

Operator Control Panel Manual

High Temperature Twin Screw
Extrusion Line

MOD. E-LAB22

S/N 315/2020

**ATHLONE INSTITUTE OF
TECHNOLOGY**

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Main features

The main features are:

- Temperature control and display
- Division of thermoregulation zones such as extruder / neck / head
- Individual zone PID parameters setup
- Individual zone alarm parameters setup
- Motor selection with Master / Slave management configuration with synchronism
- Motor status control and display
- Data store
- Alarm management with Cause / Solution pages
- Recipe management
- Access management of pages with password
- Thermoregulation auto-ignition weekly clock
- System diagnostics
- Multilingual
- Calibration of analog inputs / outputs

General thermoregulation management

The control is designed for a maximum number of 128 thermoregulation zones. For configured zones the system will automatically make the views and settings of the configured zones available.

Parameters provided for each zone:

- Minimum temperature alarm
- Maximum temperature alarm
- SBR alarm (shorted probe)
- Loop Break Alarm (LBA)
- HB Alarm (Heater Break Alarm)
- Configuration parameters typically used for extrusion
- Self-tuning

General features available for thermoregulation:

- Maximum value that can be set for the SP of the single zone
- Enable cold start block (temperatures not OK)
- Thermoregulation On / Off command (turns all enabled zones on and off)
- Very high temperature management of a zone, with consequent shutdown of the thermoregulation.
- Melt temperature display
- Melt pressure display
- Management of the thermoregulation start with weekly clock
- Management of current reading for all enabled zones (an analog channel is dedicated at the TA value reading)
- Single zone detail page, for PID parameters configuration. The sending of the parameters will be managed to the selected zone and sending the same configuration to other zones without changing the page.
- "Energy saving" functions
 - Efficient thermoregulation zone ignition
 - Instantaneous power limitation for thermoregulation
 - Peak limitation of thermoregulation power
 - TA reading without thermoregulation interruption

General motor management

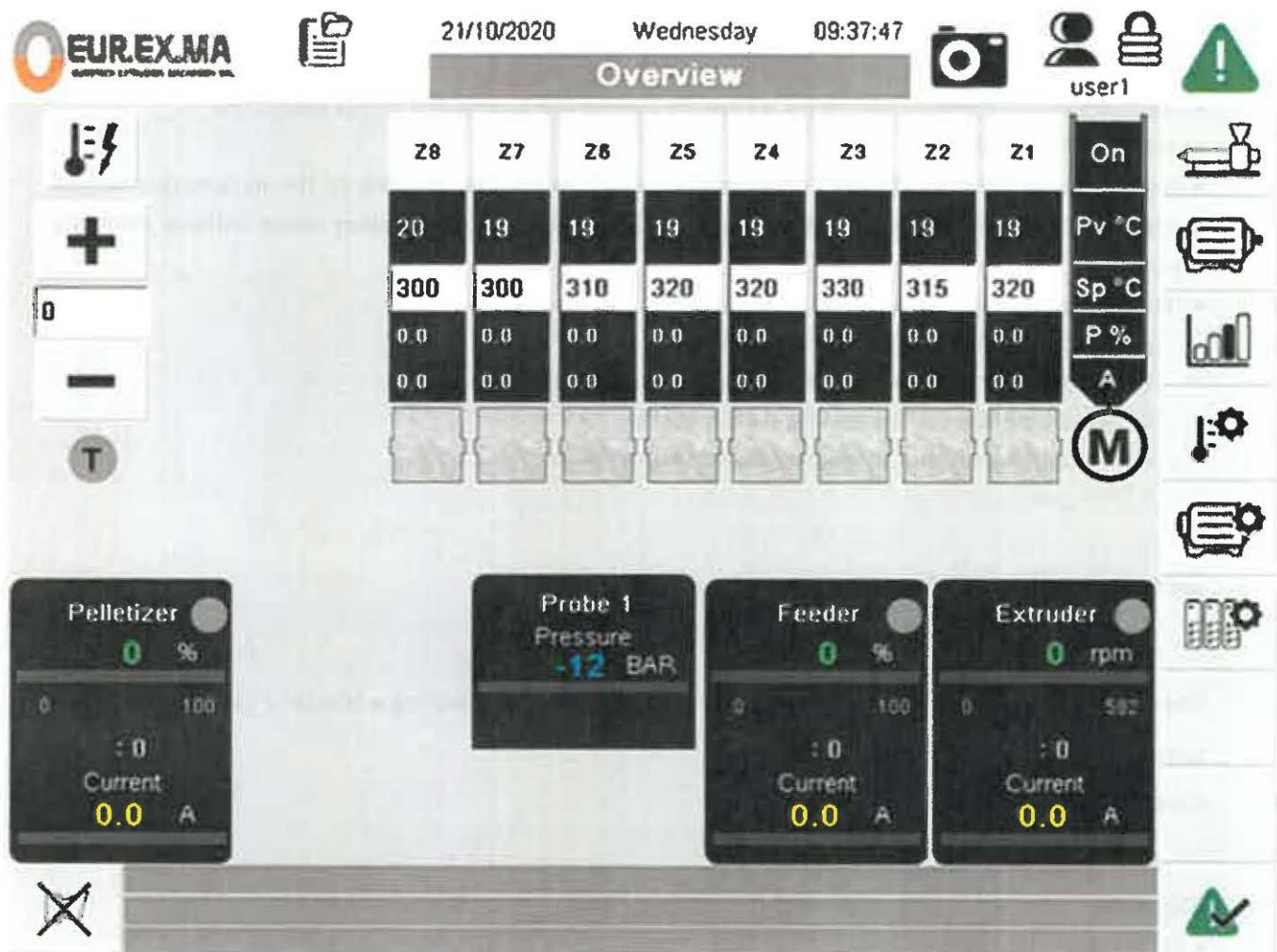
The management of motors is designed with the possibility of enabling a Master / Slave control with synchronism.

General engine parameters available are:

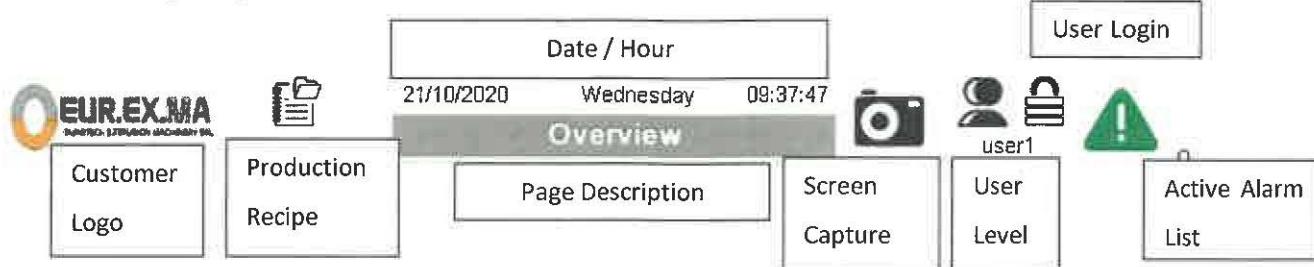
- Enabling
- Start / stop management
- Speed reference setting
- Synchronized motors management (Master / Slave)
- Speed and current absorption display
- Interface for calibration in engineering units of analog input and output signals
- Setting of intervention thresholds on absorption and speed with generation of alarm states
- Operating hours count for maintenance management

Graphic interface

Operator Interface General Structure



A common top bar panel:



A common bottom bar panel:



On the right side on the panel one of the three bars here below will be shown, depending on the user level.

Level 0



Level 1



Level 2



OPERATOR page group (Level 0) with recall of Overview, Motor and Graph Trend pages.

MAINTENANCE page group (Level 1) to recall configuration pages

extruder control (e.g. alarm thresholds, maintenance management parameters, etc ..)

MANUFACTURER page group (Level 2) to recall configuration pages

general extruder (e.g. number of thermoregulation zones, number and type of motors, etc.)

Level 0 - Operator

Level 0 pages are graphic pages accessible from all available levels.

Overview



Monitor page with the main information relating to the operation of the machine, such as the general status of all the temperature control zones, of the motors, the selection of the type of synchronism and the Melt temperature / pressure values.

O
EUR.EX.MA
EUROTECH EXTRUSION MACHINERY SRL

21/10/2020
Wednesday
09:37:47

user1

Z8	Z7	Z6	Z5	Z4	Z3	Z2	Z1	On
20	19	19	19	19	19	19	19	Pv °C
300	300	310	320	320	330	315	320	Sp °C
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	P %
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	A

