# AC2 Service Manual

## AC23XX26/NL & AC23XX27

*This Manual is applicable to AC23XX26/NL and AC23XX27 pump variants. For professional use only.*

*Maximum Working Pressure: 1740 psi (120 bar, 12 MPa).*

*Maximum operating temperature: 140°F/60°C .*

**(Note that operating close to maximum temperature will effect life of the pump).**

*Minimum operating temperature: -31°F/-35°C (with grade 000 grease), 10°F/-12°C (with grade 2 grease).*

*IP Rating: IP66*

*Voltage: 12V*

*Power Rating: 2A*

*Fuse Rating: 1A*


*** IMPORTANT NOTICE ***

# WARNING

**INSTALLATION**

Only install the Groeneveld AC2 System if you are suitably qualified. **Read installation instructions in full before commencing installation.** If in doubt contact Groeneveld USA Inc. at 937-276-4507. (custserv-dayton@groeneveld-com)

**PERSONAL PROTECTIVE CLOTHING**

You must wear appropriate protective equipment when operating and servicing the equipment, this is to protect you from serious injury.

This equipment includes but is not limited to:

- Protective eyewear.
- Respirators, protective clothing and gloves as recommended by the Lubricant manufacturer.

**PLASTIC PART CLEANING SOLVENT HAZARD**

Many solvents can damage plastic parts and cause them to fail, which could cause serious injury or property damage. Use only compatible cleaning products.

**ENVIRONMENT**

Ensure that all Lubricants are responsibly disposed of in accordance with the manufacturers MSDS sheets and local regulations.

**Please retain these safety and operation instructions for future reference.**

# EC Declaration of Conformity

In accordance with ISO/IEC 17050-1:2010

*We* Groeneveld Ltd.

*Of* 85a St Modwen Rd, Parkway Industrial Estate, Plymouth, Devon, United Kingdom, PL6 8LH.

*I hereby declare that:*

*Equipment:* AC23XX26/NL and AC23XX27 Multi-Line Lubrication System

*In accordance with the following Directive (s):*

| | |
|---|---|
| 2004/108/EC | The Electromagnetic Compatibility Directive |
| 2006/42/EC | Machinery Directive |
| 95/54/EC | Vehicle Electromagnetic Compatibility Directive |
| 2011/65/EC | Restriction of Certain Hazardous Substances |

*Has been designed and manufactured to the following specifications:*

97/23/EC, BS EN ISO 50498:2008

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications. The unit complies with all essential requirements of the Directives.

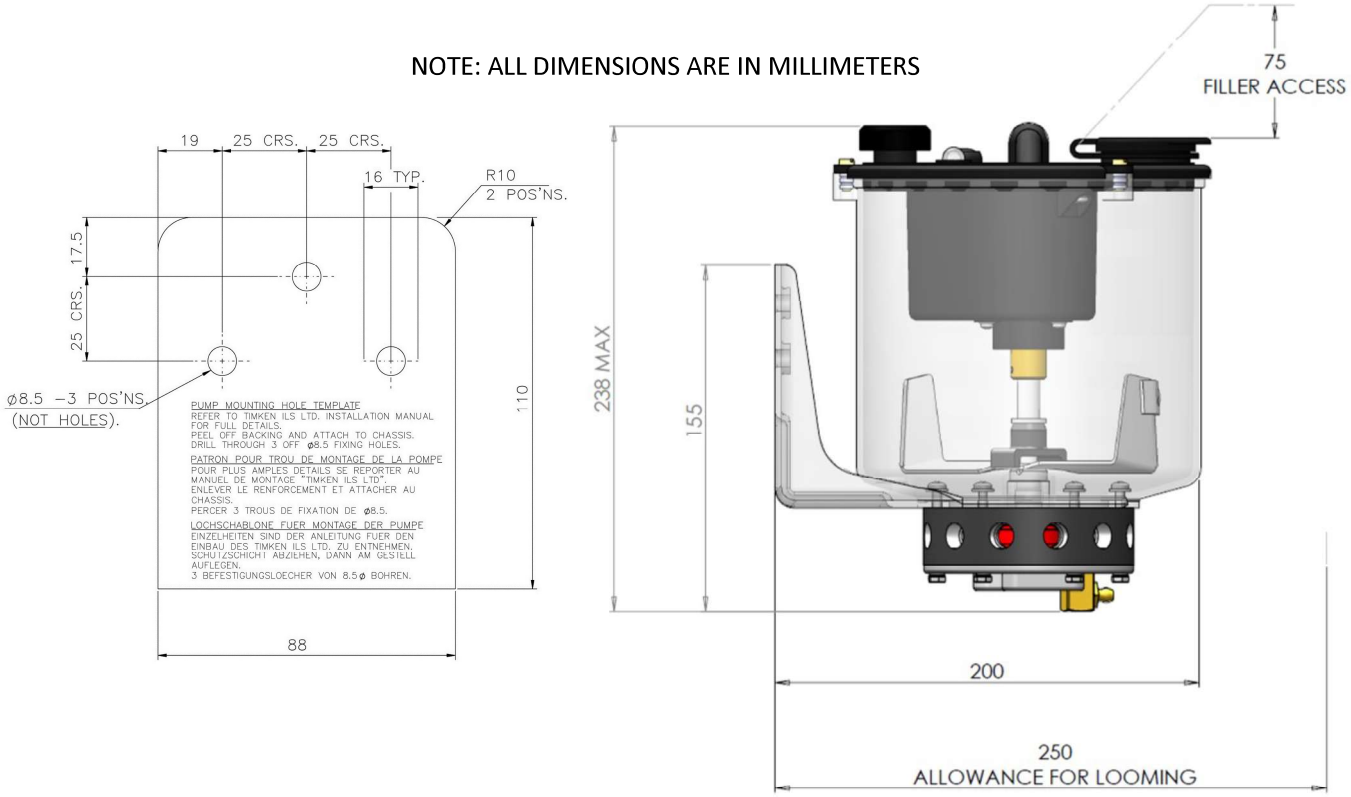
Signed:

