# Watchdog™ Super Elite
## BUCKET ELEVATOR & BELT CONVEYOR HAZARD MONITORING SYSTEM



EN - FR - CN - RU

**INSTALLATION INSTRUCTIONS**

# OPERATION MANUAL
**Part No.'s - WDC4V4CAI, WDC4V46CAI**
**Hardware Version R4 - Software Version 4.9.X**

# www.go4b.com

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# 1. 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.

## *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.)  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.  If the equipment is used in a manner not specified in this manual, the protection provided by the equipment may be impaired.

### 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 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.

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⚠️**WARNING**

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

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# 2. PRODUCT OVERVIEW

The Watchdog Super Elite (WDC4) is a user-programmable, microprocessor controlled bucket elevator and belt conveyor monitor.  The control unit accepts signals from sensors for belt misalignment, belt speed & slip, continuous bearing temperature, pulley misalignment and plug condition monitoring.  The unit is able to sound an alarm and provide shutdown control of the elevator or conveyor, and feeding system, when a potentially hazardous condition is detected.

Microprocessors and electronics are housed in a self-contained wall mounted control unit.  An LCD screen on the front of the unit displays system status.  Calibration and set-up parameters are accessed via a password and front panel touch buttons.

The Watchdog Super Elite can also integrate into HazardMon.com®, which is a secure cloud based hazard monitoring solution providing status notifications and data logging for bucket elevators and conveyors.  Live system status, graphs and historical data can be viewed on any web-enabled device (smartphone, tablet PC, desktop or laptop computer).  Emails can be sent to notify users whenever a change in the system's health is detected. An automated maintenance feature allows site operators to verify that all sensors on the system are operational and working correctly.

# 3. SPECIFICATIONS

| | |
|---|---|
| Supply Voltage - | 120 to 240 VAC or 24 VDC (WDC4V46CAI)<br>24 VDC (WDC4V4CAI) |
| Power Consumption (Max.) - | 12 Watts |
| Power Terminals - | 14 AWG / 4 mm² |
| Signal Terminals - | 16 AWG / 2.5 mm² |
| Alarm Relay Contacts - | 1 Pole Normally Open - 8A @ 250 VAC Voltage Free Changeover |
| Stop Relay Contacts - | 1 Pole Normally Open - 8A @ 250 VAC Voltage Free Changeover |
| Sensor Supply - | 24 VDC @ 800 mA (Across F1, F2 and F3) |
| Sensor Inputs - | 15 (Expandable to 27 with Auxiliary Boards) |
| Interlock (Run Signal) Input - | 24 VDC or 120 to 240 VAC |
| Dimensions (H x W x D) - | 11-3/4 x 9-1/2 x 5-1/4 (inches) / 298 x 241 x 133 (mm) |
| Fixing Centers (H x W) - | 10-7/8 x 6 (inches) / 276 x 152 (mm) |
| Cable Entry - | 2 Holes 1-1/8 in. Diameter (28 mm) |
| Weight - | 3 lbs / 1.3 kg |
| Protection - | IP66 |
| Approvals - | **ATEX / IECEx/UKEX - V4**<br>Ex tb IIIC T125° Db IP66 TAMB -20°C to +50°C IECEx BAS05.0026X<br>C€0598 ᵁᴷCA 1180 Ex II 2D Ex tb IIIC T125° Db IP66 TAMB -20°C to +50°C<br>Baseefa04ATEX0131X  BAS21UKEX0306X<br>**ATEX / IECEx/UKEX - V46**<br>Ex tc IIIC T125°Dc IP66 TAMB -20°C to +45°C IECEx BAS11.0018X<br>C€0598 ᵁᴷCA 1180 Ex II 3D Ex tc IIIC T125°Dc IP66 TAMB -20°C to +45°C<br>Baseefa II ATEX 0033X  BAS21UKEX0309X<br>**CSA - V4**<br>Ex tb IIIC T125°C Db IP66 Tamb -20°C to +50°C<br>Zone 21 AEx tb IIIC T125°C Db IP66 Tamb -20°C to +50°C<br>Class II Division 1, Groups E, F and G T125°C<br>(When used with a Class2 power supply)<br>**CSA - V46**<br>Ex tc IIIC T125°C Dc IP66 Tamb -20°C to +45°C<br>Zone 22 AEx tc IIIC T125°C Dc IP66 Tamb -20°C to +45°C<br>Class II Division 2, Groups F and G T125°C<br>IP66<br>**EAC Ex - V46 ONLY**<br>RU C-GB.Аж58.B.00249/20      Ex tc IIIC T125° Dc X IP66 -20°C ≤ Tamb ≤ +45°C |
| PLC Communications - | • Modbus TCP/IP (Standard)<br>• ControlLogix® (See ProSoft® Technical Note - Available Online) |

<table>
<tr><td colspan="1" align="center">**NOTE**</td></tr>
</table>

| **NOTE** |
|---|
| Conditions of use:<br>1.　　The equipment shall be suitably earth bonded via the PCB mounted terminal inside the equipment enclosure.<br>2.　　Warning: The equipment is a potential static hazard, clean only with a damp cloth.<br>3.　　Do not allow dust to build up on the equipment. |

## 4. FEATURES

**BELT MISALIGNMENT DETECTION -**

The Watchdog Super Elite offers greater flexibility for belt misalignment monitoring.  The supported methods are:

| METHOD | DESCRIPTION | APPLICATION |
|---|---|---|
| Contact | Force activated contact signal. When contact from the belt occurs an alarm is generated. | Standard method, most reliable for misalignment detection. |
| Pulse | Continuous pulses are generated by detecting a ferrous metal source (bolts, buckets, chain). Absence of pulses generates an alarm condition. | Used for applications requiring non-contact sensors. |
| Rub Block | Processes temperature information from brass blocks to detect belt misalignment. When the belt rubs against the brass block heat from friction is generated. | Alternative detection method, not recommended due to unreliability. |

**BELT SPEED / SLIP DETECTION -**

The Watchdog Super Elite also offers greater flexibility for belt speed/slip monitoring.  The supported methods are:

| METHOD | DESCRIPTION | APPLICATION |
|---|---|---|
| Dedicated Speed | Shaft rotation speed measurement. | Standard method, most commonly used. |
| Highest Pulse Rate | Speed determined by the detection of ferrous metal (bolts, buckets, chain) passing by the alignment sensors. | Used for applications requiring non-contact belt alignment sensors. |
| Differential Speed | A combination of both methods listed above. | Used with variable speed drives (VSD). |

## HOT BEARING DETECTION -

The Watchdog Super Elite can monitor up to 8 NTC type temperature sensors (standard).  This can be expanded to a total of 20 NTC sensors with optional auxiliary boards.  The supported alarm methods are:

| METHOD | DESCRIPTION | APPLICATION |
|---|---|---|
| Absolute Temperature (ABS) | An alarm is raised if the sensed temperature exceeds the preset trip point. | Simple bearing detection for over heating, most commonly used. |
| Relative Temperature (REL) | An alarm is raised if the difference between the sensed temperature and the selected relative or ambient source temperature is greater than the preset trip point. | Used in addition to the first method and provides much earlier fault detection.  Especially useful in cold weather as it is no longer necessary to wait until the bearing gets to a very high temperature before a failure detected. |
| Rate of Rise (dR - delta R) | An alarm is detected if the bearing starts to heat up at a rate higher than the preset value in degrees per minute. | Used in addition to the two methods above, and provides for an alternative fault detection for a failing bearing. |

## AUXILIARY INPUTS -

The Watchdog Super Elite also has auxiliary inputs for pulley misalignment, plug condition or blocked chute monitoring. These offer additional protection and prevent unnecessary costly downtime.

## SETTINGS BACKUP & TRANSFER -

The controller is equipped with an SD card slot, and supports the ability to save and restore the system settings from the memory card.  This also allows system settings from one unit to be copied to another, which is especially useful to duplicate settings on multiple controllers at the same location.

## WDC4 CONFIGURATOR SOFTWARE -

The Watchdog Super Elite can be programed directly through the controller's LCD menu screen, or by using the WDC4 Configurator Software (Appendix C).  The software tool makes programming the Watchdog easier by providing all the system settings for each profile menu into one screen.  Once a profile setup file has been created, it can be saved to an SD card and then uploaded to the Watchdog.  For remote sites, the file can be emailed to an on-site technician, who can upload the file.

## EVENT & ALARM LOGGING -
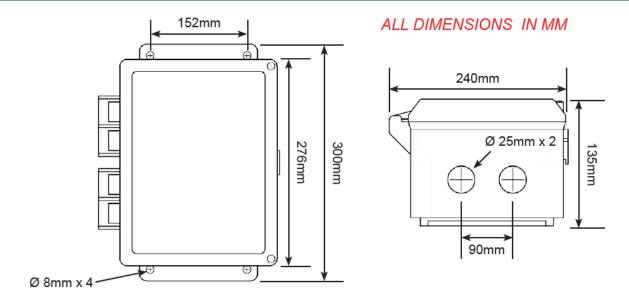
The last 40 events and alarms are logged and can be viewed directly from the Watchdog's main LCD screen.  If an SD card is installed, all events and alarms (not just the last 40) are saved on the card.  The file can be imported into a spreadsheet program to create more detailed logging and trending reports.

## HAZARDMON.COM CONNECTIVITY -

The Watchdog Super Elite has in-built network support for Hazardmon.com service connectivity. HazardMon is a secure cloud based hazard monitoring solution providing status notifications and data logging for bucket elevators and conveyors.  Live system status, graphs and historical data can be viewed on any web-enabled device (smartphone, tablet PC, desktop or laptop computer).  Emails can be sent to notify users whenever a change in the system's health is detected.  An automated maintenance feature allows site operators to verify that all sensors on the system are operational and working correctly.

To review of all the available features, and to see how the system works for yourself register for a free demo account at: https://hazardmon.com.

# 5. DIMENSIONS



ALL DIMENSIONS IN MM

# 6. INSTALLATION

The WDC4 should be installed in a suitable control or switch room, and mounted at eye level so that the warning lights and LED screen can be readily seen.

**ENCLOSURE INSTALLATION -**

1. Use the correct cable, glands and sealing arrangement in accordance with IEC 60079-14.
2. Where other certified components are used as part of the assembly or installation procedure, the user must take into account any limitations which might be listed on the relevant certificates.
3. The box is supplied with 2 x 25mmØ pre drilled holes in the bottom face. All unused entry apertures must be sealed using component certified stopping plugs. The end user must install component or apparatus certified stopping plugs and cable glands/conduit in strict accordance with the manufacturer's instructions. In order to connect conduit to the control unit enclosure, use a CSA and/or UL certified Class II conduit hub (for example, a Myers™ hub) with a suitable bonding (grounding) connection that is rated for the installation environment.
4. The enclosure must not be modified in any way, as this will invalidate the certification.
5. All wiring must be carried out in accordance with relevant codes of practice and/or instructions.
6. The voltage, current and maximum power dissipation shown on the label must not be exceeded.
7. The wiring installation must extend to within 1 mm of the metal face of the terminal.
8. All leads must be insulated for the appropriate voltage.
9. Not more than 1 single or multiple strand cable is to be connected to any terminal unless multiple conductors have previously been joined in a suitable manner such that they present a single connection point to the terminal.
10. A flat-head or straight screwdriver of the correct size should be used to tighten terminals.
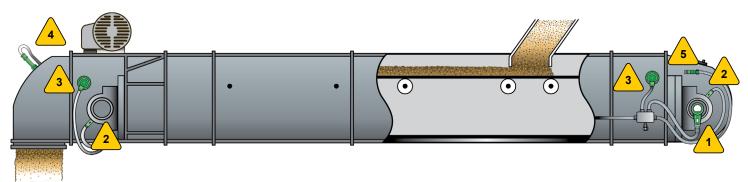
**SENSOR INSTALLATION -**

Follow the installation instructions for each sensor as provided in each individual product manual.

## ⚠️WARNING

The Control Unit is susceptible to static voltage, static handling precautions should be taken. Connection of a clean ground to terminal 16 is essential for optimum performance. Since the enclosure is a static hazard, it should only be cleaned with a damp cloth.

## TYPICAL SENSOR PLACEMENT FOR BUCKET ELEVATORS & ENCLOSED BELT CONVEYORS

**1** SPEED MONITORING
Qty 1 - One sensor located on either side of the tail or boot shaft.

**2** BEARING TEMPERATURE
Qty. 4 - One sensor for the bearings at each end of the drive and tail or head and boot shafts.

**3** BELT MISALIGNMENT
Qty. 4 - Sensors work in pairs, one for each side of the belt on the drive and tail or head and boot sections.
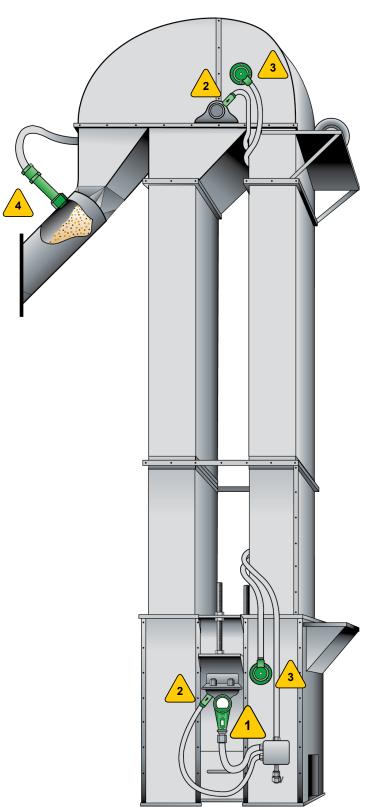
**4** PLUG INDICATION
Qty. 1 - One sensor located near the top of the drive section or spouting by the discharge.

**5** TAIL PULLEY MISALIGNMENT
(Enclosed Belt Conveyor)
Qty. 2 - One sensor located on each side of the housing on the conveyor tail section.

# 8. ELECTRICAL CONNECTION

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.

All electrical connections are made via 3 sets of terminals provided as shown in image 1.

**FUSE RATINGS -**

In order to maintain the product certification, all fuses MUST be replaced with equivalent fuses at the same rating. Failure to do so will invalidate the certification and any warranties which may exist.

Model WDC4V4CAI -

- F1, F2, F3, F5 200 mA maximum.
- F1 to F3 are used to limit the current available to the sensor inputs.
- F5 is used to limit the current available to the internal electronics.
- F6 is not used.

Model WDC4V46CAI -

- F1 to F3 2 amp maximum, used to limit the current available to the sensor inputs.
- F5 200 mA, used to limit the current available to the internal electronics.
- F6 2 amp maximum, used to protect the AC power supply.

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## NOTE

To calibrate speed and utilize the Watchdog's built-in alarm and shutdown capabilities, a motor interlock (run signal) is required. For typical motor interlock wiring examples, review the wiring diagrams for terminals 6 & 7.

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## NOTE

Recommended cable type is Belden 5508FE with 10 conductors each 22 AWG, shielded. Overall outer diameter is 0.23 inches. Belden 5508FE wire colors are used in all of the sensor wiring diagrams in section 9.
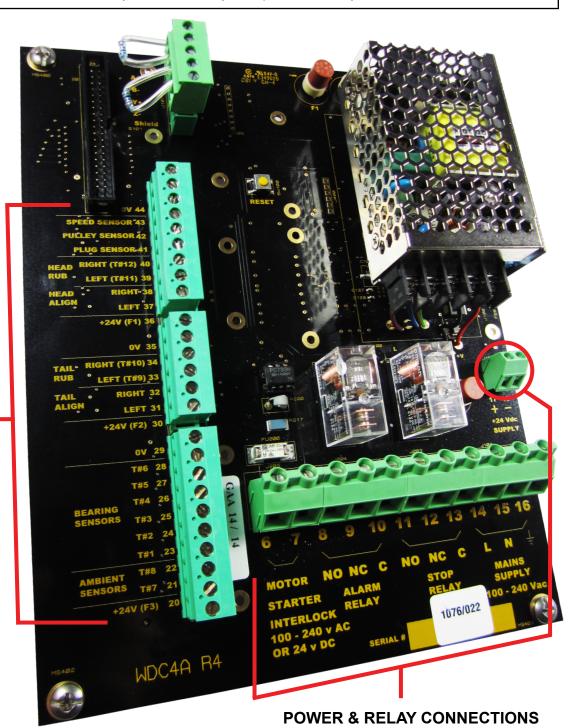
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⚠ **WARNING**

Rotating parts can crush, cut and entangle.

Do NOT operate with guard removed.

Lockout power before removing guard or servicing.

## FIELD WIRING CONNECTIONS

44 - 0 VDC
43 - Speed Sensor
42 - Pulley Sensor
41 - Plug Sensor
40 - Head Rub - Right
39 - Head Rub - Left
38 - Head Align - Right
37 - Head Align - Left
36 - 24 VDC (Fuse F1)

35 - 0 VDC
34 - Tail Rub - Right
33 - Tail Rub - Left
32 - Tail Align - Right
31 - Tail Align - Left
30 - 24 VDC (Fuse F2)

29 - 0 VDC
28 - Bearing Sensor 6
27 - Bearing Sensor 5
26 - Bearing Sensor 4
25 - Bearing Sensor 3
24 - Bearing Sensor 2
23 - Bearing Sensor 1
22 - Ambient Sensor 2
21 - Ambient Sensor 1
20 - 24 VDC (Fuse F3)

**Image 1 -
Inside View - Bottom Board
WDC4 Wiring Connections**

## POWER & RELAY CONNECTIONS

06 - (-) Motor Starter Interlock (Run Signal)
07 - (+) Motor Starter Interlock (Run Signal)
08 - Alarm Relay Normally Open
09 - Alarm Relay Normally Closed
10 - Alarm Relay Common
11 - Stop Relay Normally Open
12 - Stop Relay Normally Closed
13 - Stop Relay Common
14 - 120 to 240 VAC Connection
15 - VAC Neutral Connection
16 - Ground or 0 Volt Connection
17 - (+) 24 VDC Connection
18 - (-) 24 VDC Connection
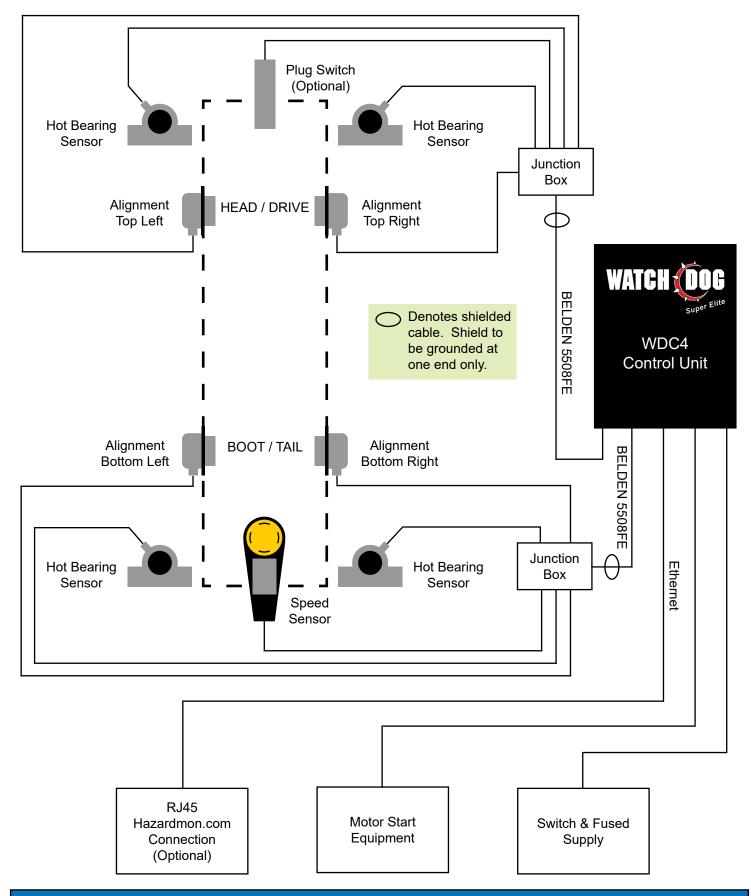
# 9. WIRING DIAGRAMS

## 9.1 WIRING BLOCK DIAGRAM FOR BUCKET ELEVATOR & BELT CONVEYOR



**NOTE**

- Metal conduit and liquid tight should be used to protect the cables from physical damage.
- Left and right are determined when facing the direction the bucket elevator discharges.

