



Resistance Power Control Thyristor Control Pack

USER MANUAL

Manual

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NOTE

These instructions do not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired or should particular problems arise which are not covered sufficiently for the purchasers purposes, the matter should be referred to our factory.

The contents of this User Manual shall not become part of or modify any prior or existing agreement or relationship. Any statements contained herein do not create new warranties or modify the existing warranty.

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1. Introduction

Traditional methods of heater power control use a thermostat and a contactor for power on / off control. This results in generating voltage transients on the load, and has large hysteresis for the controlled temperature.

The phase angle control method of power control gradually increases or decreases the firing angle for the SCR as a solid state power control device. Thus, the average voltage delivered to the load is a function of phase angle.

Since in this method, the power is not completely switched on or off, no voltage overshoot or undershoot transients are generated on the supply voltage. Secondly, the Microcontroller of the Power Controller is able to monitor the difference between set temperature and actual temperature, it can reduce this error by smoothly increasing or decreasing the SCR conduction angle. This achieves in maintaining actual process temperature close to desired set temperature.

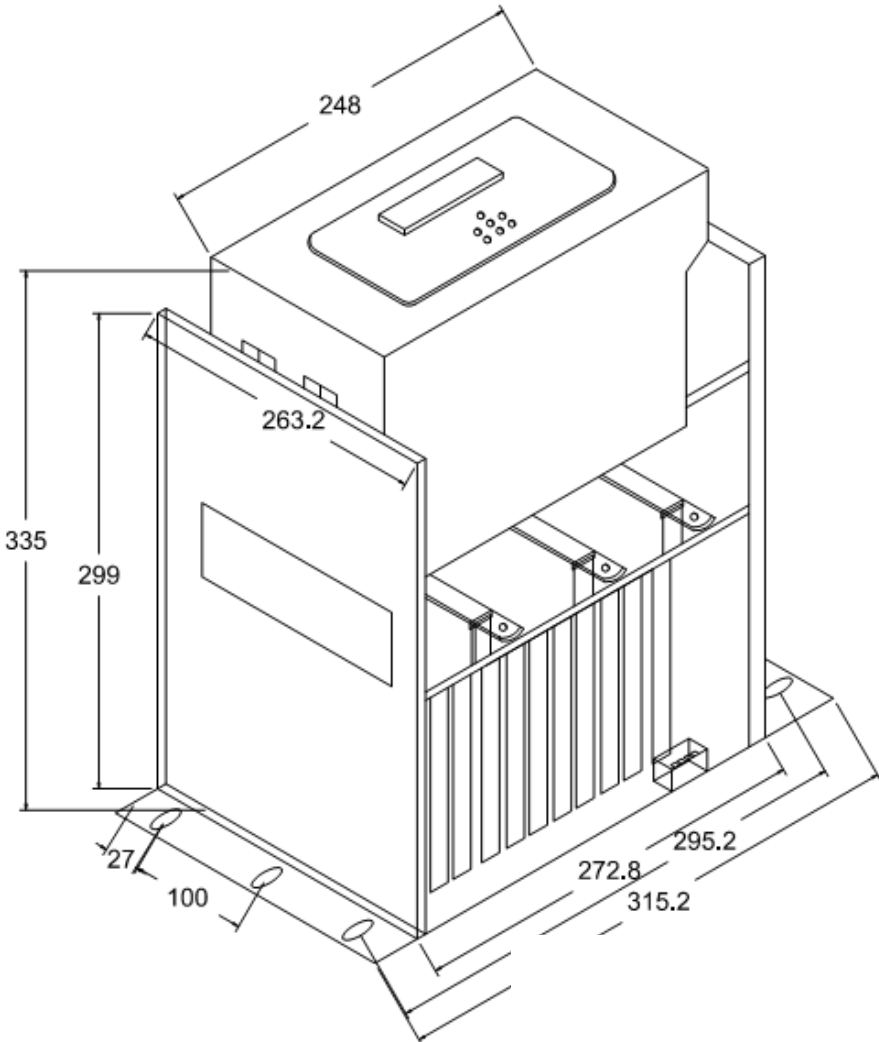
2. Specification & Features

- Power Supply 3 Phase, 4 Wire, 240V nominal between phase and neutral.
- Temperature control using phase angle controlled 3 Phase Thyristor Modules.
- 16 Character x 2 line Alpha Numeric dot matrix LCD display, with LCD Contrast Adjustment and Automatic Back-Light On/Off Control.
- Single-Phase (Phase-Neutral 240V) supply for auxiliary input.

