



08:013-1703

ELECTRICAL WATER HEATERS



Manual

Smart Control models 60, 110 and 160
Type 206 ECO, 211 ECO and 216 ECO



Type 206 ECO



Type 216 ECO

Model 60, Smart Control
Type 206 ECO
METRO number: 112061003
Plumbing number: 345181360

Model 110, Smart Control
Type 211 ECO
METRO number: 112111003
Plumbing number: 345181560

Model 160, Smart Control
Type 216 ECO
METRO number: 112161003
Plumbing number 345181760



Type 211 ECO

Contents

Transport	4
Position	5
Diagram	6
Plumbing installation	7
Electrical installation	9
User Guide	11
Maintenance	15
Troubleshooting	17
Guarantee terms	18
Declaration of compliance	19

Transport

Inspect the water heater for damage and missing parts immediately upon receipt. Report any damage or missing parts to the carrier immediately. All shipping is the responsibility of the recipient unless otherwise agreed.

Position

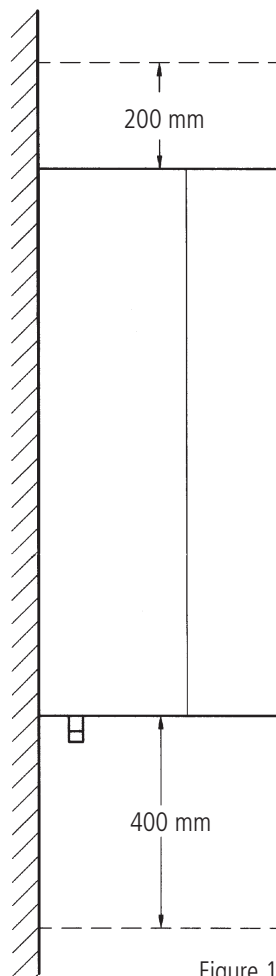
Installation can only be performed by an authorised plumbing installer, and in accordance with the Danish Building Code. Tank and pipes cannot be exposed to freezing. Position the heater close to its water supply and a floor drain. Ensure that there is sufficient room for service and maintenance.

Electrical water heaters must always be mounted vertically and with the spouts downwards.

Distance to the floor for wall-mounted models shall be min. 400 mm and distance to ceiling should be min. 200 mm (figure 1). If suspending a water heater, always use the ceiling-mounting bracket supplied.

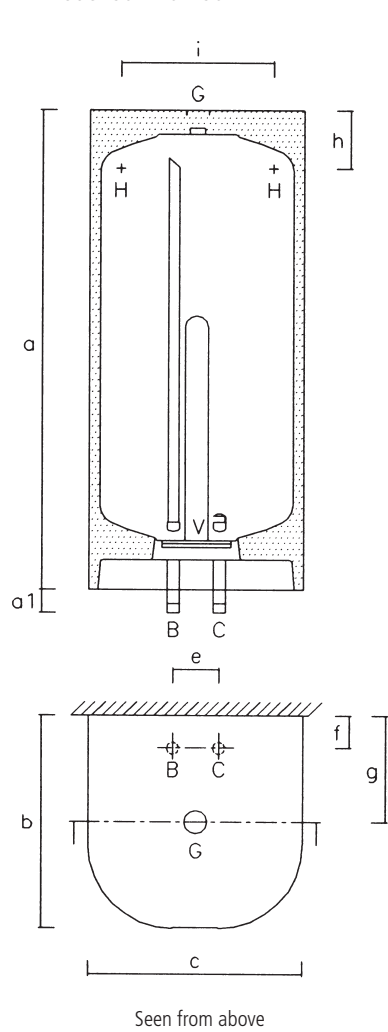
Check that the wall can bear the weight of the tank when full of water.

A stand and plate set with adjustable feet is available for models 60, 110 and 160, making it possible to install a water heater on a level, firm surface.



