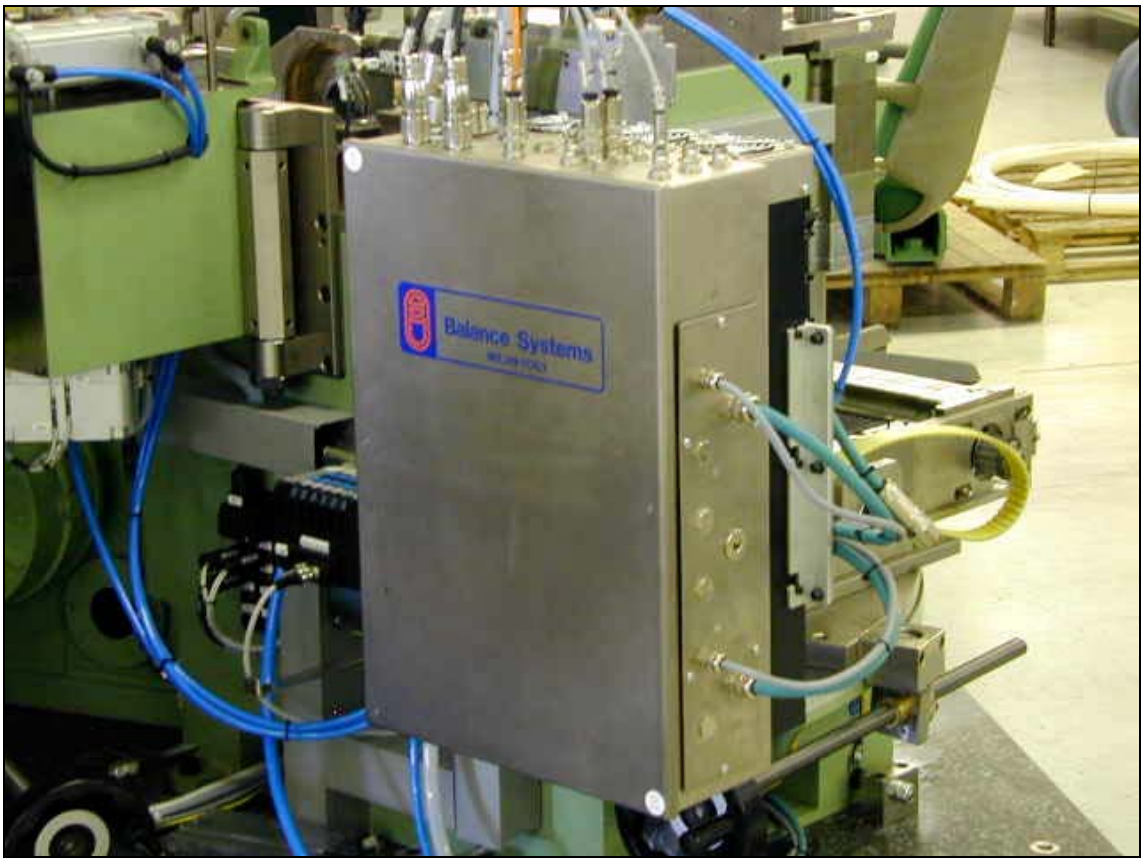
CONTROL ELECTRONICS A90



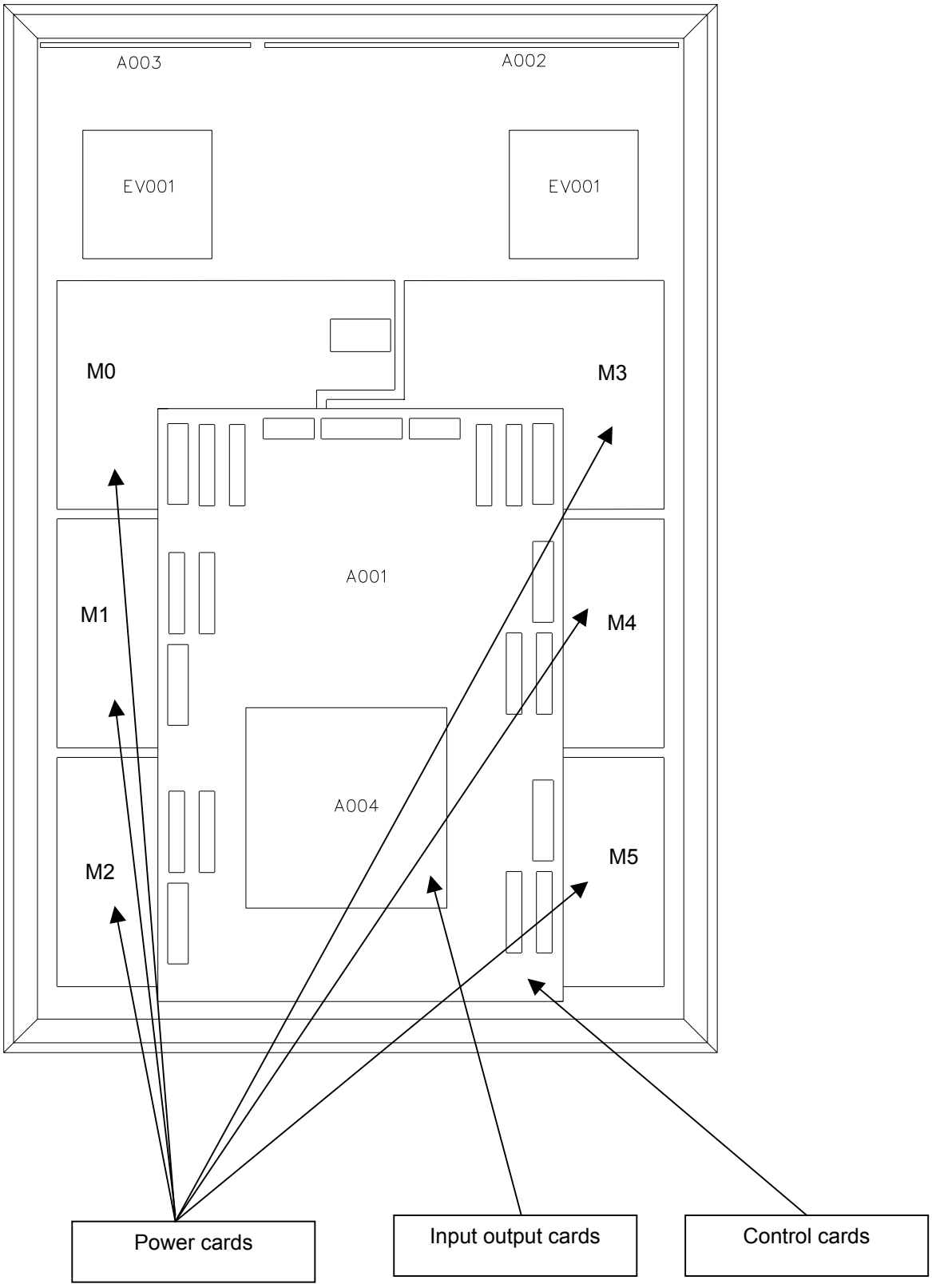
Index

1. Introduction

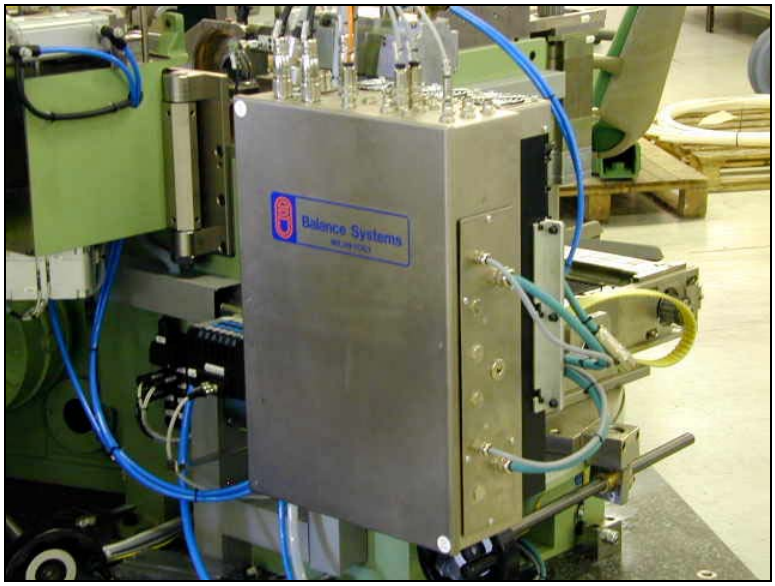
This electronics is multi-purpose, able to completely control and manage 6 motorized axis and able to carry out the unbalance measurement of rotors.

The logical subdivision is the following:

- Process operation. It manages all electronics functions and operates with the external world by means of more serial lines. Normally the connection is done by means of RS485 to a PC for the management of the operator interface, by means of RS485 to the measuring stations, and by means of CAN BUS to all of the I/O remote peripherals.
- Motor Control. It consists of six electronic controls for brushless motors with position control or for asynchronous motors. The main goal of this section is to bring in position the axis of automatic machines for balancing, by performing the control of the axis position. The control is a closed loop system with feedback by means of resolver or, in particular cases, of encoder.
- Unbalance measurement. It is defined by two equal and independent sections which analyze the unbalance of a rotor, by performing the resolution of vectors and the separation of compensation planes. The inputs relative to the vibration transducers and the polar expansion reading sensor refer to these sections.
- Inputs / Outputs. This section basically consists of an input and output card, and is used for the management of all sensors and of all of the valves necessary for the control of the axes, and for the management of the processing cycle of the rotors to be processed.
- Connectors panel. It consists of two cards where all the connectors for external connection are located, (except the connection to the motors).


A003
A002
EV001
EV001
M0
M3
A001
M1
M4
A004
M2
M5
Power cards
Input output cards
Control cards

2. Product Identification



Product Configuration

9A902000000000	2-axis control A90 series
9A904000000000	4-axis control A90 series
9A906000000000	6-axis control A90 series
9A907000000000	0-axis control A90 series

Note : The control 0-axis manages drives in **PROFIBUS.**

3. Components description

3.1. Input output card

The main functions of the card are:

