

### Characteristics

- Power amplifier for proportional valves with one or two solenoids
- Power supply 10... 30 V
- Input signals:  
0... 10 V,  $\pm 10$  V, 0... 20 mA and 4... 20 mA
- PWM input (PAM-191)
- Reference voltage
- MIN, MAX, RAMP and DITHER adjustment via potentiometer
- Internal concept: digital
- Current ranges: 1,0 A to 2,6 A
- Low cost Snap-On housing



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### Description

The standard power amplifiers PAM-191 to PAM-194 (analogue power amplifiers) are adjustable via potentiometer. The advantage of the fast handling is combined with the effective and efficient control by a microcontroller.

Internally they work with the microcontroller family HC08 of Motorola (today Freescale), what ended up in clearly greater flexibility and strength and simultaneously in cost reduction.

For all modules a flexible adjustment via potentiometer is standard, a wide range for the voltage supply (suitable for 12 V and 24 V systems) as well as current or voltage inputs supports the universal use. Internal monitoring announces the typical mistakes as cable breakdown at the input signal (4... 20 mA) as well as cable breakdown to the solenoid by the LED.

The PAM-191 power amplifier can also be controlled via a 12 V or 24 V PWM signal.

Advantage: no analogue output is required at the PLC and the cable does not have to be screened. The module measures the frequency and the pulse duration at the PWM input and calculates the proportional signal. The input frequency can be in a range of 50... 2000 Hz.

The amplifiers PAM-192 to 194 are specific variants for the control of proportional directional valves. The characteristics are largely comparable with those of the PAM-191.

Because of the internal digital implementation of these power amplifiers custom-built adaptations are fast and economically possible. For example the function of the potentiometers as well as the operating range can be changed by the software.

## The power amplifiers

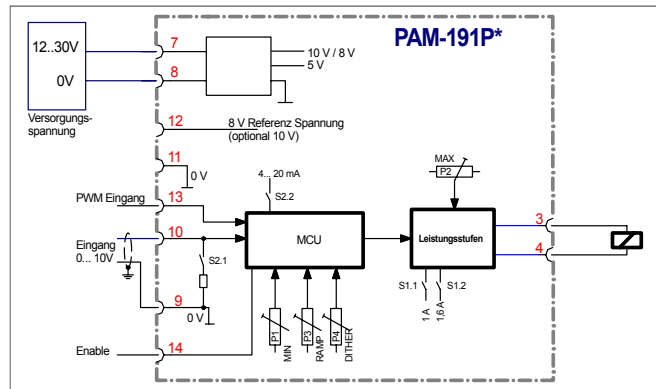
**PAM-191:** Power amplifier for proportional pressure or throttle valves. MIN, MAX, RAMP and DITHER are adjustable. The max. output current can be switched over in three steps. A special feature is the PWM input.

**PAM-192:** Power amplifier for proportional directional valves. Adjustable is: 2 x MIN, 2 x MAX, RAMP and DITHER. The max. output current can be switched over in two steps. With 4... 20 mA input signals the valve is in neutral position at 12 mA.

**PAM-193:** Power amplifier for proportional directional valves. Adjustable is: 2 x MIN, MAX, RAMP and DITHER.

The max. output current can be switched over in two steps. A special current control is the use of only one return wire (common line) for two solenoids.

**PAM-194:** Power amplifier for proportional directional valves. Adjustable is: 2 x MIN, 2 x MAX, RAMP and DITHER. The max. output current can be switched over in two steps. A special feature is the optimized input for joysticks. Therefore the different joystick signals ( $\pm 10$  V, 0... 10 V or with centre tap  $\pm 5$  V ( $\pm 4$  V)) can be used.



**Low Cost power amplifier with PWM input**

### Custom-built adaptations:

- Adjustable PWM frequency instead of adjustable dither amplitude
- Custom-built dither and PWM frequencies
- MIN adjustment always active
- Current control via three switch inputs
- Ramp UP / DOWN

### Applications:

- General control of proportional pressure and throttle valves
- General control of proportional directional valves
- Joystick control

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