

PM TWIN

Pressure manager for twin pumps

Installation and operating instructions



PM TWIN

English (GB)

Installation and operating instructions	4
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English (GB) Installation and operating instructions

Original installation and operating instructions

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1. General information

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.

Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.



Read this document before you install the product. Installation and operation must comply with local regulations and accepted codes of good practice.

1.1 Hazard statements

The symbols and hazard statements below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.



DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious personal injury.



WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious personal injury.



CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate personal injury.

The hazard statements are structured in the following way:



SIGNAL WORD

Description of the hazard

Consequence of ignoring the warning

- Action to avoid the hazard.

1.2 Notes

The symbols and notes below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.



Observe these instructions for explosion-proof products.



A blue or grey circle with a white graphical symbol indicates that an action must be taken.



A red or grey circle with a diagonal bar, possibly with a black graphical symbol, indicates that an action must not be taken or must be stopped.



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



Tips and advice that make the work easier.

2. Receiving the product

2.1 Inspecting the product

On receipt of the product, do the following:

- Check that the product is as ordered.
If the product is not as ordered, contact the supplier.
- Make sure that the supply voltage and frequency correspond to the values stated on the product nameplate.

3. Installing the product

3.1 Location

Install the product so that inspection, maintenance and service can easily be performed.

Install the product in a well-ventilated location to ensure cooling of its components.

The product can be installed indoors or outdoors, but it must be protected from exposure to direct sunlight, rain and snow.

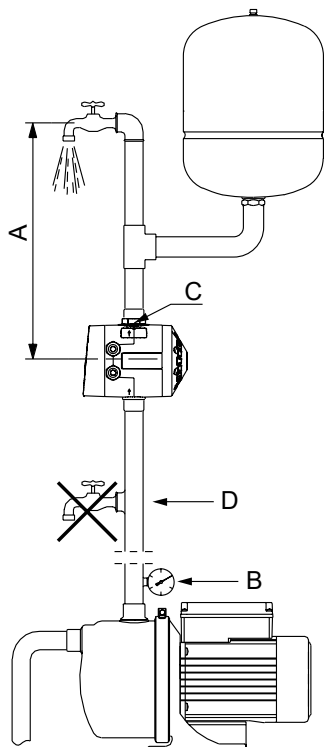
3.2 Mechanical installation

3.2.1 Position in the pipe system

Install the pressure manager on the outlet side of the pump.
The unit can be fitted directly to the system manifold outlet port or between the manifold and the first tapping point.

Installation example

Grundfos Pressure Manager can be installed in systems with or without a pressure tank.
Please observe these general recommendations when you install the unit.



TM070583

Pos. Installation instructions	
A	Observe the recommended maximum installation height between the pressure manager and the highest tapping point.
B	Observe the recommended minimum outlet pressure for the pump to achieve correct operation.
C	Install the pressure manager, so that the operating panel is visible and easy to access.
D	Do not install taps between the pump and the pressure manager.

Non-return valve

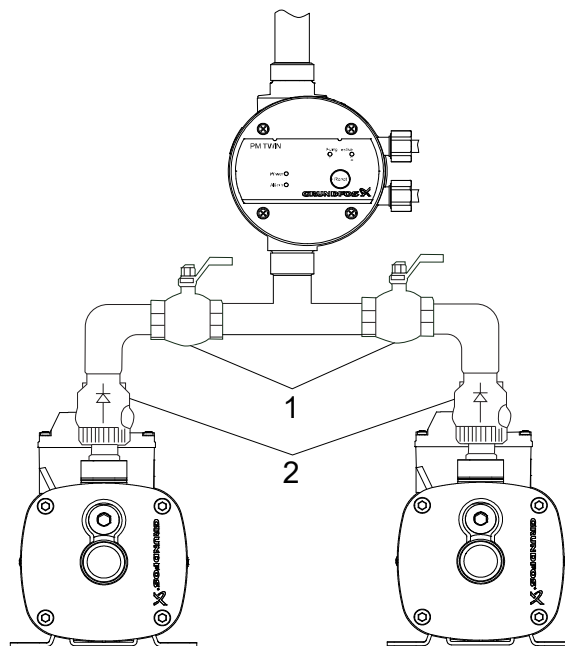
Pressure Manager has a built-in non-return valve.
If you pump from a well, borehole or similar, always fit a non-return valve on the pump's inlet side.

