Electronic Controls

Proportional Valve
Control Power Plugs

EHH-AMP-702-D/J/K-2* Series

For use with valve types:

EPV**-12D-1*

EFV1-**-012DE*

ERV1/2**-12D-1*

EPRV1**-12D-1*

Application

Primary applications are in the control of non-feedback proportional valves where the cost of more sophisticated electronic controls can be avoided.

Type J is typically used in closed-loop applications.

General Description

Three types of plugs, conforming to ISO 4400/DIN 43650 interface, with integral amplifiers and necessary adjustment potentiometers, are designed for use with non-feed back hydraulic valves.

This plug/valve combination offers very low cost solutions to many hydraulic control problems requiring proportional control.

Type D is controlled with a 0-10V command signal, and has adjustable gain, ramp, deadband compensation and dither.

Type J, designed for closed-loop applications, is controlled with a 0-10V command signal, and has no ramp function.

Type K is controlled with a 4-20 mA command signal, and has an adjustable ramp time of 50 ms to 5s.

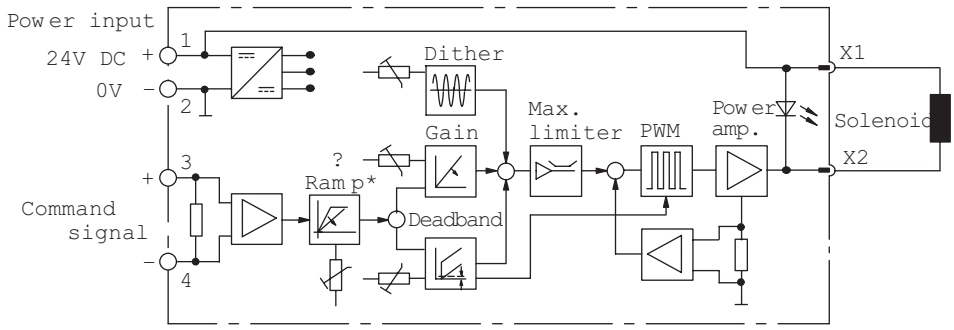
Features and Benefits

- Integral amplifier provides essential functions for control of proportional valves
- Adjustable ramp time (types D and K), gain, deadband compensation and dither
- Ease of installation, with reduced cost
- Fully short-circuit and reverse-polarity protected
- Differential voltage command signal (types D and J)
- Adjustable dither
- EMC to latest European standards
- Protection to IP67

C

Electrical Block Diagram

EHH-AMP-702-D/J/K-2*



* Type J does not have the ramp function.

Note: This product has been designed and tested to meet specific standards outlined in the European Electro-magnetic Compatibility Directive (EMC) 89/336/EEC, amended by 91/26/EEC, 92/31/EEC and 93/68/EEC, article 5. For instructions on installation requirements to achieve effective protection levels, see this leaflet and the Installation Wiring Practices for Vickers Electronic Products leaflet 2468. Wiring practices relevant to this Directive are indicated by a warning symbol and Electromagnetic Compatibility (EMC).

Model Code/ Operating Data

C

Model Code

EHH – AMP – 702 – * 2*

1 Adjustment Range
D - Proportional plug:
0-10 VDC with ramp
J - Proportional plug: 0-10
VDC without ramp function
K - Proportional plug:
4-20 mA with ramp

