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VOGEL®

Centralized Lubrication for Wheel+Rail

Standard systems and special solutions based on decades of experience

Wheel flange lubrication systems for:

- High-speed trains
- Local trains
- Shunting engines
- Subway and elevated trains
- Streetcars

SKF

Table of Contents

This catalog will show you how VOGEL wheel flange lubrication systems work so that you can plan, install and properly maintain corresponding systems.

A wheel flange lubrication system is installed either by the manufacturer at the factory or at a later date by trained shop staff, our skilled personnel or by you yourself if you have the requisite knowledge. We provide supportive technical training and assembly training courses for this purpose.

VOGEL sells wheel flange lubrication systems for nearly every kind of rail vehicle such as locomotives, multiple-train units, subways, elevated trains and streetcars as well as other rail-bound vehicles. System plans and parts lists are available for a large number of applications.

VOGEL's field staff will be pleased to advise you. Make use of our experience!

VOGEL Centralized Lubrication for Wheel+Rail Cuts Life Cycle Costs (LCC), Friction and Wear!

- **Track resistance drops by 30 to 35%,**
  more energy available.
  No effect on traction or braking.
- **12 to 15% less energy consumed**
  Lower energy costs make themselves felt at once.
- **Wear cut by 30 to 80%.**
  Longer intervals between reshaping or replacement of wheel sets ans rails,
  maintenance time is minimized.
- **Greater safety**
  Less danger of derailment because
  it is harder for wheel flanges to climb out of the tracks.

VOGEL systems are in use around the world. Our products provide solutions to problems in any operating conditions: Pin-point accuracy with no compromises!

Introduction

Importance of wheel flange lubrication

When rail vehicles are in motion the friction between the wheel and rail leads to high wear and tear on the wheel flanges and rail faces, undesirable screeching (above all in curves) and considerable energy losses during acceleration. Moreover, the danger of derailment also grows when wheel flanges are left unlubricated.

Selective, precision application of lubricant to the flange faces of the locomotive or motor car wheels lubricates not only these wheels and rail face but also all the following wheels, e.g. of passenger or freight cars.

The lubricant sprayed on the first wheel flange in the direction of travel is transferred to the rail face, thus lubricating the following wheel flanges.

Optimally configured wheel flange lubrication systems supply as many as 250 axles. A large number of motor cars with wheel flange lubrication assures requisite lubrication of the rail network, the basis on which wheel flange lubrication systems achieve the desired effect.

The service life of wheelsets and tracks can be considerably extended. Travel of up to 500,000 km before the wheelsets have to be recontoured is no longer a rarity. A wheel flange lubrication system often pays for itself in just one year's time. And that doesn't include the savings resulting from longer rail life, above all in curves.

Thanks to their high reliability and important developments in control and monitoring techniques, VOGEL wheel flange lubrication systems can be adapted to any type of rail vehicle.

Types of wheel flange lubrication

VOGEL has been producing and selling various types of wheel flange lubrication systems for rail vehicles for many years now.

The systems assure high metering accuracy, regardless of fluctuations in air pressure or temperature. That is one of their main advantages and the reason for their worldwide spread.

A large number of possible combinations and perfected control technology make it possible to choose the optimal wheel flange lubrication system for the respective operating conditions.

Control and monitoring

If until recently the control of wheel flange lubrication systems was generally seen to by the vehicle's control system, e.g. the locomotive, increasing use is now being made of special control and monitoring equipment designed exclusively for wheel flange lubrication. This is especially the case when the usual functional range of the vehicle's control system isn't up to the special needs of wheel flange lubrication, or when a clear separation of responsibility is desired and the user should be able to make necessary changes in lube operations (e.g. shorter lube intervals, switchover from time- to distance-dependent control) without having to interfere with the vehicle software.

Comparision of VOGEL systems

System	SP8 / SP10	SP9	Tram
Line lengths	max. 10 m	max. 5 m	max. 10 m
Delivery pressure/lubricant	100 bars	8 bars	38 bars
Lubricant feed	piston pump	grease reservoir	piston pump
Reservoir capacity	5 liters	up to 6 liters	3 liters
Two directions of travel	●	special model	special models
Distance-dependent lubrication	●	●	●
Curve-dependent lubrication	●	●	●
Time-dependent lubrication	●	●	●
Temperature range	–25 to +80 °C	–25 to +80 °C	–25 to +80 °C
Special model	down to –40 °C	down to –40 °C	
Lubricant	fluid grease NLGI grade 000 or 00	fluid grease NLGI grade 000 or 00	fluid grease NLGI grade 000 or 00
Metered quantity, standard	0.03 ccm/spray	0.03 ccm/spray	0.04 ccm/spray

Lubricants

The quality of the lubricants has a decisive influence on the efficacy of the lubrication applied to the wheel-rail interface. In the end, it determines the friction, wear and noise. In the last few years attempts have been made to achieve optimal surface smoothness and minimal wear with the help of increasingly higher percentages of solids. Regardless of the fact that a certain amount of wheel flange wear is necessary for proper functioning of the wheel-rail interface, since undesirable growth in the diameter of the wheel flange likewise increases the danger of derailment, solid particles in the lubricant are only good as long as they do not lead to clogged systems, thereby jamming the wheel flange lubrication installation.

That is why the makers of lubricants and wheel flange lubrication systems as well as the operators of rail vehicles have all worked together to develop a number of special biodegradable lubricants for wheel flange lubrication systems and separating agents for railhead lubrication. The greases are made of substances that are broken down into their basic ingredients by ubiquitous microorganisms as quickly and completely as possible. They have to be usable not only for new wheel flange lubrication systems but also for the thousands of systems installed years ago.

In general, NLGI grade 000 and 00 fluid grease is used in the systems made by VOGEL. The grease can contain as much as 30 % solids. The systems can also be operated with all the wheel flange lubricating grease approved by the Deutsche Bahn AG (German Railways).

The lubricants recommended for certain types of systems by the manufacturers can be found in corresponding lists of approved products. After extensive testing the Deutsche Bahn AG, for instance, also assigns so-called “material numbers” to suitable lubricants and approves them for use in its vehicles.

The lubricants approved for VOGEL's wheel flange lubrication systems can be found in an updated list on the Internet at www.vogelag.com.

List of lubricants approved by VOGEL for wheel flange lubrication systems

Designation	Supplier	Service temperaturs [°C]
LOCOLUB NSB *)	Fuchs Lubritech GmbH	–40 to +60
LOCOLUB ECO *)	Fuchs Lubritech GmbH	–30 to +60
Alvania RSB	Shell	–25 to +60
Raillub 30/50 *)	IGRALUB	–40 to +60
DIVINOL Spurkranzschmierstoff *)	Zeller & Gmelin GmbH & Co	–25 to +50
Bio Top 9418 *) 1)	Tribol	–25 to +60
Berolube Ecoflange	C. Bechem GmbH	–25 to +60

*) *rapidly biodegradable*

1) *Pressure has to be relieved if left to stand in SP9 systems for extended periods of time.*

System SP8

Description of system

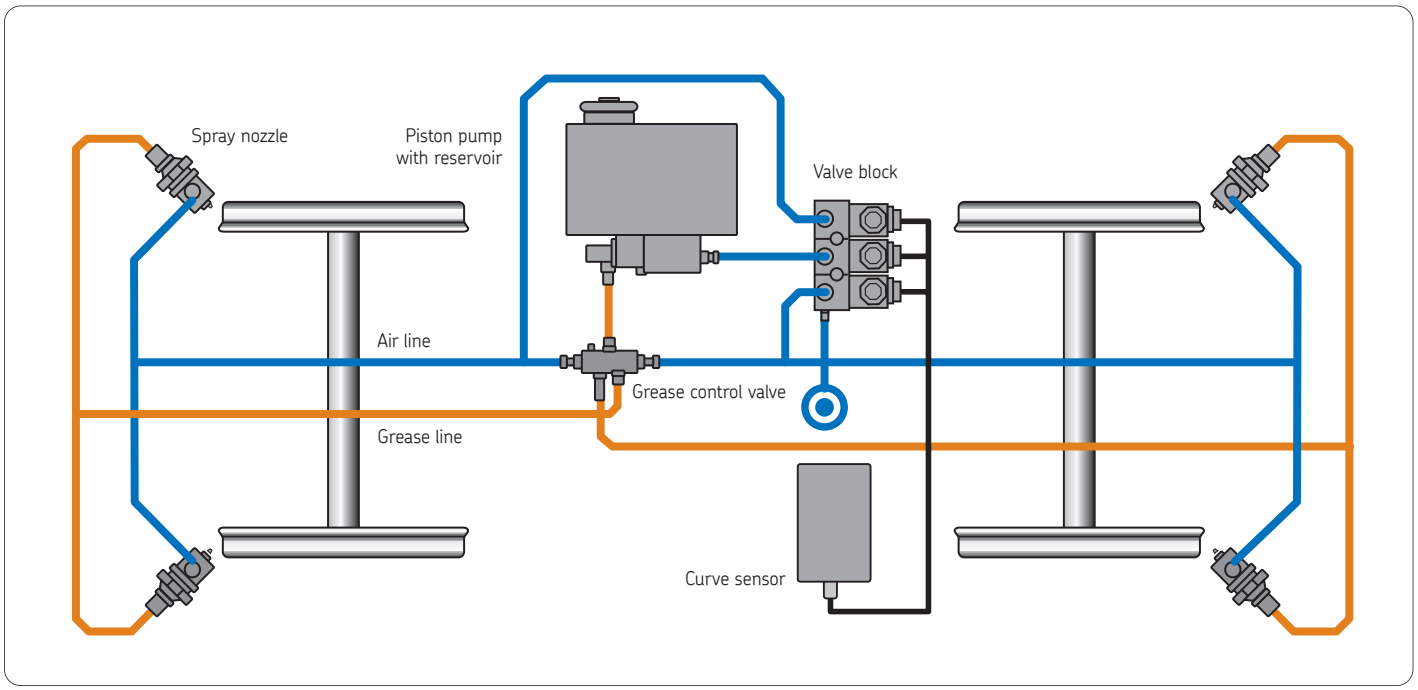
The SP8 wheel flange lubrication system is used mainly on large locomotives. The spray nozzles supply lubricant to the wheel flanges on the leading axle and/or the wheel flanges of the respectively leading axle on a bogie. The lubricant is transferred from the wheel flange to the rail face, where it reduces friction between the following wheel flanges and rail face as well.

Function

The pump feeds the lubricant to the grease control valve.

From the grease control valve the lubricant is directed to the spray nozzles for the first axle in the relevant direction of travel.

The lubricant is metered in the spray nozzles and sprayed onto the wheel flanges with compressed air.



Application

- Rail vehicles with a maximum of 20 m distance between the wheelsets to be sprayed
- Max. line length between pump and spray nozzle: 10 m
- Low ambient temperature

Advantages

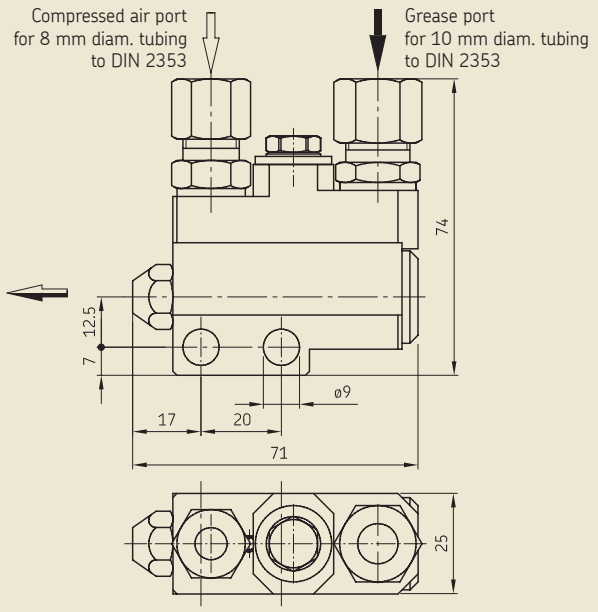
- System pressure: 100 bars
- selectable: 2 directions of travel
- separate expendables feed
- exact spray-nozzle metering

Components

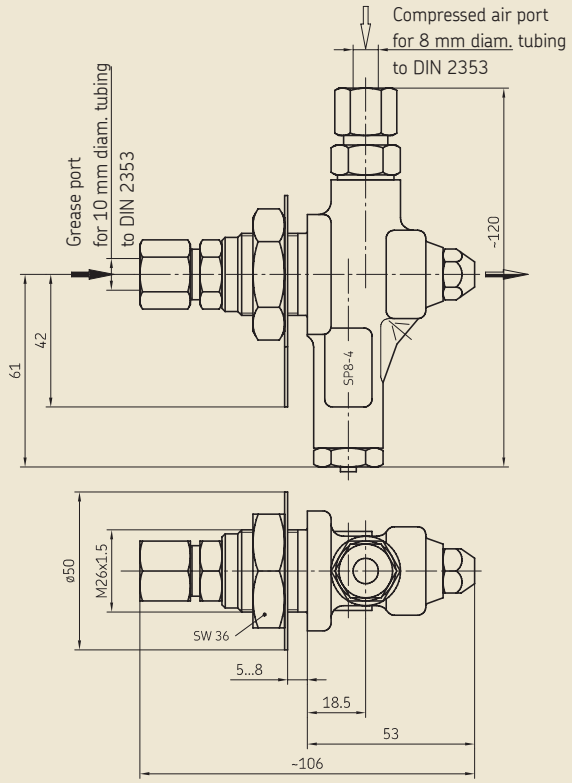
Piston pumps with reservoir
PF-100-21, 112-508-042
Spray nozzles SP8-4, SP8-2, SP10
Grease control valve SF10
Actuated via valve unit STG12-2 or STG13, 3/2-way valve

SP10, SP8-4, SP8-2 Spray nozzle

SP10

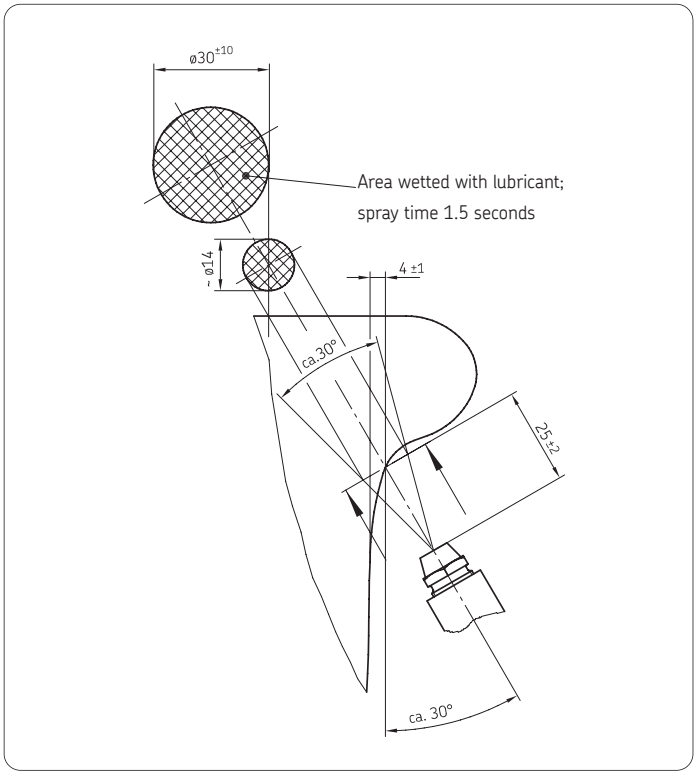


SP8-4 / SP8-2



Adjustment of spray nozzle

The spray cone is angled at approx. 30°. The spray nozzle is set to an angle of approx. 30° to the wheel's contact surface.
The throat between the contact surface and wheel flange is struck by the spray.
The nozzle should be 25 ±2 mm from the point in the throat struck by the spray.
The area wetted with lubricant on a wheel at rest has a diameter of 30 ±10 mm after being sprayed for 1.5 seconds.



