



PROCESS INDICATOR UNITS ESM-XX00



ESM-4400, ESM-7700, ESM-9900, ESM-4900

Universal Input Smart output module system Process display units

- 4 digit process (PV) display
- Universal process input (TC, RTD, mV, V, mA)
- Dual or multi point calibration for voltage & current inputs
- Smart output module system
- Programmable Alarm functions
- Process control or re-transmission with 0/4...20 mA Current output module
- RS-232 (standard) or RS-485(Optional) serial communication with Modbus RTU protocol

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)

Input: mV, V, mA

Measurement Range : Please refer to Table-1 for selection of input type and scale

Accuracy: $\pm 0.25\%$ of full scale for thermocouple, thermoresistance, mV, V and mA input.

Cold Junction Compensation: Automatically $\pm 0.1^\circ\text{C}/1^\circ\text{C}$

Line Compensation: Maximum 10 Ohm

Sensor break protection: Upscale

Sampling Cycle: 3 samples per second

Input Filter: 0.0 to 900.0 seconds

OUTPUT

Standard Relay Output: 5A@250V~ (on resistive load)

Output Modules: User can insert 2 output module to the device.

- Relay Output Module

- SSR Output Module (Max. 26mA, Max. 22V~)

- Digital (Transistor) Output Module (Max. 40 mA @ 18V~)

- 0/4...20 mA Current Output Module

POWER SUPPLY

Power Supply Voltage :

100-240V ~ 50/60 Hz (-%15; +%10) -6VA

24V ~ 50/60 Hz (-%15; +%10) -6VA

24V ~ (-%15; +%10) -6W

(It must be determined in order.)

DISPLAY

Process Display :

ESM-4400 : 10.1 mm Red 4 digit LED Display

ESM-4900 : 20.3 mm Red 4 digit LED Display

ESM-7700 : 13.2 mm Red 4 digit LED Display

ESM-9900 : 19 mm Red 4 digit LED Display

LED Göstergeler : °C/°F/V, OP1/2/3 (Output Status) LED.

ENVIRONMENTAL RATINGS AND PHYSICAL SPECIFICATIONS

Operating Temperature: 0...50°C

Humidity: 0-90%RH (non condensing)

Protection Class: IP65 at front, IP20 at rear

Mounting: Type-1 Enclosure Mounting

Installation: Fixed installation Category II

Over Voltage Category: II

Pollution Degree: II, office or workplace, none conductive pollution

Weight:

ESM-4400: 210 gr.

ESM-4900: 260 gr.

ESM-7700: 270 gr.

ESM-9900: 360 gr.

Dimensions / Panel Cut-Out:

ESM-4400 : (48 x 48mm, Depth:116 mm) / (46 x 46mm)

ESM-4900 : (96 x 48mm, Depth:86.5 mm) / (92 x 46mm)

ESM-7700 : (72 x 72mm, Depth:87.5 mm) / (69 x 69mm)

ESM-9900 : (96 x 96mm, Depth:87.5 mm) / (92 x 92mm)

Minimum Distance Between Panel Cut-Out Centers:

ESM-4400 : X=65mm, Y=65mm

ESM-4900 : X=129mm, Y=65mm

ESM-7700 : X=97mm, Y=97mm

ESM-9900 : X=129mm, Y=129mm



This symbol is used for safety warnings. User must pay attention to these warnings.

