Products Tde Macno

User's Manual

VX 5000 PLC

Cod. MP00001E00 V_1.5

BDF DIGITAL

ECS TDE MACNO

INDEX

1. GENERAL INFORMATION ABOUT SAFETY

1.1. WARNINGS

- Before installing and using the equipment, read the manual carefully.
- We decline any responsibility if the equipment is used incorrectly in ways other than those listed in the manual.
- No change or operation not specified in the manual is allowed without express authorisation from the manufacturer, and it shall always be carried out by qualified staff. In case of default, the manufacturer declines any responsibility as regards possible consequences, and the guarantee shall be forfeited.
- Commissioning and installation shall be exclusively entrusted to qualified staff, which is responsible for compliance with the safety standards imposed by the regulations in force.
- In the specific case of the equipment in use, attention should be paid to safety norms applicable to accident prevention. Power must be disconnected while the equipment is being installed, cabled and opened.
- The equipment and converters shall be installed in a shockproof container with an IP protection degree according to standard.
- Place the equipment in such a way that maintenance is facilitated and that there is no risk of interference with moving parts.
- Make sure that sufficient ventilation is always guaranteed to reduce the temperatures generated inside the system.
- In the event of a fire close to the equipment, do not use water-based devices for fire extinguishing.
- Always prevent water or other fluids from penetrating the equipment.
- Before performing any operation inside the equipment, make sure that the power is disconnected.

2. TECHNICAL DATA

2.1. TECHNICAL FEATURES OF THE VX5000/EU SYSTEM

Model	VX5000-IO24	VX5000-IO48
Power	24Vcc +-20% 18W	24Vcc +-20% 18W
Process. X86 800MHz	YES	YES
Math coprocessor	YES	YES
Disk On Module	1GB	1GB
Job data FRAM	64Kb/2Mb	64Kb/2Mb
Ethernet/LAN	10/100	10/100
Serial RS485 optoisolated	1	1
Serial RS232	1	1
USB Host	1	1
USB Host optional	2	2
CAN optoisolated	1	1
Second CANBUS expansion	optional	optional
Setup BIOS buffer battery	CR2032	CR2032
Digital inputs sink optoisolated type	24	48
Digital outputs source optoisolated type	24 of 2A 14 relay interface	48 of 2A 14 relay interface
ADC main	14 bit	14 bit
DAC main	12 bit (14bit in oversampling)	12 bit (14 bit in oversampling)
Input Thermocouples J-K/PT100/0-10V	16	16
Internal cold joints	YES	YES
Power generators for PT100	2	2
Ref. power 10V/10mA	2	2
ADC auxiliary	12 bit	12 bit
Input power/0-5V/0-10V aux.	4	4
DAC auxiliary	12 bit	12 bit
Analog outputs 0-10V/-+10V aux.	4	4
PWM power-adjusted outputs	4 of 2A	4 of 2A
Dither control	Yes	Yes
Encoder incr. input with zero top	3 optoisolated	3 optoisolated
Inputs FC zero	Yes	Yes
Encoder input type	Push-pull/line driver/sink/source	Push-pull/line driver/sink/source
Size	330x190	330x190

2.2. TECHNICAL FEATURES OF THE RELAY EXPANSION

Power	24Vcc +-20%
Outputs	14
Max power on contacts	2A resistive load
Closing cycles	> 5 x 10^6

3. INSTALLATION

3.1. INSTALLATION INSTRUCTIONS

The regular operation and life of the equipment depend on keeping the room temperature within the allowed range between 0°C and +50 °C.
The temperature should therefore be checked on a regular basis.
It is necessary to make sure that the relative air humidity does not exceed 90% without any condensation formed.

VX5000 should be installed in a well ventilated place which is not dusty. Avoid environments with aggressive gases because the presence of abrasive powders, atomized oil or brackish air could jeopardise the life of the equipment.

Any other equipment should be installed at sufficient distance from the VX5000 system to make sure that no metal scrap from piercing or electric cables drops into the latter. In no case shall the VX5000 system be assembled close to easily flammable materials.

Vx5000 shall never be installed in areas where there are strong vibrations; if the equipment on which it is installed is of the moving kind, arrangements should be made for suitable vibration dampening systems.

4. I/O CARD: CONNECTIONS

4.1. CONNECTOR LAYOUT

The layout of the I/O/EU 24IO card looks like two overlapping cards: the I/O card and the PLC card. The connection description will focus first on the I/O card then on the PLC card.

4.1.1. I/O CARD CONNECTORS

The distribution of connections on the I/O card is as follows:

a) General card power (X3)
b) 16 analog inputs (XAI1-XAI4)
c) 2 voltage outputs for PT100 (X1,X2)
d) 3 encoder inputs with the relevant power (XE1-XE3)
e) 24 digital inputs (XDI1-XDI3)
f) 24 digital outputs (XDO1,XDO2)
g) 14 relay card outputs (XREL)
h) 4 PWM and analog outputs (X5-X6)
i) 2 outputs10V/10mA (CN1)

