

Electronic amplifier type EV1M3

Assembly instructions



Modular design

Supply voltage U_B : 9 to 32 V DC

Output current I_A : max. 2,4 A



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1 Overview of proportional amplifier type EV1M3

Proportional amplifiers actuate proportional solenoid valves by converting an input signal into a corresponding control current. The amplifier module EV1M3 can be assembled on a 32 mm or 35 mm DIN rail through the use of an additional card holder. Thanks to the excellent control accuracy and highly precise feedback measurement, even challenging hydraulic applications can easily be realised. A multi-turn potentiometer is used to configure the valve parameters such as the minimum and maximum current, dither and ramps.

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Features and benefits:

- Compact design
- Easy commissioning
- Functions tailored to HAWE-products

Intended applications:

- For the actuation of proportional valves
- Switch cabinet installation in an industrial setting

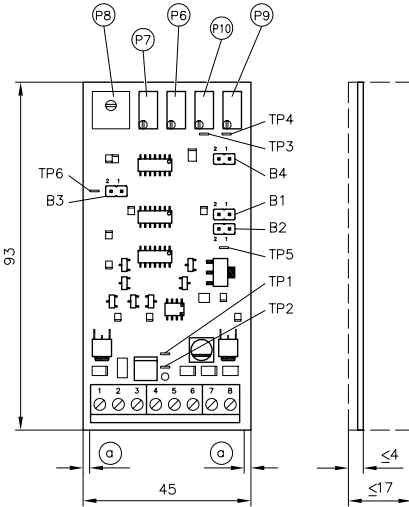


Figure 1: Proportional amplifier type EV1M3



2 Dimensions

All dimensions in mm, subject to change.

2.1 Amplifier module



Bridges (Jumper)

-  Jumper placed
-  Jumper open

i Note

Leave the bridge (jumper) B4 open. Only change B4 to adjust the ramp time (see [D 7831/2](#) Chapter "Assembly, operating and maintenance information")

Potentiometer

P6	Potentiometer ramp down time t_d (25-turns)
P7	Potentiometer ramp up time t_u (25-turns)
P8	Potentiometer dither amplitude
P9	Potentiometer basic current I_{\min} (25-turns)
P10	Potentiometer maximum current I_{\max} (25-turns)

Direction of potentiometer rotation 

Test points

TP1	Test point 1 (+) for current feedback measurement, 100 mV ± 0.5 A
TP2	Test point 2 (-) for current feedback measurement, 100 mV ± 0.5 A
TP3	Test point 3 to adjust ramp UP
TP4	Test point 4 to adjust ramp DOWN
TP5-6	Test points for adjusting the ramp time (see D 7831/2 Chapter "Assembly, operating and maintenance information")

Mounting the printed circuit boards

- a max. 1.8 mm
Area for printed circuit board guide and holder (see [D 7831/2](#) Chapter "Assembling the amplifier module in the card holder" section")

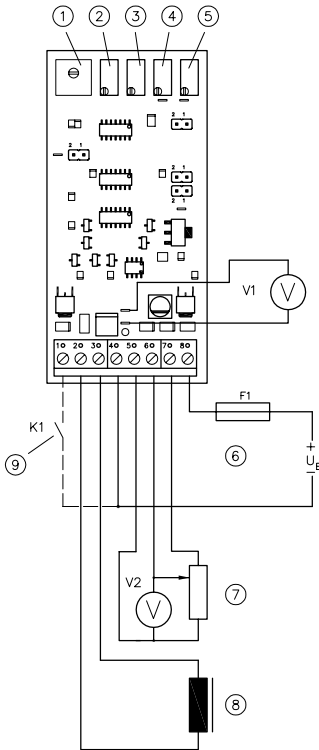
Plan of terminal connections

1	Enable/disable inout
2	+ solenoid
3	0 V earth for solenoid
4	0 V power earth
5	0 V signal earth
6	Reference input
7	U_{ST} stabilized voltage (+5 V DC)
8	+ U_a supply voltage

3 Installation, operation and maintenance information

3.1 Setting instructions

F1	Fuse 2.5 A mT
V1	Control voltmeter for measuring the coil current, 100 mV \pm 0.5 A



- 1 Potentiometer Ditheramplitude
- 2 Potentiometer Ramp up time t_{up}
- 3 Potentiometer Ramp down time t_d
- 4 Potentiometer max. current I_{max}
- 5 Potentiometer min. current I_{min}
- 6 Supply voltage
(e.g.: MNG 2,5-230/24 according to D 7835)
- 7 Target value potentiometer P1; 2 - 10 k Ω
(e.g. wire potentiometer 5 k Ω , 2 W)
- 8 Proportional solenoid
- 9 Enable / Disable

Precondition: The bridges of the amplifier module are provided as part of the delivery.

