EMKO

Process Controllers
"Smart I/O Module"System RS-232/485 Modbus RTU
Serial Communication

ESM-4450 (48x48mm DIN 1/16)
ESM-4950 (96x48mm DIN 1/8)
ESM-7750 (72x72mm DIN 1/8)
ESM-9950 (96x96mm DIN 1/4)
ESM-9450 (48x96mm DIN 1/8)

- 4 digits process (PV) and 4 digits process set (SV) display
- Universal process input (TC, RTD, mV===,V===, mA===)
- Optional secondary sensor input
- Dual or multi point calibration for===Voltage /===
  Current input
- Configurable ON/OFF, P, PI, PD and PID control forms
- Auto-tune and Self-tune PID
- Manual/Automatic mode selection for control outputs
- Bumpless transfer
- Smart I/O module system
- Programmable heating, cooling and alarm functions
  for control outputs
- Motorized valve control function
- 8 steps profile control (Ramp & Soak) function and
  start-hold-stop by using logic input module
- Remote set point function by using analogue input
  modules
- Retransmission of process value or process control
  by using 0/4...20 mA===Current Output Module
- Detection of heater failure by using 0...5A VCT
  input module
- Hardware configuration by using input/output
  modules
- RS-232 (standard) or RS-485 (optional) serial
  communication with Modbus RTU protocol

ESM series process controllers are designed for measuring and controlling temperature
and any process value.They can be used in many applications with their universal
process input, multifunction control outputs, selectable alarm functions, serial
communication unit and input/output modules. They are mainly used in glass, plastic,
petro-chemistry, textile, automotive and machine production industries. Sensitive and
developed controlling is done with it`s selectable ON-OFF, P, PI, PD, PID,
AutoTune and Self Tune PID properties.

ELECTRICAL WIRING
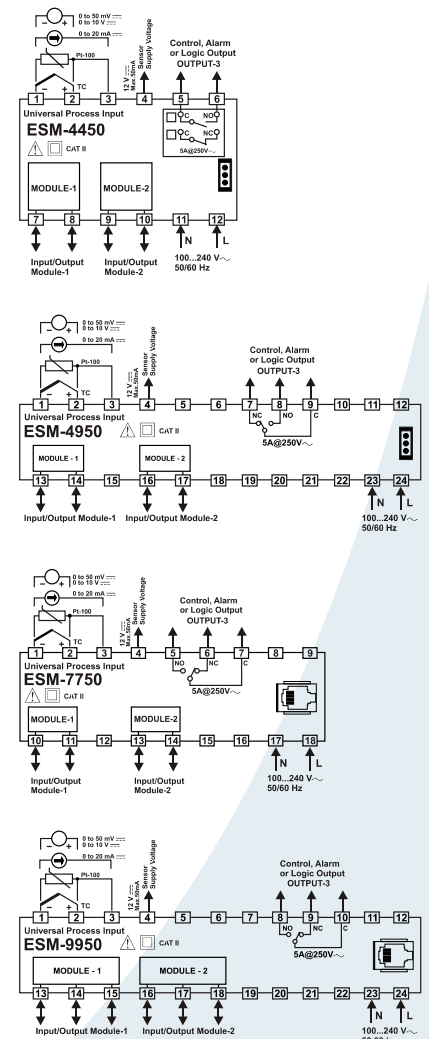
SPECIFICATIONS

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: ± 0.25% of full scale for thermocouple, thermoresistance, mV, V
± 0.70% of full scale for mA input
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, PID or Heating PID and Cooling PID together (Control form is programmable)

OUTPUT
Standard Relay Output: 5A@250V⎓(at resistive load)
 (It can be configured as control or alarm output)
Input/Output Modules: Two Input / Output Modules can be plugged in sockets.
Output Modules: Relay Output Module, SSR Output Module (Max.20mA@18V⎓),
Digital(Transistor) Output Module(Max.40 mA@18V⎓), 0/4...20 mA Current Output Module
Input Modules: Digital Input Module, 0/4...20 mA⎓Current Input Module, 0...5A V CT Input Module,
TC or 0...50mV⎓Input Module, PT-100 Input Module, 0...10V⎓ Input Module

SUPPLY VOLTAGE
100-240V∿50/60 Hz (-15%;+10%) -6VA Universal
24V∿50/60 Hz (-15% ; +10%) -6VA Optional
24V⎓(-15% ; +10%) -6W Optional
(Must be determined in order)

ENVIRONMENTAL RATINGS and PHYSICAL SPECIFICATIONS
Operating Temperature: 0...50°C
Humidity: 0-90%RH (none condensing)
Protection Class: IP65 at front, IP20 at rear
Dimensions:
ESM-4450 : (48 x 48mm, Depth:116 mm)
ESM-4950 : (96 x 48mm, Depth:86.5 mm)
ESM-7750 : (72 x 72mm, Depth:87.5 mm)
ESM-9950 : (96 x 96mm, Depth:87.5 mm)
ESM-9450 : (48 x 96mm, Depth86.5 mm)

ORDERING INFORMATION

ESM-4450 (48x48 DIN 1/16)	A	BC	D	E	/	FG	HI	/	U	V	W	Z
ESM-4950 (96x48 DIN 1/8)												
ESM-7750 (72x72 DIN Size)				1	/			/	0	0	0	0
ESM-9950 (96x96 DIN 1/4)												
ESM-9450 (48x96 DIN 1/8)												

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

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@250 V∿ at 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 20mA@18V ⎓)	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 ⎓) (or 0...10V ⎓with appropriate mechanism)	EMO-430,EMO-730,EMO-930
07	Digital Input Module	EMI-400,EMI-700,EMI-900
08	Current Input Module(0/4...20 mA ⎓)	EMI-410,EMI-710,EMI-910
09	∿ CT Input Module(0...5A∿)	EMI-420,EMI-720,EMI-920
10	TC (Thermocouple) or 0...50mV ⎓ Input Module	EMI-430,EMI-730,EMI-930
11	PT-100 Input Module	EMI-440,EMI-740,EMI-940
12	0...10V ⎓ Input Module	EMI-450,EMI-750,EMI-950

HI	Module-2	Module Codes
00	None	
01	Relay Output Module	EMO-400,EMO-700,EMO-900
02	SSR Driver Output Module (Maximum 20mA@18V ⎓)	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 ⎓) (or 0...10V ⎓with appropriate mechanism)	EMO-430,EMO-730,EMO-930
07	Digital Input Module	EMI-400,EMI-700,EMI-900
08	Current Input Module(0/4...20 mA ⎓)	EMI-410,EMI-710,EMI-910
09	∿ CT Input Module(0...5A∿)	EMI-420,EMI-720,EMI-920
10	TC (Thermocouple) or 0...50mV ⎓ Input Module	EMI-430,EMI-730,EMI-930
11	PT-100 Input Module	EMI-440,EMI-740,EMI-940
12	0...10V ⎓ Input Module	EMI-450,EMI-750,EMI-950

Note-1: EMO-4xx , EMI-4xx are used in ESM-4450,ESM-4950 and ESM-9450
EMO-7xx , EMI-7xx are used in ESM-7750
EMO-9xx , EMI-9xx are used in ESM-9950
Note-2: EMO-400 Relay Output Modules rating is 3A@250V∿(at resistive load), EMO-700 and EMO-900 Relay Output Modules ratings are 5A@250V∿ (at resistive load)
Note-3: EMI-410,430,440,450 ; EMI-710,730,740,750 ; EMI-910,930,940,950 Input Modules are named Analogue Input Module. Two Analogue Input Modules Can not be plugged in Module-1 and Module-2 sockets.

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