



Translation of the
Original Operating Instructions
perma
STAR VARIO

This operating manual is valid for the lubricator
perma STAR VARIO in sizes S60, M120 and L250.

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We have taken great care when compiling all the details contained in this documentation. However we cannot rule out discrepancies and we reserve the right to make technical changes to the product without giving advance notice.

We do not assume any judicial responsibility or liability for damages which may ensue as a result.

We will include any necessary changes in the next edition.

Compiled and printed: 11 / 02 / 2009

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1 VARIOUS

1.1 About this operating manual

- ◆ This operating manual is intended for the safe operation of the perma STAR VARIO automatic lubricator. It contains safety instructions which must be adhered to.
- ◆ Everyone who works on or with the lubricator must have access to this operating manual during their shift. They must also pay attention to all relevant instructions and notices.
- ◆ The operating manual must be kept in a complete and easy to read condition.

1.1.1 Terms used

◆ Lubricator

In the following text, the “lubricator” will either be called “lubricator” or by its name “perma STAR VARIO”.

◆ Lubrication Canister

In the following text, the “Lubrication Canister” will be called LC unit. The user can order the LC unit filled with different oils and greases and in sizes S60, M120, and L250.

1.1.2 Usage of safety instructions

All safety instructions in this operating manual are standardized.

1.1.3 Danger signs



Attention Danger!

This sign warns you of any danger to people's health, life-threatening injuries, and death.

1.1.4 Tips



This sign alerts you to application tips which will help you in doing certain things quicker and safer.

1.2 Delivery

- ◆ perma STAR VARIO can be ordered and delivered according to customer specifications in regards to type of grease and oil, size / content of LC unit.
- ◆ Upon delivery, make sure to check if the delivered goods correspond to your order. perma-tec GmbH & Co. KG will not accept liability for subsequent claims of any shortcomings.
- ◆ Please immediately forward any claim
 - of noticeable transport damage: directly to the forwarder
 - of noticeable faults, shortcomings or defects: directly to your perma distributor.

1.2.1 Delivered sizes

Name (type)	Volume in cc
S60	60
M120	120
L250	250

1.3 Lubricator perma STAR VARIO

1.3.1 Markings

- ◆ The lubricator perma STAR VARIO is clearly marked with a label on the drive system and a label on the LC unit
- ◆ **CE Mark** on the drive unit
- ◆ **UL Mark** on the drive unit:
 “This equipment is suitable for use in Class I, Div. 2, Groups A, B, C and D; Class II, Div. 2, Groups F and G; Class III Hazardous Locations or Non-Hazardous Locations only.
 Warning - Explosions Hazard - Substitution of components may impair suitability for Class I, Division 2.”
- ◆ Manufacturer:
 perma-tec GmbH & Co. KG
 Hammelburger Straße 21
 97717 Euerdorf, Germany
 Tel: +49 (0) 9704 609-0
 Fax: +49 (0) 9704 609-50

E-mail: info@perma-tec.com
 Homepage: www.perma-tec.com

1.3.2 Intended usage

- ◆ The lubricator perma STAR VARIO
 - supplies all lubrication points with oil and grease to a large extent continuously, precisely and temperature independent up to a pressure build-up of max 5 bar / 75 psi.
 - can be used for all lubrication points of sliding- and roller bearings, drive- and transport chains, sliding guideways, open gears and seals.
 - is intended for use on machinery and equipment.
 - is only to be used for the ordered purpose and purposes confirmed by perma-tec.
 - is only to be used for operating conditions recommended in this operating manual.
 - is only to be used with settings and variations recommended by this operating manual.



Any other usage, setting and variation is considered to be inappropriate.

1.4 Legal requirements

1.4.1 Liability

- ◆ The information, data and tips stated in this operating manual were up-to-date as of the printing date.
No claims for already delivered lubricators can be made based on the information, pictures and descriptions.
- ◆ perma-tec GmbH & Co. KG can not be held liable for damages and malfunctions caused by:
 - inappropriate usage;
 - unauthorized alterations to the drive system or the LC unit; inappropriate operations on or with the lubricator;
 - incorrect operation and settings of the lubricator;
 - incorrect settings of time and size of the lubricator;
 - ignoring the operating manual.