2 Design Number
20 Series
Subject to change. Installation dimensions unaltered for design numbers 20 to 29 inclusives.

Operating Data

Electrical

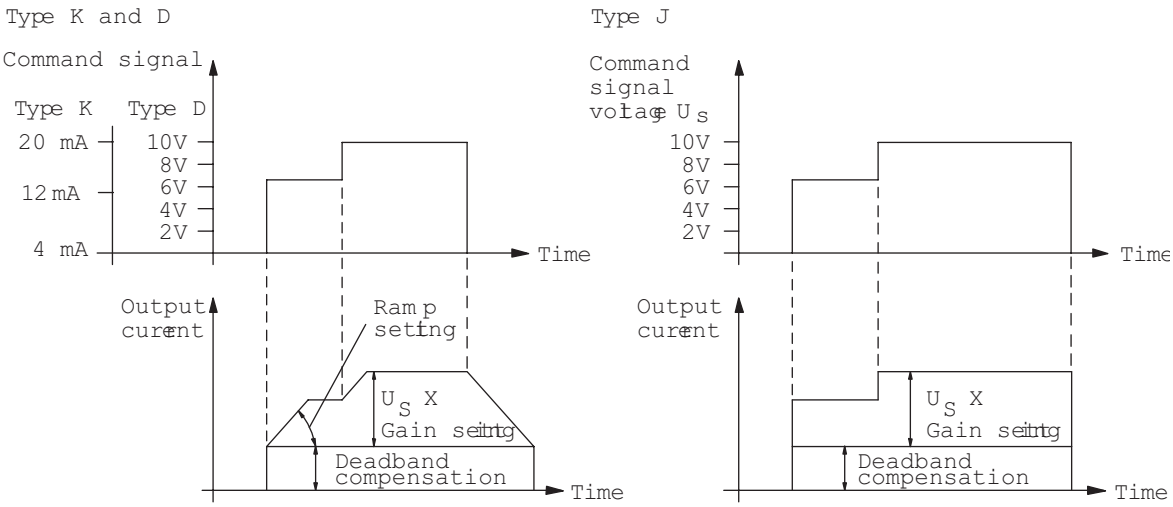
	Types D and J	Type K
Connections 1 2 3 4	 24V DC OV (power and signal) Positive command signal Negative command signal	
Power (input) supply	20-30V DC including ± 10% maximum ripple (peak-to-peak) 24V DC nominal	
Absolute maximum voltage	40V	
Max. power consumption including solenoid	35W	
Reverse polarity protected	Yes	
Short circuit protected	Yes	
Maximum output current	1,6A	
Maximum output voltage typical (1,6A output current)	Typically 1,5V below supply voltage	
Command signal	0-10V (10 kohms)	4-20 mA (250 ohms)
Deadband triggering For output (LED on) For no output (LED off)	200 mV 200 mV to 10V 0 mV to 100 mV	4 mA 4-20 mA 0-4 mA
Deadband adjustment range	100 to 1000 mA	
Gain adjustment range	0.02A/V to 0.16A/V	0.01 A/mA to 0.08 A/mA
Dither adjustment range	0 to 500 mA	
Ramp time (types D and K only)	50 ms to 5s	
PWM frequency	1200 Hz ± 10%	
Dither frequency	120 Hz ± 10%	
Protection	IEC 529: IP67 (when correctly installed with interface seal in place) Fully short-circuit and reverse-polarity protected	
Isolation to VDE 0110	Group “B”	
Electromagnetic compatibility (EMC): Emission Immunity	 EN 50081-2 EN 50082-2	

Mechanical

Housing	PA6 glass-reinforced plastic (conforming to UL-94HB). Color: gray
Mounting interface	ISO 4400 (DIN 43650)
Cable clamp	Pg9 screw type
Cable diameter	Ø 5 to 10 mm (0.197 to 0.394” dia.)
Wire section	0,5 to 1,0 mm2 (20-17 AWG)
Temperature, ambient range	-20° to +70°C (-4° to +158°F)
Mass	0,07 kg (0.154 lb)

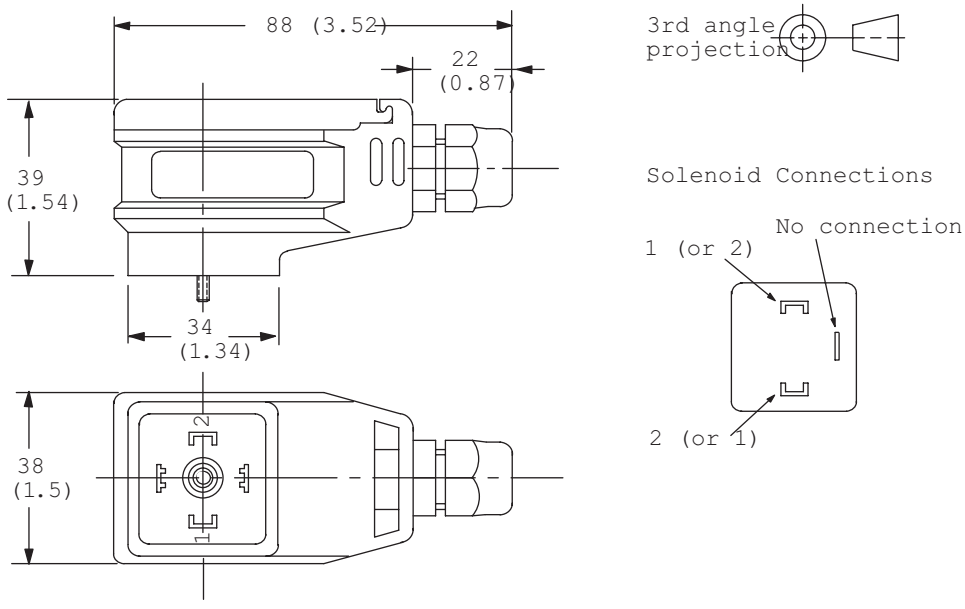
Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.

