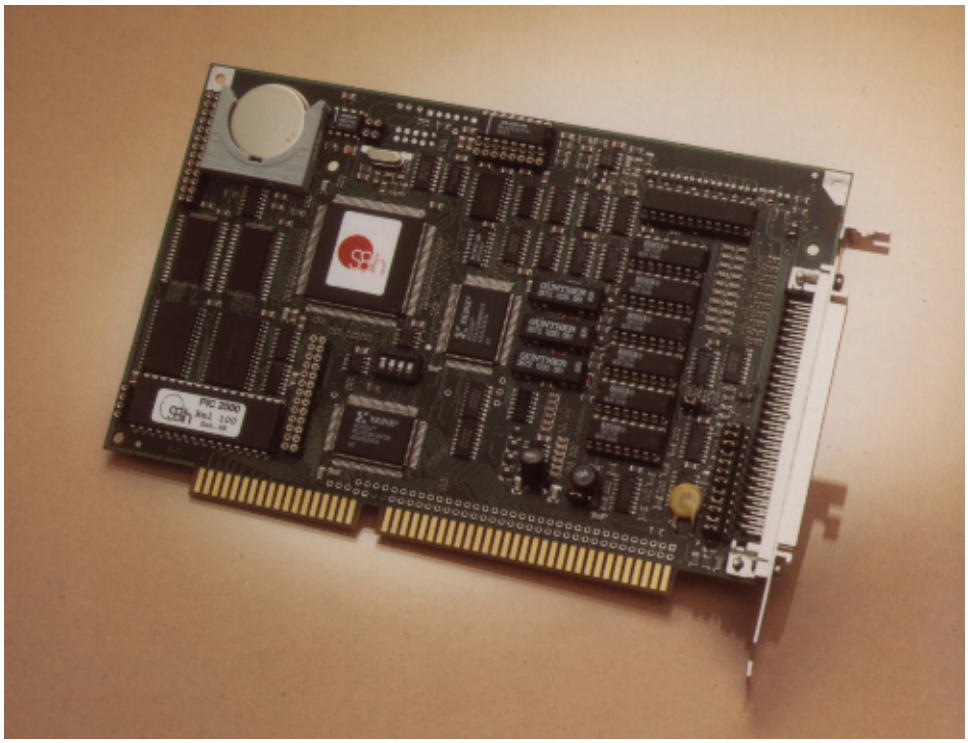
PICASSO 2000

STD 1

USER'S MANUAL



MANUAL VERSION :	***1.02***
Refers to software version::	***P2000: 1.00*** ***CNC / PLC: 3.00 / 3.00***

CE

MANUAL CODE: ***MA P2K U STD1 12***

DATE: 22 MAGGIO 2000

This documentation has been produced by S&h for the exclusive use of purchasers of the Picasso 2000 and Picexp boards manufactured by the same S&h.
Its contents are the property of S&h and may not be reproduced in whole or in part without the written consent of S&h.
The information contained in the present documentation is subject to change without prior notice and does not constitute a commitment on the part of S&h.

Index

GENERAL

INTRODUCTION

The present manual contains all information regarding the technical characteristics and the performance of the CNC on the Picasso 2000 board. It is designed as a useful guide which can be referred to for a quick understanding and for efficient application of all its functions.

The PICASSO2000 CNC is a NUMERICAL CONTROLLER on a board for inserting in a PC, which can control between one and four axes of the types Stepper, dc or brushless, both in point to point positioning and in linear and circular interpolation. It can handle machine I/O (16in/8out), both in sequential mode and as a PLC program (optional). The I/O can be expanded to 128in + 128out via Can-Bus.

Main features:

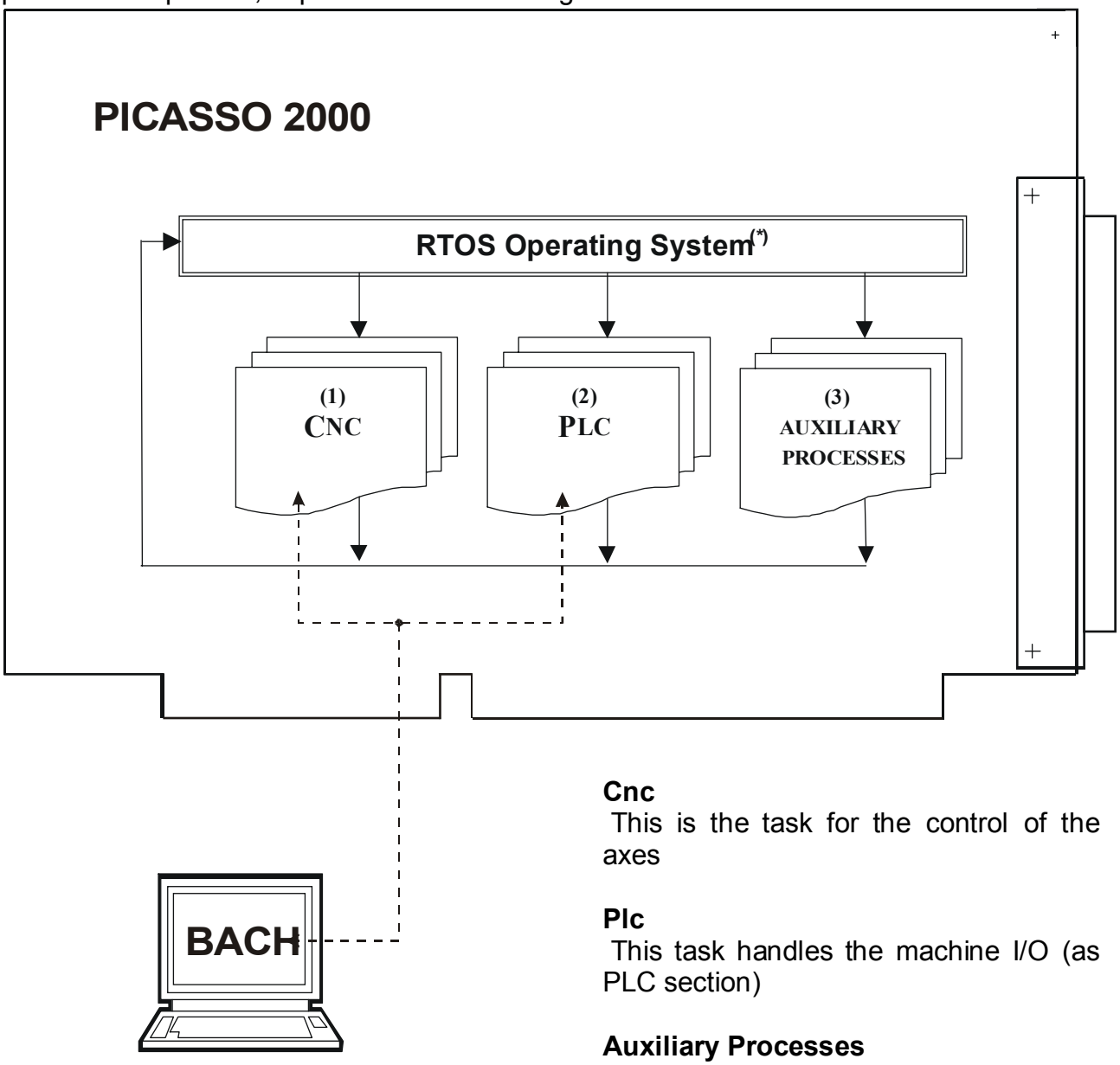
- Power supplies: +5Vdc, +12Vdc, -12Vdc
- Maintains data and programs even in the event of a power out.
- 1…4 axes STEPPER, DC OR BRUSHLESS
- PID control algorithm and programmable feedforward action.
- Point to point positioning, linear interpolation, circular interpolation
- Programmable velocity profiles
- Encoder feedback, even for stepper motors
- 16 in and 8 out that can be handled sequentially or in PLC logic (optional), expandable to 128+128 using industrial Can-Bus.
- Programming language: ISO (extended) for the axes control section, AWL (in the PC) for the PLC section.
- Fast input for acquisition of the axes co-ordinates (touch probe)
- Auxiliary analogue inputs (max. 8)
- Handling the program "Variables"
- Serial port (definable as RS232/422/485) for connecting the machine control panel "MCP".
- 4 incremental encoders
- Parallel process control
- Interface for DC or BRUSHLESS motor drives: REF (±10V / 16bit), DIR, ENABLE, FAULT
- Interface for STEPPER motor drives: PULSE(800KHZ), DIR, ENABLE, FAULT

VERSION

The information in this manual refers to the "Picasso2000 Software Version " shown on the cover.
The message showing the software version installed in the Picasso2000 can be read using the %99 instruction.

FIRMWARE GENERAL STRUCTURE

The Picasso2000 has an operating system inside that performs the control of several processes in parallel; in particular the following tasks are executed:



Cnc
This is the task for the control of the axes

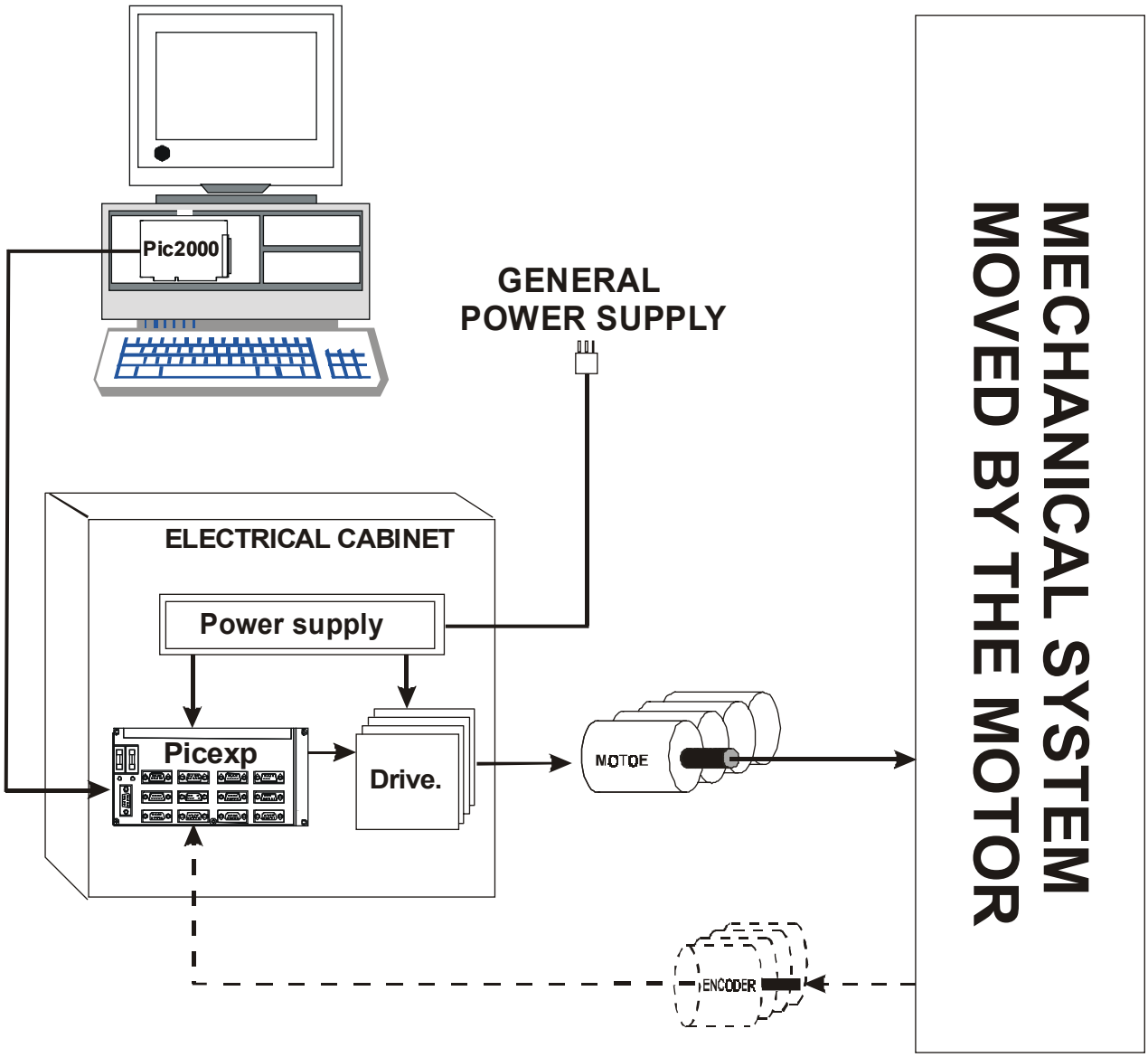
Plc
This task handles the machine I/O (as PLC section)

Auxiliary Processes
Performs the service tasks: communication, error handling, timing, alarms, watchdog, etc.

