**Proportional-amplifier**
- Plug amplifier for direct assembly on the valve
- Protection class IP65
- 24 and 12 VDC supply voltage
- Housing-types for solenoids from □ 29

### Description
Proportional amplifier for direct assembly on the valve. Pin layout according to DIN 43650, Type A (ISO 4400) for solenoids from □ 29 or larger. Protection class of the plug amplifier is IP65, mounted according to DIN 40050. The connector cable is already mounted in the plug.

### CONTENTS
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- Electrical specifications
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### General Specifications
- Plug housing: polyamide
- Plug: polycarbonate
- Weight: 160 g
- Connections: mounted cable, length 1.5 m (on request, cable length 5 m/10 m)
- Ambient temperature: see curve max. ambient temp.

### Electrical Specifications
- Supply voltage: 24 VDC tolerance: 22...36 VDC
- 12 VDC tolerance: 11...18 VDC
- Preset value input: 0...+10 VDC (0...+8 VDC)
- Input resistance: ≥ 100 kΩ
- Stabilized output voltage: 24 V-version: 10 VDC, max. load 2 mA
- 12 V-version: 8 VDC, max. load 2 mA
- Dither frequency adjustable 60...250 Hz
- Works setting: 200 Hz
- No load-power: 24 VDC: 0.3 W
- 12 VDC: 0.2 W

### Type Code
- Plug number
- Housing A for solenoids □ 29 or larger
- 1-solenoid version
- Supply voltage: 24 V proportional solenoid □
- 12 V proportional solenoid □
- Preset value input: 0...+8 VDC (only for 12 VDC)
- Preset value input: 0...+10 VDC (only for 24 VDC)
- Design-Index (Subject to change)

### Function
The proportional amplifier has a clock-pulsed final stage. The clock frequency acts as dither and can be steplessly adjusted. Minimum and maximum solenoid current can be adjusted separately. Furthermore, a linear ramp is integrated. By means of the input release/block, the function can be blocked. A stabilized output voltage is available for supplying external preset value transmitters.

### Applications
The amplifier is suitable for different applications because of its splash water proof design. The easyness of connection allows to put it into operation without help of special tools. All settings are easily adjustable. The plug can be rotated by 180°.

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**Start-up**

- Works setting: 200 Hz
- No load-power: 24 VDC: 0.3 W
- 12 VDC: 0.2 W

**Solenoid current**
- for 24 Volt solenoid
  - min. current $I_{min}$: adjustable 30...400 mA
  - max. current $I_{max}$: adjustable $I_{max}$-1200 mA

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**EMC**
- Immunity: EN 61 000-6-2
- Emission: EN 61 000-6-4

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**Data Sheet **

- Edition 03 38
Proportional-amplifier P02

D2 = 24 VDC

Stabilized output voltage

Supply voltage

Preset value input

Release/block

Ramp I-min I-max

Dither

Solenoid

MAX. AMBIENT TEMPERATURE CURVE

If mounted on the solenoid 60/12V the current has to be limited to 1.8 A, otherwise the proportional-amplifier could be overloaded.

ADDITIONAL INFORMATIONS

- Proportional directional control valves register 1.10
- Proportional pressure control valves register 2.3
- Proportional flow control valves register 2.6
START-UP
This data sheet is enclosed with each proportional-amplifier.

Connection examples

Connection with external preset value potentiometer

Supply voltage
Preset value input P1
(Ground)

F1: 24 V = 1.6 A quick-break P1 = 10 kΩ
12 V = 2.5 A quick-break S1 = release/block

Connection with n preset value potentiometers

Connection with preset value switch

Connection with external power source release/block with PLC, PC or NC

Analog output
PLC

Connection with external current source

Rx = 470 Ω/0.5 W for 24 VDC
Rx = 390 Ω/0.5 W for 12 VDC

Connection instructions

Supply voltage (brown, grey)
The connection has to be done as shown above:
+ pole = brown
- pole = grey (Ground)

Stabilized output voltage (yellow)
The output can be used for supplying an external preset input. The maximum load is 2 mA.
(R preset input ≥ 5 kΩ)

Preset value input (green)
The analog preset value signal 0...10 VDC (0...+8 VDC/12 V-version) has to be connected here.

Release/block (white)
If the line is not connected, the proportional amplifier is released. If the line is connected to ground, the amplifier is blocked.

Mounting
With a screwdriver the bottom of the amplifier can be lifted-off and turned by 180°.

Setting instructions

Minimum current \( I_{\text{min}} \)
Adjust the external preset value to 0%. Adjust the solenoid current with the potentiometer \( I_{\text{min}} \) to a value which results in the desired minimum output of the consumer.

Maximum current \( I_{\text{max}} \)
Adjust the external preset value to 100%. Adjust the solenoid current with the potentiometer \( I_{\text{max}} \) to a value which results in the desired maximum output of the consumer.

Dither
With the potentiometer Dither, adjust the frequency of the modulated solenoid current to the value which results in the desired sensitivity of the consumers.
Turning the potentiometer to the right: Higher frequency.
Turning the potentiometer to the left: Lower frequency.

Ramp
There is a common potentiometer mounted for the «ramping up/ramping down» functions.
Turning the potentiometer to the right: Long ramping time.
Turning the potentiometer to the left: Short ramping time.