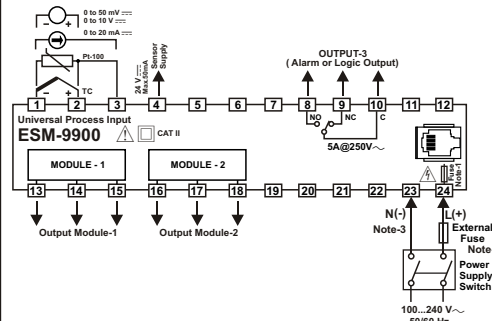
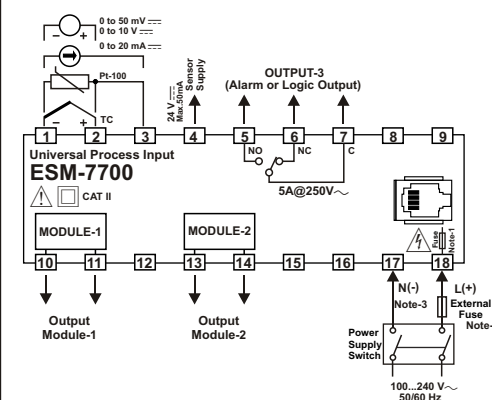
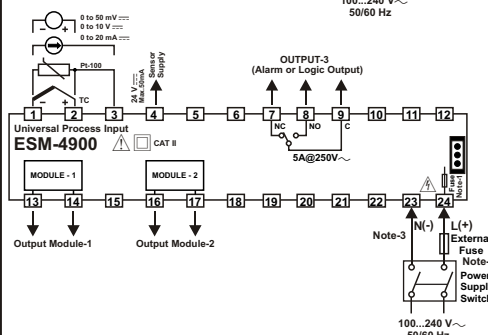
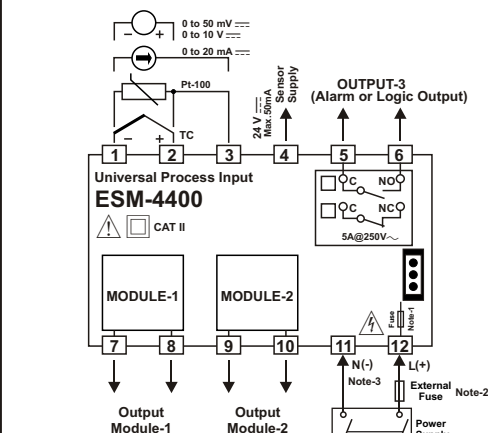


This symbol is used to determine the dangerous situations as a result of an electric shock. User must pay attention to these warnings definitely.



This symbol is used to determine the important notes about functions and usage of the device

Electrical Wirings



Note-1 : There is an internal fusible flameproof resistor.

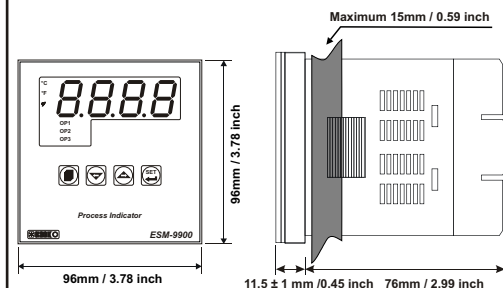
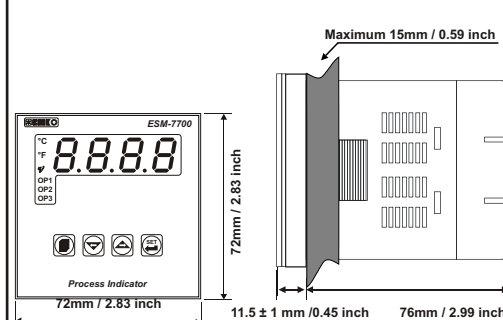
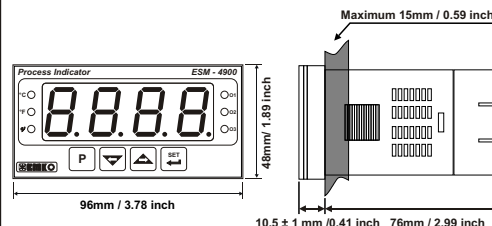
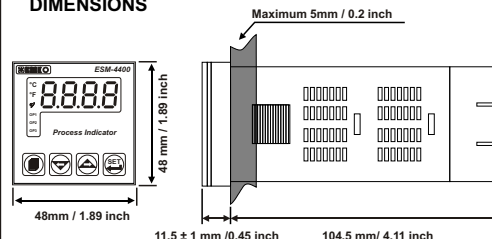
Note-2 : External fuse is recommended.

