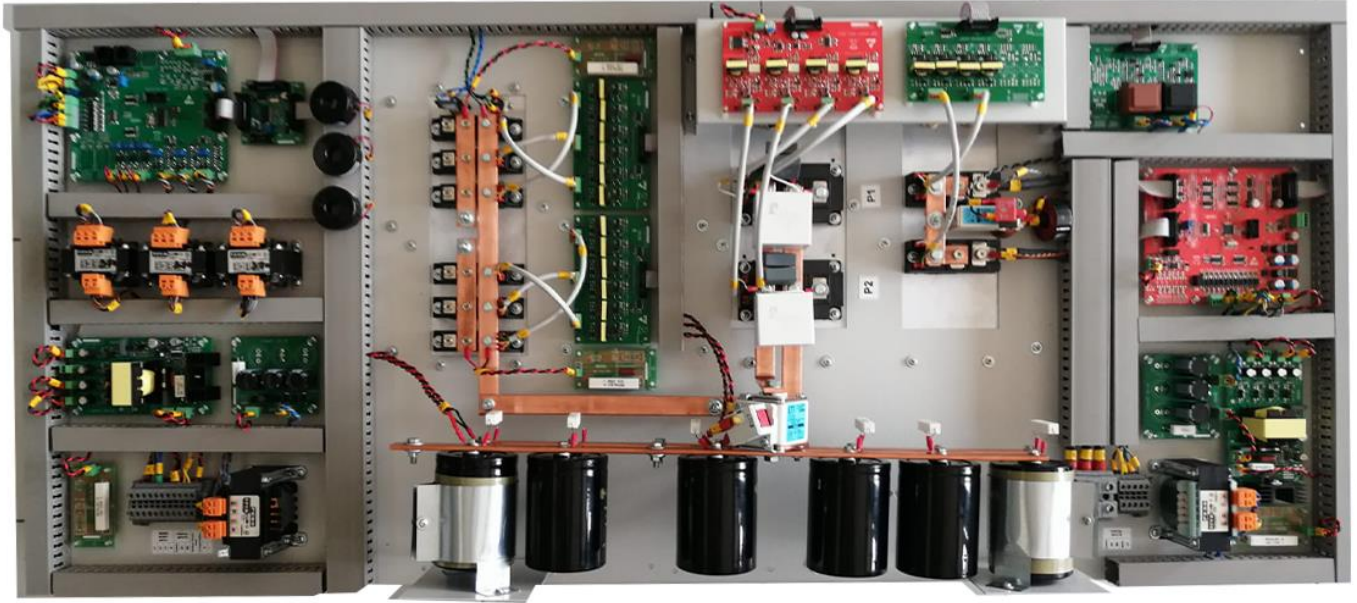
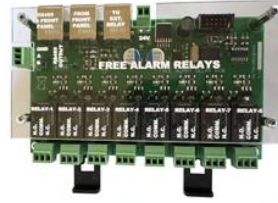


