

SKF EasyRail System Components

Product Series 112, PF, PER, LCG2

For Fluid Grease and Grease

For use in SKF EasyRail Centralized Lubrication Systems



Wheel flange lubrication and top of rail conditioning systems for

- High-speed trains
- Regional and commuter trains
- Locomotives
- Underground and tram vehicles

Main advantages

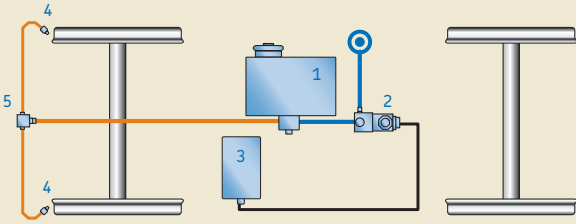
- Efficient technology with intelligent control systems
- Lower operating cost and maintenance expenditures
- Ecologically sustainable operations



SKF EasyRail wheel flange lubrication systems (WFL) and top of rail conditioning systems (TOR)

(WFL = wheel flange lubrication, TOR = top of rail conditioning)

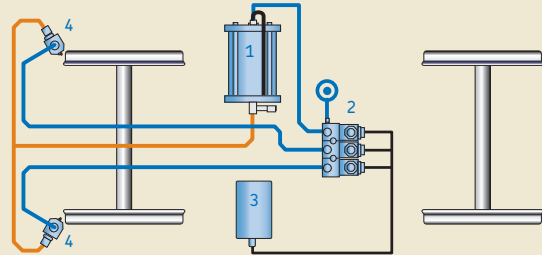
SKF EasyRail Compact (WFL)



Components

- 1 Piston pump unit with reservoir
- 2 Valve block
- 3 Control unit with curve sensor
- 4 Spray nozzle
- 5 Flow divider

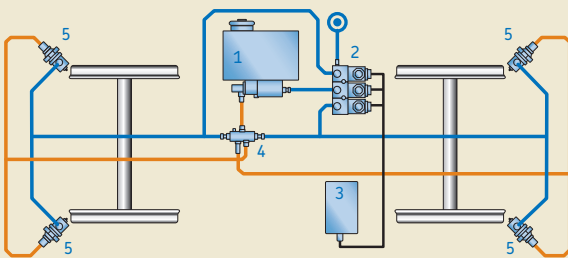
SKF EasyRail Low Pressure (WFL)



Components

- 1 Pressurized reservoir
- 2 Valve block
- 3 Control unit with curve sensor
- 4 Metering nozzles

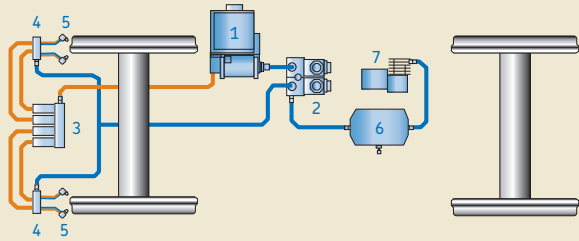
SKF EasyRail High Pressure (WFL)



Components

- 1 Piston pump with reservoir
- 2 Valve block
- 3 Control unit with curve sensor
- 4 Lubricant control valve
- 5 Metering nozzles

SKF EasyRail Compressor* (WFL)

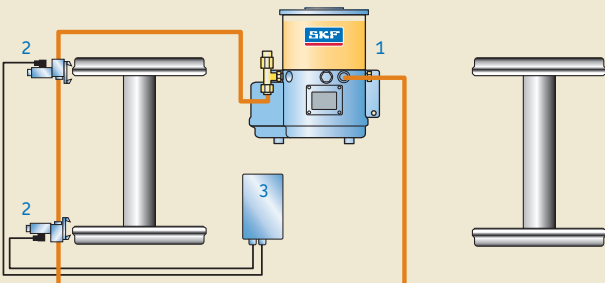


Components

- 1 Piston pump with reservoir
- 2 Valve block
- 3 Lubricant distributor
- 4 Mixing valve
- 5 Spray nozzle
- 6 Pressure storage
- 7 Compressor

* detaillierte Systeminformationen auf Anfrage

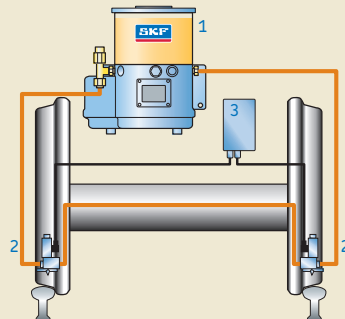
SKF EasyRail Airless (WFL)



Components

- 1 Pump unit with lubricant reservoir
- 2 Pump with spray nozzle
- 3 Control unit with curve sensor

SKF EasyRail Airless (TOR)



Components

- 1 Pump unit with lubricant reservoir
- 2 Pump with spray nozzle
- 3 Control unit with curve sensor

SKF EasyRail system components

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Spray nozzles	18–20
Accessories	20–21

CAUTION

For all products and systems described in this brochure, apply the important product usage information on the back cover.

Product selector

Product	SKF lubrication system					Application						Page
	SKF EasyRail Compact	SKF EasyRail Low Pressure	SKF EasyRail High Pressure	SKF EasyRail Airless (TOR)	SKF EasyRail Airless (WFL)	TRAMs	Metros	Regional trains	Commuter trains	High-speed trains	Locomotives	
Control units with curve sensor												
LCG2-A	•	•	•	•	•		•	•	•	•	•	4
LCG2-B	•	•	•				•	•	•	•	•	5
Pump units / reservoirs												
112-508-051	•							•	•		•	6
112-508-052			•				•	•	•			7
PF-100-21			•				•	•	•	•	•	8
BF4.5 / BF6-S3		•					•	•	•		•	9
MP 50 / 100 / 150 / 200 / 400	•						•	•	•		•	10
KFG				•	•	•	•					11
PER				•	•	•	•					12
Valves												
SF10			•				•	•	•			13
221-196... 2/2-way valves	•						•	•	•			14
221-296... 3/2-way valves		•	•				•	•	•			15
STG12			•				•	•	•	•	•	16
STG13			•				•	•	•	•	•	16
Flow divider												
SV-8	•							•	•		•	17
SV-84	•							•	•		•	17
Spray nozzles												
SP8-2			•							•	•	18
SP8-4			•							•	•	18
SP8-5			•							•	•	18
SP9-2		•					•	•	•			19
169-000-400	•							•	•			20
169-000-410	•							•	•			20
Accessories												
Hoses SLH	•	•	•	•	•	•	•	•	•	•	•	20
Refill pump 169-000-224	•	•	•	•	•	•	•	•	•	•	•	21
Micro filter 213-808-10	•	•	•	•	•	•	•	•	•	•	•	21

Control unit with curve sensor

LCG2-A



Order code

LCG2 - A - **000** + **924**

Software version
(see table)

Key for software version

System Curve-dependent spraying
-outside curve -both sides

SKF EasyRail Compact	-	03
SKF EasyRail Low Pressure	01	02
SKF EasyRail High Pressure	01	02
SKF EasyRail Airless	-	04

Technical data

Order No. see order code

Housing

Material aluminum, powder-coated
Type of enclosure to EN 60 529/10.91. . . IP 65
Weight 0,50 kg

Ambient temperature

Class T1
Ambient temperature -25 to +70 °C

Electrical connection

Rated operating voltage 24 V DC
Operating voltage tolerance -30%, +25%
Closed-circuit power consumption
(without output load) max. 75 mA
Clock-pulse spaces 1,5; 3; 4,5; 6 sec.
Spray time 1,5 sec

Curve sensor

Detection threshold adustable in 15 stages from 0,5 %/s to 1,9 %/s

Time-dependent operation

Spray period 10 to 244 sec. in 15 stages

Distance-dependent operation

Input pulses 500 to 123,000 in 15 st.

