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Sypris Sig-Tech® Pig Signaler Installation and Operation Manual

Spare Parts Store

⚠Caution:
Installing a pig signaler can be a hazardous activity and certain precautions should be exercised. Proper installation and maintenance of Sypris Sig-Tech® pig signaler has a direct bearing on the safety of the operator. All instructions should be read carefully by personnel engaged in installation, operation, and maintenance.

Sypris Sig-Tech® pig signaler is designed so that the plug and O-ring are the only pressure containing parts. Proper containment of pressure to the full pressure rating depends on the installation of the PTFE back up ring for 3302 psi design pressure (DP).

The purchaser of this equipment is responsible for how this equipment is used and the training and competence of each operator using the product. Contact Sypris Technologies, Tube Turns Products for any additional training required.

Should there be any issues with installation, please contact Sypris Technologies, Tube Turns Products immediately. The information contained herein is based on data and information developed in the laboratories of Sypris Technologies (‘Seller”), but is presented without guarantee or warranty, and the seller disclaims any liability incurred from the use thereof. Nothing contained herein is to be construed as a recommendation for any use, including, without limitation, any use in a commercial process not controlled by seller, nor for a use which is in violation of any existing patent, foreign or domestic or of applicable laws and regulations. Tube Turns® is a trademark of Sypris Technologies, Inc.

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1.0 Purpose:

The purpose of this manual is to instruct a properly trained and qualified field service technician how to safely and properly install, troubleshoot a Sypris Technologies, Tube Turns Products Sig-Tech® pig signaler.

2.0 Background:

When a Sig-Tech® pig signaler is built, it is built and functionally tested so that the signaler flag opens and closes easily and properly. The Sig-Tech® pig signaler is designed to work under full design pressure and detect cast polyurethane pigs and spherical type pigs.

The Sig-Tech® pig signaler trigger protrudes into the pipeline media by being attached via the threaded boss fitting. The signaler is available in multiple indication types, flag, electrical, flag/electrical and GPS models. The signaler is designed such that it is corrosion resistant and can be seen over a long distance. All applicable items are constructed of a durable 316SS or other corrosion resistant materials.

3.0 Safety:

Proper care must be taken to protect yourself as well as those in the area from potential hazards created by servicing a pressurized vessel/pipeline and working with heavy parts and tools. Safety equipment such as safety shoes with non-slip soles, safety glasses, gloves, and coveralls appropriate for the service environment must be worn at all times. Fire protection equipment may also be required. When in doubt, consult the safety coordinator at the installation for appropriate safety equipment including breathing protection (respirator) when required.

⚠ WARNING	⚠ CAUTION
WARNING – **Hazards or unsafe practices which could result in severe personal injury or death and damage to the equipment.**	*CAUTION – Hazards or unsafe practices which could result in minor personal injury or product or property damage*.

3.1 Pressurized Line Installation

⚠ WARNING Ensure the safety features and operating procedures of hot tapping equipment is understood and trained for use on equipment. Do not attempt to make a tap or set a plug assembly without having a complete understanding of the drilling machine and of the hazards of working on pressurized “hot” lines.

3.2 Personal Protective Equipment (PPE)

⚠ WARNING Appropriate PPE is recommended whenever working around machinery. Follow installers company requirements for PPE needs and requirements. Minimum Suggestions are: hard hat, gloves, safety goggles, safety shoes, FR rated clothing to cover exposed areas of skin, hearing protection, and the appropriate breathing apparatus when the potential for toxic atmosphere exists. All suggested equipment is taken at operators own risk. A proper hazard analysis should be conducted before installing any pressurized equipment and all hazards should be understood and prepared for before initiating any work.

4.0 Installation

This section will contain the necessary steps to install the Sig-Tech® pig signaler on a pipeline with and without pressure. Section 4.1 will contain instruction for non-pressurized installation and 4.2 will contain details for pressurized installation. The Sig-Tech® pig signaler is shipped fully assembled.

