TexComputer
systems & solutions

# Programmable Automation Controller (PLC + CNC + HMI) for 4 interpolated axes

Power L 7" Only touch

- TFT WVGA display in 15:9 (800x480 pixel) size with touch screen
- USB socket
- dimensions 243x146x77 (WxHxD in mm)

Power L 7" with 20 keys

- TFT WVGA display in 15:9 (800x480 pixel) size with touch screen
- 20-key thermoformed membrane keypad
- USB socket
- dimensions 289x160x77 (WxHxD in mm)
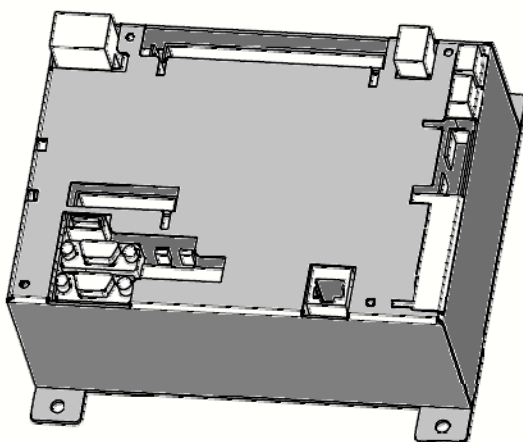
Power L Box

- dimensions 174x157x83 (WxHxD in mm)

Technical data

Description		Notes / Options
CPU	**32 bit RISC**	132 MHz clock
Flash memory + F volume	**11 MB**	
Ram (with buffer battery)	**4 MB**	8 MB on request
Clock calendar	**Yes**	Optional
Buzzer	**Yes**	
Touch screen	**Yes**	
Keypad management	**Yes**	Maximum 60 keys
Digital inputs PNP 24 Vdc	**16**	Locally expandable to 32 with INT-SPI
Digital inputs 5V TTL	**2**	Can be conditioned via INT-185 GP
Protected outputs PNP 0,6 Amp. 24Vdc	**8**	Locally expandable to 24 with INT-SPI
Optoinsulated outputs 60 mA 24Vdc PNP	**4**	
Digital outputs 5V TTL	**8**	4 can be conditioned via INT-185 GP
Analog inputs 0..5 volt - 12 bit	**7**	On request 3 can be 0-20 mA
Analog input +/-10 volt	**1**	Optional
Analog input 0-20 mA 12 bit	**1**	Optional
Input for thermo couple J/K 12 bit	**1**	Optional
Analog outputs +/-10V, from PWM	**2**	
5V Line Driver encoder interface	**2**	On request they can be 5 V Push Pull
STEP / DIRECTION or PWM outputs	**for 4 axis**	5V Push Pull , can be conditioned to 5V Line Driver via INT-185 GP
RS232 port	**1**	Own protocol, Modbus RTU
CAN port	**1**	CANopen CiA 401, CiA 402 and CiA 406
Ethernet 10-100 T port	**1**	TCP/IP, FTP, ModbusTCP and WEB server
Auxiliary port	**RS232**	RS485 optional
USB port	**1**	Front connector with cover or rear
SPI port (local I/O expansion)	**1**	For INT-SPI interface with 16 I +16 O
Power supply	**24 Vdc**	Low consumption, battery function also possible

Please note: the graphics controller of Power L not have enough dynamic memory and thus cannot handle the USB mouse and is generally less performing than other Power controllers.
In cases where it is required to use the mouse or you have to have high-performance graphics is therefore recommended to use the Power J.
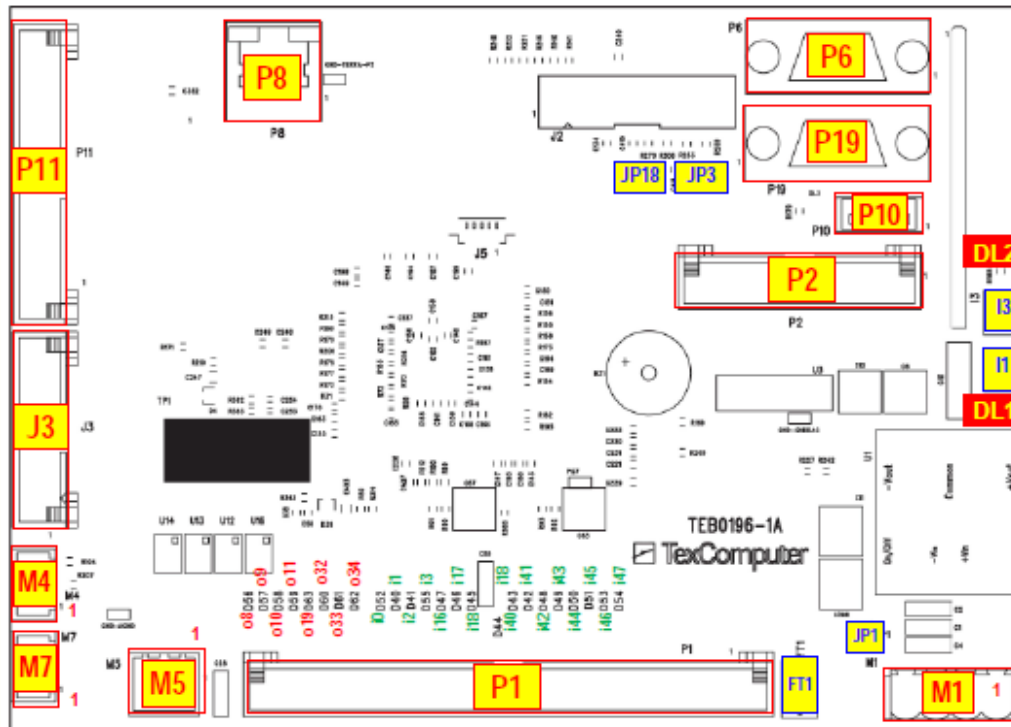
Warnings

Before powering up the controller you should always check the following:

1. **That the power is supplied only via terminal M1**

2. **That the supply voltage never exceeds 27 VDC**

3. **That the connections between the + and - of the power supplies are not reversed, both incoming or exiting the controller**

4. **That the encoders are not fed with voltages other than those provided by the controller**

5. **That the position of connectors having the same number of poles have not been inverted**

Failure to observe any of these recommendations could cause irreparable damage to the controller.

