

GRUNDFOS INSTRUCTIONS

MQ

- Ⓢ Installation and operating instructions
- ⓕ Notice d'installation et d'entretien
- ⓔ Instrucciones de instalación y funcionamiento



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MQ

**Installation and
operating instructions**

Page 4

US

**Notice d'installation
et d'entretien**

Page 14

F

**Instrucciones de instalación
y funcionamiento**

Pág. 24

E

CONTENTS

US

1. General description	4
1.1 Applications	4
1.2 Type key	4
1.3 MQ pump	5
2. Pumped liquids	5
3. Technical data	5
3.1 Operating conditions	5
3.2 Electrical data	6
3.3 Dimensions	6
3.4 Approvals	6
4. Functions	6
4.1 Control panel	6
4.2 Pump stop	8
5. Mounting and connection	8
5.1 Mounting the pump	8
6. Electrical connection	9
6.1 Generator or inverter	9
6.2 Wiring diagram	10
6.3 Winding resistance measurement	10
6.4 Start-up	11
7. Maintenance	11
7.1 Service kits	11
7.2 Start-up after a long time of inactivity	11
8. Service	11
9. Disposal	11
10. Fault finding chart	12
Dimensions	35



Before beginning installation procedures, these installation and operating instructions should be studied carefully. The installation and operation should also be in accordance with local regulations and accepted codes of good practice.

1. General description

The MQ is a compact water supply system consisting of a pump, motor, pressure tank and controller combined in an integral unit.

The pump starts automatically when water is consumed in the installation and stops when the consumption ceases. The MQ is a low-noise pump which can be installed both indoors and outdoors.

Note: When installed outdoors the MQ should not be exposed to direct sunlight or rain.

The pump is self-priming and has a check valve incorporated in the discharge port, see fig. 1. The pump features a user-friendly control panel.

The pressure tank incorporated in the pump reduces the number of starts and stops in case of leakage in the installation.

The MQ pump has built-in overtemperature and dry-running protection.

1.1 Applications

Typical applications:

- Water pressure boosting (maximum inlet pressure: 45 psi) and
- water supply from wells (maximum suction lift: 25 ft), e.g.
 - in private homes,
 - in summer houses and weekend cottages,
 - on farms,
 - in market gardens and other large gardens.

The pump can be used for rain water and has been approved for drinking water.

The maximum suction lift of the pump can be determined from the diagram on page 35.

Example:

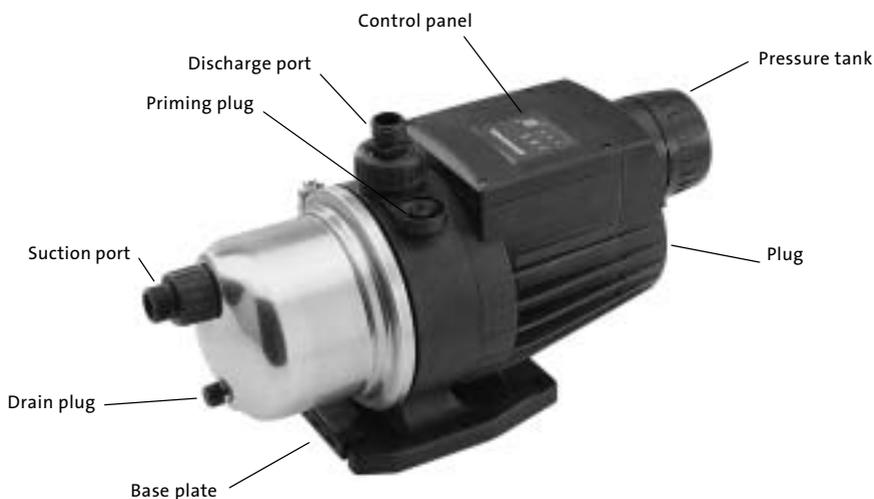
If the suction lift is 10 ft, the length of the suction pipe must not exceed 72 ft.

1.2 Type key

Example	MQ	3	-35	A	-O	-A	BVBP
Pump type							
Nominal flow rate [m ³ /h]							
Head [m]							
Code for pump version							
A: Standard							
Code for pipework connection							
Code for materials							
A: Standard							
Code for shaft seal							

1.3 MQ pump

Fig. 1



TM01 9873 2600

2. Pumped liquids

Thin, clean, non-aggressive liquids, not containing solid particles or fibres.