(*): *Real Time Operating System*

OPERATION MODE

The operation mode of the Picasso 2000 board can be illustrated by the following drawing, in which the components, that are described later, are divided into groups by function.



- *Power supply unit:* the group of components that make up the electronics that are used to supply the correct power to the control unit (and other parts of the system). Usually made up of a transformer and the associated protection and manoeuvring devices that must be provided by the user.
- *Controller*: electronics of the mechanical displacement system that takes care of, together with other parts of the system, the movement along the axes, the electromechanical actuators and any sensors present on the machine.
- *Drive Unit*: the electronics of a mechanical displacement system that receives and transmits analogue and digital signals from the external controller and drives the motor in such a way that it performs the movements required by the controller
- *Motor*: is the component, driven by the drive unit, and coupled with the mechanical parts, physically performs the movements along an axis.

- *Encoder*: is the electronic component that supplies the position information for the mechanical axis (displacement transducer). It may not be used if the system is designed as "open loop" (e.g. with stepper motors).

COMMUNICATION

The Personal Computer can control the (1)Cnc and (2)Plc processes directly, using the BACH support software that enables the operator to: upload/download programs, setup and calibration of the axis parameters, writing/compilation/debugging of the Plc program etc..

CUSTOMISING THE SYSTEM

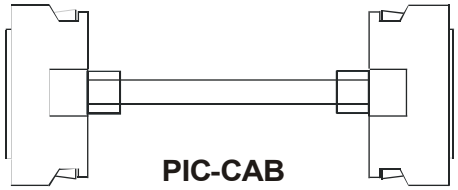
The @ commands may be used to customise the system by assigning values that differ from those of the default parameters.
For a full description of these commands, refer to the manual supplied with the Picasso 2000 board.

INSTALLATION AND CONNECTIONS

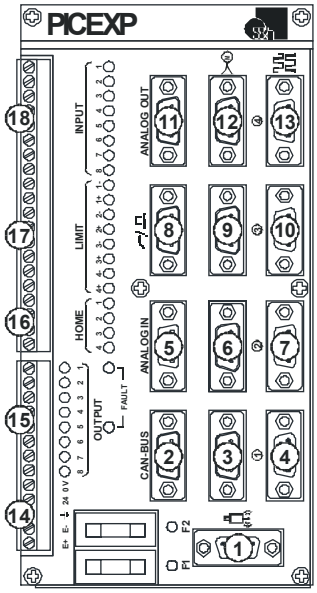
UNPACKING

The Picasso 2000 package contains the following components:

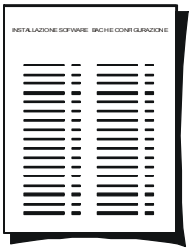
PICASSO 2000 BOARD



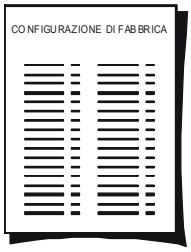
PIC-CAB CABLE



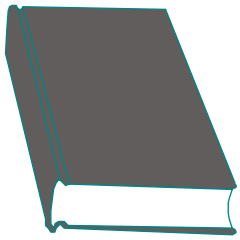
PIC-EXP BOARD



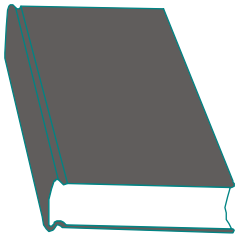
INSTALLATION AND CONFIGURATION OF BACH SOFTWARE



