BEKAWIND RETROFIT

CENTRAL LUBRICATION SYSTEMS FOR RETROFIT IN WIND POWER PLANTS

BEKAWIND PRO

BEKAWIND FLOW

BEKAWIND SINGLE

BEKAWIND COMBI

...made by BEKA

WS000000912 EN 1090200472

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BAIER + KÖPPEL GmbH + Co. KG
PRÄZISIONSAPPARATEFABRIK
BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

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BAIER + KOPPEL GmbH + Co. KG
PRÄZISIONSAPPARATEFABRIK
BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Central lubrication of wind power plants

Wind power plants have various highly stressed bearings which need lubricant in order to reach a perfect function and reliability. Maintenance periods of 6 months and longer, especially at offshore-wind power plants show that a manual lubrication is not sufficient and practicable.

Reasons are among others

- large lubrication intervals with very discontinuous lubrication
- maintenance intervals that are uncertain due to weather conditions
- high time expenditure = long stand still times of the turbine
- high risks for workers when lubricating blade bearings

Due to these facts the automatic central lubrication systems are already installed at new wind power plants by the manufacturers. Permanent increasing reliability demands of older wind power plants and ,on the other hand, decrease of maintenance costs are resulting in retrofitting automatic central lubrication systems during the “upgrades”.
This pays off already after a short time.

Advantages of a central lubrication system

Modern central lubrication systems offer various advantages compared to a manual lubrication.

1. Bearings are supplied with lubricant steadily and during the operation.
2. A temporary overlubrication within minutes with the lubricant quantity that is necessary for 6 months, resulting in lost of lubricant as well as in contamination of ambient parts and areas can be avoided.
3. The automatic lubrication with minimised quantities during the running time of the turbine, enables the complete consumption of lubricant by the bearing and also prevents that sealings are pressed out due to high lubricant pressure.
4. The lubrication is done automatically and is also monitored. Forgetting to lubricate some lube points by the service staff is eliminated.
5. Mixing with wrong lubricant type is not possible.
6. Savings of lubricant due to a good designed lubrication system can be up to 80 %.

BEKA offers a large number of retrofit systems. They fit the according wind power plant and can be combined optionaly and according to the requested level of automatisation. The questionnaire makes it easier to find out the necessary details to select a retrofit kit and enables a quick and specific design.
As you can see in this catalogue, lubrication systems also can be combined by reducing the number of different lubricant types and hence reduce installation and maintenance costs.

Contact us.

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D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
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WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Cost comparison manual lubrication vs central lubrication*

Bearing	Manual lubrication		Central lubrication		Saving (ca. €)
	Time	Costs (ca. €)	Time	Costs(ca. €)	
Blade bearing					
Loss of production	12 h	2 x 1140,-	-	-	2280,-
Bearing raceway	lubricating 7 h	2 x 560,-	automatic	-	1120,-
	cleaning 1 h	2 x 80,-	-	-	160,-
Blade gears	lubricating 3 h	2 x 240,-	automatic	-	480,-
	cleen teeths 1 h	2 x 80,-	cleen teeths 1 h	2 x 80,-	-
Yaw bearing					
Loss of production	3 h	2 x 285,-	-	-	570,-
Bearing raceway	lubricating 0,5 h	2 x 40,-	automatic	-	80,-
	cleaning 0,5 h	2 x 40,-	-	-	80,-
Yaw gears	lubricating 1 h	2 x 80,-	automatic	-	160,-
	clean break plate 1 h	2 x 80,-	clean break plate 1h	-	80,-
Main bearing					
Loss of production	1h	2 x 95,-	-	-	190,-
	lubricating 0,5 h	2 x 40,-	automatic	-	80,-
	clean waste grease pan 0,5 h	2 x 40,-	clean waste grease pan 0,5 h	2 x 40,-	-
Generator bearing					
Loss of production	1 h	2 x 95,-	-		190,-
	lubricating 0,5 h	2 x 40,-	automatic		160,-
	cleaning 0,5 h	2 x 40,-	cleaning 0,5 h	2 x 40,-	-
Special services**	clean blades 8h	640,-	-		640,-
	clean tower 8h	640,-	-		640,-
	clean hub 4 h	320,-	-		320,-
	exchange break shoes 5h	400,-	-		400,-

* Example: 1,5 MW system, 70 % power, refund 0,09 €/KWh, 2 maintenances / year service costs 80 €/h

Energy reduction 1,5MW x 0,7 x 0,09 €/KWh = 95 €/h

** additional down time costs, frequency can not be specified

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Advantages of BEKAWIND central lubrication systems

General advantages

- Reduction of bearing and teeth wear due to steadily lubrication during the operating time
- Specific lubrication for loaded areas
- Small quantities of lubricant - no pollutions
- Collecting used lubricant in disposal reservoirs
- No mixing up of different lubricants
- No lube points are forgotten
- Weather independent lubrication

Cost reduction

- Reduction of turbine stand still times during maintenance by 1 to 1,5 days per maintenance cylce, i. e.
- Loss of production costs — approx. 1200,- to 1500,- € *
- Service personal costs — approx. 900,- bis 1100,- € **
- Cleaning costs (blades, tower, nacelle) — approx. 1500,- (cleaning)
- Costs of brake shoes for yaw bearing — approx. 3000,- €
- No handling costs for grease cartridges

Increase maintenance reliability

- No overlubrication and pollution
- No pressing out of bearing sealings (blade bearing)
- Compliance of service time plan (weather independent)
- Check of lubrication via control system
- Warning at shortage of lubricant or system failure

* 1,5 MW system, 70 % running time, refund 0,09€/KWh = 95 €/h
** service fee 80,- € / h

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Advantages BEKAWIND flow spray lubrication

- Specific lubrication of loaded areas
- Lubrication of pitch gear also at stand still
- Prevention of sand entry into gearing
- Reduction of lubricant quantity by 90 %
- No stock of special spare lubrication pinions

Example calculation of cost savings

Wind power plant 1,5 MW, 70 % production, refund 0,009€ / KWh

2 maintenance cycles at blade bearings / year

Loss of production (12 h)	1050 KW / h x 0,09 = 95 €/h 95 x 12 x 2 = 2280,- €/h
Service hours (2 x 12 h)	24 x 80,- € = 1920,- €
25 % cleaning costs	480,- €
Logistics and grease saving	150,- €
Total saving in comparison with manual lubrication	**4830,-** €

Assuming a price of approx. 3500,- € for material and assembly of a blade bearing lubrication, the return of investment is approx. 9 months.
There is no exact specification concerning the savings; this could be independence of weather influences, extention of life time of bearings and teeths, prevention of early replacement of grease contaminated break pads at the yaw.

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Check List Lubrication Systems for Wind Converters

Type of Wind Converter		Blade Bearings	Blade Drives	Main Bearing	Generator Bearing	Yaw Bearing	Yaw Drives
Maintenance Cycle							
Type of Lubricant							
Progressiv System	Single Line System	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Pump Reservoir Size 2, 4, 8, 12 (kg)							
Filling Connection	Level Switch	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Pump static	Pump rotating	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Pressure Relief Valve Connection to Reservoir		☐	☐	☐	☐	☐	☐
100 - 250 V / AC	24 V / DC	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Pump with BEKA - Control Unit	Pump without BEKA - Control Unit	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Number of Bearings Number of Lubrication Pinions		Layout available ☐ Number =	Layout available ☐ Number = Modul = Nr. of Teeth = Depth of Teeth =	Layout available ☐ Number =	Layout available ☐ Number =	Layout available ☐ Number =	Layout available ☐ Number = Modul = Nr. of Teeth = Depth of Teeth =
Number of Lub Points per Bearing / Lubrication Pinion							
Lub Point internal Thread	Plug-in Connection	☐	☐	☐	☐	☐	☐
Number of Grease Collector (straight)	Number of Grease Collector (angular)						
Grease Collector internal Thread							
Lubrication Cycles per day							
Quantity per cycle and lube point							
System Layout available (piping etc.)		☐	☐	☐	☐	☐	☐
Temperature Range							
Sytem Monitoring	Distributor Monitoring	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Others							
Contact Person (adress, name, dept., phone, e-mail)							
Date, Sign:							

FB WKA 001-20090127

Lubricant release list for BEKAwind Central lubrication

BEKAWIND

All details according to the grease manufacturer (no guarantee) - rev. 05/2013

Manufact.	Lubricant designation	NLGI-cl.	Lubricant temperat. of application	Designation acc. DIN 51502	Density g/cm²	BEKA-no.:
AGIP	GR MU/EP-2	2	-30°C bis 120°C	KP2K-30	0,97	0320078
Aral	Aralub LFZ 1	0-1	-20°C bis 120°C	OGPF0/1K-20	0,93	0320238
Avia	Avilub CTK	2	-30°C bis 110°C	KPF2G-30	0,94	0320102
Castrol	Molub Alloy 936 SF heavy	0	-10°C bis 130°C	OGPF0G-10	0,9	0320166
Castrol	Optimol Optipit	2-3	-10°C bis 140°C	N/A	N/A	0320187
Esso	Mobil SHC grease 460WT	1,5	-30°C bis 140 °C	KPHC1-2N-30	0,90	0320095
Esso	Mobilith SHC 220	2	-30°C bis 140°C	KPHC2N-30	0,87	0320162
Esso	Mobilith SHC 100	2	-35°C bis 140°C	KPHC2N-35	1,0	0320171
Esso	Mobilith SHC 007	00	-50°C bis 180°C	GPHC00K-30	N/A	0320246
Esso	Mobil OGL 461	1,5	-20°C bis 120°C	OGPF1-2K-20	N/A	0320219
Esso	Mobilux EP-2	2	-20°C bis 130°C	KP2K-30	0,9	0320127-18
FAG	Arcanol LOAD460	1	-30°C bis 130°C	KP1K-30	0,93	0320168
FAG	Arcanol Load 400	2	-30°C bis 130°C	KP1K-30	0,9	0320164
Fuchs	Ceplattyn BL	1-2	-40°C bis 160°C	OGPF1P-30	N/A	0320172
Fuchs	Ceplattyn Eco 300 Plus	0	-30°C bis 100°C	OGPF1P-30	1,0	0320174
Fuchs	Gleitmo 585K	2	-45°C bis 130°C	KPFHC2K-40	1,0	0320112-115
Fuchs	Lagermeister WHS 2002	2	-20°C bis 130°C	KP2K-20	0,95	0320239
Fuchs	STABYL EOS E 2	2	-40°C bis 130°C	KPE2K-40	0,94	0320163
Klüber	Klüberplex AG 11-461	1	-40°C bis 100°C	N/A	1,07	0320165
Klüber	Klüberplex AG 11-462	2	-40°C bis 100°C	N/A	1,07	0320116
Klüber	Klüberplex BEM 41-132	2	-40°C bis 150°C	KPHC2N-30L	0,90	0320049
Klüber	Klüberplex BEM 41-141	1	-40°C bis 150°C	N/A	0,88	0320121
Klüber	Isoflex Tobas NB 52	2	-50°C bis 120°C	N/A	0,96	0320242
Molykote	Longterm 2 plus	2	-25°C bis 110°C	N/A	0,9	0320103/106
NTN/SNR	Lub Universal +	2	-25°C bis 130°C	N/A	0,89	0320228
Schaeffer	Moly EP synthetic blend	0	-40°C bis 170°C	N/A	N/A	0320167
Shell	Gadus S5 T460	1,5	-35°C bis 180°C	N/A	0,90	0320176
Shell	Rhodina BBZ	1,5-2	-55°C bis 100°C	K1,5 G-50	0,90	0320107/-170
SKF	LGEP 2	2	-20°C bis 110°C	KP2G-20	N/A	0320080
SKF	LGWA2	2	-30°C bis 140°C	KP2N-30	N/A	0320175
SKF	LGWM1	1	-30°C bis 110°C	KP1G-30	N/A	0320145
SKF	LGWM2	1-2	-40°C bis 110°C	KP2G-40	N/A	0320226
Total	Ceran AD Plus	0-1	-20°C bis 150°C	OGP0N-20	0,90	0320159

The pumpability in central lubrication systems is generally guaranteed. However please take care that due to different system configurations (total pressure loss of the complete system) and application conditions the clarifying of pumpability (at low temperatures) could be necessary in certain cases. In general the temperature limit of lubricant of central lubrication systems is approx. 10-20°C above the lowest lubricant application in temperature.

BEKA
www.beka-lube.de

BAIER+KÖPPEL GMBH + CO. KG

PRÄZISIONSAPPARATEFABRIK
BEETHOVENSTRASSE 14
91275 PEGNITZ / BAVARIA

fon +49 9241 729-0
fax +49 9241 729-50
e-mail beka@beka-lube.de

Distributor set

Distributor block with lubricating nipple or lubrication connection and pressure pipework for retrofit of bearings. Unscrew the lubricating nipple and connect the distributor block with prefilled lubrication lines. - ready.

Lubricator BEKALUB

The lubricator BEKALUB is a battery-operated, autonomous working and refillable lubrication system.
BEKALUB supplies exposed lube points at machines, systems and vehicles of all types. An external voltage supply or controlling is not necessary.
Lubrication time and metering quantity / stroke can be adjusted individually. The spare cartridges and spare batteries are delivered as refilling sets.

Lubrication pinion set I

Autonomous battery-operated lubricator BEKALUB with distributor block and lubrication pinions e.g. for retrofit of blade drives (1 set per blade drive).
Lubrication time and metering quantity / stroke can be adjusted individually. Refill cartridges and spare batteries are delivered as refilling sets.

BAIER + KÖPPEL GmbH + Co. KG
PRÄZISIONSAPPARATEFABRIK
BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Lubrication pinion set II

Electric central lubrication pump with 3 pump elements and 3 lubrication pinions for retrofit e.g. at blade drives.

Pump with follower piston for rotating installation.

Blade bearing set I

Blade bearing set I for automatic lubrication of 3 blade bearings consists of an electric central lubrication pump with follower piston, monitored main distributor and 3 secondary distributors for the assembly at each blade bearing. It is designed as a progressive system. The pump can be delivered with or without control unit. The set is also offered with pump and pipework, already filled.

Blade bearing set II

The blade bearing set II is designed as a single line system. A central lubrication pump is connected via a main line to the injectors at blade bearings 1 to 3. The pressure switch to control the system is installed at the last injector. The 2/2 way solenoid valve at the pump enables the necessary pressurisation of the system.

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Yaw bearing set

The yaw bearing set can be delivered as progressive system or single line system. The electric central lubrication pump with or without control unit supplies the lubricant to the distributor that is installed at the yaw bearing together with the lube point lines. The delivery of the system with prefilled pump and filled lines as well as with fastening elements is possible.

Yaw drive spray set

The spray set for yaw gears supplies lubricant to the smashing area of the gear. Due to the spray process just small grease quantities are applied and thus avoid pollutions of break systems, blades and towers due to manual overlubrication. The small compressor unit operates the pneumatic piston pump and creates compressed air for the application of lubricant (minimum quantity lubrication).

Main bearing set

The main bearing set I consists of an electric central lubrication pump and a progressive distributor with cycle switch. The used lubricant is collected by a disposal reservoir. The lubrication pump can be delivered with and without control unit. The level sensor and the cycle switch are evaluated. The main bearing set I can also be offered as a single line system.

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FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Generator bearing set I

The generator bearing set I consists of a electric piston pump Pico with 2 pump elements for the lubrication of both generator bearings. Via the lubrication cycle or by counting the pump rotations the lubricant quantity for the bearings is calculated. The lubrication pump has a low level switch.

Generator bearing set II

At the generator bearing set II, a progressive distributor with monitorng (cycle switch) is assembled at the electric central lubrication pump. Hence the control and monitoring of the lubrication is possible. The pump has a low level switch. It can be offered with or without control unit.

Rotor lubrication system

The rotor lubrication system consists of a rotating central lubrication pump, main distributor with cycle switch and 3 secondary distributors for the lubrication of blade bearings and blade gears or drives. Always use the same lubricant for bearing raceways and gears.

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BEETHOVENSTR. 14
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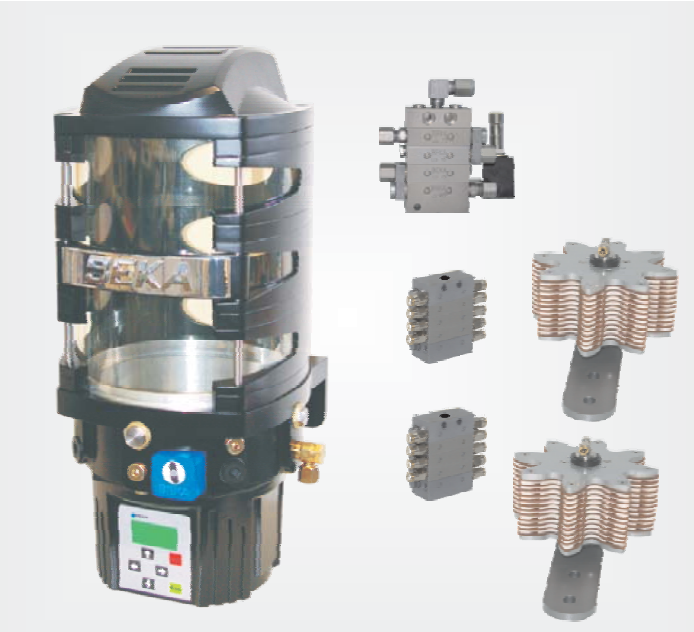
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Nacelle lubrication system I



The nacelle lubrication system I is a central lubrication system for main bearing, yaw bearings and yaw gears by using the same lubricant. The different quantity of lubricant is considered with the distributor design. The system can also be designed as a single line system. The pump can be offered with or without control unit.

