GRUNDFOS INSTRUCTIONS

PM 1, PM 2

GB Service instructions









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1. Symbols used in this document



Warning

If these safety instructions are not observed, it may result in personal injury.



Warning

If these instructions are not observed, it may lead to electric shock with consequent risk of serious personal injury or death.

Caution

If these safety instructions are not observed, it may result in malfunction or damage to the equipment.

Note

Notes or instructions that make the job easier and ensure safe operation.

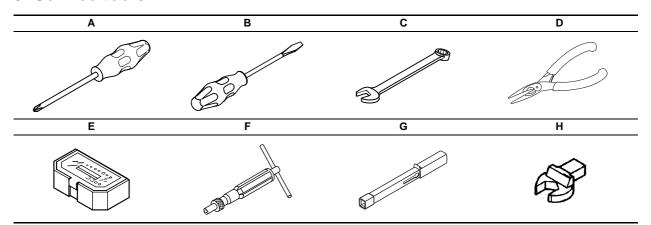
2. Torques and lubricants

See chapter 7. Drawings for position numbers.

| Pos. | Designation | Quantity | Dimension | Torque [Nm] | Lubricant |
|------|-------------|----------|-----------|-------------|-----------|
| | Screw, PM 1 | 4 | D3.5x20 | 1.3 - 1.5 | _ |
| ı | Screw, PM 2 | 4 | D3.5x35 | 1.3 - 1.5 | - |
| 16 | Screw, PM 1 | 4 | D4.7x40 | 2.8 - 3 | - |
| 10 | Screw, PM 2 | 8 | D4.7x40 | 2.8 - 3 | _ |
| 11 | Cable nut | 2 | M20 | 2.8 - 3 | - |
| 6 | O-ring | 1 | - | - | Rocol 22 |

Rocol 22, part number RM2924 (1 kg).

3. Service tools



3.1 Standard tools

| Pos. | Designation | For pos. | Further information | Part number |
|------|------------------------|----------|---------------------|-------------|
| Α | Cross-head screwdriver | 1, 9 | PH1 | SV0279 |
| В | Screwdriver | 11, 4 | 0.5 x 3 x 60 | SV0803 |
| С | Ring/open-end spanner | 14 | 23 mm | _ |
| D | Needle nose pliers | 10, 18 | - | _ |
| Е | Bits kit | 1, 9 | _ | SV2010 |

3.2 Torque tools

| Pos. | Designation | For pos. | Further information | Part number |
|------|----------------------|----------|---------------------|-------------|
| F | Torque screwdriver | Е | 1-6 Nm | SV0438 |
| G | Torque wrench | Н | - | _ |
| Н | Open-end insert tool | 14 | 23 mm | _ |

4. Dismantling and assembly

4.1 General description

If it is necessary to dismantle the PM unit, either because it is choked or damaged, follow the instructions in the following sections.

Position numbers of parts (digits) refer to drawings and parts lists see section 7. *Drawings*; position numbers of tools (letters) refer to section 3. *Service tools*.

Before dismantling

- Switch off the power supply to the PM unit.
- · Disconnect the power supply cable at the connection point.
- · Close the isolating valves, if fitted, to avoid draining the piping system.

Before assembly

- · Clean and check all parts.
- · Replace defective parts by new parts.
- · Order the necessary service kits.
- · Always replace gaskets and O-rings when the PM unit is serviced.

During assembly

· Lubricate and tighten screws and nuts to the correct torque. See section 2. Torques and lubricants.

4.2 PM 1

4.2.1 Removing the supply cables

- 1. Remove screws (pos. 1), and take off front cover (pos. 2).
- 2. Remove terminal board cover (pos. 3).
- 3. Disconnect cables (pos. 9 and 10) from the terminals on the electronic unit (pos. 4).
- 4. Loosen cable entries (pos. 11), and pull cables (pos. 9 and 10) out of the cable entries.

4.2.2 Fitting the supply cables

1. Lead cables (pos. 9 and 10) into the cable entries (pos. 11), and tighten them.

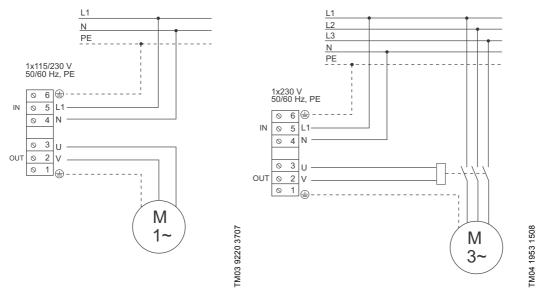


Fig. 1 Connecting cables to single- and three-phase motors

- 2. Connect cables (pos. 9 and 10) to the terminals in the electronic unit (pos. 4).
- 3. Fit terminal board cover (pos. 3).
- 4. Fit front cover (pos. 2), and fit and cross-tighten screws (pos. 1).

