# Single-line Systems for Commercial Vehicles

For fluid grease, NLGI grades 000, 00



- Cut wear and tear
- Reduce downtime
- Lower maintenance costs with automatic lubrication

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# Order No. Index

# System overview

## Lubricant: Fluid grease, NLGI[1)] grades 000, 00

| | | | |
|---|---|---|---|
| Selection criteria | Max. connected load ($cm^3$) or max. number of lube points | 80 $cm^3$ | |
| | Pump suitable for | Truck tractor<br>Truck tractor with extra equipment<br>Interconnected system/ semitrailer<br>KFU units also for GGVS vehicles [2])<br>(with cable harness 997-000-374) | |
| | Type of drive | electric | |
| Type designation | Pump | Gear pump unit<br>**KFU2-40**<br>**KFUS2-64**<br>  <br>page 12 | **KFU6-20**<br>  |
| Technical data | Operating pressure | 38 bars | |
| | Reservoir capacity | 2.7 liters | 6 liters |
| Auxiliary equipment | Lubricant distribution | VN relubrication distributors | |
| | Control system | Electronic control unit IG502-2-E<br>with or without monitoring function<br>KFUS with integrated control unit IG490 | |
| | Main line<br>(connection: pump – distributor) | Mainly plastic tubing 10x1.5 diam., but also steel tubing 10x0.7 diam.<br>hose SLH10-... | |
| | Secondary line<br>(connection: distributor – lube point) | Mainly plastic tubing 4x0.85 diam.;<br>in case of large movement between lubrication point and chassis: hose 734 ... | |

*1) For progressive systems for commercial vehicles up to NLGI grade 2, see leaflet 1-9430-EN*
*2) GGVS = Hazardous Goods Road Ordinance Germany*

| | | | |
|---|---|---|---|
| | 36 cm³ | 36 cm³ | approx. 20 lubrication points |
| | Truck tractor<br>Truck tractor with small extra equipment<br>also for GGVS vehicles [1]) | Trailer / semitrailer<br>also for GGVS vehicles [1]) | Truck tractor with small number of lubrication points<br>Truck tractor with extra equipment<br>also for GGVS vehicles [1]) |
| | pneumatic | pneumatic | electric |
| | Piston pump<br>**PEF-90**<br>  <br><br>page 15 | Piston pump<br>**PEF-90-S14**<br>**PEF-90-S19** *for GGVS vehicles [1)]*<br>  <br><br>page 18 | Compact unit<br>**KFB(S)1**<br>  <br><br>page 20 |
| | 22 to 50 bars | 22 to 50 bars | 38 bars |
| | 3 liters | 3 liters | 1.4 liters |
| | VN relubrication distributors | | VN relubrication distributors |
| | Electronic control unit IG502-2-E with or without monitoring function | with built-in electronic control unit<br>IG476-2 for PEF-90-S14<br>IG476-3 for PEF-90-S19 | Electronic control unit IG502-2-E with or without monitoring function |
| | | | plastic tubing 10x1.5 diam. |
| | | | plastic tubing 4x0.85 diam. |

# Lubricants and Centralized Lubrication Systems

See important product usage information on the back cover.

Centralized lubrication systems may only be used for their intended purpose. Centralized lubrication systems can normally be operated with the lubricants listed in the system's documentation as long as the latter comply with the respective consistency classes and viscosity limits within the indicated temperature range. It is possible for the demands on a lubrication system's configuration to vary concerning the lubricant and the use to which the installation is put.

Given the already high "apparent viscosity", we advise against the use of grease conforming to NLGI Grade 0 since it is possible for fundamental properties related to delivery of the lubricant to deteriorate considerably, particularly at low ambient temperatures.
If, nevertheless, a lubricant conforming to NLGI Grade 0 is required, we recommend that its properties be checked to confirm they are adequate.

## Suitable Lubricants

The lubricants must be suitable for the lubrication of bearings under the ambient conditions to be expected in operation. Our experience shows that suiteable lubricants are available from every well-known manufacturer. Please contact the supplier when you choose a lubricant. SKF Lubrication Systems offers to test the deliverability of a selected lubricant in the event of doubt. Lubricants that meet the identical specifications of SKF Lubrication Systems Germany AG, Daimler AG and MAN AG match each other in terms of the parameters applying to their deliverability.

A corresponding lubricant can also be purchased from SKF Lubrication Systems Germany AG in 1 kg and 25 kg drums.

**1 kg drum, Order No. FL1-000** [1) 3)]
**25 kg drum, Order No. FL25-000** [2)]

Biodegradable types of grease available from SKF Lubrication Systems Germany AG can also be used in centralized lubrication systems.

**1 kg drum, Order No. FL1-000BIO** [1)]
**25 kg drum, Order No. FL25-000BIO** [2)]

To assure reliable operation of the centralized lubrication system, always pay attention to cleanliness when topping up lubricant. Dirt will lead to malfunctions in a centralized lubrication system and to destruction of the friction points.

Lubricant manufacturers who are known to sell appropriate lubricants:

| | | |
|---|---|---|
| ARAL AG | Deutsche Shell GmbH | Reiner Chemische Fabrik GmbH |
| Autol-Werke GmbH | ELF | RHENUS |
| AVIA Mineralöl | Esso | Wilhelm Reiners GmbH & Co. |
| Axel Christiernsson | FINA | Siebert GmbH |
| BP Oil Deutschland GmbH | Georg Oest Mineralölwerke | Texaco |
| Calypsol | Mobil Schmierstoff GmbH | Veedol Int. Ltd., England |
| Castrol Ltd., England | Optimol | Winterahall AG |
| DEA | ÖMV GmbH | Zeller+Gmelin GmbH & Co. |

*1) Coupler for 1 kg drum, order No. KFU2.U8*
*2) Topping-up pumps for 25 kg drum, order No. 169-000-082 and 169-000-084*
*3) Filler bend for pumps with screw cap, order No. 169-000-037*

# Systems for grease, NLGI grades 000, 00

- Electrically operated gear pump units KFU / KFUS
- Pneumatically actuated piston pump PEF-90
- Electrically operated piston pump KFB(S)1

## 1. Planning and installation

a) Determination of number of lubrication points.
All friction points of the chassis and any body units, with the exception of the universal joints of the cardan shaft

b) Determination of metered quantities.
The tabular values correspond to the average lubricant needs of the bearings in a vehicle weighing more than 8 tons.
The lubrication frequency depends on the type of operation.

| Truck tractors | Metered qty. ($cm^3$) | Trailers and semitrailers | Metered qty. ($cm^3$) | Buses | Metered qty. ($cm^3$) |
|---|---|---|---|---|---|
| 1. Steering knuckle | 0.4 | 1. Tow bar | 0.4 | 1. Stop lever | 0.1 |
| 2. Spring pin | 0.4 | 2. Turntable | 0.4 | 2. Dual lever | 0.1 |
| 3. Spring suspension | 0.4 | 3. Spring pin | 0.4 | 3. Reversing lever | 0.1 |
| 4. Brake shaft | 0.2 | 4. Brake shaft | 0.2 | 4. Idler arm | 0.1 |
| 5. Brake shaft, wheel side | 0.1 | 5. Brake shaft, wheel side | 0.1 | 5. Linkage setting device | 0.2 |
| 6. Linkage setting device | 0.2 | 6. Linkage setting device | 0.2 | 6. Brake shaft | 0.2 |
| 7. Stabilizer | 0.2 | 7. Hand brake | 0.1 | 7. Brake shaft, wheel side | 0.1 |
| 8. Driver's cab support | 0.1 | 8. Spare wheel | 0.1 | 8. Steering knuckle | 0.4 |
| 9. Longitudinal control arm | 0.2 | 9. Brake shoe pin | 0.1 | 9. Turntable | 0.4 |
| 10. Transverse control arm | 0.2 | 10. Steering assembly | 0.4 | 10. Drag link | 0.4 |
| 11. Coupling | 0.1 | 11. Support arms | 0.1 | 11. Knuckle pin bearing | 0.4 |
| 12. Gas control | 0.1 | 12. Wearing plate | 0.4 | 12. Axle support | 0.4 |
| 13. Center bearing | 0.4 | | | 13. Gas control | 0.1 |
| 14. Fifth wheel support plate | 0.4 | | | | |

c) Calculation of system capacity

Maximum values:
Electrically operated gear pump units
KFU / KFUS ..... = 80 $cm^3$

Pneumatically actuated piston pump
PEF-90 ..... = 36 $cm^3$

Electrically operated compact unit
KFBS ..... Cf. diagram on page 21 for max. system capacity

Example of how to calculate the system capacity: *)

| | | | |
|---|---|---|---|
| 20 lubrication points, 0.4 $cm^3$ each ..... | = | 8 | $cm^3$ |
| 10 lubrication points, 0.2 $cm^3$ each ..... | = | 2 | $cm^3$ |
| 10 lubrication points, 0.1 $cm^3$ each ..... | = | 1 | $cm^3$ |
| | | 11 | $cm^3$ |
| +25% (safety margin) ..... | = | 2.75 | $cm^3$ |

Compressibility and expansion losses:

1 $cm^3$/m main-line tube
(average value for steel and plastic tubing),

assumed:

| | | | |
|---|---|---|---|
| 12 m main-line tubing, 10 x 1 ..... | = | 12 | $cm^3$ |
| .....Total **) | | 25.75 | $cm^3$ |

d) Selection of distributors

Metered quantities of VN distributors: 0.1, 0.2 and 0.4 $cm^3$.
Depending on tubing layout: 2-, 4- and 6-port VN distributors.
Two different distributors are connected to one manifold with a VKR 2.U2 connector

e) Tubing connections

Main line connections to VN distributors:
M16x1.5 thread for 10 mm diam. tube,
tapped for solderless tube connection.

Secondary (lubrication) line connections
to VN distributors: with plugin connectors.

*) *The example applies only to KFU and PEF90 units. The safety margins for the KFB(S) units are already worked into the table.*

**) *If the calculated system capacity exceeds the capacity of the pump unit, a second pump unit must be used. A second unit is also required when the vehicle is operated for extended periods of time at temperatures below –20 °C with a main-line train of more than 17 m.*

f) Installation
(Detailed installation instructions are available on request.)

This information is supposed to be a guideline and aid for the fitter. It will enable him to install the equipment on vehicles even if there are no tubing layouts available, or only incomplete ones.

**For the prevalent, standard types of commercial vehicles, we have prepared tubing layouts that show how the installations are supposed to be done.**
If required, these layouts will be mailed free of charge.

Additional superstructures and special vehicles can be outfitted on the basis of these layouts.

The preassembled VN distributors for standard systems are supplied with a preset metered quantity, but they can be changed to another quantity of lubricant if necessary.

Install the VN distributors at suitable locations on the vehicle and connect to the tubing.

**Max. length of the secondary lines is 6 m** (connection: distributor – lubrication point).

Tighten the socket unions, but do not overtighten (maximum of $1\,^1/_2$ turns). The tapered sleeves and tubing are slightly deformed when tightened, thus offering no resistance as a fixing bolt would when tightened.

**Attention must be paid to the following when installing the secondary lines:**

- **Steering lock angle, sagging, chafing spots.**
- **Keep away from heat sources.**

Install the pump and control unit at a suitable place.

Connect hoses and make electrical connections.

**Some installation hints:**

- Use the existing holes drilled in the chassis and in other vehicle parts for the installation.
- Span large boreholes with body washers.
- Lay 4 x 0.85 plastic tubing (as per WVN716, flexible) between distributors and lubrication points.
- Use 734...-K hose lines to connect nonstationary lubrication points and lubrication points that are subject to heavy mechanical stress and strain.
- **The compressed air for the PEF-90 pneumatically actuated pump must be taken** from a line for auxiliary loads. The regulations of the german TÜV (Technical Control Board) must be observed.
- **The pertinent Hazardous Goods Road Ordinance Germany (GGVS) must be observed in the case of tank trucks and other vehicles carrying hazardous goods.**

The following pump unit can be used: electrically operated gear pump units KFU2-40, KFU6-20 in conjunction with cable harness 997-000-374; compact units KFB(S) in conjunction with cable harness 997-000-630 or 997-000-650.

Furthermore, the pressure switch line must likewise be laid in corrugated tubing

## 2. Operation and maintenance

In the case of automatically controlled systems, with the exception of KFB(S) compact units, the indicator light goes on for about 3 seconds every time the ignition is switched on. (See 3.a for malfunctions of indicator light.)

For the most part, maintenance is limited to topping up with clean lubricantwhen necessary.

All tube connections should be checked for a tight fit when the vehicle is inspected.

Replace torn or worn hose lines after eliminating the cause of the problem, and trigger test lubrication. Actuate automatic systems by hand and observe the indicator light.

The main line (connection: pump – distributor) is monitored by a pressure switch that reports the build-up of pressure. Exception: KFBS and KFUS units. If the indicator light does not light up, or if it burns constantly in the case of automatic systems, this means the pressure has failed to build up.

Select a smaller metered quantity for highly overlubricated points and a higher quantity for dry points.

If the entire system is overlubricated or underlubricated, there can be malfunction: in this case, follow the instructions in 3.b or 3.c below.

## 3. Malfunctions and their elimination

a) **Fault indication by indicator light.**
**The indicator light does not go out about 3 seconds after the ignition is switched on or the motor has been started.**

**Check lubricant level in the reservoir;** top up lubricant if necessary and bleed the system.

**In the case of electrically operated gear pumps**, loosen the screw union of the main line while the pump is running. There must be a continuous discharge of lubricant.

**In the case of pneumatically operated systems:**
**Check the compressed air supply**. Minimum pressure is 6 bars.

**Check pump function.**
The piston stroke must be heard or felt when compressed air is applied.

**Check pressure in main line.**
Loosen the lubrication-point connection and check whether the distributor is delivering lubricant. If it is, the fault must be looked for in the pressure switch, electrical wiring or control unit.

Please note:
The distributor will not feed lubricant until the main line is relieved of pressure again. It is therefore called a “relubrication distributor”.

Check electrical connections:
Is power available?
Are all terminals tight?
Check the indicator light, solenoid valve, pressure switch and control unit.

Main line connections, main hose lines in particular, must be checked for leakage. Then check whether the pump valves are dirty.

b) Entire system insufficiently lubricated.
Install a pressure gauge in the main line and check the pressure build-up and relief. Min. pressure build-up is 30 bars.

A maximum residual pressure of 1 bar may remain after the pressure is relieved (measured at pump's outlet port).

c) Entire system is overlubricated.
Check setting of control unit and increase interval time if necessary.

d) Individual lubrication points are over-lubricated or underlubricated.
Change metered quantity.

e) Distributor faults.
Replace distributors.

**Please note!**

A high level of cleanliness must be maintained when doing any work on the system, especially when replacing metering nipples on distributors. Dirt in the system causes malfunctions.

Never use trichloroethylene, perchloroethylene or similar liquids aggressive to Perbunan when cleaning centralized lubrication systems. Suitable cleaning agents are petroleum ether or kerosene.

# Pressure curve in main line in the case of systems with VN relubrication distributors

Pneumatically actuated piston pumps and electrically operated gear pump units have an identical pressure curve, but the time required for the pressure build-up will generally be shorter with pneumatically actuated piston pumps.

The maximum pressure reached in the main line depends on the actuating pressure of the piston pumps or on the pressure intensity of the safety valve in the case of gear pump units.

Pneumatically actuated
piston pump . . . . . 22-50 bars
Electrically operated
KFU gear pump units . . . . . ≈ 38 bars
Electrically operated
KFBS compact units . . . . . ≈ 30 bars
(length of main line limited to 10 m)

## Functional sequence

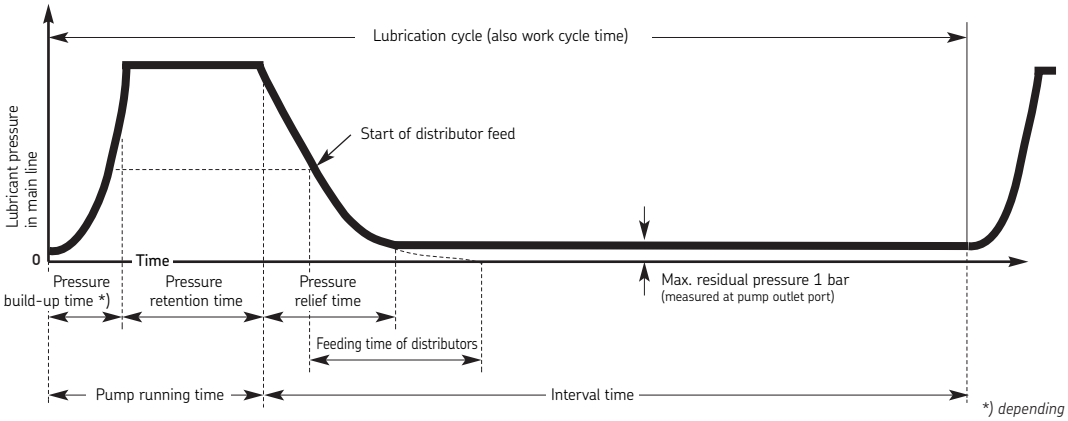
At the end of the preset interval time, the pump motor is switched on and the pressure required by the system built up. This is reported to the control unit by the actuation of the pressure switch. At the end of the pump running time, the pump motor is switched off and a new interval time begins.

If there is no signal from the pressure switch while the pump is in operation, the control unit will report a fault at the end of the pump running time. This is signaled by the constant burning of the indicator light.

The metering chambers of the distributors are filled with lubricant during the pressure build-up in the main line.

The relief of pressure in the main line via the pressure relief valve starts when the pump is switched off. The lubricant from the metering chambers is delivered to the lubrication points by the spring-loaded distributor pistons at the same time as the pressure is relieved.

The KFB(S) compact units have the same functional sequence, but the pressure build-up is not monitored in this case.



