



ZYGGOT THERMOGRAPHY + OZONE + HUMIDITY

Complete Predictive System for Arc Flash Prevention with Ultra Sensitive 0 to 2000 ppb Ozone Monitoring

ONLINE TEMPERATURE + PARTIAL DISCHARGE/CORONA + HUMIDITY MONITORING



OFFPRINT

World's First Online Thermography System (2004).
World Leader in Continuous Temperature Monitoring.
World's First UV Arc Protection System.*
Over 1 Million Sensors Installed Worldwide.
* Patent N° PI 0903809-4

Offprint ZYGGOT V5F/TOH ENG - V17 - May 2025 (from the manual w/128 pages)

varixx

ZYGGOT THERMOGRAPHY

TEMPERATURE +OZONE+HUMIDITY PROTECTION SYSTEM



DESCRIPTION

Varixx was the world's first company to introduce a Continuous, Online, Networked Temperature Monitoring System in 2008 and is a market leader in this area. The low-cost ZYGGOT system was designed to allow online monitoring of the temperatures of low and medium voltage components and internal connections, transformers, motors, etc., replacing old methods of periodic thermography with cameras.

The ZYGGOT system introduced an important innovation to the market because current safety standards prohibit the opening of energized electrical panels for any type of measurement, including temperature measurements with manual point-of-care guns or thermography cameras, without the use of appropriate protective clothing.

An important feature of the ZYGGOT system is that it simultaneously measures both the **target and the sensor body**, which is equal to the temperature of the surrounding air.

This feature also allows the detection of an increase in the internal temperature of the panel, which can identify obstructions or ventilation failures or even an increase in the temperature of equipment not directly monitored.

Sensors with opening angles of 7° allow the monitoring of both well-defined points (points) and areas of any size, depending on the distance from the sensor to the area.

Varixx also introduced the world's first and only Ultraviolet arc detection system in 2014, which does not require confirmation of current rise and inhibits arc formation at its onset due to its extremely fast action (<250 uS), detecting the arc in its initial phase and not in the fourth phase of the arc, already formed, thereby reducing the Incident Energy by around 80 to 150 times compared to the competition. It is a system that has already been widely approved, with hundreds of real cases of detection and action, with minimal or no damage to the protected systems, with a return to operation time of minutes to a few hours.

Furthermore, as it does not require current monitoring, it is very easy to implement and costs much less than light and current detection systems.

In addition to the systems mentioned above, Varixx has introduced the integrated Continuous Temperature Monitoring + Arc Flash Protection systems - V5FTA/O and V5FTA/M respectively Mono and Multi Gateway and also the integrated Continuous Temperature Monitoring + Ozone + Humidity system - V5F/TOH, the equipment covered in this manual, establishing a complete predictive system against possible future electric arcs in the monitored equipment, since the 3 main variables that can lead to the occurrence of an arc are covered and the readings can be obtained worldwide since the relay has Modbus and Ethernet communication.



Gateway

Sensor THM



Sensor BT



Sensor OZÔNIO



FUNCTION

Monitoring, Alarm and Trip based on the 4 most important variables for preventing Arc Flashes (250 independent measurements):

- * Multi connections temperatures
- * Multi internal air temperatures of the panel
- * Multi Ultra-sensitive ozone level
- * Multi Air humidity inside the panel

BENEFITS

- * Prevents opening of the energized panel.
- * Dispenses with periodic thermography.
- * Readings of up to 125 target temperatures (points) and 125 internal air temperatures.
- * Readings of up to 125 ozone level sensors with extremely high sensitivity in the order of parts per billion + 125 internal air humidity levels.
- * Non-contact measurement.
- * May trigger an alarm in the event of an increase in temperature or ozone levels over time.
- * Indicates a faulty sensor.
- * Failure history.
- * Modbus and Ethernet communication

System

- * Applicable in low, medium and high voltage.
- * Up to 125 non-contact temperature sensors (250 point and air readings), and 125 ozone and humidity sensors (up to 250 readings) in RS485 network with mini USB connections.
- * Smart sensors powered by the network itself.
- * 7° measurement angle for temperature.
- * Continuous temperature, ozone and humidity level readings.
- * Relay with color graphic Touch Screen display with Modbus and Ethernet communication.
- * Fault history with "Time Stamp".
- * Readings and protections related to 4 analog inputs.
- * External fault monitoring.
- * Sensor status monitoring.
- * 4 programmable digital outputs.
- * Each sensor has a flashing LED and can be controlled by the relay to facilitate its location and address in the network.
- * Operation in «Fail Safe» mode
- * Ethernet protocols:
 - TCP/IP (Modbus Slave):** Modbus over Ethernet).
 - Ethernet/IP:** ODVA CIP over Ethernet.
 - FTP:** (File Server) File Transfer Protocol.
 - ASCII over TCP/IP:** ASCII Data over Ethernet.
 - NTP Protocol:** Network Time Protocol
 - HTTP (Web Server):** Hypertext Transfer Protocol (Web Server).

KEY POINTS

MAIN ADVANTAGES

CAN BE TESTED WITH THE SYSTEM OFF

WITH ETHERNET

4 IMPORTANT MEASUREMENTS (PREDICTIVE)

MEASURES OZONE IN PARTS PER BILLION

HIGHLY PREDICTIVE FOR PARTIAL DISCHARGES

DIFFERENTIAL ALARM ACTUATION

AVOID CONVENTIONAL THERMOGRAPHY

MEASUREMENT WITHOUT ELECTRICAL CONTACT

TOUCH SCREEN FRIENDLY COLOR SCREENS

DOES NOT USE BATTERIES

INDIRECTLY MEASURES THE ENTIRE SYSTEM (AIR)

PROVEN RELIABILITY

HISTORY OF EVENTS

INCLUDES DATA PLOTTING

WORLD LEADING SYSTEM

KEY POINTS

- Color Touch Screen.
- Has Ethernet communication with several protocols.
- Measurement of up to 125 different points of ultra-sensitive ozone from 0 to 2000 parts per billion (ppb) for detection of Corona / Partial Discharges.
- Measurement of up to 125 different points of relative humidity levels of the air inside the panel.
- Measurement of the 4 most important causes for generation of Electric Arc.
- Ultra predictive, with built-in programmable differential variation calculation.
- Several built-in protections.
- Graphical recording in real time (Plot).
- History of failures and events.
- Continuous readings of target and sensor's surrounding air temperatures.
- Modbus RTU communication (and others).
- Networks of common temperature and arc sensors.
- Each relay presents up to 375 continuous measurements namely: Temperature of up to 125 targets, Temperature of up to 125 sensor bodies (surrounding air), Ozone level of up to 125 different points, Relative humidity level of up to 125 different points and voltage of up to 125 temperature sensors and voltage of up to 125 ozone + humidity sensors (allowing monitoring of network integrity).

APPLICATIONS

- Internal panels for online thermography of connections + air temperature + detection of partial discharges / corona by ozone levels + measurement of relative humidity.
- Fully predictive protection for the 4 most important causes of electric arcs.

MAIN FEATURES

- Modbus RTU + Ethernet
- Reads temperature of up to 125 targets per relay. Reads temperature from up to 125 sensors (body/surrounding air), allowing detection of temperature increases at points not directly monitored.
- Reads ozone levels from up to 125 sensors
- Reads relative humidity from up to 125 sensors.
- Reads supply voltage from up to 125 sensors.
- Up to 125 Temperature or Ozone+Humidity sensors per relay.
- Monitors partial discharge/corona by ultra-sensitive ozone detection.
- Configurable alarm and trip levels for target temperatures, surrounding air, ozone and humidity for each of the 125 sensors.
- Real-time graphical recording for temperatures and ozone.
- Detection of differential temperature increases integrated into the relay and configurable by the user.
- Failure and status history.
- Continuous readings.
- 4 analog inputs with configurable alarm and trip levels.
- 4+8 digital inputs for external events or faults (ventilation, doors, etc.).
- 4+8 digital outputs for signaling, alarm and trip.
- Color Touch Screen Display providing user-friendly programming and operation.
- Event memorization (history) with Real Time Clock.
- Data recording on included memory card.
- Plot of readings in graphs on the screens and recording on included memory card.
- Internal intelligence, programmable for alarm and trip by differential variation as a function of time.
- Easy installation and commissioning without the need for tools. All connections are Plug and Play.

The ZYGGOT system with stainless steel tubular sensors was developed for low, medium and medium voltage panels, measuring both connection points without electrical contact and air temperature in each sensor + ultra-sensitive ozone sensors, with detection in the order of parts per billion, in addition to measuring relative humidity. THM sensors measure temperature, without physical contact, by infrared detection and allow local and online reading and protection for up to 125 targets per relay. Each sensor measures two temperature levels: of the target and of the air surrounding the sensor (case), allowing fault detection at unmeasured points, by indirect heating of the air. They are networked, using mini USB cables, in sizes from 0.3 to 8.0 meters (supplied), which allows for quick, error-free and tool-free installation.

Ozone and Humidity Sensors are ultra-sensitive, measuring from 0 to 2000 Parts per Billion of ozone in the air. Systems with compromised or aged insulation present a high rate of Partial Discharges which generate ozone (O³) production. An increase in Ozone levels over time indicates the need for predictive maintenance before the eventual occurrence of an electric arc. These sensors also measure the relative humidity of the air inside the panel, which is also

an important variable for the generation of an electric arc.

The relay provides local protection and also through a supervisory system. Alarm and trip levels are freely programmable for each point and each variable. A possible failure in one of the sensors does not interrupt the operation of the other sensors. In addition to the tubular sensors mentioned, which are applied in medium and high voltage systems, LV sensors can also be used in low voltage MCCs, which require a large number of sensors in a small space, in addition to demanding a low cost. Its quick-fix base can be fixed by means of a screw or by means of a stainless steel tape directly to the busbar to be monitored.

TECHNOLOGY AND BENEFITS OF THE THM+OZONE+HUMIDITY MEASUREMENT SYSTEM

The ZYGGOT Ozone Detection Protection System, integrated in this product with the Zyggot V5F/TOH THM+OZONE+HUMIDITY Temperature Monitoring Relay, was designed to enable full-time monitoring and predictive protection against arc flash in low, medium and high voltage electrical panels and systems.

OZONE: The ZYGGOT ultra-sensitive ozone measurement protection system introduces an important innovation to the market due to the fact that it detects levels in the order of parts per billion and is networked.

Differential increases in ozone levels trigger an alert for possible checking and predictive maintenance.

Ozone is composed of 3 oxygen atoms (O³) and is a highly oxidizing gas. In gaseous form it is colorless, in liquid form it is dark blue, almost black. Its melting point is 80K and its boiling point is 161K. It has a characteristic odor that can be detected in concentrations as low as 0.015ppm (15 PPB) (0.01mg/kg).

Ozone is produced mainly by the Corona effect (Corona Discharge) or by UV radiation that are present in electrical sparks in an environment with the presence of Oxygen (Air in other words). Its production can be extended to the occurrence of partial discharges in compromised insulating media (due to the existence of emulsified air), which occurs in the case of poor quality of the insulator or its aging. These partial discharges not only increase the Corona level but also directly produce ozone, which ends up leaking into the surrounding air.

Electric arcs in electrical equipment are produced by the reduction of insulation between two electrical conductors or between an energized conductor and ground (panel mass) and also by heating of electrical connections which end up increasing electrical resistance, causing exponential heating of the connection to the point of melting the copper and consequently the opening of an arc due to an abrupt increase in voltage levels in circuits with existing or distributed inductance, since the energy stored in the inductance as $E = LI^2/2$ is converted into high voltage as $E = VC^2/2$ (where c is the distributed capacitance).

