



# STATVAR LINE - VED905 V5L SYNCHRONOUS MOTOR EXCITER

## EXCITATION SYSTEM FOR SYNCHRONOUS MOTORS



CATALOG

# VED905 V5L

## SYNCHRONOUS MOTOR EXCITER SYSTEM



The VED905 V5L Static Exciter / Power Factor Regulator is the newest model in Varixx's advanced family of exciters for Synchronous Motors. The VED905 is a Digital Regulator with a touch screen, which, together with the specific Power Module, composes a Static Exciter for excitation currents between 1 and 2000 Amperes, which can operate fully automatically.

The VED905 V5L can be programmed via keyboard or Modbus network or by Ethernet.

The VED905 has dozens of built-in protections and functions, all programmable.

Dozens of variable and status readouts are available on the liquid crystal display and via Modbus.

Faults are memorized, with date and time of occurrence.

The last event or first fault that occurred is also memorized, as well as various data, such as the time of the last excitation, number of hours excited, number of total hours, etc.

Several intelligent functions facilitate application, such as switching without disturbances (Bounceless) between "Automatic" and "Manual Open Loop" or "Manual Constant Field Current" or even between different modes of "Settings". Other functions available, such as "PID Auto-tune", Calibration of readings, Fault Indication, Active Operating Modes and others facilitate application and operation.

Several types of operation point setting are available individually or in combination, such as "Up/Down", "Keyboard" (Touch Screen), Potentiometer, 0 to 5 VDC, 0 to 20 mA or Modbus network.

The VED905 V5L features great response time (10 mS) with built-in Power Factor Sensing and low first-order delay.

The VED905 V5L can work in several modes such as: Constant Field Current, Constant Power Factor or Constant KVAR or Constant Field Current with "Droop" by Power Factor or by KVAR (allowing to work in "tandem" configuration, with more than a motor on the same shaft).

One of the main characteristics of the VED905 V5L is the automatic dual-channel system with dual setpoint of work point and dual PID (Primary and Secondary) in addition to the manual channel, which allows switching to "Constant Field Current" mode that can be used in start-up and synchronization, for "Constant Power Factor" without the need for intervention at the work point, being able to work completely without operator supervision.

It has programmable automatic limitation functions of Leading and Delaying Polar Angle and Minimum and Maximum Excitation Current.

It also has a "Pull In Booster" function with a current ramp up to the setpoint, facilitating synchronization with heavy loads.

The semiconductors in the power module are "isolated base module" type allowing for clean and reliable construction.

A specific "Control" input facilitates operation in selectable "Force Open Loop" and "Force Field Current" modes. The digital inputs and outputs can be programmed for different functions.

### MAIN ADVANTAGES

DIGITAL CONTROL

WITH ETHERNET

COMPACT AND EASY TO USE

TOUCH SCREEN - FRIENDLY

DIGITAL MEASUREMENTS

EVENT HISTORY

PLOT OF VARIABLES

TWO CONTROL CHANNELS

WITH ETHERNET

### APPLICATIONS

- Excitation systems for brushless synchronous motors.
- Excitation systems for slip ring synchronous motors.
- Excitation systems for synchronous motors with external auxiliary rotary exciter.

The **VED905 V5L** relay has Ethernet communication with several protocols, and can be accessed from anywhere by mobile devices or not.

Ethernet protocols:

TCP/IP (Modbus Slave): Modbus over Ethernet).

Ethernet/IP: ODVA CIP over Ethernet.  
FTP: (File Server) File Transfer Protocol.

NTP Protocol: Network Time Protocol

HTTP (Web Server): Hypertext Transfer Protocol (Web Server).

## TECHNICAL DETAILS

- **Application:** High performance Digital Static Exciter with color touch screen, for Synchronous Motors, with Modbus RTU protocol communication.

- **Channels:** Two channels with independent and switchable PID and setpoint.

- **Control Signals:** “Up/Down”, “Keyboard” or Modbus Network.

- **Modes:** “Automatic”, “Manual Open Loop”, “Manual Field Current”.

- **Regulation:** Constant Power Factor or KVAR, Constant Field Current with or without "Droop" by P.F. or KVAR.

- **Programmable protections** (21 total): Line Over and Under Voltage, Stator Over and Undercurrent, Lead and Lag Polar Angle Trip and Limitation, Minimum and Maximum Field Current Limitation and Trip, Over and Under-power, Long Start, Over-temperature , External Fault, Loss of Field, Delay for restart after hot and cold stop and Loss of Control (Self-monitoring).

- **Additional programmable functions:** Pull In Booster with “Soft Ramp”, Dual automatic channel with independent setpoint (PID1 for Ictc and PID2 for PF cte, Input limit in PF cte, Change from PID1 to PID2 automatic or commanded, “Reset” and Manual/automatic “Mute”, Memory of the 1st fault, fault history, “PID Auto Tune”, “FAR” (Field Application Relay) and “FCX” (Loading) signal inputs and outputs, and others.

- **Signals and Measurements** (31 Total): Line Voltage and Current, KVA, KVAR, Power Factor, KW, Field Current, “Lead” or “Lag”, “Setting Range”, % of Current “Setting”, Limits Active, Active Clamping, “Mode/Droop” Status, “Droop Range”, Operation Mode, Regulation Mode, “Setting Mode”, “Forcing Mode”, Forcing Setting”, Fault Signaling, “Modbus Status”, “ Modbus Messages”, Time and Date, Last Event, Last Excitation and De-excitation Time, 1st Fault, Fault and Event History, Excited Hours, Total Hours and Cycles.

- **Programming:** via touch screen or network.

- **Inputs and Outputs:** 4 digital inputs and 4 digital outputs, all programmable.

- **Ethernet communication:** with several available protocols.

### VED905 V5L RELAY CHARACTERISTICS

|   |  |
|---|--|
| Power Supply  | 24 VDC, 150 mA   |
| Moisture  | 5 - 95%  |
| Dimensions  | 96 mm x 125 mm x 31 mm   |
| Connectios  | 1 x RS232<br>1 x RS485<br>1 x CAN (125 Kbps - 1 Mbps)<br>1 x Ethernet (1-10 Mbps/100 Mbps)<br>1 x USB Mini Program<br>1 x USB Flash<br>1 x Micro SD/SDHC   |
| Inputs  | 4 analog 0-20 mA (50 ohms)<br>12 Bits, Error: 1,5% FS Max<br><br>4 digital Programmable - 0-24 VDC<br>Min On= 8VDC, Max Off: 3VDC<br>(Starting, FAR, FCX, Up, Down, Force Field Curr, Force Open Loop, Reset, External Fail) |
| Outputs   | 4 Programmable outputs, Half-Bribrge<br>0,5A max, 10 - 30 VDC, C. Source +<br>Protections: Short-circuit / Over Voltage.<br>(PWM - Firing, Start Permission, FAR, FCX, Alarm, Trip, Opman)                                   |
| Communication                                       | Modbus RTU, CsCAN<br>Ethernet,<br>Devicenet (Optional)   |
| Screen  | Color, WVGA (480 x 272)<br>Colors 64K<br>Touch Screen Resistive 4,3"<br>450 cd/m <sup>2</sup>  |
| Certificates  | CE /<br>FCC Compliance - Part 15 of FCC  |
| Connectors  | 3,5 mm - pluggable   |
| Weight  | 270 Grams  |
| Temperature   | Operation: -10 °C - 60 °C<br>Stored: -30 °C - 70 °C  |
| RTC battery<br>(only for the<br>Real Time<br>Clock) | Operation: > 10 Anos<br>Stored: 5 - 10 anos<br>Clock error: 8 s / mês at 25 °C max   |

