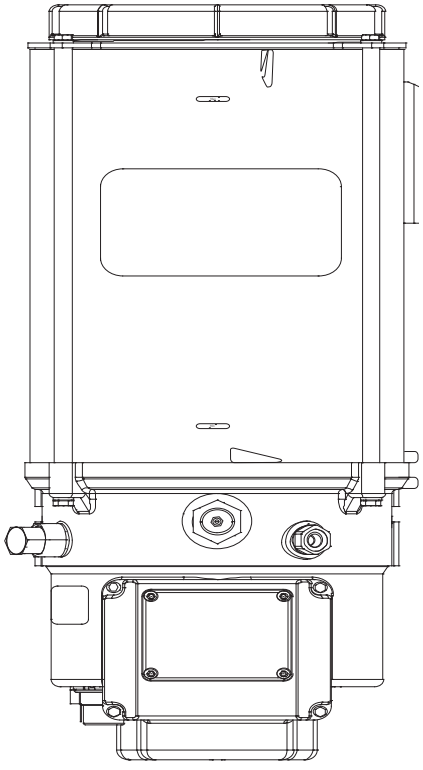
LINCOLN

Installation and maintenance guide

Electric operated Centro–Matic oil pump P653S

Models 80127 (*4L*) 80128 (*8L*)



Date of issue	**May 2016**
Publication number	**404542C**

Read manual prior to installation or use of product. Keep manual nearby for future reference.

SKF

Contents

Introduction

Explanation of symbols used

The following description standards are used in this manual:

Structure of safety instructions:

- Pictogram
- Signal words
- Danger text
- Danger notes
- How to avoid danger

The following pictograms are used in this manual and are combined with corresponding signal words:

Note!
Emphasizes useful hints and recommendations as well as information for efficient and trouble–free operation.

⚠ CAUTION

Signalizes a dangerous situation, which can lead to light personal injury or property damage, if the precautionary measures are ignored.

⚠ WARNING

Signalizes a dangerous situation, which can lead to severe or light personal injury, if the precautionary measures are ignored.

⚠ DANGER

Signalizes a dangerous situation, which can lead to death or severe personal injury, if the precautionary measures are ignored.

User's responsibility

To ensure the safe operation of the unit, the user is responsible for the following:

1 The pump/system shall be operated only for the intended use (→ **Safety instructions**, **page 4**) and its design shall neither be modified nor transformed.
2 The pump/system shall be operated only if it is in a proper functioning condition and if it is operated in accordance with the maintenance requirements.
3 The operating personnel must be familiar with this owners manual and the safety instructions mentioned within, and observe these carefully.

The correct installation and connection of tubes and hoses, if not specified by Lincoln Industrial, is the user's responsibility.

Lincoln Industrial technical services will gladly assist you with any questions pertaining to the installation.

Environmental protection

Used oil, detergents and lubricants must be disposed of in accordance with relevant environmental regulations.

Service

The personnel responsible for the handling of the pump/system must be suitably qualified. If required, Lincoln Industrial offers you full service in the form of advice, on–site installation assistance, training, etc.
Please contact the technical service department for assistance.

In the event of inquiries pertaining to maintenance, repairs and spare parts, we require model specific data to enable technical services to clearly identify the components of your pump/system.

Therefore, always indicate the part, model and series number.

Safety instructions

Appropriate use

The electric Centro-Matic oil pump P653S has been designed for the automatic lubrication of commercial vehicles, industrial, construction and agricultural machines and wind power plants.

The P653S pump has been designed for intermittent operation and is not suitable for continuous operation. The pump is capable of supplying lubricants such as mineral oil from minimum 40 mm²/s (CST).

Misuse

Any use of the P653S pump that is not expressly mentioned in this user manual will be regarded as misuse. If the P653S pump is used or operated in a manner other than specified, any claim for warranty or liability will be null and void.

⚠ CAUTION

If personal injury or material damage occurs as a result of inappropriate operation, (e.g. if the safety instructions are ignored or resulting from an incorrect installation of the P653S pump), no claims or legal actions may be taken against Lincoln Industrial.

Exclusion of liability

The manufacturer of the P653S pump will not accept any liability for damages caused by:

- a lack of lubricant due to an irregular refilling of the pump.
- the use of contaminated lubricants.
- the use of oils that are not or only conditionally pumpable by P653S pump.
- inadequate disposal of used or contaminated lubricants as well as of components that have been in touch with lubricant.
- un-authorized modification of the system components.
- the use of unapproved parts.
- operation without adhering to the minimum pause time and respectively the maximum lubrication time (→ **Technical data**, **page 30**).

Regulations for prevention of accidents

To prevent accidents, observe all city, state and federal safety regulation of the country in which the product will be used.

General safety instructions

- Pump P653S is designed for safe operation.
- Incorrect use may result in bearing damage caused by poor or excessive lubrication.
- P653S pump with follower can be mounted vertically, horizontally or upside down.
- Pump without the follower should be mounted vertically upright only.
- Un-authorized modifications or changes to an installed system are not admissible. Any modification of the pump must be subject to prior authorization by manufacturer.
- Install the components of the P653S pump in such way that operator can always see the low-level position of the pump reservoir.
- Each time the reservoir has been refilled, make sure that pump is pumping lubricant.

Operation, maintenance and repair

⚠ WARNING

Before carrying out any maintenance or repair on the P653S pump, make sure that all lubrication lines of the carrier unit are depressurized.

Repair

Repair should only be performed by authorized and instructed personnel who are familiar with the instructions.

Defective printed circuit boards should be appropriately packed and returned to the factory.

Operation/maintenance

Pumps P653S:

- Must be refilled at regular intervals with clean lubricant.
- Operate automatically. However, a regular check (approximately every two days) should be made to ensure that lubricant is pumped to all lubrication points.

Disposal

Dispose of used or contaminated lubricants as well as of parts that were in touch with lubricant according to the legal regulations pertaining to environmental protection. Make sure to observe the safety data sheets of the lubricants used.

⚠ WARNING

Pump P653S must be installed by qualified personnel. The connection of the 120 V AC must be done according to the National Electrical code.
Before installing or working on the pump, disconnect and lock out the incoming power.

⚠ WARNING

Failure to observe the safety instructions, (e. g. touching electrically charged parts when the pump is opened, or improper handling of the pump P653S) may cause serious injury or death. If the values specified in the technical data are exceeded, the device may overheat.
It may damage the pump P653S and thus impair the electric safety.

⚠ CAUTION

Electric voltage!
In the case of pumps where oil is filled from top, the power supply must be switched off before the lubricant is filled in.

⚠ CAUTION

Danger of injury in case of pumps being filled from the reservoir top: Never put your hand into the open reservoir while pump is running!

Important!
Risk of bursting if the reservoir is overfilled! When filling the reservoir by means of pumps with a large delivery volume do not exceed the maximum filling mark.

⚠ CAUTION

Do not use the pump in potentially explosive applications.

Installation

- Any safety equipment already installed on the vehicle:
  - should not be modified or made ineffective;
  - should only be removed for the purpose of installing the system and must be replaced afterwards.
- Use only original Lincoln spare parts or parts approved by Lincoln.

Important!
Adhere to:

- the installation instructions of the vehicle manufacturer with regard to all drilling and welding procedures.
  - the specified minimum distances between the holes and the upper/ lower rim of the frame or between two holes.

Important!
Route supply lines professionally.
Firmly bolt together any components that are subject to pressure.

Installation and maintenance of hydraulic hoses

⚠ CAUTION

Operational safety of the P653S pump can only be ensured in the case of a professional installation and maintenance of the hose lines. Make sure to observe the following recommendations!

Lubrication hose lines

- must never be subjected to torsion.
- must be installed twist–free.
- must not rub against metal components or edges.
- are to undergo regular visual checks and must be exchanged in the case of wear (at the latest 2 years after installation).

Pay attention to non–linear installations to allow for a larger bending radius as possible. Avoid kinks. In constricted installation conditions use pipe elbow unions to avoid the danger of kinking behind the hose socket. Use high pressure hydraulic hose for lubrication lines.

⚠ CAUTION

Use only supply line hose and fittings that are appropriate for the programmed/set system pressure.
Failure to comply may result in personal injury.

General Description

The P653S pump is designed for single line (S) parallel Centro–Matic type lubrication systems. The pumps integrated design includes all necessary components to support Centro–Matic lubrication systems:

- controller to program and monitor lubrication cycle.
- internal pressure transducer.
- internal vent valve.
- three pumping elements connected together.
- external pressure relief valve.
- reservoir low–level control.
- contacts for remote monitoring.
- 120/230 V AC power supply .Pump can supply adequate lubricant to bearings using oil injectors SL–32, SL–33 SL–41, SL–42, SL–43 and SL–44. Number of injectors should be based on output of the pump being 1.8 in^3/min. (*30 ml/min.*)

Pump for 120/230 V AC power supply can be installed in any stationary industrial type of applications requiring lubrication for the same number of medium size bearings.

Notice
Installations using SL–32 and SL–33 Lincoln injectors can lubricate more than 35 bearings.

Typical Centro–Matic system schematic is shown on **page 31.**

Notice
Use only supply line hose and fittings that are appropriate for the programmed/set system pressure.

Pump P653S

- pumps mineral oil (per approved list) at temperatures from 32 to 122 °F *(0 to 50 °C)* min. 40 mm 2/s (CST)
- develop maximum pressure up to 1,500 psi *(100 bar)* with pressure transducer.

Reservoir sizes

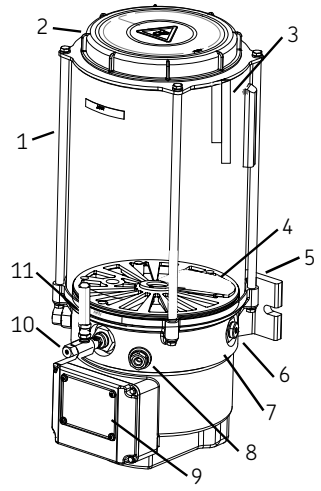
- 4 l transparent plastic reservoir
- 8 l transparent plastic reservoir

Electrical connection

- For industrial 120/230 V AC applications P653S pumps are provided with 4–pole square type connector. Electric cable is provided by installer.

Fig. 1

Single–line pump P653S, no follower (Note: Low–level control → fig. 12 and 13, page 17)



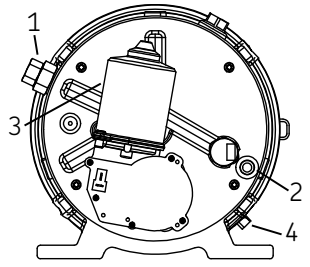
1 Reservoir
2 Top lid
3 Stationary paddle
4 Stirring paddle
5 Mounting plate
6 Pump elements
7 Pump housing
8 Refill oil fitting
9 Keypad
10 Pump outlet
11 Relief valve

	Industrial (S)					
Pump combinations	Application: Industrial	Time (TC) or count control (cc)	Number of transducers.	Low–level control;	F1 fault relay; (31) switch to ground	F2 fault relay; (31) switch to ground
AS09	Industrial	TC	one	NC	Switch to ground	Switch to ground
AS11	Industrial	TC	one	NO	Switch to ground	Switch to ground
AS12	Industrial	TC	two	NO	Switch to ground	Switch to ground

Description of operation

Fig. 2

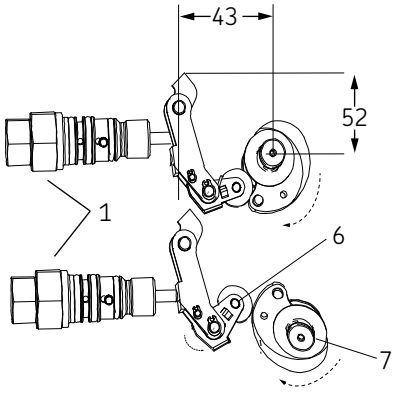
Disassembled pump housing – view from the bottom



1 Venting element
2 Integrated pressure transducer
3 Motor
4 Pump elements with integrated lubrication lines

Fig. 3

Idle run of the switch joint on the venting element.