1.4.2 Warranty

- ◆ Warranty terms and conditions: see terms and conditions of sale and delivery appertaining to perma-tec GmbH & Co. KG.
- ◆ Lodge any warranty claims with perma-tec immediately after the defect or error has been identified.
- ◆ The warranty expires in all instances where no liability claims can be enforced.

2 SAFETY INSTRUCTIONS

2.1 Persons responsible for safety

◆ Operator

- The operator is any individual or legal entity who or which uses the lubricator or on whose authority the lubricator is used.
- The operator or his safety officer must warrant,
 - that all the relevant regulations, instructions and laws are adhered to;
 - that only qualified personnel will work with and on the lubricator;
 - that the operating manual is made available to the personnel for all work done with and on the lubricator, and that the personnel adhere to it;
 - that unauthorized personnel are not allowed to work with and on the lubricator;
 - and that the safety regulations are adhered to when mounting the lubricator or during maintenance.

◆ Qualified personnel

Qualified personnel are persons who, by virtue of their training, experience, instruction and information concerning the relevant standards and provisions, accident prevention regulations and plant and operating conditions, as received from the person responsible for the safety of the plant, are entitled to carry out the activities required at any time so that any possible dangers or hazards can be identified and avoided.

2.2 General safety instructions

- ◆ We are not laying claim to completeness as regards these safety instructions. Please contact local supplier if you have any queries or problems.
- ◆ At the time of delivery the lubricator is in line with state-of-the-art technology and in principle is considered to be safe to operate.
- ◆ Dangers emanate from the lubricator for persons, the lubricator itself and for other material assets of the operator if:
 - unqualified personnel operates the lubricator;
 - the lubricator is used inappropriately and for operations that it was not intended to be used for;
 - the lubricator setting / variation is incorrect.
- ◆ The lubricators must be filled with the correct oil or grease and must be set to operate correctly without causing any hazards to people when set, installed, and used for its intended purpose. This also pertains to their operation together with the complete machine and its lubrication points.
- ◆ Make sure to prevent material damage by putting certain measures in place in the case that the lubricator malfunctions.
- ◆ Operate the lubricator only when it is in perfect condition.
- ◆ Retrofitting, changing, or reconstructing the lubricator is not allowed. perma-tec must be consulted first.
- ◆ The LC unit should not be forced open.

2.3 Safety information for perma STAR VARIO

2.3.1 Safety during installation and maintenance



- ◆ Ensure that all workstations and traffic routes are clean and safe!
- ◆ Ensure that the relevant regulations and guidelines are adhered to when the installation or maintenance work is carried out in places where danger of falling exists.
- ◆ Ensure that the relevant safety and operating instructions are observed when the lubricators are installed on machines or in factories (i.e. to stop the machine).

2.3.2 Safety when handling the LC unit



- ◆ Avoid contact of oil and grease with eyes, skin, and clothing!
- ◆ Avoid swallowing of oil and grease!
- ◆ Prevent oil and grease from getting into soil or sewer system!
- ◆ Observe safety data sheets of oils and greases! You may also download data sheets of lubricants supplied by perma-tec from perma-tec's web page (www.perma-tec.com) or ask your local supplier.
- ◆ Oil and grease on traffic ways will increase the danger of slipping! Therefore, immediately clean oil and grease from floors!
- ◆ Only use original LC units from perma-tec!

2.3.3 Safety when handling batteries



- ◆ Avoid contact of battery substances with eyes, skin and clothing!
- ◆ Avoid swallowing any leaking battery substances!
- ◆ Do not expose batteries to extreme temperature and do not throw into open fire!
- ◆ Do not recharge batteries!
- ◆ Ensure that regulations for waste disposal of batteries are observed!
- ◆ Only use original battery sets from perma-tec!