Nacelle lubrication system II

At the nacelle lubrication system II, the central lubrication system was extended by the generator lubrication system so that all raceways and gears in the nacelles, can be lubricated and monitored. The system can also be offered as a single line system. Central lubrication pumps can be supplied with 4 up to 30 kg reservoirs, with or without control unit.

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EMAIL: beka@beka-lube.de

Combi lubrication system

The combi lubrication system connects the lubrication systems of the nacelle and the rotor via a rotary union. Hence, only one lubrication system is installed in the nacelle; no lubrication pumps are necessary in the hub. The rotary union is installed before the slip ring and has an opening for the electric connection.

There are two lubrication connections for 2 different greases or for one grease type and a spray lubricant.

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Lubrication pumps

Autonomous lubricator BEKALUB

Technical data

Dimensions:	see drawing
Supply pressure:	25 bar
Supply volume:	max. 0,64 cm^3
Lubricant consistency:	up to NLGI 2
Ambient temperature:	-15 to 50°C
Connection thread:	R1/4"
Voltage supply:	3 x 1,5 V Mignon
Lubricant cartridge:	240/500 cm^3

Accessories

Grease cartridges with different grease types, adjusting disks, time period rings, fastening angles, progressive distributor.
We will inform you!

Technology

The BEKALUB lubricator is driven by battery. It builds up a pressure of 25 bar and can supply individual lube points. As only the supplied lubricant is pressurised, the bleeding of grease is eliminated. Lubrication cycles and the output rate can be adjusted individually.

Combined with a progressive distributor up to 10 outlets, it can be used as autonomous central lubrication system for smaller turbines.

Lubricant cartridges

The BEKALUB lubrication cartridges have a volume of 240 cm^3 or 500 cm^3. They consist of a belly that can be exchanged quickly and clean.
BEKA offers lubricant cartridges for nearly every application - from multi purpose grease via high temperature- and high load grease up to greases for food industry and chain oil.

The refilling cartridges are offered with included spare batteries.

Number of distributor elements	A	B
3	84,25	79,75
4	99	94,5
5	113,75	109,25

Distributor elment with outlets		Code
MX-F 45	Fitting	1
MX-F 45	Plug-in connect.	2
MX-F 75	Fitting	3
MX-F 75	Plug-in connect.	4
MX-F 105	Fitting	5
MX-F 105	Plug-in connect.	6
without	without	0

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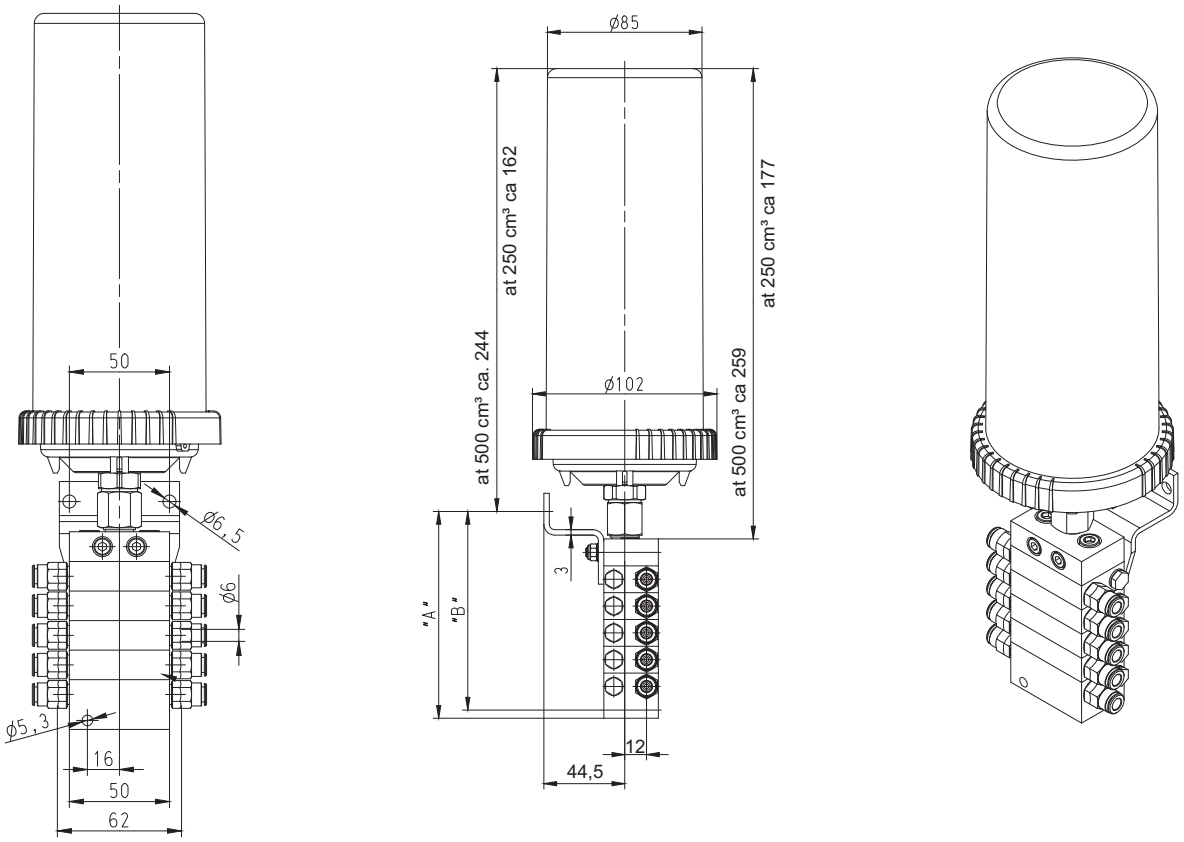
Dimensional drawing



Order key for series 2090

Type-no.	2090	x	x	x	x	x	x	x	xxx
Grease cartridge	250 cm³	500 cm³							
Code	1	2							
1. Distributor element	MX-F								
Code	1 to 6 (see table)								
2. Distributor element	MX-F								
Code	1 to 6 (see table)								
3. Distributor element	MX-F								
Code	1 to 6 (see table)								
4. Distributor element	MX-F								
Code	1 to 7 (see table)								
5. Distributor element	MX-F								
Code	1 to 7 (see table)								

Grease type	Longtime PD00	Longtime PD2	Optiplit	Mollub-Alloy Bio Top 9488	Mobilith SHC 460
Code	1 (nur für 250 cm³)	2	3	4	5

Special version	

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Technical data

Pump

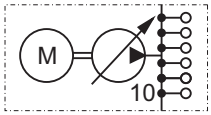
Delivery volume per stroke (= 1 pump rotation) and outlet: 0,005 to 0,12 cm³ (depend on pump element)
Regulation: possible for PE 120 FV
Reservoir content: 1,2 kg, plastic, transparent
Operating pressure: max. 200 bar at multi line system
max. 280 bar at progressive system
Delivering medium: greases up to NLGI cl. 2 without solid contents
Operating temperature: -25 to 70 °C
No. of outlets: max. 10
Outlet type: see order key
Rotation direction of agitator blade: clockwise
Installation position: reservoir vertical as shown
Weight: max. 4,5 kg (without pump elements, with basic grease filling)
Level monitoring: integrated into the pump

Motor

Drive: d.c. motor
Operating voltage: 12 V DC or 24 V DC
Current consumption at 280 bar counter-pressure and -25° C: max. 3,8 A for 24 V DC
max. 7,5 A for 12 V DC
Speed (= pump rotations): 15 r/min
Protection class: IP 65

Note: The installation of an integrated control unit PICO-tronic (standard) is possible for this pump*** (see documentation control- and monitoring devices).

Hydraulic diagram



Pump elements (see documentation pump elements)		Metering volume cm³ / stroke and outlet	System
PE 5		0,005	Multi line
PE 10		0,010	
PE 15		0,015	
PE 25		0,025	
PE 50		0,050	
PE 120 F	with/without pressure limitation valve	0,12	Progressive
PE 120 FV		max. 0,12 (adjustable)	

Order key for type 2185

2185 3 1 1 10 0000***

Type-no.		2185				
Code-no.		2185				
Motor voltage	with bayonet connector	12 V DC			24 V DC	
Code-no.		3			4	
Pump elements **						
Outlet position		**4**	**10**	**4+10**	**without PE**	
PE 120 F with DBV*		1	2	3	0	
PE 120 FV with DBV*		4	5	6		
PE 120 F with DBV* (pos. **4**) + **PE 120 FV** with DBV* (pos. **10**)				7		
PE 120 F with DBV* (pos. **10**) + **PE 120 FV** with DBV* (pos. **4**)				8		
reservoir content (kg)		**1,2**				
Code-no.		1				
Control unit		**without**				
Code-no.		10				
Special models						

* with DBV = with Pressurebegrenzungsventil = with pressure limitation valve

** Please indicate pump elements PE 5, PE 10, PE 15, PE 25, PE 50 separately; see documentation pump elements.

*** Please indicate type of control separately for model with integrated control unit.

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BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

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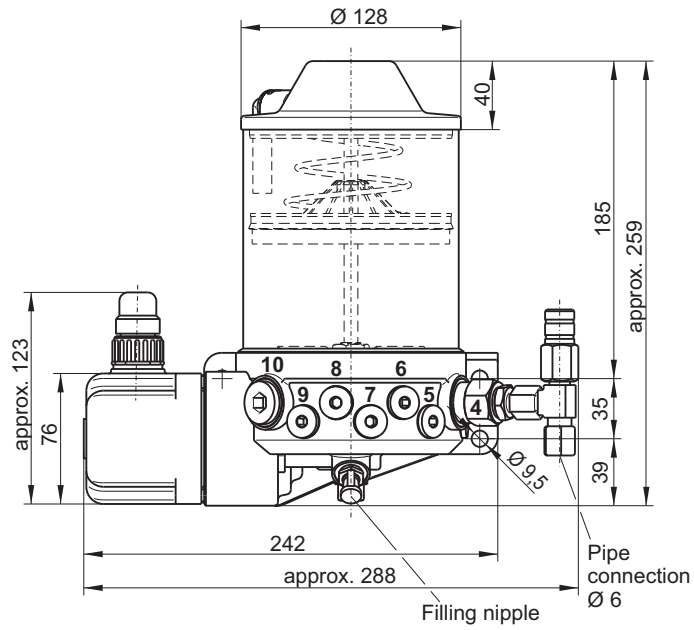
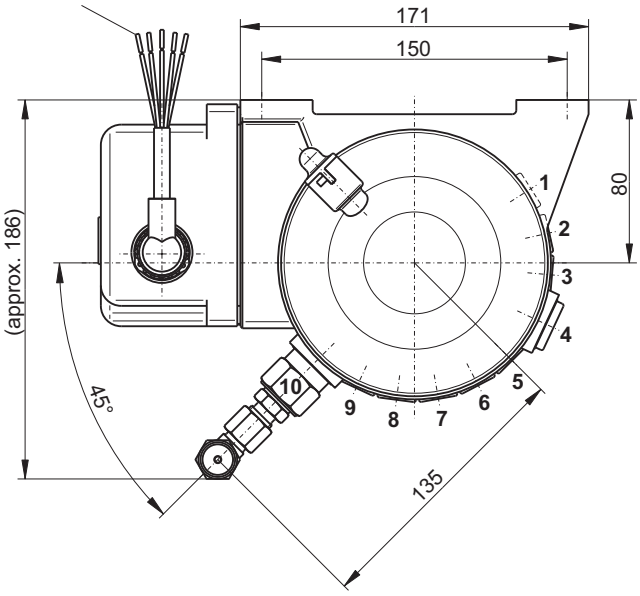


Spare cable with plug, 10 m
Order-no.: FAZ02499-19



Pump elements

The PICO can be equipped with 10 outlets as a maximum, whereas two outlets are intended for the connection to a progressive system and eight outlets for the direct connection to the lubrication point.

For connecting a progressive system can the pump elements PE 120 F and PE 120 FV optionally be installed into the outlet positions 4 and 10.

The pump elements PE 5 or PE 10, PE 15, PE 25, PE 50 can be installed into the outlet positions 1 to 3 and 5 to 9.

When a pump element is disassembled, the outlet position has to be locked with a corresponding screw plug and a sealing ring.

Order-no. for outlet position 4 and 10:

Screw plug M20 x 1,5:	090090800850
Sealing ring Ø28 x Ø21:	100150010149

Order-no. for outlet position 1 to 3 and 5 to 9:

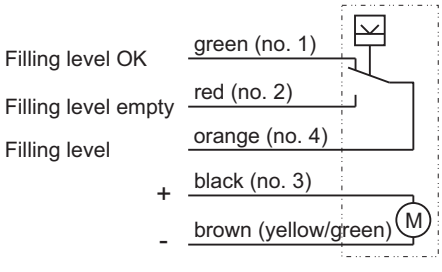
Screw plug M14 x 1:	090090801450
Sealing ring Ø14 x Ø18:	100150010148

Level monitoring

As a standard, the pump is equipped with an electrical filling level indicator. The pump has to be switched off in the case of minimum level in order to prevent that air is sucked into the system.

Wiring diagram

Connection possibilities to existing machine control, for example:



(no. ...) = cable-no. for uni-colored cable

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BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Lubrication pumps

Grease lubrication pumps series FKGGM-EP/EPR

FKGGM-EP (with PSU, 115 or 230 V AC)

BEKAWIND Lubricaton systems

Technical data

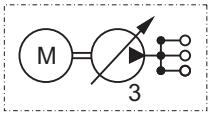
Pump

Delivery volume per stroke (= 1 pump rotation) and outlet: 0,06 to 0,17 cm³ (depends on pump element)
Regulation: possible for PE 120 V
Reservoir content: 1,9/2,5/4,2/8 kg, plastic, transparent
Operating pressure: max. 350 bar
Pressure limiting valve adjusted to: max. 280 bar
Delivering medium: greases up to NLGI-cl. 2 without solid contents
Operating temperature: -20 to 70 °C
No. of outlets: max. 3
Outlet type: pipe Ø 6 mm, as standard
Rotation direction of the agitator blade : counter clockwise
Installation position: reservoir vertical, as shown
Protection class: IP 65
Weight: max. 5,8 kg (without pump elements, without grease filling)

Motor

Drive: d.c. motor 24 V DC
Connection voltage: 230 V AC / 50 Hz
115 V AC / 60 Hz (via installed power supply unit)
Current consumption: max. 0,2 A (230 V AC)
Speed (= pump rotations): 15 r/min
Duty cycle: 10 % duty cycle (10 min)

Symbol



Pump elements (see documentation pump elements)		Metering volume cm³ / stroke and outlet
PE 60	with / without pressure limitation valve	0,06
PE 120		0,12
PE 170		0,17
PE 120 V		max. 0,12 (adjustable)

Order key for type 2037

2037 1 A H L 1 B1 000

Type-no.	2037						
Code-no.	2037						
Drive type	d.c.motor with power supply unit	24 V DC / 230 V AC				24 V DC / 115 V AC	
Code-no.		1				2	
Pump element 1**	PE 120 / PE 170 / PE 120 V all PE* without or with PLV*)						
Code-no./ code letter	**1** - **7**** or **A** - **O****; **Z** = Model without pump element						
Pump element 2**	see pump element 1						
Code-no./ code letter	see pump element 1						
Pump element 3**	see pump element 1						
Code-no./ code letter	see pump element 1						
Filling connection	Filling nipple G 1/4		Filling connection G 1/4				
Code-no.	1		2				
Reservoir content (kg)		**1,9**	**2,5**	**4,2**	**8** (2-part)	**8** (1-part)	
without FÜ***,	without filling cover	02	01	03	04	07	
with FÜ*** (M12x1 standard),	without filling cover	-	D1	D2	-	D3	
with FÜ*** (cube plug****),	without filling cover	-	F1	F2	-	F3	
without FÜ***,	with filling cover	-	21	23	24	25	
with FÜ*** (M12x1 standard),	with filling cover	-	E1	E2	-	E3	
with FÜ*** (cube plug****),	with filling cover	-	G1	G2	-	G3	
Special models							

* DBV = Pressurebegrenzungsventil = pressure limitation valve; PE = Pumpenelement /-e = pump elements

