 00075/130 EN

Pos.	Name	Type- /Part-No.:	Quantity
1	Overflow Valve	**DR4378**	1
2	In-Line Air Filter	**LA2103**	1
3	Reservoir	**VB33..**	-
4	Drain Valve	**EE1100**	-
5	Levelling Valve with height limitation and secondary exhaust	**SV1466**	1
6	Lift Axle Control Valve	**AE1141**	1
7	Raise Lower Valve	**SV3240**	1
8	Distributor Block	**LS5...**	1
9	Operating Valve	**AE4265**	1
10	Pressure Limiting Valve (optional)	**DB1116**	1
11	Pressure Sustaining Valve (optional)	**LS1051**	1
-	Clamping band for Pos. 3; d=...mm	**VB1...**	-
-	Rubber joint at the lower end for Pos 5	**K001406**	1

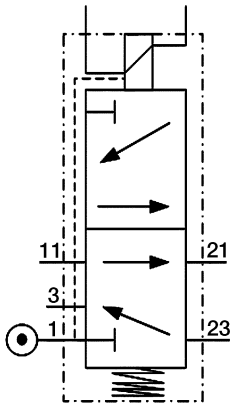
Air Suspension System for a 3 axle semitrailer with raise/lower function, one fully automatic lift axle controlled by TEBS (Trailer Electronic Braking System)

Section No.: K002498-000
Doc. No.: Y011381-EN-000
Catalogue No.: K001561

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

System Diagrams

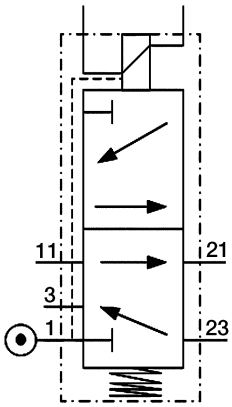
Supplied with current: charged



Legend:

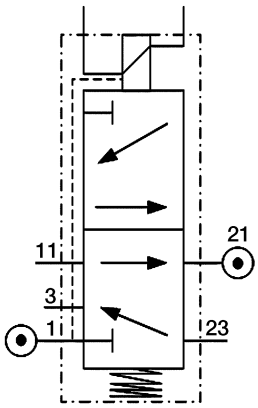
1 = Supply
23 = Output
3 = Exhaust
11 = to lock
21 = to lock

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

VF00075/285

Section No.: K002498-002
Doc. No.: Y011381-EN-002

Catalogue No.: K001561-EN

Function

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

Charging Valves are typically used to prevent suspension and auxiliary system reservoirs being supplied before the brake system reservoirs are fully charged.

The valves have an adjustable opening pressure which stops air pressure being delivered from the valve until the desired pressure is reached.

Charging Valves with Feedback can be used to control the load-dependent lowering of the lifting axle if the Lift Axle Control Valve AE1124 is used (see page 75.3)

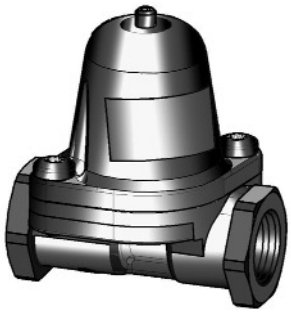
Charging Valves without Feedback can be used in the supply to the air suspension reservoirs to ensure priority is initially given to the service brake reservoirs.

Charging Valves fall into three main categories:

DR4150 has a full feedback function. Once the valve is open, air can flow unrestricted in both directions through the valve. If supply pressure drops, delivered pressure will feed back and this can continue until both supply and delivery pressures are zero.

DR4256 has a Limited Feedback function. Once the valve is open, air can flow unrestricted in both directions through the valve. However if the supply pressure drops, at a preset pressure the valve will close and the downstream pressure will no longer feed back irrespective of any further reduction in the supply pressure.

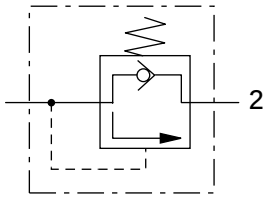
DR43.. valves have a Non-Feedback function. Once the valve is open, air can flow through the valve to increase the downstream pressure. However, if the supply pressure drops, a non-return valve prevents the return flow of air under all conditions.



