

CD52-A30 & CD52-A45

Subsea Pig Passage Detector and Signaler

USER GUIDE



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The CD52-A30 and CD52-A45 products are covered under United States Patent No. 6,489,771 B1



WARNING



Any operation involving work on pipelines containing gases or liquids under pressure is potentially hazardous. It is necessary, therefore, to follow correct procedures in the use of this equipment to maintain a safe working environment.

No person should use this equipment unless fully aware of potential hazards of working with pressurized pipelines and trained in the procedures stated in this manual.

The purchaser of this equipment is responsible for the training and competence of operators and the manner in which it is used.

Contact CDI immediately should any difficulty arise in the use of this equipment.



WARNING



Always use caution when opening any CDI transmitter that has been in a pressurized environment.

It is possible for pressurized liquid or gas to leak into a transmitter and remain there even after the transmitter has been removed from the pipeline.

Always point the transmitter away from yourself or others when opening a cover or end cap.

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INTRODUCTION

The CD52-A30 & CD52-A45 are non-intrusive subsea pipeline pig passage signalers designed for short-term deployments to depths of 9,842 and 14,763 ft [3,000 and 4,500 m] respectively.

As the only difference between the CD52-A30 and CD52-A45 is their depth of operation, this user guide will use the term “CD52-A30” to address both systems except where otherwise necessary.

The CD52-A30 allows for non-intrusive detection of pipeline pigs equipped with either a permanent magnet or a low frequency electromagnetic transmitter. The CD52-A30 accomplishes this through the use of a proprietary and patented magnetic field antenna array located in its base and attached to (or near to) a pipeline.

Once a pig has been detected, the time and date of a passage are recorded into the memory of the CD52-A30 and displayed for on a LCD User Interface.*

In addition to the most recent pig passage time and date, the CD52-A30 will store times and dates of the previous nine pig passages as well. Therefore, an operator may quickly and easily view the times and dates of the ten most recent pig passages.

POWER OPTIONS

The CD52-A30 is powered by either *two* D-Cell alkaline batteries or *one* D-Cell lithium battery.** The batteries are located in the unit’s stainless steel housing. Changing these batteries requires disassembly of the housing (see pg. 18).

The CD52-A30 will operate for up to five years on a change of batteries.

*The CD52-A30 will actually record and display up to 99 passages on the User Interface (see pg. 9) but time and date information is stored only for the ten most recent passages.

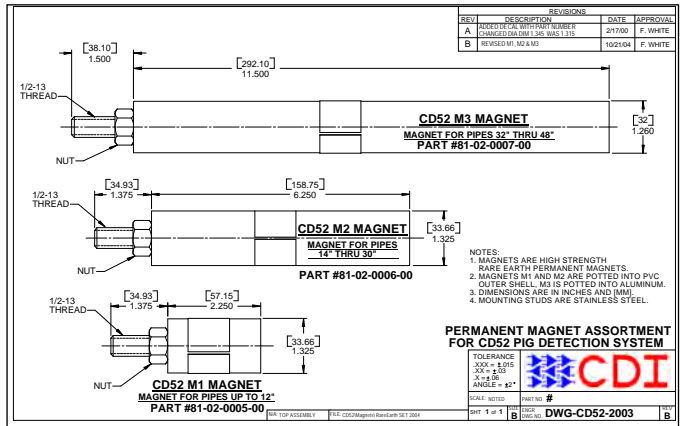
** Lithium batteries are recommended for operation under low temperature—deep water conditions.

DETECTION METHODS

The CD52-A30 is able to detect pig passages via two very distinct methods: permanent magnets and 22 Hz electromagnetic transmitters.

Permanent Magnets

The CD52-A30 can detect rare earth permanent magnets attached to a pipeline pig. Magnets for this purpose are available from CDI for pipeline diameters from 3/4 in. to 60 in. [19 mm to 1524 mm].



NOTE: Where pipe wall thickness exceeds 25.4 mm [1 in.], a custom magnet design may be required. Please consult CDI for an evaluation of deployment options.

Advantages of Permanent Magnets

- Small
- Inexpensive
- Low maintenance
- Batteries are not required

Despite these benefits, because of the permanent magnet's static magnetic field, it may be difficult to locate a pig that is stalled, obstructed, or otherwise immobilized in a pipeline. In these situations, an active (electromagnetic) transmitter is a recommended option.

Electromagnetic Transmitters

The CD52-A30 readily detects active electromagnetic transmitters. CDI offers the largest family of pipeline pig location and tracking transmitters in the industry.

