CANADA TECH

Carrier Tool

Assembly and Service

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Reference Diagrams

I. Introduction Overview

The major purpose of this manual is to inform users on how to use and maintain the Canada Tech Carrier Gauge. The user will find information on assembly, general maintenance. Operation is covered in the Tool Box software manual.

Canada Tech offers a wide range of oilfield related memory devices. Some of these include downhole memory gauges utilizing both peizo-resistive and quartz transducers, surface readout pressure recorders, surface pressure loggers and various products utilized by the slimline / wireline industry. These products have been developed and manufactured to obtain the highest accuracy and resolution in the industry.

A. Components

A complete set of Carrier gauges comes with the following components:

- 2 - Electronics housings
- 2 - Battery housings
- 2 - Bullnoses
- 1 - Maintenance Kit
  (Contains gauge O-rings MOR 12 x 1.5 UP, Backup rings MOR 12 x 1.5 PBU, and V90 2-009 Pressure Port o-rings)
- 20 - ¼" x $^{3}/_{8}$" hex socket head Cap screws
- 6 - ¼" X 5/8" hex socket cap screws
- 1 - Data Download Box (RS232 Serial or USB – customer specific)
- 1 - Data Download Cable (RS232 Serial or USB)
- 1 - USB Drivers Disk (only needed with USB Communications)
- 1 - Interface Power Supply (only needed with RS232 Communications)
- 2 - Gauge Calibration files and Certificates
- 1 - Tool Box Program CD

B. Extra Accessories:

- Pelican Case
- Lithium Batteries
- Battery Tester

Canada Tech software requires an IBM compatible 60 MHz Pentium computer or better, along with Microsoft Windows.

II. Assembly and Installation

1. Ensure the gauge bed on the Carrier and the bottom side of the gauge is free of any debris. Clean the Carrier bed and the Carrier gauge with an aerosol lubricant such as WD40. Make sure that the area around the pressure port is extremely clean as well. See Figure 1.
   WARNING: Do not use any abrasive cleaners! They will scratch the metal surface.

Figure 1

2. The gauge should be programmed and communication tested with the Carrier gauge before bolted into place. This will ensure the gauge is working properly before placing it downhole. (See Tool Box Software Manual for proper programming instructions).

3. Install the 2-009 Viton 90 pressure port o-ring located on the bottom of the gauge electronics housing. A light film of grease will help hold the o-ring in place. See Figure 2.

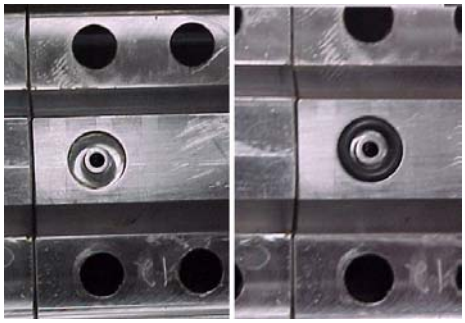

Figure 2

4. Install gauge o-rings MOR 12 x 1.5mm UP and backup rings MOR 12 x 1.5 PBU onto the gauge electronics and battery housing. Notice that the gauge electronics housing allows for two backup rings on either side of the o-ring while on the battery housing only one backup ring is needed on the low pressure side of the o-ring. See Figure 3 & 4.

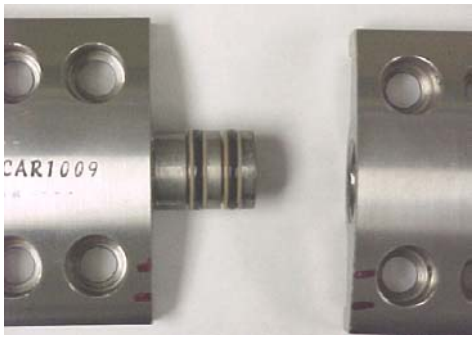

Figure 3

Figure 4

5. Place the gauge squarely in the bed on the Carrier.
   Hint: Use the gauge removal screws (hex cap 1/4" x 5/8") to hold the gauge into place while placing the gauge into the Carrier bed. See Figure 6.

6. Place the ¼" x $^{3}/_{8}$" hex socket head Cap screws into the holes. Start tightening the tool down ¼ turn at a time in a zigzag pattern until snug down to 10ft lbs of torque for grade 5 fasteners. See Figure 5.