## 9.2 CONTROL WIRING DIAGRAM FOR WDC4V46CAI (120 to 240 VAC)

Alarm and Stop Relays are Shown Energized in the Normal Running Condition



Diagram A: Automatic Shutdown
Control Signal to Feed Equipment



| NOTE |
| :---: |

To calibrate speed and utilize the Watchdog's built-in alarm and shutdown capabilities, a motor interlock (run signal) is required.  For typical motor interlock wiring examples, review the wiring diagrams for terminals 6 & 7.

# 9.3 CONTROL WIRING DIAGRAM FOR WDC4V4CAI (24 VDC)

Alarm and Stop Relays are Shown Energized in the Normal Running Condition



DC Connection for Model WDC4V4CAI

Diagram A: Automatic Shutdown
Control Signal to Feed Equipment



| NOTE |
| --- |
| To calibrate speed and utilize the Watchdog's built-in alarm and shutdown capabilities, a motor interlock (run signal) is required. For typical motor interlock wiring examples, review the wiring diagrams for terminals 6 & 7. |

# WATCHDOG CONTROL UNIT #1

Alarm and Stop Relays are Shown Energized in the Normal Running Condition
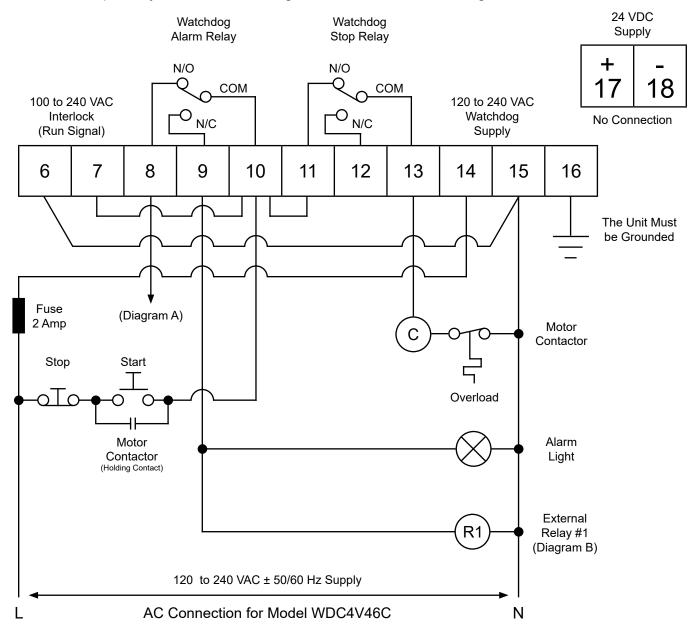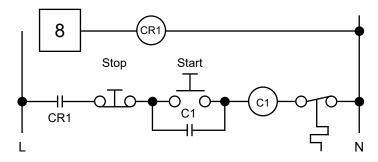


AC Connection for Model WDC4V46C

Diagram A: Automatic Shutdown
Control Signal to Feed Equipment



## NOTE

To calibrate speed and utilize the Watchdog's built-in alarm and shutdown capabilities, a motor interlock (run signal) is required. For typical motor interlock wiring examples, review the wiring diagrams for terminals 6 & 7.

# WATCHDOG CONTROL UNIT #2

Alarm and Stop Relays are Shown Energized in the Normal Running Condition

24 VDC Supply

Watchdog Alarm Relay

Watchdog Stop Relay

| + | - |
|---|---|
| 17 | 18 |

No Connection

N/O    COM    N/C

N/O    COM    N/C

100 to 240 VAC Interlock (Run Signal)

120 to 240 VAC Watchdog Supply

| 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|----|----|----|----|----|----|----|

The Unit Must be Grounded

Fuse 2 Amp

(Diagram A)

Stop    Start

Motor Contactor
(Holding Contact)

C — Motor Contactor

Overload

Alarm Light

R2 — External Relay #2 (Diagram B)

120 to 240 VAC ± 50/60 Hz Supply

L                    AC Connection for Model WDC4V46C                    N

Diagram B:  Multiple Watchdog Relays Linked to Audible Warning

R1

L    R2    N

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## NOTE

Recommended cable type is Belden 5508FE with 10 conductors each 22 AWG, shielded.  Overall outer diameter is 0.23 inches.  The shield is to be connected to ground at the Watchdog only.

**Image 2**
**Profile - Select New Profile**

## 9.5 SELECT NEW PROFILE

*MENU > SETUP (PASSWORD) > PROFILE > SELECT NEW PROFILE*

To help make the setup process easier for bucket elevator legs, four preset program profiles are available to choose from (Image 2).  All four profiles are highlighted in RED at the top of each wiring diagram (9.7 - 9.10).  Refer to section 14 for more information regarding sensor settings.

1. LEG (TS) / 1 SP, 4BS, 4TS
   - 1 Speed Sensor
   - 4 Bearing Temperature Sensors
   - 4 Touchswitch Sensors (Alignment)

2. LEG (RB) / 1SP, 4BS, 4RB
   - 1 Speed Sensor
   - 4 Bearing Temperature Sensors
   - 4 Rub Block Sensors (Alignment)

3. LEG (WDA) 4MA, 4BS
   - 4 Motion Alignment Sensors
   - 4 Bearing Temperature Sensors

4. LEG (TS) / 1SP, 6BS, 6TS
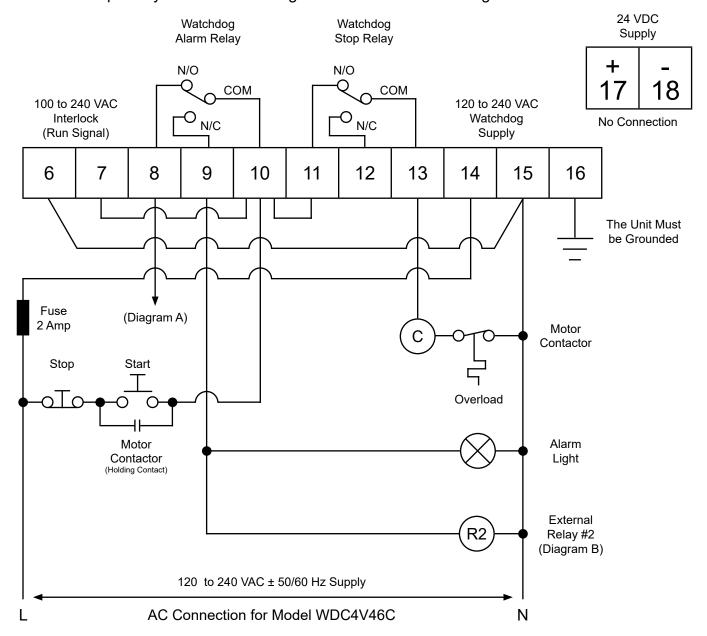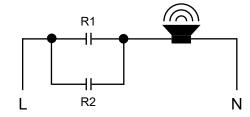   - 1 Speed Sensor
   - 6 Bearing Temperature Sensors
   - 6 Touchswitch Sensors (Alignment)

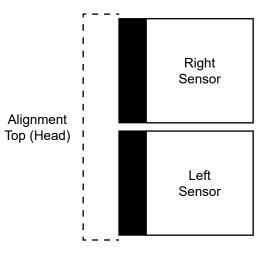| NOTE |
|---|
| All preset program profiles default to the factory settings.  To modify settings from the factory defaults, go to the EDIT SELECTED PROFILE menu. |

Wiring diagrams for the four pre-programmed profiles are shown in sections 9.7 - 9.10.
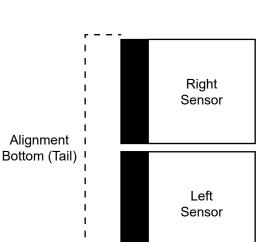
*More wiring diagrams are available online, please refer to the WATCHDOG SUPER ELITE SENSOR WIRING DIAGRAMS manual that can be found at www.go4b.com/usa.  This online manual will continue to be updated as new wiring diagrams are completed and added.*

# 9.6 WDC3 (RETIRED MODEL) TO WDC4 SENSOR WIRING DIAGRAM
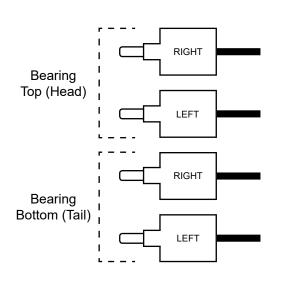
*MENU > SETUP (PASSWORD) > PROFILE > SELECT NEW PROFILE > LEG (WDA) 4MA, 4BS*

| NOTE |
|------|
| Wiring diagram 9.6 is for end users upgrading their WDC3 Watchdog to the WDC4 Watchdog Super Elite.  This basic diagram provides a quick terminal reference between the two models. |



Alignment Top (Head) — Right Sensor, Left Sensor
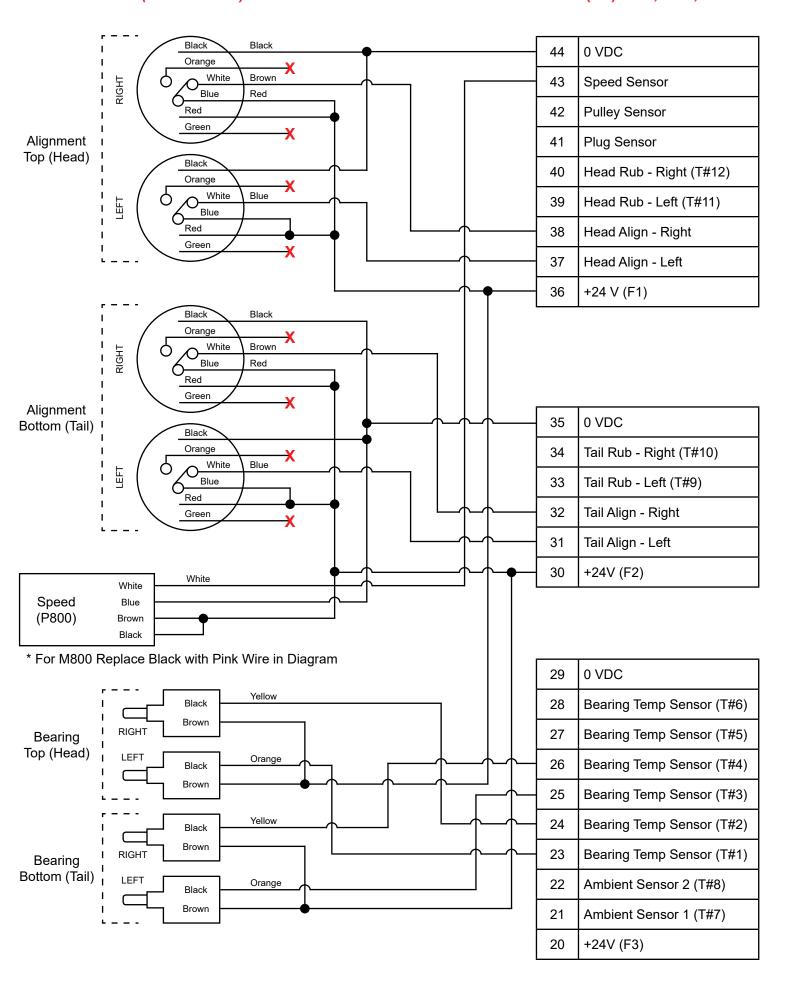
| WDC3 | WDC4 | WDC4 Terminal |
|------|------|---------------|
| 1 | 44 | 0 VDC |
| ---- | 43 | Speed Sensor |
| ---- | 42 | Pulley Sensor |
| ---- | 41 | Plug Sensor |
| ---- | 40 | Head Rub - Right (T#12) |
| ---- | 39 | Head Rub - Left (T#11) |
| 3A | 38 | Head Align - Right |
| 2A | 37 | Head Align - Left |
| 5 (1) | 36 | +24 VDC (F1) |

Alignment Bottom (Tail) — Right Sensor, Left Sensor
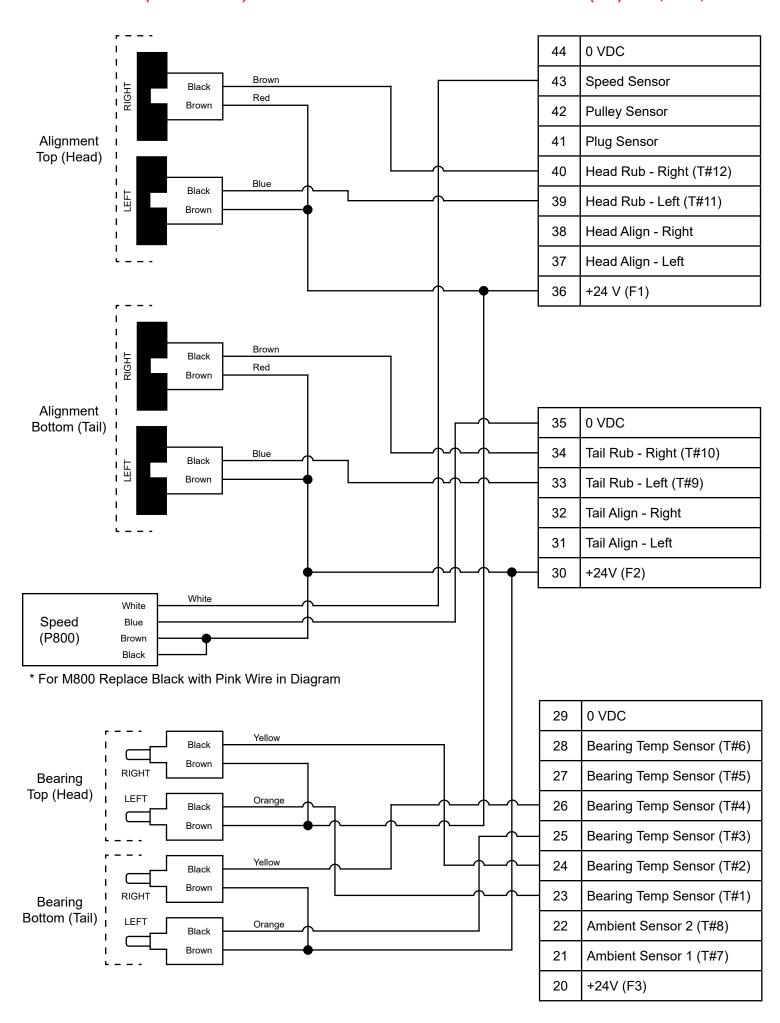
| WDC3 | WDC4 | WDC4 Terminal |
|------|------|---------------|
| 1 | 35 | 0 VDC |
| ---- | 34 | Tail Rub - Right (T#10) |
| ---- | 33 | Tail Rub - Left (T#9) |
| 3B | 32 | Tail Align - Right |
| 2B | 31 | Tail Align - Left |
| 5 (1) | 30 | +24 VDC (F2) |

Bearing Top (Head) — RIGHT, LEFT
Bearing Bottom (Tail) — RIGHT, LEFT

| WDC3 | WDC4 | WDC4 Terminal |
|------|------|---------------|
| ---- | 29 | 0 VDC |
| ---- | 28 | Bearing Temp Sensor (T#6) |
| ---- | 27 | Bearing Temp Sensor (T#5) |
| 4D | 26 | Bearing Temp Sensor (T#4) |
| 4C | 25 | Bearing Temp Sensor (T#3) |
| 4B | 24 | Bearing Temp Sensor (T#2) |
| 4A | 23 | Bearing Temp Sensor (T#1) |
| ---- | 22 | Ambient Sensor 2 (T#8) |
| ---- | 21 | Ambient Sensor 1 (T#7) |
| ---- | 20 | +24 VDC (F3) |

# 9.7 SENSOR WIRING DIAGRAM PROFILE WITH TOUCHSWITCHES

*MENU > SETUP (PASSWORD) > PROFILE > SELECT NEW PROFILE > LEG (TS)/ 1SP, 4BS, 4TS*



| 44 | 0 VDC |
| 43 | Speed Sensor |
| 42 | Pulley Sensor |
| 41 | Plug Sensor |
| 40 | Head Rub - Right (T#12) |
| 39 | Head Rub - Left (T#11) |
| 38 | Head Align - Right |
| 37 | Head Align - Left |
| 36 | +24 V (F1) |
| 35 | 0 VDC |
| 34 | Tail Rub - Right (T#10) |
| 33 | Tail Rub - Left (T#9) |
| 32 | Tail Align - Right |
| 31 | Tail Align - Left |
| 30 | +24V (F2) |
| 29 | 0 VDC |
| 28 | Bearing Temp Sensor (T#6) |
| 27 | Bearing Temp Sensor (T#5) |
| 26 | Bearing Temp Sensor (T#4) |
| 25 | Bearing Temp Sensor (T#3) |
| 24 | Bearing Temp Sensor (T#2) |
| 23 | Bearing Temp Sensor (T#1) |
| 22 | Ambient Sensor 2 (T#8) |
| 21 | Ambient Sensor 1 (T#7) |
| 20 | +24V (F3) |

* For M800 Replace Black with Pink Wire in Diagram

Alignment Top (Head) — RIGHT, LEFT
Alignment Bottom (Tail) — RIGHT, LEFT
Speed (P800) — White, Blue, Brown, Black
Bearing Top (Head) — RIGHT, LEFT
Bearing Bottom (Tail) — RIGHT, LEFT

# 9.8 SENSOR WIRING DIAGRAM PROFILE WITH RUB BLOCKS

**Alignment Top (Head)**

RIGHT — Black / Brown — Brown, Red
LEFT — Black / Brown — Blue

| 44 | 0 VDC |
|----|-------|
| 43 | Speed Sensor |
| 42 | Pulley Sensor |
| 41 | Plug Sensor |
| 40 | Head Rub - Right (T#12) |
| 39 | Head Rub - Left (T#11) |
| 38 | Head Align - Right |
| 37 | Head Align - Left |
| 36 | +24 V (F1) |

**Alignment Bottom (Tail)**

RIGHT — Black / Brown — Brown, Red
LEFT — Black / Brown — Blue

| 35 | 0 VDC |
|----|-------|
| 34 | Tail Rub - Right (T#10) |
| 33 | Tail Rub - Left (T#9) |
| 32 | Tail Align - Right |
| 31 | Tail Align - Left |
| 30 | +24V (F2) |

**Speed (P800)**

White, Blue, Brown, Black

* For M800 Replace Black with Pink Wire in Diagram

**Bearing Top (Head)**

RIGHT — Black / Brown — Yellow
LEFT — Black / Brown — Orange

**Bearing Bottom (Tail)**

RIGHT — Black / Brown — Yellow
LEFT — Black / Brown — Orange

| 29 | 0 VDC |
|----|-------|
| 28 | Bearing Temp Sensor (T#6) |
| 27 | Bearing Temp Sensor (T#5) |
| 26 | Bearing Temp Sensor (T#4) |
| 25 | Bearing Temp Sensor (T#3) |
| 24 | Bearing Temp Sensor (T#2) |
| 23 | Bearing Temp Sensor (T#1) |
| 22 | Ambient Sensor 2 (T#8) |
| 21 | Ambient Sensor 1 (T#7) |
| 20 | +24V (F3) |

