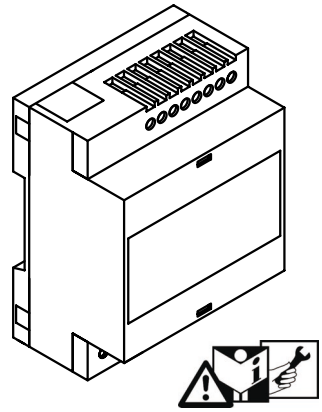


WiFiControl

2.4 GHz IEEE 802.11b
REMOTE CONTROL
Wi-Fi @ certified WFA7150



CONTAINS FCC ID W70ZG2100-ZG2101

USER GUIDE

STANDARD VERSION: 2600.05.3B
OTHER OPTIONS ON REQUEST

WiFiControl	2600.05.3B
MEMORY CARD	
NONE	0
microSD SOCKET	1
OUTPUTS	
NONE	0
1 RELAY	1
2 RELAYS	2
3 RELAYS	3
4 RELAYS	4
5 RELAYS	5
COM PORTS	
USB	1
IrDA + USB	2
RS485 + USB	3
IrDA + RS485 + USB	4
SUPPLY	
USB	U
AUX + USB	B

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THE WARRANTY DOES NOT APPLY IN CASE OF IMPROPER USE

CARE AND MAINTENANCE

Your WiFiControl is the product of advanced engineering, design and craftsmanship. The suggestion below will help you to enjoy this product for many years.

- Do not expose the unit to any extreme environment where the temperature or humidity are out of operating range.
- Do not use or store the unit in dusty or dirty areas.
- Do not attempt to disassemble the unit or remove any part or label. There are no user serviceable parts inside.
- Do not expose the unit to water, rain or spilt beverages. It is not waterproof.
- Do not abuse the unit by dropping, knocking or violently shaking it. Rough handling can damage it.
- Do not place the unit alongside computer discs, credit or travel cards or other magnetic media. The information contained on these devices may be affected.
- This unit is under your responsibility. Please treat it with care respecting all local regulations. It is not a toy. Therefore, keep it out of the reach of children.

Do contact an authorized service center in the unlikely event of a fault in the unit.

SAFETY INFORMATION

Embedded RF module has been certified for use in European Countries and fully compliant with:
ETSI EN 300 328 V1.7.1 (2006-10)

- Maximum Transmit Power
- Maximum EIRP Spectral Density
- Frequency Range
- Radiated Emissions
- Radiated Emissions
- Electro-Static Discharge
- Radiated RF Susceptibility

ETSI EN 301 489-1:2008
ETSI EN 301 489-17:2008

EN 55022 (Radiated Emissions)
EN 61000-4-2 (Electrostatic Discharge)
EN 61000-4-3 (Radiated Immunity)
EN 60950-1 (Information Technology Equipments)

Contains FCC ID: **W70ZG2100-ZG2101**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- this device may not cause harmful interference, and
- this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into a different outlet or circuit.
- Consult the dealer or an experienced radio/TV technician for help.

This RF unit is not designed for and intended to be used in portable applications (within 20 cm or 8 inches of the body of the user) and such uses are strictly prohibited. The antenna used for this device must not be co-located or operating in conjunction with any other antenna or transmitter.

This device should be installed only by qualified personnel. Carefully read the instruction manual in its entirety and keep it safe for future reference.

It is essential to know the information and comply with the instructions given in the manual to ensure the unit is installed, used and serviced correctly and safely. This unit is not authorised for use as critical component in life-support devices or systems unless a specific written agreement has been given.

No complex software or hardware system is perfect. Bugs are always present in a system of any size.

In order to prevent danger to life or property, it is the responsibility of the system designer to incorporate redundant protective mechanism appropriate to the risk involved.

All units are 100% functionally tested. Specifications are based on characterisation of tested sample units rather than testing over temperature and voltage each unit.

Contrive disclaims all liability for damage to the fitting or to other property or persons deriving from installation, use and maintenance that have not been carried out in conformity with this instruction manual, which must always accompany the fitting.

