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1 FACSIMILE COPY OF EU DECLARATION OF CONFORMITY

The undersigned: PIUSI S.p.A.
Via Pacinotti 16/A, z.i. Rangavio - 46029 Suzzara - Mantova - Italy
HEREBY STATES under its own responsibility that the equipment described below:
Description: **GREASE GUN COUNTER**
Model: **GREASTER**
Serial number: refer to Lot Number shown on CE plate affixed to product
Year of manufacture: refer to the year of production shown on the CE plate affixed to the product
complies with the following legislation:
Electromagnetic compatibility
The technical file is at the disposal of the competent authority following motivated request at PIUSI S.p.A. or following request sent to the e-mail address: doc.tec@piusi.com.
THE ORIGINAL DECLARATION OF CONFORMITY IS PROVIDED SEPARATELY WITH THE PRODUCT.

2 GENERAL WARNINGS

Important precautions
To ensure operator safety and to protect the pump from potential damage, workers must be fully acquainted with this instruction manual before performing any operation.

Symbols used in the manual
The following symbols will be used throughout the manual to highlight the most important warnings and precautions of particular importance:
ATTENTION
This symbol indicates safe working practices for operators and/or potentially exposed persons.

WARNING
This symbol indicates that there is risk of damage to the equipment and/or its components.
NOTE
This symbol indicates useful information.

Manual preservation
This manual should be complete and legible throughout. It should remain available to end users and specialist installation and maintenance technicians for consultation at any time.

Reproduction rights
This manual belongs to Piusi S.p.A., which is the sole proprietor of all rights indicated by applicable laws, including by way of example, laws on copyrights. All the rights deriving from such laws are reserved to Piusi S.p.A.: the reproduction, including partial, of this manual, its publication, change, transcription and notification to the public, transmission, including using remote communication media, placing at disposal of the public, distribution, marketing in any form, translation and/or processing, loan and any other activity reserved by the law to Piusi S.p.A.

3 SAFETY INSTRUCTIONS SAFETY WARNINGS

3.1 Mains - preliminary checks before installation
ATTENTION
You must avoid any contact between the electrical power supply and the fluid that needs to be FILTERED.

Maintenance control
Before any checks or maintenance work are carried out, disconnect the power source.
When metering flammable liquids, observe precautions against fire or explosion.

For your safety, review the major ATTENTIONS and cautions below before operating your meter
When handling hazardous liquids, always follow the liquid manufacturer's safety precautions.
Always dispose of used cleaning solvents in a safe manner according to the solvent manufacturer's instructions.
During meter removal, liquid may spill. Follow the liquid manufacturer's safety precautions to clean up minor spills.
Do not blow compressed air through the meter.
Do not allow liquids to dry inside the meter.

FIRE AND EXPLOSION
Connect the metal parts of the device to earth.
Stop operation immediately if static sparking occurs or if you feel a shock. Do not use equipment until you identify and correct the problem.
Keep a working fire extinguisher in the work area.
Do not operate the unit when fatigued or under the influence of drugs or alcohol.
Do not leave the work area while equipment is energized or under pressure.
Turn off all equipment when equipment is not in use.
Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.
Route hoses and cables away from traffic areas, sharp edges, moving parts and hot surfaces.
Do not kink or over bend hoses or use hoses to pull equipment.
Keep children and animals away from work area.
Comply with all applicable safety regulations.
Read MSDS to know the specific hazards of the fluids you are using.
Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
Prolonged contact with the treated product may cause skin irritation: always wear protective gloves during dispensing.

EQUIPMENT MISUSE
Misuse can cause death or serious injury.
Do not leave the work area while equipment is energized or under pressure.
Turn off all equipment when equipment is not in use.
Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.
Route hoses and cables away from traffic areas, sharp edges, moving parts and hot surfaces.
Do not kink or over bend hoses or use hoses to pull equipment.
Keep children and animals away from work area.
Comply with all applicable safety regulations.
Read MSDS to know the specific hazards of the fluids you are using.
Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
Prolonged contact with the treated product may cause skin irritation: always wear protective gloves during dispensing.