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# 9.9 SENSOR WIRING DIAGRAM PROFILE WITH MOTION ALIGNMENT SENSORS

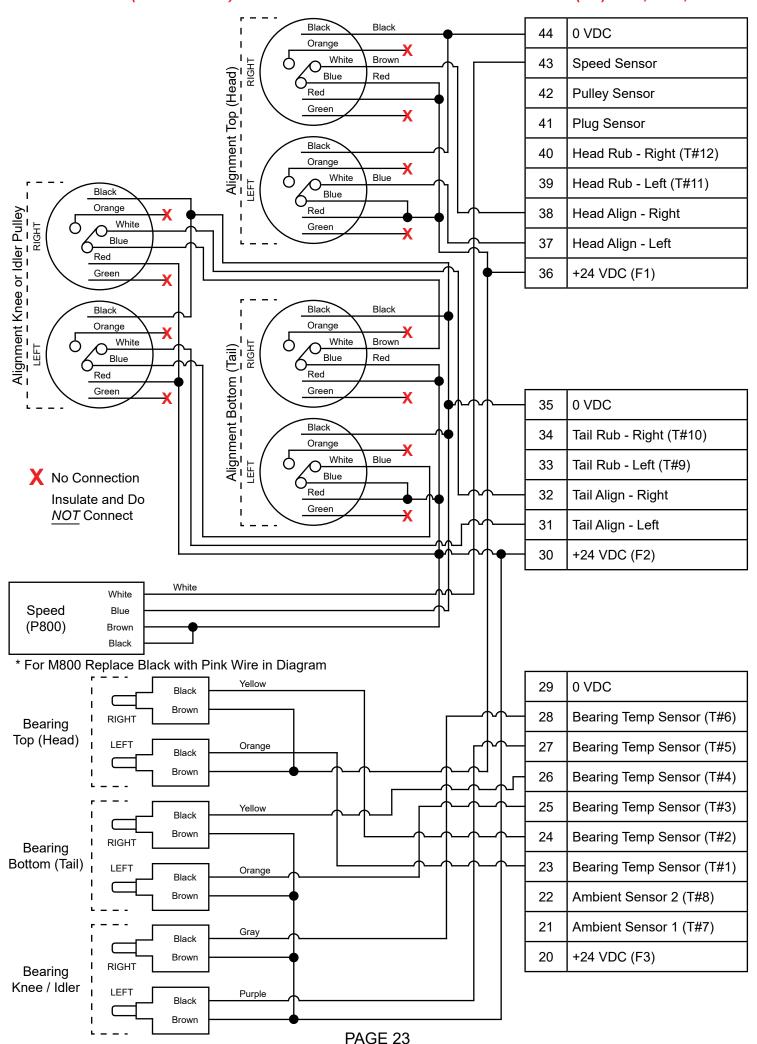*MENU > SETUP (PASSWORD) > PROFILE > SELECT NEW PROFILE > LEG (WDA) 4MA, 4BS*

# 9.10 SENSOR WIRING DIAGRAM PROFILE WITH KNEE OR IDLER PULLEYS

*MENU > SETUP (PASSWORD) > PROFILE > SELECT NEW PROFILE > LEG (TS)/ 1SP, 6BS, 6TS*

**Alignment Top (Head)**

RIGHT: Black — Black; Orange — X; White — Brown; Blue — Red; Red; Green — X

LEFT: Black; Orange — X; White — Blue; Blue; Red; Green — X

**Alignment Knee or Idler Pulley**

RIGHT: Black; Orange — X; White; Blue; Red; Green — X

LEFT: Black; Orange — X; White; Blue; Red; Green — X

**Alignment Bottom (Tail)**

RIGHT: Black — Black; Orange — X; White — Brown; Blue — Red; Red; Green — X

LEFT: Black; Orange — X; White — Blue; Blue; Red; Green — X

**X** No Connection
Insulate and Do *NOT* Connect

| 44 | 0 VDC |
| 43 | Speed Sensor |
| 42 | Pulley Sensor |
| 41 | Plug Sensor |
| 40 | Head Rub - Right (T#12) |
| 39 | Head Rub - Left (T#11) |
| 38 | Head Align - Right |
| 37 | Head Align - Left |
| 36 | +24 VDC (F1) |

| 35 | 0 VDC |
| 34 | Tail Rub - Right (T#10) |
| 33 | Tail Rub - Left (T#9) |
| 32 | Tail Align - Right |
| 31 | Tail Align - Left |
| 30 | +24 VDC (F2) |

**Speed (P800):** White, Blue, Brown, Black

* For M800 Replace Black with Pink Wire in Diagram

**Bearing Top (Head)** RIGHT: Black/Brown — Yellow; LEFT: Black/Brown — Orange

**Bearing Bottom (Tail)** RIGHT: Black/Brown — Yellow; LEFT: Black/Brown — Orange

**Bearing Knee / Idler** RIGHT: Black/Brown — Gray; LEFT: Black/Brown — Purple

| 29 | 0 VDC |
| 28 | Bearing Temp Sensor (T#6) |
| 27 | Bearing Temp Sensor (T#5) |
| 26 | Bearing Temp Sensor (T#4) |
| 25 | Bearing Temp Sensor (T#3) |
| 24 | Bearing Temp Sensor (T#2) |
| 23 | Bearing Temp Sensor (T#1) |
| 22 | Ambient Sensor 2 (T#8) |
| 21 | Ambient Sensor 1 (T#7) |
| 20 | +24 VDC (F3) |

**NOTE**

Appendix A provides a menu tree to help guide you through all of the Watchdog's available menu screens and settings.

All new Watchdogs are preset to the factory default values (Appendix B).

# 10. WATCHDOG MAIN LCD SCREEN



WDC4 - Super Elite
www.go4b.com

Initializing...

Firmware Versions:
Main IC (U102): 4.X.X
Graphics IC (U201): 4.X.X
Support IC (U400): 4.X.X
Exp 1 (N/C): -.-.-
Exp 2 (N/C): -.-.-

Graphics DB Size: 1836
Main DB Size: 1836

**Image 3**
**Initial Power Up Screen**

### 10.1 START UP SCREEN (INITIAL POWER UP)
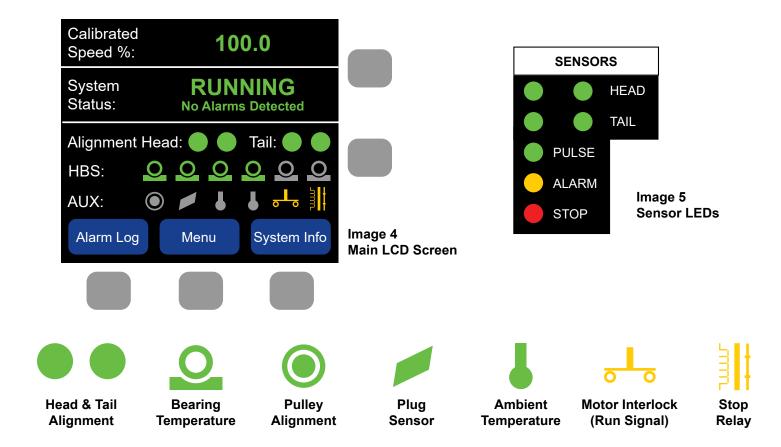
When power is first applied to the Watchdog WDC4, an opening start-up screen will be displayed for around 5 seconds (Image 3). The software version (Main IC) for the Watchdog will be listed during start-up, this will be required should you need to contact 4B for technical support.

The WDC4 is normally supplied with its programmable parameters preset to factory default settings. Appendix B consists of a number of tables giving all the allowable values. The adjustment of each parameter is accessed through the EDIT SELECTED PROFILE menu. This menu requires an engineering password to access and change any system settings.

**NOTE**

Image 3 shows generic firmware versions and database sizes for illustration purposes, actual screen information will vary.

**NOTE**

To calibrate speed and utilize the Watchdog's built-in alarm and shutdown capabilities, a motor interlock (run signal) is required. For typical motor interlock wiring examples, review the wiring diagrams for terminals 6 & 7.

Image 4
Main LCD Screen



Image 5
Sensor LEDs

**Head & Tail Alignment** | **Bearing Temperature** | **Pulley Alignment** | **Plug Sensor** | **Ambient Temperature** | **Motor Interlock (Run Signal)** | **Stop Relay**

## 10.2 MAIN LCD SCREEN & SENSOR LEDS

The Watchdog's LCD screen is not touch sensitive, do not confuse the blue text menus on the LCD with the actual push buttons (shown in grey). The function of a button is indicated by the blue text menu displayed on the LCD screen immediately above or to the left of each button and varies according to the screen being displayed.

The main LCD screen (Image 4) shows the overall status of the Watchdog. The top line shows the running speed. In this instance, it shows the speed of the elevator or conveyor as a percentage of the total calibrated speed. The next line shows the system status and any current faults or alarm conditions.

Under system status you can see the status for all of the sensors: head & tail alignment, hot bearing sensor (HBS) and the auxiliary sensors (AUX): pulley alignment, plug condition and ambient temperature. Disabled sensors are grey, if a sensor is enabled it becomes highlighted in red, green or amber. Green signifies the sensor is in a normal state while red indicates an alarm. Amber relates to the temperature sensors and indicates a fault with the sensor or the sensor wiring.

The last two icons on the far right of the auxiliary menu indicate motor interlock (run signal) and stop relay signals. These icons are used to assist with troubleshooting wiring problems. Normally the icons will both be the same color, if they are not contact 4B for assistance.

- Motor Interlock (Run Signal) -
  When this icon is yellow and appears as a closed push button, it indicates that the Watchdog detects the motor interlock (run signal). When the icon is blue and appears as an open push button, it indicates that the Watchdog does not detect the motor interlock (run signal).



Running | Not Running

- Stop Relay Signal -
  When this icon is yellow and appears as a closed contact, it indicates that the Watchdog stop relay is closed (energized). When the icon is blue and appears as an open contact, it indicates that the Watchdog stop relay is open (de-energized).
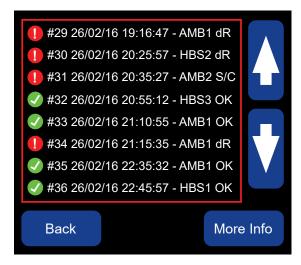


Closed Relay | Open Relay

The sensor LEDs (Image 5), located below the main LCD screen, provide a quick view status of the head and tail alignment sensors (top left, top right, bottom left, bottom right), along with pulse indication and alarm and stop status.

## 10.3 ALARM LOG BUTTON

To view the last 40 events and alarms, press the ALARM LOG button on the main screen (Image 4). The alarm log screen should now appear (Image 6). Pressing the UP and DOWN arrows allows you to scroll through the alarms. Pressing the MORE INFO button gives details of the highlighted alarm. Cleared alarm conditions are also logged. If an SD card is installed, all alarm details (not just the last 40) will be stored on the card.

| ⚠️ WARNING |
| --- |
| If the SD card is removed and more alarms occur, they will not be logged when the SD card is re-inserted. For uninterrupted historical data logging, 4B recommends using HazardMon.com. |
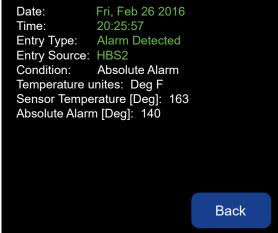


**Image 6**
**Alarm Log / More Info**

## 10.4 MENU BUTTON

The MENU button allows access to all of the sub menu functions. Most of the sub menu areas require the entry of a password. Please refer to section 12.1 for information about the password.

## 10.5 SYSTEM INFO BUTTON

The SYSTEM INFO button allows the viewing of the system information screens (1 - 9). No password is required to enter these screens. Press NEXT or PREVIOUS to scroll forward or backward through the each of the screens. The EXIT button terminates the function and returns you back to the main screen. See pages 28 - 32 for screen images for each of the seven system info screens.
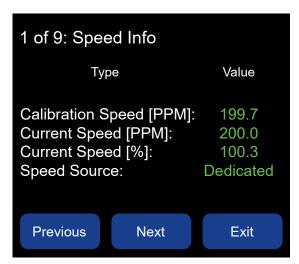


**Image 7**
**Speed Info**

## 10.6 SPEED INFO (1 OF 9)

The speed info screen (Image 7) shows information regarding the calibrated speed (PPM - pulses per minute), current speed (PPM - pulses per minute), current speed (percentage) and the speed source (detection method). Refer to 14.5 for more detail about speed settings.

| NOTE |
|---|
| To calibrate speed and utilize the Watchdog's built-in alarm and shutdown capabilities, a motor interlock (run signal) is required. For typical motor interlock wiring examples, review the wiring diagrams for terminals 6 & 7. |

**2 of 9: Head Align Info**

| | |
|---|---|
| Type: | PULSED |
| Current Value [%]: | 0 |
| Alarm Value [%]: | 66 |
| Left Pulse Rate [PPM]: | 0 |
| Right Pulse Rate [PPM]: | 0 |

| Previous | Next | Exit |
|---|---|---|

**Image 8A**
**Head Align Info - Pulsed Sensor**

**2 of 9: Head Align Info**

| | |
|---|---|
| Type: | CNT |
| Current State Left: | ON |
| Current State Right: | ON |
| Alarm State: | OFF |

| Previous | Next | Exit |
|---|---|---|

**Image 8B**
**Head Align Info - Contact Sensor**

**2 of 9: Head Align Info**

Type: RUB

| Sensor | Value | Abs | Rel | Trip |
|---|---|---|---|---|
| T#11 | 35 | 140 | 30 | AMB1 |
| T#12 | 69 | 140 | 30 | AMB1 |

| Previous | Next | Exit |
|---|---|---|

**Image 8C**
**Head Align Info - Rub Block Sensor**

## 10.7 HEAD ALIGN INFO (2 OF 9)

The head align info screen shows the head alignment sensor type and the current values for the sensor. The sensor type can be off, pulsed, contact (CNT) or rub block (RUB). The display will vary depending upon the sensor type (Image 8 A-C). Refer to section 14.6 for more information about head alignment settings.

**3 of 9: Tail Align Info**

| | |
|---|---|
| Type: | PULSED |
| Current Value [%]: | 0 |
| Alarm Value [%]: | 66 |
| Left Pulse Rate [PPM]: | 0 |
| Right Pulse Rate [PPM]: | 0 |

| Previous | Next | Exit |
|---|---|---|

**Image 9A**
**Tail Align Info - Pulsed Sensor**

**3 of 9: Tail Align Info**

| | |
|---|---|
| Type: | CNT |
| Current State Left: | ON |
| Current State Right: | ON |
| Alarm State: | OFF |

| Previous | Next | Exit |
|---|---|---|

**Image 9B**
**Tail Align Info - Contact Sensor**

**3 of 9: Tail Align Info**

Type: RUB

| Sensor | Value | Abs | Rel | Trip |
|---|---|---|---|---|
| T#11 | 35 | 140 | 30 | AMB1 |
| T#12 | 69 | 140 | 30 | AMB1 |

| Previous | Next | Exit |
|---|---|---|

**Image 9C**
**Tail Align Info - Rub Block Sensor**

## 10.8 TAIL ALIGN INFO (3 OF 9)

The tail align info screen shows the tail alignment sensor type and the current values for the sensor. The sensor type can be off, pulsed, contact (CNT) or rub block (RUB). The display will vary depending upon the sensor type (Image 9 A-C). Refer to section 14.7 for more information about tail alignment settings.

| | AMB 1: | 86.4 |
| | AMB 2: | 87.6 |

| Sensor | Value | Abs. | Rel. | Trip |
|--------|-------|------|------|------|
| HBS1 | 112 | 140 | 30 | N/A |
| HBS2 | 102 | 140 | 30 | N/A |
| HBS3 | 112 | 140 | 30 | N/A |
| HBS4 | 163 | 140 | 30 | N/A |
| HBS5 | OFF | N/A | N/A | N/A |
| HBS6 | OFF | N/A | N/A | N/A |

Previous    Next    Exit

**Image 10**
**HBS Info**
**Temperature Sensors**

## 10.9 HBS INFO (4 OF 9)

The hot bearing sensor (HBS) screens show the actual temperature value (Value) of all the enabled bearing sensors and any selected absolute (Abs.) and relative (Rel.) alarm trip points.  Where bearing sensors are not selected, the value will show OFF and the remaining information will be displayed in grey.  Normal temperature values are displayed in green, and will change to red when the sensor value is in an alarm state.

Refer to section 14.8 for more information regarding temperature settings.

| **NOTE** |
|---|
| HBS INFO can refer to any NTC type temperature sensor.  While originally developed for displaying hot bearing sensors (HBS), these menus can refer to any NTC type temperature sensor such as those used with brass rub blocks (ADB Series) or surface temperature sensors (WDB7 Series). |

## 10.10 EXP1 INFO (5 OF 9) & EXP2 INFO (6 OF 9)

If any of the optional expansion board(s) have been installed and enabled, the EXP 1 - 2 screen(s) will display and show the values of the sensor(s).  Multiple types of boards are available, so screens will differ depending on what board has been installed (Image 11 A-B).  Where sensors are not selected, the value will show OFF and the remaining information will be displayed in grey.  Normal sensor values are displayed in green and will change to red when the sensor value is in an alarm state.

Refer to section 14.10 for more information regarding expansion board settings.

| Sensor | Value | Min | Max | Units |
|--------|-------|-----|-----|-------|
| CLI1 | 10 | 4 | 17 | RPM |
| CLI2 | 4 | 4 | 20 | mA |
| CLI3 | 75 | -40 | 250 | F |
| CLI4 | OFF | N/A | N/A | N/A |
| VIN1 | 5 | 0 | 24 | V |
| VIN2 | OFF | N/A | N/A | N/A |

Previous    Next    Exit

**Image 11A**
**EXP1 Info - Analog Expansion Board Shown**

| | AMB 1: | OFF |
| | AMB 2: | OFF |

| Sensor | Value | Abs. | Rel. | Trip |
|--------|-------|------|------|------|
| Pt100 1 | 75 | 140 | N/A | N/A |
| Pt100 2 | 75 | 140 | N/A | N/A |
| Pt100 3 | OFF | N/A | N/A | N/A |
| Pt100 4 | OFF | N/A | N/A | N/A |

Previous    Next    Exit
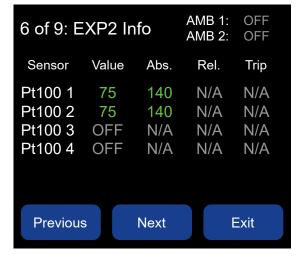
**Image 11B**
**EXP2 Info - Pt100 Expansion Board Shown**

Plug
Current State:                          -
Alarm State:                           -

Pulley
Current State:                         -
Alarm State:                           -

Previous       Next       Exit
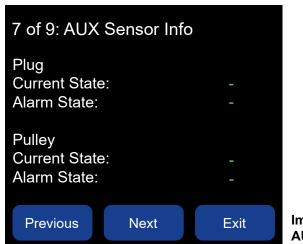
**Image 12**
**AUX Sensor Info**
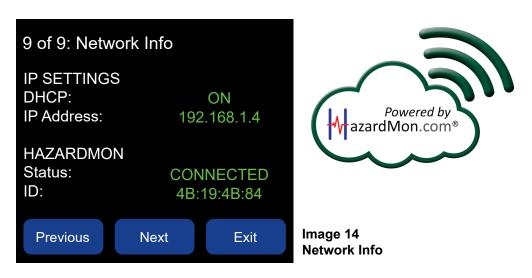
## 10.11 AUX SENSOR INFO (7 OF 9)

The Watchdog supports two auxiliary sensors, pulley alignment "Pulley" and plug condition "Plug".  The AUX Sensor Info screen (Image 12) shows the current and alarm states for these sensors.  Refer to section 14.9 for more information regarding the auxiliary sensors.

8 of 9: System Info

Date:              Tue, 04 Jul 2017
Time                   08:08:37
Runtime Hours:           66:47
Main Version:            4.8.4
Graphics Version:        4.8.4
Btm Version:             4.3.9
DB Size:                 1836

Previous       Next       Exit

**Image 13**
**System Info**

## 10.12 SYSTEM INFO (8 OF 9)

The system info screen (Image 13) shows the time and date along with the number of runtime hours elapsed.  The runtime is the actual number of run hours that the equipment has been running and not how long the Watchdog has been switched on.  Refer to section 18 for more information about setting the time and date.  This screen also shows the software versions and database size.

IP SETTINGS
DHCP:                           ON
IP Address:              192.168.1.4

HAZARDMON
Status:                  CONNECTED
ID:                        4B:19:4B:84

Previous          Next          Exit

**Image 14**
**Network Info**

## 10.13 NETWORK INFO (9 OF 9)

The Watchdog has an advanced interface to allow the remote monitoring of data through an Ethernet connection.  This cloud based monitoring system is known as HazardMon.com, and the network info screen (Image 14) shows the settings required to use HazardMon.com.  These settings are adjustable and the information is made available for the purposes of diagnostics.

HazardMon.com network settings can be found in the Network Settings Menu (Section 20).

For more information about HazardMon.com, contact 4B or visit us on the web at www.go4b.com/usa.

