TRS-System

TRS-IO

Documentation

Tecnologie e Prodotti per l'Automazione

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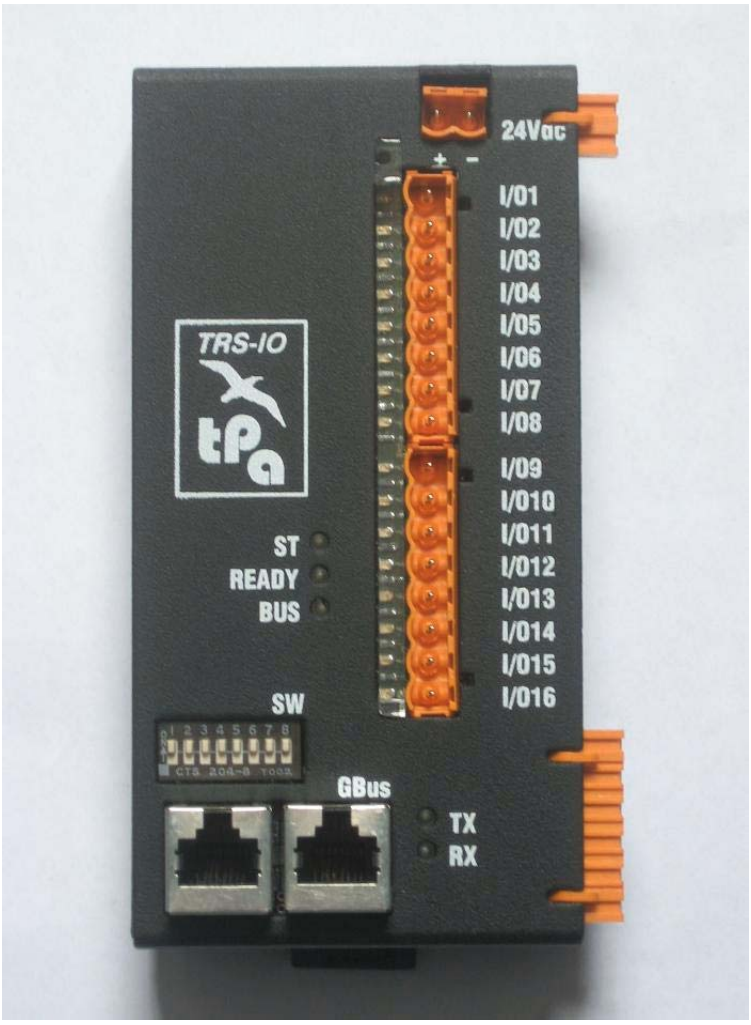
REVISIONS

Revision No.	Date	Protocol	Changes and/or changed paragraphs
Rev 0	15/07/2010		First release
Rev 1	03/08/2010		General update
Rev 2	06/06/2011		Greenbus cables update

CONTENTS

Description of requirements and production specifications of TRS-IO remote module.



1 DESCRIPTION

- 16 bidirectional INPUT/OUTPUT lines (PNP logic with High Side Driver) with yellow led signal status
- Optoelectronic decoupling of INPUT/OUTPUT
- 4 Mb/s GreenBus V4.0 connection with RJ45 connector
- Communication synchronized with the bus cycle time (1-4 ms.)
- +24Vdc nominal field power supply required to output activation
- 16 OUTPUT group power supply and signal of its presence, software control, error management of missing power supply
- Hardware protection against connection errors
- Assembly on DIN rails type EN50022 and EN50035
- Dip switch for module addressing
- Anti-rebound digital filter: the input is considered stable, if persists in this state for almost 2 ms
- Continuous read back of the active outputs, disactivation process of the outputs in short circuit (after 4 ms approx.), automatic restore of the output in short circuit (after short circuit removal - within 1 sec.)
- Possibility of TRS expansion modules until 5 units max.
- Total compatibility with TRS expansion modules
- Dimensions: 138x70x23.5 mm