## VED905 V5L

### MAIN BENEFITS

- **Color Touch Screen.**
- **Ethernet Communication**
- **Operates in 3 programmable modes.**
- **Several built-in protections.**
- **Real-time graphical recording (Plot).**
- **Failure and event history.**
- **Continuous readings.**
- **Built-in Modbus RTU serial communication (other protocols on request).**
- **Two independent PID control channels.**
- **Built-in Autotune function**

## • System Components:

**System:** VED905 V5L/xxxA/yyyV/m/n/p/r/zzz

**Control module:** VED905 V5LC.

**Power Module:** VED905 V5LP/xxxA/yyyV/m/n/p/r/zzz.

### • Rated Currents: 25 to 2000 Amp.

• **Power Control:** Compact, fully controlled, three-phase thyristor bridge or PWM from 1000 Hz to 16000 Hz, with IGBT.

• **Isolation:** 1200 VDC (between Command/Power and between Power and Mass).

• **Power Control Type:** Phase angle with thyristors or PWM with IGBT.

• **Response Time:** Maximum 10mS.

• **Control loop:** Fully programmable Independent PID type - "Bias", P (Proportional gain), I (Integral), D (Derivative), "Derivative Term" (Error=Pv-SP or Pv=Process Value), "Dead Band" (Lower and Upper), "Slew Time" and others.

• **"Droop" / "Compound" Adjustment Range:** 0 to 10% / 10 to 100%.

• **Operation Modes:** I field cte, I field cte with droop, Power Factor cte, KVAR cte (with dual channel for independent adjustment of F.P. or KVAR).

• **Operation Point Setting:** "Up/Down", "Keyboard", "Up/Down" + "Keyboard".

• **Digital Outputs:** 04 Programmable for "Starting Permission", "FAR Output", "FCX Output", "Alarm" or "Trip".

• **Pull In Booster:** with ramp to setpoint.

• **Adjustment Scales:** +/- 20% and +/- 120%.

• **Initial Setting:** Programmable for "Last Value", 0%, 50%, 100% and "Nominal".

• **Operation Modes:** "Automatic", "Manual Field Current", "Manual Open Loop".

• **Switching between Operating Modes:** "Bounceless" type, without disturbance.

• **Switching between Setting Modes:** "Bounceless" type, without disturbance.

• **Programming of parameters and values:** "On line".

• **Reading Values:** Line Voltage, Line Current, Power (KW), Apparent Power (KVA), Reactive Power (KVAR), Power Factor, Field Current.

• **Programmable limits:** Leading Polar Angle, Lagging Polar Angle, Minimum Excitation Current, Maximum Excitation Current and P.F. cte.

• **Power Factor Reading:** By built-in internal transducer or optional external transducer.

• **Manual to Automatic Transfer Modes:** Programmable for "Maintain Process Value", "Setting = 0%", "Setting = 50%", "Setting = 100%", "Setting = Nominal".

• **Analog I/O Filters:** Programmable.

• **Calibration of Readings:** Zero and Scale, all independent and fully digital and can be performed "On Line".

• **Calibration of Scale, TP, TC and Nominal Values:** All digital and "On line".

• **Autotune Function:** Available, to facilitate and optimize PID calibration.

• **Communication:** Serial RS232C MODBUS RTU protocol (optional ASCII) for "Point to Point" connection or with external RS232C/RS485 converter, for network use. (Droop Out). CAN port with optional CsCAN or Devicenet protocol.

• **Protections:** Overvoltage, Undervoltage, Leading Polar Angle, Lagging Polar Angle, Field Undercurrent, Field Overcurrent, Field Overtemperature, Field Loss, Line Overcurrent, Line Undercurrent, Overload, Underpower, Long Start, Overtemperature, External Fault, Loss of Control (Self-monitoring) and (Delay for restart - Cooling.)

• **Actions on faults:** Independently programmable for each fault in "None", "Alarm", "Inhibition", "Trip" and "Both (Trip + Inhibition)", "Force Field Current" and "Force Open Loop".

• **Delays for fault detection: Programmable.**

• **Real Time Clock: Included.**

• **Programming:** With user-changeable password.

• **Forcing:** Operating Mode and Setting Mode with programmable password.

• **Operating mode in Power Factor cte or KVAR cte:** "Compound" from 10 to 100% to optimize stability.

• **Fault History:** with Date and Time.

• **Memorization of Events:** 1st Failure, Last Event with time and date, Time and Date of the last start and Time and Date of the last stop, Total running hours, Total energized hours and Number of starts.

• **Programmable outputs:** static type for activating relay terminals (Starting permission, FAR, FCX, Alarm and Trip)

• **Active Screens:** 100+ multiple screens.

• **Repeatability and Uniformity of adjustment:** 100% (Free of analog adjustments - no "Trimpot" used externally or internally).

