

CONFIDENTIAL

Avery Weigh-Tronix

ZM510

Indicator



Service Manual

original instructions

AWT35-501571
Issue AA

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Manual revision history

Current Issue	Date Created	Details of Changes
AA	July 2016	New manual

1 General information and warnings

1.1 About this manual

This manual is divided into chapters by the chapter number and the large text at the top of a page. Subsections are labeled using the 1.1 and 1.1.1 convention. The names of the chapter and the next subsection level appear at the top of alternating pages of the manual to remind you of where you are in the manual. The manual name and page numbers appear at the bottom of the pages.

1.1.1 Text conventions

Key names are shown in **bold** and reflect the case of the key being described. If a key has dual functions, the function is shown first followed by the key name in parentheses and in bold, such as in these examples: **F1, SELECT, PRINT**, etc.

Displayed messages appear in ***bold italic*** type and reflect the case of the displayed message.

1.1.2 Special messages

Examples of special messages you will see in this manual are defined below. The heading words have specific meanings to alert you to additional information or the relative level of hazard.



ELECTRICAL WARNING!
THIS IS AN ELECTRICAL WARNING SYMBOL.
ELECTRICAL WARNINGS MEAN THAT FAILURE TO FOLLOW SPECIFIC PRACTICES OR PROCEDURES MAY RESULT IN ELECTROCUTION, ARC BURNS, EXPLOSIONS OR OTHER HAZARDS THAT MAY CAUSE INJURY OR DEATH.



WARNING!
This is a Warning symbol.
Warnings mean that failure to follow specific practices and procedures may have major consequences such as injury or death.



CAUTION!
This is a Caution symbol.
Cautions give information about procedures that, if not observed, could result in damage to equipment or corruption to and loss of data.



NOTE: This is a Note symbol. Notes give additional and important information, hints and tips that help you to use your product.

1.2 Installation

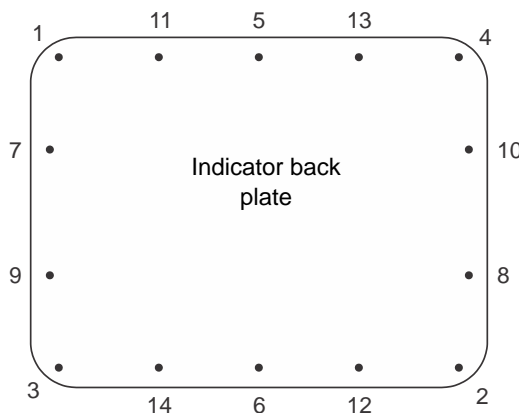


NO USER SERVICEABLE PARTS. REFER TO QUALIFIED SERVICE PERSONNEL FOR SERVICE.

1.2.1 Torque specifications



CAUTION: The acorn nuts holding the back plate of the indicator in place must each be tightened, in multiple passes, in the following pattern to a final torque of 0.68 N-m (approximately 6 in-lbs) to ensure proper gasket sealing.



There are four sizes of strain reliefs exiting the indicator: PG11, PG7, PG13.5 and NPT 3/4". The torque specifications for the locknuts which hold the strain reliefs to the indicator housing and the specs for the dome nuts which seal the cable that passes through the strain relief are shown in the table below.

	3/4" NPT Strain Relief	PG13.5 Strain Relief	PG11 Strain Relief	PG7 Strain Relief
Dome Nut	44.2 lb-in 5 N-m	22.1 lb-in 2.5 N-m	22.1 lb-in 2.5 N-m	8.9 lb-in 1.0 N-m
Lock Nut	66.4 lb-in 7.5 N-m	33.2 lb-in 3.75 N-m	33.2 lb-in 3.75 N-m	13.3 lb-in 1.5 N-m

The vent in the back cover should be torqued between 5.3 and 7.1 lb-in (0.6-0.8 N-m).

1.2.2 Proper grounding of cables

On the stainless steel desktop models, cable shield wires should be grounded directly to the studs provided at the bottom of the enclosure, close to the strain relief entry point, with wire lengths at a minimum. On the aluminum and panel mount models the shield wires should be connected to the SHLD connection on the corresponding terminal block connectors.

1.2.3 Safe handling of equipment with batteries



CAUTION: *Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.*

ATTENTION: *Il y a danger d'explosion s'il y a remplacement incorrect de la batterie, remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.*

1.2.4 Wet conditions

Under wet conditions, the plug must be connected to the final branch circuit via an appropriate socket / receptacle designed for washdown use.

Installations within the USA should use a cover that meets NEMA 3R specifications as required by the National Electrical Code under section 410-57. This allows the unit to be plugged in with a rain tight cover fitted over the plug.

Installations within Europe must use a socket which provides a minimum of IP56 protection to the plug / cable assembly. Care must be taken to make sure that the degree of protection provided by the socket is suitable for the environment.

1.3 Routine maintenance



IMPORTANT: *This equipment must be routinely checked for proper operation and calibration. Application and usage will determine the frequency of calibration required for safe operation.*

Always turn off the machine and isolate from the power supply before starting any routine maintenance to avoid the possibility of electric shock.

1.4 Cleaning the machine



Table 1.1 Cleaning DOs and DON'Ts

DO	DO NOT
Wipe down the outside of standard products with a clean cloth, moistened with water and a small amount of mild detergent	Attempt to clean the inside of the machine
	Use harsh abrasives, solvents, scouring cleaners or alkaline cleaning solutions
Spray the cloth when using a proprietary cleaning fluid	Spray any liquid directly on to the display windows

1.5 Training

Do not attempt to operate or complete any procedure on a machine unless you have received the appropriate training or read the instruction books.

To avoid the risk of RSI (Repetitive Strain Injury), place the machine on a surface which is ergonomically satisfactory to the user. Take frequent breaks during prolonged usage.

1.6 Sharp objects

Do not use sharp objects such as screwdrivers to operate the keys.

1.7 FCC and EMC declarations of compliance

United States

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canada

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

European Countries

WARNING: This is a Class A product. In a domestic environment, this product may cause radio interference in which the user may be required to take adequate measures.

2 Introduction

The ZM510 indicator is a powerful, programmable indicator with a default truck weighing application. This manual will explain the following:

- the Setup, Diagnostics, User and Audit menus
- communication protocols and print formats
- available option modules
- servicing information and parts lists

Figure 2.1 shows the front panel of the ZM510 indicator which consists of the keys and the graphic display.

















Figure 2.1 ZM510 front panel



Never press a key with anything but your finger. Damage to the overlay may result if sharp or rough objects are used.

2.1 Front Panel Keys

The key functions are listed below.

	Press the TARE key to perform a pushbutton tare function. Acts as an up arrow key for menu navigation.
	Press the SELECT key to toggle between the active display values. Acts as a down arrow key for menu navigation.
	Press the ZERO key to zero the display. Acts as an ENTER key to accept a displayed value or function.
	Press the PRINT key to send information to a peripheral device through a configured communications port. Acts as a left arrow key for menu navigation.
	Press the UNITS key to scroll through the available units of measure while in normal operating mode. Acts as a right arrow key for menu navigation.
	Use the F1 through F5 keys as defined by the label above each one on the display. The functions change according to program need.
	Use the alphanumeric keypad for entering text or numbers.
	Press the CAPS key, CAP will appear, to make one upper case letter. Press and hold the key to turn on the CAPS lock. CAP will appear when the CAPS lock is on. Press CAPS again to return to lower case characters.
	Press the Num Lock key once during a standard string entry function to type a single number. Press and hold to lock the number key function. NUM on the screen means a single number, NUM means the Num Lock is on. Press again to unlock.
	Press the ENTER key to accept a displayed choice or access a lower menu level. Duplicates the function of an on-screen softkey Enter arrow.
	Press the START key to start a process defined by the active program.
	The SETUP key can be used to perform custom application functions. It can also be used to view the password entry screen for menu access.
	Press the STOP key to stop a process defined by the active program.
	If enabled by the program, press the SCALE key to switch between active scales. Also acts as an ESCAPE key when in an entry function or in the menus.

2.2 Display

The ZM510 can display a mix of text and graphics. Menus are a mixture of graphics and text. Top level menu items appear as icons with titles. See [Figure 2.2](#). This is the screen you see when you enter the Admin level menu. The bold outline around the Setup icon shows it is the currently selected icon.

