



# SpeedMaster™

SPEED SWITCH CALIBRATION  
AND TESTING DEVICE



Patent Numbers -  
US8947073  
MX321802  
EP26223568

## OPERATION MANUAL

Part No's. SM1 (SpeedMaster) & PP1 (Pulse Pilot)

[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

- Do NOT use when hazardous dust is present!

## NOTICE

When purchased, the SpeedMaster™ has four AA batteries pre-installed with a pull tab to prevent battery discharge. To activate the batteries, remove the pull tab from the battery tray.

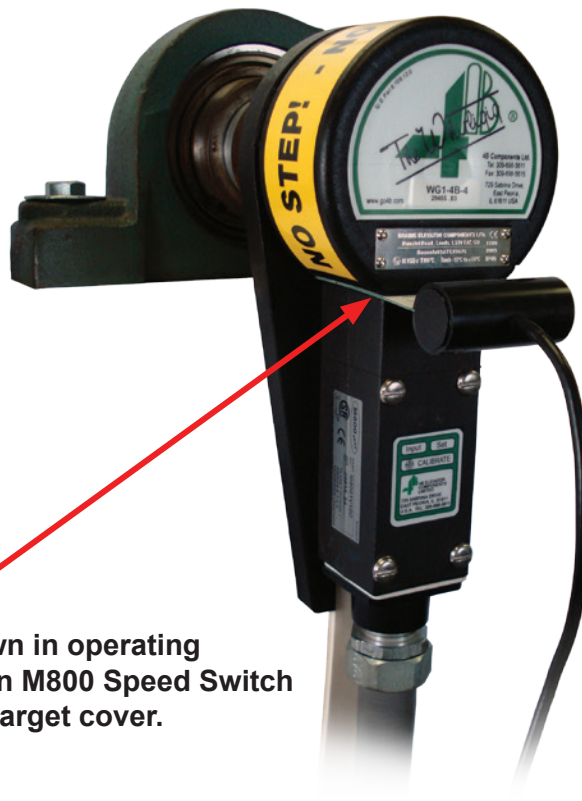
The battery tray is located on the back of the unit behind the LED display. Take off the rubber surround on the unit to expose the battery tray, then remove the two screws holding the battery cover and pull the tab.

## PRODUCT OVERVIEW

The SpeedMaster™ with Pulse Pilot is the only device that accurately tests the calibration of a speed switch, and allows testing of the 10% alarm and 20% shutdown features of the sensor while installed on the machine shaft.

The SpeedMaster™ operates in two modes. Input mode is used to measure the pulse rate at normal speed. Output mode will allow the user to simulate belt underspeed for testing purposes.

The Pulse Pilot fits in the gap between the sensor and cover on the Whirligig® (Image A). The Pulse Pilot will have no effect on the operation of the speed switch until it is connected to the SpeedMaster™ and set to “output” mode.



*Image A -* Pulse Pilot shown in operating position between M800 Speed Switch and Whirligig® target cover.