3. Technical data

3.1 Operating conditions

	MQ 3-35	MQ 3-45
Maximum flow rate [gpm]		22
Maximum pressure [psi]	51	65
Maximum system pressure [psi]		108
Maximum suction lift [ft], see page 35		25
Minimum ambient temperature [°F]		32
Maximum ambient temperature [°F]		113
Minimum liquid temperature [°F]		32
Maximum liquid temperature [°F]		95
Net weight [lbs]		29
Sound pressure level [dB(A)]		< 70
Tank volume [oz]		5
Air pressure in tank [psi]		22 to 25
Connections		1" NPT

3.2 Electrical data

US

		MQ 3-35	MQ 3-45
Enclosure class		IP 54	
Insulation class		B	
Supply cable		6.56 ft H07RN-F with/without plug	
Voltage, power consumption, P ₁ [W]	1 x 110-120 V -10/+6%, 60 Hz	800/7.2 A	1000/9.2 A
	1 x 220-240 V -10/+6%, 60 Hz	850/3.7 A	1050/4.5 A

3.3 Dimensions

See dimensions at the end of these instructions.

3.4 Approvals

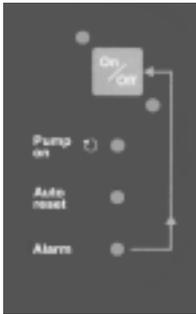
Materials in contact with the pumped liquid have been approved by the British Water Regulations Advisory Scheme (WRAS) according to BS 6920 for use in drinking water.
Other approvals: See pump nameplate.

4. Functions

4.1 Control panel

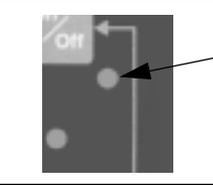
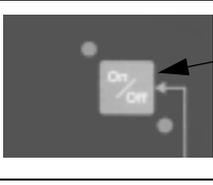
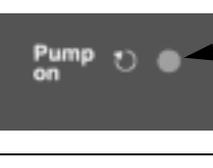
The MQ pump is operated entirely by means of the control panel, see fig. 2. The control panel offers the possibility of starting/stopping the pump. The pump settings and operating condition are indicated by indicator lights.

Fig. 2



TM01 9684 2600

The functions of the control panel are described in the following table:

Illustration	Description
1 	Indicator light (red): When the indicator light is on, the pump is on standby.
2 	On/off button: The pump is started/stopped by means of the on/off button. The on/off button can also be used for manual resetting in case of an alarm condition: <ul style="list-style-type: none">• press once for resetting and• press once more for starting.
3 	Indicator light (green): Indicates that the pump is ready for operation. When the indicator light is on, the pump will start automatically when water is consumed. The pump will stop a few seconds after the water consumption has ceased.
4 	Pump on (green): The indicator light is on when the pump is running.
5 	Auto-reset (green): As standard, this function is activated on delivery (does not apply to pump versions for Australia). When the indicator light is <ul style="list-style-type: none">• on, the Auto-reset function is activated. The pump will automatically attempt to restart every 30 minutes after an alarm/fault over a period of 24 hours. After this period, the pump will remain in the alarm condition.• off, the Auto-reset function is deactivated. The pump will not restart after an alarm/fault. The Auto-reset function can be activated/deactivated by pressing the on/off button for 5 seconds. Note: When water is consumed, the pump will start and stop automatically, whether the Auto-reset light is on or off.
6 	Alarm (red): The indicator light is on when the pump is in alarm condition. The alarm condition may have been caused by: <ul style="list-style-type: none">• dry running,• overtemperature,• overloaded motor or• seized-up motor/pump. See section 4.2 <i>Pump stop</i> .



Note: The pump settings are stored. After supply failure, the pump will automatically revert to its previous operating condition when the electricity supply is connected again.

4.2 Pump stop

The pump incorporates an electronic protective function which will stop the pump in case of

- dry running,
- overtemperature,
- overloaded motor or
- seized-up motor/pump.

The pump will restart automatically after 30 minutes (for 24 hours) in case of any type of fault if the Auto-reset function is activated (the green indicator light on the control panel is on, see point 5 in the table in section 4.1 Control panel).

5. Mounting and connection

5.1 Mounting the pump

The pump is resistant to sunlight and can be installed both indoors and outdoors. When installed outdoors, it is recommended to protect the pump by means of a suitable cover.