Pelletizer

0 %

0 : 100

: 0

Current 0.0 A

Probe 1

Pressure -12 BAR

Feeder

0 %

0 : 100

: 0

Current 0.0 A

Extruder

0 rpm

0 : 500

: 0

Current 0.0 A

Motors

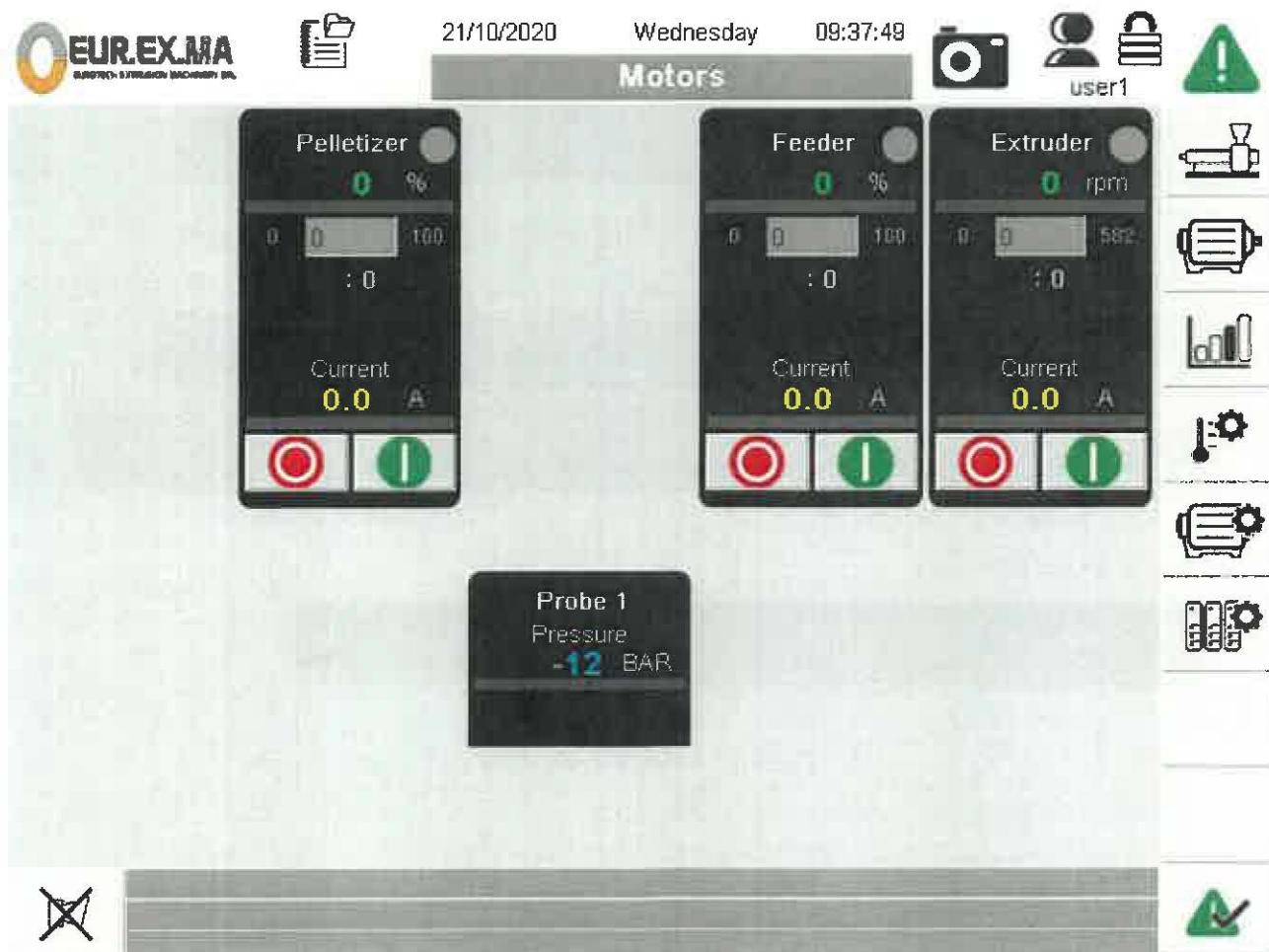


The motor page displays the interface panels for the configured motors. Also, if configured, the values relating to the pressure and the melt temperature are available.

Regarding the motors, the following information is available:

- Configured Motor name
- Motor status (on / off)
- Synchronism enabled
- Speed value (numerical and bargraph)
- Current value (numeric and bargraph)
- Melt pressure value (numerical and bargraph) if configured
- Melt temperature value (numerical and bargraph) if configured
- Motor On / Off buttons
- Increase / Decrease buttons and numerical speed reference setting

If a synchronism control of the motors is provided, a panel is provided for its enabling and for changing the common speed reference.

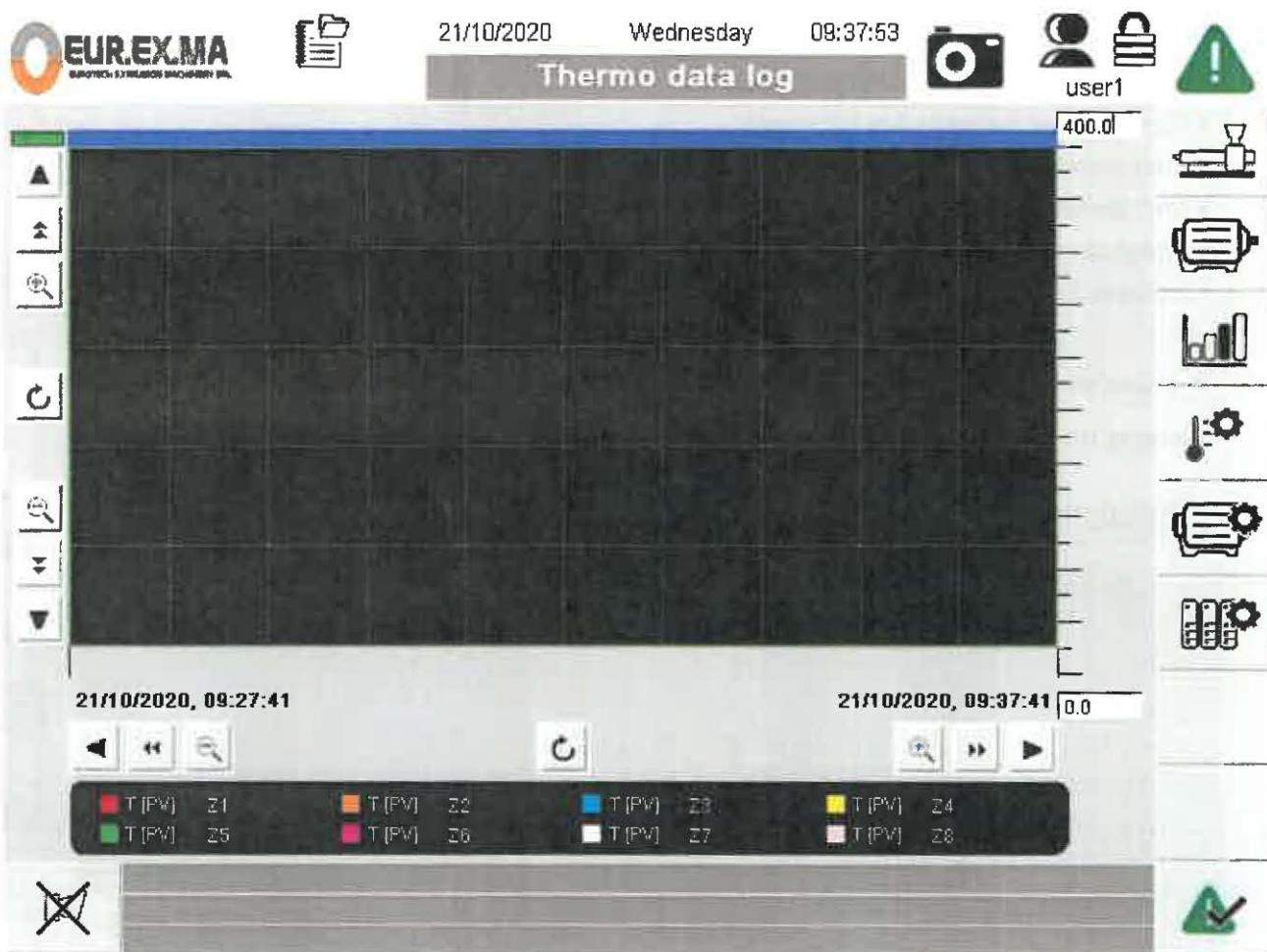


Trend Graphs



On the Trend page it is possible to view the trend over time of 8 variables. The pages are present a series of buttons that allow you to zoom +, zoom +, pan + and pan- of the graphic curves on the page.

Thermo Data Log



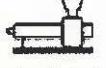
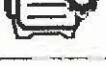
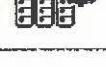
Clicking on the black bar,



the following page will appear, where it is possible to decide (and tick) which variables are to be displayed on the graph.

 **Thermo data log**
21/10/2020
Wednesday
09:37:58

 user1


<input style="width: 20px; height: 20px; vertical-align: middle; color: red; background-color: white; border: 1px solid black; margin-right: 10px;" type="checkbox"/>	T [PV]	1	Z1	
<input style="width: 20px; height: 20px; vertical-align: middle; color: orange; background-color: white; border: 1px solid black; margin-right: 10px;" type="checkbox"/>	T [PV]	2	Z2	
<input style="width: 20px; height: 20px; vertical-align: middle; color: blue; background-color: white; border: 1px solid black; margin-right: 10px;" type="checkbox"/>	T [PV]	3	Z3	
<input style="width: 20px; height: 20px; vertical-align: middle; color: yellow; background-color: white; border: 1px solid black; margin-right: 10px;" type="checkbox"/>	T [PV]	4	Z4	
<input style="width: 20px; height: 20px; vertical-align: middle; color: green; background-color: white; border: 1px solid black; margin-right: 10px;" type="checkbox"/>	T [PV]	5	Z5	
<input style="width: 20px; height: 20px; vertical-align: middle; color: magenta; background-color: white; border: 1px solid black; margin-right: 10px;" type="checkbox"/>	T [PV]	6	Z6	
<input style="width: 20px; height: 20px; vertical-align: middle; color: grey; background-color: white; border: 1px solid black; margin-right: 10px;" type="checkbox"/>	T [PV]	7	Z7	
<input style="width: 20px; height: 20px; vertical-align: middle; color: lightcoral; background-color: white; border: 1px solid black; margin-right: 10px;" type="checkbox"/>	T [PV]	8	Z8	





T [PV] Z1
T [PV] Z2
T [PV] Z3
T [PV] Z4

T [PV] Z5
T [PV] Z6
T [PV] Z7
T [PV] Z8

Pressure Data Log

Clicking twice on the Graph icon, it is possible to access Process data log page:



Clicking on the black bar,



the following page will appear, where it is possible to decide (and tick) which variables are to be displayed on the graph.

