EMKO

PROCESS CONTROL UNIT
ESM-4435

CE EAC

ESM 4435
Universal Input PID Process Controller
- 4 digits process (PV) and 4 digits process set value (SV) display
- Universal process Input (TC, RTD, mV ⎓, V ⎓, mA ⎓)
- Dual or multipoint calibration for ⎓Voltage / Current input
- Configurable ON/OFF, P, PI, PD ve PID control forms
- Adaptation of PID coefficients to the system with Auto-tune and Self-tune
- Manual/Automatic mode selection for control outputs
- Bumpless transfer
- Programmable heating,cooling and alarm functions for control outputs

SPECIFICATIONS

PROCESS INPUT

Universal Input: TC, RTD, ⎓ Voltage / Current
Thermocouple(TC): L(DIN 43710) ,J , K , R , S , T , B , E and N (IEC584.1)(ITS90) ,C (ITS90)
Thermoresistance (RTD): PT-100 (IEC751)(ITS90)
⎓ Voltage/ Current Input Types: Selectable by parameters.
0...50mV ⎓ ,0...5V ⎓ ,0...10V ⎓ or 0...20mA ⎓,4...20mA⎓
Measurement Range: Please refer to Table-1 for selection of input type and scale.
Accuracy:± 0,25% of full scale for thermocouple, thermoresistance and voltage,± 0,70% of full scale for current.
Cold Junction Compensation: Automatically ±0.1°C/1°C.
Line Compensation: Maximum 10 Ohm.
Sensor Break Protection: Upscale.
Sampling Cycle: 3 samples per second.
Input Filter: 0.0 to 900.0 seconds.

CONTROL

Control Form: ON/OFF, P, PI, PD or PID (Control form can be programmed by the user.)

OUTPUT

Standard Relay Outputs :3 pieces 5A@250V~ (at resistive load) (They can be programmed as Control or Alarm output) (Electrical Life : 100000 operation(Full Load))
Analog Output : 0/4 to 20 mA or 0/2 to 10V ⎓

SUPPLY VOLTAGE AND POWER

100-240 V ~ 50/60 Hz (-15%;+10%) -6VA
48V ⎓ (-15% ; +10%) -6W
24V ~ 50/60 Hz (-15% ; +10%) -6VA
24V ⎓ (-15% ; +10%) -6W
(Must be determined in order.)

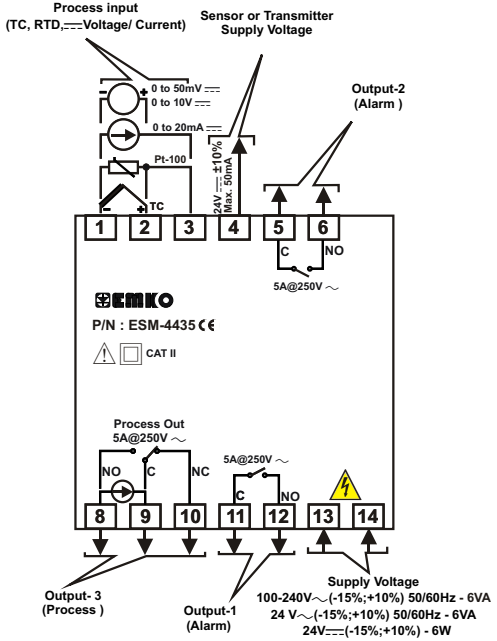
DISPLAY

Process Display :
ESM-4435 : 10.1 mm Red 4 digits LED display
Set Value Display:
ESM-4435 : 8 mm Green 4 digits LED display
LEDS : AT (Auto Tune),M (Manual Mode), A (Automatic Mode), PSET / ASET1 / ASET2 (Control or Alarm Set) , PO, AO1, AO2 (Control or Alarm Status) , °C /°F / V LEDS.