Related information

- [3.2.3 Installation height for Pressure Manager](#)
- [4.2 Minimum outlet pressure](#)

3.2.2 Installation example for PM TWIN

We recommend to install non-return valves and isolating valves as illustrated below in case of need for service.



TM071404

Fig. Installation of PM TWIN with isolating valves (1) and non-return valves (2)

3.2.3 Installation height for Pressure Manager

We recommend that the height between the pressure manager and the highest tapping point does not exceed the values in the table below.

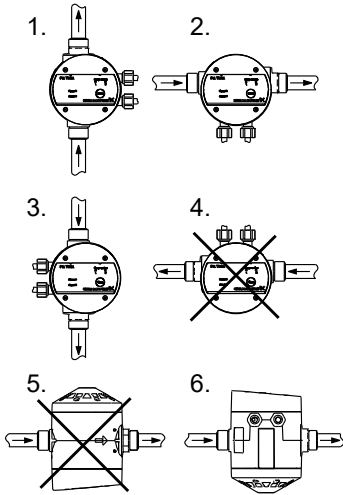
Start pressure set [bar]	Maximum height between pressure manager and highest tapping point [m]
1.5 (default)	11
2.0	16
2.5	21
3.0	26
3.5	31
4.0	36
4.5	41
5.0	46

Related information

- [3.2.1 Position in the pipe system](#)

3.2.4 Mounting Pressure Manager

1. Place the unit so that operating panel is visible and easily accessible.
2. Select a correct mounting position.



! To prevent water from entering the unit, install the unit so that the cable connections point sideways or downwards.

! Avoid mounting position 6 if the pumped liquid contains particles, as these may settle inside the unit's internal pressure tank.

3. Connect the unit to the pipe system using unions. Ensure that inlet and outlet are connected correctly. The inlet connection is an integrated part of the unit housing. The outlet connection can rotate 360°.

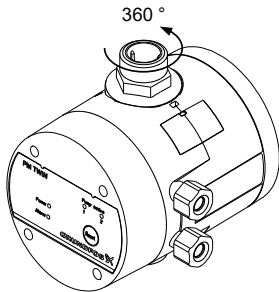


Fig. The outlet connection can rotate 360°

3.2.5 Changing the orientation of the operating panel

1. Unscrew the screws on the front panel.
2. Rotate the operating panel to the desired position. You can rotate it by 90 or 180 degrees in either direction.

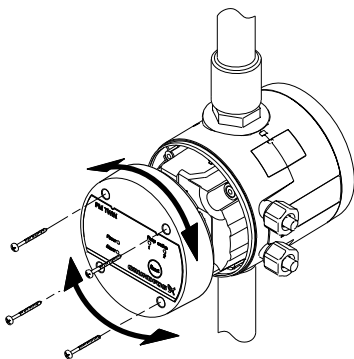


Fig. Changing front panel orientation

3. Fit the operating panel securely with all four mounting screws to maintain enclosure class IP65.

3.3 Electrical connection

WARNING Electric shock



Death or serious personal injury

- Switch off the power supply before you start any work on the product. Make sure that the power supply cannot be switched on accidentally.

WARNING Electric shock



Death or serious personal injury

- Connect the product to protective earth and provide protection against indirect contact in accordance with local regulations.
- Power supply cables without a plug must be connected to a supply disconnecting device incorporated in the fixed wiring according to the local wiring rules.
- The installation must be fitted with a residual-current device (RCD) with a tripping current less than 30 mA.



All electrical connections must be carried out by qualified persons in accordance with local regulations.



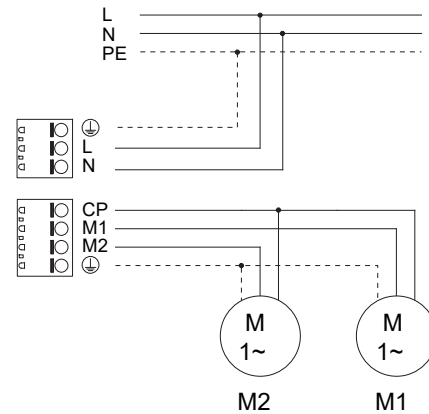
The unit can be powered by a generator or other alternative power supplies, provided that the requirements for the power supply are fulfilled.

