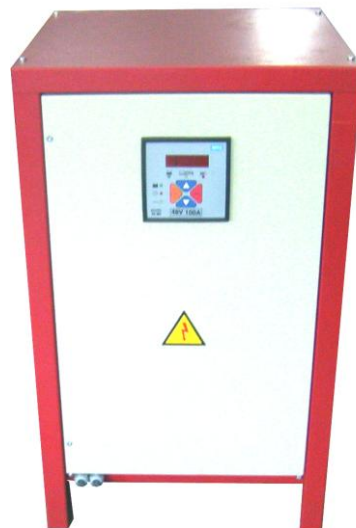




NRM-FC-W1

Forklift Battery Charger



CE

Manual

Commissioning and General Safety Rules

The charger is delivered in special package. After delivery, please check the device against any damage. If the charger's case is damaged, please call the provider.

Location

Before any operation, please prepare appropriate place for the charger. The place should have dry fresh air circulation, and be protected against direct sun shine. Normally, the charger will be hot after a working period. The charger has some gaps on the case for air-cooling to remove the heat. Any objects should not cover them. Otherwise, the charger will be damaged. Batteries produce hydrogen gas, while charging. Therefore, do not use the device in closed places.

Preparation to First Operation

The charger should be connected to appropriate mains. There is an aluminium type plate at the back of the charger. Please read the device's input and output values and compare your system. "I" on the plate means input current per phase. Be sure, your fuses and lines are enough for the value.

NORM Battery Chargers are produced according to 1 Phase –220V 50Hz AC / 2 Phases 2x380V 50Hz AC/ 3 Phases 3x380V 50Hz AC. Connect the charger appropriate phases if the charger uses 2 or 3 phases. You may find phase count on type plate. If the charger arrived without mains power cable, connect required cable to input terminal.

1 Phase Chargers Use Phase(R) – Neutral (Mp) – Earth Ground (GND),

2 Phase Chargers Use Phase(R) – Phase (S) – Neutral (Mp) – Earth Ground (GND)

3 Phase Chargers Use Phase(R) – Phase (S) –Phase (T) – Earth Ground (GND)

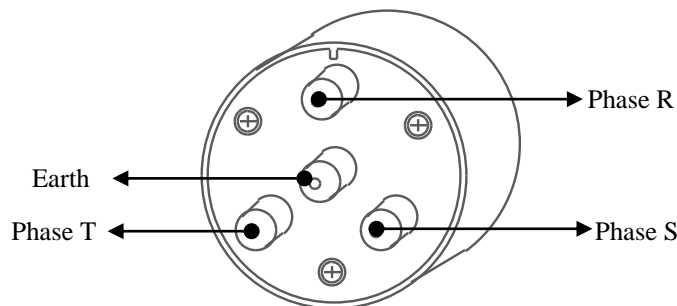
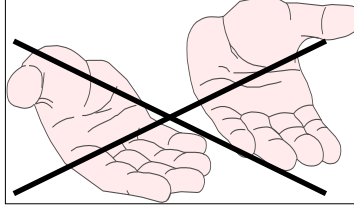


Fig 1. Three Phase Plug Front View

- The Mains Voltage should be in range (+/-)10%. If the voltage is low, the charger cannot provide required current and charge the battery. This kind of usage may cause battery problems.
- Connected Battery should be appropriate to the charger's output current, voltage and Ah values.
- Before using the product, read the manual carefully
- Always ground the charger correctly.
- The charger does not have wrong polarity protection. Make sure (+) terminal of battery connected to charger's (+) terminal and (-) to (-). Wrong connection damages the charger, heavily.

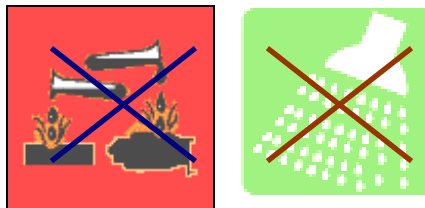
- Wait end of the charging process before disconnect the battery.
- Do not connect extra battery while charging process.
- Do not use the charger out of purpose.



There is high voltage at input and output terminals. Do not touch with bare hands.



**An electric technician should connect the battery. Be careful against electric sparks
Make sure (+) terminal of battery connected to charger's (+) terminal and (-) to (-).
Cut off the mains power before any operation in the charger.**



The charger consists of acid and humid sensitive electronic components.

Always shut the charger front and back doors.

Provide air circulation while charging to remove gas and acid vapour produced by the battery.

