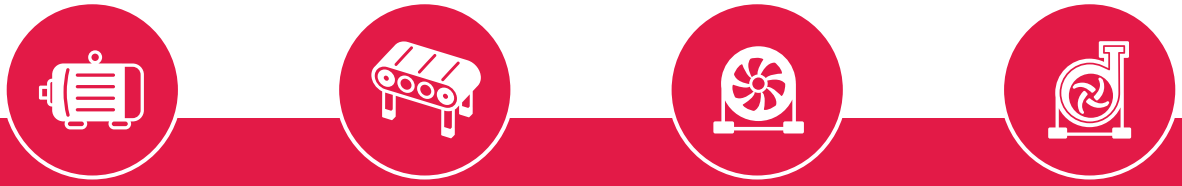
ADVANCED VERSION

PRODUCT & APPLICATION GUIDE

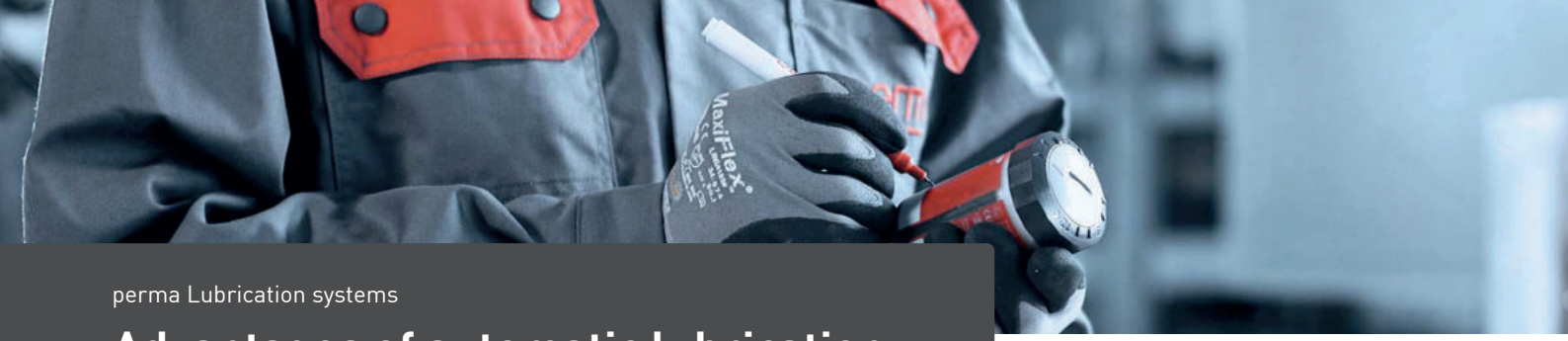


The Expert in Lubrication Solutions

perma

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
- Market leader in the field of automatic single-point lubrication
- Development and production in Germany
- Global network of subsidiaries and competent partners in more than 120 countries



perma Lubrication systems

Advantages of automatic lubrication

To be competitive on a global stage 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

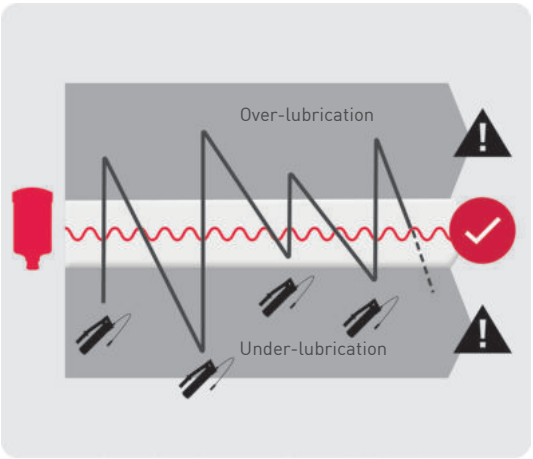
perma lubrication systems are used to lubricate a wide range of machine elements including the common production equipment such as conveyors, pumps, fans, blowers and electric motors. The product portfolio provides reliable solutions which are simple to implement and incorporate into existing maintenance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

- → Discharge periods from **1 week to 24 months**
- → Lubricant volumes from **60 cm³ to 1000 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.

Made in Germany

Manual vs. automatic lubrication



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.**

Equipment availability

perma helps to prevent roller bearing failures

Bearing failures can cause unplanned downtime. A well planned 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.

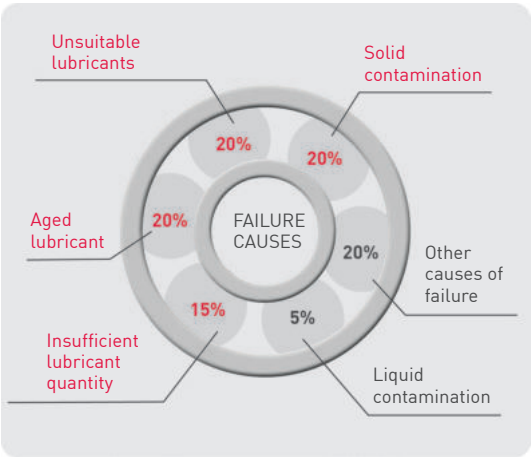
- → Reliable supply of fresh lubricant to bearings and seals
- → Improved equipment availability with automated relubrication
- → Reduction in maintenance costs
- → Avoid unplanned machine downtime

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

Cost effectiveness

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

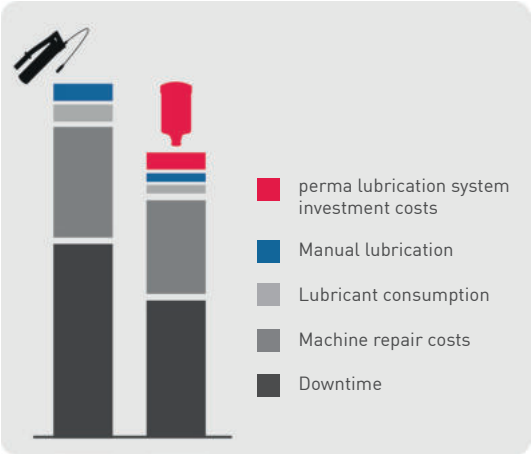
→ **Maintenance intervals can be scheduled** during downtimes

