

Product description

Pahlén's MidiHeat EHA is a compact electric heater for swimming pools. It is fitted with an analogue thermostat that controls the temperature of the pool water (max +45°C). The heaters metal chassis contains a water reservoir made from glass fibre reinforced polypropylene, that has efficient corrosion resistant titanium immersion heaters.

The immersion heaters can be supplied with ratings from 18–60kW at 230V (220-240V 3-phase) and from 18-72kW at 400V (380-415V 3-phase).

Check the name plate on the back of the heater for applicable data.

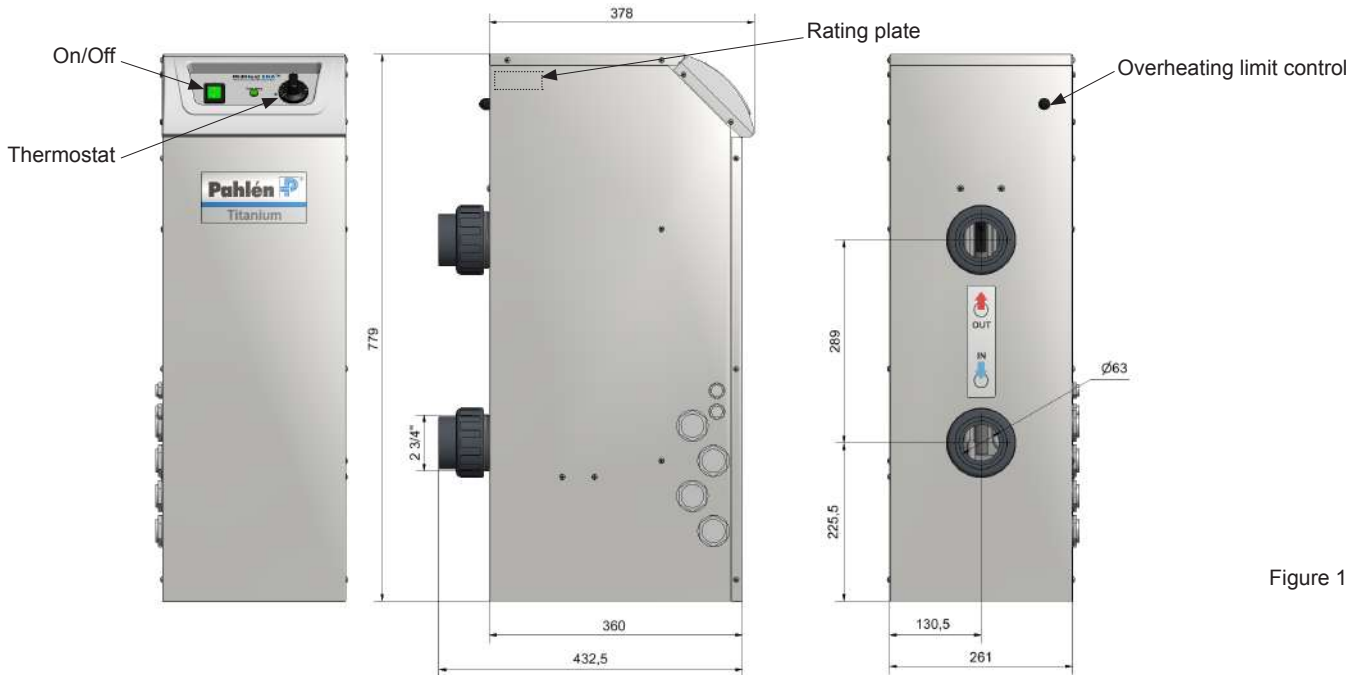


Figure 1

Safety

The heater must be installed in accordance with applicable local regulations and directives and according to the stipulations of the electrical supply utility.

The heater must not be covered, placed close to inflammable material or in direct sunlight.

Safety devices fitted to the heater comprise a flow monitor and manually resettable overheating protection, double contactors for each immersion heater and an interlock function (connection block P2: 1, 2) via the circulation pump contactor.

The immersion heaters are controlled to provide the desired water temperature via an analogue thermostat.

Under no conditions may the heater be started if it is not completely filled with water.

”The device can be used by children from the age of 8 and upwards and persons (including children) with impaired physical, sensory or mental capacity or who have a lack of experience or knowledge, as long as they have been given instructions or information about how the device is used in a safe manner, and understand the risks that may occur. Children must not be allowed to play with the device. Cleaning and maintenance of the device must not be carried out by children with guidance.” according to EN 60335-1 section 7.12.

Technical data

Max.pressure	2 bar (0.2 MPa)
Max.flow	300 l/min
Min.flow	170 l/min
Ambient temperature	+5°C to +40°C

General info

Please follow these specifications for water quality:

Free Chlorine:	0.5–1.5 mg/litre (ppm)
Combined Chlorine:	0–0.5 mg/litre (ppm)
Total Chlorine:	0.5–2.0 mg/litre (ppm)
Chloride (salt) content:	—
pH-value:	7,2–7,6
Alkalinity:	60–120 mg/litre (ppm)
Calcium hardness:	100–300 mg/litre (ppm)

Installation

Pipe routing shall always be performed before the electrical installation.

Position the heater so that the front and top can be opened. Install the connections so that the heater can be easily moved for inspection, cleaning and service.

A non-return valve must be installed AFTER the heater and a shut-off valve BEFORE the heater to allow servicing the heater without needing to empty the pool.

A by-pass should be installed and adjusted so that the recommended flow through the heater can be attained.

Mount the heater on the floor/foundation with screws/bolts through the four Ø9 mm holes in the bottom.

Pipe installation

Connect the heater to the pool system according to the flow diagram below. The outlet must not be connected to any other type of tap or connection than those given.

The electric heater has a G2^{3/4}" connection for glued attachment of Ø63 mm outer diameter PVC piping.

NOTE! Do not fit a shut-off valve between the heater and swimming pool (fit a non-return valve instead).

Mixing of chlorine, acid or similar in the pool water must always be performed AFTER the heater, to avoid corrosion.