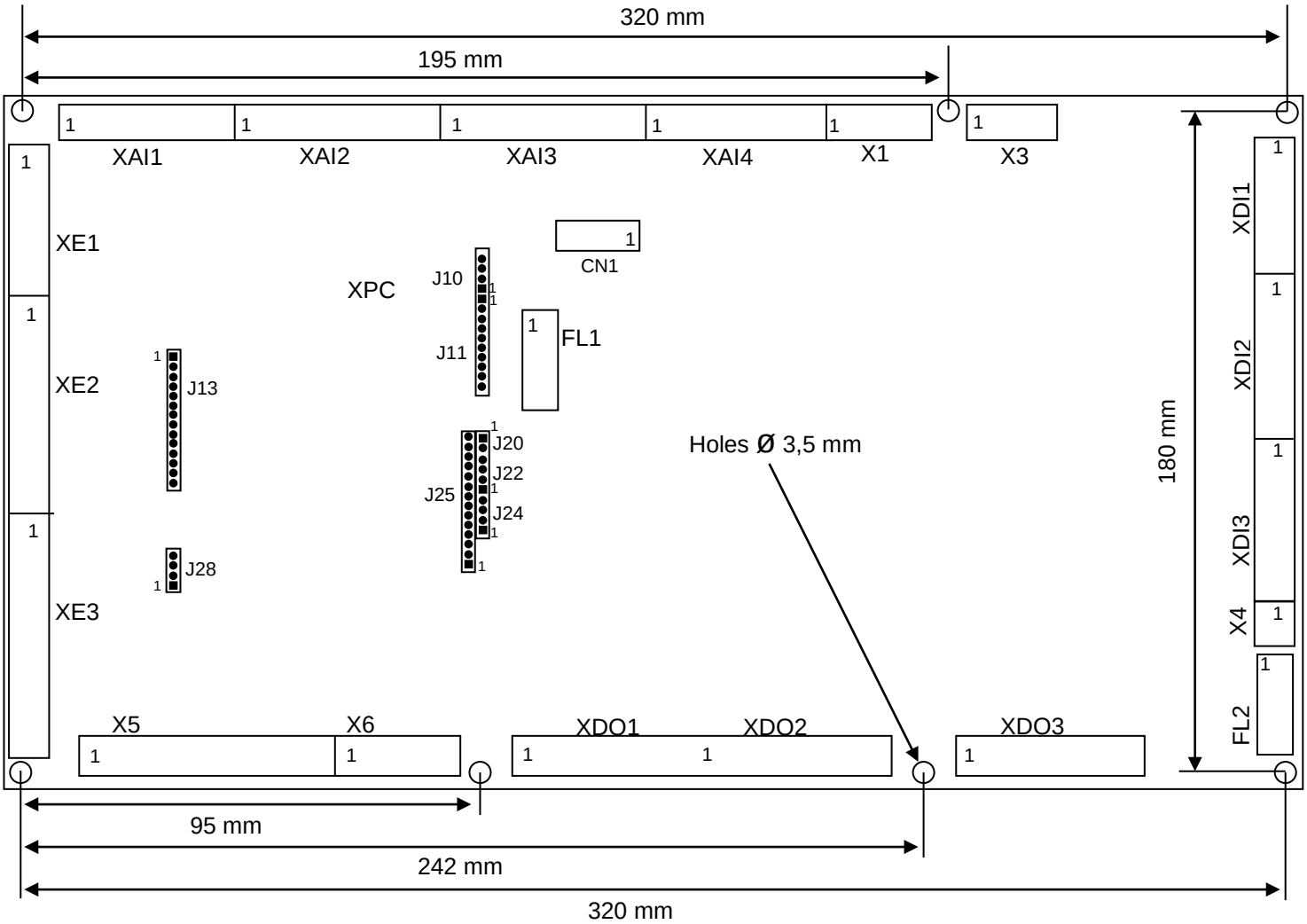

Fig. 1

4.1.2. X3 : MAIN POWER SUPPLY CONNECTOR

Pin	Description
1	GROUND
2	0Vcc
3	+24Vcc +-20%

4.1.3. ANALOG INPUTS CONNECTOR

4.1.4. XAI1 : THERMOCOUPLE 1-4 CONNECTORS

Pin	Description
1	Thermocouple 1 +
2	Thermocouple 1 -
3	Thermocouple 2 +
4	Thermocouple 2 -
5	Thermocouple 3 +
6	Thermocouple 3 -
7	Thermocouple 4 +
8	Thermocouple 4 -

4.1.5. XAI2 : THERMOCOUPLE 5-8 AND PT100 1-2 CONNECTORS

Pin	Description
1	Thermocouple 5 +
2	Thermocouple 5 -
3	Thermocouple 6 +
4	Thermocouple 6 -
5	Internal thermal probe input +
6	Internal thermal probe input -
7	+ PT100 2 (GND)
8	- PT100 2 – (–1mA)

4.1.6. XAI3 : GENERIC ANALOG INPUT 1-4 CONNECTORS

Pin	Description
1	Generic analog input 1 +
2	Generic analog input 1 -
3	Generic analog input 2 +
4	Generic analog input 2 -
5	Generic analog input 3 +
6	Generic analog input 3 -
7	Generic analog input 4 +
8	Generic analog input 4 -

4.1.7. XAI4 : GENERIC ANALOG INPUT 5-8 CONNECTORS

Pin	Description
1	Generic analog input 5 +
2	Generic analog input 5 -
3	Generic analog input 6 +
4	Generic analog input 6 -
5	Generic analog input 7 +
6	Generic analog input 7 -
7	Generic analog input 8 +
8	Generic analog input 8 -

4.1.8. X1: PWR - PT100 OR INTERNAL COLD JOINT CONNECTORS

Pin	Name	Description
1	PWRI1	Internal thermal probe output +
2	AGE	Internal thermal probe output -
3	PWRI2	- Second voltage output PT100 (-1mA)
4	AGE	+ Second voltage output PT100 (GND)

4.1.9. CN1 : 10V REFERENCE VOLTAGE CONNECTOR

This connector can be used to power potentiometers or anything else that needs precision voltage but low absorption (max.10mA) per channel.

Pin	Description
1	+10VREF1
2	AGE
3	+10VREF2
4	AGE

4.1.10. ENCODER 1 XE1, ENCODER 2 XE2, ENCODER 3 XE3 INPUT CONNECTIONS

Pin	Description
1	+12Vcc power encoder
2	DLS mechanical zero +
3	DLS mechanical zero -
4	Top zero encoder +
5	Top zero encoder -
6	Channel A +
7	Channel A –
8	Channel B +
9	Channel B –
10	0Vcc power encoder

4.1.11. DIGITAL INPUT CONNECTORS

XDI1

Pin	Description
1	Input 1
2	Input 2
3	Input 3
4	Input 4
5	Input 5
6	Input 6
7	Input 7
8	Input 8

XDI2

Pin	Description
1	Input 9
2	Input 10
3	Input 11
4	Input 12
5	Input 13
6	Input 14
7	Input 15
8	Input 16

XDI3

Pin	Description
1	Input 17
2	Input 18

3	Input 19
4	Input 20
5	Input 21
6	Input 22
7	Input 23
8	Input 24

X4

Pin	Description
1	0VP digital inputs
2	0VP digital inputs

N.B. IT IS ADVISABLE TO CONNECT THE 0 VP OF DIGITAL INPUTS AND OUTPUTS BY MEANS OF TWO SEPARATE WIRES.

4.1.12. X5: POWER SUPPLY AND PWM

Pin	Description
1	+24VP
2	+24VP
3	0VP
4	0VP
5	PWM 1 outputs
6	PWM 2 outputs
7	PWM 3 outputs
8	PWM 4 outputs

IMPORTANT folllow the connection indicated to power the valves

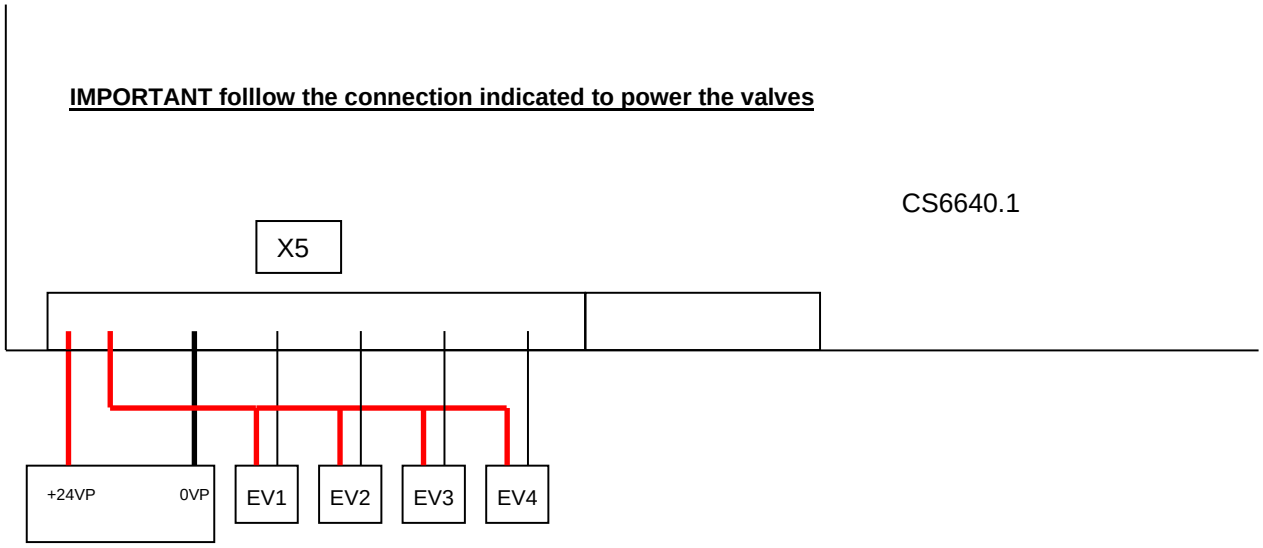

Fig. 2

4.1.13. X6: ANALOG OUTPUT

Pin	Description
1	Analog GND
2	Analog 1 outputs
3	Analog 2 outputs
4	Analog 3 outputs
5	Analog 4 outputs
6	Analog GND

4.1.14. DIGITAL OUTPUTS CONNECTOR

XDO1

Pin	Description
1	+24VP0
2	Output 1
3	Output 2
4	Output 3
5	Output 4
6	+24VP1
7	Output 5
8	Output 6
9	Output 7
10	Output 8

XDO2

Pin	Description
1	+24VP2
2	Output 9
3	Output 10
4	Output 11
5	Output 12
6	+24VP3
7	Output 13
8	Output 14
9	Output 15
10	Output 16

XD03

Pin	Description
1	+24VP4
2	Output 17
3	Output 18
4	Output 19
5	Output 20
6	+24VP5
7	Output 21
8	Output 22
9	Output 23
10	Output 24

4.2. PLC CARD CONNECTIONS

The PLC card assembled overlapping the I/O card includes the following connectors:

1) Ethernet LAN (CN17)
2) Canbus (CN19)
3) Serial RS485 4 wires (CN20)
4) Serial RS232 (CN18)
5) 4 analog inputs 0-5V for potentiometers or 0-10V generic inputs (CN7)
6) 4 analog outputs 0-10 or +-10V (CN2)
7) IDE connector for Disk On Module (CN6)
8) Canbus expansion connector (CN8)
9) Connector USB-1 (CN21)
10) Expansion connector USB-2 and USB-3 (CN15)

The connectors LAN,USB-1,IDE are not documented and reference should be made to the standard documentation. No details are provided about the CN8 CanBus expansion connector because this connector is used exclusively by TDEMACNO S.p.A.

