Technical documentation

Appendix: PEXT3 integrated power amplifier used for the ME5 module series

Revision

Datum	Modul Revision	Kommentar
31.01.2006	1	Modul für unsere ME5 Basiselektronik

Ordering code

The integrated power amplifiers are ordered by the extension **P** (standard is A for +/- 10 V output)

Example:
POS-123P (instead of POS-123A)
POS-123PL (L for reduced output current; 50 % of the standard current)

General description

This power stage was developed to control proportional valves without spool position feedback. The current is continuously controlled by the microcontroller of the main module with a PWM signal. A cycle time of 0,167 ms is supplying a good dynamic.
Internal parameters are used for optimal static and dynamic adjustments. The separate power input of the power stage supplies expanded possibilities for safety relevant applications. Diagnostics of the control function by deenergized power stages.
Integration in a closed module concept guarantees a simple and fast installation.

Control modules with optional power stage:
DSG 111, POS 121, POS 122, POS-123, POS-127, POS-128, MDR 133, CSC 151 and CSC 152

Directional- , throttle- pressure- and flow control valves of the manufactures: REXROTH, BOSCH, EATON, PARKER, FLUID TEAM, ATOS ...

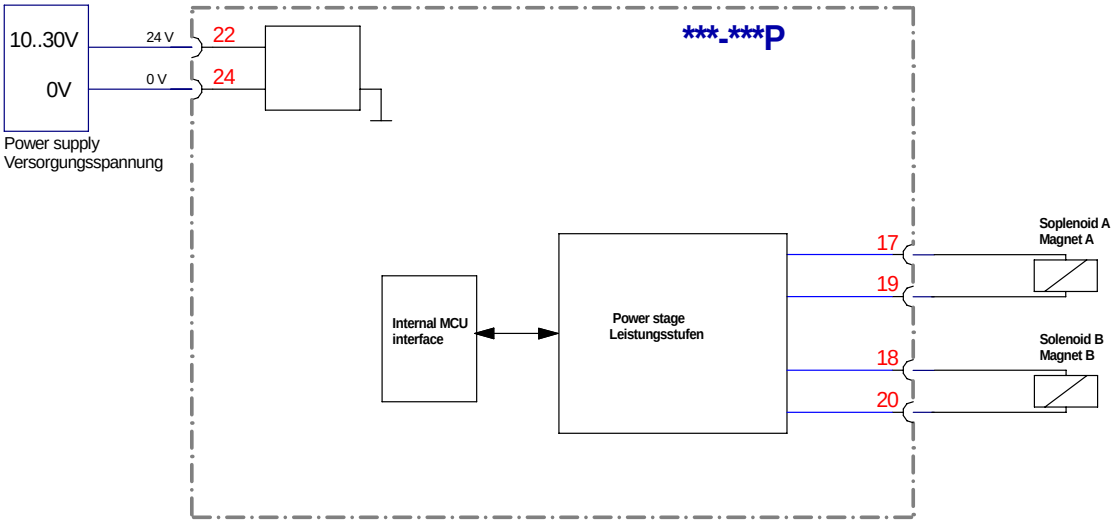
Characteristics

- **Two power stages of 1 A, 1,6 A or 2,6 A**
- **Adjustable PWM-frequency , dither frequency and dither amplitude**
- **High current resolution**
- **For one directional valve, two throttle valves or pressure valves**
- **Separate power input for safety relevant applications**
- **Integrated in basic modules, no extra wiring is necessary**
- **Best price- / performance ratio**
- **Adjustments via RS232C**

