

WDA4 INSTRUCTION MANUAL



Approvals



WDA Sensor

**Belt Alignment / Motion / Slack and Broken
Chain Monitor.**

Part Number: WDA4Vxxxx/xx

REV061724



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CUSTOMER SAFETY RESPONSIBILITIES

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.

1. SAFETY NOTICE TO OUR CUSTOMERS

- A. 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 or place of installation. All electrical or mechanical installation should be undertaken by an experienced and qualified professional. Failure to correctly install 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.

2. READ ALL LITERATURE PROVIDED WITH YOUR PRODUCT

Please read all user, instruction, and safety manuals to ensure that you understand your product operation and can safely and effectively use this product. If the equipment is used in a manner not specified in this manual, the protection provided by the equipment may be impaired.

3. YOU BEST UNDERSTAND YOUR NEEDS

Every customer and operation are unique, and only you best know the specific needs and capabilities of your operation. Please contact 4B (contact options are on the back cover of this manual) 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.

4. 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.

5. ESTABLISH AND FOLLOW REGULAR MAINTENANCE AND INSPECTION SCHEDULE FOR YOUR 4B PRODUCTS.

You should develop a proper maintenance and inspection program to confirm that your system is always in good working order. 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 always be created and retained by you.




6. 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 4B product 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 contact 4B (contact options are on the back cover of this manual).

7. SERVICE REQUEST

If you have questions or comments about the operation of your 4B product or require it to be serviced, please contact 4B (contact options are on the back cover of this manual). Please have available product part numbers, serial numbers, and approximate date of installation. 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.

 WARNING	
 	<p>Moving parts can crush and cut.</p> <p>Lockout power before removing guard or servicing.</p> <p>Do NOT operate with guard removed.</p>

PRODUCT OVERVIEW

The 4B WDA sensor is designed to detect moving ferrous (magnetic) material passing within its sensing range, and is used in conjunction with a speed relay, PLC or with 4B's Watchdog™ Elite and A400 Elite control units. The sensor will not detect non-ferrous material such as plastic, rubber, stainless steel or aluminum.

The WDA can detect ferrous steel elevator buckets from the side of the elevator leg, or through the elevator belt from the back of the leg. For plastic elevator buckets, the steel elevator bolts used to attach the buckets can be targeted by installing the WDA on the back of the leg.

A more specialized use for the WDA switch is as a broken/slack chain detector on drag chain conveyors, or as a non-contact speed switch for screw conveyors.

A flashing LED on the end of the sensor indicates a target has been detected. A potentiometer control screw, located below the LED, allows the target sensing range to be adjusted from 25 to 75 mm. Two output signals are provided: one signal is a pulse output, representing each object detected: the second signal is a continuous output when moving objects are detected (see wiring diagram).

