


Analog Battery charger

M A N U A L



T Series
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For your safety, please read the following before using.

1. Safety cautions:



NOTE :

Before attempting to install or use the charger, it is imperative that all **WARNINGS** and **CAUTIONS** in this manual are reviewed to help prevent personal injury, equipment damage or downtime.



WARNINGS :

1. Do not connect terminals while power on.
2. Do not disassemble and modify this unit. If it is necessary please contact us.
3. Please check the terminals numbers when connecting power lines.
4. When cleaning the unit, do not use water or an oil-based detergent.
5. Please connect properly after checking the polarity.

2. Features:

1-Float and Hi-Rate charging "Boost".

- The Float charging voltage = 125 V (default)
- The Boost charging voltage = 135 V (default)
- These values can be adjusted via control card.

2-Manual and Automatic operation mode.

- In case of manual operation mode, the selection between float and boost operation modes is done by the user.
- In case of auto operation mode, the selection is done by the control card.

3-Output voltage is smoothed and filtered by LC circuit.

4-Hi-Rate time -Boost time - can be controlled via control card.

5-Current limit can be adjusted via control card.

6-Soft start feature.

7-Voltage regulator for load with suitable power.

8-AC over and under voltage limits protection can be adjusted digitally via display of protection unit.

9-DC over and under voltage limits protection can be adjusted digitally via display of protection unit.

10-Earth leakage voltage limits protection can be adjusted digitally via display of protection unit.

11-Indicate the fault in LCD and alarm red led.

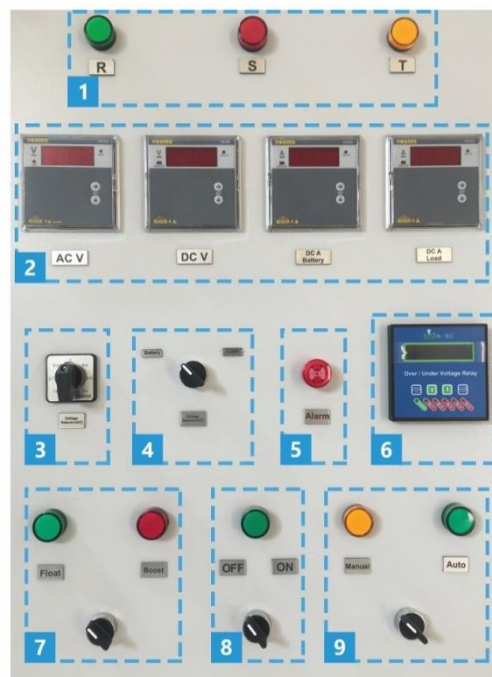
12-All settings stored in EEPROM.

13-Numerical LCD (16 * 2).

14-Parameter adjust via keypad.

