

Operating instructions

for

SB 180 – 1200 kW



November 2021



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Assembly

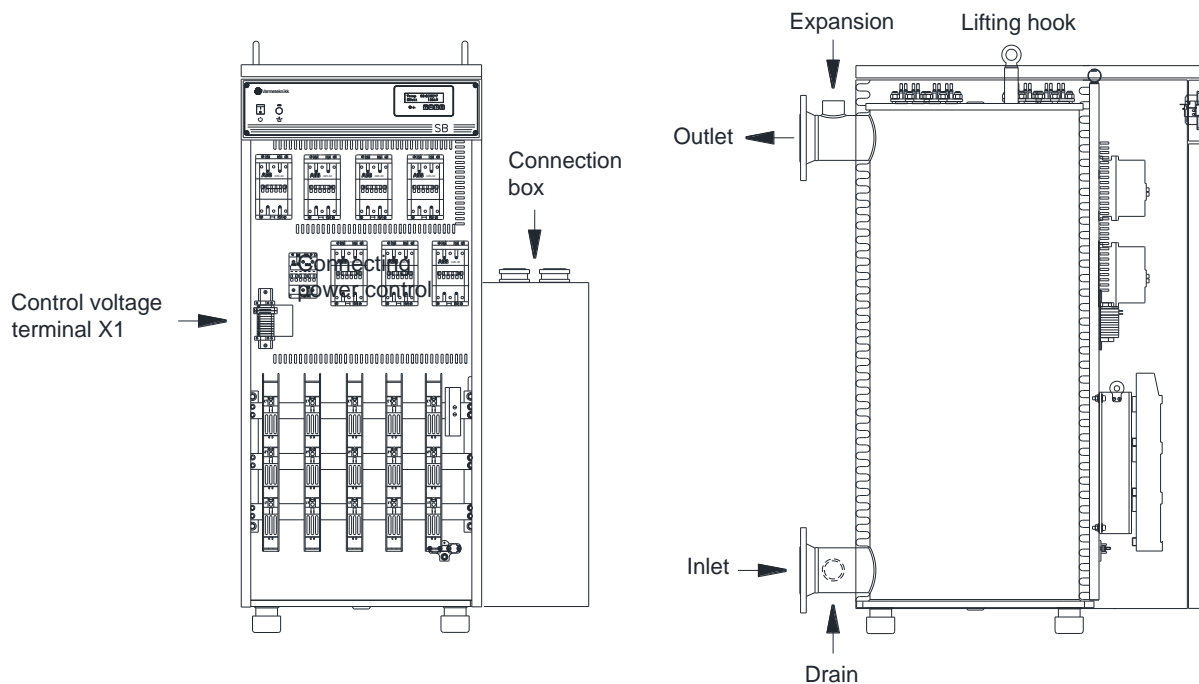
The boiler must be placed in such a way that service and maintenance can be easily performed. Dependent of the type of boiler, space is required above the boiler for possible replacement of heating elements. In general, it should be approx. 1 m free height.

In addition, there must be space in front of the boiler and on the sides for access to the top cover screws.

This is to be able to perform service and maintenance without hindrance.

Safety equipment

The SB-boilers are delivered with safety thermostat (STB) with 110 °C release for overheating protection of the boiler. Additional system safety equipment have to be installed in the pipework according to actual regulations.



Safety valves

Plant with closed expansion vessel, shall be equipped with safety valve(s) located between boiler and expansion vessel. There should be no shut-off between the boiler and safety valve(s).

Safety valve(s) and expansion vessels must be dimensioned in accordance with the system's boiler performance. The outlet from the safety valve(s) must be lowered down to the floor. The opening pressure of the valve(s) must not exceed the maximum permissible system or boiler operating pressure.

Connection

The SB-boilers are delivered with connection box(es) for connection of the power cables. This/these boxes may be installed on right- or lefthand side with entry from top or bottom.

By standard delivery connection is prepared for righthand connection.

Connectors can handle both Al and Cu cables with dimension 35 – 240 mm². Max connector current is 380 A for Al and 425 A for Cu cables.



Note! On boilers pre august 2019, connectors are dimensioned for 120 – 240 mm², and max 250 A current.

On boilers with two connection boxes, both boxes have to be installed and connected with equal supply/power.

A separate 230 V supply of control voltage (10A) is needed. Control voltage terminals are located at the switchgear plate or in the top bay behind the front panel (SB 375 - 1200 kW).

Note!

If connection boxes are moved to opposite side of the boiler, the current transformer(s) on the top busbar(s) has to be moved to the opposite side as well.

The cable glands should be installed prior to insulation removal. The power cables should be secured/fixated to a suitable cable bridge.

Tightening torques:

Connection	Dimension	Torque
Power connectors in box	Unbraco 8 mm	40 Nm (150-240 mm ²) 26 Nm (35-120 mm ²)
Connector to busbar	M10	50 Nm
Earth connector in box	SW13/Pz3	12 Nm
Earth connector on switchgear plate	M6	3 Nm
Busbar / busbar joint	M8	20 Nm

Commissioning

NB! BEFORE STARTING, CHECK THE FOLLOWING POINTS:

- Check that the boiler and the system are filled with water and that the system is tight.
- Check that the system is ventilated.
- Check that there is circulation on the system and that the water goes the right way through the boiler.
- Check that the system has min. 0.6 bar overpressure to avoid boiling.
- Check that the boiler is connected to the correct voltage.

Note! ALL ELECTRICAL CONNECTIONS MUST BE TIGHTENED BEFORE INSERTING VOLTAGE ON THE BOILER.

Do not start the boiler if there is a risk that the water in the boiler may be frozen.

Start-up

The boiler is started by switching on the control switch in the front of the boiler. The display will after a few seconds display actual water temperature, as well as set temperature in parentheses. The line below shows the switched-on power. The boiler will now gradually begin to enter the power required to achieve the set temperature.

Note! If the boiler is controlled from an SD system, a lack of signal can prevent the boiler from starting.



The set temperature is set to 80 °C at the factory. This can be changed by pressing the +/- button Then the E button to save new value. The step time is set to 40 seconds and should not be set lower as shorter step time will lead to unnecessary wear on the contactors. It is normally not necessary to make other settings on the controller.

The regulator

The boiler regulator is of the binary proportional type and integrative for temperature control. It is adjustable between 5 - 100 °C. A hysteresis of 2°C is included in the proportional control and counteracts unnecessary switching of power steps. The integration time depends on the step time and cannot be set manually. The controller has the option of power control and outdoor temperature compensated set temperature. Inputs for 0-10 V for remote control of either power or temperature are also included. A 2-line display shows actual temperature, set temperature (in brackets), number of connected power steps and switched on power. An alarm LED is located below the display and will flash if an error occurs. In addition, the alarm relay will drop. Possible errors can be:

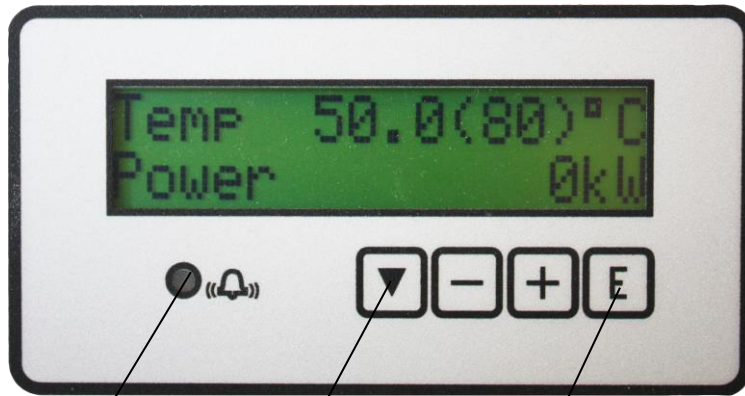
Sensor fault: Short circuit or breakage of sensor or sensor cable

Alarm power: Circuit breaker not switched on, possibly tripped, safety thermostat (STB) tripped

Alarm network: Control voltage to regulator too low (<190 V) or fault in regulator

Settings on the controller

The controller is pre-set at the factory with a set temperature of 80 °C and a step time of 40 seconds. If you want to change the settings, this is done as follows:



Alarm signal

Menu button

Enter (confirm changes)

Temperature setting:

The desired boiler temperature is adjustable between 5 - 100 ° C. By pressing the «+/-» button, the desired temperature is selected. Holding down the button will change the value faster. New temperature is saved by pressing the «E» button. If this is not done, the controller will return to the original value after about. 4 min.

Step time:

From the factory, the step time is set to 40 seconds when power steps are switched on, and 5 seconds when switching off. To prevent unnecessary wear on the contactors, this should not be set lower. If you still want to change this, the step time is adjustable between 1 - 250 seconds when switching on power steps. The step time is changed as follows:

With a press of the menu button, the menu for «Step / Step time» appears. With a press of the «+/-» button, the display will now show:



To get down to the line with step time, press the menu button once. With the «+/-» button, the desired step time is set. New step time is saved by pressing the «E» button. If this is not done, the regulator will after approx. 4 min. returns to original value. By pressing the menu button twice, the controller will return to normal display, «Temp / Power», see page 12.

Power limitation I:

If the boiler is too large for the plant or for some other reason you want to limit the maximum power of the boiler, this can be done by limiting the number of power steps. In the menu for «Step / Step time», press the «-» button until the desired power step appears in parentheses. Pressing the «E» button saves the new value. If this is not done, the controller will return to the original value after about. 4min. See also Power Limit under the Additional Features section.

Additional features

The controller has built-in a number of functions in addition to several inputs for remote control.

Power limitation II (step limitation)

If the boiler for one reason or another is too large for the plant, the boiler can easily be limited for smaller effects. A potentiometer placed on the circuit board is adjustable from 0-100%. The boiler can only be limited to the entire power stage.

External start/stop of boiler

The controller is equipped with an input for external start/stop of the boiler. This input can, among other things, be used by the E-plants in connection with interruptions in the electricity supply by accidental power. The signal may be inverted by moving a latch on the controller board. Connects to terminal block list –X1, clamps 1-2. See also page 11 and page 35.

Outdoor temperature compensation

The controller is prepared for control depending on the outdoor temperature. If an outdoor sensor is connected, the set temperature will be adapted to the outdoor temperature. The slope curve determines how much the boiler temperature should change in f.h.t. change in outdoor temperature.

With the curve «parallel», it is determined how high the temperature of the boiler should be in relation to a given outdoor temperature. When the outdoor sensor is switched on, the display will show:

TempU	47.0 (50)°C
Power	60kW

Note! The boiler's operating temperature must be set high enough so that this does not limit the maximum temperature the boiler can reach. The internal set temperature will, after the outdoor sensor is connected, act as a maximum thermostat, and will not be able to be changed or exceeded.

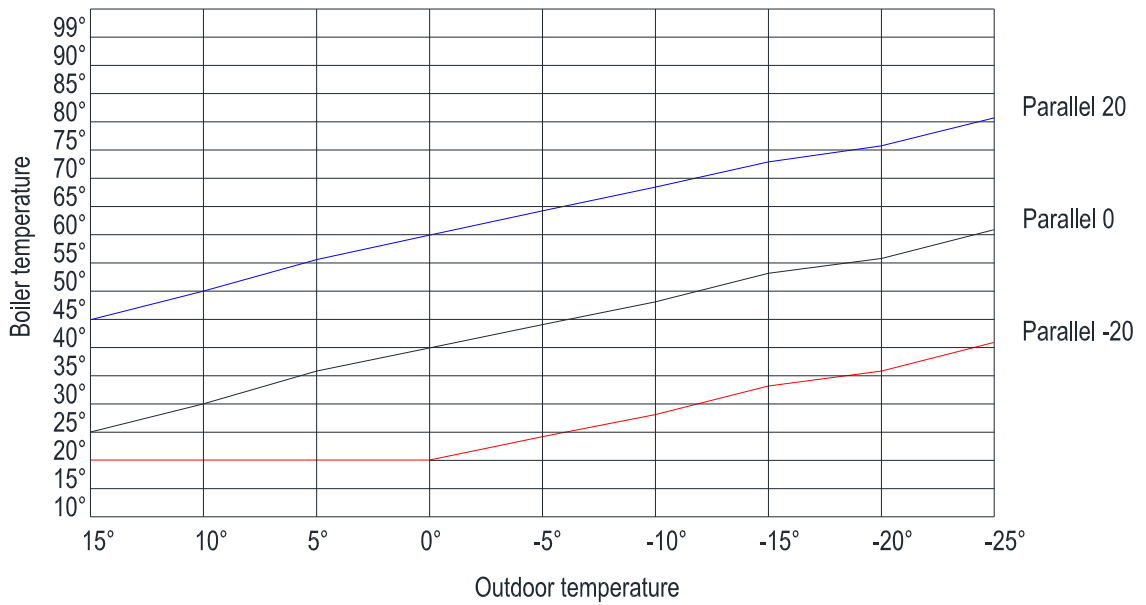
Temperature (in brackets) is a calculated set temperature depending on the current outdoor temperature. This cannot be changed. With two presses of the menu button, the outdoor temperature and the selected curve for parallel displacement can be read in the display.

Outdoor temp	5°C
Parallel	0°C

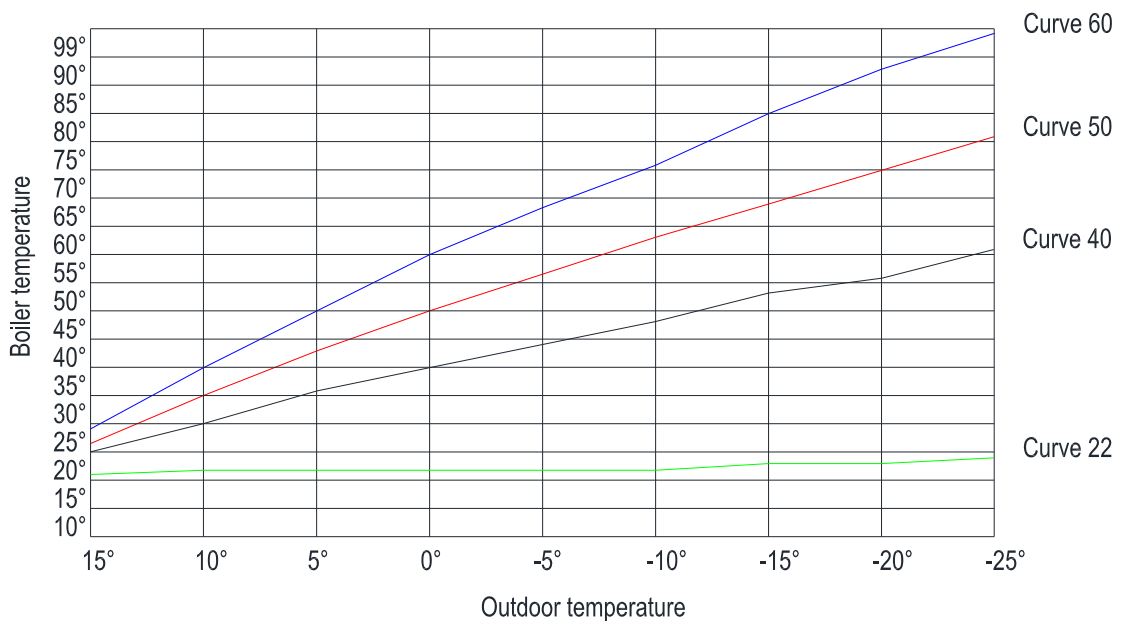
Factory outdoor temp compensation curve:

Parallel: 0
Curve: 40

Boiler temperature as a function of outdoor temperature.