Input/Output Characteristics



Installation Dimensions

mm (inch)



Installation Data

C

Adjustments

Ramp time: Turn clockwise to increase ramp time (Only types D/K).

Gain: Turn clockwise to increase gain.

Deadband compensation: Turn clockwise to increase deadband compensation current.

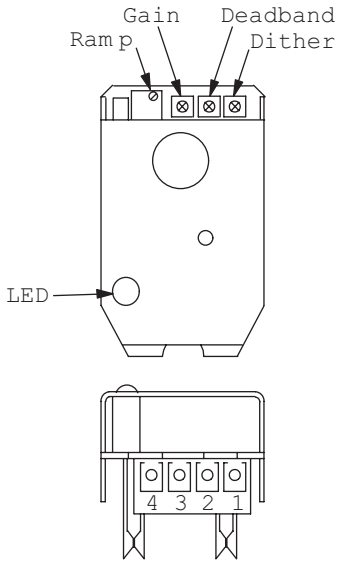
Dither: Turn clockwise to increase the dither current.

Terminal 1: Power Supply 20V-30V DC, positive.

Terminal 2: Power Supply 0V.

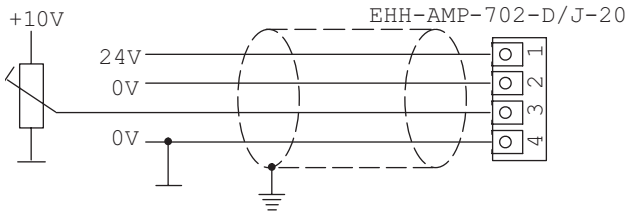
Terminal 3: Command signal positive (see "Operating Data").

Terminal 4: Command signal negative (see "Operating Data").

