TRS system

TRS-EV-24

Documentation

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Protocol

Typology   Documentation

Author   T.P.A.

Group name

Notes

TABLE OF CONTENT

REVISIONS

Revision number	Date	Protocol	List of changes and/or modified paragraphs
Rev. 0	13/11/2013		First release

1   CONTENTS

This document describes TRS-EV-24 remote module.
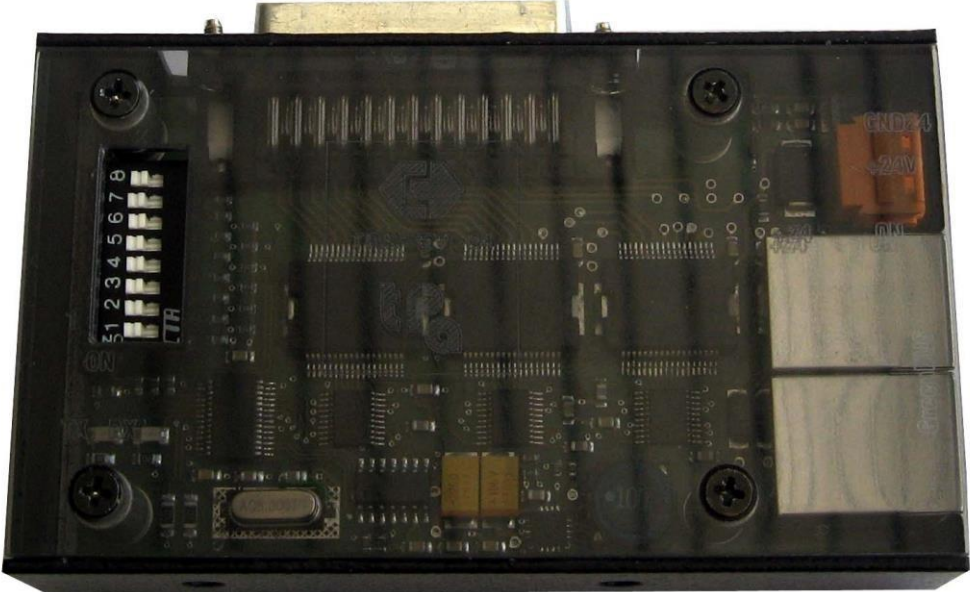
2   DESCRIPTION

- 24 output lines in PNP logic consisting of High Side Drivers

- GreenBUS v4.0 4 Mbit/s connection with RJ45 connector

- Communication synchronized with bus cycle time (1-4 ms)

- Requires +24 V nominal field power for output activation

- DIP switch for module addressing

- Display of Transmission/Reception status on control bus

- Error presence software control

- Monitoring of all power supplies via GreenBUS

- Direct mounting on SMC Manifold (SQ, VQ, and SY series) or, as an alternative, on DIN rails type EN50022 or EN500035.

3   TECHNICAL SPECIFICATIONS

- Max output current: 0.5 A

- Output protection against:

    o   overload

    o   overvoltage (40 V)

- Logic power supply from GreenBUS v4.0

- Field power supply galvanically separated from logic circuitry power supply

- Field reverse polarity protection

- Software control and LED signals of the presence of field power

- LED signalling module activity, communication, and input/output status

- Output activation synchronized with the execution of GPL instructions

4   ELECTRICAL FEATURES

4.1   Maximum values allowed

Parameter	Conditions	Min	Typ	Max	Unit
Vdc, Power Supply	by GreenBUS	10.8		13.2	V
On Output Current max	VO = 24 Volt DC			1	A
VO Output Power Supply	by external power supply	16		36	V
Io, Power Supply current max	by external power supply			3	A
Temperature		0		65	°C