 **EUR.EX.MA**
EUROTECH EXTRUSION MACHINERY SRL

21/10/2020 Wednesday 14:55:06

Process data log


 user1


Extruder speed

Extruder current

Pump speed

Pump current

Ring speed

Ring current

Godet 1 speed

Godet 1 current

















Recipe Page

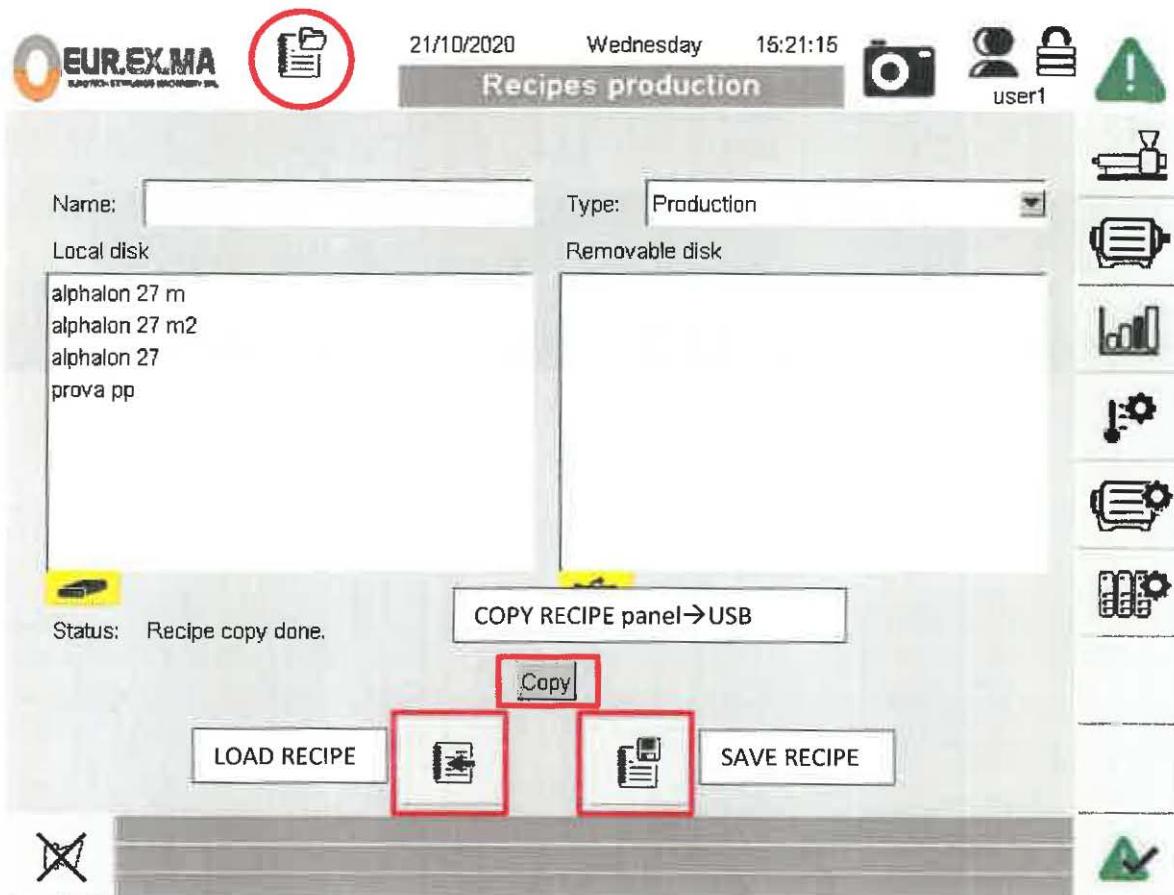
To access Recipe Page, click on the corresponding icon on the top bar



This page allows to save all the parameters related to a particular production. The production recipe includes all zone SP and motor speed.

The following commands are available:

- Save recipe
- Load recipe
- Copy recipe from panel to USB: select desired recipe and then press COPY



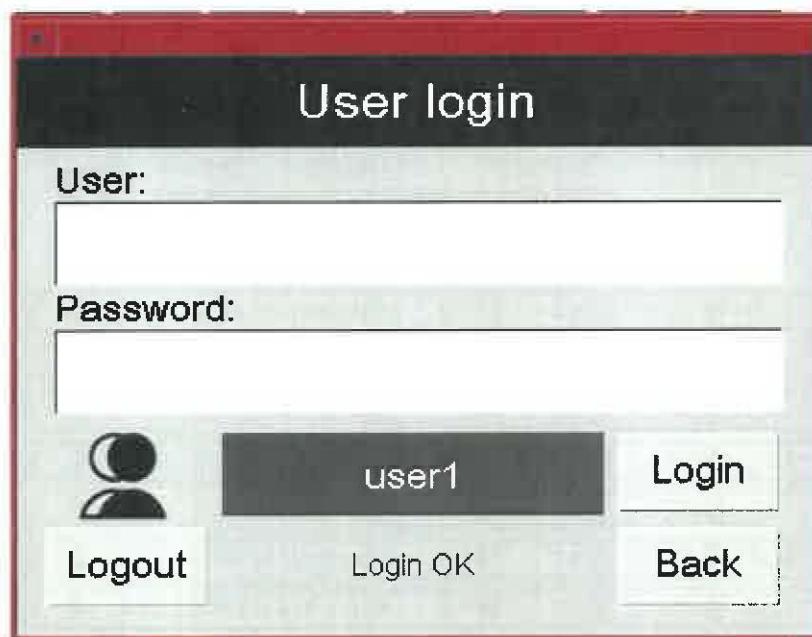
User login page

This page allows to change the active user level login. The following 3 user levels are available:

- Level 0 (default) OPERATOR → Start Up Panel DEFAULT
- Level 1 MAINTENANCE → Maintenance
- Level 2 MANUFACTURER → EurExMa ONLY

Here below MAINTENANCE log-in information is given:

○ User: **user1** - Password: **user1**



Level 1 - Maintenance

In addition to the pages available on Level 0, LEVEL 1 allows to set up the following parameters:


THERMOREGULATION GROUP

MOTORS GROUP

GENERAL

Thermoregulation – Thermo PID

On the PID parameters page, for every configured thermoregulation zone the following data are available: PID management for the Heat and Cool actions, configuration of the type of action and activation of the self-tuning function.

E EUR.EX.MA
EUROTECH EXTRUSION MACHINERY SRL

E 21/10/2020 Wednesday 09:30:48 user1

Thermo PID

Zones	HPB	HIT	HDT	CSP	CPB	PID type	Selftuning
Z1	1.0	% 240.0	s 80.0	s 0.0	% 1.0	% H PID+ C PI	OFF
Z2	1.0	% 240.0	s 60.0	s 0.0	% 1.0	% H PID+ C PI	OFF
Z3	1.0	% 240.0	s 60.0	s 0.0	% 1.0	% H PID+ C PI	OFF
Z4	1.0	% 240.0	s 60.0	s 0.0	% 1.0	% H PID+ C PI	OFF
Z5	5.0	% 240.0	s 80.0	s 0.0	% 1.0	% H PID+ C PI	OFF
Z6	1.0	% 240.0	s 60.0	s 0.0	% 1.0	% H PID+ C PI	OFF
Z7	1.0	% 240.0	s 60.0	s 0.0	% 1.0	% H PID+ C PI	OFF
Z8	1.0	% 240.0	s 60.0	s 0.0	% 1.0	% H PID+ C PI	OFF
Z9	1.0	% 240.0	s 60.0	s 0.0	% 1.0	% H PID+ C PI	OFF
Z10	1.0	% 240.0	s 60.0	s 0.0	% 1.0	% H PID+ C PI	OFF

General ST

Thermoregulation – Thermo Alarms

On the PID alarm page, for all the configured temperature control zones management of the alarm thresholds and HB alarm limit is available.



21/10/2020
Wednesday
09:38:05


user1


Thermo alarms

Zone Nr	Wait temp.	AL. 1	AL. 2	AL. 3
Z1		-10 °C	10 °C	0 °C
Z2		-10 °C	10 °C	0 °C
Z3		-10 °C	10 °C	0 °C
Z4		-10 °C	10 °C	0 °C
Z5		-10 °C	10 °C	0 °C
Z6		-10 °C	10 °C	0 °C
Z7		-10 °C	10 °C	0 °C
Z8		-10 °C	10 °C	0 °C





