TD1512AX
Technical Data

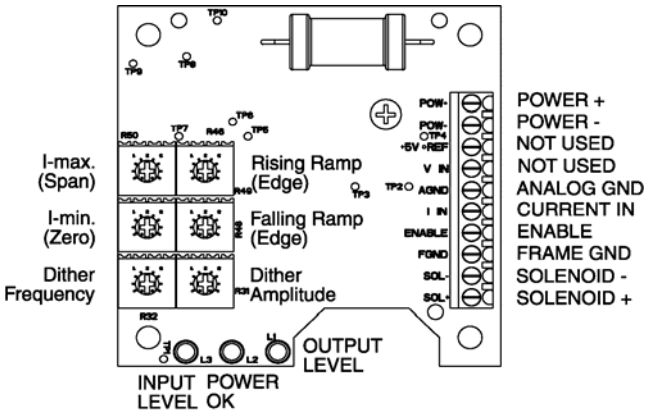
REMOTE MOUNT SOLENOID DRIVER (4-20mA Input Version)

Part No.:

Packaged Driver (board installed in housing assembly)

Available with no cable - RSD-SMB-4-20MA-800MA-00-2

Description: The Remote Mount Solenoid Driver simplifies control of proportional solenoids by supplying a current proportional to a 4-20mA input signal. It accepts power supply voltages from 9 to 32VDC. This linear solenoid driver utilizes high frequency switching output (PWM) to provide a maximum DC current output of 800mA. A current sensing circuit maintains output current regardless of changes in input voltage and coil resistance. The user can adjust maximum and minimum current. Ramp time, dither frequency and amplitude can also be adjusted to match the application. A system of LED's indicates output power level, input level and power on/off. The unit is enclosed in a metal housing with grommet provided for cable connection to the board (supplied by others). It is designed for remote mounting.



Features:

- Enclosed in a metal housing
- Current sensing circuit maintains output current regardless of changes in input voltage and coil resistance
- Maximum current adjustment does not affect minimum current setting
- Broad range of supply voltages (9 to 32VDC) with no degradation in performance
- Modern technology utilizing high frequency switching output (PWM)
- Energy efficient design (no heat sink is required)
- Accepts a 4-20mA signal input
- Maximum current output of 800mA
- LED indication of output power level, input level and power on/off
- Electronic limiting circuit means no internal fuses
- Short circuit proof (in case of solenoid failure or miswiring) and reverse polarity protection
- Filter eliminates electrical noise

