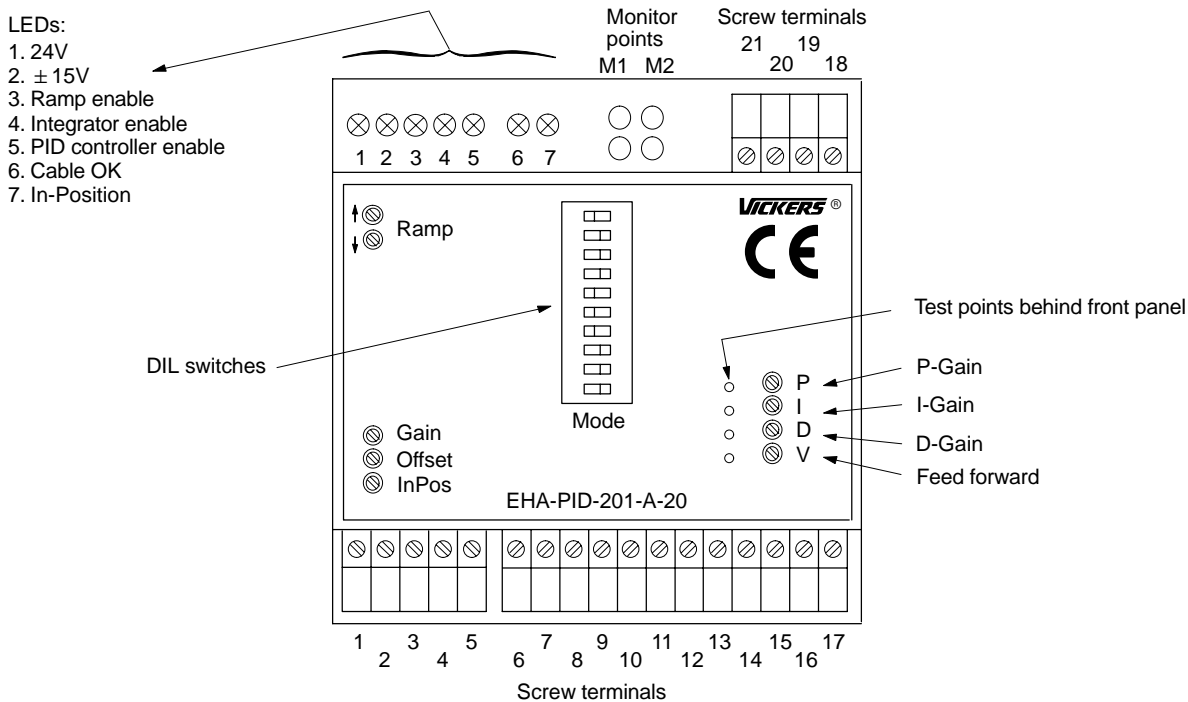


Electronic PID Controller Module for DIN-Rail-Mounting

EHA-PID-201-A-20

Front View



General Description

This product is one of a range of “Snap-on” control modules for mounting into control cabinets, using rails to DIN EN 50022 or DIN EN 50035. The module is ideally suited for use with Vickers “KA” series of proportional valves with integrated drive electronics, where external PID functions may be required.

All adjustment potentiometers, together with status LEDs and switches are accessible from the front of the module.

Features and Benefits

- Provides for enhancement of control system for Vickers “KA” series integrated valve/amplifier proportional valves
- Snap-on to DIN EN 50022 or DIN EN 50035 rails
- 24V DC power supply with wide tolerance
- Output signal ±10V DC
- Screw terminals reduce wiring installation costs
- All of user adjustments clearly identified
- LEDs show status
- Suitable for closed-loop pressure, closed-loop velocity, closed-loop position and p/Q controls. Integral selector switches are used to set the internal configuration of the controller
- Parameters P, I and D of the controller, ramp up and ramp down are independently adjustable
- Output is enabled by an external 24V signal
- Bi-polar reference voltages are available for external use



This product has been designed and tested to meet specific standards outlined in the European Electromagnetic Compatibility Directive (EMC) 89/336/EEC, amended by 91/263/EEC, 92/31/EEC and 93/68/EEC, article 5. For instructions on installation requirements to achieve effective protection levels, see this leaflet and the Installation Wiring Practices for Vickers Electronic Products leaflet 2468. Wiring practices relevant to this Directive are indicated by Electromagnetic Compatibility (EMC).

