



BLUE RIBBON CORP.

BC001 Birdcage Installation Manual

Product Overview:

This manual is applicable for the BC001 Birdcage Submersible Level Transmitters.

If the product you have has a different prefix part number than listed above please contact the factory for the installation manual. The part number and/or serial number will help identify the exact product you have. Failure to identify the product you have before installation may cause permanent damage to the instrument and in most cases, void the manufacturer's warranty.

The Patented Birdcage design provides a Heavy Duty 316 SS Protective Stand-off Plate that protects the 3-1/2" Flush Diaphragm from debris floating in the media which could strike the diaphragm, causing damage.

Electrical Features:

The BC001 submersible level transmitters include Internal Voltage Surge Protection via a gas tube arrestor across the input power leads and Lightning Protection via a MOV (Metal Oxide Varistor) to ground which provides secondary protection and in some instances can react quicker when used in conjunction with the gas tube suppressor. Typically the MOV will discharge the initial buildup of the surge limiting the energy to the circuit.

Materials:

The BC001 submersible level transmitters utilize a silicon piezo-resistive sensor for accurate hydrostatic level measurement. The transmitters include corrosion resistant wetted parts of 316L stainless steel construction with either Polyurethane or Tefzel cable. The transmitters are designed to be submerged directly in the media being measured. Ensure that the transmitters are compatible with the media being measured before being submerged as failure to do so may cause catastrophic failure of the device and void the warranty.

Polyurethane and Tefzel cables are ~0.330" OD with multi-conductors. The internal wires are 22AWG with a drain / shield and 1/8" OD integral vent tube for barometric reference.

Standard Wiring

Wire Color	BC001
Red	+Excitation/Signal
Green	NC
White	NC
Black	-Excitation/Signal
Shield	Shield

The cable is fully shielded with the shield connected to the metal housing at the transducer end and terminated in an insulated wire at the termination end.

The integral vent tube includes a hydrophobic filter on the end to prevent moisture migration. For the most accurate performance of the unit, the cable should be terminated in a water tight box. See Care & Handling section for further instructions.



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The submersible level transmitters are calibrated at the factory per the range and output ordered. Standard units are not field adjustable. Units should perform as indicated on the Calibration Certificate and product label.

Installation:

The BC001 submersible level transmitters provide a linear output in relation to the depth / head pressure above the lowest point on the transmitter to the top of the media level.

The submersible level transmitters are designed to sit on the bottom of an application. The area between the flush diaphragm and the stand-off plate is approximately $\frac{3}{4}$ " to allow solids to pass through. The weight of the Birdcage, in most instances, will prevent the transmitter from moving in turbulent flow. However, if the transmitter is mounted and elevated above the bottom of an application, a stilling well or perforated stand pipe may be utilized to reduce the possibility of movement if turbulent flow conditions are present. It is recommended to suspend the transmitters via an external support grip, not the cable itself.

An inexpensive way to support the transmitter is via the $\frac{1}{2}$ " NPT Male conduit connection. This comes standard on the Model BC001. A rigid metal or plastic pipe or $\frac{1}{2}$ " NPT Female conduit with 316 SS chain can then be attached to the transmitter before lowering into the media.

When lowering the transmitter into your media, avoid throwing or dropping the transmitter from an extreme height. The impact on the media surface could exert extreme pressure on the flush diaphragm, thus exceeding the maximum pressure rating. Such damage will void the warranty.

The cable attached to this instrument is specifically engineered for submersible applications. The standard polyurethane outer jacket provides long-term reliability under most conditions. The cable should be handled carefully as the jacket may be subject to damage if "raked" over sharp edges such as a well casing. Care also needs to be taken to prevent the cable from being crushed, which in turn may close the vent tube and cause the appearance of drift in the transmitters output. If your installation requires bending the cable, take care not to crimp the integral vent tube. Do not bend the cable more than a radius of 1 inch.

It is recommended that the cable be terminated in a water-tight junction box, using a water tight compression style fitting to secure the cable as it enters the junction box. Care needs to be taken to not over tighten the fitting as damage to the cable or integral vent tube could occur. Blue Ribbon also recommends the use of surge protection at the termination end of the cable, typically inside the junction box. This insures further protection of the transmitter and additional equipment on the line. Blue Ribbon also offers DIN rail mounted surge protection. Contact the factory for more information. Nothing is 100% effective, especially if hit with a direct lightning strike. If an area is prone to strikes using a combination of these options greatly reduces the risk of failure.

The end of the cable typically provides 2 signal wires, a ground wire and integral barometric reference vent tube. The shield should be terminated to a good earth ground. The vent tube is specially prepared at the factory to help eliminate moisture migration with a hydrophobic filter. Every effort should be made to leave this vent tube filter intact. Should the cable be longer than is required, it is recommended that the excess length be accommodated in a service loop. If this is not possible, a replacement filter should be purchased from Blue Ribbon. This PN is: VT-PB and is installed in a similar fashion to shrink fit. **(Reference Fig. 1)**