Parallel 20	45	50	56	60	64	68	73	76	81
Parallel 0	25	30	36	40	44	48	53	56	61
Parallel -20	20	20	20	20	24	28	33	36	41



Curve 60	29	40	50	60	68	76	85	93	99
Curve 50	27	35	43	50	57	63	69	75	81
Curve 40	25	30	36	40	44	48	53	56	61
Curve 22	21	22	22	22	22	22	23	23	24

Parallel and curve adjustment

If the set temperature that the controller calculates is too high or low, the curve "parallel" can be shifted up or down. By pressing the menu button twice, the display shows:

Outdoor t.	-15°C
Parallel	0°C

With the «+/-» buttons the curve can be set between -20 and +20. New value must be saved by pressing "E" button. If the travel temperature is not high enough on cold days, the inclination curve can also be adjusted. By choosing a steeper curve, the trip temperature can be further increased. Adjustment of the slope is made in the service menu, see page 12. In the menu «slope» the desired curve is set with the «+/-» buttons. New value is saved by pressing the «E» button.

Curve	40°C
Curve min	60°C

With the «+/-» buttons the slope can be set between 22 and 60. New value must be saved by pressing «E» button. With Slope min, you can set a minimum limit of how low you want to allow the temperature to drop.

See an overview of the menus on page 12.

Remote control with external signals

The boiler has several possibilities for remote control from e.g. SD system (central operating system). The regulator has an input for external start/stop of the boiler and with a 0 -10 V signal, the boiler's operating temperature or power can be controlled.

External start/stop of boiler

Connection is made on the boiler's terminal block X1. The factory fitted latch between terminals 1 & 2 is removed. See page 11.

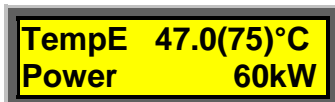
Temperature control 0-10 V

The desired set temperature can be controlled with an external signal 0 -10 V where 0 V = 0 ° C, 10 V = 100 ° C (V1725). The connection is made on terminals 30 (-) and 31 (+) on the controller board. The input must be activated in the service menu, see page 12. In the «Temp IN» menu, this is set to «ON» by pressing the «+» button twice. Then press the «E» button to save a new value.



Temp IN ON

Press the menu button until the display shows «Temp / Power» again. With external temperature control switched on, the display shows:



TempE 47.0(75)°C
Power 60kW

Note! With external temperature control, the set temperature on the controller will function as a maximum thermostat. This must therefore be set to the maximum desired temperature so as not to limit the boiler.

Step / power control 0 - 10 V, possibly 10 - 0 V

The boiler's power can be controlled with an external signal 0 -10 V. However, the effect can only be controlled at the entire effect stage. 0 V = 0 steps, 10 V = all steps (7). The connection is made on terminals 29 (+) and 30 (-). The input must be activated in the service menu. In the «Power IN» menu, this is set to ON by pressing the «+» button twice. Then press the "E" button to save a new value.

Note!

If the signal is inverted, ie 0 V = all steps and 10 V = 0 steps, this is done by pressing the «+» button 3 times. Then press the «E» button to save a new value.



Power IN ON

Press the menu button until the display again shows «Step / Step time». With external step control switched on, the display shows:



StepE 3 (15)
Step time 40s

Signals for SD systems

The boiler is prepared for control from central operating control (SD system). Operation and failure signal is presented to terminal block X1 in the boiler.

Operation signal: indicates switched on boiler (control voltage on). Connects to the boiler terminal block X1, clamps 3 & 4.

Failure message: indicates triggered safety thermostat, temperature sensor fault or low control voltage to the controller. The error that has occurred can be read in the display.

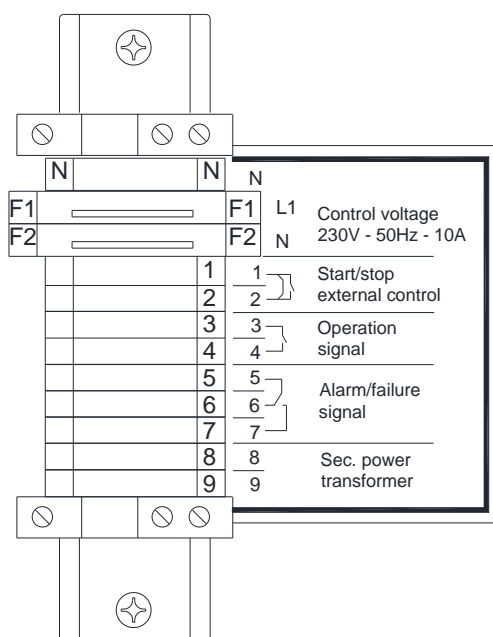
In addition to temperature and power control with 0 - 10 V signal, the boiler is also prepared for power regulation, ie. the boiler can be controlled so that it has the power that is available at any given time based on a given subscription limit.

In addition, there are the following outputs:

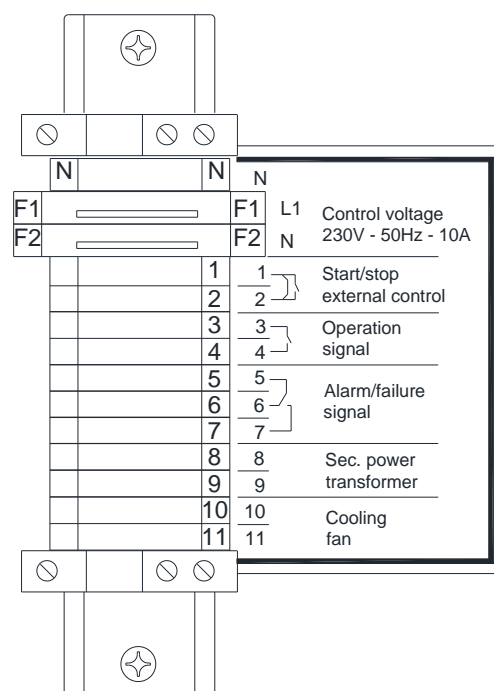
- Output for indication of set temp. (0-10 V)
- Output for indication of real temp. (0-10 V)
- Output for indication of real time step / power (0-10 V)

Terminal block X1 in the boiler

SB 180 – 300



SB 375 - 1200



Menus

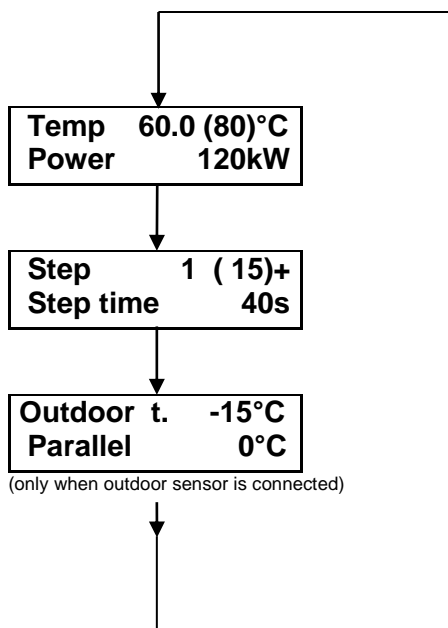
By pressing the arrow (▼) button you can scroll through the different menus.

At startup:

EL 15	v1725
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El 15 : 15-step controller
V1725: version

Main menu



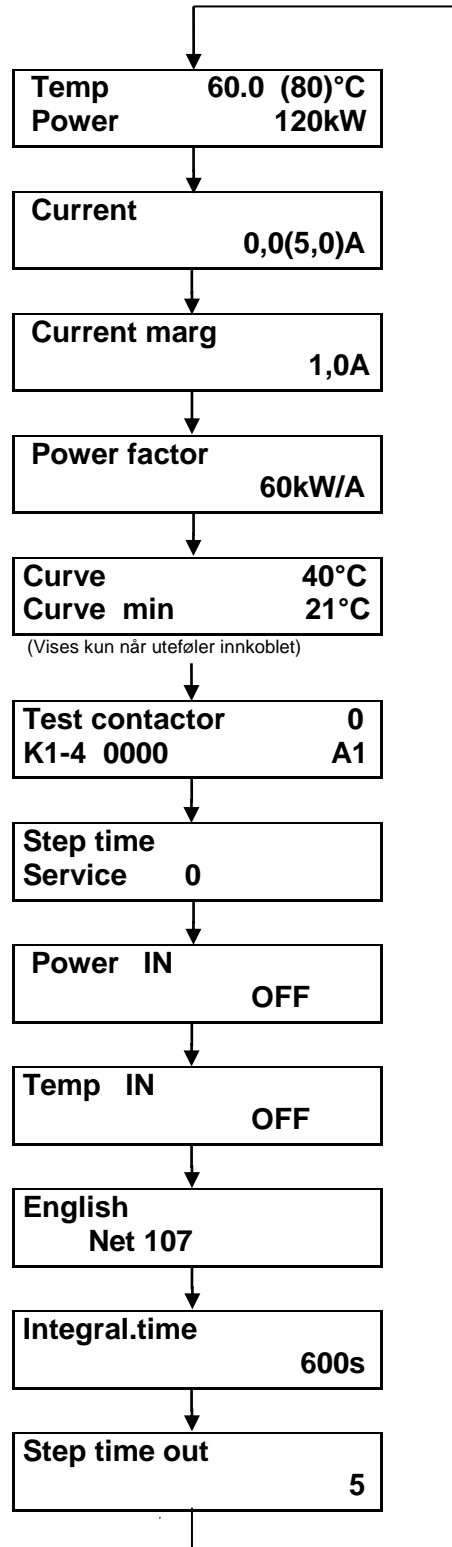
In the main menu following adjustments are available:

- Adjustment of set temperature
- Adjustment (limitation) of max available steps
- Adjustment of step time

Note! Short step time will reduce the lifetime of the contactors.

Service menu

For access to service menu, press and hold arrow button for min. 5 sec.



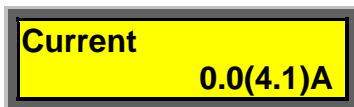
Power control

On systems with varying current loads, the electrical subscription can be utilized to the maximum by using power regulation. The total power is measured in the building's main switchboard and by means of the boiler's regulator, the power that is available below the subscription limit is supplied at all times. Necessary equipment is 3 pcs. measuring transformers for placement in the building's main board and 3 pcs. secondary transformers for connection to the controller.

Example:

The building's maximum load is 450 kW, which at 400 V corresponds to 650 A. Suitable current transformers for the system, 800/5. The factor for this will then be: $800:5 = 160$. The system is desired to be regulated at a maximum of 650 A, which gives 4.1 A. ($650:160 = 4.1$).

Settings must be made in the service menu. By holding the menu button inside min. 5 sec. you will have access to this. With the «-» button the current limit is set to 4.1 and the new value is saved by pressing the «E» button.



Calculation of appropriate current margin

When the power limitation has limited the boiler to a certain power, you get to a point where a step will constantly switch on and off. To prevent the boiler from switching on and off the power stage, a certain "power margin" must be available before a new stage enters. This margin should be at least the current corresponding to the difference between two arbitrary power levels on the boiler. If the power levels are different, the calculation should be performed according to the largest power level.

The value is calculated according to the following formula:

$$\frac{P \times I_s}{U \times \sqrt{3} \times I_p}$$

P = The boiler's largest power change in W between two stages

U = Main voltage at the system

$\sqrt{3} = 1.732$

I_p = Max. primary current on the plant's current transformers

I_s = The secondary current on the system's current transformer (normally 5A)

Example:

The boiler is 600 kW with a 30-step regulator.

Largest power change 20 kW, current transformers on 1000/5 A and main voltage 400 V.

$$\frac{P \times I_s}{U \times 1,732 \times I_p} = \frac{20000 \times 5}{400 \times 1,732 \times 1000} = \frac{100000}{692800} \approx 0,14$$

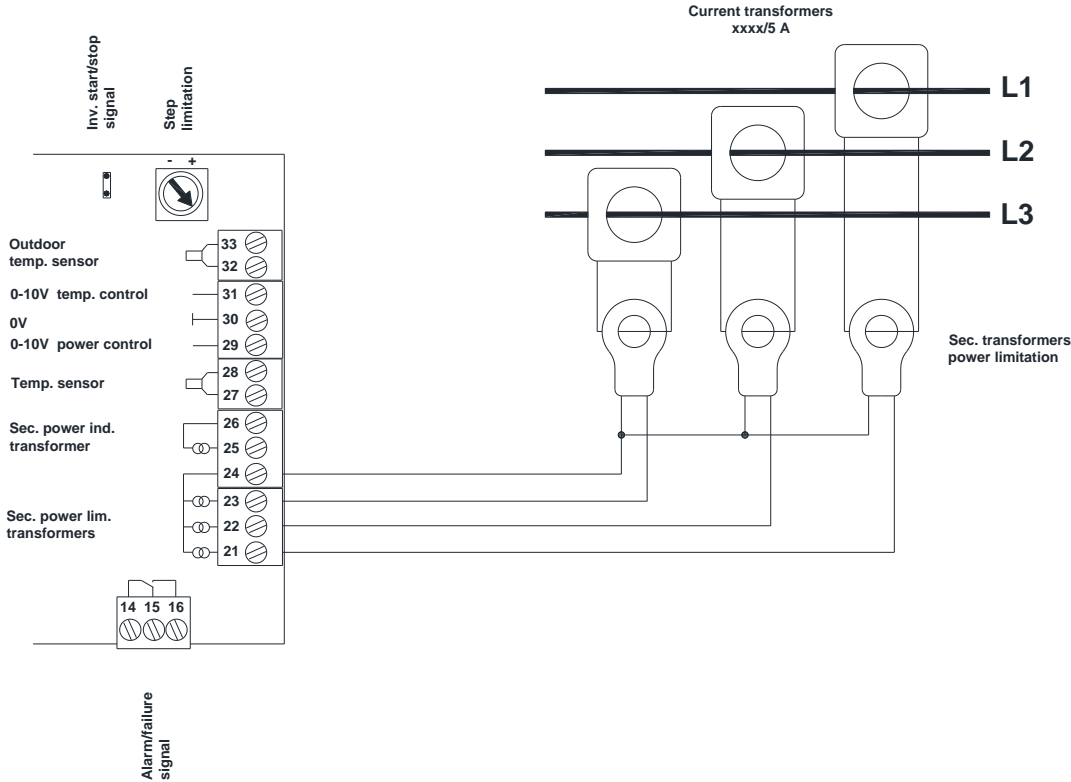
To avoid ending up too close to the limit for self-oscillation in the system, you should set the power margin approx. 0.1 higher than the calculated value. In the example above, this entails a setting of 0.32.

The setting must be made in the service menu. By holding the menu button inside min. 5 sec. you will have access to this. With two presses of the menu button you will have access to setting the current margin.

With the ± buttons, the current margin is set to the calculated value, 0,32. The new value is saved by press the «E» button. See also page 12.



