

MQ

USA Installation and operating instructions



DECLARATION OF CONFORMITY

We Grundfos declare under our sole responsibility that the products **MQ**, to which this declaration relates, are in conformity with the Council Directives on the approximation of the laws of the EEC Members States relating to:

- Machinery(98/37/EEC).
 - Standard used: EN 292
 - Electromagnetic compatibility (89/336/EEC).
Standards used: EN 50 081-1 and EN 50 082-2.
 - Electrical equipment designed for use within certain voltage limits (72/23/EEC).
Standards used: EN 60 335-1 and EN 60 335-2-41.
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Bjerringbro, 15th August 2000



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Technical Manager

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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.

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

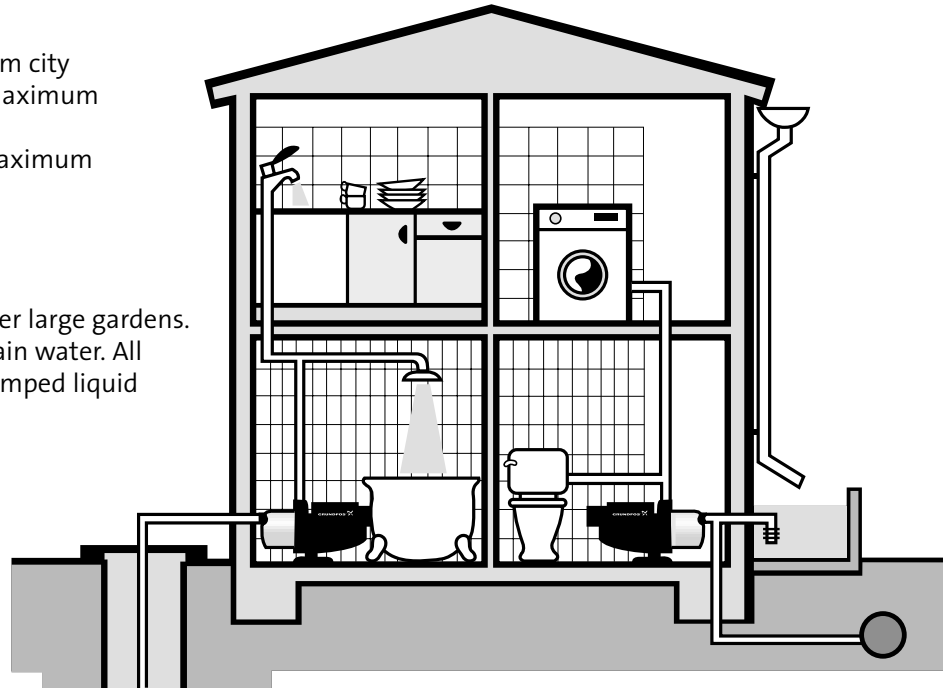
The pressure tank incorporated in the pump reduces the number of starts and stops in case of leakage in the installation.