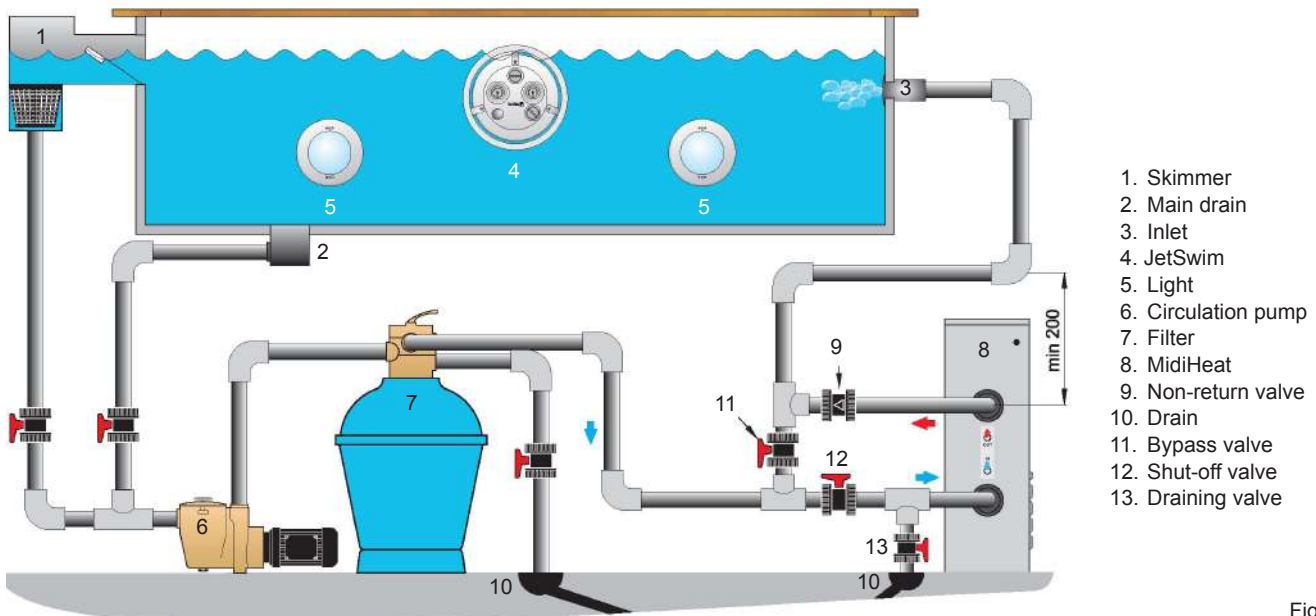


Figure 2

Electrical installation

- The electrical installation must be performed by an authorized electrician and in accordance with the instructions included with the heater.
- A main switch must be fitted before all of the heater's electrical connections (L1, L2 L3). This must be a multi-pole switch that fulfils the demands of IEC/EN 60335-1 sections 7.12.2, 22.2, 24.3.
- We recommend the installation of a residual current device.
- Connect the heater in accordance with the connection drawing, see pages 13 and 14.
- The control voltage is connected to connection block L1 and N from a single phase 230V supply or to L1 and L2 from a 3-phase 230V supply with no N (neutral).
Note that the control voltage must be equipped with separate 5–10 A fuses for the electrical connections (L1, L2).
- The heater must be installed in such a way that it cannot be activated unless circulation pump (sufficient flow) is operational, i.e. the control voltage to the heater's contactor must be interlocked via the pump's contactor.
- Do not connect the heater to an incorrect power source. Contact the local electrical utility for the correct power source. The voltage to the heater may not vary by more than +5% to -10% with respect to the model and name plate specification.
- On delivery, the heater is connected for 400V 3-phase, see figure 4 + electrical drawing page 13, but can be reconnected for 230V 3-phase, see figure 5 + electrical drawing page 14 (applies to all variants except 72kW).
- The input cabling for the control circuit must always be fused for 5–10A.
- The input cabling for the contactors shall be fused in accordance with the table for the operating voltage in question, see figure 4 or 5.

The input cabling for the contactors (K1A-K4A) shall be connected according to the electrical drawing in the way shown in figure 3 below. **NOTE! It is important that the screwdriver has the correct dimensions, and is pushed into the correct hole in the correct way.**

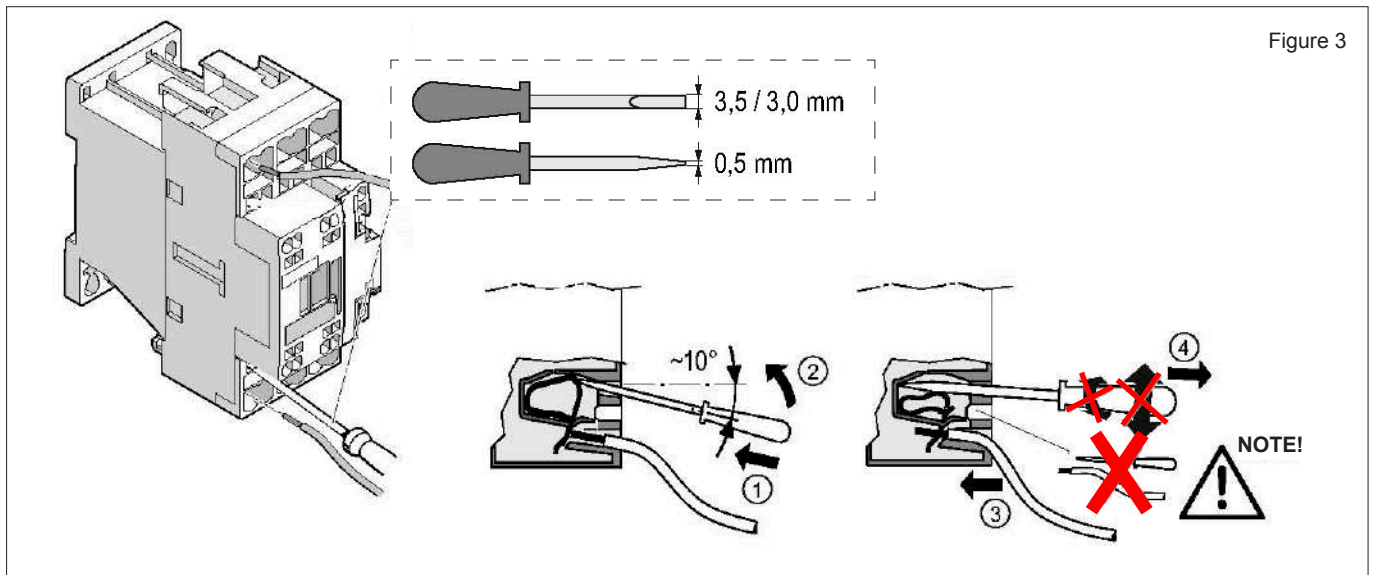


Figure 3

3~ 380–415V

Output	Fuses F1-4	min. cable area
2x9 = 18kW	20A	2,5 mm ²
2x12 = 24kW	25A	4 mm ²
2x15 = 30kW	32A	6 mm ²
3x12 = 36kW	25A	4 mm ²
3x15 = 45kW	32A	6 mm ²
4x15 = 60kW	32A	6 mm ²
4x18 = 72kW	32A	6 mm ²

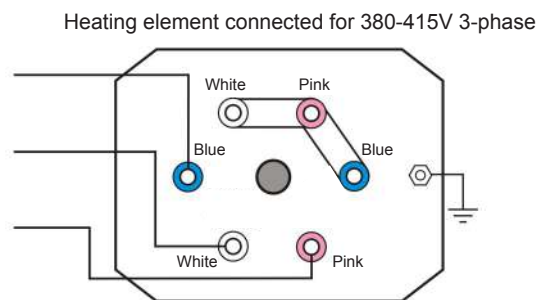


Figure 4

3~ 220–240V

Output	Fuses F1-4	min. cable area
2x9 = 18kW	32A	6 mm ²
2x12 = 24kW	50A	10 mm ²
2x15 = 30kW	50A	10 mm ²
3x12 = 36kW	50A	10 mm ²
3x15 = 45kW	50A	10 mm ²
4x15 = 60kW	50A	10 mm ²

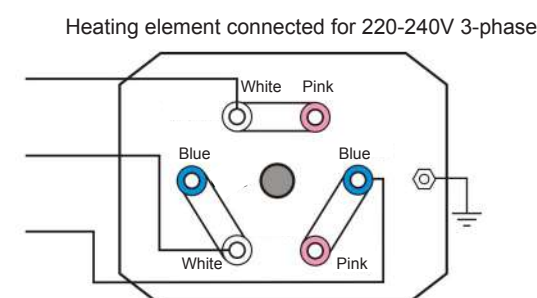


Figure 5

Reconnection from 400V to 230V

On delivery, the heater is marked with a name plate and connected for 400V 3-phase (see figure 4) but can be reconnected for 230V 3-phase.

The input cabling to the contactors should then be fused according to the table above, see figure 5 + electrical drawing.

NOTE! If reconnection is performed, the supplied alternative rating plate must be fitted.

Starting up

Start

1. Check the electrical connections and pipe routing. Turn on all external fuses.
2. Open all the valves except the drain valve and fill the system with water.
 - If the water level in the pool is lower than the heater, fill the pool with the heater turned off (switch in position O) and start the system pump to fill the system with water.
 - If the system has a by-pass, open the by-pass valve half way. Make final adjustments later.
3. Start the pump.

Temperature setting

4. Turn the switch on the electrical heater ON.
5. Set the desired pool temperature (°C) by turning the thermostat knob.
6. If the flow of water is correct and the pool water temperature is lower than the setting, immersion heaters 1 and 2 will start with approx 20 seconds delay to heat the water and the green "operating" lamp will light up. If the electrical heater has more than two immersion heaters, no.3 will start after an additional 5 seconds and no.4 approx 5 seconds after that. This is to avoid overloading the power supply.
7. Check that water temperature in the pool after a while and make any fine adjustments to the thermostat.

Water flow/Bypass adjustment

The water flow is adjusted using a valve (item 22, figure 2) on the by-pass.

Adjust the by-pass valve so that the flow through the electrical heater is between 170–300 l/min. To prevent unauthorized adjustment, operating problems or damage to the electrical heater, we recommend that the handle of the by-pass valve is removed once final adjustment has been made.

