



TRS-AC-E

Remote Module

Documentation

Document data

Date 03/07/2019
Revision 3
File Name eTRS-AC-E.pdf
Protocol
Type Documentation
By ; © T.P.A. S.r.l.
Group name
Remarks

This documentation is property of T.P.A. S.r.l.

Any unauthorized duplication is forbidden.

The Company reserves the right to modify the content of the document at any time.

TABLE OF CONTENT

| | | |
|-----------|---------------------------------------|-----------|
| 1 | CONTENTS | 5 |
| 2 | DESCRIPTION | 6 |
| 3 | TECHNICAL SPECIFICATIONS | 7 |
| 4 | ELECTRICAL FEATURES | 8 |
| 4.1 | Highest accepted values..... | 8 |
| 4.2 | Operating parameters..... | 8 |
| 4.3 | Other parameters..... | 9 |
| 5 | INSTRUCTIONS | 10 |
| 6 | LED | 11 |
| 6.1 | +24Vdc green led..... | 11 |
| 7 | INTERFACE IN TRS BUS | 12 |
| 7.1 | Data in/out..... | 12 |
| 7.1.1 | Function..... | 12 |
| 7.1.2 | Set Position..... | 13 |
| 7.1.3 | Position..... | 13 |
| 7.1.4 | Latched Position..... | 13 |
| 7.1.5 | Info..... | 13 |
| 8 | SELF TEST | 14 |
| 9 | CABLING MAPS | 15 |
| 9.1 | +24Vdc Field Power Supply..... | 16 |
| 10 | CABLES | 17 |
| 11 | FIELD CONNECTIONS | 18 |
| 12 | DIMENSIONS | 22 |

REVISIONS

| Revision number | Date | Protocol | Changes and/or changed paragraphs |
|-----------------|------------|----------|-----------------------------------|
| Rev 0 | 18/12/2012 | | Preliminary |
| Rev 1 | 13/05/2013 | | Preliminary release |
| Rev 2 | 08/10/2013 | | First official release |
| Rev 3 | 02/07/2019 | | Drawings translation |

1 CONTENTS

This document describes requirements and production specifications of TRS-AC-E remote module.



2 DESCRIPTION

- It interfaces a differential encoder providing a 16 bit-counting and the fast input functionality, zero reference mark distributed in:
 - pair Phase A
 - pair Phase B
 - pair Phase C (zero)
 - pair Fast Input
- n° 2 Output (output 0-24V, max 100mA) configurable uncoupled with opto-isolators.
- Decoupling opto-electronic of the encoder inputs
- +24 Vdc Nominal field power supply for outputs activation, taken from TRS bus and signal of its presence
- Interface (in return) of the Fast Input pair, of the P4-P5 pair and of the two outputs 0-24V configurable that have the addition of the following signals
 - pair Phase A (signals RS422)
 - pair Phase B (signals RS422)
 - pair Phase C (signals RS422)
- assembly on DIN rails type EN50022 and EN50035
- full compatibility with TRS remote modules and TRS expansions.
- Through connection to the remote module TRS (master in TRS bus):
 - Communication synchronised with the bus cycle time
 - diagnostics of the expansion (power supply)
- Dimensions 138x35x23.5 mm

3 TECHNICAL SPECIFICATIONS

- Input threshold levels:
 - 0 = from 0V to 10V
 - 1 = from 14V to 24V
- Max. Output power supply: 0.1 A
- Incremental encoder input channel
 - Maximum frequency 4MHz
 - Interfacing possibility with differential and no-differential driver 5V, 12V and 24V, with zero reference mark.
 - fast input for setpoint, determination of the positions, limit switch.
 - Toggle/direction outputs or fast outputs mode.
- Encoder output channel
 - Maximum frequency 4MHz
 - It shows the encoder input signals in differential standard RS422.
 - Toggle/direction outputs or fast outputs mode.
- Possible encoder sampling in synchronized mode with constant delay.