Connect units delivered with a power plug using the supplied cable and plug.

Connect units with no fitted cable and plug according to the following instructions.

1. Remove the operating panel from the front of the unit.
2. Make the electrical connection according to the wiring diagram.
3. Fit the operating panel securely with all four mounting screws to maintain enclosure class IP65.

3.3.1 Wiring diagram, PM TWIN



4. Starting up the product

4.1 Starting up PM TWIN

Pressure Manager automatically starts and stops the pump according to the operating mode set in the DIP switches. The default operating mode is start/stop according to water consumption.

1. Make sure that both pumps are primed.
2. Open a tap in the system.
3. Switch on the power supply.
4. Watch the operating panel on Pressure Manager where all the indicator lights will briefly light up. Pump 1 will start running and pressure will build up in the system.
5. Close the tap.
6. Check that the pump stops after a few seconds and that the "Pump 1" indicator light goes out.

7. Open the tap again so that pump 2 starts running.
8. Close the tap.
9. Check that the pump stops after a few seconds and that the "Pump 2" indicator light goes out.
10. The system is now ready for operation.

If pressure is not built up in the system within five minutes after startup of each pump, the dry-running protection will be activated and the pump stops.



Check the pump's priming conditions before attempting to restart the pump.

The pump restarts automatically if DIP switch 6 (AUTO RESET) has been set to **ON**.

The pump can be restarted manually by pressing **[Reset]**.

Related information

[5.3 PM TWIN operating panel](#)

[6.4 Dry-running protection](#)

4.2 Minimum outlet pressure

To achieve correct operation, the pump must be capable of providing an outlet pressure which is higher than the **start pressure set [bar]** setting on the pressure manager DIP switches.

The exact minimum outlet pressure depends on the operating mode:

- Start/stop according to water consumption (default): the minimum pump outlet pressure must be 0.4 bar higher than **start pressure set [bar]**.
- Start/stop with 1 bar differential pressure: the minimum pump outlet pressure must be 1.4 bar higher than **start pressure set [bar]**.

Minimum pump outlet pressures

	Operating mode: Start/stop according to water consumption	Operating mode: Start/stop with 1 bar differential pressure
Start pressure set [bar]	Min. pump outlet pressure [bar]	Min. pump outlet pressure [bar]
1.5 (default)	1.9	2.9
2.0	2.4	3.4
2.5	2.9	3.9
3.0	3.4	4.4
3.5	3.9	4.9
4.0	4.4	5.4
4.5	4.9	5.9
5.0	5.4	6.4

Related information

[3.2.1 Position in the pipe system](#)

[6.1 Operating modes](#)

5. Product introduction

5.1 PM TWIN applications

Grundfos PM TWIN is designed for automatic duty/standby control of two Grundfos pumps or other pumps for water supply in domestic applications. PM TWIN has a built-in non-return valve and is equipped with a small internal pressure tank to minimise the number of starts and stops of the pump in case of minor leakages. PM TWIN can be installed in systems with or without an external pressure tank.

Typical applications are water supply systems and rainwater systems in:

- single-family houses
- blocks of flats
- summer houses and cottages
- horticulture and gardening
- agriculture.

5.2 Pumped liquids

Clean, thin, non-aggressive and non-explosive liquids without solid particles or fibres that may attack the unit mechanically or chemically.

Related information

[10. Technical data](#)

5.3 PM TWIN operating panel

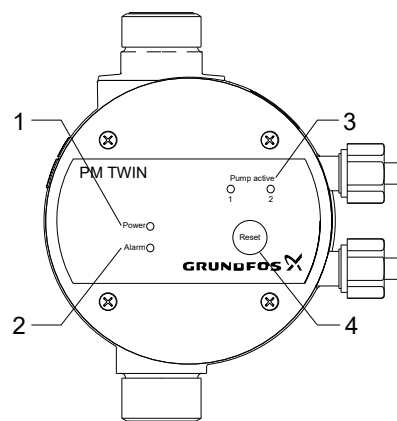


Fig. PM TWIN operating panel

Pos.	Description	Function
1	Power	The green indicator light is permanently on when the power is on.
2	Alarm	The red indicator light is permanently on or flashes when there is an operating fault in the pump.
3	Pump active	The green indicator light 1 or 2 is on when pump 1 or pump 2, respectively, is in operation. The indicator will flash to show which pump has stopped due to dry running.
4	[Reset]	The button is used for resetting of fault indications.