# Gear pump units KFU2-40, KFU6-20, KFUS2-64 with reservoir, electrically operated

The gear pump unit consists mainly of a gear pump with relief valve, safety valve, DC motor, transparent lubricant reservoir, filler socket and angle bracket. The DC motor and filler socket are covered by a hood to protect them from dirt. The hood snaps into place on both sides of the reservoir lid.

## Function

The gear pump continuously supplies lubricant to the relubrication distributors via the main line network when the pump is in operation. As soon as the metering chambers of the distributors are full, the excess lubricant flows back into the reservoir via the safety valve.

At the end of the pump running time (start of the interval time), the pressure relief valve opens so that the pressure in the main line can drop to a residual pressure of 0.2 to 1.0 bar. The spring-loaded pistons of the distributors can now deliver lubricant from the metering chambers to the lubrication points.

**Nearly every size of system on commercial vehicles, including superstructures, can be supplied by one single pump when a KFU2-40 or KFU6-20 pump unit is used.**

Furthermore, the semitrailer or trailer can be connected using an interconnected system, but this is only advisable when the motor vehicle and semitrailer/trailer are rarely or never disconnected from each other.

**The KFU units must be used with cable harness 997-000-374 on vehicles approved for the transport of hazardous goods by road (GGVS).**

Associated cable harness for KFU, order No. 997-000-373;

cable harness for KFUS2-64, order No. 997-000-750.

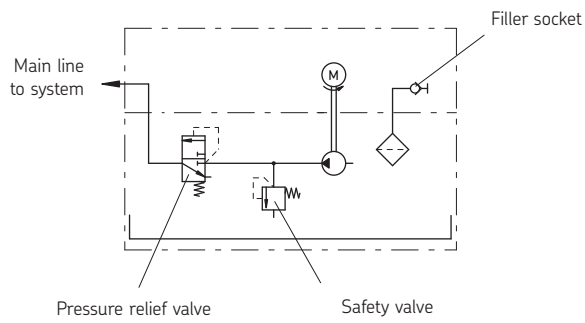
### Technical data

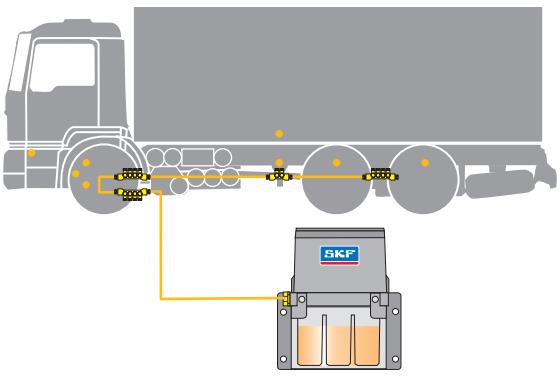
| | | |
|---|---|---|
| Order No. | KFU2-40 | KFU6-20 *) |
| Order No. | KFUS2-64 | |
| Reservoir capacity | 2.7 l | 6 l |
| Weight (without lubricant) | ≈ 5.5 kg | ≈ 7.3 kg |
| Operating voltage | 12 or 24 V DC | |
| | Please quote required voltage when ordering. | |
| 12 V fuse for KFU | 7.5 A | |
| 24 V fuse for KFU | 7.5 A | |
| 12 V fuse for KFUS | 16 A | |
| 24 V fuse for KFUS | 8 A | |
| Flow rate | 140 $cm^3$/min | |
| | at back pressure p = 38 bars and temperature t = 25 °C | |
| System capacity for singleline systems | max. 80 $cm^3$ | |
| Units with relief valve and safety valve | | |
| Max. operating pressure | $38^{+2}_{-3}$ bars | |
| | (corresponds to actual value of built-in safety valve) | |
| Permissible operating temperature | –25 °C to +75 °C | |
| Type of enclosure | IP 59 k | |
| Lubricant | fluid grease, NLGI grades 000, 00 | |

Associated control unit for KFU: IG502-2-E,
KFUS unit with integrated control unit: IG490

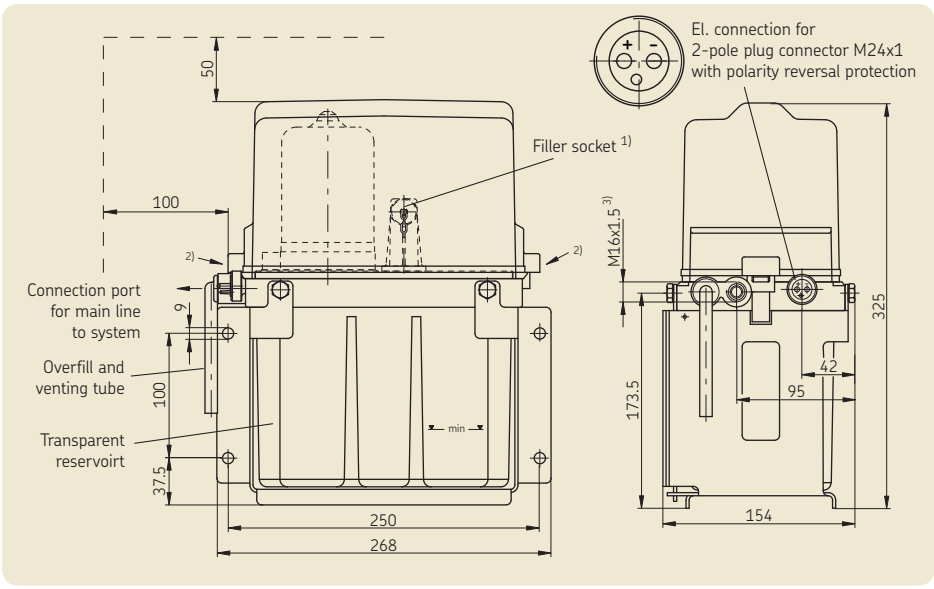
**) This unit should only be used for systems with a minimum lubricant consumption of 6 l/year.*

### Hydraulic layout

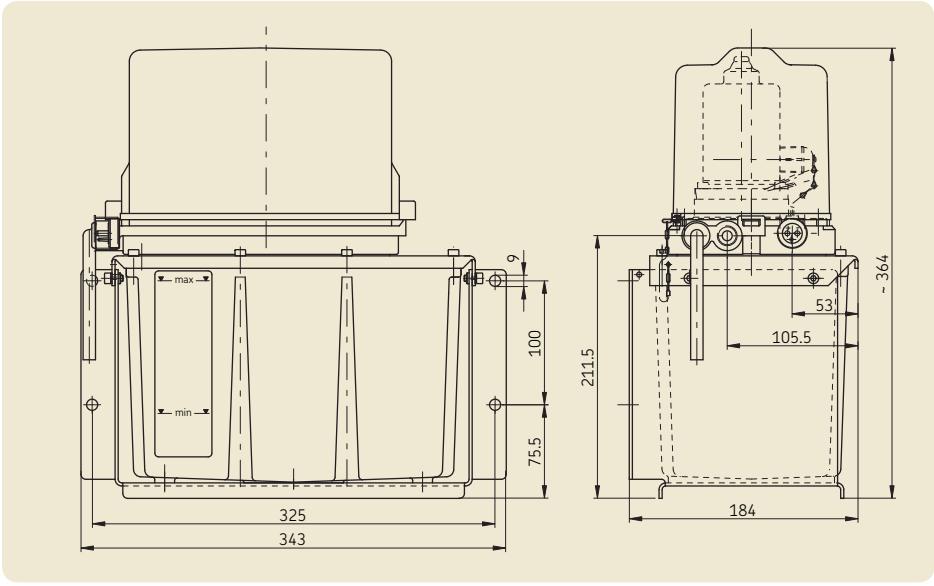


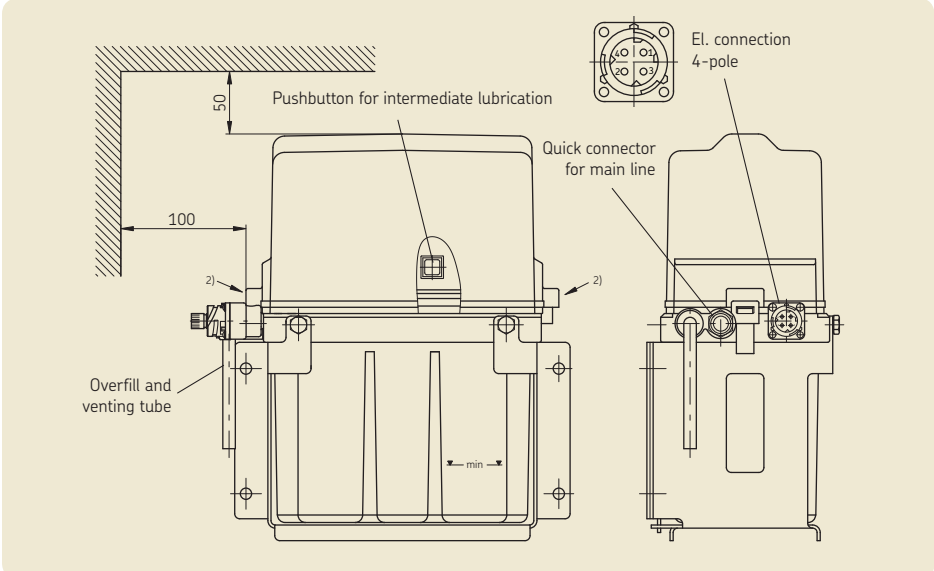
## KFU2-40 with 2.7 l reservoir




## KFU6-20 with 6 l reservoir




## KFUS2-64 with 2.7 l reservoir




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

*2) The cover must be removed for filling. Press in cover with both hands at the positions marked and lift.*

*3) Ports tapped for solderless tube connection.*

# Interconnected system with KFU2-40, KFU6-20, KFUS2-64 gear pump units, electrically operated,

## for truck tractors with trailer or semitrailer without frequent change of vehicles

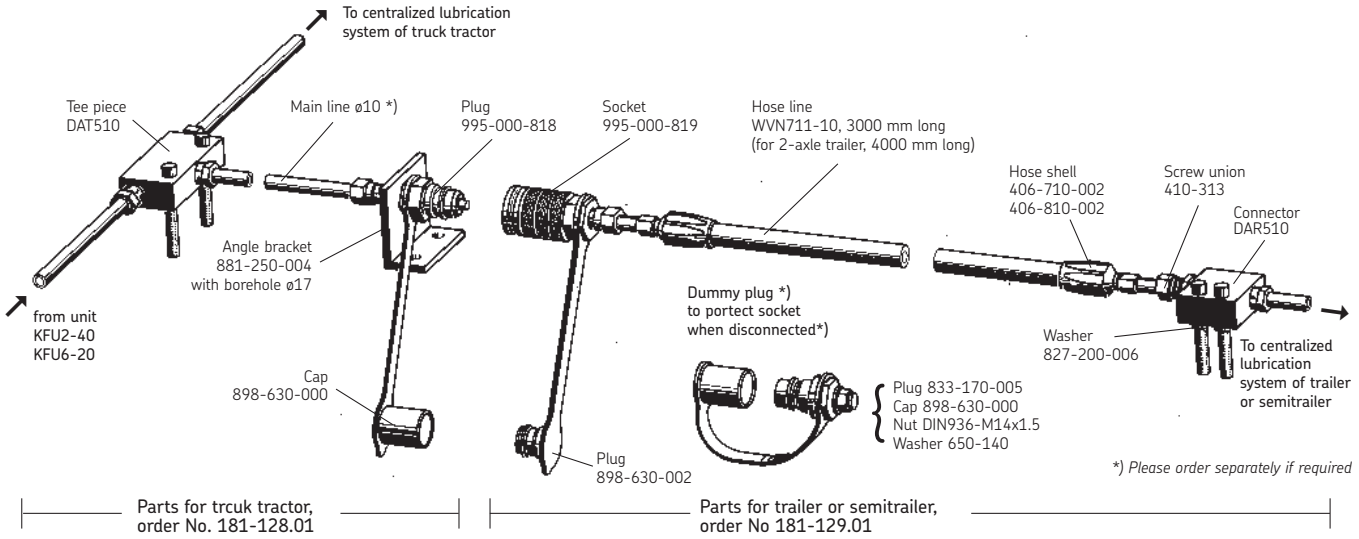
The unit is installed on the truck tractor, and the main line of the following vehicle is connected to the centralized lubrication system of the truck tractor via a plug and socket coupling.

The feed capacity is dimensioned so that all standard interconnected vehicles can be supplied.

The units must be used with cable harness 997-000-374 on vehicles approved for the transport of hazardous goods by road (GGVS).

Associated control unit: IG502-2-E


**Coupling parts for interconnected system**




| Coupling parts for interconnected system, complete<br>Order No. | Complete, but with spiral tubing [1])<br>Order No. | Parts for trailer or semitrailer with spiral tubing [1])<br>Order No. |
|---|---|---|
| 181-123.01 | 181-122.01 | 181-140.01 |

[1]) *Spiral tubing,* ***order No. 167-003-501***

# Piston pump PEF-90, pneumatically actuated

The unit consists mainly of

- a lubricant pump in the form of a pneumatically actuated piston pump with spring reset,
- suction valve,
- combination pressure and relief valve,
- lubricant reservoir in the form of a bellows, including protective holder,
- filler socket for topping up the lubricant reservoir.

## Function

The delivery piston is moved in the direction of the outlet after pressurization with compressed air. As a result, the lubricant that flowed into the pump chamber through the suction valve is delivered to the system via the combination pressure and relief valve.

After the compressed air is switched off, the delivery piston is returned to its initial position by the reset spring. Due to the resulting underpressure, the combination pressure and relief valves also return to their initial position, thereby opening the pressure relief bore; the pressure in the main line is relieved as a result.

Due to the pressure relief, the paths from the metering chambers to the friction point are opened in the distributors so that the spring-loaded metering pistons can now deliver lubricant to the friction point.

The inlet valve is opened by the underpressure resulting from the return motion of the piston, and new lubricant flows into the pump chamber.

This ends the work cycle.


## Please note

When filling for the first time, overfill the pump unit in order to keep air from becoming trapped in the bellows.

**Technical data**

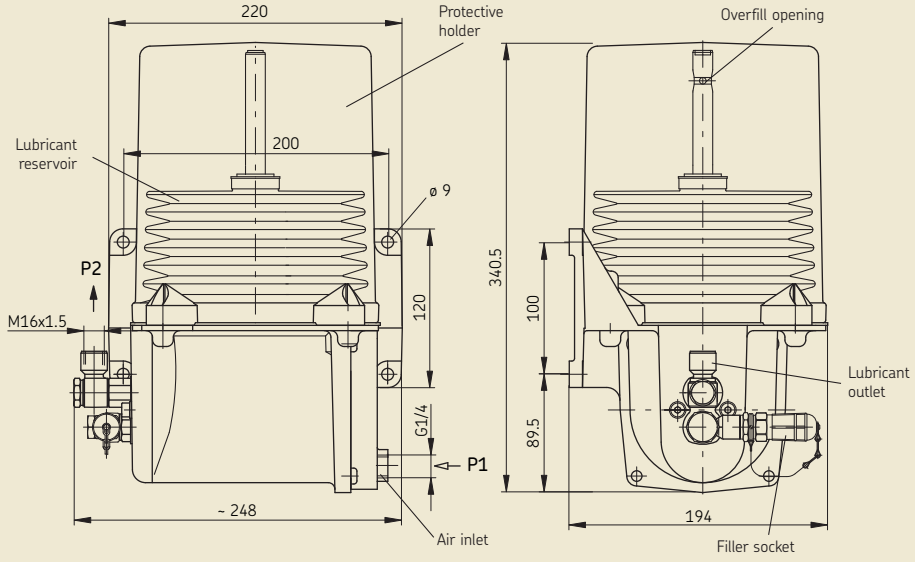
| | |
|---|---|
| **Order No.** | **PEF-90** |
| Delivery rate per stroke | 48 $cm^3$ |
| Operating pressure (depending on air pressure) | 22 to 50 bars |
| Max. perm. P1 air pressure for the pump | 10 bars |
| Permissible operating temperature | –25 °C to +80 °C |
| Reservoir capacity | 3 liters |
| Lubricant | fluid grease, NLGI grades 000, 00 |

Materials:

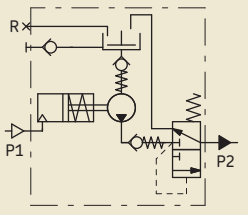
| | |
|---|---|
| Cylinder/piston | Al Mg Si 0.5 |
| Valves | steel, Cu Zn 40 Pb 2 |
| Seals, lubricant reservoir | NBR |
| Mounting position | as shown |
| Weight (without lubricant) | approx. 4.7 kg |

Make sure the pump is installed without distortion!

**Associated control unit: IG502-2-E**




Hydraulic layout




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

P1 = when connected to tubing: order adapter 406-054 for 6 mm diam. tube and washer 508-108 separately.

P2 = ports tapped for solderless tube connection for tube 10 mm diam.

*See page 41 for grease topping-up pumps.*

# Electronic control unit IG502-2-E

for systems with KFU2-40, KFU6-20 gear pump units or PEF-90 piston pump

## Operating and display elements

The IG502 control units come with an operating and display panel that can be used to check, monitor and, if necessary, readjust the parameters as well as programmed functions.

## Modes of operation

**PAUSE (pump OFF) with timer function**

- programmable from **0.1 to 99.9 h**
- digital display after invoking: **tPA** (**t** = timer, **PA** = PAUSE)

The PAUSE (the interval between two lube cycles) is determined by a clock cycle (timer) generated by the control system and by the value (in hours) programmed for PAUSE (tPA).

**PAUSE (pump OFF) with counter function**

- programmable from **1 to 999 pulses**
- digital display after invoking: **cPA** (**c** = counter, **PA** = PAUSE)

The PAUSE (the interval between two lube cycles) is determined by the interval between the time signals arrive at the counter input and by the value programmed for PAUSE (cPA).