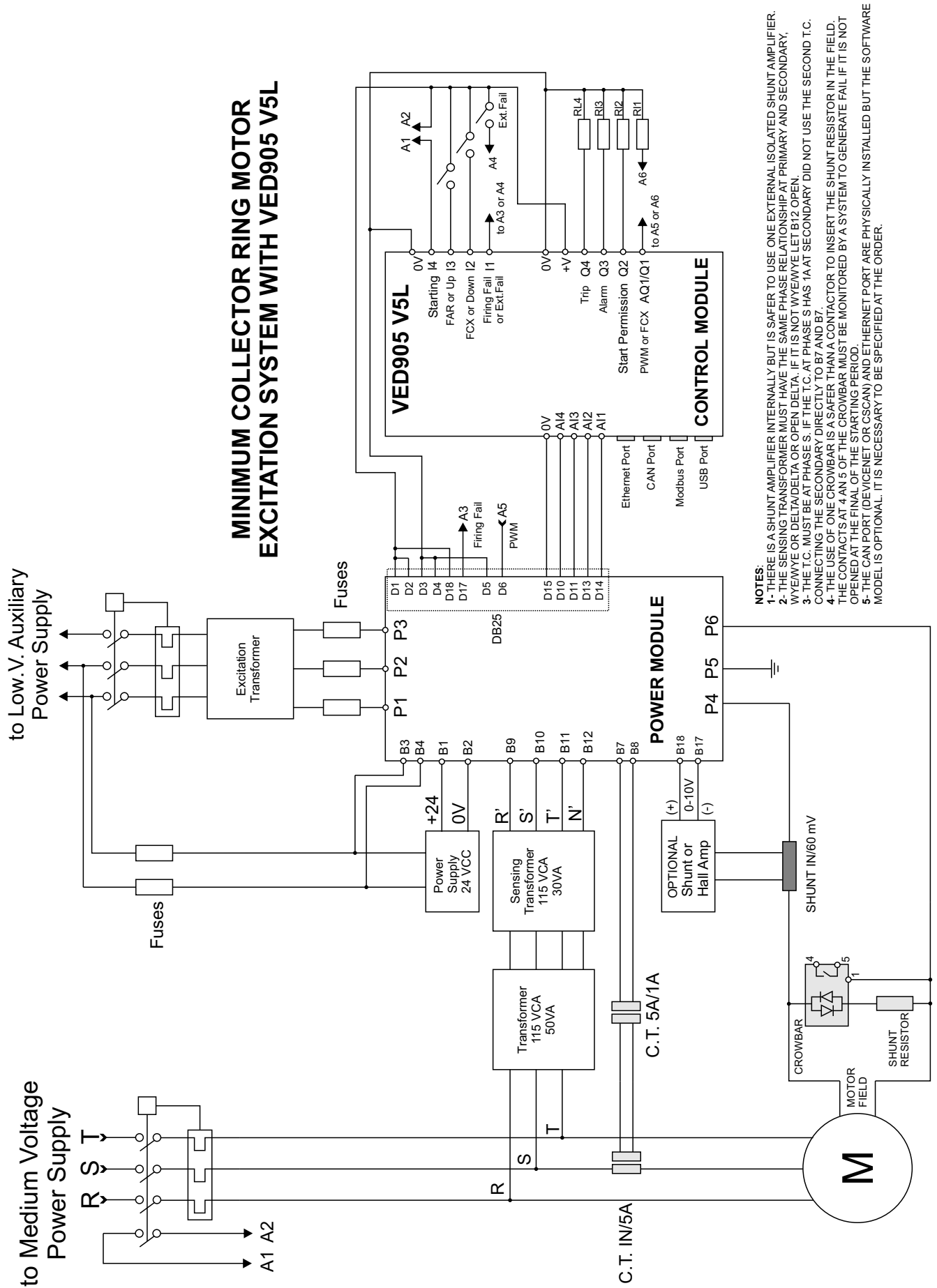
• **Up/Down adjustment resolution:** 0.01%.

• **Up/Down Adjustment Speed:** 3 speeds automatically selected every 2 seconds that the keys are kept pressed.

• **Programmable inputs:** Starting, UP, Down, FAR, FCX, Reset, Force Open Loop, Force Field Current.

## TYPICAL APPLICATION

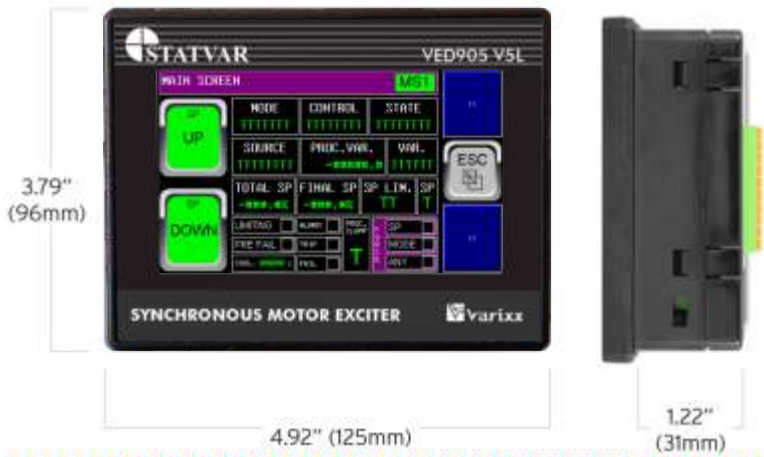
### Minimum System for Slip Ring Motor



## MECHANICS



- 1- POWER 24 VCC
- 2- D.I. / A.I. CONNECTOR
- 3- D.O. / AQO. CONNECTOR
- 4- CAN PORT
- 5- RS232/RS485 SERIAL PORTS
- 6- CONFIGURATION SWITCHS
- 7- ETHERNET LAN PORT
- 8- MICRO SD SLOT
- 9- USB PORT



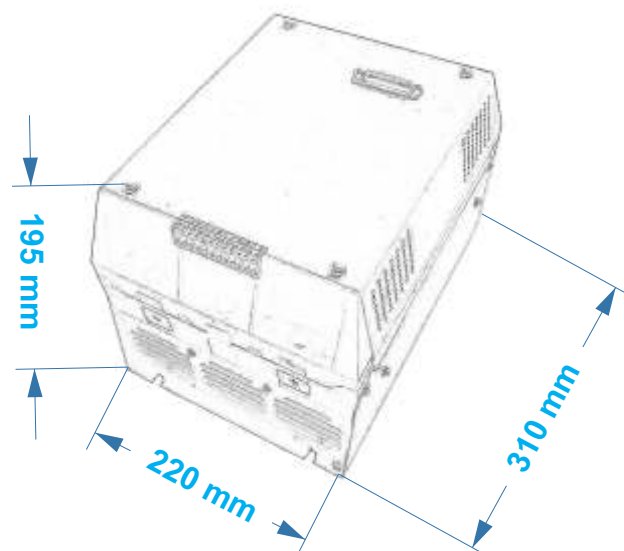
## PANEL CUTTING



## DIP Switchs in the Relay

| DIP SWITCHES |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| PIN          | NAME               | FUNCTION        | DEFAULT |
| 1            | RS-485 Termination | ON = Terminated | OFF     |
| 2            | CAN Termination    | ON = Terminated | OFF     |
| 3            | Bootload           | Always Off      | OFF     |

## 25 A Converter Mechanics (Available up to 1200 A)



## BASIC COMPONENTS OF THE SYSTEM

Controller Module



Cable Connection Example



Power module



Interconnection Cable



## MAIN SCREENS FOR OPERATION

### MAIN MENU, (ESC) INFO SCREENS

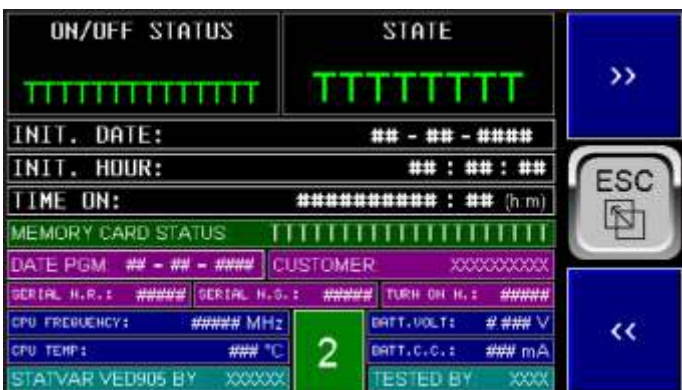


#### MAIN MENU:

Screen from which all other system screens are accessed. From there, all operating and programming screens can be accessed.