1 Inactive venting element
6 Switch joint
7 Cam (driven clockwise by the motor)

Pump operation

Drive

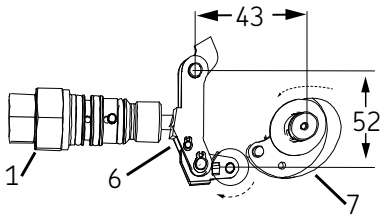
- The pump housing consists of the following components: gear motor, final gear drive, three pumping elements connected together by internal passages and vent valve. Pump can be configured with internal pressure transducer.
- The gear motor shaft is connected to the final stage gear drive. The final gear has incorporated eccentric and cam to drive the pumping elements and to control the internal vent valve (→ **fig. 3**).
- Vent valve is a two way normally closed spring biased valve.
- Pressure transducer is adjustable. Factory setting is 1,450 psi *(80 bar)*. Pressure setting of the pressure transducer can be adjusted from 600 to 1,200 psi *(41 to 82 bar)* in 100 psi *(6,9 bar)* increments.

Lube cycle/pressurization

- The motor turns the cam (**7**) clockwise to start lubrication cycle. As soon as pump starts to operate, the display rotating segment is turning clockwise also (→ **fig. 17**, **page 19**). Maximum time to build the preset pressure is 12 minutes.
  If pump does not build preset pressure, fault signal E1 or E2 will appear on the display.
- Vent valve (**1**) is normally closed and stays closed during lubrication cycle, preventing lubricant flow back to the reservoir (→ **fig. 3**).
- The output of three pump elements (**4**) (→ **fig. 2**) is combined by internal passages.
- The eccentric drives the pump elements to pump the lubricant from the reservoir and build the line pressure.
- The cam (**7**) will keep the vent valve (**1**) closed.
- Supply line can be connected to any one of the pump element outlets. The remaining two pump elements outlets should be plugged.

Fig. 4

Activated vent cycle diagram



1 activated venting element
6 activated vent level
7 Cam (driven counterclockwise by the motor)

Fig. 5

Display during braking application of pump motor

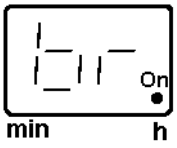


Fig. 6

Display during change of moving direction of pump motor

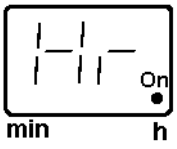


Fig. 7

Rotating segmented display during venting (counterclockwise)

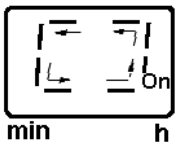
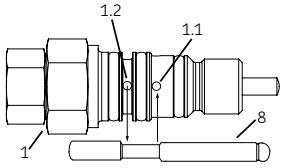


Fig. 8

Venting in the vent valve



1 Venting element
1.1 inlet hole
1.2 outlet hole
8 Plunger, venting

Pump element operation

The pump element (→ **fig. 10** and **11**) is a single stroke spring biased pump. Motor drives the eccentric (**1**). Eccentric is in constant contact with the plunger (**2**).

Compression spring (**3**) is pushing plunger (**2**) to open lubricant passage to create vacuum to prime the pump with lubricant from the reservoir. Check valve (**4**) is closed to isolate the supply lines of the system.

Eccentric (**1**) is pushing the plunger (**2**) in opposite direction to pump lubricant, developing the operating pressure. Check valve (**4**) is open to pass the lubricant to supply lines.

The body of the pump element has a lateral outlet (**5**) (→ **fig. 9**) for lubricant cross porting to the internal material passages to combine the outlet of all three pump elements.

Any one of the three elements can be used as a pump outlet. The remaining two elements should be closed with plug (**A**) (→ **fig. 9**).

Pressure control/hold time/vent cycle

Pump with internal pressure transducer

Use only pump elements designed for operation in the P653S pump.

Internal pressure transducer is factory set to close at 1450 psi (*80 bar*). The pressure transducer can be adjusted from 600 to 1300 psi (*41 to 82 bar*) in 100 psi (*6.9 bar*) increments. Internal pressure transducer is factory set to close.

After pump starts a lubrication cycle, motor stops when pressure at pump reaches preset pressure. Pump will go through two holding periods, H1, H2 and H3.

Holding time (H1)

Internal pressure transducer must stay closed for 15 consecutive seconds before going to H2. If internal pressure transducer opens during the 15 seconds, pump will restart and run until internal pressure transducer closes.

Holding time (H2) – will last for 30 seconds

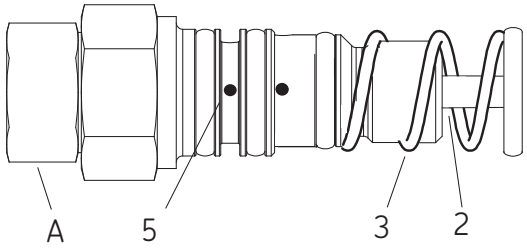
- At the end of 30 seconds, if the internal pressure transducer is closed, the pump will begin a vent cycle.
- If at the end of the 30 seconds the internal pressure transducer is open, the pump will restart and run until the internal pressure transducer closes. When it closes a vent cycle will take place.
- If at the end of 30 seconds the internal pressure transducer is closed, but during the H1 hold time the internal pressure transducer did open, the pump will restart and pump for 2 seconds before a vent cycle begins.

Possible Faults

- E1 Fault – A failure to build pressure at the pump within the allotted 12 minutes of pumping time.
- E3 Fault – A failure to vent at the pump. The internal pressure transducer has 10 seconds to open when the motor reverses to locate the vent position.

Fig. 9

Pump element Z7 for internal lubricant cross porting



A Closure plug (connection G 1/4 in. *(6,35 mm)* for main line)
2 Piston
3 Spring
5 Lateral outlet for lubricant cross porting

Fig. 10

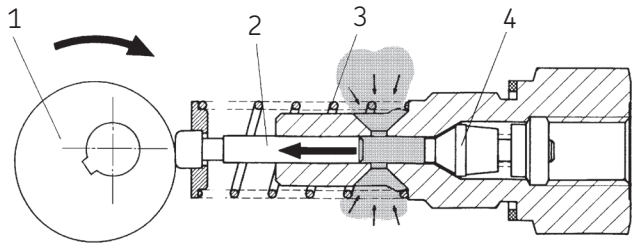
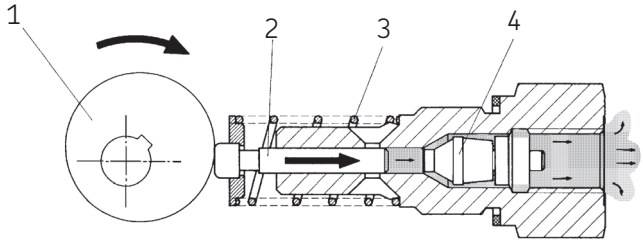


Fig. 11



Holding time (H1)

- Internal pressure transducer must stay closed for 15 consecutive seconds before going to H2. If internal pressure transducer opens during the 15 seconds, pump will restart and run until internal pressure transducer closes.

Holding time (H2) – will last for 30 seconds

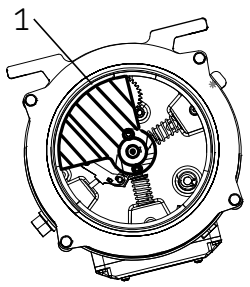
- At the end of H2, if the internal pressure transducer is closed and the external pressure transducer is closed, pump will begin a vent cycle. At the end of H2, if the internal pressure transducer is open or both the internal and external pressure transducers are open an H3 will appear on the display. Pump will turn on again and pump until the internal pressure transducer is closed. When both the internal and external pressure transducers are closed a vent cycle will take place. If at the end of H2 the internal pressure transducer is closed but the external pressure transducer is open, the pump will turn on for 2 seconds and then stop and wait until the external pressure transducer closes. An H3 will appear on the display. When both the internal and external pressure transducers are closed a vent cycle will take place.

Venting cycle

- After the pump completes the preset hold time and the pump maintains the specified pressure, the controller will initiate a vent cycle. The vent cycle will last for ten seconds.
- The motor will turn counterclockwise to engage and open the internal vent valve. The display's rotating segment is turning counter clockwise.
- The motor will stop in a position to hold the vent valve open. "Hr" will be displayed for the remainder of the 10 seconds.

Fig. 12

1 stirring paddle



Filling reservoir with oil

Remove top cover and pour oil into strainer and install cover on reservoir. Tighten cover. Initiate the lubrication cycle to start the motor.

Stirring paddle

The stirring paddle (**1**) (**→ fig. 12**) is attached to the motor and rotates during the lubrication cycle. The paddle is working oil in the reservoir.

Low–level control

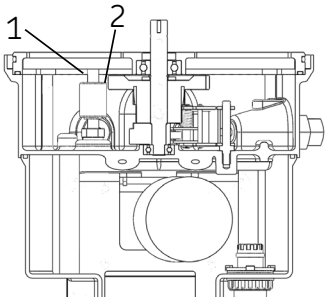
The pump model P653S is equipped with a low–level oil control as a standard feature. The low level control consists of an electromagnetic reed switch and a magnetic float at the bottom of housing. The switch is sealed and does not have any contact with oil.

As soon as the float reaches the preset position at the bottom of the reservoir, a magnetic field will open the switch to indicate the low–level of the oil. The control panel display "LL" will be on.

The electromagnetic reed switch is closed when oil in the housing.

Always refill the pump to the maximum of the reservoir capacity. The "LL" display should be "off" as soon as pump is refilled.

Fig. 13



Switching parts of the low–level control for oil (when the reservoir is empty).

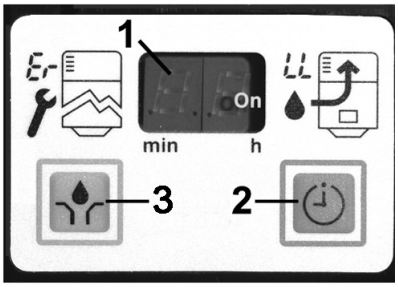
1 Reed switch
2 Float

Keypad and display

Membrane keypad

Fig. 14

P653S membrane key pad



1 Display.
2 Key for acknowledgment of fault indications and changing programming screens.
3 Key for triggering an additional lubrication cycle and for changing programming values.

Test display of the membrane key pad

- A test display is made when voltage is applied: all segments and decimal points are illuminated for 2 seconds.

Fig. 15

Green segment right, power supply “on” ignition switch open (“off”).

