



# Binswitch Elite

CAPACITANCE POINT LEVEL SENSOR



**INSTALLATION INSTRUCTIONS**

## **OPERATION MANUAL**

Part No. BSE1V10C / BSE2V10C

[www.go4b.com/usa](http://www.go4b.com/usa)



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Dear 4B Customer:

Congratulations on your purchase. 4B appreciates your business and is pleased you have chosen our products to meet your needs.

Please read in its entirety and understand the literature accompanying the product before you place the product into service. Please read the safety precautions carefully before operating the product. With each product you purchase from 4B, there are some basic but important safety considerations you must follow to be sure your purchase is permitted to perform its design function and operate properly and safely, giving you many years of reliable service. Please read and understand the Customer Safety Responsibilities listed below. Failure to follow this safety directive and the Operation Manuals and other material furnished or referenced, may result in serious injury or death.

### ***SAFETY NOTICE TO OUR CUSTOMERS***

- A. In order to maximize efficiency and safety, selecting the right equipment for each operation is vital. The proper installation of the equipment, and regular maintenance and inspection is equally important in continuing the proper operation and safety of the product. The proper installation and maintenance of all our products is the responsibility of the user unless you have asked 4B to perform these tasks.
- B. All installation and wiring must be in accordance with Local and National Electrical Codes and other standards applicable to your industry. (Please see the article “Hazard Monitoring Equipment Selection, Installation and Maintenance” at [www.go4b.com](http://www.go4b.com).) The installation of the wiring should be undertaken by an experienced and qualified professional electrician. Failure to correctly wire any product and/or machinery can result in the product or machine failing to operate as intended, and can defeat its design function.
- C. Periodic inspection by a qualified person will help assure your 4B product is performing properly. 4B recommends a documented inspection at least annually and more frequently under high use conditions.
- D. Please see the last page of this manual for all warranty information regarding this product.

### ***CUSTOMER SAFETY RESPONSIBILITIES***

#### **1. READ ALL LITERATURE PROVIDED WITH YOUR PRODUCT**

Please read all user, instruction and safety manuals to ensure that you understand your product operation and are able to safely and effectively use this product.

#### **2. YOU BEST UNDERSTAND YOUR NEEDS**

Every customer and operation is unique, and only you best know the specific needs and capabilities of your operation. Please call the 24-hour hotline at 309-698-5611 for assistance with any questions about the performance of products purchased from 4B. 4B is happy to discuss product performance with you at any time.

### **3. SELECT A QUALIFIED AND COMPETENT INSTALLER**

Correct installation of the product is important for safety and performance. If you have not asked 4B to perform the installation of the unit on your behalf, it is critical for the safety of your operation and those who may perform work on your operation that you select a qualified and competent electrical installer to undertake the installation. The product must be installed properly to perform its designed functions. The installer should be qualified, trained, and competent to perform the installation in accordance with Local and National Electrical Codes, all relevant OSHA Regulations, as well as any of your own standards and preventive maintenance requirements, and other product installation information supplied with the product. You should be prepared to provide the installer with all necessary installation information to assist in the installation.

### **4. ESTABLISH AND FOLLOW A REGULAR MAINTENANCE AND INSPECTION SCHEDULE FOR YOUR 4B PRODUCTS**

You should develop a proper maintenance and inspection program to confirm that your system is in good working order at all times. You will be in the best position to determine the appropriate frequency for inspection. Many different factors known to the user will assist you in deciding the frequency of inspection. These factors may include but are not limited to weather conditions; construction work at the facility; hours of operation; animal or insect infestation; and the real-world experience of knowing how your employees perform their jobs. The personnel or person you select to install, operate, maintain, inspect or perform any work whatsoever, should be trained and qualified to perform these important functions. Complete and accurate records of the maintenance and inspection process should be created and retained by you at all times.

### **5. RETAIN AND REFER TO THE OPERATION MANUAL FOR 4B'S SUGGESTED MAINTENANCE AND INSPECTION RECOMMENDATIONS**

As all operations are different, please understand that your specific operation may require additional adjustments in the maintenance and inspection process essential to permit the monitoring device to perform its intended function. Retain the Operation Manual and other important maintenance and service documents provided by 4B and have them readily available for people servicing your 4B equipment. Should you have any questions, please call the free 24-hour hotline number (309-698-5611).