Richard Butler FCMI
Divisional Managing Director

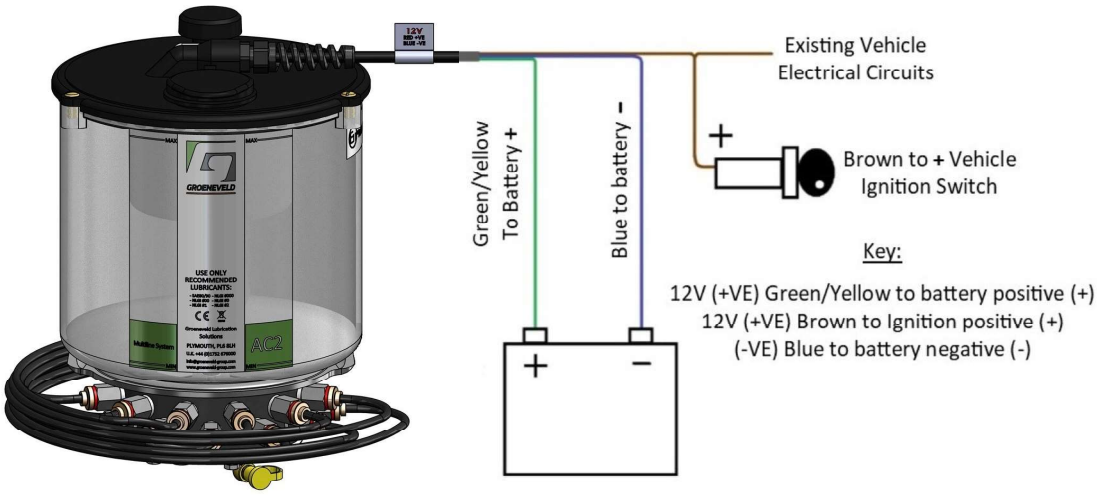
| | | | |
|---|---|---|---|
| Name: | Richard Butler | Position: | Divisional Managing Director |
| Done at: | Plymouth, UK | Date: | 30/01/2018 |

# Pump Clearance Requirements

NOTE: ALL DIMENSIONS ARE IN MILLIMETERS




# Wiring Information




Installation of the AC range of pumps should ideally incorporate direct connections to the vehicle ignition system. This wiring setup provides automatic lubrication whenever the ignition is switched on, but allows for manual override and testing when ignition is off.

If the power drops out at any time to the pump, the cycle time counter will be stopped and retain its value, thus remembering its value within the cycle. The system will then continue from that point when the power to the pump resumes. This memory retention, built into the pumps printed circuit board, lessens the possibility of over-lubrication on a short trip/multi-drop operation.