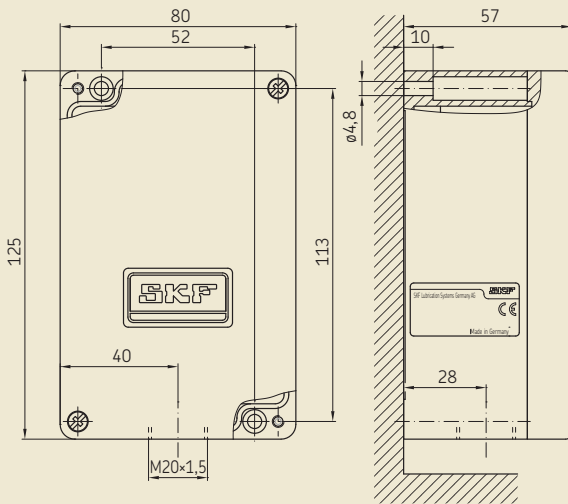
Inputs

FG. spray enable
VR direction of travel
P distance pulses:
visually separate input
external press button for
spray tests
DK

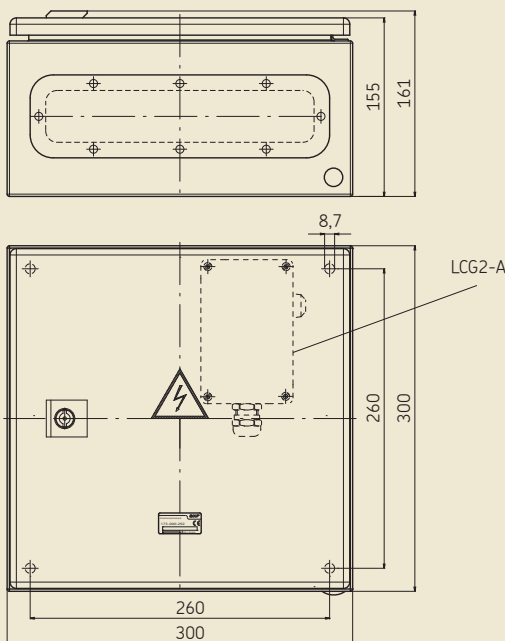
2 valve outputs

Max. output current
(only in intermittent operation). 5 A
Max. output load
(only in intermittent operation). 120 W
Short-circuit protection yes
Overload protection yes

LCG2-A04-000-924



LCG2 (SKF EasyRail Airless version)



Control unit with curve sensor

LCG2-B



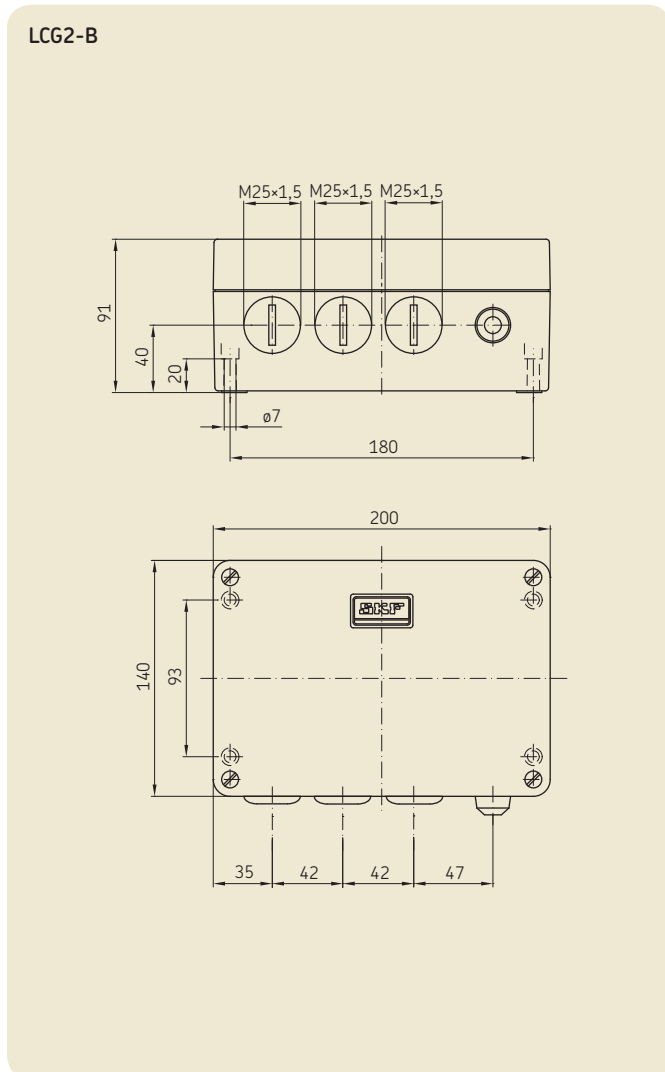
Order code

L C G 2 - B - **0 0 0** + **9 0 2**

Software version
(see table)

Key for software version

System	Curve-dependent spraying	
	-outside curve	-both sides
SKF EasyRail Compact	-	03
SKF EasyRail Low Pressure	01	02
SKF EasyRail High Pressure	01	02
SKF EasyRail Airless	-	-



Technical data

Order No. see order code

Housing

Material aluminum, powder-coated
Type of enclosure to EN 60 529/10.91. IP 65
Weight 1,84 kg

Ambient temperature

Class T1
Ambient temperature -25 to +70 °C

Electrical connection

Rated operating voltage 72 V DC to 110 V DC
Operating range 50,4 V DC to 137,5 V DC
Rated power input (without output load) approx. 8 W
Clock-pulse spaces 1,5; 3; 4,5; 6 sec.
Spray time 1,5 sec

Curve sensor

Detection threshold adjustable in 15 stages from 0,5 %/s to 1,9 %/s

Time-dependent operation

Spray period 10 to 244 sec. in 15 stages

Distance-dependent operation

Input pulses 500 to 123,000 in 15 st.

Inputs

FG spray enable
VR direction of travel
P distance pulses:
visually separate input
DK external press button for
spray tests

2 valve outputs

Max. output current
(only in intermittent operation). 0,3 A
Max. output load
(only in intermittent operation). 32 W
Short-circuit protection yes
Overload protection yes

Pump units/reservoirs

112-508-051 – Pneumatically actuated metering pump with reservoir



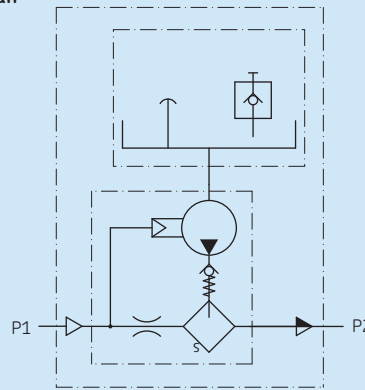
Technical data

Order No. 112-508-051

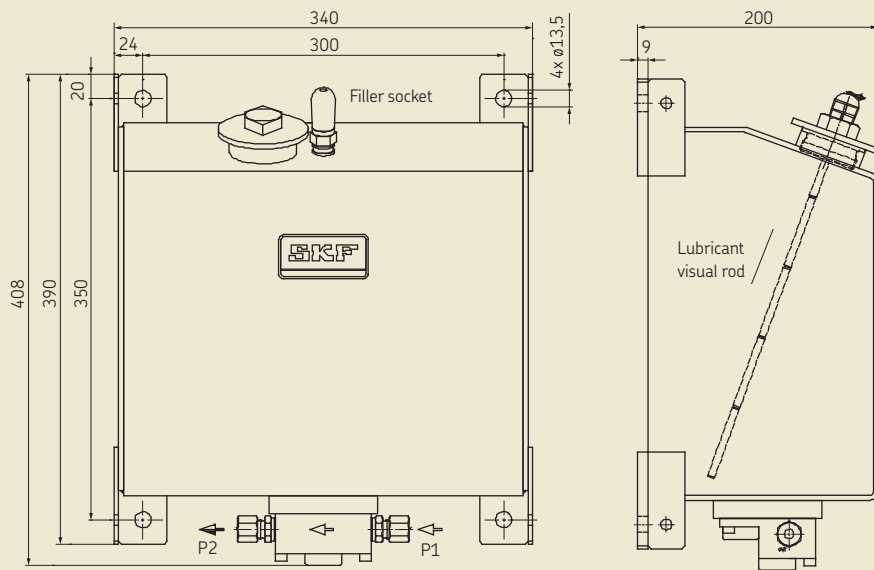
- Reservoir capacity 11 litre
- Number of outlets 1
- Output volume ¹⁾ 0,05 cm³/spraying pulse
- Operating pressure 5–10 bar
- Ambient temperature –25 to +80 °C
- Lubricant oil or fluid grease,
NLGI grade 000, 00

¹⁾ 0,1; 0,2 or 0,4 cm³/spraying pulse on request

Hydraulic plan



112-508-051



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

Inlet and outlet ports for 8 mm diam. tubing to DIN 2353

Pump units/reservoirs

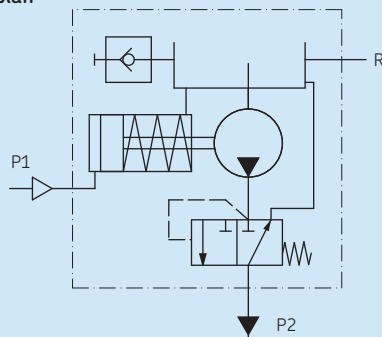
112-508-052 – Pneumatically actuated piston pump with reservoir