Always mount the pump on the base plate with horizontal suction port and vertical discharge port.

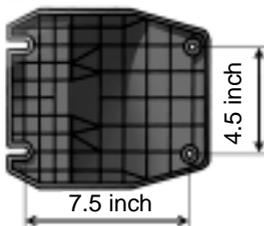
The pump must be mounted horizontally. Maximum permissible inclination angle: $\pm 18^\circ$, see fig. 3.

Fig. 3



The pump must be secured to a solid foundation by bolts through the holes in the base plate, see fig. 4.

Fig. 4



The pump discharge is flexible, $\pm 5^\circ$, to facilitate the connection. Never apply unnecessary force when connecting the pipes.

The pump is supplied with 1" NPT screwed connections to be fitted in the suction and discharge ports, see fig. 5.

Fig. 5

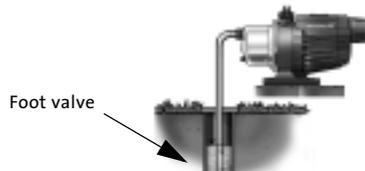


The pump incorporates a check valve which prevents backflow during priming and operation.

Installations with long suction pipes: A check valve is supplied with the pump. It is recommended to fit this check valve in the pump suction port.

If the pump is installed in long pipes, the pipes must be adequately supported on either side of the pump in order not to strain the pump connections. If the pump draws water from a well, it is recommended also to fit a foot valve to the end of the suction pipe, see fig. 6.

Fig. 6



If a hose is used for suction pipe, it must be of a non-collapsible type.

As the pump is self-cooling, no space is required around the pump and no ventilation is required.

6. Electrical connection

The electrical connections and additional protection should be carried out by qualified persons in accordance with local regulations.

Never make any connections in the pump terminal box unless the electricity supply has been switched off for at least 5 minutes.

Risk of electric shock: This pump is supplied with a grounding conductor and grounding type attachment plug. To reduce the risk of electric shock, be certain that it is connected only to a properly grounded electrical circuit equipped with a ground fault interrupter device.

This pump is not intended, nor has it been investigated for use in swimming pool areas.

This pump has been evaluated for use with water only.

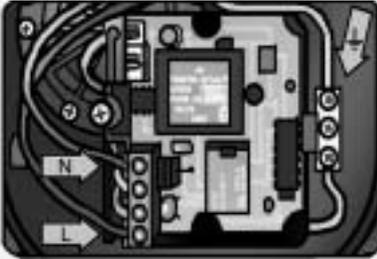
Do not start the pump until it has been filled with water (primed, see fig. 9).

For indoor use only.

The operating voltage and frequency are marked on the nameplate. Make sure that the motor is suitable for the electricity supply on which it will be used.

The pump must be connected to the mains via a rubber-sheathed cable with a protective ground lead. It is possible to replace the mains supply cable, see fig. 7.

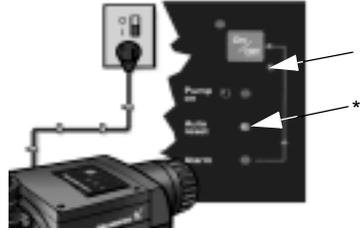
Fig. 7



TM01 9694 2600

Connect the mains supply cable of the pump to the electricity supply. When the cable is connected, a red and a green indicator light on the control panel will be on, see fig. 8.

Fig. 8



TM01 9695 2600

* Does not apply to pump versions for Australia.