4 ELECTRICAL FEATURES

4.1 Highest accepted values

| Parameter | Conditions | Min | Type | Max | Units |
|-------------------------------|-----------------|-----|------|-----|-------|
| Vcc, Power Supply | by Bus TRS | 4.5 | | 6.5 | V |
| On Output Current max | VO = 24 Volt DC | | | 100 | mA |
| VO Output Power Supply | by Bus TRS | 16 | | 30 | V |
| Icc, Power Supply current max | by Bus TRS | | | 200 | mA |
| Temperature | | 0 | | 65 | °C |
| On Output Current max | VO = 24 Volt DC | | | 100 | mA |

4.2 Operating parameters

| Parameter | Conditions | Min | Type | Max | Units |
|--------------------------------|-----------------------------------|-----|------|------|-------|
| Vcc, Power Supply | by Bus TRS | 4.5 | 5 | 5.5 | V |
| Iq, Quiescent Current | all off, Vcc=5V | | | 60 | mA |
| Ip, Operating Current | all active outputs, Vcc=5V | | 100 | | mA |
| On Output Current | VO = 24V | 0 | | 100 | mA |
| VO Output Power Supply | by Bus TRS | 18 | 24 | 30 | V |
| Voh, output high state voltage | VO = 24V, RI = 10KOhm, CI = 50pF | 18 | | | V |
| Vol, output low state voltage | VO = 24V, RI = 10KOhm, CI = 50pF | | | 6 | V |
| FastIN threshold | Vlow (On trans 0->1) VO = 24V | 0 | | 10 | V |
| | Vhigh (On trans 0->1) VO = 24V | 18 | | 24 | V |
| FastOut hold time | VO = 24V | 7 | | | ms |
| Incremental encoder frequency | | | | 4000 | KHz |
| Operative Temperature | | 5 | | 60 | °C |

4.3 Other parameters

| Parameter | Conditions | Min | Type | Max | Units |
|--------------------------|-------------------|------------|-------------|------------|--------------|
| Logic to ouput isolation | 1 minute duration | | 500 | | Vac |
| | 100 ms duration | | 1100 | | Vac |
| Input to logic isolation | 1 minute duration | | 2500 | | Vac |

5 INSTRUCTIONS

Generally, the values indicated in the chapter 4 must not be exceeded.

You must interface TRS-AC-E using cables/terminals and everything else, as shown in the following chapters.

TRS-AC-E must be fixed on EN50022 or EN50035 DIN rails by means of the rear spring connection. For coupling and removal, you must work on the connecting tongue with a flat-blade screwdriver, in a way that you can 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 ground of TRS-AC-E: the connection to earth **MUST** be provided through this connection (that is the DIN rail must be earthed).

Warning! The connection/disconnection of TRS-AC-E expansion in a TRS module with logic and/or from available field supply is not accepted.

TRS-24-E is an electronic device for general purposes in the environment of the light industry.

This is a class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take the due precautions.

6 LED

6.1 +24Vdc green led

shows that +24Vdc power is available

- It is on, when the power supply is available
- It is off, when it is not powered or outside the acceptability range.

7 INTERFACE IN TRS BUS

TRS-AC-E is an "intelligent expansion" of the TRS-nn-E series, thus it occupies N = 2 expansions in the bus TRS frame. For the maximum allowed expandability from a TRS remote module, make reference to the receiver TRS-nn to which TRS-AC-E is connected.

7.1 Data in/out

The in/out data of a TRS-AC-E expansion are shown to the CNC with the interface planned by the receiver TRS-nn to which TRS-AC-E will be connected.

7.1.1 Function

Input data of 16 bit.

Function[0] = '0' incremental encoder mode (default), '1' pulse counter mode

Function[1] = '0' straight phases (default), '1' inverted phases

Function[2] = '0' toggle/direction outputs (default), '1' fast-out outputs

Function[3] = '0' zero reference mark creates coordinate acquisition (default), '1' zero reference mark resets counter (it doesn't create coordinate acquisition)