**CONTACT (pump ON) with timer function**

- programmable from **1 to 99.9 minutes**
- digital display after invoking: **tCO** (**t** = timer, **CO** = CONTACT)

The pump running time (CONTACT) is determined by a clock cycle (timer) generated by the control system and by the value (in minutes) programmed for CONTACT (tCO).

## Monitoring functions

**PS** (**P**ressure **S**witch)

This monitoring function is intended for centralized grease lubrication systems designed for NLGI grades 000, 00, 0 in which the pressure in the main line is monitored. Once the monitoring parameter **PS** has been programmed, the pressure switch installed in the main line is monitored for respective signals while the pump is in operation.

**CS** (**C**ycle **S**witch)

This monitoring function is intended for centralized grease lubrication systems with progressive feeders in which a piston's motion is monitored with a cycle switch.

Once the monitoring parameter **CS** has been set, the cycle switch installed on the progressive feeder is monitored for the respective signal while the pump is in operation.

The respective monitoring parameter selected (**PS** or **CS**) is displayed by the lighting of the corresponding LED in the PAUSE (interval) mode.

**Without monitoring (OFF)**

The monitoring can also be switched off (OFF).

The control system then works without direct monitoring of the pressure build-up in the main line or without monitoring of the feeder's operation. The **PS** or **CS** LEDs do not light up.

## Fault displays

The red FAULT LED shows a group fault signal when it constantly burns. The cause of the fault signal is additionally shown on the digital display to help with troubleshooting.

The following messages are provided for:

FPS – pressure build-up fault when monitoring is effected with a pressure switch.

FCS – cycle switch fault when a progressive feeder is not working or is blocked (line break).

## Special functions

Control units comprising the IG502 group have two electronic counters in which times are permanently stored; they cannot be changed by the user.

These counters are used to check the operation of the centralized lubrication system and are read out via the LED display.

## Fault-hours counter

The amount of time a farm or construction machine has been run with a non-functioning centralized lubrication system (e.g. with no lubricant in the reservoir) is added up by the fault-hours counter.

The counter's contents are automatically updated and cannot be cleared. The current state of the counter can be displayed by invoking function parameter **Fh** on the display and operating panel. The current value is displayed in hours.

The counter has a resolution of 0.1 hour, i.e. the smallest displayable interval amounts to 6 minutes.

## Elapsed-hours counter

The electronic elapsed-hours counter adds up the time in which power is applied to the control unit.

The counter's contents are automatically updated and cannot be cleared. The current state of the counter can be displayed by invoking function parameter **Oh** on the display and operating panel. The current value is displayed in hours.

The counter has a resolution of 0.1 hour, i.e. the smallest displayable interval amounts to 6 minutes.

**The units meet the legal requirements of the applicable EC Directives.**
**The unit is EC Type Approved (e1).**

## Application

The IG502-2-E universal control unit is used to control and monitor centralized lubrication systems on commercial vehicles. The control unit's functions can be programmed. Its housing dimensions, electrical connection and functions are compatible with those of SKF control units currently in use.

The operating elements are protected by a foil against moisture and dirt. The unit has a voltage-independent data memory. This is where the configuration data and parameters are stored. As a result, the control unit is not dependent on a constant supply of voltage.

If an external indicator light SL has been installed in the driver's cab, it will light up for 3 seconds after the unit is switched on.

## Installation

The unit has to be installed in a closed compartment on the vehicle where it is protected from ambient influences. It is fastened in place with straps.

The IG502-2-E is accommodated in an IP 20 type of enclosure. The plug conforms to safety class IP 00.

If the control unit is installed in a hard-to-reach place, it is advisable to additionally install an illuminated pushbutton on the dashboard to serve as a fault display and function check.

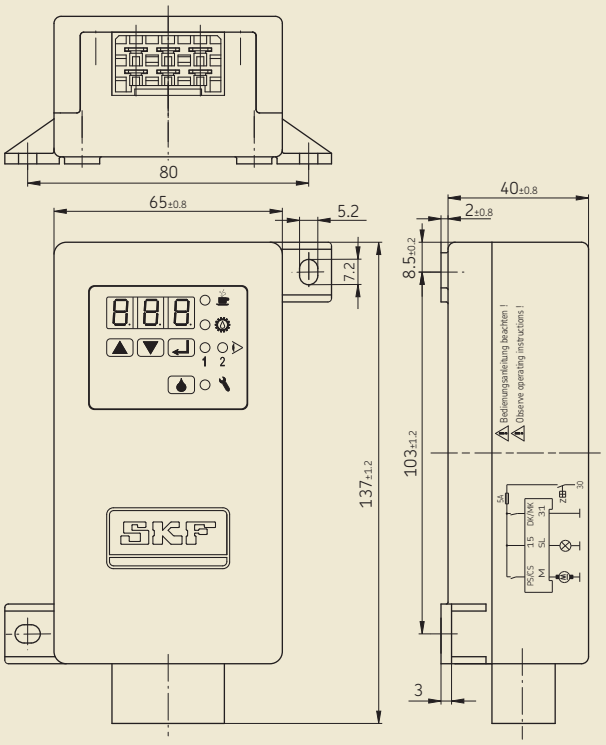
# Electronic control unit IG502-2-E

## Technical data

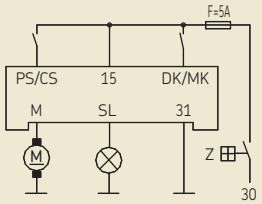
| | |
|---|---|
| Order No | IG502-2-E |
| Associated cable harness | |
| for KFU2-40, KFU6-20, **order No.** | **997-000-373** |
| for vehicles with hazardous goods, **order No.** | **997-000-374** |
| for PEF-90, **order No.** | **997-000-189** |
| Control votlage [1] | 12 or 24 V DC |
| Max. contact load, terminal M | 10 A |
| SL-output | 4 W |
| Type of enclosure [2] | IP 40, DIN 40050 |
| Temperature range | –25 to +75 °C |
| Max. fusing | 5 A |
| Programmable interval times | 0.1 to 99.9 h |
| Programmable pump running time | 0.1 to 99.9 min |
| Programmable pulses | 1 to 999 |
| Elapsedtime, fault hours memory | 0 to 99999.9 h |

*1) Please quote control voltage when ordering.*

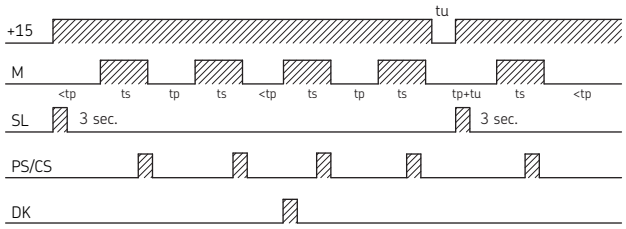
*2) Warranted for vertical (plug-in connector pointing downward) and horizontal installation.*




Wiring diagram




## Normal functional sequence




(time axis not to scale)

| | |
|---|---|
| **tu** | = ignition interruption |
| **ts** | = contact time |
| **tp** | = interval time |
| **30** | = battery + / vehicle network |
| **15** | = operating voltage + / after ignition “ON” |
| **31** | = operating voltage – |
| **DK/MK** | = pushbutton / intermediate lubrication or pulsecounter input |
| **PS/CS** | = pressure switch / cycle switch |
| **M** | = pump motor |
| **SL** | = indicator light |
| **Z** | = ignition loc |
| **F** | = fuse 5 A |

LED **PAUSE**
lights in intervals.

LED **CONTACT**
lights when pump running.

1 LED **CS**
lights for monitoring with cycle switch function.

2 LED **PS**
lights for monitoring with pressure switch function.

LED **FAULT**
lights for fault monitoring (cycle or pressure switch).

Pushbutton **DK**

# Trailer and semitrailer lubrication

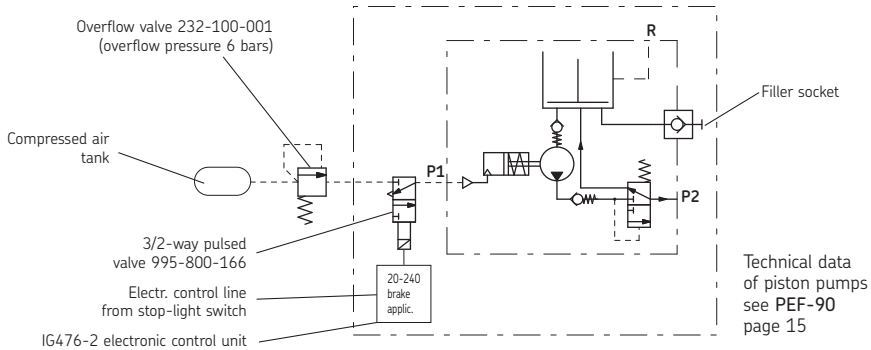
with PEF-90-S14 pneumatically actuated piston pump including IG476-2 electronic control unit
with PEF-90-S19 pneumatically actuated piston pump including IG476-2 electronic control unit for use on vehicles carrying hazardous goods

**PEF-90-S..**

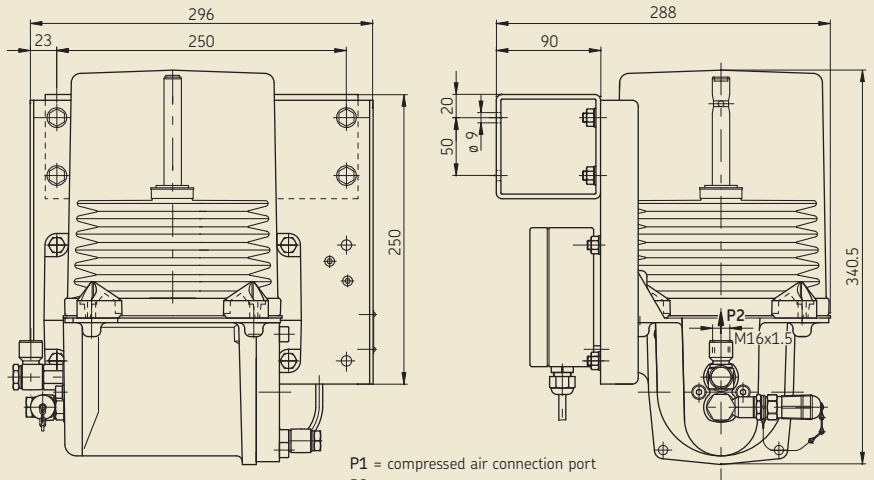

**Rear view of PEF-90-S14**

**Rear view of PEF-90-S19**

**Diagram of a system**




Technical data of piston pumps see **PEF-90** page 15




**P1** = compressed air connection port
**P2** = pressure port to system

Weight (without lubricant): approx 11.4 kg

**Pulsed valve compl. order No. 995-800-166**

for PEF-90-S19 with corrugated tube (used on vehicles carrying hazardous goods)

# Trailer and semitrailer lubrication

with PEF-90-S14 pneumatically actuated piston pump including IG476-2 electronic control unit
with PEF-90-S19 pneumatically actuated piston pump including IG476-2 electronic control unit for use on vehicles carrying hazardous goods

## Functional sequence

The switching pulses for the stop light are registered and added in the electronic control unit at an interval of at least one second. As soon as the preset number of brake applications is reached, the pulse-controlled 3/2-way solenoid valve is energized for a lubricating time of at least 40 seconds, thereby pressurizing the compressed air cylinder of the piston pump. The delivery piston of the pump executes one working stroke and the lubricant distributors are filled (relubrication distributors).

Application of the brakes during the lubricating time is ignored by the control unit.

The first application of the brakes at the conclusion of the lubricating time reverses the valve. As a result, the compressed air cylinder of the piston pump is relieved of pressure, and the delivery piston returns to its initial position. At the same time, this relieves the pressure in the main line so that the distributors can now deliver the lubricant.

Further applications of the brakes are now registered and added again to the control unit.

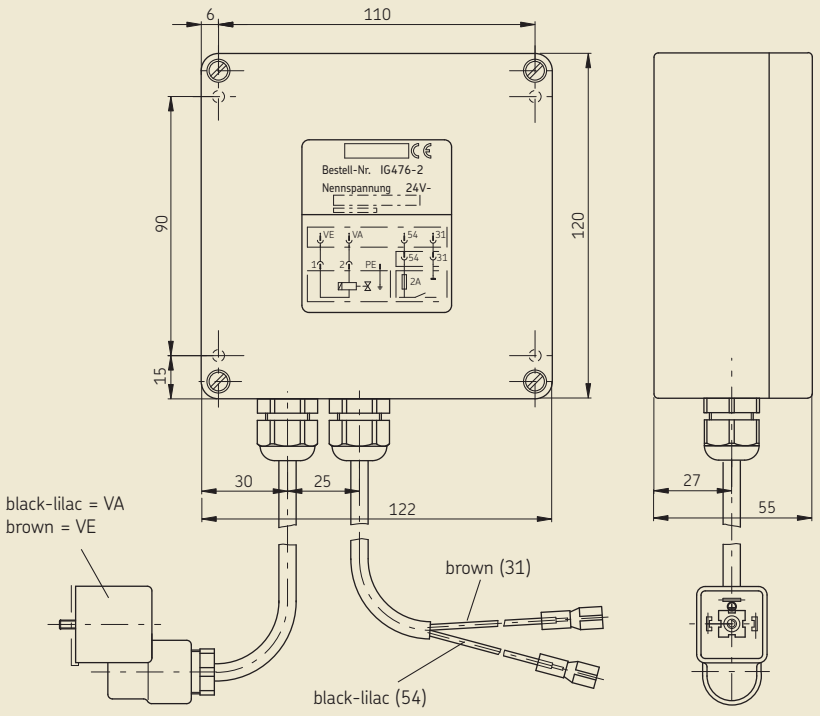
The control unit is equipped with an EEPROM memory that stores the counter states, even when no power is applied between applications of the brakes.

The number of times the brakes have to be applied before lubrication takes place depends on the conditions in which the vehicle is operated. It is possible to set the number of times (20, 40, 60,80, 100, 120, 140, 160, 180, 200, 220, 240) after which lubrication is initiated. After changing the setting, it is advisable to trigger manual lubrication so that the counter begins at 0 again.

The unit is set at the factory for 100 applications of the brakes before lubrication starts.

A pushbutton is built in for function tests when the brakes are applied. The function test can only be performed when there is adequate air pressure (more than 6 bars) in the air tank and power is available.

**IG476-2**



# KFB/KFBS compact unit, electrically operated

**KFBS1**


The KFB/KFBS compact unit consists mainly of a gear pump with DC gear motor, relief and safety valve, control unit, pushbutton for manual triggering, and lubricant reservoir.

**The lubricant reservoir comes with an overfill release valve and vent.** The filling level can be seen in the reservoir that is made of transparent material. The reservoir is filled via a filler.

**The lubricant supplied by the pump is distributed to the individual lubrication points via VN relubrication distributors.**

The **KFBS** pump unit is controlled by the integrated IG502-I control and monitoring unit. This can be done on a time or (pulse) load-dependent basis, with or without monitoring of the system's pressure build-up. A pressure switch [1] has to be installed in the system for this purpose.

## Function

The automatic cycle consisting of the interval time and pump running time is started after the KFB/KFBS unit has been connected to the vehicle's electrical system and the ignition turned on.

When the ignition is on, the pump motor is switched on at the end of the interval time and the pump running time started. During the pump running time, the gear pump delivers lubricant from the reservoir to the metering chambers of the relubrication distributors. As soon as the metering chambers of the distributors are full, the surplus lubricant flows back into the reservoir via the safety valve.

Forced pressure relief is initiated at the end of the pump running time (beginning of the interval time) and the pressure in the distributor feed (main line) drops to a residual pressure of 0.2 to 1 bar via the open relief valve.

The spring-loaded pistons of the distributors can now deliver lubricant from the metering chambers to the lubrication points.

A new interval time sequence is started when the pump motor is switched off.

The interval time stops running down every time the ignition is switched off. The interval time continues to run down when the ignition is turned on again.