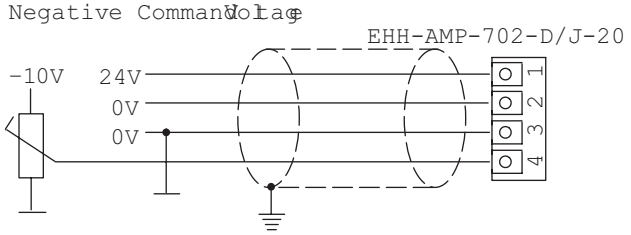


Installation Wiring Options

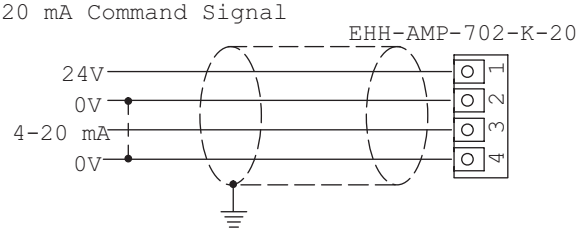
Positive Command Voltage



Negative Command Voltage

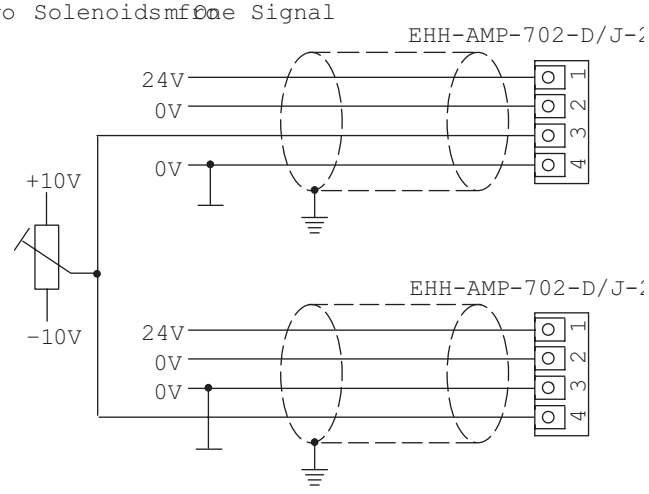


4-20 mA Command Signal

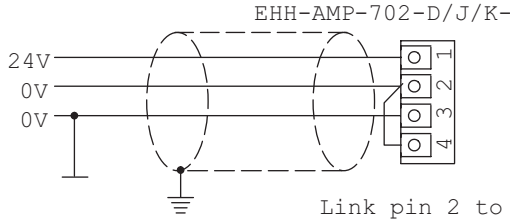


Protective ground connection.

Bi-polar Command Voltage or Operating Two Solenoids from One Signal



Connections when replacing design pre with -20 design and only 3 wires



Link pin 2 to

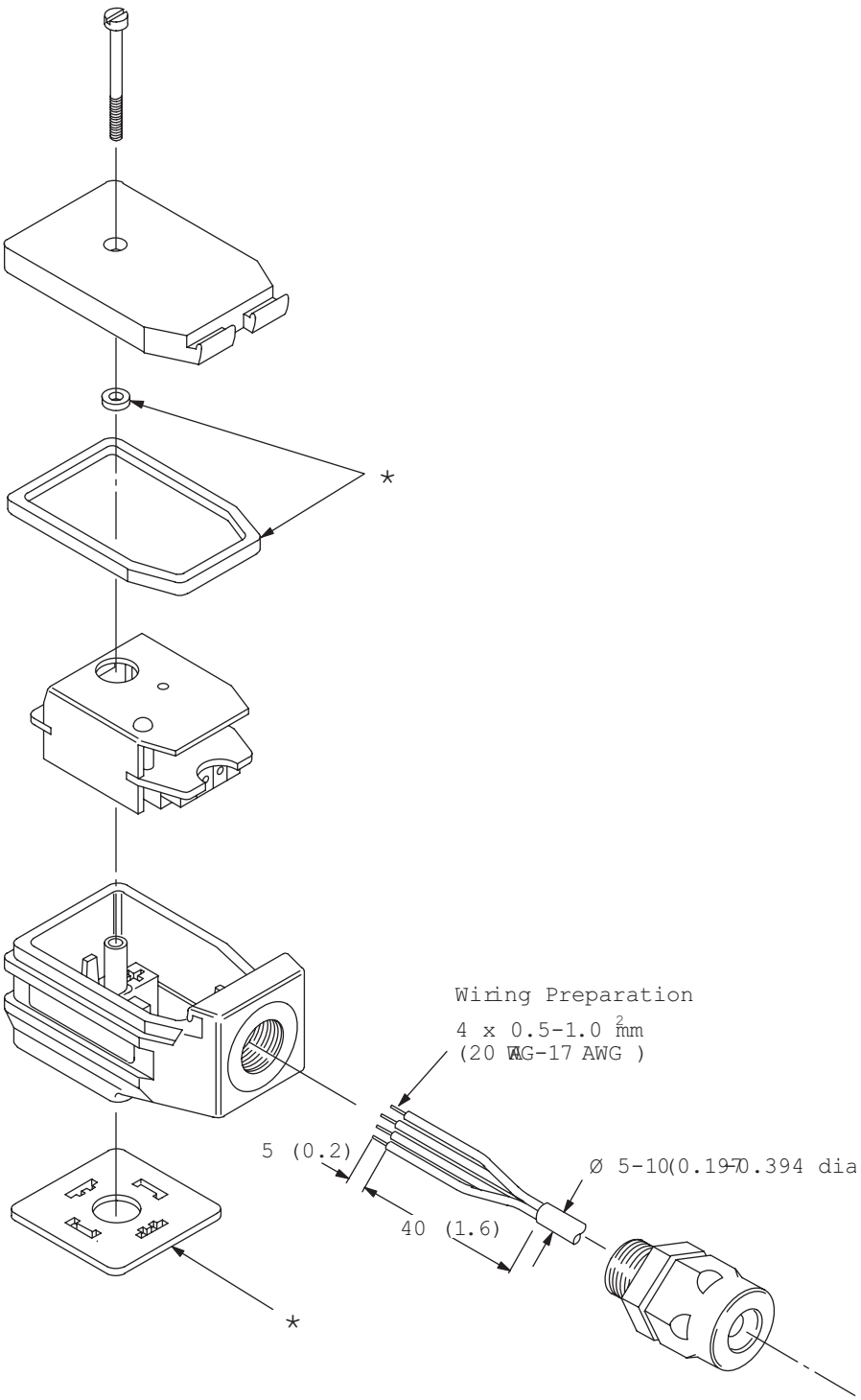
WARNING

Electromagnetic Compatibility (EMC) - Screened cables should be used and particular attention paid to the grounding of the screens as shown in the above diagrams.