VF00199_167

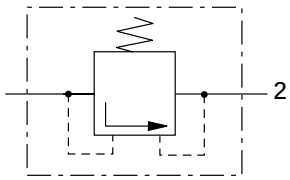
Standard Symbol as DIN ISO 1219

DR4150



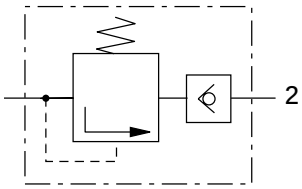
DR 4125

DR4256



DR 4232

DR4370
DR4378



DR 4341

Technical Features

Maximum Service Pressure:	20 bar
Operating Temperature Range:	-40 °C to +80 °C
Way Through:	Ø 8 mm
Medium:	Compressed Air
Approximate Weight:	0.2 kg

Section No.: K002499-001
Doc. No.: Y011382-EN-001

Catalogue No.: K001561-EN

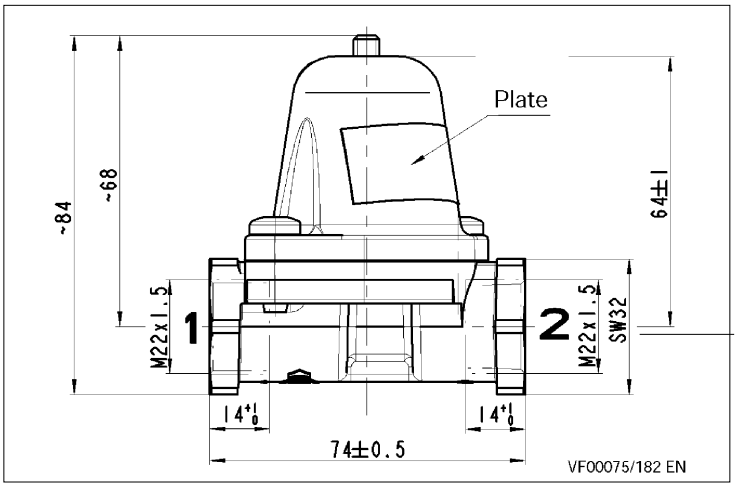
Options

Type No.	Opening Pressure [bar]	Closing Pressure [bar]	Feedback	Air Port Threads	Replaces:
DR4150	[1]	–	Yes	M22x1,5-14	DR4125
DR4256	6,0	5,4	Limited		DR4232
DR4370	[1]	–	No		DR4350
DR4378	6,0	5,4	No		DR4341

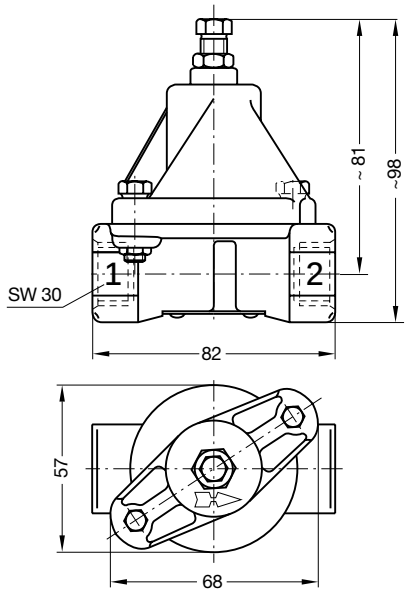
Other versions can be delivered on request!

Dimensions

DR4150
DR4256
DR4370
DR4378



DR4125
DR4232
DR4341
DR4350



[1] Setting Range 1 to 10 bar. After setting, mark the opening pressure on plate.

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Section No.: K002499-001
Doc. No.: Y011382-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function

These Control Valves are used for auxiliary systems on trailers. By depressing the button port 2 is pressurised, by pulling the button out port 2 is exhausted.

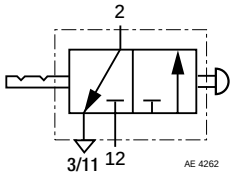
The valve exists in two versions that differ in the colour of the button only. The valve with the green button is typically used to lower lift axles on unladen vehicles (see page 74.6), the one with the white button is used for auxiliary functions that are not related to lift axle control (e.g. operating working cylinders). Both valves have detents in the end positions.