All further lubrication operations are repeated on a cyclic basis in the order described.

| Piston pump<br>Order No. | Reservoir capacity<br>[liters] | Design |
|---|---|---|
| KFB1<br>KFBS1 *) | 1.4 | |
| KFB1-W<br>KFBS1-W *) | 1.0 | with filling level monitoring function |
| KFB1-4-S...<br>KFBS1-4-S... *) | 1.4 | with preinstalled 4-port piston distributor |
| KFB1-6-S...<br>KFBS1-6-S... *) | 1.4 | with preinstalled 6-port piston distributor |

**) incl. control system*

The voltage key has to be added to the order No: **12 VDC:** order key **912**
**24 VDC:** order key **924**

**Order example** for compact unit without distributors:
KFB1 in 24 V DC, **order No. KFB1+924**

**Order example** for compact unit with 4-port piston distributor:
KFB1 in 24 V DC with VN4 metered with 0.2; 0.2; 0.2; 0.2 $cm^3$ (as of port 1)
**order No. KFB1-4-S1+924** (specified with same metering of 0.2 $cm^3$)

**Order example** for compact unit with 6-port piston distributor:
KFB1 in 12 V DC with VN6 metered with 0.1; 0.4; 0.2; 0.2; 0.4; 0.1 $cm^3$
**order No. KFB1-6-S..+912** (specified after receipt of order)

*1) Pressure switch for 20 bar switching pressure,*
***order No. DS-E20-S1** (when installed at end of main line);*
*for 25 bar switching pressure,*
***order No. DS-E25-S1** (not possible when installed at end of main line).*
*Associated cable harness for pressure switch,*
**order No. 997-000-379.**

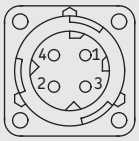
## Technical data

**Unit**

| | |
|---|---|
| Operating voltage | 12 V DC / 24 V DC (please indicate when ordering) |
| Mode/ON time | S3/2,5% – 120 min. Pay attention to interval and contact time when setting! Max. runtime 3 min., min. interval time 2 h |
| Operating pressure | 38 bars |
| Permissible operating temperature | –25 °C to +75 °C |
| DIN 40050 enclosure | IP 6K9K |
| Number of outlets | 1 |
| Weight (filled with grease) | approx. 3.8 kg |
| Lubricant | fluid grease, NLGI grades 000, 00 |
| System capacity | cf. diagram |
| Main line | 10x1.5; max. 16 m cf. diagram |
| Grease filling | via filler socket |

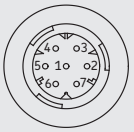
## Pin allocation

**KFB1** cable harness 997-000-706 (not included in delivery)




| Pin No. | Function | | Core color |
|---|---|---|---|
| 1 | 15 | plus potential | red/black |
| 2 | 31 | minus potential | brown |

**KFB1-W/KFBS1(-W)** cable harness 997-000-904 (not included in delivery)
(for GGVS design[1]): 997-000-630 or 997-000-650)

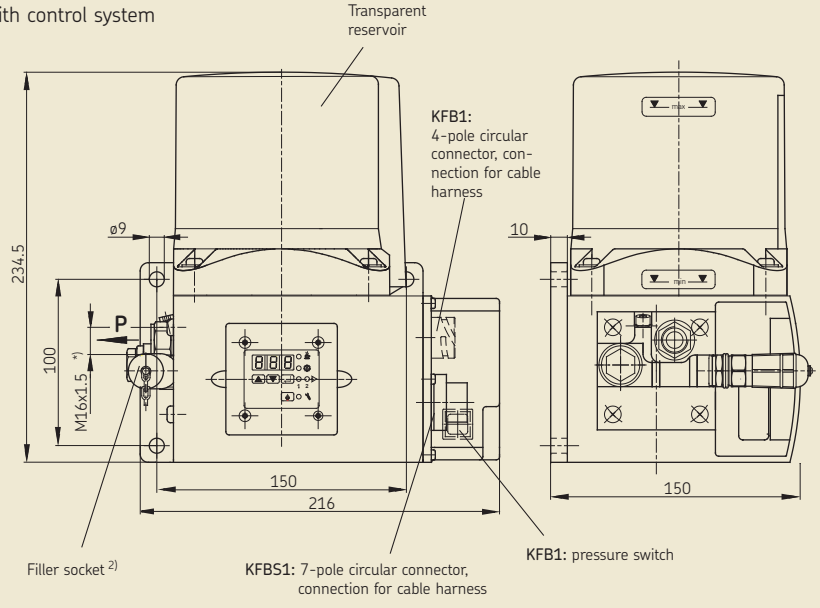



| Pin No. | Function | | Core color |
|---|---|---|---|
| 1 | 31 | minus potential | brown |
| 2 | 15 | plus potential | red/black |
| 3 | DK | manual lubrication | blue |
| 4 | SL2 | indicator light, ext. | pink |
| 5 | ZDS+ | pressure switch, +output | black |
| 6 | ZDS | cycle switch, input | black |
| 7 | SL1 | status display light | lilac/green |

*[1]) GGVS = Hazardous Goods Road Ordinance*

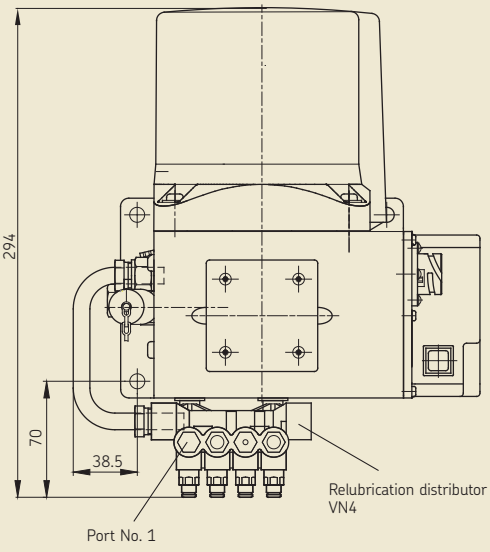
## KFBS1

with control system



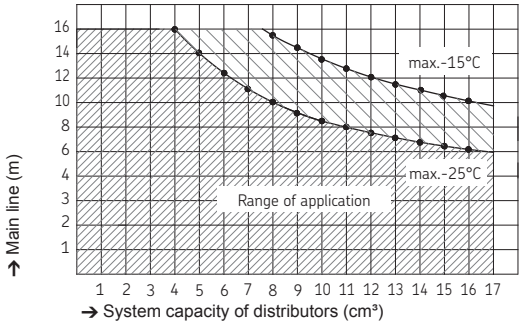

## KFB1-4-S...

with preinstalled piston distributor




**) Ports tapped for solderless tube connection for 10 mm diam. tube.*
*[2]) Coupling bush for filler socket, **order No. 995-001-500** (order separately)*

### Diagram: max. system capacity / max. length of main line for fluid grease, NLGI grades 000, 00



# Relubrication distributors, group VN

**VN2**

**VN4**

**VN6**

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.

When installing a system, arrange the lines and distributors in such a way that any air entrained in the system can escape by itself via the lubrication points.

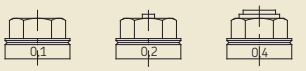
For this purpose, distributors with horizontal outlet ports or with outlet ports pointing upward must be installed at a position suitable for bleeding of the entire system.

Assign only one lubrication point to each distributor outlet port.

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

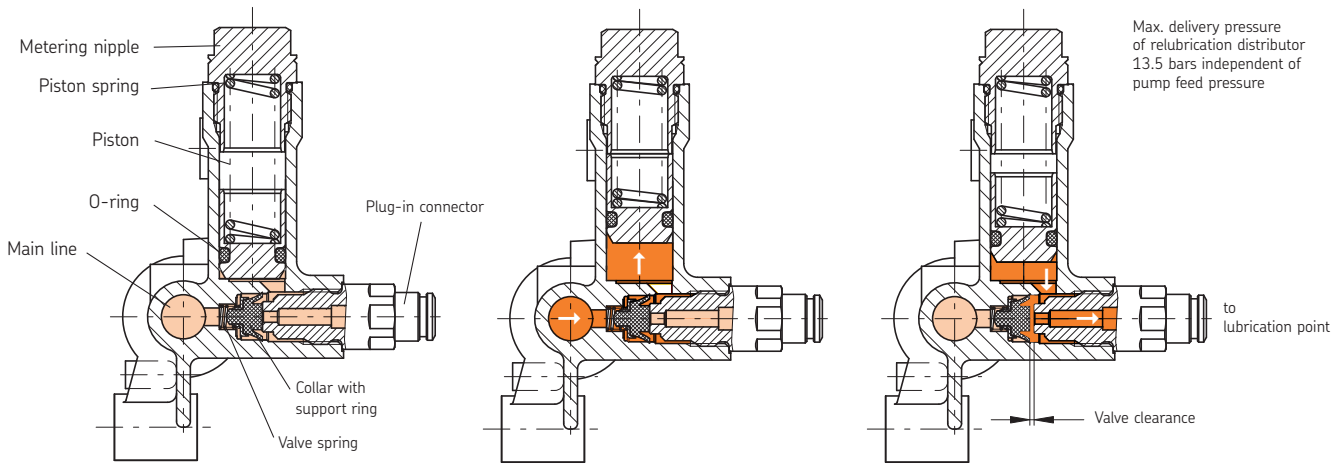
The metered quantity can be seen from the shape of the metering nipple and code number.

**Metering nipples**




0,1 0,2 0,4 cm³

**Design and function**



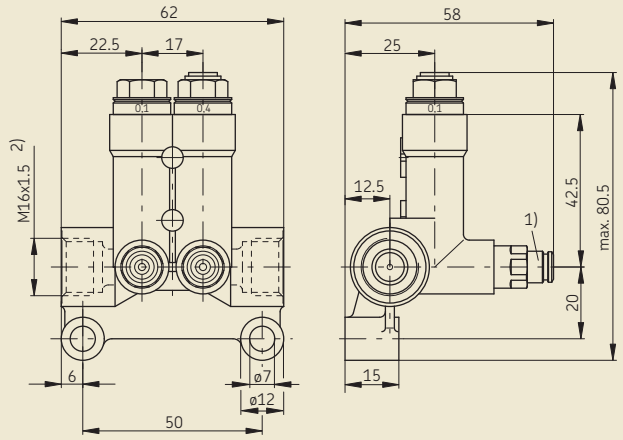

**Distributor in initial position**
system is non-pressurized

**Distributor pressurized**
main line pressurized by pump

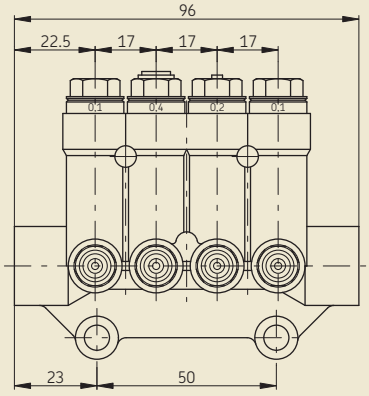
**Distributor feeding**
main line relieved of pressure

## Relubrication distributors, group VN

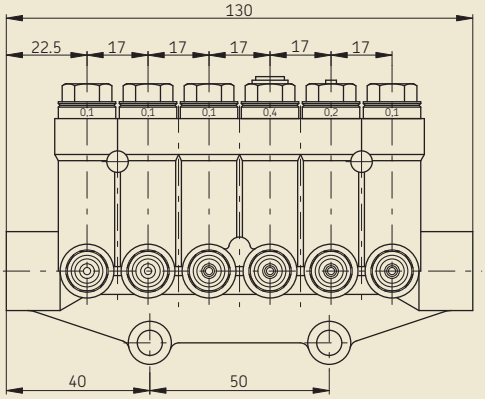
### VN2... 2-port distributor




### VN4... 4-port distributor




### VN6... 6-port distributor

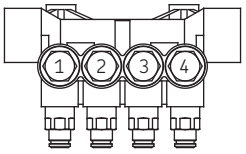



*1) Quick connector connection for 4 mm diam. plastic tubing.*
*2) Ports tapped for solderless tube connection for 10 mm diam. tube*

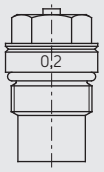
Piston distributors are only supplied with metering nipples fitted.

Plug-in connectors permit timesaving installation of secondary lines without the use of tools (cf. page 27).

| Order No. | Number of lubrication points |
|---|---|
| VN2 ... | 2 |
| VN4 ... | 4 |
| VN6 ... | 6 |

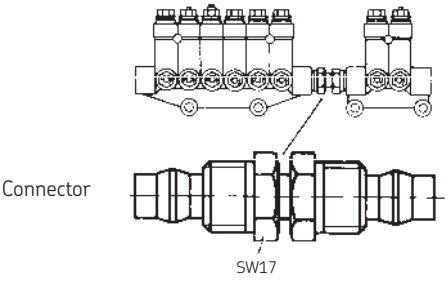


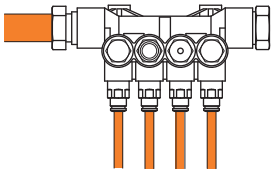

When ordering distributors, please quote the desired metered quantities (0.1; 0.2; 0.4 cm³) in their respective order.



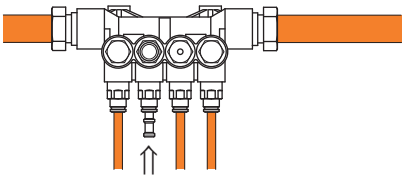

| Metering nipples, with O-ring for metered quantity | Order No. |
|---|---|
| 0.1 cm³ | VKU010-K |
| 0.2 cm³ | VKU020-K |
| 0.4 cm³ | VKU040-K |

Distributors are connected to manifolds with a connector, **order No. VKR2.U2**



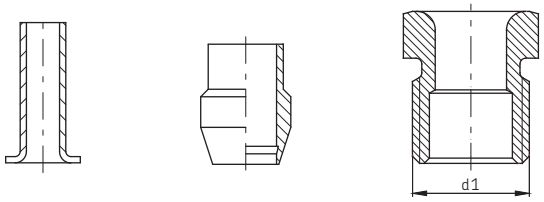
If required:
⇐
screw plug 410-011
washer DIN7603-A16x20-CU

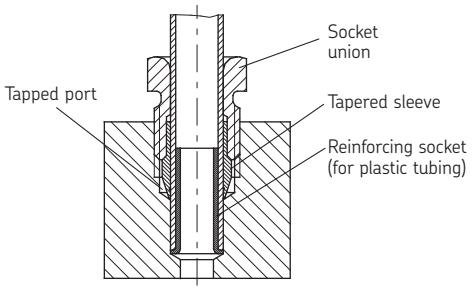


Individual distributor outlet can be closed with **plug pin 450-204-002** and thus shut down. Other metered quantities will not be affected by this step.

# Fittings and auxiliary equipment

## Screw unions for steel and plastic tubing
(use reinforcing socket for plastic tubing)




| for outer tube diam. | Reinforcing socket for plastic tubing Order No. | Tapered sleeves Order No. | Socket unions Order No. | d1 |
|---|---|---|---|---|
| 4x0,85 | 404-603 | 404-611 | 404-612-MS | M8x1 |
| 6x1,25 | 406-613 | 406-611 | 406-612-MS | M10x1 |
| 8x1,25 | 408-603 | 408-611 | 408-612-MS | M14x1.5 |
| 10x1,5 | 410-603 | 410-611 | 410-612-MS | M16x1.5 |

Material: brass

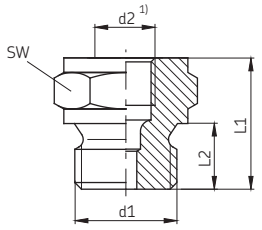
**Assembly**

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 fingertight and then turn it another $1\,^1/_2$ turns.

## Adapters with respective washers

| for outer tube diam. | Order No. | d1 | d2 [1)] | L1 | L2 | sw | Respective washers Order No. |
|---|---|---|---|---|---|---|---|
| 4 | 404-044 *) | M8x1 | M8x1 | 46 | 6 | 11 | DIN7603-A8x11.5-CU |
| 4 | 404-063 | M8 | M8x1 | 22 | 8 | 11 | DIN7603-A8x11.5-CU |
| 4 | 404-006 | M10x1 | M8x1 | 18 | 7.5 | 14 | 504-019 |
| 4 | 404-007 | M10x1 | M8x1 | 24 | 6 | 11 | 504-019 |
| 4 | 404-164 | M14x1.5 | M8x1 | 18 | 9 | 17 | DIN7603-A14x18-CU |
| 6 | 406-004 | M10x1 | M10x1 | 18 | 7.5 | 14 | 504-019 |
| 6 | 406-166 | M16x1.5 | M10x1 | 19 | 9 | 19 | DIN7603-A16x20-CU |
| 6 | 406-054 | G1/4 A | M10x1 | 20 | 10 | 17 | 508-108 |
| 8 | 408-004 | M10x1 | M14x1.5 | 28 | 7.5 | 17 | 504-019 |
| 8 | 408-005 | M16x1.5 | M14x1.5 | 22 | 9 | 19 | DIN7603-A16x20-CU |
| 8 | 301-020 | G1/4 A | M14x1.5 | 23 | 10 | 17 | 508-108 |

Material Adapters: steel, galvanized surface
Washer: copper




Please note! Order washers separately!

*1) Ports tapped for solderless tube connection*
**) extra long*

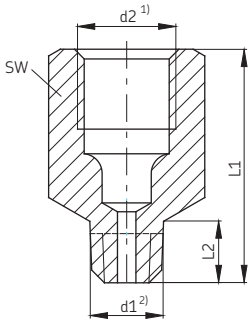
# Fittings and auxiliary equipment

## Adapters with tapered thread

for screwing into lubrication ports without sealing face

| for outer tube diam. | Order No | d1 [2] | d2 | L1 | L2 | sw |
|---|---|---|---|---|---|---|
| 4 | 404-662K | M6 tap. | M8x1 [1] | 19 | 5 | 11 |
| 4 | 404-663K | M6 tap. | M8x1 [1] | 20 | 6 | 11 |
| 4 | 404-673K | M6x0.75 tap. | M8x1 [1] | 20 | 6 | 11 |
| 4 | 404-047K | M7 tap. | M8x1 [1] | 20 | 6 | 11 |
| 4 | 404-003K | M8x1 tap. | M8x1 [1] | 17 | 7.4 | 11 |
| 4 | 404-045 | M8x1 tap. | M8x1 [1] | 62.5 | 7.4 | 11 |
| 4 | 404-006K | M10x1 tap. | M8x1 [1] | 16 | 7.4 | 11 |
| 4 | 401-004-512 | M10x1 tap. | M8x1 | 25 | 7.4 | 11 |
| 4 | 404-050 | *) | M8x1 [1] | 18 | 5.2 | 11 |
| 4 | 853-460-000 | *) | M8x1 [1] | 46 | 5.2 | 11 |
| 4 | 404-040K | R1/8 tap. | M8x1 [1] | 16 | 6 | 11 |
| 4 | 404-040K-US | 1/8 NPTF | M8x1 [1] | 20 | 6.7 | 11 |
| 4 | 404-054K | R1/4 tap. | M8x1 [1] | 14 | 9 | 14 |
| 4 | 404-072 | 1/4-28 UNF | M8x1 [1] | 20 | 5.6 | 11 |
| 4 | 401-004-903 | 1/4 BSF | M8x1 [1] | 20 | 5 | 11 |
| 4 | 401-004-904 | 3/16 BSF | M8x1 [1] | 18 | 5 | 11 |
| 4.5 | 406-004K-S1 | M10x1 | M10x1 [1] | 23 | 7.4 | 13 |
| 4.5 | 406-004K-S2 | M10x1 tap. | M10x1 | 18 | 7 | 13 |
| 4.5 | 456-004K-S2 | R1/8 tap. | M10x1 | 18 | 6 | 13 |
| 4.5 | 401-019-691 | R1/8 tap. | G1/8 | 23 | 7.5 | 14 |
| 6 | 406-004K | M10x1 tap. | M10x1 [1] | 23 | 7.4 | 14 |
| 6 | 406-035K | M10x1 tap. | M10x1 | 40 | 8 | 14 |

Material: steel, galvanized surface

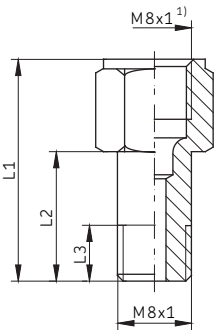



Adapters with tapered threads are used without washers, since tapered threads are self-sealing.
Therefore, the ports do not have to be provided with sealing faces.