Technical Features

	24V 150A	48V 80A	48V 100A
Mains Voltage	380V. 3Faz AC 50Hz.		
Mains Current	10A. Max.	10A. Max.	12A. Max.
Output Voltage	24V. (32V.Max.) DC.300Hz.	48V. (64V.Max.) DC.300Hz.	48V. (64V.Max.) DC.300Hz.
Output Current	150A.	80A.	100A.
Charging Method	Wa Charging Method. Battery state of charge decision and microprocessor controlled charging according to battery charging curve. Recognition of sulphated battery and automatic charge mode selection.		
Charge Duration	Max.10 hours (48 hours equalizing charge)		
Control	Microprocessor controlled full automatic		
Measuring	Voltage, Current, Process Time, End Charge Time, Total Ampere-hour, Charge Cycle, Cell Voltage, Last 20 charge logs		
Warnings	Transformer over heat, Semiconductor over heat, Over current, Mains disconnection, Low Battery Voltage, High Battery Voltage,		
Dimensions	E(L):465 D:440 Y(H):870 (mm.)		
Weight	98kg.	80kg.	85kg.

	48V 120A		
Mains Voltage	380V. 3Faz AC 50Hz.		
Mains Current	14A. Max.		
Output Voltage	48V. (64V.Max.) DC.300Hz.		
Output Current	120A.		
Charging Method	Wa Charging Method. Battery state of charge decision and microprocessor controlled charging according to battery charging curve. Recognition of sulphated battery and automatic charge mode selection.		
Charge Duration	Max.10 hours (48 hours equalizing charge)		
Control	Microprocessor controlled full automatic		
Measuring	Voltage, Current, Process Time, End Charge Time, Total Ampere-hour, Charge Cycle, Cell Voltage, Last 20 charge logs		
Warnings	Transformer over heat, Semiconductor over heat, Over current, Mains disconnection, Low Battery Voltage, High Battery Voltage,		
Dimensions	E:465 D:440 Y:870 (mm.)		
Weight	98.5kg.		

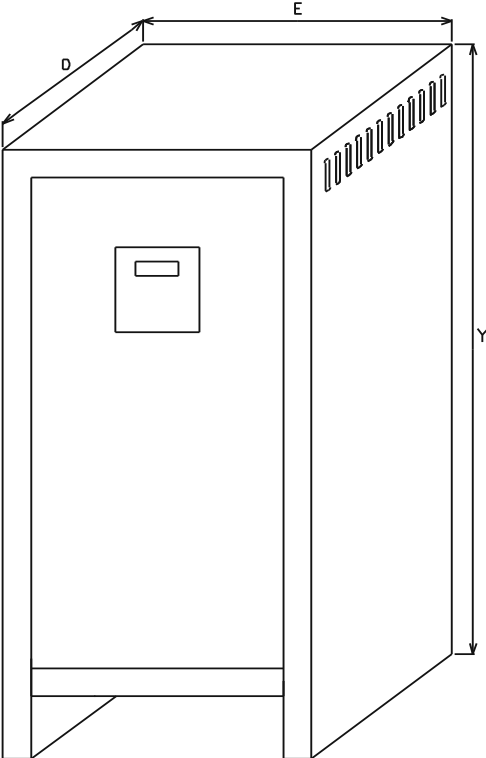


Fig 2. Case Dimensions

Transformer Tap Changing

The mains transformer of the charger has three input taps for each phase (RST) at the terminal block shown in Fig 3.. Using these taps user may increase or decrease output current. The taps labelled as (+5%) – (0) – (-5%). The (+5%) Tap increases the transformer output current approx. 5%. The (-5%) Tap reduces the transformer output current approx. 5%. Factory default is 0. If mains voltage is low, you may use high level. If the voltage is very high you may use low level.

