

MultiController E 0-100% 24V and 230V

Manual output controller 0-100% or On/Off
and Modbus interface



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Description

Multicontroller E 0-100% for adjustment of output signal (0-10V) from 0 to 100% or on/off.

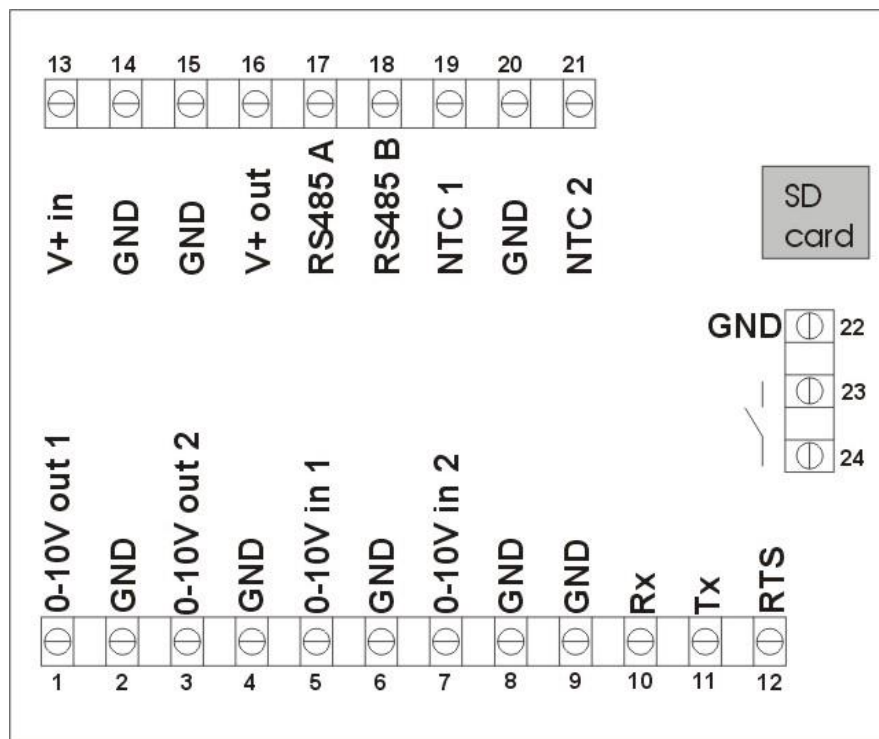
The integrated scheduler function allows for individual adjustment of the output signal with up to 10 shifts per day. Clock with integrated battery backup. RS-485 interface with MODBUS® protocol function facilitating connection to network system.

Built-in quick guide for easy setting up and adjustment. Integrated micro SD card reader for easy updating of software.

1 Mounting

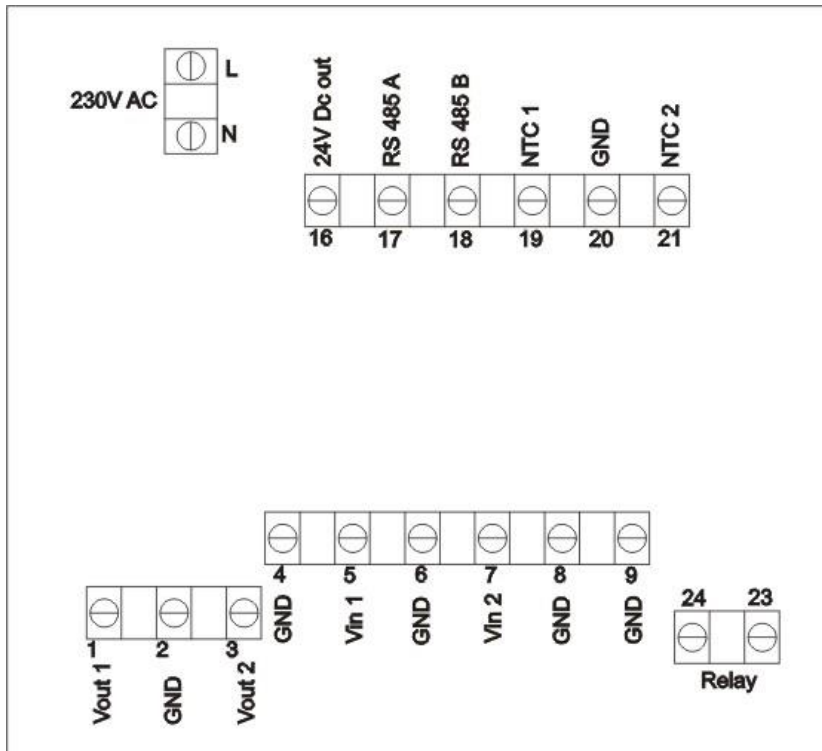
MultiController E 0-100% is mounted according to the general applicable installation rules in the low voltage directive. The unit is to be carefully fixed on a plane and stable surface with screws in the 2 ovale holes. The unit is not to be fixed on moving or vibrating surfaces. Avoid exposure to high temperatures and direct sunlight on the unit. If long connection cables are used, ensure that the unit is not disturbed by electromagnetic interference.

