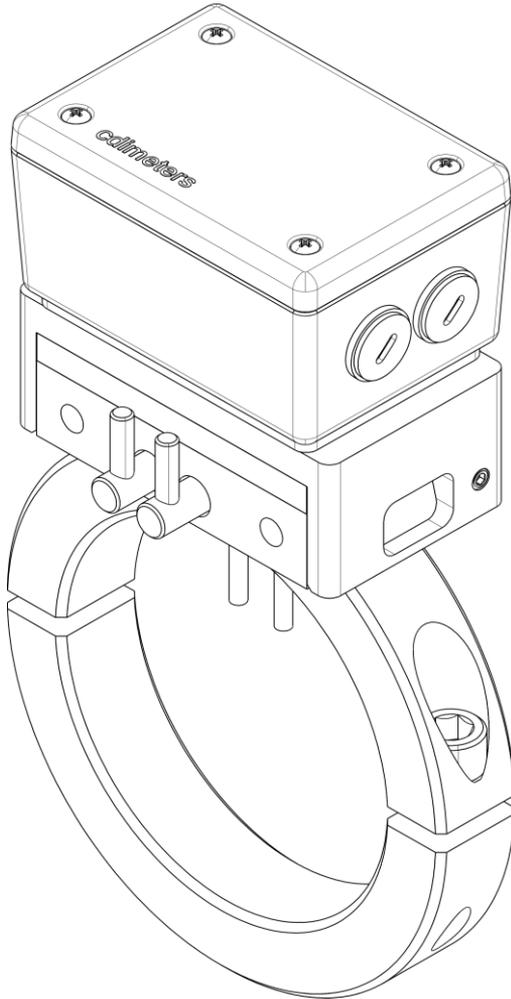


# CDI 5450 Hot-Tap Flowmeter

## Installation and Operating Instructions



**cdimeters**

CDI Meters, Inc.

support@cdimeters.com

866-885-2462

www.cdimeters.com

## **Safety Precautions**

Installation of the meter requires two hands, and missteps could cause a release of air that would startle the installer. Consequently, the work should be done from a lift or staging, and fall protection must be provided where appropriate.

Opening either valve at the wrong moment or withdrawing the drill without closing the corresponding valve would cause air containing sharp chips to blow out at high velocity. Consequently

- Gloves and face protection must be worn.
- The installer should practice opening and closing the valves and withdrawing the drill several times before drilling the holes.

Normally, the chips formed by the drilling operation are small. If long chips are formed, the installer should back out the drill frequently to clear the chips so that they will not prevent the valves from being closed.

## **Limitations and Cautions**

CDI 5450 flowmeters are not for use in hazardous areas or on pipes containing gasses other than air or nitrogen. They must be installed in a pressurized pipe to ensure all chips are cleared. They are not for use in control or safety applications or designed for installation where pressure exceeds 130 psig (9 barg). Contact CDI for all applications other than steel pipe. The temperature compensation of the meters is suitable for use from 20 to 120°F (-7 to 49°C).

## **Locating the Meter**

For accurate and reliable readings, the meters must be installed with adequate straight pipe upstream, and, in compressed-air applications, they must be installed downstream of a dryer.

Select a location with a straight run of pipe upstream equal to at least twenty times the pipe diameter. If the meter is downstream of something that could distort or concentrate the flow, such as a sweep elbow, a partially-closed valve, an increase in pipe size or a hose, the run of pipe should be as long as possible; thirty times the diameter at a minimum. Five diameters of straight downstream piping is sufficient, unless the meter is immediately upstream of something that would restrict the flow, such as a valve. If possible, locate and orient the meter for good visibility from the plant floor.

The meters may, when necessary, be installed outdoors. For best visibility, avoid direct sunlight.