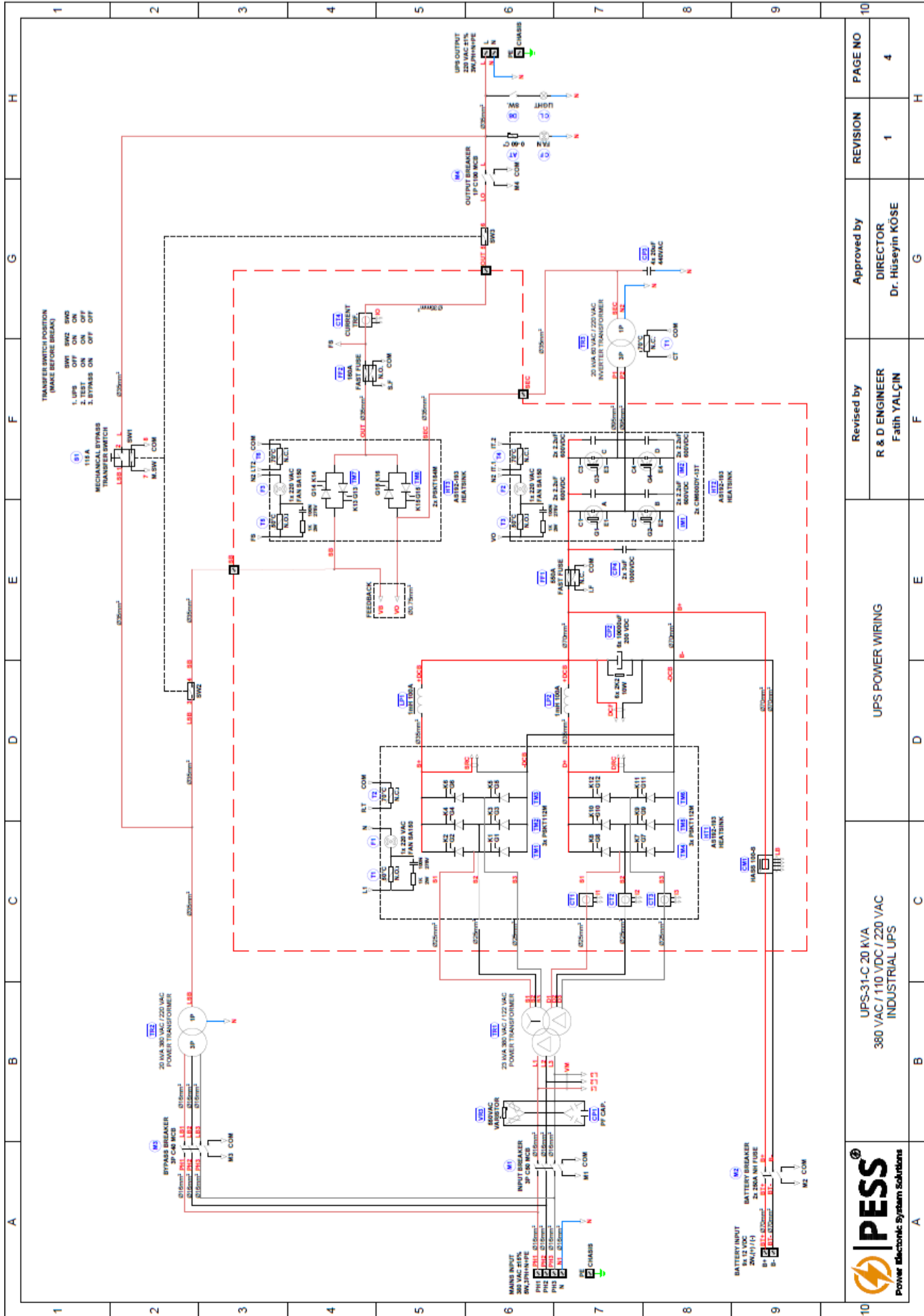
Quick Installation Guide for PESS Open Frame Devices



1. Table for Required Components

The list of the components provided by PESS				
No	Description	QTY	Manufacturer	Part code
1	20 kVA 3PH 380 VAC 50 Hz / 110 VDC / 220 VAC UPS-31 Module	1	PESS	UPS-31
2	7" Touch Screen HMI Display Module	1	PESS	TS-REC-HMI
3	Battery Current Measurement Module	1	LEM	HASS 100-S
4	550 VAC Delta Connected Varistor	1	PESS	VR3-550
5	8 Channel Programmable Alarm Relay Board	1	PESS	REC-RLY-BD
6	23 kVA 380 VAC / 125 VAC 12P Rectifier Transformer	1	PESS	23-380-125-12
7	20 kVA 60 VAC / 220 VAC Single Phase Inverter Transformer	1	PESS	20-60-220-01
8	20 kVA 380 VAC / 220 VAC Scott Type Bypass Transformer	1	PESS	20-380-220-T

The list of the components should provided by customer				
No	Description	QTY	Manufacturer	Part code
1	3P C50 Input Circuit Breaker MCB (10 kA)	1	Schneider	A9F74350
2	3P C40 Bypass circuit Breaker MCB (10 kA)	1	Schneider	A9F74340
3	1P C100 Output Circuit Breaker MCB (10 kA)	1	Schneider	A9N18358
4	NH1 gG 250A/500V Battery NH Fuse	2	ETI	004184219
5	NO/NC Auxiliary Contact for Input and Bypass MCB	2	Schneider	A9A26924
6	NO/NC Auxiliary Contact for Output MCB	1	Schneider	A9N26924
7	NO/NC Auxiliary Contact for NH Fuse	2	ETI	004117001