Technical data

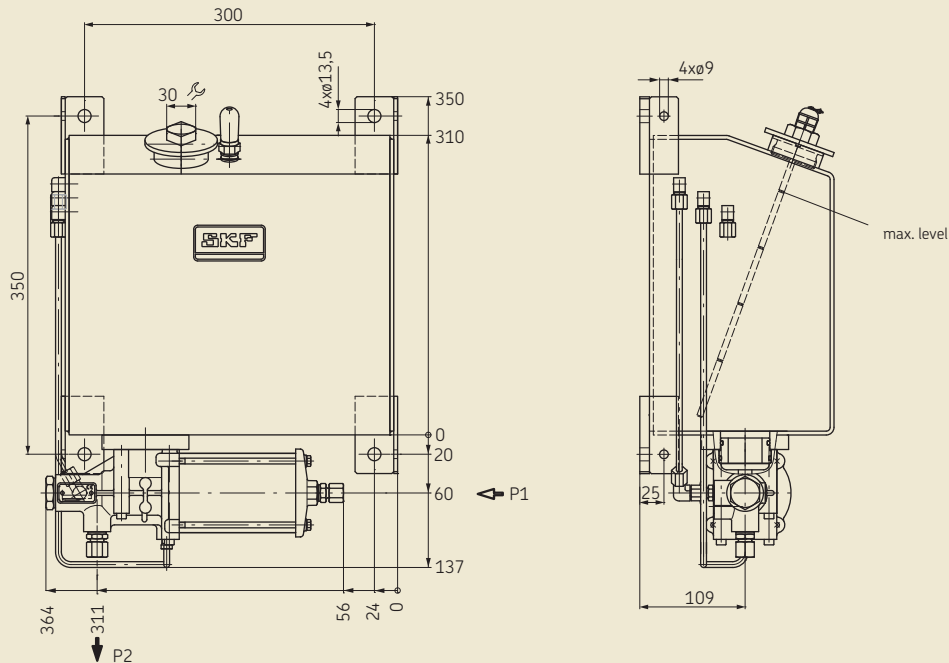
Order No.	112-508-052
Reservoir capacity	11 litre
Number of outlets	1
Output volume	12 cm ³ /stroke
Operating pressure (P2)	60–100 bar
Actuating pressure (P1)	6–10 bar
Ambient temperature	–25 to +80 °C
Lubricant	oil or fluid grease, NLGI grade 000, 00

Hydraulic plan



- 1) P1 = Pressure Air-port for cutting sleeve screw acc. to DIN 2353 for tube ø8 mm
- 2) P2 = Pressure port for cutting sleeve screw acc. to DIN2353 für tube ø10 mm

112-508-052



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

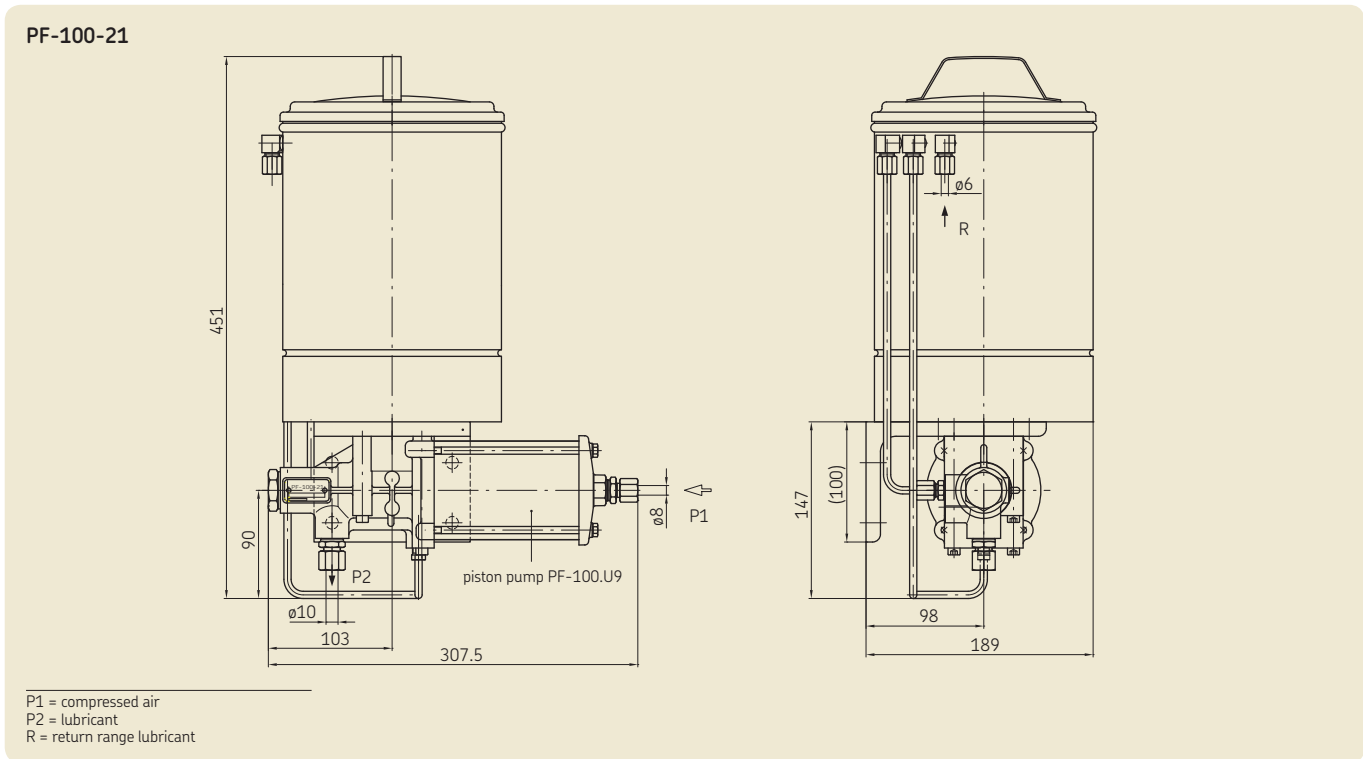
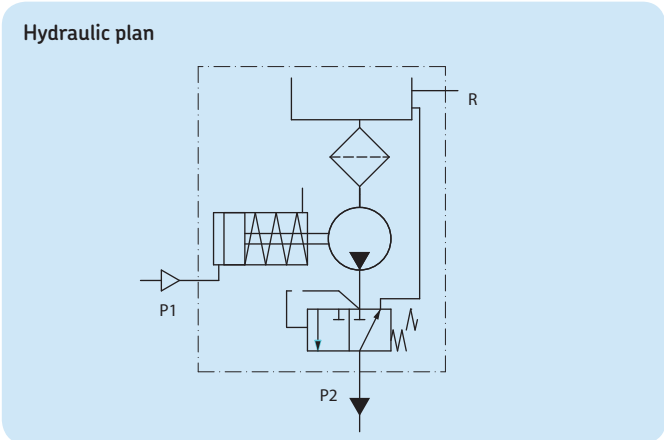
Pump units/reservoirs

PF-100-21 – Pneumatically actuated piston pump



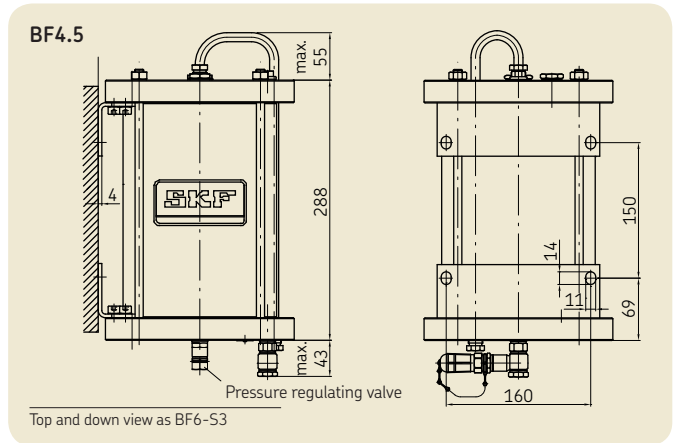
Technical data

Order No.	PF-100-21
Reservoir capacity	5 litre
Lubricant	fluid grease NLGI grade 00, 000
Number of outlets	1
Output volume	12 cm ³ /stroke
Operating pressure (P2)	60–100 bar
Actuating pressure (P1)	6–10 bar
Ambient temperature	–25 to +80 °C