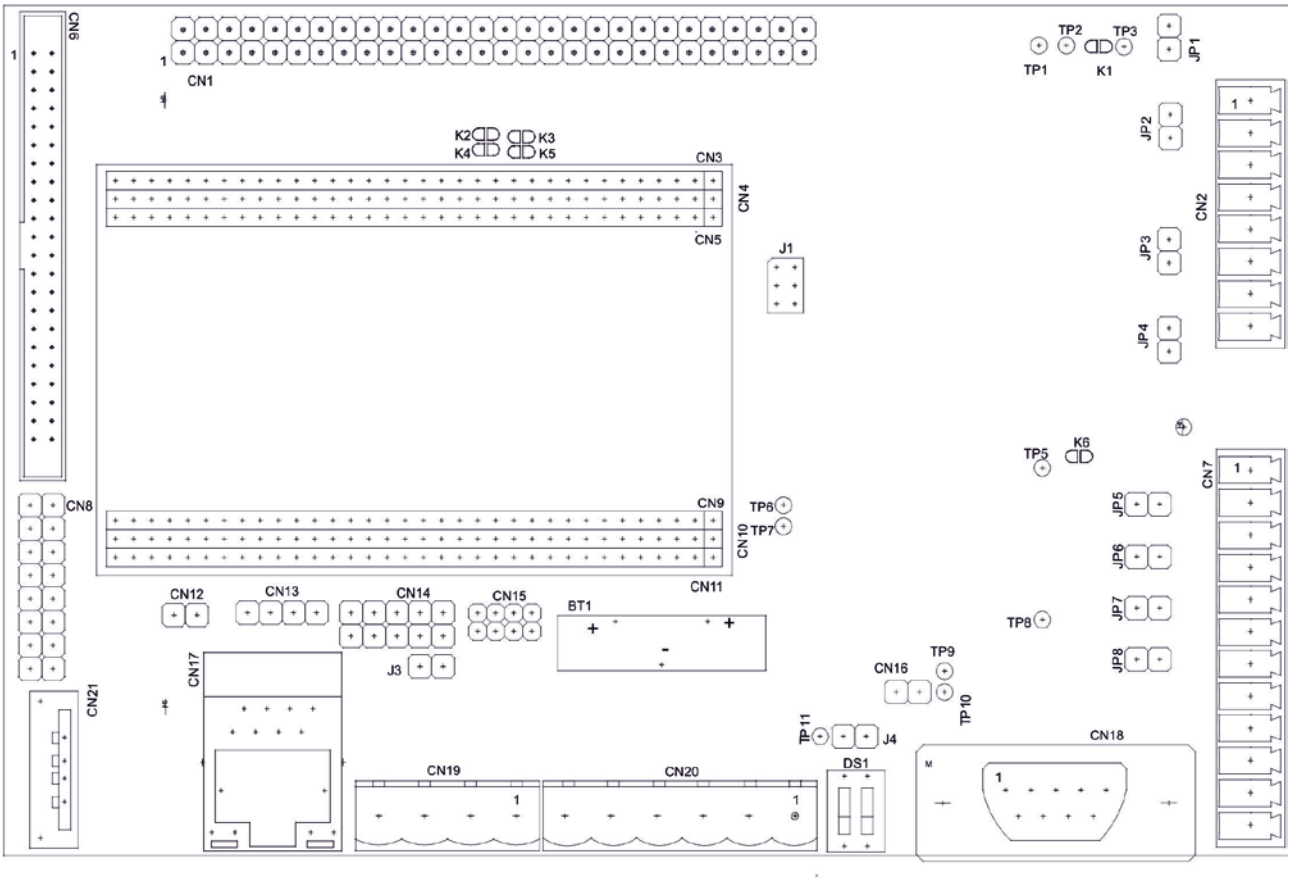

Fig. 3

4.2.1. CANBUS (CN19)

Pin	Description
1	CAN-H
2	CAN-L
3	0VExt.
4	GROUND

4.2.2. SERIAL RS485 4 WIRES (CN20)

Pin	Description
1	GND
2	TX+
3	TX-
4	RX+
5	RX-
6	0VExt.

4.2.3. SERIAL RS232 (CN18)

Pin	Description
1	n.c.
2	RX
3	TX
4	n.c.
5	0VInt
6	n.c.
7	n.c.
8	n.c.
9	n.c.

4.2.4. FOUR ANALOG INPUTS FOR POTENTIOMETERS OR GENERIC 0-10V (CN7)

The connection structure of these four analog inputs is designed for the direct connection of potentiometers and suitable reference power is provided for high precision but low voltage. The inputs can be set at 0-5V for potentiometer or 0-10V for generic inputs; this choice is made through the jumpers (see jumper and dipswitch chapter).

Pin	Description
1	+POT-VREF (5V)
2	Analog Input 1
3	0VExt
4	+POT-VREF (5V)
5	Analog Input 2
6	0VExt
7	+POT-VREF (5V)
8	Analog Input 3
9	0VExt
10	+POT-VREF (5V)
11	Analog Input 4
12	0VExt

4.2.5. FOUR ANALOG OUTPUTS 0-10V/+-10V (CN2)

For the selection of the 0-10V or +-10V range see the jumper and dipswitch chapter

Pin	Description
1	Analog Output 1
2	0VExt
3	Analog Output 2
4	0VExt
5	Analog Output 3
6	0VExt
7	Analog Output 4
8	0VExt

4.2.6. EXPANSION CONNECTOR USB-2 AND USB-3 (CN15)

This connector directly carries the two USB gates which can be used by means of the appropriate cables. **The USB gates on the card can support a maximum overall load amounting to 0.16A.**

Pin	Description
1	+5V(max 160mA overall)
2	0VInt
3	USB2-
4	USB3-
5	USB2+
6	USB3+
7	0VInt
8	+5V(max 160mA overall)

4.3. JUMPER AND DIPSWITCH

Position	Description	Function
J3	CANBUS terminator	open=disconnecte closed=connected
JP5	Range auxiliary analog input 4	open=0-5V closed=0-10V
JP6	Range auxiliary analog input 3	open=0-5V closed=0-10V
JP7	Range auxiliary analog input 2	open=0-5V closed=0-10V
JP8	Range auxiliary analog input 1	open =0-5V closed=0-10V
JP1	Range auxiliary analog output 1	open =0-10V closed=+-10V
JP2	Range auxiliary analog output 2	open=0-10V closed=+-10V
JP3	Range auxiliary analog output 3	open=0-10V closed=+-10V
JP4	Range auxiliary analog output 4	open=0-10V closed=+-10V
J4	RS485 tx data re-reading	open=enabled closed=disabled
DS1	RS485 PullUp/PullDown/Terminator	open=disabled closed=enabled
CN16	RS485 Enabling Transmission	open=only on character from TX closed=always
CN12	BIOS Consolle on COM1	closed=enabled open=disabled