UPS-31-C 20 KVA
 380 VAC / 110 VDC / 220 VAC
 INDUSTRIAL UPS

UPS POWER WIRING

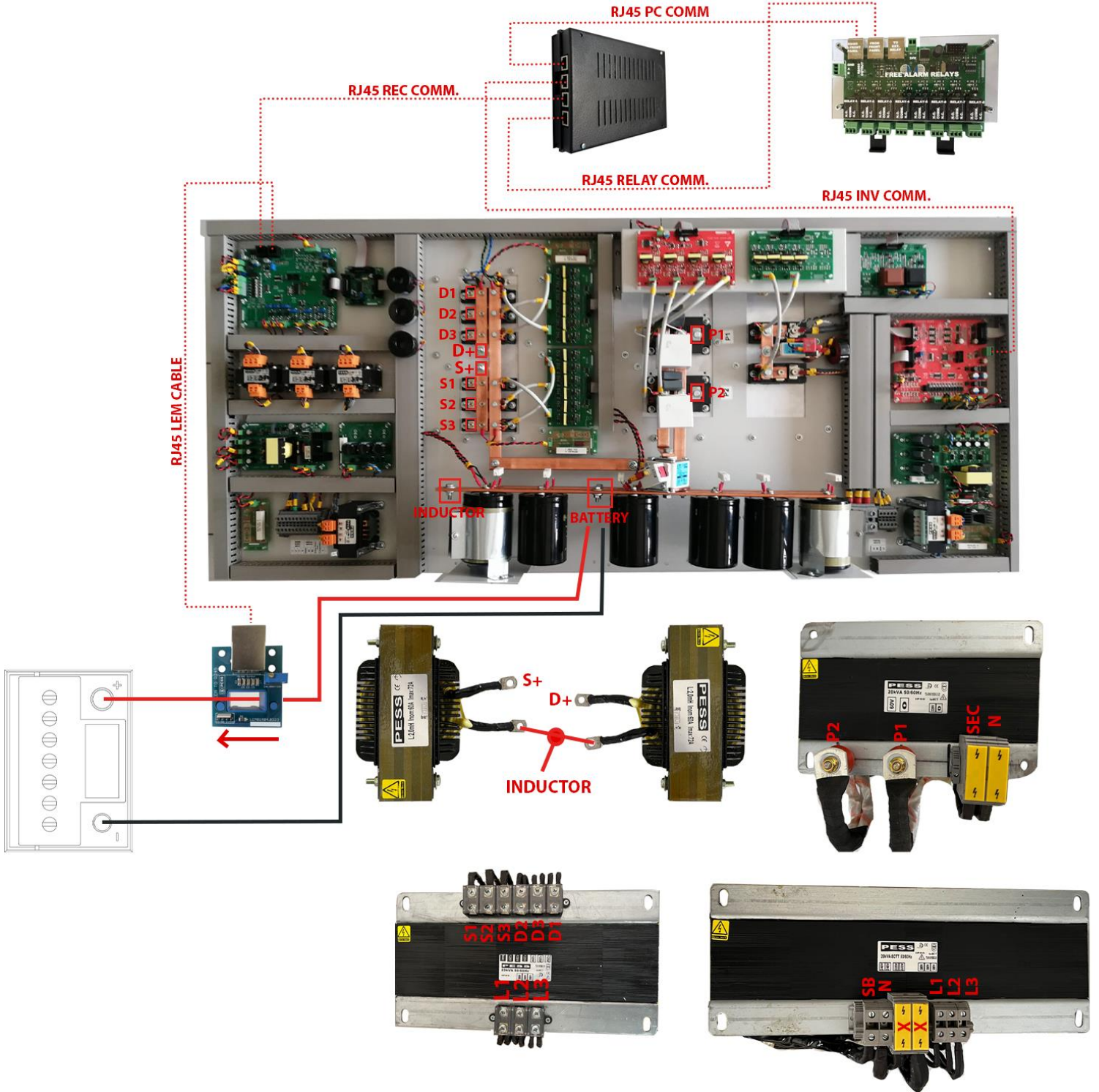
Revised by
 R & D ENGINEER
 Fatih YALÇIN

Approved by
 DIRECTOR
 Dr. Hüseyin KOŞE

REVISION
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2. Connection Points



3. Cabling Description

Please read this section carefully. PESS company doesn't accept any responsibility if the connection method specified in this document is not followed or the wrong connection is made.