3.1.1. Layout of input output card

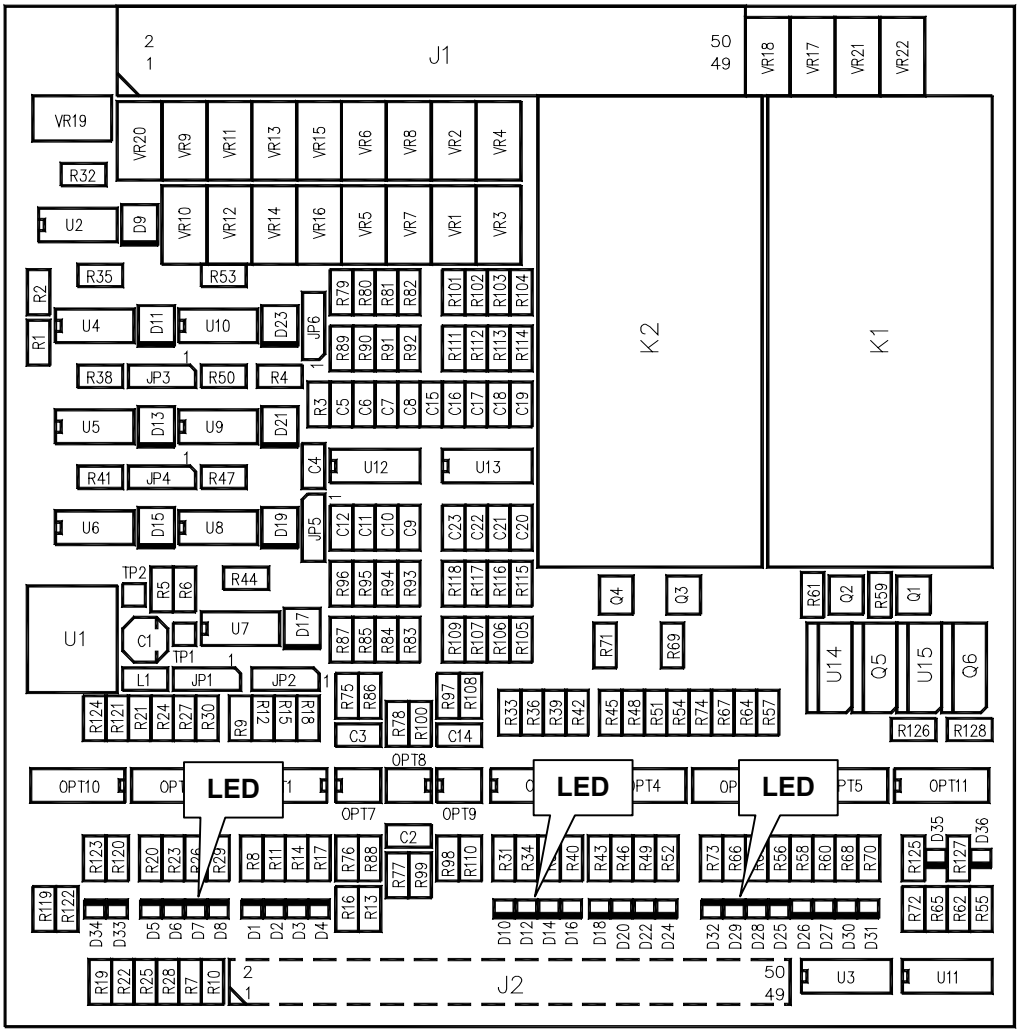


Table of Signaling LEDs			
LED	HW Label	SW Address (Dec)	Description
Input			
D5	IN0	0	Digital input
D6	IN1	1	Digital input
D7	IN2	2	Digital input
D8	IN3	3	Digital input
D1	IN4	4	Digital input
D2	IN5	5	Digital input
D3	IN6	6	Digital input
D4	IN7	7	Digital input
	SIN0_0	16	Digital serial input
	SIN0_1	17	Digital serial input
	SIN0_2	18	Digital serial input
	SIN0_3	19	Digital serial input
	SIN0_4	20	Digital serial input
	SIN0_5	21	Digital serial input
	SIN0_6	22	Digital serial input
	SIN0_7	23	Digital serial input
	SIN1_0	24	Digital serial input
	SIN1_1	25	Digital serial input
	SIN1_2	26	Digital serial input
	SIN1_3	27	Digital serial input
	SIN1_4	28	Digital serial input
	SIN1_5	29	Digital serial input
	SIN1_6	30	Digital serial input
	SIN1_7	31	Digital serial input
D33	V0	14	Input signaling presence of auxiliary power supply on section 0-A90
D25	ENABLE		Input signal of power enabling - section 0-A90
D28	Control		Input to verify "output" signaling axes in safety mode - section 0-A90 When turned ON, it indicates that the machine is not in safety mode.
D34	V1	15	Input signaling presence of auxiliary power supply on section 1-A90
D29	ENABLE		Input signal of power enabling - section 1-A90
D32	Control		Input to verify "output" signaling axes in safety mode - section 1-A90 When turned ON, it indicates that the machine is not in safety mode.
D10	OUT0	0	Digital output in positive logic. Power supply depending on JP3
D12	OUT1	1	Digital output in positive logic. Power supply depending on JP3
D14	OUT2	2	Digital output in positive logic. Power supply depending on JP4
D16	OUT3	3	Digital output in positive logic. Power supply depending on JP4
D18	OUT4	4	Digital output in positive logic. Power supply depending on JP5
D20	OUT5	5	Digital output in positive logic. Power supply depending on JP5
D22	OUT6	6	Digital output in positive logic. Power supply depending on JP6
D24	OUT7	7	Digital output in positive logic. Power supply depending on JP6
D26	COM_0		Output signaling axes not in safety mode section 0-A90
D27	COM_1		Output signaling axes not in safety mode section 0-A90
D30	COM_0		Output signaling axes not in safety mode section 1-A90
D31	COM_1		Output signaling axes not in safety mode section 1-A90
D35	FAN	14	Output for the enabling of the external fan
D36	PELT.	15	Output for the enabling of the internal conditioner

Note: Maximum current provided on the outputs from OUT0 to OUT7 = 250 mA

3.1.2. Configuration of input output card

		Default
JP3 OUT0, OUT1 JP4 OUT2, OUT3 JP5 OUT4, OUT5 JP6 OUT6, OUT7		
	The outputs are supplied by the interlocked power supply.	*
	The outputs are supplied by the not interlocked power supply.	

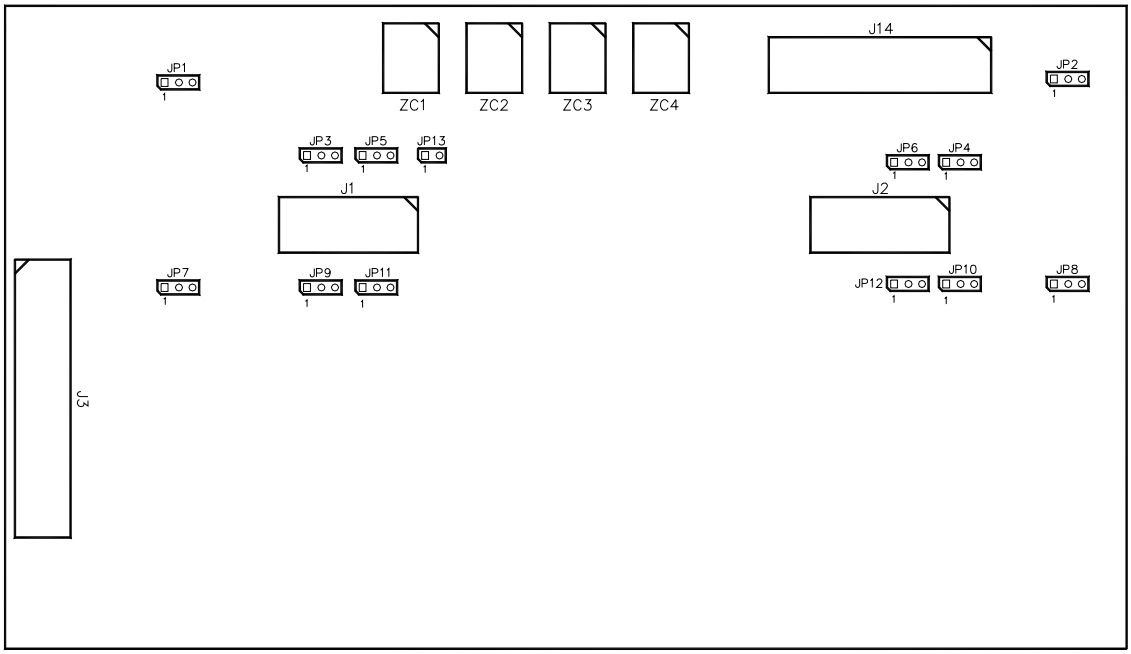
3.1.3. List of input output card connectors

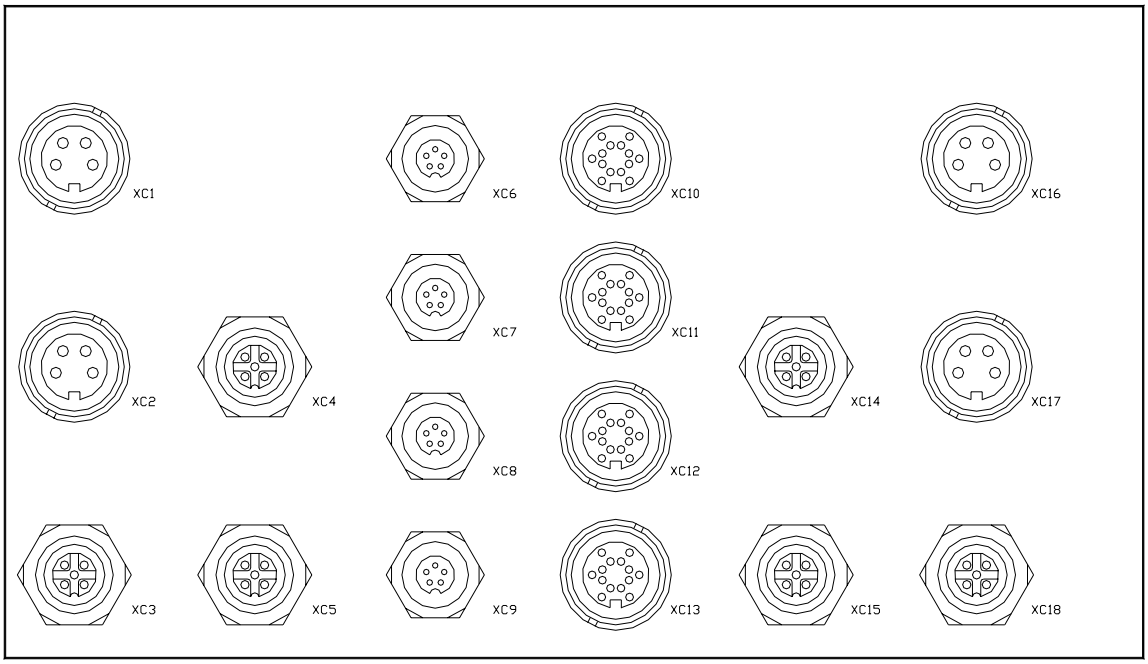
Input / Output card Connectors	
J1	Connects the input output card to the connectors panel card for controlling the signals relative to inputs and outputs, and the power supply of the card itself.
J2	Connects the input output card to the control card.

3.2. Connectors card I

- Its main function is to limit the cabling in the card, distributing signals on the different connectors outside the cabinet.
- Another function is to configure the vibration transducers and the reference voltage in the line Can-open.

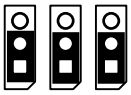
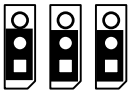
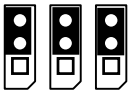
3.2.1. Layout of connectors card I

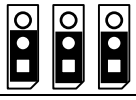
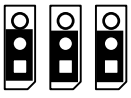
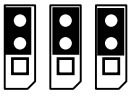


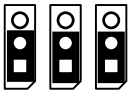
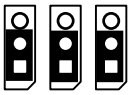
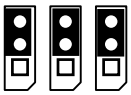


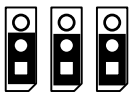
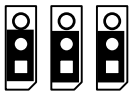
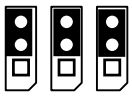
3.2.2. Configuration of connectors card I

3.2.2.1. Configuration of vibration transducers

JP2	JP4	JP6	Vibration transducer input XC1	Default
			Mobile coil transducer	*
			Force transducer	
			Accelerometric transducer	

JP8	JP10	JP12	Vibration transducer input XC2	Default
			Mobile coil transducer	*
			Force transducer	
			Accelerometric transducer	

				Default
JP1	JP3	JP5	Vibration transducer input XC16	
			Mobile coil transducer	
			Force transducer	
			Accelerometric transducer	*

				Default
JP7	JP9	JP11	Vibration transducer input XC17	
			Mobile coil transducer	
			Force transducer	
			Accelerometric transducer	*

3.2.2.2. Reference configuration CAN-OPEN Line

		Default
JP13	CAN-OPEN line reference	
	The reference of the Can-Open serial line is not referred to potential 0 of cabinet A90.	
	The reference of the Can-Open serial line is referred to potential 0 of cabinet A90.	*

Note: JP13 is used to connect the CAN line reference to potential 0 of cabinet A90.
Valid for connectors XC6, XC7, XC8, XC9.

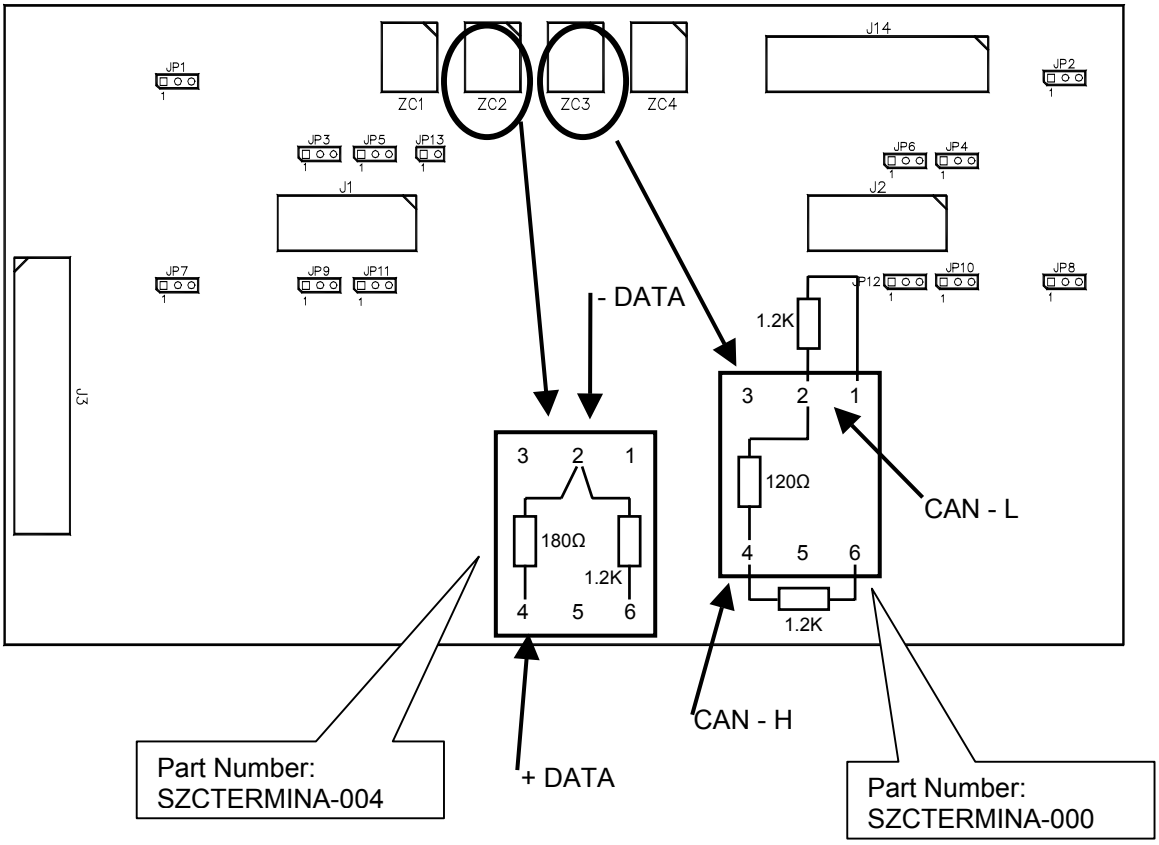
3.2.3. List of card I connectors

External connectors of connectors card I	
Label	Description
XC1	Vibration transducer input - channel 0 section B (section 1)
XC2	Vibration transducer input - channel 1 section B (section 1)
XC3	Input of polar expansions reading sensors - section B (section 1)
XC4	Digital outputs OUT4, OUT5
XC5	Digital outputs OUT6, OUT7
XC6	Serial lines (CAN-OPEN) remote modules.
XC7	Serial lines (CAN-OPEN) remote modules.
XC8	Serial lines (CAN-OPEN) remote modules.
XC9	Serial lines (CAN-OPEN) remote modules.
XC10	Serial lines (RS485-1), (RS485-2), (CAN-OPEN)
XC11	Serial lines (RS485-1), (RS485-2), (CAN-OPEN)
XC12	Serial lines (RS485-1), (RS485-2), (Ethernet)
XC13	Serial lines (RS485-1), (RS485-2), (RS232C)
XC14	Digital outputs OUT0, OUT1
XC15	Digital outputs OUT2, OUT3
XC16	Vibration transducer input - channel 0 section A (section 0)
XC17	Vibration transducer input - channel 1 section A (section 0)
XC18	Input of polar expansions reading sensors - section A (section 0)
Internal connectors of connectors card I	
Label	Description
J1	Connects the input of the vibration transducers of section A to the control card.
J2	Connects the input of the vibration transducers of section B to the control card.
J3	Connects connectors card I to connectors card II for controlling the signals relative to the outputs and the power supply of the card itself.
J14	Connects the serial lines to the control card.

