
Operator Manual
for
LabCon-00
Control Unit

Release 0.4 Build 00 (12/2020)



Ready-to-use but also customizable Labelling Control Unit



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Releases			
Date	Version	Author	Description
05-02-2020	0.1	A. Moro	Preliminary version (for evaluation)
10-02-2020	0.2	A. Moro	Added description of Lamps Status (§3.4) and description of NEAR_END_OF_BOBBIN function (§3.3.3)
06-10-2020	0.3	A. Moro	Updated Service interface Kit
01-12-2020	0.4	A. Moro	Fix some errors(P3.1,P3.2 unit, P4.2 description)

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1.0 Introduction

The present document explain the functionalities of the Labelling Control unit (LabCon-00) that can be applied on linear or rotative labelling machine.

This ready-to-use control unit for labelling machines includes a Vectorial Stepper Drive Titanio Series which guarantees precise, smooth and silent movements to your machines.

It has a touch screen interface for the configuration and setting of the parameters of work, providing up to **50 recipes**.

The labelling main functionalities are already available, **moreover the internal software can be customized using our e3PLC IDE**, a fast and intuitive programming environment, which integrates the tested Labelling_Realttime Module, developed specifically for the control of labelling machines.

Supported by a good mechanics and a good motor(we can supply motors in addition, too), it can reach up to 80 mt/min.

1.1 Reference manuals

Manual_Titanio_eePLC_Studio_EN	(eePLC Studio user manual)
Manual_SW1_Labelling_Realttime_Module_EN	(Labelling Realttime module Manual)
short_LABCON-xx_GB.pdf	(Installation short LabCon)

1.2 Overview



1.3 Technical Data

Ac Supply	115/230Vac
Maximun Labelling Speed	80 m/1'
Dimensions	250x280x140
Protection degree	IP20
HMI	3,5" Touch screen with colors
I/O	12 digital inputs & 10 digital outputs
Motor	Hybrid stepper motor 4 phase has to be connect to X6

1.4 Suggested stepper motor

Performances	Motor model
Up to 25 m/1'	MT34HE26 (holding torque 3.4 Nm)
Up to 50 m/1'	MT34HE38 (holding torque 7 Nm)
Up to 80 m/1'	MT34HE47 (holding torque 9 Nm)

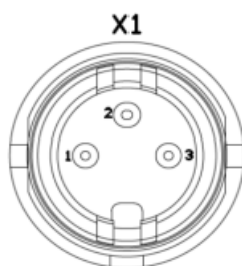
The table above, is only one indication because the real performances are depended by machine's mechanic characteristics and by label width.

2.0 Wirings and Connections

2.1 Connectors Pinout

X1: Start sensor connector

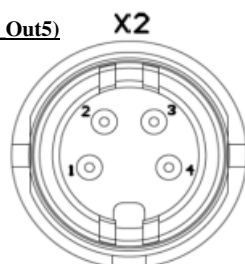
Pin	Map on	Signal	Type	Description
X1.1		24V	PWR_OUT+	24V Start sensor supply output - positive side
X1.2	B0_In0	FTC_START	DIG_IN	Start sensor 24V PNP
X1.3		VSS	PWR_OUT-	24V Start sensor supply output - negative side



X2: Lamps connector

Pin	Map on	Signal	Type	Description
X2.1	B1_Out5	Green Lamp *	DIG_OUT	Digital output for Green Lamp .. 24V Relay NO
X2.2	B1_Out4	Orange Lamp	DIG_OUT	Digital output for Orange Lamp ..24V PNP
X2.3	B1_Out5	Red_Lamp *	DIG_OUT	Digital output for Green Lamp .. 24V Relay NC
X2.4		VSS	PWR_OUT-	Negative reference for lamps digital output

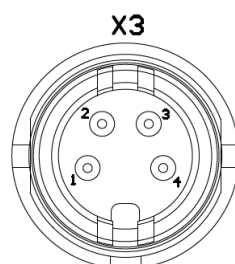
* Green Lamp and Red Lamp share the same dital output (B1_Out5)



X3:Emergency connector

Pin	Map on	Signal	Type	Description
X3.1		24V	PWR_OUT+	24V supply output .. positive side
X3.2	B1_In1	ALARM_EXT	DIG_IN	External missing power 24V PNP
X3.3		n.c.		Not connected
X3.4		n.c.		Not connected

The ALARM_EXT generally has to be connect to the Emergency Button . If not used the pin X3.1 and X3.2 has to be connected together.