*1) Ports tapped for solderless tube connection*
*2) Tapered thread according to DIN 158, tapered, short, or as per DIN 2999*
**) Self-forming thread for 7.6 mm diam. borehole*

## Adapters

| for outer tube diam. | Order No. | L1 | L2 | L3 | Material |
|---|---|---|---|---|---|
| 4 | 404-004 | 24 | 14 | 6 | steel, galvanized surface |
| 4 | 404-005 | 32 | 22 | 5 | |

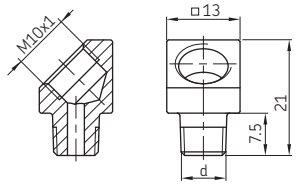



*1) Ports tapped for solderless tube connection*

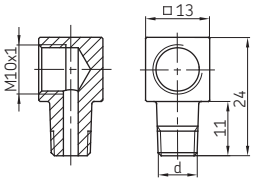
# Fittings and auxiliary equipment

## Elbows

A

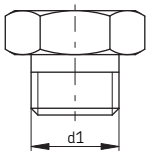



B




| Order No. | d | Type | Material |
|---|---|---|---|
| 406-145K | M8x1 tap. | A | steel, |
| 406-045K | M10x1 tap. | A | galvanized surface |
| 406-089K | M8x1 tap. | B | |
| 406-090K | M10x1 tap. | B | steel, |
| 406-091K | R $^1/_8$ tap. | B | galvanized surface |
| 406-092K | M10×1 tap. | B | |
| 406-093K | R $^1/_8$ tap. | B | |

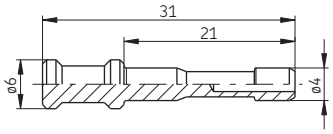
## Screw plugs
and respective flat washers




| Order No. | d1 | Respective flat washer Order No. |
|---|---|---|
| 404-011 | M8x1 | DIN7603-A8x11.5-CU |
| 408-011 | M14x1.5 | DIN7603-A14x18-CU |
| 410-011 | M16x1.5 | DIN7603-A16x20-CU |
| Material: steel, galvanized surface | | Material: copper |

**Please note! Order flat washers separately!**

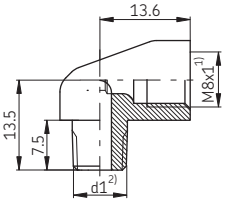
## Pin plug for plug-in connector, tube diam. 4



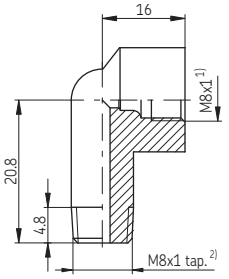

| Order No. | Material |
|---|---|
| 450-204-002 | brass |

## Elbows with tapered thread

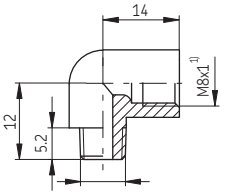
**for screwing into lubrication ports without sealing face.**
Elbows with tapered threads are used witout washers, since tapered threads are self-sealing. Therefore, the ports do not have to be provided with sealing faces.




| for outer tube diam. | Order No. | d1 | Material |
|---|---|---|---|
| 4 | 504-200K | M6 tap. | brass |
| 4 | 504-201K | M8x1 tap. | |
| 4 | 504-202K | M10x1 tap. | |
| 4 | 514-018K-S1 | R1/8 tap. | |




| for outer tube diam. | Order No. | Material |
|---|---|---|
| 4 | 504-211K | brass |




Selfforming thread for
7.6 mm diam. borehole

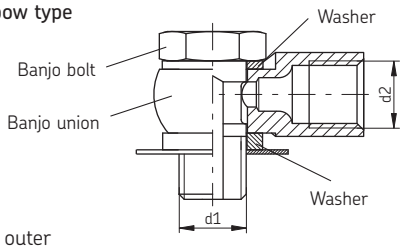
| for outer tube diam. | Order No. | Material |
|---|---|---|
| 4 | 504-050 | steel, galvanized surface |

*1) Ports tapped for solderless tube connection*
*2) Tapered thread according to DIN 158, tapered, short, or as per DIN2999*

# Fittings and auxiliary equipment

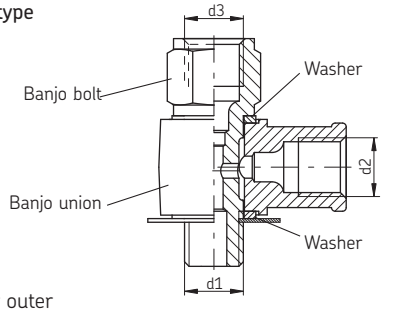
## Banjo fittings

### Elbow type



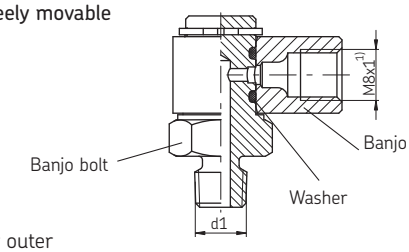

| for outer tube diam. | Order No. | d1 | d2 [1] |
|---|---|---|---|
| 4 | 504-401 | M8x1 | M8x1 |
| 6 | 506-140 | M10x1 | M10x1 |
| 6 | 506-214 | G1/4 A | M10x1 |
| 6 | 506-145 | M16x1.5 | M10x1 |
| 8 | 508-145 | M16x1.5 | M14x1.5 |
| 10 | 510-024 | G1/4 A | M16x1.5 |
| 10 | 510-145 | M16x1.5 | M16x1.5 |

### L-type




| for outer tube diam. | Order No | d1 | d2 [1] | d3 [1] |
|---|---|---|---|---|
| 4 | 504-114 | M8x1 | M8x1 | M8x1 |
| 6 | 506-114 | M10x1 | M10x1 | M10x1 |
| 6 and 10 | 506-346 | M16x1.5 | M10x1 | M16x1.5 |
| 10 and 8 | 508-346 | M16x1.5 | M14x1.5 | M16x1.5 |
| 10 | 510-343 | G1/4 A | M16x1.5 | M16x1.5 |
| 10 | 510-344 | M16x1.5 | M16x1.5 | M16x1.5 |
| 10 and 6 | 510-346 | M16x1.5 | M16x1.5 | M10x1 |

### Freely movable



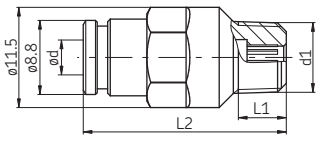

| for outer tube diam. | Order No. | d1 |
|---|---|---|
| 4 | 405-549-049 | M8x1 tap. |
| 4 | 405-551-049 | M10x1 tap. |

Swing angle: 360°
Frequency: approx. 1 movement/min. at max. swing angle

*1) Ports tapped for solderless tube connection*

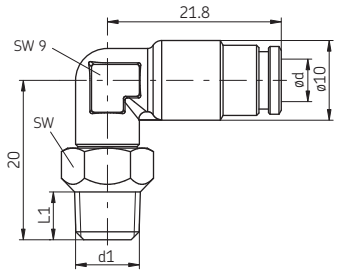
## Plug-in connectors, detachable

### Adapters



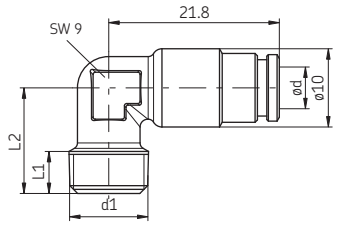

| Order No. | tube diam. d | d1 | L1 | L2 |
|---|---|---|---|---|
| 451-004-462-VS | 4 | M6 tap. | 5.5 | 25.8 |
| 451-004-498-VS | 4 | M8x1 tap. | 5.5 | 23.3 |
| 451-004-518-VS | 4 | M10x1 tap. | 5.5 | 22.8 |
| 404-673K-V1-VS | 4 | 1/4-28 SAE LT | 5.1 | 26.3 |
| 404-040K-V1-VS | 4 | 1/8 NPTF | 8 | 24.8 |

### Banjo fittings




| Order No. | tube diam. d | d1 | L1 | sw |
|---|---|---|---|---|
| 455-546-048-VS | 4 | M6 tap. | 6 | 10 |
| 455-529-048-VS | 4 | M8x1 tap. | 6 | 10 |
| 455-531-048-VS | 4 | M10x1 tap. | 6 | 12 |

### Elbows



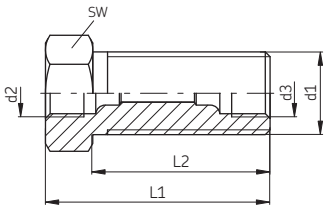

| Order No. | tube diam. d | d1 | L1 | L2 |
|---|---|---|---|---|
| 453-004-471-VS | 4 | M6 tap. | 6 | 14 |
| 504-201-VS | 4 | M8x1 tap. | 6 | 13.5 |
| 504-202-VS | 4 | M10x1 tap. | 6 | 13.5 |
| 514-018-VS | 4 | R1/8 tap. | 7.5 | 15 |
| 504-200K-V1-VS | 4 | 1/4-28 SAE LT | 5.1 | 15.5 |
| 514-018K-V1-VS | 4 | 1/8 NPTF | 7 | 15 |

Protective cap for quick connectors, 4 mm diam. tubing, **order No. 898-110-077.**

Pipe cutter with formation of claw groove for quick connectors, **order No. 169-000-336.**

# Fittings and auxiliary equipment

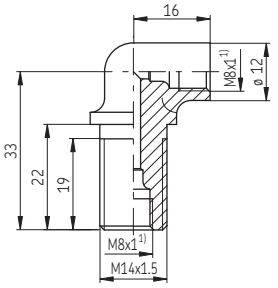
## Connector, tube to tube



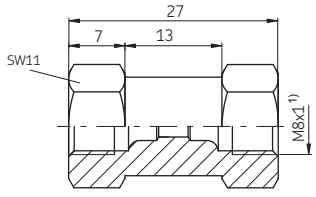

| for outer tube diam. | Order No. | d1 | d2 [1] | d3 [1] | L1 | L2 | sw |
|---|---|---|---|---|---|---|---|
| 4 | 404-008 | M14x1.5 | M8x1 | M8x1 | 27 | 19 | 17 |
| 4 | 404-009* | M14x1.5 | M8x1 | M8x1 | 38 | 30 | 17 |
| 6 | 406-008 | M14x1.5 | M10x1 | M10x1 | 30 | 20 | 17 |
| 8 | 408-008 | M20x1.5 | M14x1.5 | M14x1.5 | 40 | 28 | 24 |
| 10 | 410-008 | M20x1.5 | M16x1.5 | M16x1.5 | 42 | 27 | 24 |

Material: steel, galvanized surface

** specially long version for double frame.*

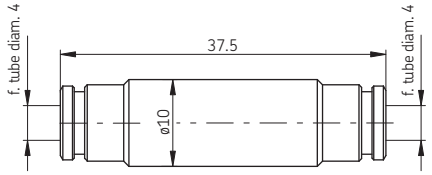



| for outer tube diam. | Order No. | Material |
|---|---|---|
| 4 | 504-103 | brass |

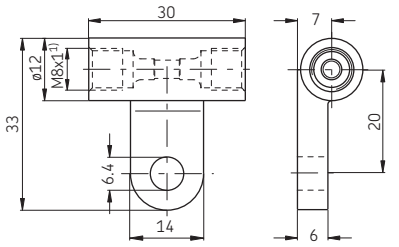



| for outer tube diam. | Order No. | Material |
|---|---|---|
| 4 | 404-010 | steel, galvanized surface |

**for quick connectors**

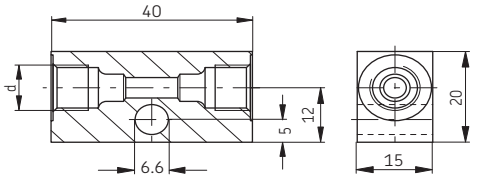



| for outer tube diam. | Order No. |
|---|---|
| 4 | 454-504-041-VS |



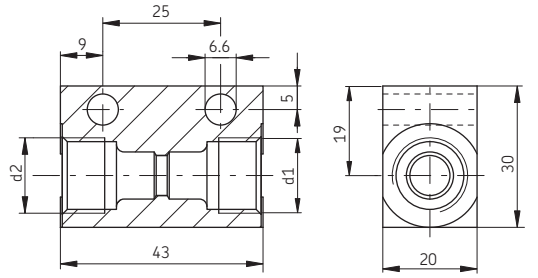

| for outer tube diam. | Order No. | |
|---|---|---|
| 4 | 504-004 | 1 fastening hole |
| 4 | 504-040 | 2 fastening holes |

Material: die-cast zinc




| for outer tube diam. | Order No. | d [1] |
|---|---|---|
| 6 | DAR506 | M10x1 |
| 8 | DAR508 | M14x1.5 |

Material: aluminum alloy




| for outer tube diam. | Order No. | d1 [1] | d2 [1] |
|---|---|---|---|
| 10 | DAR510 | M16x1.5 | M16x1.5 |
| 8 and 10 | DAR510-S1 | M14x1.5 | M16x1.5 |

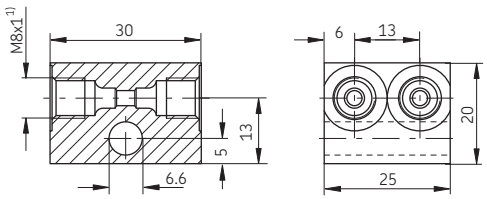
Material: steel, galvanized surface

*1) Ports tapped for solderless tube connection*

# Fittings and auxiliary equipment

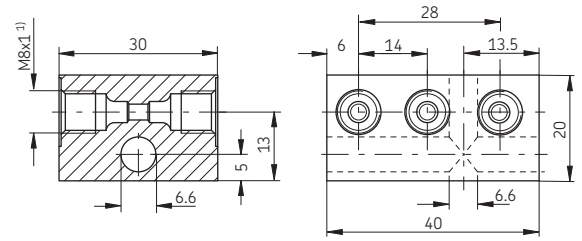
## Connectors, tube to tube

### Double connector



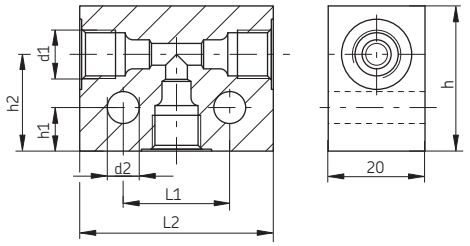

| for outer tube diam. | Orderr No. | Material |
|---|---|---|
| 4 | DAR524 | steel, galvanized surface |

### Triple connector




| for outer tube diam. | Order No. | Material |
|---|---|---|
| 4 | DAR534 | steel, galvanized surface |

### Tee

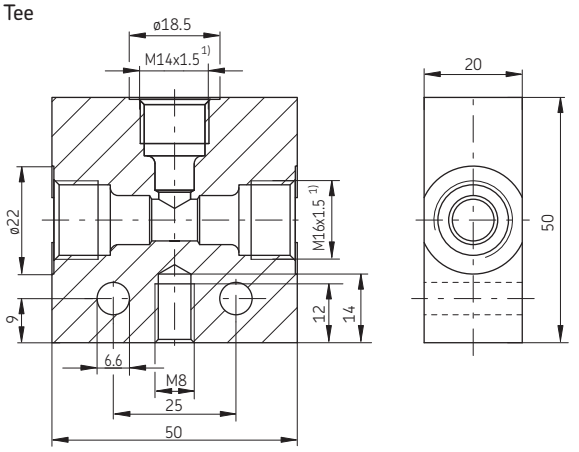



| for outer tube diam. | Order No | d1 1) | d2 | L1 | L2 | h | h1 | h2 |
|---|---|---|---|---|---|---|---|---|
| 6 | DAT506 * | M10x1 | 6.6 | 22 | 40 | 30 | 9 | 20 |
| 8 | DAT508 * | M14x1.5 | 6.6 | 32 | 50 | 40 | 9 | 29 |
| 10 | DAT510 ** | M16x1.5 | 7 | 25 | 52 | 40 | 15 | 29 |

Material: * aluminum alloy; ** steel, galvanized surface

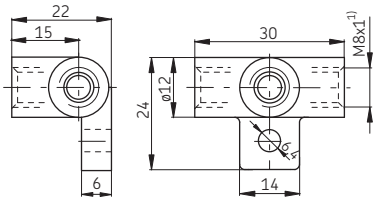
*1) Ports tapped for solderless tube connection*

### Tee



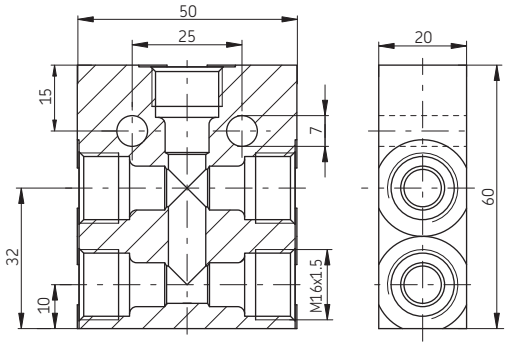

| for outer tube diam. | Order No. | Material |
|---|---|---|
| 10 (2x) and 8 (1x) | DAT510-S1 | steel, galvanized surface |