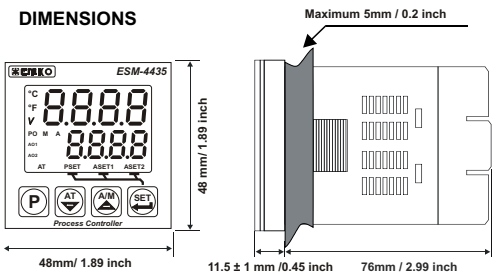
ENVIRONMENTAL RATINGS and PHYSICAL SPECIFICATIONS

Operating Temperature: 0...50°C
Humidity : 0-90%RH (none condensing)
Protection Class: IP65 at front, IP20 at rear
Weight:ESM-4435 : 170 gr.
Dimensions: ESM-4435 : (48 x 48mm, Depth:87.5 mm)
Panel Cut-Out:ESM-4435 : (46 x 46mm)

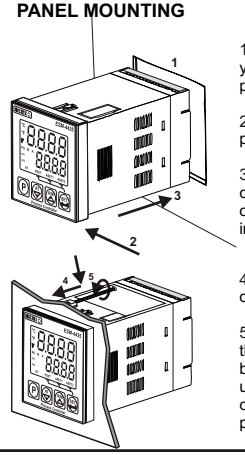
Electrical Wirings



DIMENSIONS



PANEL MOUNTING



1-Before mounting the device in your panel, make sure that the panel cut-out is suitable.

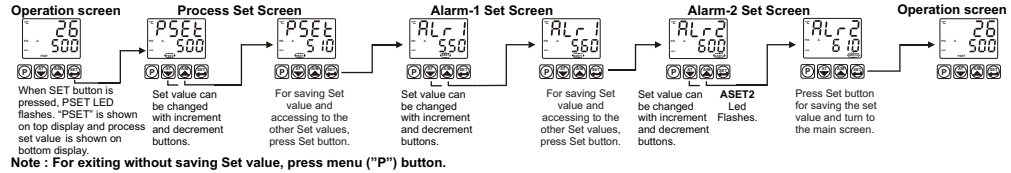
2-Check front panel gasket position

3-Insert the device through the cut-out. If the mounting clamp are on the unit, put out them before inserting the unit to the panel.

4-Insert the unit in the panel cut-out from the front side.

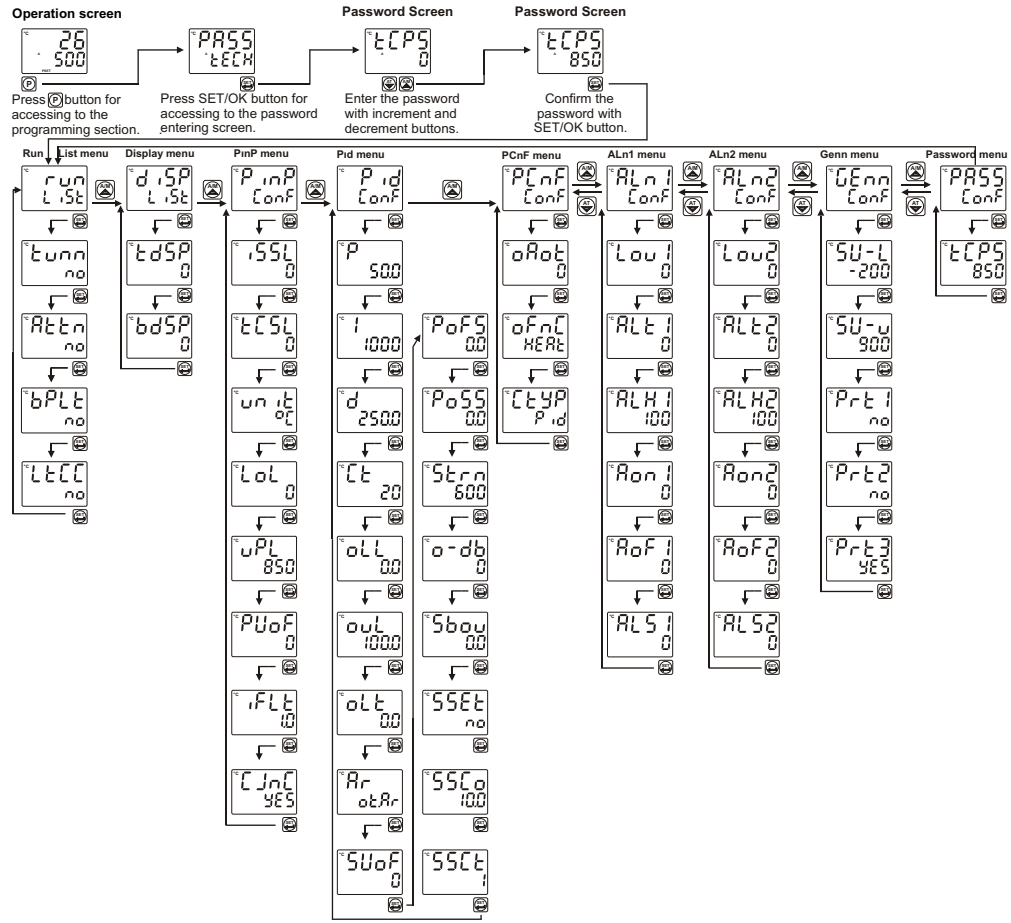
5-Insert the mounting clamps to the holes that located top and bottom sides of device and screw up the fixing screws until the unit completely immobile within the panel.