Technical data

Order No.	**SP10**
Rated spray quantity	0.03 ccm/actuation
Order No.	**SP8-4**
Rated spray quantity	0.03 ccm/actuation
Order No.	**SP8-2**
Rated spray quantity	0.05 ccm/actuation
Air pressure	6 to 10 bars
Air consumption	~ 3 NL (at 6 bars/1.5 s)
Temperature range	–25 to +80 °C
Medium pressure	100 bars
Lubricant	fluid grease, NLGI grade 000, 00
Actuation	max. 0.7 Hz
Mounting position	any

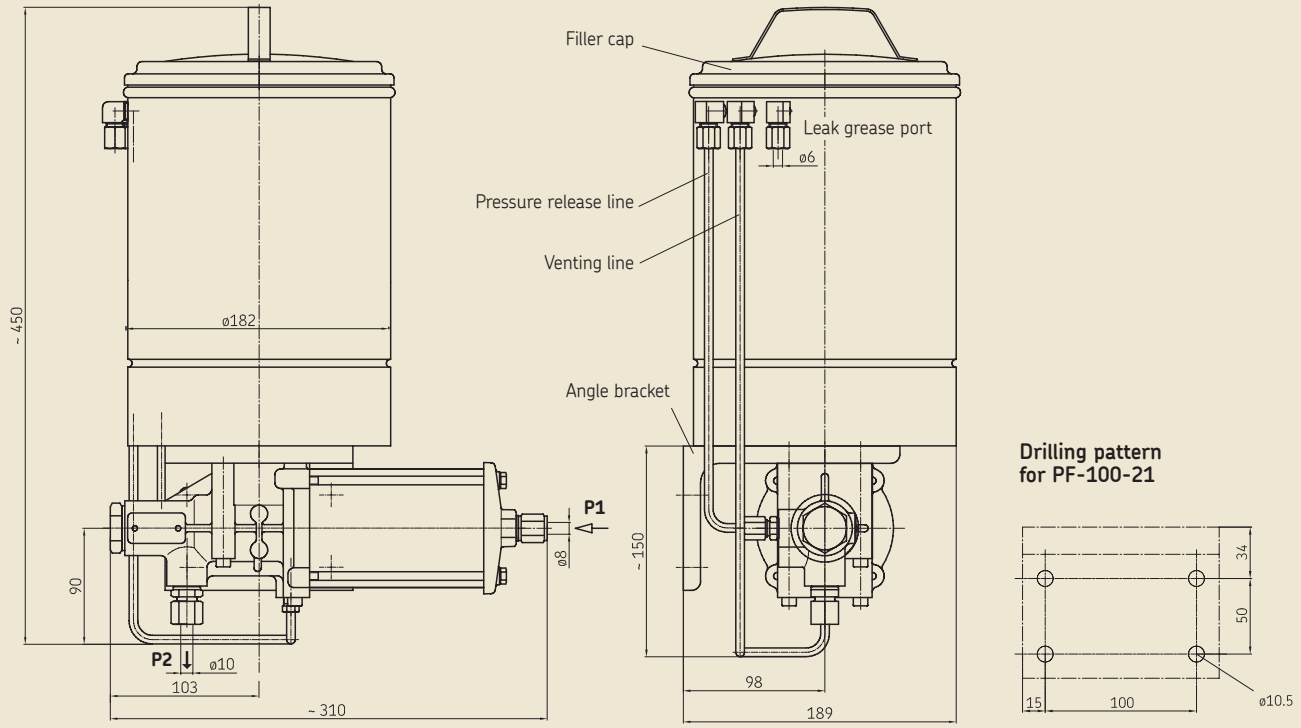
PF-100-21 Piston pump with reservoir

Technical data

Order No.	**PF-100-21**
Reservoir capacity	5 liters
Delivery volume	12 ccm/stroke
Delivery pressure	100 bars
Lubricant	Fluid grease, NLGI grade 000, 00
Air pressure	6 to 10 bars
Area ratio	
air side : grease side	10 : 1
Drive medium	filtered compressed air
Ambient temperature	–25 to +80 °C
Mounting position	as shown

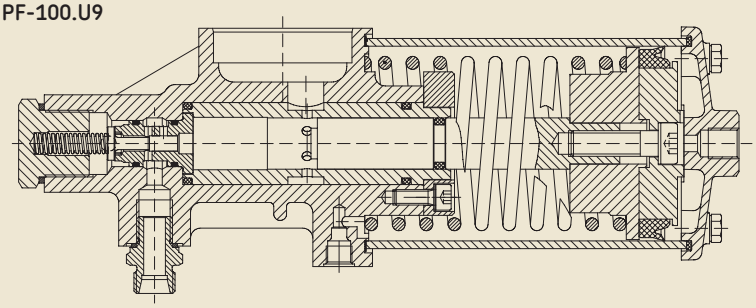
The piston pump must only be installed inside!

PF-100-21



P1 = air line from compressed air network
P2 = main line of system

Order No. PF-100.U9



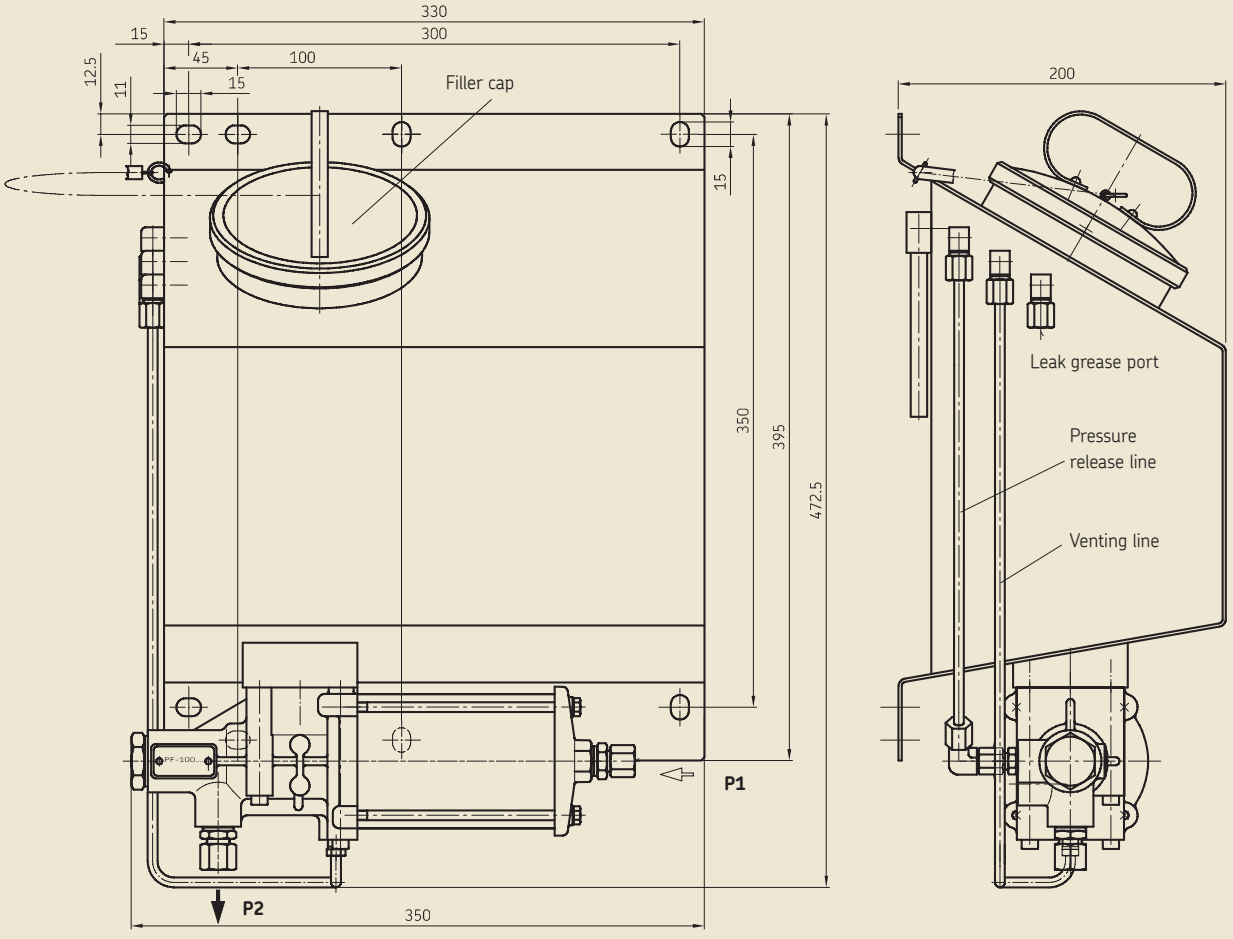
112-508-042 Piston pump with reservoir

Technical data

Order No.	**112-508-042**
Reservoir capacity	11 liters
Delivery volume	12 ccm/stroke
Delivery pressure	100 bars
Lubricant	Fluid grease, NLGI grade 000, 00
Air pressure	6 to 10 bars
Area ratio	
air side : grease side	10 : 1
Drive medium	filtered compressed air
Ambient temperature	–25 to +80 °C
Mounting position	as shown

The piston pump must only be installed inside!

112-508-042



P1 = air line from compressed air network

P2 = main line of system

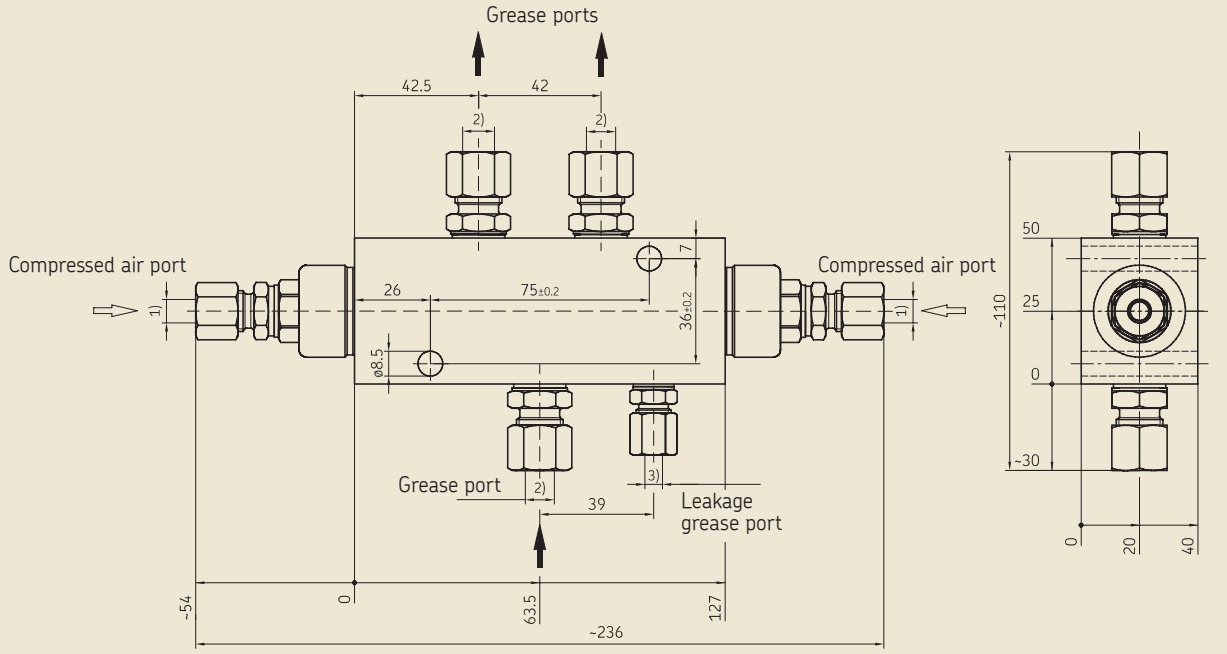
SF10 Grease control valve

The grease control valve controls the flow of lubricant in the SP8 system, e.g. for curve-dependent lubrication (left/right spray nozzles) or distance-dependent lubrication (front/rear spray nozzles).