3 TECHNICAL DATA

3.1 Product specifications

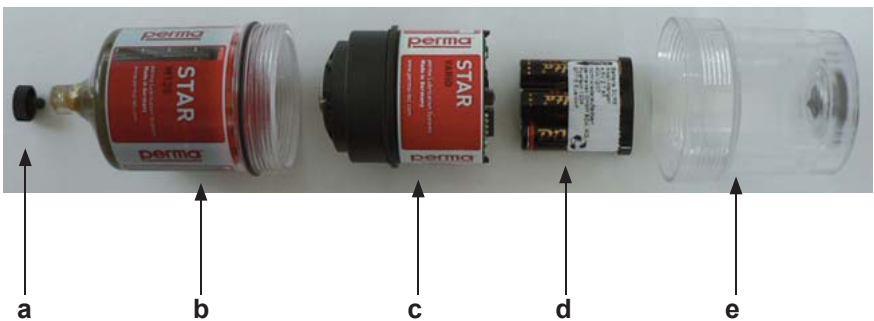
3.1.1 Components

- ◆ Lubricators are delivered as requested by the customer in regards to size, and oil or grease filling. They consist of (see Picture 1):
 - a. Plug
 - b. LC unit (Lubrication Canister), available with the requested lubricant and in three different sizes (thread size R1/4).
LC unit is not intended for refilling!
 - c. Drive unit, consisting of a tough gear motor and circuit board.
Re-usable.
 - d. Battery Set, consisting of three size AA batteries, each 1.5 V.
Battery set is not intended for recharging!

A new battery must be used for every LC unit replacement.

Never use battery twice!

- e. Drive unit cover, **re-usable.**



Picture 1

3.1.2 Airborne noise emission

Emission sound pressure level of the lubrication system: < 70 dB(A)
(Measuring point: distance 1 m / height 1.6 m)

3.1.3 Functions

In the LC unit, a motor driven spindle moves the piston and builds up pressure in the LC unit of **up to 5 bar** (75psi) and pushes the lubricant out of the LC unit.

The automatic pressure shut-off will turn the system OFF after several attempts when the pressure exceeds 5 bar.

The size of the LC unit can be adjusted with “VOL” switches 3+4 of the four-way code switch on the circuit board.

The desired discharge period can be adjusted with “TIME” switches 1+2.

3.1.4 Discharge amount per discharge cycle

Discharge period	Pause time	Discharge amount per discharge cycle		
		S60	M120	L250
[Months]	[h:min]	[cc]	[cc]	[cc]
1	1:30	0,13	0,26	0,53
3	4:37			
6	9:17			
12	18:36			

3.2 Weights and measures

Type	Volumen		Diameter D		Total length L		Weight empty		Weight filled with SF01	
	cc	fl. oz.	mm	in.	mm	in.	kg	lbs	kg	lbs
S60	60	2.03	71	2.8	142	5.60	0.376	0.829	0.430	0.948
M120	120	4.06	71	2.8	165	6.50	0.386	0.851	0.498	1.100
L250	250	8.45	71	2.8	215	8.46	0.417	0.919	0.652	1.440



3.3 Operating conditions

3.3.1 Temperatures

- ◆ Temperature range: – 10 °C to + 50 °C (+14 °F to +122 °F)
- ◆ Within this temperature range, a regular discharge and a max. output pressure up to 5 bar (75 psi) is guaranteed.
- ◆ For temperatures higher than + 50 °C (+122 °F) and lower than – 10 °C (+14 °F) the correct function can no longer be guaranteed.

3.3.2 Ambient conditions

- ◆ The lubricators are protected against dust and water jets when the individual parts are assembled correctly.
- ◆ Ambient media, especially chemically aggressive substances, may affect sealing rings and plastic materials.

3.3.3 Vibration

Lubricator has passed the environmental audit according to standard EN 60068-2-6 (vibration test) without any component damage or malfunctions.