# 11. VIEW SETTINGS

View Settings
Setup
Reset Eng. Password

Exit                          OK
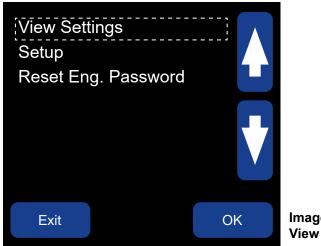
**Image 15**
**View Settings**

## 11. VIEW SETTINGS -

*MENU > VIEW SETTINGS*
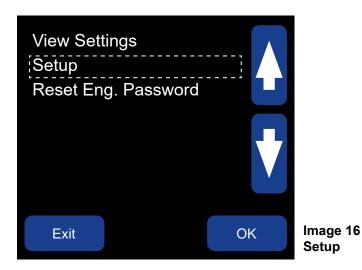
Due to the total number of screens used within the view settings menu, not all will be illustrated.

You can view the system settings on the Watchdog without a password by choosing VIEW SETTINGS from the menu (Image 15).  This will allow you to scroll through all of the current settings for the SYSTEM, SPEED, ALIGNMENT, TEMPERATURE, AUXILIARY and EXPANSION BOARD menus.

The number of pages and information in each section will vary depending upon what settings are chosen for each section.  For example, in the TEMPERATURE menu, if HBS1 (hot bearing sensor) is not enabled, then the setting details for HBS1 will not be displayed.

This is a read only area, no changes can be made within the VIEW SETTINGS menu.  Changes can only be made under SETUP or FACTORY SETTINGS, which are password protected menus.

**Image 16
Setup**

## 12. SETUP -

*MENU > SETUP (PASSWORD)*

There are seven password protected settings within the setup menu (Image 16): PROFILE, TEST, FACTORY SETTINGS, SD CARD, TIME & DATE, CHANGE PASSWORD and NETWORK. All of these settings are explained in detail within individual sections of this manual.
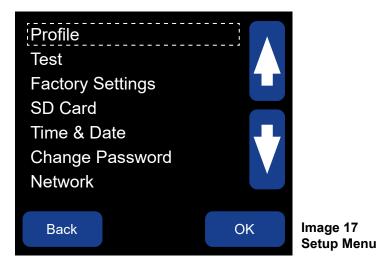
### 12.1 PASSWORD

In order to make any system changes to the Watchdog, an engineering password is required. The default engineering password set at the factory is BBBB.

You can change the password from the factory setting within this menu by choosing CHANGE PASSWORD. The password is from 1 to 8 characters long, and can be any combination of the letters A, B and C. If you change the password from the factory default, make a note of your new password.

| NOTE |
| --- |
| If the engineering password has been changed from the factory default and you have forgotten your new password, contact 4B for assistance. |



**Image 17
Setup Menu**

| NOTE |
| --- |
| Settings shown in yellow text indicate that the value is locked. The value can only be modified within the FACTORY SETTINGS menu, which requires an administrator password. |

**Image 18**
**Reset Engineering Password**

## 13. RESET ENGINEERING PASSWORD

*MENU > RESET ENG. PASSWORD*

If the engineering password has been changed from the factory default and you have forgotten your new password, it can be reset.  In order to perform a password reset, you will need to contact 4B technical support and supply them with the four digit code displayed on the RESET ENG. PASSWORD screen (Image 19).  Once your code has been verified by the 4B technician, they will provide a secondary code to enter into your unit which will reset the engineering password back to the factory default of BBBB).
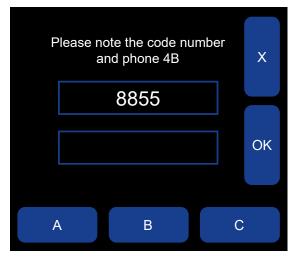


**Image 19**
**Reset Engineering**
**Password Screen**

## 14. PROFILE

*MENU > SETUP (PASSWORD) > PROFILE*

The first choice under the SETUP menu is PROFILE (Image 17), which allows you to edit individual section settings without having to go through the entire FULL SYSTEM SETUP. Once PROFILE has been selected, you will see the next sub-menu (Image 20) where you can EDIT SELECTED PROFILE, RESTORE DEFAULTS or SELECT NEW PROFILE.
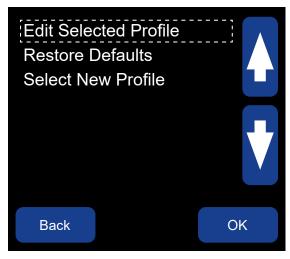


**Image 20**
**Profile Menu**

## 14.1 EDIT SELECTED PROFILE

*MENU > SETUP (PASSWORD) > PROFILE > EDIT SELECTED PROFILE*

Menu choices in this sub-menu (Image 21) include:   CALIBRATE SYSTEM, FULL SYSTEM SETUP, SYSTEM, SPEED, ALIGNMENT, TEMPERATURE, AUXILIARY and EXPANSION BOARDS
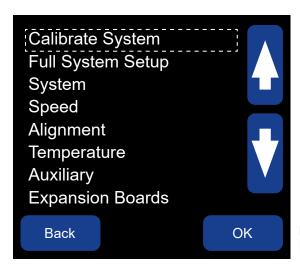


**Image 21**
**Edit Selected Profile Menu**

---

## NOTE

Settings shown in yellow text indicate that the value is locked.  The value can only be modified within the FACTORY SETTINGS menu, which requires an administrator password.

---

## ⚠WARNING

When you have completed making changes to the Watchdog profile setup, you will be prompted to save your changes.  You must enter YES, or your changes will not go into effect.

---

## 14.2 CALIBRATE SYSTEM

*MENU > SETUP (PASSWORD) > PROFILE > EDIT SELECTED PROFILE > CALIBRATE SYSTEM*

The Watchdog <u>must</u> be calibrated to correctly monitor the speed of an elevator or conveyor belt.

Select CALIBRATE SYSTEM in the menu section (Image 21).  Press the CALIBRATE button, you will then be asked to start the elevator or conveyor.  A progress bar will display the calibration percentage (Image 22).  After calibration is complete, the screen will display CALIBRATION SUCCESSFUL and the LCD will return to the main screen.  If the calibration procedure fails, the screen will display NOT CALIBRATED CALIBRATION FAILED!  If this occurs, follow the SYSTEM RECALIBRATION instructions below.

Press "Calibrate"
to start the calibration process.

Warning:  This action will
erase current system settings.

Startup Delay [s]:
Current Speed [PPM]:

0%

Cancel          Calibrate
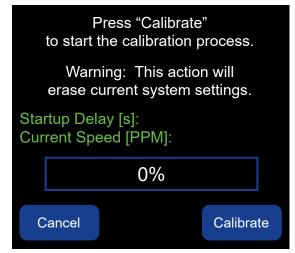
**Image 22
Edit Selected Profile -
Calibrate System**

- **14.2.A SYSTEM RECALIBRATION** - The Watchdog can be re-calibrated at any time while the machine is running normally by selecting the CALIBRATE SYSTEM option as described above.  You are strongly advised against indiscriminate re-calibration, as you may be attempting to calibrate the unit when the machine is not running normally.  If you have persistent alarm/stop conditions there is something wrong with the machine or with the adjustment of the system.

  If the STOP button is operated on the motor starter (interlock/run signal removed) during calibration, the Alarm and Stop relays will be de-energized and calibration will be aborted.  Calibration will also be aborted if any fault conditions occur, i.e. the elevator fails to start, or stops during the procedure.  Start calibration again if this happens, proceed from section 14.2 above, after rectifying the fault condition.

- **14.2.B INCORRECT CALIBRATION** - If the unit was calibrated at less than normal speed, it will display an over speed alarm/stop condition and possibly stop the machine when running at normal speed.  This indicates that the calibration is incorrect and the belt tension should be checked and adjusted as required.  The unit should then be re-calibrated (see section 14.2.A).

- **14.2.C START UP TIMER** - When the equipment being monitored starts, the Watchdog's motor interlock (run signal) input is energized and a start-up timer begins to time out.  When the start-up timer expires, the input speed is compared to the calibrated speed.  If the input speed is within the preset limits no action is taken, however if it is not an alarm will occur.
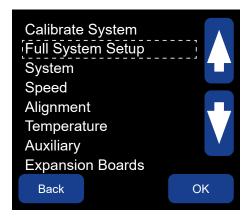
**Image 23
Edit Selected Profile -
Full System Setup**

## 14.3 FULL SYSTEM SETUP

*MENU > SETUP (PASSWORD) > PROFILE > EDIT SELECTED PROFILE > FULL SYSTEM SETUP*

Watchdog control units are preset with factory default values (Appendix B).  All new installations should go through either a FULL SYSTEM SETUP or use one of the pre-installed profiles available under SELECT NEW PROFILE (section 14.12) before using the Watchdog for the first time.

FULL SYSTEM SETUP will guide you through each of the five sections:  SYSTEM, SPEED, ALIGNMENT, TEMPERATURE, AUXILIARY and EXPANSION BOARDS.  These can also be accessed individually as outlined below.

After the Watchdog has been setup, all settings will be stored within the controller's memory.
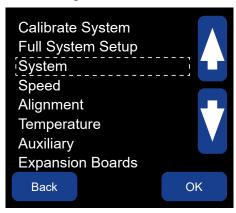


**Image 24
Edit Selected Profile -
System**

## 14.4 SYSTEM

*MENU > SETUP (PASSWORD) > PROFILE > EDIT SELECTED PROFILE > SYSTEM*

- *14.4.A TEMPERATURE UNITS* - Fahrenheit (°F) or Celsius (°C) can be selected.  The default is Fahrenheit.  The Watchdog will reset temperatures to the factory default settings if the temperature unit is changed, be sure to check all settings if this occurs to ensure proper operation.

- *14.4.B PRE ABS ALARM -* Can be turned ON or OFF (default). If turned ON you will see a new settings screen that lets you configure the threshold for the pre-absolute alarm. The range is 3.0- 100. When the temperature increases to within the set amount of either the RUB BLOCK ABSOLUTE ALARM (section 14.6.C), the HBS ABSOLUTE ALARM (section 14.8.B), or the AMB ABSOLUTE ALARM (section 14.8.I) an alarm will occur. The system will not shut down due to this alarm, however if the equipment is stopped it can not be re-started until this alarm has been cleared. The alarm event is also logged in the ALARM LOG. Here is an example. HBS absolute alarm is set to 140° F . Pre abs alarm is set to 10. When the HBS temp hits 130° F (10 below the absolute alarm) the pre abs alarm will activate.

- *14.4.C NEGATIVE DIFFERENTIAL ALARM* - Can be turned ON or OFF (default), and is used when monitoring temperature using a relative ambient temperature alarm source.  During normal operation, it would be unusual for the bearing temperature value to be below that of the ambient temperature source (default OFF).  If turned ON, and a bearing temperature value drops below the value of the ambient source by an amount greater than the relative alarm value, an alarm will occur. The alarm is logged in the ALARM LOG.

- *14.4.D RATE OF RISE START UP DELAY [MIN]* -  Allows a delay when the system is started before any rate of rise in temperature is monitored.  This allows the system to reach a steady state before alarming.  This level setting can be set from 0 - 5 minutes, the default is 5.
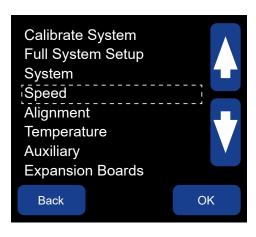
## 14.5 SPEED

*To calibrate speed and utilize the Watchdog's built-in alarm and shutdown capabilities, a motor interlock (run signal) is required.  Review the wiring diagrams for terminals 6 & 7.*

*MENU > SETUP (PASSWORD) > PROFILE > EDIT SELECTED PROFILE > SPEED*

- ***14.5.A SPEED MONITORING*** - This section allows you to enable or disable speed monitoring.  The default setting is ON, but it can only be disabled by selecting OFF in the FACTORY SETTINGS menu (Section 16).

- ***14.5.B SCALING UNITS*** - Allows the selection of the main screen speed units.  Four options are available:

  1.  PPM - Pulses Per Minute
  2.  RPM - Revolutions Per Minute
  3.  USR - User Defined
  4.  % - Percentage of Calibrated Speed (Default)

- ***14.5.C SCALING FACTOR*** - If either RPM or USR is selected then a scaling factor must be entered.  The default value is 12.

  PPM and % are automatically calculated.  Display = (Input PPM X Scale factor) / 12.

  1.  Example: Tons/Hour -
      If the elevator normal speed is 420 pulses per minute (PPM) and the desired display is 3000 tons/hour then the scale factor = (3000 X 12) / 420 = 85.71.

  2.  Example: Feet/Min -
      If there are 9 inches between each bucket and you wish to display speed in feet/minute then set the scale factor to 9.  This is a special case of when the scale factor is set to the bucket spacing in inches then the display will show belt speed in feet/minute.

  3.  Example: Meters/Min -
      Scale factor = 12 X bucket pitch in meters.  If the pitch is 23 cm, then the scale factor = (12 X 0.23) = 2.76.

- ***14.5.D SPEED DETECTION SOURCE*** - Three options determine the different ways to measure speed.

  1.  MAS SPEED INPUT -

      This option is selected when using multiple speed sensors, such as 4B's WDA Motion Alignment Sensor (MAS).  MAS sensors can be used to detect the passage of buckets when the elevator belt is in motion.  As each bucket passes a sensor, a pulse is generated and the Watchdog uses these pulses to measure belt speed and alignment between the sensors.

  2.  DEDICATED SPEED INPUT (Default) -

      The dedicated speed input is selected when a single speed sensor is to be used.  Usually this sensor is used with a Whirligig and is connected to the boot / tail end of the elevator or conveyor belt.  The Watchdog uses the pulses from the sensor to determine speed.

3. DIFFERENTIAL SPEED -

Differential speed monitoring is selected when you intend to monitor an elevator or conveyor belt that may intentionally vary in speed as part of the process or when that belt is driven by a variable speed controller.

The monitoring of differential speeds usually takes place between the top of the elevator (the drive end) and the bottom (the driven end). This allows the varying speed to be monitored while comparing the drive speed with the driven speed, differences between the two being the result of belt slippage.

Once differential speed is enabled the Watchdog expects 2 independent signals by which to measure the speed of an elevator or conveyor belt. This method allows the monitoring of both fixed and variable speed elevators.

The 2 speed inputs are connected in the following manner.

Speed 1 is connected to the dedicated speed input. The source for the pulses is usually a Whirligig mounted on the head (or main) drive assembly.

Speed 2 can be derived from a number of different sources but will usually be connected to either the head alignment sensor inputs, tail alignment sensor inputs or both head and tail together.

The source for the speed can also be derived from a Whirligig connected to the tail shaft (or driven), the pulsed output being passed through the Touchswitch alignment sensor pairs into the Watchdog alignment inputs.

An alternative speed source could be from WDA alignment sensors (MAS) installed to detect buckets on the elevator belt. When MAS are used the Watchdog always uses the highest speed input for speed 2.

For the differential speed option to work correctly it is necessary to enable alignment monitoring on either the tail and/or head and for them to be set as "Pulsed" inputs.

The speed monitoring is performed by comparing the two different speed sources. They do not need to be the same speed since the speed is determined by checking the difference between the two speeds or rather the ratio of one speed to the other. Because speed 2 is connected to 2 or 4 inputs, the highest measured speed is always used.

Although calibration is not required in the usual way on a variable speed elevator it is used to determine the ratio of speed 1 to speed 2. This approach allows two completely different pulse rates to be compared and if either changes in relation to the other, action can be taken.

During the calibration cycle the Watchdog checks the two different speeds and calculates the RATIO of one to the other. After the calibration cycle is complete, this ratio is used to determine if there is any difference in the relationship between the speeds. If this difference is sufficient then the Watchdog reacts in the usual manner and will generate an alarm or stop action depending upon the outcome of the comparison.

Because the relationship between the two speeds determines the action to be taken, the speed of the elevator can rise and fall (variable speed) and as long as the two speeds are in the same relationship (ratio) to each other, the Watchdog will not generate a fault condition.

The permitted ratio is 0.1 to 10.0, values outside this range will result in a calibration failure.

---

### ⚠️ WARNING

When you have completed making changes to the Watchdog profile setup, you will be prompted to save your changes. You must enter YES, or your changes will not go into effect.

---

Below are examples of how the Watchdog sees the two speeds:

- Example 1:

    Speed 1 - 426 PPM
    Speed 2 - 987 PPM
    Ratio of speed 2 to speed 1 = 2.316 (987/426)

    If the elevator was to increase in speed so that speed 1 was now 556 PPM then speed 2 should be speed (556 X 2.316) or 1288 PPM (these figures are rounded).

    Speed 1 at 426 PPM and speed 2 at 987 PPM has the same relationship as speed 1 at 556 PPM and speed 2 is 1288 PPM. In both cases the elevator is running at 100% or the relationship of the two speeds is 100% of the expected ratio.

- Example 2:

    Speed 1 - 583 PPM
    Speed 2 - 416 PPM
    Ratio of speed 2 to speed 1 = 0.713 (416/583)

    If the elevator was to decrease in speed so that speed 1 was now 480 PPM then speed 2 should be speed (480 X 0.713) or 342 PPM (these figures are rounded).

    Speed 1 at 583 PPM and speed 2 at 416 PPM has the same relationship as speed 1 at 480 PPM and speed 2 as 342 PPM. In both cases the elevator is running at 100% or the relationship of the two speeds is 100% of the expected ratio.

    Once the ratio between speed 1 and 2 is established, then it is possible to determine if the belt is slipping. Because speed 1 is derived from the head pulley drive it can be considered a reference because it will only normally vary as a result of deliberate action to speed up or slow down the elevator belt. Speed 2 can vary either because of a variation in speed 1 or if the belt begins to slip for any reason. Because we know the ratio of speed 1 to speed 2 then we can check to see the amount of belt slip.

- Example 3:

    Speed 1 is 350 PPM. The ratio after calibration is 1.256, therefore speed 2 should be 440 but it is currently 405. This means that he belt is running at 92% of the expected speed (or slipping by 8% (405/440 X 100)). The default alarm level for under-speed is 10% so as yet the slip isn't a problem. If speed 2 was to drop to 390 then the error is 88% of the expected speed (or slipping by 12%) therefore the Watchdog will generate an underspeed alarm.

    The same principle applies no matter what the elevator speed is providing that the values measured for speed 1 and speed 2 remain within the maximum and minimum speed limits of the Watchdog.

- **14.5.E ACCELERATION MONITORING LEVEL** - When disabled (0), the Watchdog will not monitor speed during the start-up delay. When enabled, the Watchdog will monitor the speed during start-up delay and initiate a stop condition if the system speed is not increasing according to the set acceleration value.

Level settings range from 0 - 9, the default is 5. See below for more information on acceleration monitoring values:

    0 - Off, no monitoring will take place.
    1 - System speed should reach at least 10% of the calibrated speed by 90% of start-up delay.
    5 - Default setting, system speed should reach 10% of the calibrated speed by 10% of start-up delay, 20% by 20% of start-up delay, etc.
    9 - System speed should reach at least 90% of the calibrated speed by 10% of start-up delay.

- **14.5.F NUMBER OF STARTS / MINUTE** - This function is used to prevent damage to the motor and the motor start circuitry by limiting the number of times in a minute the system can be started. This setting can range from 1 to 10, the default is 3.

  When the Watchdog is started and a shutdown fault occurs, a jog delay is introduced. For example, if the "Number of Starts / Minute" is set to 4, then a delay of 15 seconds before restarting would be introduced (60 seconds / 4 starts per minutes = 15 seconds between starts).

  The jog countdown is shown under SYSTEM STATUS on the Watchdog's main screen.

- **14.5.G START UP DELAY [S]** - The delay in seconds before the system starts to fully monitor the system for possible alarm conditions. This setting can range from 1 to 15 seconds, the default is 5. A countdown is shown on the status screen.

  This delay allows elevator or conveyor belts to start-up and achieve a correct running state before the general alarm conditions are monitored. The exceptions to this are acceleration monitoring, bearing temperature and plug condition.

  If acceleration monitoring is enabled (a value other than 0), and the acceleration speed is outside of the permitted parameters, the Watchdog will stop the elevator or conveyor in accordance with the acceleration monitoring level.

- **14.5.H UNDERSPEED ENABLE** - Turns ON (default) and OFF underspeed monitoring. The OFF option is only displayed when the FACTORY SETTINGS menu has been accessed. If turned OFF, underspeed will not be monitored and settings 14.5.I - 14.5.L are disabled and not displayed.

