LDSmart LMSmart LHSmart

This product family encompass temperature controllers developed with the most advanced technologies.
Light and very compact (1/16 DIN size), they are able to respond to the most sophisticated demands of easy and reliable control of the temperature process.

To use these instruments and to obtain the best result in control stability and reliability, it is necessary only:
• to connect the instrument;
• to set the set point and alarm thresholds;
• to push the SMART pushbutton.

In this way all operators, with or without skills in temperature process nor knowledge of PID control parameters, can obtain a control insensitive to the noise, perfect in quality and able to adjust itself automatically to the load variations or to the modified process parameters.

Additional functions as specific algorithm for heating/cooling control (LHS only), the dual display (LHS and LMS only) and the process, deviation or band alarms complete the features of these instruments.

The SMART function

This new self-tuning method makes large use of the artificial intelligence concepts and logic decision structures.
In addition to the standard control algorithms, these instruments incorporate sophisticated mathematical models.
Thank to it, these instruments are able to self-adjust automatically and rapidly to all the plant variations (load variations, set point variations, etc.) and it can assure the best control without user intervention and without any disturbance on the process.

The final result is the possibility to guarantee an optimum and reliable control for all the processes and for all the users also.

MAIN FEATURE

This product family was developed by an R&D dedicated to the measurement and control instrumentation and in possession of a specific know-how in electronic design, automation, firmware development, and mechanical engineering.
It is manufactured with the most up-to-date technology (SMT), tested with dedicated computer for IN CIRCUIT tests and FUNCTIONAL tests, verified with burn-in made during a long time and with many cycle in climatic chambers in order to guarantee reliability and a long and maintenance free operative life.
The basic features are:

- 1/16 DIN 48 x 48 mm dimensions.
- Switching power supply (from 100 to 240 V A.C.).
- IP 65 (*) and NEMA 4X (*) front protection.
- SMART function for the self-tuning of control parameters.
- Specific algorithm for heating/cooling control (LHS only).
- TC and RTD input with programmable ranges.
- Easy Man/machine interface.
- Timed output power limiter.
- Configurable output type (relay or SSR).
- Alarm, programmable as process alarm, deviation alarm, band alarm, instrument failure alarm.
- OFFSET in the measured value.
- Stand by of the alarm.
- Output power off.

GENERAL CHARACTERISTICS

Case:	polycarbonate dark grey color. Self-extinguishing degree V0 according to UL-94.
Front protection:	designed and tested for IP 65 (*) and NEMA 4X (*) for indoor locations (when panel gasket is installed).
Installation:	panel mounting.
Rear terminal block:	10 screw terminals with safety rear cover.
Dimension:	1/16 DIN (48x48 mm) according to DIN 43700; 100 mm depth.
Cut-out:	45x45 mm +0,8 mm -0 mm.
Weight:	160 g.
Nominal power supply:	from 100 to 240 V AC, 50/60 Hz or 24 V AC or DC.
Power supply variation:	-15% +10% of nominal value.
Power consumption:	6 VA.
Insulation resistance:	> 100 Mohm (Class III apparatus) according to IEC 1010-1.
Insulation strength:	1500 Vrms.
Electromagnetic compatibility and safety requirements:	This instrument is marked CE. Therefore, it is conforming to council directives 89/336/EEC (reference harmonized standard EN-50081-2 and EN-50082-2) and to council directives 73/23/EEC and 93/68/EEC (reference harmonized standard EN 61010-1).
Installation category:	II.
Sampling time:	500 ms typical.
Accuracy:	±0,3 fsv ±1 digit @ 25 °C and nominal power supply voltage.
Temperature drift:	< 200 ppm/°C of fsv selected (RJ excluded). < 400 ppm/°C of fsv for RTD range -19.9/99.9.
Reference junction drift:	0.1 °C/°C.
Common mode rejection ratio:	120 dB @ 50/60 Hz.
Normal mode rejection ratio:	60 dB @ 50/60 Hz.
Ambient temperature:	0 to +50 °C.
Storage temperature:	-30 to 70 °C.
Humidity:	from 20% to 85% RH non condensing.

Control actions:

ON/OFF, PID or SMART.

Special function:	stand by alarm sequence.
Protections:	internal jumper for calibration and configuration parameters protection.

INPUTS

Input:	thermocouples (J, L, K, N, T) or RTD Pt 100. The input type is keyboard programmable.
Engineering unit:	°C or °F programmable.
Reference junction:	automatic compensation from 0 to 50 °C.
Line impedance:	100 Ω max for TC input < 4 Ω per wires for RTD input.
Burn-out:	down scale or up scale programmable. On RTD input, a special test is provided to signal OVERRANGE when input resistance is less than 15 Ω (Short circuit sensor detection).
Calibration:	according to IEC 584-1 and DIN 43710-1977.

TABELLA SCALE STANDARD

Input	Ranges		
TC L	0/800 °C	0/999 °F	DIN 43710-1977
TC J	0/800 °C	0/999 °F	IEC 584-1
TC K	0/999 °C	0/999 °F	IEC 584-1
TC N	0/999 °C	0/999 °F	IEC 584-1
TC T	0/400 °C	0/752 °F	IEC 584-1
RTD Pt 100	-19.9/99.9°C		DIN 43760
RTD Pt 100	-199/500 °C	-199/999 °F	DIN 43760

(*) Test were performed in accordance with CEI 70-1 and NEMA 250-1991 STD.