Maintenance

Note that the electrical heater only operates when the water in the system is circulating. It should not operate if the circulation pump is turned off or if the desired temperature has been reached.

If the water in the system is stationary for more than a week, the electrical heater should be drained of water.

If there is a risk of freezing, the power to the electrical heater and circulation pump must be turned off and the electrical heater and remainder of the system drained of water.

Open the system drain valve and let it remain open until it is time to start up the pool again.

When reverse flushing and cleaning the pool system's filter, the electrical heater must be turned off.

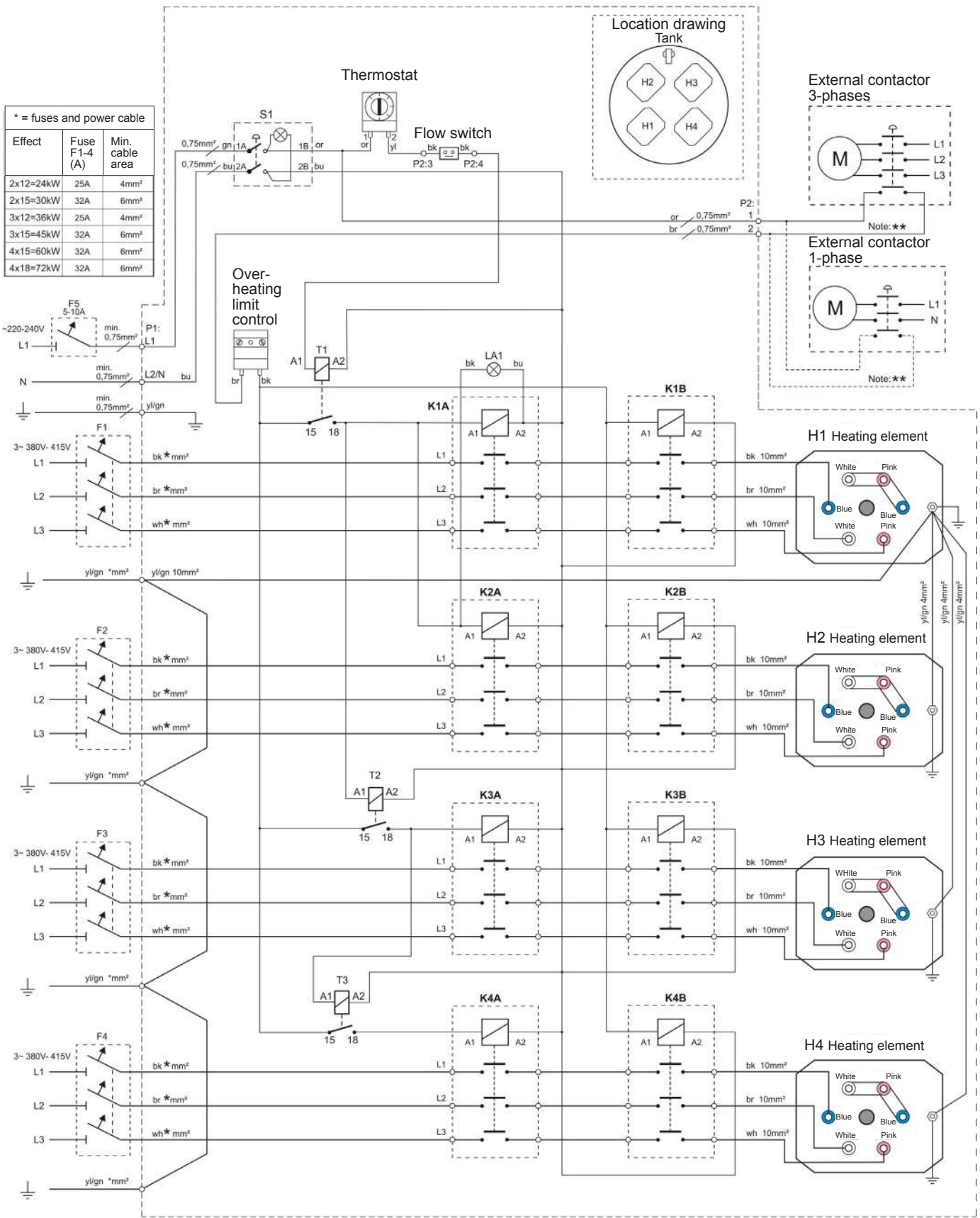
In areas of very hard water, the immersion heaters can accumulate a coating of calcium after a long time, which reduces the power of the electrical heater and the life of the immersion heaters. In such cases, contact an authorized electrician who can perform a regular inspection of the immersion heaters and remove any such coating when necessary.

Draining the heater

1. Turn off the electrical heater and turn off the main switch before draining.
2. Close the shut-off valve (item 12 figure 2).
3. Open the draining valve (item 13 figure 2).
4. Undo the electrical heater's outlet connection (marked with a red arrow) a little to let air in. The electrical heater contains approx. 15 litres of water. Make sure that all water has drained out.
5. Re-tighten the electrical heater outlet connection again once the heater is fully drained.
6. Close the draining valve.

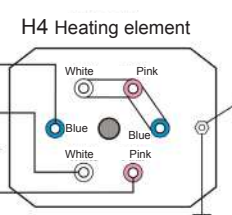
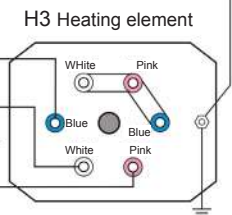
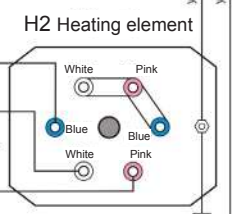
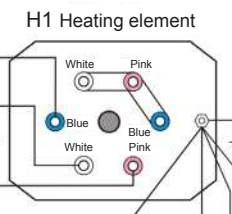
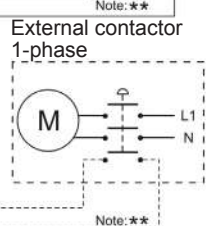
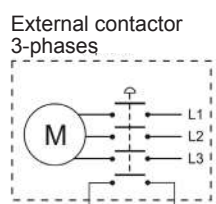
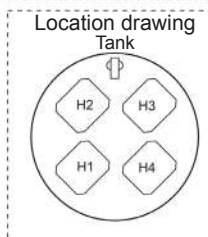
With reservation for printing errors. We reserve the right to alter the technical specification and product range. Colour deviations may occur due to printing techniques.