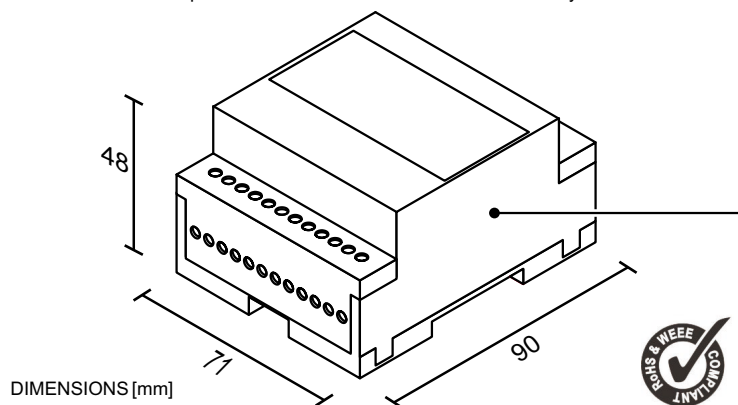
Embedded module is certified under Wi-Fi 802.11 with WPA2, WPA, and WEP System Interoperability ASD Model Test Plan with Test Engine For IEEE 802.11b.

PRODUCT DESCRIPTION

WiFiControl is a low power 2.4GHz IEEE 802.11b/g/n compatible RF equipment for the supervision and control of remote inputs and outputs (Internet of Things). Industrial standard interface and an integrated Webserver mean it can be used rapidly, easily and universally to quickly implement new applications in telemetry, telematics and remote control. All interfaces are integrated in the housing. Local com ports can be used to transfer data over Wi-Fi networks. The connections are suitable for use in domestic and industrial environments.

WiFiControl can operate in either:

- Infrastructure mode – BSS: Basic Service Set
A wireless access point is used to create, control and regulate the network
- Ad-hoc mode – IBSS: Independent Basic Service Set
There is no access point and wireless devices communicate directly with each other



DIMENSIONS [mm]

CONFIGURATION

Before to operate WiFiControl must be configured:

- connect WiFiControl USB port to a Personal Computer
- move dipswitch 1 to ON
- WiFiControl display: "Config Mode"
- start WiFiSuite



once completed move dipswitch 1 to OFF to exit Config Mode and return to operation mode, configuration is lost if the power supply is removed while in Config Mode.

Available settings:

NETWORK	AdHoc or Infrastructure SSID Name DHCP or IP address and subnet mask Gateway IP address Primary and Secondary DNS Security (open, WEP, WPA) and Passkey / Passphrase
SMTP	Email Server address and Port UserID and Password
THINGSPEAK	Cloud Service upload interval API keys for Analog Inputs Digital Inputs, Digital Outputs API keys for ThingTweet alerts through twitter
DEVICE	Device name Optional Webpage protection UserID and Password Optional power-on Email / Twitter message Autoreset interval
DISPLAY	Backlight Default text at power-on
CLOCK	Manual/Automatic (NTP server) Timezone
COM1	Mode (Command, TCPserver, TCPclient, WEBserver, mirror) Settings (baud rate, framing, flow control)
COM2	Mode (Command, TCPserver, TCPclient, WEBserver, mirror) Settings (baud rate, framing)
DIGITAL INPUTS	Alias (name) Debounce time and local sound on event Recipient and text for Email / Twitter alerts on closing/opening
ANALOG INPUTS	Alias (name) Input Offset, Scale Bottom and Top Above / Below thresholds and local sound on event Recipient and text for Email / Twitter alerts passing thresholds
OUTPUTS	Alias (name) Control Mode (Web and/or digital/analog inputs events) Recipient and text for Email / Twitter alerts turning on / off

Easy configuration and management by means of **WiFiSuite** software for computers running Windows, MacOS and Linux available for free download at: www.contrive.it

In Configuration mode WiFiControl waits for parameters to be received from COM1 (19200 8N1) and could be entered directly, instead of using WiFiSuite. Parameter always end with <CR>. Responses always end with <CR><LF>.