5. RELAY CARD: CONNECTIONS

5.1. CONNECTOR LAYOUT

The CS6632 card appears as follows

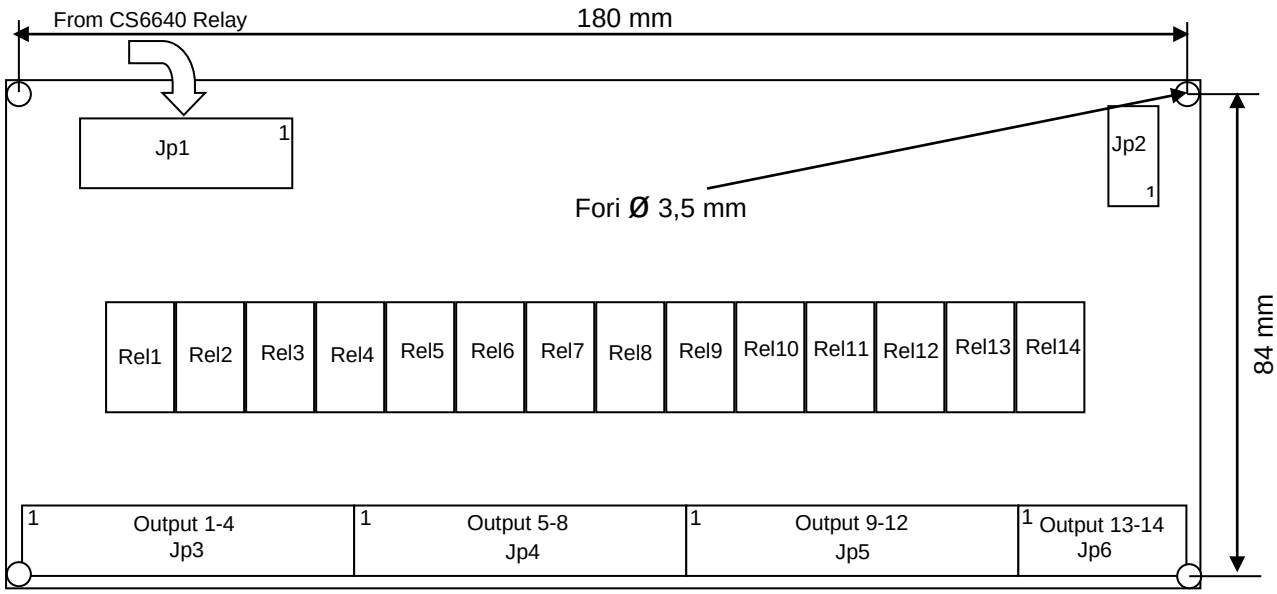

Fig. 4

5.1.1. CONNECTOR JP1

Connector Jp1 is connected by a suitable flat-cable to the CS6640 card and carries commands to the relay.

Pin	Description
1	Piloting relay 1
2	Piloting relay 2
3	Piloting relay 3
4	Piloting relay 4
5	Piloting relay 5
6	Piloting relay 6
7	Piloting relay 7
8	Piloting relay 8
9	Piloting relay 9
10	Piloting relay 10
11	Piloting relay 11
12	Piloting relay 12
13	Piloting relay 13
14	Piloting relay 14
15	+Vrel
16	+Vrel

5.1.2. CONNECTOR JP2

Power for relay spools

Pin	Description
1	+VRel
2	0VRel

5.1.3. CONNECTOR JP3

Output connector. Carries directly the normally open connector of the relevant relay.

Pin	Description
1	Com. relay 1
2	N.O. relay 1
3	Com. relay 2
4	N.O. relay 2
5	Com. relay 3
6	N.O. relay 3
7	Com. relay 4
8	N.O. relay 4

5.1.4. CONNECTOR JP4

Output connector. Directly restores the normally open connector of the relevant relay.

Pin	Description
1	Com. relay 5
2	N.O. relay 5
3	Com. relay 6
4	N.O. relay 6
5	Com. relay 7
6	N.O. relay 7
7	Com. relay 8
8	N.O. relay 8

5.1.5. CONNECTOR JP5

Output connector. Directly restores the normally open connector of the relevant relay.

Pin	Description
1	Com. relay 9
2	N.O. relay 9
3	Com. relay 10
4	N.O. relay 10
5	Com. relay 11
6	N.O. relay 11
7	Com. relay 12
8	N.O. relay 12

5.1.6. CONNECTOR JP6

Output connector. Directly restores the normally open connector of the relevant relay.

Pin	Description
1	Com. relay 13
2	N.O. relay 13
3	Com. relay 14
4	N.O. relay 14

6. ANTI-DISTURBANCE MEASURES

Electric or electronic equipment can mutually affect each other due to the network connections or to other metal connections between them. In order to reduce to a minimum or to eliminate this mutual interference it is necessary to make sure that the system is correctly installed, possibly with anti-disturbance measures being taken.

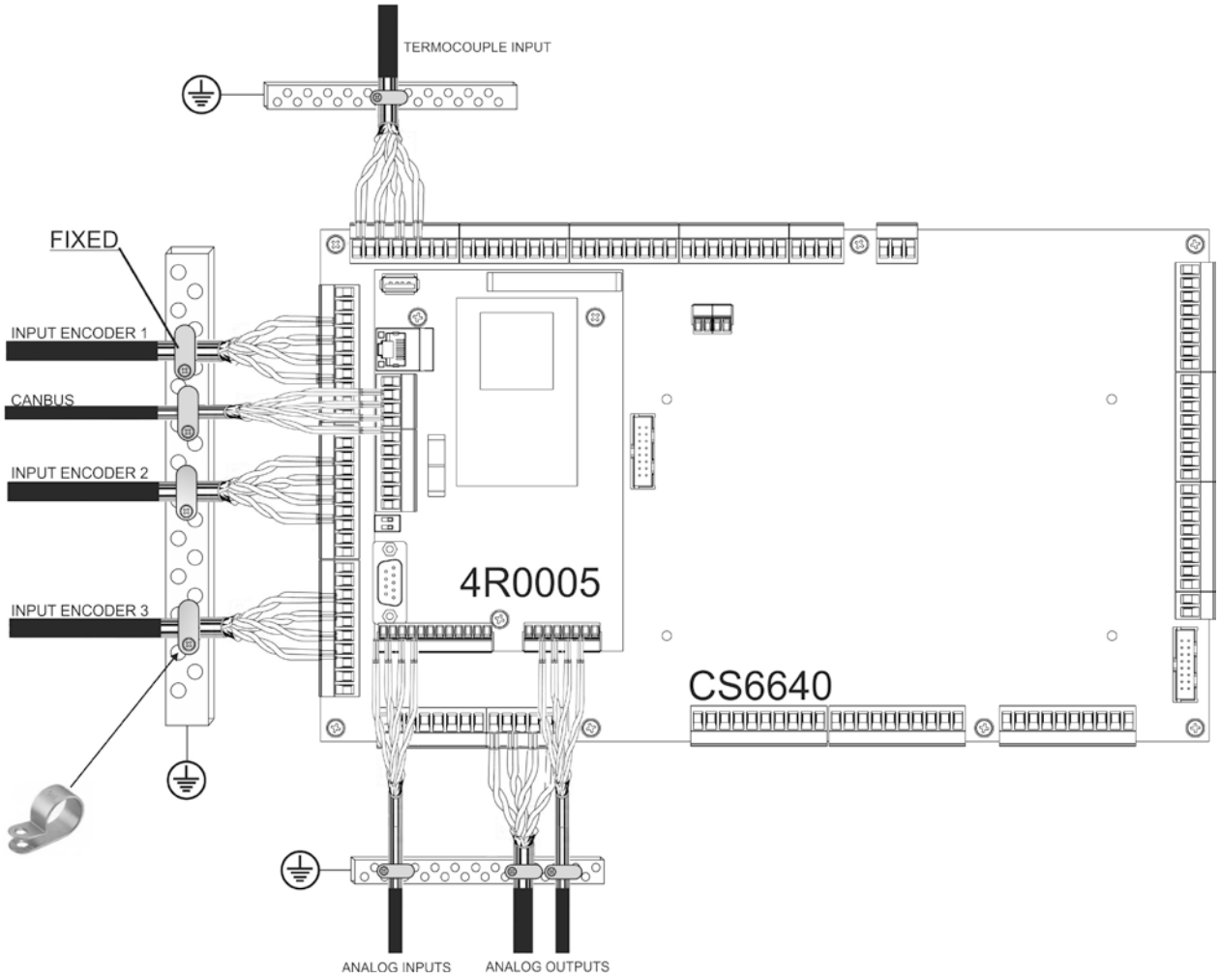

Fig. 5

The following notices refer to a power network without disturbances. If the network is disturbed, other measures need to be taken to reduce any disturbance.
In these cases it is not possible to give general advice and, if the anti-disturbance measures should not result in the desired outcome, please contact TDE MACNO.

