Life Is On | Eurotherm by Schneider Electric

Imagine Process Excellence Made Easy

Piccolo™ Temperature and Process Controller Series

Product at a Glance

Eurotherm by Schneider Electric piccolo™ controllers offer precision PID control of temperature and other processes with many advanced features not normally found in this class of controllers.

Designed to offer outstanding performance in an affordable package providing a complete solution for a wide variety of applications, this range guarantees extremely easy access to parameterization and operation in a high quality unit.

Despite their advanced features, the controllers are easy to use and apply and may be customized for ease of operation. Full autotune is provided.

Ramp-soak timer and soft start

A ramp soak timer is provided for time based profiling of temperature sequences. These can be used to gradually vary the temperature in a control zone before maintaining it at a defined level, and is typically used to avoid the dangers of damage due to thermal shock.

Overshoot elimination

The unique Eurotherm cutback system ensures precise control to setpoint and when correctly tuned inhibits temperature overshoot.

Ideal for:

- Precision PID controller
- Plastics extrusion
- Food and beverage
- Furnaces and ovens
- Incubators
- Laboratory equipment

- Precision PID control
- Easy to use and apply
- High reliability and quality
- Three year warranty
- Ramp-soak timer and soft start
- Overshoot elimination
- Energy usage estimation
- Heater failure detection
- Modbus RTU digital communications
- Digital setpoint retransmission
- Analog retransmission
- Simplified and customizable operator HMI
- High visibility three color LED display
- Wipedown front fascia
- Recovery point “undo” function
- Configuration adaptor
- iTools Wizard

Energy Usage Estimation

The piccolo controller allows estimation of energy usage to provide basic data for evaluating energy saving control strategies for continuous improvement and Kaizen techniques.

Heater Failure Detection

Using the optional current transformer adaptor, the piccolo will monitor current levels in electrical heaters and generate status and alarm information allowing heater element failure and short circuit to be detected, thereby allowing corrective action and avoiding further stress on remaining heater elements.

Modbus Digital Communication

The piccolo optionally supports 2-wire EIA485 communications using the Modbus RTU protocol.

Digital Setpoint Retransmission

The piccolo controller is optionally able to send a setpoint to slave devices using Master Modbus communications to allow multizone control. Requires EIA485 option.

Analog Retransmission

Transmit setpoints or other process variables to downstream equipment or data recorders using a 4-20mA analog retransmission function.

Simplified and Customizable Operator HMI

The piccolo controller has been designed around a simplified menu structure with settings clearly identified against sections in the user and engineering manuals to avoid guesswork during commissioning. The operator menus may be fully customized for the needs of operators and supervisors, with password protection so that unauthorized personnel are unable to adjust critical settings.

Wipedown Front Fascia

IP65 panel sealing allows these units to be used in washdown or dusty applications. Panels are easily customizable and are therefore ideal for OEM applications.

High Visibility Three Color LED Display

Process and alarm indication is clearly indicated on a bright emissive three color LED display.

Recovery Point Undo Function

A new feature is provided in the piccolo controller, named RECOVERY POINT. Through this feature the user can create a snapshot of the current instrument settings (operative and configuration parameters). These values can be subsequently restored to reverse changes made during use.

Values in the Recovery Point table are modified by an authorized operator saving a working configuration through front panel or through PC based configuration tools.

Configuration Adaptor

iTools configuration to piccolo controllers can be achieved by using a configuration adaptor. It provides iTools with the ability to communicate with and configure devices without the need for any power being connected.

iTools Wizard

Used to simplify the set up of piccolo controllers. The wizard guides the user through the configuration process with interactive help and graphical demonstrations of features.