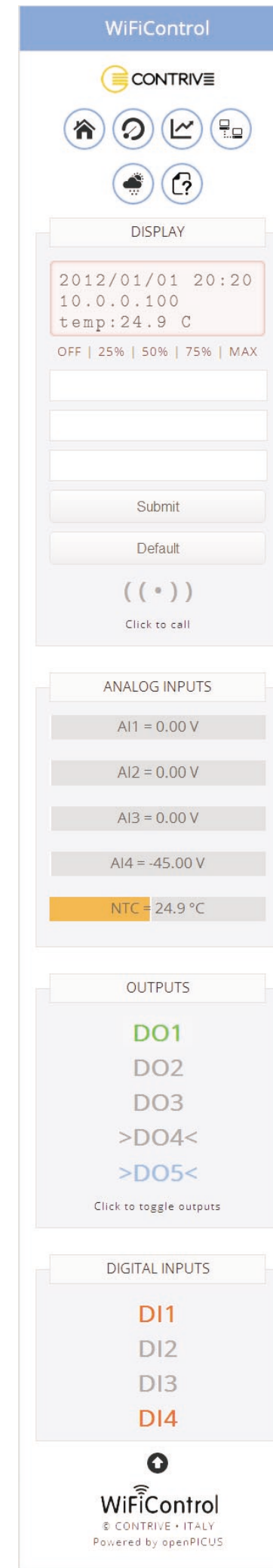
PRODUCT FEATURES

ISM Band	2.400-2.4835 GHz (US/Canada/Europe)
Typical output power	+10 dBm
Typical sensitivity	-91 dBm at 1Mbps
Range	outdoor 100m typical indoor 30m typical
Data rate	1 / 2 Mbps
Security	WEP / WPA-PSK / WPA-2-PSK (802.1x, 802.1i)
Wired interfaces	USB EIA-TIA RS485
Temperature:	operating 0 to 60°C storage and transport -30 to 70°C
Relative humidity:	5 to 95% non-condensing
Enclosure:	EN-50022 rail 4 modules, polycarbonate, UL94 -V0
Overall dimensions:	mm 71 x 90 x 48 (W x H x D)
Weight:	200 g
Degree of protection:	IP 40 (EN-60529 / IEC 529) properly fitted

Please perform the following tasks after receiving the product :

- Inspect the unit for damage. If the unit appears damaged upon receipt, contact the shipper immediately.
- Verify receipt of the correct unit by checking the label on the right side of the unit.
- If you have received the wrong model or the device does not function properly, contact your supplier.

OPERATION



WiFiControl allows a user to remote monitor and control all the local resources anywhere via standard web browser from any network enabled device (PC, tablets, phones, TV...).

Enter the IP address of the WiFiControl you want to connect to access the onboard website. For example: <http://192.168.1.200>. Within some networks you may use the device ID instead of its IP address.

MENU

Navigation menu available at the top of the pages:

- Home page the one visible here
- Analog gauges and real time analog thresholds settings
- I/O Graphs from data stored on ThingSpeak cloud service
- Transparent data terminal for COM1 and COM2
- 2 day weather forecast (cloud service)
- Device description and help (cloud service)

HOME PAGE

The first page is a summary of all inputs and outputs.

DISPLAY

This frame is reflecting the content of the LCD located on the WiFiControl. The text is visible to anyone visiting this Webpage, thus could be used also as a messaging system. Backlight is adjustable in 5 steps. Type the text you want displayed for one or more rows (including tags to display system variables) and click **Submit**. An audible alert can be triggered using the **Click to call** button.

ANALOG INPUTS

Five analog bargraphs report the value currently read from the analog inputs and NTC sensor.

OUTPUTS

Click on the output name to control the digital outputs:

- GREY** output released, OFF
- GREEN** output active, ON
- BLUE** output enabled and controlled by local input (AI or DI)

The behaviour of outputs is depending from the configuration settings. A name enclosed within '+' means the output is controlled from a digital or analog input.