### Tee




| for outer tueb diam. | Order No. | Material |
|---|---|---|
| 4 | 504-045 | die-cast zinc |

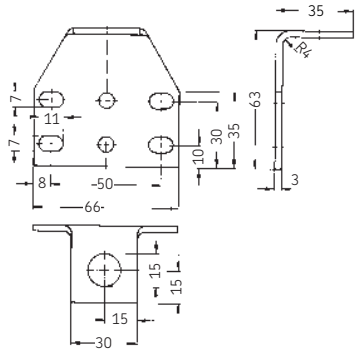
### Cross joint



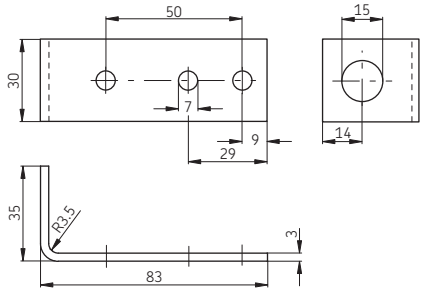

| for outer tube diam. | Order No. | Material |
|---|---|---|
| 10 | DAK510-S1 | steel, galvanized surface |

# Fittings and auxiliary equipment

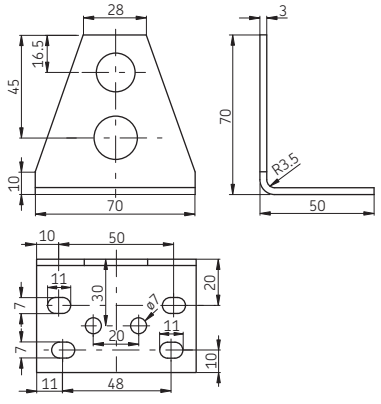
## Fixing brackets for mounting of distributors



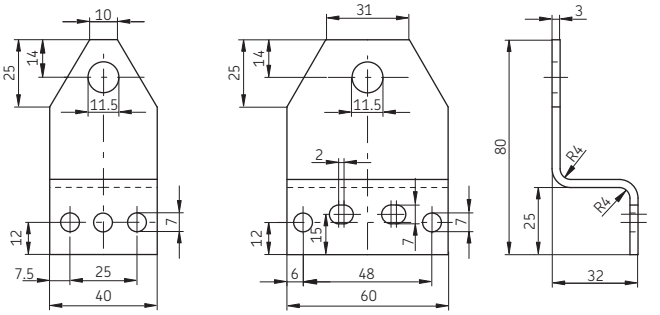

| Order No. | Material |
|---|---|
| 881-260-020 | steel, galvanized surface |



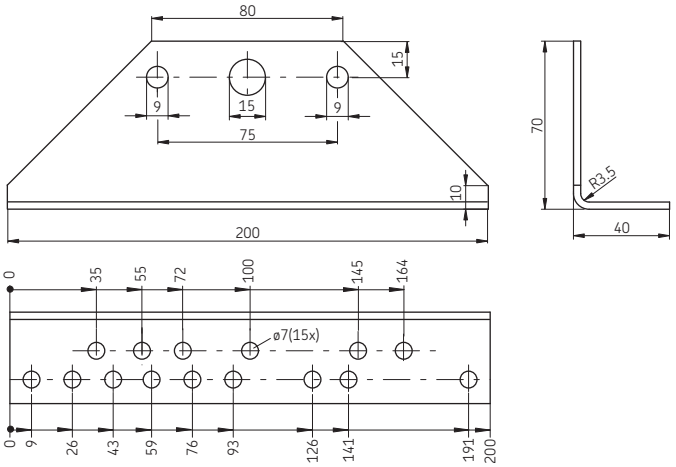

| Order No. | Material |
|---|---|
| 881-280-006 | steel, galvanized surface |



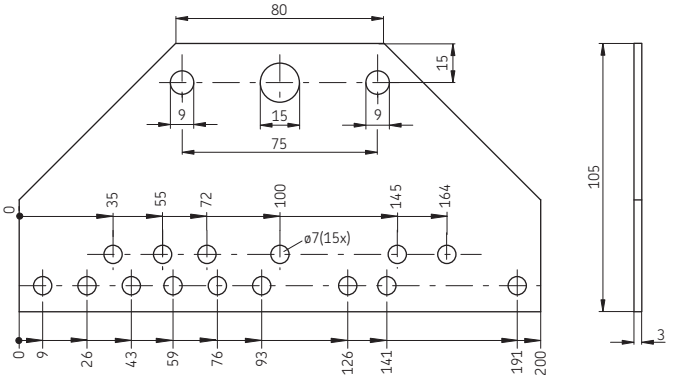

| Order No. | Material |
|---|---|
| 881-280-007 | steel, galvanized surface |




| Order No. | Order No. | Material |
|---|---|---|
| 881-280-008 | 881-280-009 | steel, galvanized surface |




| Order No. | Material |
|---|---|
| 881-290-110 | steel, galvanized surface |

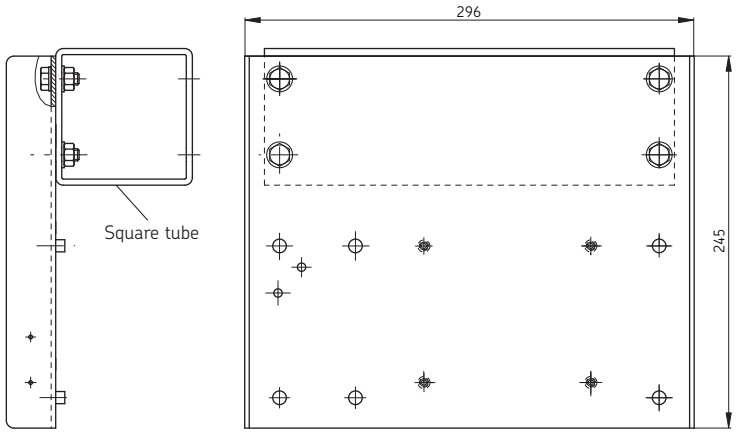



| Order No. | Material |
|---|---|
| 881-290-111 | steel, galvanized surface |

# Fittings and auxiliary equipment

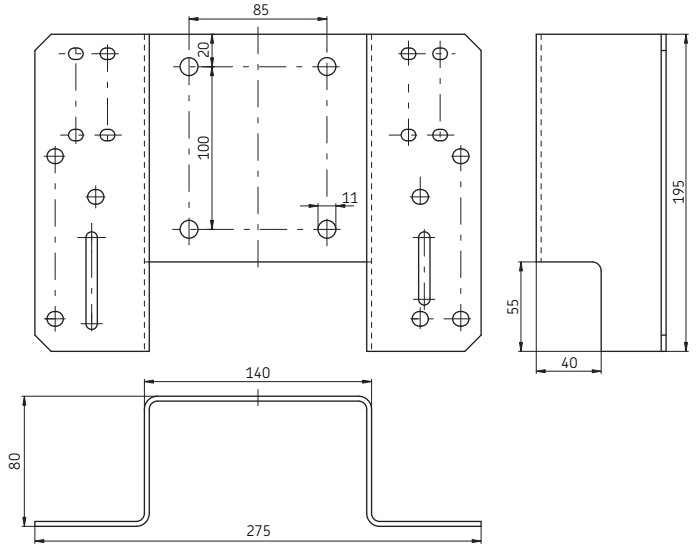
**Pump fastening plate** for systems with KFU gear pump units and PEF piston pumps

Order No. 995-002-140




**Bracket** for systems with KFU gear pump units

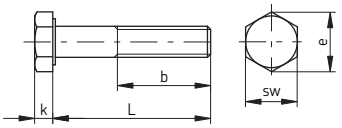
Order No. 881-290-450



# Fittings and auxiliary equipment

## Fixing bolts

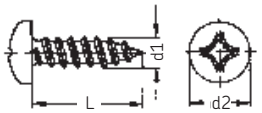
Hexagonal head bolts




| Order No. | L | b | k | sw | e |
|---|---|---|---|---|---|
| DIN933-M6x20-8.8 | 20 | 20 | 4 | 10 | 11.1 |
| DIN933-M6x25-8.8 | 25 | 25 | 4 | 10 | 11.1 |
| DIN931-M6x30-8.8 | 30 | 18 | 4 | 10 | 11.1 |
| DIN933-M6x35-8.8 | 35 | 35 | 4 | 10 | 11.1 |
| DIN931-M6x40-8.8 | 40 | 18 | 4 | 10 | 11.1 |
| DIN933-M6x45-8.8 | 45 | 45 | 4 | 10 | 11.1 |
| DIN931-M6x55-8.8 | 55 | 18 | 4 | 10 | 11.1 |
| DIN933-M8x25-8.8 | 25 | 25 | 5.5 | 13 | 14.4 |
| DIN933-M8x35-8.8 | 35 | 35 | 5.5 | 13 | 14.4 |

Material: steel, galvanized surface

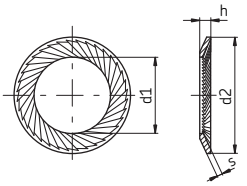
Self-tapping screws




| Order No. | L | d1 | d2 |
|---|---|---|---|
| DIN7981-B4.2x9.5 | 9.5 | 4.2 | 8.2 |
| DIN7981-BZ4.8x9.5 | 9.5 | 4.8 | 9.5 |
| DIN7981-BZ4.8x13 | 13 | 4.8 | 9.5 |

Material: steel, galvanized surface

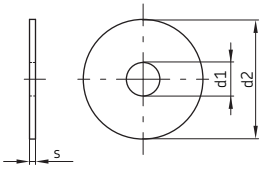
## Lock washers




| Order No. | for bolt | d1 | d2 | s | h |
|---|---|---|---|---|---|
| 650-050 | BZ 4.8 | 5.3 | 9 | 0.6 | 0.9 |
| 650-060 | M6 | 6.4 | 10 | 0.7 | 0.9 |
| 650-080 | M8 | 8.4 | 13 | 0.8 | 1.2 |
| 650-140 | M14 | 15 | 22 | 1.2 | 1.8 |
| 650-160 | M16 | 17 | 24 | 1.3 | 1.9 |
| 650-200 | M20 | 21 | 30 | 1.5 | 2.2 |

Material: spring steel

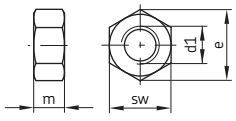
## Body washers




| Order No. | d1 | d2 | s |
|---|---|---|---|
| 821-400-006 | 6.6 | 28 | 2 |
| 821-400-010 | 8.4 | 30 | 1.5 |

Material: steel, galvanized surface

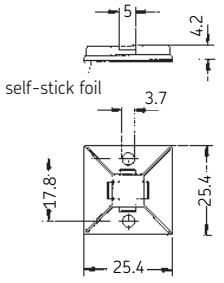
## Nuts

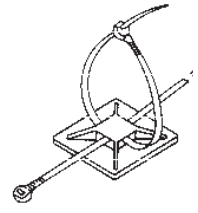



| Order No. | d1 | m | sw | e |
|---|---|---|---|---|
| DIN934-M6-8 | M6 | 5 | 10 | 11.5 |
| DIN934-M8-8 | M8 | 6.5 | 13 | 14.4 |
| DIN936-M14x1.5-5 | M14x1.5 | 8 | 22 | 25.4 |
| DIN936-M16x1.5-5 | M16x1.5 | 8 | 24 | 27.7 |
| DIN936-M20x1.5-5 | M20x1.5 | 9 | 30 | 34.6 |

Material: steel, galvanized surface

## Mounting base

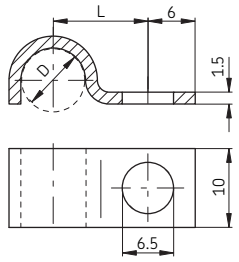


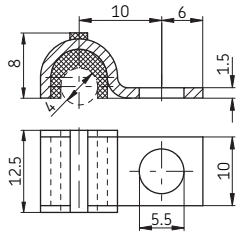
Order No. 179-990-186

# Fittings and auxiliary equipment

## Mounting clips

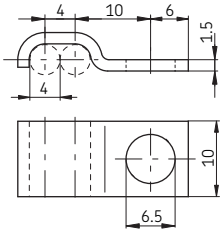



Clip with cushion

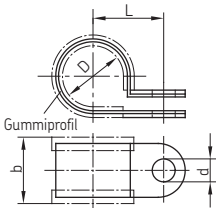



| for outer tube diam. D | Order No. | L | for outer tube diam. | Order No. |
|---|---|---|---|---|
| 4 | 604-001-A | 9 | 4 | 604-111 |
| 6 | 606-010-A | 10 | | |
| 8 | 608-001-A | 12 | | |
| 10 | 610-001-A | 13 | | |

Material: mild steel, galvanized surface

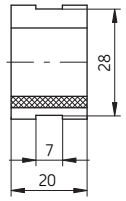


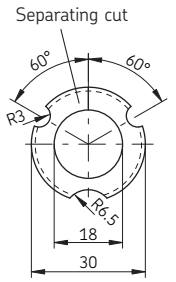

| for outer tube diam. | Order No. | Number of tubes | Material |
|---|---|---|---|
| 4 | 604-002-A | 2 | mild steel, galvanized surface |

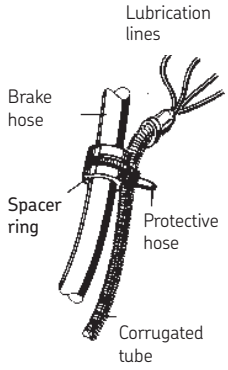



| for outer tube diam. D | Order No. | d | b | L |
|---|---|---|---|---|
| 6 | 941-206-104 | 5.2 | 15 | 11 |
| 6 | 941-206-108 | 6.4 | 18.5 | 14.2 |
| 8 | 941-208-104 | 6.4 | 18.5 | 15.2 |
| 9 | 941-209-104 | 5.2 | 15 | 12.5 |
| 12 | 941-212-104 | 6.4 | 18.5 | 17.2 |
| 13 | 941-213-104 | 6.4 | 18.5 | 17.7 |
| 15 | 941-215-104 | 6.4 | 18.5 | 18.7 |
| 17 | 941-217-104 | 5.2 | 15 | 16.5 |
| 20 | 941-220-104 | 6.4 | 18.5 | 21.2 |
| 22 | 941-222-100 | 6.4 | 18.5 | 22.2 |
| 27 | 941-227-104 | 10.2 | 31 | 31 |

## Spacer ring

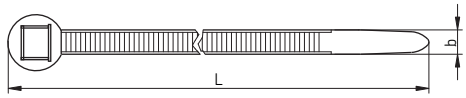


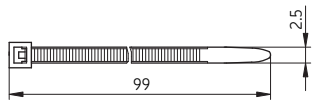

| Order No. | Material |
|---|---|
| 898-210-061 | CR (chloroprene rubber) |

## Cable strap



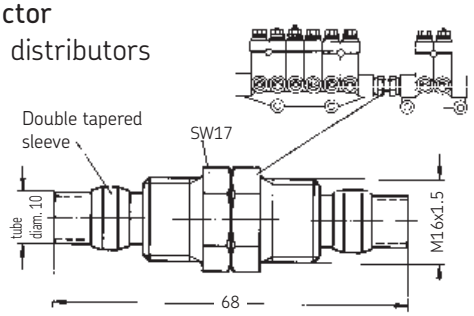

| Order No. | L | b | Material |
|---|---|---|---|
| 898-610-000 | 197 | 4.9 | |
| 898-710-000 | 302 | 4.9 | polyamide |
| 898-710-001 | 360 | 7.5 | |

For automatic pincers:




| Order No. | single part Order No. | Material |
|---|---|---|
| 898-510-002 | 898-510-000 | polyamide |

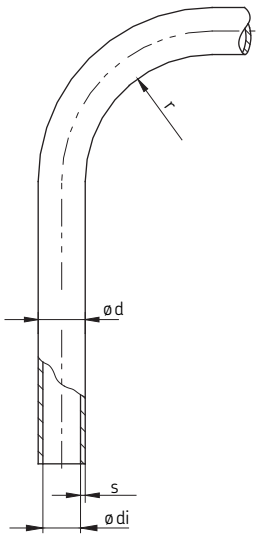
## Connector
for VN distributors




Order No. VKR2.U2

# Fittings and auxiliary equipment

## Tubing




### Steel tubing, galvanized

| Order No. | øda | s | ødi | Minimum bending radius **r** bent with **mandrel** | bent with **grooved disk** |
|---|---|---|---|---|---|
| WV-R04x0.7VERZI | 4 | 0.7 | 2.6 | 6 | – |
| WV-R06x0.7VERZI | 6 | 0.7 | 4.6 | 22 | 16 |
| WV-R08x0.7VERZI | 8 | 0.7 | 6.6 | 42 | 22 |
| WV-R010x0.7VERZI | 10 | 0.7 | 8.6 | 76 | 27 |
| Diesel injection pipe | | | | | |
| DIN73000A2-6ST30AL | 6 | 2.0 | 2.0 | 22 | 16 |

### Plastic tubing WVN715, unplasticized/semi-rigid as per DIN 73 378

| Order No. | øda | s | ødi | Minimum bending radius **r** | Perm. operating pressure (bars) | Rupture pressure (bars) |
|---|---|---|---|---|---|---|
| WVN715-R010x1.5+A89 | 10 | 1.5 | 7 | 89 | 47 | 141 |

Color: black

### Plastic tubing WVN716, flexible as per DIN 73 378

| Order No. | øda | s | ødi | Minimum bending radius **r** | Perm. operating pressure (bars) | Rupture pressure (bars) |
|---|---|---|---|---|---|---|
| WVN716-R04x0.85* | 4 | 0.85 | 2.3 | 38 | 36 | 108 |
| WVN716-R06x1.25 | 6 | 1.25 | 3.5 | 63 | 35 | 105 |
| WVN716-R010x2 | 10 | 2 | 6 | 60 | 34 | 102 |

*) The WVN716-R04x0.85 plastic tubing can be supplied in various colors and also filled with grease NLGI grades 000 or 00.

