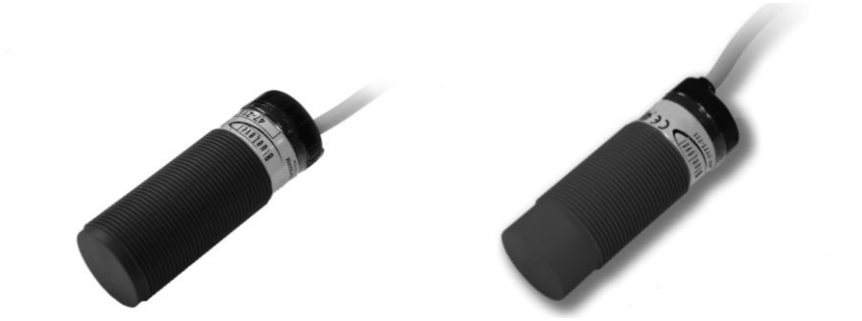
Installation, Operation & Maintenance Instructions



Model CPH and CPU
Capacitive Proximity Switches

Thank you for purchasing the Model CPH or CPU Capacitive Proximity Switch from BlueLevel Technologies. We sincerely appreciate your business and strive to make your experience with us and our products uniquely positive.

⚠ This document contains information necessary to ensure a safe and successful installation. PLEASE READ ALL INSTRUCTIONS CAREFULLY BEFORE PROCEEDING and comply with the section on page 3 of this document pertaining to SAFETY to ensure proper operation of the equipment and personnel safety.

STOP Before discarding shipping container, please inspect it thoroughly and verify that all parts are accounted for. If you have any questions please do not hesitate to contact us on our website at www.blueleveltechnologies.com, by email at bluelevel@blueleveltechnologies.com or by phone at 330-523-5215 by fax at 330-523-5212.

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Safety Terms & Symbols

WARNING: Warning statements identify conditions or practices that could result in injury or loss of life. Risk of electrical shock exists.

CAUTION: Caution statements identify conditions or practices that could result in damage to this product or other property.

Safety Summary

General Safety

CAUTION: It is important that all instructions within this manual be followed to ensure proper operation of the equipment and safety of operating personnel. The product should be installed, commissioned and maintained by qualified and authorized personnel only. Install according to installation instructions and comply with all National and Local codes. Use electrical wire that is sized and rated for the maximum voltage and current of the application.

Electrical Shock Caution

Certain Model CPH and CPU Capacitive Proximity Switches may be powered with HIGH VOLTAGE. All Model CPH and CPU units are completely encapsulated. No serviceable parts are inside.

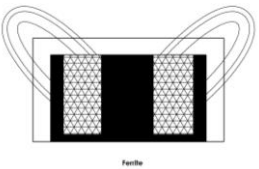
Mechanical Installation

Material Flow: Mount the Model CPH/CPU Capacitive Proximity Switch so that it will not be within the path of incoming flow of material. The face of the switch must be at the point where incoming material will reach and cover it during normal material flow, and when receding, the material will flow away from the switch's face in an even manner.

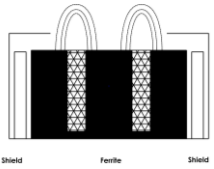
Vibration: Mount the switch at a location where limited vibration exists.

General: All Model CPH/CPU Capacitive Proximity Switches have an industry standard 30mm threaded housing, M30 X 1.5 threaded process connection. The switch can be easily mounted through a 31mm hole in the tank or bin wall and secured in place with the two (2) lock nuts provided. See "Dimensions" section. Alternatively, and for liquid level applications specifically, all units can be mounted using any of the Sensor Mounting Accessories as shown in the Technical Information Document, Form 438. Consult the factory with any questions regarding Sensor Mounting Accessories.

Unshielded Switch: Unshielded Capacitive Proximity Switches have a spherical electrical field. These units are designed to touch the product, bulk goods or liquids (e.g. granulate, sugar, flour, corn, sand, or oil and water) with their active surface. Surrounding objects can affect the proper operation of unshielded switches. It is necessary to maintain a minimum standard distance of >1.5D (diameter of switch) from other objects or 2D between two switches.



Shielded Switch: Shielded switches have a straight-line electrical field. These units are typically used when the circumference of the front of the switch will be embedded in a bin wall or to scan solid targets (e.g. components, PCB's, cartons, bottles, paper piles, etc. at a distance, or liquids through a separating wall up to a maximum of 4mm thick (such as a plastic tank or when using the switch with a Sight Glass mounting accessory for detecting liquid level in a sight tube).



