

CD42-STS Operating Manual
Diver/ROV Pipeline Pig
Location & Tracking System

Manufactured By:



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INTRODUCTION

This instruction manual explains step by step how to operate the CD42-STS Diver/ROV pipeline pig location and tracking system. Included as well are some generic methods of tracking and locating pigs in a pipeline using magnetic-based tracking equipment.

OVERVIEW

The CD42-STS receiver is used to display the pulses of magnetic transmitters in an underwater pipeline to the operator. By locating and tracking these pulses one can know where in the pipeline a pig or pigs are.

NOTE

When the CD42-STS receiver is used in conjunction with an ROV, the thruster motors will create large magnetic fields that will interfere with the operation of the CD42-STS receiver. It may be necessary to park the ROV periodically to create a quiet magnetic environment for this system. This is an unavoidable side-effect of all magnetics-based pig location and tracking systems.

SPECIFICATIONS

- APPROXIMATE WEIGHT: 42 pounds
- LENGTH: 36.5 inches
- CERTIFIED DEPTH IN SALT WATER: 8000 feet
- PRESSURE RATING: 3560 psig
- BATTERY TYPE: 6 Alkaline D-Cell
- DISPLAY: LED Indicator

UNPACKING

PHYSICAL CHECKS

The CD42-STS receiver is assembled at CDI and should be ready for operation upon receipt. The batteries are installed and the unit is sealed and tested before the unit is packaged for shipment.

Check for any damage to the CD42-STS receiver after removal from the shipping container. Check the antenna for any bends, dents or deformities.

OPERATIONAL CHECKS

When the unit is first powered on, the display will self check by scroll flashing the LEDs from both ends of the display scale. When the light show is complete the display will indicate the last gain setting stored in the memory by flashing 3 times before going steady on. The gain readout will remain on for 3 seconds then the display will go dark. The CD42-STS receiver is now in the operational mode. To verify the unit is operating, jar the antenna with your hand. The display will light to confirm it is operating.

ANTENNA

CONSTRUCTION

The antenna on the CD42-STS receiver is 26.4 inches long and is made of stainless steel with a solid core. This is what allows it to withstand the salt-water pressure to the depths of 8000 ft. The antenna is sealed to the receiver body with an "O" Ring seal and the bolts are tightened to a specified torque setting. **Do not remove the antenna from the housing end cap assembly.**

ANTENNA OPERATION

The receiver signal strength is directly affected by the orientation of the receiver's antenna to the transmitter attached to the pig. The transmitter attached to the pig is positioned parallel to the pipe wall when the pig is running in the pipe. If the receiver antenna is placed perpendicular to the transmitter antenna, there will be minimal signal coupling between the transmitter antenna and the receiver antenna. Therefore there will be little or no signal observed on the LED indicator of the CD42-STS receiver.

To gain maximum coupling between the transmitter antenna and the receiver antenna the CD42-STS receiver antenna must maintain a parallel orientation to the pipe wall (transmitter antenna). This positioning will give the operator the best signal for tracking and locating the pig.

OPERATION

ON /OFF

To power the CD42-STC receiver up, insert the power jumper into the connector receptacle on the operator end of the unit. Verify the jumper plug is lined up properly. There is one pin in the jumper that is larger than the others. This pin will not allow the jumper to be inserted if it is not lined up with its mating socket. After the jumper is inserted, thread the cover onto the receptacle. Secure the cover **by hand** only.

When the unit is first powered on, the display will be dark for about 3 seconds then the system will perform a system self check by scroll flashing the LEDs from both ends of the display scale. When the light show is complete the display will indicate the last gain setting stored in the memory by flashing 3 times before going steady on. The gain readout will remain on for 3 seconds then the display will go dark. The CD42-STC receiver is now in the operational mode. To verify the unit is operating, jar the antenna with your hand. The display will light to confirm it is operating.

GAIN

Pressing the control button at the operator end of the receiver momentarily will display the current setting of the gain control.

To increase the signal gain on the CD42-STC receiver after the unit is operating, press and hold the control button. The gain will be displayed and start to increase after approximately 3 seconds. The gain will increment from left to right as the gain increases. Release the button and observe the signal levels on the display to view the change in gain effects.

Each increment will be set in 1.25-second intervals. After the gain control reaches the full-scale position it will cycle to the zero gain position and start to increase again while the control button is held down.

The zero position has no LEDs lit. In position 1, 2, and 3 there is very little gain and therefore the signal level may not be enough to give a good display indication.

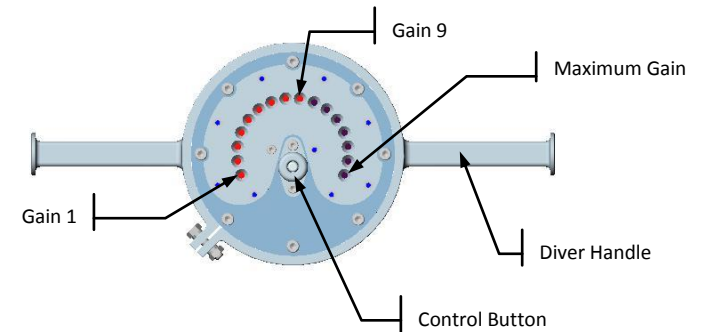


Figure 1 – The Controls

The gain is stored in non-volatile memory. This will hold the current gain control setting after the CD42-STC receiver is powered down and while the batteries are removed. When the unit is powered back up this gain setting will be displayed in the power up sequence.

READ OUT

The operator read out is a 16-LED display read from left to right with the minimum to the left and the maximum to the right. The behavior of the LEDs simulates the movement of a needle meter. The display contains a peak hold indication whereby an LED will light to indicate the maximum averaged signal received by the CD42-STC receiver. As the signal level increases (or the transmitter gets closer) the peak LED will light and shift to the right and as the signal diminishes the peak LED will shift to the left. The LED indicators that are below the peak LED will pulse to indicate the pulses received by the transmitter.