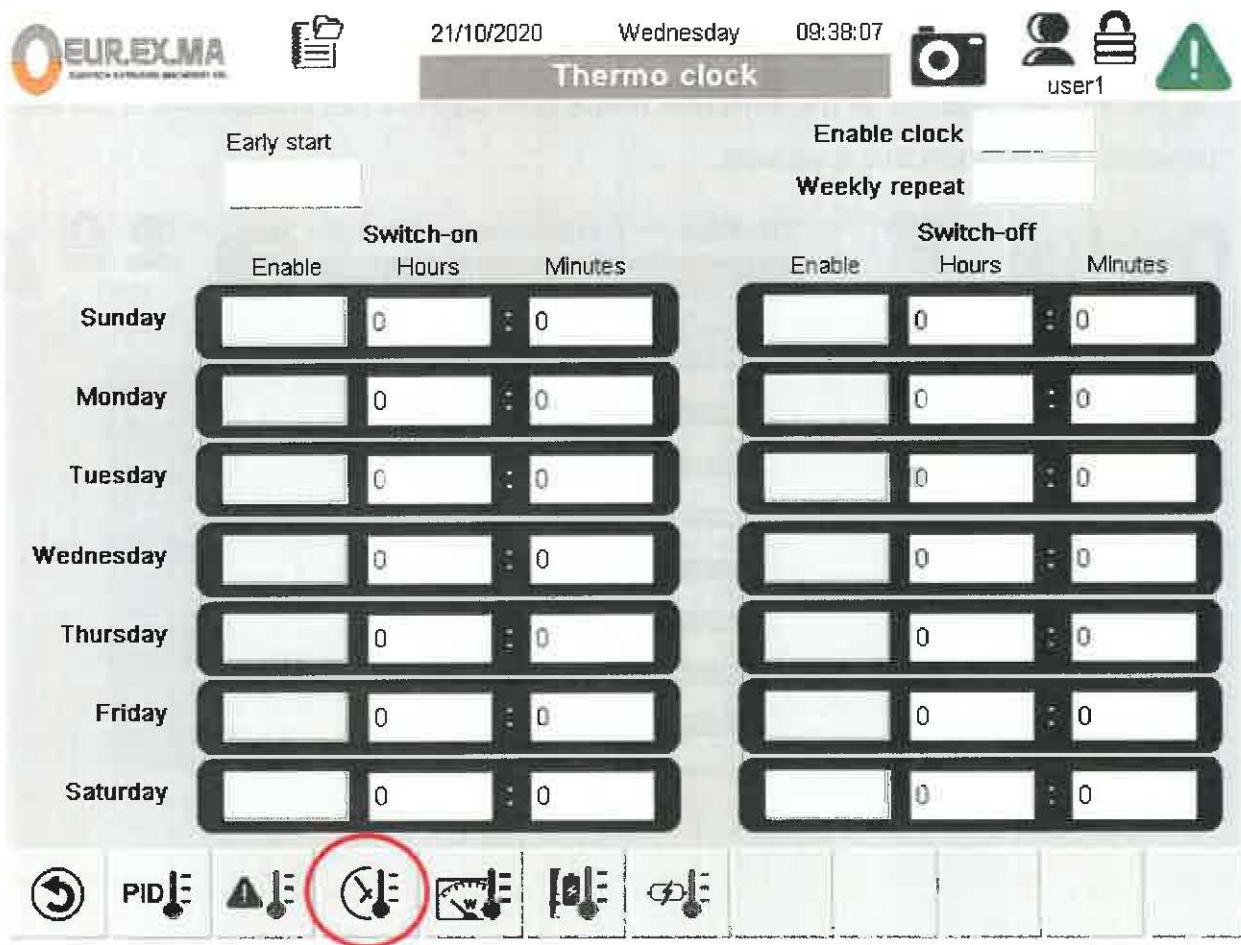







Thermoregulation – Thermo Clock

On the weekly clock page it is possible to configure date/time for activation and automatic shutdown of thermoregulation. The individual stages can be configured for all single days of the week with the possibility of repetition.



A general enabling button is provided for automatic start from the clock.

IMPORTANT NOTE:

Due to the risk of this configuration, EUR.EX.MA. will not assume any liability for damages or malfunctions resulting from an incorrect usage.

Thermoregulation group – Thermo TES

This page allows the configuration of the operating parameters for the control management switching on of sequential thermoregulation zones (TES = THERMO ENERGY SAVING) with the purpose of reduce system energy consumption.

Starting from the consideration that there are different thermal masses and therefore different times for reach the operating temperature, we can formulate the operation of turning on the zones last

which have a short reaction time that otherwise would remain in regulation waiting for the other zones with slower thermal mass reach their normal temperature.

The control uses time counters that measure the time it takes for each individual zone to reach a temperature value referred to a band around the regulation set.

This phase, called acquisition of the thermal mass, is used to calculate the maximum time of system start-up, i.e. the time that all the zones take to reach the working temperature.

The next time the heating is switched on, the program will activate the zones of thermoregulation using the time of the thermal mass of the zone referred to the maximum time of goodwill.

EXAMPLE:

Suppose the system has three zones with the following thermal masses:

Zone A: power 25Kw, time to reach 45 min. and 30 sec.

Zone B: power 15Kw, time to reach regime 22 min.

Zone C: power 15Kw, time to reach 35 min. and 50 sec.

The maximum time is given by Zone A and therefore the ignition timing diagram becomes:

1. Immediate start of Zone A
2. Start of Zone C after 9 min. and 10 sec. (Max time - zone C time)
3. Start of Zone B after 23 min. and 30 sec. (Max time - zone B time)

The energy saving is evident, without TES control the zones B and C would have been unnecessarily fully operational using electricity for 23'30 "and 9'10" respectively.

It must be considered that the calculation does not take into account the mutual thermal influence of the zones which reduces the time to reach the regime, in any case even if in the maximum time the normal temperature of all zones, however we will be very close to it and we will have obtained a energy benefit.

In addition, the system provides the ability to manually change the values of the time counters for adapt them to the best.

The following features are provided:

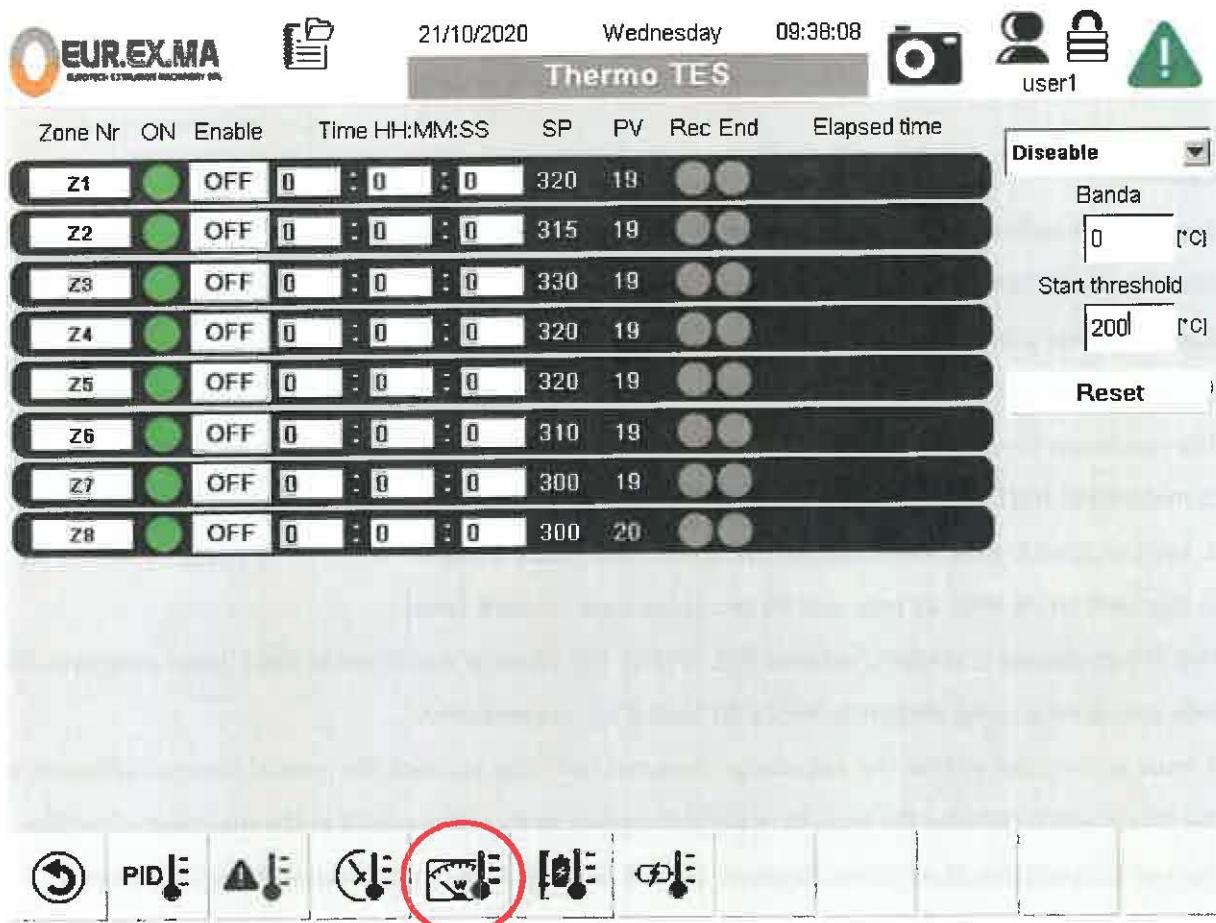
- Exclusion of control on the single zone.
- Modification of the time count value (hh: mm: ss) calculated during the acquisition phase.

The new value will be implemented at the next activation of the process.

- Configuration of a band value (global to all zones) around the working set that

serves to consider the acquisition process finished.

- General TES qualification. With TES enabled and zone thermoregulation switch-on command will be managed following the set data.
- Zone status being registered.
- Status of zones undergoing TES control.



Thermoregulation – Thermo Power

This page allows the configuration of the advanced power control available within the Template.

The following features are available:

- Limitation of the maximum power absorbed by the extruder
- Limitation of the maximum instantaneous peak absorbed by the extruder
- PID control mode
 - Direct without optimization
 - With PWM algorithm
 - With PWM Burst firing algorithm

The heat outputs are assumed to drive solid-state relays (SSRs) with zero trigger crossing.

For each zone it is necessary to set the rated power of the load and a maximum power value total payable

If the total power required by the PIDs is higher than the maximum deliverable power:

- The power sent to the individual actuators is reduced, with respect to the value calculated by the PID, in proportion to the calculated reduction

- The total instantaneous power delivered is limited to the maximum set value.

If, on the other hand, the total power required by the PIDs is lower than the maximum power that can be supplied:

- The power calculated by the PID is sent to the individual actuators.
- The total instantaneous power delivered is limited to the maximum set value.

The implementation of the heating outputs is performed with multiple periods of the network period. Of consequently with network at 50 Hz multiple periods of 20 ms, with network at 60 Hz multiple periods of 50 ms (three whole waves). The configuration of the grid frequency, expressed as a value in ms, must be carried out using the “PWM period” parameter available on the page.

 EUR.EX.MA
EUROTECH EXTRUSION MACHINERY SRL

21/10/2020
Wednesday
09:38:11


 user1


Zone Nr	Heat power	Zone power
Z1	0.0 %	0.000 kW
Z2	0.0 %	0.000 kW
Z3	0.0 %	0.000 kW
Z4	0.0 %	0.000 kW
Z5	0.0 %	0.000 kW
Z6	0.0 %	0.000 kW
Z7	0.0 %	0.000 kW
Z8	0.0 %	0.000 kW

Disable power distribution

Power limit [kW]

Power reduction [%]

Actual power [kW]

Period PWM / BF [s]

Control mode



PWM mode

The output is commanded to ON for a percentage of the period configured in the page configuration as PWM PERIOD (period setting in hundredths of a second), to OFF for the time residue.