Heater Power Controller Unit comes equipped with following features:

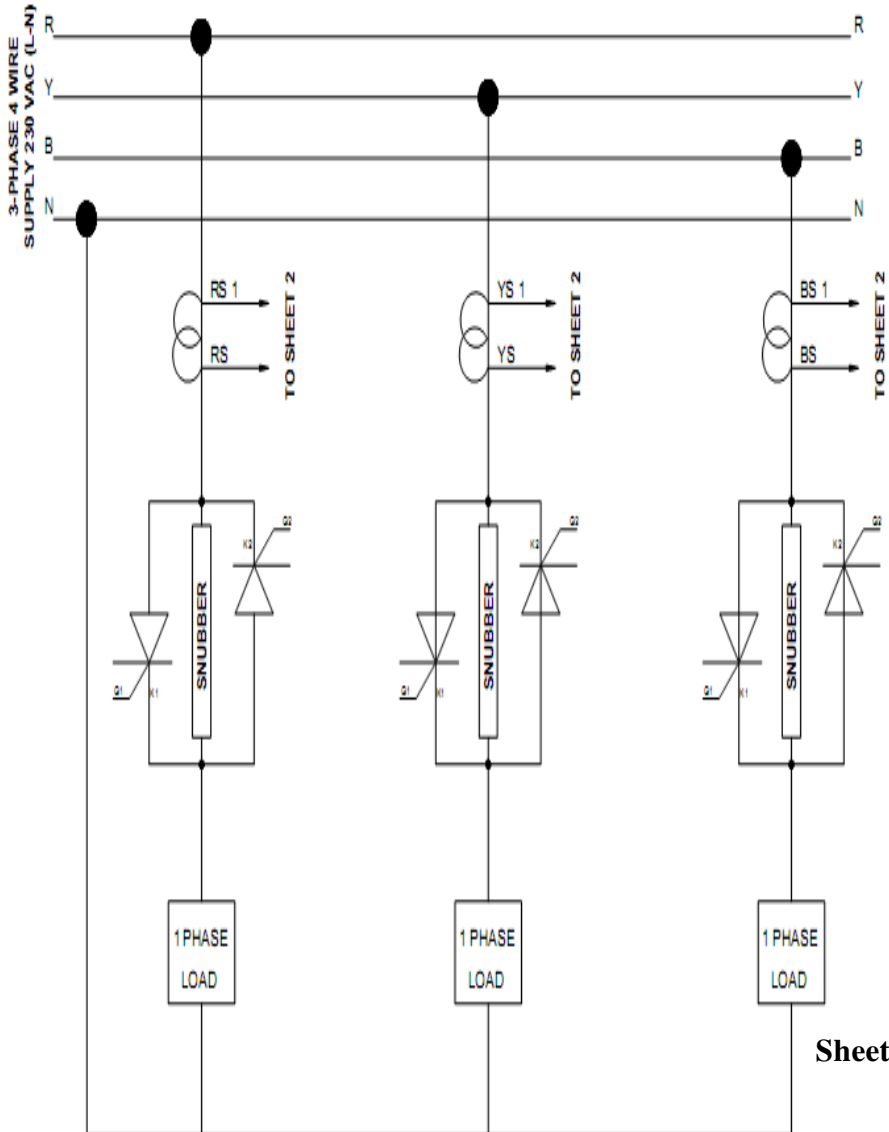
- Suitable for high speed smooth power control.
- Firing angle control available using 4-20 mA Current-Loop Signal as control input from external PID controller.
- Up to 6 Auxiliary Outputs and 2 Auxiliary Inputs are available. Aux. Outputs are Pot.-Free N.O. Contacts.
- Protections: Thyristor Short, Over Current, Over Temperature, Load Unbalance, Under and Over Voltage.
- Special Indications: Output Trip, Output Enable/Disable, Control Input Faulty.