### **6. SERVICE REQUEST**

If you have questions or comments about the operation of your unit or require the unit to be serviced please contact the 4B location who supplied the product or send your request via fax (309-698-5615) or call us via our 24-hour hotline number in the USA (309-698-5611). Please have available product part numbers, serial numbers, and approximate date of installation. In order to assist you, after the product has been placed into service, complete the online product registration section which is accessed via our website [www.go4b.com/usa](http://www.go4b.com/usa).

## ! WARNING

Always lockout and tagout machinery prior to installation

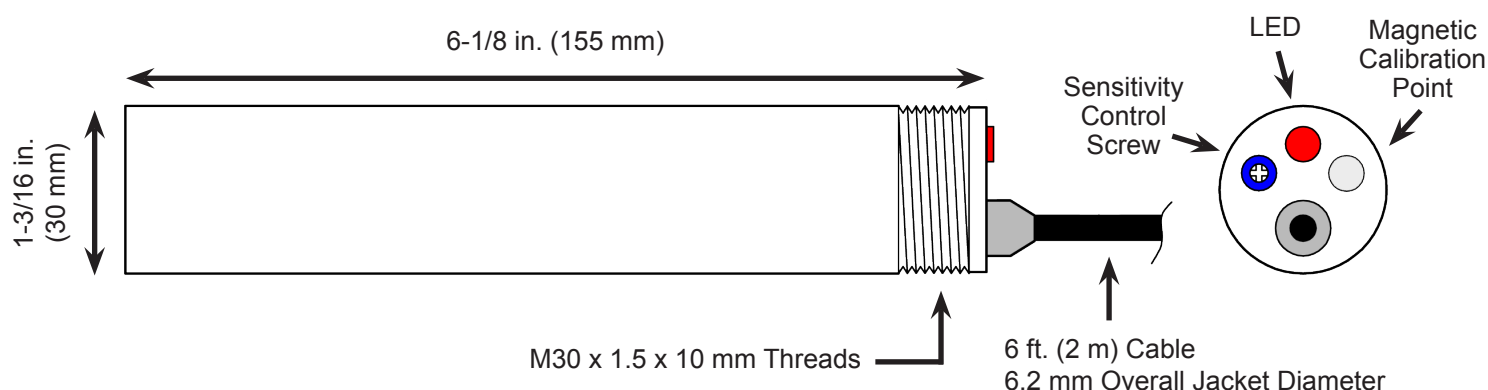
## PRODUCT OVERVIEW

The Binswitch Elite sensor detects level or plug situations for bulk granular solids or liquids in tanks, bins, or silos and can be used as a plug or choke detector in chutes, conveyors and elevator legs. The sensor is fully encapsulated in a 30 mm diameter nylon body that is corrosion and abrasion resistant, dust-tight and waterproof. The Binswitch Elite operates by detecting capacitance change when material is present. A user selectable relay output can be magnetically calibrated to be normally energized or de-energized, and during calibration the sensor automatically compensates for material build up, shields or attached metal probes.

## SPECIFICATIONS

Model Power Supply -	BSE1V10C - 24 to 240 VAC or 12 to 240 VDC BSE2V10C - 24 to 240 VAC/VDC (universal supply)
Operating Temperature -	-13°F (-25°C) to 158°F (70°C)
Sensing Range -	1 inch (25 mm) maximum
Output Modes -	BSE1V10C - Energized: output on (N/O and common contacts closed) De-energized: output off (N/C and common contacts closed) BSE2V10C - Energized: output on (5.2V drop maximum) De-energized: output off (< 1mA leakage maximum)
Output -	BSE1V10C - Relay rated 240 VAC 3A maximum BSE2V10C - FET rated 200 mA maximum
Calibration Controls -	1. Sensitivity control screw (bin must be empty when calibrating) 2. Magnetic calibration point (bin must be empty when calibrating)
Red LED Indication -	On - normally energized (see sensor calibration for details)
Cable -	BSE1V10C - 6 ft. (2 m) 5 wire BSE2V10C - 6 ft. (2 m) 2 wire
Enclosure -	Nylon
Protection -	IP65
Approvals -	CSA Class II Division 1 Groups E, F and G (USA & Canada) ATEX & CE Versions Available (Europe)

## DIMENSIONS



# INSTALLATION

The Binswitch Elite may be mounted horizontally or vertically. 4B offers two mounts, SMP or the BMPG36 (see illustrations below). The end of the sensor must be at least one inch from the bin wall or other metalwork.

