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TR5

Operator Terminal

Hardware Manual
Ver. 2.00



1. INSTALLATION AND DIAGNOSTICS

1.1. Safety instructions



In order to have an installation in safety conditions, it is necessary to follow, besides the existing regulations, some simple rules:

- Metallic parts of the plant must be connected to earth.
- Control the external devices related to safety before effecting the plant working process check.
- Test and maintenance of the plant must always be done by qualified staff.

1.2. Instructions for the electromagnetic compatibility

The electromagnetic noises (EMI) can cause the bad functioning of this device or others located nearby, compromising the plant working. Therefore, it is necessary, during the installation, to take all precautions to limit the above mentioned noises produced by parts constituting the plant itself.

A correct connection of all devices to earth reduces the problems caused by EMI; in particular, it is important to carefully follow the regulations indicated in the here-under paragraphs.

1.3. Connections to earth

- Connect to earth all metallic parts of the units composing the plant.
- Avoid serial connections to earth; connect each unit to the main earth.
- The main earth bar must be connected to the metallic cabinet and to the general ground manhole.

1.4. Cables shielding

All cables for “D” connectors on TR5 must be copper shielded. It is possible, even if not recommended, especially for very long cables, to join all conductors of different connectors in a single shield, respecting the uniformity of the tension and current levels and the signal kinds.

If joints on shielded conductors are required, it will be necessary to limit the not twisted and not shielded cable length, joining the cable in the farthest point as possible from electrical interferences, such as motors, drivers, etc.

Alternatively, it is possible to place the joint inside a metallic box, which can be: connected to earth, but isolated from the shield connections of the two joined cables, or connected to the shield of the joined cables, isolated from earth.

The best configuration for the shielding functioning is to connect both ends of the cable to the protective covering of the two devices. In order to avoid the shield having currents circulation which could make it useless or even a noising source, the shield itself should not be used as an earth interconnection between the two devices and the equipotentiality of the two masses must be assured by special conveniently sized connections.

The connections of 24V power supply can be realized with unshielded cables.

2. General Characteristics

TR5 is an alphanumerical terminal with graphic display, to be used as an Operator interface for RT600 and ARP control cards; its main characteristics are :

- 128x64 dots STN LCD yellow reflective back lighted display with contrast regulation by software control



- 25 keys membrane keyboard, with 7 function keys and 7 leds, completely controllable through the user's program.
- It is possible to display up to 15 pre-set messages for each screen page, controlling the characters zoom x1, x2, x4.
- In the message definition it is possible to include special characters to display or modify the internal variables of the system and set the characters dimension.
- The TR5 terminal has a permanent memory for 250 messages formed by 16 characters; the messages are previously prepared in a ASCII file and transmitted to the terminal by the WinAxis applicative.
- Opto-isolated interconnecting CAN interface.
- Optional internal clock for date and hour displaying.
- 24Vcc/±20% power supply, absorption about 0.15A
- Embedded panel mounting with 5mm maximum depth; external dimension of the frontal panel: 192x96mm; dimension of the embedding window: 187x91mm; depth: 75mm, connectors not included.
- Protection: IP40 both from the frontal panel and from the rear one.

- For the monitor, keyboard and led control, refer to the software manual of the system connected to the TR5 terminal.
- List of the available characters:

32		53	5	74	J	95	_	116	t	137	ë
33	!	54	6	75	K	96	`	117	u	138	è
34	“	55	7	76	L	97	a	118	v	139	ï
35	#	56	8	77	M	98	b	119	w	140	î
36	\$	57	9	78	N	99	c	120	x	141	ì
37	%	58	:	79	O	100	d	121	y	142	Ä
38	&	59	;	80	P	101	e	122	z	143	Å
39	‘	60	<	81	Q	102	f	123	{	144	Ë
40	(	61	=	82	R	103	g	124	|	145	æ
41	)	62	>	83	S	104	h	125	}	146	Æ
42	*	63	?	84	T	105	i	126	~	147	ô
43	+	64	@	85	U	106	j	127		148	ö
44	,	65	A	86	V	107	k	128	Ç	149	ò
45	-	66	B	87	W	108	l	129	ü	150	û
46	.	67	C	88	X	109	m	130	è	151	ù
47	/	68	D	89	Y	110	n	131	â	152	ÿ
48	0	69	E	90	Z	111	o	132	ä	153	Ö
49	1	70	F	91	[	112	p	133	à	154	Ü
50	2	71	G	92	\	113	q	134	å		
51	3	72	H	93	]	114	r	135	ç		
52	4	73	I	94	^	115	s	136	ê		

3. Interfaces



Picture 1 – Connectors Position

3.1. Power Supply Connector

The TR5 terminal is 24Vcc supplied by the POWER connector, with the following pitch

Pin	Signal
1	+ 24 Volt
2	0 Volt
3	Earth Cable

Table 1 – Connector for power supply

- Nominal power supply : 24Vcc (limits 18-30V)
- Maximal absorption : <0.15A (internal restorable cut-out 0.3A)

3.2. CAN-BUS Connector

Each TR5 terminal has a D9 female port for the CAN BUS connection towards RT600 and ARP cards :