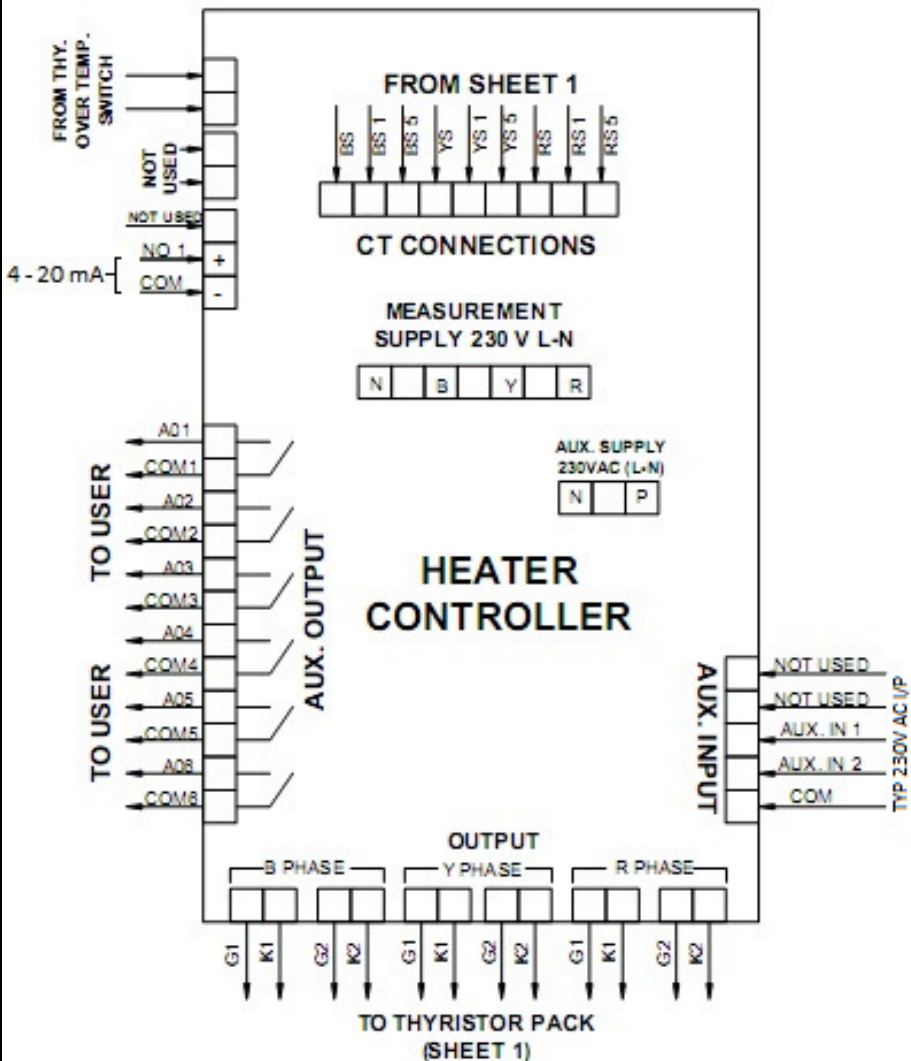
3.Mechanical Dimension



Note: Keep 150mm space free above the cooling fan and below the unit, while assembling the unit in panel, for proper air circulation.