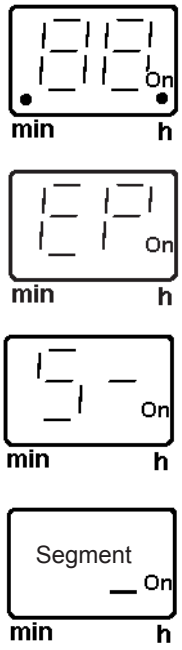
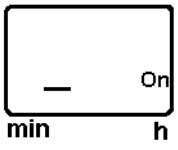


Fig. 16

Green segment left and right are “on”/ignition switch closed (“on”).



Notice
EP will briefly appear after the display test. If EP remains on after the display test this indicates that the remote lube push button is in the closed position or the keypad push button is defective.

When power is applied to the pump the display will indicate a pressure transducer is connected to the pump. The example indicates an internal pressure transducer.

Operating mode

- If there is only one segment on in the lower right-hand corner this indicates that the ignition switch is open. If the ignition switch is open and the right segment is flashing this indicates a fault condition. Closing the ignition switch the display will indicate what type of fault has occurred.
- If the ignition switch opens during a lubricating time the lube cycle will be completed.
- When switching on the ignition switch, the left-hand segment in the display window lights up (→ **fig. 19**, **page 15**).
- During the lubricating time of the pump, a circulating illuminated segment appears in the display window of the membrane key pad (→ **fig. 20**, **page 16**).
- If the power supply is interrupted during the pause time, the pause time continues at the point of interruption after switching power on again.

- If the power supply is interrupted during the lubricating time the operating time will start at the beginning after switching power on again.
- If the lower right-hand segment is on this indicates that there is 24 V DC going to the red wire in the 7 conductor cable.
- When there is a 24 V DC pulse on the black wire the lower left-hand segment will be on.
- During the lubricating time of the pump, a circulating illuminated segment appears in the display window of the membrane key pad (→ **fig. 17**).
- If the power supply is interrupted during the lubricating time the operating time will start at the beginning after switching power on again.

Fig. 17

Green circulating illuminated segment, lubricating time, pump is running.

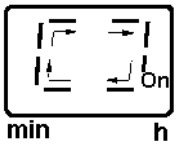
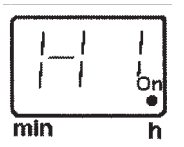
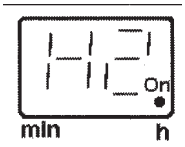
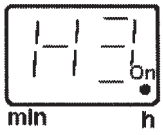


Fig. 18

Display of holding time



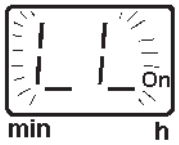




Display is indicating holding times when pump reaches preset pressure.

Fig. 19

Display of a low-level indication.



Low-level control
In the event of a low–level signal the display will flash LL.

Important:
If a low-level signal occurs during the lubricating time, the current operating cycle will still be completed. However the pump does not switch on automatically any more. It can only be switched on again by a manual lube cycle.

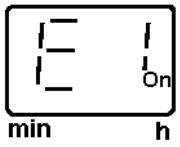
Malfunctions

- If there is no feedback from the pressure transducer within 12 minutes of pumping time, the pump switches off immediately. One of the fault signals E1 to E4 (Error, → **fig. 20** to **23**) will be shown flashing in the display of the membrane key pad.

Important!
If a malfunction is present, E1, E2, E3 or E4 will be flashing. The pump does not switch on automatically any longer. It can only be triggered via an additional lubrication cycle. Furthermore, a change to the programming mode is not possible while in alarm.

Fig. 20

Display of the malfunction E1, failure to build pressure at the pump

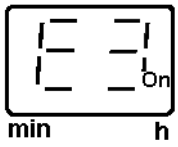


E1 fault is a failure to build pressure at the pump.

- If pressure transducer fails to actuate within 12 minutes of pumping this fault will occur.

Fig. 22

Display of the malfunction E3, failure to vent at the pump

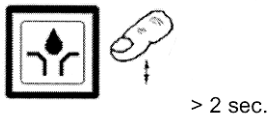


E3 fault is a failure to vent at the pump.

- Failure of the internal pressure transducer to open during the 10 seconds that the pump motor reverses to locate the vent position.
- Failure of the internal pressure transducer to drop 900 psi *(62 bar)* below the P7 parameter (P7 minus 900 psi *(62 bar)*) during the 10 seconds that the pump motor reverses to locate the vent position.
- If at the end of the pause time the internal pressure transducer has not dropped below 900 psi *(62 bar)* an E3 fault will occur.

Fig. 24

Operator key to trigger an additional lubrication cycle



To trigger an additional lubrication cycle via the push button, press the button for 2 seconds.

Fig. 25

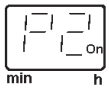
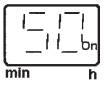
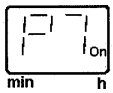
Operator key to acknowledge a fault.

To trigger additional lubrication cycles externally:

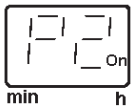
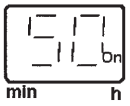
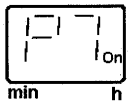
- Press the push button to trigger additional lubrication cycles externally. Press the push button for 2 seconds.
  - Mobile pump with/ignition switch open up to two times.
  - Industrial pump w/machine switch open to unlimited.

Note!
Existing fault signals (→ **fig. 19** and **20**, **pages 15** and **16**) must be acknowledged before triggering an additional lubrication cycle.

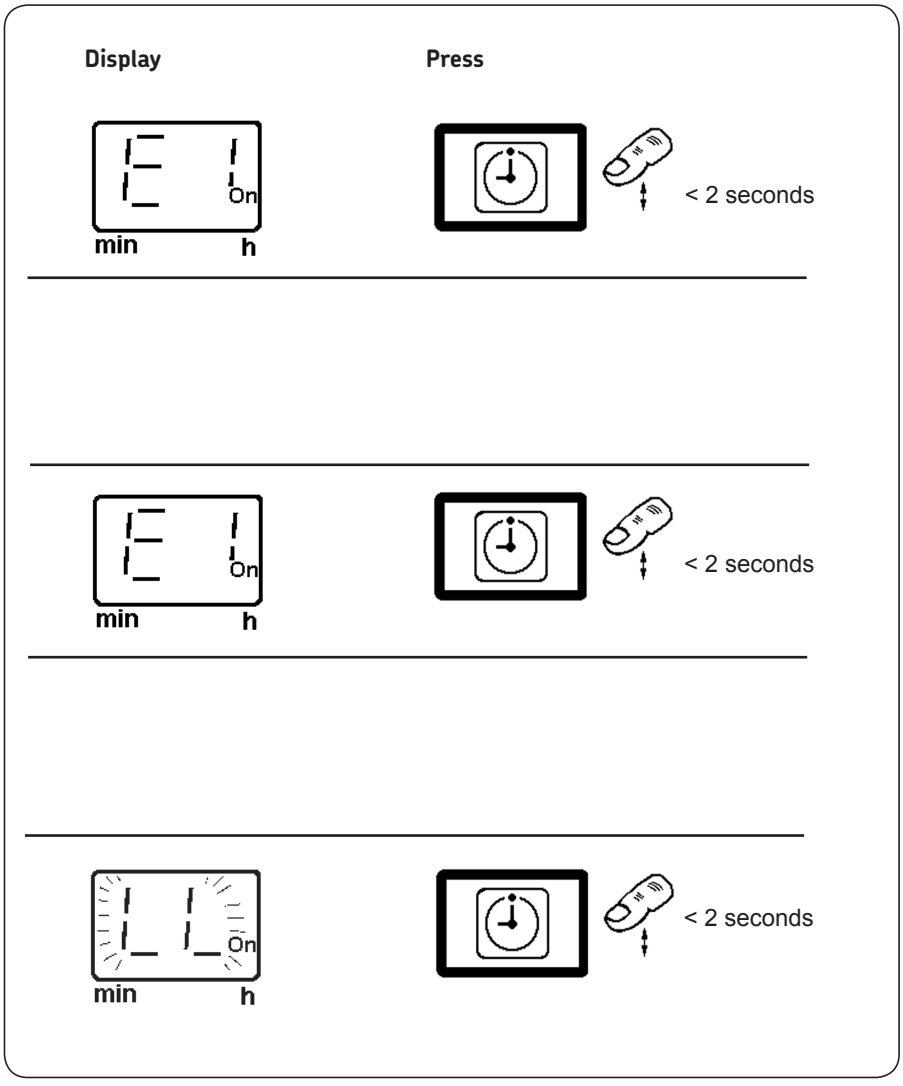
Factory settings for parameters

Programming steps	Factory setting	Description
	00	Count Thousands, hundreds
	01	Count Tens, unit
	NO	Output of both fault relays **no (normally open)** nc (normally closed)
	02	Two options for signalling a fault 01 (Option 1) F1 relay contact a) Low–level fault will cause F1 contact to repeatedly open and close. b) Pressure fault will cause F1 contact to close and stay closed. F2 relay contact A low–level fault or a pressure fault will cause the F2 contact to close and stay closed. 02 (Option 2) F1 fault relay's contact will close on a low–level fault F2 fault relay's contact will close on a pressure fault Both of these contacts can be used for remote signalling.
	35	The P7 programming step will only appear if you have a pump that uses an internal pressure transducer. (Reading x 100) 35 x 100 = 3,500 psi. 3,500 psi is the maximum pressure that the pump will build. Adjustable from 700 to 4,600 psi in 100 psi increments. Preset to 1,200 psi. Hysteresis 500 psi.

Factory settings for parameters

Programming steps	Factor setting	Description
	01	Pause time - 0 to 59 hours.
	00	Pause time - 0 to 59 minutes.
	NO	Output of both fault relays. NO (normally open). NC (normally closed).
	o2	Two options for signalling a fault: **o1 (option 1)** F1 relay contact. a) Low-level fault will cause F1 contact to repeatedly open and close. b) Pressure fault will cause F1 contact to close and stay closed. F2 relay contact. A low-level fault or a pressure fault will cause the F2 contact to close and stay closed. **o2 (option 2)** F1 fault relay's contact will open on a low-level fault. F2 fault relay's contact will close on a pressure fault. Both of these contact can be used for remote signalling,
	SP	Option to have the pump start with a pause time or a lube system **SP – pump starts with a pause time** SO – pump starts with a lube cycle
	35	The P7 programming step will only appear if you have a pump that uses an internal pressure transducer. (Reading x 100) 35 x 100 - 3,500 psi Adjustable from 700 to 4,600 psi in 100 psi increments. Preset 1200 psi, hysteresis - 500 psi.

Acknowledging a fault



To acknowledge a malfunction:

- The flashing display changes into continuous light by pressing the button (acknowledging). By acknowledging the fault signal, the flashing E1, E3, or LL changes into permanent light.
- Messages which have been acknowledged but have not yet been remedied will flash again after the pump is switched off and on again.
- After fault has been acknowledged no more lube cycles will take place until a successful manual lube cycle has taken place.

Programming the pump

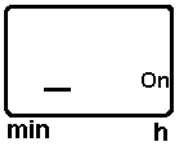
Notice
Pump power must be on to start programming.