Technical data

Order No.	**SF10**
Air pressure	6 to 10 bars
Lubricant	fluid grease, NLGI grade 000, 00
Lubrication pressure	100 bars
Ambient temperature	–25 to +80 °C
Mounting position	as shown

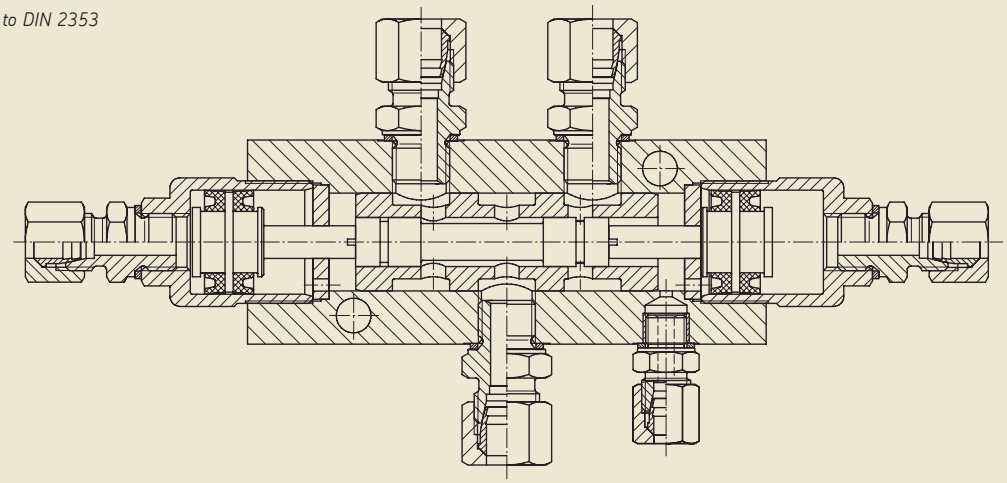
SF10



1) Compressed air ports for 8 mm diam. tubing to DIN 2353

2) Grease ports for 10 mm diam. tubing to DIN 2353

3) Leakage port for 6 mm diam. tubing to DIN 2353

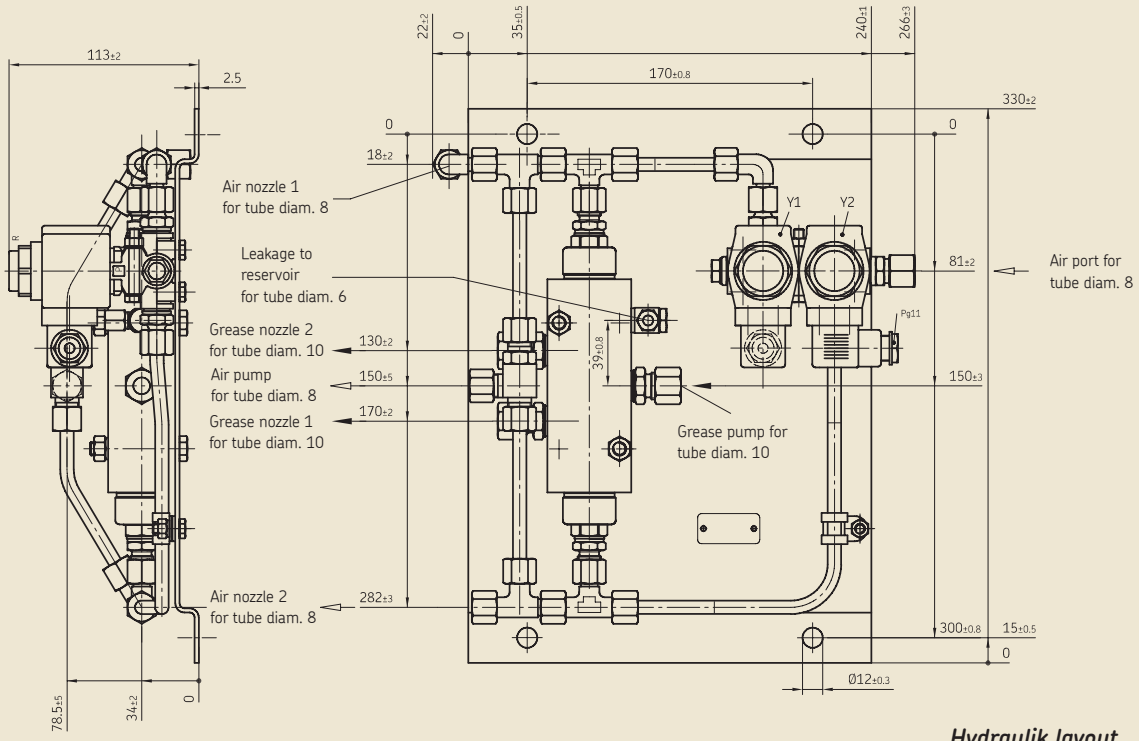


STG12-2, STG13 Valve unit

The unit controls the flow of air and lubricant to the spray nozzles separately.
The STG12-2 and STG13 valve units are used for curve-dependent lubrication (left/right spray nozzles) or distance-dependent lubrication (front/rear spray nozzles).

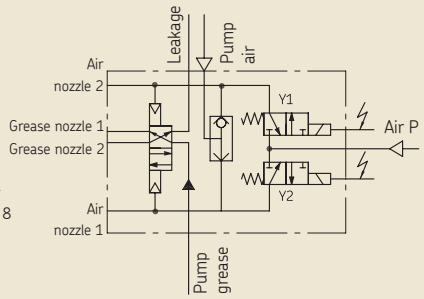
These valve units are used on, among others, shunting locomotives and diesel or electric locomotives with a maximum distance of 20 m between the wheelsets to be sprayed.

STG12-2+... 1) Operating voltage 72 V DC, 110 V DC

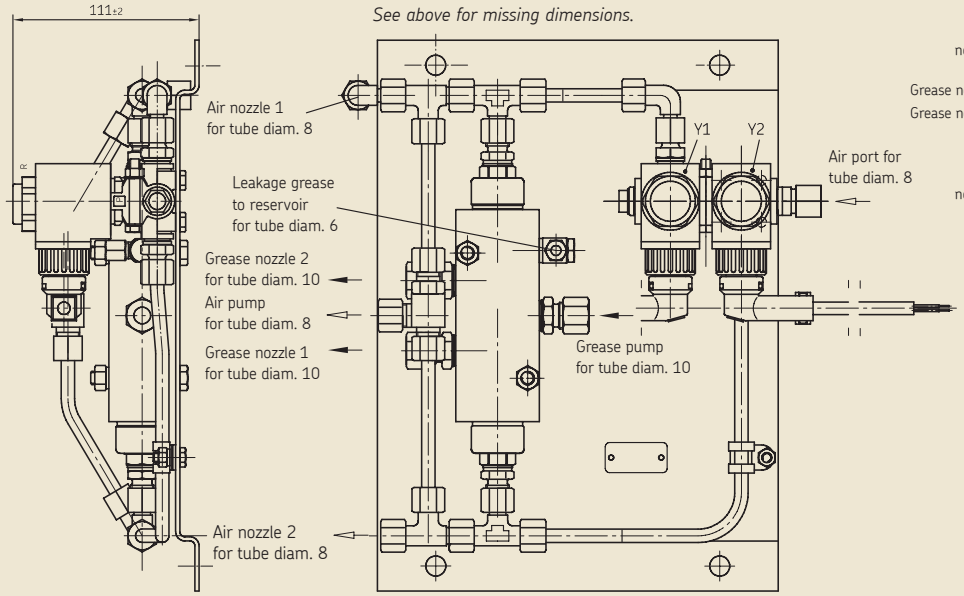


1) the voltage (72 V DC or 110 V DC) has to be added to the order No.

Hydraulik layout for STG12-2 and STG13



STG13+924 Operating voltage 24 V DC



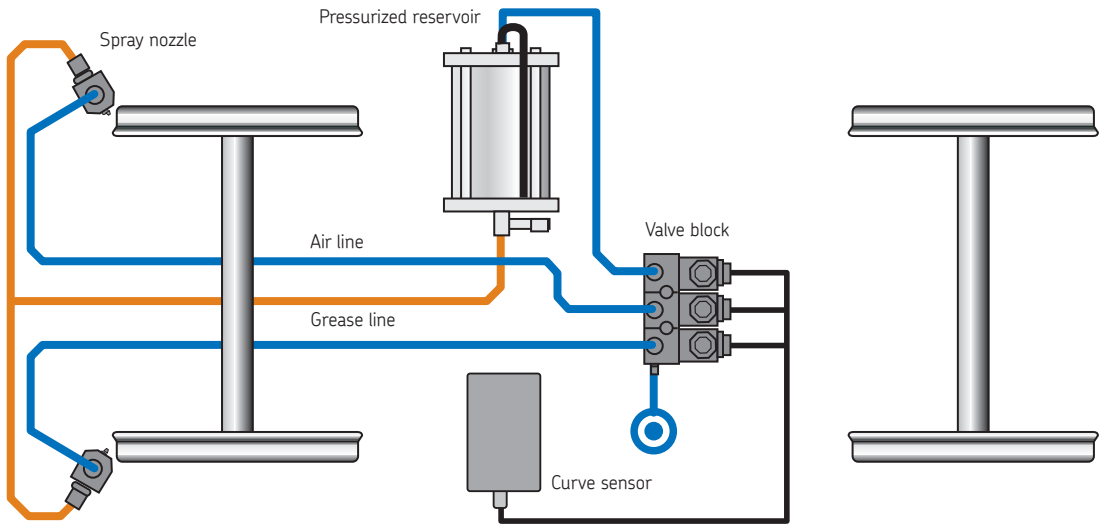
System SP9

Description of the system

The System SP9 wheel flange lubrication system is used mainly on motor units and small locomotives. The spray nozzles supply lubricant to the wheel flanges on the leading axle and/or the wheel flanges of the respectively leading axle on a bogie.
The lubricant is transferred from the wheel flange to the rail face, where it reduces friction between the following wheel flanges and rail face as well.

Function

The compressed air for the pressure reservoir is enabled when the rail vehicle is made up.
The lubricant is fed to the spray nozzles and is constantly available in the form of a "column". The metering of the lubricant takes place in the spray nozzles.
The spray nozzles are actuated by compressed air, and the compressed air is controlled by the valve block.
The grease reservoir is unpressurized when the rail vehicle is shut down.



Application

- System with a max. line length of 5 m between the grease reservoir and spray nozzle
- Separate systems on motor unit and end of train for the respective direction of travel

Advantages

- Simple configuration
- Compact design
- No separate grease pump
- Separate expendables feed
- Exact spray-nozzle metering
- Independent of vehicle's length

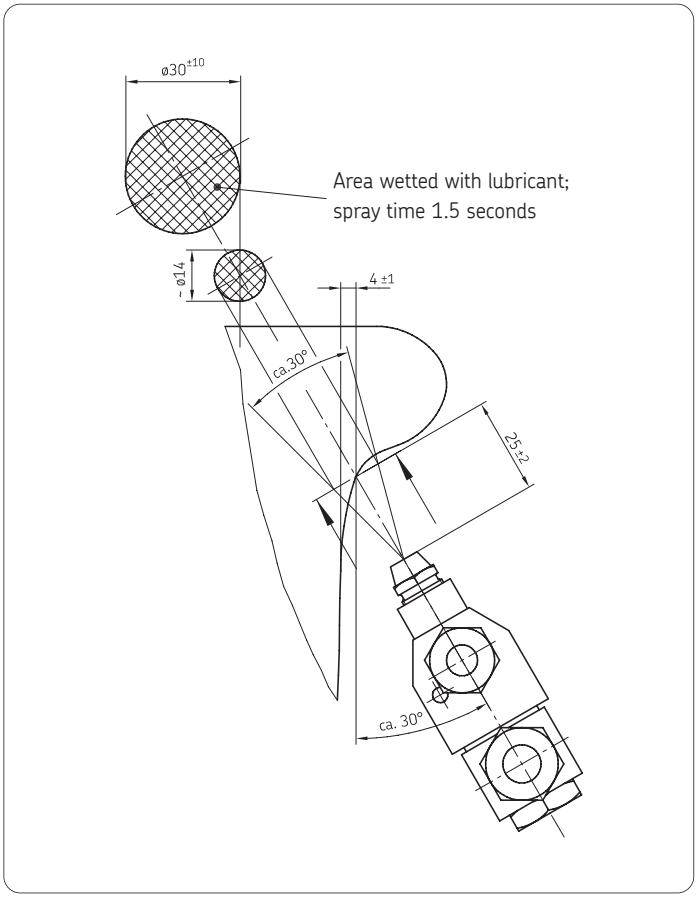
Components

Pressure reservoir BF4.5 or BF6-S3
Spray nozzles SP9-2, SP9-2-S7
Actuation via valve unit
3/2-way valve

SP9-2, SP9-2-S7 Spray nozzle

Adjustment of spray nozzle

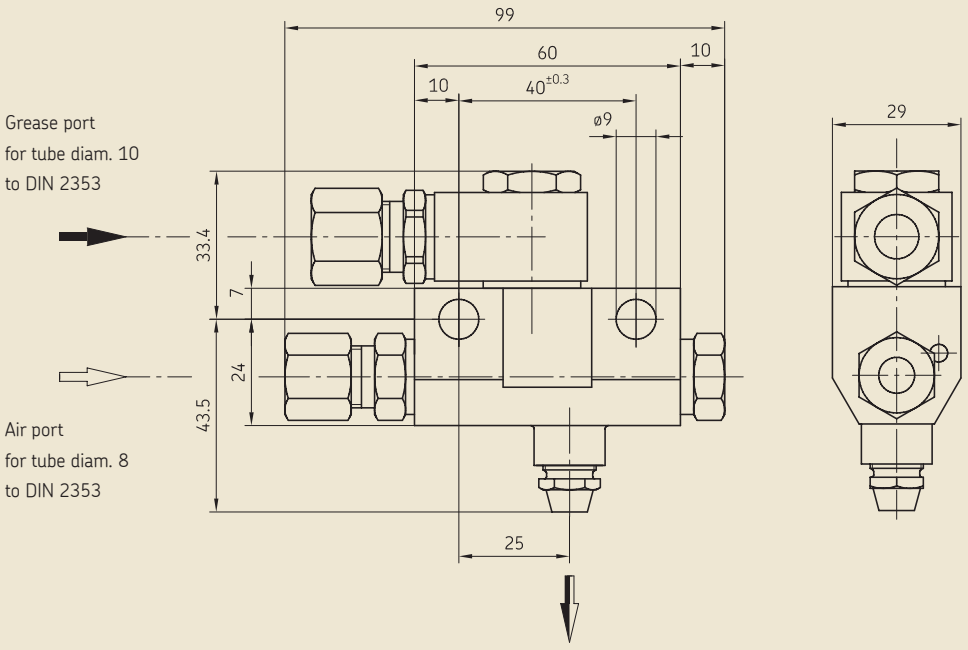
The mounting position of the spray nozzle is horizontal through the axial center line. The influence of the spring excursion on the wheel/spray nozzle arrangement is then the least.
The spray cone is angled at approx. 30°. The spray nozzle is set to an angle of approx. 30° to the wheel's contact surface.
The throat between the contact surface and wheel flange is struck by the spray.
The nozzle should be 25 ±2 mm from the point in the throat struck by the spray.
The area wetted with lubricant on a wheel at rest has a diameter of 30 ±10 mm after being sprayed for 1.5 seconds.



