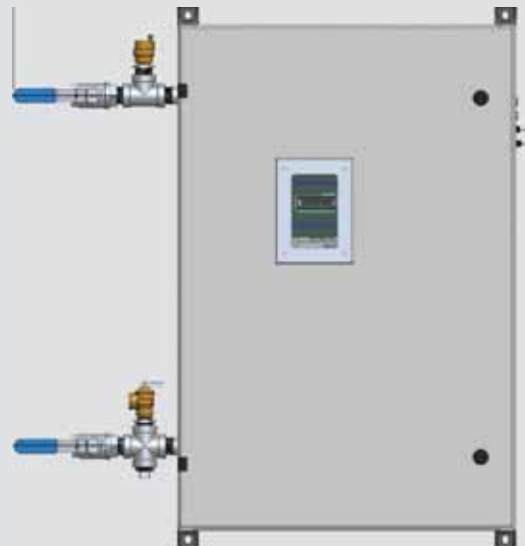


OPERATION AND INSTALLATION

C SERIES 3-PHASE ELECTRONICALLY CONTROLLED INSTANTANEOUS WATER HEATERS

- » CF PLUS/CE PLUS/CES PLUS/CERO PLUS 12KW
- » CF PLUS/CE PLUS/CES PLUS/CERO PLUS 15KW
- » CF PLUS/CE PLUS/CES PLUS/CERO PLUS 18KW
- » CF PLUS/CE PLUS/CES PLUS/CERO PLUS 24KW
- » CF PLUS/CE PLUS/CES PLUS/CERO PLUS 27KW
- » CF PLUS/CE PLUS/CES PLUS/CERO PLUS 36KW
- » CF PLUS/CE PLUS/CES PLUS/CERO PLUS 48KW
- » CF PLUS/CE PLUS/CES PLUS/CERO PLUS 54KW
- » CF PLUS/CE PLUS/CES PLUS 60KW
- » CF PLUS/CE PLUS/CES PLUS/CERO PLUS 72KW
- » CF PLUS/CE PLUS/CES PLUS/CERO PLUS 81KW
- » CF PLUS/CE PLUS/CES PLUS 90KW
- » CF PLUS/CE PLUS/CES PLUS/CERO PLUS 108KW
- » CF PLUS/CE PLUS/CES PLUS 120KW
- » CF PLUS/CE PLUS/CES PLUS/CERO PLUS 144KW



STIEBEL ELTRON



Conforms to ANSI/UL Std. 499
Certified to CAN/CSA Std. C22.2 No.88

OPERATION

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OPERATION

1. General information

Read this entire manual. Failure to follow all the guides, instructions and rules could cause personal injury or property damage. Improper installation, adjustment, alteration, service and use of this unit can result in serious injury.

This unit must be installed by a licensed electrician and plumber. The installation must comply with all national, state and local plumbing and electric codes. Proper installation is the responsibility of the installer. Failure to comply with the installation and operating instructions or improper use voids the warranty.

Save these instructions for future reference. The installer should leave these instructions with the consumer.

If you have any questions regarding the installation, use or operation of this water heater, or if you need any additional installation manuals, please call our technical service line at 800.582.8423 (USA and Canada only). If you are calling from outside the USA or Canada, please call USA 413.247.3380 and we will refer you to a qualified Stiebel Eltron service representative in your area.



This is the safety alert symbol. It is used to alert you to potential personal injury hazard. Obey all safety messages that follow this symbol to avoid possible injury or death.

1.1 Safety information

1.1.1 Structure of safety information



KEYWORD: Type of risk
Here, possible consequences are listed that may result from not observing the safety information.
► Steps to prevent the risk are listed.

1.1.2 Symbols, type of risk

Symbol	Type of risk
	Injury
	Electrocution
	Burns or scalding

OPERATION

SAFETY

1.1.3 Keywords

KEYWORD	Description
DANGER	If this information is not observed, it will result in serious injury or death.
WARNING	If this information is not observed, it can result in serious injury or death.
CAUTION	If this information is not observed, it can lead to medium or minor injury.

1.2 Other symbols in this document



Note

Notes are bordered by horizontal lines above and below the text. General information is identified by the symbol shown on the left.

► Read these notes carefully.

Symbol	
	Damage to the water heater and environment
	Appliance disposal

► This symbol indicates that you have to do something. The action you need to take is described step by step.

2. Safety

Observe the following safety information and regulations.

Operate the water heater only when fully installed and with all safety equipment fitted.

2.1 Intended use

CF Plus, CE Plus, and CES Plus water heaters are intended for heating domestic hot water and can supply several draw-off points. CERO Plus water heaters are intended for heating domestic hot water and other caustic liquids, and can supply several draw-off points.

Any other use beyond that described shall be deemed inappropriate, and may void the manufacturer's warranty.

Observation of these instructions is also part of the correct use of this water heater.

2.2 Safety precautions



DANGER: Injury

Please read and follow these instructions.

Failure to follow these instructions could result in serious personal injury or death.



Damage to the water heater and the environment

The water heater must be installed by a licensed electrician and plumber. The installation must comply with all national, state and local plumbing and electric codes.

Service of the water heater must be performed by qualified service technicians.



DANGER: Electrocution

Before proceeding with any installation, adjustment, alteration, or service of the water heater, all circuit breaker switches servicing the water heater must be turned off. Make sure that nobody can activate the breaker in the distribution panel during your service work on the water heater.



DANGER: Electrocution

The water heater must be properly grounded. Failure to electrically ground the product could result in serious personal injury or death.



DANGER: Electrocution

Never open the water heater cover unless the electricity servicing the water heater is turned off.



DANGER: Burns

Water temperatures over 125 °F (52 °C) can cause severe burns instantly or death from scalding. A hot water scalding potential exists if the thermostat on the water heater is set too high. Households with small children, disabled or elderly persons may require that the thermostat be set at 113 °F (45 °C) or lower to prevent possible injury from hot water.



WARNING: Injury

Where children or persons with limited physical, sensory or mental capabilities are to be allowed to control this water heater, ensure that this will only happen under supervision or after appropriate instructions by a person responsible for their safety. Children should be supervised to ensure that they never play with the water heater.

2.3 Test symbols

See the type label on the water heater.

2.4 Licenses / certificates

- UL (USA) Std. 499: 2014 Ed.14
- CSA (Canada) Std. CSA C22.2#88 issue:1958/09/01 (R2013)

OPERATION

FUNCTIONAL CHARACTERISTICS

3. Functional characteristics

CF Plus/CE Plus/CES Plus/CERO Plus are electronically temperature controlled three-phase instantaneous electric water heater intended for commercial use, permanently wired in Delta or Wye configuration. Each series has models with power output ranging from 12–144 kW.

CF Plus heaters have a preset temperature setting. The temperature can be adjusted by the installer on the control board. CF Plus heaters feature hot-start operation for the fastest response time. CF Plus units heat water to the desired temperature on-demand and during standby as well (hot-start). Standby heating is activated after a hot water draw ends, once the flow rate returns to 0 gpm. To reduce the standby energy consumption, the heaters are well insulated.

CE Plus models feature adjustable temperature output with a range of 60–180 °F (16–82 °C), user-adjustable in one degree increments (°F or °C) via a push button switch (12).

CES Plus models limit the output temperature according to OSHA requirements to a maximum of 90 °F (32 °C). They are factory set at a fixed temperature of 85 °F (29 °C).

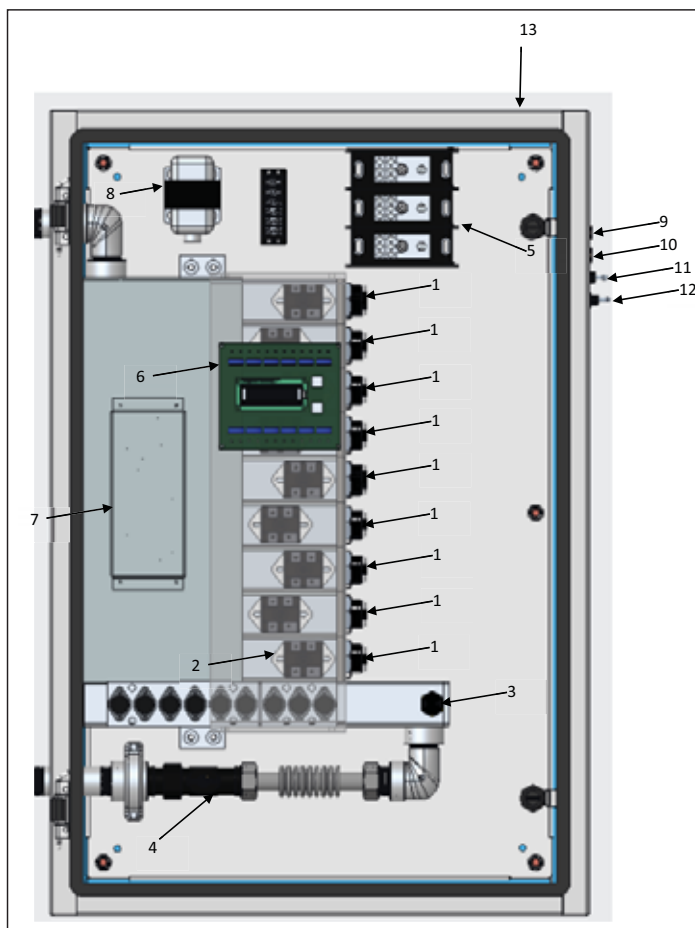
CERO Plus models have the same temperature adjustment range as CE models, but are designed for caustic liquids like salt water. To avoid corrosion, titanium elements (1) are used instead of the standard incoloy elements (1) found in CE and CES models.

CE/CES/CERO 12–18 kW models contain 3 heating elements, 24–36 kW models contain 6 heating elements, 48–72 kW models contain 12 heating elements, 81–108 kW models contain 18 heating elements, and 120–144 kW models contain 24 heating elements. The elements used in different configurations are for 208, 240, 277, and 288 V.

CF Plus/CE Plus/CES Plus/CERO Plus models are available in a NEMA 3 (standard), a NEMA 4 (optional), or a NEMA 4X (optional) enclosure.

The activation of the heating elements during a hot water draw depends on the flow meter which is installed in the heater. The flow meter size is customized depending on the required activation flow rate and pressure drop of the installation.

Flow meter	Activation rate	Deactivation rate
DN 10	0.75 gpm (2.85 l/min)	0.5 gpm (1.9 l/min)
DN 15	1.25 gpm (4.7 l/min)	1.0 gpm (3.8 l/min)
DN 20	1.75 gpm (6.6 l/min)	1.5 gpm (5.7 l/min)
DN 25	3.75 gpm (14.2 l/min)	3.5 gpm (13.25 l/min)



- 1 Element
- 2 Individual element thermostat/safety cut-off
- 3 Pressure sensor switch
- 4 Flow sensor
- 5 Terminal block
- 6 Electronic board PCB
- 7 Fuse box
- 8 Transformer
- 9 Power indicator light
- 10 On/off indicator light
- 11 On/off switch
- 12 External temperature set switch (CE, CES, CERO models only)
- 13 Wire support

The heater's outgoing water temperature is controlled with an electronic board (6) receiving sensor information from the flow sensor (4), and an NTC sensor placed to detect incoming and outgoing water temperatures. The element turns on once the flow sensor detects a flow rate at or above the minimum activation rate. The CF Plus heater elements are also activated during standby to keep the water temperature continuously at the desired temperature, once the flow rate returns to 0 gpm. The board calculates the necessary heating capacity, depending on required temperature rise and flow rate.

Safety is provided by an manual reset safety cut-off with 200 °F (93 °C) cut-off temperature (2) for each element, designed to avoid excessive heat buildup. A pressure sensor switch (3) is installed

OPERATION

TROUBLESHOOTING

in the first chamber to eliminate any possibility of dry firing. Each element circuit is individually fused. The fuses are located in the fuse box (7).

In order to avoid latent heat buildup, the unit has an electronically controlled delay timer that delays the activation of the heating element slightly. This feature allows air to be purged from the system before the element arrangement is activated to heat, and eliminates scalding risk. Beside the electronic delay, the board has no additional safety functions.

The display monitor shows the set point temperature, the actual outgoing water temperature, the flow rate and the heating rate. It is possible to change the units from °F / gpm to °C / l/min.

Safety is provided by a pressure relief valve with a 150 psi setting.

4. Troubleshooting

Before troubleshooting, check the following items:

- ▶ Is the water pressure more than 3 psi (0.21 bar)?
- ▶ Is the electric supply a:
 - Wye (4 wires + ground) or
 - Delta (three wires + ground)?
- ▶ Does the electric supply match the voltage and configuration designation shown on the unit nameplate?
- ▶ If the heater fails to maintain the desired temperature, check the flow rate according to the table. See 10.7, "CF/CE/CES/CERO Plus temperature rise", pg. 39.
- ▶ If the CF water heater fails to maintain the desired temperature, check all connected taps for leaks, and ensure all taps are fully closed.

The following items are required for testing to diagnose a possible failure:

Continuity tester, 600 V voltage meter, amp and Ohm meter.

Use the following steps for diagnosis:

- ▶ Turn off the power supply to the heater.

Caution: follow all safety precautions in 2.2, "Safety precautions", pg. 3.
- ▶ Turn off the heater on/off switch (11).
- ▶ Open the heater enclosure.
- ▶ Check for any loose connections, and properly operating breakers.
- ▶ Purge the heater to cool down the heater and to reset the electronic thermostat function.
- ▶ Turn the main breaker back on. Turn on the heater on/off switch (11). For resistivity test turn the breaker off and check voltage just in case.

4.1 Fault table

Symptom	Possible cause	Action
No hot water	(A) Circuit breakers off	Turn circuit breakers on
	(B) On/off switch (12) defect	Check voltage
	(C) Pressure switch (3)	Check voltage
	(D) PCB sensor	Check sensor NTC and flow sensor, PCB voltage supply
	(E) PCB voltage supply	Check voltage X8 primary
	(F) Transformer	Check voltage yellow-white (secondary)
Reduced hot water	(G) Safety cut-off	Check voltage
	(H) Fuse (7)	Check voltage
	(I) Element (1)	Check resistivity
	(J) Ball valve closed (14, 15)	Open ball valve
Lukewarm water	(K) Filter clogged	Clean filter
	(L) Air in the system	Vent the system
	(M) Fuse burned (7)	Check continuity
	(N) Triac failure	Check amperage

4.2 Solutions based on symptoms in fault table

Symptom	Analysis	Solution
(A) No power	(B) No continuity	Replace on/off switch (12)
	(C) No continuity	Replace pressure switch (3)
	(D) No continuity NTC	Replace sensor
	No continuity flow sensor	Replace flow sensor (4)
	(E) X8(X10) > 200 V, A1 PWR IN 1-	Replace transformer (10)
	(F) A1 PWR In 2 > 20 V	
(G) No continuity in cold status		Replace safety cut-off
(H) No continuity		Replace fuse (7)
(I) Resistivity nok		Replace element (1)
(M) No continuity		Replace fuse (7), check resistivity of the associated element
	(N) No ampacity element supply	Replace triac

4.3 Cold element resistivity by heater type (in Ohms)

(kW)	208 V	240 V	480 V Y	480 V Δ	575 V Δ
12	11.41 Ω	13.55 Ω	16.88 Ω	-	-
15	8.07 Ω	11.41 Ω	13.55 Ω	-	-
18	6.93 Ω	9.32 Ω	12.48 Ω	18.73 Ω	-
24	11.41 Ω	13.55 Ω	20.53 Ω	13.55 Ω	20.53 Ω
27	9.32 Ω	12.48 Ω	16.88 Ω	12.48 Ω	-
36	6.93 Ω	9.32 Ω	-	9.32 Ω	13.55 Ω
48	11.41 Ω	13.55 Ω	-	13.55 Ω	20.53 Ω
54	9.32 Ω	12.48 Ω	-	12.48 Ω	-
60	8.07 Ω	11.41 Ω	-	11.41 Ω	-
72	6.93 Ω	9.32 Ω	-	9.32 Ω	13.55 Ω
81	-	-	-	12.48 Ω	-
90	-	-	-	11.41 Ω	-
108	-	-	-	9.32 Ω	13.55 Ω
120	-	-	-	11.41 Ω	-
144	-	-	-	9.32 Ω	13.55 Ω

Depending on element type, hot resistivity may be 5% more than cold resistivity.

INSTALLATION

5. Mounting the water heater



CAUTION: Injury
Hot water outlet pipes leaving unit can be hot to the touch. Insulation must be used for hot water pipes below 36" (0.9 m) due to burn risk to children.



NOTICE:
This unit should not be installed in a location where it may be exposed to temperatures less than 36 °F (2 °C). If the unit may be subject to freezing temperatures all water must be drained from the unit. Failure to comply with this instruction voids all warranties. The unit should be located in an area where water leakage from the unit or connections will not result in damage to the area adjacent to the unit. If such a location cannot be avoided it is recommended that a drain pan be installed under the unit.

Application

Before mounting, double check that the correct voltage the unit requires matches the voltage of the local power supply. The voltage and configuration (Wye or Delta) are declared on the nameplate. Make sure that the supply wire size corresponds to the heater capacity and wire run according to NEC. Installation carried out by a licensed electrician will ensure this. The hot water supply includes an air vent. The incoming water supply is equipped with a pre-installed pressure relief valve. For water supply line positions, see section 10.5, "Dimension drawings", pg. 13.

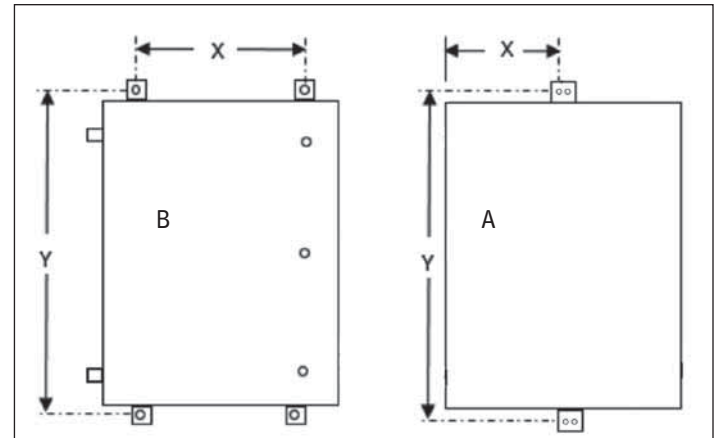
5.1 Mounting

- ▶ Install the water heater as close as possible to the main hot water draw off points.
- ▶ Keep a minimum of 5" (127 mm) clearance on all sides for service.
- ▶ NEMA 3 enclosures require a minimum clearance of 20" (510 mm) on the front side to allow the hinged cover to be fully opened.
- ▶ If there is a drain tube connected to the pressure relief valve, make sure that the drain water is not blocked by anything.

5.1.1 Maximum dimensions, including plumbing fittings

Capacity	No. of Elements	NEMA 3			NEMA 4/4X		
		Width (X)	Height (Y)	Depth (Z)	Width (X)	Height (Y)	Depth (Z)
12-18 kW	3	23 ¹ / ₃₂ "	28 ¹ / ₄ "	11 ¹¹ / ₃₂ "	35 ¹ / ₂ "	26 ¹³ / ₃₂ "	12 ¹ / ₁₆ "
24-36 kW	6	22 ⁵ / ₈ "	30 ¹¹ / ₁₆ "	9 ¹⁵ / ₁₆ "	35 ¹ / ₂ "	26 ¹³ / ₃₂ "	12 ¹ / ₁₆ "
48-72 kW	12	22 ²⁷ / ₃₂ "	38 ²⁵ / ₃₂ "	9 ⁷ / ₈ "	37 ⁹ / ₁₆ "	38 ¹³ / ₃₂ "	14"
81-108 kW	18	37 ⁹ / ₁₆ "	38 ¹³ / ₃₂ "	14"	37 ⁹ / ₁₆ "	38 ¹³ / ₃₂ "	14"
120-144 kW	24	39 ⁵ / ₁₆ "	50 ¹³ / ₃₂ "	14"	39 ⁵ / ₁₆ "	50 ¹³ / ₃₂ "	14"

5.1.2 Mounting screw positions



Enclosure	3-element 12-18 kW	6-element 24-36 kW	12-element 48-72 kW
NEMA 3 - (A) X/Y	9 ¹ / ₄ " / 21 ¹ / ₄ "	9 ¹ / ₄ " / 23 ⁷ / ₈ "	8 ⁷ / ₃₂ " / 32 ⁷ / ₁₆ "
NEMA 4 - (B) X/Y	22 ¹ / ₂ " / 25 ²⁵ / ₃₂ "	22 ¹ / ₂ " / 25 ²⁵ / ₃₂ "	22 ¹ / ₂ " / 37 ²⁵ / ₃₂ "
NEMA 4X - (B) X/Y	22 ¹ / ₂ " / 25 ²⁵ / ₃₂ "	22 ¹ / ₂ " / 25 ²⁵ / ₃₂ "	22 ¹ / ₂ " / 37 ²⁵ / ₃₂ "

Enclosure	18-element 81-108 kW	24-element 120-144 kW
NEMA 3 - (B) X/Y	22 ¹ / ₂ " / 37 ²⁵ / ₃₂ "	22 ¹ / ₂ " / 49 ²⁵ / ₃₂ "
NEMA 4 - (B) X/Y	22 ¹ / ₂ " / 37 ²⁵ / ₃₂ "	22 ¹ / ₂ " / 49 ²⁵ / ₃₂ "
NEMA 4X - (B) X/Y	22 ¹ / ₂ " / 37 ²⁵ / ₃₂ "	22 ¹ / ₂ " / 49 ²⁵ / ₃₂ "

6. Water connections



NOTICE:
Excessive heat from soldering on copper pipes near the heater may cause damage.