** Please indicate pump elements PE 60 separately; see documentation pump elements. ***** cube plug acc. to DIN 43650

*** FÜ = level monitoring (min.) = level monitoring (min.)

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BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
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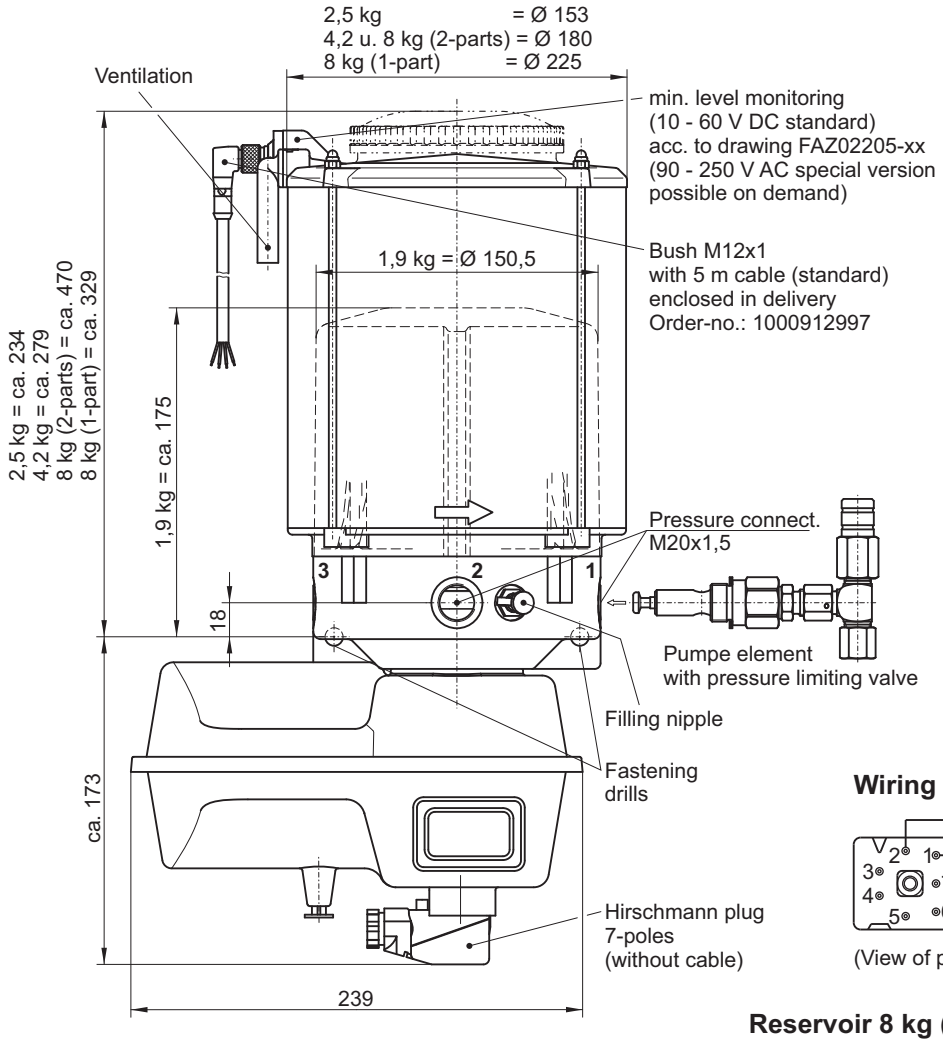
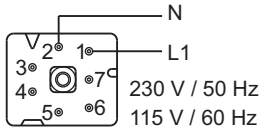


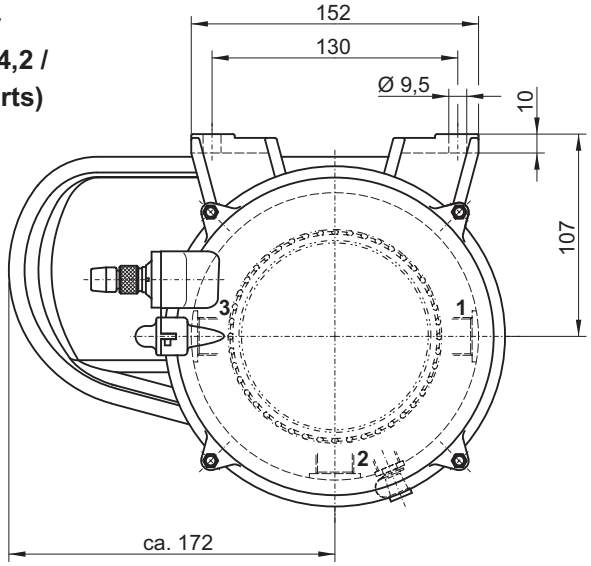
Attention: The min. level monitoring (M12x1 or cubic plug acc. to DIN43650) is assembled on the cover at plastic reservoirs; see drawing or documentation level monitoring (accessories multi line).

Wiring diagram



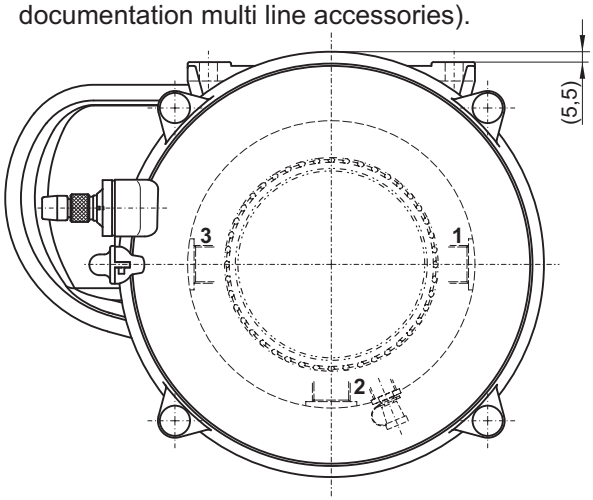
(View of plug contacts)

Reservoir
1,9 / 2,5 / 4,2 /
8 kg (2 parts)



Reservoir 8 kg (1 part)

A mounting angle, order-no. 0800800822, is necessary for fastening the pump (see documentation multi line accessories).



The pump elements are mounted one by one, starting with position 1 (see numbering of the outlets). Please indicate the combination of the different pump elements or certain installation positions of the pump elements separately.

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D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
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FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Technical data:

Pump

Compressed air supply:	4 - 10 bar
Compressed air connection:	G 1/4
Air-lubricant outlet connection:	G 1/4
Temperature range:	- 25°C to + 70°C
Supply rate:	0,1 - 1,0 cm³/stroke

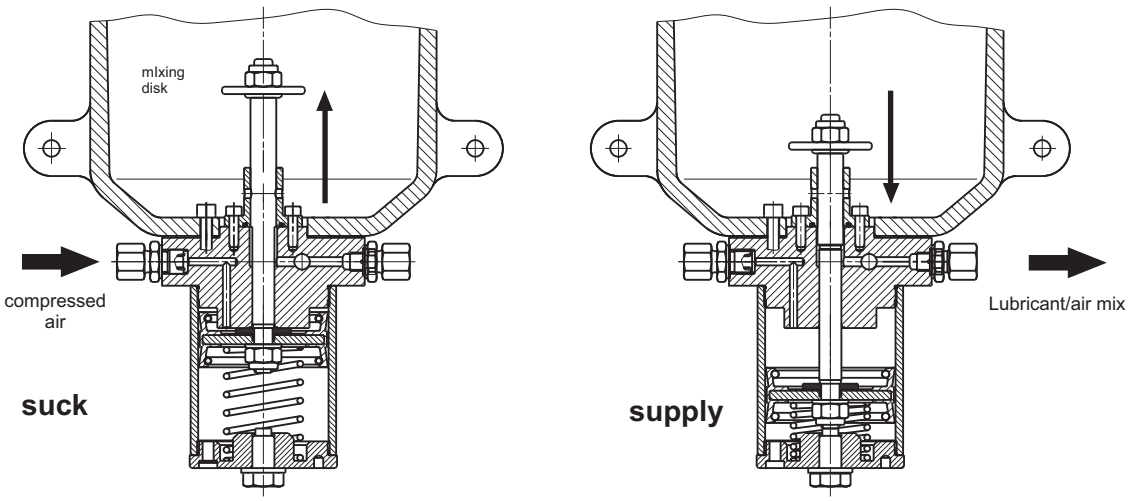
Construction:

- Reservoir 4,5 liter: material Trogamid
- Actuation sprayed air / pump together
- Compressed air connection on side with supply control
- Level monitoring min.
- Filling plug NW6,3 / (G1/4)

The pneumatic pump creates a lubricant-air mixture for the mixing distributor and spray nozzles of the lubrication system BEKAWIND flow. The compressed air supply of the pump is done by the compressor with integrated control unit for compressed air niveau and condensate drainage.

The pump is actuated via the 3/2 way solenoid valve Y1 with relief. The period of wiring of the solenoid valve corresponds to the spray time. The pneumatic piston is pressed into the up position by the spring and therefore sucks lubricant into the ring chamber.

The FluiLub pump can also supply lubricants with a high solid content. As soon as the pump is pressurized the piston is pressed downwards and lubricant in the ring chamber is lead to the outlet. Lubricant is then supplied to the mixing distributor by sprayed air. The mixing disk avoids the separation of lubrication due to its movements.



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BEETHOVENSTR. 14
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POSTFACH 1320
D-91257 PEGNITZ
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FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Pneumatic pump FluiLub series 4548...

Technical data of pneumatic pump, series 4548...:

General:

Weight:	approx. 6 kg unfilled (4,5 liter reservoir) approx. 6,2 kg unfilled (6 liter reservoir) approx. 6,5 kg unfilled (9 liter reservoir)
Reservoir size:	4,5 / 6 / 9 Liter
Reservoir material:	plastic transparent
Output rate:	0,1 - 1,0 cm³/stroke

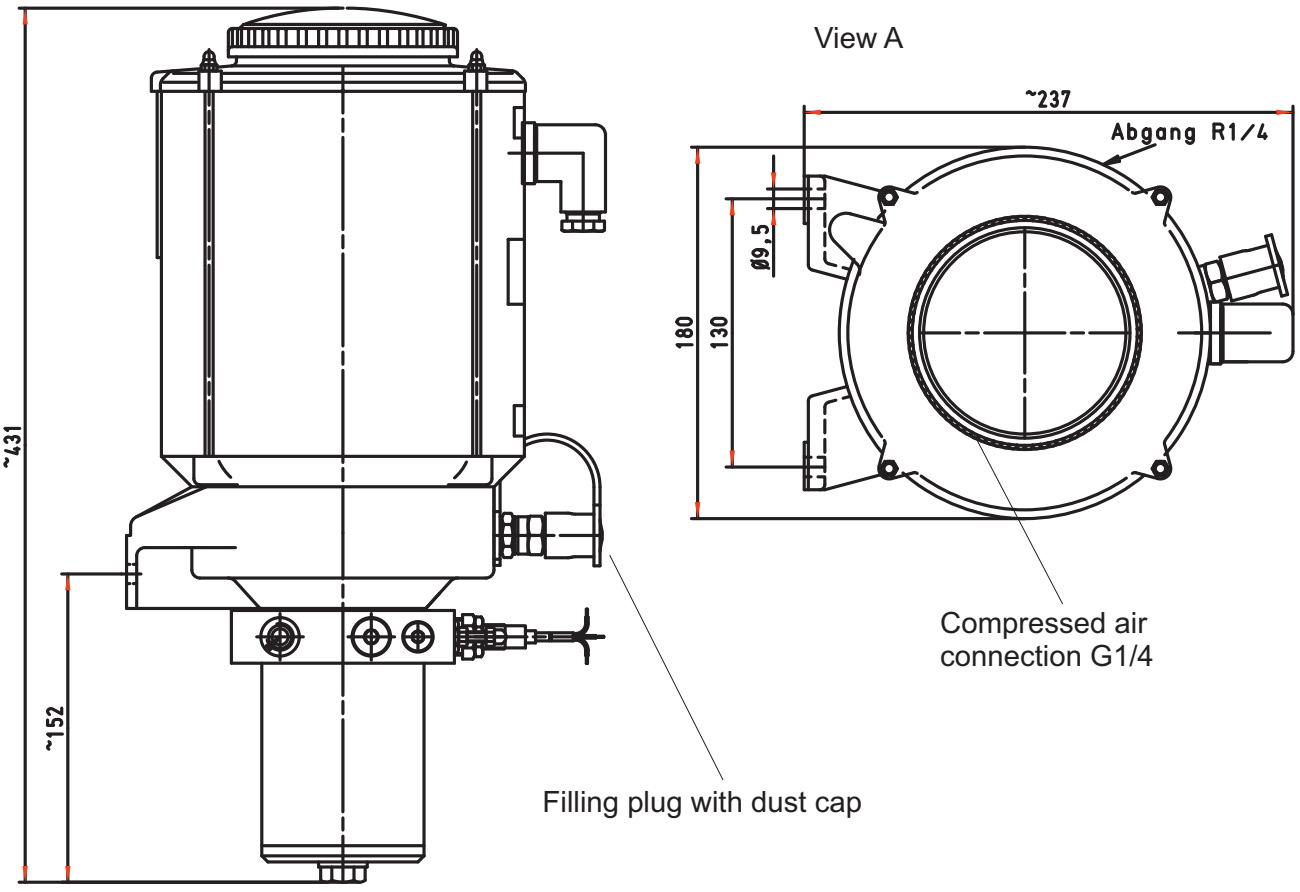
Pneumatic:

The compressed air for the FluiLub gear rim lubrication must be clean and dry (min. 95 %)!

Compressed air connection:	min. 6,5 bar, max. 10 bar
Compressed air consumption per spray nozzle ø 1,2mm at 6 bar:	1 nl/sec

Dimensional drawing
Shown is a pneuamtic pump with platic reservoir acc. to drawing FAZ02946-03 with order number 4548* 21421

Other reservoir sizes and output rates on demand.



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BEETHOVENSTR. 14
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POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Lubricant distributor

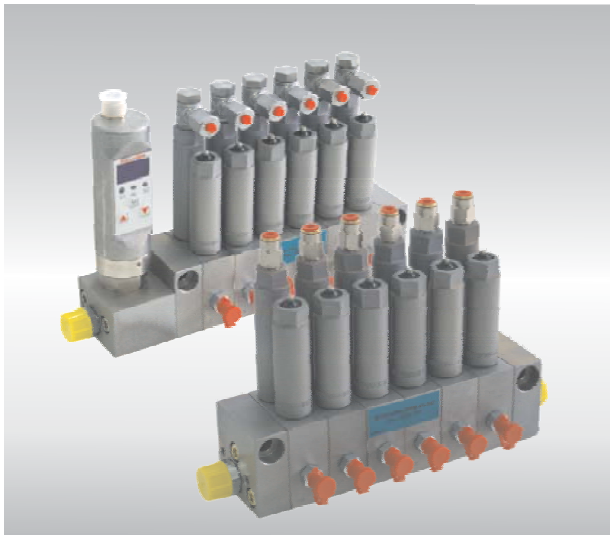
Single line distributor

UEN (Relubrication system)

Technical description

The single line distributor UEN supplies lubricant after pressure- relief process into the lines towards the lube points, i.e. after the pump is switched off. Each outlet has one lube point.

Due to the piston control unit of the distributor, high system pressures are possible. Because of the restoring force of the metering piston, high operational safety is possible at large line lengths or at cold temperatures.



