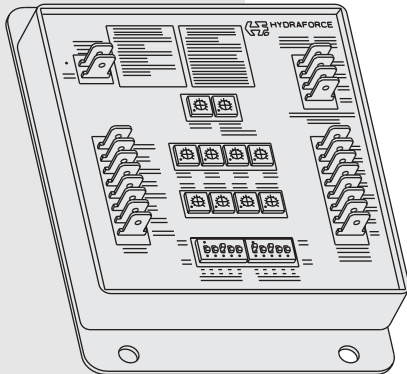


Proportional Valve Controller—Metal Housing—



GENERAL SPECIFICATIONS

Metal Housing: Conformal coated
Exterior; Potted Interior; IP65 rated

Weight: 0.58 kg (1.28 lbs.)

Connections: Flat, tab-style (22); mates
with 0.25 inch female tab connector:
Keystone part no. 4470; also accepts
16–20 AWG wire.

DESCRIPTION *Dual Solenoid Multifunction Valve Driver*

A metal box-style control amplifier for controlling HydraForce proportional valves. The metal housing is potted and is IP65 rated. Remote mounting is required. This controller has seven outputs that provide accurate control of hydraulic proportional and directional valves for a variety of hydraulic functions.

OPERATION

This controller will accept inputs from a joystick potentiometer with or without center tap, from a standard potentiometer, or from commonly available control signals such as 0–5 VDC, ± 5 VDC, 0–10 VDC, ± 10 VDC, 0–20 mA, and ± 20 mA. It is designed for circuits using dual solenoid proportional four-way valves, single solenoid proportional flow and pressure controls, single or dual solenoid on/off valves, or half-speed functions.

FEATURES

- Adjustments easily accessible and clearly labeled.
- One unit covers supply voltages from 9 to 32 VDC.
- Current sensing circuit maintains output current regardless of changes in input voltage and coil resistance.
- High/Low range input provides reduced output for training or operation of equipment in tight spaces.
- No internal fuses; circuit limits current electronically.
- Short circuit proof and reverse polarity protected.
- User selectable Deadband Jump.
- Adjustable Min. and Max. current.
- Pump Enable output active only when joystick is active.
- Asymmetrical or symmetrical ramps—user selectable using Dip Switch 2
- Center Null feature accommodates joystick or potentiometer centering errors.

RATINGS

Supply Voltage: 9–32 VDC

Coil rating must be matched with supply voltage: $R_{COIL} \leq (V_{SUPPLY} - 1.5 V) / I_{Max}$.

Control Input Signal Options: User selectable using Dip Switch 1:

Voltage Inputs: 0–5 VDC (2.5 VDC=0); 0–10 VDC (5 VDC=0); ± 5 VDC (0 VDC=0); ± 10 VDC (0 VDC=0)

Current Inputs: 0–20 mA (10 mA=0); ± 20 mA (0 mA=0)

Joystick Potentiometer Input: 10K potentiometer recommended; 5K to 50K pots can be used; The potentiometer connection provides a 5.0 VDC bias voltage as well as a 2.5 VDC center tap driving voltage. A remote joystick potentiometer with or without center tap can be used.

Low Range Input ($I_{Max}/2$): Full speed unconnected; 50% speed activated by applying 9–32 VDC through an external switch.

Input Resistance: Current Mode: 250 Ohms

Voltage Mode: 0–5 VDC, 1.38M Ohms

± 5 VDC, 750K Ohms

0–10 VDC, 750 K Ohms

± 10 VDC, 1.75M Ohms

Output Current: up to 2000 mA (see ordering info.)

Minimum Current Range: 0–2000 mA (adjustable)

Maximum Current Range: 0–2000 mA (adjustable)

Ramp Up and/or Down: 0.01–5.0 seconds (independently adjustable using Dip Switch 2)