Name	Type	Function
P1	Flat connector , 64 pin	no. 3 signals A, B and Z Line driver encoder # 1 no. 3 signals A, B and Z Line driver encoder # 2 no. 2 analog outputs +/- 10 V (from PWM # 5 and 6) no. 16 digital inputs (to use also as Fc Zero) no. 8 digital protected outputs PNP 0,6 A – 24 Vdc no. 4 digital outputs opto PNP 60 mA – 24 Vdc
P2	Flat connector, 26 pin	PWM / STEP outputs and DIR # 1, 2, 3 and 4 (5V TTL) no. 2 digital inputs 5V TTL (available on INT-185 GP) no. 8 digital output 5V TTL (4 available on INT-185 GP) no. 4 Analog inputs 0-5 V 12 bit ADC (0/1/2/3)
P6	Pan connector 9 pin M	RS232 (COM1 & COM2); on option COM1 -> RS485
P8	Connector RJ45	Ethernet 10/100 T
P10	Connector USB	USB 1.1
P11	Connector 34 pin	Reserved for future developments
P19	Sub-D connector 9 pin F	CAN A (addressable nodes 0-63)
M1	4-pin Terminal board	Controller power supply
M4	3 pin Terminal board	Optional analog inputs +/- 10V ADC(32) and 0-20 mA ADC(13) – 12 bit resolution
M5	6 pin Terminal board	no. 3 Analog inputs 0-5 Volt (on request 0-20mA) 12 bit ADC(10/11/12)
M7	3 pin Terminal board	Optional no. 1 analog input for thermo couple J/K ADC(24)
J3	Connector 20 pin	Connection to INT-SPI interface (I/O expansion)
JP1	Jumper	VA supply short circuit with VAX supply
JP3	Jumper	CAN port termination resistance
JP18	Jumper	Optional RS485 port termination resistance
FT1	Faston	Ground connection with at least 2,5 mm^2 cable

Name	Type	Function
I1	Microswitch (input i4)	Launch of Boot and Card recovery functions
I3	Microswitch (input i5)	At start up it simulates pression on STOP key
DL1	Red led	Internal power supply ok
DL2	Red led (output o42)	Signalling functions selectable by micro switch I1

For connectors without numbering, pin 1 is highlighted in red.
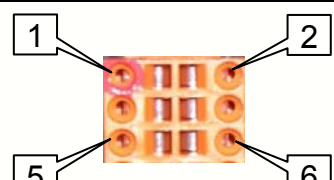
M1 TERMINAL BOARD (power supply)

Terminal	Function
1	VA +24 Vdc controller's power supply
2	GNDA 0Vdc power supply
3	GNDA 0Vdc power supply
4	VAX with jumper JP1 closed (default configuration) it's connected to terminal 1

VAX terminal allows you to supply the 0,6A protected outputs independently to the power supplied to the controller.   This possibility is particularly useful when controller's outputs are used on machines which have to respect CE safety regulations.

M4 TERMINAL BOARD (+/- 10V and 0-20 mA optional inputs)

Terminal	Function
1	+/- 10 V analog input readable with operator ADC(32), range 1640…14744, ris..12 bit
2	GND
3	0-20 mA analog input readable with operator ADC(13), range 0… 16384, risoluz.12 bit

M5 TERMINAL BOARD (3 5V or 0-20mA analog input)

Terminal	Function	Layout
1	GND analog	
2	5V analog input readable with operator ADC(10) *	
3	5V analog input readable with operator ADC (11) *	
4	5V analog input readable with operator ADC (12) *	
5	GND analog	
6	+ 5V for potentiometers supply	

 * on request they can be 0-20mA with resistance in input of 249 Ω

M7 (AN24 analog input for thermo couple J type * optional)

Terminal	Function	Remarks
1	TC + Positive input for thermo couple J or K *	Temperature reading through operator ADC(24) applying a conversion coefficient of 5 mV/°C, 0°C = 0V
2	TC - Negative input for thermo couple J or K *	
3	GND	

 * on request it's possible to condition input for thermo couple K type

Measuring features according to the according to the type of thermo couple connected

Type	Max. linearity error	Field's temperature	Measuring range
J	+/- 2 °C	From 25 °C to 100 °C	From + 55 °C to + 565 °C
K	+/- 2 °C	From 0 °C to 50 °C	From - 25 °C to + 400 °C

Unsupported graphics commands

Compared to other members of the Power Family, the Power L adopts a graphics controller different, already integrated in the display. This controller does not allow to support the following graphics commands:

- **HCURS:** which displays a graphic cursor depicted by an icon
- **SPRITE:** defining superimposed graphic layers
- **WINDOW !p:** a graphical window with SPRITE (ie with a priority level p> 64)
- **MKPERM:** making permanent the graphics drawn in a rectangular area of the screen
- **SCREEN 99:** opening a dialog box after the graphic simulation of CNC program

Please be aware that into file ICU you cannot insert icons in jpeg format.

For more information, see manual html PowerFamily.chm.

Box version

Since graphics controller is integrated into the display, as there is no display when you make the dump (that is a copy of the screen image) from Power Studio or WebServer, you get a screen image completely light blue.

Ethernet connection

There is one parameter to enable Ethernet connection, one to set its IP address and one to declare its subnet mask; the first and the third one are accessible in the machine parameters, while the Ethernet address is in the "change card parameters" list accessible from the Boot menu (see also "Basic touch screen functions" in this data sheet). If the controller does not have a full hardware keyboard, the Boot menu should be accessed through the touch screen tool bar (remember that this access is protected by a password):
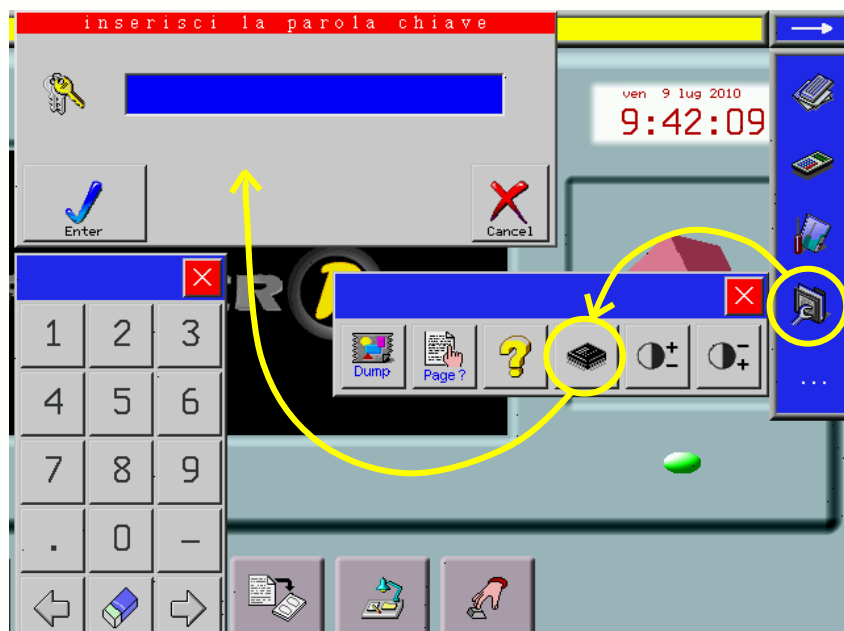
You can find further information on html manual PowerFamily.chm, in the paragraph "User's interface". By default connection is already enabled and the controller is accessible at IP 192.168.0.200, subnet mask 255.255.255.0; for a direct connection with a PC (peer to peer mode) use a crossed Ethernet cable with RJ45 8 pins connectors.

Names of axes

This hardware configuration parameter associates the names of axes to the hardware resources on the motherboard. These resources can be identified per type and differ for a consecutive numbering (e.g. encoder # 1, encoder # 2, PWM # 5 etc.). In the default configuration, the names XYZ are assigned to the axes and the position assumed by each letter indicates the number of the hardware resource which will be associated to the relative axis if installed.

Installed axes

In order to be installed and be operative the axis have to be declared in specific hardware configuration parameter. It's possible to modify default hardware resources assignation operating on respective special parameters of each axis.

