MEASUREMENT AND CONTROL ELECTRONICS E90

Index

1. Introduction

This electronics is multi-purpose and is able to carry out the unbalance measurement of armatures and other functions of process management.

The logical subdivision is the following:

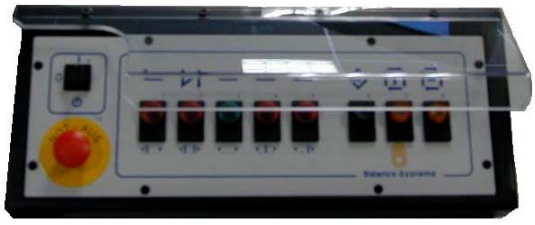
- Process operation. It manages all control functions of the measuring process and operates with the external world by means of more serial lines. The connection can be done to a normal PC or with the supervisor of a more complex machine.
- Control of trailing motor. It is a real electronic control for brushless motor with position control. The aim of this section is to bring in rotation the rotor to be measured (in manual machines it carries out the positioning of the correction points during the correction phase). The control is a closed-loop system with feedback by means of resolver. In particular cases an encoder is installed.
- Unbalance measurement. This section defines to analyze the unbalance of a rotor, by performing the resolution of vectors and separation of compensation planes. The inputs relative to the vibration transducers and the polar expansion reading sensor refer to this section.
- Inputs / Outputs. This section basically consists of an input/output card and is used to control the cycle of measurement and correction. It is used to control all the digital signals which may be used during the cycle, for example buttons and solenoid valves. Because of its large capacity to fit, the description of the functions is explained in the next paragraphs.
- Card power supply. This card needs two main power supplies from which all others derive by means of the on-board power supply group. The first power supply consists of an input to be supplied at 24v DC, which will supply the electronic part. The second one is used to supply the trailing motor. To supply the trailing motor, a voltage included between 110 and 240V 50-60 Hz must be provided. In particular cases of high-torque motors, the voltage must be 230V. In case of complete systems, there is also the version with integrated power supply, where only the net power supply is provided, which supplies also the electronics part by using a supplementary power supplier.
- Connectors panel. It consists of an electronics card where all the connectors for external connection are located.
- Front control panel. It is installed only on manual and semiautomatic machines. It is composed of a keyboard for controlling the working cycle and of a series of signal lamps indicating the results of the measurement cycle. On the panel there are also the switch for interrupting power supply from the power part and the emergency button. On the back side of the panel there are installed the protection fuses.

2. Product Identification

There are two similar models of cabinet E90 in standard production: the version with internal power supply that is used on manual machines which has product code 9E900100000000 and the version without internal power supply which has product code 9E900200000000.
The two electronics can be completed with the front control panel (product code 9E900300000000).
In the following photos can be seen an electronics for automatic machines and one provided with front panel to be used on manual or semiautomatic machines.

9E900100000000

9E900000000000



9E901000000000 + 9E900000000000

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On the backside of the cabinet can be found an identification label carrying the product code and the serial number.

3. Components Description

3.1. Input / Output Card

The main functions of the card are:

- Digital input management.
- Digital output management; the outputs depend on the type of power supply. The interlocked power supply is linked with emergency functions. Therefore by opening the protection or by pressing the emergency button, they are automatically turned off. The outputs supplied directly by the non-interlocked circuit are not turned off even if the protections are open or the emergency buttons are pressed. On the card there are two outputs configurable as interlocked or not.
- Marker's head, The card allows to control two jet markers.

3.1.1. Layout of I/O card

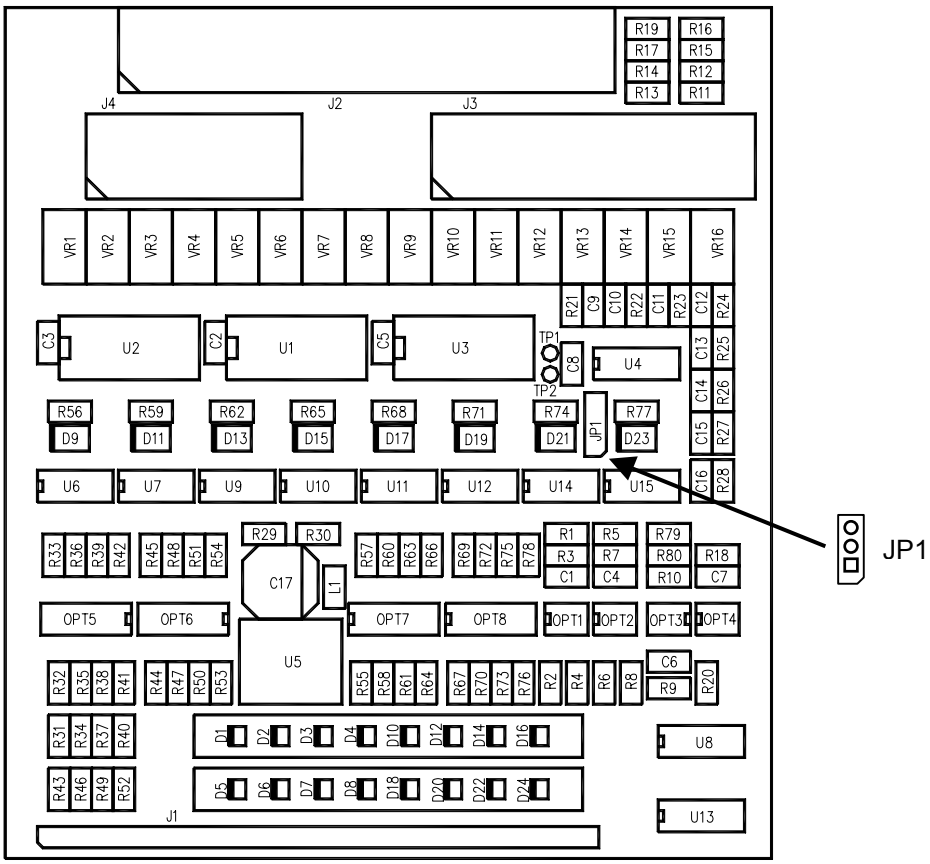


Table of Signalling LEDs			
Signal	HW Label	SW Address	Description
Inputs			
D1	IN1	0	Digital Input
D2	IN2	1	Digital Input
D3	IN3	2	Digital Input
D4	IN4	3	Digital Input
D5	IN5	4	Digital Input
D6	IN6	5	Digital Input
D7	IN7	6	Digital Input
D8	IN8	7	Digital Input
Outputs			
D10	OUT1	0	Digital output in positive logic. Power supply not interlocked.
D12	OUT2	1	Digital output in positive logic. Power supply not interlocked.
D14	OUT3	2	Digital output in positive logic. Power supply interlocked.
D16	OUT4	3	Digital output in positive logic. Power supply interlocked.
D18	OUT5	4	Digital output in positive logic. Power supply not interlocked
D20	OUT6	5	Digital output in positive logic. Power supply not interlocked.
D22	OUT7	6	Digital output in positive logic. Power supply depending on JP1
D24	OUT8	7	Digital output in positive logic. Power supply depending on JP1

Note: Maximum current provided on OUT1 = 450 mA
Maximum current provided on OUT2...OUT8 = 250 mA

3.1.2. Configuration of I/O card

		Default
	Output OUT7 e OUT8 are supplied by the not-interlocked power supply.	
	Output OUT7 e OUT8 are supplied by the interlocked power supply.	*