Diagram

Model 60-110-160



- B Hot water outlet
- C Cold water inlet
- G Connector 3/4" with plug (e.g. for circulation)
- H Holes in mounting plate
- I CC measurements for mounting plate

Dimensioned diagram

All dimensions are in mm.

Type no.	Model	Volume (litres)	Net weight	a	a1	b	c	e	f	h	i
206 ECO	60	56	48	875	40	390	390	100	60	175	255
211 ECO	110	98	59	1030	40	460	460	100	70	175	255
216 ECO	160	142	76	1400	40	460	460	100	70	175	255

Plumbing installation

Note following for installation

- Installations shall comply with the Danish Building Code and all other relevant regulations and provisions, including those for electrical and water installations.
- Check all technical data and information on the type plate.
- Check that all accessories are removed from the packaging.
- Check that there is easy access to the hot water tank. Always install an external shut-off valve for water supply to the heater.
- Flush all water pipes carefully before connection.
- Never expose the heater to water pressure exceeding 1 MPa (10 bar).

Installation can only be performed by an authorised plumbing/electrical installer, and in accordance with the Danish Building Code.

Approvals

VA no. 3.23/19559

Approved by DEMKO

	Hot water tank
Test pressure	13 bar
Operating pressure	10 bar

Energy labels at www.METROTHERM.dk

Risk of corrosion

METRO THERM hot water tanks are made of enamelled steel, and protected by a magnesium anode. If connections and pipes are copper or stainless steel, there can be risk of galvanic corrosion at the point of connection. The risk can be mitigated by using a PEX pipe adapter between tank and pipe installation.

The water heater is fitted with PEX bushings for cold and hot water supply pipes. These bushings protect the enamel coating and must not be removed.

The water heater must be installed as a pressurised tank with shut-off, non-return and safety valves, e.g. METRO safety device. The safety device must be positioned as shown in figure 2.

Using softened water in a METRO THERM tank

Water softened using salt can be used in a METRO THERM hot water tank. However, we recommend removing the anode before the tank is used, to avoid degradation of the anode. If the anode is degraded, the water can begin to smell, glasses in dishwashers can be stained a milky-white and sulphur hydroxide can form, which cause the tank to begin to sputter.

Do not use demineralised water (double ion exchange), which will rapidly corrode the tank. Demineralised water is also referred to as totally desalinated or deionised water.

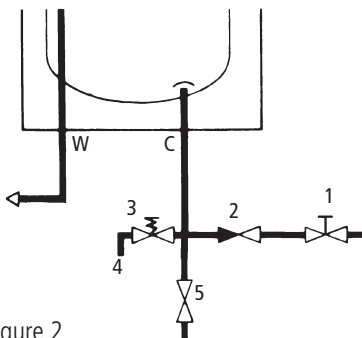


Figure 2

1. Water supply (cold) 3/4" shut-off valve
2. Non-return valve (integrated)
3. Safety valve
4. Overflow 3/4"
5. Drain tap
- B Hot water out 3/4"
- C Cold water in 3/4"

Safety device

The safety valve must be mounted on the cold water supply pipe close to the tank, and easily accessible for service and testing. It must be impossible to shut-off the pipe connecting safety valve and tank and the overflow from the safety valve. Diameter min. 3/4" (20 mm.). The overflow outlet must be visible and run to a drain. It must not run outdoors to protect it from freezing.

The safety valve must be able release the rated output of the water heater at least. The use of a METRO safety device (figure 3) fulfils this requirement. Because water expands when heated (approx. 2%), the safety valve must drip during heating.

Installing circulation

A plastic plug is fitted in the top plate. Under the plug (in the insulation) is a connector (3/4" internal RG) with plug (NV 26).

Forced circulation

We recommend forced circulation with a pump mounted using a circulation kit (supplied as accessory). The circulation kit consists of an enamelled extension pipe to be fitted in the top of the water heater, and a PEX pipe fitted at the bottom (figure 4).