1. Point : Connect the 23 kVA 380 VAC / 125 VAC rectifier transformer

Caution ! Since this device has 12 pulse rectifiers, incorrect phase sequence at the input of the rectifier transformer will cause the rectifier not to turn on. Please make sure the tightness of the terminals and connectors.

2. Point : Connect 1 mH 100A rectifier filter inductors

Caution ! Please make sure the tightness of the terminals and connectors. We recommend using anti-vibration mounts when fixing the inductor to the cabinet.

3. Point : Connect 20 kVA 60 VAC / 220 VAC Inverter transformer

Caution ! Switching between Inverter and Bypass while they are asynchronous will cause permanent damage to the device. Therefore, it is very important to connect the inverter transformer correctly.

4. Point : Connect 20 kVA 380 VAC / 220 VAC Scott Type Bypass transformer

Caution ! Since the connections of the bypass transformer affect synchronization, Switching between Inverter and Bypass while they are asynchronous will cause permanent damage to the device. the connections of the bypass transformer must also be made correctly.

5. Point : Connect the battery cables to the terminals left for battery connection on the copper DC BUS of the device

6.

Caution ! Please make sure the tightness of the terminals and connectors. We recommend using flange bolts and flange nuts to prevent the bolts from loosening over time. Make sure that the plastic insulation of the cable does not touch the DC BUS, except for the connection area.

Caution ! There is a directional arrow on the Lem battery current measurement module. The head of this arrow should be towards the battery. Incorrect arrow direction will cause incorrect battery current measurement.

7. Point : Connect mechanical bypass transfer switch according to the device circuit schematic.

Caution ! The terminal numbers of the packet switch are written in the diagram. After completing the connections of the packet switch, a probe check must be made before operating the device. An error made in the transfer switch causes permanent damage to the device.

8. Rectifier electronic control cables

Monitoring For AC input monitoring, it must be connected to the primary of the rectifier transformer with L1-L2-L3 sequence. If the phase sequence is not correct rectifier will not turn-on.

Digital Inputs Input circuit breaker (M1) and battery circuit breaker(M2) should be connect here for monitoring the breaker trip status.

Heat compensation This terminal is used to measure the temperature of the batteries while they are being charged. If the user does not want to use this feature, this terminal can be left alone. If this feature will be used, a resistive temperature sensor must be connected to these terminals.

24V supply This 24V supply reserved for the relay board 24V supply. Before the turn-on the device please check the polarity of the 24V supply. Wrong polarity may cause a permanent damage.

9. Inverter electronic control cables

Digital Inputs Bypass circuit breaker (M3), battery circuit breaker(M4), Maintenance bypass switch(M.SW) and inverter trf. core thermostat (CT) should be connected here for monitoring for status.

4. Transformer Design

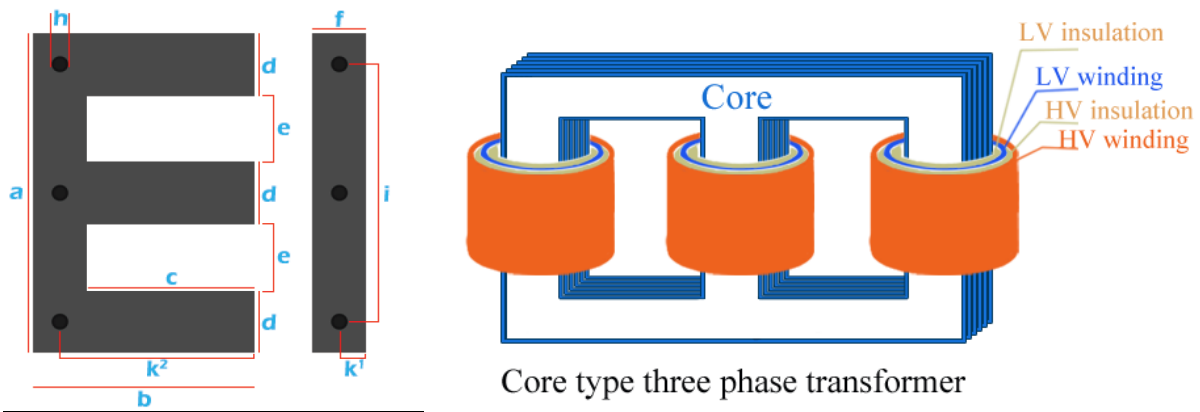
In this section we will explain how the transformers used in this device are designed.

