# MOTORIZED WAVEGUIDE SWITCH

## SWJ-WG-L1(-H)
## SWJ-WG-LM1(-H)
### (WG for Waveguide Size)

## CONTROL MANUAL

**Waveguide Switch Control**

The SWJ waveguide switch includes a micro d-sub connector for the user interface. This connector accepts DC power as well as Position Select command signals from the user. It also provides Position Indicator output signals to the user.

**Micro D-Sub Connector Pin Assignments**

| Pin | Name | Function |
| --- | --- | --- |
| 1 | V+ | DC Power Positive Voltage |
| 2 | VC | DC Power Common Voltage |
| 3 | SC | Position Select Common (positive voltage) |
| 4 | S0 | Position Select 0 (Active Low) |
| 5 | S1 | Position Select 1 (Active Low) |
| 6 | GND | Chassis Ground Connection |
| 7 | PC | Position Indicator Common |
| 8 | P0 | Position Indicator 0 |
| 9 | P1 | Position Indicator 1 |

**Pin Descriptions**

Pins 1, 2 – DC Power Supply

The DC power supply input pins are electrically isolated from the Chassis Ground pin and the digital I/O pins. The power supply input pins are diode-protected against reverse polarity. An internal shunt Zener diode absorbs transient voltage spikes but does not protect against sustained voltages above 32 Volts. The DC supply voltage must not exceed the rated maximum switch voltage, or 32 VDC, whichever is lower. The power supply must be able to deliver up to 1.0 Amps for short durations when the switch position is changed electronically. At reduced supply voltages, from 5.0 Volts up to the rated minimum supply voltage, Position Select commands are ignored. However, the Position Indicator output relays remain active and valid.

Pins 3, 4, 5 – Position Select Inputs

The Position Select pins are electrically isolated from the DC power supply and the Position Indicator output pins. Electrical isolation allows more flexibility and improved noise immunity compared to inputs that are referenced to the DC power supply. Position Select Common (SC) pin (Pin 3) is connected to a positive DC voltage. This voltage is typically +5V for TTL compatibility but may be as high as +32V relative to the minimum voltage applied to S0 and S1 (Pins 4 and 5).

www.eravant.com | 501 Amapola Avenue, Torrance, CA 90501
Phone: 424-757-0168 | Fax: 424-757-0188 | Email: support@eravant.com

ERAVANT
Copyright © 2024 by Eravant

Rev 1.0, Page 2 of 5

The Position Select input pins S0 and S1 are Active Low. They are pulled Low to produce current through the input optical couplers (see figure). To assert Position 0, Pin 4 (S0) is pulled Low momentarily while P1 stays High. To assert Position 1, Pin 5 (S1) is pulled Low momentarily while Pin 4 stays High. The Position Select inputs must be pulled low for at least 10 microseconds to ensure proper switch operation.

If S1 (Pin 5) is held Low continuously, the switch position follows the state of Pin 4. If S0 (Pin 4) is held Low continuously, the switch defaults to Position 0 regardless of the logic state of P1 (Pin 5).
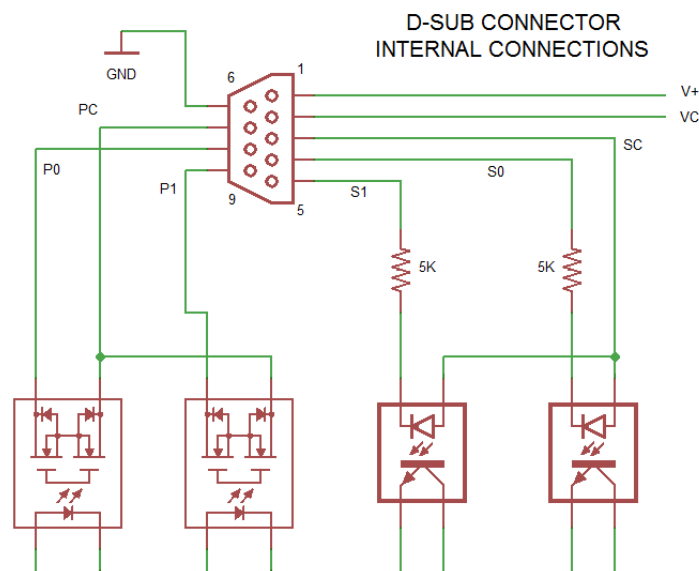
A change in the logic state of either P0 or P1 from High to Low is required to change or reassert the switch position.