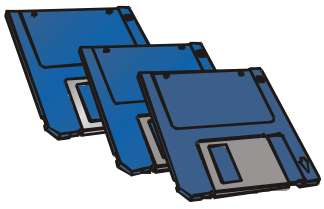
FACTORY CONFIGURATION SHEET



PROGRAMMING MANUAL

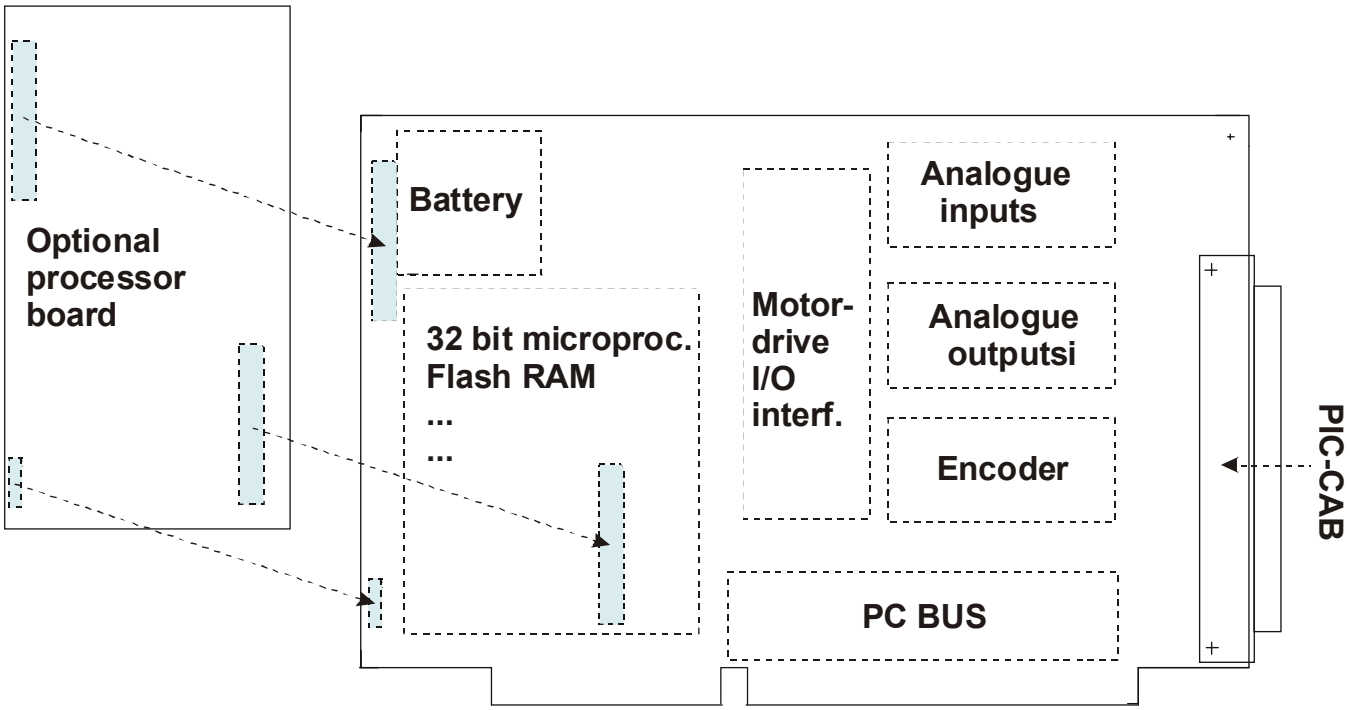


USERS' MANUAL

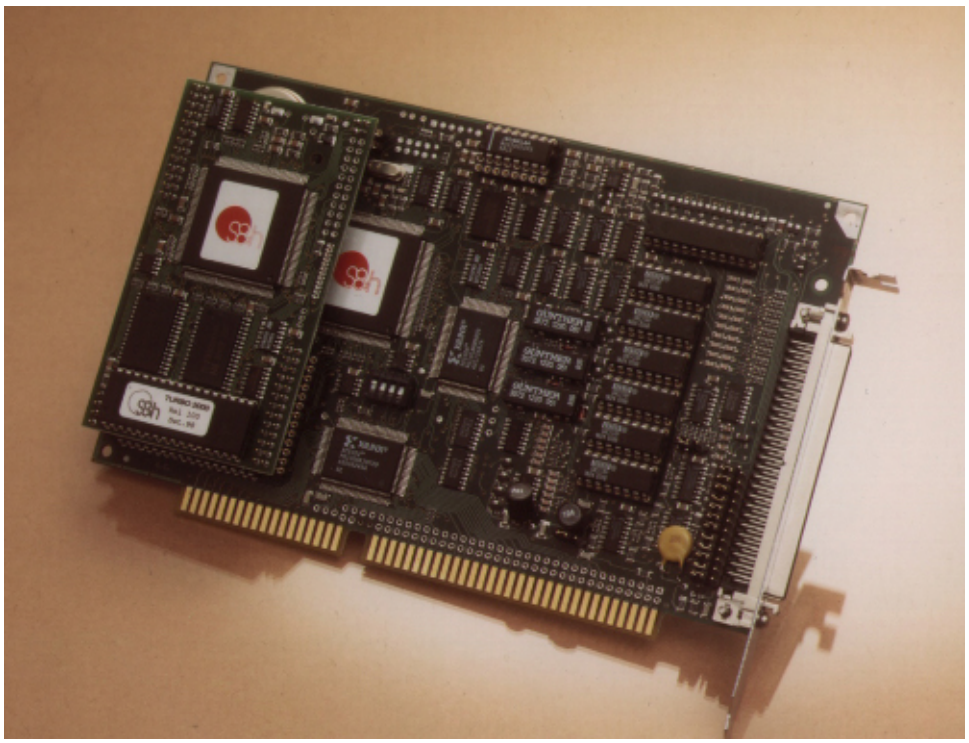


BACH SOFTWARE INSTALLATION DISKETTES

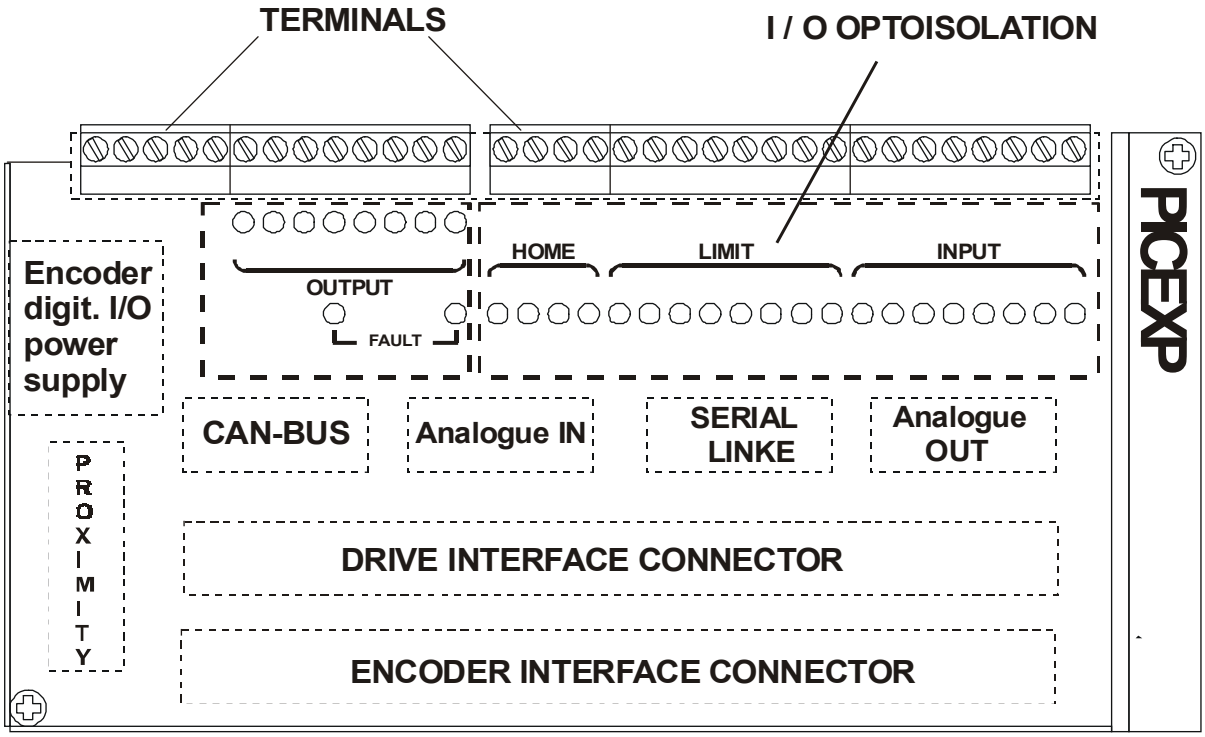
SYSTEM COMPONENTS



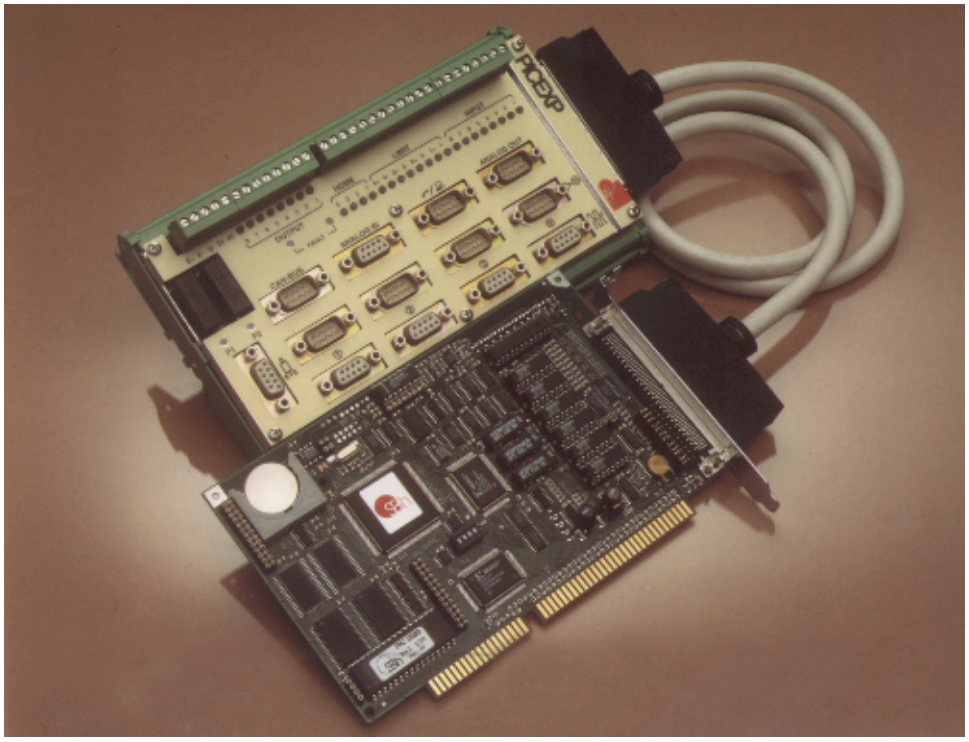
PICASSO 2000



PICEXP



VIEW OF THE SYSTEM ASSEMBLY



PICASSO2000 CONFIGURATION

CHECKING THE BOARD

Before installing the Picasso 2000 board into the PC, check that there are no obvious anomalies. In spite of all the careful checks performed in the factory, it is possible that they can become damaged during the packing or transport. If this is the case, please contact our factory immediately.
.

PRELIMINARY CONFIGURATION

The operation of the board is determined not only by the application program but also by a few fixed preset options, that may be changed by moving jumpers on the board (jumpers:jp)
Before using the board, read the following instructions carefully and set up these jumpers properly to ensure the best performance and best possible coupling between the board and your system.
In particular, use the jumpers to preset the COM port:

The tip of a ballpoint pen may be used to shift the jumpers (ON / OFF).

CONFIGURE THE JUMPERS TO SELECT THE COM PORT

Use the jumpers on the Picasso2000 board to select the serial communication port to which you wish to connect the Picasso2000 board, see the following table for the available choice
To move the jumpers (ON / OFF), use the point of a biro.

	SW1	**SW2**	**SW3**	**SW4**
COM1 (3F8 IRQ 4)	OFF	OFF	OFF	OFF
COM2 (2F8 IRQ 3)	ON	OFF	"	"
COM3 (3E8 IRQ 4)	OFF	ON	"	"
COM4 (2E8 IRQ 3)	ON	ON	"	"
BUS1 (300/301 hex)	ON	ON	ON	OFF
BUS2 (302/303 hex)	OFF	ON	"	"
BUS3 (304/305 hex)	ON	OFF	"	"
BUS4 (306/307 hex)	OFF	OFF	"	"
UPDATE FIRMWARE				ON

CONFIGURATION OF THE PC

Check that the number of the serial port (COM) selected for the communication with the PICASSO2000 board is different from serial ports already present on the PC.
In you wish to install the Picasso2000 board on a serial port that is already occupied on the PC, then it is necessary to disactivate the serial port of the PC in the system BIOS

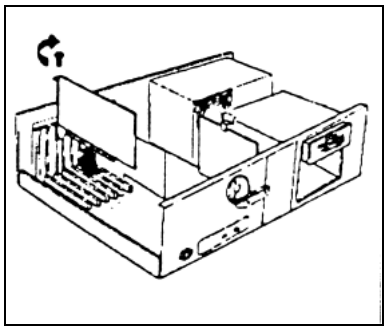
INSTALLATION OF THE PICASSO2000 BOARD IN THE PC

The installation of the board need the execution of a sequence of operations (you can see forward). You must do the sequence with attention.

Caution! Do not ever open the computer when this is connected to the electrical supply. Turn this off together with any supply connected to peripheral equipment that may be connected.
The computer must remain off for all the installation time.

- Carefully remove the board from its packaging and hold it by the edges, avoid touching the electronic components on the board itself as they are sensitive to electrostatic discharges.
- Remove the cover of the PC, letting it slide along its guides
- Choose a free slot on the motherboard for each board to be installed and remove the rear cover for each slot chosen.
- Insert the board in the slot with great care, following the guides and the supports. Fix the PICASSO 2000 board in place.
- Close the PC and connect the expansion cable of the signals and relative PICEXP board to the PICASSO 2000, taking care the fixing is made correctly, listening for the click that can be heard when it is correctly inserted.
- Reconnect any peripherals that were disconnected, as well as the power cable and switch the computer on.
- Install the "BACH" support software.

Preparation of the expansion slot



COMMUNICATION SOFTWARE

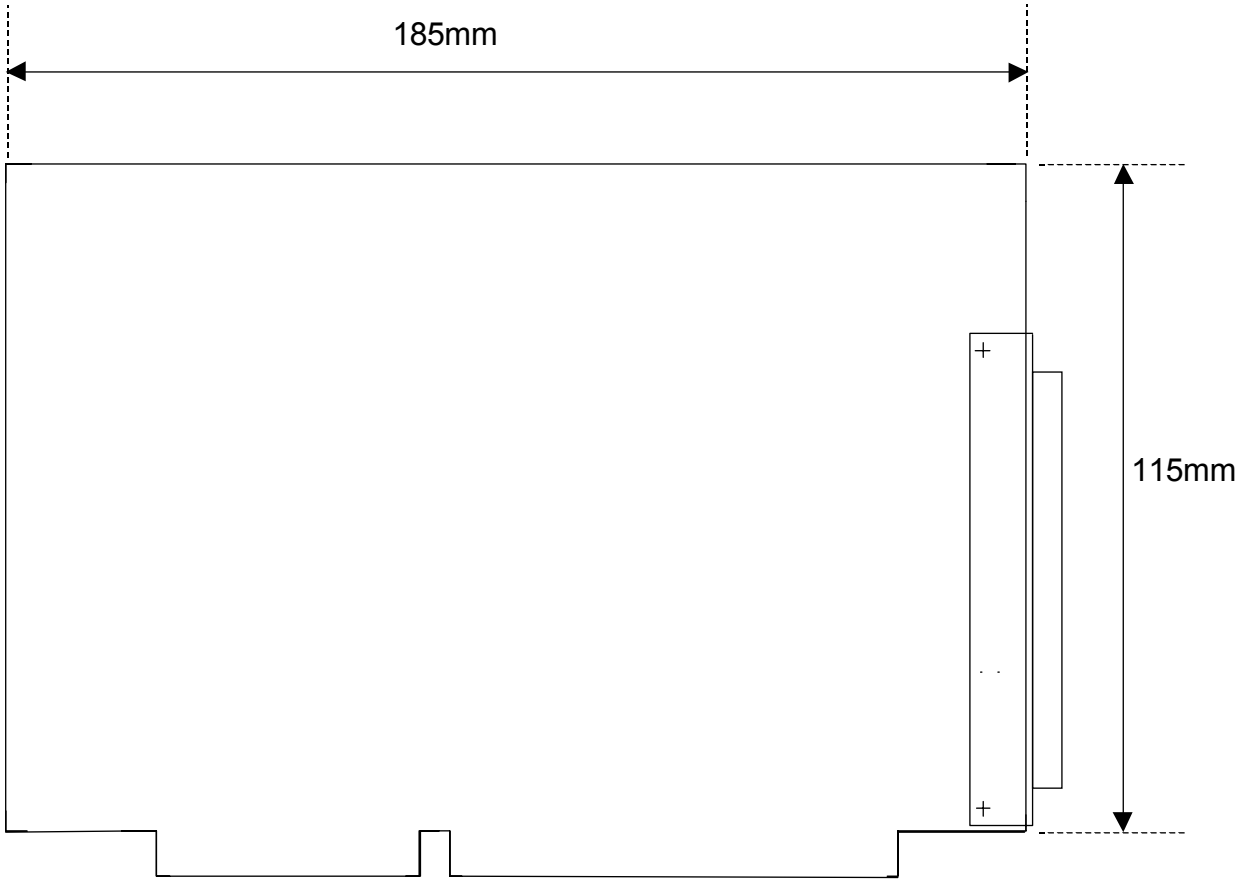
The BACH program is support software created by S&h.
It is designed to be installed on a PC running Windows 95/98 operating system.

BACH SOFTWARE INSTALLATION AND CONFIGURATION

See the instructions provided.