CDI transmitters operate by emitting electromagnetic fields at a very low frequency (between 15 and 30 Hz). This makes them safe and reliable for use in any offshore environment and any pipeline product (water, oil, gas, ammonia, carbon dioxide, etc.).

Many models have the ability to remain dormant until activated by preconfigured pipeline pressure.



CDI T-Series 22 Hz Electromagnetic Transmitters

Another advantage of a CDI active transmitter is the ease of locating an immobilized pig. A stuck pig can easily be detected by following the pipeline from the last known location using a handheld active locator system such as the CD42-STS *Subsea Pig Locating and tracking System*.

It is possible to use both a permanent magnet and a transmitter in the same pig. This will not prevent the CD52-A30 or CD42-STS receiver system from successfully tracking and locating pigs.

Regardless of which type of transmission source you use, the CD52-A30 will detect it.

Advantages of Electromagnetic Transmitters

- Easily located with a handheld device
- Quicker to locate

Disadvantages

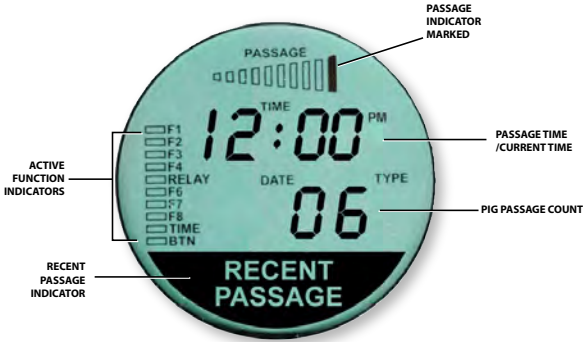
- Higher cost
- Requires batteries
- Maintenance



CDI X-Series Adjustable-frequency Electromagnetic Transmitters

THE USER INTERFACE

The CD52-A30 user interface display contains much information for an operator, yet is quite simple and easy to read.



This display automatically cycles between showing the most recent pig passage time, and the actual real-time every few seconds. This allows the operator to simply approach the CD52-A30 on the pipeline and see the most recent pig passage time, as well as verify that the internal clock is set correctly – all without having to touch the unit.

Passage Time/Current Time



These display segments normally alternate between showing the most recent pig passage's time and the actual real-time as known by the CD52-A30 unit.

During the time that the real-time is displayed the colon will blink and the "TIME" Active Function Indicator segment will be lit.

When the most recent pig passage time is displayed the colon will be static (non-blinking) and the "TIME" Active Function Indicator segment will not be displayed.

Pig Passage Count



The CD52-A30 continually displays the Pig Passage Count (i.e., the number of pig passages that have been detected) instead of the Date. This behavior is desirable

for temporary subsea installations. Up to 99 passages can be recorded and displayed.*

The Pig Passage Count is the number of pig passages that have been detected since the unit was powered on, or since the time of the last Pig Passage Count clear. The Pig Passage Count may be cleared through the use of the *Interface Diver/ROV T-Handle* (see pg. 12).

Recent Passage Indicator



The Recent Pig Passage Indicator Segment is a large segment that consumes most of the lower half of the display area. This segment indicates that a pig passage has been detected recently. The duration and behavior of the Recent Passage Indicator is user-defined.

The Recent Pig Passage Indicator will switch ON when a Pig Passage is detected and will stay on for a period of ONE MINUTE. During this one minute time, the CD52-A30 will not detect additional Pig Passages.

*As previously mentioned, as many as 99 passages can be indicated, time and date information is stored only for the ten most recent passages (see pg. 4).

Remote Indicator System (RIS)



The Remote Indicator System (RIS) consists of four built-in high-luminosity LEDs that, when pig passage occurs, can be seen over distances (approximately 300 ft./100 meters). These LEDs indicate that a Pig Passage has recently occurred.

In addition, the blinking pattern of the LED lights will convey the current Pig Passage Count as indicated on the LCD display.

If one pig has passed, the LEDs will blink (.) one time and there will be a pause () following by another one blink and a pause.

[. _ . _ . _]

If three pigs have passed, the LEDs will blink three times and there will be a pause, followed by another three blinks, etc.

[... _ ... _ ... _ ...]

This blinking duration is user-defined, but by default is 36 hours.

Displayed Passage Indicator

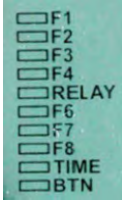


The Displayed Passage Indicator is a cone-shaped array of 10 segments. Each one of these individual segments represents one of the 10 pig passage times that are recorded in the CD52-A30 memory. The larger the segment, the more recent the pig passage represented.