Connection of current transformers for power control



Maintenance

DO NOT START REPAIR AND MAINTENANCE UNTIL THE BOILER IS DISCONNECTED

To avoid unnecessary downtime, the boiler should be inspected annually. This can advantageously be done before the boiler is put into operation in the autumn. The inspection should include the following points:

- Check the boiler for leakage

Check return sockets as well as draining and expansion. Also check for leaks from element. Leakage from here can be difficult to detect and the damage can be significant if the leak is not detected at an early stage.

- Control of elements

The condition of the heating elements is checked by resistance measurement / megging. Possibly defective element(s) must be replaced to avoid errors in the effect groups.

- Contactors / relays

Check the contact set on the contactors and that these make/brake contact. Possible noise from the contactors may indicate wear and should be checked carefully or replaced. Worn contactors can burn fixed and cause great damage.

- Electrical connections

All connections on busbars, power switches, contactors and elements are tightened with correct torque.

- Regulator

Controller is function tested and power groups are checked.

- Safety thermostat

The safety thermostat is checked. By stopping the pump or closing the valves, you will quickly reach the trigger temperature to test if the safety thermostat trips.

REPAIR AND MAINTENANCE MUST ONLY BE PERFORMED BY QUALIFIED PERSONNEL


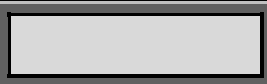
Varmeteknikk AS can be helpful with and spare parts.

Tightening torques:

Parts	Screw dimension	Tightening torques
Contactor AF09 – AF16	M3,5	1,2 Nm
Contactor AF26 – AF30	M4	2,5 Nm
Contactor AF40, AF52, AF65	M6	4 Nm
Contactor AF80, AF96	M8	6 Nm
Contactor AF116, AF 140	M8	8 Nm
Element connections	M4	1,2 Nm
Clampdisc for elements	M12	12-15 Nm
Conductors to copper bars	M6	10 Nm

Troubleshooting

NB! TROUBLESHOOTING AND REPAIRS MUST ONLY BE PERFORMED BY QUALIFIED PERSONNEL

ERROR	DISPLAY SHOWING	CAUSE	CHECK / CORRECTION
Boiler «dead»		The boiler lacks of control voltage	The boiler requires its own control voltage
		Fuse/s for control voltage broken	Check fuses and replace if required
No power	Temp 30.0 (80)°C StepS 0 (0)	External start signal missing	Check external signal
	Temp 30.0 (80)°C StepE 0 (0)	External signal for power control missing	Check external signal
	TempE 30.0 (20)°C Power 0kW	External signal for temperature control missing	Check external signal
	Temp 0.0 (80)°C Error Temp	Defect temp. sensor	Change temp. sensor
Boiler stops at Step 3 (Alarm diode is flashing)	Temp 30.0 (80)°C Alarm Power	Safety temp. limiter has tripped	Reset Safety temp. limiter (STB) on front panel
	Temp 30.0 (80)°C Alarm Power	Main switch off or broken fuses	Check switch board/fuses Replace if required
Little heat from boiler	Temp 75,5(80)°C Step 3(5)	Maximum power limited from outside	Check external signals from a central monitoring system
	TempU 30.0 (60)°C Power 120kW	Check if boiler is limited from outdoor compensator	Check curves for outdoor compensation
		Defect heating elements, fuses, contactors	Check heating elements, fuses contactors and replace if required
STB – safety temp. limiter released (Display shows "Alarm Power")	Temp 30.0 (50)°C Alarm Power	Circulation in boiler	Check pump/valves
		Burned contactor	Check contactors and replace if required
Leakage		Loose screws for heating element	Tighten screws
		Gasket for heating element	Replace if required
		Defect heating element	Replace if required

Technical data for 230V boilers

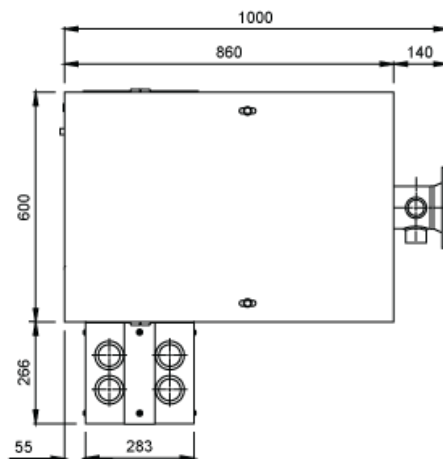
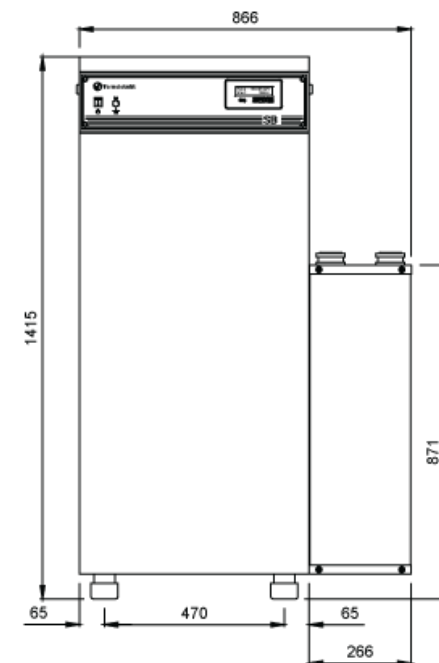
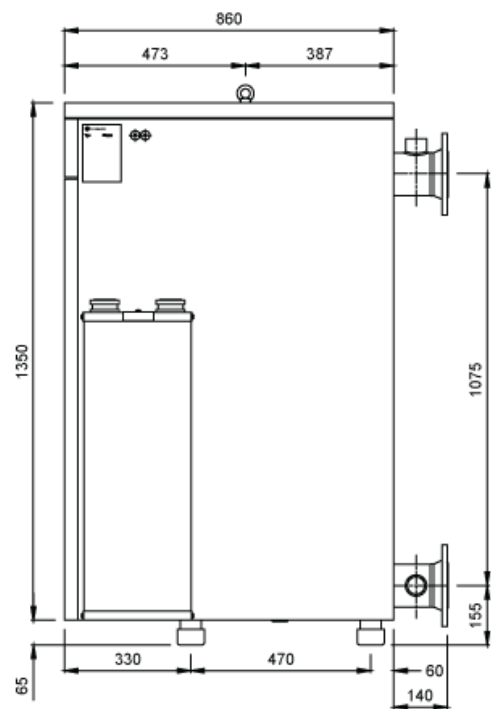
Model	kW	Amp	Regulation	Connection flange	Connection exp./drain.	Water volume liter	Q ($\Delta t=20^{\circ}\text{C}$) m ³ /h	Q min m ³ /h	Q max m ³ /h	kv m ³ /h	Weight kg
SB 2180	180	452	15-step	DN 100/16	1 ½"	240	7,7	3,1	50	790	290
SB 2200	200	502	15-step	DN 100/16	1 ½"	240	8,6	3,1	50	790	300
SB 2225	225	565	15-step	DN 100/16	1 ½"	240	9,7	3,1	50	790	310
SB 2250	250	628	15-step	DN 100/16	1 ½"	240	10,8	3,1	50	790	315
SB 2300	300	753	15-step	DN 100/16	1 ½"	240	12,9	3,1	50	790	315
SB 2375	375	941	30-step	DN 125/16	2"	310	16,1	5	75	1370	450
SB 2400	400	1004	30-step	DN 125/16	2"	310	17,2	5	75	1370	450
SB 2450	450	2 x 565	30-step	DN 125/16	2"	310	19,4	5	75	1370	450
SB 2500	500	2 x 628	30-step	DN 125/16	2"	310	21,5	5	75	1370	450
SB 2600	600	2 x 753	30-step	DN 125/16	2"	310	25,8	5	75	1370	450
SB 2750	750	2 x 942	30-step	DN 125/16	2"	620	51,6	5	75	1370	950

Technical data for 400V and 690V boilers

Model	kW	Amp 400 V 690 V		Regulation	Connection flange	Connection exp./drain.	Water volume liter	Q m ³ /h Δ t=20 °C	Q min m ³ /h	Q max m ³ /h	kv m ³ /h	Weight kg
SB 4180	180	260	151	15-step	DN 100/16	1 ½"	240	7,7	3,1	50	790	290
SB 4200	200	289	167	15-step	DN 100/16	1 ½"	240	8,6	3,1	50	790	300
SB 4225	225	325	188	15-step	DN 100/16	1 ½"	240	9,7	3,1	50	790	310
SB 4250	250	361	209	15-step	DN 100/16	1 ½"	240	10,8	3,1	50	790	315
SB 4300	300	433	251	15-step	DN 100/16	1 ½"	240	12,9	3,1	50	790	315
SB 4375	375	541	314	30-step	DN 125/16	2"	310	16,1	5	75	1370	450
SB 4400	400	577	335	30-step	DN 125/16	2"	310	17,2	5	75	1370	450
SB 4450	450	650	377	30-step	DN 125/16	2"	310	19,4	5	75	1370	450
SB 4500	500	722	418	30-step	DN 125/16	2"	310	21,5	5	75	1370	450
SB 4600	600	866	502	30-step	DN 125/16	2"	310	25,8	5	75	1370	450
SB 4750	750	2 x 542	2 x 314	30-step	DN 125/16	2"	620	32,3	5	75	1370	950
SB 4800	800	2 x 577	2 x 335	30-step	DN 125/16	2"	620	51,6	5	75	1370	950
SB 4900	900	2 x 650	2 x 377	30-step	DN 125/16	2"	620	38,7	5	75	1370	950
SB 41000	1000	2 x 722	2 x 418	30-step	DN 125/16	2"	620	43,1	5	75	1370	950
SB 41100	1100	2 x 794	2 x 460	30-step	DN 125/16	2"	620	47,4	5	75	1370	950
SB 41200	1200	2 x 866	2 x 502	30-step	DN 125/16	2"	620	51,6	5	75	1370	950

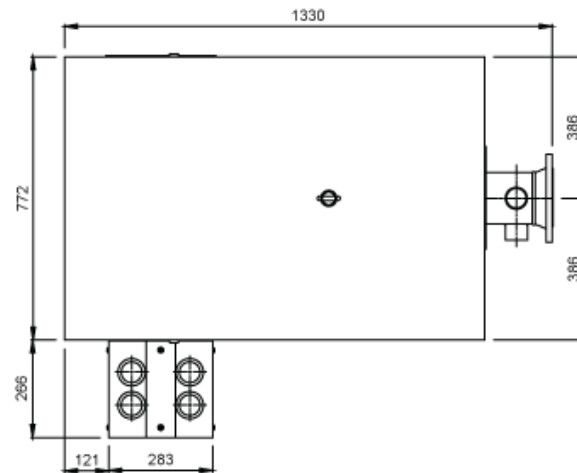
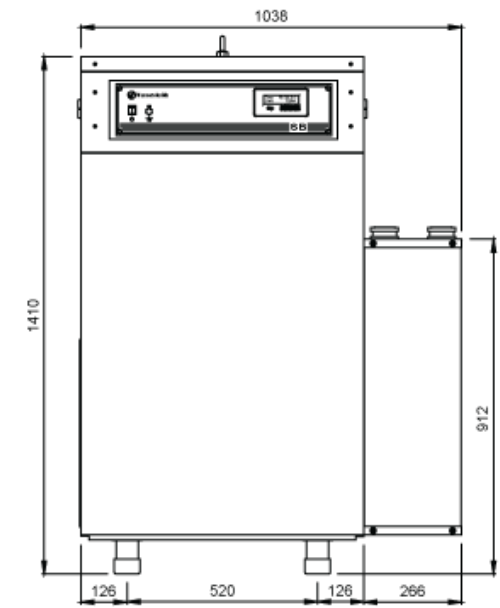
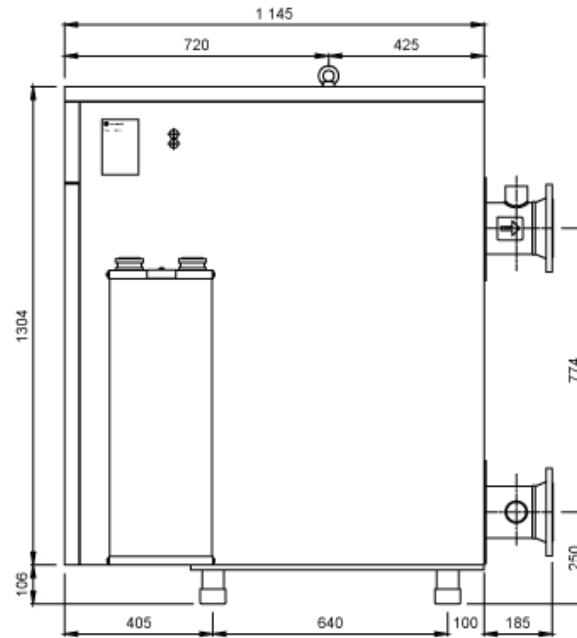
Dimensions SB 180-300

(All dimensions in mm.)



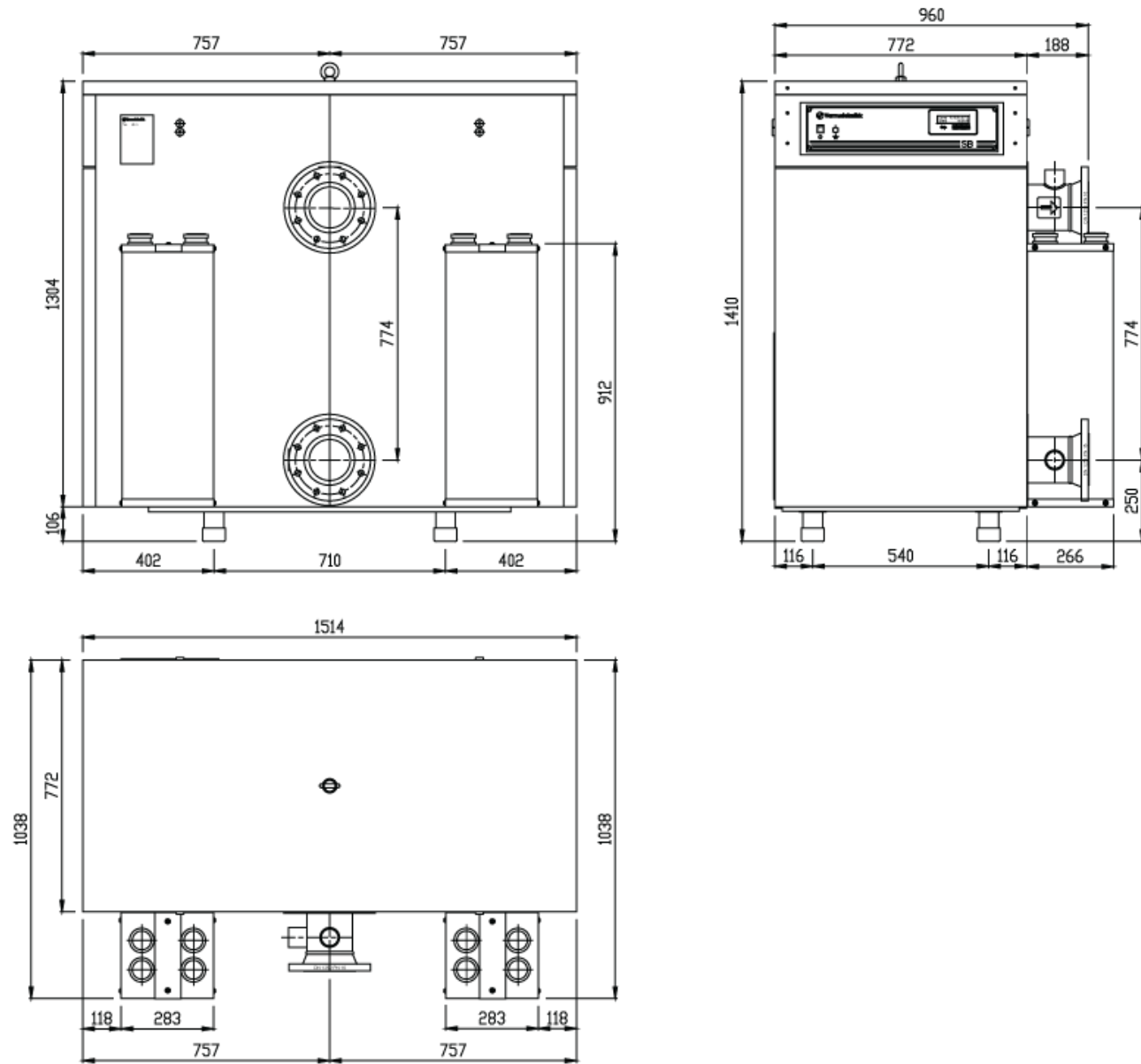
Dimensions SB 4375-4600, SB 6375-6600

(All dimensions in mm.)