Pin XC9	Signal
1	<i>Not used</i>
2	CANL
3	Ground
4	<i>Not used</i>
5	<i>Not used</i>
6	Ground
7	CANH
8	<i>Not used</i>
9	+5V \pm 10% with 10 mA max. current

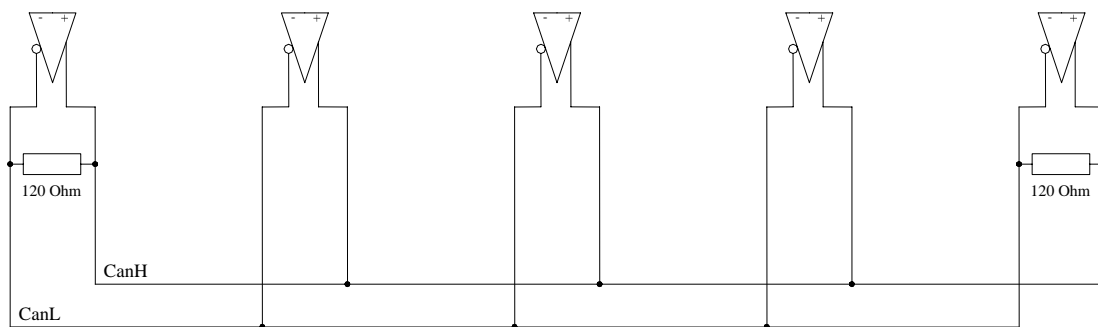
Table 2 – CAN Bus Connector

When two units are connected with CAN BUS, it is indispensable to connect two termination resistors to both side. If there are more than two devices, it will be necessary to remove all terminations from the intermediate devices, keeping the ones at the two ends of the line.

1° Card on the Bus

Intermediate Cards

Last Card on the Bus



Picture 2 –Terminations Connection Example on a CAN BUS line

In the previous picture it is shown the typical correct example of the connection of several devices through the CAN BUS line. In order to reduce interferences, it is recommended to follow this diagram. To add the termination resistor on TR5 terminal, please, refer to the here-under paragraph.

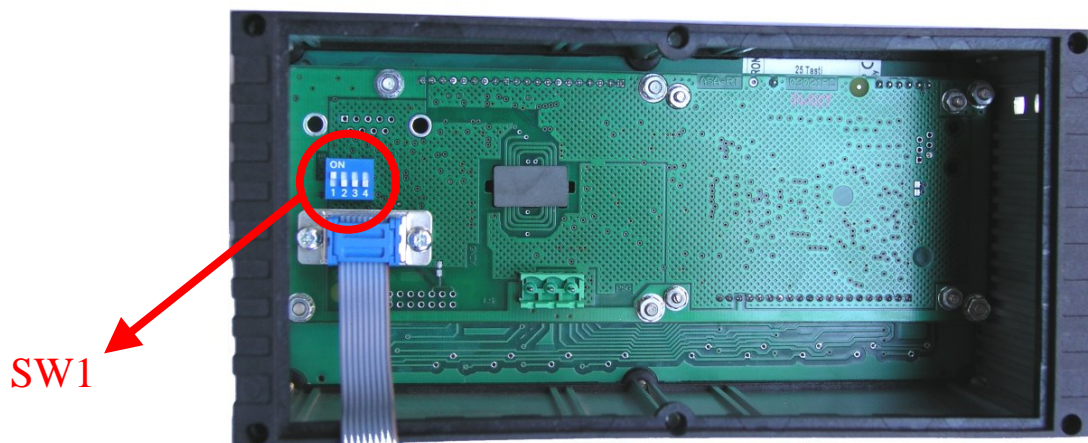
3.3. Configuration DIP-SWITCH

The card has several dip-switches for the CAN-bus port management.

	ON	OFF
SW 1.1	120 Ω resistance as termination on CAN BUS	No termination on CAN BUS
SW 1.2	reserved	
SW 1.3	reserved	
SW 1.4	reserved	

Table 3 – SW1 Dip-switch

NOTE: the dip-switches from 1.2 to 1.4 must always be in OFF position in order to allow the standard system functioning.



Picture 3 – Dip-switch position on the card



4. Local functions of the terminal

The terminal management is carried out by the user's program, which manages the displaying and the layout of messages and variables (see the software manual of the system connected to the TR5), and the LED status; however, there are some local parameters which allow the terminal functioning independently from the user's program.

When one of these functions is actuated, the user's messages aren't displayed any more and the terminal will visualise the specific screen page of the current function. As soon as the standard functioning is restored, the user's screen page will be shown again.

The TR5 local functions are here-under listed with the description of the corresponding operations; *each of these functions can be aborted by pressing the "ESC" key.*

By pressing the "Shift-Enter" keys, it is possible to edit the variables displayed by the user's program (only with level 1 or 2 passwords).