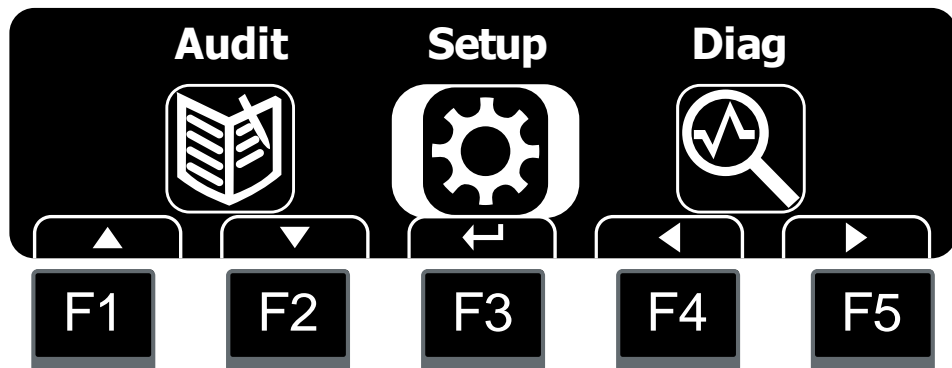
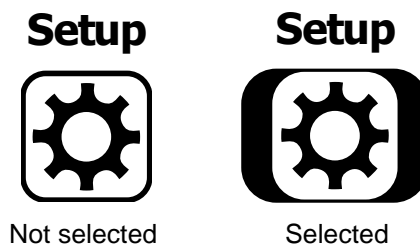


Figure 2.2 Top level menu

The other icons in the menu do not have this highlight. See the illustration below.

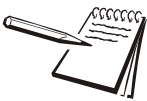


The next chapters cover the menus in detail.

3 Introduction to the menus

Menus, accessed through passwords, are available to customize and configure the indicator for your purposes. The menu levels and their passwords are shown below:

Password	Menu Level	Accessed Menus
111	USER	User, About, Audit (See <i>User level menu on page 14</i>)
3570	DIAGNOSTICS	Diag, User, About, Audit (See <i>Diagnostics menu on page 18</i>)
3088	ADMIN	Setup, Diag, User, About, Audit (See <i>ADMIN Menu on page 22</i>)
2580	CALIBRATE	Calibration
1234	DATABASE	Database
7654	SUPER	Application specific items. See User manual.



The **CALIBRATE** menu level accesses the calibration procedure only. You can also access the calibration menu through the Setup menu using the **ADMIN** password.

Some menus appear in more than one menu level. As you can see in the table above, the 111 password gives you access to three menus; User, About and Audit. The 3570 password gives you access to those three plus the Diagnostics menu. The 3088 password gives you access to those four plus the Setup menu.

This allows the supervisor to control access to some or all of the menus based on the passwords shared. The menus are the same no matter which password is used.



The menus are explained in a sequential manner to cover all information in a logical fashion. You will probably never access all the menu items in this manner. You can navigate to the area of the menu that needs to be changed by using the menu maps.

3.1 Menu Navigation

Navigation through the menus is accomplished by using arrow, enter and escape keys. Sometimes the F keys have these functions and they are shown on-screen. The **TARE**, **SELECT**, **ZERO**, **PRINT** and **UNITS** keys also have navigation arrows and when both are available either can be used. See [Figure 3.1](#).



Figure 3.1 Navigation keys

Another **ENTER** key can also be found in the lower right corner of the alphanumeric keypad, shown below. *There is one instance when this key works but the **ZERO** key will not and that is when you are accepting a highlighted vehicle from the vehicle database.*



3.2 Exiting a menu

To exit a menu you may first have to use the **ESC** softkey, if on the screen. When that key is no longer available, use the up arrow softkey repeatedly until you are asked if you want to save any changes made. Use the **Up** or **Down** key to make your choice and press the **ENTER** key to accept.

The indicator will reboot and return to the startup screen with the new changes active.

4 User level menu

The User level menu (password 111) consists of these three menus:

- **User** - Use to set Time, Date, Site ID, check Seal status and check Archive information.
- **About** - Use to see information on the software, firmware, application, serial number, options, ethernet and downloads
- **Audit** - Use to check and/or print the calibration and configuration counters.

Follow these steps to access and use these menus.

1. Press and hold the **SETUP** key until the password entry screen appears.
2. Key in 111 and press the **ENTER** key ...

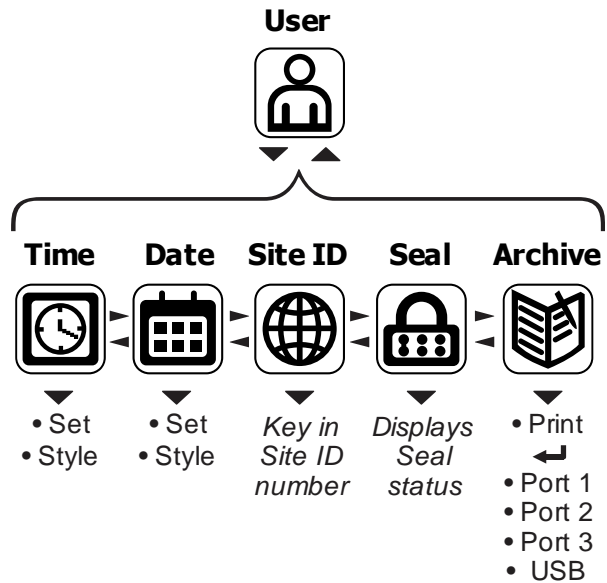
This screen is displayed:



3. Highlight the menu you want to enter and press the **ENTER** key. See *Menu Navigation* on page 12. Below are the explanations for these menus.

4.1 User menu

Here is the menu map for the User menu:



Use the **Left** and **Right** keys to highlight the menu item you want to access and press the **ENTER** key. Each of the items are explained below.

Time **Set** - Use the numeric keys to enter the correct time in the style chosen below.

Style - Choose the style of time display from these choices:

- 12HR - Shows time in the 12 hour style
- 12HR-AP - Shows time in the 12 hour style with AM/PM
- 24HR - Shows time in the 24 hour style

Date **Set** - Use the numeric keys to enter the correct date in the style chosen below.

Style - Choose the style of date display from these choices:

- MMDD2Y
- MMDD4Y
- DDMM2Y
- DDMM4Y

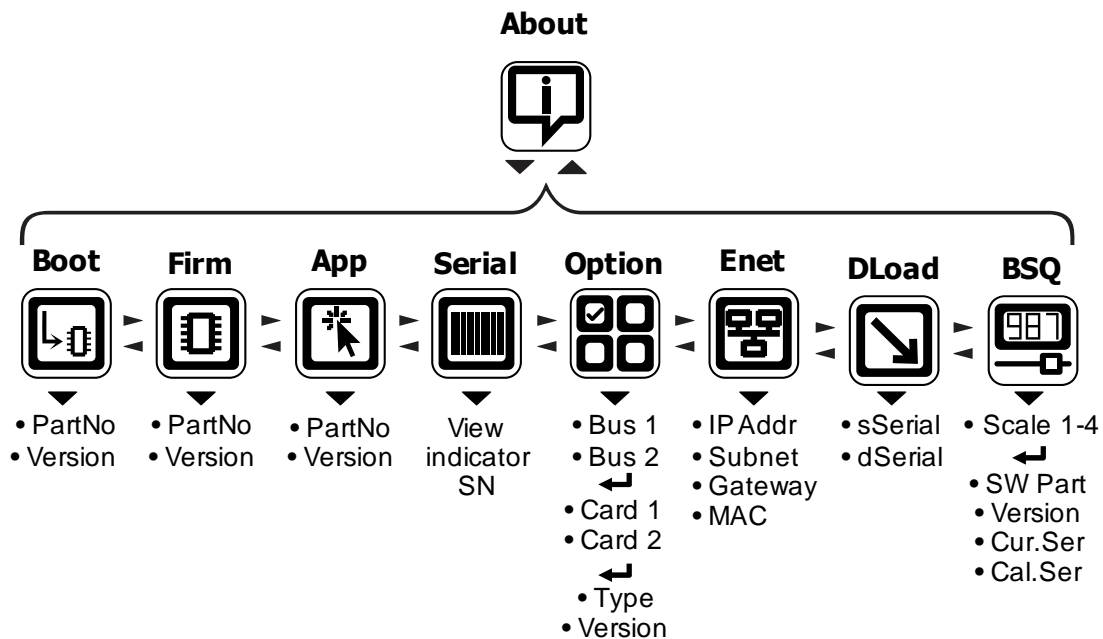
Site ID Use the alphanumeric keys to enter a Site ID, up to six characters.

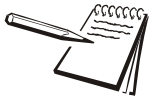
Seal Shows the status of the physical seal jumper inside the indicator: **SEAL** or **NO SEAL**. If the unit is sealed, no changes can be made to the configuration of the indicator.

Archive Allows you to print the archived transaction information. This item appears only if so configured in the ADMIN password protected menu.

4.2 About menu

If you access the About menu use this menu map:





Definitions:

Bootloader Software that makes the electronics run.

Firmware Embedded system software that creates core functions of the product.

App Specific software that controls the behaviour for a given installation.

Use the **Left** and **Right** keys to highlight the menu item you want to access and press the **ENTER** key.

Boot **PartNo** - See the bootloader part number.
Version - See the version of the bootloader.

Firm **PartNo** - See the firmware part number.
Version - See the version of the firmware.

App **PartNo** - See the application part number.
Version - See the version of the application.

Serial See the serial number of the indicator.

Option **Bus 1 or 2** - Choose the Bus of the option card.
Card 1 or 2 - Choose the Card you want to view. See page *Switch S1 settings on page 66*

- **Type** - View the type of card.
- **Version** - View the firmware version of the card.

Enet This stands for Ethernet. Use this to view the network addresses:

IP Addr - See the IP address.
Subnet - See the Subnet address.
Gateway - See the Gateway address.
MAC - See the MAC address.