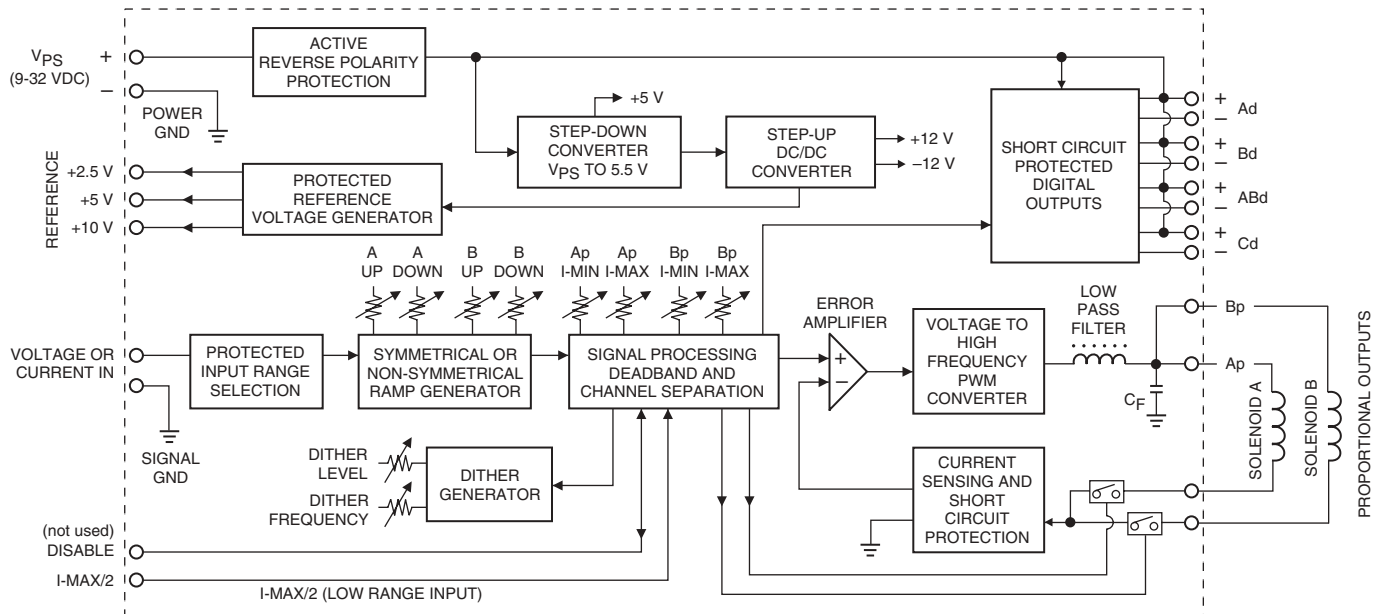
Dither Frequency: 70–350 Hz (adjustable)

Dither Amplitude: 0–10% of maximum current (adjustable)

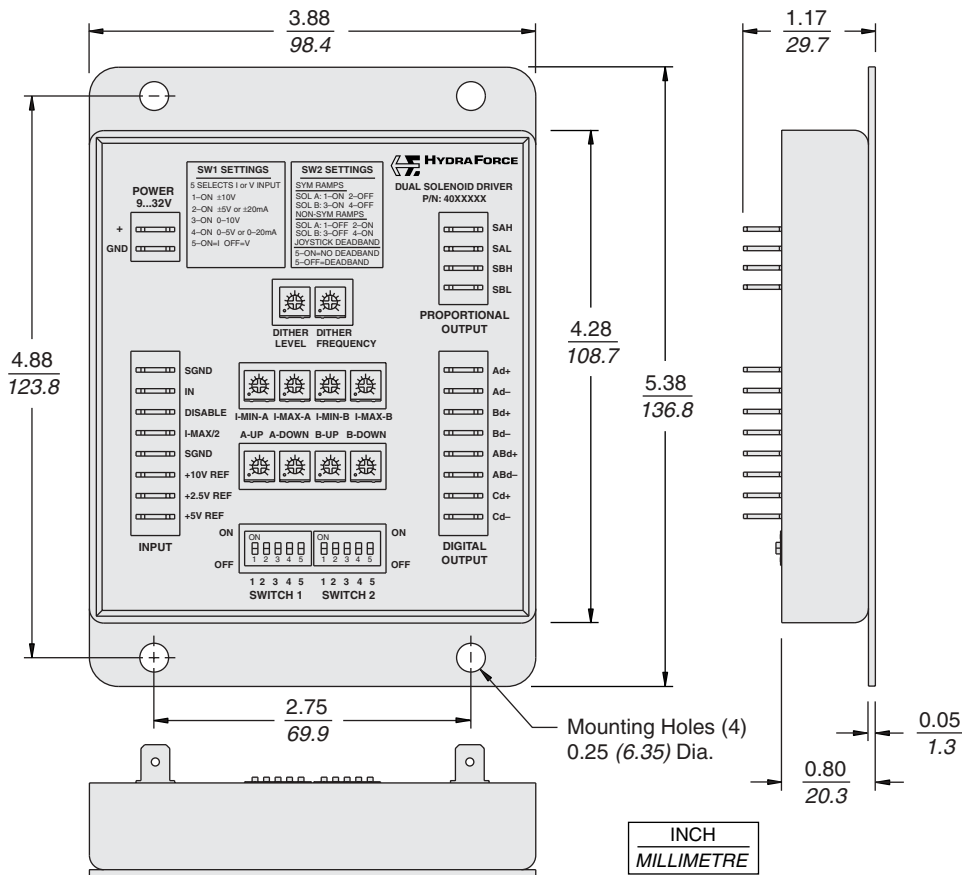
Operating Conditions: -40° to 85° C; 0 to 85% relative humidity