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

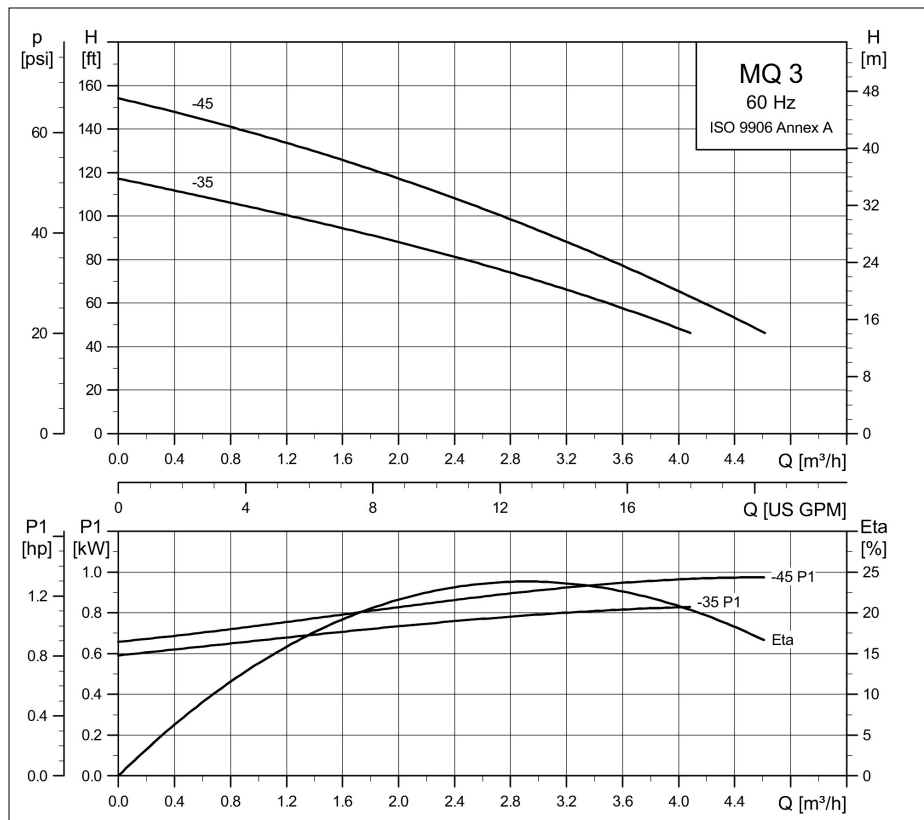
GENERAL DISCRPTION

Typical Applications

- Water pressure boosting from city supplies or storage tanks (maximum inlet pressure 45 PSI).
 - Water supply from wells (maximum suction lift 25 feet).
 - in private homes,
 - in summer houses,
 - on farms,
 - in market gardens and other large gardens.
- The pump can be used for rain water. All parts in contact with the pumped liquid have been WRc approved.



Performance



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							

MQ Pump

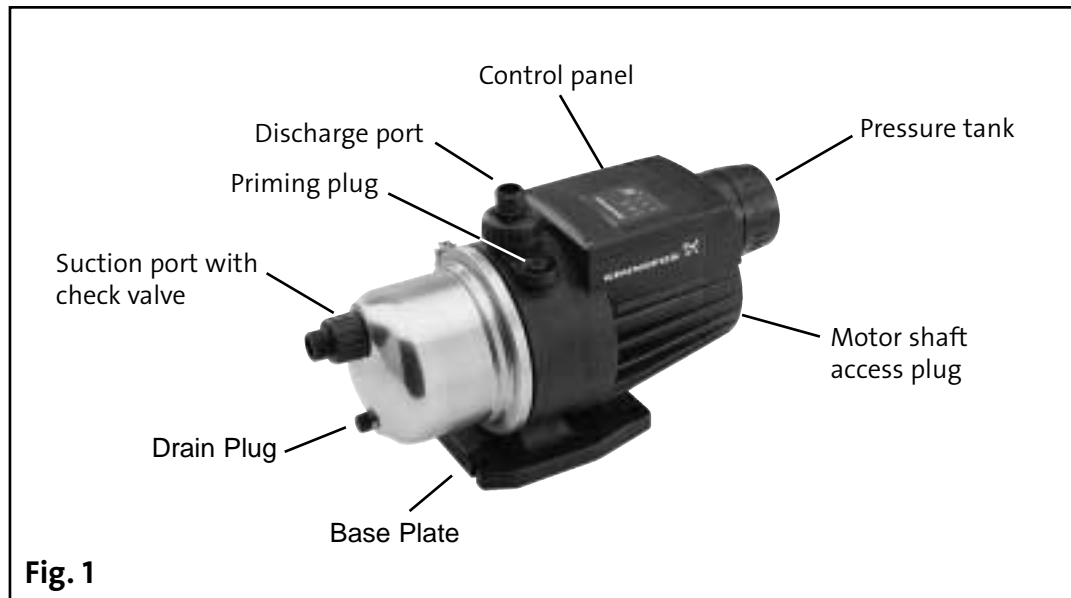


Fig. 1

Pumped Liquids

Water, not containing solid particles or fibers.

This unit is not designed, nor intended for pumping of chemicals or corrosive liquids. This will shorten the life of the pump, expose user to possible personal harm, and void the warranty.

Never pump gasoline or other flammable liquids or operate in areas where flammable or explosive fumes are present, fire or explosion could occur.