NOTICE:
Hard water or water with a high mineral count may damage the unit. Damage to the unit caused by scale or a high mineral count is not covered under the warranty.

6.1 Venting the air

- ▶ Before the heater is connected to the water supply, make sure that the water supply is flushed first to ensure it is free from any scale and dirt. The water pressure needs to be less than 145 psi (10 bar).
- ▶ If the water pressure exceeds 145 psi (10 bar), install a pressure reducing valve in the cold water pipework. Cold water supply (inlet) is located on the bottom right.
- ▶ Before the heater is connected to the electric supply, make sure that the water supply line is flushed for 3 minutes minimum to vent any air pockets out of the tubing system.
- ▶ Open the service screw on the vent valve to release the air.
- ▶ Open and close the ball valve on the cold water supply side several times to release any air pockets from the heater.
- ▶ Once the air is released, close the screw on the vent valve.

INSTALLATION

ELECTRICAL CONNECTION

6.2 Leakage check

Once all plumbing work is done, check for leaks. If necessary, take corrective action.

7. Electrical connection

7.1 Safety



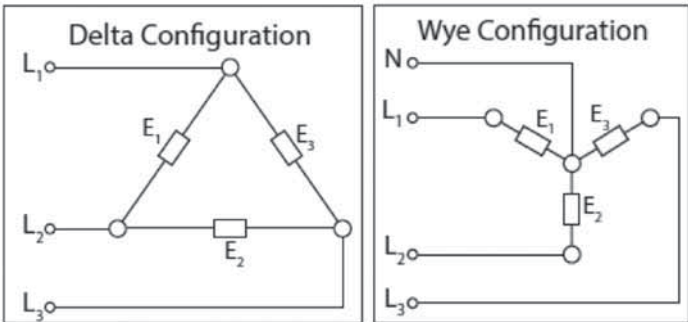
DANGER: Electrocutation
Before proceeding with any installation, adjustment, alteration, or service of the water heater, all circuit breaker switches servicing the appliance must be turned off. Make sure that nobody can activate the breaker in the distribution panel during your service work on the appliance.



DANGER: Electrocutation
The appliance must be properly grounded. Failure to electrically ground the product could result in serious personal injury or death.

7.2 Electric supply

Check the electric supply infrastructure:



For Delta configuration, a three-phase wire and a ground are supplied. For a Wye configuration, a three-phase wire, a neutral, and a ground are supplied. The configuration and voltage are declared on the unit name plate on the enclosure front type plate.



- Feed the wire through the knockout (A) using a Romex clamp for strain relief.
- Connect the live wires to the distribution block (B).
- Pull the ground wire into the ground terminal (C).

7.3 Terminal block torque

To tighten wire to the terminal block, use the proper torque value according to NEC:

Wire gauge (AWG)	Torque (lb-in)
8	80
6-4	165
3	275

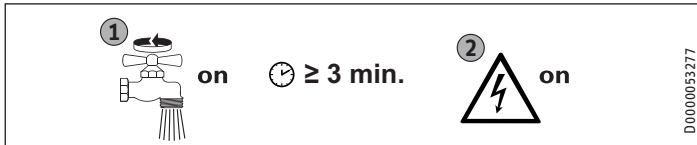
The water heater should be connected to a properly grounded dedicated branch circuit of proper voltage rating. In installations with several CF/CE/CES/CERO Plus water heaters, each unit requires a separate circuit with wire sizes according to NEC.

INSTALLATION

COMMISSIONING

8. Commissioning

- ▶ Close the front cover before the electric supply is turned on.
- ▶ Before the heater is activated by switching the electric supply on, run hot water via a hot water faucet for a minimum of 3 minutes to purge all air from the system.



- ▶ Turn on the circuit breaker.
- ▶ Turn on the heater via the on/off switch.
- ▶ Check the water temperature after several minutes of operation.
- ▶ For CF Plus heater models, to ensure proper standby heating, check all connected taps to ensure they are closed fully and that there are no leaks.
- ▶ Explain the end user how the heater operates.
- ▶ Make the end user aware that hot water can cause injuries if it is more than 125 °F (52 °C).
- ▶ Draw special attention to the safety information.
- ▶ Hand over the operating manual to the end user.

9. Maintenance



DANGER: Electrocutation

Before proceeding with any installation, adjustment, alteration, or service of the appliance, all circuit breaker switches servicing the appliance must be turned off. Make sure that nobody can activate the breaker in the distribution panel during your service work on the appliance.

Stiebel Eltron water heaters are designed for a very long service life. Actual life expectancy depends on water quality and use. To ensure consistent water flow, remove scale build up on the faucet or any connected fixtures.

INSTALLATION TECHNICAL DATA

10. Technical data

10.1 Technical data - CF Plus series

Model	Item Number	Voltage 3-phase	kW actual output	Full Load Amp Draw	3P Breaker Size (A)	No. of Elements	Pipe Size (inches)	Enclosure Size Standard NEMA 3 Including fittings (W x H x D in inches)
CF Plus 12KW	CFPLUS-012-208	208	11.27	31.27	35	3	3/4	23 ¹ / ₃₂ X 28 ¹ / ₄ X 11 ¹¹ / ₃₂
	CFPLUS-012-240	240	12.50	30.07	35			
	CFPLUS-012-480Y	480 Wye	13.50	16.24	20			
CF Plus 15KW	CFPLUS-015-208	208	15.77	43.78	50	3	3/4	23 ¹ / ₃₂ X 28 ¹ / ₄ X 11 ¹¹ / ₃₂
	CFPLUS-015-240	240	15.00	36.08	40			
	CFPLUS-015-480Y	480 Wye	16.65	20.03	25			
CF Plus 18KW	CFPLUS-018-208	208	18.00	49.96	60	3	3/4	23 ¹ / ₃₂ X 28 ¹ / ₄ X 11 ¹¹ / ₃₂
	CFPLUS-018-240	240	18.00	43.30	50			
	CFPLUS-018-480Y	480 Wye	18.00	21.65	25			
	CFPLUS-018-480D*	480	18.00	21.65	25	6*		22 ⁵ / ₈ X 30 ¹¹ / ₁₆ X 9 ¹⁵ / ₁₆
CF Plus 24KW	CFPLUS-024-208	208	22.53	62.55	70	6	3/4	22 ⁵ / ₈ X 30 ¹¹ / ₁₆ X 9 ¹⁵ / ₁₆
	CFPLUS-024-240	240	25.00	60.14	70			
	CFPLUS-024-480	480	25.00	30.07	35			
	CFPLUS-024-575	575	24.00	24.10	30			
CF Plus 27KW	CFPLUS-027-208	208	27.04	75.06	80	6	3/4	22 ⁵ / ₈ X 30 ¹¹ / ₁₆ X 9 ¹⁵ / ₁₆
	CFPLUS-027-240	240	27.02	65.01	80			
	CFPLUS-027-480	480	27.02	32.51	40			
CF Plus 36KW	CFPLUS-036-208	208	36.00	99.93	110	6	3/4	22 ⁵ / ₈ X 30 ¹¹ / ₁₆ X 9 ¹⁵ / ₁₆
	CFPLUS-036-240	240	36.00	86.60	100			
	CFPLUS-036-480	480	36.00	43.30	50			
	CFPLUS-036-575	575	36.00	36.15	40			
CF Plus 48KW	CFPLUS-048-208	208	45.07	125.09	150	12	1	22 ²⁷ / ₃₂ X 38 ²⁵ / ₃₂ X 9 ⁷ / ₈
	CFPLUS-048-240	240	50.00	120.28	150			
	CFPLUS-048-480	480	50.00	60.14	70			
	CFPLUS-048-575	575	47.99	48.19	60			
CF Plus 54KW	CFPLUS-054-208	208	54.08	150.11	175	12	1	22 ²⁷ / ₃₂ X 38 ²⁵ / ₃₂ X 9 ⁷ / ₈
	CFPLUS-054-240	240	54.05	130.02	150			
	CFPLUS-054-480	480	54.05	65.01	80			
CF Plus 60KW	CFPLUS-060-208	208	63.09	175.13	200	12	1	22 ²⁷ / ₃₂ X 38 ²⁵ / ₃₂ X 9 ⁷ / ₈
	CFPLUS-060-240	240	60.00	144.34	175			
	CFPLUS-060-480	480	60.00	72.17	80			
CF Plus 72KW	CFPLUS-072-208	208	72.00	199.85	225	12	1	22 ²⁷ / ₃₂ X 38 ²⁵ / ₃₂ X 9 ⁷ / ₈
	CFPLUS-072-240	240	72.00	173.21	200			
	CFPLUS-072-480	480	72.00	86.60	100			
	CFPLUS-072-575	575	72.00	72.29	80			
CF Plus 81KW	CFPLUS-081-480	480	81.07	97.52	110	18	1	37 ⁵ / ₁₆ X 38 ¹³ / ₃₂ X 14
CF Plus 90KW	CFPLUS-090-480	480	90.00	108.25	125	18	1	37 ⁵ / ₁₆ X 38 ¹³ / ₃₂ X 14
CF Plus 108KW	CFPLUS-108-480	480	108.00	129.90	150	18	1	37 ⁵ / ₁₆ X 38 ¹³ / ₃₂ X 14
	CFPLUS-108-575	575	108.00	108.44	125			
CF Plus 120KW	CFPLUS-120-480	480	120.00	144.34	175	24	1 ¹ / ₄	39 ⁵ / ₁₆ X 50 ¹³ / ₃₂ X 14
CF Plus 144KW	CFPLUS-144-480	480	144.00	173.21	200	24	1 ¹ / ₄	39 ⁵ / ₁₆ X 50 ¹³ / ₃₂ X 14
	CFPLUS-144-575	575	144.00	144.59	175			

*CFPLUS-018-480D is a 6-element Delta heater. The enclosure is larger than other 18 kW heaters. Available at extra cost.

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10.2 Technical data - CE Plus series

Model	Item Number	Voltage 3-phase	kW actual output	Full Load Amp Draw	3P Breaker Size (A)	No. of Elements	Pipe Size (inches)	Enclosure Size Standard NEMA 3 Including fittings (W x H x D in inches)
CE Plus 12KW	CEPLUS-012-208	208	11.27	31.27	35	3	3/4	23 ¹ / ₃₂ x 28 ¹ / ₄ x 11 ¹¹ / ₃₂
	CEPLUS-012-240	240	12.50	30.07	35			
	CEPLUS-012-480Y	480 Wye	13.50	16.24	20			
CE Plus 15KW	CEPLUS-015-208	208	15.77	43.78	50	3	3/4	23 ¹ / ₃₂ x 28 ¹ / ₄ x 11 ¹¹ / ₃₂
	CEPLUS-015-240	240	15.00	36.08	40			
	CEPLUS-015-480Y	480 Wye	16.65	20.03	25			
CE Plus 18KW	CEPLUS-018-208	208	18.00	49.96	60	3	3/4	23 ¹ / ₃₂ x 28 ¹ / ₄ x 11 ¹¹ / ₃₂
	CEPLUS-018-240	240	18.00	43.30	50			
	CEPLUS-018-480Y	480 Wye	18.00	21.65	25			
	CEPLUS-018-480D*	480	18.00	21.65	25	6*		22 ⁵ / ₈ x 30 ¹¹ / ₁₆ x 9 ¹⁵ / ₁₆
CE Plus 24KW	CEPLUS-024-208	208	22.53	62.55	70	6	3/4	22 ⁵ / ₈ x 30 ¹¹ / ₁₆ x 9 ¹⁵ / ₁₆
	CEPLUS-024-240	240	25.00	60.14	70			
	CEPLUS-024-480	480	25.00	30.07	35			
	CEPLUS-024-575	575	24.00	24.10	30			
CE Plus 27KW	CEPLUS-027-208	208	27.04	75.06	80	6	3/4	22 ⁵ / ₈ x 30 ¹¹ / ₁₆ x 9 ¹⁵ / ₁₆
	CEPLUS-027-240	240	27.02	65.01	80			
	CEPLUS-027-480	480	27.02	32.51	40			
CE Plus 36KW	CEPLUS-036-208	208	36.00	99.93	110	6	3/4	22 ⁵ / ₈ x 30 ¹¹ / ₁₆ x 9 ¹⁵ / ₁₆
	CEPLUS-036-240	240	36.00	86.60	100			
	CEPLUS-036-480	480	36.00	43.30	50			
	CEPLUS-036-575	575	36.00	36.15	40			
CE Plus 48KW	CEPLUS-048-208	208	45.07	125.09	150	12	1	22 ²⁷ / ₃₂ x 38 ²⁵ / ₃₂ x 9 ⁷ / ₈
	CEPLUS-048-240	240	50.00	120.28	150			
	CEPLUS-048-480	480	50.00	60.14	70			
	CEPLUS-048-575	575	47.99	48.19	60			
CE Plus 54KW	CEPLUS-054-208	208	54.08	150.11	175	12	1	22 ²⁷ / ₃₂ x 38 ²⁵ / ₃₂ x 9 ⁷ / ₈
	CEPLUS-054-240	240	54.05	130.02	150			
	CEPLUS-054-480	480	54.05	65.01	80			
CE Plus 60KW	CEPLUS-060-208	208	63.09	175.13	200	12	1	22 ²⁷ / ₃₂ x 38 ²⁵ / ₃₂ x 9 ⁷ / ₈
	CEPLUS-060-240	240	60.00	144.34	175			
	CEPLUS-060-480	480	60.00	72.17	80			
CE Plus 72KW	CEPLUS-072-208	208	72.00	199.85	225	12	1	22 ²⁷ / ₃₂ x 38 ²⁵ / ₃₂ x 9 ⁷ / ₈
	CEPLUS-072-240	240	72.00	173.21	200			
	CEPLUS-072-480	480	72.00	86.60	100			
	CEPLUS-072-575	575	72.00	72.29	80			
CE Plus 81KW	CEPLUS-081-480	480	81.07	97.52	110	18	1	37 ⁵ / ₁₆ x 38 ¹³ / ₃₂ x 14
CE Plus 90KW	CEPLUS-090-480	480	90.00	108.25	125	18	1	37 ⁵ / ₁₆ x 38 ¹³ / ₃₂ x 14
CE Plus 108KW	CEPLUS-108-480	480	108.00	129.90	150	18	1	37 ⁵ / ₁₆ x 38 ¹³ / ₃₂ x 14
	CEPLUS-108-575	575	108.00	108.44	125			
CE Plus 120KW	CEPLUS-120-480	480	120.00	144.34	175	24	1 ¹ / ₄	39 ⁵ / ₁₆ x 50 ¹³ / ₃₂ x 14
CE Plus 144KW	CEPLUS-144-480	480	144.00	173.21	200	24	1 ¹ / ₄	39 ⁵ / ₁₆ x 50 ¹³ / ₃₂ x 14
	CEPLUS-144-575	575	144.00	144.59	175			

*CEPLUS-018-480D is a 6-element Delta heater. The enclosure is larger than other 18 kW heaters. Available at extra cost.

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10.3 Technical data - CES Plus series

Model	Item Number	Voltage 3-phase	kW actual output	Full Load Amp Draw	3P Breaker Size (A)	No. of Elements	Pipe Size (inches)	Enclosure Size Standard NEMA 3 Including fittings (W x H x D in inches)
CES Plus 12KW	CESPLUS-012-208	208	11.27	31.27	35	3	3/4	23 ¹ / ₃₂ X 28 ¹ / ₄ X 11 ¹¹ / ₃₂
	CESPLUS-012-240	240	12.50	30.07	35			
	CESPLUS-012-480Y	480 Wye	13.50	16.24	20			
CES Plus 15KW	CESPLUS-015-208	208	15.77	43.78	50	3	3/4	23 ¹ / ₃₂ X 28 ¹ / ₄ X 11 ¹¹ / ₃₂
	CESPLUS-015-240	240	15.00	36.08	40			
	CESPLUS-015-480Y	480 Wye	16.65	20.03	25			
CES Plus 18KW	CESPLUS-018-208	208	18.00	49.96	60	3	3/4	23 ¹ / ₃₂ X 28 ¹ / ₄ X 11 ¹¹ / ₃₂
	CESPLUS-018-240	240	18.00	43.30	50			
	CESPLUS-018-480Y	480 Wye	18.00	21.65	25			
	CESPLUS-018-480D*	480	18.00	21.65	25	6*		22 ⁵ / ₈ X 30 ¹¹ / ₁₆ X 9 ¹⁵ / ₁₆
CES Plus 24KW	CESPLUS-024-208	208	22.53	62.55	70	6	3/4	22 ⁵ / ₈ X 30 ¹¹ / ₁₆ X 9 ¹⁵ / ₁₆
	CESPLUS-024-240	240	25.00	60.14	70			
	CESPLUS-024-480	480	25.00	30.07	35			
	CESPLUS-024-575	575	24.00	24.10	30			
CES Plus 27KW	CESPLUS-027-208	208	27.04	75.06	80	6	3/4	22 ⁵ / ₈ X 30 ¹¹ / ₁₆ X 9 ¹⁵ / ₁₆
	CESPLUS-027-240	240	27.02	65.01	80			
	CESPLUS-027-480	480	27.02	32.51	40			
CES Plus 36KW	CESPLUS-036-208	208	36.00	99.93	110	6	3/4	22 ⁵ / ₈ X 30 ¹¹ / ₁₆ X 9 ¹⁵ / ₁₆
	CESPLUS-036-240	240	36.00	86.60	100			
	CESPLUS-036-480	480	36.00	43.30	50			
	CESPLUS-036-575	575	36.00	36.15	40			
CES Plus 48KW	CESPLUS-048-208	208	45.07	125.09	150	12	1	22 ²⁷ / ₃₂ X 38 ²⁵ / ₃₂ X 9 ⁷ / ₈
	CESPLUS-048-240	240	50.00	120.28	150			
	CESPLUS-048-480	480	50.00	60.14	70			
	CESPLUS-048-575	575	47.99	48.19	60			
CES Plus 54KW	CESPLUS-054-208	208	54.08	150.11	175	12	1	22 ²⁷ / ₃₂ X 38 ²⁵ / ₃₂ X 9 ⁷ / ₈
	CESPLUS-054-240	240	54.05	130.02	150			
	CESPLUS-054-480	480	54.05	65.01	80			
CES Plus 60KW	CESPLUS-060-208	208	63.09	175.13	200	12	1	22 ²⁷ / ₃₂ X 38 ²⁵ / ₃₂ X 9 ⁷ / ₈
	CESPLUS-060-240	240	60.00	144.34	175			
	CESPLUS-060-480	480	60.00	72.17	80			
CES Plus 72KW	CESPLUS-072-208	208	72.00	199.85	225	12	1	22 ²⁷ / ₃₂ X 38 ²⁵ / ₃₂ X 9 ⁷ / ₈
	CESPLUS-072-240	240	72.00	173.21	200			
	CESPLUS-072-480	480	72.00	86.60	100			
	CESPLUS-072-575	575	72.00	72.29	80			
CES Plus 81KW	CESPLUS-081-480	480	81.07	97.52	110	18	1	37 ⁵ / ₁₆ X 38 ¹³ / ₃₂ X 14
CES Plus 90KW	CESPLUS-090-480	480	90.00	108.25	125	18	1	37 ⁵ / ₁₆ X 38 ¹³ / ₃₂ X 14
CES Plus 108KW	CESPLUS-108-480	480	108.00	129.90	150	18	1	37 ⁵ / ₁₆ X 38 ¹³ / ₃₂ X 14
	CESPLUS-108-575	575	108.00	108.44	125			
CES Plus 120KW	CESPLUS-120-480	480	120.00	144.34	175	24	1 ¹ / ₄	39 ⁵ / ₁₆ X 50 ¹³ / ₃₂ X 14
CES Plus 144KW	CESPLUS-144-480	480	144.00	173.21	200	24	1 ¹ / ₄	39 ⁵ / ₁₆ X 50 ¹³ / ₃₂ X 14
	CESPLUS-144-575	575	144.00	144.59	175			

*CESPLUS-018-480D is a 6-element Delta heater. The enclosure is larger than other 18 kW heaters. Available at extra cost.