Adjustment of Process and Alarm Set Values



Note : For exiting without saving Set value, press menu ("P") button.

Easy Access Diagram For Program Parameters



Run LiSt: Selection of PID Tune and Operation Form

TUNE SELECTION:
By selecting one of the methods below, device can determine the PID parameters.

- no Device operates according to the defined PID.
- AtUn **Auto tune** (Limit Cycle Tuning) operation.
- StUn **Self tune** (Step Response Tuning) operation.
- AtSE **Auto-Self Tune** Self Tune operation is performed, if the conditions are realized when power on firstly.

AUTOMATIC TUNE SELECTION

- no Device does not perform tunning.
- YES Device does perform tunning.

BUMPLESS TRANSFER

- no Process output value in manual control is not taken into consideration while passing from manual control to automatic control. New control output that is measured in automatic control is applied to process output.

yES Last % process output value in automatic control is accepted as process output value of manual control and manual control continues to run.

LtCC ALARM LATCH CANCELING

no Alarm latch canceling is not performed.

yES If there is an alarm output with latching and there is no alarm status, latching operation will be finished by the device. When it is finished, this parameter becomes no Automatically.

dISP LiSt: Function Selection for Top and Bottom Display

tdSP It defines the function of the top display. This parameter determines which value is shown in top display.

0 Process value (PV) is shown in top display.

1 Difference between process set value and process value(SV-PV) is shown in top display.

bdSP It defines the function of the bottom display. This parameter determines which value is shown in bottom

0 Process set value (SV) is shown in bottom display.

1 % Output value that is applied to process control output is shown in bottom display.

PInP ConF:Process Input Type and Relevant Parameters

iSSL Process Input Type

0 TC Process Input Type

1 RTD input type selection

2 ⎓Voltage / Current input type selection.

tCSL TC Input Selection
This parameter is active if TC input type is selected.

0 L (-100°C;850°C) or (-148°F;1562°F)
1 L (-100.0°C;850.0°C) or (-148.0°F;999.9°F)
2 J (-200°C;900°C) or (-328°F;1652°F)
3 J (-199.9°C;900.0°C) or (-199.9°F;999.9°F)
4 K (-200°C;1300°C) or (-328°F;2372°F)
5 K (-199.9°C;999.9°C) or (-199.9°F;999.9°F)
6 R (0°C;1700°C) or (32°F;3092°F)
7 R (0.0°C;999.9°C) or (32.0°F;999.9°F)
8 S (0°C;1700°C) or (32°F;3092°F)
9 S (0.0°C;999.9°C) or (32.0°F;999.9°F)
10 T (-200°C;400°C) or (-328°F;752°F)
11 T (-199.9°C;400.0°C) or (-199.9°F;752.0°F)
12 B (44°C;1800°C) or (111°F;3272°F)
13 B (44.0°C;999.9°C) or (111.0°F ; 999.9°F)
14 E (-150°C;700°C) or (-238°F;1292°F)
15 E (-150.0°C;700.0°C) or (-199.9°F;999.9°F)
16 N (-200°C;1300°C) or (-328°F;2372°F)
17 N (-199.9°C;999.9°C) or (-199.9°F;999.9°F)
18 C (0°C;2300°C) or (32°F;3261°F)
19 C (0.0°C;999.9°C) or (32.0°F;999.9°F)

rtdS RTD Input Selection
This parameter is active if RTD input is selected.

0 PT-100 (-200°C ; 650°C) or (-328°F ; 1202°F)
1 PT-100 (-199.9°C ; 650.0°C) or (-199.9°F ;999.9°F)

uASL ⎓Voltage / Current Input Selection
This parameter is active if ⎓Voltage/Current is selected.

0 0...50mV ⎓ (-1999 ; 9999)
1 0...5V ⎓ (-1999 ; 9999)
2 0...10V ⎓ (-1999 ; 9999)
3 0...20mA ⎓ (-1999 ; 9999)
4 4...20mA ⎓ (-1999 ; 9999)

dPnt Display Point Position
Active if ⎓Voltage / Current input is selected.