- **14.5.I UNDERSPEED ALARM [%]** - The percentage of underspeed at which the system will cause an alarm. The percentage can be set from 1% to 10%, the default is 10%.

  If the measured speed falls below the calibrated speed by this preset percentage, the Watchdog will generate an underspeed alarm condition. If this alarm persists longer than the underspeed stop delay, then the Watchdog will stop the elevator or conveyor.

- **14.5.J SEVERE UNDERSPEED [%]** - The percentage of severe underspeed at which the system will shut down. The percentage can be set from 1% to 20%, the default is 20%.

  If the measured speed falls below the calibrated speed by this preset percentage, the Watchdog will generate a severe underspeed condition and stop the elevator or conveyor.

- **14.5.K UNDERSPEED ALARM DELAY [S]** - The delay in seconds before the system alarms after a sensor trips. The delay can be set from 0 to 10 seconds, the default is 1. Configuring the delay above zero can help prevent nuisance alarms.

  When a sensors trips, a cumulative alarm delay counter starts to count down. If the alarm condition ends before the delay counter reaches zero, the delay counter starts to count back up to the original alarm delay value and the Watchdog will not alarm.

  If the system reaches the UNDERSPEED ALARM DELAY time, the alarm relay is de-energized, the ALARM LED on the Watchdog lights up amber, and a warning showing the source of the alarm is displayed in red on the main LCD screen. The alarm event is also logged in the ALARM LOG.

- **14.5.L UNDERSPEED STOP DELAY [S]** - The delay in seconds before the system shuts down. The delay can be set from 0 to 60 seconds, the default is 60.

  A cumulative stop delay counter starts to count down simultaneously with the alarm delay. If the alarm condition ends before the delay counter reaches zero, the counter starts to count back up to the original stop delay value and the Watchdog will not stop the system.

After the alarm delay time has elapsed and the alarm has been triggered, the stop delay timer will be displayed on the main LCD.  If the Watchdog reaches the UNDERSPEED STOP DELAY time, the stop relay is de-energized, the STOP LED on the Watchdog lights up red, and a warning showing the source of the stop condition is displayed in red on the main LCD screen.  The stop event is also logged in the ALARM LOG.

*The stop delay does not apply to SEVERE UNDERSPEED[%] conditions.  If equipment reaches the set severe percentage, it will stop immediately without any delay.*

- **14.5.M OVERSPEED ENABLE** - Turns ON (default) and OFF overspeed monitoring.  The OFF option is only displayed when the FACTORY SETTINGS menu has been accessed.  If turned OFF, overspeed will not be monitored and settings 14.5.N - 14.5.Q are disabled and not displayed.

- **14.5.N OVERSPEED ALARM [%]** - The percentage of over speed at which the system will cause an alarm.  The percentage can be set from 1% to 10%, the default is 10%.

  If the measured speed rises above the calibrated speed by this preset percentage, the Watchdog will generate an overspeed alarm.  If this alarm persists longer than the "Overspeed Stop Delay" time, then the Watchdog will stop the elevator or conveyor.

- **14.5.O SEVERE OVERSPEED [%]** - The percentage of severe overspeed at which the system will shut down.  The percentage can be set from 1% to 20%, the default is 20%.

  If the measured speed rises above the calibrated speed by this preset percentage, the Watchdog will generate a severe overspeed stop condition.  This condition results in an immediate stop of the elevator or conveyor.

- **14.5.P OVERSPEED ALARM DELAY [S]** - The delay in seconds before the system alarms after a sensor trips.  The delay can be set from 0 to 10 seconds, the default is 1.  Configuring the delay above zero can help prevent nuisance alarms.

  When a sensors trips, a cumulative alarm delay counter starts to count down.  If the alarm condition ends before the delay counter reaches zero, the delay counter starts to count back up to the original alarm delay value and the Watchdog will not alarm.

  If the system reaches the OVERSPEED ALARM DELAY time, the alarm relay is de-energized, the ALARM LED on the Watchdog lights up amber, and a warning showing the source of the alarm is displayed in red on the main LCD screen.  The alarm event is also logged in the ALARM LOG.

- **14.5.Q OVERSPEED STOP DELAY [S]** - The delay in seconds before the system shuts down.  The delay can be set from 0 to 60 seconds, the default is 60.

  A cumulative stop delay counter starts to count down simultaneously with the alarm delay.  If the alarm condition ends before the delay counter reaches zero, the counter starts to count back up to the original stop delay value and the Watchdog will not stop the system.

  After the alarm delay time has elapsed and the alarm has been triggered, the stop delay timer will be displayed on the main LCD.  If the Watchdog reaches the OVERSPEED STOP DELAY time, the stop relay is de-energized, the STOP LED on the Watchdog lights up red, and a warning showing the source of the stop condition is displayed in red on the main LCD screen.  The stop event is also logged in the ALARM LOG.

*The stop delay does not apply to SEVERE OVERSPEED[%] conditions.  If equipment reaches the set severe percentage, it will stop immediately without any delay.*
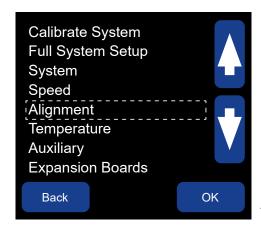
## 14.6 ALIGNMENT (HEAD)

*MENU > SETUP (PASSWORD) > PROFILE > EDIT SELECTED PROFILE > ALIGNMENT*

Settings in this menu allow you to monitor alignment at the head and/or tail sections of your equipment. Sensors are installed in pairs (left side - right side) at the head and/or tail sections.

- *14.6.A HEAD SENSOR PAIR* - This section allows you to enable or disable head alignment monitoring. Four options are available:

  1. OFF
  2. Pulsed
  3. Contact (Default Setting)
  4. Rub Block

  PULSED - Choose this option if using 4B WDA Motion Alignment Sensors, or Touchswiches that are receiving pulses from a P800. The number of pulses detected by the sensors on the right and left sides are compared. If the ratio between the two is less than 66%, an alarm condition is generated. The value of 66% is fixed and cannot be altered by the user.

  CONTACT (Default) - Choose this option if using 4B Touchswitch sensors (not receiving pulses from a P800). In this mode, the Watchdog looks for a change in signal level representing the belt alignment condition.

  > - *ON: +24V into the terminal is seen as Normal (no belt misalignment).*
  > - *OFF: 0V into the terminal is seen as a belt misalignment condition.*

  RUB BLOCK - Choose this option if using rub blocks to detect belt misalignment. A rub block is basically a temperature sensor mounted to a special block (usually brass). If the belt rubs constantly against the rub block, heat from friction will cause the rub block's temperature to rise. If the temperature rises above the preset limit, a misalignment alarm will be generated. There are a number of settings available for use with the rub block.

- *14.6.B HEAD TRIGGER ALARM* - If CONTACT is selected within the HEAD SENSOR PAIR menu, a trigger alarm must be selected. The default is OFF, meaning that an alarm will be triggered when the contact is off (0V). If ON is selected, the alarm will be triggered when the contact is on (+24V), this option (ON) is only available under FACTORY SETTINGS.

- *14.6.C ABSOLUTE ALARM [DEG]* - If RUB BLOCK is selected within the HEAD SENSOR PAIR menu, an absolute temperature value must be selected. If the measured temperature of the rub block exceeds this value, an alarm is generated. This level setting ranges from 32° to 230° F (1° to 110° C), the default is 140° F (60° C). For PRE ABS ALARM information, refer to section 14.4.B.

- **14.6.D RELATIVE ALARM SOURCE** - If RUB BLOCK is selected within the HEAD SENSOR PAIR menu, a relative alarm source must be selected.  Choices are OFF, AMB1, AMB2 or OPPOSITE, the default is OFF.

  If either AMB1 or AMB2 are selected, the relative alarm temperature is relative to the ambient temperature.  If OPPOSITE is selected, then the relative alarm for each sensor is relative to the opposite sensor's temperature.

- **14.6.E RELATIVE ALARM** - If RUB BLOCK is selected within the HEAD SENSOR PAIR menu and RELATIVE ALARM SOURCE is set to AMB1, AMB2 or OPPOSITE, a relative alarm must be selected.

  If the measured temperature of the rub block exceeds the relative temperature value, an alarm is generated.  This level setting ranges from 2° to 90° F (1° to 50° C), the default is 30° F (15° C).

- **14.6.F HEAD: RATE OF RISE [DEG/MIN]** - If RUB BLOCK is selected within the HEAD SENSOR PAIR menu you can choose to turn the rate of rise ON (default) or OFF.  If RELATIVE ALARM SOURCE is set to OFF, you will not be able to choose RATE OF RISE.

  If turned ON, this setting monitors the rub block's rate of rise of temperature in degrees per minutes.  If a rate of rise is detected equal to or greater than this value, an alarm will be generated and the alarm relay de-energized.  This level setting ranges from 0.5 to 5.0, the default is 3.0.

| NOTE |
|---|
| The temperature setting can be set to either Fahrenheit or Celsius, see FULL SYSTEM SETUP. |

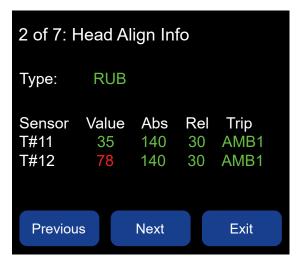| NOTE |
|---|
| On the HEAD ALIGN INFO screen (Image 27), sensor T#11 is on the head left & T#12 is head right. |



**Image 27**
**System Info Screen**
**Head Align Info - AMB1**

Image 27 shows the SYSTEM INFO screen for HEAD ALIGN INFO when AMB1 has been selected.

In the example above, an alarm will be generated when the rub block's temperature is equal to or greater than AMB1 +30°, or if the value exceeds the absolute value of 140°.  T#12 is shown in red since it is in an alarm state.

- **14.6.G HEAD ALARM DELAY [S]** - The delay in seconds before the system alarms after a sensor trips.  The delay can be set from 0 to 10 seconds, the default is 1.  Configuring the delay above zero can help prevent nuisance alarms.

When a sensors trips, a cumulative alarm delay counter starts to count down.  If the alarm condition ends before the delay counter reaches zero, the delay counter starts to count back up to the original alarm delay value and the Watchdog will not alarm.

If the system reaches the HEAD ALARM DELAY time, the alarm relay is de-energized, the ALARM LED on the Watchdog lights up amber, and a warning showing the source of the alarm is displayed in red on the main LCD screen.  The alarm event is also logged in the ALARM LOG.

- **14.6.H HEAD STOP DELAY [S]** - The delay in seconds before the system shuts down.  The delay can be set from 0 to 60 seconds, the default is 60.

A cumulative stop delay counter starts to count down simultaneously with the alarm delay.  If the alarm condition ends before the delay counter reaches zero, the counter starts to count back up to the original stop delay value and the Watchdog will not stop the system.

After the alarm delay time has elapsed and the alarm has been triggered, the stop delay timer will be displayed on the main LCD.  If the Watchdog reaches the HEAD STOP DELAY time, the stop relay is de-energized, the STOP LED on the Watchdog lights up red, and a warning showing the source of the stop condition is displayed in red on the main LCD screen.  The stop event is also logged in the ALARM LOG.

| ⚠ WARNING |
| --- |
| When you have completed making changes to the Watchdog profile setup, you will be prompted to save your changes.  You must enter YES, or your changes will not go into effect. |

## 14.7 ALIGNMENT (TAIL)

*MENU > SETUP (PASSWORD) > PROFILE > EDIT SELECTED PROFILE > ALIGNMENT*

Settings in this menu allow you to monitor alignment at the head and/or tail sections of your equipment.  Sensors are installed in pairs (left side - right side) at the head and/or tail sections.

- **14.7.A TAIL SENSOR PAIR** - This section allows you to enable or disable tail alignment monitoring.  Four options are available:

  1. OFF
  2. Pulsed
  3. Contact (Default Setting)
  4. Rub Block

  PULSED - Choose this option if using either 4B's WDA Motion Alignment Sensors or Touchswiches that are receiving pulses from a P800.  The number of pulses detected by the sensors from the right and left sides are compared, if the difference between the two exceeds 66% an alarm condition is generated.  The value of 66% is fixed and cannot be altered by the user.

  CONTACT (Default) - Choose this option if using 4B Touchswitch sensors (not receiving pulses from a P800).  In this mode, the Watchdog looks for a change in signal level representing the belt alignment condition.

  > - *ON:  +24V into the terminal is seen as normal (no belt misalignment).*
  > - *OFF:  0V into the terminal is seen as a belt misalignment condition.*

  RUB BLOCK - Choose this option if using rub blocks to detect belt misalignment.  A rub block is basically a temperature sensor mounted to a special block (usually brass).  If the belt rubs constantly against the rub block, heat from friction will cause the rub block's temperature to rise.  If the temperature rises above the preset limit, a misalignment alarm will be generated.  There are a number of settings available for use with the rub block.

- ***14.7.B TAIL TRIGGER ALARM*** - If CONTACT is selected within the TAIL SENSOR PAIR menu, a trigger alarm must be selected. The default is OFF, meaning that an alarm will be triggered when the contact is off (0V). If ON is selected, the alarm will be triggered when the contact is on (+24V), this option (ON) is only available under FACTORY SETTINGS.

- ***14.7.C ABSOLUTE ALARM [DEG]*** - If RUB BLOCK is selected within the TAIL SENSOR PAIR menu, an absolute temperature value must be selected.

  If the measured temperature of the rub block exceeds this value, an alarm is generated. This level setting ranges from 32° to 230° F (1° to 110° C), the default is 140° F (60° C).

- ***14.7.D RELATIVE ALARM SOURCE*** - If RUB BLOCK is selected within the TAIL SENSOR PAIR menu, a relative alarm source must be selected. Choices are OFF, AMB1, AMB2 or OPPOSITE, the default is OFF.

  If either AMB1 or AMB2 are selected, the relative alarm temperature is relative to the ambient temperature. If OPPOSITE is selected, then the relative alarm for each sensor is relative to the opposite sensor's temperature.

- ***14.7.E RELATIVE ALARM*** - If RUB BLOCK is selected within the TAIL SENSOR PAIR menu and RELATIVE ALARM SOURCE is set to AMB1, AMB2 or OPPOSITE, a relative alarm must be selected.

  If the measured temperature of the rub block exceeds the relative temperature value, an alarm is generated. This level setting ranges from 2° to 90° F (1° to 50° C), the default is 30° F (15° C).

- ***14.7.F TAIL: RATE OF RISE [DEG/MIN]*** - If RUB BLOCK is selected within the TAIL SENSOR PAIR menu and RELATIVE ALARM SOURCE is set to AMB1, AMB2 or OPPOSITE, you can choose to turn the rate of rise ON (default) or OFF. If RELATIVE ALARM SOURCE is set to OFF, you will not be able to choose RATE OF RISE.

  If turned ON, this setting monitors the rub block's rate of rise of temperature in degrees per minutes. If a rate of rise is detected equal to or greater than this value, an alarm will be generated and the alarm relay being de-energized. This level setting ranges from 0.5 to 5.0, the default is 3.0.

| NOTE |
|------|
| The temperature setting can be set to either Fahrenheit or Celsius, see FULL SYSTEM SETUP. |

| NOTE |
|------|
| On the TAIL ALIGN INFO screen (Image 28), T#9 is the sensor on the tail left and T#10 is tail right. |



3 of 7: Tail Align Info

Type:     RUB

| Sensor | Value | Abs | Rel | Trip |
|--------|-------|-----|-----|------|
| T#9 | 80 | 140 | 30 | T#10 |
| T#10 | 40 | 140 | 30 | T#9 |

Previous    Next    Exit

**Image 28
System Info Screen
Tail Align Info - Opposite**

Image 28 shows the SYSTEM INFO screen for TAIL ALGIN INFO when OPPOSITE has been selected, meaning that the relative alarm temperature for sensor T#9 is T#10 and vice versa.  For instance, an alarm will be generated when the actual temperature of T#9 exceeds the temperature of T#10 by +30°.  T#9 is shown in red since it is in an alarm state.

- **14.7.G TAIL ALARM DELAY [S]** - The delay in seconds before the system alarms after a sensor trips.  The delay can be set from 0 to 10 seconds, the default is 1.  Configuring the delay above zero can help prevent nuisance alarms.

  When a sensors trips, a cumulative alarm delay counter starts to count down.  If the alarm condition ends before the delay counter reaches zero, the delay counter starts to count back up to the original alarm delay value and the Watchdog will not alarm.

  If the system reaches the TAIL ALARM DELAY time, the alarm relay is de-energized, the ALARM LED on the Watchdog lights up amber, and a warning showing the source of the alarm is displayed in red on the main LCD screen.  The alarm event is also logged in the ALARM LOG.

- **14.7.H TAIL STOP DELAY [S]** - The delay in seconds before the system shuts down.  The delay can be set from 0 to 60 seconds, the default is 60.

  A cumulative stop delay counter starts to count down simultaneously with the alarm delay.  If the alarm condition ends before the delay counter reaches zero, the counter starts to count back up to the original stop delay value and the Watchdog will not stop the system.

  After the alarm delay time has elapsed and the alarm has been triggered, the stop delay timer will be displayed on the main LCD.  If the Watchdog reaches the TAIL STOP DELAY time, the stop relay is de-energized, the STOP LED on the Watchdog lights up red, and a warning showing the source of the stop condition is displayed in red on the main LCD screen.  The stop event is also logged in the ALARM LOG.
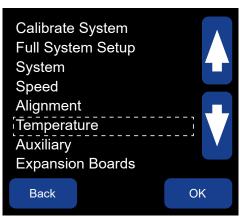


**Image 29**
**Edit Selected Profile - Temperature**

## 14.8 TEMPERATURE

**MENU > SETUP (PASSWORD) > PROFILE > EDIT SELECTED PROFILE > TEMPERATURE**

The Watchdog can monitor up to 8 NTC type temperature sensors (standard) or up to 20 with additional NTC expansion boards.  In the Watchdog system, 6 of these sensors are referred to as hot bearing sensor 1 (HBS1) through hot bearing sensor 6 (HBS6).  The other 2 sensors are referred to as ambient sensor 1 (AMB1) and ambient sensor 2 (AMB2).  Each sensor can be switched ON or OFF as required and they can be used in any combination.

If NTC expansion boards have been installed, an expanded menu will be available to configure up to 12 additional temperature inputs (see 14.10).
- If expansion board 1 (EXP1) has been installed, then HBS7 - HBS12 will be available.
- If expansion board 2 (EXP2) has been installed, then HBS13 - HBS18 will be available.

| NOTE |
| --- |
| While originally developed for displaying hot bearing sensors (HBS), menus displaying HBS can refer to any NTC type temperature sensor such as those used with brass rub blocks (ADB Series) or surface temperature sensors (WDB7 Series). |

*Since the menus are the same for each NTC sensor, HBS1 will be used as a template for all HBS sensors in this manual.*

- **14.8.A HBS1** - Choices are ON or OFF.  Select OFF to disable the sensor or ON to enable the sensor.  The default setting for HBS1 through HBS4 is ON, while the default for HBS5 and HBS6 is OFF.  If using NTC expansion boards, the default setting is OFF for each individual sensor.

- **14.8.B HBS1: ABSOLUTE ALARM [DEG]** - This is the absolute maximum temperature at which the Watchdog will generate an alarm.  If an alarm is generated, the affected bearing sensor icon will change from green to red on the main LCD screen.  The alarm condition is also logged in the ALARM LOG.  This level setting ranges from 32° to 230° F (1° to 110° C), the default is 140° F (60° C).  For PRE ABS ALARM information, refer to section 14.4.B.

- **14.8.C HBS1: RELATIVE ALARM SOURCE** - Allows you to select a relative alarm source.  Choices are OFF, AMB1 or AMB2, the default is OFF.  This option creates a relationship between two different temperature sensors.  When using the setup screen on the Watchdog, HBS1 - HBS6 can only be related to ambient sensor 1 (AMB1) or ambient sensor 2 (AMB2).

- **14.8.D HBS1: RELATIVE ALARM [DEG]** - If AMB1 OR AMB2 is selected within the RELATIVE ALARM SOURCE menu, a relative temperature value must be selected.