Dual Solenoid Multifunction Valve Driver

SCHEMATIC



DIMENSIONS

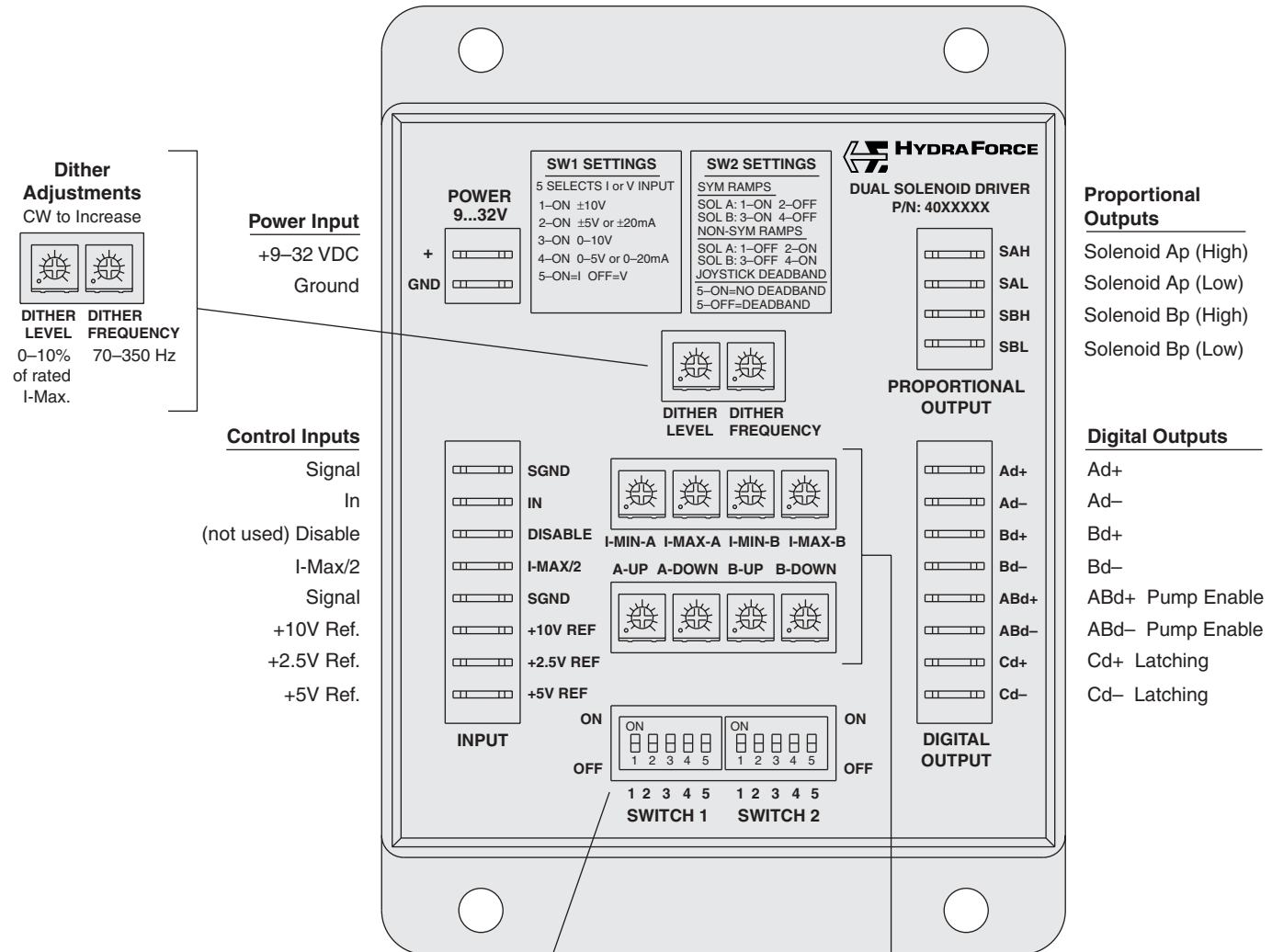


COILS AND ELECTRONIC CONTROLS

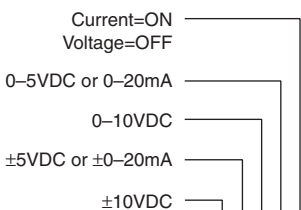
Proportional Valve Controller—Metal Housing—

