

# TRS system

*STAR-TRS*

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**Documentation**

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## TABLE OF CONTENT

<b>1</b>	<b>CONTENTS .....</b>	<b>5</b>
<b>2</b>	<b>DESCRIPTION.....</b>	<b>6</b>
<b>3</b>	<b>TECHNICAL SPECIFICATIONS .....</b>	<b>7</b>
<b>4</b>	<b>ELECTRICAL FEATURES.....</b>	<b>8</b>
4.1	Operating parameters.....	8
<b>5</b>	<b>PROVISIONS.....</b>	<b>9</b>
<b>6</b>	<b>INTERFACE ON GREENBUS .....</b>	<b>10</b>
<b>7</b>	<b>WIRING DIAGRAMS .....</b>	<b>12</b>
7.1	GreenBUS bus wiring.....	13
7.2	MA power supply .....	13
<b>8</b>	<b>DIMENSIONS .....</b>	<b>14</b>

## REVISIONS

Revision number	Date	Protocol	List of changes and/or modified paragraphs
Rev. 0	28/06/2016		Preliminary
Rev. 1	02/09/2016		First official release

# 1 CONTENTS

This document describes the requirements and implementation specifications concerning STAR-TRS module.



## 2 DESCRIPTION

- Connection on GreenBUS v4.0 bus with RJ45 connectors
- It turns a linear network topology into a star topology by using an input channel and up to 4 different output channels
- Mounting on DIN rails type EN50022 and EN50035
- Dimensions: 116 x 79 x 31.5 mm

### **3 TECHNICAL SPECIFICATIONS**

- 12 Vdc power supply (MA terminals)
- Logic reverse polarity protection

## 4 ELECTRICAL FEATURES

### 4.1 Operating parameters

Parameter	Conditions	Min	Typ	Max	Unit
V <sub>DD</sub> , Power Supply			12		V
Operating Temperature		5		60	°C



## 5 PROVISIONS

Generally speaking, power, temperature, and humidity values must not be exceeded as indicated in chapter 4.

STAR-TRS must be interfaced through terminals/cables etc. as indicated in the following chapters.

STAR-TRS must be mounted on DIN rail type EN50022 or EN50035 with the rear spring coupling. To attach and detach it, use a flat-blade screwdriver to pull back on the coupling tab, in order to retract it and allow it to be attached to or detached from the rail.

**Warning!** The metal coupling to the DIN rail is electrically connected to the ground of the STAR-TRS electrical circuit: the ground connection **MUST** be provided through this coupling (i.e., the DIN rail must be grounded).

**Warning!** In order to prevent the result of any electromagnetic interference, we recommend using Cat 6 S/STP cables for the connection with GreenBUS v4.0.

STAR-TRS is an electronic device for general use in light industrial environments.

It is a class A product and, if installed in a domestic environment, it may cause electromagnetic interference; the user must therefore take all necessary precautions.

## 6 INTERFACE ON GREENBUS

The function implemented by STAR-TRS is being able to substantially turn a linear GreenBUS v4.0 network topology into a star topology using an input channel and up to 4 different output channels: each channel can be individually enabled, in line with the table shown below.

SW1/1	ON	enable GreenBUS 1
SW1/2	ON	enable GreenBUS 2
SW1/3	ON	enable GreenBUS 3
SW1/4	ON	enable GreenBUS 4

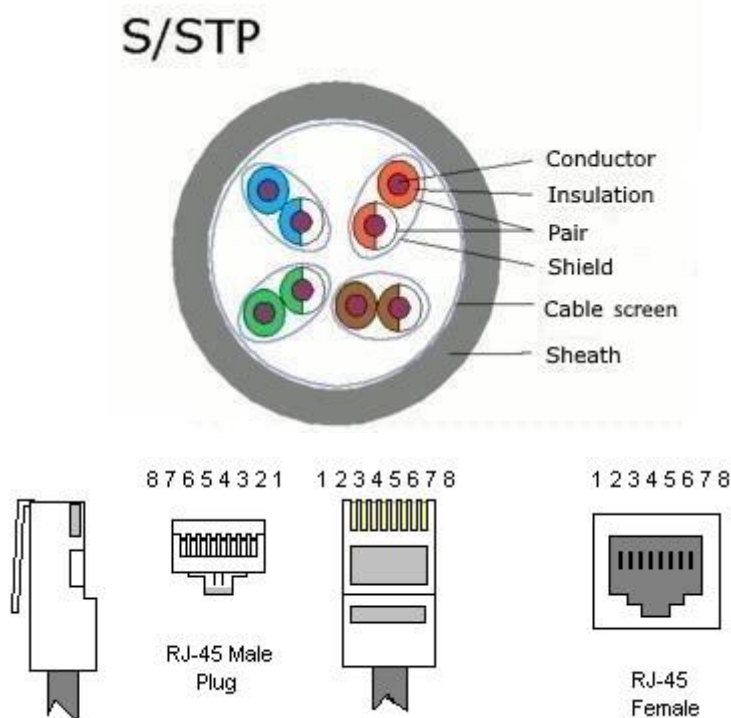
GreenBUS line is a fieldbus consisting of 8 conductors, 2 reserved for transmission (TX), 2 for reception (RX), and the remaining 4 for power supply.

GreenBUS is a proprietary bus of Tpa SpA, as its communication protocol: no device different from those provided by Tpa SpA can be connected to GreenBUS.

The designed fieldbus is a low-impedance bus: i.e., the impedance (resistance) value of the RX and TX cable pairs remains constant along the whole bus track and has a low value: 60 Ohm.