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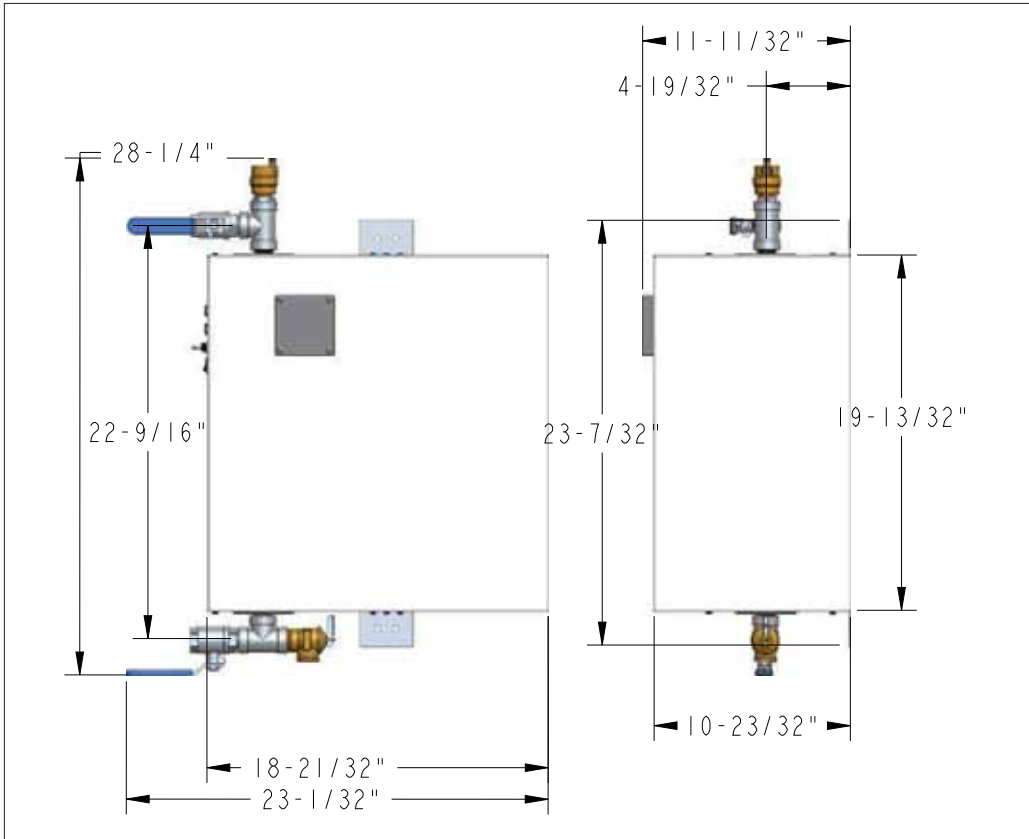
10.4 Technical data - CERO Plus series

Model	Item Number	Voltage 3-phase	kW actual output	Full Load Amp Draw	3P Breaker Size (A)	No. of Elements	Pipe Size (inches)	Enclosure Size Standard NEMA 3 Including fittings (W x H x D in inches)
CERO Plus 12KW	CEROPLUS-012-208	208	10.15	28.17	35	3	¾	23 ¹ / ₃₂ X 28 ¹ / ₄ X 11 ¹¹ / ₃₂
	CEROPLUS-012-240	240	12.50	30.07	35			
	CEROPLUS-012-480Y	480 Wye	11.10	13.35	15			
CERO Plus 15KW	CEROPLUS-015-208	208	13.52	37.53	45	3	¾	23 ¹ / ₃₂ X 28 ¹ / ₄ X 11 ¹¹ / ₃₂
	CEROPLUS-015-240	240	13.51	32.51	40			
	CEROPLUS-015-480Y	480 Wye	16.65	20.03	25			
CERO Plus 18KW	CEROPLUS-018-208	208	18.00	49.96	60	3	¾	23 ¹ / ₃₂ X 28 ¹ / ₄ X 11 ¹¹ / ₃₂
	CEROPLUS-018-240	240	18.00	43.30	50			
	CEROPLUS-018-480Y	480 Wye	18.00	21.65	25			
	CEROPLUS-018-480D*	480	16.66	20.04	25	6*		22 ⁵ / ₈ X 30 ¹¹ / ₁₆ X 9 ¹⁵ / ₁₆
CERO Plus 24KW	CEROPLUS-024-208	208	20.30	56.34	70	6	¾	22 ⁵ / ₈ X 30 ¹¹ / ₁₆ X 9 ¹⁵ / ₁₆
	CEROPLUS-024-240	240	25.00	60.14	70			
	CEROPLUS-024-480	480	25.00	30.07	35			
	CEROPLUS-024-575	575	24.00	24.09	30			
CERO Plus 27KW	CEROPLUS-027-208	208	27.04	75.06	80	6	¾	22 ⁵ / ₈ X 30 ¹¹ / ₁₆ X 9 ¹⁵ / ₁₆
	CEROPLUS-027-240	240	27.02	65.01	80			
	CEROPLUS-027-480	480	27.02	32.50	40			
CERO Plus 36KW	CEROPLUS-036-240	240	36.00	86.60	100	6	¾	22 ⁵ / ₈ X 30 ¹¹ / ₁₆ X 9 ¹⁵ / ₁₆
	CEROPLUS-036-480	480	36.00	43.30	50			
	CEROPLUS-036-575	575	36.00	36.15	40			
CERO Plus 48KW	CEROPLUS-048-240	240	50.00	120.28	150	12	1	22 ²⁷ / ₃₂ X 38 ²⁵ / ₃₂ X 9 ⁷ / ₈
	CEROPLUS-048-480	480	50.00	60.14	70			
	CEROPLUS-048-575	575	47.99	48.19	60			
CERO Plus 54KW	CEROPLUS-054-208	208	54.08	150.11	175	12	1	22 ²⁷ / ₃₂ X 38 ²⁵ / ₃₂ X 9 ⁷ / ₈
	CEROPLUS-054-240	240	54.05	130.02	150			
	CEROPLUS-054-480	480	54.05	65.01	70			
CERO Plus 72KW	CEROPLUS-072-240	240	72.00	173.21	200	12	1	22 ²⁷ / ₃₂ X 38 ²⁵ / ₃₂ X 9 ⁷ / ₈
	CEROPLUS-072-480	480	72.00	86.60	100			
	CEROPLUS-072-575	575	71.99	72.28	80			
CERO Plus 81KW	CEROPLUS-081-480	480	81.07	97.52	110	18	1	37 ⁵ / ₁₆ X 38 ¹³ / ₃₂ X 14
CERO Plus 108KW	CEROPLUS-108-480	480	108.00	129.90	150			
	CEROPLUS-108-575	575	108.00	108.44	125			
CERO Plus 144KW	CEROPLUS-144-480	480	144.00	173.21	200			
	CEROPLUS-144-575	575	144.00	144.59	175			

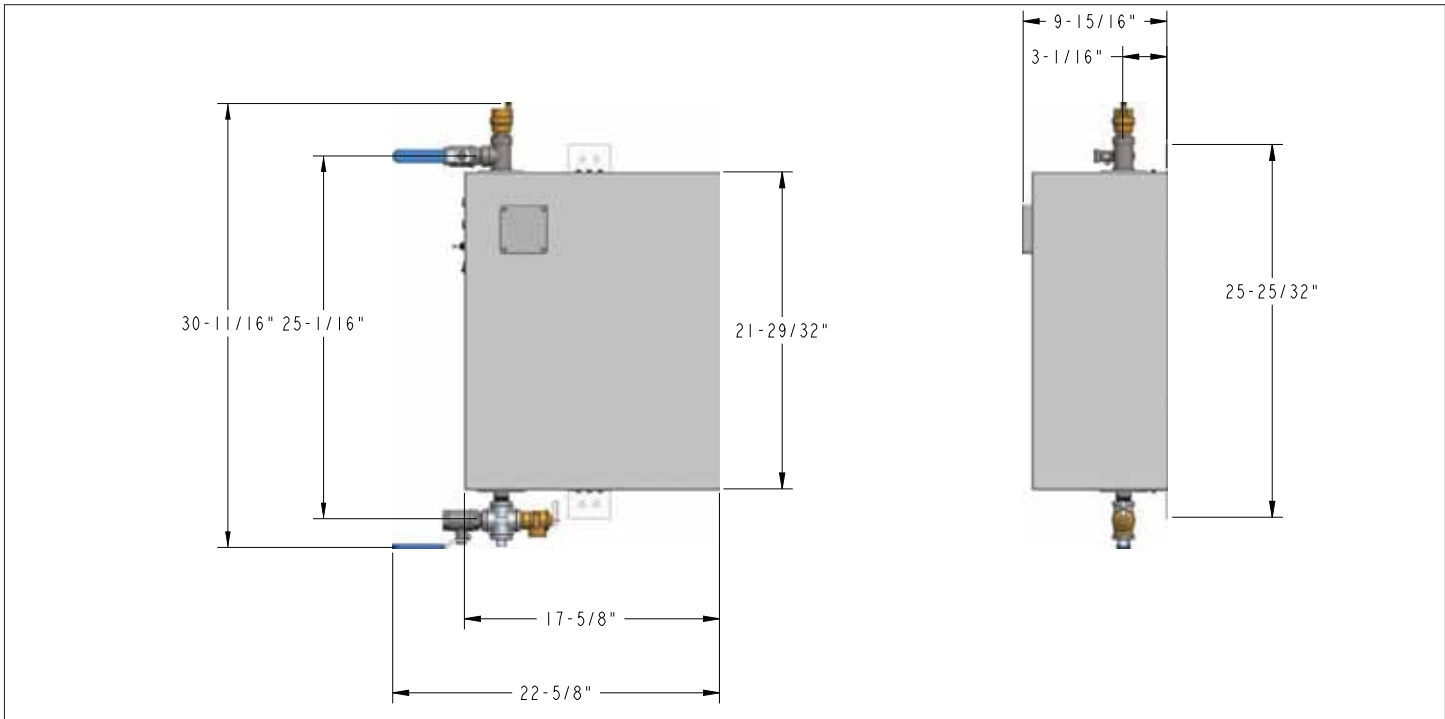
*CEROPLUS-018-480D is a 6-element Delta heater. The enclosure is larger than other 18 kW heaters. Available at extra cost.

10.5 Dimension drawings

10.5.1 CF/CE/CES/CERO Plus 12-18, NEMA 3 enclosure

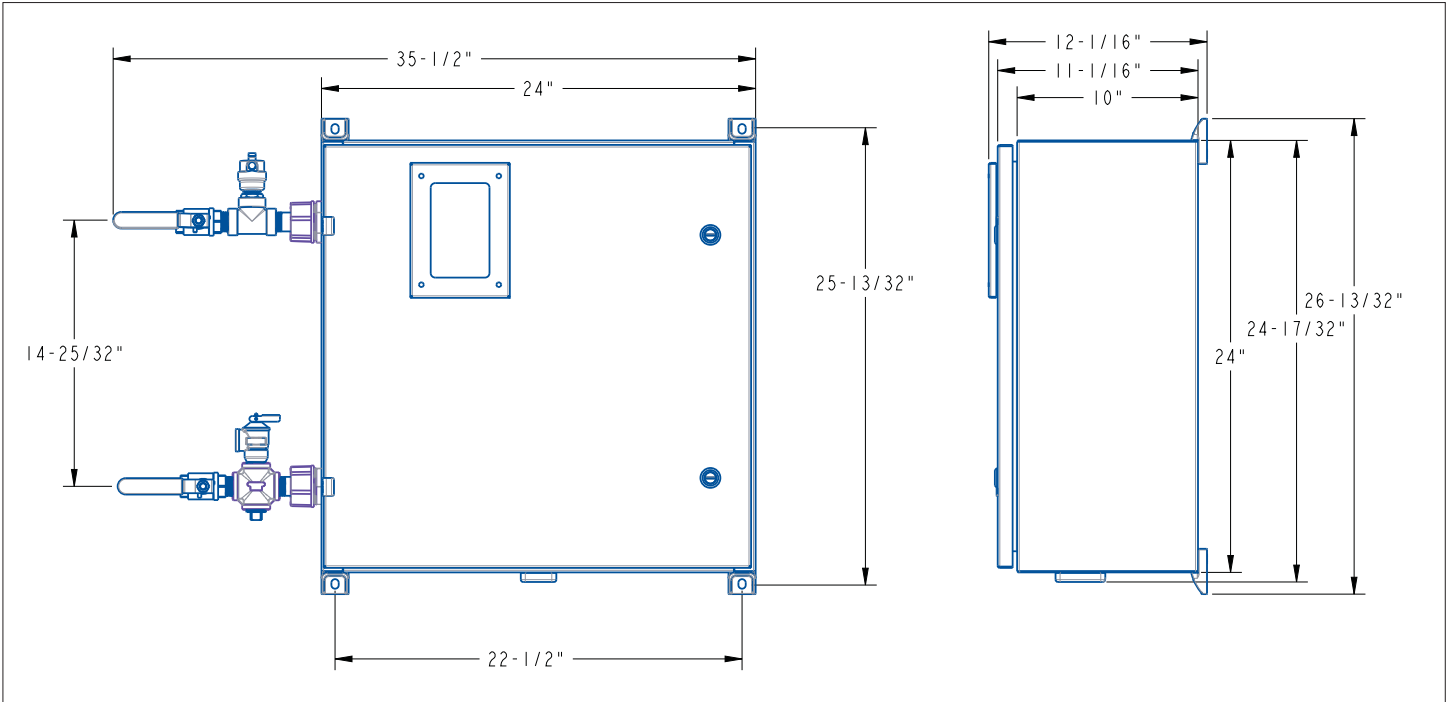


10.5.2 CF/CE/CES/CERO Plus 24-36, NEMA 3 enclosure

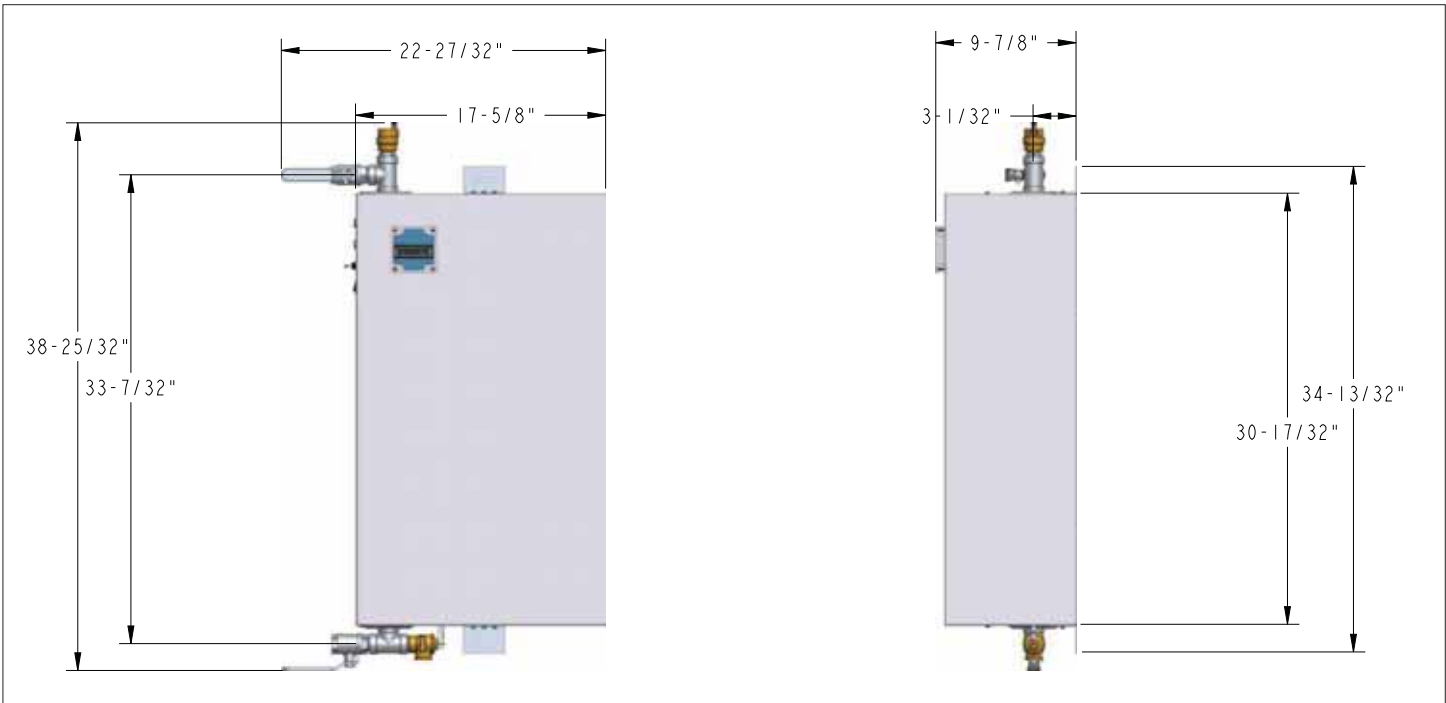


INSTALLATION
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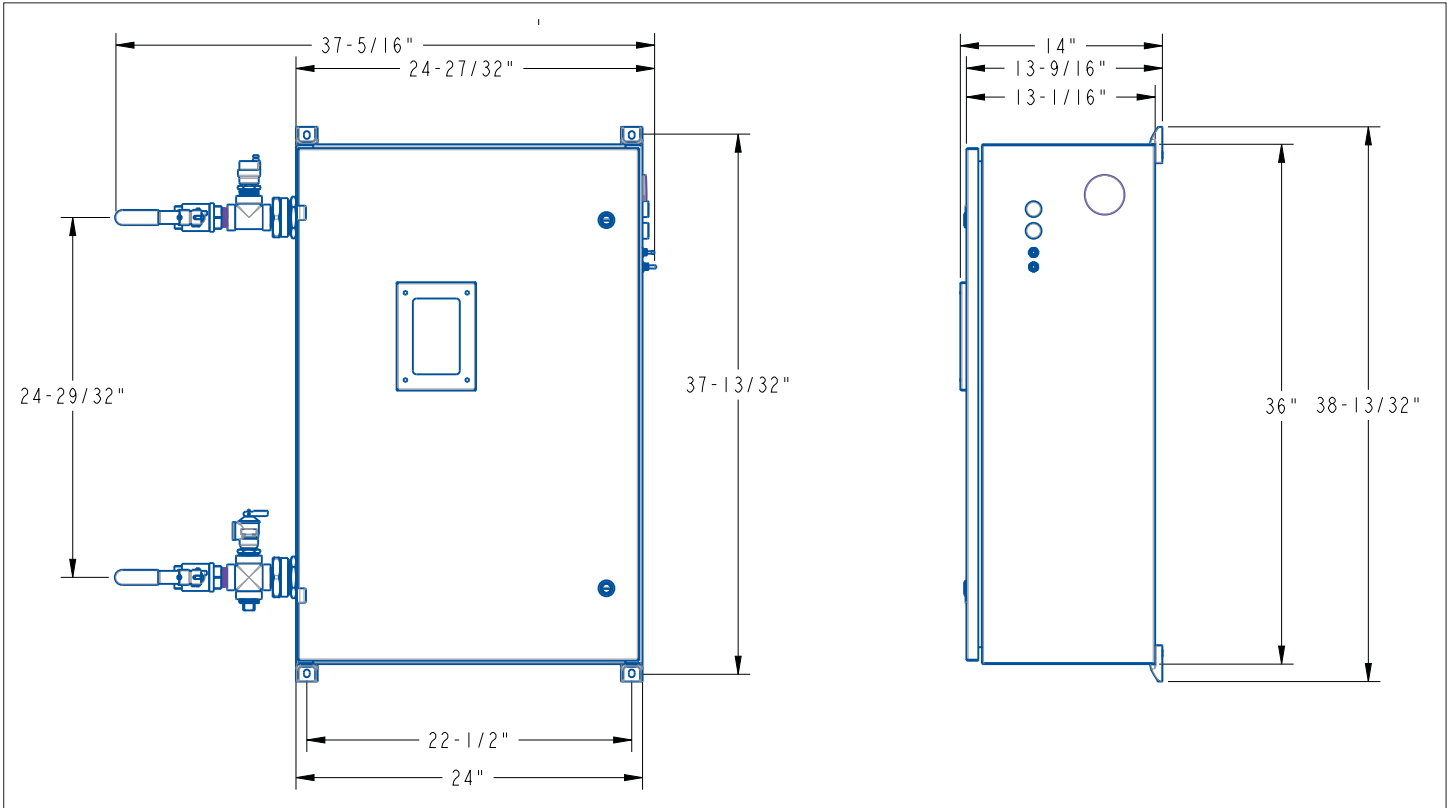
10.5.3 CF/CE/CES/CERO Plus 12-36, NEMA 4/4X enclosure