3.2.4. List of possible terminations on the serial lines

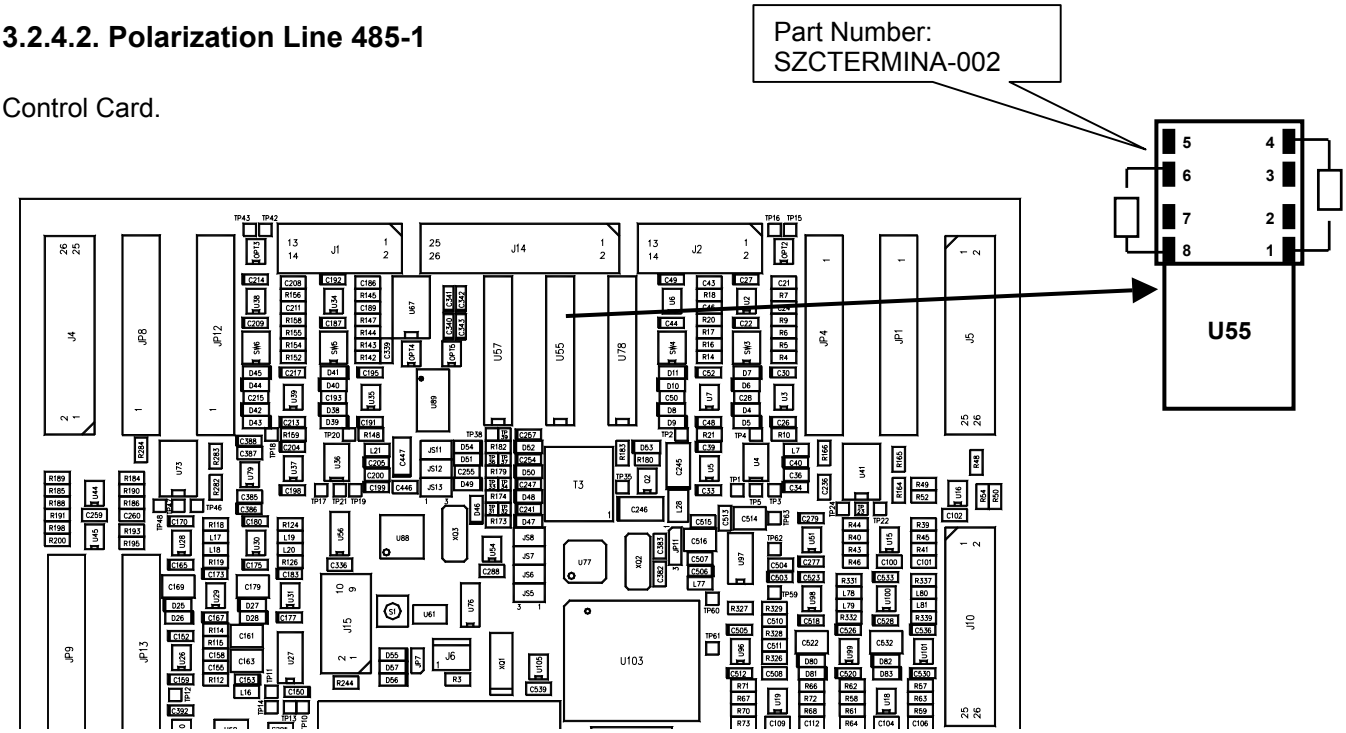
3.2.4.1. Termination CAN on ZC3 and termination 485-2 on ZC 2

Connector Card



3.2.4.2. Polarization Line 485-1

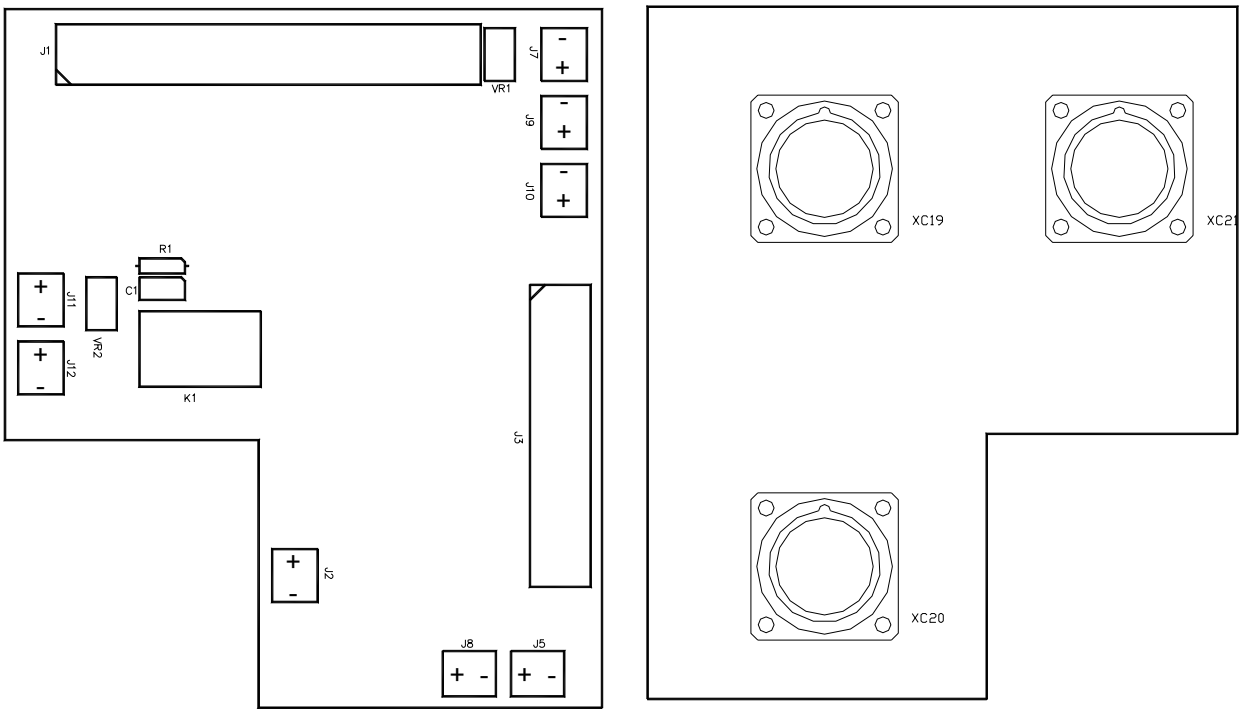
Control Card.