Specification

General

Environmental Performance

Operating Temperature	0 to 55°C
Storage Temperature	-10 to 70°C
Operating/storage humidity	5% to 90% RH non condensing
Atmosphere	Non-corrosive, non-explosive
Altitude	<2000 Meters
Vibration and Shock	EN61131-2 (5 to 11.9Hz @ 7mm peak to peak displacement, 11.9-150Hz @ 2g, 0.5 octave min.) EN60068-2-6 Test FC, Vibration. EN60068-2-27 Test Ea and guidance, Shock.
Front of panel sealing protection	EN60529 IP65, UL50E Type 12 (equivalent to NEMA12)
Rear of panel protection	EN60529 IP10

Electromagnetic Compatibility (EMC)

Emissions	HV PSU units to EN61326-1 Class B – Light industrial LV PSU units to EN61326-1 Class A – Heavy industrial
Immunity	BS EN61326-1 Industrial

Approvals and Certification

Europe	CE (EN61326), RoHS (EN50581), REACH, WEEE, EN14597 (TR)
USA, Canada	UL, cUL
Russia	EAC (CUTR)
China	RoHS, CCC: Exempt (Product not listed in catalogue of products subject to China Compulsory Certification)
Global	Suitable for use in Nadcap and AMS2750E applications under Systems Accuracy Test calibration conditions Schneider Electric Green Premium

Electrical Safety

	EN61010-1 (installation category II, pollution degree 2)

Physical

Panel mounting	P116: 1/16 DIN P108: 1/8 DIN P104: 1/4 DIN
Weight	P116: 250 g P108: 350 g P104: 420 g
Panel cut-out dimensions	P116: 45 mm W x 45 mm H P108: 45 mm W x 92 mm H P104: 92 mm W x 92 mm H
Panel depth	All: 90 mm

Power Requirements

P116:	100 to 230 ±15%, 48 to 62 Hz, max 6 W 24 V AC, –15%, +10% 24V DC, –15% +20% ±5% ripple voltage max 6 W
P108 and P104:	100 to 230 ±15%, 48 to 62 Hz, max 8 W 24V AC, –15%, +10% 24V DC –15% +20% ±5% ripple voltage max 8 W

Transmitter PSU (not P116)

Rating:	24 V DC, >28 mA, <33 mA
Isolation:	264V ac double insulated

Communications

Serial Communications Option

Protocol:	Modbus RTU slave Modbus RTU Master broadcast (1 parameter)
Isolation:	264 V AC, double insulated
Transmission standard:	EIA485 (2 wire)

Process Variable Input

Calibration accuracy:	<±0.25% of reading ±1LSD (Note 1)
Sample rate:	4 Hz (250 ms)
Isolation:	264 V AC double insulation from the PSU and communication
Resolution (µV):	<0.5 µV with 1.6 sec filter
Resolution (effective bits):	>17 bits
Linearization accuracy:	< 0.1% of reading
Drift with temperature:	<50 ppm (typical) <100 ppm (worst case)
Common mode rejection:	48-62 Hz, >-120 dB
Series mode rejection:	48-62 Hz, >-93 dB
Input impedance:	100 MΩ
Cold junction compensation:	>30:1 rejection of ambient change
Cold junction accuracy:	<±1° C at 25° C ambient
Linear (process) input range:	–10 to 80 mV, 0 to 10 V with 100 K/806 external divider module
Thermocouple types:	K, J, N, R, S, B, L, T, C, custom download (Note 2)
Resistance thermometer types:	3-wire Pt100 DIN 43760
Bulb current:	0.2 mA
Lead compensation:	No error for 22 ohms in all leads
Input filter:	Off to 59.9s
Zero offset:	User adjustable over full range
User calibration:	2-point gain & offset

OP 4 Relay

Type:	Form C (changeover)
Rating:	Min 100 mA @ 12 V DC, max 2 A @ 264 V AC resistive
Functions:	Control outputs, alarms, events

Current Transformer Input

Input range:	0-50 mA rms, 48/62 Hz. 10 Ω burden resistor fitted inside module
Calibration accuracy:	<1% of reading (Typical), <4% of reading (Worst case)
Isolation:	By using external CT
Input impedance:	<20 Ω
Measurement scaling:	10, 25, 50 or 100 Amps
Functions:	Partial load failure, SSR fault

Digital Input (DigIn 1/2, 2 not on P116)

Contact closure:	Open	>600 Ω
	Closed	<300 Ω
Input current:		<13 mA
Isolation:		None from PV or system 264 V AC double insulated from PSU and communications
Functions:		Includes alarm acknowledge, SP2 select, manual, keylock, timer functions, standby select