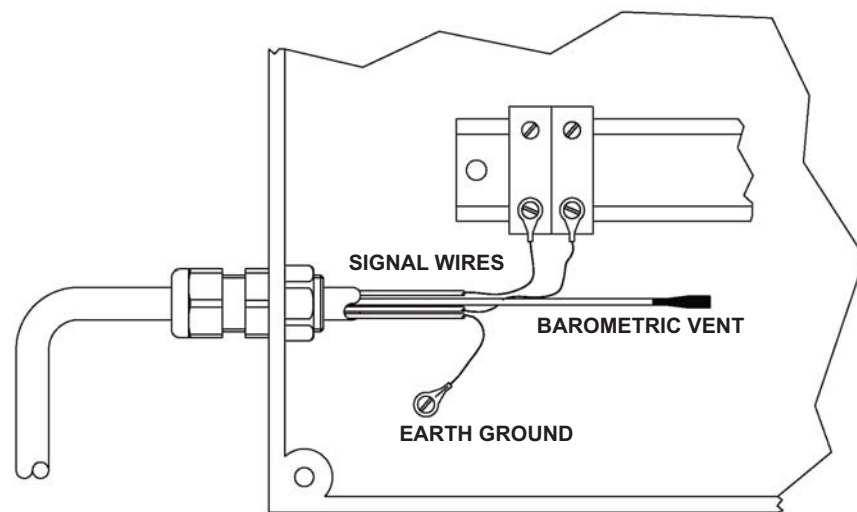


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Fig. 1: Termination of the cable in a water tight enclosure or panel box.

Fig. 1



Power Supply:

The 4-20mA transmitters require a DC power supply, (typically 10-36 VDC) and mA meter wired in a current loop.

Connect the Red wire of the transducer to the + (positive) terminal of the power supply.
Connect the Black wire of the transducer to the + (positive) input terminal of the meter.
Connect the – (negative) input terminal of the meter to the – (negative) terminal of the power supply. (See the wiring chart in the beginning of the manual)

The VDC or mV/V transmitters require a DC power supply (10-36 VDC on the 0-5 VDC version and a regulated 5-15 VDC on the mV/V version) and VDC meter.

Connect the Red wire from the transducer to + (positive) on the power supply.
Connect the Green wire to the + (positive) signal of the VDC meter.
Connect the Black wire from the transducer to both the – (negative) Power on the power supply and – (negative) signal on the VDC meter.



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Care & Handling

Insure that the media being measured is compatible with materials of construction.

The BC001 has a Heavy Duty 316 SS Protective Stand-off Plate. This provides protection to the flush diaphragm during installation, operation and handling. This protective plate should not be removed unless absolutely necessary. Doing so will expose the flush diaphragm which can be damaged if not handled properly.

If this transmitter becomes clogged during use, flush the end of the transmitter in a warm bucket of water to loosen the debris. A mild non-corrosive detergent may be used to soak the transmitter in to further loosen debris.

If this does not resolve the issue then carefully remove the Stand-off Plate. No sharp instruments should be used to scrape or brush the flush diaphragm as it will damage it. Repeat the above procedure of soaking the transmitter.

The Stand-off Plate should then be carefully reinstalled without striking the sensing diaphragm with any sharp or blunt object. Excessive pressure on the sensing diaphragm could also overpressure the transmitter.

Each submersible transmitter is supplied with a barometric vent tube which is integral to the cable. This vent tube is connected to the reference side of the sensor inside the housing. The other end is terminated outside the cable jacketing with a vent tube filter. This element helps prevent moisture migration into the vent tube. Care should be taken when installing the terminated end of the cable in a water tight enclosure, panel box or dry area outside the elements. A simple enclosure as shown previously in the manual will help protect this vent filter.

Care should be taken to insure the integral cable does not become cut or nicked during use or installation. Failure to do so may cause water intrusion into the cable and eventually failure of the transmitter.

In the event this breather element becomes damaged or torn off the vent tube, Blue Ribbon can supply a replacement element. Part No: VT-PB. Consult the factory for this part

If upon receipt of your device it is evident the cable supplied was not ordered to the correct length or if you wish to add more length, a simple solution is to provide a termination box where the vented cable from the transmitter can be spliced to any non-vented or vented cable. The termination box can be vented but not allow water to intrude. Never splice the cable and submerge under water. Blue Ribbon has found that an underwater splice is unreliable and prone to failure.

If the transmitter fails to respond or provide proper readings, a few simple trouble shooting techniques should be employed before sending the unit back to the factory or replacing.

If possible, isolate the transmitter from the reading device such as a panel meter or PLC. If possible use a different power supply and handheld multimeter that is capable of reading the 20mA or 5 VDC output.



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This ensures that the transmitter is the culprit in question in the system. If the transmitter reads the proper output then the power supply, meter or PLC may be at fault.

If isolating the transmitter from the system still provides poor or no reading the transmitter should be removed from the system and visually inspected. If damage to the cable is found it is likely that water intrusion has occurred and the assembly cannot be repaired and a replacement unit must be purchased. If upon visual inspect all looks good a continuity check may be performed between the power or signal wires and the case of the transmitter. A reading between the signal or power wires and the case or shield /ground wire probably indicates a short by water intrusion or it may indicate a lightning strike has damaged the unit.

If the failure still is uncertain returning the transmitter to Blue Ribbon for analysis is recommended. Blue Ribbon requests that the transmitter be sanitized if in a sewage application and then sent back.

Please contact the factory first to obtain an RMA number. A request for RMA can also be found on our web site:

www.blueribboncorp.com.

If you have any further questions regarding installation, care and handling or trouble shooting please feel free to contact one of our application specialist to assist you.

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