Note that, to eventually call the operator's attention, the «ALARM» field will flash and have a red border to inform that there is an alarm not displayed (Acknowledged) or Cleared (Cleared) on the alarm screen. By touching this field, you enter the alarm screen and you can acknowledge and reset the alarm. More details ahead.

### INFORMATION SCREENS



**ATTENTION: THE VED905 V5L RELAY LEAVES THE FACTORY WITH A PASSWORD TO ENTER THE PROGRAMMING MENU = «1» CHANGE IT, INSIDE THE MENU «RELAY CONFIG» TO ANY OTHER VALUE (ADVISABLE).**



#### INFO SCREENS 1 to 5:

There are 3 screens paged by the >> and << keys and accessed through the ESC key from the main menu.

**INFO SCREEN 1:** There is a lot of information. When powering up the system this is the initial screen. Pressing ESC takes you to the main menu above.

**VERS:** Software version

**ETHERNET LINK OK:** Indicates that the Ethernet cable is properly connected to the RJ45 LAN port.

**ETHERNET NOT LINKED:** Flashes if the Ethernet cable is not properly connected and not communicating.

**DATE, TIME and DAY OF WEEK:** from the internal real time clock.

**FAIL:** Indicates fault not reset.

**ALARM:** Indicates Alarm active and Mute has not yet been executed (alarm output active).

**TRIP:** indicates that a trip has occurred and has not yet been reset (Trip output active).

## MAIN SCREENS FOR OPERATION



**MAIN SCREEN MS1:** Shows 20 fields:

**MODE:** Shows the regulation mode: Automatic, Man.Fld.Cur. or Man.Open Loop.

**CONTROL:** Displays the current variable or control mode: FLD AMP, PWR FACTOR, KVAR or MVAR, FLD AMP/PF, FLD AMP/VAR, OPEN LOOP, BLOCK TM, FORCE FLD.

**STATE:** Shows the state at the moment: STANDBY, STARTING, BOOSTER, FAIL, ALARM, EXCITED, LOADED, BLOCKED.

**SOURCE:** Shows the control source of the setpoints: UP/DOWN, KEYBOARD, U/D+KBD.

**SEARCH VAR.:** Shows the value of the variable being controlled.

**VAR.:** Shows the dimension or condition of the variable being controlled: LAG, LEAD, FORCED, A, FC, PF.

**TOTAL SP:** Shows the commanded setpoint value between 0 and 100%

**FINAL SP:** Shows the values of the actual setpoint after eventual 'forcing' or 'limiting', automatic from the system.

**SP LIM:** Shows if the setpoint is suffering automatic limitation to avoid operator error: NO, < , >. NO for no limitation, < for limiting lower value and > for limiting upper value.

**SP:** Shows which PID is currently operating: P or S. P for primary (constant current) and S for secondary (other modes).

**LIMITING:** Indicates whether any automatic limiting is currently in effect.

**PRE FAIL:** Indicates if a fault is about to be triggered after the programmed delay.

**COOL.:** Indicates the time for restarting to avoid overheating in the motor. This time is calculated automatically depending on operating conditions.

**ALARM:** Indicates active alarm

**TRIP:** Indicates active trip.

**FAIL:** Indicates active failure (not cleared on the clear fails screen).

**PROC. CLAMP:** Indicates if control clamping is taking place by calculations in the process and not by a value manually entered in the clamping program in the programming menu. N, < , >. N normal operation without clamping, < for lower value clamping and > for higher value clamping.

**FORCE SP:** Indicates that the setpoint value is forcing at the moment.

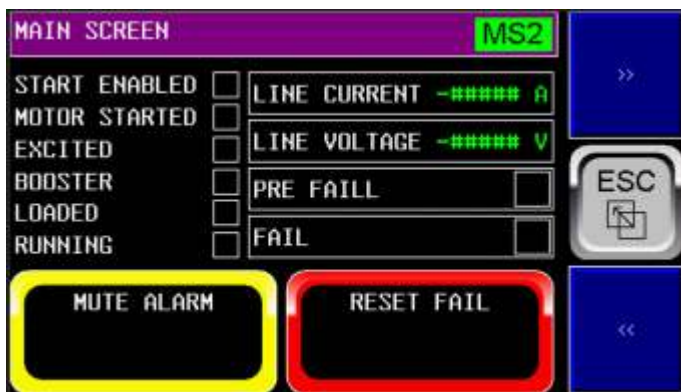
**FORCE MODE:** Indicates whether there is forcing in 'manual open loop' or 'manual field current' mode at the moment.

**FORCE ANY:** Indicates if there is any type of forcing at the moment, including Booster.

**SP UP:** Keyboard setpoint increase button.

**SP DOWN:** Keyboard setpoint decrease button.

## MAIN SCREENS FOR OPERATION



**MAIN SCREEN MS2:** Show 10 fields:

**START ENABLED:** (if the engine is already cold enough to restart and there is no active fault at the moment).

**MOTOR STARTED:** on closing the Starting contact coming from the motor circuit breaker.

**EXCITED:** Whether the field was applied by the FAR contact and other conditions.

**BOOSTER:** Whether it is in conditions for Booster application during start-up or load coupling.

**LOADED:** If the FCX contact and/or the line current is above the programmed value.

**RUNNING:** If the starting sequence is finished.

**LINE CURRENT:** Shows the motor line current value.

**LINE VOLTAGE:** Shows the motor line voltage.

**PRE FAIL:** Flashes if a fault is about to be detected, before the programmed delay time elapses.

**FAIL:** if there is an active fault that is not acknowledged and not reset.

**MUTE:** Alarm silencing button.

**RESET:** Fault Reset button.

**MAIN SCREEN MS4:** Show 6 fields

**TIME TO NEW START = 'COOL TIME':** Indicates the time for a new start and a function of the motor cooling time depending on the operating conditions, starting and stopping.

