TRS-AC-E

Remote Module

Documentation

T.P.A. Srl Tecnologie e Prodotti per l'Automazione
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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, Rl = 10KOhm, Cl = 50pF	18			V
Vol, output low state voltage	VO = 24V, Rl = 10KOhm, Cl = 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 Note: 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

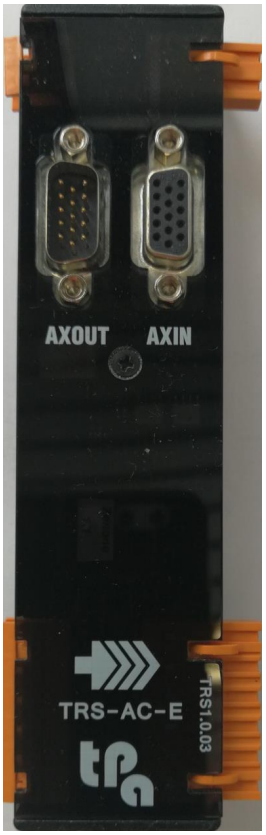
Info[4] = '1' required event occurred, '0' event not occurred

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		

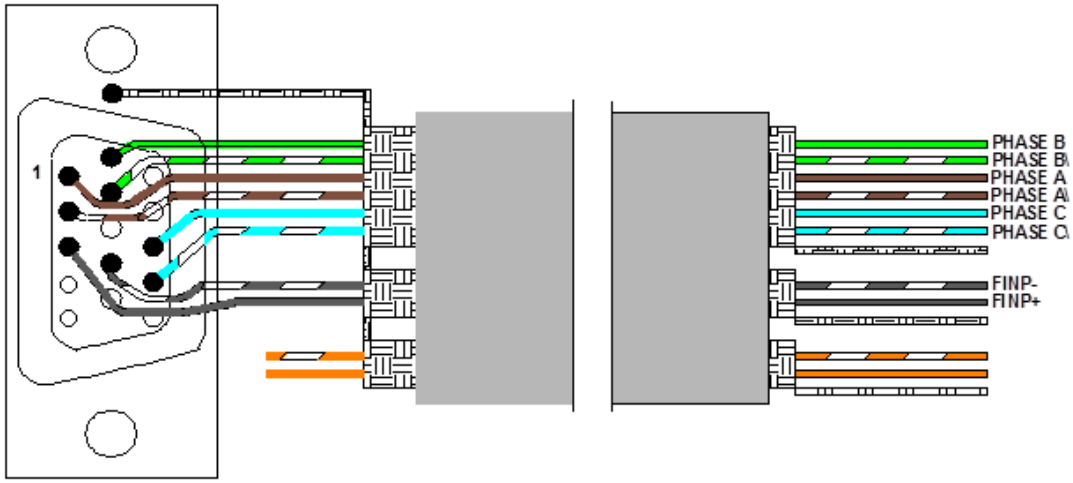
9.1 +24Vdc Field Power Supply

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

10 CABLES

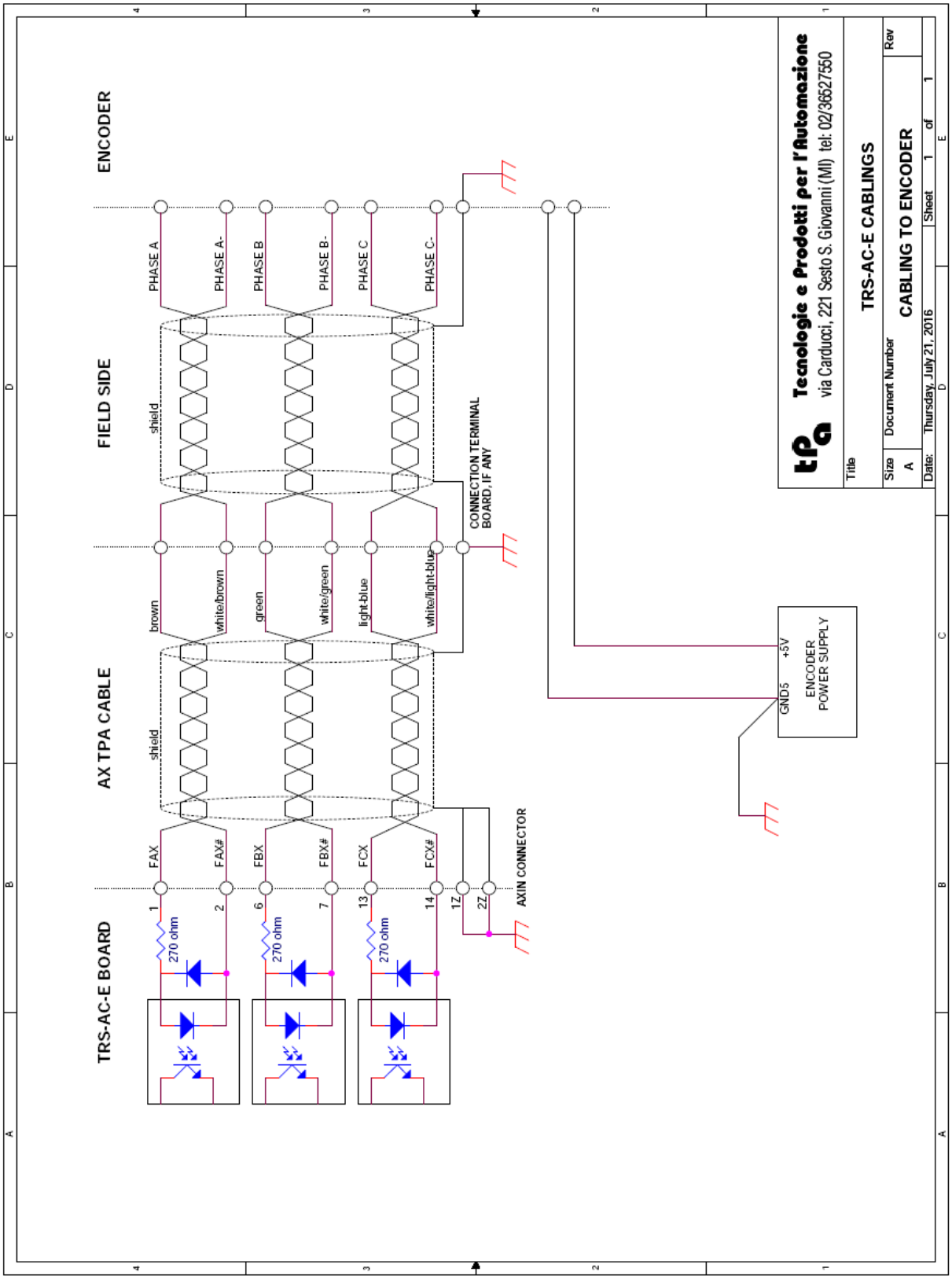
The connector box matches up to the TRS-AC-E box, the DIN rail anchoring block (metal mass) and to the earthed pin.

