

Installation Manual

For AX13X1-50 & AX13X1-51

This Manual is applicable to the AX13X1-50 and AX13X1-51 AXL lubrication kits only. For professional use only.

Applicable Kit(s):

AX13X1-50 with pre-primed grease filled loom
and AX13X1-51 with non-primed loom for customer specific grease or oil lubrication.

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)

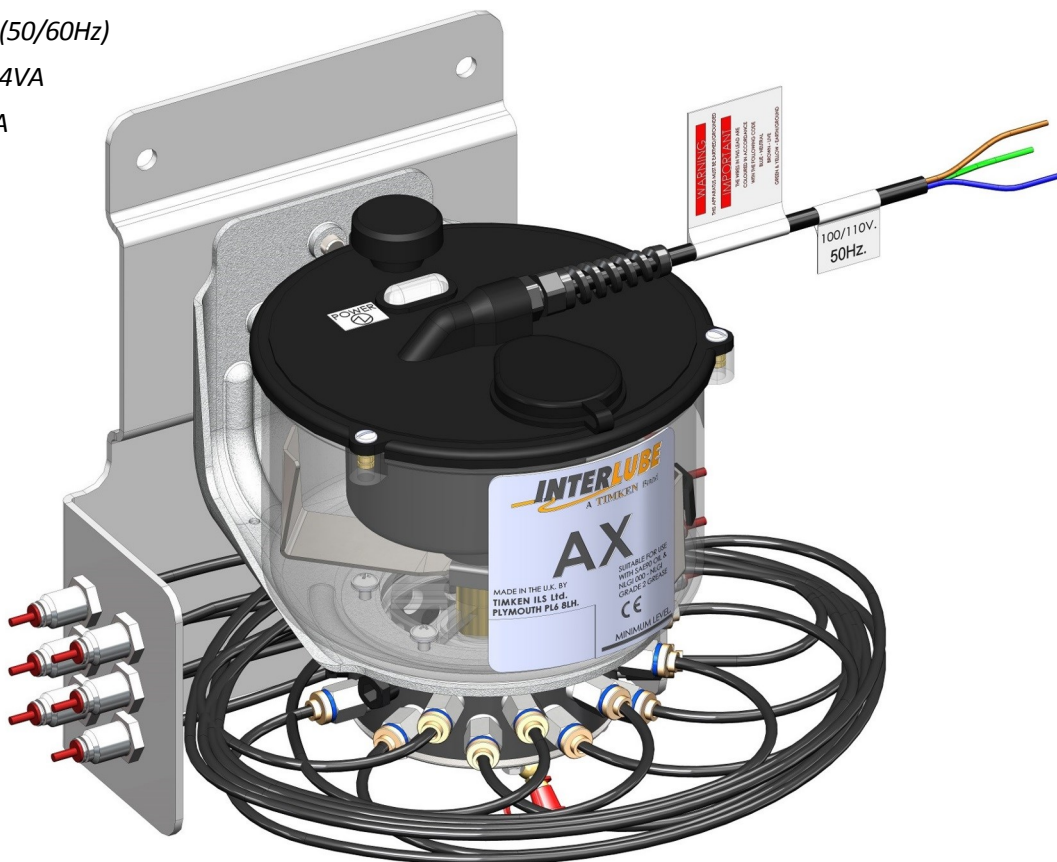
Minimum operating temperature: -31°F/-35°C (with grade 000 grease), 10°F/-12°C (with grade 2 grease).

IP Rating: IP67

Voltage: 110V (50/60Hz)

Power Rating: 4VA

Fuse Rating: 1A



Note: Wiring colors may differ from those shown.

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WARNING



INSTALLATION

Only install the Interlube Inc. AXL System if you are suitably qualified. Read installation instructions before commencing installation. If in doubt contact Interlube Inc. on +1 (937) 276 4507



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.



EC Declaration of Conformity

In accordance with ISO/IEC 17050-1:2010

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

I hereby declare that:

Equipment: AX XXXX/X Multi-Line Lubrication System

In accordance with the following Directive (s):

2004/108/EC	The Electromagnetic Compatibility Directive
2006/42/EC	Machinery Directive
2011/65/EC	Restriction of Certain Hazardous Substances

Has been designed and manufactured to the following specifications:

BS EN 61000-6-2:2005, BS EN 61000-6-4:200, EN 60204-1

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.

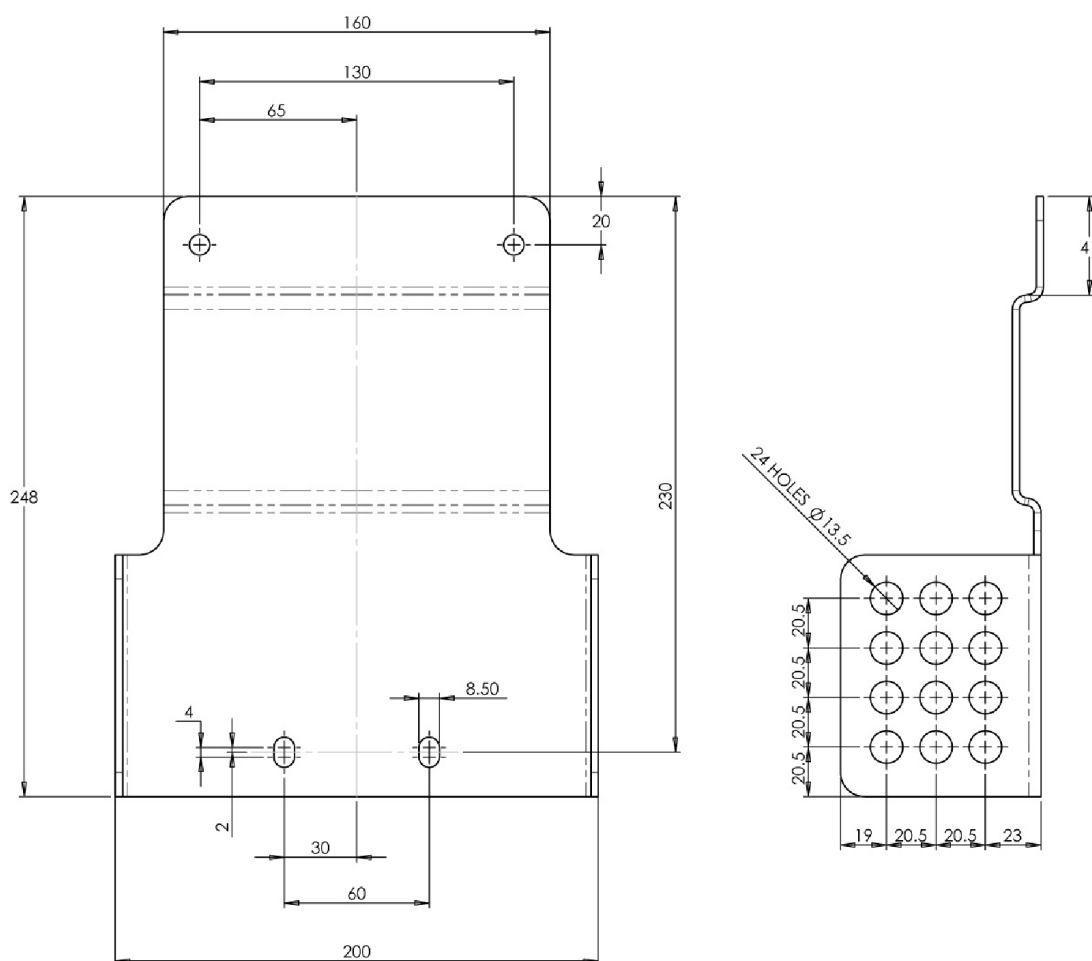
Signed:

Richard Butler FCMl
Divisional Managing Director

Name:	Richard Butler	Position:	Divisional Managing Director
Done at:	Plymouth, UK	Date:	04/01/2016

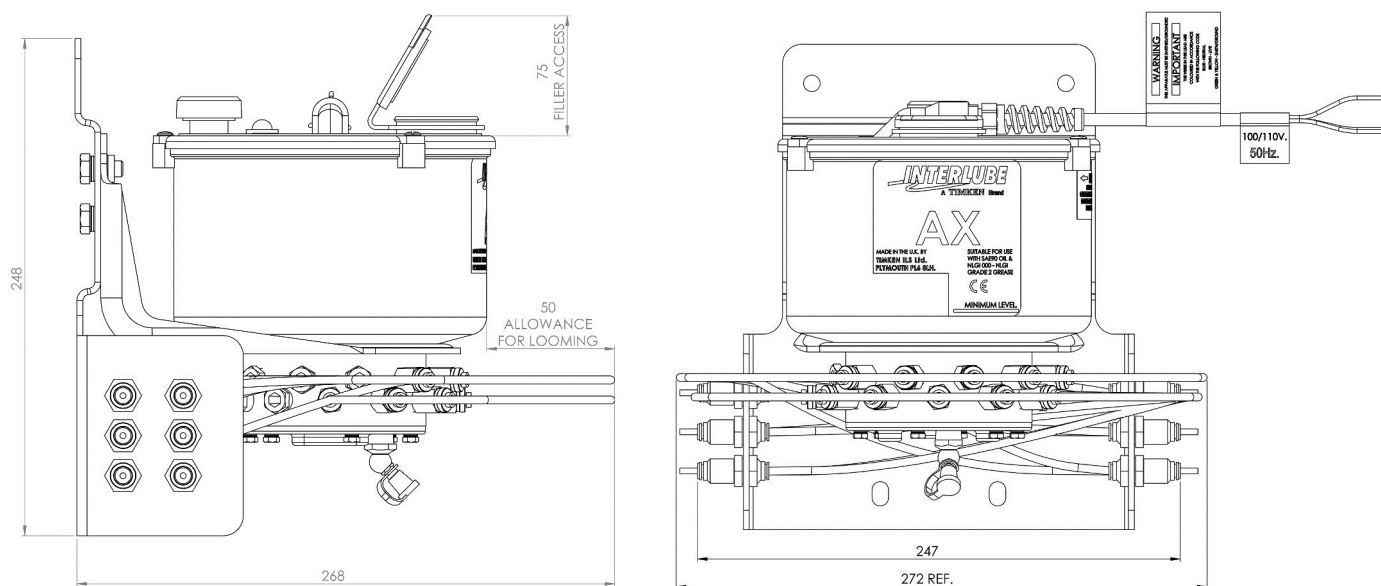
Document Ref: ISF 328 Issue 3

Mounting Hole Dimensions



Select a suitable mounting point for the pump on the machinery, preferably in a position where it is protected from debris. Ensure adequate clearance for the looming and re-filling is made (see image below for clearance allowances). Do not mount the pump on to ancillary equipment. Using the pump mounted adhesive template (part number 31867-900), supplied, position and drill the bracket holes (mounting positions and bracket clearances detailed as per the above image). Use bolts, nuts and spring washers supplied to securely mount the pump in position.

Pump Clearance Requirements



Pumping elements

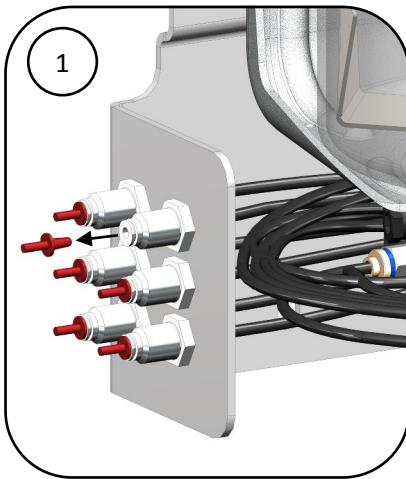
The AX13X1-50 & -51 AXL series pumps are pre-calibrated with 78036, blue, pumping units (0.04cc output per stroke). The pump timer is preset to switch '3' (6 minutes run and 30 minutes dwell) to meet most industrial applications. However, a selection of pumping elements with varying outputs are available to suit almost any need:

Standard Pump Elements for AX1 & AX2 pumps.			
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	0.10 cc	Black	

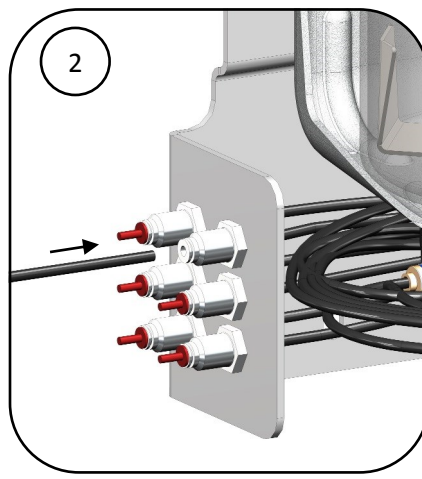
Output pressure	
Maximum Output pressure from each Pump Element	1740PSI / 120 Bar