Toxic Fluid or Fumes Hazard
Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
Prolonged contact with the treated product may cause skin irritation: always wear protective gloves during dispensing.

3.2 FIRST AID RULES
Please refer to the safety data sheet for the product.

SHOKING PROHIBITED
When operating the dispensing system and in particular during refueling, do not smoke and do not use open flame.

3.3 GENERAL SAFETY RULES
Wear protective equipment that is:
- suited to the operations that need to be performed;
- resistant to cleaning products.

3.4 PACKAGING
GREASTER comes packed in a cardboard box with a label indicating the following data:

3.5 PACKAGE CONTENTS
To open the packaging, use a pair of scissors or a cutter, being careful not to damage the dispensing system or its components.

NOTE
In the event that one or more of the components described below are missing from inside the package, please contact Piusi inc technical support.

WARNING
Check that the data on the plate correspond to the desired specifications. In the event of any anomaly, contact the supplier immediately, indicating the nature of the defects. Do not use equipment which you suspect might not be safe.

4 KNOWLEDGE GREASTER
GREASTER is a new grease dispensing handle that comes complete with an integrated oval gear flowmeter. The flow discharged by grease handles depends on the actual working conditions and can vary significantly, according to:

- the resistance opposed by the incoming grease, which depends on a number of factors (inlet passage diameter, working temperature, clogging, etc.);
- pump efficiency;
- Assessing grease flow by measuring only the dispensing time can lead to gross miscalculations, either below or above the true figure. With GREASTER, the volume of grease will not have to be reckoned by rule of thumb - it will be accurately measured and shown on the liquid crystal (LCD) display. Compact and lightweight, GREASTER can be used in place of any regular grease dispensing device, with these advantages:
- the resettable partial register provides complete control over lubrication operations;
- the general total register provides a constantly updated record of grease consumption;
- in the dispensing mode (Normal Mode), the partial and the total amount are shown in the two different registers of the LCD.
GREASTER features a non-volatile memory for storing the dispensing data of the totals, even in the event of a complete power break for long periods. In a compact aluminum casing, GREASTER provides:

- full control of greasing operations by means of a special grease valve;
- measuring and recording of dispensed amounts by means of an oval gear measuring chamber and the control circuits.
The dispensing control valve, operated by a robust steel lever fitted with a trigger lock, is designed to control grease flow even when pumping under high pressure. The handgrip contains a compartment for housing the batteries that drive the electronic components. The handle is fitted with a female threaded connection for attaching the hose. The circuit board is housed in the upper part of the valve body, and can be accessed by removing the screws that hold the cap. The measuring chamber, closed by a study cover held by screws, is located on the front of the valve body, down line from the control valve. The outlet of the measuring chamber, on the lower part of the valve body, has a female threaded connection for attaching rigid or flexible attachments.
The measuring circuits and the LCD display are located on the top part of the instrument, isolated from the grease measuring chamber and protected by a cap.

4.1 COMPATIBLE LIQUIDS
Oval gear in acetal resin for measuring variable viscosity fluids. The fluids compatible with GREASTER are the following:
All the lubricating greases included between the "000" position and the position "2" of the NLGI consistency scale.
see MAIN PARTS diagram

4.2 DISPLAY LCD
The "LCD" of the METER features two numerical registers and various indications displayed to the user only when the applicable function is required.

1 Partial register (4 figures with moving comma: 00.00-9999) indicating quantity dispensed from when the RESET button was last pressed
2 Indication of calibration mode

3 Totals register (6 figures with moving comma 00.00-999999), that can indicate two types of General Total:
4.1 General Total that cannot be reset (TOTAL) 4.2 Resettable total

4 Indication of unit of measurement of Totals: kg = kilograms, L = Litres l = pounds

4.3 USERS BUTTONS
The METER features two buttons (RESET and CAL) which individually perform two main functions and, together, other secondary functions.
- for the RESET key, resetting the partial register and Reset Total for the CAL key, entering into calibration mode
Used together, the two keys permit entering configuration mode where the desired unit of measurement can be set.
CALIBRATE MEANS PERFORMING ACTIONS ON THE METER KEYS. BELOW IS THE LEGEND OF THE SYMBOLS USED TO DESCRIBE THE ACTIONS TO BE PERFORMED.