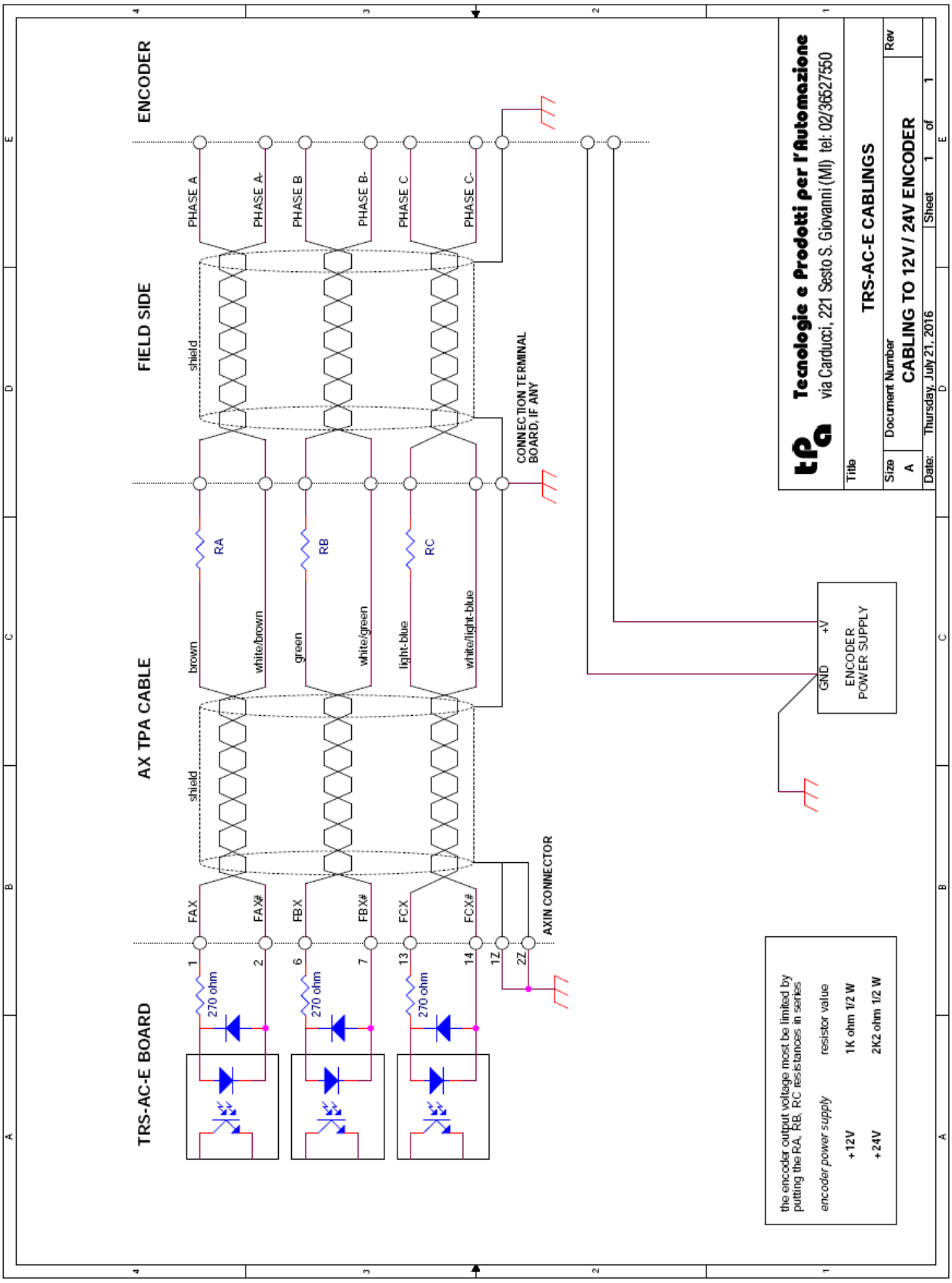
The AXIN cable cabling is the same of that of AXOUT.