TECHNICAL DATA

Operating Conditions

	MQ 3-35 (3/4 hp)	MQ 3-45 (1.0 hp)
Maximum flow rate [GPM]	22	
Maximum pressure [PSI] (H_{MAX})	51	65
Maximum inlet pressure PSI	45	
Maximum pump pressure + inlet maximum inlet pressure [PSI]	96	110
Flow rate at maximum pump efficiency [GPM] (Q)	13.2	
Pressure at maximum pump efficiency [PSI] (H)	31	40
Maximum suction lift [ft]	25	
Minimum air temperature [°F]	32	
Maximum air temperature [°F]	115	
Minimum water temperature [°F]	32	
Maximum water temperature [°F]	95	
Net weight lbs.	30	
Sound pressure level [dB(A)]	<55	
Tank Volume [oz]	5	
Air pressure in tank PSI	22 to 25*	
Connections	1" NPT	
Pressure switch cut-in	26-32 psi	

*with pump off and pump pressure at 0 psi

Electrical data

	MQ 3-35 (3/4 hp)	MQ 3-45 (1.0 hp)
Enclosure class	IP 54	
Insulation class	B	
60 Hz:		
Voltage, power consumption, P_1 [W]		
1 x 110 - 120 VAC — 10/+6%	850 W, 7.2A	1000 W, 9.2A
1 x 220 - 240 VAC — 10/+6%	850 W, 3.7A	1000 W, 4.5A

Dimensions

See dimensions at the end of these instructions

Approvals

Materials in contact with the pumped liquid have been approved by the British Water Research Council (WRc) according to BS6920 for use in drinking water. Other approvals: UL Listed- US and Canada

Functions

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 conditions are displayed by indicator lights.

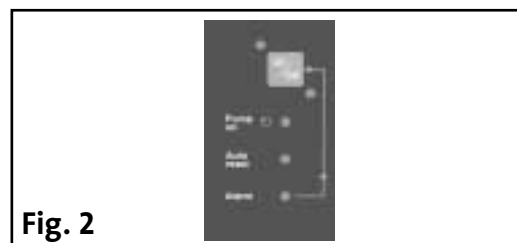
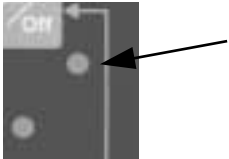
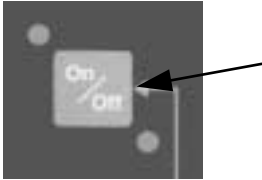
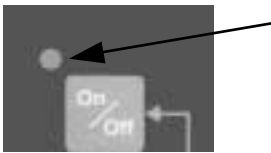





Fig. 2

CONTROL PANEL

The Functions of the control panel are described in the following table.

Illustration	Description
<p>1</p> 	<p>Indicator light (red): When the indicator light is on, the pump is on standby.</p>
<p>2</p> 	<p>On/off button: Selecting the ON position allows the pump to turn on or off based on water consumption. The on/off button can also be used for manual resetting in case of an alarm condition</p> <ul style="list-style-type: none"> - press once for resetting and - press once more for starting.
<p>3</p> 	<p>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.</p>
<p>4</p> 	<p>Pump on (green): The indicator light is on when the pump is running.</p>
<p>5</p> 	<p>Auto-reset (green): As standard, this function is activated on delivery. When the pump indicator light is:</p> <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. - To deactivate, press on/off button for 5 seconds.
<p>6</p> 	<p>Alarm (red): The indicator light is on when the pump is in alarm condition. The alarm condition may have been caused by:</p> <ul style="list-style-type: none"> - dry running - overtemperature - overloaded motor or locked motor/pump

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

INSTALLATION

Pump protection features

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

- dry running
- overtemperature
- overloaded motor
- locked rotor condition

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

INSTALLATION

Always mount the pump on the base plate with horizontal suction port and vertical discharge port. The pump must be mounted horizontally at a maximum angle of $\pm 18^\circ$.

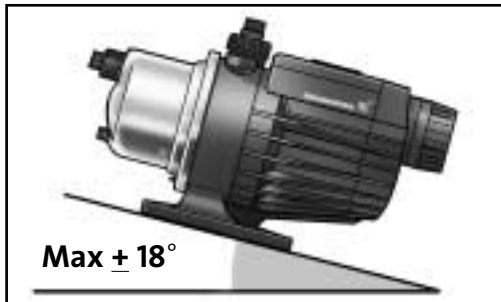


Fig. 3

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 male connections on the suction and discharge ports.



Fig. 5

Note: Discharge pressure is equal to inlet pressure plus pump pressure. For example with 25 psi at the inlet, the MQ-35 will pressurize the lines up to about 75 psi. A pressure reducing valve may be used on the MQ inlet to lower the maximum outlet pressure.

