

Universal Analog PID Controller

PID2

Features:

- **Analog design**
- **Highly dynamic**
- **With setpoint feedforward**
- **With analog multiplier for relative control travel**
- **Additional sensor power supply**
- **Supply voltage: 20...253 V AC/DC**
- **For TS35 DIN rail mounting**
- **Clear terminal labeling**
- **22.5 mm profile**
- **High reliability, 5-year warranty**



General:

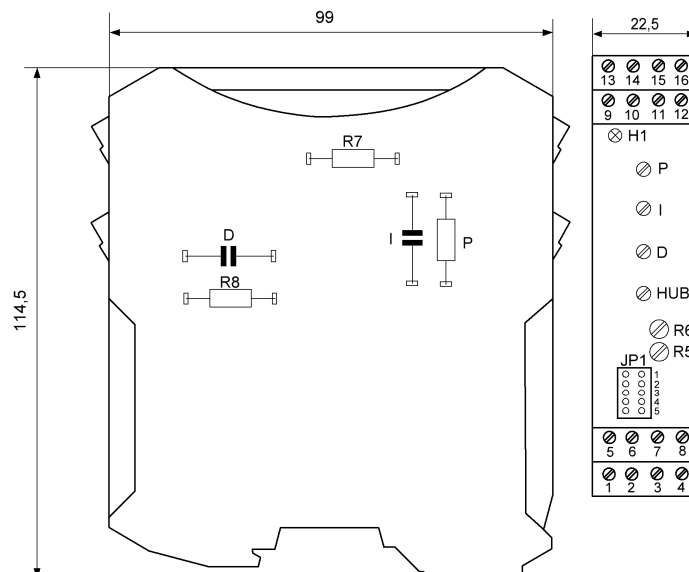
The devices in the PID2 series of PID controllers are analog in design, making them suitable for use in highly dynamic applications. All control parameters (P, I, D) can be adjusted via potentiometers and are set to values sufficient for most control loops. If the adjustment ranges cannot be adapted to the control loop, the control parameters can be optimized by changing the internal components. To do this, however, the housing must be opened to replace the components located on solder pads. This can also be ordered individually upon request.

The devices have separate inputs to calculate the setpoint/actual value difference. The inputs are designed as voltage inputs 0...±10V, but can also be switched to current inputs 0(4)...±20mA via jumpers (JP1 -1, -2, -3). Two inputs are evaluated as positive and one input as negative. Additionally, the control range of the output can be adjusted from 0...100% via an additional potentiometer. For an actual value adjustment that does not correspond to the standard voltage of 0...±10 V, a separate adjustable input is available, which can be roughly adjusted using resistor R8. Fine adjustment is then performed via potentiometer R5.

R8 can be calculated as follows (applies when R5 is in the middle position):

$$R8 = [(U_{ist} / U_{soll}) \times 7 \text{ k}\Omega] - 3 \text{ k}\Omega$$

To increase the stability of the control loop, it is often advisable to add the setpoint and the control stroke. This can be achieved by connecting the setpoint to the summing input [6]. This way, the downstream actuator is pre-controlled with the stable conductance, and the controller merely corrects the setpoint/actual deviation. Now the control range can be limited to the necessary extent, which reduces the load on the controller and thus leads to better optimization. The magnitude of the setpoint feedforward is determined by "R7"; 100 kΩ corresponds to 100%. In some applications (e.g., swing or traction control), it can be helpful for the control stroke to always adjust relative to the conductance. This is achieved by enabling the analog multiplier with jumper JP 1-4 and connecting the setpoint to the multiplier input [5]. To prevent the control stroke from becoming too small at very low setpoints, a base value of 0...30% of the controller output can be set using the potentiometer "R6". The device has an inverting [9] and a non-inverting [11] output. The controller is enabled via an optically isolated input. To power external input circuits (e.g., trimmer potentiometers, etc.), a ±12V power supply (max. ±20mA) is available at the terminals.