4.2.3 Removing the valve

- 1. Remove side cover (pos. 8) and clamp (pos. 7).
- 2. Remove the fitting and valve (pos. 6) out of the housing (pos. 5) by pulling the outlet fitting.

Note Check that the valve seat is intact.

4.2.4 Fitting the valve

1. Lubricate the O-ring. See Fig. 2

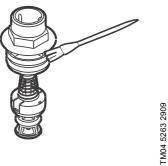


Fig. 2 Lubricating the O-ring

- 2. Press valve (pos. 6) home in the housing (pos. 5).
- 3. Fit clamp (pos. 7) and side cover (pos. 8).

4.3 PM 2

4.3.1 Removing the electronic unit

1. Remove screws (pos. 1), and take off front cover (pos. 2).

Caution Do not pull out the front cover using force as the flat cable must be removed first.

2. Pull the flat cable out of the plug in the electronic unit (pos. 4).

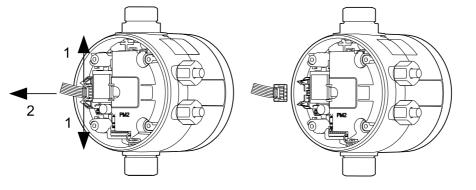
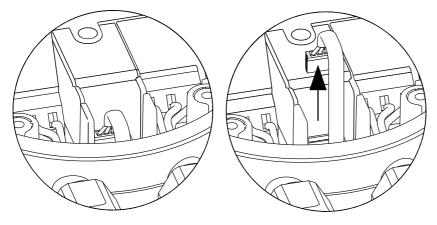


Fig. 3 Removing the flat cable

- 3. Remove terminal board cover (pos. 3).
- 4. Disconnect cables (pos. 9 and 10) from the terminals on the electronic unit (pos. 4).
- 5. Loosen cable entries (pos. 11), and pull cables (pos. 9 and 10) out of the cable entries.
- 6. Remove plug for sensor (pos. 13).

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Fig. 4 Removing the plug for sensor

7. Remove the complete electronic unit (pos. 4).

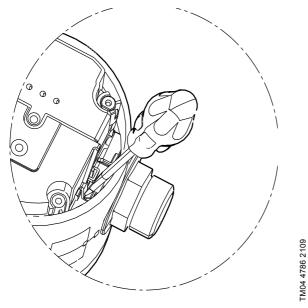


Fig. 5 Removing the electronic unit

4.3.2 Fitting the electronic unit

1. Fit the complete electronic unit (pos. 4).

Note Description | Ensure that the sensor cable is laid up to the control unit so that it can reach the plugs and does not get pinched.

2. Fit plug for sensor (pos. 13) in the electronic unit (pos. 4).

Note Be careful not to disconnect the lower sensor plug when fitting the shown plug for the electronic unit.

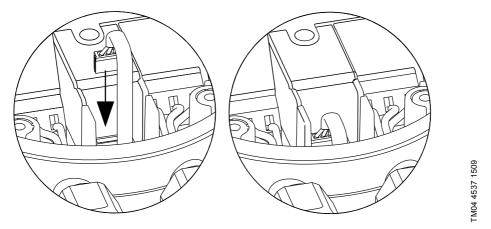


Fig. 6 Fitting the plug for sensor

3. Lead cables (pos. 9 and 10) into the cable entries (pos. 11), and tighten them.

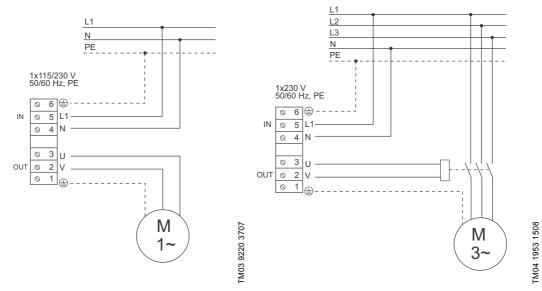
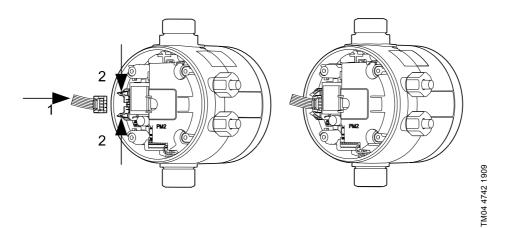


Fig. 7 Connecting cables to single- and three-phase motors

- 4. Connect cables (pos. 9 and 10) to the terminals in the electronic unit (pos. 4).
- 5. Fit terminal board cover (pos. 3).
- 6. Fit the flat cable in the plug on the electronic unit (pos. 4).