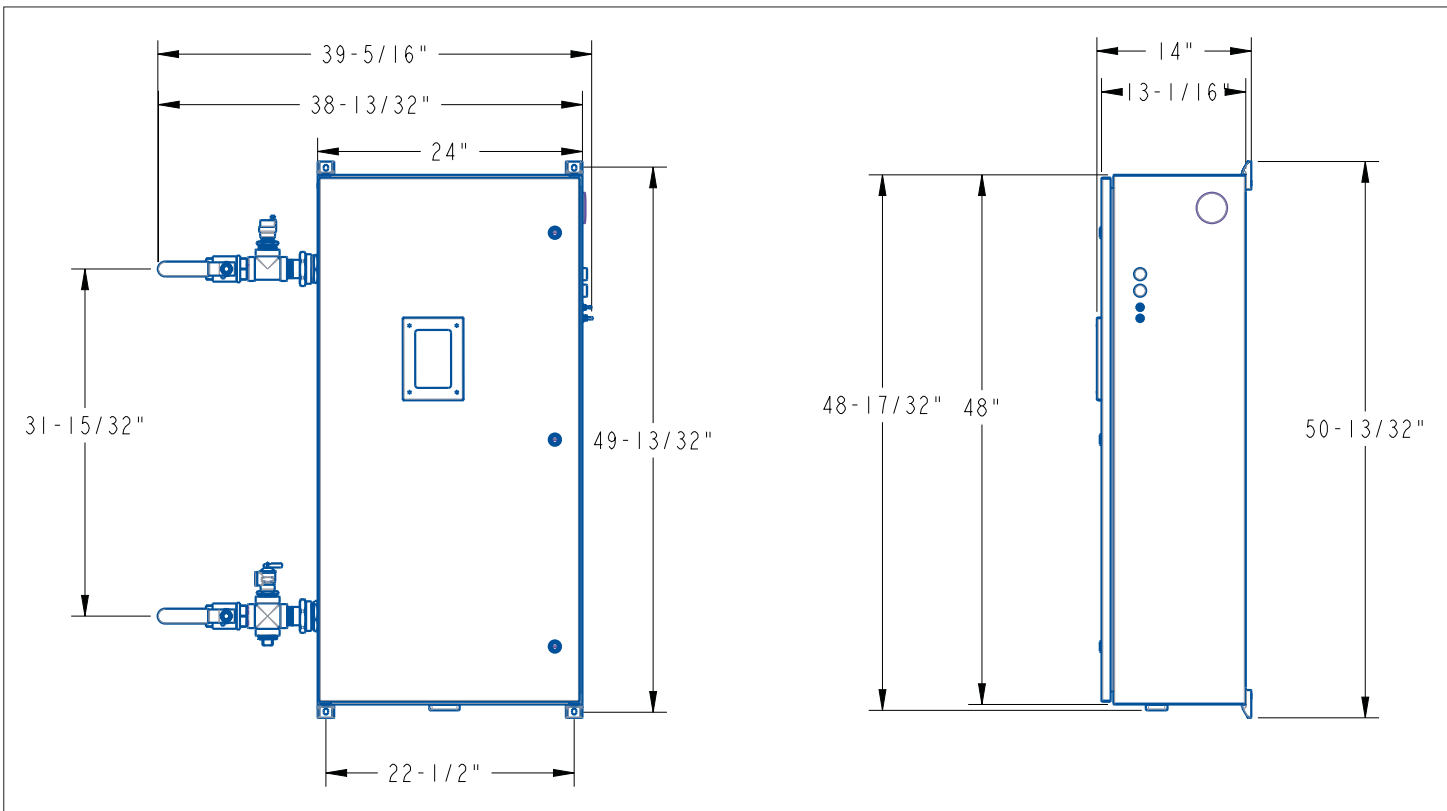
10.5.4 CF/CE/CES/CERO Plus 48-72, NEMA 3 enclosure



10.5.5 CF/CE/CES/CERO Plus 48-72, NEMA 4/4X enclosure; CF/CE/CES/CERO Plus 81-108, NEMA 3/4/4X enclosure

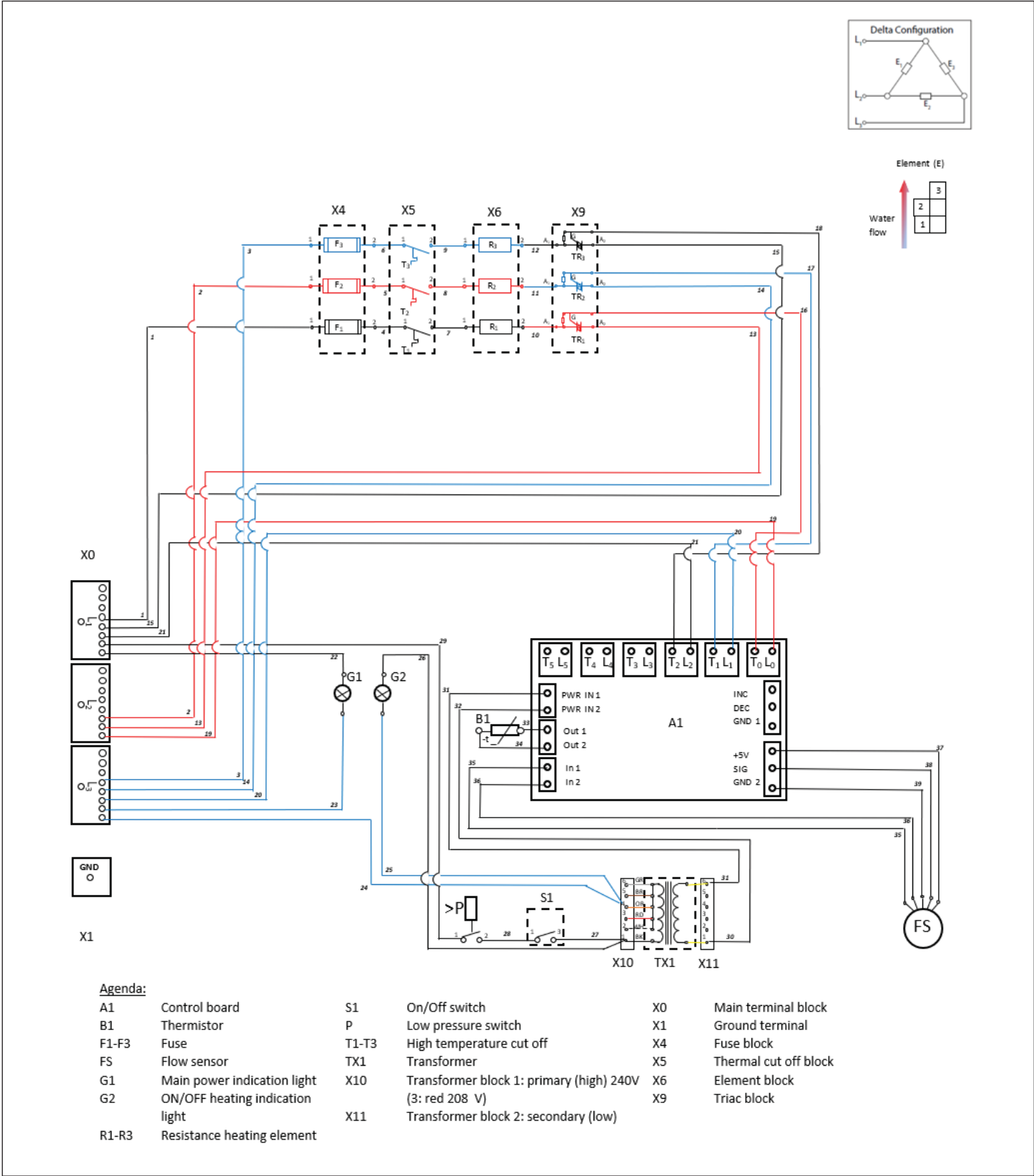


10.5.6 CF/CE/CES/CERO Plus 120-144, NEMA 3/4/4X enclosure



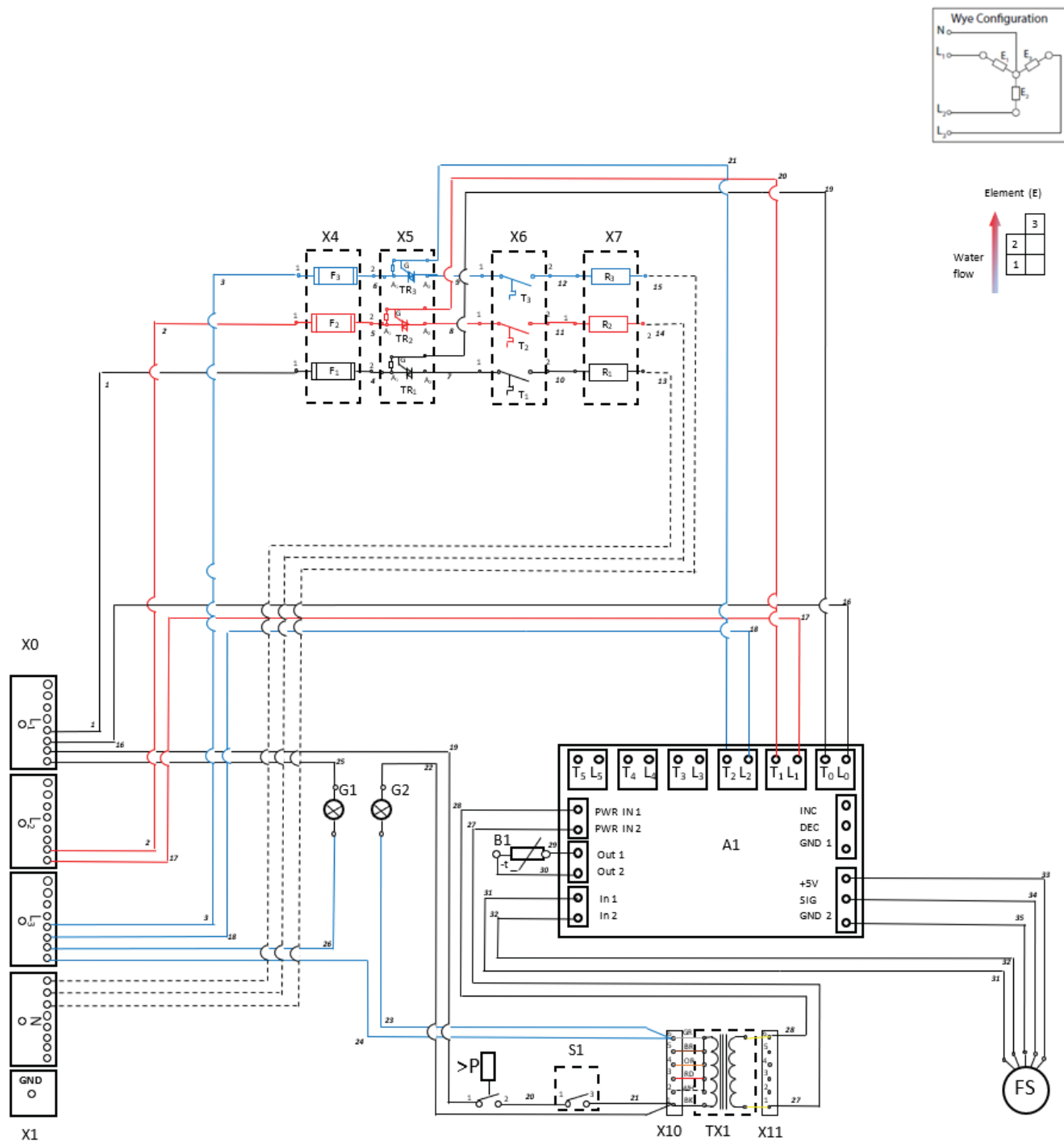
10.6 Wiring diagrams

10.6.1 CF Plus 12–18, 208–240 V Delta wiring diagram



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10.6.2 CF 12-18 Plus 480 V Wye wiring diagram



Agenda:

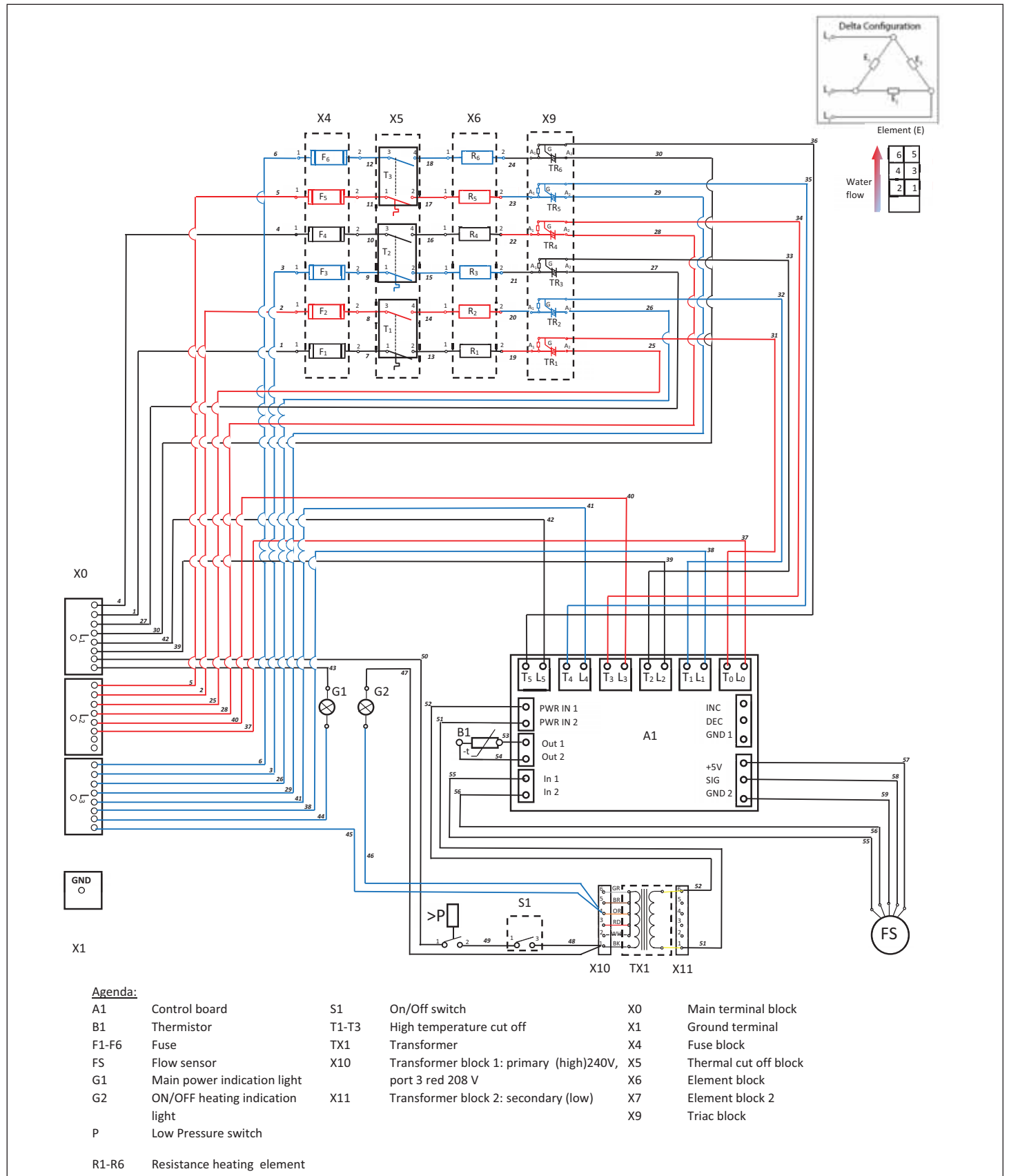
A1	Control board
B1	Thermistor
F1-F3	Fuse
FS	Flow sensor
G1	Main power indication light
G2	ON/OFF heating indication light
R1-R3	Resistance heating element

S1	On/Off switch
P	Low pressure switch
T1-T3	High temperature cut off
TX1	Transformer
X10	Transformer block 1: primary (high)
X11	Transformer block 2: secondary (low)

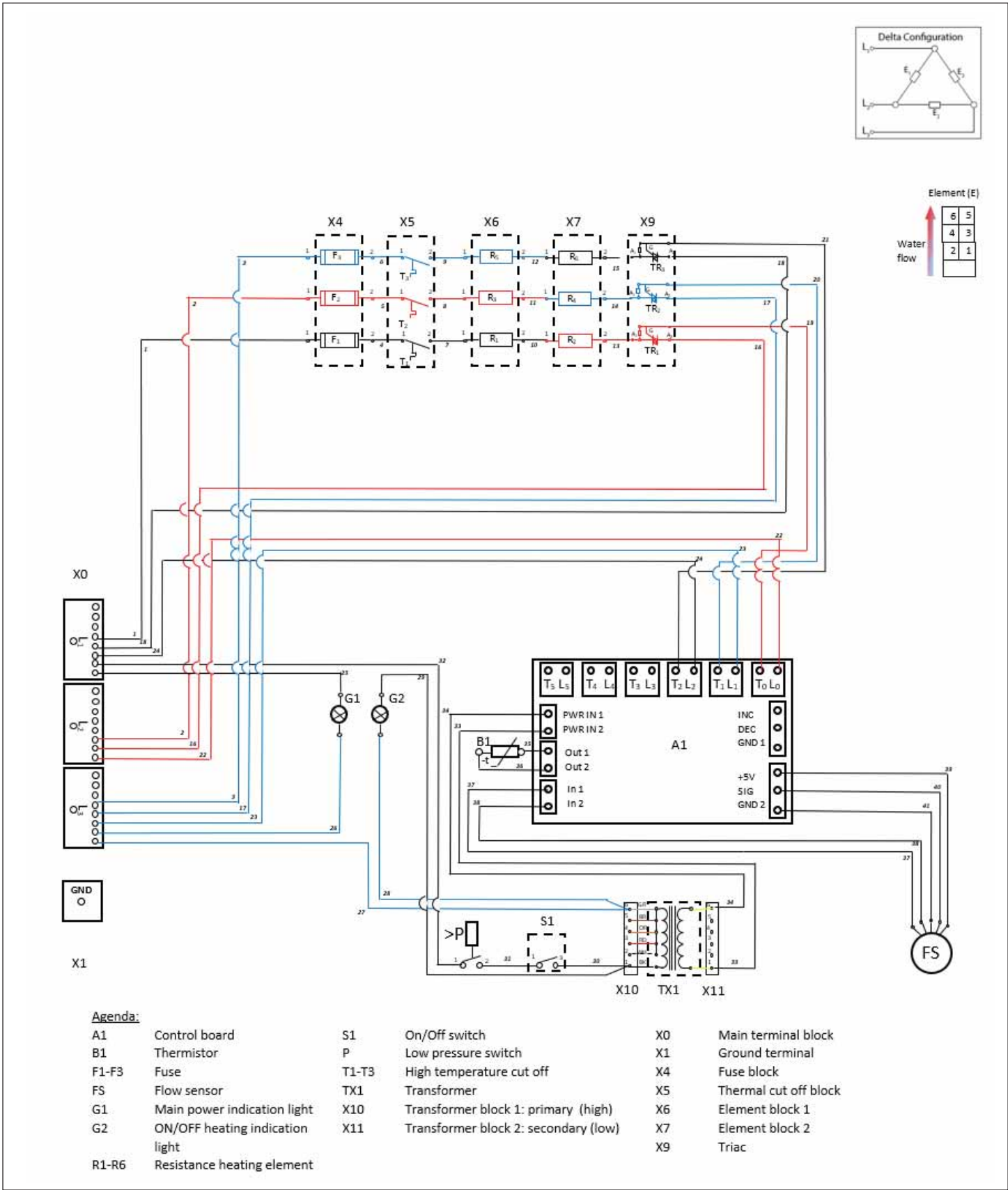
X0	Main terminal block
X1	Ground terminal
X4	Fuse block
X5	Triac block
X6	Thermal cut off block
X7	Element block

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10.6.3 CF Plus 24-36, 208-240 V Delta wiring diagram