1. Amplifier connection:

Connect the proportional solenoid to terminals 2 and 3. Connect voltmeter V1 to test points TP1 and TP2 (to measure the coil (induction) current). Connect the target value potentiometer (7) to terminals 5, 6 and 7. Connect the supply voltage to terminals 4 and 8.

2. Set the target value potentiometer to minimum (0V).

3. Preset dither amplitude using potentiometer dither amplitude (1).

4. Set ramp times t_{up} time and t_{down} time to minimum using potentiometer ramp up/down time (2) + (3) (turn anticlockwise until it stops).

5. Turn on supply voltage.

6. I_{min} to the minimum current $I_{min,op,r}$ to which, according to the Q-I or Δp -I characteristic curve of the proportional valve, the desired bottom functional end position corresponds in operation. Adjustable I_{min} range, see [D 7831/2](#) "Parameters" section, . To read $I_{min,op}$, voltmeter V1 positioned between test points TP1 and TP2 (current value see above).

7. Set target value potentiometer to max. Read target value voltage on the voltmeter V2 (approx. 5V).

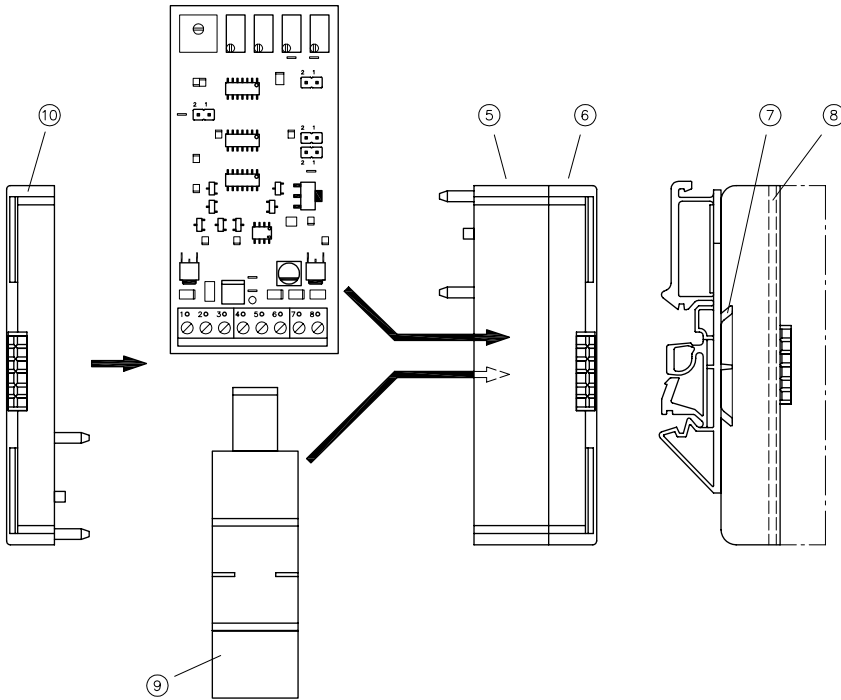
8. I_{max} to the maximum current $I_{max,op,r}$ to which, according to the Q-I or Δp -I characteristic curve of the proportional valve, the desired top functional end position corresponds in operation. Adjustable I_{max} range, see [D 7831/2](#) "Parameters" section, .

9. Dither frequency f is factory set to 60 Hz via the open bridge B3. In most circumstances this is sufficient. By closing bridge B3 this can be increased to 120 Hz, which can be more suitable for prop. valves of smaller construction. Set the target value potentiometer to approx. $0.5 \times I_{max}$ coil current. Set the dither amplitude (1) by turning the potentiometer dither amplitude clockwise to the right until vibration can just be felt on the proportional valve but does not interfere.

10. Set ramp times t_{up} and t_{down} to the desired time spans. The ramp times always extend beyond the overall range of the output current I_A . For details of the shortened setting procedure, see [D 7831/2](#) "Assembly, operating and maintenance information", .

11. Controlling the set functional parameters $I_{min,op}$. (Step 6) for $U_{target} = 0$ V DC; $I_{max,op}$. (Step 8) for $U_{target} = 5$ V DC; dither amplitude (Step 10) and ramp times (Step 9). If necessary, repeat setting procedure.