The following color key information to be added to the order No. applies in this case:

| Color key | Color key – tubing filled with grease |
|---|---|
| A 87 = green | AF 1 = natural color |
| A 88 = red | AF 4 = brown |
| A 89 = black | AF 6 = black |
| A 90 = brown | AF 7 = red |
| without color key: natural color | AF 8 = green |

Order examples

Plastic tubing WVN716-R04x0.85, color **black**, 5 m long:
**Order No. WVN716-R04x0.85+A89, 5 m**

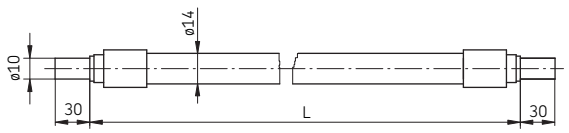
Plastic tubing WVN716-R04x0.85, color **green, filled with fluid grease, NLGI grades 000 or 00**, 8 m long:
**Order No WVN716-R04x0.85+AF8, 8 m**

Note!
For plastic tubing joints, only use unions with reinforcing sockets.

# Fittings and auxiliary equipment

## Hoses for main lines

(connection: pump – distributor)




| L +5 | Order No | Outer tube diam. | Hose diam. | Socket union thread |
|---|---|---|---|---|
| 580 | **SLH10-580** | | | |
| 650 | **SLH10-650** | 10 | 14 | M16x1.5 |
| 1600 | **SLH10-1600** | | | |

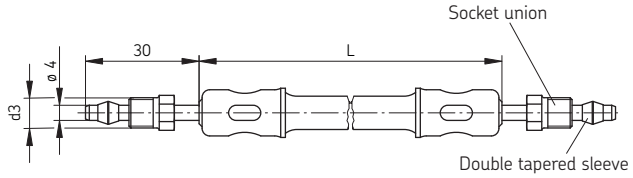
Material
inner liner: PA 11/12 or PE-E
reinforcement: 1 layer of braided, highly tear-resistant synthetic fiber
outer cover: PA 11/12

Please order tapered sleeves **410-611** and socket unions **410-612-MS** separately.

## Hoses for secondary lines

(connection: distributor – lubrication point)

**Please note! To avoid damages, these hoses line must not be used as main hose lines.**



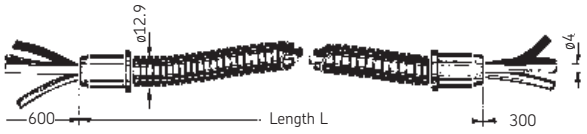

| L +5 | Order No. | Outer tube diam. | Hose diam. | d3 |
|---|---|---|---|---|
| 220 | **734-220-K** | | | |
| 260 | **734-260-K** | 4 | 8.8 | M8x1 |
| 300 | **734-300-K** | | | |
| 340 | **734-340-K** | | | |

Complete with socket unions and double tapered sleeves.

Material
hose: oil-proof rubber inside and outside with braided rayon carcass.
Tube ends: steel tubes, tube ends permanently bonded to the hose.

## Multiple-line hose

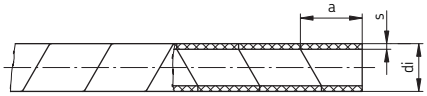
(connection: distributor – lubrication point))




| L +5 | Order No. | Hose diam. |
|---|---|---|
| 580 | **774-580** | 12.9 |
| 960 | **774-960** | |

Material protective hose: polyamide PA 6
plastic tubes: polyamide PA 11 or PA 12, flexible
4 colors: green, black, red, brown

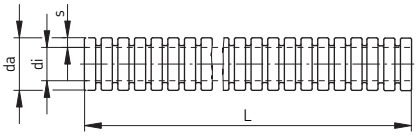
## Protective helix




| Order No. | di | s | a | |
|---|---|---|---|---|
| **982-760-061** | 4 | 1 | 10 | Please indicate length |
| **982-760-121** | 8.5 | 1.5 | 10 | (up to 25 m) when ordering |

Material: soft polyethylene; color: black

## Protective hose

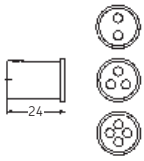



| Order No. | Rated width | da x s | di | Length L *) |
|---|---|---|---|---|
| **982-760-070** | 4 | 7 x 1.25 | 4 | up to |
| **982-760-120** | 8 | 11.7 x 1.6 | 8.4 | max. 100 m |
| **982-760-130** | 10 | 12.9 x 1.5 | 10 | up to |
| **982-760-160** | 12 | 15.7 x 1.7 | 12.3 | max. 50 m |

Material: polyamide 6; color: black

**) Please quote when ordering.*

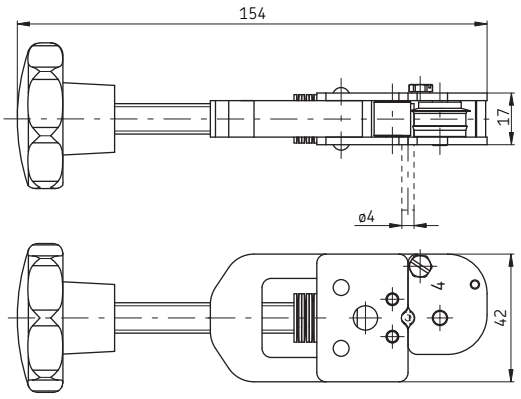
**Hose sleeves** for protective hose **982-760-130** (rated width 10)




Order No.
2-hole: **898-210-047**
3-hole: **898-210-075**
4-hole: **898-210-063**

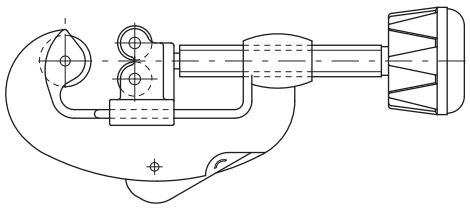
# Fittings and auxiliary equipment

## Tube cutter




with formation of claw groove for 4 mm diam. quick tube connectors

Order No. 169-000-336



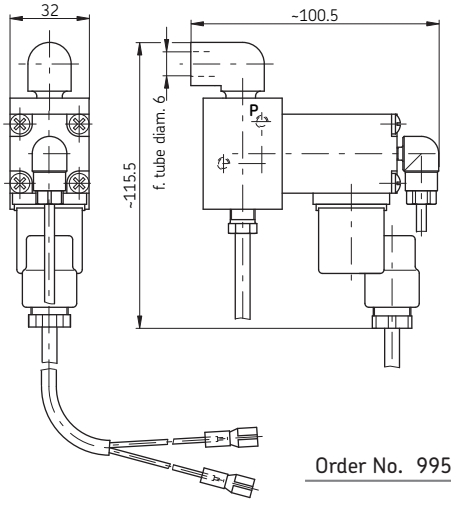
Order No. 169-000-301

Order No. for cutting wheel: **844-300-001**

**Shears** for plastic tubing

Order No. 169-000-090

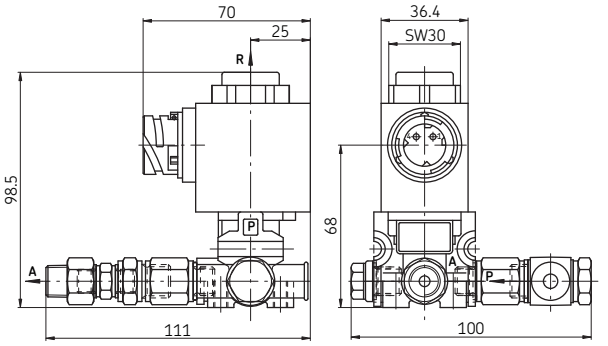
## Pulse valve




Please note: Use the pulse valve only with control units IG476-2 or IG476-3.

Order No. 995-800-166

## Solenoid valve

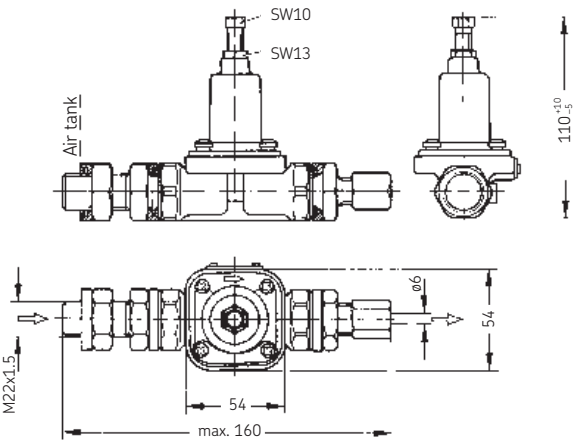



Order No. 995-800-550

| | |
|---|---|
| Type of enclosure | IP 65 |
| Ambient temperature | –40 °C to +80 °C |
| Flow rate | 66 Nl/min |
| Voltage | 12 / 24 V DC (please quote when ordering) |
| Power input | ~ 10 W |
| Mounting position | any |

Cable harness, length 3 m, **order No. 997-000-712**
Connector, complete without cable, **order No. 997-000-702**

## **Overflow valve** without return flow



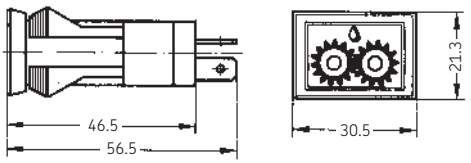

Order No. 232-100-001

| | |
|---|---|
| Operating pressure | max. 10 bars |
| Permissible medium | air |
| Temperature range | –40 °C to +80 °C |
| Rated width | 8 mm |
| Overflow pressure [1] | 6 bars |

*1) The secondary units are not supplied until a pressure of more than 6 bars is reached in the main tank.*

# Fittings and auxiliary equipment

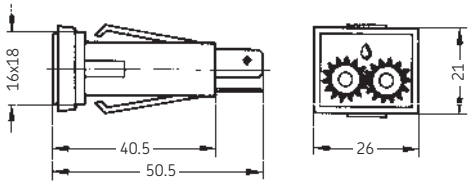
## Indicator lights




for MAN vehicles and Mercedes-Benz buses

**Order No. 179-100-028**

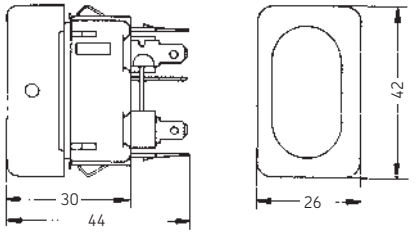
Indicator light fitted with filament lamp (**order No. 179-100-026**),
Spare filament lamp, **order No. 179-100-054.**




for Mercedes-Benz trucks

**Order No. 179-100-025**

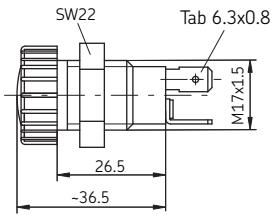
Indicator light fitted with filament lamp (order No. P-66.62).
Please indicate 12 V or 24 V voltage when ordering.




for Scania trucks

**Order No. 179-100-070**

This includes: base, **order No. 179-990-330**
2 reseptacles, **order No. 179-990-331**

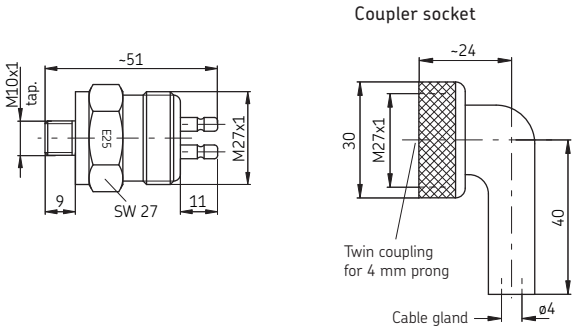



for general needs

| Order No. | Face | Voltage | Power |
|---|---|---|---|
| P-66.60GRUEN | green | | |
| P-66.60ROT | red | 12 or 24 V | 2 W |
| P-66.60GELB | yellow | | |
| **Spare filament lamp** | | | |
| P-66.62 | | 12 or 24 V | 2 W |

Please indicate 12 V or 24 V voltage when ordering.

## Pressure switch



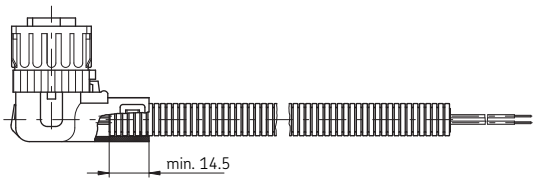

| Bestell-Nr. | Schaltdruck (bar) |
|---|---|
| DS-E20-S1 | 20 ± 2.5 |
| DS-E25-S1 | 25 ± 2.5 |

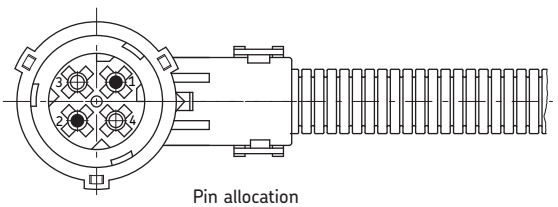
Connection for 4 mm prongs
Contact rating . . . . . 130 W at 24 V
Temperature stability . . . . . –25 °C to +80 °C
Type of enclosure . . . . . IP 56 a
Type of contact . . . . . NO contact

The diaphragm is restistant to mineral oils.
Coupler socket, **order No. 179-990-098**
Coupler socket for protective hose, **order No. 997-000-376**

## Cable harness 12 m – 2-core type

for systems withKFUS2-64 gear pump unit




**Pin allocation**

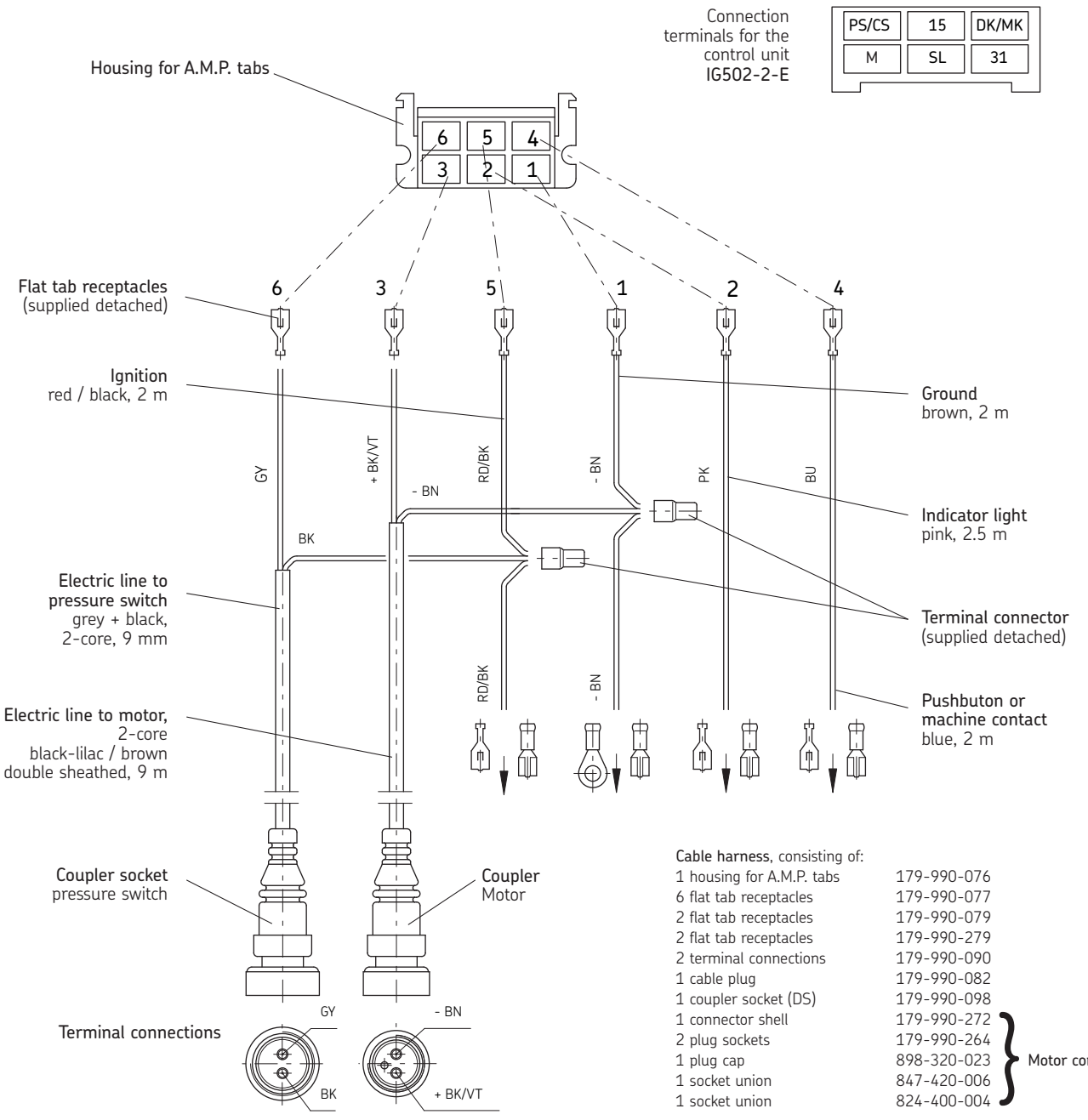
| Pin No.. | Function | Core color |
|---|---|---|
| 1 | – 31 | brown |
| 2 | + 15 | red/black |

**Order No. 997-000-750**

# Fittings and auxiliary equipment

## Cable harness for systems with KFU2-40, KFU6-20 gear pump units

Order No. 997-000-373




**Cable harness**, consisting of:

| | |
|---|---|
| 1 housing for A.M.P. tabs | 179-990-076 |
| 6 flat tab receptacles | 179-990-077 |
| 2 flat tab receptacles | 179-990-079 |
| 2 flat tab receptacles | 179-990-279 |
| 2 terminal connections | 179-990-090 |
| 1 cable plug | 179-990-082 |
| 1 coupler socket (DS) | 179-990-098 |
| 1 connector shell | 179-990-272 |
| 2 plug sockets | 179-990-264 |
| 1 plug cap | 898-320-023 |
| 1 socket union | 847-420-006 |
| 1 socket union | 824-400-004 |