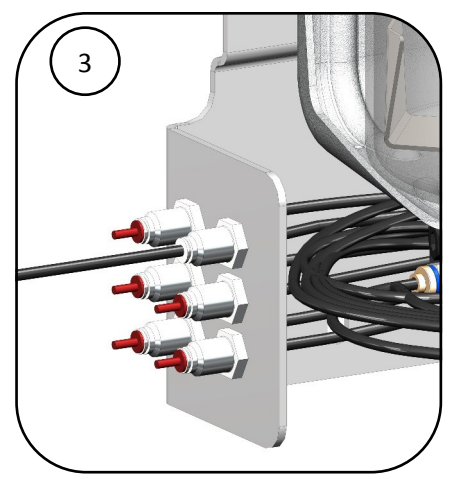
Making the Looms & Connection



REMOVE PLUG



POSITION LUBRICATION LINE
FROM BEARING FITTING



INSERT LUBRICATION LINE
INTO BULKHEAD FITTING

The AXL series pumps are pre-loomed from the pumping element to the bulkhead connections on the pump bracket (bulkhead fittings part number: 25487-072). The push fit connectors provide an easy installation of the lines to the bulkhead connectors. The lubrication line should be Interlube \varnothing 4mm, semi-rigid, nylon tubing. It is recommended that the tubing is pre-filled with grease to save on the need to prime the system once installed.

From the pump position establish the most convenient route for the lubrication lines. It may be preferred to group the lines into looms depending on pump location and quantity and positioning of the grease points. If grouping the lines, into looms, allow sufficient length for connection to the bulkhead outlet connectors and the bearings, making an allowance for movement on the machinery. In conjunction with the 'Installation Record' sheet (see page 12), fit the number identification sleeves to the lines at the pump and bearing ends. The loom should be protected along its length with the conduit/ spiral binding/ sleeving and/or tape (for part numbers see **Accessories** on page 8).

Installation:

Working from the furthest point from the pump, feed the lubrication lines through the machine following existing machine services, where possible. Ensure that the lubrication lines are positioned to fit the bearing fittings. Where a bearing is on a moving part, ensure that the line is sufficient to allow for full movement. To avoid rubbing or friction with moving parts, grommets or protective sleeving should be used. Also, depending on the severity of movement, compression fittings may be preferred at the bearing points.

Connecting the lines:

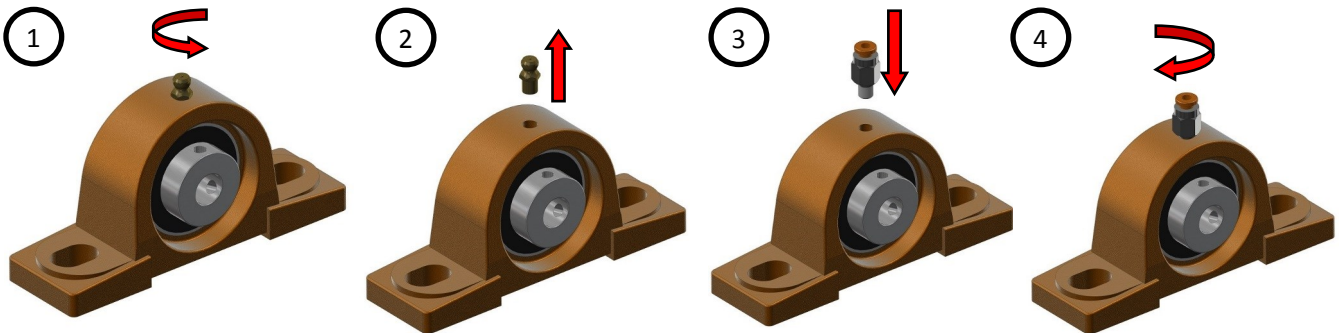
Cut each lubrication line to length ensuring a clean, square cut is achieved and connect to the bearing using push fit or compression connectors. ENSURE TUBING IS PUSHED FIRMLY INTO CONNECTOR. TEST THE ASSEMBLY BY PULLING FIRMLY ON THE LINE AFTER - INSTALLATION.

To connect to bulkhead fittings on the pump bracket follow steps 1 to 3 as shown above. Remove plug from bulkhead and push the line firmly into the bulkhead. Again, ENSURE THE LINE IS PUSHED FIRMLY INTO CONNECTOR. TEST THE ASSEMBLY BY PULLING FIRMLY ON THE LINE AFTER INSTALLATION. Using the 'Installation Record' sheet (see page 12) connect the lines to the corresponding numbered pumping units.

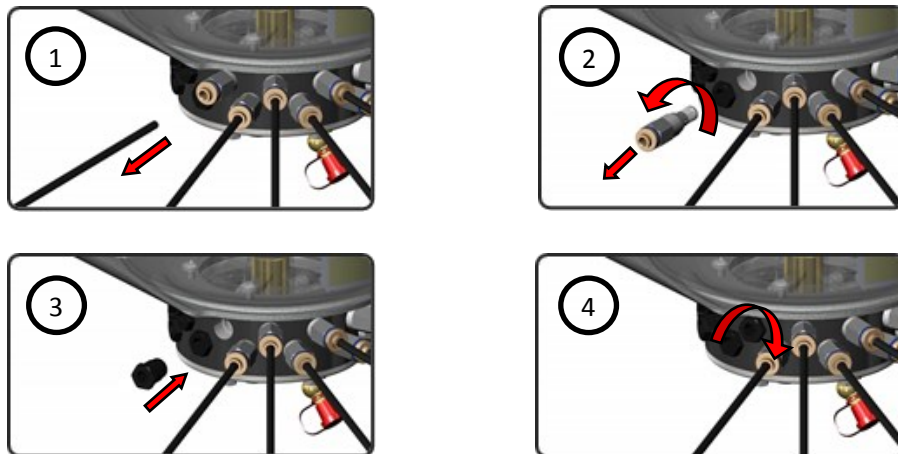
Note: All damaged pipework should be replaced using genuine spare parts, failure to do so can cause system malfunctions and major safety issues.