Capacitive Proximity Switch Function

The BlueLevel Technologies Model CPH/CPU Capacitive Proximity Switch is a compact sensor that is used for detecting the presence and absence of material within proximity or contact of the sensor. It is a low cost, low profile sensor offering high value as a level control instrument. It is used to detect liquids, powders and granular materials at predetermined levels within tanks, hoppers, bins, silos and other types of vessels, and operates efficiently in a wide array of industries.

These sensors can be used for high (full detection), low (empty detection) and intermediate (demand detection) level monitoring, as well as sight-tube level detection and the detection of non-metallic targets on moving conveyor belts and also in conveyor belt positioning and material stacking. These sensors operate based on a proven principle.

Capacitive Proximity Switch sensors are designed to operate by generating an electrostatic field and detecting changes in this field caused by the presence of a target material approaching or contacting the sensor face. Capacitive Proximity Switches consist of an RC-oscillator with a special multi-part sensing electrode. When the target material is removed from within the field created by the sensor, the oscillator becomes inactive and the amplitude decreases. As a target approaches the sensor field, it increases the capacitance of the sensor system. When the capacitance reaches a specified threshold, the oscillator is activated, which triggers the output circuit to change between “on” and “off”.

The capacitance of the sensor system is determined by the dielectric constant of the target material, its proximity or distance from the sensor face and the size or mass of the target. The larger the size, the higher the dielectric constant and the closer it is to the sensor, the more it increases capacitance.

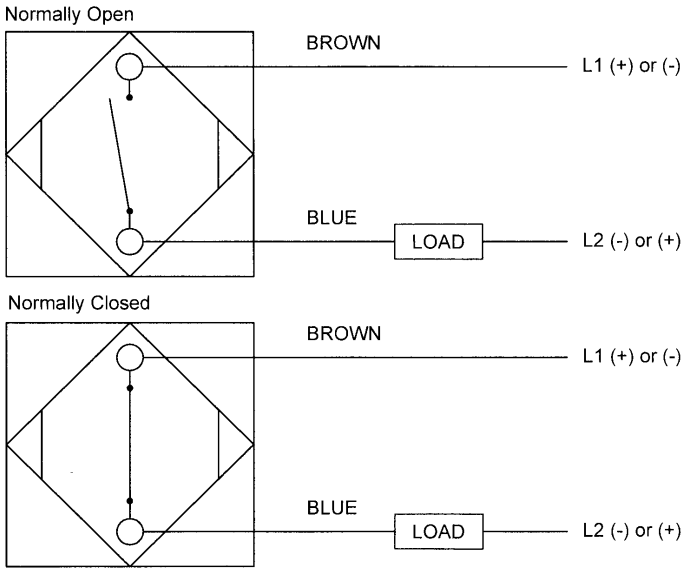
Level sensing and control applications will place the material in contact with the Capacitive Proximity Switch sensor face. Adjusting or calibrating the sensor to respond when it is in contact with or close to the target material is accomplished simply using the built-in potentiometer. Adjusting this potentiometer adjusts the oscillator amplifier voltage and hence the sensitivity of the sensor, increasing it or decreasing it.

Electrical Connections

CAUTION: DO NOT operate an incandescent light bulb as a load. The current inrush can cause a current overload and damage the Model CPH/CPU capacitive proximity switch.

CAUTION: DO NOT operate a capacitive proximity switch directly from a power supply voltage without a load. This is a short circuit and can cause damage to the Model CPH/CPU capacitive proximity switch.

2-Wire AC and 2-Wire AC/DC Output



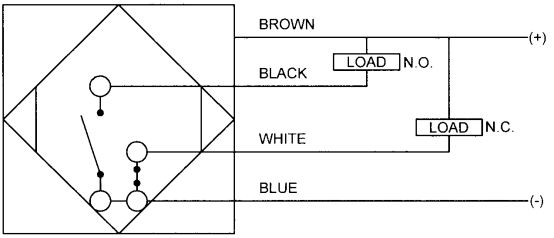
CAUTION: Properly grounding your bin, conduit system and piping to eliminate static discharge. Static discharge directly to the capacitive proximity switch may cause damage.

CAUTION: DO NOT install proximity sensor cable or wiring in the same conduit as motor power wiring as this can cause damage to the Model CPH/CPU capacitive proximity switch.

