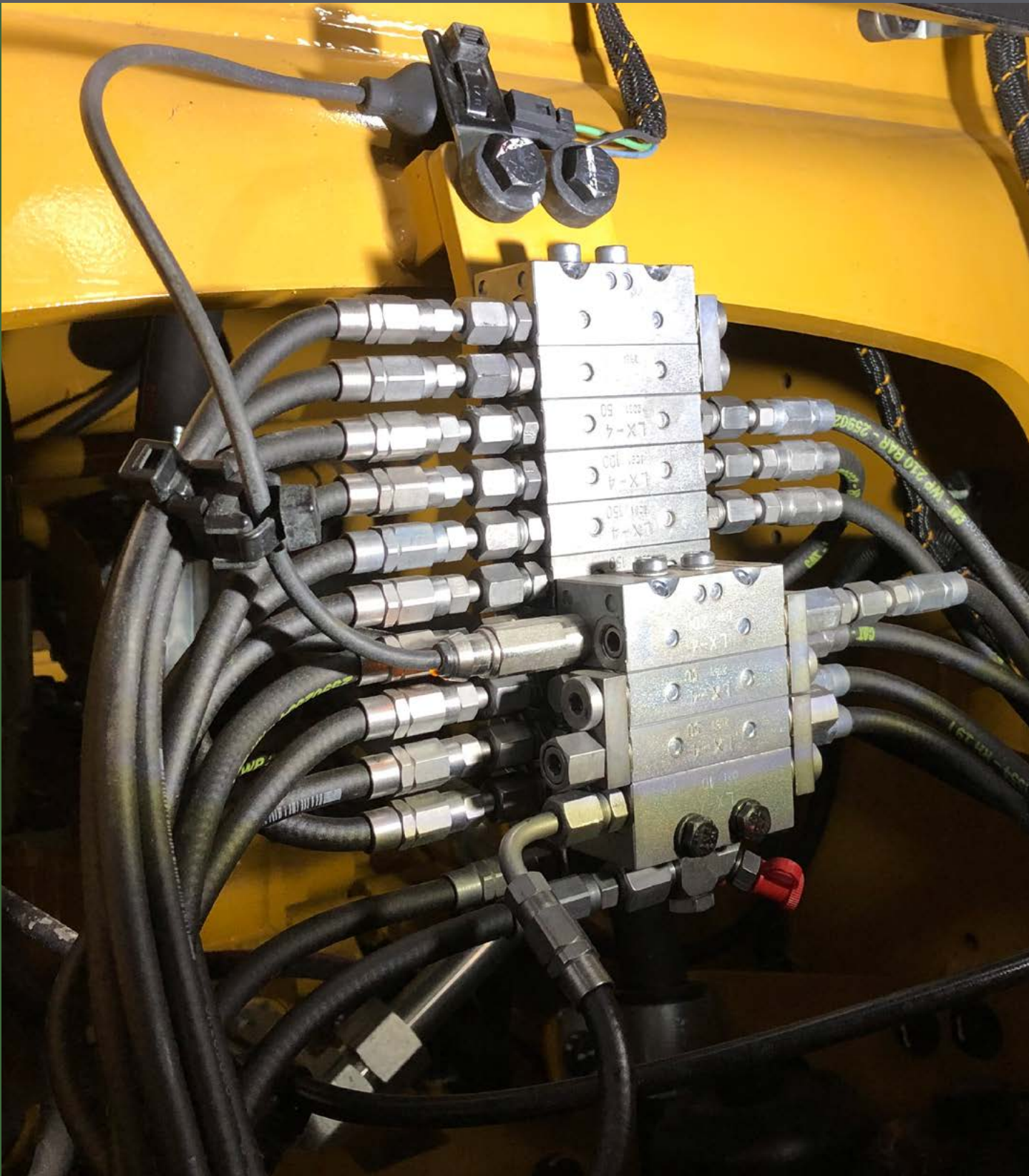


## **Progressive Systems**

Wide range of unique solutions



## Groeneveld-BEKA

**Reducing customers' operational costs and at the same time increasing uptime, productivity, efficiency and safety of their vehicles and machines. That is what it's all about at Groeneveld-BEKA. We accomplish this by developing, producing, supplying and servicing industry-leading automatic lubrication, fluid control and safety support systems.**

Groeneveld-BEKA, part of The Timken Company, is the world's second largest producer of automatic lubrication systems, fluid management and safety support systems. Groeneveld-BEKA products improve equipment lifetime and reliability, while reducing the total cost of ownership.

Groeneveld-BEKA was formed through the merger of two well-established companies: Groeneveld and BEKA. Groeneveld was founded in 1971 and acquired by Timken in 2017. BEKA was founded in 1927 and acquired by Timken in late 2019. Groeneveld has also incorporated Interlube into their brand. Interlube was acquired by Timken in 2013.

Groeneveld-BEKA products are supplied for ex-factory installs to leading manufacturers of trucks, trailers, buses, wind turbines, industrial applications, agricultural, mining and construction equipment. In addition Groeneveld-BEKA systems are installed in the after-market for a wide variety of transport, construction, agricultural, port equipment and industrial applications. Groeneveld-BEKA strives to develop and manufacture all of its products in-house according to World Class Manufacturing principles.

## Automatic Lubrication Systems

Groeneveld-BEKA offers dedicated automatic lubrication systems for all kinds of equipment in a wide variety of market segments, from the smallest excavator to the largest trucks and industrial applications. The application of our high-end systems leads to decreased wear and tear of critical components resulting in extended lifetime, less downtime and reduced repair and maintenance costs. In short: higher productivity and lower operational costs. As maintenance technicians no longer have to climb on or crawl under the equipment, Groeneveld-BEKA's automatic lubrication systems also contribute to safety.

For optimal greasing in all circumstances Groeneveld-BEKA also offers the right type of grease for every application and every system. This is your guarantee for many years of trouble-free operation of your system and perfect lubrication of your valuable equipment.

## Fluid Control

Groeneveld-BEKA's fluid management systems reduce daily maintenance and minimize the risk of unexpected downtime by controlling engine oil levels or removing contamination. Next to the oil management systems, Groeneveld-BEKA also offers systems which easily convey hydraulic power from fixed to moving points.

## Safety Support Systems

For many years, Groeneveld-BEKA supplies safety support systems for a wide range of applications. Speedlimiters as well as obstacle detection and camera systems by Groeneveld-BEKA increase safety in many segments from road transport to construction, port, terminal and internal transport.

## The World of Lubrication

Groeneveld-BEKA is a global enterprise with a worldwide coverage. In many countries, the company is also represented by independent distributors and dealers – all just as driven as our own organisation to offer added value to the customer's company.

With decades of experience providing reliability services to a range of industries, Groeneveld-BEKA offers complete automated maintenance solutions for all your needs. Groeneveld-BEKA's reliability products maintain your equipment, helping you increase uptime and improve profitability.

Visit the Groeneveld-BEKA website for contact details of our subsidiaries, distributors and service dealers.



## Less maintenance, improved efficiency and lower costs

In today's demanding industrial environment it is critical that machines generate an acceptable level of profit. Whether you are an owner, operator or a plant manager, one of the most cost effective ways of achieving this objective is by employing the use of fully automatic lubrication systems.

Groeneveld-BEKA's automatic lubrication systems have been proven to extend bearing life compared with manual greasing, dramatically cutting the cost of bearing replacements, reducing downtime and improving efficiency and safety.

### The benefits

The benefits of automatic lubrication are clear: better greasing of critical components, no time wasted on manual lubrication and the certainty that the equipment will always be greased independent of weather conditions, time schedules or operators. All resulting in significant cost savings.

#### Reduced man-hours required to lubricate.

- Improved availability of personnel for technical activities.
- Reduced lubricant spillage that occurs with manual lubrication.

#### Higher equipment productivity

Reduced equipment downtime by ca. 15% resulting from:

- Lubrication taking place during normal machine operation.
- Better and uniform greasing of all critical components because bearings and pins and bushings are in motion when lubrication takes place, resulting in less wear and tear of machinery.

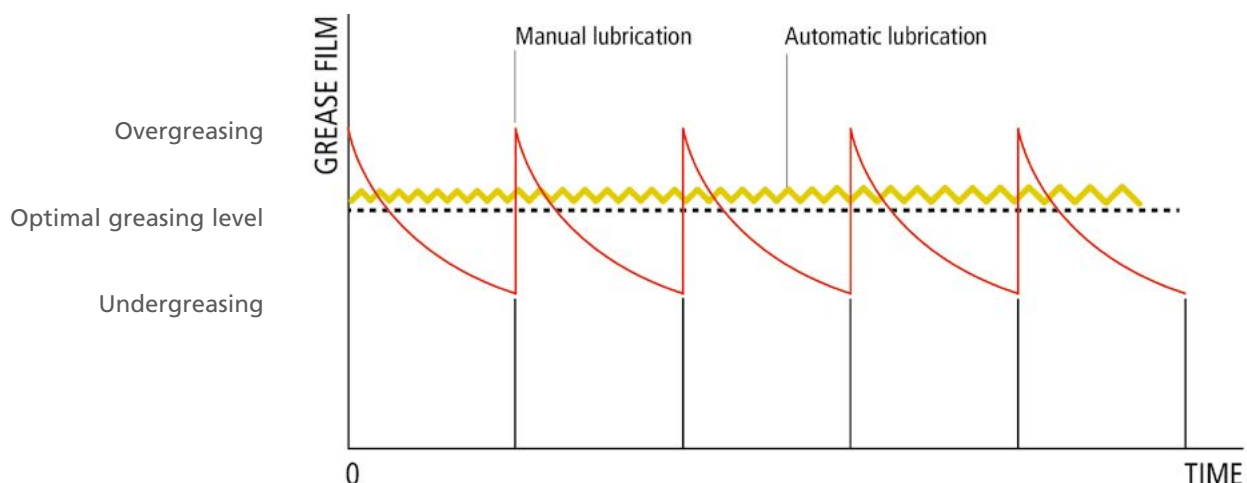
#### Decreased maintenance

- With manual lubrication, grease will follow the path of least resistance due to the fact that greasing has to take place under static conditions. So, the grease is not equally distributed around the lubrication point. Automatic greasing avoids this, as lubrication will take place during operation, reducing wear of critical components.
- Reduced replacement rate of components and bearings up to 50%.
- Decreased machine labour costs by ~ 50%.

#### Improved safety

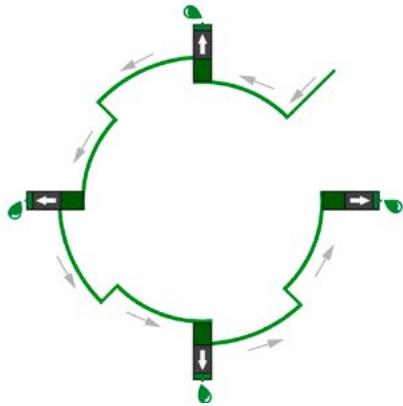
- No climbing on and around machinery or inaccessible areas.

### Effectiveness of Automatic Lubrication





## Progressive systems



A progressive system uses lubricant flow to cycle individual metering valves and valve assemblies. The valves consist of dispensing pistons moving back and forth in a specific bore. Each piston depends on flow from the previous piston to shift and displace lubricant. This ensures that each lubrication point is supplied with the correct and defined amount of grease.

Groeneveld-BEKA offers a wide range of progressive automatic lubrication systems. From the smaller ZEPTO system up to the dedicated TriPlus or GIGA with three independently controlled lubrication circuits.

Also a wide range of progressive distribution blocks is available to meet the requirements of different kinds of applications.