Typical System Installation Methods

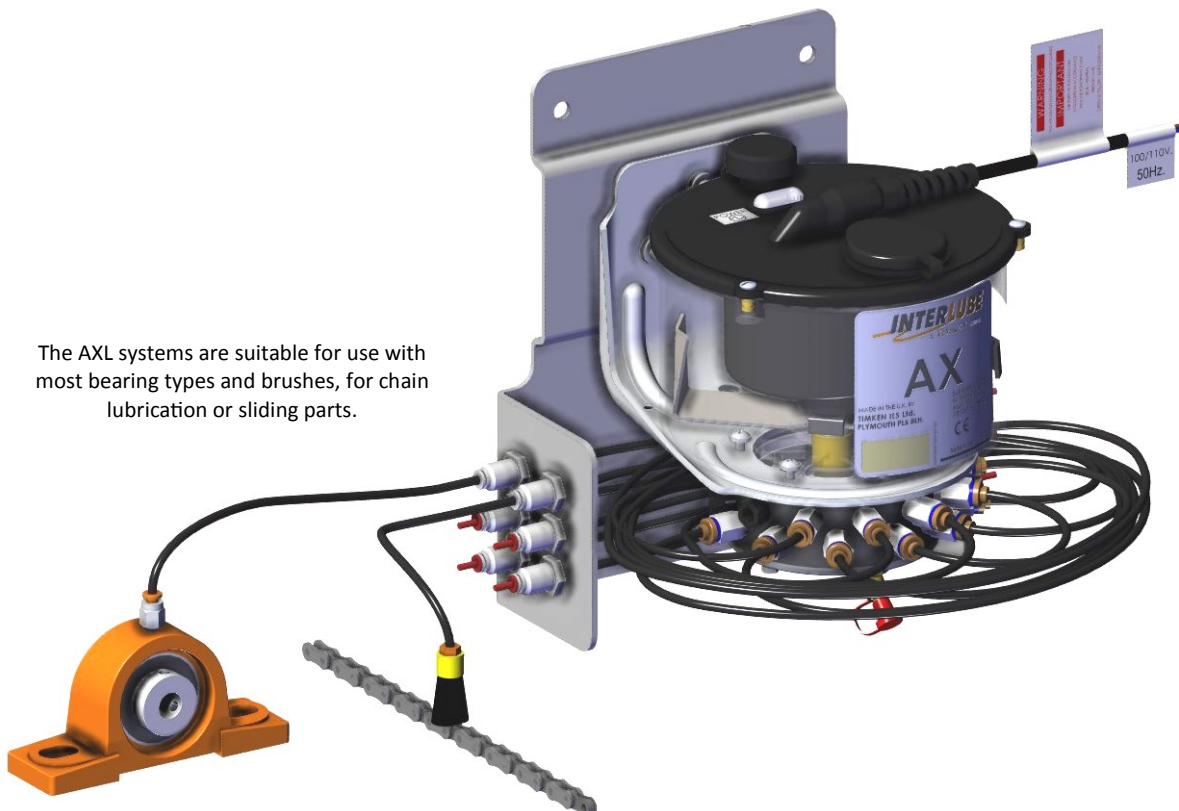
To connect the lubricant distribution lines to the bearing, as detailed on the previous page, remove the existing grease nipple(s) (see images 1 & 2, below) and replace with the preferred push-fit or compression fitting(s) (see images 3 & 4, below). A choice of fittings are available to suit all requirements (see page 8—Accessories).



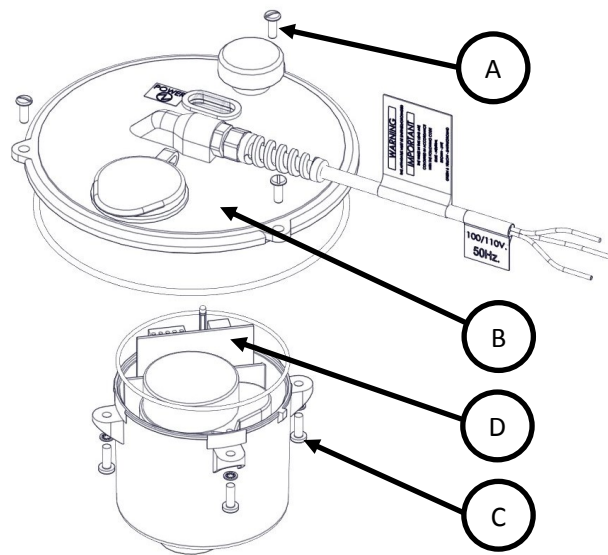
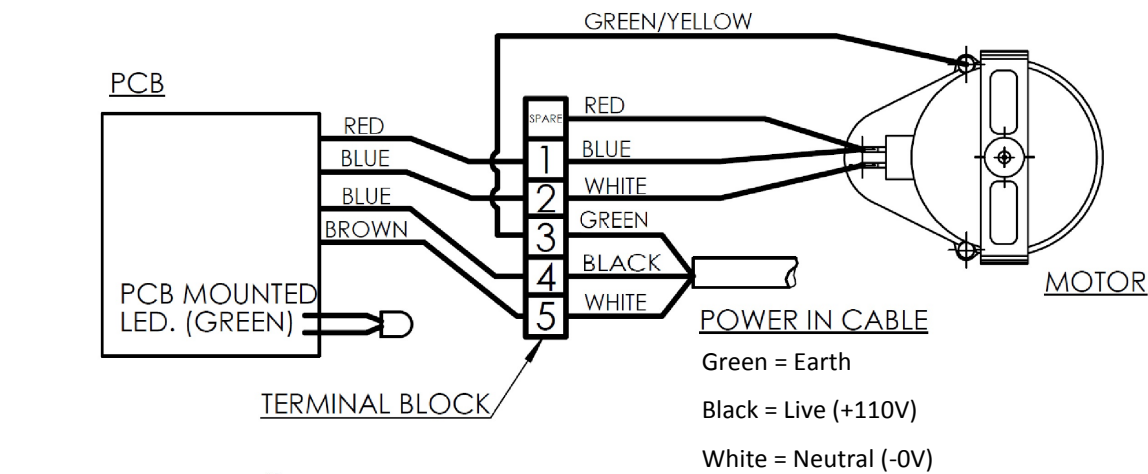
If a lubrication distribution line is not required simply remove the line (securing loose end with a cable tie around the rest of the loom) remove the pumping unit and replace with a blanking plug (part number 34237-402). See steps below:



The AXL systems are suitable for use with most bearing types and brushes, for chain lubrication or sliding parts.