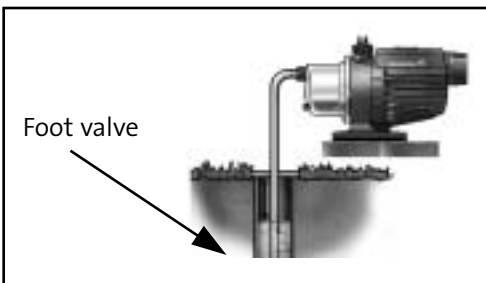


Fig. 6

A check valve is factory-fitted in the suction port. This check valve prevents the liquid from disappearing from the pump "suction chamber" during a priming attempt and during operation.

Note: The check valve must be fitted under all operating conditions. 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 recommended also to fit a foot valve to the end of the suction pipe, see fig 6

Electrical connection

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



Warnings:

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

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

Risk of electrical 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 figure 9).

For indoor use only.

Conformity with federal, state and local electric codes is mandatory. The National Electric Code request that a ground fault circuit interrupter (GFCI) be used in the branch circuit supplying sump utility and effluent pumps. Consult a licensed electrician or power company if in doubt.

The pump must be connected to the mains via a cable with a protective ground lead. Power cables as well as extension cables must not have a smaller cross section than the original mounted cable.

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

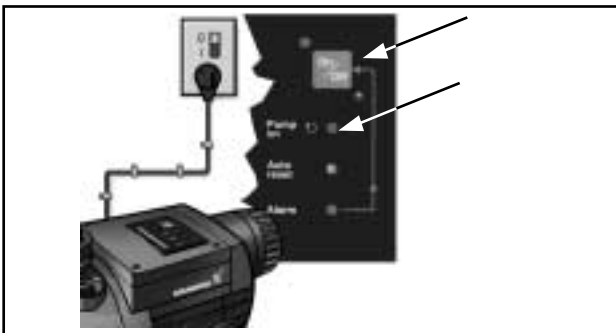


Fig. 8

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. 9. The pump is self priming with a maximum suction lift of 25 feet (at sea-level).



Fig. 9

When the pump has been started, it will begin to prime itself.

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 on page 4.

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, see fig. 10. The pump must be filled with liquid before it is started up again, see fig. 9.



Fig. 10

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

Start-up after a long period 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, the pump must be filled with liquid before start-up, see fig. 9.

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 be made) must include details about the pumped liquid if the pump has been used for liquids which are injurious to health or toxic.

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 0.3gpm *
- OR
- The pressure is below 29psi (pressure switch open when psi < 29, closed when psi > 29)

* (1.6gpm in production models with serial numbers lower than 92647R)

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 0.3gpm. 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) Is the pressure switch threshold adjustable?

Answer: Yes, it can be adjusted to start the pump at pressures up to approximately 40psi. Technical Bulletin 12-02-02 describing this procedure was sent to all distributors in early May 2002. Call 913-227-3404 to request a copy.

4) What is the maximum height of a tap above the MQ?

Answer: If a tap or faucet is installed at heights greater than 50 feet 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 (28-30psi factory setting). To allow for the pressure of 50 feet of water, tolerances and a safety margin, we recommend a maximum height of 50 feet between the MQ and any tap.

5) What is the purpose of the built-in pressure tank?

Answer: The built-in pressure tank comes from the factory pressurized at approximately 23psi (with the pump pressure at zero), and holds a volume of 5 ounces of water. It is designed to discharge its water across the flow switch when a tap is opened, thus boosting the flow switch and starting the pump.

6) 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 0.3gpm 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 shut off. 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.

7) What is the maximum inlet pressure allowed in the MQ?

Answer: For MQ3-35 - The maximum internal pressure allowed is 96psi. The maximum pressure generated is 51psi, therefore, maximum inlet pressure is $96 - 51 = 45$ psi.

For MQ3-45 - The maximum internal pressure allowed is 110psi. The maximum pressure generated is 65psi, therefore, maximum inlet pressure is $110 - 65 = 45$ psi.

If supply pressures greater than this are present, install pressure-reducing devices at the MQ inlet. Remember that inlet pressure adds to the MQ pressure, so with a 40psi inlet pressure supplied to the MQ3-45, discharge pressures can reach approximately 105psi ($65 + 40$ psi).

Additionally, if inlet pressures exceed the built-in pressure switch activation point, (28-30psi 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.

