



Vickers

C

Coils and Electronic Controls

Solenoid valve and Proportional valve coils and electronic controls for proportional valves



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Coils

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Coil Features and Benefits

The solenoid operated directional valves in this catalog are offered with a choice of standard voltages and several types of electrical connections. For other coil ratings and connections, consult your Eaton representative.

Standard AC coils are internally rectified to supply them with DC current, therefore they have no "inrush" current value.

- Coils are rated for continuous duty
- Coils are interchangeable for serviceability

- Variety of voltages and terminations
- Coils offer a one-piece weather-proof encapsulated design, eliminating the need for extra seals
- AC voltage coils are internally full-wave rectified for 50 or 60 cycle (Hz) applications

An arc suppression diode molded into the coil is available as a standard option on DC coils. Also available, are explosion-proof coils and cartridges that are CSA approved and recognized by the US Underwriters Laboratories are available.

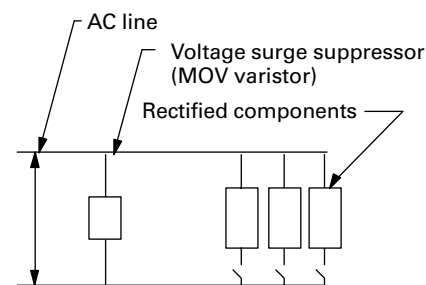
Protection of Internally Rectified Coils

The rectifiers used in these coils may require protection from high voltage surges in some electrical circuits containing highly inductive or capacitive components. These include certain types of motors, solenoids, relays, and transformers.

Protection is simple and inexpensive. It consists of

installing a commercially available voltage surge suppressor like the General Electric MOV varistor V130LA20A for 115 volts AC or the V250LA20A for 230 volts AC, across the AC line supplying the rectified components. A single suppressor will normally protect all of the rectified components in the circuit, as shown in the surge suppressor circuit diagram to the right.

Surge suppressor circuit diagram



All voltage surge producing components must be installed on this side of suppressor.

Switches or relay contacts only. Relay coils must be connected on the line side of the surge suppressor.

No inductive or capacitive loads can be installed between the surge suppressor and rectified valves without additional precautions.



WARNING

Application of these products beyond published performance specifications may cause valve malfunction which may result in personal injury and/or damage to the machine.



CAUTION

Coils may be hot to touch if used in continuous duty applications.

8-Series, 16 Watt Coils

8-16 W

"S" Series Coils

For 8 Size Solenoid &
Proportional Solenoid
Valves

(formerly 8 series,
210 bar coils)

RATINGS AND SPECIFICATIONS

| | | | | |
|--------------------------------|---|---------------|----------|------------|
| Duty Rating | Continuous from 85% to 110% of nominal voltage | Std. Voltages | Amperes* | Lead Color |
| Operating temperature | 100°C (218°F) continuous @nominal voltage | 12 DC | 1.32 | red |
| Lead Wires | 18 gauge, 610 mm (24") long, UL style 3173 CSA CL 1251 (meets SAE J1128 XLPE style SXL) | 24 DC | 0.66 | black |
| Power Rating | 16 watts @ 25°C (77°F) | 36 DC | 0.44 | blue |
| Encapsulant | P.E.T. | 24 AC | 0.73 | orange |
| Magnet Wire | U.L. class N, 200°C (392°F) NEMA pub. no. MW 1000, section MW 35-C (single) | 120 AC | 0.15 | yellow |
| Flyback diode (arc suppressor) | Maximum recurrent peak reverse voltage – 800 V (optional) | 240 AC | 0.07 | red/white |

*Nominal voltage 25°C (77°F).

Coil part numbers

| VOLTAGE | G** CONNECTOR | P CONNECTOR | Q CONNECTOR | W CONNECTOR | N CONNECTOR | Y CONNECTOR |
|---------|------------------|----------------|----------------|----------------|----------------|----------------|
| 12VDC | 02-160690 | 02-160684 | 02-160681 | 02-160678 | 02-160958 | 02-178001 |
| 24VDC | 02-160691 | 02-160685 | 02-160682 | 02-160679 | 02-160959 | 02-178002 |
| 36VDC | 02-160692 | 02-160686 | 02-160683 | 02-160680 | 02-160960 | 02-178003 |
| 24VAC | 02-160702 | 02-160699 | 02-160696 | 02-160693 | – | – |
| 115VAC | 02-160703 | 02-160700 | – | – | – | – |
| 220VAC | 02-160704 | 02-160701 | – | – | – | – |
| 12VDC* | 02-178810 | – | 02-178804 | 02-178802 | 02-160953 | 02-160957 |
| 24VDC* | 02-178811 | – | 02-178805 | 02-178803 | 02-178812 | 02-178815 |

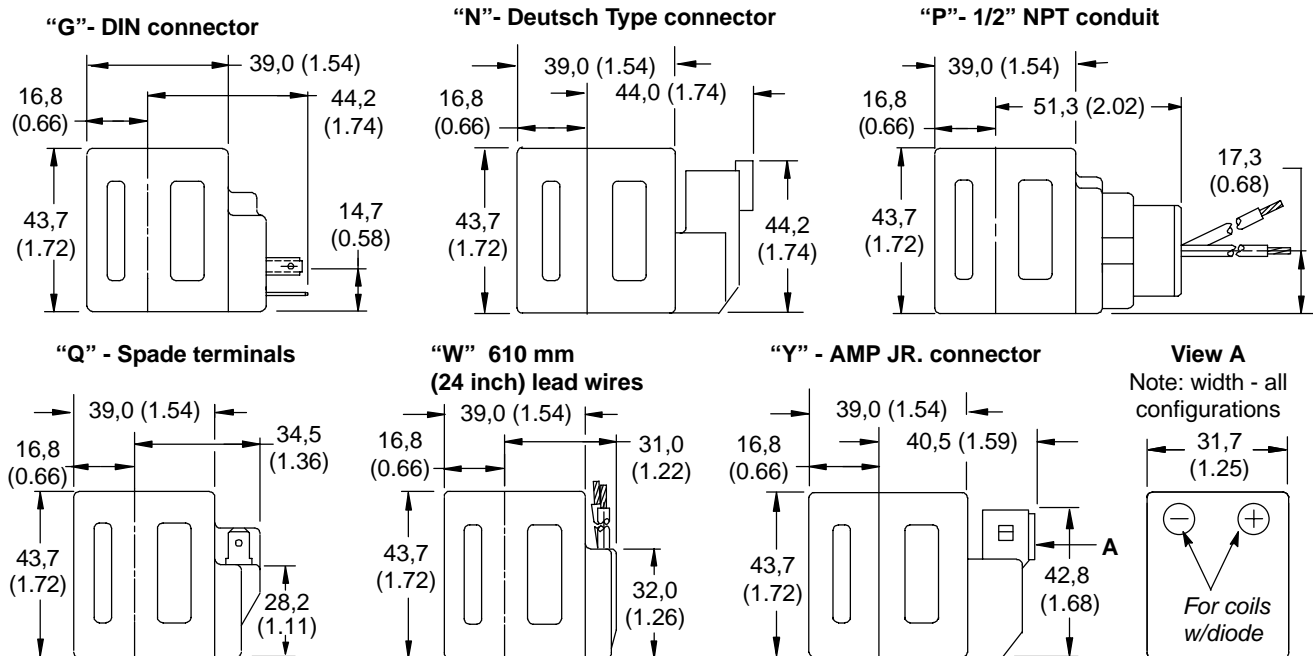
*With flyback diode.

**DIN 43650 connector for "G" style coil – 02-166796.

For other voltages and connectors contact your Eaton representative.