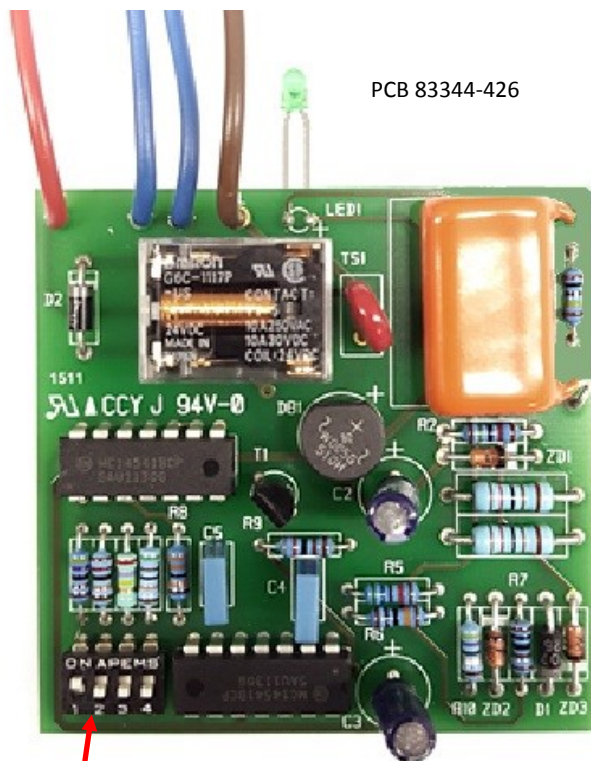
Wiring Information



To access the internal PCB and adjust the run settings, via the dip switch:

- 1) Disconnect power to the pump.
- 2) Remove lid screws x3 (see 'A'), (Torqued to 0.6Nm).
- 3) Remove lid (see 'B'), making sure to retain the O-ring.
- 4) Remove motor housing screws x4 (see 'C'), (Torqued to 1.2Nm). Make sure to retain the O-ring.
- 5) Access PCB ('D') and adjust dip switch as required (see PCB 83344-426 image, at the bottom of this page, for the location of the dip switch).
- 6) Re-assemble, ensuring the drive adaptor locates on the paddle and the O-rings are correctly fitted.

PCB Adjustments



PCB 83344-426 settings table:

SUFFIX	TOTAL CYCLE TIME (mins.)	PCB SWITCH POSITION					
		1	2	3	4	Run time (mins.)	Delay time (mins.)
1	12 MINS	ON	-	-	-	6	6
2	21 MINS	-	ON	-	-	6	15
3	36 MINS	-	-	ON	-	6	30
4	66 MINS	-	-	-	ON	6	60

The Pump cycle time can be changed from the factory set option, if required. The above table shows the settings available via setting of the dip switch on the PCB (see left hand image).

- Switch positions '1-4' cycle times are based on the delay period. Pump runs for 6 minute cycles before the specified dwell time then repeats.
- Note that only 1 switch can be in 'on' position at a time.
- Having all switches in 'off' position will cause the pump to run one cycle (6mins) and delay indefinitely, or until power is switched off.

System Overview and Operation

The Interlube AXL range has been designed to provide reliable and virtually maintenance free service in the most demanding applications. The system is an electrically operated (110/240V) pump with integral controller and one or more lubricant distribution lines, which connects each bearing directly to the respective pumping unit, via a bulkhead fitting situated on the sides of the mounting bracket.

Each bearing is fed independently, meaning that the lubrication amounts to the respective points can vary depending on the specific pumping unit selected. It also means that damage to one lubricant distribution line does not affect the rest of the system.

The motor drives the paddle blade, which pushes grease into the pumping chamber and provides a visual indication of the pumps operation. The motor also drives the cam(s), which operates the individual pumping units and feeds the grease into the lubricant distribution lines. Each lubricant injector is actuated by its cam once every 360° revolution.

The lubrication process starts after the power to the pump is switched on and after the allotted dwell time (of the already programmed pump) has elapsed. The pump will run for 6 minutes and dwell for the allotted time as programmed (6 minutes dwell if 6 minute program, 15 minutes dwell if 15 minute program, etcetera).

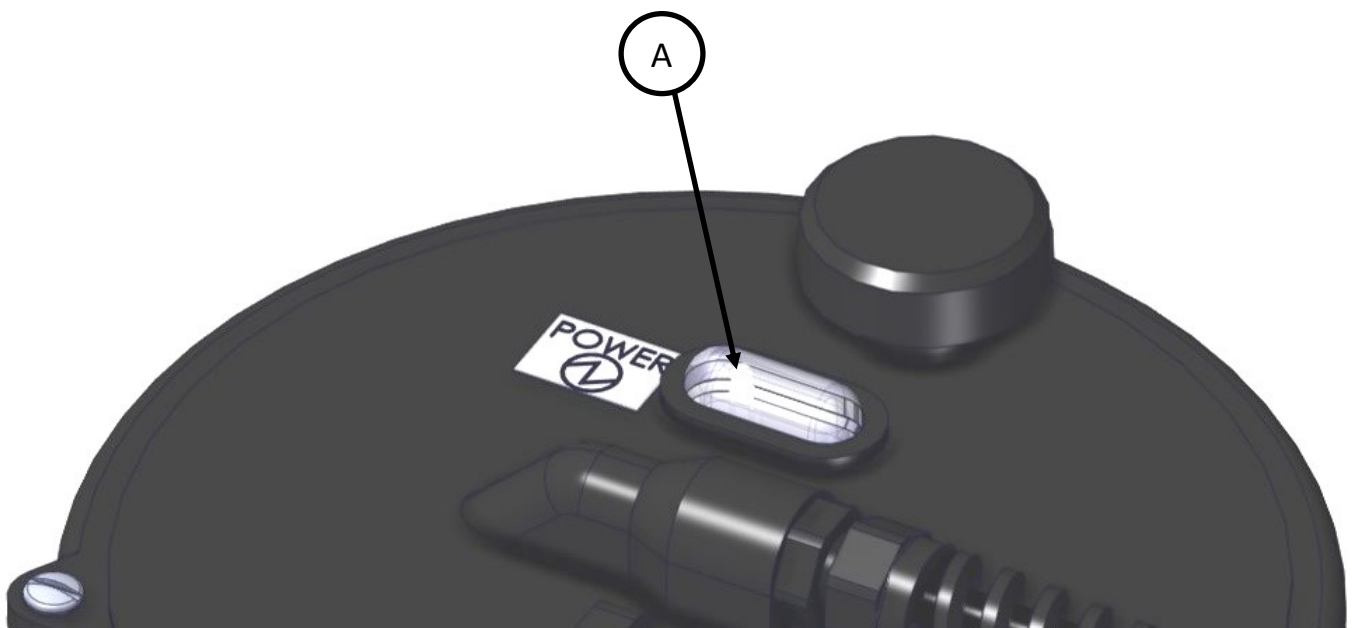
If the power drops out at any time to the pump the counter will be stopped and the program will restart when the power resumes.

