

Your perma partner:

# Catalogue



The Expert in Lubrication Solutions



SCAN ME

perma

## Legend

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### Applications:



Conveyors



Electric motors



Pumps



Blowers / Fans

### Machine elements:



Roller bearings



Sliding bearings /  
Sliding guides



Linear guides



Open gears /  
Gear racks



Spindles



Shaft seals



Chains

### Ex-proof certification:

Testing and certification of equipment intended for use in potentially explosive atmospheres. It certifies that the device was tested and is in compliance with ex-proof requirements and safety standards.



**Ex**  
→ Europe

**TIIS**

**TIIS**  
→ Japan



**IECEX**  
→ Global



**FM APPROVED**  
→ Canada and USA

**ANZEx**

**ANZEx**  
→ Australia and New Zealand



**UL (Underwriters Laboratories)**  
→ Canada and USA

### perma VIDEOS:



Video available  
online



## perma – The Expert in Lubrication Solutions

4–7

- References
- The company
- Driving directions
- Advantages at a glance



### Industries

8–17

- Gypsum, lime & cement plants
- Quarrying industry
- Sewage treatment plants
- Recycling industry
- Pulp & paper industry
- Mining & heavy industry



### Applications

18–27

- Conveyors
- Electric motors
- Pumps
- Blowers & fans



### Machine elements

28–37

- Roller & sliding bearings
- Chains
- Linear guides
- Spindles & open gears



### Determination of mounting type

38–41

- Direct mounting
- Remote mounting



### perma lubrication systems

42–63

- Functioning of automatic lubrication
- Comparison: Independent lubrication systems/ lubrication systems with external power supply
- Single-point lubrication systems
- Multi-point lubrication systems



### perma lubricants

64–65

- Oils
- Greases up to NLGI 2

3 steps to the optimal lubrication solution



### Part numbers & mounting of lubrication systems

66–73

- Accessories for preparing the lubrication point
- Part numbers of lubrication systems/product accessory



### Part numbers of accessories

74–83

- Brackets
- Tubes/tube connectors
- Reducers/extensions/angles
- Oil retaining valves/oil brushes

## References



### Strong brands around the world rely on perma automatic lubrication systems

perma-tec manufactures and sells single- and multi-point lubrication systems for many different applications. perma products, with their numerous patents, are used millions of times worldwide in all branches of industry, reliably performing their services.

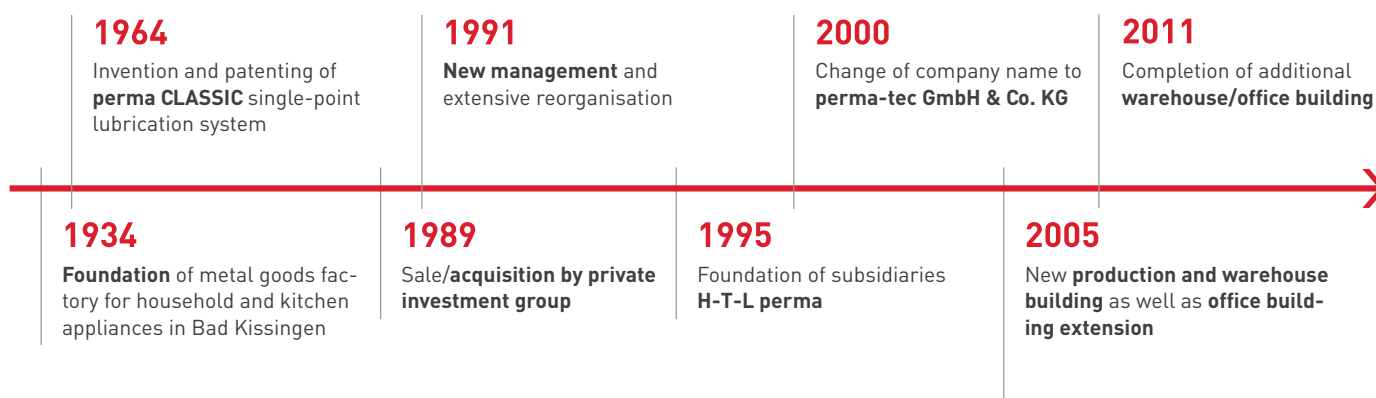
For years, renowned companies have profited from the performance and benefits of perma lubrication systems. perma, the expert in lubrication solutions, convinces with performance, reliability and customer satisfaction.

## Company introduction – perma-tec

For more than 50 years, the perma name has stood for innovative and creative lubrication solutions. perma single- and multi-point lubrication systems are used in almost all types of industries and applications around the world.

perma's leadership in the single-point lubrication market is based on numerous patented and specifically certified products. All perma products are developed, tested and manufactured in the company's headquarters in Germany and meet the quality standard "Made in Germany".

With many years of sales experience and a global network of own subsidiaries and competent partners around the world, perma can offer customers many solutions that meet the highest technical requirements.



### → perma-tec in figures

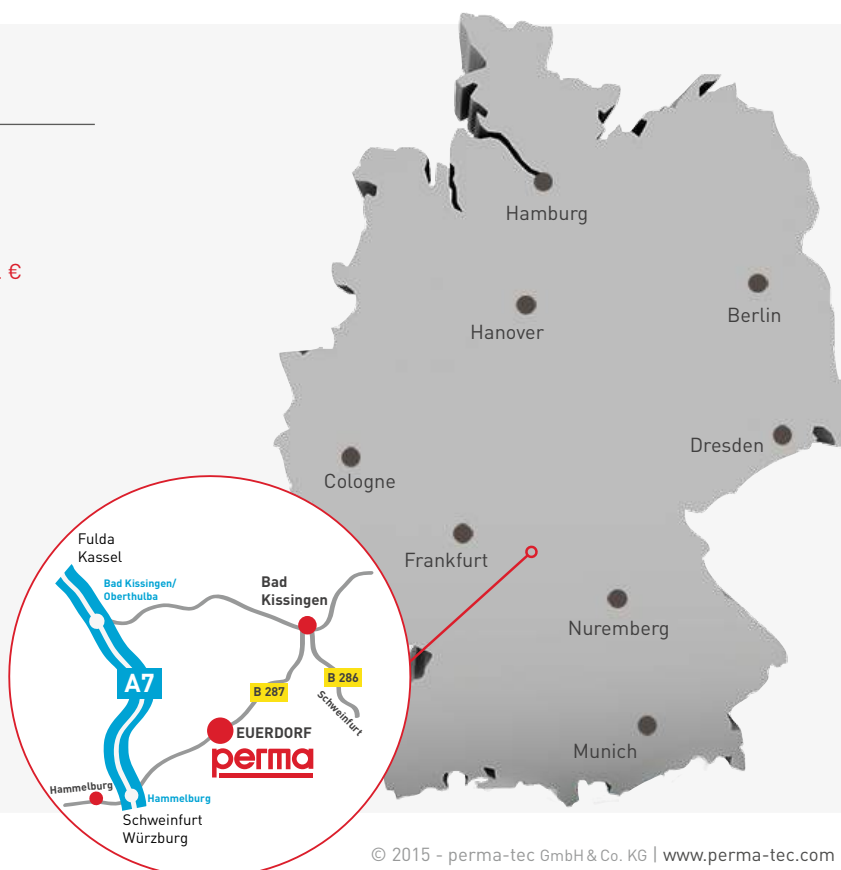
Employees worldwide	219
Employees in Germany	151
Turnover 2014 (unconsolidated)	70 Mio. €
Share of sales earned abroad	78%

#### Subsidiaries

H-T-L perma USA	1995
H-T-L perma France	1995
H-T-L perma Ibérica (Spain)	1996
H-T-L perma Italia	1997
H-T-L perma UK	1998
H-T-L perma Australia	2004
H-T-L perma India	2008
H-T-L perma Sudamérica	2014

Distributor network in more than 60 countries

As of: 03/2015



perma lubrication systems

## Advantages at a glance

Every 11 seconds, a perma lubrication system is installed or exchanged, worldwide. Manual lubrication is a thing of the past! Today, anyone looking for safe, effective and long-term economical lubrication of equipment takes advantage of automatic lubrication. perma offers a technically and economically optimal solution for any lubrication point.

### Technology

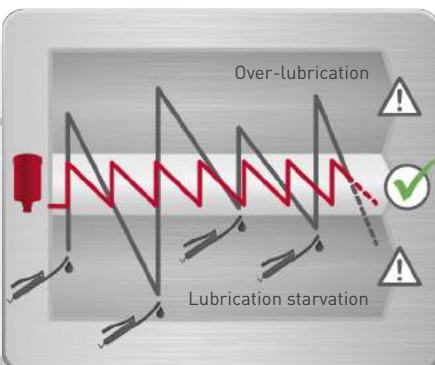
#### perma helps to prevent up to 55% of roller bearing failures

- ✓ Constant renewal of the lubricating film during application **ensures equipment availability**
- ✓ Reliable, clean and precise lubrication **around the clock**
- ✓ Discharge periods from **1 day to 24 months**
- ✓ Lubricant volume **60 cm<sup>3</sup> to 7,000 cm<sup>3</sup>**
- ✓ Operating temperature from **-20 °C to +60 °C**

Since 1964 perma-tec has been manufacturing exclusively in Germany.



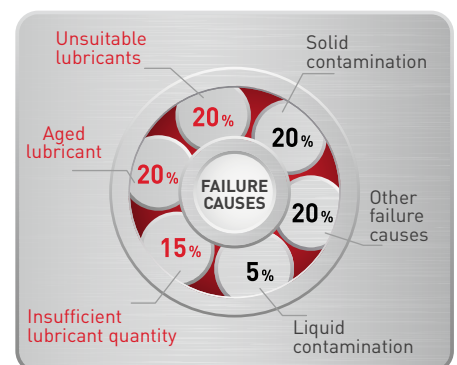
Lubricant output comparison:  
Manual lubrication vs. perma lubrication



Bearing damage caused by lubrication starvation



55% of roller bearing failures could be prevented with perma lubrication systems!



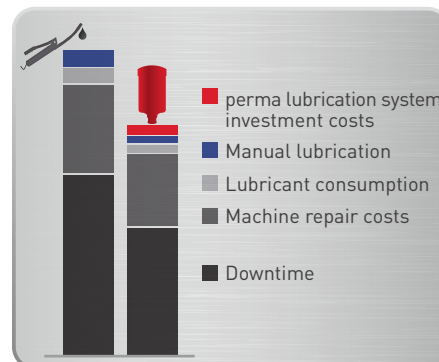
\*Sources:

Internal calculations: Material, time and servicing expenditure/ figures from the roller bearing industry and insurance companies

## Cost effectiveness

### perma reduces costs by up to 25%

- ✓ Continuous production processes and **predictable servicing intervals**
- ✓ Continuous, low maintenance, **long-term lubrication**
- ✓ Permanent supply of lubrication points with **fresh lubricant**
- ✓ Consistently high lubricant quality guarantees **high equipment availability**
- ✓ **Reduction of energy cost**



The perma-tec quality management system is certified according to DIN EN ISO 9001 and DIN EN ISO/IEC 80079-34.

## Workplace safety

### perma reduces the risk of accidents by up to 90%

- ✓ **Long replacement intervals**
- ✓ **Reduction of maintenance runs**
- ✓ **Reduction of time spent in dangerous areas**
- ✓ Significantly **less** workplace hazards



perma-tec is member of the Association of German Safety Engineers (Verband Deutscher Sicherheitsingenieure – VDSI).



## Environmental protection

### perma – certified environmental management system

- ✓ **Reduction of lubricant demand** due to optimal lubricant quantity for each lubrication point
- ✓ **Closed systems** – lubricant cannot escape into the environment
- ✓ **Reusable** components help minimise energy and material costs
- ✓ **Environmentally friendly materials** for simple, unproblematic and clean disposal



The perma-tec environmental management system is certified according to DIN EN ISO 14001.

## Applications

# STEP 1

1.1



### Industries

8-17

- Gypsum, lime & cement plants
- Quarrying industry
- Sewage treatment plants
- Recycling industry
- Pulp & paper industry
- Mining & heavy industry



1.2



### Applications

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- Conveyors
- Electric motors
- Pumps
- Blowers & fans

1.3



### Machine elements

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- Chains
- Linear guides
- Spindles & open gears

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- Remote mounting

3.1



### perma lubrication systems

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- Functioning of automatic lubrication
- Comparison: Independent lubrication systems/ lubrication systems with external power supply
- Single-point lubrication systems
- Multi-point lubrication systems

3.2



### perma lubricants

64-65

- Oils
- Greases up to NLGI 2



### Lubrication systems for your industry

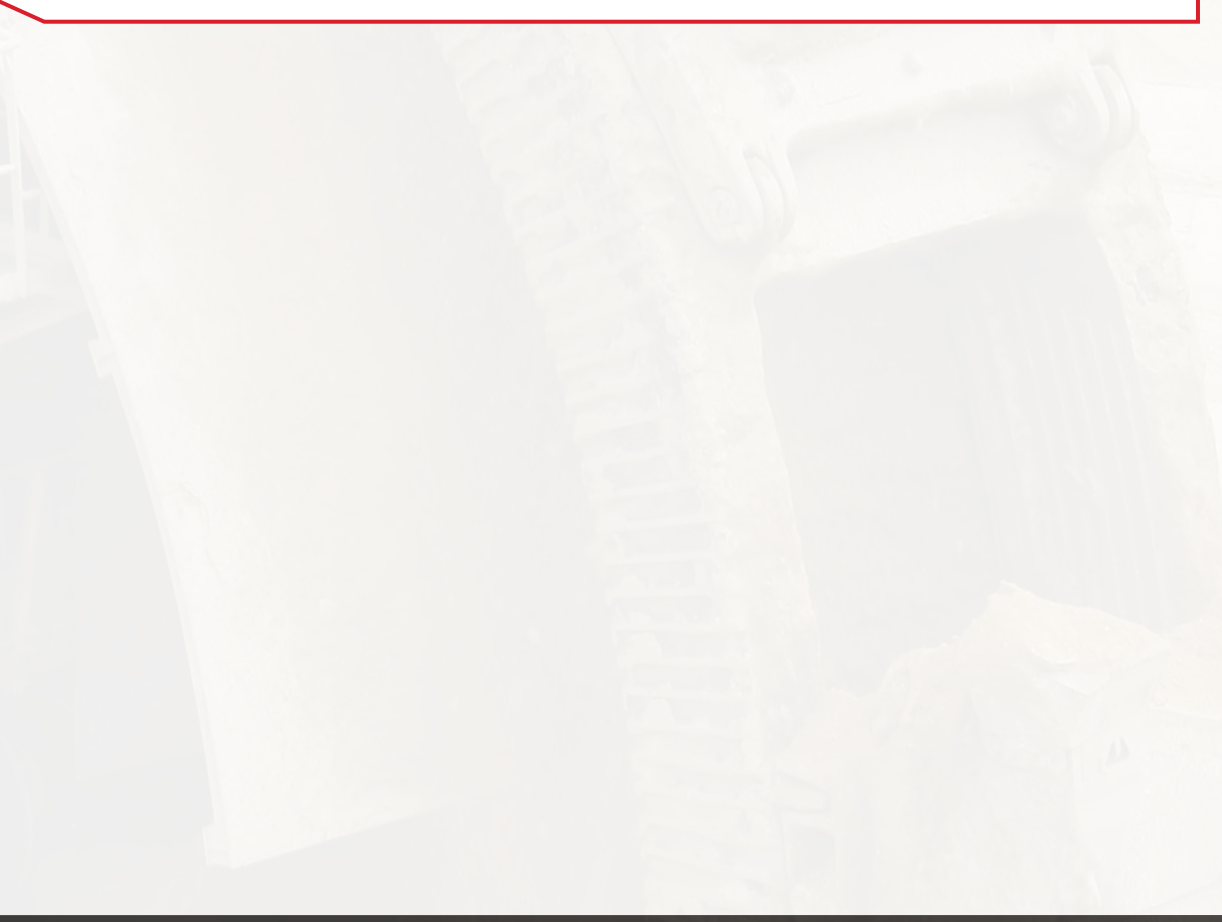
perma-tec has the right lubrication system for every industry. Depending on requirements, single- or multi-point lubrication systems are used, which have now been proven in practice for more than 50 years.

Continuous product developments, designed to meet the needs of the individual, local production processes, have contributed to this success. Since 1964 more than 55 million perma lubrication systems have been sold globally in all industries.



- 
- Gypsum, lime & cement plants Page 10
  - Quarrying industry Page 11
  - Sewage treatment plants Page 12
  - Power plants Page 13
  - Recycling industry Page 14
  - Pulp & paper industry Page 15
  - Mining & heavy industry Page 16

Further industries can be found on our website: [www.perma-tec.com](http://www.perma-tec.com)



# perma lubrication systems for Gypsum, lime & cement plants

There are hundreds of rotating machine elements in gypsum, lime and cement plants. Equipment must function reliably under the most difficult operating conditions. 80% of machine failures are due to mechanical wear caused by dirt contamination. perma automatic lubrication systems prevent ingress of dirt and ensure optimum lubrication of the equipment.

## References



## Lubrication points

		1 Roller bearings	2 Sliding bearings	3 Chains	
	<b>Raw material processing</b>				
	→ <b>Crushing</b>	Crusher	✓	✓	-
	→ <b>Transport</b>	Conveyors	✓	-	-
	→ <b>Drying and grinding</b>	Raw mill	✓	✓	-
	<b>Processing to final product</b>				
	→ <b>Heating</b>	Rotary kiln	✓	-	-
	→ <b>Fine grinding</b>	Cement mill, fine screen	✓	✓	-
	→ <b>Cleaning</b>	Dust removal equipment	✓	-	-
	<b>Storage and packing</b>				
	→ <b>Storage</b>	Conveyors	✓	-	✓
	→ <b>Packing</b>	Palletiser	-	-	✓

## Application examples



Lubrication of motor on a vibrating screen



Lubrication of pillow block bearing on fan drive shaft



Lubrication of pillow block bearing on rotary dryer

## perma lubrication systems for Quarrying industry

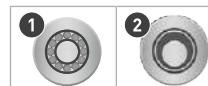
The quarrying industry is very demanding for both workers and machines. Spread-out equipment, insufficient staff, rough operating conditions and cost pressure continuously challenge quarry operators and employees. Automatic lubrication with perma lubrication systems can tremendously increase equipment safety and availability.

### References



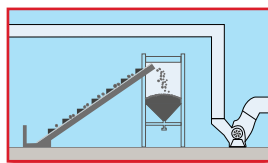
## Lubrication points

1 Roller bearings    2 Sliding bearings



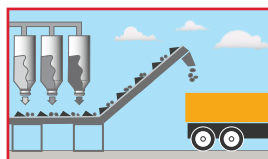
### Raw material processing

→ <b>Crushing</b>	Jaw, cone and roll crushers	✓	✓
→ <b>Transport</b>	Conveyors	✓	-



### Processing to final product

→ <b>Screening</b>	Grit and sand screens	✓	-
→ <b>Sorting &amp; cleaning</b>	Conveyors	✓	-
→ <b>Dust removal</b>	Dedusting equipment, fans	✓	-
→ <b>Transport</b>	Conveyors	✓	-



### Storage & packing

→ <b>Packing</b>	Conveyors	✓	-
→ <b>Filling</b>	Silo discharge	✓	-

## Application examples



Lubrication of pillow block bearing on conveyor



Lubrication of pillow block bearing on belt weigher



Remote lubrication of electric motor

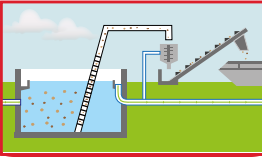
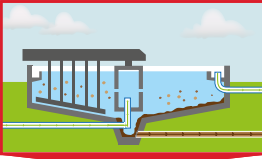
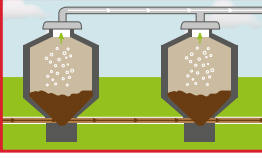
perma lubrication systems for  
**Sewage treatment plants**

Trouble-free operation during the entire cleaning process is imperative for treatment of waste water. Important equipment parts like roller and sliding bearings, chains and spindles are directly exposed to dirt, water, phosphates and other chemicals. Continuous relubrication is necessary to prevent premature wear.

**References**



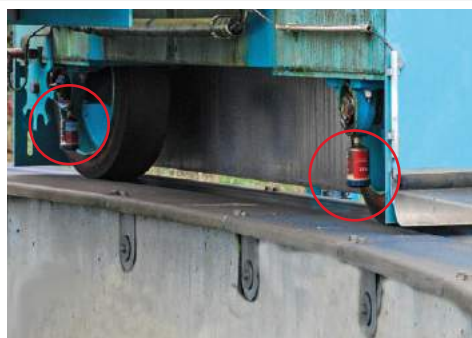
**Lubrication points**

		1 Roller bearings	2 Sliding bearings	3 Chains	
	<b>Physical treatment</b>				
	→ <b>Screening</b>	Chain guide roller	✓	-	✓
	→ <b>Grit &amp; grease removal</b>	Scraper	-	✓	-
	→ <b>Sedimentation tank</b>	Impeller wheel	✓	✓	-
	<b>Biological treatment</b>				
	→ <b>Aerated tank</b>	Surface aerator	✓	-	-
	→ <b>Clarification tank</b>	Wheel bearing, pivot bearing	-	✓	-
	<b>Sludge treatment</b>				
	→ <b>Sludge thickening</b>	Sludge belt conveyor	✓	-	-
	→ <b>Sludge dewatering</b>	Screw press	✓	-	-

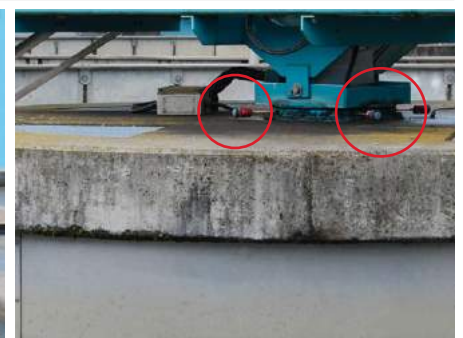
**Application examples**



Lubrication of bearing at surface aerator



Wheel bearing lubrication at circular scraper bridge



Pivot bearing lubrication at circular scraper bridge



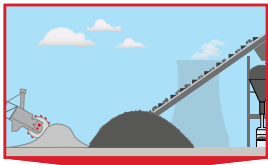
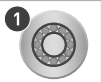
References



The energy turnaround demands more flexibility from conventional power plants. Power plant operators, in particular maintenance departments, are faced with new challenges. Frequent load changes and longer downtimes require reliable lubrication of equipment and machine elements.

