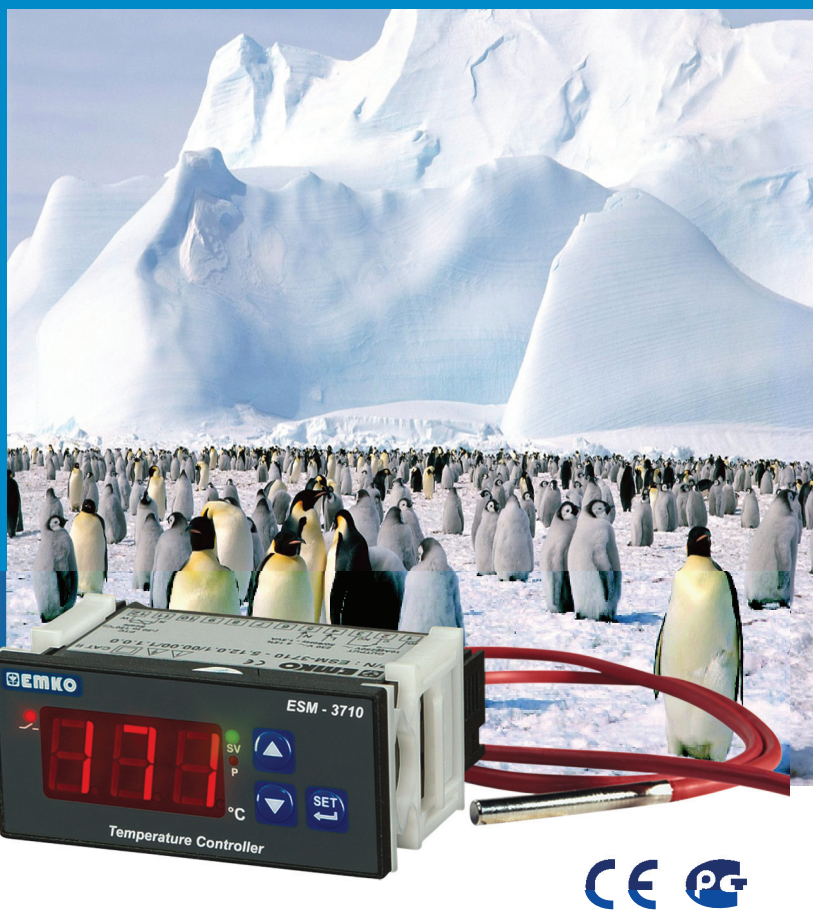
# Heating and Cooling Controllers




## ESM-3710
Single SET, ON/OFF Controller

## ESM-3711-H
Single SET ON/OFF,
Heating + Timer Controller, with Audible alarm

## ESM-7311-H
Single SET ON/OFF,
Heating + Timer Controller, with Audible alarm

## ESM-3712-H
Dual SET (SET+Alarm) ON/OFF,
Heating + Timer Controller, with Audible alarm

## ESM-3711-C
Single SET ON/OFF,
Cooling + Defrost Time Controller, with Audible alarm

## ESM-3712-C
Cooling and Defrost Controller, with Audible alarm

## ESM-3711-CL
Single SET ON/OFF,
Cooling + Defrost Time Controller, with Audible alarm
Min/Max. data logging

## ESM-3712-HC
Dual SET (SET+Alarm) ON/OFF,
Heating and Cooling Controller,

- Heating / Cooling applications
- Easy to use
- 3 digits display
- PTC, NTC, Pt-100, Pt-1000 thermoresistance input types
- Fe-Const (J), NiCr-Ni (K) thermocouple input types
- ON / OFF temperature control
- Adjustable temperature offset
- SET value limit and SET value high limit boundaries
- Compressor protection delays
- Defrost control
- Audible alarm by internal buzzer
- Password protection for programming section
- Min / Max Data logging

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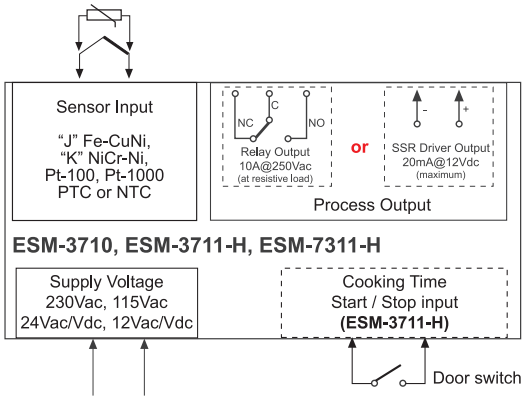
# Heating Control


## ESM-3710

Single SET, ON/OFF Controller

- ON/OFF temperature control
- Heating and Cooling applications
- Relay or SSR driver output
- Thermoresistance or Thermocouple input
- Compressor protection delay
- Password protection for programming section





## ESM-3711-H

Single SET ON/OFF, Heating + Timer Controller, with Audible alarm

- ON/OFF temperature control
- Adjustable cooking time
- Relay or SSR driver output
- Audible alarm for alarm situation
- Audible alarm at the end of the cooking time
- Button protection
- Adjustable temperature offset
- Digital input for Cooking time Start / Stop


## ESM-7311-H

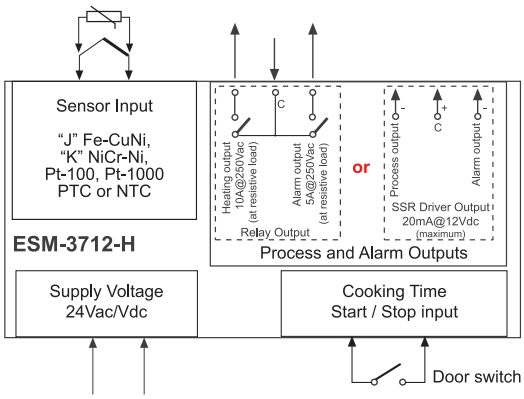
**Application Fields:**

- Industrial kitchen applications
- Bakery applications
- Industrial oven control
- Chemical sample testers
- Laboratuary test equipments
- Fermentation cabinets
- Heating automation
- Quality control applications
- Jeweller furnace etc.,


## ESM-3712-H

Dual SET (SET+Alarm) ON/OFF,
Heating + Timer Controller, Audible alarm

- Relay or SSR Driver output for Cooking and Alarm
- Adjustable SET value for Cooking and Alarm
- 24Vdc/Vac supply voltage
- Thermoresistance or Thermocouple input types
- Adjustable Cooking time from front panel
- Digital input for Cooking time Start / Stop
- Functional alarm parameters
- Adjustable temperature offset
- Audible alarm for alarm situations
- Button protection
- Password protection for programming section



# Cooling Control


with buzzer

## ESM-3711-CL

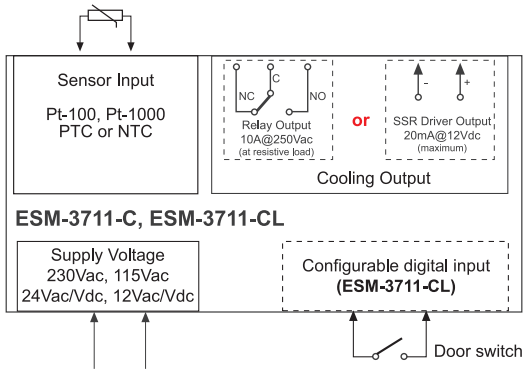

with buzzer

## ESM-3711-C

Single SET ON/OFF,
Cooling + Defrost Time Controller, with Audible alarm
Min/Max. data logging

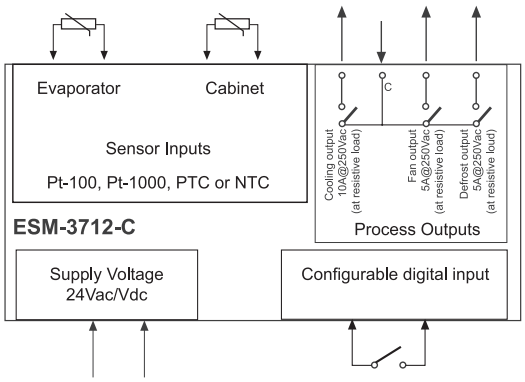
If your product is exposed to critical temperature level, you can learn it by one button on front panel,
Maximum and minimum temperature values are recorded .

Application Fields:
Refrigerators, Freezing chambers, Cold chain applications
Medicine stores, Blood cabinets, etc.,





with buzzer




## ESM-3712-C

Cooling + Defrost Controller with buzzer

- 3 output for Compressor, defrost and fan control
- 2 sensor inputs for Cabinet and evaporator
- Programmable digital input
- Separately adjustable 2 offset values for Cabinet and evaporator sensor
- SET value boundaries
- Fan can be operated depending on compressor and defrost
- Adjustable defrost time from front panel
- Functional alarm parameters
- Operation selection of compressor operate continuously, stops or operates periodically in case of cabinet probe defect
- Adjustable internal buzzer according to the defrost, cabinet probe defect and status
- Button protection
- Password protection for programming mode


## ESM-3712-HC

Heating & Cooling Controller

### General Specification of Heating and Cooling Controllers

| | |
|---|---|
| Measurement Range | : It is in ordering information |
| Accuracy | : +/-%1 of scale |
| Cold Junction Compensation | : Automatically +/- 0.1°C / 1°C |
| Sensor Break Protection | : Upscale |
| Sampling Cycle | : 3 samples per second |
| Control Output | : ON/OFF |
| ON/OFF Hysteresis | : It can be configured by the user |
| Operation Temperature | : 0...50°C |
| Humidity | : %0-90RH (none condensing) |
| Protection Class | : IP65 at front , IP20 at rear |
| Dimension | : 77x35mm, Depth: 60mm., 35x77mm, Depth: 60mm. (ESM-7311-H) |

| Order Code | | ESM-3710 | ESM-3711-H | ESM-7311-H | ESM-3712-H | ESM-3711-C | ESM-3711-CL | ESM-3712-C | ESM-3712-HC |
|---|---|---|---|---|---|---|---|---|---|
| A BC D E / FG HI / U V W Z | | | | | | | | | |
| _ _ 0 _ / _ _ / 1 _ 0 0 | | | | | | | | | |
| A | Supply Voltage | | | | | | | | |
| 1 | 100...240Vac (-%15, +%10) 50/60Hz | - | - | - | - | - | - | - | + |
| 2 | 24Vac/Vdc (-%15, +%10) 50/60Hz | + | + | + | + | + | + | + | + |
| 3 | 24Vac (-%15, -%15) 50/60Hz | + | + | + | - | + | + | - | - |
| 4 | 115Vac (-%15, -%15) 50/60Hz | + | + | + | - | + | + | - | - |
| 5 | 230Vac (-%15, -%15) 50/60Hz | + | + | + | - | + | + | - | - |
| 6 | 12Vac/Vdc (-%15, -%15) 50/60Hz | + | + | + | - | + | + | - | - |
| BC | Input Type | | | | | | | | |
| 05 | J, Fe-CuNi, 0...800 °C | + | + | + | + | - | - | - | + |
| 10 | K, NiCr-Ni, 0...999 °C | + | + | + | + | - | - | - | + |
| 11 | Pt-100, -50...400 °C | + | + | + | + | + | + | + | + |
| 09 | Pt-100, -19.9...99.9 °C | + | + | + | + | + | + | + | + |
| 12 | PTC, -50...150 °C | + | + | + | + | + | + | + | + |
| 15 | PTC, -19.9...99.9 °C | + | + | + | + | + | + | + | + |
| 14 | Pt-1000, -50...400 °C | + | + | + | + | + | + | + | + |
| 13 | Pt-1000, -19.9...99.9 °C | + | + | + | + | + | + | + | + |
| 18 | NTC, -50...100 °C | + | + | + | + | + | + | + | + |
| 19 | NTC, -19.9...99.9 °C | + | + | + | + | + | + | + | + |
| E | Output-1 | | | | | | | | |
| 1 | Relay Output (Max. 10A@250Vac ) | + | + | + | + | + | + | - | + |
| 1 | Compressor Relay Output (Max 10A@250Vac) | - | - | - | - | - | - | + | - |
| 2 | SSR Driver Output (Max.. 20mA@12Vdc) | + | + | + | + | + | + | - | + |
| FG | Output-2 | | | | | | | | |
| 01 | Alarm Relay Output (Max. 5A@250Vac) | - | - | - | + | - | - | - | + |
| 01 | Defrost Relay Output (Max. 5A@250Vac) | - | - | - | - | - | - | + | - |
| 02 | SSR Driver Output (Max. 20mA@12Vdc) | - | - | - | + | - | - | - | + |
| HI | Output-3 | | | | | | | | |
| 01 | Fan Relay Output (Max. 5A@250Vac) | - | - | - | - | - | - | + | - |
| V | PTC and NTC Temperature Sensor Selections | | | | | | | | |
| 0 | Without Sensor | + | + | + | + | + | + | + | + |
| 1 | PTC-M6L40.K1,5<br>PTC Air probe 1,5 m silicon cable | + | + | + | + | + | + | + | + |
| 2 | PTCS-M6L30.K1,5.1/8”<br>PTC Liquid probe with 1,5m silicone cable, 1/8” fittingnut | + | + | + | + | + | + | + | + |
| 3 | NTC-M5L20.K1,5<br>Thermoplastic covering for cooling application, 1,5 m cable NTC probe | + | + | + | + | + | + | + | + |
| 4 | NTC-M6L50.K1,5<br>Metal protection tube, 1,5 m cable NTC probe | + | + | + | + | + | + | + | + |
| Specifications | | | | | | | | | |
| Dimension | | 77x35mm | 77x35mm | 35x77mm | 77x35mm | 77x35mm | 77x35mm | 77x35mm | 77x35mm |
| Password protection for programming mode | | + | + | + | + | + | + | + | + |
| Functional Internal Buzzer | | - | + | + | + | + | + | + | - |
| Adjustable cooking time from Front panel | | - | + | + | + | - | - | - | - |
| Digital input (Cooking time start/stop input) | | - | + | - | + | - | - | - | - |
| Compressor protection delay | | + | - | - | - | + | + | + | + |
| Set value boundaries | | + | + | + | + | + | + | + | + |
| Adjustable temperature offset | | + | + | + | + | + | + | + | + |
| ON/OFF Heating control | | + | + | + | + | - | - | - | + |
| ON/OFF Cooling control | | + | - | - | - | + | + | + | + |
| Alarm parameters | | - | + | + | + | + | + | + | + |
| Button protection | | - | + | + | + | + | + | + | - |
| Minimum and Maximum value’s recording | | - | - | - | - | - | + | - | - |
| Defrost (Off/Cycle) functions | | - | - | - | - | + | + | + | - |
| Compressor, Evaporator and Fan control outputs | | - | - | - | - | - | - | + | - |
| 2 sensor input for cabinet and evaporator | | - | - | - | - | - | - | + | - |
| Configurable digital input | | - | - | - | - | - | - | + | - |