## Progressive systems for all kinds of applications



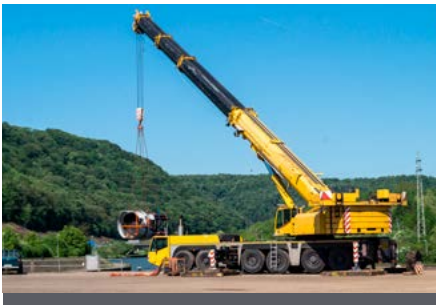
Trucks & Trailers



Refuse trucks



Buses



Mobile cranes



Wheel loaders (<50 tons)



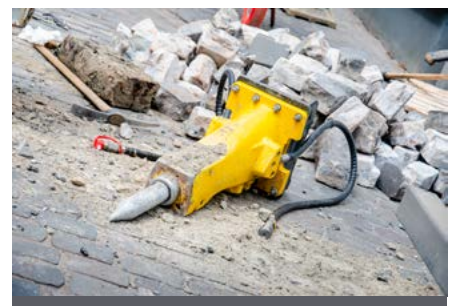
Excavators (<100 tons)



Agricultural machines



Reachstackers



Attachments

# Progressive lubrication systems

## Electric actuated pumps





## BEKAMAX ZEPTO

The electric cartridge pump ZEPTO is designed to provide lubricant within a central lubrication system (for example, a progressive system) or to single lubrication points. ZEPTO is mainly used for lubrication of smaller machines and systems with up to 30 lubrication points.

The compact eccentric pump supplies the lubricant reliably with the help of a desmodromic pump element. An innovative revolution control ensures constant delivery rates irrespective of the supply voltage.

ZEPTO can be used with various screw cartridge types available on the market. Due to simple cartridge replacement the lubricant can be refilled fast and clean.

- Rugged and compact design
- Simple replacement of lubrication cartridge without tools
- Suitable for various screw cartridge types available on the market
- High-strength glass fiber plastics withstand the most adverse conditions
- Unique: dust tightness (6K) and safe cleaning through high pressure/steam jet cleaning (9K)

### System overview



#### Protective cover

The cartridge is protected by a transparent cover.

#### Cartridge types

Suitable for different cartridge types for greases up to NLGI-2. ZEPTO is as standard being delivered with a cartridge adapter type S.

#### Pump element

Pump element incl. pressure limiting valve and a Ø 6 mm pressure connection. The pump element has a constant output of 0.9 cc per minute, regardless of the supply voltage.

#### Display

All programs and parameters of the device can be set directly with the control keys on the display under the inspection glass. No additional tools are needed.

#### Integrated control unit

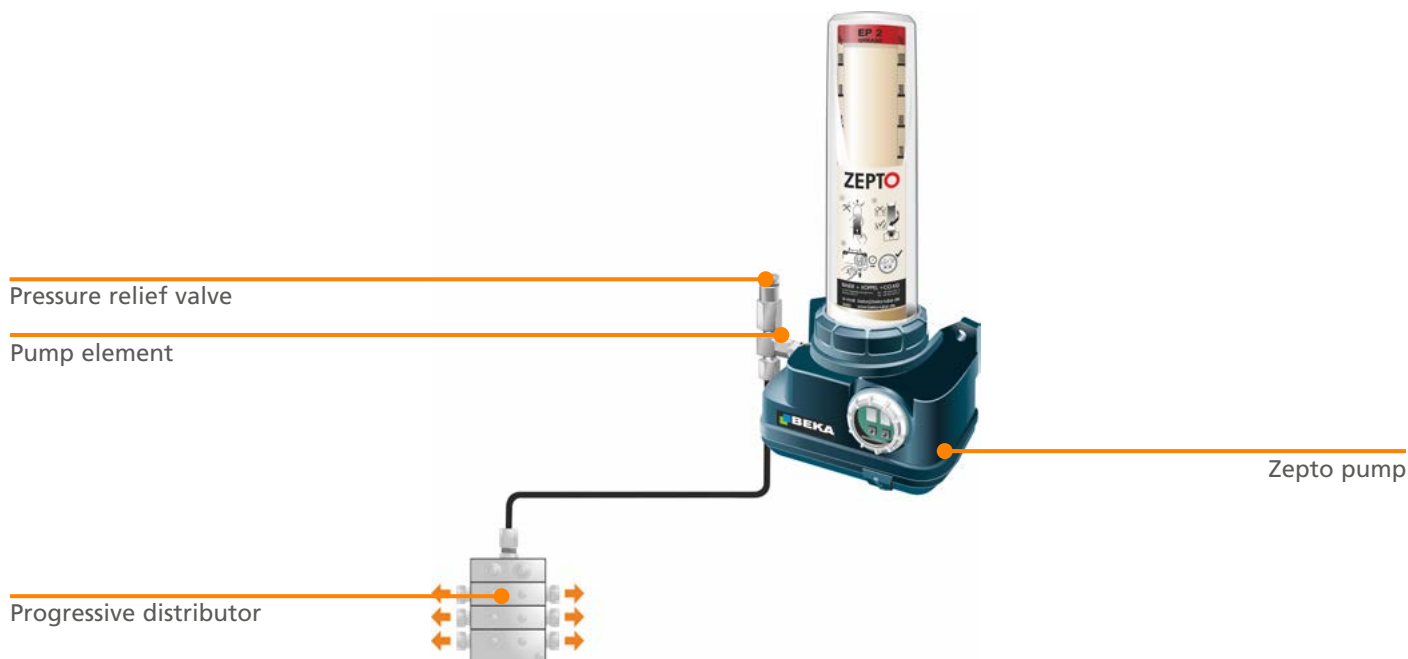
The ZEPTO has an integrated control and is available in two versions.

The operational modes are time control, time control with pressure monitoring, pulse control and continuous operation.



## Working principle

When the pump is activated, grease is pumped from the cartridge to the distribution block. The metering units on the progressive distributor provide the exact amount of grease to the lubrication points.



## Technical information

|                            |   |
|----------------------------|---|
| Pump type                  | Electric  |
| Operating voltage          | 12 or 24V   |
| No. of outlets             | 1   |
| Max. operating pressure    | 290 bar (4200 psi)  |
| Delivery volume            | Constant 0,9 cc/min.  |
| Grease class               | NLGI-000 up to NLGI-2   |
| Reservoir capacity         | Standard cartridges   |
| Compatible cartridge types | S (Lube-Shuttle®), F (SYSTEM REINER) or L (Ritter grease cartridge 400 ml) with corresponding adapter |
| Temperature range          | -25 up to +70 °C (-13 up to 158 °F), depending on lubricant   |
| Protection class           | IP6K9K  |

## Applications

The BEKAMAX Zepto can be used for a wide variety of applications but is most commonly used for mobile applications in transport, construction, agricultural, forestry, port equipment and for smaller industrial applications.



Trucks



Sweepers



Forklift



Mini-excavator

## BEKAMAX PICO

The PICO system combines power and flexibility in perfect conditions with a compact design. The PICO system is the unique combination of progressive- and multi line technology.

The basic version of the PICO pump supplies lubricant through the progressive outlets to the lube points via one or more progressive distributors. In addition up to 8 lubrication points can be supplied directly via the multi line principle. If necessary the system can be enlarged by a second progressive cycle.

- Very compact design for applications with little number of lubrication points
- Unique combination of two lubrication systems:
- Progressive- and multi line technology
- Suitable for all common lubricants from NLGI-000 up to NLGI-2
- Flexible extension possibilities

### System overview



#### Reservoir

The 1,2 litre reservoir is available with agitator blade or follower plate. The system with a follower plate can be installed in each direction, also upside down.

#### Follower plate

The follower plate ensures that all the grease in the reservoir is used. This means that the reservoir wall remains clean, allowing you to check the grease level visually. Ageing of the grease as a result of oxidation is also prevented.

#### Multi line outputs

The PICO has got 8 multi line outputs for different pump elements.

#### Progressive outputs

The PICO has got 2 progressive outputs for different pump elements.

#### Filling zerk

The pump can be filled with a standard filling gun. The filling zerk can be replaced by a filling connection to refill using a filling pump.

#### Control unit

The PICO can be delivered with an integrated control unit with:

- 3 control functions: time, stroke or revolutions
- Electronic monitoring of grease level, pump function, distributor function, line rupture, lubricant feeding
- Selection of operating conditions: easy, medium or heavy
- Integrated data logger with diagnosis module DiSys

The protective housing is equipped with a bayonet or Hirschmann plug-type connection.

### Pump elements

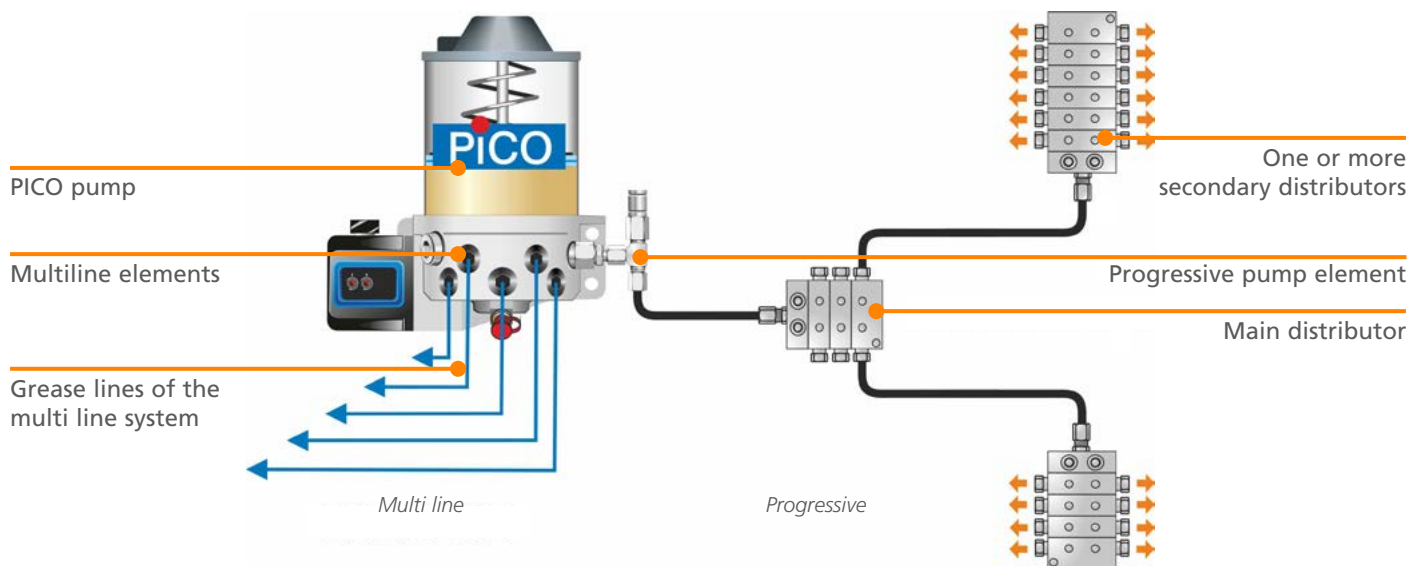
Two different construction types of pump elements can be installed into the device, depending on for which lubrication system or for which lubrication system combination the device is used.

| System      | Pump elements |                                      | Metering volume                             |
|-------------|---------------|--------------------------------------|---|
| Multi line  | PE 5          |                                      | 0.005 cc/stroke                             |
|             | PE 10         |                                      | 0.010 cc/stroke                             |
|             | PE 15         |                                      | 0.015 cc/stroke                             |
|             | PE 25         |                                      | 0.025 cc/stroke                             |
|             | PE 50         |                                      | 0.050 cc/stroke                             |
| Progressive | PE 120 F      | with/without pressure limiting valve | 0.120 cc/stroke                             |
|             | PE 120 FV     |                                      | 0.04 up to max. 0.12 cc/stroke (adjustable) |



## Working principle

When the pump is activated, grease is pumped through the pump elements. The pump elements transfer the grease to main and secondary progressive distributors. The multi line elements transfer the grease directly to the lubrication points.