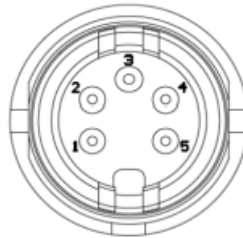


X4: Encoder Connector

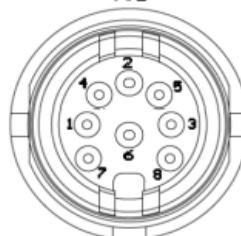
Pin	Map on	Signal	Type	Description
X4.1		24V	PWR_OUT+	24V encoder supply output .. positive side
X4.2		VSS	PWR_OUT-	24V encoder supply output .. negative side
X4.3	B0_In3	ENC_A		Master Encoder PHA 24V PNP
X4.4	B0_In2	ENC_B		Master Encoder PHB 24V PNP
X4.5		n.c.		

X4

The master encoder is used for the sincronization of labelling speed with product speed.

**X5: Customer Connector**

Pin	Map on	Signal	Type	Description
X5.1		COM_RL1	DIG_OUT	Common side of RL1 .. used for ALARM
X5.2	B0_Out1	NO_RL1	DIG_OUT	Output side of RL1 ... used for ALARM
X5.3		COM_RL2	DIG_OUT	Common side of RL2 .. used for END_CYCLE
X5.4	B1_Out6	NO_RL2	DIG_OUT	Output side of RL2 ... used for END_CYCLE
X5.5	B1_In2	RESET_EXT	DIG_IN	RESET command from digital input 24V PNP
X5.6		24V	PWR_OUT+	24V encoder supply output .. positive side
X5.7	B1_Out7	COM_RL3	DIG_OUT	Common side of RL3... used for BOBBIN_PRE_END
X5.8		NO_RL3	DIG_OUT	Output side of RL3... used for BOBBIN_PRE_END

X5

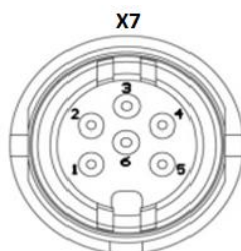
X6: Head connector

Pin	Map on	Signal	Type	Description
X6.1	B1_In0	FTC_PRES	DIG_IN	FTC Product presence 24V PNP
X6.2	B0_In1	FTC_STOP	DIG_IN	FTC Stop Sensor(gap sensor) 24V PNP
X6.3		PHASE A	PWR_OUT	Stepper motor Phase A output
X6.4		PHASE_A/	PWR_OUT	Stepper motor Phase A/ output
X6.5		PHASE B	PWR_OUT	Stepper motor Phase B output
X6.6		PHASE B/	PWR_OUT	Stepper motor Phase B/ output
X6.7	B1_In4	PX_IN	DIG_IN	Proximity PISTON BACK 24V PNP
X6.8	B1_In5	PX_OUT	DIG_IN	Proximity PISTON OUT 24V PNP
X6.9		VSS	PWR_OUT-	24V Supply output – negative side
X6.10		24V	PWR_OUT+	24V Supply output – positive side
X6.11	B1_Out0	EV_ASSIST	DIG_OUT	ASSIST Electro valve output .. 24V PNP
X6.12	B1_In3	PX_LAB_END	DIG_IN	Proximity NEAR_END_BOBBIN 24V PNP
X6.13		24V	PWR_OUT+	24V Supply Electro Valve output – positive side
X6.14	B1_Out1	EV_BLOW	DIG_OUT	BLOW Electro Valve output .. 24V PNP
X6.15	B1_Out2	EV_PISTON	DIG_OUT	PISTON Electro Valve output .. 24V PNP
X6.16	B1_Out3	EV_VACCUM	DIG_OUT	VACCUM Electro Valve output ..24V PNP

**X7:Printer connector**

Pin	Map on	Signal	Type	Description
X7.1		24V	PWR_OUT+	24V supply output .. positive side
X7.2	B1_In6	PRINTER_READY	DIG_IN	Ready signal from printer. Signal ON= printer ready
X7.3	B1_IN7	free	DIG_IN	Additional digital input
X7.4		n.c		Not connected
X7.5	B0_Out0	PRINT	DIG_OUT	PRINT signal for print activation
X7.6		VSS	PWR_OUT-	Negative reference 0V

If the PRINTER_READY signal not used the pin X7.1 and X7.2 has to be connected together.



2.2 Digital inputs description

Pin	Map on	Signal	Description
X1.2	B0_IN0	FTC_START	Start sensor. On the rising edge begin the label eject cycle
X6.2	B0_IN1	FTC_STOP	Stop sensor- Label label gap sensor (The input must be detected closed by the drive when the sensor detects the label, while has to be open when the sensor detect the gap)
X4.4	B0_IN2	ENC_B	Master Encoder PHB
X4.3	B0_IN3	ENC_A	Master Encoder PHA
X6.1	B1_IN0	FTC_PRES	Product presence sensor. The input must be detected closed by the drive when the sensor detects the product
X3.2	B1_IN1	ALARM_EXT	External missing power. Generally the input has to be connect to the EMERGENCY button. The input must be detected closed by the system when the Emergency button is released. If the emergency button is not used the input has to be connect to +24V(Connect together the pins X3.1 and X3.2)
X5.5	B1_IN2	RESET_EXT	External reset from input. Generally the input has to connect to RESET button. The input must be detected closed by the drive when the button is pushed.
X6.12	B1_IN3	PX_LAB_END	NEAR_END_BOBBIN. The input must be ON when the bobbin present and must goes OFF when bobbin near at the end. If sensor not used, connect the X6.12 pin at 24V(connect X6.12 at X6.13) or set P4.5 =0.
X6.7	B1_IN4	PX_IN	Proximity PISTON BACK. The input must be ON when the PISTON is back
X6.8	B1_IN5	PX_OUT	Proximity PISTON OUT. The input must be ON when the PISTON is OUT
X7.2	B1_IN6	PRINTER_READY	Signal from printer. Signal ON = printer ready
X7.3	B1_IN7	Free	Additional digital input