1. Rectifier transformer

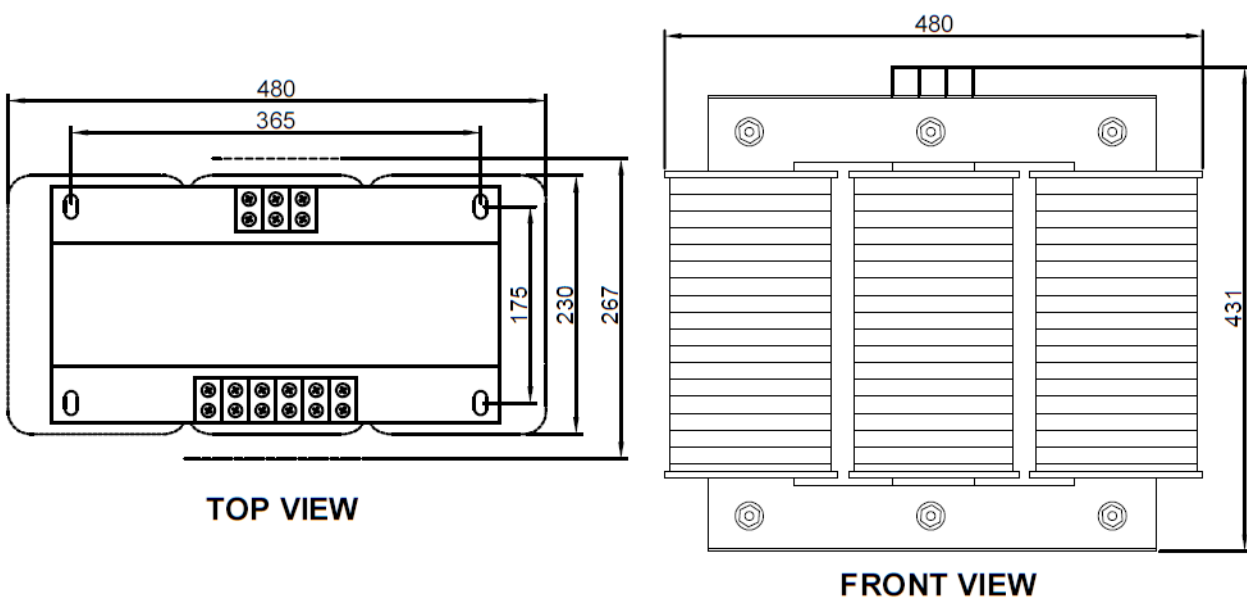
23KVA, 12Pulse Rectifier Transformer Design Parameters

	Primary	Secondary	Secondary
	Delta (Δ)	Delta (Δ)	Star (Y)
Base Voltage	380V (Ph-Ph)	125V (Ph-Ph)	125V (Ph-Ph)
Power	23 KVA	11,5 KVA	11,5 KVA
Wire Area (Diameter)	12,56 mm ² ($\varnothing=4.0$ mm)	18.1 mm ² ($\varnothing=4.8$ mm)	31.2 mm ² ($\varnothing=6.3$ mm)
Wire Type	Aluminum Enamel	Aluminum Enamel	Aluminum Enamel
Turn	164 turns	54 turns	32 turns

Material	iron core
Type	EI400
B(max)	10000 gauss (1 Tesla)
Ae	80 mm x 150mm (d) x (thickness)
Dimensions (EI400 packet)	400 mm x 400 mm x 150mm (a) x (b+f) x (thickness)



	a	b	c	d	e	f	h	i	k1	k2	kg/1000 0.5mm
<input checked="" type="checkbox"/> EI 400x400 *	400	320	240	80	80	80	15	320	40	280	468