4. Typical Wiring Diagram

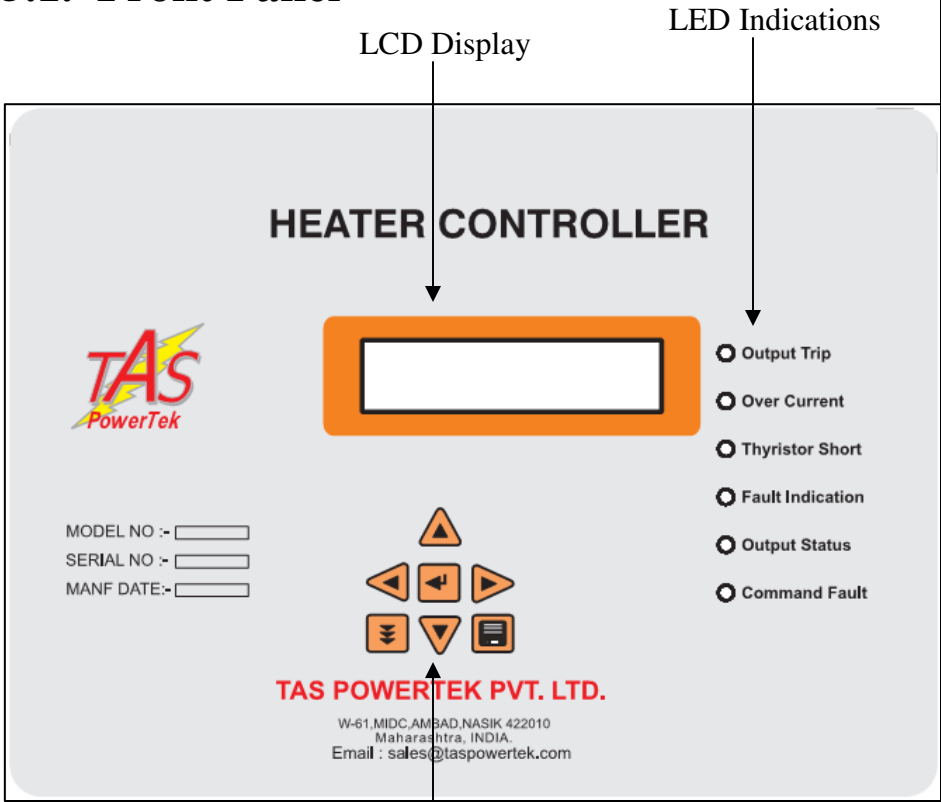




Rear View

5. Front Fascia

5.1. Front Panel



5.2. LCD Display

Power on Display

A screenshot of an LCD display showing the text 'TAS PowerTek' on the top line and 'VERSION 2.4' on the bottom line. The background of the display is a light green grid pattern.

TAS PowerTek
VERSION 2.4

Default LCD Display:

A screenshot of an LCD display showing the text '3 PH Load Power' on the top line and '48 KVA' on the bottom line. The background of the display is a light green grid pattern.

3 PH Load Power
48 KVA

The screen denotes the Power delivered to load of 3 phases as KVA.

Fault Indication on default screen:

- If control input connection is not made or has been broken, following message will be displayed on default screen.

A screenshot of an LCD display showing the text 'Check Control' on the top line and 'Input Signal' on the bottom line. The background of the display is a light green grid pattern.

Check Control
Input Signal

- Last two characters on second line of default screen represent one of the following:

OV	Over Voltage
UV	Under Voltage
OT	Over Temperature (Internal)
OC	Over Current
LU	Load Unbalance
ET	Over Temperature (Thyristor)

5.3. LED Indication

●	Output Trip (Output has tripped due to some fault)
●	Over Current Fault (Output has tripped due to over current)
●	Thyristor Short Fault
●	Fault Indication
●	Output Status
●	Control Signal Input (4-20mA loop) Faulty

5.4. Keyboard



UP key: Used to scroll up the menu screen / Increment the numbers while entering values.



DOWN key: Used to scroll down the menu screen / Decrement numbers while entering values.



RIGHT key: Used to shift the cursor to right / Increase LCD Contrast, when not in Edit mode.



LEFT key: Used to shift the cursor to left / Decrease LCD Contrast, when not in Edit mode.



ENTER key: Used for entering a sub-menu or for setting up values.



MODE key: Used for entering edit parameters mode.

