

PRODUCT & APPLICATION GUIDE





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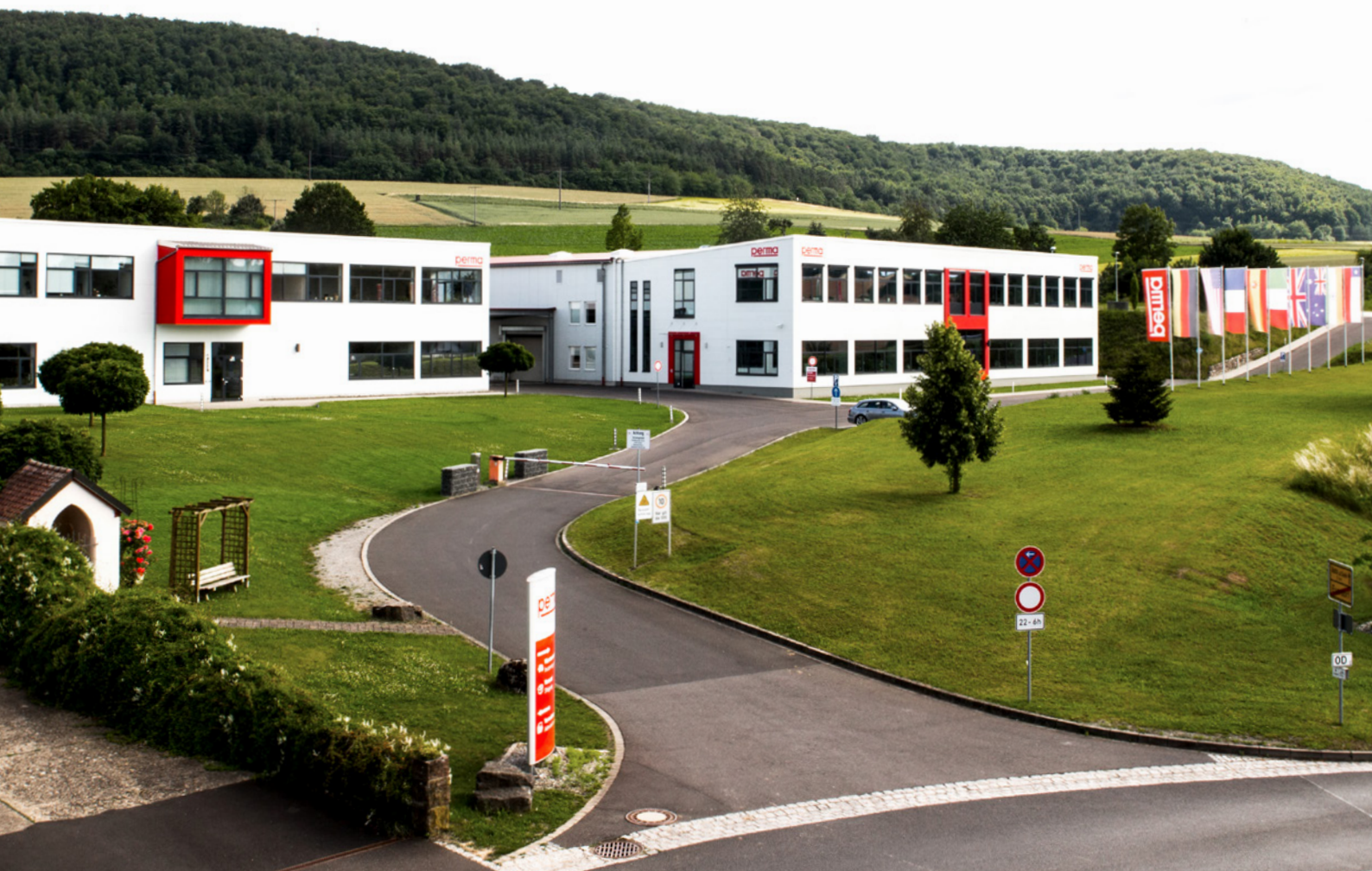
- Lights and Display Screen
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The Expert in Lubrication Solutions

- More than 50 years of experience in developing and implementing innovative lubrication solutions
- Inventor of the first single-point lubrication system: perma CLASSIC
- Market leader in the field of single-point lubrication
- Development and production in Germany
- Global network of subsidiaries and competent partners in more than 80 countries

perma Lubrication systems

Advantages of automatic lubrication

To be competitive on a global stage manufacturing and mining companies must maximise production output while minimising long-term operating costs and protecting the safety of their workforce. Key to achieving this is the implementation of lubrication strategies which extend equipment service life and minimise downtime. perma automatic lubrication systems help companies all around the world to achieve this goal.

Benefits of perma lubrication systems



perma simplifies maintenance

perma lubrication systems are used to lubricate a wide range of machine elements including the rolling element bearings of common production equipment such as conveyors, pumps, fans, blowers and electric motors. The product portfolio provides reliable solutions which are simple to implement and incorporate into existing maintenance plans.

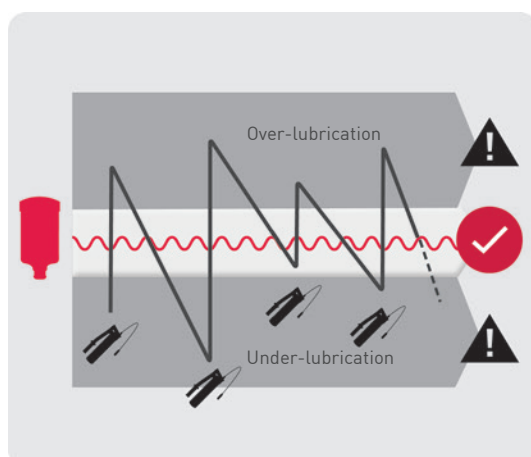
- Discharge periods from **1 month to 12 months**
- Lubricant volumes from **60 cm³ to 500 cm³**
- Operating temperatures from **-40 °C to +60 °C**
- Lubrication systems with high-performance **lubricants up to NLGI 2**



Since 1964 perma has been manufacturing exclusively in Germany.



Manual vs. automatic lubrication



Sources: Internal calculations: Material, time and maintenance requirements / Figures from the roller bearing industry and insurance companies.

Over-lubrication

- Increase in operating temperature
- Displacement of seals
- Excessive lubricant consumption

Under-lubrication

- Increase in friction and wear
- Contamination ingress

- **Automatic lubrication with perma lubrication systems ensures constant supply of the ideal lubricant quantity. Unlike manual lubrication, over-lubrication or lubrication starvation can be prevented.**



perma helps to prevent roller bearing failures

Bearing failures can cause unplanned downtime. A well planned and implemented lubrication strategy is needed for bearings to achieve their designed service life. Installing perma lubrication systems ensure that bearings receive regular lubrication which avoids premature bearing failure. The diagram below highlights the causes of premature bearing failures.

- Reliable supply of fresh lubricant to bearings and seals
- Improved equipment availability with automated relubrication
- Reduction in maintenance costs
- Avoid unplanned machine downtime



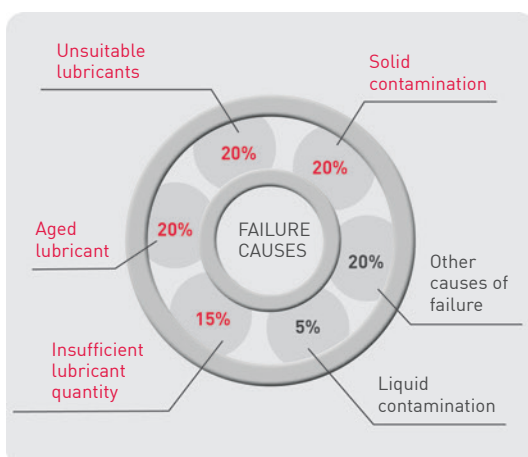
perma prevents bearing damage from contamination ingress

Contamination from dust and water reduces bearing service life. By applying lubricant in small amounts regularly, perma automatic lubrication systems prevent ingress of liquids, dirt and dust.

- **Automated lubrication** prevents **ingress** of **dirt particles** and **liquids** into bearings
- **Avoids damage** to the bearing from solid particles and **corrosion** from water
- **Increase** in **bearing service life**



Causes of failure in roller bearings



Sources: Internal calculations: Material, time and maintenance requirements / Figures from the roller bearing industry and insurance companies.