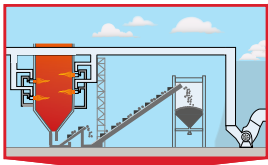
**Lubrication points**

1 Roller bearings



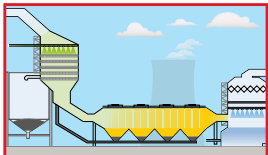
**Material transport**

→ <b>Transport</b>	Portal scraper, conveyors	✓
→ <b>Loading</b>	Ship unloader, crane	✓



**Processing**

→ <b>Crushing</b>	Impact hammer, coal mill	✓
→ <b>Dust removal</b>	Blowers & fans, electric motors	✓
→ <b>Transport</b>	Conveyors	✓



**Post processing**

→ <b>Dust extracting</b>	Flue gas scrubbing, blowers & fans, electric motors	✓
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**Application examples**



Lubrication of flange bearing on bucket conveyor



Electric motor bearing lubrication



Lubrication of electric motor and shaft on secondary fan

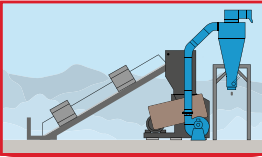
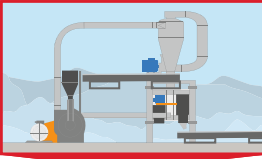
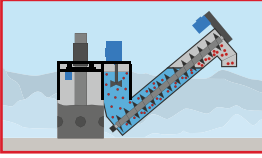
perma lubrication systems for  
**Recycling industry**

Recycling companies are constantly under pressure. Large price fluctuations, significantly changing market demands and short contract periods with buyers of recycling materials are some of the enormous challenges faced by the operators. In order to operate profitably, operators must have efficient technologies and avoid recycling process failures. This makes machine and plant maintenance and lubrication particularly important for these operations.

**References**



**Lubrication points**

		1 Roller bearings	2 Sliding bearings	
	<b>Preparation</b>			
	→ <b>Crushing</b>	Hammer/impact mills	✓	✓
	→ <b>Grinding</b>	Granulators	✓	-
	<b>Processing</b>			
	→ <b>Screening</b>	Vibrating screen	✓	-
	→ <b>Screening</b>	Air separator	✓	-
	→ <b>Dust removal</b>	Electric motors	✓	-
	<b>Final processing</b>			
	→ <b>Cleaning</b>	Scrubbers	✓	-
	→ <b>Drying</b>	Blowers/fans	✓	-
	→ <b>Transport</b>	Conveyors	✓	-

**Application examples**



Lubrication of flange earing on conveyor



Lubrication of pillow block bearing on conveyor



Lubrication of drive shaft on pump

# perma lubrication systems for Pulp & paper industry

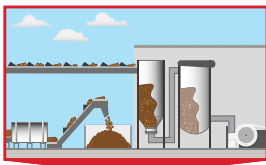
The paper industry is currently facing many new challenges: An increase in international competition, falling demand for a variety of paper types as a result of digital media, rising energy costs, stricter health, safety and environmental constraints. In order to meet these challenges, operators must increase plant productivity and profitability and simultaneously reduce operating costs. perma lubrication systems can help to provide a solution to these problems.

## References



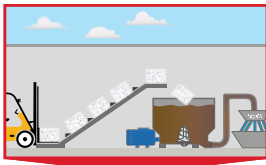
## Lubrication points

1 Roller bearings    2 Shaft seals    3 Chains



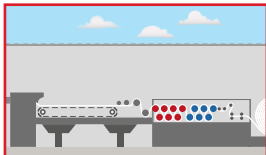
### Pulp production

→ <b>Chipping, storing</b>	Conveyors, tumblers	✓	-	✓
→ <b>Cooking, washing</b>	Pumps, wash presses	✓	✓	-
→ <b>Bleaching, drying</b>	Electric motors, dryers	✓	-	-



### Pulp treatment

→ <b>Defibering</b>	Pulpers, electric motors	✓	-	-
→ <b>Grinding</b>	Refiners, electric motors	✓	-	-
→ <b>Conveying, dewatering/thickening</b>	Pumps, electric motors	✓	-	-



### Paper production

→ <b>Dewatering, screening</b>	Vacuum systems	✓	-	-
→ <b>Pressing, drying</b>	Press pulpers, dryers	✓	-	-
→ <b>Spreading, rolling</b>	Dryers, roller conveyors	✓	-	✓

## Application examples



Bearing lubrication at the tree sorting system



Lubrication of pillow block bearing on a ventilation system



Pump bearing lubrication

perma lubrication systems for  
**Mining & heavy industry**

In order to maintain their competitiveness, mining and heavy industry companies (e.g. steel mills) must increase productivity and simultaneously minimise long-term operating costs. One important component in this context is preventive maintenance, which extends equipment service life and minimises the downtimes required for maintenance, repairs and overhauls. This reduces operating costs and enhances company performance.

**HINT**

Order the free perma catalogue for Heavy industry & mining  
Art. No. 110197



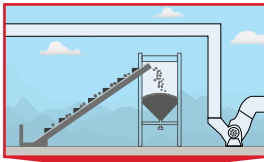
## Lubrication points

1 Roller bearings    2 Sliding bearings    3 Shaft seals



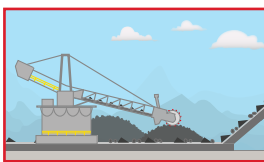
### Mining and transport of raw materials

→ Mining	Conveyor excavators, conveyor shovels	✓	✓	-
→ Crushing	Jaw, cone & roll crushers	✓	✓	-
→ Transport	Conveyors, pumps	✓	-	✓



### Processing to final product

→ Screening	Raw material screens	✓	✓	-
→ Sorting & cleaning	Conveyors, pumps, mixer gears	✓	-	✓
→ Dust removal	Dedusting equipment, fans	✓	-	✓
→ Transport	Conveyors	✓	-	✓



### Storage & transport

→ Storage	Conveyors	✓	-	✓
→ Transport	Conveyors, loading stations	✓	-	-

## Application examples



Lubrication of flange bearings and seals on pump

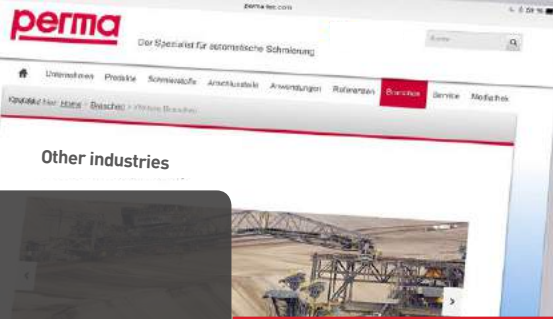


Lubrication of pillow block bearing on conveyor



Pump bearing lubrication





perma lubrication systems for  
**Other industries**

Information on other industries, such as elevators, biogas plants, escalators, timber industry, building services engineering, hospitals, hotels, cranes, railway transport, locks, cable cars and mountain railways, textiles industry, wind turbines, etc., can be found on our website:

→ [www.perma-tec.com/en/industry-sectors](http://www.perma-tec.com/en/industry-sectors)

### Automotive industry

**Lubrication points:**

- Electric motors
- Blowers/fans
- Lifting stations
- Lifting devices
- Linear guides



### Chemicals & pharmaceuticals industry

**Lubrication points:**

- Blowers/fans
- Electric motors
- Pumps
- Fan drives



### Food industry

**Lubrication points:**

- Pumps
- Mixers
- Filling facilities
- Compressors
- Surface aerators



### Steel industry

**Lubrication points:**

- Pumps
- Cooling section
- Vibrating screen
- Crane systems  
 → CWL PLUS SET, Art. No. 101564
- Coking plant
- Rolling mill



# Applications

## STEP 1

1.1



### Industries

8-17

- Gypsum, lime & cement plants
- Quarrying industry
- Sewage treatment plants
- Recycling industry
- Pulp & paper industry
- Mining & heavy industry

1.2



### Applications

18-27

- Conveyors
- Electric motors
- Pumps
- Blowers & fans

1.3



### Machine elements

28-37

- Roller & sliding bearings
- Chains
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### Determination of mounting type

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- Direct mounting
- Remote mounting

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### perma lubrication systems

42-63

- Functioning of automatic lubrication
- Comparison: Independent lubrication systems/ lubrication systems with external power supply
- Single-point lubrication systems
- Multi-point lubrication systems

3.2



### perma lubricants









64-65

- Oils
- Greases up to NLGI 2



**Our product recommendation for your application**

For years, perma-tec has been offering perfect solutions for single-point lubrication in application areas including conveyors, electric motors, pumps and fans and blowers. This chapter explains the lubrication challenges of these applications in more detail and presents suitable solutions.

					
		<b>Conveyors</b> → Page 20/21	<b>Electric motors</b> → Page 22/23	<b>Pumps</b> → Page 24/25	<b>Blowers &amp; fans</b> → Page 26/27
○ Limited suitability + Suitable ++ Recommended					
Single-point lubrication systems					
	<b>CLASSIC FUTURA</b>	+	○	+	○
	<b>FLEX</b>	+	+	++	++
	<b>NOVA</b>	+	++	+	++
	<b>STAR VARIO*</b>	++	++	++	++

\* also available as perma STAR CONTROL with external power supply

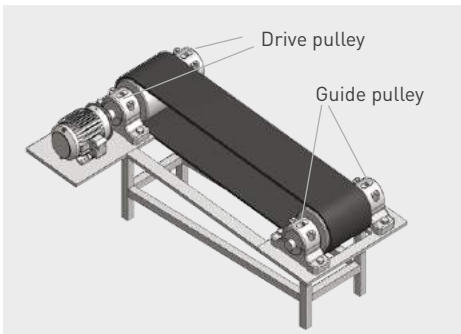


## perma lubrication systems for **Conveyors**

Functioning conveyors are essential for smooth process flows. Despite dirt, dust or strong vibration, optimal lubrication is necessary to prevent equipment failures. Equipment downtimes, costly repairs and service calls make up a significant proportion of the operating costs.

- Mining & heavy industry
- Power plants
- Food industry
- Recycling industry
- Quarrying industry
- Cement plants

### Lubrication points



Pillow block housings with spherical roller bearings are mainly used for **drive/guide pulleys**.

**Bearings** and **bearing housing seals** must be permanently supplied with lubricant.

### Challenges



Large conveyors often extend over large distances and several levels and are **difficult to access**. Relubrication should ideally take place while the equipment is running. The lubrication points at the transfer points above the storage containers or treatment facilities can often only be reached with the help of ladders or other aids and are therefore often **neglected**. Restricted access as a result of hazardous ambient conditions **endangers workplace safety**.

**Lubrication starvation** results in wear, which leads to **failure of equipment components** and reduces productivity and cost effectiveness.

- **Dirt** and **water** must not enter the lubrication points
- Optimal and regular **lubrication with fresh lubricant** during equipment operation
- **No unnecessary equipment downtimes** due to relubrication
- **Workplace safety** must be ensured





## Advantages of automatic lubrication

- ✓ Lubricant seals lubrication points and **prevents** ingress of **contamination**
- ✓ **Lubrication takes place while the equipment is running** without interrupting the work process
- ✓ perma lubrication systems are installed outside of dangerous areas (remote mounting) and **actively contribute to accident prevention**
- ✓ Precise lubricant discharge **lowers** lubricant consumption and thus the **environmental impact**

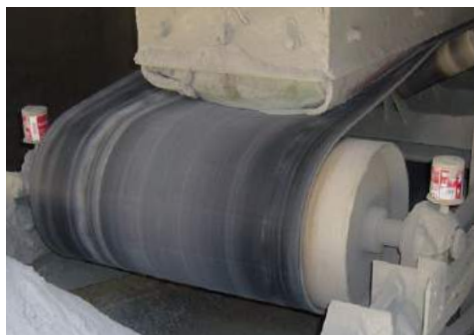
### References



## Solutions

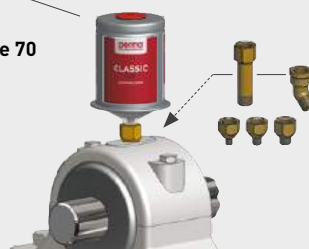
### Direct mounting on the lubrication point: e.g. with perma CLASSIC

- Easy, quick mounting
- For lubrication points with little vibration/shocks
- For easy-to-reach, safe lubrication points



perma CLASSIC

Art. No. go to page 70



**INSTALLATION KIT CLASSIC  
Direct Mounting**  
Use extensions, angles & reducers depending on the installation situation

Art. No. 101476

→ Go to page 40 for details

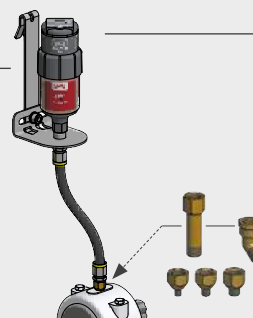
### Remote mounting at lubrication point: e.g. with perma STAR VARIO

- For lubrication points with strong vibration/shocks (isolation of lubrication system)
- When workers' safety is at risk: Mounting in safe areas
- For hard-to-reach lubrication points



Cage hanger arm

Art. No. 109959



**perma STAR VARIO  
with LC 120**

Art. No. go to page 71

**INSTALLATION KIT STAR  
with 3.0 m hose**  
Use extensions, angles & reducers depending on the installation situation

Art. No. 101482

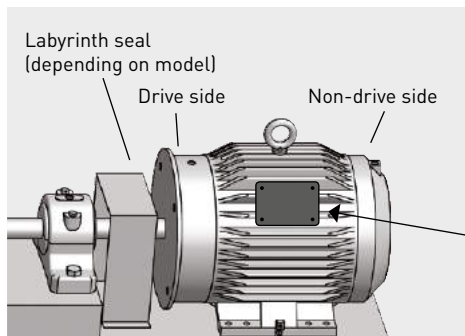
→ Go to page 41 for details

## perma lubrication systems for Electric motors

Electric motors are used for a variety of applications. An electric motor is designed to convert electrical into mechanical energy. Efficient lubrication and maintenance are essential for reliable operation of electric motors. Many motors are located in poorly accessible locations or in dangerous areas. They are therefore often only lubricated irregularly. Failure to adhere to manufacturer specifications frequently leads to damage and failures due to over-lubrication or lubrication starvation.

- Mining
- Power plants
- Food industry
- Recycling industry
- Quarrying industry
- Cement plants

### Lubrication points



Lubrication points are located on the **drive and non-drive end of electric motors**. **Grease escape** (grease drain hole, grease relief ports or grease trap) also has to be taken into consideration. Bearings will overheat if grease cannot escape and/or if grease traps are filled up with used grease.

**The correct lubricant**  
Motors with relubrication fittings come with information plates specifying grease amounts and relubrication intervals.

Speed high	Base oil thinner
Speed low	Base oil thicker

NLGI 0-2



### Challenges



During manual lubrication, the grease is **applied in uneven amounts**. A large quantity of lubricant is introduced at one time. This leads to temporary **over-lubrication of the bearings**. Non-adherence to relubrication intervals leads to **lubrication starvation**.

- **Overheating** of bearings and **fire hazard**, since distribution of excess grease takes hours; **shut-off** by temperature monitoring
- Bearing damage due to lubrication starvation results in **unscheduled machine downtimes** and higher production costs
- **Increasing maintenance costs** caused by premature wear



**Relubrication during running operation** (manufacturer recommendation) jeopardises maintenance workers. Increased accident risk due to time spent in **dangerous** or **difficult-to-access** areas.

- **High accident risk**
- **Motor shut-down** when entering secured areas

**HINT**

Electric motor lubrication manual available on request.



## Advantages of automatic lubrication

- ✓ **Relubrication during running operation** minimises overheating of bearings
- ✓ **Predictable exchange intervals** with reduced material and personnel expenditure
- ✓ **Increased workplace safety** due to automatic lubrication of hard-to-reach lubrication points
- ✓ Precise lubricant discharge **lowers** lubricant consumption and thereby **environmental impact**

### References



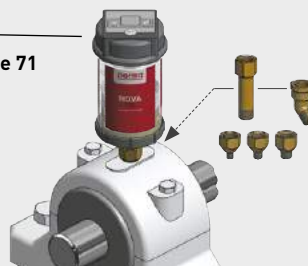
## Solutions

### Direct mounting on the lubrication point: e.g. with perma NOVA

- Easy, quick mounting
- For lubrication points with little vibration/shocks
- For easy-to-reach, safe lubrication points



perma NOVA with LC 125  
Art. No. go to page 71



**INSTALLATION KIT NOVA Direct Mounting**  
Use extensions, angles & reducers depending on the installation situation

Art. No. 101476

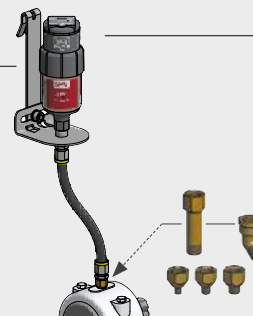
→ Go to page 40 for details

### Remote mounting at lubrication point: e.g. with perma STAR VARIO

- For lubrication points with strong vibration/shocks (isolation of lubrication system)
- When workers' safety is at risk: Mounting in safe areas
- For hard-to-reach lubrication points



Cage hanger arm  
Art. No. 109959



perma STAR VARIO with LC 120

Art. No. go to page 71

**INSTALLATION KIT STAR with 3.0 m hose**  
Use extensions, angles & reducers depending on the installation situation

Art. No. 101482

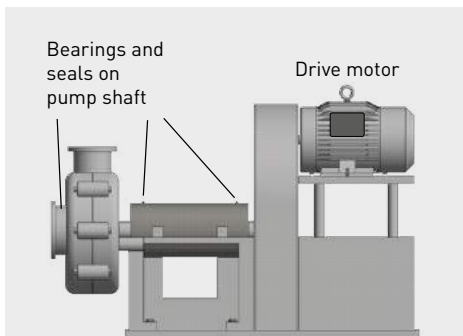
→ Go to page 41 for details

## perma lubrication systems for **Pumps**

Pumps are the core of many industrial applications. A failing pump can often interrupt the entire work or production process. All sorts of pumps are used in many fields and applications. Appropriate lubrication safeguarding the work and production process of the pump is a decisive factor of smooth operation.

- Mining & heavy industry
- Chemical industry
- Power generation
- Food industry
- Oil and gas production
- Paper industry
- Pharma industry
- Environmental technology
- Water and wastewater

### Lubrication points

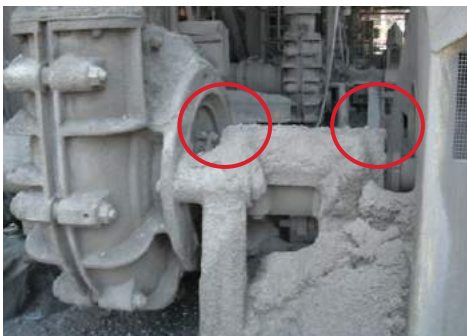


Lubrication points (roller bearings) are located on the **drive shaft** between drive motor and pump body or in the pump housing.

Lubrication of **packing gland** and **labyrinth seals** prevents the ingress of dirt and/or pumped media. **Bearings** and **bearing housing seals** must be permanently supplied with the specified amount of the right lubricant.

Information about drive motor lubrication can be found on pages 22/23, "Electric motors".

### Challenges



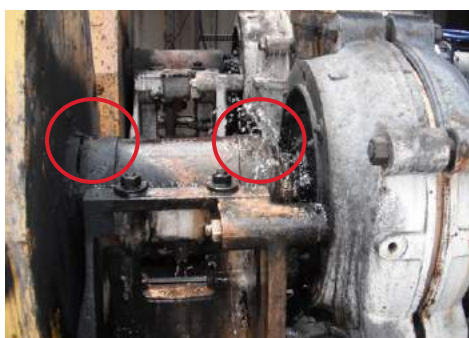
Pumps are often operated under extreme conditions, subjecting individual components to special wear. These can include **heavy contamination** from slurry or dust, as well as **hazardous materials** such as bases and weak acids.

- **Dirt, water or other contaminants** must not enter the bearing points

Lubrication points can often only be accessed using **extreme protective measures** (safety gloves and mask). This frequently leads to neglect of or non-compliance with the prescribed lubrication.

Lubrication starvation results in wear, which leads to **failure of equipment components** or pump **leakages**.

- Optimal and regular **lubrication with fresh lubricant** during equipment operation
- Operation in **potentially explosive areas**
- **Workplace safety** must be ensured





HINT

Pump lubrication manual available on request.