4.1. Shift-F1 : Setting

```
S E T T I N G
P A S S W O R D   L E V .   0

F 1 : E D I T   F 2 : R E S
```

In this menu it is possible to change the Password level. The default level when the device is switched on is 0. After pressing "F1" (Edit) key, it is possible to write the password (max. 4 characters). If the user's password has been edited, the program will pass to level 1; on the contrary, if the system password (505) has been edited, the program will pass to level 2. To insert a new user's password (Level 1) it is necessary to go through level 1 or 2, press "F3" (Modify) and enter a new password. To go back to level 0, press "F2" (Reset).

If level 1 is enabled, it is possible to edit only the variables displayed by the user's program, while with level 2 it is possible to edit parameters and variables by the Diagnostic menu.

4.2. Shift-F2 : Diagnostic

```
DIAGNOSTIC
1 General
2 Axis 1
3 Axis 2
4 Flags
5 Inputs

↓ ↑ :SEL 0..9 ESC
```

```
DIAGNOSTIC
6 Outputs
7 AxMov 1
8 AxMov 2
9 Variables
0 Status

↓ ↑ :SEL 0..9 ESC
```

In the Diagnostic environment, it is possible to choose which group of parameters/variables should be displayed, through the 0-9 keys :

- 1) General : general parameters of the system connected to the TR5. A two column window is visualised. The first column shows the parameter number (please, refer to the software manual of the system connected to TR5), the second one contains the parameter value. If level 2 of the password is enabled, it is possible to edit the parameters with “F1” (Edit) key.
- 2) Axis 1 : parameters of axis 1 of the system connected to TR5. The displaying and modifying procedures are the same as the previous window.
- 3) Axis 2 : as the previous window, for axis 2.
- 4) Flags : flags of the user and of the system connected to TR5. A window with three words (32 flags) is displayed. Flag number 1 is the first right on the first line; flag number 17 is the first right on the second line, and so on. If the flag is LO, a dot “.” is shown on the monitor. If the flag is HI, a “1” is visualised. If level 2 of the password is enabled, it is possible to change the selected flag status by pressing “F1” (Edit) and writing the required value, “.” or “1”.
- 5) Inputs : digital inputs of the system connected to TR5. The displaying is the same as the previous window. It is not possible to change the inputs value.
- 6) Outputs : digital outputs of the system connected to TR5. The displaying and modifying procedures are the same as the flags window.
- 7) AxMov1 : axis 1 status parameters of the system connected to TR5. The displaying is the same as the general parameters window. It is not possible to change the parameters value, which are continually updated by the system.
- 8) AxMov2 : as the previous window, for axis 2.



- 9) Variables : variables of the system connected to TR5. The displaying and modifying procedures are the same as the general parameters window.
0) Status : status of the system connected to TR5.

```
S T A T U S

H o s t   R e l   :       2 . 0 0
E r r o r       :       1 5
W a r n i n g   :       0
A x   N b r     :       0
S t a t u s     :       S t o p
                  ( E S C )
```

- Host Rel : firmware version of the system connected to TR5.
Error : error code of the system (see the software manual of the system connected to TR5).
Warning : warning code of the system (see the software manual of the system connected to TR5).
Ax Nbr : axis number where the error or warning occurred.
Status : current status of the system connected to TR5 (Stop, Break, Go).

4.3. Shift-F3 : Setup

```
S E T U P

C O N T R A S T :   1 7 3
B A U D R A T E :   1 2 5
I D   T R 5     :       2
I D   H o s t   :       1

↓ ↑ : S E L   ^ ↓ ^ ↑ : C H G
```

- Contrast : display contrast selection
Baudrate : CAN-bus baudrate selection (125, 250, 500, 1000).
ID TR5 : node address on CAN-bus of TR5 (0-255)
ID Host : node address on CAN-bus of the system connected to TR5 (0-255).

To go through a parameter to another, use the arrow keys; in order to change the selected parameter, press “Shift” + arrow key.

All parameters, a part from the Contrast one, are selectable ONLY with level 2 password.

4.4.Shift-F4 : Messages

```

M E S S A G E S   0 0 1 - 0 0 5
M e s s a g e           1
M e s s a g e       2   #
M e s s a g e       3   # . #
M e s s a g e       4   # # . # #
M e s s a g e       5

                ↓ ↑ : S E L

```

In this window it is possible to visualise all messages (five messages each time), recorded on TR5.

4.5.Shift-FA : Edit Messages

```

M E S S A G E S   0 0 1 - 0 0 5
M e s s a g e           1
M e s s a g e       2   #
M e s s a g e       3   # . #
M e s s a g e       4   # # . # #
M e s s a g e       5

                F A   F B   ↓ ↑ : S E L

```

It is possible to change the first five messages recorded on the terminal, by acting on the above shown screen page. By the arrow keys the message is selected and by FA and FB keys the character to be changed is pointed out.

4.6.Shift-FB : Edit Clock

```

16 : 4 4 : 3 8
3 0 / 1 1 / 0 5

                F A   F B   ↓ ↑ : S E L

```

This window allows to read and set the internal clock. The displayed format for the date is “DD/MM/YY”, while for the hour is “HH:MM:SS”. To carry out the changes, please follow the instruction of the previous window. The decimal point of the alphanumeric keyboard allows to go through the “MM/DD/YY” format to visualise the date.



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