4.2   Operating parameters

Parameter	Conditions	Min	Typ	Max	Unit
Vdc, Power Supply	by GreenBUS		12		V
Iq, Quiescent Current	all off, Vdc = 12 V		50		mA
Ip, Operating Current	all active outputs, Vdc = 12 V			130	mA
On Output Current	VO = 24 Volt DC	0	--	0.5	A
Max On Output current	VO = 24 Volt DC		2.5		A
VO Output Power Supply		18	24	30	V
Voh, output high status voltage	VO = 24 V, RI = 10 KOhm, CI = 50 pF	18			V
Vol, output low status voltage	VO = 24 V, RI = 10 KOhm, CI = 50 pF			6	V
Operating Temperature		5		60	°C
Baudrate	GreenBUS		4		

5   PROVISIONS

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

TRS-EV-24 must be interfaced through terminals/cables etc. as indicated in the following chapters.

TRS-EV-24 can be mounted on a DIN rail type EN50022 or EN50035 with the rear spring coupling (DIN version).

Warning! The metal coupling to the DIN rail is electrically connected to the ground of the TRS-EV-24 electrical circuit: the ground connection **MUST** be supplied through this coupling (i.e., the DIN rail must be grounded).

Warning! 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 eventual electromagnetic interference, we recommend using Cat 6 S/STP cables. All in all, the wiring must present short lengths.

TRS-EV-24 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   SIGNALLING LEDS

6.1   GreenBUS yellow (TX) and green (RX) Leds

- If they are off, there is no communication on GreenBUS.

- They blink synchronously (1/2 second) if the remote module is not initialized.

- They blink asynchronously if the remote module is initialized and there is communication.

6.2   Green Led +24 Vdc

It indicates the presence/validity of power +24 Vdc

- It is on when there is power.

- It is off when there is no power or it is out of the allowed range.

6.3   Green ON Led

- It is normally on when the module is powered.

7   AUTOMATIC DIAGNOSIS

7.1   System errors

TRS-EV-24 remote device can report error or anomalous operating conditions via GreenBUS bus v4.0.

TRS-EV-24 generates some system errors, as listed below:

Code	System error	Description
2049	#N Incorrect Configuration	The type of remote #N detected is not the same as the one provided in the configuration
2050	#N Disconnected	The remote #N is no longer reachable by fieldbus communication
2051	#N Reconnected	The remote #N is now reachable by fieldbus communication; it has not lost power and has retained configuration data
2052	#N Error reading Output not connected #D	On remote #N non-connected #D output is in error status
2055	#N Initialized	The remote #N is now reachable by fieldbus communication, but it has lost power and/or has lost configuration data, it has thereupon been initialized and configured again
2056	#N +24VDC power fail in bank #D	On remote #N the +24 V power for bank #D is off or out of the expected voltage range
2058	#N Error reading output #D	On remote #N connected and active output #D is in error status
2067	#N Error while transmitting the configuration	Communication or execution error of configuration command of remote #N hardware occurred

#N stands for remote number

#D stands for the mentioned device

Below is an additional system error that does not concern the remote at issue, but the fieldbus. The occurrence or presence of this error can explain some other concurring system errors received from other remotes.

Code	System error	Description
2057	GreenBUS power fail	GreenBUS power is off or however is out of the eligibility range

Further information on system errors can be found in Albatros help, in the chapter regarding remote device errors.

8   WIRING DIAGRAMS

DIP SWITCH

SW	1	2	3	4	5
Receiver N. 1	ON	ON	ON	ON	ON
Receiver N. 2	OFF	ON	ON	ON	ON
Receiver N. 3	ON	OFF	ON	ON	ON
Receiver N. 4	OFF	OFF	ON	ON	ON
Receiver N. 5	ON	ON	OFF	ON	ON
Receiver N. 6	OFF	ON	OFF	ON	ON
Receiver N. 7	ON	OFF	OFF	ON	ON
Receiver N. 8	OFF	OFF	OFF	ON	ON
Receiver N. 9	ON	ON	ON	OFF	ON
Receiver N. 10	OFF	ON	ON	OFF	ON
Receiver N. 11	ON	OFF	ON	OFF	ON
Receiver N. 12	OFF	OFF	ON	OFF	ON
Receiver N. 13	ON	ON	OFF	OFF	ON
Receiver N. 14	OFF	ON	OFF	OFF	ON
Receiver N. 15	ON	OFF	OFF	OFF	ON
Receiver N. 16	OFF	OFF	OFF	OFF	ON