An indication lamp is located on the top of the pump (marked 'A' below), within a viewing window. The indication light will be lit when there is a continuous supply to the circuit and pump.

The following inspection procedures are recommended to help ensure proper operation of the AX industrial lubrication system. Once the reservoir refill period has been determined (see page 6, **Typical Refill Periods**) make certain that the interval is part of your scheduled maintenance.

- Inspect all lubrication points for signs of FRESH grease,
- Check the condition of all fittings and connections. Tighten or replace loose or damaged fittings.
- Check all lubrication lines; make certain that there are not any breaks. Check for wear or chaffing that may lead to leakage.

If, during these checks, any issues are found use the **Lubrication Troubleshooting Chart** on page 11 to help resolve them.



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 AX pump has been developed specifically to run with NLGI Grade 000, 00, 0, 1 and 2 greases. 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 Operational Temperatures

Pump Type	Recommended Lubricants					
	Oils SAE 80/90	000 Fluid	00 Semi Fluid	0 Soft	1 Stiff	2 Hard
AX2XX1	-40°C	-35°C	-30°C	-25°C	-20°C	-15°C
AX2XX2	-30°C	-25°C	-20°C	-15°C	-10°C	-5°C
AX2XX3	-20°C	-15°C	-	-	-	-
AX1XX1	-40°C	-35°C	-30°C	-25°C	-20°C	-15°C
Upper Temp Limit	+40°C for all pumps					

(Based on maximum lubricant distribution line length of 60ft /18m)

Typical Refill Periods

The AX1 & AX2 refill periods range greatly, dependent on the number of pumping units as well as output quantities and cycle times. Due to the accuracy of output quantities and the reliability of pump functionality refill periods can be simply calculated to ensure that the pump and the bearing points don't run dry. Use the following to calculate refill periods:

Calculation:

$$(N \times O_1) + (N \times O_2) + (N \times O_3) + (N \times O_4) + (N \times O_5) + (N \times O_6) = A$$

Key:

N = Number of Pumping Units (P.U.) 1-36.

O₁= Red P.U. with Output 0.01cc

O₂= Green P.U. with Output 0.015cc

O₃= Yellow P.U. with Output 0.025cc

O₄= Blue P.U. with Output 0.04cc

O₅= Grey P.U. with Output 0.06cc

O₆= Black P.U. with Output 0.10cc

A = Total Output Amount per 1 revolution

E = Number of revolutions until Empty

R₁= 1250cc AX1 Reservoir
R₂= 2000cc AX2 Reservoir } Select only one

P = Programmed cycle time (12, 21, 36 or 66 minutes).

$$E = \frac{R_1 \text{ or } R_2}{A}$$

E x P = Total Runtime in minutes (T) until empty

T / 60 = Total Runtime in hours (H) until empty

H/24 = Total Runtime in days (D) until empty

Example:

An AX1 (R1) with a 0.167 RPM motor (M) calibrated with 2 Red P.U. (O₁), 4 Yellow P.U. (O₃) & 6 Grey P.U. (O₅) programmed for a 36 minute cycle time.

$$((2 \times 0.01) + (4 \times 0.025) + (6 \times 0.06)) = 0.48 \text{cc}$$

$$1250 \text{cc} / 0.48 \text{cc} = 2604.16 \text{ Revs}$$

$$2604.16 \times 36 = 93749.76 \text{ minutes until empty}$$

$$93749.76 / 60 = 1562.5 \text{ hours until empty}$$

$$1562.5 / 24 = 65.1 \text{ days between refills}$$

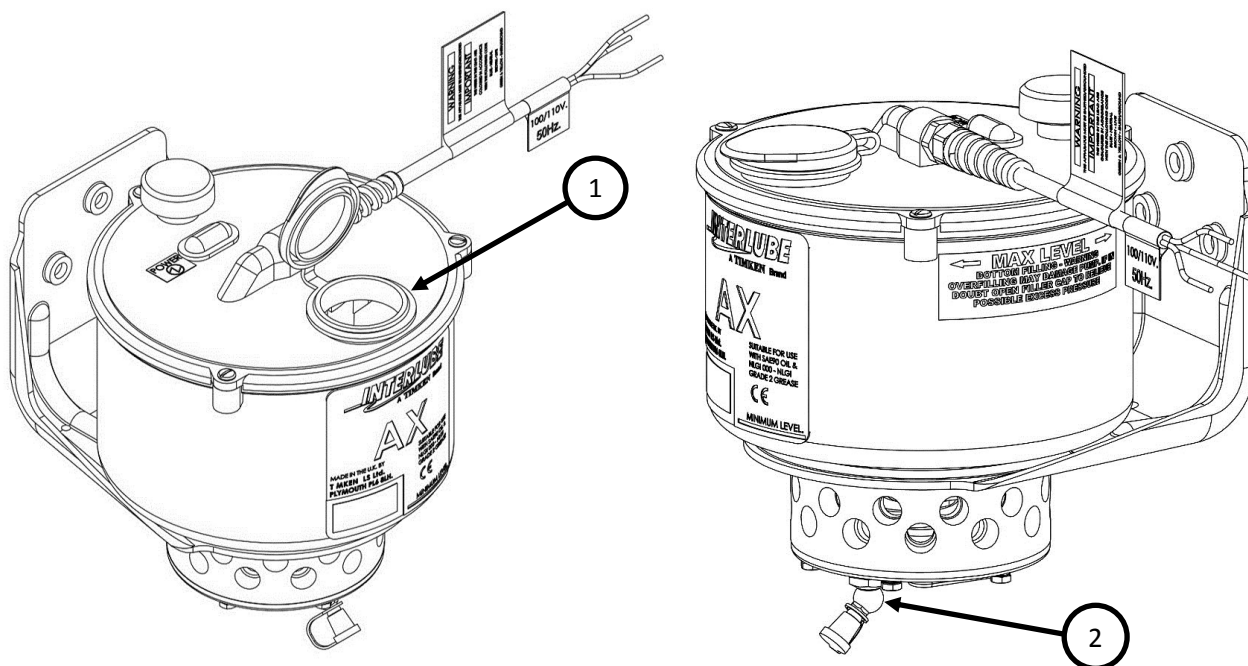
Note that this calculation is based on the pump having an - uninterrupted power supply and being in continuous operation

