piccolo™ Controller SERIES

invensys Eurotherm



P304 ¼ DIN
Melt Pressure Indicator/Controller
Specification Sheet

- Easy to integrate and use in new and legacy applications
- Fast-acting alarms to protect against overpressure
- Responsive, precision PID control with overshoot inhibit
- Easy, effective auto-tune
- Universal + strain gauge inputs
- Second input for differential pressure indication / control
- Analogue retransmission
- Easy and flexible configuration via PC software or front panel
- Modbus RTU digital communications
- High visibility three colour LED display
- Wipedown, customizable front fascia
- High reliability and quality
- Three year warranty

The Invensys Eurotherm piccolo™ P304i Melt Pressure indicator and P304c controller offer versatile solutions with advanced features and a wide range of hardware options that make them ideal for all types of plastic processing. Both units have a 50ms sample rate to give the fast-acting control and alarm functionality required in the plastics industry. The P304c controller provides outstanding control performance in an affordable package for a wide variety of pressure sensors.

Input/output flexibility

A strain gauge or process linear input is standard with an optional strain gauge input for differential pressure control, or a universal input for remote setpoint. Up to two opto-isolated DC linear outputs are available for control or retransmission along with one standard logic input for alarm reset/acknowledge or zero calibration of sensor. An additional four logic inputs may be selected for remote activation of functions like auto/manual mode selection and increase/ decrease of power output.

The display

A custom, dual-line 5-digit display provides a complete view of the process while a horizontal bar graph gives clear visual indication of the process input. The status of alarms, outputs, active setpoint and engineering units are represented with clear beacons on the front of the unit.

Configuration

The P304 is fully software configurable using iTools PC configuration and parameter monitoring. iTools provides the ability to edit, store and 'clone' complete controller configurations as well as data logging and process monitoring capability.

Ideal for:

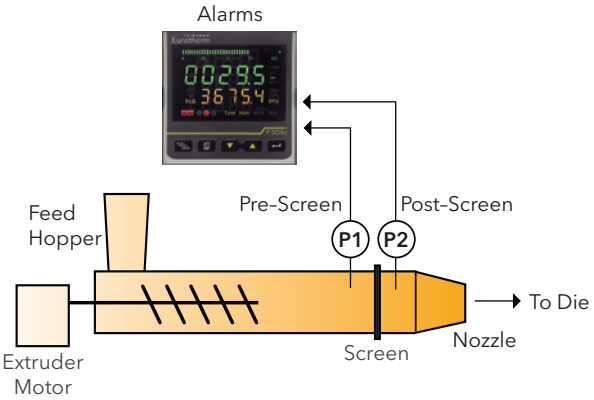
- All types of plastic processing applications including extrusion and injection molding

P304i Melt Pressure Indicator

The P304i is a fully programmable indicator with a single input configured for melt pressure measurement and the choice of wiring either strain gauge or amplified transducers to the unit. An optional second input provides an additional facility for differential pressure measurement if required.

The update time for each channel is 50ms to respond to very fast processes. To provide full process measurement, the second input can be configured for either Thermocouple or RTD temperature measurement.

Three preconfigured and ready to use alarms are associated to the process to detect high and low pressure conditions. A flexible alarm strategy enables shutdown of extruder at dangerous pressure levels.



P304c Melt Pressure Controller

The P304c Melt Pressure Controller provides accurate pressure or differential pressure control, ideal for plastic applications.

A clear display shows the main PV value along in the main area with a secondary variable beneath. The process input is also shown with a 35 point bar graph. Up to 24 dedicated LED beacons are further included to provide the operator with good visibility of the whole process status.

Accurate PI/PID control for Die Pressure gives fast and constant closed loop pressure control to give excellent process performance. Pre-tuning and adaptive selftuning algorithms further ensure good tuning of the control without the need for specific operator expertise.

A remote setpoint option, which can be either voltage or current, enables setpoint generation by a master controller or PLC. A wide range of control and retransmission linear outputs can also be selected without the use of hardware jumpers.

Specification

General

Environmental performance

Temperature limits operation:	0 to 50°C (32 to 122°F)
Storage:	–20 to 70°C (–4 to 158°F)
Humidity limits operation:	0 to 85% RH non condensing
Panel sealing:	IP55
Altitude:	<2000 metres
Atmospheres:	Not suitable for use in explosive or corrosive atmosphere

Electromagnetic compatibility (EMC)

Emissions and immunity:	Compliant with the European Directive 2004/108/CE according to Product Standard EN 61326-1

Electrical safety

(BS EN61010):	Installation cat. II; Pollution degree 2

INSTALLATION CATEGORY II
The rate impulse voltage for equipment on nominal 230V mains is 2500V.

POLLUTION DEGREE 2
Normally, only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation shall be expected.