  If the measured temperature of the bearing sensor exceeds the relative temperature value, an alarm is generated.  This level setting ranges from 2° to 90° F (1° to 50° C), the default is 30° F (15° C).

- **14.8.E HBS1: RATE OF RISE [DEG/MIN]** - You can choose to turn the rate of rise ON or OFF (default).  If turned OFF, the rate of rise is ignored and no alarm will be generated.

  If turned ON, this setting monitors the rate of rise of the bearing sensor temperatures.  It is designed to detect when temperature rises are in excess of what might be considered normal.  If the sensor temperature rises more than 3 degrees (default) per minute, then a RATE OF RISE alarm will be generated.  If an alarm is detected, the alarm relay will be de-energized until the rate of rise drops below the set target.  The process of monitoring the rate of rise can be delayed at start-up by setting the RATE OF RISE START UP DELAY in the SYSTEM SETTINGS menu.  This level setting ranges from 0.5 to 5.0, the default is 3.0.

- **14.8.F HBS1 ALARM DELAY [S]** - The delay in seconds before the system alarms after a sensor trips.  The delay can be set from 0 to 10 seconds, the default is 1.  Configuring the delay above zero can help prevent nuisance alarms.

  When a sensor trips, a cumulative alarm delay counter starts to count down.  If the alarm condition ends before the delay counter reaches zero, the delay counter starts to count back up to the original alarm delay value and the Watchdog will not alarm.

  If the system reaches the ALARM DELAY time, the alarm relay is de-energized, the ALARM LED on the Watchdog lights up amber, and a warning showing the source of the alarm is displayed in red on the main LCD screen.  The alarm event is also logged in the ALARM LOG.

- **14.8.G HBS1 STOP DELAY [S]** - The delay in seconds before the system shuts down.  The delay can be set from 0 to 60 seconds, the default is 60.

  A cumulative stop delay counter starts to count down simultaneously with the alarm delay.  If the alarm condition ends before the delay counter reaches zero, the counter starts to count back up to the original stop delay value and the Watchdog will not stop the system.

  After the alarm delay time has elapsed and the alarm has been triggered, the stop delay timer will be displayed on the main LCD.  If the Watchdog reaches the STOP DELAY time, the stop relay is de-energized, the STOP LED on the Watchdog lights up red, and a warning showing the source of the stop condition is displayed in red on the main LCD screen.  The stop event is also logged in the ALARM LOG.

*Since the menus are the same for both AMB1 and AMB2, AMB1 will be used as a template in this manual.*

- **14.8.H AMB1** - Up to 2 ambient temperature sensors may be used with the Watchdog.  These can be used to monitor the temperature of additional bearings, motors or gearboxes.  These sensors are referred to as AMB1 and AMB2.  Each sensor can be switched OFF (default) or ON as required and they can be used in any combination.

- **14.8.I AMB1: ABSOLUTE ALARM [DEG]** - This is the absolute maximum temperature at which the Watchdog will generate an alarm.  The appropriate ambient sensor icon will change from green to red on the main LCD screen, and the alarm condition will be logged in the ALARM LOG.  This level setting ranges from 32° to 230° F (1° to 110° C), the default is 140° F (60° C).  For PRE ABS ALARM information, refer to section 14.4.B.

- **14.8.J AMB1: RATE OF RISE [DEG/MIN]** - You can choose to turn the rate of rise ON or OFF (default).  If turned OFF, the rate of rise is ignored and no alarm will be generated.

  If turned ON, this setting monitors the rate of rise of the ambient sensor temperatures.  It is designed to detect when temperature rises are in excess of what might be considered normal.  If the sensor temperature rises more than 3 degrees (default) per minute, then a RATE OF RISE alarm will be generated.  If an alarm is detected, the alarm relay will be de-energized until the rate of rise drops below the set target.  The process of monitoring the rate of rise can be delayed at startup by setting the RATE OF RISE START UP DELAY in the SYSTEM SETTINGS menu.  This level setting ranges from 0.5 to 5.0, the default is 3.0.

- **14.8.K AMB1: ALARM DELAY [S]** - The delay in seconds before the system alarms after a sensor trips.  The delay can be set from 0 to 10 seconds, the default is 1.  Configuring the delay above zero can help prevent nuisance alarms.

  When a sensors trips, a cumulative alarm delay counter starts to count down.  If the alarm condition ends before the delay counter reaches zero, the delay counter starts to count back up to the original alarm delay value and the Watchdog will not alarm.

  If the system reaches the ALARM DELAY time, the alarm relay is de-energized, the ALARM LED on the Watchdog lights up amber, and a warning showing the source of the alarm is displayed in red on the main LCD screen.  The alarm event is also logged in the ALARM LOG.

- **14.8.L AMB1: STOP DELAY [S]** - The delay in seconds before the system shuts down.  The delay can be set from 0 to 60 seconds, the default is 60.

  A cumulative stop delay counter starts to count down simultaneously with the alarm delay.  If the alarm condition ends before the delay counter reaches zero, the counter starts to count back up to the original stop delay value and the Watchdog will not stop the system.

  After the alarm delay time has elapsed and the alarm has been triggered, the stop delay timer will be displayed on the main LCD.  If the Watchdog reaches the STOP DELAY time, the stop relay is de-energized, the STOP LED on the Watchdog lights up red, and a warning showing the source of the stop condition is displayed in red on the main LCD screen.  The stop event is also logged in the ALARM LOG.

- **14.8.M EXP SENSORS (1 & 2)** - If an expansion board using temperature sensors has been installed, an extended selection menu will appear after the ambient sensors.  This shortcut within the temperature settings section provides quick access to the expansion board temperature sensors.
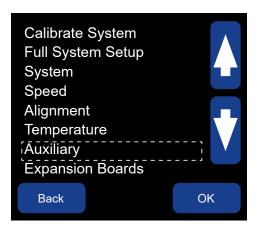
**Image 30**
**Edit Selected Profile -**
**Auxiliary**

## 14.9 AUXILIARY

*MENU > SETUP (PASSWORD) > PROFILE > EDIT SELECTED PROFILE > AUXILIARY*

The Watchdog is capable of monitoring for plug conditions (PLUG) and pulley misalignment (PULLEY). To enable these functions, sensors must be installed and turned on within the AUXILIARY menu.

- *14.9.A PLUG ENABLED* - Choices are ON or OFF (default). A plug or choke sensor is usually used for blocked chute detection. A Binswitch Elite is most commonly used however, an Auto-Set™ flush probe can also be installed depending on the application.

  When a plug sensor is installed and PLUG ENABLED is ON, the Watchdog looks for a change in signal level representing the plug condition.

  > *- ON: +24V into the terminal is seen as normal (no plug detected).*
  > *- OFF: 0V into the terminal is seen as blockage (plug) detected condition.*

- *14.9.B PLUG TRIGGER ALARM WHEN* - Choices are ON or OFF (default). Allows you to choose to trigger an alarm when the sensor contact is on, or trigger an alarm when the sensor contact is off. The default is OFF, in order to switch this setting to ON, you must go to the FACTORY SETTINGS menu.

- *14.9.C PLUG ALARM DELAY [S]* - The delay in seconds before the system alarms after a sensor trips. The delay can be set from 0 to 10 seconds, the default is 1. Configuring the delay above zero can help prevent nuisance alarms.

  When a sensors trips, a cumulative alarm delay counter starts to count down. If the alarm condition ends before the delay counter reaches zero, the delay counter starts to count back up to the original alarm delay value and the Watchdog will not alarm.

  If the system reaches the ALARM DELAY time, the alarm relay is de-energized, the ALARM LED on the Watchdog lights up amber, and a warning showing the source of the alarm is displayed in red on the main LCD screen. The alarm event is also logged in the ALARM LOG.

- *14.9.D PLUG STOP DELAY [S]* - The delay in seconds before the system shuts down. The delay can be set from 0 to 60 seconds, the default is 3.

  A cumulative stop delay counter starts to count down simultaneously with the alarm delay. If the alarm condition ends before the delay counter reaches zero, the counter starts to count back up to the original stop delay value and the Watchdog will not stop the system.

  After the alarm delay time has elapsed and the alarm has been triggered, the stop delay timer will be displayed on the main LCD. If the Watchdog reaches the STOP DELAY time, the stop relay is de-energized, the STOP LED on the Watchdog lights up red, and a warning showing the source of the stop condition is displayed in red on the main LCD screen. The stop event is also logged in the ALARM LOG.

- **14.9.E PULLEY ENABLED** - Choices are ON or OFF (default).  The pulley sensor is usually used to detect if the drive pulley has moved position (misaligned).  Typically a Touchswitch contact sensor would be used for this application.

   When a pulley sensor is installed and PULLEY ENABLED is ON, the Watchdog looks for a change in signal level representing the misaligned pulley condition.

      *- ON: +24V into the terminal is seen as normal (no pulley movement).*
      *- OFF:  0V into the terminal is seen when pulley movement has been detected.*

- **14.9.F PULLEY TRIGGER ALARM WHEN** - Choices are ON or OFF (default).  Allows you to choose to trigger an alarm when the sensor contact is on, or trigger an alarm when the sensor contact is off.  The default is OFF, in order to switch this setting to ON, you must go to the FACTORY SETTINGS menu.

- **14.9.G PULLEY ALARM DELAY [S]** - The delay in seconds before the system alarms after a sensor trips.  The delay can be set from 0 to 10 seconds, the default is 1.  Configuring the delay above zero can help prevent nuisance alarms.

When a sensor trips, a cumulative alarm delay counter starts to count down.  If the alarm condition ends before the delay counter reaches zero, the delay counter starts to count back up to the original alarm delay value and the Watchdog will not alarm.

If the system reaches the ALARM DELAY time, the alarm relay is de-energized, the ALARM LED on the Watchdog lights up amber, and a warning showing the source of the alarm is displayed in red on the main LCD screen.  The alarm event is also logged in the ALARM LOG.

- **14.9.H PULLEY STOP DELAY [S]**  - The delay in seconds before the system shuts down.  The delay can be set from 0 to 60 seconds, the default is 5.

   A cumulative stop delay counter starts to count down simultaneously with the alarm delay.  If the alarm condition ends before the delay counter reaches zero, the counter starts to count back up to the original stop delay value and the Watchdog will not stop the system.

   After the alarm delay time has elapsed and the alarm has been triggered, the stop delay timer will be displayed on the main LCD.  If the Watchdog reaches the STOP DELAY time, the stop relay is de-energized, the STOP LED on the Watchdog lights up red, and a warning showing the source of the stop condition is displayed in red on the main LCD screen.  The stop event is also logged in the ALARM LOG.

---

⚠️**WARNING**

When you have completed making changes to the Watchdog profile setup, you will be prompted to save your changes.  You must enter YES, or your changes will not go into effect.
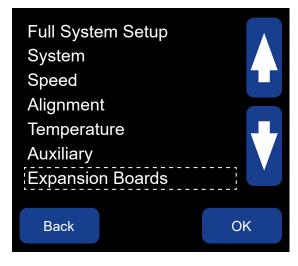
---



**Image 31**
**Edit Selected Profile -**
**Expansion Boards**

## 14.10 EXPANSION BOARDS

### *MENU > SETUP (PASSWORD) > PROFILE > EDIT SELECTED PROFILE > EXPANSION BOARDS*

Additional expansion boards can be installed inside the Watchdog WDC4 in positions EXPANSION 1 and EXPANSION 2.  Board types can be installed in pairs or mixed.  Boards can be pre-installed at the factory when ordering a new Watchdog WDC4, or installed into existing control units already in the field.  For installation instructions and board specifications, refer to the specific expansion board manual.

| ⚠ WARNING |
|---|
| Expansion boards are NOT suitable for HOT INSTALL.  Expansion boards should NOT be installed while the WDC4 is powered.  Refer to the board's manual for installation information or contact 4B. |

*Since the menus are the same for both expansion boards, expansion board 1 (EXP 1) will be used as a template for this manual.*

- **14.10.A EXPANSION 1 & 2** - After installing the expansion board(s) into the WDC4, note the location (1 or 2) as outlined in the board's installation manual.  Enter the EXPANSION BOARDS menu to select the board location (1 or 2) in the SETUP screen (Image 32).  Once the expansion board location has been set, the WDC4 will need to know what board has been installed (SELECT EXPANSION - Image 33).
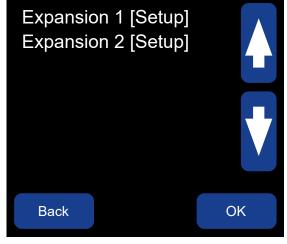


**Image 32
Expansion Board Setup Screen**



**Image 33
Expansion Board Selection Screen**

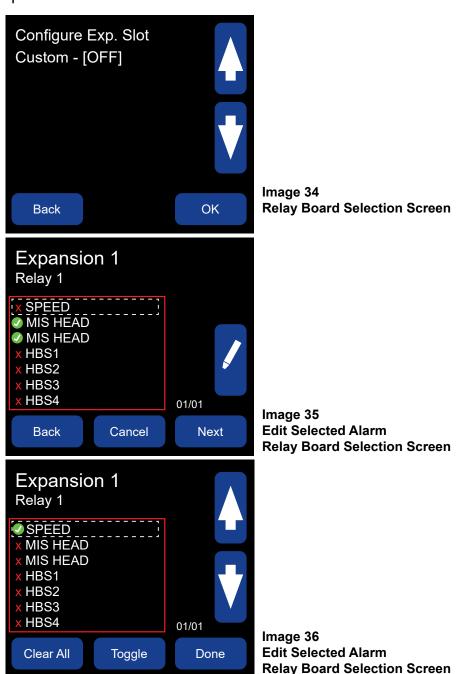| NOTE |
|---|
| If the incorrect expansion board is chosen for either expansion 1 or 2, select CONFIGURE EXP. SLOT from the menu.  This will return you to the expansion board selection menu where you can select the correct board type. |

- **14.10.B NTC BOARD** - The NTC board (WDC4-AUXI-6NTC) provides the ability to connect 6 additional NTC temperature sensors to the WDC4.  A maximum of two can be installed, providing a total of 12 additional NTC inputs.

If EXPANSION 1 is selected, NTC temperature settings for HBS7 - HBS12 will be available.  If EXPANSION 2 is selected, NTC settings for HBS13 - HBS18 will be available.  The menu default setting is OFF, so each individual NTC sensor must be turned ON and configured (see temperature sensors - section 14.8).

- **14.10.C RELAY BOARD** - The relay board (WDC4-AUXO-4SSR) provides the ability to connect additional signals from the WDC4 to a PLC. The board has 4 solid state relays (50 mA max.) that can be used to indicate alarm conditions.  By default, these are related to speed, alignment, temperature and auxiliary alarms as four separate signals. A maximum of two can be installed, providing a total of 8 separate alarm signals.

An additional level of controls have been added to the relay board. This allows the user to select which alarms trigger which relay. Otherwise by default the behaviour is identical to previous versions with each relay tied to a specific type of alarm.

If using the default settings, leave the Custom option Off. Otherwise select the Custom option (Image 34). Turn it on and save settings. The options for each relay should now be available. Selecting a relay brings up a table which displays the selected alarms for this relay (Image 35). Press the edit button (pencil) to change what alarms are selected. Press Next to save. When editing, the buttons change, giving arrows for cycling through the alarms. The clear all button will turn off all alarms for this relay. The toggle button will swap the state of the currently selected alarm. Press done once editing is complete.



**Image 34**
**Relay Board Selection Screen**



**Image 35**
**Edit Selected Alarm**
**Relay Board Selection Screen**



**Image 36**
**Edit Selected Alarm**
**Relay Board Selection Screen**

- ***14.10.D ANALOG BOARD (6AN)*** - The analog board (WDC4-AUXI-6AN) provides the ability to connect 4 current loop inputs (CLI), and 2 voltage in inputs (VIN) to the WDC4 control unit.

  If EXPANSION 1 is selected, settings for CLI1 - CLI4 and VIN1 - VIN2 will be available.  If EXPANSION 2 is selected, settings for CLI5 - CLI8 and VIN3 - VIN4 will be available.  The menu default setting is OFF, so each individual sensor must be turned ON and individually configured.

  *Since the menu options are similar for both CLI and VIN sensors, CLI1 will be used as a menu template for both types in this manual.*

  – ***14.10.D.1 CLI1: CUSTOM LABEL*** - Displays a name for the sensor on the WDC4 display, the default setting is mA (milliamp).  For example, if monitoring speed, RPM (revolution per minute) may be used.  For temperature monitoring, F (Fahrenheit) or C (Celsius) could be entered.  These labels appear in the ALARM LOG and SYSTEM INFO screens of the WDC4 and make it easier to identify the sensor type for the end user.

    The unit type can be changed from the default (mA) to any 3 character text by pressing the edit button (pencil icon).  A flashing editing cursor will appear under the first character, pressing the left and right arrow buttons (<  >) will move the cursor accordingly.  To edit, simply press the up and down arrows to change the display, the following characters are available:

  <space>!"#$%&'( )*+,-./0123456789:;< = >?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ ] /^_' abcdefghijklmnopqrtsuvwxyz

  – ***14.10.D.2 CLI1: INPUT RANGE*** - Select the sensor input range.  Choices available, 4-20 mA (default) and  0-20 mA for CLI sensors, or 0-10 VDC and 0-24 VDC (default) for VIN sensors.

  – ***14.10.D.3 CLI1: MIN SCALED VALUE*** - The value displayed when the sensor is reading its minimum value (mA or V).  The default is 4 for CLI or 0 for VIN, however the range can be set between -999 and 999.  Refer to the sensor manual for this information.

  – ***14.10.D.4 CLI1: MAX SCALED VALUE*** - The value displayed when the sensor is reading its maximum value (mA or V).  The default is 20 for CLI or 24 for VIN, however the range can be set between -999 and 999.  Refer to the sensor manual for this information.

  – ***14.10.D.5 CLI1: ABSOLUTE ALARM LOW*** - Choices are ON or OFF (default).

  – ***14.10.D.6 CLI1: ABSOLUTE ALARM LOW*** - Allows a value to be set for absolute low alarms.  The range can be set between -999 and 999 (no decimals).

  – ***14.10.D.7 CLI1: PRE-ABSOLUTE ALARM LOW*** - Choices are ON or OFF (default).

  – ***14.10.D.8 CLI1: PRE-ABSOLUTE ALARM LOW*** - Allows a value to be set for pre-absolute low alarms.  The range can be set between -999 and 999 (no decimals).

  – ***14.10.D.9 CLI1: PRE-ABSOLUTE ALARM HIGH*** - Choices are ON or OFF (default).

  – ***14.10.D.10 CLI1: PRE-ABSOLUTE ALARM HIGH*** - Allows a value to be set for pre-absolute high alarms.  The range can be set between -999 and 999 (no decimals).

  – ***14.10.D.11 CLI1: ABSOLUTE ALARM HIGH*** - Choices are ON or OFF (default).

  – ***14.10.D.12 CLI1: ABSOLUTE ALARM HIGH*** - Allows a value to be set for absolute high alarms.  The range can be set between -999 and 999 (no decimals).

- ***14.10.D.13 CLI1: ALARM DELAY [S]*** - The delay in seconds before the system alarms after a sensor trips (absolute alarm high / low value).  The delay can be set from 0 to 10 seconds, the default is 1.  Configuring the delay above zero can help prevent nuisance alarms.
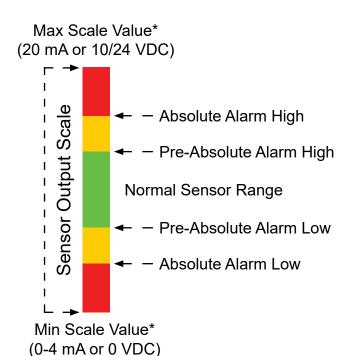
  When a sensors trips, a cumulative alarm delay counter starts to count down.  If the alarm condition ends before the delay counter reaches zero, the delay counter starts to count back up to the original alarm delay value and the Watchdog will not alarm.

  If the system reaches the ALARM DELAY time, the alarm relay is de-energized, the ALARM LED on the Watchdog lights up amber, and a warning showing the source of the alarm is displayed in red on the main LCD screen.  The alarm event is also logged in the ALARM LOG.

- ***14.10.D.14 CLI1: STOP DELAY [S]*** - The delay in seconds before the system shuts down (absolute alarm high / low value).  The delay can be set from 0 to 60 seconds, the default is 60.