HUMIDITY: The increase in relative humidity of the air inside the panel also contributes to reduced insulation. Its variation in relation to time may indicate, for example, that the system is operating without the internal heaters of the panel in operating conditions, or changes in the condition of the air present in the rooms.

TEMPERATURE: THM sensors with an opening angle of 7° (1/8) not only monitor the target (point to be monitored) via infrared, without contact, from long distances, but also allow monitoring of the rise in the internal temperature of the panel, since each sensor also measures the temperature of the surrounding air, thus detecting rises in temperatures and points not directly targeted. The rise in internal temperature in panels, due to fan failure or clogged air filters or even indirect heating through heating of electrical connections, is also an important indicator. Electrical connections not directly monitored by the infrared THM sensor can be indirectly detected by the rise in the internal air of the panel above the historical levels for the panel in question.

BENEFITS

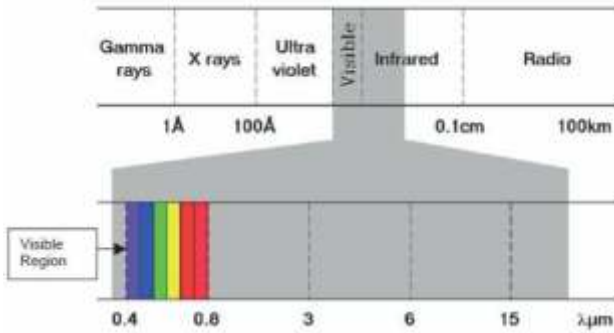
- !Monitors, at the same time, with a single relay and a single network of up to 125 sensors and 250 measurements, 4 important variables to avoid future arc flash.
- !Detects poor contact due to mechanical failure or oxidation in electrical connections.
- !Detects aging of the panel or its insulation.
- !High sensitivity for ozone detection.
- !The only networked system for ozone detection worldwide (low cost).
- !Easy installation and commissioning. Low implementation cost.
- !High reliability.
- !High alarm selectivity with independent alarms for sensor groups and identification of the sensor sending the alarm.

MAIN FEATURES OF THE SYSTEM

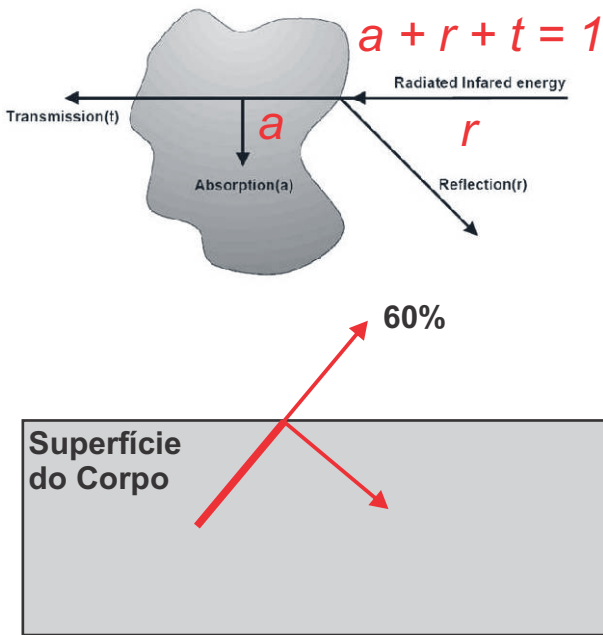
- > Intelligent relay (with color touch screen). User-friendly.
- > Applicable in low, medium and high voltage.
- > Relay with Modbus RTU port for connection to PLC or DCS.
- > Relay with ETHERNET for worldwide monitoring.
- > Intelligent THM and Ozone sensors powered by the network itself.
- > Monitoring of voltages and sensor status.
- > Dispenses with analog interfaces.
- > Sensors and Relays can be configured and tested by PC with free software.
- > Possibility of using only temperature sensors, only ozone+humidity sensors or both, in the same relay.
- > Up to 125 sensors connected to a single Zyggot Relay. (Network with plug-in sensors).
- > Each sensor has an LED that flashes when commanded by the relay, to detect faults or their identification. > Zyggot relay with 4 or 12 programmable digital outputs and 4 digital inputs for external faults, etc., in addition to 4 analog inputs.
- > Easy testing with the system de-energized.

CAPTURING THE TEMPERATURE MEASUREMENT AND INFLUENCE OF EMISSIVITY

Every object with a temperature above absolute zero radiates electromagnetic energy. This radiation in the infrared range is not visible, as can be seen in the figure below.



When radiation from one object reaches another object, some of the energy is absorbed, some is reflected, and if the body is not opaque, a portion is transmitted. The sum of the parts must always be equal to the total value that fell on the object. In view of these facts, in order to capture the temperature of desired targets, you must have sensors that capture such electromagnetic energy.



When a material is heated, its surface does not absorb all the energy and ends up emitting infrared energy. In practice, there is no material that is an ideal emitter of infrared radiation. The ideal emitter is called a black body. Objects tend to radiate less energy than black bodies even though they are at the same temperature.

The emissivity of an object is defined by: $\epsilon = t/b$

ϵ = Emissivity;

t = Radiation emitted at a certain temperature;

b = Radiation emitted by a black body at the same temperature

The table below shows the emissivity range for various materials.

MATERIAL	EMISSIVIDADE (1μm)
Iron and Steel	0,35
Iron and oxidized steel	0,85
Aluminum	0,13
Oxidized Aluminum	0,40
Polished copper	0,06
Oxidized copper	0,80
Brick	0,80
Asphalt	0,85
Asbestos	0,90

There are some portable meters that do not have the possibility of varying the emissivity index, which leads to erroneous measurements since this index is fixed at 0.95. Zyggot sensors allow emissivity index configuration, ensuring accurate measurements on any material

UNIDEX TAPE

Solution for emissivity variations

Most metals have a change in emissivity due to oxidation. An example is copper, which under normal conditions has an emissivity of 0.06 and 0.80 when oxidized.

To avoid emissivity calibration readjustments of the sensors, the Zyggot System includes the supply of a special adhesive tape for temperatures up to 250°C, whose emissivity value of 0.95 is known and guaranteed by Varixx. With the Unidex tape glued over the measurement area of a target to be measured, we will always obtain the real temperature reading, without having to worry about the emissivity of the material.

Using the tape, it is not necessary to calibrate different indexes for each material.

The tape is supplied in dimensions of 50mm x 50mm or in a roll of 30m. For each sensor purchased by the customer, a tape drive is shipped.



UNIDEX TAPE
ROLL
(30 meters)

units de
UNIDEX TAPE
50m x 50m
(ref. Zu50)

COMPOSITION OF THE T+O+H SYSTEM

COD: V5F/TOH



RELAY 96 X 125 Touch Screen

Technical information

FEATURES: V5F/TOH

Power Supply	24 VDC
Humidity	5 to 95%
No. of sensors	up to 125 sensors
Resolution	1°C
Inputs	4 analog 4 digital (12 to 24VDC)
Outputs	2 Alarm and Trip outputs (N.O.) 2 programmable outputs (N.O.) 1 output for connection to sensors
Communication	Modbus RTU Devicenet (optional) Ethernet TCP-IP (optional)
Screen	Color, Touch Screen WVGA

COD: V5CON
(Includes in each Relay Supplied)



INTERFACE

COD: ZST/M/7/300/24



THM TUBULAR SENSOR

Technical information

FEATURES: EBLOCK 88x (x=D or x=R)

Power Supply	24 VDC (10 - 30 VDC) 2W
Moisture	5 to 95%
Communication	CAN
Temperature	Oper: 0 to 60 °C /// Armaz: -10 to +60 °C
Inputs	8 Digital Inputs (12 - 24 VDC)
Outputs	Model 88D = 8 Digital Outputs (DC) Model 88R = 8 Digital Output (Relay)
Inputs	Imp.: 10K /// Treshold: 8 VDC / 3 VDC
Distance Max	1000 M
Output Current (Model 88D)	2,5 A Max per point /// 10A Total Max (model 88D)
Output (mod 88R)	3,0 A @ 250 VAC Res. Max (mod. 88R)

Informações Técnicas

FEATURES: OZONE SENSOR

Measuring range O ³ :	0 - 2000 ppb
Typical reading error (*):	+/- 1%
Sensitivity O ³ :	< 5 ppb
Humidity Range:	0 - 100%
Resolution O ³ :	0.1 PPB
Humidity Resolution:	0.1 %
Humidity Sensitivity:	< 2%
Power Supply:	24 Vdc
Diameter:	54 mm
Length:	31,2 mm
Communication:	Modbus RTU
Material:	Polycarbonate

COD: ZSB/M/60/120



SENSOR THM BT

Technical information

FEATURES: THM TUBULAR SENSOR

Measurement angle:	7°
Typical read error (*):	+/- 0,5°C (trg: 0-125°C)
Normal Distribution (100 s):	0.48°C at 80°C target
Emissivity:	Programmable (0,95 std)
Resolution:	1°C
Target reading:	0 to 300 °C
Environment reading:	0 to 75 °C
Power:	24 Vcc
Diameter:	19 mm
Length:	53 mm
Communication:	Modbus RTU
Material:	Stainless Steel / Polycarbonate

(* See test report at the end of this manual)

Technical information

Connectors: EB/88D & EB 88R

1:	Digital Outputs / Relay Outputs
2:	NET address selection switches
3:	LEDs de status
4:	Inputs
5:	CAN & Power Supply
6:	Ground
7:	CAN RJ45

COD: ZSO/2000



OZONE SENSOR

Technical information

FEATURES: BT SENSOR

Measurement angle:	120°
Typical read error (*):	+/- 0,5°C (trg: 0-125°C)
Normal Distribution (125 s):	0.48°C at 80°C target
Emissivity:	Programmable (0,95 std)
Resolution:	1°C
Target reading:	0 to 120 °C
Environment reading:	0 to 75 °C
Power:	24 Vcc
Diameter:	54 mm
Length:	31 mm
Communication:	Modbus RTU
Material:	Polycarbonate

(* See test report at the end of this manual)

ACCESSORIES

Accessory

COD: VPS6024 ou VPS12024



POWER SUPPLY

Accessory

COD: ZSF2



Support for fixing and sight for tubular

Accessory

COD: VZX/B1/U ou VZX/B1/U/P



SUITCASE WITH LASER SIGHT

Accessory



Y-split Derivator, USB cables and terminating resistor

Accessory

COD: VLP2



Laser sight attachable to tubular sensor for startup

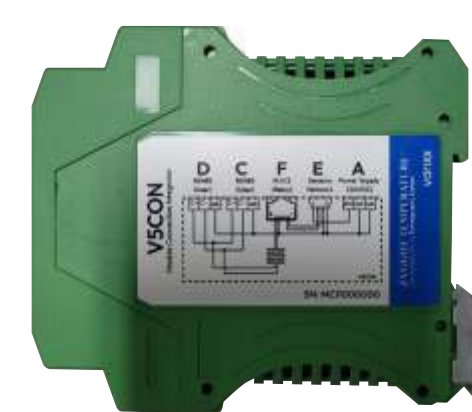
Accessory

COD: ZA232-2



SPLIT RS232

Accessory



COD: V5CON (Comes with each Relay)

INTERFACE

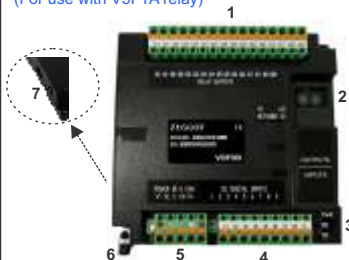
Accessory

COD: RJ45/C2 (Comes with each V5CON module and each Eblock)



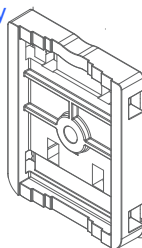
RJ45 CABLE

COD: EB/88D ou EB/88R (For use with V5FTA relay)



EBLOCK (Optional Use)

Included with every BT sensor



Quick Fixing Base for BT Sensor

V5CON AND EBLOCK INTERFACE DETAILS



The V5CON interface simplifies the connection of the Zyggot V5FTA relay to the sensor network, power supply and also integrates the sensor network termination resistor at the end of the relay and two RS232C to RS485 converters, more suitable for long distance communication. It must be installed on a quick fixing rail at the base in the same cubicle where the Zyggot relay is installed.

