



# M100 Stopswitch

## STOPPED MOTION MONITOR

  
C US  
APPROVED  
Class II Div. 1



 **WARNING:**  
*Do not use the M100 Stopswitch for belt slip applications!*

**INSTALLATION INSTRUCTIONS**

**OPERATION MANUAL**




Part No. M1001V10F

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



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|--|---|
| <br> |  <b>WARNING</b>  |
|  | <p>Rotating parts can crush, cut and entangle.<br/>Do NOT operate with guard removed.<br/>Lockout power before removing guard or servicing.</p> |

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

- Rotating machinery can cause serious injury or death
- Always lockout and tagout the machine prior to installation

## PRODUCT OVERVIEW

The M100 Stopswitch is a simple inductive proximity shaft speed monitoring device. The self-contained unit has a single set point, which signals when the shaft has stopped rotating. It can be used for process control, motion detection and stopped shaft indication.

An inductive sensing device located in the nose of the M100 enclosure will detect a metal target. This target can be an existing bolt head or device attached to a shaft. The M100 Stopswitch requires no calibration and provides an output when the shaft has stopped rotating.

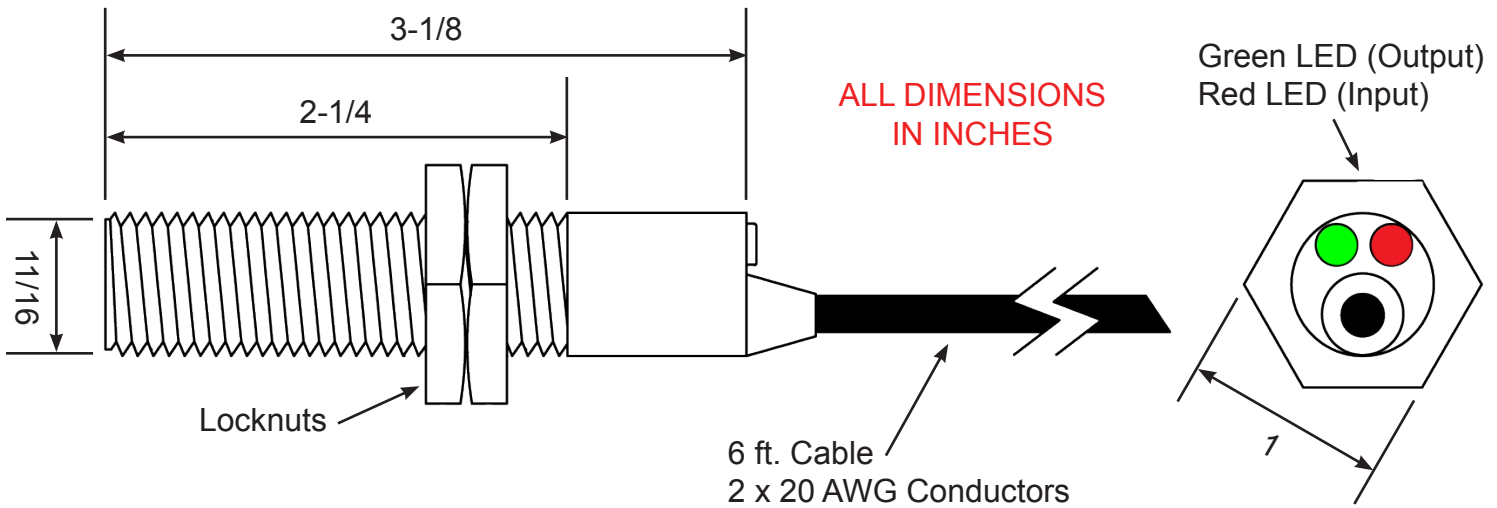
Ideally, the target should be a ferrous metal, but non-ferrous metal will be detected at a shorter range. Maximum range for ferrous targets is 5/16 in. (8 mm) and for non-ferrous targets it is 3/16 in. (5 mm), assuming a 3/4 in. (19 mm) diameter target. Smaller targets may be used but operating distances will be reduced.