Terminal connections 24V version



Terminal no.	Description	Comments
1 and 2 (Vout1)	0-10V output 1	Load max 10mA
13 and 14	Connection of power supply	15-30VDC or 24VAC
15 and 16	Power supply of auxiliary outlet	As terminals 13 and 14
15,17 and 18	RS 485 Modbus	
2,4,6,8,9,14,15,20,22	0V	
23 and 24	Voltage free contact. Function depending on choice of model	24VDC NO, 3A AC1

Terminal connections 230V version






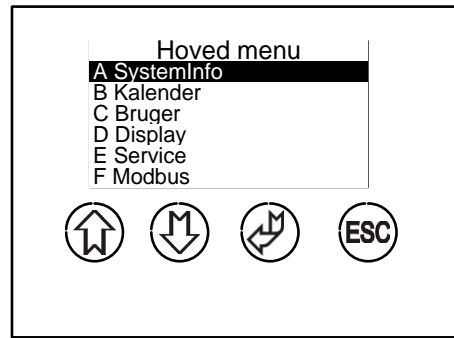
Terminal no.	Description	Comments
1 and 2 (Vout1)	0-10V output 1	Load max 10mA
L and N	Connection of power supply	230V AC $\pm 10\%$
16	24V power output	+24VDC max 100mA
17 and 18	RS 485 Modbus	
2,4,6,8,9,20	0V, GND	
23 and 24	Voltage free contact. Function depending on model	5A-AC1, 250VAC

2 Functions




2.1 User interface

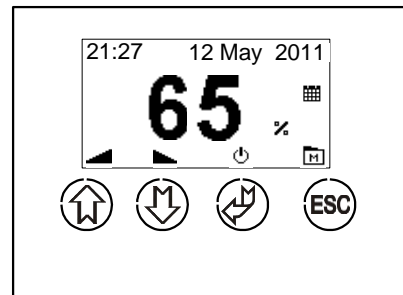
The display is operated by push buttons. The general function of each button is shown below.

Icon	Function
	Enter
	Increase / step up
	Decrease / step down
ESC	Escape, cancel



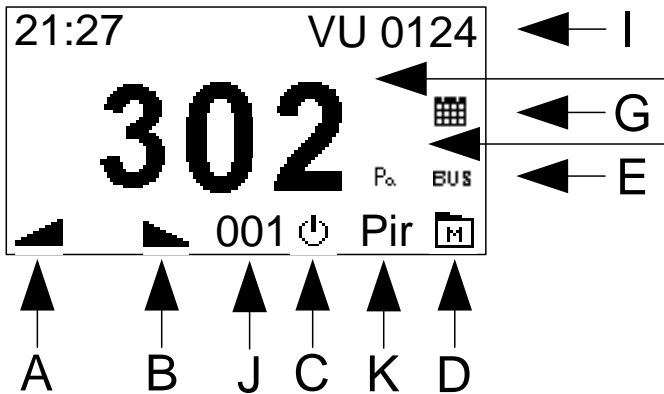
Shortcuts are available in the main window. They are indicated by an icon above the button.

Icon	Function
	Enter
	Increase
	Decrease
ESC	Go to menu



2.2 Main window

In the main menu the current start level and status of the enabled functions are displayed (scheduler and Modbus). The icons at the bottom of the display indicate the function of the buttons.



- A) By pressing "arrow up" the level of the output signal is increased.
- B) By pressing "arrow down" the level of the output signal is decreased.
- C) By pressing "On/Off" the output signal changes between On and Off.
- D) By pressing "menu" the displayed window changes to the main menu window.
- E) Icon indicating that Modbus communication is enabled.
- F) Icon indicating that the output signal is adjusted in percentage.
- G) Icon indicating that the scheduler function is enabled.
- H) Level of current output signals.
- I) Display of time and date and, if applicable, plant name / alarm (optional).
- J) Display of extended operation in minutes (if enabled)
- K) Display of PIR operation (motion sensor) if enabled.