380-415V 3N~



* = fuses and power cable

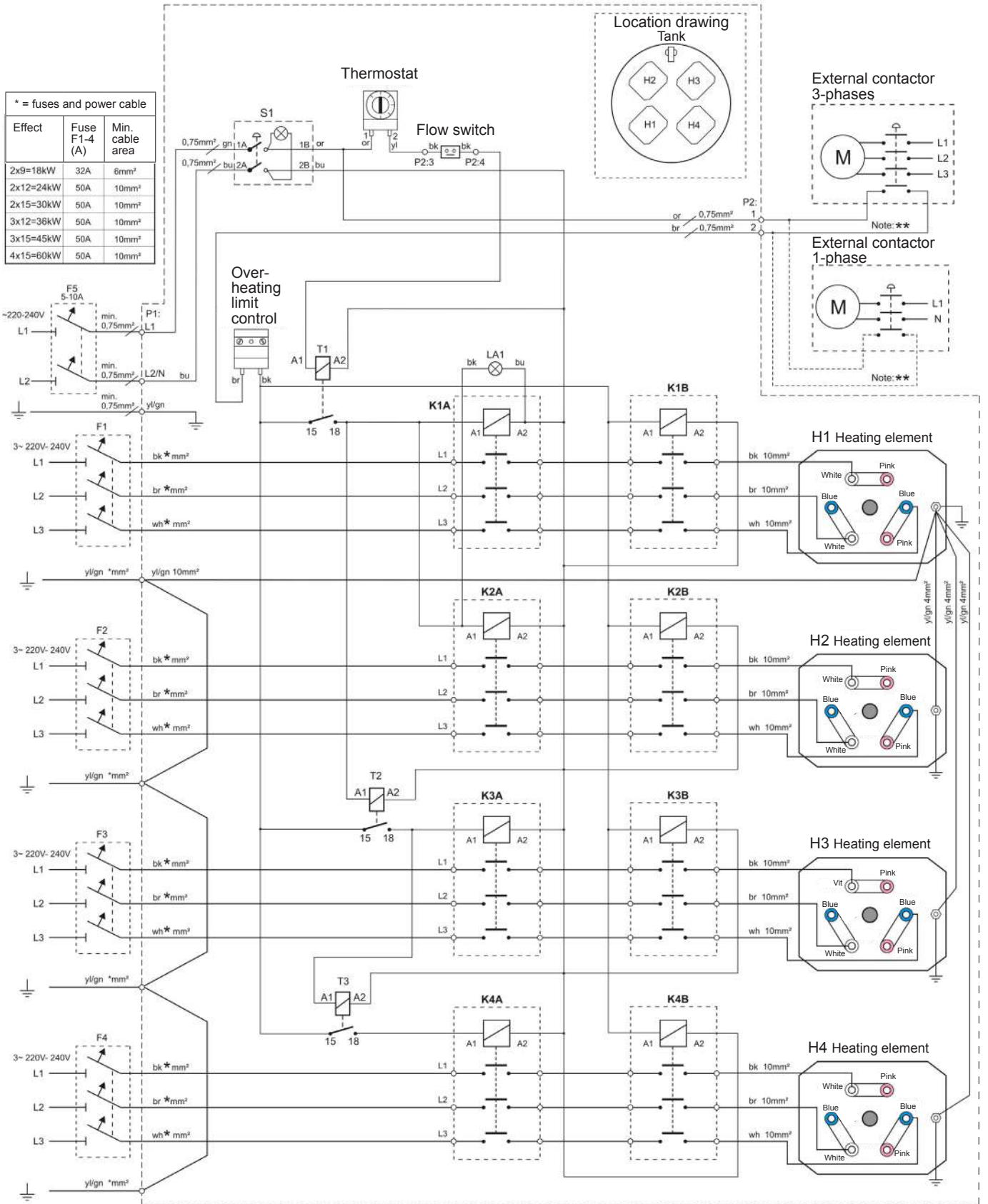
Effect	Fuse F1-4 (A)	Min. cable area
2x12=24kW	25A	4mm ²
2x15=30kW	32A	6mm ²
3x12=36kW	25A	4mm ²
3x15=45kW	32A	6mm ²
4x15=60kW	32A	6mm ²
4x18=72kW	32A	6mm ²



** = Potential free floating contact

E10068-12
140113 TS

220-240V 3~



* = fuses and power cable

Effect	Fuse F1-4 (A)	Min. cable area
2x9=18kW	32A	6mm ²
2x12=24kW	50A	10mm ²
2x15=30kW	50A	10mm ²
3x12=36kW	50A	10mm ²
3x15=45kW	50A	10mm ²
4x15=60kW	50A	10mm ²

** = Potential free floating contact

E10069-5
140113 TS

Product description

Pahlén's Midi Heat EHD is a compact electric heater for swimming pools. It is equipped with a digital thermostat that controls the pool water temperature (max + 45°C). Its metal chassis plate includes water container made of glass-fiber reinforced polypropylene with efficient and corrosion-proof heating elements of titanium.

The electric heater is in effect from 18–60 kW for 230V (220–240V 3-phase) and from 18–72kW for 400V (380–415V 3-phase). Check rating plate on the back of the heater for the applicable data.

Several Midi Heat Digital electric heaters can be connected in parallel (2-10 devices) and controlled by the (Master) electric heater instead of adjusting individual temperature settings for every one of them.

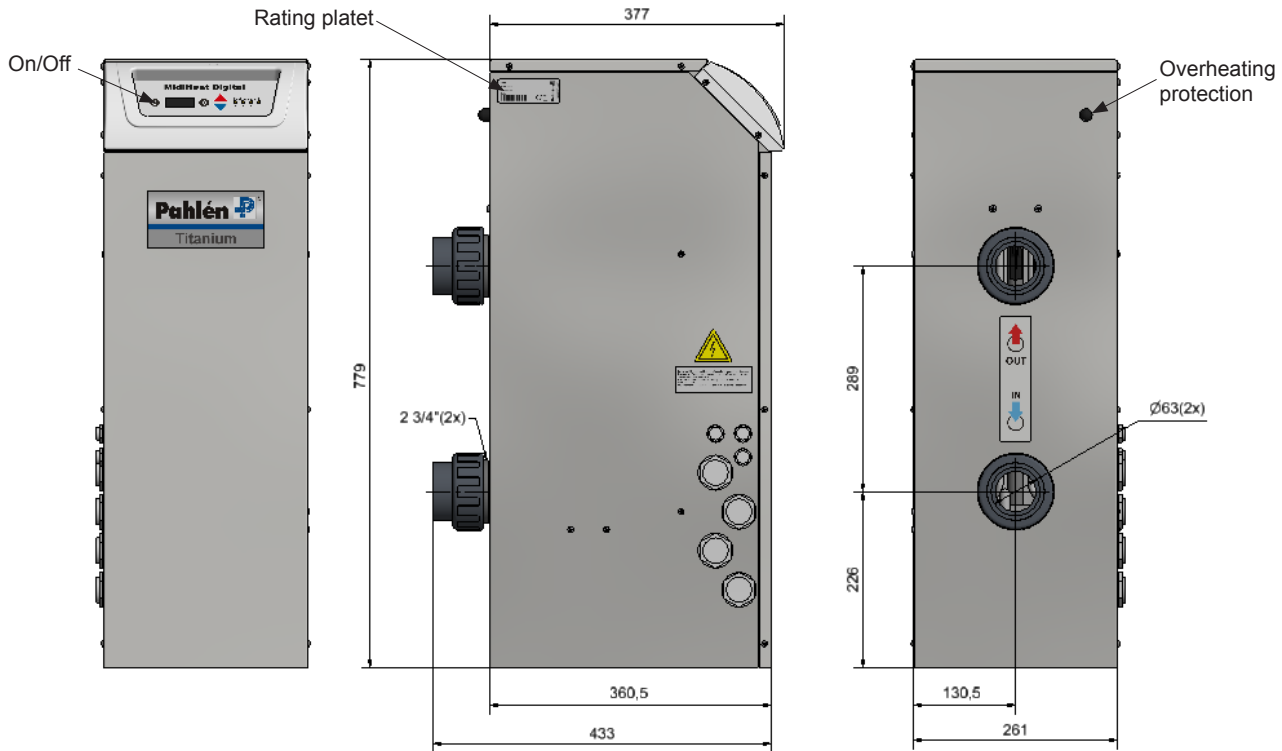


Fig. 1

Tekniska data

Max. load	2 bar (0.2 MPa)
Max. flow	300 l/min
Min. flow	170 l/min
Ambient temperature	+5°C till +40°C

General information

Follow these instructions concerning water quality:

Free chlorine:	0.5-1.5 mg/liter (ppm)
Combined chlorine:	0-0.5 mg/liter (ppm)
Total chlorine:	0.5-2.0 mg/liter (ppm)
Chloride (salt) content:	—
pH-value:	7.2-7.6
Alkalinity:	60-120 mg/liter (ppm)
Calcium hardness:	100-300 mg/liter (ppm)

Safety

The heater must be installed in accordance with local laws and regulations and with the energy company rules.

The heater must not be covered or placed near flammable materials or in direct sunlight.

The heater built-in safety devices are a flow switch and a manually reset overheating protection, dual contactors for each heater and an interlock (terminals P2: 1, 2) of the circulation pump contactor.

The immersion heaters are electronically controlled by a thermostat in order to provide the desired water temperature.

The heater should under no circumstances be started without being completely filled with water.

“The device can be used by children aged from 8 years and cannot be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience or knowledge, unless they have been given some supervision or information about how to use the device safely and understand the risks that may occur. Children should not play with the appliance.

Cleaning and maintenance shall not be performed by children without supervision”, according to the Regulation EN 60335-1 Section 7.12.

Installation

Piping must be performed before wiring.

Place the heater so that the front and top parts can be opened. Install connectors so that the heater can be easily moved for inspection, cleaning and servicing

A check valve should be installed AFTER the heater and a shutoff valve BEFORE the heater, so that servicing of the heater can be performed without emptying the swimming pool.