Pin 6 – Chassis Ground

Pin 6 provides an optional connection to the switch frame. All electronic circuits within the switch are isolated from Chassis Ground to avoid unwanted stray currents and provide greater immunity from noise. The Chassis Ground pin may be used to ground the shield of a control cable. There is no requirement to connect the Chassis Ground pin to any other pin or a cable shield, although doing so could reduce or eliminate problems caused by external electrical noise.

Pins 7, 8, 9 – Switch Position Indicator Outputs

A pair of electrically isolated solid-state relays are used to indicate the switch position. The indicator relays have bi-directional outputs rated for ±60 peak Volts when open or ±1.4 peak Amps when closed. When the switch is in Position 0, Pin 8 (P0) is connected to Pin 7 (PC). When the switch is in Position 1, Pin 9 (P1) is connected to Pin 7. If the switch position is not resolved, neither Pin 8 nor Pin 9 is connected to Pin 7. In such cases the waveguide switch may be stuck in-between valid positions, or the position sensors may not be functional due to insufficient supply voltage.



**Fig. 1 – Internal electronic interface components**

www.eravant.com | 501 Amapola Avenue, Torrance, CA 90501
Phone: 424-757-0168 | Fax: 424-757-0188 | Email: support@eravant.com

ERAVANT
Copyright © 2024 by Eravant
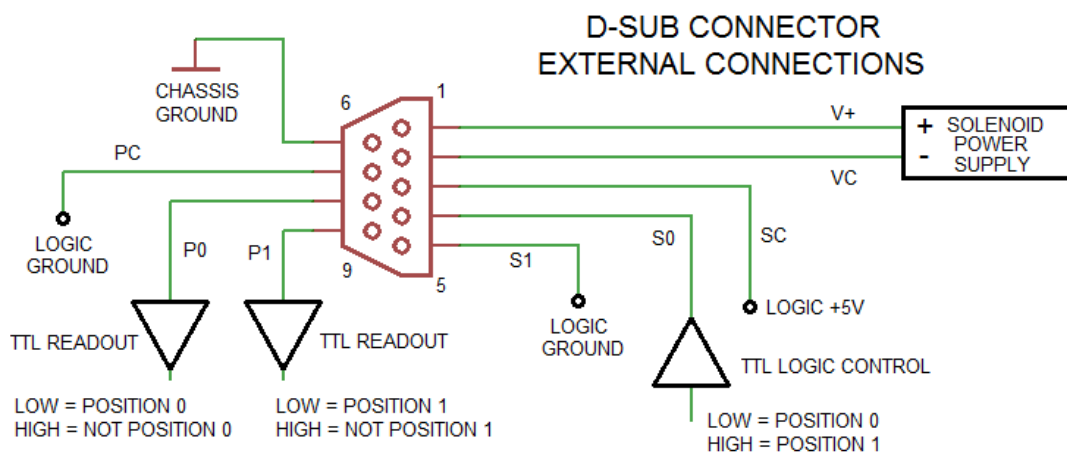
Rev 1.0, Page 3 of 5

**Switch Operation**

After DC power is applied, the switch remains in its current position until a Position Select command is received. The current position will be reported by the output relays within 1 second of applying power, and continuously thereafter. When a Position Select command is received, a solenoid drive signal is generated to move the switch to the requested position. If the position of the switch is changed manually, the P0 and P1 output pins will immediately indicate the new switch position.

After a drive pulse is applied to the solenoid, a fixed time-out period begins. The forced time-out period limits how often the switch position can change or be reasserted. If a Position Select command is received during the time-out period, the corresponding drive signal will be generated at the end of the time-out period. If multiple Position Select commands are received during the time-out period, the most recent command is followed at the end of the period. The forced time-out period is approximately 0.2 seconds, allowing up to five position changes per second.