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Fig. 8 Connecting the flat cable

7. Fit front cover (pos. 2), and fit and cross-tighten screws (pos. 1).

4.3.3 Removing the pressure sensor

- 1. Follow the instructions in section 4.3.1 Removing the electronic unit.
- 2. Remove plug for sensor (pos. 13).
- 3. Note how the sensor is positioned.

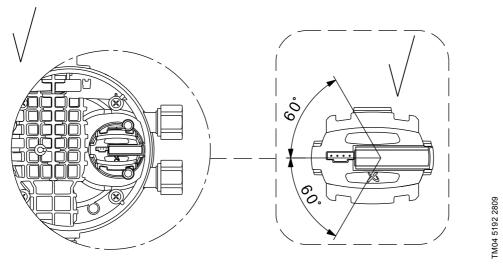


Fig. 9 Correct fitting of sensor

4. Unscrew pressure sensor (pos. 12) counter-clockwise until it is free.

4.3.4 Fitting the pressure sensor

Note

1. Screw the pressure sensor (pos. 12) until its tightened. See fig. 10. Then check the position according to fig. 9 and the note made in step 3. *Note how the sensor is positioned.*

Caution If the pressure sensor not is in the allowed area, then it is because the can be tightened further or the thread is damaged. If the thread is damaged then the PM unit must be replaced.

When the pressure sensor is tightened, then it is not allowed afterwards to turn it counterclockwise.

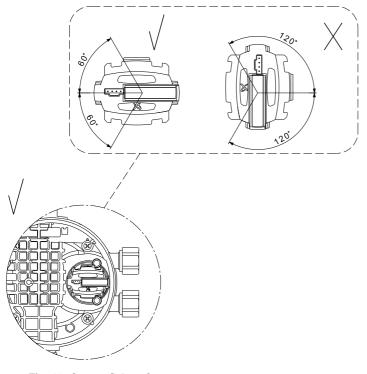


Fig. 10 Correct fitting of sensor

- 2. Fit plug for sensor (pos. 13) in the sensor (pos. 12).
- 3. Follow the instructions in section 4.3.2 Fitting the electronic unit.

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4.3.5 Removing the diaphragm

- 1. Slacken screws (pos. 16), and remove cover for diaphragm (pos. 15).
- 2. Remove diaphragm (pos. 14).

4.3.6 Fitting the diaphragm

1. Fit diaphragm (pos. 14) in the cover for diaphragm (pos. 15).

Note The diaphragm must not be lubricated.

2. Fit cover for diaphragm (pos. 15), and fit and cross-tighten screws (pos. 16) in steps to prevent the back cover from tilting.

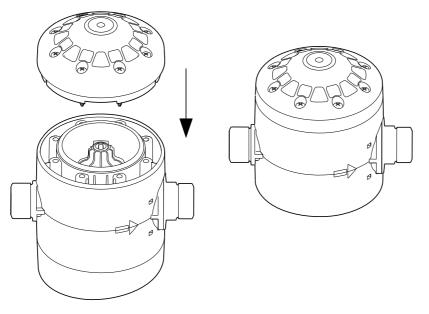


Fig. 11 Correct fitting of cover for diaphragm

4.3.7 Removing the valve

- 1. Remove side cover (pos. 8) and clamp (pos. 7).
- 2. Remove the fitting and valve (pos. 6) out of the housing (pos. 5) by pulling the outlet fitting.

Note Check that the valve seat is intact.

4.3.8 Fitting the valve

1. Lubricate the O-ring. See Fig. 12



Fig. 12 Lubricating the O-ring

- 2. Press valve (pos. 6) home in the housing (pos. 5).
- 3. Fit clamp (pos. 7) and side cover (pos. 8).

