



1600

Series 1/16 DIN Temperature Controllers

- **SMART Self-Tuning with Fuzzy Logic**
- **NEMA 4X Faceplate**
- **Soft Start Power Limiting on Power-Up**
- **Universal Inputs**
- **Switching Power Supply from 100-240 Vac, 50/60 Hz**
- **IEC 801-4 Noise Immunity**
- **Three Year Warranty**



1600 Series Models

- 1601 Single 3-Digit Display
- 1603 Dual 3-Digit Display, Heat/Cool Control
- 1604 Dual 4-Digit Display, Three Control Outputs
- 1604mA, Linear Output for Process/Setpoint Retransmit
- 1605 Ramp/Soak Controller
- 1600 High/Low Limit Controller

Description

The fully field configurable 1600 series 1/16 DIN controllers combine advanced hardware design and sophisticated electronic control technology into a compact, reliable 1/16 DIN package.

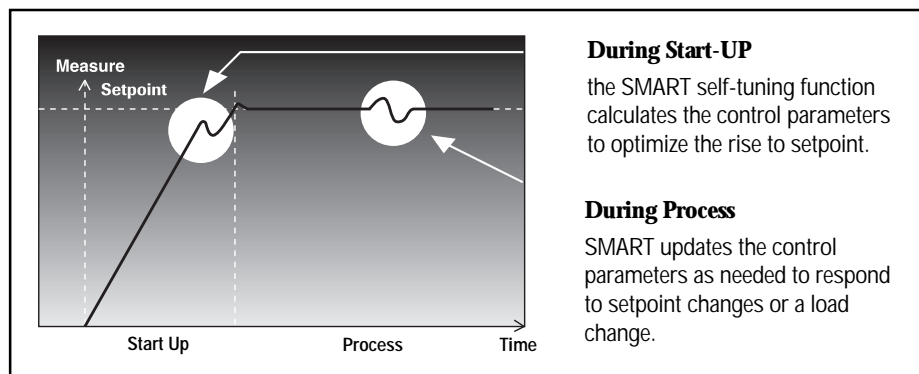
Easy to install and operate, the plug-in design requires only panel cutout, instrument mounting, setpoint and alarm setpoint adjustment to set up.

The 1600 series' SMART self-tuning feature automatically adjusts the controller to rapidly respond to all process changes. Sophisticated control features include:

- Start-up and continuous in-process tuning
- Continuous self-tuning without artificial upset
- Proprietary control algorithm using fuzzy logic/artificial intelligence concepts
- Proven maximum suppression of overshoot

Applications

- Rubber production, polymerization and synthetic fiber plants
- Packaging and packing equipment
- Fermentation equipment, reactors for chemical and pharmaceutical industries
- Food industries
- Environmental chambers and refrigeration
- Extrusion lines, co-extrusion lines, plastic films and injection presses



During Start-UP

the SMART self-tuning function calculates the control parameters to optimize the rise to setpoint.

During Process

SMART updates the control parameters as needed to respond to setpoint changes or a load change.

1600 1/16 DIN Temperature Controllers *(cont'd.)*

Specifications

Control Modes	Field Selectable	On/Off
	Manual (1604 only)	PID SMART (Autotune) Bumpless, Balanceless transfer with Proportional Control
Heat/Cool (1604 only)	Relative Gain	0.20-1, select air, oil or water
Outputs		
Output #1	One (1) Heat or Cool Output	
	Relay	NO. SPDT contact, 3 Amps at 250 Vac (resistive)
	SSR Drive	Transistor output of 24 Vdc max at 1mA, 14 Vdc ± 20% at 20mA
		4-20 mA Current
Output #2	One Alarm Output (1603/1604 only), or Vdc Cool Output (1603/1604 only)	
	Relay	NO. SPST contact, 2 Amps at 250 Vac (resistive)
Output #3 (1604 only)	Alarm Output	One (1) SPST relay, 2 Amps at 250 Vac (resistive load)
Alarm Features		
Functions	Field Selectable	Process, Deviation, Band or Heater Breakdown Alarm (1604 only)
Types		High/Low for Process Alarm Inside/Outside for Band Alarm Normally Energized/Normally De-energized Inhibit on Power-Up and Setpoint Changes Latching/Non-latching (Manual/Automatic Reset)

Input Specifications

Sensor Type	1600/1604**		1603/1601	
	Range* °F	°C	Range °F	°C
Thermocouple	J	-150 to +1830	-100 to +1000 -100.0 to +400.0	0-999 0-800
	K	-150 to +2500	-100 to +1370 -100.0 to +400.0	0-999 0-999
	L	0-1650	0-900 -100.0 to +400.0	0-999 0-999
	N	-150 to +2550	-100 to +1400	0-999 0-999
	R	0-3200	0-1760	
	S	0-3200	0-1760	
	T	-330 to +750	-199.9 to +400.0	
RTD				
		-330 to +1470 -199.9 to +400.0	-200 to +800 -199.9 to +400.0	-199 to +999 -199 to +500 -19.9 to +99.9
Current (1604 only)	0-20 mA or 4-20 mA dc		Range and decimal points programmable, -1999 to 4000	
Voltage (1604 only)	0-5, 1-5, 0-10, or 2-10 Vdc, 0-60 or 12-60 mVdc			

*Field Programmable for °C or °F

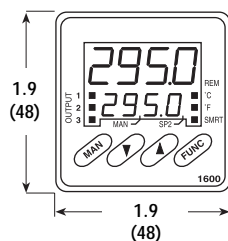
**1604 with Digital Communications does not have negative sensor range.

Digital Communications (1604 only) RS-485 multi-drop, Isolated, CPlF, ASCII Line Mode, Modbus and J-BUS protocol selection

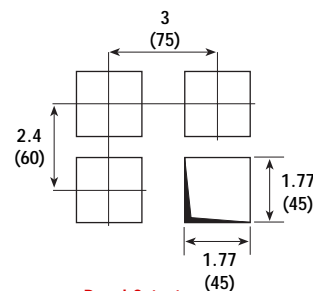
Instrument Power 100-240 Vac, +10%, -15%, 50-60 Hz, 24 Vac or Vdc

Operating Environment 30-120°F (0-50°C) ambient with less than 85% relative humidity

Dimensions



Front View



Panel Cutout

All Dimensions in Inches (mm)