

Based on Doc. rev. 1.1	<b>notes for use of EF10</b> <b>electronic board for tank level control, via a pressure transducer, and relation with working logic Single / Double Dehydra</b>	
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**Introduction**

The board features four working modes:

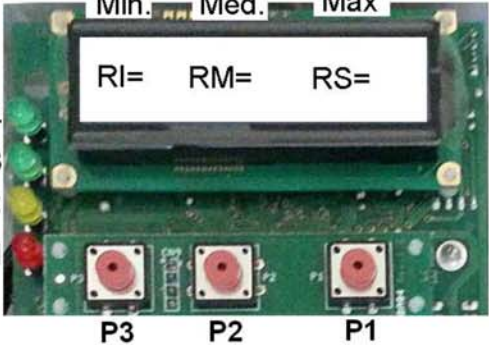
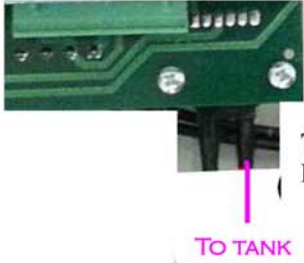
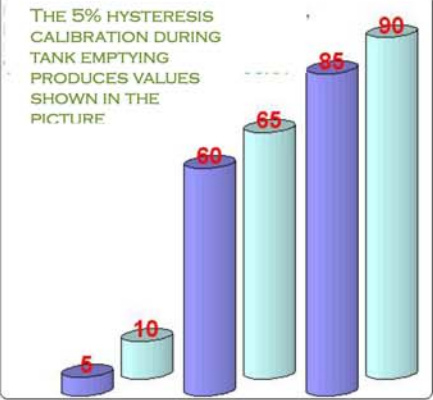
- normal
- user
- manufacturer
- diagnostics

Normal mode: "NORMAL VISUALIZATION DURING USE"

User mode: "MODE FOR MAINTENANCE STAFF"

Manufacturer mode: "FACTORY PROGRAMMING MODE"

Diagnostics mode: this mode can be useful for factory or maintenance staff, in order to identify possible electric failures

<p>Some clarifications about the printed circuit:</p> <ul style="list-style-type: none"> <li>• Led diodes are identified as on the printed circuit and as shown in the picture on the right</li> <li>• the buttons panel is also to be read from right to left, as shown in the picture</li> </ul>	<div style="text-align: center;"> <p><b>Ecofast default values</b></p> <p>10%    65%    90%</p> <p>Min.    Med.    Max</p> </div>  <div style="text-align: center;">  <p><b>Tube in P1 (positive)</b> <b>Front right view</b></p> </div> <div style="text-align: right; margin-top: 20px;"> <p>THE 5% HYSTERESIS CALIBRATION DURING TANK EMPTYING PRODUCES VALUES SHOWN IN THE PICTURE</p>  </div>
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10% = the mixer starts, and after about one minute the dewatering unit starts in order to empty the tank (by default, the tank has to be kept empty: it is not intended for storage but for temporary accumulation only)

65% = in Double Dehydra, the second dewatering unit is started and it will go on working until the 60% value is reached, plus an "n" minutes delay (countdown), to be defined

65% = alert zone: if the tank level does not go back under 60% within a pre-set time, a command is sent to the remote intake stations to limit their capacity. This command remains active until tank level goes back under 60% plus an "n" minutes delay (countdown)

65% = in Single Dehydra, since a second dewatering unit is not available, if the tank doesn't return below 60% in X (to be defined) minutes, a command is sent to remote intake stations to limit their capacity. This command remains active until the tank level goes back below 60% plus an "n" minutes delay (countdown)

90% = the system sends an arrest command to remote intake stations, to avoid overflow. This command remains active until tank level goes back below 85% (return) plus an "n" minutes delay (countdown)

5% = the dewatering unit has almost emptied the tank, so it is kept turned on for one more minute to finish clearing the tank.

## **NORMAL mode** (NORMAL VISUALIZATION DURING USE)

In NORMAL mode the controller working state is shown. On the first row of display is visualized the tank level in % and on the second row is visualized the state of relays for lower, middle and upper threshold respectively. 1 means activated relay, 0 means deactivated relay.