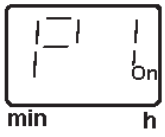
Key	Function
	Key for modifying the parameters in the programming step

Key	Function
	Key for switching to the next programming step

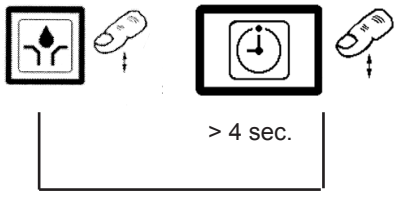
Step 1

Display





Press

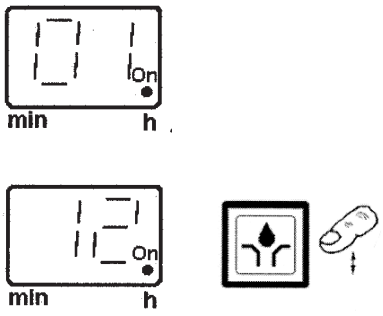


Setting of Pause Time P1 (hours) and P2 (minutes).

To access the programming mode, press both buttons at the same time > 4 seconds, so that "P1" appears in the display.

Programming options:	**Pause time**
P1	0 - 59 hours
P2	0 – 59 minutes
Min. pause time	4 minutes
Max. pause time	59 hours
	59 minutes

Step 2



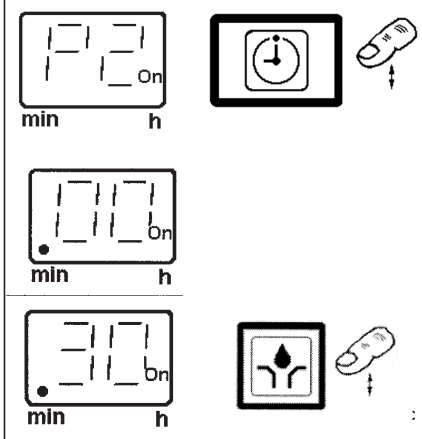
P1: Setting of hours

When releasing the two buttons, the currently set value appears.

Example.: factory-set value: ..... 1 hour

"Hour" is indicated by a **dot** on the **right-hand side.**

Step 3



Press button

Settings are made in one direction:.....0, 1, 2, 3,..59 hours
Button pressed once ..... increase by 1 hr.
Button pressed continuously ....quick sequence
Example:.....12 hrs.

P2: Setting minutes

Press button, so that "P2" appears in the display.

When releasing the button, the currently set value appears (here the factory-set value: 0 minutes).

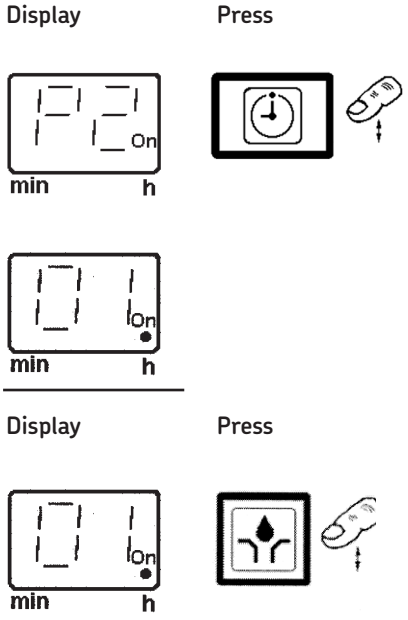
"Minute" is indicated by a dot on the left-hand side.

Press button

Settings are made in one direction:..... 0, 1, 2, 3, 4, 5, ... 59 min
Button pressed once ..... increase by 1 minute
Button pressed continuously ..... quick sequence
Example:..... 30 minutes

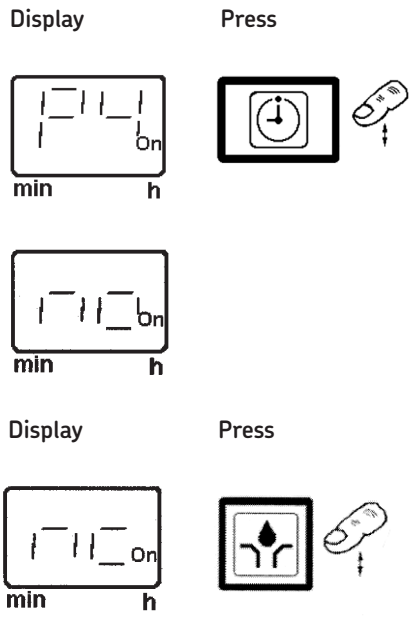
Notice
If "Hours" are set to "00", the display will show minimum pause time of 4 minutes..

Step 4



P2: Setting for counts – tens, units

Step 5



P4: Programming of the output signal for both alarm relays. The default setting on the printed circuit board for the alarm contacts is switching to battery minus.

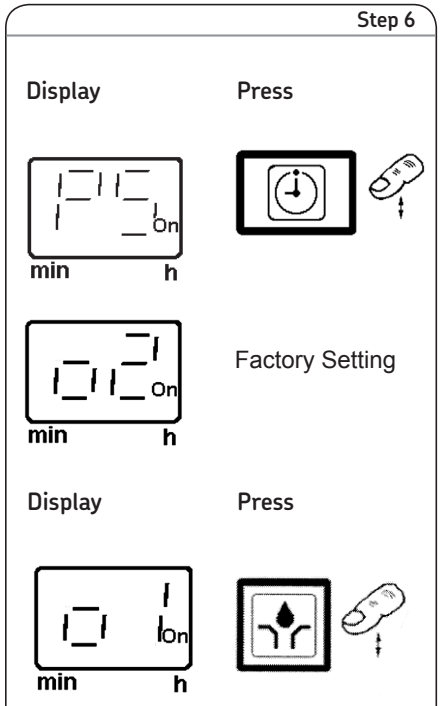
Press button so that "P4" appears in the display.

When releasing the button, the currently set value appears in the display (here the factory–set value NO, normally open contact). On a fault condition the alarm contact will close.

Press button.

The external fault contact is modified by programming it as NC normally closed contact. On a fault condition the alarm contact will open.

Step 6



P5: Two options for signalling a fault condition with alarm relays F1 and F2.

Press button so that "P5" appears in the display.

01 (Option 1) P4 is set to the default of Normally Open.

F1 relay contact

a) A low–level fault will cause the F1 contact to repeatedly open and close.

b) A pressure fault will cause the F1 contact to close and stay closed.

F2 relay contact

A low–level fault or a pressure fault will cause the F2 contact to close and stay closed.

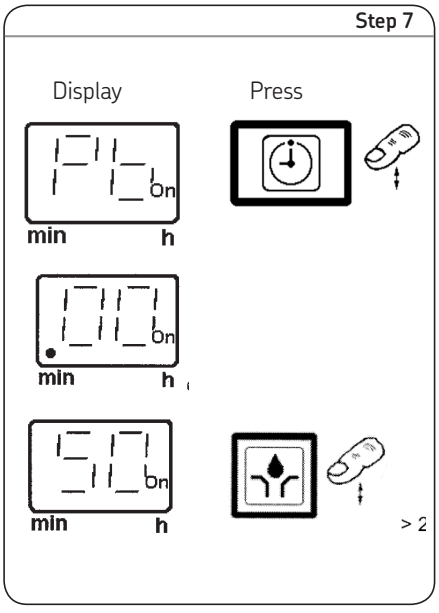
02 (Option 2) P4 is set to the default of normally open.

F1 fault relay's contact will close on a low–level fault and stay closed.

F2 fault relay's contact will close on a pressure fault and stay closed.

Both of these contacts can be used for remote signaling.

Press push button to change to option 1.



P6: Upon applying power to the pump you can program whether it starts with a pause time SP or starts with a lube cycle S0.

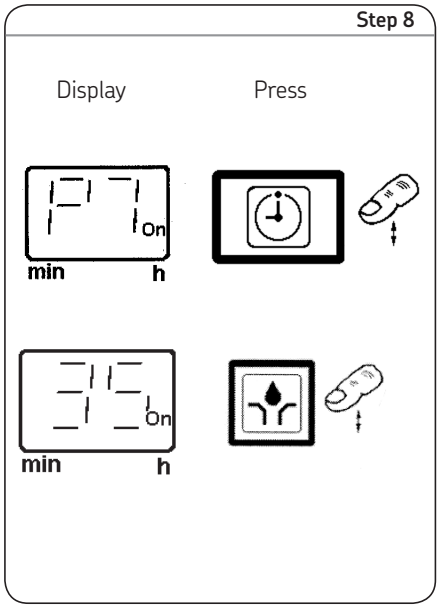
Press button, so that "P6" appears in the display.

The currently set values appear as to whether the cycle is to start with the pause time or the lubricating time.

The default setting for the pump is set to start with a pause time **SP (Start Pause time)**.

Press button.

Each time the pump is switched on, it will start with the lubricating time **S0 (Start Operation**). After the first lubricating time the preset pause time will be valid.



P7: Programs the setting of where the internal pressure transducer will close. This is the maximum pressure that the pump can reach. Factory setting is 3,500 psi.

Press button to change value.

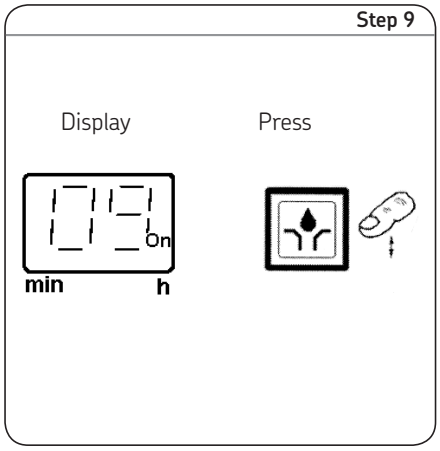
Reading x 100 = Transducer setting in psi

35 x 100 = 3,500 psi.

This setting is adjustable from 1,400 psi to 4,600 psi in 100 psi increments.

Notice

The P7 programming will only appear if you have a pump that has an internal pressure transducer..



Press button to change value.

Reading x 100 = Transducer setting in psi

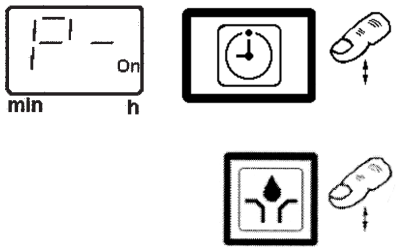
9 x 100 = 900 psi.

Notice

The P8 programming parameter will only appear if you have a pump that has an external pressure transducer connected.

Step 10

Display Press



Completing the programming

Press button. “P -” is displayed.

Notice
Always carry out the programming completely in order to save the new values.

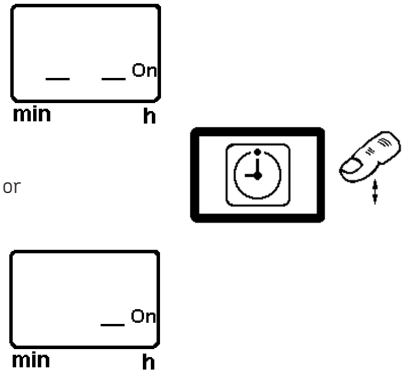
- Press this key (additional lubrication) to complete the programming and to save the entered parameters.

Notice
If the button “additional lubrication” is not pressed within 30 seconds, the changed parameters will not be saved and the previous programming remains valid.

Notice
After completion of the programming, check the parameter settings in the review mode.

Programming of the pump with pressure transducer is complete.

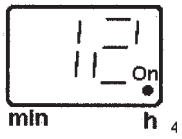
Review of the pump parameters



Press the button > 2 seconds.

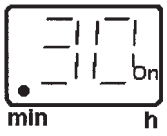
Notice
The following display sequence is shown once. The change of display occurs every two seconds. Example of the pump set to lubricate each 12 hours 30 minutes and remaining pause time (rP) is 5 hours 10 minutes.