The unit incorporates a start-up delay of 4 seconds to allow moving parts to achieve correct speed, thereafter, if a pulse is not received within 4 seconds an output stopped motion signal is indicated.

## SPECIFICATIONS

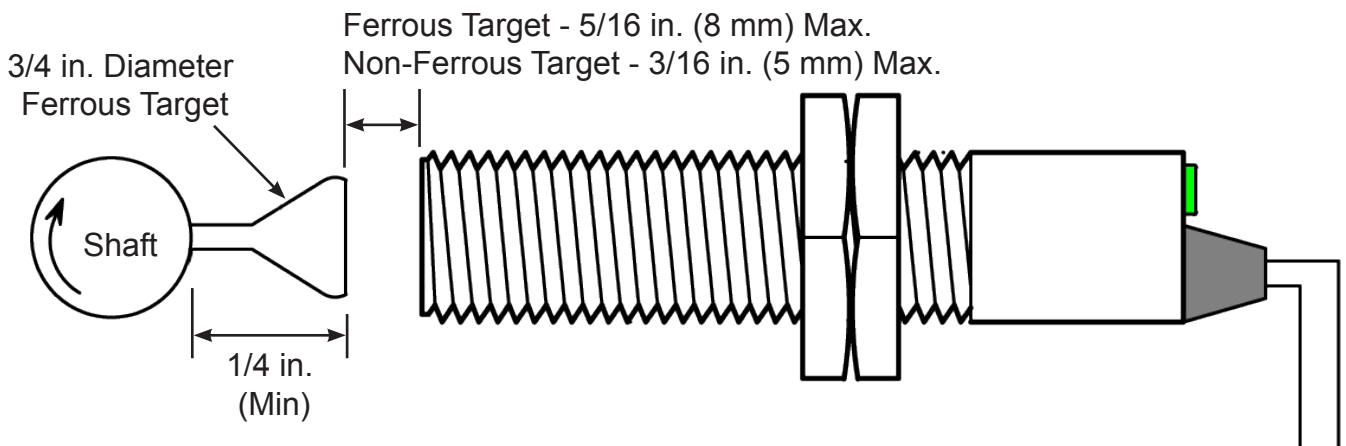
|                         |   |
|-------------------------|---|
| Supply -                | 24 to 240 Volts AC/DC   |
| Switching Capacity -    | 200 mA Maximum  |
| Saturation Voltage -    | 8 Volts Maximum (Output On)   |
| Leakage Current -       | 1.6 mA Maximum (Output Off)   |
| Operating Temperature - | -13°F (-25°C) to +158°F (+70°C)   |
| Relative Humidity -     | 90% RH  |
| Sensing Range -         | Ferrous Target - 5/16 Inch (8 mm) Maximum<br>Non-Ferrous Target - 3/16 Inch (5 mm) Maximum  |
| Enclosure -             | Nylon - ISO Threaded 18 mm by 1 mm Pitch  |
| Cable -                 | 6 ft. (2 m), 2 Conductor  |
| Output State -          | Normally Closed (Volt Drop 8 Volts Max.) Above Minimum Input Speed<br>Normally Open (Leakage Current 1.6 mA Max.) at Stopped Motion |
| Input Pulse Range -     | 20 to 2,000 PPM Maximum   |
| Start Up Delay -        | 4 Seconds   |
| Trip Point -            | Stopped Motion if No Input Received for a Period of 4 Seconds   |
| LED Indicators (2) -    | Red (Input) = Target Sensed<br>Green (Output) = Closed Circuit  |
| Protection -            | IP67  |
| Approvals -             | CSA Class II Division 1 Groups E, F and G (USA & Canada)<br>ATEX & CE Versions Available (Europe)                                   |