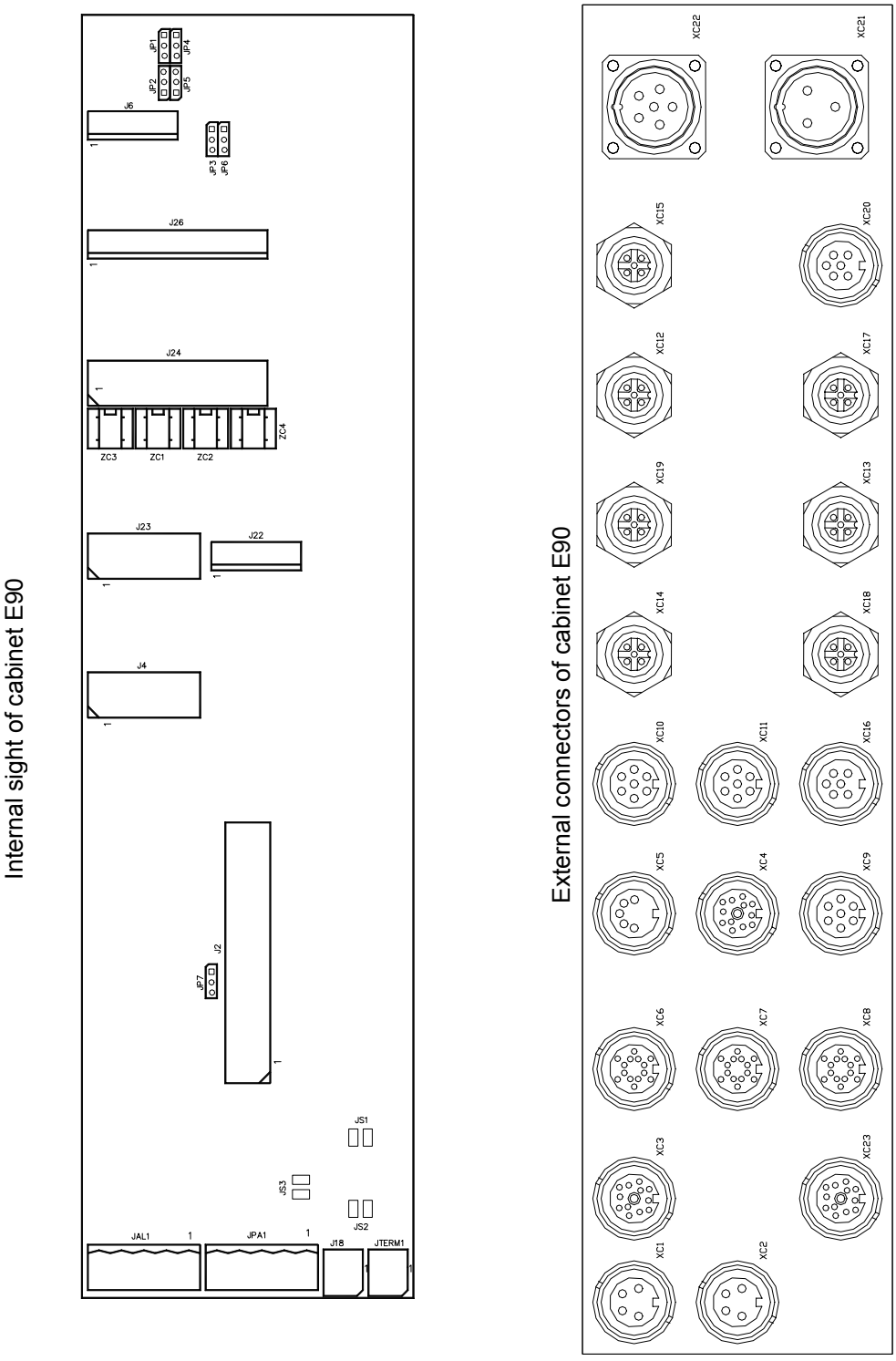
3.1.3. Connectors list of I/O card

I/O card Connectors	
J1	Connects the I/O card to the control card.
J2	Connects the I/O card to the back panel card for controlling the signals relative to inputs and outputs, and the power supply of the card itself.
J3	Connects the I/O card to the front panel card. The panel is composed of the command button board, for controlling buttons and signal lamps. Inputs and Outputs relative to the front panel are not visualized through signalling LEDs placed on the I/O Card.
J4	Connects the I/O card to the back panel card for controlling the signals relative to the jet markers.

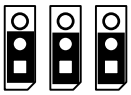
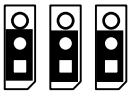
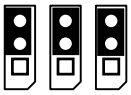
3.2. Back connectors panel

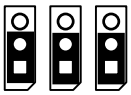
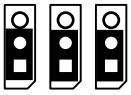
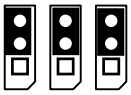
- Its main function is to limit the cabling in the card, distributing signals on different connectors outside the cabinet.
- Other function is to configuration from cabinet E90.

3.2.1. Lay out of Back Panel card



3.2.2. Back Panel Configuration

				Default
JP1	JP2	JP3	Vibration transducer input XC1	
			Mobile coil transducer	*
			Force transducer	
			Accelerometric transducer	

				Default
JP4	JP5	JP6	Vibration transducer input XC2	
			Mobile coil transducer	*
			Force transducer	
			Accelerometric transducer	

		Default
JP7	Digital input Configuration	
	Logic Configuration sensors PNP (Standard)	*
	Logic Configuration sensors NPN	

		Default
JS3	External emergency button for AC version	
	External emergency button on XC16	*
	No external emergency button on XC16	

		Default
JS3	External emergency button for DC version	
	External emergency button on XC16	
	No external emergency button on XC16	*

			Default
JS1	JS2	Electronic power supply, sensors, actuators for AC version	
		Internal power supply 24V	*
		External power supply 24V	

			Default
JS1	JS2	Electronic power supply, sensors, actuators for DC version	
		Internal power supply 24V	
		External power supply 24V	*

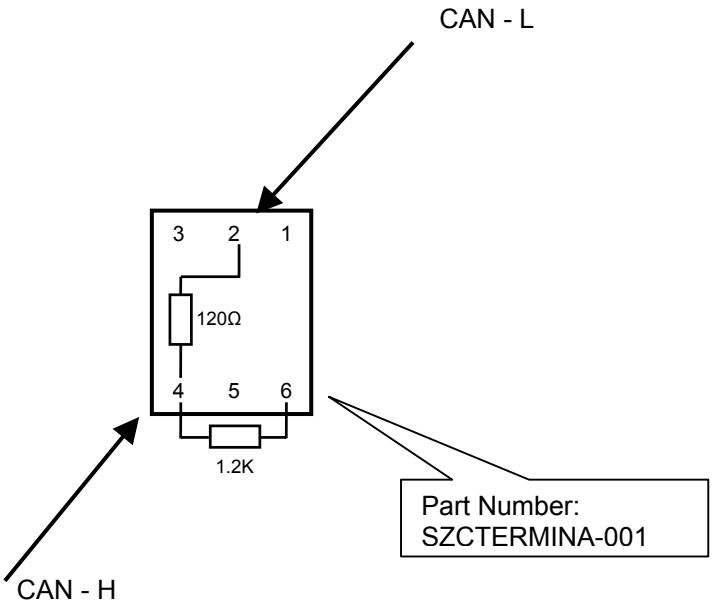
3.2.3. List of Back Panel card connectors

Back panel external connectors	
Label	Description
XC1	Vibration transducer input channel 0
XC2	Vibration transducer input channel 1
XC3	Analog input AN1, AN2, AN3
XC4	Trailing motor resolver
XC5	Input of polar expansions reading sensors.
XC6	Serial line. (RS485-1), (RS485-2 OPTIONAL), (CAN-OPEN)
XC7	Serial line. (RS485-1), (RS485-2 OPTIONAL), (Ethernet)
XC8	Serial line. (RS485-1), (RS485-2 OPTIONAL), (RS232C)
XC9	External display. (RS485-1)
XC10	Jet Marker channel 1
XC11	Jet Marker channel 0
XC12	Digital output OUT7, OUT8
XC13	Digital output. OUT3, OUT4
XC14	Digital output. OUT2, OUT5, OUT6
XC15	Digital input. IN7, IN8
XC16	Safety Guard. OUT1, IN2
XC17	Digital input. IN5, IN6
XC18	Digital input. IN1, IN3
XC19	Digital input. IN4
XC20	Supplementary power supply and panel emergency.
XC21	Trailing motor power supply.
XC22	Input power supply 110-240V 50/60Hz 6A.
XC23	Encoder trailing motor.
Back panel internal connectors	
Label	Description
J2	Connects the I/O card to the back panel card for controlling the signals relative to inputs and outputs, and the power supply of the card itself
J4	Connects the I/O card to the back panel card for controlling the signals relative to the jet markers.
J6	Connects the input of the vibration transducers to the control card.
J18	Connects the thermal protection of the trailing motor to the control card.
J22	Connects the resolver of the trailing motor to the control card.
J23	Connects the encoder of the trailing motor to the control card and to the polar expansions reading sensor
J24	Connects the serial lines to the control card.
J26	Connects the analog inputs to the control card.
JAL1	Power supply 24v connection (The machine can be provided of internal power supply)
JPA1	Connection of control front panel - installed only on manual or semiautomatic machines.
JTERM1	Connection of motor thermal protection signal