Natural circulation

If connecting the water heater to natural circulation, the hot water outlet must be connected to the top of the tank. The circulation circuit should be connected to the hot water outlet in the base, and the PEX pipe in the hot water outlet shortened to a length of 2/3".

NB:

The customer must be made aware of heat loss from the circulation circuit, and the extra running costs that will incur. Circulation can be controlled by a timer.

High circulation loss can cause breakdowns if the control system is set for ECO operation. In such instances, it may be necessary to switch the control system over to manual operation, when the tank temperature can be controlled in the same way as a standard electrical water heater.

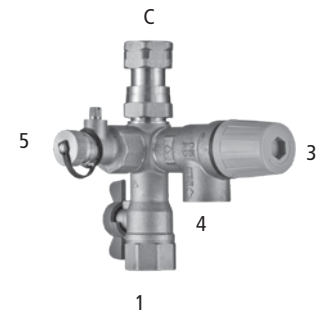


Figure 3

1. Water supply (cold) 3/4" shut-off valve
3. Safety valve
4. Overflow 3/4"
5. Drain tap
- C Cold water in 3/4"



Figure 4

Electrical installation

Remember! The water heater must be filled with water before connecting electricity.

Electrical installation can only be performed by an authorised electrical installer.

The water heater has splashproof IP24 encapsulation and must always be extra-protected in accordance with the LVD directive.

The water heater is fitted with Smart Control, which includes a thermostat, a thermal fuse and a display for setting the different forms of control systems and temperature levels.

Smart Control

The water heater is fitted with a thermal fuse to prevent overheating, and that can be reconnected. The fuse can only be reconnected by an authorised electrician. The fuse is located under the plastic plug in the baseplate, by the yellow sticker.

The Smart Control system with thermostat and thermal fuse is located under the water heater baseplate. The Smart Control display is located on the bottom of the front, and is used to set various forms of control systems and temperature levels.

Remember that the sensor tube from the thermostat and thermal fuse must extend as far from the spade terminal on the heating element as possible.

Electrical heating element – up to 3 kW 3 kW/400 V – 1 kW/230 V

The standard heating element can be connected to 400 V (3 kW) or 230 V (1 kW), see wiring diagram. The water heater is supplied from the factory with a 4-wire cable (with no plug) to be connected to mains electricity. If the cable is damaged, it must be replaced (can be purchased as a spare part).

Smart Control

Wiring diagram 3 kW (1 kW) Type 206 ECO, 211 ECO and 216 ECO

1. Connection to mains electricity 1.2m 4x1[□]
400V2 ~ +N+J (L1+L2+N+J) or
230V ~ +J (L1+N+J) (black+blue to neutral)

2. Cable penetration with strain relief

3. Terminal block, 6 pin on baseplate

TYPE: 206 ECO/211 ECO

4. Smart Control with 350 mm sensor bulb.
Mechanical thermal fuse 95°C +/- 7°C
Electronic thermostat 60°C to 75°C

TYPE: 216 ECO

4. Smart Control with 450 mm sensor bulb.
Mechanical thermal fuse 95°C +/- 7°C
Electronic thermostat 60°C to 75°C

5. ECO Display in box with front sticker:

6. Flat wire 600mm PH7 pin

7. Steatite heating element 400V-3.0KW
230V-1.0KW

8. Terminal, earth wire (tank)

9. Terminal, earth wire (cabinet)

INTERNAL WIRING:

All wires are 0.75[□]