It is important that the Binswitch is not located in the direct flow path of any abrasive material. However, if the Binswitch must be located in the path of an abrasive material, use in conjunction with the BAS (Binswitch Abrasion Shield).

Three alternative mounting methods are available for the Binswitch Elite, see figures A, B and C below:

Fig. A -

Cut and drill holes as shown and attach mounting plate (SMP) using six 5/16" x 3/4" (M8 x 20) bolts, nuts and washers. Slide Binswitch into position and secure by tightening mounting plate adaptor (BMPA).

**DO NOT OVERTIGHTEN**

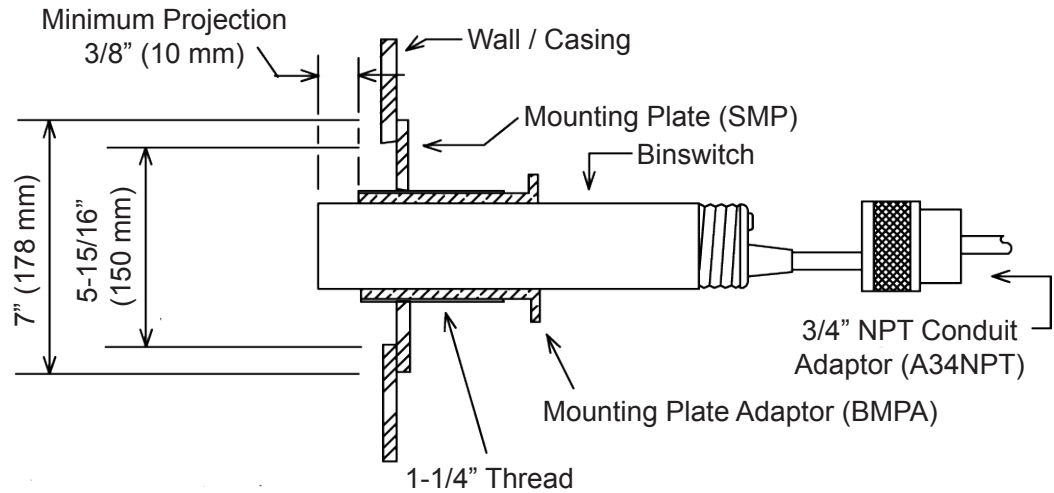


Fig. B -

Cut holes as shown and attach mounting gland (BMPG36) using locknut. Slide binswitch into position and secure with clamp.

**DO NOT OVERTIGHTEN**

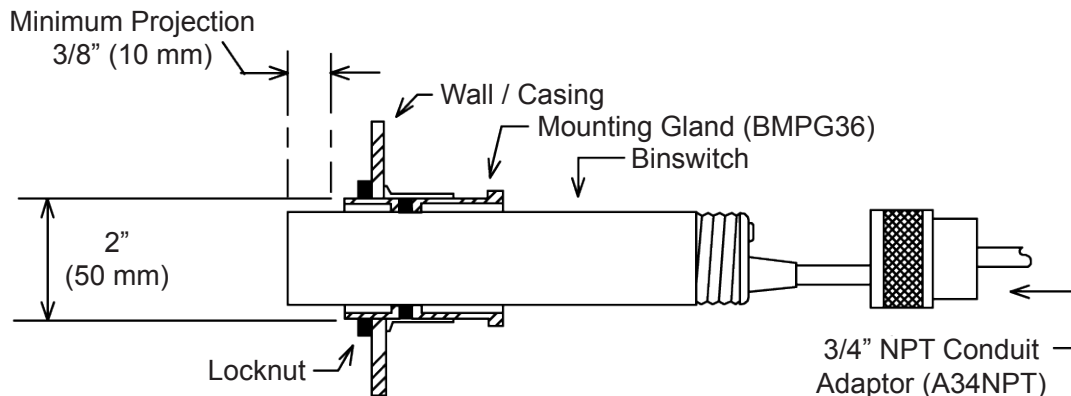
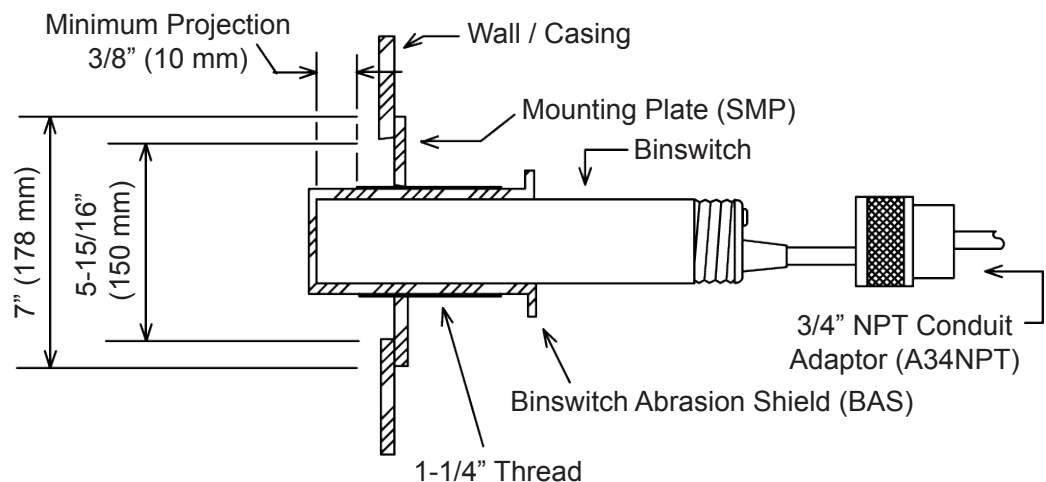