For example: installing axes X and Y and modifying the "encoder number" parameter of the "X axis special parameters" from the "default" value to value "4" transfers the X axis feedback from encoder # 1 to encoder # 4, while the Y axis feedback will remain the default correlation to # 2.

The freed resources (encoder # 1 in the example) can be used by other axes or managed through specific commands available in the programming language.

Parameters to associate hardware resources to the axes

"PWM/DAC/freq output number": destination of the PID output of the axis (valid values from 1 to 16).
"encoder number": velocity/position feedback of the axis (valid values from 1 to 2)
"enabling output": output to enable the drive of the axis (any available user output is valid).
"zero sensor": input to change the position of the axis (only interrupt inputs are valid)
"minimum sensor": input to limit the minimum stroke of the axis (any available input is valid).
"maximum sensor": input to limit the maximum stroke of the axis (any available input is valid). The output which controls the direction of the axis cannot be changed from the default setting.

Management of the limit switches dedicated to the axes

Each installed axis has associated by default inputs which have a predetermined function:
- **Zero limit switch**, allows you to change axis position when at its disactivation or when an encoder impulse occurs through signal "Notch 0". Input must be manageable in interrupt.
- **Minimum limit switch** at its activation interrupts axis motion, puts it in alarm and prevents any motion towards lower quotes. The input must remain active till it reaches the lowest physical limit of the axis motion.
- **Maximum limit switch** at its activation interrupts axis motion, puts it in alarm and prevents any motion towards higher quotes. The input must remain active till it reaches the highest physical limit of the axis motion..

Generally Zero Limit Switch can also simultaneously work as one of the two limit switches (minimum or maximum), therefore by default the Zero and Minimum Limit Switchs use the same input.

Inputs in interrupt

All inputs present on the main board can be managed at interrupt.

+/- 10V analog inputs

To use correctly analog input connected to pin 1 of terminal M4, you have to execute linearization of the value read through ADC (32) opearator, considering that:
- At each value in input equal to -10V corresponds a value of 1640 um
- At each value in input equal to 0V corresponds a value of 8192 um
- At each value in input equal to +10V corresponds a value of 14744 um

Since the converter resolution is 12 bit, the smallest noticeable variation will be 1,5996 um

Other analog inputs

All analog inputs readable from ADC operator (xx) have to be lined up to Full Scale value (F.S.) of the input considering that:

- To a value in input equal to 0 % of F.S. corresponds a value of 0 um
- To a value in input equal to 100 % of F.S. corresponds a value of 16384 um

Since the converter resolution is 12 bit, the smallest noticeable variation will be 4 um

Alarm signal on protected outputs

If one or more protected 0,6A outputs undergo an overload the automatic thermal protection function of the integrated circuit ISO1H811G releases and restores repeatedly the output generating at the same time an alarm signal detectable from transition from 1 to 0 of input i7. In normal working conditions of the output, input i7 is at 1 but it can change to 0 even if supply tension of the VAX outputs goes below the minimum allowed value of 10,5V.

20-key keyboard coding

For technical reasons, the 20-key keyboard has a low-level coding, ie that shown in the S bit, different from the standard. The high-level coding, readable through KBHIT command, remains unchanged:

Key	Bit S	High-level coding				
SHIFT	s66	key only	Shift + key		Alt + key	
ALT	s50					
x	s53	120	88	X	37	%
y	s69	121	89	Y	34	"
z	s85	122	90	Z	61	=
Freccia su	s67	267	267		269	PgUp
Freccia giù	s86	268	268		270	PgDw
Freccia sinistra	s83	265	265		265	
Freccia destra	s35	266	266		266	
Freccia su/sx (Home)	s55	273	273		373	Home
Freccia giù/dx (End)	s39	272	272		372	End
ENTER	s51	13	13		13	
START	s54	275	275		275	
Space	s71	32	32		32	
STOP	s70	276	276		276	
HELP	s87	274	274		274	
TEST	s82	271	271		271	
DEL	s34	264	264		264	
ESC	s38	27	27		27	
FNZ	s37	277	277		277	

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P1 CONNECTOR (Analog outputs, encoder and digital I/O)

Pin	DESCRIPTION	NOTES
1	GNDANAL X X axis analog ground	
2	VREF X reference signal, +/- 10V	obtained from channel PWM # 5
3	GNDANAL Y Y axis analog ground	
4	VREF Y reference signal, +/- 10V	obtained from channel PWM # 6
5	GND logic ground	
6	GND logic ground	
7	CLK A channel A direct encoder # 1	5V Line Driver or Push Pull *
8	CLK /A channel A negative encoder # 1	
9	GND logic ground	
10	CLK B channel B direct encoder # 1	5V Line Driver or Push Pull *
11	CLK /B channel B negative encoder # 1	
12	GND logic ground	
13	NOTCH 0 channel 0 direct encoder # 1	5V Line Driver or Push Pull *, usable in interrupt as i56
14	NOTCH /0 channel 0 negative encoder # 1	
15	VCC supply + 5Vcc for encoder	
16	GND logic ground	
17	CLK A channel A direct encoder # 2	5V Line Driver or Push Pull *
18	CLK /A channel A negative encoder # 2	
19	GND logic ground	
20	CLK B channel B direct encoder # 2	5V Line Driver or Push Pull *
21	CLK /B channel B negative encoder #2	
22	GND logic	
23	NOTCH 0 channel 0 direct encoder # 2	5V Line Driver or Push Pull *, usable in interrupt as i57
24	NOTCH /0 channel 0 negative encoder # 2	
25	VCC supply + 5Vcc for encoder	
26	GND logic ground	
27	User input i22N	5V TTL, it activates at GND
28	GND logic ground	
29	User input i16	
30	User input i17	
31	User input i18	
32	User input i19	
33		Not connected
34		Not connected
35	User output o0	24V PNP - 60 mA powered by VA
36	GND logic ground	
37	GNDA I/O logic supply	
38	User output o8	
39	User input i46	
40	User input i40	By default = Fc Zero limit stop # 1 (X)
41	FCEMG emergency	s127, if deactivated becomes user input i47
42	User input i41	By default = Fc Axis # 1 (X) max limit stop
43	User output o32	DIRO X axis # 1 direction output
44	User input i42	By default = Fc Axis # 2 (Y) home limit stop
45	User output o33	DIRO Y axis # 2 direction output
46	User input i43	By default = Axis # 2 (Y) max limit stop
47	User output o34	
48	User input i44	
49	User output o16	By default = ENBX enabling of driver # 1 (X) - 24 V PNP - 60 mA powered by VA

Pin	DESCRIPTION	NOTES
50	User input i45	
51	User output o17	By default = ENBY enabling of driver # 2 (Y) - 24 V PNP - 60 mA powered by VA
52	User input i0	
53	User output o18	24V PNP - 60 mA powered by VA
54	User input i1	
55	User output o19	
56	User input i2	
57	User output o9	
58	User input i3	
59	User output o11	
60	User output o10	
61	GNDA power supply I/O	
62	GNDA power supply I/O	
63	VA +24V supply	
64	VAX +24V I/O supply	

* On request, encoder's inputs can be supplied in 5V Push-Pull configuration; in this case the input signals must be connected to the straight channels and the negated channels must be left disconnected.