2 TECNICAL SPECIFICATIONS

- Input threshold levels:
  - 0 = from 0V to 10V
  - 1 = from 14V to 24V
- Max. Output current: 0.5 A
- Outputs protection against:
  - short-circuit
  - overload
  - overvoltage (40V)
- 4ms delayed read-back of the activated outputs (SM diagnosis)
- 1 terminal for each input/output referred to 0V of +24Vdc power supply
- Connections to AWG 24 ÷ 12
- Field power supply galvanically isolated from the power supply of logic circuits and 4.0 Greenbus interface
- Power Supply from v4.0 GreenBus
- Protection against field supply inversion
- Software control and led signalling the power supply presence
- Led signalling the module activity status, the communication and the input/output status
- Output activation synchronized according to the execution of the GPL instruction
- Synchronized sampling of field Input with constant delay

3 ELECTRICAL CHARACTERISTICS

3.1 Maximum levels permitted

Parameter	Condition	Min	Type	Max	Unit
Vcc, 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
Icc, Power Supply current max	by external power supply			8	A
Temperature		0		65	°C

3.2 Operating parameters

Parameter	Condition	Min	Type	Max	Unit
Vcc, Power Supply	by GreenBus		12		V
Iq, Quiescent Current	all off, Vcc=12V		40		mA
Ip, Operating Current	all active outputs, Vcc=12V			100	mA
On Output Current	VOn = 24 Volt DC	0	--	0.5	A
VO Output Power Supply		18	24	30	V
Voh, output high state voltage	VO = 24V, Rl = 10KOhm,Cl = 50pF	18			V
Vol, output low state voltage	VO = 24V, Rl = 10KOhm,Cl = 50pF			6	V
Vih, input high state voltage	VO = 24V	18			V
Vil, input low state voltage	VO = 24V			10	V
Operative Temperature		5		60	°C
BaudRate	GreenBus		4		Mb/s

3.3 Additional parameters

Parameter	Condition	Min	Type	Max	Unit
Logic to ouput isolation	1 minute duration		500		Vac
	100 ms duration		1100		Vac
Input to logic isolation	1 minute duration		2500		Vac

4 SPECIFICATIONS

Generally, power supply, temperature and moisture values must not be exceeded (see chapter 3).
TRS-IO must be interfaced by means of cables/clamps and anything else (see next chapters).
The terminal blocks must be inserted also when they are not cabled.

TRS-IO must be assembled on a EN50022 or EN50035 DIN rail by means of the rear spring connection. For coupling and removal, the user should work on the connecting tongue with a flat-blade screwdriver, in such a way as to move it back and allow the coupling, or the release from the guide.

Warning! The metal coupling for the DIN rail is electrically connected to the circuit earth of TRS-IO the connection to earth: MUST be provided through this connection (that is the DIN rail must be earthed).

Warning! It should be noted that the GreenBus v4.0 works with 4MHz frequency. Due to the frequency of the data transmission, to prevent from the effect of possible electromagnetic interferences, we suggest the use of Cat.6 S/STP cables. Globally, the cabling length must be limited.

TRS-IO is an electronic device for general purposes in the environment of the light industry.
It is an A - class product, that, if installed in the home environment, can produce electromagnetic interferences.
Therefore, the final user must take all the necessary precautions.

5 SIGNAL LED

5.1 Red led (ST).

reporting the System status (ST) and showing different behaviours: all are not due to error conditions.

- Blanking light waiting for communication and related to TRS-IO initialization.
- If TRS-IO is properly initialized, it is turned completely off. From this time forward, if it switches on, it only reports an internal error.
- It is turned on in case of very serious HW fault and is operating until the problem is removed, followed by other signals from other leds (loss of power supply, disconnection from GreenBus, and so forth).

5.2 Yellow (TX) and green (RX) Greenbus Led

- In off condition, there is no communication on GreenBus
- They blink synchronously (1/2 second), if GreenBus is not initialized.
- They blink asinchronously, if GreenBus is initialized and the communication is operating.