## Advantages of automatic lubrication

- ✓ **Increased workplace safety** due to automatic lubrication of hard-to-reach lubrication points
- ✓ Precise lubricant discharge **lowers** lubricant consumption and thereby **environmental impact**
- ✓ **Fewer maintenance runs** minimise the time workers spend in dangerous areas
- ✓ Depending on the selected lubrication system, use may be possible **underground** or in **potentially explosive areas**

### References



## Solutions

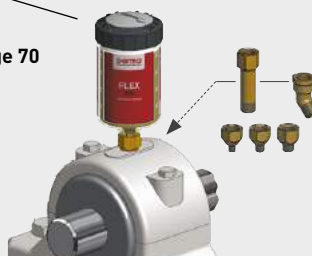
### Direct mounting on the lubrication point: e.g. with perma FLEX

- Easy, quick mounting
- For lubrication points with little vibration/shocks
- For easy-to-reach, safe lubrication points



perma FLEX 125

Art. No. go to page 70



**INSTALLATION KIT FLEX Direct Mounting**  
Use extensions, angles & reducers depending on the installation situation

Art. No. 101476

→ Go to page 41 for details

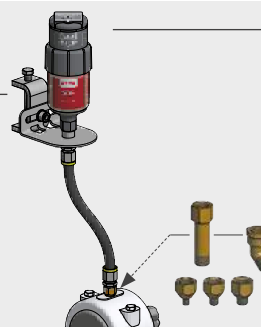
### Remote mounting at lubrication point: e.g. with perma STAR VARIO

- For lubrication points with strong vibration/shocks (isolation of lubrication system)
- When workers' safety is at risk: Mounting in safe areas
- For hard-to-reach lubrication points



Beam clamp 65 mm

Art. No. 109958



**perma STAR VARIO with LC 120**

Art. No. go to page 71

**INSTALLATION KIT STAR with 3.0 m hose**  
Use extensions, angles & reducers depending on the installation situation

Art. No. 101482

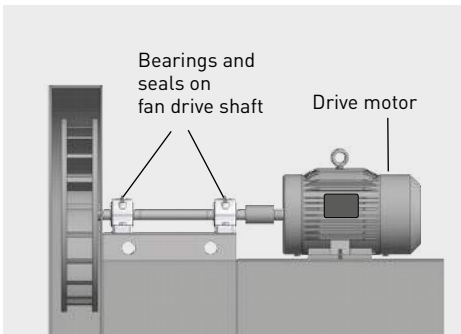
→ Go to page 41 for details

## perma lubrication systems for **Blowers & fans**

Blowers and fans are used in almost all key industries. They provide adequate amounts of primary and secondary air. Flue gas fans remove air containing dust, gases and harmful substances. In primary air zones, induced draft fans are used such as in scrubbers, dust collectors, heat exchangers and desulfurisation plants.

- Mining & heavy industry
- Chemical industry
- Glass industry
- Wood-working
- Power plants (power generation)
- Food industry
- Refineries

### Lubrication points



The lubrication points (roller bearings) are located at the **drive shaft** between drive motor and fan impeller.

**Bearing and sealing of fan drive shaft** is normally done by means of a pillow block housing or a bearing unit. These must be permanently supplied with the specified amount of the right lubricant.

Information about drive motor lubrication can be found on pages 22/23, "Electric motors".

### Challenges



Fans and blowers are normally operated under **exceptional conditions**.

**Contaminants** such as dust or pumped media are dispersed by operation of the ventilator. These can enter the bearing system, which leads to increased wear of individual components and a shorter service life.

- Contaminants (e.g. **dust**) raised in the air must not enter the lubrication points

Regular lubrication of bearings and seals is imperative. Lubrication points are often extremely dirty and hard to reach, which makes maintenance even more difficult. Specified lubrication intervals are neglected or not observed for this reason. The resulting **lubrication starvation** leads to increased wear and in extreme cases to failure of the blowers and fans.

- **Excessive overheating of bearing points** due to lubrication starvation
- Lubricants must cope with the **demands** made of it, e.g. in terms of vibrations or high speeds
- **Observation of relubrication intervals** depending on bearing type, bearing size and ambient conditions

**HINT**

Blower/fan lubrication manual available on request.



## Advantages of automatic lubrication

- ✓ perma lubrication systems seal lubrication points and **protect against contamination**
- ✓ **Precise metering** of lubricant amount reduces lubricant consumption
- ✓ Safe and reliable lubrication, also in areas with **potentially explosive atmospheres**
- ✓ Different lubricant volumes for **exact adjustment to lubrication point**

### References



## Solutions

### Direct mounting on the lubrication point: e.g. with perma FLEX

- Easy, quick mounting
- For lubrication points with little vibration/shocks
- For easy-to-reach, safe lubrication points



perma FLEX 125  
Art. No. go to page 70



**INSTALLATION KIT FLEX Direct Mounting**  
Use extensions, angles & reducers depending on the installation situation

Art. No. 101476

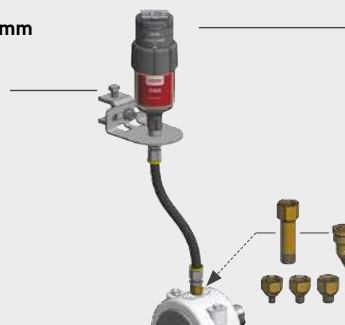
→ Go to page 40 for details

### Remote mounting at lubrication point: e.g. with perma STAR VARIO

- For lubrication points with strong vibration/shocks (isolation of lubrication system)
- When workers' safety is at risk: Mounting in safe areas
- For hard-to-reach lubrication points



Beam clamp 30 mm  
Art. No. 109957



perma STAR VARIO  
with LC 120

Art. No. go to page 71

**INSTALLATION KIT STAR with 3.0 m hose**  
Use extensions, angles & reducers depending on the installation situation

Art. No. 101482

→ Go to page 41 for details

# Applications

## STEP 1

1.1



### Industries

8-17

- Gypsum, lime & cement plants
- Quarrying industry
- Sewage treatment plants
- Recycling industry
- Pulp & paper industry
- Mining & heavy industry

1.2



### Applications

18-27

- Conveyors
- Electric motors
- Pumps
- Blowers & fans

1.3



### Machine elements

28-37

- Roller & sliding bearings
- Chains
- Linear guides
- Spindles & open gears



2.



### Determination of mounting type

38-41

- Direct mounting
- Remote mounting

3.1



### perma lubrication systems

42-63

- Functioning of automatic lubrication
- Comparison: Independent lubrication systems/ lubrication systems with external power supply
- Single-point lubrication systems
- Multi-point lubrication systems

3.2



### perma lubricants

64-65

- Oils
- Greases up to NLGI 2

### Our product recommendation for your machine elements

perma-tec not only offers perfect application solutions, but also constantly works on finding reliable and safe lubrication solutions for lubrication points with special demands.

<ul style="list-style-type: none"> <li>- Unsuitable</li> <li>o Limited suitability</li> <li>+ Suitable</li> <li>++ Recommended</li> </ul>				
	<b>Roller &amp; sliding bearings</b> → Page 30/31	<b>Chains</b> → Page 32/33	<b>Linear guides</b> → Page 34/35	<b>Spindles &amp; open gears</b> → Page 36/37
<b>Single- &amp; multi-point lubrication systems</b>				
	+	+	-	+
	+	++	o Depending on lubricant	+
	++	++	o Depending on lubricant	++
	++	-	++ perma PRO LINE / perma PRO C LINE	+
	-	++	-	+



perma lubrication systems for

## Roller & sliding bearings

Roller and sliding bearings are used in all industry sectors. Only regular and efficient lubrication ensures that these components function correctly. Bearing damage, resulting from insufficient lubrication or contamination in the bearing, can result in consequential damage.

- Automotive industry
- Conveying and warehouse technology
- Food industry
- Packaging industry
- Machine tools

### Lubrication points



In **roller bearings**, loads and movements are transferred by means of rollers, arranged between an outer and inner race. If these metallic components make contact, undesirable friction, wear and damage is the result, which may lead to bearing failure.

In **sliding bearings**, the moving parts are in direct, sliding, linear contact. They can accept greater forces than roller bearings, but are more heavily impacted by wear due to the greater friction.

### Challenges



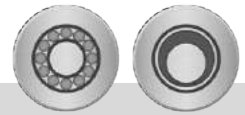
Service life and reliability of seals, roller and sliding bearings are to a large extent governed by the ambient conditions. Exceptional operating conditions and the ingress of contaminants in the bearing system lead to increased wear and thus to a reduction in the service life.

The ambient and influencing factors can be divided into three groups:

- **Dust and liquids in the bearing**
- **Oscillations and vibrations**
- **High bearing temperatures**

These factors influence the service life and must be taken into consideration when calculating lubricant quantities. The higher the load or the influence of ambient conditions, the greater the quantity of lubricant required to guarantee **optimal lubrication**.





## Advantages of automatic lubrication

- ✓ **Protection** against contaminant and liquid ingress reduces wear and **increases the bearing service life**
- ✓ **Permanent supply** of lubrication points with correct quantity of fresh lubricant
- ✓ **Machine / PLC controlled lubrication** with lubrication system monitoring (e.g. with perma STAR CONTROL)
- ✓ **Maintenance and servicing works** can be planned in advance

## Solutions

### Automatic lubrication with perma lubrication systems

- Continuous, low-maintenance, long-term lubrication ensures uninterrupted production processes
- Maintenance runs can be reduced and planned long-term
- Reusable components minimise energy and material costs



**Angle 45° G1/4 male x G1/4 female**

Art. No. 104823

**Extension 75 mm  
G1/4 male x G1/4 female**

Art. No. 104856



**perma NOVA with LC 125**

Art. No. go to page 71



**perma STAR VARIO with LC 250**

Art. No. go to page 71

**Beam clamp 30 mm**

Art. No. 109957

**Support flange STAR Gen 2.0  
G1/4 male x G1/4 female**

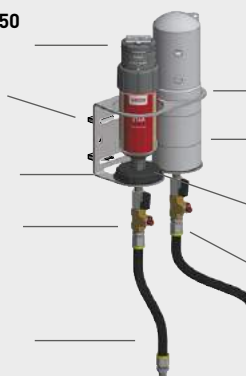
Art. No. 109420

**Purge connection with  
manual valve G1/4 female**

Art. No. 109684

**Heavy Duty hose with  
NBR lining and fabric insert**

Art. No. 101555



**Mounting bracket STAR  
Heavy Duty C-section 2-point G1/4  
female**

Art. No. 108648

**Protection cap STAR VARIO  
Heavy Duty 250**

Art. No. 109999

**Cover clip for protection cap  
STAR VARIO Heavy Duty**

Art. No. 108606

**Hose connector G1/4 male for  
hose iØ 9.5 mm - push-lock**

Art. No. 101554



**PRO LC 250**

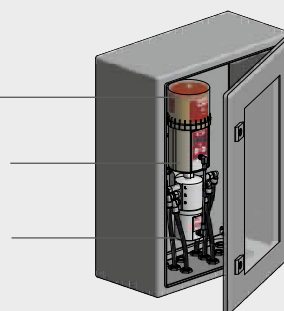
Art. No. go to page 71

**PRO MP-6 Basic system  
(with Battery PRO B)**

Art. No. 106919

**Accessory kit PRO**

Art. No. 106937



**Protection box double**

Art. No. 111153

perma lubrication systems for

## Chains

The primary aims of operators are equipment safety and availability. Plant servicing bears many challenges.

Integration of "intelligent" perma lubrication systems permits exact and individual lubrication of chains.

- Elevators
- Moving walkways
- Escalators
- Conveyors
- Lifting stations

### Lubrication points



In oil lubrication it is extremely important to apply just the right amount of lubricant, because lubrication starvation can be just as bad as over-lubrication.

#### The following aspects must be considered:

Over-lubrication of chains can lead to **safety hazards**

- **Slipping hazard** for persons in the direct vicinity of the lubrication point
- **Contamination** of the environment

Lubrication starvation can lead to **severe attrition**

- **Premature wear** of chain pins and rollers
- Unpleasant **noise development**
- **Uneven chain movement (jerking)**
- Possible **equipment failure**

**Access** for equipment lubrication or cleaning is **not always** possible and/or desired

- Additional night-time work and thus **increased costs**
- **Emergency shutdown** of equipment required

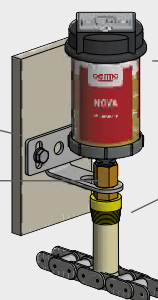


The following single-point lubrication systems are suitable: perma CLASSIC / FUTURA / FLEX / NOVA / STAR



**Bracket**  
Art. No. 104864

**Insert for bracket**  
G1/4 male x G1/4 female  
Art. No. 104820



**perma NOVA with LC 125**  
Art. No. go to page 71





**Oil brush Ø20 mm G1/4 female**  
Art. No. 101396

When mounting perma CLASSIC or perma STAR, additionally use an oil retaining valve (go to page 82).





## Advantages of automatic lubrication

-  **Protection** against corrosion and contamination reduces wear and **increases chain service life**
-  **Maintenance costs are minimised** as oil consumption is reduced by up to 75%
-  perma lubrication systems are mounted in an easily accessible place and remote from moving parts, and **actively contribute to accident prevention**
-  **Contamination** caused by over-lubrication is **avoided** hence **environmental impact is reduced**

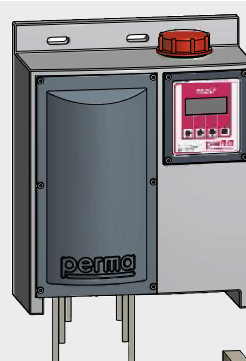
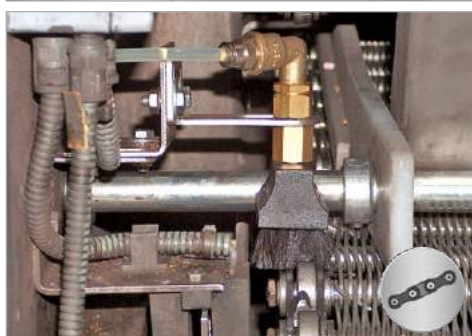
## References



## Solutions

### Multi-point lubrication for up to 6 lubrication points

- Up to 6 lubrication points can be supplied with an individual amount of oil independently of each other
- Large tank volume allows long maintenance intervals and helps to reduce maintenance costs
- For hard-to-reach lubrication points: Remote mounting <10 m grease line possible per lubrication point



**perma ECOSY**  
Art. No. 101700

**Tube up to +100 °C  $\text{o}\varnothing$  6 x  $\text{i}\varnothing$  4 mm**  
Art. No. 101494

**Tube connector G1/8 male for tube  $\text{o}\varnothing$  6 mm straight**  
Art. No. 101446

**Oil brush 60 x 30 mm G1/4 female**  
Art. No. 101398

**Bracket**  
Art. No. 104864  
**Oil retaining valve G1/4 male x G1/4 female**  
Art. No. 104862

**Tube  $\text{o}\varnothing$  6 mm x  $\text{i}\varnothing$  4 mm (PA)**  
Art. No. 101494

**Special brush for large chains up to +80 °C with tapped bore M6**  
Art. No. 101524 + 101525

**Mounting bracket left for special brush**  
Art. No. 101533

**Spacer for special brush, width: 13 mm**  
Art. No. 101535

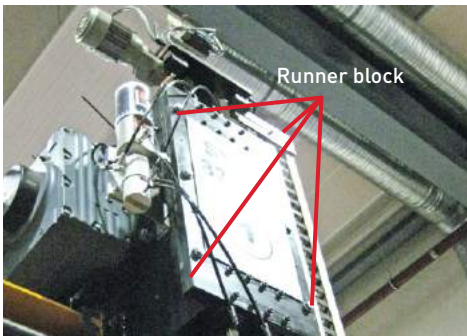


perma lubrication systems for  
**Linear guides**

Linear guides are machine elements that enable the movement of machines or components in linear direction. These are available in the form of roller bearing guides (e.g. linear bearings, linear roller bearings or profile rails) or as sliding guides (e.g. dovetail guides or linear sliding guides). Linear guide drives are mainly screw drives, lifting gears or a combination of both.

- Automotive industry
- Conveying and warehouse technology
- Food industry
- Packaging industry
- Machine tools

## Lubrication points



Lubrication points are located on the **runner block** or on the **drive** (spindle and/or gear rack or belt).

A **continuous supply** of components with fresh lubricant is a basic requirement for achieving maximum service life.

## Challenges



On account of the **special design** and diverse use of linear guide systems, lubrication points on these systems present a challenge for efficient and preventive maintenance.

Lubrication points can often only be accessed with assistive equipment. The consequences are neglected or insufficient lubrication of the components.

- **Prevent equipment downtimes** through relubrication
- **Workplace safety** must be ensured

Several lubrication points must be lubricated exactly according to **manufacturer specifications** while the equipment is running. Different lubrication points require different lubricant amounts. Improper lubrication can cause **equipment component failures** and reduce productivity and cost effectiveness.

- Recirculating ball/roller guides: the internal distribution to the four raceways on the runner block requires a **specific minimum volume flow**
- The **drive** (spindle and/or gear rack) often requires **more lubricant** than the runner blocks





## Advantages of automatic lubrication

- ✓ The lubricant amount can be set differently for **each of the 6 outlets** according to the different manufacturers' specifications
- ✓ **Long exchange intervals** significantly **reduce maintenance expenditure** compared to manual lubrication
- ✓ perma lubrication systems can be mounted outside of dangerous areas and **actively contribute to accident prevention** and/or **risk minimisation**
- ✓ **Precise lubricant discharge prevents over-lubrication** and contributes to environmental protection

### References

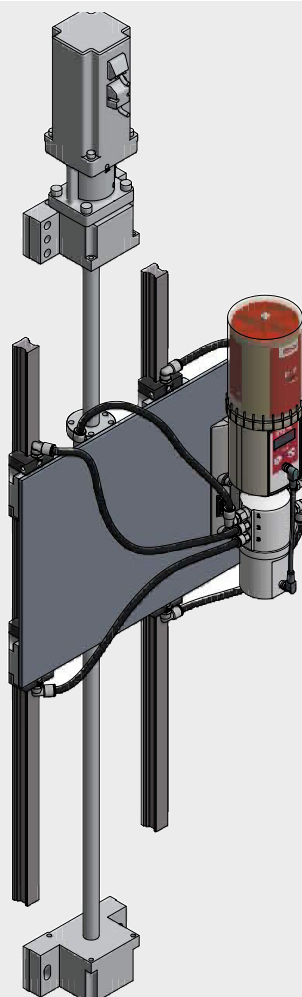
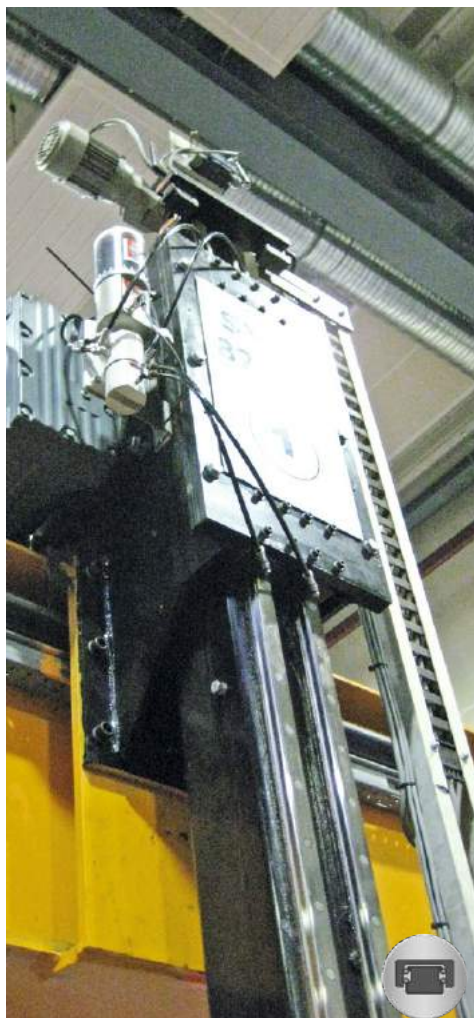
# Rexroth Bosch Group

Use of lubricants approved by the manufacturer.

## Solutions

### Special system for linear guides: perma PRO LINE / PRO C LINE

- Different discharge amount can be set for each outlet: Number of pump strokes per discharge
- Number of activated outlets can be selected freely: 1–6
- Flexible setting of time between discharges: Setting of pauses in days (24 h) possible



#### Linear guide outlet assignment, e.g.:

- Outlet 1: Spindle/gear rack  
(= larger discharge quantity)
- Outlet 2: Closed
- Outlet 3: Runner 1
- Outlet 4: Runner 2
- Outlet 5: Runner 3
- Outlet 6: Runner 4

#### perma PRO LINE Basic system


battery operated

or

#### perma PRO C LINE Basic system

with external power supply

→ For product description, go to page 60/61



perma lubrication systems for

## Spindles & open gears

The demand for ever higher transferable power and torques with simultaneous reduction in size and weight can often only be implemented with difficulty in practice. This makes it all the more important to implement effective lubrication, contributing to optimisation of a rack and pinion drive.

- Automotive industry
- Conveying and warehouse technology
- Food industry
- Packaging industry
- Machine tools

### Lubrication points



Relubrication is especially important for enhancing the service life and availability of gear ring drives. Right at the beginning of the bedding-in phase, care must be taken that the tooth flank surfaces are smooth.

During running operations, **graphite-containing adhesive lubricants** are generally employed, which withstand the **high loads** (mixed friction, loads, corrosion, aggressive impacts).

### Challenges



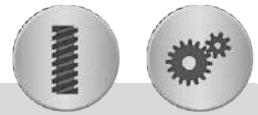
In order to ensure relubrication occurs, a lubrication system with matching accessories for transferring the lubricant to the gear surface can be used. Permanent renewal of the lubricant film with subsequent lubricant transfer to additional gear wheel pairs helps to reduce wear in the long-term and increases gear wheel service life.

Large gear ring drives are used where heavy loads need to be moved, e.g. in rotary kilns and ball mills. Because of their occasionally considerable dimensions, the gear teeth on gear rings often cannot be effectively protected against environmental impacts.

Open gear ring and spindle drives are often used in contact with dirt, abrasive cement and coal dust, which accelerates wear and corrosion.

- **Dust, liquids and contamination**
- **Environmental impacts**
- **Oscillations and vibrations**
- **High temperatures**





## Advantages of automatic lubrication

- ✔ Permanent operational lubrication **extends the service life of gear ring drives**
- ✔ Lubrication of tooth flanks **reduces friction and protects against wear**
- ✔ Easy transfer of lubricant to tooth surfaces with **extensive accessories**
- ✔ **Contamination** caused by over-lubrication is **prevented** and **environmental impact is reduced**

## Solutions

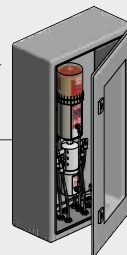
### Automatic lubrication with perma lubrication systems

- Lubrication systems available in varying sizes
- Simple mounting directly at the lubrication point
- The right lubricant can be selected for every lubrication point



**Protection box single**  
Art. No. 101527

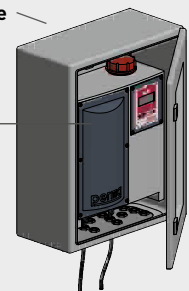
**perma PRO MP-6/  
perma PRO LINE**  
Go to page 72 et seq.