DIGITAL INPUTS

Real time status of digital inputs:

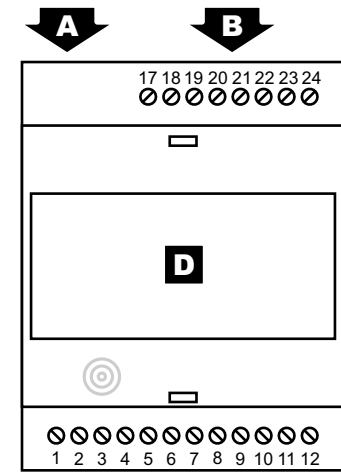
- GREY** input inactive, OFF
- ORANGE** input active, ON

Move up to top of the page

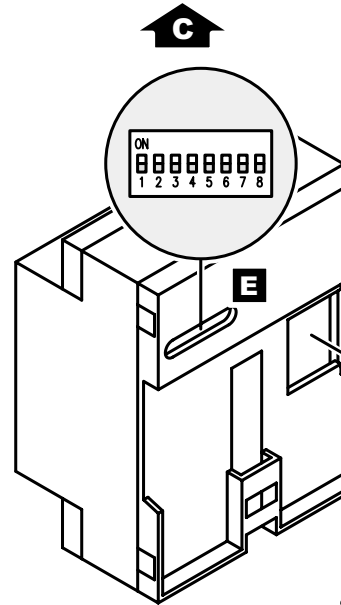
All pages are upgraded dynamically thanks to AJAX technology: Asynchronous JavaScript & XML the art of exchanging data with a server, and updating some parts of a web page without reloading the whole page.

INSTALLATION

This unit can be installed on any standard EN-50022 rail by simple snap-in. For safe operation, the unit must be installed only by qualified personnel in an enclosure which prevents accidental contact with hazardous voltages. Protection degree IP40 must be guaranteed, raised to IP54 for open air application.



- A. USB type B socket**
Power supply
COM1 port
- B. 8 x 2,5mm² (AWG14) terminals**
Aux power supply
EIA-TIA RS485 COM2 port
Analog inputs
- C. 12 x 2,5mm² (AWG14) terminals**
Relay outputs
Digital inputs
- D. Liquid Crystal Display**
3 x 16 characters
- E. DIPSWITCHES**



- 1** Mode
OFF: OPERATION
ON: CONFIGURATION
- 2** Analog input 4 mode
- 3** Analog input 3 mode
- 4** Analog input 2 mode
- 5** Analog input 1 mode
OFF: 0...10V
ON: 0...20mA
- 6** RS485 Fail safe resistor
OFF: NO BIAS
ON: BIAS ACTIVE
- 7** RS485 Termination resistor
OFF: NO TERMINATION
ON: TERMINATION ACTIVE
- 8** RS485 Fail safe resistor
OFF: NO BIAS
ON: BIAS ACTIVE

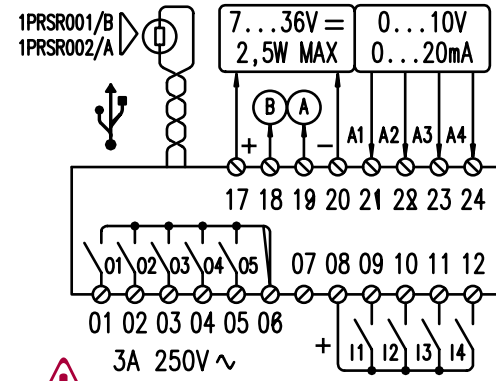
- F. SD Card holder**
micro SD 2GB

THE EMBEDDED ANTENNA IS LOCATED ON THE FRONT SIDE

KEEP THE AREA NEAR THE ANTENNA CLEAR FROM METAL OBJECTS

WIRING

01. Relay output 1
02. Relay output 2
03. Relay output 3
04. Relay output 4
05. Relay output 5
06. Output common
07. —
08. Positive 5 Vdc
09. Digital Input 1
10. Digital Input 2
11. Digital Input 3
12. Digital Input 4
17. Power supply +
18. EIA/RS-485 B
19. EIA/RS-485 A
20. Power supply -
21. Analog input 1
22. Analog input 2
23. Analog input 3
24. Analog input 4



POWER SUPPLY, INPUTS AND COM PORT MUST MEET THE DEMANDS PLACED ON SELV (SAFETY EXTREMELY LOW VOLTAGE) CIRCUITS ACCORDING TO EN60950 / IEC950

Regulated 5V – 50 mA MAX available at terminal 08 respect to negative terminal 20.