→ **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

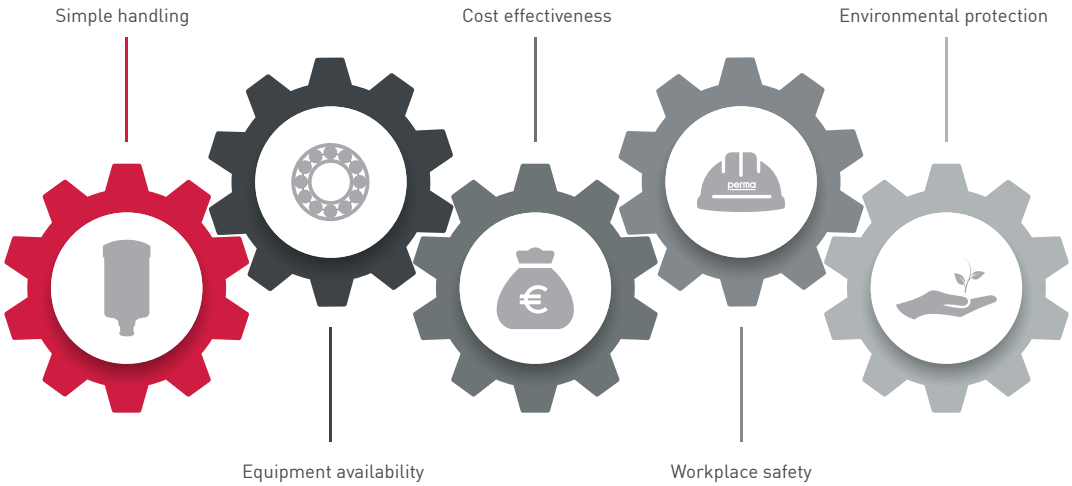


Sources: Internal calculations: Material, time and maintenance requirements / figures from the roller bearing industry and insurance companies.

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



Workplace safety

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).

Environmental protection

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.

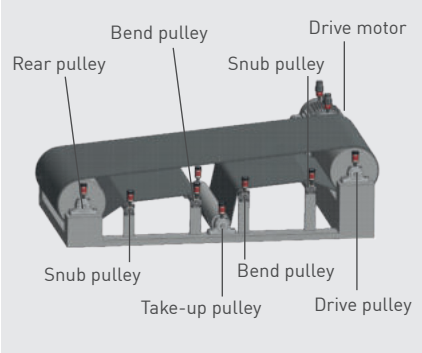
- → **Reduction of lubricant consumption** with programmed delivery
- → **No lubricant contamination** thanks to enclosed systems
- → **Reusable components** help minimise **energy** and **material costs**

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

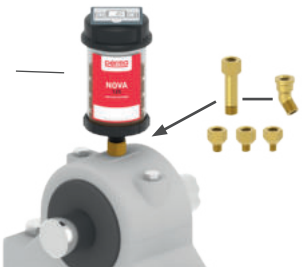
- → Continual purging of fresh grease through shaft seals **prevents contamination**
- → **Grease is applied while the equipment is in operation,** removing the need to stop production for lubrication
- → perma lubrication systems can be remotely mounted **outside of guards to avoid worker exposure to 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 NOVA or perma 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 NOVA with NOVA LC 125



INSTALLATION KIT for perma NOVA
Use extensions, angles & reducers depending on the installation situation

perma STAR VARIO with STAR 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

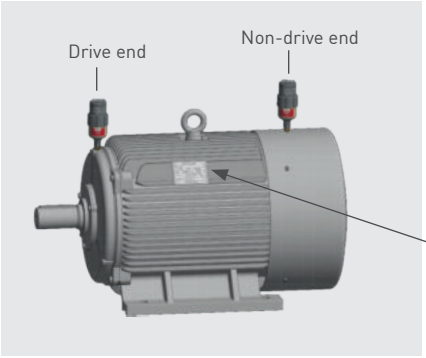
INSTALLATION KIT STAR Standard Duty
1-point
cage hanger mount
incl. 3 m hose

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

perma Lubrication systems for

Electric motors

Lubrication points



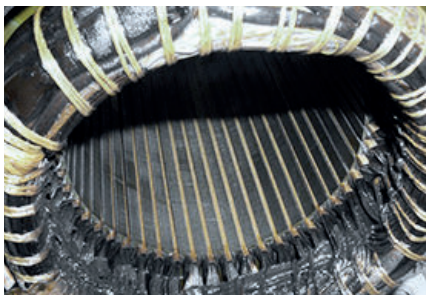
Electric motors require precise lubrication. Under-lubrication can cause premature bearing failure and excess amounts of grease can cause damage from excessive heat generation or grease entering the windings of the motor.

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**
Speed: low	=	**high viscosity**

NLGI 0-2

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

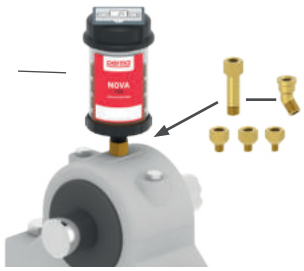
Advantages of automatic lubrication

- → **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 NOVA or perma STAR VARIO

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

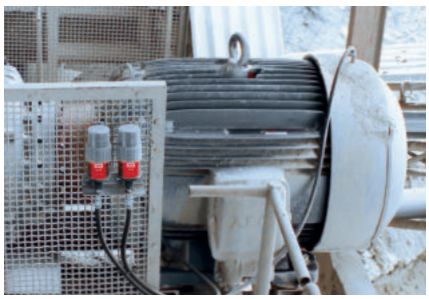


INSTALLATION KIT
for perma NOVA
Use extensions, angles & reducers depending on the installation situation

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



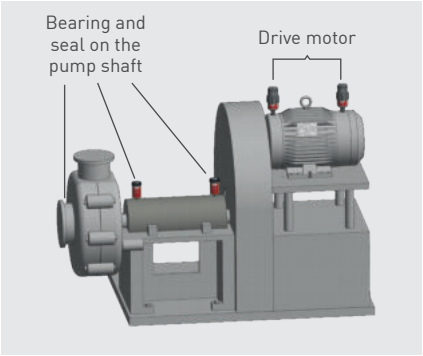
INSTALLATION KIT STAR
Standard Duty
2-point
65 mm beam clamp mount
incl. 5 m hose