2.3 Digital outputs description

Pin	Map on	Signal	Description
X7.5	B0_OUT0	PRINT	Print output used for printer activation
X5.2	B0_OUT1	RELE' ALARM	Relè OPEN if system in ALARM, Relè close if not ALARM
X6.11	B1_OUT0	EV_ASSIST	
X6.14	B1_OUT1	EV_BLOW	Output used in Pneumatic cycle for Blow activation
X6.15	B1_OUT2	EV_PISTON	Output used in Pneumatic cycle for Piston activation
X6.16	B1_OUT3	EV_VACCUM	Output used in Pneumatic cycle for vaccum activation
X2.2	B1_OUT4	ORANGE_LAMP	Warning lamp (see §3.4 Lamps_Status)
X2.3	B1_OUT5	RED_LAMP	Go ON if B1_OUT5=OFF and go OFF if B1_OUT5=ON(see §3.4)
X2.1		GREEN_LAMP	Go ON if B1_OUT5=ON and go OFF if B1_OUT5=OFF(see §3.4)
X5.4	B1_OUT6	RELE' END_CYCLE	Relè CLOSE if END_CYCLE
X5.7	B1_OUT7	RELE' NEAR_END_BOBBIN	Relè CLOSE if Bobbin NEAR END

3.0 Description of operative modalities

Below are described all the feature implemented in the Labcon

3.1 Standard Labelling Modalities

3.1.1 Mode 0: Single Label Modality

The Mode 0: is the more standard modality for label application.
In this modality on every rising edge of the start signal one label is issued.

The parameters to set for this modality are:

- [P10.2](#) - Start_Delay
- [P10.3](#) - OFFSET_STOP(COURSE to adjust the label position on the blade)
- [P10.4](#) - WORKING_SPEED(the speed is used if Gearing is OFF, otherwise the speed is synchronized with Encoder master)
- [P10.5](#) - LABEL_LENGTH

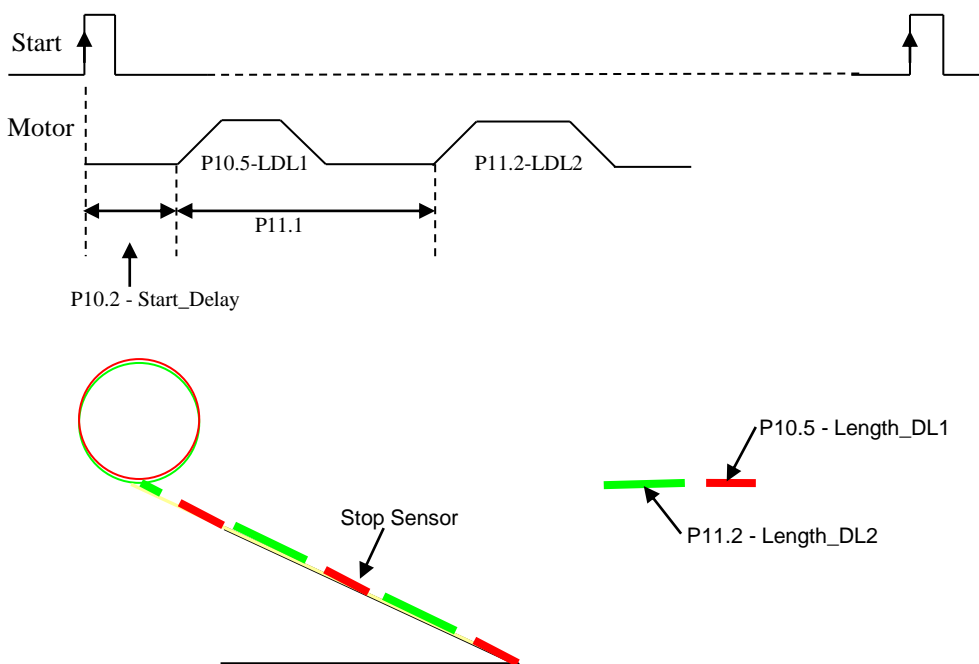
3.1.2 Mode 1: Double Label Modality

The Mode 1: is generally used on round bottle to apply the front and back label that are on the same paper roll. In this modality, on every rising edge of start signal, two labels are issued (front and back label).