VF00199_170

Technical Features

Maximum Operating Pressure:	8.5 bar
Operating Temperature Range:	-40 °C to +80 °C
Way Through:	4.5 mm
Medium:	Compressed Air
Approximate Weight:	0.4 kg

Standard Symbol as DIN ISO 1219



Options

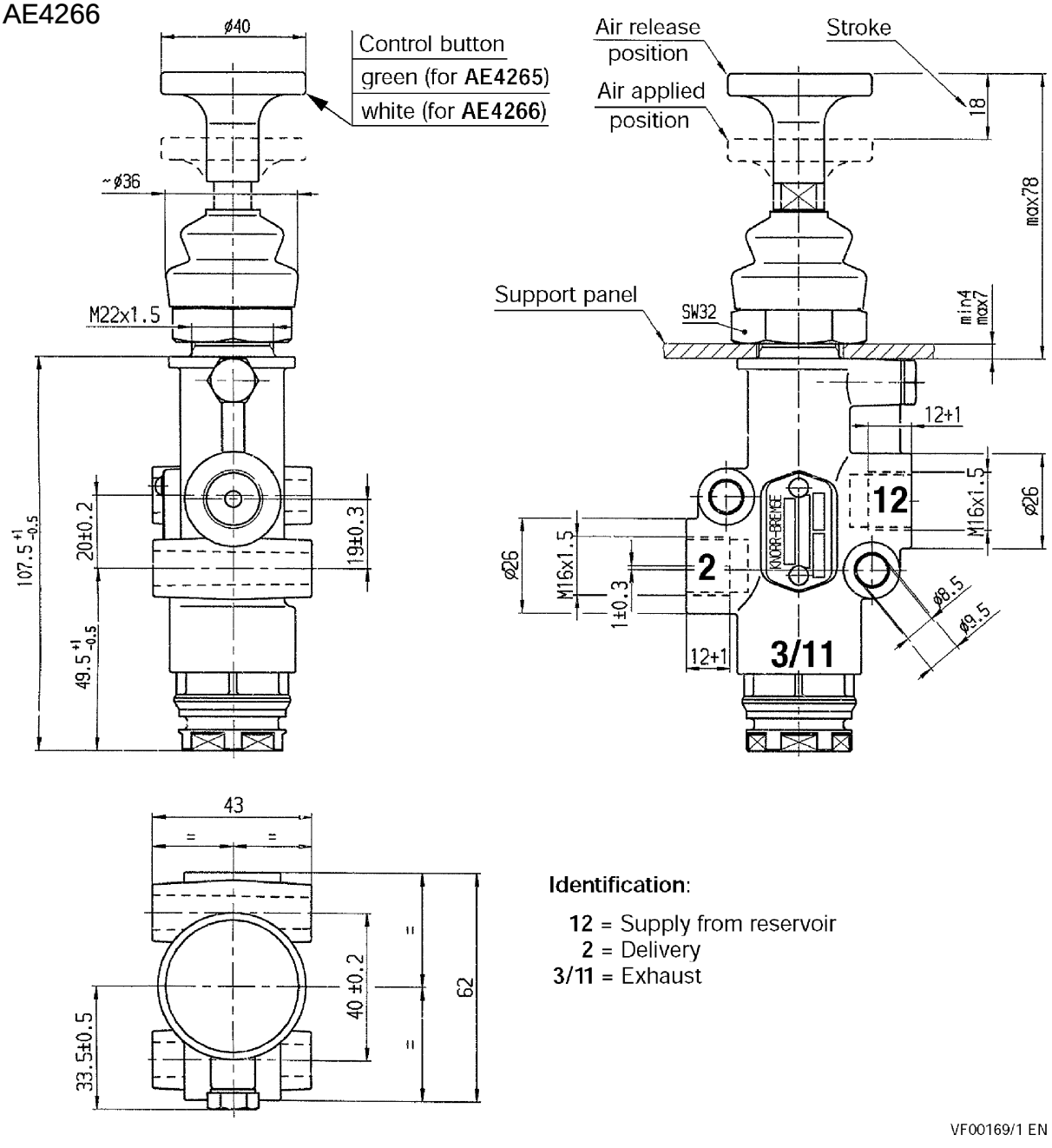
Type No.	Air Port Threads	Installation	Button	
			Colour	Shape
AE4265	M16x1,5	Auxiliary System	Green	Round, without symbol plate
AE4266			White	