Logic Output Module

Output

Rating:	ON	12 V DC @ <44 mA
	OFF	<300 mV @ 100 µA
Isolation:		None from PV or system. 264V ac double insulated from PSU and communications
Functions:		Control outputs, alarms, events

Relay Output Channels

Type:	Form A (normally open)
Rating:	Min 100 mA @ 12 V DC, Max 2 A @ 264 V AC resistive
Functions:	Control outputs, alarms, events

Triac Output

Rating:	0.75 A (rms) 30 to 264 V (rms) resistive load
Isolation:	264 V AC double insulated
Functions:	Control outputs, alarms, events

Analog Output (Note 3)

OP2 (P116 only)

Rating:	0-20 mA into <50 Ω
Accuracy:	± (<1% of Reading + <100 µA)
Resolution:	13.5 bits
Isolation:	264 V AC double insulated from PSU and communications
Functions:	Control outputs, retransmission

OP3 (P108, P104 only)

Rating:	0-20 mA into <500 Ω
Accuracy:	±(<0.25% of Reading + <50 µA)
Resolution:	13.5 bits
Isolation:	264 V AC double insulated
Functions:	Control outputs, retransmission

Software Features

Control

Number of loops:	1
Loop update:	250 ms
Control types:	PID, ON/OFF
Cooling types:	Linear, fan, oil, water
Modes:	Auto, manual, standby
Overshoot inhibition:	High, low

Alarms

Number:	3
Type:	Absolute high & low, deviation high, low or band
Latching:	Auto or manual latching, non-latching
Output assignment:	Relay and digital output

Other Status Outputs

Functions:	Including sensor break, timer status, loop break, heater diagnostics

Timer

Modes	Dwell when setpoint reached Delayed control action, Soft start limits power below PV threshold

Current Monitor

Alarm types:	Over current, SSR short circuit, SSR open circuit
Indication type:	Flashing beacon

Special Features

Features	Energy monitoring, recovery point

Notes

1. Calibration accuracy quoted over full ambient operating range and for all input linearization types
2. Contact Eurotherm® for details of availability of custom downloads for alternative sensors
3. Voltage output can be achieved by external adaptor

Order Codes

	1	2	3	4	5	6	7	8	9	10

Basic Product

P116	1/16 DIN
P108	1/8 DIN
P104	1/4 DIN

1 Function

CC	Controlled

2 Supply Voltage

VH	85-264 V AC
VL	24 V AC/DC

3 Outputs

OP1, OP2 P116 only

	OP1	OP2
LRX	Logic	Relay
RRX	Relay	Relay
RCX	Relay	Analog isolated
LTX*	Logic	Triac

OP1, OP2, OP3 P108 and P104 only

	OP1	OP2	OP3
LRR	Logic	Relay	Relay
RRR	Relay	Relay	Relay
RRC	Relay	Relay	Analog isolated
LTR*	Logic	Triac	Relay

*Available with VH only

4 AA Relay (OP4)

X	Disabled
R	Changeover relay

5 Options

XXX	None
XCL	CT and digital input A
4CL	RS485 + CT and digital input 1

6 Custom Label

XXXXX	None

7 Special

XXXXXX	None

8 Warranty

XXXXX	Standard
WL005	Extended

9 Certificates

XXXXX	None
CERT1	Certificate of Conformity
CERT2	5 point Factory Calibration

10 Accessories

XXXXXX	None
RES250	250 R resistor for 0-5 V DC OP
RES500	500 R resistor for 0-10 V DC OP

Accessories

HA031260	Engineering/CD manual
SUB35/ACCESS/249R.1	2.49R Precision resistor
RES250	250R resistor for 0-5 V DC OP
RES500	500R resistor for 0-10 V DC OP
CTR100000/000	10 A Current transformer
CTR200000/000	25 A Current transformer
CTR400000/000	50 A Current transformer
CTR500000/000	100 A Current transformer
iTools/None/3000CK	Configuration clip
SUB21/IV10	0-10 V input adaptor

Quick Start Code

1	2	3	4	5	6	7	8	9

1 Quick Start

O	Quick code request at start up
F	Factory default table
P	piccolo code pre loaded

2 Input Type

Thermocouple	
B	Type B
J	Type J
H	Type H
L	Type L
N	Type N
R	Type R
S	Type S
T	Type T
C	Custom/Type C
Resistance Thermometer	
P	Pt100
Linear	
V	0-80 mV
2	0-20 mA
4	4-20 mA