Physical

Panel mounting:	1/4 DIN
Weight:	650g
Panel cut-out dimensions:	92W x 92Hmm
Panel depth:	128mm

Operator interface

Type:	LED
Main PV display:	5 digits, green, 13.3mm high
Secondary display:	5 digits, amber, 10.7mm high
Bar graph:	35 segments, green with 3% resolution
Status beacons:	4 engineering units, 3 alarms, 18 active status beacons, including engineering units and alarms

Power requirements

Main power supply:	100 to 230V ac 50/60Hz
Power supply variation:	100 to 230V ac 50/60Hz ± 15%
Power consumption:	Max 22VA at 50Hz; Max 27VA at 60Hz
Optional power supply:	24V ac/dc
Power supply variation:	From 14 to 30V ac From 14 to 32V dc
Power consumption:	Max 18VA at 24V ac 50/60Hz; Max 12W at 24V dc

Approvals

CE, cUL
RoHS 2

Transmitter Power Supply TPSU (optional on P304i)

Rating:	24V dc ±2% 1.5 W
Isolation:	From input / output

Communications

Serial communications option

Protocol:	Modbus RTU slave
Transmission standard:	EIA485

Process Variable Input

Strain gauge input:	From 340 to 5000Ω bridge
Sensitivity:	1-4mV/V
Connection:	4 or 5-wire (5 uses internal shunt)
Excitation:	10V ±7%
Calibration accuracy:	±0.1% fsv ±1 digit @ 25°C ±1°C
Input span:	–25/125% of full scale (approx. 10/50mV)
Linear input:	0-5V dc, 0-10V dc, 0-20mA, 4-20mA
Sample rate:	50 ms (typical)
Resolution:	4000 counts/12 bits
Zero balance:	±25% of full scale (approximately ±10mV)
Drift with temperature:	<300 ppm/K of full span for current, voltage and strain gauge input
Common mode rejection:	>120dB @ 50/60Hz
Series mode rejection:	>60dB @ 50/60Hz

Secondary Process Variable Input

Strain gauge input:		For differential pressure calculation
Input features:		See main input
Linear input:	P304c only:	For differential pressure or remote setpoint
Input features:		See main input
Thermocouple:	P304i only:	J, K, L, N, T, E
RTD Resistance	P304i only:	3-wire Pt100, Pt500
Input impedance:		>1MΩ for thermocouple input <10Ω for linear current input >165kΩ for linear voltage input
Sample rate temperature input:		100, 200, 500 or 1000ms

Main Analogue Output

Function:	P304i:	PV retransmission
	P304c:	Control output
Rating:		Configurable between: 0/10 VDC, min. load 5kΩ –10/+10 VDC, min. load 5kΩ 0/5 VDC min. load 5kΩ 0/20 mA, max. load 500Ω 4/20 mA, max. load 500Ω
Accuracy:		0.1% in manual mode, 0.03% in automatic mode
Resolution:		0.1% of output span
Isolation:		From input / output
Output filter:		Selectable: OFF, 0.4, 1, 2, 3, 4, 5s

Secondary Analogue Output

Function:	P304i:	Configured as pressure or temperature input retransmission
	P304c:	Acts as pressure input retransmission
Output features:		See main output

Relay Output

Alarm 1–2

Type:	Form C (changeover)
Rating:	2A max @ 240V ac resistive load
Functions:	Process alarm

Alarm 3

Type:	Form A (normally open)
Rating:	2A max @ 240V ac resistive load
Functions:	Process alarm

Digital Input

Reset/Cal (P304c and P304i)

Isolation:		None from PV
Functions:		Configurable as: Alarm reset Peak reset Alarm and peak reset Zero calibration of the primary input Zero calibration of the primary input, alarm and peak reset

1-2-3-4 (P304c only)

Isolation:		Opto-isolated from input/output
Functions:	Dig In 1:	Automatic/manual control
	Dig In 2:	Control output value increase
	Dig In 3:	Control output value decrease
	Dig In 4:	Automatic to manual mode setting to zero the control output

Software Features

Control

Number of loops:	1
Control loop update:	50ms (typical)
Control types:	PI/PID
Modes:	Auto, manual, forced manual
Autotune:	Tune algorithm from manual mode. Adaptive algorithm in auto mode

Transducer calibration

Calibration types:	With or without shunt resistor
Shunt resistor:	Programmable from 40 to 100%, default 80%

Alarms

Number:	3
Type:	Absolute high & low, deviation high, low or band Low masked on start up Auto / Manual reset

Other features

Peak monitor:	Stores high or low values
Automatic stand-by:	Avoids overshoot caused by temporary process interruptions