## ! DANGER

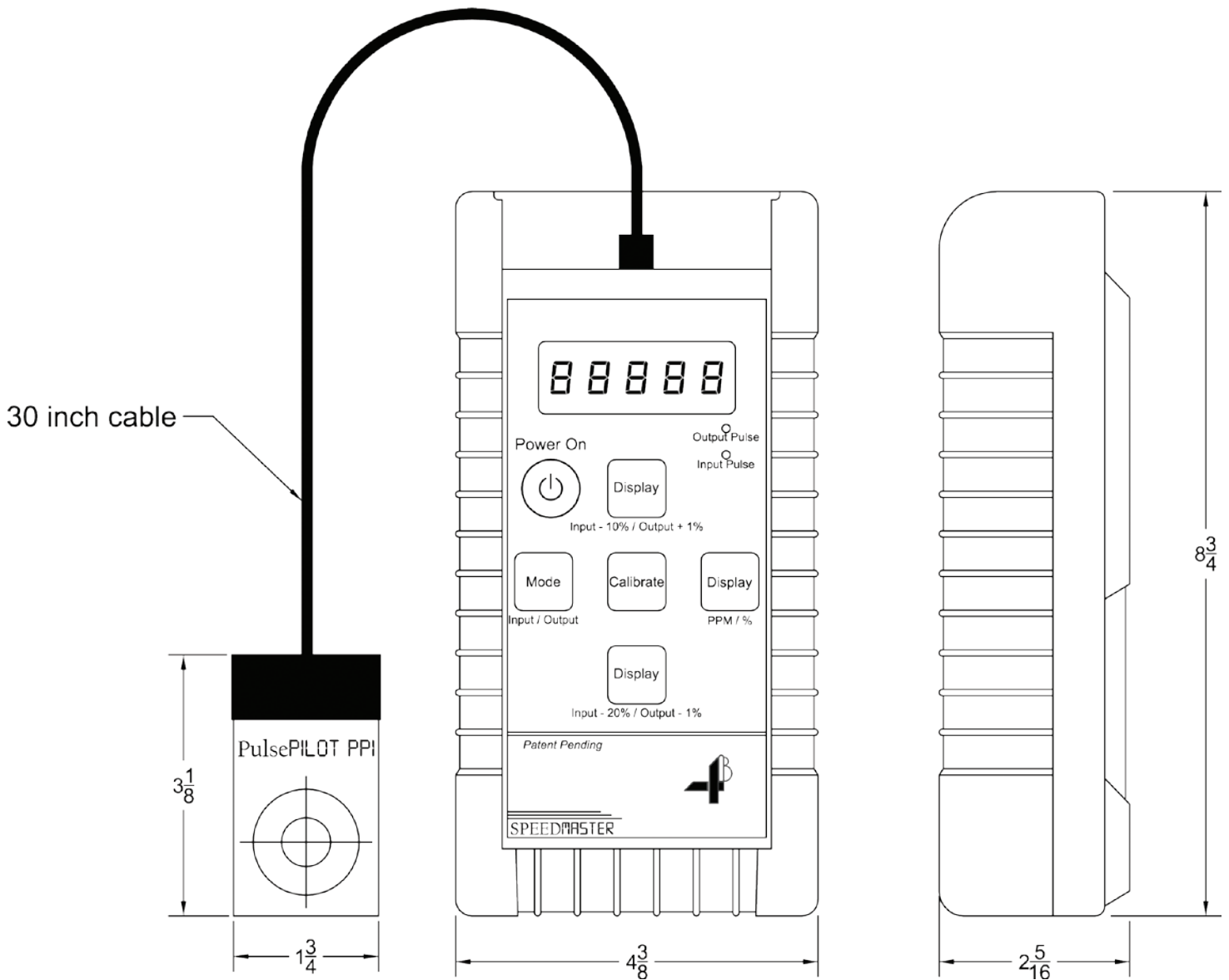
When using the 4B Whirligig speed monitoring accessory the Pulse Pilot can generally be hand held even when the monitored shaft is rotating. However all applications are different and great care should be taken with regard to personal safety.

If a target system supplied by third parties is being used, the Pulse Pilot must not be hand held. The shaft should be stopped and locked out. The Pulse Pilot should then be attached firmly but temporarily (non-metallic industrial adhesive tape may be used). Guards should be reattached and then the system can be restarted.

# SPECIFICATIONS

|                          |  |
|--------------------------|--|
| Supply -                 | 4 AA alkaline batteries (included - see notice on page 6) - 6 VDC  |
| Control -                | Push button  |
| Input Mode Indication -  | Green LED  |
| Output Mode Indication - | Red LED  |
| Display -                | 5 digit - 7 segment, green LED (shaft speed / pluses per minute - PPM)   |
| Power On -               | Plug in Pulse Pilot (top of unit) and press "Power On" button  |
| Power Off -              | Unit powers off automatically if no buttons are pressed for 5 minutes. Unit can be turned of manually by unplugging the Pulse Pilot. |

# DIMENSIONS



# TESTER OPERATION

**Step 1.** Plug the Pulse Pilot coil into the top of the *SpeedMaster™* and press the “Power On” button, the LED display will illuminate.

**Step 2.** Place the Pulse Pilot coil between the speed sensor and target (Image A). The *SpeedMaster™* is now in input mode and the input pulse light will flash each time a target is detected. The display will show speed in pulses per minute (PPM). The whirligig® can have 1, 2, 4, or 8 pulses resulting in a measured speed of 1, 2, 4, or 8 times the shaft’s rpm, respectively.