The encoder inputs can be filtered by software acting on INFO 1623 and INFO 1648

The GNDANAL signals must be connected to the differential inputs of the DRIVES (where the inputs are available, of course). If the differential input is not provided, this signal must not be connected.
In this case the GND is used as common reference between POWER L and DRIVE.
In the case of DRIVES without differential input, it might be necessary to connect the screened cable to ground at both ends or to connect the -vref signal of the drive directly to ground in the gnd drive.
It depends on the specifications of drive and on how the control panel is constructed.
The analog motor control signal is obtained by converting the digital PWM signal into analog with an integrator; the "drive type" parameter must be set at 1 and the PWM resolution can be set at 13 or 14 bit.

P2 CONNECTOR (PWM / STEP and DIR # 1, 2, 3 and 4 + analog inputs)

Pin	DESCRIPTION	NOTES
1	VCC + 5Vdc power supply for encoder	
2	PWM / STEP # 1 driver control output	Note 1
3	GND logic ground	
4	DIR # 1 driver direction output	User output o24 (5V TTL)
5	GND logic ground	
6	PWM / STEP # 2 driver control output	Note 1
7	GND logic ground	
8	DIR # 2 driver direction output	User output o25 (5V TTL)
9	GND logic ground	
10	PWM / STEP # 3 driver control output	Note 1
11	GND logic ground	
12	DIR # 3 driver direction output	User output o26 (5V TTL)
13	User input i48	5V TTL
14	PWM / STEP # 4 driver control output	Note 1
15	User input i49	5V TTL
16	DIR # 4 driver direction output	User output o27 (5V TTL)
17	ENABLE # 2 negated (0 = driver enabled)	User output o21N (5V TTL)
18	ENABLE # 1 negated (0 = driver enabled)	User output o20N (5V TTL)
19	ENABLE # 4 negated (0 = driver enabled)	User output o23N (5V TTL)
20	ENABLE # 3 negated (0 = driver enabled)	User output o22N (5V TTL)
21	VREF + 5Vdc reference for analog inputs	
22	AGND analog ground for analog inputs	
23	Analog In 1 – readable with ADC operator (1)	Note 2
24	Analog In 0 – readable with ADC operator (0)	Note 2
25	Analog In 3 – readable with ADC operator (3)	Note 2
26	Analog In 2 – readable with ADC operator (2)	Note 2

Note 1: The PWM signal can become a STEP signal if you set the drive type special parameter at value 8; if other motor parameter is set at 0 the axis feedback is an encoder, if it is at 1 the pulses generated by the STEP output are used as feedback. The motor output offset special parameter should also be set at a value different from 0 to avoid that the stabilization time is too long when the target position is reached. Max. frequency of the STEP signal is 263 KHz if INFO 1154=1 and may fall to 37 KHz if INFO 1154 = 7 (further information in "Power Family.chm" manual).

Note 2: Analog inputs not buffered with resolution 12 bit: accept tensions between 0 and 5 volt; these inputs can be used only locally because they have no protection

Through the INT-185-GP interface, many of these I/O can be electrically conditioned.

WARNING: this document only describes the electrical connections of the connectors most often used. For all further information about the electrical connections and programming of the controller, refer to the manual supplied as a "Compiled HTML Help" file called "**Power Family.chm**"; this manual is on the CD supplied with the controller and can also be downloaded from the "Download Service" area of the site www.texcomputer.com

DIGITAL INPUTS (consecutive numbering)

Input	Connector	pin	led	notes
i0	P1	52	d52	
i1	P1	54	d40	
i2	P1	56	d41	
i3	P1	58	d55	
i4	-	-		I1 push button
i5	-	-		I2 push button
i7 *	-	-		Internal alarm on protected outputs
i16	P1	29	d47	
i17	P1	30	d46	
i18	P1	31	d45	
i19	P1	32	d44	
i22N	P1	27		5V TTL, is active to GND
i40	P1	40	d43	Axis # 1 (X) zero limit stop
i41	P1	42	d42	Axis # 1 (X) max limit stop
i42	P1	44	d48	Axis # 2 (Y) zero limit stop
i43	P1	46	d49	Axis # 2 (Y) max limit stop
i44	P1	48	d50	
i45	P1	50	d51	
i46	P1	39	d53	
i47	P1	41	d54	EMERGENCY s127 (if EMG is deactivated it is i47)
i48	P2	13		5V TTL inputs, can become a 24V PNP via the INT-185 GP interface card
i49	P2	15		
i56	P1	13&14		Enc. # 1 zero notch, 5V Line Driver, usable in interrupt
i57	P1	23&24		Enc. # 2 zero notch, 5V Line Driver, usable in interrupt

* Normally 1, switches to 0 if one or more outputs are in safety alarm or if VAX voltage drops below 10.5 Vdc.

DIGITAL OUTPUTS (consecutive numbering)

Output	Connector	pin	led	powered from	notes
o0	P1	35		VA	24V PNP - 60 mA
o8	P1	38	d56	VAX	0,6A * protected output
o9	P1	57	d57		0,6A * protected output
o10	P1	60	d58		0,6A * protected output
o11	P1	59	d59		0,6A * protected output
o16	P1	49		VA	ENB X, 24V PNP - 60 mA
o17	P1	51			ENB Y, 24V PNP - 60 mA
o18	P1	53			24V PNP - 60 mA
o19	P1	55	d63	VAX	0,6A * protected output
o20	P2	18		internal	5V TTL, can become 24Vdc - 0.6A * protected outputs via the INT-185-GP interface card
o21	P2	17			
o22	P2	20			
o23	P2	19			
o24	P2	4			5V TTL
o25	P2	8			5V TTL
o26	P2	12			5V TTL
o27	P2	16			5V TTL
o32	P1	43	d60	VAX	DIRO X, 0,6A * protected output
o33	P1	45	d61		DIRO Y, 0,6A * protected output
o34	P1	47	d62		DIRO Z, 0,6A * protected output
o42	-	-	DL2	-	

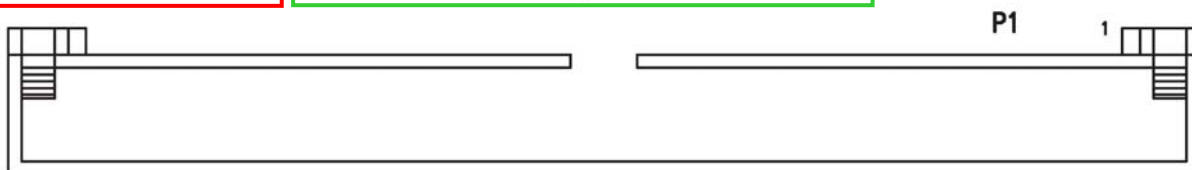*** Maximum current supplied at the same time from all outputs cannot exceed 3A.**

Separate supply of outputs connected to VAX

By removing the jumper JP1 the 0.6A protected outputs can be connected to a power supply different from the one that powers the controller (VA). The max. voltage applicable is 30 Vdc, with the positive connected on VAX and the negative in common with the power supply of the controller (GNDA).