**Protection box double**  
Art. No. 111153

**perma ECOSY**  
Art. No. 101700

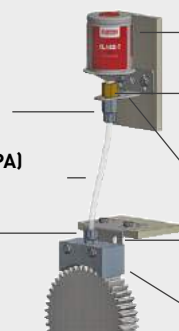
**Accessories**  
Go to page 73 et seq.



**Tube connector for  
perma G1/4 female**  
Art. No. 101390

**Tube ø8 mm x iø 6 mm (PA)**  
Art. No. 101393

**Tube connector G1/4 male**  
Art. No. 101391



**perma CLASSIC**  
Art. No. go to page 70

**Insert for bracket G1/4 male x G1/4 female**  
Art. No. 104820

**Bracket**  
Art. No. 104864

**Mounting angle 50 x 70 x 70 x 2.5 mm**  
Art. No. 101430

**Lubrication pocket for gear lubrication**  
Art. No. on request

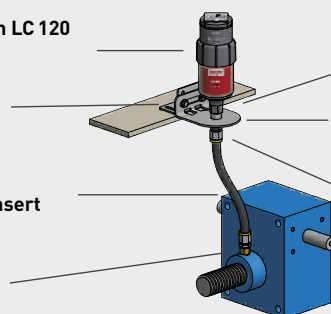


**perma STAR VARIO with LC 120**  
Art. No. go to page 72

**Mounting angle  
50 x 70 x 70 x 2.5 mm**  
Art. No. 101430

**Heavy Duty hose with  
NBR lining and fabric insert**  
Art. No. 101555

**Reducer**  
Art. No. go to page 79



**Support flange STAR Gen 2.0**  
Art. No. 109420

**Mounting bracket STAR  
Standard Duty 1-point G1/4  
female**  
Art. No. 109663

**Hose connector G1/4 male**  
Art. No. 101554

## Determination of mounting type

1.1



### Industries

8-17

- Gypsum, lime & cement plants
- Quarrying industry
- Sewage treatment plants
- Recycling industry
- Pulp & paper industry
- Mining & heavy industry

1.2



### Applications

18-27

- Conveyors
- Electric motors
- Pumps
- Blowers & fans

1.3



### Machine elements

28-37

- Roller & sliding bearings
- Chains
- Linear guides
- Spindles & open gears

STEP 2



### Determination of mounting type

- 2.1 Determine the parameters
- 2.2 Decide which mounting type is suitable

38/39

40/41



3.1



### perma lubrication systems

42-63

- Functioning of automatic lubrication
- Comparison: Independent lubrication systems/ lubrication systems with external power supply
- Single-point lubrication systems
- Multi-point lubrication systems

3.2



### perma lubricants

64-65

- Oils
- Greases up to NLGI 2

**2.1 Determine the lubrication point parameters to specify the optimal mounting type**

For many lubrication points it is beneficial to mount the lubricating system with a grease line at a location that can be accessed without danger during plant operation.

**General data:**

- Installation point/application designation
- Plant manufacturer

---

**Specifications:**

- Size/model
- Speed
- Vibrations
- Moisture
- Load
- Operating time per day
- Bearing temperature
- Counter pressure, if known
- Ambient temperature
- Indoor/outdoor
- Contamination

---

**Bearing parameters:**

- Bearing type/size
- Relubrication quantity/interval
- Grease drain hole
- Prescribed lubricant in accordance with manufacturers' specifications/select perma lubricant in step 3.2

**HINT**

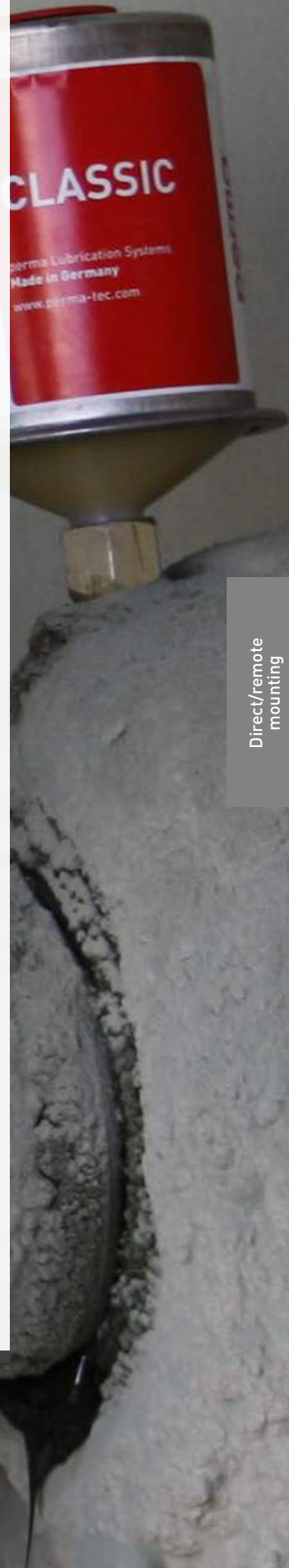
You can print out the checklist from our website: [www.perma-tec.com](http://www.perma-tec.com)



Transfer the information to the perma SELECT APP. You will receive a recommendation for a suitable lubrication system, lubricant and the required setting.



**Download:** AppStore/PlayStore  
**Online:** Browser version

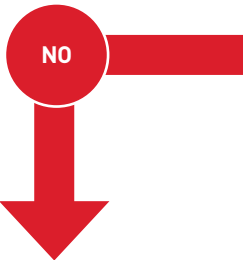


Direct/remote mounting

# Determination of mounting type

## 2.2 Decide which mounting type is suitable

If you answer any of the questions with **YES**, we recommend remote mounting:



### INSTALLATION KITS Direct mounting



**Contents for all INSTALLATION KITS**

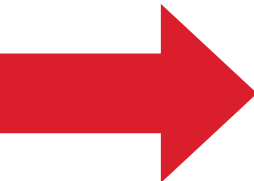
<b>A</b>	1 x Reducer G1/8 male x G1/4 female 1 x Reducer M6 male x G1/4 female 1 x Reducer M8x1 male x G1/4 female 1 x Reducer M10x1 male x G1/4 female
<b>B</b>	1 x Extension G1/4 male x G1/4 female – 45 mm
<b>C</b>	1 x Angle 45° G1/4 male x G1/4 female
<b>D</b>	1 x Support flange STAR Gen 2.0 G1/4 male x G1/4 female (only with Art. No. 101477)



**INSTALLATION KIT CLASSIC, FUTURA, FLEX, NOVA**  
Direct Mounting  
Art. No. 101476

**INSTALLATION KIT STAR**  
Direct Mounting  
Art. No. 101477

**!** Order lubrication system separately!  
 ■ Use extensions, angles & reducers depending on the installation situation



For varying installation situations you can find additional accessories such as angles, reducers, etc. starting on page 78.



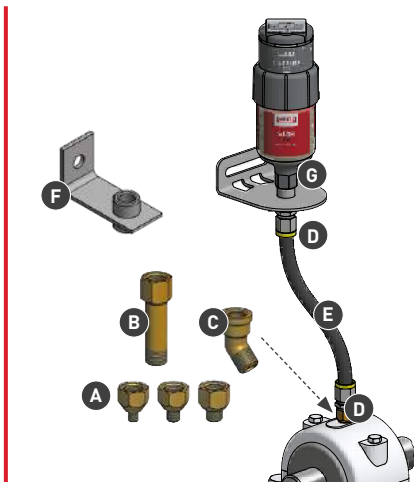
Determine the thread size at the lubrication point  
**perma Fitting thread tester, Art. No. 110374**



- Is it difficult or dangerous to reach the lubrication point **during plant operation**?
- Is the lubrication point subject to **strong vibrations** or **high temperatures** which may impair or damage the lubrication system?
- Is **access permission** required to reach lubrication points in secured areas or at great heights?
- Is the lubrication point exposed to the following:  
**Large amounts of water, pumped media, production process media or impact by solid substances?**

**YES**

## INSTALLATION KITS remote mounting with grease line



Direct/remote mounting

### Contents for all INSTALLATION KITS

<b>A</b>	1 x Reducer G1/8 male x G1/4 female 1 x Reducer M6 male x G1/4 female 1 x Reducer M8x1 male x G1/4 female 1 x Reducer M10x1 male x G1/4 female
<b>B</b>	1 x Extension G1/4 male x G1/4 female – 45 mm
<b>C</b>	1 x Angle 45° G1/4 male x G1/4 female
<b>D</b>	2 x Hose connector G1/4 male for tube iØ9.5 mm (zinc-plated steel)
<b>E</b>	Heavy Duty hose up to +100 °C oØ 16 mm x iØ 9.5 mm
<b>F</b>	1 x Mounting bracket G1/4 female single
<b>G</b>	1 x Support flange STAR Gen 2.0 G1/4 male x G1/4 female (only with Art. No. 101482)



**INSTALLATION KIT CLASSIC, FUTURA, FLEX, NOVA**  
incl. 1.5 m hose  
Art. No. 101481

**INSTALLATION KIT STAR**  
incl. 3.0 m hose  
Art. No. 101482

- !** Order lubrication system separately!
- Use extensions, angles & reducers depending on the installation situation

**The following lubrication systems are always installed with grease line:**



perma PRO/PRO C  
perma PRO LINE/PRO C LINE  
→ Accessory KIT PRO go to page 72



perma ECOSY  
→ Accessories go to page 73

## Selecting the lubrication system

1.1



### Industries

8-17

- Gypsum, lime & cement plants
- Quarrying industry
- Sewage treatment plants
- Recycling industry
- Pulp & paper industry
- Mining & heavy industry

1.2



### Applications

18-27

- Conveyors
- Electric motors
- Pumps
- Blowers & fans

1.3



### Machine elements

28-37

- Roller & sliding bearings
- Chains
- Linear guides
- Spindles & open gears

2.



### Determination of mounting type

38-41

- Direct mounting
- Remote mounting

## STEP 3

3.1



### perma lubrication systems

42-63

- Functioning of automatic lubrication
- Comparison: Independent lubrication systems/ lubrication systems with external power supply
- Single-point lubrication systems
- Multi-point lubrication systems

3.2



### perma lubricants

64-65

- Oils
- Greases up to NLGI 2





**Overview of all perma lubrication systems & standard lubricants**

Manual relubrication is work- and time-intensive and is often impractical in practice. This quickly leads to the lubricant in the bearings ageing rapidly or the lubricant falling to an excessively low level. The bearings are then subject to greater wear or fail completely.

By using automatic lubrication systems the necessary lubricant is discharged at the lubrication point in sufficient quantity and optimal quality. This ensures that no mixing of lubricants occurs, because only the lubricant in the lubrication system is introduced into the lubrication point.



**Single-point lubrication systems**

- perma CLASSIC Page 48/49
- perma FUTURA Page 48/49
- perma FLEX Page 50/51
- perma NOVA Page 52/53
- perma STAR VARIO Page 54/55
- perma STAR CONTROL Page 56/57



**Multi-point lubrication systems**

- perma PRO MP-6 Page 58/59
- perma PRO C MP-6 Page 58/59
- perma PRO LINE Page 60/61
- perma PRO C LINE Page 60/61
- perma ECOSY Page 62/63

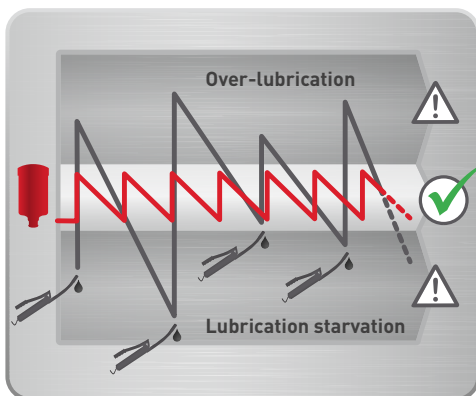
perma lubrication systems

## Functioning

Today, anyone looking for safe, effective and long-term economical lubrication of equipment takes advantage of automatic lubrication. perma offers an optimal solution for any lubrication point in terms of technology, economy, and workplace safety aspects.



### Continuous relubrication



The service life of roller and sliding bearings can be considerably extended by applying a selected lubricant to the lubrication point at short intervals and in the correct quantity. In manual lubrication using a grease gun, lubrication intervals generally cannot be adhered to due to the lack of capacity, which often leads to premature wear or bearing failure.

Automatic lubrication systems continuously discharge small quantities of lubricant into the lubrication point over a predefined discharge period. This ensures that the correct amount of lubricant is replaced in the bearing.

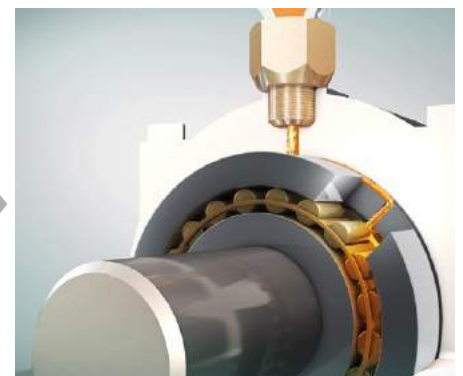
### Mode of functioning of automatic lubrication systems



perma lubrication systems can be easily attached to any lubrication point.



The quantity is regulated in the discharge time settings.



Once the system is activated fresh lubricant is discharged uniformly into the lubrication point.

## Independent lubrication systems

**Self-sufficient systems** can be used at any location and are **immediately ready for use**. The systems are driven by an electrochemical reaction or an electromechanical drive with battery. These systems can be installed quickly and easily.



perma CLASSIC /  
perma FUTURA



perma FLEX



perma NOVA



perma STAR VARIO



perma PRO MP-6 /  
perma PRO LINE

## Precise lubrication systems with external power supply

Automatic lubrication systems with **external power supply** allow time- or distance-based lubrication. By coupling with a higher-level machine controller, signals from the lubrication system's operating status can be analysed.



perma STAR CONTROL



perma PRO C MP-6 /  
perma PRO C LINE



perma ECOSY

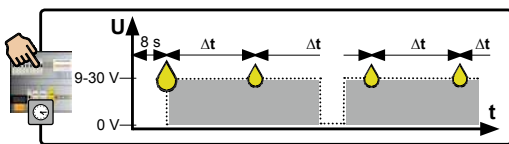
### Signalling

- Operating status
- Errors
- Lubricant empty/  
refill/replace LC (= lubricant  
cartridge)

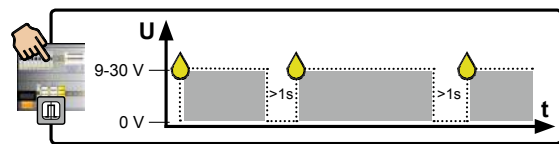
### In addition for impulse control:

- Time of impulses
- Number of impulses

**Time control** – In case of external power supply, the lubrication system discharges the predefined amount **per operating hour (Oh)** independently. The required discharge amount setting is made via the lubrication system.



**Impulse control** – In case of external power supply, the lubrication system carries out a **single lubrication impulse**. The time at which discharge occurs can be programmed via the PLC. The discharge amount per impulse is either pre-set (PRO C/ECOSY) or can be selected (STAR CONTROL/PRO C LINE).







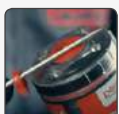
















## Lubrication systems with remote servicing




























perma NET is a network, which is monitored and configurable online, consisting of up to 100 multi-point lubrication systems. The discharge behaviour can be defined individually for each lubrication point and be modified if required. Your perma contact will support you in project planning and configuration. We are happy to advise you.

## Overview of single-point lubrication systems

	perma CLASSIC / perma FUTURA → Page 48/49	perma FLEX → Page 50/51	perma NOVA → Page 52/53	perma STAR VARIO → Page 54/55	perma STAR CONTROL → Page 56/57
					
<b>Specifications</b>					
	Activator 	Rotary switch  Complete system	Push button + LCD display  Reusable NOVA Control unit	Push button + LCD display + LED signals red/green  Reusable STAR VARIO Drive	Push button + LCD display + LED signals red/green  Reusable STAR CONTROL Drive
	0 to +40 °C	-20 to +60 °C		-10 to +60 °C	-20 to +60 °C
	max. 4 bar	max. 5 bar	max. 6 bar	6 bar	
	120 cm <sup>3</sup>	60, 125 cm <sup>3</sup>	65, 125 cm <sup>3</sup>	60, 120, 250 cm <sup>3</sup>	
	Electrochemical			Electromechanical Battery pack STAR VARIO	Electromechanical 9–30 V DC
	Tamper-proof	Discharge period can be altered at any time/system can be shut down			
	1, 3, 6, 12 months at +20 °C/ perma Multipurpose grease SF01	1, 2, 3 ... 12 months at +20 °C/ perma Multipurpose grease SF01	1, 2, 3 ... 12 months independent of operating temperature	1, 2, 3 ... 12 months independent of operating temperature and counter pressure	-
					1, 2, 3 ... 12 months independent of operating temperature and counter pressure
					0.1–9.5 cm <sup>3</sup> per impulse independent of operating temperature and counter pressure
		IP 68	IP 65	IP 65	
	CE Ex	CE Ex IECEx FM APPROVED TIIS	CE Ex IECEx ANZEx	CE UL US LISTED	CE
<b>Special operating conditions</b>					
	Minor vibration at the lubrication point	Minor to moderate vibration Remote mounting of lubrication system with grease line allows connection to lubrication points with minor to heavy vibrations.		Minor to heavy vibration	
	<1 meter grease line → Go to page 76	<2 meters grease line → Go to page 76		<5 meters grease line → Go to page 76	

## Overview of multi-point lubrication systems

	perma PRO MP-6 → Page 58/59	perma PRO C MP-6 → Page 58/59	perma PRO LINE → Page 60/61	perma PRO C LINE → Page 60/61	perma ECOSY → Page 62/63
					
<b>Specifications</b>					
	<b>Push button + LCD display + LED signals red/green</b>  				<b>Push button + LCD display</b> 
	PRO Drive & Distributor MP-6 Reusable				perma ECOSY Refillable
	-20 to +60 °C				
	max. 25 bar				max. 10 bar
	250, 500 cm <sup>3</sup> (greases up to NLGI 2)				7 litres (oils)
	Electromechanical				Electromechanical
	Battery PRO B	15–30 V DC	Battery PRO B	15–30 V DC	24 V DC/85–240 V AC
	Discharge period can be altered at any time / system can be shut down				
	1 day to 24 months Number of outlets selectable		Individual discharge quantity Number of outlets selectable		-
	1 day to 24 months (LC 250) 1 day to 12 months (LC 500)	1 day to 24 months (Depending on operating hours)	1 to 99 days pause period 1 to 9 discharge strokes (Depending on operating hours)		0 to 9.999 ml per 1,000 operating hours
	Discharge quantity 1.0 cm <sup>3</sup> per impulse/outlet Same discharge quantity per outlet → Max. 6 lubrication points		Discharge quantity 0.5 to 4.5 cm <sup>3</sup> per impulse/outlet Individual discharge quantity per outlet → Max. 6 lubrication points		Discharge quantity 0.5 cm <sup>3</sup> per impulse/outlet Individual discharge quantity per outlet → Max. 6 lubrication points
	IP 54		IP 54		
	 				
<b>Special operating conditions</b>					
	<b>Minor to heavy vibration</b> Remote lubrication system mounting with grease line allows deployment at lubrication points with minor to heavy vibrations				
	<b>&lt;5 meters grease line</b> → Go to page 76				<b>&lt;10 meters grease line</b> → Go to page 76

# perma CLASSIC / perma FUTURA

The classical lubrication system



CE Ex I M2 c X  
II 2G c IIC T6 X  
II 2D c T80°C X  
0 °C ≤ Ta ≤ +40 °C

Made in  
Germany

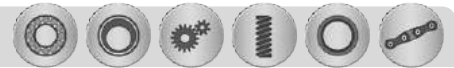
## Simple, robust, reliable

perma CLASSIC and perma FUTURA can be used in all types of applications with ambient temperatures from 0 to +40 °C. Depending on operating conditions, a lubricant volume of 120 cm<sup>3</sup> is dispensed in 1, 3, 6 or 12 months. Reliable function is based on an electrochemical reaction. The activator is screwed in the lubrication system and the eyelet torn off. The contained gas generator generates a pressure of max. 4 bar, which moves the piston forward and transports lubricant into the lubrication point.

**perma**



## Applications / machine elements



perma CLASSIC and perma FUTURA are used for single-point lubrication of roller and sliding bearings, sliding guides, open gears, gear racks, spindles, shaft seals, chains, etc. Main application areas of perma CLASSIC include the mining, steel, automotive and mechanical engineering industries. perma FUTURA has a corrosion-proof plastic housing, which makes it ideal for hygienically clean environments such as the food and chemical industries.