SHORT PRES-SURE OF CAL KEY
LONG PRES-SURE OF CAL KEY
SHORT PRES-SURE OF RESET KEY
LONG PRES-SURE OF RESET KEY
RESET KEY
CAL KEY

5 HOW GREASTER WORKS
GREASTER's metering system is based on a measuring chamber that contains two oval gears that, when rotating, generate electric impulses which are detected and processed by a microprocessor.
The gears are made to turn by the grease flowing through the chamber. The volume of grease that flows through is calculated by the number of gear rotations, given that each rotation corresponds to an identical amount of grease.
The magnetic coupling, between the magnets installed on the gears and a magnetic switch outside the measuring chamber, ensures measurement chamber sealing and ensures transmission of the pulses generated by gear rotation to the electronic board microprocessor. By applying an appropriate calibration factor, the microprocessor transforms the impulses into the amount of grease (in weight) that has been dispensed, and displays the result on the LCD display. All GREASTER models are factory set with a calibration factor called FACTORY K FACTOR equal to 1000.
For best GREASTER performance - adapting this to the intrinsic characteristics of the grease to be measured - the instrument can be "calibrated". Calibration can be restored to factory settings at any time (see "Calibrating").

3.3 GENERAL SAFETY RULES

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For best GREASTER performance - adapting this to the intrinsic characteristics of the grease to be measured - the instrument can be "calibrated". Calibration can be restored to factory settings at any time (see "Calibrating").

5.1 CALIBRATION
At the end of the calculation, the new USER K FACTOR is shown for a few seconds, after which the reset cycle is repeated to finally achieve a standby condition.
IMPORTANT! From now on, the indicated factor will become the calibration factor used by GREASTER and will continue to remain such even after a battery change

NO OPERATION
GREASTER stores the new calibration factor and is ready for dispensing, applying the newly defined USER K FACTOR.

3.3.3 DIRECT MODIFICATION OF K FACTOR
If normal GREASTER operation shows a mean percentage error, this can be corrected by applying to the currently used calibration factor a correction of the same percentage. In this case, the percentage correction of the USER K FACTOR must be calculated by the operator in the following way:
New Cal. Factor = Old Cal. Factor * (100 - E%) / 100
EXAMPLE:
CURRENT calibration factor: 1000
New USER K FACTOR: 1000 * (100 - (-0.9) / 100) * 1000 * (100 + 0.9) / 100 = 1009
If GREASTER indicates less than the real dispensed value (negative error) the new calibration factor must be higher than the old one as shown in the example. The opposite applies if the Meter shows more than the real dispensed value (positive error).

3.3.3.1 IN-FIELD CALIBRATION PROCEDURE
This procedure calls for the fluid to be dispensed into a graduated sample container in real operating conditions (flow rate, viscosity, etc.) requiring maximum precision.
ATTENTION
For correct GREASTER calibration, it is most important to:

1 Completely remove the air from the system before performing the calibration;
2 Use a precise sample container with a capacity of not less than 5 litres, featuring an accurate graduated indicator;
3 Ensure calibration dispensing is done at a constant flow rate equivalent to that of normal use, until the container is full;
4 Not reduce the flow rate to reach the graduated area of the container during the final dispensing stage (the correct method during the final stages of sample container filling consists in making short top-ups at normal operation flow rate);
5 After dispensing, wait a few minutes to make sure any air bubbles are eliminated from the sample container; only read the real value at the end of this stage, during which the level in the container could drop;
6 Carefully follow the procedure indicated below.