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# Temperature Controllers


**ESM-4410**
**ESM-7710**
**ESM-9910**
Digital ON/OFF Temperature Controller

**ESM-4420**
**ESM-7720**
**ESM-9920**
PID Temperature Controller

**ESM-1510**
Rail Panel Montage Type ON/OFF Temperature Controller

- Heating / Cooling applications
- Easy to Use
- PTC, NTC, Pt-100, Pt-1000 thermoresistance input types
- Fe-Const (J), NiCr-Ni (K), PtRh-Pt (R, S), Cu-CuNi (T) thermocouple input types
- ON / OFF, P, PI, PD, PID Temperature control
- Adjustable temperature Offset
- Selection of Operation with Hysteresis
- Set value Boundaries
- Selectable Relay or SSR driver outputs
- Adaptation of PID Coefficients to the system with Self -Tune operation
- Selectable alarm functions
- Compressor protection delays
- Password protection for programming mode

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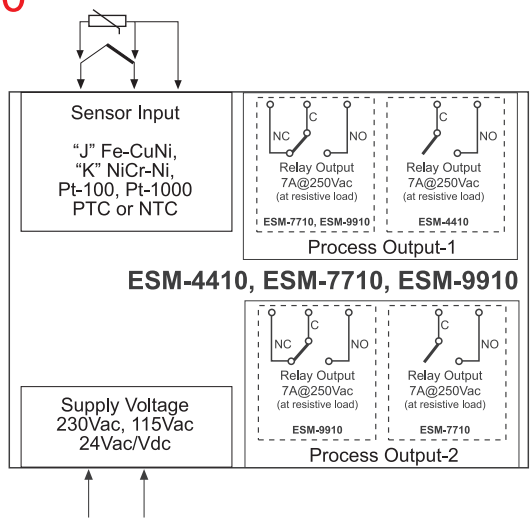
# ESM-4410, ESM-7710, ESM-9910

Digital ON/OFF Temperature Controller

- ON/OFF tempareture control
- Selectable heating and cooling function
- Adjustable temperature offset
- Operating type selection with hysteresis
- Minimum pulling time adjustment for control outputs
- 3 Digits display
- One or dual SET temperature control (It can be described in order)
- Password Protection for Programming Section
- Fe-Const (J), NiCr-Ni (K) thermocouple input selection
- PTC, NTC, Pt-100, Pt-1000 thermoresistances input selection



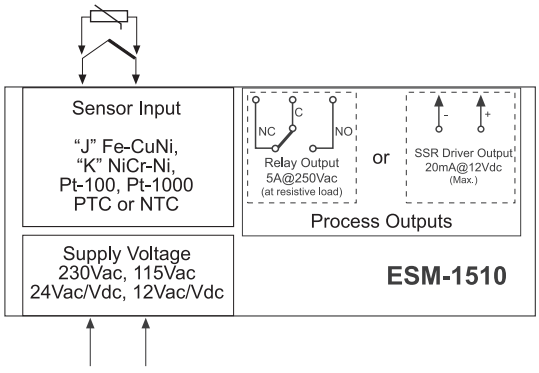

## Specification

| | |
|---|---|
| Measurement Range | : It is ordering information |
| Accuracy | : +/-%1 of scale |
| Cold Junction Compensation | : Automatically +/- 0.1°C / 1°C |
| Sensor Break Protection | : Upscale |
| Sampling Cycle | : 3 samples per second |
| Control Output | : ON/OFF |
| ON/OFF Hysteresis | : It can be configured by the user |
| Operation Temperature | : 0...50°C |
| Humidity | : %0-90RH (none condensing) |
| Protection Class | : IP65 at front , IP20 at rear |
| Dimension | : ESM-4410 48x48mm, depth: 95mm, |
| | ESM-7710 72x72mm, depth: 95,5mm, |
| | ESM-9910 96x96mm, depth: 96mm, |
| | ESM-1510 86x35mm, depth: 59mm. |

# ESM-1510


Digital ON/OFF Temperature Controller

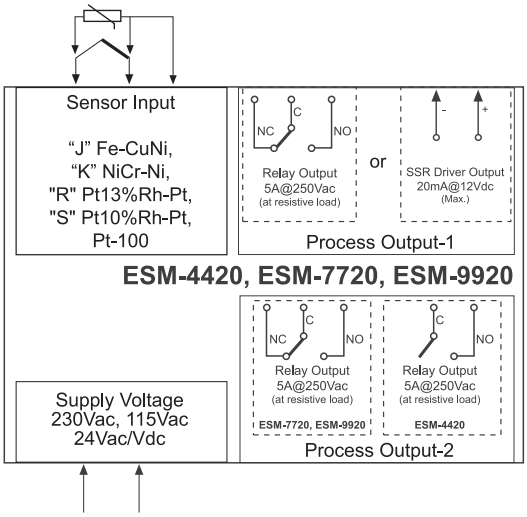
- ON/OFF temperature control
- Selectable heating and cooling function
- Fe-Const (J), NiCr-Ni (K) thermocouple input selection
- PTC, NTC, Pt-100, Pt-1000 thermoresistances input selection
- Adjustment of temperature offset value
- Operating type selection with hysteresis
- DIN RAIL mounting
- 3 digits display
- Password Protection for Programming Section




# ESM-4420, ESM-7720, ESM-9920

PID Temperature Controller

- ON/OFF, P, PI, PD or PID control forms
- Programmable Heating or Cooling functions for control outputs
- Adaptation of PID coefficients to the system with Self-Tune operation
- Universal Thermocouple and thermoresistances process input
- Relay or SSR driver outputs selection for process output
- Accurate temperature control with PID functions
- Optimal power consumption by PID control methode
- Alarm functions for alarm output
- 4 digits process and 4 digits SET value display
- °C or °F temperature indicating
- High and low limit boundaries for Process and Alarm SET values
- Adjustable hysteresis value for Process and Alarm output
- Adjustable Off/On delay time for alarm output
- Password Protection for Programming Section




## Specification

| | |
|---|---|
| Measurement Range | : It is in ordering information |
| Accuracy | : ±%0,25 of scale |
| Cold Junction Compensation | : Automatically +/- 0.1°C / 1°C |
| Sensor Break Protection | : Upscale |
| Sampling Cycle | : 3 samples per second |
| Control Output | : ON/OFF, P, PI, PD or PID |
| ON/OFF Hysteresis | : It can be configured by the user |
| Operation Temperature | : 0...50°C |
| Humidity | : %0-90RH (none condensing) |
| Protection Class | : IP65 at front , IP20 at rear |
| Dimension | : ESM-4420 48x48mm, depth: 95mm, |
| | ESM-7720 72x72mm, depth: 95,5mm, |
| | ESM-9920 96x96mm, depth: 96mm, |

| Input type | Range (°C) | Range (°F) |
|---|---|---|
| J, Fe-CuNi IEC584.1 (ITS90) | -200...900°C | -328...1652°F |
| K, NiCr-Ni IEC584.1 (ITS90) | -200...1300°C | -328...2372°F |
| R, Pt13%Rh Pt IEC584.1 (ITS90) | 0...1700°C | 32...3092°F |
| S, Pt10%Rh Pt IEC584.1 (ITS90) | 0...1700°C | 32...3092°F |
| T, Cu-CuNi IEC584.1 (ITS90) | -200...400°C | -328...752°F |
| Pt-100, IEC751 (ITS90) | -200...650°C | -328...1202°F |
| Pt-100, IEC751 (ITS90) | -199,9...650,0°C | -199,9...999,9°F |

| Order Code | | ESM-4410 | ESM-7710 | ESM-9910 | ESM-4420 | ESM-7720 | ESM-9920 | ESM-1510 |
|---|---|---|---|---|---|---|---|---|
| A BC D E / FG HI / U V W Z | | | | | | | | |
| _ _ 0 _ / _ 00 / 1 _ 0 0 | | | | | | | | |
| A | Supply Voltage | | | | | | | |
| 2 | 24Vac/Vdc (-%15, +%10) 50/60Hz | + | + | + | + | + | + | + |
| 3 | 24Vac (-%15, -%15) 50/60Hz | + | + | + | + | + | + | + |
| 4 | 115Vac (-%15, -%15) 50/60Hz | + | + | + | + | + | + | + |
| 5 | 230Vac (-%15, -%15) 50/60Hz | + | + | + | + | + | + | + |
| 6 | 12Vac/Vdc (-%15, -%15) 50/60Hz | - | - | - | - | - | - | + |
| BC | Input Type | | | | | | | |
| 20 | Universal (Thermocouple or Thermoresistance) | - | - | - | + | + | + | - |
| 05 | J, Fe-CuNi, 0...800 °C | + | + | + | | | | + |
| 10 | K, NiCr-Ni, 0...999 °C | + | + | + | | | | + |
| 03 | Pt-100, 0...400 °C | + | + | + | | | | + |
| 09 | Pt-100, -19.9...99.9 °C | + | + | + | | | | + |
| 12 | PTC, -50...150 °C | + | + | + | - | - | - | + |
| 15 | PTC, -19.9...99.9 °C | + | + | + | - | - | - | + |
| 14 | Pt-1000, -50...400 °C | + | + | + | - | - | - | + |
| 13 | Pt-1000, -19.9...99.9 °C | + | + | + | - | - | - | + |
| 18 | NTC, -50...100 °C | + | + | + | - | - | - | + |
| 19 | NTC, -19.9...99.9 °C | + | + | + | - | - | - | + |
| E | Output-1 | | | | | | | |
| 1 | Relay Output | + | + | + | + | + | + | + |
| 2 | SSR Driver Output (max. 20mA@12Vdc) | - | - | - | + | + | + | + |
| FG | Output-2 | | | | | | | |
| 01 | Relay Output | - | + | + | + | + | + | - |
| V | PTC and NTC Temperature Sensor Selections | | | | | | | |
| 0 | Without Sensor | + | + | + | + | + | + | + |
| 1 | PTC-M6L40.K1,5<br>PTC Air probe 1,5 m silicon cable | + | + | + | - | - | - | + |
| 2 | PTCS-M6L30.K1,5.1/8”<br>PTC Liquid probe with 1,5 m silicon cable, 1/8” fittingnut | + | + | + | - | - | - | + |
| 3 | NTC-M5L20.K1,5<br>Thermoplastic covering for cooling application<br>1,5 m cable NTC probe | + | + | + | - | - | - | + |
| 4 | NTC-M6L50.K1,5<br>Metal protection tube, 1,5 m cable NTC probe | + | + | + | - | - | - | + |
| Specifications | | | | | | | | |
| Dimension | | 48x48mm | 72x72mm | 96x96mm | 48x48mm | 72x72mm | 96x96mm | DIN Rail |
| Password protection for programming mode | | + | + | + | + | + | + | + |
| Set value boundaries | | - | - | - | + | + | + | + |
| Adjustable temperature offset | | + | + | + | + | + | + | + |
| ON/OFF Temperature control | | + | + | + | + | + | + | + |
| Adjustable P, PD, PI and PID Control forms | | - | - | - | + | + | + | - |
| Adjustable Compressor delay times | | - | - | - | - | - | - | + |
| Alarm functions for alarm output | | - | - | - | + | + | + | - |
| Adaptation of PID coefficients to the system with Self-Tune operation | | - | - | - | + | + | + | - |
| Universal Thermocouple and thermoresistances process input | | - | - | - | + | + | + | - |
| Programmable Heating or Cooling functions for control outputs | | + | + | + | + | + | + | + |
| Adjustable hysteresis value | | + | + | + | + | + | + | + |
| Adjustable re-activation time for control outputs | | + | + | + | - | - | - | - |
| Process display | | 3 digits | 3 digits | 3 digits | 4 digits | 4 digits | 4 digits | 3 digits |
| SET display | | - | - | - | 4 digits | 4 digits | 4 digits | - |