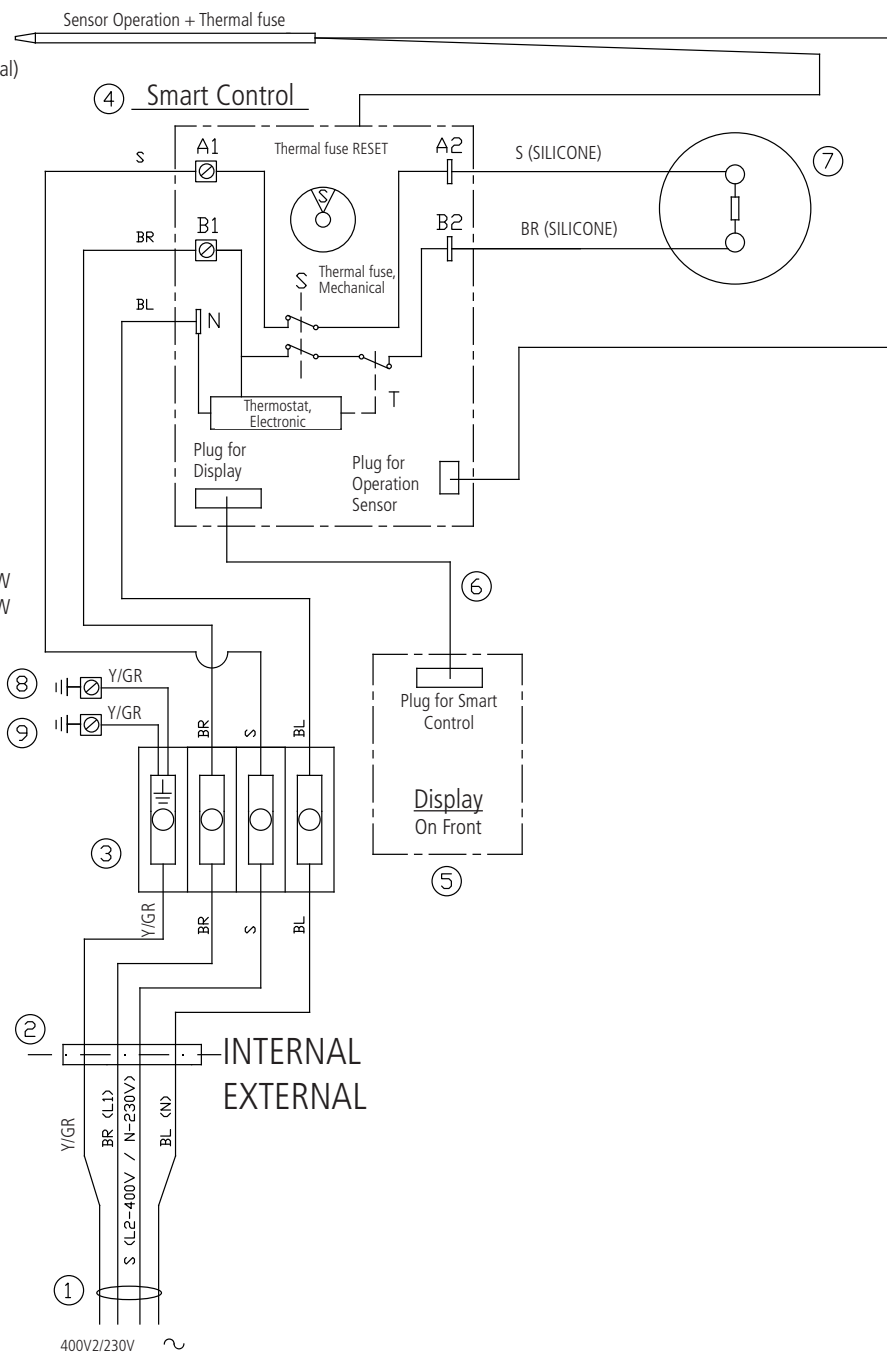
To heating element in SILICONE with steel plug

G/GR = yellow/green

BR = brown

BL = blue

B = black



User Guide

Read this manual carefully before installation and using the water heater.

Safety regulations

Installation, first activation and maintenance of this product can only be performed by an authorised plumber/electrician, who will be responsible for observance of the relevant standards and installation regulations. We cannot be held liable for damage or injury caused by failing to observe the safety regulations.