## Pumping elements

| Standard Pump Elements. | | | |
|---|---|---|---|
| Part No. | Output/stroke | Color | Outlet Size |
| 78033-PL | 0.010 cc | Red | 4mm OD Push Type |
| 78034-PL | 0.015 cc | Green | |
| 78035-PL | 0.025 cc | Yellow | |
| 78036-PL | 0.040 cc | Blue | |
| 78037-PL | 0.060 cc | Grey | |
| 78038-PL | 0.100 cc | Black | |

| Output pressure | |
|---|---|
| Maximum Output pressure | 1740PSI / 120 Bar |

## Installing the Groeneveld AC2 System

Feed the lubrication lines through the chassis, following existing vehicle services where possible and connect to the corresponding grease point. Ensure tubes are positioned to fit bearing connectors. Where bearing is on a moving part, ensure tube length is sufficient to allow for full movement. To avoid rubbing or friction with chassis, grommets or protective sleeving should be used.

**Connecting the lubrication lines:**

When installing a new kit, or replacing individual lines, cut each line to length ensuring a clean, square cut is achieved and connect to the bearing using push fit connectors. **ENSURE LINES ARE PUSHED FIRMLY INTO CONNECTOR. TEST ASSEMBLY BY PULLING FIRMLY ON THE LINE AFTER FITMENT.** Using the relevant System Layout sheet (between pages 8 to 14) connect the lines to the corresponding numbered pumping elements. When running the lines into the pumping elements, to give the loom strength and rigidity, the lines should be clipped together to form an arrangement (as shown on the front page of this guide) with an offset from the pump of 50 to 60mm. The starting point for the loom can be as required.

*Note: All damaged lubrication lines should be replaced using genuine spare parts, failure to do so can cause system malfunctions and safety concerns.*

## Timer Settings

Accessing the internal PCB and adjusting the run settings, via the rotary switch:

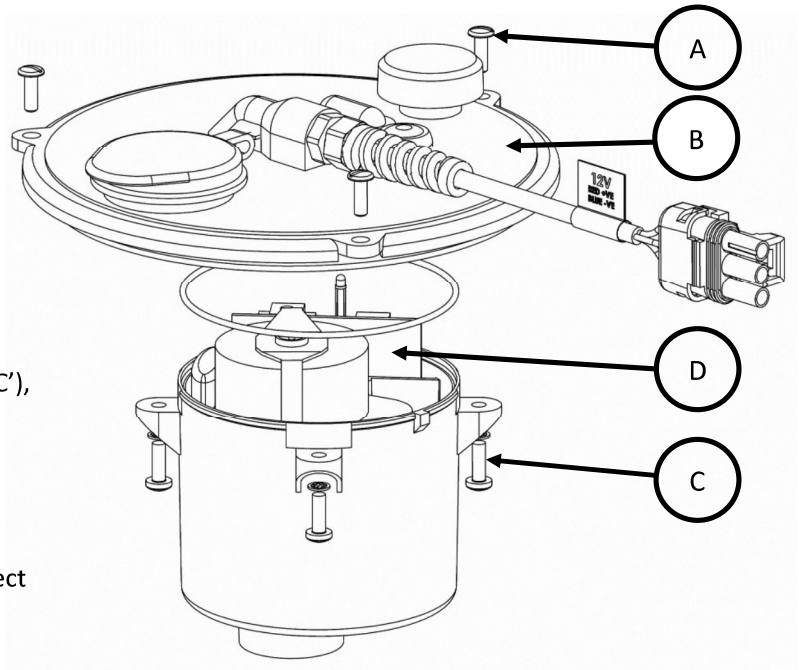
1) Remove lid screws x3 (‘A’),

2) Remove lid (‘B’),

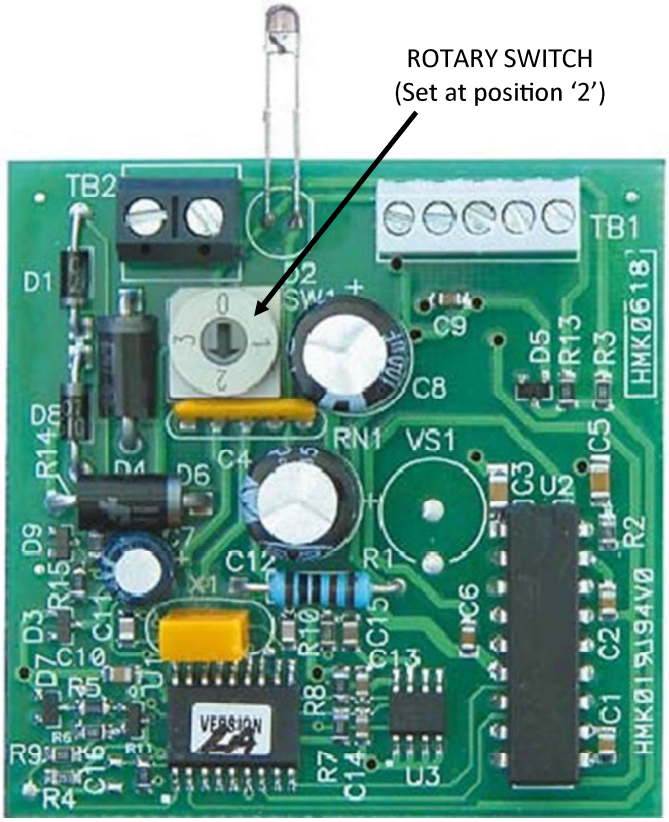
3) Remove motor housing screws x4 (‘C’),

4) Access PCB (‘D’).

To re-assemble reverse steps, ensure correct fitment of motor housing and lid O-rings.



# PCB Adjustments




PCB 83344-120

PCB 83344-120 settings table:

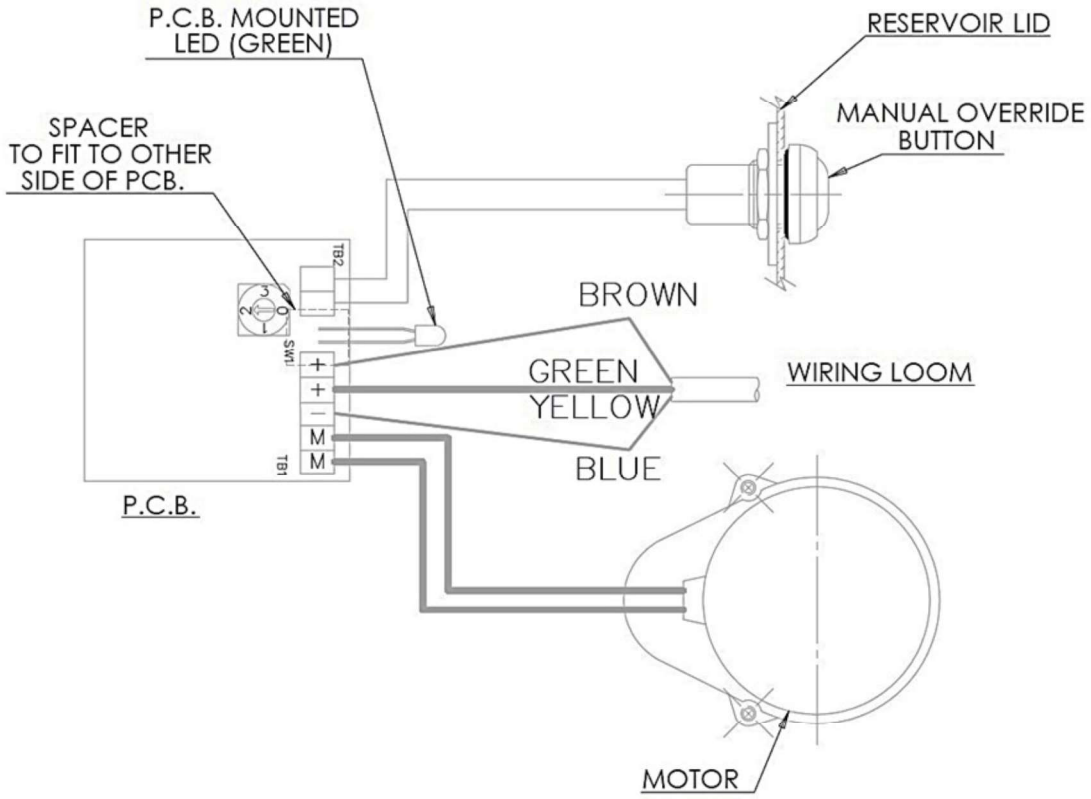
| Rotary Switch Position | Cycle Time |
|---|---|
| 0 | Continuous / 2.5 mins |
| 1 | 15 minutes |
| **2** | **30 minutes** |
| 3 | 45 minutes |

The timer setting on the pump is *preset* from the factory to automatically grease the entire system, every 30 minutes, when the ignition is ON. Although the timer setting is adjustable, the 30-minute interval has proven to be a reliable setting and generally does not have to be changed. If required, the timer setting can be changed from the initial factory setting.