Order codes

P304i Melt Pressure Indicator

P304i | 1 | 2 | 3 | 4 | 5 | 6

Basic Product

P304i	¼ DIN Indicator

1 Function

AL	Pressure indicator

2 Power Supply

VH	100-230V ac
VL	24V ac/dc

3 Second input

XXX	None
PV2	Linear, TC, RTD, Strain gauge

4 Options

XXXX	None
SDXX	24V dc TPSU + 2nd DC retransmission
SD4X	24V dc TPSU + 2nd DC retransmission + RS485

5 Custom Label

XXXXX	None

6 Special

XXXXXX	None

P304c Melt Pressure Controller

P304c | 1 | 2 | 3 | 4 | 5 | 6

Basic Product

P304c	¼ DIN Controller

1 Function

CC	Pressure controller

2 Power Supply

VH	100-230V ac
VL	24V ac/dc

3 Second input

XXX	None
RSP	Analogue setpoint or second PV input (differential pressure)

4 Options

SDXX	24V dc TPSU + 2nd DC retransmission
SD4L	24V dc TPSU + 2nd DC retransmission + RS485 + 4 logic inputs

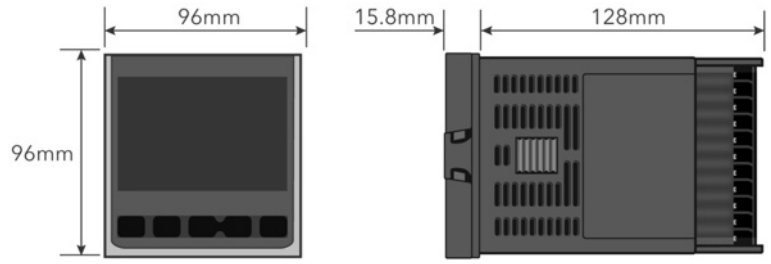
5 Custom Label

XXXXX	None

6 Special

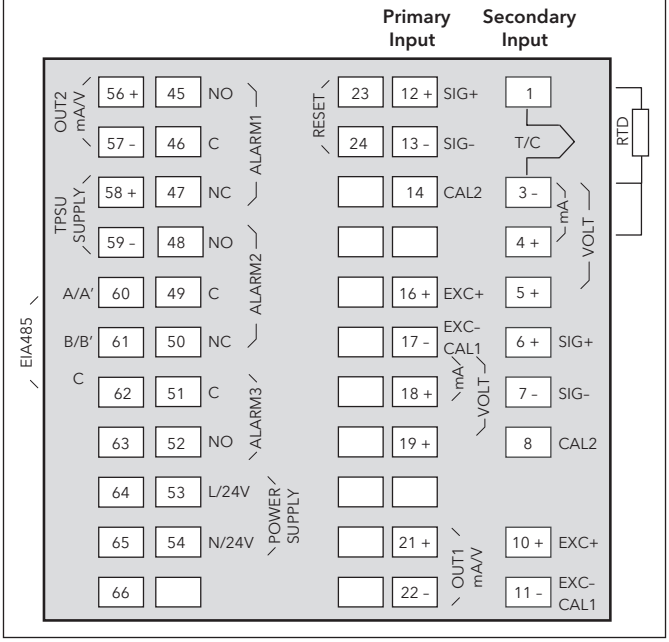
XXXXXX	None

Mechanical Details

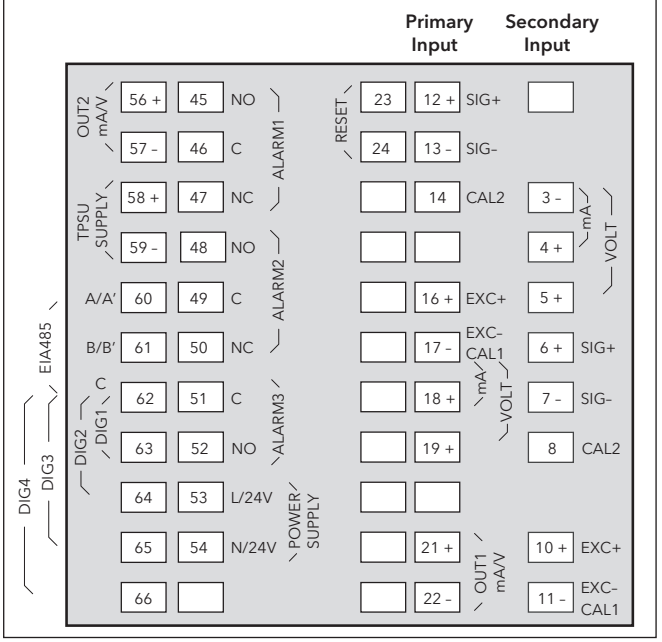


Panel cut-out 92mm (-0.0 +0.8) x 92mm (-0.0 +0.8)

P304i Indicator Rear Terminals



P304c Controller Rear Terminals



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