3 Range

C	°C full range
F	°F full range
Centigrade	
0	0 to 100
1	0 to 200
2	0 to 400
3	0 to 500
4	0 to 800
5	0 to 1000
6	0 to 1200
7	0 to 1400
8	0 to 1600
9	0 to 1800
Fahrenheit	
G	32 to 212
H	32 to 392
I	32 to 752
L	32 to 1112
M	32 to 1472
N	32 to 1832
O	32 to 2192
P	32 to 2552
R	32 to 2912
T	32 to 3272

4 Output 1

N	Unconfigured
Control	
H	PID heating (logic, relay)
C	PID cooling (logic, relay)
J	ON/OFF heating (logic, relay)
F	ON/OFF cooling (logic, relay)
Alarm 3 Energized in Alarm	
0	High alarm
1	Low alarm
2	Deviation high
3	Deviation low
4	Deviation band
Alarm 3 De-energized in Alarm	
5	High alarm
6	Low alarm
7	Deviation high
8	Deviation low
9	Deviation band
Event (Note 1) Timer/Programmer Events	
E	Timer end status
R	Timer run status

5 Output 2

N	Unconfigured
Control	
H	PID heating (logic, relay, or 4-20 mA [Note 3])
C	PID cooling (logic, relay or 4-20 mA [Note 3])
J	ON/OFF heating (logic, relay or 4-20 mA [Note 3]))
F	ON/OFF cooling (logic, relay or 4-20 mA [Note 3])
Alarm 1 Energized in Alarm	
0	High alarm
1	Low alarm
2	Deviation high
3	Deviation low
4	Deviation band
Alarm 1 De-energized in Alarm	
5	High alarm
6	Low alarm
7	Deviation high
8	Deviation low
9	Deviation band
DC OUT Retransmission	
T	4-20 mA setpoint
U	4-20 mA process value
Y	4-20 mA output power
A	0-2 mA setpoint
B	0-20 mA process value
D	0-20 mA output power
Event (Note 1) Timer/Programmer Events	
E	Timer end status
R	Timer run status

6 Output 3 P108 and P104 only

N	Unconfigured
Control	
H	PID heating (relay or 4-20 mA)
C	PID cooling (relay or 4-20 mA)
J	ON/OFF heating (relay or 4-20 mA)
F	ON/OFF cooling (relay or 4-20 mA)
Alarm 3 Energized in Alarm	
0	High alarm
1	Low alarm
2	Deviation high
3	Deviation low
4	Deviation band
Alarm 3 De-energized in Alarm	
5	High alarm
6	Low alarm
7	Deviation high
8	Deviation low
9	Deviation band
DC OUT Retransmission	
T	4-20 mA setpoint
U	4-20 mA process value
Y	4-20 mA output power
A	0-2 mA setpoint
B	0-20 mA process value
D	0-20 mA output power
Event (Note 1) Timer/Programmer Events	
E	Timer end status
R	Timer run status

7 Output 4

N	Unconfigured
Control	
H	PID heating (relay)
C	PID cooling (relay)
J	ON/OFF heating (relay)
F	ON/OFF cooling (relay)
Alarm 2 Energized in Alarm	
0	High alarm
1	Low alarm
2	Deviation high
3	Deviation low
4	Deviation band
Alarm 2 De-energized in Alarm	
5	High alarm
6	Low alarm
7	Deviation high
8	Deviation low
9	Deviation band
Event (Note 1) Timer/Programmer Events	
E	Timer end status
R	Timer run status

8 Digital Input 1

N	Unconfigured
A	Alarm acknowledge
S	Setpoint 2 select
T	Timer/programmer reset
R	Timer/programmer run
U	Timer/programmer run/reset
H	Timer/programmer hold
M	Manual status
B	Standby mode
L	Keylock