Fig. C -

Cut and drill holes as shown. Attach mounting plate (SMP) using six 5/16" x 3/4" (M8 x 20) bolts, nuts and washers. Slide Binswitch into abrasion shield (BAS) and tighten BAS into mounting plate (SMP).

**DO NOT OVERTIGHTEN**



# WIRING DIAGRAMS

All wiring must be in accordance with local and national electrical codes and should be undertaken by an experienced and qualified electrician.

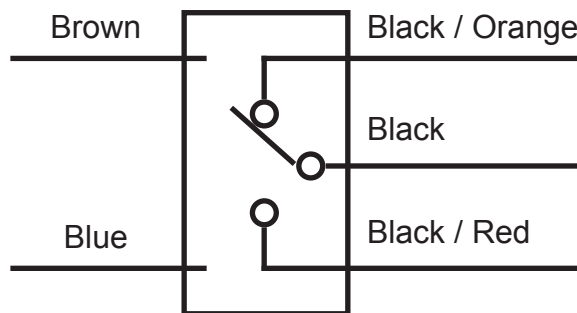
Always use dust/liquid tight flexible metal conduit with approved fittings to protect the sensor cables. Use rigid metal conduit to protect the cables from the sensors to the control unit. Conduit systems can channel water due to ingress and condensation directly to sensors and sensor connections which over time will adversely affect the performance of the system. As such, the installation of low point conduit drains is recommended for all sensors.

## NOTE

Supply polarity is not important. However for the BSE2V10C (2 wire), the sensors load *MUST* have the same voltage rating as the supply being used and may be connected to either lead. *DO NOT* connect to supply without a suitable load.

### BSE1V10C - 5 Wire

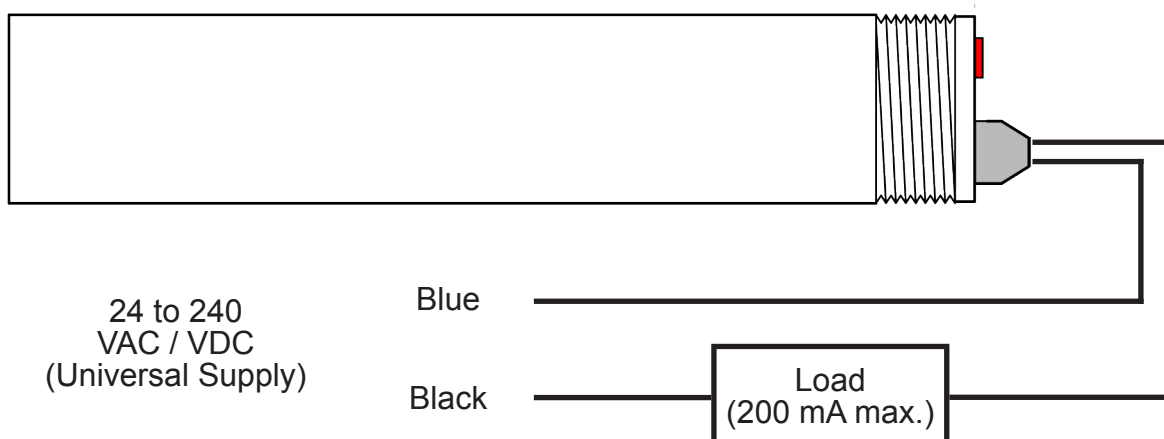
24 to 240 VAC or  
12 to 240 VDC  
(Universal Supply)