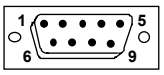
TECHNICAL DATA

POWER SUPPLY VOLTAGES	+5VDC, +12VDC, -12VDC
CONSUMPTION	5VDC: 600mA (1000mA with expansion) +12VDC 100mA -12VDC 150mA +5VDC/ +12VDC ENCODER 500mA
STORAGE TEMPERATURE	0 ..... +50 C°
OPERATING TEMPERATURE	+5 ... +40 C°
RELATIVE HUMIDITY	20% ... 80% (NON-CONDENSING)
WEIGHT	0.4 KG
DIMENSIONS	WIDTH: 185mm HEIGHT: 115mm



CONNECTORS ON THE PICEXP (PICASSO2000) BOARDS

CAN BUS

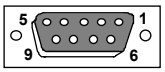


9-POLE MALE D-CONNECTOR

X2

Pin	Signal
1	
2	CAN L
3	COM (0V)
4	
5	
6	
7	CAN H
8	
9	

ANALOGUE INPUTS

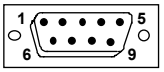


9-POLE FEMALE D-CONNECTOR

X5

Pin	Signal	I/O
1	COM	-
2	AIN1	I
3	AIN2	I
4	AIN3	I
5	AIN4	I
6	AIN5	I
7	AIN6	I
8	AIN7	I
9	AIN8	I

SERIAL PORT

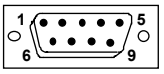


9-POLE MALE D-CONNECTOR

X8

Pin	RS232		RS422	
1				
2	RX	I	RX+	I
3	TX	O	TX+	O
4				
5	COM (0V)			
6				
7	RTS	O	TX-	O
8	CTS	I	RX-	I
9				

ANALOGUE OUTPUTS

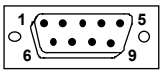


9-POLE MALE D-CONNECTOR

X11

Pin	Signal	I/O
1	AGND(AN.REF.)	-
2	OUT1 (PWM)	O
3	AGND(AN.REF.)	-
4	AO⑥ (+VOUT)	O
5	GND_AZN (0V)	-
6	AO⑤ (+VOUT)	O
7	ENB⑤(ENABLE)	O
8	ENB⑥ (ENABLE)	O
9	OUT2 (PWM)	O

AXIS 1 (X) DRIVER

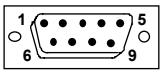


9-POLE MALE D-CONNECTOR

X3

Pin	Signal	I/O
1	AGND(AN.REF.)	-
2	FLT① (FAULT)	I
3	PULSE①	O
4		
5	GND_DRV (0V)	-
6	AO① (+VOUT)	O
7	ENB①(ENABLE)	O
8	DIR①	O
9		

AXIS 2 (Y) DRIVER

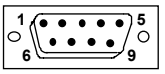


9-POLE MALE D-CONNECTOR

X6

Pin	Signal	I/O
1	AGND(AN.REF.)	-
2	FLT② (FAULT)	I
3	PULSE②	O
4		
5	GND_DRV (0V)	-
6	AO② (+VOUT)	O
7	ENB②(ENABLE)	O
8	DIR②	O
9		

AXIS 3 (Z) DRIVER

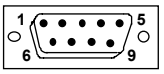


9-POLE MALE D-CONNECTOR

X9

Pin	Signal	I/O
1	AGND(AN.REF.)	-
2	FLT③ (FAULT)	I
3	PULSE③	O
4		
5	GND_DRV (0V)	-
6	AO③ (+VOUT)	O
7	ENB③(ENABLE)	O
8	DIR③	O
9		

AXIS 4 (W) DRIVER

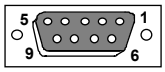


9-POLE MALE D-CONNECTOR

X12

Pin	Signal	I/O
1	AGND(AN.REF.)	-
2	FLT④ (FAULT)	I
3	PULSE①	O
4		
5	GND_DRV (0V)	-
6	AO① (+VOUT)	O
7	ENB①(ENABLE)	O
8	DIR①	O
9		

AXIS 1 (X) ENCODER

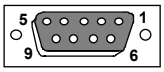


9-POLE FEMALE D-CONNECTOR

X4

Pin	Signal	I/O
1	GND_ENC (0V)	-
2	+VENC (+5V)	-
3	ZE①+	I
4	FB①+	I
5	FB①-	I
6		
7	ZE①-	I
8	FA①-	I
9	FA①+	I

AXIS 2 (Y) ENCODER

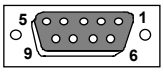


9-POLE FEMALE D-CONNECTOR

X7

Pin	Signal	I/O
1	GND_ENC (0V)	-
2	+VENC (+5V)	-
3	ZE②+	I
4	FB②+	I
5	FB②-	I
6		
7	ZE②-	I
8	FA②-	I
9	FA②+	I

AXIS 3 (Z) ENCODER

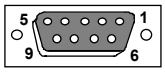


9-POLE FEMALE D-CONNECTOR

X10

Pin	Signal	I/O
1	GND_ENC (0V)	-
2	+VENC (+5V)	-
3	ZE③+	I
4	FB③+	I
5	FB③-	I
6		
7	ZE③-	I
8	FA③-	I
9	FA③+	I

AXIS 4 (W) ENCODER

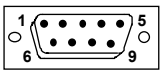


9-POLE FEMALE D-CONNECTOR

X13

Pin	Signal	I/O
1	GND_ENC (0V)	-
2	+VENC (+5V)	-
3	ZE④+	I
4	FB④+	I
5	FB④-	I
6		
7	ZE④-	I
8	FA④-	I
9	FA④+	I

PROXIMITY SWITCH

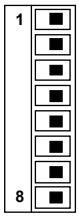
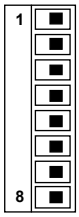
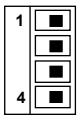
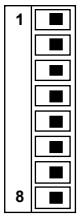
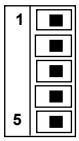


9-POLE MALE
D-CONNECTOR

X1

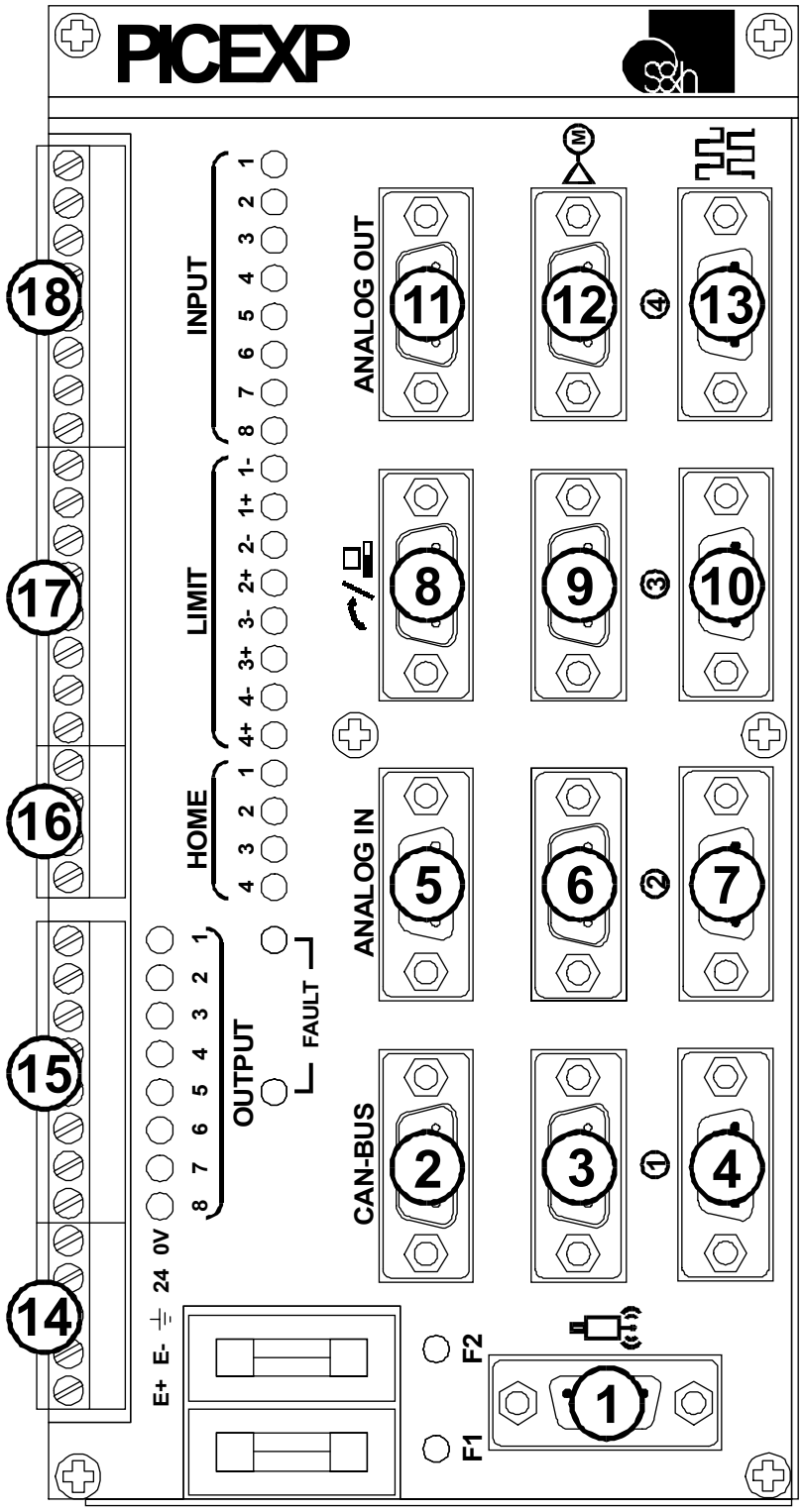
Pin	*Signal*	*I/O*
1	**0V**	-
2	**+5V**	-
3	**TAUX**	I
4	**TASTD**	I
5	**ALED**	O
6		
7		
8		
9		

CONNECTORS OF THE PICEXP (PICASSO2000) BOARD

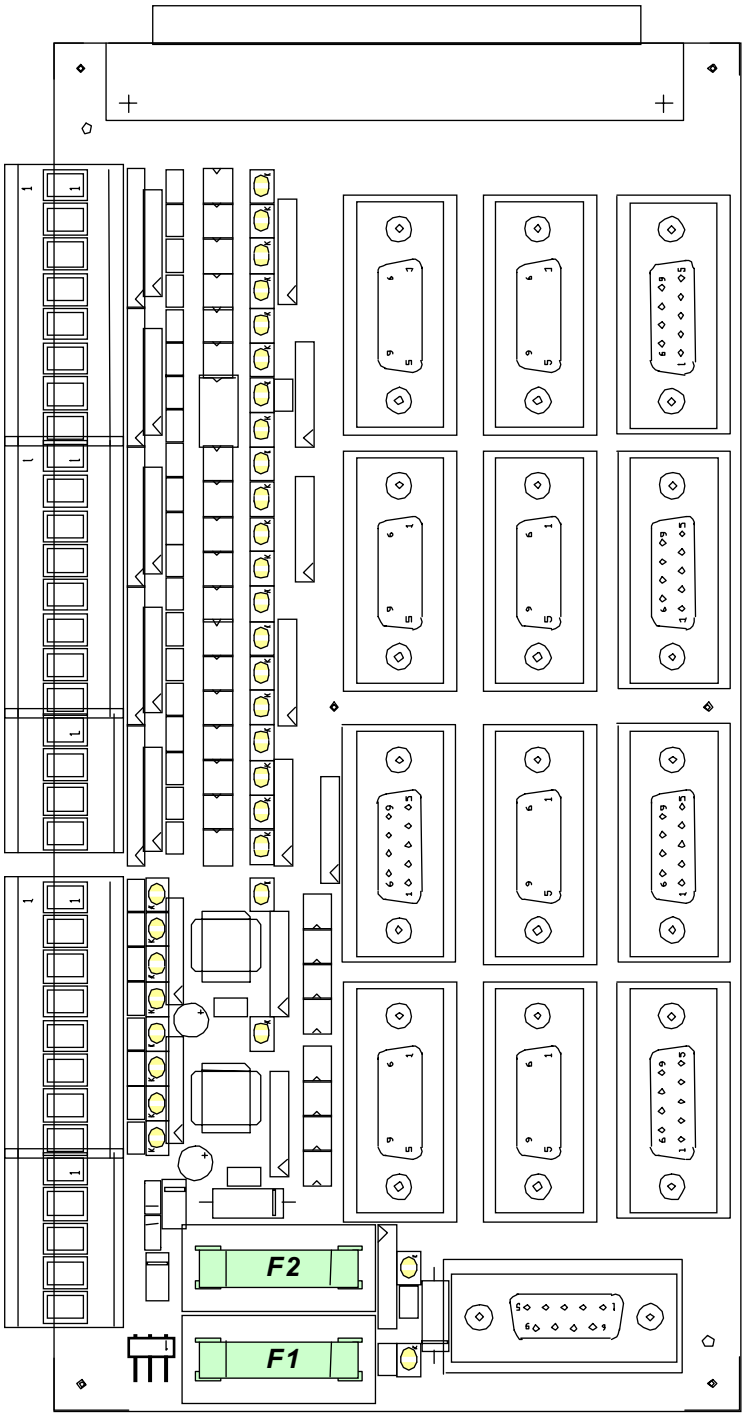
TERMIINALS	*PIN*	*SIGNAL*	*DESCRIPTION*	*I/O*
X18 	**1**	**INP1**	**DIGITAL INPUT NO.1**	**I**
	2	**INP2**	**DIGITAL INPUT NO.2**	**I**
	3	**INP3**	**DIGITAL INPUT NO.3**	**I**
	4	**INP4**	**DIGITAL INPUT NO 4**	**I**
	5	**INP5**	**DIGITAL INPUT NO.5**	**I**
	6	**INP6**	**DIGITAL INPUT NO.6**	**I**
	7	**INP7**	**DIGITAL INPUT NO.7**	**I**
	8	**INP8**	**DIGITAL INPUT NO.8**	**I**
X17 	**9**	**LS①-**	**LIMIT SWITCH FORWARD(-) AXIS ①**	**I**
	10	**LS①+**	**LIMIT SWITCH REVERSE(+) AXIS ①**	**I**
	11	**LS②-**	**LIMIT SWITCH FORWARD(-) AXIS ②**	**I**
	12	**LS②+**	**LIMIT SWITCH REVERSE(+) AXIS ②**	**I**
	13	**LS③-**	**LIMIT SWITCH FORWARD(-) AXIS ③**	**I**
	14	**LS③+**	**LIMIT SWITCH REVERSE(+) AXIS ③**	**I**
	15	**LS④-**	**LIMIT SWITCH FORWARD(-) AXIS ④**	**I**
	16	**LS④+**	**LIMIT SWITCH REVERSE(+) AXIS ④**	**I**
X16 	**17**	**HOME①**	**MACHINE ZERO: AXIS ①**	**I**
	18	**HOME②**	**MACHINE ZERO: AXIS ②**	**I**
	19	**HOME③**	**MACHINE ZERO: AXIS ③**	**I**
	20	**HOME④**	**MACHINE ZERO: AXIS ④**	**I**
X15 	**21**	**OUT1**	**DIGITAL OUTPUT NO.1**	**O**
	22	**OUT2**	**DIGITAL OUTPUT NO.2**	**O**
	23	**OUT3**	**DIGITAL OUTPUT NO.3**	**O**
	24	**OUT4**	**DIGITAL OUTPUT NO.4**	**O**
	25	**OUT5**	**DIGITAL OUTPUT NO.5**	**O**
	26	**OUT6**	**DIGITAL OUTPUT NO.6**	**O**
	27	**OUT7**	**DIGITAL OUTPUT NO.7**	**O**
	28	**OUT8**	**DIGITAL OUTPUT NO.8**	**O**
X14 	**29**	**COM_24V DC**	**0REF. POWER SUPPLY INPUT (0V OF THE +24VDC)**	**-**
	30	**+24VDC**	**+24VDC POWER SUPPLY INPUT**	**-**
	31	**GROUND**		**-**
	32	**ENC. -**	**0REF. ENCODER SUPPLY (0V OF THE +5/+12VDC)**	**-**
	33	**ENC. +**	**+5/+12VDC ENCODER SUPPLY**	**-**