9 Digital Input 2 P108 and P104 only

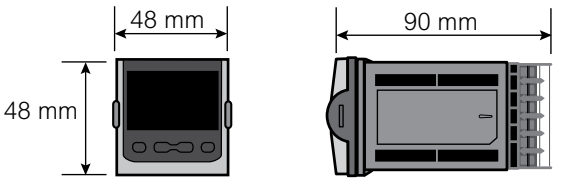
N	Unconfigured
A	Alarm acknowledge
S	Setpoint 2 select
T	Timer/programmer reset
R	Timer/programmer run
U	Timer/programmer run/reset
H	Timer/programmer hold
M	Manual status
B	Standby mode
L	Keylock

Notes

1. If controller timer is configured as dwell timer.
2. OUT2 = can be also DC linear output only on 1/16 DIN.

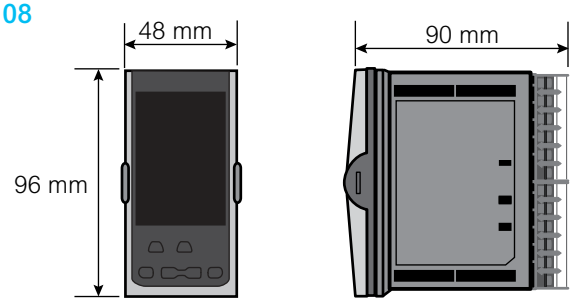
Mechanical Details

P116



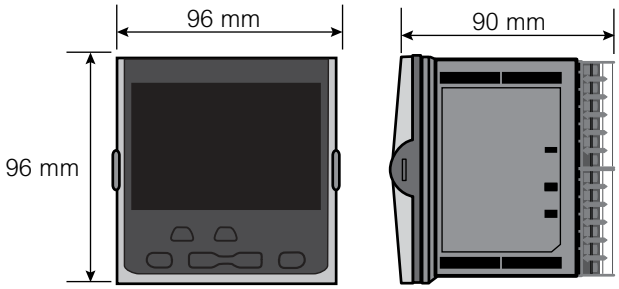
Panel cut-out 45 mm (–0.0 +0.6) x 45 mm (–0.0 +0.6)

P108



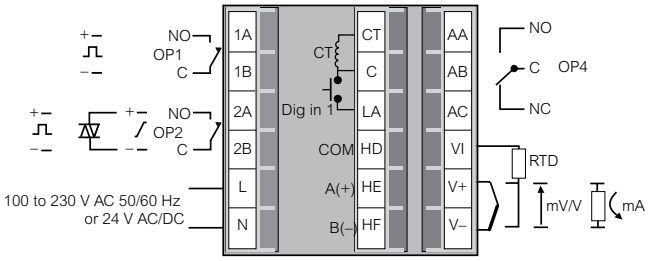
Panel cut-out 45 mm (–0.0 +0.6) x 92 mm (–0.0 +0.8)

P104

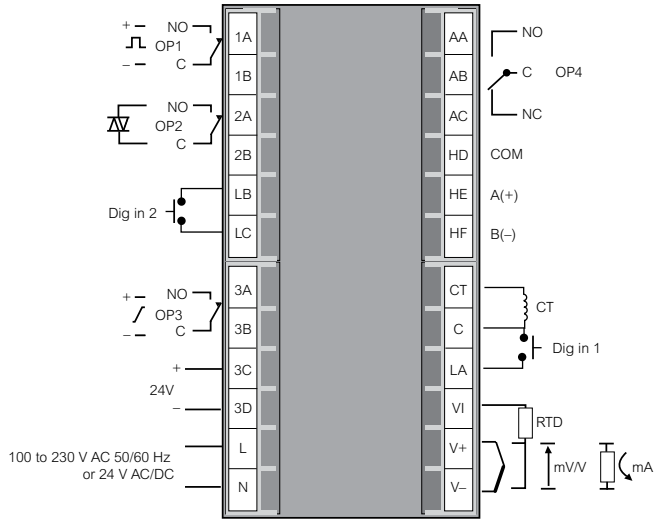


Panel cut-out 92 mm (–0.0 +0.8) x 92 mm (–0.0 +0.8)

P116 Rear Terminals



P108 and P104 Rear Terminals



Eurotherm USA
44621 Guilford Drive, Suite 100
Ashburn, VA 20147
Phone: +1-703-724-7300
Fax: +1-703-724-7301
www.eurotherm.com

Life Is On Eurotherm by Schneider Electric