Technical data

Operating pressure at inlet: 210 bar
max. 300 bar

Outlet pressure: max. 50 bar

Relief pressure: max. 40 bar

Temperature range: -30 °C to +60 °C

Lubricant: fluid grease;greases up to NLGI-cl. 2 acc. to release list

Metering volume: see table

Material: steel,
zinc-nickel-coating acc. to DIN 50979

Number of metering elements or of outlets of one single line distributors:
min. 1 metering element: UEN-1
max. 6 metering elements: UEN-6
(up to 12 metering elements possible with a connecting element, up to 24 metering elements possible with two connecting elements)

Weights: see table of dimensional drawing (next page)

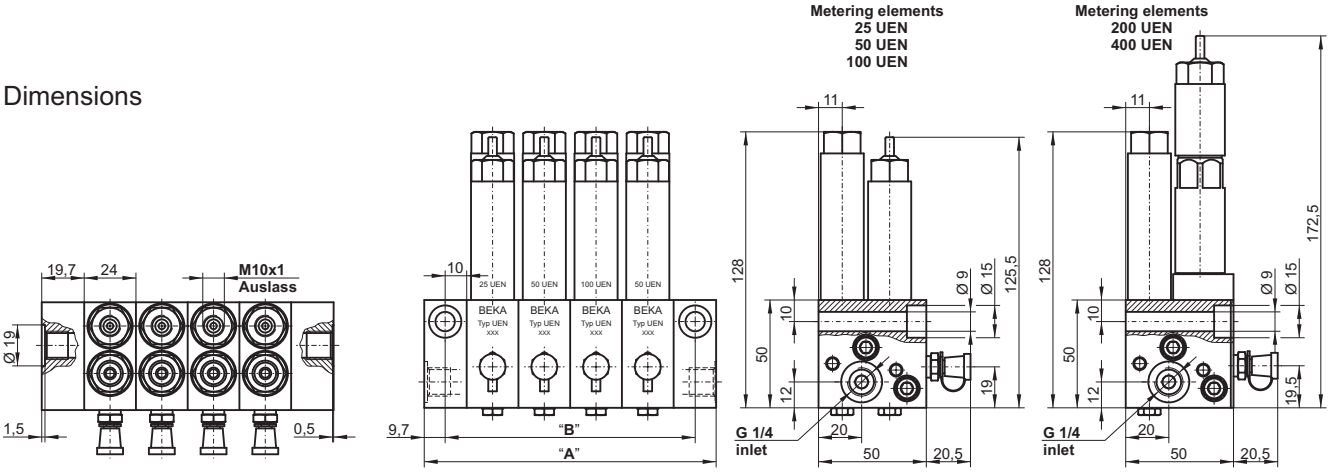
Table of dimensions:

Number of metering elem.	Dimension “A” (mm)	Dimension “B” (mm)
1	63,4	44
2	87,4	68
3	111,4	92
4	135,4	116
5	159,4	140
6	183,4	164

Table of weight for one single line distributors UEN:

Number of one metering element	Weigt of distributor (kg) with metering elementes 25/50/100 UEN	with metering elementes 200/400 UEN
1	2,44	2,89
2	4,24	5,14
3	6,04	7,39
4	7,84	9,64
5	9,64	11,89
6	11,44	14,14

Dimensions



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BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

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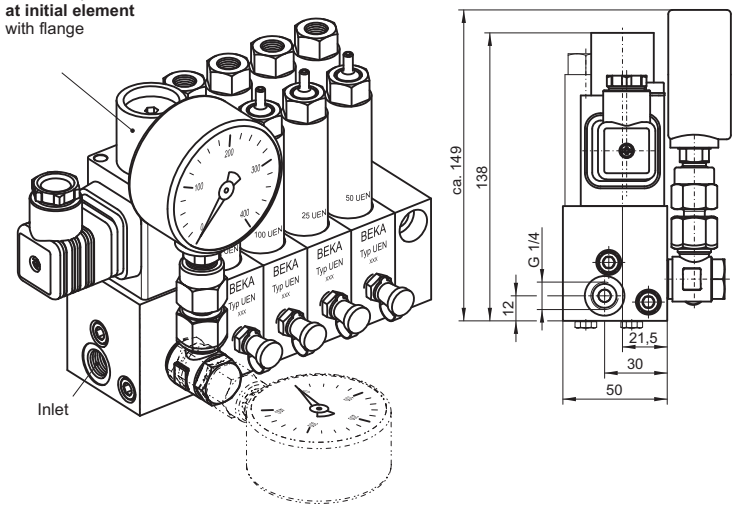
The mechanic pressure switch monitors the system pressure in the line and switches off the pump when reaching 210 bar in order to start the pressure line relief.

When installing the mechanic pressure switch, a widened **initial- or end element** is necessary instead of the standard ones. Hence, five or eleven metering elements can be combined to one single line distributor by means of a connecting element.

Mechanic pressure switch

mechanic pressure switch
at initial element
with flange

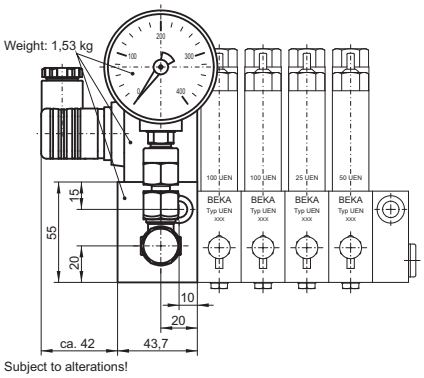


Electronic pressure switch

The electronic pressure switch monitores the system pressure in the pressure line and switches off the pump when reaching 210 bar to start the relief in the pressure lines.

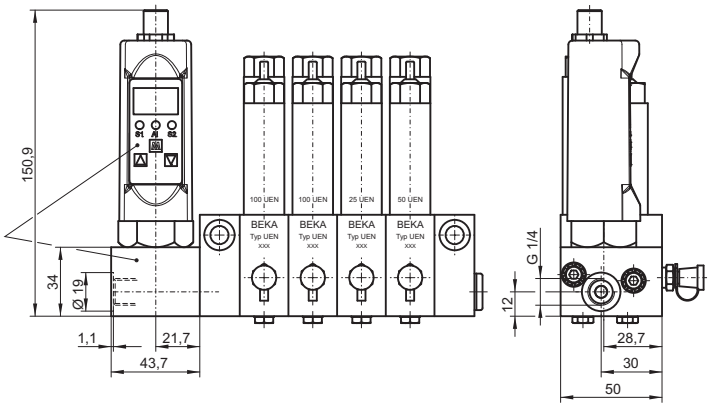
If more single line distributors are installed in the lubrication system, the electronic pressure switch shall be installed at the inlet, which is the farthest away from the pump to ensure that the switching pressure is reached in the complete system.

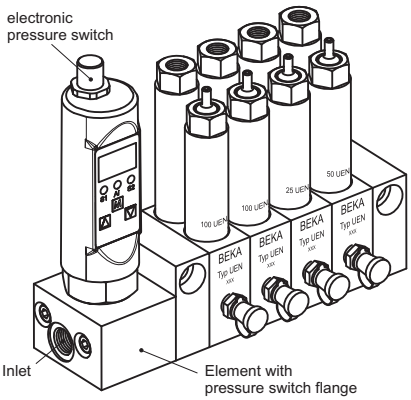
Compared with a mechanic pressure switch, the electrical one exclude lubricant hardenings at the measuring inlet.



For installing the electronic pressure switch, there is an **element with pressure switch flange** that is assembled as standard at the initial element.

Electronic pressure switch with pressure switch flange element and fastening (complete).
Order-no.:
4124990012





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BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Progressive distributors are used for different bearings in wind power plants in which the lube points are supplied central by a lubrication pump. The distribution of the supplied lubricant is done in same or different quantities, progressively controlled via the follower piston control of the progressive distributor.

Depending on the case of application the progressive distributors can be delivered in various types. The differences between the types are explained in individual descriptions.

All progressive distributor types can be delivered with extensive accessories e.g. electrical and visual stroke monitoring, fittings, non-return valves, and partly with solenoid valves.

MX-F

SXE-2

LX-2

Designation	Type	max. rotations/ min	Pressure max. (bar)	No. of outlets max.	Connection inlet	Connection outlet	Material	Metering volume (mm^3/stroke per outlet)	Metering lubricant	Features
MX-F	4010	180	300	24	M10x1	M10x1	steel, galv.	25 - 105		- use in mobile range (on- /off-road vehicles, agricultural a. construction machinery etc.) - special coating for heaviest operating conditions
SXE-2	4003	180	300	20	G 1/4	G 1/8	steel, galv.	100 - 760		- designed for the use as main distributor for grease lubrication systems at construction machinery - use of dummy elements, which can be replaced by metering elements if necessary
LX-2	3972	180	300	20	M10x1	M10x1	steel, ZnNi	200		- Perfect for applications, where VA is not really necessary, high corrosion protection - 100 % compatible dimensions and output rate to similar block distributors

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BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Technical description

Progressive distributors MX-F are built in a variable disk construction. Therefore the distributor can be, depending on the number of lubrication points, extended or shortened. Because of the disk construction there is the possibility to join individual distributor disks (middle element, end element) with different metering volumes together to one complete progressive distributor.

The different metering volume per stroke is effected by different piston diameters.

A progressive distributor needs at least three pistons.

Technical data

Operating pressure inlet: max. 300 bar

Temperature range: -30 °C to 80 °C

Metering medium: oil - fluid grease - grease up to NLGI-cl. 2

rotations: max. 180 r/min

Material: steel, galvanized

No. of elements:

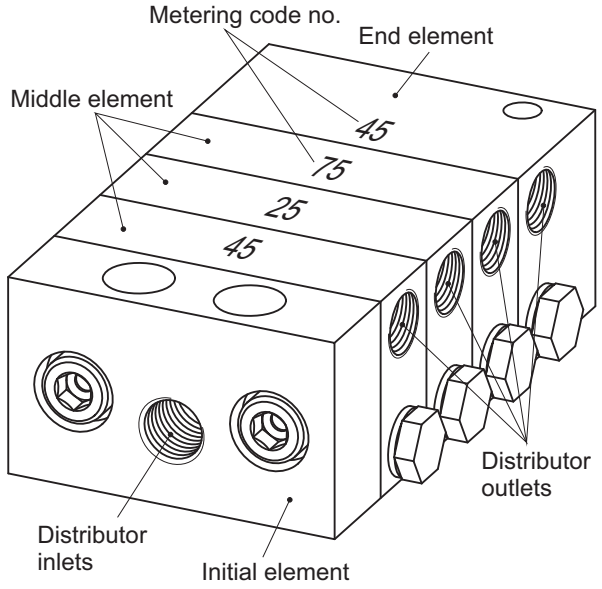
min. 3 piston elements: MX-F 3/6

max. 12 piston elements: MX-F 12/24

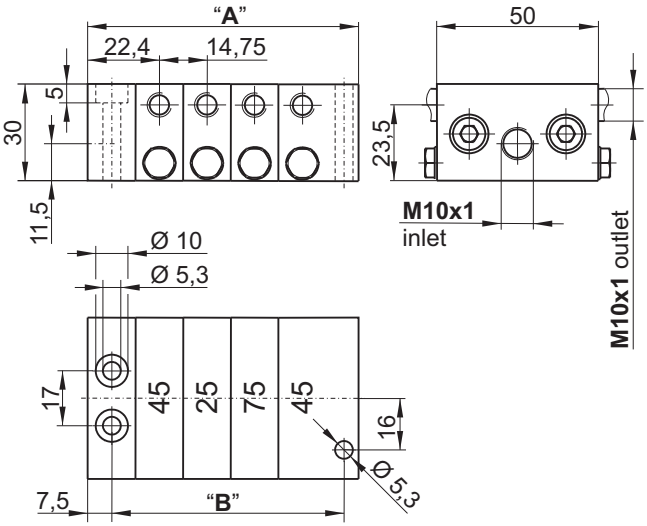
Table metering volume:

Designation piston element	Metering volume (mm³/stroke)		Code no.
	p. outlet	p. element	
MX-F 25	25	50	25
MX-F 45	45	90	45
MX-F 75	75	150	75
MX-F 105	105	210	105

Progressive distributor MX-F with four piston elements (middle element, end element) and eight outlets:



Dimensional drawing



No. of piston elements	No. of outlets (max.)	Dim. "A" (mm)	Dim. "B" (mm)
3	6	69,20	57,2
4	8	83,95	72,0
5	10	98,70	86,7
6	12	113,45	101,5
7	14	128,20	116,2
8	16	142,95	131,0
9	18	157,70	145,7
10	20	172,45	160,5
11	22	187,20	175,2
12	24	201,95	190,0

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WEB: www.beka-lube.de EMAIL: beka@beka-lube.de

Lubricant distributor

Progressive distributor SXE-2

BEKAWIND

Technical description

Progressive distributors SXE-2 are built in a variable disk construction. Therefore the distributor can optionally arranged, depending on the number of lubrication points and their lubricant need.

The SXE-2 distributor consists of distributor disks. These disks consist of a basic element and a metering, respectively a dummy element. Basic elements are divided into initial, middle- and end elements.

The variable system enables changes of the metering volume of the individual outlets as well as the number of outlets.

The different metering volume per stroke is effected by different piston diameters.

For reducing the number of distributor outlets of an existing distributor SXE-2, a dummy element is available or a basic element with metering element can be removed. The distributor can be enlarged with an additional basic element with metering element.

A progressive distributor needs at least three metering elements (piston elements).

Technical data

Operating pressure - inlet : max. 300 bar

Temperature range: -35 °C to 80 °C

Lubricant: oil - fluid grease- grease up to NLGI-cl. 2

No. of rotations: max. 180 rev/min

Material: steel, galvanized

stainless model possible on enquiry

Number of elements:

Min. 3 metering elements: SXE-2 3/6

Max. 10 metering elements: SXE-2 10/20

Progressive distributor SXE-2 with four distributor disks and eight outlets:

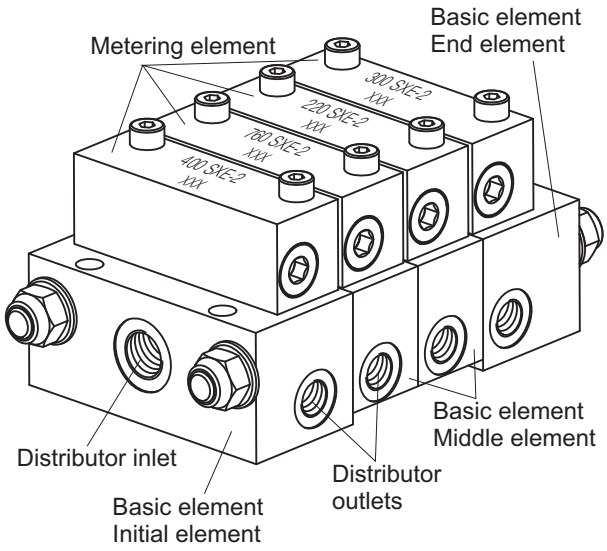

Table of metering volume:

Designation metering elem.	Metering volume (mm³/stroke)		Code no.
	p. outlet	p. element	
000 SXE-2 (= Dummy elem.)	-	-	000
100 SXE-2	100	200	100
150 SXE-2	150	300	150
220 SXE-2	220	440	220
300 SXE-2	300	600	300
400 SXE-2	400	800	400
500 SXE-2	500	1000	500
620 SXE-2	620	1240	620
760 SXE-2	760	1520	760

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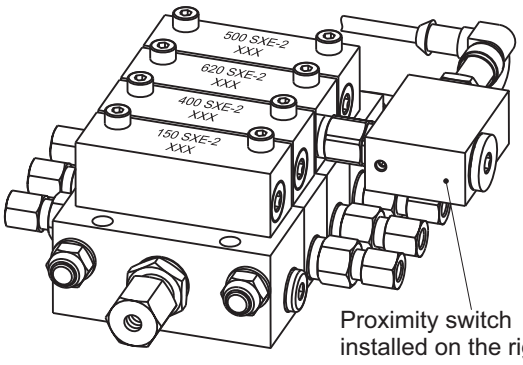
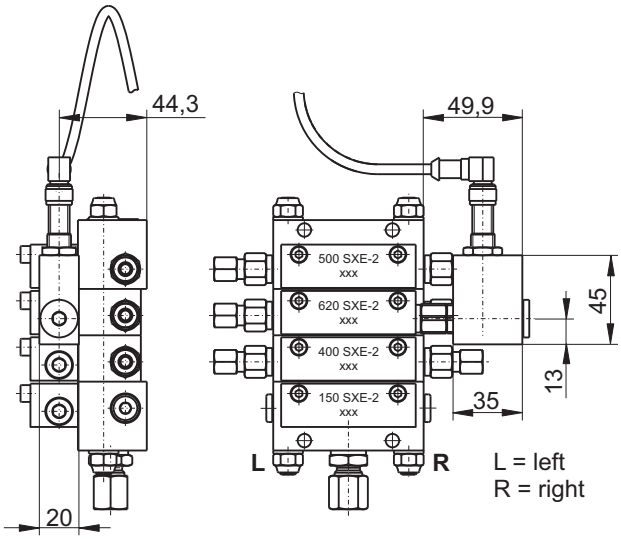
BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

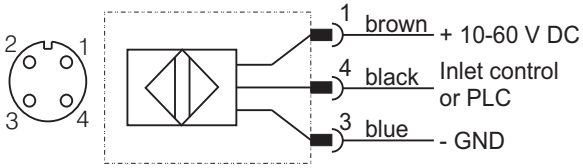




Technical data of the proximity switch:

Connection:	M12x1 pluggable
Switching method:	PNP NO
Load capacity:	200 mA
Possible voltage:	10 - 60 V DC
Per. ambient temperature:	-40 °C to 85 °C
Function indicator:	LED yellow
Housing material:	stainless steel
Protection class:	IP 67 / IP 69K

Terminal diagram:



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BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Lubricant distributor

Progressive distributor LX-2

BEKAWIND

BEKAWIND Lubricaton systems

Technical description

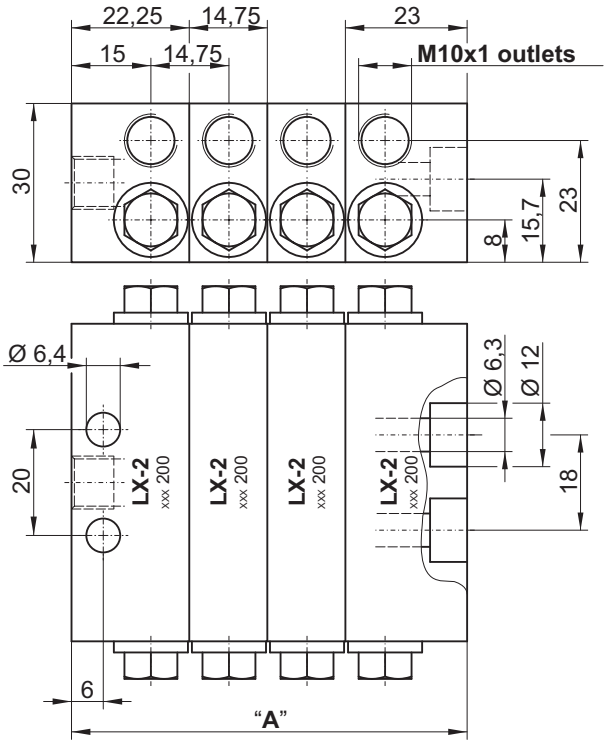
The progressive distributor LX-2 and LX-3 are identically constructed, only the material is different (see "technical data").