  A cumulative stop delay counter starts to count down simultaneously with the alarm delay.  If the alarm condition ends before the delay counter reaches zero, the counter starts to count back up to the original stop delay value and the Watchdog will not stop the system.

  After the alarm delay time has elapsed and the alarm has been triggered, the stop delay timer will be displayed on the main LCD.  If the Watchdog reaches the STOP DELAY time, the stop relay is de-energized, the STOP LED on the Watchdog lights up red, and a warning showing the source of the stop condition is displayed in red on the main LCD screen.  The stop event is also logged in the ALARM LOG.



Max Scale Value*
(20 mA or 10/24 VDC)

Sensor Output Scale

Absolute Alarm High

Pre-Absolute Alarm High

Normal Sensor Range

Pre-Absolute Alarm Low

Absolute Alarm Low

Min Scale Value*
(0-4 mA or 0 VDC)

*Scale Values Dependent on Sensor Type (CLI or VIN)

The sensor output scale on the left represents the alarm range.  Settings can vary by sensor, refer to the sensor manual for details.

One application for pre-absolute alarms is bearing temperature.  For example, the pre-absolute alarm provides more notice of an increasing temperature issue prior to a shutdown sequence.  This allows for the alarm relay to activate without starting the shutdown timer, allowing time to resolve the issue.

Absolute alarms warn when a critical set point has been reached.  Both the alarm and stop delay settings are triggered by the absolute alarm high/low setting.  Absolute alarms always take precedence over any pre-absolute alarm settings.

The example CLI1 settings below are based on 4B's Milli-Speed switch. The Milli-Speed has a 4-20 mA output designed to detect belt slip, belt underspeed, stop motion, low speed or zero speed.

Referring to the manual for the Milli-Speed, at calibrated speed the output will be set to 17 mA (100%). If the speed input increases to equal 123% of the calibrated speed, the output will be 20 mA and will not rise above this. An input rate of less than 10% of the calibrated speed is treated as zero speed (4 mA). Once the speed reaches 10% of calibrated speed, the output will change from 0% (4 mA) to 10% (5.3 mA). The output will then continue linearly up to the maximum rate of 123% (20 mA). In belt slip applications, the machinery must shutdown with no more than 20% belt slip to prevent damage to the belt. On a fixed motor speed application where the Milli-Speed is calibrated for normal running speed (100%), 80% of the calibrated speed is 14.4 mA.

## EXAMPLE MENU SETTINGS

1. CLI1 Custom Label: %
   *% was chosen since speed is being monitored. This is can be changed based on individual requirements.*

2. CLI1: Input Range: 4 to 20
   *The Milli-Speed output is from 4 to 20 mA.*

3. CLI1 Min Scaled Value: 0
   *The minimum scale for the Milli-Speed is 0% (4 mA).*

4. CLI1 Max Scaled Value: 123
   *The maximum scale for the Milli-Speed is 123% (20 mA).*

5. CLI1 Absolute Alarm Low: 80
   *20% underspeed alarm (100% running speed - 20%), will provide an alarm and shut down equipment (if setup).*

6. CLI1 Pre-Absolute Alarm Low: 90
   *10% underspeed alarm (100% running speed - 10%), will provide an alarm but will not shut down equipment.*

7. CLI1 Pre-Absolute Alarm High: 110
   *10% overspeed alarm (100% running speed + 10%), will provide an alarm but will not shut down equipment.*

8. CLI1 Absolute Alarm High: 120
   *20% overspeed alarm (100% running speed + 20%), will provide an alarm and will shut down equipment (if setup)*

9. CLI1 Alarm Delay: 1
   *The default alarm delay of 1 second is being used.*

10. CLI1 Stop Delay: 1
    *The default stop delay of 1 seconds is being used for immediate shutdown on severe underspeed and overspeed conditions.*

Since sensor outputs can vary, it is vital to use the information provided in the sensor's manual to properly setup the WDC4.

- ***14.10.E ANALOG BOARD (2AN)*** - The analog board (WDC4-AUXI-2AN) provides the ability to connect 2 current loop inputs (CLI1 - CLI2) for 0 to 20 mA sensors to measure current.  Settings for the CLI inputs are similar to the ANALOG BOARD (6AN), refer to 14.10.D for setup details.

- ***14.10.F Pt100 BOARD*** - Pt100 board (WDC4-AUXI-4Pt100) provides the ability to connect a total of 4 Pt100 type temperature sensors to the WDC4.  The board has 12 terminal connections allowing for 2 wire or 3 wire sensor configurations (see expansion board manual for wiring diagrams).

  If EXPANSION 1 is selected, Pt100 temperature settings for Pt100 1 - Pt100 4 will be available.  If EXPANSION 2 is selected, Pt100 settings for Pt100 5 - Pt100 8 will be available.  The menu default setting is OFF, so each individual sensor must be turned ON and configured (see temperature sensors - section 14.8).
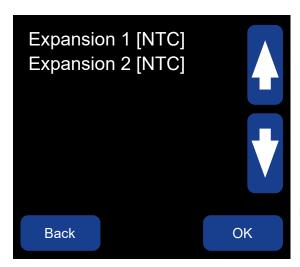


**Image 37**
**Edit Selected Profile -**
**Expansion Board Settings**

Image 37 illustrates the expansion board settings screen.  In this example, NTC expansion boards have been programmed into EXPANSION 1 and 2.  Each expansion board type has its own abbreviation code as listed below:

1. [NTC] - NTC Board
2. [SSR] - Relay Board
3. [6AN] - Analog Board (6 Inputs)
4. [2AN] - Analog Board (2 Inputs)
5. [Pt100] - Pt100 Board



**Image 38**
**Profile - Restore Defaults**

## 14.11 RESTORE DEFAULTS

*MENU > SETUP (PASSWORD) > PROFILE > RESTORE DEFAULTS (PASSWORD)*

All settings in the Watchdog can be restored to the factory default settings as described in Appendix B. Before allowing the settings to be reset, the user is prompted to enter the engineering password again and a final confirmation screen to confirm the action is displayed (Image 38).  The menu choices are: X (No) terminate without taking action, or OK (Yes), restore the factory defaults.



**Image 39**
**Profile - Select New Profile**

## 14.12 SELECT NEW PROFILE

*MENU > SETUP (PASSWORD) > PROFILE > SELECT NEW PROFILE*

To help make the setup process easier for bucket elevator legs, four preset program profiles are available to choose from (Image 39).  All four profiles are also listed in the WIRING DIAGRAMS section.

1. LEG (TS) / 1 SP, 4BS, 4TS
   - 1 Speed Sensor
   - 4 Bearing Temperature Sensors
   - 4 Touchswitch Sensors (Alignment)

2. LEG (RB) / 1SP, 4BS, 4RB
   - 1 Speed Sensor
   - 4 Bearing Temperature Sensors
   - 4 Rub Block Sensors (Alignment)

3. LEG (WDA) 4MA, 4BS
   - 4 Motion Alignment Sensors
   - 4 Bearing Temperature Sensors

4. LEG (TS) / 1SP, 6BS, 6TS
   - 1 Speed Sensor
   - 6 Bearing Temperature Sensors
   - 6 Touchswitch Sensors (Alignment)

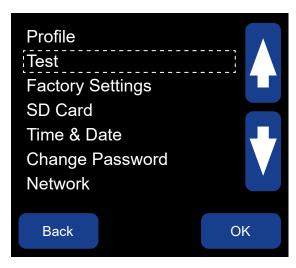| NOTE |
|---|
| All preset program profiles default to the factory settings.  To modify settings from the factory defaults, go to the EDIT SELECTED PROFILE menu. |

Profile
Test
Factory Settings
SD Card
Time & Date
Change Password
Network

Back    OK

**Image 40**
**Setup Menu - Test**

## 15. TEST -

*MENU > SETUP (PASSWORD) > TEST*

A number of test functions are available to simulate various fault conditions to validate the functionality of the alarm and stop relays (Image 40).  The testing function is not designed to test the sensors on the equipment, it allows you to ensure that your control wiring, PLC or HazardMon.com connectivity are functioning.  None of the tests will function if the Watchdog is in an alarm condition, or if the system has not been calibrated.  Testing can be run for the following:  ALARM RELAY, ALIGNMENT, OVER SPEED, Underspeed and HOT BEARING SENSOR.

| NOTE |
| --- |
| Only the ALARM RELAY test can be started while the equipment is running.  All of the other tests require the equipment to be stopped prior to testing. |

- *15.1 ALARM RELAY* - Toggles the alarm relay 5 times at a rate of once per second.  The display prompts you to "Press OK to Start the Test and Then Start the Elevator".  If the elevator is already running, the test will begin immediately.  If the elevator is stopped, the test will begin the next time the elevator is started.  When testing begins, "ALARM TEST"  will appear under SYSTEM STATUS on the main LCD screen.  The elevator will remain running after the test is concluded.

- *15.2 ALIGNMENT* - Simulates an alignment fault condition by introducing a head alignment fault.  The values used for alarm and stop delays will be the current settings.  The display prompts you to "Press OK to Start the Test and Then Start the Elevator".  The test will begin the next time the elevator is started.  When testing begins, "ALIGN. TEST"  will appear under SYSTEM STATUS on the main LCD screen.  The elevator will be in the stopped condition after the test is concluded.  If the alarm and stop delays are excessive, then it will take a long time to perform the test.

- *15.3 OVER SPEED* - Simulates an over speed fault condition by simulating an increase in speed by 15%, introducing an over-speed condition.  The values used for alarm and stop delays will be the current settings.  The display prompts you to "Press OK to Start the Test and Then Start the Elevator".  The test will begin the next time the elevator is started.  When testing begins, "O/S TEST" will appear under SYSTEM STATUS on the main LCD screen.  The elevator will be in the stopped condition after the test is concluded.  If the alarm and stop delays are excessive, then it will take a long time to perform the test.

- **15.4 Underspeed** - Simulates an underspeed fault condition by simulating a decrease in speed by 15%, introducing an underspeed condition.  The values used for alarm and stop delays will be the current settings.  The display prompts you to "Press OK to Start the Test and Then Start the Elevator".  The test will begin the next time the elevator is started.  When testing begins, "U/S TEST" will appear under SYSTEM STATUS on the main LCD screen.  The elevator will be in the stopped condition after the test is concluded.  If the alarm and stop delays are excessive, then it will take a long time to perform the test.

- **15.5 HOT BEARING SENSOR** - Simulates a hot bearing sensor exceeding the trip value.  The test is always on HBS1.  If HBS1 is not enabled, the firmware will enable it for the duration of the test and then switch it back off when the testing has been completed. The values used for alarm and stop delays will be the current settings.  The display prompts you to "Press OK to Start the Test and Then Start the Elevator".  The test will begin the next time the elevator is started.  When testing begins, "HBS TEST"  will appear under SYSTEM STATUS on the main LCD screen.  The elevator will be in the stopped condition after the test is concluded.  If the alarm and stop delays are excessive, then it will take a long time to perform the test.
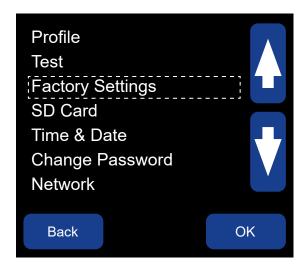
# 16. FACTORY SETTINGS



**Image 41 Factory Settings Menu**

## 16. FACTORY SETTINGS

*MENU > SETUP (PASSWORD) > FACTORY SETTINGS (PASSWORD)*

The changes that can be made through the PROFILE menu have been deliberately limited to safe values.  The FACTORY SETTINGS option allows a wider range of adjustments to be made and should be used with extreme caution.

The FACTORY SETTINGS menu can only be accessed by calling 4B technical support and getting an administrator password.  When this menu is selected, the screen will display a 4 digit number generated by the Watchdog (Image 42).  You must give this code to a 4B technical support representative, and after they verify that the changes you intend to make will leave the Watchdog in a safe working condition will in return give you a 4 digit administrator password.  The password expires after one use.

Once saved, any changes will become the new set limits and you will automatically exit the FACTORY SETTINGS menu and be taken back to the PROFILE menu.  Since only one setting can be changed per access within FACTORY SETTINGS, you may need to contact 4B on more than one occasion.  This may seem to be a nuisance, but the intention is to reduce the risk that some incorrect adjustment may cause the Watchdog to function in an undesirable and potentially unsafe way.

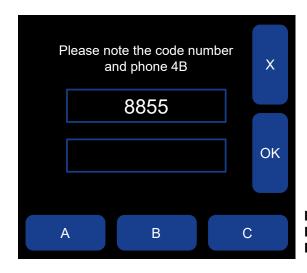| ⚠️ **DANGER** |
|---|
| Improper changes made to the Watchdog's FACTORY SETTINGS menus can be potentially unsafe.  Always consult with 4B technical support to confirm any change prior to implementation. |

**Image 42
Factory Settings -
Password Screen**

## 16.1 EDIT SELECTED PROFILE

*MENU > SETUP (PASSWORD) > FACTORY SETTINGS (PASSWORD) > EDIT SELECTED PROFILE*

The EDIT SELECTED PROFILE menu within FACTORY SETTINGS is almost an exact duplicate of the menus found under PROFILE.  FACTORY SETTINGS allow for a wider range of system adjustments which should only be changed by advanced users.  4B recommends using the standard settings found within the PROFILE menu.  Refer to PROFILE for more details.

## 16.2 RESTORE DEFAULTS
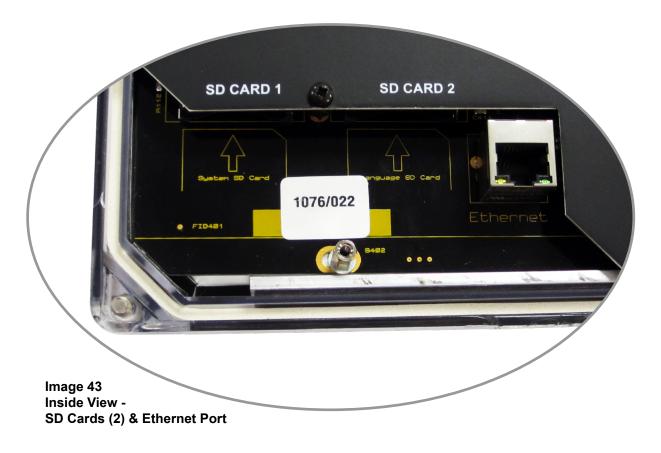
*MENU > SETUP (PASSWORD) > FACTORY SETTINGS (PASSWORD) > RESTORE DEFAULTS*

The RESTORE DEFAULTS menu within FACTORY SETTINGS is an exact duplicate of the same menu found under PROFILE.  Refer to PROFILE for more details.

## 16.3 SELECT NEW PROFILE

*MENU > SETUP (PASSWORD) > FACTORY SETTINGS (PASSWORD) > SELECT NEW PROFILE*

The SELECT NEW PROFILE menu within FACTORY SETTINGS is an exact duplicate of the same menu found under PROFILE.  Refer to PROFILE for more details.
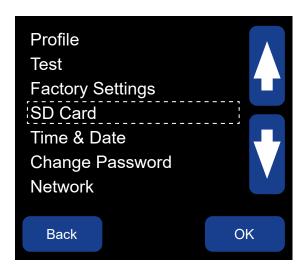


**Image 43
Inside View -
SD Cards (2) & Ethernet Port**

Profile
Test
Factory Settings
SD Card
Time & Date
Change Password
Network

Back          OK

**Image 44**
**Setup Menu - SD Card**

## 17. SD CARD -

*MENU > SETUP (PASSWORD) > SD CARD*

All of the settings in the Watchdog can be saved to and loaded from an SD card inserted into the System SD Card / SD Card 1 slot (Image 43) inside the control unit.  The setup file will have an extension of .wd4.

An SD card will be required if you are using the WDC4 Configurator Software to setup the Watchdog (Appendix C).

The SD CARD menu has two options -

- *LOAD FILE* - This allows a user to load a .wd4 file from the SD card and overwrites the current WDC4 settings.  You can choose to continue with the load or cancel the load.  The file load will be recorded in the ALARM LOG.

- *SAVE FILE* - The WDC4 will save it's status and settings to a .wd4 file on the SD Card.  This can be useful when upgrading the firmware.  If a file already exists on the SD card it will be overwritten. You can choose to continue with the save or cancel the save.  The file save will be recorded in the ALARM LOG.

After the load or save file operations have been completed, remove the SD card and press the RESET button on the circuit board (Image 51) to restart the Watchdog.  If the SD Card is missing or an error occurred during loading or saving, the entry recorded in the ALARM LOG will show "SD No Media".

By leaving an SD card in the System Card / SD Card 1 slot, a file named WDC4.csv will be created. This file will contain all the logging information regarding the status of the Watchdog.  Any run / stop request and alarm / stop conditions are logged.  If a WDC4.csv file already exists on the SD card, the data will be appended to the existing data in the file.

If the file size of WDC4.csv exceeds 10 MB, a warning will be reported in the ALARM LOG.  If using a program such as Microsoft Excel, the file size is important since versions before 2008 can have issues importing large file sizes.

---

### ⚠WARNING

Power down the Watchdog before inserting or removing the SD card from either the SD CARD 1 or SD CARD 2 slots to prevent system errors.

---
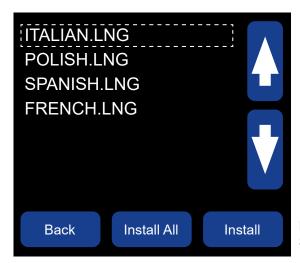
**Image 45**
**Setup Menu - Language**

## 17.1 LANGUAGE

*MENU > SETUP (PASSWORD) > SD CARD > INSTALL LANGUAGE FILE*

The ability to install languages via the SD card is available. The user must insert an SD card containing one or more language (.lng) files into the Language SD Card / SD Card 2 slot (Image 43). When coming to the screen the user is given the option to go back, to install all languages or to install the selected language.

In the event the user presses Back they are simply taken to the previous screen.

If Install All is pressed then a dialogue will appear prompting the user to confirm the choice. In the event that they do, the screen will pause for a moment before taking the user to the select language screen once all languages are installed on the card (up to 10).

If Install is pressed, the screen will pause briefly before going to the select language screen and auto selecting and enabling the new language.

In the event that the user tries to install too many languages a dialogue with a warning is displayed.

# 18. TIME & DATE



**Image 46**
**Setup Menu - Time & Date**

## 18. TIME & DATE -

*MENU > SETUP (PASSWORD) > TIME & DATE*

The time can be set by pressing the HRS, MIN or SEC keys at the bottom of the screen.  One press will increment the chosen value by one count.  When you have completed th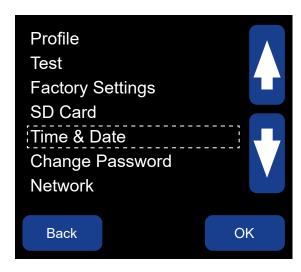e time settings, press the "OK" button to save the changes.  Pressing the "X" button will exit the setting mode without saving the changes.

The date can be set by pressing the DAY, MONTH or YEAR keys at the bottom of the screen.  One press will increment the chosen value by one count. When you have completed the date settings, press the "OK" button to save the changes.  Pressing the "X" button will exit the setting mode without saving the changes.

# 19. CHANGE PASSWORD
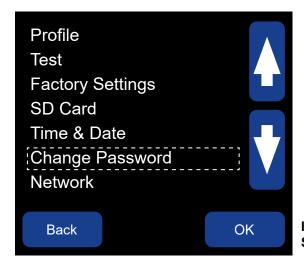


**Image 47**
**Setup Menu - Change Password**
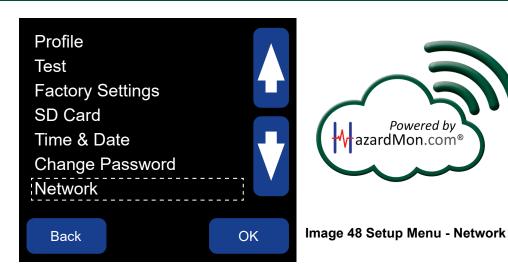
## 19. CHANGE PASSWORD -

*MENU > SETUP (PASSWORD) > CHANGE PASSWORD*

In order to make any system changes to the Watchdog, an engineering password is required.  This is to ensure that only authorized people can change important settings that may lead to inappropriate operation of the Watchdog. The default engineering password set at the factory is BBBB.