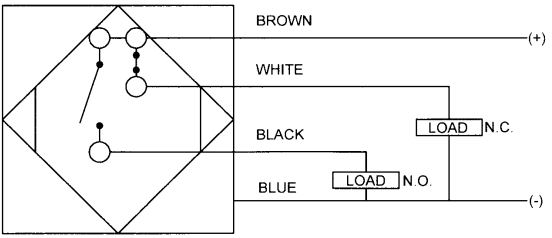
Electrical Connections - Cont'd.

4-Wire DC Output

NPN Normally Open & Normally Closed



PNP Normally Open and Normally Closed



Calibration

Follow the below steps for calibrating the Model CPH/CPU Capacitive Proximity Switches:

1. To adjust the sensitivity on a Capacitive Proximity Sensor, mount the sensor in the working position.
2. Allow the target material to reach the position where detection should take place.
3. If the material has not been detected, rotate the sensitivity potentiometer clockwise, with the screwdriver provided, until detection first occurs (LED will illuminate).
4. Continue to rotate the potentiometer for another ¼ turn.
5. Remove the target material and ensure that the sensor turns OFF (LED will turn off).
6. If the sensor turns OFF, leave the sensitivity at that position.
7. If the sensor remains ON, decrease the sensitivity (counterclockwise rotation) until the sensor turns OFF.
8. For best results, position the sensitivity potentiometer half way between these two points.

Sensitivity Potentiometer Locations:

AC and AC/DC Switches:
On back of switch.

DC Switches:
On back of switch; to access potentiometer, remove screw above/between the Red & Green LED's on back of switch.

Maintenance

All Model CPH/CPU Capacitive Proximity Switches are fully encapsulated solid-state devices and are therefore maintenance free.

Technical Data

Model CPH 2-Wire AC Switches

Sensing Distance:	
Unshielded	30mm
Shielded	20mm
Operating Voltage:	20-250VAC
No Load Current:	< 2.5mA
Maximum Load Current:	300mA
Leakage Current:	< 2.5mA
Surge Current:	5A
Minimum Load Current:	5mA
Voltage Drop:	< 9VAC @ 300mA
Switching Frequency:	25Hz
Response Time:	10ms
Switching Hysteresis:	<15% (Sensing Range)
Repeat Accuracy:	< 5% (Sensing Range)
Housing Protection Category:	IP 67
Operating Temperature:	-13°F to +158°F (-25°C to +70°C)
Temperature Drift:	< 10% (Sensing Range)
Short Circuit Protection:	No
EMC:	
RFI	≤ 3V/m
EFT	≤ 1KV
ESD	≤ 4KV (contact)
Shock/Vibration:	IEC 60947-5-2, Part 7.4.1, 7.4.2
Active Face Material:	PBT (Polybutylene Terephthalate)
Housing Material:	PBT
Certifications:	CE Mark
	$_{c}CSA_{us}$ Ordinary Locations

Technical Data - Cont'd.

Model CPH 4-Wire DC Switches

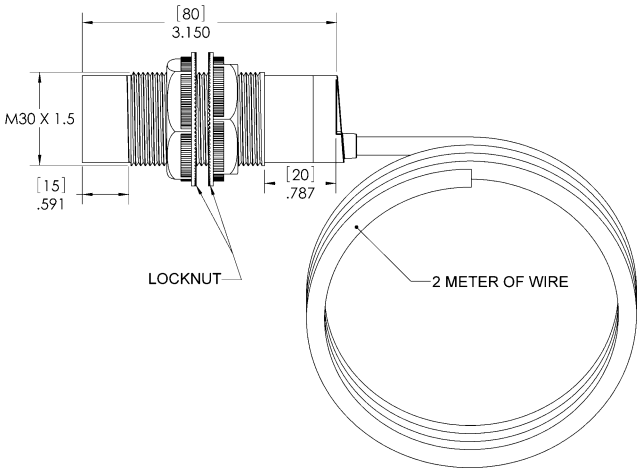
Sensing Distance:	
Unshielded	2-30mm
Shielded	CONSULT FACTORY
Operating Voltage:	10-30VDC
Ripple:	< 10%
No Load Current:	< 10mA
Maximum Load Current:	300mA
Leakage Current:	0.01mA
Voltage Drop:	< 2VDC
Switching Frequency:	100Hz
Response Time:	1.5ms
Switching Hysteresis:	<15% (Sensing Range)
Repeat Accuracy:	< 5% (Sensing Range)
Housing Protection Category:	IP 67
Operating Temperature:	-13°F to +158°F (-25°C to +70°C)
Temperature Drift:	< 10% (Sensing Range)
Short Circuit Protection:	Yes
Overload Trip Point:	220mA
Time Delay Before Availability:	<25ms
EMC:	
RFI	≤ 3V/m
EFT	≤ 1KV
ESD	≤ 4KV (contact)
Shock/Vibration:	IEC 60947-5-2, Part 7.4.1, 7.4.2
Active Face Material:	PBT (Polybutylene Terephthalate)
Housing Material:	PBT
Certifications:	CE Mark
	$_{c}CSA_{us}$ Ordinary Location

Technical Data - Cont'd.