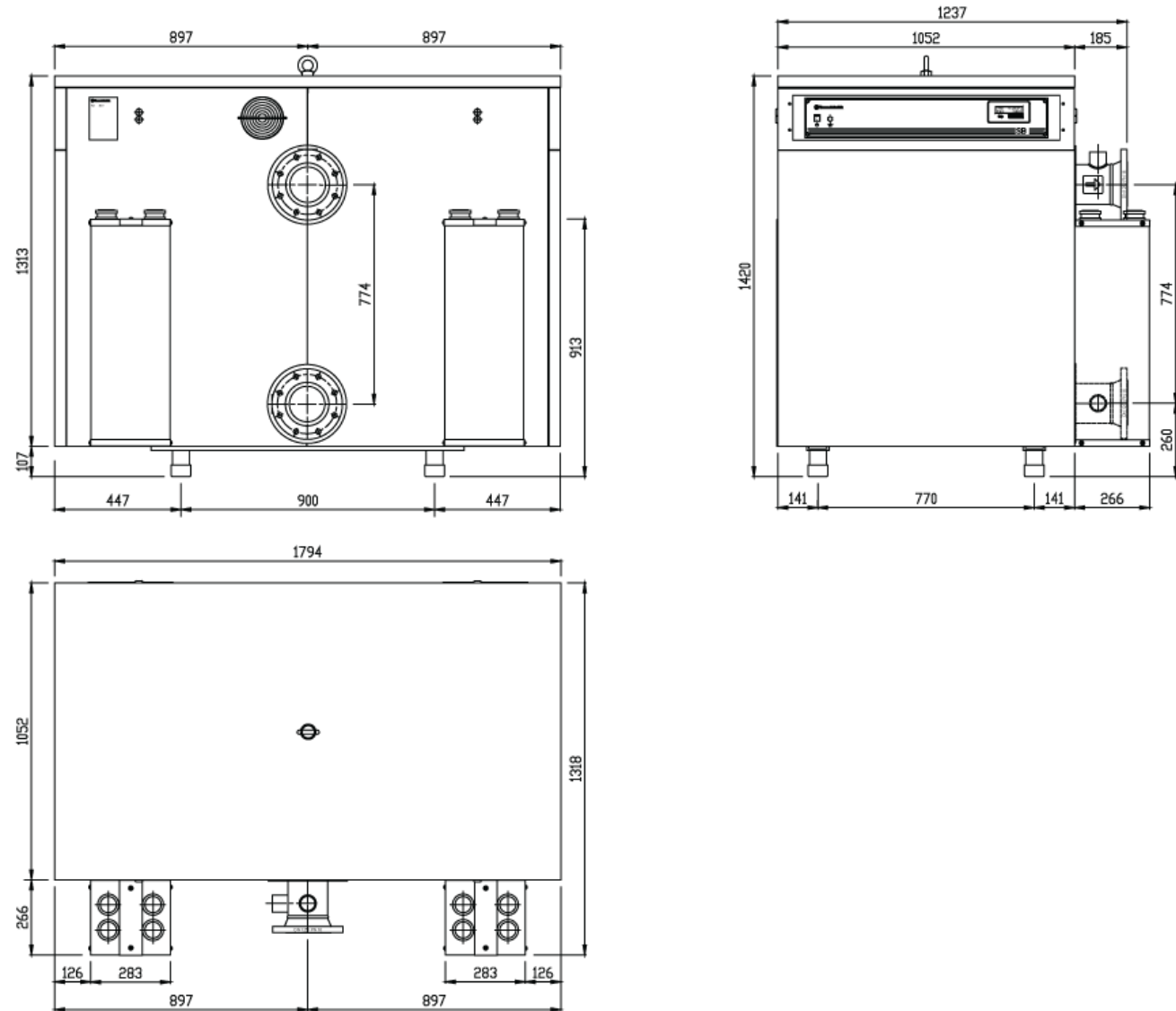
Dimensions SB 2375-2400

(All dimensions in mm.)

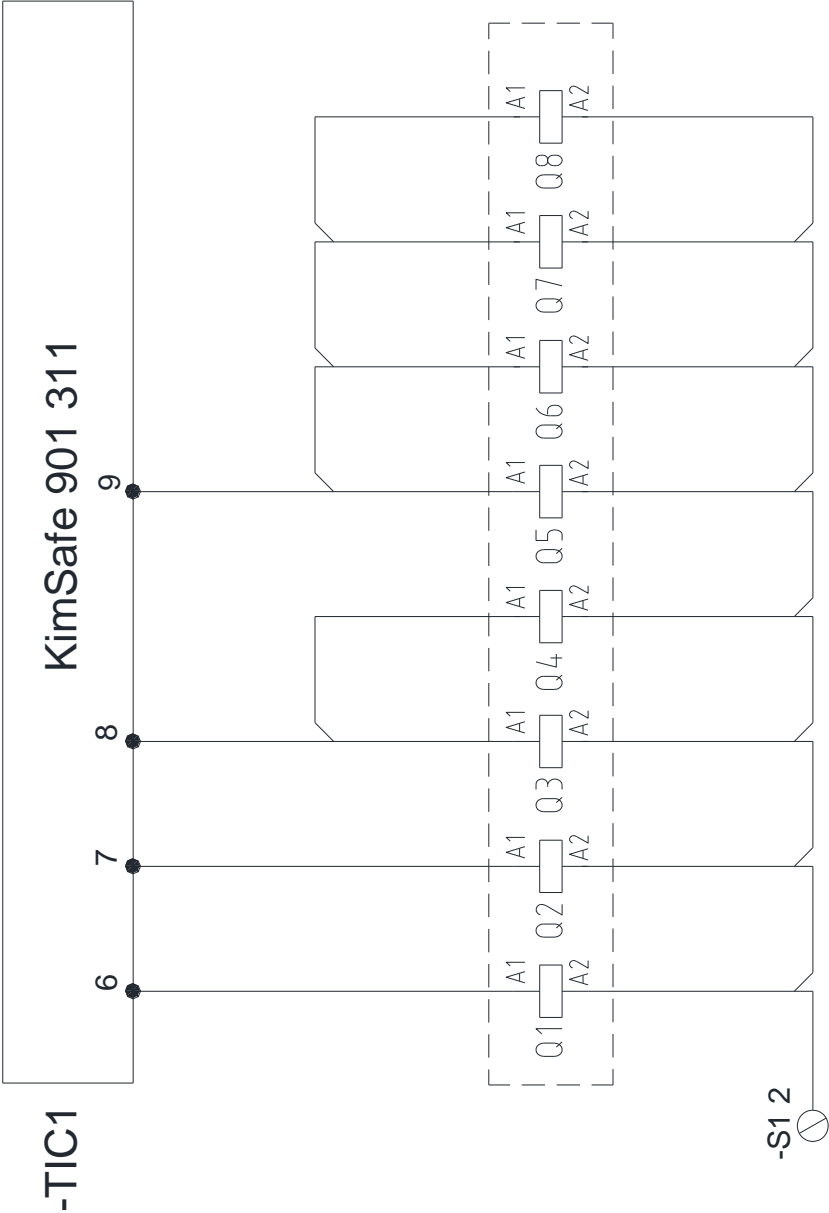


Dimensions SB 2450-2750, SB 4750-41200, SB6750-61200

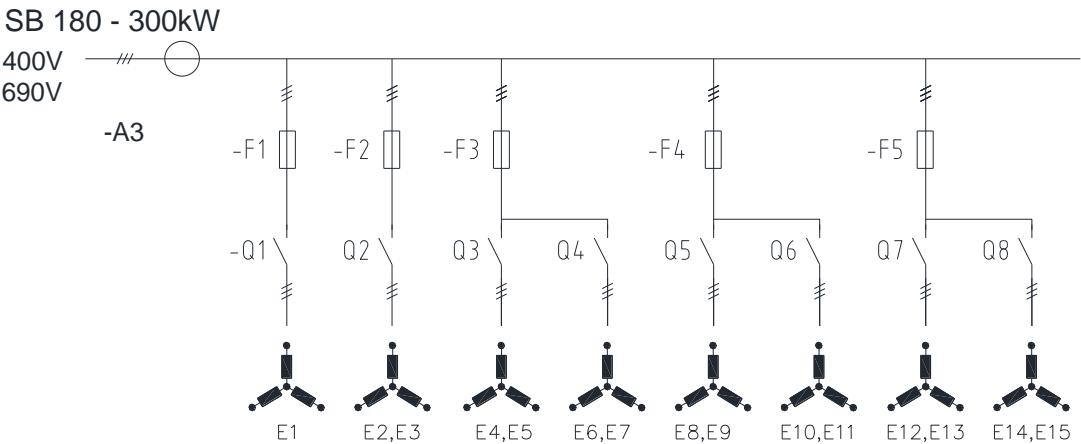
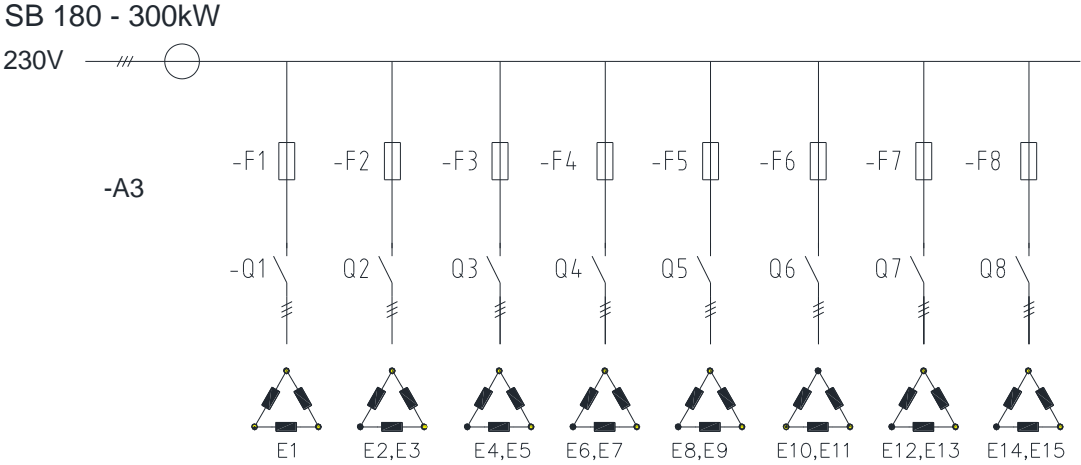
(All dimensions in mm.)