A bypass connection should be installed and adjusted so that the recommended flow through the heater can be achieved.

If several (2-10) MidiHeat devices are connected in parallel, each Midi Heat should have its own by-pass connection for easy servicing.

Fix the heater on a flat horizontal floor/foundation with a screw/bolt through four Ø9 mm holes in the bottom.

Piping layout

Plug the heater into the pool system according to the flowchart below. The outlet may not be connected to any type of crane or connections other than those stated here.

The heater is equipped with connections G2¼" for binding PVC pipes with outside diameter Ø63 mm.

Note! Do not install a shutoff valve between the heater and the swimming pool (install check valve instead). Dosing of chlorine, acid or similar must always be done AFTER the heater.

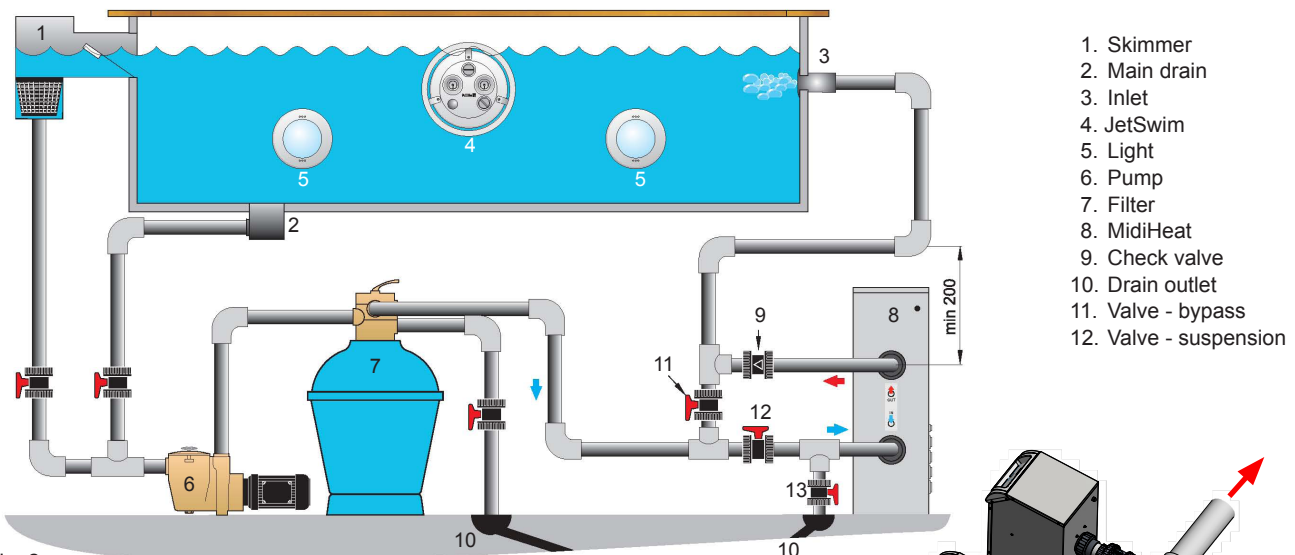


Fig. 2

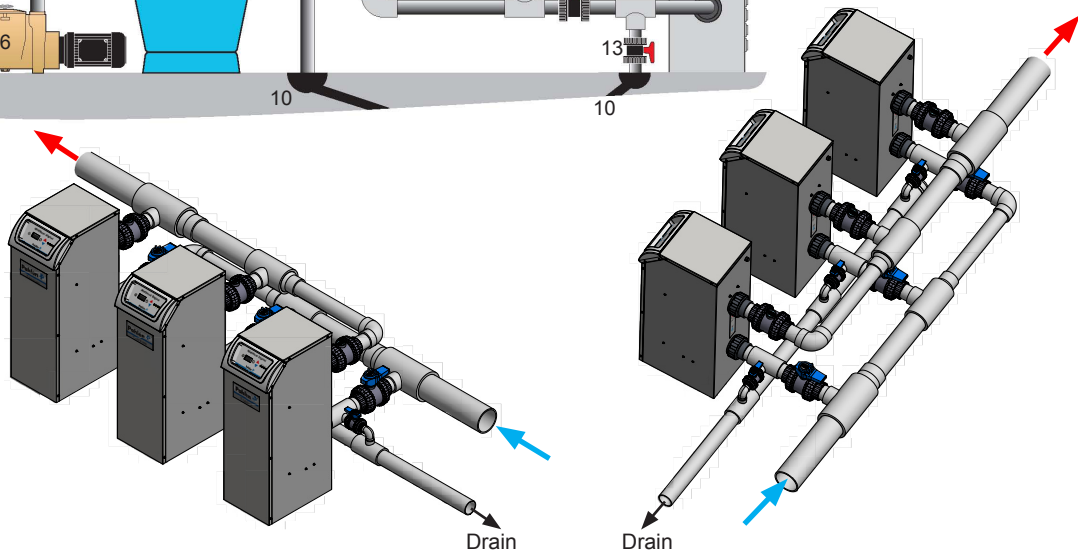


Fig. 3.
 Example of several
 Midi Heat devices

Electric installations

- Electric installations must be performed by a qualified electrician according to the instructions supplied with the heater.
- Main switch should be installed before the heater, same as all the following electric connections L1, L2 and L3 (all pole switches complying with IEC/EN 60335-1 par. 7.12.2, 22.2, 24.3.)
- Pahlén recommends to install circuit breakers.
- Connect the heater according to the wiring diagram, see pages 6 and 7.
- The control voltage is connected to terminals L1 and N at 3-phase 400V net and to terminals L1 and L2 at 3-phase 230V net without N (neutral). Note that the control voltage must be fitted with a separate fuse (F5) at 5-10 Amperes for electric connections (L1, L2).

- If a motor protection auxiliary relay for the pool circulation pump is available, it must be connected to terminals P1 and P2, see attached wiring diagram for the voltages and number of phases. When motor protection is switched on, the circuit should be closed, potential-free changeover contact.
- Do not connect the heater to a faulty power supply. Contact your local power company for correct power supply. Voltage to the heater must not vary by more than + 5% to -10% according to the model and nameplate specification.
- Incoming cables to the control circuit must always be secured at 5-10A.
- Incoming cables to the contactors must be secured under the table for the current operating voltage, check the product nameplate and see the respective wiring diagram and table (Fig. 6 or 7).
- At 2-10 devices connected in parallel, they can all be controlled from an electric heater instead of individual temperature adjustment for all other electric heaters. Connections are made by means of a 2-wire communication cable (min. 0,25mm²) on terminal J4, between each circuit boards of the electrical heaters (daisy chain).