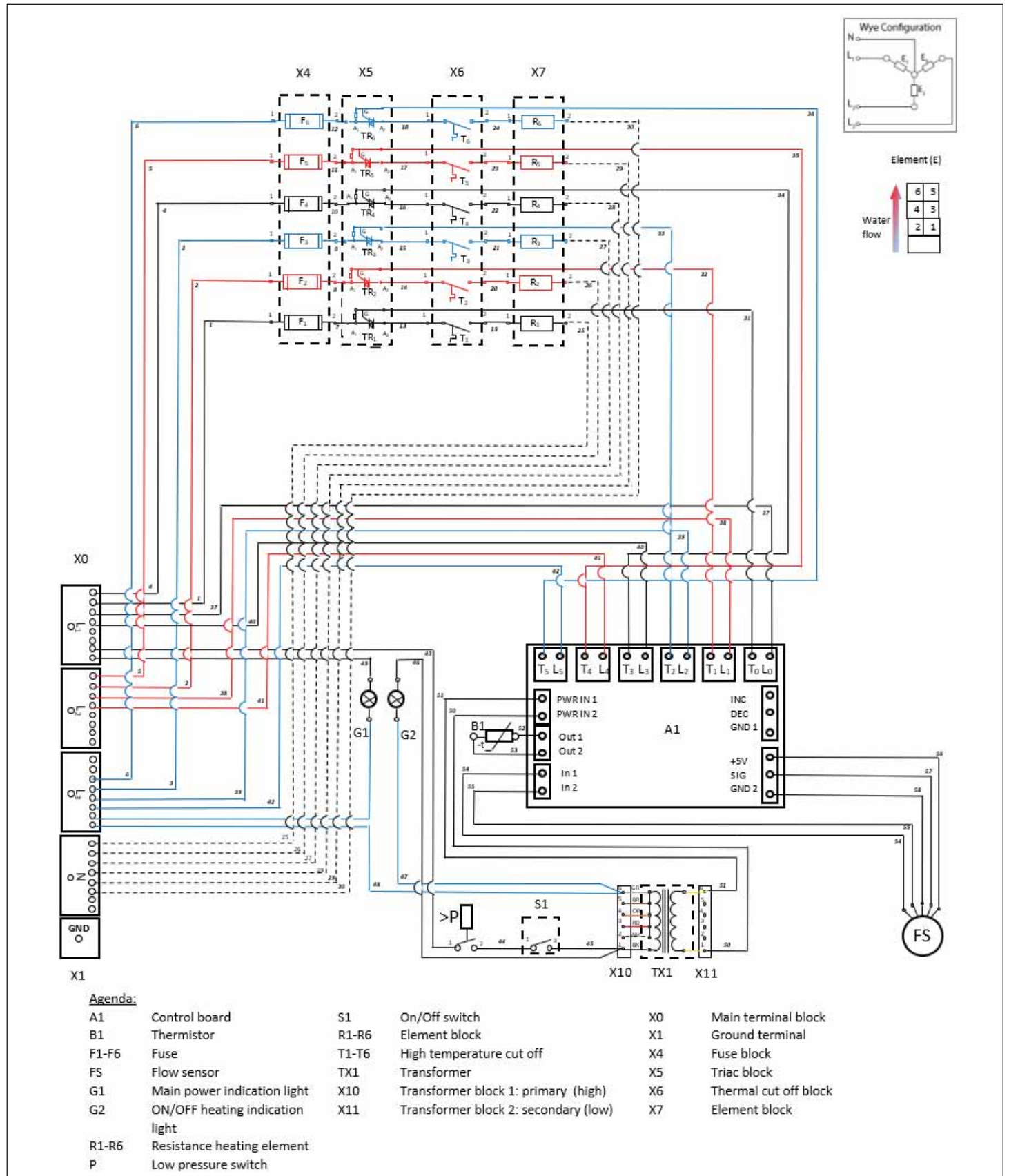


10.6.4 CF Plus 24-36, 480 V Delta wiring diagram

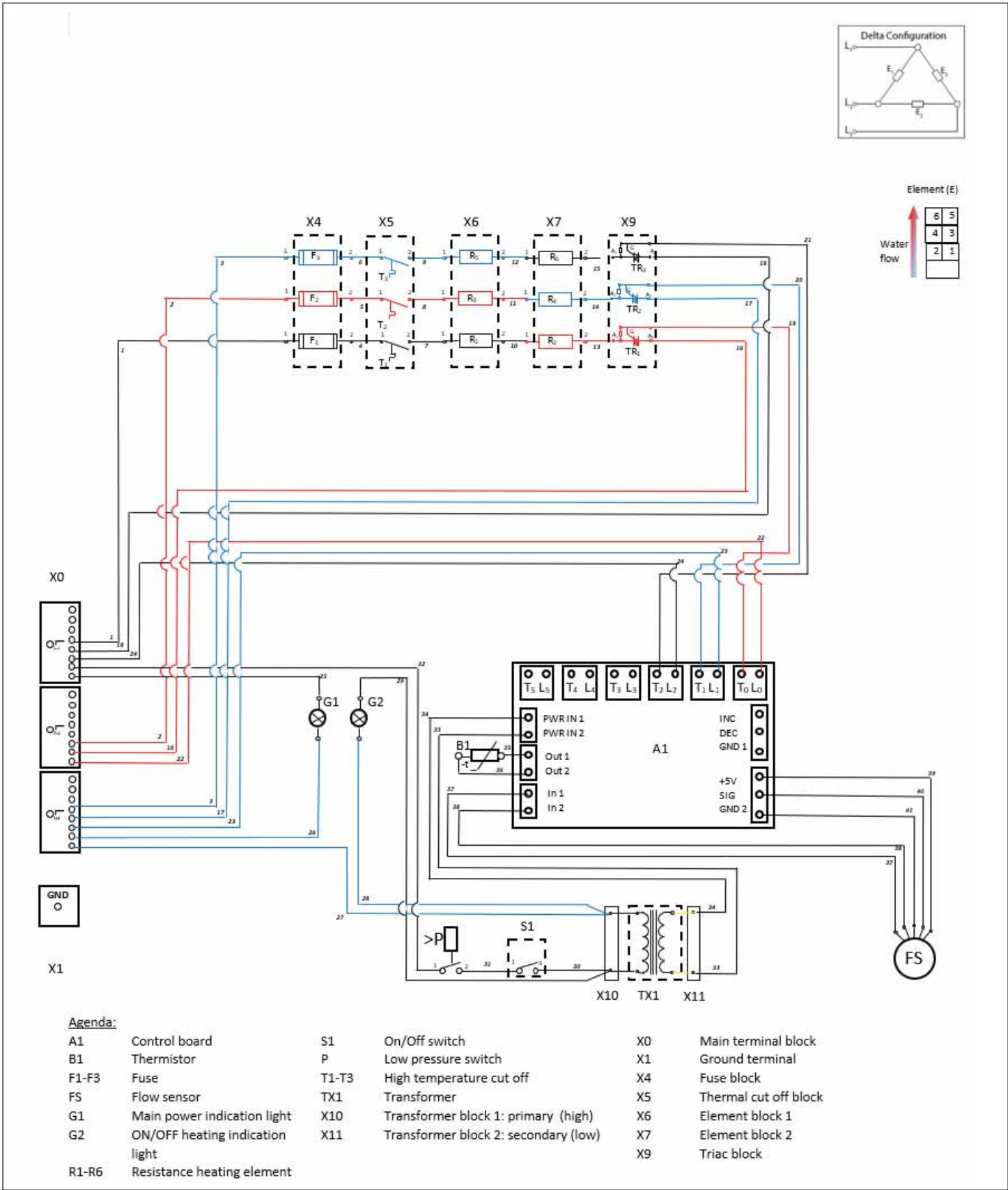


INSTALLATION TECHNICAL DATA

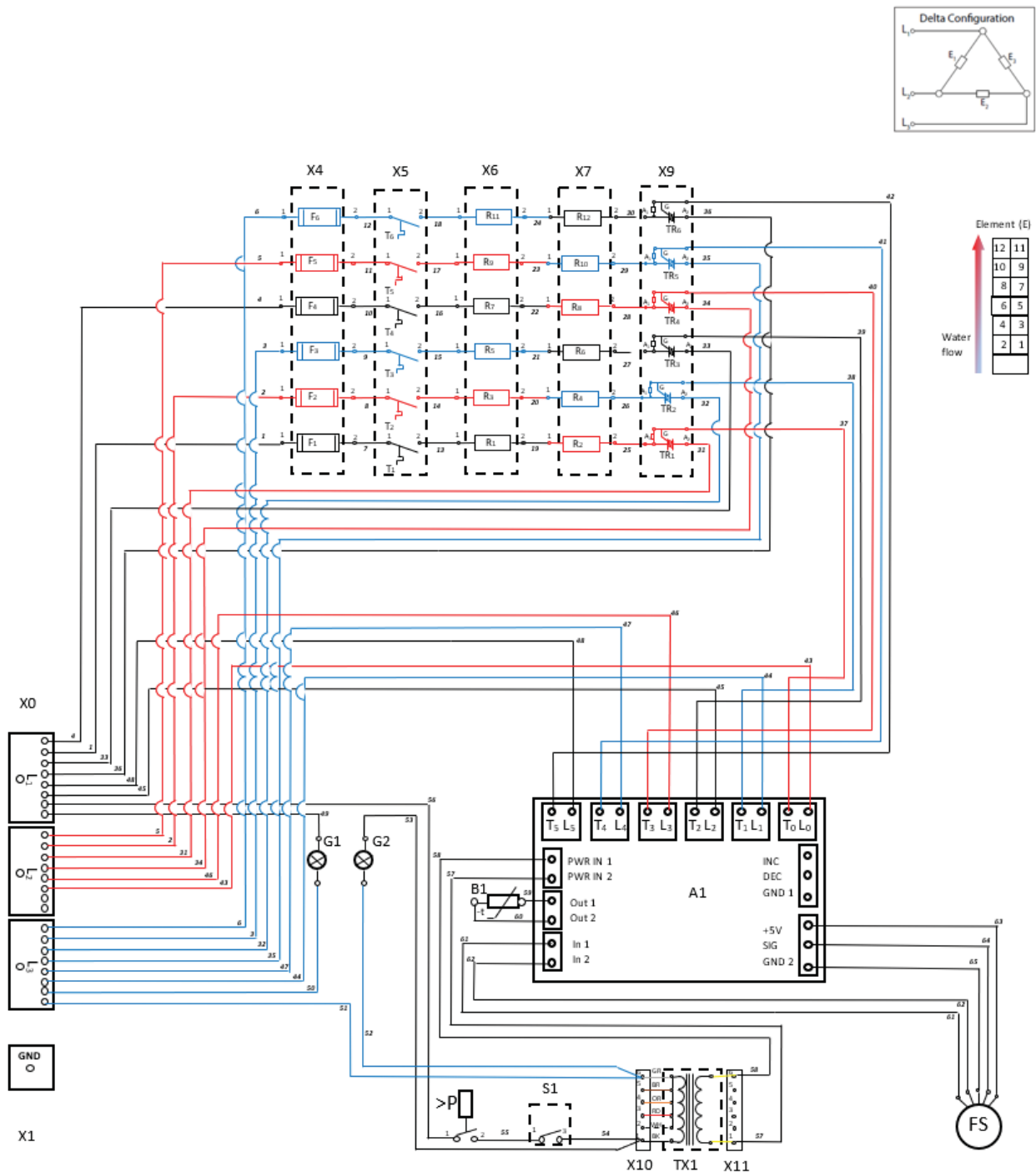
10.6.5 CF Plus 24-36, 480 V Wye wiring diagram



10.6.6 CF Plus 24-36, 575 V Delta wiring diagram



10.6.8 CF Plus 48-72, 480 V Delta wiring diagram



Agenda:

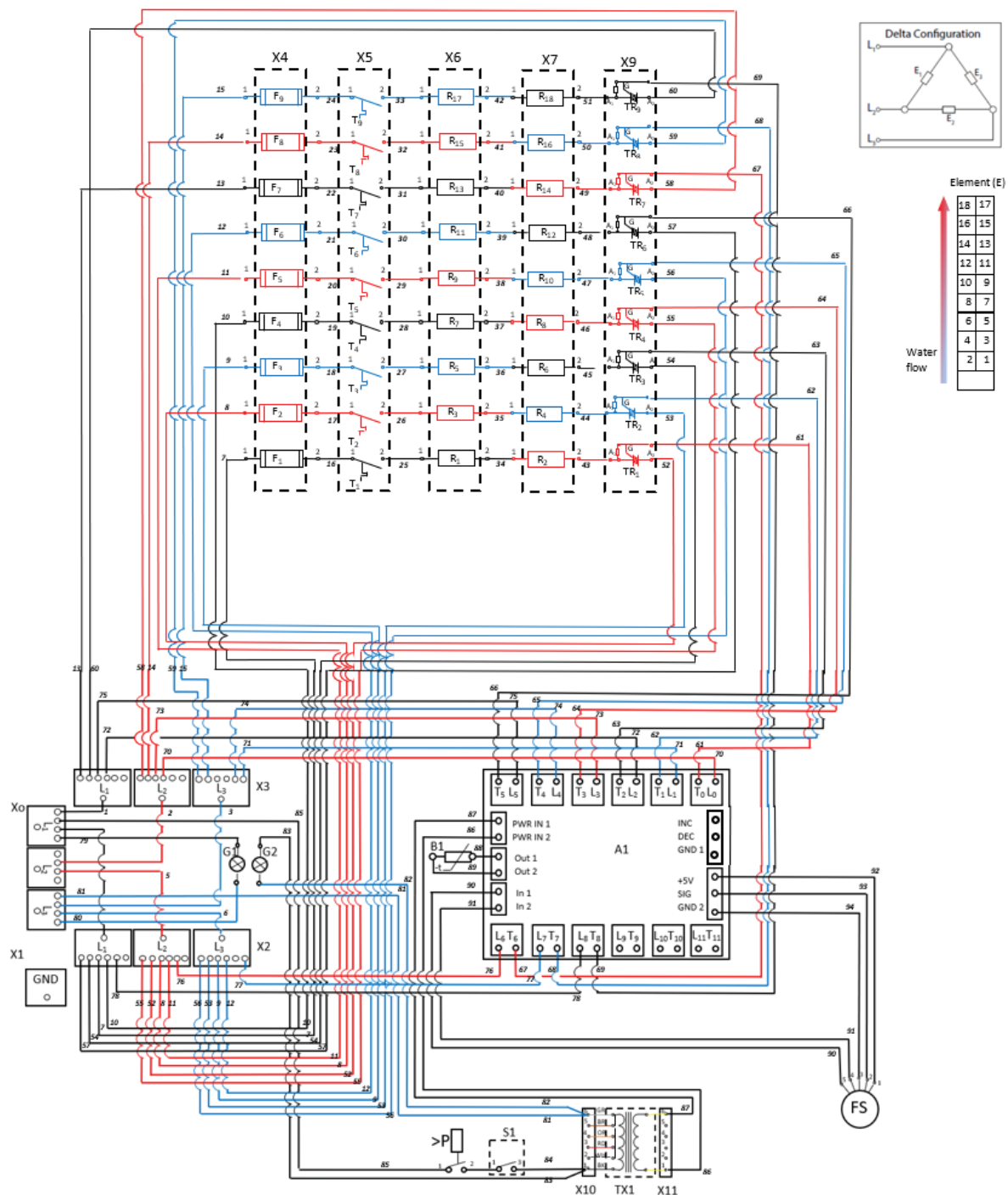
A1 Control board
B1 Thermistor
F1-F6 Fuse
FS Flow sensor
G1 Main power indication light
G2 ON/OFF heating indication light
R1-R12 Resistance heating element

S1 On/Off switch
P Low pressure switch
T1-T6 High temperature cut off
TX1 Transformer
X10 Transformer block 1: primary (high)
X11 Transformer block 2: secondary (low)

X0 Main terminal block
X1 Ground terminal
X4 Fuse block
X5 Thermal cut off block
X6 Element block 1
X7 Element block 2
X9 Triac block

INSTALLATION TECHNICAL DATA

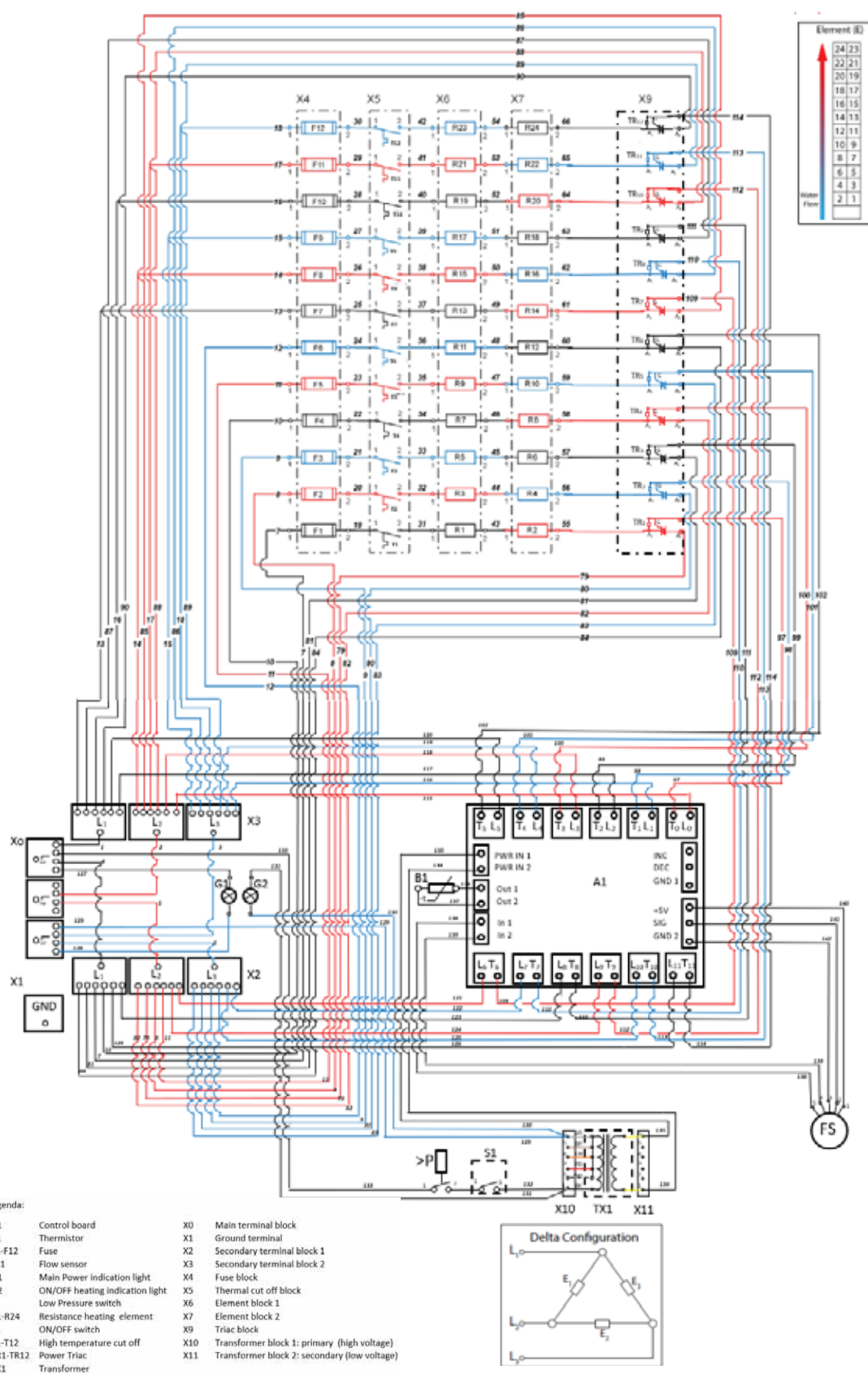
10.6.9 CF Plus 81-108, 480-575 V Delta wiring diagram