Pump Refill Procedure

All Interlube Systems' multiline pump options are fitted with both a bulk fill cap (see image '1' below), which is suitable for oil and fluid grease up to NGLI '000' and a bottom fill, grease nipple, adaptor (see image '2' below, right) for filling with grease up to NGLI Grade 2. Using the grease nipple adaptor for grease fill avoids the possibility of air entrapment and cavitation. Bulk fill adaptors are also available on special request, which can be fitted instead of the grease nipple as shown on the examples below.

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.



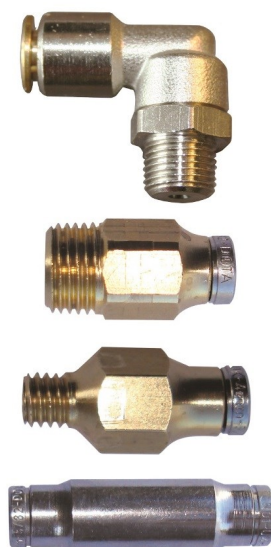
Pump Refill Schedule Log

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Accessories

Elbow Connectors

Part Number	Thread Size
PM90412-NP	1/8" NPT
PM90484-ST	1/4" x 28UNF
PM90485	5/16" x 24UNF
PM90487	1/8" BSPT
PM90489	M6 x 1
PM90490	M8 x 1
PM90491	M8 x 1.25
PM90492	M10 x 1
PM90493	M10 x 1.5



Straight Connectors

Part Number	Thread Size
PM80412-NP	1/8" NPT
PM80484-ST	1/4" x 28UNF
PM80485	5/16" x 24UNF
PM80487	1/8" BSPT
PM80489	M6 x 1
PM80490	M8 x 1
PM80492	M10 X 1

Note: Actual connectors may vary from images.

Conduit / Spiral Binding

Part Number	Description
20030	1/4" Spiral binding (for 1 tube)
20034	3/8" Spiral binding (for 2-5 tubes)
20031	1/2" Spiral binding (for 6-12 tubes)
20032	3/4" Spiral binding (for 13+ tubes)
39694A250	1/4" Split Conduit (for 1 tube)
39694A375	3/8" Split Conduit (for 2-4 tubes)
39694A500	1/2" Split Conduit (for 5-7 tubes)
39694A625	5/8" Split Conduit (for 8-12 tubes)
39694A750	3/4" Split Conduit (for 13-19 tubes)
39694A1000	1" Split Conduit (for 20-34 tubes)



Grease Filled Nylon Tube

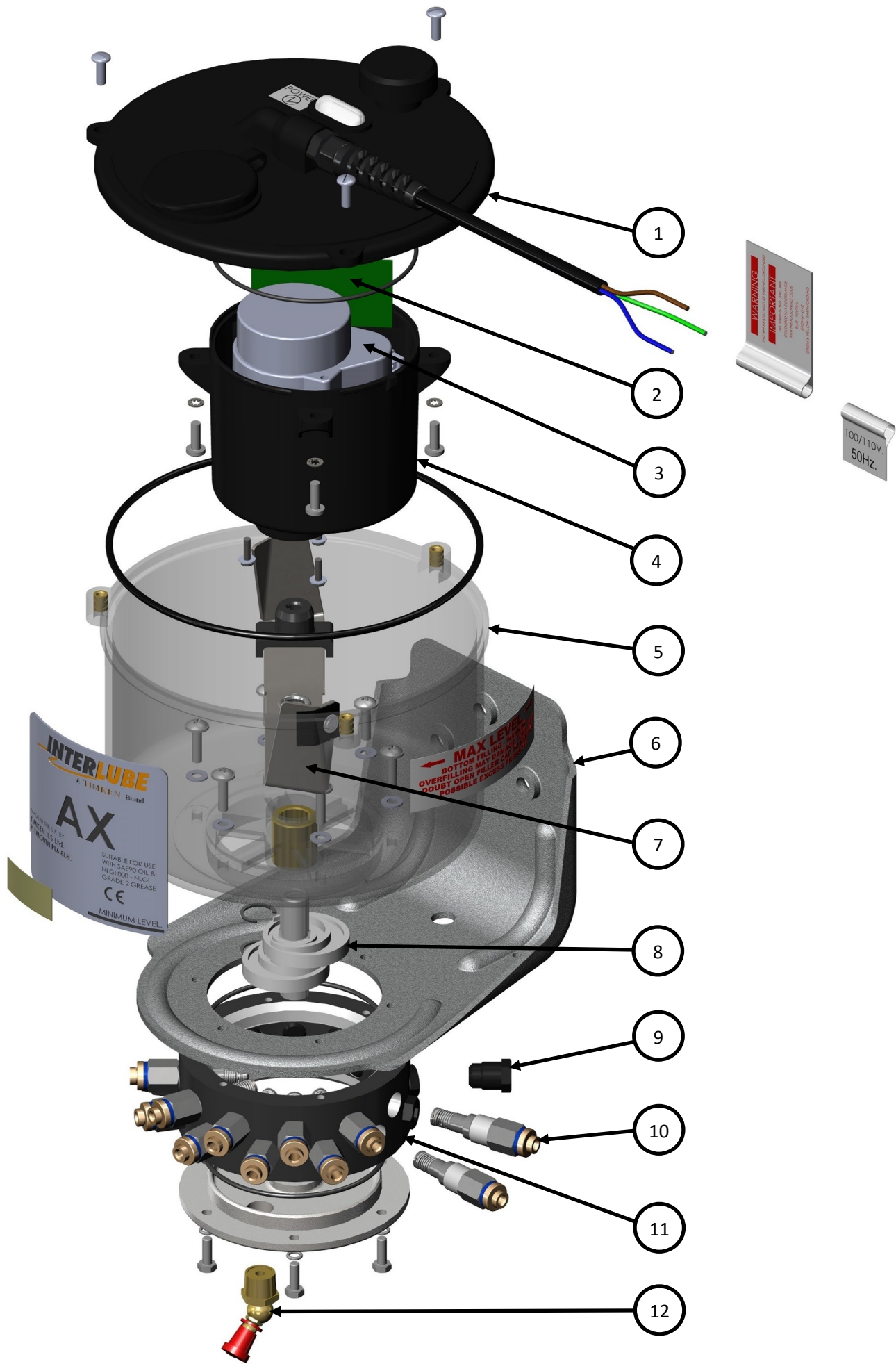
Part Number	Description
152057-164	Ø4mm OD Unprimed 164ft.
152823-164	Ø4mm OD Grease Filled (NLGI00) 164ft.
152823/FG-164	Ø4mm OD Grease Filled (Food Grade) 164ft.
38508A1	Cable Tie (7" Length)
1755-830	Black electrical tape (1" Width)