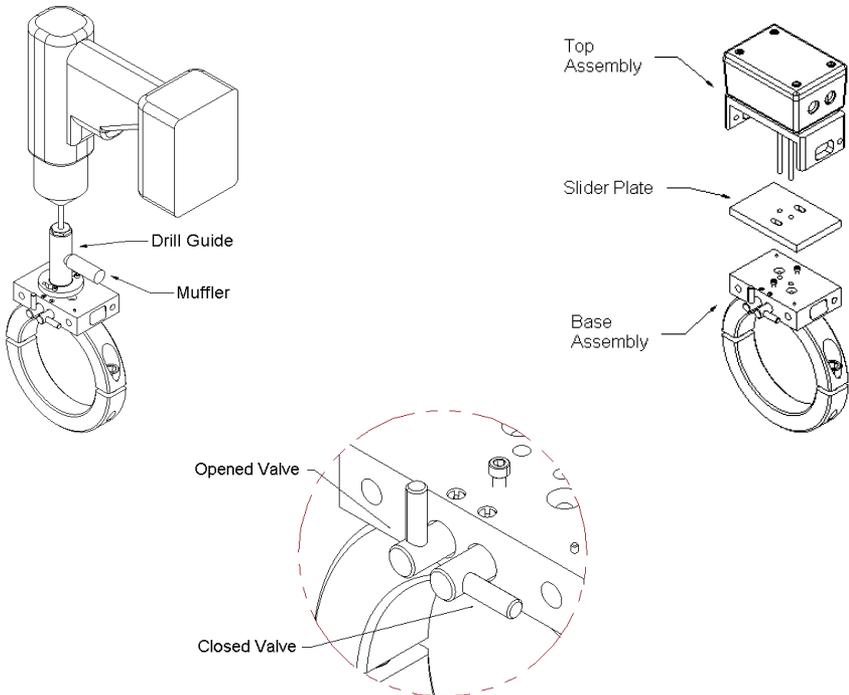
## Preparing for Installation

When the holes are drilled, metal shavings will enter the pipe. Make sure that filters or other provisions are present downstream to prevent shavings from damaging equipment or product or being blown out and causing injury.

Prepare the meter for the pipe orientation and the direction of flow. To switch the 5450 between horizontal and vertical orientation, loosen the screws on the underside of the top bracket, rotate the display, and then re-tighten the screws. Be careful to loosen the screws no more than necessary, and then tighten them securely. The flow arrow on the meter must be oriented to match the direction of flow in the pipe. If doing so will cause the display to be upside-down, remove the cover of the meter, lift out the display, rotate both 180° and re-install.

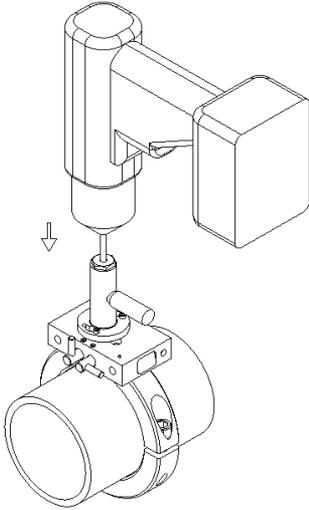
Apply the "Holes in Pipe" decal so that it will be hidden when the meter is in place but will be revealed when it is removed.

## Installing the Meter



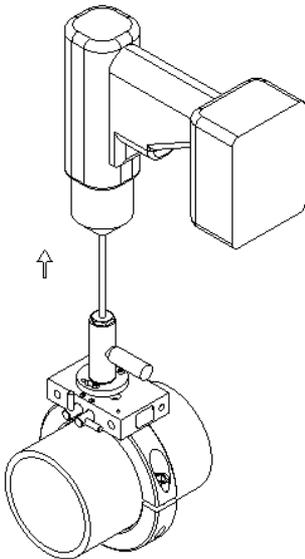
Installation of the CDI 5450 Hot Tap Flowmeter should be done by an experienced mechanic. As a precaution, hearing, face, and hand protection should be worn at all times. If done properly, the sound of the drill will be the loudest part of the installation.

## Step 1



- a. Mount the base assembly on the pipe and tighten the cap screws evenly. The torque should be sufficient to seal the gasket but not so great that it will crush the gasket, or distort or over-stress the pipe.
- b. Place the drill guide over the exposed socket head cap screws, slide fully to one side and tighten. Orient the drill guide so that the muffler is horizontal or pointing down.
- c. Open the corresponding valve.
- d. Install the 5/32" drill bit into the drill's chuck. Insert the bit into the drill guide and base until the tip makes contact with the pipe. The distance between the chuck and the top of the drill guide must exceed the thickness of the pipe's wall. Readjust if necessary.