5.3 BUS green led

- From an initial off status it is turned on at the end of the self-initialization of the remote device.
- It is turned off, when there is a problem on the TRS bus or when the TRS bus is not active.
- It is normally on.

5.4 Green led READY

- Start condition is off
- It goes on steady from TRS-IO self-initialization and it is ready to communicate via GreenBus
- It can go off if there is some hardware problem.

5.5 I/O yellow led

shows the status of corresponding I/O.

- When the logic status is 1, it is on
- When the logic status is 0, it is off

5.6 +24Vdc Green led

shows +24Vdc power supply

- It is on when it is powered
- It is off when unpowered or not included within the acceptability range.

6 SELF-TEST

6.1 System errors

TRS-IO remote device can report conditions of
- anomalous working
- own errors
- expansions connected through v4.0 GreenBus

TRS-IO produces some system errors as follows:

Code	System errors	Description
2049	#N Wrong Configuration	#N remote type found is not equal to the provided configured one
2050	#N Disconnected	#N remote cannot be reached by the field bus communication
2051	#N Reconnected	#N remote now can be reached by the field bus communication, it has not lost the power supply and has maintained the configuration data
2052	#N Error read back not connected #D	On #N remote the #D non-connected output failed
2055	#N Initialized	#N remote now can be reached by the field bus communication; however, it has lost the power supply and/or the configuration data; therefore it has been initialized and configured again
2056	#N +24V power supply error, #D error	On #N remote +24V power supply concerning the #D bench is off or outside of the provided voltage range
2058	#N Error read back output #D	On #N remote the #D active and connected output failed
2067	#N Error during the transmission of the configuration	A communication error or an error during the execution of an #N remote hardware configuration command occurred
2068	#N Internal error	A Hw or a Fw error inside the #N remote device occurred

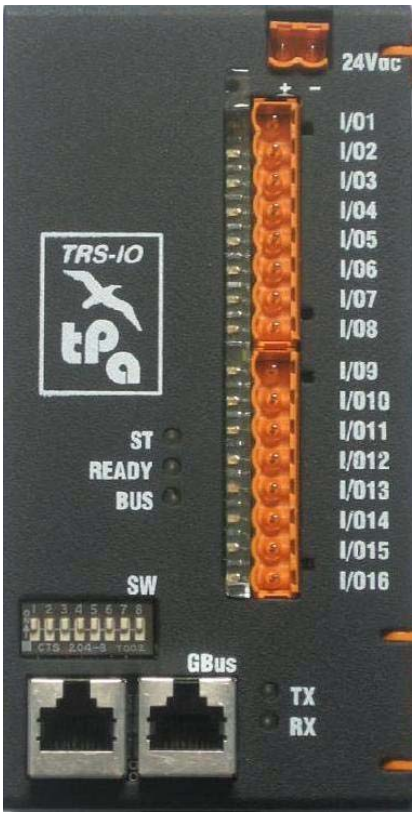
#N shows the remote number
#D shows the mentioned device

Herewith a further system error is shown, which does not concern the current remote, but the field bus. The onset or the presence of this error may explain some other accompanying system errors from the remotes.

Code	System errors	Description
2057	GreenBus power failed	GreenBus power supply is off or is in any case outside the acceptability range

Additional information on the system errors are shown in the Albatros help in the chapter of the errors related to the remote devices.