Numbered Sleeve

Part Number	Description
39257-A1	For up to 12 point system
39257-A2	For up to 24 point system
39257-A3	For up to 36 point system





AXL Pump Assembly Spares

Item No.	Part No.	Description	Qty.
1	AX/SP1	AX LID AND SEALS ONLY	1
2	AX/SP2	PCB ASSEMBLY 83344-426	1
3	AX/SP3/110V AX/SP3/240V	ELECTRIC MOTOR	1
4	AX/SP15	LID, MOTOR & PCB ASSEMBLY (110V & 240V)	1
5	AX/SP4	AX1 RESERVOIR	1
6	83341-805	BRACKET	1
7	AX/SP-9 AX/SP-6	PADDLE ASSEMBLY DRIVE ADAPTOR	1
8	AX/SP5-1 AX/SP5-2 AX/SP5-3*	CAMSHAFT ASSEMBLY (12 PORT) CAMSHAFT ASSEMBLY (24 PORT) CAMSHAFT ASSEMBLY (36 PORT)	1
9	34237-402	BLANKING PLUG	1-23
10	78033-PL 78034-PL 78035-PL 78036-PL 78037-PL 78038-PL	PUMPING UNIT—0.010cc PUMPING UNIT—0.015cc PUMPING UNIT—0.025cc PUMPING UNIT—0.040cc PUMPING UNIT—0.060cc PUMPING UNIT—0.100cc	1-24
11	32478-202 32478-203 32478-204*	MANIFOLD (12 PORT) MANIFOLD (24 PORT) MANIFOLD (36 PORT)	1
12	83416-037	GREASE NIPPLE FILL POINT	1
13	25487-072 (Not Shown)	BULKHEAD FITTING M13x1	1-36
14	34237-469 (Not Shown)	4mm PUSH FIT BLANKING PLUG FOR ITEM 13	2-36

* Check with supplier the suitability of a 36 point, AX13X1-50 or –51 system and it's likely application.

† Parts are on AXL pump bracket.

Lubrication Troubleshooting Chart

Problem	Cause	Solution
1. Inoperative Pumping Element.	a) Inoperative Pump b) No Grease flow	a) Refer to “Problem A” in ‘Electrical—Troubleshoot’ b) Replace pumping unit
2. All lubrication points appear dry.	a) Empty reservoir b) Inoperative pump c) Time between lube cycles is too long. d) Reservoir filled with an unsuitable lubricant. e) Inoperative Pumping Unit f) Reservoir vent blocked from over filling.	a) Refill the reservoir, using the correct lubricant. b) Refer to “Problem A.” c) Adjust pump CYCLE TIME setting. d) Remove the lubricant and replace with correct grade of lubricant. e) Replace Pumping Unit f) Clear vent and only fill to max level.
3. Pump is working, but does not supply lubrication	a) Grease level dropped below minimum level b) Defective pumping element	a) Bleed the pump & refill the reservoir b) Replace the pump element
4. No grease at all points of lubrication	a) Pump does not work. b) Dwell time is too long or c) Lubrication quantity is too little. d) System is blocked.	a) Refer to “Problem A.” b) Reduce the system dwell time. c) Change the pumping unit with an increased output. d) Refer to “Problem A.”
5. No grease at some points of lubrication	a) Some pipes are burst or leakage at pumping unit unions to pipework. b) Blocked or broken pumping unit.	a) Renew the pipes. b) Determine defective pumping unit and replace.
6. No grease at one point of lubrication	a) The lubrication pipe is burst or leaking b) Leakage at union point	a) Renew the pipe b) Retighten or renew the screwed union
7. Lubrication points are over-lubricated.	a) Incorrect pumping unit output.	a) Re-configure pumping unit for lower output quantity.
8. Excessive pressure of the System.	a) Excessive pressure in the system caused by blockage in the system. b) One or more lubrication points are blocked and will not accept grease.	a) Check the system b) Remove pipe from fitting and flush bearing through with grease gun.
9. All lubrication points are over lubricated.	a) Incorrect setting of “on-time” or “Delay Time”.	a) Reduce “On Time” or increase Delay Time”, or both.

Electrical Troubleshooting Chart

Problem	Cause	Solution
A.) Pump Does Not Work.	a) No input power.	a) Check for power to the pump and controller.
	b) Loose / broken wire connection inside the pump.	b) Check all wires and connections in the pump.
	c) Defective PLC.	c) Replace Controller Assembly.
	d) Defective Motor.	d) Replace Motor.
	e) Fuse doesn't work.	e) Replace fuse (1.Amp)
B.) Reduced Pump Speed.	a) High pressure in the system	a) Check the system / bearing points
	b) Low ambient temperature	b) Not a defect (1 or 2 lubrication cycles may be required)

INSTALLATION RECORD

Pump No..... Customer.....
Voltage.....Timer Setting.....

Unit No.	Bearing location	Col. Code	Cal. CC	Unit No.	Bearing Location	Col. Code	Cal. CC
1				19			
2				20			
3				21			
4				22			
5				23			
6				24			
7				25			
8				26			
9				27			
10				28			
11				29			
12				30			
13				31			
14				32			
15				33			
16				34			
17				35			
18				36			

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