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

perma Lubrication systems for

Pumps

Lubrication points

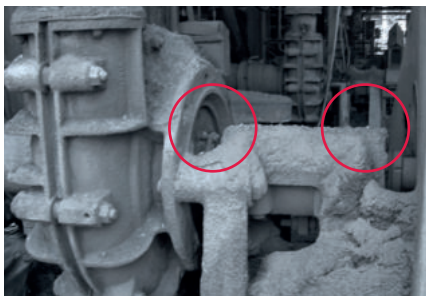


Pumps can have requirements for bearing lubrication and seal lubrication for the pump barrels and gland seal lubrication for the pump body.

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.

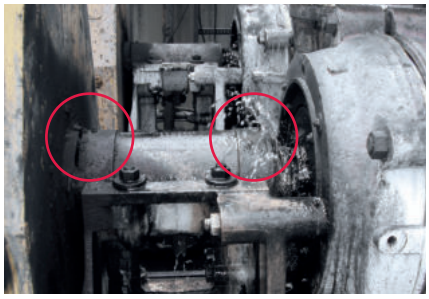
Information about drive motor lubrication can be found on pages 10 / 11 “Electric motors”.

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

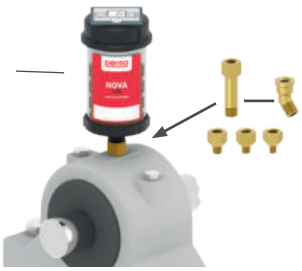
Advantages of automatic lubrication

- → **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 NOVA or perma STAR VARIO

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



perma NOVA with NOVA LC 125

INSTALLATION KIT for perma NOVA
Use extensions, angles & reducers depending on the installation situation

perma STAR VARIO with STAR 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

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

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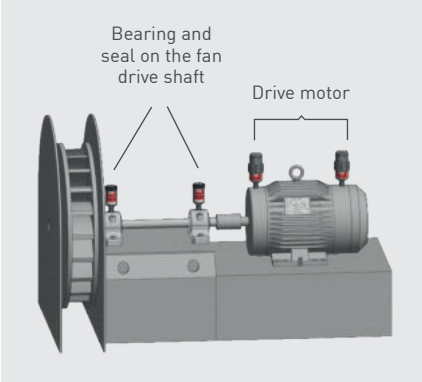
incl. 5 m hose

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.

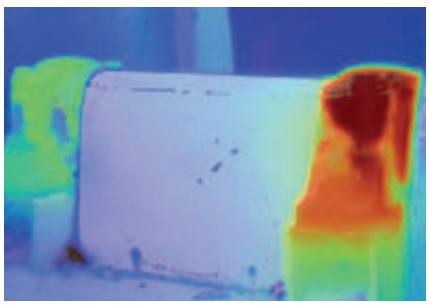
The bearing housings can have separate **bearing** and seal lubrication points which each require regular lubrication.

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**

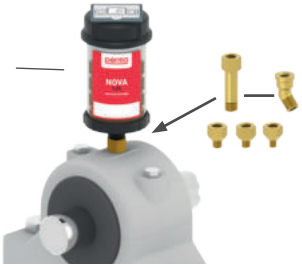
→ Different lubricant volumes for **exact adjustment to lubrication point**

Solutions

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

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

perma NOVA with NOVA LC 125



INSTALLATION KIT for perma NOVA
Use extensions, angles & reducers depending on the installation situation

perma STAR VARIO with STAR 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 STAR VARIO
perma STAR VARIO BLUETOOTH

Versatile lubrication system - optionally with Bluetooth functionality

perma STAR VARIO

perma STAR VARIO BLUETOOTH

Four different sizes for individual lubricant metering

perma STAR VARIO operates fully automatically, independent of temperature and pressure with a very precise discharge. The system consists of an electromechanical drive, an LC with 60, 120, 250 or 500 cm^3 of lubricant and a battery pack. The bluetooth-enabled version, perma STAR VARIO BLUETOOTH is optionally available. It can be conveniently operated via perma CONNECT.

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. 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 67 / IP 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
Display with backlighting
Only STAR VARIO BLUETOOTH

Electromechanical, reusable drive with battery pack

Bluetooth functionality
Only STAR VARIO BLUETOOTH

Allows simplified operation via **perma CONNECT**

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
- → Configure, control and maintain remotely
- → Increased workplace safety
- → Real-time lubricator function and feedback

Technical data

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

Discharge period
1, 2, 3 ... 12 months / 1, 2, 3 ... 52 weeks
STAR LC 60: + 15, 18, 21, 24 months
STAR LC 500: max. 6 months

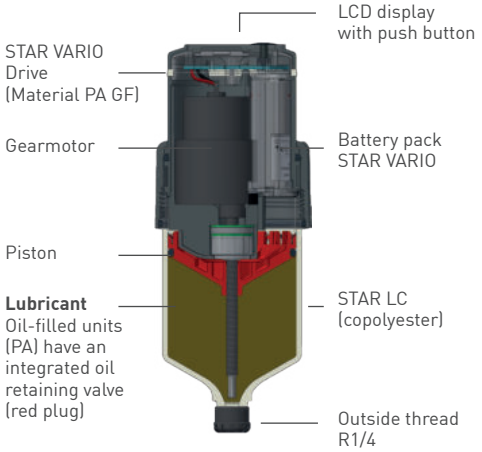
Lubricant volume
60 cm³, 120 cm³, 250 cm³, 500 cm³
2.03 oz, 4.06 oz, 8.45 oz, 16.91 oz

Operating temperature*
-40 °C to +60 °C /**
-40 °F** bis +140 °F

Pressure build-up
7.5 bar / 109 psi

Protection class
IP 67 / IP 65

Standard & special lubricants
Greases up to NLGI 2 / Oils



Dimensions
LC 60: Ø 75 x 155 mm LC 250: Ø 75 x 228 mm
LC 120: Ø 75 x 178 mm LC 500: Ø 75 x 324 mm