5. Control panels

5.1 Control panel on PM 1

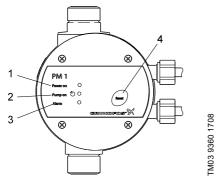


Fig. 13 Control panel

| Pos. | Description | Function |
|------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | "Power on" | The green indicator light is permanently on when the power supply has been switched on. |
| 2 | "Pump on" | The green indicator light is permanently on when the pump is running. |
| 3 | "Alarm" | The red indicator light is permanently on or flashes when the pump has stopped due to an operating fault. See section 6.1 PM 1. |
| 4 | [Reset] | The button is used for resetting fault indications enabling and disabling of the anti-cycling function. See the installation and operating instructions for further information. |

5.2 Control panel on PM 2

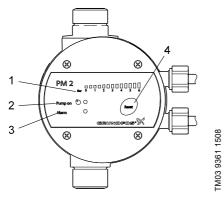


Fig. 14 Control panel

| Pos. | Description | Function |
|------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | "Pressure scale" | The pressure scale has 13 light fields indicating the pressure from 0 to 6 bar. All light fields illuminate briefly when the power supply is switched on. |
| 2 | "Pump on" | The green indicator light is permanently on when the pump is running. The indicator light also illuminates briefly when the power supply is switched on. |
| 3 | "Alarm" | The red indicator light is permanently on or flashes when the pump has stopped due to an operating fault. See section 6.2 PM 2. The indicator light also illuminates briefly when the power supply is switched on. |
| 4 | [Reset] | The button is used for resetting of fault indications checking of DIP switch settings. See section 5.2.3 Checking the DIP switch settings. |

5.2.1 DIP switches

The PM 2 has a number of settings which can be made with the DIP switches behind the control panel. See fig. 15.



Fig. 15 DIP switches

| DIP s | witch | Description | Default cotting | | |
|-------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|--|--|
| No | Name | — Description | Default setting | | |
| | | Start pressure (p _{start}) With these DIP switches the start pressure can be set from 1.5 to 5.0 bar in steps of 0.5 bar. | | | |
| 1-4 | START | Example: DIP switch 1 = "ON" DIP switch 2 = "ON" Start pressure = 1.5 + 0.5 + 1 = 3 bar | All set to OFF $(p_{start} = 1.5 \text{ bar})$ | | |
| | | See the installation and operating instructions for further information. | | | |
| 5 | STOP = START + 1 BAR | Start/stop with 1 bar differential pressure (This operating mode is only suitable for systems with a pressure tank). When the DIP switch has been set to "ON", the pump stop pressure will be equal to p _{start} + 1 bar. See the installation and operating instructions for further information. | OFF (start/stop according to water consumption) | | |
| | | In systems without a pressure tank, the DIP switch must be set to "OFF". | | | |
| 6 | AUTO RESET | Automatic resetting of alarms When the DIP switch has been set to "ON", the cycling and dry-running alarms will automatically be reset if they have been activated. See the installation and operating instructions for further information. | OFF (manual resetting) | | |
| 7 | ANTI CYCLING | Anti-cycling When the DIP switch has been set to "ON", the pump will be stopped in case of cycling. See the installation and operating instructions for further information. | OFF | | |
| 8 | MAX RUN 30 MIN. | Maximum continuous operating time (30 minutes) When the DIP switch has been set to "ON", the pump will automatically be stopped if it has been running continuously for 30 minutes. See the installation and operating instructions for further information. | OFF | | |

5.2.2 Enabling the DIP switch settings

Note | When the desired DIP switch settings have been made, they must be enabled, otherwise the PM 2 cannot detect the settings.

To enable the DIP switch settings, press [Reset] or disconnect and reconnect the power supply to the unit.

5.2.3 Checking the DIP switch settings

When [Reset] is kept pressed for at least 3 seconds, the light fields for the DIP switches set to "ON" will illuminate in the pressure scale.

The light fields illuminate from right to left. This means that if the light field to the far right is on, DIP switch 8 has been set to "ON", etc. See the table below.

| Light field [bar] | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 |
|-------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| DIP switch no | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

6. Fault finding

6.1 PM 1



Warning

Before starting work on the pump/PM unit, make sure that the power supply has been switched off and that it cannot be accidentally switched on.