CONNECTIONS/ADJUSTMENTS

Dual Solenoid Multifunction Valve Driver



INPUT SELECTION OPTIONS



SOLENOID 'A' RAMPS

Symmetrical: 1=ON, 2=OFF
Non-Symmetrical: 1=OFF, 2=ON

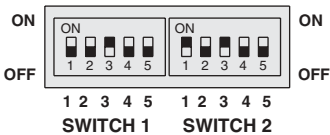
SOLENOID 'B' RAMPS

Symmetrical: 3=ON, 4=OFF
Non-Symmetrical: 3=OFF, 4=ON

JOYSTICK DEADBAND

No Joystick Deadband: 5=ON
Joystick Deadband: 5=OFF

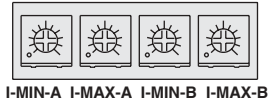
Settings shown are for 0–10VDC input



Settings shown are for Symmetrical Up and Down Ramps for Solenoids 'A' and 'B'.
Electronic Deadband is selected for Joystick Input or Control Signal.

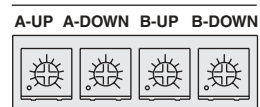
Proportional Adjustments

0–2.0 amps
CW to Increase



Ramp Time Adjustments

0.01 to 5 seconds
CW to Increase



NOTE: Do not change switch positions while unit is powered.

Dual Solenoid Multifunction Valve Driver

APPLICATION INTERFACE INFORMATION

Input Specifications:

For proper operation, match the power supply voltage with the rating of the coil. Operating this driver with a supply voltage lower than the coil's rated voltage may result in reduced maximum current output.

Output Specifications:

All outputs are capable of operating a 2 amp solenoid or relay. Each output can withstand an indefinite short circuit to power or ground. Each output is protected from "over voltage" with a recirculating diode. For proper operation of this driver, the solenoid coils should have no polarity or protection diodes. The maximum current output of this driver should not exceed the current rating of the coil.

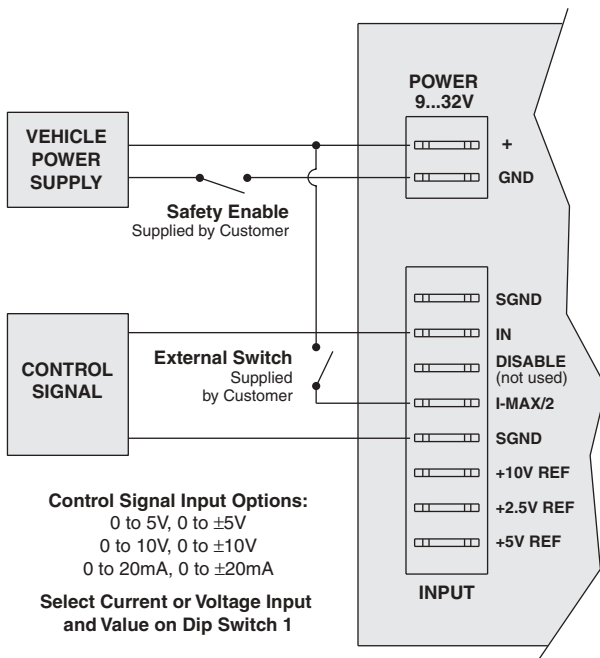
Joystick Deadband:

Deadband is the zone of the joystick or threshold of the control signal where no action is generated by movement of the joystick or application of the control signal. "Deadband Jump" will be provided by safety microswitches if they are installed on the joystick. **This feature can be enabled or disabled using Dip Switch 2.**

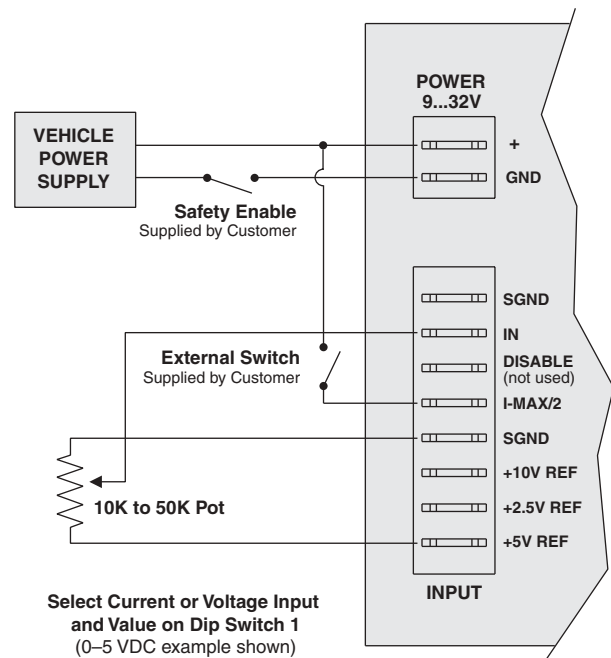
Joystick Center Null:

If the joystick does not have safety microswitches installed, this effect can be achieved by external connections to the input side of this driver. Connect the joystick potentiometer to the +5V Reference and connect the midpoint terminal to the +2.5V Reference. This ensures that the mechanical and electrical centers of the joystick are consistent with each other.