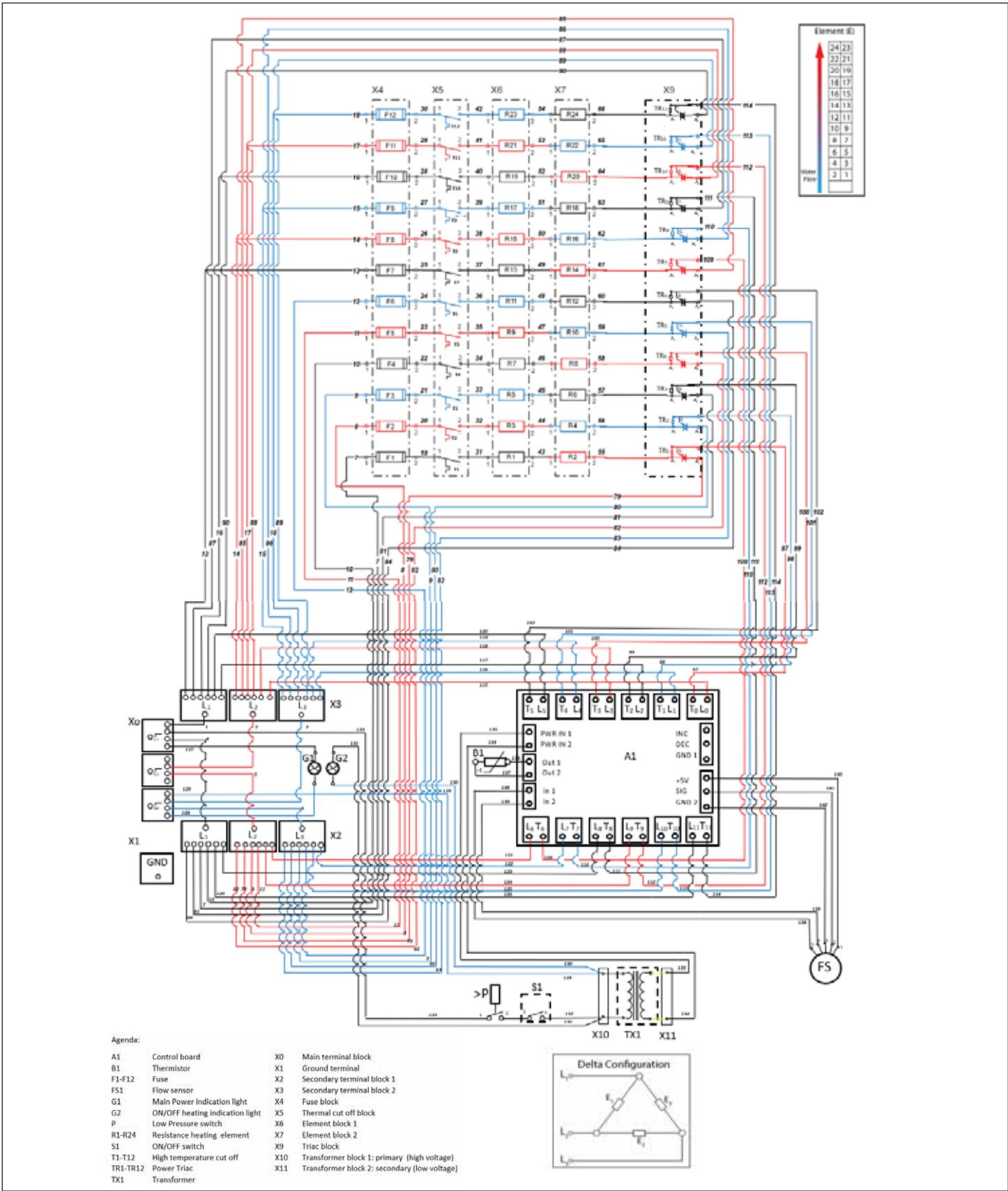
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A1	Control board	S1	On/Off switch	X0	Main terminal block
B1	Thermistor	T1-T9	High temperature cut off	X1	Ground terminal
F1-F9	Fuse	TX1	Transformer	X2	Secondary Terminal block 1
FS1	Flow sensor	X10	Transformer block 1: primary (high)	X3	Secondary Terminal block
G1	Main power indication light	X11	Transformer block 2: secondary (low)	X4	Fuse block
G2	ON/OFF heating indication light			X5	Thermal cut off block
P	Low Pressure switch			X6	Element block 1
R1-R18	Resistance heating element			X7	Element block 2
				X9	Triac block

10.6.10 CF Plus 120-144, 480 V Delta wiring diagram

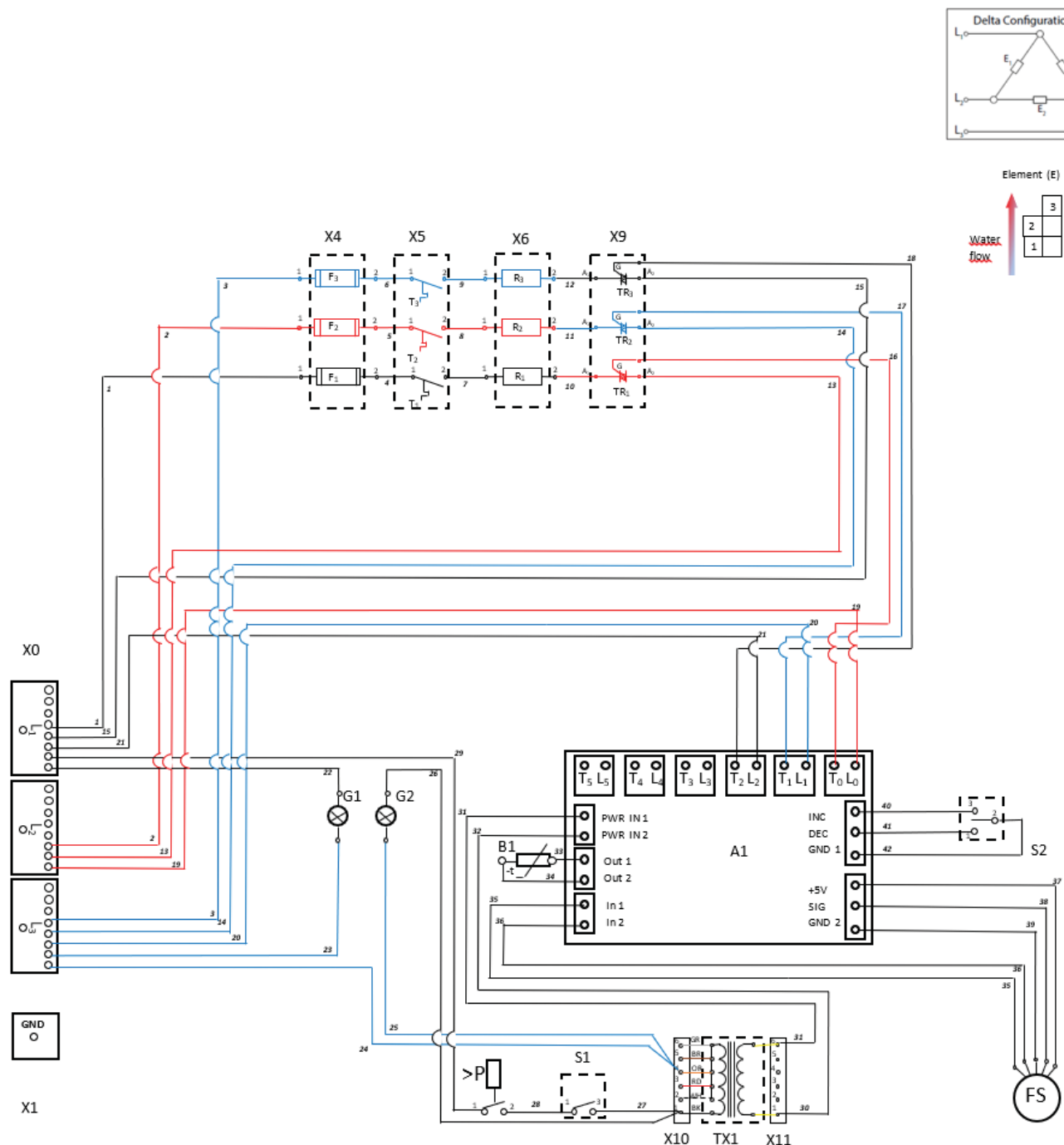


10.6.11 CF Plus 120-144, 575 V Delta wiring diagram



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10.6.12 CE/CES/CERO Plus 12-15, 208-240 V Delta wiring diagram

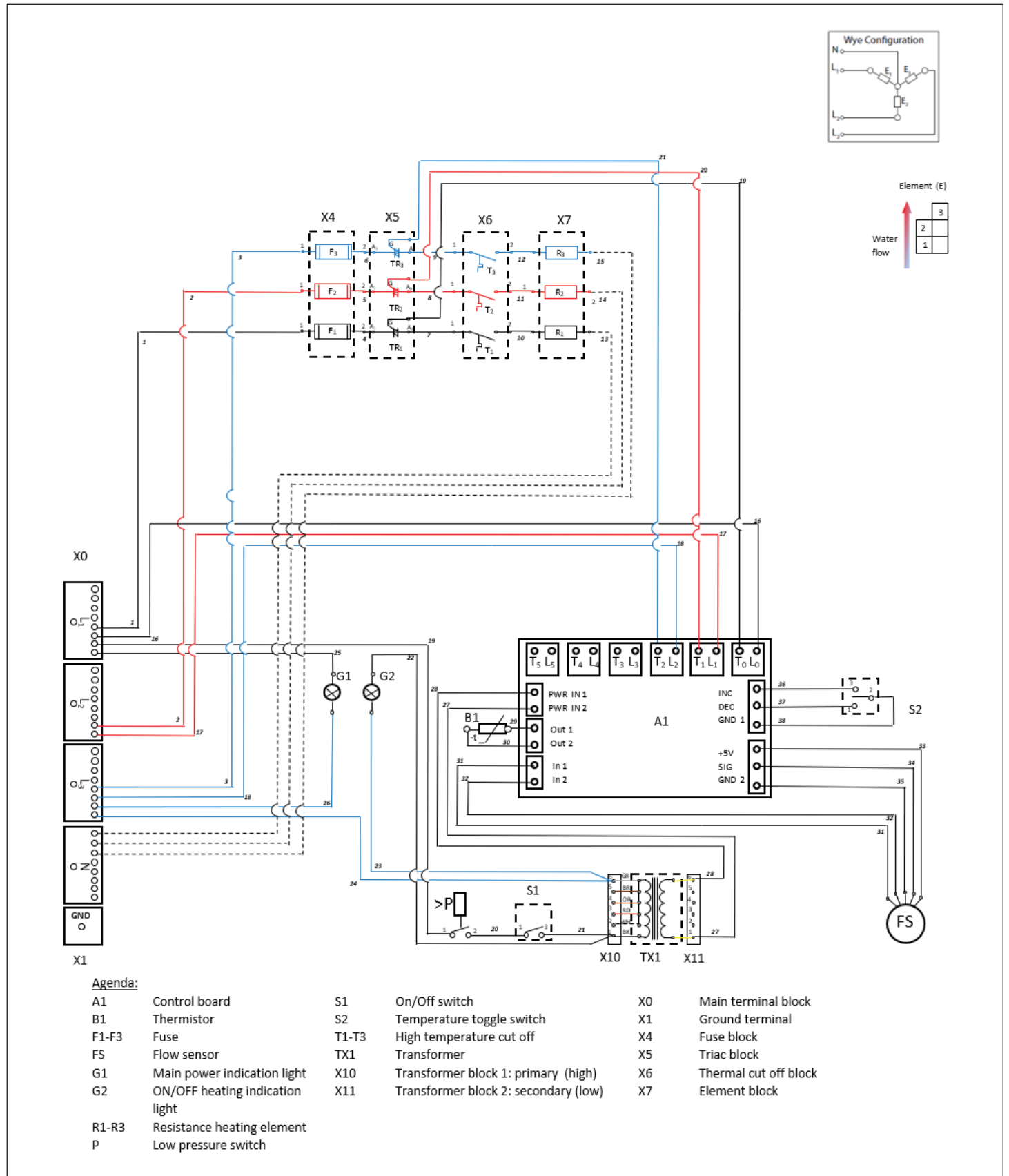


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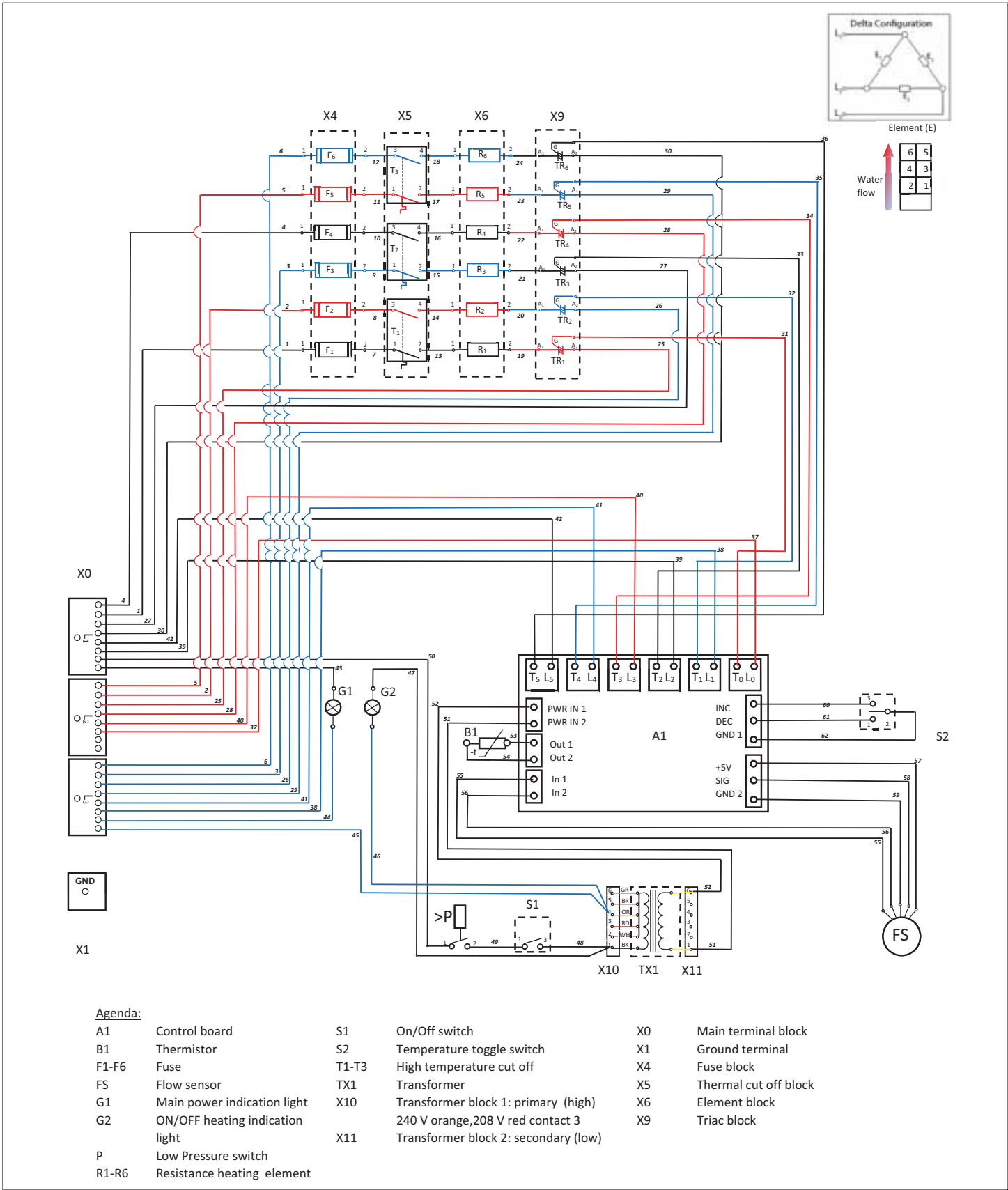
A1	Control board	S1	On/Off switch	X0	Main terminal block
B1	Thermistor	S2	Temperature toggle switch	X1	Ground terminal
F1-F3	Fuse	P	Low pressure switch	X4	Fuse block
FS	Flow sensor	T1-T3	High temperature cut off	X5	Thermal cut off block
G1	Main power indication light	TX1	Transformer	X6	Element block
G2	ON/OFF heating indication light	X10	Transformer block 1: primary (high) 240 V orange, 208 V red contact 3	X9	Triac block
R1-R3	Resistance heating element	X11	Transformer block 2: secondary (low)		