The parameters to set for this modality are:

- **P10.2** - Start_Delay
- **P10.3** - OFFSET_STOP(COURSE to adjust the label position on the blade)
- **P10.4** - WORKING_SPEED(the speed is used if Gearing is OFF, otherwise the speed is synchronized with Encoder master)

- **P10.5** – Label Length first Label(LDL1)
- **P11.1** – Start_Delay Second Label
- **P11.2** – Label Length second label(LDL2)



For this modality the length of each labels has to be set: Length_DL1(front) and Length_DL2(back). The label on the blade is considered by System as the LDL1.

The stop sensor position should be adjusted to have the sensor that points the same label that is aligned on the blade.

On each start signal the system start always ejecting before the label with length DL1.

Before to enable the automatic labelling cycle or after one Alarm, is necessary to positioning the DL1 label on the blade using the Manual_Eject_Label Command.

In case of missing label, the System, show the alarm only after all two labels(front and back) are issued, in any case the alarm is showed when the missing label is the more near possible to the blade avoiding to give pass bottle with only one label applied.

3.2 Pneumatic Labelling Modalities


To be define

3.3 Other functionalities

3.3.1 Paper Break Alarm

To enable the check of the Paper Break Alarm, has to be set the [P4.4](#)=1 (bit OPTION.9=1).

The LabCon show the alarm (Lab_Alarm_Code=[13](#)) if it detect a number of consecutive missing labels >= [P13.2](#)(N_MISSING_LAB_ALARM).

To clear the Alarm, the Reset_Alarm has to be done  (COMMAND.15 =1 x 10 ms)

For this functionality has to be set the parameter:

- [P4.4](#) - has to be set =1 to enable the check
- [P13.2](#) - # of consecutive missing labels

3.3.2 Recovery of Missing Label

To enable the Recovery of Missing Label function, has to be set [P4.3](#)=1 (bit OPTION.8 =1).

The LabCon recover the missing label when the missing label is on the blade.

For this functionality has to be set the parameter:

- [P4.3](#) – has to be set to enable the recovery of missing label
- [P13.1](#) - # of complete labels between stop sensor and blade
- [P13.3](#) – Recovery speed

PS: This function can't be active in the [Mode 1](#) (Double Label modality).

3.3.3 Label_END Warning and Alarm

To enable the Label_End Warning and Alarm, has to be set [P4.5](#)=1 (bit OPTION.10 =1).

For this functionality has to be set the parameters:

- [P4.5](#) – has to be set to enable the Label_END Warning and Alarm
- [P13.4](#) - # of labels after that is showed [ALARM\[11\]](#) since the input [X6.12](#)(PX_LAB_END) goes OFF

When the functionality is active, the [Alarm\[11\]](#) is showed if [X6.12](#)(PX_LAB_END) goes off for a number of consecutive labels > [P13.4](#)

When the input PX_LAB_END goes of, the dispenser continue to works for the number of label defined by [P13.4](#).

While the input PX_LAB_END is OFF and before that the [Alarm\[11\]](#) is showed, the lamp Orange is blinking

3.4 Lamps Status

Below is showed the lamps status depending by Head Status

RED(X2.3)	GREEN(X2.1)	ORANGE(X2.2)	Description
ON	OFF	OFF	Machine ALARM, look the Head Status on HMI for Alarm descriptions
OFF	ON	OFF	Machine READY to start on Start signal
OFF	ON	ON	Machine MANUAL, the start signal is inhibited, only manual commands can be done
OFF	ON	BLINK	Machine in RUN but warning Near_End_Of_Bobbin

3.5 Alarms

Alarm code table showed in the Head Status

Code Alarm	Description	Cause
0	No Alarm	
1	Drive Alarm	Drive of the motor in alarm. Check the motor wiring (X6)
2	Gap sensor Alarm	Gap sensor doesn't work properly
11	Alarm Label_End	Sensor PX_LABEL_END(X6.12) gone OFF for a # of labels > P13.4
13	Alarm Paper Break	# of consecutive missing label > P13.2 has been detected
20	Stop from fieldbus	Bit V_COMMAMD.7 is set to 1
21	Missing Power Input	Missing 24V on pin X3.2

To clear the Alarm has to be removed the alarm condition then must be pushed the reset button



4.0 Parameters description

Below are showed the parameters that can be insert through HMI.

The parameters are divided in two group:

- Configuration parameters
- Format parameters

The configuration parameters have a global mean, while the format parameters are stored in different recipes. Up to 50 recipes can be stored.