For indicator-light check, all indicator lights will be on when the power is switched on.

Related information

[4.1 Starting up PM TWIN](#)

6. Control functions

6.1 Operating modes

The pressure manager automatically starts and stops the pump. This can be achieved in two different ways:

- On delivery the unit has a default setting which can be used in systems with or without a pressure tank.
- In systems with a pressure tank it is possible to use the setting 'Start/stop with 1 bar differential pressure'. This setting will reduce the pump operating time.

Related information

[4.2 Minimum outlet pressure](#)

6.1.1 Start/stop according to water consumption

Default operating mode for the Pressure Manager.

- Setting: DIP switch 5 set to **OFF**.

The default start pressure is 1.5 bar and can be increased in steps of 0.5 bar.



With the default setting the pump will not stop until it reaches its maximum pressure.

Starting and stopping conditions

The unit starts the pump when at least one of the following conditions is met:

- The flow is higher than the minimum flow $[Q_{\min}]$.
- The pressure is lower than the start pressure.

The unit stops the pump when at least one of the following conditions is met:

- The flow is lower than the minimum flow $[Q_{\min}]$.
- The pressure is higher than the start pressure.

Related information

[7.2 DIP switches](#)

6.1.2 Start/stop with 1 bar differential pressure

Optional operating mode for systems with a sufficient size pressure tank.

- The pump starts and stops at a 1 bar differential pressure, which reduces the pump operating time.
- Setting: DIP switch 5 is set to **ON**.

The default start pressure is 1.5 bar and can be increased in steps of 0.5 bar.



Insufficient size pressure tank will cause cycling in the pump with frequent starts and stops.

Starting and stopping conditions

The unit starts a pump when this condition is met:

- The pressure is lower than the start pressure.

The unit stops a pump when at least one of the following conditions is met:

- The pressure is higher than the stopping pressure p_{stop} .
 $p_{\text{stop}} = \text{start pressure} + 1 \text{ bar}$
- The pressure is higher than p_{start} and the flow is below Q_{\min} .

Related information

[7.2 DIP switches](#)

6.2 Anti-cycling function

The anti-cycling function prevents the product from starting and stopping too often in case of a minor leakage in the system or if a tap has not been closed completely. The anti-cycling function will stop the pump and an alarm will be indicated.

Related information

[6.6.1 List of alarms for PM TWIN](#)

[7.2 DIP switches](#)

6.3 Auto-reset function



The auto-reset function must NOT be enabled on pumps which cannot self-prime when water returns after dry running.

The auto-reset function automatically resets alarms activated by the anti-cycling function and dry-running protection.

Related information

[7.2 DIP switches](#)

6.4 Dry-running protection

Dry-running protection automatically stops the pump in case of dry running to prevent damage to the pump.

The dry-running protection functions differently during priming and operation.

Related information

[4.1 Starting up PM TWIN](#)

[6.6.1 List of alarms for PM TWIN](#)

6.4.1 Dry running during priming

If pressure and flow has not built up in the system within five minutes after startup, the dry-running protection will be activated and the working pump is stopped.

The second pump will start, if the first pump has not built up pressure in the system. If pressure has still not been built up within five minutes, the dry-running protection will be activated.

6.4.2 Dry running during operation

If during normal operation there is no pressure and no flow for more than 40 seconds, the dry-running protection is activated and the working pump is stopped.

The other pump starts if it is not in protection mode (stopped). If pressure and flow are low for more than 40 seconds for this pump also, the system dry-running protection is activated and both pumps stop.

6.4.3 Resetting of dry-running alarm

Manual reset of the dry-running alarm

If a dry-running alarm has been activated, the pump can be restarted manually by pressing **[Reset]**. If the unit detects no pressure and no flow within 40 seconds after restarting, the dry-running alarm is re-activated.