8) Where can a pressure gauge be easily installed?

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

TROUBLESHOOTING

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 pump.	Pull out motor shaft plug and try to rotate motor shaft.
	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.	Turn on 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.
2. The pump does not stop.	a) The existing pipework is leaking or defective.	Repair the pipework.
	b) Defective pressure switch	Unplug the 2 pin pressure switch plug from the circuit board and short the two vertical pins together. If the pump stops, the switch is defective.
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: <ul style="list-style-type: none"> • high ambient temperature (> +115°F), • overloaded motor. 	Correct these conditions.
	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. The pressure must be 22 to 25 psi.
	c) The non-return valve is blocked or missing.	Clean the valve or fit a new non-return valve.
5. The pump gives electric shocks.	a) Defective earth connection.	Connect the earth connection to the pump in accordance with local regulations.
6. The pumps starts when no water is consumed.	a) Defective non-return valve or the existing pipework is leaking or defective.	Clean the valve or fit a new non-return valve.

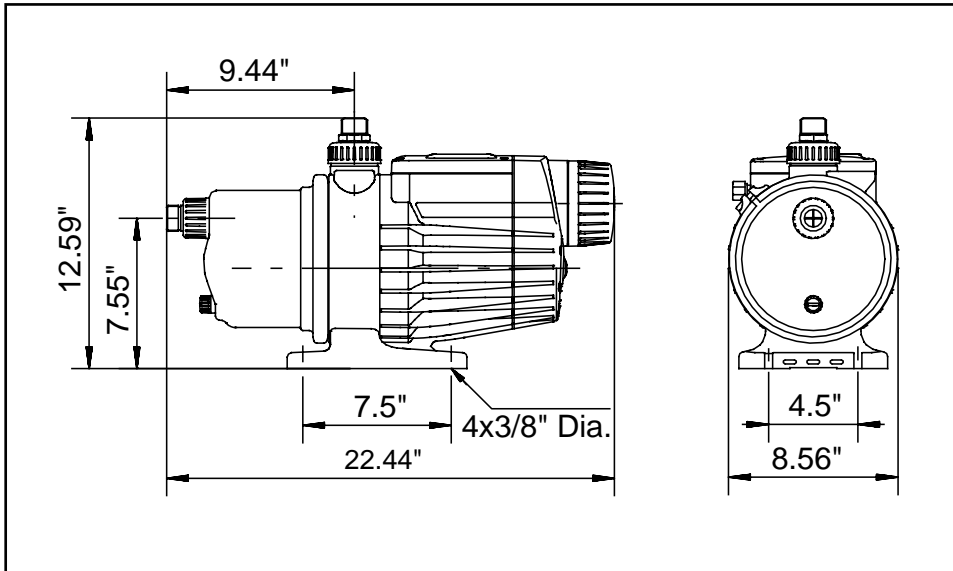
If the pump does not start when the fault has been corrected, contact your pump supplier or GRUNDFOS for further information.