## Technical information

|                            |   |
|----------------------------|---|
| Pump type                  | Electric  |
| Supply voltage             | 12 or 24V   |
| No. of outlets             | Max. 10, 2 progressive and 8 multi line   |
| Maximum operating pressure | 200 bar (2900 psi) at multi line system<br>280 bar (4000 psi) at progressive system |
| Delivery volume            | Max. 0.12 cc per stroke/outlet  |
| Reservoir capacity         | 1,2 litre   |
| Grease class               | Greases up to NLGI-2  |
| Temperature range          | -20 up to +70 °C / (-4 up to 158 °F)  |
| Protection class           | IP65  |

## Applications

The BEKAMAX PICO can be used for a wide variety of applications but is most commonly used for mobile applications like trucks and trailers, busses and industrial applications.



Trailers



Tipper



Refuse trucks



Busses

## BEKAMAX EP-1

The EP-1 is an electrically actuated pump with up to 3 lubrication outlets. The EP-1 is able to deliver commercial lubricants from NLGI-000 up to NLGI-2 at a working pressure of maximum 280 bar. Therefore this system is the ultimate solution for different applications in onroad, construction, agriculture and port equipment.

- A versatile solution for most mobile and stationary applications
- Suitable for all common lubricants
- Springless pump elements with desmodromic drive for highest reliability

### System overview



#### Level monitor

The EP-1 can be equipped with an electronic grease level controller to control the minimum grease level.

#### Reservoir

The EP-1 reservoir is made of transparent plastic and contains an agitator blade. The agitator blade enables a visual check of the lubricant volume in the reservoir.

EP-1 is available with different reservoir capacities.

#### Pressure relief valve

#### Pump element

The EP-1 has up to a maximum of 3 lubricant outlets. A separate pump element is required for each outlet. Three pump elements with different flow rates are available, as well as a flow-adjustable pump element.

#### Filling zerk

The pump can be filled with a standard filling gun. The filling zerk can be replaced by a filler coupling.

#### Control unit

The EP-1 series differ in control type. EP-1 can be controlled externally or with an integrated control unit with:

- 3 control functions: time, stroke or revolutions
- Electronic monitoring of grease level, pump function, distributor function, line rupture, lubricant feeding
- Selection of operating conditions: easy, medium or heavy
- Integrated data logger with diagnosis module DiSys

### Pump elements

Three pump elements with different flow rates are available, as well as a flow-adjustable pump element. All pump elements are marked either with a groove or with a notch for a better differentiation.



PE 60 PLV  
0.06 cc/stroke



PE 120 PLV  
0.12 cc/stroke



PE 120 V PLV  
Max. 0.12 cc/stroke  
Adjustable output



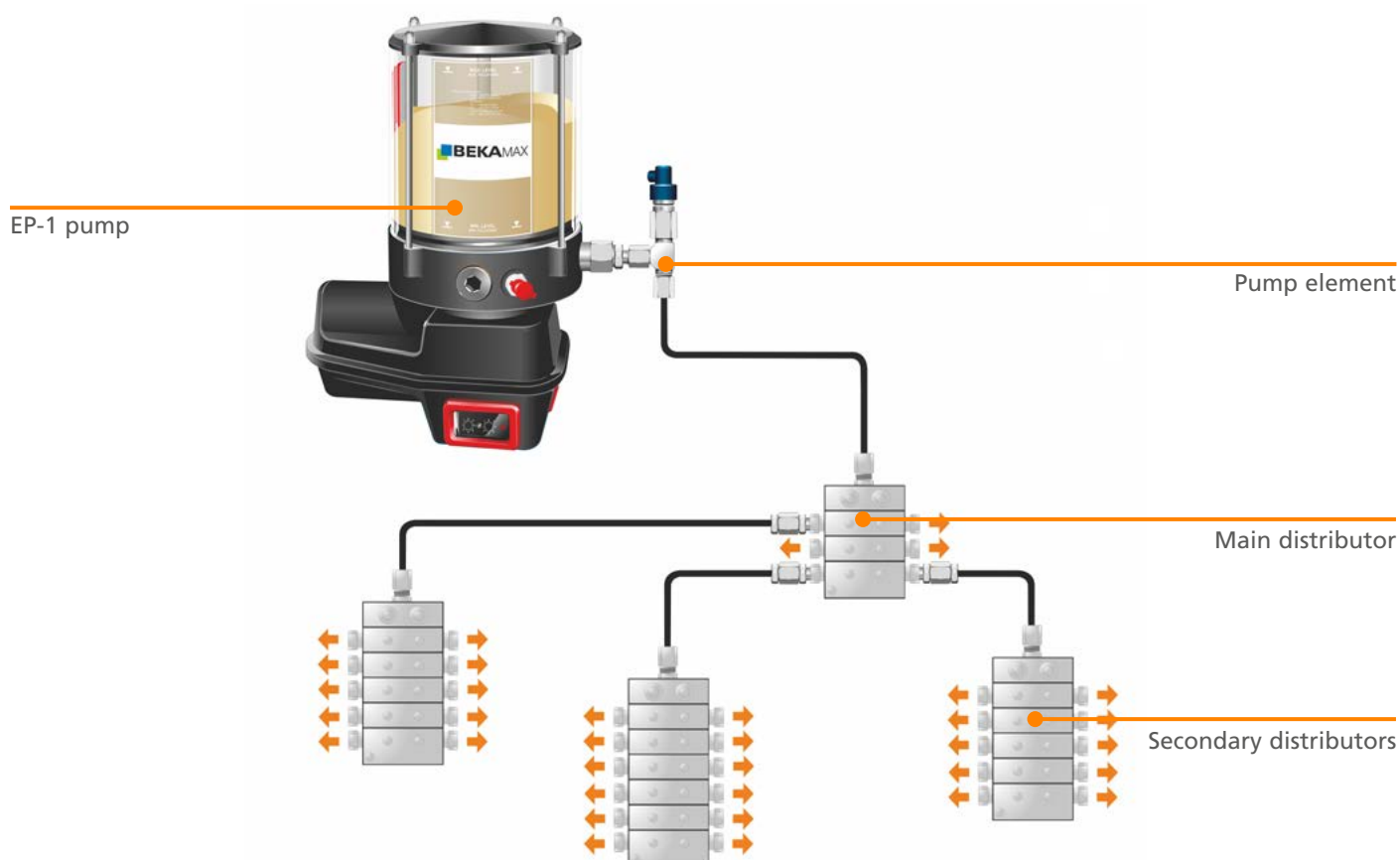
PE 170 PLV  
0.17 cc/stroke

Pressure: Max. 350 bar

Pressure limiting valve: adjusted to 280 bar

## Working principle

When the pump is activated, grease is pumped through the pump elements. The pump elements transfer the grease to the main and secondary progressive distributors.



## Technical information

|                            |                                     |
|----------------------------|-------------------------------------|
| Pump type                  | Electric                            |
| Supply voltage             | 12 or 24V                           |
| No. of outlets             | Max. 3                              |
| Maximum operating pressure | 350 bar (5100 psi)                  |
| Pressure limiting valve    | Adjusted to max. 280 bar (4000 psi) |
| Number of revolutions      | 15 min <sup>-1</sup>                |
| Reservoir capacity         | 1.9, 2.5, 4, 8, 12 and 16 litre     |
| Grease class               | Greases up to NLGI-2                |
| Temperature range          | -20 up to +70 °C (-4 up to 158 °F)  |
| Protection class           | IP5K9K                              |

## Applications

The BEKAMAX EP-1 can be used for a wide variety of applications but is most commonly used for low loaders, sweepers, refuse trucks, construction equipment, port and agricultural equipment.



Low loaders



Refuse trucks



Wheel loaders



Reachstackers

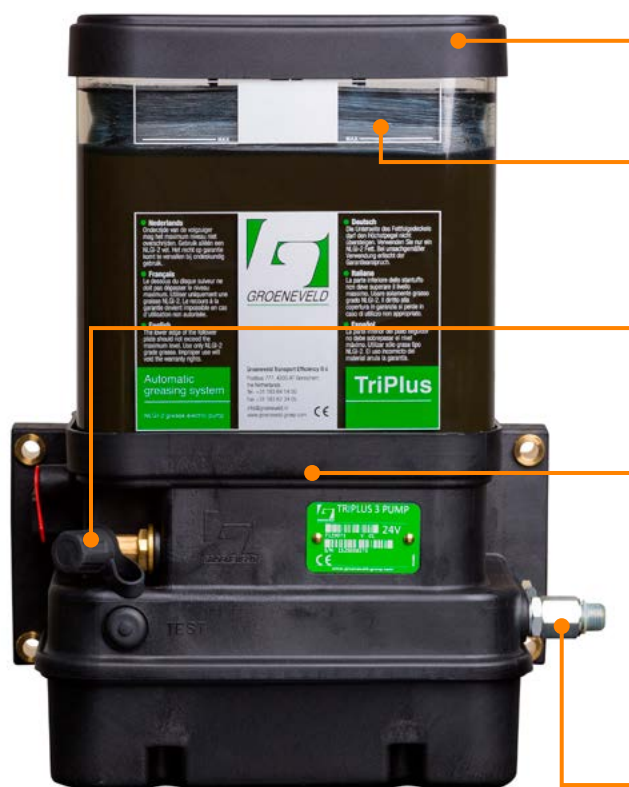


## Groeneveld TriPlus

The Groeneveld TriPlus is a unique progressive lubrication system that offers three circuits that can be operated independently. It is the ultimate solution for machines that have different components requiring different amounts of lubrication. This prevents unnecessary lubrication of components that are not moving.

- Three lubrication circuits that can be operated independently
- Grease metering regardless of the ambient temperature
- Optimal grease metering per lubrication point
- Follower plate for visual checking of the grease level and to prevention of ageing of the grease as a result of oxidation
- Filling coupling with filter prevents contamination during refilling
- Provided with in-cab check light

### System overview



#### Reservoir

TriPlus is available with reservoir volumes of 1,5, 3, 4, 6 and 8 litres. The 6 and 8 litre pumps are equipped with a round reservoir.

#### Follower plate

The follower plate ensures that all the grease in the reservoir is used. This means that the reservoir wall remains clean, allowing you to check the grease level visually. Ageing of the grease as a result of oxidation is also prevented.

#### Filler coupling with filter

The filling coupling with grease filter prevents contamination during filling. To be able to fill the reservoir using a special filling pump, a special filler coupling can be installed.

#### Pump housing with integrated control unit

The pump is made of hard anodised aluminium and nylon reinforced - containing the control unit, memory database and minimum level indicator.

The controller is the core of the TriPlus. This electronic controller, with a real-time clock and memory, ensures that each lubrication circuit receives the exact amount of grease that has been programmed. These settings can always be adjusted to changing working conditions.