Insufficient lubricant quantity

- Metal to metal contact within the bearing
- Increased wear and friction

Aged lubricant

- Caused by irregular lubrication of hard to reach lubrication points
- Caused by extended time periods between applying grease manually

Unsuitable lubricants

- Lubricant characteristic not suitable for the application
- Incompatible greases mixing within the bearing

Solid contamination

- Contamination from dirty grease nipple
- Contamination ingress past dry or displaced seals



perma reduces costs

perma lubrication systems help to reduce maintenance costs. Automatic lubrication avoids premature bearing failures and unplanned downtime.

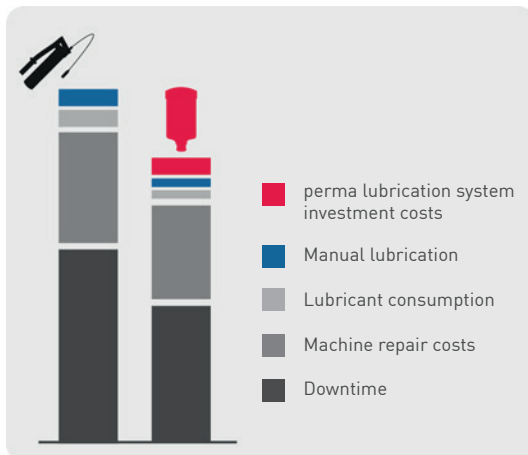
- **High equipment availability** by avoiding breakdowns
- **Maintenance intervals can be scheduled** during downtimes
- **Reduction in repair and maintenance costs**
- Allows for equipment to **receive lubricant while in operation**



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



Cost savings with automatic lubrication

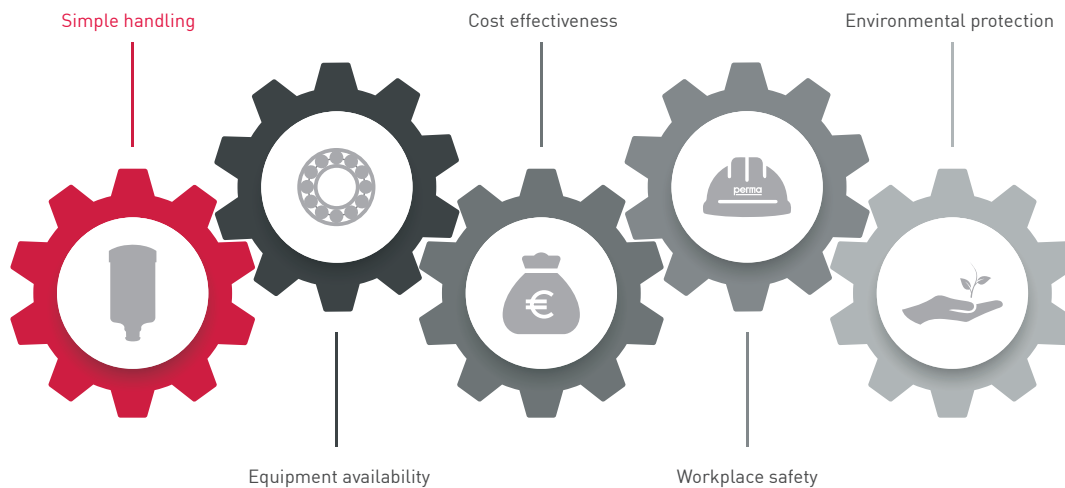


Sources: Internal calculations: Material, time and maintenance requirements / figures from the roller bearing industry and insurance companies.

Comparing manual lubrication with perma lubrication shows savings potential in different areas.

The following areas have the biggest savings potential:

- Reduction in downtimes
- Machine repair costs





perma reduces the risk of accidents

Using perma lubrication systems increases workplace safety. perma lubrication systems help avoid contact between workers and machine components and make an important contribution to workplace safety.

- **Reduces** exposure to **hazardous areas**
- Lubrication systems prevent **direct contact** with **hazardous lubricants**
- **Reduction of slipping accidents** caused by lubricant contamination



perma is a member of the German Association for Safety, Health and Environmental Protection at Work (VDSI).



perma – certified environmental management system

The perma environmental management system is certified to DIN EN ISO 14001. Lubricant consumption is reduced by matching the lubricant quantity to the equipment requirements.

- **Reduction of lubricant consumption** with programmed delivery
- **No lubricant contamination** thanks to enclosed systems



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

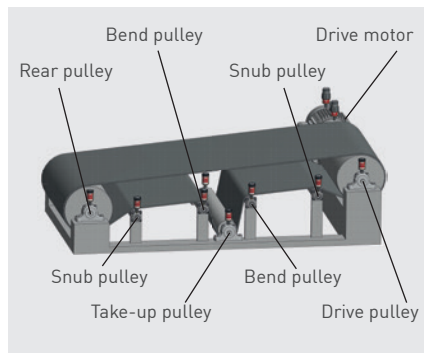




perma Lubrication systems for

Conveyors

Lubrication points



Pillow block housings with spherical roller bearings are mainly used for **drive and bend pulleys**.

Bearings and bearing housing seals must be regularly supplied with required amounts of grease.

Information about drive motor lubrication can be found on pages 10 / 11: "Electric motors".

Challenges



Lubrication points on conveyors are often **difficult to access** as pulleys are at different levels and can be spread over large distances. Access to some areas can be restricted during operation, even though lubrication should ideally occur while the conveyor is operating.

Inadequate lubrication leads to increased wear within the bearing as well as an increased risk of contamination ingress. This can lead to unplanned maintenance and an interruption to production.



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

- **Risk of contamination** ingress from dirt on the grease nipples
- **Access to all parts** of the conveyor while it is **in operation**
- **Exposure of workers** to equipment hazards

Advantages of automatic lubrication



- Continual purging of fresh grease through shaft seals **prevents contamination**
- **Grease is applied while the equipment is in operation**, removing the need to stop production for lubrication
- perma lubrication systems can be remotely mounted **outside of guards to avoid worker exposure to hazards** from operating equipment
- Maximum value is realised from your lubricant as the grease is **injected in small and regular amounts**

Solutions

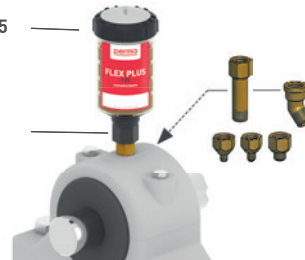
Direct mounting on the lubrication point: e.g. with perma FLEX PLUS or STAR VARIO

- Easy, quick mounting
- Where the lubrication system is at risk of being damaged from vibration or impact
- For easy-to-reach, safe lubrication points



perma FLEX PLUS 125

Support Flange FLEX



INSTALLATION KIT for perma FLEX PLUS
Use adapters and extensions as required to fit to the lubrication point



perma STAR VARIO with LC 120



INSTALLATION KIT for perma STAR VARIO
Use adapters and extensions as required to fit to the lubrication point

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

- For lubrication points with strong vibration / shocks (isolation of lubrication system)
- For lubrication points which are unsafe to access or behind guards
- For hard-to-reach lubrication points



INSTALLATION KIT STAR
Standard Duty 1-point cage hanger mount incl. 3 m hose

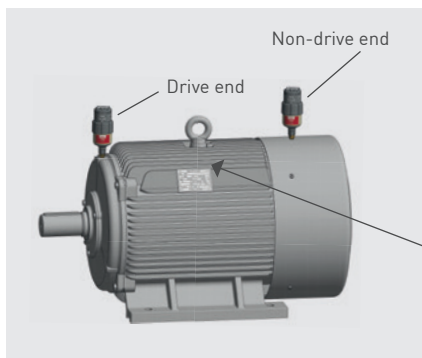


INSTALLATION KIT STAR
Heavy Duty 2-point cage hanger mount incl. 5 m hose



perma Lubrication systems for
Electric motors

Lubrication points



Electric motors require precise lubrication. Under lubrication can cause premature bearing failure and excess amounts of grease can cause damage from excessive heat generation or grease entering the windings of the motor.

Motor Name Plate
 Information about the required grease type, the required grease amount and interval or the bearings fitted to the motor can often be found on the motor name plate.