## Step 2

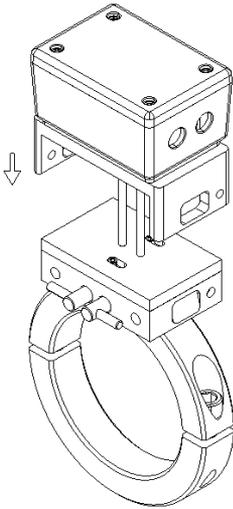


- a. Without applying too much force, begin drilling the hole. Occasionally back the drill bit off of the pipe to help dissipate heat and clear the chips.
- b. Once you have broken through the pipe wall, run the drill bit up and down through the hole to ensure clean edges. With the drill bit still spinning, extract it so one to two inches of it is exposed, being careful not to completely remove the bit or expose the flute. Hold it there for a few seconds to give time for all chips to bypass the drill bit and collect within the muffler.
- c. Carefully remove one hand from the drill and apply light pressure to the corresponding valve handle as if you were closing it. While the bit is spinning, begin extracting the drill bit slowly. The pressure applied to the valve

handle will help indicate when the drill bit has cleared. When this happens, rotate the handle 90° to its closed position. It is now safe to completely remove the drill bit. At this stage a slight hiss may be present through the drill guide.

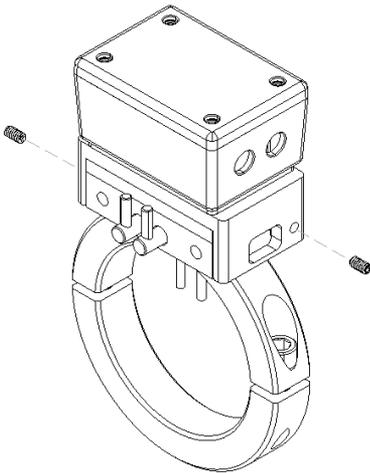
- d. Loosen, but do not remove, the screws holding down the drill guide, slide it so that it aligns with the second hole, and tighten the screws back down.
- e. Open the corresponding valve.
- f. Repeat steps 2a through 2c.

### Step 3



- a. Loosen the screws holding down the drill guide, remove it, and empty the chips from the muffler. Wipe away any chips that may have fallen on top of the base. Place the slider plate over the screws with the side containing the O-rings facing the base. Slide it into position so the alignment pins are in place and it sits flat against the base. Tighten the screws so that the slider plate is firmly mounted to the base.
- b. With the flow arrow in the correct direction, insert the probes into the two holes of the slider plate. Expect some resistance as the probes make their way through the O-rings. Continue to push in until the probes make contact with the closed valves. At this point any leakage noted in step 2c should go away.

### Step 4



- a. With one hand firmly holding the top assembly, use the other to rotate each valve 90° to its open position. Push the top assembly into place until you hear an audible 'click', letting you know the two latches are now firmly in place and it is safe to let go. You can expect approximately five pounds of force at the meter's maximum pressure rating.
- b. To complete the installation, there are two safety screws that will need to be placed in the side of the top bracket next to each latch. Screw both in until they bottom out.

## **Wiring the Meter**

Wiring must be in accordance with applicable codes and standards. In areas where electrical interference may be present, signal wiring should be shielded with the shield grounded remote from the meter. Signal cables must not be run in conduit or cable trays shared with power wiring. The main terminal block inside the meter is accessed by removing the cover and lifting out the display circuit board.

### **POWER**

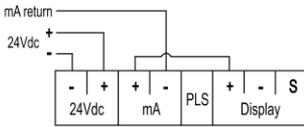
Either use the dc wall-plug supply furnished with the meter, or connect the terminals marked "24V dc" to a distributed dc power supply and seal the unused power opening with the plastic plug provided. The meter will draw a maximum of 250 mA. Unlike earlier 5200 and 5400 meters, the Rev. 3 meters do not connect the dc- terminal to the pipe on which they are mounted. Please note that 18 Volt dc supplies furnished with some earlier CDI flowmeters do not provide the voltage required for Rev. 3 meters.