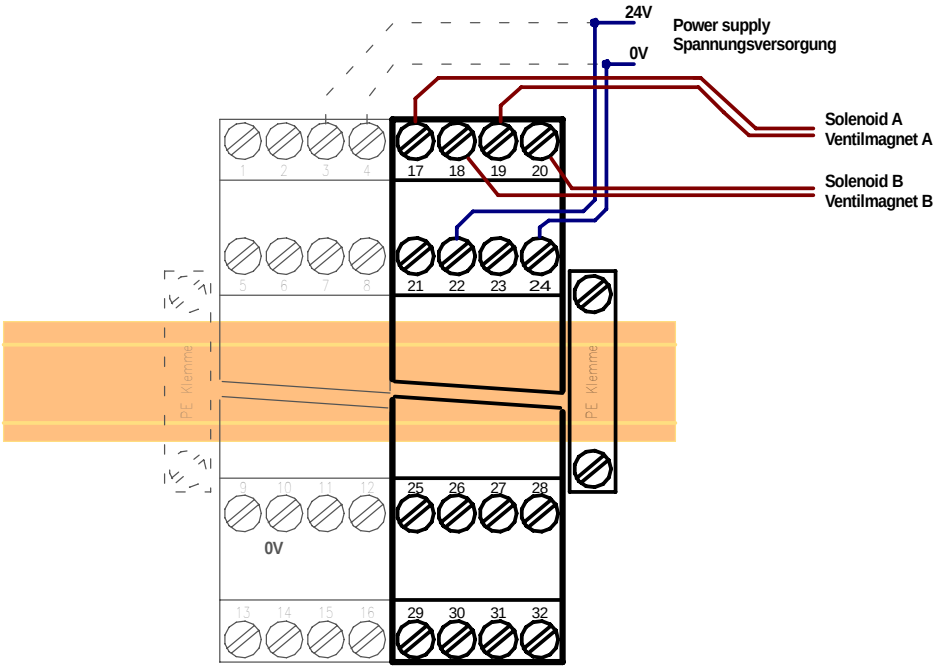
Inputs and outputs of the power amplifier

Connection	Description
PIN 22 + PIN 24 -	**Power supply: 10… 30 VDC:** Separate power connection for the power stage.
PIN 17+19	Solenoid current A, at valves with one solenoid (0… 10 V output signal at the basic module) output A is active (MDR-133, SCU-136,…).
PIN 18+20	Solenoid current B.

Circuit



Typical wiring



Technical Data

Power supply **Current consumption** **Fuse**	**[VDC]** **[A]** **[A]**	10.. 30 depending on the solenoids (max. 5A) 5 (medium lag)
Output current (PWM signal, closed loop current controlled) **Max. solenoid currents**	 **[A]** **[A]** **[A]**	 1,0 1,6 2,6
Housing		Snap-On Module EN 50022 Polyamide PA 6.6 Combustibility class V0 (UL94)
Temperature range	**°C**	-20..60
dimensions	**[mm]**	120 x 100 x 45
Terminals		2 x 4pol. Terminal blocks
EMC		EN 61000-6-2: 8/2002 EN 61000-6-3: 6/2005

Power supply

This module is designed for 10… 30 VDC (typical 24 V) of a power supply. This power supply must correspond to the actual EMC standards.
All inductivities at the same power supply (relays, valves …) must be provided with an over voltage protection (varistors, free-wheel diodes …).
It is recommended to use a regulated power supply (linear or switching mode) for the supply of the module and the sensors. These power supplies have a clearly lower internal resistance in comparison with non regulated power supplies and therefore a better spurious rejection.

Power supply : 10… 30 VDC, incl. ripple
Power consumption: 100 mA
External protection: 5 A medium lag

ATTENTION: Without an external fuse and in case of a continual short-circuit the module can be destroyed in spite of all internal protections.

Digital PWM output

The digital PWM outputs are closed loop current controlled. Measurements should be made only in current mode.
All outputs are protected with suppressor diodes and RC-filters against transient overshoots.

Output current: depending on the current range, 1 A, 1,6 A or 2,6 A

ATTENTION: Plugs with free wheel diodes or LEDs should not be used with closed loop current controlled power stages. The current loop is disturbed and the power stage can be damaged.

Parameter list

Command	Parameter	Default	Unit	Description
current x	x=0… 2	0	-	Selection of the output current range: 0 = 1,0 A range, 1 = 1,6 A range and 2 = 2,6 A range.
dfreq x	x= 60… 400	120	Hz	Dither frequency
dampl x	x= 0… 3000	500	0,01%	Dither amplitude. Typical values between 500 and 1200 (good experience were made with 700).
pwm x	x= 100… 7700	2600	Hz	PWM Frequency. PWM Frequencies of ≥2000 Hz improve the current loop dynamics. PWM Frequencies in the range of 100… 500 Hz will be used for low dynamic valves with high hysteresis. In this case, DAMPL must be zero.
ppwm x ipwm x	x= 0… 30 x= 1… 500	3 40	- -	PI-compensator for the current controller. Changes should be only done with good experience in optimizing of current loops.. In some cases a PWM Frequency of >2500 Hz; PPWM can be increased to 7… 15. ATTENTION: The dither amplitude must be optimized after that.

The standard parameterization is used at many proportional valves of different manufactures. Without special requirements on the application, this parameterization is almost sufficient.