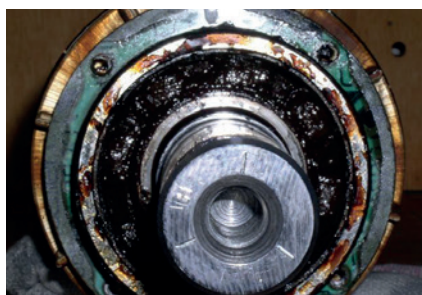
Speed: high	=	low viscosity	NLGI 0-2	
Speed: low	=	high viscosity		

Challenges



Even when following Manufacturer's recommendations, grease is **applied in large amounts infrequently**. This can lead to **elevated operating temperatures** within the bearing and **missed manual lubrication** can lead to **bearing damage**.

- **Elevated bearing temperatures** from excess grease
- Possible **shut-off** with temperature monitoring
- Under lubrication leads to premature bearing failure and unplanned **equipment downtime**
- **Increasing maintenance costs** caused by bearing failure



Relubrication while equipment is operating can expose workers to hazards and **increase the risk of injury** from rotating equipment.

- **High accident risk**
- **Equipment is shut down** for lubrication

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**

Solutions

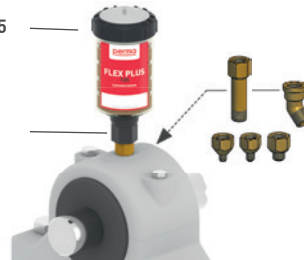
Direct mounting on the lubrication point: e.g. with perma FLEX PLUS or STAR VARIO

- Easy, quick installation of lubrication systems
- For lubrication points with little vibration / shocks
- For easily accessible locations not behind machine guards



perma FLEX PLUS 125

Support Flange FLEX



INSTALLATION KIT for perma FLEX PLUS
Use adapters and extensions as required to fit to the lubrication point



perma STAR VARIO with LC 120



INSTALLATION KIT for perma STAR VARIO
Use adapters and extensions as required to fit to the lubrication point

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

- For locations where the lubrication system could be exposed to vibration or impact: Reduces risk of damage to lubrication system
- For locations where there is risk to maintenance workers from operating equipment: Reduces risk of injury to workers
- For hard-to-reach lubrication points



INSTALLATION KIT STAR
Standard Duty 2-point 65 mm beam clamp mount incl. 5 m hose



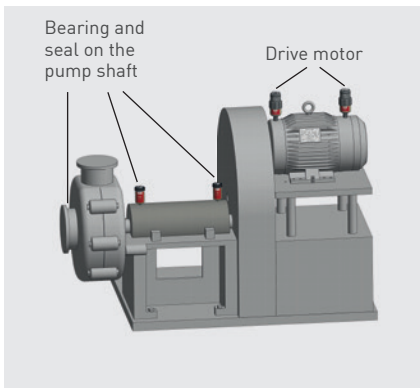
INSTALLATION KIT STAR
Heavy Duty 2-point cage hanger mount incl. 5 m hose



perma Lubrication systems for

Pumps

Lubrication points

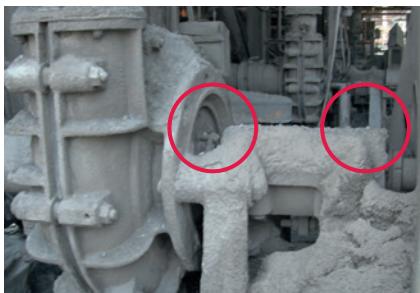


Pumps can have requirements for bearing lubrication and seal lubrication for the pump barrels and gland seal lubrication for the pump body.

Automated lubricant supply to the seals ensures the correct lubricant is supplied in the required quantities which provides improved protection from contamination ingress which can lead to premature bearing failure.

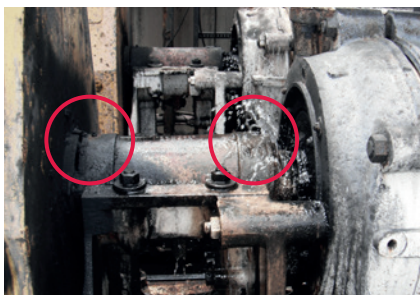
Information about drive motor lubrication can be found on pages 10 / 11: "Electric motors".

Challenges



Pumps are normally operated under extreme conditions. These can include **heavy contamination** from slurry or dust and **hazardous materials** such as alkali solutions and weak acids.

- **Contamination** needs to be controlled so there is no ingress past the seals
- In **hazardous environments**, the risk of harm to workers can result in lubrication requirements being neglected



Not meeting the lubrication requirements can lead to premature **bearing failure** or **pumps leaking** past glands.

- Equipment should be **lubricated while in operation**
- Operation in **potentially explosive areas**
- **Workplace safety** must be ensured

Advantages of automatic lubrication



- **Increased workplace safety** due to automatic lubrication of hard-to-reach lubrication points
- A precise lubricant discharge reduces lubricant consumption and **lessens environmental impacts**
- **Fewer maintenance runs** minimise the time spent in dangerous areas
- If a certified lubrication system is selected, it may be used **underground** or in **potentially explosive areas**

Solutions

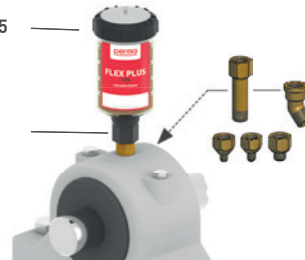
Direct mounting on the lubrication point: e.g. with perma FLEX PLUS or STAR VARIO

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



perma FLEX PLUS 125

Support Flange FLEX



INSTALLATION KIT for perma FLEX PLUS
Use adapters and extensions as required to fit to the lubrication point



perma STAR VARIO with LC 120



INSTALLATION KIT for perma STAR VARIO
Use adapters and extensions as required to fit to the lubrication point

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

- For lubrication points with strong vibration / shocks (isolation of lubrication system)
- For lubrication points which are unsafe to access: Mounting in safe areas
- For hard-to-reach lubrication points



INSTALLATION KIT STAR
Standard Duty 2-point 65 mm beam clamp mount incl. 5 m hose

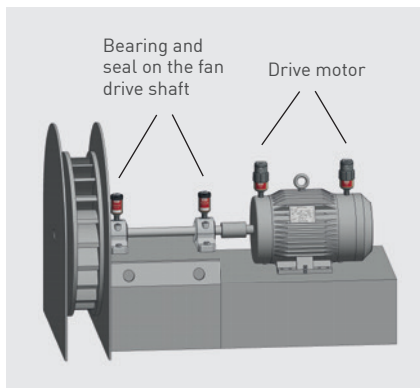


INSTALLATION KIT STAR
Heavy Duty 2-point 65 mm beam clamp mount incl. 5 m hose



perma Lubrication systems for
Blowers | Fans

Lubrication points

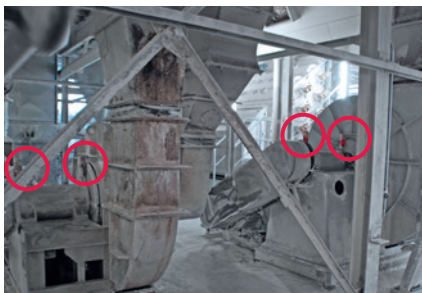


Bearing housings which require lubrication are located on the **drive shaft** between the motor and the fan.

The bearing housings can have separate **bearing** and seal lubrication points which each require regular lubrication.

Information about drive motor lubrication can be found on pages 10 / 11: "Electric motors".

Challenges



Blowers and fans are often operated in an environment with very **high levels of air born contaminants** which can deposit as dust on the bearing housings. If this contamination enters the bearing housing it can lead to premature bearing failure.

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

Regular lubrication of bearings and seals with the correct amount of grease is essential to achieve the bearing design life. Extended periods between grease being supplied can lead to bearing failure from lack of lubrication and increases the risk of contamination entering the bearing area via **dry seals**.