CONTROL SIGNAL INTERFACE



POTENTIOMETER INTERFACE

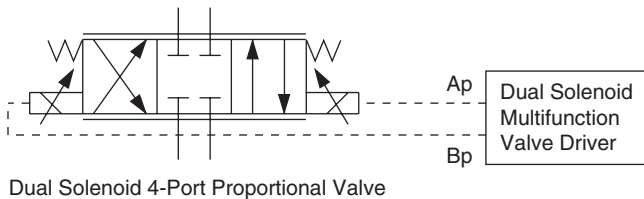


Proportional Valve Controller—Metal Housing—

TYPICAL APPLICATIONS

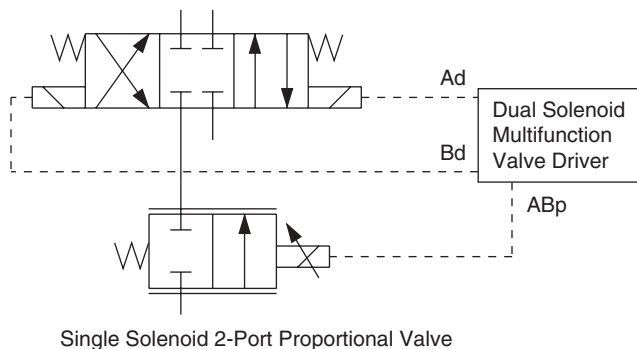
Dual Solenoid Multifunction Valve Driver

Application A



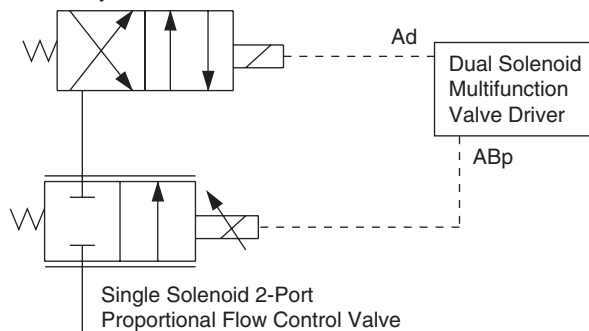
Application B

Directional 3-Position 4-Way Control Valve



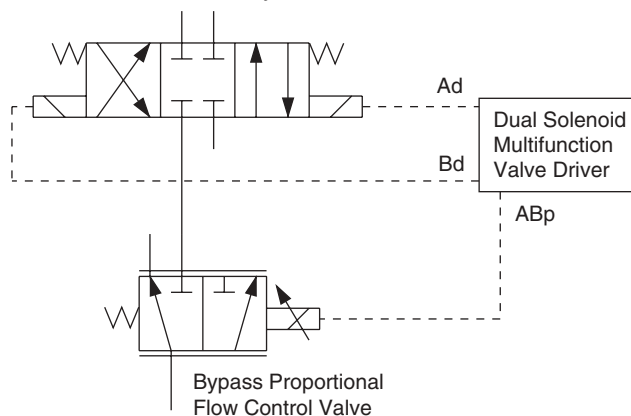
Application E

Directional 2-Position 4-Way Control Valve



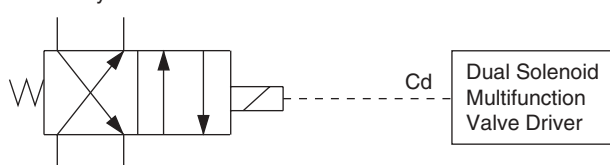
Application C

Directional 3-Position 4-Way Control Valve



Application H

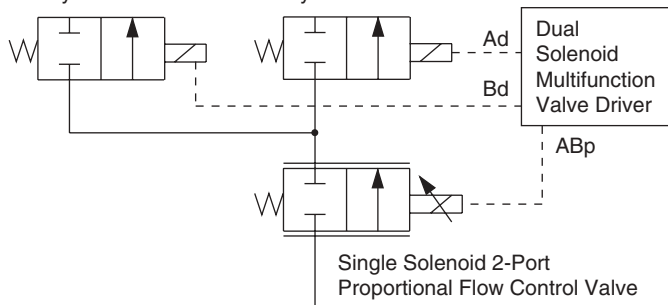
Directional 2-Position 4-Way Control Valve



