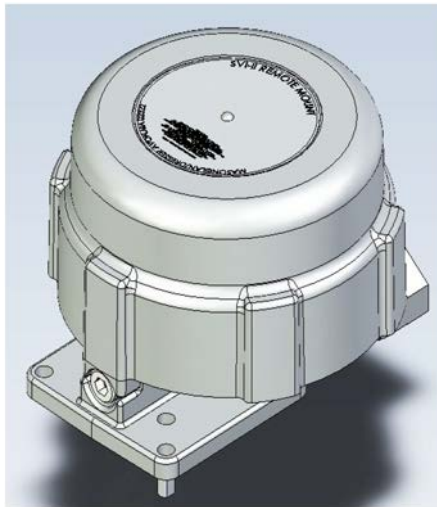


Remote Position Sensor (RPS)

Quick Start Guide (Rev. D)

(For SVI™ II AP, SVI3 and SVI FF)



About this Guide

This Quick Start Guide applies to the **Masoneilan™** Remote Position Sensor and supported software.

The information in this manual is subject to change without prior notice.

In no case does this manual guarantee the merchantability of the Remote Position Sensor or the software or its adaptability to a specific client needs.

Please report any errors or questions about the information in this manual to your local supplier or visit <https://valves.bakerhughes.com>.

Disclaimer

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PN 011525100-888-0000 REV D

Document Changes

Version/Date	Changes
A/6-2014	First release
B/6-2014	Edited procedural text for both reciprocating and rotary installation.
C/08-2018	Change Operating Temperature specifications. Added sections for SVI FF configuration. Added procedure for checking configuration using Ohmmeter. Changed graphics and procedures to reflect new board. Changed permissible cable length specification. Added section: Configuring for SVI II AP and SVI II APN. Added section: Configuring for SVI FF.
D/02-2022	Rebranded as per Baker Hughes format. Reference to SVI II APN has been removed Reference to SVI3 has been added Reference to SMARTS Assistant configuration tool has been removed

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Safety Information

This section provides safety information and defines the documentation symbols.

Safety Symbols



Indicates a potentially hazardous situation, which if not avoided could result in serious injury or death.



Indicates a potentially hazardous situation, which if not avoided could result in instrument or property damage, or data loss.

Note: Indicates important facts and conditions.

Remote Mount Product Safety

General installation, maintenance or replacement

- ☐ Products must be installed in compliance with all local and national codes and standards by qualified personnel using safe site work practices. Personal Protective Equipment (PPE) must be used per safe site work practices.
- ☐ Ensure proper use of fall protection when working at heights, per safe site work practices. Use appropriate safety equipment and practices to prevent the dropping of tools or equipment during installation.

Explosion Proof or Intrinsically Safe Installations

Products certified as explosion proof or flame proof equipment or for use in intrinsically safe installations **MUST BE**:

- ☐ Installed, put into service, used and maintained in compliance with national and local regulations and in accordance with the recommendations contained in the relevant standards concerning potentially explosive atmospheres.
- ☐ Used only in situations that comply with the certification conditions shown in this document and after verification of their compatibility with the zone of intended use and the permitted maximum ambient temperature
- ☐ Installed, put into service and maintained by qualified and competent professionals who have undergone suitable training for instrumentation used in areas with potentially explosive atmospheres.

Note: Before using these products with fluids/compressed gases other than air or for non-industrial applications, consult the factory. This product is not intended for use in life support systems.



Under certain operating conditions, the use of damaged instruments could cause a degradation of the performance of the system which may lead to personal injury or death. Installation in poorly ventilated confined areas, with a potential of gases other than oxygen being present, can lead to asphyxiation.



Refer to ES-787 (Masoneilan SVI-II), ES-817 (SVI3) or ES-776 (SVI FF) for special instructions for installing Masoneilan SVI-II remote unit in areas where there is a potential for explosive gas atmosphere or inflammable dust.

Changes to specifications, structure, and components used may not lead to the revision of this manual unless such changes affect the function and performance of the product.

Introduction

The Remote Position Sensor is a remotely mounted position-sensing device, that can be connected electrically to a digital valve positioner or other suitable field device. It is used as position feedback in applications where direct mounting of a positioner to a valve actuator is not practical due, typically but not limited to, extreme vibration, heat or radiation.

A precision rotary transducer is located in the RPS enclosure, which can be mounted on a valve or damper to indicate stem position when connected to a suitable receiver. There is a three wire connection provided on a spring pressure terminal block to interconnect to the receiving device.

The Remote Position Sensor is suitable for installation indoors and outdoors in an industrial environment. Mounting kits are available to permit mounting on a variety of valves.

The kit can be used with non-Masoneilan positioners. For Masoneilan positioners, it can be used for the SVI3, SVI II AP and SVI FF positioners. The images shown are for the SVI II AP board; however, the SVI3 and SVI FF vary only slightly in board appearance.

Note: For non-Masoneilan positioners: When the flat of the RPS output shaft is facing right (from the backside with the conduit opening facing down), the potentiometer is at the midusable travel range.