DIGITAL I/O DIAGNOSTICS

Near P1 connector there are leds for digital I/O diagnostics; they are red for the outputs and green for the inputs:

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ANALOG INPUTS (consecutive numbering)

input	connector	pin	full scale	notes
0	P2	24	0-5V	12 bit, not buffered
1		23		
2		26		
3		25		
10	M5	2	0-5V	12 bit, not buffered
11		3		
12		4		
13	M4	3	0-20 mA	12 bit, buffered
24	M7	1-2	-	J or K type thermocouple
32	M4	1	+/- 10V	12 bit, buffered

ANALOG OUTPUTS (consecutive numbering)

output	connector	pin	full scale	notes
5	P26	2	+/- 10V	from PWM with 12-14 bits resolution
6		4		

CONNECTION EXAMPLES

This section is an extract of the information provided in the "Electrical Connections" section of the manual supplied with the controller, to which you must always refer for the wiring of the system according to the constructor's technical recommendations.
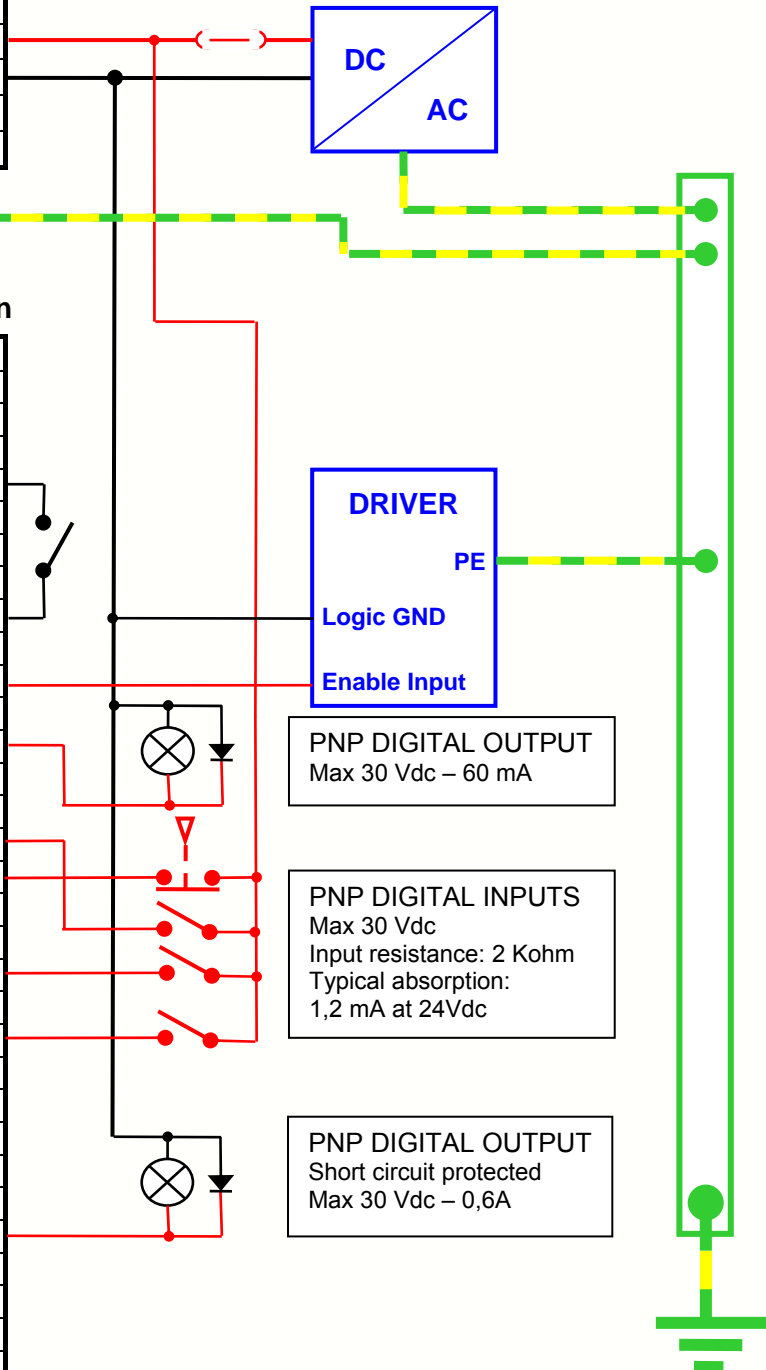
Power supply and ground connection

Pin	Connector M1
1	24 VA +24 V +/- 10%
2	GNDA 0Vdc
3	GNDA 0Vdc
4	VAX (jumper JP1 closed)

FT1

Digital input and output connection

Pin	Connector P1
27	User input i22N
37	GNDA I/O power supply ground
49	ENBX X driver enable (60 mA)
50	User in i45
51	User output o17 (opto 60 mA)
40	FCZEROX X axis zero limit
41	FCEMG emergency
52	User input i0
53	User output o18
54	User input i1
60	User output o10
61	GNDA I/O power supply ground
62	GNDA I/O power supply ground
63	VA +24 V power supply
64	VAX I/O +24 V power supply

DC / AC

DRIVER

PE

Logic GND

Enable Input

PNP DIGITAL OUTPUT
Max 30 Vdc – 60 mA

PNP DIGITAL INPUTS
Max 30 Vdc
Input resistance: 2 Kohm
Typical absorption:
1,2 mA at 24Vdc

PNP DIGITAL OUTPUT
Short circuit protected
Max 30 Vdc – 0,6A

NB: CE regulations recommended to place the free-wheeling diode in proximity of each inductive load to prevent the spread of electromagnetic interference along the wiring cables.
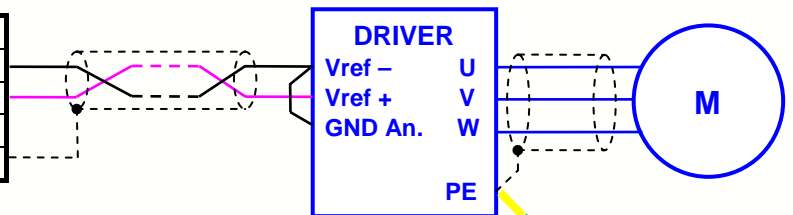
Analog input connection

Pin	Connector M5
1	Analog GND
2	ADC (10) Analog input
3	ADC (11) Analog input
4	ADC (12) Analog input
5	Analog GND
6	+ 5V for potentiometer power supply
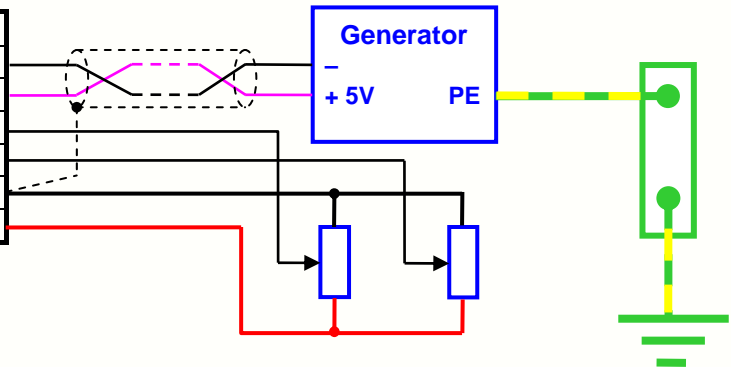
Drive reference connection

Pin	Connector P1
1	GNDANAL X X axis analog ground
2	VREF X X reference signal, +/- 10V
5	GND logic ground