SW	1	2	3	4	5
Receiver N. 17	ON	ON	ON	ON	OFF
Receiver N. 18	OFF	ON	ON	ON	OFF
Receiver N. 19	ON	OFF	ON	ON	OFF
Receiver N. 20	OFF	OFF	ON	ON	OFF
Receiver N. 21	ON	ON	OFF	ON	OFF
Receiver N. 22	OFF	ON	OFF	ON	OFF
Receiver N. 23	ON	OFF	OFF	ON	OFF
Receiver N. 24	OFF	OFF	OFF	ON	OFF
Receiver N. 25	ON	ON	ON	OFF	OFF
Receiver N. 26	OFF	ON	ON	OFF	OFF
Receiver N. 27	ON	OFF	ON	OFF	OFF
Receiver N. 28	OFF	OFF	ON	OFF	OFF
Receiver N. 29	ON	ON	OFF	OFF	OFF
Receiver N. 30	OFF	ON	OFF	OFF	OFF
Receiver N. 31	ON	OFF	OFF	OFF	OFF
Receiver N. 32	OFF	OFF	OFF	OFF	OFF

SW 7	ON	OFF
SW 8	ON	OFF
GBUS termination	Last Receiver	Last Receiver No

1	+24 Vdc		
2	GND24		

1	OUT1		
14	OUT2		
2	OUT3		
15	OUT4		
3	OUT5		
16	OUT6		
4	OUT7		
17	OUT8		
5	OUT9		
18	OUT10		
6	OUT11		
19	OUT12		
7	OUT13		
20	OUT14		
8	OUT15		
21	OUT16		
9	OUT17		
22	OUT18		
10	OUT19		
23	OUT20		
11	OUT21		
24	OUT22		
12	OUT23		
25	OUT24		
13	COM		

8.1 GreenBUS v4.0
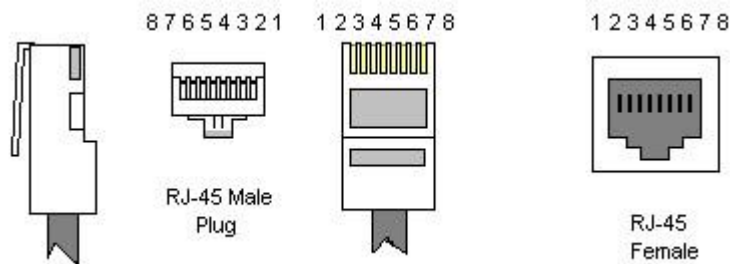
Pin	Name	Function	Notes
1	0 V	GreenBUS power supply negative	
2	+12 V	GreenBUS power supply (+12 Volt ±5%)	Max 1.5 A
3	0 V	GreenBUS power supply negative	
4	TX+	GreenBUS TX (positive signal)	100 Ohm termination
5	TX-	GreenBUS TX (negative signal)	
6	+12 V	GreenBUS power supply (+12 Volt ±5%)	Max 1.5 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 field remote 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.

