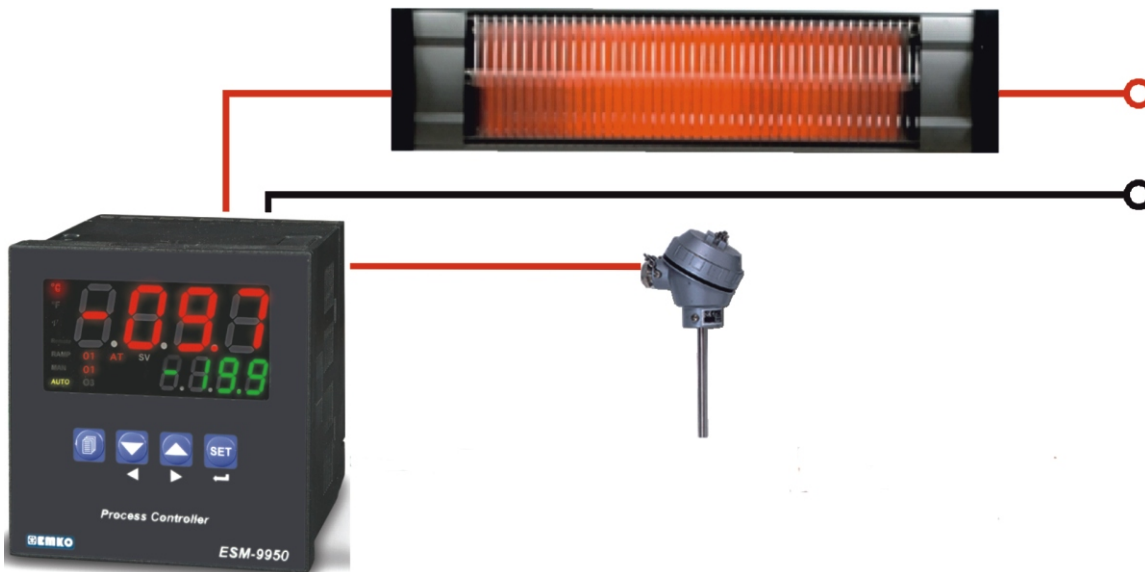


TEMPERATURE CONTROL AND HEATER FAILURE DETECTION WITH ESM-XX50 SERIES



ESM-XX50 series process controllers can be used to process input value (temperature, humidity, weight, pressure etc.) and control desired outputs accordingly. The Input/Output modules, Universal Inputs, RS 232/ RS 485 serial communication modules enhance the application fields of ESM-XX50 series process controllers. Some of the applications can be listed as follows; PID Process Control, Motorized Valve Control, Profile Control, Heating Failure Detection.

Heating failure detection is commonly required in heating processes such as;

- Steel hardening
- Ceramic ovens
- Plastic enjections
- Moldings etc.

Sample application;

Heating failure detection from

- Single resistance
- Multiple resistances
- J Type Sensor Input (Temperature Measurement)
- CT Module for Heating Failure Detection
- Control Output (ON/OFF, P, PI, PD, PID)
- Alarm / Control Output (Relay, SSR, Digital, Analog)
- Iop2 is temperature control output through (EMO-400 relay output module)
- Output3 is active if the heater or one of the heaters (in the use of multiple resistances) breaks down.

diSP LiSt: Function Selection for Top and Bottom Display

tdSP

It defines the function of the top display.

This parameter determines which value is shown on top display.

0000

Temperature (PV) is shown on top display.