5.2 WHY CALIBRATE
GREASTER is supplied with a factory calibration that ensures precise measuring in most operating conditions. Nevertheless, when operating close to extreme conditions, such as for instance:
- using grease with viscosity in the extremes of the acceptable range
- in extreme flow rate conditions (close to minimum or maximum acceptable values)
the on-spot calibration may be required to suit the real conditions in which GREASTER is required to operate.

3.3.3.2 IN-FIELD CALIBRATION PROCEDURE
This procedure calls for the fluid to be dispensed into a graduated sample container in real operating conditions (flow rate, viscosity, etc.) requiring maximum precision.
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5 After dispensing, wait a few minutes to make sure any air bubbles are eliminated from the sample container; only read the real value at the end of this stage, during which the level in the container could drop;
6 Carefully follow the procedure indicated below.

5.3.2.1 IN-FIELD CALIBRATION PROCEDURE
This procedure calls for the fluid to be dispensed into a graduated sample container in real operating conditions (flow rate, viscosity, etc.) requiring maximum precision.
ATTENTION
For correct GREASTER calibration, it is most important to:

1 Completely remove the air from the system before performing the calibration;
2 Use a precise sample container with a capacity of not less than 5 litres, featuring an accurate graduated indicator;
3 Ensure calibration dispensing is done at a constant flow rate equivalent to that of normal use, until the container is full;
4 Not reduce the flow rate to reach the graduated area of the container during the final dispensing stage (the correct method during the final stages of sample container filling consists in making short top-ups at normal operation flow rate);
5 After dispensing, wait a few minutes to make sure any air bubbles are eliminated from the sample container; only read the real value at the end of this stage, during which the level in the container could drop;
6 Carefully follow the procedure indicated below.

5.3.2.2 RESETTING THE RESET TOTAL
The reset total resetting operation can only be performed after resetting the partial register. The reset total can in fact be reset by pressing the reset key at length while the display screen shows reset total as on the following display page:

Schematically, the steps to be taken are:

1 Wait for the display to show normal standby display page (with total only displayed)
2 Press the reset key quickly
3 The meter starts to reset the partial
4 While the display page showing the reset total is displayed
Press the reset key again for at least 1 second

5 The display screen again shows all the segments of the display followed by all the resetted-off segments and finally shows the display page where the reset Reset Total is shown.

6 INSTALLATION

FOREWORD
GREASTER can be installed in place of any traditional grease dispensing device. At the bottom of the handgrip, there is a 1/4" BSP or NPT, depending on model, female threaded hexagonal steel ring for attaching the grease supply hose. Since pumping under high pressure can make the hose very stiff, it is advisable to place a swivel connector between the handgrip and the hose.

The trigger lever that commands the control valve is equipped, on its lower part, with a regulator consisting in an adjustment screw and a lock nut (see pos. 10 of the Exploded View in section "4").

ATTENTION
Always make sure that the thread on the hose (or on the swivel connector) and on all attachments applied are compatible with the thread on the chosen GREASTER model. To avoid damaging the grease handle, always fasten every component tightly using the appropriate tools. Make sure the grease is free from impurities, foreign matter in the grease can impair the tightness of the valve or obstruct the measuring gears.

For the grease handle and the valve to function properly, air should be removed from the grease supply line, ensuring a smooth and regular grease flow.

GREASTER is supplied with the lever regulator locked and set for optimum performance, and no adjustment is normally required upon installation; an adjustment may become necessary only after long-time use.

7 DAILY USE
GREASTER is supplied ready to use. No commissioning operations are required even after long storage periods.

ATTENTION
GREASTER is designed for professional use and should be operated only by authorised personnel.
Do not use GREASTER in conditions exceeding the limits described in the "SPECIFICATIONS" section or with fluids other than lubricating grease.
Do not modify or tamper with GREASTER
Check GREASTER periodically to make sure it is in good conditions.
GREASTER is a high-precision grease dispenser. Never aim the nozzle toward any part of your body or toward anyone else.
Use all personal protection equipment prescribed by law.
Discharge the pressure in the supply line before performing maintenance.
The only operations that need to be done for daily use are Partial and/or Resettable Total register resetting.