TRACKING A PIG

Normally an operator monitors a pig's progress with a signal receiver (CD42-STS receiver). In this process the operator sets up with the antenna parallel to the pipeline in a location where he knows the pig will pass.

As the pig approaches the signal will increase in strength, the pulses will get stronger, and the peak LED will shift to the right in accordance.

After the pig passage the operator moves quickly to the next predetermined spot to wait and monitor the signal for the approach of the pig.

LOCATING A PIG

Being able to locate accurately a stuck pig in a pipeline is probably more important than being able to track one. The best way to minimize the amount of searching for a stuck pig is for the operator to properly track the pig in the pipeline.

If the pig does stick in a pipeline and the operator knows the last confirmed tracking location, then all the operator has to do is backtrack the pipeline until the receiver reads the signal.

With the antenna held parallel to the pipeline as the operator progresses along the pipeline, the peak signal indicator will shift right as the operator approaches the stuck pig. If the peak signal starts to diminish in strength (peak shifts to the left) the operator has passed the stuck pig.

BATTERY REPLACEMENT

TYPE

The battery type installed in the CD42-STS receiver when shipped is an industrial alkaline based 1.5 VDC "D" Cell. This piece of equipment requires six (6) each "D" Cells

These batteries give the best performance for this application. It is recommended that if necessary to replace them they should be replaced with the same type.

REMOVAL

To remove the batteries; remove the eight (8) socket head cap screws (1/4 X 20 X 5/8) and the eight (8) split lock washers from the operator end of the housing (opposite the antenna end). Note the orientation of the end cap to the antenna positioning.

CAUTION: Be careful not to damage the "O" Ring under the plate and do not bump or drop the end plate. There is a circuit board attached to the back of the end plate. The end plate is heavier than it looks.

There is a ribbon cable connected to the circuit board mounted to the end cap. Disconnect the ribbon cable by unlocking the connector end locks. Observe the orientation of the connector.

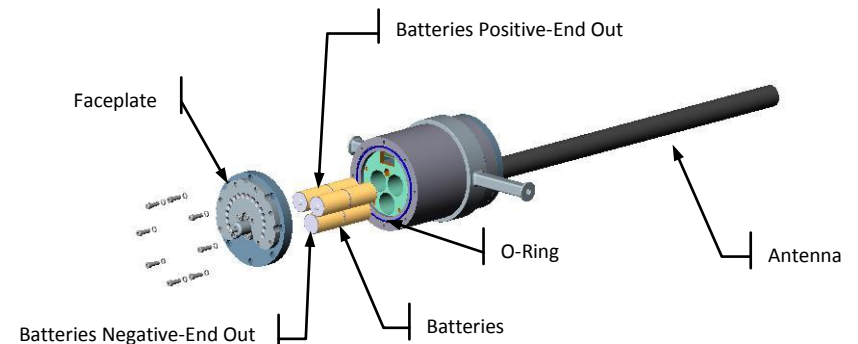


Figure 2 - Battery Replacement

Slide the batteries out of the aluminum interior body. Note the orientation of the batteries in the aluminum body.

REPLACEMENT

Slide the new batteries into the aluminum interior body. Make sure the orientation of the battery polarity is identical to the orientation of the batteries that were removed.

Carefully reconnect the ribbon cable to the circuit board mounted to the end cap. Observing the orientation of the connector. The connector pins can be easily bent. Make sure the connector is locked.

After the new batteries are inserted, inspect the "O" Ring seal for damage. If it has been damaged replace it with a new one ([Parker # 2-222 90] N1059-90). Lubricate the "O" Ring seal with synthetic grease and reinstall it into the housing groove.

Carefully orient the end cap exactly as it was previous to removal. Re-insert the eight (8) socket head cap screws (1/4 X 20 X 5/8) and the eight (8) split lock washers into the end plate mounting holes.

Tighten the cap screws by hand until they are just starting to snug down. Tighten the screws in a cross side pattern in 20-inch pound increments. Continue until the cap screws reach 60-inch pounds torque. After reaching the 60-inch pound level continue the torque pattern and torque to 70-inch pounds. This is the final torque level.

CAUTION: Any deviation from this process will cause water to get into the electronics compartment and damage the CD42-STC receiver.

CONNECTOR INTERFACE

POWER PLUG

The power jumper is a plug with a jumper wire installed across pins 9 and 12. This completes the circuit for battery power to be applied to the electronics of the CD42-STC receiver.

Once the jumper is installed it is important to secure the connector by tightening the metal housing around the connector. Any slack in the connector may cause water to get into the connector pins.

To Install The Jumper Plug Into The Socket: Press the plug into the socket with the alignment tabs aligned with the socket indentation (Marked in orange on the socket and plug). Place the stainless steel cover over the jumper plug and **TIGHTEN BY HAND ONLY.**

REMOTE INTERFACE

For remote surface interface accommodation, a remote plug may be wired. The mating connector for the interface is an "IMPULSE VSK-12-BCL. See drawings #89-02-0039 and #89-11-0016.

The signals and potentials are as follows:

PIN	SIGNAL
1.	D-GROUND
2.	RS-232 TXD (transmit)
3.	A-GROUND
4.	DH485-
5.	D-GROUND
6.	DH485+
7.	+9.6VDC BATTERY VOLTAGE SWITCHED
8.	A RS-232 RXD (receive)
9.	+9.6VDC BATTERY VOLTAGE SWITCHED
10.	N/C
11.	N/C
12.	+9.6VDC BATTERY VOLTAGE UN-SWITCHED