0 Not point.
1 Between first and second digits “0.0”
2 Between second and third digits “0.00”
3 Between third and fourth digits “0.000”

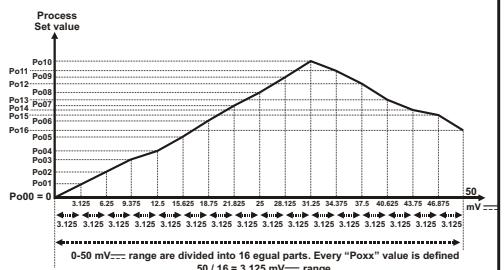
uCAL Display Value Adjustment Type
Active if ⎓Voltage / Current input is selected.

0 Fixed dual point display adjustment. Display adjustment low point value is fixed to -1999, display adjustment high point value is fixed to 9999.
1 User can do dual point display adjustment with tPoL and TPoH.
2 User can do defined 16 display adjustment points.

tPoL Low Point Display adjustment (-1999, 9999)Unit
Active if ⎓Voltage / Current input is selected.

tPoH High Point Display adjustment (-1999, 9999)Unit
Active if ⎓Voltage / Current input is selected.

Po00 ... Po 16 Display adjustment points (-1999, 9999)Unit
Active if ⎓Voltage / Current input is selected.
In multipoint display adjustment operation, defined scale is divided into 16 adjustment points.
For example :uASL is 0 (0-50mV) .



CoEF Coefficient value (1.000, 9.999)
Process value is multiplied with this value.
Active if ⎓Voltage / Current input is selected.

unit Unit selection

°C Unit is °C
°F Unit is °F
U Unit is Voltage. Active if ⎓Voltage/Current input is selected.
- No unit. Active if ⎓Voltage / Current input is selected.

toL Minimum value of operating scale. It can be changed according to input type and scale of the process.

uPL Maximum value of operating scale. It can be changed according to input type and scale of the process.

PUoF Display offset for process value.It can be adjusted -10 % to +10 % of scale. The defined value is added to process value.

iFLt Defines filter time for input signal. It can be adjusted from 0.0 to 900.0.

CJnC It is active if process input is selected TC input. It decides if cold junction compensation is active or not.

yES Cold junction compensation is active.
no Cold junction compensation is not active.

PId ConF: PID Configuration Parameters

P PROPORTIONAL BAND (0.0% , 999.9%)
If uPL = 1000 °C, toL = 0 °C and P = 50.0 then,
Proportional Band = (uPL - toL) * P / 100.0
Proportional Band = (1000-0)*50.0/100.0 = 500 °C

I INTEGRAL TIME (0, 3600)Second
It can be changed by the user. When Tune operation stops, it can be changed by the device. If it is 0, integral control part does not run. When tune operation stops if this parameter is 0, this parameter can not be changed because of integral control part does not run.

d DERIVATIVE TIME (0.0, 999.9)Second
It can be changed by the user. When Tune operation stops, it can be changed by the device. If it is 0, derivative control part does not run. When tune operation stops if this parameter is 0, this parameter can not be changed because of derivative control part does not run.

Ct CONTROL PERIOD TIME (1, 150)Second
Process output period time.

oLL MINIMUM CONTROL OUTPUT (0.0% ouL)
It is % of minimum output.
Even as a result of the PID calculation device calculates the % output value less than this parameter, heating or cooling output is active minimum for OLL parameter.

ouL MAXIMUM CONTROL OUTPUT (oLL , 100.0%)
It is % of maximum output.
Even as a result of the PID calculation device calculates the % output value greater than this parameter, heating or cooling output is active maximum for OUL parameter.

oLt MINIMUM CONTROL OUTPUT TIME (0.0 sec , Ct)
Heating or cooling output can not be active less than this parameter. Even if this parameter is 0, this parameter is accepted 50 msecs for security.

Ar ANTI-RESET WINDUP (0, SCALE HIGH POINT)Unit
While PID operation is running if
PSEt - Ar <= process value <= PSEt + Ar
condition is true, integral value is calculated. If the condition is not true, integral value is not calculated and last calculated integral value is used.
If Ar Parameter is selected otAr, heating proportional band is used for heating PID process instead of Ar Parameter and cooling proportional band is used for cooling PID process instead of Ar Parameter.