3.2 Assembly of the amplifier module on the card holder



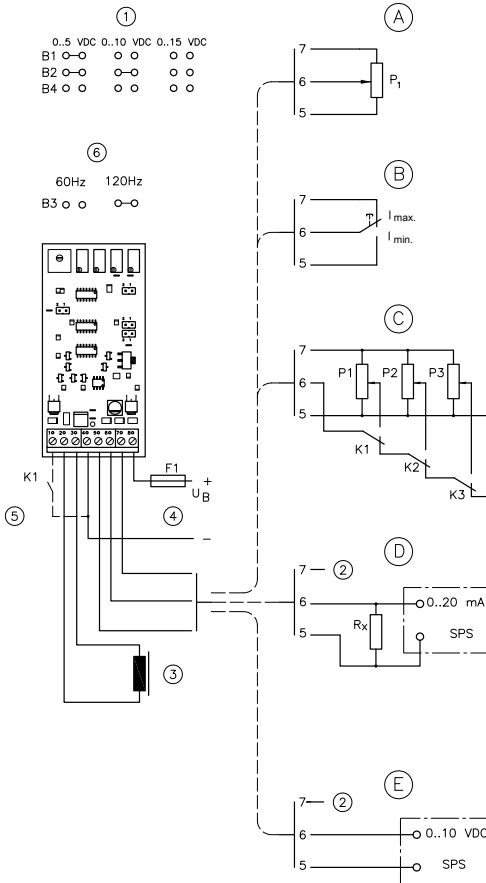
- 5 Centrepiece
- 6 Card holder, right side
- 7 Rear trapezoid guid groove for support bar clamp
- 8 All-round holding groove for module (printed circuit)
- 9 Support bar clamp
- 10 Card holder, left side

Quick guide

1. Fit together centrepiece of card holder (5) and one of the two side pieces (6) + (10).
2. Insert support bar clamp (9) into trapezoid groove at the back (7).
3. Insert conductor plate into end of all-round holding groove (8).
4. Insert remaining card holder side piece (6) + (10).

4 Typical circuits

4.1 Actuation of hydraulic valves using a proportional solenoid



- 1 Bridge setting for target value voltage ranges
- 2 Not used
- 3 Proportional solenoid
- 4 Supply
- 5 Enable/block
- 6 Dither frequency

Example A	<p>Operation with target value potentiometer</p> <p>F1 = medium-fast fuse; for nominal see Chapter 3.1, "Setting instructions" P1 = target value potentiometer 10 kΩ, min. 0.1 W Jumpers B1 and B2 fitted</p>
Example B	<p>Operation with target value changeover switch for both configured target values I_{min} and I_{max}</p> <p>F1 = as in example A Bridges B1 and B2 set</p>
Example C	<p>Operation with a priority-dependant target value switch for four target values (relay switch)</p> <p>Typical example of operation: Fast gear 1 - K1 → P1 Fast gear 2 - K2 → P2 Slow gear- K3 → P3 Stop - K1 → K2 → K3 → ⊥</p> <p>F1 = as in example A Jumper B1 and B2 closed</p>
Example D	<p>Operation with external target value power source from SPS, CNC or PC</p> <p>Note Pay attention to the maximum load of the power source.</p> <p>F1 = as in example A $R_x = 250 \Omega / 0.5 W$ Jumper B1 and B2 closed</p>
Example E	<p>Operation with external target voltage from SPS, CNC or PC</p> <p>Note Whenever the maximum target value voltage of 10V DC (15V DC) is exceeded, the maximum current set will continue to increase! Accordingly, the coil might overheat under excessive power and break down!</p> <p>F1 = as in example A Jumper B2 for 10V DC, do not set jumper for 15V DC voltage</p>

Further information

Additional versions

- Electronic amplifier type EV1D: D 7831 D
- Proportional amplifier type EV22K2: D 7817/1
- CAN node type CAN-IO: D 7845 IO
- Programmable logic valve control with Profibus type PLVC 21: D 7845-21
- Programmable logical valve control type PLVC 41: D 7845-41
- Programmable logic valve control type PLVC 8: D 7845 M

Application

- Proportional directional spool valve, type PSL and PSV size 2: D 7700-2
- Proportional directional spool valve, type PSL, PSM and PSV size 3: D 7700-3
- Proportional directional spool valve, type PSL, PSM and PSV size 5: D 7700-5
- Directional spool valve type NSWP 2: D 7451 N
- Clamping module type NSMD: D 7787
- Directional seated valve type EM and EMP: D 7490/1