Therefore, the largest segment represents the most-recent pig passage in memory, while the smallest segment represents the oldest recorded pig passage time and date in memory.

In normal default operation the largest segment is marked and the time and date of the most recent pig passage is displayed.

Active Function Indicators



The Active Function Indicators are an array of 10 rectangular LCD segments aligned vertically along the left-hand side of the display. Only some of these segments currently have a purpose, while the others are reserved for future functions and customer requested customizations

The current functions assigned to the Active Function Indicators are:

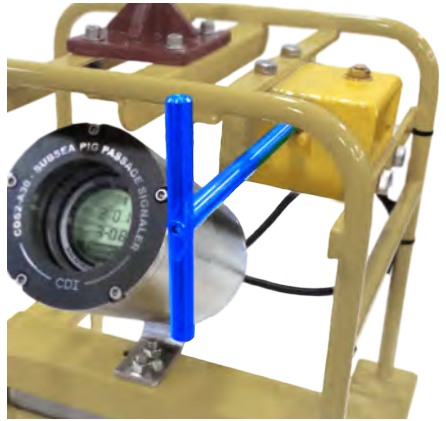
F1	Reserved
F2	Reserved
F3	Reserved
F4	Reserved
RELAY	Internal contact relay engaged*
F6	Reserved
F7	Reserved
F8	Reserved
TIME	Real-time currently displayed
BTN	User Interface Diver/ROV T-Handle currently engaged

* For SCADA and additional external signaling devices such as pingers, xenon flashers, etc. (See pgs. 26-27.)

Interface Diver/ROV T-Handle

The blue T-Handle switch is the user interface switch of the CD52-A30. The primary use of the T-Handle is to clear the Pig Passage Counter, but it is also used to set the clock and to review the passage times of previous detected pigs.

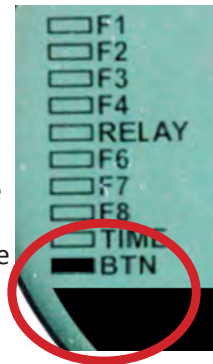
The Diver/ROV T-Handle contains a small magnet that actuates a subsea-compatible switch.



In its disengaged (“relaxed”) position, the blue Diver/ROV T-Handle is vertical. To activate the T-Handle, simply grasp the T-Handle with your hand or ROV manipulator and rotate it clockwise 90 degrees until it is horizontal and hits its stop.

Any time the T-Handle is activated, the “BTN” display segment will confirm contact.

Should the T-Handle of the CD52-A30 become stuck, or engaged for a period of time exceeding 1 minute and 45 seconds, the unit will automatically return to normal operation, disregarding the T-Handle rotation. This insures that the unit will always be able to detect pig passages, even if the T-Handle becomes damaged, vandalized, or simply somehow stuck in the “engaged” position.



Previous Pig Passages

The CD52-A30 user interface is required to review pig passage times other than the most recent one (displayed by default).

Simply grasp the blue Diver/ROV T-Handle and rotate clockwise until it hits its stop. Hold the T-Handle in this position until you notice the BTN LCD segment marked as shown.



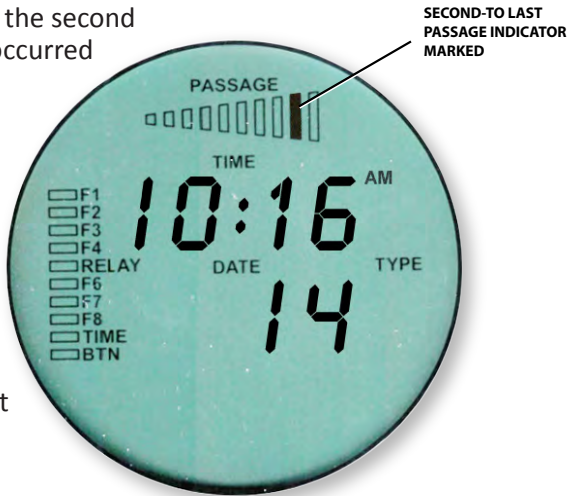
When this segment lights or you count one second, the CD52-A30 is acknowledging that it has received the Diver/ROV T-Handle “button press”. Release the T-Handle back into its disengaged position.

You should now notice a change in the CD52-A30 display as it shows the time of the second most recent pig passage. You will know which pig passage is being displayed to you by again looking at the display of the unit.

If you have followed the steps above successfully, then the CD52-A30 display should look similar to the following after one T-Handle actuation.