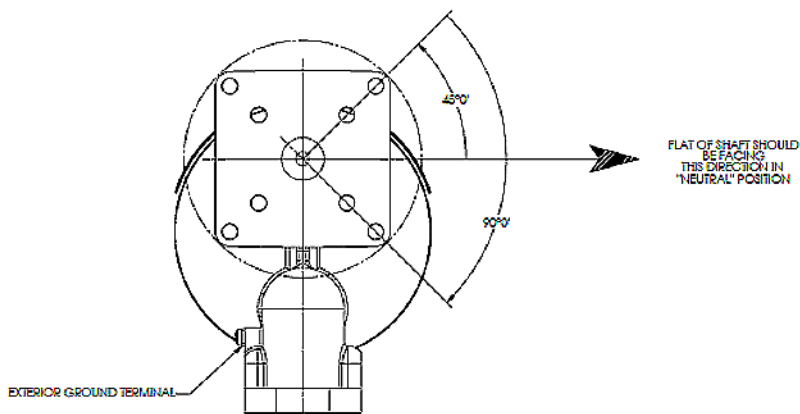


Table 1: Remote Position Sensor Specifications

Operating Temperature Range	Hazardous Environment: -50 °C to 85 °C (-58 °F to 185 °F) Non-Hazardous Classified Locations: -50 °C to 125°C (-58 °F to 257 °F)
Maximum Distance to SVI positioner	25 m (82 feet) maximum recommended, for setups with distances of more than 30 m consult the factory
Recommended Wiring	Shielded cable up to 14 AWG
Linear travel	6.35 mm (0.25 inches) TO 63.5 mm (2.5 inches) with standard Masoneilan mounting kits
Rotary travel	100° maximum
Potentiometer	Rotation, no mechanical stops, resistance 1 kOhm

Table 2: Construction Material Specifications

Weight	1.6 kg (3.5 lbs.)
Housing and cover	ASTM B85 aw SG100A
Output shaft	Austenitic stainless steel
Fasteners	Austenitic stainless steel
O-rings	Silicone



Do not remove the instrument cover or connect to an electrical circuit in a Hazardous Area unless the power is disconnected.



- ☐ *Comply with current national and local regulations for electrical installation work.*
- ☐ *Comply with national and local explosive atmosphere regulations*

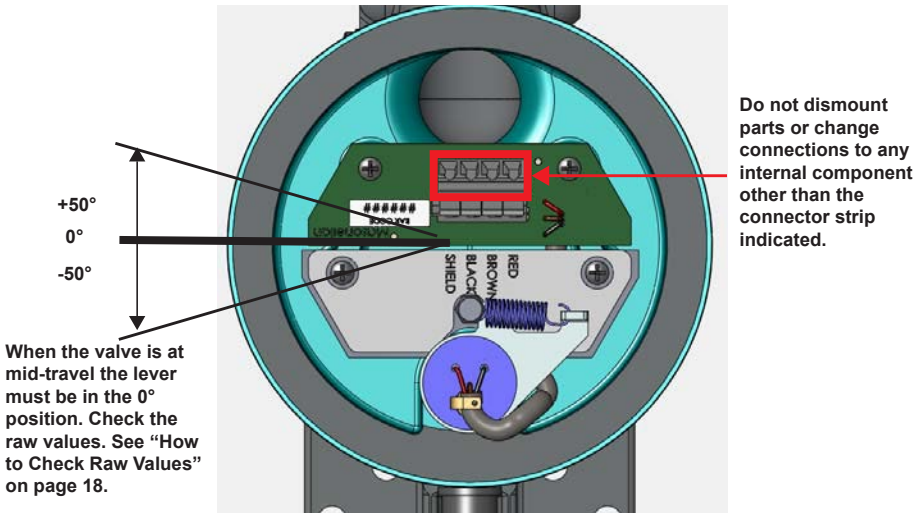
Before carrying out any work on the device, power off the instrument or make sure that the local conditions for potentially explosive atmosphere permit the safe opening of the cover.

Connecting to Reciprocating Valves

Notes on Travel Range

The figure below shows several items to consider when installing the RPS lever in a reciprocal or reciprocating situation:

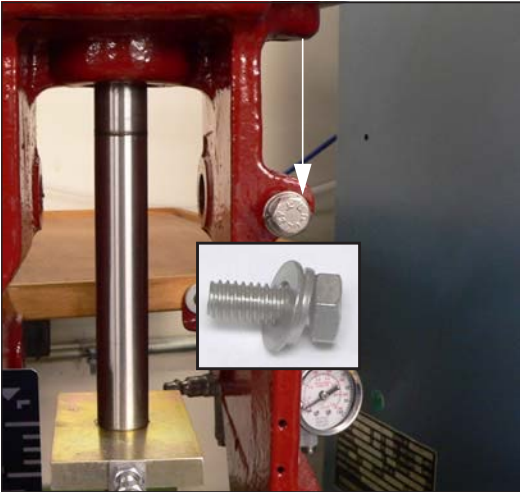
- ☐ There is an angular range to which the lever must be restricted to maintain proper positioner operation.
- ☐ Once properly connected and activated you can use the *ValVue™ Check tab Raw Position* data to ensure the proper minimum and maximum positions are achieved.
- ☐ Check for correct resistance readings by:
 1. Disconnecting the cable from RPS to SVI II AP entirely.
 2. Attaching Ohm meter clips on red and brown RPS terminals. Correct Ohm reading range: Between $1150 \pm 50 \Omega$ minimum and $1750 \pm 100 \Omega$ maximum.



Note: Note the orientation of the drawing and adjust as necessary if your orientation differs.

Tools required:

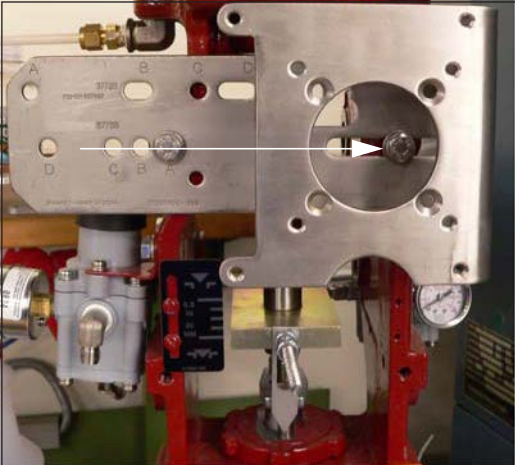
- Adjustable wrench
- 3 mm and 6 mm hex key
- Blade screwdriver



Loosely install the right side nut and washers first. Use an adjustable wrench to install one set of:

- Hex cap screws 5/16-18 UNC L=0.75
- 8 mm split lock washer
- 5/16 inch flat washer

Figure 1 Mounting Bracket Mounting Holes



Slide the bracket in to match the required mounting hole. See Table 3.