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# Proces
# Controlle


## ESM-4450, ESM-4950
## ESM-7750, ESM-9450
## ESM-9950
"Smart I/O Module" System,
RS-232/485 ModBus RTU Serial Communication,
Process Controller

## ESM-4430, ESM-4930
## ESM-7730, ESM-9430
## ESM-9930
PID Dual SET (SET + Alarm), Process Controller

## ESM-4435
PID 3 SET (SET + Alarm), Process Controller

## ESM-4400, ESM-4900
## ESM-7700, ESM-9900
"Smart Output Module" System,
RS-232/485 ModBus RTU Serial Communication,
Process Controller

## ESM-3700
Single SET, Process Indicators

- Universal process inputs
- Optional secondary sensor input
- Dual or multi point calibration for dc 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
- Motorized valve control function
- 8 steps profile control (Ramp & Soak) function
- Remote SET function
- Retransmission of process value or process control
- Detection of heater failure
- Programmable heating, cooling and alarm functions for control outputs
- RS-232 (standard) or RS-485 (optional) serial communication with Modbus RTU protocol

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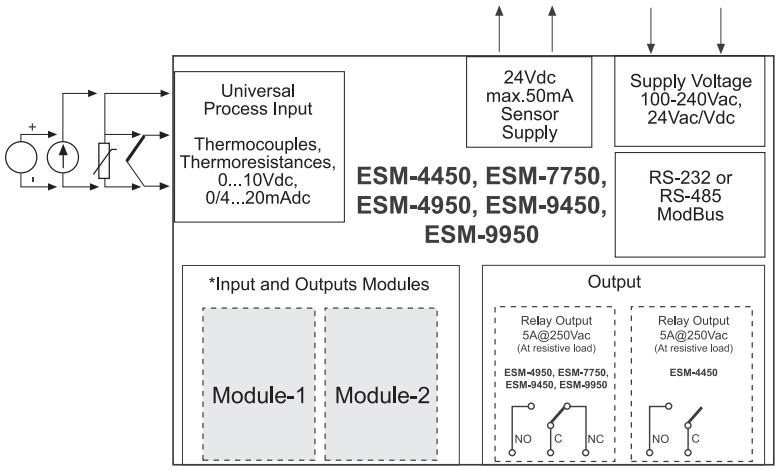
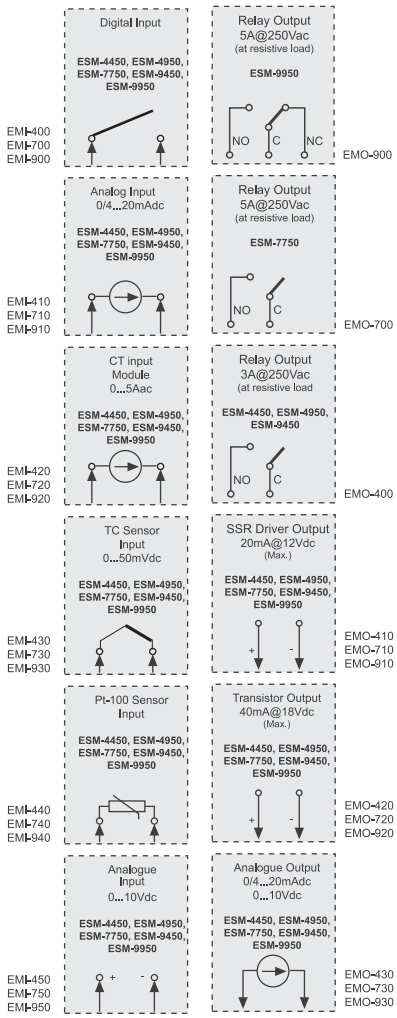
# ESM-4450, ESM-4950, ESM-7750
# ESM-9450, ESM-9950

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

- Universal process input (TC, RTD, mVdc, Vdc, mAdc )
- Optional secondary sensor input
- Dual or multi point calibration for dc Voltage/ Current input
- Configurable ON/OFF, P, PI, PD, PID control forms
- Auto-tune and Self-tune PID
- Manual/Automatic mode selection for control outputs
- Bumpless transfer
- Motorized valve control function
- 8 steps profile control and start-hold-stop options by using logic input modules
- Remote SET by using analogue input modules
- Re-transmission function
- Detection of heater failure by using 0...5Aac CT input module
- Programmable heating, cooling and alarm functions for control outputs
- RS-232 or RS-485 serial communication with Modbus RTU protocol
- Password protection for operator and technician section




Module-1 ve Module-2
Input / Output alternatives

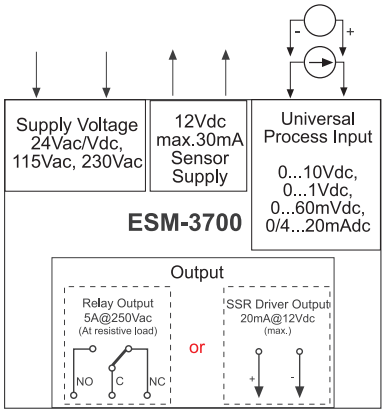



* Input and output modules can be mounted each modules sockets.
* Two input modules can be not be plugged in Module-1 and Module-2 socket at the same time

# ESM-3700


Single SET, Process Indicators

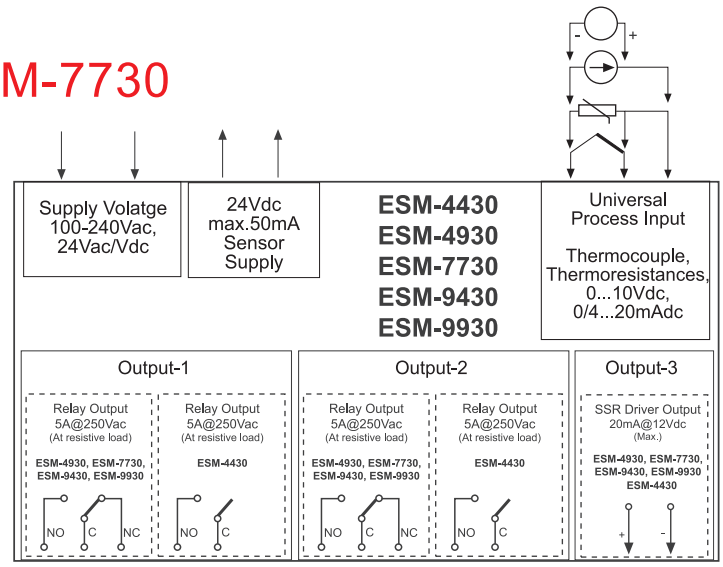
- 0...10Vdc, 0...1Vdc, 0...60mVdc, 0/4...20mAdc Universal process input
- Max. or min measurement value are registered to the device memory
- Max. or min measurement value can be shown continuously on the display
- Adjustable decimal point position
- Programming mode password protection
- Relay output and SSR driver output for alarm output ( it must be determined in order)




# ESM-4430, ESM-4930, ESM-7730 ESM-9430, ESM-9930

PID Dual SET (SET + Alarm)
Process Controllers

- Universal process input (TC, RTD, mVdc, Vdc, mAdc )
- Dual or multi point calibration for dc Voltage/ Current input
- Configurable ON/OFF, P, PI, PD, PID control forms
- Auto-tune and Self-tune PID
- Manual/Automatic mode selection for control outputs
- Bumpless transfer
- Programmable heating, cooling and alarm functions for control outputs
- Password protection for operator and technician section

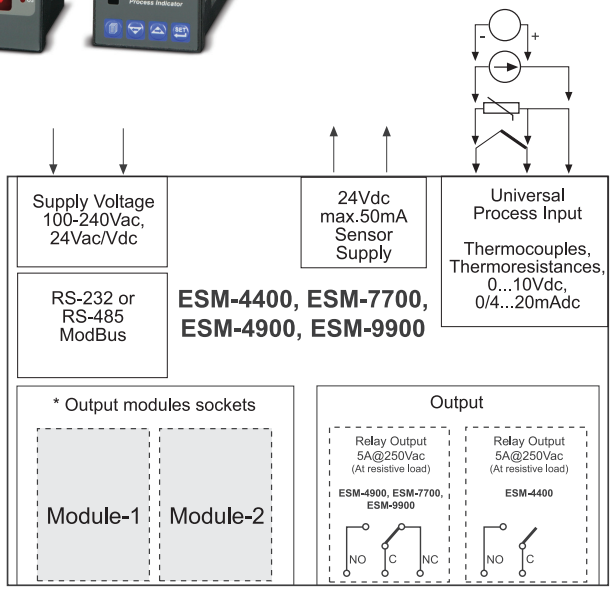




# ESM-4400, ESM-4900, ESM-7700, ESM-9900

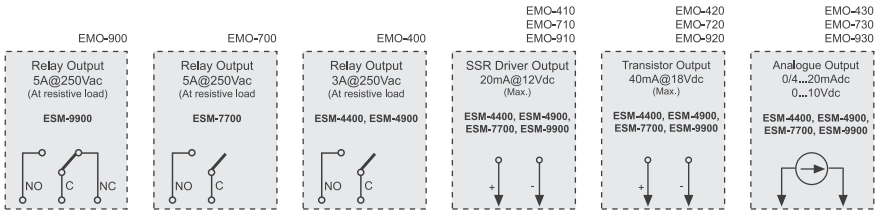
"Smart Output Module" Systems
RS-232/485 Modbus RTU Serial Communication
Process Indicators

- Universal process input (TC, RTD, mVdc, Vdc, mAdc )
- Dual or multi point calibration for dc Voltage/ Current input
- Re-transmission of process value or process control by using current output module
- Programmable high and low alarm functions
- RS-232 (standard) or RS-485 (optional)serial communication with Modbus RTU protocol
- "Smart Output Module" system
- Password protection for operator and technician section




* Output modules can be mounted each modules sockets.