This display indicates that the second most-recent pig passage occurred at 10:16 am, and that the current number of pig passage detections is 14.

Repeatedly rotating and releasing the Diver/ROV T-Handle will move you back in time through the recorded pig passages and change the Displayed Passage Indicator segment to the corresponding indicator.



Moving to the oldest passage in memory requires a total of nine (9) Diver/ROV T-Handle activations, after which the Displayed Passage Indicator segments loop back to the first passage.

To exit this mode and return to the normal operating mode of cycling between the most recent passage time and the real (current) time, simply allow the Diver/ROV T-Handle to return to its default position for a period of twenty-five (25) seconds. Normal display cycling will resume.



When a pig passage occurs and is recorded by the CD52-A30, the “Recent Passage” LCD segment begins blinking. This segment, as discussed above blinks for a user-defined period of time which may be many hours.

Additionally, the LED lights within the unit will begin blinking to indicate that a passage has occurred and how many passages have been counted.



You may wish to manually discontinue the blinking of the “Recent Passage” message and LED lights and clear the Pig Passage Counter.

To accomplish this, simply rotate the Diver/ROV T-Handle into the “activated” position and hold it there for a period of approximately five (5) seconds. After approximately five seconds the LED lights will blink a brief pattern to indicated that the Pig Passage Counter has been cleared to zero (0).

In addition, after five seconds you should see that the “Recent Passage” segment extinguishes itself and the LEDs will cease blinking.

Once the segment and lights have extinguished themselves, you may immediately release the T-Handle and the unit will return to normal operation without a recent passage being indicated and with the Pig Passage Count set to zero.

Manually extinguishing the “Recent Passage” message in this way does not affect the stored pig passages. The most recent pig passage time and date will cycle every few seconds, and all previous pig passages will still be available to you by using the user interface.

Setting the Clock

Occasionally it will be necessary to set the Real Time clock inside the CD52-A30 unit. To do so, simply grasp the blue Diver/ROV T-Handle and rotate it into the activated position. Hold the T-Handle in the activated position for a period of twenty (20) or more seconds.

After 20+ seconds you will see most of CD52-A30 display “go blank.” Release the T-Handle, and then briefly rotate and release it one time. You should then be presented with a display that looks similar to the following, depending upon what the unit’s current time is set for.



NOTE: the unit calendar does not automatically compensate for a leap year, so it will be necessary to re-set the unit every February 29 to ensure accuracy.



The CD52-A30 is now prepared to set the hours portion of the clock. To change the hours, simply again rotate the T-Handle to the activated position and hold it there. You should notice that the BTN segment lights and that the hours digits begin to increment at a rate of one hour per second.

Continuing to hold the T-Handle in the activated position will cause the hours to increase until they reach “12”, and then wrap to “1” (The CD52-A30 uses 12-hour, not 24-hour time). Hold the T-Handle in the activated position until the digit reaches the desired hour and then release the Diver/ROV T-Handle. Upon release of the Diver/ROV T-Handle the display will immediately jump to the minutes portion of the time to allow you to set it.

Use the same method to set the minutes that you used to set the hours. Simply rotate and hold the T-Handle to increment the digits, and release to move to the date.

Repeatedly rotating and releasing the T-Handle while in clock set mode causes the clock set mode to cycle through the following clock set options:

1. HOURS
2. MINUTES
3. AM/PM
4. DAY
5. MONTH

To end the clock set mode, simply release the T-Handle. Normal CD52-A30 operation will return in twenty-five (25) seconds and the clock will be set to the time indicated.

CHANGING/INSTALLING BATTERIES

This is the procedure to install or change the batteries in the CD52-A30 subsea pig passage signaler. Please follow them carefully and be mindful that while a fully-assembled CD52 is a very durable piece of equipment, care must be exercised when opened and the electronics must be handled carefully to avoid damage.



DO NOT PERFORM THIS PROCEDURE IN A HAZARDOUS ENVIRONMENT. ENSURE THAT YOU ARE IN A SAFE AND NON-EXPLOSIVE ATMOSPHERE PRIOR TO OPENING.



Disconnect the water-tight subsea cables from the rear of the CD52-A30 system.

One of these cables connects to the T-Handle and the other connects to the patented antennas.



Loosen and prepare to remove the mounting bolts using a 5/16 Allen wrench.



Have an associate hold the pressure vessel when you remove the bolts, as it is quite heavy.



Remove the pressure vessel from the frame.



Place the pressure vessel face down on a table.

Remove the five Allen head bolts which secure the rear of the pressure vessel.