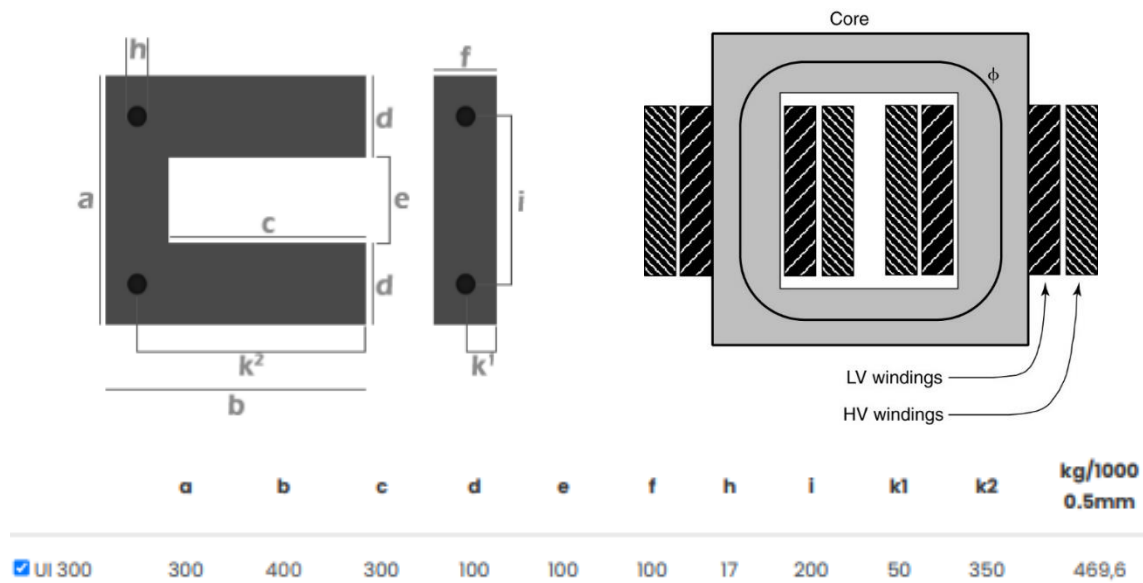
115 kg

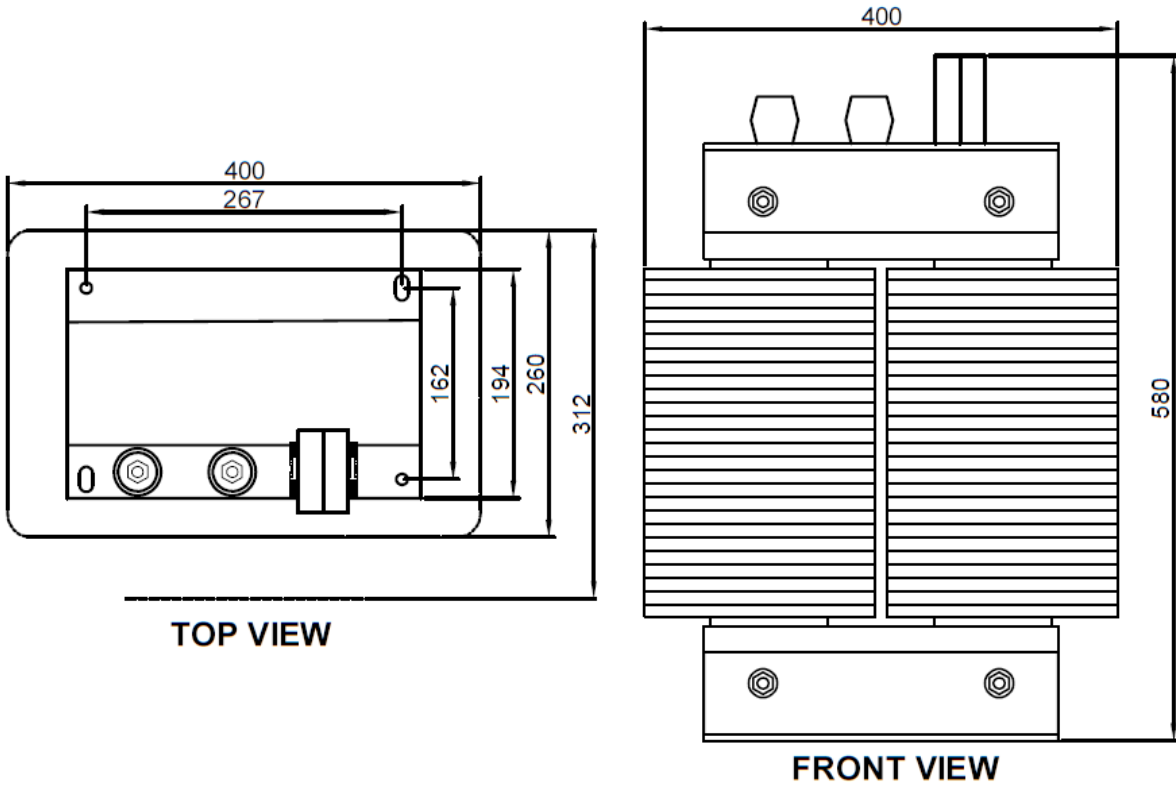
2. Inverter transformer

20KVA, Inverter Output Transformer Design Parameters

	Primary	Secondary
	1 ph	1 ph
Base Voltage	60V (Ph-N)	220V (Ph-N)
Power	20 KVA	20 KVA
Wire Area (Diameter)	201 mm ² ($\phi=16.0$ mm)	52,8 mm ² ($\phi=8.2$ mm)
Wire Type	Aluminum Enamel	Aluminum Enamel