V5CON INTERFACE CONNECTIONS (All on top)

Port A (Power): Connection for the system's 24 VDC power supply. VPS6024 OR VPS 12024 power supplies.

Port F (Relay): Connection with RJ45 cable between the Interface and the Zyggot relay.

Port E (Sensor Network): Connection with cable and mini USB connector between the Interface and the sensor network.

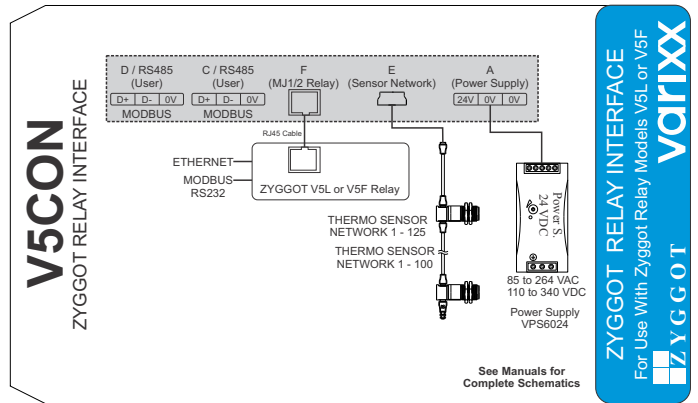
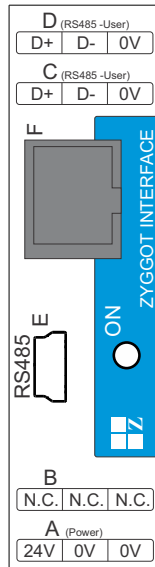
Port C (RS485): RS485 serial connection between the relay and the user's DCS system.

Port D (RS485): RS485 serial connection between the relay and the user's DCS system.



Label

V5CON Interface



The **EBLOCK 88D** module adds 8 digital outputs and 8 programmable digital inputs to the Zyggot V5FTA relay. The **EBLOCK 88R** module adds 8 relay outputs (dry contacts) and 8 programmable digital inputs to the Zyggot V5FTA relay. These modules are optional.



EBLOCK 88R

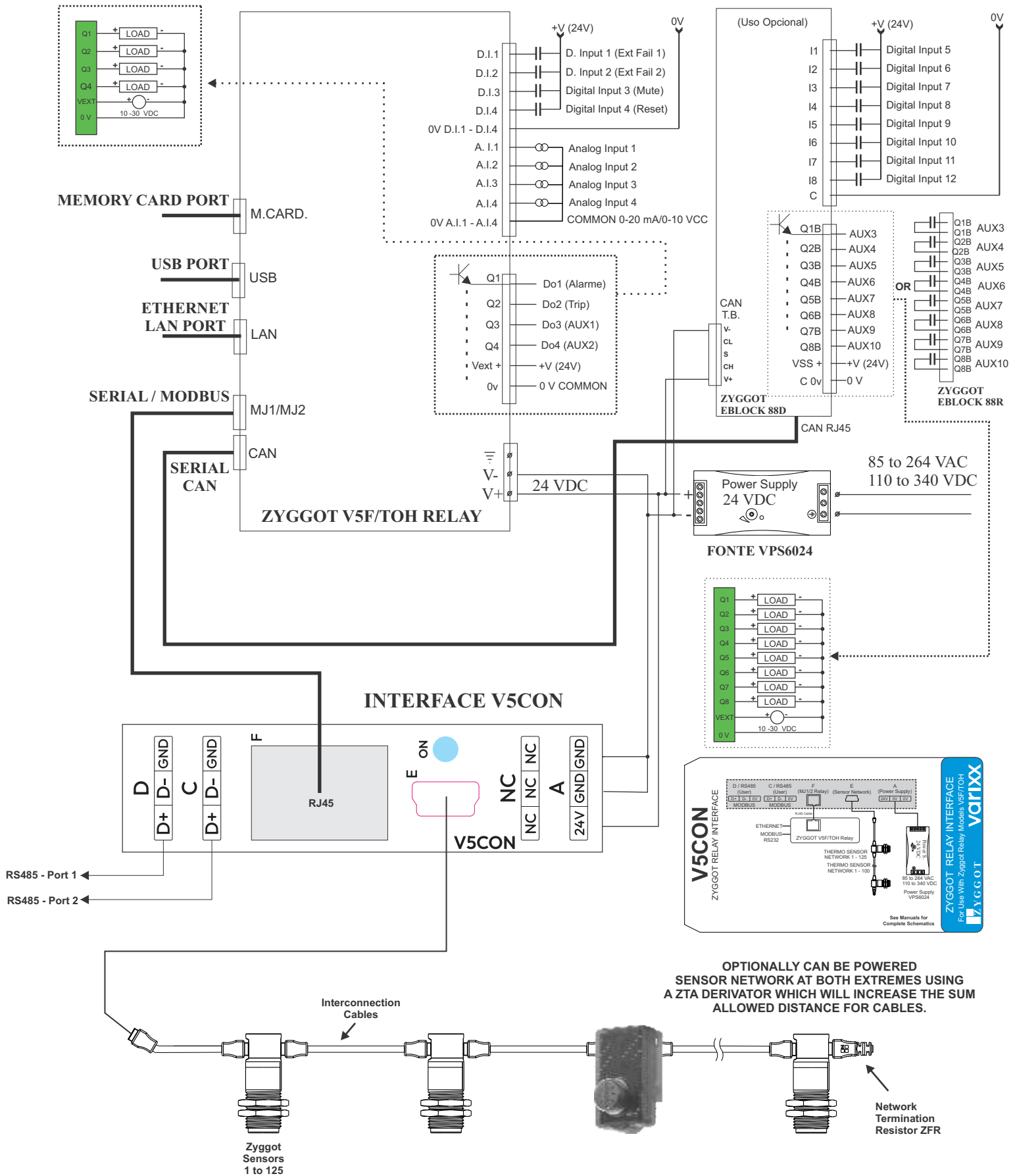
Digital Outputs		
D. OUT. 1	ALARM	Q1 RELAY
D. OUT. 2	TRIP	Q2 RELAY
D. OUT. 3	D.O. 3	Q3 RELAY
D. OUT. 4	D.O. 4	Q4 RELAY
D. OUT. EB1	AUX 1	Q1 EBLOCK
D. OUT. EB2	AUX 2	Q2 EBLOCK
D. OUT. EB3	AUX 3	Q3 EBLOCK
D. OUT. EB4	AUX 4	Q4 EBLOCK
D. OUT. EB5	AUX 5	Q5 EBLOCK
D. OUT. EB6	AUX 6	Q6 EBLOCK
D. OUT. EB7	AUX 7	Q7 EBLOCK
D. OUT. EB8	AUX 8	Q8 EBLOCK

Digital Inputs		
D. INP. 1	EXT. F. 1	I1 RELAY
D. INP. 2	EXT. F. 2	I2 RELAY
D. INP. 3	MUTE	I3 RELAY
D. INP. 4	RESET	I4 RELAY
D. INP. EB1	AUX 1	I1 EBLOCK
D. INP. EB2	AUX 2	I2 EBLOCK
D. INP. EB3	AUX 3	I3 EBLOCK
D. INP. EB4	AUX 4	I4 EBLOCK
D. INP. EB5	AUX 5	I5 EBLOCK
D. INP. EB6	AUX 6	I6 EBLOCK
D. INP. EB7	AUX 7	I7 EBLOCK
D. INP. EB8	AUX 8	I8 EBLOCK



Detail of the EBLOCK RJ45 connector for communication with the relay (CAN)

TYPICAL CONNECTIONS



MAIN SCREENS FOR OPERATION

MAIN MENU, (ESC) INFO SCREENS



MAIN MENU:

Screen from which all other system screens are accessed. From here, all operating and programming screens are accessed. Note that, to eventually draw the operator's attention, the «ALARM» field will flash and have a red border to indicate that there is an Acknowledged or Cleared alarm on the Alarm screen. By touching this field, you enter the alarm screen and can acknowledge and reset the alarm.



INFO SCREENS 1 to 5:

There are 5 screens, the one above, and the four below. They are paged through using the >> and << keys and accessed through the ESC key on the main menu.

INFO SCREEN 1: Contains various information. When the system is powered on, this is the initial screen. Pressing ESC takes you to the main menu above.

VERS: Software version

SENSOR COMM. OK: Indicates that the sensor network is communicating OK.

SENSOR COMM. ERROR: Indicates that the sensor network is experiencing a communication failure.

LINK ETHERN.OK: Indicates that the Ethernet connection is OK.

ETHERNET NOT LINKED: Indicates that the Ethernet connection is OK.

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

FAIL: Indicates a failure that has not been reset.

TRGT: Indicates a failure related to Target (Targets).

AIR: Indicates a failure related to air (sensor bodies). **OZO:** Indicates a fault related to the ozone level.

H: Indicates a fault related to the relative humidity level in the air.

NR: Indicates the existence of 1 or more sensors not responding in the network.

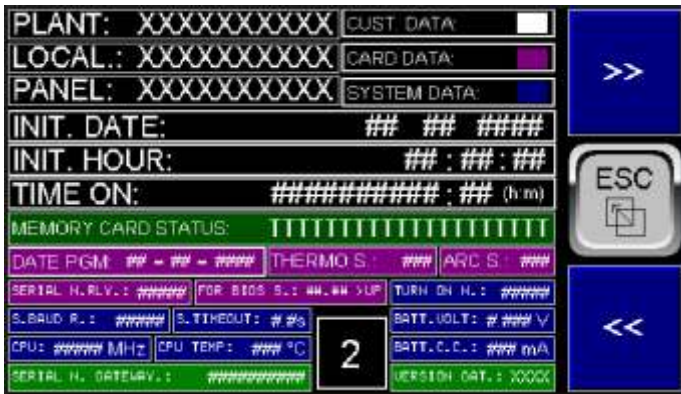
ALRM: Indicates the alarm condition not silenced (without Mute) and the alarm output active.

TRIP: Indicates a Trip failure condition (Trip output active, not reset).

ATTENTION: THE ZYGGOT V5F/TOH RELAY LEAVES THE FACTORY WITH A PASSWORD TO ENTER THE PROGRAMMING MENU = «827499» CHANGE IT, WITHIN THE «RELAY CONFIG» MENU TO ANY OTHER VALUE (ADVISABLE).

MAIN SCREENS FOR OPERATION

a- MAIN MENU, (ESC) INFO SCREENS



INFO SCREEN 2: It shows information about the plant, location and panel names, date and time of start of operation, total system operation time, relay serial number, software serial number, number of times the relay was turned on, baud rate and timeout of the sensor communication network, number of programmed sensors and finally it also shows some hardware information.
Other fields as in screen 1.