Please note that GreenBUS v4.0 operates at a frequency of 4 MHz.

Considering the data transmission frequency, in order to prevent the result of any electromagnetic interference, we recommend using Cat 6 S/STP cables (or at least Cat 5-E S/UTP). Overall, the wiring must present short lengths.



Pin	Name	Function	Notes
1	0 V	GreenBUS power supply negative	
2	+12 V	GreenBUS power supply (+12 Volt $\pm 5\%$ )	Max 1.5 A
3	0 V	GreenBUS power supply negative	
4	TX+	GreenBUS TX (positive signal)	100 Ohm termination
5	TX-	GreenBUS TX (negative signal)	
6	+12 V	GreenBUS power supply (+12 Volt $\pm 5\%$ )	Max 1.5 A
7	RX+	GreenBUS RX (positive signal)	100 Ohm termination
8	RX-	GreenBUS RX (negative signal)	
Shield	Ground		

This channel, designed by T.P.A. S.p.A., can connect remote field devices with a refresh time of 1 to 4 milliseconds. The transmission frequency is 4 MHz, the throughput is 300 B/ms. Communication is in full-duplex mode.

Within the communication frame, it is possible to have up to 8 devices that answer with a 1 ms refresh time, or up to 16 devices at 2 ms, or 32 devices at 4 ms, or a combination thereof, according to the application needs.

**Warning!** Do not use Ethernet crossover cables (a.k.a. “patch cables”).

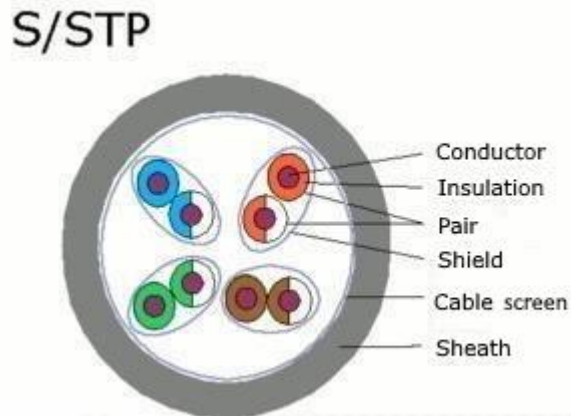
### 7 WIRING DIAGRAMS



1	MA+		
2	MA-		

## 7.1 GreenBUS bus wiring

The GreenBUS v4.0 channel needs a device-to-device wiring, consisting of Ethernet cable segments terminating in a RJ45 connector. In order to prevent the result of any electromagnetic interference, we recommend using Cat 6 S/STP cables. All S/STP cables have individually shielded twisted pairs, in addition to having an overall screen.



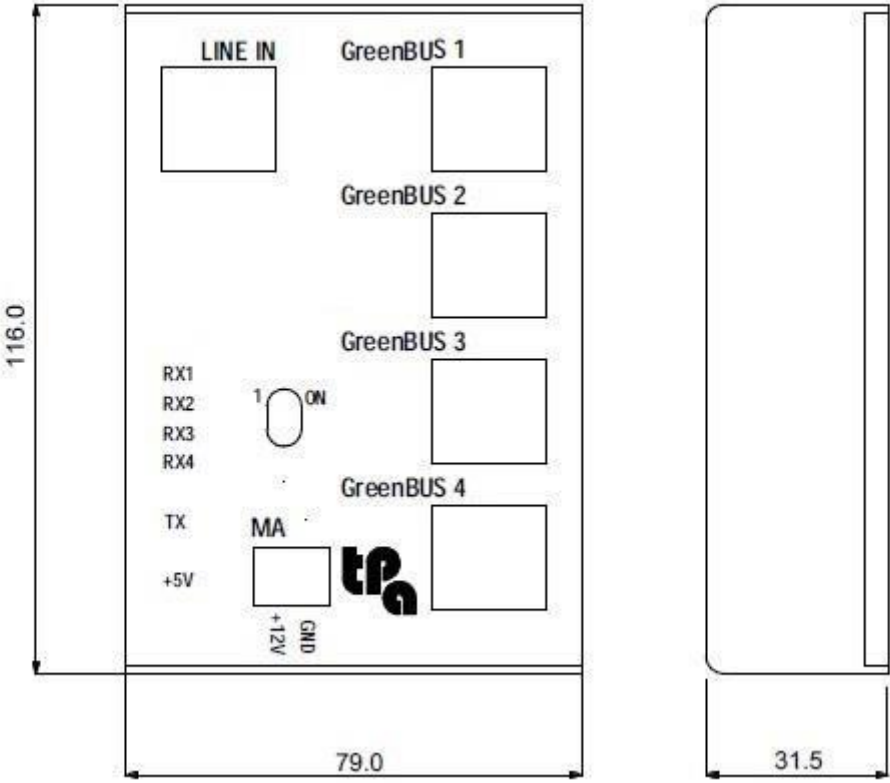
**Warning!** Do not use Ethernet crossover cables (a.k.a. “patch cables”).

## 7.2 MA power supply

It is the power supply (12 Vdc) used to operate STAR-TRS, and it powers the GreenBUS remote devices connected to its outputs.

**Warning!** It is required the logic power supply (+12 V and relative GND) to be separated from the one of any field power supplies to prevent possible electromagnetic interference from the field from affecting STAR-TRS operation, and that it be sized in such a way as to effectively power the remote units connected to STAR-TRS.

### 8 DIMENSIONS





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