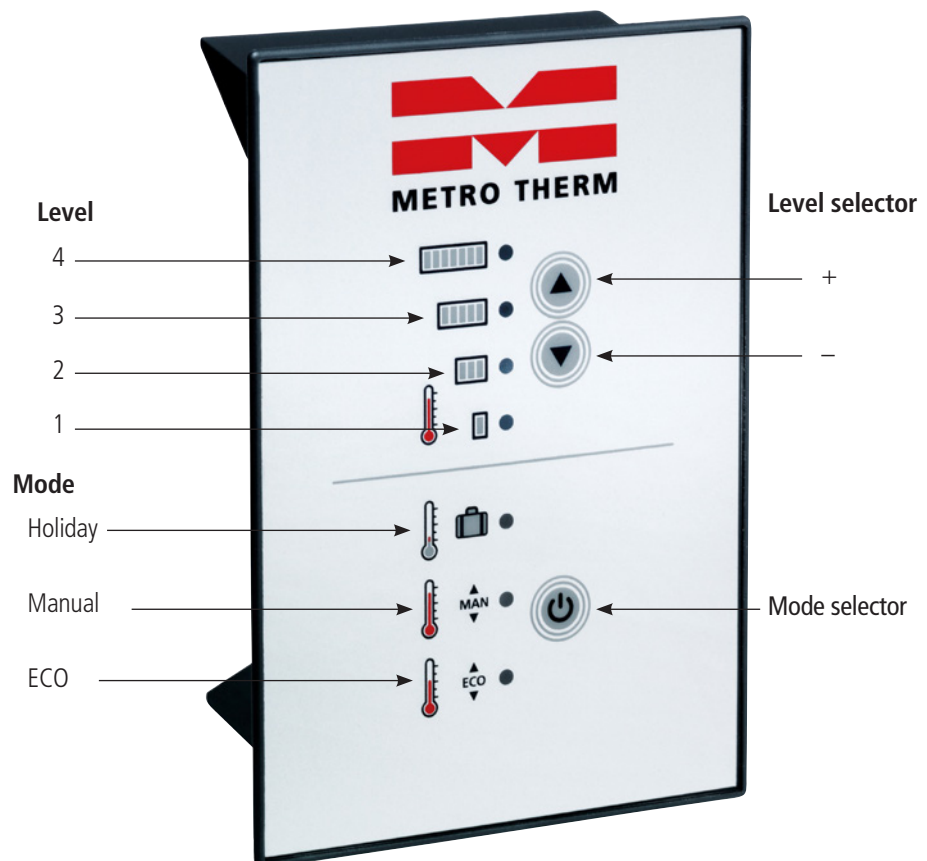
Risk of flooding and freezing

If the water heater is mounted in a holiday home, or a house which is uninhabited for long periods, we recommend draining the entire water installation to damage caused by freezing. If there is no risk of freezing, shutting-off the water supply at the mains cock will be sufficient.

Smart Control

Smart Control consistently reads actual patterns for household hot water consumption, and only heats up the amount of water needed at any given time. That saves energy, and ensures that there is always sufficient hot water.

Smart Control Display



Start

When switching on electricity for the water heater – at the mains switch – the Smart Control will run a short test, during which the seven diodes will light in turn. After a few seconds, ECO mode will automatically cut in, using comfort level 2, meaning that the water heater is working. The diode opposite the comfort level in use will flash when the heating element is on.

Control system modes

The Smart Control has three different control system modes: ECO, Manual and Holiday. Select the function required by pressing the mode selector button until the diode for the mode required lights.

- **ECO**

Economy mode, in which Smart Control consistently reads actual patterns for household hot water consumption, and only heats up the amount of water needed at any given time.

The consumption pattern established in week 1 is used to forecast the amount of hot water needed at the right time in week 2. If the pattern changes, the Smart Control will automatically adapt accordingly in the following week.

Four comfort levels can be selected, from 1 to 4, by pressing the level selector buttons + (arrow up), and – (arrow down), until the diode by the comfort level required comes on.