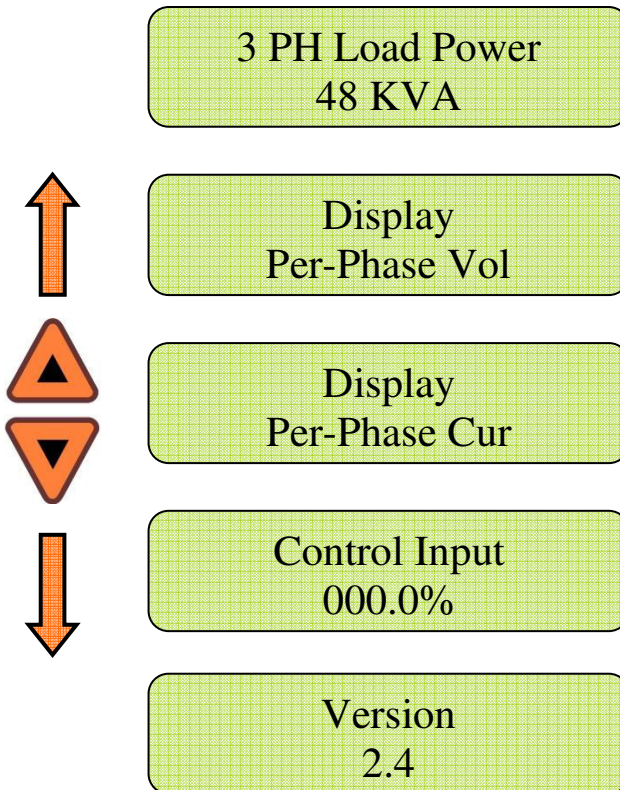


SAVE key. Used to save all changes made in Edit Parameters menu.

6. Screen Navigation

6.1. Display of various parameters

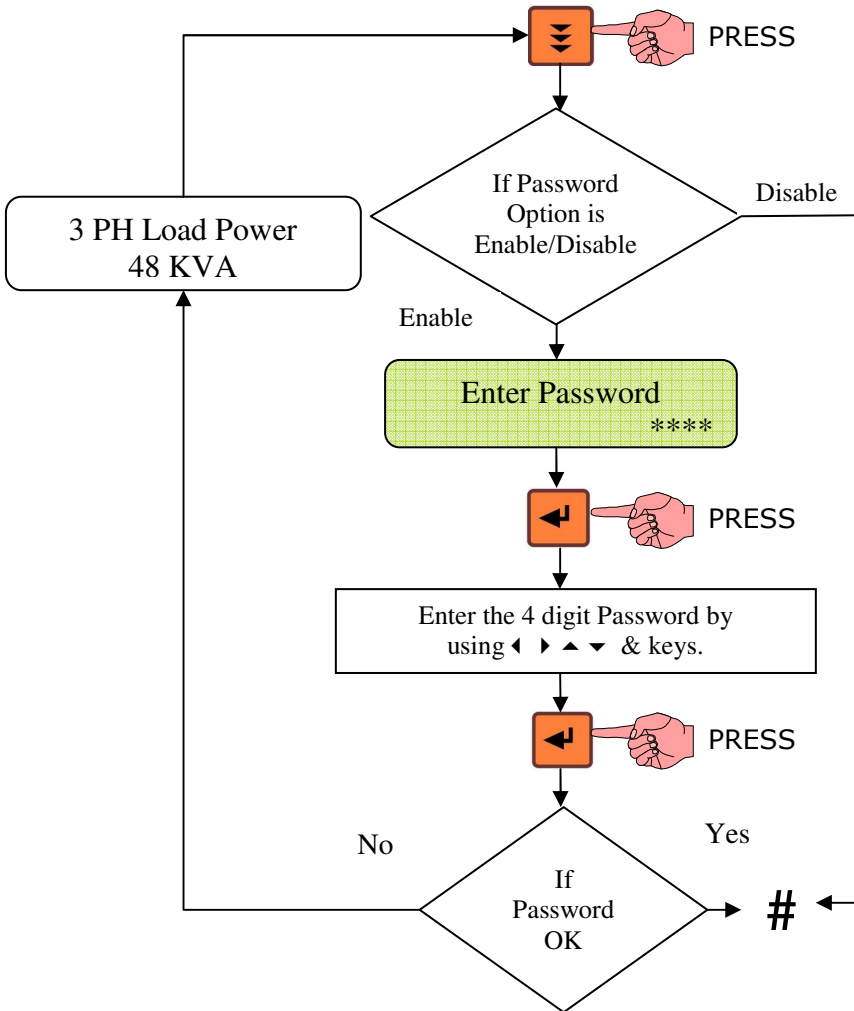
Values of various parameters can be viewed by using UP / DN keys & then pressing ENT key. To exit a sub-menu, press MODE key.