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




ENCODER
FIELD SIDE
AX TPA CABLE
TRS-AC-E BOARD
PHASE A
PHASE A-
PHASE B
PHASE B-
PHASE C
PHASE C-
shield
RA
RB
RC
brown
white/brown
green
white/green
light-blue
white/light-blue
shield
FAX
FAX#
FBX
FBX#
FCX
FCX#
1
2
6
7
13
14
1Z
2Z
270 ohm
270 ohm
270 ohm
AXIN CONNECTOR
CONNECTION TERMINAL BOARD, IF ANY
GND
+V
ENCODER POWER SUPPLY
the encoder output voltage most be limited by putting the RA, RB, RC resistances in series
encoder power supply
resistor value
+12V
1K ohm 1/2 W
+24V
2K2 ohm 1/2 W
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via Carducci, 221 Sesto S. Giovanni (MI) tel: 02/36527550
Title
TRS-AC-E CABLINGS
Size
A
Document Number
CABLING TO 12V / 24V ENCODER
Rev
Date:
Thursday, July 21, 2016
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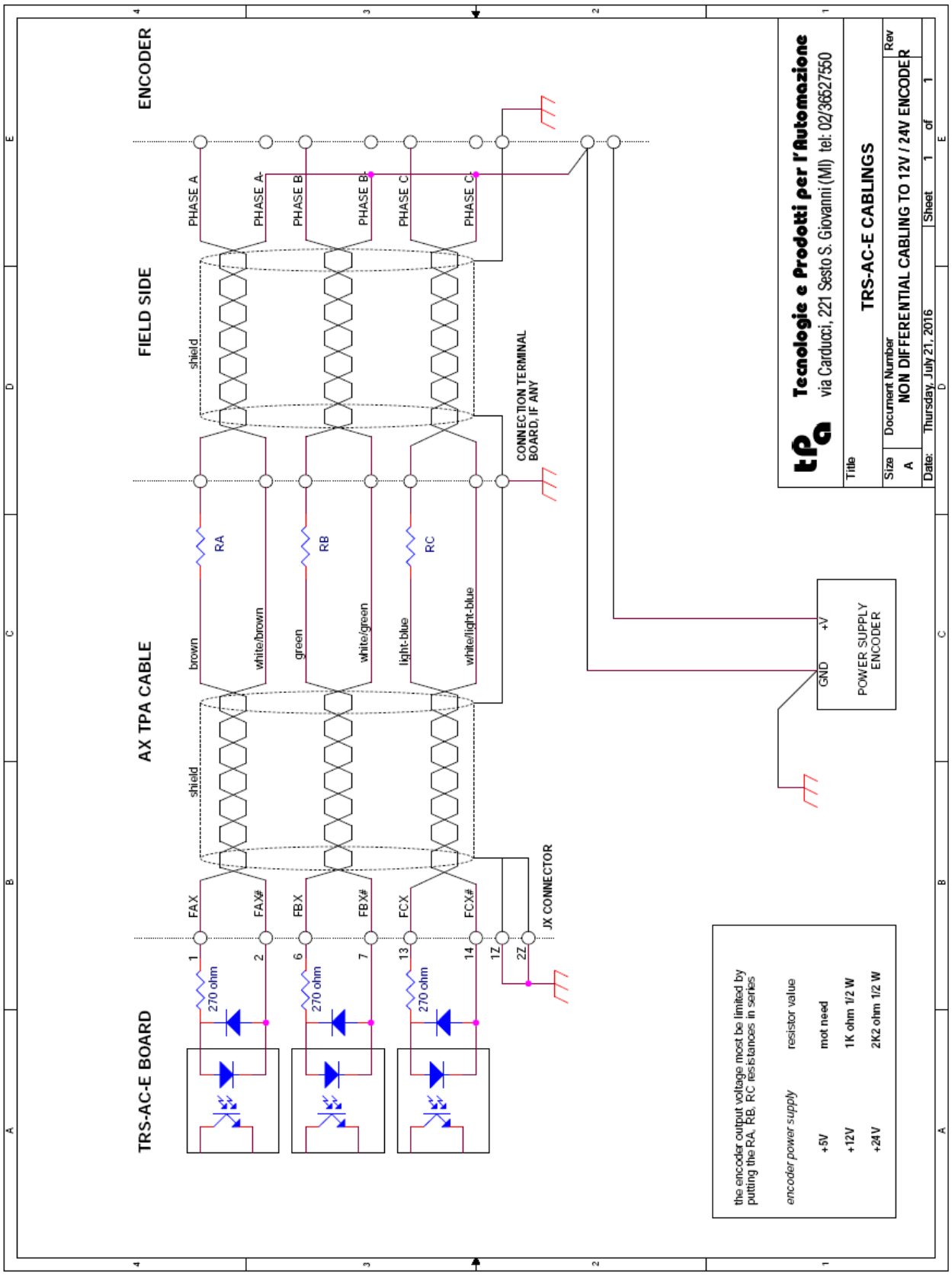
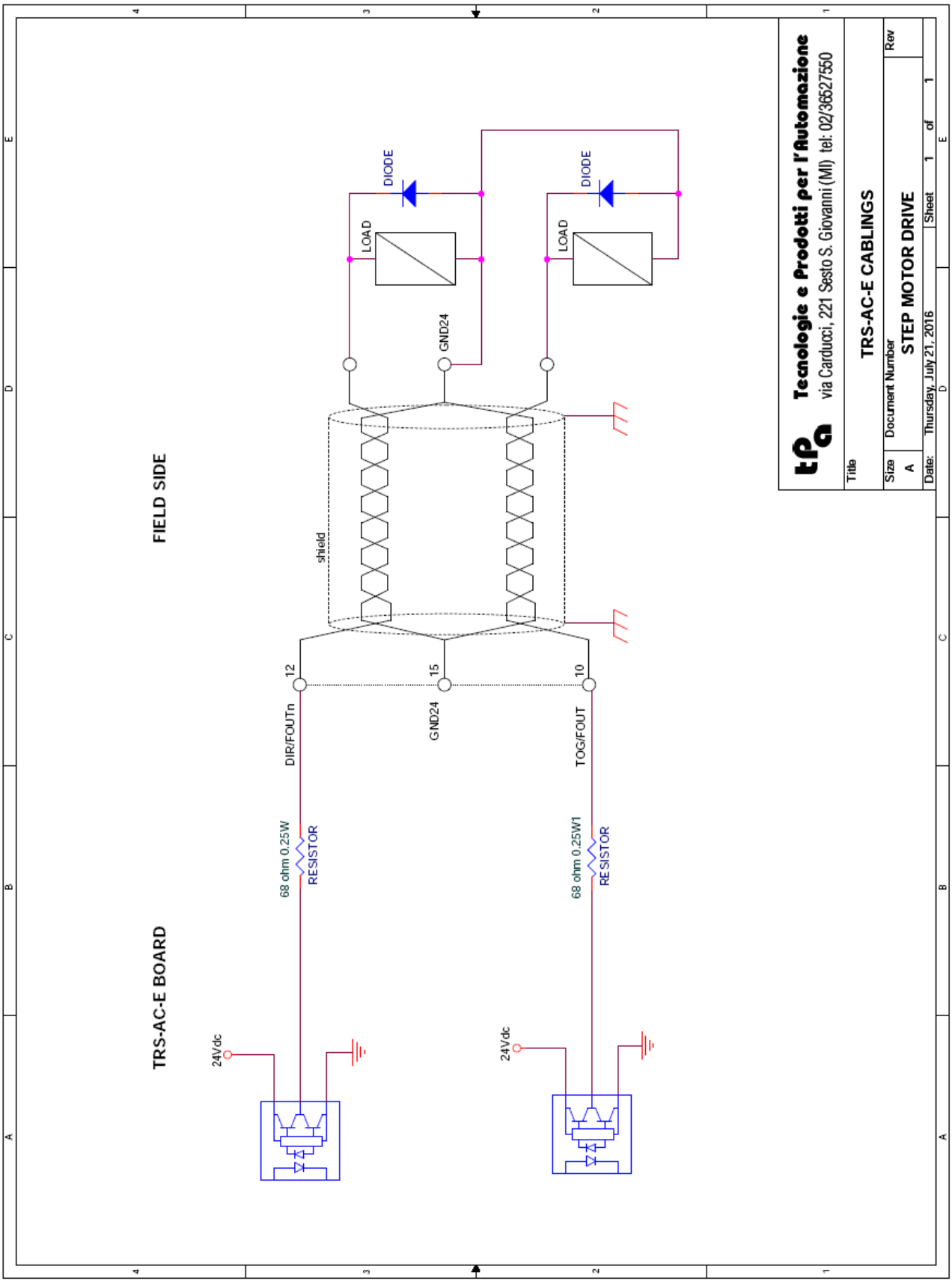