3.2.4. List of possible terminations on the serial lines

3.2.4.1. Termination CAN on ZC3

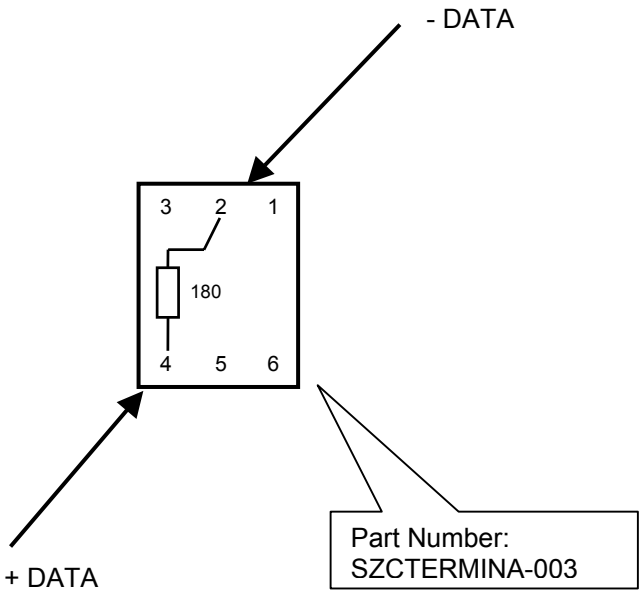
Connector Card



3.2.4.2. Termination RS 485 on ZC 1 and on ZC2

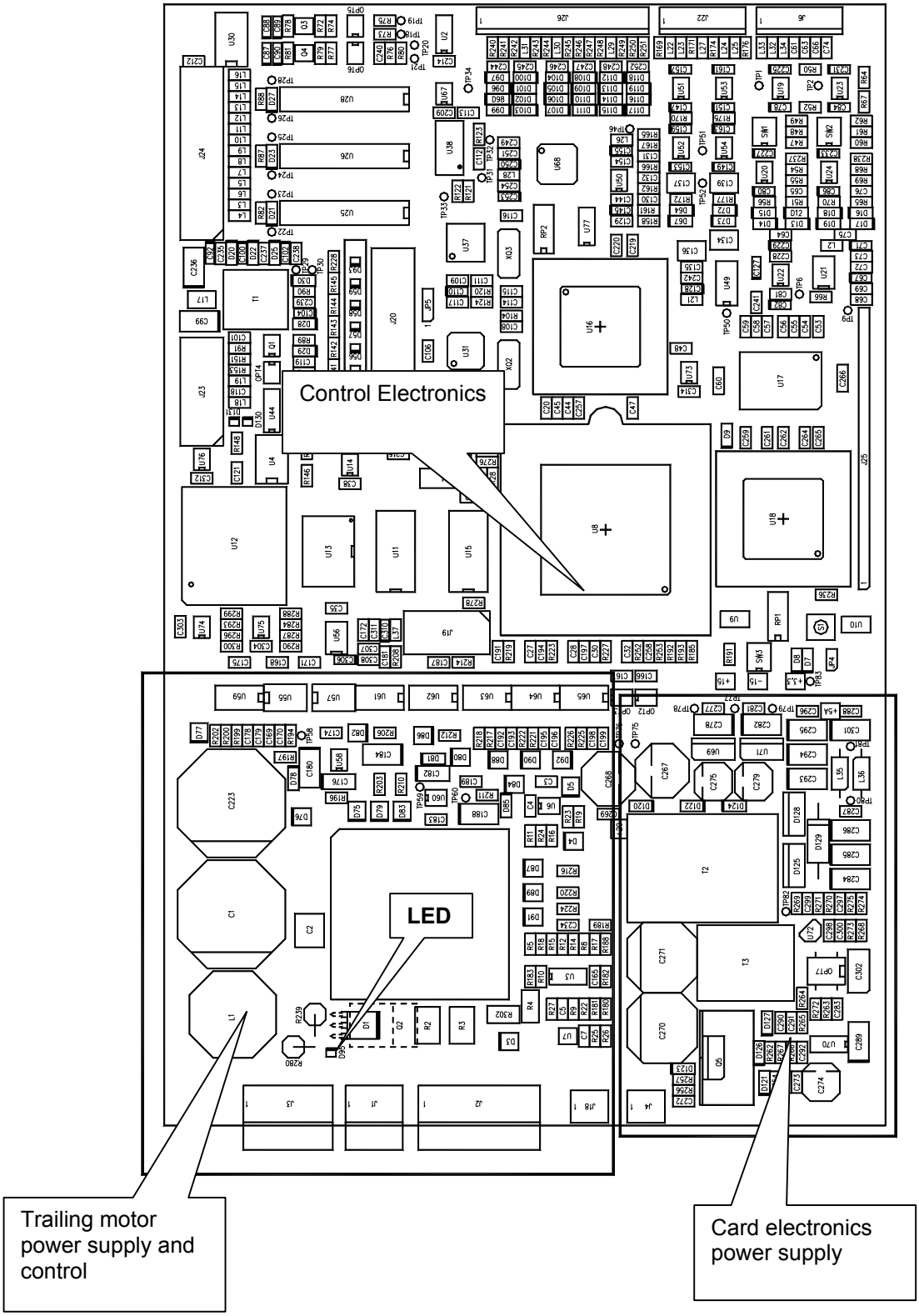
No terminations are required; however it is recommended to terminate the lines which are not used.

Connector Card

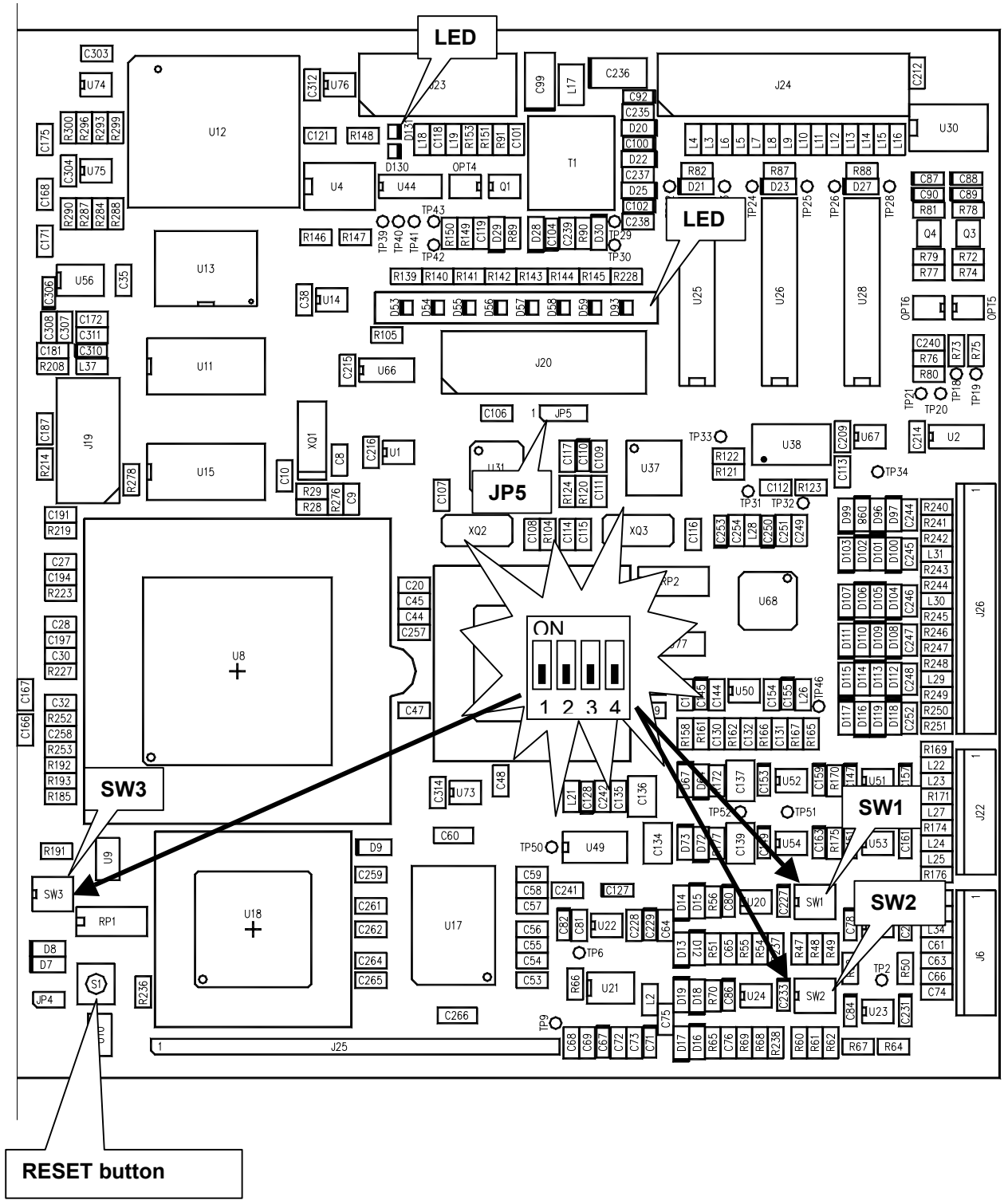


3.3. Control card

3.3.1. Lay out of Control card



3.3.1.1. Details of layout of control card



Signalling LED Table		
LED	HW Label	Description
D53	F0	Phase 0 of trailing motor encoder.
D54	F1	Phase 1 of trailing motor encoder.
D55	FZ	Zero of trailing motor encoder.
D56	SY0	Input 0 of polar expansions reading sensors
D57	SY1	Input 1 of polar expansions reading sensors
D58	+3.3V_DIG	Card power supply +3.3V Digital
D59	+15V_AN	Card power supply +15V Analog
D93	-15V_AN	Card power supply -15V Analog
D95	300V	Power supply Circuit of trailing motor - live
D130	RUN	Signalling LED for CPU status
D131	SPARE	Diagnostics LED - not assigned.