#### Outlets

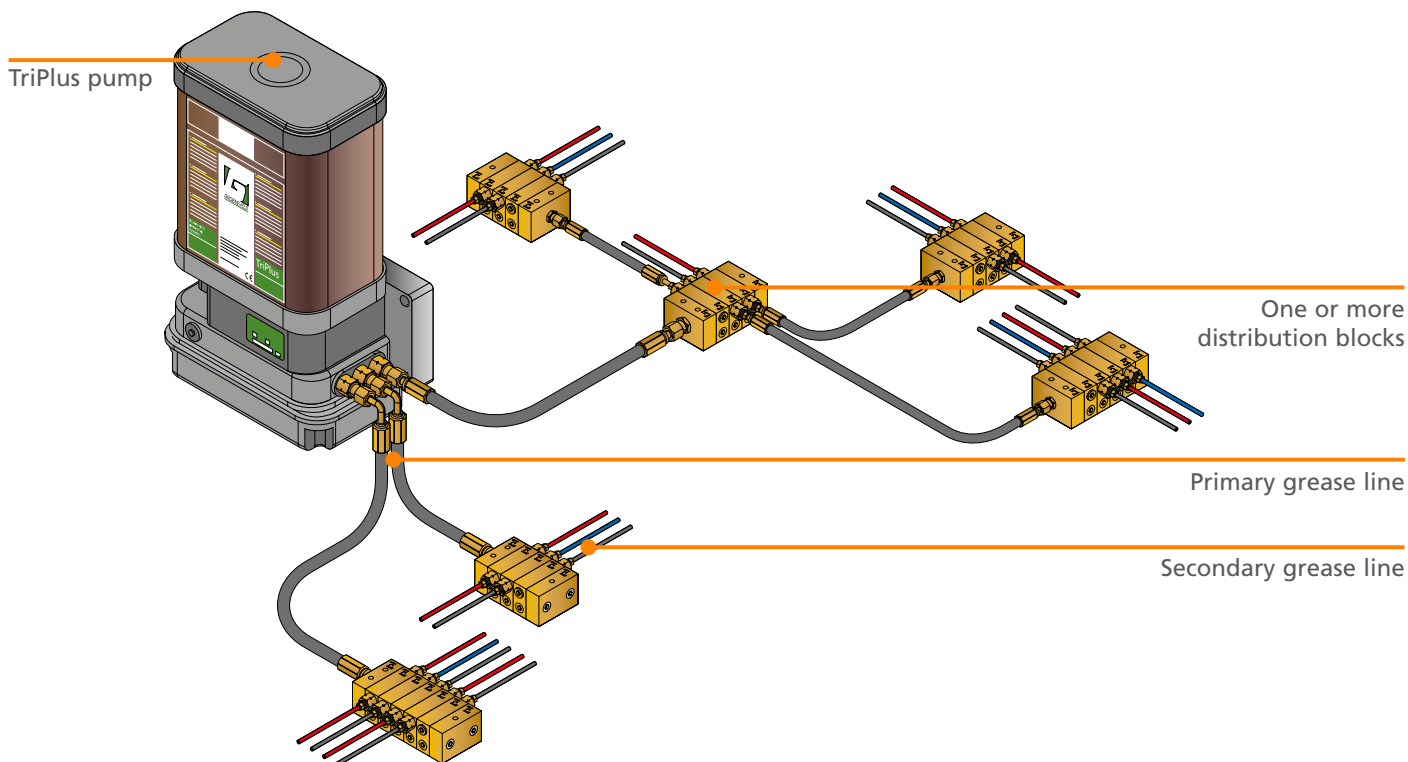
The TriPlus can be delivered with up to 3 separate grease outlets with independent programming.



## Working principle

When the pump is activated, grease is pumped into the pump elements. The progressive elements transfer the grease to the progressive distribution block via the primary grease line. Then it's being transferred to additional blocks or to the lubrication points via secondary grease lines.

If the pump features more than 1 grease output port, one or 2 shuttle valves are installed in the pump. By placing the shuttle valves in a certain position the control unit controls which output is used to transfer the grease.



## Technical information

|                            |                                    |
|----------------------------|------------------------------------|
| Pump type                  | Electric                           |
| Supply voltage             | 12 or 24 Vdc                       |
| No. of outlets             | Max. 3                             |
| Output                     | 2.5 cc/min. or 0.1 cc/revolution   |
| Maximum operating pressure | 250 bar (3625 psi)                 |
| Reservoir capacity         | 1.5, 3, 4, 6 or 8 litre            |
| Grease class               | NLGI-2                             |
| Temperature range          | -20 up to +85 °C (-4 up to 185 °F) |
| Protection class           | IP67                               |

## Applications

The TriPlus can be used for a wide variety of applications but is most commonly used for low loaders, tippers, refuse trucks or in bulk handling



Low loaders



Tipper



Refuse trucks

## BEKAMAX GIGA

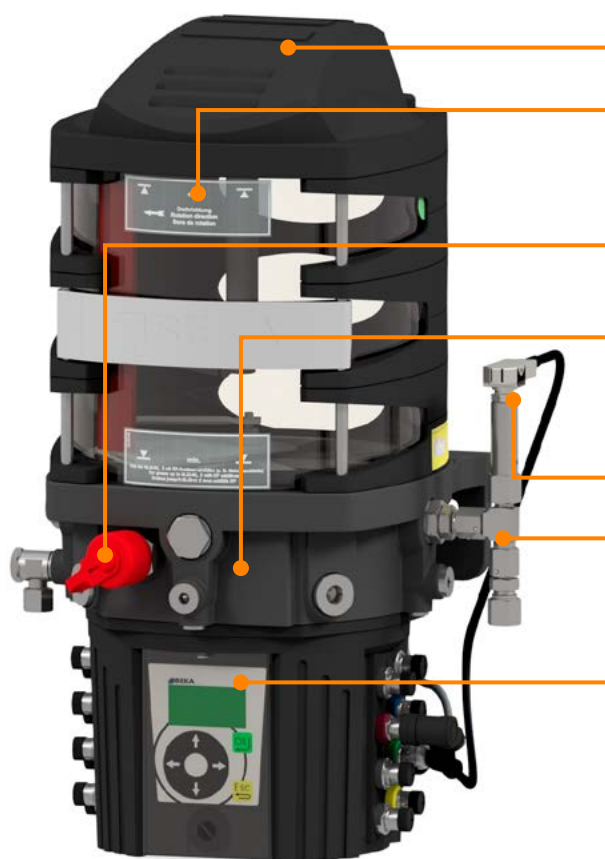
The BEKA GIGA range is like having four pumps in one! It serves the full range of automatic lubrication systems and can be used as a progressive as well as a single line, dual line or sectional system. The progressive system is the most commonly used layout.

The GIGA has three independent outlets for lubricant supply that are tied together by internal channels within the pump housing. Each channel can be used for a different section (with its own pump element) and set to a unique cycle, or they can all be combined to one lubrication circle with a higher delivery rate.

The optional GIGA-multitronic control unit can control and monitor up to four modes of lubrication.

- Suitable for all lubrication systems: single line, dual line, progressive and sectional
- Three lubrication circuits that can be operated independently
- Grease metering regardless of the ambient temperature
- Available in different reservoir sizes; 4, 8 or 16 litre

### System overview



#### Reservoir cover

#### Reservoir

The GIGA is available with reservoir volumes of 4, 8 and 16 litre. All reservoirs contain a agitator blade which enables a visual check of the lubricant volume in the reservoir.

#### Filling port

The pump can be filled with a standard filling gun.

#### Pump housing

The delivery volume of the GIGA can be varied by combining the outlets to one due to the special pump body with integrated channels.

#### Pressure relief valve

#### Pump element

The GIGA has up to a maximum of 3 independently operating lubricant outlets. A separate pump element is required for each outlet. Two pump elements with different flow rates are available.

#### Controller with motor housing

There are 3 different housings available:

- A version without control
- A version with the GIGA-tronic
- A version with the GIGA-multitronic control unit.

### Pump elements

Two pump elements with different flow rates are available for the GIGA range. Both elements are available with or without a pressure limiting valve.



PE 120G PLV  
0.12 cc/stroke and outlet



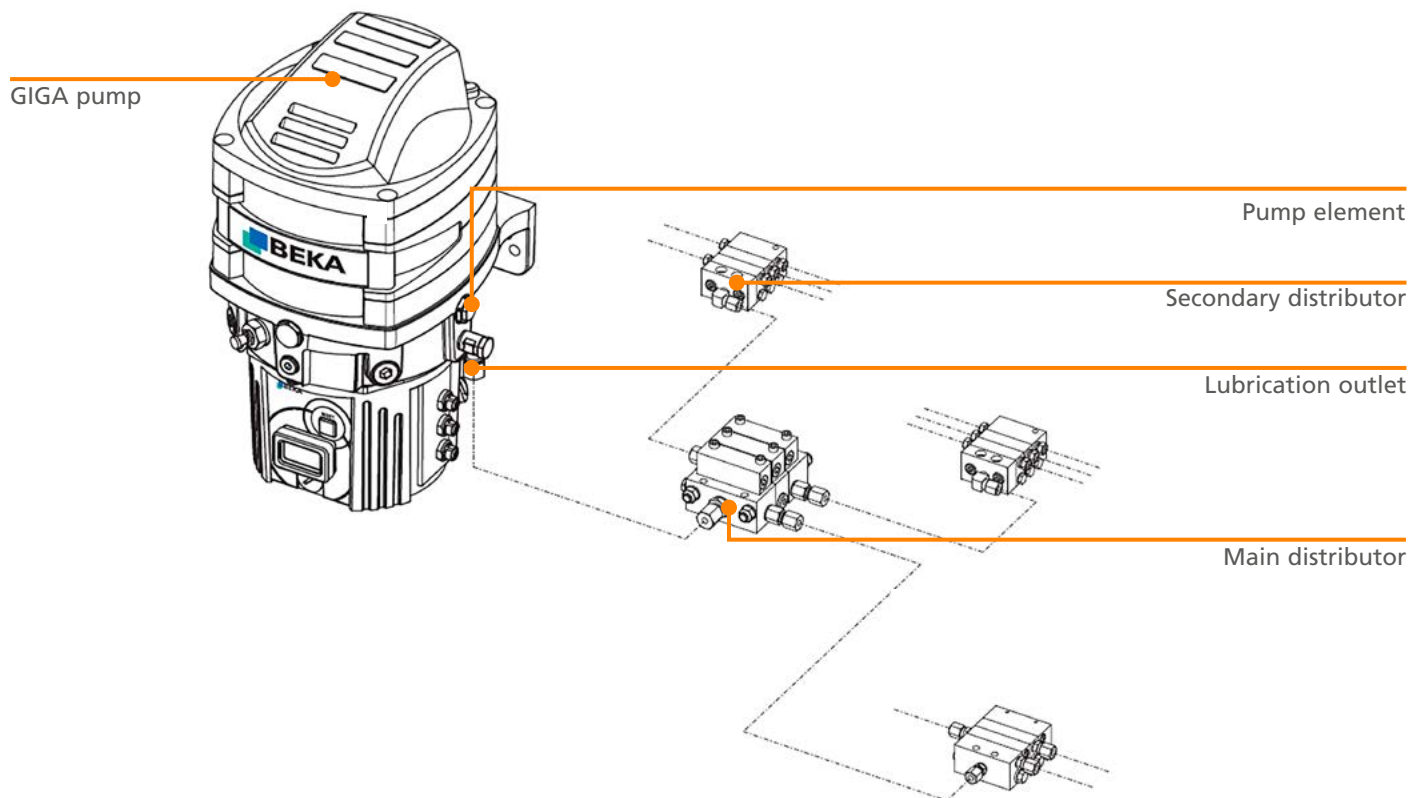
PE 250G PLV  
0.25 cc/stroke and outlet



## Working principle

A progressive system consists of a lubrication pump and progressive distributors. The pump delivers the lubricant into a main distributor. The main distributor distributes the lubricant in the correct ratio to the secondary distributors which continue to distribute the lubricant to the lubrication points.

By internally connecting the outputs of the GIGA pump unit you can create 1 lubrication cycle with an output of 0.25, 0.50 or 0.75 cc per stroke.