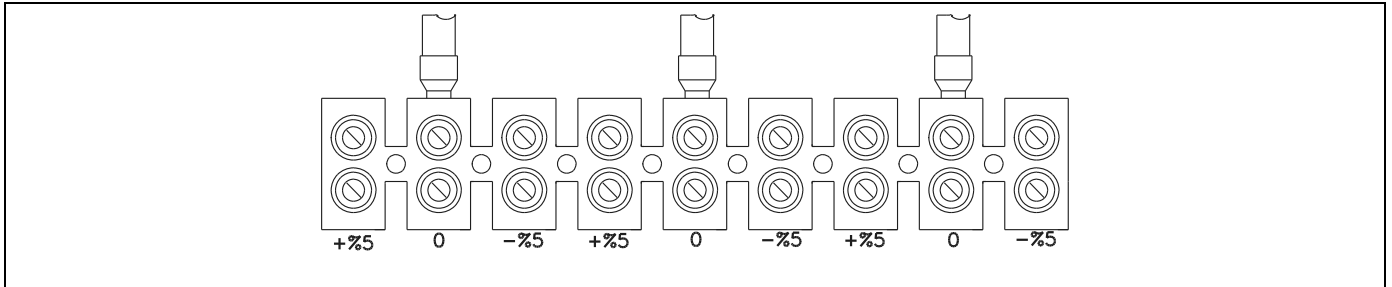


Fig 3. Transformer tap at 0

Increasing output current ;

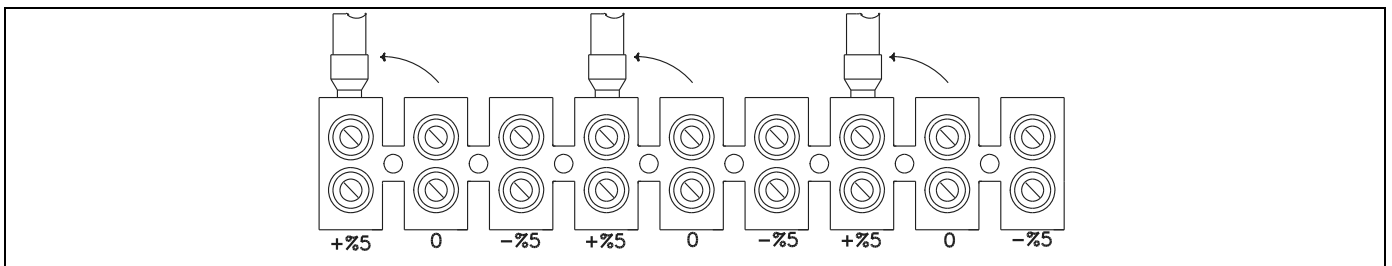


Fig 4 High Output Current Connection

Each cable is shifted to left as shown in Fig 4.

Decreasing output current ;

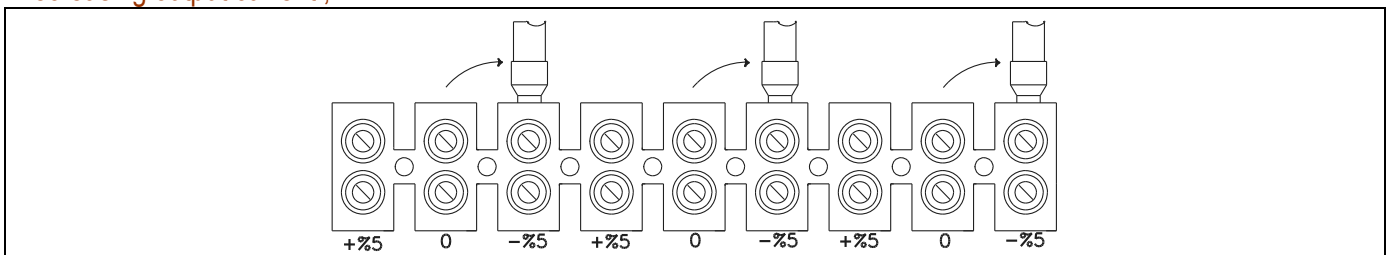


Fig 5 Low output connection

Each cable is shifted to left as shown in Fig 5.

Definition of The Charger and Working

The charger has produced for charging forklift batteries only. Always use with appropriate battery.

FCW1 chargers have microprocessor control unit, which manages charging process. The unit automatically sense mains and battery connection and warns user. If both of them are connected properly and set values are okay, charging process automatically starts.