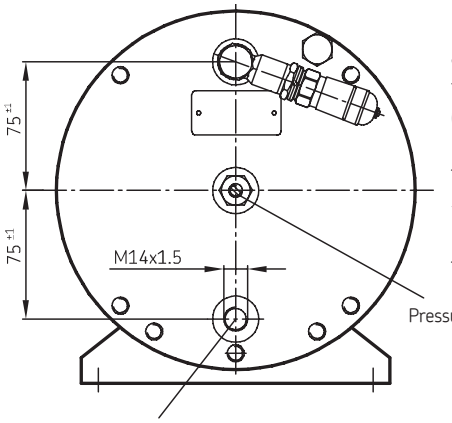
Technical data

Order No.	**SP9-2**
Rated spray quantity	0.03 ccm/actuation
Order No.	**SP9-2-S7**
Rated spray quantity	0.05 ccm/actuation
Air pressure	4.5 to 10 bars
Mean air consumption	~ 4,5 NL (at 6 bars / 1.5 s)
Max. lubrication pressure	40 bars
Lubricant	fluid grease, NLGI grade. 000, 00
Actuation	max. 4 Hz
Mounting position	any

SP9-2



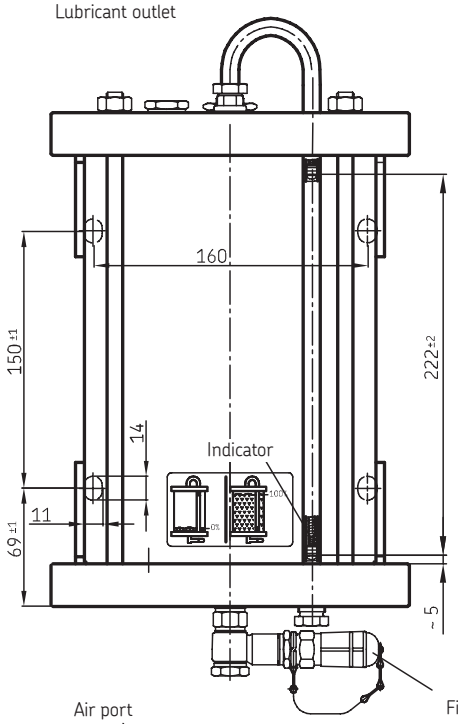
BF4.5 Grease reservoir

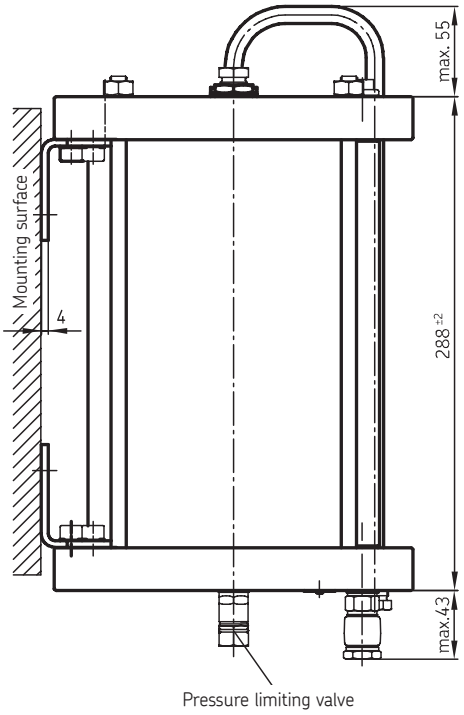


BF4.5 / BF6-S3 grease reservoirs have the advantage that there is no contact between the lubricant in the reservoir and the air (media separated by follower piston).

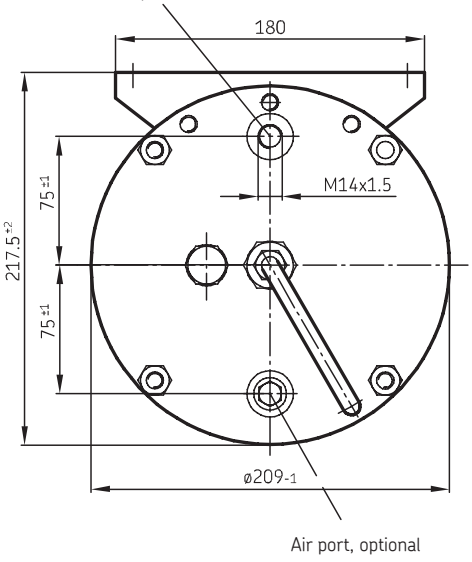
The lubricant level can be seen from the mechanically driven indicator.

To filling pump see page 28.





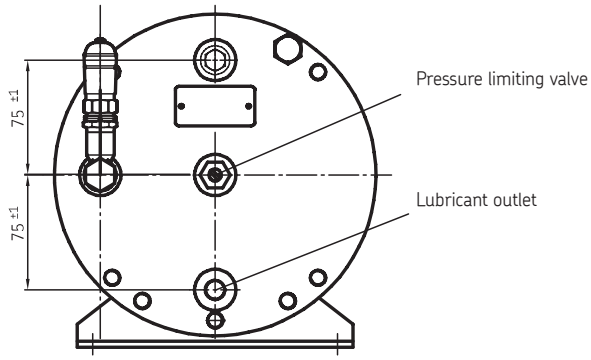
1) *Coupling bush for filler socket order separately, order No. 995-001-500.*

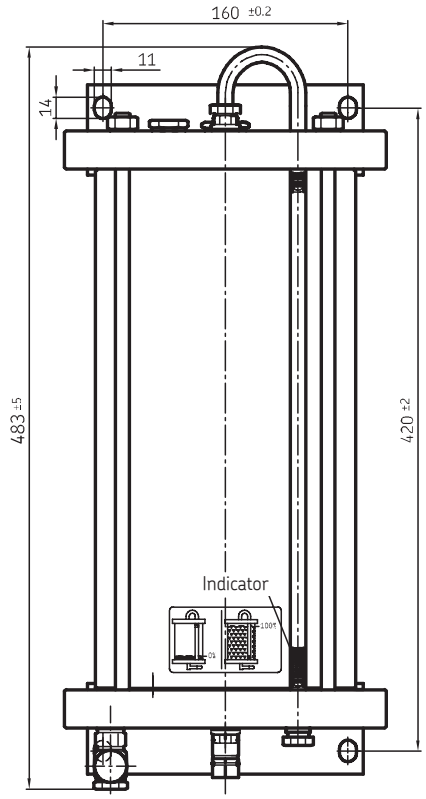


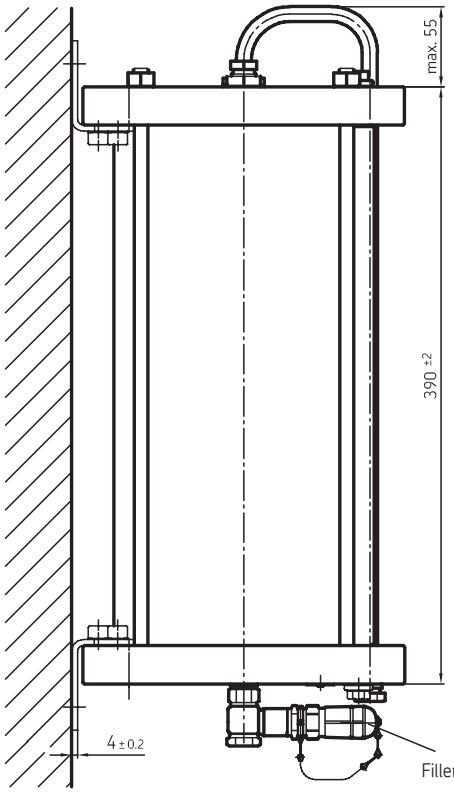
Technical data

Order No.	**BF4.5**
Reservoir capacity	4.5 liters
Filling level display	analog, by indicator
Operating pressure	max. 10 bars
Pressure limiting valve	16_{-2} bars (overfill preventer)
Perm. ambient temperature	–25 to +80 °C
Mounting position	preferably as shown

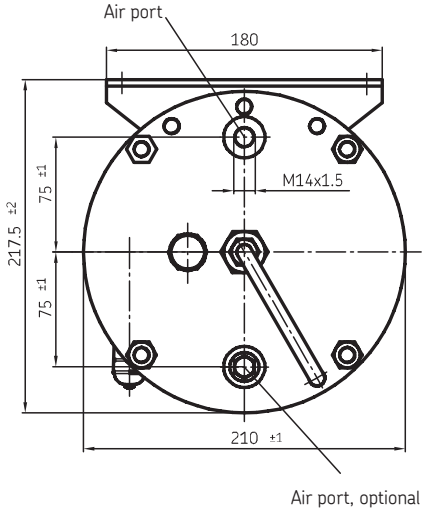
BF6-S3 Grease reservoir







1) *Coupling bush for filler socket order separately, order No. 995-001-500.*



Technical data

Order No.	**BF6-S3**
Reservoir capacity	6 liters
Filling level display	analog, by indicator
Operating pressure	max. 8 bars
Pressure limiting valve	16_{-2} bars (overfill preventer)
Perm. ambient temperature	–25 to +80 °C
Mounting position	preferably as shown

System Tram with its own supply of compressed air

Description of system and Function

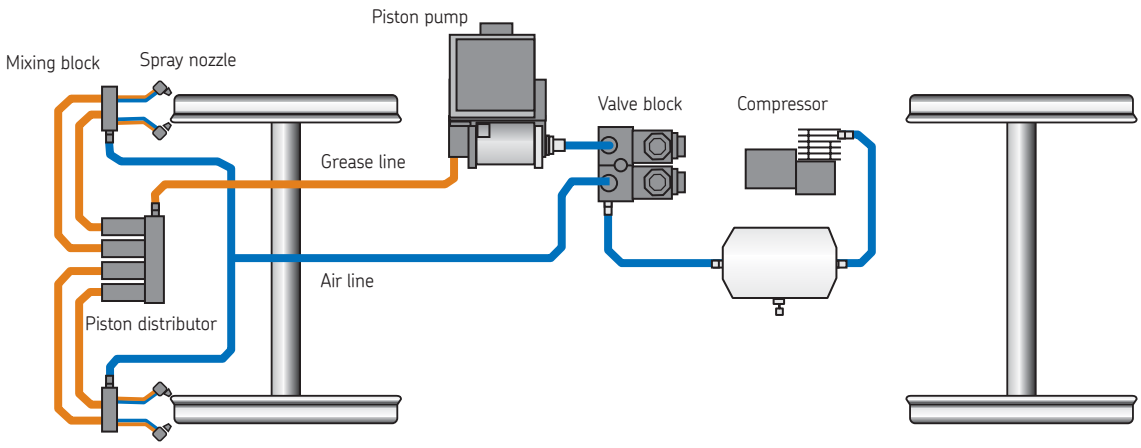
The pneumatically actuated pump delivers lubricant to the piston distributor.

The metered quantity of lubricant goes into the mixing blocks after the pump switches off.

The metered lubricant mixes with compressed air in the mixing blocks. The production of compressed air is part of VOGEL's System Tram wheel-flange lubrication.

The compressed air flows through the mixing block intermittently and blows the metered lubricant through the mixed-flow line to the nozzles.

The regular or dry lubricant is sprayed onto the wheel flanges and/or railheads by compressed air.



Application	Advantages	Components
– Vehicles without a compressed air network – Preferably used on urban rail vehicles – Also for railhead lubrication systems	– Compressed air supply of its own – Can be put to versatile use – Variable metered quantities of piston distributors	Piston pumps with reservoir PEF-98 or PEU-98, Mixing block 169-000-205, Piston distributor VKSO Spray nozzles 169-000-208, 169-000-209 Inquiries about compressed air unit (compressor, air vessel, etc.) must specify model.

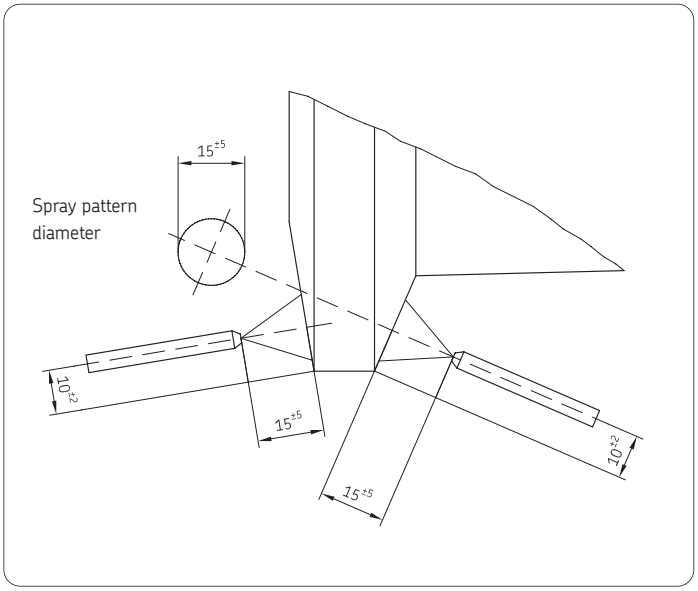
169-000-208, 169-000-209 Spray nozzle

Adjustment of spray nozzle

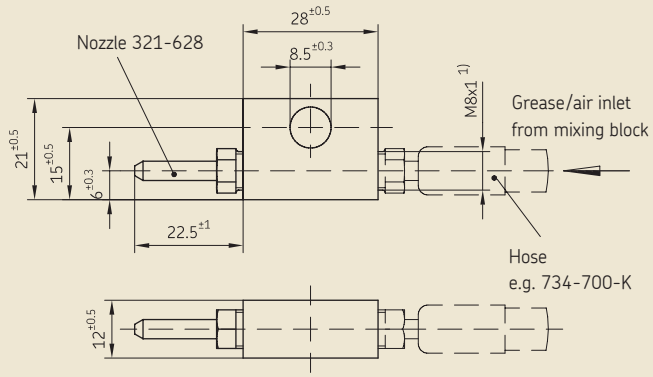
The spray nozzles point directly at the two sides of the wheel flange (front and back of wheel flange) and feed the mixture of lubricant and air exactly to the area to be lubricated.