**ON/OFF STATUS:** Shows the starting and stopping conditions of the motor according to the programmed cooling time in the programming menu: **Running - Cold** (if it started and the



**MAIN SCREEN MS3:** It shows 10 fields, 8 of which are measurements and readings, self-explanatory.

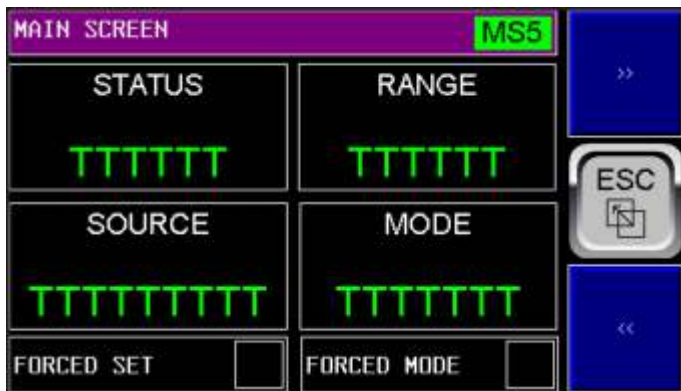
**PF FORCED:** Indicates whether there is currently a 'Force' of 'Power Factor' in order not to exceed a minimum value both in LAG and in LEAD.

**COOL TIME:** It indicates the time for a new start and the function of the motor cooling time depending on the operating, starting and stopping conditions.



programmed time has passed), **Running - Hot** (if it started and the programmed time has not yet passed) programmed time), **Stopped - Cold** (if stopped while already in the Running - Cold condition and the programmed time has passed) and **Stopped - Hot** (if stopped in the Running - Hot condition and the programmed cooling time has not yet elapsed..

## MAIN SCREENS FOR OPERATION



**MAIN SCREEN MS5:** Show 6 fields

**STATUS:** Shows operating conditions:

**NORMAL:** If there is no active fault

**ALARM:** If the alarm output is active

**FAIL:** If there is an active fault.

**MUTED:** If there is an active fault but the alarm has already been muted.

**RANGE:** shows the programmed range for the setpoints. 20% or 100%

**SOURCE:** Shows the control source of the setpoints: UP/DOWN, KEYBOARD, U/D+KBD.

**MODE:** Shows the regulation mode: Automatic, Man.Fld.Cur. or Man.Open Loop.

**FORCE SET:** Indicates that the setpoint value is forcing at the moment.

**FORCE MODE:** Indicates that manual forcing is taking place openloop or manual field current at the moment.

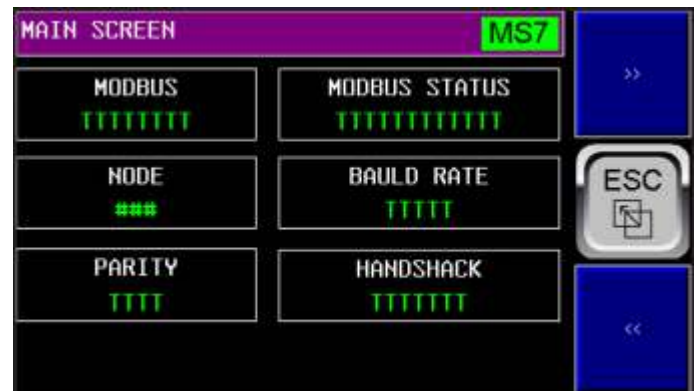


**MAIN SCREEN MS6:** Shows 9 fields of limiting, forcing and clamping conditions.

**FORCED MODE:** whether there is a forced mode of 'Manual Open Loop' or 'Manual Field Current'.

**FORCED SET:** If there is currently a forced setpoint value, calculated internally to protect against operator error.

The other fields are self explanatory.



• **MAIN SCREEN MS7:** Shows 6 fields of Modbus communication parameters, as programmed. It is informational only.



**MAIN SCREEN MS8:** Shows 7 bargraphs - bars of values from 0 to 100% or 0 to 32000

**SP1:** Primary Setpoint from 0 to 100%

**Process 1:** Value of the controlled variable read for actuation by Setpoint P and Primary PID.

**SP2:** Secondary Setpoint from 0 to 100%

**Process 2:** Value of the controlled variable read for actuation by Setpoint S and Secondary PID.

**PID 1/2 SPF:** Final SetPoint value for the PID that is currently active. The final value may be different from the set value due to limitation, forcing and clamping calculated by the system. 0 to 32000

**PID 1/2 PVF:** Final Process Value for the PID that is currently active. The final value may be different from the value read due to Limiting, Forcing and Clamping calculated by the system. 0 to 32000.

**PID 1/2 CVF:** Refers to the value of the control output for the power module as a function of the error between SP and PV. 0 to 32000.

This information helps in the startup to establish the best stability of the system.

## MAIN SCREENS FOR OPERATION



**FAIL / INDICATOR SCREEN FS1:** Shows the currently active faults.

There is a **MUTE** button to silence the alarm output and a **RESET** button to reset it.



**FAIL / INDICATOR SCREEN FS2:** Shows the states of the digital inputs and digital outputs.



**EVENT SCREEN ES2:**

**LAST STOP:** Date and time of last stop.

**TOTAL RUNNING HOURS:** Total number of running hours. It can be reset by the user with the proper password.



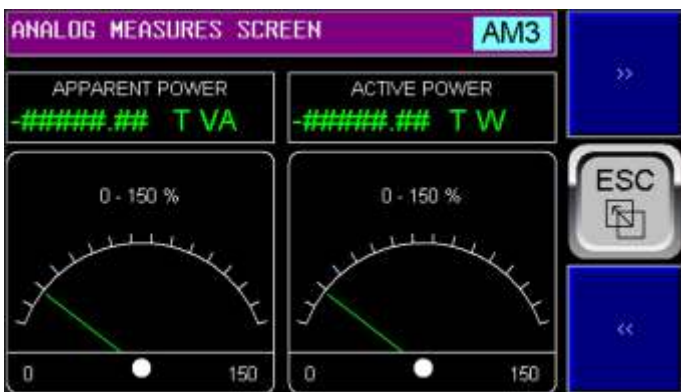
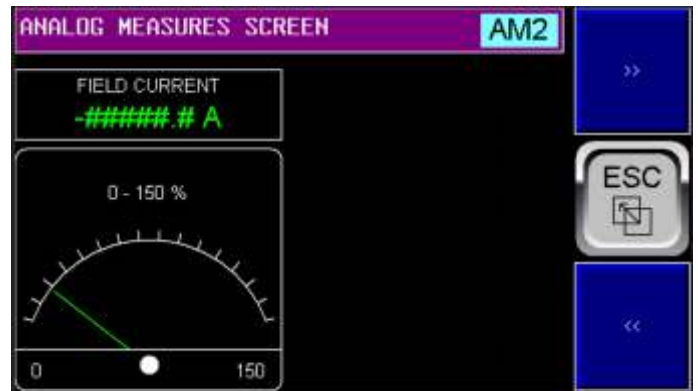
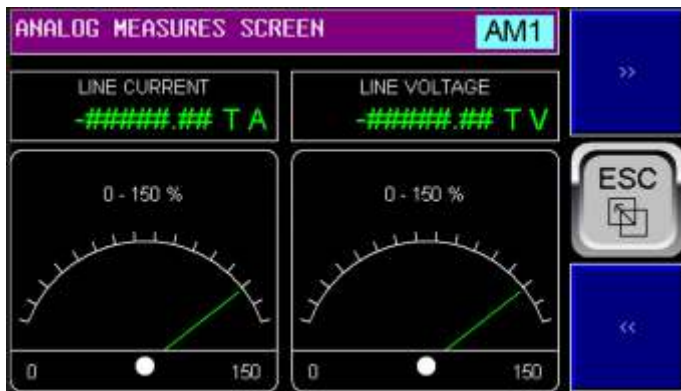
**EVENT SCREEN ES1:**