OUTPUTS: TYPE PNP 24VDC / 300MA
INPUTS: TYPE PNP 24VDC

PICEXP (PICASSO2000) PANEL



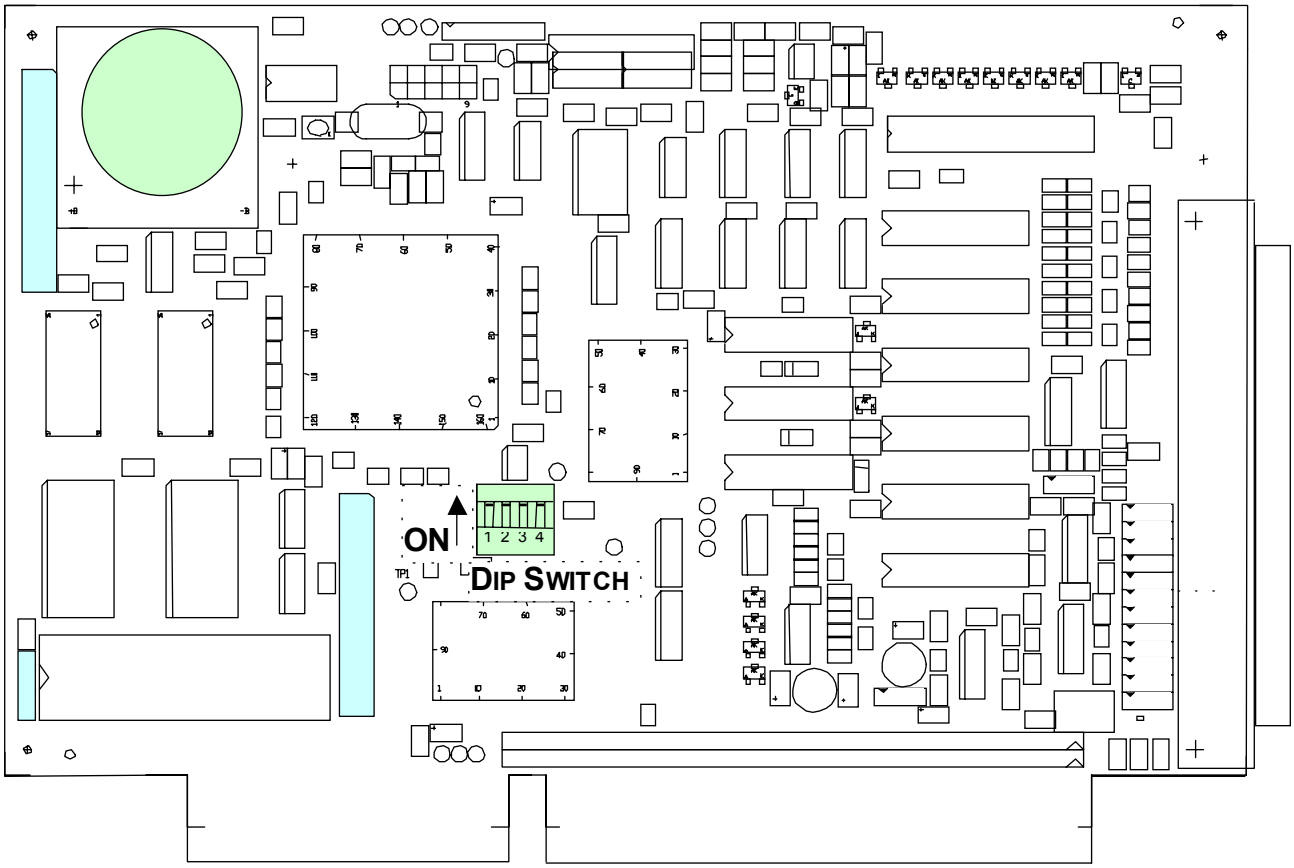
BOARD LAYOUT PICEXP (PICASSO2000)



F1 (encoder supply) **= 1A**

F2 (+24VDC I/O) **= 2,5A**

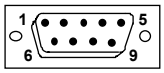
BOARD LAYOUT PICASSO2000



SERIAL PORT CONNECTIONS

CONNECTOR: X8

SERIAL PORT



9-POLE MALE
D-CONNECTOR
X8

Pin	*RS232*		*RS422*	
1				
2	**RX**	I	**RX+**	I
3	**TX**	O	**TX+**	O
4				
5	**COM (0V)**			
6				
7	**RTS**	O	**TX-**	O
8	**CTS**	I	**RX-**	I
9				

SERIAL PORT

RS232
(a)

Pin	*Signal*	*I/O*
1		
2	**RX**	I
3	**TX**	O
4		
5	**COM (0V)**	-
6		
7	**RTS**	O
8	**CTS**	I
9		

SERIAL PORT

RS422
(b)

Pin	*Signal*	*I/O*
1		
2	**RX+**	I
3	**TX+**	O
4		
5	**COM (0V)**	-
6		
7	**TX-**	O
8	**RX-**	I
9		

Notes: (a) Factory default configuration (= RS232)
(b) Supplied when specified

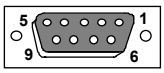
BAUD RATE	9600
DATA BIT	8
PARITY	ODD
STOP BIT	1

N.B.: Use a screened cable for the connection with the screen connected to the case of the connector.

ENCODER CONNECTIONS

CONNECTOR: X4, X7, X10, X13

AXIS 1 (X) ENCODER

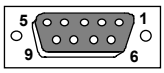


9-POLE FEMALE D-CONNECTOR

X4

Pin	*Signal*	*I/O*
1	GND_ENC (0V)	-
2	+VENC (+5V)	-
3	ZE①+	I
4	FB①+	I
5	FB①-	I
6		
7	ZE①-	I
8	FA①-	I
9	FA①+	I

ENCODER AXIS 2 (Y)

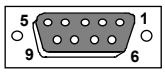


9-POLE FEMALE D-CONNECTOR

X7

Pin	*Signal*	*I/O*
1	GND_ENC (0V)	-
2	+VENC (+5V)	-
3	ZE②+	I
4	FB②+	I
5	FB②-	I
6		
7	ZE②-	I
8	FA②-	I
9	FA②+	I

AXIS 3 (Z) ENCODER

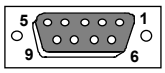


9-POLE FEMALE D-CONNECTOR

X10

Pin	*Signal*	*I/O*
1	GND_ENC (0V)	-
2	+VENC (+5V)	-
3	ZE③+	I
4	FB③+	I
5	FB③-	I
6		
7	ZE③-	I
8	FA③-	I
9	FA③+	I

AXIS 4 (W) ENCODER



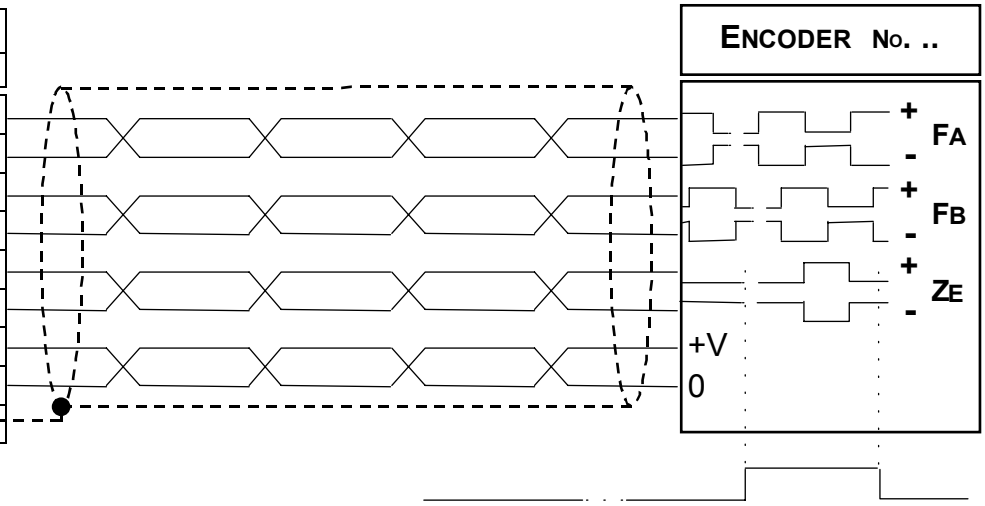
9-POLE FEMALE D-CONNECTOR

X13

Pin	*Signal*	*I/O*
1	GND_ENC (0V)	-
2	+VENC (+5V)	-
3	ZE④+	I
4	FB④+	I
5	FB④-	I
6		
7	ZE④-	I
8	FA④-	I
9	FA④+	I

Notes: The factory default configuration for the encoder is: "DIFFERENTIAL"
To change the encoder interface from "DIFFERENTIAL" to "UNIPOLAR", the internal jumpers (JP7….JP19) on the board must be changed

X4, X7, X10, X13	
Signal	*pin*
FA⊙+	**9**
FA⊙-	**8**
FB⊙+	**4**
FB⊙-	**5**
ZE⊙+	**3**
ZE⊙-	**7**
+VENC	**2**
GND_ENC (0V)	**1**
CONNECTOR CASE	



It is strongly advised to use a "DIFFERENTIAL" type of encoder interface, and it is indispensable if the distance to the encoder exceeds 3 metres or if the environment in which the system operates is subject to electrical interference of any kind.

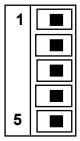
Use a screened twisted pair cable for the connection to the encoder. The screen must be isolated and connected to ground only to the casing of the connector at the controller end. Furthermore, the screen connections must be made as close as possible to the connector casing.
Maximum encoder input frequency for the PICASSO2000 is of 800KHz (with internal PICASSO2000 multiply we have 800_x_4=3200Khz real counting frequency)

ENCODER SUPPLY

The supply for the encoder can be taken from the PC power supply or supplied from an external power source.