1A~T for power supply 100...240V~ or 24V~

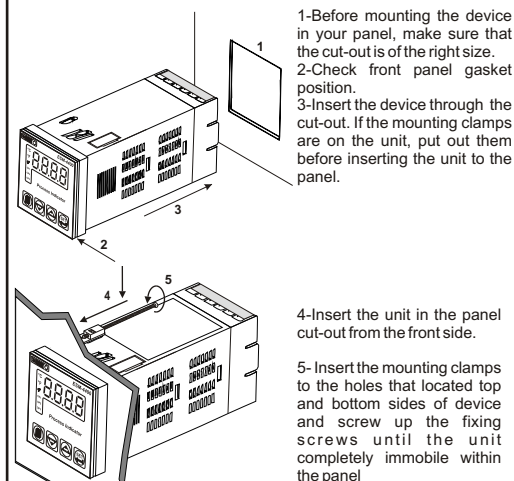
1A~T for power supply 24V~

Note-3 : "L" is (+), "N" is (-) for 24V~ supply voltage

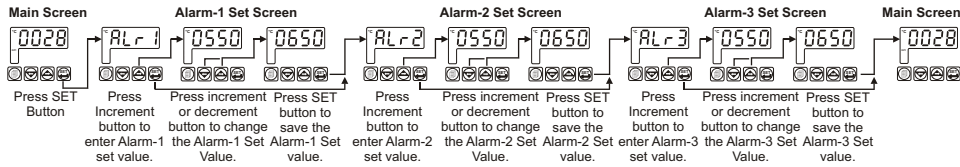
DIMENSIONS



PANEL MOUNTING



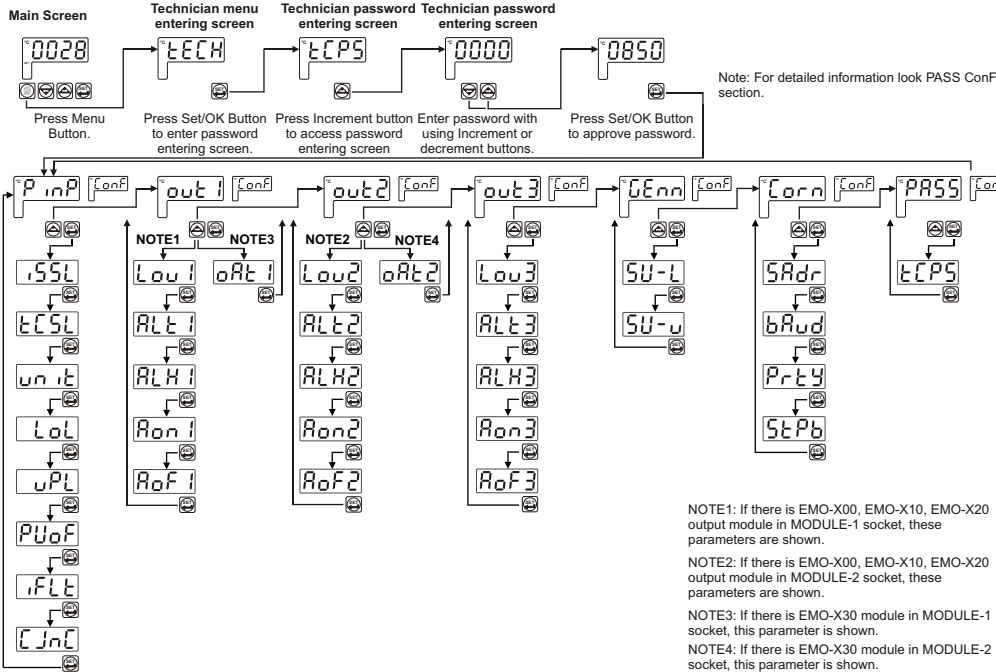
Access and change Set values



Note: User can exit from Set Value section without saving the values by pressing **ESC** button.

If no operation for 120 seconds, device automatically exits from Set Value section.