Defines for the management of internal I/O

HW Label	SW Address	Description
Input		
E90I_IN1	0	IN1 card I/O
E90I_IN2	1	IN2 card I/O
E90I_IN3	2	IN3 card I/O
E90I_IN4	3	IN4 card I/O
E90I_IN5	4	IN5 card I/O
E90I_IN6	5	IN6 card I/O
E90I_IN7	6	IN7 card I/O
E90I_IN8	7	IN8 card I/O
E90I_INPAN1	8	INPAN1 card I/O
E90I_INPAN2	9	INPAN2 card I/O
E90I_INPAN3	10	INPAN3 card I/O
E90I_INPAN4	11	INPAN4 card I/O
E90I_IN_AUX1	12	IN_AUX1 card I/O
E90I_IN_AUX2	13	IN_AUX2 card I/O
E90I_IN_AUX3	14	IN_AUX3 card I/O
E90I_IN_AUX4	15	IN_AUX4 card I/O
E90I_L_EC_A	16	L_EC_A Dsp internal
E90I_L_EC_B	17	L_EC_B Dsp internal
E90I_L_EC_0	18	L_EC_0 Dsp internal
E90I_L_CV_A	19	L_CV_A Dsp internal
E90I_L_CV_B	20	L_CV_B Dsp internal
E90I_MFAUL	21	fault signalling for trailing motor

HW Label	SW Address	Description
Output		
E90O_OUTPNP1	0	OUTPNP1 card I/O
E90O_OUTPNP2	1	OUTPNP2 card I/O
E90O_OUTPNP3	2	OUTPNP3 card I/O
E90O_OUTPNP4	3	OUTPNP4 card I/O
E90O_OUTPNP5	4	OUTPNP5 card I/O
E90O_OUTPNP6	5	OUTPNP6 card I/O
E90O_OUTPNP7	6	OUTPNP7 card I/O
E90O_OUTPNP8	7	OUTPNP8 card I/O
E90O_INKJET_SX0	8	INKJET_SX0 card I/O
E90O_INKJET_SX1	9	INKJET_SX1 card I/O
E90O_INKJET_SX2	10	INKJET_SX2 card I/O
E90O_INKJET_SX3	11	INKJET_SX3 card I/O
E90O_INKJET_SX4	12	INKJET_SX4 card I/O
E90O_INKJET_SX5	13	INKJET_SX5 card I/O
E90O_INKJET_DX0	14	INKJET_DX0 card I/O
E90O_INKJET_DX1	15	INKJET_DX1 card I/O
E90O_INKJET_DX2	16	INKJET_DX2 card I/O
E90O_INKJET_DX3	17	INKJET_DX3 card I/O
E90O_INKJET_DX4	18	INKJET_DX4 card I/O
E90O_INKJET_DX5	19	INKJET_DX5 card I/O
E90O_OUTPAN1	20	OUTPAN1 card I/O
E90O_OUTPAN2	21	OUTPAN2 card I/O
E90O_OUTPAN3	22	OUTPAN3 card I/O
E90O_OUTPAN4	23	OUTPAN4 card I/O
E90O_OUTPAN5	24	OUTPAN5 card I/O
E90O_OUTPAN6	25	OUTPAN6 card I/O

HW Label	SW Address	Description
Output		
E90O_OUTPAN7	26	OUTPAN7 scheda I/O
E90O_OUTPAN8	27	OUTPAN8 card I/O
E90O_OUTPAN9	28	OUTPAN9 card I/O
E90O_OUTNPN_AUX1	29	OUTNPN_AUX1 card I/O
E90O_OUTNPN_AUX2	30	OUTNPN_AUX2 card I/O
E90O_OUTNPN_AUX3	31	OUTNPN_AUX3 card I/O
E90O_MOTEN	32	Enable / disable Trailing motor
E90O_EN_SER_OUT	33	Enable / disable Shift Register Output

3.3.2. Configuration of Control card

		Default
JP5	Configuration of transmission line CAN_OPEN	
	Not allowed	
	Standard Configuration (DO NOT CHANGE)	*

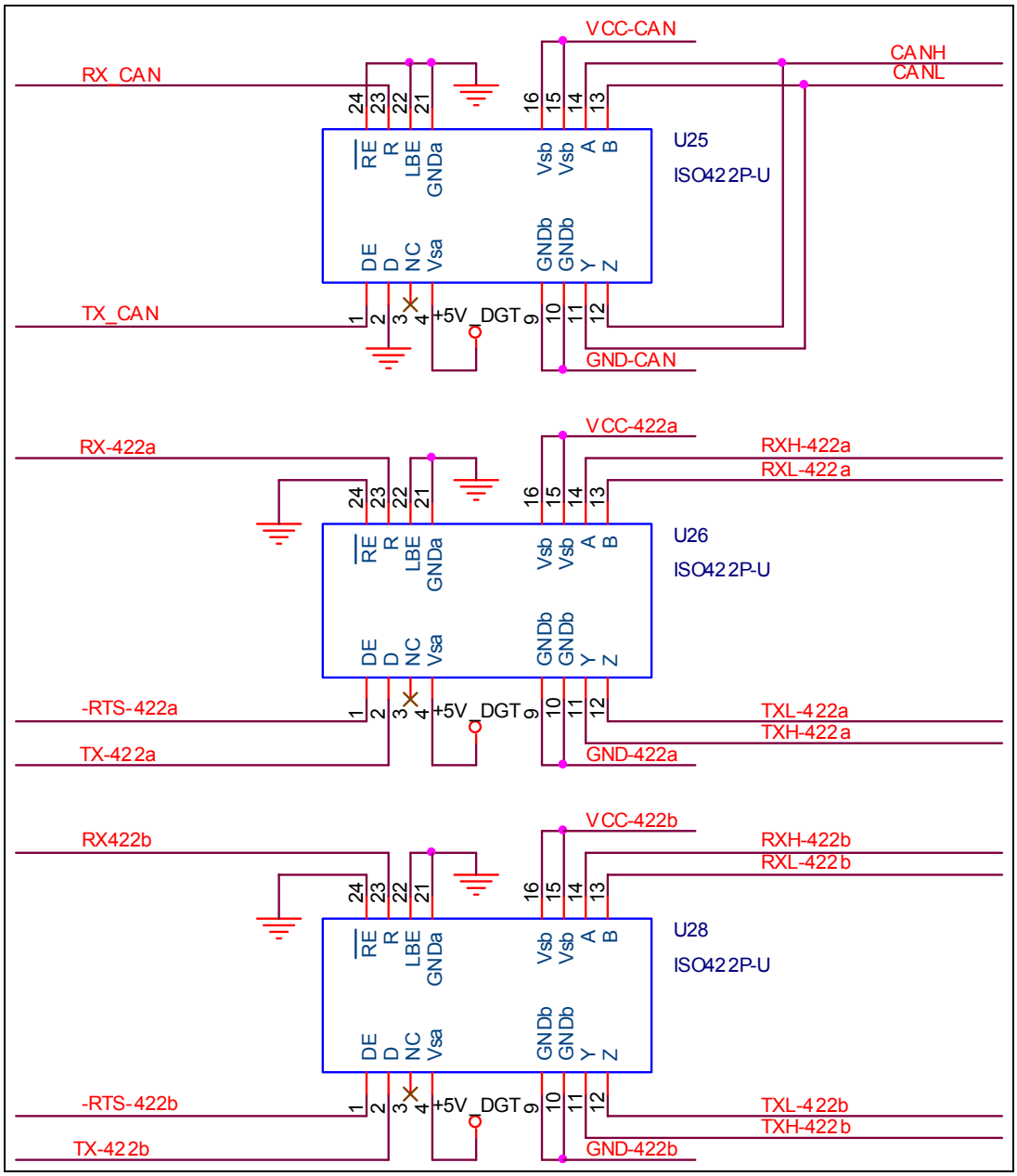
Configuration table of vibration transducers gain					
Channel 0 - input transducers XC1					
Gain =	SW1.1	SW1.2	SW1.3	SW1.4	Default
1	X	OFF	OFF	OFF	*
101	X	ON	OFF	OFF	
11	X	OFF	ON	OFF	
2	X	OFF	OFF	ON	
Channel 1 - input transducers XC2					
Gain =	SW2.1	SW2.2	SW2.3	SW2.4	Default
1	X	OFF	OFF	OFF	*
101	X	ON	OFF	OFF	
11	X	OFF	ON	OFF	
2	X	OFF	OFF	ON	

Configuration table		
Configuration Boot µP		
SW31	OFF	Reserved
SW32	OFF	Reserved
SW33	OFF	Reserved
SW34	OFF	Reserved
	DO NOT CHANGE (USED FOR PROGRAMMING)	