Coil Dimensions

mm (inch)



8-Series, 20 Watt Coils

8-20 W

"P" Series Coils

For 8 Size Solenoid Valves

(formerly 8 series,
350 bar coils)

RATINGS AND SPECIFICATIONS

| Ratings and Specifications | | Std. Voltages | Amperes* | Lead Color |
|--------------------------------|---|---------------------------------|----------|------------|
| Duty Rating | Continuous from 85% to 110% of nominal voltage | 12 DC | 1.67 | red |
| Operating temperature | 100°C (212°F) continuous @nominal voltage | 24 DC | 0.83 | black |
| Lead Wires | 18 gauge, 610 mm (24") long, UL style 3173 CSA CL 1251 (meets SAE J1128 XLPE style SXL) | 36 DC | 0.56 | blue |
| Power Rating | 20 watts @ 25°C (77°F) | 24 AC | 0.97 | orange |
| Encapsulant | P.E.T. | 120 AC | 0.19 | yellow |
| Magnet Wire | U.L. class N, 200°C (392°F) NEMA pub. no. MW 1000, section MW 35-C (single) | 240 AC | 0.09 | red/white |
| Flyback diode (arc suppressor) | Maximum recurrent peak reverse voltage – 800 V (optional) | *Nominal voltage @ 25°C (77°F). | | |

Coil part numbers

| VOLTAGE | G** CONNECTOR | P CONNECTOR | Q CONNECTOR | W CONNECTOR | N CONNECTOR | Y CONNECTOR |
|---------|------------------|----------------|----------------|----------------|----------------|----------------|
| 12VDC | 02-178143 | 02-178137 | 02-178134 | 02-178131 | 02-178146 | 02-178704 |
| 24VDC | 02-178144 | 02-178138 | 02-178135 | 02-178132 | 02-178147 | 02-178705 |
| 36VDC | 02-178145 | 02-178139 | 02-178136 | 02-178133 | 02-178148 | 02-178706 |
| 24VAC | 02-178160 | 02-178157 | 02-178156 | 02-178156 | – | – |
| 115VAC | 02-178161 | 02-178158 | – | – | – | – |
| 220VAC | 02-178162 | 02-178159 | – | – | – | – |
| 12VDC* | 02-178824 | 02-178820 | 02-178818 | 02-178816 | 02-178826 | 02-178830 |
| 24VDC* | 02-178825 | 02-178821 | 02-178819 | 02-178817 | 02-178827 | 02-178831 |

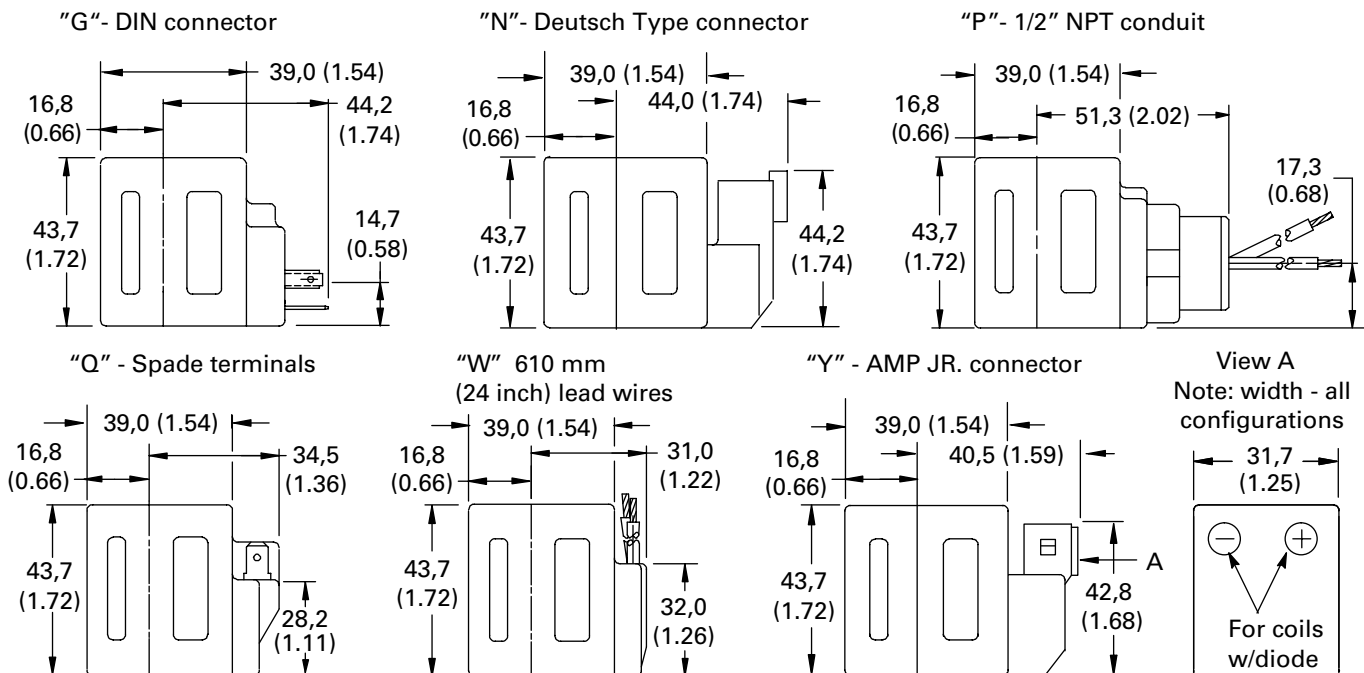
*With flyback diode.

**DIN 43650 connector for "G" style coil – 02-166796.

For other voltages and connectors contact your Eaton representative.

Coil Dimensions

mm (inch)



10-Series, 20 Watt Coils

10-20 W

"J" Series Coils

For 10, 12, 16 and 20 Size
Solenoid and Proportional
Solenoid Valves

(formerly 10 series,
210 bar coils)

RATINGS AND SPECIFICATIONS

| | | | | |
|--------------------------------|---|---------------|----------|------------|
| Duty Rating | Continuous from 85% to 110% of nominal voltage | Std. Voltages | Amperes* | Lead Color |
| Operating temperature | 100°C (212°F) continuous @ nominal voltage | 12 DC | 1.66 | red |
| Lead Wires | 18 gauge, 610 mm (24") long, UL style 3173 CSA CL 1251 (meets SAE J1128 XLPE style SXL) | 24 DC | 0.83 | black |
| Power Rating | 20 watts @ 25°C (77°F) | 36 DC | 0.55 | blue |
| Encapsulant | P.E.T. | 24 AC | 0.83 | orange |
| Magnet Wire | U.L. class N, 200°C (392°F) NEMA pub. no. MW 1000, section MW 35-C (single) | 120 AC | 0.17 | yellow |
| Flyback diode (arc suppressor) | Maximum recurrent peak reverse voltage – 800 V (optional) | 240 AC | 0.08 | red/white |

*Nominal voltage @ 25°C (77°F).

Coil part numbers

| VOLTAGE | G** CONNECTOR | P CONNECTOR | Q CONNECTOR | W CONNECTOR | N CONNECTOR | Y CONNECTOR |
|---------|------------------|----------------|----------------|----------------|----------------|----------------|
| 12VDC | 02-178086 | 02-178078 | 02-178070 | 02-178063 | 02-178093 | 02-178711 |
| 24VDC | 02-178087 | 02-178079 | 02-178073 | 02-178065 | 02-178094 | 02-178712 |
| 36VDC | 02-178089 | 02-178080 | 02-178075 | 02-178066 | 02-178095 | 02-178713 |
| 24VAC | 02-178112 | 02-178104 | 02-178103 | 02-178102 | – | – |
| 115VAC | 02-178114 | 02-178106 | – | – | – | – |
| 220VAC | 02-178117 | 02-178109 | – | – | – | – |
| 12VDC* | 02-178840 | – | 02-178834 | 02-178832 | 02-178842 | 02-178762 |
| 24VDC* | 02-178841 | – | 02-178835 | 02-178833 | 02-178843 | 02-178846 |