Easy Access diagram of Program Parameters



PinP ConF: Process Input Type and Relevant Parameters

- Process Input Type**
- 0000** TC input type selection
 - 0001** RTD input type selection
 - 0002** ---Voltage / Current input type selection.
- TC Input Selection**
- This parameter is active if TC input type is selected.
- 0000** L (-100°C;850°C) or (-148°F;1562°F)
 - 0001** L (-100.0°C;850.0°C) or (-148.0°F;999.9°F)
 - 0002** J (-200°C;900°C) or (-328°F;1652°F)
 - 0003** J (-199.9°C;900.0°C) or (-199.9°F;999.9°F)
 - 0004** K (-200°C;1300°C) or (-328°F;2372°F)
 - 0005** K (-199.9°C;999.9°C) or (-199.9°F;999.9°F)
 - 0006** R (0°C;1700°C) or (32°F;3092°F)
 - 0007** R (0.0°C;999.9°C) or (32.0°F;999.9°F)
 - 0008** S (0°C;1700°C) or (32°F;3092°F)
 - 0009** S (0.0°C;999.9°C) or (32.0°F;999.9°F)
 - 0010** T (-200°C;400°C) or (-328°F;752°F)
 - 0011** T (-199.9°C;400.0°C) or (-199.9°F;752.0°F)

- 0012** B (44°C;1800°C) or (111°F;3272°F)
- 0013** B (44.0°C;999.9°C) or (111.0°F; 999.9°F)
- 0014** E (-150°C;700°C) or (-238°F;1292°F)
- 0015** E (-150.0°C;700.0°C) or (-199.9°F;999.9°F)
- 0016** N (-200°C;1300°C) or (-328°F;2372°F)
- 0017** N (-199.9°C;999.9°C) or (-199.9°F;999.9°F)
- 0018** C (0°C;2300°C) or (32°F;3261°F)
- 0019** C (0.0°C;999.9°C) or (32.0°F;999.9°F)

RTD Input Selection

- This parameter is active if RTD input is selected.
- 0000** PT-100 (-200°C; 650°C) or (-328°F; 1202°F)
 - 0001** PT-100 (-199.9°C; 650.0°C) or (-199.9°F; 999.9°F)

---voltage / Current Input Selection

This parameter is active if ---Voltage / Current is selected.

- 0000** 0...50mV --- (-1999; 9999)
- 0001** 0...5V --- (-1999; 9999)
- 0002** 0...10V --- (-1999; 9999)
- 0003** 0...20mA --- (-1999; 9999)
- 0004** 4...20mA --- (-1999; 9999)

Display Point Position

This parameter is active if ---Voltage/Current input is selected.

- 0000** No point
- 0001** Between first and second digits "0.0"
- 0002** Between second and third digits "0.00"
- 0003** Between third and fourth digits "0.000"

Display Value Adjustment Type

This parameter is active if ---Voltage/Current input is selected.

- 0000** Fixed dual point display adjustment. Display adjustment low point value is fixed to -1999, display adjustment high point value is fixed to 9999.
- 0001** User can do dual point display adjustment with tPoL and tPoH.
- 0002** User can do defined 16 display adjustment points.

Low Point Display adjustment (-1999, 9999)Unit

This parameter is active if ---Voltage/Current input is selected.

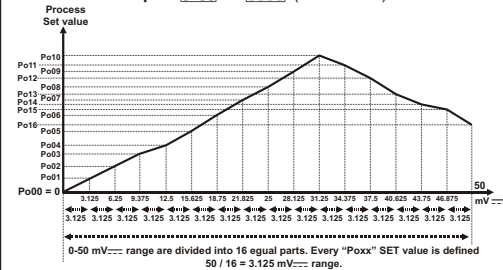
High Point Display adjustment (-1999, 9999)Unit

This parameter is active if ---Voltage/Current input is selected.

Display adjustment points (-1999, 9999)Unit

This parameter is active if ---Voltage/Current input is selected. In multi point display adjustment operation, defined scale is divided into 16 adjustment points.

For example: **0000** is **0000** (0-50 mV---).



Coefficient value (1.000, 9.999)

Process value is multiplied with this value.

This parameter is active if ---Voltage/Current input is selected.

Unit selection

- 00** Unit is °C
- 01** Unit is °F
- 02** Unit is Voltage. This selection is active if ---Voltage/Current input is selected
- 03** No unit. This selection is active if ---Voltage / current input is selected

Operating Scale Minimum Value

(Scale Low Point, Scale High Point)Unit
Used for Proportional band calculation and display blink.

Operating Scale Maximum Value

(Scale Low Point, Scale High Point)Unit
Used for Proportional band calculation and display blink.

Display offset for process value (Scale -10%, Scale +10%)Unit

This parameter value is added to the process value.