POWER SUPPLY

USB POWER SUPPLY

This unit can receive the power supply through the USB connector when linked to a Personal Computer capable to deliver 250mA. Internal BLUE led. A low cost USB wall power supply / charger could also be used.

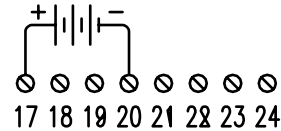
Supply Voltage 5 V dc
Supply current < 250 mA
USB socket type B



AUX POWER SUPPLY

Power supply in a wide voltage range could be provided at terminals 17 (positive) – 20 (negative), protected against reverse polarity connection. Internal GREEN led. Both USB and AUX power sources are allowed at same time.

Supply Voltage 7...36 V DC
Power consumption < 2,5 W
2 x 2,5 mm² (AWG14) screw connector



OUTPUTS

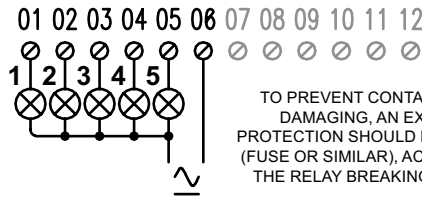
Process or appliance can be controlled by means of 5 SPST relay contacts available at terminals 01 – 05, internal GREEN led. Common return at terminal 06.

Rated current 3 A
Rated voltage 250 VAC
Breaking voltage 277 VAC
Max breaking capacity 750 VA
Minimum contact load 1 mA, 5 Vdc
Cadmium free contacts

Insulation to IEC60664
Voltage rating 277 V
Pollution degree 2
category as basic insulation III
category as reinforced insulation II

Surge voltage coil contacts: 5000VRMS

Dielectric strength
coil-contacts 3000VRMS
open contact circuit 750VRMS



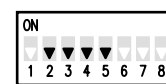
TO PREVENT CONTACTS FROM DAMAGING, AN EXTERNAL PROTECTION SHOULD BE PROVIDED (FUSE OR SIMILAR), ACCORDING TO THE RELAY BREAKING CAPACITY

ANALOG INPUTS

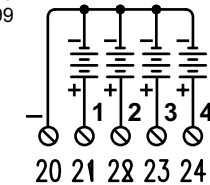
Up to 4 analog signal can be connected from terminals 21 – 24 respect to negative terminal 20. Select input mode by means of dipswitch [E] before to operate the unit.

Software configuration available for each input:

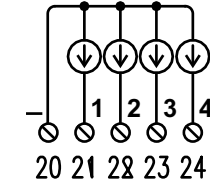
top value -99999 ... +99999
bottom value -99999 ... +99999
zero (offset) 0 ... 90%
unit any text



Input range 0 ... 10V
Resolution 0,01 V
Accuracy ±1%
Impedance 100 kΩ



Input range 0 ... 20mA
Voltage drop 2V @20mA
Resolution 0,02 mA
Accuracy ±1%
Impedance 100 Ω



COM PORTS

USB

WiFiControl provides an USB type B port connection for interfacing to computer systems, by installing USB to Serial bridge software. WiFiControl uses CP2101 from Silabs, allowing communication to Windows, Linux or MacOS by creating a virtual serial port.

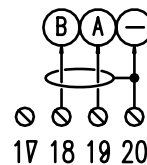
WiFiControl consumes up to 250 mA at 5 Vdc. This exceeds the recommended current draw from a standard USB computer port, which is 100 mA. When the unit is powered through the USB port only, an external USB hub may be required if your computer cannot provide such current.

WiFiControl accepts commands from USB interface while in operation. Use the escape sequence (+++) to exit data mode and enter command mode when a TCPClient is active.

EIA-TIA RS485

Multipoint com port is available at terminals 18 – 19.

Units 32 multidrop
Line length < 1000 m
Termination 120 Ω
Fail-safe 4700 Ω



WiFiControl accepts commands from RS485 interface while in operation. Use the escape sequence (+++) to exit data mode and enter command mode when a TCPClient is active.