# DIMENSIONS



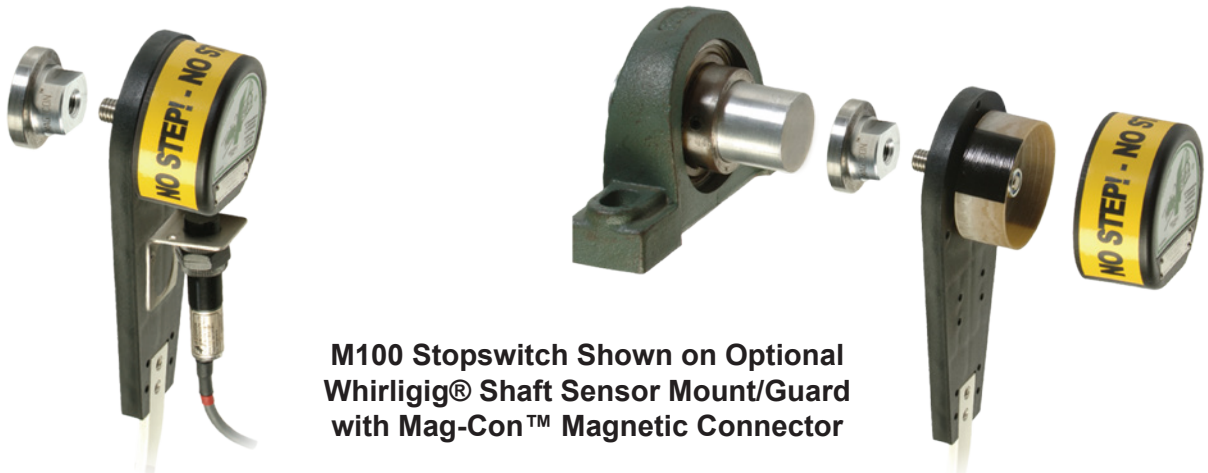
# INSTALLATION

Fasten the M100 Stopswitch to a suitable mounting bracket with guard, such as 4B's Whirligig® universal shaft sensor mount, with the nose of the switch within the sensing range of the target, as shown below -



## ⚠ WARNING

O.S.H.A. requires that all exposed rotating shafts are provided with a full guard. Therefore, this device and its target must be equipped with a guard.



**M100 Stopswitch Shown on Optional Whirligig® Shaft Sensor Mount/Guard with Mag-Con™ Magnetic Connector**

## NOTE

18 mm to 1/2 inch NPT Conduit Adapter Available (Part # A12NPT)