Open the Pressure Release Valve so that you are not fighting a vacuum when opening the container.



Carefully separate the rear of the pressure vessel and lift it free of the can.

Caution: The electronics are attached to the rear of the container and will lift out simultaneously.



Carefully extract the electronics module from the pressure vessel.



Carefully place the attached rear of the pressure vessel on a table.

Clean, padded and/or electrically grounded static-free environments are preferred.



Set the now-empty pressure vessel aside, being careful not to damage the glass window or to allow foreign objects or moisture into the vessel.



DO NOT REMOVE THE WINDOW



Rotate the electronics module until one of the D-Cell battery holders is exposed. Note that the battery should be retained with a reusable black cable-tie.



NOTE: DO NOT CUT OR REMOVE CABLE-TIE





Using small screwdriver or other similar instrument, release the small catch of the cable-tie and allow it to open as shown.



Carefully remove and replace the battery with a fresh D-Cell alkaline or lithium battery.

Once the new battery is in place, re-insert and close the cable-tie to secure the battery in position.



If using alkaline batteries, rotate the unit and repeat the battery replacement process for the second battery. If you have installed a lithium battery, one battery is sufficient and may be installed on either side of the unit (do not install a second lithium battery!).



NOTE: THE CD52-A30 IS DESIGNED TO OPERATE ON EITHER TWO D-CELL ALKALINE BATTERIES OR ONE LITHIUM BATTERY. DO NOT INSTALL TWO LITHIUM BATTERIES.



DO NOT INSTALL ALKALINE AND LITHIUM BATTERIES IN THE SAME UNIT.

Once new batteries are installed, carefully begin the re-insertion process. Lowering the electronics into the pressure vessel.

Pay attention to the orientation of the text on the face with the text on the rear of the unit so that they are matching. This ensures that the text on the face will be upright when the unit is fully reassembled.



Ensure that the Pressure Relieve Valve is open.

When the O-Rings meet the pressure vessel there should be mild resistance.

Place your hands as shown and apply careful, even pressure to the rear of the unit until the O-Rings engage the pressure vessel and the lid lowers into place.



Re-insert and tighten the five Allen head bolts. Torque is not critical but do not over-tighten.



Close pressure relief valve and with a torque wrench tighten it to 75 inch pounds [8.47 N-m]



Reverse the procedure for installing the pressure vessel into the pipeline chassis.

Have an associate assist with this process as maneuvering the heavy pressure vessel can be difficult without help.



Re-insert the Allen head bolts which attach the pressure vessel to the chassis.





Before connecting components, apply Molykote®44 Medium high-temperature grease to all male connector pins and all female connector sockets. Apply sufficient Molykote to completely cover pins and to fill approximately 1/3 socket depth. This should be done at every connection mating and can be done underwater as well as on land or aboard vessel before deployment.



Reconnect the cables. The connections are clearly labeled on the rear of the pressure vessel.

Pay attention to the keying of the pins as they are different.



Tighten the shells of the two connectors. Torque is not important but do not over-tighten.



Review the procedure to ensure that each step has been followed. Pay particular attention to the tightness of the bolts and whether the pressure relief valve has been closed to the proper torque setting.

OPTIONAL EQUIPMENT

ROV Handle

This easily-installed “fishtail” handle is designed for efficient ROV tooling (CDI Part # 943-30-0001-01).



Chrome Duplex Stainless Steel Housing

22/25% chrome duplex stainless steel (CDI Part # 946-18-0002-01).



Acoustic Pinger

A battery-powered acoustic pinger allows remote signaling of a pig passage to any surface-going vessel (CDI Part # 81-03-0073-00)



Hold-down Straps

Ratchet-operated tie-down straps with 1-in. [2.54 cm] wide polyester webbing and stainless steel ratchet mechanism. (CDI Part # CD52-RATSTRAP 91-01-0006-05)



Xenon Flasher

HELIO Xenon Flasher provides greater subsea visibility. (CDI Part # 81-03-0073-00)



Pipe Clip Kit

This pipe saddle is custom-fabricated to mount A30/A45 in lieu of hold-down straps. (CDI Part # 80-10-0131-00; Specify pipe O.D. at time of order)



ROV FISHTAIL HANDLE MOUNTING

Fishtail handles are installed with a set of stainless steel mounting hardware:

CAPSCREW	5/16-18	(4)
FLAT WASHER	5/16	(8)
LOCK WASHER	5/16	(4)
NUT	5/16-18	(4)



1. Mount handle with capscrew, two flat washers, lock washer, and nut at each hole as shown.



2. Tighten with 1/4-in. Allen wrench and 1/2-in. socket.



SUBSEA PIPELINE MOUNTING

The CD52-A30 may be secured to a subsea pipeline with an optional flexible synthetic webbing set.