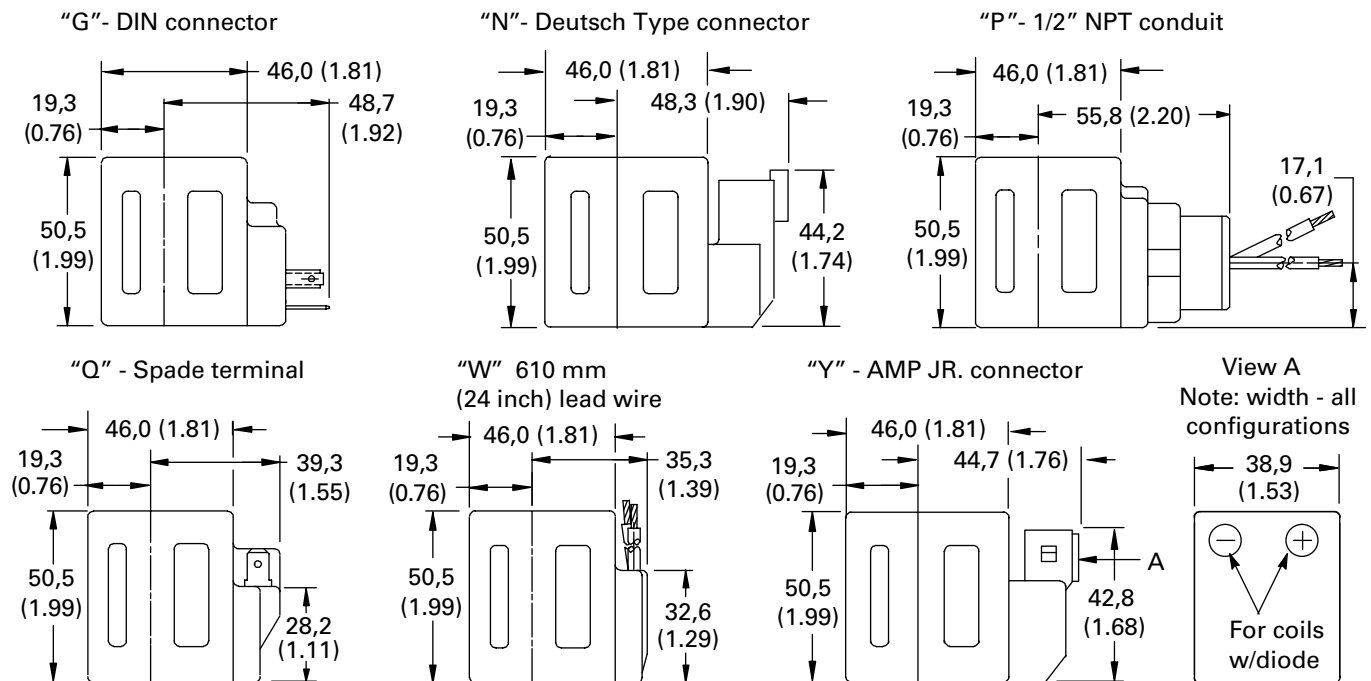
*Without flyback diode.

**DIN 43560 connector for "G" style coil – 02-166796.

For other voltages and connectors contact your Eaton representative.

Coil Dimensions

mm (inch)



10-Series, 26 Watt Coils

For 10, 12, 16 and 20 Size
Solenoid Valves

(formerly 10 series,
350 bar coils)

10-26 W

"H" Series Coils

RATINGS AND SPECIFICATIONS

| | | | | |
|--------------------------------|---|---------------|----------|------------|
| Duty Rating | Continuous from 85% to 110% of nominal voltage | Std. Voltages | Amperes* | Lead Color |
| Operating temperature | 100°C (212°F) continuous @ nominal voltage | 12 DC | 2.20 | red |
| Lead Wires | 18 gauge, 610 mm (24") long, UL style 3173 CSA CL 1251 (meets SAE J1128 XLPE style SXL) | 24 DC | 1.09 | black |
| Power Rating | 26 watts @ 25°C (77°F) | 36 DC | 0.73 | blue |
| Encapsulant | P.E.T. | 24 AC | 1.26 | orange |
| Magnet Wire | U.L. class N, 200°C (392°F) NEMA pub. no. MW 1000, section MW 35-C (single) | 120 AC | 0.25 | yellow |
| Flyback diode (arc suppressor) | Maximum recurrent peak reverse voltage – 800 V (optional) | 240 AC | 0.12 | red/white |

*Nominal voltage @ 25°C (77°F).

Coil part numbers

| VOLTAGE | G** CONNECTOR | P CONNECTOR | Q CONNECTOR | W CONNECTOR | N CONNECTOR | Y CONNECTOR |
|---------|------------------|----------------|----------------|----------------|----------------|----------------|
| 12VDC | 02-178027 | 02-178021 | 02-178018 | 02-178015 | 02-178030 | 02-178035 |
| 24VDC | 02-178028 | 02-178022 | 02-178019 | 02-178016 | 02-178031 | 02-178036 |
| 36VDC | 02-178029 | 02-178023 | 02-178028 | 02-178017 | 02-178032 | 02-178037 |
| 24VAC | 02-178047 | 02-178044 | 02-178043 | 02-178042 | – | – |
| 120VAC | 02-178048 | 02-178045 | – | – | – | – |
| 240VAC | 02-178049 | 02-178046 | – | – | – | – |
| 12VDC* | 02-178855 | 02-178851 | 02-178849 | 02-178847 | 02-178857 | 02-178861 |
| 24VDC* | 02-178856 | 02-178852 | 02-178850 | 02-178850 | 02-178858 | 02-178862 |

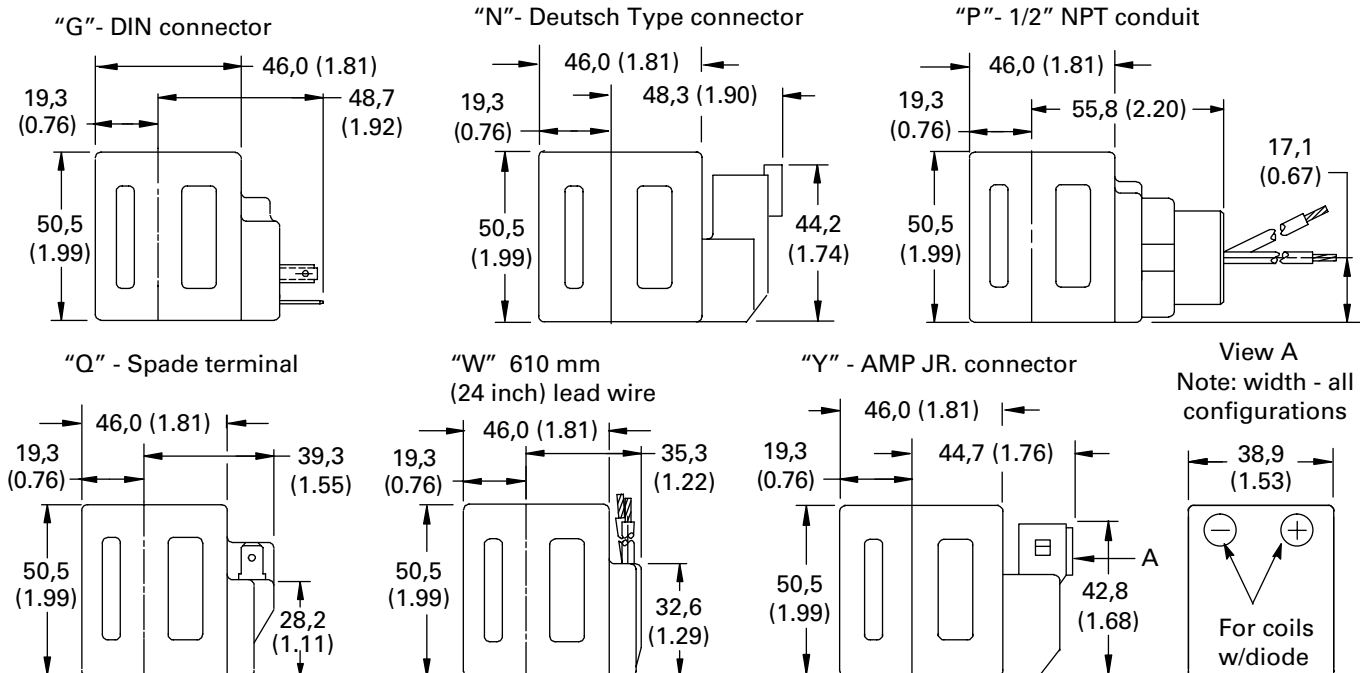
*Without flyback diode.