| Fault | | ult Cause | | Remedy |
|-------|------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| 1. | The green "Power on" indicator light is off. | a) | The fuses in the electric installation have blown. | Replace the fuses. If the new fuses also blow, check the electric installation. |
| | | b) | The earth leakage circuit breaker or the voltage- operated circuit breaker has been tripped out. | Cut in the circuit breaker. |
| | | c) | No power supply. | Contact the power supply authorities. |
| | | | The PM unit is defective. | Repair or replace the PM unit. |
| 2. | The green "Pump on" indicator light is on, but | a) | The power supply to the pump is disconnected after the PM unit. | Check the plug and cable connections, and check if the built-in circuit breaker of the pump is switched off. |
| | the pump does not start. | b) | The motor protection of the pump has tripped out due to overload. | Check if the motor/pump is blocked. |
| | | c) | The pump is defective. | Repair or replace the pump. |
| | | | The PM unit is defective. | Repair or replace the PM unit. |
| 3. | The pump does not start when water is consumed. The "Pump on" indicator light is off. | a) | Too big difference in height between the PM unit and the tapping point. | Adjust the installation, or select a PM unit with a higher start pressure. |
| | | b) | The PM unit is defective. | Repair or replace the PM unit. |
| 4. | Frequent starts/stops. | a) | Leakage in the pipework. | Check and repair the pipework. |
| | | b) | Leaky non-return valve. | Clean or replace the non-return valve. |
| | | | A valve close to the PM 1 outlet has been closed. | Open the valve. |
| 5. | The pump does not stop. | | The pump cannot deliver the necessary discharge pressure. | Replace the pump. |
| | | b) | A PM unit with too high start pressure is installed. | Select a PM unit with a lower start pressure. |
| | | c) | The PM unit is defective. | Repair or replace the PM unit. |
| | | | The non-return valve is stuck in open position. | Clean or replace the non-return valve. |
| 6. | The red "Alarm" | a) | Dry running. The pump needs water. | Check the pipework. |
| | indicator light is permanently on. | b) | The power supply to the pump is disconnected after the PM unit. | Check the plug and cable connections, and check if the built-in circuit breaker of the pump is switched off. |
| | | c) | The motor protection of the pump has tripped out due to overload. | Check if the motor/pump is blocked. |
| | | d) | The pump is defective. | Repair or replace the pump. |
| | | | The PM unit is defective. | Repair or replace the PM unit. |
| 7. | The red "Alarm" indicator light is flashing. | a) | Cycling. A tap has not been closed entirely after use. | Check that all taps have been closed. |
| | 5 - 5 | | Cycling. There is a minor leakage in the system. | Check the system for leakages |

6.2 PM 2

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Warning

Before starting work on the pump/PM unit, make sure that the power supply has been switched off and that it cannot be accidentally switched on.

| Fault | | Ca | nuse | Remedy |
|-------|-------------------------------------------------------------------------------------------|----|--------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | The green light field for "0 bar" is off even if the power supply | a) | The fuses in the electric installation have blown. | Replace the fuses. If the new fuses also blow, check the electric installation. |
| | has been switched on. | b) | The earth leakage circuit breaker or the voltage-operated circuit breaker has been tripped out. | Cut in the circuit breaker. |
| | | c) | No power supply. | Contact the power supply authorities. |
| | | d) | The PM unit is defective. | Repair or replace the PM unit. |
| 2. | The green "Pump on" indicator light is on, but the pump does not start. | a) | The power supply to the pump is disconnected after the PM unit. | Check the plug and cable connections, and check if the built-in circuit breaker of the pump is switched off. |
| | | b) | The motor protection of the pump has tripped out due to overload. | Check if the motor/pump is blocked. |
| | | c) | The pump is defective. | Repair or replace the pump. |
| | | d) | The PM unit is defective. | Repair or replace the PM unit. |
| 3. | The pump does not start when water is consumed. "Pump on" is off. | a) | Too big difference in height between the PM unit and the tapping point. | Adjust the installation, or increase the start pressure. See section 5.2.1 DIP switches. |
| | | b) | The PM unit is defective. | Repair or replace the PM unit. |
| 4. | System without pressure tank: | a) | DIP switch 5 set to "ON". | Set DIP switch 5 to "OFF". See section 5.2.1 DIP switches. |
| | Frequent starts/stops. | b) | Leakage in the pipework. | Check and repair the pipework. |
| | | | The non-return valve is stuck in open position. | Clean or replace the non-return valve. |
| 5. | System with pressure tank: Frequent starts/stops. | a) | The pressure tank has no precharge pressure, or the tank size is insufficient. | Check the tank precharge pressure, and recharge the tank, if necessary. If the size of the pressure tank is insufficient, set DIP switch 5 to "OFF", or replace the pressure tank. |
| | | b) | Leaky non-return valve. | Clean or replace the non-return valve. |
| 6. | The pump does not stop. | a) | The pump cannot deliver the necessary discharge pressure. | Replace the pump. |
| | | b) | The start pressure is set too high. | Decrease the start pressure. |
| | | c) | The PM unit is defective. | Repair or replace the PM unit. |
| | | d) | The non-return valve is stuck in open position. | Clean or replace the non-return valve. |
| 7. | The red "Alarm" indicator light | a) | Dry running. The pump needs water. | Check the pipework. |
| | is permanently on. | b) | The power supply to the pump is disconnected after the PM unit. | Check the plug and cable connections, and check if the built-in circuit breaker of the pump is switched off. |
| | | c) | The motor protection of the pump has tripped out due to overload. | Check if the motor/pump is blocked. |
| | | d) | The pump is defective. | Repair or replace the pump. |
| | | e) | The PM unit is defective. | Repair or replace the PM unit. |
| 8. | System without pressure tank: The red "Alarm" indicator light | a) | Cycling. A tap has not been closed entirely after use. | Check that all taps have been closed. See the installation and operating instructions for further information. |
| | flashes once per period. | b) | Cycling. There is a minor leakage in the system. | Check the system for leakages. See the installation and operating instructions for further information. |
| 9. | System with pressure tank: The red "Alarm" indicator light flashes once per period. | a) | Cycling. The pressure tank has no precharge pressure, or the tank size is insufficient. | Check the tank precharge pressure, and recharge the tank, if necessary. If the size of the pressure tank is insufficient, set DIP switch 5 to "OFF", or replace the pressure tank. See the installation and operating instructions for further information. |
| 10 | . The red "Alarm" indicator light flashes twice per period. | a) | Maximum continuous operating time (30 minutes). The pump has been running continuously for 30 minutes. | Check the system for leakages. Disable the function to allow the pump to run for 30 minutes. See the installation and operating instructions for further information. |