Note: *Before attempting to install the Sig-Tech® pig signaler ensure that all items needed for installation are available. Ensure that the signaler is working as it should by depressing the trigger and make sure the flag operates as intended. Disassemble the indicator from the boss and remove the plug assembly from the boss.*

⚠ CAUTION *Be aware of all moving parts, pinch points, and other potential hazards while handling the Sig-Tech® pig signaler including dropping of the product while actuating the trigger.*

4.1 Non-Pressurized Plug Assembly Installation

4.1.1 The Sig-Tech® boss can be installed over a pre-cut hole, 1-7/16” to 1-1/2” (36.5mm – 38.0mm). Alternatively, the hole can be cut using a drilling machine using a 1-7/16” to 1-1/2” (36.5mm – 38.0mm) drill bit with the boss installed. The hole in the pipe must be concentric to the boss within 1/64” (0.4mm). No part of the boss should penetrate the pipe. Ensure the wall thickness, root gap and length of the boss do not exceed the required length for proper plug installation. If additional reinforcement is required contact factory for additional options. The boss should be welded using only an approved/ appropriate weld procedure for connecting to pipe. **See MTR provided**.

4.1.2 After the boss is welded to the proper sized hole, clean the assembly from any weld slag and clean threads from any debris from the weld process using an appropriate solvent.

4.1.3 Utilize an appropriate thread lubricant on the internal boss threads.

4.1.4 Lubricate the plug assembly O-ring with a PTFE based grease and thread the plug assembly into the boss, being careful not to cross thread or damage threads. If damaged, repair thread and try again.

4.1.5 Use a 3/4" ratchet or square drive wrench to tighten the plug into the boss. As the plug assembly is threaded it will become more difficult to tighten as the O-ring is compressed into the boss. Tighten the plug assembly until the plug contacts the physical stop in the boss.
Note: *As a check the plug assembly should sit 5/8” (16mm) above the top of the boss.*

4.2 Pressurized Plug Assembly Installation

4.2.1 ⚠ WARNING **Use established weld procedure when welding the boss to the pipe. Incorrect welding can cause a rupture in the pipeline during or after welding.**

4.2.2 The Sig-Tech® boss will be welded on the pipe using an approved/ established weld procedure. **See MTR provided for material**.

4.2.3 Once welding is completed, clean the internal and external threads of the boss to prevent thread damage during plug assembly installation. Inspect the internals of the base of the boss to the pipe and ensure there is not weld slag or spatter and remove if any is present.

4.2.4 Ensure the weld has cooled before beginning tapping process.

4.2.5 ⚠ CAUTION *If tapping machine is using a threaded ball valve do not over tighten. Over tightening will reduce the ID of the boss and prevent the Sig-Tech® plug assembly from being installed.*

4.2.6 The hole can be cut using a 2” tapping machine using a 1-7/16” to 1-1/2” (36.5mm – 38.0mm) drill bit with the boss installed. The hole in the pipe must be concentric to the weld boss within 1/64” (0.4mm). No part of the

boss should penetrate the pipe. If additional reinforcement is required contact factory for additional options. The boss should be welded using only an approved/ appropriate weld procedure for connecting to pipe. See MTR provided.

4.2.7 **For All Valves:** Before attaching the valve insert brass plug into internal threads to help keep from distorting internal threads. Remove after valve is installed and make sure it threads out easily. Before installing tapping machine, check the boss for any distortion by running dummy plug or gauge tool down into boss without an O-ring. If it will not begin threading into the boss, then there may be some distortion on the boss and will need to be repaired before moving forward.

4.2.7.1 **Threaded Valves:** Through bore of 2-1/16” (52.4mm) required for plug assembly to pass though the valve. Must be rated equal to or greater than line pressure.

4.2.7.2 **Flanged Valves:** Through bore of 2-1/16” (52.4mm) for plug assembly to pass through the valve. Flange faces and pressures must match what was installed in the line. Gasket must not interfere with 2-1/16” (52.4mm) ID. Utilize new gaskets and seals

.

4.2.8 For most tapping machines, there is a measurement process that needs to be followed. It is good practice to measure from the top of the boss to the top of the valve.