- Providing the correct amount of lubrication and **avoiding under lubrication**
- **Avoiding too much lubricant** being injected into the bearing which can result in grease churn and high operating temperatures
- Ensuring only the **correct lubricant** is used



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**

Solutions

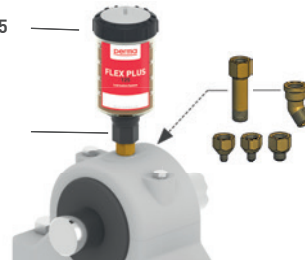
Direct mounting on the lubrication point: e.g. with perma FLEX PLUS or STAR VARIO

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



perma FLEX PLUS 125

Support Flange FLEX



INSTALLATION KIT for perma FLEX PLUS
Use adapters and extensions as required to fit to the lubrication point



perma STAR VARIO with LC 120



INSTALLATION KIT for perma STAR VARIO
Use adapters and extensions as required to fit to the lubrication point

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

- For lubrication points with strong vibration / shocks (isolation of lubrication system)
- For lubrication points which are unsafe to access: Mounting in safe areas
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INSTALLATION KIT STAR
Standard Duty 2-point 65 mm beam clamp mount incl. 5 m hose



INSTALLATION KIT STAR
Heavy Duty 2-point 65 mm beam clamp mount incl. 5 m hose

perma STAR VARIO

Precise and easy to use lubrication system
with display screen and LED signal lights

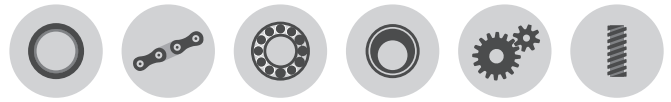


Four different sizes for individual lubricant metering

perma STAR VARIO operates fully automatically, independent of temperature and pressure with a precise discharge. The system consists of an electromechanical drive, an LC with 60, 120, 250 or 500 cm³ of lubricant and a battery pack. The desired discharge period and LC size can easily be selected with the push 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 recognisable from a distance.

*Total resistance to grease flow must be less than the pressure delivery capability of the lubrication system.

Applications | Machine elements



perma STAR VARIO provides pressure build-up of 7.5 bar and is used for single-point lubrication of roller and sliding bearings, sliding guides, open gears, gear racks, spindles, shaft seals and chains. Due 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 67 / 65).



Product characteristics



Pressure build-up of 7.5 bar allows remote mounting up to 5 m

System operates reliably from **-40 °C to +60 °C**



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



Electromechanical, reusable drive with battery pack

LED (red / green) visible all round signals functioning and any errors

Benefits

- Mounting outside of dangerous areas or at easy-to-reach locations increases workplace safety
- Higher equipment availability since LC can be easily exchanged during running operation
- Universal use at both low and higher temperatures
- Simple and self-explanatory operation
- Precise settings according to requirements prevent lubrication starvation and over-lubrication
- 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

Technical data

Drive – reusable
Electromechanical drive with Battery pack STAR VARIO with Battery pack STAR VARIO low temperature

Discharge period
1, 2, 3 ... 12 months / 1, 2, 3 ... 26 weeks
STAR LC 60: + 15, 18, 21, 24 months
STAR LC 500: max. 6 months

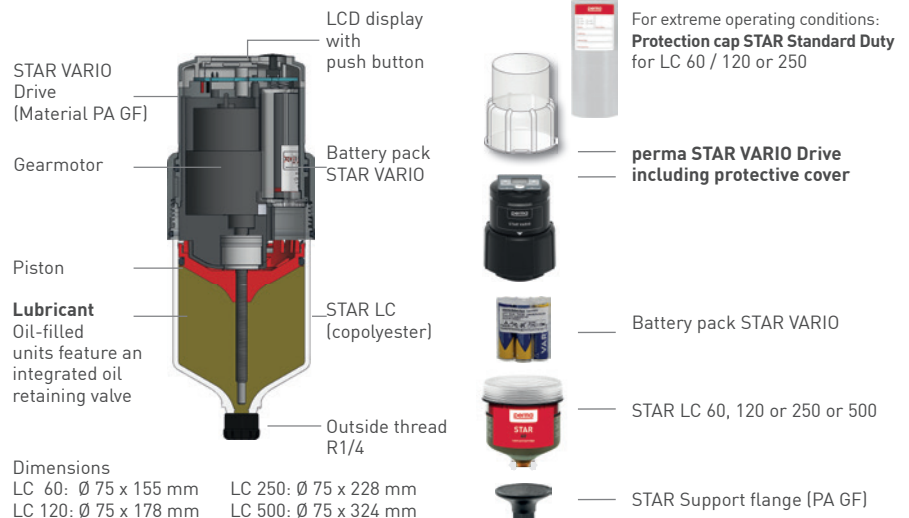
Lubricant volume
60 cm³, 120 cm³, 250 cm³ or 500 cm³

Operating temperature
-40 °C to +60 °C

Pressure build-up
7.5 bar

Protection class
IP 67 / IP 65

Standard & special lubricants
Greases up to NLGI 2 / Oils



*To achieve functionality below -20° C, Battery pack / Battery housing STAR VARIO low temperature (lithium) must be used. Only to be used with suitable low temperature lubricants!

perma STAR CONTROL

TIME and IMPULSE mode combined in a single system



Machine controlled delivery

perma STAR CONTROL consists of reusable drive unit and a single use lubricant cartridge. Because the lubrication system is mechanically driven, the discharge rate is independent of ambient temperature and back pressure.* The perma STAR CONTROL can be connected to the machine control which limits lubrication to only when the machine is in operation. Inspection of the perma STAR CONTROL is made easy with the transparent lubricant cartridge, LED lights and the LCD screen and the ability to communicate with the machine controller.

*Total resistance to grease flow must be less than the pressure delivery capability of the lubrication system.

Applications | Machine elements



perma STAR CONTROL is a PLC controlled automatic lubrication system which is suited to a wide range of applications. There are two modes of operation – TIME and IMPULSE. For the IMPULSE mode the lubrication system discharges a set volume of lubricant when voltage is applied. In TIME mode the lubricant is discharged at a set rate of cm³ per 100 hours of operation.



Product characteristics



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

Setting:
Mode, LC size, discharge quantity and PIN



Electromechanical drive with external power supply

LED (red / green) visible all round
signals functioning and errors



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

Manual additional discharge via push button on display (purge)

Benefits

- Broad range of settings for both TIME and IMPULSE
- Lubricant only supplied while the machine is in operation
- Cable connection controls lubricant delivery and communicates lubrication system status to the PLC

- Simple handling and programming via intuitive menu
- Simple to inspect via the combination of the flashing LED, LCD and transparent lubricant cartridge

- Extensive options for remote mounting
- Remote mounting allows for lubrication system inspections and servicing safely

Technical data

Drive – reusable
Electromechanical drive with external power supply:
9–30 V DC, I_{max} 0.5 A

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

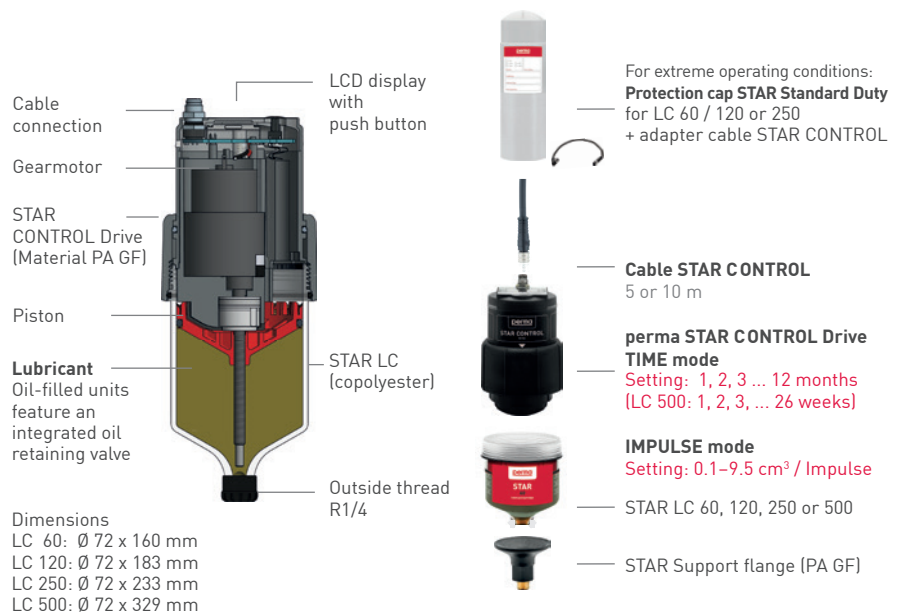
Lubricant volume
60 cm³, 120 cm³, 250 cm³ or 500 cm³