3.3. Connectors card II

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

3.3.1. Layout of connectors card II

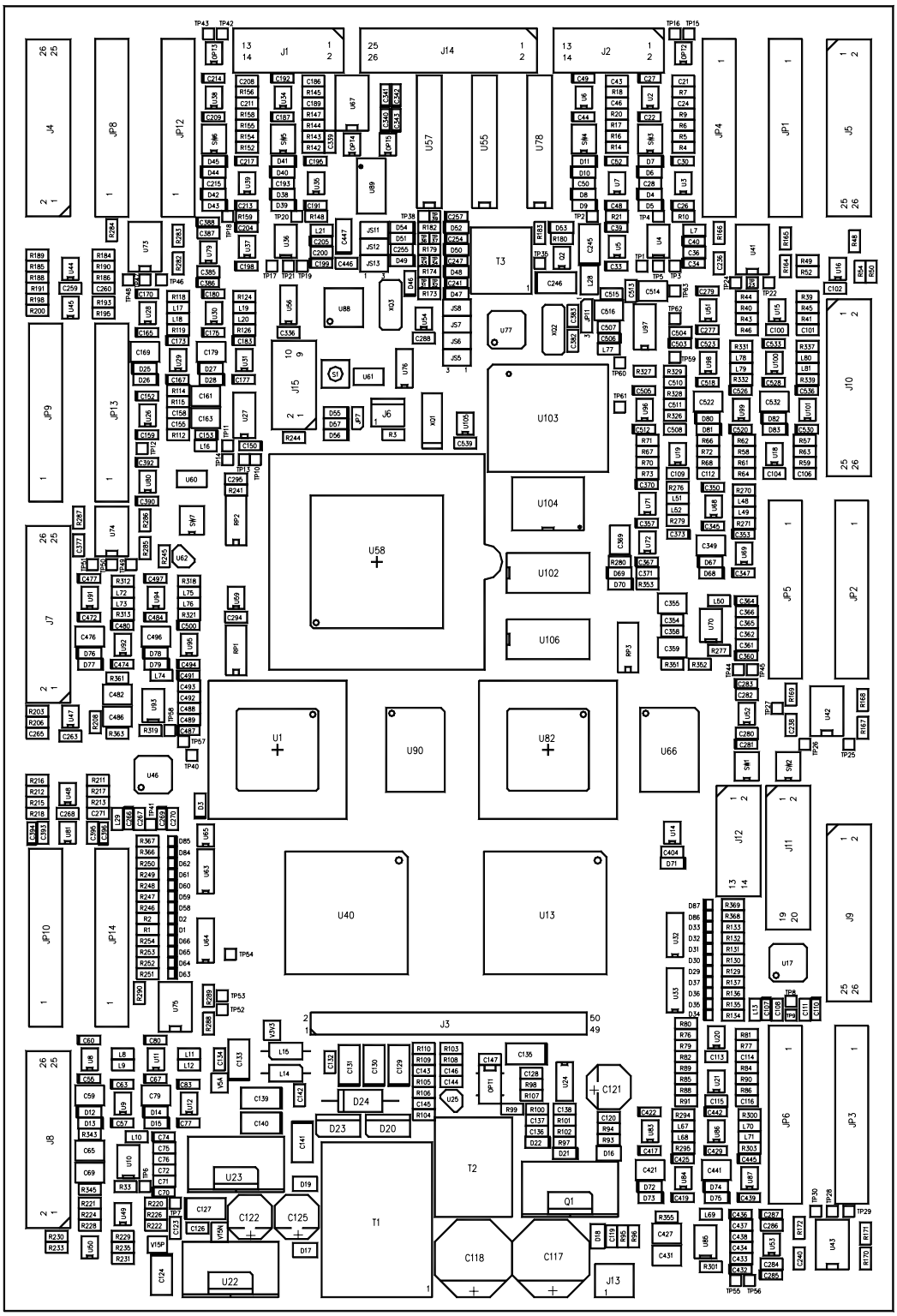


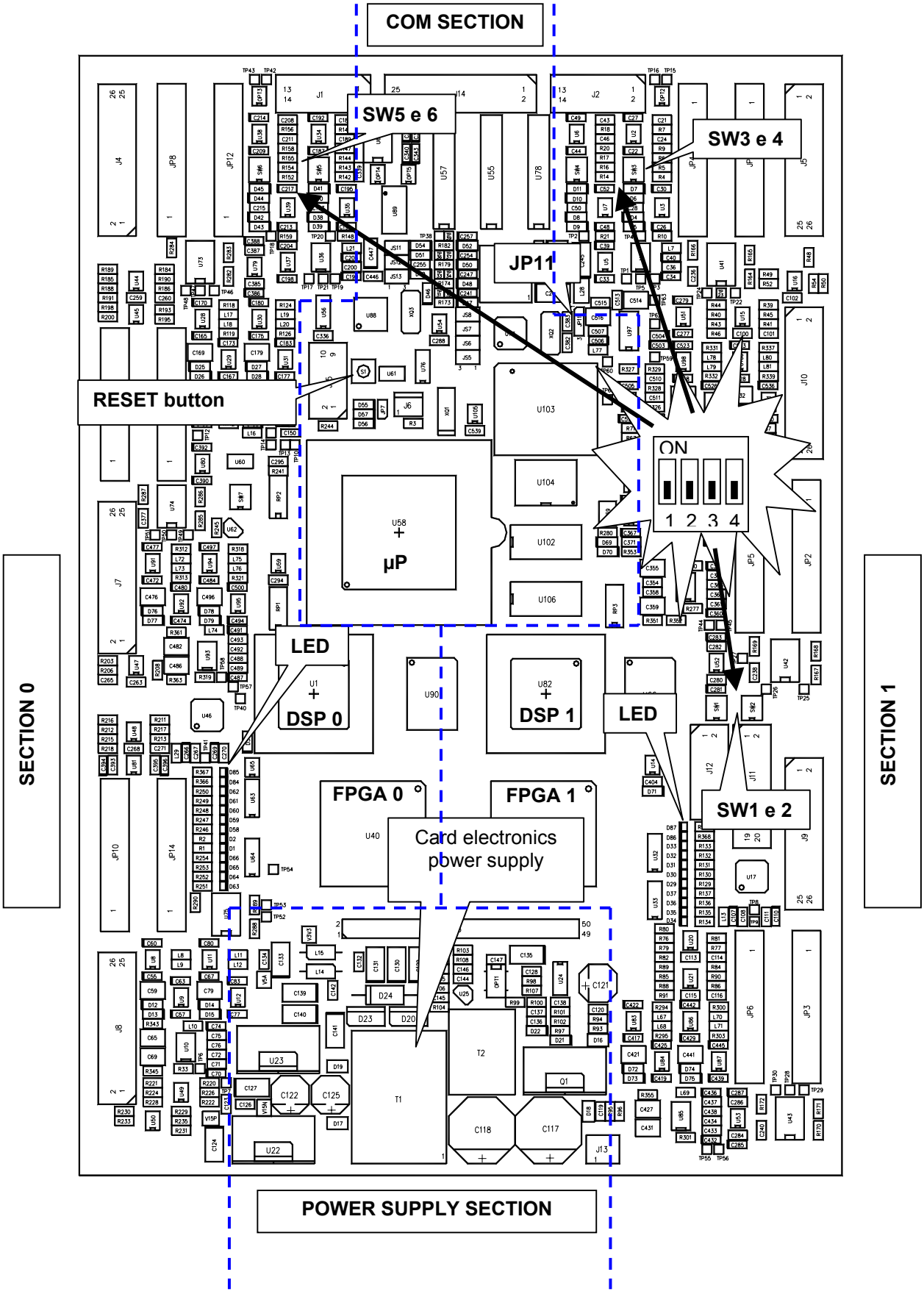
3.3.2. List of card II connectors

External connectors of connectors card II	
Label	Description
XC19	Digital Inputs. INPUT0..7, SIN1_0..7
XC20	Supplementary power supply, enabling and emergency signals.
XC21	Digital Inputs. INPUT0..7, SIN0_0..7
Internal connectors of connectors card II	
Label	Description
J1	Connects the input/output card to the connectors panel card II for controlling the signals relative to inputs, and the power supply of the card itself
J2	Control card power supply 24V
J3	Connects connectors card I to connectors card II for controlling the signals relative to the outputs
J5	Power supply of power module (M3,M4 and M5), for the motors stationing brakes.
J8	Power supply of power module (M0,M1 and M2), for the motors stationing brakes.
J7,J9,J10	Power supply for air cooling external fans.
J11	Power supply for PELTIER group of internal air conditioning.
J12	Power supply for fans of internal air conditioning group.

3.4. Control card

3.4.1. Lay out of Control card




COM SECTION
SW5 e 6
SW3 e 4
JP11
RESET button
ON
1 2 3 4
U58
µP
U103
U104
U102
U106
LED
U1
DSP 0
U82
DSP 1
LED
U90
FPGA 0
FPGA 1
U40
Card electronics
power supply
SW1 e 2
SECTION 0
SECTION 1
POWER SUPPLY SECTION

Signalling LED Table		
LED	Label HW	Description
D1	RUN	Signalling LED for CPU status
D2	SPARE	Diagnostics LED - not assigned.
D58	F0	Phase 0 of motor encoder axis 0
D59	F1	Phase 1 of motor encoder axis 0
D60	FZ	Zero of motor encoder axis 0
D61	F0	Phase 0 of motor encoder axis 1
D62	F1	Phase 1 of motor encoder axis 1
D63	F1	Phase 1 of motor encoder axis 2
D64	FZ	Zero of motor encoder axis 2
D65	SY0	Input 0 of polar expansions reading sensors - section 0
D66	SY1	Input 1 of polar expansions reading sensors - section 0
D85	FZ	Zero of motor encoder axis 1
D84	F0	Phase 0 of motor encoder axis 2
D29	F0	Phase 0 of motor encoder axis 3
D30	F1	Phase 1 of motor encoder axis 3
D31	FZ	Zero of motor encoder axis 3
D32	F0	Phase 0 of motor encoder axis 4
D33	F1	Phase 1 of motor encoder axis 4
D34	F1	Phase 1 of motor encoder axis 5
D35	FZ	Zero of motor encoder axis 5
D36	SY0	Input 0 of polar expansions reading sensors - section 1
D37	SY1	Input 1 of polar expansions reading sensors - section 1
D86	FZ	Zero of motor encoder axis 4
D87	F0	Phase 0 of motor encoder axis 5

Defines for the management of internal I/O

HW Label	SW Address (Dec)	Description
Input		
A90I_INPUT0	0	INPUT0
A90I_INPUT1	1	INPUT1
A90I_INPUT2	2	INPUT2
A90I_INPUT3	3	INPUT3
A90I_INPUT4	4	INPUT4
A90I_INPUT5	5	INPUT5
A90I_INPUT6	6	INPUT6
A90I_INPUT7	7	INPUT7
A90I_PWM0_FAULT	8	PWM0_FAULT
A90I_PWM1_FAULT	9	PWM1_FAULT
A90I_PWM2_FAULT	10	PWM2_FAULT
A90I_PWM3_FAULT	11	PWM3_FAULT
A90I_PWM4_FAULT	12	PWM4_FAULT
A90I_PWM5_FAULT	13	PWM5_FAULT
A90I_INPUT_V0	14	INPUT_V0
A90I_INPUT_V1	15	INPUT_V1
A90I_SIN0_0	16	SIN0_0
A90I_SIN0_1	17	SIN0_1
A90I_SIN0_2	18	SIN0_2
A90I_SIN0_3	19	SIN0_3
A90I_SIN0_4	20	SIN0_4
A90I_SIN0_5	21	SIN0_5
A90I_SIN0_6	22	SIN0_6
A90I_SIN0_7	23	SIN0_7
A90I_SIN1_0	24	SIN1_0
A90I_SIN1_1	25	SIN1_1
A90I_SIN1_2	26	SIN1_2
A90I_SIN1_3	27	SIN1_3
A90I_SIN1_4	28	SIN1_4
A90I_SIN1_5	29	SIN1_5
A90I_SIN1_6	30	SIN1_6
A90I_SIN1_7	31	SIN1_7
A90I_SSIC_AonA	32	SICHN_SIC_AonA
A90I_SECO_AonA	33	SICHN_ECO_AonA
A90I_SOUT_AonA	34	SICHN_OUT_AonA
A90I_SSIC_AonB	35	SICHN_SIC_AonB
A90I_SECO_AonB	36	SICHN_ECO_AonB
A90I_SOUT_AonB	37	SICHN_OUT_AonB
A90I_SSIC_BonB	38	SICHN_SIC_BonB
A90I_SECO_BonB	39	SICHN_ECO_BonB
A90I_SOUT_BonB	40	SICHN_OUT_BonB
A90I_SSIC_BonA	41	SICHN_SIC_BonA
A90I_SECO_BonA	42	SICHN_ECO_BonA
A90I_SOUT_BonA	43	SICHN_OUT_BonA
	44	
	45	
	46	
	47	
A90I_ENC0_FA	48	ENC0_FA
A90I_ENC0_FB	49	ENC0_FB
A90I_ENC0_FZ	50	ENC0_FZ
A90I_ENC1_FA	51	ENC1_FA
A90I_ENC1_FB	52	ENC1_FB

HW Label	SW Address (Dec)	Description
Input		
A90I_ENC1_FZ	53	ENC1_FZ
A90I_ENC2_FA	54	ENC2_FA
A90I_ENC2_FB	55	ENC2_FB
A90I_ENC2_FZ	56	ENC2_FZ
A90I_ENC3_FA	57	ENC3_FA
A90I_ENC3_FB	58	ENC3_FB
A90I_ENC3_FZ	59	ENC3_FZ
	60	
	61	
	62	
	63	
A90I_ENC4_FA	64	ENC4_FA
A90I_ENC4_FB	65	ENC4_FB
A90I_ENC4_FZ	66	ENC4_FZ
A90I_ENC5_FA	67	ENC5_FA
A90I_ENC5_FB	68	ENC5_FB
A90I_ENC5_FZ	69	ENC5_FZ
	70	
	71	
	72	
	73	
	74	
	75	
	76	
	77	
	78	
	79	
A90I_PB_0_IN0	80	IN 0 Axis 0 Pb
A90I_PB_0_IN1	81	IN 1 Axis 0 Pb
A90I_PB_0_IN2	82	IN 2 Axis 0 Pb
A90I_PB_0_IN3	83	IN 3 Axis 0 Pb
A90I_PB_0_IN4	84	IN 4 Axis 0 Pb
A90I_PB_0_IN5	85	IN 5 Axis 0 Pb
A90I_PB_0_IN6	86	IN 6 Axis 0 Pb
A90I_PB_0_IN7	87	IN 7 Axis 0 Pb
A90I_PB_1_IN0	88	IN 0 Axis 1 Pb
A90I_PB_1_IN1	89	IN 1 Axis 1 Pb
A90I_PB_1_IN2	90	IN 2 Axis 1 Pb
A90I_PB_1_IN3	91	IN 3 Axis 1 Pb
A90I_PB_1_IN4	92	IN 4 Axis 1 Pb
A90I_PB_1_IN5	93	IN 5 Axis 1 Pb
A90I_PB_1_IN6	94	IN 6 Axis 1 Pb
A90I_PB_1_IN7	95	IN 7 Axis 1 Pb
A90I_PB_2_IN0	96	IN 0 Axis 2 Pb
A90I_PB_2_IN1	97	IN 1 Axis 2 Pb
A90I_PB_2_IN2	98	IN 2 Axis 2 Pb
A90I_PB_2_IN3	99	IN 3 Axis 2 Pb
A90I_PB_2_IN4	100	IN 4 Axis 2 Pb
A90I_PB_2_IN5	101	IN 5 Axis 2 Pb
A90I_PB_2_IN6	102	IN 6 Axis 2 Pb
A90I_PB_2_IN7	103	IN 7 Axis 2 Pb
A90I_PB_3_IN0	104	IN 0 Axis 3 Pb
A90I_PB_3_IN1	105	IN 1 Axis 3 Pb
A90I_PB_3_IN2	106	IN 2 Axis 3 Pb
A90I_PB_3_IN3	107	IN 3 Axis 3 Pb

HW Label	SW Address (Dec)	Description
Input		
A90I_PB_3_IN4	108	IN 4 Axis 3 Pb
A90I_PB_3_IN5	109	IN 5 Axis 3 Pb
A90I_PB_3_IN6	110	IN 6 Axis 3 Pb
A90I_PB_3_IN7	111	IN 7 Axis 3 Pb
A90I_PB_4_IN0	112	IN 0 Axis 4 Pb
A90I_PB_4_IN1	113	IN 1 Axis 4 Pb
A90I_PB_4_IN2	114	IN 2 Axis 4 Pb
A90I_PB_4_IN3	115	IN 3 Axis 4 Pb
A90I_PB_4_IN4	116	IN 4 Axis 4 Pb
A90I_PB_4_IN5	117	IN 5 Axis 4 Pb
A90I_PB_4_IN6	118	IN 6 Axis 4 Pb
A90I_PB_4_IN7	119	IN 7 Axis 4 Pb
A90I_PB_5_IN0	120	IN 0 Axis 5 Pb
A90I_PB_5_IN1	121	IN 1 Axis 5 Pb
A90I_PB_5_IN2	122	IN 2 Axis 5 Pb
A90I_PB_5_IN3	123	IN 3 Axis 5 Pb
A90I_PB_5_IN4	124	IN 4 Axis 5 Pb
A90I_PB_5_IN5	125	IN 5 Axis 5 Pb
A90I_PB_5_IN6	126	IN 6 Axis 5 Pb
A90I_PB_5_IN7	127	IN 7 Axis 5 Pb

HW Label	SW Address (Dec)	Description
Output		
A90O_OUTPNP0	0	OUTPNP0
A90O_OUTPNP1	1	OUTPNP1
A90O_OUTPNP2	2	OUTPNP2
A90O_OUTPNP3	3	OUTPNP3
A90O_OUTPNP4	4	OUTPNP4
A90O_OUTPNP5	5	OUTPNP5
A90O_OUTPNP6	6	OUTPNP6
A90O_OUTPNP7	7	OUTPNP7
A90O_PWM_PWREN0	8	PWM_PWREN0
A90O_PWM_PWREN1	9	PWM_PWREN1
A90O_PWM_PWREN2	10	PWM_PWREN2
A90O_PWM_PWREN3	11	PWM_PWREN3
A90O_PWM_PWREN4	12	PWM_PWREN4
A90O_PWM_PWREN5	13	PWM_PWREN5
A90O_OUT_FAN	14	OUT_FAN
A90O_OUT_PELTIE	15	OUT_PELTIE
A90O_SYCA_AB	16	Relay A/B CH A
A90O_SYCB_AB	17	Relay A/B CH B
	18	
	19	
	20	
	21	
	22	
	23	
	24	
	25	
	26	
	27	