Auto reset of the dry-running alarm

When the auto-reset function is enabled, the system will restart automatically after 30 minutes in alarm condition. If, after restarting, the pumps are not primed within five minutes of operation, the dry-running alarm will reappear. The auto-reset function will attempt to restart the system every 30 minutes during the first 24 hours. After that, there will be 24 hours between the restarting attempts.



The auto-reset function will not restart the system if only one pump is in dry-running protection.

6.5 Maximum continuous operating time (30 minutes)

When this function is enabled, the system will stop when a pump has been running continuously for 30 minutes. The purpose of this function is to avoid unnecessary water and power consumption, for instance in case of pipe fracture or considerable leakages.

Restart the system by pressing **[Reset]**.



When the function is enabled, any consumption exceeding 30 minutes will cause an alarm and the pump will stop.



When the pump has stopped due to the maximum continuous operating time function, the auto-reset function will not restart the system.

Related information

[6.6.1 List of alarms for PM TWIN](#)

[7.2 DIP switches](#)

6.6 Fault and warning signals

6.6.1 List of alarms for PM TWIN

Alarm indications on the pressure manager operating panel.

Indication	Alarm and cause
Pump active LED is blinking and Alarm LED is permanently on.	Dry running. The pump with the blinking LED has been running without water.
Alarm LED flashes once at a regular interval.	Anti-cycling. The system starts and stops too frequently. This alarm only occurs if the anti-cycling function is enabled.
Alarm LED flashes twice at a regular interval.	Maximum operating time. The system has been running continuously for 30 minutes. This alarm only occurs if the function 'Maximum continuous operating time (30 minutes)' is enabled.
Alarm LED flashes three times at a regular interval.	Protection mode. The system has had too many start/stop sequences within a short period. Each pump start is delayed a few seconds to protect the installation. The start delay is active until normal operation has been re-established. The protection mode will protect the installation when the Pressure Manager is set to operating mode 'Start/stop with 1 bar differential pressure'. This protection mode functions independently of the anti-cycling function.
Alarm LED flashes more than three times at a regular interval.	Internal fault. Internal fault in the pressure manager.

Related information

[6.2 Anti-cycling function](#)

[6.4 Dry-running protection](#)

[6.5 Maximum continuous operating time \(30 minutes\)](#)

7. Setting the product

7.1 Setting by means of DIP switches

1. Unscrew the four screws on the front panel.
2. Take off the front cover to access the DIP switches on the board inside the unit.
3. Do the desired DIP switch setting using a pointy tool.
4. Refasten the front panel securely with all four mounting screws to maintain enclosure class IP65.
5. Press **[Reset]** or disconnect and reconnect the power supply to activate the new DIP switch settings.

7.2 DIP switches

OFF/ON

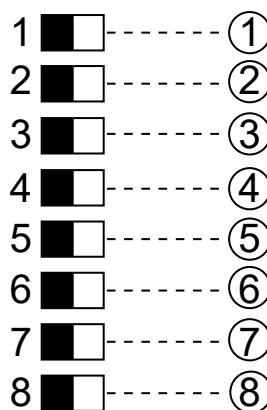


Fig. Pressure Manager DIP switches

Description of the Pressure Manager DIP switches.

Switch	Name	DIP switch settings
1-4	START	<p>Start pressure (p_{start}) Set the start pressure from 1.5 to 5.0 bar in steps of 0.5 bar. DEFAULT: OFF (= 1.5 bar) SETTINGS: Default start: 1.5 bar DIP switch 1: +0.5 bar DIP switch 2: +1 bar DIP switch 3: +1 bar DIP switch 4: +1 bar</p> <p>Example: DIP switch 1 = ON DIP switch 2 = ON $p_{start} = 1.5 + 0.5 + 1 = 3$ bar</p>
5	STOP = START + 1 bar	<p>Start/stop with 1 bar differential pressure Operating mode for systems with a pressure tank. DEFAULT: OFF (Start/stop according to water consumption) SET TO ON: The pump's stop pressure is equal to $p_{start} + 1$ bar.</p>
6	AUTO RESET	<p>Auto-reset function DEFAULT: OFF (Manual reset) SET TO ON: The anti-cycling and dry-running alarms will automatically be reset if they have been activated.</p>
7	ANTI CYCLING	<p>Anti-cycling function DEFAULT: OFF SET TO ON: The pump will stop if the pump starts and stops too frequently.</p>
8	MAX RUN 30 MIN	<p>Maximum continuous operating time (30 minutes) DEFAULT: OFF SET TO ON: The pump will automatically stop if it has been running continuously for 30 minutes.</p>