Model CPU 2-Wire AC/DC Switches

Sensing Distance:	
Unshielded	20mm
Shielded	15mm
Operating Voltage:	20-250VAC/VDC
No Load Current:	< 2.5mA
Maximum Load Current:	200mA
Leakage Current:	< 2.5mA
Surge Current:	2.2A for 20ms
Minimum Load Current:	5mA
Voltage Drop:	≤ 10VAC / ≤ 8VDC
Switching Frequency:	25Hz (AC) / 40Hz (DC)
Response Time:	10ms
Switching Hysteresis:	<15% (Sensing Range)
Repeat Accuracy:	< 1% (Sensing Range)
Housing Protection Category:	IP 67
Operating Temperature:	-13°F to +158°F (-25°C to +70°C)
Temperature Drift:	< 15% (Sensing Range)
EMC:	
RFI	≤ 3V/m
EFT	≤ 1KV
ESD	≤ 4KV (contact)
Shock/Vibration:	IEC 60947-5-2, Part 7.4.1, 7.4.2
Active Face Material:	PBT (Polybutylene Terephthalate)
Housing Material:	PBT
Certifications:	CE Mark
	$_{c}CSA_{us}$ Ordinary Locations

Dimensions (unshielded prewired 30mm 2-Wire AC and AC/DC version shown)



Our Commitment Stands

Golden Parachute:
Each BlueLevel Technologies Model CPH/CPU Capacitive Proximity Switch product is backed by our **Golden Parachute** support program. If you are the initial purchaser and purchased the product directly from BlueLevel Technologies, this provides you with added assurance.

The Golden Parachute support program gives the initial purchaser **90 days to evaluate the product**. Within this time frame if you are not satisfied for any reason, call us and request a "Golden RMA", providing your order details and serial number on the unit, and then return the unit and request a replacement or a credit to your account for the cost of the equipment as shown on your invoice from BlueLevel Technologies.

In addition, all BlueLevel Technologies products are covered by our industry-leading lifetime limited warranty. Consult our Warranty statement for details.

Standard Warranty

Summary:

Each BlueLevel Technologies Model CPH/CPU Capacitive Proximity Switch product is backed by our five-year limited warranty. Should you experience a problem with one of our products deemed by our factory to be a product failure covered by our warranty, we will repair the unit at our factory or provide you with a replacement unit or sub-assembly at our discretion. A return authorization number must be obtained from a BlueLevel Technologies customer service technician BEFORE returning any unit. Refer to the below details for more information.

Details:

We warrant BlueLevel Technologies products to be free from defects in workmanship and materials when operated under normal conditions and in accordance with nameplate characteristic limits for a period of five (5) years from the date of shipment. Products must be installed and maintained in accordance with BlueLevel Technologies installation, operation and maintenance instructions. Users are responsible for the suitability of the products to their application. There is no warranty against damage resulting from misapplication, improper specifications, or other operating conditions beyond our control. Claims against carriers for damage in transit must be filed by the buyer.

THIS WARRANTY SHALL BE IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

BlueLevel Technologies will repair or replace, at its option, any product which has been found to be defective and is within the warranty period, provided that the product is shipped, with previous factory authorization, freight prepaid, to the factory in Peru, Illinois, U.S.A., or to the nearest service station. BlueLevel Technologies is not responsible for removal, installation, or any other incidental expenses incurred in shipping the products to or from BlueLevel Technologies.

BlueLevel Technologies' liability under this warranty shall be solely limited to repair or replacement of the products within the warranty period, and BlueLevel Technologies shall not be liable, under any circumstances, for consequential or incidental damages, including, but not limited to, personal injury or labor costs.

Under no circumstances will BlueLevel Technologies be responsible for any expense in connection with any repairs made by anyone other than the factory or an authorized service station, unless such repairs have been specifically authorized in writing.

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