- **ENCODER SUPPLY: FROM THE PC**
  In this case, the supply that can be used for the encoder is **+5VDC** or **+12VDC**.
  The factory default is **+5VDC.**

- **ENCODER SUPPLY: FROM AN EXTERNAL POWER SUPPLY**
  In this case the encoder supply must be provided by an independent power supply, external to the PC, and connected to terminals 42 and 43 (X14 –4,5).

X14 	**29**			-
	30			-
	31	**GROUND**		-
	32	**ENC. -**	**0REF. ENCODER SUPPLY (0V OF THE +5/+12VDC)**	-
	33	**ENC. +**	**+5/+12/+24 VDC ENCODER SUPPLY**	-

DRIVE CONNECTIONS (ANALOGUE)

CONNECTORS: X3, X6, X9, X12

AXIS 1 (X) DRIVER

9 POLE MALE D-CONNECTOR

X3

Pin	Signal	I/O
1	AGND(AN.REF.)	-
2	FLT① (FAULT)	I
3		
4		
5	GND_DRV (0V)	-
6	AO① (+VOUT)	O
7	ENB①(ENABLE)	O
8	DIR①	O
9		

AXIS 2 (Y) DRIVER

9 POLE MALE D-CONNECTOR

X6

Pin	Signal	I/O
1	AGND(AN.REF.)	-
2	FLT② (FAULT)	I
3		
4		
5	GND_DRV (0V)	-
6	AO② (+VOUT)	O
7	ENB②(ENABLE)	O
8	DIR②	O
9		

AXIS 3 (Z) DRIVER

9 POLE MALE D-CONNECTOR

X9

Pin	Signal	I/O
1	AGND(AN.REF.)	-
2	FLT③ (FAULT)	I
3		
4		
5	GND_DRV (0V)	-
6	AO③ (+VOUT)	O
7	ENB③(ENABLE)	O
8	DIR③	O
9		

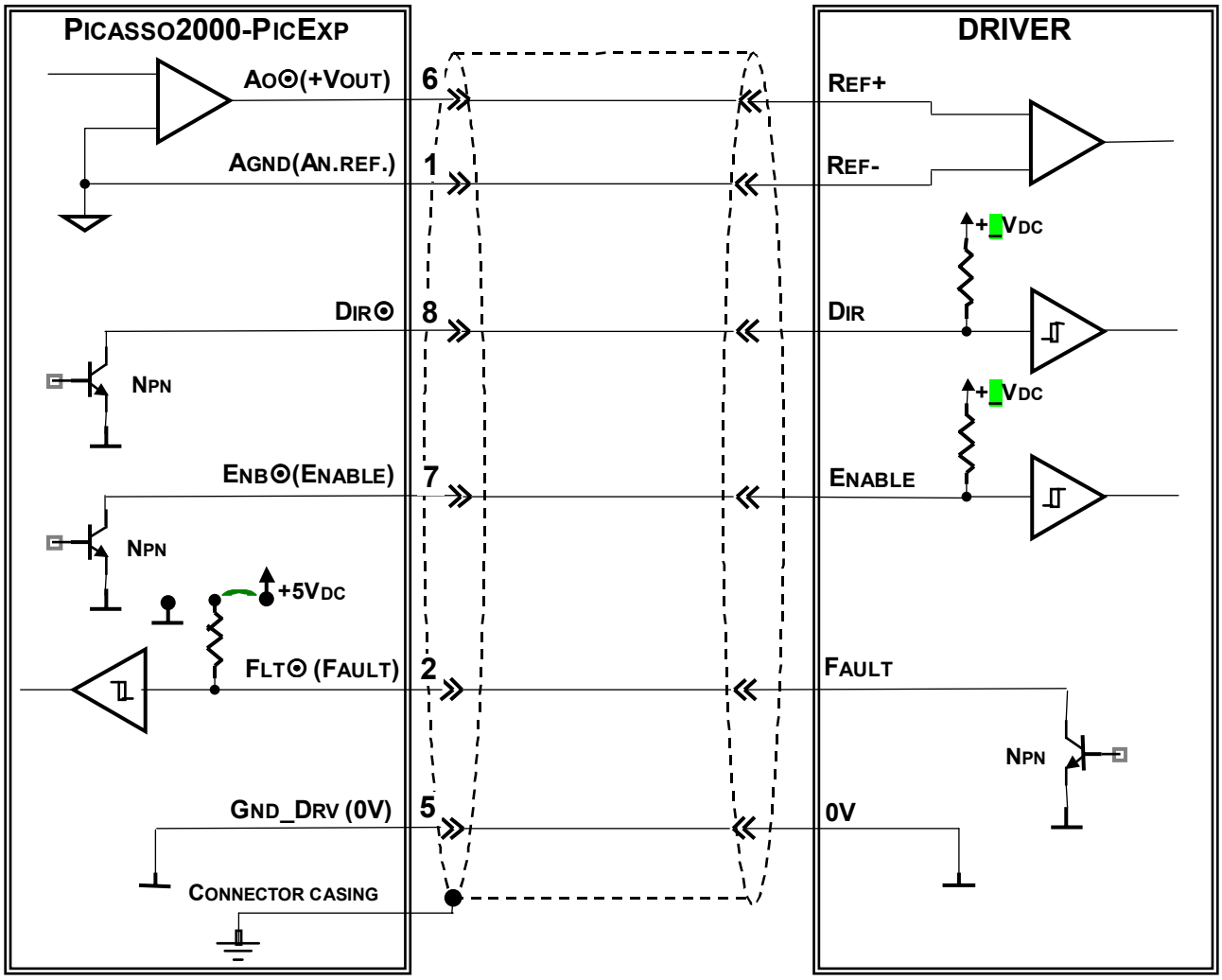
AXIS 4 (W) DRIVER

9 POLE MALE D-CONNECTOR

X12

Pin	Signal	I/O
1	AGND(AN.REF.)	-
2	FLT④ (FAULT)	I
3		
4		
5	GND_DRV (0V)	-
6	AO① (+VOUT)	O
7	ENB①(ENABLE)	O
8	DIR①	O
9		

Note: The **DIR⊙** SIGNAL must only be connected if required



Note: The cable screen must be connected to the casing of the controller

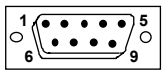
Note: If the **DRIVER** does not have internal pull-up resistors, these must be provided externally

Analogue output **+VOUT** is: ±10V / 16 bit resolution.

DRIVER CONNECTIONS (FREQUENCY)

CONNECTORS: X3, X6, X9, X12

AXIS 1 (X) DRIVER

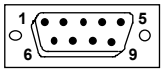


9-POLE MALE D-CONNECTOR

X3

Pin	Signal	I/O
1		
2	FLT① (FAULT)	I
3	PULSE①	O
4		
5	GND_DRV (0V)	-
6		
7	ENB①(ENABLE)	O
8	DIR①	O
9		

AXIS 2 (Y) DRIVER

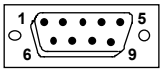


9-POLE MALE D-CONNECTOR

X6

Pin	Signal	I/O
1		
2	FLT② (FAULT)	I
3	PULSE②	O
4		
5	GND_DRV (0V)	-
6		
7	ENB②(ENABLE)	O
8	DIR②	O
9		

AXIS 3 (Z) DRIVER

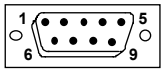


9-POLE MALE D-CONNECTOR

X9

Pin	Signal	I/O
1		
2	FLT③ (FAULT)	I
3	PULSE③	O
4		
5	GND_DRV (0V)	-
6		
7	ENB③(ENABLE)	O
8	DIR③	O
9		

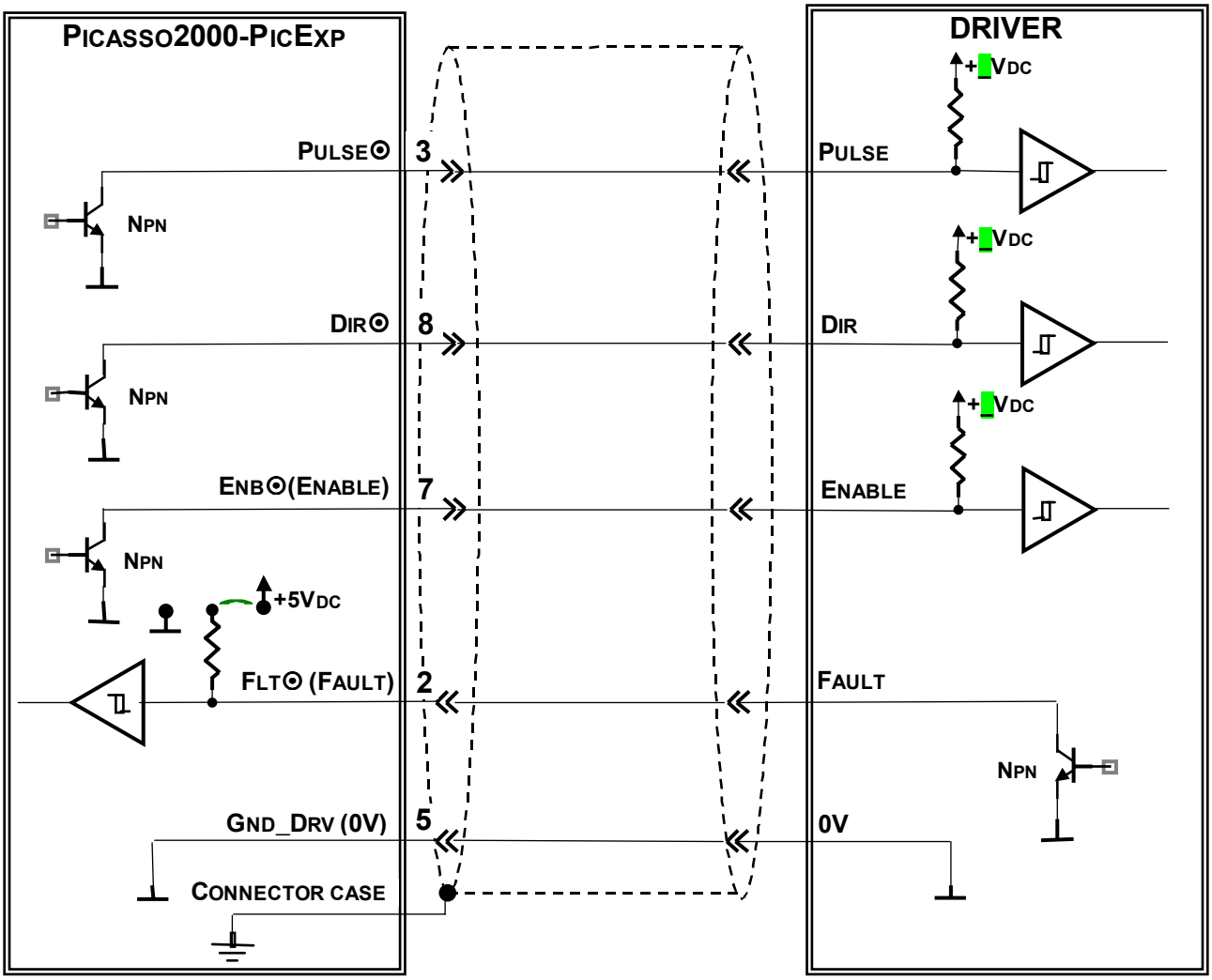
AXIS 4 (W) DRIVER



C9-POLE MALE D-CONNECTOR

X12

Pin	Signal	I/O
1		
2	FLT④ (FAULT)	I
3	PULSE①	O
4		
5	GND_DRV (0V)	-
6		
7	ENB①(ENABLE)	O
8	DIR①	O
9		



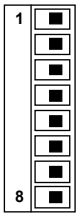
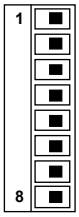
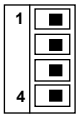
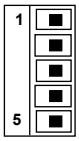
Note: The cable screen must be connected to the casing of the controller