Section No.: K002500-000
Doc. No.: Y011383-EN-000

Catalogue No.: K001561-EN

Dimensions

AE4265
AE4266



Identification:

12 = Supply from reservoir
2 = Delivery
3/11 = Exhaust

VF00169/1 EN

Section No.: K002500-000
Doc. No.: Y011383-EN-000
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function

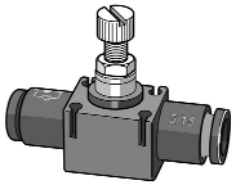
The Throttle Check Valve is used in air systems to control the rate of air flow in one direction.

The Valve can be used in combination with a small reservoir prior to the Charging Valve in the control line of the Axle Lifting Valve AE1124 (see page 75.3).

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.

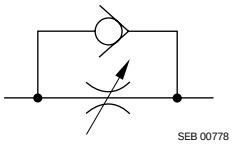
As the load imposed on the non-lift axle suspension is reduced, air pressure from the damping reservoir can flow un-throttled back into the suspension system.

The valve is supplied complete with pre-installed "push-in" fittings.



GrF 0011

Standard Symbol as DIN ISO 1219



SEB 00778

Technical Features

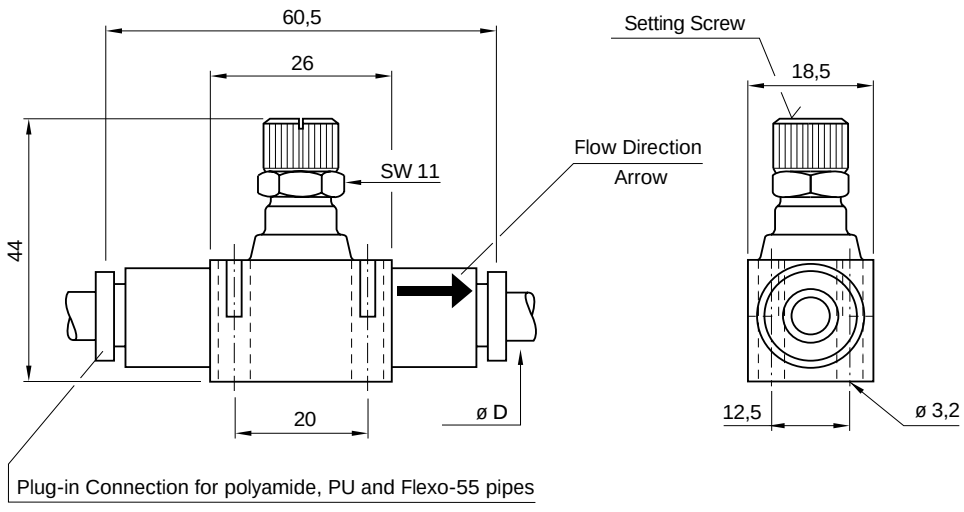
Maximum Operating Pressure:	10 bar
Operating Temperature Range:	-40 ºC to +80 ºC
Maximum Way Through:	Ø 2,5 mm
Medium:	Compressed Air
Approx. Weight:	0,05 kg

Options

Type No.	Fitting for Pipe Diameter "D"
–	8mm

Dimensions

SEB00778



VF 00075/59 EN

Section No.: K002501-001
Doc. No.: Y011384-EN-001
Catalogue No.: K001561-EN

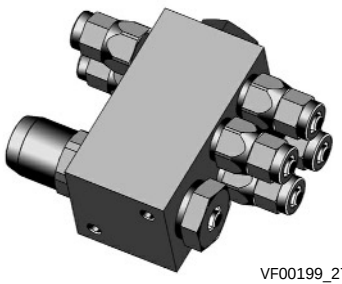
Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

Function

The Manifold Block is used for single circuit air suspension systems on semi-trailers or centre axle trailers.
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 manufacturer a significant number of connectors and installation time.

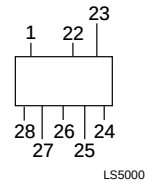
(See also position 18 of the system drawing with EBS in the content chapter).