**DIN 43560 connector for "G" style coil – 02-166796.

For other voltages and connectors contact your Eaton representative.

Coil Dimensions

mm (inch)



Explosion Proof Valves

Coil Options
(SV*E Series)

SPECIFICATIONS

Hydraulic Performance Specifications for explosion proof valves are the same as the base valve.
For details please refer to the base valve page reference.

| | |
|------------------------|--|
| Coil Temperature Range | -40° to 100°C (-40° to 212°F) |
| Coil Duty | Continuous from 85% to 110% of nominal voltage |
| Housing Type | Explosion proof version with 1/2" threaded conduit hub |
| Coil Type | Epoxy encapsulated lead wire coil |
| Lead Wire | 24" Long, 18 gauge with 1/32" cross linked Polyethylene insulation |

APPROVALS

| | |
|-----|--|
| UL | File AU2206, Component - Industrial truck accessory, Battery powered |
| CSA | Both for general purpose and Hazardous locations Class I, Group C & D Class II, Group E, F & G |

SUMMARY

| Model Code | Description | Typical Application Pressure psi (bar) | Rated flow l/min (Usgpm) | Base Valve design | Section Reference |
|--------------------|---|--|--------------------------|-------------------|-------------------|
| SV1E-10-C-XX-XXXXU | 2 way, 2 position, normally closed, poppet type | 210 (3000) | 45 (12) | SV1-10-C | A |
| SV2E-10-C-XX-XXXXU | 2 way, 2 position, normally closed, poppet type | 210 (3000) | 23 (6) | SV2-10-C | A |
| SV3E-10-C-XX-XXXXU | 2 way, 2 position, normally closed, poppet type | 210 (3000) | 45 (12) | SV3-10-C | A |
| SV4E-10-C-XX-XXXXU | 2 way, 2 position, normally closed, spool type | 210 (3000) | 23 (6) | SV4-10-C | A |
| SV1E-16-C-XX-XXXXU | 2 way, 2 position, normally closed, poppet type | 210 (3000) | 132 (35) | SV1-16-C | A |
| SV2E-20-C-XX-XXXXU | 2 way, 2 position, normally closed, poppet type | 210 (3000) | 227 (60) | SV2-20-C | A |
| SV4E-10-0-XX-XXXXU | 2 way, 2 position, normally open, spool type | 210 (3000) | 23 (6) | SV4-10-0 | A |
| SV3E-10-0-XX-XXXXU | 2 way, 2 position, normally open, poppet type | 210 (3000) | 45 (12) | SV3-10-0 | A |
| SV5E-10-0-XX-XXXXU | 2 way, 2 position, normally open, poppet type | 210 (3000) | 45 (12) | SV5-10-0 | A |
| SV3E-16-0-XX-XXXXU | 2 way, 2 position, normally open, poppet type | 210 (3000) | 132 (35) | SV3-16-0 | A |
| SV3E-20-0-XX-XXXXU | 2 way, 2 position, normally open, poppet type | 210 (3000) | 227 (60) | SV3-20-0 | A |
| SV1E-10-3-XX-XXXXU | 3 way, 2 position, spool type | 210 (3000) | 23 (6) | SV1-10-3 | A |
| SV1E-10-4-XX-XXXXU | 4 way, 2 position | 210 (3000) | 23 (6) | SV1-10-4 | A |
| SV2E-10-4-XX-XXXXU | 4 way, 2 position, circuit center | 210 (3000) | 23 (6) | SV2-10-4 | A |
| SV3E-10-4-XX-XXXXU | 4 way, 2 position, normally open | 210 (3000) | 23 (6) | SV3-10-4 | A |
| SV4E-10-4-XX-XXXXU | 4 way, 2 position, tandem center | 210 (3000) | 23 (6) | SV4-10-4 | A |

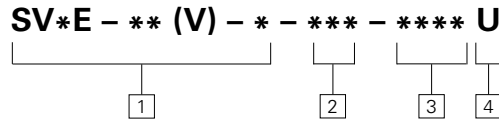
REPLACEMENT COIL PART NUMBERS

| Voltage | Assembly Number | Amperes (A) | Power (W) | Lead Color |
|---------|-----------------|-------------|-----------|-------------|
| 12 VDC | 888831 | 1.50 | 20 | Red |
| 24 VDC | 888832 | 0.75 | 20 | Black |
| 36 VDC | 888834 | 0.50 | 20 | Blue |
| 48 VDC | 888835 | 0.38 | 20 | Purple |
| 110 VDC | 888836 | 0.16 | 20 | Brown |
| 24 VAC | 888837 | 0.75 | 20 | Orange |
| 115 VAC | 888838 | 0.16 | 20 | Yellow |
| 230 VAC | 888840 | 0.08 | 20 | Red/White |
| 480 VAC | 888841 | 0.04 | 20 | Black/White |



Explosion Proof Valves

(SV*E Series) Model Code



1 Base Valve

| | |
|------------------|----------|
| SV1E-10-C | SV1-10-C |
| SV2E-10-C | SV2-10-C |
| SV3E-10-C | SV3-10-C |
| SV4E-10-C | SV4-10-C |
| SV1E-16-C | SV1-16-C |
| SV2E-20-C | SV2-20-C |
| SV4E-10-0 | SV4-10-0 |
| SV3E-10-0 | SV3-10-0 |
| SV5E-10-0 | SV5-10-0 |
| SV3E-16-0 | SV3-16-0 |
| SV3E-20-0 | SV3-20-0 |
| SV1E-10-3 | SV1-10-3 |
| SV1E-10-4 | SV1-10-4 |
| SV2E-10-4 | SV2-10-4 |
| SV3E-10-4 | SV3-10-4 |
| SV4E-10-4 | SV4-10-4 |

For performance specifications refer to base valve data sheet.

Viton® seal options are available.

Dimensions

mm (inch)

Note

Cartridge only or coil housing are not available as a service parts.

It is not possible to convert standard valves to explosion proof variants.

SV1E-10-3 shown. Dimensions of coil housing are the same for all Vickers explosion proof SiCV valves, for other dimensions please refer to base valve datasheet.

2 Port Size/Housing number

Refer to table in Model Code for Base valves

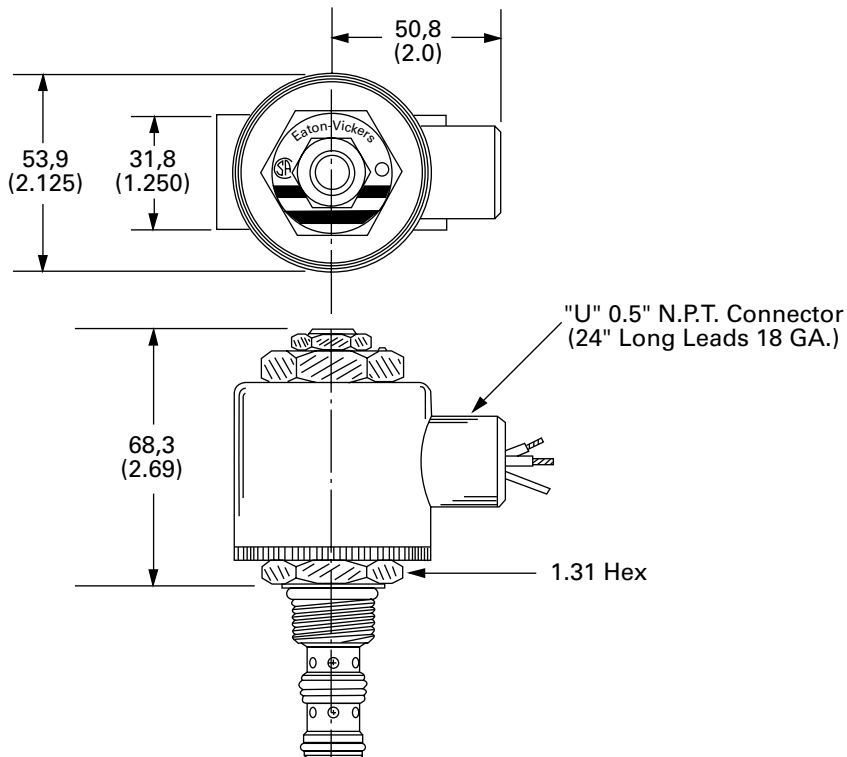
4 Type (C.S.A. Approved)

U - 1/2" NPT Connector
Class I, Group C & D
Class II, Group E, F & G

3 Voltage*

| CODE | VOLTAGE | REPLACEMENT COIL PART NUMBER |
|-------------|---------|------------------------------|
| 12D | 12 VDC | 888831 |
| 24D | 24 DVC | 888832 |
| 36D | 36 VDC | 888834 |
| 48D | 48 VDC | 888835 |
| 110D | 110 VDC | 888836 |
| 24A | 24 VAC | 888837 |
| 115A | 115 VAC | 888838 |
| 230A | 230 VAC | 888840 |
| 460A | 460 VAC | 888841 |

* Arc suppression diode is not available.