DLoad This stands for download. Use this to view the following:
sSerial - View the license number that created the configuration file.
dSerial - View the license number that downloaded the configuration file.

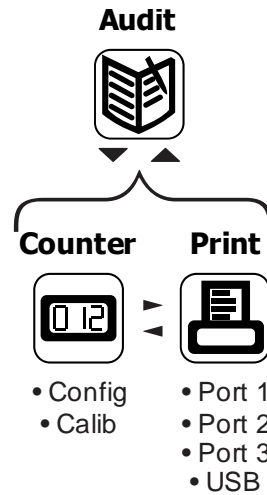
This is used for security and licensing purposes.

BSQ **Scale 1-4** - Choose the scale, if so configured.

- **SW Part** - View the firmware part number of the cell that is connected.
- **Version** - View the firmware version of the cell that is connected.
- **Cur. Ser** - View the serial number of the cell that is connected.
- **Cal. Ser** - View the serial number of the cell that WAS connected at the time of calibration.

4.3 Audit menu

If you access the Audit menu you will see this menu:



Counter **Config** - See the number of configurations the indicator has undergone.
Calib - See the number of calibrations the indicator has undergone.

Print Use these to select which port to print the audit report through. Choices are:

Port 1 Under **Port 1** choose to print to a column or ticket printer.

Port 2 Under **Port 2** choose to print to a column or ticket printer.

Port 3 Under **Port 3** choose to print to a column or ticket printer.

USB Printing to USB requires that a USB flash drive is connected to the indicator host USB. Printing to USB will create a folder on the flash drive and a comma separated file with the data.

5 Diagnostics menu

The Diagnostics menu, password 3570, is shown in [Figure 5.1](#). Use this to test or diagnose various functions of the indicator.

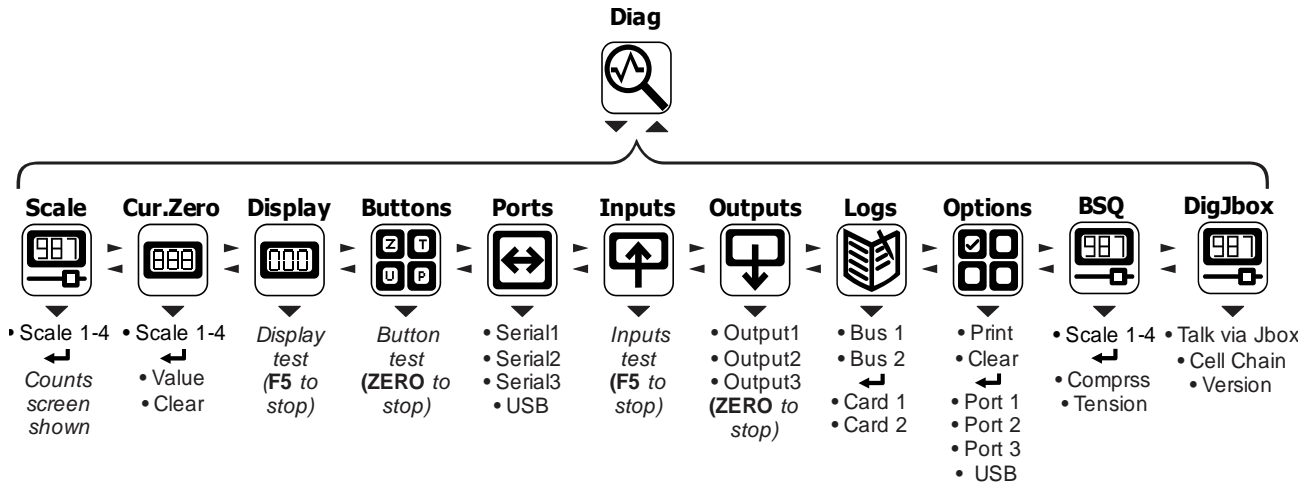


Figure 5.1 Diagnostics menu map

5.1 Scale

If a second scale is installed you can select to view values for Scale 1 through Scale 4.

Press **ENTER** to display the A to D counts. The value is only for diagnostic purposes. The value should increase as weight on the scale increases and decrease as weight decreases.

Press **SELECT** to toggle to a mV/V display. This is an approximate value for the mV/V output of the combined analog load cells of the scale. If the scale is a BSQ or you are using T301x load cells, you can only view counts, not mV/V.

5.2 Cur.Zero

Cur.Zero This stands for current zero and represents the weight offset between the calibration zero setting and the current zero setting due to pushbutton zero or Auto-Zero Tracking (AZT) adjustments.

Select to view values for Scale 1 through Scale 4, if installed.

Value View the zero offset.

Clear Clear the zero offset to return the indicator to calibration zero. Choose Yes or No.



*This can restore the original calibration zero point if the **ENTER** key is accidentally pressed when a tank or vessel contains product that cannot be emptied.*

5.3 Display

Use to test the segments of the display. Each digit area lights up in progression and continues until you press **ENTER**.

5.4 Buttons

Use to test the keys. When you begin the test, **Testing** is briefly displayed followed by dashes.

Press any key to test if it is functioning and its name or value will be displayed.

Press **ENTER** to stop the test.

5.5 Ports

Use this to do a loopback test for serial port 1 through 3 or to perform a write/read test on the USB port.

Serial1 to 3 When you pick a serial port to test, **Testing** is briefly displayed and then **Pass** or **Fail**, depending on if the send and receive lines are jumpered (pass) or not (fail). Add a jumper or wire between the transmit output and receive input. On an external 9 pin connector the transmit line is pin 2 and the receive line is pin 3.



It is recommended that you insert the jumper (a paper clip works) into the external cable connector to validate the wiring and not just the internal ports. See System block diagram on [page 141](#) for I/O configuration of the serial ports TB3 (Serial ports 1 & 2) and TB6 (Serial port 3).

USB Use this to test a connected USB flash drive.

Open is briefly displayed, then **Write** is briefly displayed, then **Read** is briefly displayed, then **Pass** or **Fail**, depending on if the USB device is working correctly or not.

If no USB device is plugged in when you begin the test, **Open** is briefly displayed, then **No USB** is briefly displayed, then **USB**.

5.6 Inputs

The input test is used to verify if external switches wired to the input ports on TB2 are functioning properly.

Follow the steps below to perform the inputs test.

1. Press **SELECT** ...

In 000 is displayed, if no inputs are jumpered.

2. To test input 1, jumper pins 1 and 2 of the I/O connector on the indicator ...

The first digit becomes **1** until the jumper is removed.

3. To test input 2, jumper pins 1 and 3 of the I/O connector on the indicator ...
The second digit becomes **2** until the jumper is removed.
4. To test input 3, jumper pins 1 and 4 of the I/O connector on the indicator
The third digit becomes **3** until the jumper is removed.
5. Press **ENTER** ...
Inputs is displayed.

5.7 Outputs

The output test is used to verify if external relays or lights (etc.) connected to TB2 are properly wired and functioning properly.

Follow the steps below to perform the output test.



CAUTION: Be sure to take proper precautions to ensure material controlled by the scale outputs will not create a hazardous condition during an output test.

1. With **Outputs** displayed, press **SELECT** ...
Output1 is displayed.
2. Press **SELECT** ...
o.1-Off is displayed.
3. Press **PRINT** or **UNITS** to toggle the output **on (o.1-on)** and repeat to turn it **Off**.

Output 1 will be toggled on and off as you press the keys. This is shown by the annunciator (*SP1*) on the display turning on and off.
4. Press **ENTER** or **F1** to stop the test ...
Output1 is displayed.
5. Press **UNITS** to go to the next output. Repeat the steps to test output 2 and 3.
6. When finished, press **TARE** ...
Outputs is displayed.

5.8 Logs



The logs report will be a printout of overloads and underloads that have occurred.

Logs These are logs of overload and underload conditions experienced by the scale. You can print them or clear them from memory.

Print Choose to print the log from Port 1 or Port 2.

Clear Choose to clear the log from memory.

5.9 Options

Use this to test the various installed option cards.

Bus x Refers to Bus 1 or Bus 2, where the option card is attached.

Card x Refers to the position of the S1 switches on the option card. See *Switch S1 settings* on [page 66](#).

5.10 BSQ

The BSQ menu item provides the digital frequency information for the crystals on the QDT (Quartzell Digital Transducer).

Scale 1 through **Scale 4**:

Select which Scale number the BSQ is assigned, **Scale 1** through **Scale 4**.

Comprss This stands for compression frequency.

Tension This stands for tension frequency.

The nominal value for the tension and compression frequency is $47,200 \pm 2000$ kHz. The tension and compression frequencies should each be as stable as the other and within 10% of each other. As weight increases the tension frequency should increase and the compression frequency should decrease.

5.11 DigJbox

This stands for Digital Junction box and is used when the indicator is attached to a digital junction box using the T301 or T301X load cells. If you access this item select the scale you want, if multiple scales are in use, and you can view the following:

Talk via Jbox A screen appears showing every load cell's weight data and status. There are keys for scrolling through each load cell's information.