*To achieve functionality below -20 °C, Battery pack 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 lubrication system with external power supply 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 7,5 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 mode.
- → 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, Imax 0.5 A

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

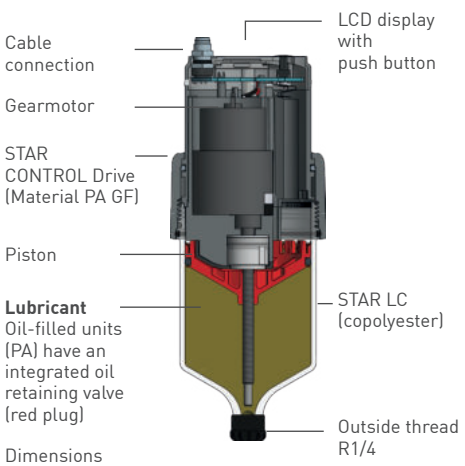
Lubricant volume
60 cm³, 120 cm³, 250 cm³ or 500 cm³
2.03 oz, 4.06 oz, 8.45 oz, 16.91 oz

Operating temperature
-40 °C* to +60 °C / -40 °F* to +140 °F

Pressure build-up
7,5 bar / 109 psi

Protection class
IP 65

Standard & special lubricants
Greases up to NLGI 2 / Oils



Dimensions
LC 60: Ø 72 x 160 mm
LC 120: Ø 72 x 183 mm
LC 250: Ø 72 x 233 mm
LC 500: Ø 72 x 329 mm

*Only to be used with suitable low temperature lubricants!

perma ULTRA

High pressure output with weekly and monthly time setting options

Bluetooth-enabled lubrication system with high pressure build-up and wide temperature range

perma ULTRA is a fully automatic lubrication system, independent of temperature and counter pressure with a very precise discharge. With two cartridge sizes, pressure build-up to 50 bar and options of weekly and monthly time settings.

Applications | Machine elements

perma ULTRA is an extremely versatile and capable lubrication system suited to a wide range of applications which demand high lubrication rates and where long remote grease lines are necessary to ensure safe access, e.g. drag conveyors, shaker screens, rotary kilns and belt conveyors.

Product characteristics

Bluetooth functionality

Allows simplified operation via perma CONNECT

Pressure build-up to 50 bar

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

Remote mounting

LCD display with backlighting and push button operation

Setting:
1, 2, 3 ... 12 months
1, 2, 3 ... 52 weeks

Benefits

- → Bluetooth functionality as standard
- → Configure, control and maintain remotely
- → Increase of work safety
- → Real-time lubricator function and feedback
- → High pressure capability benefits, e. g. applications on gravity take-ups or where long remote grease lines are necessary
- → Universal use both in cold areas and at higher temperature
- → Wide remote installation options to improve workplace safety by installing the systems at safe and easy-to-access locations
- → Straightforward, single-button operation
- → Precise settings according to requirements prevent lubrication starvation and over-lubrication
- → Various dispensing rate options-extended maintenance intervals

Technical data

Drive – reusable
Electromechanical drive with Battery pack ULTRA / Battery pack ULTRA low temperature

Discharge period
1, 2, 3 ... 12 months / 1, 2, 3 ... 52 weeks

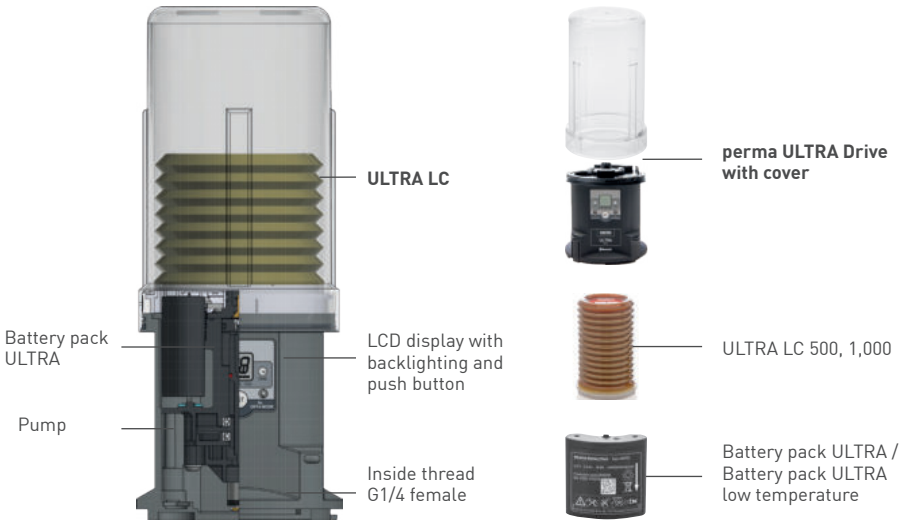
Lubricant volume
500 cm³, 1,000 cm³
16.91 oz, 25.36 oz, 33.81 oz

Operating temperature*
-40 °C to +60 °C /** -40 °F** to +140 °F

Continuous pressure build-up
Up to 50 bar / 725 psi

Protection class
IP 67 / IP 65

Standard & special lubricants
Greases up to NLGI 2



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

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

Made in Germany

For applications with high temperature fluctuations

perma NOVA can be used in all application areas from -20 °C to +60 °C. A discharge period from 1 to 12 months can be entered via the setting button on the NOVA Control unit. The control unit then calculates the required quantity of gas for constant and reliable discharge while taking into account the ambient temperature. 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 65 cm^3 and 125 cm^3.

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^3 is ideal for the lubrication of electric motors.