Burst Firing Mode

With the period set in the PWM PERIOD parameter (setting in hundredths of a second) the output comes controlled to ON or OFF according to the power calculated by the PID. Burst Firing mode improves the implementation of power delivery in the following ways:

- The very fine alternation of ON and OFF bursts ensures uniform energy delivery in the time. Eg: if the PID calculates a power of 50.0%, a burst will be delivered alternately to ON and a burst to OFF
- The power delivered is exactly that required by the PID (one per thousand precision). E.g.: if the PID calculates a power of 51.2% 512 bursts will be delivered at ON and 488 bursts at OFF, with continuous alternation of ON and OFF burst.
- The delivered power adapts immediately to the values calculated over time by the PID

In addition, with Burst Firing mode the total energy delivered to the heating outputs is distributed in a coordinated way over time between the various areas.

In the normal operation of a process, when the set temperature has been reached, the power calculated by the PIDs is (much) lower than the peak power. Under these conditions the Burst Firing mode it coordinates the moment of ignition of the different zones to provide a total output of power instantaneous equal to the total power required by the PIDs.

Thermoregulation group – Thermo HB

This page allows parameterization and control regarding the absorption reading single current thermoregulation zones (CT reading), interrupted resistance alarm detection (HB) and short circuit resistance detection.

Periodically the current flowing in the resistors is measured and compared with the current nominal.

The HB check can be done in two ways (HB CHECK MODE):

- One zone at a time: all zones are switched off except the zone under test for the necessary time for stabilization of the current reading.
- Simultaneously on all zones: the outputs are frozen for the time necessary for the stabilization of the circulating current reading. The detected current must be equal to sums of the currents foreseen for the zones at that moment ON.

Warning! In the case of SINGLE-PHASE loads, the CT installed on the Neutral must be sized to allow the reading of the sum of all installed loads. In the case of THREE-PHASE loads it is necessary to install 3 CTs, one for each phase, adequately sized.

The implementation of the power in Burst Firing mode allows to limit the impact of the HB control on energy supply, ensuring that the average power output is in any case the calculated one from the PID (also considering the time dedicated to HB control in the calculation).



21/10/2020

Wednesday

09:38:14

**Thermo HB**

Zone Nr	TA 1	TA 2	TA 3	CC Err	HB Err	TA Read 1 real	thresh.	TA Read 2 real	thresh.	TA Read 3 real	thresh.
Z1	1	0	0	●	0	0.0	3.4				
Z2	1	0	0	●	0	0.0	3.5				
Z3	1	0	0	●	0	0.0	1.9				
Z4	1	0	0	●	0	0.0	1.8				
Z5	1	0	0	●	0	0.0	2.7				
Z6	1	0	0	●	0	0.0	3.6				
Z7	1	0	0	●	0	0.0	3.5				
Z8	1	0	0	●	0	0.0	4.4				

Mode **Single zone**check period **60** [Sec]tolerance threshold **25** [%]alarm filter **1** [nr]survey zone **0** [nr]TA1 offset **0.0** [A]TA2 offset **0.0** [A]TA3 offset **0.0** [A]

Research zone



The following parameters are required for the HB control configuration:

- Verification time HB
- Tolerance allowed in the control of the detected current
- Number of consecutive errors detected in the HB control before signaling the alarm
- Maximum current circulating in each CT with all outputs off

The rated currents for each CT must also be set. In case of three-phase loads with connection to triangle two or three CTs can be used and some resistors can cause a transition of current detected by two CTs.

The rated current and the associated CTs can be automatically detected by activating a command dedicated.

The HB and SSR short circuit control generate the following information:

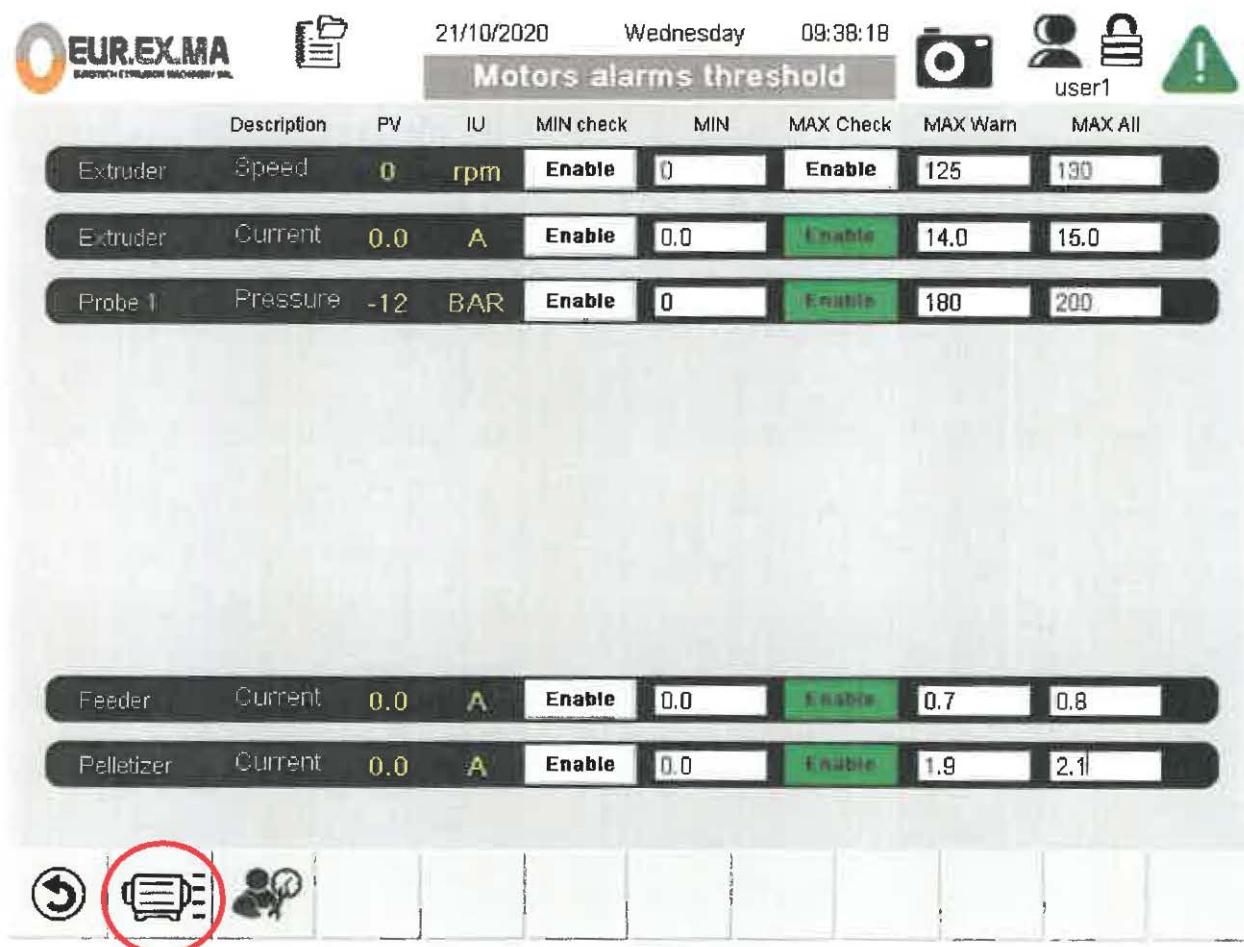
- HB alarm detected
- Number of consecutive errors found in the HB control
- SSR short circuit alarm detected

Number of consecutive errors detected in the SSR short circuit check

Motors – Motor Alarm Threshold

The motor alarms page contains the threshold parameters relating to the alarms for the configured motors.

There are minimum, warning and maximum thresholds. As for the Minimum and Warning thresholds, an enable button is available.



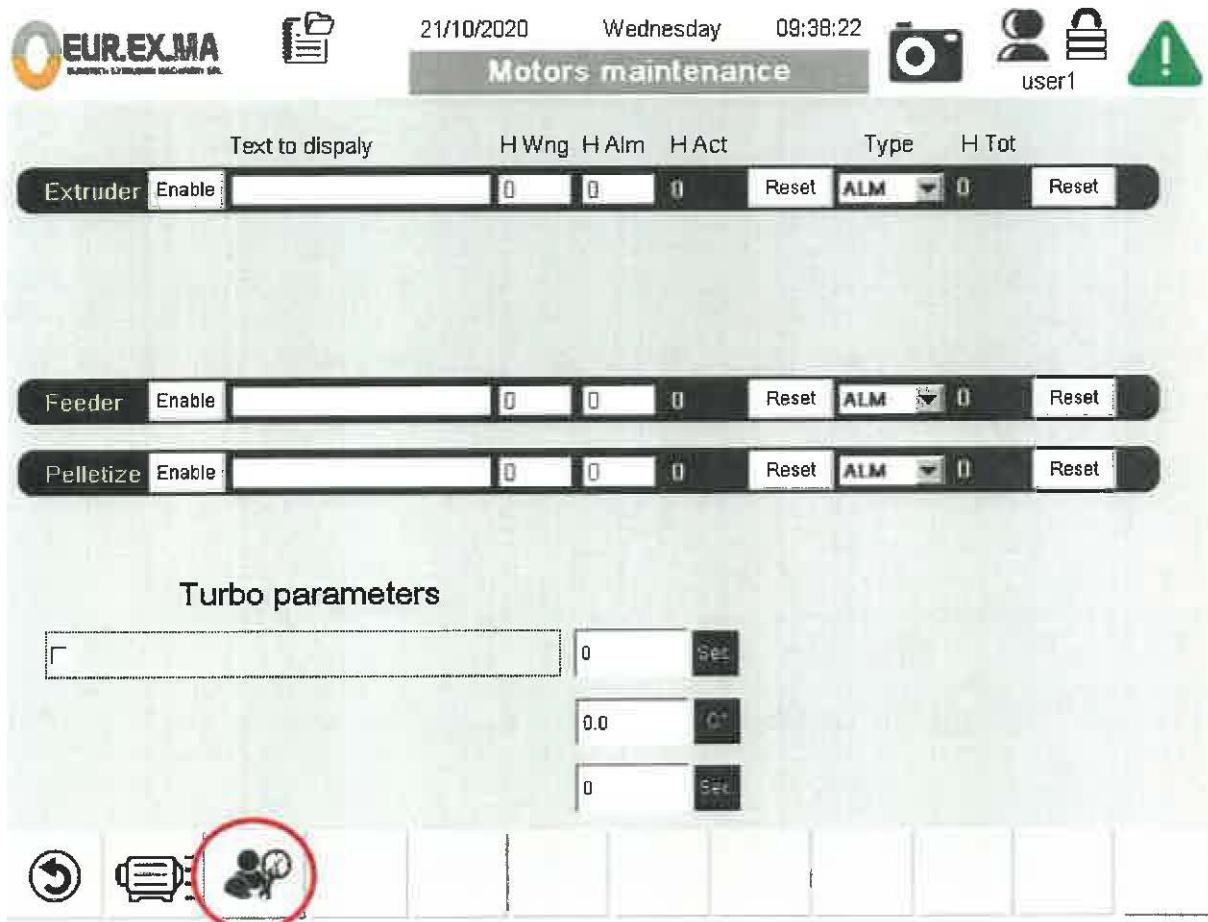
Description	PV	IU	MIN check	MIN	MAX Check	MAX Warn	MAX All
Extruder Speed	0	rpm	Enable	0	Enable	125	130
Extruder Current	0.0	A	Enable	0.0	Enable	14.0	15.0
Probe 1 Pressure	-12	BAR	Enable	0	Enable	180	200
Feeder Current	0.0	A	Enable	0.0	Enable	0.7	0.8
Pelletizer Current	0.0	A	Enable	0.0	Enable	1.9	2.1