Module-1 and Module-2 Output alternatives



| Order Code | | ESM-4450 | ESM-4950 | ESM-7750 | ESM-9450 | ESM-9950 | ESM-4430 | ESM-4930 | ESM-7730 | ESM-9430 | ESM-9930 | ESM-4435 | ESM-4400 | ESM-4900 | ESM-7700 | ESM-9900 | ESM-3700 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A BC D E / FG HI / U V W Z | | | | | | | | | | | | | | | | | |
| [ ] 20 [ ] 1 / [ ] [ ] / 0 0 0 0 | | | | | | | | | | | | | | | | | |
| A | Supply Voltage | | | | | | | | | | | | | | | | |
| 1 | 100...240Vac (-%15, +%10) 50/60Hz | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | - |
| 2 | 24Vdc/Vac (-%15, +%15) 50/60Hz | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| 3 | 24Vac (-%15, +%15) 50/60Hz | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + |
| 4 | 115Vac (-%15, +%15) 50/60Hz | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + |
| 5 | 230Vac (-%15, +%15) 50/60Hz | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + |
| 9 | 48Vdc (-%15, +%10) 50/60Hz | - | - | - | - | - | - | - | - | - | - | + | - | - | - | - | - |
| BC | Input Type | | | | | | | | | | | | | | | | |
| 20 | Configurable Universal inputs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| D | Serial Communication | | | | | | | | | | | | | | | | |
| 0 | None | | | | | | + | + | + | + | + | + | | | | | + |
| 1 | RS-232 ModBus RTU | + | + | + | + | + | - | - | - | - | - | - | + | + | + | + | - |
| 2 | RS-485 ModBus RTU | + | + | + | + | + | - | - | - | - | - | - | + | + | + | + | - |
| E | Process Output | | | | | | | | | | | | | | | | |
| 0 | None | | | | | | | | | | | | | | | | + |
| 1 | Relay Output (At resistive load 5A@250Vac) | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| 2 | SSR Driver Output (Max. 20mA@12Vdc) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + |
| FG | Input/Output Modules-1 | | | | | | | | | | | | | | | | |
| 00 | None | + | + | + | + | + | | | | | | | + | + | + | + | + |
| 01 | Relay Output | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | - |
| 02 | SSR Driver Output (Max. 20mA@12Vdc) | + | + | + | + | + | - | - | - | - | - | - | + | + | + | + | - |
| 03 | Transistor Output (Max. 40mA@18Vdc) | + | + | + | + | + | - | - | - | - | - | - | + | + | + | + | - |
| 04 | Analogue Output (0/4...20mAdc or 0...10Vdc) | + | + | + | + | + | - | - | - | - | - | - | + | + | + | + | - |
| 07 | Digital Input | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - |
| 08 | Analogue Input (0/4...20mAdc) | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - |
| 09 | CT Input Module (0...5Aac) | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - |
| 10 | Thermocouple Input (0...50mVdc) | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - |
| 11 | Pt-100 Input | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - |
| 12 | Analogue Input (0...10Vdc) | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - |
| HI | Input/Output Module-2 | | | | | | | | | | | | | | | | |
| 00 | None | + | + | + | + | + | | | | | | | + | + | + | + | + |
| 01 | Relay Output | + | + | + | + | + | - | - | - | - | - | + | + | + | + | + | - |
| 02 | SSR Driver Output (Max. 20mA@12Vdc) | + | + | + | + | + | + | + | + | + | + | - | + | + | + | + | - |
| 03 | Transistor Output (Max. 40mA@18Vdc) | + | + | + | + | + | - | - | - | - | - | - | + | + | + | + | - |
| 04 | Analogue Output (0/4...20mAdc or 0...10Vdc) | + | + | + | + | + | - | - | - | - | - | + | + | + | + | + | - |
| 07 | Digital Input | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - |
| 08 | Analogue Input (0/4...20mAdc) | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - |
| 09 | CT Input Module (0...5Aac) | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - |
| 10 | Thermocouple Input (0...50mVdc) | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - |
| 11 | Pt-100 Input | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - |
| 12 | Analogue Input (0...10Vdc) | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - |
| Specifications | | | | | | | | | | | | | | | | | |
| "Smart I/O Module" system | | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - |
| "Smart Output Module" system | | + | + | + | + | + | - | - | - | - | - | - | + | + | + | + | - |
| Universal process (TC, RTD, mVdc, Vdc, mAdc) input | | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | - |
| Bumpless transfer | | + | + | + | + | + | + | + | + | + | + | + | - | - | - | - | - |
| Motorized valve control function | | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - |
| 8 steps profile control | | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - |
| Remote Set point function | | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - |
| Re-transmission function | | + | + | + | + | + | - | - | - | - | - | - | + | + | + | + | - |
| Detection of heater failure by CT input module | | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - |
| Dimension | | | | | | | | | | | | | | | | | |
| 77x35mm DIN | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + |
| 48x48mm DIN 1/16 | | + | - | - | - | - | + | - | - | - | - | + | + | - | - | - | - |
| 96x48mm DIN 1/8 | | - | + | - | - | - | - | + | - | - | - | - | - | + | - | - | - |
| 72x72mm DIN | | - | - | + | - | - | - | - | + | - | - | - | - | - | + | - | - |
| 48x96mm DIN 1/8 | | - | - | - | + | - | - | - | - | + | - | - | - | - | - | - | - |
| 96x96mm DIN 1/4 | | - | - | - | - | + | - | - | - | - | + | - | - | - | - | + | - |

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# Temperature Sensors

Thermocouple

Thermoresistances

Transmitter

Compensation Cable

Resistance Thermometers are used widely from -200 to +850° in different processes. Especially at low temperature, resistance thermometers are preferred since their accuracy is much better than thermocouples. Up to 500°C standard types and between 500 - 850°C special types are used. The maximum immersion length of the resistance thermometers should be determined by considering the measurement errors that may be caused by heat transfer occurring along the protecting tube and R/T element. The fluid speed where the resistance thermometer is immersed is a factor affecting the measurement sensitivity. In general, R/T should be perpendicular to the flow direction. Copper conductive cables are used between resistance thermometer head and the instruments. Up to 10 meters, 2x1.5 mm copper cable, up to 150 meters 3x1.5 mm copper cable, after 150 meters 4x1.5 mm copper cable are used.

Straight thermocouple with metal and ceramic protecting tubes are widely used in a variety of processes between -200°C and 1600°C The maximum operating temperatures given in the catalogue apply to the air where there are no corrosive gases. In general the thermowells chosen for the installation is governed mainly by the corrosion conditions the well will face. The high polish given to all stainless wells provides maximum corrosion resistance. Occasionally, the material consideration is one of the strength rather than corrosion resistance.

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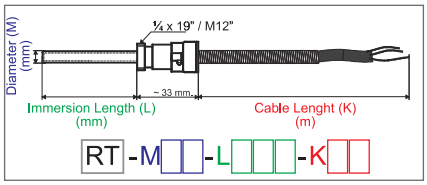
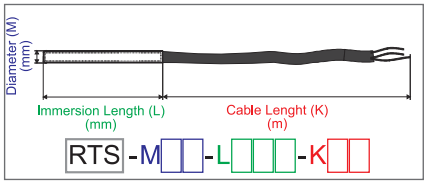
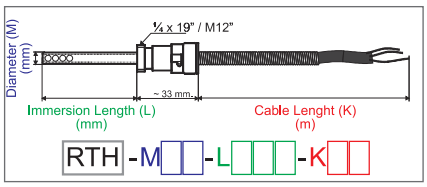
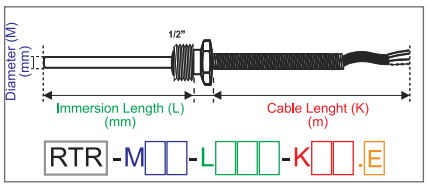
# Thermoresistances




## (RT) Bayonet Type
## (RTS) Bayonet Bore Type
## (RTH) Bayonet Air Type
## (RTR) Bayonet Type with fittingnut.

Max. operating temperature : **400°C** for braided wire
**200°C** for silicone

Standard cable types : Fiber glass + fiber glass + braided wire, 3x0,22 $mm^2$
Silicon + Silicon, 3x0,22 $mm^2$
"Si+Si" is added to order code

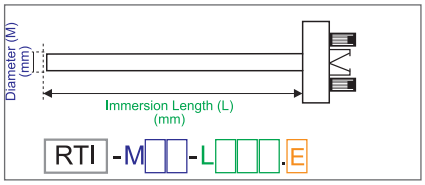
Standard cable length ***(K)*** : **K01** = 1 m, **K02** = 2 m, **K03** = 3 m,
**K04** = 4 m, **K05** = 5 m.

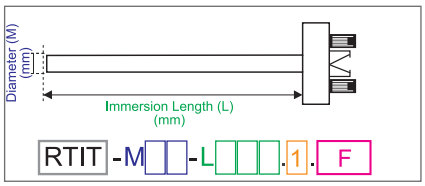
Sensor type : DIN/EN60751 Class "B" **1xPt-100** ( E=1 )
or **2xPt-100** ( E=2 ) (**RTR**)

Protection tube material : Nickel coated brass (**RT**) or
AISI304 (DIN1.4301)
"316" is added to order code for AISI316 (**RTR**)

Connector : ¼ x 19" ( selectable as M12" on ordering)

Fittingnut (**RTR**) : ½" fittingnut is used for standard production



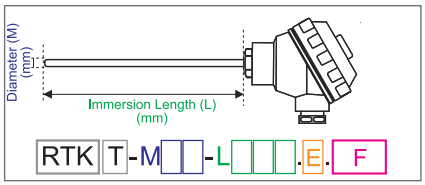

## (RTI) Inset Type,
## (RTIT) Inset Type with Transmitter

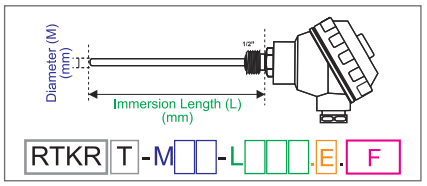
Max. operating temperature : 600°C

Protection tube material : AISI304 (DIN1.4301)
"316" is added to order code for AISI316

Sensor type : DIN/EN60751 Class "A" 1xPt-100 E=1 (**RTIT**)
DIN/EN60751 Class "B" 2xPt-100 E=2

Transmitter (**RTIT**) : 4...20mA current output, serial connection,
(Loop Powered) transmiter.
F = Calibration scale must be described on ordering




## (RTK) Terminal Block Type,
## (RTKR) Terminal Block, with Fittingnut Type,
## (RTKT) Terminal Block, with Transmitter Type,
## (RTKRT) Terminal Block, with Fittingnut, Transmitter Type,

Max. operating temperature : 600°C

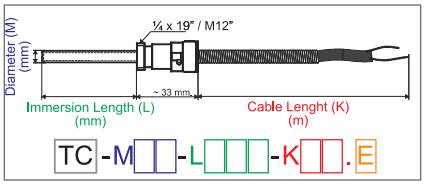
Protection tube material : AISI304 (DIN1.4301)
"316" is added to order code for AISI316

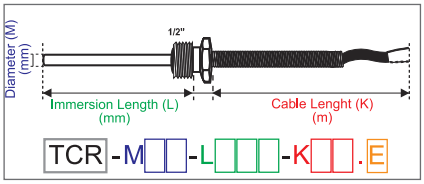
Sensor type : DIN/EN60751
Class "A" 1xPt-100 için E=1 (**RTKT**, **RTKRT**)
DIN/EN60751 Class "B" 2xPt-100 için E=2

Transmitter (**RTKT**, **RTKRT**) : 4...20mA current output, serial connection,
(Loop Powered) transmiter.
F = Calibration scale must be described on ordering

# Thermocouples

## (TC) Bayonet Type,
## (TCR) Bayonet Type with fittingnut




Max. operating temperature : **400°C** for braided wire
**200°C** for silicone

Standard cable types : Fiber glass + fiber glass + braided wire,3x0,22 $mm^2$
Silicon + Silicon, 3x0,22 $mm^2$
"Si+Si" is added to order code

Standard cable length ***(K)*** : **K01** = 1 m, **K02** = 2 m, **K03** = 3 m,
**K04** = 4 m, **K05** = 5 m.

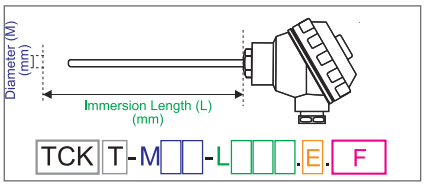
Sensor type : DIN/IEC-584 "J" FeCu-Ni E=J,
DIN/IEC-584 "K" NiCr-Ni E=K

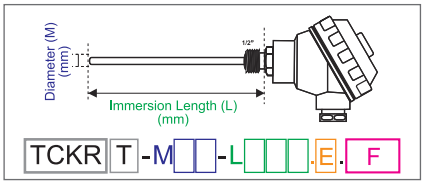
Protection tube material : Nickel coated brass or AISI304 (DIN1.4301)

Connector (**TC**) : ¼ x 19" ( selectable as M12" on ordering)

Fittingnut (**TCR**) : ½" fittingnut is used for standard production

## (TCK) Terminal Block Type,
## (TCKR) Terminal Block, with Fittingnut Type,
## (TCKT) Terminal Block, with Transmitter Type,
## (TCKRT) Terminal Block, with Fittingnut and Transmitter Type,



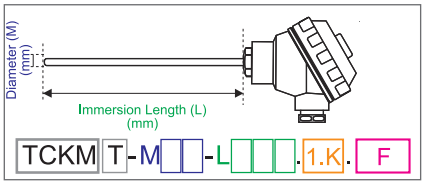

Max. operating temperature : "K" type 1200°C (M22), 900°C (M16), 800°C (M10)
"K and J type" 600°C (M06, M08)

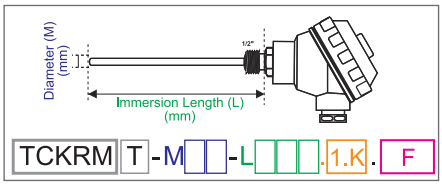
Protection tube material : AISI304 (DIN1.4301)
"316" is added to order code for AISI316

Sensor type : DIN/IEC-584 "J" FeCu-Ni E=1.J,
DIN/IEC-584 "K" NiCr-Ni E=1.K,
DIN/IEC-584 2x"J" FeCu-Ni E=2.J (**TCK**, **TCKR**),
DIN/IEC-584 2x"K" NiCr-Ni E=2.K (**TCK**, **TCKR**)

Transmitter (**TCKT** or **TCKRT**) : 4...20mA current output, serial connection,
(Loop Powered) transmiter.
F = Calibration scale must be described on ordering.

