



CONTROLLER

TYPE 160-30

FUNCTION

The 160-30 unit provides the continuous controller element of a Process Control Loop, introducing adjustable gain and phase shift to compensate for other elements in the loop and making the Measured Value approach the Set Point (or Desired Value).

DESCRIPTION

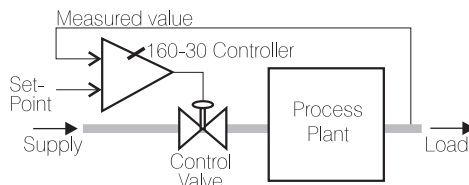
A process control loop consists of typically; the process plant, the transducer of the measured variable, the valve or regulator of the measured variable and a controller. The difference between the Measured Value (MV) and the Set Point (SP) - the deviation - is measured by the 160-30 Controller. In Proportional only mode, the output of the controller will equal the deviation multiplied by the gain setting i.e. an error signal will always exist. In Proportional + Integral Mode, the output will initially act as for proportional only mode, but integral action will reduce the error signal to zero.

Proportional Band (PB)

This front panel control sets the gain of the proportional effect amplifier. For 100% PB setting, the controller output will give 0-100% as the deviation goes 0-100% of the MV. For 200% PB the output will only give 0-50% for 0-100% change in deviation.

Set Point (SP)

The set point, or desired value, is the value at which the plant is required to run. The SP may be controlled in one of three ways depending on the version of Controller ordered. The SP may be adjusted by a front panel mounted control, a remotely mounted control or by an external signal voltage. The latter version has applications in cascade control configurations where a master controller provides the SP of a slave unit.



Typical Process Control Loop

INT Time

This is the Integral Action Time adjustment. It sets the time for the controller to reproduce the effect of the proportional setting in response to the same deviation being maintained.

P or P+I

The controller mode of action may be Proportional Only (P) or Proportional + Integral as set by a switch accessed through the front panel. In 'P' mode the proportional setting applies only to one set of plant supply and load conditions. Changes in these conditions result in the controller taking up an offset. The 'P' only mode is useful for cascade loops.

Forward or Reverse Action

The output phasing may be set by an internal, user selectable, programming link. With MV-SP increasing positively, the output increases in Forward Action and reduces in Reverse Action.

A front panel indicator is illuminated when power is applied to the unit.



Features

- * **Proportional only or Proportional + Integral**
- * **Optional Slave Version for Cascade Control**
- * **Current or Voltage Inputs & Output**
- * **User Selectable Output Phasing**
- * **Isolated Current or Voltage Output (Including Current Sink Option)**
- * **Optional Remote Set-point Control or Signal**
- * **Rack, Panel, DIN, & Wall Mounting Enclosures Available**

Information Required When Ordering

- Input Signal (see specification overleaf)
- Type of Output (see specification overleaf)
- Set Point Control: Specify Front Panel, Remote or Remote Signal Type
- Signal Type for Optional Remote Signal S P Input
- Supply Voltage and Frequency

SPECIFICATION

INPUTS

Measured Value & Set Point Remote Signal (Optional)

(Others can be provided)

0-10mA	into	100 ohms
0-20mA	into	50 ohms
4-20 mA	into	62.5 ohms
0-1 Volt	into	100k ohms
0-5 Volts	into	100k ohms
1-5 Volts	into	100k ohms

REMOTE SET-POINT POTENTIOMETER

Value required: 5k ohm linear

OUTPUTS (Others can be provided)

0-10mA	into	2000 ohms max.
0-20mA	into	1000 ohms max.
4-20 mA	into	1000 ohms max.
0-5v	into	500 ohms min.
1-5v	into	500 ohms min.

OUTPUT PHASING

Forward or Reverse acting *selected by internal link.*

OUTPUT SIGNAL LIMIT

Nominally 108% FSD

OUTPUT RIPPLE

≤ 0.2% FSD

LOAD RESISTANCE EFFECT

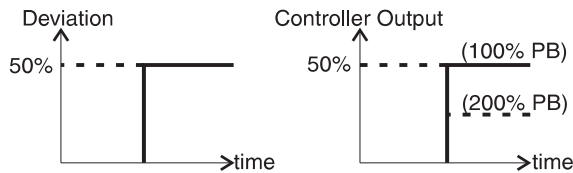
≤ 0.001% of span per 100 ohms change
(current output with 1000 ohms load)

SUPPRESSION ELEVATION ERROR

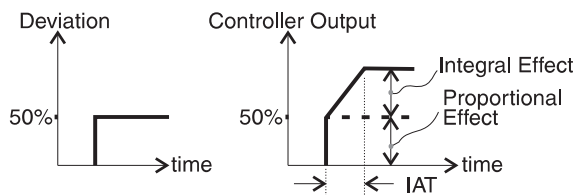
≤ ± 0.1% FSD

CONTROL MODES

Proportional only or Proportional plus Integral (Switched)



Proportional Effect



Proportional + Integral

CONTROL TERMS

Proportional Band: 5 - 200%
Integral Action Time: 12 - 600 Seconds

SET-POINT CONTROL (version with front panel control)

Range: 0 - 100% of Measured Value

Accuracy: Error = 2% of span approx.

PROPORTIONAL BAND ERROR

± 4% of setting

TEMPERATURE RANGE

Operating: -10 to +60 °C

Storage: -20 to +70 °C

ISOLATION

The inputs (MV and optional SP remote signal) and output are isolated from each other and from the power supply. Maximum voltage 250V RMS or 400V DC. Resistance ≥ 50 x 10⁶ ohms at 1000V DC.

POWER SUPPLY

Standard AC and optional DC powered versions are available. Full details of the power supply options are given in the 160 Series General Information Sheet.

Power Supply Indication: A front panel 'LED' indicator is illuminated when power is applied.

Fuse: This unit is fused internally.

MODULE WIDTH (rack mounting details)

12HP (see 160 Series General Information Sheet)

ENCLOSURES & ACCESSORIES

See 160 Series General Information Sheet.

WEIGHT

Approx. 0.5kg (Module Only)

TERMINAL CONNECTIONS

Terminal

- 1 (no connection)
- 2 ⇐ Measured Signal Positive (+)
- 3 ⇒ Measured Signal Com (0V)
- 4 ⇐ Remote SP Signal Positive (+) SP
- 5 ⇒ Remote SP Signal Com (0V) Option
- 6 ⇐ Full Scale
- 7 ⇐ Wiper Connections for Optional Remote Set Point Control (5k ohms Pot.)
- 8 ⇐ Common
- 9 (nc)
- 10 ⇒ Output Positive (+)
- 11 ⇐ Output Common (-)
- 12 ⇐ (0V)
- 13 (nc)
- 14 ⇐ Earth
- 15 ⇐ Neutral AC Mains Supply Earth Negative (-) Positive(+) DC Supply Option
- 16 ⇐ Line

NB: Options are only available if specified at time of order.

WARNING THIS UNIT CAN BE MAINS POWERED, AND ALL INPUTS TO IT MUST BE ISOLATED FROM DANGEROUS VOLTAGES BEFORE WITHDRAWING THE UNIT FROM ITS RACK OR ENCLOSURE.



Continuous development may necessitate changes in these details without notice

SIL

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