HW Label	SW Address (Dec)	Description
Output		
	28	
	29	
A90O_PB_0_OUT0	30	OUT 0 Axis 0 Pb
A90O_PB_0_OUT1	31	OUT 1 Axis 0 Pb
A90O_PB_0_OUT2	32	OUT 2 Axis 0 Pb
A90O_PB_0_OUT3	33	OUT 3 Axis 0 Pb
A90O_PB_0_OUT4	34	OUT 4 Axis 0 Pb
A90O_PB_0_OUT5	35	OUT 5 Axis 0 Pb
A90O_PB_0_OUT6	36	OUT 6 Axis 0 Pb
A90O_PB_0_OUT7	37	OUT 7 Axis 0 Pb
A90O_PB_1_OUT0	38	OUT 0 Axis 1 Pb
A90O_PB_1_OUT1	39	OUT 1 Axis 1 Pb
A90O_PB_1_OUT2	40	OUT 2 Axis 1 Pb
A90O_PB_1_OUT3	41	OUT 3 Axis 1 Pb
A90O_PB_1_OUT4	42	OUT 4 Axis 1 Pb
A90O_PB_1_OUT5	43	OUT 5 Axis 1 Pb
A90O_PB_1_OUT6	44	OUT 6 Axis 1 Pb
A90O_PB_1_OUT7	45	OUT 7 Axis 1 Pb
A90O_PB_2_OUT0	46	OUT 0 Axis 2 Pb
A90O_PB_2_OUT1	47	OUT 1 Axis 2 Pb
A90O_PB_2_OUT2	48	OUT 2 Axis 2 Pb
A90O_PB_2_OUT3	49	OUT 3 Axis 2 Pb
A90O_PB_2_OUT4	50	OUT 4 Axis 2 Pb
A90O_PB_2_OUT5	51	OUT 5 Axis 2 Pb
A90O_PB_2_OUT6	52	OUT 6 Axis 2 Pb
A90O_PB_2_OUT7	53	OUT 7 Axis 2 Pb
A90O_PB_3_OUT0	54	OUT 0 Axis 3 Pb
A90O_PB_3_OUT1	55	OUT 1 Axis 3 Pb
A90O_PB_3_OUT2	56	OUT 2 Axis 3 Pb
A90O_PB_3_OUT3	57	OUT 3 Axis 3 Pb
A90O_PB_3_OUT4	58	OUT 4 Axis 3 Pb
A90O_PB_3_OUT5	59	OUT 5 Axis 3 Pb
A90O_PB_3_OUT6	60	OUT 6 Axis 3 Pb
A90O_PB_3_OUT7	61	OUT 7 Axis 3 Pb
A90O_PB_4_OUT0	62	OUT 0 Axis 4 Pb
A90O_PB_4_OUT1	63	OUT 1 Axis 4 Pb
A90O_PB_4_OUT2	64	OUT 2 Axis 4 Pb
A90O_PB_4_OUT3	65	OUT 3 Axis 4 Pb
A90O_PB_4_OUT4	66	OUT 4 Axis 4 Pb
A90O_PB_4_OUT5	67	OUT 5 Axis 4Pb
A90O_PB_4_OUT6	68	OUT 6 Axis 4 Pb
A90O_PB_4_OUT7	69	OUT 7 Axis 4 Pb
A90O_PB_5_OUT0	70	OUT 0 Axis 5 Pb
A90O_PB_5_OUT1	71	OUT 1 Axis 5 Pb
A90O_PB_5_OUT2	72	OUT 2 Axis 5 Pb
A90O_PB_5_OUT3	73	OUT 3 Axis 5 Pb
A90O_PB_5_OUT4	74	OUT 4 Axis 5 Pb
A90O_PB_5_OUT5	75	OUT 5 Axis 5 Pb
A90O_PB_5_OUT6	76	OUT 6 Axis 5 Pb
A90O_PB_5_OUT7	77	OUT 7 Axis 5 Pb

3.4.2. Configuration of control card

		Default
JP11	Configuration of transmission line CAN_OPEN	
	Not allowed	
	Standard Configuration (DO NOT CHANGE)	*

Configuration table of vibration transducers gain					
Channel 0 Section B - input transducers XC1					
Gain =	SW3.1	SW3.2	SW3.3	SW3.4	Default
1	X	OFF	OFF	OFF	*
101	X	ON	OFF	OFF	
11	X	OFF	ON	OFF	
2	X	OFF	OFF	ON	
Channel 1 Section B - input transducers XC2					
Gain =	SW4.1	SW4.2	SW4.3	SW4.4	Default
1	X	OFF	OFF	OFF	*
101	X	ON	OFF	OFF	
11	X	OFF	ON	OFF	
2	X	OFF	OFF	ON	

Configuration table of vibration transducers gain					
Channel 0 Section A - input transducers XC16					
Gain =	SW5.1	SW5.2	SW5.3	SW5.4	Default
1	X	OFF	OFF	OFF	*
101	X	ON	OFF	OFF	
11	X	OFF	ON	OFF	
2	X	OFF	OFF	ON	
Channel 1 Section A - input transducers XC17					
Gain =	SW6.1	SW6.2	SW6.3	SW6.4	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		
SW7.1	OFF	Reserved
SW7.2	OFF	Reserved
SW7.3	OFF	Reserved
SW7.4	OFF	Reserved
	DO NOT CHANGE (USED FOR PROGRAMMING)	

Configuration Table			
SW1.1	TDO FPGA0	OFF	Reserved
SW1.2	TDO1	OFF	Reserved
SW1.3	DEBUG DSP01	OFF	Reserved
SW1.4	DEBUG DSP00	OFF	Reserved

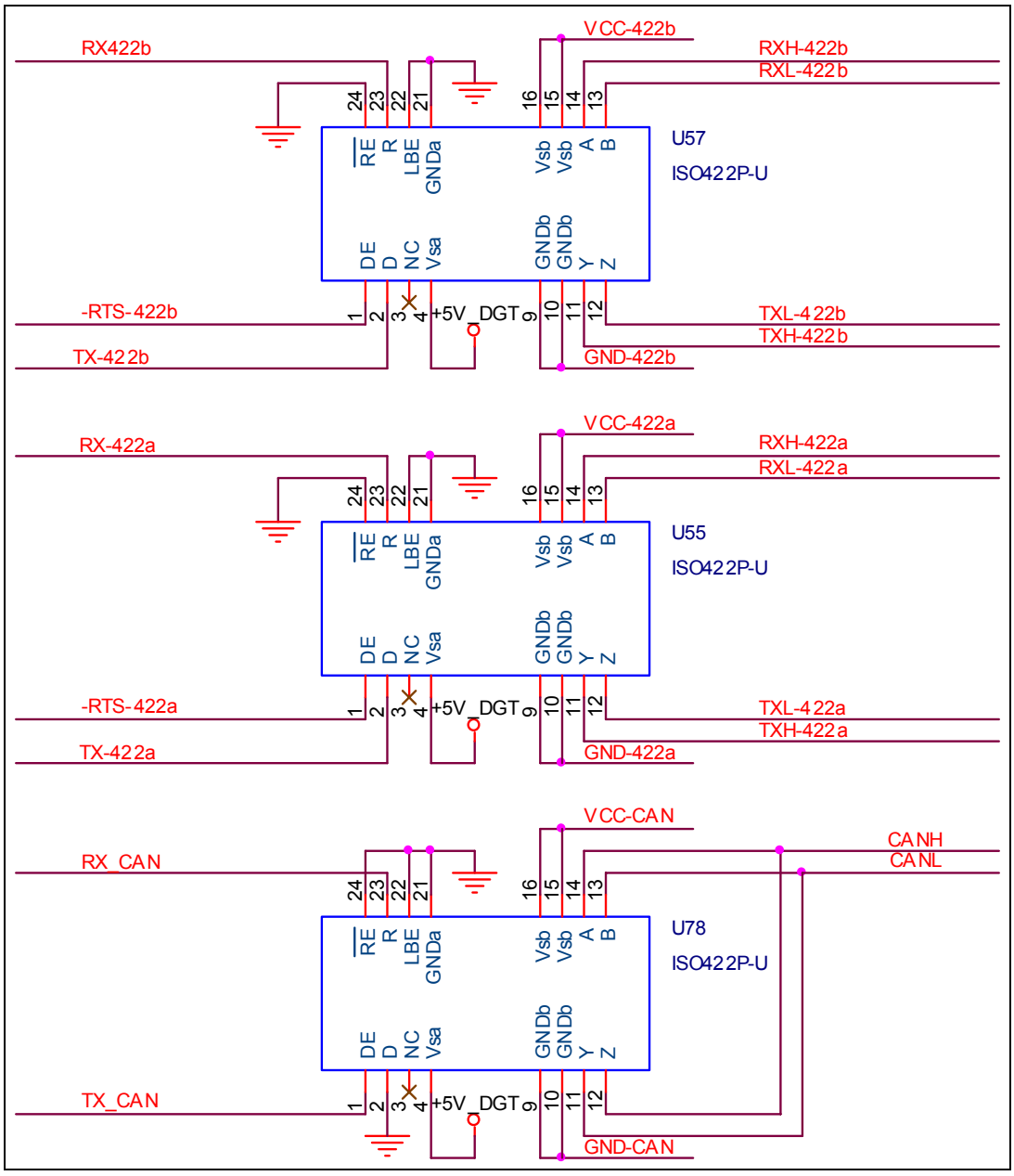
Configuration Table			
SW2.1	TDI FPGA1	OFF	Reserved
SW2.2	TDO1	OFF	Reserved
SW2.3	JTEG DSP10	OFF	Reserved
SW2.4	JTEG ctrl1	OFF	Reserved

Nota: To emulate DSP0 by means of TP12, all of the switches of SW1 must be OFF.
To emulate DSP1 by means of TP11, the contact SW2-2 must be ON and all of others must be OFF.

3.4.3. List of control card connectors

Connectors of control card	
J1	Connects the input of vibration transducers of section A to the control card.
J2	Connects the input of vibration transducers of section B to the control card.
J3	Connects the control card to the input/output card.
J4	Control signals of power module M0.
J5	Control signals of power module M3.
J6	Connection of heatsink temperature sensor
J7	Control signals of power module M1.
J8	Control signals of power module M2.
J9	Control signals of power module M5.
J10	Control signals of power module M4.
J11	Connection emulator DSP1. (Used only for repairing card, verify configuration of SW2_2)
J12	Connection emulator DSP0. (Used only for repairing card, verify configuration of SW1)
J13	Connects the input of the power supply voltage for the electronics. (24Vdc)
J14	Connects the serial lines to the control card.
J15	Connection emulator microprocessor. (Used only for repairing card)
JP1	Connection encoder axis 3 (power module M3)
JP2	Connection encoder axis 4 (power module M4)
JP3	Connection encoder axis 5 (power module M5)
JP4	Connection resolver axis 3 (power module M3)
JP5	Connection resolver axis 4 (power module M4)
JP6	Connection resolver axis 5 (power module M5)
JP7	External reset connection.
JP8	Encoder connection axis 0 (power module M0)
JP9	Encoder connection axis 1 (power module M1)
JP10	Encoder connection axis 2 (power module M2)
JP12	Resolver connection axis 0 (power module M0)
JP13	Resolver connection axis 1 (power module M1)
JP14	Resolver connection axis 2 (power module M2)

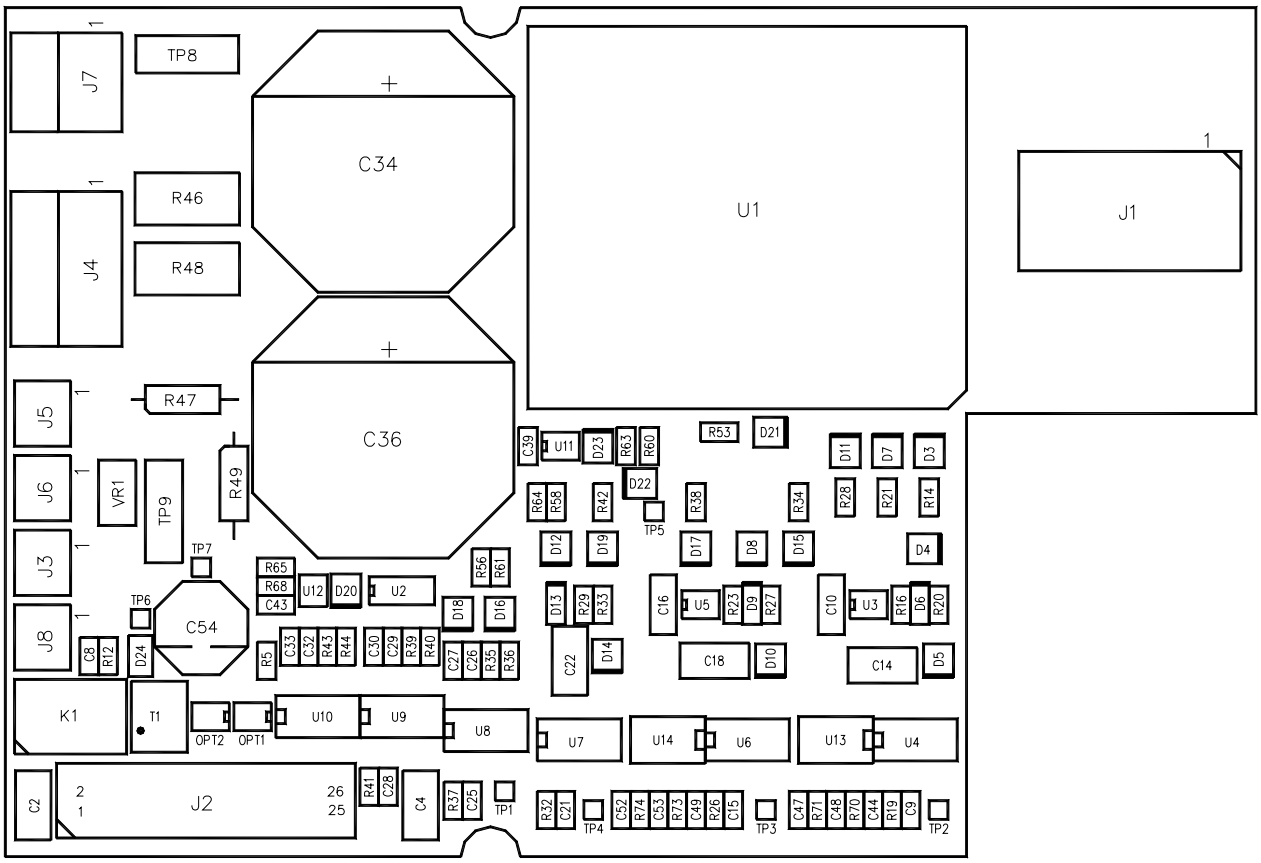
3.4.3.1. Layout detail of isolated communication channels section



3.5. Power card

This is a card that integrates the power component of each axis. On each card is installed an integrated power bridge.