INSTALLATION TECHNICAL DATA

10.6.13 CE/CES/CERO Plus 12–15, 480 V Wye wiring diagram

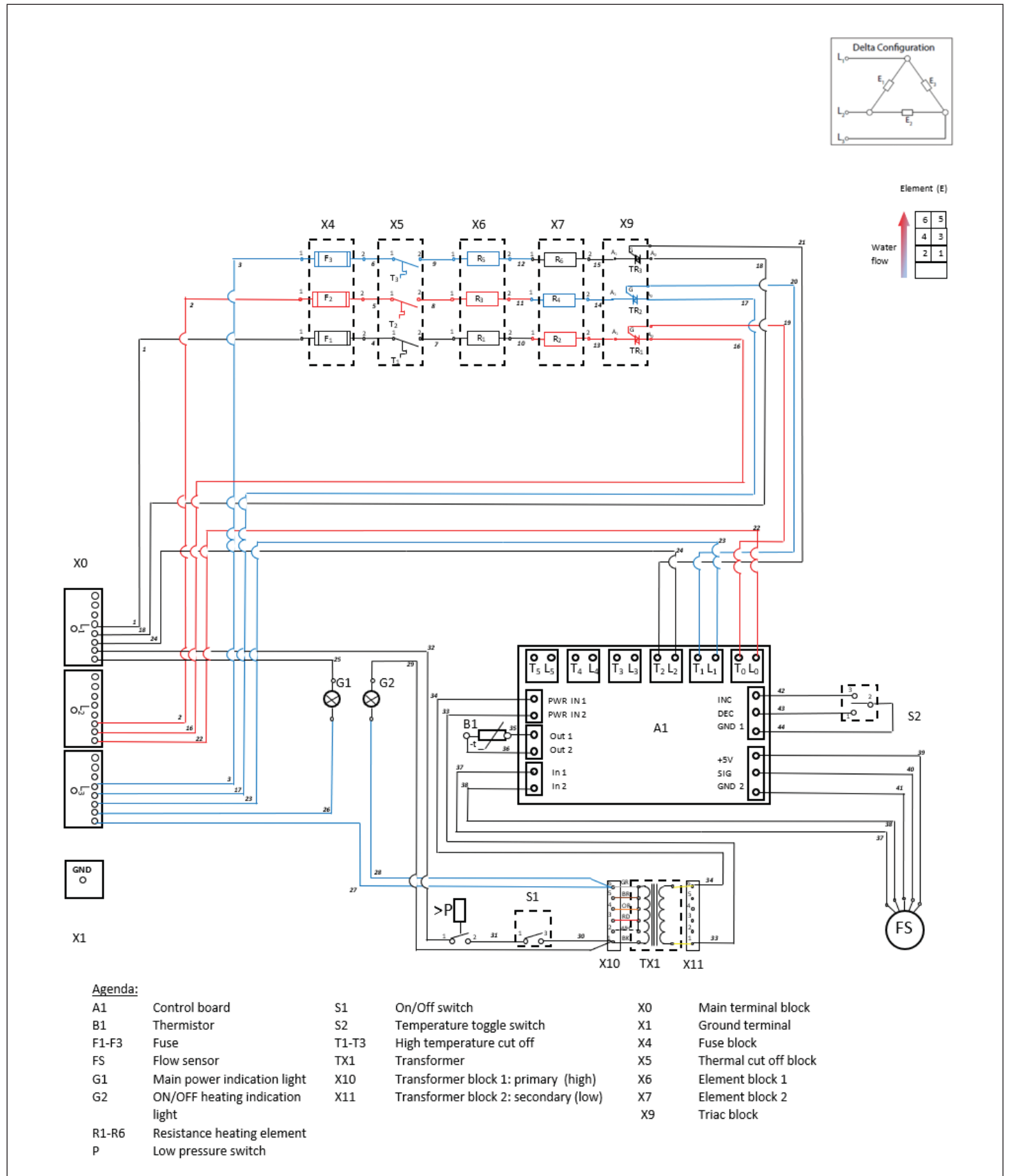


10.6.14 CE/CES/CERO Plus 24–36, 208–240 V Delta wiring diagram

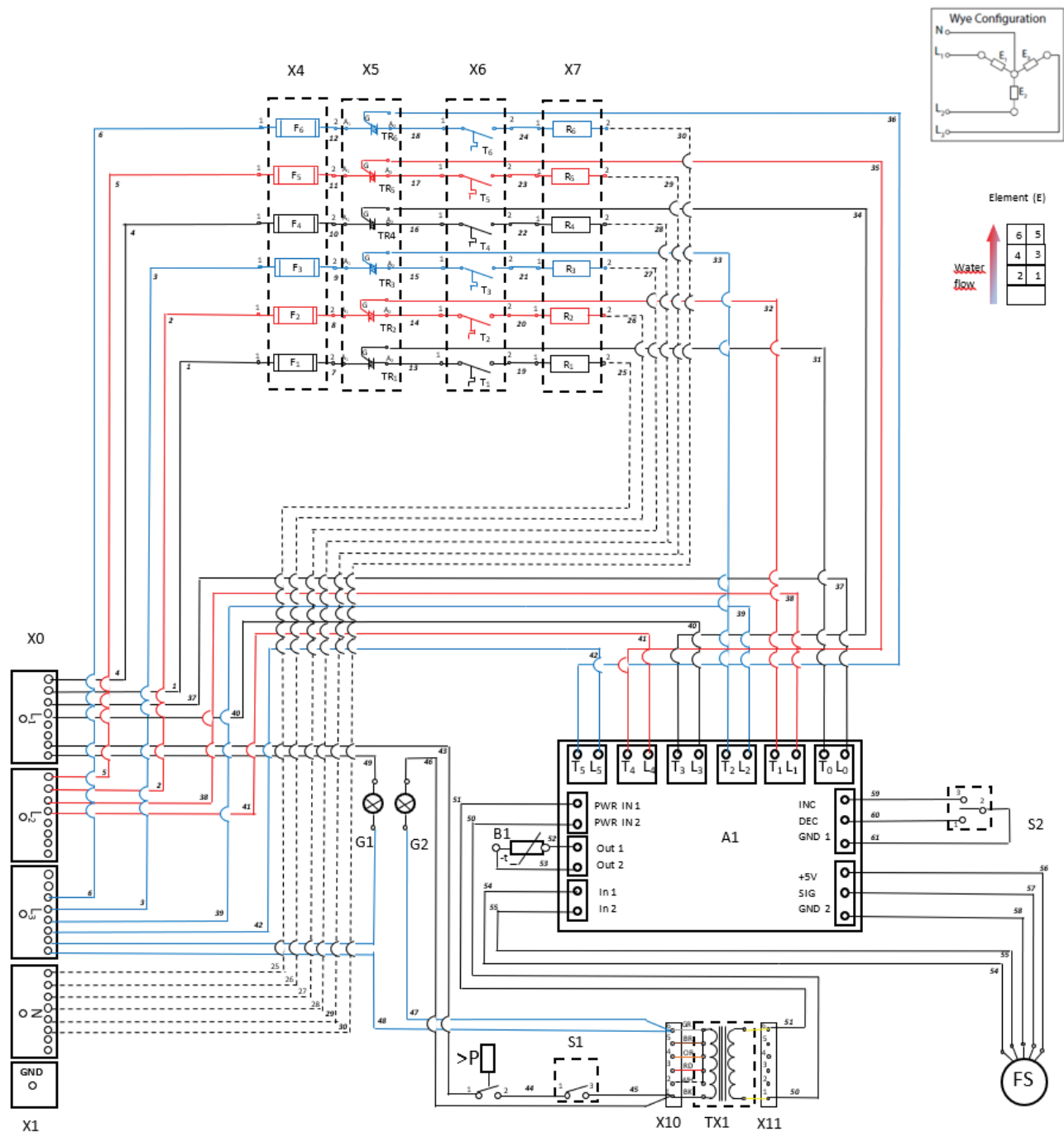


INSTALLATION TECHNICAL DATA

10.6.15 CE/CES/CERO Plus 24–36, 480 V Delta wiring diagram



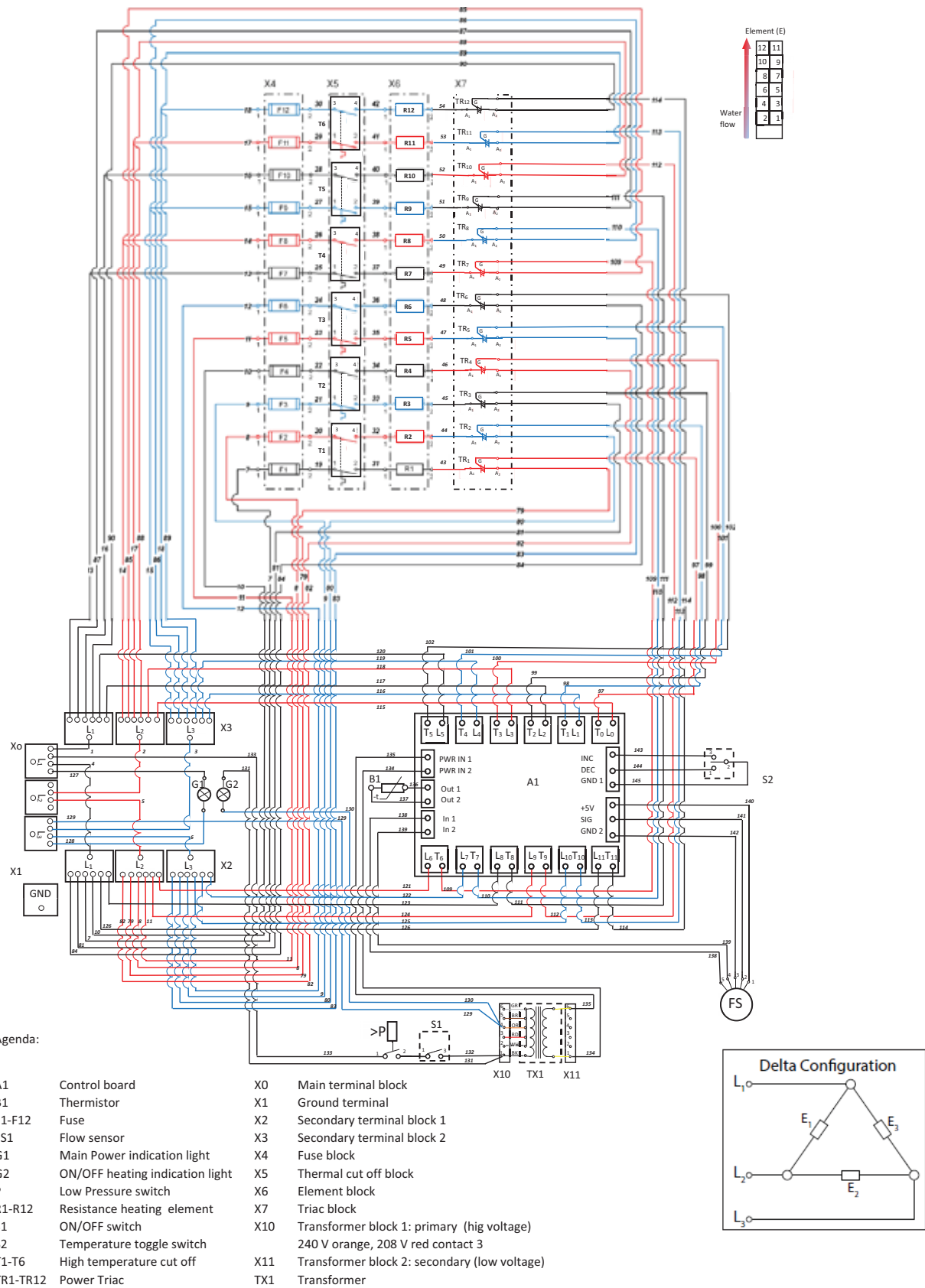
10.6.16 CE/CES/CERO Plus 24-36, 480 V Wye wiring diagram



Agenda:

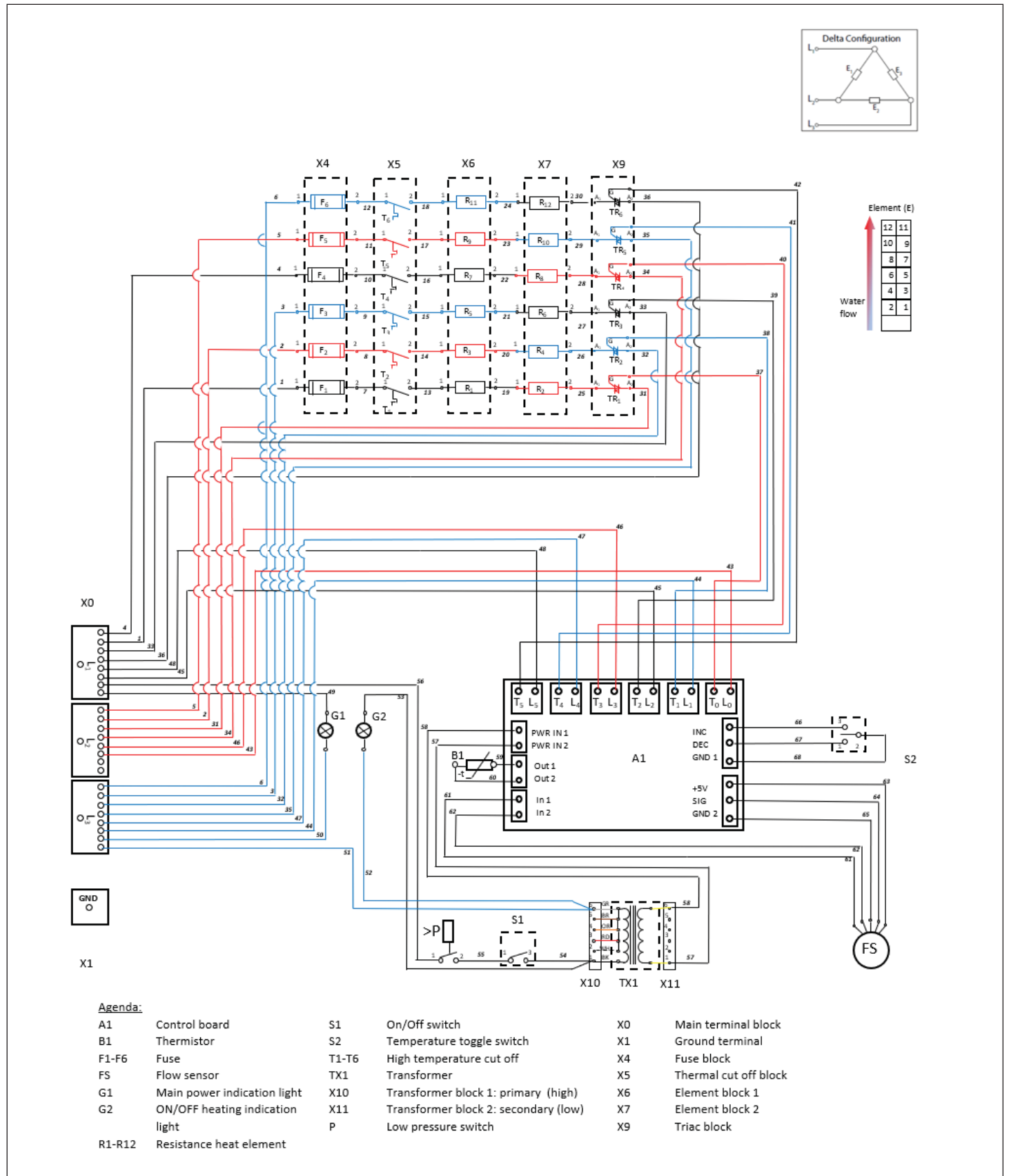
A1	Control board	S1	On/Off switch	X0	Main terminal block
B1	Thermistor	S2	Temperature toggle switch	X1	Ground terminal
F1-F6	Fuse	T1-T6	High temperature cut off	X4	Fuse block
FS	Flow sensor	TX1	Transformer	X5	Triac block
G1	Main power indication light	X10	Transformer block 1: primary (high)	X6	Thermal cut off block
G2	ON/OFF heating indication light	X11	Transformer block 2: secondary (low)	X7	Element block
R1-R6	Resistance heating element				
P	Low pressure switch				

10.6.18 CE/CES/CERO Plus 48-72, 208-240 V Delta wiring diagram

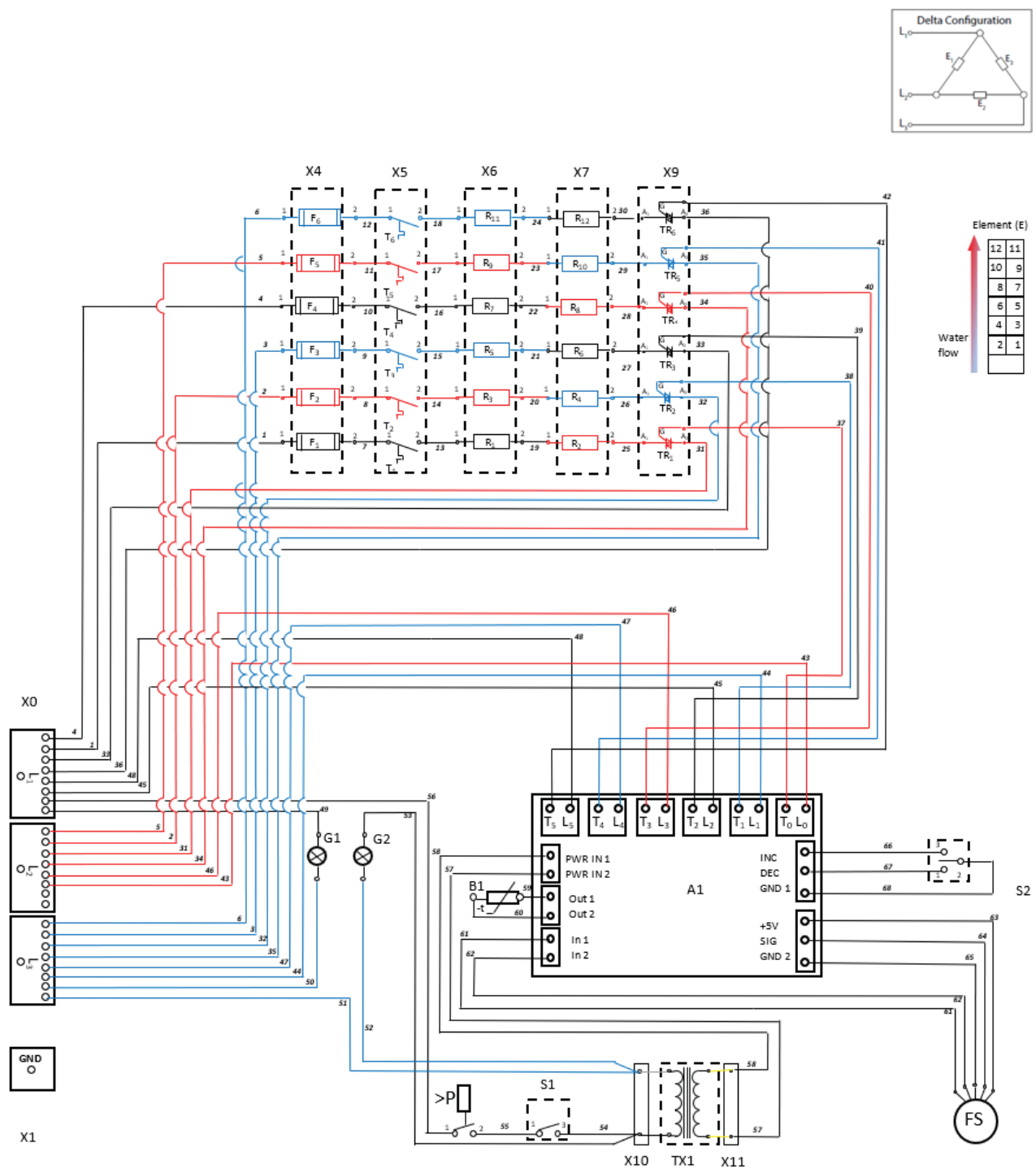


INSTALLATION TECHNICAL DATA

10.6.19 CE/CES/CERO Plus 48-72, 480 V Delta wiring diagram



10.6.20 CE/CES/CERO Plus 48-72, 575 V Delta wiring diagram

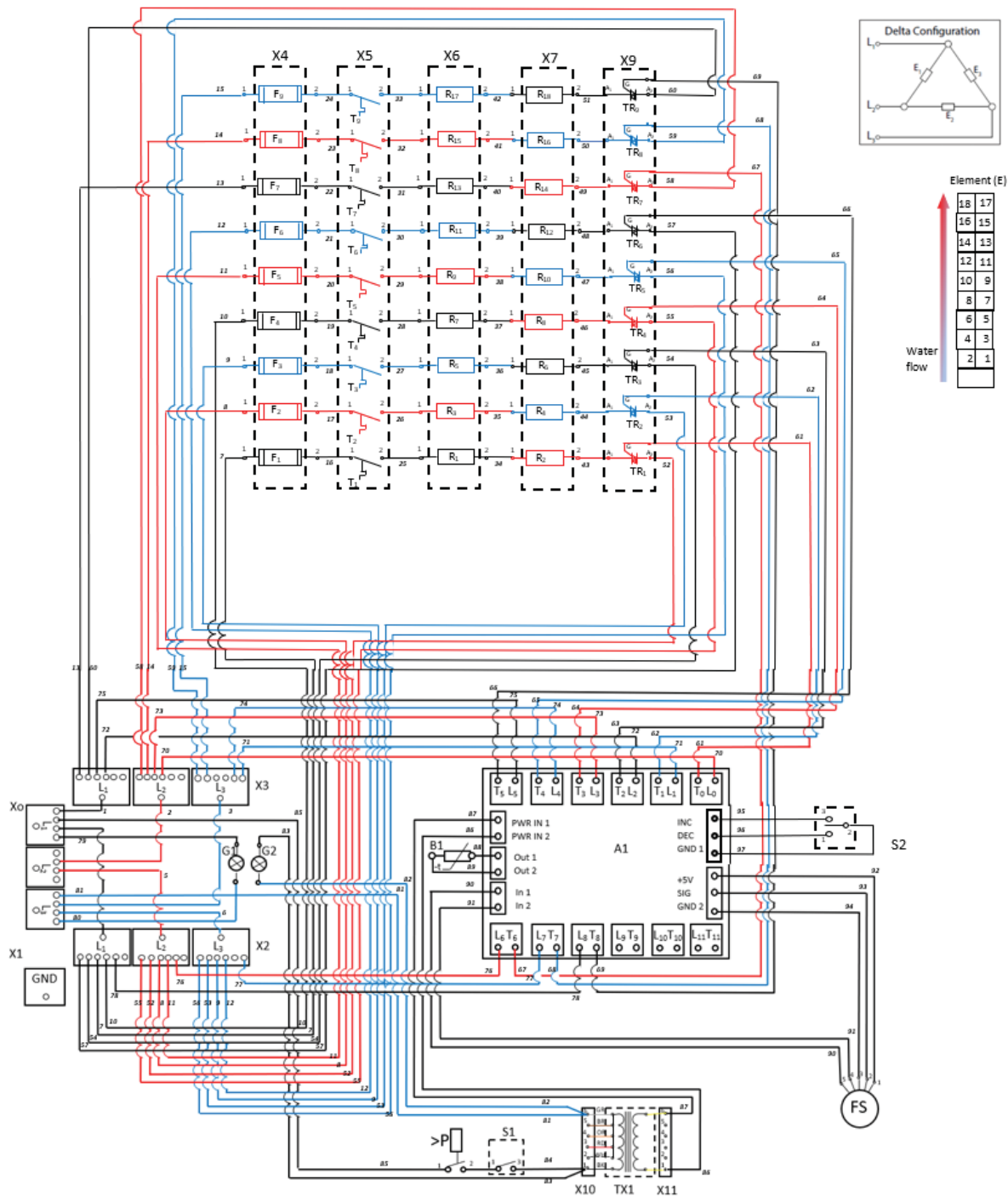


Agenda:

A1	Control board	S1	On/Off switch	X0	Main terminal block
B1	Thermistor	S2	Temperature toggle switch	X1	Ground terminal
F1-F6	Fuse	T1-T6	High temperature cut off	X4	Fuse block
FS	Flow sensor	TX1	Transformer	X5	Thermal cut off block
G1	Main power indication light	X10	Transformer block 1: primary (high)	X6	Element block 1
G2	ON/OFF heating indication light	X11	Transformer block 2: secondary (low)	X7	Element block 2
		P	Low pressure switch	X9	Triac block