*Shown In De-Energized State*

### BSE2V10C - 2 Wire

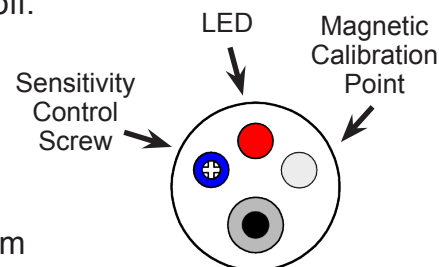
24 to 240  
VAC / VDC  
(Universal Supply)



*Load & Supply Must Have Same Voltage Rating*

# SENSOR CALIBRATION

1. The unit must be installed before calibration takes place. Connect the Binswitch to power and a suitable control unit
2. Check that the tip of the Binswitch is not covered or obstructed.
3. Carefully turn the calibration control screw fully counter clockwise to set the sensor sensitivity to zero. Do not use excessive force, the control has end stops.
4. A magnet is taped to the wire of the sensor. Place the magnet on the magnetic calibration point on the end of the sensor (see illustration), the red LED will flash on and off.
  - If a NORMALLY ENERGIZED sensor is required (with no material present), remove the magnet while the LED is "ON".
  - If a NORMALLY DE-ENERGIZED sensor is required (with no material present), remove the magnet when the LED is "OFF".
5. Wait approximately one minute for the automatic compensation system to stabilize. Then either fill the vessel until the tip of the Binswitch is covered, or remove the Binswitch and place the tip of the sensor in a bucket filled with the material to be monitored and then calibrate the unit as follows:
  - NORMALLY ENERGIZED - Slowly turn the sensitivity control screw clockwise until the LED turns "OFF". To set the sensor sensitivity to the optimum setting, turn the control screw an additional ten degrees clockwise.
  - NORMALLY DE-ENERGIZED - Slowly turn the sensitivity control screw clockwise until the LED turns "ON". To set the sensor sensitivity to the optimum setting, turn the control screw an additional ten degrees clockwise.



*Turning the sensitivity control screw counter clockwise decreases the sensitivity, turning clockwise increases the sensitivity.*

## NOTE

If the material being monitored creates dust, you may need to re-calibrate the sensor. Dust build up on the Binswitch will affect the initial calibration. **DO NOT** remove the Binswitch and clean off the dust. *Always check that the Binswitch detects material after the sensitivity has been adjusted.*

## TESTING AND COMMISSIONING

1. Check that the unit is correctly installed (see standard wiring diagram).
2. After going through the sensor calibration steps, the red LED should be "ON" if calibrated to be NORMALLY ENERGIZED or "OFF" if NORMALLY DE-ENERGIZED.
3. Introduce material to the Binswitch. If calibrated correctly, the Binswitch will activate when material has been detected. Machinery shut down will depend on your specific monitoring setup. 4B recommends an instant shutdown when maximum fill level or a plug condition has been detected.

## ⚠ WARNING

If the system does not immediately shutdown as expected or alarm as required, then remove the machine from service until the problem has been diagnosed and corrected.

## TROUBLESHOOTING GUIDE

FAULT	REMEDY
Unexpected Operation	Re-calibrate sensor, if problem continues contact 4B.
False / Inconsistent Readings	<ol style="list-style-type: none"> <li>1. Check that sensor is not in the direct flow of material, and remove from flow if necessary.</li> <li>2. If sensor is coated in dust, re-calibrate by following calibration instructions.</li> </ol>
Sensor Not Detecting Material	<ol style="list-style-type: none"> <li>1. If monitoring different types of materials, calibrate the sensor sensitivity to the lightest material being monitored.</li> <li>2. Re-calibrate sensor, if problem continues contact 4B.</li> </ol>