## Technical information

|                            |                                     |
|----------------------------|-------------------------------------|
| Pump type                  | Electric                            |
| Supply voltage             | 12, 24 V DC or 100-250 V AC         |
| No. of outlets             | Max. 3                              |
| Output                     | Depending on pump element           |
| Maximum operating pressure | 300 bar (4000 psi)                  |
| Pressure limiting valve    | Adjusted to max. 280 bar (4000 psi) |
| Number of revolutions      | 17 min <sup>-1</sup>                |
| Grease class               | NLGI-2                              |
| Reservoir volume           | 4, 8 or 16 litre                    |
| Temperature range          | -30 up to +70 °C (-22 up to 158 °F) |
| Protection class           | IP67                                |

## Applications

The GIGA range can be used for a wide variety of applications but is most commonly used for large construction and mining applications like dump trucks, tracked excavators, harvesters, combines and port equipment.



Dump trucks



Tracked excavators



Harvesters



Port Equipment

## BEKA FKGGM-EP(R)

The BEKA FKGGM-EP/EPR lubrication system is able to deliver commercial lubricants from up to NLGI-2 at a working pressure of maximum 350 bar. Due to its large reservoir capacity, the FKGGM is mainly used in wind turbines and industrial applications like printing machines, packing machines and plastic-, wood- or metal processing machines.

- Up to three lubrication circuits
- Available in different reservoir sizes up to 30 litres
- Powerful output up to 0.17 cc/stroke

### System overview



#### Minimum level monitoring

The minimum level monitor is assembled on the cover of the plastic reservoirs.

#### Reservoir

The FKGGM is available with different reservoir volumes.

The FKGGM-EP is equipped with an agitator blade.

The FKGGM-EPR is equipped with a follower plate, enabling an installation in each position, also in rotating parts.

#### Pump element

The FKGGM has up to a maximum of 3 lubricant outlets. A separate pump element is required for each outlet. Three pump elements with different flow rates are available, as well as a flow-adjustable pump element.

#### Filling zerk

The pump can be filled with a standard filling gun. The filling zerk can be replaced by a filler coupling.

#### Control unit

The FKGGM can be controlled externally or with an integrated control unit with:

- 3 control functions: time, cycle or revolutions
- Electronic monitoring of grease level, pump function, distributor function, line rupture, lubricant feeding
- Selection of operating conditions: easy, medium or heavy
- Integrated data logger with diagnosis module

### Pump elements

Three pump elements with different flow rates are available, as well as a flow-adjustable pump element. All pump elements are marked either with a groove or with a notch for a better differentiation.



PE 60 PLV  
0.06 cc/stroke



PE 120 PLV  
0.12 cc/stroke



PE 120 V PLV  
Max. 0.12 cc/stroke  
Adjustable output



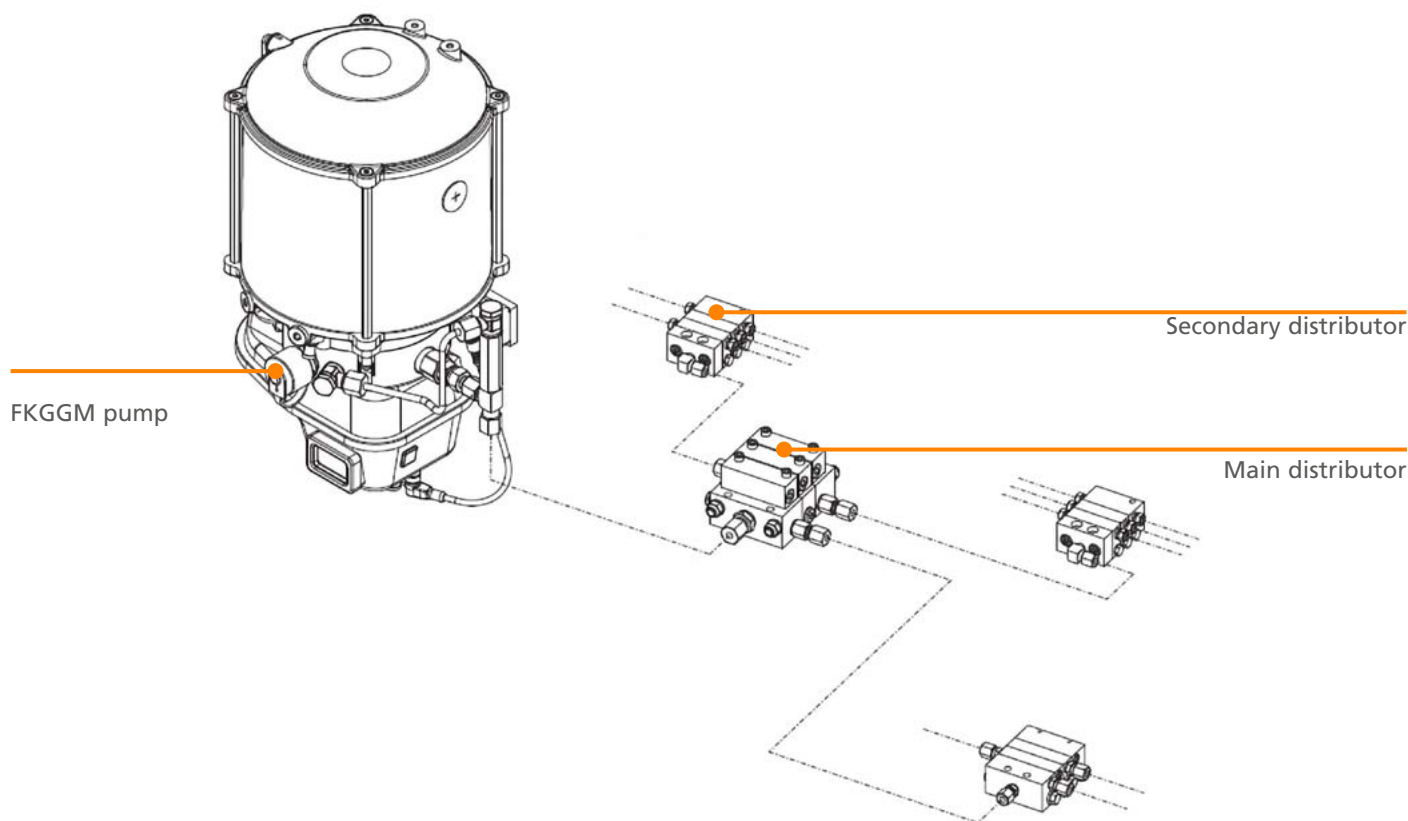
PE 170 PLV  
0.17 cc/stroke

Pressure: Max. 350 bar

Pressure limiting valve: adjusted to 280 bar

## Working principle

The progressive central lubrication system consists of a central lubrication pump, a main distributor and secondary distributors (related on the system). The central lubrication pump supplies lubricant to the main distributor. This one supplies lubricant in the right relation to the secondary distributors. From here lubricant is delivered to the lube points.



## Technical information

|                            |  |
|----------------------------|--|
| Pump type                  | Electric                               |
| No. of outputs             | Max. 3                                 |
| Output                     | 2.5 cc/min. or 0.17 cc/revolution      |
| Maximum operating pressure | 350 bar                                |
| Pressure limiting valve    | Set to 280 bar                         |
| Number of revolutions      | 15 min <sup>-1</sup>                   |
| Grease class               | Greases up to NLGI-2                   |
| Reservoir volume FKGGM-EP  | 1.9, 2.5, 4, 8, 12, 16, 20 or 30 litre |
| Reservoir volume FKGGM-EPR | 4, 8, 12, 15 or 20 litre               |
| Temperature range          | -40 up to +70 °C (-40 up to 158 °F)    |
| Supply voltage             | 12 or 24 Vdc                           |
| Protection class           | IP65                                   |

## Applications

The FKGGM range can be used for a wide variety of applications but is most commonly used for wind turbines or industrial applications.



Wind turbines



Industrial applications







## **Solutions for attachments**



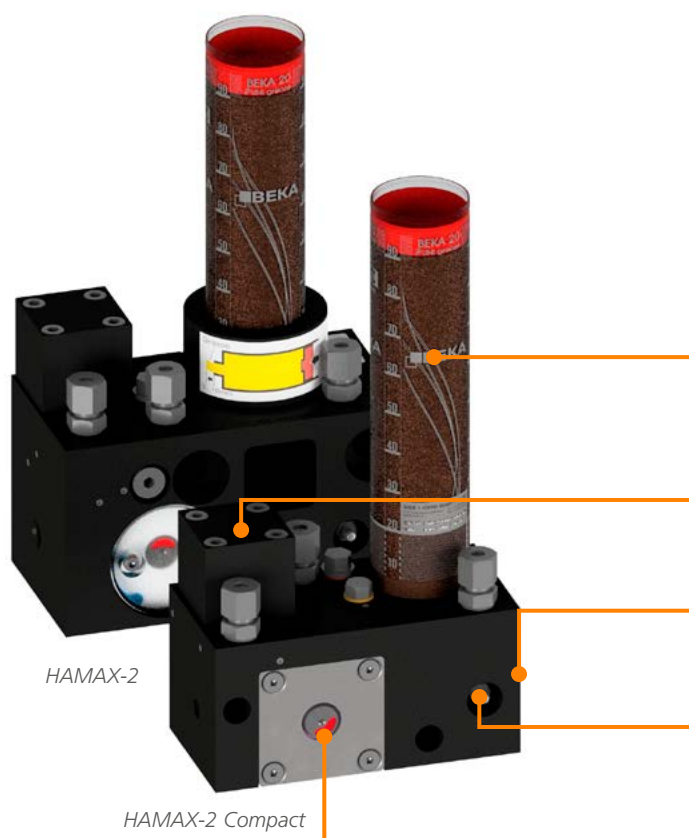
## BEKA HAMAX

Hydraulic breakers are highly-stressed add-on tools for construction machines and need to be supplied with special lubricants to reduce wear and tear of the chisel. The BEKA HAMAX offers a complete range for hydraulic breakers or other construction machinery attachments.

BEKA's HAMAX breaker lubrication systems guarantee the steady lubrication of highly loaded bearing points. Due to the special design of the pumps it is even possible to deliver lubricants with high solid additives like copper.

- Effective reduction of wear and tear
- Higher productivity without separate lubricating services
- Trouble free operation with heavy duty components
- Reliable even with low temperatures
- Suitable for special lubricants
- Installation at the breaker - ideal for the use with different machines

### System overview HAMAX-2 & HAMAX-2 Compact



#### Grease cartridge

The HAMAX-2 and HAMAX-2 Compact are suitable for different grease cartridge types for EP-grease without solids or chisel pastes up to NLGI-2.

#### Hydraulic motor

Since the device is driven by a hydro motor a continuous lubricant delivery is ensured.

#### Pump element

The HAMAX-series have an integrated and exchangeable pump element.

#### Grease zerk

A grease zerk is integrated for manual lubrication in case of a failure of the hydraulic system.