Application F1

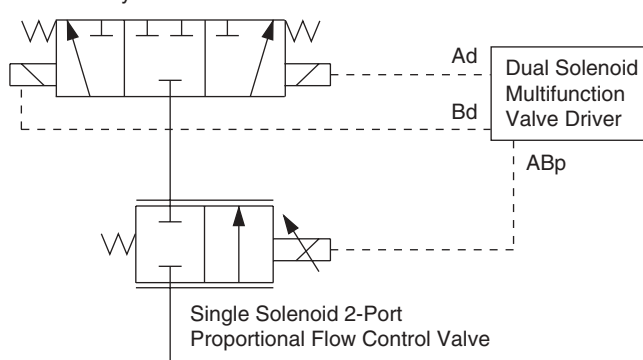
Directional 2-Position 2-Way Control Valve

Directional 2-Position 2-Way Control Valve



Application F2

Directional 3-Position 3-Way Control Valve

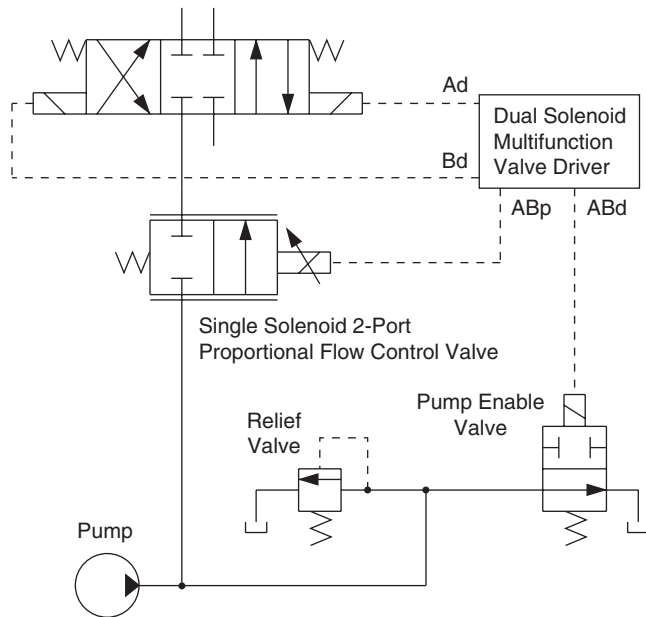


Dual Solenoid Multifunction Valve Driver