} Motor connection

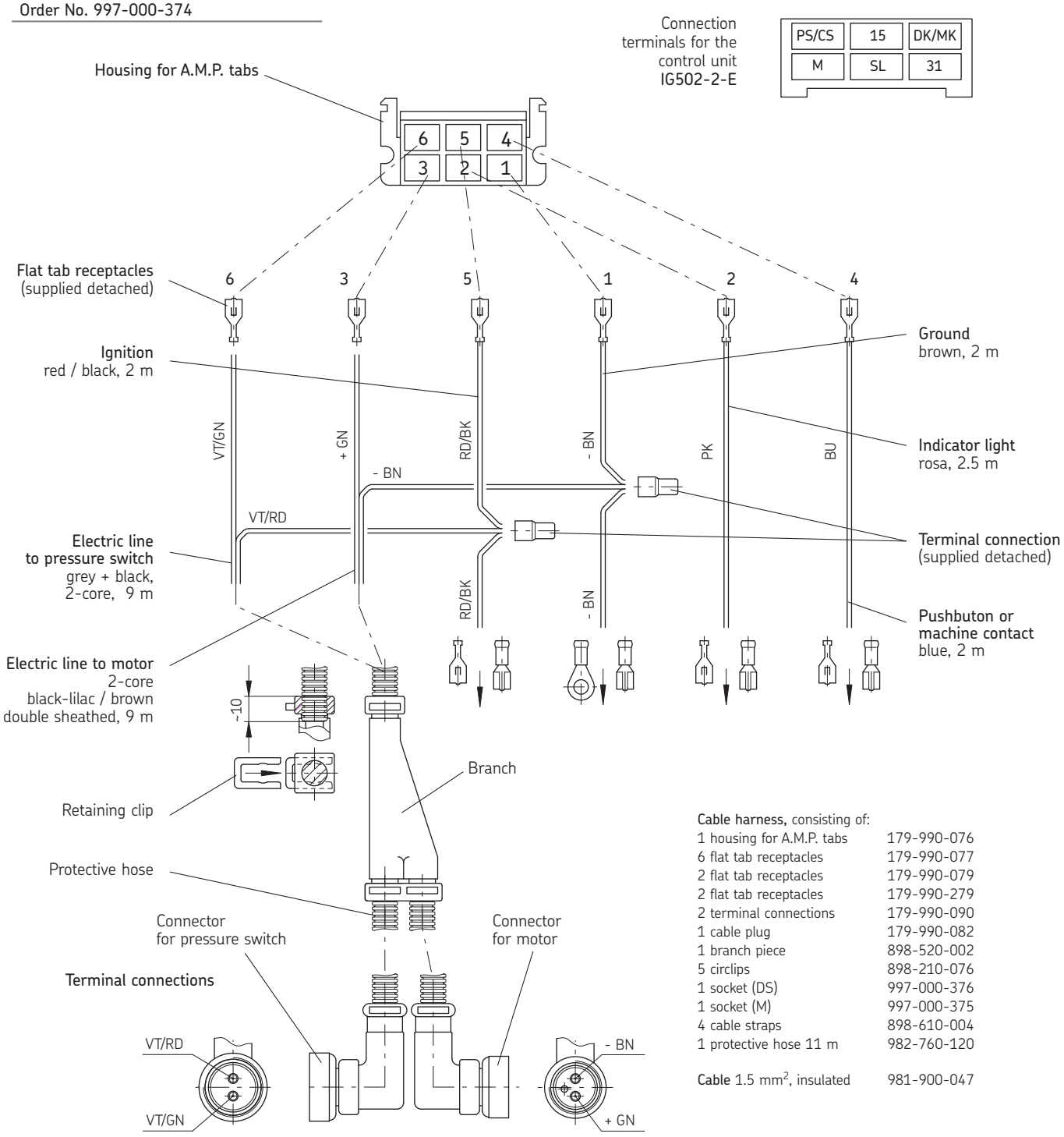
**Cable** 1.5 mm²

| | |
|---|---|
| single-sheathed | 981-900-008 |
| double-sheathed, 2-core | 981-900-018 for pressure switch |
| double-sheathed, 2-core | 981-900-031 for motor |

# Fittings and auxiliary equipment

## Cable harness for systems with KFU2-40, KFU6-20 gear pump units used on vehicles carrying hazardous goods

Order No. 997-000-374




**Cable harness,** consisting of:

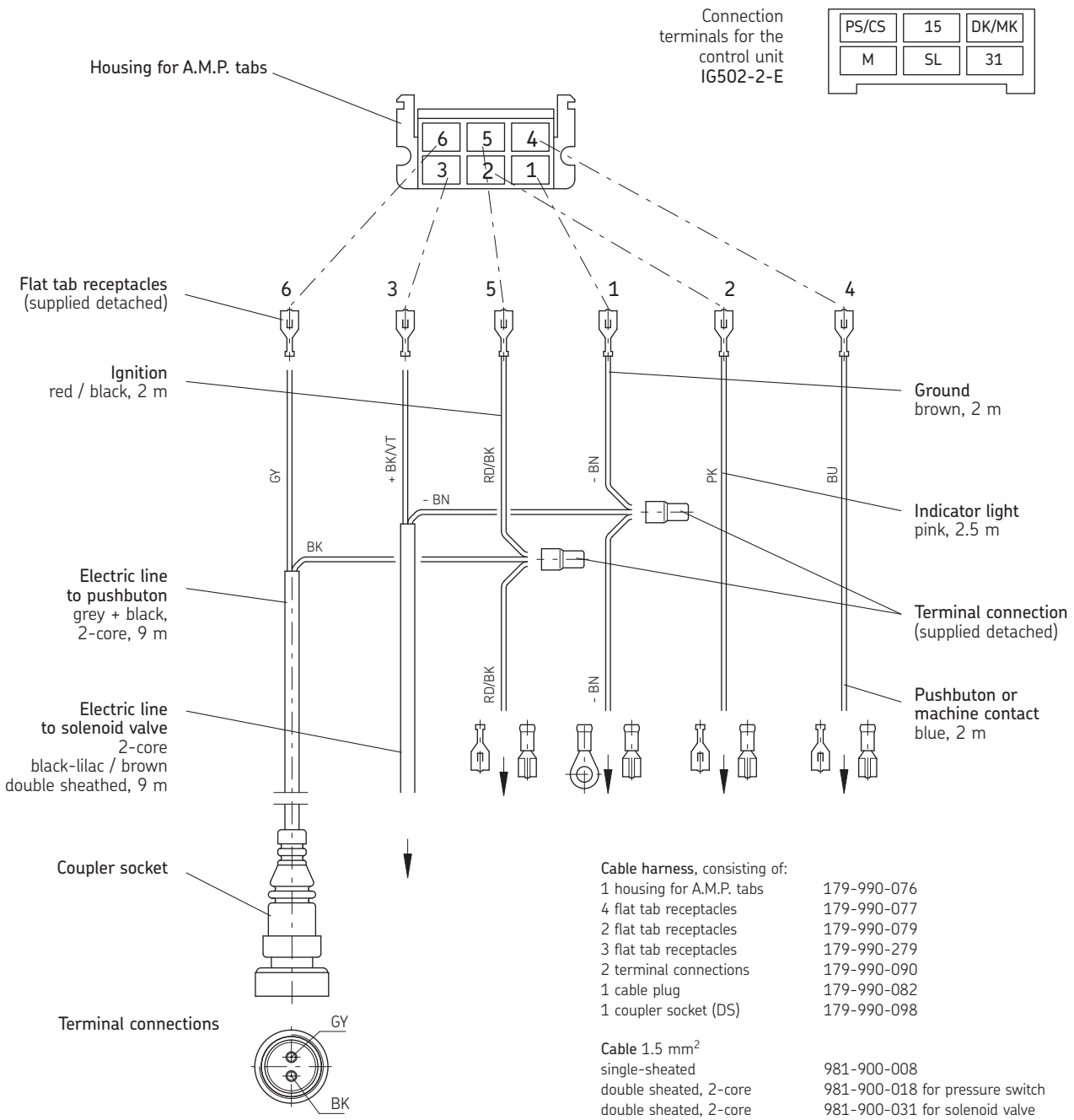
| | |
|---|---|
| 1 housing for A.M.P. tabs | 179-990-076 |
| 6 flat tab receptacles | 179-990-077 |
| 2 flat tab receptacles | 179-990-079 |
| 2 flat tab receptacles | 179-990-279 |
| 2 terminal connections | 179-990-090 |
| 1 cable plug | 179-990-082 |
| 1 branch piece | 898-520-002 |
| 5 circlips | 898-210-076 |
| 1 socket (DS) | 997-000-376 |
| 1 socket (M) | 997-000-375 |
| 4 cable straps | 898-610-004 |
| 1 protective hose 11 m | 982-760-120 |

**Cable** 1.5 $mm^2$, insulated 981-900-047

# Fittings and auxiliary equipment

## Cable harness for systems with PEF-90 piston pump

Order No. 997-000-189




**Cable harness**, consisting of:

| | |
|---|---|
| 1 housing for A.M.P. tabs | 179-990-076 |
| 4 flat tab receptacles | 179-990-077 |
| 2 flat tab receptacles | 179-990-079 |
| 3 flat tab receptacles | 179-990-279 |
| 2 terminal connections | 179-990-090 |
| 1 cable plug | 179-990-082 |
| 1 coupler socket (DS) | 179-990-098 |

**Cable** 1.5 $mm^2$

| | |
|---|---|
| single-sheated | 981-900-008 |
| double sheated, 2-core | 981-900-018 for pressure switch |
| double sheated, 2-core | 981-900-031 for solenoid valve |

# Fittings and auxiliary equipment

## Operating instructions

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 bottom 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).

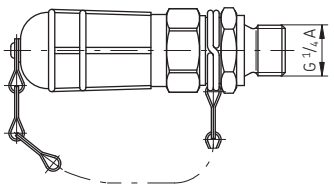
When the reservoir is full, remove the coupling from the pump and put the protective cap back on the filler socket. Slip the coupling half of the topping-up pump onto the respective holder.

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

## Filler socket

Order No. 995-000-705

Respective coupling socket
Order No. 995-001-500

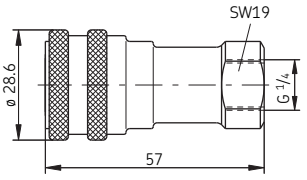



## **Coupling socket** for topping-up port

Order No. 995-001-500

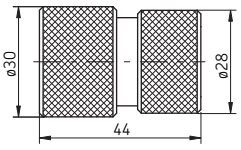
Respective plug
Order No. 833-370-001

Connection piece with
hose socket NW 16
Order No. 857-870-002




## **Coupler** for grease drum FL1-000

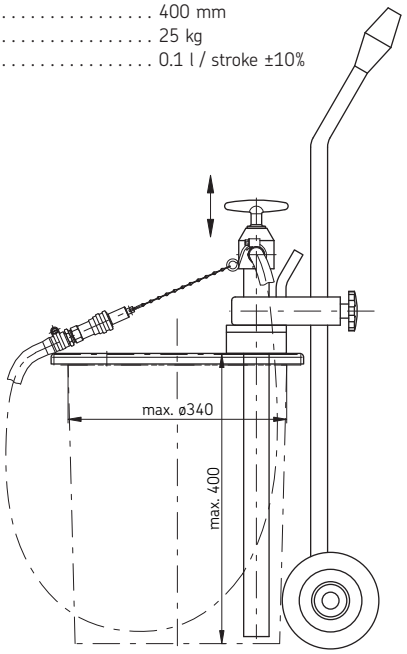
Order No. KFU2.U8-S1




## Topping-up pump with trolley

Order No. 169-000-082

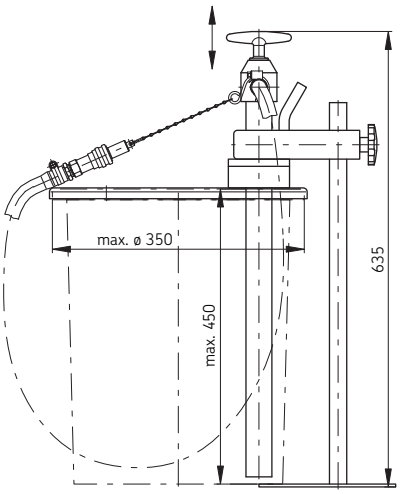
Can be used for grease drum . . . . . FL25-000 and FL25-000-BIO
Max. internal diameter . . . . . 340 mm
Max. height . . . . . 400 mm
Capacity . . . . . 25 kg
Pump output . . . . . 0.1 l / stroke ±10%




## Topping-up pump without trolley

Order No. 169-000-084

Can be used for grease drum . . . . . FL25-000 and FL25-000-BIO
Max. internal diameter . . . . . 340 mm
Max. height . . . . . 450 mm
Capacity . . . . . 25 kg
Pump output . . . . . 0.25 l / double stroke



# Connection of compressed air supply line to the compressed air system of a vehicle for a pneumatically operated centralized lubrication system

- Observe the regulations of the German Technical Control Board (Technischer Überwachungsverein) when connecting the air supply for the centralized lubrication system.
- The air supply line may only be connected to an air tank or to a line for secondary loads.
- The compressed air for the centralized lubrication system must be clean and dry.

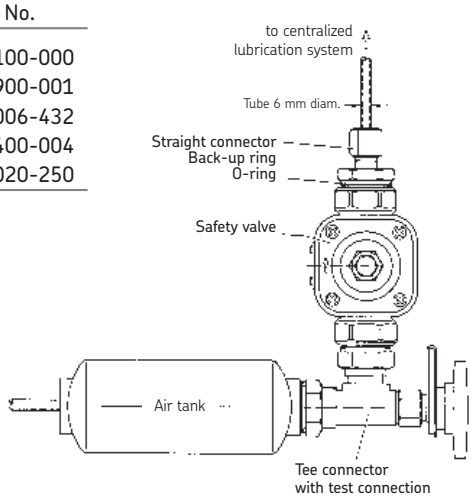
The following check should be made to ascertain whether the air supply line has been connected at a place conforming to the safety regulations:

Open the air line to the centralized lubrication system so that the air can escape.
The air pressure indicated on the pressure gauge in the driver's cab must not drop below 5.5 bars; the airbrake pressure is thus maintained as prescribed.

## For trailers with laminated leaf springs

**Air connection** at the air tank **with safety valve** (without return flow)

| | Order No. |
|---|---|
| Safety valve | 232-100-000 |
| Tee connector with test connection | 491-900-001 |
| Straight connector | 441-006-432 |
| Back-up ring | 847-400-004 |
| O-ring | 971-020-250 |

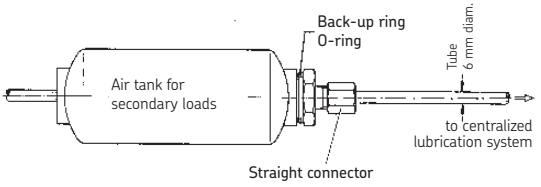



## For trailers with air suspension

**Air connection** at the air tank for secondary line loads

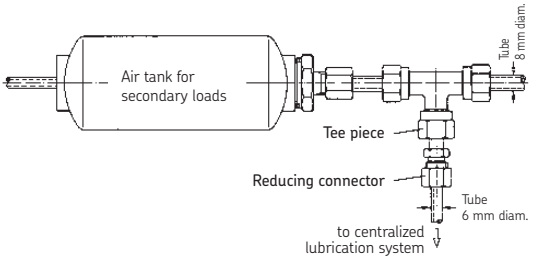
### with straight connector

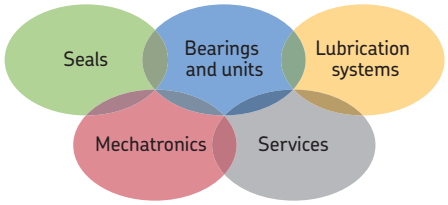
| | Order No |
|---|---|
| Straight connector | 441-006-432 |
| Back-up ring | 847-400-004 |
| O-ring | 971-020-250 |




### branch of air connection with tee piece

| | Order No. |
|---|---|
| Tee piece | 408-407 |
| Reducing connector | 408-406 |






**The Power of Knowledge Engineering**

Drawing on five areas of competence and application-specific expertise amassed over more than 100 years, SKF brings innovative solutions to OEMs and production facilities in every major industry worldwide. These five competence areas include bearings and units, seals, lubrication systems, mechatronics (combining mechanics and electronics into intelligent systems), and a wide range of services, from 3-D computer modelling to advanced condition monitoring and reliability and asset management systems. A global presence provides SKF customers uniform quality standards and worldwide product availability.

**Important information on product usage**

All products from SKF may be used only for their intended purpose as described in this brochure and the operating instructions. If operating instructions are supplied together with the products, they must be read and followed.

Not all lubricants can be fed using centralized lubrication systems. SKF can, on request, inspect the feedability of the lubricant selected by the user in centralized lubrication systems. Lubrication systems and their components manufactured by SKF are not approved for use in conjunction with gases, liquefied gases, pressurized gases in solution, vapors or such fluids whose vapor pressure exceeds normal atmospheric pressure (1 013 mbar) by more than 0,5 bar at their maximum permissible temperature.

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, Para. 2, may only be filled into SKF centralized lubrication systems and components and delivered and/or distributed with the same after consultation with and written approval from SKF.

**Further brochures:**

*1-9201-EN* *Transport of Lubricants in Centralized Lubrication Systems*
*1-9430-EN* *Progressive Systems for Commercial Vehicles*

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**This brochure was presented by:**



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