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OUTPUTS

Main output:
a) Relay SPDT, contact rating 3 A @ 250 V AC on resistive load.
b) Logic output for SSR, max load 700 Ω protected against accidental short circuit.
Logic level 1: 14 V DC ±20% @ 20 mA max
24 V DC max ±20% @ 1 mA.
Logic level 0: < 0.5 V DC.

Cooling output (LHS only):
a) Relay SPST and contact normaly open, contact rating 1 A @ 250 V AC on resistive load.
b) Logic output for SSR, max load 700 Ω protected against accidental short circuit.
Logic level 1: 14 V DC ±20% @ 20 mA max
24 V DC max ±20% @ 1 mA.
Logic level 0: < 0.5 V DC.

ALARM

Alarm functions:
process alarm
deviation alarm
band alarm
instrument malfunctioning annunciator.

Type of alarm:
- High /Low (Outside/Inside for band alarm)
- Direct/Reverse
- Programmable automatic or manual reset.
- Masked alarm/No masked alarm.

Alarm hysteresis: 0.1 - 10.0% of input span or 1 LSD.

Alarm output: relay SPST 1 A @ 250 V AC resistive load.

SPECIFIC CHARACTERISTICS

Display: 3 digit 7 segments LED display; figure high 10 mm.

BAR-GRAPH: one green LED + 2 red LED for 5 level deviation indication.

Indicators:
1 red LED for heating output in ON condition.
1 red LED for alarm 1 in ON condition
1 green LED for SMART function enabled indication.

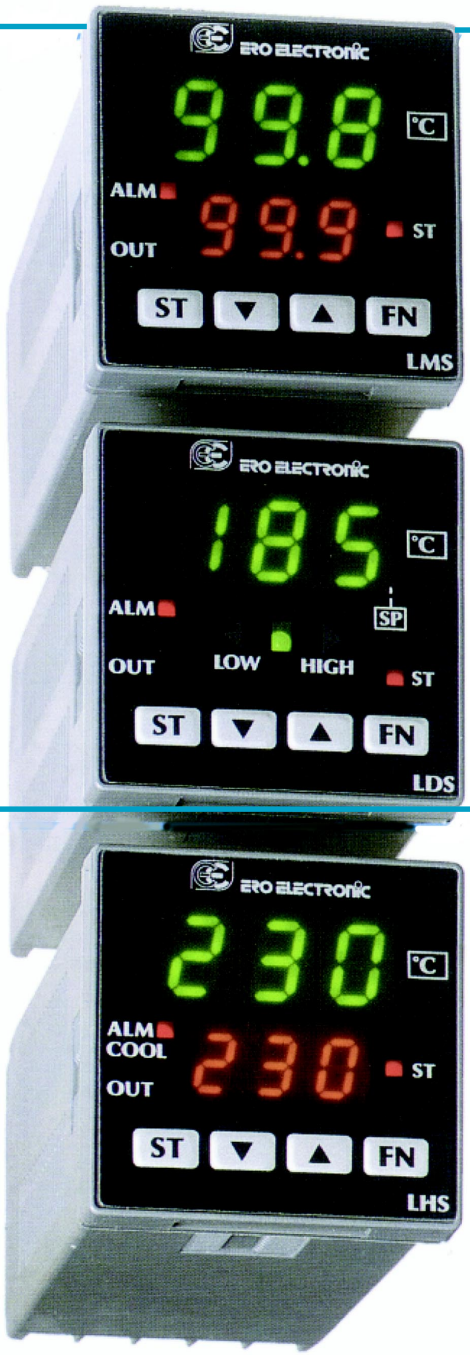
SPECIFIC CHARACTERISTICS

Upper display: 3 digit 7 segments LED display: figure high 10 mm.

Lower display: 3 digit 7 segments LED display; figure high 7.6 mm.

Indicators:
1 red LED for heating output in ON condition.
1 red LED for cooling output in ON condition or alarm in ON condition.
1 green LED for SMART function enabled indication.

Cooling output (LHS only):
a) Relay SPST and contact normal open, contact rating 1 A @ 250 V ac on resistive load.
b) Logic output for SSR max load 700 Ω protected against accidental short circuit.
Logic level 1: 14 V dc ±20% @ 20 mA max
24 V dc max ±20% @ 1 mA.
Logic level 0: < 0.5 V cc.



LDS - LMS CODING

FAMILY
L = Temperature controller

MODEL
DS = 3 Digit + deviation bar-graph
MS = Dual display

INPUT
4 = TC - RTD

CONTROL ACTION
9 = Smart or PID

HEATING OUTPUT
1 = Relay
6 = SSR

OPTION
0 = Not provided
1 = 1 alarm

POWER SUPPLY
3 = 100 - 240 V AC
5 = 24 V AC/DC

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LHS CODING

MODEL
LHS = Dual display temperature controller with H/C output

INPUT
4 = TC + RTD

CONTROL ACTION
9 = SMART or PID

HEATING OUTPUT
1 = Relay
6 = SSR

COOLING OUTPUT/ALARM
1 = Relay

OPTION
0 = Not provided

POWER SUPPLY
3 = 100 - 240 V AC
5 = 24 V AC/DC

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DIMENSIONS AND PANEL CUT-OUT