SUoF SET VALUE OFFSET
((-SCALEHIGH POINT / 2) , (SCALE HIGH POINT / 2))Unit
PSEt + SUoF is used as set value in PID calculations. It is used for shifting the proportional band.

PoFS PID OUTPUT OFFSET
(FOR HEATING PID 0.0, 100.0)%
(FOR COOLING PID -100.0, 0.0)%
This parameter is added to “Output %” which is calculated at the end of the PID.

PoSS OUTPUT OFFSET RELATED TO PID SET
(FOR HEATING PID 0.0, 100.0)%
(FOR COOLING PID -100.0, 0.0)%
This parameter is added to the % process output that is calculated at the end of the PID according to process set value.
PoSS * PSEt / (uPL - toL)

Strn PROCESS VALUE STABILIZATION
(1, SCALE HIGH POINT)Unit
It is used for controlling if process value oscillates or not when tunn parameter is AtUn or AtSt if;
PSEt - Strn <= Process Value <= PSEt + Strn condition is not true, then device start tune operation automatically.

SCALE LOW POINT: Minimum process input value in Pt -100 and TC inputs. -1999 for fixed dual point display adjustment used inputs, Scale low point is the lowest one from tPoL or tPoH for selectable dual point display adjustment used inputs display adjustment scale low point is the lowest one from Po00 or Po 16 for multipoint used inputs.
SCALE HIGH POINT: Maximum process input value in Pt-100 and TC inputs. 9999 for fixed dual point display adjustment used inputs, Scale high point is the biggest one from tPoL or tPoH for selectable dual point display adjustment used inputs display adjustment scale high point is the biggest one from Po00 or Po 16 for multipoint used inputs.

o-db PROPORTIONAL BAND SHIFTING
((-SCALE HIGH POINT / 2), (SCALE HIGH POINT / 2))Unit
If cooling function is performed ; Cooling process set value is calculated by adding set value PSEt with parameter o-db Control form can be ON/OFF or PID.

If set value for heating = PSEt + SUoF then
Set value for cooling = PSEt + SUoF + o-db

Sbou SENSOR BREAK OUTPUT VALUE
(FOR HEATING PID 0.0, 100.0)%
(FOR COOLING PID -100.0, 0.0)%
When sensor breaks, controlling of the process can continue by entering % output value to Sbou parameter.
If this parameter 0.0,process control output does not perform an output when sensor breaks.

SSEt Soft Start Set value
It can be adjusted from 0 to 9999 with increment and decrement buttons. If parameter is selected no, Soft start function becomes inactive.
When the device power on, if the Soft start set value different from no and temperature value is lower than soft start value on processes, device starts soft start operation,until temperature reaches soft start set value. On soft start device output period will be SSCt parameter value and device control output will be SSCo parameter value.

SSCo Soft Start Control Output
It can be adjusted from %10 to %90 with increment and decrement buttons.

SSCt Soft Start Control Period
It can be adjusted from 1 to 100 sec with increment and decrement buttons.

PCnF ConF: Process Output Configuration Parameters

oAot It determines output functions of Process Outputs
If Process Output is chosen Current Output, then oAot parameter is shown and CtyP Parameter can be adjust only PID mode.
If Process Output is chosen Relay Output, then oAot parameter is invisible.

0 0-20 mA Output
1 4-20 mA Output

oFnC It determines output functions of Process Outputs

HEAt Heating
Cool Cooling

CtyP It determines control algorithms of Process Outputs

onoF ON/OFF control algorithm.
Pid PID control algorithm.

HYS Hysteresis value of Process Outputs.
It can be adjusted from 0% to 50% of full scale.(It is active if ON/OFF control is selected.)

HYn It determines operation form of hysteresis
(It is active if ON/OFF control is selected.)

0 SV + HYS/2 and SV - HYS/2
1 SV and SV+HYS or SV and SV-HYS

oFFt In ON/OFF operation, this time must be passed for the output to be energised again.It can be adjusted from 0.0 to 100.0 seconds.(It is active if ON/OFF control is selected.)

Aln1 ConF: ALARM Output-1 Configuration Parameters

Lou1 **Logic Output-1**

It determines logic output function for Alarm Output-1.

- 0 Alarm output
- 1 Manual /Automatic data output
- 2 Sensor break alarm output
- 3 Output is active when the process value is out of the band which is defined with minimum value of operating scale LoL And maximum value of operating scale uPL

Alt1 **Alarm-1 Type**

It determines alarm type for Alarm-1 Output. It is active if logic output function of Alarm Output-1 is alarm output.