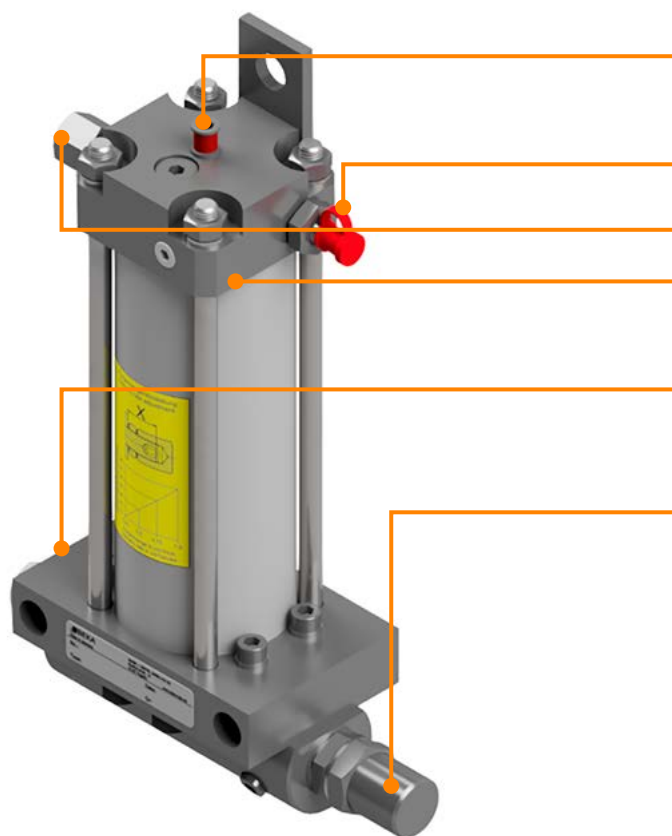
#### Visual operating indicator

### Technical information

|                                 |   |
|---------------------------------|---|
| Pump type                       | Hydraulic   |
| Supply                          | Hydraulic breaker circuit, 60 - 320 bar (870 - 4641 psi)                        |
| Volume flow of the drive medium | 0,8 - 2,8 l/min (0,21 - 0,74 gal/min)   |
| No. of outlets                  | 1   |
| Delivery rate                   | 0.12 cc/stroke  |
| Default stroke                  | 14 strokes/min. Stroke number adjustable with throttle                          |
| Grease class                    | Chisel paste with solids and standard grease up to NLGI-2                       |
| Grease supply                   | Different types of cartridges, depending on cartridge sleeve: Type S, F, J or L |
| Temperature range               | -20 up to +70 °C (-4 up to 158 °F)  |



## System overview HAMAX-11



### Level indication pin

If the grease reservoir is empty, the level indication pin will be visible.

### Filling zerk

### Outlet

### Grease reservoir

The HAMAX-11 is available with reservoir volumes of 0.1, 0.2 or 0.4 litre.

### Hydraulic connection

The hydraulic connection of the pump can be connected via a bypass line to the hydraulic system of the supporting device.

### Output adjusting screw

The output rate is infinitely variable from 0.25 cc up to 1 cc per stroke via the adjustment screw.

## Working principle

HAMAX 11 is mainly used to lubricate hydraulic hammers or other construction machinery attachments. Due to its compact design, it can be mounted directly at the attachment. For operation, the grease pump is connected with a bypass line to the hydraulic pressure line of the carrier.

HAMAX 11 is designed that with each hydraulic pulse one lubricant stroke is carried out. The delivery rate is adjustable with a setscrew. Three different types of reservoir sizes are available. The grease level control is carried out visually by the level indicator pin.

## Technical information

|                   |   |
|-------------------|---|
| Pump type         | Hydraulic   |
| No. of outlets    | 1   |
| Delivery rate     | 0.25 up to 1 cc/stroke                                    |
| Default stroke    | 1 stroke per pulse at hydraulic connection                |
| Grease class      | Chisel paste with solids and standard grease up to NLGI-2 |
| Temperature range | -25 up to +80 °C (-13 up to 176 °F)                       |

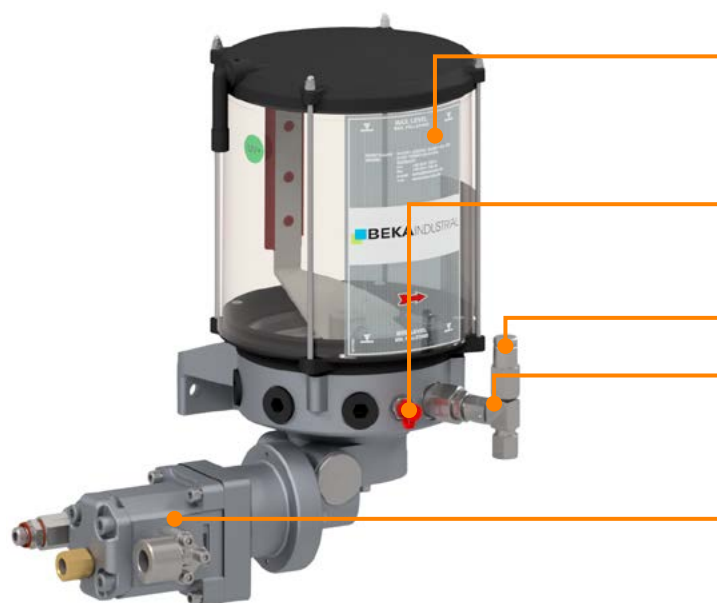


## BEKA FKGM-HP

The BEKA-MAX FKGM-HP is a hydraulic actuated pump and used for lubrication of an hydraulic hammer, installed on the excavator itself to protect the pump.

- Installation directly at the excavator to protect the pump
- Suitable for greases up to NLGI-2 and chisel paste
- Available in different reservoir sizes, transparent plastic or steel
- Lubricant output from 0.12 up to 0.17 cc per stroke

### System overview



#### Grease reservoir

The FKGM-HP is equipped with an agitator blade. The pump is available with 4 transparent reservoir sizes and with 2 steel reservoir sizes.

#### Filling zerk

The pump can be filled with a standard filling gun. The filling zerk can be replaced by a filler coupling.

#### Pressure relief valve

#### Pump element

A separate pump element is required for each outlet. Three pump elements with different flow rates are available, as well as a flow-adjustable pump element.

#### Hydraulic motor

The speed of the hydraulic driven gear motor is regulated via the flow of the drive medium. The number of revolutions can be adjusted.

### Pump elements

Three pump elements with different flow rates are available, as well as a flow-adjustable pump element. All pump elements are marked either with a groove or with a notch for a better differentiation. Special versions are available for the use of grease with solid contents.



PE 120 PLV  
0.12 cc/stroke



PE 120 V PLV  
Max. 0.12 cc/stroke  
Adjustable output



PE 170 PLV  
0.17 cc/stroke

Pressure: Max. 350 bar

Pressure limiting valve: adjusted to 280 bar

### Technical information

|                    |   |
|--------------------|---|
| Pump type          | Hydraulic   |
| No. of outlets     | Max. 3  |
| Delivery rate      | Max. 0.17 cc/stroke                                       |
| Grease class       | Chisel paste with solids and standard grease up to NLGI-2 |
| Reservoir capacity | 1.9, 2.5, 4 or 8 litre transparent<br>2 or 4 litre steel  |
| Temperature range  | -20 up to +70 °C (-4 up to 158 °F)                        |

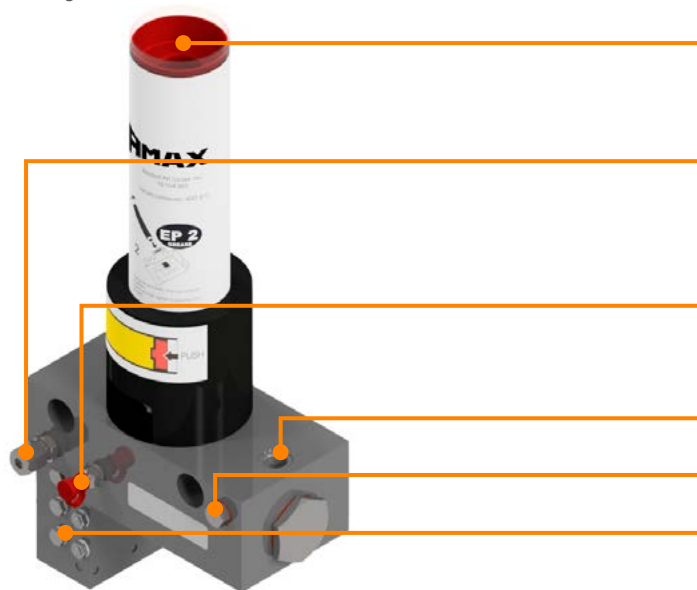
## BEKA HPG-2

The hydraulic grease pump HPG-2 is an automatic lubrication system which, thanks to its robust and compact design, is particularly suitable for use in progressive centralized lubrication systems. The HPG-2 is the ideal solution for greasing of attachments of construction machinery or agricultural applications.

The HPG-2 is designed for the delivery of NLGI-1 and NLGI-2 multi-purpose grease. The use of standard grease cartridges enables quick and clean refilling.

- Robust and compact design for use with progressive centralized lubrication systems
- Ideal solution for attachments
- Suitable for different grease cartridge types, NLGI-1 and NLGI-2
- Equipped with a MX-2 type progressive distributor
- Suitable for up to 20 lubrication points

### System overview



#### Grease cartridge

The HPG-2 is suitable for different grease cartridge types for EP-grease up to NLGI-2.

#### Lubricant outlet

If a lubrication point needs a higher dosage it is possible to combine several metering elements and deliver the grease to the pumps separate lubrication outlet.

#### Filling zerk

A grease nipple is integrated for manual lubrication in case of a failure of the hydraulic system or to prefill the system.

#### Hydraulic connection

#### Hydraulic ventilation

#### Progressive distributor

The HPG-2 is equipped with a MX-2 progressive distributor. The number of elements as well as the metering volume can be adjusted to the application.

### Progressive divider MX-2

The progressive distributor MX-2 is installed at the hydraulic pump HPG-2. The MX-2 contains minimum three and maximum 10 metering elements and one end element, that are combined to one distributor block. Each element has 2 outlets.

| Metering element | Output per outlet | Output per element |
|------------------|-------------------|--------------------|
| MX-2 25          | 0.025 cc          | 0.050 cc           |
| MX-2 45          | 0.045 cc          | 0.090 cc           |
| MX-2 75          | 0.075 cc          | 0.150 cc           |
| MX-2 105         | 0.105 cc          | 0.210 cc           |

### Technical information

|                                    |  |
|------------------------------------|--|
| Pump type                          | Hydraulic  |
| Actuation pressure                 | Min. 70 bar, max. 400 bar (Min. 1015 psi, max. 5801 psi)                         |
| Residual pressure hydraulic system | Max. 20 bar (290 psi)  |
| No. of outlets                     | Max. 20 or 1 at pump housing   |
| Delivery rate                      | 0.27 cc/stroke   |
| Grease class                       | NLGI-1 and NLGI-2 multi-purpose grease   |
| Type of cartridge                  | Different types of cartridges, depending on cartridge sleeve: Type S, F, J, or L |
| Temperature range                  | -10 up to +50 °C (14 up to 122 °F)   |

## BEKA HPM-2S

The BEKA HPM-2S grease hydraulic pump is a centralized lubrication pump which, thanks to its robust and compact design, is particularly suitable for use in progressive centralized lubrication systems on attachments such as plowing, harrowing, drilling or sowing machines, balers, front loaders and other hydraulic equipment.

The HPM-2S hydraulic grease pump is designed for pumping NLGI-2 multi-purpose greases. The use of standard grease cartridges type S, which are screwed directly into the pump housing, enable quick and clean refilling.

The HPM-2S hydraulic grease pump can be combined with progressive distributors.

- Delivers lubricant dose with each impuls of the hydraulic system
- Adjustable output rates to suit equipment and application
- Suitable for NLGI-2 grease cartridge type S
- Output from 0.2 up to 2.0 cc/stroke

### System overview



#### Grease cartridge

The HPM-2S is suitable for NLGI-2 grease cartridge type S without solids.