Below are the two typical normal operation displays. One display shows the Partial and Resettable Total registers. The other shows the partial and general total. Switchover from Resettable Total to general Total display is automatic and tied to phases and times that are factory set and cannot be changed by the user.

1 The Partial register positioned in the top part of the display indicates the quantity dispensed since the RESET key was last pressed.
2 The Resettable Total register, positioned in the lower part of the display, indicates the quantity dispensed since the last Resettable total resetting. The Resettable Total cannot be reset until the Partial has been reset, while vice versa, the Partial can always be reset without resetting the Resettable Total.
3 The General TOTAL register (Total) can never be reset by the user. It continues to rise for the entire operating life of GREASTER.

The register of the two totals (Resettable Total and Total) share the same area and digits of the display. For this reason, the two totals will never be visible at the same time, but will always be displayed alternately. GREASTER is programmed to show one or the other of the two totals at very precise times:

1 The General Total (Total) is shown during GREASTER standby.
2 The Resettable Total is shown.
3 At the end of a Partial reset for a certain time (a few seconds).
4 During the entire dispensing stage. For a few seconds after the end of dispensing. Once this short time has expired GREASTER switches to standby and lower register display switches to General Total.

8 DISPENSING
Make sure the partial register is at zero (for resetting, see section 8.1, "Resetting the Partial").
Use the lever regulator. The trigger lever is equipped with a safety lock (see pos. 10 of the Exploded View in section "4"). Tightening the knob all the way will prevent the valve from accidentally opening. By partially tightening the knob you can adjust the lever's run, reducing the amount of grease dispensed.
Pull the lever, and release it when you have finished dispensing. While dispensing, the partial register shows the amount of grease dispensed since the last reset. During dispensing the general register will also be updated.
Lock the trigger lever.

9 CALIBRATION
When operating close to extreme conditions (close to minimum or maximum acceptable values), an on-spot calibration may be required to suit the real conditions in which GREASTER is required to operate.

9.1 DEFINITIONS
Multiplication factor applied by the system to the electrical pulses received, to transform these into measured fluid units.

9.2 WHY CALIBRATE
GREASTER is supplied with a factory calibration that ensures precise measuring in most operating conditions. Nevertheless, when operating close to extreme conditions, such as for instance:
- using grease with viscosity in the extremes of the acceptable range
- in extreme flow rate conditions (close to minimum or maximum acceptable values)
the on-spot calibration may be required to suit the real conditions in which GREASTER is required to operate.

9.3 CALIBRATION MODE
GREASTER permits making quick and precise electronic calibration by changing the Calibration Factor (K FACTOR).
Two procedures are available for changing the Calibration Factor:
1 FIELD CALIBRATION, performed by means of a dispensing operation
2 DIRECT CALIBRATION, performed by directly changing the calibration factor

The calibration phases can be entered (by keeping the CAL key pressed for a long time) to:
- Display the currently used calibration factor.
- Return to factory calibration (Factory K Factor) after a previous calibration by the user.
- Change the calibration factor using one of the two previously indicated procedures.

In calibration mode, the partial and total dispensed quantities indicated on the display screen take on different meanings according to the calibration procedure phase. In calibration mode, GREASTER cannot be used for normal dispensing operations. In "Calibrating" mode, the totals are not increased.

ATTENTION
GREASTER features a non-volatile memory that keeps the data concerning calibration and total dispensed quantity stored for an indefinite time, even in the case of a long power break; after changing the batteries, calibration need not be repeated.

9.3.1 DISPLAY OF CURRENT CALIBRATION FACTOR AND RESTORING FACTORY FACTOR.
By pressing the CAL key while the appliance is in Standby, the display page appears showing the current calibration factor used. Two cases can occur:
A) If no calibration has ever been performed, or the factory setting has been restored after previous calibrations, the following display page will appear.
The word "Fact" (abbreviation for "factory") shows that the factory calibration factor is being used.
B) If, on the other hand, calibrations have been made by the user, the display page will appear showing the currently used calibration factor (in our example 0.998). The word "user" indicates a calibration factor set by the user is being used.