3.5.1. Layout of the power card

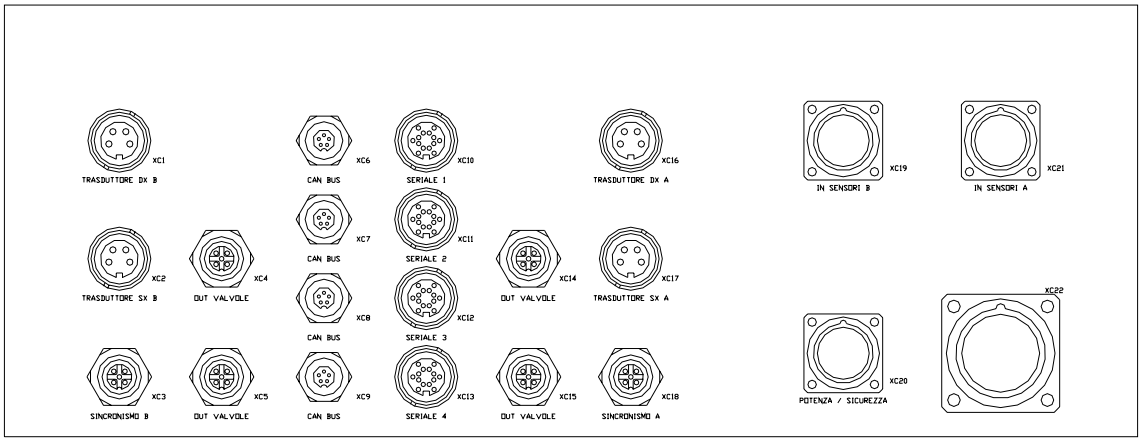


3.5.2. List of power card connectors

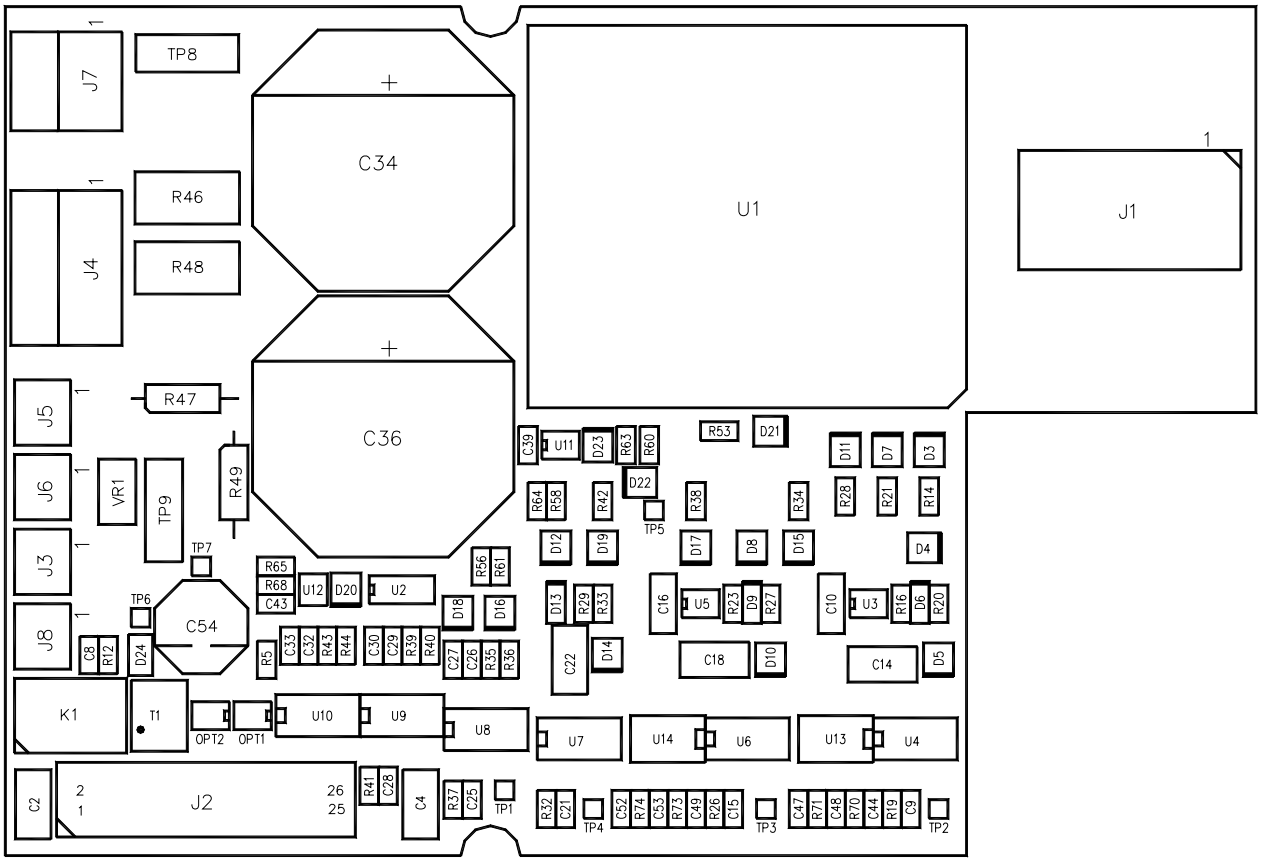
Pay attention to the labels of the power module. Inside the cabinet up to six equal cards can be found and therefore there may be six connectors with the same label. To avoid this problem, the label of the connector is preceded by another label identifying the module inside the cabinet.

Power card connectors	
J1	Connects the power card to the three phase power supply in input. This is a power supply bus connecting all of the power modules.
J2	Connects the power card to the control card.
J3	Connects the power card to the operating 24V power supply. The connector J8 has the same function and it is used as a bridge between one module and the next.
J4	Connects the power card to the motor - Power section
J5	Connects the power card to the motor's thermal control (PTC)
J6	Connects the power card to the motor's stationing brake.
J7	Connects the power card to the braking resistance.
J8	Connects the power card to the operating 24V power supply. The connector J3 has the same function and it is used as a bridge between one module and the next.

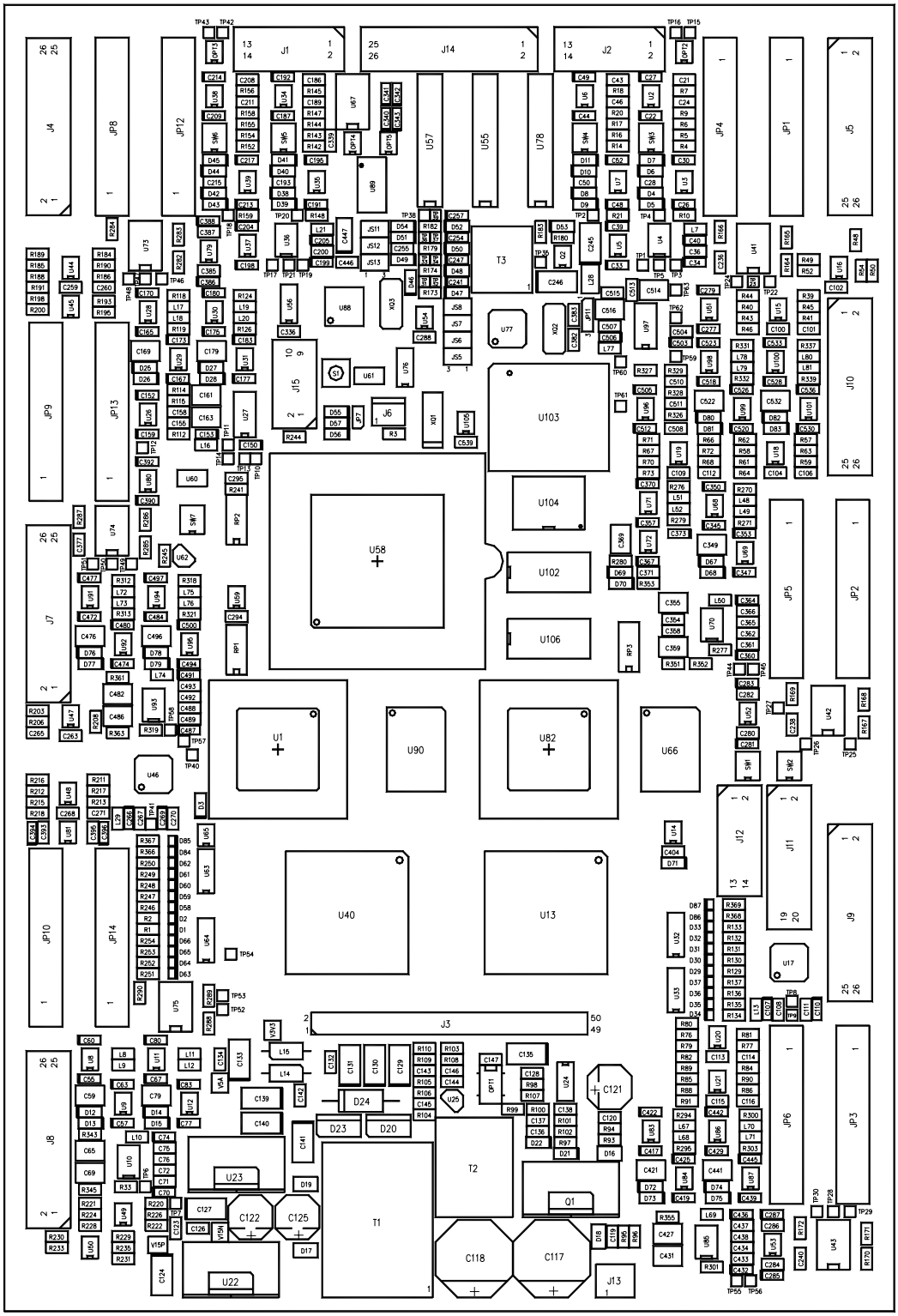
4. External connections



Power Card



Control Card



4.1. Motors connection

The motors connection is done in same way for all of the six axes. In the following table is shown the list of the connectors referred to each axis.

Function	Axis 0	Axis 1	Axis 2	Axis 3	Axis 4	Axis 5
Power Module	M0	M1	M2	M3	M4	M5
Power supply motor	M0-J4	M1-J4	M2-J4	M3-J4	M4-J4	M5-J4
Resolver	JP12	JP13	JP14	JP4	JP5	JP6
Encoder	JP8	JP9	JP10	JP1	JP2	JP3
Stationing brake	M0-J6	M1-J6	M2-J6	M3-J6	M4-J6	M5-J6
Motor thermal protection signal	M0-J5	M1-J5	M2-J5	M3-J5	M4-J5	M5-J5

4.1.1. Power supply Connection

Connector:	M0-J4, M1-J4, M2-J4, M3-J4, M4-J4, M5-J4	
Pin	Signal	Description
1	Phase U	Phase U motor
2	Phase V	Phase V motor
3	Phase W	Phase W motor

Connect the ground wire to the copper rods inside the cabinet. Pay particular attention to the shield of the cables that have to be connected to the frame.

4.1.2. Stationing Brake Connection

The stationing brake is automatically released when the motor is enabled. The brake is released by supplying power to it. The stationing brake power supply is taken from an appropriate connector in the cabinet A90. Normally the power supply of the actuators is used. In case of missing functioning, check the presence of brake power supply.

Connectors:	M0-J6, M1-J6, M2-J6, M3-J6, M4-J6, M5-J6	
	Signal	Description
1	+BR	Output 24V Stationing brake
2	-BR	Output 0V Stationing brake. Connect also the wire shield.