Cell Chain This screen shows the relative address positions of all the load cells connected to the digital junction box.

Version This screen shows the software versions of the junction box and all the digital load cells.

This completes the Diag menu. To exit the menu, see *Exiting a menu* on [page 13](#).

6 ADMIN Menu

The Administrator's menu (ADMIN), shown in Figure 6.1, gives the password holder access to Setup, Diagnostic, User and Audit menus. The password is 3088. Since the Diagnostic, User and Audit menus have been explained in previous chapters, this chapter will cover the Setup menu.

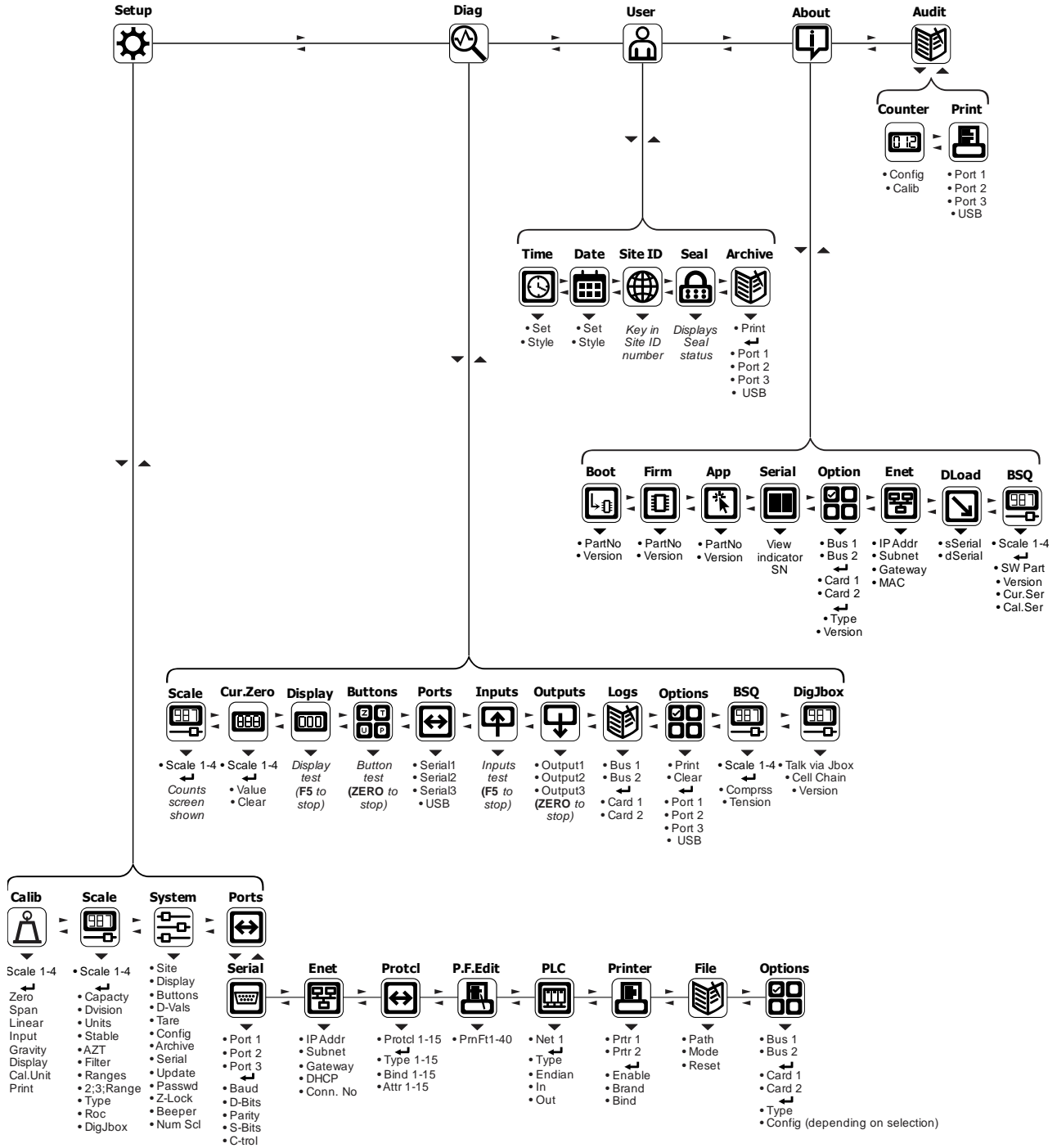


Figure 6.1 ADMIN menu map

1. Press and hold the **SETUP** key to access the password screen.
2. Key in the ADMIN menu password, 3088, and press the **ENTER** key ...

You will see the top level of the ADMIN menu. See [Figure 6.2](#).

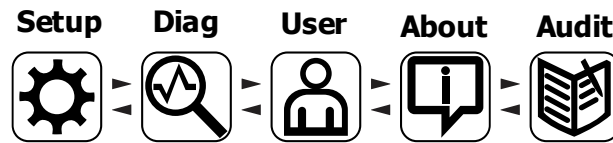


Figure 6.2 ADMIN menu top level

3. Highlight the Setup icon and press **ENTER** ...

The top level of the Setup menu is displayed. Follow the normal navigation rules to move through the items in this menu. Each item is explained below. See [Figure 6.3](#).

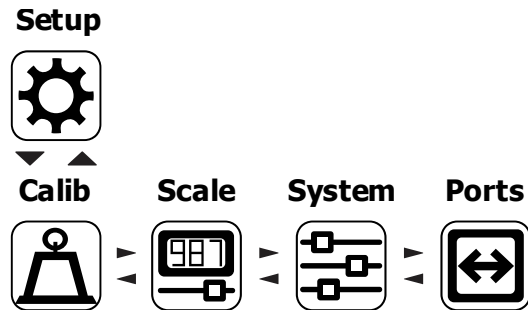


Figure 6.3 Setup menu top level

6.1 Calibrate

Under **Calib** you first must choose which scale to calibrate. If there is only one scale connected, **Scale 1** is the only choice displayed. There can be up to four scales.

Highlight the scale you want to calibrate and press **ENTER**.

The list of procedures available appears, as shown in [Figure 6.4](#).

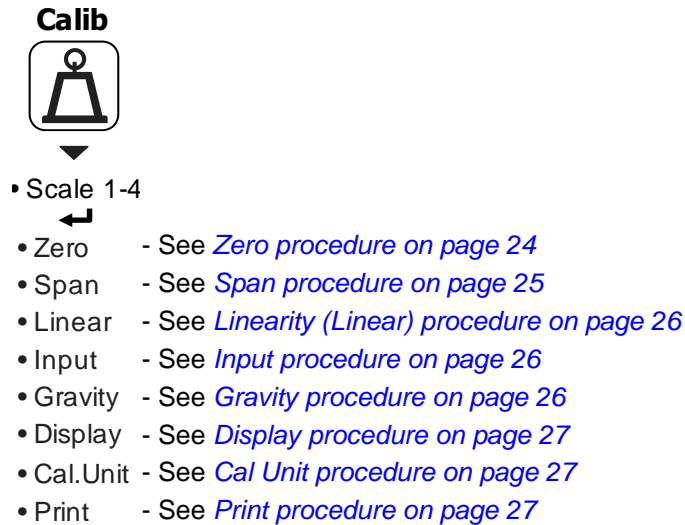



Figure 6.4 Calibration menu

6.1.1 Zero procedure

Highlight **Zero** to set the zero point for the scale and press **ENTER**

<p>Calib</p>  <p>• Scale 1-4</p> <p style="padding-left: 20px;">←</p> <p style="padding-left: 40px;">Zero</p> <p style="padding-left: 20px;">←</p> <p>• Cal.Zero</p> <p>• Temp</p> <p>• Last</p>	<p>Set the zero for the scale using one of the following three methods.</p> <p>Cal.Zero Use this to record the zero point. The word CALIBRATE on the display denotes the fact you are in the calibration procedure. See CAL.ZERO procedure below.</p> <p>Temp This is an alternate zeroing procedure. Use this when the product weight on the scale, such as in a tank or vessel, appears to be inaccurate but cannot be removed to establish a no-load condition. See TEMP procedure below.</p> <p>Last This is an alternate zeroing procedure. Use this if certified test weights placed on the scale display a slightly inaccurate value. See LAST procedure on page 25.</p>
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CAL.ZERO procedure

1. Highlight **Cal.Zero** and press **ENTER** ...

The **CALIBRATE** window appears.

2. Empty the scale and press **ENTER** ...

Busy is briefly shown then the weight is displayed.

3. Press **ENTER** to accept the zero point calibration.



On the initial zero calibration of the indicator to a new scale, the zero cal counts may appear unstable. Continue to the span calibration and when completed the condition should correct itself.

TEMP procedure

1. Highlight **Temp** and press **ENTER** ...

The current weight on the scale will be temporarily assigned as the Cal Zero value.

2. Continue to the SPAN procedure, key in the value of the test weights and place them on the scale and complete the SPAN procedure. The original Cal Zero is restored after exiting the span procedure and the current product weight will now be correctly represented. Due to factors that created the original inaccuracy, it may be necessary to re-zero the scale when the tank or vessel is empty.