Figure 2 Slide the Mounting Bracket In

Table 3: Reciprocating Valve Mounting Hole and Turnbuckle Length

Actuator Size Masoneilan	Stroke	Mounting Hole	Lever Hole	Turnbuckle Length
6 and 10	0.5 - 0.8 inch (12.7 - 20.32 mm)	A	A	1.25 inch (31.75 mm)
10	0.5 - 0.8 inch (12.7 - 20.32 mm)	A	A	1.25 inch (31.75 mm)
10	>0.8 – 1.5 inch (20.32 - 41.5 mm)	B	B	1.25 inch (31.75 mm)
16	0.5 - 0.8 inch (12.7 - 20.32 mm)	B	A	2.90 inch (73.66 mm)
16	>0.8 – 1.5 inch (20.32 - 41.5 mm)	C	B	2.90 inch (73.66 mm)
16	>1.5 – 2.5 inch (41.5 - 63.5 mm)	D	C	2.90 inch (73.66 mm)
23	0.5 - 0.8 inch (12.7 - 20.32 mm)	B	A	5.25 inch (133.35 mm)
23	>0.8 – 1.5 inch (20.32 - 41.5 mm)	C	B	5.25 inch (133.35 mm)
23	>1.5 – 2.5 inch (41.5 - 63.5 mm)	D	C	5.25 inch (133.35 mm)

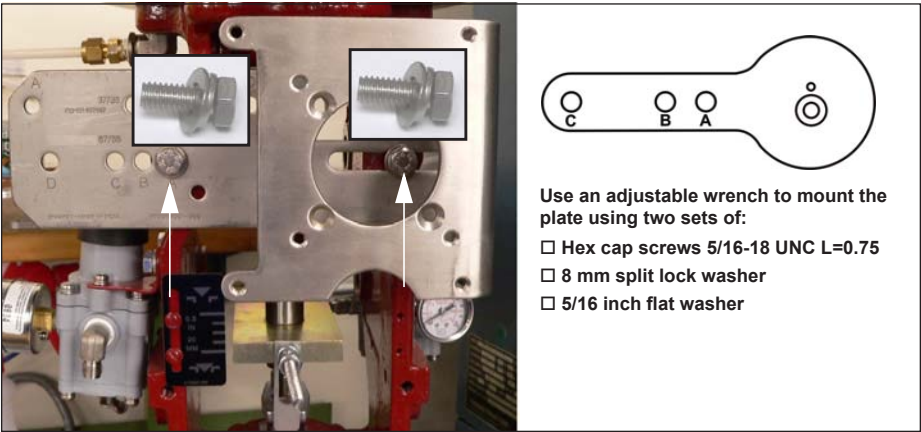


Figure 3 Attach Mounting Bracket to Valve

Select the correct turnbuckle size (Table 3). Assemble the turnbuckle by screwing each side (RH and LH) into a turnbuckle end and loosely tighten (you will adjust later) to each nut.

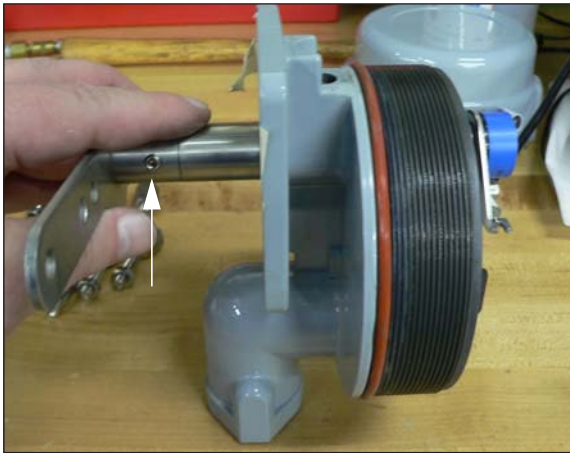


Figure 4 Assemble the Turnbuckle



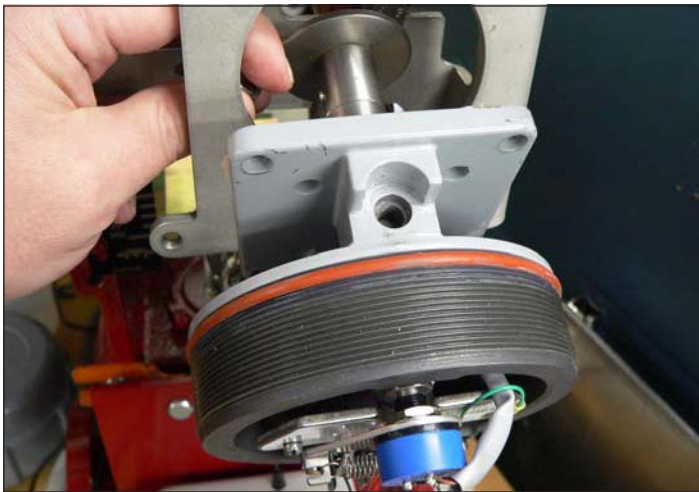
Place the LH rod end bearing of the turnbuckle over the take off rod and slide against the hex jam nut. Place the 1/4 inch hex jam nut on the take off rod and loosely tighten.

Figure 5 Connect the LH Rod End



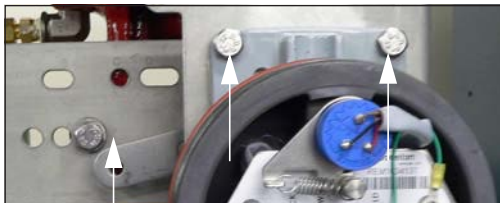
Slide the lever arm on to the RPS and use a 2.5 mm hex wrench to tighten the lever arm using the M5 set screw. Ensure the set screw aligns with the flat of the RPS shaft.