4.1.3. Motor thermal protection signal Connection

Connectors:	M0-J5, M1-J5, M2-J5, M3-J5, M4-J5, M5-J5	
	Signal	Description
1	+TEMP	Input PTC motor temperature control
2	-TEMP	Input PTC motor temperature control

4.1.4. Resolver Connection

Connectors:	JP4	
Pin	Signal	Description
1	SEN+	Positive Input resolver SINE Axis 3
2	SEN-	Negative Input resolver SINE Axis 3
3		
4	COS+	Positive Input resolver COSINE Axis 3
5	COS-	Negative Input resolver COSINE Axis 3
6		
7	RES_POS	Resolver positive excitation Axis 3
8	RES_NEG	Resolver excitation Axis 3

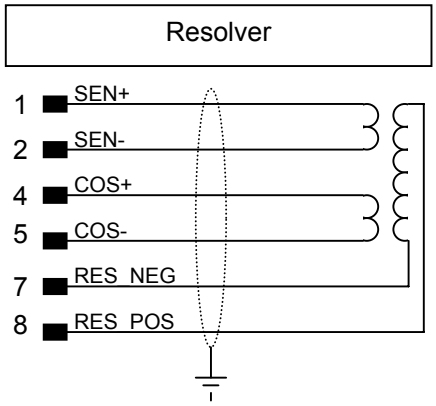
Connectors:	JP5	
Pin	Signal	Description
1	SEN+	Positive Input resolver SINE Axis 4
2	SEN-	Negative Input resolver SINE Axis 4
3		
4	COS+	Positive Input resolver COSINE Axis 4
5	COS-	Negative Input resolver COSINE Axis 4
6		
7	RES_POS	Resolver positive excitation Axis 4
8	RES_NEG	Resolver excitation Axis 4

Connectors:	JP6	
Pin	Signal	Description
1	SEN+	Positive Input resolver SINE Axis 5
2	SEN-	Negative Input resolver SINE Axis 5
3		
4	COS+	Positive Input resolver COSINE Axis 5
5	COS-	Negative Input resolver COSINE Axis 5
6		
7	RES_POS	Resolver positive excitation Axis 5
8	RES_NEG	Resolver excitation Axis 5

Connectors:	JP12	
Pin	Signal	Description
1	SEN+	Positive Input resolver SINE Axis 0
2	SEN-	Negative Input resolver SINE Axis 0
3		
4	COS+	Positive Input resolver COSINE Axis 0
5	COS-	Negative Input resolver COSINE Axis 0
6		
7	RES_POS	Resolver positive excitation Axis 0
8	RES_NEG	Resolver excitation Axis 0

Connectors:	JP13	
Pin	Signal	Description
1	SEN+	Positive Input resolver SINE Axis 1
2	SEN-	Negative Input resolver SINE Axis 1
3		
4	COS+	Positive Input resolver COSINE Axis 1
5	COS-	Negative Input resolver COSINE Axis 1
6		
7	RES_POS	Resolver positive excitation Axis 1
8	RES_NEG	Resolver excitation Axis 1

Connectors:	JP14	
Pin	Signal	Description
1	SEN+	Positive Input resolver SINE Axis 2
2	SEN-	Negative Input resolver SINE Axis 2
3		
4	COS+	Positive Input resolver COSINE Axis 2
5	COS-	Negative Input resolver COSINE Axis 2
6		
7	RES_POS	Resolver positive excitation Axis 2
8	RES_NEG	Resolver excitation Axis 2



4.1.5. Encoder Connection

Connectors:	JP1	
Pin	Signal	Description
1	VENC	+5V Power supply encoder Axis 3
2	0ENC	0V Power supply encoder Axis 3
3	+FA	Phase A encoder Axis 3
4	-FA	Phase A* encoder Axis 3
5	+FB	Phase B encoder Axis 3
6	-FB	Phase B* encoder Axis 3
7	+FZ	Phase C encoder Axis 3
8	-FZ	Phase C* encoder Axis 3

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

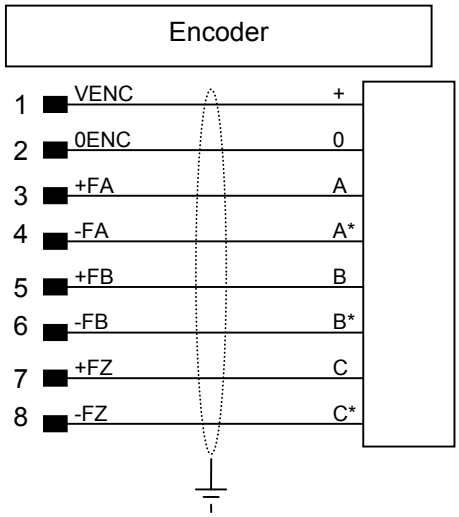
Connectors:	JP2	
Pin	Signal	Description
1	VENC	+5V Power supply encoder Axis 4
2	0ENC	0V Power supply encoder Axis 4
3	+FA	Phase A encoder Axis 4
4	-FA	Phase A* encoder Axis 4
5	+FB	Phase B encoder Axis 4
6	-FB	Phase B* encoder Axis 4
7	+FZ	Phase C encoder Axis 4
8	-FZ	Phase C* encoder Axis 4

Connectors:	JP3	
Pin	Signal	Description
1	VENC	+5V Power supply encoder Axis 5
2	0ENC	0V Power supply encoder Axis 5
3	+FA	Phase A encoder Axis 5
4	-FA	Phase A* encoder Axis 5
5	+FB	Phase B encoder Axis 5
6	-FB	Phase B* encoder Axis 5
7	+FZ	Phase C encoder Axis 5
8	-FZ	Phase C* encoder Axis 5

Connectors:	JP8	
Pin	Signal	Description
1	VENC	+5V Power supply encoder Axis 0
2	0ENC	0V Power supply encoder Axis 0
3	+FA	Phase A encoder Axis 0
4	-FA	Phase A* encoder Axis 0
5	+FB	Phase B encoder Axis 0
6	-FB	Phase B* encoder Axis 0
7	+FZ	Phase C encoder Axis 0
8	-FZ	Phase C* encoder Axis 0

Connectors:	JP9	
Pin	Signal	Description
1	VENC	+5V Power supply encoder Axis 1
2	0ENC	0V Power supply encoder Axis 1
3	+FA	Phase A encoder Axis 1
4	-FA	Phase A* encoder Axis 1
5	+FB	Phase B encoder Axis 1
6	-FB	Phase B* encoder Axis 1
7	+FZ	Phase C encoder Axis 1
8	-FZ	Phase C* encoder Axis 1

Connettori:	JP10	
Pin	Signal	Description
1	VENC	+5V Power supply encoder Axis 2
2	0ENC	0V Power supply encoder Axis 2
3	+FA	Phase A encoder Axis 2
4	-FA	Phase A* encoder Axis 2
5	+FB	Phase B encoder Axis 2
6	-FB	Phase B* encoder Axis 2
7	+FZ	Phase C encoder Axis 2
8	-FZ	Phase C* encoder Axis 2



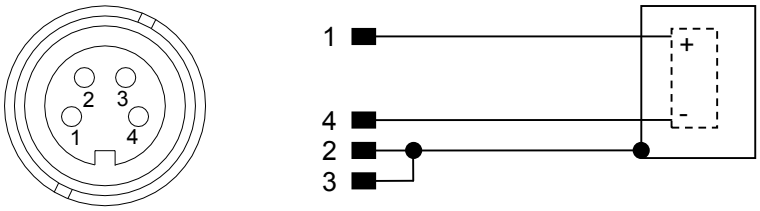
4.2. Peripherals Connection

4.2.1. Vibration transducers

The system allows to connect different types of transducers for vibration detection. For their configuration, operate on the panel **connectors I (JPx)** for the transducer type and on SWx of the control card to determine the gain. See paragraphs 3.2.2 and 3.4.2.

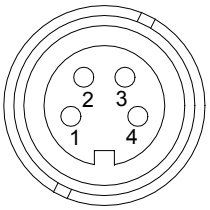
4.2.1.1. Mobile coil transducer connection

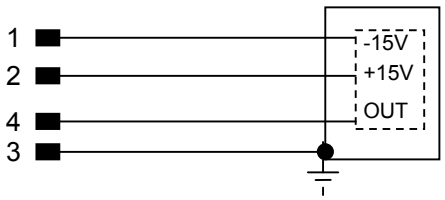
Connectors		
XC1	Signal	Description
1	-DX	Input Signal (defined as negative). Channel 0
2	GND	Ground Connection of transducer. Channel 0
3	GND	Ground Connection of transducer. Channel 0
4	+DX	Input Signal (defined as positive). Channel 0
XC2	Signal	Description
1	-SX	Input Signal (defined as negative). 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
XC16	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
XC17	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



4.2.1.2. Accelerometer Connection

Connectors:		
XC1	Signal	Description
1	-15V	Negative power supply of accelerometer. (Channel 0)
2	+15V	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	Negative power supply of accelerometer. (Channel 1)
2	+15V	Positive power supply of accelerometer. (Channel 1)
3	GND	Ground Connection of transducer. (Channel 1)
4	+SX	Input signal of accelerometer. (Channel 1)
XC16	Signal	Description
1	-15V	Negative power supply of accelerometer. (Channel 0)
2	+15V	Positive power supply of accelerometer. (Channel 0)
3	GND	Ground Connection of transducer. (Channel 0)
4	+DX	Input signal of accelerometer. (Channel 0)
XC17	Signal	Description
1	-15V	Negative power supply of accelerometer. (Channel 1)
2	+15V	Positive power supply of accelerometer. (Channel 1)
3	GND	Ground Connection of transducer. (Channel 1)
4	+SX	Input signal of accelerometer. (Channel 1)

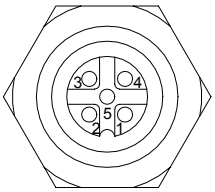


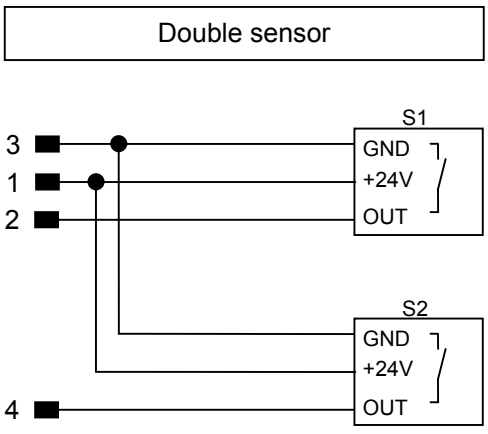


4.2.2. Polar expansions reading sensor

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).

Connectors:		
XC3	Signal	Description
1	+24V-EL	Sensor power supply
2	SY1	Input sensor 1. Sensors of type NPN normally open
3	GND	Sensor power supply
4	SY2	Input sensor 2. Sensors of type NPN normally open
5	PE	Ground Connection
XC18	Signal	Description
1	+24V-EL	Sensor power supply
2	SY1	Input sensor 1. Sensors of type NPN normally open
3	GND	Sensor power supply
4	SY2	Input sensor 2. Sensors of type NPN normally open
5	PE	Ground Connection

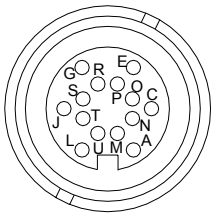




4.2.3. Serial lines

The serial lines are distributed on more connectors to make the wiring operations easier.

Connectors:		
XC10	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
XC11	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


E
G
R
O
S
P
C
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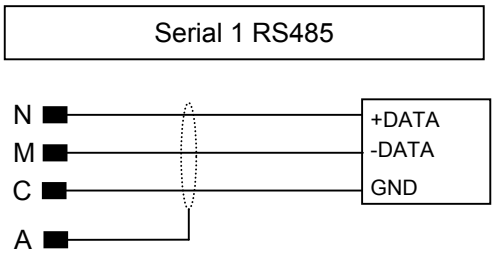
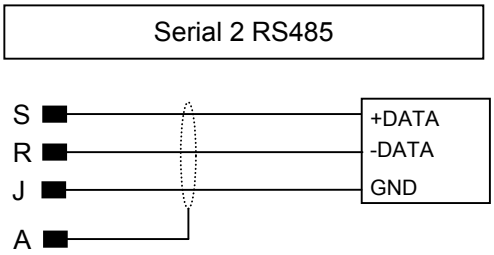
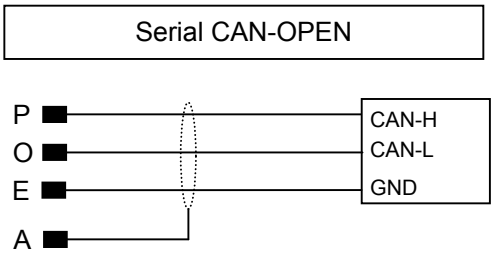
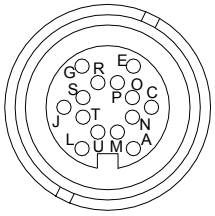
M
A

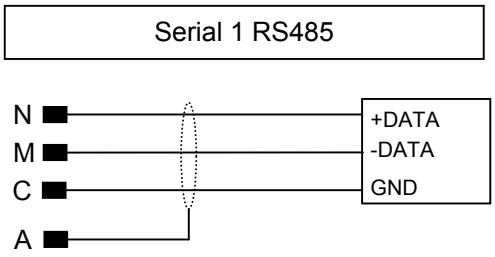

Serial 1 RS485
N
M
C
A
+DATA
-DATA
GND

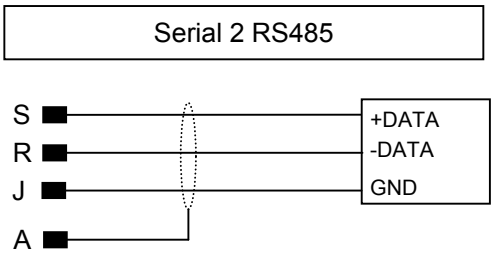

Serial 2 RS485
S
R
J
A
+DATA
-DATA
GND

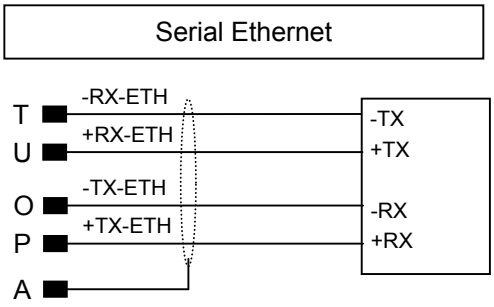

Serial CAN-OPEN
P
O
E
A
CAN-H
CAN-L
GND

Connectors:	XC12	
Pin	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 reference RS485 2
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