*Note: Pressing upper “Display Input - 10%” button, will display 90% of measured speed for several seconds, display will then return to measured speed. Pressing lower “Display Input - 20%” button, will display 80% of measured speed for several seconds, display will then return to measured speed.*

**Step 3.** Press the “Calibrate” button, this will set the *SpeedMaster™* to the measured shaft speed.

**Step 4.** Press the “Mode” button, the output light will flash and the calibrated pulse rate will be fed to the sensor.

## WARNING




During step 4, the sensor is receiving pulses only from the *SpeedMaster™*. Shaft pulses are not monitored and the system should be observed for faults and shut down manually in the event of a fault occurring.

At this point, the speed can be artificially raised or lowered by 1%. Pressing the “PPM / %” display button will toggle between speed or percentage of calibrated speed. Each press of the upper display button will increase simulated speed by 1% and on the lower display button will decrease simulated speed by 1%.

The system should alarm/shut down when the underspeed trip point is reached.

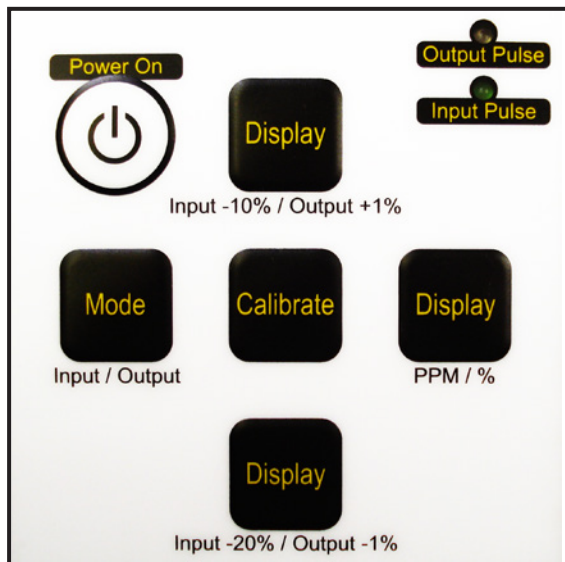
## WARNING

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.

|  |   |
|--|---|
| <br> | <h2> WARNING</h2> <p><b>Rotating parts can crush, cut and entangle.</b></p> <p><b>Do NOT operate with guard removed.</b></p> <p><b>Lockout power before removing guard or servicing.</b></p> |
|--|---|

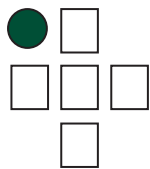


# BUTTON FUNCTIONS



## MODE

Power On - Press once when Pulse Pilot is connected.

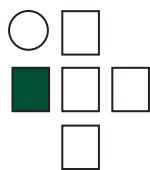


### INPUT

### OUTPUT

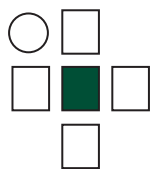
Press to toggle between "Output" and "Input" modes.

Press to toggle between "Input" and "Output" modes.



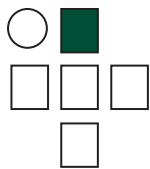
Sets simulated speed generated by *SpeedMaster* to be equal to measured speed.

No function.



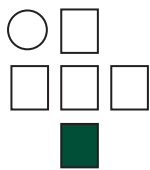
When pressed, displays 90% of measured speed.

Each press increases simulated speed by 1%.



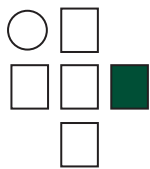
When pressed, displays 80% of measured speed.

Each press reduces simulated speed by 1%.



Toggles between measured speed in pulses per minute (PPM) and % of calibrated speed.

Toggles between simulated speed in pulses per minute (PPM) and % of calibrated speed.



# TROUBLESHOOTING GUIDE

| FAULT  | REMEDY   |
|--|--|
| LED Display not Functioning                  | <ol style="list-style-type: none"><li>1. Make sure Pulse Pilot is plugged into top of the <i>SpeedMaster</i>, LED display will not power on until the Pulse Pilot is attached.</li><li>2. Replace batteries.</li></ol>   |
| Sensor not Responding as Expected to Testing | <ol style="list-style-type: none"><li>1. Make sure the Pulse Pilot is securely inserted between the sensor and the Whirligig (See Image A).</li><li>2. If equipment shuts down prematurely, ensure equipment is functioning correctly. For example: on a bucket elevator, check for belt slippage.</li><li>3. If equipment has a delay or does not shut down, check sensor calibration. If sensor is still not responding as expected, contact 4B.</li></ol> |

# 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 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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