- Make sure that all the equipment in the cabinet is properly connected to the earth bar using short cables with a star connection. It is particularly important to make sure that any control equipment connected to the system, for example drivers, are connected to the ground with short cables.
- The system needs to be fixed with indented screws and washers to guarantee a proper electric connection between the inside masses and the metal support connected to the earth of the switchboard; if necessary remove the paint to ensure a good contact.
- For thermocouple connections, PT100, analog inputs and encoder use **only** screened cables and connect the screening to the earth on both sides. The best screen connection to the earth is a small band wrapped around the screen fixed directly to the switchboard mechanics.
- Keep the connection cables of the PWM outputs distant and separate from control cables like thermoregulations.
- Lay the control cables at a distance of at least 10 cm from any parallel power cables. Also in this case it is advisable to use a separate and earthed metal raceway. If the control cables were to cross with the power cables, keep a crossing angle of 90°C.
- If the RC or flywheel diode units for the contactor spools, relays and other electromechanical switches are installed in the same cabinet as the VX5000, they need to be assembled directly on the connections of the spools.
- Connect all the external control, measurement and adjustment systems using screened cables.
- Cables through which disturbances may spread need to be laid separately and distant from the control cables.

7. BLOCK DIAGRAM VX5000/EU

The VX5000/EU system consists of two standard cards and an optional one. The cards are:

a) 4R50001 – interface card with the SOM module
b) CS6640 – interface card with the external I/O
c) CS6641 – digital I/O expansion card (optional)

7.1. 4R0005.2 – BLOCK DIAGRAM INTERFACE CARD

1) System On Module x86 800MHz
2) Internal CPLD: interfaccia da ISA Bus a SPI interna a 24bit
3) Internal CPLD1: Interface from SPI to the external analog section of the CPLD
4) Internal CPLD2: Complete encoder input management, with direction discriminator and reset counter circuit
5) Opto-isolated interface for the analog section
6) Auxiliary ADC to read potentiometric inputs or auxiliary inputs
7) Primary ADC: the signals come from the CS6640 card to the 16 channels found on the card
8) Primary DAC: it is connected with the CS6640 to the analog output amplification circuits and to the PWM circuits
9) Auxiliary DAC: manages the four auxiliary analog outputs

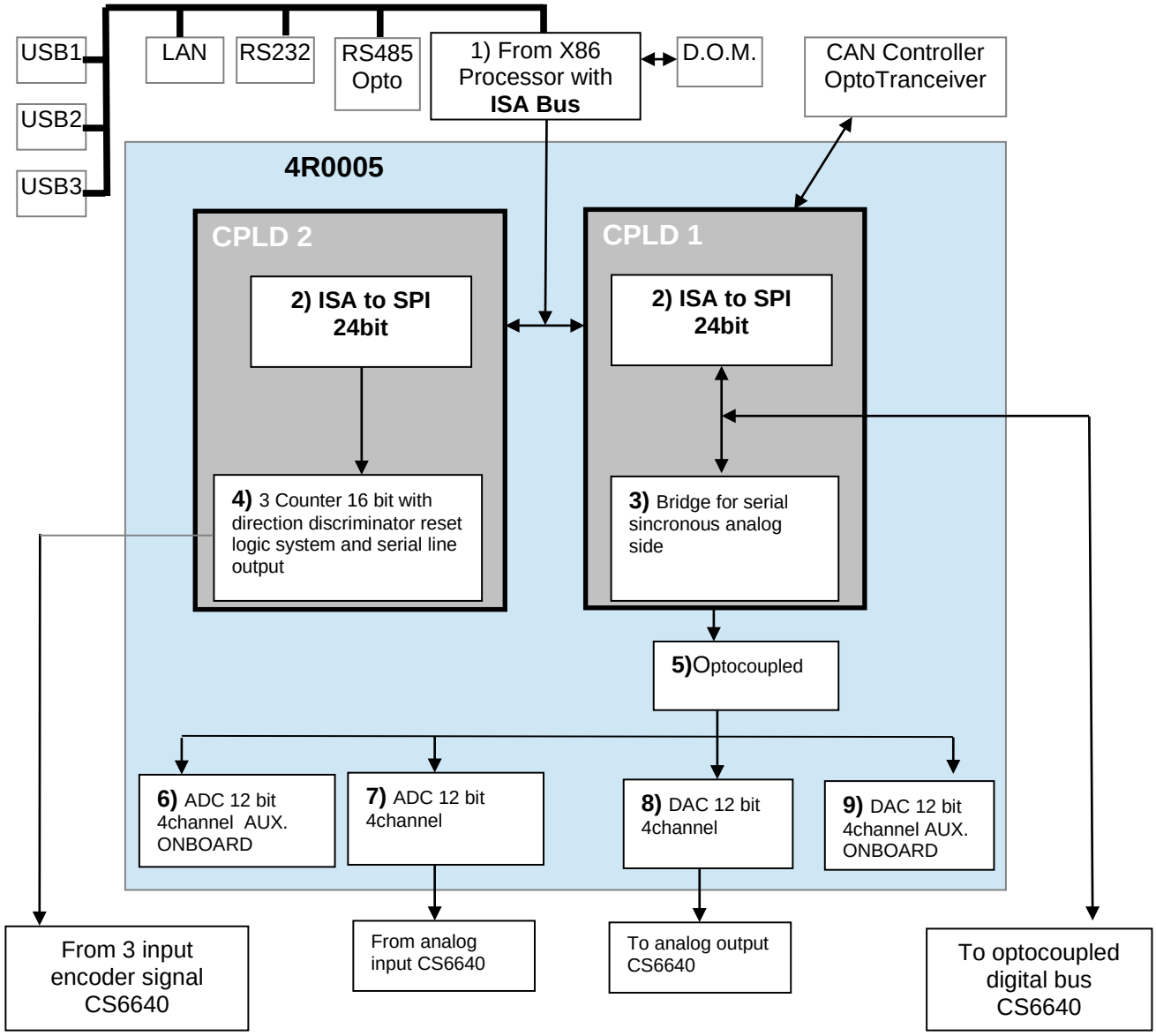

Fig. 6

7.2. CS6640 – BLOCK DIAGRAM I/O CARD

The card is divided into 8 areas:

a) Power input card
b) Synchronous serial for digital I/O
c) 24 digital inputs
d) 24 digital outputs
e) Analog inputs: 10 termocoppie, 2 PT100, 4 generic inputs
f) 2 power generators for PT100
g) 4 PWM or analog outputs
h) 3 encoder inputs