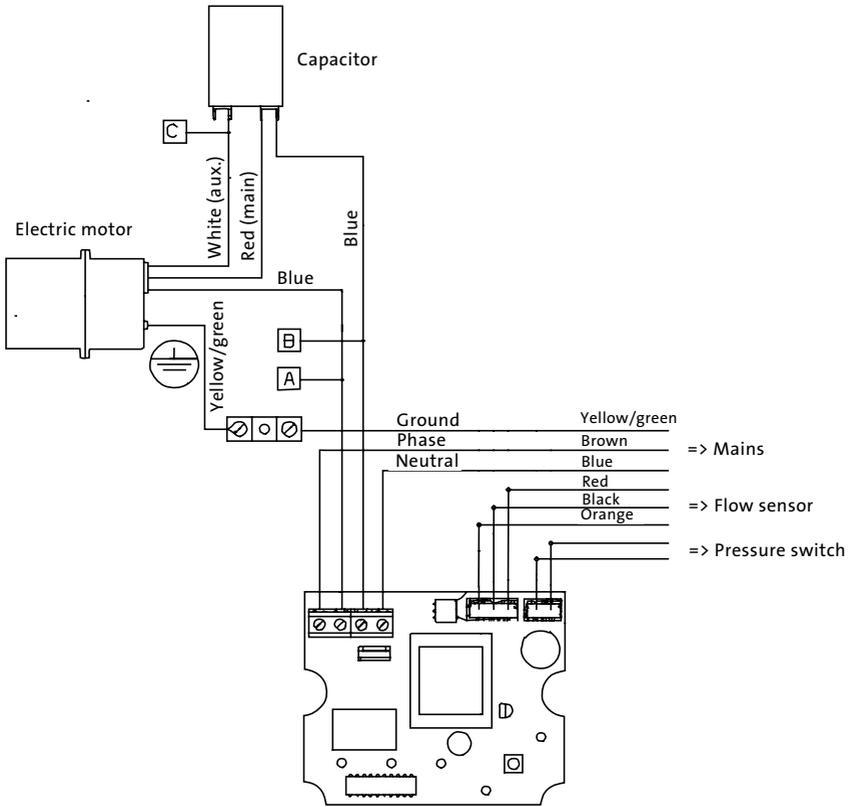
6.1 Generator or inverter

Note: The MQ can be powered by a generator or an inverter. However, the pump will only operate satisfactorily if the generator or inverter generates a true sinusoidal wave with the necessary power and voltage input.

US

6.2 Wiring diagram

Fig. 9



TMO2 2424 4303

6.3 Winding resistance measurement

Motor [V/Hz]	Measuring point	Winding	Resistance [$\Omega \pm 10\%$]	Ambient temperature	
				[°C]	[°F]
230/50	A-B	Main	6.4	21	70
230/60	A-C	Aux	16.7		
120/60	A-B	Main	1.5		
	A-C	Aux	6.1		

The measurement can be done with or without cables connected to the PCB and the capacitor.

6.4 Start-up

Before start-up, the pump must be filled with 1.2 to 1.5 gallons of water to enable it to self-prime, see fig. 10. The pump is self-priming with a maximum suction lift of 25 ft.

Fig. 10



TM01 9696 2600

When the pump is started, it will begin to self-prime. When the pump has been primed, it will automatically change over to normal operation. If the priming has not been completed within 5 minutes, the pump will stop automatically and attempt to restart after 30 minutes. It is possible to reset the pump manually, see point 2 in the table in section 4.1 *Control panel*.

7. Maintenance

Under normal operating conditions, the pump is maintenance-free. However, it is recommended to keep the pump clean.



Do not remove the pressure tank from the pump unless it has been vented through the air escape valve.

Never touch the electronics unless the pump has been switched off for at least 5 minutes.

If there is any risk of frost damage, drain the pump through the drain hole and slacken the union nut on the discharge pipe, see fig. 11. The pump must be filled with liquid before it is started up again, see fig. 10.

Fig. 11



TM01 9697 4403

7.1 Service kits

Service kits are available for the MQ pump. The service kits consist of the following replaceable parts:

- shaft seal,
- motor,
- electronic units,
- hydraulic components.

7.2 Start-up after a long time of inactivity

The end cover incorporates a plug which can be removed by means of a suitable tool. It is then possible to free the pump rotor if it has seized up as a result of inactivity. If the pump has been drained, it must be filled with liquid before start-up, see fig. 10.

8. Service

Note: If a pump has been used for a liquid which is injurious to health or toxic, the pump will be classified as contaminated.

If Grundfos is requested to service the pump, Grundfos must be contacted with details about the pumped liquid, etc. *before* the pump is returned for service. Otherwise Grundfos can refuse to accept the pump for service.

Possible costs of returning the pump are paid by the customer.

However, any application for service (no matter to whom it may be made) must include details about the pumped liquid if the pump has been used for liquids which are injurious to health or toxic.

9. Disposal

Disposal of this product must be carried out according to the following guidelines:

1. Use the local public or private waste collection service.
2. In case such waste collection service does not exist or cannot handle the materials used in the product, please deliver the product or any hazardous materials from it to your nearest Grundfos company or service workshop.