- 0 Process high alarm.
- 1 Process low alarm.
- 2 Deviation high alarm.
- 3 Deviation low alarm.
- 4 Deviation band alarm.
- 5 Deviation range alarm.

AlH1 **Alarm- 1 hysteresis value.**
It can be adjusted from 0 % to 50 % of process input scale. (LoL - uPL) It is active if logic output function of Alarm Output-1 is alarm output.

Aon1 **Alarm on delay time for Alarm Output-1.**
It can be adjusted from 0 to 9999 seconds. It is active if logic output function of Alarm Output-1 is alarm output.

AoF1 **Alarm off delay time for Alarm Output-1.**
It can be adjusted from 0 to 9998 seconds. When the value is bigger than 9998, LtCH is seen on the screen. It means alarm latching output is selected. Logic output function of Output-1 if is selected as Alarm ,AoF1 parameter will be activated.

ALS1 **Alarm stabilisation time for Alarm Output-1.**
It can be adjusted from 0 to 99 second.Logic output function of Output-1 is selected as Alarm ,ALS1 parameter will be activated. After the unit is power-on and Alarm Stabilisation Time is expired, Alarm Output-1 becomes active when the alarm conditions realised in Alt1 parameter.

Aln2 ConF: Alarm-2 Output Configuration Parameters

(i) "Aln2 Conf" Menu is accessible if oCnF parameter in "PCnF ConF" is 0

Lou2 **Determines logic output function for Alarm-2 Output.**

- 0 Alarm output
- 1 Manual /Automatic selection output
- 2 Sensor break alarm output
- 3 Output is active when the process value is out of the band which is defined with minimum value of operating scale LoL and maximum value of operating scale uPL

Alt2 **Determines Alarm type for Alarm-2 Output.**

It is active if logic output function of Alarm Output-2 is alarm output.

- 0 Process high alarm.
- 1 Process low alarm.
- 2 Deviation high alarm.
- 3 Deviation low alarm.
- 4 Deviation band alarm.
- 5 Deviation range alarm.

AlH2 **Alarm- 2 hysteresis value.**

Active if logic output function of Alarm-2 Output is alarm output.

Aon2 **Alarm on delay time for Alarm Output-2.**
It can be adjusted from 0 to 9999 seconds. It is active if logic output function of Alarm Output-2 is alarm output.

AoF2 **Alarm off delay time for Alarm Output-2.**
It can be adjusted from 0 to 9998 seconds. When the value is bigger than 9998, LtCH is seen on the screen. It means alarm latching output is selected. It is active if logic output function of Alarm Output-2 is alarm output.

ALS2 **Alarm stabilisation time for Alarm Output-2.**
It can be adjusted from 0 to 99 second. Logic output function of Output2 if is selected as Alarm ,ALS2 parameter will be activated. After the unit is power-on and Alarm Stabilisation Time is expired, Alarm Output-2 becomes active when the alarm conditions realised in Alt2 parameter.

Gen ConF: General Parameters

SU-L **Process Set Value Low Limit** (LoL , SU-U)Unit

SU-U **Process Set Value Up Limit** (SU-L , uPL)Unit

Prt1 **Alarm Set Values Protection**

- no Alarm Set values can be changed.
- YES Alarm Set values can not be changed. Alarm set values Parameters (Alr1 and Alr2) are not accessible.

Prt2 **AUTO / MANUAL Selection Button Protection**

- no Auto or Manual selection is possible with A/M button in Main Operation screen.
- YES Auto or Manual selection is not possible with A/M button in Main Operation screen.

Prt3 **AT (AUTO TUNE) Button Protection**

- no Limit Cycle Tuning operation can be active or inactive with AT(Auto Tune) Button in Main Operation screen.
- YES Limit Cycle Tuning operation can not be active or inactive with AT(Auto Tune) Button in Main Operation screen.

PASS ConF: Technician Password

tCPS **Technician Password (0, 9999)**

It is used for accessing to the technician parameters.
It can be adjusted from 0 to 9999.

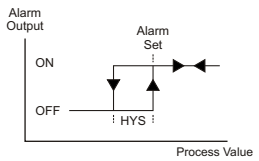
If it is 0 ; there is no password protection while entering to the technician parameters.

If this parameter is different from " 0" and user wants to access to the technician parameters;
1- If technician does not enter tCPS password correctly: It turns to operation screen without entering to technician parameters.