## (TCKM) Terminal Block Type,
## (TCKRM) Terminal Block, with Fittingnut Type,
## (TCKMT) Terminal Block, with Transmitter Type,
## (TCKRMT) Terminal Block, with Fittingnut and Transmitter Type,




Max. operating temperature : 1200°C

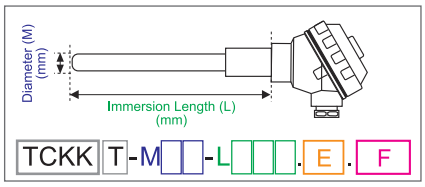
Protection tube material : AISI310 (DIN1.4841)
"inconel" is added to order code for INCONEL600

Sensor type : DIN/IEC-584 "K" NiCr-Ni E=1.K,

Transmitter (**TCKMT** ve **TCKRMT**) : 4...20mA current output, serial connection,
(Loop Powered) transmiter.
F = Calibration scale must be described on ordering

# Thermocouples

## (TCKK) Terminal Block Type,
## (TCKKT) Terminal Block, with Transmitter Type,



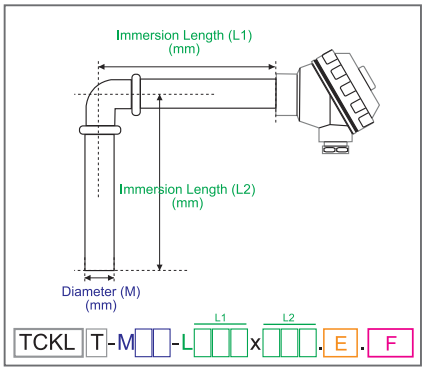

Max. operating temperature : 1200°C for “K” NiCr-Ni
1600°C for “S” Pt10%Rh-Pt
1600°C for “R” Pt13%Rh-Pt

Wire Diameter : 3,00mm for “K” type
0,35mm for “S” and “R” type

Protection tube material : KER610 Ceramic

Sensor type : DIN/IEC-584 “K” NiCr-Ni E=1.K,
DIN/IEC-584 “S” Pt10%Rh-Pt E=1.S,
DIN/IEC-584 “R” Pt13%Rh-Pt E=1.R,
2x“K” NiCr-Ni E=2.K (**TCKK**),
2x“S” Pt10%Rh-Pt E=2.S (**TCKK**),
2x“R” Pt13%Rh-Pt E=2.R (**TCKK**)

Transmitter (**TCKKT**) : 4...20mA current output, serial connection,
(Loop Powered) transmiter.
F = **Calibration scale must be described on ordering**




## (TCKL) Terminal Block Type “L” Type,
## (TCKLT) Terminal Block Type “L” Type, Transmitter Type

Max. operating temperature : 700°C

Protection tube material : AISI304 Stainless steel

Sensor type : DIN/IEC-584 “J” FeCu-Ni E=1.J,
DIN/IEC-584 “K” NiCr-Ni E=1.K,
2x“J” FeCu-Ni E=2.J (**TCKK**)
2x“K” NiCr-Ni E=2.K (**TCKK**)

Transmitter (**TCKKT**) : 4...20mA current output, serial connection,
(Loop Powered) transmiter.
F = **Calibration scale must be described on ordering**

## Compensation Cable

Silicon + fiber glass + braided wire, 2 x 1,50 mm2 IEC584 “J” FeCu-Ni
Silicon + fiber glass + braided wire, 2 x 1,50 mm2 IEC584 “K” NiCr-Ni
Silicon + fiber glass + braided wire, 2 x 1,50 mm2 IEC584 “S” Pt10%Rh-Pt
Silicon + fiber glass + braided wire, 2 x 1,50 mm2 IEC584 “R” Pt13%Rh-Pt

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# Counters and Timers


EZM-4450
EZM-7750
EZM-4950
EZM-9950

Multifunctional programmable Counter, Total Counter, Batch Counter, Chronometer, Frequencymeter,Tachometer RS-232/485 ModBus ACSII/RTU serial communication

EZM-4430
EZM-7730
EZM-4930
EZM-9930

Programmable Counters, Single SET

EZM-4435
EZM-7735
EZM-4935
EZM-9935

Programmable Timers, Single SET

ERM-3770

Digital Tachometer

**Counter / Totalizer Counter,**

**Batch Counter,**

**Timer,**

**Chronometer,**

**Frequencymeter and**

**Tachometer** functions

- Operation with Automatic and Manual Reset
- Output Module System
- UP / DOWN counting function
- Programmable Time Base ( Millisecond, Second, Minute, Hour )
- Operation with Single SET or Dual SET
- Functional alarm selections
- Encoder, proximity, switch, capacitive sensor input type
- Start, Reset, Pause Inputs
- Relay, Transistor or SSR driver outputs selections
- Multiplication coefficient and decimal point position
- Password protection for programming section

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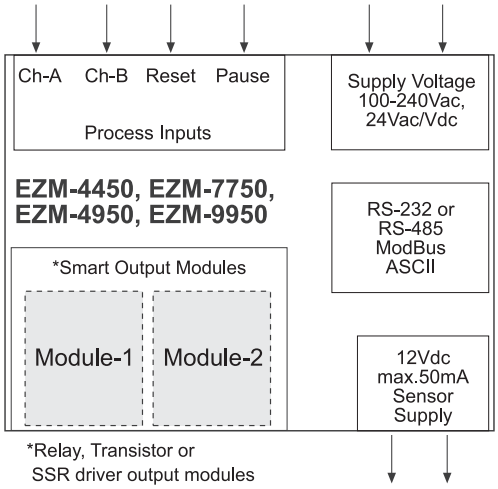
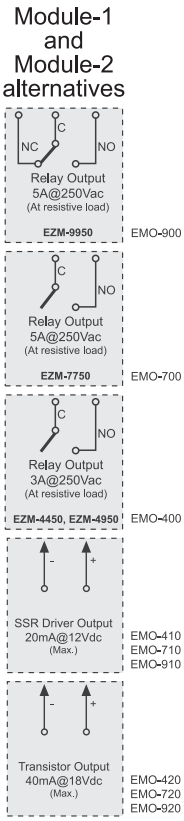
# EZM-4450, EZM-7750, EZM-4950, EZM-9950

Multifunctional Programmable Counter and Timer

- Counter / Totalizer,
- Batch Counter,
- Timer,
- Chronometer,
- Frequencymeter,
- Tachometer,
- RS-232 or RS-485 Serial Communication with Modbus ASCII or RTU protocol
- Operation with Single SET or Dual SET Values
- NPN, PNP input types
- Optional smart Output module systems
- Password protection for programming section



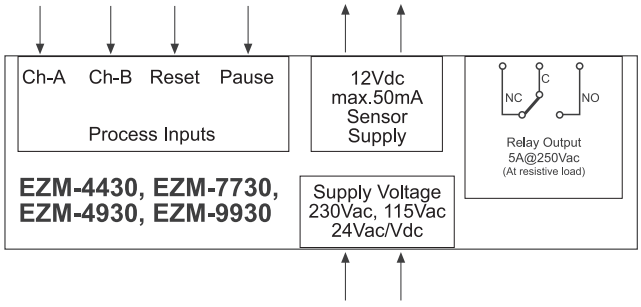





# EZM-4430, EZM-7730, EZM-4930, EZM-9930

Programmable Counters

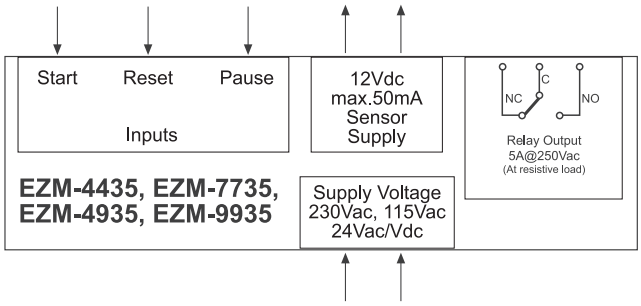
- Programmable Single SET operation
- Operation with Automatic and Manual reset
- NPN, PNP input type selection
- 5A@250Vac Relay output
- Multiplication Coefficient and Decimal point position
- Password protection for programming section




# EZM-4435, EZM-7735, EZM-4935, EZM-9935

Programmable Timers

- 6 digits Process and 6 digits Set value display
- Operation with 1 Set Value
- Reset, Pause and Start inputs
- Operation with Automatic or Manual Reset
- Programmable Time ( in Millisecond, Second, Minute, Hour)
- Password protection for programming section

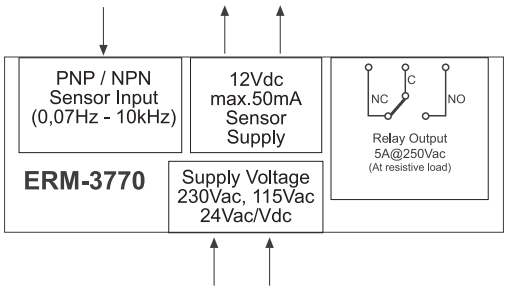




# ERM-3770

Digital Tachometer

- 4 digits display
- PNP or NPN input type
- Adjustable decimal point position
- Adjustable division rate
- 0,07 Hz. and 1000Hz input signal
- Relay output for Alarm control output
- Working with adjustable Alarm SET
- Alarm SET value boundary



| Order Code | | EZM-4450 | EZM-7750 | EZM-4950 | EZM-9950 | EZM-4430 | EZM-7730 | EZM-4930 | EZM-9930 | EZM-4435 | EZM-7735 | EZM-4935 | EZM-9935 | ERM-3770 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A BC D E / FG HI / U V W Z | | | | | | | | | | | | | | |
| [ ] 00 [ ] [ ] / [ ] [ ] / 0 0 0 0 | | | | | | | | | | | | | | |
| A | Supply Voltage | | | | | | | | | | | | | |
| 1 | 100-240Vac (-%15, +%10) 50/60Hz | + | + | + | + | - | - | - | - | - | - | - | - | - |
| 2 | 24Vac/Vdc (-%15, +%10) 50/60Hz | + | + | + | + | + | + | + | + | + | + | + | + | + |
| 3 | 24Vac (-%15, -%15) 50/60Hz | - | - | - | - | + | + | + | + | + | + | + | + | + |
| 4 | 115Vac (-%15, -%15) 50/60Hz | - | - | - | - | + | + | + | + | + | + | + | + | + |
| 5 | 230Vac (-%15, -%15) 50/60Hz | - | - | - | - | + | + | + | + | + | + | + | + | + |
| D | Serial Communication | | | | | | | | | | | | | |
| 0 | None | | | | | + | + | + | + | + | + | + | + | + |
| 1 | RS-232 ModBus ASCII | + | + | + | + | - | - | - | - | - | - | - | - | - |
| 2 | RS-485 ModBus ASCII | + | + | + | + | - | - | - | - | - | - | - | - | - |
| E | Process Output-1 | | | | | | | | | | | | | |
| 0 | None | + | + | + | + | | | | | | | | | + |
| 1 | Relay Output | - | - | - | - | + | + | + | + | + | + | + | + | + |
| FG | Modules Output-1 | | | | | | | | | | | | | |
| 00 | None | + | + | + | + | + | + | + | + | + | + | + | + | + |
| 01 | Relay Output | + | + | + | + | - | - | - | - | - | - | - | - | - |
| 02 | SSR Driver Output (max. 20mA@12Vdc) | + | + | + | + | - | - | - | - | - | - | - | - | - |
| 03 | Digital (Transistor) Output (max. 40mA@18Vdc) | + | + | + | + | - | - | - | - | - | - | - | - | - |
| HI | Modules Output-2 | | | | | | | | | | | | | |
| 00 | None | + | + | + | + | + | + | + | + | + | + | + | + | + |
| 01 | Relay Output | + | + | + | + | - | - | - | - | - | - | - | - | - |
| 02 | SSR Driver Output (max. 20mA@12Vdc) | + | + | + | + | - | - | - | - | - | - | - | - | - |
| 03 | Digital (Transistor) Output (max. 40mA@18Vdc) | + | + | + | + | - | - | - | - | - | - | - | - | - |
| Specifications | | | | | | | | | | | | | | |
| **Counter** | | + | + | + | + | + | + | + | + | - | - | - | - | - |
| **Total Counter** | | + | + | + | + | - | - | - | - | - | - | - | - | - |
| **Batch Counter** | | + | + | + | + | - | - | - | - | - | - | - | - | - |
| **Timer** | | + | + | + | + | - | - | - | - | + | + | + | + | - |
| **Chronometer** | | + | + | + | + | - | - | - | - | - | - | - | - | - |
| **Frequencymeter** | | + | + | + | + | - | - | - | - | - | - | - | - | - |
| **Tachometer** | | + | + | + | + | - | - | - | - | - | - | - | - | + |
| Working with automatic and manual reset | | + | + | + | + | + | + | + | + | + | + | + | + | - |
| Smart Output module system | | + | + | + | + | - | - | - | - | - | - | - | - | - |
| Ch-A, Ch-B Encoder inputs | | + | + | + | + | + | + | + | + | - | - | - | - | - |
| Multiplication coefficient and decimal point position | | + | + | + | + | + | + | + | + | - | - | - | - | + |
| Process display | | 6 digits | 6 digits | 6 digits | 6 digits | 6 digits | 6 digits | 6 digits | 6 digits | 6 digits | 6 digits | 6 digits | 6 digits | 4 digits |
| SET display | | 6 digits | 6 digits | 6 digits | 6 digits | 6 digits | 6 digits | 6 digits | 6 digits | 6 digits | 6 digits | 6 digits | 6 digits | - |
| Start input | | - | - | - | - | - | - | - | - | + | + | + | + | - |
| Reset and Pause input | | + | + | + | + | + | + | + | + | + | + | + | + | - |
| Supply voltage for switch and proximity sensors | | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Operation with 2 Set values | | + | + | + | + | - | - | - | - | - | - | - | - | - |
| Password protection for programming section | | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Dimension | | | | | | | | | | | | | | |
| 77x35mm DIN | | - | - | - | - | - | - | - | - | - | - | - | - | + |
| 48x48mm DIN 1/16 | | + | - | - | - | + | - | - | - | + | - | - | - | - |
| 72x72mm DIN | | - | + | - | - | - | + | - | - | - | + | - | - | - |
| 96x48mm DIN 1/8 | | - | - | + | - | - | - | + | - | - | - | + | - | - |
| 96x96mm DIN 1/4 | | - | - | - | + | - | - | - | + | - | - | - | + | - |