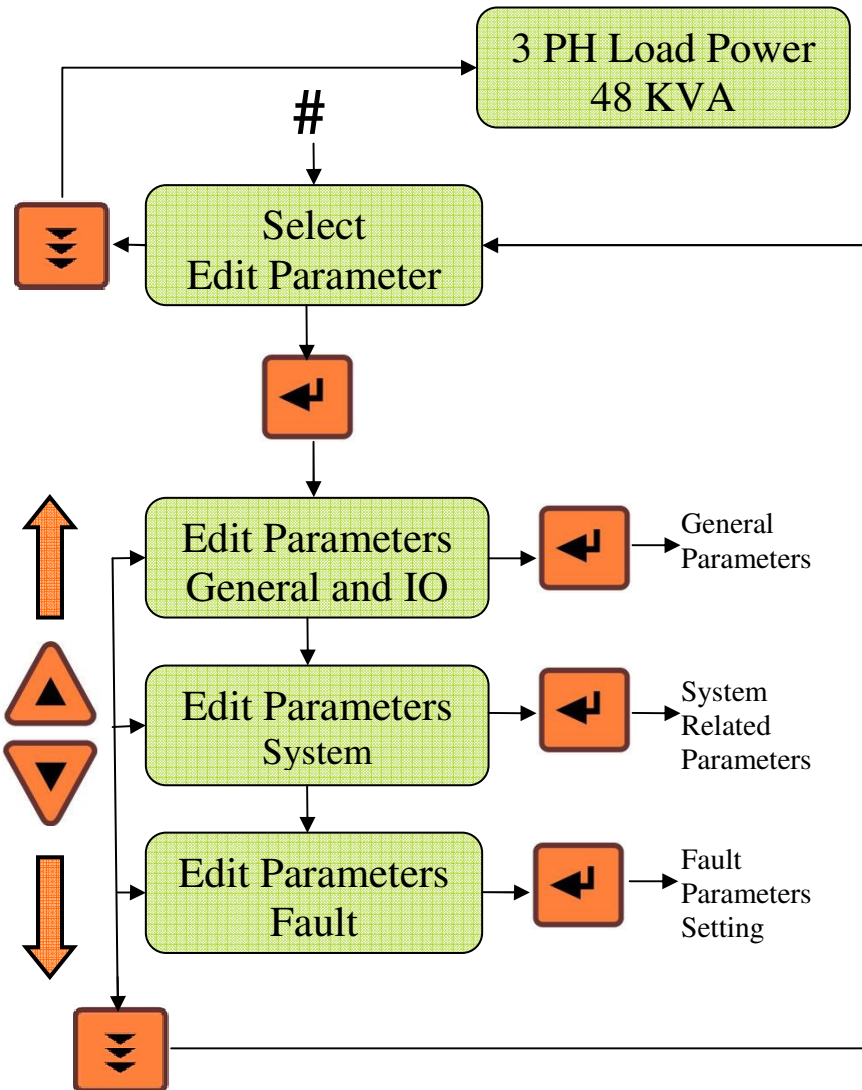


Note: Control Input is displayed as 0 – 20mA i.e. 4mA is displayed as 0% and 20mA as 100%.

6.2. Programming Mode Navigation

Flowcharts for entering into Programming mode:





7. Programming Mode

7.1. Edit Parameters

This mode is used to carry out system settings. In this mode, various system settings can be carried out. To do the same, use the ▲ ▼ keys and select the type of parameters to be edited. The types of parameters that can be edited are:

- **General & Input / Output** : For General and input/output settings.
 - **System** : For System Parameters.
 - **Fault** : Different types of fault settings.
1. After selecting the type, press “**Enter**” to enter the sub-menu of that specific type. The details of these sub-menus are given further.
 2. You can edit all these sub-menu settings by using the “**Enter**”, “**Up**”, “**Down**”, “**Right**” or “**Left**” keys.
 3. To come out of the sub-menu, press “**Mode**” key once.
 4. To store the edited parameters permanently, press “**SAVE**” when you are either in the Edit Parameters or any sub-menu area.
 5. To come out of EDIT Parameters without saving the changes, press “**Mode**” key again.