The above table shows the settings available via setting of the rotary switch on the PCB (see left hand image).

- Switch Position '0' indicates continuous operation at a standard speed of 0.4rpm.
- Switch positions 1-3, cycle times *include* 3 minutes run time and the delay period.

# PCB Wiring



## System Operation and Testing

The lubrication process starts after either the ignition is switched on (if set to continuous run mode and the pump is only powered when the ignition is on) or after the allotted dwell time (of the already programmed pump) has elapsed. The pump will run for 2.5 minutes and dwell for the allotted remaining time as programmed (11.5 minute cycle time for a 9 minute delay setting, 14.5 minute cycle for a 12 minute delay setting, and a 17.5 minute cycle time for a 15min delay setting.)

If the power drops out at any time to the pump the dwell counter will be stopped and will retain its value, thus remembering its position within the dwell cycle. The system will then continue from that point when the power / run signal resumes.

An indication lamp is located on the top of the pump, within a viewing window (see below image 'A'). The indication light will be lit when there is a continuous power supply to the circuit and pump. The indication light will flash green when the motor is in operation and is lit red when in the programming mode.

Pressing the manual override button ('B'), for between 1 and 5 seconds, will operate the pump for one complete cycle (2.5 minutes).

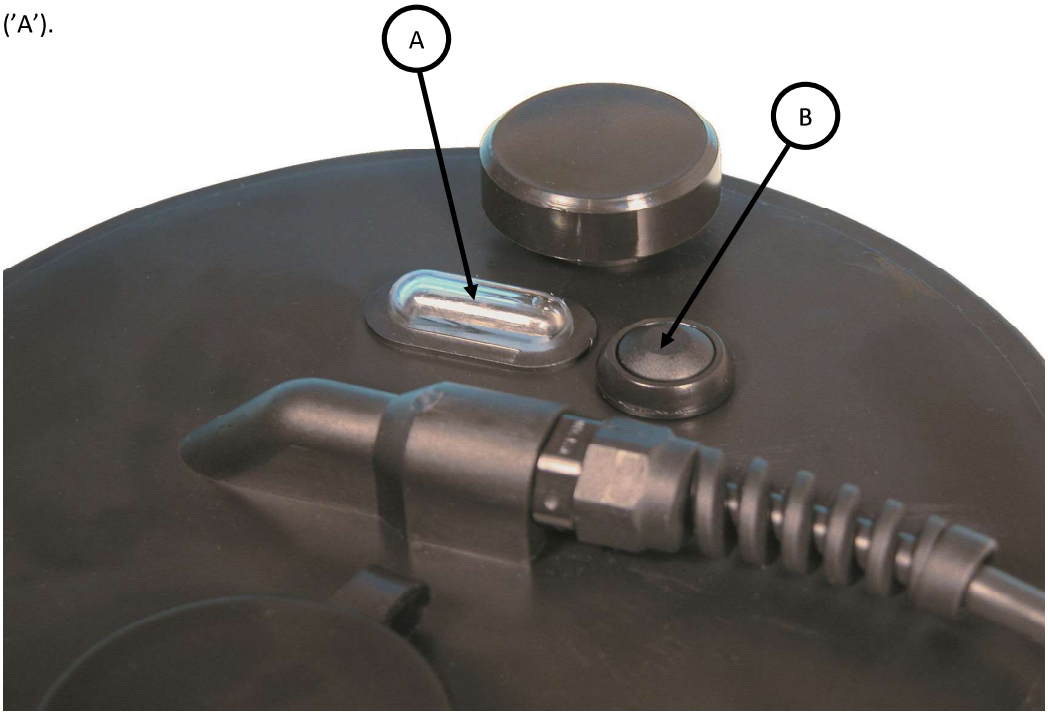
The following inspection procedures are recommended to help ensure proper operation of the AC chassis lubrication system. Once the reservoir refill has been determined—every 3 days, once a week, once a month, etc. make certain that the interval is part of your scheduled maintenance.

A. Inspect all lubrication points for signs of FRESH grease,

B. Check the condition of all fittings and connections. Tighten or replace loose or damaged fittings.

C. Check all lubrication lines; make certain that there are not any breaks. Check for wear or chaffing that may lead to leakage.