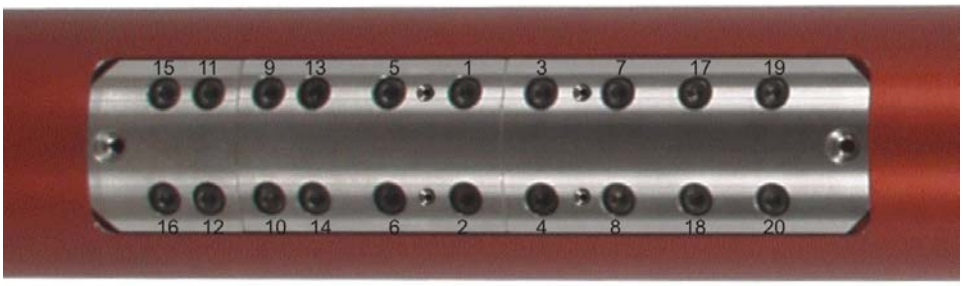

Figure 5

III. Placement of the Carrier into the Well

1. Once both Carrier gauges have been mounted to the Carrier, the Carrier can be attached to the tubing string.

2. Do not place tongs on the Carrier. Use the nipples on either end of the Carrier for pipe wrenches or tongs.

3. Run the Carrier into the well as deep as needed.
   WARNING: Try to avoid quick starts and stops with the rig when running or pulling the tools. This avoids unnecessary damage to the Carrier gauges.

IV. Removing the Carrier Gauge

1. Once the Carrier has been removed from the tubing string wash off the carrier and then remove the 1/4" x 3/8" hex cap screws from the Carrier gauge. Do not remove the end screws (1/4" x 5/8") all the way for they will be of help while lifting the Carrier Gauge from the Carrier bed.

Figure 6

2. Turn each end screw (1/4" x 5/8") ½ a turn at a time. The Carrier gauge should pop up a little allowing the gauge to be removed evenly and slowly. Once the Carrier gauge is removed, clean and lubricate the Carrier bed and gauge to prevent any corrosion.

V. Communication with the Gauge

To start communicating with the gauge, the following procedure is recommended:

1. **Attach the female end of the 9 pin serial cable**, which was provided with gauges, **to an empty parallel port in the back of the computer**. Attach the male end of the cable to the Serial Data Download Box. The Serial Data Download Box is an electric interface adapter, which allows communication between the computer and the gauge. If you are using the USB Download Box, connect the USB cable to the USB port on the computer. With the USB connection, no interface power supply is needed. Make sure the USB Divers are installed on the computer for the USB connection to work. A USB Driver disk is provided with the complete package or you can find the latest driver on our website www.canadatech.com >>> Support >>> Downloads >>> USB Drivers.

2. **Line up the red dot on the interface box to the red dot on the gauge and insert carefully.** They will only connect this way. Do not force or twist!! If the connection is difficult, stop and look to see what the obstruction might be. Clear all obstructions and try the connection again. When these three components are connected together, the gauge is said to be in *Communication Mode*. This mode is used to program the tool, download file, and upload calibration information and other related operations through the software. The power consumption in this mode is 8mA.
   Once again, for USB connections, line up the red dot on the interface box to the red dot on the gauge and insert carefully, but no interface power supply is needed.

3. **Connect the battery pack to the interface box** by lining up the red dots on the interface box and the red dot on the battery pack. You will know if the connection is ready when the LED on the battery pack flashes red on and then off. If the flashing does not occur, try this connection again. This is not needed for USB connection.

4. Open the program Tool Box. Refer to Tool Box Manual for connection and operation instructions.

VI. Servicing Procedures

1. After the gauge has been removed from the Carrier examine o-rings for damage. All o-rings should be replaced after every run even if they don't appear to be damaged or leaking. Replace the gauge electronics and battery housing o-rings with MOR 12 X 1.5mm UP o-rings and V90 2-009 pressure port o-ring located in the maintenance kit provided. Examine the MOR 12 x 1.5 PBU backup rings for damage. Replace if needed. These do not usually need to be replaced unless the bottom hole temperature is around 300ºF.

2. To protect the transducer clean all materials out of the transducer port and then fill the pressure port with clean grease before reassembling the Carrier gauge. (Keep frac sand out of pressure port).
   WARNING: Do NOT touch the transducer face. Do NOT use compressed air on the transducer! Us a degreaser aerosol can to spray the transducer clean.