Motors – Motors Maintenance

The maintenance page contains the threshold parameters for the configured motor operating hours.

The following configurations are provided:

- Maintenance alarm display message
- Warning threshold for operating hours and reset command for hours count
- Alarm threshold for maximum operating hours and hour count reset command
- Selection for display only Maximum alarm or display Alarm with stop automatic extruder

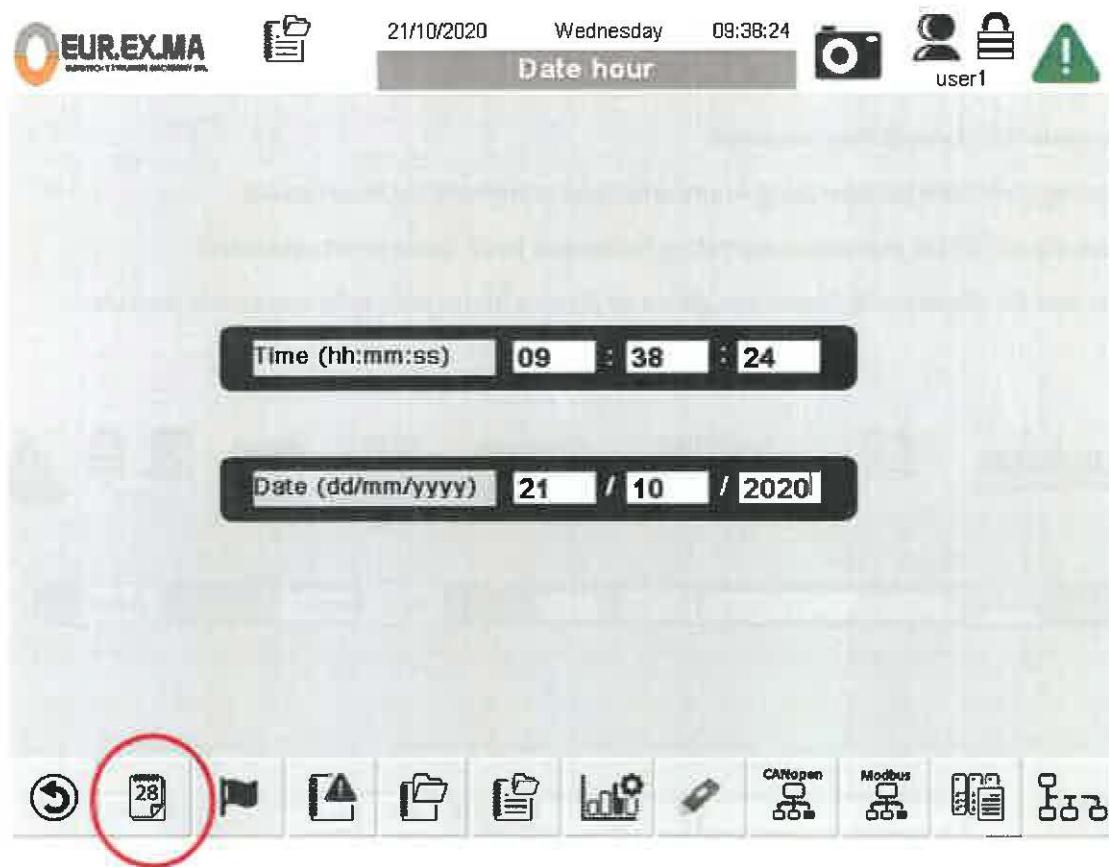


	Text to display	H Wng	H Alm	H Act	Type	H Tot	
Extruder	Enable	0	0	0	Reset ALM	0	Reset
Feeder	Enable	0	0	0	Reset ALM	0	Reset
Pelletize	Enable	0	0	0	Reset ALM	0	Reset

Turbo parameters

General– Date / Hour

In the date / time page it is possible to set the date / time displayed on the graphic pages



General - Language

The selection of the active language is available on the change language page. The languages available are Italian is English



General – Alarms History

The historical alarms list page displays the descriptions, status (ON / ACK) and date / time of activation for all historical alarms recorded on the machine. On the right side there are two buttons (scroll up and down) to allow the visualization of the alarm lines that exceed the monitor size.

A reset button is also available to reset the recorded alarms log.



21/10/2020

Wednesday

09:38:27


Alarms history

user1

Alarm	In	Out
Alarm thermo: SBR	21/10/2020 09:37:32	21/10/2020 09:37:42
Alarm thermo: SBR	21/10/2020 09:37:32	21/10/2020 09:37:42
Alarm thermo: SBR	21/10/2020 09:37:32	21/10/2020 09:37:42
AUX-3_003 - %1 drive fault	21/10/2020 09:05:12	21/10/2020 09:05:36
EXT1_003 - %1 drive fault	21/10/2020 09:04:56	21/10/2020 09:05:02
AUX-3_003 - %1 drive fault	21/10/2020 09:04:55	21/10/2020 09:05:02
SIDE FEEDER_007 - %1 modbus communication error	21/10/2020 09:04:50	21/10/2020 09:04:55
S013 - Modbus RTU error	21/10/2020 09:04:47	21/10/2020 09:04:56
EXT1_025 - %1 modbus communication error	21/10/2020 09:04:47	21/10/2020 09:04:55
S011 - Emergency off	21/10/2020 09:04:47	21/10/2020 09:04:55
PUMP_007 - %1 modbus communication error	21/10/2020 09:04:47	21/10/2020 09:04:55
GODET2_007 - %1 modbus communication error	21/10/2020 09:04:47	21/10/2020 09:04:55
EXT1_032 - After pump pressure broken	21/10/2020 08:58:29	21/10/2020 08:58:31
EXT1_017 - %1 min. temperature not reached	21/10/2020 08:58:29	21/10/2020 08:58:31
EXT1_092 - After pump pressure broken	21/10/2020 08:57:58	21/10/2020 08:58:21
EXT1_017 - %1 min. temperature not reached	21/10/2020 08:57:58	21/10/2020 08:58:21
EXT1_032 - After pump pressure broken	21/10/2020 08:57:35	21/10/2020 08:57:49
EXT1_017 - %1 min. temperature not reached	21/10/2020 08:57:35	21/10/2020 08:57:49
SIDE FEEDER_003 - %1 drive fault	21/10/2020 08:56:35	21/10/2020 08:56:37
PUMP_003 - %1 drive fault	21/10/2020 08:56:34	21/10/2020 08:56:36



General – Data History

This page lists all the changes made on the machine in chronological order.

Each change is displayed with the reference of the user active at the time of the change, the date and time of the modification, the data modified, the data before the modification and the new data set.

O EUR.EX.MA
AUTOMATION EXTRUSION MACHINERY SRL

21/10/2020
Wednesday
09:38:29

Data history

user1

Date-Time	Description	Old	New	Unit
Sep 30, 2020 9:40:09 A		OFF	ON	
Sep 29, 2020 9:22:47 A		200	210	
Sep 29, 2020 9:22:45 A		200	210	
Sep 29, 2020 9:22:43 A		200	220	
Sep 29, 2020 9:22:40 A		200	215	
Sep 29, 2020 9:22:38 A		200	220	
Sep 29, 2020 9:21:52 A		200	190	
Sep 29, 2020 9:21:49 A		200	185	
Sep 29, 2020 8:50:23 A		0	200	
Sep 29, 2020 8:48:15 A		0	400	
Sep 25, 2020 3:03:07 P		50	20	
Sep 25, 2020 3:02:15 P		31	50	

General - System status

The status of the controller and the status of the individual modules are displayed on the system status page / O and the status of the individual signals configured in the various modules.