2.3 Quick set-up:

The first time the controller is connected to power, the function of the controller is selected: Subsequently the operation parameters will be adjusted to a standard set-up. A new quick set-up can be done by resetting the unit (D4).

01 ON/Off: For change between two levels (low/high). Both voltage levels are adjustable.

E.g.: 0,0/10V 3,5/8,0V etc. Press Enter to change level or use the integrated scheduler. Relay output is closed = "ON"

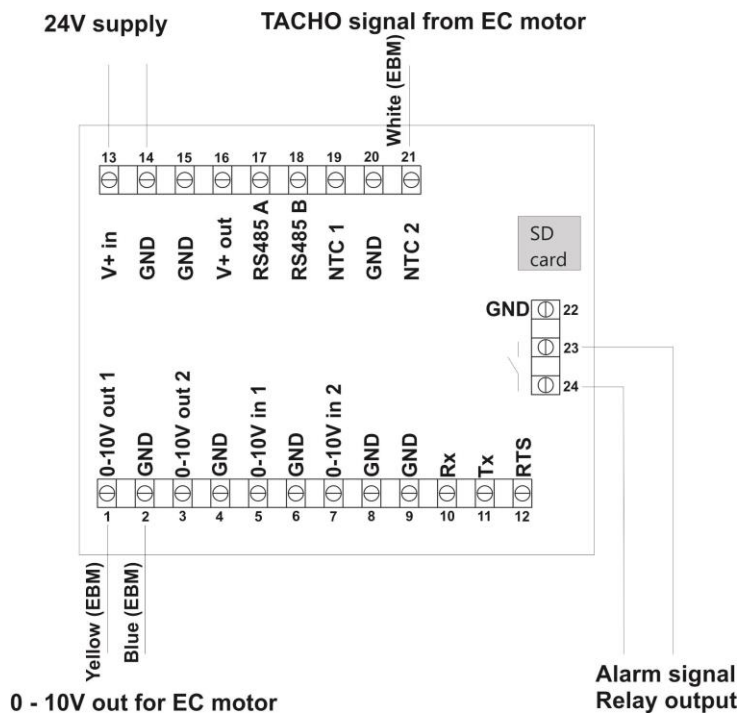
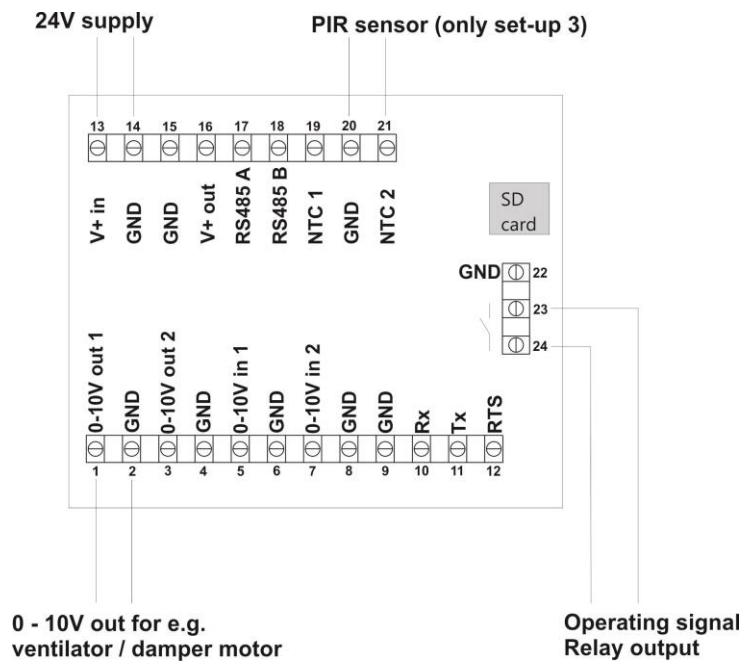
02 0-100%: For stepless level adjustment by pressing "arrow up" and "arrow down". The integrated scheduler function is able to change between 3 operation levels: Stop – Normal setpoint – Alternative setpoint. The relay out closes when the voltage level is higher than the selected level (normally at 0.1V, i.e. the relay operates as an operation relay).