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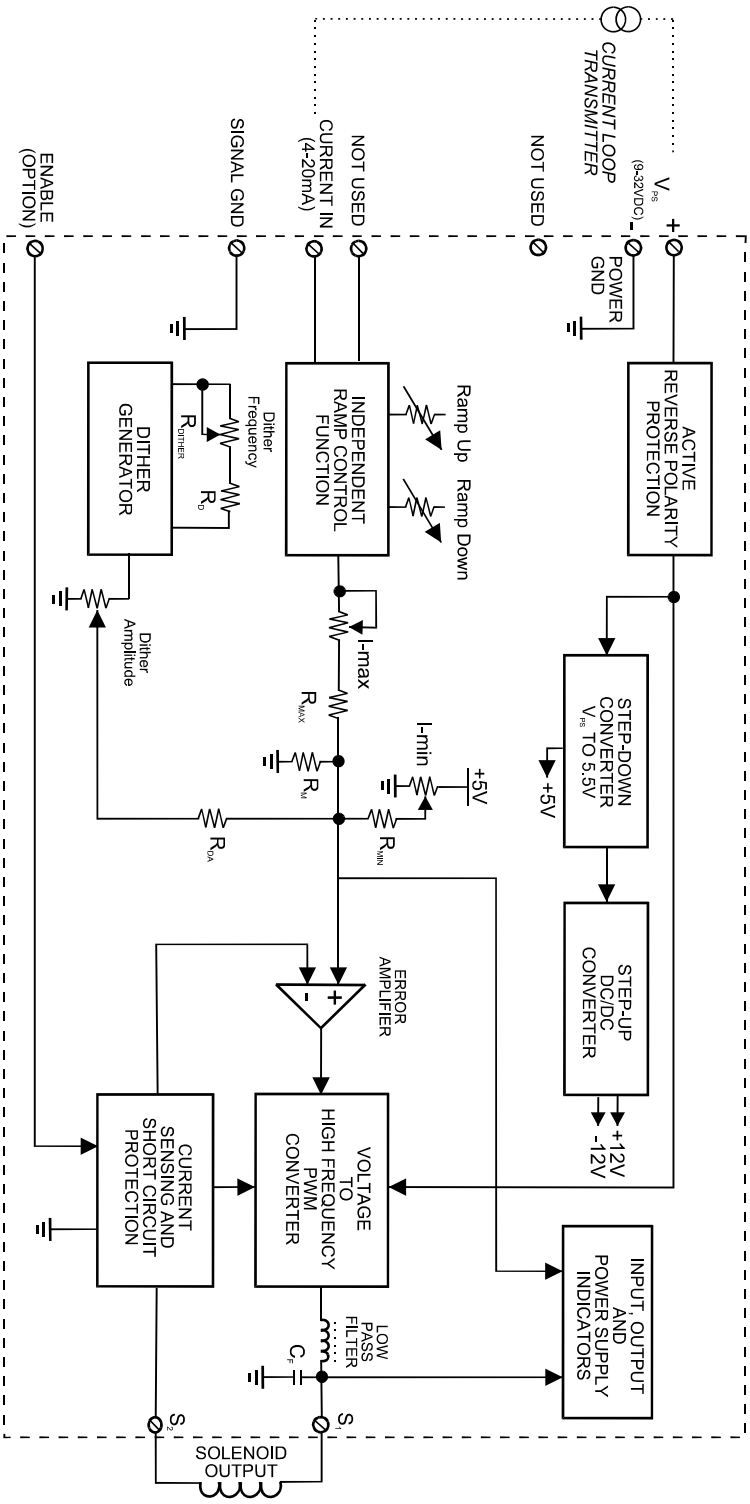
BLOCK DIAGRAM (4-20mA Remote Mount Solenoid Driver)



Technical Specifications: All specifications typical at nominal input voltage and 25°C unless otherwise specified.

General Specifications

Operating conditions Storage temperature	-40 to +85 degrees C (-40 to 185°F) 0 to 85% relative humidity -50 to +125 degrees C (-58 to 257°F)
Electromagnetic compatibility (EMC)	Emission EN 50081-2 Immunity EN 50082-2
Approvals	CE (Packaged Driver)
Protection - Packaged Driver	Not applicable on units sold without cable.
Electrical connection - PCB Board or Packaged Driver (no cable)	 10 screw terminals (torque rating of clamping screw is 4.425 lb. in.)
Cable clamp (grommet) size Max. cable diameter	PG9 screw type 5.00 to 7.92 mm (0.200 to 0.312 in.)
Dimensions - PCB Board	63.5 x 20.3 x 63.5 mm (W x D x H) 2.5 x 0.8 x 2.5 inches
Dimensions - Packaged Driver	114.3 x 27.9 x 79.3 mm 4.500 x 1.099 x 3.125 inches (W x D x H excluding grommet and cable)