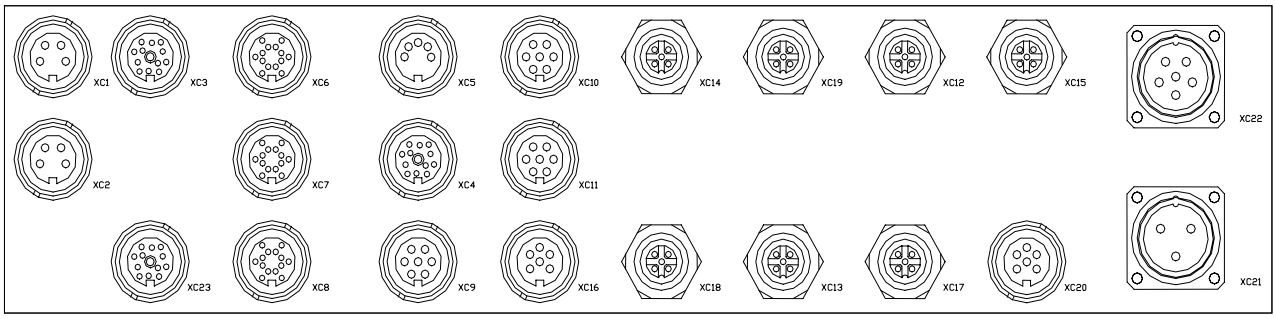
3.3.3. List of control card connectors

Connectors of measurement and control card	
J1	Connects a possible brake resistance for the trailing motor.
J2	Connects the trailing motor power supply to the power connector XC21.
J3	Connects the input of the power supply voltage for the trailing motor.
J4	Connects the input of the power supply voltage for the electronics. (24Vdc)
J6	Connects the input of the vibration transducers to the connectors panel card.
J18	Connects the thermal protection of the trailing motor to the connectors panel card.
J22	Connects the resolver of the trailing motor to the connectors panel card
J23	Connects the encoder of the trailing motor to the connectors panel card and to the polar expansions reading sensor.
J24	Connects the serial lines to the connectors panel card.
J25	Connects the input/output card.
J26	Connects the analog inputs to the connectors panel card
JP4	External reset Connection.

3.3.3.1. Layout detail of section of isolated communication channels



4. External Connections



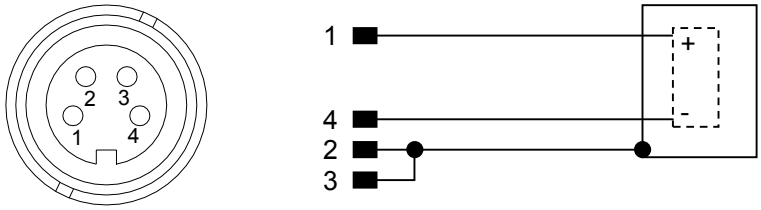
4.1. Peripherals Connection

4.1.1. Vibration transducers

The system allows to connect different types of transducers for vibration detection. For their configuration, operate on the back panel (JP1...JP6) for the transducer type and on SW1, SW2 of the control card to determine the gain. See paragraphs 3.2.2 and 3.3.2.

4.1.1.1. Mobile coil / transducer connection

XC1	Signal	Description
1	-DX	Input Signal (defined as negative) channel 0
2	GND	Ground Connection of transducer channel 0
3	GND	Ground Connection of transducer channel 0
4	+DX	Input Signal (defined as positive) channel 0
XC2	Signal	Description
1	-SX	Input Signal (defined as negative) channel 1
2	GND	Ground Connection of transducer channel 1
3	GND	Ground Connection of transducer channel 1
4	+SX	Input Signal (defined as positive) channel 1



4.1.1.2. Accelerometer Connection

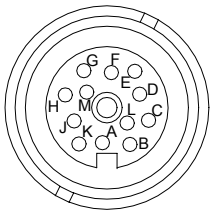
XC1	Signal	Description
1	-15V-AN1	Negative power supply of accelerometer channel 0
2	+15V-AN1	Positive power supply of accelerometer channel 0
3	GND	Ground Connection of transducer channel 0
4	+DX	Input signal of accelerometer channel 0
XC2	Signal	Description
1	-15V-AN1	Negative power supply of accelerometer channel 1
2	+15V-AN1	Positive power supply of accelerometer channel 1
3	GND	Ground Connection of transducer channel 1
4	+SX	Input signal of accelerometer channel 1

4.1.2. Analog Input

The system is provided with three not galvanically isolated analog inputs. To use them it is necessary to use the external conditioning electronics that receives power supply directly from the E90 cabinet and provides to isolate the inputs and to adapt the reference voltages.

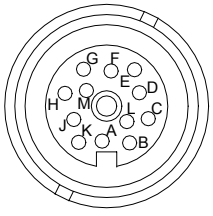
The direct use is not recommended because of missing protections and because the operating voltages are included between 1.4-3.6V referred to ground (GND).

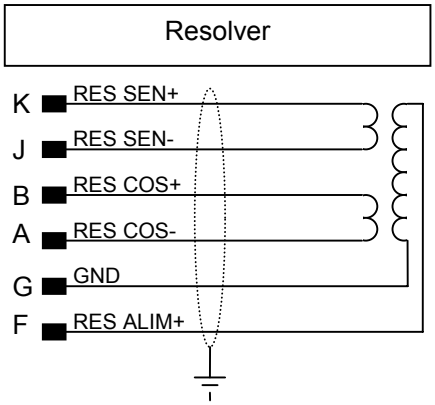
XC3	Signal	Description
A	-AN1	Negative reference analog input 1
B	+AN1	Positive reference analog input 1
C	-AN2	Negative reference analog input 2
D	+AN2	Positive reference analog input 2
E	+15V-AN	Positive Power supply
F	REF-OUT	Reference Connection
G	GND	Analog ground connection - control card
H	GND	Analog ground connection - control card
J	-AN3	Negative reference analog input 3
K	+AN3	Positive reference analog input 3
L	-15V-AN	Negative Power supply
M	GND	Ground Connection



4.1.3. Connection of trailing motor Resolver

XC4	Signal	Description
A	RES COS-	Negative Input resolver COSINE
B	RES COS+	Positive Input resolver COSINE
C	TERM1	Input PTC motor temperature control
D	TERM0	Input PTC motor temperature control
F	RES ALIM+	Resolver positive excitation
G - H	RES ALIM0	Resolver excitation
K	RES SEN+	Positive Input resolver SINE
J	RES SEN-	Negative Input resolver SINE
M	PE	Ground Connection

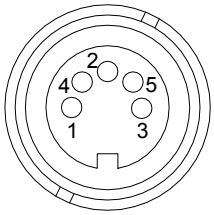


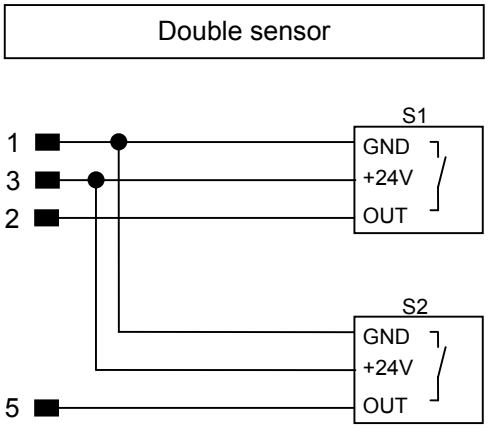


4.1.4. Polar expansions reading sensor

This is the sensor or pair of sensors used to detect the references at every revolution of the rotor. Both inductive sensors, to detect the polar expansions, or photocells, to detect the polar expansions or other reference marks, can be used. The pair of sensors is used in those applications where it is necessary to ensure a correct positioning of the rotor, even if it is worked by an operator (usually with manual operational conditions).

XC5	Signal	Description
1	GND	Sensor power supply
2	SY1	Input sensor 1. Sensors of type NPN normally open
3	+24V-EL	Sensor power supply
4	PE	Ground Connection
5	SY3	Input sensor 2. Sensors of type NPN normally open

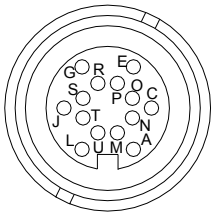


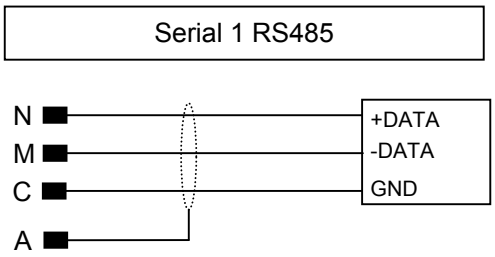


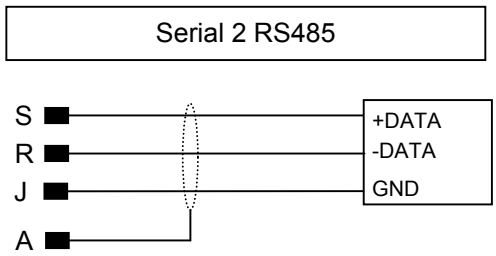
4.1.5. Serial lines

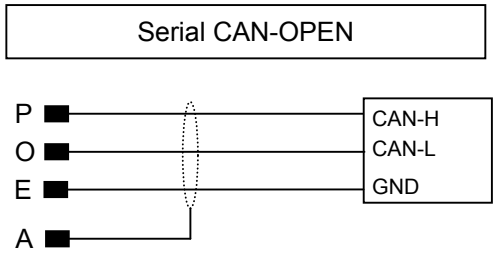
The serial lines are distributed on more connectors to make the wiring operations easier. The Serial RS485-1 is configured mainly for the external display if it is installed.