Operating temperature
-40 °C to +60 °C

Pressure build-up
6 bar

Protection class
IP 65

Standard & special lubricants
Greases up to NLGI 2 / Oils



perma FLEX PLUS

The flexible, compact lubrication system for high demands



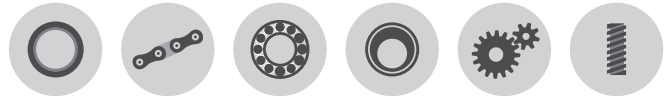
I M1 Ex ia I Ma
II 1 G Ex ia IIC T6 Ga
II 1 D Ex ia IIIC T85 °C Da



Flexible use – even on lubrication points with challenging requirements

perma FLEX PLUS is a single use lubrication system which comes ready to use. Turning the dial on top of the lubrication system to set the discharge time from 1 through to 12 months. The electronically controlled chemical reaction will build pressure that is necessary to continually supply fresh lubricant. The transparent body of the lubrication system makes it easy to check the lubrication system piston position.

Applications | Machine elements



perma FLEX PLUS is suited to a wide range of applications. The dial activation system is simple to use and allows the time setting to be adjusted during operation. perma FLEX PLUS is IP 68 rated meaning that it is dust tight and waterproof and has IECEx certification for use in explosive environments.



Product characteristics



Drive with gas generating cells and boost function



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



Ex-proof certification IP 68

Benefits

- System is supplied ready to use
- Available time settings reduce compromise of lubricant discharge rates
- Boost function available to ensure quick lubricant supply
- Lubrication system is transparent to allow inspection of the piston position
- Slimline design minimises the space required for installation
- Safe and reliable lubrication in explosive areas
- Can be used in very moist and dusty environments
- Increased workplace safety

Technical data

Drive

Electrochemical reaction

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

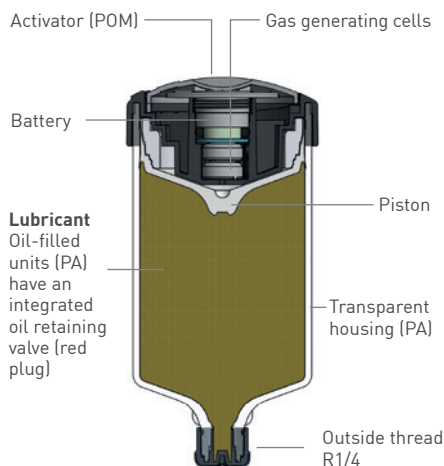
Lubricant volume
60 cm³ or 125 cm³

Operating temperature
-20 °C to +55 °C

Pressure build-up
Max. 5 bar

Protection class
IP 68

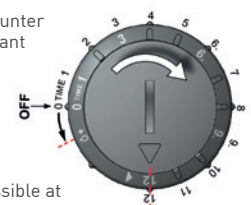
Standard & special lubricants
Greases up to NLGI 2 / Oils



Dimensions FLEX PLUS
FLEX PLUS 60: Ø 60 x 86 mm
FLEX PLUS 125: Ø 60 x 116 mm

Discharge period setting in months:

Reference values for emptying without counter pressure with lubricant NLGI 2 for perma FLEX PLUS 125.



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

The time settings indicated on the dial are nominal based on an average ambient temperature of +20 °C and with no counter pressure.

perma LUBRICANTS

The correct lubricant for a longer service life



Greases

Name → Lubricant properties → Labelling as per DIN 51502	NLGI grade	Thickener	Base oil	Operating temperature (°C)	Base oil viscosity at +40 °C [mm ² /s]	Speed index
perma Multipurpose grease SF01 (KP2K-30) → Powerful multipurpose grease → Reduced wear by use of EP additives → Free of heavy metals & silicone	2	Li / Ca	Mineral oil	-30 to +130	150	300,000
perma Extreme pressure grease SF02 (OGF2K-30) → High-pressure grease with MoS ₂ → Ageing- & oxidation-resistant → Good dry-running properties	2	Li + MoS ₂	Mineral oil	-30 to +120	100	350,000
perma High speed grease SF08 (KHC2N-40) → 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
perma Food grade grease H1 SF10 (KHC1K-40) → Low-temperature resistance → Good wear protection → Good water resistance	1	Al com.	PAO	-45 to +120	150	500,000



Base oil

Grease consists of between 70 % and 95 % of oil. The type of oil influences the lubricating properties of the grease and also determines the applications the grease is best suited for.

Base Oil Viscosity

The viscosity indicates the flowability of the base oil. Greases with a low viscosity base oil are usually used for bearings with a high speed factor whereas slow moving bearings will use a high viscosity base oil.

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 is the component of grease which gives it a semi fluid consistency. This ensures that the grease is retained within the bearing and does not flow away as oil alone would. Different thickeners are not always compatible which means that different greases should be checked before being mixed.

NSF

One requirement for the food and beverage industry is the registration of lubricants with the US organization NSF. All lubricants that occasionally come into direct contact with food must be tested and registered according to the criteria of NSF H1.

Halal and Kosher

Another requirement are often the dietary laws of the Jewish and Muslim population, which apply to the machines and surroundings during the production of food. Appropriate certification confirms that the strict requirements for halal and kosher have been met and complies with the religious requirements.

Miscibility

When relubricating a lubrication point, the same lubricant should always be used to avoid mixing different lubricants. If this is not possible, it must be ensured that the base oil and thickener are compatible. The compatibility of these components must be checked and taken into account using specified miscibility tables.

INSTALLATION

The correct kits and accessories for your mounting solution

Wherever possible, it is recommended that perma lubrication systems are mounted directly to the point that lubricant is being delivered to. There are situations where this is not always possible.

Using the check list below can assist in deciding if a remotely mounted lubrication system is required.



Decide what mounting type is suitable for you...

- | | | |
|--------------------------|--------------------------|--|
| YES | NO | Is it difficult or dangerous to reach the lubrication point during plant operation ? |
| <input type="checkbox"/> | <input type="checkbox"/> | |
| YES | NO | Is the lubrication point subject to strong vibrations or high temperatures which may impair or damage the lubrication system? |
| <input type="checkbox"/> | <input type="checkbox"/> | |
| YES | NO | Is access permission required to reach lubrication points in secured areas or at great heights? |
| <input type="checkbox"/> | <input type="checkbox"/> | |
| YES | NO | Is the lubrication point exposed to large quantities of water, pumped media, media from the manufacturing process or impact from solids ? |
| <input type="checkbox"/> | <input type="checkbox"/> | |

If you answer **yes** to **one** of the questions, we recommend that you use **indirect / remote mounting**.

Benefits: Direct mounting

- **Immediate supply** of lubrication points with **fresh lubricant**
- Grease has the shortest supply path meaning it does **not age before entering the bearing**
- **Lowest cost**, quickest and most **simple installation method**

Benefits: Remote mounting

- **Risk of harm to workers is reduced** by not needing to access areas near moving machinery parts
- Lubrication systems can be located in an area **away from the risk of damage**
- Lubrication systems can be **inspected and serviced without** the need to **shut down operating equipment**

Installation Kits

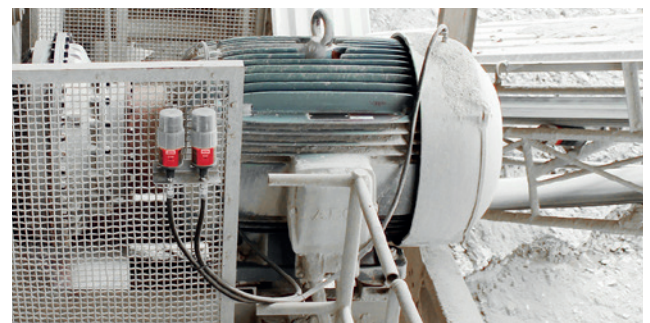
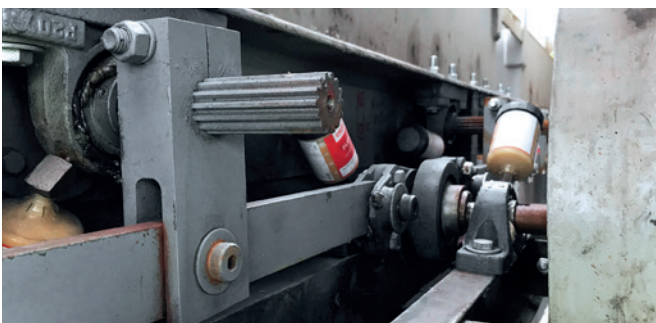
Determine thread size at the lubrication point with perma fitting thread tester
Art. No. 110374