7 CABLING MAPS



DIP SWITCH

SW	1	2	3	4	5
Receiver No. 1	ON	ON	ON	ON	ON
Receiver No. 2	OFF	ON	ON	ON	ON
Receiver No. 3	ON	OFF	ON	ON	ON
Receiver No. 4	OFF	OFF	ON	ON	ON
Receiver No. 5	ON	ON	OFF	ON	ON
Receiver No. 6	OFF	ON	OFF	ON	ON
Receiver No. 7	ON	OFF	OFF	ON	ON
Receiver No. 8	OFF	OFF	OFF	ON	ON
Receiver No. 9	ON	ON	ON	OFF	ON
Receiver No.10	OFF	ON	ON	OFF	ON
Receiver No.11	ON	OFF	ON	OFF	ON
Receiver No.12	OFF	OFF	ON	OFF	ON
Receiver No.13	ON	ON	OFF	OFF	ON
Receiver No.14	OFF	ON	OFF	OFF	ON
Receiver No.15	ON	OFF	OFF	OFF	ON
Receiver No.16	OFF	OFF	OFF	OFF	ON

SW	1	2	3	4	5
Receiver No.17	ON	ON	ON	ON	OFF
Receiver No.18	OFF	ON	ON	ON	OFF
Receiver No.19	ON	OFF	ON	ON	OFF
Receiver No.20	OFF	OFF	ON	ON	OFF
Receiver No.21	ON	ON	OFF	ON	OFF
Receiver No.22	OFF	ON	OFF	ON	OFF
Receiver No.23	ON	OFF	OFF	ON	OFF
Receiver No.24	OFF	OFF	OFF	ON	OFF
Receiver No.25	ON	ON	ON	OFF	OFF
Receiver No.26	OFF	ON	ON	OFF	OFF
Receiver No.27	ON	OFF	ON	OFF	OFF
Receiver No.28	OFF	OFF	ON	OFF	OFF
Receiver No.29	ON	ON	OFF	OFF	OFF
Receiver No.30	OFF	ON	OFF	OFF	OFF
Receiver No.31	ON	OFF	OFF	OFF	OFF
Receiver No.32	OFF	OFF	OFF	OFF	OFF

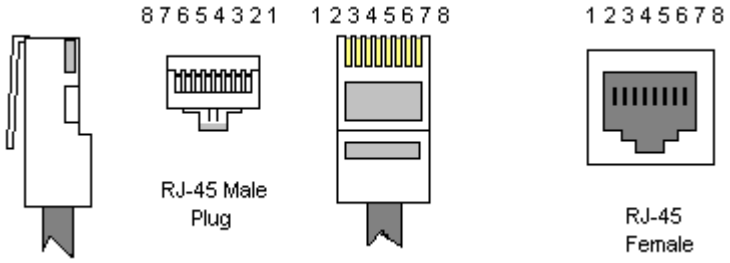
SW 7	ON	OFF
SW 8	ON	OFF
GBus Termination	Last Receiver	Last Receiver No

1	**+24Vdc**		
2	**GND24**		

1	**I/O 1**		
2	**I/O 2**		
3	**I/O 3**		
4	**I/O 4**		
5	**I/O 5**		
6	**I/O 6**		
7	**I/O 7**		
8	**I/O 8**		

1	**I/O 9**		
2	**I/O 10**		
3	**I/O 11**		
4	**I/O 12**		
5	**I/O 13**		
6	**I/O 14**		
7	**I/O 15**		
8	**I/O 16**		

7.1 GreenBus v4.0



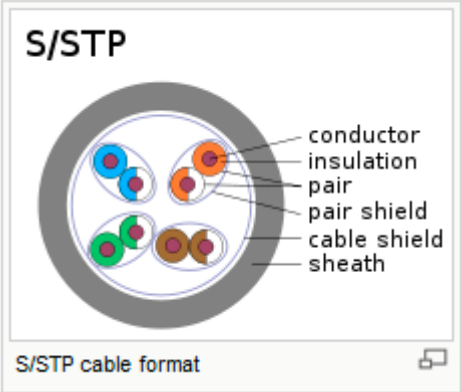
Pin	Name	Function	Notes
1	0 V	Negative GreenBUS power	
2	+12 V	GreenBus Power supply (+12Volt ±%5)	Max 1,5A
3	0 V	Negative GreenBUS power	
4	TX+	GreenBus Tx (positive signal)	100 Ohm termination)
5	TX-	GreenBus Rx (negative signal)	
6	+12 V	GreenBus Power supply (+12Volt ±%5)	Max 1,5°
7	Rx+	GreenBus Rx (positive signal)	100 Ohm termination
8	RX-	GreenBus Rx (positive signal)	
Shield	Ground		