Figure 6 Attach Lever Arm to RPS Assembly



Ensure lever is facing toward the left for attachment to turn-buckle assembly.

Figure 7 Rotate the Lever Assembly into Position with Conduit Towards Ground



Use an adjustable wrench to mount the RPS unit to the Mounting Plate using the four hex head cap screws (1/4 inch-20UNC -2A, 12.7 L). Two not shown.

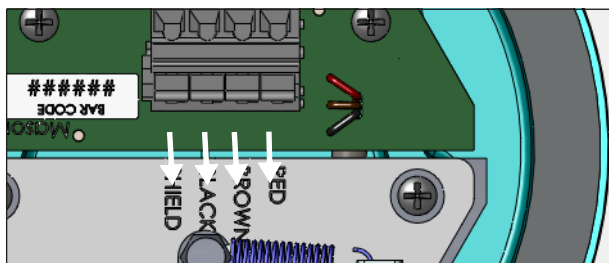
Align the lever with the indicating hole. The example shown is Air-to-Open.

Figure 8 Attach the RPS to the Mounting Plate

Place the RH rod end bearing to the front of the lever arm in the correct hole and secure loosely using the hex head cap screw (0.250 inch-20 UNC, 0.75 inch L). Adjust the turnbuckle position along the length of the take off rod and tighten all of the turn-buckle nuts.



Figure 9 Connect the RH Rod End



When connecting to an SVI unit with a Masoneilan cable, connect each color coded wire to the same color printed on plate.

When connecting to other systems. Black is Low, Brown is Wiper, Red is High and Shield is Ground.

Figure 10 Connect Wires

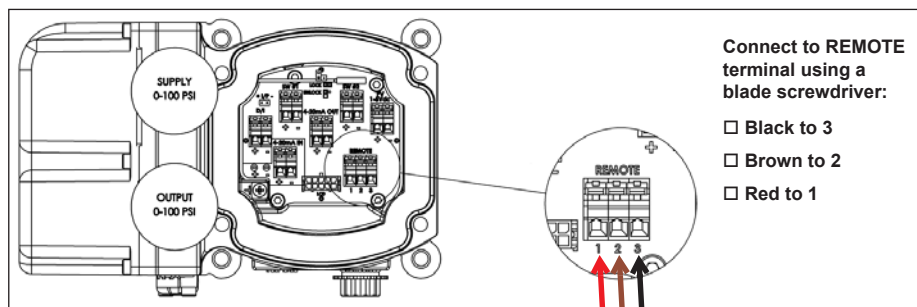
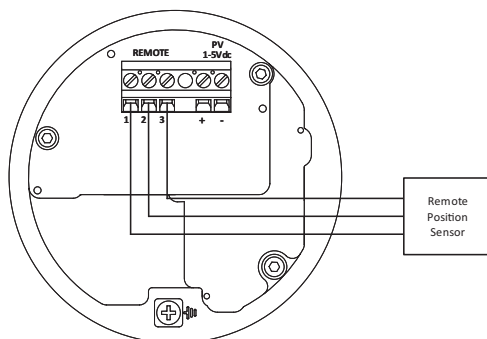


Figure 11 SVI II AP Connections

SVI3



Remote Position Sensor Input Connections for SVI3

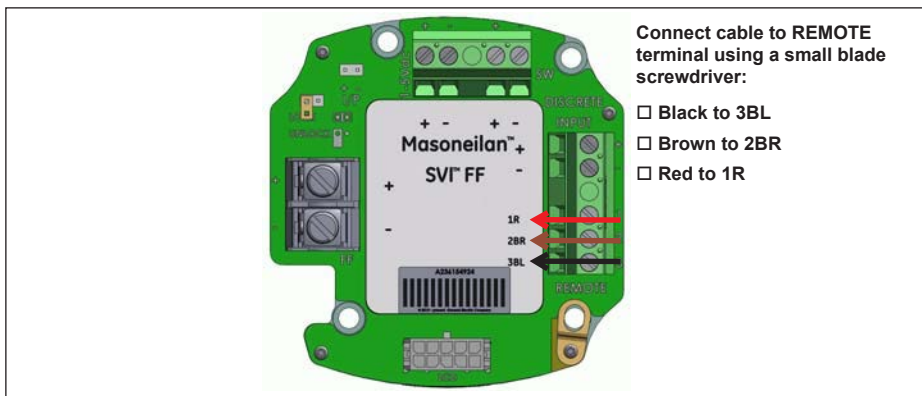


Figure 12 SVI FF Connections

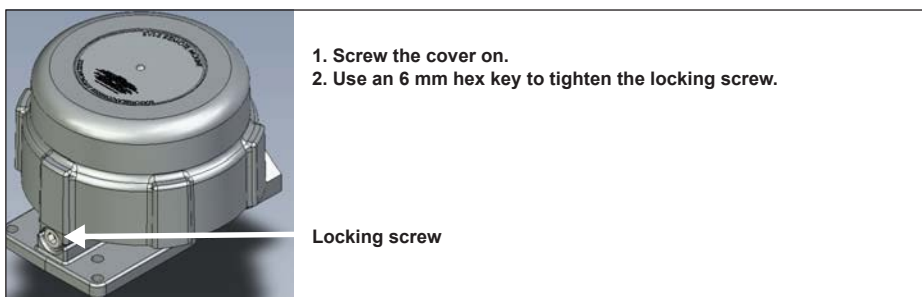


Figure 13 Assemble cover onto RPS unit

Refer to “Configuring the SVI II for Remote Position Sensing” on page 23 or “Configuring for SVI FF” on page 25 for required software and instruction for configuration.