XC6	Signal	Description
A	024V-EL	Power supply reference 24V
C	GND1	Serial line RS485 1 reference
E	GND-CAN	Reference serial line CAN-OPEN
G	+24V-EL	Power supply 24V
J	GND2	Serial line RS485 2 reference
L	N.C.	Terminal not connected
M	-DATA1	Serial RS485 1 inverted signal
N	+DATA1	Serial RS485 1 signal
O	CAN-L	Low signal CAN-OPEN line
P	CAN-H	High signal CAN-OPEN line
R	-DATA2	Serial RS485 2 inverted signal
S	+DATA2	Serial RS485 2 signal
T	N.C.	Terminal not connected
U	N.C.	Terminal not connected

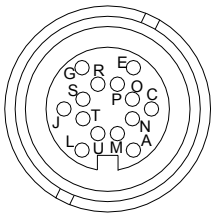


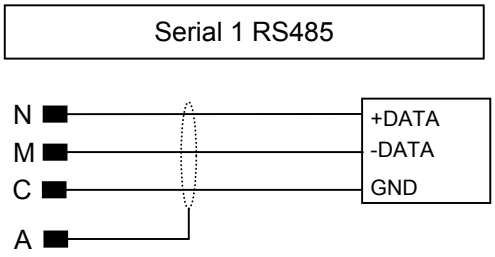


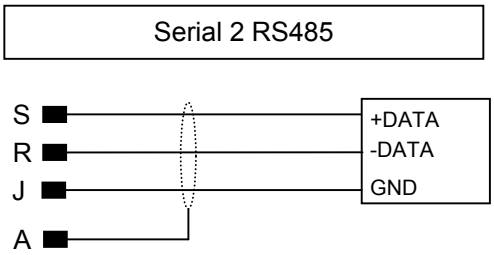


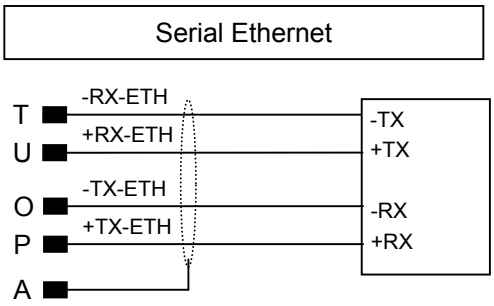


XC7	Signal	Description
A	024V-EL	Reference power supply 24V
C	GND1	Serial line RS485 1 reference
E	N.C.	Terminal not connected
G	+24V-EL	Power supply 24V
J	GND2	Serial line RS485 2 reference
L	N.C.	Terminal not connected
M	-DATA1	Serial RS485 1 inverted signal
N	+DATA1	Serial RS485 1 signal
O	-TX-ETH	Ethernet serial transmission inverted signal
P	+TX-ETH	Ethernet serial transmission signal
R	-DATA2	Serial RS485 2 inverted signal
S	+DATA2	Serial RS485 2 signal
T	-RX-ETH	Ethernet serial receiving inverted signal
U	+RX-ETH	Ethernet serial receiving signal

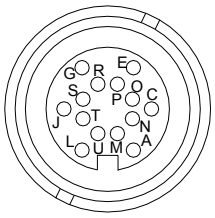


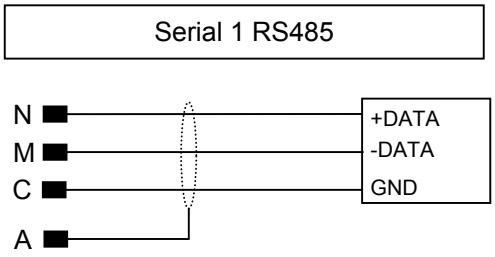


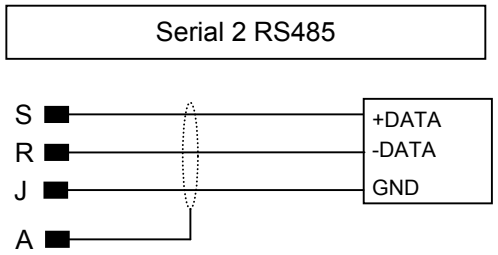


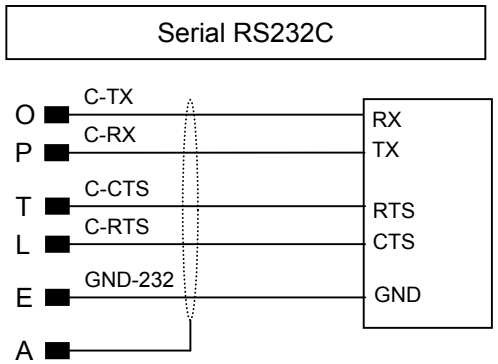


XC8	Signal	Description
A	024V-EL	Reference power supply 24V
C	GND1	Serial line RS485 1 reference
E	GND-232	Serial line RS232C reference
G	+24V-EL	Power supply 24V
J	GND2	Serial line RS485 2 reference
L	C-RTS	Serial RS232C RTS signal
M	-DATA1	Serial RS485 1 inverted signal
N	+DATA1	Serial RS485 1 signal
O	C-TX	Serial RS232C TX signal
P	C-RX	Serial RS232C RX signal
R	-DATA2	Serial RS485 2 inverted signal
S	+DATA2	Serial RS485 1 signal
T	C-CTS	Serial RS232C CTS signal
U	N.C.	Terminal not connected





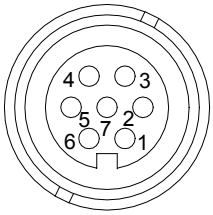


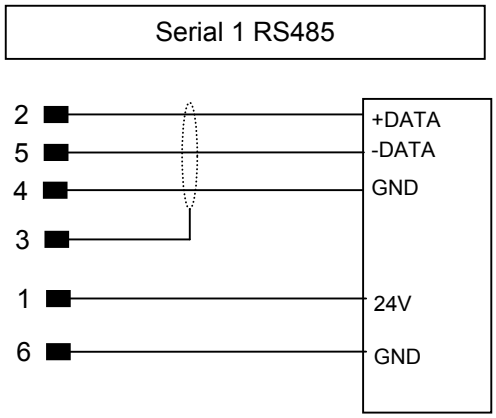


4.1.6. External display

Pay attention that the external display uses one of the serial lines present on the machine.

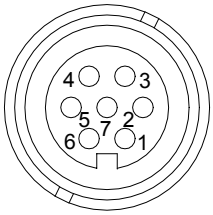
XC9	Signal	Description
1	+24V-EL	Power supply 24V
2	+DATA1	Serial RS485 1 signal
3	024V-EL	Reference power supply 24V
4	GND1	Serial line RS485 1 reference
5	-DATA1	Serial RS485 1 inverted signal
6	GND1	Serial line RS485 1 reference
7	024V-EL	Reference power supply 24V

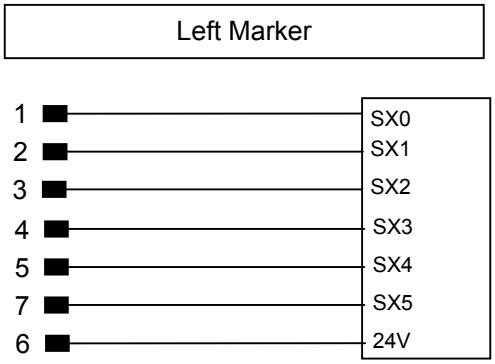




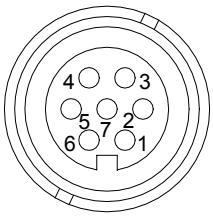
4.1.7. Jet Markers

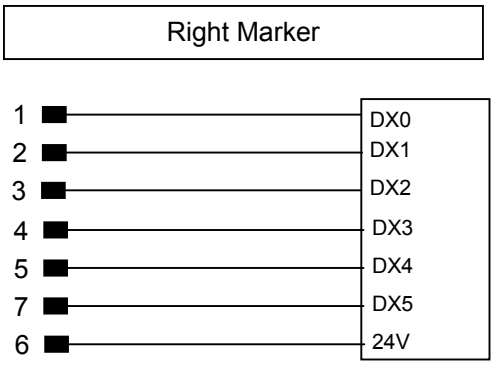
XC10	Signal	Description
1	SX0	Marker control signal channel 0
2	SX1	Marker control signal channel 0
3	SX2	Marker control signal channel 0
4	SX3	Marker control signal channel 0
5	SX4	Marker control signal channel 0
6	+24V- PROT	Marker power supply 24V channel 0
7	SX5	Marker control signal channel 0





XC11	Signal	Description
1	DX0	Marker control signal channel 1
2	DX1	Marker control signal channel 1
3	DX2	Marker control signal channel 1
4	DX3	Marker control signal channel 1
5	DX4	Marker control signal channel 1
6	+24V-PROT	Marker power supply 24V channel 1
7	DX5	Marker control signal channel 1





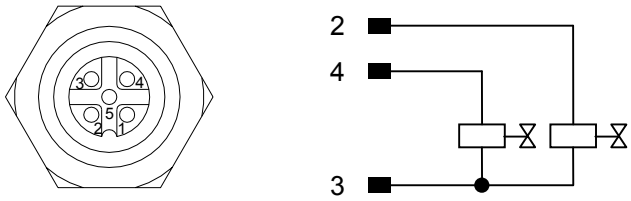
4.1.8. Digital outputs

Digital outputs are programmable. For their programming and use see paragraph 3.1.2. In that section also the software addresses for their management can be found.