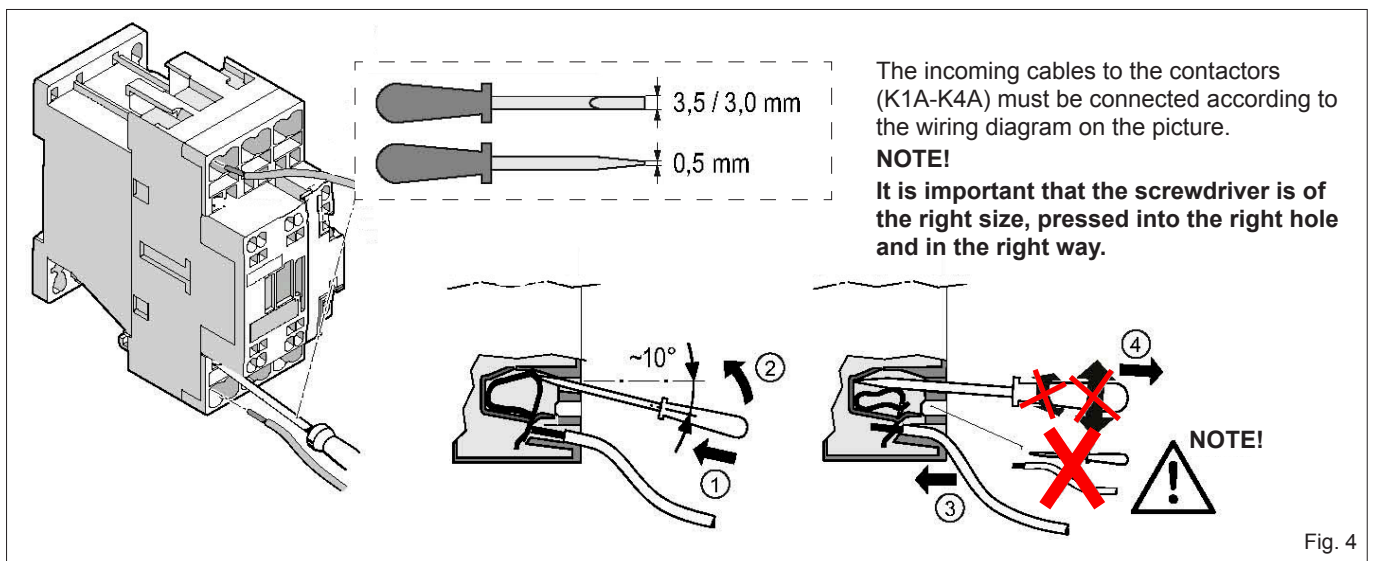


Fig. 4

The electric heater is factory wired for 400V 3-phase, but can be switched to 230V 3-phase (applies to all versions except 72kW). See table below + wiring diagram on pages 6 and 7.

3~ 380-415V

Effect	Fuse F1-4	Min. cable area*	Heating element connected for 380-415V 3-phase
2x9 = 18kW	20A	2,5 mm ²	
2x12 = 24kW	25A	4 mm ²	
2x15 = 30kW	32A	6 mm ²	
3x12 = 36kW	25A	4 mm ²	
3x15 = 45kW	32A	6 mm ²	
4x15 = 60kW	32A	6 mm ²	
4x18 = 72kW	32A	6 mm ²	

Fig. 5

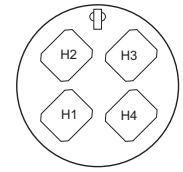
3~ 220-240V

Effect	Fuse F1-4	Min. cable area*	Heating element connected for 220-240V 3-phase
2x9 = 18kW	32A	6 mm ²	
2x12 = 24kW	50A	10 mm ²	
2x15 = 30kW	50A	10 mm ²	
3x12 = 36kW	50A	10 mm ²	
3x15 = 45kW	50A	10 mm ²	
4x15 = 60kW	50A	10 mm ²	

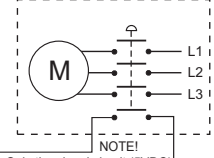
Fig. 6

380-415V 3N~
18-72kW

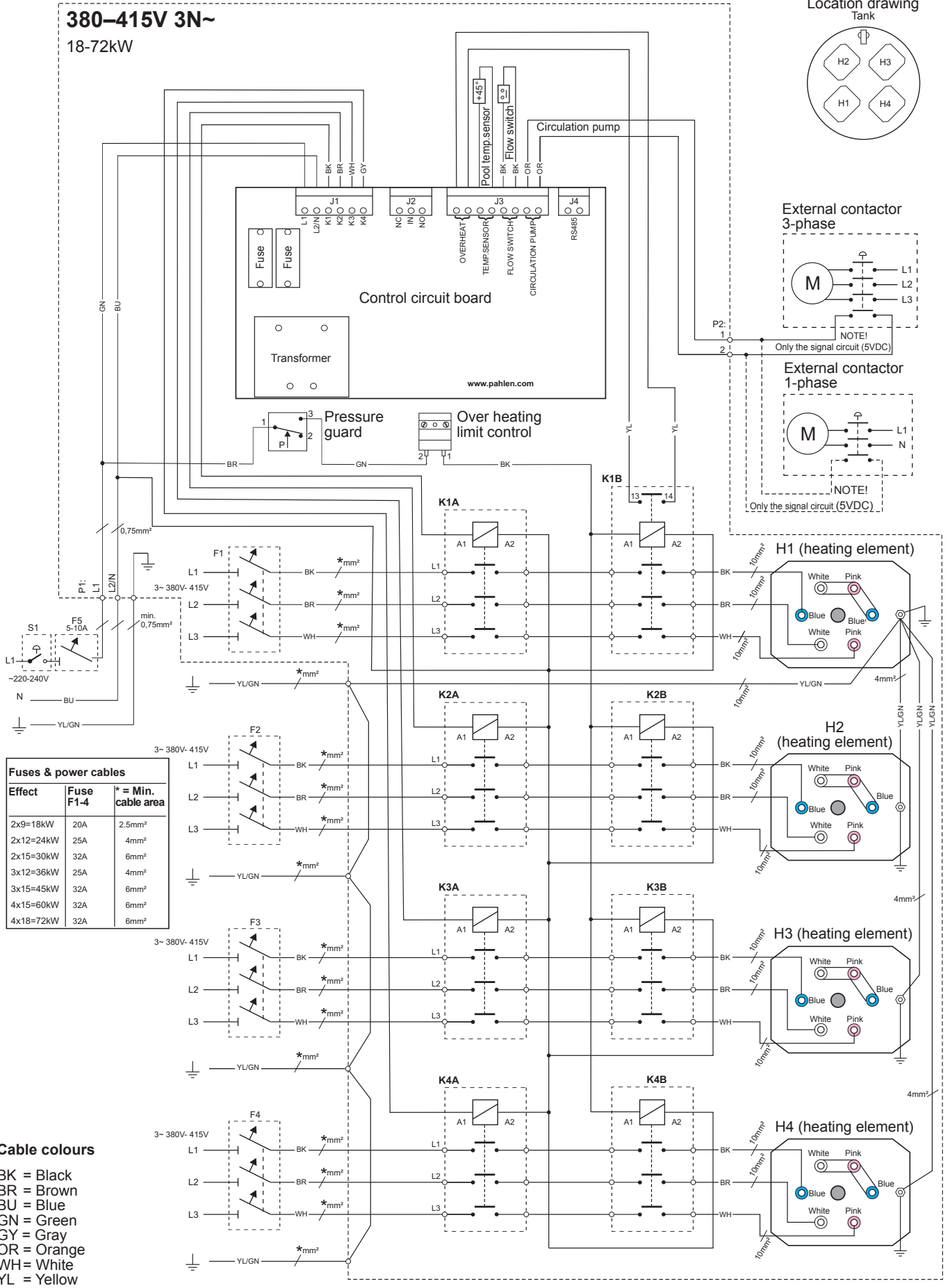
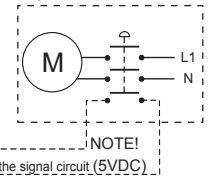
Location drawing
Tank



External contactor
3-phase



External contactor
1-phase



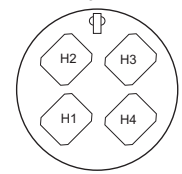
Fuses & power cables		
Effect	Fuse F1-4	* = Min. cable area
2x9=18kW	20A	2.5mm ²
2x12=24kW	25A	4mm ²
2x15=30kW	32A	6mm ²
3x12=36kW	25A	4mm ²
3x15=45kW	32A	6mm ²
4x15=60kW	32A	6mm ²
4x18=72kW	32A	6mm ²

Cable colours

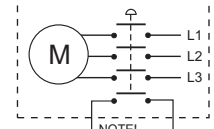
- BK = Black
- BR = Brown
- BU = Blue
- GN = Green
- GY = Gray
- OR = Orange
- WH = White
- YL = Yellow