INFO SCREEN 3: Mute Alarm and Reset Fail Buttons.

When the alarm is active, the Mute button silences it (turns off the Alarm Output).

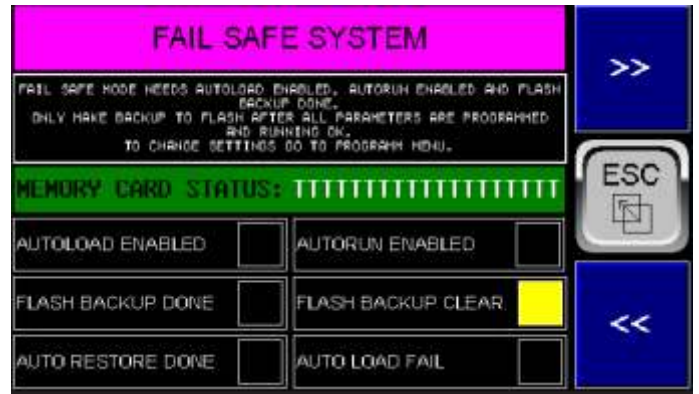
When the alarm is in Mute condition (Mute has already been executed), the Reset button clears the fault and turns off the Trip Output.

Fail Active: Indicates that there is an active fault.

Alarm Unacknowledged: Indicates that there is an alarm that has not yet been acknowledged by the operator on the alarm screen and, depending on what is programmed in the Reset on Fail Unacknowledge parameter, it will not be possible to reset the faults and cancel the trip output.

Alarm Uncleared: Indicates that there is an alarm that has not yet been cleared by the operator on the alarm screen and, depending on what is programmed in the Reset on Fail Active parameter, it will not be possible to reset the faults and cancel the trip output.

Other fields as on screen 1.



INFO SCREEN 4: «Fail Safe» system information such as Auloload Enabled, Autorun Enabled, Flash Backup Done (these 3 fields must be active, in green for the «Fail Safe» system to operate correctly if necessary. Flash Backup Cleared: It will indicate in yellow if there is no Backup file in the Flash memory. To create the backup file, enter the programming menu and create it after having all the parameters programmed and with the relay operating correctly. Auto Restore Done, Indicates whether there was an automatic software restoration and Autoload Fail indicates whether there was a restoration failure.



INFO SCREEN 5:

On this screen, you can control the write and read protection on the memory card for safe removal and insertion of the card, with the relay in operation, preventing it from being manipulated during writing operations that could corrupt it.

Remove/Insert: This button is invisible if the relay is in writing or reading operation so that the Remove/Insert command is not entered at an inappropriate time.

Wait: If active, it indicates that the relay is in writing or reading operation.

No Card: It is active if the relay does not have a memory card inserted.

Card OK: Indicates that the card is inserted and operating properly.

Ready to Remove/Insert: After the Remove/Insert command is selected in the «Yes» option, this indication becomes active, indicating that the card can now be removed or inserted.

Memory Card Status: May display one of the following messages depending on the current system condition:

- 1- Card OK - Operational
- 2- Unknow Format
- 3- No card in slot
- 4- Card Not Supported
- 5- Illegal Swapped
- 6- Unknow Error
- 7- Access Protected

After the Insert/Remove command is selected as «Yes», the message will be 6- Access Protected.

Attention: Removing the card without the Insert/Remove command inserts the Alarm condition in the alarm and history screen if the action for this fault is selected as «Log» in the programming menu. If the action is selected as «None», this alarm will not be logged.

If the card is removed after the Insert/Remove command, the alarm will not be triggered even if programmed for «Log»

MAIN SCREENS FOR OPERATION

1a- MAIN SCREEN

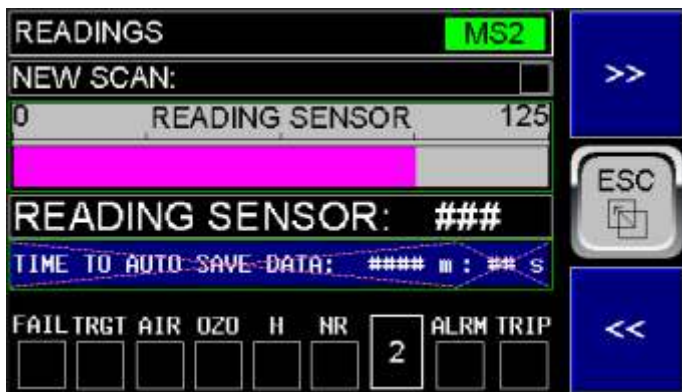


MAIN SCREEN MS1 a Ms11:

MS1:
> TARGET: Shows the highest target temperature measured among all sensors.
> AIR: Shows the highest air/sensor body temperature measured among all sensors.
> OZONE: Shows the highest ozone concentration measured among all sensors.
> HUMIDITY: Shows the highest relative humidity level measured among all sensors.

Fail Active: Indicates that there is an active fault.
Alarm Unacknowledged and **Alarm Uncleared:** Indicate that there is an alarm acknowledged (Ack) and not cleared (cleared) respectively, still by the operator on the alarm screen and depending on what is programmed in the Reset on Fail Unack or Reset on fail Active parameters, it will not be possible to reset the faults and cancel the trip output.
AIR W.U. SENSOR and **TRG W.U. SENSOR:** Indicate the current air and target "Warm Up" compensation values for the THM sensors, if this function is used. (Normally not used).
SCAN OK: Indicates each Scan of all THM sensors.

Other indications: as described on INFO SCREEN 01.



MS2: READING THERMO

NEW SCAN: Indicates new sensor reading scans on the network. This is done continuously.
READING SENSOR: Shows the number of the sensor being read and a bar graph corresponding to the number of the sensor currently being read. This serves to show activity and generate confidence that the sensors are being read continuously. It also shows the time remaining for new saving of the target and air temperature data for all sensors if programmed to perform this action. If not programmed, it will always show zero.
TIME TO AUTO SAVE DATA: Shows the time for automatic data saving, depending on the programming in the corresponding parameters.
Other indications: as described on INFO SCREEN 01.



MS3: STATISTIC

PROGRAMMED: Shows the total number of sensors in the network for both THM and ozone sensors and the total.
RESPONDING: Shows the number of sensors responding in the network for each type and the total.
NOT RESPONDING: Shows the number of sensors not responding in the network for each type and the total.
TOTAL ALARMS: Shows the total number of alarms in the system, occurring since the last action to reset this number from the programming menu.
TOTAL TRIPS: Same as number of trips occurred.
Other indications: as described on INFO SCREEN 01.

MAIN SCREENS FOR OPERATION

2-TARGET, 3- AIR, 4- OZONE, 5- HUMIDITY



TARGET T01 to T21:

There are 21 screens, scrolled by the >> and << keys.

T01 to T21: Screen Index. Flashes if any of the Target values is above the stipulated alarm value.

°TT: Indicates °C (degrees Centigrade) or °F (degrees Fahrenheit), as programmed.

T001 to T125 (screens 1 to 21): Shows the current temperature of each target. The color will be green if within the normal range, yellow if above the programmed Alarm point and red if above the programmed Trip point. If yellow or red, it will also flash. It will be blue if the respective sensor is not responding and gray for non-programmed sensors.

CLEAR: (After Reset / Auto): Indicates whether the Reset of the fault indication is programmed to clear automatically if the fault does not persist or only after pressing the «Reset» key.



OZONE T01 to T21:

There are 21 screens, scrolled by the >> and << keys.

T01 to T21: Screen Index. Flashes if any of the Target values is above the stipulated alarm value.

TTT: Indicates PPB (Parts per Billion) or % (Percent) as programmed.

L001 to L125 (screens 1 to 21): Shows the ozone level. The color will be green if within the normal range, yellow if above the programmed Alarm point and red if above the programmed Trip point. If yellow or red, it will also flash. It will be blue if the respective sensor is not responding and gray for non-programmed sensors.

CLEAR: (After Reset / Auto): Indicates whether the Reset of the fault indication is programmed to clear automatically if the fault does not persist or only after pressing the «Reset» key.



AIR T01 to T21:

There are 21 screens, scrolled by the >> and << keys.

A01 to A17: Screen Index. Flashes if any of the Air (sensor body) values is above the stipulated alarm value.

°TT: Indicates °C (degrees Centigrade) or °F (degrees Fahrenheit), as programmed.

A001 to A125 (screens 1 to 17): Shows the current temperature of each target. The color will be green if within the normal range, yellow if above the programmed Alarm point and red if above the programmed Trip point. If yellow or red, it will also flash. It will be blue if the respective sensor is not responding and gray for non-programmed sensors.

CLEAR: (After Reset / Auto): Indicates whether the Reset of the fault indication is programmed to clear automatically if the fault does not persist or only after pressing the «Reset» key.



HUMIDITY H01 to H21:

There are 21 screens, scrolled by the >> and << keys.

H01 to H21: Screen Index. Flashes if any of the Target values is above the stipulated alarm value.

TTT: Indicates PPB (Parts per Billion) or % (Percent) as programmed.

H001 to H125 (screens 1 to 21): Shows the relative humidity level. The color will be green if within the normal range, yellow if above the programmed Alarm point and red if above the programmed Trip point. If yellow or red, it will also flash. It will be blue if the respective sensor is not responding and gray for non-programmed sensors.

CLEAR: (After Reset / Auto): Indicates whether the Reset of the fault indication is programmed to clear automatically if the fault does not persist or only after pressing the «Reset» key.

MAIN SCREENS FOR OPERATION

6-FAILS



FAILS AF1 to AF7:

There are 7 screens scrolled by the >> and << keys.

They indicate the memorized faults (active or not at the moment) if selected in the programming menu for LOG, ALARM or TRIP. They are self-explanatory.

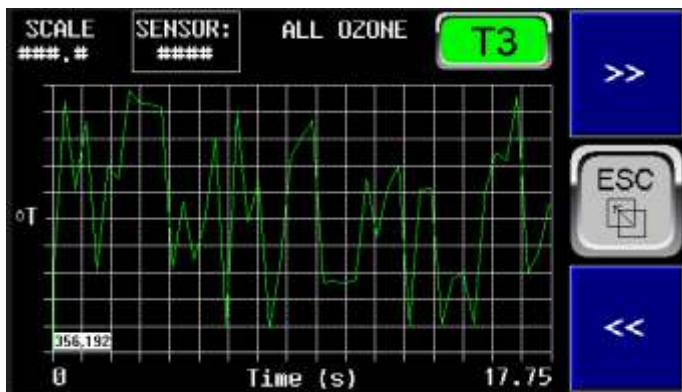
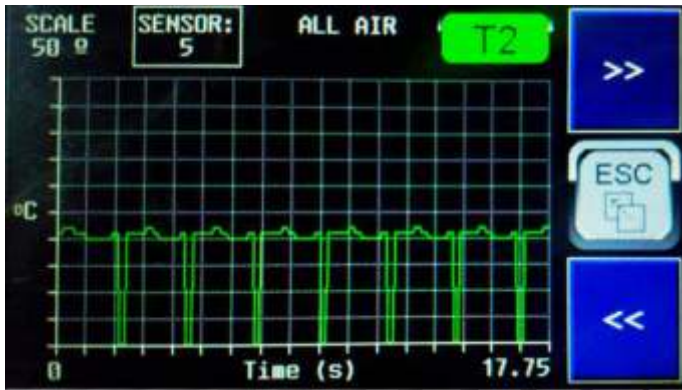
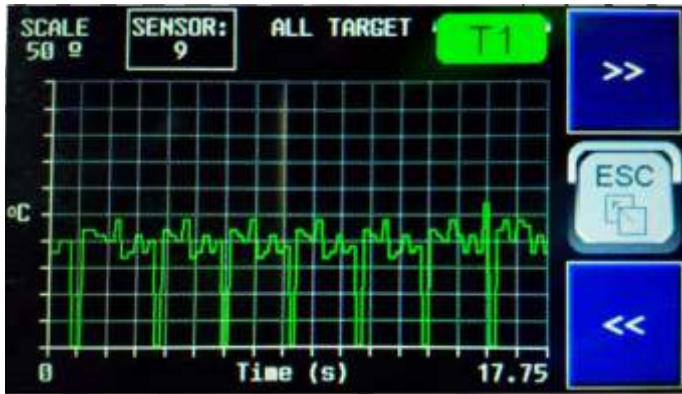
The Mute Alarm and Reset Fail buttons on each screen allow you to silence the alarm (digital alarm output) or Reset the fault, respectively. Note that to reset the fault you must first perform the Mute and also that the fault no longer exists if the 'Reset On Fail' parameter is not enabled in the Programming menu.