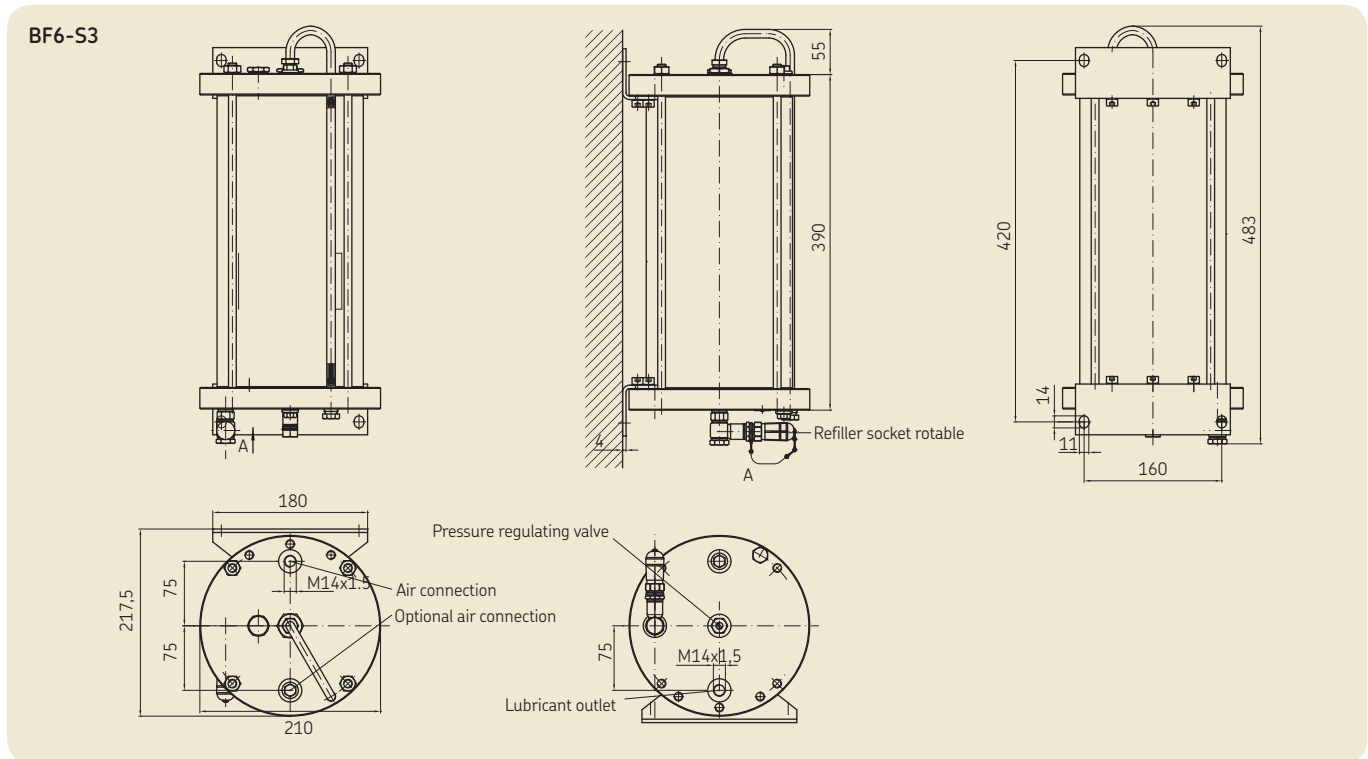
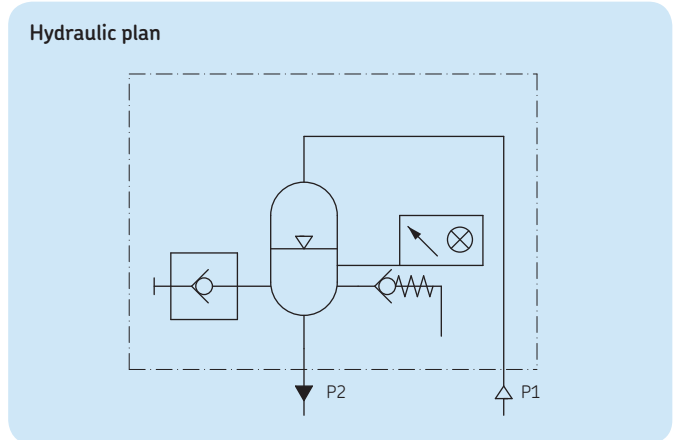
Pump units/reservoirs

BF 4.5, BF6-S3 – Pneumatically actuated lubricant reservoir



Technical data

Order No.	BF4.5 / BF6-S3
Reservoir capacity	4,5 / 6 litre
Material	metal
Lubricant	oil, fluid grease up to NLGI grade 000, 00
Filling level display	analog, by indicator
Operating pressure	max. 10 / 8 bar
Pressure limiting valve	16 ₋₂ bar (overflow preventer)
Ambient temperature	-25 to +80 °C
Mounting position	any, preferably as shown



PUB_LS/P2_13230_EN · 1-8092-EN

Pump units/reservoirs

MP 50 / 100 / 150 / 200 / 400 – Pneumatically actuated metering pump

MP 50 pump unit without reservoir



Technical data

Order No. MP 50 / 100 / 150 / 200 / 400

Lubricant oil or fluid grease NLGI grade 00, 000

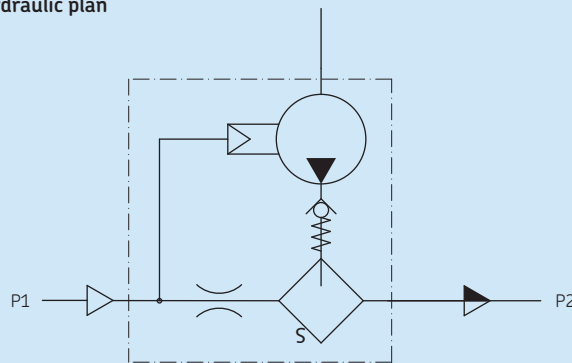
Number of outlets 1

Output volume MP 50: 0,05 cm³/stroke
 MP 100: 0,1 cm³/stroke
 MP 150: 0,15 cm³/stroke
 MP 200: 0,2 cm³/stroke
 MP 400: 0,4 cm³/stroke

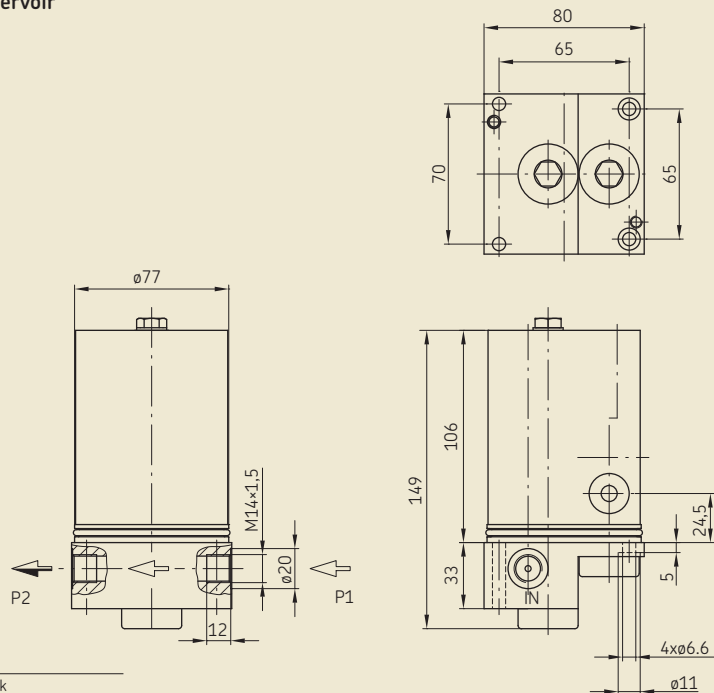
Operating pressure 5–10 bar

Ambient temperature –25 to +80 °C

Hydraulic plan



MP 50 pump unit without reservoir



P1 = air line from compressed air network
 P2 = lubricant line

Pump units/reservoirs

KFG – Electrically operated piston pump unit

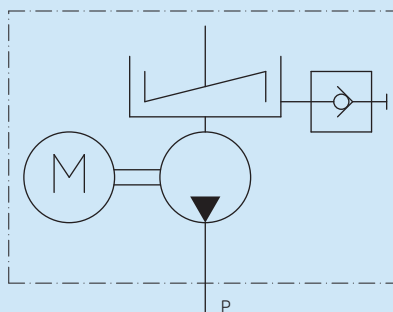


Technical data

Order No. see brochure 1-3030-EN

- Reservoir capacities 2 kg
- Number of outlets 1-3
- Output volume 0,8-5 cm³/min
- Ambient temperature -25 to +80 °C
- Lubricant fluid grease up to NLGI grade 000, 00
- Further information in KFG-brochure 1-3030-EN

Hydraulic plan



KFG

Technical drawing showing dimensions and weights for the KFG pump unit:

- Front view dimensions:
 - Overall width: 266
 - Internal width: 200
 - Height to top of reservoir: 343 (6 kg)
 - Height to pump centerline: 229 (2 kg)
 - Port diameter: $\phi 9$
 - Port offset: 75
 - Base offset: 27
- Top view dimensions:
 - Overall diameter: 227 (6 kg)
 - Internal diameter: 208 (2 kg)
 - Port offset: 11
 - Internal offset: 115

Version with level switch or with 6 kg reservoir on request

PUB_LS/P2_13230 EN · 1-8092-EN

Pump units/reservoirs

PER – Electromagnetically actuated piston pump

PER-2 pump unit with two spray nozzles



Order code

P E R - [] - [] [] + 9 2 4

Nozzle

- 1 = 1 nozzle
- 2 = 2 nozzles

Output volume

- 20 = 0,02 cm³/stroke
- 40 = 0,04 cm³/stroke
- 60 = 0,06 cm³/stroke

Rated operation voltage

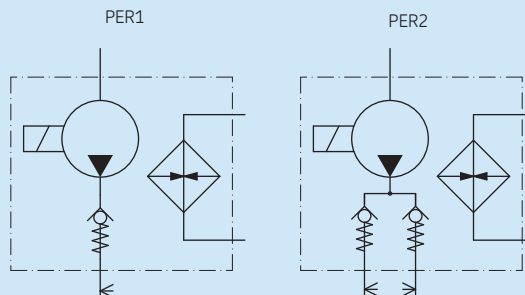
924 = 24 V DC

Technical data

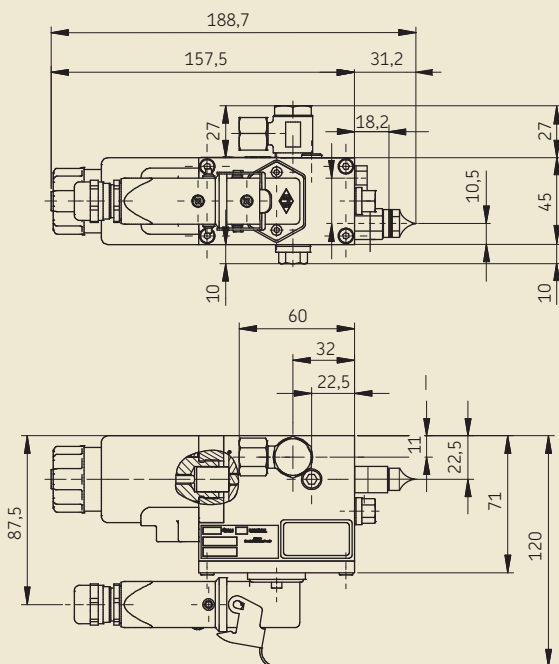
Order No. see order code

- Lubricant oil or fluid grease NLGI grade 00, 000
- Number of outlets (spray nozzles) . 1 or 2
- Output volume 0,02; 0,04; 0,06 cm³/stroke
- Rated operating voltage 24 V DC
- Ambient temperature -25 to +45 °C