CONTROL AND SPECIFICATIONS

| | |
|--------------------|--|
| Rheostat | 12 VDC operation 10-12 Ω, 20-25 watts 24 VDC operation 25-30 Ω, 20-25 watts |
| Power plug options | EHH-AMP-702, EPAD-SA-1A6-10 (Require 24 VDC power supply to power plug and 12 VDC coil) |
| Amplifier card | EEA-PAM-523 (Requires 24 VDC power supply and either 12VDC or 24 VDC coil) |
| Joystick suppliers | OEM Controls, Inc, Shelton, CT P-Q Controls, Inc, Bristol, CT |

Power plug details in section B.

| Std. Voltages | Amperes* | Lead Color | Power Rating |
|---------------|----------|------------|--------------|
| 12 DC | 1.32 | red | 16 W |
| 24 DC | .66 | black | 16 W |

*Nominal voltage @ 25°C (77°F).

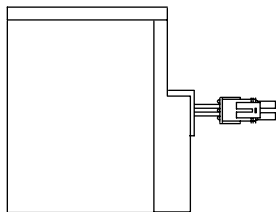
Coil part numbers

| VOLTAGE | F CONNECTOR | Q CONNECTOR | U* CONNECTOR | W CONNECTOR | Y CONNECTOR |
|---------|-------------|-------------|--------------|-------------|-------------|
| 12VDC | 02-308810 | 02-317154 | 02-154070 | 02-154072 | 02-308808 |
| 24VDC | 02-308811 | 02-317155 | 02-154071 | 02-154073 | 02-308809 |

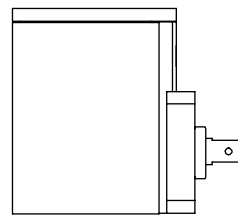
*DIN 43650 connector for "U" style coil – 02-166796.

Coil Kits

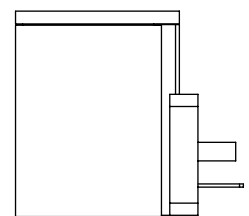
"F" - Weather-Pack male on leads



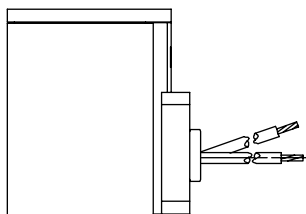
"Q" - Spade terminal



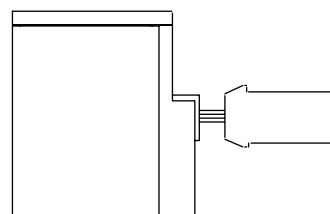
"U" - DIN 43650



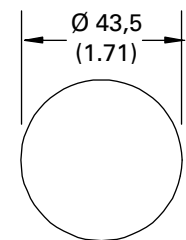
"W" 610 mm (24 inch) lead wire



"Y" - Metri-Pack 150 male on leads



Note: Width – all configurations



CAUTION

Coils may be hot to touch if used in continuous duty applications.

CONTROL AND SPECIFICATIONS

| | |
|--------------------|--|
| Power plug options | EHH-AMP-702, EPAD-SA-1A6-10 (Require 24 VDC power supply to power plug and 12 VDC coil) |
| Amplifier card | EEA-PAM-523 (Requires 24 VDC power supply and either 12VDC or 24 VDC coil) |
| Joystick suppliers | OEM Controls, Inc., Shelton, CT P-Q Controls, Inc., Bristol, CT |

Power plug details in Section B.

SPECIFICATIONS

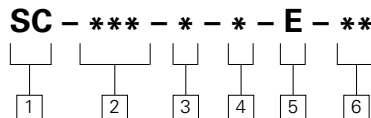
| Standard Voltage | Amperes* | Resistance | Power |
|------------------|----------|------------|-------|
| 12 VDC | 2.55 | 4.7 Ω | 30 W |
| 24 VDC | 1.26 | 19.0 Ω | 30 W |



CAUTION

Coils may be hot to touch if used in continuous duty applications.

Coil Model Code



Model code positions 2, 3, 4, 5 and 6 are integrated into EPV model code when ordered with valve.

1 Solenoid Coil

2 Voltage Rating

012 - 12VDC
024 - 24VDC

3 Protection

D - Standard DC coil
B - DC coil with flyback diode

4 Connection

G - DIN 43650*
W - Leadwire - 24"
E - Weather-Pack female on leads
N - Deutch DT0402P on leads
Z - Metri-Pack 150 on leads

*DIN 43560 connector for "G" style coil - 02-166796.

5 Series

E - EPV series coil, 30W

6 Special Features

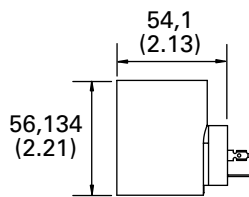
00 - None

Coil Kits

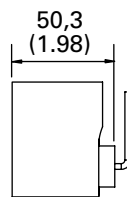
STANDARD COIL PART NUMBERS

| Model Code | Assembly Number |
|-------------|-----------------|
| SC-012BGE00 | 4995052-230 |
| SC-012BWE00 | 4995052-231 |
| SC-012DGE00 | 4995052-001 |
| SC-012DWE00 | 4995052-002 |
| SC-024BGE00 | 4995052-232 |
| SC-024BWE00 | 4995052-233 |
| SC-024DGE00 | 4995052-003 |
| SC-024DWE00 | 4995052-004 |

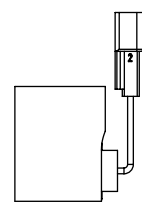
"G" - DIN 43650



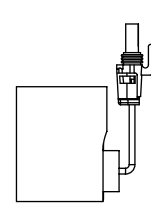
"W" - 610 mm (24 inch) lead wire



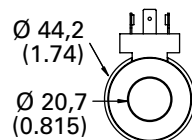
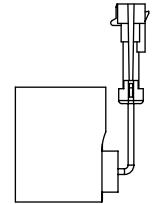
"E" - Weather-Pack female on leads



"C" - Deutch DT0402P on leads



"H" - Metri-Pack 150 male on leads



Note: Width all configurations

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*

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

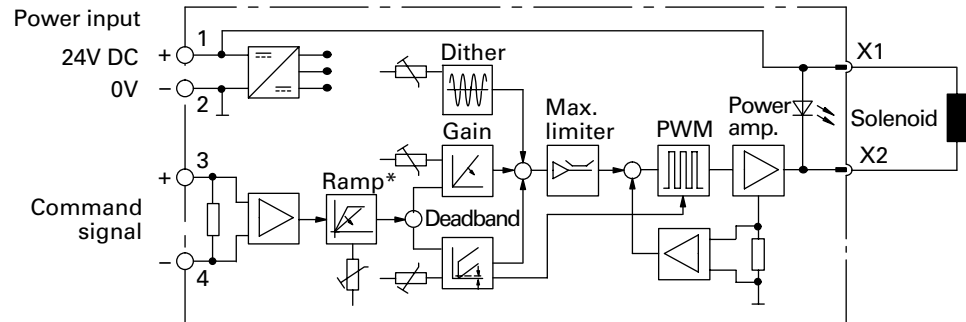
Application

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.