4.1 Configuration parameters

4.1.1 Mechanics parameters

<i>Par</i>	<i>Object</i>	<i>Unit</i>	<i>Description</i>
P1.1	G1_Pulley	--	Number of teeth or pulley diameter assembled on the shaft of the stepper motor
P1.2	G2_Pulley	--	Number of teeth or pulley diameter assembled on the shaft of the dragging label roll. The transmission ratio between the motor and the roll is thus G1_Pulley/G2_Pulley
P1.3	Roll_Diameter	0.1 mm	Diameter of the dragging label roll
P1.4	Speed_Max_Scale	mm/1'	The parameter defines the maximum obtainable label ejection speed
P1.5	Motor Rotation direction	--	0=CW 1=CCW

4.1.2 Motor parameters

<i>Par</i>	<i>Object</i>	<i>Unit</i>	<i>Description</i>
P2.1	Min_Current	mA	Motor current when motor is standstill
P2.2	Max_Current	mA	Motor current when motor is running

4.1.3 Encoder Synchronization parameters

<i>Par</i>	<i>Object</i>	<i>Unit</i>	<i>Description</i>
P3.1	Lab_Encoder_PPR	pulses	Pulses per revolution of the encoder assembled on the transport belt. The parameter is used if Electrical Gear mode ON.
P3.2	Lab_Encoder_Development	0.1mm	Linear development of an encoder revolution, which means a linear feed of the product for every encoder revolution.
P3.3	# of encoder signal	--	0= One phase connected to X4.3 1=Two phases connected to X4.3 and X4.4

4.1.4 Activations

<i>Par</i>	<i>Object</i>	<i>Unit</i>	<i>Description</i>
P4.1	Start Label without delay	--	0 = Keeps label position on product. 1= doesn't keep label position on product. This bit has to be set when is necessary that the label eject start as soon is possible. For example for square product, stamps and so.
P4.2	Gearing_Synchronization	--	0 = The label is ejected ar speed defined by P10.4 1= The label is ejected at speed depended by Master Encoder
P4.3	Label Recovery	--	0= Label Recovery Disabled 1= Label Recovery Enabled(parameters P13.x must be configured)
P4.4	Break Paper Alarm	--	0= Break paper Alarm Disabled 1= Break paper Alarm Enabled. (parameters P13.2 and P13.3 must be configured)
P4.5	Label End Alarm	--	0= Label End Alarm Disabled 1= Label End Alarm Enabled.. (parameters P13.4 must be configured and pin X6.12 must be wired)

4.2 Format parameters

4.2.1 Main parameters

<i>Par</i>	<i>Object</i>	<i>Unit</i>	<i>Description</i>
P10.1	Labelling_Modality	--	Mode 0= Single Label(see §3.1.1) Mode 1= Double Label(see §3.1.2) Mode x = to be defines
P10.2	Start_Delay	0.1 mm	Start Delay from the start signal and the beginning of label eject. It's used for the regulation of label position on the product.
P10.3	Offset_Stop	0.1 mm	Stop offset for the regulation of label position on the blade
P10.4	Working_Speed	0.1 mm	Defines the label ejection speed when Electrig_Gearing is OFF. The set velocity is limited to the value of Lab_Speed_Max_Scale(P1.4)
P10.5	Label_Lengh	0.1 mm	Defines the Label length + Gap. The parameter can be automatically detected pushing the relative button in the manual command window.
P10.6	Manual Speed	mm/1'	Defines the label eject speed for manual command
P10.7	Ramp_Time	ms	Defines the TIME for acceleration from 0 to Speed_Max_Scale

4.2.2 Double Label parameters

<i>Par</i>	<i>Object</i>	<i>Unit</i>	<i>Description</i>
P11.1	Start_Delay_Second_Label	0.1 mm	Start Delay from the beginning of first label and the beginning of second label. It's used for the regulation of the distances between the end of first label and the begin of second label. The parameter should be set equal at P10.4 + desired distance between end of first label and begin of second label
P11.2	Label_Lengh_Second_Label	0.1 mm	Defines the Label length + Gap of the second label. See §3.1.2

4.2.3 PRINT parameters

<i>Par</i>	<i>Object</i>	<i>Unit</i>	<i>Description</i>
P12.1	Print_Delay	ms	Delay from the end of the label eject and the activation of PRINT output
P12.2	Print_Time	0.1 mm	Time that the PRINT output remain activated

4.2.4 MISSING label parameters

<i>Par</i>	<i>Object</i>	<i>Unit</i>	<i>Description</i>
P13.1	# Labels from Gap to Blade	--	Number of complete labels between GAP Sensor and peeling blade
P13.2	# Missing Label	--	Number of consecutive missing label after that the ALARM[13] is generate
P13.3	Recovery Speed	mm/1'	Defines the label eject speed used during recovery of missing labels.
P13.4	#Labels near end of roll	--	Define the number of labels after that is showed ALARM[11] since the input X6.12 (PX_LAB_END) goes OFF .