Turn	28 turns	102 turns

Material	iron core
Type	UI300
B(max)	10000 gauss (1 Tesla)
Ae	100 mm×140 mm (d) x (thickness)
Dimensions (UI300 packet)	300 mm×500 mm×140 mm (a) x (b+f) x (thickness)





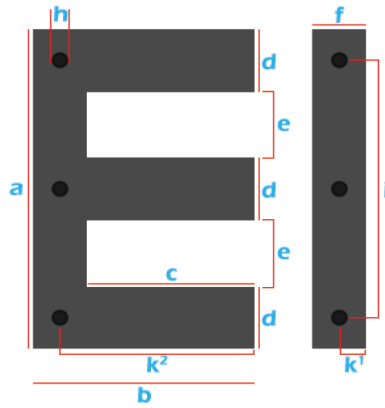
115 kg

3. Bypass transformer

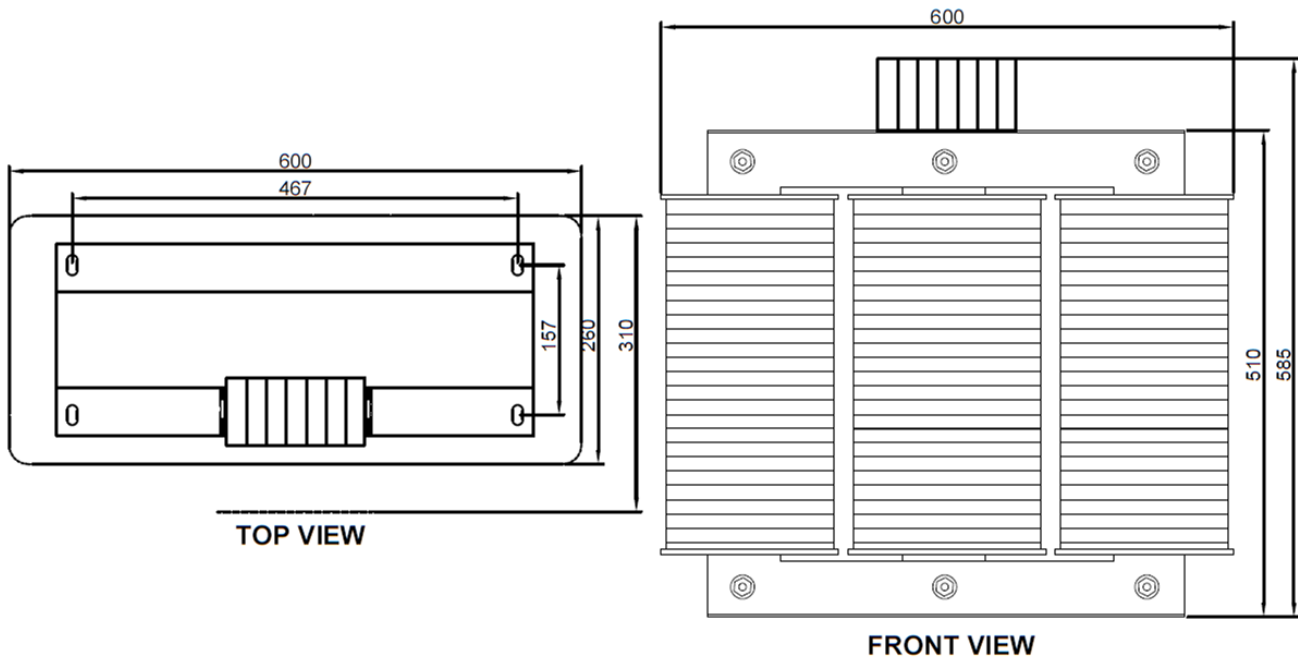
20KVA, Bypass Scot Type 3/1 Transformer Design Parameters