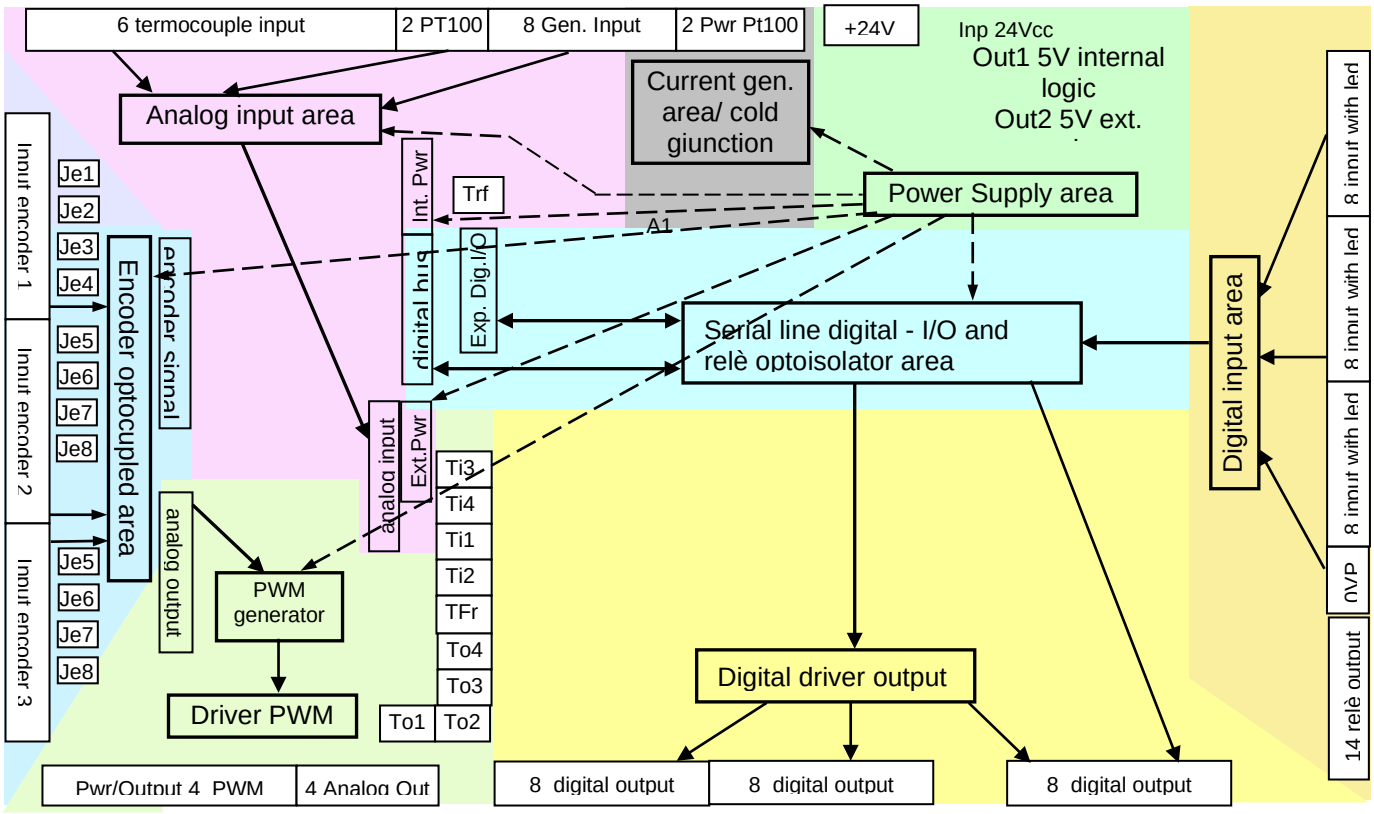

Fig. 7

7.2.1. POWER SUPPLY

As you can see, the power connections are dashed and supply only some sections of the card; the other areas such as PWM driver, digital inputs and outputs receive them from the relevant connector. The power is of the switching fly-back type with 24Vcc+-20% input and provides four power inputs galvanically separated one from the other. The output voltages are:

1) +5V internal: powers the digital synchronous serial section, the FPGA and the differential interface to the PC. It supplies a maximum of 0.5A
2) +12 and –12 external: powers the whole input and output analog section and the encoders, supplying 0.2A max per branch
3) +5V external: powers the DAC, the ADC and the opto-isolators of the analog synchronous serial, supplying a maximum of 0.2A

7.2.2. SYNCHRONOUS SERIAL DIGITAL I /O

The system consists of a series of output shift-registers in cascade one with the other, at the end of which there is the expansion connector before closing the loop with input shift-registers. This circuit also includes the opto-isolators of the digital I/O. The output cascade consists of three bytes for 24V digital outputs and two bytes for the 14 relay outputs. The input cascade, on the other hand, consists of only three bytes. There is also a buffer for the possible expansion of the cascade and it is advisable not to assemble more than one digital expansion card.

7.2.3. DIGITAL INPUTS

In the area indicated there are about 1mSec filters for each input and the visualisation leds. The input circuit is of the sink type as shown in the figure.

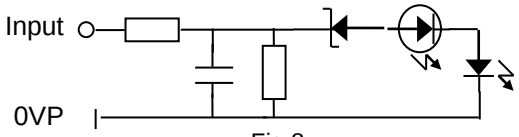

Fig.8

7.2.4. DIGITAL OUTPUTS

The output stages are of the source type as shown in the figure.

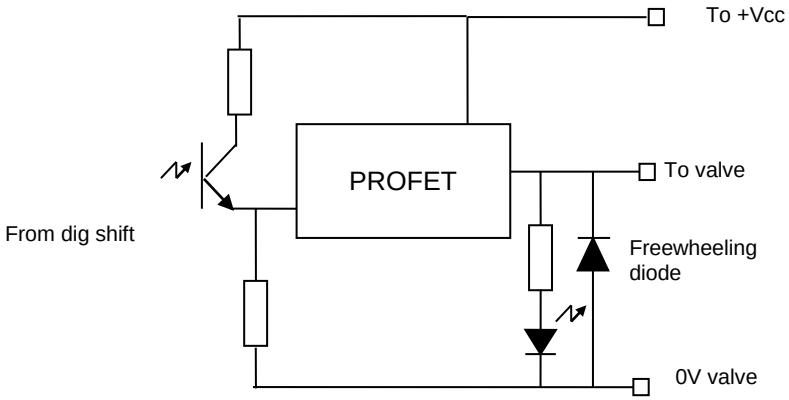

Fig. 9

There are twenty-four 2A outputs. The output driver has a power limitation device, overheating block, short-circuit protection and ESD protection.

7.2.5. ANALOG INPUTS

The card can take up to 16 analog inputs of the differential type divided into four groups. Each group consists of an analog multiplexer and a differential amplifier.

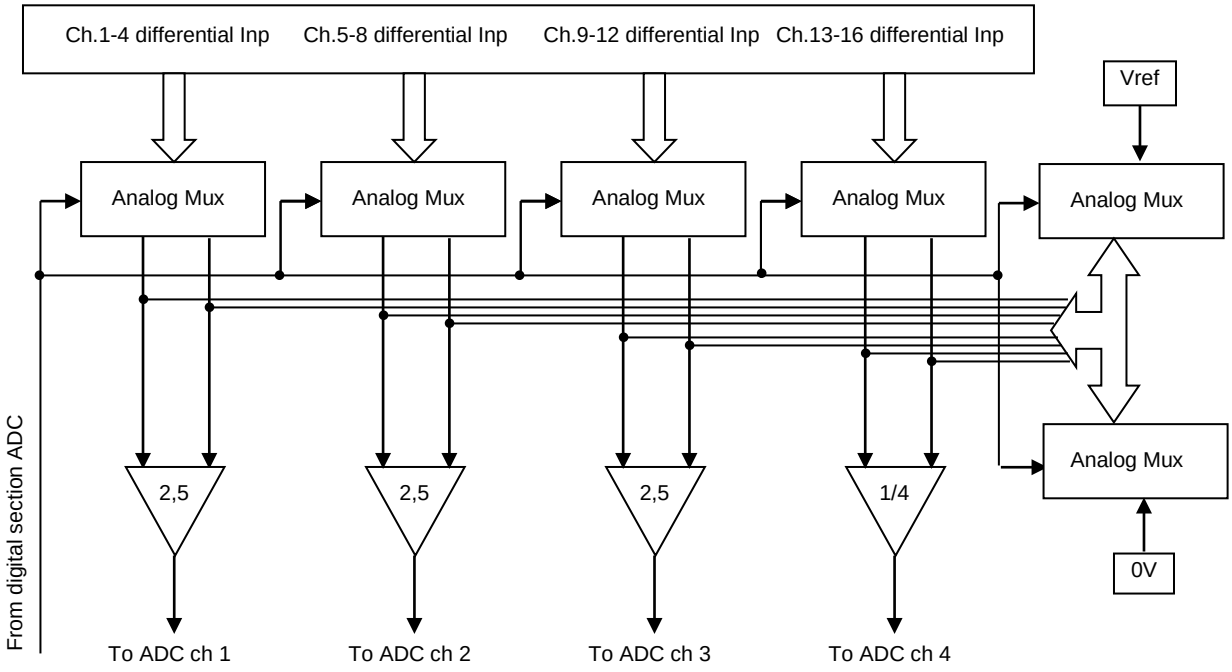

Fig. 10

By default the first two groups are set with a gain of ten and the other two groups with a gain of 1/4. The first six inputs can be connected to thermocouples both of the J and of the K type with a full scale of 50mV.
Inputs 7 and 8 are reserved to two PT100 which have to be connected as shown in the diagram below.