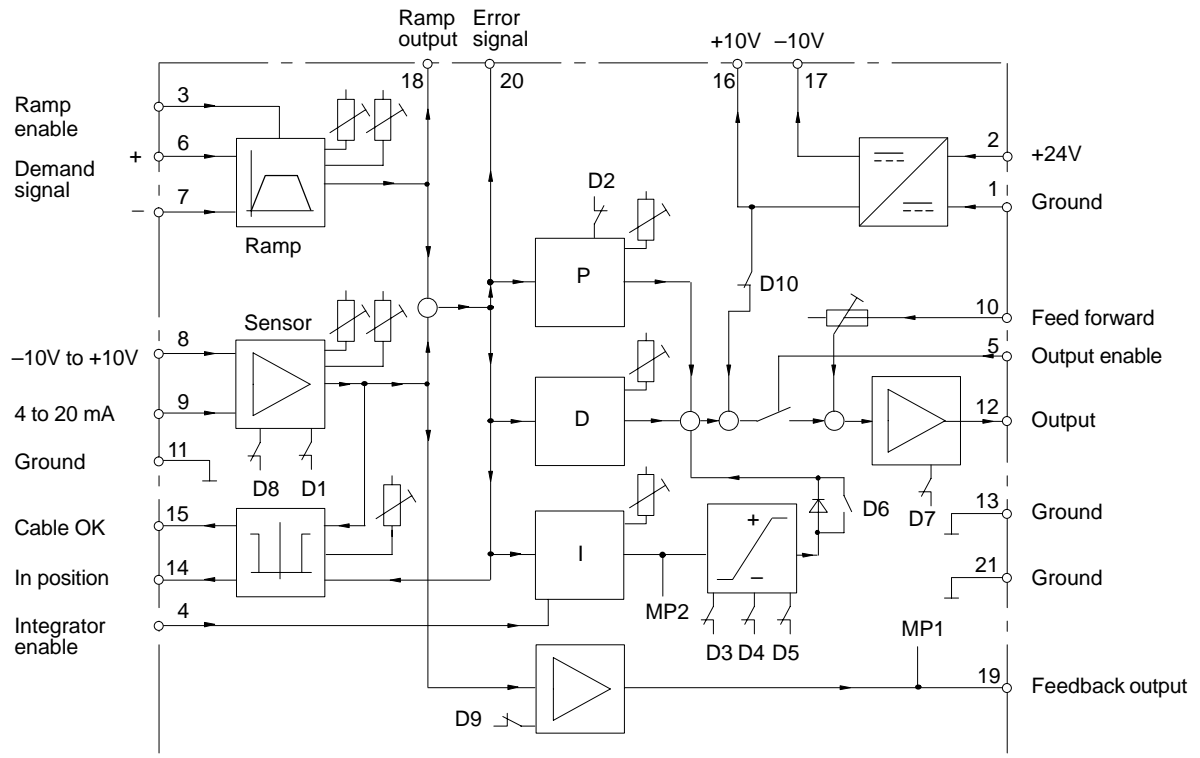
Operating Data

Power (input) supply: Nominal [2] Range Power ground [1]	24V DC nominal x 6W 18 to 36V DC including $\pm 10\%$ pk. to pk. ripple
Control (output) supplies [16] [17]	+10V x 10 mA -10V x 10 mA Temperature drift: < 1 mV/°C thru 0-50°C (< 0.5 mV/°F thru 32-122°F)
Differential demand input signal: Positive [6] Negative [7] Sensor inputs: Voltage input [8] Current input [9] Ground [11] Feed forward input [10]	$\pm 10V$; 100 k Ω $\pm 10V$; 1 M Ω 0 to 20 mA or 4 to 20 mA; 100 Ω $\pm 10V$; 6 k Ω
Monitoring of sensor failure for sensors with a current output only (4 to 20 mA)	
Switched inputs: Ramp enable [3] Integrator enable [4] PID controller enable [5] Enabled Disabled Input impedance	17 to 40V 0 to 3,5V 10 k Ω
Switched outputs: Sensor and cable OK [15] Sensor or cable failure Load current (continuous short circuit proof) This output may be used only in conjunction with sensors providing a current output (4 to 20 mA) In position [14] Sensor matches demand Sensor does not match demand Load current (continuous short circuit proof) The load at terminal [14] and [15] has to be connected to ground	$V_{Supply}-2V$ < 3V < 100 mA $V_{Supply}-2V$ < 3V < 100 mA