The relays state is also visualized by leds DL2, DL3 and DL4.  
Led DL1 lighting means the relays control logic is disabled due to:

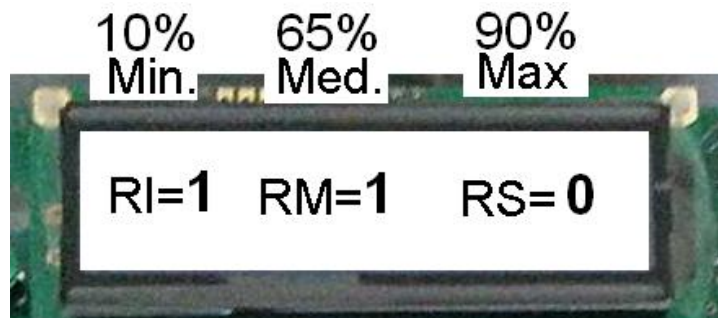
- ⤴ the diagnostics mode is activated
- or
- ⤴ the specific parameter for relay enabling is set to OFF

*an added analog output supplies a 0 to 10 V voltage, determined by the tank % level*

example of visualization in NORMAL mode:

**LEVEL= 65.3 %**  
**RI=1 RM=1 RS=0**

RI = relay for lower threshold (DL2 on)  
RM = relay for middle threshold (DL3 on)  
RS = relay for upper threshold (DL4 off)



From NORMAL mode it is possible to access the USER and MANUFACTURER modes typing the respective passwords. In these modes it is possible to check the parameters list and set them as desired.

To access the password area, press and hold [P2] until is shown the message:

### **PASSWORD**

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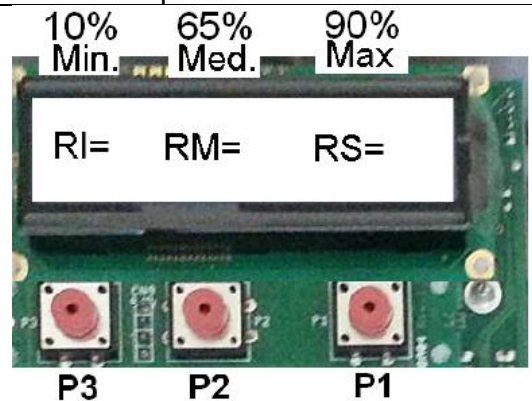
Press [P2] (central button) or [P1] (right button) to browse the parameters list

Press [P3] (left button) to start editing a parameter

Press [P2] or [P1] to increase or decrease a parameter value

Press [P3] and hold for one second to confirm the parameter value

Press [P2] and [P1] at the same time to exit editing mode and go back to NORMAL mode



## USER mode (MODE FOR MAINTENANCE STAFF)

To enter USER mode, press and hold for 3 seconds [P2] and then press the sequence [P1] → [P2] → [P1] → [P2] → [P1]. The following parameters can be visualized:

- ▲ lower threshold
- ▲ middle threshold
- ▲ upper threshold
- ▲ thresholds hysteresis
- ▲ relay enabling
- ▲ screen contrast
- ▲ screen back-light time
- ▲ language selection for messages visualization
- ▲ current time
- ▲ current date
- ▲ week day

To access the password area, press and hold [P2] until is shown the message:

### PASSWORD

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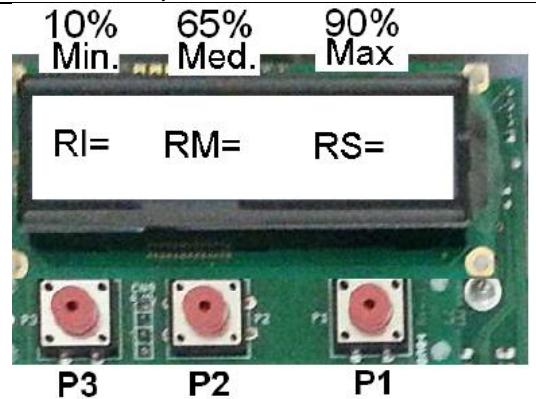
Press [P2] (central button) or [P1] (right button) to browse the parameters list

Press [P3] (left button) to start editing a parameter

Press [P2] or [P1] to increase or decrease a parameter value

Press [P3] and hold for one second to confirm the parameter value

Press [P2] and [P1] at the same time to exit editing mode and go back to NORMAL mode



## MANUFACTURER mode "FACTORY PROGRAMMING MODE"

To enter MANUFACTURER mode, press and hold [P2] for 3 seconds and then press the sequence [P1] → [P1] → [P1] → [P2] → [P2].