Electrical Block Diagram

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

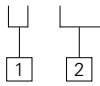


Note

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

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

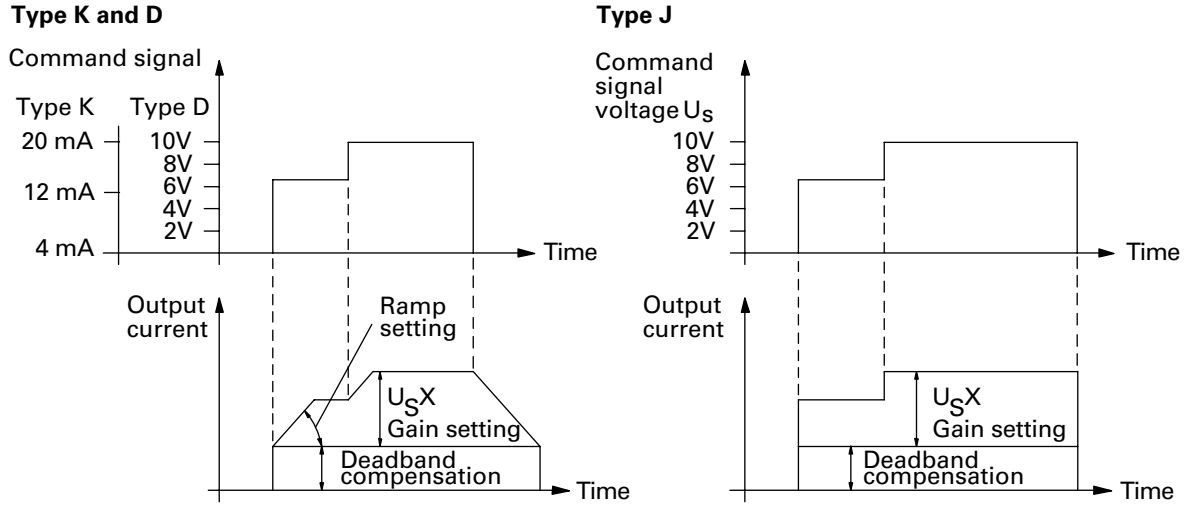
| | Types D and J | Type K |
|--|---|------------------------|
| Connections | | |
| 1 | 24V DC | |
| 2 | 0V (power and signal) | |
| 3 | Positive command signal | |
| 4 | Negative command signal | |
| Power (input) supply | 20-30V DC including $\pm 10\%$ maximum ripple (peak-to-peak) 24V DC nominal | |
| 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 | 200 mV | 4 mA |
| For output (LED on) | 200 mV to 10V | 4-20 mA |
| For no output (LED off) | 0 mV to 100 mV | 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 $\pm 10\%$ | |
| Dither frequency | 120 Hz $\pm 10\%$ | |
| 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 | EN 50081-2 | |
| Immunity | 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 | \emptyset 5 to 10 mm (0.197 to 0.394" dia.) |
| Wire section | 0,5 to 1,0 mm ² (20-17 AWG) |
| Temperature, ambient range | -20° to +70°C (-4° to +158°F) |
| Mass | 0,07 kg (0.154 lb) |

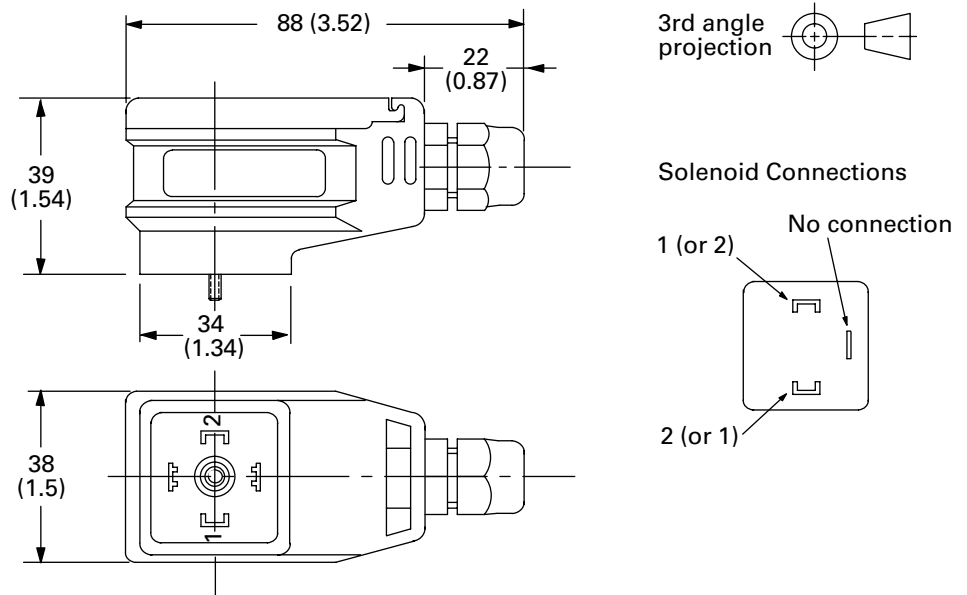
Installation Data

Input/Output Characteristics



Installation Dimensions

mm (inch)



Installation Data

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.

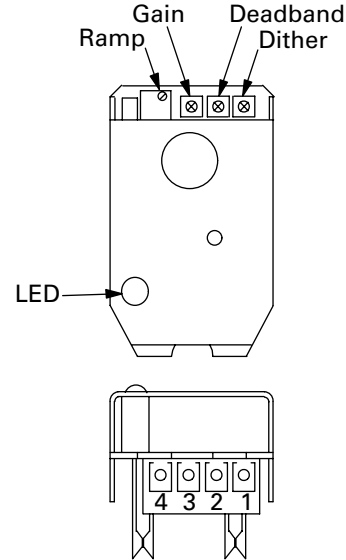
Dither: Turn clockwise to increase the dither current.

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

Terminal 2: Power Supply 0V.

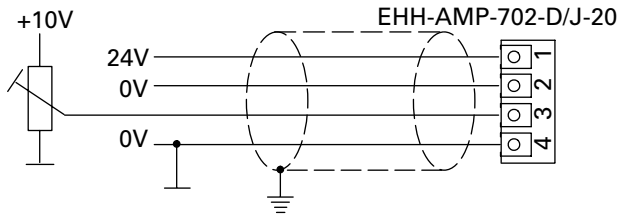
Terminal 3: Command signal positive (see "Operating Data").

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

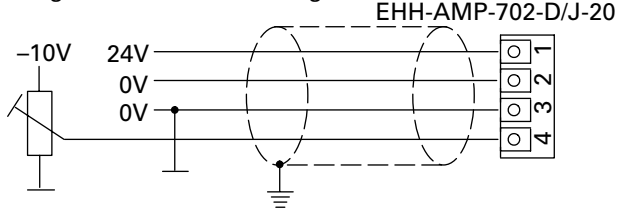


Installation Wiring Options

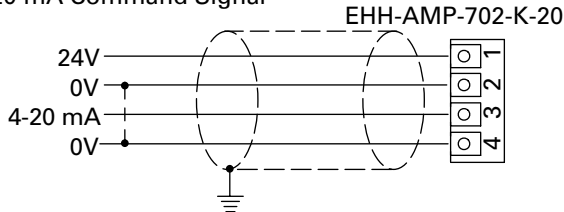
Positive Command Voltage



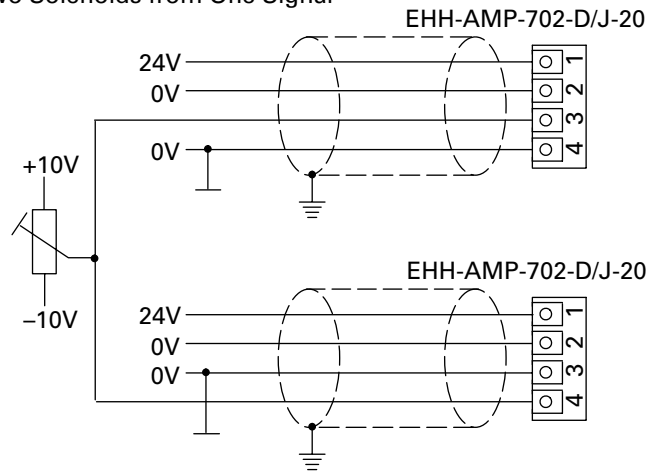
Negative Command Voltage



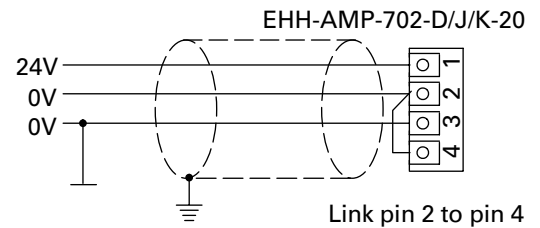
4-20 mA Command Signal



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



Connections when replacing -10 design power plug with -20 design and only 3 wires exist