5V Line Driver Encoder connection

Pin	Connector P1
7	CLK A channel A straight enc. # 1
8	CLK/A channel A negated enc. # 1
10	CLK B channel B straight enc. # 1
11	CLK/B channel B negated enc. # 1
13	NOTCH 0 ch. 0 straight enc. # 1
14	NOTCH /0 ch. 0 negated enc. # 1
12	GND logic ground
15	VDC +5Vdc power supply
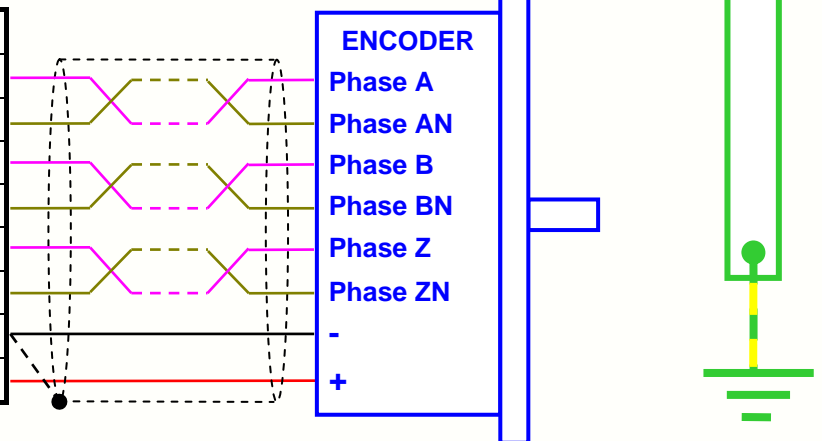
Connection of RS232 serial interface Com. 1

Pin	Connector P6
1	GDN logic ground
2	Com. 1 RX
3	Com. 1 TX
4	
5	GDN logic ground
6	
7	Com. 2 TX
8	Com. 2 RX
9	VA +24V DC
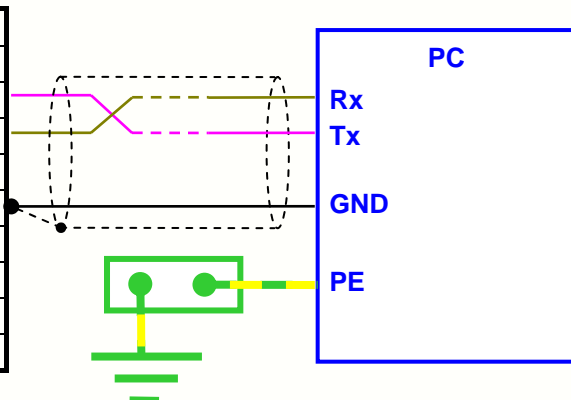
Connection of RS485 serial interface Com 1 (optional)

Pin	Connector P6
1	GDN logic ground
2	RTX + Com. 1
3	RTX - Com. 1
4	
5	GDN logic ground
6	
7	Com. 2 TX
8	Com. 2 RX
9	VA +24V DC
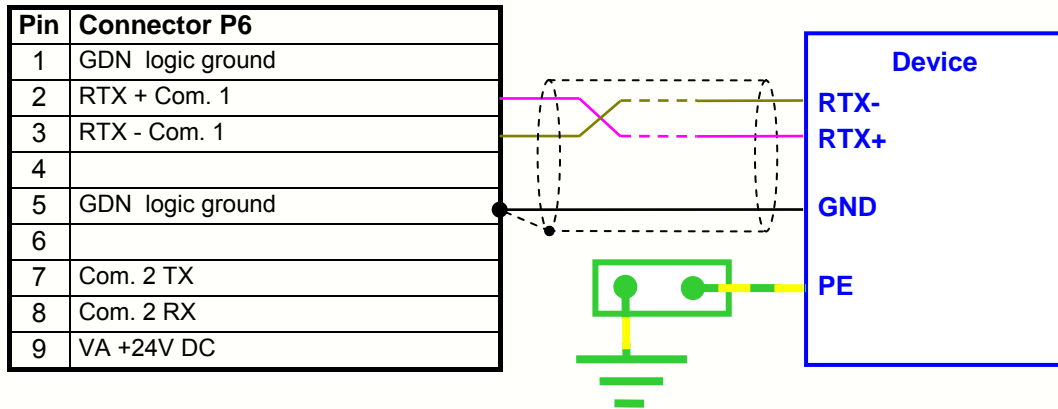
JP18 inserts the line start and end termination resistance of the RS485 (not connected by default).
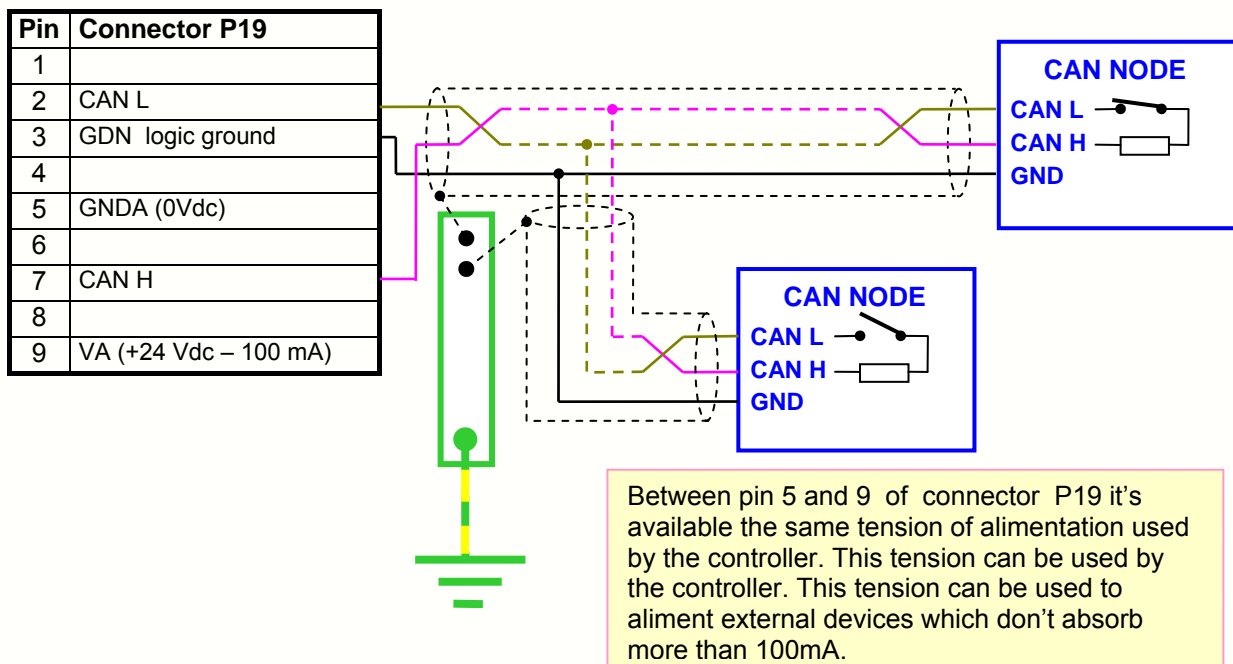
CANopen interface connection

The Power L is able to control one CAN port using both the CiA 301 general communication protocol and the specific profiles CiA 401 (I/O devices), CiA 402 (drives) and CiA 406 (encoder).