**LAST EVENT / FIRST FAIL:** It shows the last event or first fault: it can be Normal Starting or Normal Stopping or the programmed faults. Shows the date and time of the occurrence.

**LAST START:** Date and time of the last start

**TOTAL STARTING TIMES:** Number of total starts. Can be reset by user with password.

## MAIN SCREENS FOR OPERATION

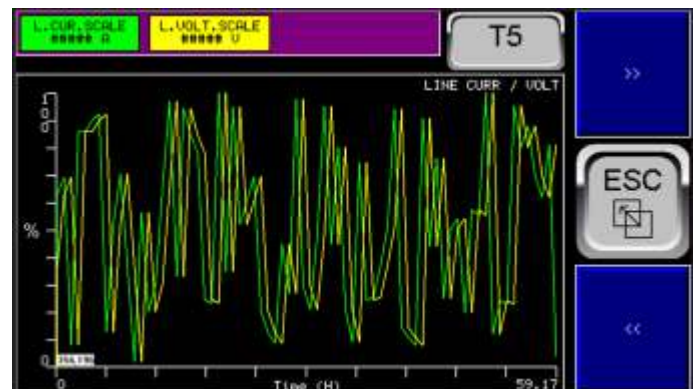
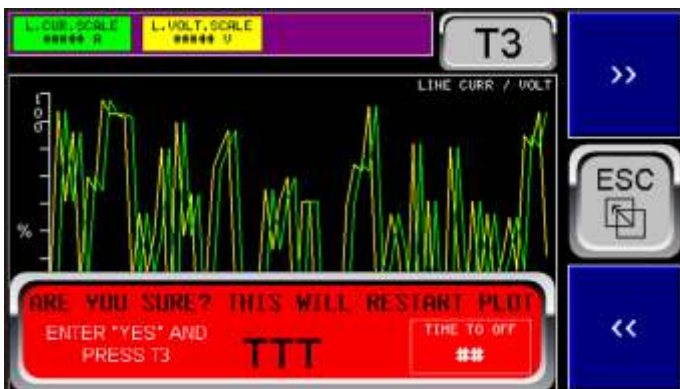
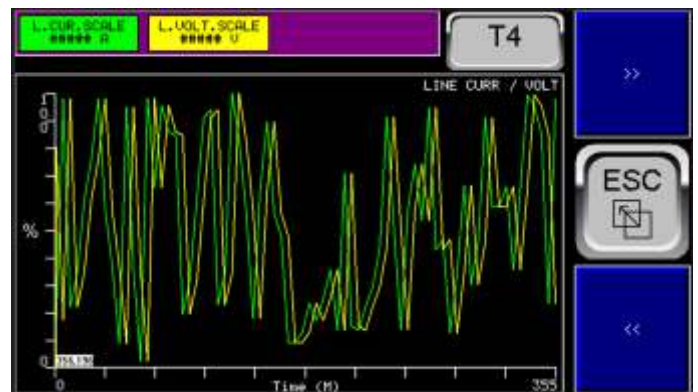
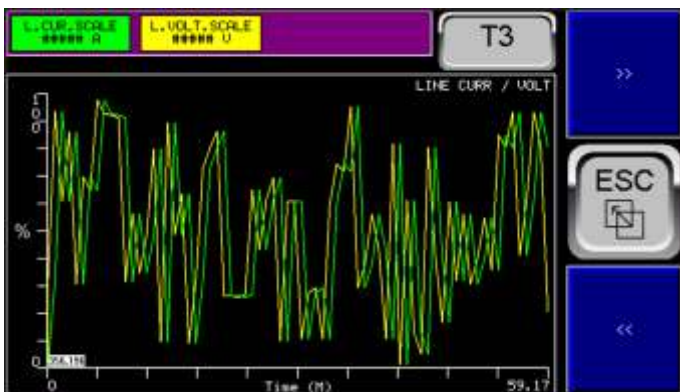
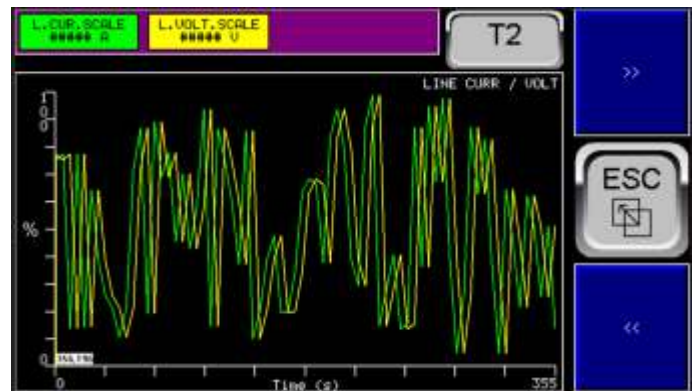
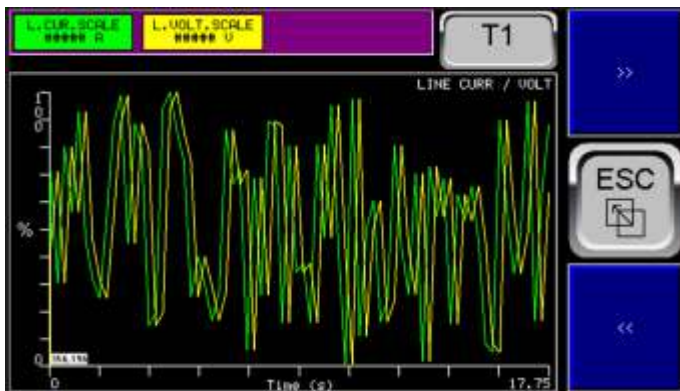


## ANALOG MEASURES SCREEN AM1 to AM5:

Shows main readings in analog mode, facilitating interpretation under certain analysis conditions. Scales and variables are indicated on each screen. The digital value is also shown.