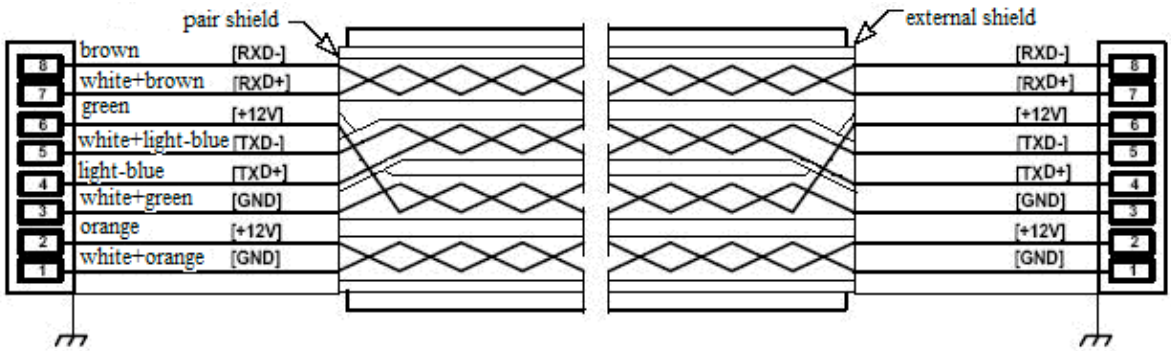
This channel, created by TPA. S.p.A. is able to connect remote devices of a field with a refresh time from 1 to 4 milliseconds. The transmission frequency is 4MHz, the throughput is 300 Byte/millisecond.
Communication occurs in Full-Duplex-mode.
Within the communication frame max. 8 devices, reacting with a refresh time of 1 millisecond, or up to 16 devices at 2 milliseconds, or 32 devices at 4 milliseconds or a combination of these values, according to the application requirements, can be available.

Warning! TX and RX always refer to the transmitter

7.2 Cabling

v4.0 GreenBus serial cable requires a cabling from device to device made of Ethernet cable segments terminated with RJ45 connector. Due to the frequency of the data transmission, to prevent from the effect of possible electromagnetic interferences, we suggest the use of **Cat.6 S/STP** cables. All S/STP cables are equipped with double twisted, individually shielded wires and a comprehensive shield.





Overall, the cabling length must be contained.
To reach more devices and reduce cabling distances, the AlbStar device (R1M3 models and following) can be used to have 4 links available (of course remote devices must be distributed on the lines, in order to supply a lower line load to the more distant remotes).
Each GreenBus v4.0 channel link must be terminated in correspondence of the last remote device physically connected (the more distant one); termination is made by activating (ON) the 7 and 8 Dip-Switches fit on the remote device.

Warning! Without termination the GreenBus v4.0 channel will not work properly and the Cnc Albatros will return a list of communication errors. In the same manner it will happen, if the termination is executed also on other remote devices of the same stretch of line.

Warning! Do not use Ethernet cross-cables (also called "patch cables")