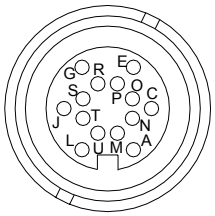


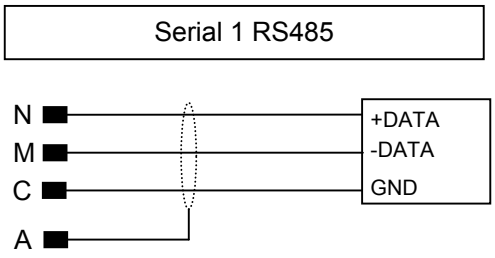


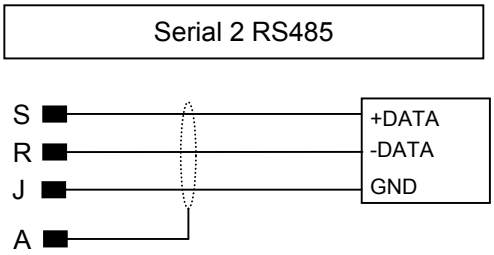


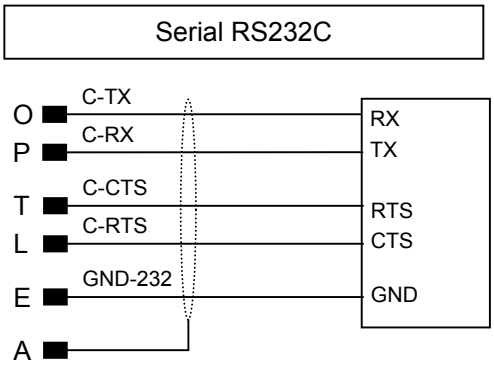


Connectors:	XC13	
Pin	Signal	Description
A	024V-EL	Reference power supply 24V
C	GND1	Serial line RS485 1 reference
E	GND-232	Serial line RS232C reference
G	+24V-EL	Power supply 24V
J	GND2	Serial line RS485 2 reference
L	C-RTS	Serial RS232C RTS signal
M	-DATA1	Serial RS485 1 inverted signal
N	+DATA1	Serial 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



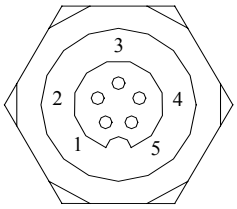






4.2.4. Remote groups Connection

Connectors:		
XC6	Signal	Description
1	+24V-EL	Electronics and sensors power supply 24V
2	+24V-Prot	Actuators power supply 24V. (Section 0)
3	024V-EL	Reference power supply 24V
4	CAN-H	High signal CAN-OPEN line
5	CAN-L	Low signal CAN-OPEN line
XC7		
1	+24V-EL	Electronics and sensors power supply 24V
2	+24V-Prot	Actuators power supply 24V. (Section 1)
3	024V-EL	Reference power supply 24V
4	CAN-H	High signal CAN-OPEN line
5	CAN-L	Low signal CAN-OPEN line
XC8		
1	+24V-EL	Electronics and sensors power supply 24V
2	+24V-Prot	Actuators power supply 24V. (Section 0)
3	024V-EL	Reference power supply 24V
4	CAN-H	High signal CAN-OPEN line
5	CAN-L	Low signal CAN-OPEN line
XC9		
1	+24V-EL	Electronics and sensors power supply 24V
2	+24V-Prot	Actuators power supply 24V. (Section 1)
3	024V-EL	Reference power supply 24V
4	CAN-H	High signal CAN-OPEN line
5	CAN-L	Low signal CAN-OPEN line

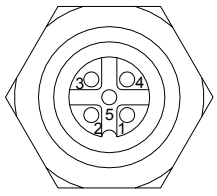


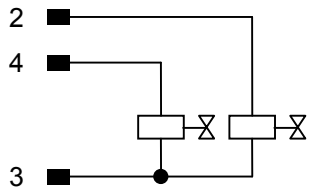
4.2.5. Digital outputs

Digital outputs are programmable. For their programming and use see paragraph 3.1.1. In that section also the software addresses for their management can be found.

In the following pages some typical connections can be found.

Connectors:		
XC4	Signal	Description
1	+24V_PROT	Power supply 24V interlocked with protection
2	OUT4	Output 24V 200mA pilot valves*
3	GND	Power supply 0V
4	OUT5	Output 24V 200mA pilot valves*
5	PE	Ground Connection
XC5	Signal	Description
1	+24V_PROT	Power supply 24V interlocked with protection
2	OUT6	Output 24V 200mA pilot valves*
3	GND	Power supply 0V
4	OUT7	Output 24V 200mA pilot valves*
5	PE	Ground Connection
XC14	Signal	Description
1	+24V_PROT	Power supply 24V interlocked with protection
2	OUT0	Output 24V 200mA pilot valves*
3	GND	Power supply 0V
4	OUT1	Output 24V 200mA pilot valves*
5	PE	Ground Connection
XC15	Signal	Description
1	+24V_PROT	Power supply 24V interlocked with protection
2	OUT2	Output 24V 200mA pilot valves*
3	GND	Power supply 0V
4	OUT3	Output 24V 200mA pilot valves*
5	PE	Ground Connection



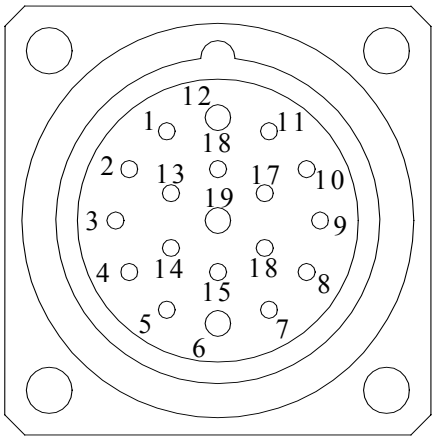


NOTE
* The function is determined by the program installed on the machine. Therefore the description is just generic.

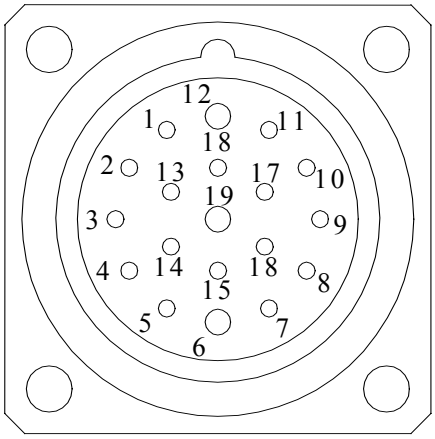
4.2.6. Digital Inputs Connection

The inputs are completely programmable.

Connector:			XC19
Pin	HW Label	SW Address	Description
1	IN4	4	Digital Input
2	IN6	6	Digital Input
3	SIN1_6	30	Digital serial Input
4	SIN1_3	27	Digital serial Input
5	SIN1_2	26	Digital serial Input
6	GND		Sensors power supply
7	SIN1_1	25	Digital serial Input
8	SIN1_5	29	Digital serial Input
9	IN3	3	Digital Input
10	IN1	1	Digital Input
11	IN0	0	Digital Input
12	PE		Ground Connection
13	IN7	7	Digital Input
14	SIN1_7	31	Digital serial Input
15	SIN1_0	24	Digital serial Input
16	SIN1_4	28	Digital serial Input
17	IN2	2	Digital Input
18	IN5	5	Digital Input
19	+24V		Sensors power supply



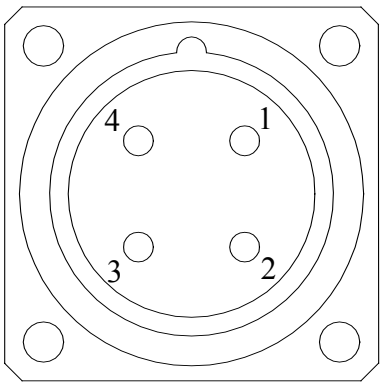
Connector:			XC21
Pin	HW Label	SW Address	Description
1	IN6	6	Digital Input
2	IN4	4	Digital Input
3	SIN0_7	23	Digital serial Input
4	SIN0_3	19	Digital serial Input
5	SIN0_2	18	Digital serial Input
6	GND		Sensors power supply
7	SIN0_1	17	Digital serial Input
8	SIN0_5	21	Digital serial Input
9	IN1	1	Digital Input
10	IN3	3	Digital Input
11	IN2	2	Digital Input
12	PE		Ground Connection
13	IN5	5	Digital Input
14	SIN0_6	22	Digital serial Input
15	SIN0_0	16	Digital serial Input
16	SIN0_4	20	Digital serial Input
17	IN0	0	Digital Input
18	IN7	7	Digital Input
19	+24V		Sensors power supply



4.3. Power supply Connection

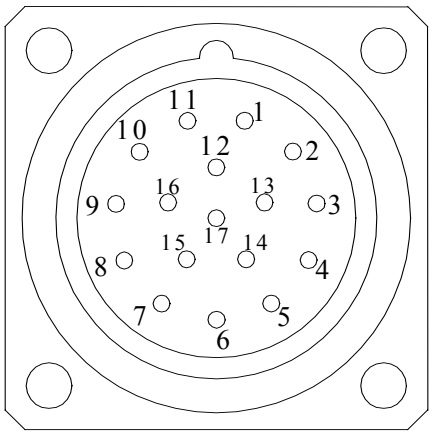
4.3.1. Motor Power supply

Connectors:	XC22	
Pin	Signal	Description
1	R	Phase R drive Motor Power supply
2	S	Phase S drive Motor Power supply
3	T	Phase T drive Motor Power supply
4	PE	Ground Connection of cabinet A90



4.3.2. Electronics, actuators and control signals Power supply

Connectors:	XC20	
Pin	Signal	Description
1	+24V-Prot	Actuators power supply 24V - section 1 A90. (Interlocked)
2	RELE1_C	Power safety contact - section 1
3	ENABLE1	Power enabling - section 1
4	GND	Reference power supply 24V
5	+24V-EL	Electronics and sensors power supply 24V. (Not Interlocked)
6	+24V-EL	Electronics and sensors power supply 24V. (Not Interlocked)
7	-FRENO	Stationing brake power supply 24V.
8	RELE0_C	Power safety contact - section 0
9	+24V-EL	Electronics and sensors power supply 24V. (Not Interlocked)
10	+FRENO	Stationing brake power supply +24V.
11	+24V-Prot	Actuators power supply 24V - section 0 A90. (Interlocked)
12	RELE1_NC	Power safety contact - section 1
13	+24V-EL	Electronics and sensors power supply 24V
14	GND	Reference power supply 24V
15	RELE0_NC	Power safety contact - section 0
16	ENABLE0	Power enabling - section 0
17	PE	Ground Connection



4.3.3. 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	76399042914204	2PNECNFST00006	Free male connector 4 poles double output
XC4	76399042914204	2PNECNFST00006	Free male connector 4 poles double output
XC5	76399042914204	2PNECNFST00006	Free male connector 4 poles double output
XC6	7129904131005	2CNPSDMV002405	Free male connector 5 poles
XC7	7129904131005	2CNPSDMV002405	Free male connector 5 poles
XC8	7129904131005	2CNPSDMV002405	Free male connector 5 poles
XC9	7129904131005	2CNPSDMV002405	Free male connector 5 poles
XC10	4239954511514	2CNPSDMV001714	Free male connector 14 poles
XC11	4239954511514	2CNPSDMV001714	Free male connector 14 poles
XC12	4239954511514	2CNPSDMV001714	Free male connector 14 poles
XC13	4239954511514	2CNPSDMV001714	Free male connector 14 poles
XC14	76399042914204	2PNECNFST00006	Free male connector 4 poles double output
XC15	76399042914204	2PNECNFST00006	Free male connector 4 poles double output
XC16	4239951091504	2CNPSDMV000104	Free male connector 4 poles
XC17	4239951091504	2CNPSDMV000104	Free male connector 4 poles
XC18	4239951091504	2CNPSDMV000104	Free male connector 4 poles double output
XC19	2CNPOTMA001419	09152192603	Male insert 19 poles
	2CNPOTCV002300	09152000403	Wander housing
	2RB000000003-0	53112220	Cable clamp PG11
XC20	2CNPOTFE001417	09152172703	
	2CNPOTCV002300	09152000403	Wander housing
	2RB000000003-0	53112220	Cable clamp PG11
XC21	2CNPOTMA001419	09152192603	Male insert 19 poles
	2CNPOTCV002300	09152000403	Wander housing
	2RB000000003-0	53112220	Cable clamp PG11
XC22	2CNVARFV001004	PFCN43 SC16	Free female connector 4 poles

5. POWER SUPPLY DATA

The A90 system is provided with 4 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 and power modules	1.7A	40W
Heat exchange pump conditioning system	2.5A	60W
Cooling system for external heat sink	0.5A	12W
Remote modules: the power required by these devices depends on their number; however the maximum allowed load is about:	4A	96W
Maximum power on the main power supply	24Vdc 8.5A	205W

5.2. Interlocked power supply

The A90 system is provided with two interlocked power supply inputs, because it is divided into two sections. These sections are directly connected to the valves managed by A90 outputs, or by the remote modules. The power required by these devices depends on their number.

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

5.3. Motors power supply

The A90 system can control up to a maximum of 6 motors of 2 kW each; however the simultaneous movement of all 6 motors is not provided.

Maximum power on the motor power supply:	415Vac three phase 15A	

5.4. Motors brakes power supply

Maximum power on the motors brakes power supply	24Vdc 3.6A	86W

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.

Layout