⚠ WARNING **Follow IOM for preferred tapping machine for hot tapping process. If not properly trained on equipment, injury or death can occur.**

4.2.9 After hot tap is complete block in the valve and bleed pressure off tapping machine. Following tapping machine recommended pressure release procedure. Install 3/4” square plug holder onto tapping machine and install as directed by your tapping machine manufacture’s recommendations, typically held with D-clip in most cases. The spring ball in the plug holder must seat into plug assembly hole. There should be space between plug holder shoulder and plug assembly.

4.2.10 Inspect O-ring, back-up ring, and threads before installation and ensure no damage has been done. Repair if damage is found.

⚠ WARNING **If damaged O-ring is installed it can create a dangerous atmosphere by leaking gas and/or liquid which could result in injury or death.**

4.2.11 Lubricate the plug assembly O-ring with a silicon-based grease and use a light thread lubricant on plug threads, ensuring there is no build up.

4.2.12 Utilizing the IOM for the preferred tapping machine equipment, ensure there is clearance for the Sig-Tech® plug body to recess far enough to clear the valve ball surface. Best practice is to be fully recessed inside machine adapter tube.

4.2.13 When calculating the installation. Utilize the following measurements:

1. Base of the boss internal thread to the top of the boss: 5/8” (16mm)
2. Dimension taken earlier; Top of the boss to top of valve: _____”
3. Top of the valve to the base of the plug body threads: _____”
4. The added total will be the total movement of the tool. _____”

4.2.14 When calculations are complete follow procedures for operation of the tapping machine to install the Sig-Tech® plug assembly being careful to not damage the threads. Do not over tighten, as there is a physical stop. Depth should equal measurements.

Note: If pressure exists on the drilling machine after installation, it is an indication it is not fully seated or there is a damaged O-ring. The solution is to remove the signaler and inspect the plug.

4.2.15 Once installed remove tapping equipment and inspect installation and ensure there are no small leaks.

Note: *As a check, the plug assembly should sit* 5/8” (16mm) *above the top of the boss.*

4.3 Indicator Assembly Installation

4.3.1 Identify the 4 set screws provided with the Sig-Tech® Indicator Assembly. These 4 set screws will have a PTFE coated tip to prevent damage to the boss thread.

Note: *1/8” Allen wrench is needed for this process.*

4.3.2 Lubricate exterior boss threads with a silicon-based grease or thread protector oil, to protect threads over time as they should not be painted.

4.3.3 Open flag on indicator if not already raised.

⚠ CAUTION *Exercise caution to avoid pinch points and other potential hazards.*

4.3.4 Set indicator assembly onto top of the Sig-Tech® plug assembly and ensure it is fully seated. There should be a metallic interaction on the top of plug to the interior top of the indicator. There should not be any threads showing at the base of the indicator.

Note: *Close flag and ensure it will latch. If there is trouble latching. The Indicator Assembly may not be seated properly.*

⚠ CAUTION *If in a location of potential freezing it is good practice to place a small amount of glycol inside the plug cavity to prevent water freezing the magnet due to condensation build up. The product will be inoperable until thawed.*

4.3.5 Once confirmed proper seating of the Sig-Tech® Indicator, face the flag opening direction to the most desirable direction. Tighten the 4 set screws evenly to keep from binding the magnet. When all have been seated, tighten each another 1/4 to 1/2 turn.

Note: *Over tightening can damage boss threads and make the set screws not function as intended.*

5.0 Maintenance

Do not attempt to remove Sig-Tech® signaler plug assembly for maintenance while still under pressure, unless using the proper procedure and tools for removal.

5.1 General Maintenance

While the Sig-Tech® pig signaler is designed for an extended life cycle, and mostly maintenance free. With all things, routine inspection is always recommended.

- 5.1.1 Cleaning the Sig-Tech® pig signaler of dirt and debris is a good way to keep the signaler in great working condition. This is also a good chance to inspect for any leakage or damage to components.
- 5.1.2 Standard O-ring material is FKM, but other options are available, if needed to be changed review installation date and part number to ensure correct material is installed for the application. O-ring life will be dependent on product exposure and can vary product to product.
- 5.1.3 If damage to flag or other items, please refer to manufacturer for repair or new component supply.
- 5.1.4 When removing the Indicator by loosening the set screws, it is recommended to replace the 4 set screws with nylon tipped sets screws.