## Product characteristics

## Benefits



**Simple activation through activator**

**One-time activation:**  
1, 3, 6 or 12 months

- Tamper-proof, easy to use
- Economical, permanent lubrication
- Quick and easy exchange without special tools



perma CLASSIC  
**Metal housing**

perma FUTURA  
**Transparent plastic housing with integrated support flange**

- Robust housing for use in harsh environments
- Easy fill level check via permanently visible position of piston in lubrication system
- Corrosion-proof



**Ex-proof certification**  
**Mining approval**

- Safe and reliable lubrication in explosive areas
- Better workplace safety, since dangerous areas have to be visited for maintenance less often
- Suitable for underground use

## Technical data

→ Refer to page 70 for part numbers

Drive

**Electrochemical reaction via gas generator**

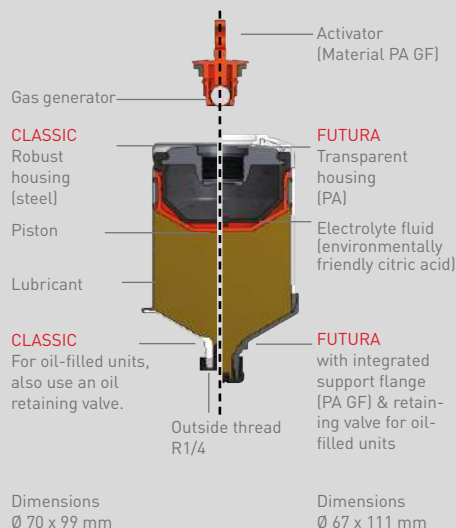
Discharge period at +20 °C/  
perma Multipurpose grease SF01  
**1, 3, 6 or 12 months**

Lubricant volume  
**120 cm<sup>3</sup>**

Operating temperature  
**0 °C to +40 °C**

Pressure build-up  
**Max. 4 bar**

Standard & special lubricants  
**Greases up to NLGI 2/oils**



### Discharge period in months:

	101331	101332	101333	101335
120 cm <sup>3</sup>				
at 0 °C	4	8	15	>18
at +10 °C	2	5	8	18
at +20 °C	1	3	6	12
at +30 °C	0.8	2	3	6
at +40 °C	0.6	1	2	3

Go to page 69 to select a suitable activator.

## perma FLEX

The flexible lubrication system in two compact sizes



II 1G Ex ia IIC T6  
II 1D Ex iaD 20 T85°C  
I M1 Ex ia I



TIIS



### Flexible use – even on lubrication points with challenging requirements

perma FLEX is a compact, ready-to-use lubrication system supplied as a complete unit. It can be used in various types of applications at temperatures ranging from -20 °C to +60 °C. Discharge period setting is freely adjustable from 1 to 12 months. The required pressure is developed via an electronically controlled chemical reaction. The lubrication point is continuously supplied with fresh lubricant throughout the selected discharge period. perma FLEX is available in sizes 60 cm<sup>3</sup> and 125 cm<sup>3</sup>.

**perma**

## Applications / machine elements



perma FLEX is suitable for single-point lubrication in all types of applications. It fulfils the requirements of IP 68 (ingress of water/contamination) and functions reliably in extremely dusty and moist environments. It can furthermore be used at various temperatures, also outdoors. Discharge can be suspended if required. The discharge period can also be adjusted after activation.



## Product characteristics

## Benefits



**All-in-one system with rotary switch for discharge period setting:**  
1, 2, 3 ... 12 months

- System is supplied fully mounted and is ready to use immediately
- Easy setting and activation using rotary switch
- Discharge period can be regulated from 1–12 months in monthly steps



**System operates reliably from -20 °C to +60 °C**

- Flexible use in various temperature ranges
- Year-round outdoor use possible



**Ex-proof certification FM approval IP 68**

- Safe and reliable lubrication in explosive areas
- Can be used in very moist and dusty environments
- Increased workplace safety

## Technical data

→ Refer to page 70 for part numbers

Drive  
**Electrochemical reaction via gas generating unit**

Discharge period at +20 °C/  
perma Multipurpose grease SF01  
**1, 2, 3 ... 12 months**

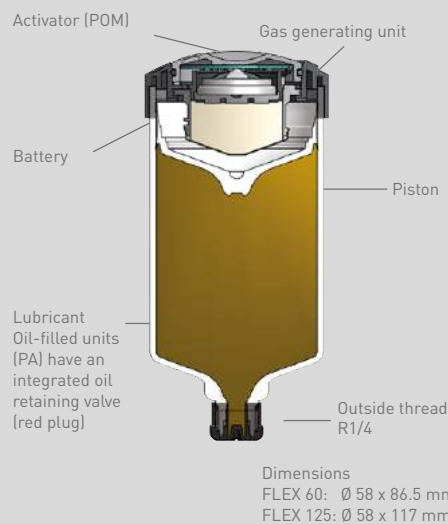
Lubricant volume  
**60 cm<sup>3</sup> or 125 cm<sup>3</sup>**

Operating temperature  
**-20 °C to +60 °C**

Pressure build-up  
**Max. 5 bar**

Protection class  
**IP 68**

Standard & special lubricants  
**Greases up to NLGI 2/oils**



### Discharge period setting in months:

Reference values for emptying without counter pressure using NLGI 2 lubricant.

Grease residues possible at temperatures >+40 °C and discharge periods >6 months.



	1	3	6	9	12
at -20 °C	2	5	10	13	15
at 0 °C	1.3	3.8	7.2	11	13
at +20 °C	1	3	6	9	12
at +40 °C	0.8	2.5	5.2	7.5	10
at +60 °C	0.6	2	4	-	-

## perma NOVA

The first temperature-independent, electrochemical lubrication system



I M1 Ex ia I Ma  
II 2G Ex ia IIC T4 Gb  
II 2D Ex ia IIIC T135°C Db  
ZELM 09 ATEX 0420 X  
-20 °C ≤ Ta ≤ +60 °C

ANZEx



### For application areas with high temperature fluctuations

perma NOVA can be used in all application areas between -20 °C and +60 °C. A discharge period from 1 to 12 months can be entered via the setting button on the NOVA Control unit. Taking into account the ambient temperature, the control unit then calculates the required quantity of gas for constant and reliable discharge. perma NOVA consists of a reusable control unit, a NOVA LC filled with grease or oil and a protective cover. NOVA LC is available in sizes of 65 cm<sup>3</sup> and 125 cm<sup>3</sup>.

**perma**

## Applications / machine elements



perma NOVA was specifically developed for single-point lubrication of roller and sliding bearings, sliding guides, open gears, gear racks, shaft seals and chains located in areas with considerable temperature variations (e.g. outside installations). The lubrication system is protected against dust and water jets, subject to correct assembly of the individual parts (IP 65). perma NOVA with LC 65 cm<sup>3</sup> is ideal for the lubrication of electric motors.



## Product characteristics

## Benefits



**Electronic control unit with temperature compensation** shows discharge period/operating status  
**LCD display and push button setting:** 1, 2, 3 ... 12 months

- Discharge period setting independent of ambient temperature
- Accelerated pressure build-up for first discharge within one day
- Simple and safe handling
- Reusable NOVA Control unit



**System operates reliably from -20 °C to +60 °C**

- Universal use both in cold areas and at higher temperatures
- Temperature compensation permits use with heavily fluctuating ambient temperatures
- Stable threaded connection through integrated support flange



**Ex-proof certification IP 65**

- Safe and reliable lubrication in explosive areas
- Dust-tight and protected against water jets
- Increased workplace safety

## Technical data

→ Refer to page 71 for part numbers

Drive – reusable  
**Electrochemical reaction via gas generating cells with electronic temperature compensation**

Discharge period  
**1, 2, 3 ... 12 months**

Lubricant volume  
**65 cm<sup>3</sup> or 125 cm<sup>3</sup>**

Operating temperature  
**-20 °C to +60 °C**

Pressure build-up  
**Max. 6 bar**

Protection class  
**IP 65**

Standard & special lubricants  
**Greases up to NLGI 2/oils**

NOVA LC with gas generator and battery



NOVA Control unit (PA GF)

Piston

Lubricant  
Oil-filled units (PA) have an integrated oil retaining valve (red plug)

Robust, integrated support flange (PA GF) with R1/4 outside thread

Dimensions  
LC 65: Ø 65 x 101 mm  
LC 125: Ø 65 x 132 mm



Transport protection and cover against dust and dirt



**NOVA Control unit**  
LCD display with setting button (discharge period and function)  
107271



Go to page 69 for selection of suitable discharge period and LC size

NOVA LC 65 or 125

## perma STAR VARIO

High-precision and easy-to-use lubrication system – independent of temperature and counter pressure

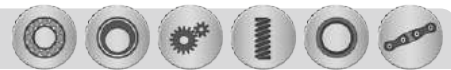


### Three different sizes for individual lubricant metering

perma STAR VARIO operates fully automatically, independent of temperature and pressure as well as offering a very precise discharge. The system consists of an electromechanical drive, an LC with 60, 120 or 250 cm<sup>3</sup> of lubricant and a battery pack. The desired discharge period and LC size can easily be selected with the setting button and are immediately visible in the LCD. The current operating status is indicated on the LCD and via LED signal lights (red/green) visible all round. The LED signals are also recognisable from a distance.

**perma**

## Applications / machine elements



perma STAR VARIO is used for single-point lubrication of roller and sliding bearings, sliding guides, open gears, gear racks, spindles, shaft seals and chains. Thanks to precise lubricant metering, perma STAR VARIO is ideal for lubrication of electric motors with specified lubricant quantities. perma STAR VARIO is protected against dust and water jets, subject to correct assembly of the individual parts (IP 65).



## Product characteristics

## Benefits



**LCD display with setting button** displays discharge period, LC size and operating status

**Setting:**  
1, 2, 3 ... 12 months and LC size

- Simple and self-explanatory operation
- Precise settings according to requirements prevent lubrication starvation and over-lubrication
- Settings can be changed at any time
- Can be turned off for extended equipment shut downs



**Electromechanical, reusable drive with battery pack**  
**LED (red/green) visible all round** signals functioning and any errors

- Reliable, precise lubricant discharge independent of temperature and counter pressure
- One-time acquisition costs for STAR VARIO Drive
- Quick function control via LED signals saves time and relieves maintenance workers



**Pressure build-up to 6 bar allows remote mounting up to 5 m**

**Counter pressure testing and manual additional discharge at the press of a button (purge)**

- Installation outside of dangerous areas or at easy-to-reach places increases workplace safety and saves time
- Higher equipment availability, since exchange during running operation possible
- Lubrication point can be purged to clear blockages

## Technical data

→ Refer to page 71 for part numbers

Drive – reusable  
**Electromechanical function using Battery pack STAR VARIO**

Discharge period  
**1, 2, 3 ... 12 months**

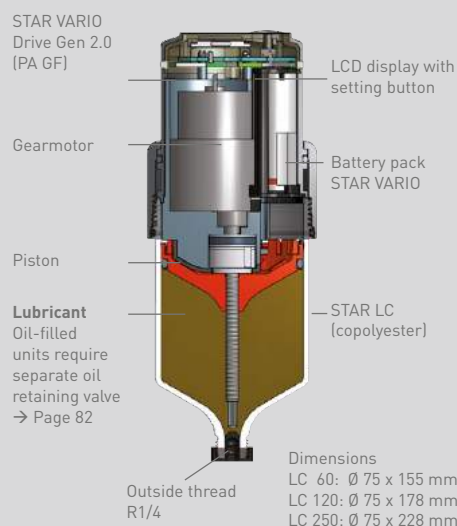
Lubricant volume  
**60 cm<sup>3</sup>, 120 cm<sup>3</sup> or 250 cm<sup>3</sup>**

Operating temperature  
**-10 °C to +60 °C**

Pressure build-up  
**6 bar**

Protection class  
**IP 65**

Standard & special lubricants  
**Greases up to NLGI 2/oils**



## perma STAR CONTROL

TIME and IMPULSE mode combined in a single system



### Lubricant optimally metered as a function of operating hours or by impulses

In contrast to the perma STAR VARIO (with battery pack), the perma STAR CONTROL is supplied with external power via cable. In addition, the operating status can be transmitted to a PLC via this connection. The two integrated operating modes TIME and IMPULSE allow flexible use. In the TIME mode, lubricant dispensing is dependent on operating hours. In the IMPULSE mode, a precisely defined quantity is dispensed as soon as a voltage is applied. The perma STAR CONTROL consists of an electromechanical drive and an LC with 60, 120 or 250 cm<sup>3</sup> of lubricant. The required mode is set on the drive. Lubrication is precise, temperature-independent and with up to 6 bar counter pressure.

**perma**



## Applications / machine elements



The perma STAR CONTROL is used to lubricate roller and sliding bearings, sliding guides, open gears, gear racks, spindles, shaft seals and chains. Thanks to precise lubricant metering, perma STAR CONTROL is ideally suited for lubrication of electric motors with specified lubricant quantities. The system is protected against dust and water jets, subject to correct assembly of the individual parts (IP 65).



### Product characteristics

### Benefits



**LCD display with setting button shows discharge settings, LC size and operating status**

**Setting:**  
Mode, LC size, discharge quantity and PIN

- Flexible handling thanks to simple TIME or IMPULSE mode setting; can be changed at any time
- Fast, simple control of settings, the remaining impulses or operating hours until exchange
- PIN request protects against possible tampering



**Electromechanical drive with external power supply**  
**LED (red/green) visible all round signals functioning and any errors**

- Reliable, precise lubricant discharge independent of temperature and counter pressure
- Quick function control thanks to optical or electronic signals on the lubrication system and plant error reporting system saves time and relieves maintenance workers



**6 bar pressure build-up allows remote mounting**  
**Counter pressure testing and manual additional discharge at the press of a button (purge)**

- Mounting up to 5 m outside of dangerous areas or at easily accessible locations increases workplace safety
- Higher equipment availability, because exchange can take place during running operations
- Lubrication point can be purged to clear blockages

### Technical data

→ Refer to page 71 for part numbers

Drive – reusable  
**Electromechanical function using external voltage: 9–30 V DC, I<sub>max</sub> 0.5 A**

Discharge period  
**Time-controlled (TIME)**  
**Impulse-controlled (IMPULSE)**

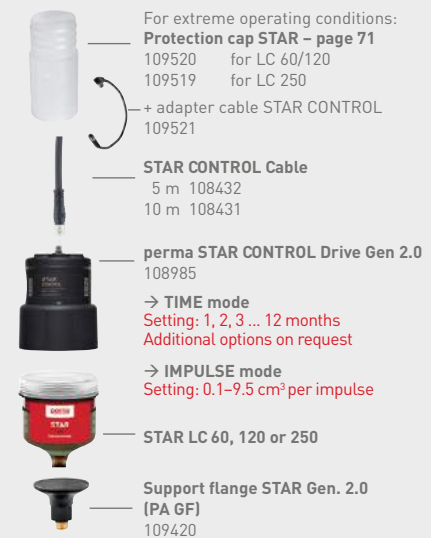
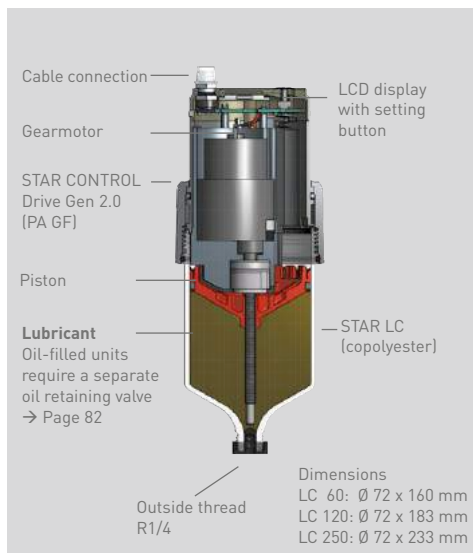
Lubricant volume  
**60 cm<sup>3</sup>, 120 cm<sup>3</sup> or 250 cm<sup>3</sup>**

Operating temperature  
**-20 °C to +60 °C**

Pressure build-up  
**6 bar**

Protection class  
**IP 65**

Standard & special lubricants  
**Greases up to NLGI 2/oils**



## perma PRO MP-6 / PRO C MP-6

The precise multi-point lubrication system for up to 6 lubrication points



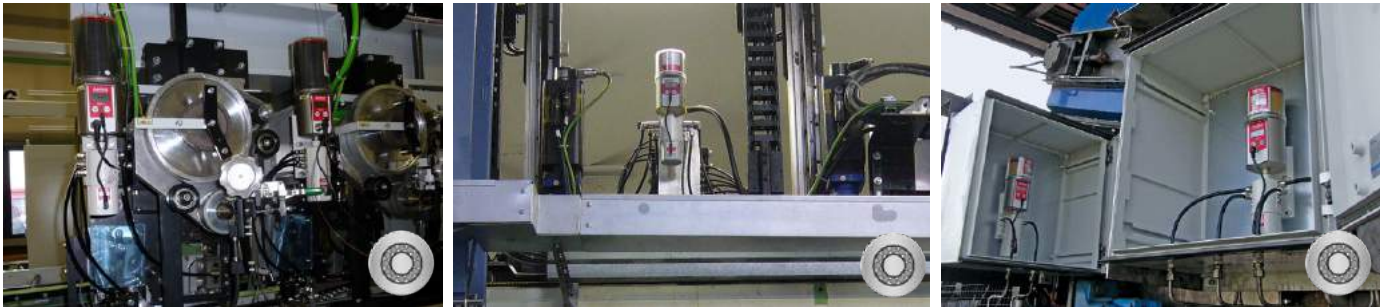
### Precise lubricant supply even under extreme conditions

The perma PRO MP-6 is available as a self-sufficient, battery operated multi-point lubrication system or as perma PRO C MP-6 with external power supply (PLC or machine controlled). Depending on the discharge period, from 1 day to 24 months, 250 or 500 cm<sup>3</sup> of lubricant are dispensed from a maximum of six outlets into the lubrication points. Thanks to the maximum pressure build-up of 25 bar in the MP-6 distributor, the lubricant is uniformly and precisely distributed using up to 5 m of grease line per outlet.

**perma**



perma PRO MP-6 and perma PRO C MP-6 multi-point lubrication system applications include roller and sliding bearings, linear guides, open gears, spindles as well as shaft seals on motors, generators, pumps and fans. The types of applications range from the automotive industry and combined heat and power stations, through the paper industry and mining, and on to various steel industry sectors.



## Product characteristics

## Benefits



**Setting via push button with display and LED**

Outlet display  
LED red/green = function

- Easy configuration of discharge period and outlets
- Display of remaining volume and active outlets
- Status control on display
- Easy to set and change at any time



**Pressure build-up to 25 bar allows remote mounting up to 5 m per outlet**

**Additional discharge (purge)**

- Installation outside of dangerous areas or at easy-to-reach places increases workplace safety and saves time
- Higher equipment availability, since exchange during running operation possible
- Lubrication point can be purged to clear blockages



**MP-6 distributor with 6 outlets – Number of active outlets can be user-defined**

- Supply of 1 to 6 lubrication points with same lubricant amount
- Precise supply of lubrication points
- Monitoring of lubrication point status

## Technical data

→ Refer to page 72 for part numbers

Drive – reusable

**PRO MP-6: Battery operation**  
**PRO C MP-6: External power supply 15–30 V | 120 mA**

Discharge periods

**1 day to 24 months**

Lubricant volume

**250 cm<sup>3</sup> or 500 cm<sup>3</sup>**

Operating temperature

**-20 °C to +60 °C**

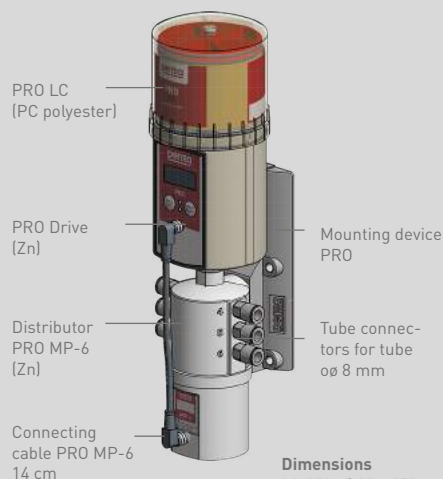
Pressure build-up

**Max. 25 bar**

**Mounting with <5 m grease line per outlet**

Standard & special lubricants

**Greases up to NLGI 2**



**Dimensions**  
LC 250: Ø 92 x 358 mm  
LC 500: Ø 92 x 408 mm

**Create your perma PRO system in 3 steps:**

**1 perma PRO Basic system**  
battery operated

or

**perma PRO C Basic system**  
with external power supply

**2 Accessory kit PRO**

**3 PRO LC and Cover**

The grease used to prefill the grease lines has to match the grease used for PRO LC. 400 g cartridges for prefilling can be found on page 68.

## perma PRO LINE / PRO C LINE

Precise lubrication system for linear guides



### References

**Rexroth**  
Bosch Group

Use of lubricants approved by the manufacturer.



### The flexible multi-point lubrication systems for 1 to 6 lubrication points

perma PRO LINE and perma PRO C LINE are flexible multi-point lubrication systems for linear guides. The discharge can be adapted precisely to the manufacturer's specifications. The lubricant quantity and relubrication interval can be set flexibly for each of the six outlets. The PRO LC is filled with 250 or 500 cm<sup>3</sup> of grease. The high pressure build-up enables remote mounting using grease lines of up to 5 meters per outlet. This increases workplace safety, while at the same time allowing reliable lubrication of the running system.

**perma**



Main applications for the multi-point lubrication systems perma PRO LINE and perma PRO C LINE are linear guides. The types of applications range from linear components, modules and units, through screw drives and gear racks in machine tools, handling systems, and traversing axes on industrial robots. Other application areas are roller and sliding bearings, open gears and spindles.