LS5500 is normally used on 3 axle semi-trailers without lift axle and LS5501 on 3 axle semi-trailers with one lift axle.

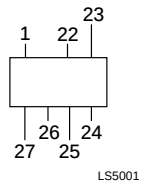

VF00199_276

Standard Symbol as DIN ISO 1219

LS5500



LS5501



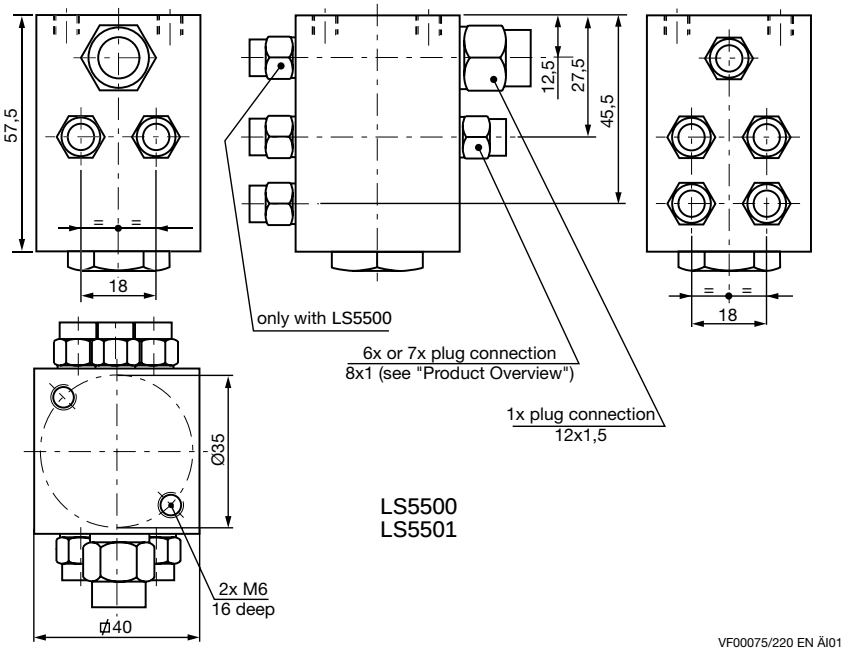
Technical Features

Maximum Operating Pressure:	10 bar
Operating Temperature Range:	-40 °C to +60 °C
Medium:	Compressed Air
Approximate Weight:	0,5 kg
Surface:	Elox

Product Overview

Type No.	Supply Connection (push-in fittings)	Delivery Connections (push-in fittings)
LS5500	1 connector 12 x 1,5	7 connectors 8 x 1
LS5501	1 connector 12 x 1,5	6 connectors 8 x 1

Dimensions



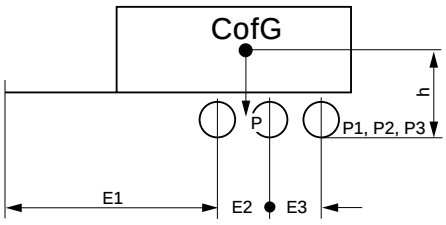
Section No.: K002502-001
Doc. No.: Y011385-EN-001
Catalogue No.: K001561-EN

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

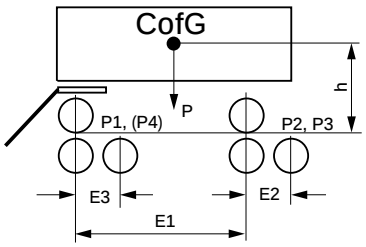
90. Data Sheet for Brake Calculation

Trailer Manufacturer:		
Trailer Type:		
☐ With TEBS ☐ With ABS	Number of teeth of the pole wheel:	Desired ABS configuration: ☐ 2S/2M ☐ 4S/2M ☐ 4S/3M
☐ Without ABS	$v_{max.}$ [km/h]:	
☐ With Trailer Information Module (TIM)		