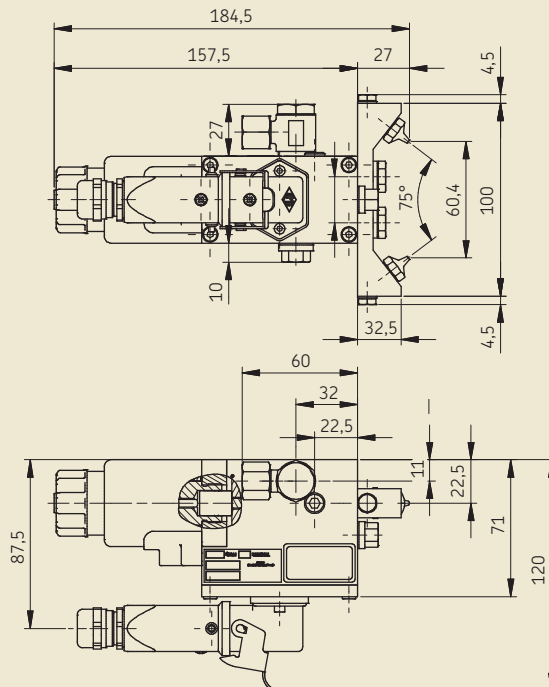
Hydraulic plan



PER-1-20+924

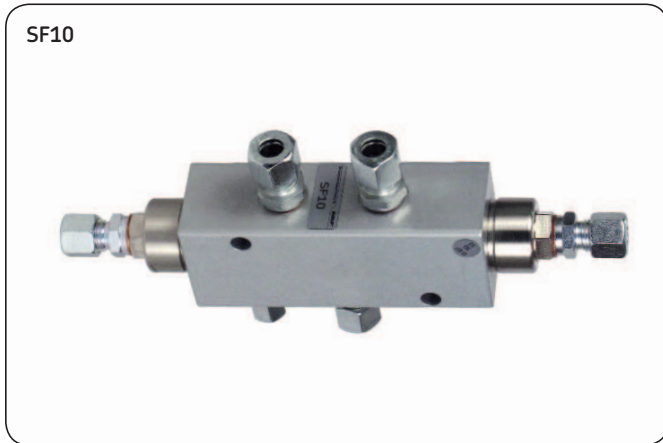


PER-2-20+924



Pneumatically actuated valves

SF10



Function

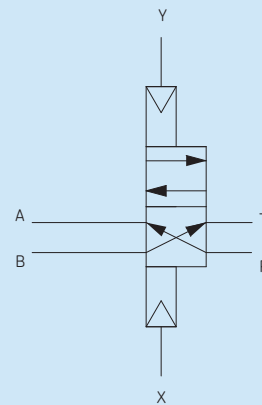
The grease control valve controls the flow of lubricant in the dual line systems, e.g. for curve-dependent lubrication (left/right spray nozzles) or distance-dependent lubrication (front/rear spray nozzles).

Technical data

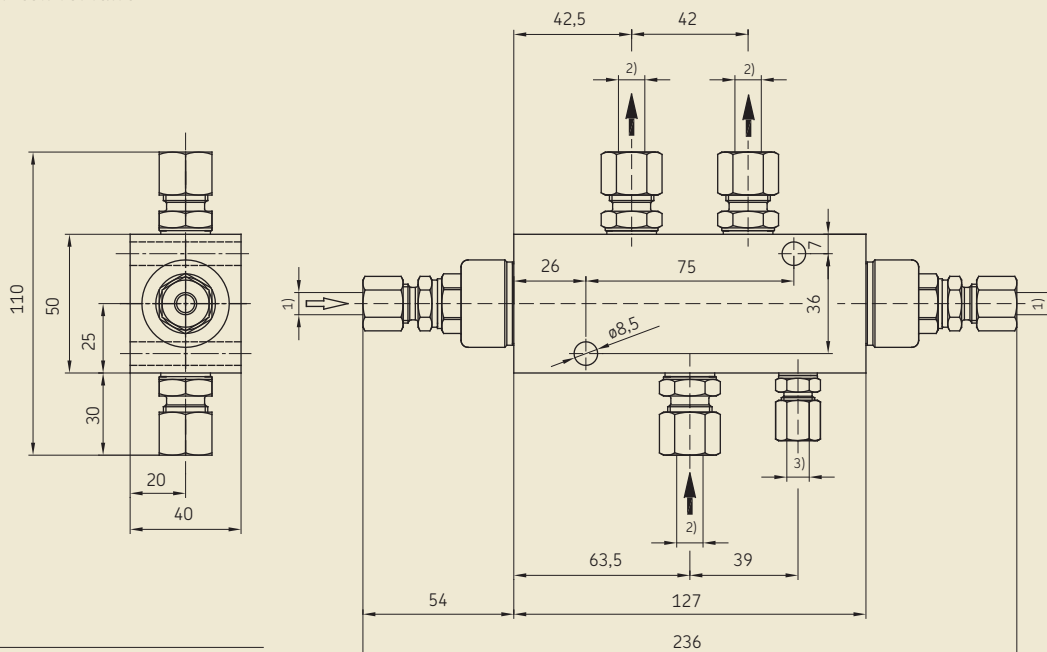
Order No. SF10

Actuation pressure 6 to 10 bar
 Lubricant oil or fluid grease, NLGI grade 000, 00
 Operating pressure max. 100 bar
 Ambient temperature -25 to +80 °C
 Mounting position as shown in drawing

Hydraulic plan



SF10 Lubricant control valve



¹⁾ Compressed air ports for 8 mm diam. tubing to DIN 2353
²⁾ Lubricant ports for 10 mm diam. tubing to DIN 2353
³⁾ Leakage port for 6 mm diam. tubing to DIN 2353

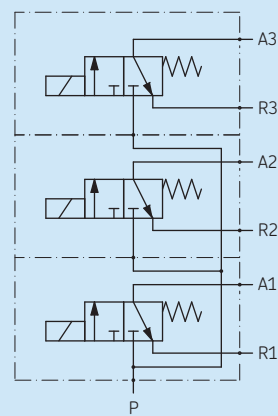
Solenoid valves

221-296... – 3/2-way valves

221-296-053+927



Hydraulic plan



Technical data

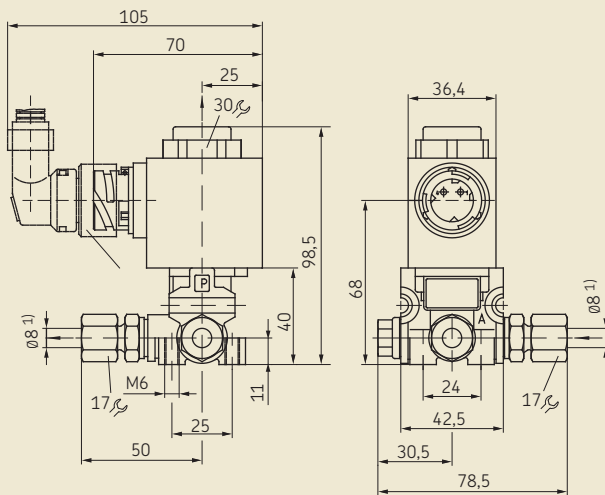
Order No. (1 port, 24 V DC)	221-296-031+924
Order No. (2 ports, 24 V DC)	221-296-032+924
Order No. (3 ports, 24 V DC)	221-296-033+924
Rated width DN	3 mm
Operating pressure	0 to 10 bar
Valve seat seal	FPM
Ambient temperature	-25 to +80 °C
Medium	compressed air
Mounting position	any
Rated voltage	24 V DC
Voltage tolerance	+25% / -25%
Duty cycle	100% ED
Power input	about 10 W
Magnet	with two built-in diodes
Type of enclosure acc. to EN 60529	IP 65