Filter Time (0.0, 900.0)Second

Defines filter time for display value.

Cold Junction Compensation

This parameter is active if process input is selected TC input.

- 00** Cold junction compensation is active.
- 01** Cold junction compensation is not active.

Scale: The difference, between high point and low point of the process input type. Example: If tCSL = 2 (low point is -200, high point is 900), then scale is 1100. If input type is Voltage/Current, then the scale is difference between tPoH and tPoL parameters.

out1 ConF: MODULE-1 parameters

If there is EMO-X00 (Relay Output), EMO-X10 (SSR driver) and EMO-X20 (Digital Output) module in MODULE-1 socket, then the following parameters is active.

MODULE-1 output module Logic output function

- 0000** Alarm output
- 0001** Sensor break alarm output
- 0002** 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**

Alarm-1 Type

MODULE-1 alarm type. This parameter is active, if the Logic-1 output function is Alarm output.

Process high alarm

Process low alarm

Alarm-1 hysteresis value (0% of scale, 50% of scale)Unit

This parameter is active, if the Logic-1 output function is Alarm output.

Alarm-1 On delay time (0, 9999)Second

This parameter is active, if the Logic-1 output function is Alarm output.

Alarm-1 Off Delay Time (0, 9998)Second

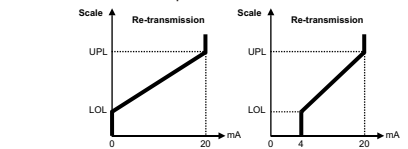
When the value is greater than 9998, **EECH** is seen on the screen. It means alarm latching output is selected. This parameter is active if logic-1 output function of Alarm-1 Output is alarm output.

out1 ConF: MODULE-1 parameters

If there is EMO-X30 (0/4...20 mA --- Current output) module in MODULE-1 socket, then the following parameter is active.

MODULE-1 analogue output module configuration

- 0000** 0...20mA--- output
- 0001** 4...20mA--- output



out2 ConF: MODULE-2 parameters

If there is EMO-X00 (Relay Output), EMO-X10 (SSR driver) and EMO-X20 (Digital Output) module in MODULE-2 socket, then the following parameters is active.

MODULE-2 output module Logic output function

- 0000** Alarm output
- 0001** Sensor break alarm output
- 0002** 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**

Alarm-2 Type

MODULE-2 alarm type. This parameter is active, if the Logic-2 output function is Alarm output.

Process high alarm

Process low alarm

Alarm-2 hysteresis value (0% of scale, 50% of scale)Unit

This parameter is active, if the Logic-2 output function is Alarm output.

Alarm-2 On delay time (0, 9999)Second

This parameter is active, if the Logic-2 output function is Alarm output.

Alarm-2 Off Delay Time (0, 9998)Second

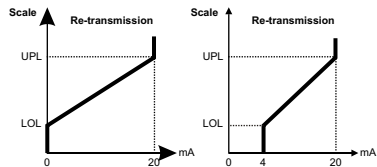
When the value is greater than 9998, **EECH** is seen on the screen. It means alarm latching output is selected. This parameter is active if logic-2 output function of Alarm-2 Output is alarm output.

out2 ConF: MODULE-2 parameters

i If there is EMO-X30 (0/4...20 mA --- Current output) module in MODULE-2 socket, then the following parameter is active.

oAL2 MODULE-2 analogue output module configuration

0000 0...20mA--- output 0001 4...20mA--- output



out3 ConF: MODULE-3 parameters

LOU3 Output-3 Logic output function

- 0000 Alarm output
- 0001 Sensor break alarm output
- 0002 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]

AL3 Alarm-3 Type

- 0000 Process high alarm
- 0001 Process low alarm

ALH3 Alarm-3 hysteresis value (0% of scale, 50% of scale)Unit

This parameter is active, if the Logic-3 output function is Alarm output.

ROn3 Alarm-3 On delay time (0, 9999)Second

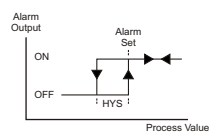
This parameter is active, if the Logic-3 output function is Alarm output.