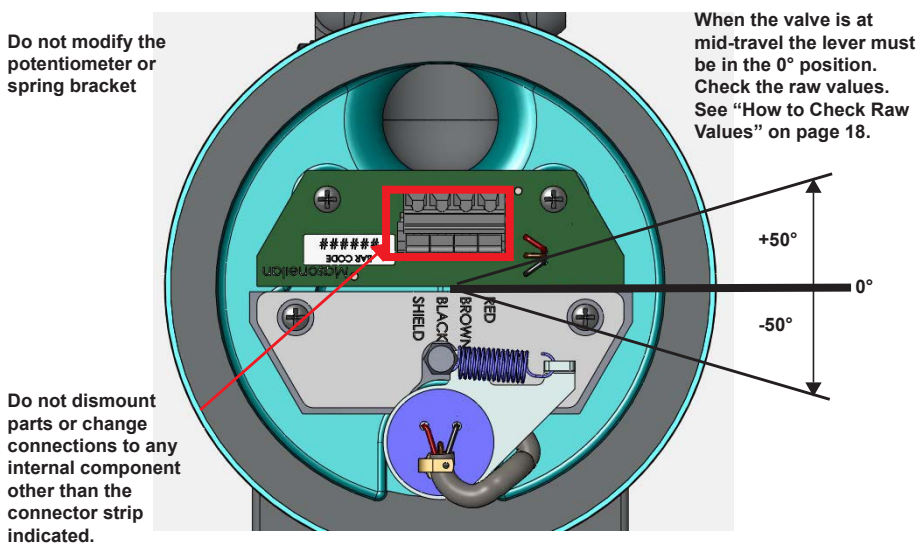
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Connecting to Rotary Valves

Notes on Travel Range

The figure below shows several items to consider when installing the RPS lever in a quarter turn situation:

- ☐ There is an angular range to which the lever must be restricted to maintain proper sensor operation.
- ☐ Once properly connected and activated you can use the ValVue *Check* tab *Raw Position* data to ensure the proper minimum and maximum positions are achieved.
- ☐ Check for correct resistance readings by:
 1. Disconnecting the cable from RPS to SVI II AP entirely.
 2. Attaching Ohm meter clips on red and brown RPS terminals. Correct Ohm reading range: Between $1150 \pm 50 \Omega$ minimum and $1750 \pm 100 \Omega$ maximum.



Note: Note the orientation of the drawing and adjust as necessary if your orientation differs.

How to Check Raw Values

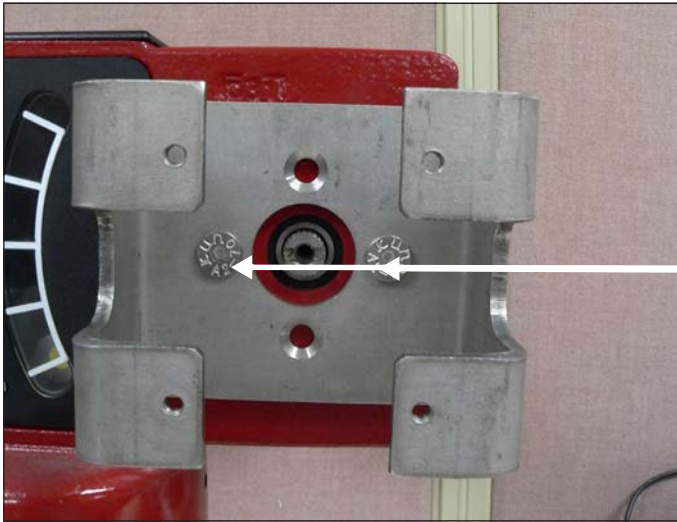
Raw values can be checked using the SVI II AP *Check* tab or the SVI FF DTM *Calibration Find Stops* tab.

When using a handheld, navigate to:

- SVI II AP: Online > Status/Diagnostics > Sensor Measurements > Raw Sensor Data > Raw Sensor Count
- SVI FF: Custom > Status/Diagnostics > Sensor Measurements > Raw Sensor Value: RAW_POSITION

Tools required:

- Adjustable wrench
- Blade screwdriver
- 3 mm, 6 mm and 3/16 inch hex keys
- 7/16 inch nut driver



Use a 3/16 inch hex key to install the mounting plate using the two flat head socket screws 5/16 inch-18UNC, 0.62 inch Long.

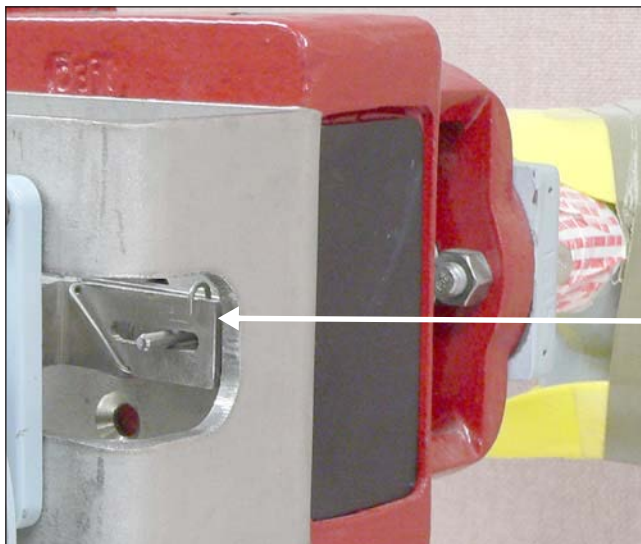
Figure 14 Attach Mounting Bracket to Valve