**Control and Readout Interface – Single-Bit TTL Position Command**

The position readout relays can be connected to a TTL input interface by connecting the relay common pin, PC (Pin 7), to Logic Ground (Fig. 2). The position readout relays will pull the TTL inputs Low when they are active. When P0 (Pin 8) is Low, the switch is in Position 0. When P0 is High, the switch may be in Position 1, provided that the solenoid operation was successful. When P1 (Pin 9) is Low, the switch is in Position 1. When P1 is High, the switch may be in Position 0, provided that the solenoid operation was successful.

To interface the control inputs to a TTL control interface, the Position Select Common pin, SC (Pin 4) is connected to Logic +5 Volts. When the Position 1 Select input pin, S1 (Pin 5) is connected to Logic Ground, the relay position follows the state of the Position 0 Select input, S0 (Pin 4). When S0 changes to Low, the switch moves to Position 0. When S0 changes to High, the switch moves to Position 1.
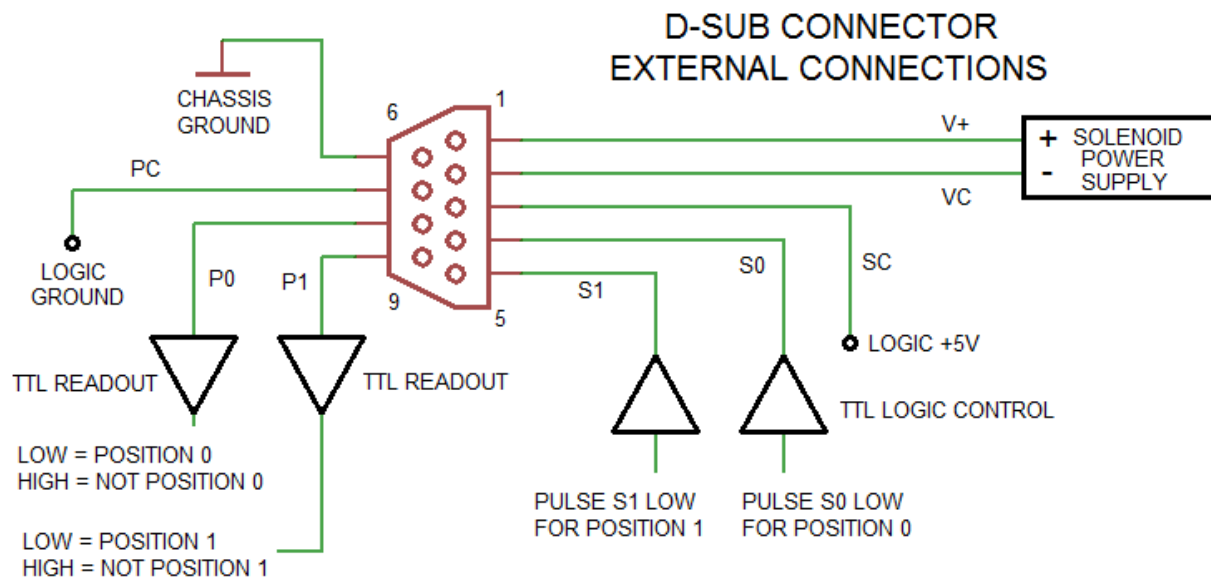


**Fig. 2 – External connections for single-bit TTL control and TTL position readout**

**Control and Readout Interface – Two-Channel TTL Position Command**

To interface the control inputs to a TTL control interface, the Position Select Common pin, SC (Pin 4) is connected to Logic +5 Volts. When S0 and S1 are held High, the switch position remains unchanged. When S0 is pulsed Low while S1 is held High, the switch moves to Position 0. When S1 is pulsed Low while S0 is held High, the switch moves to Position 1.



**Fig. 3 – External connections for two-channel TTL control and TTL position readout**

www.eravant.com | 501 Amapola Avenue, Torrance, CA 90501
Phone: 424-757-0168 | Fax: 424-757-0188 | Email: support@eravant.com

ERAVANT
Copyright © 2024 by Eravant

Rev 1.0, Page 5 of 5