Function[7:4] = must be "0000"

| Function[15:8] | Command type | Function |
|----------------|-----------------------------|--|
| 0xx0x001 | TCZ activation | For Function[3] = 0 it acquires the coordinate when it finds the zero reference mark. For Function[3] = 1 the counter is reset when it finds the zero reference mark. |
| 0xx00011 | FIN activation with rising | It acquires the coordinate when there is a transition 0->1 on the fast-in signal |
| 0xx01011 | FIN activation with falling | It acquires the coordinate when there is a transition 1->0 on the fast-in signal |
| 0xx0x101 | FOUT activation | It enables the FOUT functionality, with the match value contained in the "Set Position" data <u>Note</u> : the bit "select Out" has to be set as "1". |
| 0xx1xxx0 | Counter load | Counter load with the value contained in the "Set Position" data Load sequence is Function[12] = 1->0. |

| | | |
|----------|-------------|--|
| 1xxxxxxx | Event reset | Reset the occurred event. As long as Function[15] = '1' is not possible the creation of other events, even if they are enabled. As long as the occurred event (Info[4]) is not reset through this command, it is not possible the creation of other events, even if they are enabled. Reset sequence is Function[15] = 1->0. Note: it is advisable to put at zero also the bit Function[8], otherwise, at the end of the reset, another event will be enabled. |
|----------|-------------|--|

7.1.2 Set Position

Input data of 16 bit.

Value of the encoder counter to which is created the fast-out signal when "Activation FOUT" command.

Load value of the counter when command "Counter Load"

7.1.3 Position

Output data of 16 bit.

Value of the encoder counter with complement notation to 2. Position[15] is the bit of sign.

7.1.4 Latched Position

Output data of 16 bit.

Value of the last coordinate of the encoder counter acquired on event with complement notation to 2. Latched Position[15] is the bit of sign.

7.1.5 Info

Output data of 16 bit.

Info[0] = status of the zero reference mark (FC)

Info[1] = status of the fast-in signal (FIN)

Info[2] = status of the output OUT1

Info[3] = status of the output OUT2

Info[4] = '1' required event occurred, '0' event not occurred

Info[15:5] = N/A

8 SELF TEST

The self test of the TRS-AC-E expansion is managed by the TRS bus master that performs the appropriate actions in order to communicate any system error to the CNC.

9 CABLING MAPS



AXIN

| | | | |
|----|--------------|--|--|
| 1 | PHASE A IN | | |
| 2 | PHASE A \ IN | | |
| 3 | FINP+ | | |
| 4 | P4 | | |
| 5 | P5 | | |
| 6 | PHASE B IN | | |
| 7 | PHASE B \ IN | | |
| 8 | P8 | | |
| 9 | FINP- | | |
| 10 | TOG/FOUT | | |
| 11 | P11 | | |
| 12 | DIR/FOUTn | | |
| 13 | PHASE C IN | | |
| 14 | PHASE C \ IN | | |
| 15 | GND | | |

AXOUT

| | | | |
|----|---------------|--|--|
| 1 | PHASE A OUT | | |
| 2 | PHASE A \ OUT | | |
| 3 | FINP+ | | |
| 4 | P4 | | |
| 5 | P5 | | |
| 6 | PHASE B OUT | | |
| 7 | PHASE B \ OUT | | |
| 8 | P8 | | |
| 9 | FINP- | | |
| 10 | TOG/FOUT | | |
| 11 | P11 | | |
| 12 | DIR/FOUTn | | |
| 13 | PHASE C OUT | | |
| 14 | PHASE C OUT \ | | |
| 15 | GND | | |

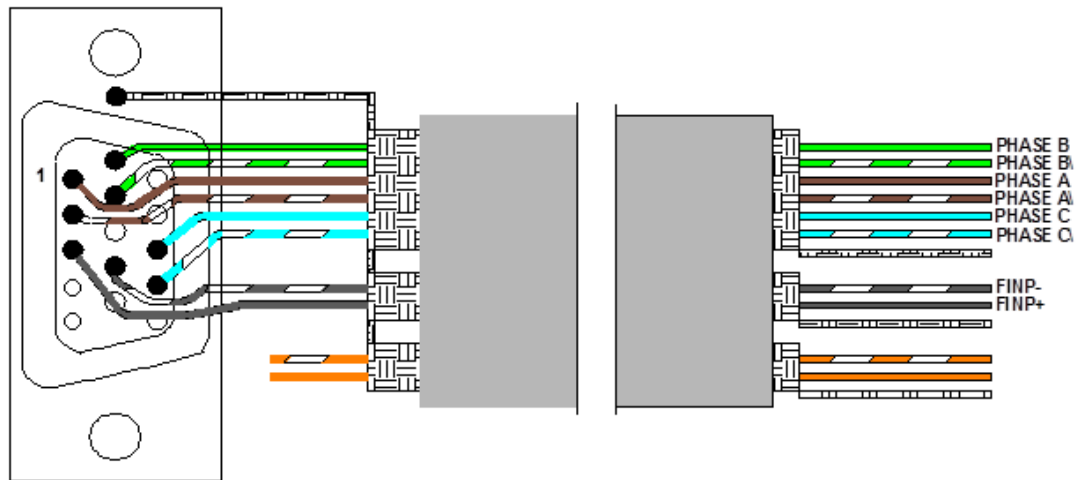
9.1 +24Vdc Field Power Supply

The power supply (24 Volt DC) is employed for the output driver and it is delivered by the TRS bus.

