Set-Up Procedure

Vickers® by Danfoss
Valves

Proportional Power Plug

EHH-AMP-702-D/E-10

Introduction

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This set-up procedure describes the adjustments on the Power Plug for setting the dead-band, gain and ramp rate on a non-feedback proportional valve.

Proportional valves with over-lapped spools have a range of spool travel where there is no flow from the valve. This range of spool motion is called dead-band. Adjusting the power plug allows the dead-band to be electronically eliminated (dead-band compensation) by making the spool jump across the dead-band when a small input signal is applied to the power plug.

$$\text{Gain} = \frac{\text{Output Flow}}{\text{Input Voltage}}$$

The gain of the valve is the ratio of the opening of the valve (or flow rate from it) to the applied voltage input to the power plug.

The ramp rate is the rate at which the power plug allows the valve to open (or close) when a step voltage input is applied to the power plug. In many applications this ramp would be used to gradually accelerate or decelerate an actuator.

Installation precautions to eliminate leaks into the power plug

- Use only cables with circular cross-sections and diameter between 5–10 mm (.2" - .4")
- Ensure that sealing grommet is present and installed correctly. It must be forced over the outer jacket of the cable.
- Ensure that all the gaskets are present and properly seated.
- Ensure that the plastic cover seats firmly and correctly on the center body post.

Necessary Equipment

- EHH-AMP-702-D-10 or EHH-AMP-702-E-10 power plug
- Compatible KDG series or KTG series non-feedback type proportional valve
- Hydraulic power source and load circuit
- 24 volt DC power source
- 10 volt DC power source
- DC voltmeter
- 1000 ohm potentiometer (multi-turn preferred)
- Connecting cables

Connection of power plug

Referring to the schematic in Figure 1 and the power plug diagram in Figure 2, connect the power supplies, voltmeter, command potentiometer and valve solenoid as shown.

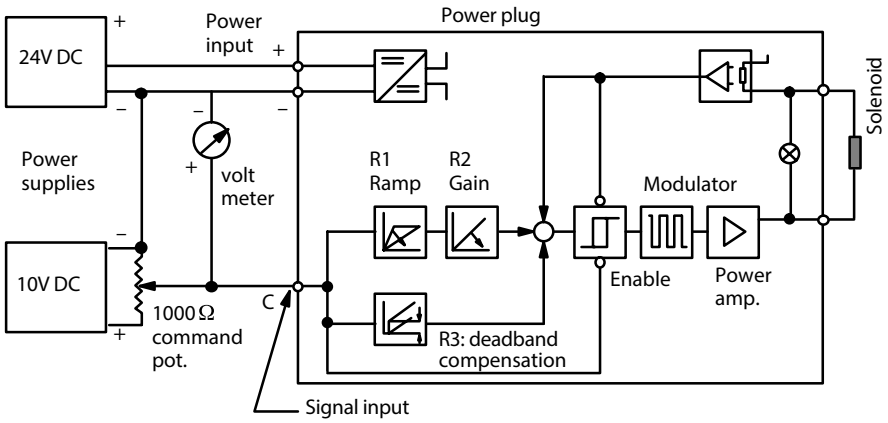


Figure 1. Power plug set-up schematic

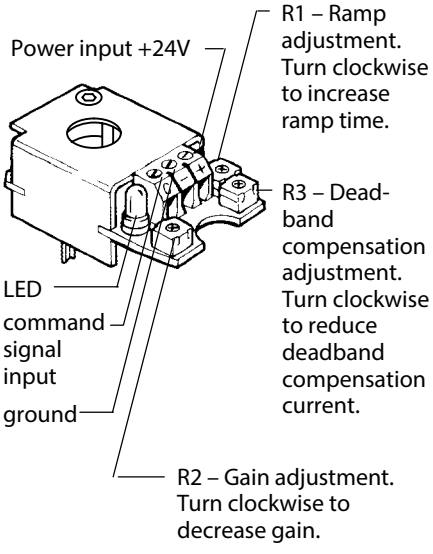


Figure 2. Power plug connections

Adjustment Procedures

Figure 1 shows the set-up for one solenoid. If the valve contains two solenoids, the set-up and the following procedure should be repeated.

CAUTION

Applying more than 10 volts at input C may result in damage to the power plug.

Deadband adjustment

A. Turn potentiometer R3 on the power plug fully clockwise (no deadband compensation) and R1 fully counter-clockwise (maximum ramp rate).The red LED will turn off (it turns off to signify an "off" condition valve, when input voltage is less than 100 mV).

B. Adjust command potentiometer until the voltmeter reads 0.25 volts at connection C.

C. Slowly adjust potentiometer R3 counter-clockwise until movement at the actuator is detected.

Deadband compensation is set.

Gain adjustment

A. For many applications the valve gain may simply be set to a maximum by turning potentiometer R2 fully clockwise.

For any other gain setting:

A.. Calculate the maximum speed of the actuator. Calculate 80% of this maximum speed.

B.. Set command potentiometer to provide 8 volts at C (8 volts is 80% of maximum input voltage.

C.. Slowly adjust potentiometer R2 until this 80% speed is observed at the actuator.

Valve gain is set.

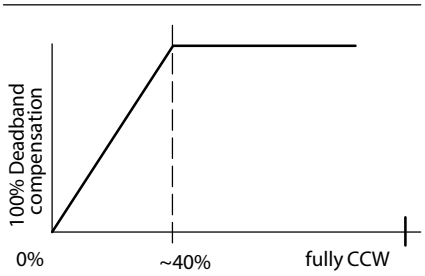
Repeat the deadband adjustment and the gain adjustment steps at least once more since adjusting one parameter affects the setting of the other.