The length of the tubing between the mixing block and spray nozzle should not be any longer than 1 m to ensure an optimal, even lubrication effect.

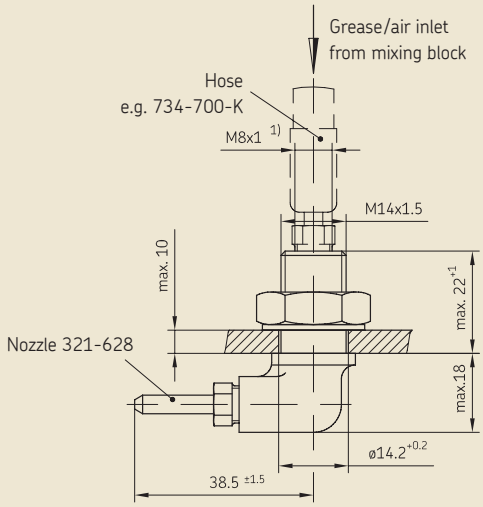
The nozzles can be pointed in different directions so that the spray angle and spray distance can be optimized again when the wheel flange is recontoured.



169-000-208



169-000-209



1) Port tapped for solderless tube connection for tube diam. 4 mm

Technical data

Order No.	**169-000-208**
Order No.	**169-000-209**
Temperature range	–25 to +80 °C
Mounting position	any

Piston pump with reservoir, pneumatically actuated

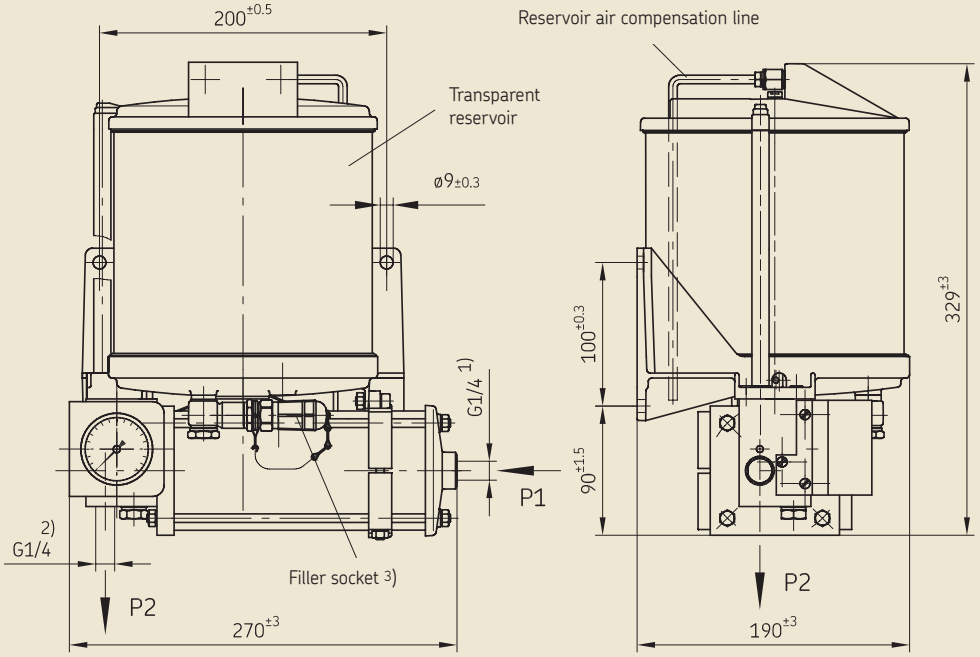
A maximum of 50 ccm of lubricant is fed into the main line with every stroke of the PEF-98 pump. The main line is briefly pressurized with a least 30 bars of pressure, the distributors being filled as a result.

Two spring-loaded cone valves serve as the intake and outlet valve.

The pressure-relief valve forms a unit together with the residual-pressure valve.

When the pump's piston returns to its initial position, the outlet valve disconnects the main line from the pump chamber to assure new intake. At the same time, the main line is relieved via the pressure-relief valve.

PEF-98



Technical data

Order No.	**PEF-98**
Reservoir capacity	4 liters
Delivery rate	50 ccm/stroke
Perm. air pressure P1	max. 10 bars
Lubricant	Fluid grease, NLGI grade 000, 00
Operating temperature	–25 to +80 °C
Mounting position	as shown

Make sure the pump is installed without distortion.

1) Air port tube diam. 8 to DIN 2353

2) Lubricant port for tube diam. 10 mm to DIN 2353

3) Coupling bush for filler socket order separately, oder No. 995-001-500.

P1 = air line from compressed air network

P2 = main line of system

Piston pump with reservoir, pneumatically actuated

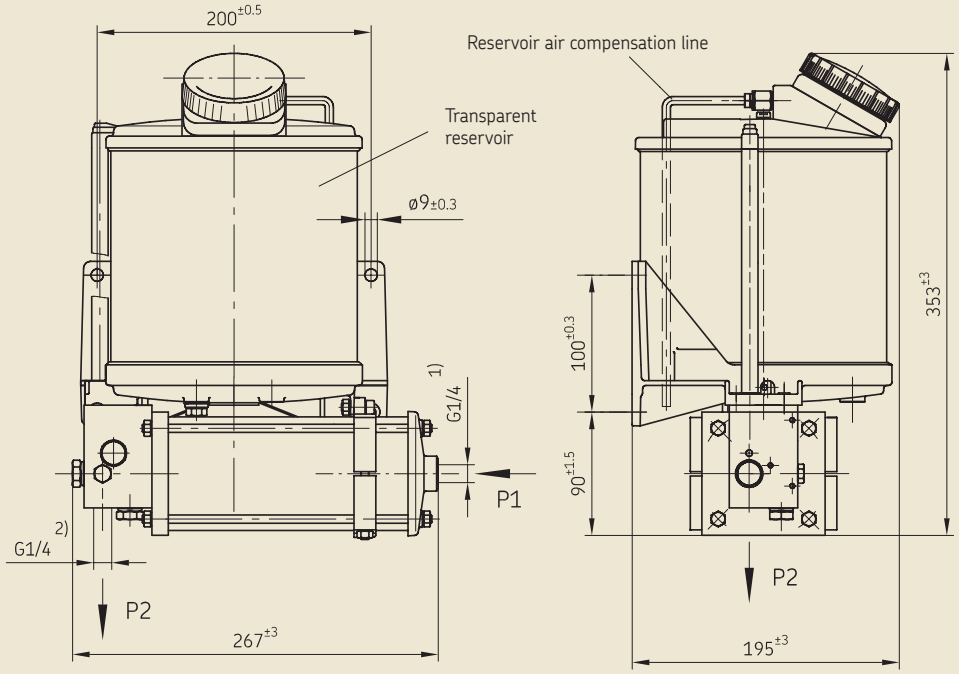
A maximum of 50 ccm of lubricant is fed into the main line with every stroke of the PEU-98 pump. The main line is briefly pressurized with a least 30 bars of pressure, the distributors being filled as a result.

Two spring-loaded plug valves serve as the intake and outlet valve.

The pressure-relief valve forms a unit together with the residual pressure valve.

When the pump's piston returns to its initial position, the outlet valve disconnects the main line from the pump chamber to assure new intake. At the same time, the main line is relieved via the pressure-relief valve.

PEU-98



Technical data

Order No.	**PEU-98**
Reservoir capacity	4 liters
Delivery rate	50 ccm/stroke
Perm. air pressure P1	max. 10 bar
Lubricant	fluid grease, NLGI grade 000, 00
Operating temperature	–25 to +80 °C
Mounting position	as shown

Make sure the pump is installed without distortion.

1) Air port for tube diam. 8 mm to DIN 2353

2) Lubricant port for tube diam. 10 mm to DIN 2353

P1 = air line from compressed air network

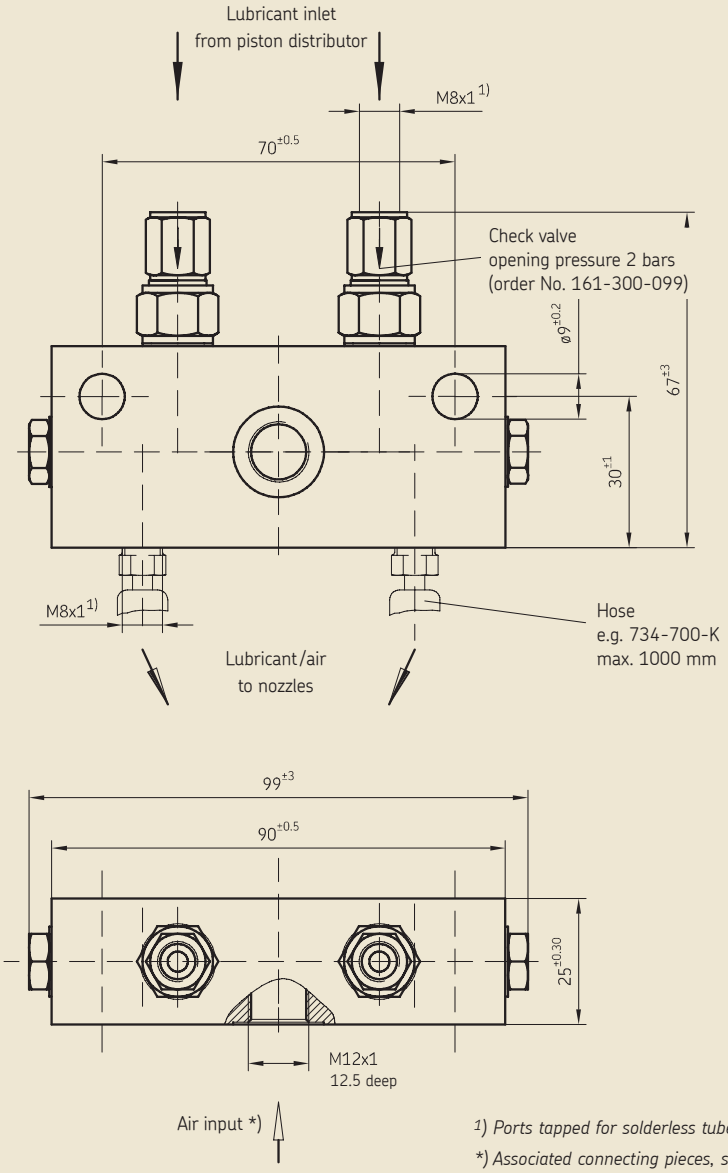
P2 = main line of system

169-000-205 Mixing Block (for System Tram)

Function

One respective mixing black is installed on the body near the nozzles for one wheel. In each mixing block the lubricant presupplied by the piston distributor for a wheel flange (= two lube points) is fed by pulses of compressed air through the hose to the nozzles, being mixed with air in the process.

169-000-205



1) Ports tapped for solderless tube connection for tube diam. 4 mm

**) Associated connecting pieces, see page 29*

Piston distributors, group VKSO

VKSO4

The distributors meter and distribute the lubricant from the pump to the individual lubrication points. They do so independent of each other.

Interchangeable metering nipples make it possible to adapt the quantity to the amount of lubricant required by the friction point.

The cycle number, i.e. the number of pump strokes per time unit of the lubrication system, also permits further coordination of the lubricant quantity with the friction point and entire system.

Lubricant is only delivered under spring pressure after the end of pump operation, i.e. after the pressure is relieved.

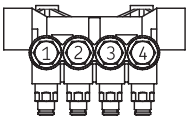
A collar (changeover valve) in the distributor closes the outlet to the lubrication point during the delivery stroke, thus storing the lubricant beneath the piston. The changeover valve opens the outlet as soon as the pressure drops in the main line, i.e. when the pressure relief valve of the pump opens.

Assign only one lubrication point to each distributor outlet port.

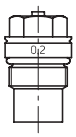
Connect the secondary line (connection: distributor - mixing block) to the mixing block only after bubble-free lubricant emerges from the tubing after the pump is repeatedly actuated. Fill long secondary lines beforehand if necessary.

Piston distributors are only supplied with metering nipples fitted.

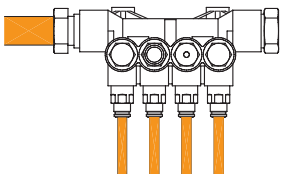
Order No.	Number of lubrication points
VKSO2 ...	2
VKSO4 ...	4



When ordering distributor, please quote the desired metered quantities (0.1; 0.2; 0.4 ccm) iin the respective order.