LAST procedure

1. Highlight **Last** and press **ENTER** ...

The last acquired zero value will be assigned as the new Cal Zero value.

2. Continue to the SPAN procedure without removing the test weights. Key in the value of the test weights on the scale and complete the SPAN procedure. The test weights will now read accurately.

6.1.2 Span procedure

When you access the Span procedure the screen will show the current calibration weight value.

1. You can enter a new value for the calibration weight and press **ENTER** to accept it or press **ENTER** to accept the displayed value ...

The CALIBRATE screen appears showing the accepted calibration weight value.

2. Place the test weights equal to the calibration weight value on the scale and press **ENTER** ...

Busy is briefly displayed then the CALIBRATE screen with the span weight displayed.

3. Press **ENTER** to accept the span ...

The screen returns to the home calibration screen.

6.1.3 Linearity (*Linear*) procedure

When you access the **Linear** procedure the screen will show a list of points numbered 2-9. Use these to improve the linearity performance of the scale. The points are numbered 2 through 9 because, internally, the zero reference point is point 1 and the span point is point 10.

Follow the same steps as described in the SPAN procedure to enter each linearity point.



Linearity points are cleared if a new span calibration is performed.

6.1.4 Input procedure

Use this to set the zero and span for an input.

Zero Use this to enter a value for the zero point.

CountS Use this to enter a zero point using A to D counts.

mV Use this to enter a zero point using a mV/V value.

SPan Accept the flashing displayed span weight (**XXXX**) or key in the span weight that corresponds with the span A to D counts or mV/V value.

CountS Use this to enter a span using A to D counts.

mV Use this to enter a span using a mV/V value.



The Span value is the differential value of the actual Calibration Zero and Span count (or mV/V) values.

6.1.5 Gravity procedure

Use this item to key in a gravity constant value. If the scale has been calibrated at a different location that has a significantly different gravitational factor than the installation site, and it is not possible to re-calibrate with known test weights, the scale can be adjusted using this gravity factor.

G-Fact If you know the local gravitation factor (allowable range is 9.70000 to 9.90000), key it in here

OR

If you do not know the local gravitation factor but can determine the approximate latitude and altitude of the installation site, then the indicator can calculate the gravity factor from these two values.

Lat This stands for latitude. Key in the latitude for the installation site. The valid range is 0 to 90. A positive value works for north or south of the equator.

Alt This stands for altitude. Key in the altitude for the installation site. The valid range is 0 to 30,000 ft. (10000 m).

Calc This stands for calculate. The indicator calculates the gravity factor and loads this value as the gravity factor.

Be sure to save the changes when you exit the menu and test the accuracy with a known weight.



CAUTION: *Verify with local agencies if adjusting the gravity factor is accepted in your area. It may be required that calibration be done with certified weights.*

6.1.6 Display procedure

Use this to view live scale weight while in the calibration menu. Press **ZERO** to temporarily zero the scale. Press **SCALE** key to exit.

6.1.7 Cal Unit procedure

Use this item to set the unit of measure of the weights used during calibration. Choices are **Lb**, **1000 g** or **gr**.

6.1.8 Print procedure

Use this to print a calibration report through **Port 1**, **Port 2**, **Port 3** or to **USB**. This information can be used in the future to restore calibration. See [Calibration report on page 104](#) to view a representation of the printed report.

This completes the Calib menu. To exit the menu, see [Exiting a menu on page 13](#).

6.2 Scale menu



CAUTION: *Be sure you follow all local weights and measures regulations.*

Some parameters may be set automatically by your choice of SitE in the System menu item.

Use the Scale menu to configure the scale operating parameters such as capacity and division size, etc. See the full list in [Figure 6.5](#).

If more than one scale is attached, first choose which scale to configure. Press **ENTER** to select it and the list shown in [Figure 6.5](#) appears.

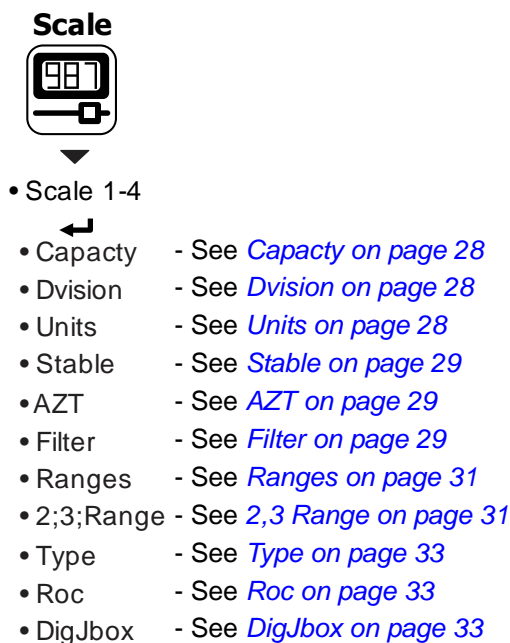


Figure 6.5 Scale menu

6.2.1 Capacity

This stands for capacity. Access this item and you can key in a new capacity or accept the displayed capacity.

6.2.2 Division

This stands for division size. Choices are *0.000001, 0.000002, 0.000005, 0.00001, 0.00002, 0.00005, 0.0001, 0.0002, 0.0005, 0.001, 0.002, 0.005, 0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50, 100, 200* and *500*. The default value is *1*.



Division sizes for other units of measure are automatically calculated by the indicator.

6.2.3 Units

Use this to select the units of measure or create custom units.

Unit From this item you can choose which units of measure are available when the user presses the **UNITS** key during normal weighing. You can have up to four units for viewing. They are listed as: **Unit 1, Unit 2, Unit 3** and **Unit 4**. You can assign any of the following units of measure to any of the units: **Lb, 1000 g, oz, gr, lb-oz, Cust 1, Cust 2, Cust 3, Cust 4** or **Off**.

Custom This stands for custom unit. To use a custom unit you must first create them by entering a ratio and a string to define it.

Cust 1-4 You can set up one to four custom units. The process to set up a custom unit is the same for all four.

Ratio The ratio is the number you divide into the calibration unit of measure to create the custom unit. Example: Ratio would equal 2000 if you wanted to convert pounds to tons.

String Use this to enter a string label for the custom unit.

6.2.4 Stable

Use this parameter to set the stability window for the scale. Set a division window and a time window which will be used to determine when the stability icon will be displayed.

Div Set the division window size to define stability.

Time Set the time window in seconds to define stability. Set both **Div** and **Time** to **0** to disable stability.



The **Stable** time value is used during normal operation as the length of time the indicator will continue to check for a 'motion stable' condition after the **ZERO**, **TARE** or **PRINT** button is pressed. If the intended operation cannot be completed before the timeout, **Cant** is displayed and the key request is ignored.

6.2.5 AZT

This stands for Automatic Zero Tracking. The **Div** value defines a \pm range around zero. When scale weight is not at the center of zero but inside this range for the time value entered, $\frac{1}{2}$ of the weight will be subtracted. This process is repeated until weight is inside the center of zero region.

Div Set the AZT window size to define stability. 3 divisions is the default value. Set **Div** to **0** to disable AZT.

Time Set the time window in seconds. 1 second is the default value. Set to **0** to disable AZT.

6.2.6 Filter

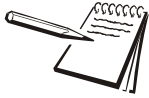
Use this to filter out vibrations affecting the scale. Under this item you have the following three parameters to set.

Avg This stands for average. 10 is the default value.

Const This stands for constant. 1 is the default value.

T-hold This stands for threshold. 100 is the default value. When **0** is the threshold value, filtering is always on.

To find the best settings for your filter needs, follow steps 1 to 7.



Default settings are:

AVG = 10

Const = 1

t-hold = 100 (factory default based on 5000 lb capacity)

These values will provide the best weight response for the majority of scale installations. In adverse conditions, where wind, vibration or other conditions are affecting the stability of the weight displayed, refer to the following instructions to improve the performance of the indicator.

- Using the Threshold setting is only recommended if the items to be weighed are similar in weight. If the item weights vary considerably then set the threshold value to 0 and proceed to step 2.

To determine the threshold value first set **T-Hold** to 0.0, **Const** to 0, and **Avg** to 1.0. Return to weigh mode and, with a typical item on the scale, observe the weight swings. Record the difference between the highest and lowest displayed weight values. Add 30 to 50% to this value. This is a good starting value for the **T-Hold** setting. Do not set your indicator to this value until told to in step 7.

- Setting **Avg** to higher values increases the filtering effect.

To do this: Set **T-Hold** to 0.0, **Const** to 0, and **Avg** to 10. Check the stability of the scale by exiting to normal weigh mode, remove all weight from the scale and/or press **ENTER** and observe the Center of Zero annunciator. If it is on all the time your scale is stable. If the Center of Zero light blinks, more filtering is required. Go to step 3.

- Repeat step 2 but increase **Avg** by 10.

Keep repeating steps 2 and 3 until the scale is stable or you've tried an Average value up to 80. If the scale is still not stable go to step 4.