The lowest comfort level is no. 1, which uses the least energy, but also sticks closest to last week's actual hot water consumption pattern. The higher the comfort level, the higher the amount of extra hot water is needed compared to the forecast. There is therefore greater likelihood that there is always sufficient hot water – but also higher energy consumption.

Comfort level no. 2 is factory default setting, which is also used for energy rating testing for the electrical water heater.

- **Manual**

Smart Control works as a traditional electrical hot water heater thermostat, heating up the entire tank to the temperature selected. The temperature can be selected at four comfort levels, from 1 to 4, by pressing the level selector buttons + (arrow up), and – (arrow down), until the diode by the temperature level required comes on.

Temperature level no. 1 = 60°C and should normally be used, as it minimises limescale accumulation on the heating element, extending its service life.

Temperature level no. 2 = 65°C should only be used if level no. 1 does not provide sufficient hot water. The higher temperature will mean accelerated limescale accumulation on the heating element.

Temperature level no. 3 = 70°C and no. 4 = 75°C can only be used if an anti-scalding device is also installed on the hot water outlet of the tank. Otherwise, there can be a danger of scalding! Limescale accumulation will also be significantly higher.

- **Holiday**

“Standby” mode, in which the Smart Control turns down the temperature in the tank to prevent freezing, to 6°C. No higher temperature level can be selected in this mode.

Legionella protection

The Smart Control always runs with a Legionella protection function, which constantly monitors the water heater's function. Any breakdown which could allow the Legionella bacteria to exist will result in the temperature in the tank being automatically raised to 65°C and maintained until any bacteria have been eradicated.

Child lock

The Smart Control can be set in a mode in which its functions are locked, to prevent changes being made to the settings. The child lock is activated by simultaneously pressing the mode button and level button – (arrow down), until the diodes light in turn for ECO + Manual and level 3 + 4. The child lock can be deactivated using the same process as activation.

Fault indicator

The Smart Control can detect and provide a warning for the following faults. The water heater will automatically stop working in the event of a fault!

- **RESET**

Once the cause of a fault has been eliminated, the Smart Control must be RESET before it starts working again. To do so, press the level selector button + (arrow up) and – (arrow down) simultaneously.

- **No water in the water heater**

If there is not enough water in the tank when the heating element comes on, the Smart Control will provide a warning by alternately flashing the diodes level 1 + 3 and level 2 + 4. The diode for the selected mode will be off.

- **Abnormally long heating time**

If it takes an abnormal amount of time to heat the water, the Smart Control will provide a warning by alternately flashing the diodes level 1 + 3 and level 2. The diode for the selected mode will be off. This will usually be due to the thermal fuse cutting out, or a faulty heating element.

- **Other faults**

If any other faults occur – such as a defective temperature sensor, water temperature over 90°C, or a fault in the control system – the Smart Control will provide a warning by alternately flashing the ECO + Holiday and Manual diodes, and the diodes for levels 1 to 4 will all be off.

NB:

Pipes and fittings near the water heater can reach temperatures over 60°C.

The water heater is fitted with a thermal fuse that will cut-out in the event of overheating. The fuse can only be reconnected by an authorised electrician.

Disposal

Ensure disposal of the product in the most eco-friendly manner. Private owners must comply with local municipal rules for disposal of domestic waste.

Maintenance

External cleaning

The tank can only be cleaned with a damp cloth. Window or glass cleaner can be used, but not scouring cream/powder or solvents. Always read the instructions on the cleaning product.

Safety valve

Always inspect the safety valve at least twice annually. The plumbing installer can show you how. When testing, water should flow out of the valve.

Limescale removal guide

Limescale removal can only be performed by an authorised installer. Always replace the gasket. Never re-use the old gasket.