03 0-100% + PIR: Function as 02, but instead of the scheduler function, a PIR motion sensor is used to change between two operation levels. In PIR mode the scheduler function is not available.

04 0-100% + Tacho: For use with EC motors with Tacho signal (rotation alarm). Function as 02 and in addition a missing Tacho signal will activate an alarm text in the display.

Set-up of 01 (ON/OFF), 02 (0-100%) and 03 (0-100%+PIR):

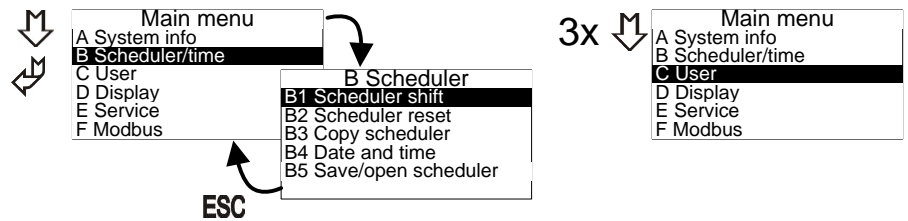
Set-up of 04 (0-100% +Tacho)



2.4 Menu structure:

The menu is operated by 4 buttons. The function of the individual button is indicated on the button. The menu consists of a main menu with submenus. Configuration parameters are accessed from the submenus. Automatic time out from menu, if the buttons have not been activated for 2 minutes.

Example – menu operation:



Different pop up boxes are available for editing of mode parameters.

Arrow up and arrow down are used for editing of values. The cursor is moved by activating the Enter key. After the last figure, the value is saved by pressing Enter. Esc to cancel editing without saving it.

Time

↓

18 : 45

2.5 Main menu and submenus

The submenus, A – F, are accessible from the main menu.

2.6 System information (A menu)

In this menu the controller input and output signals and current operating data are displayed. The window is updated approx. every 5 seconds.

Information		Information	
01 I-ntc	: 21.4	07 Vin1	: 3.2
02 Ntc1	: 23.4	08 Vin2	: 7.4
03 Ntc2	: -13.7	09 Rel	: 1
04 Vout1	: 2.1	10	:
05 Vout2	: 8.6	11	:
06 PID	: 564	12	:

- 01: I-NTC temperature measured with internal sensor
- 02: NTC1 Not in use
- 03: NTC2 Not in use
- 04: VIN1C Not in use
- 05: VIN2C Not in use
- 06: REL Relay position OFF = open switch ON= closed switch (terminals 23+24)
- 07: VIN1 Measured input signal on VIN1 input (terminals 5+6)
- 08: VIN2 Measured input signal on VIN2 input (terminals 7+8)
- 09: VOUT1 Output signal on VOUT1 (terminals 1+2)
- 10: VOUT2 Output signal on VOUT2 (terminals 3+4)
- 11: PID1 Not in use
- 12: PID2 Not in use

2.7 Scheduler menu (B menu):

The integrated scheduler function is a week scheduler with 10 shifts per day. The scheduler function is enabled / disabled in the user menu (menu point C3). An icon in the main window indicates the current scheduler status.

Main menu	
A System info	
B Scheduler/time	
C User	
D Display	
E Service	
F Modbus	

B Scheduler	
B1 Scheduler shift	
B2 Scheduler reset	
B3 Copy scheduler	
B4 Date and time	
B5 Save/open scheduler	

B1:

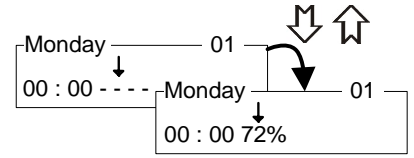
Setpoint, hour and minute are set for the shift.

The scheduler shifts when the event shift time is reached, and an icon in the main window indicates if the scheduler function is enabled.

It is still possible to manually edit the setpoint in the main window (if the safety level is 0 or 1), but at the next event shift, the scheduler will revert to the settings.