The progressive distributor LX-2 and LX-3 are built in a variable disk construction. Therefore the distributor can be, depending on the number of lubrication points, extended or shortened.

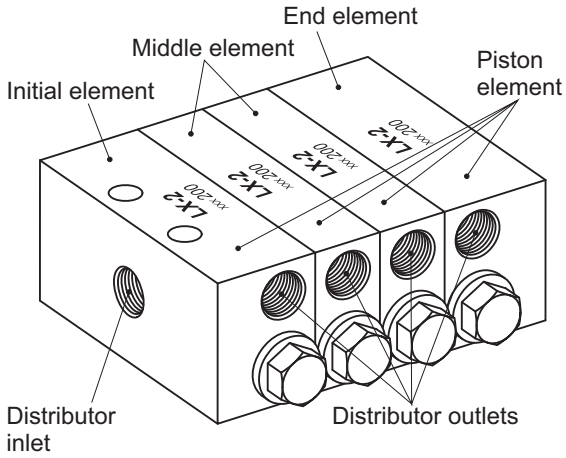
A progressive distributor needs at least three pistons for function, i.e. an initial and end element as well as a middle element for distributor LX-2 and LX-3.

Technical data

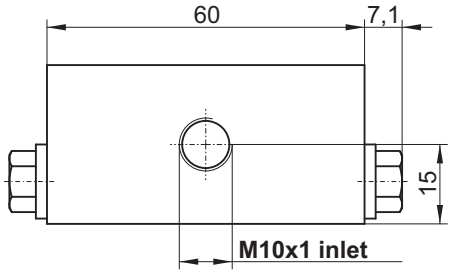
Operating pressure inlet:	max. 300 bar
Temperature range:	-30 °C to 80 °C
Metering medium:	oil - fluid grease - grease up to NLGI-cl. 2
Metering volume:	200 mm³/stroke per outlet
Umlaufzahl:	
LX-2	max. 180 revol./min
LX-3	max. 60 revol./min
Werkstoff:	
LX-2	**steel, zinc-nickel-coating**
LX-3	**V4A (1.4404 / 1.4401)**
Number of piston elements:	
min. 3 piston elements:	LX-2 or LX-3 3/6
max. 10 piston elements:	LX-2 or LX-3 10/20



Progressive distributor LX-2 or LX-3 with four piston elements and eight outlets:



Dimensional drawing of progressive distributor LX-2 or LX-3:



Number of piston elements	Number of outlets (max.)	Dim."A" (mm)
3	6	60,00
4	8	74,75
5	10	89,50
6	12	104,25
7	14	119,00
8	16	133,75
9	18	148,50
10	20	163,25

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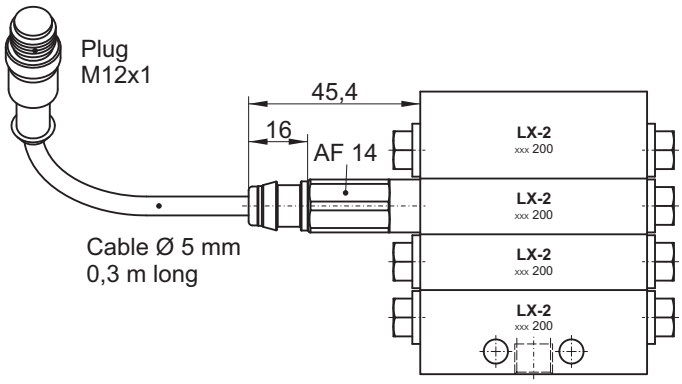
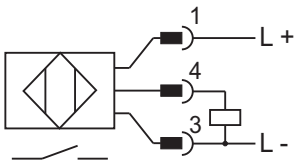
BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Technical data of proximity switch

Connection:		M12x1 plugable
Switch type:		PNP NO contact
Operating voltage:		10 - 60 V DC
		incl. residual ripple
Current load,	Duration:	100 mA
	Short-term:	100 mA
Current consumption:		< 15 mA
Permitted temperature (ambient):		-25 °C to 70 °C
Function indication:		LED yellow
Protection class:		IP 67
Housing material:		V4A (1.4571)
Threaded connection:		M11x1



Circuit diagram



Order number

Proximit switch with 0,3 m cable and plug M12x1
1000912960

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FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Rotary union

Rotary union RC60 and RC 75

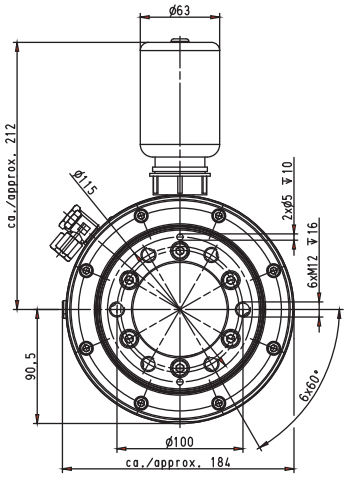
Rotary union RC 60 and RC 75

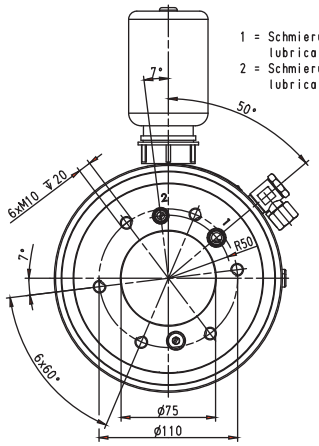
The rotary union RC60 and RC75 enable the flow of lubricant through the main shaft to the lubrication of the rotor bearings.

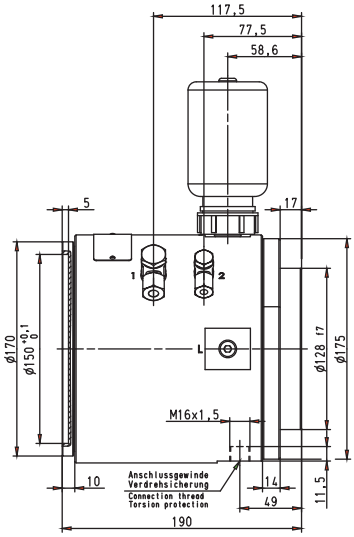
It is installed at the end of the main shaft before the slip ring transmitter. The connection rings connect it with the main shaft and slip ring transmitter.

The center drilling helps to lead through the electric connections for the rotor (ø 60 or 75 mm).

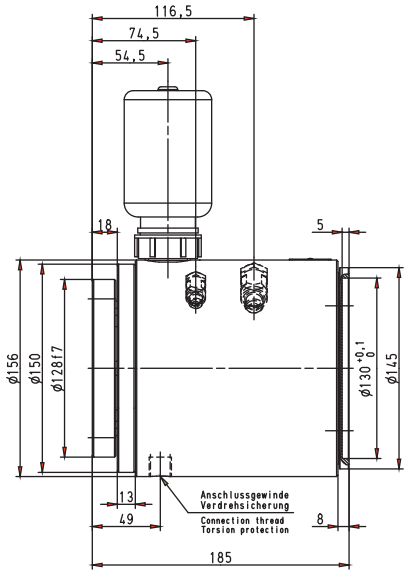
The lubrication connections are at the side.

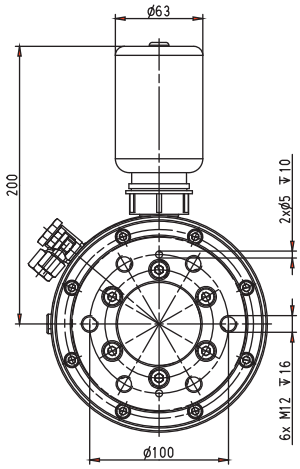


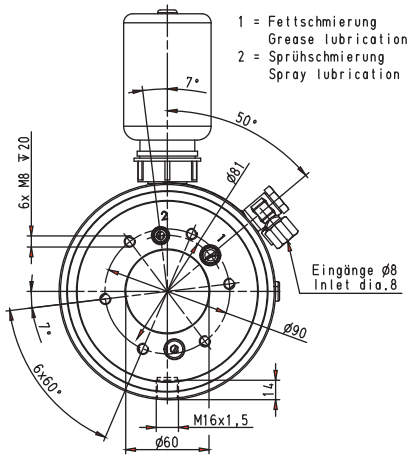




Anschlüsse / Connections				max. Druck max. pressure (bar)	Medium
Nr./no.	NW	Rotor	Stator		
1	8	G1/4	ø8	280	Fett/Grease
2	6	G1/8	ø6	280	Fett/Grease
L	4	M10x1	--	5	Trennkanal/Leakchannel







Anschlüsse / Connections				max. Druck max. pressure (bar)	Medium
Nr./no.	NW	Rotor	Stator		
1	8	G1/4	ø8	280	Fett/Grease
2	6	G1/8	ø6	10	Luftfettgemisch/Air grease mix.
L	4	M10x1	--	5	Trennkanal/Leakchannel

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BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

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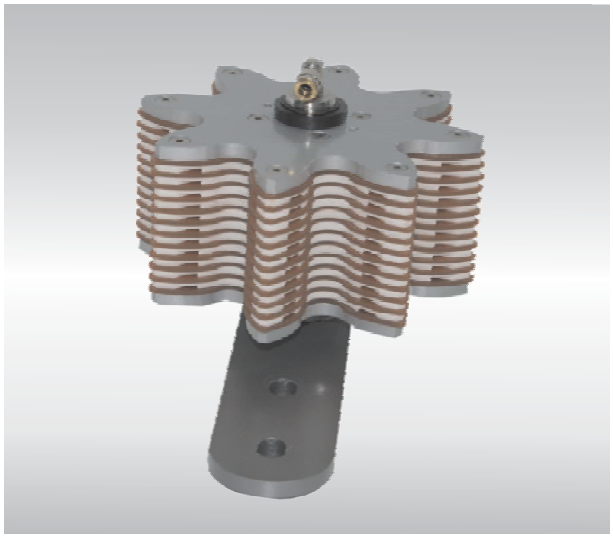
Module	m10	m12	m14	m16	m18	m20	m22	m24
No. of teeth	9	9	9	8 9	8 9	9	9	9
Height of teeth*	100 120	80 100 120	100 120	79,5 100 100 120 125 134	110 110 140 120 150 125 140	100 120 140 170	140 170	160 200

* other heights on demand

Standard- lubrication pinion made of aluminium

In order to lubricate teeth of blade bearings and yaw bearings, lubrication pinions are used. They supply lubricant steadily onto the tooth flanks of the bearing teeth. Due to internal connections it can be ensured that only the tooth in mesh supplies lubricant via the connection drills and lubricant bags.

The lubrication pinions are made of aluminium.
According to the teeth geometry, lubrication pinions with different modules and teeth heights are available. Up to a height of 100 mm the pinions are constructed as one part. All heights exceeding 100 mm result in a two part lubrication pinion to ensure a perfect lubricant application. The available version can be seen in the table.



Segment- lubrication pinion

For modules m16 and m12, segmented lubrication pinions are offered. They consist of alternately stacked distance disks made of rubber and lubrication segments made of plastic.
Hence the number of outlet openings is increased and a variable graduation of teeth heights is reached.
in order to optimize the lubrication, version with integrated proximity switches are used to adjust the lubrication via a number of rotation of the pinion. Please find the available version in the table.

Module	m12	m16	Note
No. of teeth	8	8	
Height of teeth*	98 107 116	82 106 118 124 136 142	Lubrication pinion with proximity switch on demand

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POSTFACH 1320
D-91257 PEGNITZ
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FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Disposal reservoir

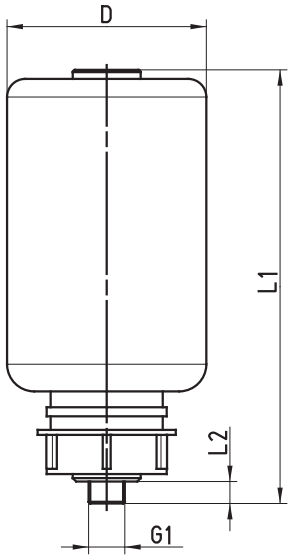
Disposal reservoir

Disposal reservoir straight

Disposal reservoirs are screwed into the bearing's outlet openings to collect used lubricant. The integrated ventilation system enables a perfect filling with used lubricant and avoids too high lubricant pressure in the bearing that could result in leakages of the bearings and a possible pressing out of the sealings. The connection caps of the disposal reservoir remain in the bearing and the filled reservoir is unscrewed and drained or replaced by a new reservoir.

There are various reservoir sizes available, depending on connection thread, lubricant flow rate and maintenance duration.

When selecting the reservoir size we recommend to choose the total quantity of all reservoirs double as big as the calculated lubricant application quantity of the bearing.
Hence differences regarding the filling rate of the disposal reservoirs can be considered.



Capacity(ml)	G1	D(mm)	L1(mm)	L2(mm)	Order-no.	Disposal reservoir
250	M10x1 M14x1,5 M16x1,5 G1/4	63	137	10	FAZ04116-18 001 FAZ04116-18 005 FAZ04116-18 002 FAZ04116-18 004	FAZ04116-02
500	M10x1 M14x1,5 M16x1,5 G1/4	76	174	10	FAZ04481-16 001 FAZ04481-16 005 FAZ04481-16 002 FAZ04481-16 004	FAZ04481-02
750	M10x1 M14x1,5 M16x1,5 G1/4	88	192	10	FAZ04819-09 001 FAZ04819-09 005 FAZ04819-09 002 FAZ04819-09 004	FAZ04819-02
1000	M10x1 M14x1,5 M16x1,5 M22x1,5 G1/4 G3/8 G1/2 G3/4	95 95 95 95	223 267 225 225	10 18 10 12	FAZ04480-13 001 FAZ04480-13 005 FAZ04480-13 002 FAZ04480-20 002 FAZ04480-13 004 FAZ04480-13 006 FAZ04480-23 001 FAZ04480-23 002	FAZ04480-02
2000	M10x1 M14x1,5 M16x1,5 G1/4 G3/8	120	260	10	FAZ04479-04 001 FAZ04479-04 005 FAZ04479-04 002 FAZ04479-04 004 FAZ04479-04 006	FAZ04479-02

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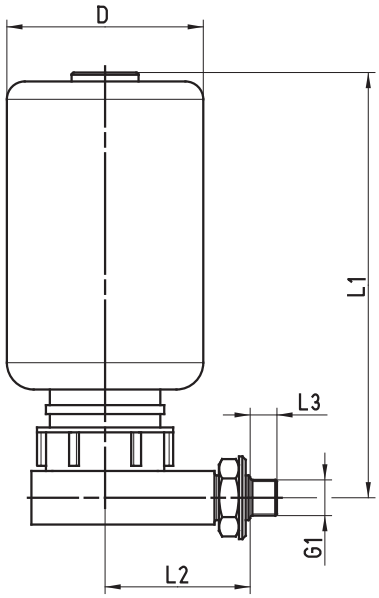
BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Disposal reservoir angled

Angled disposal reservoirs have, unlike the straight version, an angled connection piece to screw it into the bearing.

The space requirement is very small so that this version can easier be retrofit between the outside ring of the bearing and the lifting cover of a blade bearing.