D. Confirm pump operation by pressing Manual Override button ('B') and checking the indication light flashes ('A').



## Periodic System Inspection

A program of visual checks, regular inspections and servicing should be incorporated in accordance to the assets existing maintenance schedule. Maintenance staff should be encouraged to check automatic lubrication on a periodic basis and report any defects.

## Recommended Lubricants

The AC23 Pump has been developed specifically to run with NLGI Grade 000, 1, 2 grease and FG3,0 fluid grease. Oils to a minimum viscosity of SAE80 are also acceptable. **Do not use heavy, tackified greases, greases containing bentone/ bentonite or greases containing molybdenum and/or graphite.**

**NOTE:** To ensure proper operation of the lubrication system only ever fill with clean lubricant that has been in a sealed container and correctly stored. To abstain from clean lubricant can result in premature system or bearing failures.

## Recommended Lubricants Minimum Operational Temperatures Estimates

**(Based on maximum lubricant distribution line length of 50ft /15m)**

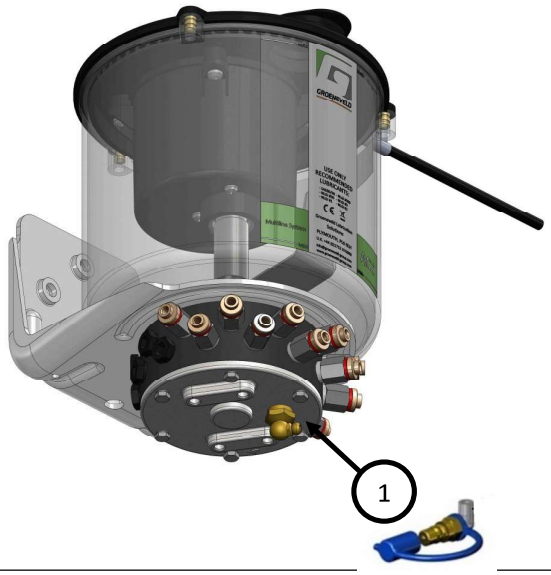
| Pump Type | Recommended Lubricants | | | | | |
|---|---|---|---|---|---|---|
| | Oils SAE 80/90 | 000 Fluid | 00 Semi Fluid | 0 Soft | 1 Stiff | 2 Hard |
| AC231126/NL | -40°C (-40°F) | -35°C (-31°F) | -30°C (-22°F) | -25°C (-13°F) | -20°C (-4°F) | -15°C (5°F) |
| AC231127 | -40°C (-40°F) | -35°C (-31°F) | -30°C (-22°F) | -25°C (-13°F) | -20°C (-4°F) | -15°C (5°F) |
| AC231226/NL | -20°C (-4°F) | -15°C (5°F) | -10°C (14°F) | -5°C (23°F) | 0°C (32°F) | 5°C (41°F) |
| AC231227 | -20°C (-4°F) | -15°C (5°F) | -10°C (14°F) | -5°C (23°F) | 0°C (32°F) | 5°C (41°F) |
| Upper Temp Limit | +40°C for all pumps | | | | | |