9.3.2 IN FIELD CALIBRATION
This procedure calls for the fluid to be dispensed into a graduated sample container in real operating conditions (flow rate, viscosity, etc.) requiring maximum precision.
ATTENTION
For correct GREASTER calibration, it is most important to:

1 Completely remove the air from the system before performing the calibration;
2 Use a precise sample container with a capacity of not less than 5 litres, featuring an accurate graduated indicator;
3 Ensure calibration dispensing is done at a constant flow rate equivalent to that of normal use, until the container is full;
4 Not reduce the flow rate to reach the graduated area of the container during the final dispensing stage (the correct method during the final stages of sample container filling consists in making short top-ups at normal operation flow rate);
5 After dispensing, wait a few minutes to make sure any air bubbles are eliminated from the sample container; only read the real value at the end of this stage, during which the level in the container could drop;
6 Carefully follow the procedure indicated below.

9.3.2.1 IN-FIELD CALIBRATION PROCEDURE
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9.3.2.2 RESETTING THE RESET TOTAL
The reset total resetting operation can only be performed after resetting the partial register. The reset total can in fact be reset by pressing the reset key at length while the display screen shows reset total as on the following display page:

Schematically, the steps to be taken are:

1 Wait for the display to show normal standby display page (with total only displayed)
2 Press the reset key quickly
3 The meter starts to reset the partial
4 While the display page showing the reset total is displayed
Press the reset key again for at least 1 second

5 The display screen again shows all the segments of the display followed by all the resetted-off segments and finally shows the display page where the reset Reset Total is shown.

9 CALIBRATION

When operating close to extreme use or flow rate conditions (close to minimum or maximum acceptable values), an on-spot calibration may be required to suit the real conditions in which the GREASTER is required to operate.

9.1 DEFINITIONS
Multiplication factor applied by the system to the electrical pulses received, to transform these into measured fluid units.

9.2 WHY CALIBRATE
GREASTER is supplied with a factory calibration that ensures precise measuring in most operating conditions. Nevertheless, when operating close to extreme conditions, such as for instance:
- using grease with viscosity in the extremes of the acceptable range
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ATTENTION
GREASTER features a non-volatile memory that keeps the data concerning calibration and total dispensed quantity stored for an indefinite time, even in the case of a long power break; after changing the batteries, calibration need not be repeated.

9.3.1 DISPLAY OF CURRENT CALIBRATION FACTOR AND RESTORING FACTORY FACTOR.
By pressing the CAL key while the appliance is in Standby, the display page appears showing the current calibration factor used. Two cases can occur:
A) If no calibration has ever been performed, or the factory setting has been restored after previous calibrations, the following display page will appear.
The word "Fact" (abbreviation for "factory") shows that the factory calibration factor is being used.
B) If, on the other hand, calibrations have been made by the user, the display page will appear showing the currently used calibration factor (in our example 0.998). The word "user" indicates a calibration factor set by the user is being used.

9.3.2 IN FIELD CALIBRATION
This procedure calls for the fluid to be dispensed into a graduated sample container in real operating conditions (flow rate, viscosity, etc.) requiring maximum precision.
ATTENTION
For correct GREASTER calibration, it is most important to:

1 Completely remove the air from the system before performing the calibration;
2 Use a precise sample container with a capacity of not less than 5 litres, featuring an accurate graduated indicator;
3 Ensure calibration dispensing is done at a constant flow rate equivalent to that of normal use, until the container is full;
4 Not reduce the flow rate to reach the graduated area of the container during the final dispensing stage (the correct method during the final stages of sample container filling consists in making short top-ups at normal operation flow rate);
5 After dispensing, wait a few minutes to make sure any air bubbles are eliminated from the sample container; only read the real value at the end of this stage, during which the level in the container could drop;
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