Capacity (ml)	G1	D (mm)	L1 (mm)	L2 (mm)	L3 (mm)	Order-no.	Disposal reserv.
250	M10x1 M14x1,5 M16x1,5 G1/4	63	136	65	12	FAZ04116-10 001 FAZ04116-10 005 FAZ04116-10 002 FAZ04116-10 004	FAZ04116-02
500	M10x1 M14x1,5 M16x1,5 G1/4 G3/8	76	172	65	12	FAZ04481-03 001 FAZ04481-03 005 FAZ04481-03 002 FAZ04481-03 004 FAZ04481-03 006	FAZ04481-02
750	M10x1 M14x1,5 M16x1,5 G1/4	88	192	65	12	FAZ04819-10 001 FAZ04819-10 005 FAZ04819-10 002 FAZ04819-10 004	FAZ04819-02
1000	M10x1 M14x1,5 M16x1,5 M22x1,5 G1/4 G3/4	95 95 95	222 228 225	65 71 84	12 18 20	FAZ04480-06 001 FAZ04480-06 005 FAZ04480-06 002 FAZ04480-19 002 FAZ04480-06 004 FAZ04480-21	FAZ04480-02
2000	M10x1 M14x1,5 M16x1,5 G1/4 G3/8 G1/2	120 120	267 260	65 90	12 23	FAZ04479-12 001 FAZ04479-12 005 FAZ04479-12 002 FAZ04479-12 004 FAZ04479-12 006 FAZ04479-10	FAZ04479-02

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BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Service devices

Compressor station

Technical data

Pressure reservoir	25 L
Motor voltage:	230 V AC
Frequency:	50 Hz 60Hz
Power consumption:	270 W 300W
Current consumption:	1,2 A 1,3A
No. or rotations:	1300 min^{-1} 1600 min^{-1}
Motor protection:	temperature switch
Temperature range:	-25°C bis + 70°C
Duty cycle:	50 %

Compressor station

The compressor station creates and regulates compressed air to actuate the pneumatic driven lubrication pump in the spray system BEKAWIND flow.

The 25 l pressure reservoir and the integrated control system ensure a sufficient compressed air supply as well as the necessary quality of mentioned medium.

In connection with the rotary union the compressor station in the nacelle can be connected either with the spray system for yaw teeth or for the blade gears.

Compressor station contains:

- Suction filter
- 25 l pressure reservoir, high quality 2-K coating, outside impact resistant varnish
- oscillation absorber assembled on pressure reservoir
- the high temperature compressed air hose, steel covered, connects compressor with fittings
- fittings with automatic start-up relief, automatic condensate drain, safety valve, pressure switch, non-return valve, pressure gauge, cable, ball valve, overload switch, assembly kit and pressure reducer.

BEKAWIND Lubricaton systems

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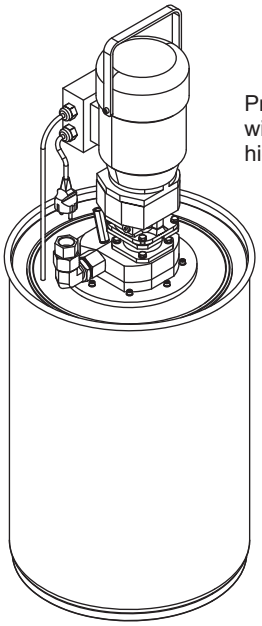
BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Technical data

Output	approx. 6 l/min
Voltage	230 V AC, 50 Hz
Power	0,55 kW
Insulation class	F
Protective system	IP 55
Weight	23 Kg



Pressure connection with coupling for high pressure hose

Quick and clean refilling of lubrication pumps

The electric filling pump ERP 230 has been developped especially for the refilling of grease pumps of central lubrication systems used in wind power plants.

Opposite to small cartridges with only 450 g, the use of large grease reservoirs (25 kg) guarantees a very fast filling without pollution.

A digital flowmeter allows the monitoring or pre-selection of the grease quantity.

Before the grease barrel runs empty, the filling pump is switched off automatically. Therefore the reservoir of the grease pump is protected against air bubbles.

Delivery including filling hose NW 12,7 with plug connection to the grease pump and electric connection cable (10 m).

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BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
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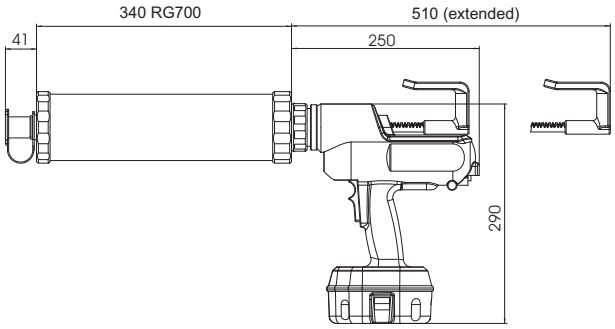
Service devices

Grease filling gun BEKA Filler RG 700

BEKAWIND

Filling press



Technical data

Operating voltage	18 V
Battery capacity	2700 mAh
Refillable cartridge	700 cm³
Filling time	ca. 30 s*
Unload/battery recharche	50 - 100x*
Battery charching time	ca. 40 min

* depends on temperature and viscosity of lubricant

Refilling of grease pumps
quick and clean

The battery operated grease filling gun RG 700 refills reservoirs of central lubrication pumps in a very quick and clean way.
The grease filling gun is connected with the central lubrication pump by a quick coupling and refills the grease reservoir within a few seconds.
The connection of the grease filling gun to the grease reservoir happens directly at the filling coupling of the pump. Using two different reservoir tubes, cartridges with a capacity of 700 and 1400 cm³ can be used. Compared with common cartridges with 450 cm³, the filling time is reduced decisively. After filling, no rigid cartridge remains.

The grease filling gun is delivered with all necessary accessories (charger, battery, reservoir tube) in a transport box. Additional battery packs are suitable as option.

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BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
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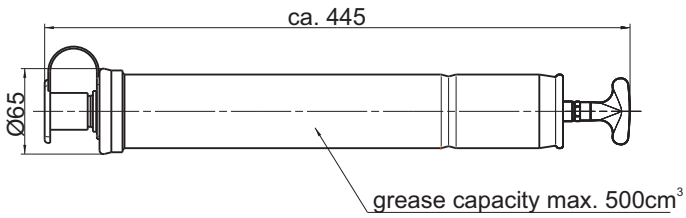
Manual filling press for EP-1 and PICO

Dimensional drawing:



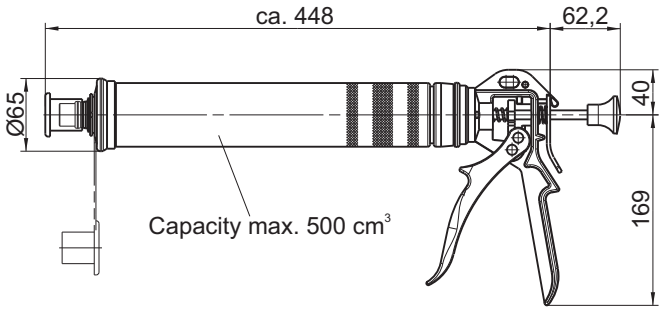
Technical data:

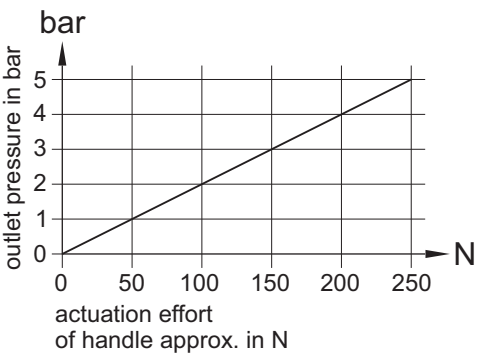
Cartridge capacity:	400 g
Content without cartridge:	500 cm³
max. pipe outside diameter:	53,5 mm
min. pipe inside diameter:	51 mm
Fördermedium:	Fette bis NLGI-Kl. 2

Article-no.	Capacity
208103026	max. 500 cm³

One-hand filling press

Dimensional drawing:





Technical data:

Supply volume:	ca. 9 cm³ to 10 cm³ per full stroke
Cartridge content:	400 g
Content without cartridge:	500 cm3
max. pipe outside diameter:	53,5 mm
min. pipe inside diameter:	51 mm

Article-no.	Capacity
20830001	max. 500 cm³

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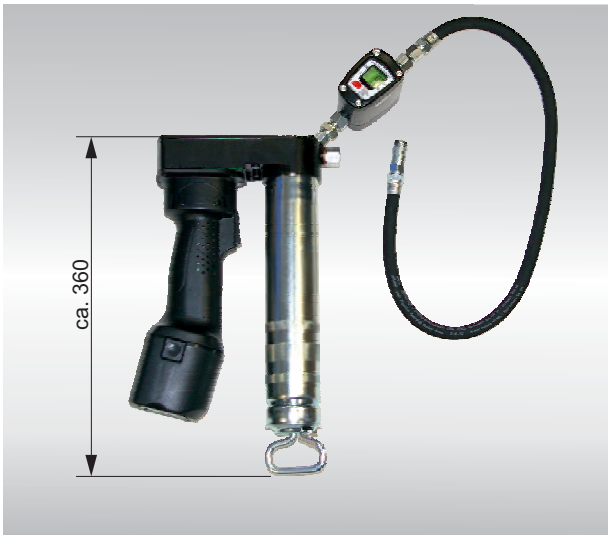
HAP



The high pressure lubrication gun HAP is used for the lubrication of half automatic central lubrication systems. The battery-powered device with integrated flow meter is connected to the lubrication nipple of the distributor via a high pressure hose. When actuating the grease gun, lubricant is supplied to the distributor with high pressure. The grease quantity can be checked at the flow meter and hence an exact quantity of lubricant per distributor is ensured.
The lubrication of individual lube points via lubrication nipple is possible.

Technical data

Operating pressure	400 bar
Flow rate	100 ccm/min*
Accu voltage	14,4 V
Capacity	3000 mAh
Recharching time	1,5 h
Flow meter	up to 2000 ccm/min
Operating temperature	-18°C to 50°C
Lubricants	greases up to NLGI 000 to 2 in 400 g grease cartridges acc. to DIN1284 or 500 cm³ loose grease

Further equipment

Overload protection
High pressure hose with Filling coupling
Charger

Order number complete:

04951106	High pressure lubrication gun with grease gun, charging device, Digimet E5, high pressure hose and suitcase (approx. 480 x 390)

Order number without Digimet:

04951106

Order number individual components:

0496020199	Pump unit complete with motor and handle
0496020200	Grease reservoir complete
0496020201	Battery pack Li-Ion
0496020202	Battery charger
0496020203	High pressure hose 750 mm
0496020204	Digimet E5 with fittings
0496020205	Suitcase

08-5-40-02 state 03.13EN

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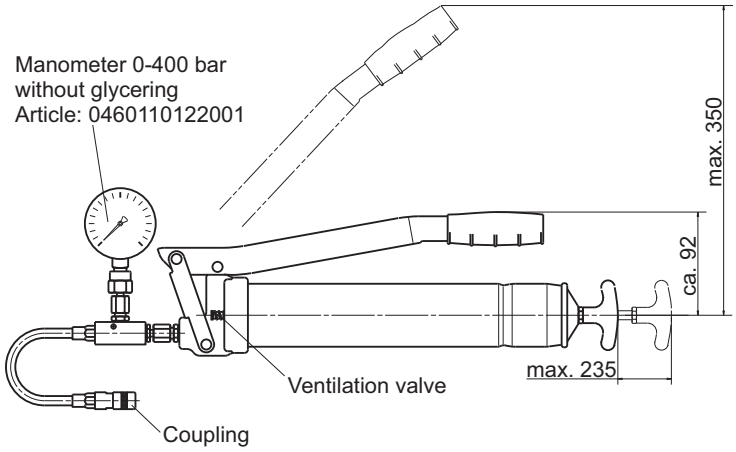
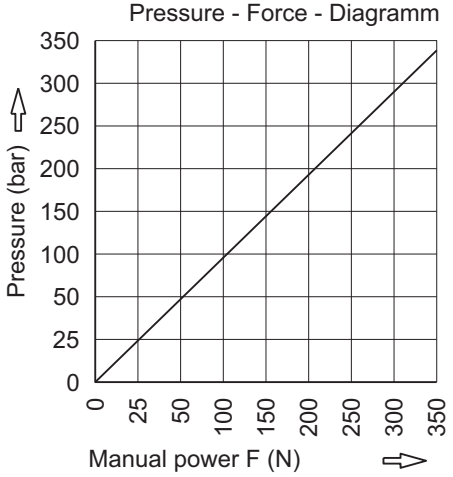
Manual grease press

according to FAZ02255-00 for lubricating suitable for cartridges acc. to DIN 1284

Dimensional drawing



Pressure - Force - Diagramm



Technical data:

Pressure:	max. 350 bar
Output rate:	max. 2 cm^3/stroke
Cartridge content:	400 g
Content w/o cartridge:	500 cm^3
max. pipe outside diameter:	53,5 mm
min. pipe inside diameter:	51 mm
Lubricant:	grease up to NLGI 2

Article-no	Content
21590080000	max. 500 cm^3

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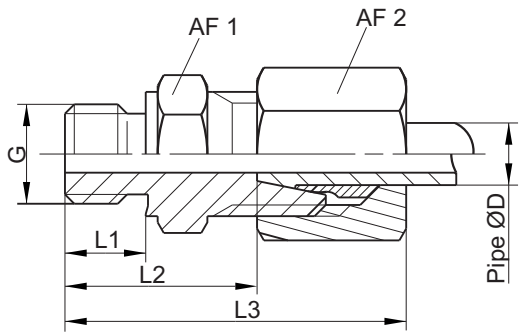
Male stud coupling

with straight thread

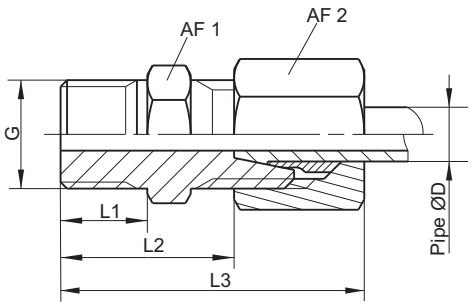


Article-no.	G	Series	Pipe Ø D	L1	L2	L3	SW 1	SW 2	Material	Kg/100	Pressure
0406 1234	M10x1	L	6	8	16,5	31	14	14	steel ZnNi	1,4	PN 315
0406 2465	G 1/4	S	6	12	24,5	38	19	17	steel ZnNi	3,5	PN 315
0406 2954	M10x1	L	8	8	18	32,5	17	17	steel ZnNi	1,9	PN 315
0406 2996	G 1/8	L	8	8	18	32,5	17	17	steel ZnNi	1,8	PN 315
0406 2450	G 1/4	L	10	12	18	38	19	19	steel ZnNi	3,0	PN 315

Male stud coupling

with conical thread

Dimensional drawing:



Article-no.	G	Series	Pipe Ø D	L1	L2	L3	SW 1	SW 2	Material	Kg/100	Pressure
0406 2937	M10x1k	LL	6	8	14,5	26	11	12	steel ZnNi	1,2	PN 100
0406 2436	M10x1k	L	6	8	15	29,5	14	14	steel ZnNi	1,3	PN 315

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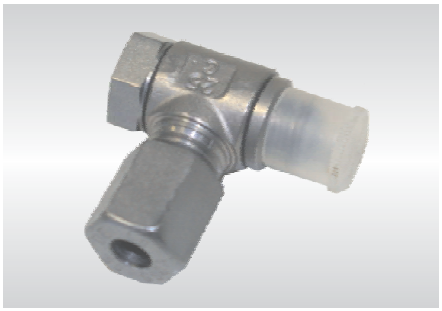
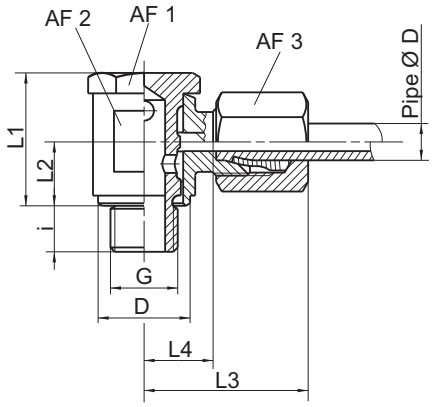
Elbow swivelling fitting

Dimensional drawing



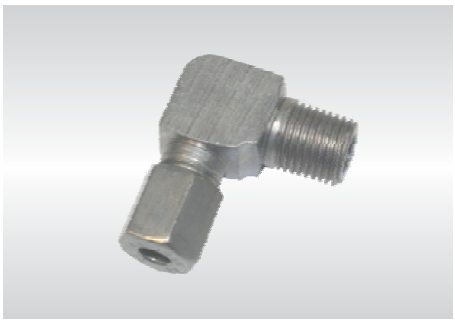


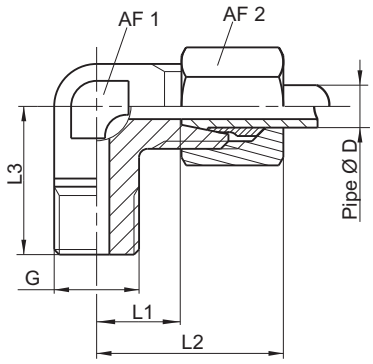
Article-no	G	Series	Pipe Ø D	L1	L2	L3	L4	i	AF 1	AF 2	AF 3	Material	Kg/100	Pressure
0406 2453	M10x1	L	6	23,5	10	25	10,5	6	14	14	14	steel ZnNi	3,6	PN 250
0406 2785	G 1/4	S	6	27	12	30	15	9	19	19	17	steel ZnNi	7,3	PN 250
0406 2451	G 1/4	L	8	27	12	28	13	9	19	19	17	steel ZnNi	6,5	PN 250
0406 2452	G 1/4	L	10	28	13	29	14	9	19	19	19	steel ZnNi	6,8	PN 250