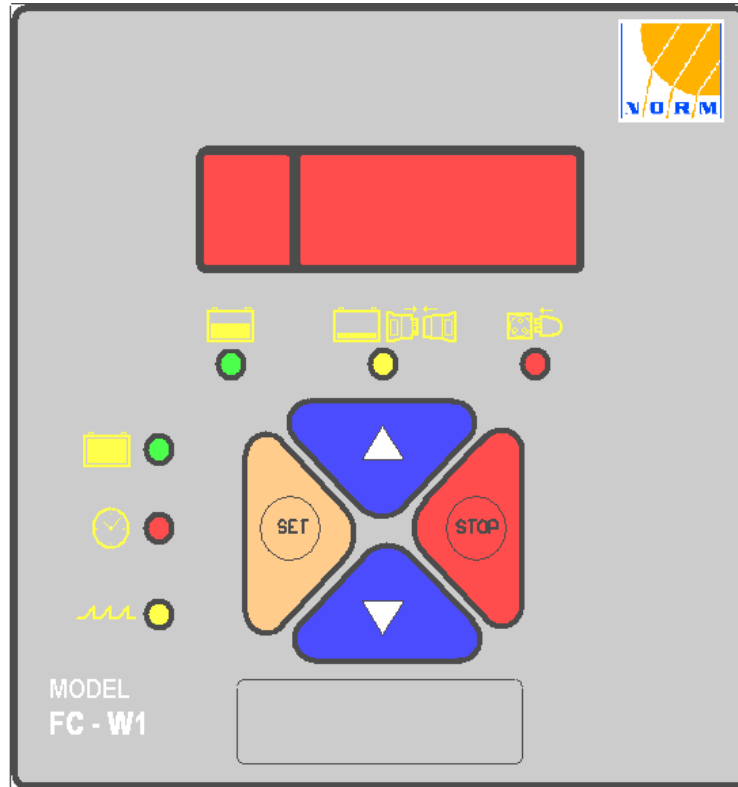


Fig 6 Operator Panel

Mains and battery connection is enough to start charge. If mains disconnected from the charger, mains indicator led lights.



Fig 7 Mains Indicator

If mains connected properly, the led is turned off. When the battery connected to the charger, battery connection



Fig 8 Battery Connection Indicator

led lights. It means battery connected to charger correctly.


After battery and mains connection, the charger automatically starts. In this case battery connection indicator starts blinking. While charging, all information about battery and process are readable on panel display.











Fig 9 Up Button

Pressing Up button fetches next data. These are;

	<p>Output Current: Charging current goes to battery in amps.(85.0A)</p>
	<p>Output Voltage Current battery voltage in volt.(25.6 V)</p>
	<p>Cell voltage in volt (2.18 V/c)</p>
	<p>Total time from starting in minutes (13min.)</p>
	<p>Time from the point that battery voltage has reached to set voltage in minutes (26min.)</p>

	<p>Ampere-Hour delivered to battery in ampere-hours. (550Ah)</p>
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The panel displays some warning messages to inform operator about the case. These are;

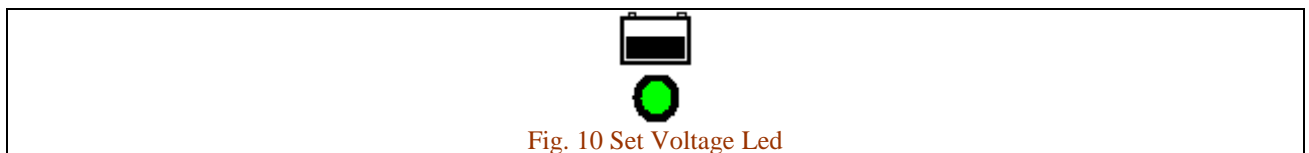
	<p>SARJ: Working in charge mode.</p>
	<p>ISI: Over heat occurred in the charger. It will continue when the temperature drops under normal value. It starts from break point.</p>
	<p>STOP: Charging process has stopped by pressing STOP button on the panel</p>
	<p>Umax: The connected battery excess charger's output voltage</p>
	<p>Umin: The connected battery voltage very low according to output voltage. The battery may be wrong. (Ex; Perhaps, 24V battery connected to 48V charger).</p>
	<p>I max: Over current occurred..</p>
	<p>Off : Equalizing charge has cancelled by pressing SET button while normal charge. The equalizing charge will not be applied.</p>
	<p>On: Equalizing charge has activated by pressing SET button while normal charge. After normal charge, the charger will apply equalizing charge while 48hours.</p>

	<p>END: End of the charge. The battery can be disconnected</p>
	<p>ARZA: Failure. Output fuse has blown or bad connection or charger failure</p>
	<p>No batt: There is no battery connected to charger</p>
	<p>FUSE: Output fuse has blown.</p>

Led indicators ;

<p>Mains disconnection or mains circuit breakers are off</p>	<p>Lighting; Battery Connected Blinking; Charging.</p>	<p>Lighting; Battery voltage has reached to set value. Blinking; Charging Period Timer Started.</p>
<p>Battery has charged successfully. Ready to disconnect.</p>	<p>Maximum cycle time is over. Charging has not finished.</p>	<p>Equalizing Charge. Ready to disconnect.</p>

When the battery voltage reaches to set value (normally 2.50V/Cell) ,Set Voltage indicator lights.