Pause Time



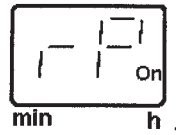
after one sec.

12 . (hours)



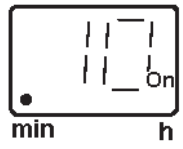
after one sec.

30 (minutes)



after one sec.

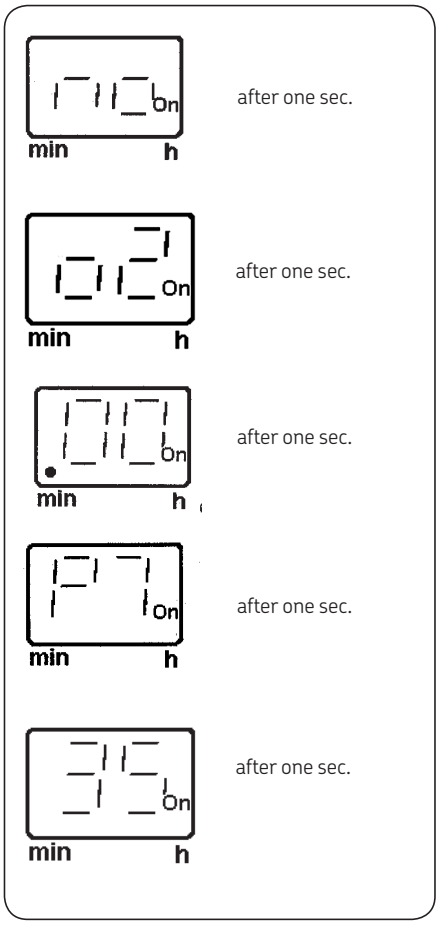
after one sec.



after one sec.

rP (remaining pause time)
5 . (hours)
10 (minutes)

Operating mode



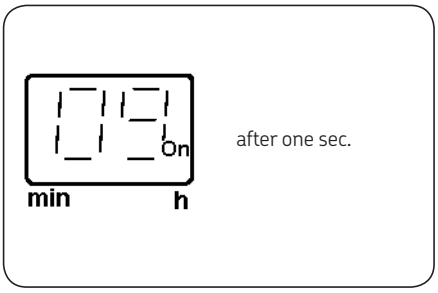
NO Both relay contacts are normally open.

o2 Option 2 - How F1 and F2 will signal a fault.

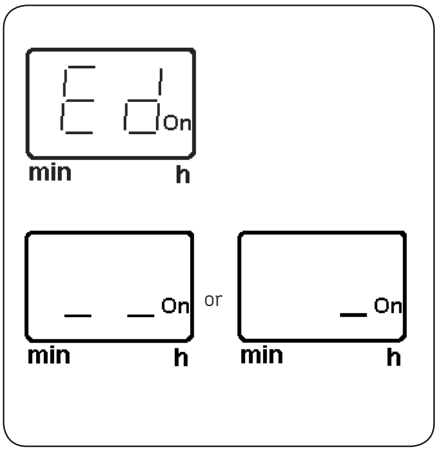
SP Pump starts with a pause time.

P7 Will only appear if pump has an internal pressure transducer. Maximum pressure the pump will build.

35 Indicates that the internal pressure transducer will close at 3500 psi.



External pressure transducer will open at 900 psi.



Ed Indicates software version.

The next two displays will indicate software version.

Termination of the Reviewing of Parameters.

Technical data

Electrical data for AC pump

Incoming voltage	100 to 240 V AC
Maximum current	1.7 A
Frequency	47 to 63 Hz
Output from power supply	24 V DC at 5 A
External fuse	3 A (time delay)

Common electrical data

Minimum pause time	4 min.
Maximum pause time	59 hrs 59 min.
Pause time increments	1 min. or 1 hour
Maximum pumping time	12 min.
Enclosure rating	IP 6K9K (NEMA 4X)

Rating for fault relay contact:

Switching voltage	Max. 230 V AC/120 V AC/24 V DC
Switching current	Max. 1 A inductive
Minimum switching current	0.1 Ma

Pump P653S

Operating pressure with pressure transducer	1,450 psi *(80 bar)* (transducer can be adjusted from 600 to 1,200 psi (*41 to 82 bar*))
Operating temperature range for ac pumps	32 to 122 °F *(0 to 50 °C)*
Number of outlets (see instructions)	1
Lubricant	Oil at least 40 mm^2/s (cST)
Output	1.5 in^3/min (24,6 cm^3/min)
Reservoir sizes, l	4 and 8,
Lubricant line connection size	G 1/4 in. *(6,35 mm)*

Pump elements k7

Piston diameter	7 mm
Number of pumping elements (connected together)	3

Tightening torques

Install pump	13.3 ft.lbf *(18 Nm)*
Electric motor on housing	8.8 ft.lbf *(12 Nm)*
Pump element in housing	14.57 ft.lbf *(20 Nm)*
Closure plug in housing	8.8 ft.lbf *(12 Nm)*
Return line connector on housing	8.8 ft.lbf *(10 to 12 Nm)*

Weights

8-l reservoir, standard

Pump P653S without connecting cable	19.8 lbs. *(9,0 kg)*
Pump P653S version 1A	21.1 lbs. *(9,6 kg)*

4-l reservoir, standard

Pump P653S without connecting cable	19.1 lbs. *(8,7 kg)*
Pump P653S version 1A	21.3 lbs. *(9,7 kg)*

The weights above include the following equipment:
Pump kit with three pump elements, pressure relief valve, oil filling 3.3 lbs. (*1,5 kg*)

Packing (cardboard box)

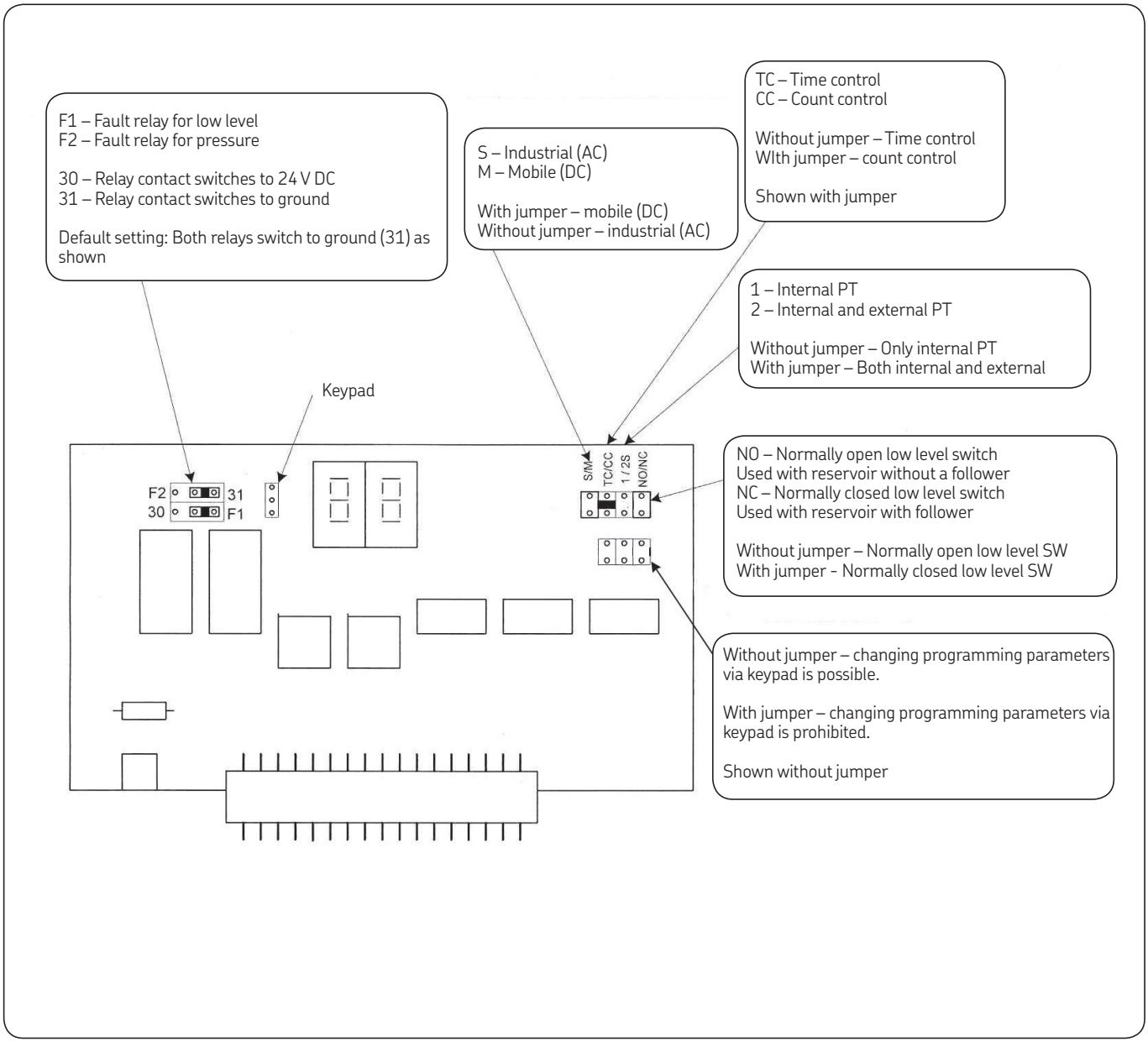
Attaching parts

Operating Instructions

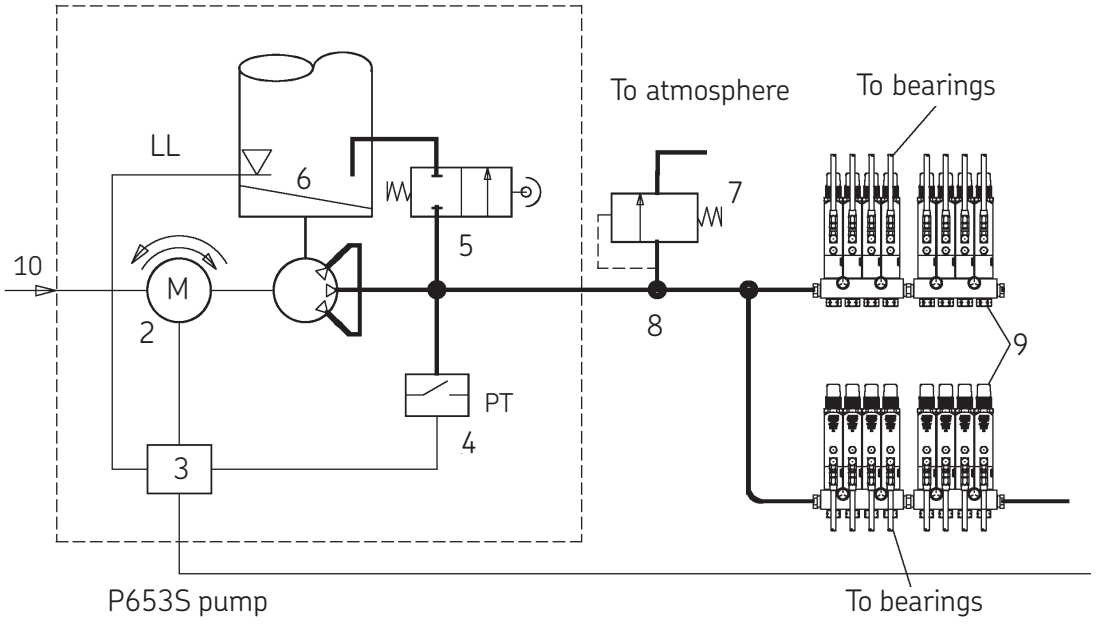
Installation

- Use only high pressure 5,000 psi *(344 bar)* minimum hydraulic hose for supply lines.
- Use only hose connection fittings that are appropriate for the programmed/pre-set system pressure.