Figure 15 Attach Valve Side Lever to Valve

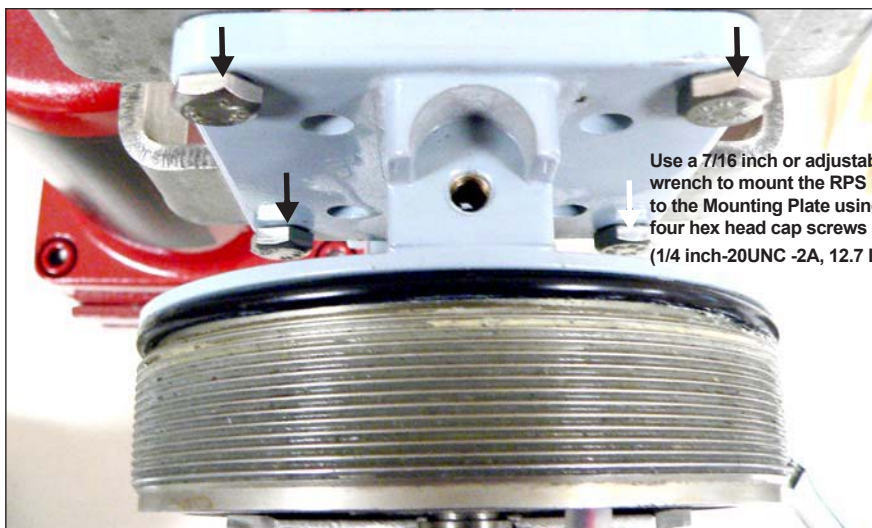


Figure 16 RPS Side Lever



Position the RPS unit with the conduit down in front of the valve side lever. Pull up the anti-backlash spring and slide the pin on the valve side lever into the slot on the RPS side lever.

Figure 17 Insert RPS Assembly into RPS Side Lever



Use a 7/16 inch or adjustable wrench to mount the RPS unit to the Mounting Plate using the four hex head cap screws (1/4 inch-20UNC -2A, 12.7 L).

Figure 18 Attach the RPS to the Mounting Plate



Figure 19 Connect Wires

CAUTION

Do not exceed 30 m (98 Feet) in wiring to the RPS to an SVI unit. Contact Masoneilan for assistance beyond 30 m.

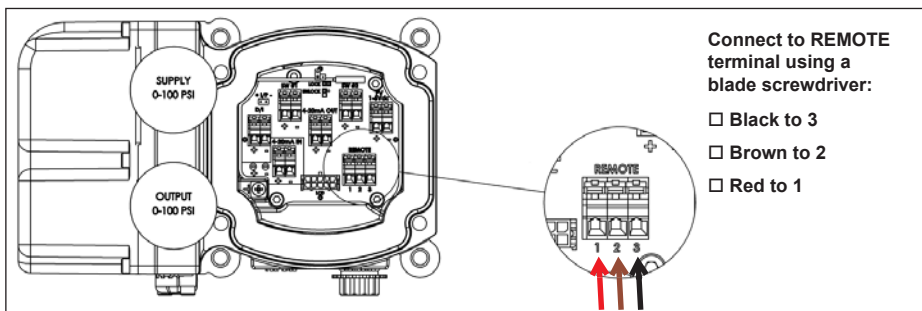
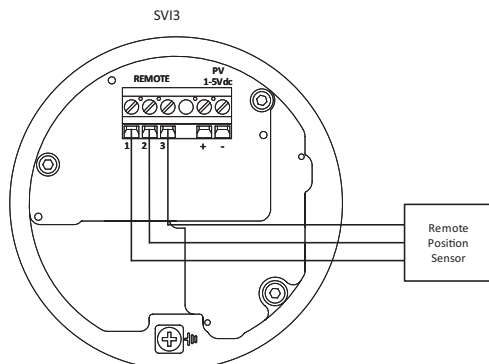


Figure 20 SVI II AP Connections



Remote Position Sensor Input Connections for SVI3

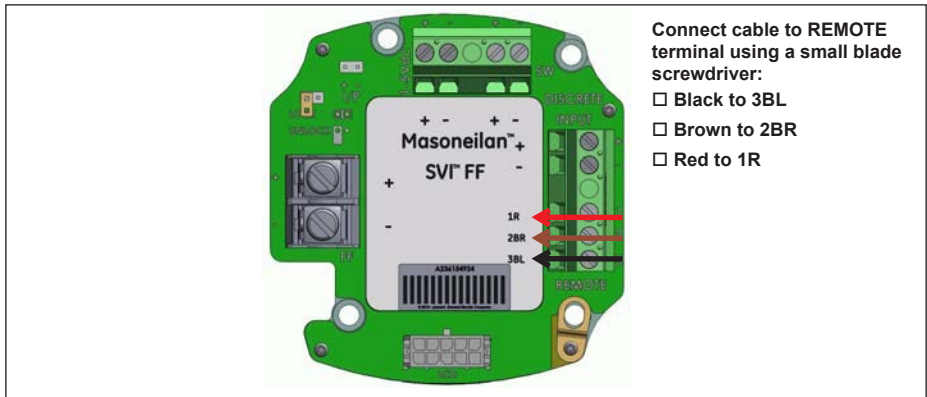
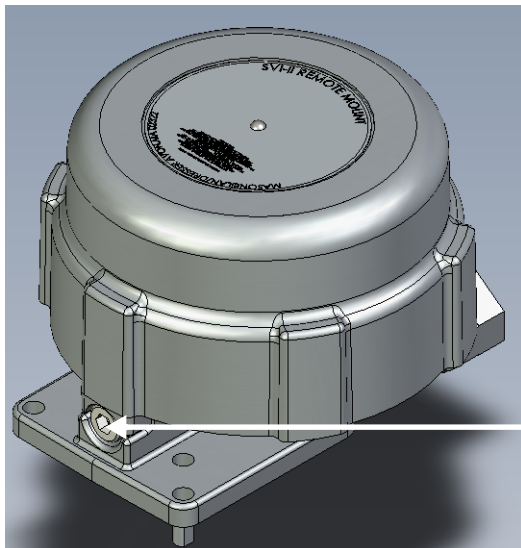


Figure 21 SVI FF Connections



1. Screw the cover on.
2. Use an 6mm hex key to tighten the locking screw.

Locking screw

Figure 22 Assemble Cover onto RPS Unit

Configuring for SVI II AP and SVI3

Configuring the SVI II for Remote Position Sensing

After the Remote Position Sensor is installed and cabled to the SVI positioner, the SVI positioner needs to be configured so that valve position is sensed by Remote Position Sensor.