Assembly Showing Wiring Connection Points

WARNING

Ensure cable clamp nut is adequately tightened to secure cable. Do not connect, or disconnect, the plug while power is on. Do not mount, or dismount, the plug while power is on.



*All seals must be fitted correctly at plug installation to provide protection to IP67 (IEC529).

Installation Data

C

Start-Up Procedure

- Correctly wire the plug and, before mounting it on the valve solenoid, apply 24V DC (20 to 30V limits) to the "power input" terminals.
- Check for correct plug function by illumination/ non-illumination of the LED. The LED should illuminate when the demand applied to the "signal input" terminal is between 200 mV and 10V (or 4 mA and 20 mA) and should not be illuminated when the applied demand is less than 100 mV (4 mA). If there is a malfunction a new plug must be fitted.
- Switch off power supply and command/input signal and then install plug on solenoid. Ensure that all seals are fitted correctly and clamped as the retaining screw is tightened: this is essential in providing IP67 protection.
- Ensure that the hydraulic system will not cause any erratic movement of actuators, then:
  - Switch on power supply again.
  - Repeat LED/function check as in 2.

  An LED malfunction now indicates a short circuit at the load.
- Successful completion of these checks means that the plug and load are ready for use.

Spare Parts

The only spare part available is the interface seal, part number 732100.

Ordering Procedure

Order plug by full model code, and spare interface seals by part number 732100.

Electronic Controls

"Soft Switch" Power Plugs

EHH-AMP-702-C-2*
10 Series

For use with valve types:

EPV**-12D-1*

EFV1-**-012DE*

ERV1/2**-12D-1*

EPRV1**-12D-1*

Application

Focus applications for this plug are in the control of hydraulic solenoid operated directional and pressure control valves where control of valve response time can significantly reduce shocks in the hydraulic system.

Best results in reducing hydraulic shocks will only be obtained by using valves with the right "low shock", or " proportional" features.

General Description

These plugs, conforming to ISO 4400/DIN 43650 interface, offer adjustable, ramped on/off switching times through the use of an integral amplifier.

The switching time range is 50 ms to 5 seconds.

The soft switch plug is rated for 24V DC nominal and controlled by a 24V logic signal. Applying an "on" signal causes the output current to ramp up to, and stay at, an adjustable maximum while the "on" signal is maintained. At "switch-off" the output current is ramped down to zero and will remain at zero until the next "on" signal.

Ramp times (switching times) can be adjusted by an in-built potentiometer.

An adjustment also allows for compensation of any deadband in the valve.

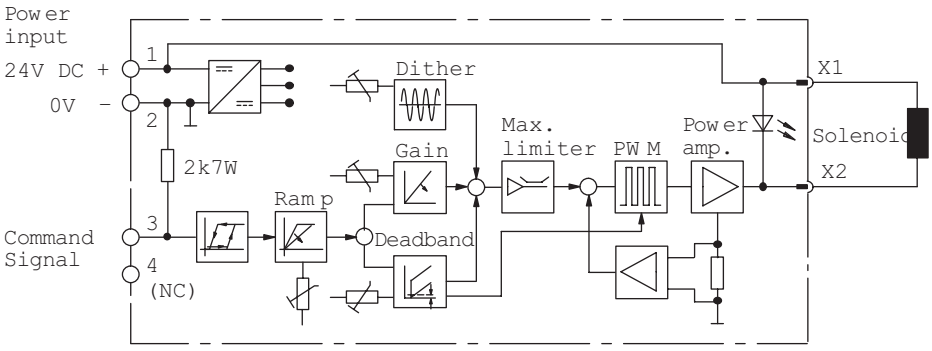
Features and Benefits

- Integral amplifier provides control from on/off logic command signal
- Adjustable ramp time
- Deadband compensation
- Adjustable output level
- Adjustable dither
- EMC to latest European standards
- Improved switching time repeatability
- Fully short-circuit and reverse-polarity protected
- Protection to IP67