They also show the conditions: Alarm State Active and Trip State Output.

Fail Active, Alarm Unacknowledged and Alarm Uncleared: as detailed in screen MS1.

MAIN SCREENS FOR OPERATION

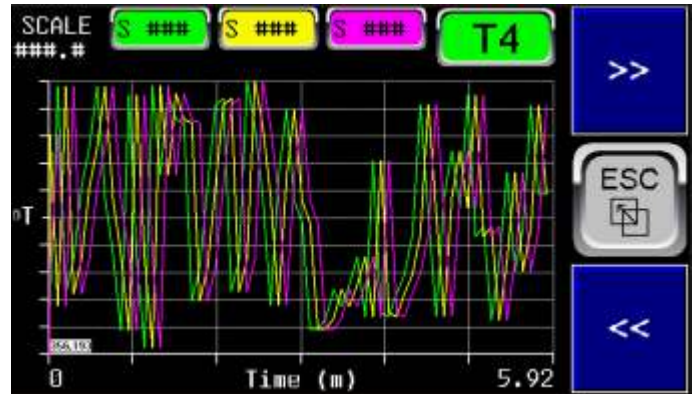
7a- DATA PLOT



DATA PLOT T1, T2 e T3 (Continuous Scope):

There are 19 screens, scrolled by the >> and << keys. These are the first three.

T1, T2 and T3: Screen Index and curve reset button (Plot restart) if programmed to be active in the programming menu. The first two show all **Target** and **Air** temperatures respectively, of the THM sensors programmed in the network, sequentially. The third shows the **Ozone** levels of all programmed ozone sensors, sequentially. With each 'scan' of all temperatures, the curve goes down to zero and repeats this continuously as if it were an electrocardiogram. The 'scan' never stops and the curve is continually shifted to the left. The sampling time is 50 mS and each screen can show 17.75 seconds. When leaving this screen and returning to it, the curves restart, unlike the curves from T4 to T18.



DATA PLOT T4 (Continuous Scope)

This screen shows both temperature and ozone levels, depending on the sensors selected.

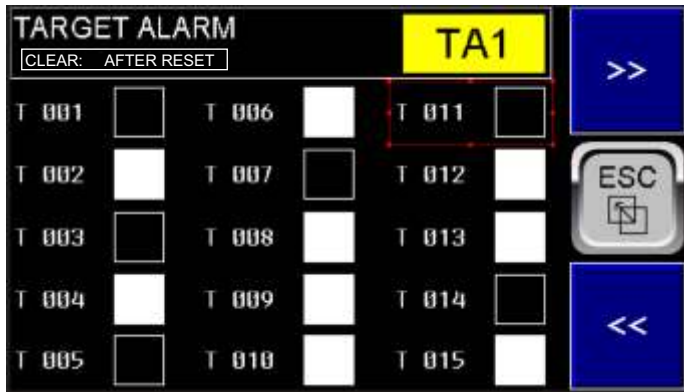
T4: Screen Index and curve reset button (plot restart) if programmed to be active in the programming menu.

On this screen, you can enter the indexes of 3 sensors, from 1 to 125, and if you enter «0» (zero), the trace remains at zero. With each scan, the curve goes down to zero and repeats this continuously as if it were an electrocardiogram. The scan never stops and the curve is continually shifted to the left.

The sampling time is 1 second and the total screen scan time is 5.92 minutes. When you leave this screen and return to it, the curves reset, unlike the curves from T5 to T18.

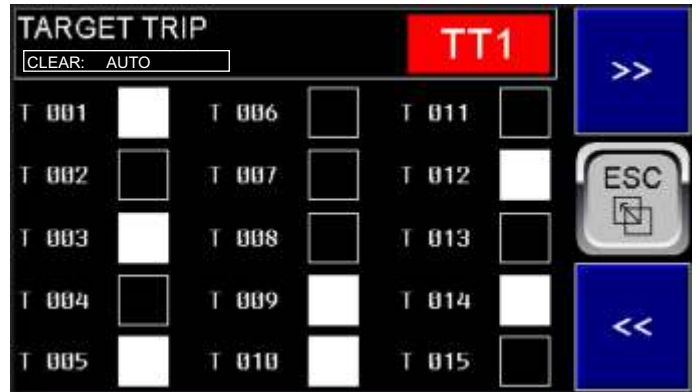
MAIN SCREENS FOR OPERATION

8-TARGET ALRM, 9- TARGET TRIP, 10- AIR ALARM, 11- AIR TRIP, 12- OZONE ALARM, 14- HUMIDITY ALARM.



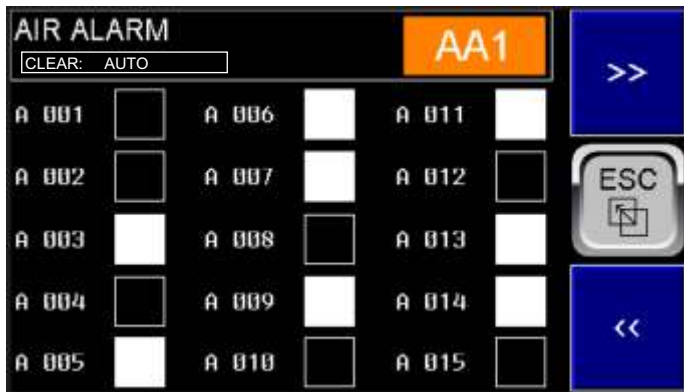
TARGET ALARM TA1 to Ta9:

There are 9 screens, scrolled by the >> and << keys.
Ta1 to TA9: Screen Index. Flashes if any of the Target values is above the programmed alarm value.
T001 to T125 (from screens TA1 to TA9): Indicates whether the temperature of each Target is above the programmed alarm value.



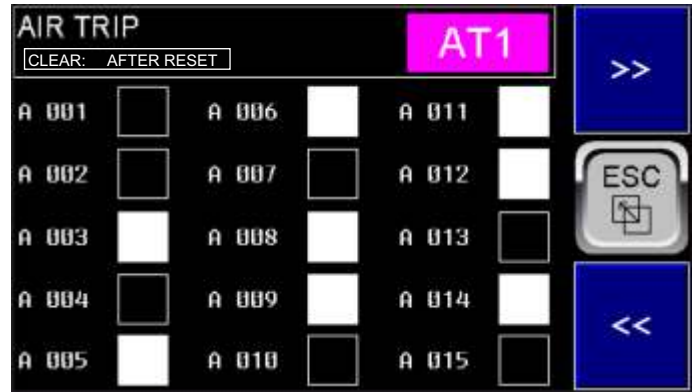
TARGET TRIP TT1 to Tt7:

There are 9 screens, scrolled by the >> and << keys.
Tt1 to TT9: Screen Index. Flashes if any of the Target values is above the value programmed for Trip.
T001 to T125 (from screens TA1 to TA9): Indicates whether the temperature of each Target is above the value programmed for Trip.



AIR ALARM AA1 to AA7:

There are 9 screens scrolled by the >> and << keys.
AA1 to AA9: Screen Index. Flashes if any of the Air (Body) values is above the programmed alarm value.
A001 to A125 (from screens AA1 to AA9): Indicates whether the temperature of each Air (Body) is above the programmed alarm value.



AIR TRIP AT1 a AT9:

There are 9 screens scrolled by the >> and << keys.
At1 to AT9: Screen Index. Flashes if any of the Air (Body) values is above the value programmed for Trip.
A001 to A125 (from screens AT1 to AT9): Indicates whether the temperature of each Air (Body) is above the value programmed for Trip.



OZONE ALARM OZA1 to OZA9:

There are 9 screens, scrolled by the >> and << keys.
OZA1 to OZA9: Screen Index. Flashes if any of the ozone level values is above the value programmed for the alarm.
O001 to O125 (from screens OZA1 to OZA9): Indicates whether the ozone level read by each sensor is above the value programmed for the alarm.



HUMIDITY ALARM HA1 to Ha9:

There are 9 screens scrolled by the >> and << keys.
Ha1 to HA9: Screen Index. Flashes if any of the relative humidity levels is above the value programmed for the alarm.
H001 to H125 (from screens HA1 to Ha9): Indicates whether the humidity level read by each sensor is above the value programmed for the alarm.

MAIN SCREENS FOR OPERATION

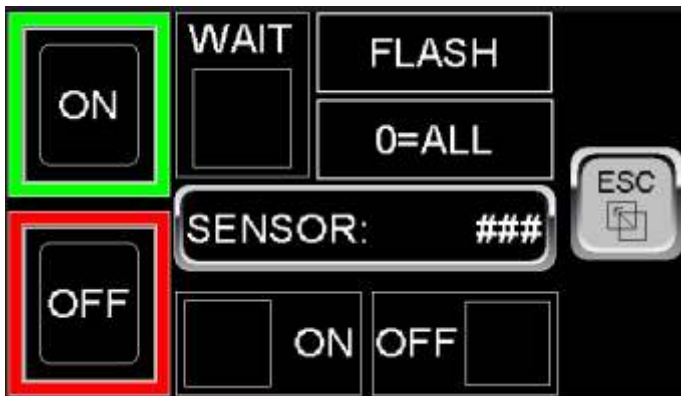
15- THM STATUS



NOT RESPONDING NR1 to NR9:

There are 9 screens that are scrolled by the >> and << keys. **S001 to S125** (from screens **NR1 to NR9**): Indicates whether the respective **THM** or **Ozone** sensor has stopped responding to the relay on the network. The indication only occurs after 2, 3 or 4 scans of all sensors, so that a reliable indication is obtained. Note that the correct indication may take some time depending on the number of sensors on the network and the number of scans. Sensors that are responding correctly are indicated in **BLACK** and if a sensor does not respond, its indication will be in **VIOLET** on the network.

NOTE: Once the system is correctly configured and operating, the possibility of a sensor not responding is extremely remote. This is evidenced by thousands of systems operating worldwide with zero reported sensor failures.



IDENTIFY:

When the ON action is commanded, a THM or Ozone sensor stops flashing. In addition to testing the integrity of the sensor when responding to a command on the network, this also serves to physically differentiate sensors. When the OFF action is commanded, it returns to the normal state, flashing continuously. This command can be executed with the system operating normally. Each sensor on the network has an address from 1 to 125 for THM or Ozone, depending on the programming of the sensor number.