Direct mounting

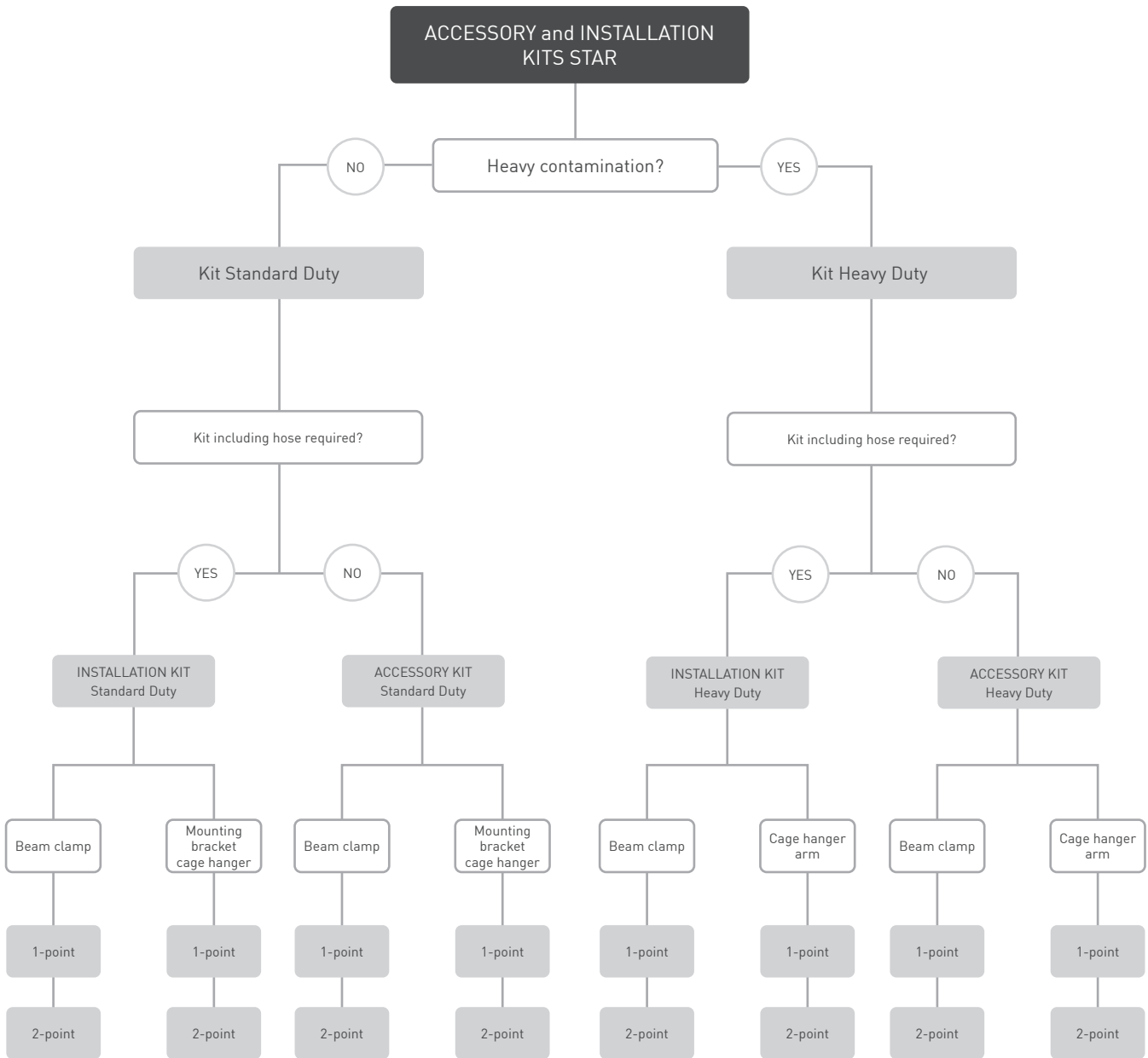


Remote mounting



Selecting the right kit

perma has developed a variety of kits for remote mounting. We recommend to use the decision tree below to determine the most suitable kit for your application:



Kit Standard Duty
Kit Heavy Duty

Standard ambient conditions
Extrem ambient conditions

INSTALLATION KIT
ACCESSORY KIT

Hoses included
Hoses not included

Beam clamp
Mounting bracket cage hanger

Mounting of the kit by means of a beam clamp
Mounting of the kit to a safety guard

ACCESSORY KITS and INSTALLATION KITS STAR

Standard and Heavy Duty



STANDARD DUTY KIT

These kits are very versatile and can be used in areas with normal ambient conditions.

HEAVY DUTY KIT

Heavy Duty Kits have been specifically designed for use in operational areas with harsh ambient conditions which are subject to regular wash down and water impact, such as the conditions found in coal handling preparation plants.

INSTALLATION KITS

INSTALLATION KITS contain all necessary parts for the complete mounting of the lubrication system to the lubrication point: mounting bracket with mounting support, support flange, hose connectors, reducers M10x1 & G1/8 and Heavy Duty hose.

ACCESSORY KITS

The only difference between the ACCESSORY KITS and the INSTALLATION KITS is that no hose is included.

BEAM CLAMP



MOUNTING BRACKET CAGE HANGER



Standard Duty:
Mounting bracket
cage hanger



Heavy Duty:
Cage hanger arm

Kits STAR Standard Duty

Solutions for normal ambient conditions

INSTALLATION KITS STAR (with hose) Standard Duty



1-point 65 mm
beam clamp mount
incl. 3 m hose

Art. No. 116961



1-point
cage hanger mount
incl. 3 m hose

Art. No. 116962



2-point 65 mm
beam clamp mount
incl. 5 m hose

Art. No. 116963



2-point
cage hanger mount
incl. 5 m hose

Art. No. 116964

ACCESSORY KITS STAR (without hose) Standard Duty



1-point 65 mm
beam clamp mount
without hose

Art. No. 116951



1-point
cage hanger mount
without hose

Art. No. 116952



2-point 65 mm
beam clamp mount
without hose

Art. No. 116953



2-point
cage hanger mount
without hose

Art. No. 116954



Hose to suit these Kits
can be found on page 34



Protection Caps offer enhanced protection for
the STAR VARIO lubricator. Please see page 33
for more information