## STANDARD WIRING DIAGRAM

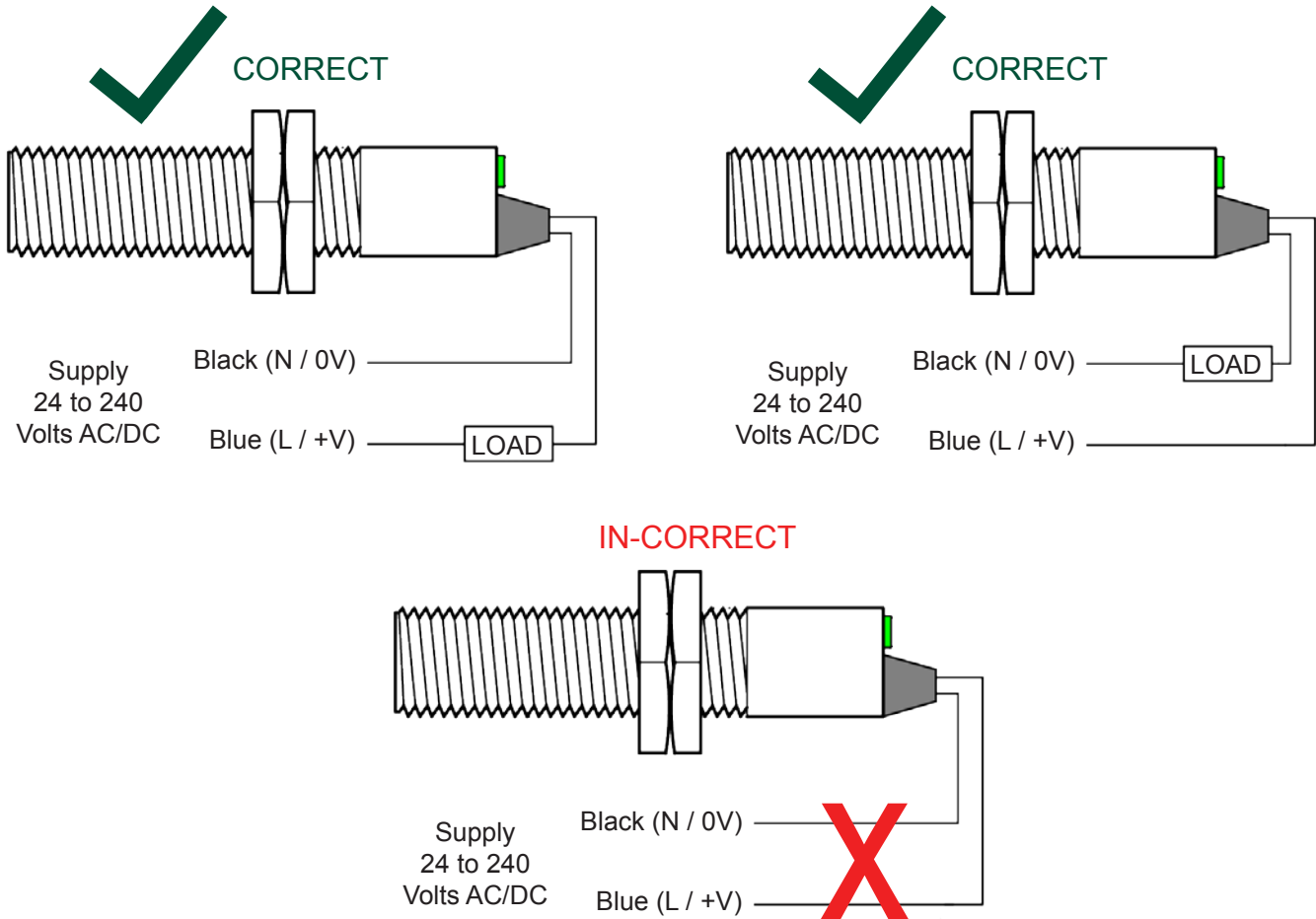
All wiring must be in accordance with local and national electrical codes and should be undertaken by an experienced and qualified electrician.

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.

The M100 has a two wire cable. It must be wired through a load (see below) with the same voltage rating as the supply being used. The supply polarity to the M100 is not important and the load can be connected to either wire. The cable can be extended to virtually any length with ordinary 2 wire cable.

Do not wire the M100 directly to a motor starting coil due to the 200 mA maximum current capacity.

It is not recommended to wire the M100 in series with other sensors.