## MAIN SCREENS FOR OPERATION



## TREND SCREEN T1 to T5:

Shows the curves for Line Current and Line Voltage on different timescales (shown on the x-axis). On the Y axis, the scale is always from 0 to 100% of the scale value programmed in the Menu and shown above. For example, if the Line Current scale is 3000 A and the curve is at 50% it means that at this instant the current is 1500 A.

## RESET OF CURVES

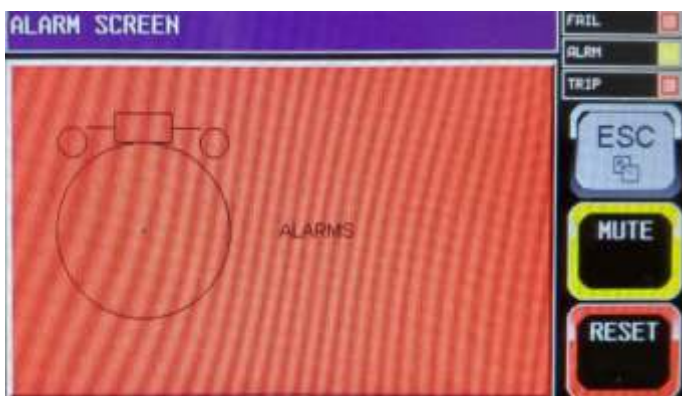
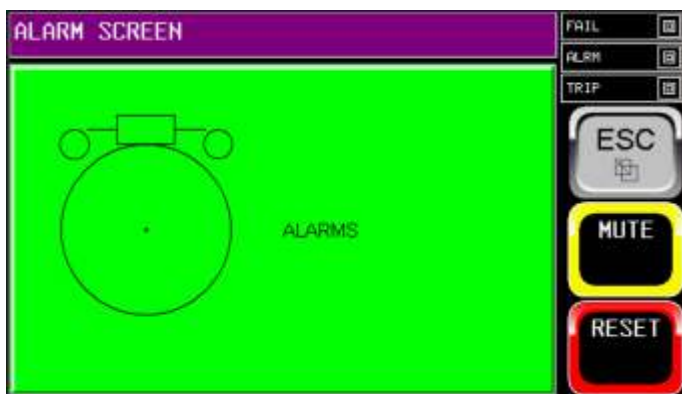
To restart, touch buttons T3 to T16.

When leaving screens T1 and T2 and returning, the curves restart, unlike the curves from T3 to T17.

When pressing the T3 to T16 key, a red button appears, asking if you are sure you want to restart the curves on the respective screen. If yes is entered, the operator will have 10 seconds to enter the answer «Yes» into the button and touch T3 to T16 again. Otherwise, the red button disappears and the curves are not reset.

This is intended to prevent inadvertently resetting a curve that has been plotted for a long time, thus losing observable data. See Example T3 Screen above.

## MAIN SCREENS FOR OPERATION

**ALARM SCREEN:**

If it is green when entering, it means that there is no active alarm. If it is red, tap anywhere on the screen and the alarm list will open. The date and time of the occurrence can then be verified and, when Tapping the Ack or Ack All button, each fault or all faults can be recognized respectively. This will change the text color from red to blue and the alarm screen color will change to yellow on exiting with the Esc key while faults are not cleared.

You cannot clear the faults on this screen, only on the Clear screen where you can enter a specific password for this.

**HISTORY SCREEN:**

There will be the sequence of failures with day and time. When touching any point on the screen it will open to show more details.

Events will be in red. Acknowledged faults on the Alarm screen will be in blue and denials (RTN - Return) of faults will be in green.

Faults with Acknowledge - Ack (acknowledged) will be in blue.

You cannot clear the faults on this screen, only on the Clear screen where you can enter a specific password for this.

## MAIN SCREENS FOR OPERATION

### ETHERNET REPORT

**ETHERNET REPORT** ER1  
LAN CONFIG

IP ADDRESS: ### ## # ## # ## # ## # ## #

NET MASK: ### ## # ## # ## # ## # ## #

GATEWAY: ### ## # ## # ## # ## # ## #

DNS: ### ## # ## # ## # ## # ## #

LINK  NOT LINKED  CONNECTIONS: ###

**ETHERNET REPORT** ER7  
HTTP / WEB SERVER

USER

USER NAME: V905\_WS

PASSWORD: 83397

**ETHERNET REPORT** ER2  
STATUS

HALF DUPLEX  FULL DUPLEX

SPEED 10 Mbps  SPEED 100 Mbps

Tx:  Rx:

LINK  CONNECTIONS: ###

**ETHERNET REPORT** ER8  
NTP PROTOCOL

1: a.st1.ntp.br

2: b.st1.ntp.br

3: c.st1.ntp.br

4: d.st1.ntp.br

5: gps.st1.ntp.br

**ETHERNET REPORT** ER3  
ICMP PING

PING ADDRESS: ### ## # ## # ## # ## # ## #

PING RESPONSE TIME: ##### ## # mS

Tx:  Rx:  PING TIMEOUT

START STOP

**ETHERNET REPORT** ER4  
ICMP MODBUS SLAVE

MODE: [TCP]

PORT: [502]

ENABLE WRITE INHIBITION: TTTT

**ETHERNET REPORT** ER5  
ETHERNET/IP

PRODUCED (CONTROL TO NET)

REGISTERS: [M3200 - M3200]

CONSUMED (NET TO CONTROL)

PROGRAM PERMISSION: [TTTTTT] CONNECTED

REGISTERS: [M3200 - M3200]

CONNECT CLASS 3: ### CONNECT CLASS 1: ###

**ETHERNET REPORT** ER6  
FTP / FILE SERVER

USER1

USER NAME: V\_FTP\_USER

PASSWORD: 833905 | READ ONLY

USER2

USER NAME: V\_FTP\_VRX

MODE: [READ / WRITE]

### ETHERNET REPORT SCREEN 1 to 8:

There are 8 screens that reproduce the Ethernet Programming Menu, where you can check the different programming conditions without being able to inadvertently change the programming. None of the screens allow commands or changes, with the exception of the ER3 screen, where you can choose an address and command a PING action to check if a certain device on the network is responding.

Later on, the fields of all these screens will be detailed. Here we will only comment on the function of each one of them.

The ER1 and ER2 screens refer to the main Ethernet configuration parameters. On the ER1 screen are the parameters and on the ER2 screen are the Status of the connection.

The ER3 Screen refers to the **ICMP - Internet Control Message Protocol** and it is possible to Ping the address of a certain equipment.

The ER4 screen refers to the **TCP/IP protocol - Transmission Control Protocol (Modbus TCP Server or Modbus Slave)**. Through this protocol, Modbus Over Ethernet communication can be carried out, using all the parameters and addresses described in the Modbus Map at the end of this manual.

The ER5 screen refers to the Internet Protocol (Ethernet IP Server).