Electrical Specifications

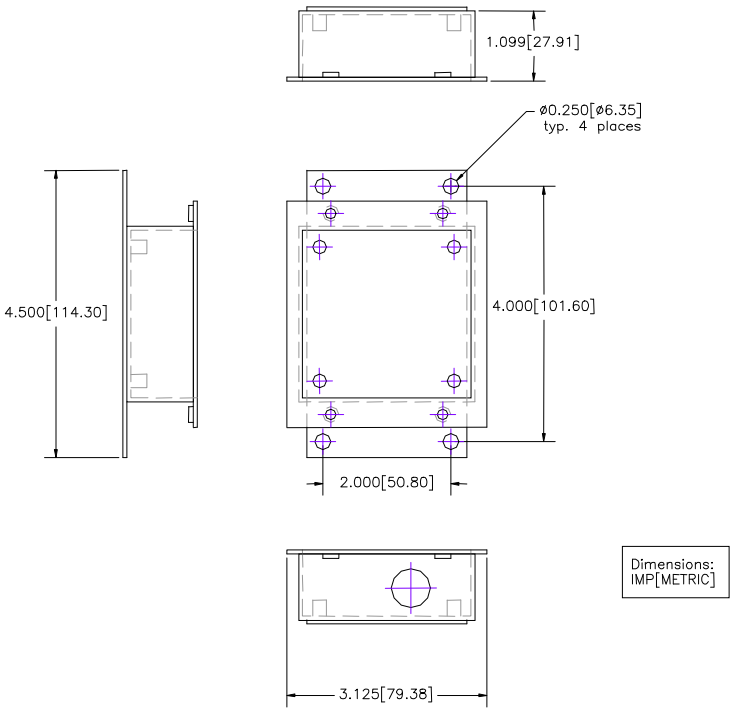
Operating voltage (power supply requirement)	9 to 32 VDC nominal power supply range
Control input signal options	4-20 mA current signal
Input resistance	250K Ohms
Range of maximum output current	800mA
Solenoid resistance	$R_{coil} \leq (V_{power\ supply} - 1.5\ V)/I_{max}$

Note 1: Match power supply voltage with rating of solenoid coil. Operating the driver with a supply voltage lower than the solenoid rated voltage may result in reduced maximum current output.
Note 2: The coil should have no polarity or protection diodes for proper operation of the device.
Note 3: The maximum current output of the driver should not exceed the current rating of the solenoid coil.

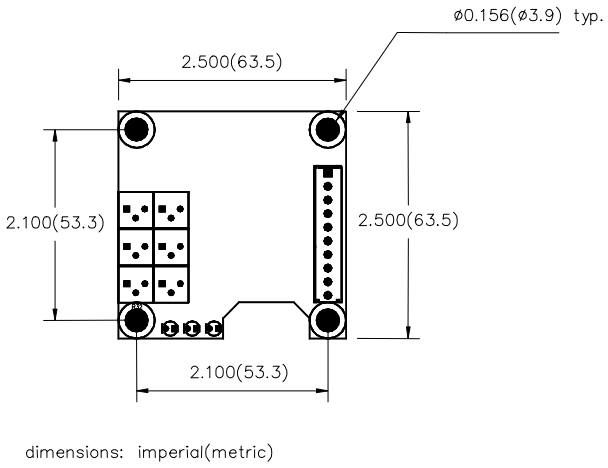
Adjustments

Torque rating of trim pots	5.0 oz-in. max.
Minimum current setting	0 to 350mA
Maximum current setting	400 to 800mA
Current ramp time	0.01 - 5 sec. independent
Dither amplitude Dither waveform Current dither frequency	0 to 10% of rated maximum current Triangular 70 to 350 Hz (±10% of full scale)

Housing Dimensions



PCB Board Dimensions



Specifications are subject to update without notice.

Mounting Instructions and Wiring Connections:
For Packaged Drivers (PCB boards enclosed in housing assembly):

Mounting the housing

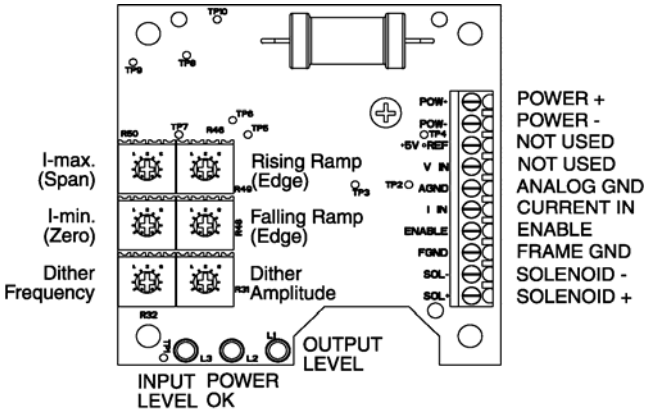
Mount the housing using four #10-32 bolts or screws.