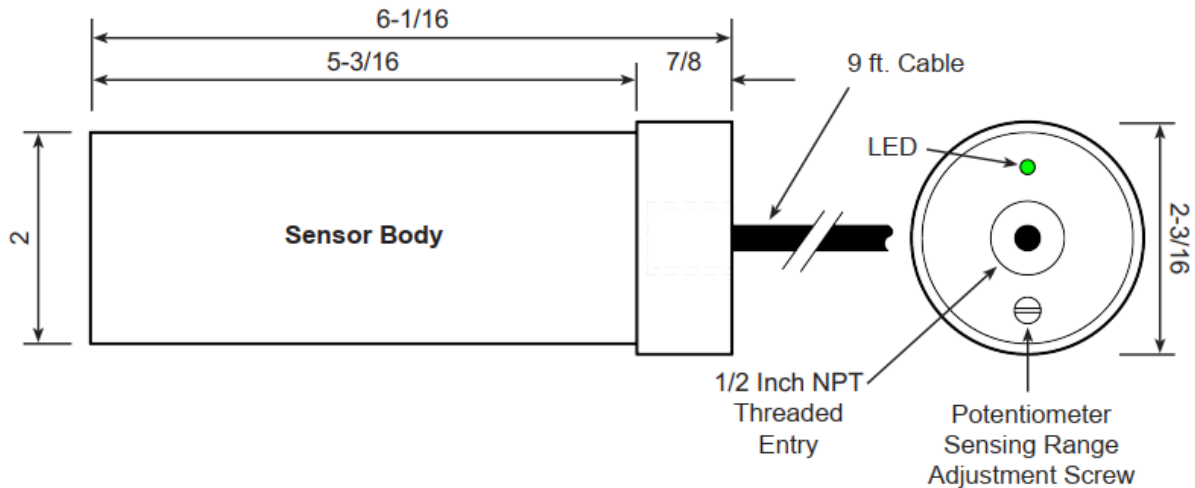
SPECIFICATIONS

Operating Voltage Range	12 to 24 VDC + 10%
Supply Current	40 mA
LED Indicator	<ul style="list-style-type: none"> • Green (Flashing) – Target Detected • Green (Off) – No Target Detected
Pulses Output (MAX)	Solid State Relay, 25 mA sink or source @ 240 VAC/DC (MAX), non-inductive
Continuous Output (MAX)	Solid State Relay, 25 mA sink or source @ 240 VAC/DC (MAX), non-inductive
Detection Range	Adjustable 25 to 75mm
Detection Rate	20 – 2,000 PPM (Pulses Per Minute)
Cable	3m 6 core
Operating Temperature	-20 °C to +50 °C
Conduit Entry	½" NPT
Ingress Protection	IP66

APPROVALS

	<p>Baseefa05ATEX0088X, BAS23UKEX0063X</p> <p>WDA4V341AI, WDA4V342AI</p> <p> II 1D Ex ta IIIC T₂₀₀120°C Da IP66 Tamb -20°C to +50°C</p> <p>WDA4V341AI-HT, WDA4V342AI-HT</p> <p> II 1D Ex ta IIIC T₂₀₀150°C Da IP66 Tamb -20°C to +50°C</p>
<p>IECEX</p>	<p>IECEX BAS 05.0031X</p> <p>WDA4V341AI, WDA4V342AI</p> <p>Ex ta IIIC T₂₀₀120°C Da IP66 Tamb -20°C to +50°C</p> <p>WDA4V341AI-HT, WDA4V342AI-HT</p> <p>Ex ta IIIC T₂₀₀150°C Da IP66 Tamb -20°C to +50°C</p>

DIMENSIONS



SPECIFIC CONDITIONS OF USE

1. The integral cable shall be terminated in a suitably certified junction box or in a safe area.
2. The sensor shall be internally earthed via the green wire of the integral cable.
3. The sensor shall be externally earthed via one of the following three methods:
 - i) Via the 1/2" NPT threaded entry in the metallic end cap of the WDA4 sensor that is fitted with metal conduit by the end user. The conduit shall be earthed by the end user and they shall check that the earth connection is less than 500 Milli Ohms, between the metallic end cap of the WDA4 sensor and the metallic conduit.
 - ii) Via the Don Electronics WDA4 metallic mounting bracket, that is fitted around the sensor housing. The mounting bracket is fitted directly to the end users earthed machine housing, via the mounting brackets' 4 off bolts complete with anti-rotation and anti-vibration fixings. The end user shall check that the earth connection is less than 500 Milli Ohms, between the metallic body of the WDA4 sensor and the metallic mounting bracket, and between the mounting bracket and machine housing.
 - iii) Via a wire and ring crimp fitted on the external earth stud arrangement located on the WDA4 sensor end cap and wire connection to the site earth point.
4. The supply circuit of the system where the equipment is connected shall be protected by a suitably rated fuse capable of interrupting a prospective short circuit current of 1.5 kA.

EXTERNAL EARTHING OPTIONS

The WDA4 can be externally earthed using one of the following options:

1. 1/2" NPT conduit entry when an earthed conduit is fitted.
2. Earth stud present on the version 2 of end plug (bung), WDA4V342.
3. Using metal bracket when fitted to an earthed machine housing.

(For options 1 & 2, brackets do not need to be there, or any bracket type can be used).

Please see below for the instructions related to the above mentioned external earthing options.

External Earthing Option 1 Instructions

1. Confirm that the WDA4 sensor is fully powered down.
2. Ensure that the 1/2" NPT male conduit thread is earthed suitably as per the local electrical wiring regulations (such as NEC, CEC, EN IEC 60079-14).
3. Thread the Earthed Conduit Fitting into the 1/2" NPT threaded female entry of the WDA4. Hand-tighten it securely but avoid over-tightening, which can damage the threads.
4. Double-check that all connections are secure and properly tightened.
5. Before energizing the product, verify that the earth connection is secure and effective by testing it with a suitable continuity tester or multimeter as quantified in the specific conditions of use.

External Earthing Option 2 Instructions

The WDA4 is shipped with the following accessories for earthing the product.