Metering nipples, with O-ring for metered quantity	Order No.
0.1 ccm	VKU010-K
0.2 ccm	VKU020-K
0.4 ccm	VKU040-K



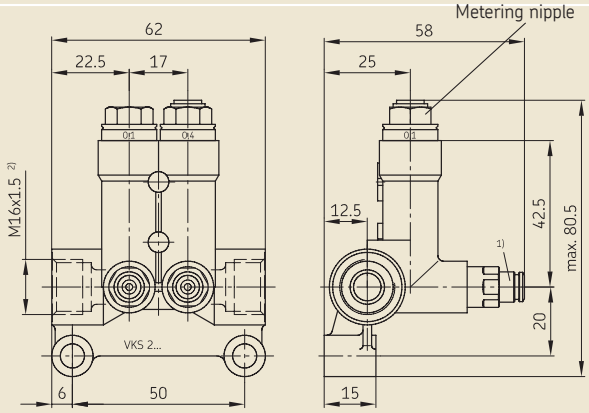
If required:

←

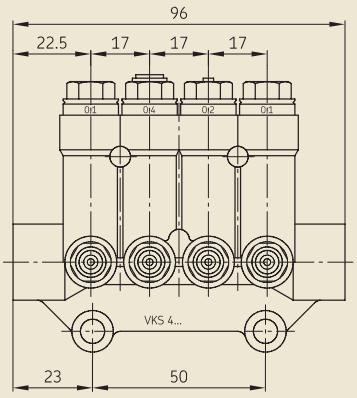
screw plug 410-011

washer DIN7603-A16x20-CU

VKSO2... 2-port distributor



VKSO4... 4-port distributor

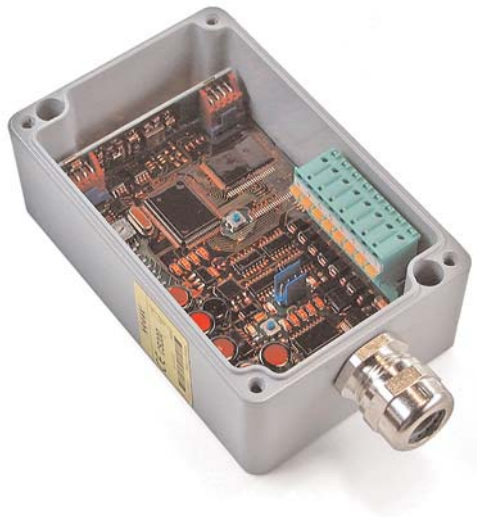


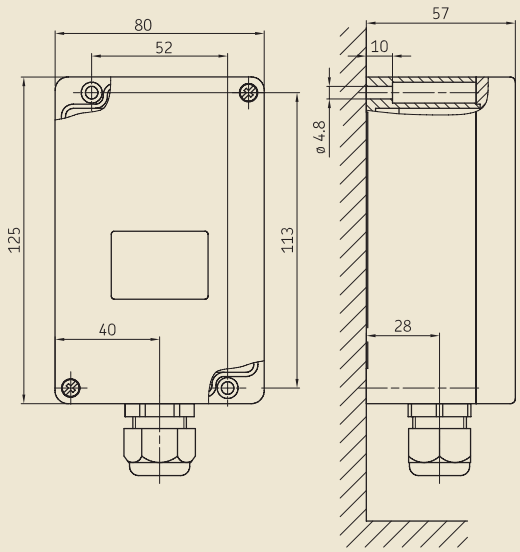
1) Quick connector connection for ø4 plastic tubing.

2) Ports tapped for solderless tube connection for tube diam. 10 mm.

CS200 Curve sensor control unit

CS200





- Comprehensive range of functions – curve sensor, combinable with robust control unit functions (time- and distance-dependent lubrication)
- Direct detection of curves – no adjustment problems since it's not the tilt that's detected
- Designed to fit in with railway conditions
- Small size
- Functions and voltage variants available on request

Function

The CS200 control unit is used to control centralized lubrication systems for the lubrication of wheel flanges or railheads. Two spray nozzles are actuated, the lubrication taking place in curve-, time- or distance-dependent modes.

In the time-dependent mode lubrication is respectively triggered after a set interval time regardless of the distance traveled.

In the distance-dependent mode the unit has a pulse input that is used to receive pulses proportional to the distance traveled. Lubrication is then triggered after a certain number of previously specified pulses are received.

In the case of curve-dependent lubrication it is possible to specify whether lubrication is to take place on both sides or only on the respective outside curve, namely depending on the direction of travel.

Curves are detected via an integrated sensor with adjustable sensitivity. Curve-dependent lubrication can be combined either with time- or distance-dependent lubrication.

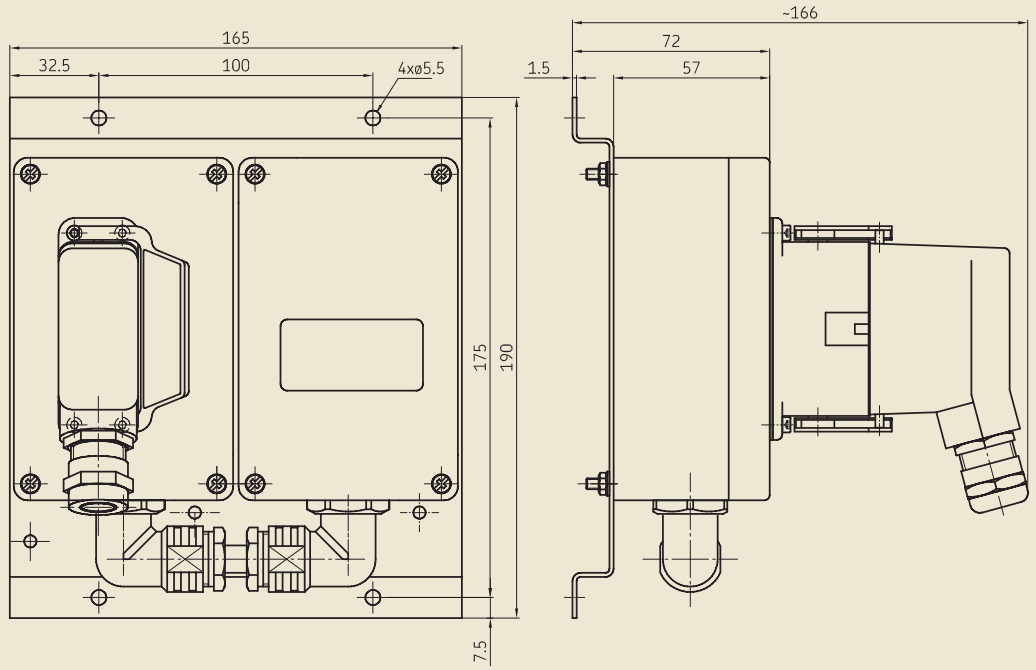
The parameters for the modes are set via an 8-pole DIP switch.

Technical data

Order No.	**CS200**
Housing	
Material	aluminum
Type of enclosure to EN 60 529/10.91	IP 65
Weight	0.57 kg
Ambient temperature	
Class	T3
Operation	–25 to +70 °C
Electrical connection	
Terminals	8 spring-loaded terminals for core diam. 0.2 - 2.5 mm²
Cable gland	1x M20x1.5
	for line diam. 7-13 mm
Rated operating voltage	24 V DC
Operating voltage tolerance	–50 %, +30 %
Closed-circuit power consumption (without output load)	max. 75 mA
Clock-pulse spaces	1.5; 3; 4.5; 6 sec.
Spray time	1.5 sec.
Curve sensor	
Detection threshold adjustable in 15 stages from 0.5 °/s to 1.9 °/s	
Time-dependent operation	
Spray period	10 to 244 sec. in 15 stages
Distance-dependent operation	
Input pulses	500 to 123,000 in 15 stages
Eingänge	
FG	– spray enable
VR	– direction of travel
P	– distance pulses:: visually separate input
2 valve outputs	
Rated output current	1 A per output
Short-circuit protection	yes

Standards see page 23

CS200-S1+902 Curve sensor control unit



Function

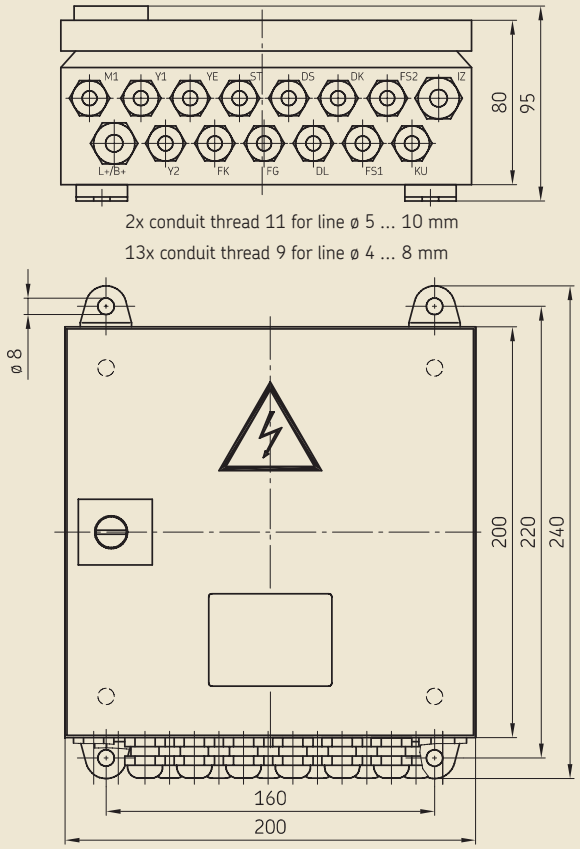
see CS200

Technical data	
Order No.	**CS200-S1+902**
Housing	
Material	aluminum
Type of enclosure to EN 60 529/10.91	IP 65
Weight	1.6 kg
Ambient temperature	
Class	T3
Operation	–25 to +70 °C

Electrical connection	
Plug and socket connection	HARTING HAN 15 D
Cable gland	1x M20x1.5 for line diam. 7-13 mm
Rated operating voltage	72 V DC ...110 V DC
Operating range	50.4 V DC ...137.5 V DC
Rated power input (without output load)	approx. 8 W
Clock-pulse spaces	1.5; 3; 4.5; 6 sec.
Spray time	1.5 sec.
Curve sensor	
Detection threshold adustable in 15 stages from 0.5 °/s to 1.9 °/s	
Time-dependent operation	
Spray period	10 to 244 sec. in 15 stages
Distance-dependent operation	
Input pulses	500 to 123,000 in 15 stages
Inputs	
FG	– spray enable
VR	– direction of travel
P	– distance pulses: visually separate input
2 valve outputs	
Rated output power	36 W per output
Short-circuit protection	yes
Standards	
EN 50153, EN 50155, ENV 50121-3-2 (EMC for railway equipment); Electromagnetic compatibility EMC 89/336/EEC: EN 50081-1, EN 50082-2	

IG665, IG666, IG667 Control units

IG666



The control units are used to control and monitor wheel-flange lubrication systems. They satisfy a large number of different system requirements relating to time-, distance- and curve-dependent spray cycles as well as the type of lubricant pump.

The control units are not limited to passenger and freight trains. They can also be used on other rail-bound means of transport like container cranes, railway track machinery and general-cargo cranes, etc.

General characteristics (selection criteria)

Order No.	IG665	IG666	IG667
Suitable for electrically driven compressor	●	–	●
Number of spray valve outlets	2	4	3
Curve-dependent operation only in conjunction with external curve sensor	●	●	●
Time- or distance-dependent operation (selectable)	●	●	●
Curve-dependent operation possible	●	●	●
Time-dependent operation possible	●	●	●
Distance-dependent operation possible	●	●	●
Curve- and time-dependent operation possible	●	●	●
Curve- and distance-dependent operation possible	●	●	●
Special function for wheel flange and railhead lubrication	–	–	●
Special function for lubrication of wheel flange and back of wheel	–	●	–
Curve spray cycle resets time or distance counter	●	●	–
Control input for travel direction reversal	–	●	–

IG665, IG666, IG667 Control units

Technical data

Type of enclosure ..... IP 65
acc. to EN 60 529/10.91
Mounting position ..... any
Weight ..... 3.5 kg

Ambient temperature

Class T1
Operation ..... –25 to +55 °C
Storage and transport ..... –40 to +85 °C

Operating voltage inputse B+, L+ / M

Rated operating voltage UN ..... 24 V DC; 72 V DC; 110 V DC
Operating voltage tolerance ..... –30 % / +25 %

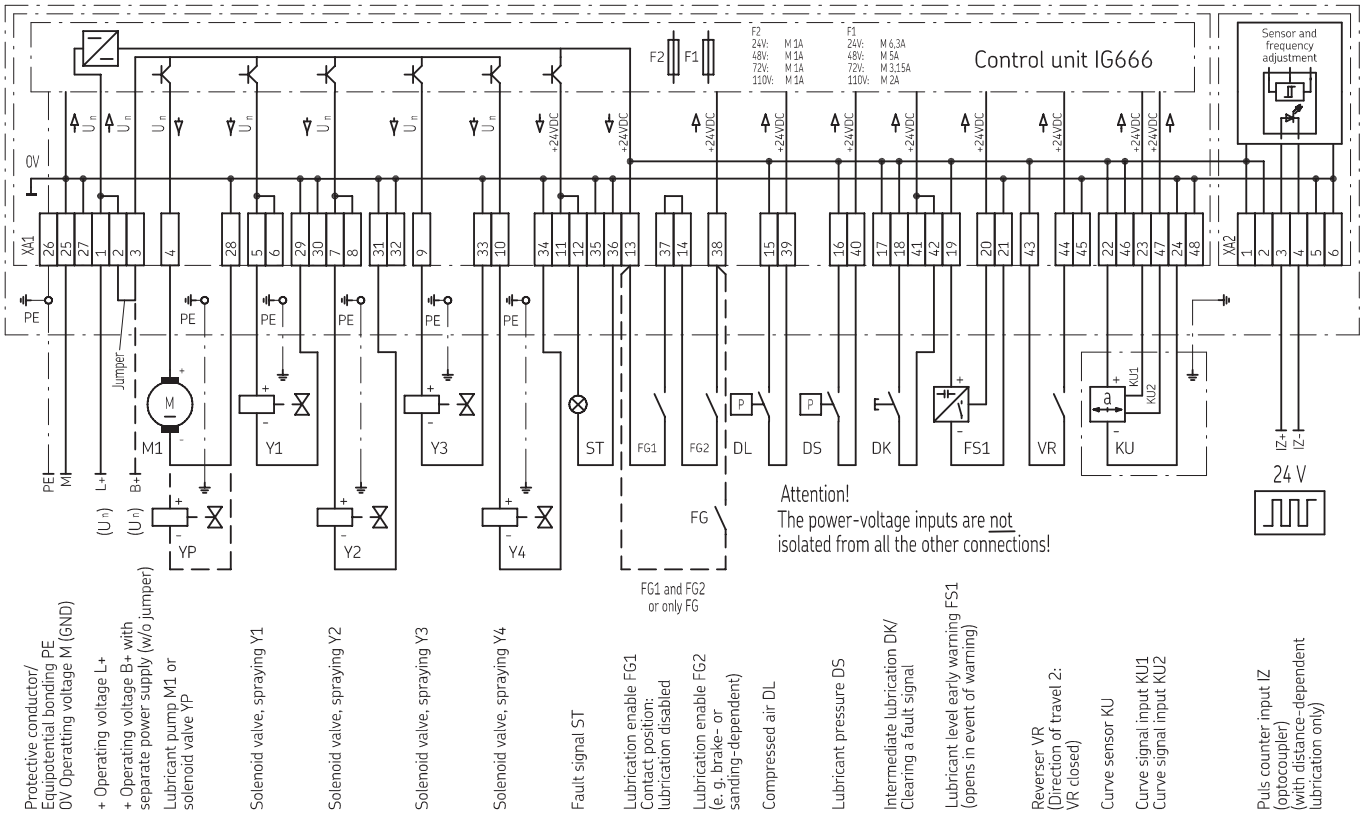
Power input

Input L+ (P at rated voltage) ..... 12 W
Input B+ (P at rated voltage) ..... 90 W
Input B+ ($P_{max.}$) ..... 180 W

Standards

EN 50153, EN 50155, ENV 50121-3-2 (EMC for railway equipment);
Electromagnetic compatibility EMC 89/336/EEC:
EN 50081-1, EN 50082-2.