Connecting to the screw terminals on the board

For models where no cable is provided connect a cable as follows. For a cable specification, refer to the technical specification section. For the pin out of the screw terminals refer to the drawing in the Adjustment Details section.

- To access the screw terminals, loosen the four screws on the lid using a Phillips #1 screwdriver. Remove the lid.
- Use a 0.200 to 0.312 inch diameter solid round shielded cable to connect to the remote mount solenoid driver. Each wire should be stripped to 6.5 mm (1/4 inch) and the shield (jacket) stripped to a minimum of 57 mm (2-1/4 inches). Exposed ground shield wire should have a heat shrink placed around the wire as a precautionary measure.
- Remove the clamp nut on the Heyco PG9 grommet using an adjustable wrench.
- Slide the clamp nut over the cable. Insert the cable into the grommet, allowing for the stripped minimum of 2 1/4 inches to be available inside the housing. Tighten the clamp nut securely attaching the cable to the housing assembly.
- Reference the label (found on the inside of the lid) for the pin out connections of the screw terminals. The wiring connections diagram shows the appropriate connections.
- To connect the cable to the board, loosen each screw terminal, insert the pre-tinned wire and tighten with a jeweller's sized screwdriver. **Take care to position the ground shield wire away from the PCB Board.**
- Replace the lid and gasket. Replace and tighten the four 4-40 Phillips flat head screws.

Adjustment Details:



Adjustments are accessible by loosening the four screws on the lid of the housing and removing the lid. Ensure that the unit is connected to an operating proportional valve. Use a Phillips #1 screwdriver to make adjustments to the trim pots. The torque rating for the trim pots is 5.0 oz-in. max. Trim pots are single turn.

For 4-20mA Control: Turn ramp screws fully counterclockwise to eliminate ramping.

Use I-Min. screw to set up minimum speed with minimum control input.

Use I-Max. screw to set maximum speed with 100% of control input.

Enable: When Enable is connected to the -ve power supply, the unit will be disabled. When Enable is left open or connected to the +ve power supply, the unit is enabled.

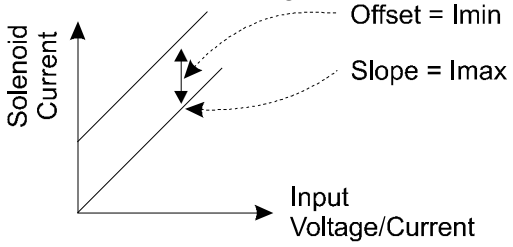
Trim Pot Adjustments	Range of Adjustment	Factory Setting
Zero - Minimum Current Setting (I_{min})	0 to 350mA	0% (CCW)
Span - Maximum Current Setting (I_{max})	400 to 800mA	100% (CW)
Ramp Time (Rising and Falling Edge)	0.01 to 5 seconds independent	minimum (0.01 seconds) (CCW)**
Dither Level (Amplitude)	0 to 10% of rated maximum current	0% (CCW)
Dither Frequency	70 to 350 Hz (±10%)	minimum (CCW)