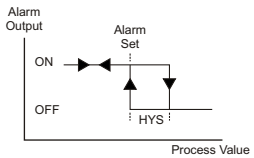
2- When tCPS in top display and 0 in bottom display, if technician presses SET button without entering password (For observing parameter)
Technician can see all menus and parameters except Technician Password menu ("Pass Conf"), but parameters can not be changed.

Alarm Types

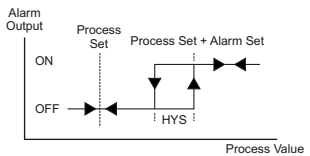
Process high alarm



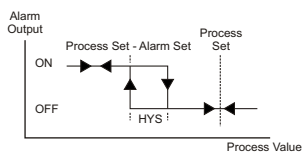
Process low alarm



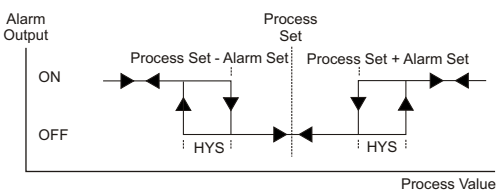
Deviation high alarm



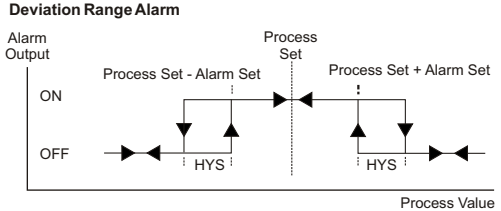
Deviation low alarm



Deviation Band Alarm



Deviation Range Alarm

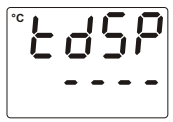


Failure Messages in ESM- 4435 Process Controllers

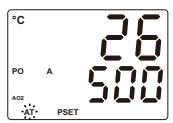
1 - Sensor failure in analogue inputs. Sensor connection is wrong or there is no sensor connection.

2- If value on top display blinks : If analogue input value is less than minimum value of operating scale LoL Value on the top display starts to blink.

3- If value on top display blinks : If analogue input value is bigger than maximum value of operating scale uPL top display starts to blink.



4- If technician password is different from "0" and technician accesses to the parameters by Set button without entering the technician password and wants to change a parameter, device does not allow to do any changes in parameters. If increment or decrement button is pressed, a warning message will appear on the bottom display as shown on the left.



5- If tuning operation can not be completed in 8 hours, AT led starts to blink. Blinking can be canceled by pressing Enter button.

6- If user does not do anything for 120 seconds while device is on technician menus, device turns to operation screen.

Installation

Before beginning installation of this product, please read the instruction manual and warnings below carefully.

In package ,
-One piece unit
-Two pieces mounting clamp
-One piece instruction manual

A visual inspection of this product for possible damage occured during shipment is recommended before installation. It is your responsibility to ensure that qualified mechanical and electrical technicians install this product.
If there is danger of serious accident resulting from a failure or defect in this unit, power off the system and the electrical connection of the device from the system.
The unit is normally supplied without a power switch or a fuse. Use power switch and fuse as required.
Be sure to use the rated power supply voltage to protect the unit against damage and to prevent failure.
Keep the power off until all of the wiring is completed so that electric shock and trouble with the unit can be prevented.
Never attempt to disassemble, modify or repair this unit. Tampering with the unit may results in malfunction, electric shock or fire.
Do not use the unit in combustible or explosive gaseous atmospheres. During the equipment is putted in hole on the metal panel while mechanical installation some metal burrs can cause injury on hands, you must be careful.
Montage of the product on a system must be done with it's mounting clamp. Do not do the montage of the device with inappropriate mounting clamp. Be sure that device will not fall while doing the montage.
It is your responsibility if this equipment is used in a manner not specified in this instruction manual.

Warranty

EMKO Elektronik warrants that the equipment delivered is free from defects in material and workmanship. This warranty is provided for a period of two years. The warranty period starts from the delivery date.

This warranty is in force if duty and responsibilities which are determined in warranty document and instruction manual performs by the customer completely.

Maintenance

Repairs should only be performed by trained and specialized personnel. Cut power to the device before accessing internal parts. Do not clean the case with hydrocarbon-based solvents (Petrol, Trichlorethylene etc.). Use of these solvents can reduce the mechanical reliability of the device. Use a cloth dampened in ethyl alcohol or water to clean the external plastic case.