Technical data

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

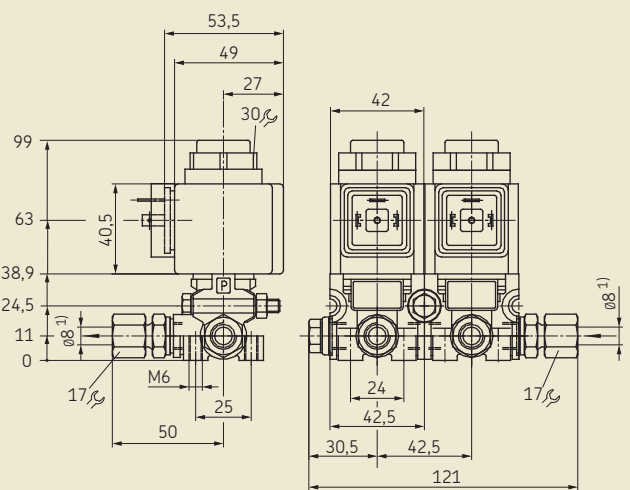
221-296-031

1-port type



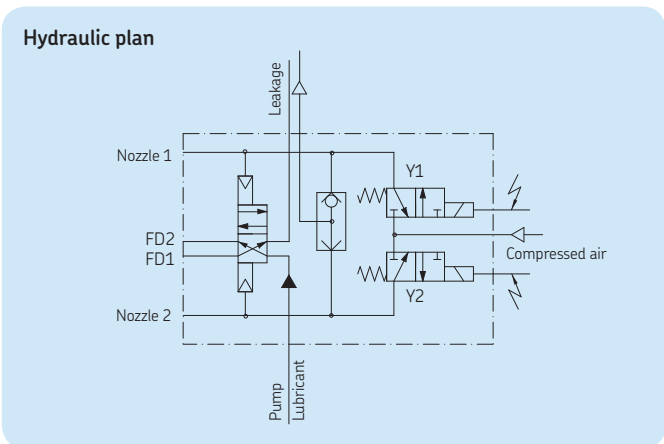
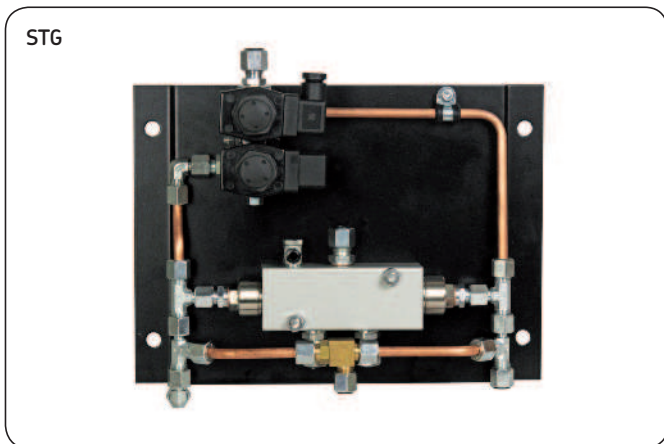
221-296-052

2-ports type



Electropneumatically actuated valve plates

STG

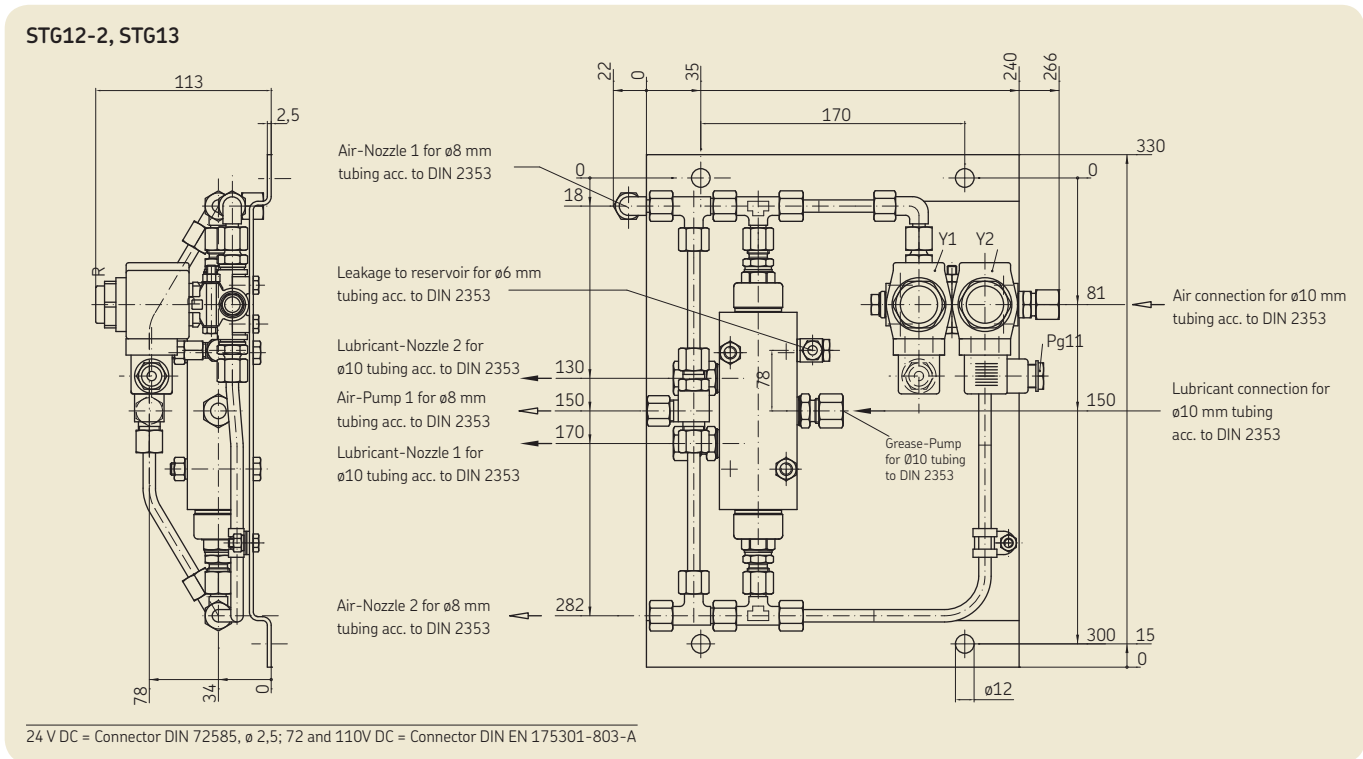


Technical data

Order No. (24 V DC)	STG13+924
Rated width DN	3 mm
Actuation pressure (Air)	6 to 10 bar
Operating pressure (Lubricant)	max. 150 bar
Valve seat seal	FPM
Ambient temperature	-25 to +80 °C
Medium	compressed air
Mounting position	any
Rated voltage	24 V DC
Voltage tolerance	+25% / -25%
Duty cycle	100% ED
Power input	about 10 W
Magnet	with two built-in diodes
Type of enclosure acc. to EN 60529	IP 65

Technical data

Order No. (72 V DC)	STG12-2+927
Order No. (110 V DC)	STG12-2+926
Rated width DN	3 mm
Actuation pressure (Air)	6 to 10 bar
Operating pressure (Lubricant)	max. 150 bar
Valve seat seal	FPM
Ambient temperature	-25 to +80 °C
Medium	compressed air
Mounting position	any
Rated voltage	72 or 110 V DC
Voltage tolerance	+10% / -30%
Duty cycle	100% ED
Power input	about 16 W
Type of enclosure acc. to EN 60529	IP 65

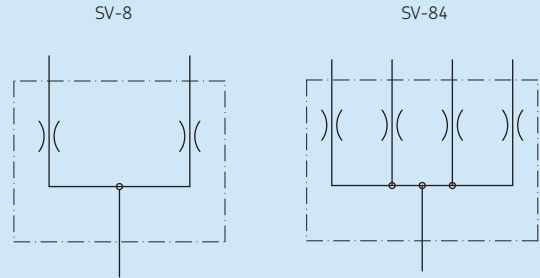


Flow divider

SV-8



Hydraulic plan



Technical data

Order No. **SV-8**

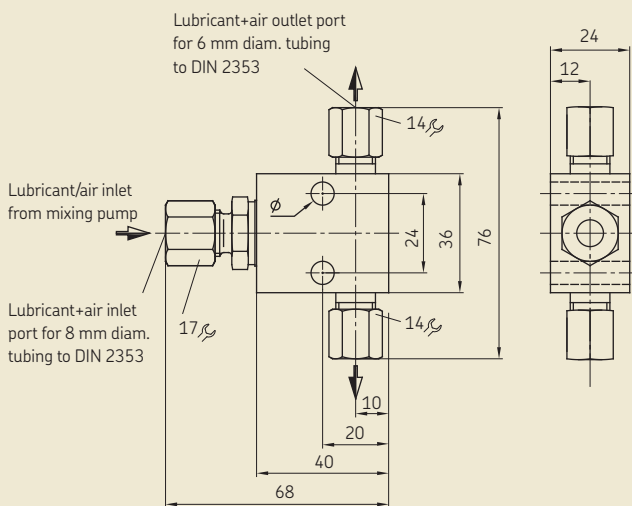
Distribution / lubricant+air. 1 inlet port in 2 outlet ports
 Compressed air 5 to 10 bar
 Lubricant fluid grease,
 NLGI-grade 000, 00
 Ambient temperature -25 to +80 °C
 Mounting position any