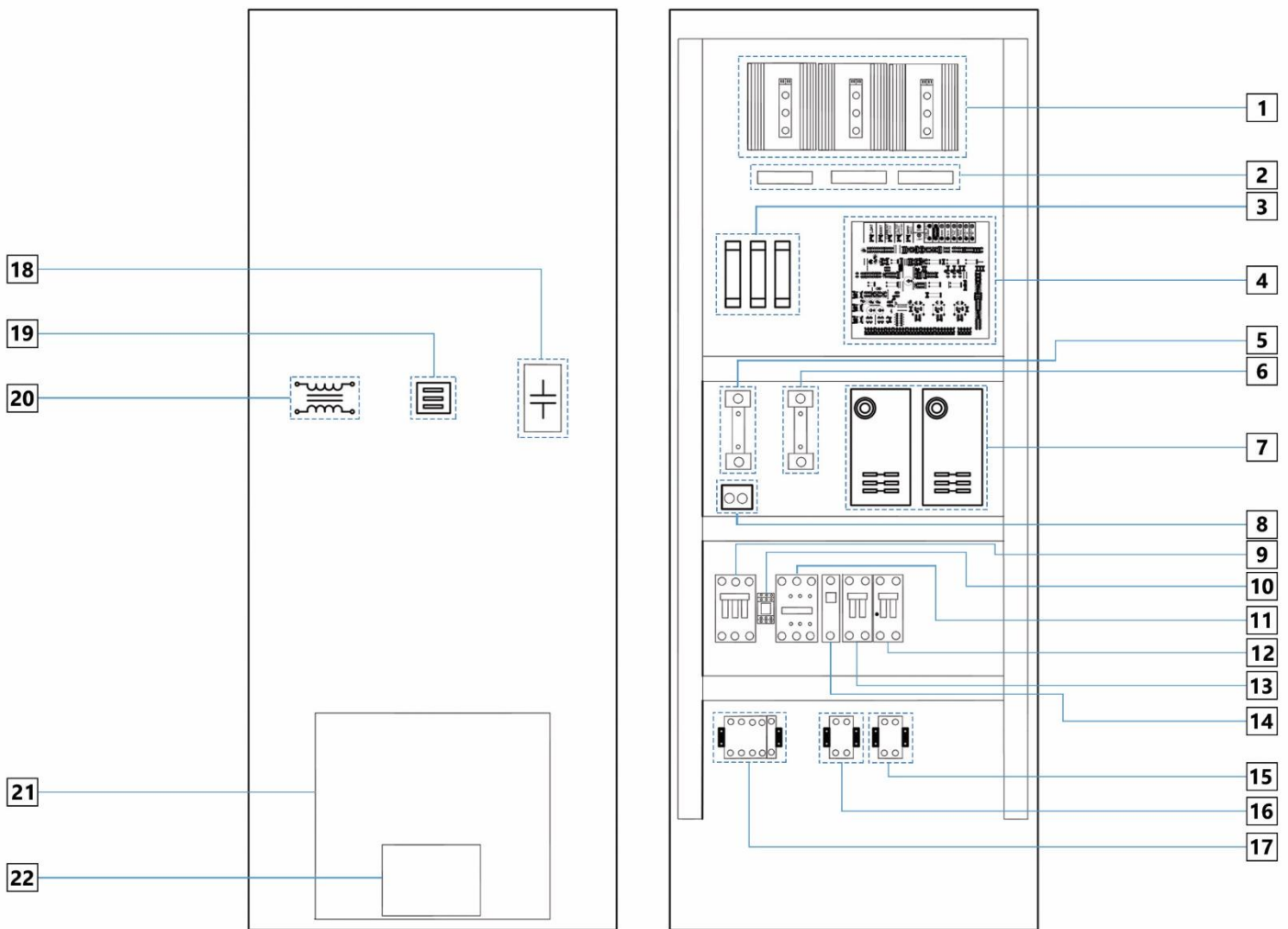
3. Panel identification:

3.1 Front



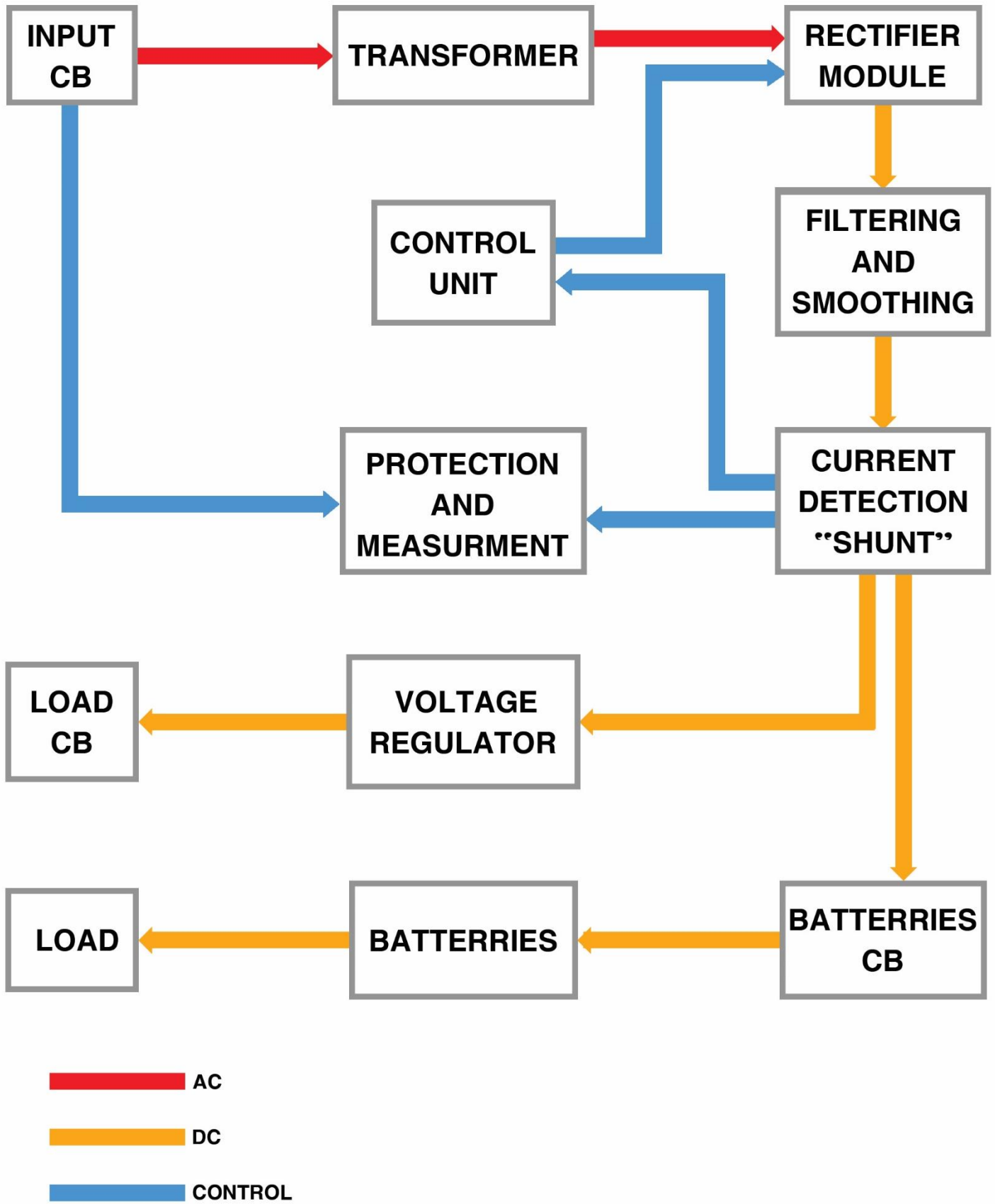
- 1 AC input 3 phase lamps
- 2 Indicators (input AC V-output DC V-output DC A Battery-output DC Load)
- 3 Input voltage AC selector.
- 4 Output voltage DC selector (Battery-Load)
- 5 Alarm (Lamp+Serin)
- 6 Protection unit
- 7 Float-Boost operation mode selector with indication lamps
- 8 ON/OFF selector with indication lamp
- 9 Manual-Auto operation mode selector with indication lamps

3.2 Inside



| | |
|--|--|
| 1 Rectifier module (3 Thyristors - 3 Diodes) | 12 Load circuit breaker (2-pole , 40 A DC) (Q3) |
| 2 Cooling fans | 13 Battery circuit breaker (2-pole , 50 A DC) (Q2) |
| 3 Fuses for thyristor protection (63 A) (F1 , F2 , F3) | 14 Fuse for reverse polarity (63 A) (F4) |
| 4 Charger control unit (C.C.U) | 15 Load output terminal connection (+ -) |
| 5 Shunt resistor (60A – 75 mV) (SH1) | 16 Batteries output terminal connection (+ -) |
| 6 Shunt resistor (40A – 75 mV) (SH2) | 17 AC input terminal connection (R S T N)+Earth connection (E) |
| 7 Voltage regulator (in : 72-144 VDC , out : 110 VDC,10A) | 18 Smoothing capacitor (C1) |
| 8 Reverse polarity diode protection (400 V - 70 A) (D1) | 19 Discharge resistances |
| 9 Input circuit breaker (3-pole , 63 A AC) (Q1) | 20 Transformer for control unit supply (T2) |
| 10 Relay (12 VDC , 8 Pin with base) (R1) | 21 Main transformer (380 VAC to 135 VAC & 20 VAC , 7KVA) (T1) |
| 11 Transformer input contactor (220 VAC coil , 26 A contacts) (K1) | 22 Chock coil (Filtration) (L1) |