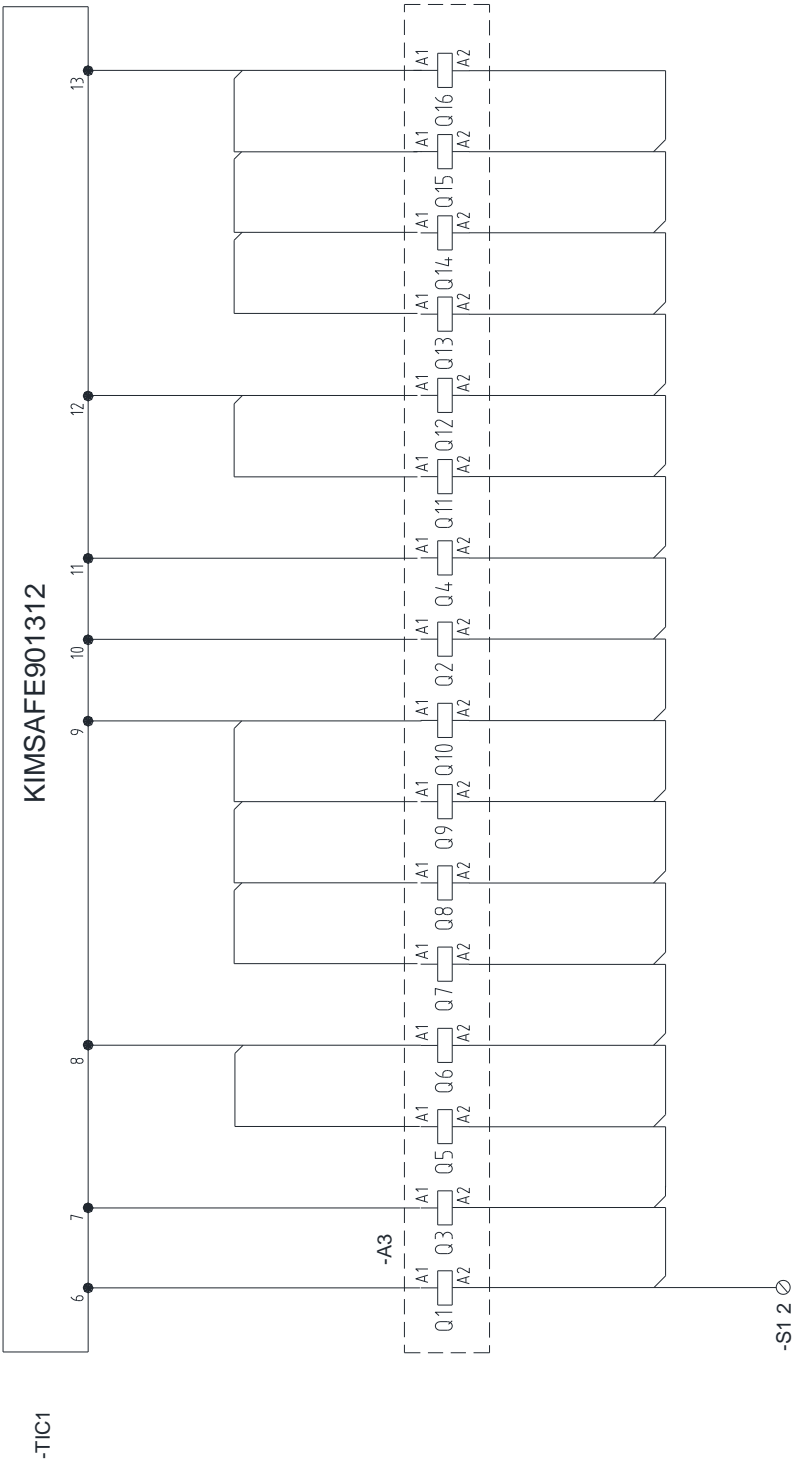
Contactor circuit SB 180 – 300 kW



Main circuit diagram SB 180 – 300 kW

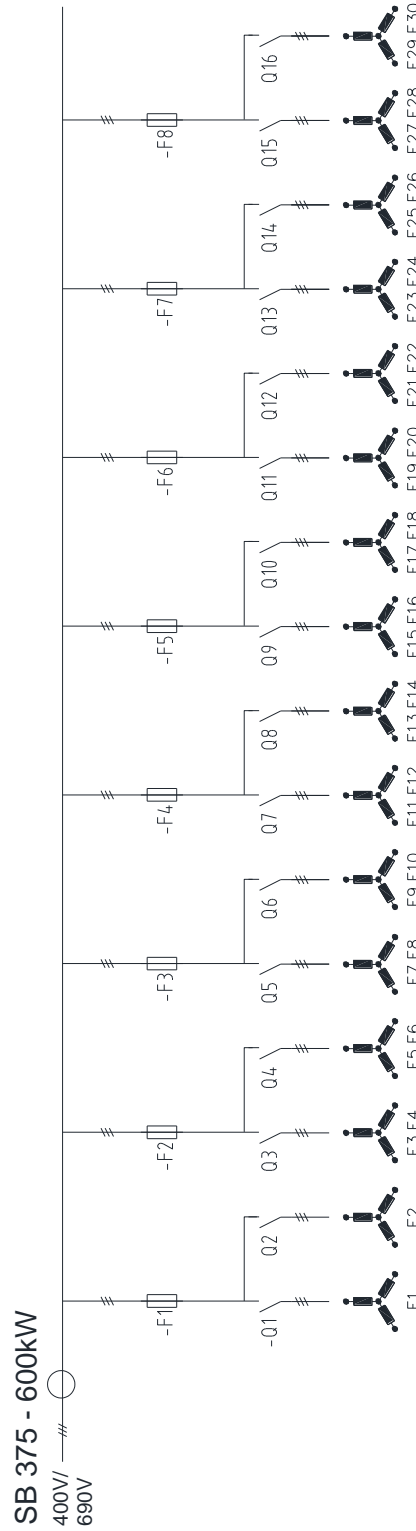
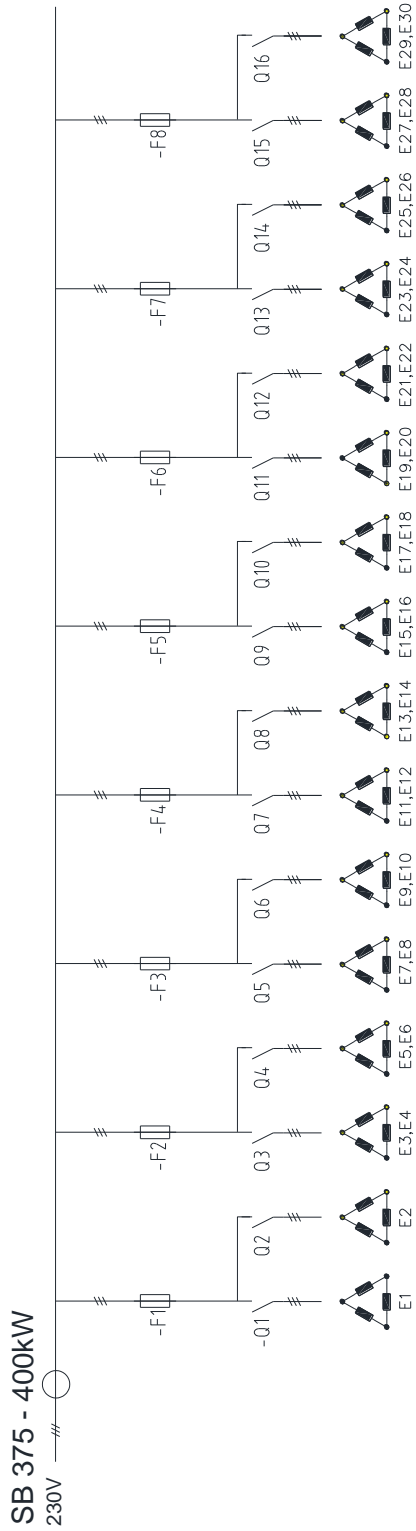


Contactor circuit SB 375 – 400 kW, 230 V
SB 375 – 600 kW, 400/690 V

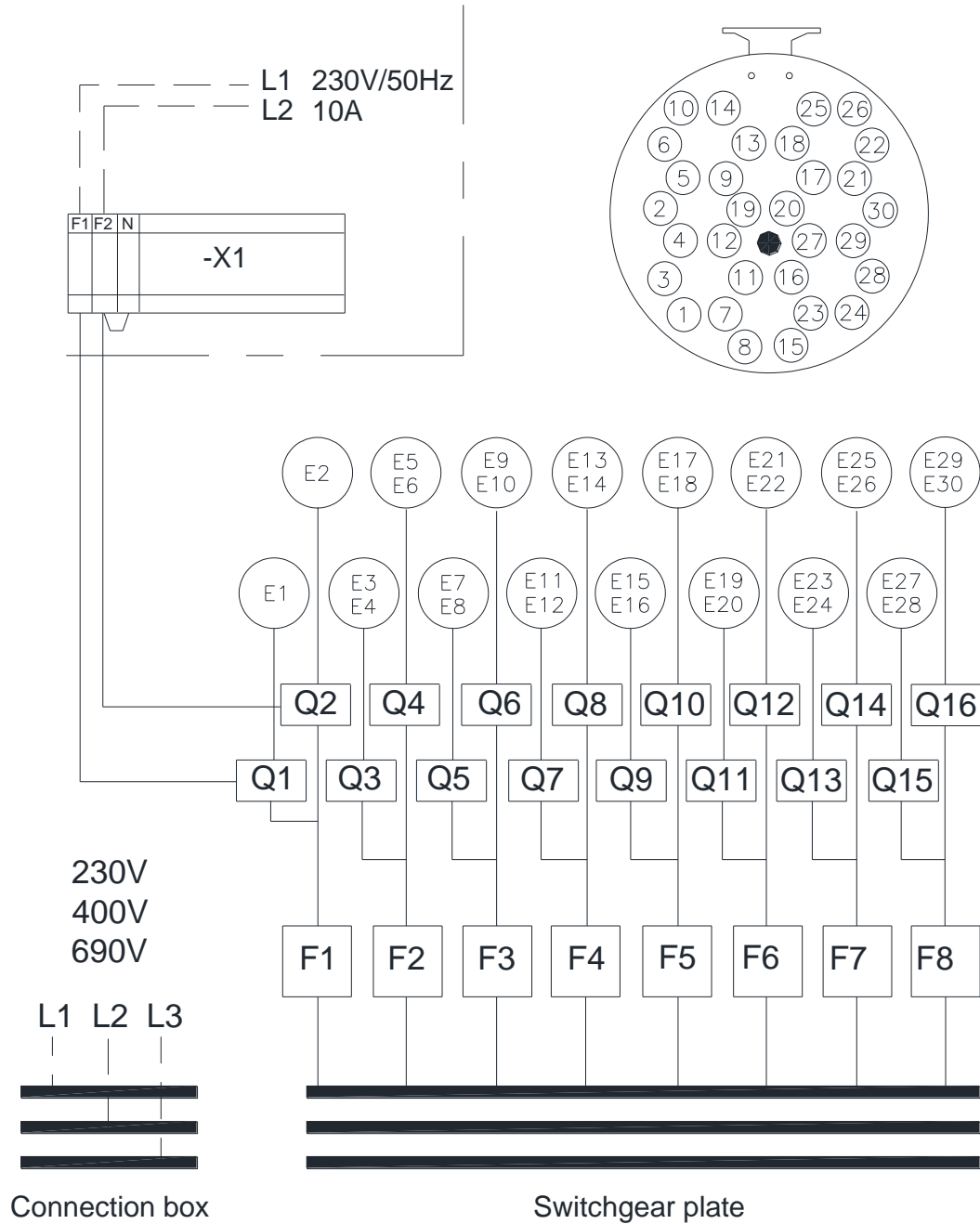


Main circuit diagram

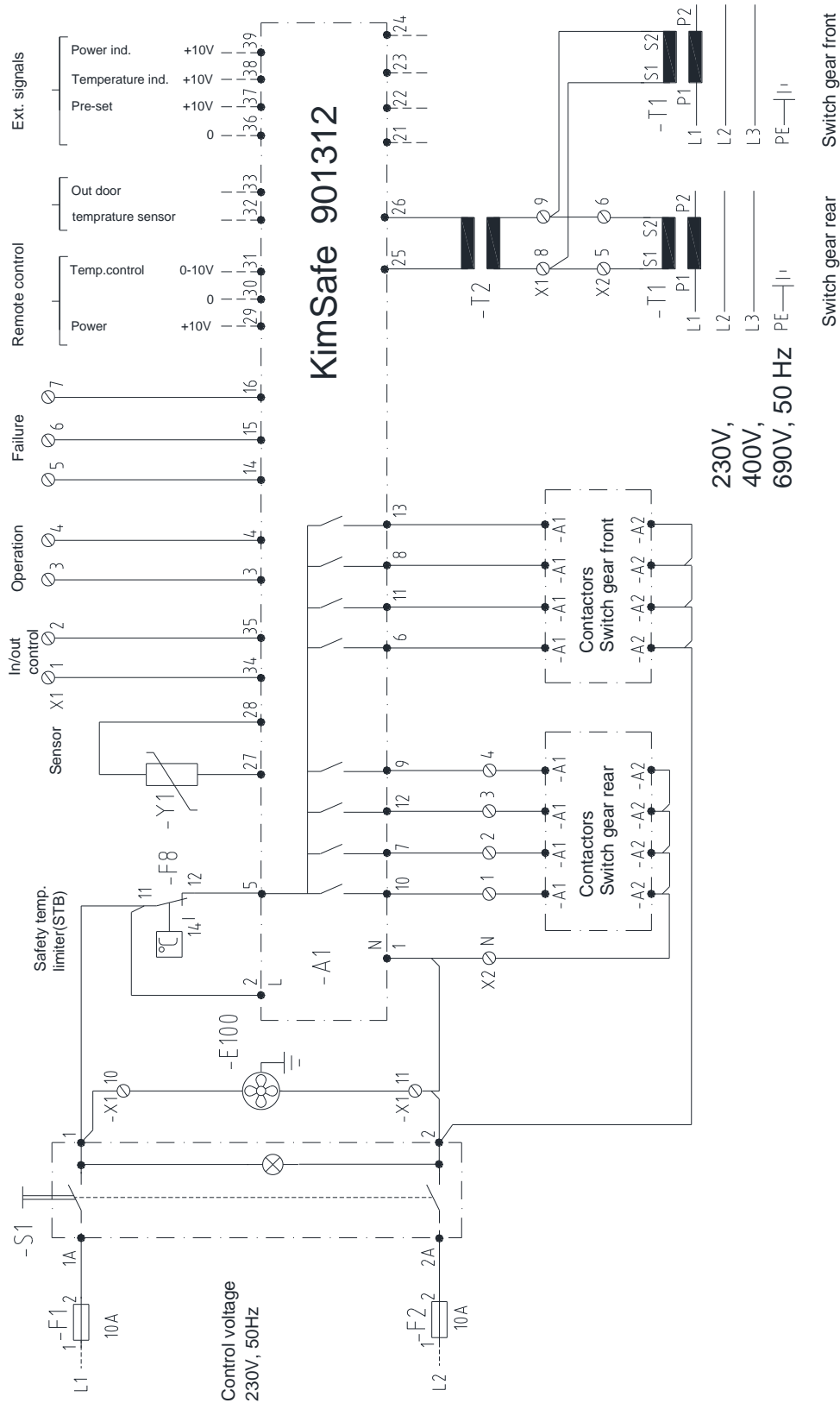
SB 375 – 400 kW, 230 V
SB 375 – 600 kW, 400/690 V



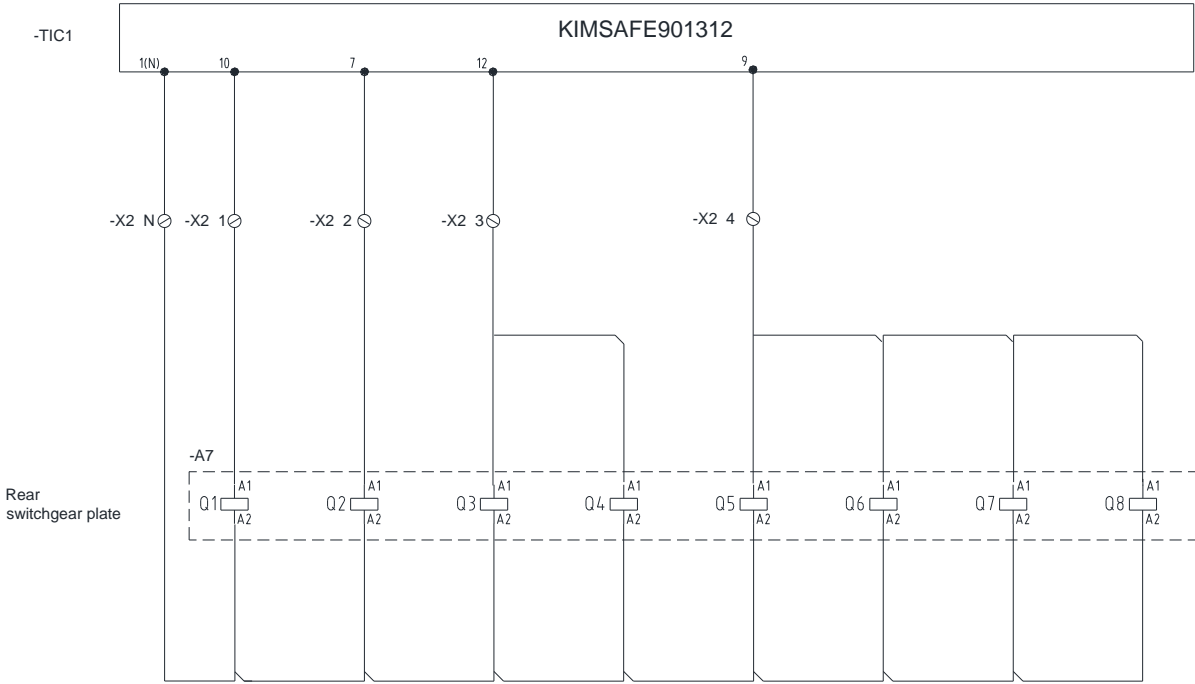
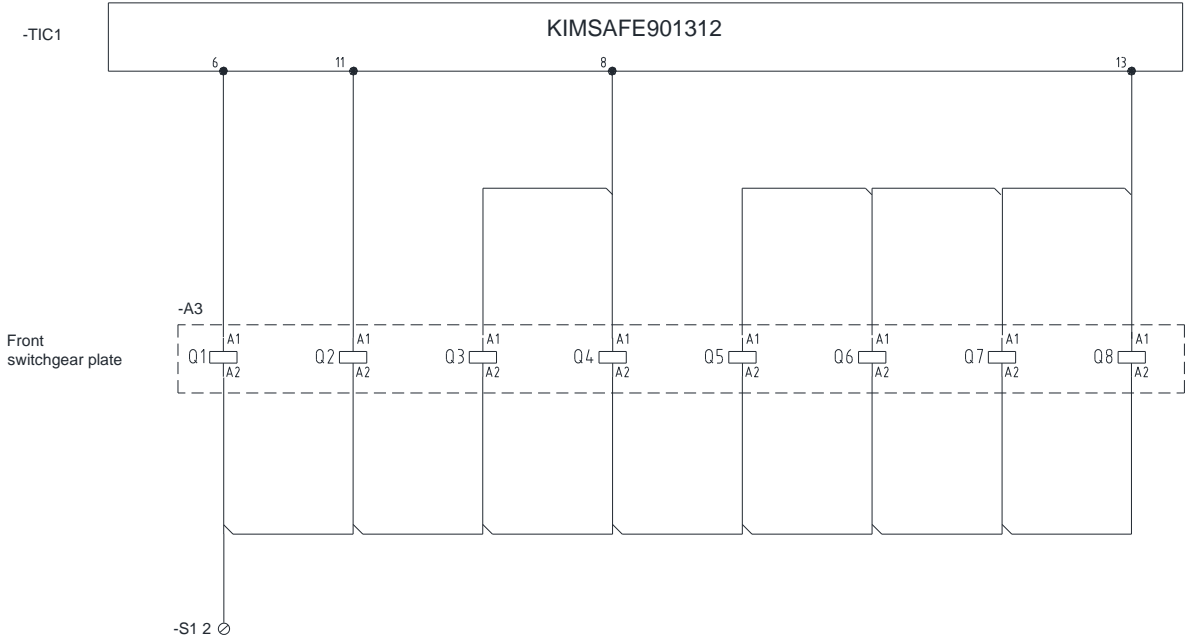
Element/switchgear overview SB 375 – 400 kW, 230 V SB 375 – 600 kW, 400/690 V