10 CABLES

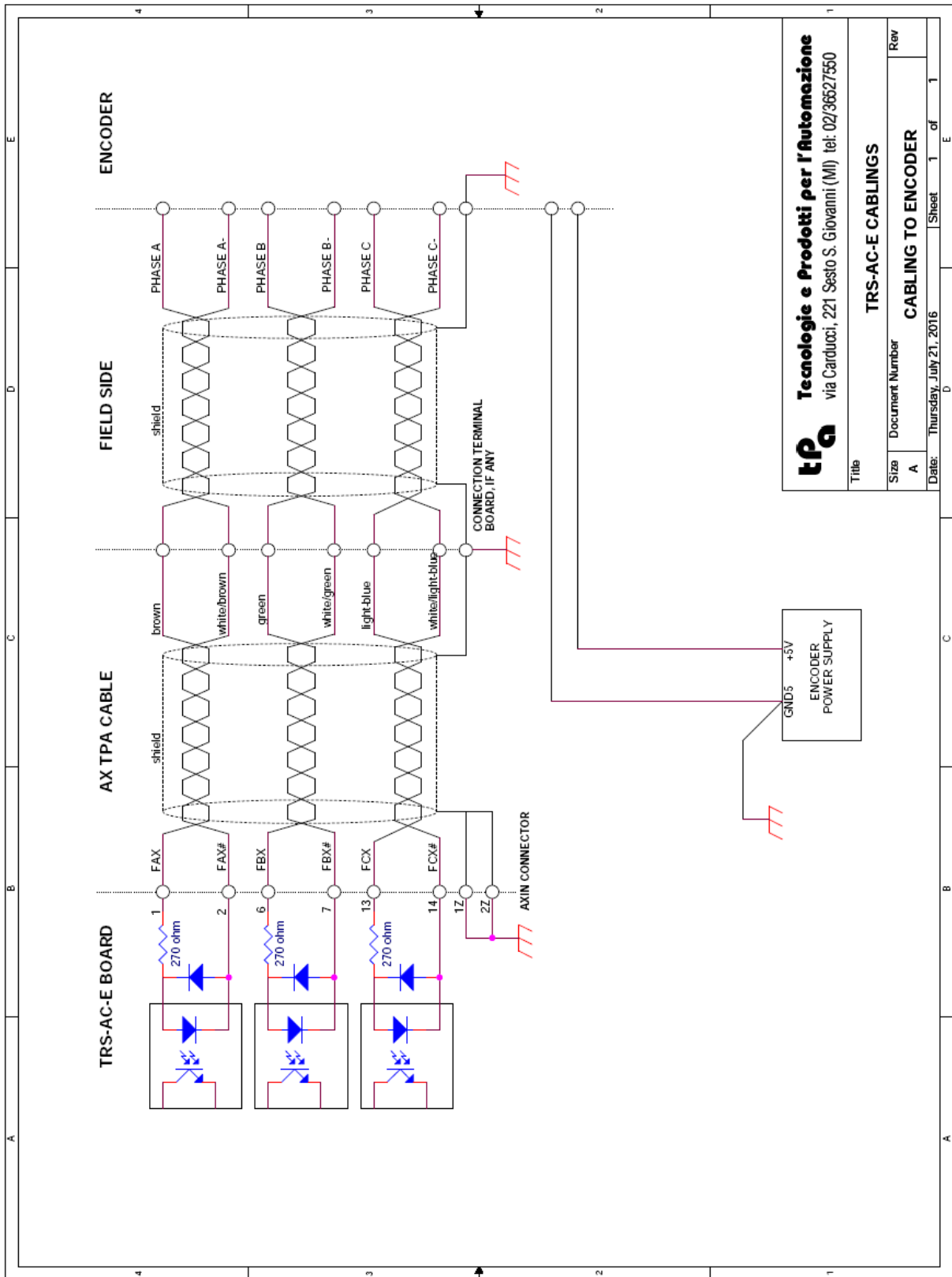
The connector box matches up to the TRS-AC-E box, the DIN rail anchoring block (metal mass) and to the earthed pin.