In this case battery voltage is equal to set value. After 5 minute delay, normal charge timer starts and this led starts blinking. Default time is 120min.



Fig 11 En of Charge Led

After the period, the process finishes and End of Charge led lights. At the time the battery has fully charged.

After that, If user has activated equalizing charge, the charger automatically starts equalizing charge. This charge is applied while 48hours. This mode may be used at weekends to keep the battery fully charged until usage. While this charge;



Fig 12 Equalizing Charge

Equalizing charge led lights. The charge is 48 cycle of 55min. pause and 5min. charge. While pause, the led lights continuously for 55 minutes. After that led starts blinking while charging for 5 minutes. If the battery voltage is okay, the charger not wait for 5 min. and jumps next pause.

The charge can be activated or cancelled by pressing SET button while normal charge.

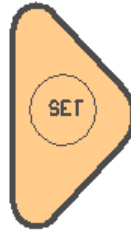


Fig. 13 Set Button

When the SET button pressed, the panel displays "ON" and then activates equalizing charge after normal charge. Operator may disconnect the battery an any time of this charge.



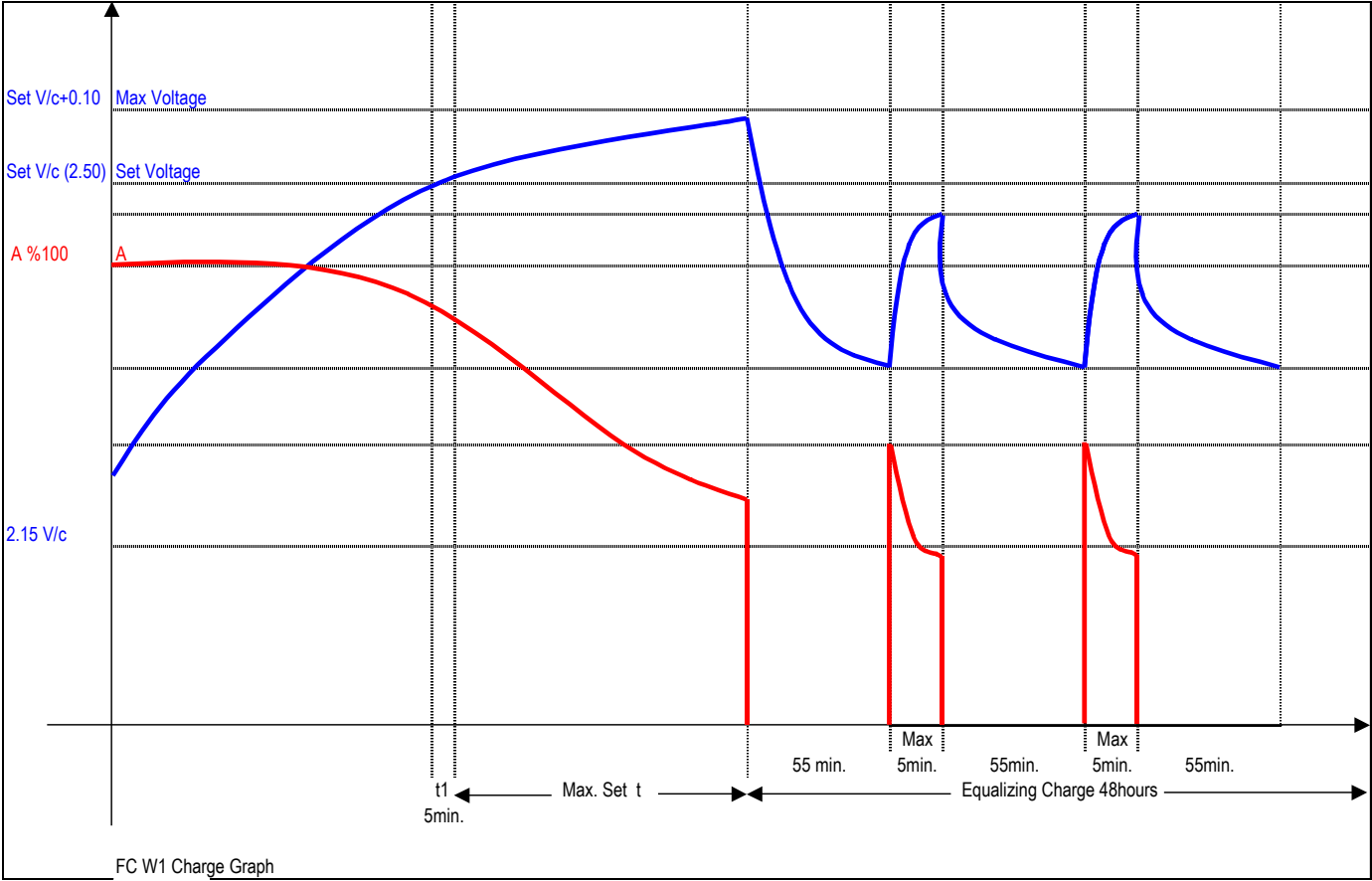
Fig 14 Stop Button

To do this, press STOP button. When the panel displays END message, the charger stops and battery can be disconnected.