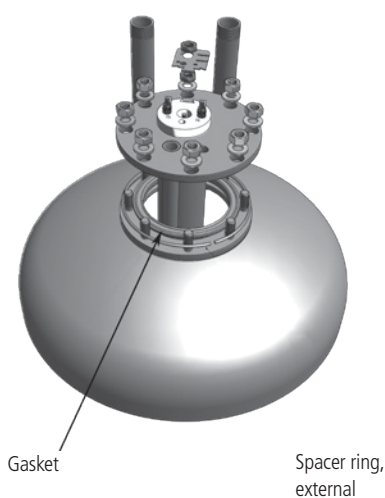


Figure 8

- Disconnect electricity supply at the mains, and shut off water supply at the shut-off valve.
- Drain the tank.
- Remove bottom cover to access the heating element. This is a ceramic heating element placed in an immersion pipe in the bottom flange (flange pipe).
- Disconnect wires on the heating element, carefully extract the capillary pipes from the small immersion cover.
- Remove the flange. The gasket may need to be cut free from the tank. Use a thin-bladed knife. The flange pipe can be difficult to get through the opening if heavily scaled with lime or other deposits. Ease it carefully out, as aggressive handling of the enamelled parts can cause damage, which can later lead to corrosion.
- Remove loose limescale. Loosen limescale caked on the element by tapping gently, e.g. with a piece of wood.
- Rinse out remaining limescale from tank.
- Replace the flange with a new gasket and spacer ring on the outside of the bolts (figure 8). Tighten the bolts in diagonal cross-sequence to 15 to 17 Nm.
- Fill with water and check for leaks by pressure-testing at water pressure of 10 bar.
- Replace the capillary pipes and wires. Ensure the Smart Control sensor is positioned well inside the immersion cover.

IMPORTANT! Check that the capillary pipes fit before touching conductive parts.

Checking/replacing the anode

Must be performed by an authorised plumbing/electrical installer. The tank is fitted with a magnesium anode that can be inspected. It is fitted in the bottom flange, and can be inspected by removing the connection to the tank and inserting a multimeter (see figure 9).

If the anode current reading is greater than 0.3 mA, the mass of the anode is sufficient to protect the tank. If the reading is less than 0.3 mA, the anode should be replaced. To do so, drain the tank and remove the flange pipe (figure 10).

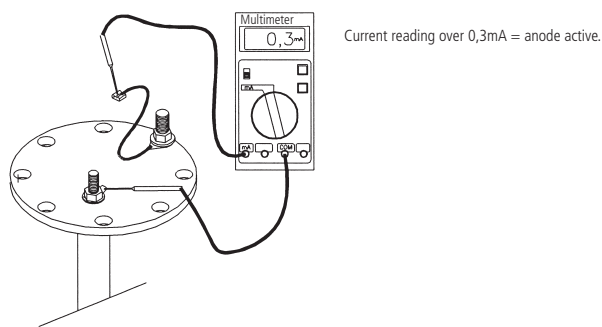


Figure 9

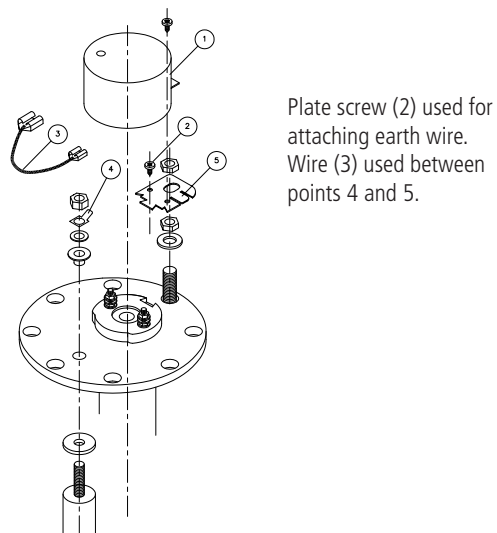


Figure 10

Troubleshooting

The table below can help identify and remedy any problems. If a problem cannot be remedied using the table, contact an authorised plumbing/electrical installer.