2 x Saddle Washers

1 x Shake Proof Washer

1 x Bolt

1. Confirm that the WDA4 sensor is fully powered down.
2. Prepare a ring-crimped earth cable, strip the cable end, insert it into the ring terminal, and crimp securely using the appropriate crimping tool. Ensure that the cable is properly earthed as per the local electrical wiring regulations (such as NEC, CEC, EN IEC 60079-14).
3. Stack the components in the following order from bottom to top:
 - a. Earth Stud with a threaded hole for the bolt
 - b. Saddle Washer with sides facing up
 - c. The crimped end of the Earth Cable
 - d. Saddle Washer with sides facing down
 - e. Anti-Vibration Washer

4. Thread the bolt through the entire stack-up, ensuring it passes through all the components in the specified order.
5. Using an appropriate tool, tighten the bolt securely but avoid over-tightening.
6. Check that all components are securely in place and that the earth cable is firmly attached.
7. Before energizing the product, verify that the earth connection is secure and effective by testing it with a suitable continuity tester or multimeter as quantified in the specific conditions of use.

External Earthing Option 3 Instructions

1. Confirm that the WDA4 sensor is fully powered down.
2. Ensure that the machine is earthed suitably as per the local electrical wiring regulations (such as NEC, CEC, EN IEC 60079-14).
3. Clean the sensor tube with a dry soft cloth to remove any residual material and make sure that the metal tube is contaminant free.
4. Identify the area of the sensor tube to install the mounting bracket without interfering with sensor fixing on the machine (depending on the application).
5. Put both the bracket's halves over the sensor tube & using 2 off bolts & Nord-lock/wedge washer along with anti-vibrational Nyloc locking nut fittings.
6. Align the bracket & secure the sensor assembly with machine using 4 off bolts & anti rotational Nord-lock/wedge washers along with ant vibrational Nyloc locking nut fittings.
7. Before energizing the product, verify that the earth connection is secure and effective by testing it with a suitable continuity tester or multimeter as quantified in the specific conditions of use.

POTENTIAL ELECTROSTATIC CHARGING HAZARD

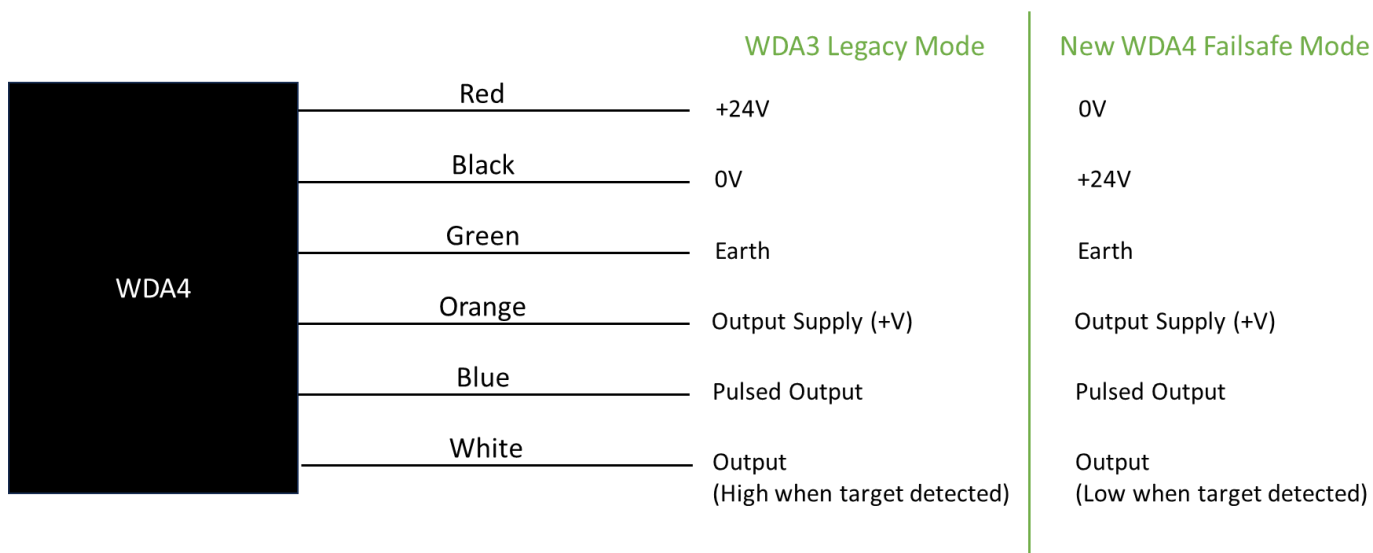
Please check if the markings on the WDA4 are on an adhesive label, if this is the case then observe the following warning, if the marking is engraved into the body the warning maybe disregarded.

Warning: POTENTIAL ELECTROSTATIC CHARGING HAZARD, Clean only with a damp cloth.

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.

Where required 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. If required, mount a suitable junction box within the supplied length of the product's cable and (if required, using a suitable conduit to protect the cables) make the necessary wiring connections inside this junction box.