INSTALLATION TECHNICAL DATA

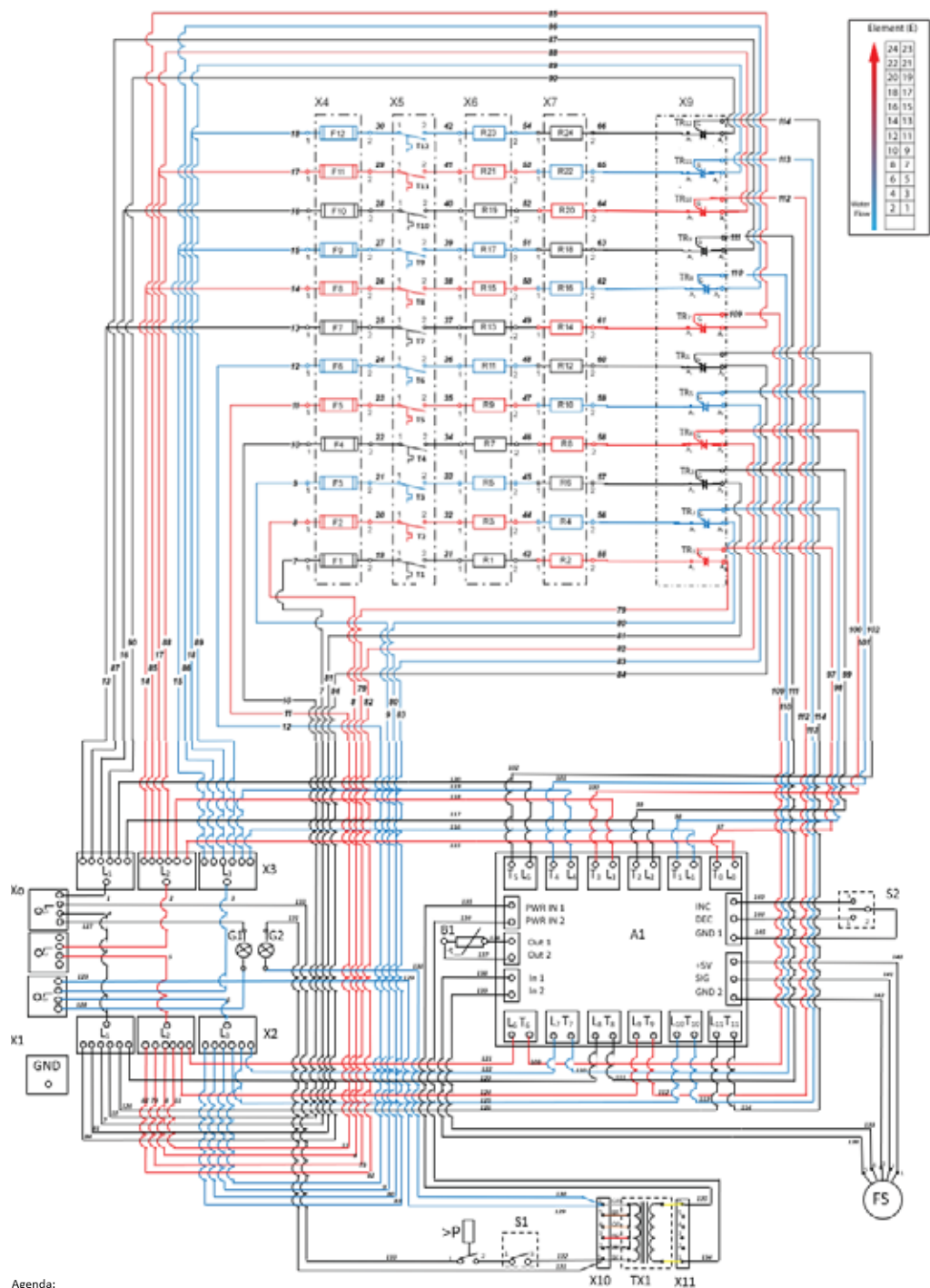
10.6.21 CE/CES/CERO Plus 81-108, 480-575 V Delta wiring diagram



Agenda:

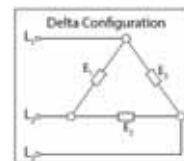
A1	Control board	S1	On/Off switch	X0	Main terminal block
B1	Thermistor	S2	Temperature toggle switch	X1	Ground terminal
F1-F8	Fuse	T1-T9	High temperature cut off	X2	Secondary Terminal block 1
FS1	Flow sensor	TX1	Transformer	X3	Secondary Terminal block
G1	Main power indication light	X10	Transformer block 1: primary (high)	X4	Fuse block
G2	ON/OFF heating indication light	X11	Transformer block 2: secondary (low)	X5	Thermal cut off block
P	Low Pressure switch			X6	Element block 1
R1-R18	Resistance heating element			X7	Element block 2
				X9	Triac block

10.6.22 CE/CES/CERO Plus 120-144, 480 V Delta wiring diagram

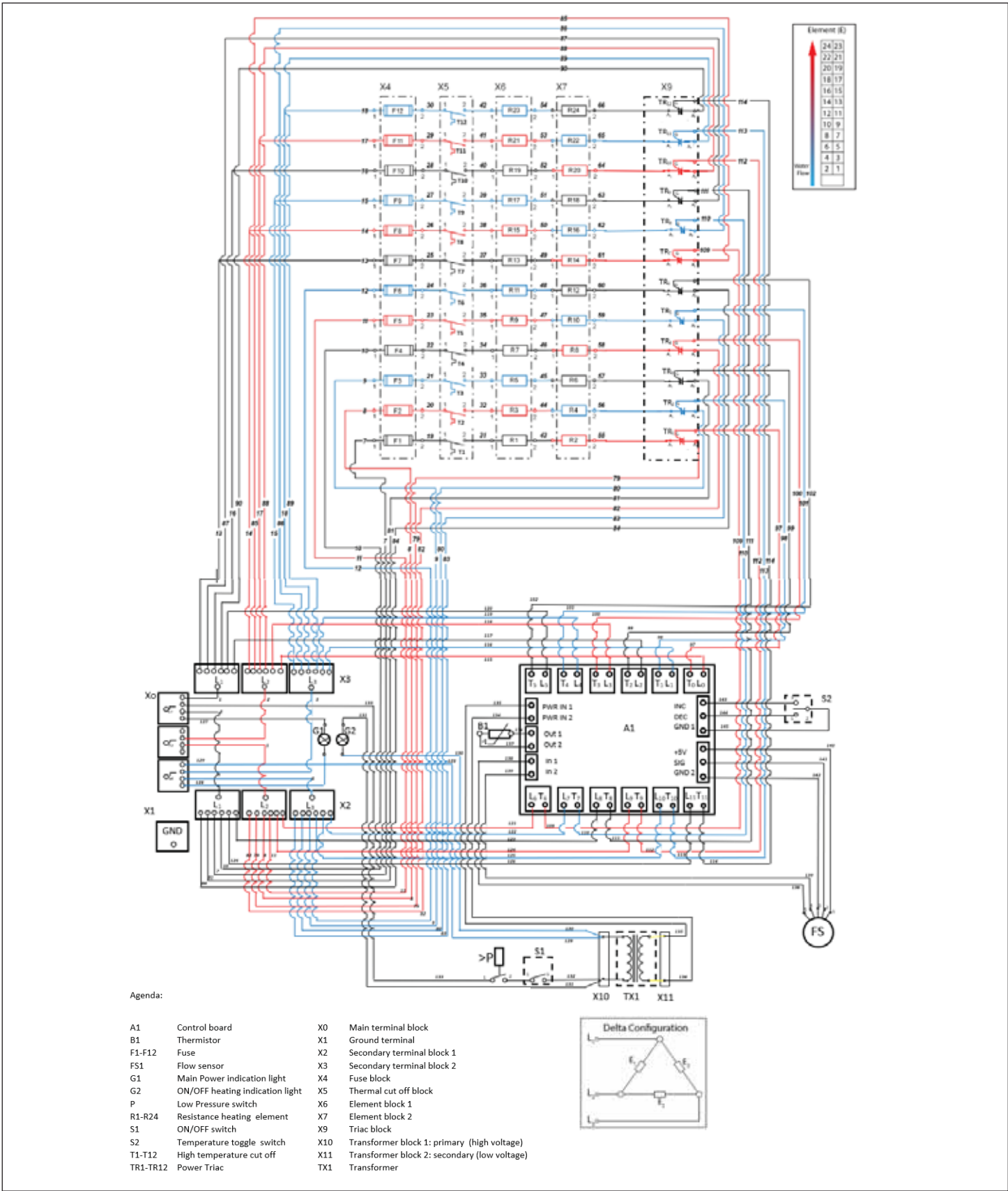


Agenda:

- | | | | |
|----------|---------------------------------|-----|--|
| A1 | Control board | X0 | Main terminal block |
| B1 | Thermistor | X1 | Ground terminal |
| F1-F12 | Fuse | X2 | Secondary terminal block 1 |
| FS1 | Flow sensor | X3 | Secondary terminal block 2 |
| G1 | Main Power indication light | X4 | Fuse block |
| G2 | ON/OFF heating indication light | X5 | Thermal cut off block |
| P | Low Pressure switch | X6 | Element block 1 |
| R1-R24 | Resistance heating element | X7 | Element block 2 |
| S1 | ON/OFF switch | X9 | Triac block |
| S2 | Temperature toggle switch | X10 | Transformer block 1: primary (high voltage) |
| T1-T12 | High temperature cut off | X11 | Transformer block 2: secondary (low voltage) |
| TR1-TR12 | Power Triac | TX1 | Transformer |



10.6.23 CE/CES/CERO Plus 120-144, 575 V Delta wiring diagram



INSTALLATION TECHNICAL DATA

10.7 CF/CE/CES/CERO Plus temperature rise

ENGLISH

	Power Output of Model ¹	Flow Rate Gallons/Min. Gallons/Hr.	Temperature Rise												
			20°F	30°F	40°F	50°F	60°F	70°F	80°F	90°F	100°F	110°F	120°F	130°F	140°F
Ships via UPS	12 kW	GPM	4.1	2.7	2.1	1.6	1.4	1.2	1.0	0.9	0.8	0.7	0.7	0.6	0.6
		GPH	246	164	123	98	82	70	61	55	49	45	41	38	35
	15 kW	GPM	5.1	3.4	2.6	2.1	1.7	1.5	1.3	1.1	1.0	0.9	0.9	0.8	0.7
		GPH	307	205	154	123	102	88	77	68	61	56	51	47	44
	18 kW	GPM	6.1	4.1	3.1	2.5	2.1	1.8	1.5	1.4	1.2	1.1	1.0	1.0	0.9
		GPH	369	246	184	147	123	105	92	82	74	67	61	57	53
	24 kW	GPM	8.2	5.5	4.1	3.3	2.7	2.3	2.1	1.8	1.6	1.5	1.4	1.3	1.2
		GPH	492	328	246	197	164	140	123	109	98	89	82	76	70
	27 kW	GPM	9.2	6.1	4.6	3.7	3.1	2.6	2.3	2.1	1.8	1.7	1.5	1.4	1.3
		GPH	553	369	277	221	184	158	138	123	111	101	92	85	79
	36 kW	GPM	12.3	8.2	6.1	4.9	4.1	3.5	3.1	2.7	2.5	2.2	2.1	1.9	1.8
		GPH	737	492	369	295	246	211	184	164	147	134	123	113	105
Ships via Common Carrier	48 kW	GPM	16.4	10.9	8.2	6.6	5.5	4.7	4.1	3.6	3.3	3.0	2.7	2.5	2.3
		GPH	983	655	492	393	328	281	246	218	197	179	164	151	140
	54 kW	GPM	18.4	12.3	9.2	7.4	6.2	5.3	4.6	4.1	3.7	3.4	3.1	2.8	2.6
		GPH	1106	737	553	442	369	316	277	246	221	201	184	170	158
	60 kW	GPM	20.5	13.7	10.2	8.2	6.8	5.9	5.1	4.6	4.1	3.7	3.4	3.2	2.9
		GPH	1229	819	614	492	410	351	307	273	246	223	205	189	176
	72 kW	GPM	24.6	16.4	12.3	9.8	8.2	7.0	6.1	5.5	4.9	4.5	4.1	3.8	3.5
		GPH	1475	983	737	590	492	421	369	328	295	268	246	227	211
Ships via Common Carrier with crate	81 kW	GPM	27.7	18.4	13.8	11.0	9.2	7.9	6.9	6.1	5.5	5.0	4.6	4.3	4.0
		GPH	1659	1106	829	664	553	474	415	369	332	302	277	255	237
	90 kW	GPM	30.7	20.5	15.4	12.3	10.2	8.8	7.7	6.8	6.1	5.6	5.1	4.7	4.4
		GPH	1843	1229	922	737	614	527	461	410	369	335	307	284	263
	108 kW	GPM	36.9 ²	24.6	18.4	14.7	12.3	10.5	9.2	8.2	7.4	6.7	6.1	5.7	5.3
		GPH	2212 ²	1475	1106	885	737	632	553	492	442	402	369	340	316
	120 kW	GPM	40.0 ²	27.3	20.5	16.4	13.7	11.7	10.2	9.1	8.2	7.5	6.8	6.3	5.9
		GPH	2400 ²	1638	1229	983	819	702	614	546	492	447	410	378	351
	144 kW	GPM	40.0 ²	32.8	24.6	19.7	16.4	14.0	12.3	10.9	9.8	8.9	8.2	7.6	7.0
		GPH	2400 ²	1966	1475	1180	983	843	737	655	590	536	492	454	421

¹ Actual power output varies by model depending on voltage which will affect achievable temp. rise.

² Assumes 1¼" pipe size

11. Spare parts and service advice



DANGER: Electrocutation

Before proceeding with any installation, adjustment, alteration, or service of the appliance all circuit breaker, switches servicing the appliance must be turned off. Make sure that nobody can activate the breaker in the distribution panel during your service work on the appliance.



DANGER: Burns

Water temperatures over 125 °F (52 °C) can cause severe burns instantly or death from scalding. A scalding potential risk exists on any connected tap or fixture and on the surface of the heat exchanger during service. Before opening the housing for service, ensure the on/off switch is in the "off" position. Flush cold water through the heater for several minutes. The ball valves need to be completely open.

Pressure switch

Check the water supply pressure. The heater requires 3 psi (0.21 bar) to activate the pressure switch. Check for continuity across the switch contact. If the switch is not closed and the pressure is more than 3 psi (0.21 bar), the mechanical portion of the pressure switch may clogged with debris.

Thermostat/safety cut-off

The thermal safety cut-off also has a permanent cut-off safety function in case of an emergency caused by overheating. The fuse side of the thermostat is designed to be destroyed by extreme heat. Should this occur, the individual thermostat/safety cut-off will need to be replaced.

If the thermal cut-off was not overheated, it will have continuity.

The thermal cut-off condition is determined by a continuity check **after power is off and cold water has been run through the heater.**

If the cut-off has no continuity, turn the power off at the disconnect, then run water through the unit to cool the heat exchanger. After the heat exchanger has cooled you can manually reset the thermostatic cutoff by depressing the red reset button in the center of the unit. The thermostatic cutoff will click when it has been reset.

Element

If the heater display shows active heating and there is still lukewarm water at the desired flow rate, a failed element may be the cause.

- ▶ Disconnect the heater from the power supply.
- ▶ Check each element with an Ohm meter for correct reading. See 4.3, "Cold element resistivity by heater type (in Ohms)", pg. 5, to identify the element resistivity according to the heater name plate and wattage. If the element reads 0 Ohm or the meter flickers, the element needs to be replaced.
- ▶ For replacing the identified bad element, use a Phillips screwdriver to remove the wire. If there is more than one failed element, mark the wires of the associated elements.

- ▶ Close the ball valves and drain the heater.

- ▶ To remove the element from the heat exchanger socket, use a 1 1/2" socket wrench spanner. If the failed element looks like it is split from the inside, this can be caused by air contamination during heating.
- ▶ Insert the new element, being sure that the replacement element has a factory provided O-ring in place.
- ▶ Tighten the element. Make sure that it is not overly tight. This will ruin the O-ring sealing.
- ▶ After all elements are replaced, check for leaks by opening the ball valves and running water through the heater.
- ▶ Reattach the wires to the element.
- ▶ Turn on the power supply.
- ▶ Turn on the on/off power switch.

Transformer

- ▶ Disconnect the heater from the power supply.
- ▶ Check for continuity on the fuse FLM1-1/4 to be sure the problem is not just a transformer fuse.
- ▶ Replace wire from the transformer distribution block. Make sure to mark the wire to the desired port.
- ▶ Loosen the mounting screws in the corner of the transformer to the support bar.
- ▶ Replace the transformer and rewire the spare part transformer as before.

Pressure switch

It is possible for the pressure switch to become so blocked with residue or dirt that it does not function and allow the heater to turn on.

- ▶ Disconnect the heater from the power supply.
- ▶ Check for continuity across the poles of the switch with water pressure on the heater. The water pressure needs to be more than 3 psi (0.21 bar). If there is continuity, the pressure switch is not the cause.
- ▶ If there is no continuity, drain the water from the heater and remove the wires from the switch. Mark the wires with the switch pole designation. Pole nb. 1 needs to be connected to the transformer.
- ▶ Remove the switch using an open-end wrench.
- ▶ Check for water leaks.
- ▶ Rewire the switch.

Triac failure

If there is lukewarm water in steady state status of the heater, check the ampacity of each supply wire from the element contact to the triac supply. If there is no ampacity from the triac supply to the element, replace the triac.

For triac replacement, make sure that enough heat transfer paste is applied between the cooling plate and the triac.

Indicator light

- ▶ Disconnect the heater from the power supply.
- ▶ Clip the wires to the light. Pop out the light socket out of the hole in the enclosure.
- ▶ Install the spare part light. Rewire the spare part light.

Element fuses

- ▶ Disconnect the heater from the power supply.
- ▶ Remove the failed fuses from the fuse holder.
- ▶ Replace the fuse. For elements larger than 6000 W at 240 V rating, use MDL 35 type fuse. For smaller elements use part number KLK 30.

12. Warranty

Subject to the terms and conditions set forth in this limited warranty, Stiebel Eltron, Inc. (the "Manufacturer") hereby warrants to the original purchaser (the "Owner") that each Tankless Electric Commercial Water Heater (the "Heater") shall not (i) leak due to defects in the Manufacturer's materials or workmanship for a period of six (6) years from the date of purchase or (ii) fail due to defects in the Manufacturer's materials or workmanship for a period of two (2) years from the date of purchase. As Owner's sole and exclusive remedy for breach of the above warranty, Manufacturer shall, at the Manufacturer's discretion, send replacement parts for local repair; retrieve the unit for factory repair, or replace the defective Heater with a replacement unit with comparable operating features. Manufacturer's maximum liability under all circumstances shall be limited to the Owner's purchase price for the Heater.

This limited warranty shall be the exclusive warranty made by the Manufacturer and is made in lieu of all other warranties, express or implied, whether written or oral, including, but not limited to warranties of merchantability and fitness for a particular purpose. Manufacturer shall not be liable for incidental, consequential or contingent damages or expenses arising directly or indirectly from any defect in the Heater or the use of the Heater. Manufacturer shall not be liable for any water damage or other damage to property of Owner arising, directly or indirectly, from any defect in the Heater or the use of the Heater. Manufacturer alone is authorized to make all warranties on Manufacturer's behalf and no statement, warranty or guarantee made by any other party shall be binding on Manufacturer.

Manufacturer shall not be liable for any damage whatsoever relating to or caused by:

1. any misuse or neglect of the Heater, any accident to the Heater, any alteration of the Heater, or any other unintended use;
2. acts of God and circumstances over which Manufacturer has no control;

3. installation of the Heater other than as directed by Manufacturer and other than in accordance with applicable building codes;
4. failure to maintain the Heater or to operate the Heater in accordance with the Manufacturer's specifications;
5. operation of the Heater under fluctuating water pressure or in the event the Heater is supplied with non-potable water, for any duration;
6. improper installation and/or improper materials used by any installer and not relating to defects in parts or workmanship of Manufacturer;
7. moving the Heater from its original place of installation;
8. exposure to freezing conditions;
9. water quality issues such as corrosive water, hard water, and water contaminated with pollutants or additives;

Should owner wish to return the Heater to manufacturer for repair or replacement under this warranty, Owner must first secure written authorization from Manufacturer. Owner shall demonstrate proof of purchase, including a purchase date, and shall be responsible for all removal and transportation costs. If Owner cannot demonstrate a purchase date this warranty shall be limited to the period beginning from the date of manufacture. Manufacturer reserves the right to deny warranty coverage upon Manufacturer's examination of Heater. This warranty is restricted to the Owner and cannot be assigned.

Some States and Provinces do not allow the exclusion or limitation of certain warranties. In such cases, the limitations set forth herein may not apply to the Owner. In such cases this warranty shall be limited to the shortest period and lowest damage amounts allowed by law. This warranty gives you specific legal rights and you may also have other rights which vary from State to State or Province to Province.

Owner shall be responsible for all labor and other charges incurred in the removal or repair of the Heater in the field. Please also note that the Heater must be installed in such a manner that if any leak does occur, the flow of water from any leak will not damage the area in which it is installed.



The installation, electrical connection and first operation of this appliance should be carried out by a qualified installer.



The company does not accept liability for failure of any goods supplied which have not been installed and operated in accordance with the manufacturer's instructions.

Environment and recycling

Please help us to protect the environment by disposing of the packaging in accordance with the national regulations for waste processing.

This Warranty is valid for U.S.A. & Canada only. Warranties may vary by country. Please consult your local Stiebel Eltron Representative for the Warranty for your country.

NOTES

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STIEBEL ELTRON