	Primary	Secondary
	Scot-T type	Scot-T type
Base Voltage	380V (Ph-Ph-Ph)	220V (Ph-Ph)
Power	20 KVA	20 KVA
Wire Area (Diameter)	17.3 mm ² (Ø=4.7 mm)	50.2 mm ² (Ø=8 mm)
Wire Type	Aluminum Enamel	Aluminum Enamel
Turn	172x3 turns	58x2 turns

Material	iron core
Type	EI500
B(max)	10000 gauss (1 Tesla)
Ae	100 mm×130 mm (d) x (thickness)
Dimensions (EI500 packet)	500 mm×500 mm×130 mm (a) x (b+f) x (thickness)

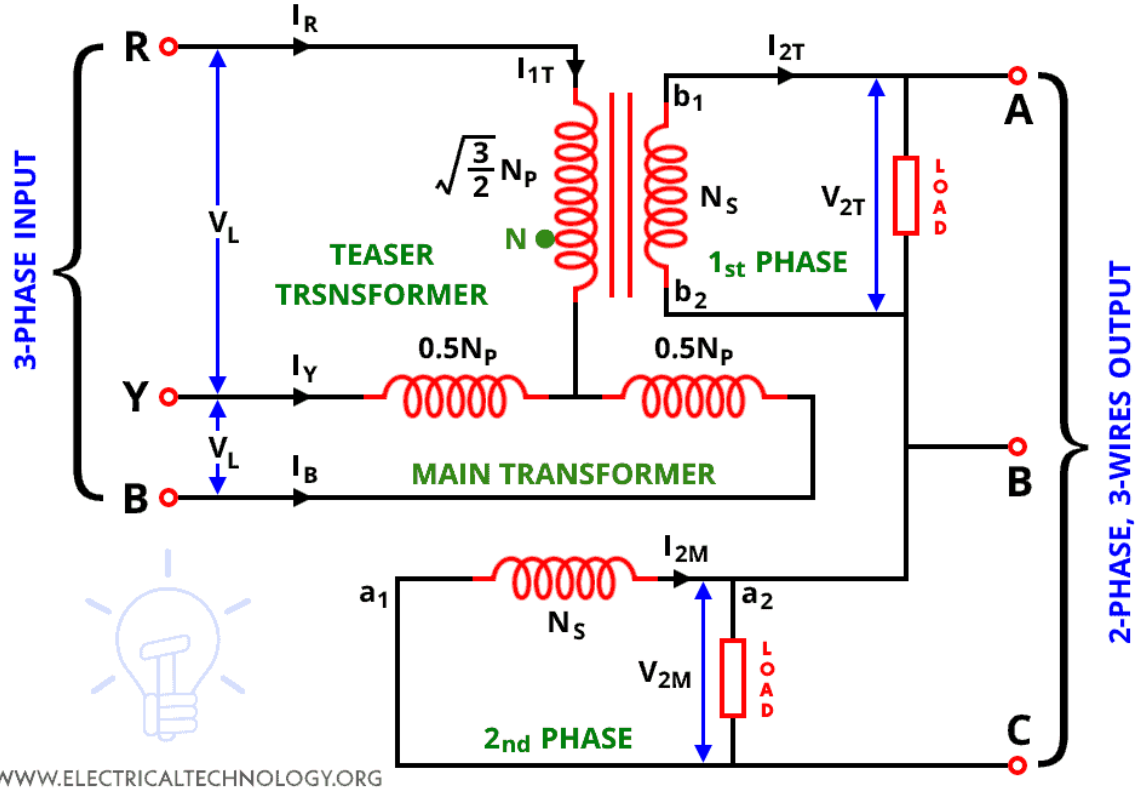


	a	b	c	d	e	f	h	i	k1	k2	kg/1000 0.5mm
<input checked="" type="checkbox"/> EI 500x500 *	500	400	300	100	100	100	16	400	50	350	730



180 kg

Scott-T Transformer Connection



- Use 172 turn for $(\sqrt{3}/2) N_p$,
- Use 172 turn for each $0.5 N_p$,
- Use 58 turn for each N_s , Secondary total turn will be $58 \times 2 = 116$ turn.
- Use A-C ports output for single phase output. Current sharing in primary will be 25%/50%/25%.

4. Transformer placement layout