- Setting the **Const** to higher values increases the filtering effect.

To do this: Set **T-Hold** to 0.0, **Const** to 1, and **Avg** to 80. Check the stability of the scale by exiting to normal weight mode and observe the Center of Zero annunciator. If it is on all the time your scale is stable. If the Center of Zero light blinks, more filtering is required. Go to step 5.

- Repeat step 4 but increase the **Const** by 1. Keep repeating steps 4 and 5 until the scale is stable or you've tried the entire range of Constant (10). If the scale is still not stable, decrease your display update rate and start over at step 1 using the new, slower display rate.

- After the **Const** value is established you may wish to lower the **Avg** value to improve display response time.

7. After a final value for **T-Hold**, **Const** and **Avg** has been set, enter the **T-hold** value established in step 1. If this value is too small your scale will act as if the filtering is off or not working.

Increase the **T-hold** value until your scale stabilizes.

If the Threshold value is too high, your scale will react slowly to weight changes.

When filtering is properly adjusted the scale will be stable at zero and will rapidly display a stable test weight value.

6.2.7 Ranges

Use this to set the following ranges.

- O-Rnge** Use this to set the percentage of capacity which can be zeroed off the scale by pressing the **ENTER** key.
- O-Cap** This stands for over capacity. Use this to configure the over/under capacity function of the scale. See the items below.
- Basis** Use this to choose what the over and under capacity function is based on.
- Percent** Use this to choose to base over/under capacity on a percent.
- Div** Use this to choose to base over/under capacity on number of divisions.
- O-Load** This stands for overload. Once you've picked the basis for an over capacity condition, use this item to set the value that triggers the overload condition.
- U-Load** This stands for underload. Use this item to set the value that triggers the underload condition.
- G-Zero** Use this to configure the gross zero band. This is a parameter used to perform the tare clear function and set the Return to Zero range for Autoprint, Accumulate, Checkweighing, Counting and Batch functions. You can enter a value between 0 and 10000 divisions.

6.2.8 2,3 Range

The indicator can be setup for dual or triple ranging operation using multi-range or multi-interval type division size switching

- Cap 1** CAP 1 is used for both dual and triple range operation. In dual range operation (and increasing weight) values between 0 and **Cap 1** will use **Div 1** as the division size and values above **Cap 1** will use the division size entered in [Division on page 28](#).
- Cap 2** CAP 2 is used for triple ranging operation only. In triple range operation (and increasing weight) values between 0 and the **Cap 1** will use **Div 1** as the division size, values between **Cap 1** and **Cap 2** will use **Div 2** as the division size, and values above **Cap 2** will use the division size entered in [Division on page 28](#).

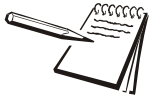
Div 1 This is the division size for the 1st weight range.

Div 2 This is the division size for the 2nd weight range.

Type Use this to choose between Multi Range or Multi Interval. The Type setting determines the condition for switching to a new division size when weight is removed.

M.Range Multi-range - the division size will change as it enters a new weight range on increasing weight but will not change back to the smaller division size until the display returns to Zero. This is the default setting.

M.Intrvl Multi-interval - the division size will change immediately as it enters a new weight range.



Check with local authorities to find out if multi-interval is an agency approved mode of operation.

6.2.9 Type

Use this to select the mode and corresponding binding for the selected scale.

Mode Select the mode from these choices:

Disable Pick this to disable the selected scale. This is the default setting for Scale 2.

Onbrd Pick this if you are using the onboard analog scale. This is the default setting for Scale 1.

Option Pick this mode if you are using the analog scale option card.

Protcl Pick this mode if you are using the BSQ base connected to a serial port or a T301x connected to a 485 option card.

Bind This option appears in two different forms depending on which Mode you pick. If you pick **Disable** or **Onboard** in the Mode menu, the **Bind** menu does not appear.

If you choose **Option**, this selection requires a bus and card number. For the ZM510 indicator, up to four option cards can be installed.

If you choose **Protcl**, you must choose a binding with a protocol selection. There are 10 available protocols and the protocol number selected must be matched with a properly configured protocol shown in [Protcl on page 46](#).

6.2.10 Roc

This stands for Rate of Change. Use this to set the parameters to calculate rate of change for flow rates or weight/time applications.

Settings available are:

Period Enter a value for the period of time to calculate Roc.

Units Enter the units for the time: **Seconds**, **Minutes** or **Hours**.

6.2.11 DigJbox

This stands for digital junction box. Use this to setup the function of the digital junction box connected to T301 or T301X load cells.

When you access this item you will see the following:

SET CELL ADDRESSES

All load cells have the same address after manufacture. A new, unique system address needs to be assigned to each loadcell in a system.

You must connect each cell, one at a time, to the digital junction box. You're prompted to search for the cell. When the loadcell is found you are prompted to give it an address from a drop down list. Make your selection and press **ENTER**.

SET CAL DEFAULTS

If you choose this item you will be warned that continuing will destroy the calibration information.

If you continue the indicator will show all the load cells and the active weight reading on each. You are prompted to remove all load from the deck. Press **YES** and the screen shows **BUSY**. The calibration information is destroyed and calibration defaults are created and downloaded to the load-cells.

ZERO JBOX

If you choose this item you will be warned that continuing will destroy the calibration information.

Choose this to zero the junction box. Press **YES** and the screen shows all weights from the individual load cells. Screen shows live weight. Press **ENTER** to return to DigJbox menu.

RANGE JBOX

If you choose this item you will be warned that continuing will destroy the calibration information.

Press **YES** to continue and you are prompted to enter the calibration load value. Key in the value and press **ENTER**.

Place the calibration load on the scale. The display shows all weights from individual cells.

Press **YES** to span the junction box. The display shows **BUSY**. Press **ENTER** to returns to DigJbox menu.

CORNER JBOX

If you choose this item you will be warned that continuing will destroy the calibration information.

Press **YES** to continue and you are prompted to apply zero load.

Remove all weight from the scale and press **ENTER**. Screen prompts you to key in a corner test weight value. Press **ENTER** to accept it and the screen shows the current weight for each loadcell.

The screen prompts for the test weight to be place over loadcell 1. When indicator senses weight on loadcell 1 the screen prompts you to press **ENTER**. Press **ENTER**, **BUSY** is shown briefly then the screen prompts for weight to be moved to loadcell 2, etc.

Repeat for all load cells and you are prompted to press **ENTER** to calculate the corner factors. Press **ENTER** to returns to DigJbox menu.

MANUALLY CORNER JBOX

If you choose this item you will be warned that continuing will destroy the calibration information.

Press **YES** to continue and you are prompted to apply zero load.

Remove all weight from the scale and press **ENTER**. Screen prompts you to key in a corner test weight value. Press **ENTER** to accept it and the screen shows the total weight for all load cells.

You are prompted to place the test weight over loadcell 1. Record the weight and repeat for all other load cells.

If a loadcell is causing the total to be high or low, use the + or - softkey to adjust the loadcell output.

After each loadcell is adjusted, check all the load cells again before adjusting another loadcell.

Repeat until all load cells give the same total weight. **They do not necessarily have to be equal to the test weight but they must be equal to each other.**

Re-span the scale after this procedure. Press **ENTER** to returns to DigJbox menu.

6.3 System menu

Use the System menu to configure system parameters such as loading defaults for the country of operation, setting available display modes and tare functions, selection of the scale application mode, and several other functions that will be described. Refer to [Figure 6.6](#) as you setup the items of the System menu.

System



- Site - See [Site on page 36](#)
- Display - See [Display on page 37](#)
- Buttons - See [Buttons on page 38](#)
- D-Vals - See [D-Vals on page 38](#)
- Tare - See [Tare on page 40](#)
- Config - See [Config on page 40](#)
- Archive - See [Archive on page 41](#)
- Serial - See [Serial on page 41](#)
- Update - See [Update on page 41](#)
- Passwd - See [Password on page 42](#)
- Z-Lock - See [Z-Lock on page 42](#)
- Beeper - See [Beeper on page 42](#)
- Num Scl - See [Num Scl on page 42](#)

Figure 6.6 System menu

6.3.1 Site

Choose your area of operation of the indicator. Choices are: **USA**, **GB**, **CAN**, **EU**, **CHINA** and **INDIA**. This sets the defaults needed for your area when the indicator is reset. See [Default Values](#) below..



CAUTION: Be sure you follow all local weights and measures regulations.



To reset the default settings affected by the Site selection, choose an alternate Site selection and press **ENTER**, then re-select the original Site selection.

Default Values

Each area of the world has different requirements for indicator configuration. The table below shows all the default values listed for all the different sites covered by the indicator.

	USA	GB	CAN	EU	CHINA	INDIA
Unit of measure	lb	kg	kg	kg	kg	kg
Unit of measure 2	kg	off	off	off	off	off
Cal unit	lb	kg	kg	kg	kg	kg
Zero Range	100	2	2	2	2	2
Over Basis	Percent	Division	Percent	Division	Division	Division
Disp. Update Rate	10	20	10	20	10	10
Separator	decimal	decimal	decimal	comma	decimal	decimal
Date Format	MM-DD-YY	DD-MM-YY	DD-MM-YY	DD-MM-YY	DD-MM-YY	DD-MM-YY
Time Format	12 Hr	24	24	24	24	24
Under Cap. Div.	250	20	250	250	250	250
AZT Div.	3	.25	3	3	3	3
Motion Div.	3	.25	3	3	3	3



All **bold** items apply to all scales if multiple scales are attached to the indicator.