Be careful not to use in the same network devices CiA 401 and CiA 402 because it could result in a malfunction.

The CAN network must be done with twisted screened cables and the furthest ends of CAN H and CAN L signals must be charged through a 120 ohm termination resistance.

In the Power L, the termination resistance is already connected by default and can be disconnected by removing jumper JP3, but you have to install the termination resistance at the other end of the network.

Pin	Connector P19
1	
2	CAN L
3	GDN logic ground
4	
5	GNDA (0Vdc)
6	
7	CAN H
8	
9	VA (+24 Vdc – 100 mA)

Between pin 5 and 9 of connector P19 it's available the same tension of alimentation used by the controller. This tension can be used by the controller. This tension can be used to aliment external devices which don't absorb more than 100mA.

Basic functions of the touch screen

On the controllers equipped with touch screen, a number of basic functions can be accessed immediately without having to enable and calibrate the screen.

1. If at start up the system detects a pressure at the <u>top right-hand</u> corner of the screen, it accesses the **Boot menu**:

FUNZIONI DI BOOT

F1 = change card parameter
F2 = touch screen calibration
F3 = full ram clear
F4 = reset
F5 = load file
F6 = clear screen
F7 = save current firmware
F8 = export card parameter
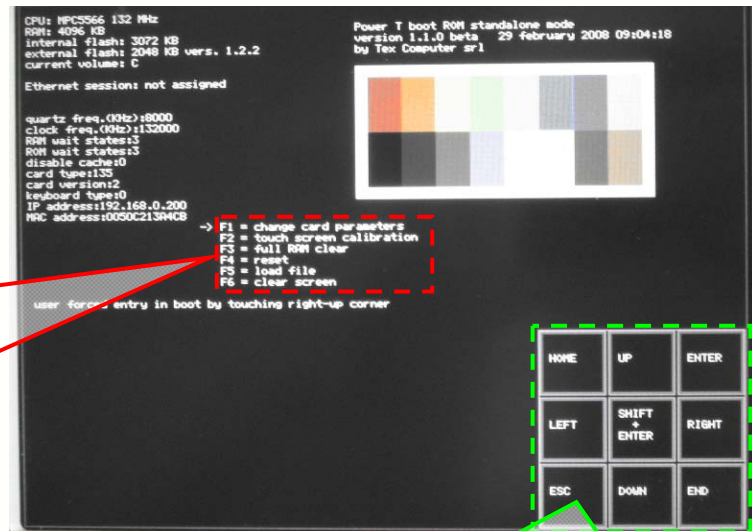
**Touch keys to browse the boot functions**

WARNING: the Boot menu only manages the USB memories and not any other peripherals, such as the keypad and the mouse, which may be connected to the same USB port by means of a hub.

Once you are in Boot menu, we suggest you to calibrate the touch screen so that the touch function is still active when the system is switched on again, even after running functions F3 and F4 which partially or totally clear the RAM memory.

We recommend not to alter the card's basic configurations without contacting first the Tex Computer's technical staff.

2. If at start up the system detects a pressure at the <u>top left-hand</u> <u>corner</u> of the screen you enter the menu which allows the operator to disable some functions during the current start-up phase. The following check list will be displayed:

Touching the screen on each of the white boxes allows the user to check or un-check the functions to be disabled during the current start-up phase. Pressing ENTER you confirm the selections made <u>which affect the current start-up phase only and not the following ones.</u>
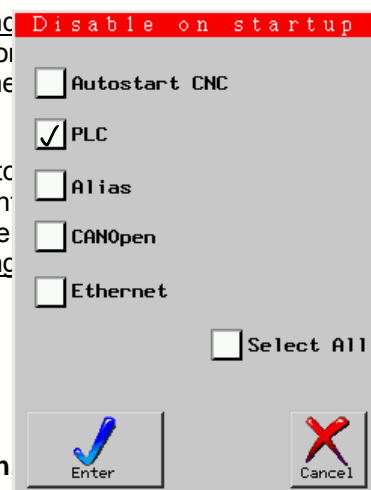
For further information on the functions of the touch screen refer to the manual with the same name.

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Recalling Boot and Card recovery Functions from I1