## Pump Refill Procedure

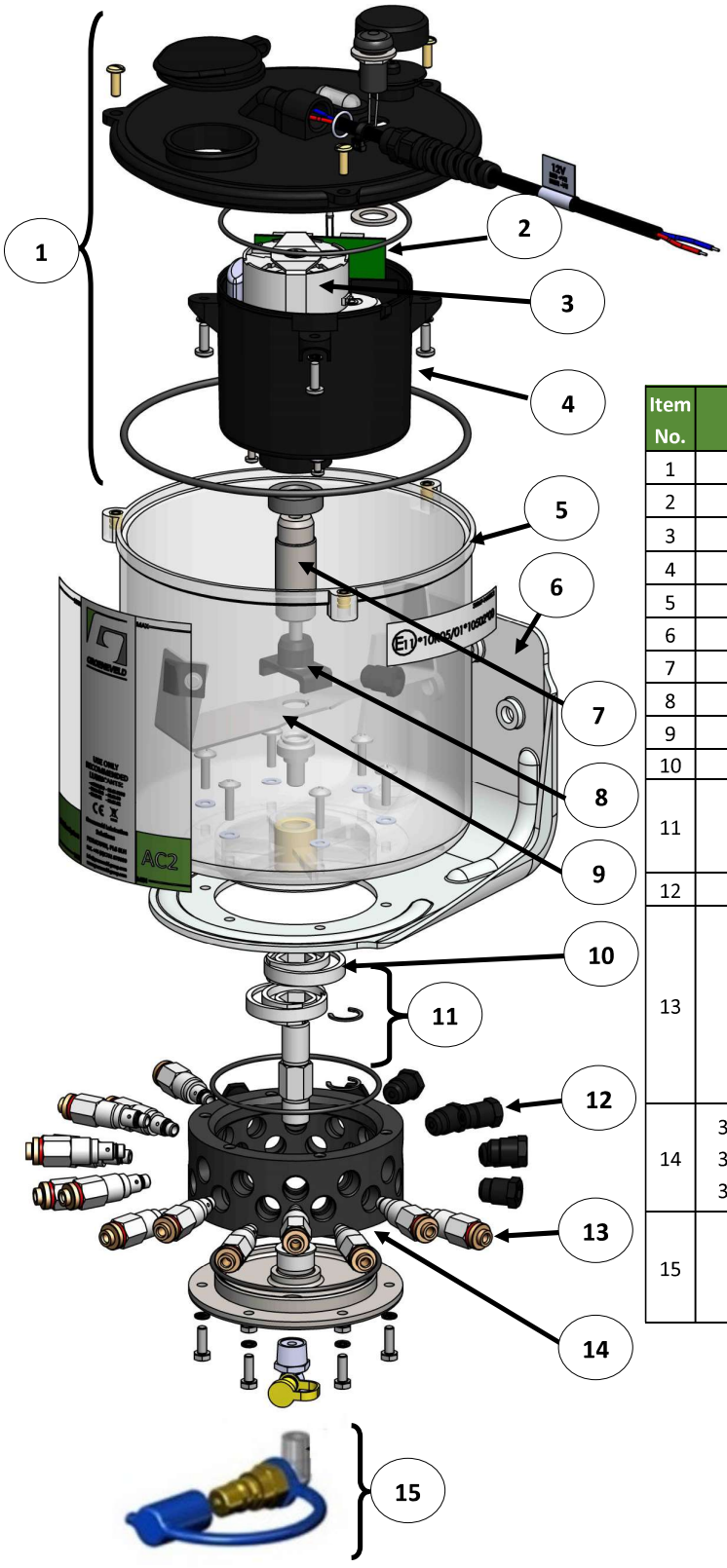
All AC23 multiline pumps are fitted with a bulk fill adapter (zerk adapter shown in below '1' ), which is suitable for NLGI 000 up to NGLI Grade 2 grease. Using the bulk fill adaptor avoids the possibility of air entrapment and cavitation.

**IMPORTANT NOTES:**

- If the reservoir is filled through the reservoir bulk fill cap ensure that the cap is firmly secured to the reservoir lid when finished.
- If the reservoir is filled through the grease nipple ensure that it is cleaned first. Place the dust cap back on the nipple when finished.
- **Do not overfill the reservoir.** Fill only to the MAX Level Label.



# Pump Spares




| Item No. | Part No. | Description |
|---|---|---|
| 1 | AC/SP17 | LID & MOTOR ASSEMBLY (INCLUDES PCB) |
| 2 | AC/SP14/12V | PCB ASSEMBLY 83344-120 |
| 3 | AC/SP8/12V | ELECTRIC MOTOR (0.4rpm) |
| 4 | 38785-688 | MOTOR COVER & SEAL |
| 5 | AC2/SP4P | AC2 RESERVOIR |
| 6 | 83341-803 | MOUNTING BRACKET |
| 7 | AC2/SP10 | PADDLE ARM DRIVE ADAPTOR |
| 8 | AC/SP6 | DRIVE ADAPTOR MOULDING |
| 9 | AC/SP7 | PADDLE ARM AND SPINDLE ASSEMBLY |
| 10 | 38585-228 | CAMSHAFT CAM |
| 11 | AC/SP5/1<br>AC/SP5/2<br>AC/SP5/3 | 12 PORT CAMSHAFT ASSEMBLY<br>24 PORT CAMSHAFT ASSEMBLY<br>36 PORT CAMSHAFT ASSEMBLY |
| 12 | 34237-402 | BLANKING PLUG |
| 13 | 78033-PL<br>78034-PL<br>78035-PL<br>78036-PL<br>78037-PL<br>78038-PL | 0.010cc PUMPING ELEMENT (RED)<br>0.015cc PUMPING ELEMENT (GREEN)<br>0.025cc PUMPING ELEMENT (YELLOW)<br>0.040cc PUMPING ELEMENT (BLUE)<br>0.060cc PUMPING ELEMENT (GREY)<br>0.10cc PUMPING ELEMENT (BLACK) |
| 14 | 32478-202/ASM<br>32478-203/ASM<br>32478-204/ASM | MANIFOLD (12 OUTPUTS)<br>MANIFOLD (24 OUTPUTS)<br>MANIFOLD (36 OUTPUTS) |
| 15 | 25471-107<br>25471-108<br>25210-405 | MALE HYDRAULIC QUICK FILL ADAPTOR<br>MALE HYDRAULIC QUICK FILL DUST CAP<br>1/4” BSPT ELBOW FITTING |