RS485 bus requires a termination resistor at each end of the bus to avoid signal reflections. WiFiControl includes an on-board termination resistor that can be connected to the bus by setting dipswitch 7 to ON.



A fail-safe biasing mechanism must be provided to prevent fail status detections by the receivers when there is no active transmitters. A fail safe biasing circuit has been included, it can be connected to the bus turning dipswitches 6 and 8 to ON. This biasing must only be supplied by one of the devices connected to the bus.

Command MODE

In this mode WiFiControl waits for commands to be received from local COM ports. Commands are coded over one or several characters and may include additional data. Commands always end with <CR>. Responses always end with <CR><LF>.

?<CR> List of available commands

Live report of WiFiControl activity can be issued to COM1:

TRACE=ON<CR> Enable tracing to COM1
TRACE=OFF<CR> Disable tracing to COM1 (default)

Commands allow lowercase and uppercase characters (case insensitive).

TCP Server Mode

In this mode WiFiControl waits for a TCP connection from remote Clients. Port 55001 is assigned to COM1. Port 55002 is assigned to COM2.

Once a Client is connected (only 1 allowed per channel), WiFiControl converts the raw data from the serial port to TCP/IP packets establishing a transparent data channel between peers.

TCP Client Mode

In this mode WiFiControl establishes a link between local COM port and remote server. It works like a Telnet client contacting the specified IP address and Port. If the other peer is a WiFiControl running TCP Server, a transparent data link can be established between local and remote COM ports. TCP Server address and port can be changed runtime: enter the escape sequence to exit data mode and use specific commands, then return to online mode. Thingspeak and Twitter alerts are not available once TCP Client is enabled.

WEB Server Mode

In this mode WiFiControl sends and receives transparent data from the Webserver PORT page. It could be useful to control external devices connected to COM ports from the Webpage accessible from any browser.

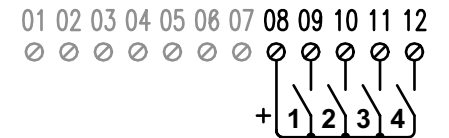
Repeater Mode

In this mode WiFiControl sends the incoming data to another local COM port. The receiving port still works in command mode. A transparent interface converter can be achieved setting repeater mode to cross link two COM ports.

DIGITAL INPUTS

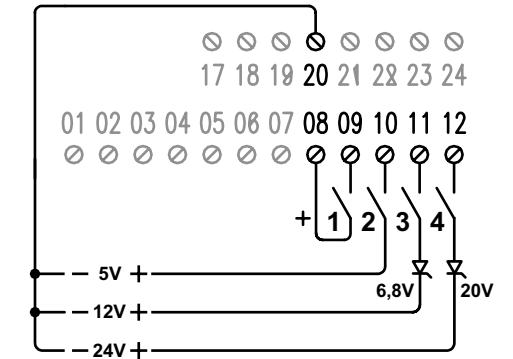
Up to 4 SPST contacts can be wired to terminals 09 – 12, internal RED led. Power supply for contacts provided by WiFiControl at terminal 08. Using electronic switches, terminal 08 is the positive leg. Independent debounce time setting for each input in the range 1... 300 seconds.

Input voltage 3 ... 9 Vdc
Input current 5mA @ 5V
Output voltage 5,0V DC AT TERMINAL 08



When inputs are supplied by external source, negative must be connected to terminal 20. Insert a zener diode to keep inputs voltage within 9Vdc. Multiple options can be used, see example below:

- inputs 1 using internal supply
- inputs 2 using external 5Vdc supply
- inputs 3 using external 12Vdc supply reduced by zener diode 6,8V
- inputs 4 using external 24Vdc supply reduced by zener diode 20V



External power supply for inputs must meet SELV circuits requirements according to EN60950 / IEC950: maximum allowed voltage is 60Vdc.

TEMPERATURE SENSOR

The NTC (Negative Temperature Coefficient) thermistor included with the unit is connected to analog input 5, implemented as internal 6 pin socket accessible removing the top terminal cover.