TYPICAL APPLICATIONS

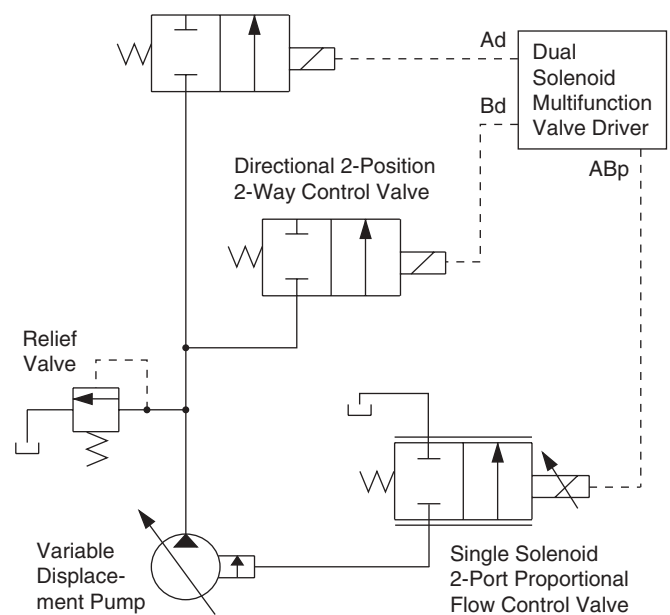
Application D

Directional 3-Position 4-Way Control Valve

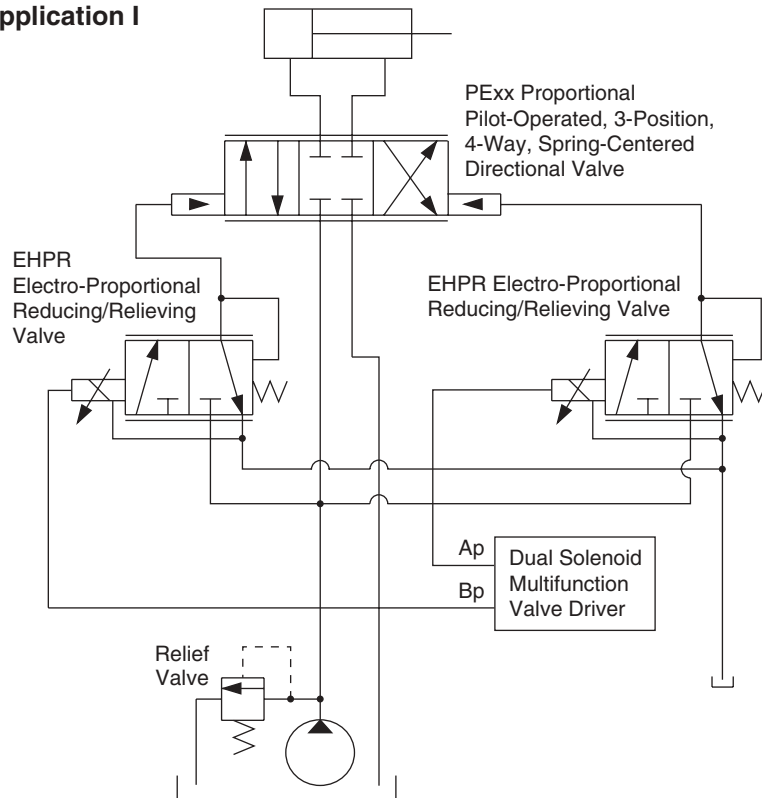


Application G

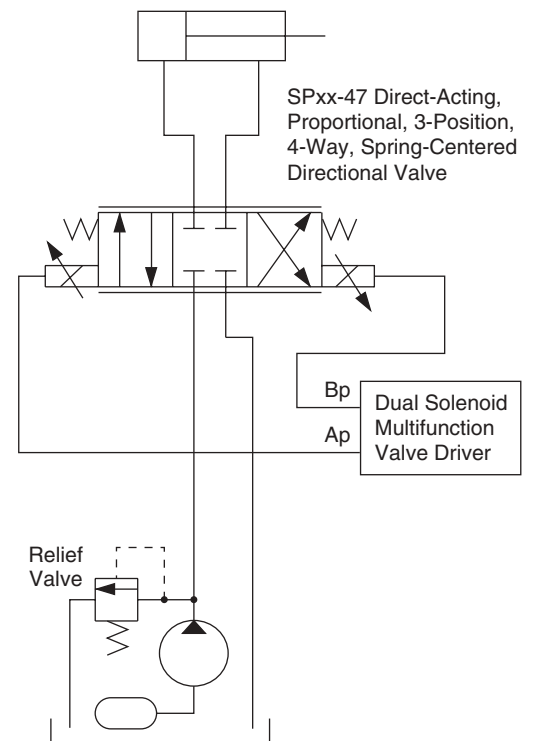
Directional 2-Position 2-Way Control Valve