Use this tab to configure the position sensor as either build-in or remote position.

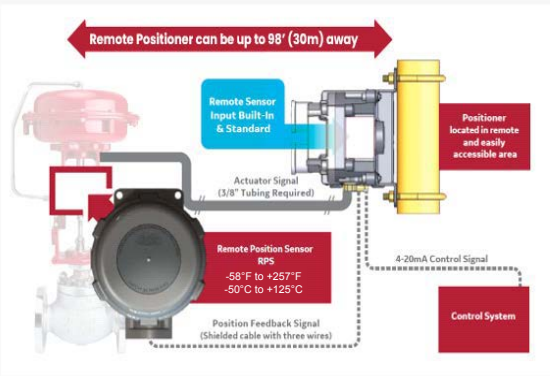
For Remote Position Sensor or Analog PV Remote Sensor, it is a remotely mounted position-sensing device, that can be connected electrically to a digital valve positioner or other suitable field device. It is used as position feedback in applications where direct mounting of a positioner to a valve actuator is not practical due, typically but not limited to, extreme vibration, heat or radiation.

I/O Configuration

← ↓ →

Input Signal | Pressure Sensors | Position Sensor | AO Output | Digital Switches | LCD

Position Sensor  Remote Position Sensor



The diagram illustrates the remote position sensing setup. A red valve actuator is connected to a grey positioner. A red box labeled 'Remote Position Sensor RPS' is connected to the positioner via a 'Position Feedback Signal (Shielded cable with three wires)'. The RPS box specifies a temperature range of '-58°F to +257°F' and '-50°C to +125°C'. A blue box labeled 'Remote Sensor Input Built-In & Standard' is connected to the positioner via an 'Actuator Signal (3/8" Tubing Required)'. A red box labeled 'Positioner located in remote and easily accessible area' is connected to the positioner. A red box labeled 'Control System' is connected to the positioner via a '4-20mA Control Signal'. A red arrow at the top indicates 'Remote Positioner can be up to 98' (30m) away'.

Advanced Setup: I/O Configuration: Position Sensor

Note: The Remote Position Sensor is allowed only if the Options module is physically present and licensed.

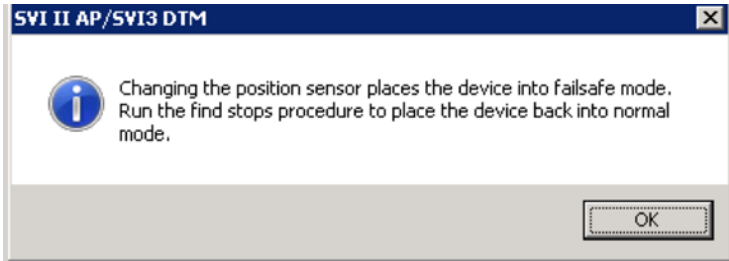
You must run a Find Stops and Autotune procedure after setting up the Remote Position Sensor. Refer to SVI II AP or SVI3 DTM help manual for further instructions.

Buttons and Fields

Position Sensor A pulldown list for selecting the position sensor type: *Internal Position Sensor*, *Remote Position* or *PV Analog Position Sensor*.

Set Position Sensor

1. Ensure the SVI3 is in Setup mode.
2. Use the position sensor pulldown to select: Internal Position Sensor, Remote Position or PV Analog Position Sensor.
A warning dialog appears.



Warning Dialog

3. Click  to download to the device.

Configuring for SVI FF

Configuring the SVI FF for Remote Position Sensing: SVI FF DTM

Refer to the Masoneilan SVI FF Advanced Performance Digital Positioner Bench Quick Start Instruction Manual (P/N 720036097-888-0000, Ref. 31457) for steps 1, 3 and 4. This manual can be downloaded at:

<https://valves.bakerhughes.com/resource-center>

Steps include:

1. Open ValVue3, open the SVI FF DTM and connect.
2. "Configure for the Remote Position Sensor" on page 26.
3. Run Find Stops and optionally perform Open Stops Adjustments. Refer to SVI FF help or help print manual, which is installed with the SVI FF DTM.
4. Perform Autotune. Refer to SVI FF help or help print manual, which is installed with the SVI FF DTM.

Configure for the Remote Position Sensor

Figure 24 shows the SVI FF DTM with some key areas highlighted. For more detail, refer to the on-line help.

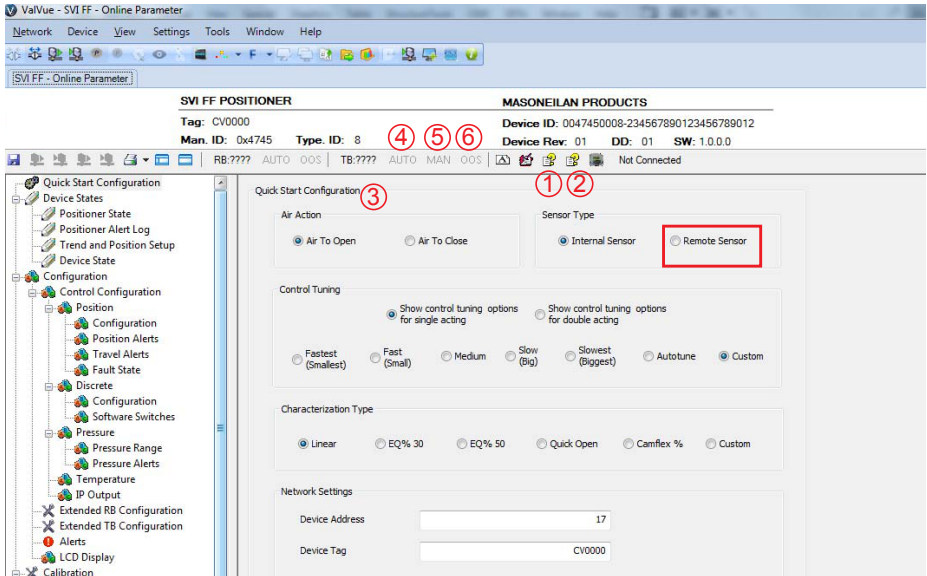


Figure 24 SVI FF DTM

1. Select **Quick Start Configuration** and the *Quick Start Configuration* (3) tab appears. Click **Remote Sensor**. Red box in Figure 24.
2. Click **OOS** on toolbar to switch to *Out of Service* mode (6) in Figure 24).