Connection layout for IG666 control unit



3/2-way valves, valve manifolds

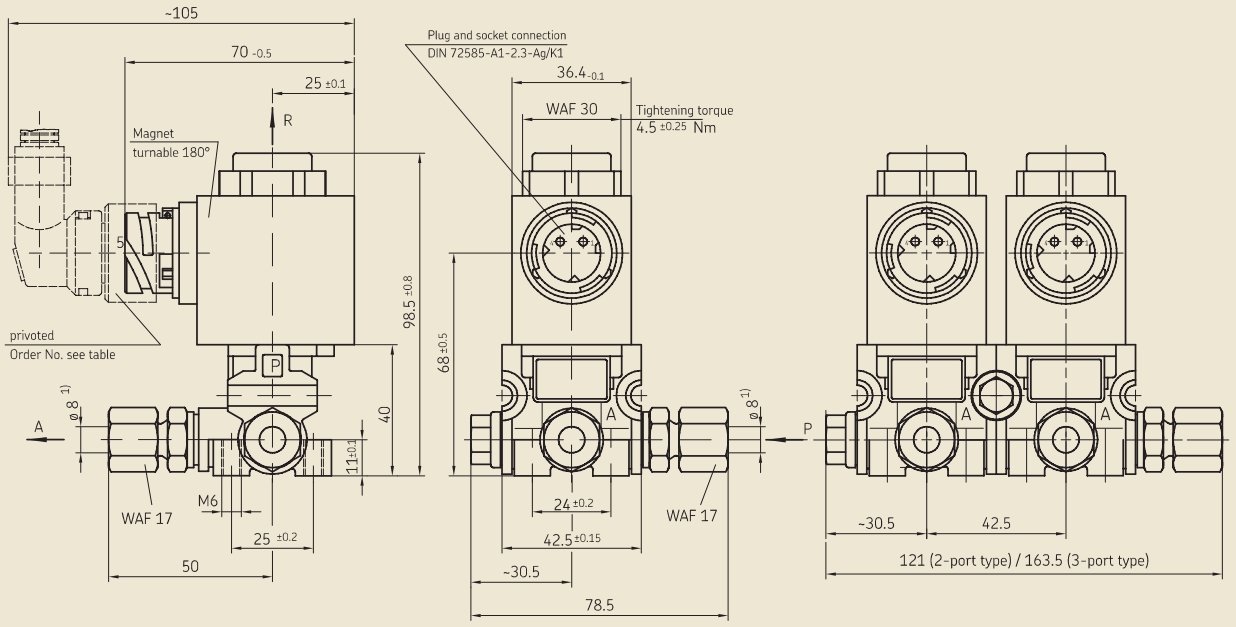
Technical data	
Order No. (1 port)	**221-296-031+924**
Order No. (2 port)	**221-296-032+924**
Order No. (3 port)	**221-296-033+924**
Rated width DN	3 mm (admission and venting)
Operating pressure P	0 to 10 bars
Valve seat seal	FKM (FPM)
Temperature range	–25 to +80 °C
Medium	compressed air
Mounting position	any
Rated voltage *)	24 V DC
Voltage tolerance	±25 %
Duty cycle	100 % ED
Power input	~10 W
Magnet	with two built-in diodes
Type of enclosure acc. to EN 60529	IP 65

Cable harness, set of plugs

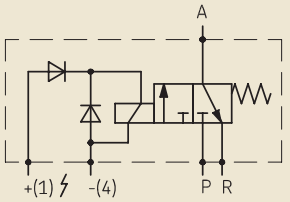
Designation	Order No.
Cable harness with corrugated tubing cable length 3 m	**997-000-712**
Set of plugs, compl. without cable	**997-000-702**

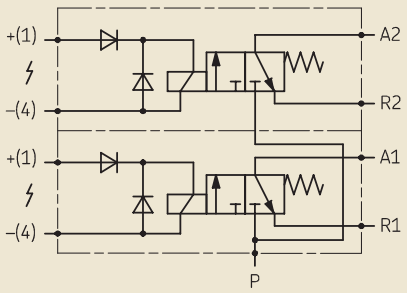
221-296-031
1-port type

221-296-032
2-port type



1) *Cutting sleeve screw union to DIN 2353*
Port for ø8 tubing





P (supply)
A (consumption)
R (return)
electr. terminals (1) +; (4) –

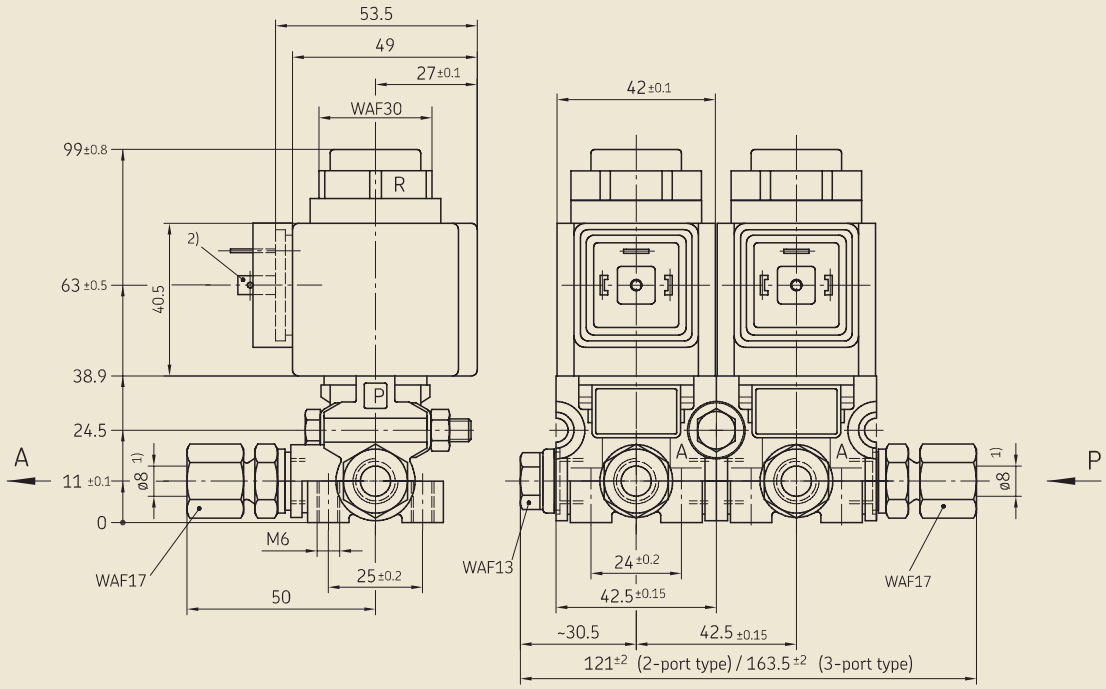
3/2-way valves, valve manifolds

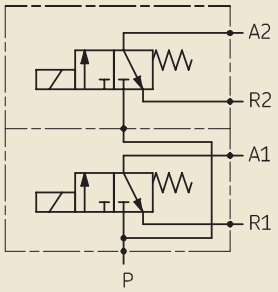
Technical data

Order No. (2 ports, 110 V DC)	**221-296-052+926**
Order No. (2 ports, 72 V DC)	**221-296-052+927**
Order No. (3 ports, 110 V DC)	**221-296-053+926**
Order No. (3 ports, 72 V DC)	**221-296-053+927**
Rated width DN	3 mm (admission and venting)
Operating pressure P	0 to 10 bar
Valve seat seal	FKM (FPM)
Temperature range	–25 to +80 °C
Medium	compressed air
Mounting position	any
Rated voltage *)	110 or 72 V DC
Voltage tolerance	+10 % / –30 %
Duty cycle	100 % ED
Power input	~16 W
Type of enclosure acc. to EN 60529	IP 65

221-296-052

2-port type



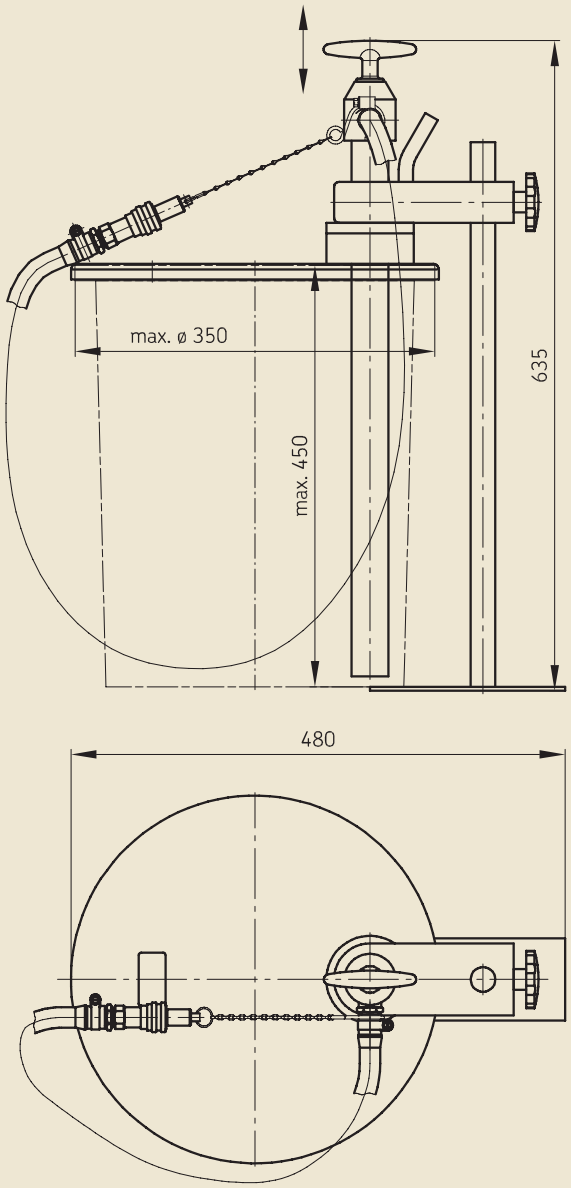


P (supply)
A (consumption)
R (return)

1) Cutting sleeve screw union to DIN 2353 Port for ø8 tubing

2) Plug connector to DIN EN 175301-803; matching socket 179-990-147

169-000-084 Topping-up pump



1) *Bundle size: up to 25 kg*

Technical data

Order No.	**169-000-084**
Medium	fluid grease, NLGI grade 000, 00, 0
Delivery rate	0.25 l double stroke
Temperature range	0 to +60 °C
Grease connection for Parker filler socket	BH2-61-...
fits reservoirs	BF4.5 and BF6-S3

With the bundle change the following is to be considered:
Open the grease drum and place the cover of the topping-up pump on the drum.

Insert the suction tube in the opening in the cover, push down to the buttom of the grease drum and secure with the lock screw.

Use a clean cloth to thoroughly clean the filler socket of the vehicle pump and filler coupling of the grease pump after removing the protective caps.

Now connect the coupling of the topping-up pump to the filler socket of the vehicle pump. The hose coupling must snap into place when connected.

Actuate the lever of the topping-up pump until the reservoir of the vehicle pump is filled to within approx. 1 cm of the top edge (max. marking on reservoir).

When the reservoir is full remove the coupling from the pump and put the protective cap back on the filler socket.

Slip the coupling half of the topping-up pump onto the respective holder.

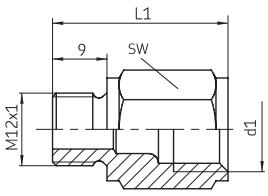
Pay attention to cleanliness

Coupling bush for topping-up connection **order No. 995-001-500**

Other filling possibilities on request.