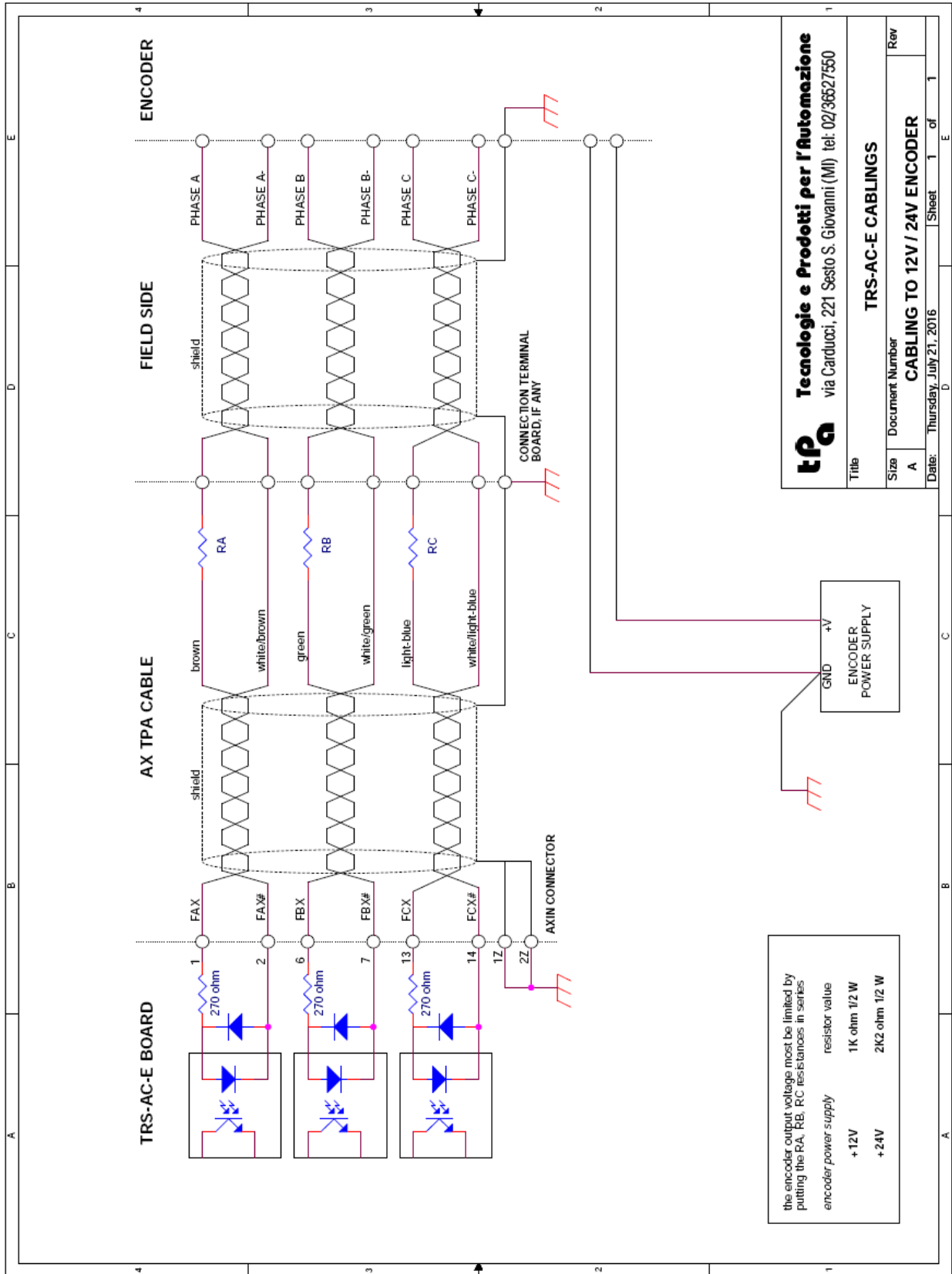
The AXIN cable cabling is the same of that of AXOUT.