7.1.1 General & Input / Output

Password
Enable : 1

Enables or Disable password for programming mode
 0: Disable 1: Enable

Change Password
:0000

Sets new password for programming mode
 Factory Default Value: 0000

Load Default
No : 0

Loads factory set values of Parameters
 0: No 1: Yes

O/P Status I/P
Disable

Sets status of o/p on Auxiliary input 1 state
 0: O/P Disable
 1: O/p Enable

Manual FLT RST
No Action : 0

Manual Fault Reset: Resets all the set faults
 0: No action will be taken on faults set
 1: Faults (if set) will be reset

Output Trip
OFF : OK

¹Output Trip Fault: Indicates o/p is trip due to some faults.
OFF: O/P is not trip
ON: O/P is trip due to fault

Over Current FLT
OFF : OK

Over Current Fault: Indicates load current is above limit.
OFF: No fault
ON: Current is above limit

Thyristor Short
OFF : OK

²Thyristor Short Fault: Indicates Thyristor is short.
OFF: No fault
ON: Thyristor is short

Fault Indication
OFF : OK

³Fault Indication: Indicates if any fault has occurred.
OFF: No fault
ON: Fault has occurred

O/P Status O/P
OFF: O/P Disable

Output Status: Indicates if o/p is enabled or disabled through Auxiliary I/P 1.
OFF: O/P Disabled
ON: O/P Enabled

Command Fault
OFF : OK

Command Fault: Indicates if i/p command signal (4-20mA) is faulty (Open/Shorted Loop etc.)
OFF: Signal is OK
ON: Signal is Faulty

Note:

- 1. Auxiliary inputs are 240V AC (L-N) signal for logic 0.**
 - 2. Auxiliary outputs are potential free N.O. contacts.**
- Contact Rating (Resistive load): 5A, 240VAC/30VDC**

1: Output will be tripped for following faults:

- Load Unbalance
- Thyristor Short
- Load Current Over Limit
- Under Voltage (if set)
- Over Voltage (if set)
- Over Temperature (for Thyristor)

2: Thyristor Short fault will be checked on at the power-on or if output is trip due to some other fault

3: Fault Indication will be provided for following faults:

- Load Unbalance
- Thyristor Short
- Load Current Over Limit
- Under Voltage
- Over Voltage
- Over Temperature (for Thyristor)
- Input Command Signal (4-20mA) is faulty

7.1.2 System

Meas. Voltage
: 240

Measured Voltage: It is a Factory set parameter dependent on hardware. This parameter is **not editable**.

CUR CT Primary
: 0080

Sets the Load Current CT's Maximum allowed Primary Current.

Control Input
4-20mA : 1

Control Input Signal: It is a Factory set parameter dependent on hardware. This parameter is **not editable**.

Note: The Maximum allowable secondary current of Load CT can be either 1A or 5A. Confirm proper CT connections as per the maximum secondary current.

7.1.3 Fault

For all types of faults except “Load current over Limit” defined here, the options available are as under:

0 - Disable

1 - Indicate (Display a Fault Message)

2 - Off O/P (Switch-Off Output)

For all the faults, normally two limits are defined. One is Detection Limit (Over Limit) and another Resume Limit. Detection Limit, if exceeded by the parameter, would mean

the action as defined by parameter in type of fault (as given here-above). Resume Limit defines the parameter value below / above which the fault is de-activated.

Over Volt Fault
Trip O/P : 2

As name suggests, it is for the Over-Voltage conditions.

Over Voltage
Limit (%) : 115

Sets the detection level for Over voltage fault.
Parameter value is in percentage.
Parameter Range: 110-125%

Over Voltage
Resume (%) : 100

Sets the Resume level for Over voltage fault. This parameter is **not editable**. Resume level will always be 5% less than OV Limit.

Under Volt Fault
Trip O/P : 2

It is for the Under-Voltage conditions.