Required: Two ratchet-operated tie-down straps with 1-in. [2.54 cm] wide polyester webbing and stainless steel ratchet mechanism (CDI Part # CD52-RATSTRAP 91-01-0006-05).



**DO NOT PERFORM THIS PROCEDURE UNLESS YOU ARE
A QUALIFIED DIVER EXPERIENCED IN
UNDERWATER MAINTENANCE OPERATIONS**



1. Ensure the CD52-A30 is properly seated on pipeline.



2. Run webbing around pipe.



3. Thread webbing through ratchet spool.

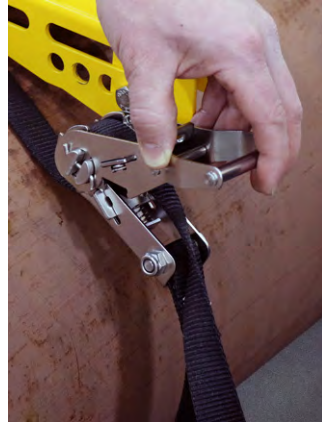


4. Position ratchet so that handle has sufficient clearance for operation.

Pull webbing through ratchet spool to take up slack.



5. Operate ratchet until webbing is snug.



6. Repeat procedure for other side.

Ensure both straps have sufficient tension to secure the CD52-A30.

DO NOT OVER-TIGHTEN



PIPE CLIP INSTALLATION

This optional Pipe Clip is available for in lieu of tie-down straps.



PIPE CLIP KIT*
 (CDI Part # 80-10-0131-00)
 includes four angles, two
 clamp hoops, and stainless
 steel mounting hardware.



BOLTS, HEX HEAD 316SS

7/16-14 X 1 IN	8
1/2-13 X 1-5/8 IN	2

WASHERS, SPLIT LOCK 316SS

7/16-IN	8
1/2-IN	2

WASHERS, PLAIN FLAT 316SS

7/16-IN	16
1/2-IN	4

NUTS, HEX 316SS

7/16-14	8
1/2-13	2



Recommended tools:
 5/8 [16 mm] and 3/4 in.
 [19 mm] socket wrenches
 with extensions.

11/16 [18 mm] and
 3/4 in. [19 mm] box
 wrenches.

*NOTE: Pipe Clip is custom-fabricated for an exact fit. Pipe O.D. must be supplied at time of order.

1. Remove existing pipe bracket legs, if installed. (It may help to set A30/A45 unit on its side for better access.)



2. Insert angles as shown.



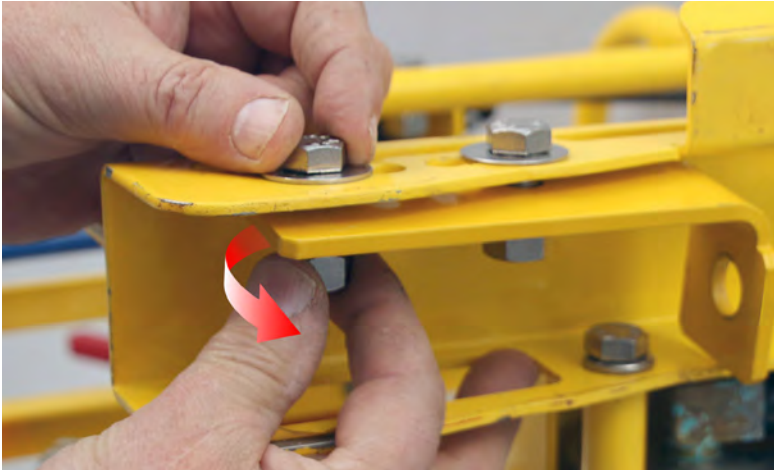
Insert smaller (7/16) bolts and flat washers as shown.