Disposal

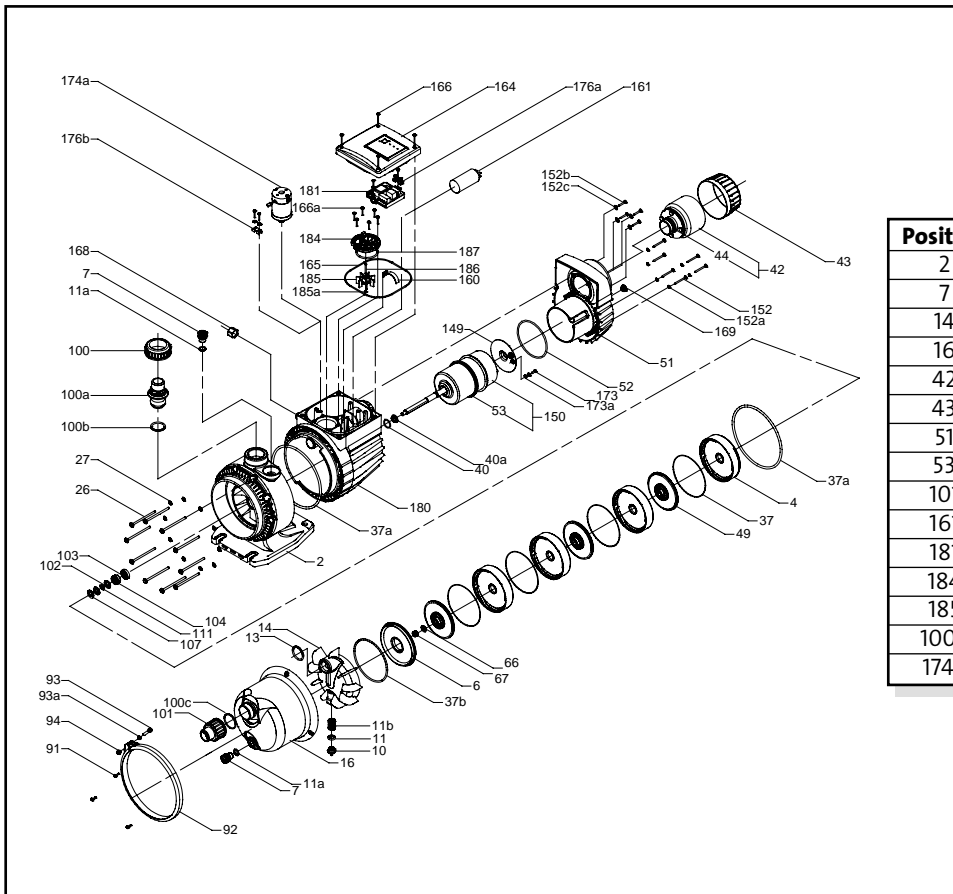
Disposal of this product must be carried out according to the following guidelines:

1. Use 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 construction of the product, please deliver the product or any hazardous materials from it to your nearest GRUNDFOS company or service workshop.
3. Any pumps used to pump hazardous or contaminated liquids will not be accepted for return.