ON: Button to turn on the «Ident» (ON).
OFF: Button to turn off the «Ident» (OFF).
SENSOR: Button where you can enter the sensor number from 1 to 125. If 0 is entered, all sensors on the network will execute the «Ident» command (used to check whether all sensors responded and recognized the command, and are therefore intact).
ON: Indicates that one or all sensors have the «Ident» command active.
OFF: Indicates that no sensor has the «Ident» command active.

If you try to exit the screen with the «Ident» command active, a «Warning» screen appears for 2 seconds to prevent you from forgetting to turn off the command before exiting the screen.



THM SENSORS VOLTAGE LEVEL TV01 to TV05:

There are 4 screens that are scrolled by the >> and << keys. **V001 to V125** (from screens **TV01 to Tv05**): Shows the supply voltage reaching each sensor via the communication network with shielded sleeved cables and mini USB connectors. Note that there are 3 factory-set voltage levels, which are shown in 3 different colors: **Green** if it is within the optimal range (Nominal is 24 VDC, but much lower voltages are allowed), **Yellow** if it is within an acceptable range in which stable operation is safe, or **Red** if the voltage is below a safe level for operation.

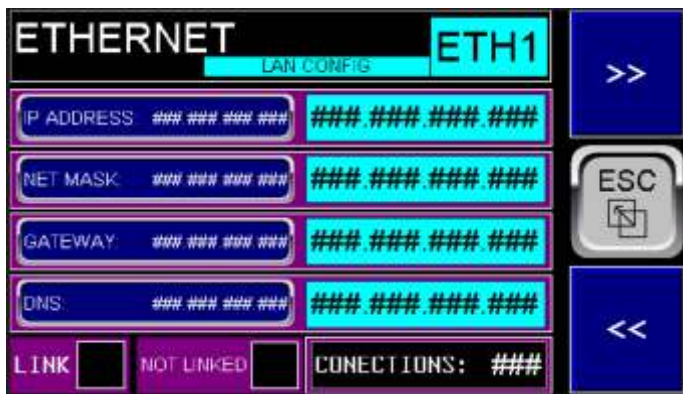
«Sensors Voltage Levels» will show the voltage reaching each sensor via the network with a resolution of two decimal places, that is, 0.01 Volts DC. On this screen, the voltages are shown in 4 different colors depending on the programmed ranges, namely: «**Green**» if the voltage is within the optimal range (**Good**), «**Yellow**» if the voltage is within the acceptable range (**Acceptable**) in which it is still possible to operate safely, «**Red**» if the voltage is in the marginal voltage range (**Marginal**) where the sensor still operates but attention must be paid to the lengths of the network cables and possible power supply from the network at both ends to minimize this factor and «**Violet**» (**NR**) if the respective sensor is not responding and in this case the indicated voltage will be 0.00

Note that as the communication network can have different lengths, depending on the cabling used by each user, the sensors further away from the V5CON device (Interface) and therefore from the power supply may have a greater voltage drop in the wiring. In this case, the user simply needs to divide the network into more than one branch, since this is possible because the sensors are in parallel and as many branches as necessary can be used for better distribution in the cubicles of each MCC or Switchgear, using the accessory device code **ZTA**. It is also possible to supply power from both ends of the network. See wiring suggestions in the chapter «**Typical Interconnections**» earlier in this manual.

In this way, by observing the voltage at each sensor, the user can be sure that the network is operating under safe conditions and it also serves to demonstrate that the sensor is communicating correctly, since it transmits voltages in the same way that it transmits temperature, ozone or humidity information.

PROGRAMMING MENU

20- MENU



M13A- ETHERNET - LAN CONFIG

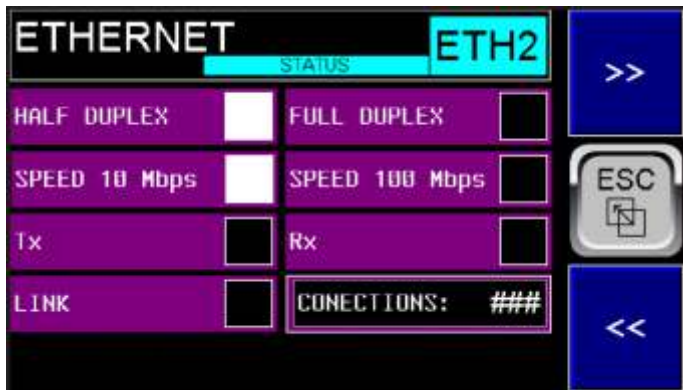
M13A.1- IP ADDRESS: Enter the address of the Zyggot V5F/TOH relay on the LAN network.

M13A.2- NET Mask: Enter the number corresponding to the network mask. Normally 255.255.255.0

M13A.3- Gateway: Enter the number corresponding to the Gateway if necessary. If not necessary, leave it at 0.0.0.0

M13A.4- DNS: Enter the address of the Domain Name Server if necessary. If not used, leave it at 0.0.0.0

This screen also shows whether the Ethernet cable is connected or not and the number of connections. Note: the number of connections may eventually show «zero» even though it is connected if the transmissions are not repetitive and because it is very fast, there is not enough time to show it on the screen.



M13B- ETHERNET - STATUS

This screen only shows the various connection statuses, and does not have any fields to be entered.

The statuses shown are:

M13B.1- HALF DUPLEX or FULL DUPLEX: Shows the connection mode.

M13B.2- SPEED 10 Mbps or 100 Mbps: Shows the connection speed.

M13B.3- Tx and Rx: Shows whether data is being transmitted or received.

M13B.4- LINK: Whether the Ethernet cable is connected (Link) or not and the number of connections. Note: the number of connections may eventually show "zero" but it is connected if the transmissions are not repetitive and because they are very fast there is not enough time to show it on the screen.



M13C- ETHERNET - ICMP (PING)

This screen, like the corresponding screen in the **Report Menu**, allows you to test whether a specific device on the network is responding, i.e., is active on the network.

M13C.1- PING ADDRESS: Enter the address to perform the ping.

M13C.2- PING RESPOND TIME: Shows the time in milliseconds that the device took to respond.

M13C.3- Tx and Rx: Shows whether it is transmitting or receiving data.

M13C.4- PING TIMEOUT: If the device does not respond in less than 1 second, it will indicate Timeout, i.e., it is not responding.

M13C.5- STAR and STOP: Starts and stops the PING. When exiting the screen, a Stop is automatically given.



M13D- ETHERNET - TCP/IP PROTOCOL - MODBUS SLAVE

This screen refers to the main protocol of the Zyggot V5F/TOH relay, which allows full Modbus operation, with all functionalities and valid addresses, as well as offsets, etc.

The SUPERGER program provided free of charge by Varixx allows, among other functionalities, complete testing of the Modbus Over Ethernet connection with a computer connected to the Zyggot V5F/TOH relay.

ZYGOT SUPERGER

3- Once the parameters are correct and the relay has Modbus enabled, click on «Connect». The «**Connected**» indicator should light up and the current parameter reading bar will indicate that the parameters are being read on the relay. This is because you can save them and also indicate in red in each parameter window that is changed that the respective parameter will be changed if you use the «**Save**» key. You can also use the «**Receive**» key at any time to read the current parameters again. The window on the right shows all the LOG messages to facilitate any communication corrections.

5- You are ready to program all parameters in the subsequent screens. Note that in each available window, when a parameter is changed, it turns red as a warning that it will be changed when sending the data to the relay.



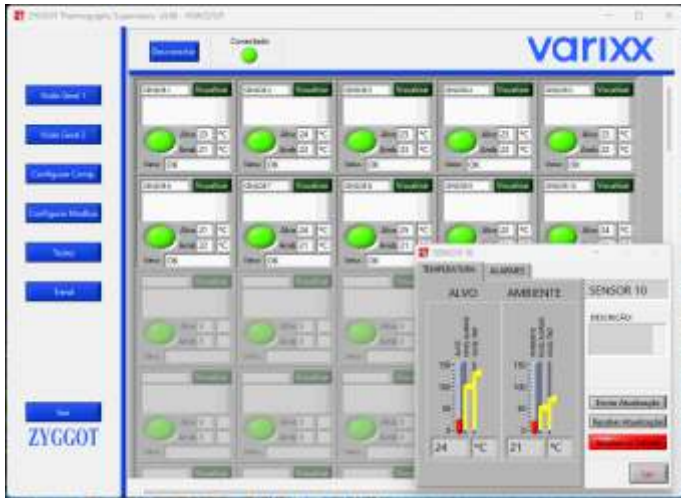
4- When the connection is made, the connected light will light up. If the initial reading box is checked, immediately after connecting to the relay, all the relay parameters will be transferred to the program. When finished, a success message will be displayed. Use the save and open buttons to save the information from a relay to a file on the computer and download the same information to other Zygot relays.



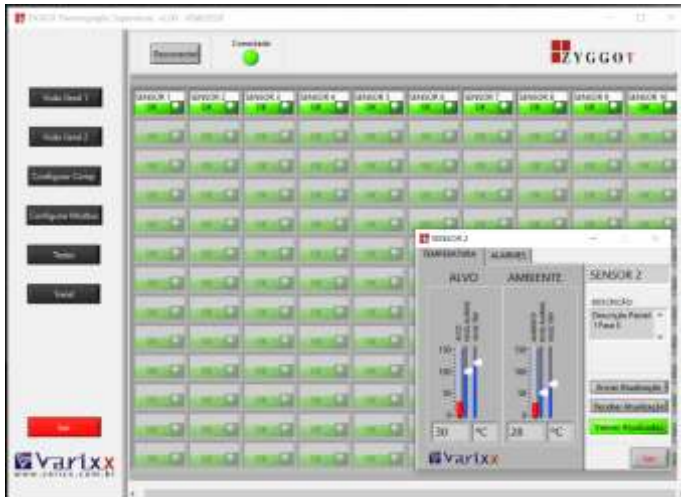
SUPERVISORY SOFTWARE

ZYGGOT THERMOGRAPHY 2.0 SUPERVISORY SOFTWARE

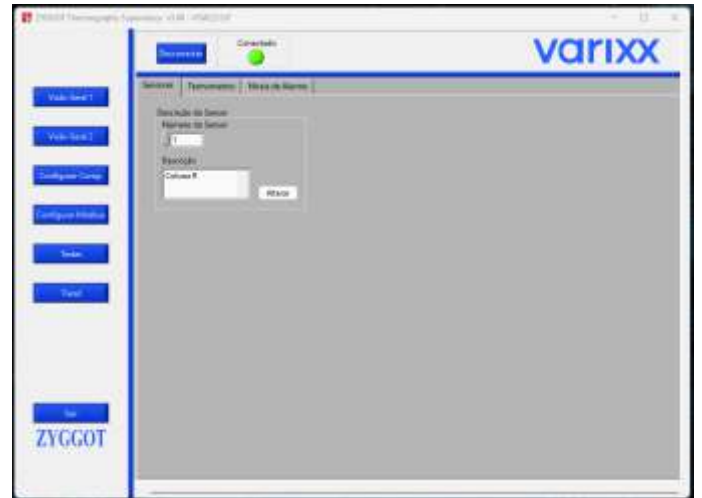
3- Once connected, click on the «**Overview 1**» button, you can observe the target and air temperatures (sensor body) of each sensor responding on the network and a description of the same case inserted.