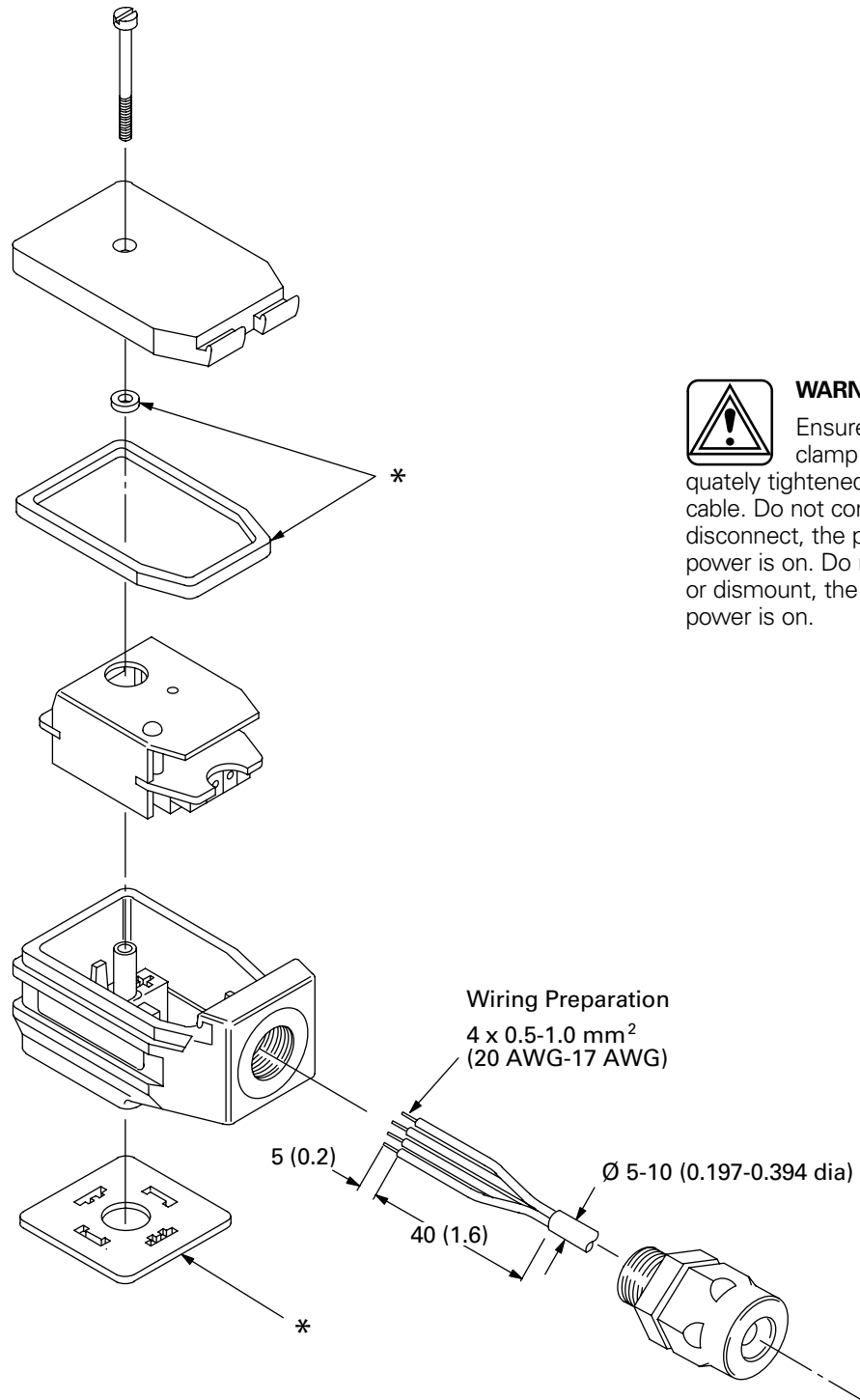
⏏ Protective ground connection.



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 (IEC 529).

Installation Data

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*

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

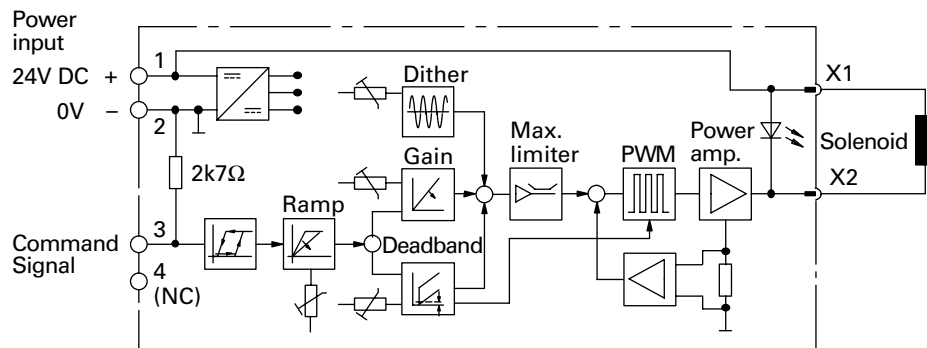
Application

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.

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

EHH – AMP – 702 – C – 2*



1 Design number, 20 series

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

OPERATING DATA

Electrical

| | |
|--|---|
| Connections | |
| 1 | 24V DC |
| 2 | 0V (power and signal) |
| 3 | Positive command signal |
| 4 | Negative command signal |
| Power (input) supply | 20-30V DC including $\pm 10\%$ 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) | 15V to 24V |
| For no output (LED off) | 0V to 5V |
| Input impedance | 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 $\pm 10\%$ |
| Dither frequency | 120 Hz $\pm 10\%$ |
| 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 | EN 50081-2 |
| Immunity | EN 50082-2 |

Mechanical

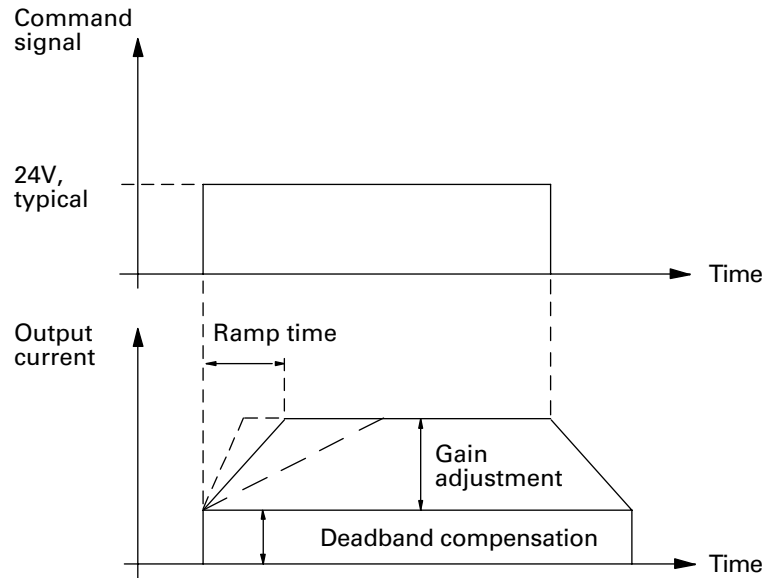
| | |
|----------------------------|---|
| Housing | PA6 glass-reinforced plastic (conforming to UL-94HB). Color: gray |
| Mounting interface | ISO 4400 (DIN 43650) |
| Cable clamp | Pg9 screw type |
| Cable diameter | \emptyset 5 to 10 mm (0.197 to 0.394" dia.) |
| Wire section | 0,5 to 1,0 mm ² (20-17 AWG) |
| Temperature, ambient range | -20° to +70°C (-4° to +158°F) |
| Mass | 0,07 kg (0.154 lb) |