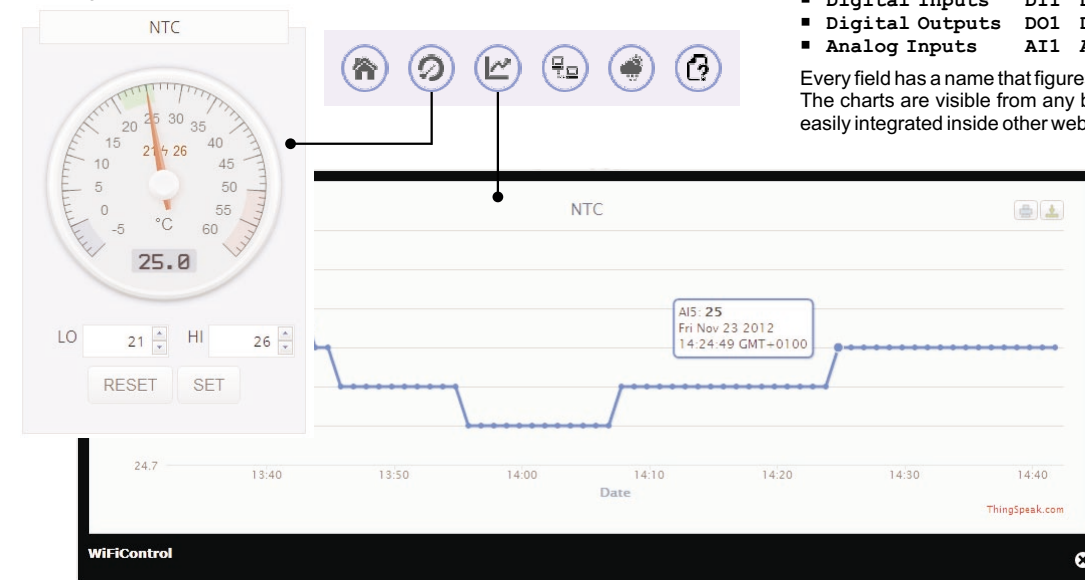
Range -5 ... 60 °C
Resolution 0,1 °C
Accuracy ±2%
NTC sensor 10k @ 25 °C
B_{25/85} 3.435 k



ANALOG MANAGEMENT & THINGSPEAK CLOUD SERVICE

Analog channels are manageable from any browser accessing the ANALOG page, where 5 gauges report the actual measured value for the 4 analog inputs and the temperature sensor (NTC).

Bottom and Top values are shown as per configuration settings and could be positive, negative and reversed (Bottom > Top). Above threshold (measure rising above) and below threshold (measure falling below) are available for each channel. The thresholds values are the one set in Configuration Mode but can be modified runtime from the webpage. Removing the power supply, all the Thresholds will fallback to the default values set in Configuration Mode.



ThingSpeak is an IoT (Internet of Things) application that allows users to store and retrieve data from WiFiControl over the Internet. Every ThingSpeak user can create channels. Every channel has:

- Channel ID
- Name
- Write API Key
- Description

Every channel can store up to 8 fields (values) and creates charts with those fields. WiFiControl manages the following fields / channels:

- Digital Inputs DI1 DI2 DI3 DI4
- Digital Outputs DO1 DO2 DO3 DO4 DO5
- Analog Inputs AI1 AI2 AI3 AI4 NTC

Every field has a name that figures inside the Charts. The charts are visible from any browser accessing the TREND page and could be easily integrated inside other websites or seen directly from the ThingSpeak website.

ERRORS

If WiFiControl fails to reach the network, a specific error code is shown on the display and sent to COM1:

- E02: JOIN FAILURE
- E03: AUTHENTICATION FAILURE
- E04: ASSOCIATION FAILURE
- E05: WEP HANDSHAKE FAILURE
- E06: PSK CALCULATION FAILURE
- E07: PSK HANDSHAKE FAILURE
- E08: AD HOC JOIN FAILURE
- E09: SECURITY MISMATCH FAILURE
- E10: NO SUITABLE AP FOUND FAILURE
- E11: UNSPECIFIED FAILURE