C

Electrical Block Diagram

EHH-AMP-702-C-2*
10 Series



Note: This product has been designed and tested to meet specific standards outlined in the European Electro-magnetic Compatibility Directive (EMC) 89/336/EEC, amended by 91/26/EEC, 92/31/EEC and 93/68/EEC, article 5. For instructions on installation requirements to achieve effective protection levels, see this leaflet and the Installation Wiring Practices for Vickers Electronic Products leaflet 2468. Wiring practices relevant to this Directive are indicated by a warning symbol and Electromagnetic Compatibility (EMC).

Model Code/ Operating Data

Model Code

EHH – AMP – 702 – C – 2*
1

1 Design Number
20 Series

Subject to change. Installation dimensions unaltered for design numbers 20 to 29 inclusives.

C

Operating Data

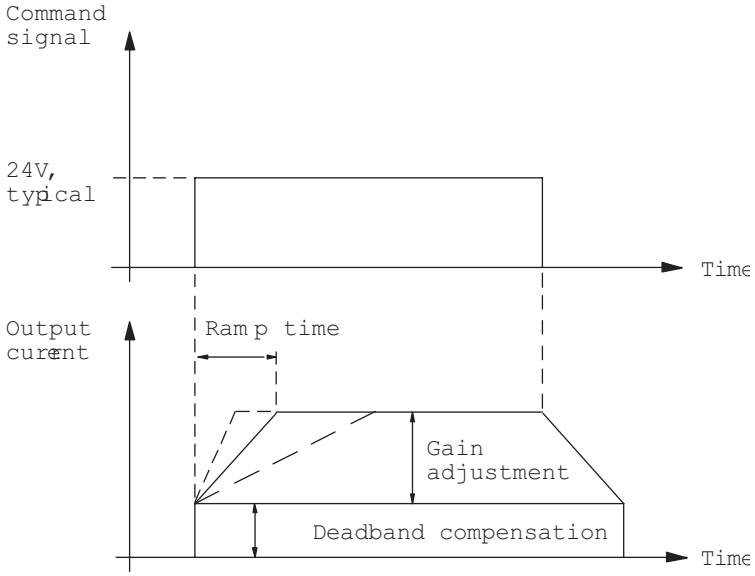
Electrical	
Connections 1 2 3 4	 24V DC OV (power and signal) Positive command signal Negative command signal
Power (input) supply	20-30V DC including ± 10% maximum ripple ripple (peak-to-peak) 24V DC nominal
Absolute maximum voltage	40V
Max. power consumption including solenoid	35W
Reverse polarity protected	Yes
Short circuit protected	Yes
Maximum output current	1,6A
Maximum output voltage typical (1,6A output current)	Typically 1,5V below supply voltage
Command signal For output (LED on) For no output (LED off) Input impedance	 15V to 24V 0V to 5V 2700 ohms
Deadband adjustment range	<100 - 1000 mA
Gain adjustment range	0.02A to 1,6A (maximum)
Dither adjustment range	0 to 500 mA
Ramp time	50 ms to 5s
PWM frequency	1200 Hz ± 10%
Dither frequency	120 Hz ± 10%
Protection	IEC 529: IP67 (when correctly installed with interface seal in place) Fully short-circuit and reverse-polarity protected
Isolation to VDE 0110	Group "B"
Electromagnetic compatibility (EMC): Emission Immunity	 EN 50081-2 EN 50082-2

Mechanical	
Housing	PA6 glass-reinforced plastic (conforming to UL-94HB). Color: gray
Mounting interface	ISO 4400 (DIN 43650)
Cable clamp	Pg9 screw type
Cable diameter	Ø 5 to 10 mm (0.197 to 0.394" dia.)
Wire section	0,5 to 1,0 mm2 (20-17 AWG)
Temperature, ambient range	-20° to +70°C (-4° to +158°F)
Mass	0,07 kg (0.154 lb)