DIMENSIONS



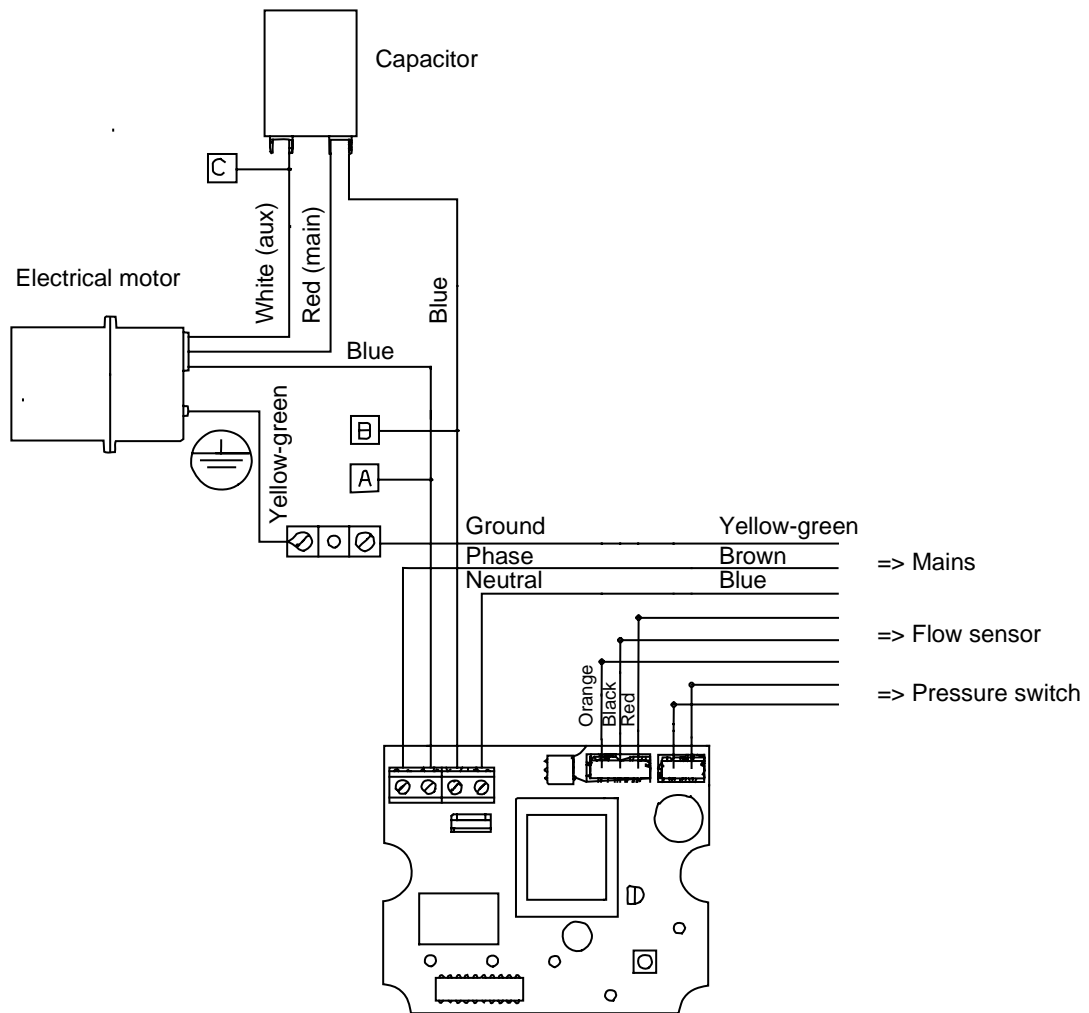
Exploded view



Position	Description
2	Motor Stool w/ base plate
7	priming plug
14	self priming mechanism
16	pump sleeve
42	pressure tank
43	cover
51	end cover
53	O-ring
101	inlet with non-return valve
161	capacitor
181	circuit board
184	flow switch housing
185	flow switch paddlewheel
100a	discharge nozzle
174a	pressure switch

Note: Before assembling the MQ pump, apply silicone grease to the O-rings.

WIRING DIAGRAM



TM02 2424 4401

4.1 Winding resistance measurement

Motor [Volt/Hz]	Reading point	Winding	Resistance [T #10%]	Ambient temp. [°F]
230/50	A-B	Main	6.4	70
230/60	A-C	Aux	16.7	70
120/60	A-B	Main	1.5	70
	A-C	Aux	6.1	70

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

LIMITED WARRANTY

Products manufactured by GRUNDFOS are warranted to the original user only to be free of defects in material and workmanship for a period of 24 months from date of installation, but not more than 30 months from date of manufacture. GRUNDFOS liability under this warranty shall be limited to repairing or replacing at GRUNDFOS' option, without charge, F.O.B. GRUNDFOS' factory or authorized service station, any product of GRUNDFOS' manufacture. GRUNDFOS will not be liable for any costs of removal, installation, transportation, or any other charges which may arise in connection with a warranty claim. Products which are sold but not manufactured by GRUNDFOS are subject to the warranty provided by the manufacturer of said products and not by GRUNDFOS' warranty. GRUNDFOS will not be liable for damage or wear to products caused by abnormal operating conditions, accident, abuse, misuse, unauthorized alteration or repair, or if the product was not installed in accordance with GRUNDFOS' printed installation and operating instructions.

To obtain service under this warranty, the defective product must be returned to the distributor or dealer of GRUNDFOS' products from which it was purchased together with proof of purchase and installation date, failure date, and supporting installation data. Unless otherwise provided, the distributor or dealer will contact GRUNDFOS or an authorized service station for instructions. Any defective product to be returned to GRUNDFOS or a service station must be sent freight prepaid; documentation supporting the warranty claim and/or a Return Material Authorization must be included if so instructed.

GRUNDFOS WILL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSSES, OR EXPENSES ARISING FROM INSTALLATION, USE, OR ANY OTHER CAUSES. THERE ARE NO EXPRESS OR IMPLIED WARRANTIES, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WHICH EXTEND BEYOND THOSE WARRANTIES DESCRIBED OR REFERRED TO ABOVE. EXCEPT AS EXPRESSLY HERIN PROVIDED THE GOODS ARE SOLD "AS IS", THE ENTIRE RISK AS TO QUALITY AND FITNESS FOR A PARTICULAR PURPOSE, AND PERFORMANCE OF THE GOODS IS WITH THE BUYER, AND SHOULD THE GOODS PROVE DEFECTIVE FOLLOWING THEIR PURCHASE, THE BUYER AND NOT THE MANUFACTURER, DISTRIBUTOR, OR RETAILER ASSUMES THE ENTIRE RISK OF ALL NECESSARY SERVICING AND REPAIR.

Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages and some jurisdictions do not allow limitations on how long implied warranties may last or require you to pay certain expenses as set forth above. Therefore, the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from jurisdiction to jurisdiction.

The telephone number of our service and repair facilities central directory, from which you can obtain the locations of our service and repair facility is, 1-800-333-1366

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