Fittings and accessories

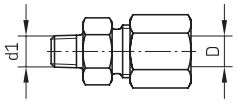
Adapters



for outer tube diam.	Order No.	d1 [1]	L1	SW
8	**408-162**	M14x1.5	29	17
10	**410-162**	M16x1.5	31	19

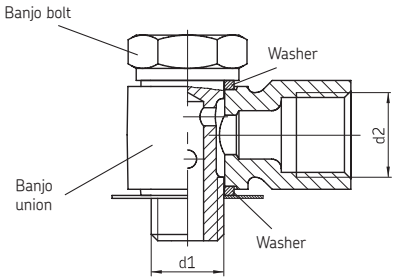
[1] Ports tapped for solderless tube connection

Male connectors DIN 2353



D (outer tube diam.)	Order No.	d1
8	**408-403W**	G 1/4 A
8	**406-413W**	G 3/8 A
8	**408-403**	M12x1.5
10	**410-403**	M14x1.5
10	**410-403W**	G 1/4 A

Banjo fittings

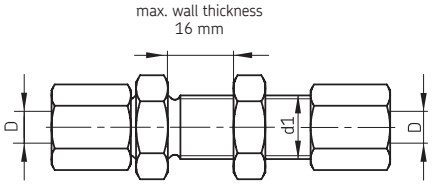


for outer tube diam.	Order No.	d1	d2 [1]
6	**506-145**	M16x1,5	M10x1
8	**508-142**	M12x1	M14x1.5
10	**510-024**	M12x1	M16x1.5
10	**510-142**	M12x1	M12x1.5

[1] Ports tapped for solderless tube connection

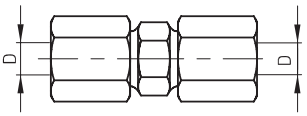
sw = width across flats

Straight bulkhead connectors DIN 2353



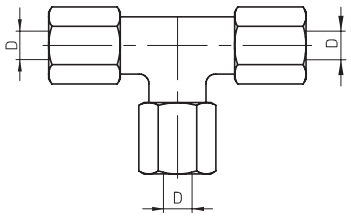
D (outer tube diam.)	Order No.	d1
8	**406-416**	M14x1.5
10	**410-416**	M16x1.5

Straight connectors DIN 2353



D (outer tube diam.)	Order No.
8	**408-408**
10	**410-410**

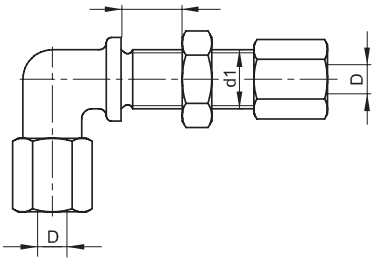
T-connectors DIN 2353



D (outer tube diam.)	Order No.
8	**408-407**
10	**410-407**

Elbow bulkhead connectors DIN 2353

max. wall thickness 16 mm

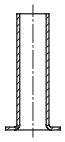


D (outer tube diam.)	Order No.	d1
8	**408-409**	M14x1.5
10	**410-409**	M16x1.5

Fittings and accessories

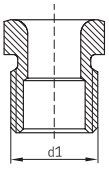
Screw unions for steel and plastic tubing

(use reinforcing socket for plastic tubing)



Reinforcing socket
for plastic tubing

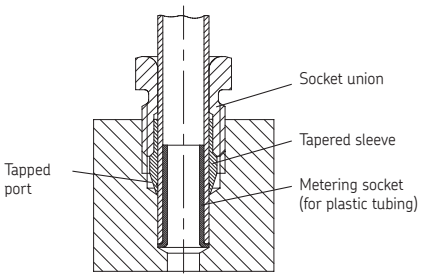
Tapered sleeves



Socket unions

for outer tube diam.	Order No.	Order No.	Order No.	d1
4x0.85	**404-603**	**404-611**	**404-612-MS**	M8x1
8x1.25	**408-603**	**408-611**	**408-612-MS**	M14x1.5
10x1.5	**410-603**	**410-611**	**410-612-MS**	M16x1.5

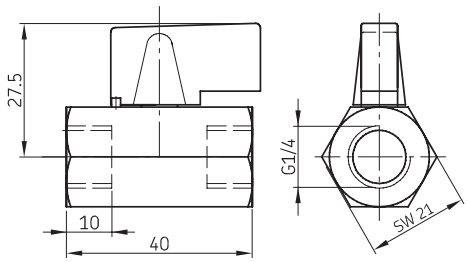
Material: brass



Assembly

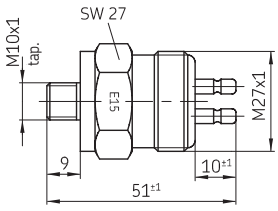
Slide socket union and tapered sleeve onto end of the tube. In the case of plastic tubing, **first** insert the reinforcing socket. Insert end of tube into tapped port up to the stop. First tighten the socket union finger-tight and then turn it another $1\,^{1}/_{2}$ turns.

Shut-off valve

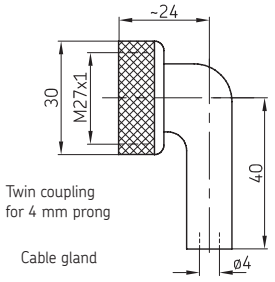


Order No.	p max. [bars]	Temperature max. [°C]
161-600-036	16	90

Pressure switch



Coupler socket



Order No.	Switching pressure (bars)
191-600-036	15 ± 2.5

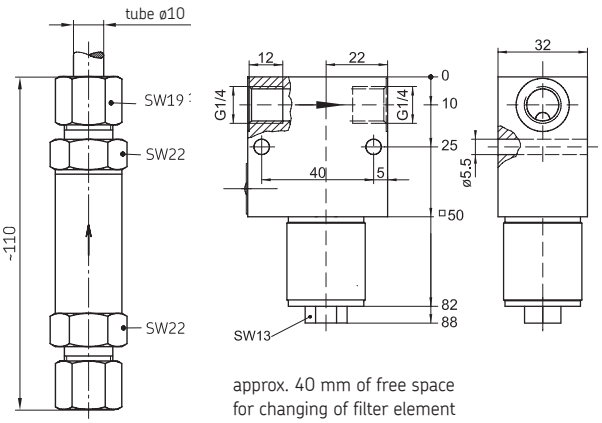
Connection for 4 mm prongs

Contact rating	130 W at 24 V
Temperature stability	–40 °C to +80 °C
Overpressure safety	50 bars
Type of enclosure	IP 00
Type of contact	NO contact

The diaphragm is resistant to mineral oils.
Coupler socket order No. 179-990-098

sw = width across flats

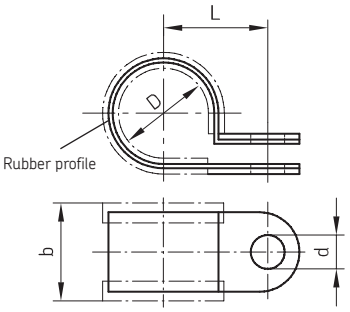
Micro filter



213-810-10 **213-870-F**

Order No.	Filter fineness [µm]
213-808-10	320
213-870-F	160

Mounting clips

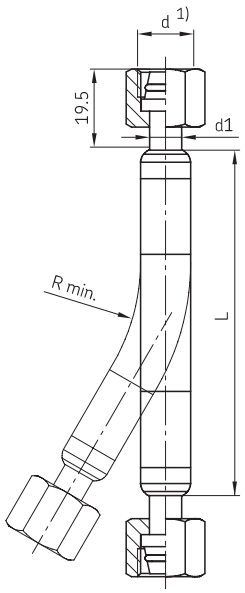


for outer tube diam. D	Order No.	d	b	L
6	**941-206-104**	5.2	15	11
8	**941-208-104**	6.4	18.5	15.2
10	**941-210-104**	6.4	18.5	16.2

Fittings and accessories

Hoses acc. to DIN 5510 for railway applications

Order No.	d	Tube diam. d1	L ±10 *)	R min.	Perm. operating press [bars]	Application
SLH86-180-K **SLH86-580-K**	M14x1.5	8	180 560	50	225	as compressed air line
SLH106-180-K **SLH106-580-K**	M16x1.5	10	180 560	60	180	as lubricant line



Design

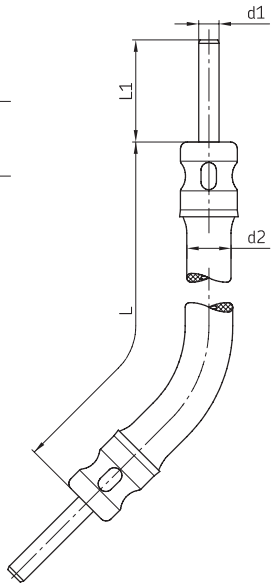
Inner liner ..... synthetic rubberNBR
Reinforcement ..... 1 wire braiding
Outer cover ..... synthetic rubber CR
Resistant to ..... lubricants, also rapidly biodegradable ones based on synthetic ester, vegetable and mineral oils, compressed air
Perm. operating temperature ..... –25 to +70 °C
To fire protection standard ..... DIN 5510 “Preventive fire protection in rail vehicles”
Flammability class S3
Smoke development class SR1

1) Prepared in confomity with DIN 3865, light series: with 24 ° cone and O-ring for port and W to DIN 3861

Hoses

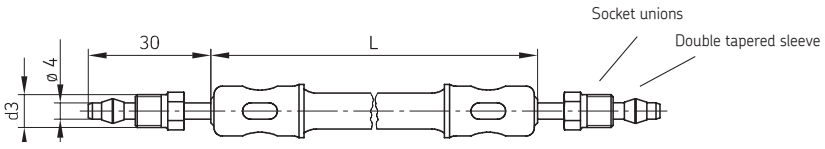
Order No.	Tube diam. d1	Hoses diam. d2	L ±5 *)	L1	Perm. operating pressure [bars]	Application
718-580	8	15	580	30	40	as compressed air line
740-580	10	17	580	23	210 1)	as lubricant line

1) with 130-bar load bursts



Perm. operating pressure ..... –25 to +70 °C

Material: Hose: mineral-oil resistant CR rubber inside; 2 layers of braided rayon; outside rubber conditionally oil-resistant, resistant to light cracks and ozone.
Tube ends: galvanized steel tubing



Order No.	External tube diam.	d3	L ±5 *)	Perm. operating pressure [bars]
734-700-K	4	M8x1	700	40

Please note!!
These hoses must not be used as main lines.
Complete with socket unions and double tapered sleeves.

Material hose: oil-proof internal and external rubber with braded layer of rayon..
tube ends: steel tubing, ends permanently joined to the hose.

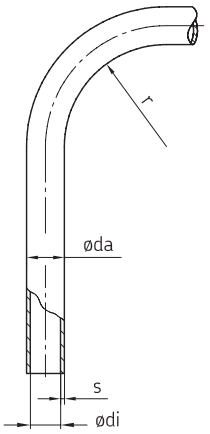
**) other lengths on request.*

Fittings and accessories

Steel tubing, galvanized

Order No.	øda ±0.05	s ±0.03	Minimum bending radius r bent with mandrel	bent with grooved disk	Design pressure [bars]	Burst pressure [bars]
WV-RO6x0.7 VERZI	6	0.7	25	12	320	850
WV-RO8x0.7 VERZI	8	0.7	46	19	230	675
WV-RO10x1 VERZI	10	1	76	27	270	660

VERZI = 25 µm galvanization - yellow passivated. Length delivered 5 m. Stainless steel tubing on request.



Plastic tubing: WVN715, without plasticizer
WVN716, flexible (containing plasticizer)

Bestell-Nr.	øda	s	ødi $^{+0.15}_{-0.05}$	Smallest permissible bending radius r bent free-hand	with fixture	Perm. operating pressure [bars]	Burst pressure [bars]
WVN715-RO4x0.85+A89	4	0.85	2.3	38	14	72	216
WVN715-RO8x1.25+A89	8	1.25	5.5	76	28	49	147
WVN715-RO10x1.5+A89	10	1.5	7	89	35	47	141
WVN716-RO4x0.85+A89	4	0.85	2.3	38	14	36	108
WVN716-RO8x1.25+A89	8	1.25	5.5	80	30	25	75

Color: black

Tubing with other dimensions on request.

Important!
For screwed tubing joints only use unions with reinforcing sockets.

Material WVN715: PA 12 HL: polyamide 12 without plasticizer, stabilized against light-related and termal ageing.
Material WVN716: PA 12 PHL: polyamide 12 with plasticizer, stabilized against light-related and termal ageing.

VOGEL®

Checklist

Replay

Willy Vogel AG
Sales Vehicle
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68766 Hockenheim
Germany

Fax: +49 (0) 6205-27-100

From

❑ Dealer ❑ Customer

Name . . . . . .
Date . . . . . .
Company . . . . . .
Name . . . . . .
Dept. . . . . .
Street . . . . . .
City . . . . . .
Zip Code . . . . . .
Phone . . . . . .
Fax . . . . . .
E-mail . . . . . .

Please complete the following check list. Send the check list back to the above address or fax.

Vehicle: ❑ Electric locomotive ❑ Diesel locomotive ❑ Railcar ❑ Subway/underground ❑ Interurban train/ rapid rail system ❑ Streetcar/tram

Type/series: . . . . . .

Number of systems: . . . . . .

Delivery schedule: . . . . . .

Bid deadline: . . . . . .

Disconnectable vehicle: ❑ yes ❑ no

Compressed air supply: ❑ yes, from ..... bars to ..... bars ❑ no

Bogie: ❑ yes ❑ no

Power supply: ❑ 24 V DC ❑ 72 V DC ❑ 110 V DC ❑ ..... V AC
tolerance + ... / – V

Type of lubrication: ❑ curve-dependent ❑ distance-dependent ❑ time-dependent ❑ curve-/time-dependent ❑ curve-/distance-dependent

Type signal for distance dependent lubrication:

Speedometer: . . . . . .
Others: . . . . . .

Max. vehicle length with track-dependent lubrication: . . . . . m

Directions of motion: ❑ 1 direction ❑ 2 directions →

SKF

Driving speed: Maximum speed ..... km/h

Operational speed ..... km/h

Competitors (Wheel-flange lubrication): Company .....

Special requirements/options: .....

.....

.....

Photographs/catalogues of rail vehicles? ❑ yes (attached) ❑ yes (will be supplied ❑ no

Principal scheme of system layout

Notice!
All products from VOGEL may be used only for their intended purpose. If operating instructions are supplied together with the products, the provisions and information therein of specific relevance to the equipment must be observed as well.
In particular, we call your attention to the fact that hazardous materials of any kind, especially the materials classified as hazardous by EC Directive 67/548/EEC, Article 2, Par. 2, may only be filled into VOGEL centralized lubrication systems and components and delivered and/or distributed with the same after consultation with and written approval from VOGEL.
All products manufactured by VOGEL are not approved for use in conjunction with gases, liquefied gases, pressurized gases in solution and fluids with a vapor pressure exceeding normal atmospheric pressure (1013 mbars) by more than 0.5 bar at their maximum permissible temperature.

This brochure was presented by:

Competence Center for Railhead Lubrication

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