In test: perma STAR VARIO lubricators with perma Clip, support flange, and bracket in various mounting positions.

4 STORAGE

4.1 General storage information

When the lubricators are not immediately installed, you must ensure appropriate storage conditions in dry, dust free, sunlight-protected rooms indoors.

4.1.1 Storage conditions

- ◆ Dry
- ◆ Dust free
- ◆ Temperature + 20 °C ± 5 °C (+68 °F ± 9 °F)

4.1.2 Storage periods

- ◆ Up to one year
 - LC unit: refer to filling date i. e. 03/06=June 2003
 - Battery Set
- ◆ Up to two years
 - Drive unit
 - Drive unit cover

5 STARTING AND OPERATING

5.1 Preparation



Before installing the lubricator, the lubrication points and any extensions must be adequately pre-lubricated with the same lubricant which is contained in the perma STAR VARIO.

For this purpose, perma-tec offers a 400 g lubricant cartridge for grease guns (see chapter 11.1).

- ◆ Please use a STAR support flange G1/4a x G1/4i (brass/plastic) from perma-tec for the installation of perma STAR VARIO.
- ◆ For horizontal mounting positions we recommend the clip (plastic) to hold the lubricator in place.

The perma STAR installation instructions provide support for mounting of the lubricators and can be downloaded from our homepage.

5.2 Before operation

- ◆ Completely check the lubricator for visible damages!
- ◆ Check if the LC unit is filled with the requested grease or oil!
- ◆ Has a new battery pack been inserted?
- ◆ Do “VOL” switches 3+4 of the four-way code switch in the drive unit match the correct size of the LC unit?
- ◆ Do “TIME” switches 1+2 of the four-way code switch in the drive unit match the desired discharge period?
- ◆ In case of oil-filled LC units, has an oil throttle been attached?
- ◆ Were all components properly assembled and screwed together hand-tight?

5.3 Initial operation

- ◆ perma STAR VARIO is delivered with a pre-set discharge period of 6 months (standard setting).
- ◆ On request, we can pre-set the discharge period according to your requirements.



Regardless of which option you choose, the operator must check the setting again and carry out any desired changes before starting the lubricator (see chapter 7)!

- ◆ Pre-lubricate the lubrication point with the same lubricant that is contained in the perma STAR VARIO (see chapter 5.1).
- ◆ Check if the thread of the perma STAR VARIO (R1/4) corresponds to the thread of the screw point.
- ◆ Remove the plug from the LC unit and screw the perma STAR VARIO into the lubrication point hand-tight. Never screw the lubricator into the lubrication point a second time, as this may destroy the self-sealing feature of the thread.
- ◆ All connecting threads must be additionally sealed with a suitable, standard sealant. When you use an oil filled lubricator, the lubricator must be installed (max. $\pm 45^\circ$) vertically (outlet pointing down).
- ◆ To start the discharge, turn the rotary switch on the cover of the drive unit from position "OFF" to "ON" (chapter 7.5).

The red LED signal and the running of the motor indicate that the discharging of lubricant has begun.

5.4 During operation

- ◆ Carry out regular performance checks during operation.
Check for possible leakages and the status of the lubricator (see chapter 7.1, Function display)!
- ◆ Regularly monitor the fill-level of the transparent LC unit!
- ◆ In case of malfunctions during operation, please check the trouble shooting chart in chapter 9. If the malfunction cannot be eliminated, please contact your perma distributor.



Never change the four-way code switch settings while the lubricator is already in operation, or anytime after starting the operation.

6 CHANGING THE LC Unit

6.1 General note

A simultaneous blinking of the red and green LED indicates that the empty LC unit must be changed.



Whenever the LC unit is changed, the battery set must also be replaced. Otherwise, correct operation of the lubricator cannot be guaranteed.

During the LC unit exchange, it is possible to choose a different size and a different discharge period for the new LC unit by resetting the four-way code switches on the circuit board.