CW = clockwise, CCW = counterclockwise

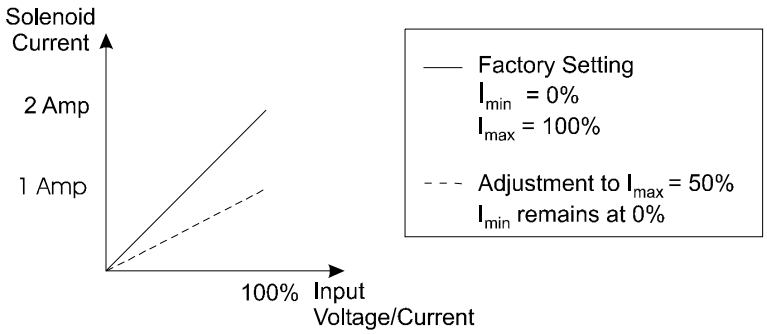
∗NOTE 1: Range of maximum output current is 2A (maximum output current = minimum current setting + maximum current setting).

**NOTE 2: To eliminate ramping, turn the trim pots fully counterclockwise.

Adjusting the minimum current will shift the maximum current setting, as shown.



Adjusting the maximum current (I_{max}) does not affect the minimum current (I_{min}) setting.



Setting the Minimum Current (I_{min})

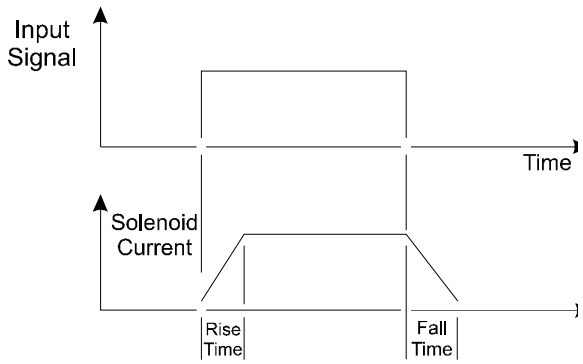
- Set the minimum current before setting the maximum current. Apply minimum input (4 mA).
- The factory setting for the I_{min} trim pot is set at 0 or fully counterclockwise (CCW).
- If the desired minimum current is greater than 0, adjust the trim pot clockwise (CW) until the desired current is achieved.

The minimum current setting can be used to take into account the mechanical valve deadband and provide desired offsets from zero to allow full control within the functional range of the specific valve.

Setting the Maximum Current (I_{max})

- Apply maximum control (20 mA).
- The factory setting for the I_{max} trim pot is 100% or fully CW.
- Turn the trim pot CCW to adjust the current setting downwards to the desired maximum.

The maximum current setting is adjusted to meet the customer's working pressure or flow range to the full scale signal input range. This provides maximum control for a specific application.



Ramp Times

Setting the Ramp Times

- The factory setting for ramp times is the minimum (0.01 seconds) or fully CCW.
- **If the ramp time settings are not needed, leave the setting at the minimum value.**
- To change the ramp times, adjust the trim pot CW to increase the time.
- Note that rising and falling ramp times are independent.

Ramp times are application dependent. They limit the rate of change or how fast the operation happens. Note that if the input signal is not applied long enough for the ramp time set, the desired solenoid current will not be reached.

Setting the Dither Amplitude

- The factory setting for dither amplitude is 0% (CCW).
- To adjust dither amplitude, turn the trim pot CW until small changes in the input signal register similar changes in current output.
- Choose the smallest effective dither amplitude.

Dither amplitude is adjustable from 0 to 10% of the rated maximum current. Dither amplitude and frequency are dependent on the specific valve. The effects of static friction on the operation of the solenoid are reduced by the application of a small AC current. The hysteresis and repeatability of the valve are improved by this practice. The optimum dither amplitude is attained when small input signal changes register similar changes in current output (pressure or flow through the valve).

Setting the Dither Frequency

- The factory setting for dither frequency is the minimum or 0% (CCW).
- To adjust dither frequency, turn the trim pot CW until the desired frequency is set.
- The dither frequency rating for a particular valve is available from the valve manufacturer.

Ordering Part Number:

Packaged Driver (board installed in housing assembly)

Available with no cable - RSD-SMB-4-20MA-800MA-00-2

Form: TD1512AX-TEI-TD8/29/00