Related information

[6.1.1 Start/stop according to water consumption](#)

[6.1.2 Start/stop with 1 bar differential pressure](#)

[6.2 Anti-cycling function](#)

[6.3 Auto-reset function](#)

[6.5 Maximum continuous operating time \(30 minutes\)](#)

8. Taking the product out of operation

8.1 Frost protection

If the unit is subjected to frost in periods of inactivity, the unit and the pipe system should be drained before the unit is taken out of operation.

1. Shut off the water supply to the system.
2. Drain the isolated system at the lowest located point in the system. Make sure that pumps and pressure manager are drained separately.
3. The pressure manager has no draining options, but mounting the unit in horizontal or vertical position makes draining easier.

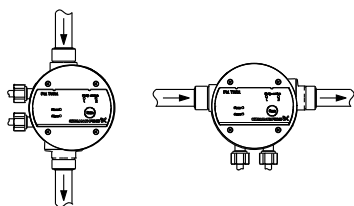


Fig. Pressure Manager mounted in horizontal or vertical position.

9. Fault finding the product

9.1 The "Power on" indicator light is off even though the power supply has been switched on

Cause	The fuses in the electrical installation have blown.
Remedy	Replace the fuses. If the new fuses also blow, check the electrical installation for malfunctions.

Cause The earth-leakage circuit breaker or the voltage-operated circuit breaker has tripped.

Remedy Cut in the circuit breaker.

Cause The pressure manager is defective.

Remedy Repair or replace the pressure manager.
Find more information in the service instructions at <https://product-selection.grundfos.com>.

9.2 The "Pump on" indicator light is on, but the pump does not start

Cause The power supply to the pump is disconnected.

Remedy Check the plug and cable connections, and make sure that the built-in circuit breaker of the pump is switched off.

Cause The motor protection of the pump has tripped due to overload.

Remedy Make sure the motor or pump is not blocked.

Cause The pump is defective.

Remedy Repair or replace the pump.

Cause **The pressure manager is defective.**

Remedy Repair or replace the pressure manager.
Find more information in the service instructions at <https://product-selection.grundfos.com>.

9.3 The pump does not start when water is consumed

The "Pump on" indicator light is off.

Cause **There is too big a difference in height between the pressure manager and the tapping point.**

Remedy Adjust the installation, or increase the start pressure.

Cause **The pressure manager is defective.**

Remedy Repair or replace the pressure manager.
Find more information in the service instructions at <https://product-selection.grundfos.com>.

9.4 System without pressure tank has frequent starts/stops

Cause **DIP switch 5 is set to "ON".**

Remedy Set DIP switch 5 to "OFF".

Cause **Leakage in the pipes.**

Remedy Check and repair the pipes.

Cause **The non-return valve is stuck in open position.**

Remedy Clean or replace the non-return valve.

9.5 System with pressure tank has frequent starts/stops

Cause **The pressure tank has no precharge pressure.**

Remedy Check the tank precharge pressure and recharge the tank, if necessary.

Cause **The tank size is insufficient.**

Remedy If the size of the pressure tank is insufficient, set DIP switch 5 to "OFF" on the Pressure Manager, or replace the pressure tank.

Cause **Leaky non-return valve.**

Remedy Clean or replace the non-return valve.

9.6 The pump does not stop

Cause **The pump cannot deliver the necessary outlet pressure.**

Remedy Replace the pump.

Cause **The start pressure is set too high.**

Remedy

- PM 1: The start pressure is factory set. Make sure that your product is dimensioned correctly.
- PM 2, PM TWIN: Decrease the start pressure.

Cause **The non-return valve is stuck in open position.**

Remedy Clean or replace the non-return valve.

Cause **The pressure manager is defective.**

Remedy Repair or replace the pressure manager.
Find more information in the service instructions at <https://product-selection.grundfos.com>.

9.7 The "Alarm" indicator light is permanently on

Cause **Dry running. The pump needs water.**

The pump has stopped due to the dry-running function.