Since the drive unit and the circuit board must always be protected from moisture, the exchange must be carried out in a dry place!

6.2 How to change the LC unit

- (a) Turn the rotary switch from position "ON" to "OFF"
- (b) Completely screw off and remove the lubricator from the lubrication point
- (c) Unscrew the cover of the drive unit
- (d) Remove the drive unit from the LC unit
- (e) Remove the battery set (OLD) from the drive unit
- (f) Insert battery set (NEW) in the direction of the arrows into the drive unit
- (g) The settings of the four-way code switch should be changed in cases where a different size LC unit was used, or if a different discharge period is desired.
- (h) Place drive unit on top of new LC unit until the teeth of both units are locked.
- (i) Screw the cover of the drive unit onto the LC unit hand-tight
- (j) Remove plug from the LC unit
- (k) Screw the lubricator into the lubrication point hand-tight, but DO NOT screw it in a second time
- (l) For oil filled lubricators, make sure that the lubricator is installed (max. $\pm 45^\circ$) vertically (outlet pointing down)!
- (m) Turn rotary switch from position "OFF" to "ON"

Discharge will start!

7 DRIVE UNIT SETTINGS

7.1 Function display

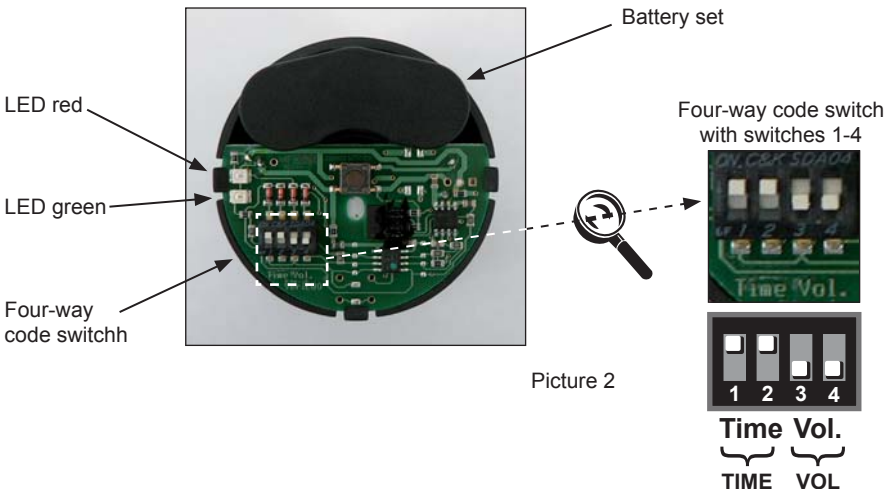
The LEDs (Light Emitting Diodes) are on the circuit board and are visible through the transparent cover (see picture 2, chapt. 7.2).

The perma STAR VARIO has a red and green LED. The following signals about operating conditions/ malfunctions are displayed by the LED for the user:

LED	Signal	Signal time	Meaning
Green	Blinking	Every 15 Seconds	Operation OK
Red	Blinking	Every 8 Seconds	Malfunction/Error
Green and Red	Blinking	Every 3 Seconds	LC Unit empty
Red	Continuous	ständig	VARIO is currently discharging

7.2 Circuit board settings

There is a four-way code switch on the circuit board. "TIME" switches 1+2 are used to set the discharge period, and "VOL" switches 3+4 are used to set the size of the LC unit.



7.3 Setting the discharge period

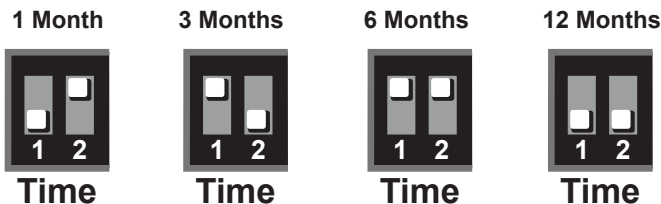
The discharge period of the LC unit must be set with “TIME” switches 1+2 of the four-way code switch on the circuit board of the drive unit.