Input/Output Characteristics

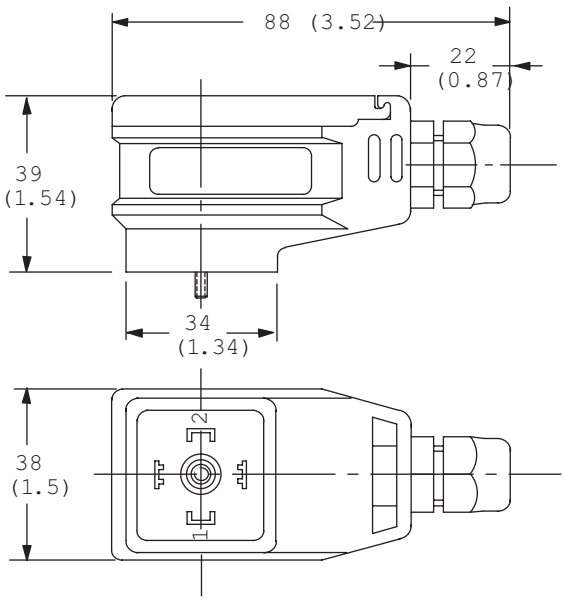
Functions

Switch-on/off: after switching on with a 15V signal the amplifier will remain in the “on” condition with a command signal above 6V. The command signal must be reduced to below 5V to achieve switch-off of the amplifier.

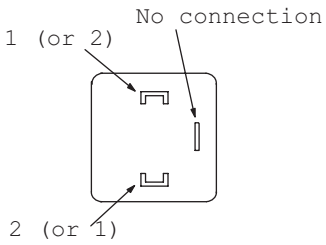


Installation Dimensions

mm (inch)



Solenoid Connections



Installation Data

C

Adjustments

Ramp time: Turn clockwise to increase ramp time.

Gain: Turn clockwise to increase gain.

Deadband compensation: Turn clockwise to increase deadband compensation current.

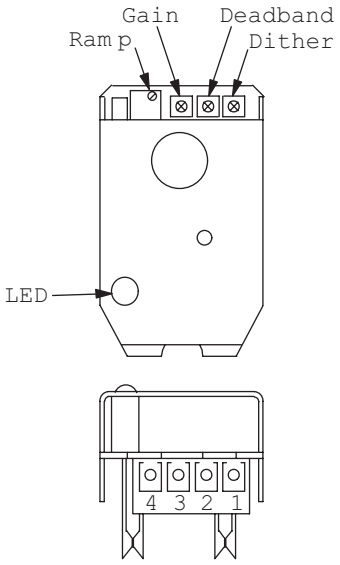
Dither: Turn clockwise to increase the dither current.

Terminal 1: Power Supply 20V-30V DC, positive.

Terminal 2: Power Supply 0V.

Terminal 3: Switch command signal positive.