220-240V 3N~
18-60kW

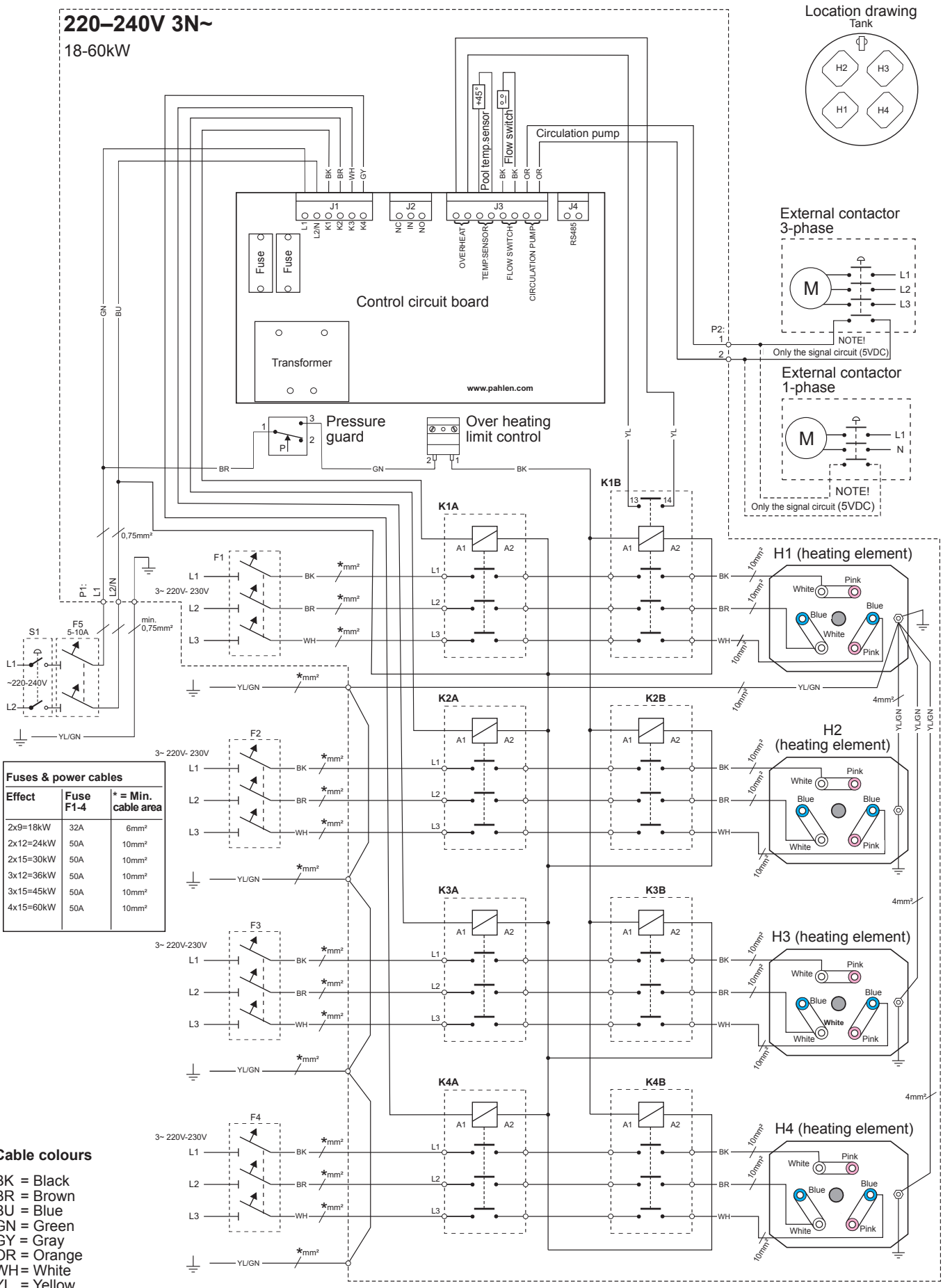
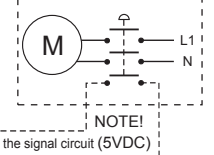
Location drawing
Tank



External contactor
3-phase



External contactor
1-phase



Fuses & power cables		
Effect	Fuse F1-4	* = Min. cable area
2x9=18kW	32A	6mm ²
2x12=24kW	50A	10mm ²
2x15=30kW	50A	10mm ²
3x12=36kW	50A	10mm ²
3x15=45kW	50A	10mm ²
4x15=60kW	50A	10mm ²

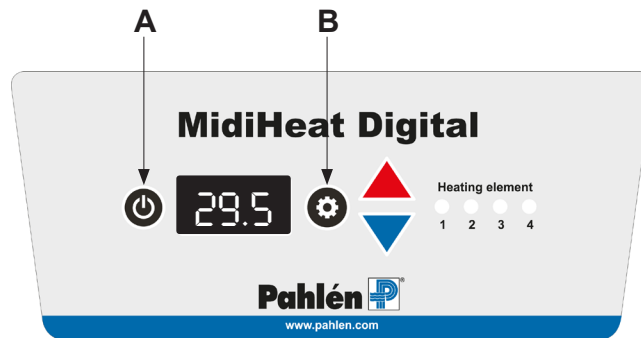
Cable colours

- BK = Black
- BR = Brown
- BU = Blue
- GN = Green
- GY = Gray
- OR = Orange
- WH = White
- YL = Yellow

Startup

Start

1. Check electric connections and piping. Turn on all external fuses and circuit breakers.
2. Open all valves to and from MidiHeat (except drainage) and fill the system with water.
 - If the pool water level is lower than the heater, fill the pool with the heater off and restart the pump system in order to fill the system with water.
 - If the system has a bypass switch, open the by-pass valve halfway (making final adjustments later).
3. Start the pump.



Temperature adjustment

Midi Heat is factory set at 28°C upon delivery.

The electric heater remembers the last set of desired temperatures in the event of power failure.

Set/change the required temperature:

1. Press the standby button (A) on the panel.
2. Set the desired pool temperature (°C) by pressing blue or red arrow. Red = temp. up, blue = temp. down.
3. "Heating elements" diodes on the panel indicate that the cartridges are being switched. The cartridges are sequentially activated with a delay. When the desired pool temperature is reached, the el. Cartridges are closed sequentially.
4. Check the pool temperature for some time and adjust if necessary any temperature offset (may be due to energy losses in the system), see "System Settings".

Water/Bypass adjustment

Water flow can be adjusted using an external valve in by-pass connection.

Adjust bypass valve so that the flow through the electric heater is between 170–300 l/min. In order to prevent the unauthorized handling, operational problems or damage to the electrical heater, it is recommended that the handle of the bypass valve is removed after the adjustment is made.

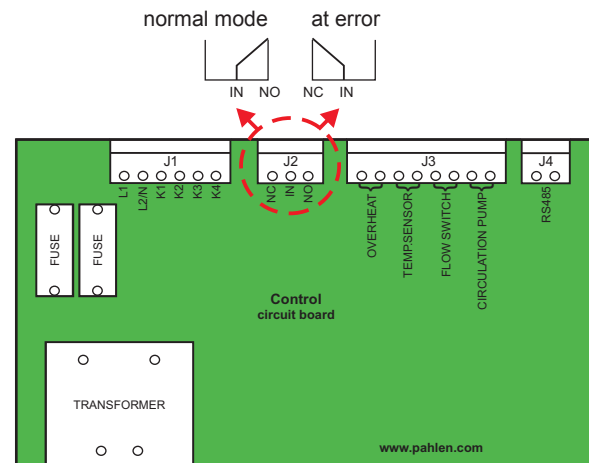
At low flow in the pool circulation, the electric heater will break the warming and display error code E1. When the correct flow has been achieved, the electrical heater restarts with a time delay of approximately 20 seconds.

Alarm output

The electric heater has built-in alarm output J2. The relay output is a potential-free changeover contact and is active at fault codes and blackouts.