Control circuit diagram 450 – 750 kW, 230 V 750 - 1200 kW, 400/690 V

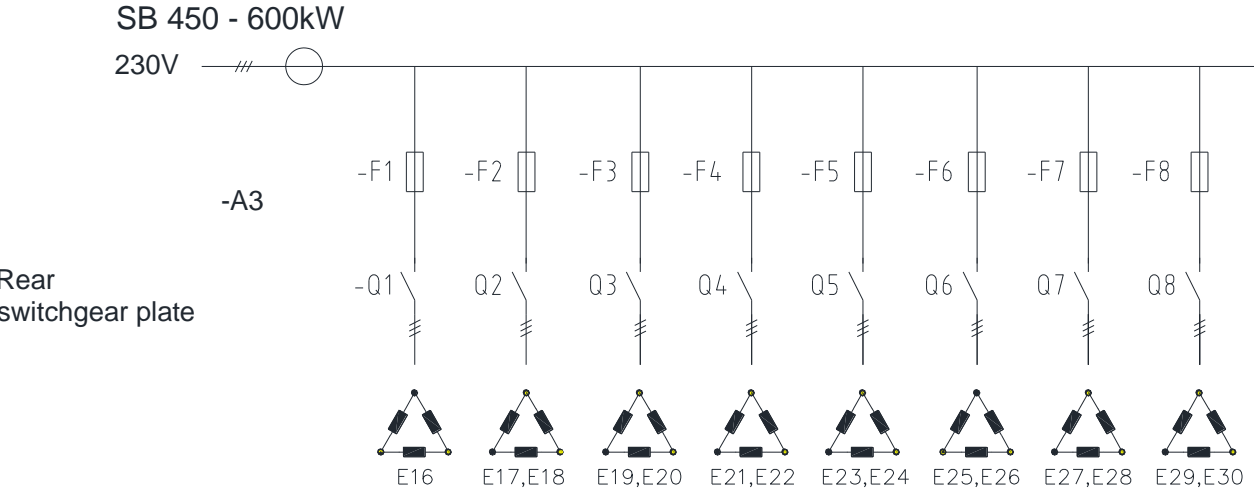
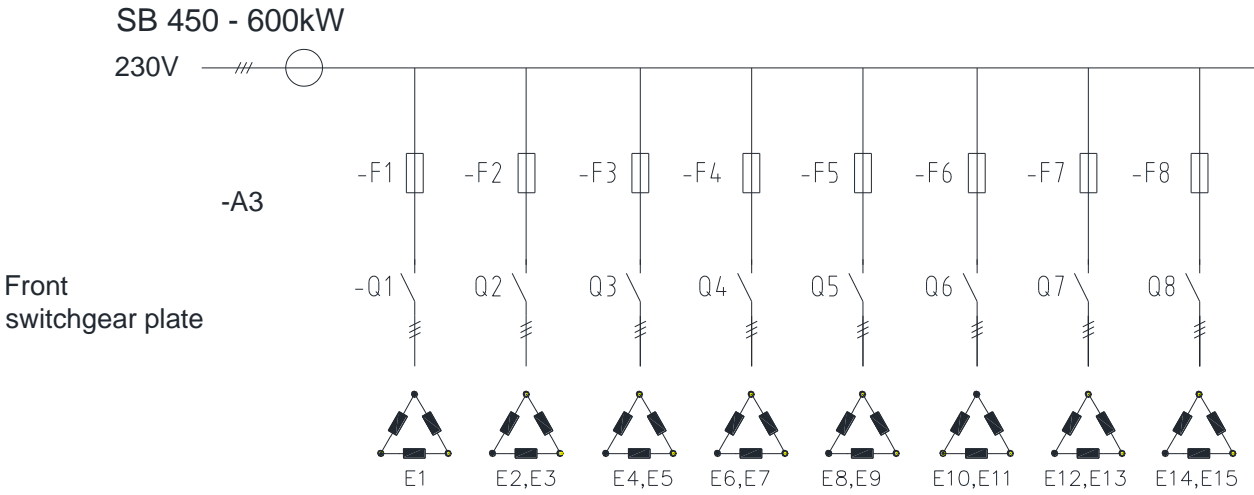


Contactor circuit 450 – 600 kW/230 V

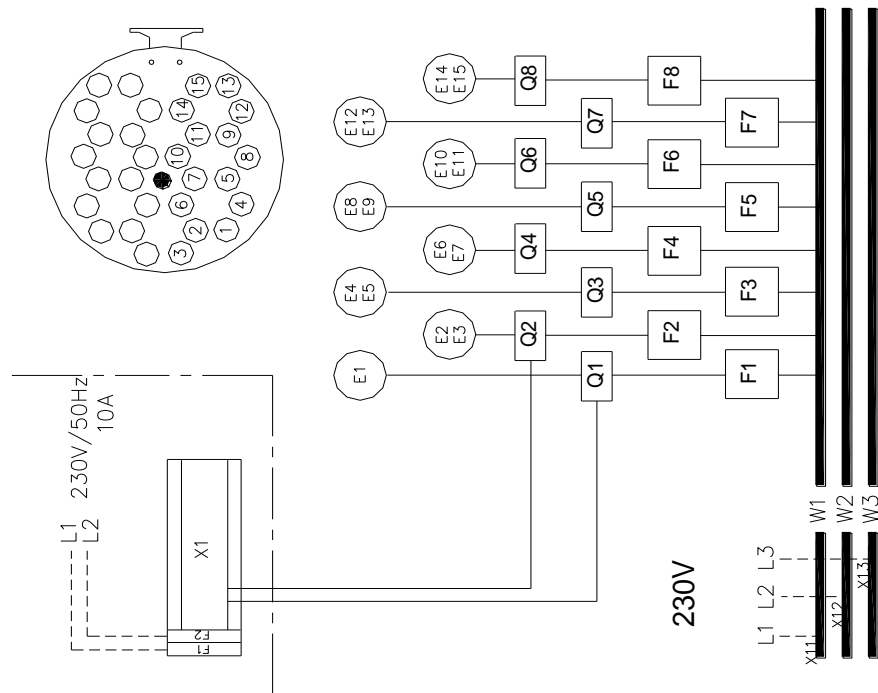
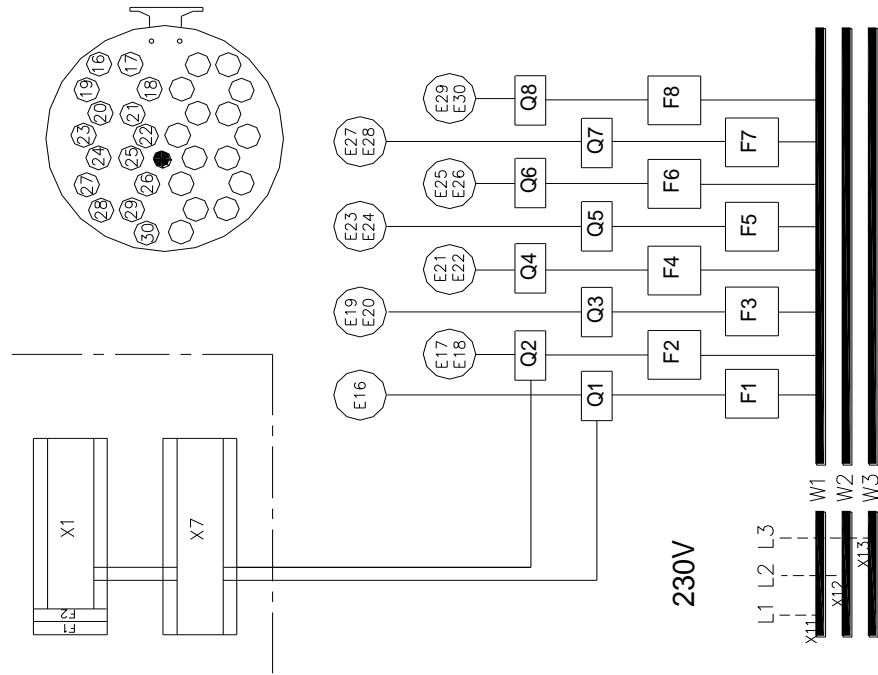