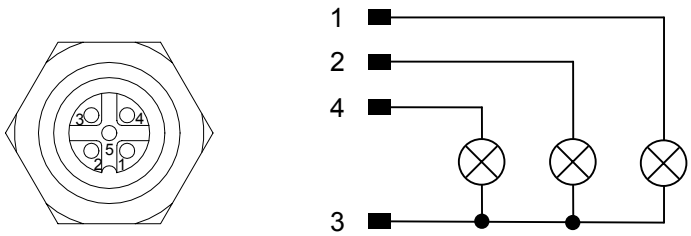
In the following pages some typical connections can be found.

XC12	Signal	Description
1	+24V_PROT	Power supply 24V interlocked with protection
2	OUT7	Output 24V 250mA pilot valves*
3	GND	Power supply 0V
4	OUT8	Output 24V 250mA pilot valves*
5	PE	Ground Connection

XC13	Signal	Description
1	+24V_PROT	Power supply 24V interlocked with protection
2	OUT3	Output 24V 250mA pilot valves*
3	GND	Power supply 0V
4	OUT4	Output 24V 250mA pilot valves*
5	PE	Ground Connection



XC14	Signal	Description
1	OUT6	Output 24V 250mA pilot lamp signal *
2	OUT5	Output 24V 250mA pilot lamp signal *
3	GND	Power supply 0V
4	OUT2	Output 24V 250mA pilot lamp signal *
5	PE	Ground Connection



NOTE
* The function is determined by the program installed on the machine. Therefore the description is just generic.

4.1.9. Digital Inputs

Digital inputs are programmable. For their programming and use see paragraph 3.1.2. In that section also the software addresses for their management can be found.

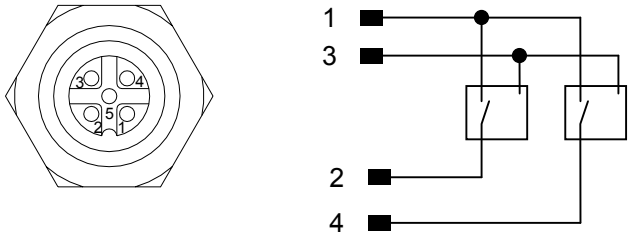
In the following pages some typical connections can be found.

XC15	Signal	Description
1	+24V_EL	Sensors power supply 24V
2	IN7	Digital Input PNP 24V *
3	GND	Sensors power supply 0V
4	IN8	Digital Input PNP 24V *
5	PE	Ground Connection

XC17	Signal	Description
1	+24V_EL	Sensors power supply 24V
2	IN5	Digital Input PNP 24V *
3	GND	Sensors power supply 0V
4	IN6	Digital Input PNP 24V *
5	PE	Ground Connection

XC18	Signal	Description
1	+24V_EL	Sensors power supply 24V
2	IN1	Digital Input PNP 24V *
3	GND	Sensors power supply 0V
4	IN3	Digital Input PNP 24V *
5	PE	Ground Connection

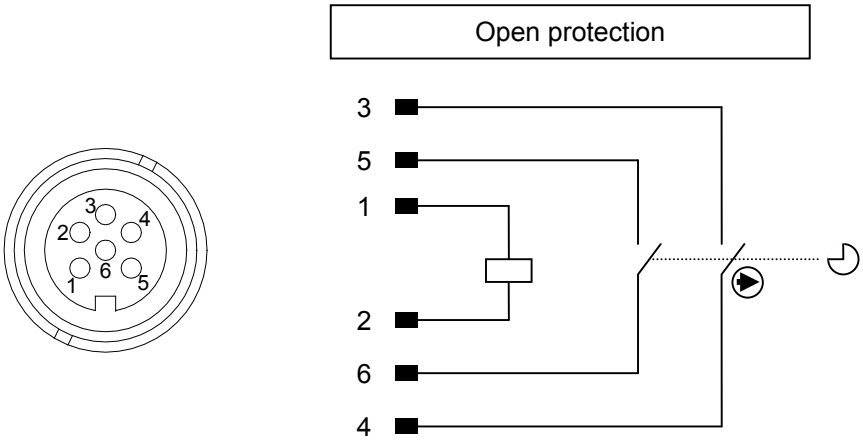
XC19	Signal	Description
1	+24V_EL	Sensors power supply 24V
2	N.C.	Digital Input PNP 24V *
3	GND	Sensors power supply 0V
4	IN4	Digital Input PNP 24V
5	PE	Ground Connection



NOTE
* The function is determined by the program installed on the machine. Therefore the description is just generic.

4.1.10. Accident prevention protection

XC16	Signal	Description
1	OUT1	Command for protection interlock opening. 24V 450mA
2	GND	Power supply 0V
3	EM1	Contact input of protection interlock
4	EM2	Contact input of protection interlock
5	+24V-EL	Power supply 24V
6	IN2	Input PNP 24V, closed protection signalling

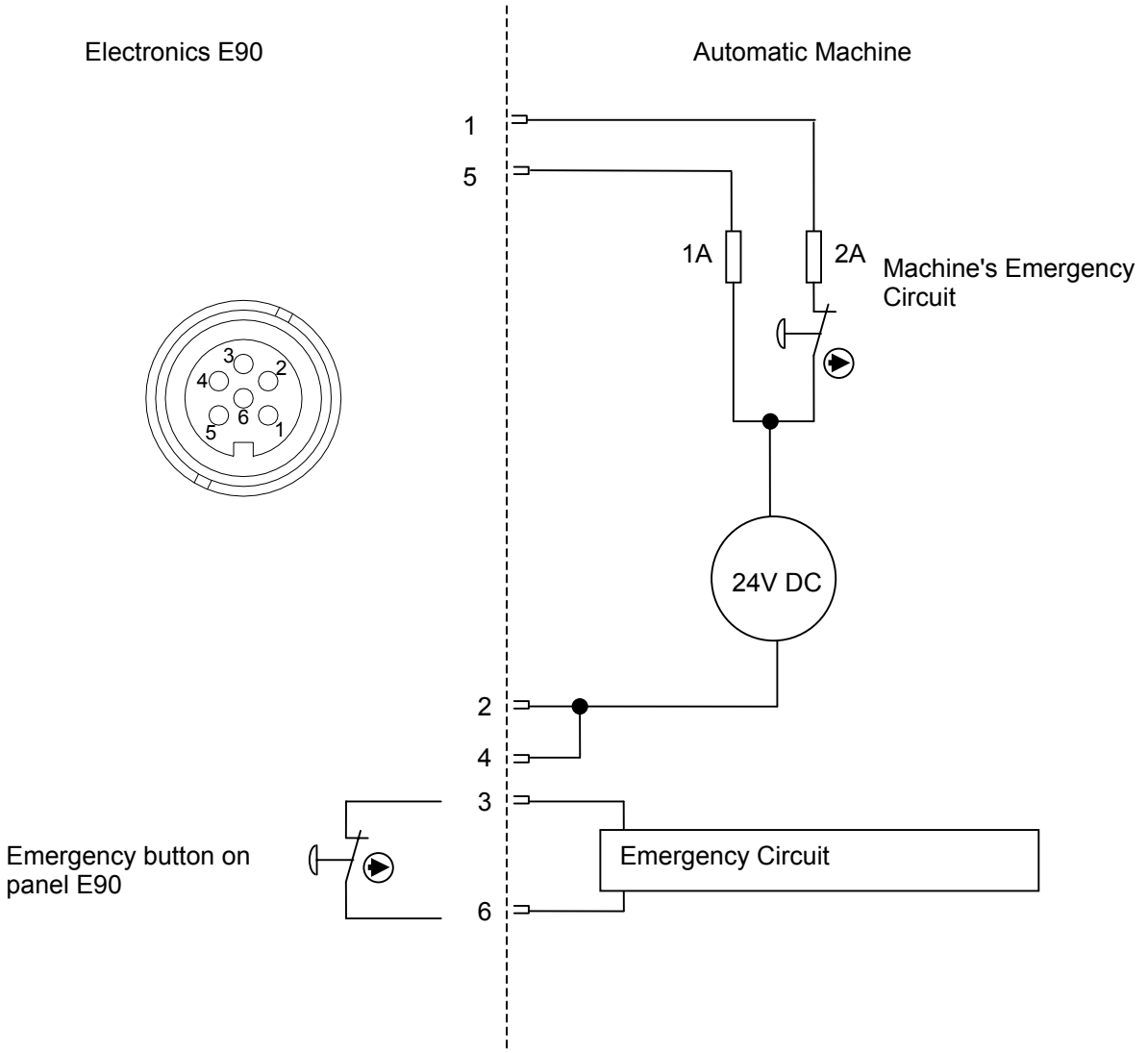


The "Open" command is provided by the electronics every time the operator has to access the accident prevention protection. The protection input is used by the electronics to recognize when the protection is closed and to lock it. The contact of protection interlock (which must be a forced opening safety contact) is used to disable all dangerous functions that can occur inside the machine during the machining cycle.