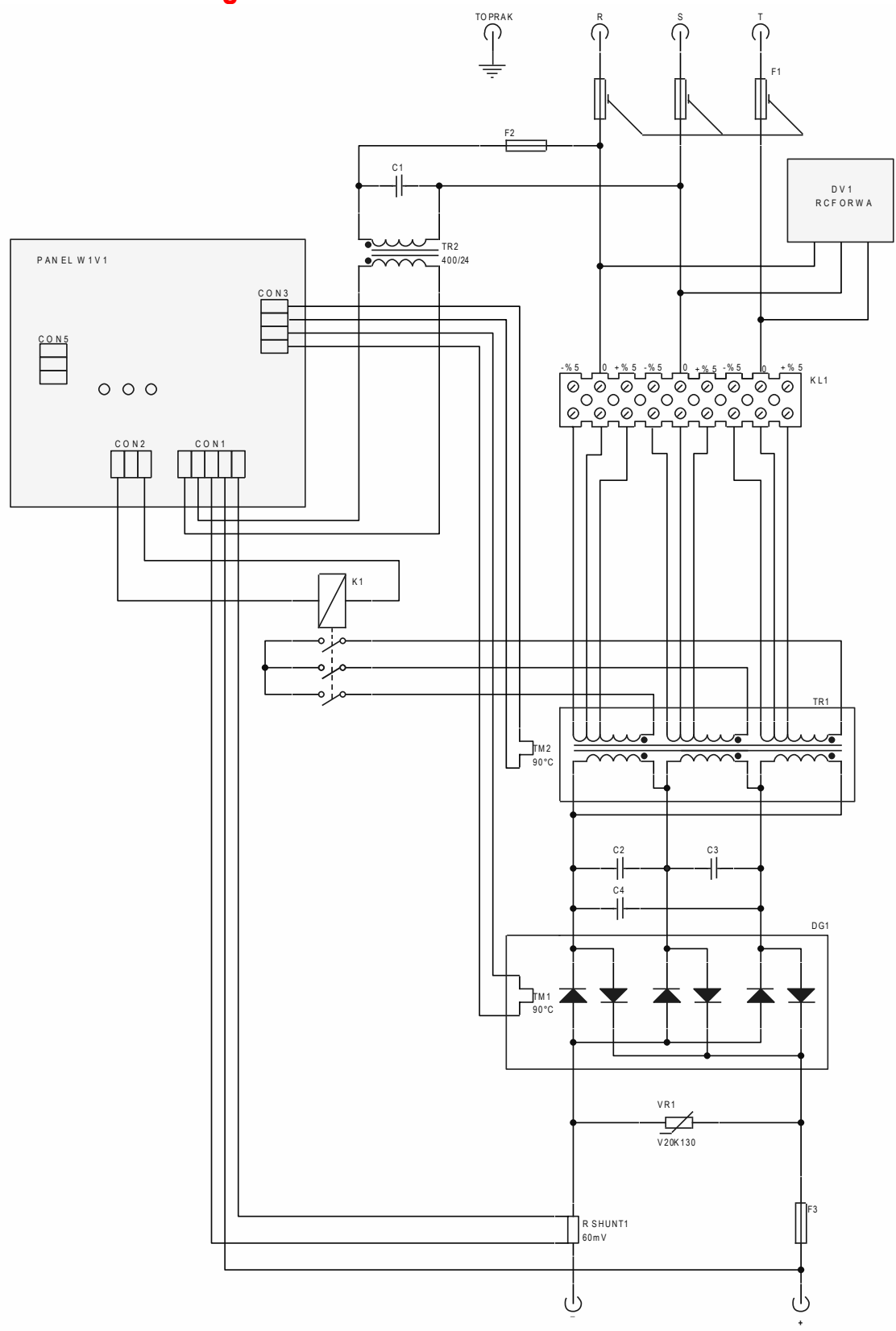


Fig 15 End of charge

Charging Graph



Electrical Diagram



Part List

24V 150A			
CODE	COMMENT	DESCRIPTION	POSITION (Fig. 16)
F1	W Automatic Circuit Breaker	Merlin Gerin C60a C16 16Amps	1
F2	Fuse + socket	3A+ UK5 HESI	2
F3	NH Fuse	Siemens 3NA3 160A	3
TR1	Mains Transformer	3X380V/24V 150A DB	4
TR2	Auxiliary Supply Transformer	380V / 28V 35VA	5
PANEL	Operator Panel W1V1	Operator Panel	6
DV1	RCFORWA	Capacitor Board	7
C1	Polyester Capacitor	100nF 630V	8
C2	Polyester Capacitor	1 μ F 275V	9
C3	Polyester Capacitor	1 μ F 275V	10
C4	Polyester Capacitor	1 μ F 275V	11
K1	Contactora	GMC12 AC24V	12
KL1	Terminal	NO:4 9LU	13
TM1	Thermostat	NC 90°C	14
TM2	Thermostat	NC 90°C	15
DG1	Diode Group	150A DB	16
VR1	Peak Voltage Protector	V20K150	17
RSHUNT1	Shunt Resistor	150A 60mV	18

48V 80A			
CODE	COMMENT	DESCRIPTION	POSITION (Fig. 16)
F1	W Automatic Circuit Breaker	Merlin Gerin C60a C16 16Amper	1
F2	Fuse + socket	3A+UK5 HESI	2
F3	NH Fuse	Siemens 3NA3 80A	3
TR1	Mains Transformer	3X380V/48V 80A DB	4
TR2	Auxiliary Supply Transformer	380V / 28V 35VA	5
PANEL	Operator Panel W1V1	Operator Panel	6
DV1	RCFORWA	Capacitor Board	7
C1	Polyester Capacitor	100nF 630V	8
C2	Polyester Capacitor	1 μ F 275V	9
C3	Polyester Capacitor	1 μ F 275V	10
C4	Polyester Capacitor	1 μ F 275V	11
K1	Contactora	GMC9 AC24V	12
KL1	Terminal	NO:4 9LU	13
TM1	Thermostat	NC 90°C	14
TM2	Thermostat	NC 90°C	15
DG1	Diode Group	80A DB	16