Main circuit diagram

SB 450 – 600 kW, 230 V

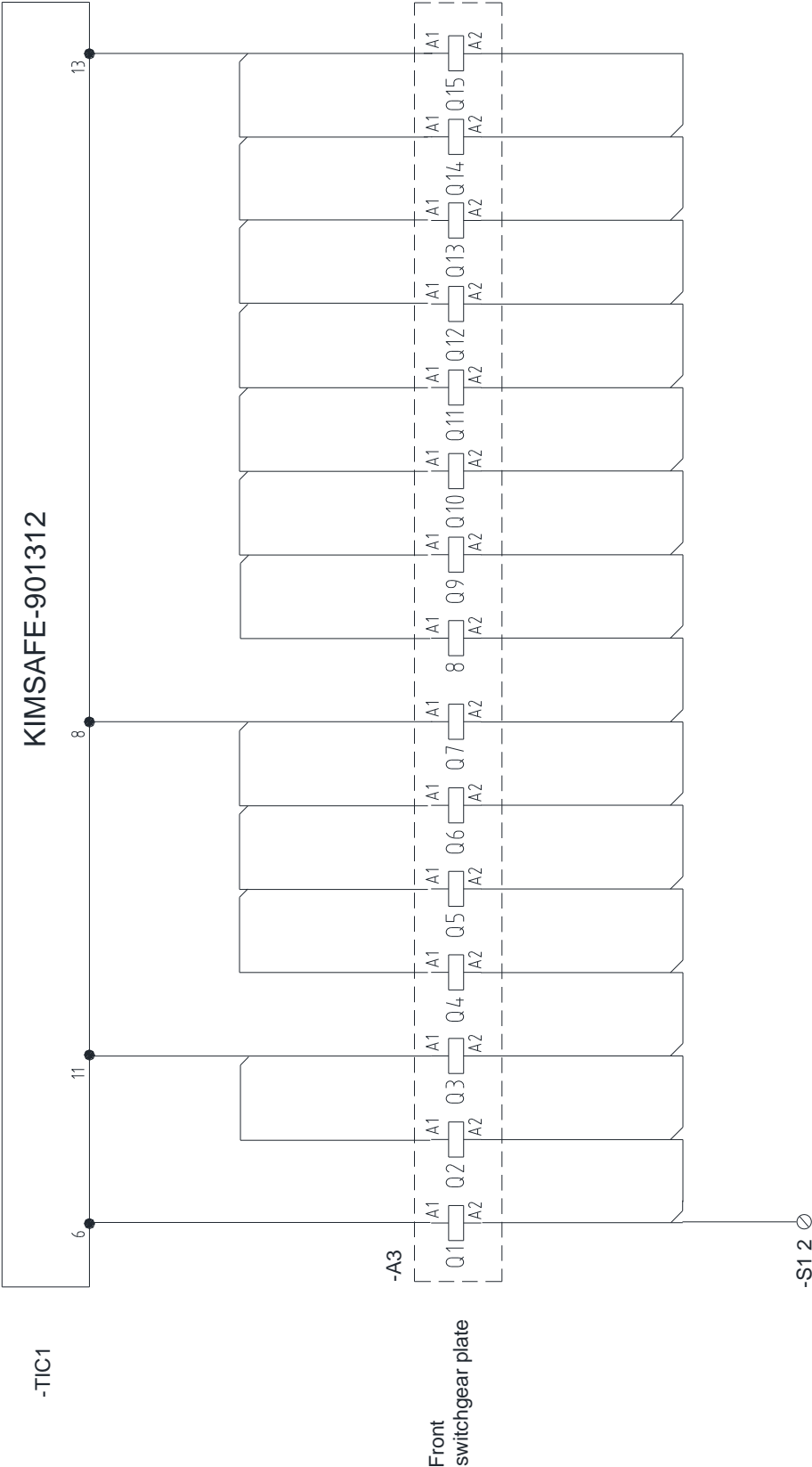


Element/switchgear overview SB 450 – 600 kW/230 V



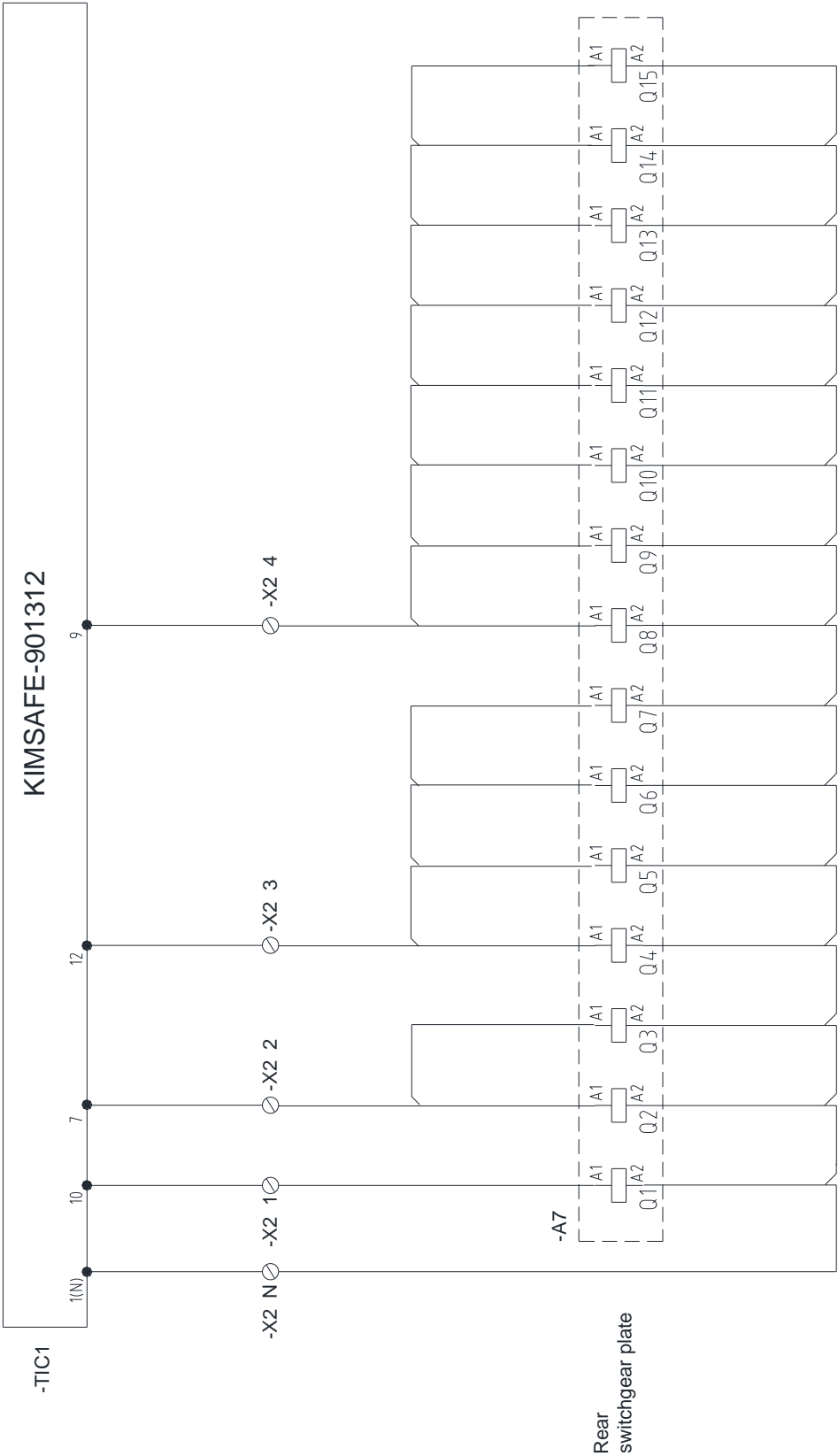
Contactor circuit 750 – 1200 kW

Front switchgear plate

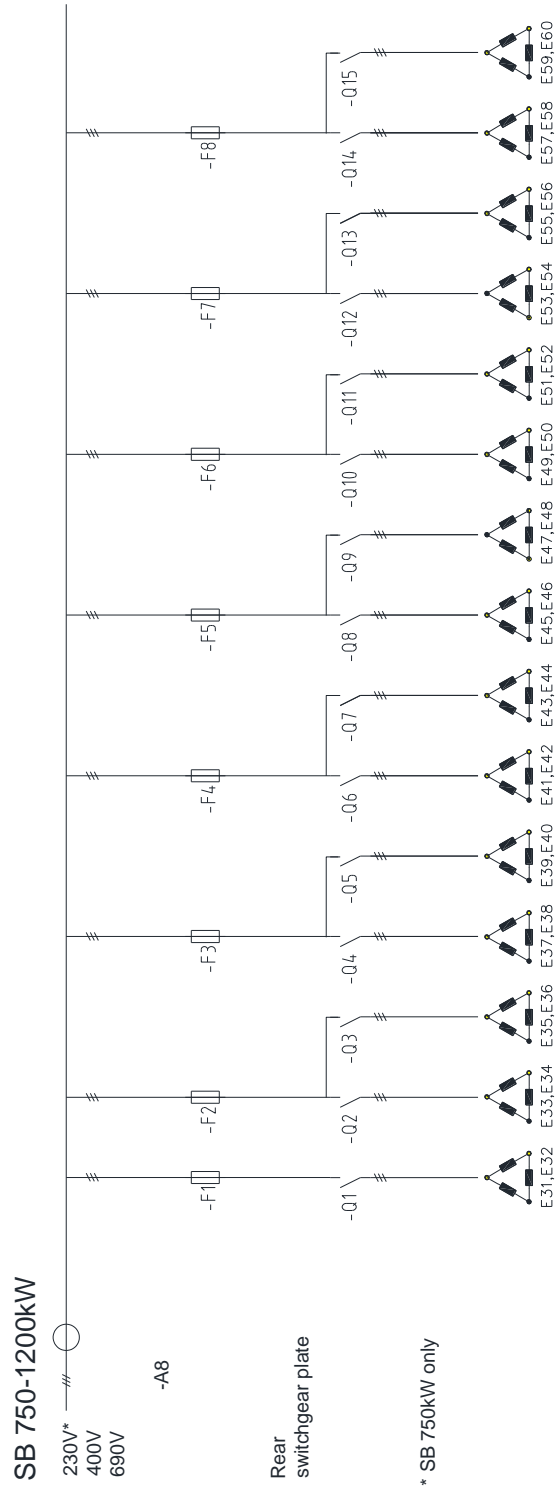
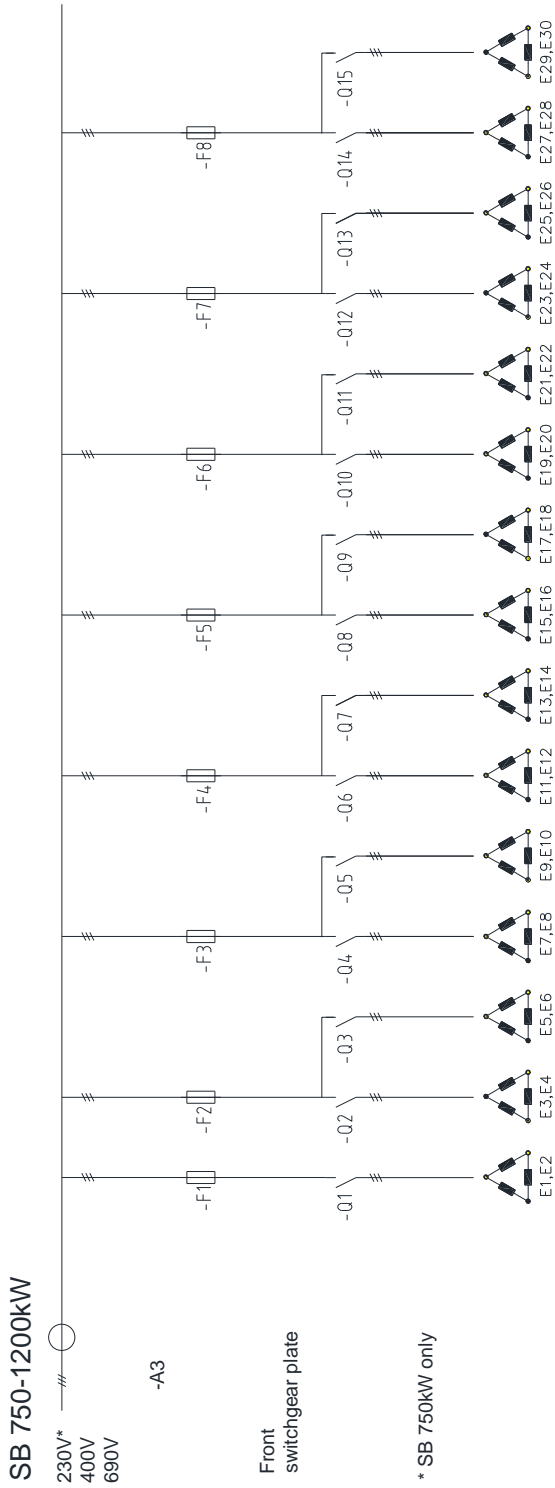


Contactor circuit 750 – 1200 kW

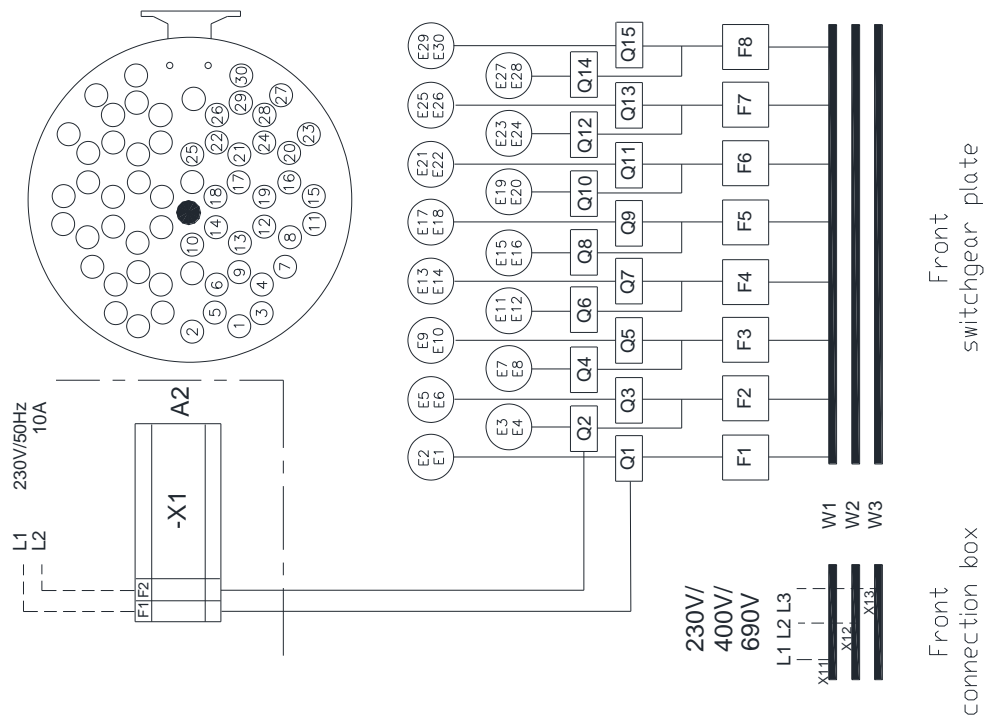
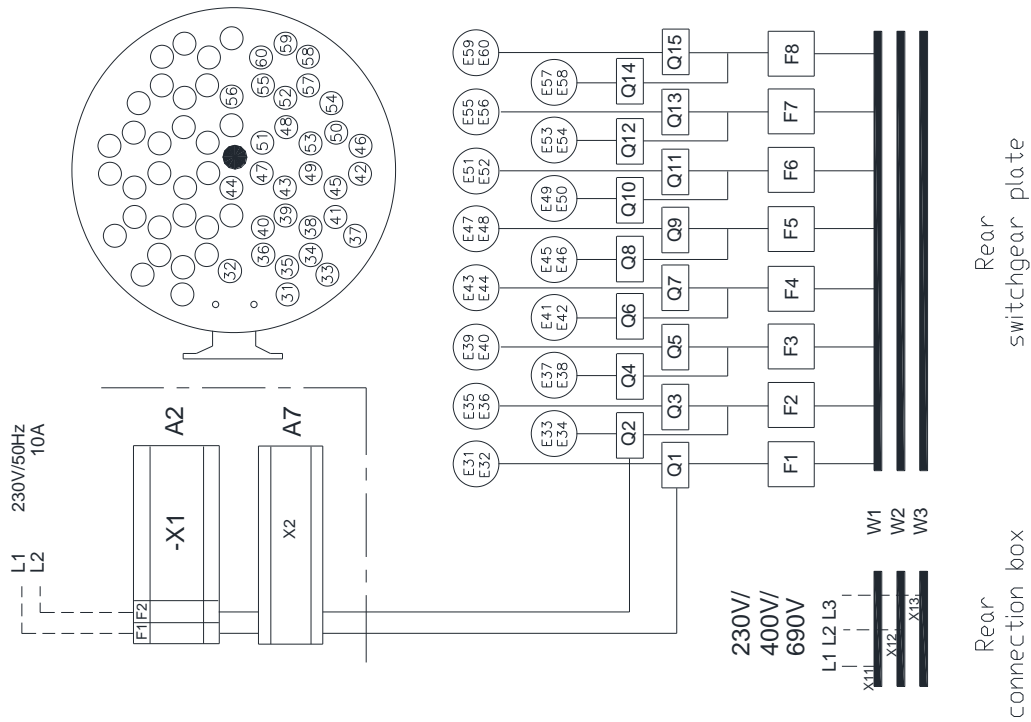
Rear switchgear plate



Main circuit diagram SB 750-1200 kW

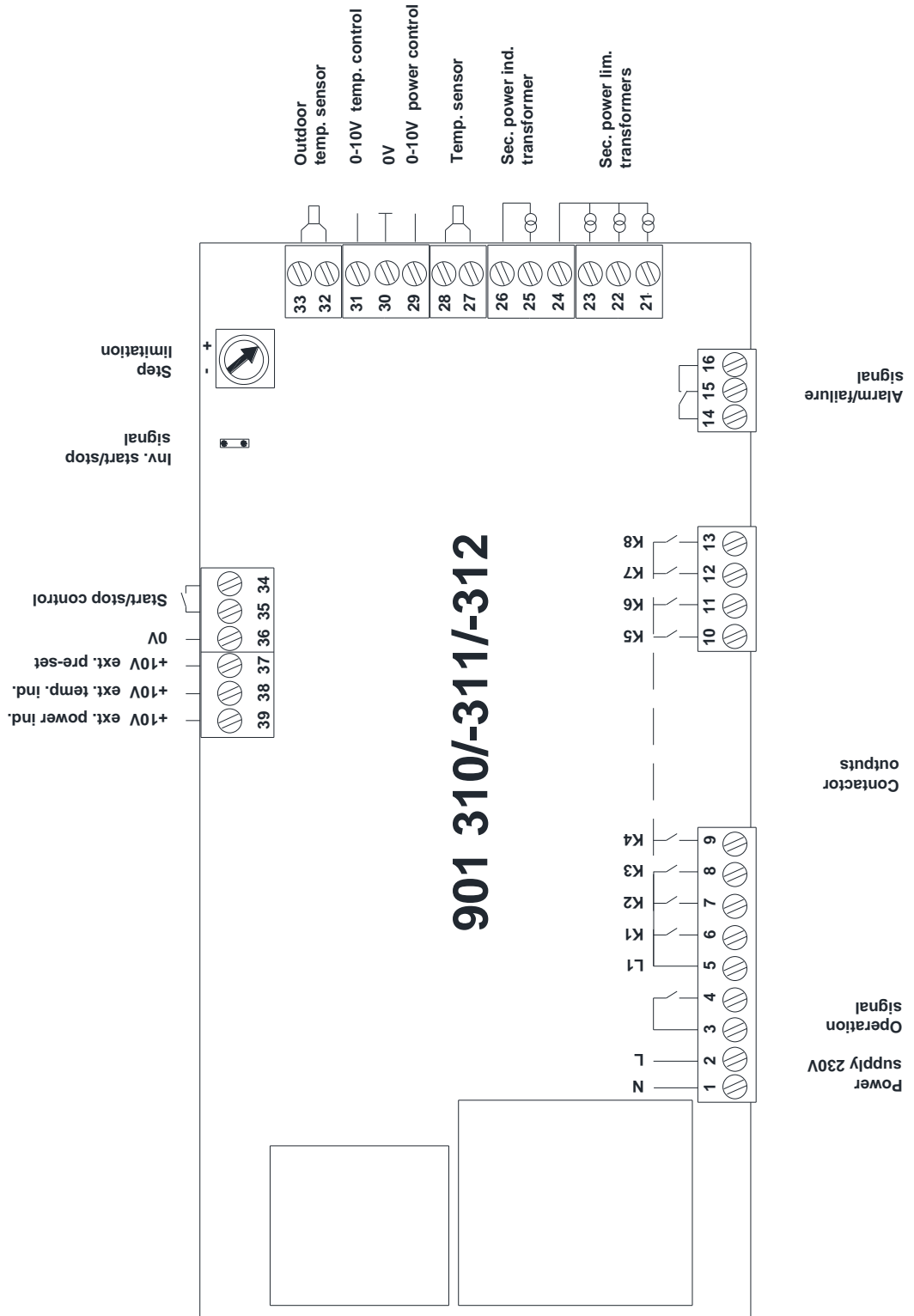


Element/switchgear overview SB 750 – 1200 kW



Temp.regulator connections

KimSafe electronic temp.regulator



Power factors

These values are set at factory and should not be changed.