## Product characteristics

## Benefits



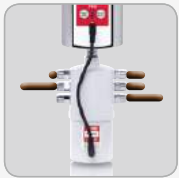
**Flexible setting options for every outlet**  
Pause time between discharges

- Lubricant quantity individually configurable for each outlet
- Individual setting of pause times per outlet
- Lubricant discharge is optimally adapted to respective lubrication point



**Setting via push button with display and LED**  
Display of remaining discharge time  
Display of distributor outlets  
LED red/green = function

- Simple operation of lubrication system
- Lubrication system function and error immediately visible
- Quick check of discharge time saves time and simplifies planning of PRO LC exchange



**Dual operation**  
Mixture of time and impulse operation

- Time mode (flexible discharge per interval) and impulse mode (flexible discharge per impulse), as well as dual operation
- Additional discharges can be triggered for all outlets during pause times
- Lubrication point can be purged in order to e.g. supply fresh lubricant after longer downtimes

## Technical data

→ Refer to page 72 for part numbers

Drive – reusable

**PRO LINE: Battery operation**  
**PRO C LINE: External power supply**  
15–30 V | 120 mA

Discharge periods

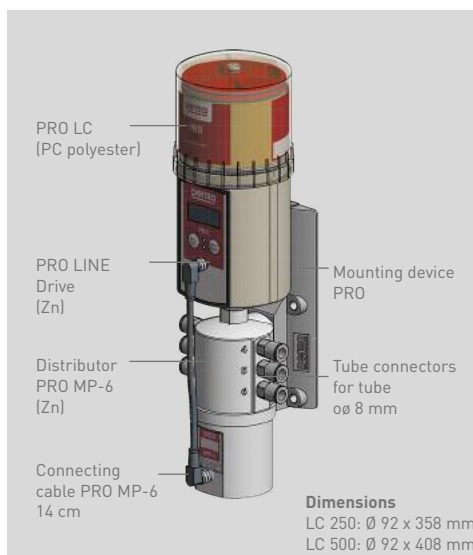
**Pause times in days (24 h)**  
**Discharge quantity per outlet**  
**Impulse mode**

Lubricant volume  
**250 cm<sup>3</sup> or 500 cm<sup>3</sup>**

Operating temperature  
**-20 °C to +60 °C**

Pressure build-up  
**Max. 25 bar**  
**Mounting with <5 m grease line per outlet**

Standard & special lubricants  
**Greases up to NLGI 2**



### Create your perma PRO system in 3 steps:

**1 perma PRO LINE Basic system**  
battery operated

or

**perma PRO C LINE Basic system**  
with external power supply

**2 Accessory kit PRO**

**3 PRO LC and Cover**

The grease used to prefill the grease lines has to match the grease used for PRO LC. 400 g cartridges for prefilling can be found on page 68.

## perma ECOSY

Ideal oil lubrication for demanding applications



### Exact oil metering for every application

perma ECOSY is a multi-point lubrication system and supplies up to 6 lubrication points with a predefined quantity of oil. The machine dependent control of perma ECOSY allows time, sensor or impulse mode and can therefore be adapted to varying demands.

The lubrication pump and control unit are integrated in a 7 litre plastic tank, which is filled with oil by the user. The high perma ECOSY pump pressure allows lubrication points up to 10 m away to be supplied with lubricant, e.g. in poorly accessible and soiled areas.

**perma**



perma ECOSY can be used to lubricate guideways as well as drive and transport chains. The system supplies the lubrication points with the defined lubricant quantity via special brushes and prevents friction and wear at the contact points. This results in a longer service life cycle and lower maintenance costs. Typical application areas include escalators, moving walkways and conveyors.



## Product characteristics

## Benefits



**Multifunction display in several languages**

- Simple operation with no special programming knowledge
- Lubricant quantity per outlet can be individually defined
- Display with error and reserve notification



**High-quality plastic housing with 7-litre tank volume**

- Compact and lubricant resistant plastic housing with integrated lubrication pump and control unit
- Reduction in maintenance costs due to long servicing intervals
- Refilling only necessary every 2 years (dependent on operating hours)



**Flexible pump control of 6 outlets**

- Time, sensor or impulse dependent control possible
- Lubricating oils with viscosities of 65–2000 mm<sup>2</sup>/s (at +40 °C) can be pumped
- High pumping pressure allows supply of remote and hard-to-reach lubrication points

## Technical data

→ Refer to page 73 for part numbers

Fill volume  
**7 litres**

Number of outlets  
**1–6, individual, electronically activatable**

Discharge periods  
**Machine controlled/time controlled**

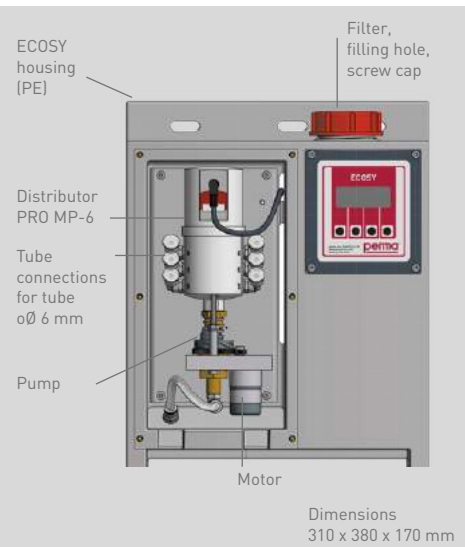
Feed rate  
**0–9,999 ml/1,000 h per outlet**

Operating temperature  
**-20 °C to +60 °C**

Pressure build-up  
**Max. 10 bar**

Supply voltage  
**85–240 V AC | 50–60 Hz  
24 V DC | 25 W**

Standard & special lubricants  
**Oils**



### perma ECOSY – electrical connections





**Plug A**  
85–240 V AC  
power supply  
4-pin

**Plug B**  
Control &  
24 V DC supply  
8-pin




perma-tec offers a wide range of high-quality lubricants meeting a great variety of requirements. Consistently high quality has established the product in diverse industrial sectors.

Renowned manufacturers develop and produce lubricants specifically for perma lubrication systems. All lubricants are tested under laboratory conditions and in real applications to ensure optimal function in perma lubrication systems.

 Food, drinks, tobacco and pharma industry

 Bio-degradable for all applications

## Oils

Name → Lubricant properties	Base oil	Operating temperature (°C)	Viscosity at +40 °C [mm <sup>2</sup> /s]	Sliding bearings Sliding guides	Open gears Gear racks	Spindles	Chains
<b>perma High performance oil S014</b> → Lubricates effectively even at high operating temperatures → Good viscosity/temperature behaviour → Special creep properties ensure rapid film formation	Ester oil + synth. hydrocarbon oil	-20 to +250	320	-	-	-	✓
<b>perma Multipurpose oil S032</b> → High performance transmission & multipurpose oil → Ageing- & oxidation-resistant → Good wear protection for gear teeth & roller bearings	Mineral oil	-5 to +100	100	✓	✓	✓	✓
 <b>perma Bio oil, low viscosity S064</b> → Multipurpose oil → Rapidly biodegradable → Good viscosity/temperature behaviour	Ester oil	-30 to +110	100	✓	✓	✓	✓
 <b>perma Bio oil, high viscosity S069</b> → Multipurpose oil → Rapidly biodegradable → Good wear protection	Ester oil	-20 to +110	460	✓	✓	✓	✓
 <b>perma Food grade oil NSF H1 S070</b> → Broad operating temperature range → Very good ageing & oxidation resistance → Good wear protection	PAO + ester oil	-30 to +120	220	✓	✓	✓	✓

### Additives

Tribological properties of the lubricant are enhanced with additives. The additives, e.g. anti-wear (AW) additives or extreme pressure (EP) additives, are mixed with the base oil.

Depending on the application, additives are selected to provide the required characteristics. In the case of gear oil, additives are imperative for specific purposes, such as increasing pressure resistance and shear strength.

### Speed index = dk

The speed index indicates the maximum speed for various bearing types for which a specific lubricant is suitable. perma overviews specify the speed indexes for grease lubrication of deep groove ball bearings.

**Calculation:**  $n \times dm = \text{speed factor } dk$        $dm = (D + d) \div 2$

n = Operating speed (1/min); D = Outside bearing diameter;

d = Inside (bore) bearing diameter; dm = Bearing size

### Operating temperature

The operating temperature is the temperature range in which reliable function of components is guaranteed. Using the lubricant outside this range can lead to damage.





**HINT**

- Special lubricants are available upon request
- The perma SELECT APP helps you choose the right lubricant



## Greases

Name → Lubricant properties	NLGI grade	Thickener	Base oil	Operating temperature (°C)	Basic viscosity at +40 °C [mm <sup>2</sup> /s]	Speed index	Roller bearings	Sliding bearings Sliding guides	Linear guides	Open gears Gear racks	Spindles
<b>perma Multipurpose grease SF01</b> → Powerful multipurpose grease → Wear reducing thanks to EP additives → Free of heavy metals & silicone	2	Li/Ca	Mineral oil	-30 to +130	220	300,000	✓	✓	✓	-	✓
<b>perma Extreme pressure grease SF02</b> → High-pressure grease with MoS2 → Ageing- & oxidation-resistant → Good dry-running properties	2	Li + MoS2	Mineral oil	-30 to +120	100	350,000	-	✓	-	✓	-
<b>perma High temp. grease SF03</b> → Good oil retention → High thermal stability → Good corrosion protection	2	PHS + PTFE	Ester + PFPE	-20 to +220	420	300,000	✓	✓	-	-	-
<b>perma High performance grease SF04</b> → Multipurpose lubricant for extreme requirements → Powerful at high temperatures & vibrations → Resistant to aggressive media	0/1	PHS	Mineral oil + PAO	-20 to +160	500	200,000	✓	✓	✓	✓	✓
<b>perma High temp. / Extreme pressure grease SF05</b> → Multipurpose grease for extreme requirements → High load-carrying capacity → Good dry-running properties thanks to solid lubricants	0/1	PHS + MoS2	Mineral oil + PAO	-20 to +160	500	200,000	✓	✓	-	✓	-
<b>perma Liquid grease SF06</b> → Good water resistance → High wear protection → Easily pumped	0	Al com.	Mineral oil	-20 to +130	220	300,000	✓	✓	✓	-	✓
<b>perma High speed grease SF08</b> → High speed index → Low friction coefficient due to synthetic base oil → Broad operating temperature range	2	Ca com.	PAO	-40 to +140	100	600,000	✓	✓	-	-	-
 <b>perma Multipurpose bio grease SF09</b> → Rapidly biodegradable → Water hazard class WGK 1 → Fully synthetic	2	PHS	Ester	-40 to +140	120	300,000	✓	✓	-	✓	-
 <b>perma Food grade grease NSF H1 SF10</b> → Synthetic → Good wear protection & low temperature resistance → Good water resistance	1	Al com.	PAO	-45 to +120	150	500,000	✓	✓	✓	✓	✓

### Base oil

The base oil determines the properties and performance of the lubricant. Base oils are mineral oils, hydrocracked oils, polyalphaolefin (PAO) oils or synthetic ester oils.

### Basic viscosity

The viscosity indicates the flowability of the base oil. Low viscosity base oils are used for very high speeds. High viscosity base oils are used for high load applications. The viscosity of a typical roller bearing grease at +40 °C is between 15 and 500 mm<sup>2</sup>/s.

### NLGI grade

The NLGI grade (consistency number) denotes the consistency of a lubrication grease. Grades range from 000 (very fluid) to 6 (very hard). Greases up to NLGI grade 2 can be used in perma lubrication systems.

### Thickener

The thickener acts like a sponge. It holds the individual components of the grease together and ensures that the oil stays at the contact point.



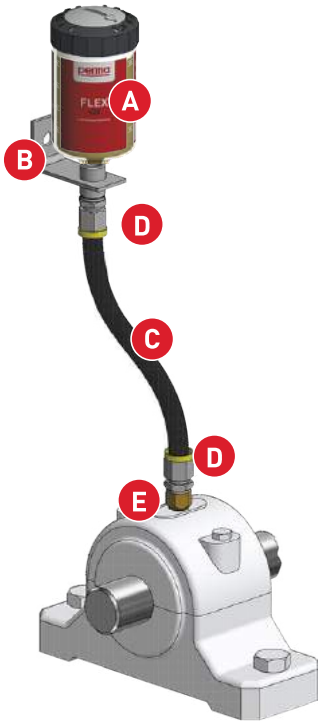
## **Lubrication system mounting – from preparation to solution**

It has never been so easy to integrate automatic lubrication systems in existing production processes. Thanks to many years of global experience perma-tec can pass on its expertise to customers in all industries, and offer service and support.

On the following pages we explain step by step, using installation examples, how the lubrication point is prepared and the materials required. In addition, the activation and installation of the lubrication systems is shown.

## Guide to optimal installation of single-point lubrication systems

### INDEX – single-point lubrication systems:



Installation example roller bearing lubrication

<b>Z</b>	Pre-filling accessories (no pic.)	Page 68
<b>A</b>	perma lubrication systems	Page 70–71
<b>B</b>	Brackets / mounting plates / mounting angles	Page 74–75
<b>C</b>	Tubes	Page 76
<b>D</b>	Tube connectors	Page 77–78
<b>E</b>	Reducers	Page 78–79
<b>F</b>	Extensions (no pic.)	Page 80
<b>G</b>	Angles (no pic.)	Page 81
<b>H</b>	Others (no pic.)	Page 81
<b>I</b>	Oil retaining valves (no pic.)	Page 82
<b>J</b>	Oil brushes (no pic.)	Page 82–83

**HINT** FAQs about all perma single-point lubrication systems can be found on our website: [www.perma-tec.com](http://www.perma-tec.com)

### 1. Prepare lubrication point

**HINT**



Clean the lubrication point, remove grease fitting



Apply thread sealant (e.g. Loctite® 243™) to all connecting parts, screw in reducer



Prelubricate lubrication point and connecting parts, prefill grease lines if applicable (use the same lubricant as in lubrication system)






**perma VIDEOS: Mounting of lubrication systems**

See perma-tec website:

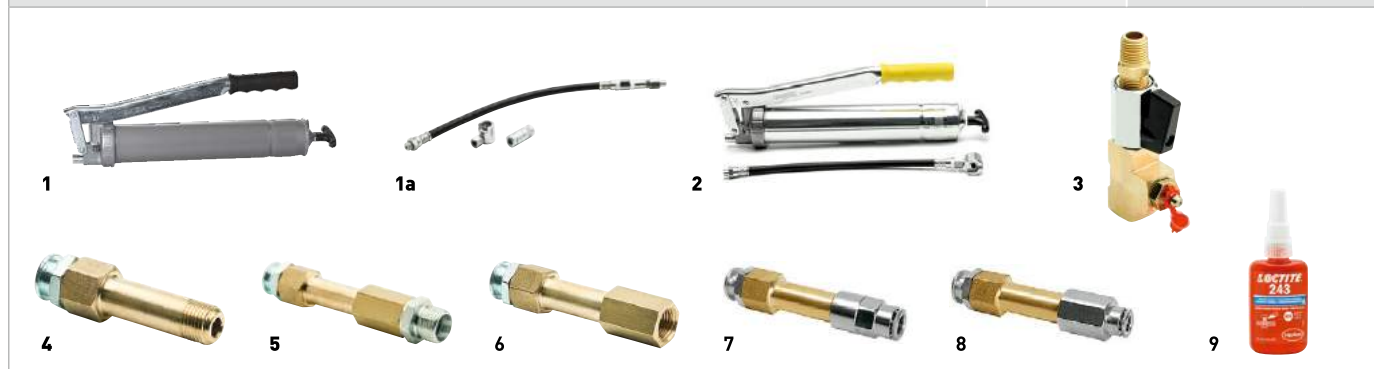
→ [www.perma-tec.com/en/media/videos/](http://www.perma-tec.com/en/media/videos/)



## Z Prepare lubrication point

Greases	Cartridge 400 g for grease gun	Pail 1 kg	Pail 5 kg
			
perma Multipurpose grease SF01	101585	107494	107508
perma Extreme pressure grease SF02	101588	107495	107509
perma High temp. grease SF03	101589	107496	107510
perma High performance grease SF04	101590	107497	107511
perma High temp. / Extreme pressure grease SF05	101591	107498	107512
perma Liquid grease SF06	101592	107499	107513
perma High speed grease SF08	101593	107500	107514
perma Multipurpose bio grease SF09	101594	107501	107515
perma Food grade grease NSF H1 SF10	101595	107502	107516
Oils	Bottle 1 litre	Canister 5 litres	
			
perma High performance oil S014	107463	107520	
perma Multipurpose oil S032	107465	107521	
perma Bio oil, low viscosity S064	107469	107523	
perma Bio oil, high viscosity S069	107472	107525	
perma Food grade oil NSF H1 S070	107473	107526	

Accessories for preparing the lubrication point	Pic.	Art. No.
Grease gun (operating pressure 400 bar/1.9 cm <sup>3</sup> stroke)	<b>1</b>	101455
Hose with rotary joint, slide and hydraulic coupling for grease gun	<b>1a</b>	110199
Oil gun (operating pressure 400 bar/1.9 cm <sup>3</sup> stroke)	<b>2</b>	109009
Accessory set for pressure test (order lubrication system separately)	-	101480
Purge connection with manual valve G1/4 female	<b>3</b>	109684
Prefill adapter G1/4 male	<b>4</b>	109003
Hose prefill adapter for Heavy Duty hose	<b>5</b>	107633
Tube prefill adapter for VA-flex tubes	<b>6</b>	107634
Tube prefill adapter for tube ø 8 mm	<b>7</b>	101526
Tube prefill adapter for tube ø 6 mm	<b>8</b>	101532
50 ml Bottle Loctite® 243™ thread sealant (medium strength)	<b>9</b>	110278



## Conversion tables

Download the free perma SELECT APP to your smartphone/tablet

### perma SELECT APP

Download: AppStore/PlayStore  
Online: Browser version



**NEW**  
As of Q1/2016

Alternatively, determine the setting based on the stipulated discharge quantity

Conversion: 1 stroke grease gun = approx. 1.5 cm<sup>3</sup> = 1.2 g lubricant

Note activation  
and exchange date  
on label

**HINT**



**120 cm<sup>3</sup> lubricant**

Activator/ months at +20 °C with SF01	1	3	6	12
Lubricant/day [cm <sup>3</sup> ]	4.0	1.3	0.7	0.3
Lubricant/week [cm <sup>3</sup> ]	28.0	9.3	4.7	2.3
Strokes with grease gun/day	2-3	1	0.5	0.25
Strokes with grease gun/week	16-20	5-7	3-4	1-2

**60-65 cm<sup>3</sup> lubricant**

Setting/months	1	2	3	4	5	6	7	8	9...	...12
Lubricant/day [cm <sup>3</sup> ]	2.0	1.0	0.7	0.5	0.4	0.3	0.3	0.3	0.2	0.2
Lubricant/100 h [cm <sup>3</sup> ]	8.3	4.2	2.8	2.1	1.7	1.4	1.2	1.0	0.9	0.7
Lubricant/week [cm <sup>3</sup> ]	14.0	7.0	4.7	3.5	2.8	2.3	2.0	1.8	1.6	1.6
Strokes with grease gun/day	1-2	<1	0.5	-	-	0.25	-	-	-	0.13
Strokes with grease gun/100 h	5-7	3	2	1.5	<1.5	1	<1	<1	<1	0.5
Strokes with grease gun/week	9-11	5	3	2-3	2	1-2	<1.5	<1.5	1	<1

**120-125 cm<sup>3</sup> lubricant**

Setting/months	1	2	3	4	5	6	7	8	9...	...12
Lubricant/day [cm <sup>3</sup> ]	4.2	2.1	1.4	1.0	0.8	0.7	0.6	0.5	0.5	0.4
Lubricant/100 h [cm <sup>3</sup> ]	17.4	8.7	5.8	4.3	3.5	2.9	2.5	2.2	1.9	1.6
Lubricant/week [cm <sup>3</sup> ]	29.2	14.6	9.7	7.3	5.8	4.9	4.2	3.6	3.2	2.6
Strokes with grease gun/day	3	1-2	1	<1	<1	0.5	-	-	-	0.25
Strokes with grease gun/100 h	11-13	5-7	4	3	2-3	2	<2	1.5	<1.5	1
Strokes with grease gun/week	18-22	9-11	6-7	5	4	3-4	3	2-3	2	1-2

**250 cm<sup>3</sup> lubricant**

Setting/months	1	2	3	4	5	6	7	8	9...	...12
Lubricant/day [cm <sup>3</sup> ]	8.3	4.2	2.8	2.1	1.7	1.4	1.2	1.0	0.9	0.7
Lubricant/100 h [cm <sup>3</sup> ]	34.7	17.4	11.6	8.7	6.9	5.8	5.0	4.3	3.9	3.1
Lubricant/week [cm <sup>3</sup> ]	58.3	29.2	19.4	14.6	11.7	9.7	8.3	7.3	6.5	5.2
Strokes with grease gun/day	5-6	3-4	2	1.5	<1.5	1	<1	<1	<1	0.5
Strokes with grease gun/100 h	22-24	9-13	7-9	5-7	4-6	3-5	2-4	1-3	2	1-2
Strokes with grease gun/week	36-40	18-21	12-14	9-11	7-9	6-7	5-6	5	4-5	3-4

## Activation & installation of lubrication system

**HINT**



perma CLASSIC/  
perma FUTURA



perma FLEX



perma NOVA /  
perma STAR VARIO



Remove plug



Screw lubrication  
system into  
lubrication point

**Which grease is in the lubrication system?**  
Information is provided on the label.

perma-tec GmbH & Co. KG  
Hammelburger Str. 21 | 97717 EUERDORF  
www.perma-tec.com | Tel.: +49 9704 609-0  
Made in Germany

Art.No. 106757 | FM-1532-37337  
perma High performance grease  
SF04  
120 m<sup>3</sup> / 4.06 fl.oz. (US)






← Art. No. | Serial number  
(Product designation -  
year/week of manufacture  
- internal no.)  
Lubricant designation

1st order/ReOrder:



1st order/ReOrder:

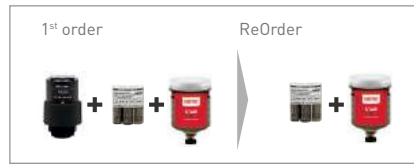
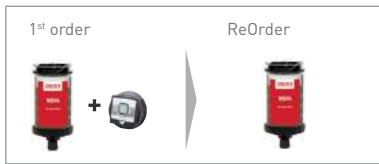


	perma CLASSIC / perma FUTURA	perma FLEX
Drive / Activator	 Activator, <b>yellow</b> 1 month, 101331	 <p>For harsh environments: Protection cap incl. support flange FLEX G1/4 male x G1/4 female (steel / alu) 101428</p>
	 Activator, <b>green</b> 3 months, 101332	
	 Activator, <b>red</b> 6 months, 101333	
	 Activator, <b>grey</b> 12 months, 101335	