Other Informations

Manufacturer Information:
Emko Elektronik Sanayi ve Ticaret A.Ş.
Demirtaş Organize Sanayi Bölgesi Karanfil Sk. No:6 16369
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Repair and Maintenance Service Information:
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Phone : +90 224 261 1900
Fax : +90 224 261 1912

Ordering Information

ESM-4435 (48x48 DIN 1/16)

A	BC	D	E	/	FG	HI	/	U	V	W	Z
		0	1	/	01		/				

A	Supply Voltage
1	100-240V ~ (-%15;+%10) 50/60Hz
2	24V ~ (-%15;+%10) 50/60Hz or 24V ⎓ (-%15;+%10)
9	48V ⎓ (-%15;+%10)

BC	Input Type	Scale
20	Configurable(Table-1)	**Table-1**

D	Serial Communication
0	None

E	Output-1 (Alarm1)
1	Relay Output (5A@250V~ at resistive load)

FG	Output-2 (Alarm2)
01	Relay Output (5A@250V~at resistive load)

HI	Output-3 (Process)
01	Relay Output (5A@250V~ at resistive load)
04	Current Output((0/4 to 20mA⎓ ; 0/2 to 10V⎓)

Table-1

BC	Input Type (TC)	Scale(°C)	Scale(°F)
21	L ,Fe Const DIN43710	-100°C,850°C	-148°F ,1562°F
22	L ,Fe Const DIN43710	-100.0°C,850.0°C	-148.0°F,999.9°F
23	J ,Fe CuNi IEC584.1(ITS90)	-200°C,900°C	-328°F,1652°F
24	J ,Fe CuNi IEC584.1(ITS90)	-199.9°C,900.0°C	-199.9°F,999.9°F
25	K ,NiCr Ni IEC584.1(ITS90)	-200°C,1300°C	-328°F,2372°F
26	K ,NiCr Ni IEC584.1(ITS90)	-199.9°C,999.9°C	-199.9°F,999.9°F
27	R ,Pt13%Rh Pt IEC584.1(ITS90)	0°C,1700°C	32°F,3092°F
28	S ,Pt10%Rh Pt IEC584.1(ITS90)	0°C,1700°C	32°F,3092°F
29	T ,Cu CuNi IEC584.1(ITS90)	-200°C,400°C	-328°F,752°F
30	T ,Cu CuNi IEC584.1(ITS90)	-199.9°C,400.0°C	-199.9°F,752.0°F
31	B ,Pt30%Rh Pt6%Rh IEC584.1(ITS90)	44°C,1800°C	111°F,3272°F
32	B ,Pt30%Rh Pt6%Rh IEC584.1(ITS90)	44.0°C,999.9°C	111.0°F,999.9°F
33	E ,NiCr CuNi IEC584.1(ITS90)	-150°C,700°C	-238°F,1292°F
34	E ,NiCr CuNi IEC584.1(ITS90)	-150.0°C,700.0°C	-199.9°F,999.9°F
35	N ,Nicrosil Nisil IEC584.1(ITS90)	-200°C,1300°C	-328°F,2372°F
36	N ,Nicrosil Nisil IEC584.1(ITS90)	-199.9°C,999.9°C	-199.9°F,999.9°F
37	C , (ITS90)	0°C,2300°C	32°F,3261°F
38	C , (ITS90)	0.0°C,999.9°C	32.0°F,999.9°F
BC	**Input Type(RTD)**	**Scale(°C)**	**Scale(°F)**
39	PT 100 , IEC751(ITS90)	-200°C,650°C	-328°F,1202°F
40	PT 100 , IEC751(ITS90)	-199.9°C,650.0°C	-199.9°F,999.9°F

BC	Input Type(⎓ Voltage and Current)	Scale
41	0...50 mV ⎓	-1999,9999
42	0...5 V ⎓	-1999,9999
43	0...10 V ⎓	-1999,9999
44	0...20 mA ⎓	-1999,9999
45	4...20 mA ⎓	-1999,9999

All order information of ESM-4435 are given on the table at above. User may form appropriate device configuration from information and codes that at the table and convert it to the ordering codes.
Firstly, supply voltage then other specifications must be determined.
Please fill the order code blanks according to your needs.
Please contact us, if your needs are out of the standards.

~ Symbol means Vac,
⎓ Symbol means Vdc,
≂ Symbol means Vac and Vdc

Thank you very much for your preference to use Emko Elektronik products, please visit our web page to download detailed user manual.
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