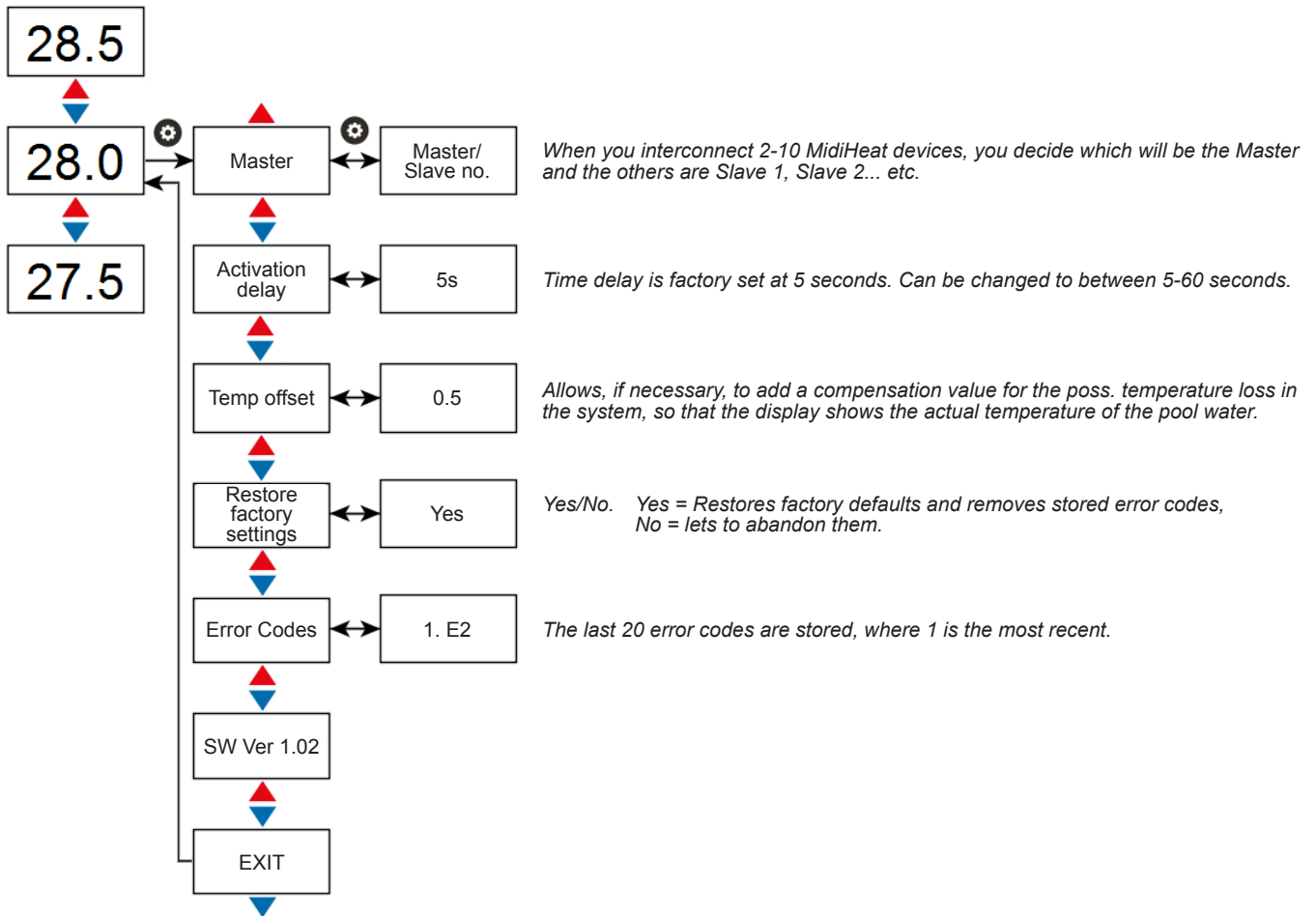
In the master/slave control system the alarm signal is picked only from the master.

Maximum load: 8A at 250VAC
5A at 30VDC



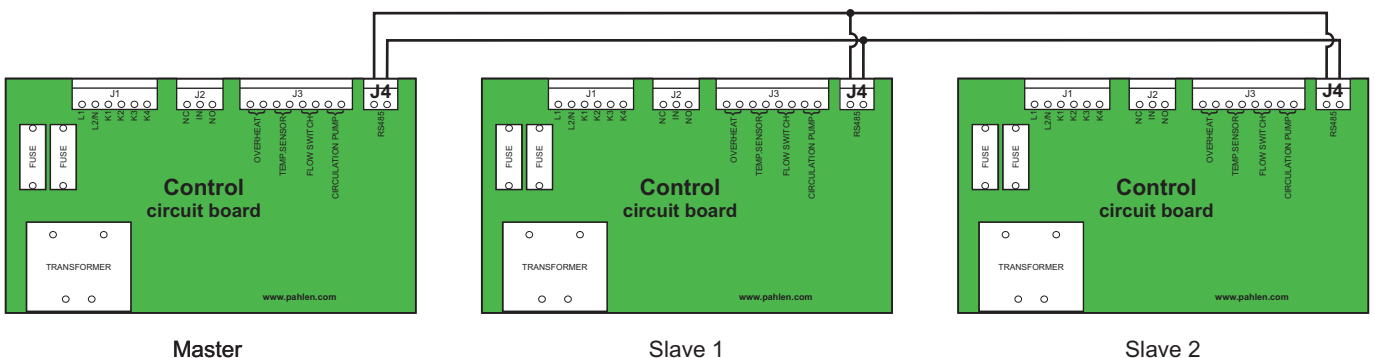
System configuration

Mode button (B) provides access to system settings and will be shown on display as [Mode]. DOWN arrow allows access and making changes to the general system parameters.
 Mode button provides access to the resp. parameter changes by means of arrow keys. Changes to the system parameters are saved with the Mode button.
 Return to the start menu is automatic after 5 seconds, or when selecting [Exit] in the display + Mode button.



Master/slave-control

Several Midi Heat Digital devices can be connected in parallel (2-10 devices) and controlled from a (Master) electric heater instead of adjusting individual temperature settings for every one of them.
 The electric heaters connected to a shielded, paired 2-wire cable 0,25-2,5mm². The part of the signal cable that is on the outside of two electric heaters should not be longer than 2 m.
 When you have [Mode] on the display, press again the MODE button for addressing a device master (the one who decides) and other devices as slaves (following the master). Note that you can not configure more than 1st master, only slaves or slaves with the same address number (leading to communication error).



Maintenance

Note that the electric heater is working only when water circulates in the system. It will not be heated if the circulation pump is switched off or if the desired pool temperature has been reached.

If the electric heater does not heat the pool water for a long period it is recommended to turn off all main power switches. If the water in the system is still for more than a week, the electrical heater must be emptied of water.

At the risk of freezing, the power to the electric heater and the pump should be turned off and both the electric heater and the whole system drained of water. Open the system drain valve and leave it open until it is time to start up the pool again.

When backwashing and cleaning the pool system filter, the electric heater must be turned off.

In areas with hard water, the electrical heater cartridges have a lime coating that reduces the electric heater power and the cartridges service life. Contact an authorized electrician in order to inspect the immersion heaters of the tank periodically and remove this coating when necessary.

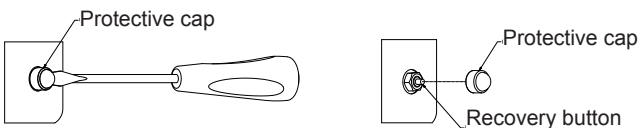
Emptying the electric heater

1. Turn off the electric heater and turn off all main power before emptying.
2. Close shut off valve (pos.12, fig. 2).
3. Open shut off valve (pos.13, fig. 2).
4. Disconnect the electric heater outlet connection (marked with red arrow) a little to let air in. The electric heater holds around 15 liters of water. Take care that all water comes out.
5. Tighten the electric heater outlet connection when the electric heater is completely empty.
6. Let drain valve stay open (water from the rest of the system may remain).

In case of any error

The display shows an error code, see below. Contact your installer to fix the error.

Error codes

Code	Cause	Action
E1	Flow switch indicates low flow	Check/increase water flow
E2	Pool water temp. sensor is not connected, or is shorted/broken	Check that the temp sensor is connected. Replace the broken temp. sensor.
E6	The overheating protection has tripped	<p>Warning! The unit is energized until the first contactor although overheating protection has been triggered. Reactivate thermal protection manually by removing a small protective cap and pressing the reset button</p>  <p>If the overheating protection continues to be tripped: contact your installer or other qualified service technician.</p>
E10	Circulation pump is inactive	Turn on the circulation pump.
E12	Communication error	Check settings for Master/Slave communications. Check the communication cable
HC	For high temperature on the circuit board	Check that the ambient temperature is not higher than 40°C.
HP	Water temperature is higher than 45°C	Check that other heat sources are not enabled

In Master/slave control system, an error code and a number in parenthesis will be seen. It indicates which of the connected devices have actually failed.

Example: E1 (2) = indicates that Slave unit 2 has an error

A reservation for possible misprints. The right to change technical specifications and assortment is reserved.

Color deviations may occur due to technical reasons.