Analog outputs: PID controller output [12] Sensor (feedback) signal [19] Ramp output signal [18] Range Error signal (inverted) [20] (indicates the difference between demand signal and sensor signal)	$\pm 10V$ x 5 mA Temperature drift: < 1 mV/°C thru 0-50°C (< 0.5 mV/°F thru 32-122°F) $\pm 10V$ x 1 mA

Continued on next page

Potentiometers: P-gain (depends on DIL-switch D2) I-gain (depends on DIL-switches D3 to D5) D-gain Feed forward Ramp adjustment, separate acceleration and deceleration Sensor gain Sensor offset In-position window		0,1 to 50 V/V 0,5 to 100 V/S/V 0 to 0,05 V/V/S 20% to 100% 50 ms to 5s 0,9 to 1,3 -10V to +10V ± 0,1V to ± 1V
Monitor point signals: Sensor (feedback) signal Integrator output Monitor point impedance	[M1] [M2]	± 10V ± 10V 10 kΩ
Connections		Screw clamping terminals
Wiring recommendations, all connections		0,5 to 2,5 mm ² (AWG 12)
Protection class		IEC 529 IP 20
Vibration: Vickers environmental specification Class 1 level 2		IEC 68-2-6
Electromagnetic compatibility (EMC): Emission Immunity		EN-50081-2 EN-50082-2
Ambient temperature ranges: Operating Storage		0°C to 50°C (32°F to 122°F) -25°C to 85°C (-13°F to 180°F)
Mounting		Rails to DIN EN 50022 or DIN EN 50035
Housing material		Polyamid 6.6
Mass		0,3 kg (0.45 lb)