The following parameters can be visualized:

- ⤴ lower threshold
- ⤴ middle threshold
- ⤴ upper threshold
- ⤴ thresholds hysteresis
- ⤴ relay enabling
- ⤴ number of adc samplings for tank level acquisition
- ⤴ transducer offset
- ⤴ transducer gain
- ⤴ screen contrast
- ⤴ screen back-light time
- ⤴ language selection for messages visualization
- ⤴ current time
- ⤴ current date
- ⤴ week day

To access the password area, press and hold [P2] until is shown the message:

### PASSWORD

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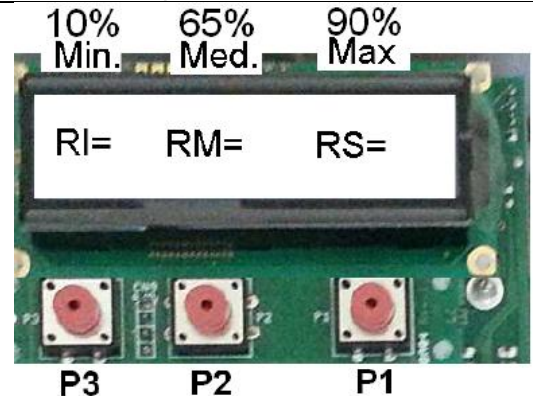
Press [P2] (central button) or [P1] (right button) to browse the parameters list

Press [P3] (left button) to start editing a parameter

Press [P2] or [P1] to increase or decrease a parameter value

Press [P3] and hold for one second to confirm the parameter value

Press [P2] and [P1] at the same time to exit editing mode and go back to NORMAL mode

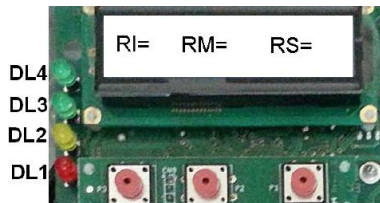


## DIAGNOSTICS mode

To enter DIAGNOSTICS mode, press and hold [P2] for 3 seconds and then press the sequence [P1] → [P2] [P3] → [P3] → [P1].

It is possible to check the working of the following devices:

- ⤴ lower threshold relay (CN7-0.1); the yellow led DL2 returns the state
- ⤴ middle threshold relay (CN7-0.2); the green led DL3 returns the state
- ⤴ upper threshold relay (CN7-0.3); the green led DL4 returns the state
- ⤴ analog output



While the DIAGNOSTICS mode is activated, which is revealed by the lighting DL1 red led, the tank level driven control logic is disabled, until going back to NORMAL mode.

### Parameters meaning

- ⤴ Lower, middle and upper thresholds are the tank filling percentages when the respective relays are to be activated
- ⤴ Thresholds hysteresis: percent value applied to every threshold for relays switching off. Therefore, each relay is activated at threshold X and deactivated at threshold X minus hysteresis value.
- ⤴ Relays enabling: allows disabling the relay control logic depending on the tank level. Disabling is reported by lighting DL1 led.
- ⤴ Number of adc samplings for tank level acquisition: it is the tank level acquisitions number, based on which the average value used by the control logic is calculated. Sampling period is 10 milliseconds, thus setting 100 acquisitions you will obtain one average value every second.
- ⤴ Transducer offset: percent value to be set while calibrating the unit, so that 0% will match with typical offset voltage for the transducer in no load condition.

Attention: offset calibration must be performed before transducer gain calibration.

Calibration procedure: press [P2] until the percent value is greater than 0; then press [P1] until the percent value is 0.



- ⤴ Transducer gain: percent value to be set while calibrating the unit, so that at maximum tank level the percent value is 100. The analog output supplies a 0 to 10 V voltage depending on the tank level percentage set by this calibration. Attention: the gain calibration must be performed after the transducer offset calibration.
- ⤴ screen contrast
- ⤴ screen back-light time
- ⤴ language selection for messages visualization
- ⤴ current time
- ⤴ current date
- ⤴ week day

## Parameters initialization to default values

Parameters values are stored in a static memory.

To set default values press and hold [P3] and [P1] while switching on the unit, until the screen shows the following message:

**Initial. EEPROM?  
Press ENTER/ESC**

Press [P1] to confirm, or press simultaneously [P2] and [P3] to abort. When initialization is complete, the NORMAL mode working state is displayed.

Default parameter values are the following (min and max between brackets):

- ⤴ Lower threshold = 10% (0 - 40)
- ⤴ Middle threshold = 70% (50 - 90)
- ⤴ Upper threshold = 90% (70 - 110)
- ⤴ Thresholds hysteresis = 5% (0 - 20)
- ⤴ Relay enabling = ON (ON - OFF)
- ⤴ Number of adc samplings for tank level acquisition = 100 (16 - 1024)
- ⤴ Transducer offset = 0% @ 0.2V on transducer (0V – 0.4V)
- ⤴ Transducer gain = 100% @ 180mbar
- ⤴ Screen contrast = 10%
- ⤴ Screen back-light time = 10 secs
- ⤴ language selection for messages visualization = English

Attention: the current release (1.1) does not manage nor report possible overlappings of relays activation thresholds; thus the user is responsible for checking that the set up values, also considering the hysteresis values, define distinct activation ranges.