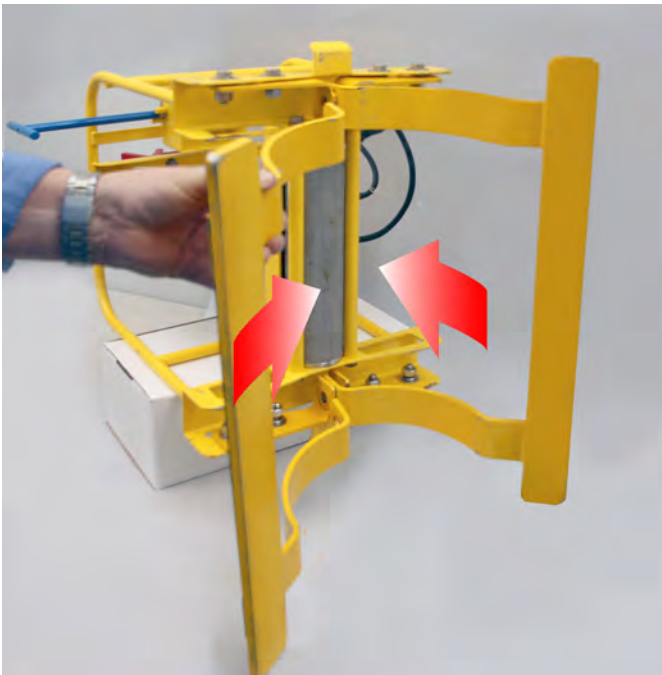
3. Position flat washers and lock washers to other side as shown.



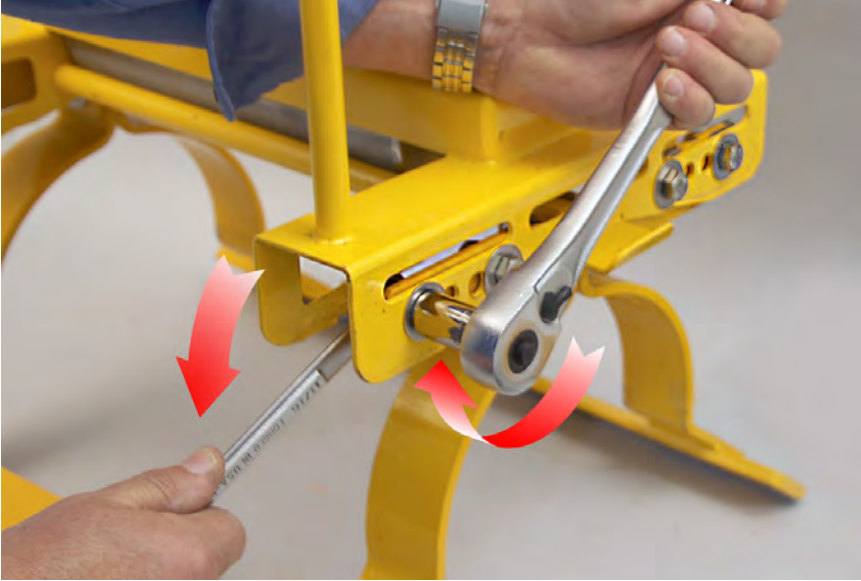
Add nuts. Finger-tighten for now.



4. Position clamp hoops.



6. Tighten all angle bolts.



Your A30/A45 is ready for deployment.



CD52-A30-P ACOUSTIC PINGER SYSTEM

When a pig passage is detected, the A30 internal relay (see pg 11) is closed and the optional CD52-A30-P Acoustic Pinger is activated. It will ping steadily for four hours following passage detection.

The pinger secured to the CD52-A30 frame and connected as shown here:



System Specifications

The CD52A30-P system includes the pinger unit, battery, cabling, and a pinger tracking receiver. The pinger is powered by a 9-volt lithium battery with an approximate lifespan of one full year.

Subsea pinger frequency is 37.5 kHz. Range is approximately three (3) miles [4.8 km] under normal conditions.

Pinger Tracking Receiver

The pinger tracking system includes a variable-frequency active tracking receiver unit, omnidirectional and directional hydrophones, headphones, speakers, and power supply accessories. A predeployment checkout procedure is provided on the following pages. (For specific information about the pinger tracking system itself, see the provided Sonotronics *USR-08 Ultrasonic Active Tracking Receiver Operation Manual*).



System Checkout Procedure

It is highly recommended that you check out the pinger system before deployment.

1. **Power up** the tracking receiver. Attach hydrophone and speaker (or headphones).



2. **Apply water to the pinger unit.** The pinger will operate only when in contact with water, so you must wet the top of the pinger with a moist cloth or paper towel as shown here.



3. **Set receiver for 37.5 kHz** using Mode and Select controls (see *USR-08 Ultrasonic Active Tracking Receiver Operation Manual*). Ensure that the tracking hydrophone is within 4 ft [1.2 m] of the CD52-A30



3. **Trigger the A30 unit.** Simulate a passage by passing a hand-held magnet or transmitter (see pgs. 5–6) along the antenna axis. An audible ping over the speakers or headphones will confirm that the pinger system is ready for deployment.