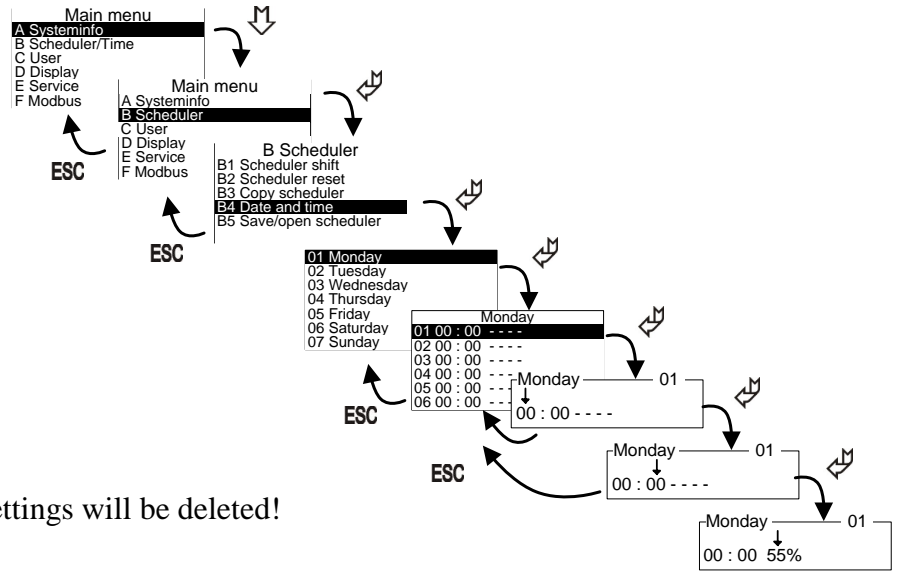
An event is enabled if the starting level is different from - - - -.

Example of scheduler shift:



To disable a shift, reset the level to - - - -.

Example of adjustment of scheduler shift:



B2: Scheduler reset.

Use this function to reset the scheduler. All settings will be deleted!

B3:

Copy of scheduler settings from one day to another day. Previous settings will be overridden during copying.

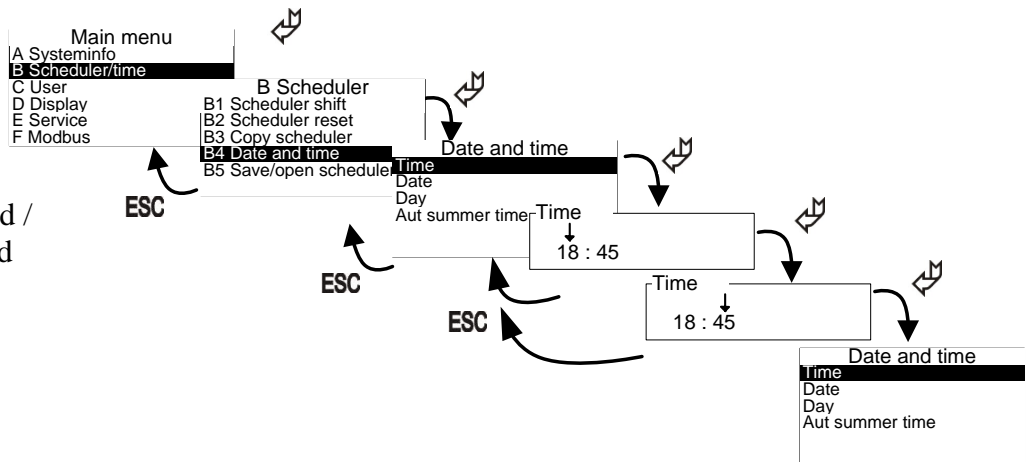
B4: Date and time.

In this menu the time, date and weekday are set.

The clock is a 24 hour clock. Automatic change between summer and winter time is optional.

The clock in the Multicontroller is equipped with a battery back-up to ensure that short power cuts do not affect the clock. In case of longer power cuts (> 72 hours) the clock must be reset.

Example of adjustment of time:



B5: Save / open scheduler.

Save the scheduler to MicroSD card / Open scheduler from MicroSD card

2.8 User menu (C-menu)

The user menu includes the frequently used control configurations.

The below functions can be edited in this menu:

C1: The controller setpoint is adjusted in this menu

This is also the setpoint which the scheduler will use as NORM value.

The setpoint is adjusted in the main window (arrow up/down). This setpoint will, however, only be active until the next event shift from the scheduler or on/off from the main.

C2: Enabling and disabling of integrated scheduler.

Example of enabling of scheduler

C3: From Off position, it is possible to enable a boost on the 0-10V output (e.g. to boost start a large motor). The boost level is adjusted in menu point **E3**. To disable the boost function, set the time to 0 sec.

C4: Safety level are set in this function

0 = Only service menu is password protected

1= All menus are password protected

2= All buttons except Enter (On/Off function) are password protected.