You can change the password from the factory setting within this menu by choosing CHANGE PASSWORD.  The password is from 1 to 8 characters long, and can be any combination of the letters A, B and C.  If you change the password from the factory default, make a note of your new password because if you lose it you will not be able to make changes to the Watchdog.  If you do lose the password, contact 4B technical support.

**Image 48 Setup Menu - Network**

## 20.1 NETWORK -

*MENU > SETUP (PASSWORD) > NETWORK*

- *HazardMon -* The Watchdog Super Elite can be integrated into HazardMon.com®, which is a secure cloud based hazard monitoring solution providing status notifications and data logging for bucket elevators and conveyors.  Live system status, graphs and historical data can be viewed on any web-enabled device (smartphone, tablet PC, desktop or laptop computer).  Emails can be sent to notify users whenever a change in the system's health is detected.  An automated maintenance feature allows site operators to verify that all sensors on the system are operational and working correctly.

  You can choose to turn HazardMon ON (default) or OFF.  In order to establish a connection to HazardMon.com, you will need to configure a network connection.  Contact 4B technical support prior to turning on this feature, 4B will work with your internal IT department to properly configure the required network settings.

- *DHCP (Dynamic Host Configuration Protocol) -* A network protocol that enables a server to automatically assign an IP address and other related configuration information to a computer from a defined range of numbers configured for a given network.

  You can choose to turn DHCP ON or OFF (default).  If you choose ON, the network settings will be automatic.  If you choose OFF, you will need to manually enter all of the network settings.

- *Ethernet IP -* Is the numerical address of a device on the local computer network.

- *Gateway -* Is a node (router) on a network that serves as an access point to give entry into different networks to send email, view web pages, etc.

- *Subnet Mask -* The subnet mask is a network generated number that identifies the network to which an IP address belongs. This allows your computer to determine if it is speaking with another computer within the same network or on a remote network and dictates how your computer communicates with other computers it encounters.   Subnetting is used to improve network security and performance.

- *DNS1 -* A domain name server (DNS) is the Internet's equivalent of a phone book. They maintain a directory of domain names (URL) and translate them to Internet Protocol (IP) addresses.  DNS is required for translation of hostnames to IP addresses and vice versa; this translation is what makes sending and receiving email, browsing the web, and numerous other network services work.

- *DNS2 -*  A backup server to DNS1 just in case it were to become unavailable for whatever reason.
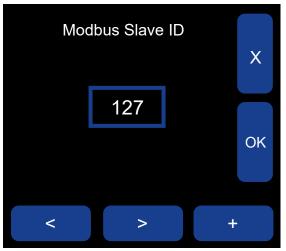
**Image 49**
**Setup Menu - Modbus RTU**

- **Modbus Slave ID** - Modbus RTU Support is available via the RS485 on J107 5 pin serial connection on the main board. The WDC4 will act as a slave and its modbus slave ID can be configured with the following screen (Image 49). The range is 1 – 247. This is a Full Duplex connection running at Baud Rate (19200), Parity (none), Data Bits (8), Stop Bits (1).

# 21. LANGUAGE

## 21. SELECT LANGUAGE -

*MENU > SETUP (PASSWORD) > SELECT LANGUAGE*

The Select Language screen lets the user change the WDC4's language. English is hard coded into the WDC4 and is always shown as the first language in the list. If you have a language file that is not yet installed in the WDC4, please see the SD Card section with installation instructions.

The SELECT LANGUAGE menu has 3 options:

- **BACK** - takes the user back to the previous screen.
- **CLEAR FLASH** - allows the user to erase all the currently installed languages (not including the default English). When selected the user is given a dialogue allowing them to confirm their choice.
- **SELECT** - allows the user to select the current language. The visual display of the screen may change as will translations for the buttons and title text.

In the event the user confirms they do want to erase all the languages, they are then presented with a factory settings password entry screen. They will need to correctly enter the factory password to erase all the languages.

# 22. TROUBLESHOOTING GUIDE

For details on specific alarms, go to the ALARM LOG and choose MORE INFO. This will provide you with details on the alarm such as: date, time, entry type, entry source, condition and data that is alarm dependent by type.
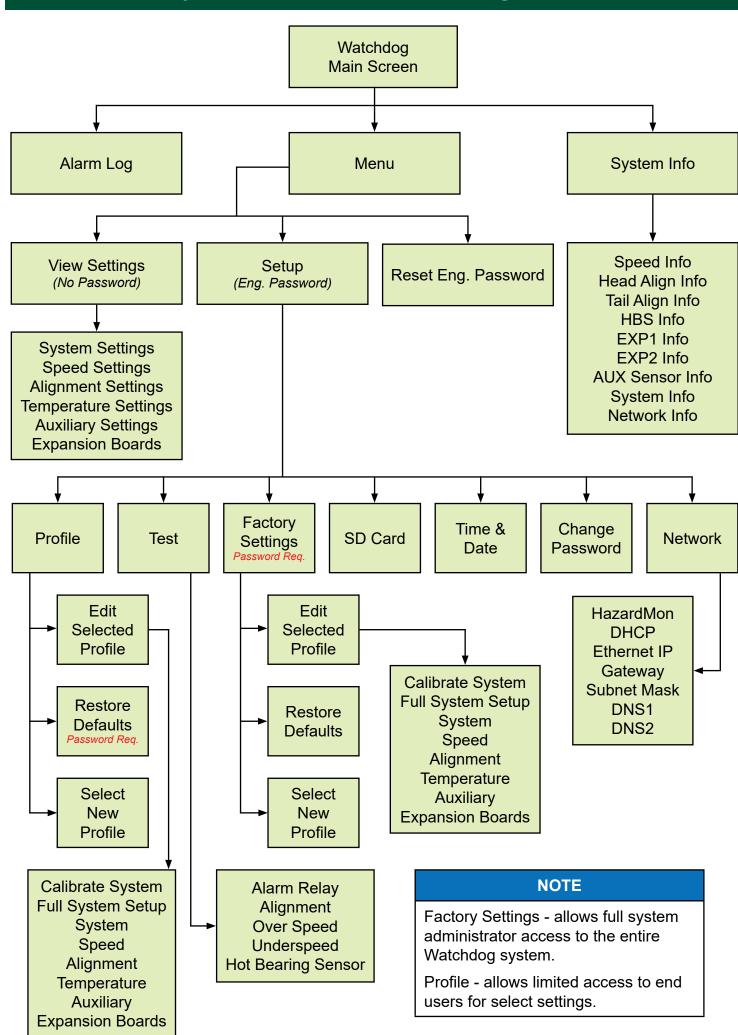
| Head & Tail Alignment | Bearing Temperature | Pulley Alignment | Plug Sensor | Ambient Temperature | Motor Interlock (Run Signal) | Stop Relay |
|---|---|---|---|---|---|---|

| LCD Icon | LCD Status | FAULT | CAUSE / REMEDY |
|---|---|---|---|
|  | Alarm: HBS(1) ABS (Could be HBS 1-6) | Hot bearing sensor 1 trip exceeded | Excessive temperature, check bearing |
|  | Alarm: HBS(1) O/C (Could be HBS 1-6) | Hot bearing sensor 1 open circuit | Faulty sensor or wiring |
|  | Alarm: HBS(1) S/C (Could be HBS 1-6) | Hot bearing sensor 1 short circuit | Faulty sensor or wiring |
|  | Alarm: AMB(1) (Could Be AMB1 or 2) | Ambient sensor trip exceeded | Excessive temperature, check bearing |
|  | Alarm: PLUG | Plug sensor has been activated | Blocked chute |
|  | Alarm: PULLEY | Pulley sensor has been activated | Pulley has misaligned, repair before running. |
|  | Alarm: MIS HEAD | Head misalignment condition | Belt slippage, check belt tension |
|  | Alarm: MIS TAIL | Tail misalignment condition | Belt slippage, check belt tension |
| ------ | Shutdown: Jog Event or Jog Delay | Too many equipment start attempts during a short period of time | Jog delay timer has activated to keep motor starter from overheating. Wait for jog delay timer to expire before restarting equipment |
| ------ | Shutdown: SPEED SOS | Severe overspeed condition | Equipment is running at excessively high speeds, check belt tension and calibration |
| ------ | Shutdown: SPEED OS | Overspeed condition | Equipment is running faster than the set limit, check belt tension and calibration |
| ------ | Shutdown: SPEED SUS | Severe underspeed condition | Equipment is running at excessively low speeds, check belt tension and load |
| ------ | Shutdown: SPEED US | Underspeed condition | Equipment is running slower than the set limit, check belt tension and load |

| LCD Icon | LCD Status | FAULT | CAUSE / REMEDY |
|---|---|---|---|
| | Messages Can Vary | Watchdog sending stop signal out, however run signal is still applied (refer to section 10.2) | Wiring fault with stop relay or interlock (run signal). Equipment monitored and interlock (run signal) needs to turn off when stop relay opens. |
| ------ | EXP1ERR or EXP2ERR | Expansion board is not recognized by Watchdog | Check jumper settings, and make sure ribbon cable is connected correctly (refer to expansion board manual) |

# 23. APPENDIX A - WDC4 MENU TREE

```
                          Watchdog
                         Main Screen
                              |
        +---------------------+---------------------+
        |                     |                     |
    Alarm Log              Menu               System Info
                              |                     |
        +---------------------+----------+           |
        |              |                 |           |
  View Settings      Setup        Reset Eng.    Speed Info
  (No Password)   (Eng. Password)  Password     Head Align Info
        |              |                         Tail Align Info
  System Settings      |                         HBS Info
  Speed Settings       |                         EXP1 Info
  Alignment Settings   |                         EXP2 Info
  Temperature Settings |                         AUX Sensor Info
  Auxiliary Settings   |                         System Info
  Expansion Boards     |                         Network Info
```

Setup branch:

| Profile | Test | Factory Settings (Password Req.) | SD Card | Time & Date | Change Password | Network |
|---------|------|----------------------------------|---------|-------------|-----------------|---------|

**Profile:**
- Edit Selected Profile
- Restore Defaults (Password Req.)
- Select New Profile

**Factory Settings:**
- Edit Selected Profile
- Restore Defaults
- Select New Profile
- Calibrate System
- Full System Setup
  - System
  - Speed
  - Alignment
  - Temperature
  - Auxiliary
  - Expansion Boards

**Network:**
- HazardMon
- DHCP
- Ethernet IP
- Gateway
- Subnet Mask
- DNS1
- DNS2

**Profile (Edit Selected Profile detail):**
- Calibrate System
- Full System Setup
  - System
  - Speed
  - Alignment
  - Temperature
  - Auxiliary
  - Expansion Boards

**Test:**
- Alarm Relay
- Alignment
- Over Speed
- Underspeed
- Hot Bearing Sensor

| NOTE |
|------|
| Factory Settings - allows full system administrator access to the entire Watchdog system. |
| Profile - allows limited access to end users for select settings. |

# 24. APPENDIX B - FACTORY DEFAULT SETTINGS

Some settings are dependent on others, so not all may be displayed or available to select.

| SYSTEM | DEFAULT | OPTIONS |
|---|---|---|
| • Temperature Units | °F | °F / °C |
| • Negative Differential Alarm | Off | On / Off |
| • Rate of Rise Start Up Delay [Min] | 3 | 0 - 5 |

| SPEED | DEFAULT | OPTIONS |
|---|---|---|
| • Speed Monitoring | On | On / Off |
| • Scaling Units | % | PPM / RPM / USR / % |
| • Scaling Factor | 12 | User Defined |
| • Speed detection Source | Dedicated | MAS / Dedicated / Differential |
| • Acceleration Monitoring Level | 5 | 0 - 9 |
| • Number of Starts / Minute | 3 | 1 - 10 |
| • Start Up Delay [S] | 5 | 1 - 15 |
| • Underspeed Alarm [%] | 10 | 1 - 10 |
| • Severe Underspeed [%] | 20 | 1 - 20 |
| • Underspeed Alarm Delay [S] | 1 | 0 - 10 |
| • Underspeed Stop Delay [S] | 60 | 0 - 60 |
| • Overspeed [%] | 10 | 1 - 10 |
| • Severe Overspeed [%] | 20 | 1 - 20 |
| • Overspeed Alarm Delay [S] | 1 | 0 - 10 |
| • Overspeed Stop delay [S] | 60 | 0 - 60 |

| ALIGNMENT (HEAD & TAIL) | DEFAULT | OPTIONS |
|---|---|---|
| • Sensor Pair | Contact | Off / Pulsed / Contact / Rub Block |
| • Trigger Alarm | Off | On / Off |
| • Absolute Alarm [Deg] | 140 °F | 32 - 230 °F |
| • Relative alarm Source | Off | Off / AMB1 / AMB2 / Opposite |
| • Relative Alarm [Deg] | 30 °F | 2 - 90 °F |
| • Rate of Rise [Deg / Min] | 3.0 | 0.5 - 5.0 |
| • Alarm Delay [S] | 1 | 0 - 10 |
| • Stop Delay [S] | 60 | 0 - 60 |

Some settings are dependent on others, so not all may be displayed or available to select.

| TEMPERATURE | DEFAULT | OPTIONS |
|---|---|---|
| • HBS1 - HBS4 (Sensors 1 - 4) | On | On / Off |
| • HBS5 - HBS6 (Sensors 5 - 6) | Off | On / Off |
| • HBS7 - HBS12 (Sensors 7 - 12)* | Off | Off / NTC Board / Relay Board |
| • HBS13 - HBS18 (Sensors 13 - 18)* | Off | Off / NTC Board / Relay Board |
| • HBS Absolute Alarm [Deg] | 140 °F | 32 - 230 °F |
| • HBS Relative Alarm Source | Off | Off / AMB1 / AMB2 |
| • HBS Relative Alarm [Deg] | 30 °F | 2 - 90 °F |
| • HBS Rate of Rise [Deg / Min] | 3.0 | 0.5 - 5.0 |
| • HBS Alarm Delay [S] | 1 | 0 - 10 |
| • HBS Stop Delay [S] | 60 | 0 - 60 |
| • AMB1 & AMB2 | Off | On / Off |
| • AMB Absolute Alarm [Deg] | 140 °F | 32 - 230 °F |
| • AMB Rate of Rise [Deg / Min] | 3.0 | 0.5 - 5.0 |
| • AMB Alarm Delay [S] | 1 | 0 - 10 |
| • AMB Stop Delay [S] | 60 | 0 - 60 |

* HBS7 - HBS18 (Sensors 7 - 18) require optional NTC expansion boards to be installed.

| AUXILIARY | DEFAULT | OPTIONS |
|---|---|---|
| • Plug Enabled | Off | On / Off |
| • Plug Trigger Alarm When | Off | On / Off |
| • Plug Alarm Delay [S] | 1 | 0 - 10 |
| • Plug Stop Delay [S] | 3 | 0 - 60 |
| • Pulley Enabled | Off | On / Off |
| • Pulley Trigger Alarm When | Off | On / Off |
| • Pulley Alarm Delay [S] | 1 | 0 - 10 |
| • Pulley Stop Delay [S] | 5 | 0 - 60 |

## NOTE

If SELECT NEW PROFILE has been chosen under the PROFILE menu, factory defaults may change depending on the profile selected.
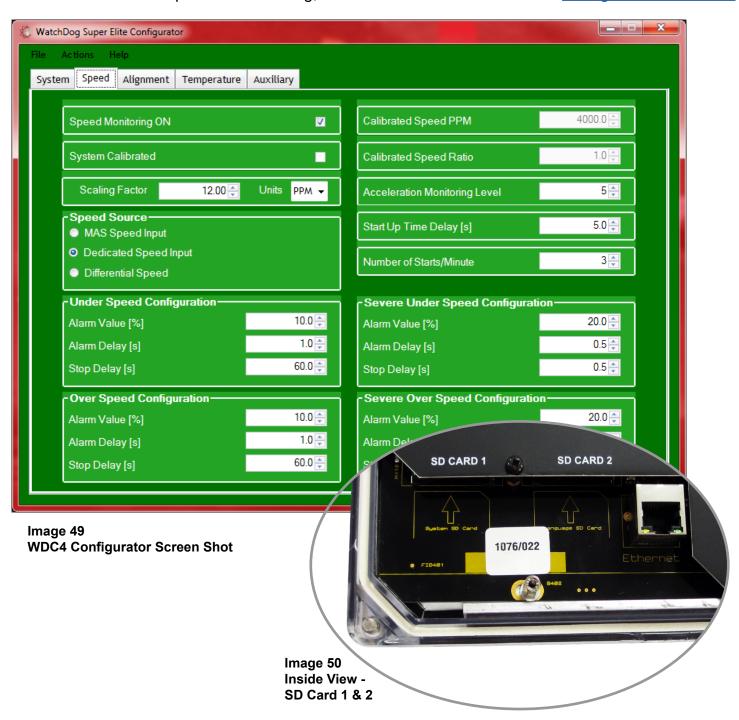
# 25. APPENDIX C - WDC4 CONFIGURATOR SOFTWARE

The Watchdog Super Elite can be programed directly through the controller's LCD menu screen, or by using the WDC4 Configurator Software. The software tool makes programming the Watchdog easier by providing all the system settings for each profile menu into one screen (Image 49).

Once a profile setup file has been created, it can be saved to an SD card and then uploaded to the Watchdog by inserting the card into the System Card / SD Card 1 slot (Image 50) inside the control unit. For remote sites, the file can be emailed to an on-site technician, who can upload the file.

When loading settings to the Watchdog, refer to Section 17 for SD card information.

The software does not ship with the Watchdog, it is available as a free download at: www.go4b.com/software.



**Image 49**
**WDC4 Configurator Screen Shot**



**Image 50**
**Inside View -**
**SD Card 1 & 2**

---

## ⚠️WARNING

Power down the Watchdog before inserting or removing the SD card from either the SD CARD 1 or SD CARD 2 slots to prevent system errors.

# 26. APPENDIX D - WDC4 SOFTWARE UPDATE

In order to receive software update notifications by email, please be sure to register your Watchdog Super Elite online at: http://www.go4b.com/usa and choose the "Product Registration" link.

## BEFORE YOU START -

Make sure to backup the system configuration settings currently installed on your Watchdog by following these steps:

1. Install an SD card into the SD CARD 1 slot (Image 50).
2. From the Watchdog's main LCD screen, choose *MENU > SETUP (PASSWORD) > SD CARD*.
3. Select SAVE FILE .WD4.
4. Remove the SD card when the file has been saved, and keep it in a safe place.

## HOW TO UPDATE -

Download the latest software version to your PC, there will be two files: U102.hex and U201.hex. To install the update to the Watchdog, follow these steps:

1. Load the software onto an SD card, make sure it is not the same card that contains the backup copy.
2. Open the lid of the Watchdog by loosening the two outside screws on the right hand side. Be careful not to touch any of internal wiring, especially the power supply.
3. Place the SD card into the LANGUAGE / SD CARD 2 slot (Image 50) located on the inside lid and press the RESET button on the circuit board (Image 51).
4. Wait for the unit to power up and display the main LCD screen.
5. Place the SD card into the SYSTEM / SD CARD 1 slot and press the RESET button again.
6. During the initial power up (Image 49) check that the new software version has been successfully loaded (Main IC).
7. After the update has successfully loaded, remove the SD card.
8. Secure the lid of the unit by re-tightening the screws.

If the new software did not install, repeat the software update process. If the upload continues to fail, contact 4B.
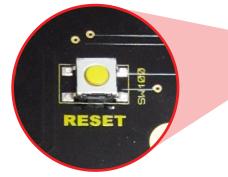


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Initializing...

Firmware Versions:
Main IC (U102): 4.X.X
Graphics IC (U201): 4.X.X
Support IC (U400): 4.X.X
Exp 1 (N/C): -.-.-
Exp 2 (N/C): -.-.-

Graphics DB Size: 1836
Main DB Size: 1836

**Image 51**
**Reset Button**

**Image 52**
**Initial Power Up Screen**

## ⚠️WARNING

Power down the Watchdog before inserting or removing the SD card from either the SD CARD 1 or SD CARD 2 slots to prevent system errors.

# END USER NOTES

# END USER NOTES

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# 27. PRODUCT WARRANTY

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