Fault	Cause	Action
No water flow	Water supply cut off (hot or cold water pipe).	Check ballcock is open. Check ballcock on the safety device is open.
Reduced hot water	Water capacity in tank used up.	Wait 30 mins before trying again.
No hot water	Thermostat set too low	Switch to a higher setting.
	No current to heating element.	Check relay board and fuses.
	Thermal fuse cut-out.	Reconnect*
	Heating element burnt out.	Replace*
No current to tank	Disconnected relay board	Switch on relay board.
	Fuse blown.	Replace fuse.
	Thermal fuse cut-out.	Reconnect*
Water too hot	Thermostat set too high.	Switch to lower setting.
	Thermostat faulty.	Replace control box*
Water too cold	Thermostat set too low.	Switch to a higher setting.

* can only be performed by an authorised installer.

The Smart Control also has a built-in fault detector that can detect and display multiple problems.

Refer to the Smart Control user guide for more details.

Guarantee terms

Dear customer

METRO THERM manufacture and supply carefully-checked quality products that require authorisation to install and service. As such, all liability for dimensioning, delivery, installation and commissioning lies with the installer, and you should therefore contact authorised plumbing and electrical installers for installation, use and warranty claims.

In the event of material or manufacturing faults, a number of provisions apply to guarantee and repair, which are specified below:

Guarantee cover is contingent on the following:

- The product is covered by guarantee up to 24 months from documented installation or purchase date in accordance with the Sale of Goods Act
- For tanks: METRO THERM provides an additional 3-year guarantee against corrosion penetration of the internal tank. In the event of corrosion from the inside, METRO THERM will undertake repair or replacement at no charge of the tank at its factory.
- For heat pumps: METRO THERM provides an additional 3-year guarantee against internal functional faults. In the event of faults on the inside, METRO THERM will undertake repair at no charge.
- The product must be positioned where service can be performed without difficulty. If the product is very difficult to access, METRO THERM cannot be held liable for any extra expense incurred. We refer to DS 439 Sections 5.1 and 5.2.
- The product must be installed according to BR Section 8.4.2.3 (1).
- When repairs are performed on the spot, the factory will supply new replacement parts when repair is agreed.

The above provisions apply ONLY if the following are fulfilled:

- The installer has contacted METRO THERM before commencing repair or replacement, and written agreement has been reached on the extent of repair.
- The installer has stated manufacturing number when contacting METRO THERM.
- The installer has sent a copy of the invoice for purchase or installation and the faulty product item to METRO THERM after replacement/repair.

What the guarantee does NOT cover:

- Compensation for anything other than the above, or for personal injury caused by any faults regarding the product.
- If the product has been connected at any temperature, Voltage or pressure other than specified on the type plate.
- If damage is caused by freezing, lightning or dry-boiling, or as a result of limescale or excess pressure.
- If repair or other physical intervention has been made on the product other than specified.
- Limescale deposits on the heat exchanger and high-output tank, as limescale is often due to incorrect settings or use.
- Damage caused by leaking water and hidden water installations.
- Damage caused during transport. The latter shall be reported to the carrier.
- Higher or extra costs for repair or replacement performed at weekends, on public holidays or outside normal working hours. Neither are travelling expenses covered. Using a local installer is therefore recommended.

All current guarantee provisions can be read at www.METROTHERM.dk.

Manufacturing number:

Set-up and instruction given by installer: (name)

Signature:

Date:

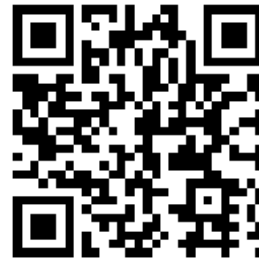
Updated March 2016

Declaration of compliance

The declaration of compliance is available on our website at: www.METROTHERM.dk

Get a 1-year extended guarantee on your METRO product

We offer a one-year extended guarantee on your METRO product when you register the product, entering where and when it was installed and by which company.



1. Go to <http://FQR.dk> or scan the QR code
2. Enter product and installation details
3. You will receive a mail confirming the extended guarantee.



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