VR1	Peak Voltage Protector	V20K150	17
RSHUNT1	Shunt Resistor	80A 60mV	18

48V 100A			
CODE	COMMENT	DESCRIPTION	POSITION (Fig. 16)
F1	W Automatic Circuit Breaker	Merlin Gerin C60a C16 16Amper	1
F2	Fuse + socket	3A+UK5 HESI	2
F3	NH Fuse	Siemens 3NA3 100A	3
TR1	Mains Transformer	3X380V/48V 100A DB	4
TR2	Auxiliary Supply Transformer	380V / 28V 35VA	5
PANEL	Operator Panel W1V1	Operator Panel	6
DV1	RCFORWA	Capacitor Board	7
C1	Polyester Capacitor	100nF 630V	8
C2	Polyester Capacitor	1 μ F 275V	9
C3	Polyester Capacitor	1 μ F 275V	10
C4	Polyester Capacitor	1 μ F 275V	11
K1	Contactora	GMC12 AC24V	12
KL1	Terminal	NO:4 9LU	13
TM1	Thermostat	NC 90°C	14
TM2	Thermostat	NC 90°C	15
DG1	Diode Group	100A DB	16
VR1	Peak Voltage Protector	V20K150	17
RSHUNT1	Shunt Resistor	100A 60mV	18

48V120A			
CODE	COMMENT	DESCRIPTION	POSITION (Fig. 16)
F1	W Automatic Circuit Breaker	Merlin Gerin C60a C20 20Amper	1
F2	Fuse + socket	3A+UK5 HESI	2
F3	NH Fuse	Siemens 3NA3 125A	3
TR1	Mains Transformer	3X380V/48V 120A DB	4
TR2	Auxiliary Supply Transformer	380V / 28V 35VA	5
PANEL	Operator Panel W1V1	Operator Panel	6
DV1	RCFORWA	Capacitor Board	7
C1	Polyester Capacitor	100nF 630V	8
C2	Polyester Capacitor	1 μ F 275V	9
C3	Polyester Capacitor	1 μ F 275V	10
C4	Polyester Capacitor	1 μ F 275V	11
K1	Contactora	GMC18 AC24V	12
KL1	Terminal	NO:4 9LU	13
TM1	Thermostat	NC 90°C	14
TM2	Thermostat	NC 90°C	15
DG1	Diode Group	120A DB	16
VR1	Peak Voltage Protector	V20K150	17
RSHUNT1	Shunt Resistor	150A 60mV	18