### **REMOTE DISPLAY**

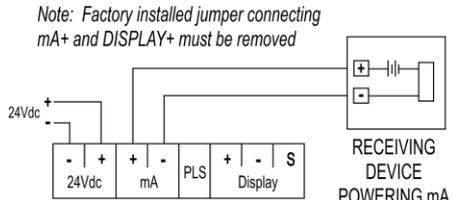
If you are using the summing remote display (SRD), connect the three terminals marked "display" to the corresponding terminals in the remote display. The meter may be powered from the remote display if the cable is 22 gauge or heavier and the distance is no greater than 200 feet.

### **MILLIAMP OUTPUT**

The 4 - 20 milliamp output is optically isolated within the meter and it is provided with a factory-installed jumper which allows it to source a milliamp signal powered from the meter. The resistance of the loop connected to the output should not exceed 600 Ohms.



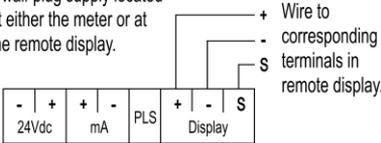
CONNECTING METER AS A THREE-WIRE TRANSMITTER



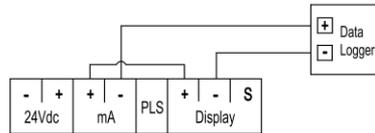
WIRING FOR ISOLATED MILLIAMP OUTPUT USING EXTERNALLY POWERED MILLIAMP LOOP

RECEIVING DEVICE POWERING mA LOOP

Power the meter from its 24Vdc terminals or from a wall-plug supply located at either the meter or at the remote display.



CONNECTING TO A REMOTE DISPLAY



CONNECTING TO A DATA LOGGER

## PULSE OUTPUT

The pulse output is open-collector, that is, a transistor switch to the meter's negative supply. To use it, connect it to the input of the receiving device; also connect that input through a 10K Ohm resistor to a suitable positive supply and connect the negative supply of the receiving device to the negative supply of the meter. If an isolated relay contact is required, install the CDI 5200-IPO isolated pulse output and wire it to the receiving device.

## SERIAL COMMUNICATION OPTION

The RS-485 signal used with the Serial Communication option is wired to the Serial Communication display board. The two threaded openings in the meter enclosure permit the signal to be wired from meter to meter without external splices. Please refer to the data sheet for the Serial Communication options.

## Using the Outputs

The milliamp output is scaled so that four milliamps corresponds to zero flow and 20 milliamps corresponds to the range of the meter indicated on the data sheet. The meter will display the milliamp full-scale value for a few seconds on startup. It will also display it if the button on the main (lower) circuit board is pressed twice.

The pulse output generates a square wave signal, sending one pulse for each cubic foot of air that passes through the meter. The LED blinks with the pulse output. At zero flow it may be on or off. The pulse output can be configured as a threshold output, and the scaling of both the pulse output and the milliamp output can be changed, using the optional configuration cable.

## Using the Display

Pressing a button indicated by a circle on the front of the meter cycles the display through four display options: rate, daily usage, cumulative usage and units of measure, the last indicated by a digit: (0) for scfm, (1) for  $\text{m}^3/\text{min}$  and (2) for  $\text{m}^3/\text{hr}$ . The cumulative values are indicated in thousands of cubic feet or cubic meters. Holding the button pressed in either of the cumulative modes (daily usage or cumulative usage) will reset that value to zero. The display normally defaults to the rate display, but this can be changed, as can the units of measure and the decimal point location in the cumulative modes. Please refer to information on configuring the display.

## Maintenance

If oil or dirt accumulates on the probes, the meter will read inaccurately. For this reason, we recommend cleaning the probes from time to time. To clean the probes, wipe them with a cloth dampened with alcohol or a similar degreaser. It may be found that the system is clean enough that cleaning is not needed.

### Warranty

CDI warrants solely to the buyer that the Model 5450 Flowmeter shall be free from defects in materials and workmanship, when given normal, proper and intended usage, for three years from the date of purchase. During the warranty period, CDI will repair or replace (at its option) any defective product at no cost to the buyer. The foregoing warranty is in lieu of any other warranty, express or implied, written or oral (including any warranty of merchantability or fitness for a particular purpose). CDI's liability arising out of the manufacture, sale or supplying of the flowmeter, whether based on warranty, contract, tort or otherwise, shall not exceed the actual purchase price paid by the buyer, and in no event shall CDI be liable to anyone for special, incidental or consequential damages.