You may set /change the switches with the help of a small screw driver or with your fingers.



The set discharge period can be marked on the drive system with the enclosed stickers. The stickers differ in color and number (months) of the discharge period.

Position of switches 1+2 “TIME” of the fourway code switch for the four possible discharge periods



You should note the set discharge period of the lubricator in your Lubrication and Maintenance Plan (see chapter 11.1)

7.4 Setting the volume of the LC units

The size of the LC unit must be set with “VOL” switches 3+4 of the four-way code switch on the circuit board of the drive unit.

You may set /change the switches with the help of a small screw driver or with your fingers.



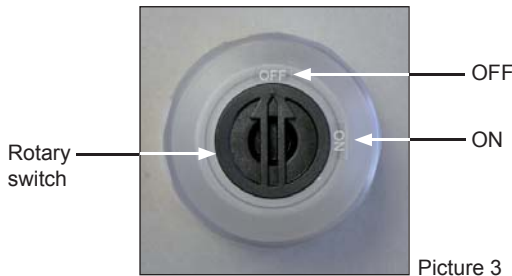
If the position of the “VOL” switches 3+4 of the four-way code switch does not correspond to the actual size of the LC unit, it will lead to incorrect signals (see chapt. 9) and possible malfunctions (over- or under-lubrication).

Position of the “VOL” switches 3+4 of the four-way code switch for the three different LC unit sizes:



7.5 Starting the discharge

Using a screwdriver or coin, turn the rotary switch on the cover of the drive system (picture 3) from position “OFF” to “ON” in order to start the discharge, or from position “ON” to “OFF” to stop or end the discharge.



7.6 Changing the setting

Changing the discharge period and/or the size of the LC unit is only possible when a new LC unit is attached. In case the settings must be changed during current operation, i.e. after discharge was started, you must attach a new, completely filled LC unit and a new battery set.

Changing of the settings during operation interferes with the controls and monitoring electronics. Therefore, perma-tec can no longer guarantee precise lubrication.



Always use a new, completely full LC unit and a new battery set after each change of setting. Never use a partially empty LC unit.

7.7 Discharge and discharge periods

- ◆ The discharge of perma STAR VARIO is precise and independent of temperature. Depending on the user's setting, it will permanently and precisely supply oil and grease to the intended lubrication points for periods of one (1), three (3), six (6), and twelve (12) months.
- ◆ The discharge period is automatically pre-set to 6 months by the manufacturer.
- ◆ When placing the order, the user may request a different discharge period which will be set by the manufacturer.
- ◆ **The user must always check the correct discharge setting before starting the unit.**

8 DISCHARGE AMOUNTS FOR EACH DISCHARGE PERIOD

Discharge amounts per day in cc

Size of LC unit	60 cc	120 cc	250 cc
Discharge Period			
1 Month	2,00	4,00	8,33
3 Months	0,67	1,33	2,78
6 Months	0,33	0,67	1,39
12 Months	0,17	0,33	0,69

9 TROUBLE SHOOTING

In case of malfunctions during operation, please check the following chart for possible causes and corrective actions. If the malfunction is not listed, please contact your perma distributor.