Kits STAR Heavy Duty

Solutions for extreme ambient conditions

INSTALLATION KITS STAR (with hose) Heavy Duty



1-point 65 mm
beam clamp mount
incl. 3 m hose

Art. No. 116965



1-point
cage hanger mount
incl. 3 m hose

Art. No. 116966



2-point 65 mm
beam clamp mount
incl. 5 m hose

Art. No. 116967



2-point
cage hanger mount
incl. 5 m hose

Art. No. 116968

ACCESSORY KITS STAR (without hose) Heavy Duty



1-point 65 mm
beam clamp mount
without hose

Art. No. 116955



1-point
cage hanger mount
without hose

Art. No. 116956



2-point 65 mm
beam clamp mount
without hose

Art. No. 116957

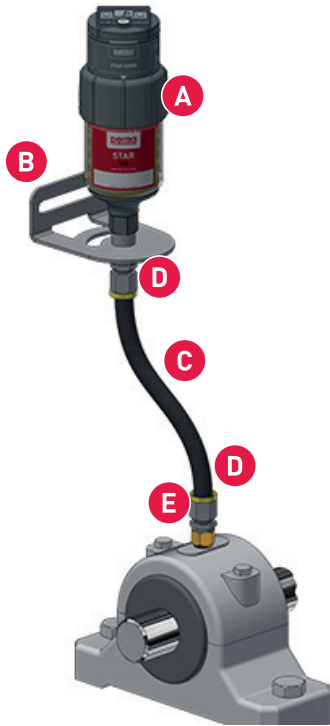


2-point cage
hanger mount
without hose

Art. No. 116958



Accessories for achieving Best Practice installations



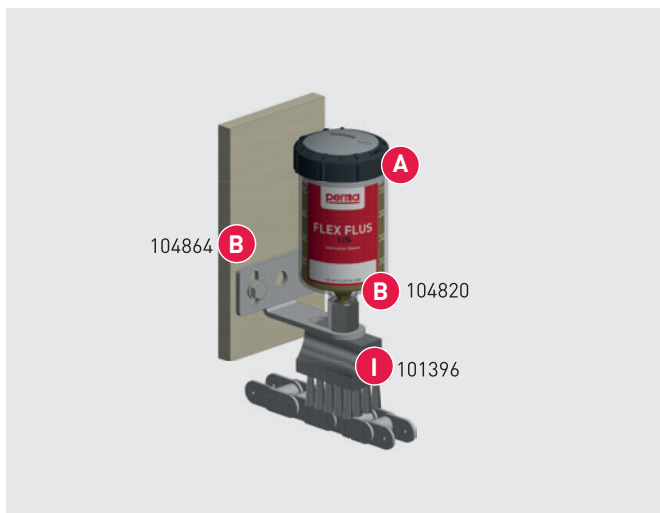
A	perma lubrication systems	Page 16-21
B	Brackets	Page 32-33
C	Tubes	Page 34
D	Tube connectors	Page 34 - 35
E	Reducers	Page 36
F	Extensions (without image)	Page 37
G	Angles (without image)	Page 38
H	Others (without image)	Page 38
I	Oil brushes	Page 39
J	Oil retaining valves	Page 39

Installation example for bearing lubrication

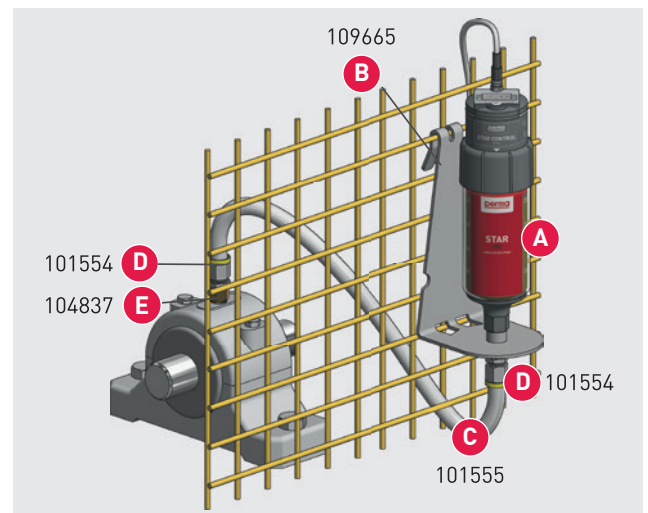
Avoid using unnecessarily long grease lines. It is best to use grease lines with an inner diameter of at least 6 mm.

We can provide a larger range of accessories on demand. Visit www.perma-tec.com/en/accessories to see the complete available range.

Chain lubrication: Direct mounting



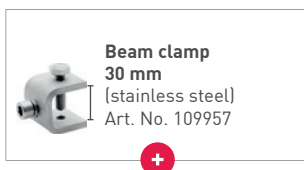
Bearing lubrication: Remote mounting





It has never been so easy to integrate automatic lubrication systems in existing production processes. Our expertise is based on many years of experience and global know-how. perma customers obtain all necessary components from a single supplier and also benefit from service and support to implement customised lubrication solutions.

B Brackets



OR



OR



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

1

2

3

4

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

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You will find additional brackets and complete INSTALLATION KITS in our catalogue for mining and heavy industry.


Additional brackets	Pic.	Material	Art. No.
Multipurpose clip CLASSIC, FUTURA, FUTURA PLUS, FLEX, FLEX PLUS, NOVA, STAR	1	Plastic	101388
Bracket	2	Stainless steel	104864
Insert for bracket G1/4 male x G1/4 female	2a	Brass	104820
	2b	Stainless steel	104865




1



2




2a




2b


Support Flanges, Standard Duty and Heavy Duty PCV	Pic.	Material	Art. No.
Support flange FLEX G1/4 male x G1/4 female	5	Brass / plastic	101427
Support flange STAR G1/4 male x G1/4 female	6	Brass / plastic	109420
Protection cap STAR Standard Duty 60 / 120	7	Plastic	115898
Protection cap STAR CONTROL Standard Duty 250	8	Plastic	115899
Protection cap STAR Heavy Duty 250	9	Plastic	109999
Support flange STAR with cover clip for protection cap	10	Plastic	116602
Purge connection with manual valve R1/4 male x G1/4 female	11	Brass nickel-plated	113972




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9



10



11






Connecting parts are available in PDF format, as a 2D drawing in dxf format and as a 3D drawing in stp format.
www.perma-tec.com/en/accessories



C Tubes

Use the same lubricant as in the lubrication system for pre-filling grease lines.



Name Material Properties	Art. No. (meter goods)	iØ/oØ [mm]	Operating temperature range [°C]	Minimum bending radius [mm]	Max. operating pressure [bar]	Initial filling amount per m [cm³]	Silicone-free / halogen-free	Max. grease line* [m]		
								FLEX PLUS	STAR	
Heavy Duty hose with NBR lining and fabric insert → Synthetic rubber with fabric insert → Oil and weather resistant outer layer	101555		9.5/16	-40 to +100	76	25	75	-	2	5
Tube PA → UV-resistant → Resistant to water → Translucent	101393		6/8	-40 to +80	40	19	33	✓	2	3
Hose spiral guard 25 mm Plastic	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.

Influence of tube length on back pressure



→ Back pressure = tube length + back pressure of the application

Rule of thumb to determine the back pressure of the tube:

1 bar per 1 m tube length for tube with 6 mm inner diameter
 8 bar per 1 m tube length for tube with 4 mm inner diameter





D Tube connectors


Heavy duty hose connector suitable for tube iØ 9.5 / oØ 16 mm 101555		Pic.	Material	Art. No.
Hose connector G1/4 male – push-lock	max. +100 °C	1	Steel, zinc-plated	101554
				
Tube connector push-lock up to 25 bar suitable for tube oØ 8 mm 101393, 101394 and 101569		Pic.	Material	Art. No.
Tube connector G1/4 male	Straight	8		101496
Tube connector G1/4 male 90°	Rotating	10		101497
				


D Tube connectors


Tube connector push-lock suitable for tube $\text{o}\varnothing$ 6 mm up to 25 bar 101494		Pic.	Material	Art. No.
Tube connector G1/8 male	Straight	20	Brass nickel-plated	101446
Tube connector G1/8 male 90°	Rotating	21		101449
Tube connector G1/4 male	Straight	22		101447
Tube connector G1/4 female	Straight	23		101511
Tube connector G1/4 male 90°	Rotating	24		101551
Tube connector M5 male	Straight	25		101448
Tube connector M5 male 90°	Rotating	26		101450
Tube connector M6 male	Straight	27		101509
Tube connector M6 male 90°	Swivelling	28		101515
Tube connector M6x0.75 male 90°	Swivelling	29		101516
Tube connector M8x1 male	Straight	30		101517
Tube connector M8x1 male 90°	Rotating	31		101507
Tube connector M10x1 male	Straight	32		101510
Tube connector M10x1 male 90°	Rotating	33		101508
Extension for tube $\text{o}\varnothing$ 6 mm to $\text{o}\varnothing$ 8 mm		34		101512
Y-Connector		35	101514	



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35

Tube connector up to 6 bar suitable for tube $\text{i}\varnothing$ 6 mm / $\text{o}\varnothing$ 8 mm 101393 and 101394		Pic.	Material	Art. No.
Tube connector G1/4 female	max. +80 °C	36	Alu / Plastic	101390
Tube connector G1/4 male	max. +80 °C	37		101391
Tube connector G1/8 male	max. +80 °C	38		101392
Tube connector G1/4 female	max. +100 °C	39	Brass, nickel-plated	104821
Tube connector G1/4 male	max. +100 °C	40	Brass	104822
Tube connector G1/4 female	max. +260 °C	41	Stainless steel	104866
Tube connector G1/4 male	max. +260 °C	42		104867