The ER6 screen refers to the **FTP - File Transfer Protocol**. Through which you can read and access the files on the memory card inserted in the respective slot of the relay and where the temperature readings, etc. are recorded using a Browser.

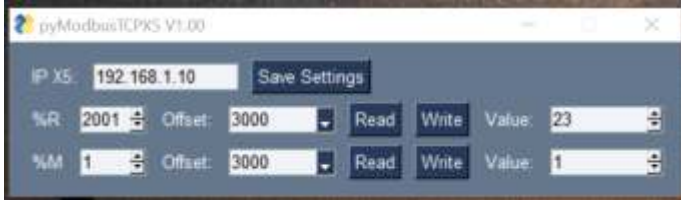
The ER7 screen refers to the **HTTP protocol - Hypertext Transfer Protocol**.

The ER8 screen refers to the **NTP protocol - Network Time Protocol** through which you can obtain precise times from predefined NTP servers.

## TESTING THE ETHERNET CONNECTION

### USING A WINDOWS COMPUTER

A simplified way to test the ETHERNET connection is described below, using simple executable software provided by Varixx or any similar program available on the world wide web). Let's consider here the explanation using the executable **pyModbusTCPV5**



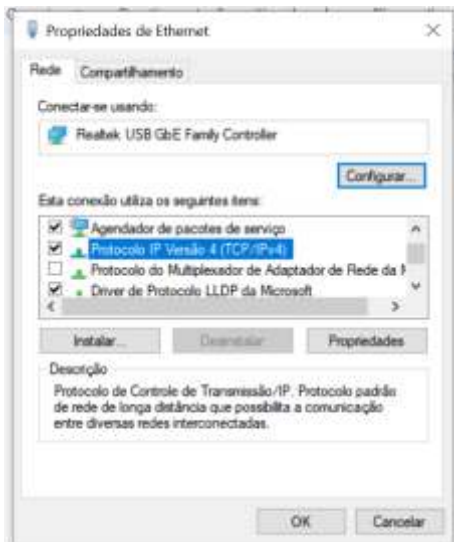
1- Initially connect the suitable RJ45 cable between the computer and the LAN port of the VED905 V5L relay and open the Windows Settings and select the **Network** and **Internet** option, which will open the properties screen that will contain content as shown below, among others.



2- Click on the option «Change adapter options». The following screen will open, in which an unidentified Ethernet connection should appear, in addition to the other existing connections.



3- Right-click the unidentified Ethernet connection. The following screen will open.



4- Double-click on the Internet Protocol Version 4 (TCP/IPv4) option. The following screen will open.



4- Enter an IP address that is different from your local network, for example if your network is **192.168.0.1** and press OK. you must use a network that has the third digit different from it. For example, we use **192.168.1.11** and in the **pyModbusTCPV5** program we use **192.168.1.10** so the computer's address on the network will have the termination **11** and the **VED905 V5L** relay will have the termination **10**. At this point the two devices should already be connected and exchanging data. On the **VED905 V5L** relay, on the Menu screen, choose option **16. REPORT** and then the option **ETHERNET REPORT / STATUS**. Then go to the **ER3** screen and activate the **START** option to test the connection with **PING**.



If the connection is OK, it will indicate a response time in the **PING RESPONSE TIME** field, which should be around 0.01 mS. If the connection is not OK, it will indicate **PING TIMEOUT** and the **PING RESPONSE TIME** field will be all +++++.

If the connection is OK, open the **pyModbusTCPV5** executable program and enter the chosen address, in this example **192.168.1.10** and click Save Settings. Choose a register to be read, for example **%R4001**, which will contain the value of the first reading, plus the necessary offset according to the Modbus tables in this manual and click Read. The current temperature should appear in the Value field. In the same way, flags of type **%M** can be read.



**Attention:** You can also write to the registers, but avoid this if you don't know that a certain register can be overwritten, as it could change configuration parameters of the VED905 V5L relay. **Never use this type of test with the VED905 operating with the engine.**

## CODE

## ORDER CODE

- Excitation System for Synchronous Motors: **VED905 V5L/xxxA/yyyV/m/n/p/r/zzz**
- **xxx** is the rated current of the power module.
- **yyy** is the ceiling voltage for the machine field.
- **m** is the power control mode: **T**=thyristors or **I**=IGBT
- **n** is the protocol inclusion option: **N**=No, **D**=Devicenet, **C**=Cscan
- **p** is the add Ethernet server option: **N**=No, **E**=Yes
- **r** is the option to include a memory card for operation in 'Fail Safe Mode': **0**=No, **F**= Yes
- **zzz** is the voltage of the cooling fans (127Vac or 220Vac).
- Interconnection Cable: **DB25-V5L**
- Replacement controller only: **VED905 V5LC**
- Replacement power module only: **VED905 V5LP/xxxA/yyyV/m/n/zzzVcal**

Complete System Example: **VED905 XL5/25A/200V/I/N/N/E/0/220VCA**

It would be a system with VED905 V5L controller + 25A Power Module and 200V field voltage, with IGBT control, without Devicenet or Cscan, without Ethernet, with memory card for 'Fail Safe' operation and with 220 VAC fans .

## OTHER EXCITATION LINE ITEMS AVAILABLE:

- **STATVAR**: Complete panel for low voltage synchronous motor excitation control.
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- **VR9045** - Field Application Relay.
- **VR9030A** - Earth Fault Relay.
- **VR9031A** - Field Overvoltage Relay.
- **VR9032A** - Field Overcurrent Relay.
- **VR9035A** - Synchronism Loss Relay ("Step Out").
- **VR9034A** - Field Loss Relay.
- **M1** - M1 type Synchronism Module for internal use in Synchronous Motors.
- **M2** - Synchronism module type M2 for internal use in Synchronous Motors.
- **M3** - Synchronism Module type M3, Microprocessed, for internal use in Synchronous Motors.
- **Crowbar symmetrical**: from 50 to 1000 Amps.
- **Crowbar symmetrical**: from 50 to 1000 Amps.
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- Current Transformers.

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For over 40 years, Varixx has pursued its vocation for developing high-tech products and focuses its efforts on serving the industrial market with quality and speed. Our know-how in power electronics has allowed us to offer the market a wide range of products that have become known for their long service life and reliability. We are a pioneering company in Brazil and one of the first worldwide to manufacture digital excitation systems for Generators and Synchronous Motors, as well as Solid State Contactors. We were the creators of the global online thermography market, with the Zyggot line, which is becoming a global reference in the market for temperature monitoring and diagnostics and arc flash detection in electrical systems in general. Our product portfolio also includes LED luminaires from our ONNO division, developed and manufactured 100% in Brazil with cutting-edge technology. Varixx values the introduction of innovative concepts worldwide.

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## KNOW MORE!

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