3.3 Block diagram



4. Operation procedures:

4.1 Start up:

- 1- First , check apparent that all components, wires and indicators in the panel are good and undamaged.
- 2-The default procedures :
 - ON/OFF selector : OFF
 - Float/Boost selector : Float
 - Auto/Manual selector : Manual
 - DC voltage selector : Battery
- 3-Connect the battery and the load in the terminals, make sure that the AC input CB (Q1), Battery CB (Q2) and Load CB (Q3) are turned off.
- 4-Connect 3 phase AC input (R-S-T-N) and turn the CB (Q1) on, notice that
 - The charger not affected with the phase sequence and don't connect the earth with neutral.
 - The Ac input lamps are turned on (R-S-T).
 - The "AC V" indicator is turned on, change the position of the AC voltage selector to display the desired voltage value.
- 5-Select "ON" Position, notice that :
 - The "ON" lamp, "Float" lamp and "Manual" lamp are turned on.
 - The protection unit is turned on.
 - The rest of the indicators are turned on, the "DC V" indicator is displaying the charging voltage value "Float = 125 V".
- 6-Make sure that the alarm lamp and the siren are turned off.
- 7-Turn on the battery CB (Q2), notice that the "DC A battery" indicator will display the current value.
- 8-Turn on the load CB (Q3), notice that :
 - The "DC A Load" indicator will display the current value.
 - If you change the position of the DC voltage selector to "Load" the "DC V" indicator will display the load voltage "110 V".

NOTES :

1. At manual operation mode , when you select Boost charging position :
 - The boost lamp will turn on.
 - The "DC V" indicator will display the charging voltage value "boost = 135 V"
2. The fans of the rectifier module are turned on by the control unit if the DC current is over than 25A.
3. At auto operation mode :
 - The control card sets the boost charging mode at first , when the drawn current decrease below the "Auto mode current selector" adjusted value the control card change the charging mode to float mode.
 - The maximum time the control card takes in boost mode is 5 minutes "by default" , the time can be adjusted via control card.

4.2 Settings:

Caution :

only authorized persons can adjust the settings using the control card to prevent any equipment damage .

1-Float and boost charging voltage values :

You can adjust the float and boost voltage values and set new values through the potentiometer in figure (1) .

2-The current limiter:

Adjust the maximum output current through the potentiometer in figure (1) .

3- The auto mode current selector :

Adjust the current value that the control card using in selection between float and boost in auto operation mode through the potentiometer in figure (1) .

4- The ramp speed:

Adjust the time that the charger takes to reach the nominal output voltage through the potentiometer in figure (1) .



figure (1)

5- The boost timer:

Adjust the maximum time that the control card takes in boost mode in auto operation mode values through the jumper in figure (2) .

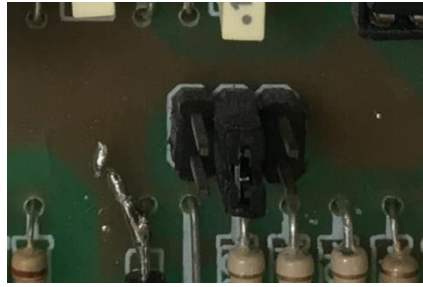


figure (2)

4.3 Faults:

In case of any faults occur, the siren will emit a warning sound and the alarm lamp will turn on, press “Reset” in the protection unit to mute the siren, the protection unit LCD will show the fault, to know the fault reasons refer to protection unit manual.

5. Technical specifications:

5.1 Electrical specifications:

➤ Input:

- **Voltage range:** 220 VAC/1Ø or 380 VAC/3Ø ± 15%.
- **Frequency range:** 50 Hz ± 5%.