Ramp rate adjustment

A. For most applications: Set R1 fully clockwise (minimum ramp rate). Run the actuator for different increasing counter-clockwise settings of the potentiometer R1 until slight hydraulic shocks in the system are observed. Back-off R1 clockwise until the shocks just disappear.

Fastest shock-free ramp rate is set.

B. For any other ramp rate: Run the actuator for different increasing CCW settings of the potentiometer R1, until the desired velocity ramp is observed at the actuator.



Note that all adjustment lies within 40% of the potentiometer rotation.

Figure 3. Sensitivity of deadband adjustment to potentiometer R3 (typical).

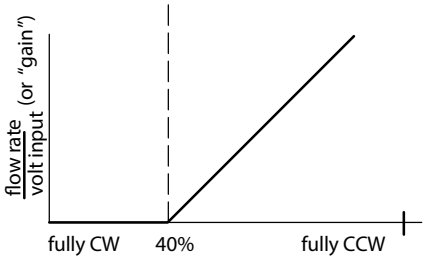
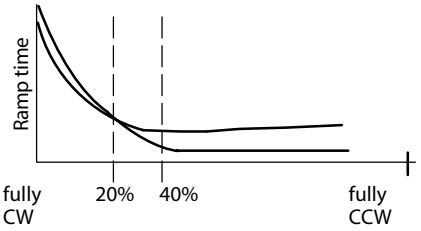


Figure 4. Sensitivity of deadband adjustment to potentiometer R3 (typical).



Note that adjustment is very non-linear and most adjustment lies within 40% of the potentiometer rotation range for ramp-up and 20% of the adjustment range for ramp-down.

Figure 5. Sensitivity of deadband adjustment to potentiometer R3 (typical).

Wiring Preparation

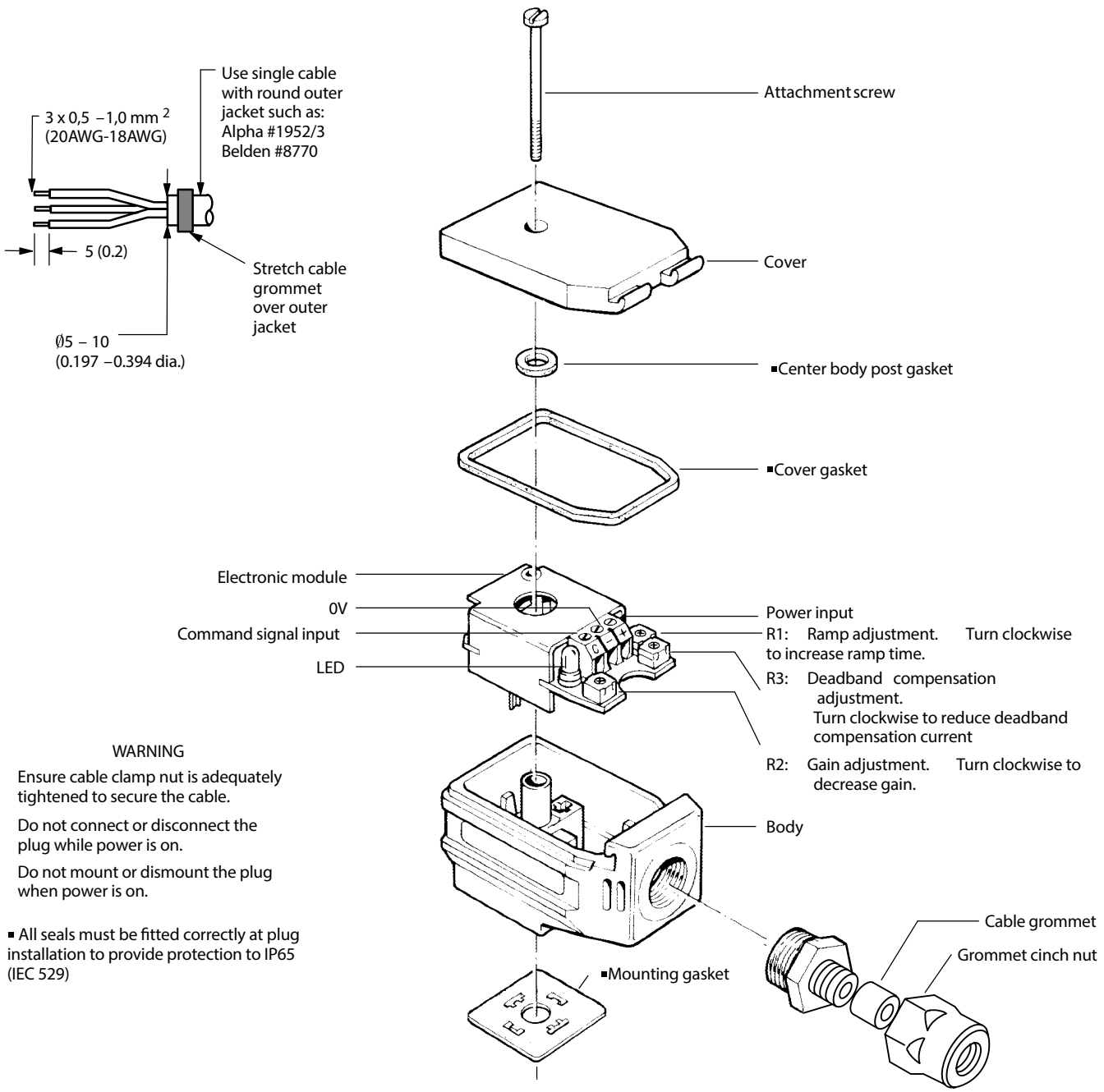


Figure 6. Power plug exploded view

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