10. Fault finding chart

US

Fault	Cause	Remedy
1. The pump does not start.	a) Insufficient water.	Check the water supply/suction pipe.
	b) Overheating due to excessive liquid temperature (above +95°F).	Supply cold liquid to the pump.
	c) Overheating due to seized-up/choked-up pump.	Contact your pump supplier.
	d) Too low or too high supply voltage.	Check the supply voltage and correct the fault, if possible.
	e) No electricity supply.	Connect the electricity supply.
	f) No water consumption.	Open a tap. Check that the height between the top point of the discharge pipe and the pump does not exceed 50 ft.
	g) The pump is in alarm condition.	Reset the pump by means of the on/off button. See point 2 in the table in section 4.1 <i>Control panel</i> .
2. The pump does not stop.	a) The existing pipework is leaking or defective.	Repair the pipework.
	b) The check valve is blocked or missing.	Clean the valve or fit a new check valve.
3. The pump cuts out during operation.	a) Dry running.	Check the water supply/suction pipe.
	b) Overheating due to excessive liquid temperature (above +95°F).	Supply cold liquid to the pump.
	c) Overheating caused by: - high ambient temperature (> 113°F), - overloaded motor or - seized-up motor/pump.	Contact your pump supplier.
	d) Too low supply voltage.	Check the supply voltage and correct the fault, if possible.
4. The pump starts and stops too frequently.	a) Leakage in suction pipe or air in the water.	Check the water supply/suction pipe.
	b) Too low or too high pressure in pressure tank.	Check pressure in pressure tank, see section 3.1 <i>Operating conditions</i> .
5. The pump gives electric shocks.	a) Defective ground connection.	Connect the ground connection to the pump in accordance with local regulations.
6. The pump starts when no water is consumed.	a) Defective check valve or the existing pipework is leaking or defective.	Clean the valve or fit a new check valve.

If the pump does not start when the fault has been corrected, contact your pump supplier or Grundfos for further information.

11. MQ frequently asked questions

1. What causes the MQ to start?

Answer: The MQ is equipped with both an internal flow switch and pressure switch. Each of these can turn the MQ on depending on water consumption. The pump will start when:

The flow rate is greater than 0.3 gpm
OR
the pressure is below 29 psi.

2. What causes the MQ to stop?

Answer: Other than the manual on/off button, only the flow switch is authorized to automatically stop the MQ during normal operation when flow drops below 0.3 gpm. The pump will shut off in 12-15 seconds after flow stops. Additionally, the MQ will be turned off in the event of a dry-run or over temperature alarm.

3. What is the maximum height of a tap above the MQ?

Answer: If a tap or faucet is installed at heights greater than 50 ft above the MQ, there is the potential risk that the MQ will never start. In cases where the MQ starts due to low pressure (low flow rates), the pressure has to fall below the pressure switch activation point (28-30 psi factory setting). To allow for the pressure of 50 ft of water, tolerances and a safety margin, we recommend a maximum height of 50 ft between the MQ and any tap.

4. What is the purpose of the built-in pressure tank?

Answer: The built-in pressure tank comes from the factory pressurized at approximately 23 psi (with the pump pressure at zero), and holds a volume of 5 ounces of water. It is designed to minimize motor startup due to small leaks.

5. How is the dry-run condition determined?

Answer: The dry-run alarm is declared when the motor is running AND the flow rate is less than 0.3 gpm AND when pressure is less than the pressure switch setting. When this condition lasts for 1 minute, the alarm is declared and the motor is stopped. The MQ attempts to automatically restart every 30 minutes for a maximum of 24 hours. If more than 24 hours pass without water, the pump must be restarted manually.

6. What is the maximum inlet pressure allowed in the MQ?

Answer: For both MQ 3-35 and MQ 3-45 the maximum internal pressure allowed is 109 psi. The maximum inlet pressure when added to the MQ pressure must not exceed 109 psi. Remember that inlet pressure adds to the MQ pressure, so with a 40 psi inlet pressure supplied to the MQ 3-45, internal pressures can reach approximately 105 psi (65 + 40 psi). Additionally, if inlet pressures exceed the built-in pressure switch activation point, (28-30 psi factory setting) the pressure switch will be unable to activate, and the ability to turn the MQ on at low flow rates will be lost. In this situation, only the flow switch will be able to turn the MQ on at flow rates above its activation point of 0.3 gpm.

7. Where can a pressure gauge be easily installed?

Answer: In the ½" straight thread opening used to add priming water to the pump.