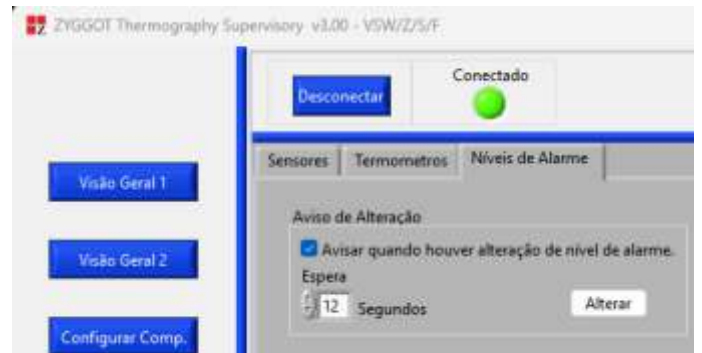
4- Click on the «**View**» button or on the lens symbol for each of the sensors. A window opens with alarm adjustment sliders and Alarm and Trip level parameters, which can be adjusted using the mouse and sent to the relay by clicking the “Send update” button. Note that when changing the slide its color changes from blue to yellow until «**Update**» is commanded. This function is also used to test the operation of the Alarm or Trip by adjusting levels below the current reading levels indicated in red. By clicking on the «**Alarms**» tab in this window for each sensor, you can also change the Alarm and Trip levels through the corresponding windows, using the mouse or by entering the values using the keyboard. Note that the color of the window changes to red until the “Send update” command is made. This way you can change relay parameters in real time.



5- Click on the «**Configure Comp**» button in the menu on the left and the following screen opens with 3 options, namely «**Sensors**», «**Thermometers**» and «**Alarm Levels**»



6- Click on the «**Sensors**» tab and you can enter a description of each of the sensors, for example «**Column R**» etc. Click on the Thermometers tab and you can change the scales of each thermometer on the graph. Click on the “**Alarm Levels**” tab and you can change the waiting time to be notified of a change in level.



7- Click on the «**Test**» tab and you can change the LED blinking mode on each sensor, from blinking to continuous or vice versa to locate it on the panel or to test whether it is responding correctly on the network. Zero commands the change in all sensors.



MODBUS OVER ETHERNET TCP IP SERVER



GENERAL SPECIFICATIONS (PART 1 / 4)

MODBUS OVER ETHERNET IP SERVER COMMUNICATION WILL WORK WITH PLCs AND ALLEN BRADLEY PROTOCOL OR ALLEN BRADLEY LIKE

Maximum connection = 2 /// PORT = 44818 TCP or 2222 UDP

SEND (PRODUCED) FIRST REGISTER = %R2801 /// LAST REGISTER = %R2928 /// WORDS COUNT = 128

RECEIVE (CONSUMED) FIRST REGISTER = %R3201 /// LAST REGISTER = %R3328 /// WORDS COUNT = 128

The Status word provides Ethernet/IP connection status. The upper byte of the word

contains the Class 3 (Explicit) connection count and the lower byte contains the Class 1 (IO) connection count.

NOTE: When the Status word indicates no connections, the Consumed OCS registers contain old data

As up to 128 words are allowed in each communication, a pagination scheme is used to access all important and available data.

In this version, parameter programming via the Ethernet connection is not allowed, so the variable on the corresponding screen is permanently set to "Disabled"

However, it is allowed to send some commands via the Ethernet connection, in addition to specifying the page to be read.

IN THE PLC CONNECTION PARAMETER, USE "100" FOR THE ASSEMBLY INSTANCE INPUT WITH SIZE = 128 AND USE "101" FOR THE ASSEMBLY INSTANCE OUTPUT WITH SIZE = 128

V5L V5F VERSION

CONSUMED	Controller Tags	WRITE PAGE	FUNCTION	DATA	NOTE	WARNING
%R3201 - %3300		1 TO 16	RESERVED			
%R3301	O.Data[100]	0	MUTE	1= MUTE // 0 = DO NOTHING	SEND COMMAND MUTE TO RELAY	
%R3302	O.Data[101]	0	RESET	1= RESET // 0 = DO NOTHING	SEND COMMAND RESET TO RELAY	
%R3303	O.Data[102]	0	SAVE TARGET	1= SAVE // 0 = DO NOTHING	SAVE TARGET DATA TO MEMORY CARD	
%R3304	O.Data[103]	0	SAVE AIR	1= SAVE // 0 = DO NOTHING	SAVE AIR DATA TO MEMORY CARD	
%R3305		0	RESERVED			
%R3306		0	RESERVED			
%R3307		0	RESERVED			
%R3308		0	RESERVED			
%R3309		0	RESET DIFFERENTIAL WARM	1= RESET DIFFERENTIAL // 0 = DO NOTHING	RESET DIFFERENTIAL WITH A NEW WARM PERIOD	CAUTION
%R3310	O.Data[104]	0	RESET DIFFERENTIAL NO WARM	1= RESET DIFFERENTIAL // 0 = DO NOTHING	RESET DIFFERENTIAL WITHOUT A NEW WARM PERIOD	CAUTION
%R3311	O.Data[105]	0	RESERVED			
%R3312		0	RESERVED			
%R3313		0	RESERVED			
%R3314		0	RESERVED			
%R3315		0	RESERVED			
%R3316		0	RESERVED			
%R3317		0	RESERVED			
%R3318		0	RESERVED			
%R3319		0	RESERVED			
%R3320		0	RESERVED			
%R3321		0	RESERVED			
%R3322		0	RESERVED			
%R3323		0	RESERVED			
%R3324		0	RESERVED			
%R3325		0	RESERVED			
%R3326	O.Data[106]	0	PAGE TO WRITE	NOTE USED IS THIS VERSION	0 = DO NOTHING // 1 TO 15 SET PAGE TO BE READ	
%R3327	O.Data[107]	0	PAGE TO READ	SET PAGE FROM 0 TO 15 TO BE READ F / RELAY	NOTE USED IN THIS VERSION	
%R3328	O.Data[108]	0	WRITING DATA VALID	1= DATA TO BE WRITE = VALID // 0 = DO NOTHING		

MODBUS OVER ETHERNET TCP IP SERVER

GENERAL SPECIFICATIONS (PART 2 / 4)

PRODUCED	Controller Tags	READ PAGE	FUNCTION	DATA	NOTE	WARNING
%R2927	I.Data[126]	0 - 16	PAGE READED	0 - 16	0 = READED NONE // 1 TO 15 DATA WILL BE READED	
%R2928	I.Data[127]	0 - 16	DATA READED VALID	1 = DATA VALID // 0 = WAIT NEW DATA	CONSIDER THE DATA READED ONLY IF %R2928 = 1	
%R2801 - %R2925		1 TO 16	DATA PAGES	SEE BELOW		
%R2801 - %R2925	I.Data[0] - I.Data[125]	1	TARGET TEMPERATURES 1 TO 125	x 10 - AS READED (FORMAT XXX.X)	THE DATA NEED TO BE DIVIDED BY 10 TO INSERT THE COMA	
%R2801 - %R2925	I.Data[0] - I.Data[125]	2	AIR TEMPERATURES 1 TO 125	x 10 - AS READED (FORMAT XXX.X)	THE DATA NEED TO BE DIVIDED BY 10 TO INSERT THE COMA	
%R2801 - %R2925	I.Data[0] - I.Data[125]	3	TARGET ALARM LEVELS 1 TO 125	x 10 - AS READED (FORMAT XXX.X)	THE DATA NEED TO BE DIVIDED BY 10 TO INSERT THE COMA	
%R2801 - %R2925	I.Data[0] - I.Data[125]	4	TARGET TRIP LEVELS 1 TO 125	x 10 - AS READED (FORMAT XXX.X)	THE DATA NEED TO BE DIVIDED BY 10 TO INSERT THE COMA	
%R2801 - %R2925	I.Data[0] - I.Data[125]	5	SENSORS VOLTAGE	x 100 - AS READED (FORMAT XX.XX)	THE DATA NEED TO BE DIVIDED BY 100 TO INSERT THE COMA	
%R2801 - %R2925	I.Data[0] - I.Data[125]	6	OZONE LEVELS 1 TO 125	x 10 - AS READED (FORMAT XXX.X)		
%R2801 - %R2925	I.Data[0] - I.Data[125]	7	TARGET ALARM ACTIVE 1 TO 125	146 = ACTIVE // 0 = INACTIVE		
%R2801 - %R2925	I.Data[0] - I.Data[125]	8	TARGET TRIP ACTIVE 1 TO 125	162 = ACTIVE // 0 = INACTIVE		
%R2801 - %R2925	I.Data[0] - I.Data[125]	9	AIR ALARM ACTIVE 1 TO 125	146 = ACTIVE // 0 = INACTIVE		
%R2801 - %R2925	I.Data[0] - I.Data[125]	10	AIR TRIP ACTIVE 1 TO 125	162 = ACTIVE // 0 = INACTIVE		
%R2801 - %R2925	I.Data[0] - I.Data[125]	11	SENSOR STATUS	0 = RESPONDING // 1 = NOT RESPONDING		
%R2801 - %R2925	I.Data[0] - I.Data[125]	12	HUMIDITY LEVELS	x 10 - AS READED (FORMAT XXX.X)		
%R2801 - %R2925	I.Data[0] - I.Data[125]	13	OZONE ALARM ACTIVE 1 TO 125	146 = ACTIVE // 0 = INACTIVE		
%R2801 - %R2925	I.Data[0] - I.Data[125]	14	HUMIDITY ALARM ACTIVE 1 TO 125	146 = ACTIVE // 0 = INACTIVE		
%R2801	I.Data[0]	15	SENSORS COMM OK	0 = NOT OK // 1 = OK		
%R2802	I.Data[1]	15	SENSORS COMM NOT OK	0 = OK // 1 = NOT OK		
%R2803	I.Data[2]	15	RESERVED			
%R2804	I.Data[3]	15	RESERVED			
%R2805	I.Data[4]	15	RESERVED			
%R2806	I.Data[5]	15	RESERVED			
%R2807	I.Data[6]	15	RESERVED			
%R2808	I.Data[7]	15	OZONE ALARM ACTIVE	0 = NO // 1 = YES		
%R2809	I.Data[8]	15	OZONE TRIP ACTIVE	0 = NO // 1 = YES		
%R2810	I.Data[9]	15	HUMIDITY ALARM ACTIVE	0 = NO // 1 = YES		
%R2811	I.Data[10]	15	RESERVED			
%R2812	I.Data[11]	15	ETHERNET NOT LINKED	0 = ETHERNET LINKED // 1 = NOT LINKED		
%R2813	I.Data[12]	15	ANY FAIL ACTIVE	0 = NO // FAIL ACTIVE = 1		
%R2814	I.Data[13]	15	TARGET FAIL	0 = NO // FAIL ACTIVE = 1		
%R2815	I.Data[14]	15	AIR FAIL	0 = NO // FAIL ACTIVE = 1		
%R2816	I.Data[15]	15	ALARM ACTIVE	0 = NO // ALARM ACTIVE = 1		
%R2817	I.Data[16]	15	TRIP ACTIVE	0 = NO // TRIP ACTIVE = 1		
%R2818	I.Data[17]	15	ALARM UNACKNOWLEDGED	0 = NO // 1 = YES		
%R2819	I.Data[18]	15	ALARM UNCLEARD	0 = NO // 1 = YES		
%R2820	I.Data[19]	15	TARGET FAIL ACTIVE	0 = NO // 1 = YES		
%R2821	I.Data[20]	15	TARGET TRIP ACTIVE	0 = NO // 1 = YES		
%R2822	I.Data[21]	15	AIR ALARM ACTIVE	0 = NO // 1 = YES		
%R2823	I.Data[22]	15	AIR TRIP ACTIVE	0 = NO // 1 = YES		