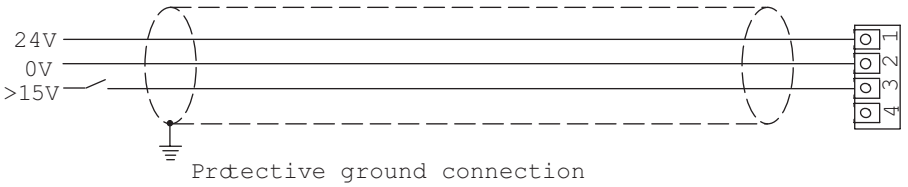
Terminal 4: Not connected



Installation Wiring

WARNING

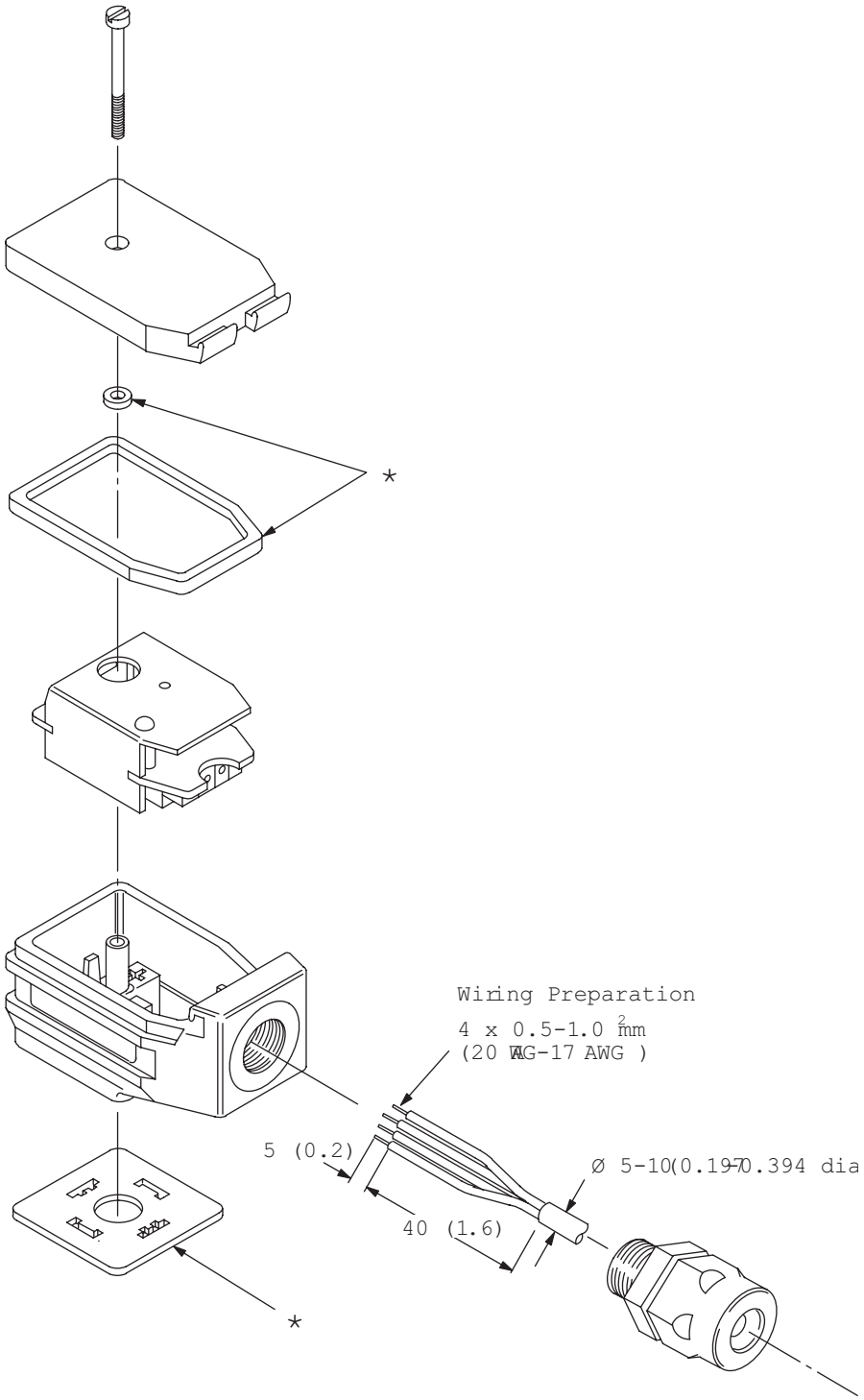
Electromagnetic Compatibility (EMC) - Screened cables should be used and particular attention paid to the grounding of the screens as shown in the above diagram.



Assembly Showing Wiring Connection Points

WARNING

Ensure cable clamp nut is adequately tightened to secure cable. Do not connect, or disconnect, the plug while power is on. Do not mount, or dismount, the plug while power is on.



*All seals must be fitted correctly at plug installation to provide protection to IP67 (IEC 529).

Start-Up Procedure

- Correctly wire the plug and, before mounting it on the valve solenoid, apply 24V DC (20 to 30V limits) to the "power input" terminals.
- Check for correct plug function by illumination/ non-illumination of the LED:
  a. Apply less than 2 to 3 volts to the input terminal: LED should not be illuminated.
  b. Increase voltage: the LED should illuminate when the voltage reaches 15V. Do not exceed 30V command signal.
  c. Decrease voltage: the LED should go off when the voltage is less than 5V.
- Switch off power supply and command/input signal and then install plug on solenoid. Ensure that all seals are fitted correctly and clamped as the retaining screw is tightened: this is essential in providing IP67 protection.
- Ensure that the hydraulic system will not cause any erratic movement of actuators, then:
  – Switch on power supply again.
  – Repeat LED/function check as in 2.

  An LED malfunction now indicates a short circuit at the load.
- Successful completion of these checks means that the plug and load are ready for use.

Spare Parts

The only spare part available is the interface seal, part number 732100.

Ordering Procedure

Order plug by full model code, and spare interface seals by part number 732100.