Application I



Application J

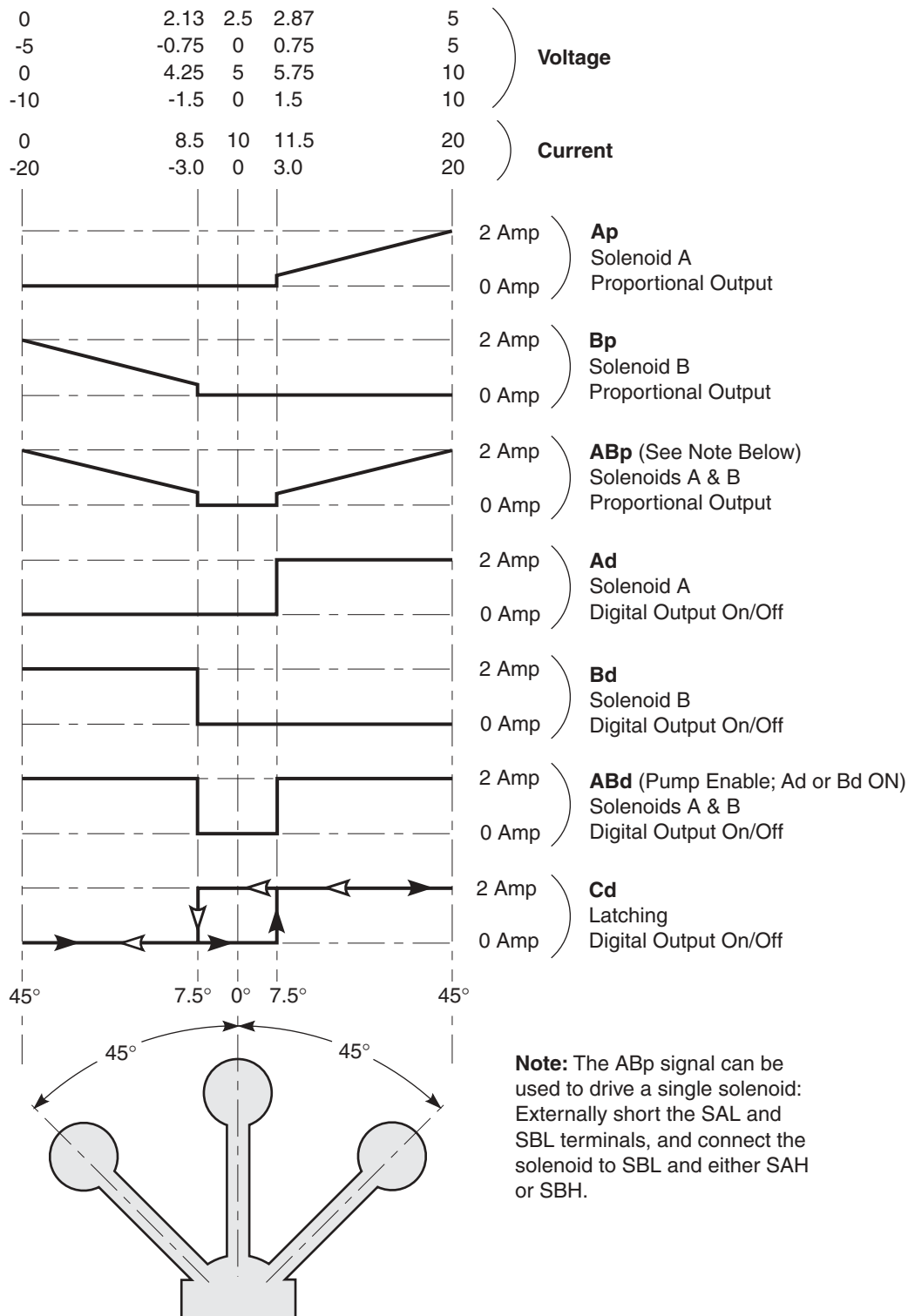


Proportional Valve Controller—Metal Housing—

JOYSTICK MOTION

Dual Solenoid Multifunction Valve Driver

Typical Examples of Analog and Digital Output vs. Various Types of Input



Note: The ABp signal can be used to drive a single solenoid: Externally short the SAL and SBL terminals, and connect the solenoid to SBL and either SAH or SBH.

Typical Joystick Motion Correlated to Output Signal

Single Axis with Seven Outputs and $\pm 7.5^\circ$ Electronic Deadband Illustrated (other values are available)

Dual Solenoid Multifunction Valve Driver

JOYSTICK MOTION

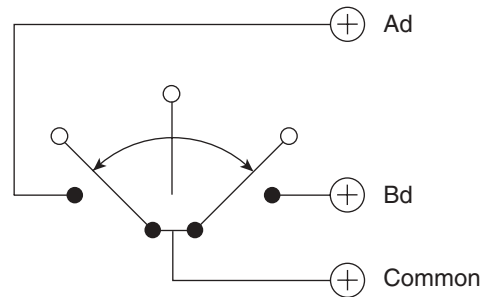
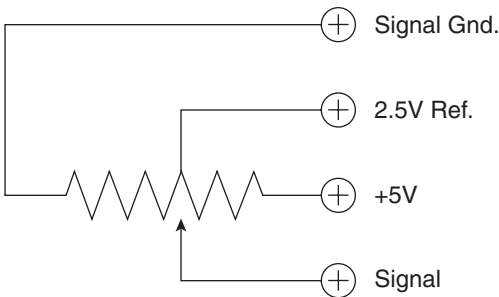
Typical Joystick Outputs:

The Dual Solenoid Driver has multiple outputs available to support a variety of hydraulic circuits. The diagram on the previous page shows the outputs of the Driver as they relate to the movement of a remote joystick, with the Deadband function selected (dipswitch setting on Driver).

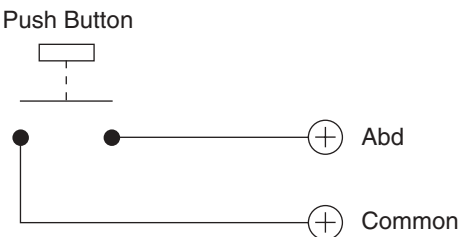
The joystick has its own potentiometer which senses movement and signals the Driver to automatically activate its additional outputs. The potentiometer output will signal the Driver, causing the Ad, Bd and Abd signals to be generated electronically.

The Dual Solenoid Driver can be used to replace joystick outputs that might otherwise be generated by microswitches or trigger switches. Problems normally encountered with mechanical switches can be eliminated because the Driver produces its outputs electronically.

Some typical mechanical push-button and joystick-actuated microswitches are illustrated below.



Microswitch Actuated by Joystick Movement



TO ORDER

<u>Part Number</u>	<u>Control Input</u>	<u>I-Min. Setting</u>	<u>I-Max. Setting</u>
4000149	0–5 VDC, 10 VDC	0 to 2000 mA	0 to 2000 mA