Installation Data

Input/Output Characteristics

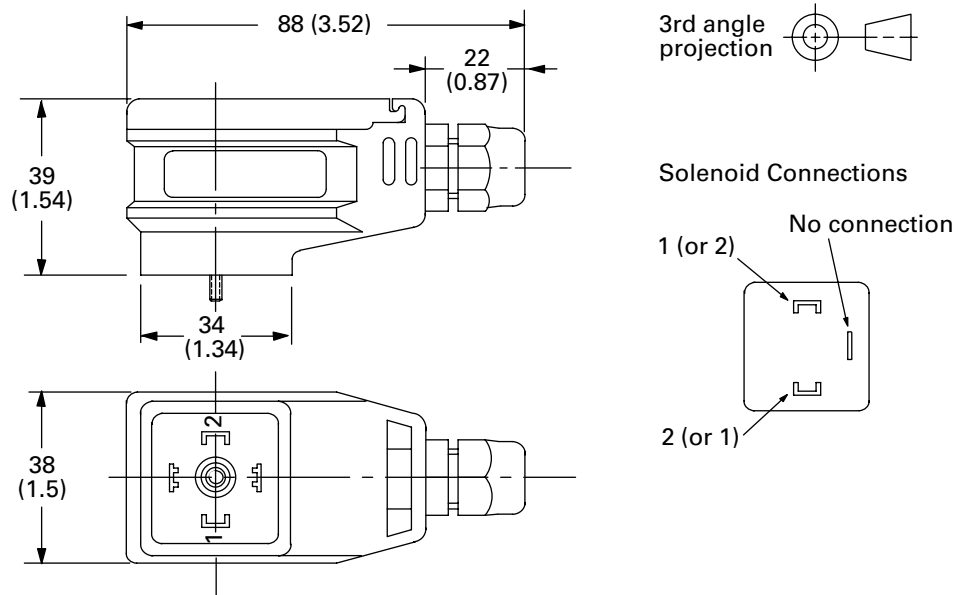
Functions

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)



Installation Data

Adjustments

Ramp time: Turn clockwise to increase ramp time.

Gain: Turn clockwise to increase gain.

Deadband compensation: Turn clockwise to increase deadband compensation current.

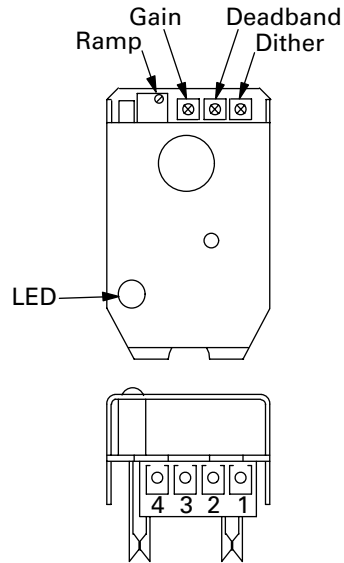
Dither: Turn clockwise to increase the dither current.

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

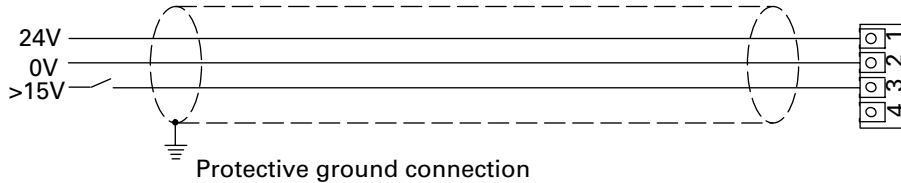
Terminal 2: Power Supply 0V.

Terminal 3: Switch command signal positive.

Terminal 4: Not connected



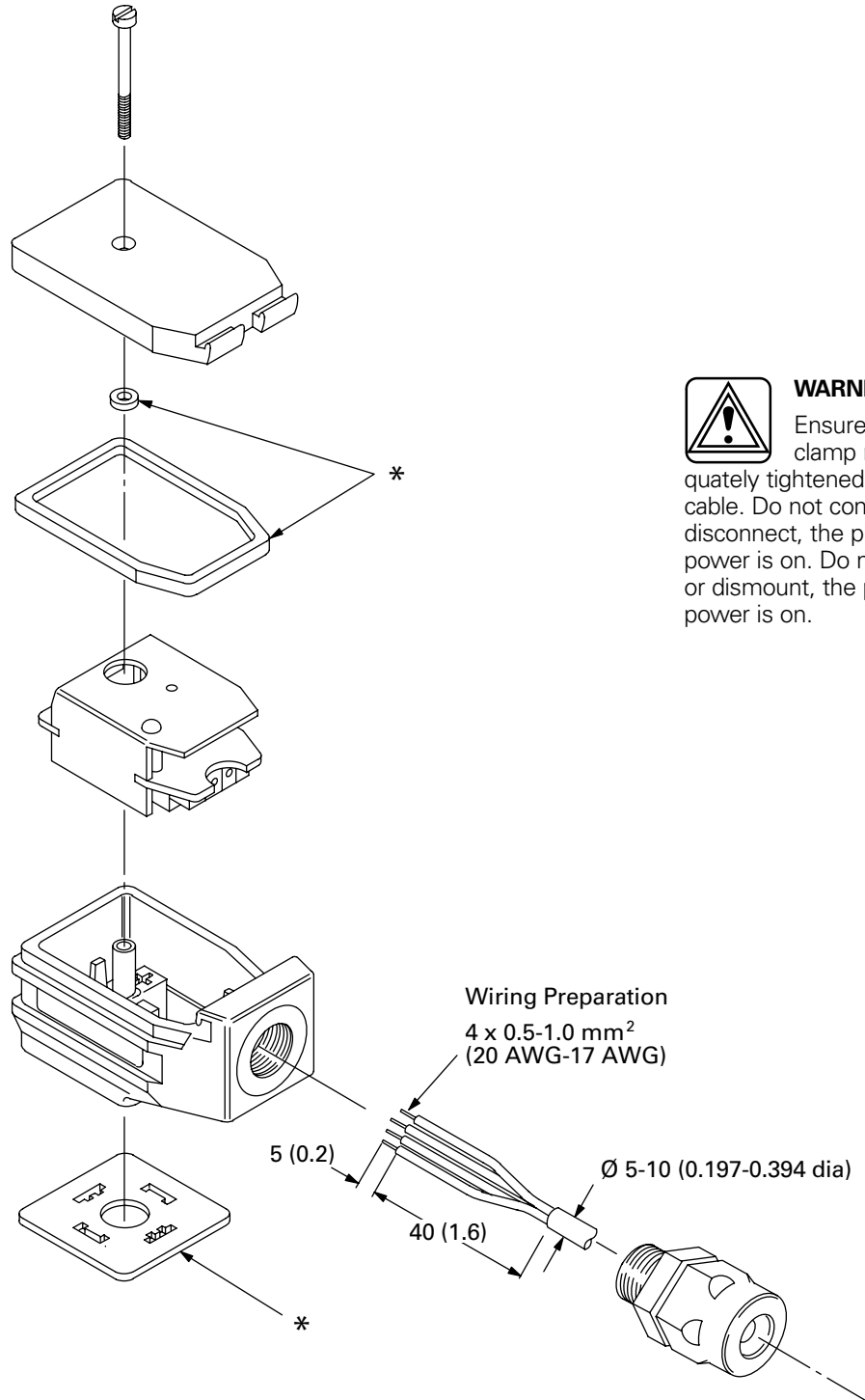
Installation Wiring



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).

Installation Data

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.