Under Voltage
Limit (%) : 085

Sets the detection level for Under voltage fault.
Parameter value is in percentage.
Parameter Range: 75-95%

Under Voltage
Resume (%) : 090

Shows the Resume level for under voltage fault
This parameter is **not editable**.
Resume level will always be 5% greater than UV Limit.

INT Temp FLT
Trip O/P : 2

Temperature fault: It activates if internal temperature of Controller goes beyond set limit.

INT Temp U. Limit
70 Deg C

Set the upper limit for internal temperature in degree Celsius.
Parameter Range: +65 to +75 Deg C.

Over Current FLT
Enable : 0

Enables or Disables the fault detection for load current over limit.
0: Enable 1: Disable

Current U. Limit
: 0080A

Set the upper limit for load current detection.
Parameter Range: 1 – (Value in CUR CT Primary Parameter) A

O.C Trip Time
: 30 sec

If load current goes above limit output will be trip after time set in this parameter.
Parameter Range: 01-60 sec.

Soft Start Time
: 60 sec

It is soft start to Power ON. It will come to control input power within set time.

Parameter Range: 01-60 sec.

Load Unbalance
Disable : 0

It Enable or Disable load unbalance fault

0 : Disable 1: Enable

Note: Thyristor Short Fault, Load-Unbalance Fault, Over-Current Fault will only get reset manually.

7.2 Parameters Default Value

Parameters	Default Value	Minimum set value	Maximum set value
Password	0000	0000	9999
CUR CT Primary	150	1	500
Over Volt Fault	2	0	2
Over Voltage Limit (%)	115	110	125
Over Voltage Resume (%)	110	-	-
Under Volt Fault	2	0	2
Under Voltage Limit (%)	85	75	95
Under Voltage Resume (%)	90	-	-
INT Temp. FLT	2	0	2
INT Temp U. Limit (Deg. C)	70	65	75
Current U. Limit (Amp.)	80	10	Value in CUR CT Primary Parameter
O.C. Trip After (Seconds)	30	01	60
Soft Start Time (Seconds)	60	01	60

8. Standard Warranty

Warranty Conditions for TAS products range:

- 1) The product/system is warranted against any manufacturing and design defects. Any other defects in the product/system due to wrong handling, transportation damages, usages of product beyond the specified electrical supply conditions, wrong application, wrong working conditions etc are not covered under the warranty clause.
- 2) TAS Powertek Private Limited will not accept any liabilities, liquidated damages claims due to usage of these equipments. The proper usage of these products/systems would be sole responsibility of the purchaser of these products and TAS would only give the guidelines for the proper usage.
- 3) Product is warranted against failure of any component as specified in clause no.1 and TAS Powertek Private Limited would be replacing any faulty components free of cost which would be including the cost of the component and the direct engineering services that are involved with the repair of the said product/system.
- 4) The warranty services offered would be only applicable in the specified territory of our service centers. Any services required outside the specified territory would be on chargeable basis.
- 5) Some of the products can only be serviced at our Manufacturing works at Nasik. With such products, the transportation cost of faulty product to and fro Nasik would be to purchaser's account.
- 6) Normally, the products offered are warranted for a period of 15 months from the product invoice date or 12 months from the first usage date, whichever is earlier. This is valid unless extended term of warranty is explicitly agreed between TAS and the purchaser.
- 7) The warranty is applicable is for rectification of the defective product/system and would not be applicable for the entire product/system replacement.

9.Important Notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule, TAS is either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether a TAS product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as hazardous)**. Useful information on this will be found in our Material

Data Sheets on the Internet (www.taspowertek.com). Should you have any more detailed questions, please contact our factory.

5. We constantly strive to improve our products. Consequently, **the products described in this publication may change from time to time**. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order.

We also **reserve the right to discontinue production and delivery of products**. Consequently, we cannot guarantee that all products named in this publication will always be available. The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.

6. Unless otherwise agreed in individual contracts, **all orders are subject to the current version of the “General Terms of Delivery for Products and Services in the Electrical Industry” published by the German Electrical and Electronics Industry Association (ZVEI)**.
7. The trade name TAS PowerTek further information will be found on the Internet at www.taspowertek.com.