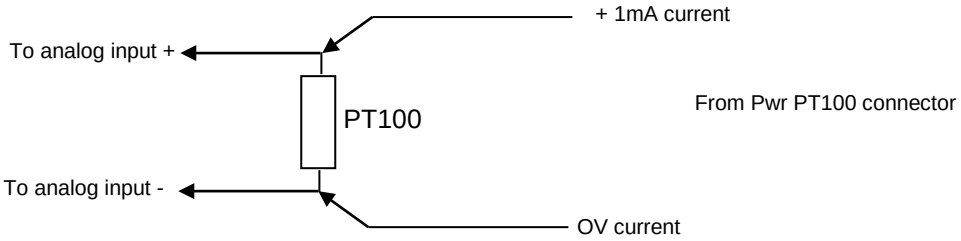

Fig. 11

The maximum value applicable to the input is 250mV which corresponds to 250 ohm, i.e. about 400 degrees.
The last eight differential inputs are set to gain ¼ in order to reduce the signal from +-10V to +-2,5V which is the full scale of the ADC. They can be used for pressure metres, potentiometers, etc..

7.2.6. POWER GENERATORS FOR PT100 OR USE OF THE INTERNAL COLD JOINT

In these area there are two 1mA precision power generators which supply the two standard PT100.
The card also includes a temperature probe which can supply 0.5mV/K corresponding to 149mV at 20C°. it is the necessary to use a high gain input (for thermocouples) to read the value and add it to the reading in degrees given by the thermocouples. This cold joint was placed by default as alternative to the power generator PWRI1. In order to use the power generator PWRI1 to supply an external PT100 it is necessary to reverse the NC and NA contact of the B19 jump.

7.2.7. PWM OR ANALOG

The analog output section is shown in the following diagram:

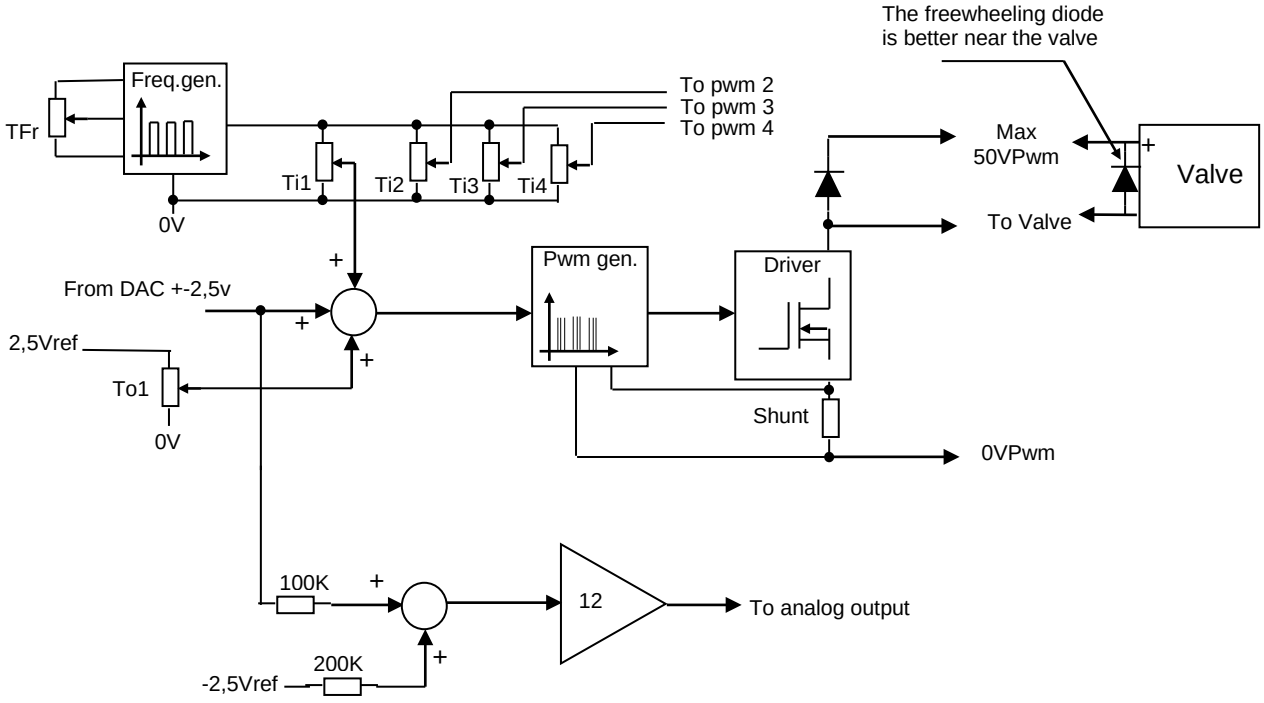

Fig. 12

The four analog outputs from the DAC of the CS6633, have a range of 0 +2.5V which is readjusted to a range of +-10V. The same signals that come from the DAC enter the PWM modulators and are then sent to the respective power drivers which can supply up to 2A. The system is retroazionato with a shunt which allows for good current linearity proportional to the value set on the DAC. The output voltage obtained depends on the power supply value introduced in the Pwr PWM connector. On the card there are two trimmers for each output which allow for the calibration of the PWM offset (To1-To4) and the valve hysteresis (Ti1-Ti4). The TFr trimmer adjusts the hysteresis recovery circuit frequency from 30-170Hz depending on the type of valve used.

7.2.8. ENCODER INPUTS

On the card there are three encoder inputs. The block diagram of the input stage is shown in the figure below.

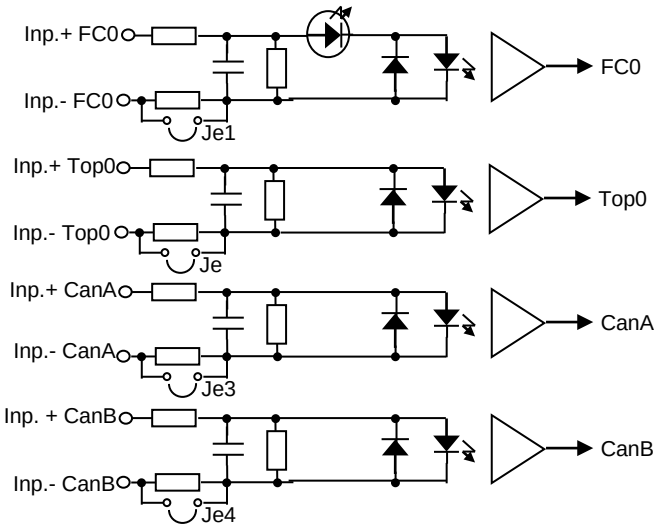

Fig. 13

This kind of circuit allows for the connection of the following encoder types:

1) Push-Pull
2) NPN
3) PNP
4) Line driver

What changes is the connection method. The figure below exemplifies the various types of connection.