I1 pressed at power on

< 4 seconds

> 4 seconds

I1 ⎍ Press quickly

I1 ⎍ Press and hold until DL is always on

Boot menu

DL ⎍

to exit:
select F4 or turn off and after turn on the power supply

Card recovery
DL ⎍⎍⎍⎍⎍⎍⎍

I1 ⎍

1 - Load configuration
DL ⎍_____⎍

I1 ⎍ → **DL** ⎍
Load configuration card parameter from file POWER.CRD

I1 ⎍

2 - Save configuration
DL ⎍⎍____⎍

I1 ⎍ → **DL** ⎍
Save configuration card parameters in file POWER.CRD

I1 ⎍

3 - Load firmware
DL ⎍⎍⎍___⎍

I1 ⎍ → **DL** ⎍
Load the firmware from file FIRMWARE.BIN

I1 ⎍

4 - Save firmware
DL ⎍⎍⎍⎍__⎍

I1 ⎍ → **DL** ⎍
Save the firmware into file FIRMWARE.BIN

I1 ⎍

5 - Restore application
DL ⎍⎍⎍⎍⎍_⎍

I1 ⎍ → **DL** ⎍
Executes the restore of desired application or DEFAULT

I1 ⎍

6 - Touch calibration
DL ⎍⎍⎍⎍⎍⎍⎍

I1 ⎍ → **DL** ⎍
Activates the calibration procedure of touch screen

I1 ⎍

Main menu

The controller is equipped with a microswitch, called I1, located on one side of the motherboard; next to it there is also a red LED DL2. Pressing the microswitch I1 at power on you can access both the **Boot menu** and the **Card recovery** functions which allow you to upload from a removable storage device, a text file, called POWER.CRD, where there are listed the values of the main card configuration parameters, including the IP address of the controller; these features are particularly useful for Box version controllers.
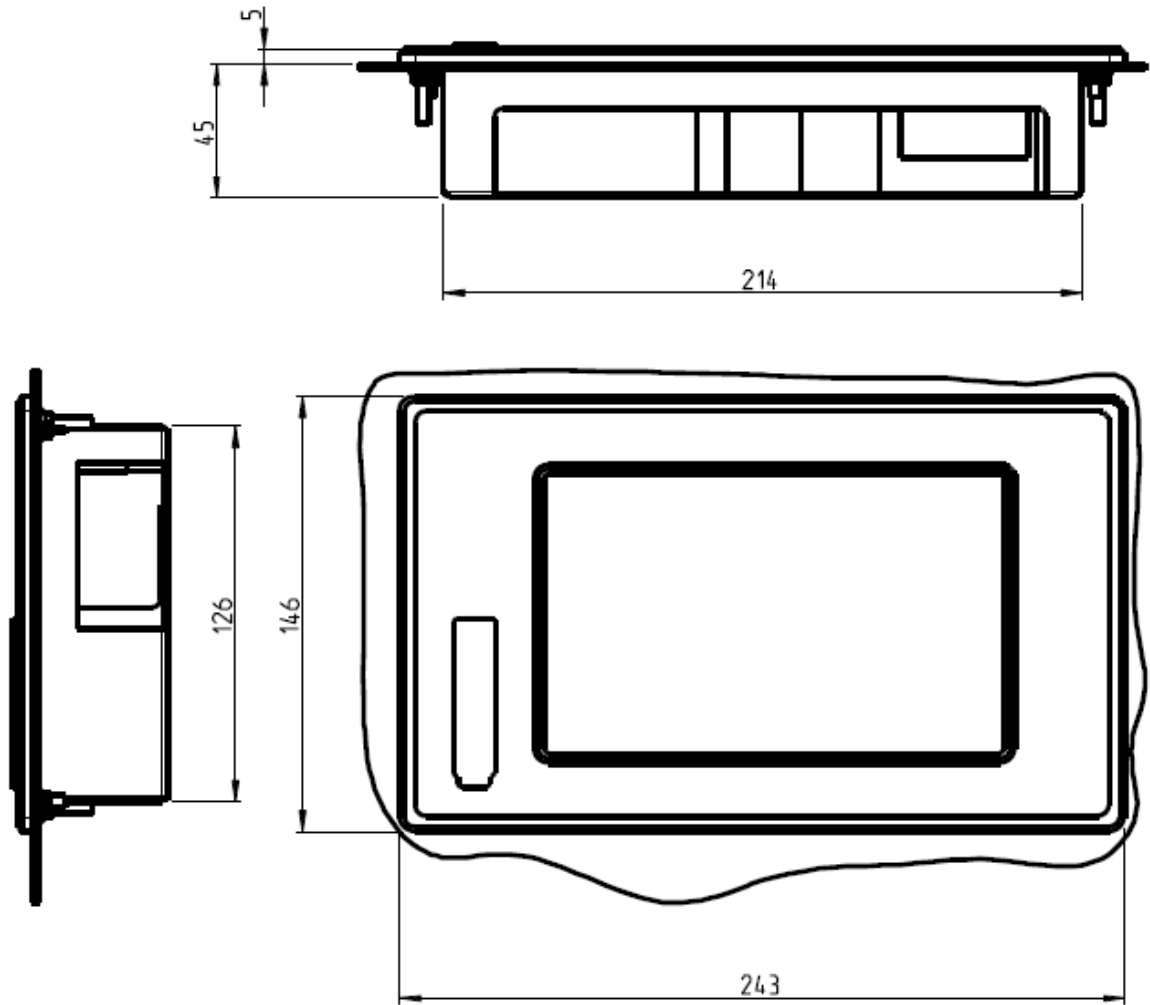
Starting from **firmware 1.4.2 & boot 1.6.3** the following functions have been added:

- *3 - Load firmware;* now you can load indifferently both the Main and the Boot of the controller if in the storage medium they are called FIRMWARE.BIN

- *5 - Restore application* with which you can activate the procedure that allows you to instantly load the backup of an application program, present on the main root of a removable storage drive, whose name is defined in the operator parameter *Restore at reset*. If this parameter is empty it will be automatically searched for an application program called DEFAULT

- *6 - Touch calibration* that gives you instant access to the calibration of the touch screen

You can exit the Card recovery menu at any time by turning off and on the power supply of controller.

Power L 7" Only touch dimensions   (Dimensions in mm)

Power J 7" Only touch drilling template   (Dimensions in mm)

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www.texcomputer.com - commerciale@texcomputer.com

Power L 7" with 20 keys dimensions

(Dimensions in mm)

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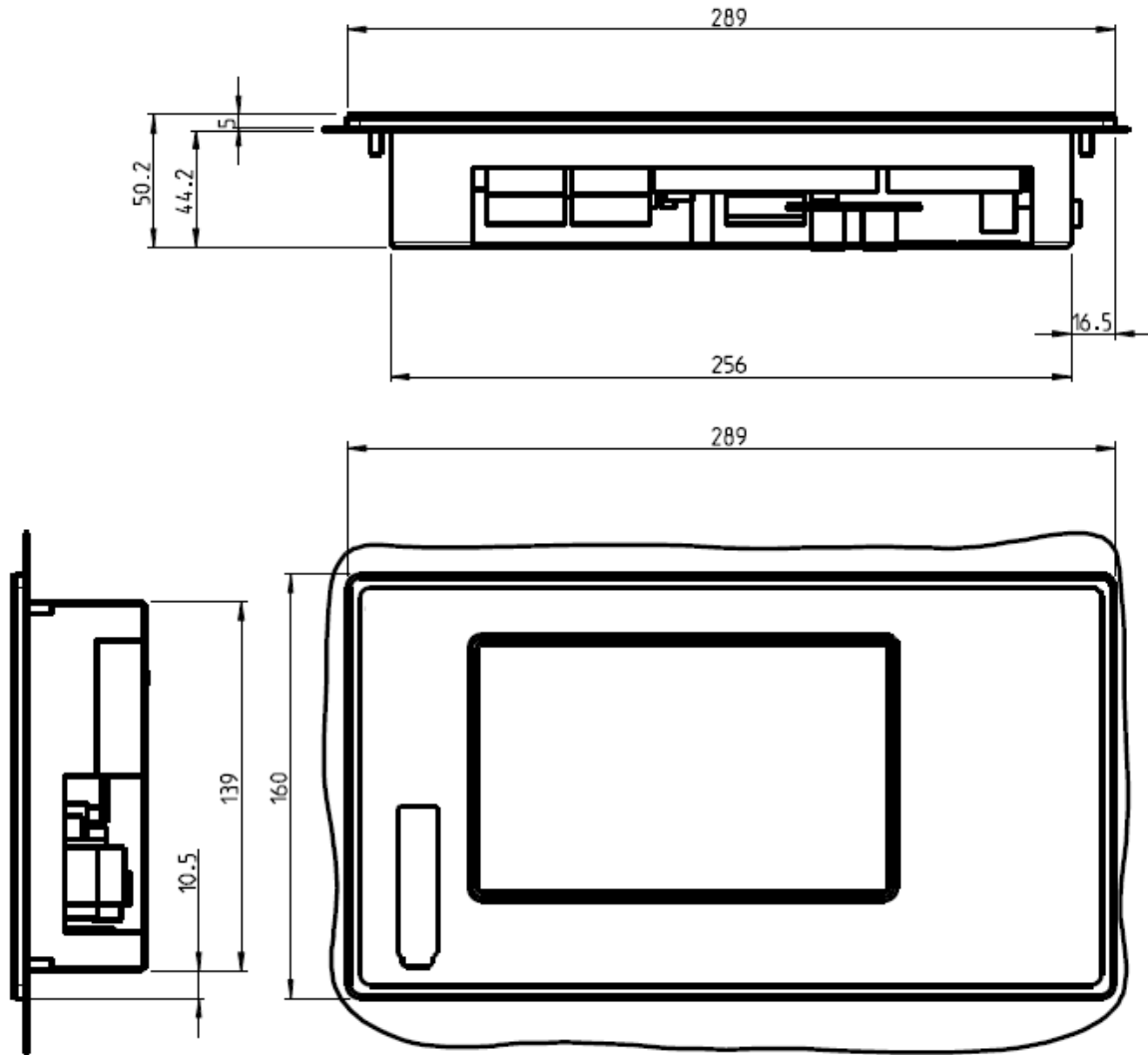
Power L 7" with 20 keys drilling template   (Dimensions in mm)

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Power L Box dimensions

(Dimensions in mm)

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