Warranty

All equipment sold by Control Devices, Incorporated (CDI) is warranted for a period of one (1) year from the date of shipment to Purchaser, providing the instrument or equipment has not been modified, abused, or used for purposes which it was not designed for.

Batteries, probes, leads, magnets, and other consumables subject to wear are not covered by this warranty. CDI will repair or replace faulty equipment during the warranty period when the cause is a defect arising from faulty design, materials or workmanship.

Operating equipment while in a damaged condition nullifies this warranty.

Making a Warranty Claim

Equipment being considered for warranty repair, or a representative sample thereof, must be returned to CDI at the Purchaser's expense. The equipment must be accompanied by the Purchaser's written order* describing the defect(s) and authorizing CDI to invoice the Purchaser for any charges not covered by the warranty.

Upon receipt of the equipment and Purchase Order, CDI will examine the equipment and make a determination of the nature and cause of the defect. If the defect is not covered by the warranty, CDI will quote to Purchaser the cost for replacement or repair equipment, and will not proceed until Purchaser delivers a written acceptance of the quotation.

During the one year warranty, CDI will bear the cost to return units repaired under the warranty back to the Purchaser's domestic premises. CDI will return units to foreign countries at Purchaser's expense.

* Contact CDI at 1-800-580-4234, ext 143 for *CDI RMA Form FM-03-0089*

Care and Maintenance

Equipment designed by CDI is protected against the environment in which it is intended to operate. Much of the equipment is designed for prolonged use in the field without any special maintenance other than routine battery replacements. It is the Purchaser's responsibility to insure that proper precautions are taken during installation and operation so that weather seals are in place, routine maintenance occurs, etc. Failure to perform these operations nullifies this warranty.

CDI equipment should only be operated by qualified personnel who are familiar with any and all manuals and procedures for said equipment's operation.

Service and Repairs

Cost for repairs not covered by the warranty or carried out after the warranty period has expired will be charged at the current hourly or set service rate, plus the cost of materials, upon approval by Purchaser.

Equipment for repair must be sent at the Purchaser's expense and be accompanied by the Purchaser's written order describing the defect and authorizing CDI to invoice the Purchaser for labor, materials and return delivery cost.

No service or repair will be undertaken until an approved written order is received from the Purchaser.

SYSTEM SPECIFICATIONS

Detection Type: Non-Intrusive, Passive Magnetic
 Devices Detected: Any
 Detection Direction: Bi-Directional

Passage Visual Indicator: LCD blinks one hour after passage
 LCD holds steady for next 11 hours
 Auto-Resets at 12 hours
 Xenon Flasher: 36 hrs (default)

Passage Electrical Indicator: Isolated Dry Contact Closure

Detection Speed: 0.01 meter/sec to 20 meter/sec

Power Source: Two alkaline D-Cell batteries
 or one lithium D-Cell battery

Battery Life: Five years (1,825 days)

Enclosure: 316 Stainless Steel
 (22–25% Chrome Duplex Stainless optional)

Pipeline Diameters: 3/4 in. to 60 in. [19 mm to 1524 mm]*

Pipe Wall Thickness: Up to 1.5 in. [38.1 mm]*

CDI Permanent Magnet Applications

<i>Model</i>	<i>Pipeline Diameter in. [mm]</i>
CD52-M0	3/4– 4 [19–101.6]
CD52-M1	4–12 [101.6–304.8]
CD52-M2	14–30 [355.6–762]
CD52-M3	32–48* [812.8–1219]*

Acoustic Pinger Option:

Power Source: 9V lithium battery
 Battery Life: 365 days
 Pulse Rate: One 10 ms ping per second

Xenon Flasher Option:

Power Source: Lithium battery pack
 Battery Life: > 30 days
 Pulse Rate: One flash per second

*** Custom magnet design may be required where pipe wall thickness exceeds 1 in. [25.4 mm] or pipe diameter exceeds 48 in. [1219 mm]. Contact CDI for an evaluation of deployment options.**

ABOUT CDI

CDI is a family-owned and operated business located in Broken Arrow, Oklahoma, just 12 miles from downtown Tulsa. Incorporated in 1982, CDI has proudly been manufacturing products in the United States for more than 32 years. CDI currently employs 45 people in the areas of electronics and mechanical design, software and firmware programming, electronics manufacture, machining, and more.

All CDI products are designed and built completely in-house utilizing an on-premises machine shop boasting six fully-automated CNC machines as well as full-time electronics assembly personnel.