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# Custom Oriented Controllers for Industrial Applications


## ESM-9944
## ESM-9945
Cooking Controllers for bakery applications,
Heating + Timer with internal buzzer

## EZM-9910
## EZM-9920
Length Measurement Control Device with
communication system for Textile Industry

## ESM-9990
Heat Treatment Controller

## EPM-3712
Single Axis Potentiometer Input Controller
for Sheet Rolling Machines

## EPM-3790
## EPM-7790
Digital Potentiometer for
Motor Speed Control Drivers

## ESM-1510
Enclosure Air Conditioning Temperature Controller

## ESM-3770
## ESM-3770-D
Digital ON/OFF Air Conditioning Controller

Since 1986, EMKO ELEKTRONIK A.S. continues its activities in desing, production , before and after sales techinical support of Industrial Measurement and control devices. Due to its many years of experience on different sectors, EMKO Elektronik implements and produces application-oriented products. The Measuring , control and data evaluation of the specific applications can be done with the products designed by EMKO, after examining the manufacturing sectors such as machinery, textile, glass, ceramic, automative chemical, heating, cooling, ventilation, metal processing, food, packaging, plastic, wood processing, automation, etc.

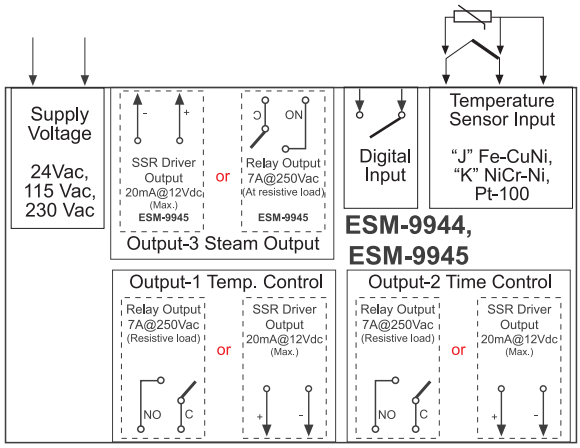
EMKO


with buzzer

# ESM-9944
# ESM-9945

Cooking Controllers

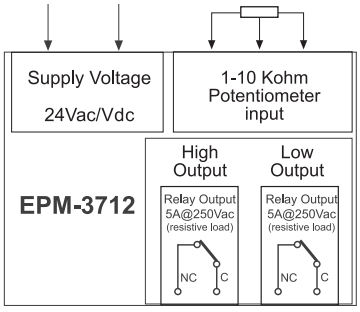
- Easy to use
- Temperature, Time SET values and control values are displayed same time
- Thermocouple and thermoresistances input types
- ON/OFF or Proportional control form selection
- Working time selection in minutes or second
- Adjustable internal buzzer according to cooking time and alarm status
- Automatic Start-Stop by closing-openning door switch (ESM-9945)
- Manual or Automatic control for Steam output
- Password protection for programming mode

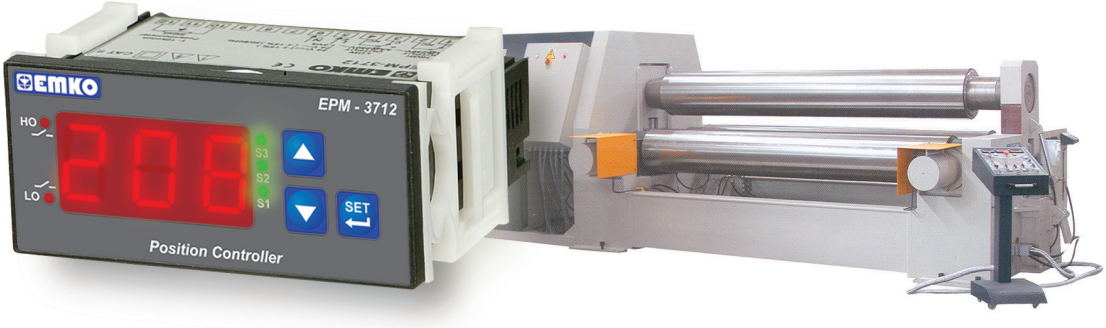



# EPM-3712

Single Axis Potentiometer Input Controller for Sheet Rolling Machine

- Operation at adjustable 3 different set values
- Potentiometer input
- Set value boundaries
- High and Low relays outputs



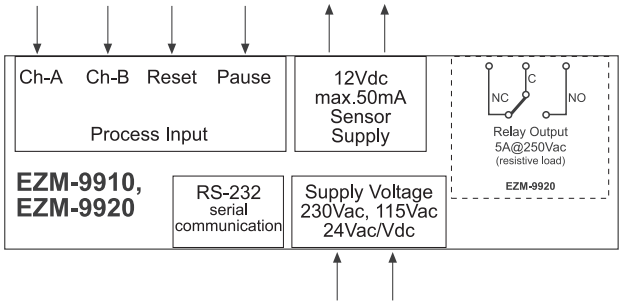






# EZM-9910
# EZM-9920

Lenght Measurement Control Device
for Textile Industry

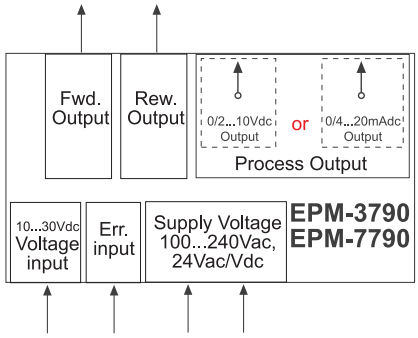
- Reset, Pause, Ch-A and Ch-B inputs
- NPN / PNP input types selection
- Inc x1/x2/x4 (with encoder) type or counting
- Coefficient and decimal point position
- Standard RS-232 serial communication
- Single SET and relay output for EZM-9920
- Inch or Metrics indication selections




# EPM-3790
# EPM-7790

Digital Potentiometer for Motor Speed Control Drivers

- Operation at adjustable set value
- Ramp function
- Easily adjustable set value from front panel
- Configurable display scale between -1999...9999
- Adjustable decimal point
- SET value low limit and set value high limit boundaries
- Adjustable ramp up and ramp down time
- Password protection for programming and adjustment sections.
- Forward, Reverse direction outpus and error input for V/F speed controller
- 0/2..10Vdc Voltage output 0/4...20mA Current output
  (It must be determined for programming and adjustment sections)

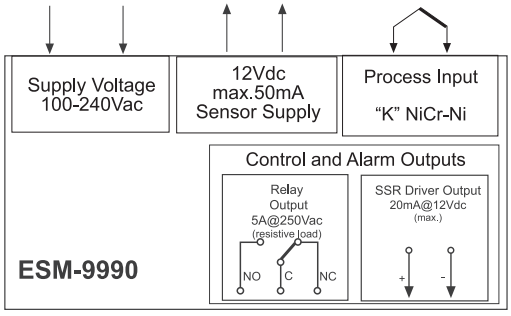





# ESM-9990

Heat Treatment Controller

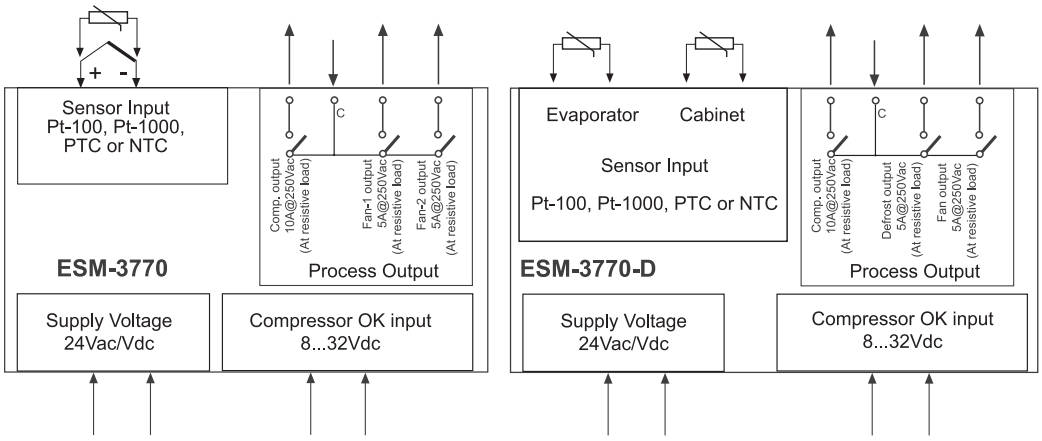
- 4 steps profile control ( Ramp&Soak ) function
- Adjustable Ramp and Soak values for each step
- Start, Stop and Pause control from front panel
- ON/OFF control forms
- Power off Back-up
- “K” NiCr-Ni (-200...1300°C) sensor input type
- Password protection for programming section.




# ESM-3770
# ESM-3770-D

Digital ON/ OFF Air Conditioning Controller

- Cooling applications
- NTC, PTC, PT-100 or PT-1000 input type
  ( it must be determined in order )
- ON/OFF temperature control
- 2 Step fan outputs
- Compressor OK digital input
- Adjustable hysteresis value
- Compressor protection time
- Password protection for programming mode

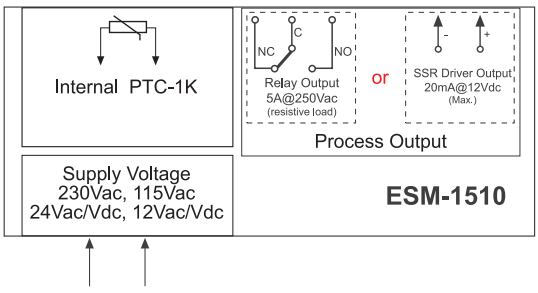




# ESM-1510

Enclose Air Conditioning
Temperature Controller

- Internal PTC sensor
- ON/OFF temperature control
- Heating / Cooling applications
- Adjustable temperature offset value
- DIN RAIL Mounting
- 3 digits display
- Password protection for programming section.

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# Poultry House Controllers


EPC series

## Poultry House Controllers

***Layer***
Egg production

***Broiler***
Chicken productions for excellent quality meat

***Breeder***
Mother and father growth for broiler and layer

Configurable “AGE CURVE”,

Easy to use,

Two zones house temperature measurement & control,

Heating, cooling and humidity control,

Feeding control from age curves, feeding storage silo weight measurement & control,

Lighting control from age curves, lighting control with analogue output,

Outside temperature measurement and intelligent influence on controls,

Outside temperature min. and max. data daily recording & logging,

Water, Electricity, Food consumption measurement, daily data recording & logging,

Ventilation control with 8 stages relay outputs and analogue output,

Shutter Open/Close control with relay outputs and analogue output,

Animal weight measurement from up to 3 scales placed in house,

Daily animal weight recording & logging ...