# Fittings and Accessories

| Fig | Part # | Description |
|---|---|---|
| 1 | PM 80412-NP | 5/32" O.D. x 1/8" NPT Straight, nickel |
| 1 | PM 80485 | 5/32" O.D. x 5/16" UNF Straight |
| 1 | PM 80487 | 5/32" O.D. x 1/8" BSP Straight |
| 1 | PM 80490 | 5/32" O.D. x M8 x 1 Straight |
| 1 | PM 80492 | 5/32" O.D. x M10 x 1 Straight |
| 2 | PM 80484-ST | 5/32" O.D. x 1/4" UNF Straight |
| 2 | PM 80489 | 5/32" O.D. x M6 x 1 Straight |
| 3 | PM 90412-NP | 5/32" O.D. x 1/8" NPT Elbow |
| 3 | PM 90485 | 5/32" O.D. x 5/16" UNF Elbow |
| 3 | PM 90487 | 5/32" O.D. x 1/8" BSP Elbow |
| 3 | PM 90492 | 5/32" O.D. x M10 x 1 Elbow |
| 4 | PM 90484-ST | 5/32" O.D. x 1/4" UNF Elbow |
| 5 | 38497S1 | 5/32" O.D. x 1/8" NPT Swivel Elbow |
| 6 | 38497S11 | 5/32" O.D. x 1/8" NPT Swivel Elbow (short taper) |
| 7 | 38497S2 | 5/32" O.D. x 1/4" UNF Swivel Elbow |
| 8 | 86433 E1 | 5/32" O.D. x 1/4" Sae self tap elbow |
| 9 | 39627C1 | 1/8 NPT Female x 1/4 UNF Male St. |
| 10 | 39597A1 | 1/8 Female x 1/8 Male NPT Elbow |
| 11 | 39597A2 | 1/8 NPT Female x 1/4 UNF Male elbow |
| 12 | 39597B2 | 1/8 NPT Female x 1/8 NPT Male 45° |
| 13 | FR-100-141 | 1/8 NPT Extension 23mm |
| 14 | FR-100-142 | 1/8 NPT Extension 18mm |
| 15 | FR-100-144 | 1/8 NPT Extension 35mm |
| 15 | 32631-141 | 1/8 NPT Extension 50mm |
| 16 | LE 505-PC | Double Ended Connector 5/32" (push lock) plastic |
| 16 | LE 505-PCM | Double Ended Connector 5/32" (push lock) metal |
| 17 | 38497Y1 | 5/32 OD Tube "Y" Connector plastic |
| 17 | 38497Y2 | 5/32" O.D. Tube Y Connector metal |
| 18 | 38497X1 | Knock-On Fitting Elbow Adapter |
| 19 | 38497X11 | Knock-On Fitting Straight Adapter |
| 20 | SCE 1/4 | Knock-On Elbow ASM (PM80484-ST + 38497X1) |
| 21 | 34237-402 | Pump port plug |
| 22 | 152823-164 | 4 mm tubing filled with #000 Grease, 164' |
| | 38497X2 | Knock-On Fitting Straight |
| | PTC-001 | Tube Cutter |
| | | |

Fig 1

Fig 2

Fig 3

Fig 4

Fig 5

Fig 6

Fig 7

Fig 8

Fig 9

Fig 10

Fig 11

Fig 12

Fig 13

Fig 14

Fig 15

Fig 16

Fig 17

Fig 18

Fig 19

Fig 20

Fig 20

Fig 21