Electrical Block Diagram



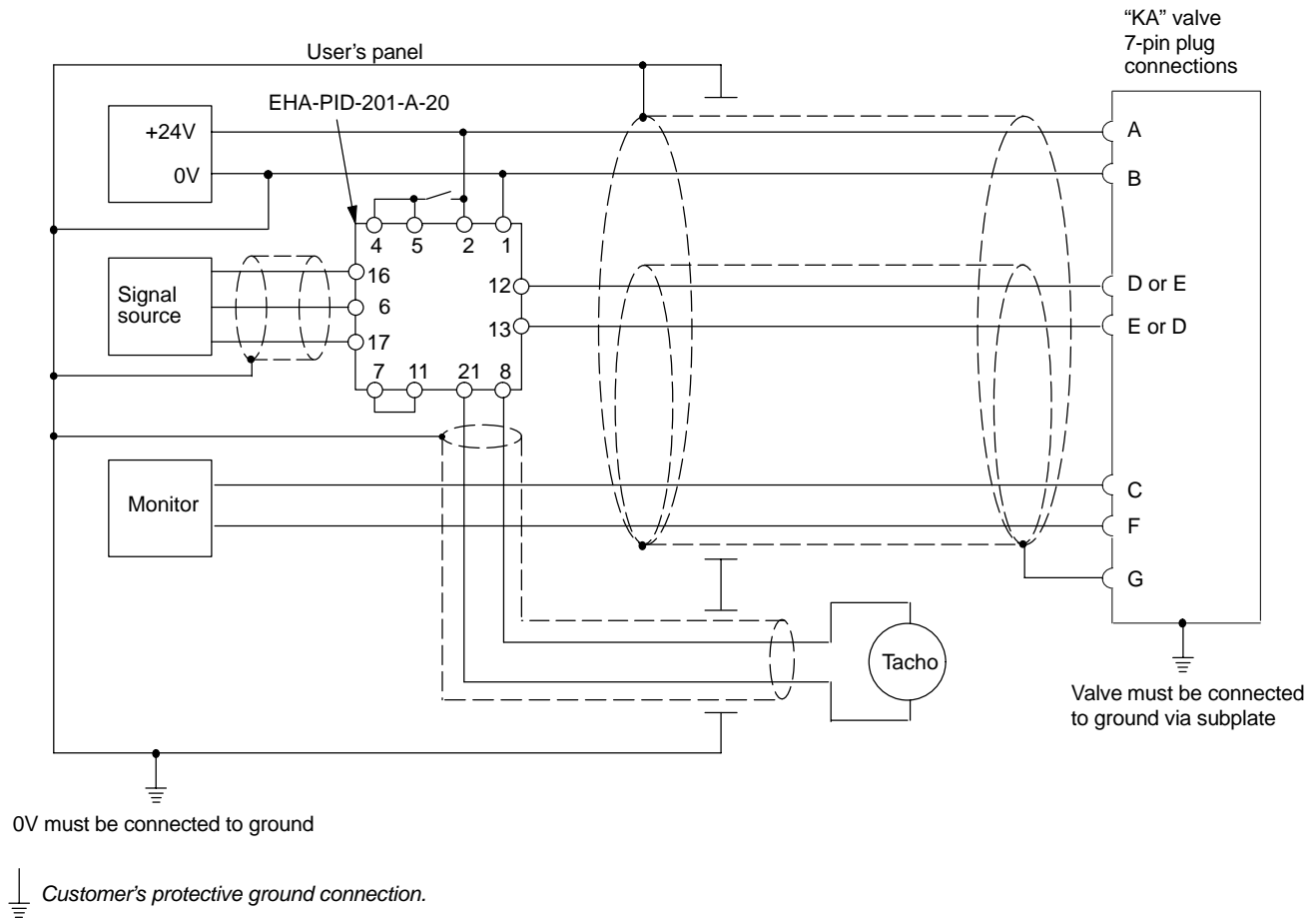
Note: The unused input signal pin 6 or 7 must be connected to signal 0V (pin 11, 13 or 21).



Warning: In a power-up sequence, the integrator should not be enabled until all hydraulic, electrical and control power and signals are applied and stable. Abrupt or unpredictable motion may occur if the integrator is enabled during this transition time.

Typical Connection Arrangement

Simple closed-loop velocity feedback control



Warning: Electromagnetic Compatibility (EMC)

It is necessary to ensure that the unit is wired up in accordance with the Typical Connection Arrangement shown in this leaflet. For effective protection, the user's electrical cabinet, the valve subplate or manifold and the cable screens should be connected to efficient ground points. The metal 7-pin connector part no. 934939 should be used for the integral amplifier.

In all cases, both valve and cable should be kept as far away as possible from any source of electromagnetic radiation such as cables carrying heavy current, relays and certain kinds of portable radio transmitters, etc. Difficult environments could mean that extra screening may be necessary to avoid the interference.

Set-up Notes

DIL-Switches

Switch	ON	OFF
D1	For sensors with 4 to 20 mA output	For sensors with 0 to 20 mA or $\pm 10V$ output
D2	P-gain 2 to 50 (default)	P-gain 0,1 to 2
D6	One-sided limitation of the integrator output (Only useful for proportional pressure and proportional throttle valves)	No limitations of integrator output
D7	Controller output signal not inverted	Controller output signal inverted
D8	For sensors with 4 to 20 mA output	For sensors with 0 to 20 mA or $\pm 10V$ output
D9	Sensor output signal not inverted	Invert the sensor (feedback) output signal
D10	For PQ control with internal switchover	For simple closed loop systems without switchover

The switches D3, D4 and D5 work together. They limit the I-gain between 5% and 100% as follows.