Default settings may need to be changed to meet local agency requirements

6.3.2 Display

Use this to set the following parameters for the display.

Dec.Pt This configures whether a decimal point or comma is used to separate whole and fractional numbers.

Update This configures the number of display refreshes per second. Choices are **1, 2, 5, 10** and **20**.



Lowering the update rate can sometimes improve stability of the display in noisy environments, e.g. vibration or wind.

M-Dash If enabled, the display will show dashes during motion.

C-Zero Choose the center-of-zero window size to be **0.25** or **0.50** division. If the weight is within this window, the zero annunciator on the display will be lit.

Tot-Scl Use this to enable display of the total of both scale weights if two scales are installed and enabled.

Invert Inverts the color values of the display. Choose **Off** for green graphics over a black background. Choose **On** for black graphics over a green background.

6.3.3 Buttons

Use this item to configure each button (key) **On** or **Off**. This allows you to limit the front panel function to suit your situation. Follow the same procedure for each key to turn it on or off. **On** is the default value for all the buttons. These are the keys listed under Buttons: **Print, Units, Select, Tare, Zero, F1-F5, Start, Stop, Setup, Scale, Numpad** and **Qwerty**.

6.3.4 D-Vals

This stands for the displayable active values. In normal weighing mode, press **SELECT** to scroll through all enabled values. Activate the ones in the following list that you want the ability to view during normal weighing mode.

- Gross** Activate this to see the gross weight value.
- Tare** Activate this to see the tare weight value.
- Net** Activate this to see the net weight value.
- Min** Activate this to see the minimum weight value.
- Max** Activate this to see the maximum weight value.
- G Total** Activate this to see the gross total weight value.
- N Total** Activate this to see the net total weight value.
- T Total** Activate this to see the tare total weight value.
- C Total** Activate this to see the count total value.
- TranCnt** Activate this to see the transaction count value.
- Count** Activate this to see the count value.
- Pc Wt** Activate this to see the piece weight value.
- A2D Cnt** Activate this to see the A to D count value.
- Percent** Activate this to see the percent value.
- InMo** Activate this to see the averaged weight value when an inmotion application is operating.
- Target** Activate this to see the target weight value.
- GTotPls** Activate this to see the gross total + current gross value. This parameter is commonly used in conjunction with the accumulation procedure for multiple-dump batching applications.
- GTotMin** Activate this to see the gross total - current gross value.
- NTotPls** Activate this to see the net total + current net value.
- NTotMin** Activate this to see the net total - current net value.

- CTotPls** Activate this to see the count total + current count value. This parameter is commonly used in conjunction with the accumulation procedure for multiple-dump batching applications based on piece count.
- CTotMin** Activate this to see the count total - current count value.
- Gr Avg** Activate this to see the average gross value. This is the average gross weight calculated through use of the % + Averaging macro command. This command can be used to start, stop and resume averaging. A separate average gross parameter is maintained for each enabled scale.
- Nt Avg** Activate this to see the average net value. The characteristics of the average net parameter are identical to that of the average gross.
- Ct Avg** Activate this to see the average count value. This represents the number of times the gross and net weight were accumulated when using the %+ Averaging command.
- Nt Min** Activate this to see the net minimum value.
- Nt Max** Activate this to see the net maximum value.
- FFall 1** Activate this to see the free fall 1 value. Free fall is like preact. This is the calculated amount of material that will fall on the scale base on the current flow rate.
- Fut Gr1** Activate this to see the future gross value (#1). This represents a predicted gross weight calculated by multiplying the current rate by the free fall time and adding the result to the current gross weight:
- $$\text{Future Gross} = \text{Rate} \times \text{Free Fall} + \text{Gross}$$
- Fut Nt1** Activate this to see the future net value (#1). This represents a predicted net weight calculated by multiplying the current rate by the free fall time and adding the result to the current net weight:
- $$\text{Future Net} = \text{Rate} \times \text{Free Fall} + \text{Net}$$
- FFall 2** Activate this to see the free fall 2 value. Free fall is like preact. This is the calculated amount of material that will fall on the scale base on the current flow rate.
- Fut Gr2** Activate this to see the future gross value (#2). This represents a predicted gross weight calculated by multiplying the current rate by the free fall time and adding the result to the current gross weight:
- $$\text{Future Gross} = \text{Rate} \times \text{Free Fall} + \text{Gross}$$
- Fut Nt2** Activate this to see the future net value (#2). This represents a predicted net weight calculated by multiplying the current rate by the free fall time and adding the result to the current net weight:
- $$\text{Future Net} = \text{Rate} \times \text{Free Fall} + \text{Net}$$
- PcWt 1K** Activate this to see the average piece weight x 1000. The average piece weight x 1000 parameter represents the average weight of 1000 pieces as calculated during the sampling routine.
- Per Acc** Activate this to see the percent accuracy value. The percent accuracy parameter represents the minimum accuracy achieved during the last sample routine. Only one percent accuracy parameter is maintained for all enabled scales.

Lst Smp Activate this to see the Last sample size value. The last sample size parameter represents the number of pieces used during the last sample routine to determine the current average piece weight. Only one last sample size parameter is maintained for all enabled scales.

6.3.5 Tare



*Pushbutton and keyboard entry tare can both be set to on simultaneously. The **TARE** key must be enabled in the **Button** menu.*

Use this item to set the type of tare entry and the tare autoclear functions.

PushBt This stands for pushbutton tare. Enable this to use the **TARE** key to tare weight from the scale. **on** is the default value.

Enter This stands for keypad entry tare. Enable this and you can key in a tare value and press **TARE** to activate it during normal weighing mode. **Off** is the default.

Preset This stands for preset tare. Preset tare values are entered in a password protected menu and can be recalled, if this parameter is enabled. **Off** is the default value.

TareCl This stands for automatic tare clear. Enable this to automatically clear a tare after a weighment when the weight falls into the gross zero band. **Off** is the default value.

HiRes This stands for high resolution tare. If On, the indicator does not round the tare value to the current division size. Choose **On** to enable high resolution tare or **Off** to disable high resolution tare. Default is **Off**.



If preset tare is enabled, pushbutton tare and keyboard entry tare will be disabled automatically.

6.3.6 Config

Use this to print out the configuration data through one of the ports or reset the configuration, calibration or database to factory defaults. Follow these steps:

Print Use this to print the indicator configuration information. You pick the port to use for printing in the following steps. See the extensive list in Chapter 9 - [Printed reports \(page 83\)](#)

Choices are **Port 1**, **Port 2**, **Port 3** and **USB** (text file).



If USB is selected, a USB flash drive must be installed to create the text file of the indicator configuration.

Reset Under this item you can choose to reset the **App.Cnfg** (reset configuration settings back to how the application had it set when it was last downloaded), **Config** (factory default settings) and **Cal** (factory default calibration) memory or choose **All** to reset both config and cal factory defaults at once.

6.3.7 Archive

This stands for electronic archive. In other regions it is known as an alibi memory or tally roll. These will be transmitted via configured communications ports. These reports can be used to confirm a weighment if it is ever in dispute. Only records that are qualified as a LEGAL record, per site motion criteria, are considered as entries to this log.



The indicator has memory capacity to store approximately 5,000 transactions.

The Archive report uses a rolling memory configuration (FIFO) so the oldest transaction will be written over first when all the memory slots are filled.

Enable Choose **On** to enable. If enabled, a **Print** menu item appears to the right of **Enable**.

Print You can choose to print the archive from Port 1, 2, 3 or to USB. (USB device must be installed).

6.3.8 Serial

Use this to record the serial number of the indicator. The serial number is located on the label attached to the indicator. To enter the serial number enter the first four digits, press **ENTER** and enter the last five digits and press **ENTER** again to accept.

6.3.9 Update

Use this to set the conditions for the indicator to accept software updates from a remote site. If connected to the internet, the indicator can accept a software update file via FTP. The software update can be installed manually or automatically when the file is received or on the next powerup.

Manual Choices under this are **No** and **Yes**. Choose **Yes** to start the update process. Choose **No** to not do an update. **No** is the default.



Manual update selection only applies when AUTO update is disabled and only if a file has been sent via FTP to the indicator and is waiting to update.

If you choose **No**, no update occurs and **Manual** is displayed. If you choose **Yes**, the indicator will update and reboot.

Auto Choices under this are **on**, **PwrUp** and **Off**. Choose **On** (the default setting) and the indicator will update anytime it receives an update via FTP. Choose **PwrUp** to have the indicator auto-update on powerup if an update is available. Choose **Off** to turn auto-update off.



*If **Auto = Off**, the only way to update the indicator is to use the **Manual** update and select **Yes**.*

6.3.10 Password

Use this to change the password for the **Admin**, **Diag** and **Calib** menus.