3= All buttons are password protected

C5: Extended operation (number of minutes).

Extended operation is chosen by pressing the Enter key for 3 seconds and then select "ON" by use of the arrow buttons. When the extended operation finishes, the multicontroller will stop ("OFF"), and it will start again when Enter is pressed or when the next scheduler shift occurs.

C6: Setpoint source.

Select the setpoint from the multicontroller or via external control signal on input Vin2.

If "external" is selected, the signal must be defined in **E25-E28**.

C8: Alarm.

If 0 sec is selected, the alarm function is not active. If 1-60 sec is selected, the alarm function is active. The time selected determines how long the alarm setpoint (**E43**) is allowed to be exceeded before the alarm relay (terminals 23-24) opens. Alarm is indicated in the display by "Alarm".

NOTE. If the alarm function is enabled, the normal operation relay function is not available.

C9: Optional plant text. Can be enabled and disabled. (Text is entered in **E44**).

C10: Operation hour counter: In this field the number of months are entered after which time the "service text" will appear (the text is entered in **E45**). The text is visible for 15 seconds and will reappear once a minute until the counter has been reset.

Reset of counter: Press the ESC button for 3 seconds when the "service text" is not visible. Press enter to accept the reset.

2.9 Display menu (D menu)

The display menu includes general configurations. The following functions are displayed / can be edited:

D1: Information on version and model.

D2: Display of language.

Danish, English, Swedish and German is available.

D3: Contrast.

If the text is blurred, the contrast may be adjusted. The changes are displayed immediately.

D4: Factory reset.

Factory reset may have an effect on vital configurations and approval prior to reset is therefore required. Note that scheduler events will also be reset. After reset the multicontroller will restart showing the quick start guide for selection of model and function.

D5: Save / open setpoints. Save setpoints to MicroSD card / open setpoints from MicroSD card.

2.10 Service menu (E menu)

The service menu contains vital configurations. Erroneous adjustment of these configurations may destroy the functionality. This menu is password protected. **The password is 5550**

The following configurations can be edited in the service menu:

E1: Model mode.

In this menu point, the output signal function is selected: percentage % or On/Off.

E2: Minimum output voltage.

If the connected equipment is unable to regulate from 0 Volt, the minimum output signal can be adjusted in this menu point.

E3: Maximum output voltage.

If the connected equipment is unable to regulate up to 10 Volt, the maximum output signal can be adjusted in this menu point.

Note: This level is also the boost level (100%).

E4: Adjustable start level.

The manual start level can be set at 3 different start values.

1) Minimum level.

2) Maximum level.

3) The level the controller was set at when it was last turned off.

Note that this function is only available if the controller mode (menu point **E1**) is set at percentage %.

The boost function (menu point **C3**) has priority over start level.

E5: Inverter output.

It is possible to invert the output in this menu point: e.g. 100% = 0V out / 1%=9.9V out.

E25-E28: These menu points are used for adjustment of the Multicontroller setpoint via an external control signal. In E25/E26 the voltage range is defined. In E27/28 the corresponding min and max voltage signals (in %) are defined.

E25: Minimum voltage that the connected voltage source is able to supply.

E26: Maximum voltage that the connected voltage source is able to supply.

E27: Sensor value at minimum.

The corresponding minimum value in % (e.g. 0V = 0%) of the voltage source at minimum (**E25**) is entered in this menu point.

E28: Sensor value at maximum.

The corresponding maximum value in % (e.g. 10.0V = 100%) of the voltage source at maximum (**E26**) is entered in this menu point.

E42: Selection of sensor input.

External = Not in use **Volt** = Not in use **Alarm** = 20-21(NTC2) is used as alarm input (open signal=alarm) **Tacho** = terminals 20-21 **PIR** = terminals 20-21 (open signal = no movement in the room).

E44: User defined text Name.

A plant name or similar may be entered: E.g. "Plant 4" (Max 12 characters, the text is enabled in **C9**)

E45: User defined text – Operation hour counter.

A service text or similar may be entered: E.g. "It is time for service" (Max 6 lines of 12 characters, the counter is enabled in **C10**)

E46: Alarmlevel Min

At E42= TACHO: Lower limit for tacho signal. Adjustment: If the tacho alarm is activated when motor operates at min rotations, the value must be increased.

At E42=Alarm: If the alarm is activated when the input is connected via an "open collector", the value must be increased. (If the input is connected via relay switch, adjustment is not required).