Elbow screw fitting

with conical threads

Dimensional drawing:





Article-no.	G	Series	Pipe Ø D	L1	L2	L3	SW 1	SW 2	Material	Kg/100	Pressure
0406 2441	M10x1k	L	6	12	27	15	12	14	Steel ZnNi	2,9	PN 315
0406 2493	G 1/8	L	6	12	27	15	12	14	Steel ZnNi	2,7	PN 315
0406 2494	G 1/4	L	6	14	29	19	14	14	Steel ZnNi	4,5	PN 315

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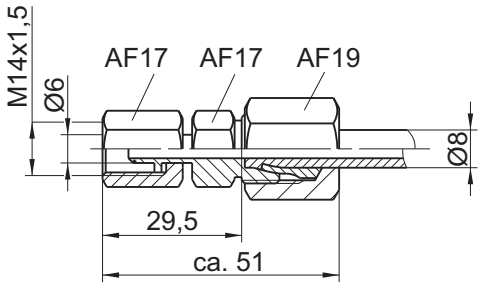
Reduction fitting

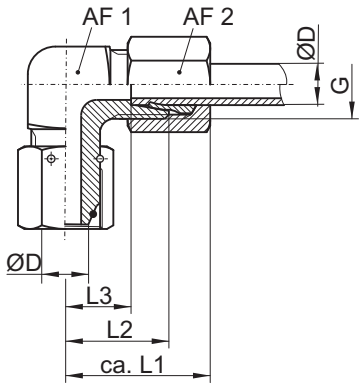
Dimensional drawing:



Article-no.	Series	Material
0406 2999	S	Steel ZnNi

Adjustable elbow fitting with sealing cone and O-Ring

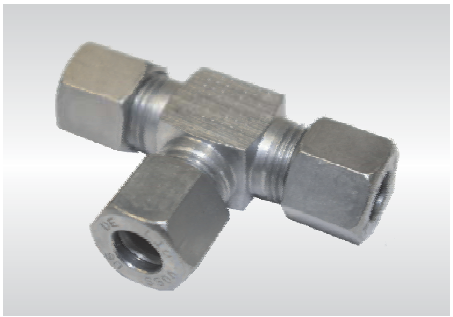
Dimensional drawing:

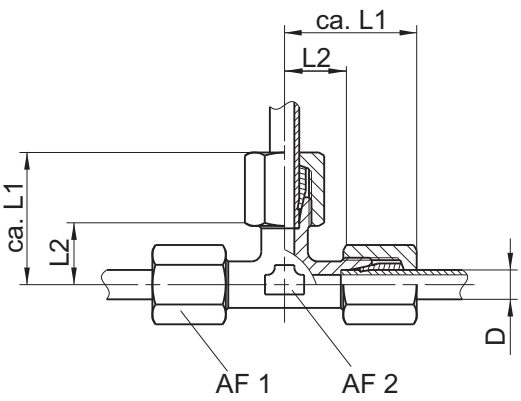


Article-no.	Series	Pipe Ø D	L1	L2	L3	AF 1	AF 2	G	Material	Pressure
0406 2462	S	6	31	16	14,5	14	17	14x1,5	Steel ZnNi	PN 630
0406 2466	L	10	30	15	14,5	14	19	16x1,5	Steel ZnNi	PN 315

T- Fitting

Dimensional drawing:





Article-no.	Series	Pipe Ø D	L1	L2	AF 1	AF 2	M	Material	Pressure
0406 2457	L	10	30	15	19	17	16x1,5	Steel ZnNi	PN 315

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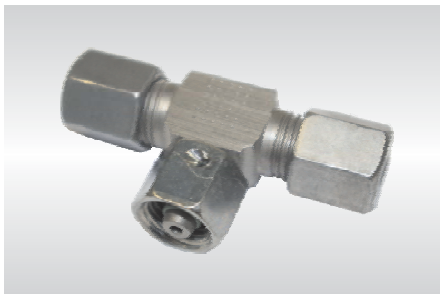
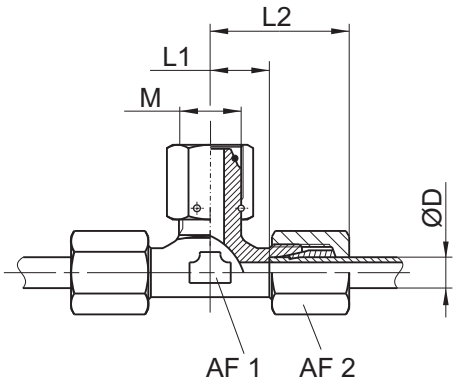
Adjustable T- fitting with sealing cone and O-ring

Dimensional drawing:

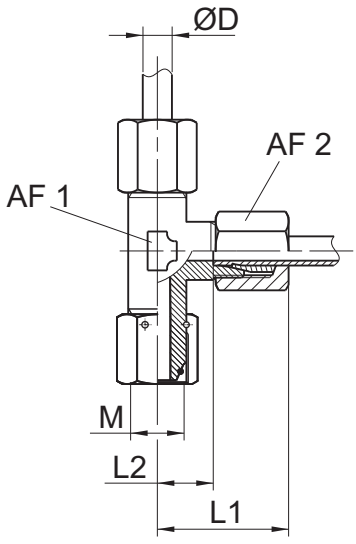




Article-no.	Series	Pipe Ø D	L1	L2	AF 1	AF 2	M	Material
0406 2463	S	6	31	16	14	17	14x1,5	Steel ZnNi
0406 2455	L	10	30	15	17	19	16x1,5	Steel ZnNi

Adjustable L- fitting with sealing cone and O-ring

Dimensional drawing:



Article-no.	Series	Pipe Ø D	L1	L2	AF 1	AF 2	M	Material
0406 1283	L	6	26	12	12	14	12x1,5	Steel ZnNi
0406 2464	S	6	28,5	16	12	17	14x1,5	Steel ZnNi
0406 1282	L	8	27	14	12	17	14x1,5	Steel ZnNi
0406 2456	L	10	29,3	15	14	19	16x1,5	Steel ZnNi

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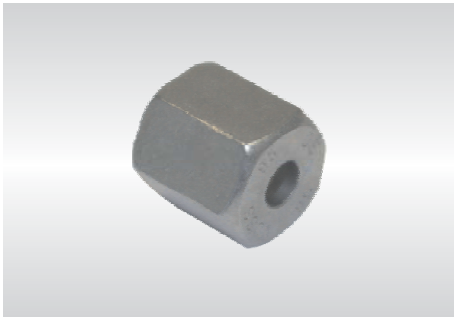
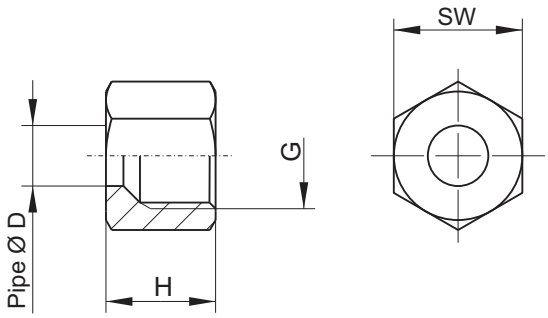
Union nut

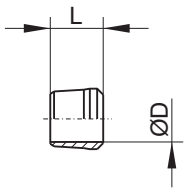




Article-no.	Series	Pipe Ø D	G	H	SW	Material	Pressure
04031500303	LL	6	M10x1	11,5	12	Steel ZnNi	PN 100
04030004002100	L	6	M12x1,5	14,5	14	Steel ZnNi	PN 500
04030004502100	S	6	M14x1,5	16,5	17	Steel ZnNi	PN 800
04030004052100	L	8	M14x1,5	14,5	17	Steel ZnNi	PN 500
04030004552100	S	8	M16x1,5	17,5	19	Steel ZnNi	PN 800
04030004102100	L	10	M16x1,5	15,5	19	Steel ZnNi	PN 500

Cutting ring

Dimensional drawing:



Article-no.	for pipe Ø D	Series	L	Material	Pressure
09038610601115	6	LL	7,8	Steel ZnNi	PN 100
09038610603215	6	L / S	8,8	Steel ZnNi	PN 315/630
09038610802215	8	L / S	9,3	Steel ZnNi	PN 315/630
09038611002215	10	L / S	9,8	Steel ZnNi	PN 315/630

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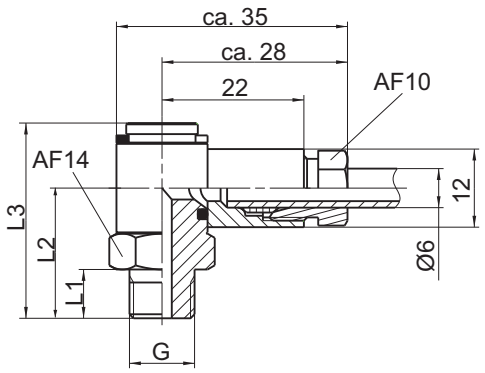
Joint

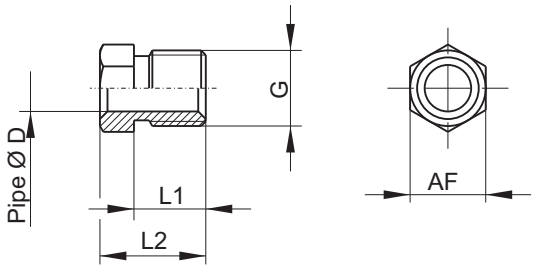
Dimensional drawing:



Article-no.	G	L1	L2	L3	Material joint	Material Union screw
0402 075	M6k	7,5	20	30	brass	Steel ZnNi
0402 076	M8x1k	7,5	20	30	brass	Steel ZnNi
0402 077	M10x1k	7,5	20	30	brass	Steel ZnNi
0402 078	R1/8"k	7,5	20	30	brass	Steel ZnNi
0402 079	R1/4"k	9	21,5	31,5	brass	Steel ZnNi
0402 080	1/8-27 NPT	7,5	20	30	brass	Steel ZnNi

Union screw

Dimensional drawing:



Article-no.	Pipe Ø D	G	L1	L2	SW	Material
0802000334	6	M10x1	9,5	14	10	Steel ZnNi

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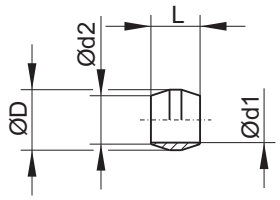
Olive

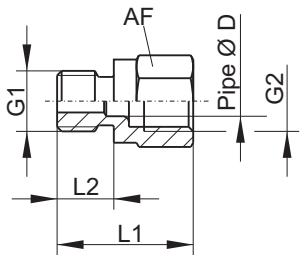
Dimensional drawing:



Article-no.	for pipe Ø	ØD	L	Ød1	Ød2	Material
09038620023	6	8	6,5	6	6,4	brass
09038620028	6	8	6,5	6	6,4	Steel ZnNi

Reduction, straight

Dimensional drawing:



Article-no.	G1	G2	L1	L2	SW	Material
FWZ03289-001 002	M16x1,5	M10x1	28	12	22	Steel ZnNi
FWZ04779_04	G1/4	M20x1,5	43	12	27	Steel ZnNi

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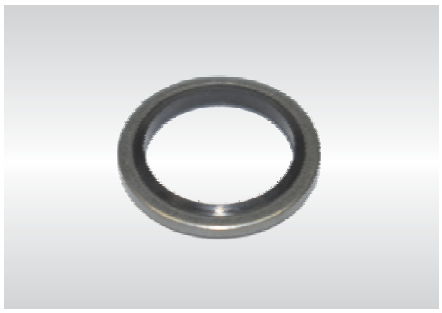
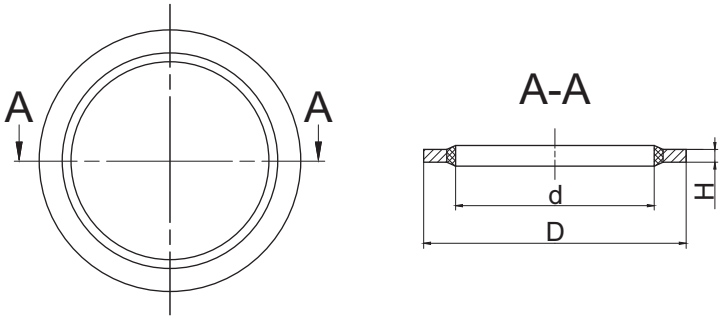
Usit - Ring

Dimensional drawing:

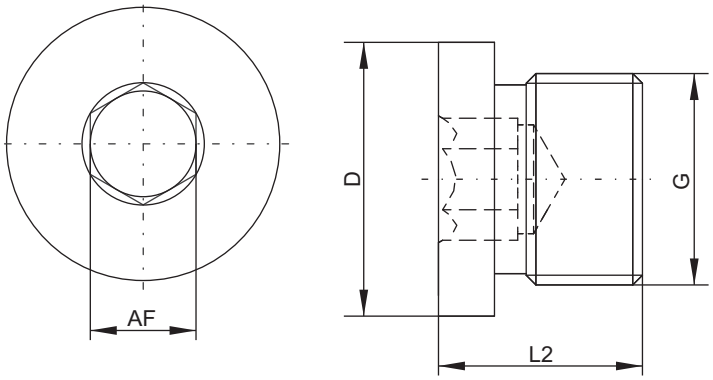




Article-no.	Nominal size	d	D	H	Thread	Sealing	Material
100150010433	16x22,7x1,5	16	22,7	1,3	M16x1,5	NBR 80	Steel ZnNi
100150010408	14x18,7x1,5	14	18,7	1,5	G1/4	NBR 80	Steel ZnNi

Screw plug
self sealing

Dimensional drawing:



Article-no.	G	D	L2	AF	Material	Kg/100
04030189142100	M8x1	12	12,3	4	Steel ZnNi	0,5
04030189202100	M10x1	14	12,3	5	Steel ZnNi	0,7
04030189222100	M14x1,5	19	17,3	6	Steel ZnNi	1,9
04030189752100	M14x1	19	17,3	6	Steel ZnNi	1,9
04030189252100	M20x1	25,9	19,3	10	Steel ZnNi	4
04030189332100	G 1/8	14	12,3	5	Steel ZnNi	0,7
04030189342100	G 1/4	18,9	17,3	6	Steel ZnNi	1,8
04030189372100	G 3/4	32	21,3	12	Steel ZnNi	7,5
04030189382100	G 1	39,9	22,8	17	Steel ZnNi	12,3
04030189392100	G 1 1/4	49,9	22,8	22	Steel ZnNi	19,4

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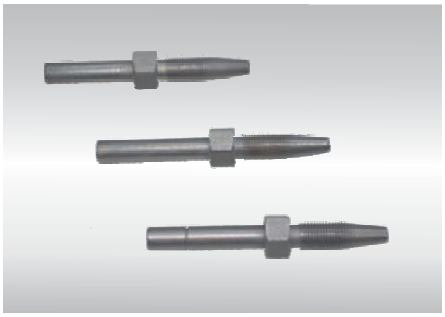
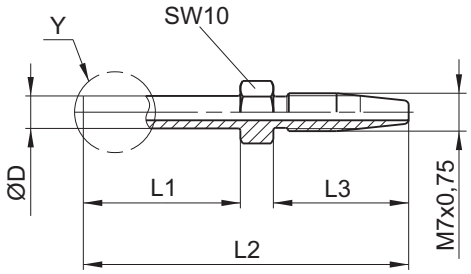
BEKAWIND

Pipe socket, straight,

for assembly at high pressure hose Ø8,6x4

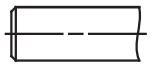
Dimensional drawing:





Article number	øD	L1	L2	M	Material
100121492	6	24	55,1	M7x0,75	steel ZnNi
100121493	6	30	61,1	M7x0,75	steel ZnNi
100121550	8	22	67,3	M9x1	steel ZnNi
100121551	8	42	87,3	M9x1	steel ZnNi

Y



Version for cutting ring / olive

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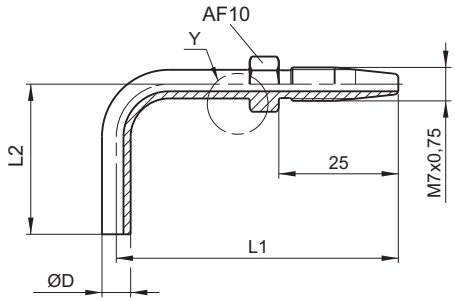
PRÄZISIONSAPPARATEFABRIK
BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Pipe socket, 90°

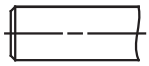
for assembly of high pressure hose Ø8,6x4

Dimensional drawing:



Article number	øD	L1	L2	M	Material
100121495	6	45,1	32,7	M7x0,75	steel ZnNi
100121496	6	59	38	M7x0,75	steel ZnNi
100121553	8	65,3	35	M9x1	steel ZnNi
100121554	8	65,3	55	M9x1	steel ZnNi
100121555	8	65,3	75	M9x1	steel ZnNi

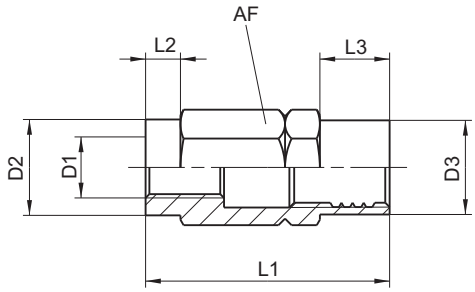
Y



Version for cutting ring / olive

Sleeve

Dimensional drawing:



Article-no.	D1	D2	D3	L1	L2	L3	SW	for high press. hose	Material
1001 21 484	M7x0,75	11	10,8	28	4	8	12	8,6x4	steel ZnNi
1001 21 549	M9x1	14	16,8	36	4	9	17	11,2x6,5	steel ZnNi

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BEETHOVENSTR. 14
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D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
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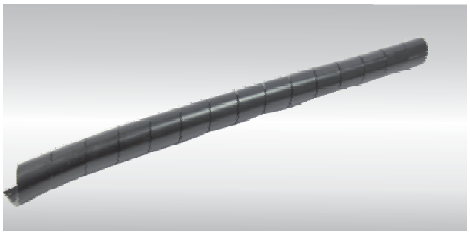
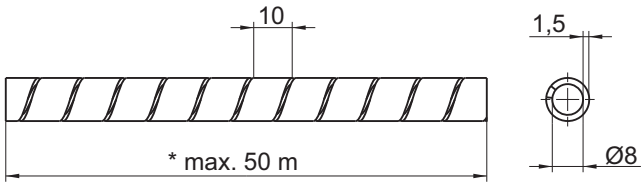
Coiled tubing

Dimensional drawing:



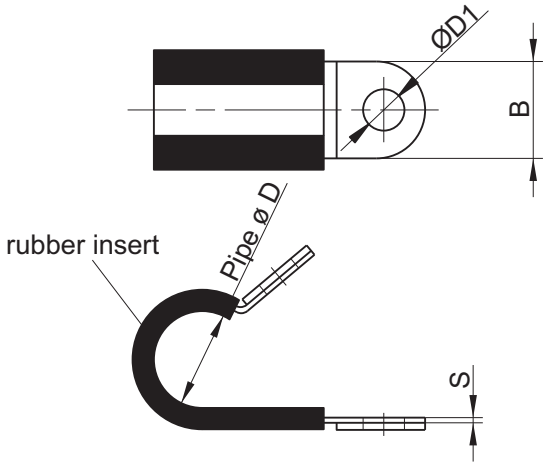


Article-no	Material
100121005	Polyethylene black color

* = indicate length when order!

Pipe clip with rubber insert

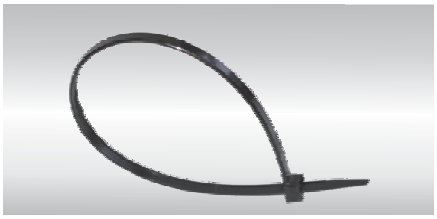
Dimensional drawing:

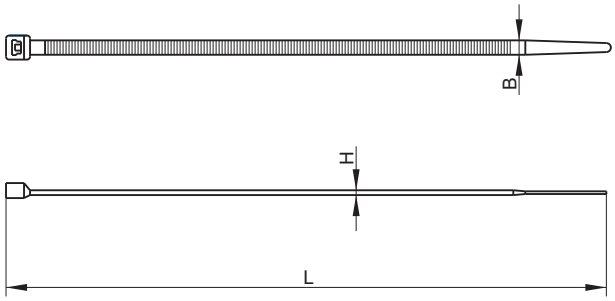


Article-no	B	Pipe ø D	S	ØD1	Material
1001 500 10	12	6	0,5	5,3	steel
1001 500 20	12	9	0,5	5,3	steel
1001 500 30	12	12	0,5	5,3	steel

Hose tie

Dimensional drawing:





Article-no	L	B	H	Material
100 121 517	200	4,8	1,6	plastic
100 121 012	200	3,6	1	plastic
100 121 520	360	4,8	1,6	plastic
100 121 518	365	7,8	1,8	plastic
100 121 016	450	7,8	1,8	plastic

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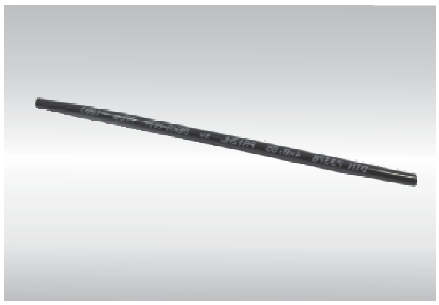
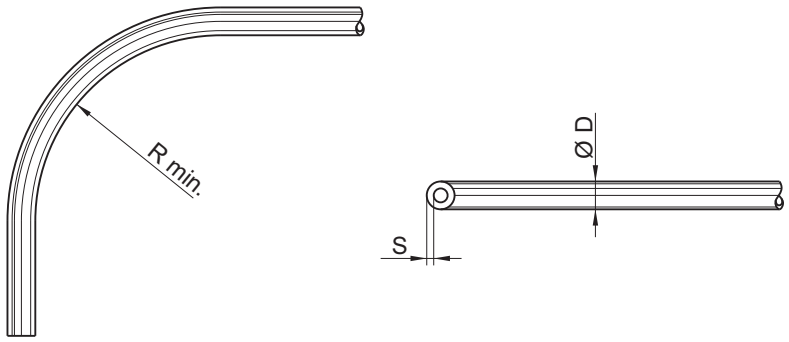
BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
FAX: +49 9241 729-50
WEB: www.beka-lube.de
EMAIL: beka@beka-lube.de

Plastic pipe

Dimensional drawing:

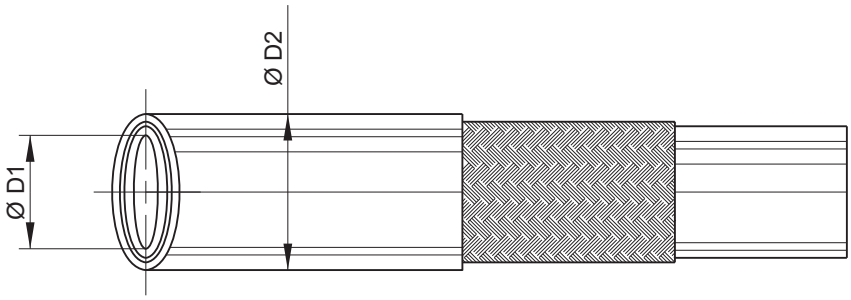




Part-No.	Dia. D	S	min. bending radius R	Type	Viscous oil filled	Material
1001 20 075	4	0.85	40	hard	with	Polyamide
1001 20 040	4	0.85	40	soft	with	Polyamide
1001 20 039	4	0.85	40	hard	without	Polyamide
1001 20 041	4	0.85	40	soft	without	Polyamide
1001 20 100	6	1.5	40	hard	with	Polyamide
1001 20 101	6	1.5	40	hard	without	Polyamide

High pressure hose

Dimensional drawing:



Part-No.	Dia. D 1	Dia. D 2	Type	Grease filled	Material
1001 20 200	4	8.6	straight	with	Plastic / Synthetic Net
1001 20 205	4	8.6	spiral	with	Plastic / Synthetic Net
1001 20 201	4	8.6	straight	without	Plastic / Synthetic Net
1001 20 206	4	8.6	spiral	without	Plastic / Synthetic Net
1001 20 265	6.5	11.2	straight	with	Plastic / Synthetic Net
1001 20 266	6.5	11.2	straight	without	Plastic / Synthetic Net

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BEETHOVENSTR. 14
D-91257 PEGNITZ
POSTFACH 1320
D-91257 PEGNITZ
TEL:+49 9241 729-0
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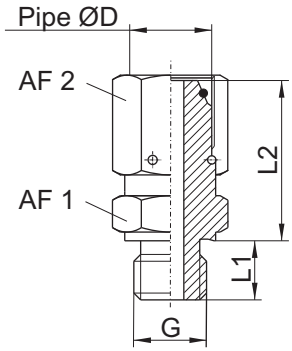
Straight connection piece

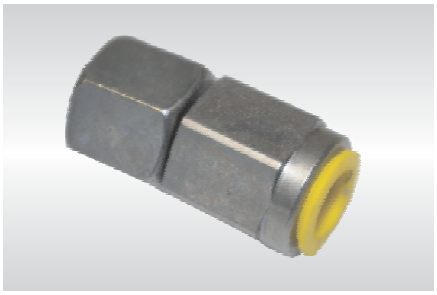
Dimensional drawing:

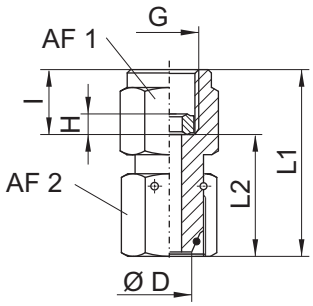


Article-no.	G	Series	Pipe Ø D	L1	L2	AF 1	AF 2	Material	Kg/100	Pressure
0406 1299	G 1/4	S	6	12	25	19	17	Steel ZnNi	4,9	PN 630
0406 1279	G 1/4	L	10	12	27,5	19	19	Steel ZnNi	5,6	PN 500
0406 2454	M 14x1,5	L	10	12	27,5	19	19	Steel ZnNi	5,7	PN 500

Manometer fitting

Dimensional drawing:

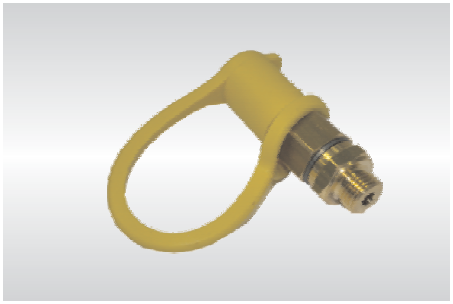


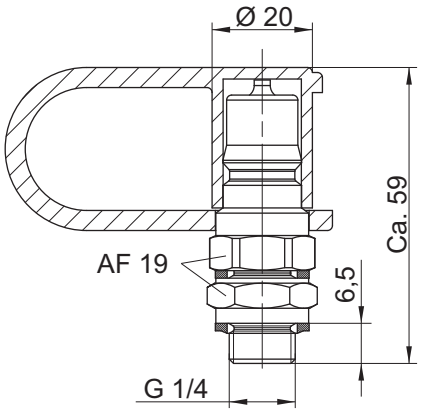


Article-no.	Series	Pipe Ø D	L1	L2	AF 1	AF 2	G	I	H	Material	Kg/100
0406 1258	L	10	36	21	19	19	G 1/4	14,6	4,6	Steel ZnNi	5,8

Coupling plug with dust cap and double nipple

Dimensional drawing:





Article-no.	Material	Weight
21590051030	brass	Ca. 90g

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TEL:+49 9241 729-0
FAX: +49 9241 729-50
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EMAIL: beka@beka-lube.de

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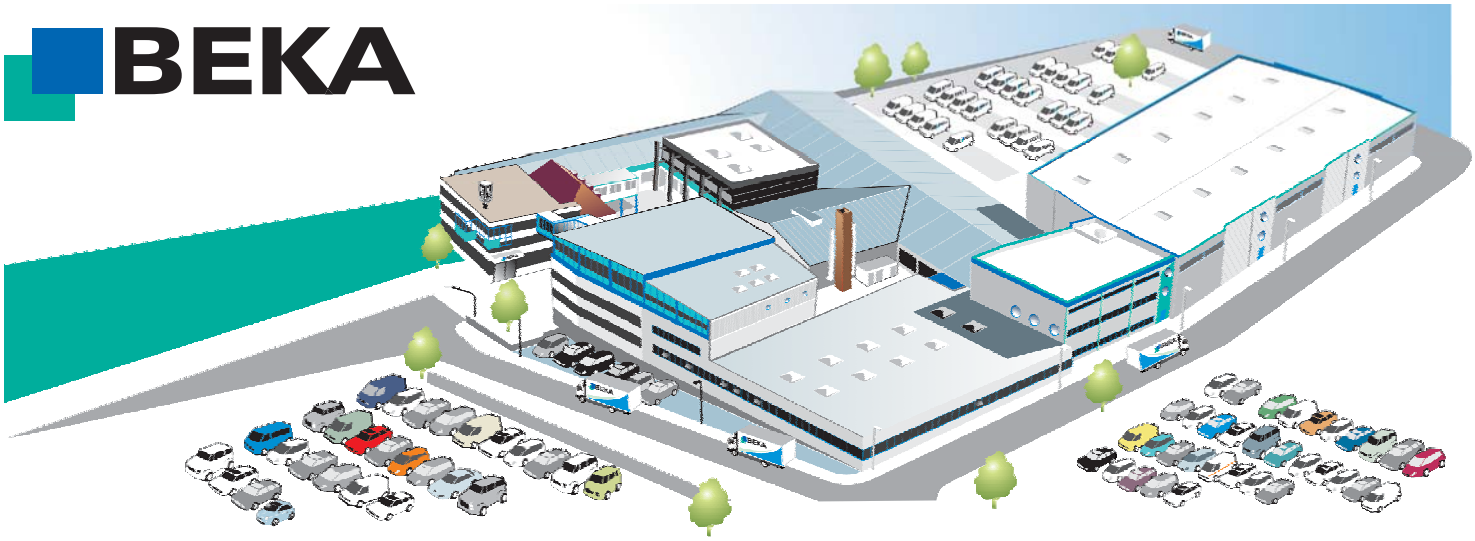

BAIER+KÖPPEL GMBH+CO KG
PRÄZISIONSAPPARATEFABRIK

BEETHOVENSTRASSE 14
91257 PEGNITZ/BAVARIA

PO BOX 13 20
91253 PEGNITZ/BAVARIA

GERMANY

fon +49 9241 729-0
fax +49 9241 729-50

e-mail beka@beka-lube.de
web www.beka-lube.de

Partners

AUSTRIA
BEKA-Lube GmbH
Carola-Blome-Str. 7
5020 Salzburg
fon +43 / 662 / 43 84 40
fax +43 / 662 / 43 84 403
e-mail office@beka-lube.at

BELGIUM
BEKA LUBE N.V.S.A.
Demerstraat 32
BE 3200 Aarschot
fon +32 / 16 / 64 09 26
fax +32 / 16 / 64 05 48
e-mail bekalube@skynet.be

CANADA
BEKA-LUBE Products Inc.
2830 Argentia Road, Unit 9
Mississauga ON L5N 8G4
fon +1 / 905 / 821 / 1050
fax +1 / 905 / 858 / 0597
e-mail info@beka-lube.com

CHINA
EAST TSANHAIR COMPANY LTD.
7A Building, Medicine Valley No.1,
No.9 Tianfu Street, Bio-Medicine Park,
Zhongguancun Science Park,
Daxing District, Beijing, China 102600
fon +86 / 10 / 83 681 526
fax +86 / 10 / 83 681 520
e-mail beka-lube@bekachina.com

FRANCE
BEKALUBE FRANCE
4, bis Rue de l'Artisanat
89100 Paron
fon +33 / 386 / 83 39 06
fax +33 / 386 / 65 52 24
e-mail contacts@bekalube.fr

ITALY
BEKALUBE s.r.l.
Via Rossi 152
20043 Arcore
fon +39 / 039 / 618 00 88
fax +39 / 039 / 61 75 23
e-mail bekalube@bekalube.it

KOREA
BEKA AHWON
326-1 Danggung Dong
Gunpo Si Kyungki Do Korea
fon +82 / 31 / 451 / 0628
fax +82 / 31 / 451 / 0974
e-mail jhleeahwon@gmail.com

NETHERLANDS
BEKA NEDERLAND B.V.
Wagenmakerij 11
4762 AV Zevenbergen
fon +31 / 168 / 37 15 38
fax +31 / 168 / 33 83 29
e-mail info@beka.nl

SPAIN
BEKA-LUBE IBERICA S.L.
Avda. de Suiza, 3 P.A.L. Coslada
28820 Coslada (Madrid)
fon +34 / 91 / 670 7800
fax +34 / 91 / 670 78413
e-mail beka@beka-lube.es

TURKEY
BEKAMAKS MAKINA SANAYI ve TICARET
LTD. STI. Kucukyali Ticaret Merkezi
B Blok No. 7 Girne Mah.
34852 Maltepe / Istanbul
fon +90 / 216 / 367 34 00
fax +90 / 216 / 367 33 85
e-mail info@bekamaks.com

USA
BEKA-MAX of America
2600 North America Drive Suite 8
P.O. Box 615 West Seneca, NY 14224
fon +1 / 905 / 821 / 1050
fax +1 / 905 / 858 / 05 97
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