Note: If the **DRIVER** does not have internal pull-up resistors, these must be provided externally

Note: Frequency output Pulse is maximum 800KHz with 50% duty-cycle

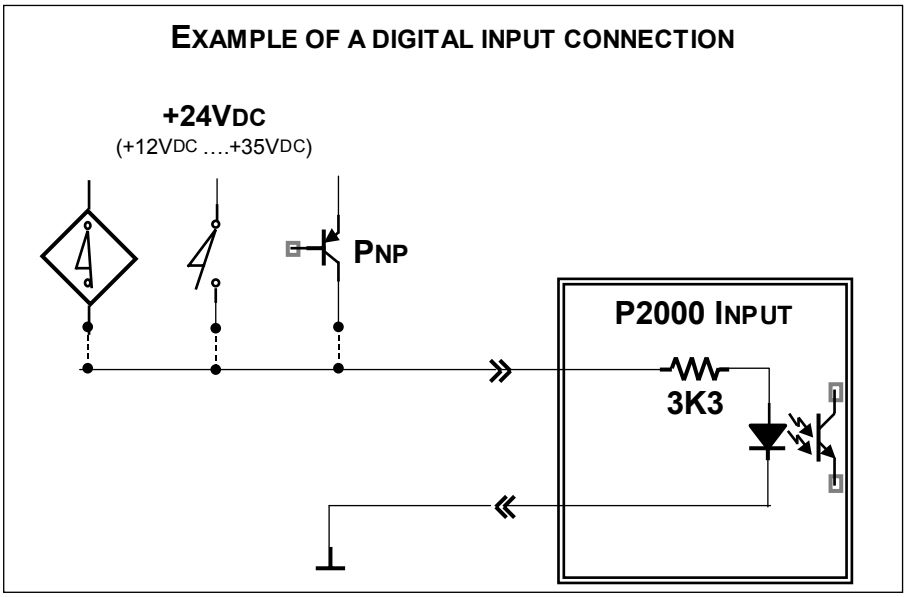
DIGITAL INPUT CONNECTIONS

TERMINALS: X18, X17, X16

TERMINALS	PIN	SIGNAL	DESCRIPTION	I/O
X18 	1	INP1	DIGITAL INPUT NO. 1	I
	2	INP2	DIGITAL INPUT NO. 2	I
	3	INP3	DIGITAL INPUT NO. 3	I
	4	INP4	DIGITAL INPUT NO. 4	I
	5	INP5	DIGITAL INPUT NO. 5	I
	6	INP6	DIGITAL INPUT NO. 6	I
	7	INP7	DIGITAL INPUT NO. 7	I
	8	INP8	DIGITAL INPUT NO. 8	I
X17 	9	LS①-	LIMIT SWITCH FORWARD (-) AXIS①	I
	10	LS①+	LIMIT SWITCH REVERSE (+) AXIS①	I
	11	LS②-	LIMIT SWITCH FORWARD (-) AXIS②	I
	12	LS②+	LIMIT SWITCH REVERSE (+) AXIS②	I
	13	LS③-	LIMIT SWITCH FORWARD (-) AXIS③	I
	14	LS③+	LIMIT SWITCH REVERSE (+) AXIS③	I
	15	LS④-	LIMIT SWITCH FORWARD (-) AXIS④	I
	16	LS④+	LIMIT SWITCH REVERSE (+) AXIS④	I
X16 	17	HOME①	MACHINE ZERO : AXIS①	I
	18	HOME②	MACHINE ZERO: AXIS②	I
	19	HOME③	MACHINE ZERO: AXIS③	I
	20	HOME④	MACHINE ZERO: AXIS④	I
X14 	29	COM_24V DC	0REF. SUPPLY INPUT (0V DEL +24VDC)	-
	30	+24VDC	+24VDC SUPPLY INPUT	-
	31	GROUND		-
	32			
	33			

INPUT: TYPE PNP 24VDC

EXAMPLE OF A DIGITAL INPUT CONNECTION



P2000 IMAGE OF INPUTS 31....0

IMAGE OF INPUTS 31…0

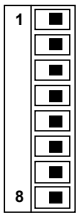
Bit / Input	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00

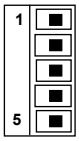
Bit	Input	Description		Connector / pin
00	INP1	DIGITAL INPUT NO.1		X18 – 1
01	INP2	DIGITAL INPUT NO.2		X18 – 2
02	INP3	DIGITAL INPUT NO.3		X18 – 3
03	INP4	DIGITAL INPUT NO.4		X18 – 4
04	INP5	DIGITAL INPUT NO.5		X18 – 5
05	INP6	DIGITAL INPUT NO.6		X18 – 6
06	INP7	DIGITAL INPUT NO.7		X18 – 7
07	INP8	DIGITAL INPUT NO.8		X18 – 8
08	Ls①-	LIMIT SWITCH FORWARD (-)	AXIS①	X17 – 9
09	LS①+	LIMIT SWITCH REVERSE (+)		X17 – 10
10	LS②-	LIMIT SWITCH FORWARD (-)	AXIS②	X17 – 11
11	LS②+	LIMIT SWITCH REVERSE (+)		X17 – 12
12	LS③-	LIMIT SWITCH FORWARD (-)	AXIS③	X17 – 13
13	LS③+	LIMIT SWITCH REVERSE (+)		X17 – 14
14	LS④-	LIMIT SWITCH FORWARD (-)	AXIS④	X17 – 15
15	LS④+	LIMIT SWITCH REVERSE (+)		X17 – 16
16	HOME①	MACHINE ZERO	AXIS①	X16 – 17
17	HOME②	MACHINE ZERO	AXIS②	X16 – 18
18	HOME③	MACHINE ZERO	AXIS③	X16 – 19
19	HOME④	MACHINE ZERO	AXIS④	X16 – 20
20	FLT①	FAULT INPUT	*DRIVER* ①	X3 – 2
21	FLT②	FAULT INPUT	*DRIVER* ②	X6 – 2
22	FLT③	FAULT INPUT	*DRIVER* ③	X9 – 2
23	FLT④	FAULT INPUT	*DRIVER* ④	X12 – 2
24				
25				
26				
27				
28				
29				
30				
31				

Note: To read the inputs from the CNC program, use the instructions :
G66 P0…P23
G65 P0…P23
G69 P0…P23

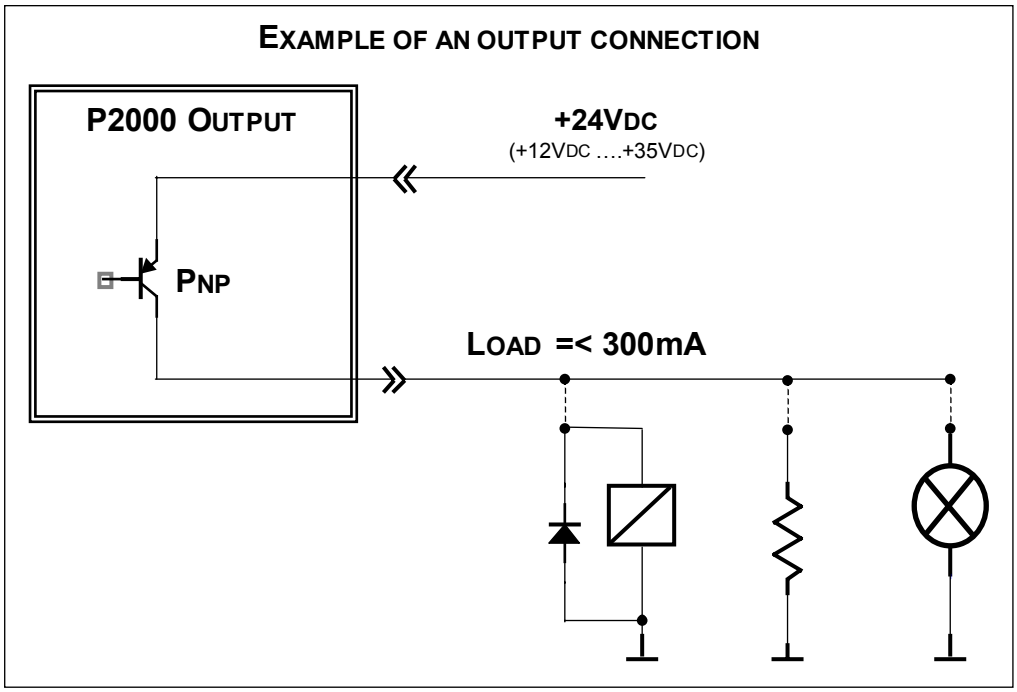
DIGITAL OUTPUT CONNECTIONS

TERMINALS: X15

TERMINALS	*PIN*	*SIGNAL*	*DESCRIPTION*	*I/O*
X15 	**21**	**OUT1**	**DIGITAL OUTPUT NO.1**	O
	22	**OUT2**	**DIGITAL OUTPUT NO.2**	O
	23	**OUT3**	**DIGITAL OUTPUT NO.3**	O
	24	**OUT4**	**DIGITAL OUTPUT NO.4**	O
	25	**OUT5**	**DIGITAL OUTPUT NO.5**	O
	26	**OUT6**	**DIGITAL OUTPUT NO.6**	O
	27	**OUT7**	**DIGITAL OUTPUT NO.7**	O
	28	**OUT8**	**DIGITAL OUTPUT NO.8**	O

X14 	**29**	**COM_24V DC**	**0REF. SUPPLY INPUT (0V DEL +24VDC)**	-
	30	**+24VDC**	**+24VDC SUPPLY INPUT**	-
	31	**GROUND**		-
	32			
	33			

OUTPUTS: TYPE PNP 24VDC / 300MA



P2000 IMAGE OF THE OUTPUTS 31....0

IMAGE OF THE OUTPUTS 31…0

Bit / input	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00

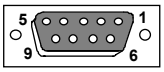
Bit	Output	Description		Connector / pin
00	OUT1	DIGITAL OUTPUT NO. 1		X15 – 21
01	OUT2	DIGITAL OUTPUT NO. 2		X15 – 22
02	OUT3	DIGITAL OUTPUT NO. 3		X15 – 23
03	OUT4	DIGITAL OUTPUT NO. 4		X15 – 24
04	OUT5	DIGITAL OUTPUT NO. 5		X15 – 25
05	OUT6	DIGITAL OUTPUT NO. 6		X15 – 26
06	OUT7	DIGITAL OUTPUT NO. 7		X15 – 27
07	OUT8	DIGITAL OUTPUT NO. 8		X15 – 28
08	DIR①	DIRECTION OUTPUT	*DRIVER①*	X3 – 7
09	ENB①	ENABLE OUTPUT		X3 – 8
10	DIR②	DIRECTION OUTPUT	*DRIVER②*	X6 – 7
11	ENB②	ENABLE OUTPUT		X6 – 8
12	DIR③	DIRECTION OUTPUT	*DRIVER③*	X9 – 7
13	ENB③	ENABLE OUTPUT		X9 – 8
14	DIR④	DIRECTION OUTPUT	*DRIVER④*	X12 – 7
15	ENB④	ENABLE OUTPUT		X12 – 8
16	ENB⑤	ENABLE OUTPUT	*DRIVER⑤*	X11 – 7
17	ENB⑥	ENABLE OUTPUT	*DRIVER⑥*	X11 – 8
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				

Note: To write the outputs from the CNC program use the instructions :
G67 P0…P7
G68 P0…P7

