

PID position controller for 4-20 mA joystick with encoder, two motor outputs

Article number PR515x016



The PR515x016 compares a 4-20 mA set point, for example from a joystick, with the actual position of an encoder on a galvanically isolated RS485/RS422 link. Based on the difference, the built-in PID controller drives the motor outputs for anticlockwise and clockwise, switched or proportional with PWM, with adjustable ramp-up and ramp-down to spare the mechanics. Open circuit and short circuit on the 4-20 mA input and faults in the encoder communication are detected; the outputs then switch off. The module is set up over Wi-Fi in a browser, and the OLED display shows position, input and outputs.

Price on request. Lead time on request. Not in stock? We will make it.

Specifications

Supply	10 to 32 V DC
Consumption	Approx. 2 W
Input	Set point 4-20 mA on terminal 12, range adjustable (for example 0-20 mA or 5-18 mA)
Output	H-bridge with two outputs: terminal 3 anticlockwise, terminal 4 clockwise (plus when active, minus when inactive), switched or PWM
Isolation	RS485/RS422 encoder link galvanically isolated; 4-20 mA input and outputs not isolated
Setup	Over Wi-Fi in a browser; Wi-Fi is switched on in the OLED menu
Encoder	Encoder with RS485/RS422 link (4-wire), on terminals 9 and 10
Control	PID controller with adjustable Kp and Kd; hysteresis and dead band adjustable
PWM frequency	Adjustable, best between 100 and 250 Hz
Rise and fall rate	Ramp-up and ramp-down time adjustable in ms
Monitoring	Open circuit and short circuit on the 4-20 mA input and the encoder communication; outputs off on a fault
Use	Not a safety system: provide fail-safe measures that work independently of the module
Dimensions	79.5 x 58 x 82 mm (w x d x h)
Mounting	DIN rail; screw terminals, USB-C for firmware and diagnostics

Connections

Terminal 1	Supply plus, 10 to 32 V DC
Terminal 2	Supply minus
Terminal 3	Motor output anticlockwise (plus when active, minus when inactive)
Terminal 4	Motor output clockwise (plus when active, minus when inactive)
Terminal 9	Encoder Data- (green wire)
Terminal 10	Encoder Data+ (yellow wire)
Terminal 12	4-20 mA set point (signal); connect the source minus to the supply minus

Setup

1. Connect the supply to terminal 1 (plus) and terminal 2 (minus).
2. Connect the encoder: red to the supply plus, black to the minus, yellow to terminal 10 and green to terminal 9. Do not connect grey.
3. Connect the 4-20 mA source to terminal 12 and connect the source minus to the supply minus.
4. Connect the motor to terminal 3 (anticlockwise) and terminal 4 (clockwise).
5. Before switching on, make sure that movement cannot cause a hazard: the module has not yet been set up and may drive the outputs straight away to turn the encoder to the requested position.
6. Switch on the module (the green PWR LED lights) and enable Wi-Fi in the OLED menu: go to page 2, press OK and select YES.
7. Connect to the Wi-Fi network whose name starts with PR515 and open <http://4.3.2.1> in the browser.
8. Set up the joystick: range in mA, offset and dead band in degrees, and the limits below and above which the signal is invalid (below 3 mA as delivered).
9. Set up the encoder: offset and hysteresis in degrees.
10. Tune the controller with Kp and Kd, and the PWM with minimum and maximum duty cycle, ramp-up and ramp-down time and frequency (best 100 to 250 Hz). Leave PWM H-Bridge Deadtime (200) and PID Direction Change Threshold (0) at their factory settings.
11. Test the full range with the joystick, check that the system stops at the target position and test what happens on cable or signal loss. The override functions for position and PWM help with testing.
12. If required, set a Wi-Fi password and record the settings. Wi-Fi switches off automatically after 10 minutes without use.

More information, price and lead time: www.procircuits.nl/en/products/pr515x016

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