Lubrication systems/ LC (= Lubricant Cartridge)				
	perma CLASSIC 120 cm <sup>3</sup>	perma FUTURA 120 cm <sup>3</sup>	perma FLEX 60 cm <sup>3</sup>	perma FLEX 125 cm <sup>3</sup>


Greases	perma CLASSIC 120 cm <sup>3</sup>	perma FUTURA 120 cm <sup>3</sup>	perma FLEX 60 cm <sup>3</sup>	perma FLEX 125 cm <sup>3</sup>
perma Multipurpose grease SF01	100020	106997	107224	107155
perma Extreme pressure grease SF02	100034	107008	107226	107161
perma High temp. grease SF03	100045	107012	107227	107163
perma High performance grease SF04	100052	107016	107228	107164
perma High temp. / Extreme pressure grease SF05	100063	107020	107229	107167
perma Liquid grease SF06	100074	107024	107230	107168
perma High speed grease SF08	100083	107029	107232	107170
perma Multipurpose bio grease SF09	100089	107032	107233	107172
perma Food grade grease NSF H1 SF10	100096	107037	107234	107173
Oils	Order oil retaining valve separately	Including oil retaining valve	Including oil retaining valve	
perma High performance oil S014	100427	107083	107246	107199
perma Multipurpose oil S032	100449	107090	107247	107200
perma Bio oil, low viscosity S064	100473	107099	107248	107202
perma Bio oil, high viscosity S069	100483	107103	107249	107204
perma Food grade oil NSF H1 S070	100489	107107	107251	107205


Support flange	Support flange not required	Support flange integrated	 Support flange FLEX Gen 2.0 G1/4 male x G1/4 female (brass / plastic) 101427
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perma NOVA	perma STAR VARIO	perma STAR CONTROL
	 <p><b>Protection cap STAR Standard Duty (plastic)</b> for LC 60/120 109520 for LC 250 109519</p>	 <p><b>Protection cap STAR Standard Duty (plastic)</b> for LC 60/120 109520 for LC 250 109519</p>
	 <p><b>Protection cap STAR VARIO Heavy Duty 250 (plastic)</b> 109999 &gt; use with Art. No. 109420 <b>Cover clip for protection cap STAR VARIO Heavy Duty</b> 108606</p>	 <p><b>Adapter cable STAR CONTROL 30 cm angled</b> 109521</p>
 <p><b>perma NOVA</b> Control unit 1, 2, 3 ... 12 months 107271</p>	 <p><b>perma STAR VARIO Drive Gen 2.0</b> 1, 2, 3 ... 12 months 107529</p>	 <p><b>perma STAR CONTROL Drive Gen 2.0</b> TIME or IMPULSE mode 108985</p>
	 <p><b>Battery pack STAR VARIO</b> 101351</p>	 <p><b>Cable STAR CONTROL Gen 2.0</b> 5 m 108432 10 m 108431</p>

NOVA LC 65 cm <sup>3</sup>	NOVA LC 125 cm <sup>3</sup>	STAR LC 60 cm <sup>3</sup>	STAR LC 120 cm <sup>3</sup>	STAR LC 250 cm <sup>3</sup>
107415	110281	104044	100724	104473
107416	110282	104048	100733	104480
107417	110283	104051	100739	104485
107418	110284	104054	100744	104488
107419	110285	104057	100750	104492
107420	110286	104061	100755	104497
107421	110287	104063	100762	104500
107422	110288	104065	100766	104502
107423	110289	104069	100770	104506
Including oil retaining valve		Order oil retaining valve separately		
107425	110290	104180	101096	104685
107426	110291	104188	101117	104696
107427	110292	104198	101137	104711
107428	110293	104202	101145	104716
107429	110294	104204	101148	104719

Support flange integrated	 <p><b>Support flange STAR Gen 2.0 G1/4 male x G1/4 female (brass / plastic)</b> 109420</p>
---------------------------	--




**1 PRO Basic system**  
Battery or external power supply?  
How many lubrication points?  
Application: Linear guide?

**2 Accessory kit PRO:** Art. No. 106937


**3 PRO LC and Cover:** Which grease? 250 or 500 cm<sup>3</sup>?

ReOrder: PRO      ReOrder: PRO C



**1st order: PRO / PRO C Complete system in 3 steps**

**1**




**Select a basic system**

**Every basic system contains the following:**  
1 x Mounting device PRO (for wall mounting) – pre-assembled  
1 x Distributor PRO MP-6 including PRO MP-6 Accessories box (16 pieces)  
1 x Connecting cable PRO MP-6 (14 cm)

PRO MP-6 Basic system (with Battery PRO B)	PRO C MP-6 Basic system (with Cable PRO C M12)	PRO LINE Basic system (with Battery PRO B)	PRO C LINE Basic system (with Cable PRO C M12)
106919	5 m 106922 10 m 106938	106934	5 m 106935 10 m 106936

**2**

Mounting example



**Accessory kit PRO 106937**

- 30 m Tube up to +100 °C oØ 8 mm x iØ 5 mm (PA) - for PRO – per outlet <5 m mounting possible 101569
- 1 x Tube prefill adapter for tube oØ 8 mm 101526
- 6 x Tube connector G1/4 male for tube oØ 8 mm straight (brass nickel-plated) 101496
- 6 x Reducer G1/8 male x G1/4 female (brass) 104833
- 6 x Reducer M6 male x G1/4 female (brass) 104837
- 6 x Reducer M8x1 male x G1/4 female (brass) 104838
- 6 x Reducer M10x1 male x G1/4 female (brass) 104840
- 2 x Extension 16 mm G1/8 male x G1/8 female (brass nickel-plated) 101576
- 2 x Extension 36 mm G1/8 male x G1/8 female (brass nickel-plated) 101577



**3**


**perma PRO LC (=Lubricant Cartridge) / Cover for PRO LC**

	PRO LC 250 cm <sup>3</sup>	PRO LC 500 cm <sup>3</sup>
perma Multipurpose grease SF01	106639	106753
perma Extreme pressure grease SF02	106641	106754
perma High temp. grease SF03	106642	106755
perma High performance grease SF04	106644	106757
perma High temp. / Extreme pressure grease SF05	106645	106758
perma Liquid grease SF06	106646	106759
perma High speed grease SF08	106647	106760
perma Multipurpose bio grease SF09	106648	106761
perma Food grade grease NSF H1 SF10	106649	106762
<b>Cover for PRO LC</b>	106959	106960



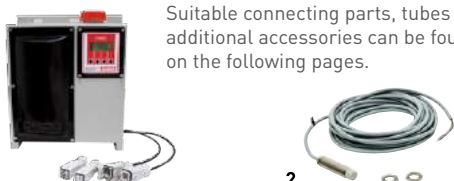
## PRO Accessories

 <p><b>1</b> Steel: perma PRO are attached to the mounting plate inside the protection box. They are wall-mounted using four screws (not supplied).</p>	<p><b>Protection box single (steel)</b> including mounting plate &amp; mounting set (cable bushings, blanking plugs and locking nuts) → Bores for outlets are made External dimensions (H x W x D): 470 x 240 x 210 mm/IP 66 <b>Fig. 1, 101527</b></p>
 <p><b>3</b> Plastic: The protection box is attached using the PRO wall-mounting bracket, Art. No. 101568.</p>	<p><b>Protection box double (steel)</b> including mounting plate &amp; mounting set (cable bushings, blanking plugs and locking nuts) → Bores for outlets are made External dimensions (H x W x D): 500 x 400 x 210 mm/IP 66 <b>Fig. 2, 111153</b></p> <p><b>Protection box single (plastic)</b> including drilling template &amp; mounting set (cable bushings, blanking plugs and locking nuts) → Without outlet bores, without cable gland External dimensions (H x W x D): 640 x 310 x 215 mm <b>Fig. 3, 101548</b></p>

PRO Components / Accessories	Pic.	Art. No.
perma PRO Drive perma PRO LINE Drive (operational only with Art. No. 106939) including 1x Reducer coupling G3/8 female to G1/8 female, nickel-plated (Art. No. 101545) Mounting material for Mounting device PRO	<b>1</b>	106896 106931
Battery PRO B	<b>2</b>	106953
perma PRO C Drive perma PRO C LINE Drive (operational only with Art. No. 106939) including 1x Reducer coupling G3/8 female to G1/8 female, nickel-plated (Art. No. 101545) Mounting material for Mounting device PRO	<b>3</b>	106903 106932
Cable PRO C M12 (5 m)	<b>4</b>	106942
Cable PRO C M12 (10 m)	<b>5</b>	106943
Distributor PRO MP-6 including MP-6 Accessories box: 6 x Tube connector G1/8 male for tube ø8 mm 90° – rotary type 6 x Tube connector G1/8 male for tube ø8 mm straight 4 x Plugs for MP-6	 (each illustrated 1x)	<b>6</b> 106939
Connecting cable PRO MP-6 (14 cm)	<b>7</b>	106940
Connecting cable PRO MP-6 (2 m)	<b>8</b>	106941
Mounting device PRO (for wall mounting)	<b>9</b>	101568



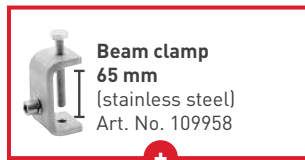
## perma ECOSY

 <p>Suitable connecting parts, tubes and additional accessories can be found on the following pages.</p>	<p><b>perma ECOSY including connecting plug</b> perma ECOSY has a volume of 7 litres and can be manually refilled.</p>	<p><b>1</b> 101700</p>
<p><b>2</b></p>	<p>Control sensor perma ECOSY</p>	<p><b>2</b> 109401</p>

## B Brackets







or




or









Mounting brackets for perma CLASSIC, FUTURA, FLEX, NOVA	Pic.	Material	Art. No.
Mounting bracket CLASSIC, FUTURA, FLEX, NOVA 1-point G1/4 female	1	Stainless steel	109685
Mounting bracket CLASSIC, FUTURA, FLEX, NOVA 2-point G1/4 female	2	Stainless steel	109686
Mounting bracket CLASSIC, FUTURA, FLEX, NOVA cage hanger 1-point G1/4 female	3	Stainless steel	109689
Mounting bracket CLASSIC, FUTURA, FLEX, NOVA cage hanger 2-point G1/4 female	4	Stainless steel	109690


for



Mounting brackets for perma STAR VARIO, STAR CONTROL	Pic.	Material	Art. No.
Mounting bracket STAR Standard Duty 1-point G1/4 female	5	Stainless steel	109663
Mounting bracket STAR Standard Duty 2-point G1/4 female	6	Stainless steel	109667
Mounting bracket STAR Heavy Duty C-section 1-point G1/4 female	7	Stainless steel	109664
Mounting bracket STAR Heavy Duty C-section 2-point G1/4 female	8	Stainless steel	108648
Mounting bracket STAR Standard Duty cage hanger 1-point G1/4 female	9	Stainless steel	109665
Mounting bracket STAR Standard Duty cage hanger 2-point G1/4 female	10	Stainless steel	109668

for



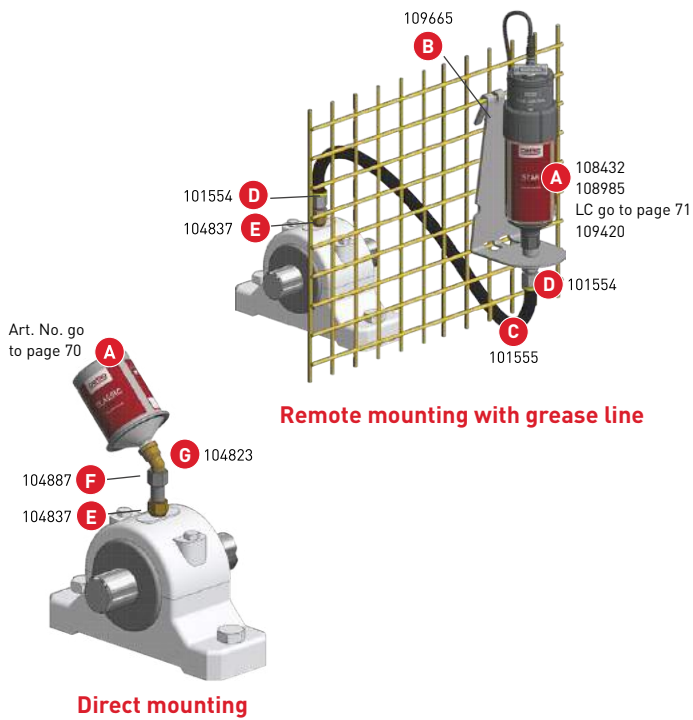
**HINT**



Additional mounting brackets and complete INSTALLATION KITS can be found in our catalogue "Lubrication Solutions Mining and Heavy Industry".



## Installation example roller bearing lubrication



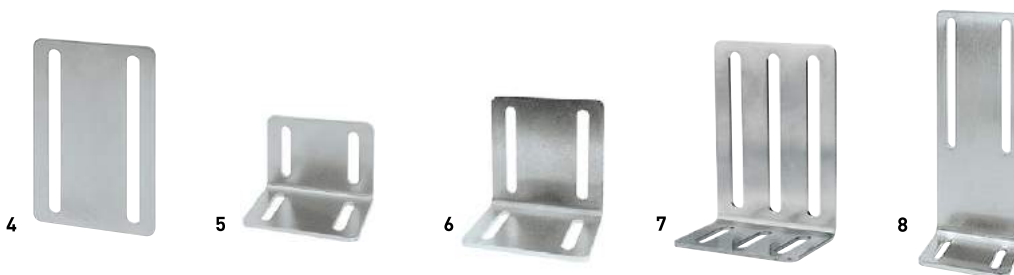
<b>Z</b>	Pre-filling accessories (no pic.)	Page 68
<b>A</b>	perma lubrication systems & accessories	Page 70–71
<b>B</b>	Brackets / mounting plates / mounting angles	Page 74–75
<b>C</b>	Tubes	Page 76
<b>D</b>	Tube connectors	Page 77–78
<b>E</b>	Reducers	Page 78–79
<b>F</b>	Extensions	Page 80
<b>G</b>	Angles	Page 81
<b>H</b>	Others (no pic.)	Page 81
<b>I</b>	Oil retaining valves (no pic.)	Page 82
<b>J</b>	Oil brushes (no pic.)	Page 82–83

**Thread designations:**  
 $i\emptyset$  = inner diameter  
 $o\emptyset$  = outer diameter  
 G1/4 female = inside thread G1/4  
 G1/4 male = outside thread G 1/4








Additional brackets	Pic.	Material	Art. No.
Clamp CLASSIC for earthing in explosion-risk area	1	Steel, zinc-plated	101384
Multipurpose clip CLASSIC, FUTURA, FLEX, NOVA, STAR	2	Plastic	101388
Bracket	3	Stainless steel	104864
Insert for bracket G1/4 male x G1/4 female	3a	Brass	104820
	3b	Stainless steel	104865



Mounting plate / Mounting angle	Pic.	Material	Art. No.
Mounting plate 110 x 70 x 2.5 mm Holespacing 45 mm	4	Stainless steel	101432
Mounting angle 50 x 50 x 70 x 2.5 mm Holespacing 45 mm	5	Stainless steel	101429
Mounting angle 50 x 70 x 70 x 2.5 mm Holespacing 45 mm	6	Stainless steel	101430
Mounting angle 50 x 100 x 70 x 2.5 mm Holespacing 45 mm / 22.5 mm	7	Stainless steel	101431
Mounting angle 50 x 180 x 70 x 5 mm Holespacing 45 mm	8	Stainless steel	101433



# C Hose / Tubes

Name Material → Properties	Art. No. (meter goods)	i∅/o∅ [mm]	Operating temperature range [°C]	Minimum bending radius [mm]	Max. operating pressure [bar]	Silicone-free/halogen-free	Max. grease line* [m]				
							CLASSIC / FUTURA	FLEX / NOVA	STAR	PRO	ECOSY
<b>Heavy Duty hose with NBR lining and fabric insert</b> → Synthetic rubber with fabric insert → Oil and weather resistant outer layer	101555 	9.5/16	-40 to +100	75	25	-	1	2	5		
<b>VA-Flex tube PTFE / stainless steel</b> → High resistance to fractures and impacts → High temperature resistance	101549 (1000 mm) 101550 (1500 mm) 	8/11	-150 to +260	70	220	✓	1	2	5	5	
<b>Tube PA</b> → UV-resistant → Resistant to water → Translucent	101393 	6/8	-40 to +80	40	19	✓	1	2	3		
<b>Tube PTFE</b> → Good temperature resistance → Noncombustible (flammability class V-0) → Suitable for food and beverages → Translucent	101394 	6/8	-70 to +260	50	9	-	1	2	3		
<b>Tube PA</b> → Highly resistant to stress cracking, pressure and impact → High mechanical strength	101569 	5/8	-35 to +100	45	31	✓				5	
<b>Tube PA</b> → Highly resistant to stress cracking, pressure and impact → High mechanical strength → Translucent	101494 	4/6	-35 to +100	35	27	-/ ✓					10
<b>Hose spiral guard 25 mm Plastic</b> 	109695										


\* The maximum length of the grease line depends on the lubrication system, lubricant and operating temperature. Information applies at +20 °C using perma Multipurpose grease SF01 or perma High performance oil S014.

### Thread designations:





i∅ = inner diameter  
 o∅ = outer diameter  
 G1/4 female = inside thread G1/4  
 G1/4 male = outside thread G 1/4

## D Hose / Tube connectors

Hose connector <b>Heavy Duty</b> suitable for hose $i\varnothing 9.5 / o\varnothing 16$ mm 101555	Pic.	Material	Art. No.
Hose connector G1/4 male – push-lock max. +100 °C	1	Steel, zinc-plated	101554


1

Tube connector <b>VA-Flex</b> suitable for tubes $i\varnothing 8 / o\varnothing 11$ mm 101549 & 101550	Pic.	Material	Art. No.
Cutting ring coupling R1/4 male straight max. +260 °C	2	Stainless steel	104868
Cutting ring coupling R1/8 male 90° adjustable max. +260 °C	3		104869
Cutting ring coupling R1/8 male straight max. +260 °C	4		104870
Cutting ring coupling straight – connector for $o\varnothing 8$ mm max. +260 °C	5		104871


2

3

4

5

Tube connector <b>up to 6 bar</b> suitable for tube $i\varnothing 6$ mm/ $o\varnothing 8$ mm 101393 & 101394	Pic.	Material	Art. No.
Tube connector for perma G1/4 female max. +80 °C	6	POM/Alu	101390
Tube connector G1/4 male max. +80 °C	7		101391
Tube connector G1/8 male max. +80 °C	8		101392
Tube connector for perma G1/4 female max. +100 °C	9	Brass, nickel-plated	104821
Tube connector G1/4 male max. +100 °C	10	Brass	104822
Tube connector for perma G1/4 female max. +250 °C	11	Stainless steel	104866
Tube connector G1/4 male max. +250 °C	12		104867


6

7

8

9

10

11

12

Tube connector <b>push-lock up to 25 bar</b> suitable for tube $o\varnothing 8$ mm 101393, 101394 & 101569	Pic.	Material	Art. No.
Tube connector G1/8 male straight	13	Brass nickel-plated	101570
Tube connector G1/8 male 90° – rotary type	14		101571
Tube connector G1/4 male straight	15		101496
Tube connector G1/4 female straight	16		101502
Tube connector G1/4 male 90° – rotary type	17		101497
Tube connector G3/8 male straight	18		101498


13

14

15




16

17

18

Y-connector			101513
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## D Tube connectors

Tube connector <b>push-lock</b> suitable for tube <b>oØ 6 mm up to 25 bar</b> 101494	Pic.	Material	Art. No.
Tube connector G1/8 male straight	1	Brass nickel-plated	101446
Tube connector G1/8 male 90° – rotary type	2		101449
Tube connector G1/4 male straight	3		101447
Tube connector G1/4 female straight	4		101511
Tube connector G1/4 male 90° – rotary type	5		101551
			
Tube connector M5 male straight	6	Brass nickel-plated	101448
Tube connector M6 male straight	7		101509
Tube connector M6 male – swivel type	8		101515
Tube connector M6x0.75 male 90° – swivel type	9		101516
Tube connector M8x1 male straight	10		101517
Tube connector M8x1 male 90° – rotary type	11		101507
Tube connector M10x1 male straight	12		101510
Tube connector M10x1 male 90° – rotary type	13		101508
Extension for tube oØ 6 mm to 8 mm	14		101512
			
Y-connector		Brass nickel-plated	101514

## E Reducers / Reducer coupling

Reducers / Reducer coupling	Pic.	Material	Art. No.
Reducer G1/4 male x G1/8 female	14	Brass	104834
Reducer G1/8 male x G1/4 female	15	Brass	104833
	16	Stainless steel	104875
Reducer coupling G3/8 female to G1/8 female	17	Nickel-plated	101545
			
Reducer R1/2 male x G1/4 female	18	Brass	104832
Reducer R1/4 male x G1/4 female	19		109954
Reducer R1/8 male x G1/4 female	20		109953
Reducer R3/4 male x G1/4 female	21		104835
Reducer R3/8 male x G1/4 female	22		104836
			

# E Reducers





Reducers	Pic.	Material	Art. No.
Reducer M6 male x G1/4 female	1	Brass	104837
	2	Stainless steel	104876
Reducer M6 male x G1/8 female	3	Stainless steel	109847
Reducer M8 male x G1/4 female	4	Brass	104839
	5	Stainless steel	104878
Reducer M8x1 male x G1/4 female	6	Brass	104838
	7	Stainless steel	104877
Reducer M10 male x G1/4 female	8	Brass	104841
Reducer M10x1 male x G1/4 female	9	Brass	104840
	10	Stainless steel	104879
Reducer M12 male x G1/4 female	11	Brass	104842
Reducer M12x1 male x G1/4 female	13		104843
Reducer M12x1.5 male x G1/4 female	12		104844
Reducer M14 male x G1/4 female	14		104846
Reducer M14x1.5 male x G1/4 female	15		104845
Reducer M16 male x G1/4 female	16		104847
Reducer M16x1.5 male x G1/4 female	17		104848
			