ANALOGUE INPUT CONNECTIONS

CONNECTOR: X5

ANALOGUE INPUTS

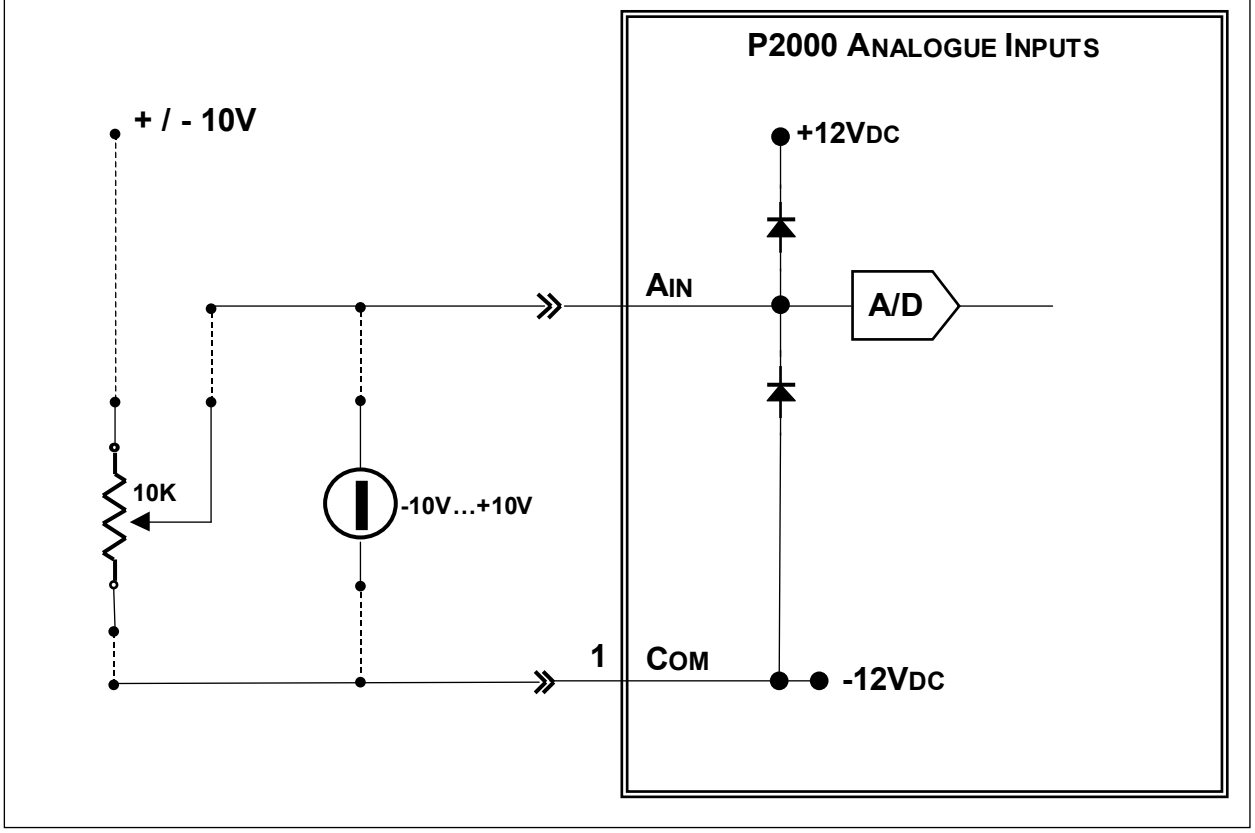


9-POLE FEMALE
D-CONNECTOR

X5

Pin	*Signal*	*I/O*
1	COM	-
2	AIN1	I
3	AIN2	I
4	AIN3	I
5	AIN4	I
6	AIN5	I
7	AIN6	I
8	AIN7	I
9	AIN8	I

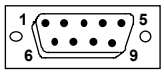
EXAMPLE OF AN ANALOGUE INPUT CONNECTION



ANALOGUE OUTPUT CONNECTIONS

CONNECTOR: X11

ANALOGUE OUTPUTS

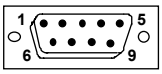


9-POLE MALE
D-CONNECTOR
X11

Pin	*Signal*	*I/O*
1	**AGND(AN.REF.)**	-
2	**OUT1 (PWM)**	O
3	**AGND(AN.REF.)**	-
4	**AO⑥ (+VOUT)**	O
5	**GND_DRV (0V)**	-
6	**AO⑤ (+VOUT)**	O
7	**ENB①(ENABLE)**	O
8	**ENB⑤ (ENABLE)**	O
9	**OUT2 (PWM)**	O

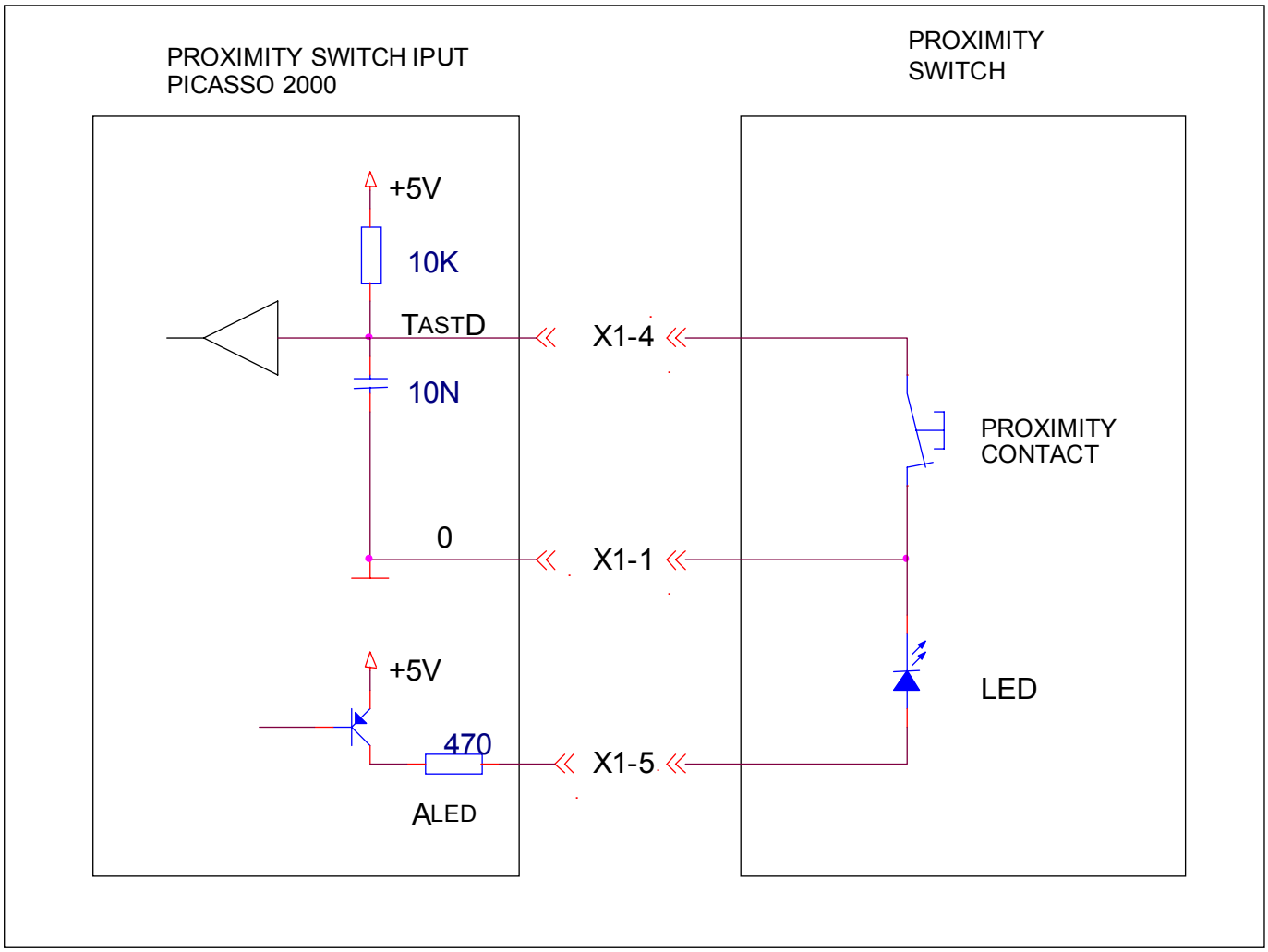
CONNECTION OF THE PROXIMITY SWITCH

PROXIMITY

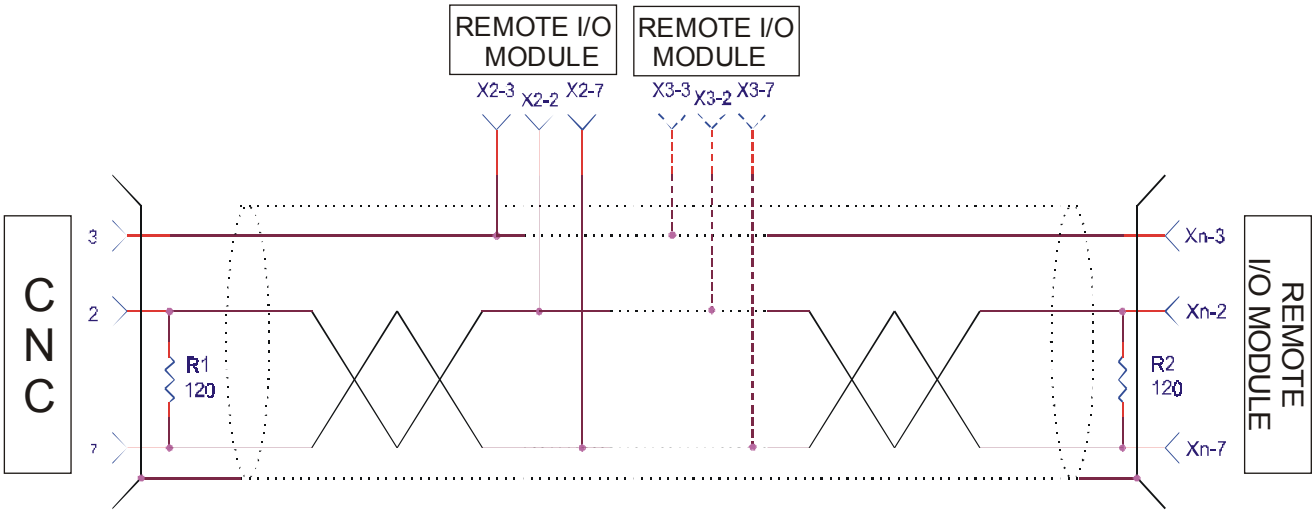


9-POLE MALE
D-CONNECTOR
X1

Pin	*Segnale*	*I/O*
1	**0V**	-
2	**+5V**	-
3	**TAUX**	I
4	**TASTD**	I
5	**ALED**	O
6		
7		
8		
9		



CAN-BUS CONNECTION



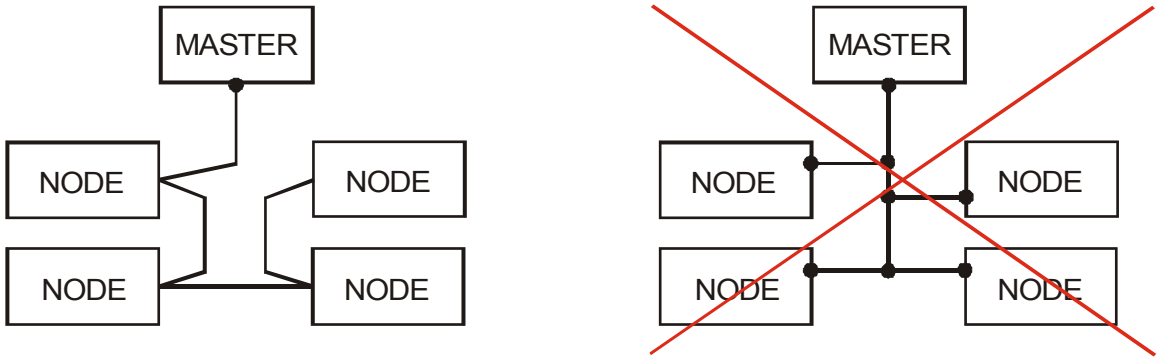
The termination resistances (120Ω) are placed at the beginning, in the connector to the CNC, and the end of the cable (see figure).
The devices connected in intermediate positions do not require a termination resistance.

Belden type 3082A or equivalent cable is recommended.

The screen must be connected to the casing of the connector.

INSTALLATION RECOMMENDATIONS

1. The network units must be connected in cascade.
2. Avoid completely any star or tree topography for the connections (see the following figure).



PERMITTED CONFIGURATION

FORBIDDEN CONFIGURATION

CAN Network Configuration

3. Use the same type of cable for the whole installation (screened, twisted pair).