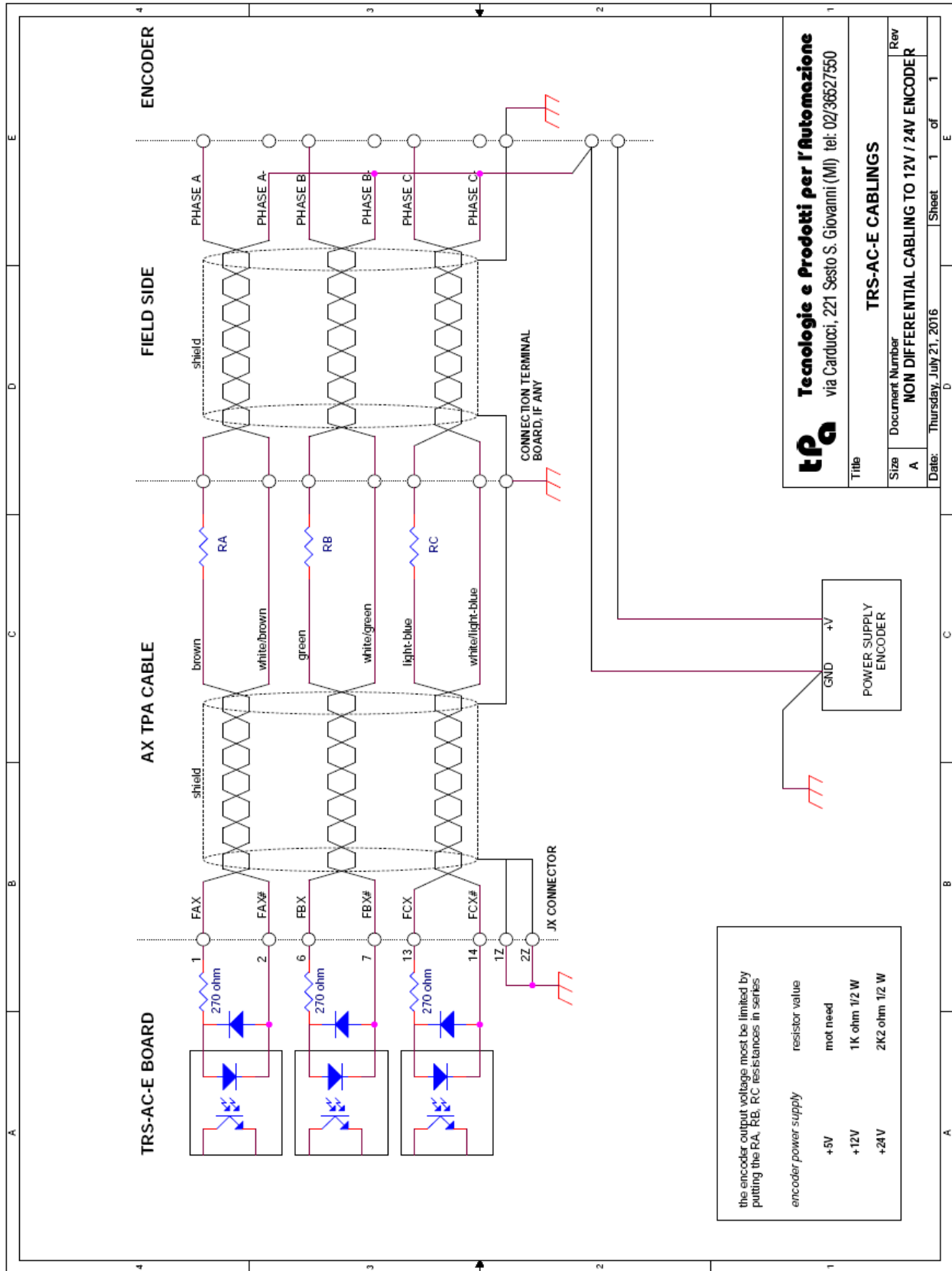


| | | | |
|----|-----------|--|--|
| 1 | PHASE A | | |
| 2 | PHASE A\ | | |
| 3 | FINP+ | | |
| 4 | P4 | | |
| 5 | P5 | | |
| 6 | PHASE B | | |
| 7 | PHASE B\ | | |
| 8 | P8 | | |
| 9 | FINP- | | |
| 10 | TOG/FOUT | | |
| 11 | P11 | | |
| 12 | DIR/FOUTn | | |
| 13 | PHASE C | | |
| 14 | PHASE C\ | | |
| 15 | GND | | |