8.2 Wiring

The GreenBUS v4.0 serial channel needs a device-to-device wiring, consisting of Ethernet cable segments terminating in a RJ45 connector. Considering the data transmission frequency, in order to prevent the result of eventual 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.
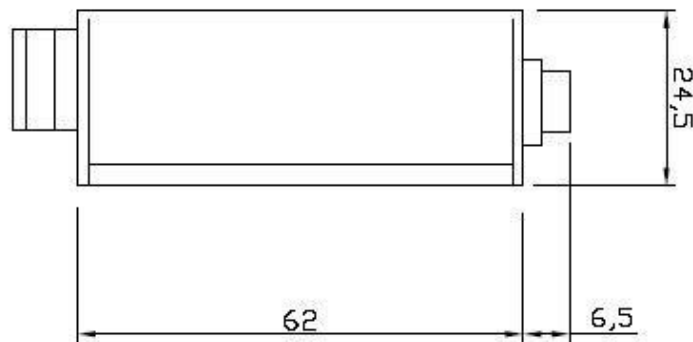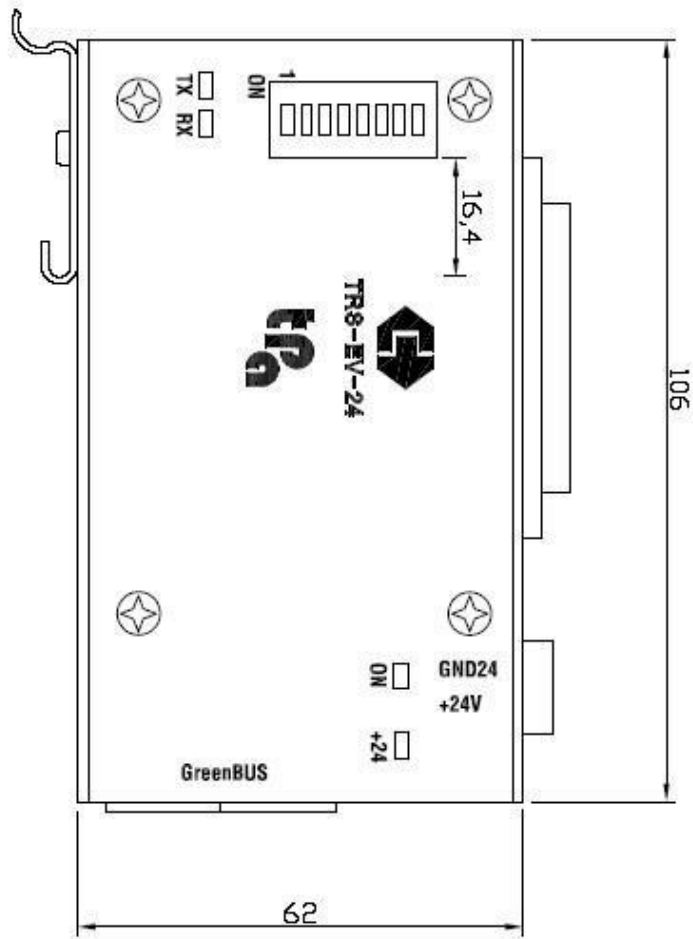All in all, the wiring must present short lengths.
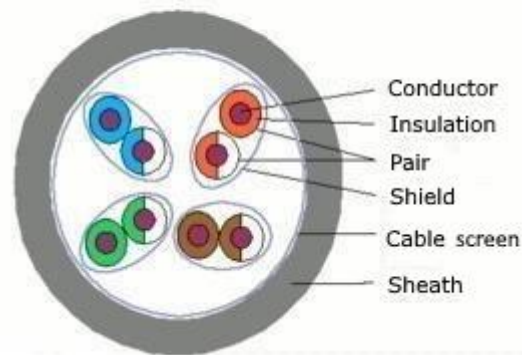
In order to be able to reach more devices and reduce wiring lengths, it is possible to use the AlbStar device (R1M3 and later models), so as to be able to rely on 4 routes (it will naturally be necessary to distribute the remote devices over the lines, in such a way as to reserve less line load for the farthest remotes).

Each GreenBUS v4.0 channel route must be terminated at the last physically connected remote device (the most distant one); it is terminated by activating (ON) the DIP switches 7 and 8 on the remote device.

Warning! Without termination, the GreenBUS v4.0 channel will not operate correctly, and the CNC Albatros will return a series of communication errors. The same would occur if the termination is also performed on other remote devices on the same route.

Warning! Do not use Ethernet crossover cables (a.k.a. "patch cables").

9   SIZE