Product characteristics

Electronic control unit with temperature compensation displays discharge period / operating status

LCD display and push buttons
Setting: 1, 2, 3, ... 12 months

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

Ex-proof certification
IP 65

Benefits

- → 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

- → Universal use at both low and higher temperatures
- → Temperature compensation permits use with heavily fluctuating ambient temperatures
- → Extremely robust due to integrated support flange

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

Technical data

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

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

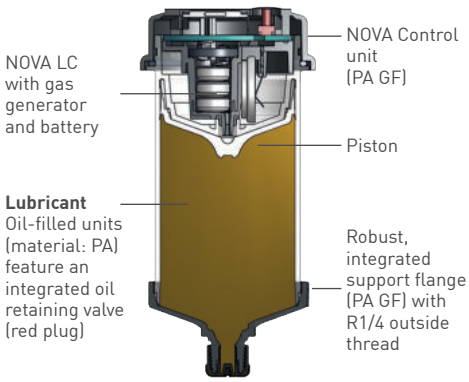
Lubricant volume
65 cm^3 or 125 cm^3 / 2.20 oz, 4.23 oz

Operating temperature
-20 °C to +60 °C / -4 °F to +140 °F

Pressure build-up
Max. 6 bar / 87 psi

Protection class
IP 65

Standard & special lubricants
Greases up to NLGI 2 / Oils



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

perma STAR VARIO & perma STAR CONTROL Components

For greater stability use
Support flange STAR | Art. No. 109420

Drive	 perma STAR VARIO Drive Art. No. 117222	 perma STAR VARIO BLUETOOTH Drive Art. No. 117223	 perma STAR CONTROL Drive TIME or IMPULSE mode Art. No. 118216
Battery / Cable	 Battery pack STAR VARIO Art. No. 101351  Battery pack STAR VARIO BLUETOOTH low temperature Art. No. 116901		 Cable STAR CONTROL 5 m 108432 10 m 108431 20 m 110512
LC (= Lubricant Cartridge)	 or  or  or 		
	perma STAR LC 60 cm³	**perma STAR LC** 120 cm³	**perma STAR LC** 250 cm³ / **perma STAR LC** 500 cm³

Greases				
perma MULTI LC 150-2 (SF01)	104044	100724	104473	112410
perma LOAD L-M 100-2 (SF02)	104048	100733	104480	112906
perma SPEED CX SYN 100-2 (SF08)	104063	100762	104500	112910
perma FOOD AX SYN 150-1 (SF10)	104069	100770	104506	112859
Oils				
perma TEMP SYN 320 (SO14)	104180	101096	104685	117545
perma FOOD SYN 220 (SO70)	104204	101148	104719	117549

perma ULTRA Components

Drive	 perma ULTRA Drive with Cover Art. No. 116159		 For extreme operating conditions: Protection cap ULTRA Heavy Duty (plastic) Art. No. 116149
Power supply	 Battery pack ULTRA Art. No. 116147	or	 Battery pack ULTRA low temperature Art. No. 116148
LC (= Lubricant Cartridge)		or	
	perma ULTRA LC 500 cm³		**perma ULTRA LC** 1,000 cm³

Greases		
perma MULTI LC 150-2 (SF01)	116170	116190
perma LOAD L-M 100-2 (SF02)	116171	116191
perma SPEED CX SYN 100-2 (SF08)	116176	116196
perma FOOD AX SYN 150-1 (SF10)	116178	116198

perma ULTRA Accessories

MOUNTING TYPE	 Beam clamp 65 mm		 Cage hanger arm	
ACCESSORY KITS	 ACCESSORY KIT ULTRA Standard Duty 1-point 65 mm beam clamp mount without hose 116335	 ACCESSORY KIT ULTRA Heavy Duty 1-point 65 mm beam clamp mount without hose 116337	 ACCESSORY KIT ULTRA Standard Duty 1-point cage hanger mount without hose 116336	 ACCESSORY KIT ULTRA Heavy Duty 1-point cage hanger mount without hose 116338
INSTALLATION KITS including hose (same as above + 5 m Extreme Heavy Duty hose up to +100 °C oØ 11.8 mm x iØ 6.4 mm)	INSTALLATION KIT ULTRA Standard Duty 1-point 65 mm beam clamp mount incl. 5 m hose 116339	INSTALLATION KIT ULTRA Heavy Duty 1-point 65 mm beam clamp mount incl. 5 m hose 116341	INSTALLATION KIT ULTRA Standard Duty 1-point cage hanger mount incl. 5 m hose 116340	INSTALLATION KIT ULTRA Heavy Duty 1-point cage hanger mount incl. 5 m hose 116342

perma NOVA Components

Drive	 **perma NOVA Control Unit** Art. No. 107271	
LC (= Lubricant Cartridge)	 **perma NOVA** 65 cm^3	 **perma NOVA** 125 cm^3
Greases		
perma MULTI LC 150-2 (SF01)	107415	110281
perma LOAD L-M 100-2 (SF02)	107416	110282
perma SPEED CX SYN 100-2 (SF08)	107421	110287
perma FOOD AX SYN 150-1 (SF10)	107423	110289
Oils		
perma TEMP SYN 320 (SO14)	107425	110290
perma FOOD SYN 220 (SO70)	107429	110294

perma LUBRICANTS

The correct lubricant for a longer service life

Greases & Oils

Name → Lubricant properties → Labelling as per DIN 51502	NLGI grade	Thickener	Base oil	Operating temperature (°C)	Base oil viscosity at +40 °C [mm²/s]	Speed index
perma MULTI LC 150-2 (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 LOAD L-M 100-2 (SF02) (OGF2K-30) → High-pressure grease with MoS2 → Ageing- & oxidation-resistant → Good dry-running properties	2	Li + MoS2	Mineral oil	-30 to +120	100	350,000
perma SPEED CX SYN 100-2 (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 AX SYN 150-1 (SF10) (KHC1K-40) → Low-temperature resistance → Good wear protection → Good water resistance NSF ISO 21469 Certified Nonfood Compounds Program Listed: H1 Registration No: 153375	1	Al com.	PAO	-45 to +120	150	500,000

Name → Lubricant properties → Labelling as per DIN 51 517-3	Base oil	Operating temperature (°C)	Viscosity at +40 °C [mm²/s]
perma TEMP SYN 320 (SO14) (CLPE 320) → Lubricates effectively even at high operating temperatures → Good viscosity / temperature behaviour wear protection → Special creep properties ensure rapid film formation	Ester oil + synthetic hydrocarbon oil	-20 to +250	320
perma FOOD SYN 220 (SO70) (CLPH 220) → Broad operating temperature range → Very good ageing & oxidation resistance → Good wear protection NSF ISO 21469 certified Nonfood Compounds Program Listed: H1 Registration No: 153376	PAO + ester oil	-30 to +120	220

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

For many lubrication points it is beneficial to mount the lubricating system with a grease line at a location that can be safely accessed during plant operation.