## BINSWITCH ACCESSORIES



### BMPA MOUNT

Urethane compression fitting mount with 1-1/4" NPT external thread



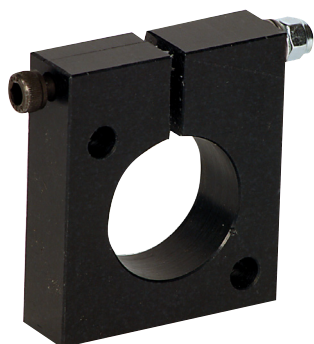
### BAS ABRASION SHIELD

Urethane abrasion shield mount for high-abrasion or liquid applications



### SMP MOUNTING PLATE

Zinc plated steel with 1-1/4" NPT coupling (available in stainless steel)



### BSM3 CLAMP MOUNT

HDP clamp style mount



### A34NPT CONDUIT ADAPTER

Anodized aluminum 30 mm to 3/4" NPT conduit adapter



### BMPG36 GLAND MOUNT

Plastic gland mount

# PRODUCT WARRANTY

## 1. EXCLUSIVE WRITTEN LIMITED WARRANTY

ALL PRODUCTS SOLD ARE WARRANTED BY THE COMPANY (4B COMPONENTS LIMITED, (4B) BRAIME ELEVATOR COMPONENTS LIMITED, AND (4B) S.E.T.E.M. Srl HEREIN AFTER REFERRED TO AS 4B TO THE ORIGINAL PURCHASER AGAINST DEFECTS IN WORKMANSHIP OR MATERIALS UNDER NORMAL USE FOR ONE (1) YEAR AFTER DATE OF PURCHASE FROM 4B. ANY PRODUCT DETERMINED BY 4B AT ITS SOLE DISCRETION TO BE DEFECTIVE IN MATERIAL OR WORKMANSHIP AND RETURNED TO A 4B BRANCH OR AUTHORIZED SERVICE LOCATION, AS 4B DESIGNATES, SHIPPING COSTS PREPAID, WILL BE, AS THE EXCLUSIVE REMEDY, REPAIRED OR REPLACED AT 4B'S OPTION.

## 2. DISCLAIMER OF IMPLIED WARRANTY

NO WARRANTY OR AFFIRMATION OF FACT, EXPRESSED OR IMPLIED, OTHER THAN AS SET FORTH IN THE EXCLUSIVE WRITTEN LIMITED WARRANTY STATEMENT ABOVE IS MADE OR AUTHORIZED BY 4B. 4B SPECIFICALLY DISCLAIMS ANY LIABILITY FOR PRODUCT DEFECT CLAIMS THAT ARE DUE TO PRODUCT MISUSE, ABUSE OR MISAPPLICATIONS, AS AUTHORIZED BY LAW, 4B SPECIFICALLY DISCLAIMS ALL WARRANTIES THAT THE PRODUCT IS FIT OR MERCHANTABLE FOR A PARTICULAR PURPOSE.

## 3. NO WARRANTY "BY SAMPLE OR EXAMPLE"

ALTHOUGH 4B HAS USED REASONABLE EFFORTS TO ACCURATELY ILLUSTRATE AND DESCRIBE THE PRODUCTS IN ITS CATALOGS, LITERATURE, AND WEBSITES, SUCH ILLUSTRATIONS AND DESCRIPTIONS ARE FOR THE SOLE PURPOSE OF PRODUCT IDENTIFICATION AND DO NOT EXPRESS OR IMPLY A WARRANTY AFFIRMATION OF FACT, OF ANY KIND OR A WARRANTY OR AFFIRMATION OF FACT THAT THE PRODUCTS WILL CONFORM TO THEIR RESPECTIVE ILLUSTRATIONS OR DESCRIPTIONS. 4B EXPRESSLY DISCLAIMS ANY WARRANTY OR AFFIRMATION OF FACT, EXPRESSED OR IMPLIED, OTHER THAN AS SET FORTH IN THE EXCLUSIVE WRITTEN LIMITED WARRANTY STATEMENT ABOVE, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

## 4. LIMITATION OF DAMAGES

ANY LIABILITY FOR CONSEQUENTIAL, INCIDENTAL, SPECIAL, EXEMPLARY, OR PUNITIVE DAMAGES, OR FOR LOSS OF PROFIT WHETHER DIRECT OR INDIRECT, IS EXPRESSLY DISCLAIMED.

With subsidiaries in North America, Europe, Asia, Africa and Australia along with a worldwide network of distributors, 4B can provide practical solutions for all your applications no matter the location.



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