#### Lubricant connection

#### Ventilation screw hydraulic oil

#### Hydraulic connection

#### Set screw

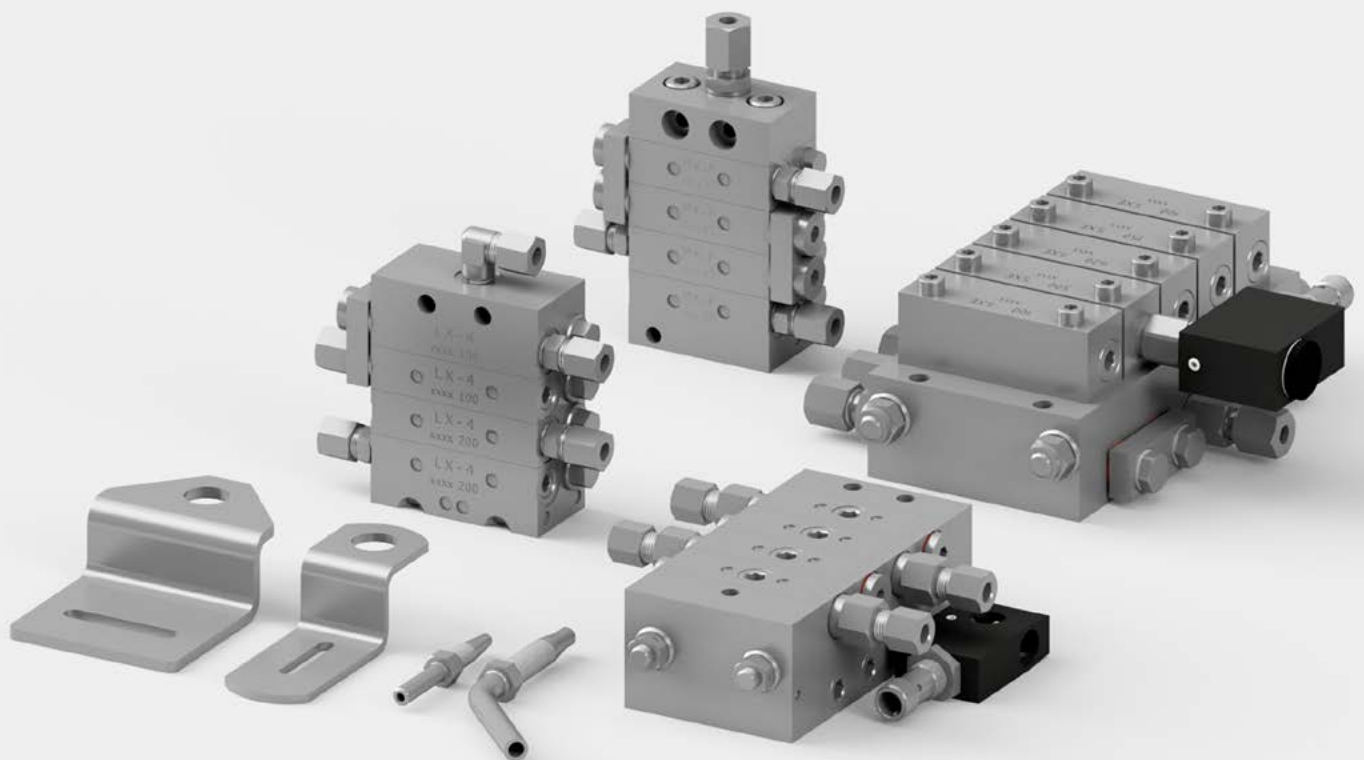
The delivery rate can be set progressively via the setscrew for the delivery rate within a range from 0.2 to 2.0 cc/stroke.

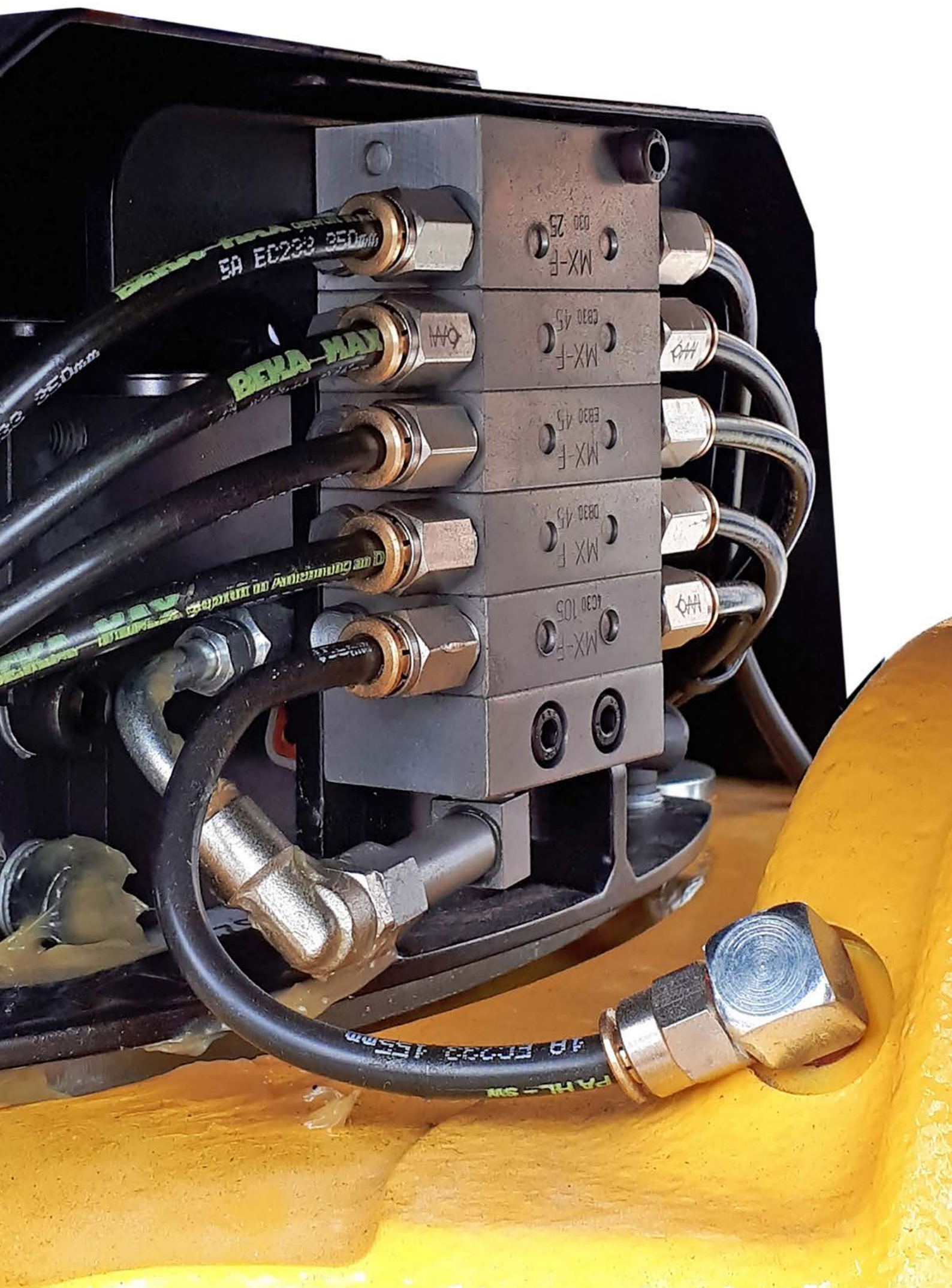
### Technical information

|                                    |   |
|------------------------------------|---|
| Pump type                          | Hydraulic   |
| Actuation pressure                 | Min. 130 bar, max. 250 bar (min. 1885 psi, max. 3625 psi) |
| Residual pressure hydraulic system | Max. 10 bar (145 psi)                                     |
| No. of outlets                     | 1   |
| Delivery rate                      | 0.2 up to 2 cc per stroke                                 |
| Max. lubrication outlet pressure   | 220 bar   |
| Default stroke                     | 1 stroke per pulse at hydraulic connection                |
| Grease class                       | NLGI-2 grease without solids                              |
| Grease supply                      | 400 cc cartridges, type S                                 |
| Temperature range                  | 0 °C up to +50 °C (-4 up to 158 °F)                       |



# Progressive distributors





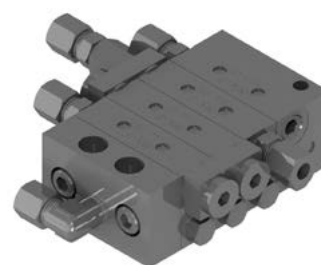
## BEKA Progressive distributors for oil and grease

The BEKA progressive distributors are built in modular disc design. Therefore the distributors can be extended or shortened depending on the number of lubrication points. Because of the disk construction, there is the possibility to form individual distributors with different metering elements and different metering volumes.

### BEKA MX-F

The MX-F distributors are used in the mobile range, in onroad and offroad vehicles, agricultural and construction machinery etc. These distributors are made of steel with a zinc-nickel coating.

| Type element             | Output per outlet                                  | Output per element |
|--------------------------|--|--------------------|
| MX-F 25                  | 0.025 cc   | 0.05 cc            |
| MX-F 45                  | 0.045 cc   | 0.09 cc            |
| MX-F 75                  | 0.075 cc   | 0.15 cc            |
| MX-F 105                 | 0.105 cc   | 0.21 cc            |
| No. of metering elements | Min. 3, max. 12<br>Excluding start and end element |                    |



### BEKA LX-4

The LX-4 distributors are the alternative for the MX-F with a high metering flexibility and accuracy. They are made of steel with a zinc-nickel coating.

| Type element             | Output per outlet                                  | Output per element |
|--------------------------|--|--------------------|
| LX-4 50                  | 0.05 cc  | 0.10 cc            |
| LX-4 100                 | 0.10 cc  | 0.20 cc            |
| LX-4 150                 | 0.15 cc  | 0.30 cc            |
| LX-4 200                 | 0.20 cc  | 0.40 cc            |
| No. of metering elements | Min. 3, max. 10<br>Excluding start and end element |                    |



### BEKA MX-I

The MX-I distributors are especially suitable for the food industry and aggressive environments. These distributors are made of stainless steel with the highest material quality, 1.4404.

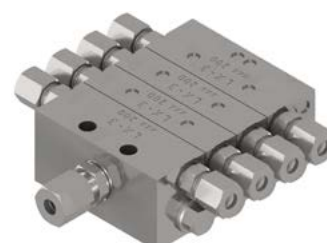
| Type element             | Output per outlet                                 | Output per element |
|--------------------------|---|--------------------|
| MX-I 45                  | 0.045 cc  | 0.90 cc            |
| MX-I 75                  | 0.075 cc  | 0.15 cc            |
| MX-I 105                 | 0.105 cc  | 0.21 cc            |
| No. of metering elements | Min. 3, max. 8<br>Excluding start and end element |                    |



### BEKA LX-3

The LX-3 distributors are perfectly suitable for the beverage and packaging industry. These distributors are made of stainless steel with the highest material quality, 1.4404.

| Type element             | Output per outlet                                  | Output per element |
|--------------------------|--|--------------------|
| LX-3                     | 0.20 cc  | 0.40 cc            |
| No. of metering elements | Min. 3, max. 10<br>Excluding start and end element |                    |





## BEKA SX-1

The SX-1 is a typical main distributor for industrial applications. They are available with integrated non-return-valve. These distributors are made of steel with a zinc-nickel coating.

| Type element             | Output per outlet                                  | Output per element |
|--------------------------|--|--------------------|
| SX-1 05                  | 0.068 cc   | 0.136 cc           |
| SX-1 10                  | 0.105 cc   | 0.210 cc           |
| SX-1 15                  | 0.150 cc   | 0.300 cc           |
| SX-1 20                  | 0.210 cc   | 0.420 cc           |
| SX-1 25                  | 0.275 cc   | 0.550 cc           |
| SX-1 35                  | 0.350 cc   | 0.700 cc           |
| SX-1 45                  | 0.430 cc   | 0.860 cc           |
| No. of metering elements | Min. 3, max. 10<br>Excluding start and end element |                    |



## BEKA SX-2 / SX3

The SX-2 and SX-3 combine compact dimensions with a high volume flow.

The SX-2 distributors are made of steel with a zinc-nickel coating. The SX-3 distributors are made of stainless steel with the highest material quality, 1.4404. Therefore they are especially suitable for the food industry and in aggressive environments.