Alarm List

The following alarms are available for all configured and non-functioning temperature control zones:

- SBR alarm (short-circuited probe)
- LBA Alarm (Short Circuit Alarm Loop)
- HB Alarm (Heater Break Alarm)
- AL1 (low temperature alarm)
- AL2 (high temperature alarm)
- AL3 (generic alarm, TYPICAL NOT in use)
- Cooling fans alarm

Motor alarms

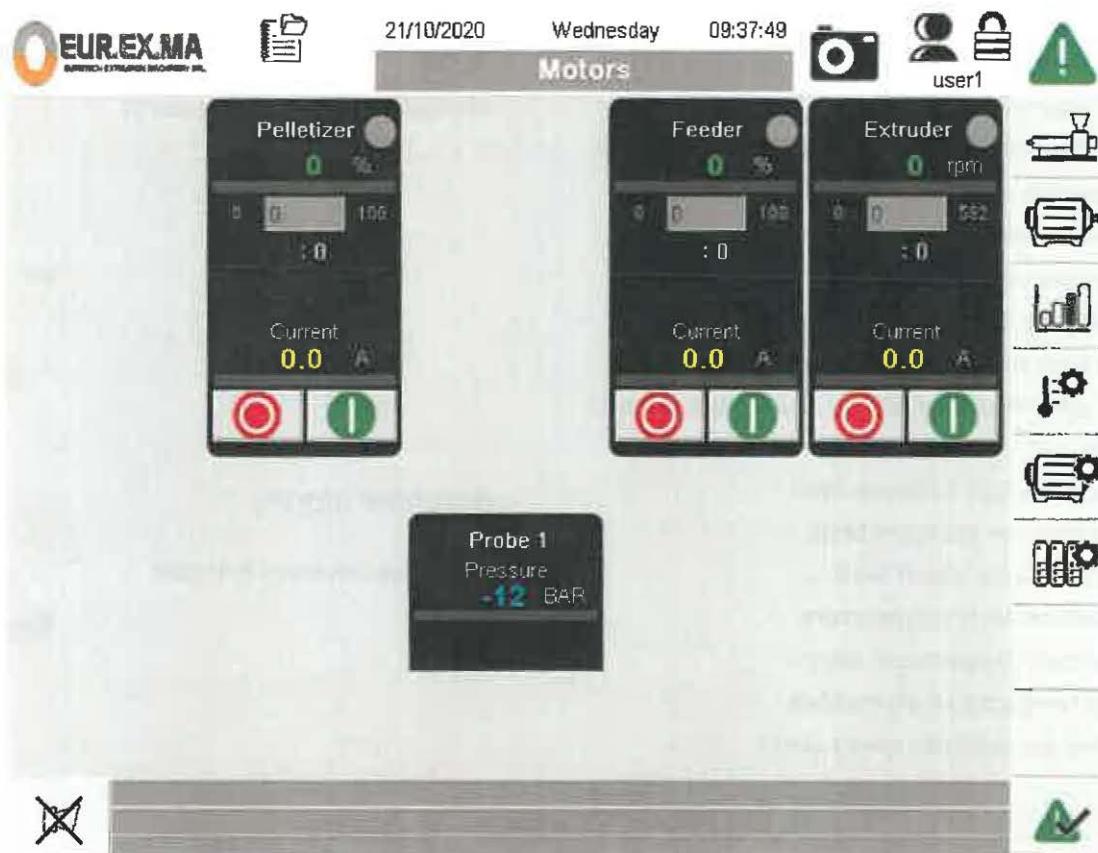
For all motors configured and not running:

- Attention maintenance motor Extruder
- Extruder motor maintenance alarm
- Attention auxiliary "Aux" motor maintenance Extruder
- Extruder motor maintenance auxiliary alarm
- Extruder motor drive alarm NOT OK
- Auxiliary alarm Extruder motor drive NOT OK
- Attention motor current
- Extruder motor high current alarm
- Extruder motor low current alarm
- Attention motor current auxiliaries
- Extruder motor auxiliary high current alarm
- Extruder motor auxiliary "Aux" low current alarm
- Attention high pressure Melt
- Warning low pressure Melt
- High pressure alarm Melt
- Attention Melt temperature
- Low melt temperature alarm
- High temperature alarm Melt
- Minimum extruder speed alarm

- Maximum extruder speed alarm
- "Aux" auxiliary alarm for extruder minimum speed motor
- "Aux" alarm for extruder maximum speed motor
- Extruder motor cooling alarm

Machine alarms

- High temperature Extruder
- Emergenc



Connector C4 determines the configuration of the machine

With the connector inserted, the machine will represent images 1 and 2

With the connector disconnected, the machine will show image 3 and 4

Machine Start-up - 10 Zones:

3

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EUROTECH EXTRUSION MACHINERY SRL

21/10/2020 Wednesday 09:30:30 Overview user1

Z10	Z9	Z8	Z7	Z6	Z5	Z4	Z3	Z2	Z1	On
20	19	19	20	19	19	19	19	19	19	Pv °C
300	300	300	300	310	320	320	330	315	320	Sp °C
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	P %
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	A
										M

Pelletizer 0 %
0 : 100
Current 0.0 A

Pump 0 %
0 : 100
Current 0.0 A

Probe 1 Auto
Pressure 50 BAR
-12 BAR
Probe 2 0 BAR

Feeder 0 %
0 : 100
Current 0.0 A

Extruder 0 mm/min
0 : 500
Current 0.0 A

4

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EUROTECH EXTRUSION MACHINERY SRL

21/10/2020 Wednesday 09:30:31 Motors user1

Pelletizer	Pump	Feeder	Extruder
0 %	0 %	0 %	0 rpm
0 : 100	0 : 100	0 : 100	0 : 500
Current 0.0 A	Current 0.0 A	Current 0.0 A	Current 0.0 A

Probe 1 Auto
Pressure 50 BAR
-12 BAR
Probe 2 0 BAR

- 1) Turn the selector to the ON position.
- 2) Disable emergencies in case they are already active (emergency release);
- 3) Press the "auxiliary restore" button to restore the Emergencies; 
- 4) Press the "Switch on Temperature" button, which will turn green 



IMPORTANT:

IT WILL BE POSSIBLE TO START THE EXTRUDER **ONLY IF** the "T" symbol  (Temperature OK) will have become **GREEN**, otherwise the Extruders **NOT** they will leave.

(This is a machine intrinsic safety setting, therefore **IT CANNOT** be excluded under any circumstances).

It is possible to check for each zone if the SET POINT temperature has been reached (this is when the relative LEDs or CELLS become GREEN).

- 4a) Check that the relevant slots corresponding to the zones are green. By selecting these slots / buttons it is possible to enable or disable the various zones. 



- 4b) Set the "° C" value using "+" or "-", or in another way by pressing in the white cell by directly writing the desired value

This is the quickest and easiest way to check ALL the temperatures of each extruder **SIMULTANEOUSLY**.

It is also possible to operate in a different way, that is by acting **INDIVIDUALLY** on the areas:
 Extruder zones + Connections and sleeves;

Filter change area + Melt pump;

Head Zone (the head is made up of multiple SET POINT zones);

5) Act on the white Slots and set the SET POINT value of the desired temperatures.

Wait for the SET POINT temperatures to be reached.

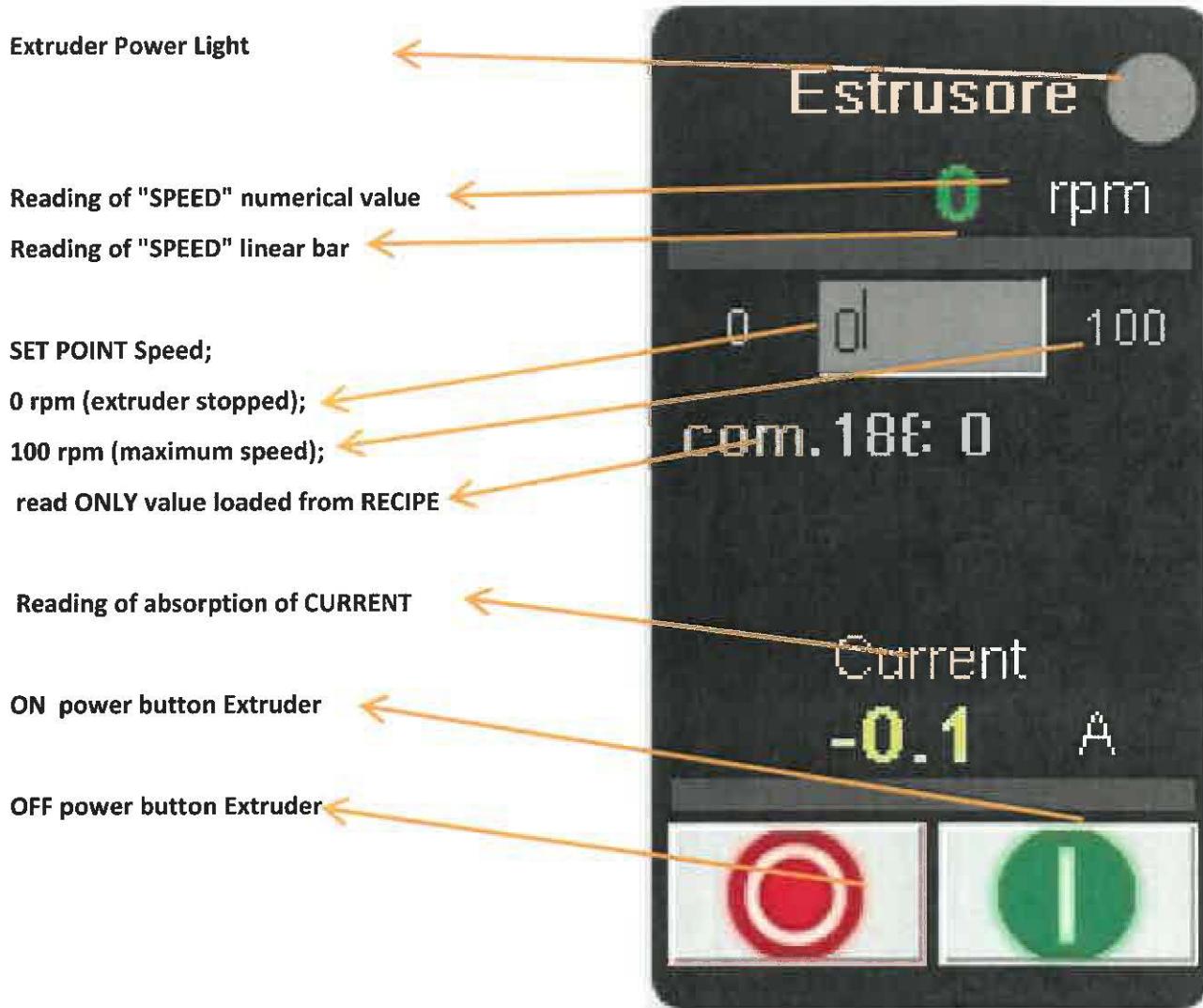
The extruders will NOT start in case of failure
reaching the set thresholds.