INSTALLATION

Please note that the following instructions are guidelines and suggestions only, the end users may have to adapt these for the end application. All installations must conform to the local electrical wiring regulations (such as NEC, CEC, EN IEC 60079-14). The below instructions are given in imperial, the user may use the equivalent metric dimensions.

Sensors are placed in pairs at the head and boot on the up side of the elevator leg. Sensor installation will vary depending on the type of elevator bucket (metal or plastic). Once the proper placement has been identified, cut a 2-1/4 inch (57 mm) diameter hole in the elevator leg housing for each sensor.

The WDA sensor can be mounted using one of the following three methods -

1. Drill and tap the machine casing for 5/16 inch threaded bolts. Make sure that the bolts used to secure the sensor mounting bracket are short enough that they do not interfere with the operation of the machine.
2. Use threaded rivet nuts for 5/16 inch threads. The length of the rivet nut will depend on the thickness of the machine's casing. Make sure that the bolts used to secure the sensor mounting bracket are short enough that they do not interfere with the operation of the machine.
3. CD weld 5/16 inch threaded welding studs to the machine casing.

To drill the four 5/16 inch bolt holes for the sensor mounting bracket, use the supplied paper template from the sensor manual or use the bracket itself, by centring on the existing 2-1/4 inch (57 mm) hole.

For side mounting of steel buckets (Option 1), make sure that the belt is centred on the pulley and install a sensor on each side of the trunking, with the sensor centred on the edge of the elevators bucket at a distance of no more than 2 inches (50 mm) from the buckets, or with the outer edge of the sensor in line with the tips of buckets with very close vertical spacing at a distance of no more than 1-1/2 inches (38 mm) from the buckets. Set the sensor so that it does not have to work at maximum sensitivity. Always ensure that in the worst case of elevator misalignment, the sensors will not be damaged within the elevator.

For rear mounting of plastic buckets with steel bolt heads (Option 2), make sure that the belt is centred on the pulley and install a sensor on either side of the rear of the trunking. The sensor should be centred on the outside edge of the outermost bucket bolts and protrude slightly through the trunking around 1 1/2 inch (25.4 mm) from the bolt head.

The sensor depth within the elevator leg can be adjusted by loosening the adjustment bolt on the mounting bracket, sliding the sensor to the required depth and retightening the bolt.

TESTING AND MAINTENANCE

Periodically test the WDA4 and the system to ensure that both are operating correctly.

1. Check that the unit is correctly installed. (See Electrical Setup)
2. Ensure that all cabling is in a good state, and that all the electrical connections are secure and in good order.

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.

PRODUCT NOMENCLATURE

WDA4V



A: VOLTAGE

OPERATIONAL VOLTAGE

- 3. 12 VDC
- 4. 24 VDC
- 34. 12-24 VDC

B: CONDUIT ENTRY

THREAD SIZE

- 1. 1/2" NPT THREAD
- 2. 1/2" NPT THREAD WITH EARTH STUD

C: CERTIFICATIONS

APPROVALS

- C NRTL (NORTH AMERICA)
- A ATEX, UKEX
- I IECEX
- N INMETRO
- CAI NRTL, ATEX, UKEX, IECEX

D: T CLASS VERSION

D = -HT (IF THE HIGH T CLASS 150°C VERSION IS MANUFACTURED)

D WILL BE OMITTED FOR THE STANDARD T CLASS 120°C VERSION

/X: Cable length

DEFAULT CABLE LENGTH IS THREE METERS

/X WILL BE OMITTED FOR THE DEFAULT CABLE LENGTH

E: CLAMP BRACKET MATERIAL OPTION

- E OMITTED, PLASTIC CLAMP BRACKET
- Y, ALUMINIUM CLAMP BRACKET
- Z, STAINLESS STEEL CLAMP BRACKET

EXAMPLE PART NUMBER

WDA4V342AY

WDA4V ALIGNMENT SENSOR
34 12-24 VDC
2 1/2" NPT CONDUIT ENTRY WITH EARTH STUD
AI ATEX/UKEX and IECEX
STANDARD T CLASS
3 METER CABLE LENGTH
Y ALUMINIUM BRACKET

Notes:

1) Approval Certifications

THE LIST ONLY SHOWS THE EXAMPLES OF APPROVAL FOR "IEC" BASED APPROVALS, DON ELECTRONICS NAME SHOULD BE PRESENT ON THE PRODUCTS COMBINATION OF DIFFERENT CERTIFICATES MAY ALSO BE USED

Manufactured by Don Electronics Ltd, Westfield Industrial Estate, Kirk Lane, Yeadon, LS19 7LX, UK

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All products sold are warranted by the company 4B Components Limited and 4B Braime Components Limited 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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