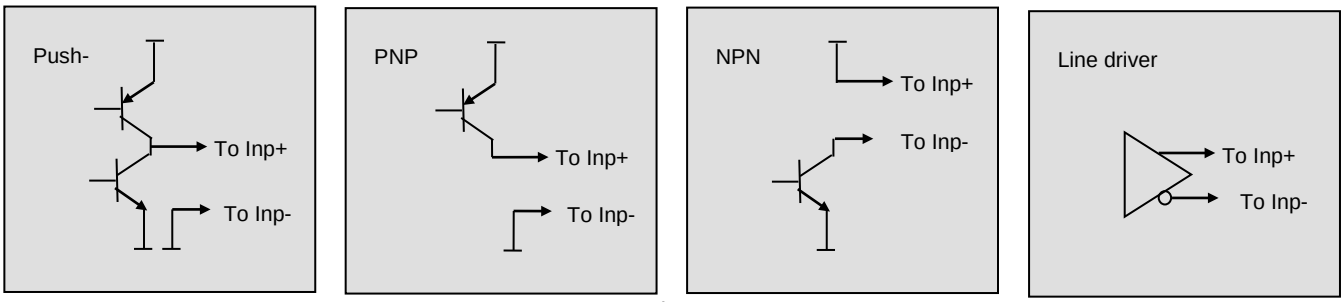

Fig. 14

On each connector, as specified in the connection chapter, there is a 12V supply to power the encoder. The maximum usable current is about 40mA. If the line driver 5V configuration is used, it is necessary to close the following jumpers Je2,Je3,Je4 for the first encoder, Je6-Je7,Je8 for the second, and Je10,Je11 and Je12 for the third. The jumpers Je1, Je5, Je9 are closed if the mechanical zero is in line drive 5V.

8. DIGITAL I/O EXPANSION CARD

The CS6641.0 expansion card is used to expand the number of digital I/O in the VX5000 system bringing it from 24I/24Out to 48I/48Out. The card is assembled through the four columns included in the kit onto the CS6640.1 card and connected through flat 16 vie also to the CS6640.1 card.

8.1. CS6641 – BLOCK DIAGRAM I/O EXPANSION CARD

The card is divided into three areas:

1) Digital inputs
2) Internal logic area
3) Digital outputs

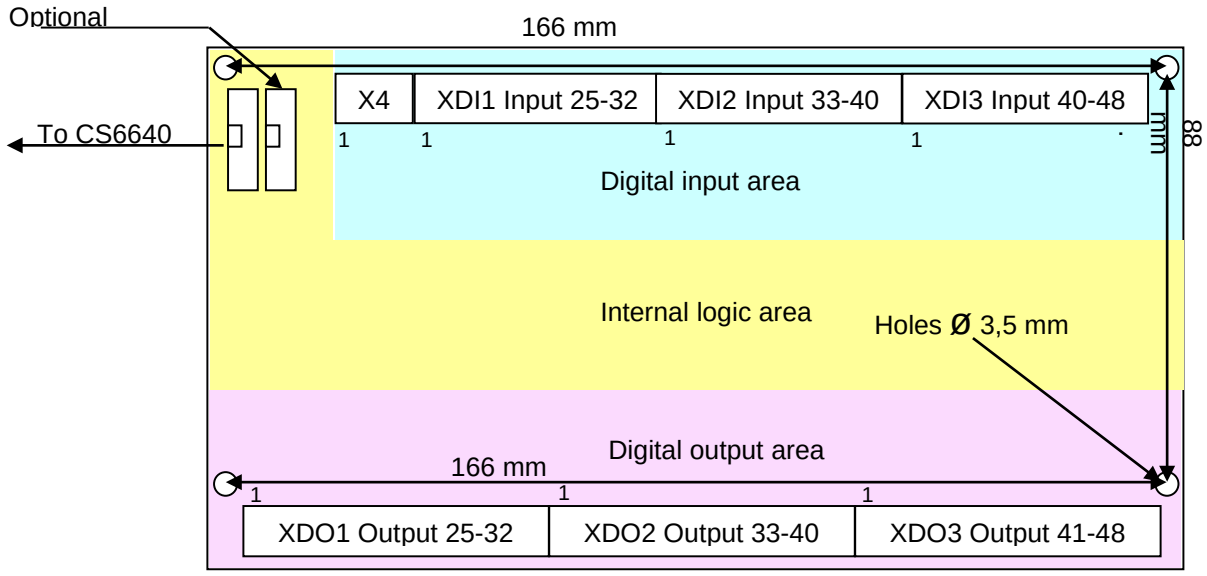

Fig. 15

8.1.1. DIGITAL INPUTS

The area indicated includes about 1mSec filters for each inputs and the visualisation LEDs. The input circuit is of the source type, as shown in the figure.

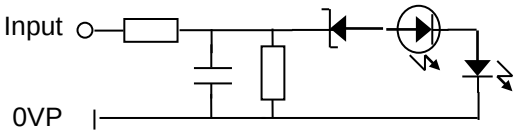

Fig. 16

8.1.2. DIGITAL OUTPUTS

The output stages are of the source type as shown in the figure.

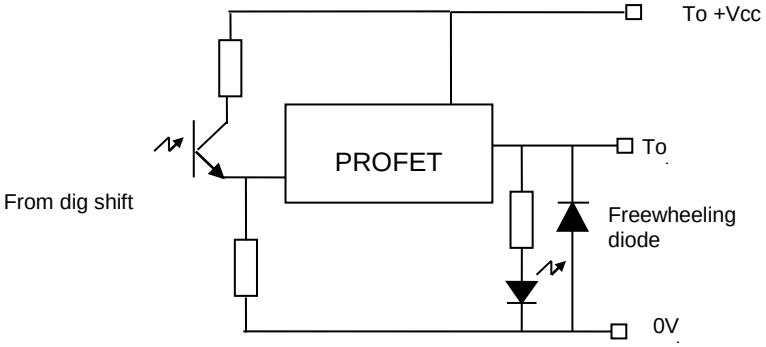

Fig. 17

There are twenty-four 2A outputs. The output driver has a power limitation device, overheating block, short-circuit protection and ESD protection.

8.1.3. DIGITAL INPUT CONNECTIONS

XDI1

Pin	Description
1	Input 1
2	Input 2
3	Input 3
4	Input 4
5	Input 5
6	Input 6
7	Input 7
8	Input 8

XDI2

Pin	Description
1	Input 9
2	Input 10
3	Input 11
4	Input 12
5	Input 13
6	Input 14
7	Input 15
8	Input 16

XDI3

Pin	Description
1	Input 17
2	Input 18
3	Input 19
4	Input 20
5	Input 21
6	Input 22
7	Input 23
8	Input 24

X4

Pin	Description
1	0VP digital inputs
2	0VP digital outputs

N.B. IT IS ADVISABLE TO CONNECT THE 0 VP OF DIGITAL INPUTS AND OUTPUTS USING TWO SEPARATE WIRES.

8.1.4. DIGITAL OUTPUT CONNECTIONS

XDO1

Pin	Description
1	+24VP0
2	Output 1
3	Output 2
4	Output 3
5	Output 4
6	+24VP1
7	Output 5
8	Output 6
9	Output 7
10	Output 8

XDO2

Pin	Description
1	+24VP2
2	Output 9
3	Output 10
4	Output 11
5	Output 12
6	+24VP3
7	Output 13
8	Output 14
9	Output 15
10	Output 16

XDO3

Pin	Description
1	+24VP4
2	Output 17
3	Output 18
4	Output 19
5	Output 20
6	+24VP5
7	Output 21
8	Output 22
9	Output 23
10	Output 24

9. TROUBLESHOOTING

9.1. INTRODUCTION

This chapter illustrates some useful operations to make sure that the system is functioning properly. The purpose is not to identify the type of failure, but rather to give the user a tool to verify proper operation of the system. Reference will be made to the block diagrams presented above, and the staff in charge of the tests is expected to be qualified.

Troubleshooting table VX5000	
All the power supply LEDs are off	1) Check that there is +24V on the XALI connector and make sure that it falls within the admissible range of +-20%
The LED on the CS6633 is off	No communication with the PC. 1) Check that the multipolar cable between PC and I/O card is connected 2) Check that the PC is in communication mode 3) Check the power supply on the Ji3-Ji4-Ji6 connectors
The analog readings are incorrect	Check –Vref=-2.5V and +Vref=2,5V on pins 1 and 2 of Ji1

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