➤ Output:

- **Hi-Rate voltage range:** 80% to 145%
- **Float voltage range:** 80% to 125%
e.g. Charger 110 VDC (Hi-Rate 88 to 160 and float 88 to 137).
e.g. Charger 220 VDC (Hi-Rate 176 to 320 and float 176 to 275).
- **Output current:** from 20A up to 150A depending on demand.
- **Load Voltage regulation accuracy:** ± 2%.
e.g. Charger 110 VDC (load voltage 108 to 112 VDC).
- **Ripple voltage:**
 - Battery connected ≤ 1 % of DC voltage.
 - Battery not connected ≤ 2 % of DC voltage.

5.2 Mechanical specifications:

- **Dimensions:** 180×60×60 cm “height x width x depth”.
- Noise level less than 45 db.

5.3 Mechanical protection:

Temperature: 0°C - 50°C

The charger components placed in a steel cell with suitable size also cured with electrostatic paint against corrosion and atmospheric circumstance.

The charger enclosure is provided with suitable cooling fans.

5.4 Electrical protection:

- Failure of any phase (over and under can be adjusted).
- Varistors (AC surge suppression).
- Over and under DC voltage which can be adjusted.
- Over current and short circuit.

- Reversing the polarity of the Batteries.
- Positive and negative earth leakage which can be adjusted.
- Current limit feature.
- Semi-conductors fuses for the SCR.
- In case of charger rated current 40A:
 - 3 pole MCB – 63A –16KA at input side.
 - 2 pole MCB – 50A –10KA at battery side.
 - 2 pole MCB – 40A –10KA at load side.

5.5 Measurements:

- Analog/Digital AC V for input with voltage selector (7 position).
- Analog/Digital DC V for Battery voltage.
- Analog/Digital DC A for Battery current.
- Analog/Digital DC V for Load voltage.
- Analog/Digital DC A for Load current.
- 3 phase AC – DC V – Earth leakage voltage – Fault voltage message in LCD of protection device.

5.6 Indication lamps:

- Float / Hi-Rate.
- Auto / Manual.
- ON / OFF.
- 3 AC phases (R-S-T).
- Over /Under AC input (OUV – unit).
- Over/Under DC output (OUV – unit).
- Positive/Negative Earth Leakage (OUV – unit).

5.7 Control Switching:

- Float / Hi-Rate selector.
- Auto / Manual selector.
- ON / OFF switch.

6. Ordering information:

| T - XX- XXX-XXX-XXX-X- XXX- XXX | | | | | | |
|---------------------------------|----------------------|--|---------------------------------|--------------------------|---|---|
| T | | | | | | Analog Charger Sires. |
| No. of Ø and SCR | 12 33 36 00 | | | | | Single phase and two SCR. Three phase and Three SCR. Three phase and Six SCR. Customer. |
| Nominal Charger Output Voltage | | 024 048 072 110 220 000 | | | | 24 VDC. 48 VDC. 72 VDC. 110 VDC. 220 VDC. Customer. |
| Nominal Charger Output Current | | | 020 040 100 150 000 | | | 20A. 40A. 100A. 150A. Customer. |
| Load Regulator | | | | 000 R10 R20 R30 | | Without voltage regulator for the load. With voltage regulator for the load 10A. With voltage regulator for the load 20A. With voltage regulator for the load 30A. |
| Communication | | | | 0 1 2 | | No communication. RS232. USB. |
| Indicators & Protection | | | | | A10 A1P A20 A2P A30 A3P A40 A4P D10 D1P D20 D2P D30 D3P D40 D4P XXX | Analog indicators (V AC – V DC – A DC) A10 & Protection unit. A10 & Load V DC. A1P & Load V DC. A20 & Load A DC. A2P & Load A DC. A30 & Input A AC. A3P & Input A AC. Digital indicators (V AC – V DC – A DC). D10 & Protection unit. D10 & Load V DC. D1P & Load V DC. D20 & Load A DC. D2P & Load A DC. D30 & Input A AC. D3P & Input A AC. Customer. |
| Special Version | | | | | | 000 Standard. Customer. |