5.0 HMI Navigation

5.1 Startup Page

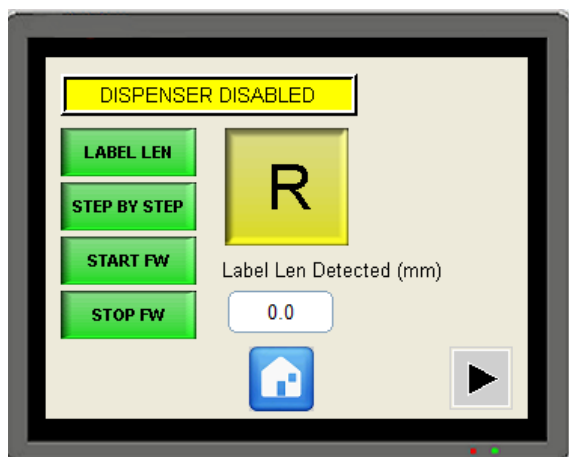


Push on the windows to go in the Home Windows

5.2 Home Page



5.3 Manual Page 1



LABEL LEN	Start label length detection. Four label will be ejected
STEP BY STEP	Eject one label
START FW	Start motor to move forward. The motor stops on the gap or when pushed STOPFW
STOP FW	Stop Motor
0.0	Show the label length measured
	Go to next Manual Page 2
	Back to Home Page

The green buttons are able only in MANUAL status

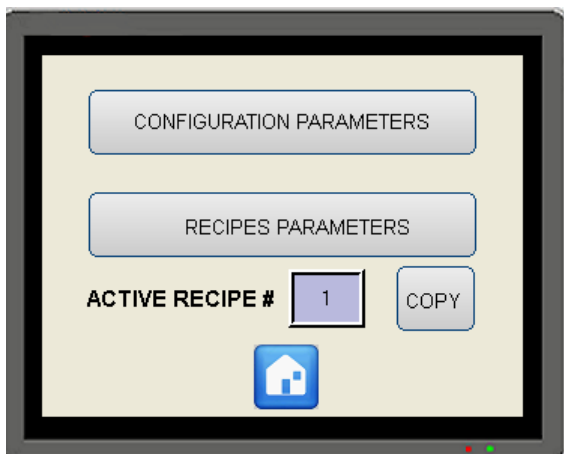
5.4 Manual Page 2,3



DRIVE FW 0000	Show firmware version	TEMP. (°) 0	Show internal temperature	VOLTS (V) 0	Show voltage supply
	Go to last Page		Back to Home Page		Go to next Page

In these page are showed the status of each digital I/O

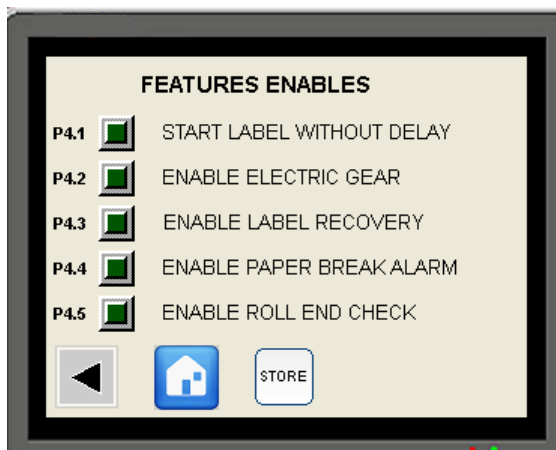
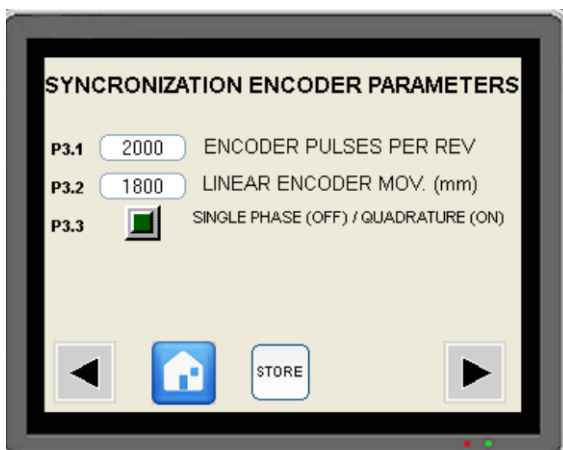
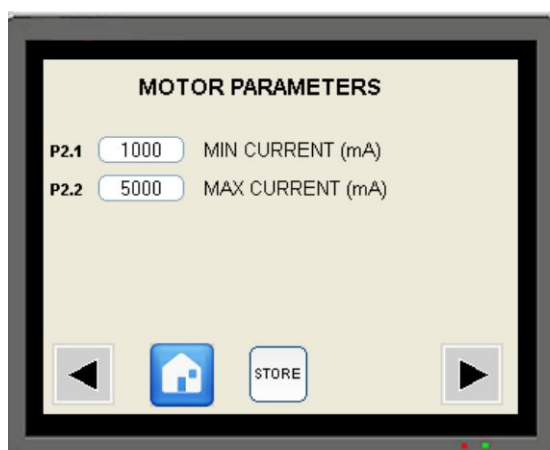
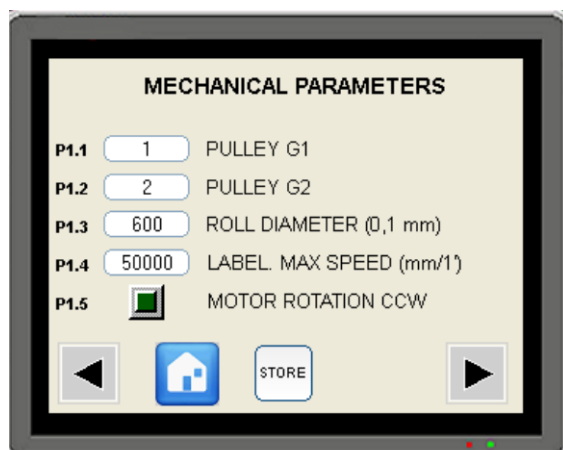
5.5 Settings Page