Technical Specifications

Auxiliary power:

Supply voltage	:	20–253 VAC/DC
Power consumption	:	1 W–2.5 VA

Analog Input:

Voltage controller	:	0...±10 V / 47 kΩ / Overload max. 30 V
Current controller	:	0(4)...±20 mA / Load 100 Ω / Overload max. 40 mA
Summator	:	0...±10V / 100kΩ / Overload max. 30V
Multiplier	:	0...±10V / 100kΩ / Overload max. 30V

Digital Input:

Controller Enable	:	15...30V / 5...12mA
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Output:

Controller	:	0...±12V / max. 10mA
Voltage output	:	±12V / 2 x 20mA

Control parameters:

P component Coarse / Fine	:	Resistor P / Potentiometer P / Right stop max. Kp (1...20)
I component Coarse / Fine	:	Capacitor I / Potentiometer I / Right stop max. Tn (1...20s)
D component Coarse / Fine	:	Capacitor D / Potentiometer D / Right stop max. Tv (0...150ms)
Control stroke	:	Potentiometer HUB / 0...100%
Multiplier	:	Potentiometer R6 / Right stop 30%

Accuracy:

Zero-point error	:	< 0,001%
Temperature coefficient:		< 0,002% / K

General data:

Operating temperature	:	0...50°C
Storage temperature	:	-25...+85°C, condensation before putting into operation is not allowed
MTBF	:	140 years mean time between failures – according to EN 61709 (SN 9500). Requirements: Stationary operation in clean rooms, average ambient temperature 40 ° C, no aeration, continuous operation
CE conformity	:	EN 61326-1, EN 61000-4-2/3*/4/5/6*, EN 61000-6-4 *during measurements are small deviations possible

Body:

Dimension	:	22,5mm adjoin body, 22,5x114,5x104,5mm (with terminals)
Material	:	PA / V0
Protection category	:	IP20
Connection	:	M3-screw-type terminal 0, 14 - 2,5mm², flexible or inflexible
Fixing	:	Snap-on mounting for norm rail TS35
Weight	:	150g

Note on safety:



Disconnect the power supply before attempting to open the unit.

During the operation of this module it is possible that parts of the module, even there is extra-low voltage, (for example shunt measurement) are under dangerous voltage! Therefore a non-observance of this caution may cause damage of property or physical injury.

Only trained qualified personnel should install or operate the unit. Before installation the qualified personnel should read the documentation and should familiarize himself with the unit.

If there is visible damage to the body of the unit it should be immediately replaced and not put into operation.



Please ensure that there is a sufficient prevention against electrostatic discharge during installation of the unit.

Installation Information:

Pay attention and make sure the unit is far away from mounted sources that may disturb the device such as magnetic coils, transformers, frequency converters etc.

Wiring advice:

Use only shielded cables. The shield is to be connected extensively to ground. Do not mix power- and signal-wires/cables in the same cable tray.

Limited warranty:

The LEG Industrie-Elektronik GmbH warranted that the product does not have any material or processing defects in a period of 5 years after date of delivery.

It is up to the choice of LEG to repair or to exchange an inoperative unit.

Subsequent damages or any claim for indemnification above the functionality of the unit are excluded.

This limited warranty is only valid if ...

1. the product was installed and put into operation according to the LEG operation documentation;
2. the technical configuration of the power supply was abided;
3. the product was not used for unintended purposes;
4. there were no unauthorized modifications or manipulations, misuse or repairs without previous agreement from LEG .

Our Terms of Trade are based on the "General Conditions for the supply of products and services of the Electrical and Electronics Industry" including the "Complementary Clause: Extended Reservation of Property" of the ZVEI e.V. (German Association of Electrical Manufacturers).

Miscellaneous:

We expressly reserve the right, without previous notice, to correct errors contained in any data of this information brochure, and to make alterations to the program and technical modifications.