Technical data

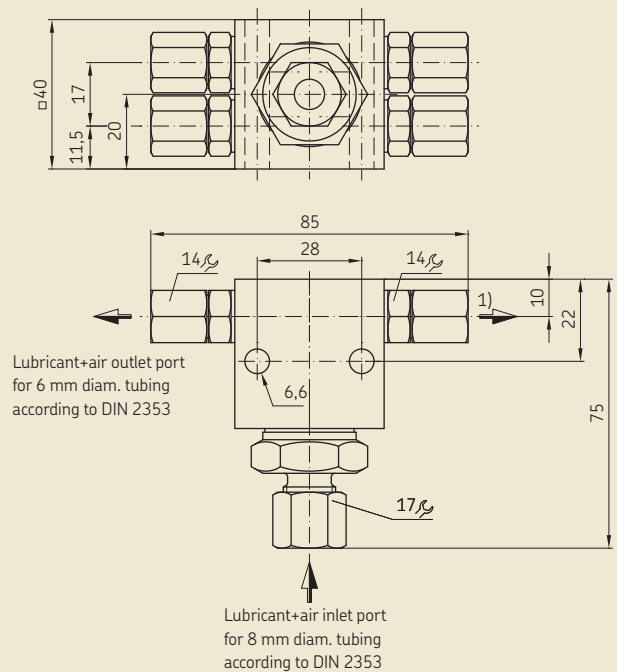
Order No. **SV-84**

Distribution / lubricant+air. 1 inlet port in 4 outlet ports
 Compressed air 5 to 10 bar
 Lubricant fluid grease,
 NLGI-grade 000, 00
 Ambient temperature -25 to 80° C
 Mounting position any

SV-8



SV-84



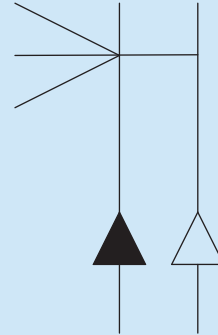
Spray nozzles

SP8

SP8-2 / SP8-4



Hydraulic plan



Technical data

Order No. **SP8-2**
 Rated spray quantity. 0,05 cm³ / actuation

Order No. **SP8-4**
 Rated spray quantity. 0,03 cm³ / actuation

Air pressure 6–10 bar
 Air consumption about 3 NL (at 6 bar / 1,5 s)
 Ambient temperature -25 to +80 °C
 Medium pressure max. 100 bar
 Lubricant oil/fluid grease,
 NLGI grade 000, 00

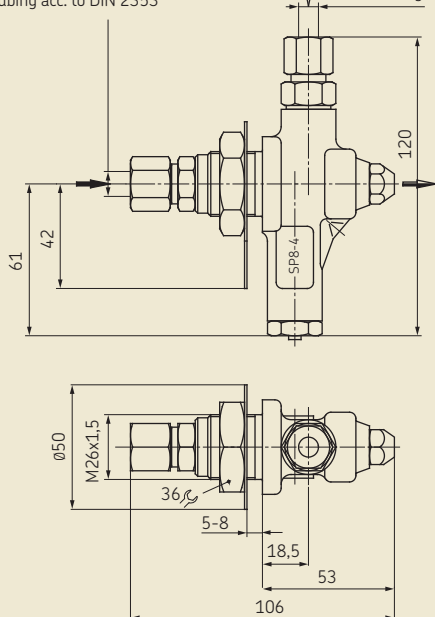
Technical data

Order No. **SP8-5**
 Rated spray quantity. 0,03 cm³ / actuation
 Air pressure 6–10 bar
 Air consumption about 3 NL (1,5 s/ 6 bar)
 Ambient temperature -25 to +80 °C
 Medium pressure max. 100 bar
 Lubricant fluid grease,
 NLGI grade 000, 00
 Actuation max. 0,7 Hz
 Mounting position any
 Seal NBR

SP8-2 / SP8-4

Grease port for 10 mm diam. tubing acc. to DIN 2353

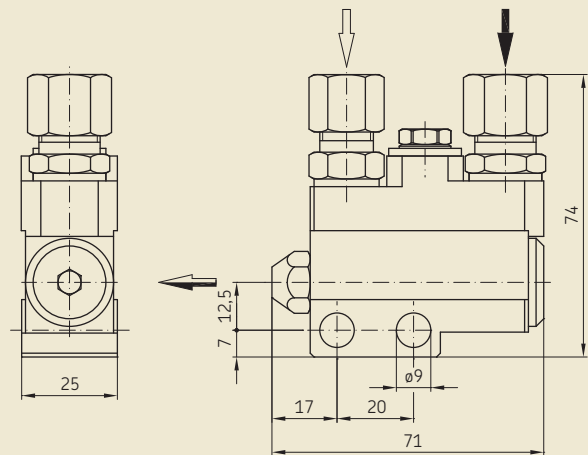
Compressed air port for 8 mm diam. tubing acc. to DIN 2353



SP8-5

Compressed air port for ø8 tubing according to DIN 2353

Grease port for ø10 tubing according to DIN 2353



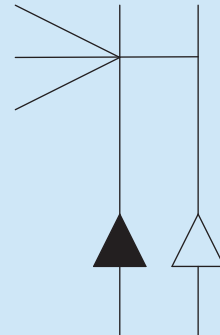
Spray nozzles

SP9-2, SP9-2-S7 Spray nozzle

SP9-2, SP9-2-S7



Hydraulic plan



Technical data

Order No. **SP9-2**

Rated spray quantity. 0,03 cm³ / actuation

Air pressure 4,5 to 10 bar

Mean air consumption about 4,5 NL (at 6 bar / 1,5 s)

Max. lubrication pressure 40 bar

Lubricant fluid grease, NLGI grade 000, 00

Technical data

Order No. **SP9-2-S7**

Rated spray quantity. 0,05 cm³ / actuation

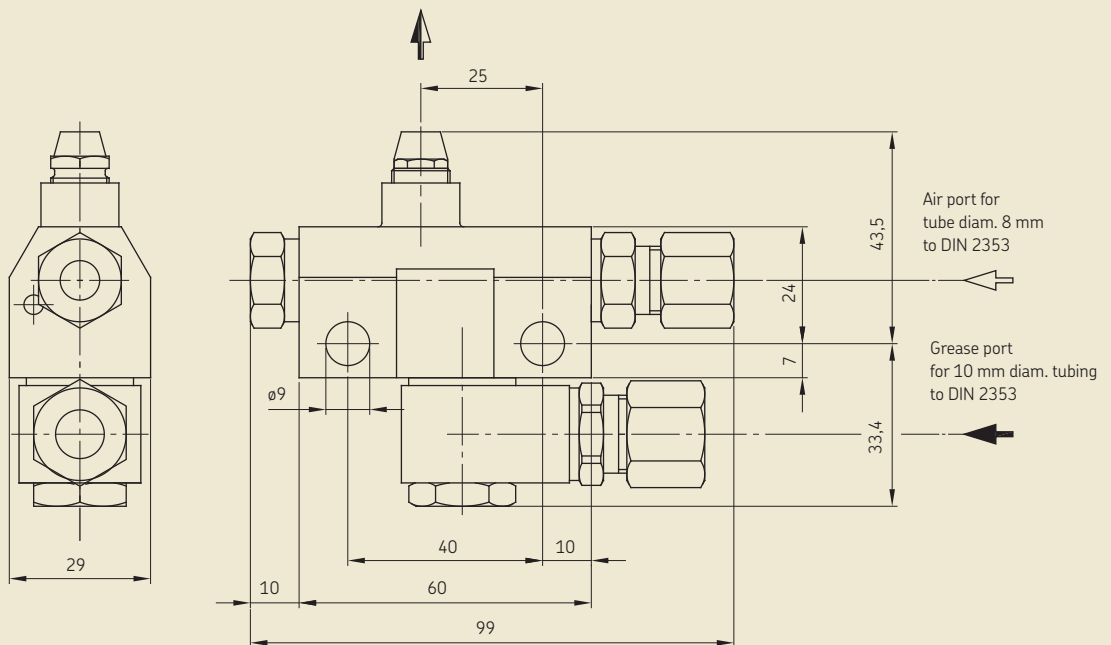
Air pressure 4,5 to 10 bar

Mean air consumption about 4,5 NL (at 6 bar / 1,5 s)

Max. lubrication pressure 40 bar

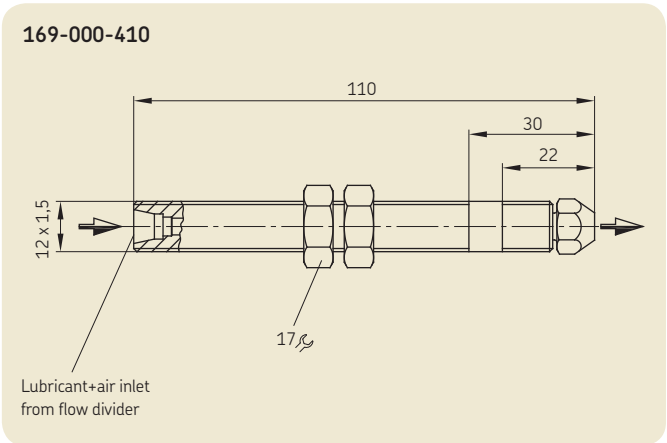
Lubricant fluid grease, NLGI grade 000, 00