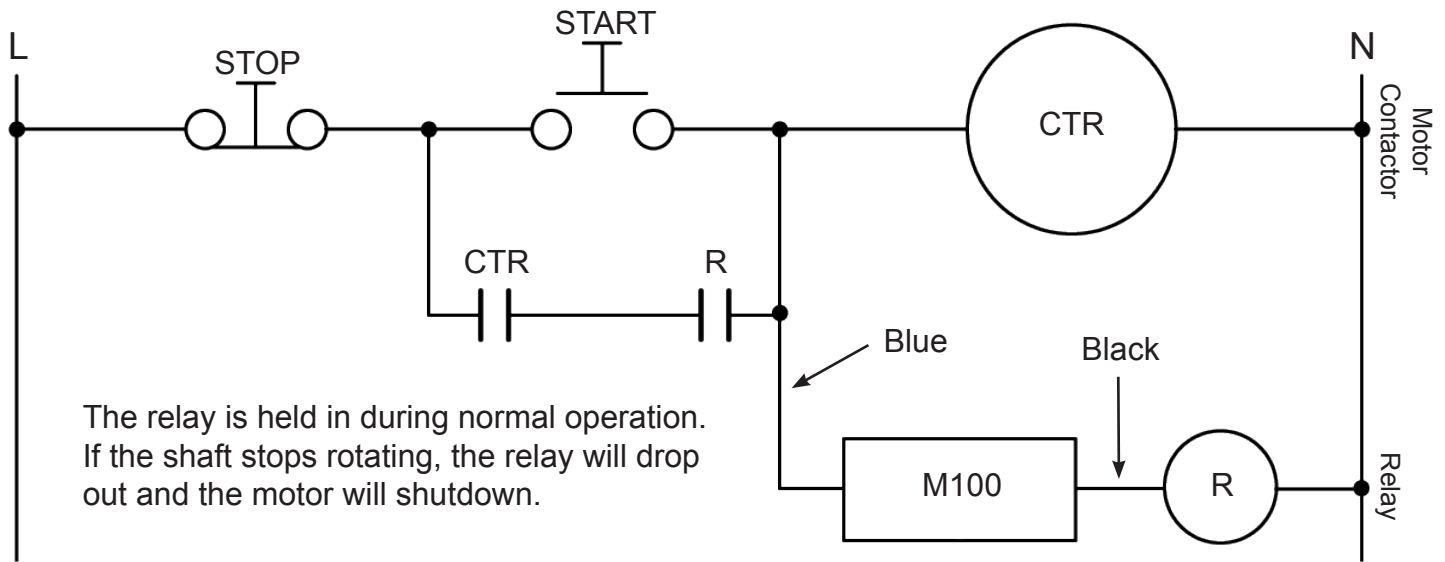


## NOTE

Load refers to any item that limits current (PLC input, ice cube relay, etc.) that you would like the M100 to switch on/off. Load must be the same voltage rating as the supply being used. Total circuit current is 200 mA (max).



## TYPICAL CONTROL WIRING



## TESTING AND COMMISSIONING

1. Check that the unit is correctly installed (see standard wiring diagram).
2. Check that the distance between the target, stud or bolt head and sensing face of M100 Stopswitch is within the minimum distance specified.
3. Start up machine.
4. The unit is now set. If the M100 Stopswitch fails to receive a signal within every 4 second period, (i.e. target stops rotating or there is a power failure) the unit will switch to normally open.
5. Test by sliding a metal putty knife between the sensor and the target.
6. During normal operation the red LED will flash each time an input signal is received. The closed circuit is indicated by a permanent green LED. If the unit fails to receive a signal for 4 seconds the circuit reverts to open state indicated by the green LED going out.

### 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  |
|--------------------------------------|---|
| Red LED (input) does not illuminate  | Check that the load and the supply voltage are the same, and that the total circuit current is less than 200 mA. Slide a screwdriver blade across the face of the sensor, the input LED should flicker. If not, contact 4B.<br><br>If the input LED does flicker, move the front face of the sensor closer to the target and check the target size as specified under "INSTALLATION". |
| Red LED (input) Stays on Permanently | Either increase the gap between the target and the shaft, or between the target and the sensor face.  |

## PARTS & ACCESSORIES



### Whirligig - Shaft Sensor Mount

The Whirligig is a fully guarded target for easy mounting of motion sensors. It is a universal shaft sensor mount suitable for all industry standard cylindrical or DIN style inductive sensors. The Whirligig is available with 1, 2, 4 or 8 pulse targets, and attaches to the machines shaft by a 1/2 in. tapped hole or magnetically using the Mag-Con™ adapter.

### Conduit Adapter

The A12NPT conduit adapter is used to connect the metric threaded body of the sensor to 1/2 inch NPT conduit.



### CDL1 & CDL4 Load Devices (2 Wire)



The CDL1 and CDL4 devices add additional loads to PLC inputs. The CDL1 is for 110 VAC powered inputs, while the CDL4 (not pictured) is designed for 24 VDC (NPN and PNP type) low power inputs. Both devices can be used with the 2 wire M100 Stopswitch.

# 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. Sarl 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.

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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 MERCHANTABILITY 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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