Type	Trafo (5A)	Effektfaktor kW/A
SB 2180	500	40
SB 2200	600	48
SB 2225	600	48
SB 2250	800	64
SB 2300	800	64

SB 2375	1000	80
SB 2400	1200	96

SB 2450	1200	96
SB 2500	1500	120
SB 2600	2000	159

SB 2750	2000	159
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Type	Trafo (5A)	Effektfaktor kW/A
SB 4180	300	42
SB 4200	300	42
SB 4225	400	55
SB 4250	400	55
SB 4300	500	69

SB 4375	600	83
SB 4400	600	83
SB 4450	800	111
SB 4500	800	111
SB 4600	1000	139

SB 4750	1200	166
SB 4800	1200	166
SB 4900	1500	208
SB 41000	1500	208
SB 41100	2000	277
SB 41200	2000	277

Type	Trafo (5A)	Effektfaktor kW/A
SB 6180	200	48
SB 6200	200	48
SB 6225	200	48
SB 6250	300	72
SB 6300	300	72

SB 6375	400	96
SB 6400	400	96
SB 6450	400	96
SB 6500	500	120
SB 6600	500	120

SB 6750	800	191
SB 6800	800	191
SB 6900	800	191
SB 61000	1000	239
SB 61100	1000	239
SB 61200	1000	239

Sensor resistances

Boiler sensor NTC22k

°C	0	10	20	30	40	50	60	70	80	90	100	110
kΩ	66,3	41,8	27,1	18	12,2	8,5	6	4,2	3,13	2,32	1,75	1,33

Outdoor sensor

°C	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
Ω	1880	1443	1115	870	680	540	430	340	276	225	180	151

Spare parts for 230 V boilers

Item	Part no.	No./boiler										
		180 kW	200 kW	225 kW	250 kW	300 kW	375 kW	400 kW	450 kW	500 kW	600 kW	750 kW
Element 10 kW-230/400V	6672 0242-A	9	5				15	10				30
Element 15 kW-230/400V	6672 0242-D	6	10	15	10		15	20	30			30
Element 20 kW-230/400V	6672 0242-G				5	15				10	30	
Element gasket	2152 0022-4	15	15	15	15	15	30	30	30	30	30	60
Insulator disc	6672 0260-AL	15	15	15	15	15	30	30	30	30	30	60
Regulator 15-step	901 311	1	1	1	1	1						
Regulator 30-step	901 312						1	1	1	1	1	1
Sensor for regulator	200 232	1	1	1	1	1	1	1	1	1	1	1
Transformer sec.	200 018	1	1	1	1	1	1	1	1	1	1	1
ON/OFF switch	6672 0235-3	1	1	1	1	1	1	1	1	1	1	1
Safety thermostat	6672 0235-1	1	1	1	1	1	1	1	1	1	1	1
Fan	6480 0001-1						1	1	1	1	1	1
Contactor AF26	41 175 48	1										
Contactor AF30	41 175 56		1	1	1				1 + 1	1 + 1		
Contactor AF40	41 175 75	1				1	2	2			1 + 1	
Contactor AF52	41 175 80	6	7	7	2				7 + 7	4 + 4		
Contactor AF65	41 175 86				5		14	14				15 + 15
Contactor AF80	41 175 92											
Contactor AF116	41 176 10					7				3 + 3	7 + 7	
Fuse 10A Ø5x20mm	6672 0235-27	2	2	2	2	2	2	2	2	2	2	2
Fuse 20 A NH000	16 192 25											
Fuse 25 A NH000	16 192 26											
Fuse 35 A NH000	16 192 27	3										
Fuse 50 A NH000	16 192 28		3	3	3				3 + 3	3 + 3		
Fuse 63 A NH000	16 192 29	3				3		3			3 + 3	
Fuse 80 A NH000	16 192 30	18	15				3		21 + 21			3 + 3
Fuse 100 A NH000	16 192 31		6	21	6					12 + 12		
Fuse 125 A NH00	16 192 32				15	21				9 + 9	21 + 21	
Fuse 160 A NH00	16 192 47						21	21				21 + 21
Fuse holder 3-ph	6672 0251-12	8	8	8	8	8	8	8	8 + 8	8 + 8	8 + 8	8 + 8
Cablegland 240 mm ²	2152 0030-2	4	4	4	4	4	4	4	2 x 4	2 x 4	2 x 4	2 x 4
Connector 240mm ²	6672 0251-6	9	9	9	9	9	12	12	2 x 12	2 x 12	2 x 12	2 x 12
Earth connector	6672 0251-9	5	5	5	5	5	5	5	2 x 5	2 x 5	2 x 5	2 x 5
Transformer 500/5A	6672 0235-55	1										
Transformer 600/5A	6672 0235-10		1	1								
Transformer 800/5A	6672 0235-11				1	1						
Transformer 1000/5A	6672 0235-9						1					
Transformer 1200/5A	6672 0235-7							1	1			
Transformer 1500/5A	6672 0235-4									1		
Transformer 2000/5A	6672 0235-56										1	1

Spare parts for 400 V boilers

Item	Part no.	No./boiler																
		180 kW	200 kW	225 kW	250 kW	300 kW	375 kW	400 kW	450 kW	500 kW	600 kW	750 kW	800 kW	900 kW	1000 kW	1100 kW	1200 kW	
Element 10 kW-230/400V	6672 0242-A	9	5				15	10				30	20					
Element 15 kW-230/400V	6672 0242-D	6	10	15	10		15	20	30	20		30	40	60	40	20		
Element 20 kW-230/400V	6672 0242-G				5	15				10	30					20	40	60
Element gasket	2152 0022-4	15	15	15	15	15	30	30	30	30	30	60	60	60	60	60	60	
Insulator disc	6672 0260-AL	15	15	15	15	15	30	30	30	30	30	60	60	60	60	60	60	
Regulator 15-step	901 311	1	1	1	1	1												
Regulator 30-step	901 312						1	1	1	1	1	1	1	1	1	1	1	
Sensor for regulator	200 232	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Transformer sec.	200 018	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
ON/OFF switch	6672 0235-3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Safety thermostat	6672 0235-1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Fan	6480 0001-1						1	1	1	1	1	1	1	1	1	1	1	
Contactor AF16	41 175 32	1																
Contactor AF26	41 175 48		1	1	1	1	2	2	2	2								
Contactor AF30	41 175 56	1	1									1 + 1	1 + 1					
Contactor AF40	41 175 75	6	6	7	1		14	14	14	4	2	14 + 14	14 + 14	15 + 15		1 + 1		
Contactor AF52	41 175 80				6	7				10	14				15 + 15	14 + 14	15 + 15	
Fuse 10A Ø5x20mm	6672 0235-27	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Fuse 20 A NH000	16 192 25	3																
Fuse 35 A NH000	16 192 27		3	3	3	3		3										
Fuse 50 A NH000	16 192 28	3	3	3			3		3	3		3 + 3	3 + 3	3 + 3	3 + 3			
Fuse 63 A NH000	16 192 29				3	3										3 + 3		
Fuse 80 A NH000	16 192 30	3					21				3	21 + 21	9 + 9				3 + 3	
Fuse 100 A NH000	16 192 31	6	9	9				21	21	6			12 + 12	21 + 21	6 + 6			
Fuse 125 A NH00	16 192 32				9	9				15	21				15 + 15	21 + 21	21 + 21	
Fuse holder 3-ph	6672 0251-12	5	5	5	5	5	8	8	8	8	8	8 + 8	8 + 8	8 + 8	8 + 8	8 + 8	8 + 8	
Cablegland 240 mm ²	2152 0030-2	4	4	4	4	4	4	4	4	4	4	4 + 4	4 + 4	4 + 4	4 + 4	4 + 4	4 + 4	
Connector 240mm ²	6672 0251-6	9	9	9	9	9	12	12	12	12	12	12 + 12	12 + 12	12 + 12	12 + 12	12 + 12	12 + 12	
Earth connector	6672 0251-9	5	5	5	5	5	5	5	5	5	5	5 + 5	5 + 5	5 + 5	5 + 5	5 + 5	5 + 5	
Transformer 300/5A	6672 0235-53	1	1															
Transformer 400/5A	6672 0235-54			1	1													
Transformer 500/5A	6672 0235-55					1												
Transformer 600/5A	6672 0235-10						1	1										
Transformer 800/5A	6672 0235-11								1	1								
Transformer 1000/5A	6672 0235-9										1							
Transformer 1200/5A	6672 0235-7											1	1					
Transformer 1500/5A	6672 0235-4													1	1			
Transformer 2000/5A	6672 0235-56															1	1	

Spare parts for 690 V boilers

Item	Part no.	No./boiler															
		180 kW	200 kW	225 kW	250 kW	300 kW	375 kW	400 kW	450 kW	500 kW	600 kW	750 kW	800 kW	900 kW	1000 kW	1100 kW	1200 kW
Element 10 kW-400/690V	6672 0242-W	9	5				15	10				30	20				
Element 15 kW-400/690V	6672 0242-Z	6	10	15	10		15	20	30	20		30	40	60	20	20	
Element 20 kW-400/690V	6672 0242-AC				5	15				10	30			40	40	60	
Element gasket	2152 0022-4	15	15	15	15	15	30	30	30	30	30	60	60	60	60	60	60
Insulator disc	6672 0260-AL	15	15	15	15	15	30	30	30	30	30	60	60	60	60	60	60
Regulator 15-step	901 311	1	1	1	1	1											
Regulator 30-step	901 312						1	1	1	1	1	1	1	1	1	1	1
Sensor for regulator	200 232	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Transformer sec.	200 018	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ON/OFF switch	6672 0235-3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Safety thermostat	6672 0235-1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Fan	6480 0001-1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1
Contactor AF09	41 175 00	1						2									
Contactor AF16	41 175 32		1	1	1				2								
Contactor AF26	41 175 48	7	7	1	1	1		2		2	2	1 + 1	7 + 7	1 + 1	1 + 1	1 + 1	
Contactor AF30	41 175 56			6				12	14	4			8 + 8	14 + 14	4 + 4		1 + 1
Contactor AF40	41 175 75				6	7	2			10	14	14 + 14			10 + 10	14 + 14	14 + 14
Contactor AF52	41 175 80																
Contactor AF65	41 175 86						14										
Fuse 10A Ø5x20mm	6672 0235-27	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Fuse 16 A NH000	16 020 04		3	3	3												
Fuse 20 A NH000	16 020 05					3											
Fuse 25 A NH000	16 020 06	3	3					3				3 + 3	3 + 3				
Fuse 35 A NH000	16 020 08			3	3				3	3				3 + 3	3 + 3	3 + 3	
Fuse 50 A NH000	16 020 10	9	3			3		3	3		3	21 + 21	9 + 9				3 + 3
Fuse 63 A NH000	16 020 11		6	9				18	21	6			12 + 12	21 + 21	6 + 6		
Fuse 80 A NH000	16 020 12				9	9	3			15	21				15 + 15	21 + 21	21 + 21
Fuse 160 A NH00	16 192 47						21										
Fuse holder 3-ph	6672 0251-12	5	5	5	5	5	8	8	8	8	8	8 + 8	8 + 8	8 + 8	8 + 8	8 + 8	8 + 8
Cablegland 240 mm ²	2152 0030-2	4	4	4	4	4	4	4	4	4	4	4 + 4	4 + 4	4 + 4	4 + 4	4 + 4	4 + 4
Connector 240mm ²	6672 0251-6	9	9	9	9	9	12	12	12	12	12	12+12	12+12	12+12	12 + 12	12+12	12+12
Earth connector	6672 0251-9	5	5	5	5	5	5	5	5	5	5	5 + 5	5 + 5	5 + 5	5 + 5	5 + 5	5 + 5
Transformer 200/5A	6672 0235-51	1	1	1													
Transformer 300/5A	6672 0235-53				1	1											
Transformer 400/5A	6672 0235-54						1	1	1								
Transformer 500/5A	6672 0235-55									1	1						
Transformer 800/5A	6672 0235-11											1	1	1			
Transformer 1000/5A	6672 0235-9														1	1	1

SAMSVARERKLÆRING
Declaration of conformity

Fabrikant/Manufacturer

Navn/Name:	Varmeteknikk AS		
Adresse/Address:	Postboks 6 Alnabru 0614 Oslo		
Telefon/Phone:	+47 23 37 55 00	e-post/e-mail:	post@varmeteknikk.no

erklærer herved at produktet er i overensstemmelse/
declare under our sole responsibility the conformity of the product:

Produkt/Product

Produkt/Type of equipment:	Elektrokjøl / Electric boiler
Fabrikat/Brand name:	Varmeteknikk
Modell/Type:	SB 180 - 1200kW

**Med de grunnleggende krav i direktivene/
With the essential requirements of the directives:**

2014/35/EU	Lavspenningsdirektivet (LVD)
2014/35/EU	Low Voltage Directive (LVD)
2014/30/EU	Elektromagnetisk kompatibilitet (EMC)
2014/30/EU	Electromagnetic Compatibility (EMC)
2009/125/EU	Energirelaterte produkter
2009/125/EU	Energy related products/ErP)

Harmoniserte standarder/Harmonized standards

	Nr./No
HOUS	EN 60335-1:2012; A11: 2014 EN 60335-1:2012 EN 60335-2-35:2002, A1; A2
EMF	EN 62233:2008
EMC	EN 61000-6-2:2005 EN 61000-6-3:2007, A1
ERP	(2014/C 207/02) OJ 3.7.2014

Dato/Date: 03.11.2020

Sted/Place: Oslo


Stig Bø

Teknisk sjef/Technical Director

Notes