SP9-2, SP9-2-S7



Spray nozzles

169-000-400 and -410 Spray nozzle

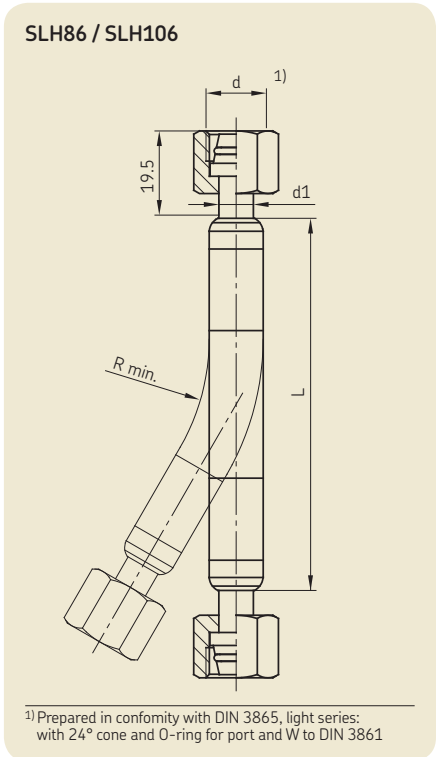


Accessories

Hose accessories for railway applications

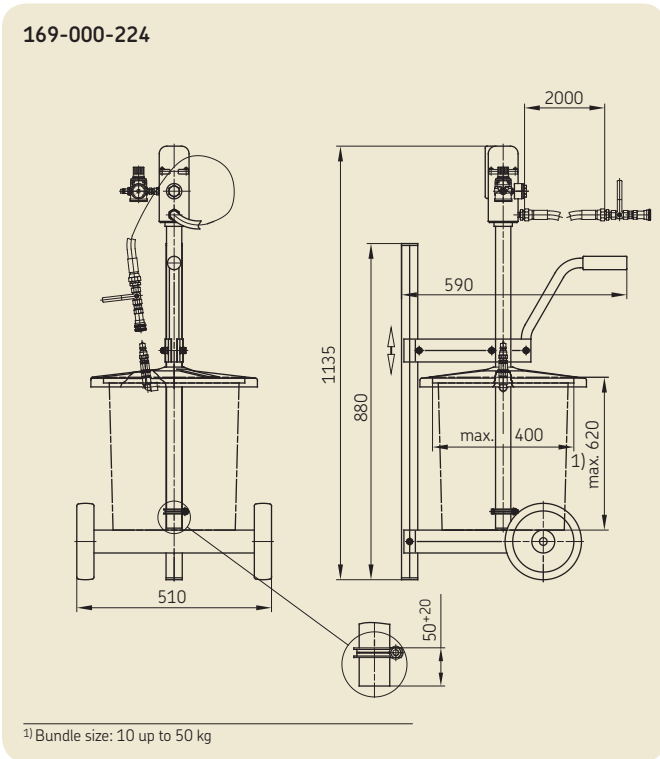
Hoses accessories						
Type	d	d1 Tube diam. L _{±10}	R min.	Perm. operating pressure [bars]	Application	Order No.
SLH86	M14x1,5	8	180/560	50	225	compressed air line SLH86-180-K/ SLH86-580-K
SLH106	M14x1,5	10	180/560	60	180	lubricant line SLH106-180-K/ SLH106-580-K

Technical data	
Inner liner	synthetic rubber NBR
Reinforcement	1 wire braiding
Outer cover	synthetic rubber CR
Resistant to	lubricants, also rapidly biodegradable ones based on synthetic ester, vegetable and mineral oils, compressed air
Ambient temperature	-25 to +70 °C
Fire protection standard	DIN 5510 "Preventive fire protection in rail vehicles"
Flammability class	S3
Smoke development class	SR1



Accessories

Pneumatically refill pump – 169-000-224



Technical data

Order No. **169-000-224**

Medium oil, fluid grease
NLGI grade 000, 00

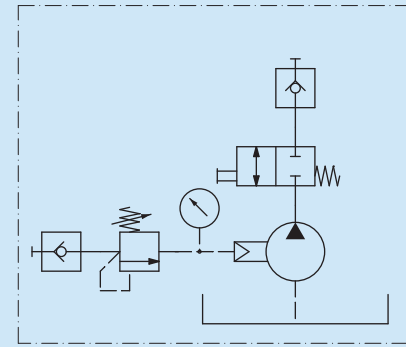
Delivery rate ca. 3 l/min

Ambient temperature 0 to +60 °C

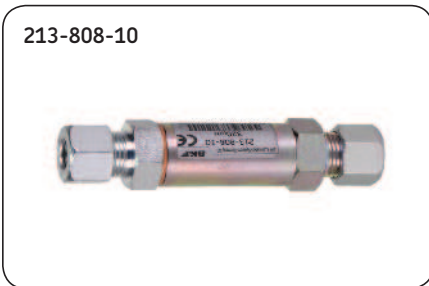
Connection for filler socket 995-000-705

Fitting reservoirs BF4.5 and BF6-S3

Hydraulic plan



Micro filters



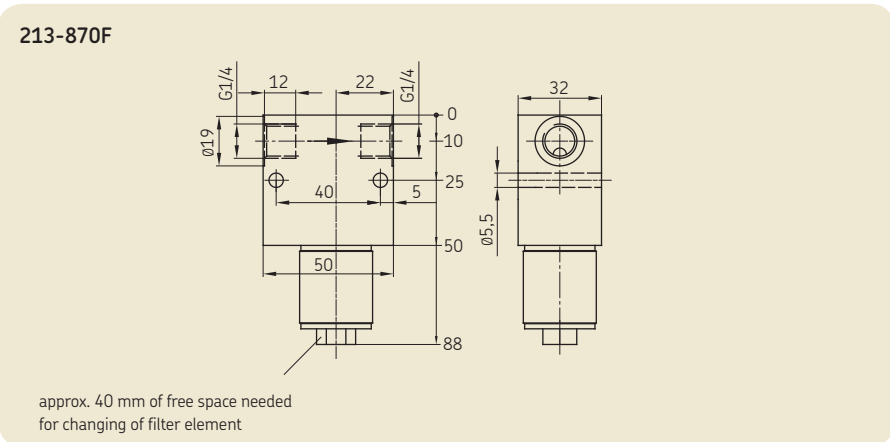
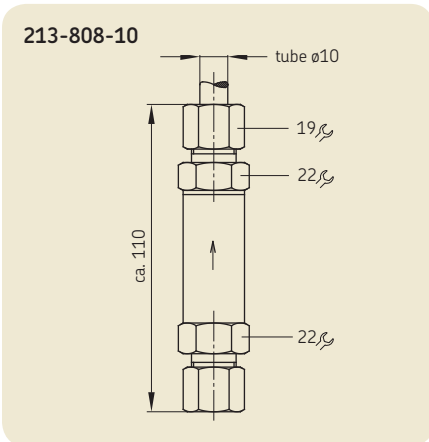
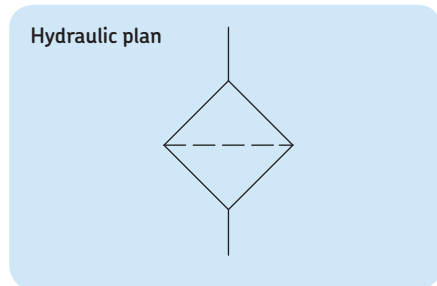
Technical data

Order No. **213-808-10**

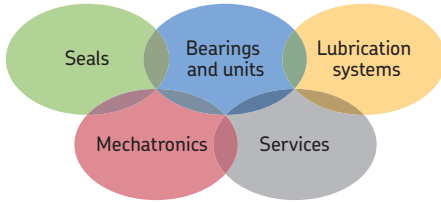
Filter fineness [µm] 320

Order No. **213-870F**

Filter fineness [µm] 160



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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 in any instructions. If operating instructions are supplied with the products, they must be read and followed.

Not all lubricants are suitable for use in centralized lubrication systems. SKF does offer an inspection service to test customer supplied lubricant to determine if it can be used in a centralized system. SKF lubrication systems or their components are not approved for use with gases, liquefied gases, pressurized gases in solution and fluids with a vapor pressure exceeding normal atmospheric pressure (1 013 mbar) by more than 0,5 bar at their maximum permissible temperature.

Hazardous materials of any kind, especially the materials classified as hazardous by European Community Directive EC 67/548/EEC, Article 2, Par. 2, may only be used to fill SKF centralized lubrication systems and components and delivered and/or distributed with the same after consulting with and receiving written approval from SKF.

Additional brochures for further information

1-2008-EN	<i>SKF EasyRail</i>
1-6917-EN	<i>Lubrication Solutions from SKF</i>
1-9201-EN	<i>Transport of Lubricants in Centralized Lubrication Systems</i>

SKF Lubrication Systems Germany GmbH

Berlin Plant
 Motzener Str. 35/37 · 12277 Berlin
 PO Box 970444 · 12704 Berlin · Germany

Tel. +49 (0)30 72002-0
 Fax +49 (0)30 72002-111

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