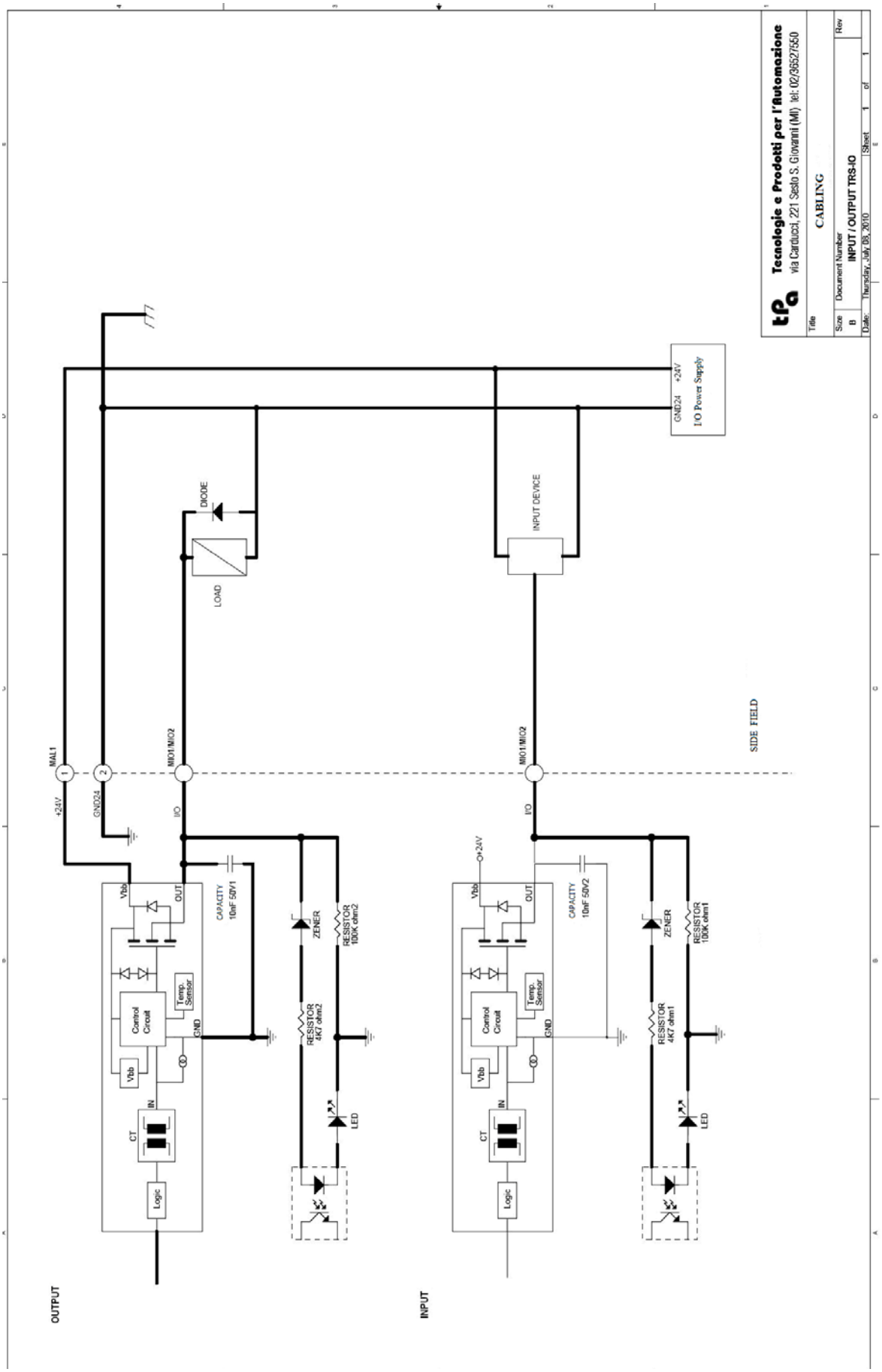
7.3 +24Vdc Power supply

This is +24Vdc power, used for the output driver and normally supplied towards the TRS bus to power possible expansions connected to TRS-IO.