Malfunction	Possible Cause	Corrective Action
perma STAR VARIO does not function	<p>The switches on the cover are in the "OFF" position.</p> <p>No batteries in the drive unit</p> <p>Old batteries were used</p> <p>Batteries are leaking</p> <p>Parts are not correctly screwed together</p>	<p>Turn switches to "ON"</p> <p>Insert battery set</p> <p>Insert new battery set</p> <p>Replace drive unit</p> <p>Correctly screw parts together or screw tighter</p>
The red and green blinking LED display of the perma STAR VARIO signals "end of discharge period", but LC unit is not empty yet.	Settings were changed during the currently running operation or adjusted wrong from the beginning	Replace the LC unit with a full one, insert a new battery set, and restart
perma STAR VARIO does not discharge.	<p>Use of old batteries</p> <p>Unit had been operating below -10 °C (14 °F) for a long period of time</p> <p>Settings were changed during the currently running operation or adjusted wrong from the beginning</p>	<p>Insert a new battery set</p> <p>Operate the unit within the specified temperature range</p> <p>Replace the LC unit with a full one, insert a new battery set, and restart.</p>
The green blinking LED display of the perma STAR VARIO signals "system in operation", but the LC unit is empty.	Settings were changed during the currently running operation or adjusted wrong from the beginning	Replace the LC unit with a full one, insert a new battery set, and restart.
The red blinking LED display of the perma STAR VARIO signals "system malfunction"	<p>Clogged duct and/or connection parts</p> <p>Counter-pressure is too high</p>	<p>Clean duct and connection parts, turn unit OFF and then ON again</p> <p>Lower counter-pressure</p>

10 DISPOSAL



Help us in protecting the environment and saving resources by recycling valuable raw material. Please follow the individual waste disposal regulations in your country.

11 ACCESSORIES FOR PERMA STAR VARIO



Accessories and replacement parts must meet the technical requirements. This can be guaranteed by using original parts from perma-tec.

11.1 Accessories

- ◆ STAR support flange G1/4a x G1/4i (brass/plastic) part no. 26 001 620
- ◆ STAR support flange 1/4" NPT (brass/plastic) part no. 26 001 621
- ◆ Clip (plastic) part no. 26 001 105
- ◆ Bracket (stainless steel) part no. 26 00012 150 with insert for bracket G1/4a x G1/4i (brass) part no. 26 0011 151 or oil throttle up to +60°C (brass with plastic-valve) part no. 26 0011 810
- ◆ 400 g grease cartridge or oil container
- ◆ Lubrication Maintenance Plan
- ◆ Additional accessories on request

11.2 Replacement parts

- ◆ LC unit (thread R1/4) in size:
 - S60 (60 cc)
 - M120 (120 cc)
 - L250 (250 cc)
- ◆ Battery set
- ◆ Drive unit
- ◆ Cover for drive unit (part no. 72 102 001)

12 SERVICE

Please contact your local supplier for availability and cost of the following:

- ◆ Returning of the empty lubricator for environmentally safe recycling or disposal.

or:

- ◆ exchange the battery set
- ◆ exchange the LC unit
- ◆ setting the desired discharge period

EC Declaration of Conformity

- according to the Machinery Directive 98/37/EC^[1] and according to EMV (Electromagnetic Compatibility) – Directive 2004/108/EC.
- according to the Machinery Directive 2006/42/EC^[2] and according to EMV (Electromagnetic Compatibility) – Directive 2004/108/EC.

The manufacturer

perma-tec GmbH & Co. KG
Hammelburger Straße 21
97717 Euerdorf, Germany

hereby declares that the product as described in the given statement conforms to the regulations appertaining to the directives referred to above, including any amendments thereto which are in force at the time of the declaration.

Product description:	Automatic lubrication system
Product name:	perma STAR VARIO
Type:	S60, M120 and L250

The following harmonised standards were applied:

- EN ISO 12100 – 1:2003 Safety of machinery – basic concepts, general terms of reference as regards design and construction – Section 1: Basic Terminology, Methodology
- EN ISO 12100 – 2:2003 Safety of machinery – basic concepts, general terms of reference as regards design and construction – Section 2: Technical terms of reference
- EN 60204 – 1:2006 Machinery's electrical equipment

Euerdorf, 11 February 2009

perma-tec GmbH & Co. KG

Walter Graf, Managing Director	Egon Eisenbacher, Technical Management and authorized documentation representative (see manufacturer address)
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This declaration certifies conformity to the directives referred to but it is not a warranty of qualities. The safety instructions of the operating manual are to be observed.

1. Directive 98/37/EC is valid until and including the 28th of December 2009.
2. Directive 2006/42/EC is valid as of 29 December 2009.

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