4.1.11. Supplementary power supply and emergency

Before connecting the power supply connector make sure that its tooling is provided with internal power supply and verify the soldered jumpers (JS1,JS2, JS3) present on the back connectors card. See paragraph 3.2.2.

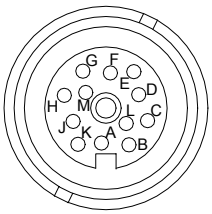
XC20	Signal	Description
1	+24V-AUX	Input power supply 24V actuators.
2	GND	Power supply 0V.
3	EMA	Output of emergency contact normally closed. 1A 250V AC , 1A 50V DC.
4	GND	Power supply 0V.
5	+24V-EL	Electronics and sensors of Input power supply 24V.
6	EMB	Output of emergency contact normally closed. 1A 250V AC , 1A 50V DC.

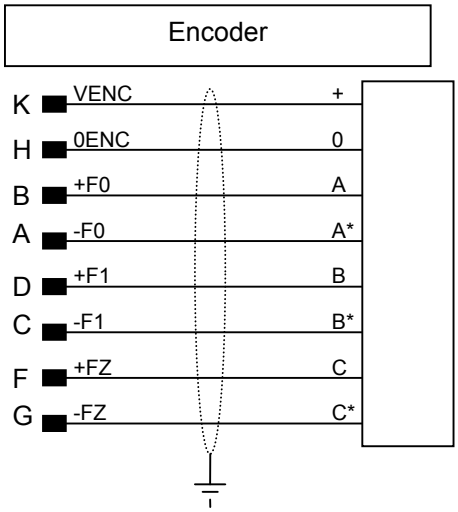


4.1.12. Connection of trailing motor Encoder

XC23	Signal	Description
A	-F0	Phase A* encoder
B	+F0	Phase A encoder
C	-F1	Phase B* encoder
D	+F1	Phase B encoder
F	+FZ	Phase C encoder
G	-FZ	Phase C* encoder
K	VENC	+5V power supply encoder
M	PE	Ground Connection
H	0ENC	0V power supply encoder

Note
the indication of A*, B* and C* means indication of inverted phase of the encoder.

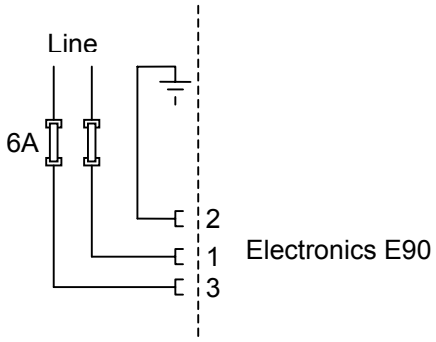


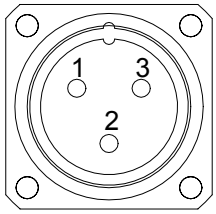


4.1.13. Power supply

Single phase power supply 110 - 240V 50/60Hz 6A. If the machine has a front panel command (manual or semiautomatic machines) on the front panel are found two fuses for protection against possible overload. In the case of automatic machines, provide for a suitable protection. The current limit is 6A. For the circuit protection the use of fuses is preferable in order to avoid problems of untimely intervention due to current peaks when the system is turned on.

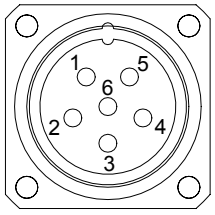
XC22	Signal	Description
1	F1	Power supply machine 110 - 240V
3	F2	Power supply machine 110 - 240V
2	PE	Ground Connection





4.1.14. Power supply of Trailing motor

XC21	Signal	Description
1	Fase U	Phase U motor
2	Fase V	Phase V motor
3	PE	Ground Connection motor
4	TERM1	Input PTC motor temperature control
5	TERM0	Input PTC motor temperature control
6	Fase W	Phase W motor



4.1.15. List of external connectors for electronic connection

Label	Manufacturer code Binder	Internal code Balance Systems	Description
XC1	4239951091504	2CNPSDMV000104	Free male connector 4 poles
XC2	4239951091504	2CNPSDMV000104	Free male connector 4 poles
XC3	4239951291512	2CNPSDMV001712	Free male connector 12 poles
XC4	7230905052516	2CNPSDMV000116	Free male connector 16 poles
XC5	4239951171505	2CNPSDMV002305	Free male connector 5 poles stereo
XC6	4239954511514	2CNPSDMV001714	Free male connector 14 poles
XC7	4239954511514	2CNPSDMV001714	Free male connector 14 poles
XC8	4239954511514	2CNPSDMV001714	Free male connector 14 poles
XC9	4239951251507	2CNPSDMV001707	Free male connector 7 poles
XC10	4239951251507	2CNPSDMV001707	Free male connector 7 poles
XC11	4239951251507	2CNPSDMV001707	Free male connector 7 poles
XC12	76399042914204	2PNECNFST00006	Free male connector 4 poles double output
XC13	76399042914204	2PNECNFST00006	Free male connector 4 poles double output
XC14	76399042914204	2PNECNFST00006	Free male connector 4 poles double output
XC15	76399042914204	2PNECNFST00006	Free male connector 4 poles double output
XC16	4239956211506	2CNPSDMV002506	Free male connector 6 poles
XC17	76399042914204	2PNECNFST00006	Free male connector 4 poles double output
XC18	76399042914204	2PNECNFST00006	Free male connector 4 poles double output
XC19	76399042914204	2PNECNFST00006	Free male connector 4 poles double output
XC20	4239956221506	2CNPSDFV002506	Free female connector 6 poles
Label	Manufacturer code Connei	Internal code Balance Systems	Description
XC21	PML62/17162	2CNVARMV000806	Free male connector 6 poles
XC22	PFL32 SC10	2CNVARFV000803	Free female connector 3 poles
XC23	4239951291512	2CNPSDMV001712	Free male connector 12 poles

5. POWER SUPPLY DATA

The E90 system is provided with 3 separate power supplies.

5.1. Electronics power supply

The control electronics is supplied at 24Vdc. This power supply is connected to the following devices:

Description	Current	Power
Control Electronics	1.2A	29W
Remote modules: the power required by these devices depends on their number; however the maximum allowed load is about:	3A	72W
Maximum power on the main power supply	24Vdc 8.5A	101W

5.2. Interlocked power supply

This section is directly connected to the valves managed by E90 outputs, or by the remote modules. The power required by these devices depends on their number.

Maximum power on the interlocked power supply	24Vdc 4A	96W

5.3. Motors power supply

The E90 can control one motor of 0.4 kW.

Maximum power on the motor power supply	230Vac 5A	1.1kW

6. Serial communication lines

The system supports 5 serial communication ports isolated galvanically (V_{ISO}= 500Vrms x 1'), all managed by the microprocessor, and can be used as follows.

6.1. ETHERNET

This communication channel is managed by a controller connected to the SCC1 and has been designed for the hardware of the card., but it is neither implemented nor tested. It will be soon implemented.

6.2. RS422_1

This communication channel is controlled by the SCC2. It can reach a transmission speed of up to 1 MB and supports at different speeds several protocols such as PROFIBUS, 485-FESTO, 485-BECKHOFF and BS-LINK.

6.3. RS422_2

This communication channel is controlled by the SCC3. It can reach a transmission speed of up to 1 MB and supports at different speeds several protocols such as PROFIBUS, 485-FESTO, 485-BECKHOFF and BS-LINK.

6.4. RS232

This communication channel is controlled by the SCC4. This channel supports TX, RX, CTS and RTS signals: its maximum transmission speed is of 115Kb.

6.5. CAN OPEN

This communication channel is controlled by a controller connected to the SPI of the microprocessor. It can reach a transmission speed of 1Mb.

7. Maintenance

7.1. Replacement of protection fuses

The procedure for the replacement of the fuses is as follows;

- Turn off the station.
- Disconnect the power supply cable from network.
- Unscrew the protection in lexan.
- Unscrew the front panel and flip it.
- Replace the two fuses and reassemble the front panel.