Warning: in a few instances you may need to balance the A, B, C channels using 2 equal resistances (half RA, RB, RC) to be installed both on the positive (FAX, FBX, FCX) and on the negative (FAX#, FBX#, FCX#) branch.


FIELD SIDE
TRS-AC-E BOARD
DIODE
DIODE
LOAD
LOAD
GND24
shield
12
15
10
DIR/FOUTn
GND24
TOG/FOUT
68 ohm 0.25W
RESISTOR
68 ohm 0.25W1
RESISTOR
24Vdc
24Vdc
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Date:
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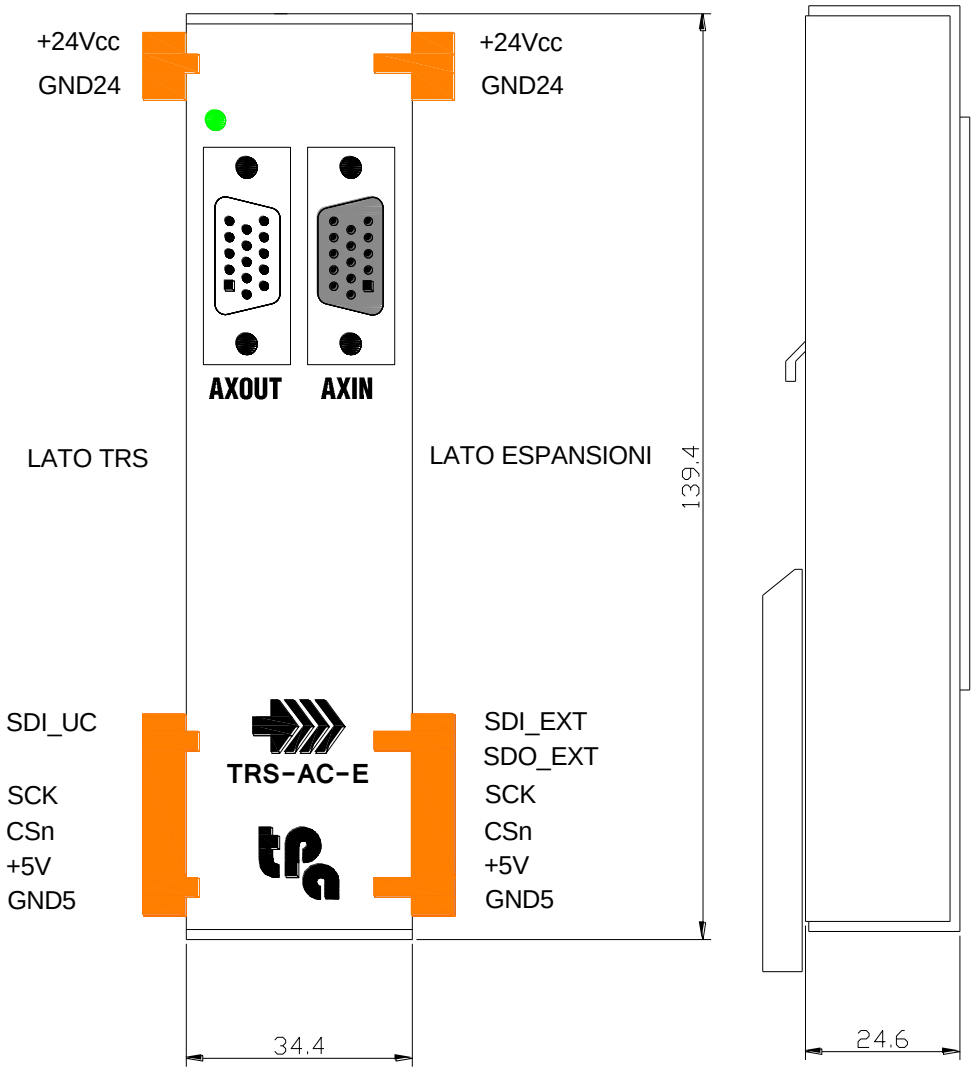
12 DIMENSIONS



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