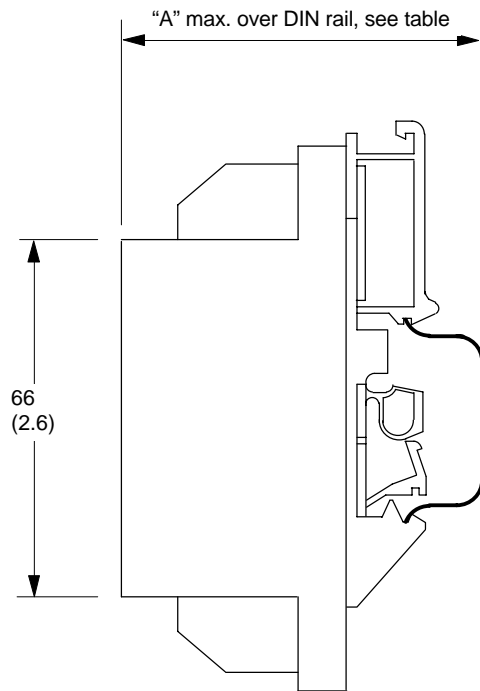
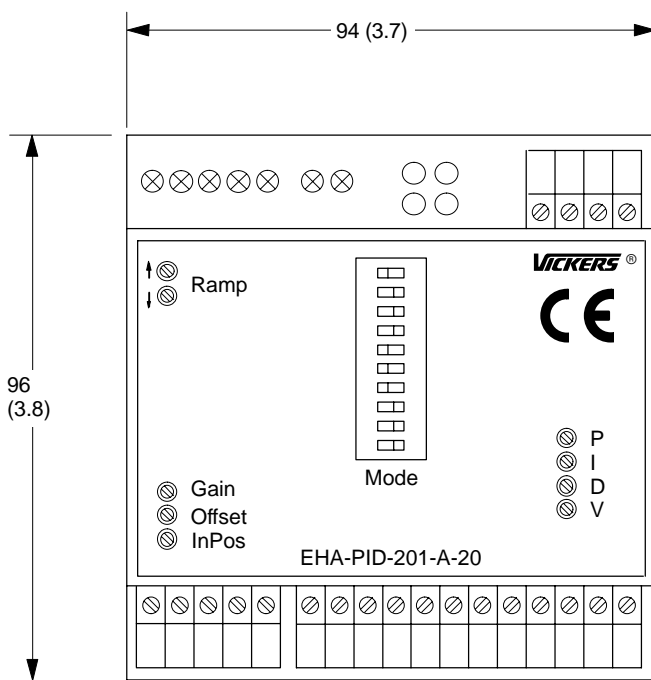
D3	D4	D5	I-Gain
ON	ON	ON	100% (default)
ON	ON	OFF	50%
ON	OFF	ON	35%
ON	OFF	OFF	25%
OFF	ON	ON	5.9%
OFF	ON	OFF	5.8%
OFF	OFF	ON	5.3%
OFF	OFF	OFF	5.0%

Reconfiguration of Controller Parameters

Once the controller parameters have been optimized and set, they can be measured by means of an ohmmeter. This allows easy configuration of the controller on different cards for use as spare parts or on standard machine series.

Four test points are located on the PID module for this purpose. The resistance between the appropriate test point (V, P, I and D), as shown in "Front View" on page C.110, and ground (at terminal [1], [11], [13] or [21]) determines the controller parameters.

Installation Dimensions in mm (inches)



Type	TS1	TS3	TS4/5
A	64,5 (2.6)	60,0 (2.4)	67,5 (2.7)