	Go to Configuration Page
	Go to Recipe Page
ACTIVE RECIPE # <input type="text" value="1"/>	Show actual recipe
	Go to Copy Recipe Page
	Back to Home Page

Two password level are managed
 Level 1: 111 and Level2: 222.
 To access at Configuration Parameters is required the insert of Level2

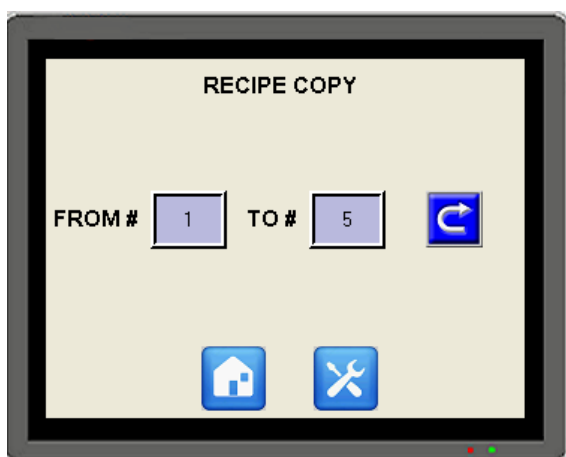
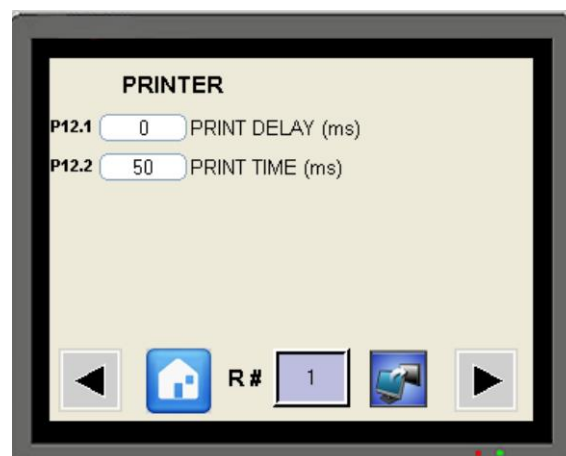
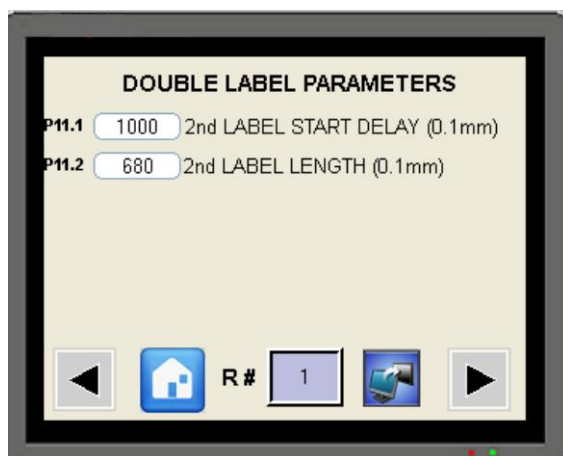
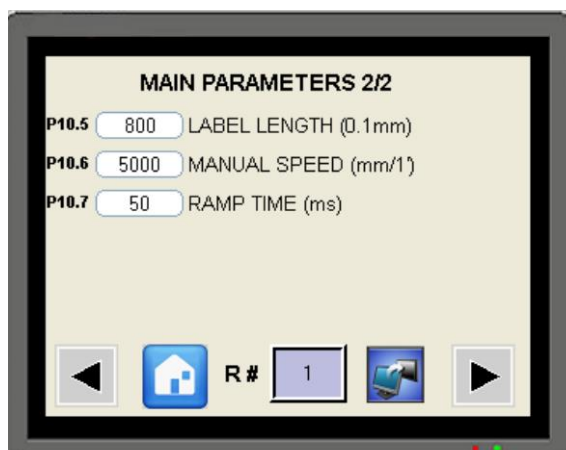
5.6 Configuration Parameters



	Store data to eeprom		Status 0: OFF		Status 1: ON
	Go to last Page		Back to Home Page		Go to next Page

All parameters when changed is immediately active but to keep the value also at switch-off is necessary push the button STORE.