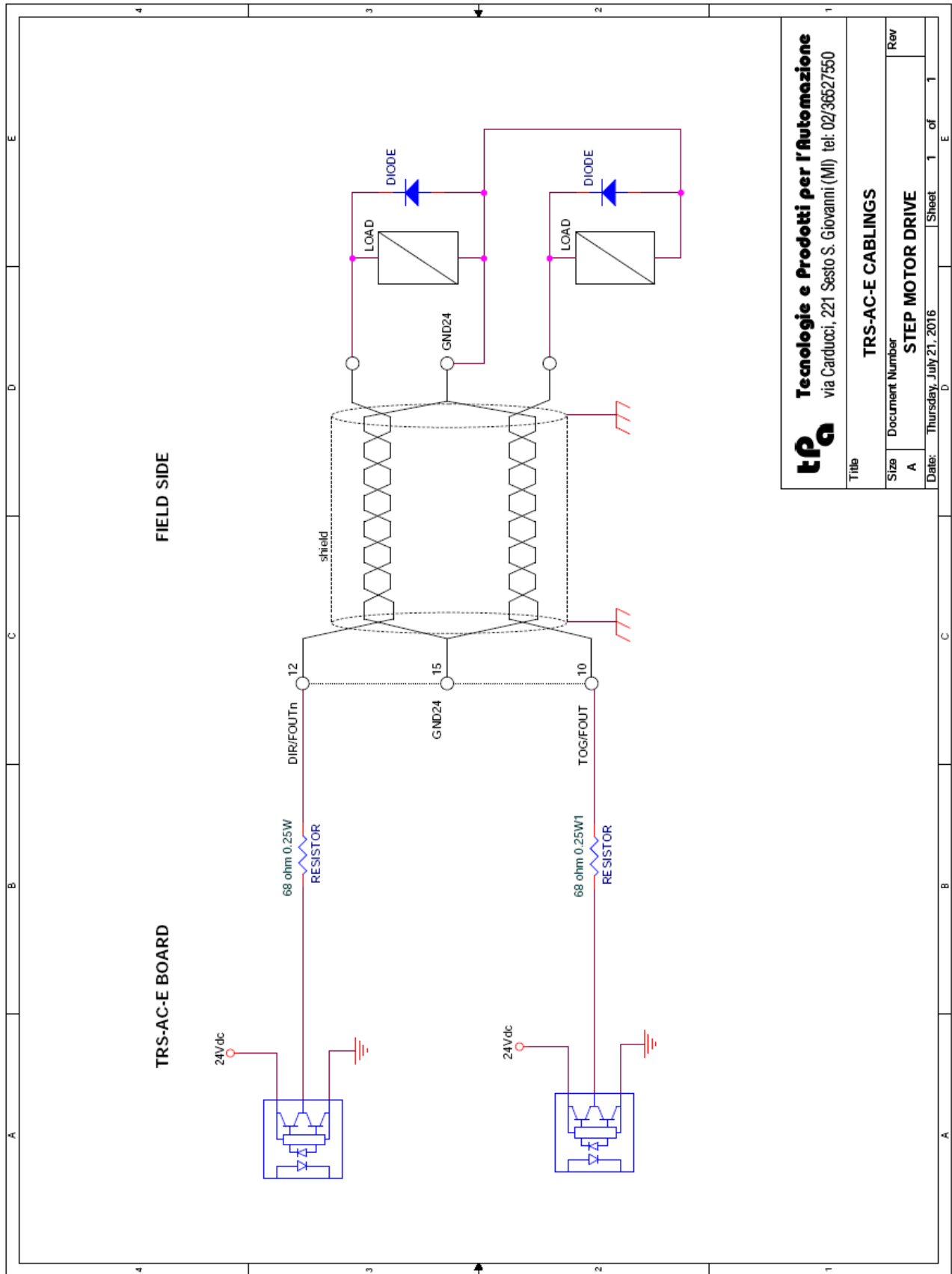
11 FIELD CONNECTIONS





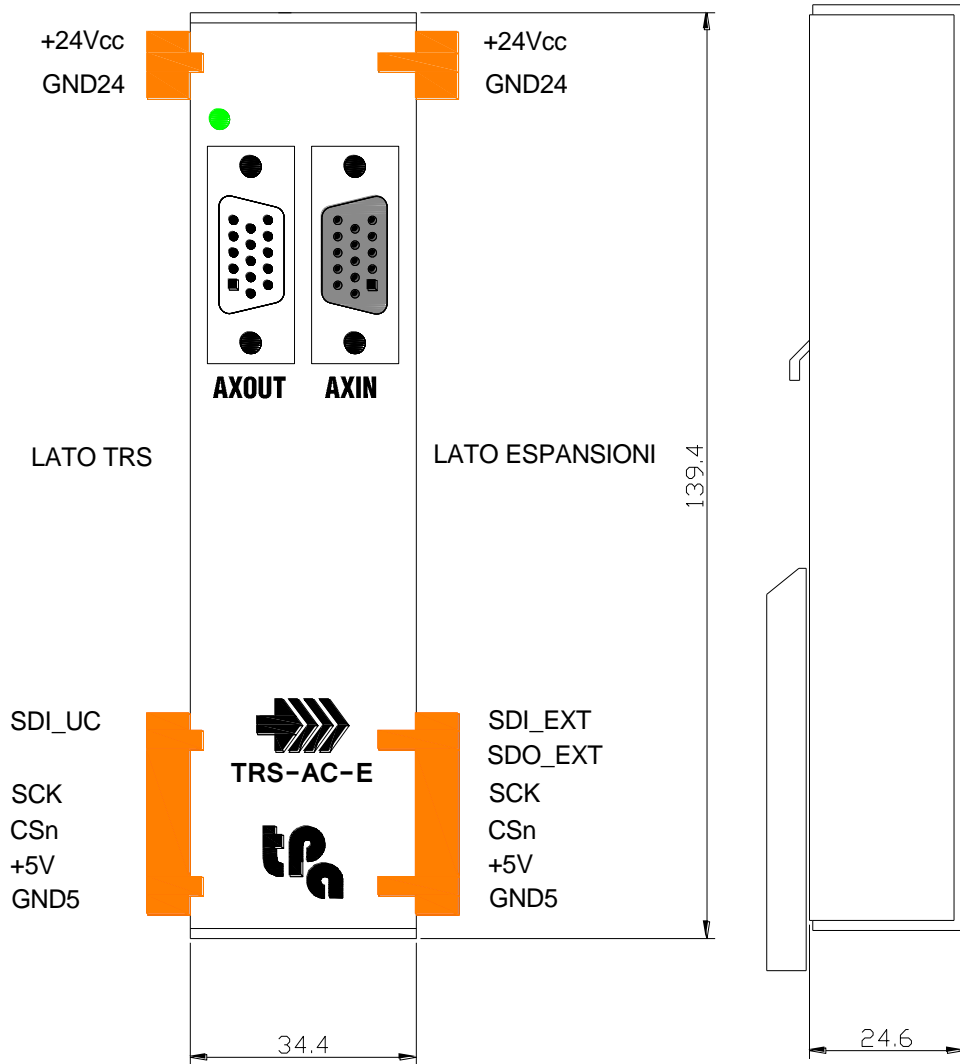


Warning: in a few instances you may need to balance the A, B, C channels using 2 equal resistances (half RA, RB, RC) to be installed both on the positive (FAX, FBX, FCX) and on the negative (FAX#, FBX#, FCX#) branch.



| | |
|--|-----------------------------------|
| TPA Tecnologie e Prodotti per l'Automazione via Carducci, 221 Sesto S. Giovanni (MI) tel: 02/36627550 | |
| Title: TRS-AC-E CABLINGS | |
| Size: A | Document Number: STEP MOTOR DRIVE |
| Date: Thursday, July 21, 2016 | Sheet 1 of 1 |

12 DIMENSIONS





T.P.A. Srl Tecnologie e Prodotti per l'Automazione

Via Carducci, 221 - 20099 Sesto S. Giovanni

<https://www.tpaspa.it>