Remedy Make sure that the water supply is sufficient.

Cause **The power supply to the pump is disconnected.**

Remedy Check the plug and cable connections, and make sure that the built-in circuit breaker of the pump is switched off.

Cause **The motor protection of the pump has tripped due to overload.**

Remedy Make sure the motor or pump is not blocked.

Cause **The pressure manager is defective.**

Remedy Repair or replace the pressure manager.
Find more information in the service instructions at <https://product-selection.grundfos.com>.

9.8 The "Alarm" indicator light flashes once at a regular interval

For systems without a pressure tank.

The anti-cycling function has stopped the pump because the pump starts and stops too frequently.

Cause **A tap has not been entirely closed after use.**

Remedy Make sure all taps are closed.

Cause **There is a minor leakage in the system.**

Remedy Make sure there are no leakages in the system.

9.9 The "Alarm" indicator light flashes once at a regular interval in a system with a pressure tank

For systems with a pressure tank.

The anti-cycling function has stopped the pump because the pump starts and stops too frequently.

Cause **The pressure tank has no precharge pressure.**

Remedy Check the tank precharge pressure and recharge the tank, if necessary.

Cause **The tank size is insufficient.**

Remedy If the size of the pressure tank is insufficient, set DIP switch 5 to "OFF" on the Pressure Manager, or replace the pressure tank.

9.10 The "Alarm" indicator light flashes twice at a regular interval

Cause **The pump has been running continuously for 30 minutes and the function 'Maximum continuous operating time (30 minutes)' has stopped the pump.**

Remedy Check the system for leakages.

Remedy If you wish to allow the pump to run for more than 30 minutes, disable the function 'Maximum continuous operating time (30 minutes)'.
"

9.11 The "Alarm" indicator light flashes three times at a regular interval and each pump start is delayed a few seconds

For systems with or without a pressure tank.

Too many start/stop sequences within a short period.

Cause The Pressure Manager is set to operating mode "start/stop with 1 bar differential pressure", but no pressure tank is installed in the system.

Remedy Set DIP switch 5 to "OFF", which is the default operating mode.

Cause The pressure tank has no precharge pressure.

Remedy Check the tank precharge pressure and recharge the tank, if necessary.

Cause The pressure tank size is insufficient.

Remedy If the size of the pressure tank is insufficient, set DIP switch 5 to "OFF" on the Pressure Manager, or replace the pressure tank.

9.12 The "Alarm" indicator light flashes four times at a regular interval

Cause The pressure sensor is defective.

Remedy Repair or replace the pressure manager.
Find more information in the service instructions at <https://product-selection.grundfos.com>.

10. Technical data

Operating conditions, PM TWIN

Supply voltage	1 x 220-240 VAC
Frequency	50/60 Hz
Max. inductive contact load	10 A
Max. ambient temperature	55 °C
Liquid temperature	0-60 °C
Q _{min}	1 l/min
Time delay during stopping	10 seconds
Max. operating pressure	PN 10 / 10 bar / 1 MPa
Enclosure class	IP65
Min./max. storage temperature	-40 / +70 °C
Volume of internal pressure tank	0.1 litre

Dimensions, PM TWIN

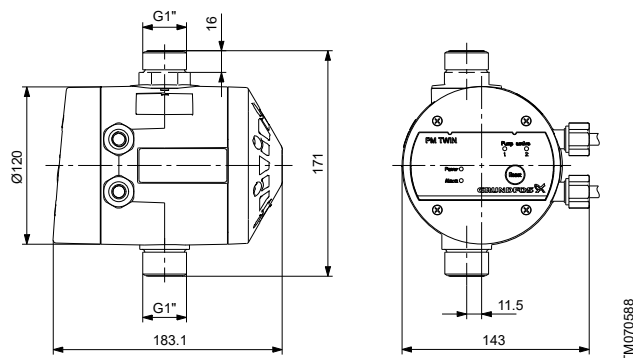


Fig. Dimensional drawing of PM TWIN

Related information

5.2 Pumped liquids

11. Disposing of the product

This product or parts of it must be disposed of in an environmentally sound way.

1. Use the public or private waste collection service.
2. If this is not possible, contact the nearest Grundfos company or service workshop.

See also end-of-life information at www.grundfos.com/product-recycling.

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