36



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E Reducers / Reducer coupling

Reducers / Reducer coupling	Pic.	Material	Art. No.
Reducer G1/4 male x G1/8 female	1	Brass	104834
Reducer G1/8 male x G1/4 female	2	Brass	104833
	3	Stainless steel	104875
Reducer coupling G3/8 female x G1/8 female	4	Brass, nickel-plated	101545
Reducer R1/2 male x G1/4 female	5	Brass	104832
Reducer R1/4 male x G1/4 female	6	Brass	109954
Reducer R1/8 male x G1/4 female	7	Brass	109953
Reducer R3/4 male x G1/4 female	8	Brass	104835
Reducer R3/8 male x G1/4 female	9	Brass	104836
Reducer M6 male x G1/4 female	10	Brass	104837
	11	Stainless steel	104876
Reducer M6 male x G1/8 female	12	Stainless steel	109847
Reducer M8 male x G1/4 female	13	Brass	104839
	14	Stainless steel	104878
Reducer M8x1 male x G1/4 female	15	Brass	104838
	16	Stainless steel	104877
Reducer M10 male x G1/4 female	17	Brass	104841
Reducer M10x1 male x G1/4 female	18	Brass	104840
	19	Stainless steel	104879
Reducer M12 male x G1/4 female	20	Brass	104842
Reducer M12x1 male x G1/4 female	21	Brass	104843
Reducer M12x1.5 male x G1/4 female	22	Brass	104844
Reducer M14 male x G1/4 female	23	Brass	104846
Reducer M14x1.5 male x G1/4 female	24	Brass	104845
Reducer M16 male x G1/4 female	25	Brass	104847
Reducer M16x1.5 male x G1/4 female	26	Brass	104848
Reducer Whitworth 1/4" male x G1/4 female	27	Brass	104849
Reducer 1/4 UNF male x G1/4 female	28	Stainless steel	109845
Reducer 1/4 UNF male x G1/8 female	29	Stainless steel	109846

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 14 mm M6x0.75 male x M6 female	10		104858
Extension 30 mm M6x0.75 male x M6 female	11		104859
Extension 14 mm M6 male x M6 female	12		104860
Extension 30 mm M6 male x M6 female	13		104861
Extension 50 mm M6 male x G1/4 female	14		Stainless steel
Extension 75 mm M10x1 male x G1/4 female	15	Brass	108923
Extension 115 mm M10x1 male x G1/4 female	16		108924
Extension 50 mm 1/4 UNF male x G1/4 female	17	Stainless steel	109854





 You will find **INSTALLATION KITS** for direct or remote mounting on page 24 to 29 or on our website at: www.perma-tec.com/en/accessories/installation-kits




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		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	1	Brass	104831
Y-Adapter 2 x G1/4 female x R1/4 male	2	Brass, nickel-plated	109002
T-Adapter 3 x G1/4 female	3	Brass	110025
	4	Stainless steel	104880
Bulkhead nipple G3/8 male x G1/4 female	5	Brass	104851
Hexagon-nipple R1/4 male	6	Brass	104852
	7	Stainless steel	104881
Sleeve G1/4 female	8	Brass	104853
	9	Stainless steel	104882











I Oil brushes

Special lubricating brushes with bristles cut to size upon request.

Oil brushes		Connecting thread	Size	Pic.	Material	Art. No.
Oil brush		G1/4 female top connection	∅ 20 mm	1	PA / Horsehair bristles	101396
Oil brush, bristle height 20 mm	up to +80 °C	G1/4 female top connection	40 x 30 mm	2	PA / Horsehair bristles	101397
			60 x 30 mm	3		101398
			100 x 30 mm	4		101399
		G1/4 female side connection	40 x 30 mm	5		101411
			60 x 30 mm	6		101412






J 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
Oil retaining valve G1/4 male x G1/4 female up to +60 °C	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





Overview of perma lubrication systems







Product	Lubricants	Discharge periods	Controlled	Max. lubrication points	Max. pressure [bar]	Operating temperature [°C]	Volume [cm ³]	Drive / Power supply	Activation / Setting	Certifications	Page
Single-point lubrication systems, electrochemical											
	FLEX PLUS Greases up to NLGI 2 / Oils	1, 3, 6 ..., 12 months*	Time	1	5	-20 to +55	60 125	Electrochemical / Integrated battery & gas generating cell	Rotary switch		20-21
Single-point lubrication systems, electromechanical											
	STAR VARIO Greases up to NLGI 2 / Oils	1, 2, 3, ... 26 weeks 1, 2, 3 ..., 12 months	Time	1	7.5	-40 to +60	60 120 250 500	Gearmotor / Battery	Push button with display		16-17
		Individual	Time / Impulse								6

* Depending on operating temperature and counter pressure

** Depending on counter pressure

All perma products conform to CE.

Troubleshooting - perma STAR VARIO

Lights & Display Screen	Lubrication System Status	Action
 <p>DISPLAY SCREEN Shows the time setting and a flashing line above the allocated lubricant cartridge size.</p> <p>LIGHTS Green with 7 second flash cycle</p>	<p>DWELL Lubrication system is between discharging cycles, waiting to commence the next programmed lubricant delivery cycle.</p>	<p>Inspect integrity of lubrication system, grease line and fittings. Mark and date the position of the piston to identify that an inspection has been completed.</p>
 <p>DISPLAY SCREEN RU = run</p> <p>LIGHTS Green with 1 second flash cycle</p>	<p>DISPENSING Lubrication system is discharging lubricant.</p>	<p>Inspect integrity of lubrication system, grease line and fittings. Mark and date the position of the piston to identify that an inspection has been completed.</p>
 <p>DISPLAY SCREEN PU = purge</p> <p>LIGHTS Green with 1 second flash cycle</p>	<p>PURGE Lubrication system purge mode has been activated and lubricant is being discharged.</p>	<p>PURGE is activated by holding down the SET button for 10 seconds to deliver 6 cm³ of grease before automatically stopping.</p> <p>The purge cycle can be interrupted at any time by pressing the SET button once.</p>
 <p>DISPLAY SCREEN LC = lubricant cartridge</p> <p>LIGHTS Red with 2 second double flash cycle</p>	<p>LUBRICANT CARTRIDGE EMPTY Based on the programmed setting the lubricant cartridge should be empty.</p>	<p>Service the lubrication system using a new lubricant cartridge and a new battery pack.</p> <p>To reset the lubrication system for the next lubricant cartridge a new battery pack must be inserted.</p>
 <p>DISPLAY SCREEN OL = overload</p> <p>LIGHTS Red with 7 second double flash cycle</p>	<p>OVERLOAD The lubrication system has experienced high resistance from the lubrication point and has been unable to deliver the lubricant.</p>	<p>Manually purge the point to clear the blockage. The lubrication system can be restarted by turning it on and off again.</p> <p>If the overload condition persists the systemic cause of the blockage must be addressed.</p>
 <p>DISPLAY SCREEN Lo = low battery</p> <p>LIGHTS Red with 2 second double flash cycle</p>	<p>LOW BATTERY The inserted battery pack is either already depleted or damaged.</p>	<p>Replace with a new battery pack.</p>

perma SERVICES

perma SELECT APP

The calculation tool for your application

The perma SELECT APP helps you determine the required lubricant amount and discharge period for the perma lubrication system while taking operating conditions into account.

You can conveniently install the perma SELECT APP on all standard iOS and Android mobile devices. A browser version is also available.



More information:

www.perma-tec.com/en/service/perma-select-app



perma MLP / perma MLP APP

Digital lubrication point management

With the perma web application and the perma MLP APP, you always have an updated overview of all lubrication points. Coordinate upcoming maintenance tasks conveniently. The perma MLP web application is used to manage lubrication points centrally. The perma MLP APP allows you to record all maintenance and replacement tasks on site. The data is then synchronised with the perma MLP web application.



More information:

www.perma-tec.com/en/service/perma-mlp



perma ACADEMY | eACADEMY

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
- Marketing tools
- Accessories
- Practical exercises
- Sales arguments
- Main applications



Training schedule:

www.perma-tec.com/en/academy



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