Decide what mounting type is suitable for you...

YES	NO	
☐	☐	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 **large quantities of water**, **pumped media**, **media** from the **manufacturing process** or impact from **solids**?

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

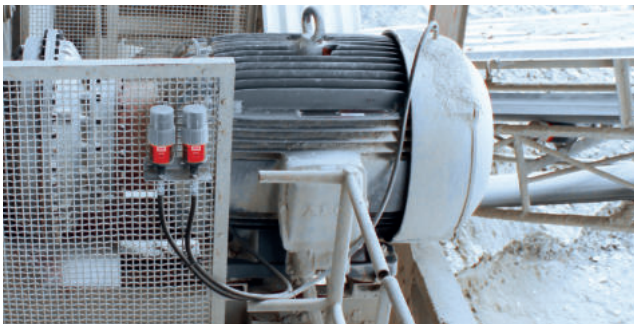
- → **Risk of harm to workers is reduced** by not needing to access areas near moving machinery parts
- → Lubrication systems can be located in an area **away from the risk of damage**
- → Lubrication systems can be **inspected and serviced without** the need to **shut down operating equipment**

Installation Kits

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

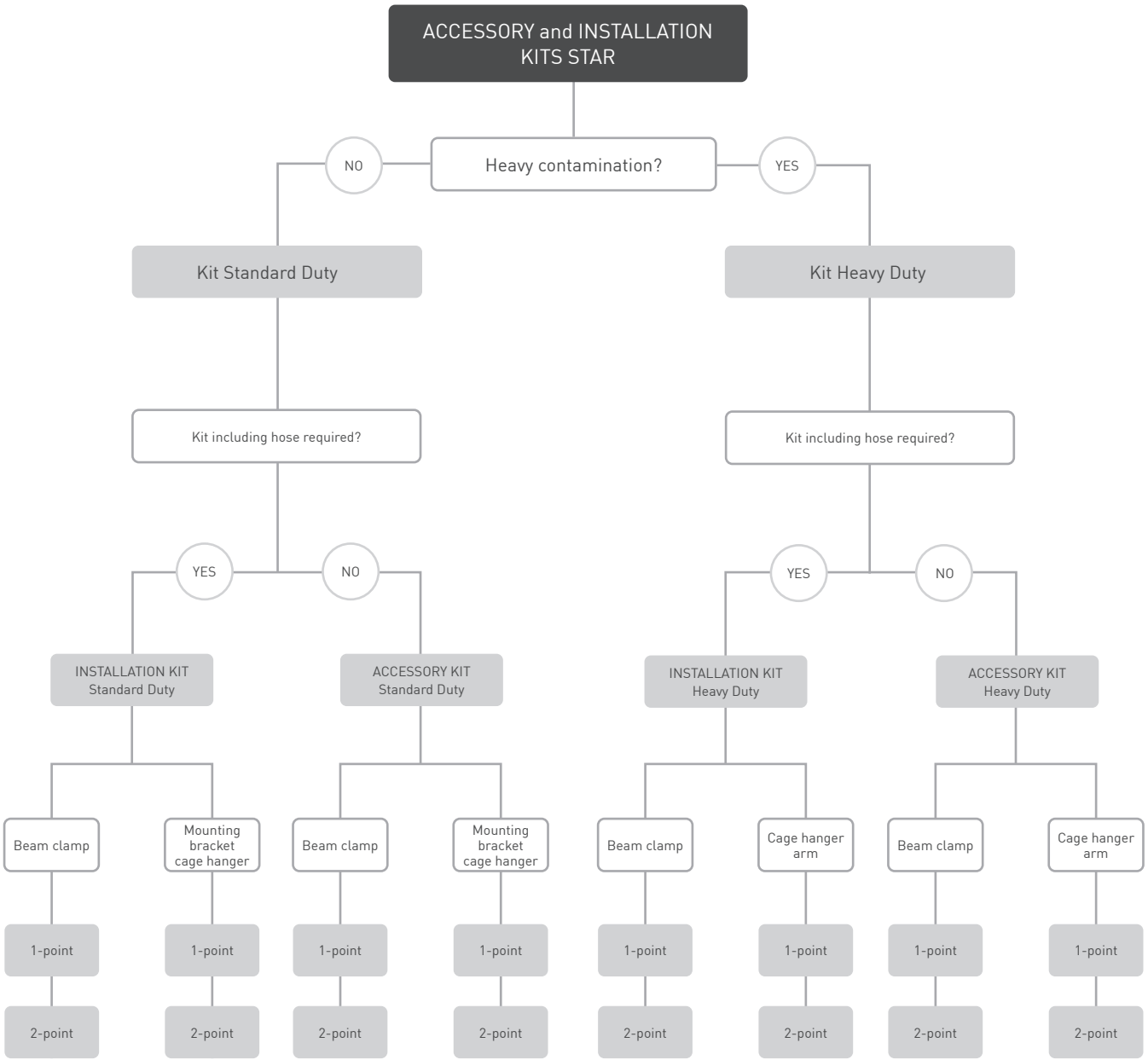
Direct mounting

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:



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

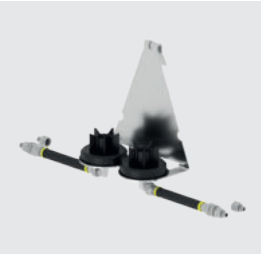
Art. No. 116961

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 38.