Jumper settings for 653 pump PCB



Schematic of P653S pump

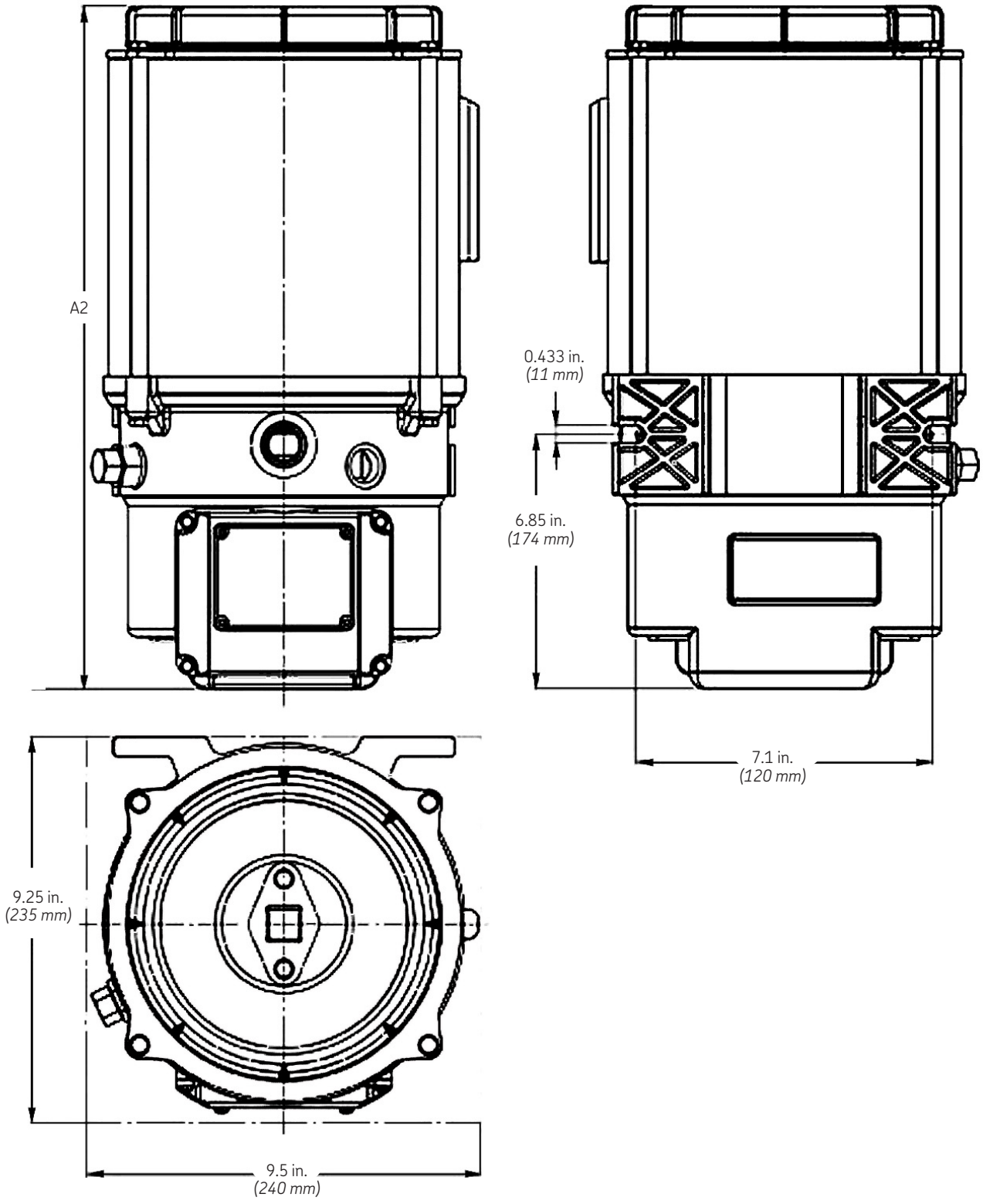


1 Pumping housing (3 pump elements)
2 Motor
3 Controller, key board with display
4 Internal pressure transducer (P.T.)
5 Internal vent valve
6 Reservoir with low level control
7 Pressure relief, 1,450 psi *(100 bar)* external
8 High pressure supply line
9 Injectors
10 Power supply (120 V AC)

Note: For proper operation of the Centro–Matic systems, vent pressure before next lubrication cycle at the end of line should be below 150 psi (10,3 bar) for oil type injectors.