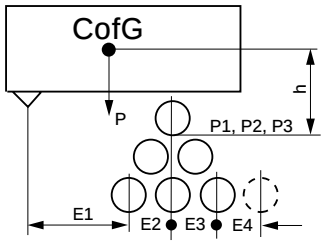
☐ Centre Axle Trailer



☐ Drawbar Trailer



☐ Semi-Trailer



VF00075/211 EN

			Unladen	Laden	Actuator Type Size / Number
Total Weight	P	kg			
Load at Axle 1	P1	kg			
Load at Axle 2	P2	kg			
Load at Axle 3	P3	kg			
Load at Axle 4	P4	kg			
Height of Centre of Gravity	h	mm			

For all trailers:

Wheelbase:

E1 [mm]:	E2 [mm]:	E3 [mm]:	E4 [mm]:

Tyre Size or Dynamic Tyre Radius:		
Possible lever length:		
Spring brake parking:	☐ Yes	☐ No
Lifting axle:	☐ Axle 1	☐ Axle 2 ☐ Axle 3
Suspension:	☐ Air suspension	☐ Mechanical suspension
Spring deflection (mechanical suspension):	△ (unladen : laden) [mm]:	
Trailing steer axle:	☐ Yes	☐ No
Suspension type:	☐ Balanced (non-reactive)	☐ Not balanced (reactive)
Axle Manufacturer:		Axle Type:
Brake Size:		Test Report No.:

To help Knorr-Bremse complete your brake calculation quickly and efficiently, please complete all sections of the Data Sheet!

If the trailer is not easy to describe, please provide additional data (sketches)!

Section No.: K002503-000
Doc. No.: Y011386-EN-000
Catalogue No.: K001561-EN-001

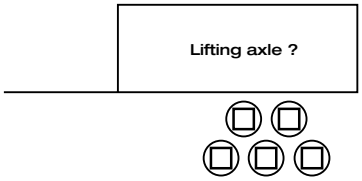
Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

90. Data Sheet for Brake Calculation and Air Suspension

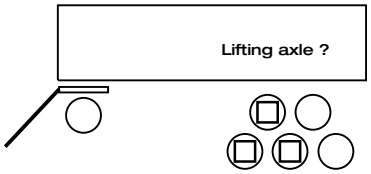
Trailer Manufacturer:		
Trailer Type:		
Characteristics:		
RSP:	☐ Yes	☐ No
Main power supply via Stop Light:	☐ Yes	☐ No
Combined Park / Shunt Valve:	☐ Yes	☐ No
Separate Release Valve for the front axle:	☐ Yes	☐ No

Air Suspension characteristic:

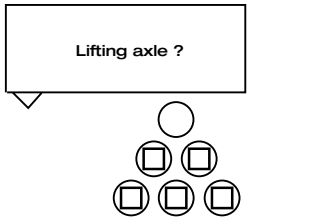
☐ Centre Axle Trailer



☐ Drawbar Trailer



☐ Semi-Trailer



VF00075/212 EN

Air Suspension manufacturer and Type No.:	Air Spring Bellow diameter:	Suspension arm lengths: L_1 = L_2 =	Bellows pressure: unladen = laden =

Design of the air suspension:	☐ Single circuit	☐ Dual circuit	
Air suspension with limitation of height:	☐ Yes	☐ No	
With lifting and lowering:	☐ Yes	☐ No	
→ with Reset to Ride:	☐ Yes	☐ No	
→ if no, with automatic return to STOP position:	☐ Yes	☐ No	
Bilateral separated lowering:	☐ Yes	☐ No	
Trailer with lifting axle control:	☐ Yes	☐ No	
→ if yes, please mark the position in the drawing			
Design of the lifting axle control:	☐ Via TEBS	☐ Conventional	
→ if conventional:	☐ Fully automatic	☐ Semi-automatic	
Traction help:	☐ Yes	☐ No	
Forced lowering of the lifting axle:	☐ Yes	☐ No	
→ if yes, design:	☐ Electrically	☐ Manually	☐ Both
Rapid bleed of the bellows:	☐ Yes	☐ No	
Adjustment of the zero point (2nd ride height):	☐ Yes	☐ No	

If the trailer is not easy to describe, please provide additional data (sketches)!

Section No.: K002503-000
Doc. No.: Y011386-EN-000
Catalogue No.: K001561-EN-001

Y007570: EN: 004: MAX1: Released:Webmaster: 2008/02/27-19:32:33

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