Protection Caps offer enhanced protection for the perma STAR VARIO lubrication system. Please see page 37 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

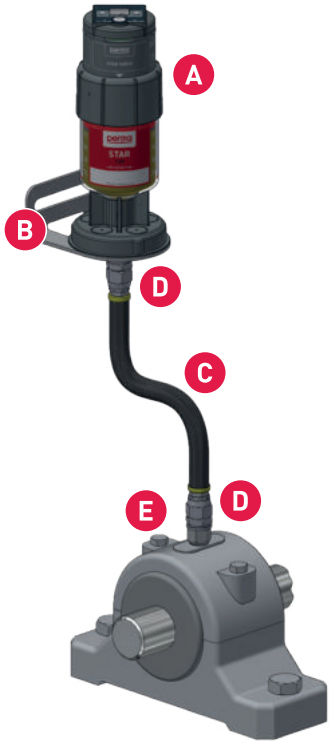
Art. No. 116957

2-point cage
hanger mount
without hose

Art. No. 116958

Accessories for achieving Best Practice installations

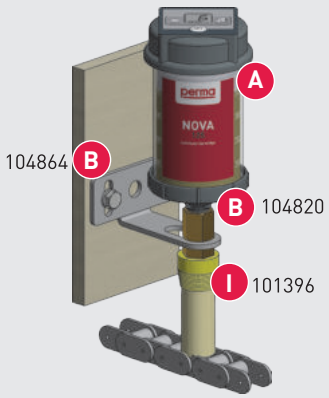
Installation example for bearing lubrication



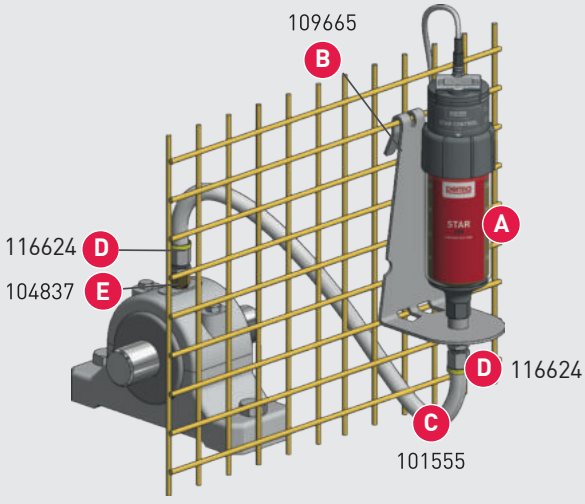
Avoid using unnecessarily long grease lines.
It is best to use grease lines with an inner diameter of at least 6 mm.

We can provide a larger range of accessories on demand. Visit *www.perma-tec.com* 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

Beam clamp
30 mm
(stainless steel)
Art. No. 109957

or

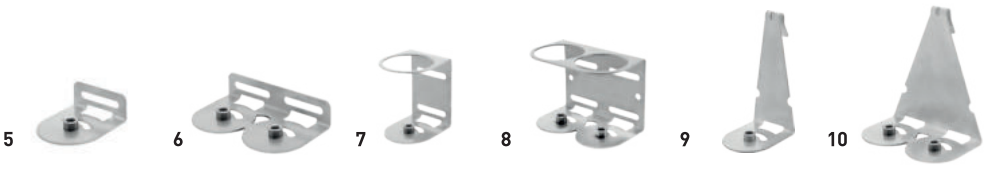
Beam clamp
65 mm
(stainless steel)
Art. No. 109958

or

Cage hanger arm
(stainless steel)
Art. No. 109959

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

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



Additional brackets	Pic.	Material	Art. No.
Multipurpose clip 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, protection cap and purge connection	Pic.	Material	Art. No.
Support flange STAR G1/4 male x G1/4 female	3	Brass / plastic	109420
Protection cap STAR VARIO Standard Duty 60 / 120	4	Plastic	115898
Protection cap STAR VARIO Standard Duty 250	5	Plastic	109519
Protection cap STAR Heavy Duty 250	6	Plastic	109999
Protection cap STAR Heavy Duty 500	7	Plastic	113595
Support flange STAR with cover clip for protection cap	8	Plastic	116602
Purge connection with manual valve R1/4 male x G1/4 female	9	Brass nickel-plated	113972


3


4


5


6


7


8


9

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]	
								NOVA	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	✓ | X	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 MULTI LC 150-2 (SF01) or perma TEMP SYN 320 (SO14).

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 9.5 mm inner diameter
1.5 bar per 1 m tube length for tube with 6 mm inner diameter

D Tube connectors

Heavy duty hose connector suitable for tube iØ 9.5 mm / oØ 16 mm 101555		Pic.	Material	Art. No.
Hose connector G1/4 male – push-lock	max. +100 °C	1	Steel, zinc-plated	116624

1

Tube connector push-lock up to 25 bar suitable for tube iØ 6 mm / oØ 8 mm 101393		Pic.	Material	Art. No.
Tube connector G1/4 male	Straight	2		101496
Tube connector G1/4 male 90°	Rotating	3		101497

2 

3 

D Tube connectors

Tube connector up to 6 bar suitable for tube iØ 6 mm / oØ 8 mm 101393		Pic.	Material	Art. No.
Tube connector G1/4 female	max. +80 °C	1	Alu / Plastic	101390
Tube connector G1/4 male	max. +80 °C	2		101391
Tube connector G1/8 male	max. +80 °C	3		101392
Tube connector G1/4 female	max. +100 °C	4	Brass, nickel-plated	104821
Tube connector G1/4 male	max. +100 °C	5	Brass	104822
Tube connector G1/4 female	max. +260 °C	6	Stainless steel	104866
Tube connector G1/4 male	max. +260 °C	7		104867