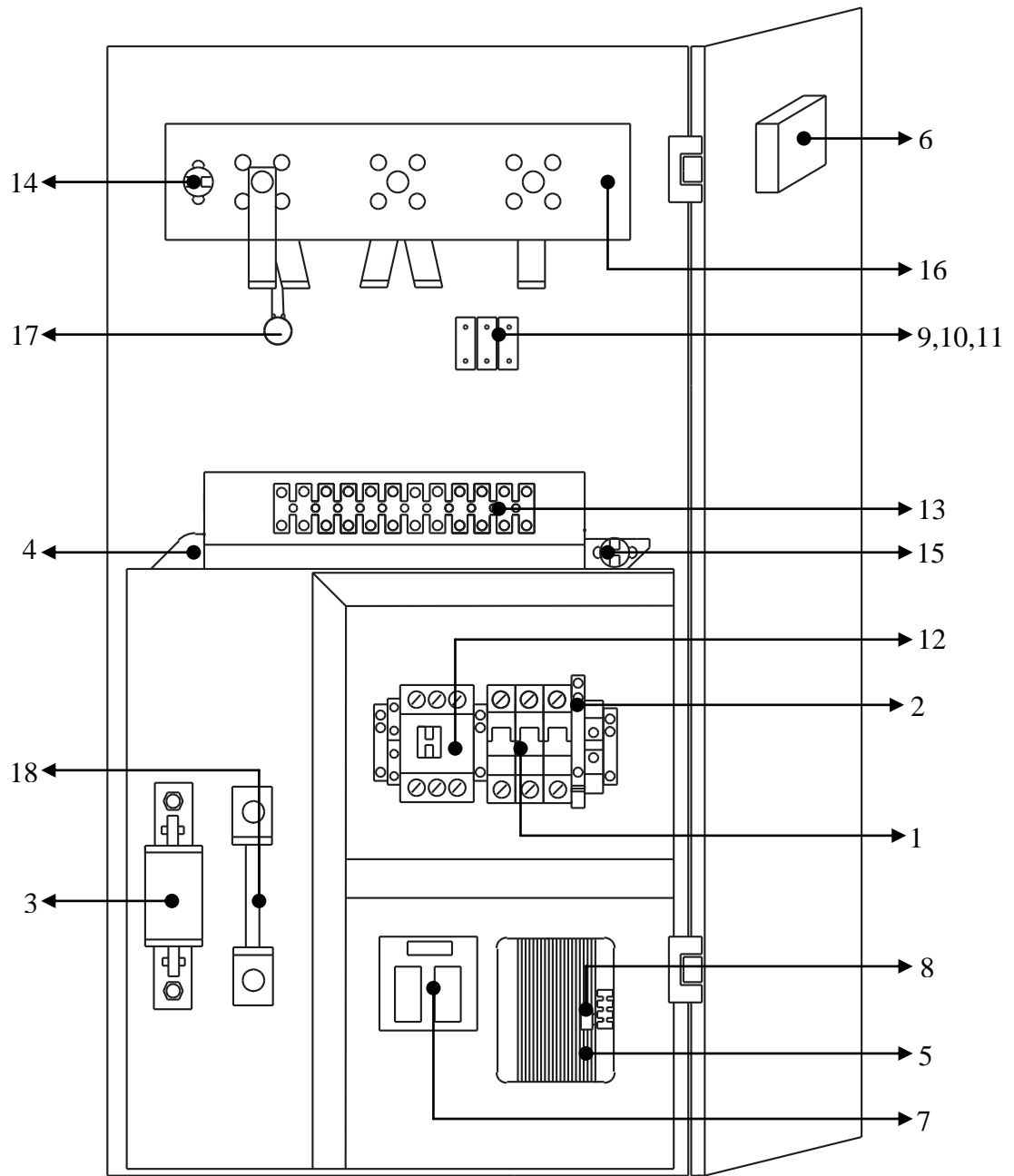


Fig. 16 Location Plan

Technical Service

Please call us whenever you need help and never interfere in the device if you don't know certain cause .
Because it may cause more damage.



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