5.7 Recipe Page



R #	1	Select Recipe number		Download Recipe		Copy recipes X to Y
		Go to last Page		Back to Home Page		Go to next Page

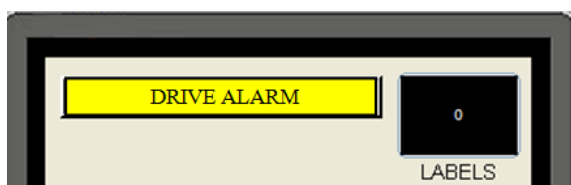
All parameters when changed are immediately stored in the HMI memory, to become effective the new values, has to be pushed the button Download Recipe.

5.8 Languages Page

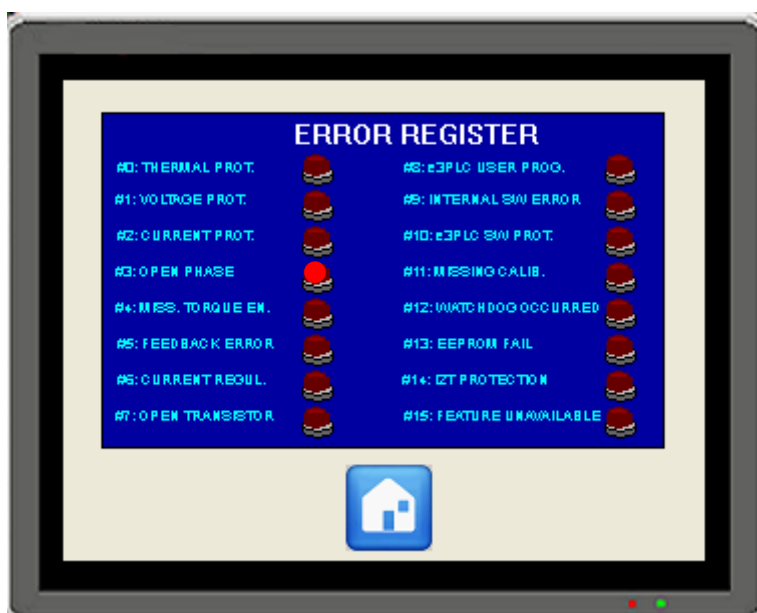


Push on the desired flag to select languages

5.9 Detailed Drive Status Page



When on the Status Bar is showed *DRIVE ALARM*, pushing on it is opened the detailed Drive Status Page that show the internal status of the drive.



For example the led *OPEN PHASE* will be lighted if stepper motor not connected to Labcon

If other leds are lighted, get more informations in the manual [Manual_Titanio_eePLC_Studio_EN](#) looking [Error_Register](#) description. Or contact Ever for technical support

7.0 Programming Tool

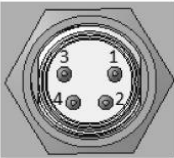
The Labcon-00, is supplied already programmed and ready to use, but the customer can also customized the functionality itself using the Tool E3PLC Editor.


To program the Labcon-00 it's necessary:

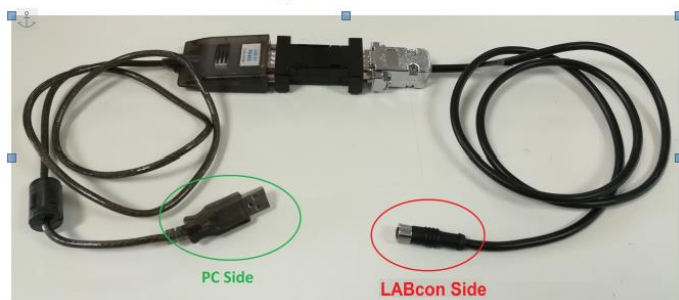
- E3PLC tools
- The service interface Kit

7.1 Service interface Kit

M8 A-Code 4pin Male		
1	GND	GND power out
2	+5L	+5V power out
3	DE/RE	Drive Enable Negated / Receive Enable
4	TX/RX	Transmit / Receive Line



 This connection is **only** possible with hardware and software provided by Ever.



Programming Kit:

Order Code	Description
LABCON_SERV00	Service Interface kit and E3PLC's demo version
LABCON_SWKIT-00	Service Interface kit and E3PLC's FULL license version