1


2


3


4

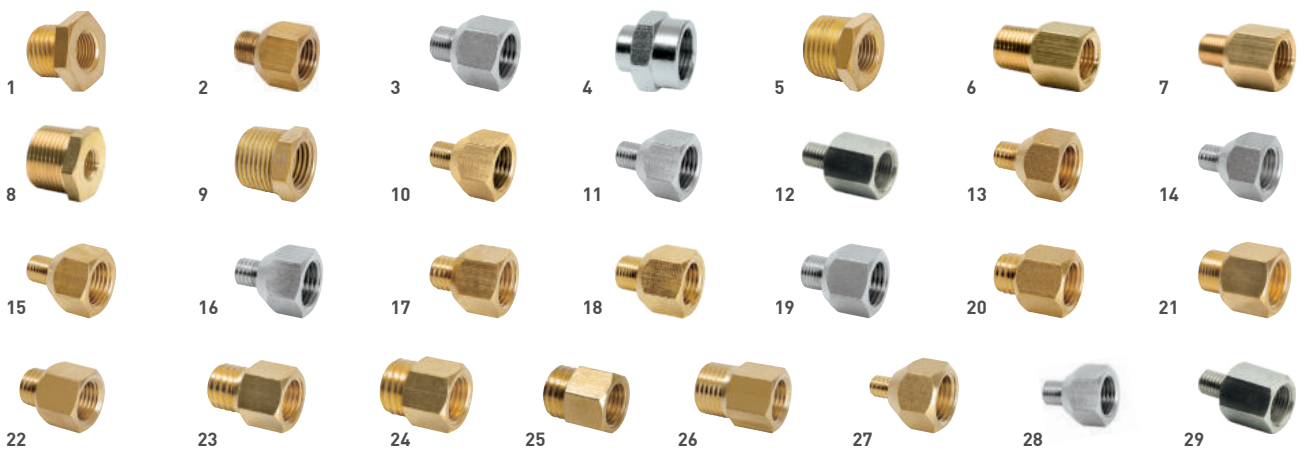

5


6


7

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

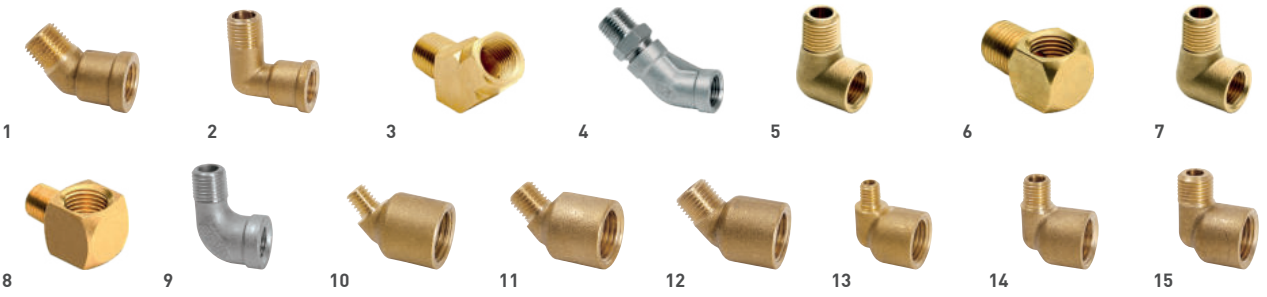


F Extensions

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	Stainless steel	116291
Extension 30 mm M6x0.75 male x M6 female	11		116292
Extension 14 mm M6 male x M6 female	12		116293
Extension 30 mm M6 male x M6 female	13		116294
Extension 50 mm M6 male x G1/4 female	14	Stainless steel	109697
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

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

Oil brushes & oil brushes foam

Special lubricating brushes with special cut upon request

Oil brushes		Connecting thread	Size	Pic.	Material	Art. No.
Oil brush		G1/4i top connection	Ø 20 mm	1	PA / Natural bristles	101396
Oil brush foam 17,5 mm	up to +80 °C	G1/4i top connection + side connection	40 x 30 mm	2	PA / Foam	117435
			60 x 30 mm	3		117436
			100 x 30 mm	4		117437


1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3


4

Overview of perma lubrication systems

	Product	Lubricants	Discharge periods	Controlled	Max. pressure [bar]	Operating temperature [°C]	Volume [cm³]	Drive / Power supply	Activation / Setting	Certifications	Page
Single-point lubrication systems, electrochemical											
	**NOVA**	Greases up to NLGI 2 / Oils	1, 2, 3, ... 12 months*	Time	6	-20 to +60	65 125	Gas generating cell / Integrated battery	Push button with display	Ex IECEx ANZEx	22 - 23
Single-point lubrication systems, electromechanical											
	**STAR VARIO**	Greases up to NLGI 2 / Oils	1, 2, 3, ... 52 weeks 1, 2, 3, ... 12 months	Time	7.5	-40 to +60	60 120 250 500	Gearmotor / Battery	Push button with display	cULus LISTED	16 - 17
	**STAR VARIO BLUETOOTH**		**LC 60:** + 15, 18, 21, 24 months **LC 500:** max. 6 months								16 - 17
	**STAR CONTROL**		Individual	Time / Impulse	7,5			Gearmotor / 9–30 V DC			18 - 19
	**ULTRA**	Greases up to NLGI 2	1, 2, 3, ... 52 weeks 1, 2, 3, ... 12 months	Time	50		500 1000	Gearmotor / Battery			20 - 21

*Depending on counter pressure

All perma products conform to CE.

APPS & 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.

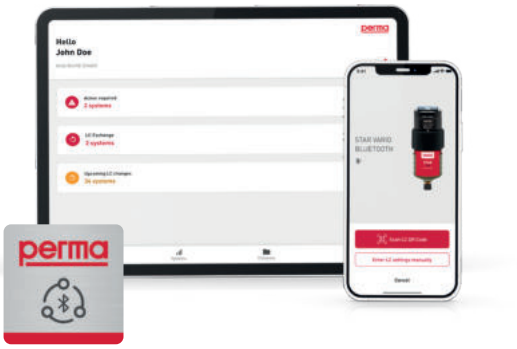
perma CONNECT

The convenient solution for remote lubrication point management

Simple and intuitive - configure and maintain your perma STAR VARIO Bluetooth and perma ULTRA lubrication systems with perma CONNECT.

Create an administrative structure in perma CONNECT with all details about your perma lubrication systems and access this data via the App.

Since the current status information is synchronized with the perma CONNECT web application, all details are also conveniently available at your workplace.



perma ACADEMY | perma 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
- Practical exercises
- Marketing tools
- Sales arguments
- Accessories
- Main applications

More information
www.perma-tec.com

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Publisher

perma-tec GmbH & Co. KG
Hammelburger Str. 21
97717 Euerdorf / Germany

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

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

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

2023/12 · en · Art. No. 117324