E47: Alarmlevel Max: Upper limit for tacho signal. Adjustment: If the tacho alarm is activated when the motor operates at max rotations, the value must be increased.

E48: PIR Time. The required operation time delay for the PIR input (in seconds) is entered in this menu point.

2.11 Modbus menu (F menu)

(MODBUS parameter list is available on WWW.LSCONTROL.DK)

MultiController E Regulate is prepared for configuration as Modbus slave. The interface is serial RS485.

The Modbus unit communicates in accordance with the RTU standard with up to 19200Baud.

Note: The data points in the menus can be set from a Modbus master. With exception of F4 which will function as a blocking if editing of the configuration via Modbus is not allowed.

It is possible to edit the following Modbus configurations in the Modbus menu.

F1: Address: Slave address is entered in this menu.

F2: Baudrate: editing of Baudrate options: Off, 9600 and 19200. Modbus is only active, when baudrate is set at 9600 or 19200.

F3: Parity: Parity options are: EVEN, ODD, NONE.

F4: Permits writing from Modbus. Set the configuration at 1 to edit the Modbus master configuration. Note that this parameter cannot be edited in Modbus. It must be edited manually in point F4.

3 Setpoint overview

Name	Factory settings	Min	Max	Unit
C1 Level	50	0	100	%
C2 SchedulerOnOff	0	0	1	On/Off
C3 BoostTime (0-250sec)	5	0	250	Sec
C4 User rights	0	0	3	
C5 Extended operation	10	1	240	Min
C6 Setpoint source	Internal	Internal	External	
C8 Alarm function	0	0	60	Sec
C9 Optional text	OFF	OFF	ON	
C10 Operation hour counter	0	0	12	Months
E1 Mode (1=ON/OFF 2=0-100%)	1	1	2	On/Off
E2 OutputMin (0-5V)	0	0	50	Volt 50 = 5.0V
E3 OutputMax (5-10V)	100	50	100	Volt 50 = 5.0V
E4 OutputStart (1=min 2=Max 3=Last)	3	1	3	
E5 Inverter output	OFF	OFF	ON	
E25 Min Input2	0.0	0.0	10.0	Volt
E26 Max Input2	10.0	0.0	10.0	Volt
E27 Sensor 2 value min	0	0	100	%
E28 Sensor 2 value max	0	0	100	%
E42 TempSensor2 select (External=NTC2 Volt=Vin2, Alarm=Vin2 + Alarm via NTC2) Tacho= signal via NTC2 PIR= signal via NTC2)	External			
E44 User text Name				
E45 User text Counter				
E46 Alarm Level Min	10	0	50	
E47 Alarm level Max	60	50	100	
E48 PIR Time	600	1	3600	Sec
F3 Modbus Parity (1=EVEN 2=ODD 3=NONE)				
F4 ModbusAllowWrite	1	1	3	Data

4 Technical specifications

	24V version	230V version
Power supply	15-30VDC or 24VAC +-15%	230V AC ±10%
Mains	Max 1A	13A
Power consumption	Max 2.4W	Max <1W
Enclosure	IP 40	IP 40
Dimensions (hxwx d)	LSBOX85: 33x85x85 mm DIN rail: 45x85x120 mm Panel: 100x100x65 mm (hole: 91x91 mm)	
Operation Temperature	0 - 60 °C	0 - 50 °C
Relay	24VDC NO, 3A AC1.	5A-AC1, 250VAC NO, 150W / 1150VA
0-10VDC input1 (Vin1)	7k Ohm input impedance	
0-10VDC input2 (Vin2)	7k Ohm input impedance	
0-10VDC output1 (Vout1)	0-10,0V DC Max 10mA	
0-10VDC output2 (Vout2)	0-10,0V DC Max 10mA	
RS-485	Channel A and B	
SD card	MicroSD, max size 2 Gb	
Jumper	120 Ohms termination RS-485	

5 Product codes

Product codes	24 V version	230V version
LS BOX 85	43401	43405
Din rail	43411	43415
Panel mounting	43421	43425

6 Applied standards

EN 61000-6-1 and EN 61000-6-3 Electromagnetic Compatibility (EMC)
EN-60335-1 The Low Voltage Directive

Drawing: 949-205916_ MultiController_E_0-100%_ UK

Date: 13-11-2013

Rev.: 2.2

Software version: Program 2.2 Sub 11

Drawn by: UP

Manufactured by: LS Control A/S

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