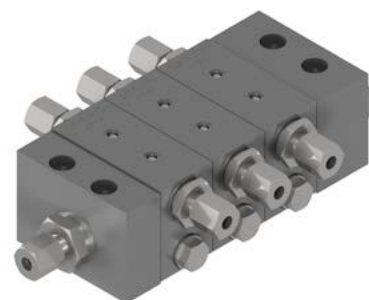
| Type element             | Output per outlet                                  | Output per element |
|--------------------------|--|--------------------|
| SX-2 (3) 07              | 0.075 cc   | 0.150 cc           |
| SX-2 (3) 11              | 0.117 cc   | 0.234 cc           |
| SX-2 (3) 17              | 0.170 cc   | 0.340 cc           |
| SX-2 (3) 23              | 0.230 cc   | 0.460 cc           |
| SX-2 (3) 30              | 0.300 cc   | 0.600 cc           |
| SX-2 (3) 38              | 0.380 cc   | 0.760 cc           |
| SX-2 (3) 47              | 0.470 cc   | 0.940 cc           |
| No. of metering elements | Min. 3, max. 10<br>Excluding start and end element |                    |
| Revolutions SX-2         | Max. 180 revolutions/min.                          |                    |
| Revolutions SX-3         | Max. 60 revolutions/min.                           |                    |



## BEKA SX-5

The SX-5 distributors stand out because of their heavy duty design and their large connection threads. They are available with integrated non-return-valve. They are especially suitable for the mining industry.

| Type element             | Output per outlet                                  | Output per element |
|--------------------------|--|--------------------|
| 075 SX-5                 | 0.075 cc   | 0.150 cc           |
| 117 SX-5                 | 0.117 cc   | 0.234 cc           |
| 170 SX-5                 | 0.170 cc   | 0.340 cc           |
| 230 SX-5                 | 0.230 cc   | 0.460 cc           |
| 300 SX-5                 | 0.300 cc   | 0.600 cc           |
| 380 SX-5                 | 0.380 cc   | 0.760 cc           |
| 470 SX-5                 | 0.470 cc   | 0.940 cc           |
| No. of metering elements | Min. 3, max. 10<br>Excluding start and end element |                    |





## BEKA UX

The UX distributors have their outlets positioned upward, making them easily detachable when swivel joints are used at the pipe lines. They are made of steel with a zinc-nickel coating.

| Type element             | Output per outlet                                  | Output per element |
|--------------------------|--|--------------------|
| UX 1000                  | 1.13 cc  | 2.26 cc            |
| UX 1500                  | 1.54 cc  | 3.08 cc            |
| UX 2000                  | 2.00 cc  | 4.00 cc            |
| No. of metering elements | Min. 3, max. 10<br>Excluding start and end element |                    |



## BEKA SXE-2 / SXE-2R / SXE-3

The SXE distributor-range is designed for the use as main distributor for lubrication systems at construction machinery. Within this range the use of dummy elements is possible, which can be replaced by metering elements if necessary without disassembling the whole distributor and lines. The SXE-distributors are made of steel with a zinc-nickel coating.

| Type element             | Output per outlet                                       | Output per element |
|--------------------------|---|--------------------|
| 000 SXE-2/3              | Dummy element   |                    |
| 100 SXE-2 (SXE-2/3)      | 0.10 cc   | 0.20 cc            |
| 150 SXE-2 (SXE-2/3)      | 0.15 cc   | 0.30 cc            |
| 220 SXE-2 (SXE-2/3)      | 0.22 cc   | 0.44 cc            |
| 300 SXE-2 (SXE-2/3)      | 0.30 cc   | 0.60 cc            |
| 400 SXE-2 (SXE-2/3)      | 0.40 cc   | 0.80 cc            |
| 500 SXE-2 (SXE-2/3)      | 0.50 cc   | 1.00 cc            |
| 620 SXE-2 (SXE-2/3)      | 0.62 cc   | 1.24 cc            |
| 760 SXE-2 (SXE-2/3)      | 0.76 cc   | 1.52 cc            |
| No. of metering elements | Min. 3, max. 10<br>Excluding start and end element      |                    |
| SXE-2R                   | With integrated return-to-tank channels and connections |                    |
| SXE-3                    | Suitable for larger line diameter                       |                    |



## BEKA SXD

The SXD distributors are also designed for the use as main distributor, but due to the connections of the outlets facing downwards they are perfectly suitable for installation into a dust and impact protected control cabinet. The use of dummy elements is possible, which can be replaced by metering elements if necessary.

The SXD-distributors are made of steel with a zinc-nickel coating.

| Type element             | Output per outlet                                  | Output per element |
|--------------------------|--|--------------------|
| SXD M000                 | Dummy element                                      |                    |
| SXD M100                 | 0.10 cc  | 0.20 cc            |
| SXD M150                 | 0.15 cc  | 0.30 cc            |
| SXD M220                 | 0.22 cc  | 0.44 cc            |
| SXD M300                 | 0.30 cc  | 0.60 cc            |
| SXD M400                 | 0.40 cc  | 0.80 cc            |
| SXD M500                 | 0.50 cc  | 1.00 cc            |
| SXD M620                 | 0.62 cc  | 1.24 cc            |
| SXD M760                 | 0.76 cc  | 1.52 cc            |
| No. of metering elements | Min. 3, max. 10<br>Excluding start and end element |                    |



BEKA SXW-1

The progressive distributors in sandwich construction consist of a connecting plate and several metering elements. The elements are connected to the connecting plate and can be exchanged individually or completely with the base plate. The use of dummy elements is possible, which can be replaced by metering elements if necessary.

The SXW-range is especially suitable for oil circulating systems. The metering elements are made of coated steel, with a connection plate made of aluminium, which reduces the weight of the distributor.

| Type element             | Output per outlet | Output per element |
|--------------------------|-------------------|--------------------|
| 000 SXW-1                | Dummy element     |                    |
| 100 SXW-1                | 0.10 cc           | 0.20 cc            |
| 150 SXW-1                | 0.15 cc           | 0.30 cc            |
| 220 SXW-1                | 0.22 cc           | 0.44 cc            |
| 300 SXW-1                | 0.30 cc           | 0.60 cc            |
| 400 SXW-1                | 0.40 cc           | 0.80 cc            |
| 500 SXW-1                | 0.50 cc           | 1.00 cc            |
| 630 SXW-1                | 0.63 cc           | 1.26 cc            |
| 750 SXW-1                | 0.75 cc           | 1.50 cc            |
| 900 SXW-1                | 0.90 cc           | 1.80 cc            |
| No. of metering elements | Min. 3, max. 10   |                    |



BEKA SXW-2

The SXW-2 distributors are especially developed for oil lubricating systems in the automotive industry.

| Type element             | Output per outlet | Output per element |
|--------------------------|-------------------|--------------------|
| 000 SXW-2                | Dummy element     |                    |
| 900 SXW-2                | 0.90 cc           | 1.80 cc            |
| 1800 SXW-2               | 1.80 cc           | 3.60 cc            |
| 2700 SXW-2               | 2.70 cc           | 5.40 cc            |
| 3700 SXW-2               | 3.70 cc           | 7.40 cc            |
| No. of metering elements | Min. 3, max. 10   |                    |

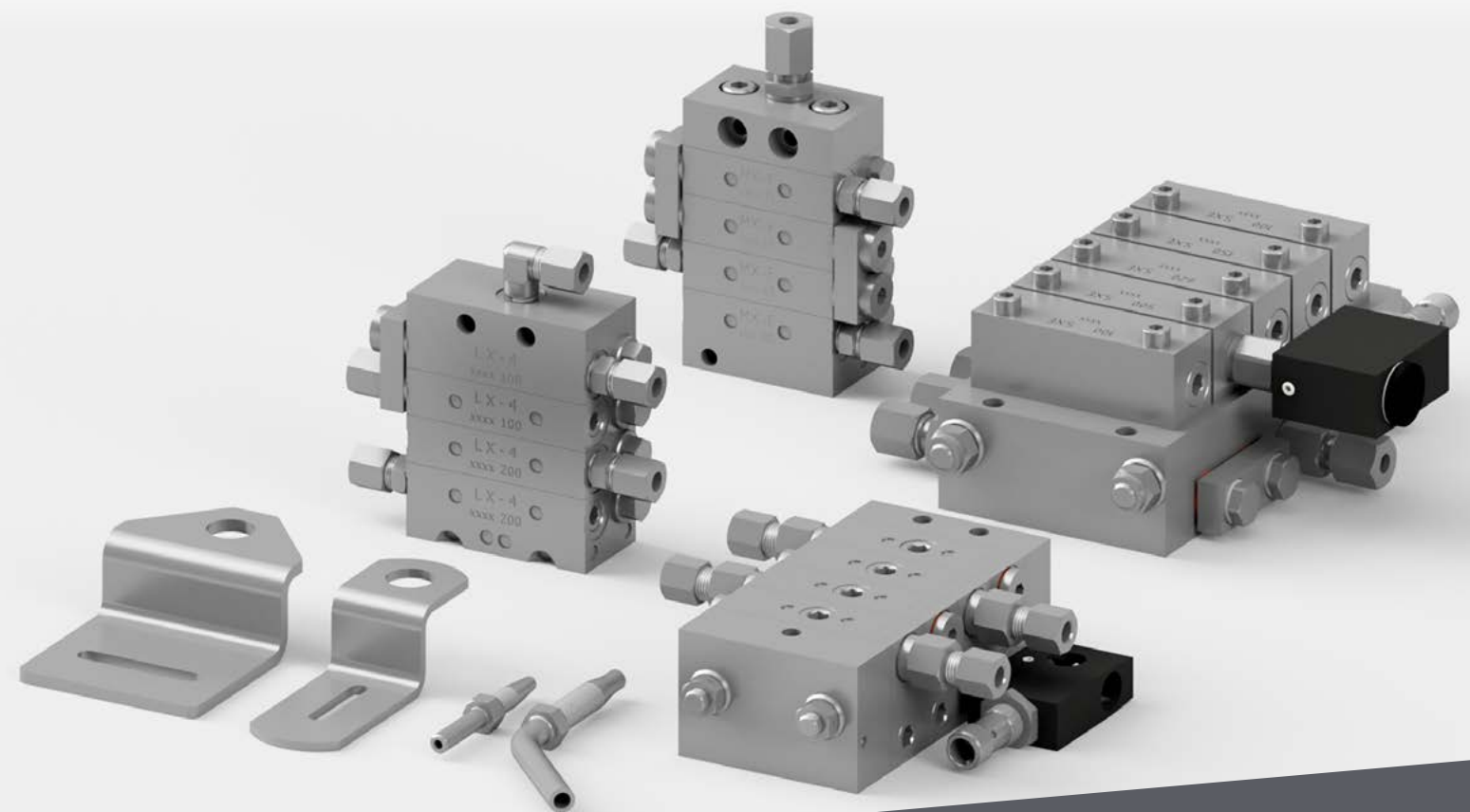


## Zinc-nickel coating, the surface for rough conditions

Zinc-nickel coating does not only considerably increase the corrosion resistance but is also characterized by highest environmental compatibility and a high-quality appearance.

Surfaces coated with zinc-nickel prove to have a significantly higher resistance against corrosion than previous solutions with A3C. As this zinc-nickel coating offers so many advantages, Groeneveld-BEKA offers all relevant components and parts like distributors, fittings, pump elements etc. with a zinc-nickel coating.

- Excellent corrosion resistance
- Free of hexavalent chromium
- Significantly longer service life compared to conventional electroplating method
- White rust only occurs as a slight grey coating
- The zinc-nickel coating complies with all European requirements



**Corrosion resistance (red rust) > 720h salt spray test**



Groeneveld-BEKA | [info@groeneveld-beka.com](mailto:info@groeneveld-beka.com) | [www.groeneveld-beka.com](http://www.groeneveld-beka.com)

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