WARNING Positioner output is de-energized.

3. Click the **Download Selected Tabs** icon ().
4. Click **Man** on the toolbar to switch to *Manual* mode (5) in Figure 24).
5. Optionally, view and clear all positioner state faults.
6. Run Find Stops.
7. Run Autotune.

Configure for the Remote Position Sensor: Handheld

This section gives a general procedure for configuring the RPS using the Emerson 475 handheld and blocks. Refer to the Emerson 475 Handheld Guide for Masoneilan SVI FF Digital Valve Positioner or the Masoneilan SVI FF Digital Positioner Advanced Performance Installation and Operation Manual (download at <https://valves.bakerhughes.com/resource-center>).

Blocks via DCS

1. Set the Transducer block to **OOS**.
2. Set **Accessory** > **Remote Sensor** to 1.



Positioner output is de-energized.

3. Download the change.
4. Set the Transducer block to **Manual**.
5. Run Find Stops.
6. Run Autoune.
7. Set the Transducer block to **AUTO**.
8. Optionally, view and clear all positioner state faults.

Emerson 475 Notes

Emerson has added a menu item to the Masoneilan SVI FF DD called *All*. You can use this command to access a menu item to activate the Remote Position Sensor.

1. Select **Menu** > **Online** > choose the required **Device Tag** > **TB** > **All**.

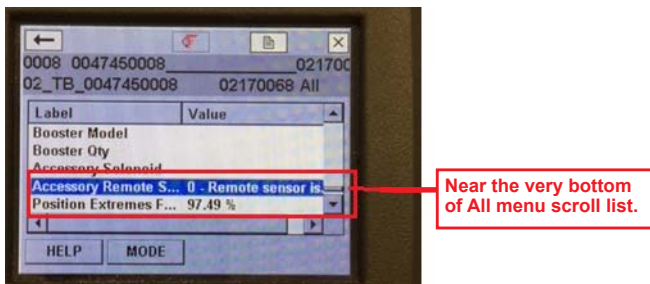


Figure 25 All Menu

2. Cursor down the list and near the bottom tap on the command in Figure 25 and Figure 26 appears.



Figure 26 Choose Remote Sensor

3. Use the down arrow to choose item **3. Enable Remote Sensor**. Tap **OK** and the **All** menu reappears (Figure 27).

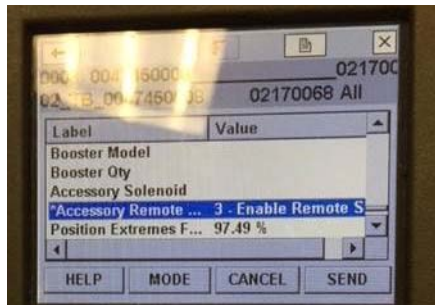


Figure 27 All Menu: Send

4. Confirm SVIFF has been configured for Remote Sensor by using the NI Dialog Utility to view the **Accessory Remote_Sensor** setting (Figure 28).

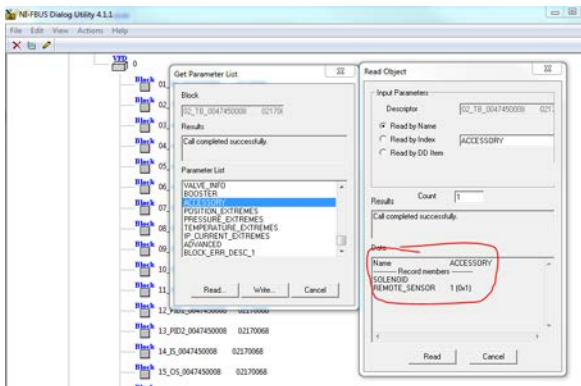


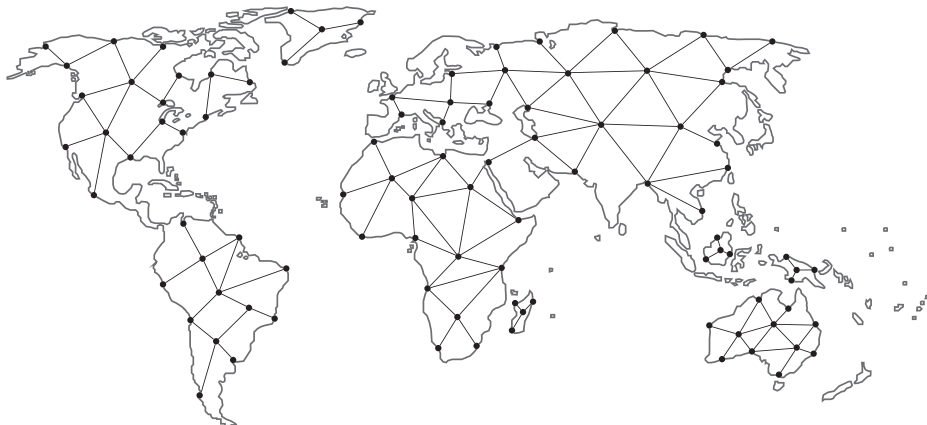
Figure 28 NI Dialog

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