MODBUS OVER ETHERNET TCP IP SERVER

GENERAL SPECIFICATIONS (PART 3 / 4)

PRODUCED	Controller Tags	READ PAGE	FUNCTION	DATA	NOTE	WARNING
%R2824	I.Data[23]	15	SENSOR NOR RESPONDING	0 = NO // 1 = YES		
%R2825	I.Data[24]	15	EXTERNAL FAIL 1 ACTIVE	0 = NO // 1 = YES		
%R2826	I.Data[25]	15	EXTERNAL FAIL 2 ACTIVE	0 = NO // 1 = YES		
%R2827	I.Data[26]	15	ANALOG 1 ALARM ACTIVE	0 = NO // 1 = YES		
%R2828	I.Data[27]	15	ANALOG 2 ALARM ACTIVE	0 = NO // 1 = YES		
%R2829	I.Data[28]	15	ANALOG 3 ALARM ACTIVE	0 = NO // 1 = YES		
%R2830	I.Data[29]	15	ANALOG 4 ALARM ACTIVE	0 = NO // 1 = YES		
%R2831	I.Data[30]	15	ANALOG 1 TRIP ACTIVE	0 = NO // 1 = YES		
%R2832	I.Data[31]	15	ANALOG 2 TRIP ACTIVE	0 = NO // 1 = YES		
%R2833	I.Data[32]	15	ANALOG 3 TRIP ACTIVE	0 = NO // 1 = YES		
%R2834	I.Data[33]	15	ANALOG 4 TRIP ACTIVE	0 = NO // 1 = YES		
%R2835	I.Data[34]	15	EXCESS LIFE ACTIVE	0 = NO // 1 = YES		
%R2836	I.Data[35]	15	DIFFERENTIAL ALARM ACTIVE	0 = NO // 1 = YES		
%R2837	I.Data[36]	15	DIFFERENTIAL TRIP ACTIVE	0 = NO // 1 = YES		
%R2838	I.Data[37]	15	RESERVED			
%R2839	I.Data[38]	15	RESERVED			
%R2840	I.Data[39]	15	G1 TARGT ALARM ACTIVE	0 = NO // 1 = YES		
%R2841	I.Data[40]	15	G2 TARGT ALARM ACTIVE	0 = NO // 1 = YES		
%R2842	I.Data[41]	15	G3 TARGT ALARM ACTIVE	0 = NO // 1 = YES		
%R2843	I.Data[42]	15	G4 TARGT ALARM ACTIVE	0 = NO // 1 = YES		
%R2844	I.Data[43]	15	G5 TARGT ALARM ACTIVE	0 = NO // 1 = YES		
%R2845	I.Data[44]	15	G1 AIR ALARM ACTIVE	0 = NO // 1 = YES		
%R2846	I.Data[45]	15	G2 AIR ALARM ACTIVE	0 = NO // 1 = YES		
%R2847	I.Data[46]	15	G3 AIR ALARM ACTIVE	0 = NO // 1 = YES		
%R2848	I.Data[47]	15	G4 AIR ALARM ACTIVE	0 = NO // 1 = YES		
%R2849	I.Data[48]	15	G5 AIR ALARM ACTIVE	0 = NO // 1 = YES		
%R2850	I.Data[49]	15	G1 TARGT TRIP ACTIVE	0 = NO // 1 = YES		
%R2851	I.Data[50]	15	G2 TARGT TRIP ACTIVE	0 = NO // 1 = YES		
%R2852	I.Data[51]	15	G3 TARGT TRIP ACTIVE	0 = NO // 1 = YES		
%R2853	I.Data[52]	15	G4 TARGT TRIP ACTIVE	0 = NO // 1 = YES		
%R2854	I.Data[53]	15	G5 TARGT TRIP ACTIVE	0 = NO // 1 = YES		
%R2855	I.Data[54]	15	G1 AIR TRIP ACTIVE	0 = NO // 1 = YES		
%R2856	I.Data[55]	15	G2 AIR TRIP ACTIVE	0 = NO // 1 = YES		
%R2857	I.Data[56]	15	G3 AIR TRIP ACTIVE	0 = NO // 1 = YES		
%R2858	I.Data[57]	15	G4 AIR TRIP ACTIVE	0 = NO // 1 = YES		
%R2859	I.Data[58]	15	G5 AIR TRIP ACTIVE	0 = NO // 1 = YES		
%R2860	I.Data[59]	15	REERVED			
%R2861	I.Data[60]	15	REERVED			
%R2862	I.Data[61]	15	REERVED			
%R2863	I.Data[62]	15	REERVED			
%R2864	I.Data[63]	15	REERVED			
%R2865	I.Data[64]	15	HUMIDITY ALARM ACTIVE	0 = NO // 1 = YES		

MODBUS OVER ETHERNET TCP IP SERVER



GENERAL SPECIFICATIONS (PART 4 / 4)

PRODUCED	Controller Tags	READ PAGE	FUNCTION	DATA	NOTE	WARNING
%R2866	I.Data[65]	15	SCREEN ALARM UNCLEARED	0 = NO // 1 = YES		
%R2867	I.Data[66]	15	SCREEN ALARM UNACKNOWLEDGED	0 = NO // 1 = YES		
%R2868	I.Data[67]	15	SCREEN ALARM ANY FAIL ACTIVE	0 = NO // 1 = YES		
%R2869	I.Data[68]	15	OZONE ALARM ACTIVE	0 = NO // 1 = YES		
%R2870	I.Data[69]	15	OZONE TRIP ACTIVE	0 = NO // 1 = YES		
%R2801	I.Data[0]	16	MAX TARGET TEMPERATURE	x 10 - AS READED (FORMAT XXX.X)	THE DATA NEED TO BE DIVIDED BY 10 TO INSERT THE COMA	
%R2802	I.Data[1]	16	MAX AIR TEMPERATURE	x 10 - AS READED (FORMAT XXX.X)	THE DATA NEED TO BE DIVIDED BY 10 TO INSERT THE COMA	
%R2803	I.Data[2]	16	MEMORY CARD STATUS	0=OK//1= UNKNOWN FORMAT//2=NO CARD// AS READED	3= NOT SUPPORTED//4=LEGAL SWAP//5=UNKNOWN//PROTECTED	
%R2804	I.Data[3]	16	DIFFERENTIAL TIME TO WARM HOUR	AS READED		
%R2805	I.Data[4]	16	DIFFERENTIAL TIME TO WARM MINUTE	AS READED		
%R2806	I.Data[5]	16	DIFFERENTIAL TIME TO RESTART HOUR	AS READED		
%R2807	I.Data[6]	16	DIFFERENTIAL TIME TO RSTRT MINUTE	AS READED		
%R2808	I.Data[7]	16	DIFFERENTIAL ON	0 = NO // 1 = YES		
%R2809	I.Data[8]	16	DIFFERENTIAL WARM OK	0 = NO // 1 = YES		
%R2810	I.Data[9]	16	DIFFERENTIAL FIRST READ OK	0 = NO // 1 = YES		
%R2811	I.Data[10]	16	DIFFERENTIAL VALID (OPERATING)	0 = NO // 1 = YES		
%R2812	I.Data[11]	16	REDING SENSOR NUMBER	AS READED (1 TO 125)		
%R2813	I.Data[12]	16	RESERVED			
%R2814	I.Data[13]	16	RESERVED			
%R2815	I.Data[14]	16	TOTAL SENSOR RESPONDING	0 TO 125		
%R2816	I.Data[15]	16	TOTAL SENSOR NOT RESPONDING	0 TO 125		
%R2817	I.Data[16]	16	TOTAL ALARM ACTIVE			
%R2818	I.Data[17]	16	TOTAL TRIP ACTIVE			
%R2819	I.Data[18]	16	RESERVED			
%R2820	I.Data[19]	16	RESERVED			
%R2821	I.Data[20]	16	RESERVED			
%R2822	I.Data[21]	16	RESERVED			
%R2823	I.Data[22]	16	REAL TIME CLOCK DAY	1 TO 31		
%R2824	I.Data[23]	16	REAL TIME CLOCK MONTH	1 TO 12		
%R2825	I.Data[24]	16	REAL TIME CLOCK YEAR			
%R2826	I.Data[25]	16	REAL TIME CLOCK HOUR	0 TO 24		
%R2827	I.Data[26]	16	REAL TIME CLOCK MINUTE	0 TO 60		
%R2828	I.Data[27]	16	REAL TIME CLOCK SECONDS	0 TO 60		
%R2829	I.Data[28]	16	RESERVED			

ABOUT VARIXX

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 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.

AREAS OF ACTIVITY

- ✓ **MANUFACTURERS OF GENERATOR MACHINES AND SYNCHRONOUS MOTORS**
Static Exciters, Control Box Controllers, Low and Medium Voltage Soft Starters, Semiconductors
- ✓ **PRODUCTION OF ALUMINUM AND HYDROGEN / OXYGEN**
High Current Rectifiers, Solid State Contactors, Smart Relay for CCM, Online Thermography System and Arc Flash Detection and Onno LED Luminaires.
- ✓ **BASE INDUSTRY, MINING AND STEEL INDUSTRY**
Smart Relays for CCMs, Low and Medium Voltage Soft Starters, Solid State Contactors, AC/DC Converters for electromagnets, High Current Rectifiers, Online Thermography System, Arc Flash Detection and Protection and Onno LED Luminaires.
- ✓ **OIL COMPANIES**
Smart Relays for CCMs, Static Excitation, Low and Medium Voltage Soft Starters, Solid State Contactors, Online Thermography System, Arc Flash Detection and Protection and Onno LED Luminaires.
- ✓ **ELECTRIC PANEL ASSEMBLERS**
Smart Relays for CCMs, Online Thermography, Arc Flash Detection and Protection System, Semiconductors, Power Supplies and Onno LED Luminaires.

Why ZYGGOT Thermography And Arc Flash Protection?



SINGLE CABLE / EASY TO INSTALL



PREDICTIVE / DIFFERENTIAL PROTECTION



EFFECTIVE PROTECTION AGAINST ARC DESTRUCTION



WORLDWIDE UNIQUE BY UV DETECTION / NO CURRENT READINGS REQUIRED



DOES NOT NEED CONVENTIONAL THERMOGRAPHY / ALSO MEASURES AIR TEMP.



WITHOUT CONTACT / WITH NETWORK COMMUNICATION

LEARN MORE!

ZYGGOT ARC FLASH SYSTEM

- ✓ **Low Cost // Up to 100 sensors per gateway.**
- ✓ **Innovative in the market // Faster (<300 uS versus up to 500 mS)**
- ✓ **Ultraviolet arc detection**
- ✓ **Does not operate with ambient light (False Alarm)**
- ✓ **No need for current readings**

varixx

ALWAYS INNOVATING

www.varixx.com.br
vendas@varixx.com.br
+55 (19) 3424-4000
+55 (19) 3301-6900

R. Felipe Zaidan Maluf, 450
Distrito Industrial Unileste
Piracicaba-SP. CEP: 13422-190



@Varixxbrasil



@varixxcompany



Varixx Indústria Eletrônica



www.varixx.com
www.varixx.com.br

Representative/Distributor:

VARIXX USA

2229 Allen Parkway, Suite 200
+1 832-871-5700
Houston - Texas, 77019

VARIXX WORLDWIDE

MORE THAN 20 BRANCHES,
DISTRIBUTORS AND REPRESENTATIVE
OFFICES WORLDWIDE



ZYGGOT THERMOGRAPHY