ROF3 Alarm-3 Off Delay Time (0, 9998)Second

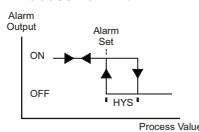
When the value is greater than 9998, [LECH] is seen on the screen. It means alarm latching output is selected. This parameter is active if logic-3 output function of Alarm-3 Output is alarm output.

Alarm Types

Process High Alarm



Process Low Alarm



Gen ConF: General Parameters

SU-L Alarm Set value Low limit ([LoL], [SU-L])Unit

SU-U Alarm Set value High limit ([SU-U], [uPL])Unit

Com ConF: Serial Communication Configuration Parameters

SAdr Communication Accessing Address (1,247)

Communication accessing address of device. Communication accessing address can be adjusted from 1 to 247.

bRud Communication Baud Rate

- 0000 1200 Baud Rate.
- 0001 2400 Baud Rate .
- 0002 4800 Baud Rate
- 0003 9600 Baud Rate
- 0004 19200 Baud Rate

PrL3 Parity Selection for Communication

- 0000 No parity.
- 0001 Odd parity.
- 0002 Even parity.

SLPB Stop Bit Selection for Communication

- 0000 1 stop bit
- 0001 2 stop bit

PASS ConF: Password Parameter

LEPS Technician Passwords(0, 9999)

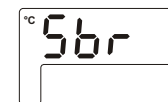
It is used for accessing to the technician parameters. If it is [0000] no password protection while entering to the technician Parameters.

If it is different from "0" and user wants to access to the technician parameters;

1- If user does not enter [LEPS] password correctly :It turns to operation screen without accessing to parameters.: When [LEPS] in top display [0000] and in bottom display are seen, if user presses SET button without entering [LEPS] Password (For observing the parameters):

Operator can see operator menus and parameters but operator can not change the parameters

ESM-XX00 Process Control Unit Error Messages



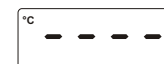
1 - Sensor failure in analogue inputs. Sensor connection is wrong or there is no sensor connection.



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



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



4- If technician password is different from "0" and user accesses to the parameter by Set button without entering the technician password and wants to change a parameter, the warning message is shown on the display as shown on the right. Device does not allow to do any changes without entering the password correctly.

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 occurred 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 separate 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 result 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
BURSA /TURKEY

Phone : +90 224 261 1900
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Repair and Maintenance Service Information:

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BURSA /TURKEY

Phone : +90 224 261 1900
Fax : +90 224 261 1912

Ordering Information

ESM-4400 (48x48 DIN 1/16)	A	B	C	D	E	/	F	G	H	I	/	U	V	W	Z
ESM-4900 (96x48 DIN 1/8)															
ESM-7700 (72x72 DIN Size)															
ESM-9900 (96x96 DIN 1/4)															

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

BC	Input type	Scale
20	Configurable(Table-1)	Table-1
D	Serial Communication	Product Code
0	None	
1	RS-232	EMC-400,EMC-700,EMC-900
2	RS-485	EMC-410,EMC-710,EMC-910

E	Output-3
1	Relay Output(5A@250V~ on resistive Load)

FG	Module-1	Module Codes
00	None	
01	Relay Output Module	EMO-400,EMO-700,EMO-900
02	SSR driver Output Module (Maximum 26mA, 22V ---)	EMO-410,EMO-710,EMO-910
03	Digital (Transistor) Output Module (Maximum 40mA@18V ---)	EMO-420,EMO-720,EMO-920
04	Current Output Module (0/4...20 mA --- veya 0...10V ---)	EMO-430,EMO-730,EMO-930

HI	Module-2	Module Codes
00	None	
01	Relay Output Module	EMO-400,EMO-700,EMO-900
02	SSR driver Output Module (Maximum 26mA, 22V ---)	EMO-410,EMO-710,EMO-910
03	Digital (Transistor) Output Module (Maximum 40mA@18V ---)	EMO-420,EMO-720,EMO-920
04	Current Output Module (0/4...20 mA --- veya 0...10V ---)	EMO-430,EMO-730,EMO-930

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, Nirosil Ni IEC584.1(ITS90)	-200°C, 1300°C	-328°F, 2372°F
36	N, Nirosil Ni 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

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