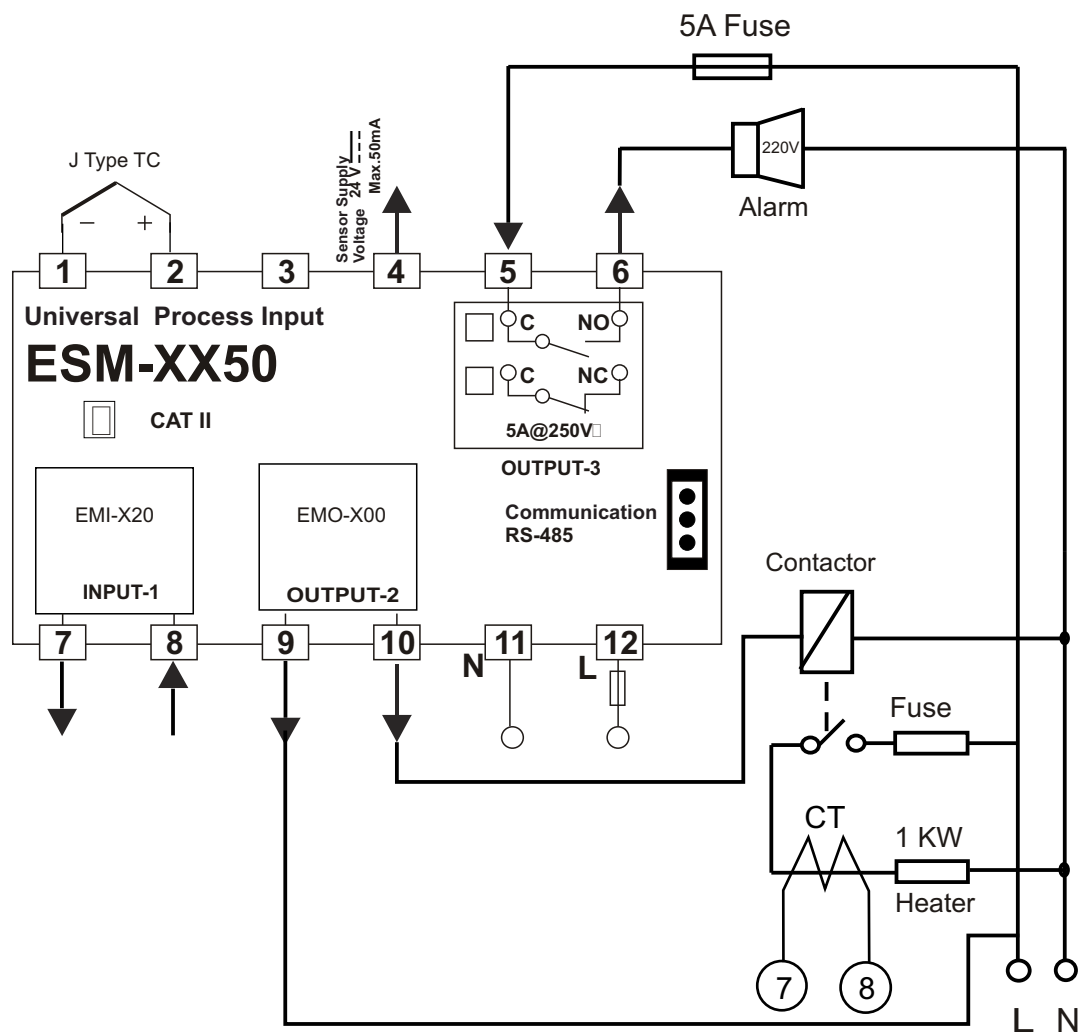
bdSP

It defines the function of the bottom display.

0004

The current value measured with CT in module is shown on bottom display .

Electrical Connections



PinP ConF: Process Input Type and Relevant Parameters with Process Input

- `.55L` Defines the process input type.
- `0000` TC input type selection
- `EE5L` Defines type and scale of the thermocouple
- `0003` J (-199.9°C;900.0°C) or (-199.9°F;999.9°F)

ioP1 ConF: MODULE-1 Configuration Parameters

- `[ctr 1]` Current transfer ratio for Module-1. It can be adjusted from 0 to 100. This function is active when EMI-X20 module is in Input-1.

For 100:5A type current transformer ;This parameter is set to
 $ctr1 = 100/5 = 20$

ioP2 ConF: MODULE-2 Configuration Parameters

- out2** Defines output function for Output-2
- HEAT** Heating
- Con2** Defines control algorithm of Output-2.
- onof** ON/OFF control algorithm is selected.
- HYS2** Hysteresis value can be adjusted from 0% to 50% of defined scale.
- HYN2** It determines operation form of hysteresis.
- 0000** SV+ HYS/2 and SV- HYS/2
 - 0001** SV and SV+HYS or SV and SV-HYS

out3 ConF: Output-3 Configuration Parameters

- out3** Defines output function for Output-3
- Lout** Logic output
- Lou3** It determines logic output function of Output-3.
It is active if output function of Output-3 is Lout(Logicoutput)
- 0000** Alarm output
- ALS3** Measurement input selection for Output-3 alarm output. This parameter is visible if Logic output function of Output-3 is Alarm output and one of the analogue input modules is plugged in Module-1 or Module-2 socket
- 0001** Alarm output runs according to the analogue input module (2nd sensor input) in Module-1 or Module-2 socket.
- ALT3** It determines the alarm type.
It is active if logic output function of Output-3 is alarm output.
- 0006** Heating failure alarm. It is active when CT module is in Module-1 socket.

Set LiSt: Set Values

PSET Process value is set to 100.

ALr2 Alarm-2 is set to 2,50.

Calculating alarm set value for heating failure

Set = $[(\text{Current value without failure} + \text{Current value with heater failure})] / 2$

For this example ;

The heater (200V and 1kW) ;

Current when the heater works properly = $1000 / 200 = 5A$

In case of failure the current would be = 0 A

Then;

Alarm set value should be entered = $(5+0) / 2 = 2.5A$

If multiple resistances are used (4 for this example) = $(1000 / 200) * 4 = 20A$

Since each resistance draws 5A current, in case of resistance failure total current will be 15A.

Then; Alarm set value should be = $(20+15) / 2 = 17,5A$