Fig. 45

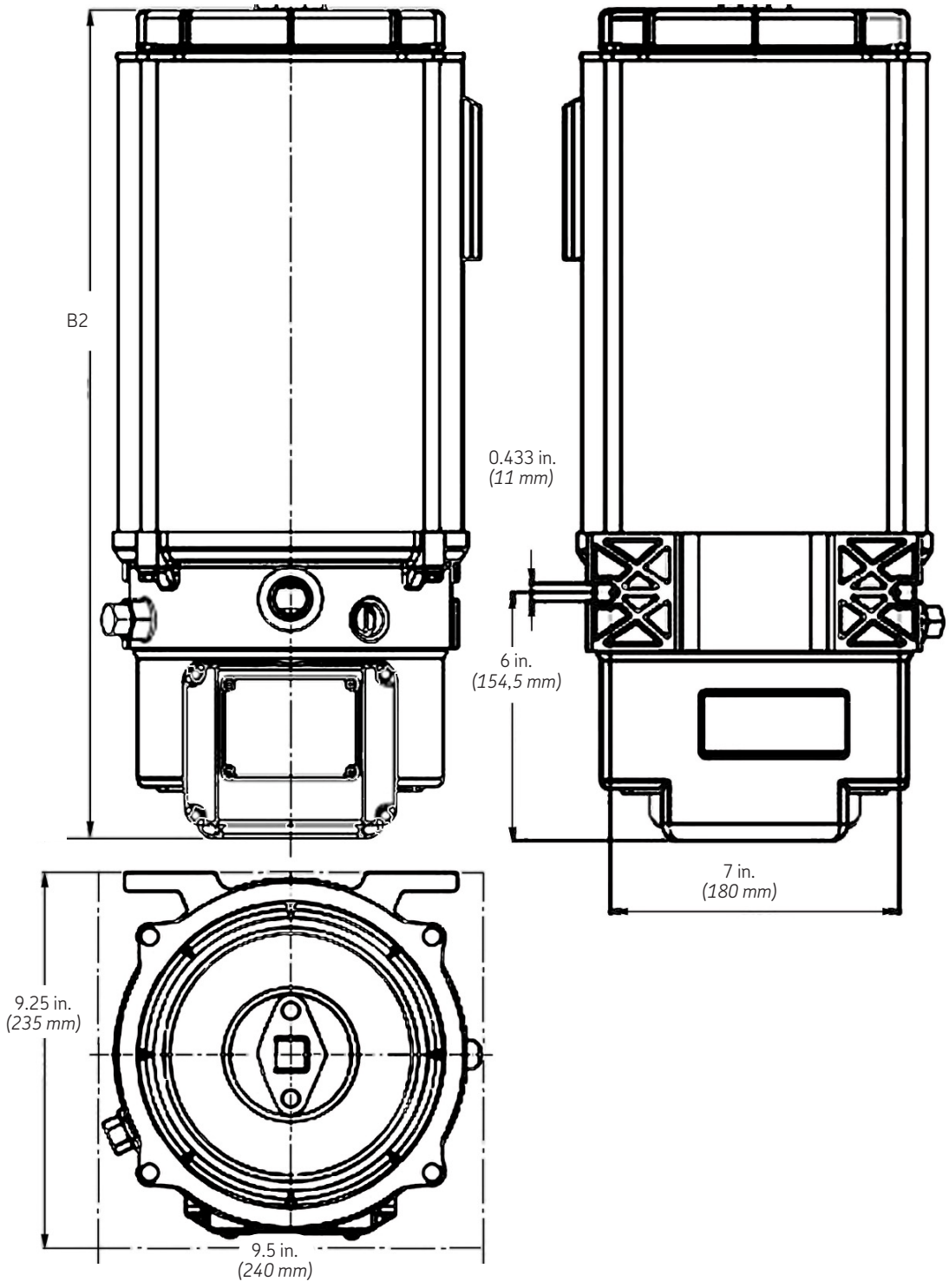
Dimensions P653S, 4 liter reservoir



Reservoir with stirring paddle: A2 = 18.4 in. *(467 mm)*

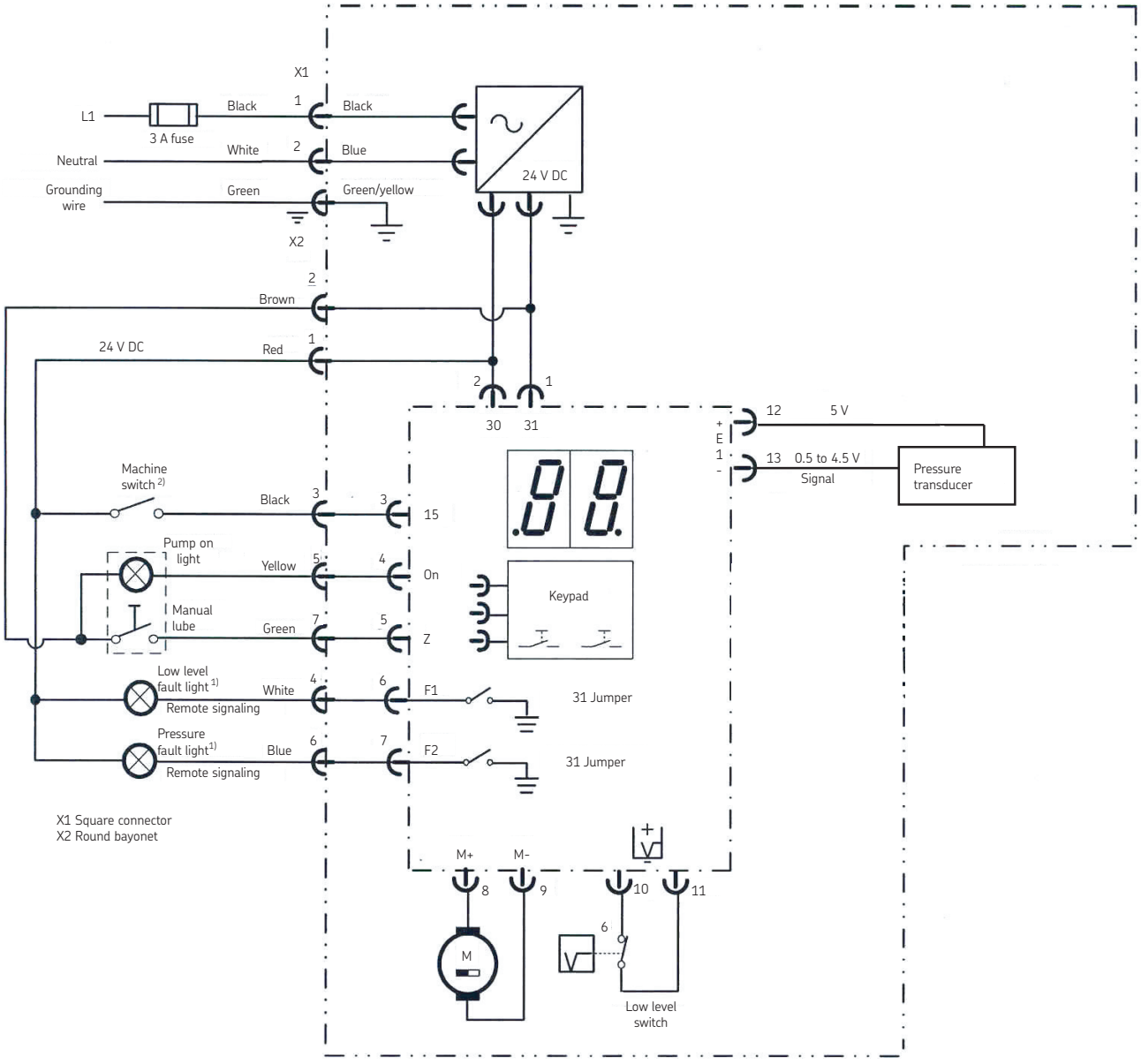
Fig. 46

Dimensions P653S, 8 liter reservoir

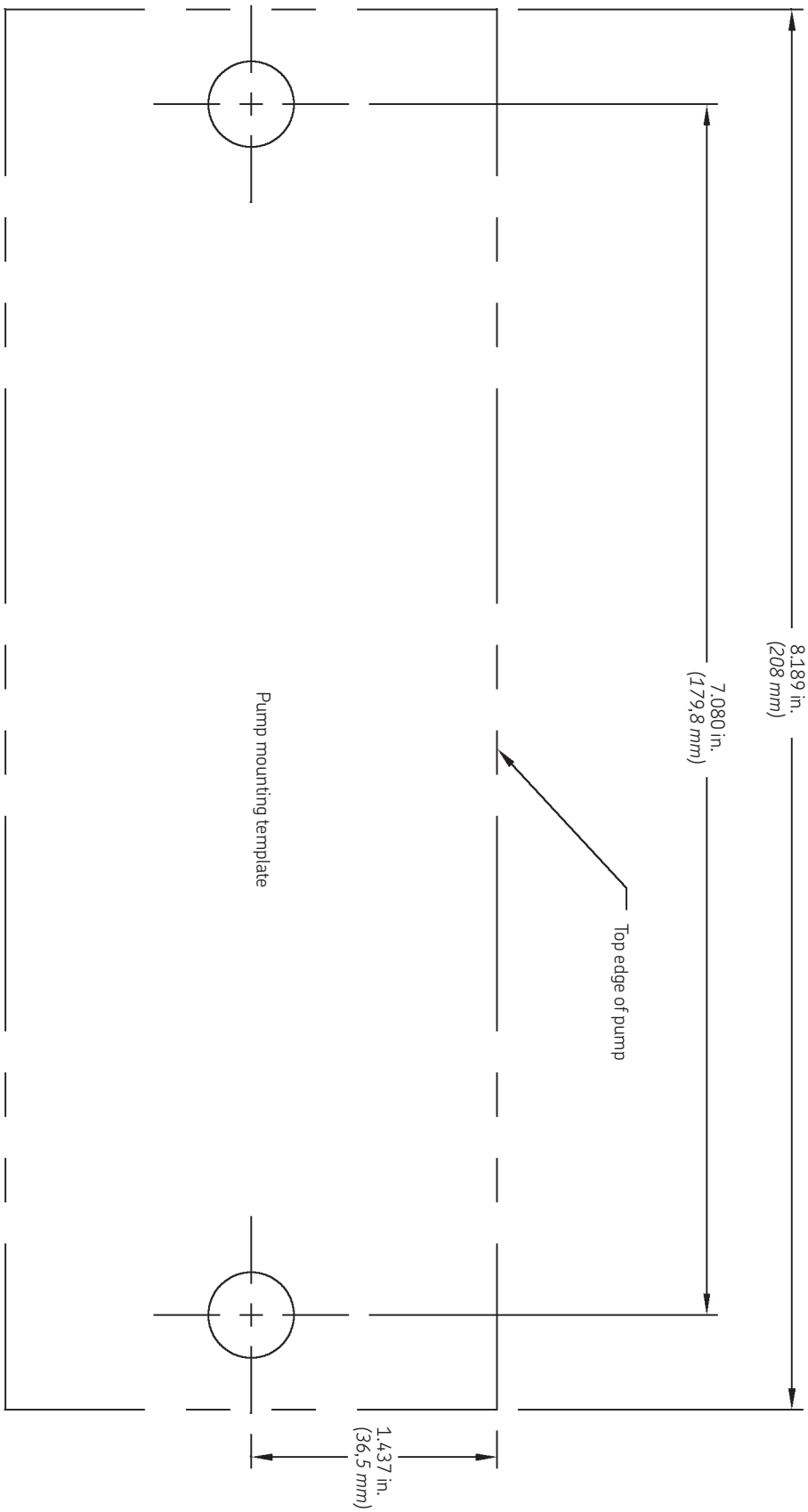


Reservoir with stirring paddle: B2 = 20 in. *(508 mm)*

Connections for 110-230 V AC 50/60 Hz P652S pump



1) P4 Programming parameter set to N.O. P5 Programming parameter set to option 2
2) Must connect red and black wires together if a machine switch is used. A special 7 conductor bayonet plug (P/N 664-34550-1 may also be used.


8.189 in.
(208 mm)
7.080 in.
(179,8 mm)
Top edge of pump
Pump mounting template
1.437 in.
(36,5 mm)

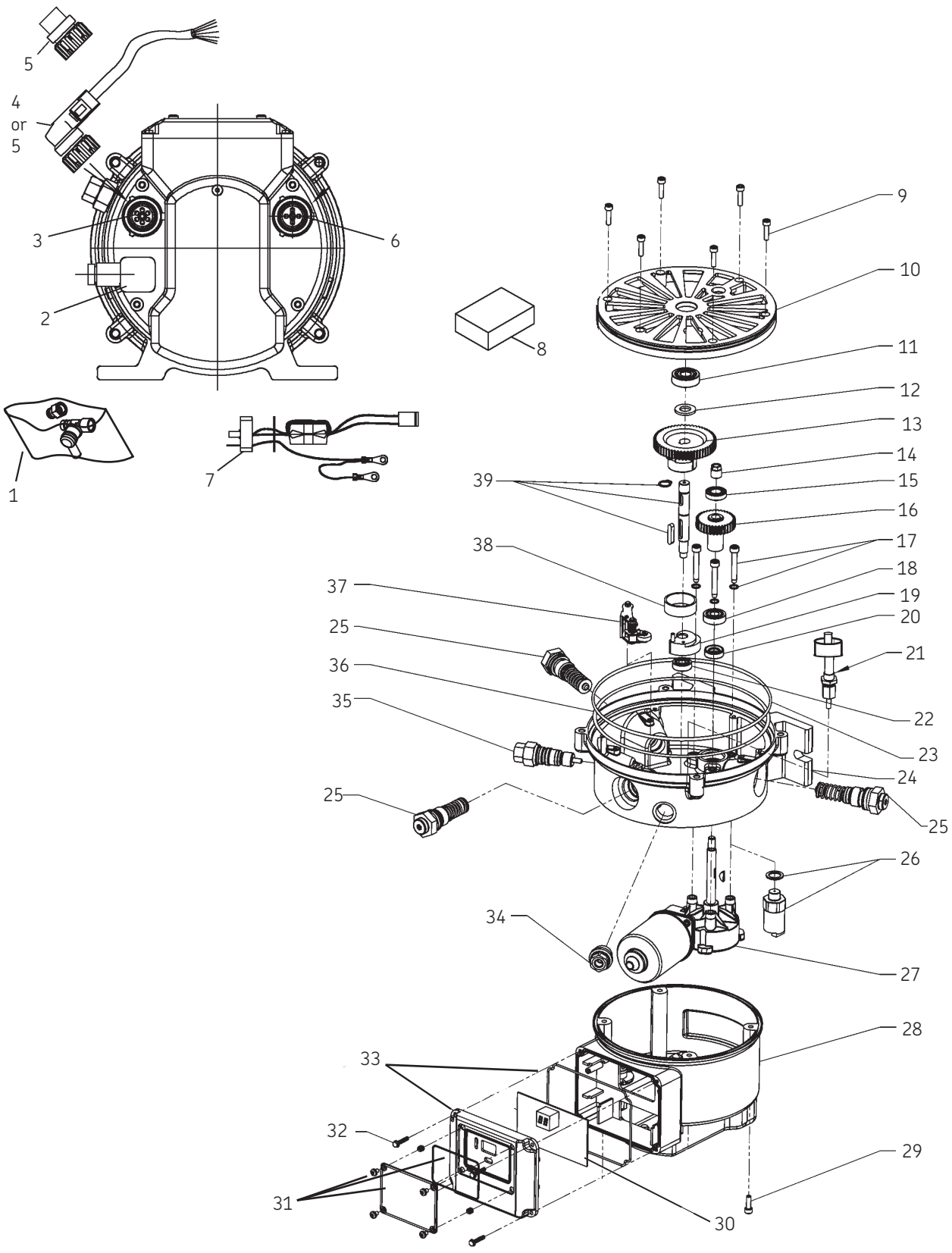
Troubleshooting

Mode of failure	Solution
Pump motor does not run. No green right corner segment lit on display (**→ fig. 18**, **page 15**)	Check power supply and fuses.
Pump does not deliver lubricant but runs if manual lube switch (**3**) (**→ fig. 17**, **page 15**) is pushed. No green left corner segment lit on display (**→ fig. 19**, **page 15**).	Check count switch for 24 V DC pulse.
"LL" display is flashing. Reservoir is almost empty.	Refill reservoir and push switch (**3**) (**→ fig 14**, **page 18**) to initiate manual lube cycle.
"E1" display is flashing. Pump failed to develop internal pressure in 12 minutes.	Push switch (**2**) (**→ fig 14**, **page 18**) to acknowledge the fault. Initiate manual lube cycle. Investigate and correct possible causes – air pockets, broken line, connections leakage, worn pumping element, failed internal pressure transducer. Initiate manual lube cycle.
"E3" display is flashing. Pump failed to vent at the pump.	Push switch (**2**) (**→ fig 14**, **page 18**) to acknowledge the fault. Initiate manual lube cycle. Investigate and correct possible causes – pump eccentric did not stop in a proper position, vent valve failed
Grease is coming out of the pressure relief valve (**6**) (**→ fig.1**, **page 7**).	Check and adjust setting of the pressure transducer.