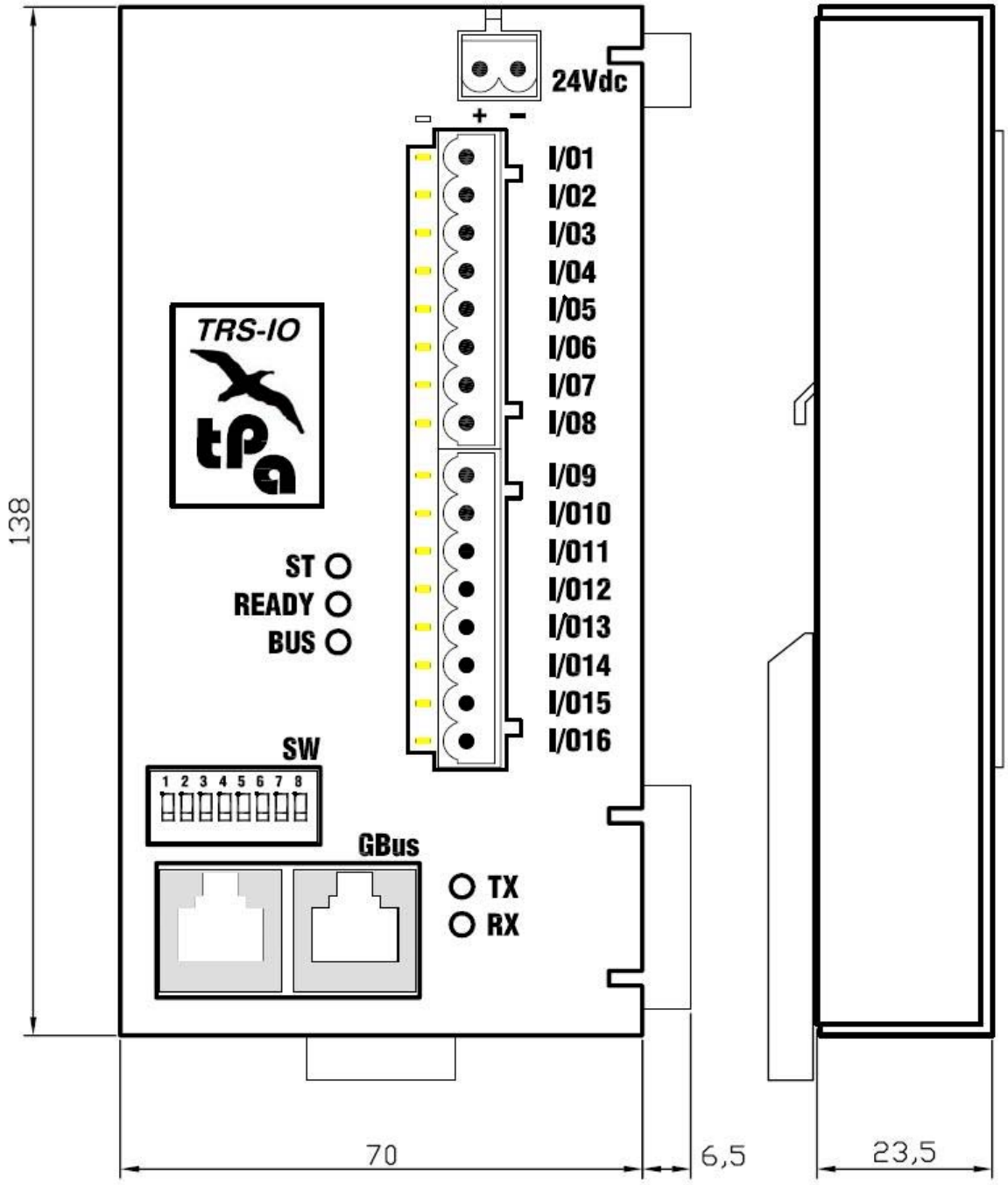
It is of note that the maximum current limit available from the +24Vdc power system along the TRS bus of a remote device (receiver and possible expansions) is equal to 8A. The total loads controlled by a remote, whose +24Vdc power supply is drawn from the master only, must be dimensioned for a 8A maximum absorption, (for the limits see chapter 3).

The terminal block should be inserted in any case.

8 INPUT/OUTPUT CABLING



9 DIMENSIONS



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