Reducer Whitworth 1/4" male x G1/4 female	18	Brass	104849
			
Reducer 1/4 UNF male x G1/4 female	19	Stainless steel	109845
Reducer 1/4 UNF male x G1/8 female	20	Stainless steel	109846
			

**Thread designations:**  
*i*∅ = inner diameter  
*o*∅ = outer diameter  
 G1/4 female = inside thread G1/4  
 G1/4 male = outside thread G 1/4



Determine the thread size  
 at the lubrication point:  
**perma Fitting thread tester, Art. No. 110374**




# F Extensions

Extensions	Pic.	Material	Art. No.
Extension 30 mm G1/4 male x G1/4 female	1	Brass	104854
Extension 45 mm G1/4 male x G1/4 female	2	Brass	104855
	3	Stainless steel	104887
Extension 75 mm G1/4 male x G1/4 female	4	Brass	104856
	5	Stainless steel	104888
Extension 115 mm G1/4 male x G1/4 female	6	Brass	104857
Extension 16 mm G1/8 male x G1/8 female	7	Brass, nickel-plated	101576
Extension 36 mm G1/8 male x G1/8 female	8		101577
			
Extension 50 mm R1/8 male x G1/4 female	9	Brass	109848
			
Extension 75 mm M10x1 male x G1/4 female	10	Brass	108923
Extension 115 mm M10x1 male x G1/4 female	11		108924
Extension 14 mm M6x0.75 male x M6 female	12		104858
Extension 30 mm M6x0.75 male x M6 female	13		104859
Extension 14 mm M6 male x M6 female	14		104860
Extension 30 mm M6 male x M6 female	15		104861
Extension 50 mm M6 male x G1/4 female	16	Stainless steel	109697
			
Extension 50 mm 1/4 UNF male x G1/4 female	17	Stainless steel	109854
			





## G Angles

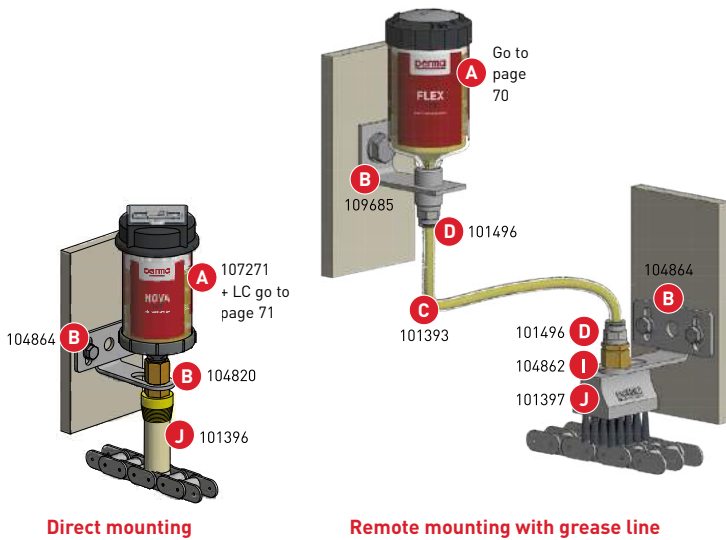
Angles	Pic.	Material	Art. No.
Angle 45° G1/4 male x G1/4 female	1	Brass	104823
Angle 90° G1/4 male x G1/4 female	2		104827
			
Angle 45° R1/4 male x G1/4 female square	3	Brass	109853
Angle 45° R1/4 male x Rp1/4 female	4	Stainless steel	104873
Angle 90° R1/4 male x G1/4 female	5	Brass	109849
Angle 90° R1/4 male x G1/4 female square	6		109850
Angle 90° R1/8 male x G1/4 female	7		109851
Angle 90° R1/8 male x G1/4 female square	8		109852
Angle 90° R1/4 male x Rp1/4 female	9	Stainless steel	104874
			
Angle 45° M6 male x G1/4 female	10	Brass	104824
Angle 45° M8x1 male x G1/4 female	11		104825
Angle 45° M10x1 male x G1/4 female	12		104826
Angle 90° M6 male x G1/4 female	13		104828
Angle 90° M8x1 male x G1/4 female	14		104829
Angle 90° M10x1 male x G1/4 female	15		104830
			

## H Others

Others	Pic.	Material	Art. No.
Swivelling screw fitting G1/4 male x G1/4 female – rotary type	16	Brass	104831
Y-Adapter 2 x G1/4 female x R1/4 male	17	Brass, nickel-plated	109002
T-Adapter 3 x G1/4 female	18	Brass	110025
	19	Stainless steel	104880
Bulkhead nipple G3/8 male x G1/4 female	20	Brass	104851
Hexagon-nipple R1/4 male	21	Brass	104852
	22	Stainless steel	104881
Sleeve G1/4 female	23	Brass	104853
	24	Stainless steel	104882



## Installation example chain lubrication



<b>Z</b>	Pre-filling accessories (no pic.)	Page 68
<b>A</b>	perma lubrication systems & accessories	Page 70–71
<b>B</b>	Brackets / mounting plates / mounting angles	Page 74–75
<b>C</b>	Tubes	Page 76
<b>D</b>	Tube connectors	Page 77–78
<b>E</b>	Reducers (no pic.)	Page 78–79
<b>F</b>	Extensions (no pic.)	Page 80
<b>G</b>	Angles (no pic.)	Page 81
<b>H</b>	Others (no pic.)	Page 81
<b>I</b>	Oil retaining valves	Page 82
<b>J</b>	Oil brushes	Page 82–83

## I Oil retaining valves

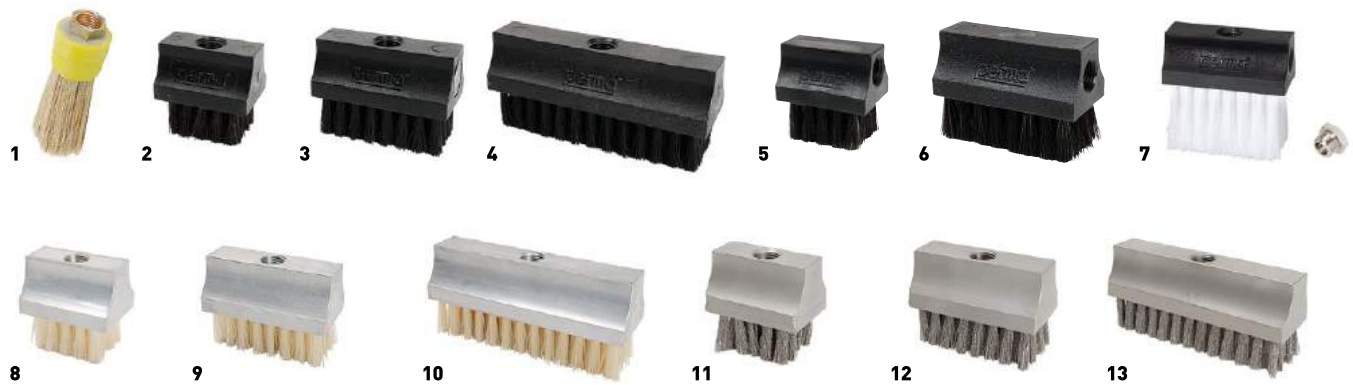
Oil retaining valves	Pic.	Material	Art. No.
Oil retaining valve G1/4 male x G1/4 female up to +60 °C	1	Brass with plastic valve	104862
	2	Stainless steel with plastic valve	104889
Oil retaining valve G1/4 male x G1/4 female up to +150 °C	3	Brass with metal valve	104863

Special brushes / Mounting brackets	Connecting thread	Pic.	Material	Art. No.
Special brush for large chains	Tapped bore M6	4	alu / polypropylene	101524
		5	alu / pekalon	101538
		6	alu / stainless steel	101540
Special brush for large chains	Through hole	7	alu / polypropylene	101525
		8	alu / pekalon	101539
		9	alu / stainless steel	101541
Mounting bracket left for special brush	Longitudinal holes	10	stainless steel	101533
Mounting bracket right for special brush		11		101534
Spacer for special brush, width: 13 mm	Through hole	12	alu	101535



# J Oil brushes

Oil brushes	Connecting thread	Size	Pic.	Material	Art. No.
Oil brush	G1/4 female top connection	Ø 20 mm	1	PA / horsehair	101396
Oil brush, bristle height 20 mm	G1/4 female top connection	40 x 30 mm	2	PA / horsehair	101397
		60 x 30 mm	3		101398
		100 x 30 mm	4		101399
		G1/4 female side connection	40 x 30 mm		5
	60 x 30 mm		6		101412
	Oil brush, bristle height 40 mm	G1/4 female top + side connection including plug	60 x 30 mm		7
High temperature brush, bristle height 20 mm	G1/4 female top connection	40 x 30 mm	8	alu / PPS	101402
		60 x 30 mm	9		101403
		100 x 30 mm	10		101404
High temperature brush, bristle height 20 mm	G1/4 female top connection	40 x 30 mm	11	stainless steel / stainless steel	101405
		60 x 30 mm	12		101406
		100 x 30 mm	13		101407

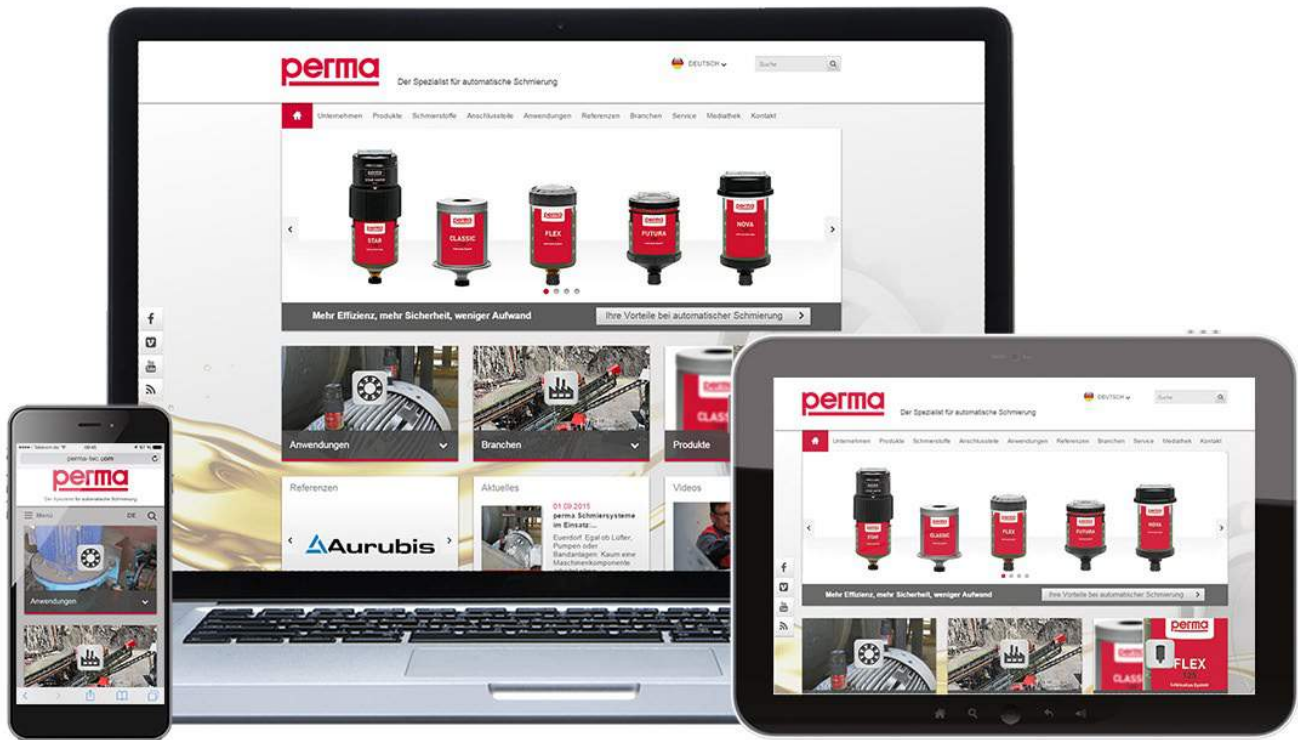


Special accessories	Pic.	Material	Art. No.
Lubrication pocket for gear lubrication Manufactured to specifications	14	Plastic	On request
Multipurpose chain lubrication box incl. 4 round brushes & 5 distance pieces	15	Plastic	101445
Rotating brush 16 mm for multipurpose chain lubrication box for re-orders	15a	Horsehair bristles	107631
CWL PLUS SET/product information, go to website <a href="http://www.perma-tec.com">www.perma-tec.com</a>	16	-	101564
Rail oiler with foam insert – without oil retaining valve (gap widths 5, 9 and 16 mm)	17	Plastic/foam	101485



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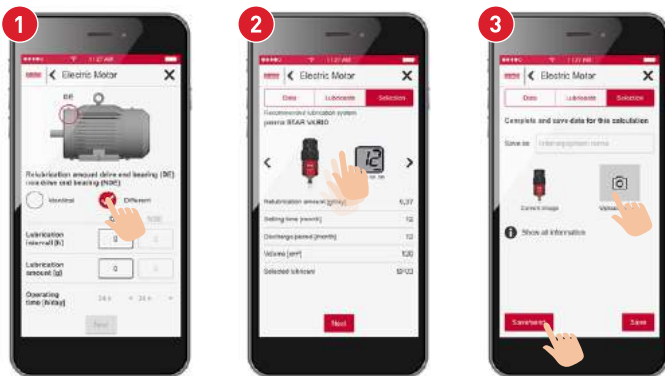


- ✔ **Application flyers:**  
Conveyors, pumps, electric motors, blowers/fans
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For example sewage treatment plants, gravel & quarrying industry, power stations
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## perma SELECT APP



One of the most important maintenance tasks is optimally supplying lubrication points with the correct lubricant. Incorrect metering can lead to unplanned downtimes and cause high outage costs. **Calculating the correct relubrication quantity** therefore represents an important factor for smooth plant operations and actively contributes to **economic success**.



### The ideal lubrication solution in only three steps

- 1 Data acquisition:**  
The calculation baseline is defined by entering bearing or application data.
- 2 Recommendation:**  
This includes a recommendation for the most suitable lubrication system, the lubricant and the correct discharge period.
- 3 Selection/solution:**  
Photograph the appropriate application and send us the results via email.



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## perma VIDEOS



Gain practical insights and hints on correct lubrication. Our informative videos assist in the correct handling of perma lubrication systems.

- ✔ **Application videos:**  
Lubrication points, challenges, solutions
- ✔ **Product videos:**  
Preparation, activation, installation



**Watch now:**  
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### With expertise to the optimal solution!

The perma SERVICE performs project planning on-site in order to concentrate completely on the respective company conditions.

- ✓ **Project planning forms the basis for a detailed tender**
- ✓ **Compilation of servicing schedules for documentation**
- ✓ **Professional engineering consulting**

## perma MLP (Maintenance Lubrication Program)

With the perma MLP you always have an up-to-date overview of your lubrication points and maintenance tasks. The online system can be used from any smartphone, tablet or PC with an Internet connection. Manage your lubrication points, get automatic reminders for upcoming maintenance tasks and print lubrication schedules and material lists for individual production or plant sections. Your perma contact will provide support in recording existing lubrication schedules.

- ✓ **Global access via any available browser**
- ✓ **Automatic notifications**
- ✓ **Store individual images and notes**
- ✓ **Exchange data with colleagues / export functions**



### Watch now:

→ <http://www.perma-tec.com/en/service/perma-mlp-maintenance-lubrication-program/>

## perma ACADEMY



We offer seminars demonstrating the use of perma lubrication systems in practical examples.

- ✓ **Technical training at perma-tec/in-house courses on request**  
"Best practice" solutions, accessories, practical exercises  
Sales arguments, marketing tools, main applications
- ✓ **Dates can be found on our website: [www.perma-tec.com](http://www.perma-tec.com)**  
↳ Service  
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Roller bearings



Sliding bearings / Sliding guides



Linear guides



Open gears / Gear racks



Spindles



Shaft seals



Chains

## perma Lubrication Systems - OVERVIEW

Product	Lubricants	Discharge period	Mode	Max. lube-points	Max. pressure [bar]	Operating temperature [°C]	Content [cm <sup>3</sup> ]	Drive / Power supply	Activation / Setting	Machine elements								Certifications	Catalogue page	
										Roller bearings	Sliding bearings / Sliding guides	Linear guides	Open gears / Gear racks	Spindles	Shaft seals	Chains				
<b>Single-point Lubrication Systems, electrochemical</b>																				
	<b>CLASSIC / FUTURA</b>	Grease up to NLGI 2 / Oil	1, 3, 6, 12 months (1)	Time	1	4	0 to +40	120	Electro-chemical	Activator screw	✓	✓	✓	✓	✓	✓	✓	Ex	48-49	
	<b>FLEX</b>		1, 2, 3, ... , 12 months (1)						Electro-chemical / Integrated battery	Dial / Rotary switch	✓	✓	-	✓	✓	✓	✓	Ex	TIIS	50-51
	<b>NOVA</b>		1, 2, 3, ... , 12 months (2)						Gas generating cell / Integrated battery	Push button control and display	✓	✓	✓	✓	✓	✓	✓	Ex	ANZEx	52-53
<b>Single-point Lubrication Systems, electromechanical</b>																				
	<b>STAR VARIO</b>	Grease up to NLGI 2 / Oil	1, 2, 3, ... , 12 months	Time	1	6	-10 to +60	60, 120, 250	Drive motor / Battery	Push button control and display	✓	✓	✓	✓	✓	✓	UL LISTED	54-55		
	<b>STAR CONTROL</b>		Customized	Time / Impulse					Drive motor / 9-30 V DC		✓	✓	✓	✓	✓	✓	✓	✓	✓	56-57
<b>Multi-point Lubrication Systems, electromechanical</b>																				
	<b>PRO MP-6</b>	Grease up to NLGI 2	1 day to 24 months	Time / Amount	6	25	-20 to +60	250, 500	Drive motor / Pump / Battery	Display with menu navigation	✓	✓	✓	✓	✓	✓	UL LISTED	58-59		
	<b>PRO C MP-6</b>		Customized	Time / Impulse					Drive motor / Pump / 15-30 V DC		✓	✓	✓	✓	✓	✓	✓		✓	
	<b>PRO LINE</b>		1 day to 24 months	Time / Amount					Drive motor / Pump / Battery		✓	✓	✓	✓	✓	✓	✓	✓	60-61	
	<b>PRO C LINE</b>		Customized	Time / Impulse					Drive motor / Pump / 15-30 V DC		✓	✓	✓	✓	✓	✓	✓	✓		
	<b>ECOSY</b>	Oil	Customized	Time / Impuls	6	10	-20 to +60	7 l	Drive motor / Pump / 24 V DC / 85-240 V AC	Display with menu navigation	-	✓	-	✓	✓	✓	✓	62-63		

(1) depending on ambient temperature and counter pressure

(2) depending on counter pressure

All perma products are approved according to CE directives.

### Publisher

perma-tec GmbH & Co. KG  
Hammelburger Str. 21  
97717 EUERDORF  
GERMANY

Tel.: +49 9704 609 - 0  
Fax: +49 9704 609 - 50  
info@perma-tec.com  
www.perma-tec.com

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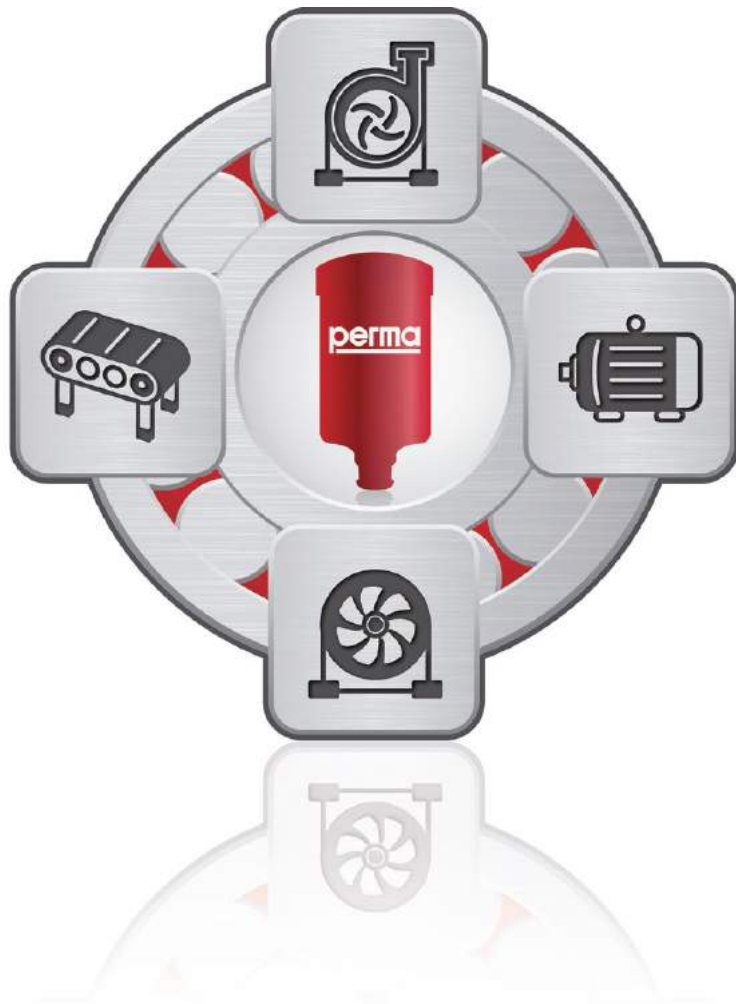
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# **MFP** Automation **ENGINEERING**

perma-tec GmbH & Co. KG  
Hammelburger Str. 21  
97717 EUERDORF  
GERMANY

[info@perma-tec.com](mailto:info@perma-tec.com)  
[www.perma-tec.com](http://www.perma-tec.com)