Parts list

Item	Description	Part no.	Quantity
1	Valve svte - 100 r1/4 +nip.S2520-1/4 1. bag)	624-77642-1	1
2	Socket GDM 3011 J black UL, CSA	236-10834-5	1
3	Connector 7 poles (AC pump)	664-34569-1	1
	Connector 7 poles (DC pump)	664-34303-7	1
4	Cable assembly,10 m (32 ft),7/7 pole	664-34428-3	1
5	Plug, 7 pole jumper	664-34550-1	1
6	Connector for external switch/transducer	664-34550-6	1
7	Internal cable for ac pump	664-34569-2	1
8	Power supply	275906	1
9	Screw, socket hex 8.8 M 5 x 20C	201-12016-1	6
10	Intermediate bottom	445-71524-1	1
11	Bearing d12/24 x 6	250-10683-1	1
12	Washer st 12 c -200hv	209-13011-9	1
13	Gear, eccentric	275558	1
14	Threaded sleeve	445-71527-1	1
15	Bearing d12/32x10	250-14064-6	1
	Shaft drive with retaining ring and key	445-71266-1	1
16	Pinion gear, drive	275557	1
17	Screw,6.0X40z with seal 220-14101-1	206-13710-6	3
18	Bearing d10/26x 8	250-14009-7	1
19	Cam, relief unit	445-71253-1	1
20	Seal, radial BA 75 fkm 10x22x 7	220-12231-3	1
21	Floating switch	445-72871-1	1
22	Bearing d 8/22x 7	250-14064-7	1
23	O-ring 72nbr 180,00x4,00	219-10684-6	1
24	Housing	316-16445-1	1
25	Pump element, z7 service kit	645-77196-1	3
26	Pressure transducer	234-106636	1
27	Motor, drive 24 V DC	275702	1
28	Cover, housing	275666	1
29	Screw, sock, hex. 8.8 M 5x 16 C	201-12016-6	4
30	Printed circuit board 24 V[1)]	236-10655-7	1
31	Protective cover kit	545-34361-6	1
32	Screw with/washer	206-13796-9	4
33	Housing front cover with/sealed keyboard	514-33602-1	1
34	Adapter m 22x1.5 w/oil fitting 5050	304-16543-1	1
35	Relief element	545-33042-1	1
36	O-ring 72 nbr 195,00x3,00	219-10390-3	1
37	Rocker arm, ass'y, relief unit	545-32906-1	6
38	Press ring	444-24439-1	1
39	Shaft drive with retaining ring and key	445-71266-1	1
40	Screw, hex, 8.8 M6x20C	200-13022-7	4
	Washer ST 6C-20HV	209-13011-5	4
41	Cover, reservoir	444-70641-1	1
42	Strainer 450/1000 f.2Yn-qls311	235-13189-1	1
43	Sheet with strainer P605/653-YNBD	445-72859-1	1
44	Closure insert	445-71532-1	1
45	O-ring 72nbr 180.000 X 4.00	219-10684-6	1
46	Reservoir, 4 l w/vent tube and labels	545-33045-1	1
	Reservoir, 8 l w/vent tube and labels	545-33044-1	1
47	Support sleeve, 4 l reservoir	445-71543-1	4
	Support sleeve, 8 l reservoir	445-71542-1	4
48	Reservoir assembly F-603-4YNBO-YLBO (4 l)	545-33009-1	
49	Reservoir assembly F-603-4YNBO-YLBO (8 l)	545-60046-1*	
50	Stirring paddle assembly	545-33601-1	1
51	Screw, hex, 8.8 M 6x40C	200-12000-3	4
	Washer ST6C-20HH	20913011-5	4

[1)] During the replacement of control PCB 236-10655-7, pay attention to the jumper position. The replacement PCB will be sent out with standard factory settings. The previous jumper settings have to be taken so that your pump operates properly.
* Indicates change.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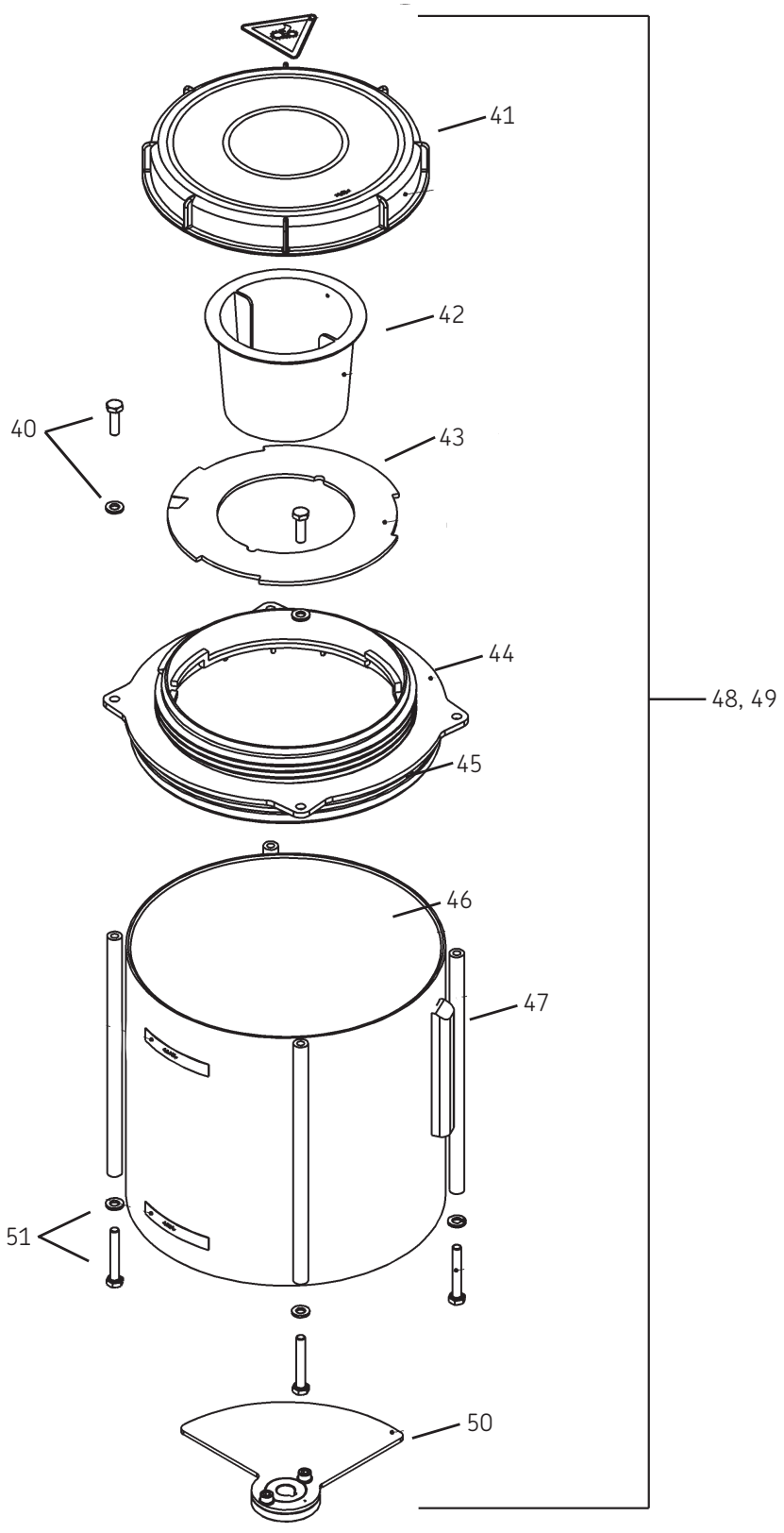
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Lincoln industrial standard warranty

Standard Limited warranty

Lincoln warrants the equipment manufactured and supplied by Lincoln to be free from defects in material and workmanship for a period of one (1) year following the date of purchase, excluding there from any special, extended, or limited warranty published by Lincoln. If equipment is determined to be defective during this warranty period, it will be repaired or replaced, within Lincoln's sole discretion, without charge.

This warranty is conditioned upon the determination of a Lincoln authorized representative that the equipment is defective. To obtain repair or replacement, you must ship the equipment, transportation charges prepaid, with proof of purchase to a Lincoln Authorized Warranty and Service Center within the warranty period.

This warranty is extended to the original retail purchaser only. This warranty does not apply to equipment damaged from accident, overload, abuse, misuse, negligence, faulty installation or abrasive or corrosive material, equipment that has been altered, or equipment repaired by anyone not authorized by Lincoln. This warranty applies only to equipment installed, operated and maintained in strict accordance with the written specifications and recommendations provided by Lincoln or its authorized field personnel.

This warranty is exclusive and is in lieu of any other warranties, express or implied, including, but not limited to, the warranty of merchantability or warranty of fitness for a particular purpose. Warranty on items sold by Lincoln, but not manufactured by Lincoln are subject to the warranty consideration, if any, of their manufacturer (such as hoses, hydraulic and electric motors, electrical controllers, etc.) Assistance in making such warranty claims can be offered as required.

In no event shall Lincoln be liable for incidental or consequential damages. Lincoln's liability for any claim for loss or damages arising out of the sale, resale or use of any Lincoln equipment shall in no event exceed the purchase price. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, therefore the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights. You may also have other rights that vary by jurisdiction.

Customers not located in the Western Hemisphere or East Asia: Please contact Lincoln GmbH and Co. Kg, Walldorf, Germany, for your warranty rights.

Special limited warranties

Special limited 2 year warranty SL–v series, single injectors–85772, 85782, and replacement injectors–85771, 85781

Lincoln warrants the SL–V Injector series to be free from defects in material and workmanship for two (2) years following the date of purchase. If an injector model (single or replacement) is determined to be defective by Lincoln, in its sole discretion, during this warranty period, it will be repaired or replaced, at Lincoln's discretion, without charge.

Special limited 5 year warranty series 20, 25, 40 bare pumps, pmv bare pumps, heavy duty and 94000 series bare reels

Lincoln warrants series 20, 25, 40 bare pumps, PMV bare pumps, Heavy Duty (82206), Mini Bench (81133, 81323), and all 94000 LFR series (single arm and dual arm) bare reels to be free from defects in material and workmanship for five (5) years following the date of purchase. If equipment is determined by Lincoln, in its sole discretion, to be defective during the first year of the warranty period, it will be repaired or replaced at Lincoln's discretion, without charge. In years two (2) and three (3), the warranty on this equipment is limited to repair with Lincoln paying parts and labor only. In years four (4) and five (5), the warranty on this equipment is limited to repair with Lincoln paying for parts only.

Special limited 5 year warranty– limited oil meters, limited fluid control valves, aod (air–operated diaphragm pumps)

Lincoln warrants the 712 series Control Valves, 912 series Lube Meters, Electronic Lube Meters (980. 981, 982 series), our Universal Inline Digital Meters (812/813 series), and our AOD Pump offering to be free from defects in material and workmanship for five (5) years following the date of purchase. If either is determined to be defective by Lincoln, in its sole discretion, during the warranty period, they will be repaired or replaced, at Lincoln's discretion, without charge.

Special DEF (diesel exhaust fluid) limited warranty

DEF products are warranted to be free from defects in material and workmanship for a period of one (1) year following the date of purchase. The following exceptions to the standard warranty period are in effect:

- **85700–30/85700–50 DEF hose reels (bare reel only),**
  277251/277252 AC DEF pumps, and 277256 and 277257 DEF meters are warranted for two (2) years from date of purchase,

- **85623 DEF AOD (air operated diaphragm) pumps**
  are covered under the standard five (5) year AOD pump warranty.

If either is determined to be defective by Lincoln, in its sole discretion, during the warranty period, they will be repaired or replaced, at Lincoln's discretion, without charge.

Lincoln Industrial contact information

To find Lincoln Industrial's Nearest Service Center call one of the following numbers, you may also use our website
Customer Service 314–679–4200 (international number 01-314-679-4200)
Website lincolnindustrial.com

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