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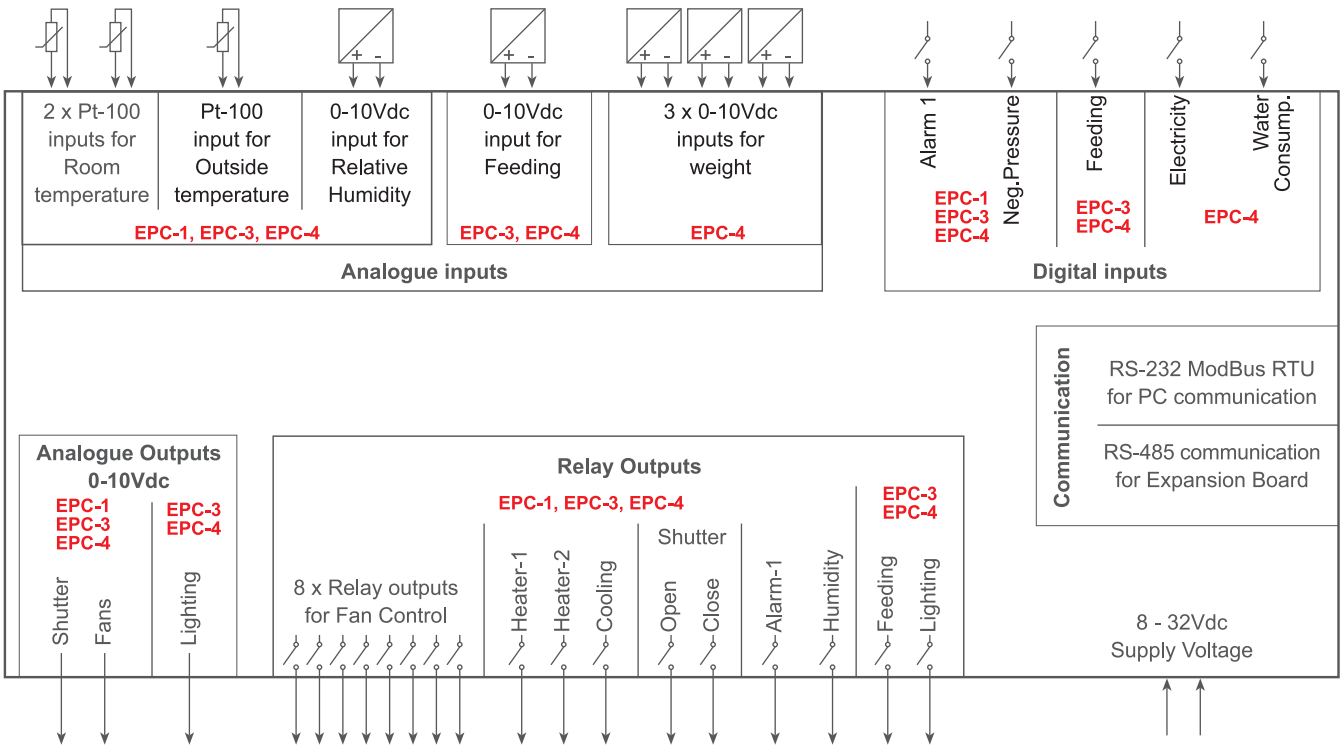



| Functions | EPC-1 | EPC-3 | EPC-4 |
|---|---|---|---|
| Age CURVE | + | + | + |
| RS-232 / RS-485 Serial Communication, ModBus RTU protocol | + | + | + |
| Pt-100 input -1, Room Temperature Measurement | + | + | + |
| Pt-100 input -2, Room Temperature Measurement | + | + | + |
| Pt-100 input -3, Outside Temperature Measurement | + | + | + |
| 8 Relay Outputs for Fans | + | + | + |
| 0-10Vdc Analogue Output for Fans | + | + | + |
| Heater-1 and Heater-2 Relay Outputs | + | + | + |
| Cooling Relay Outputs | + | + | + |
| Alarm Relay Output and 2 Alarm Signal Inputs | + | + | + |
| Shutter Open/Close Relay Outputs | + | + | + |
| 0-10Vdc Analogue Output for Shutter Control | + | + | + |
| Humidity Control Relay Output & %RH measurement | + | + | + |
| Feeding Relay Output & Feeding weight measurement | | + | + |
| 0-10Vdc Analogue Output for Lighting Control | | + | + |
| Feeding Consumption Log | | + | + |
| Lighting Curves & Lighting Relay Output | | + | + |
| Water & Electricity Consumption measurement inputs (pulse) & Log | | | + |
| 3 animal weight measurement inputs & Log | | | + |


```
WATER CONSUMPTION

03.07.08      02.11.27
RESET CONSUM:       NO
DAILY CONSUM:    430LT
TOTAL CONSUM: 15316LT
DAY NUMBER   :      12
```

```
ELECTRICITY ENERGY
CONSUMPTION
03.07.08      02.11.28
RESET CONSUM:       NO
DAILY CONSUM:    15KWH
TOTAL CONSUM: 5018KWH
DAY NUMBER   :      12
```

```
WEIGHTING1 LOG
03.07.08      02.11.26
TARE         :      NO
LOG CLEAR    :      NO
ACT AVERAGE  :   151GR
YSTR AVERAGE:   143GR
TOTAL WEIGH  :   980GR
DAY NUMBER   :      12
```

```
03.07.08      02.11.27
HOUSE      20.2°C
OUT        12.1°C
FEEDING        0KG
DAY      -5    CURVE
```

```
03.07.08      02.11.27
HOUSE      20.2°C
ROOM1          20.2°C
ROOM2          30.4°C
FEEDING          65%
DAY      -5    CURVE
```

```
SYSTEM MONITORING
TMPSETCURVE:    20.0°C
ROOM1 TEMP  :   15.1°C
ROOM2 TEMP  :   19.4°C
OUTSIDE TMP:    25.3°C
MAXVNTCURVE:    8%00
MINVNTCURVE:    0%00
VENTILATION:    0%00
```

```
MAX & MIN VALUES 1

HOUSE MIN  :    20.2°C
TIME       :     02:11
HOUSE MAX  :    30.4°C
TIME       :     13:21
```

```
EVENTS

EVENT  1

04.07.2008  11:07:03

NO ENOUGH FEED ALARM
```

```
ALARM SET VALUES
ABSOLUTE MIN:   16.0°C
ABSOLUTE MAX:   38.0°C
DIFFERENTIAL:    6.0°C
TYPE         :NONLATCH
```

```
PROCESS OUTPUTS
HEATING1        :   43%
HEATING2        :   65%
COOLING         :    5%
HUMIDITY        :   23%
VENTILATION     : 5%00
SHUTTER         : 1%00
LIGHTING ANALOG:   10%
```

```
SET VALUES
TEMP.HOUSE:   20.0°C
TEMP.HEAT  :  -2.0°C
TEMP.COOL  :  -1.0°C
HUMIDITY   :     20%
VENT.MIN   :   0%00
VENT.MAX   :   8%00
DAY        :     -5
```

```
INFLUENCE 1
F.L.O.T/MN.VNT:    NON
T.L.O.T/MN.VNT: -25.0
MAX.VENT COOL  :  8%00
F.L.O.T/T.OFF  :   NON
T.L.O.T/T.OFF  : -25.O
```

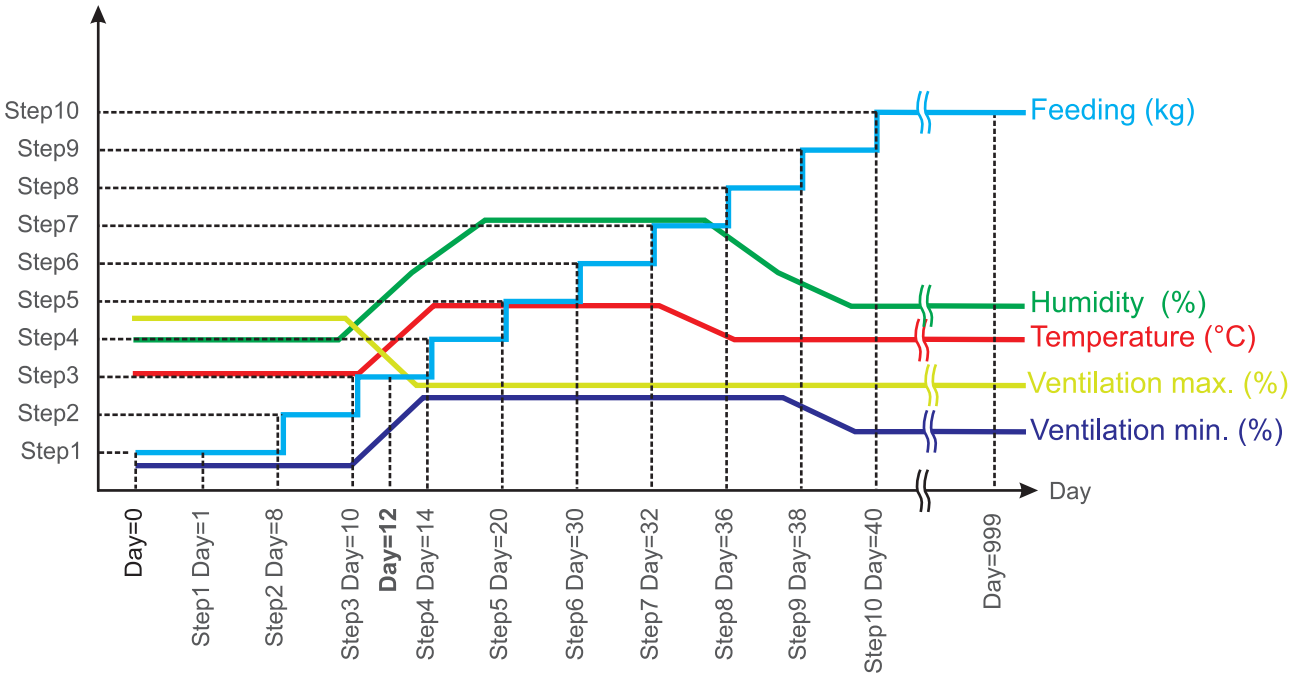
### What is an “Age Curve”?:

Optimal temperature, ventilation, humidity, feeding and lighting values change day by day. EPC offer automatic adjustment of optimal values, depending on entered parameters which are in CURVE SETUP pages. This function is called “AGE CURVE”.

| CURVE SETUP | |
|---|---|
| CURVE STEP: | 1 |
| DAY : | 1 |
| HOUSE TEMP: | 33.0°C |
| MIN. VENT : | 0%01 |
| MAX. VENT : | 1%00 |
| HUMIDITY : | 65% |

| FEEDING PARAMETERS CURVE STEP 1 | | |
|---|---|---|
| | HR:MN | FEE<KG> |
| Y1: | 06:00 | 150 |
| Y2: | 10:00 | 200 |
| Y3: | 12:00 | 100 |
| Y4: | 19:00 | 100 |
| Y5: | 22:00 | 200 |

| LIGHTING PARAMETERS CURVE STEP 1 | | | |
|---|---|---|---|
| | HR:MN | HR:MN | OUT% |
| A1: | 04:00 | 02:00 | 20 |
| A2: | 07:00 | 01:00 | 40 |
| A3: | 08:30 | 01:30 | 50 |
| A4: | 16:00 | 00:00 | 0 |
| A5: | 21:00 | 02:00 | 100 |