6) Click on the "Motor" symbol to access the motor control page



STARTING PROCEDURE FOR EXTRUDER / CALENDER / HAUL OFF / WINDER MOTORS



It is possible to manually intervene on all the speed parameters of the motors present on the machine, in particular:

- Extruder Motors;
- Melt Pump Motors;
- Haul Off motor;

In particular, the units of measurement and reading of the "motor speed" values are expressed with the following sizes:

- Extruder speed (rpm);
- Haul Off speed (mt / min)

-
- 6) Intervene on speeds by maintaining regimes suitable for production
 - 7) Optimize the speed of the motors for an adequate production

Template legend



Extruder control template



Lateral Doser control template



Automatic pressure control template

AUTO function activation / deactivation (pump synchronism);
 Pressure SET POINT;



Melt pump control template



Control Template Cutter

Other Settings

Motor Alarm Thresholds

This page is accessible with Login: "user1"

The Motor Alarm Thresholds (Bar) are designed to safeguard the Extruders from any damage caused by excessive pressure.

These thresholds can be set simply by pressing the MOTORS and THRESHOLDS buttons



The screen as below will open; then press:


21/10/2020 Wednesday 09:38:18
user1


Motors alarms threshold




Description	PV	IU	MIN check	MIN	MAX Check	MAX Warn	MAX All
Extruder Speed	0 rpm		Enable	0	Enable	125	130
Extruder Current	0.0 A		Enable	0.0	Enable	14.0	15.0
Probe 1 Pressure	-12 BAR		Enable	0	Enable	180	200
Feeder Current	0.0 A		Enable	0.0	Enable	0.7	0.8
Pelletizer Current	0.0 A		Enable	0.0	Enable	1.8	2.1





Max: 9999
Min: 0
Value: 160

7	8	9	←
4	5	6	Esc
1	2	3	↓
0	.	-	←

Please note columns MAX CONTROL / WARM MAX / MAX ALARM.

First you need to enable the Alarm Thresholds by pressing **ENABLE** (will turn green).

Now it will be possible to act directly on the 2 cells, respectively Warm MAX (ACOUSTIC ALARM THAT SIGNALS THRESHOLD REACHED) and MAX alarm (ACOUSTIC ALARM + AUTOMATIC STOP OF EXTRUDER MOTORS).

Both thresholds express pressure values (Bar) and can be edited simply by clicking on the corresponding cell.

The numeric keypad will then open for entering the desired SET POINT values; then press the ENTER key to confirm.

Procedures for saving recipes

During the work process, it may be necessary to save the data and settings of the machine.

This is an important page for the Standard machinery work regimes; for example, the saving of the Set-Point Temperatures, the speeds of the Extruders motors, the speed of the Calender Cylinders and the temperatures, the winding speeds, etc.

It is therefore possible to save the machine settings and parameters during normal work operations by following the instructions:

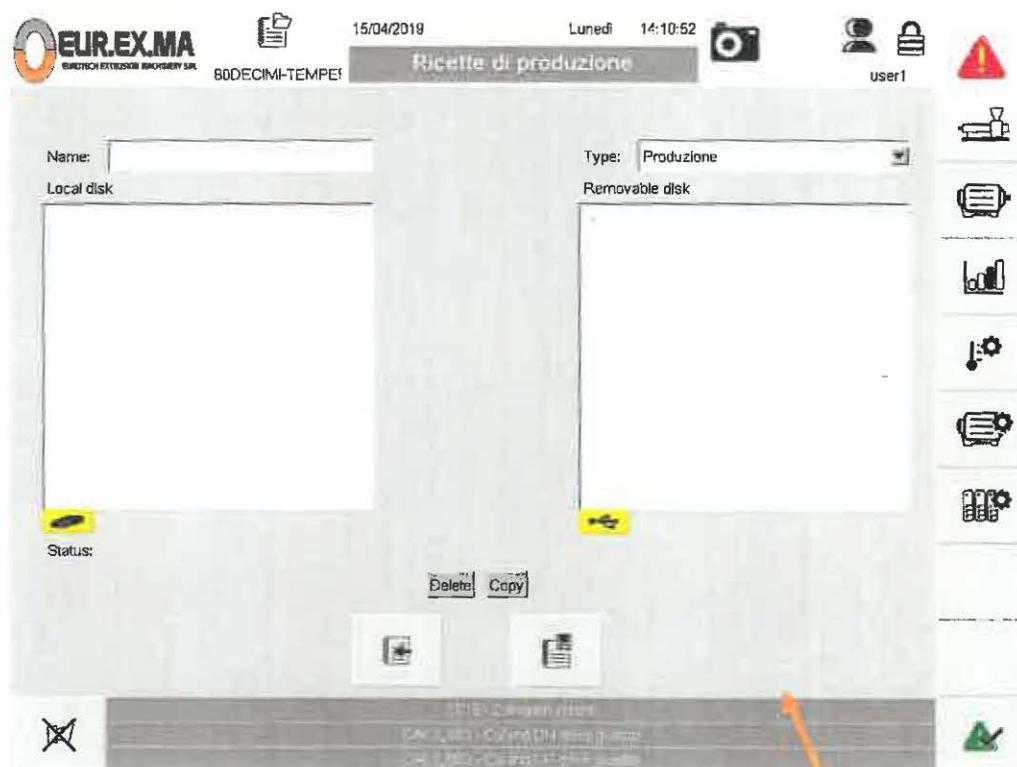
(The saves are called with the name of "RECIPES")

On each page you can see this symbol

(next to the EUR.EX.MA. logo):



Pressing the indicated the window below will open:



Enter the name of the recipe by typing it inside the "NAME" window using alpha-numeric keypad;

Press on the White cell and type (for example) a RECIPE NAME: "22 degree 03".

Then press ENTER on the keypad and accordingly, press the button **SAVE** (in this case the recipes will be saved on the local disk of the panel);

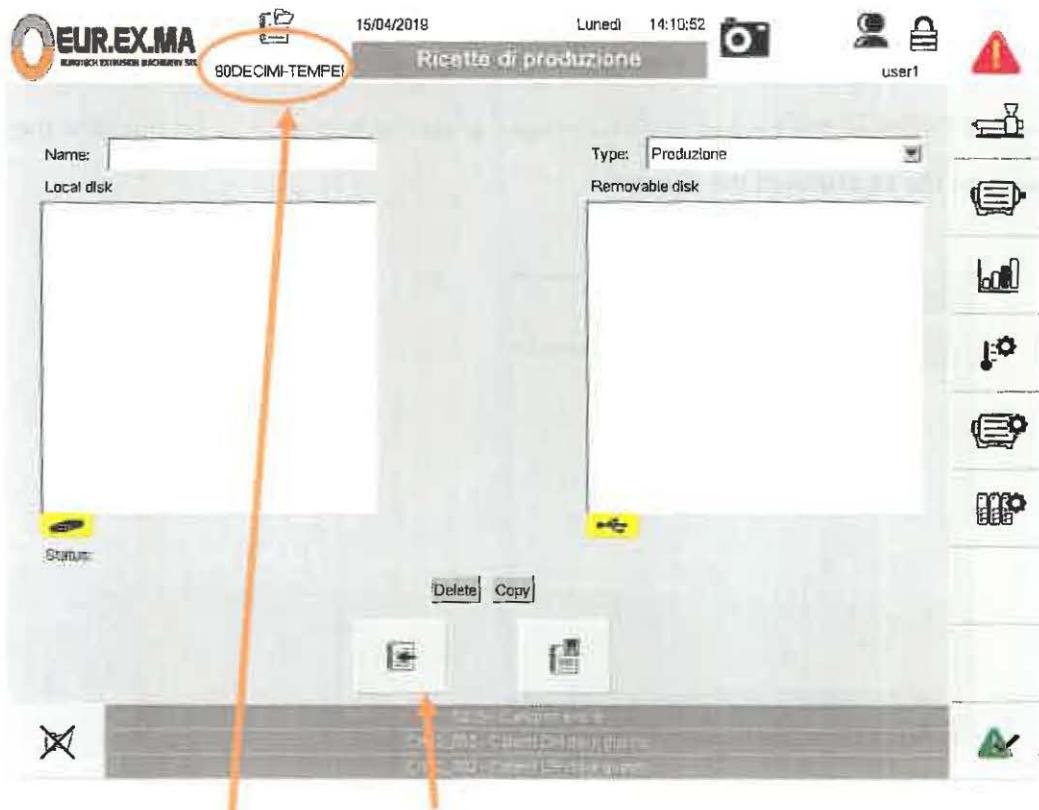


After saving the recipe, it can be loaded at any time.

Once the recipe is selected and loaded, it will reset **AUTOMATICALLY ALL** the parameters saved at that given moment while the machinery is running (temperatures, speed, etc.).

NOTE: the speeds will be loaded on the motor interfaces READ IN ONLY, the operator must then manually enter the SET POINT values.

After loading the recipe, it will then be possible to start heating the machine (as shown in the Machine Start-up page having all the SET Points ready).



TO LOAD the recipes in the machine press the indicated button.

After the loading phase, it will be possible to see the RECIPE CURRENTLY IN USE on the screen of any page (top next to the logo).

The panel is equipped with 4 USB slots on which it is also possible to save recipes and "screenshot" images.

It is therefore necessary to insert the USB pen to open a new window next to the existing one.
(as below picture shows)

At this point it will also be possible to transfer the recipes into the USB support (by simply selecting them) and pressing the key **COPY**.

The recipe will also be displayed in the right window.