| Fault | Ca | ause | Remedy |
|-------------------------------------------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11. The red "Alarm" indicator light flashes three times per period, and each pump start is delayed a few seconds. | | Too many start/stop sequences within a short period. The pressure tank has no precharge pressure, or the tank size is insufficient. | Check the tank precharge pressure, and recharge the tank, if necessary. If the size of the pressure tank is insufficient, set DIP switch 5 to "OFF", or replace the pressure tank. |
| | b) | Too many start/stop sequences within a short period. The PM 2 is set to start/stop with 1 bar differential pressure, i.e. DIP switch 5 is set to "ON", but no pressure tank has been installed in the system. | Set DIP switch 5 to "OFF". |
| 12. The red "Alarm" indicator light flashes four times per periode. | a) | Pressure sensor fault. | Repair or replace the PM unit. |

7. Drawings

7.1 Exploded view, PM 1

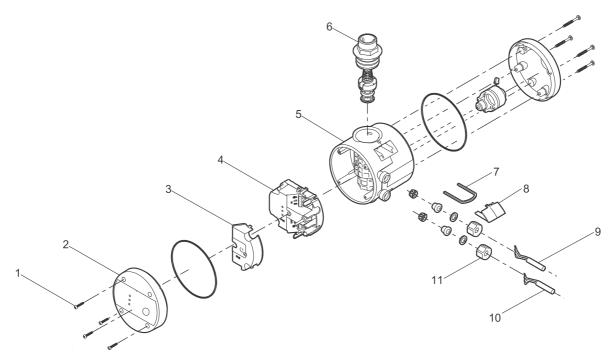


Fig. 16 Exploded view, PM 1

7.2 Exploded view, PM 2

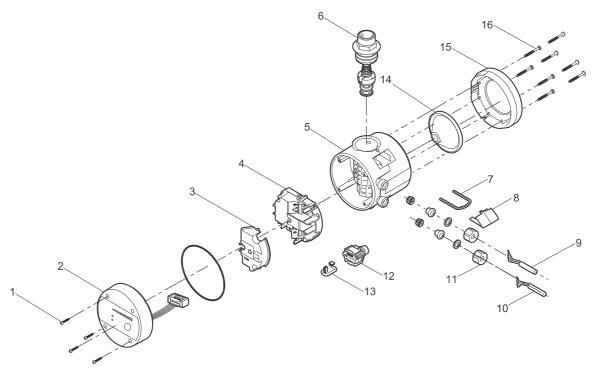


Fig. 17 Exploded view, PM 2

Subject to alterations.

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