### Breeder
Mother and father growth for broiler and layer

### Broiler
Chicken production for excellent quality meat

### Layer
Egg production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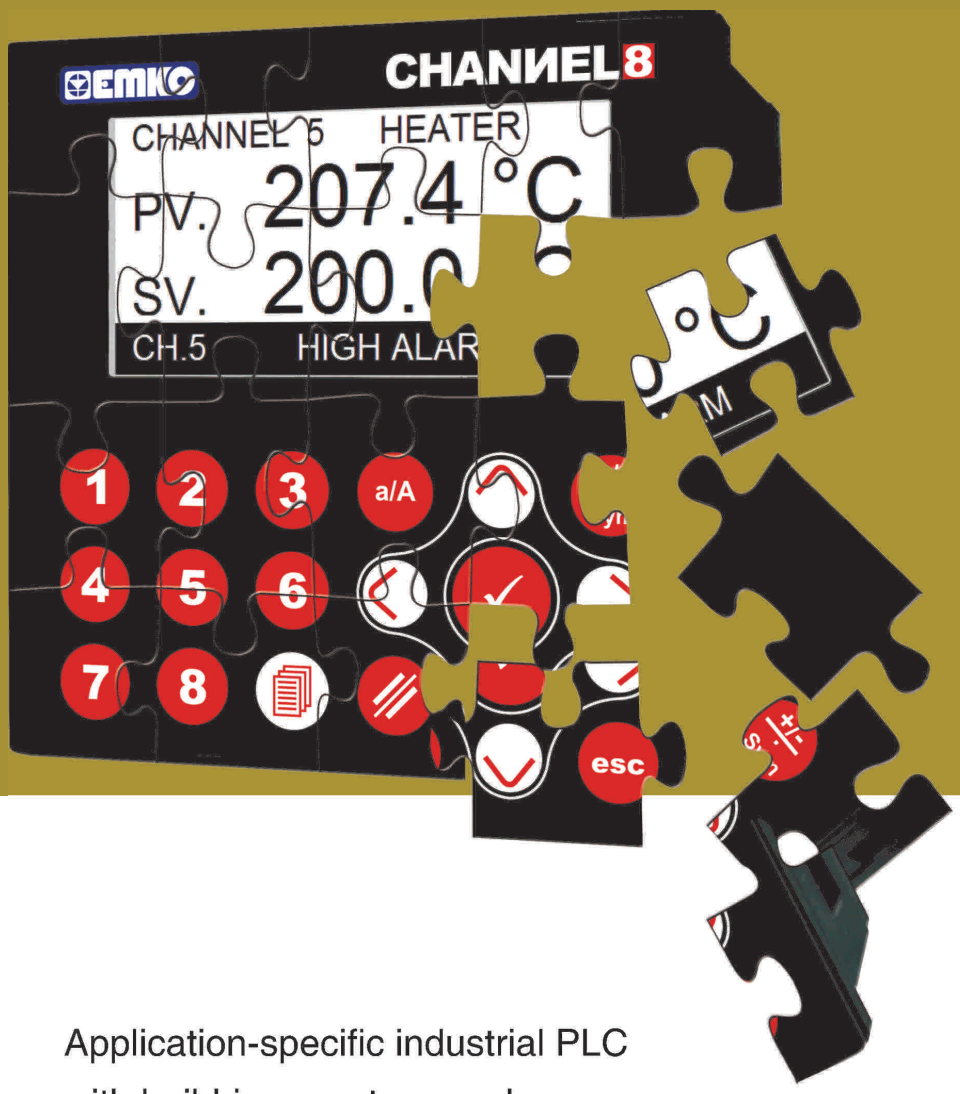
# Do It Yourself




USB ETHERNET ModBus

## CHANNEL 8
**8 Channel Scanner**

## PIDQuadro
**4 Zone PID Controller**

## Confree
**Chiller Controller**

## turnstile
**Spooling Machine Controller**

Application-specific industrial PLC with build-in operator panel

- We do the PLC programming for you,
- PLC + HMI in one unit,
- Data logging by USB memory and PC software,
- Network communication by Ethernet,
- Serial communication by RS-232 or RS-485,
- Standard ModBus RTU communication protocol,
- Networking between multiple devices with Master/Slave option,
- Custom design front panel overlay, buttons and screen views,
- 96x96 mm panel mounting type,
- Easy adaptation to different applications by selectable I/O modules,
- 6 input and 7 output modules to select for customizing the device,
- Remote programming via Ethernet,
- Communicates with external HMI panels,
- Customizing for different applications,

EMKO

# Unlimited Applications for Machinery Manufacturers

EPLC-96 series Application-specific industrial PLC with build-in operator panel can be applied to all kinds of processes. Just specify your application, we customize your device for you...

Examples of some applications;

CHANNEL 8

## 8 Channel Scanner


**8 Channel Scanner,**
8 x Pt-100 inputs, different SET values for each channel, Relay or Transistor Alarm outputs for each channel, Low, High and Range alarms for each channel, Data logging by USB memory, Networking between multiple devices by RS-485 serial communication.

**Applications:**
Visualising temperature for 8 different zones, Data logging applications, HVAC, Heating/Cooling, Cold and Drying room automations.

PIDQuadro

## 4 Zone PID Controller

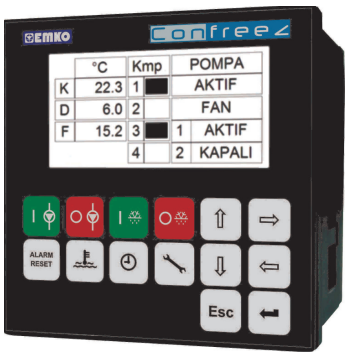

**4 Zone PID Controller ,**
4 x Universal thermocouple input, SET value for each zones, 2 x Relay or Transistor output for each zone, low, high alarms for each zones, optional analogue output for each zones, data logging by USB memory, network between multiple devices by RS-485 serial communication

**Appications:**
Tunneloven with convertor, Packing machines, Extruder, Textile RAM machine, Sterilization and Pasteurization applications, Steam control by Motorized valve.

# OEM Controllers

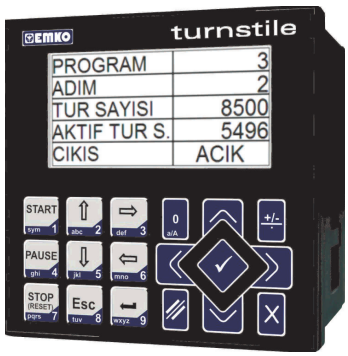
**Chiller Controller ,**
4 x Pt-100 inputs, Control up to 4 Compressor, Compressor synchronization, Low/High pressure, Oil pressure measurement and failure detection, emergency alarm output, Logging last 20 events, Working hour for compressor, Turkish, English, Russian language selections.

Confreez
## Chiller Controller




**Spooling Machine Controller ,**
Rotary encoder input, Start, Stop/Reset, Pause inputs and buttons, Motor control output, 50 different transformer specification receipts can be defined, 18 steps for each program, RS-232 and CanBus communication, ModBus RTU serial communication.

turnstile
## Spooling Machine Controller

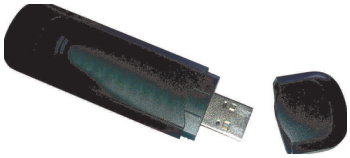



**&&&, Your machine's controller,**
Just specify your application and describe your system needs, EMKO Elektronik with 25 year experience, will customize a special control unit for your system.

# Unlimited Communication

USB

**Data logging by USB 2.0,**
Logging selected process values,
Logging in determined sample periods.



ETHERNET

**Remote Management via Ethernet,**
ModBus Over TCP-IP protocol,
Static and Dynamic IP,
Remote management via Internet, Intranet or Local Network,
Can be integrated to different SCADA softwares.

ModBus

**RS-232 standard ModBus RTU serial communication,**
Visualizing and programming from PC software.

ModBus

**RS-485 serial network,**
Networking between multiple devices by RS-485 serial communication.

CANBus

**Expandable via CanBus,**
Additional I/O expansion modules can be connected to the device in order to increase the number of the I/O 's on the device.

# Technical Specifications

**T type Output Module ,**
- 11 x Insulated PNP (source) transistor outputs
- 2 x PWM Outputs

**U type Output Module,**
- 11 x Insulated PNP (source) transistor outputs
- 2 x PWM Outputs
- 1 x 0-10Vdc or 0-20mAdc Analogue Output

**V type Output Module,**
- 11 x Insulated PNP (source) transistor outputs
- 2 x PWM outputs
- 2 x 0-10Vdc or 0-20mAdc Analogue Outputs

**W type Output Module,**
- 2x5 NO Relay Outputs (Common connection)

**X type Output Module,**
- 2x5 NO Relay Outputs (Common connection)
- 1 x 0-10Vdc or 0-20mAdc Analogue Output

**Y type Output Module,**
- 6 x NO Relay Outputs

**Z type Output Module,**
- 5 x NO Relay Outputs
- 1 x 0-10Vdc or 0-20mAdc Analogue Output

**A type Input Module ,**
- 12 x Insulated NPN/PNP selectable Digital Inputs
- 2 x Fast Counter Inputs

**B type Input Module,**
- 9 x Insulated NPN/PNP selectable Digital Inputs
- 2 x Fast Counter Inputs
- 1 x Universal Analogue Input

**C type Input Module,**
- 4 x Insulated NPN/PNP selectable Digital Inputs
- 1 x Fast Counter Input
- 4 x Insulated Thermocouple Inputs

**E type Input Module,**
- 4 x Insulated NPN/PNP selectable Digital Inputs
- 1 x Fast Counter Input
- 4 x Analogue Inputs selected by dip-switch

**G type Input Module,**
- 3 x Insulated NPN/PNP selectable Digital Inputs
- 1 x Fast Counter Input
- 8 x 2wire Pt-100 Inputs

**H type Input Module,**
- 3 x Insulated NPN/PNP selectable Digital Inputs
- 1 x Fast Counter Input
- 8 x Analogue Inputs selected by dip-switch

**Specifications**

| | |
|---|---|
| **Dimensions** | : 96 x 96 x 87,5mm 1/4 DIN 43700 panel montage type, 92 x92mm panel cut-out |
| **Protection class** | : NEMA 4X (front IP65, rear IP20) |
| **Weight** | : 400g. |
| **Working temperature** | : Between 0 to +50°C |
| **Storing temperature** | : Between -20°C to +70°C |
| **Relative Humidity cond.** | : max. 90% (non condensing) |
| **Power consumptions** | |
| **for Input modules** | : 5W (24Vdc, +/-%15) |
| **for Output modules** | : 2W (12 or 24Vdc), Additional 24W power consumption for each transistor output type |
| **Analogue Inputs** | : TC, RTD, Voltage/Current |
| **Thermocouple Inputs** | : L (DIN43710), J,K,R,S (IEC584.1, ITS90), C (ITS90) Pt-100 (IEC751, ITS90) |
| **Vdc Voltage Inputs** | : 0...50mVdc, 0...10Vdc |
| **mAdc Current Inputs** | : 0...20mAdc |
| **Accuracy** | : +/-0,25% of full scale for Thermocouple, Thermoresistance and Voltage measurement 0,70% of full scale for Current measurement |
| **Cold junction compen.** | : +/- 0,1°C/1°C automatic |
| **Line compensation** | : Max. 10 Ohms |
| **Sensor break protec.** | : Up to scale |
| **Reading period** | : 30ms (for each channel) |
| **Reading period for Fast Counting input** | : 30kHz single channel counter 20kHz double, encoder 30kHz frequency reading |
| **Digital outputs** | : Insulated transistor and relay outputs |
| **Transistor outputs** | : 500V insulated PNP, max. 1A@24Vdc |
| **Relay outputs** | : 3A@250Vac resistive at load (W & X type outputs) 5A@250Vac resistive at load (Y & Z type outputs) |
| **Analogue outputs** | : 0...20mAdc and/or 0...10Vdc (max. 10mA) |
| **Communication ports** | : 500V Insulated RS-485 (ModBus RTU) 1500V Insulated Ethernet (ModBus RTU) |
| **Display** | : 128x64 pixel graphic LCD |
| **Approval Standards** | : CE |

## EPLC-96
(96x96 DIN Size)

| A | BC | D | E | / | FG | HI | / | U | V | W | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 00 | 0 | | / | | | / | 0 | 0 | 0 | 0 |

| E | Optional Communications |
|---|---|
| 0 | None |
| 1 | USB |
| 2 | RS485 |
| 3 | Ethernet |
| 4 | Ethernet + USB |
| 5 | RS-485 + USB |
| **FG** | **Input Module** |
| A0 | A type Input Module |
| B0 | B type Input Module |
| C0 | C type Input Module |
| E0 | E type Input Module |
| G0 | G type Input Module |
| H0 | H type Input Module |
| **HI** | **Output Module** |
| T0 | T type Output Module |
| U1 | U type Output Module, (0-10Vdc) |
| U2 | U type Output Module, (0-20mAdc) |
| V1 | V type Output Module, (0-10Vdc) |
| V2 | V type Output Module, (0-20mAdc) |
| V3 | V type Output Module, (0-10Vdc + 0-20mAdc) |
| W0 | W type Output Module |
| X1 | X type Output Module, (0-10Vdc) |
| X2 | X type Output Module, (0-20mAdc) |
| Y0 | Y type Output Module |
| Z1 | Z type Output Module, (0-10Vdc) |
| Z2 | Z type Output Module, (0-20mAdc) |

# What is your application?

Process Controllers

Heating & Cooling Controllers

Temperature Controllers

Counters and Timers

Temperature Sensors

EMKO

25th year

Custom application Solutions

Poultry House Automation Controllers

GenSet Protection & Controllers

Data Logging Softwares

Remote Monitoring GenSet Controllers

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