If the ADMIN password is changed, be sure to keep a record of it available for service personnel or they may not be able to perform required maintenance when necessary.

6.3.11 Z-Lock

This stands for zero lock. Use this to enable and configure the zero lock feature during an automated weighing process. When enabled, if the scale does not achieve a stable, gross zero condition some time within X minutes (the time you configure), then the indicator locks up and displays a message in three, one second displays: **Z-Lock Press Zero**. The operator must press **ZERO/ENTER** to unlock the indicator.

Enable **Off** or **On**. **Off** is the default.

Time Use this to set the time value, in minutes, for this function. 60 minutes is the default.

6.3.12 Beeper

Use this to enable or disable the beeper sound when you press keys. **on** is the default.

6.3.13 Num Sci

Use this to key in the number of scales attached to the scale (4 max). To access settings for a scale use the **SCALE** key to display the proper scale number. Default is 1.

This completes the System menu.

6.4 Ports menu

Use the Ports menu to configure the scale communication ports and protocols for connection to external devices. Detailed descriptions are provided in each section below. Refer to the Ports menu map in [Figure 6.7](#).

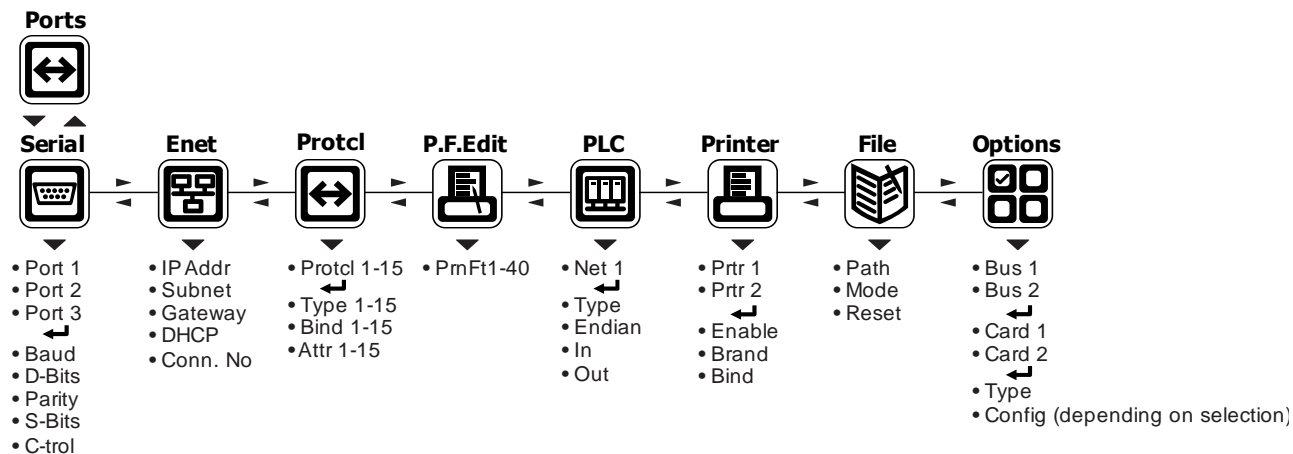


Figure 6.7 Ports menu map

6.4.1 Serial

Use this to set the serial communication parameters. Choose Port 1, 2 or 3 to begin.

Baud Set the baud rate from the available choices. **9600** is the default value.

D-Bits Choose **7** or **8** data bits. **8** is the default.

Parity Choose **None**, **Odd** or **Even**. **None** is the default.

S-Bits Choose **1** or **2** stop bits. **1** is the default.

C-Trol Use this to set the flow control for the port. Choices for Port 1 are **None**, **Hard** or **Soft**. Choices for Port 2 and 3 are **None** or **Soft**. Default is **None** for both ports.

Hard Stands for hardware flow control. If wired, a device can stop the indicator and restart it for transmitting. Example is the CTS signal on a PC serial port or print busy output on a Line or Lister printer.

Soft Stands for software handshaking. This allows a device to start and stop the indicator transmit by sending Xon or Xoff characters.

Port 1 has both **Hard** and **Soft**. Port 2 does not have hardware handshaking.



Hardware flow control on Port 1 is only available if **C-Trol** is set to **Hard** is selected and Jumper P15 is in position 1.

6.4.2 Enet

Use these menu items to setup the Ethernet port.

IP Addr Use this to key in the static IP address of the indicator.

The IP address is the unique address for a device which is part of an Ethernet network. IPv4 is supported by this indicator. The address is a numeric entry in four parts or octets (###. ###. ###. ###).



*The DHCP setting is **Off** by default so the indicator will use the entered IP address for connecting directly to a PC or other static IP address devices.*

*If DHCP setting is **On** the Ethernet settings must be assigned by the network DHCP server*

Key in each octet and press **ENTER** to accept it.



Typically devices within a network share the same address for the first three octets (network address) and each device will have a unique setting or value for the fourth octet (device address).

Subnet The Subnet Mask address is used to divide a network into smaller subnets. The address is a numeric entry in four parts or octets (###. ###. ###. ###).



Typically the subnet mask address is set to 255,255,255,0 which means the first three octets in the device network are the same and only the fourth octet of the IP address is unique for each device.

Key in each octet and press **ENTER** to accept it.

Gateway The Gateway address allows one network a gateway to another network. The address is a numeric entry in four parts or octets (###. ###. ###. ###).



In most simple networks a gateway address is not used and is set to 0,0,0,0. If the indicator is part of a network that uses an access point to another network, then a gateway address may be required. (Consult the site IT specialist)

Key in each octet and press **ENTER** to accept it.

DHCP Use this to enable or disable DHCP capability. This allows a DHCP server to automatically set the indicator IP, subnet and gateway addresses. Choices are **On** (enabled) or **Off** (disabled). Default is **Off**.



*If DHCP is enabled **On**, the above settings for the IP, Subnet and Gateway are set by the network server. In applications where the indicator Ethernet port is connected directly to a PC, laptop, printer or other non-DHCP device, you must set DHCP to **Off**.*

Con.No This stands for connection number. Under this are **E-Net 1** through **E-Net 10**. These are the numbered Ethernet ports.

E-Net 1-10 Choose the Ethernet port to set up. Choices available under

Type x Use this to set the type of connection; **Off**, **Client**, **Server**, **UDP** or **Clnt2**.



If the Ethernet port connection is to a PLC, the **Type** setting must be set to **Off**.

If **Type** is set to **Off**, it disables the selected port from communication to a server or client on the network.

The **Client** selection is typically used when the indicator(s) is connected to a print server or a shared printer on the network.

Host IP Address is only used if the **Type** setting is **Client** for this port connection.

If **Type** is set to **Off** **Type x** is the only item listed under **E-Net x**. You must choose one of the other choices to see other items listed.

If **Type** is set to **Client** **Type x**, **Port x**, **Host x**, and **Tmout x** are displayed. These are explained below.

Port x This stands for Remote Port. You need to pick the remote port number to send messages to and receive messages from. Key a port number from 1 to 65535.

Host x This is the host IP address of the server. Key in a value from 0 to 255.

Tmout x If no messages are received within the timeout period the socket will try to reconnect. Key in a value in seconds from 0 to 60000. Default is 0.

If **Type** is set to **Server** **Type x** and **Port x** are displayed. Allowable values for each are listed below.

Port x This stands for Remote Port. You need to pick the remote port number to send messages to and receive messages from. Key in a port number from 1 to 65535.

If **Type** is set to **UDP** UDP stands for User Datagram Protocol. **Type x**, **Port x**, **LcPrt x**, **RxAdd x**, **TxAdd x** and **DynTX x** are displayed. These are explained below.

Port x This stands for Remote Port. You need to pick the remote port number to send messages to and receive messages from. Key a port number from 1 to 65535.

LcPrt x This stands for Local Port. This is the local port that the remote IP will send messages to. Key in a port number from 1 to 65535.

RxAdd x This stands for Receive from Address. This is the IP address to receive messages from. A specific IP address could be specified, or an address of 0.0.0.0 could be used to receive from any remote IP address. Key in a value from 0 to 255.

TxAdd x This stands for Send to Address. This is the default remote IP address to send messages to. This address may not be used at all if dynamic address is set to ON. Key in a value from 0 to 255.

DynTX x This stands for Dynamic Address. Choices are **Off** or **On**. If **On** the firmware will change the send to IP address to the address that a message was last received from, so that a response is sent to the sender that last sent a message to the indicator. If set to **Off** then all messages will be sent to the IP address specified by the **TxAdd x** setting. Default is **Off**.

If **Type** is set to **Clnt2 x** This stands for Client 2. The socket opens and closes every time before and after sending data. **Type x**, **Port x**, **Host x**, and **Tmout x** are displayed. These are explained below.



Some port numbers are reserved. Contact your IT department for the correct port number to use.

6.4.3 Protcl

Use this to configure up to 15 communication protocols. These protocols define the information sent to and from specific types of communication equipment.

For each protocol you set the type, the binding and the attributes, described below.



Which Attributes and Bindings apply to the selected Type will be described in the detailed descriptions below.

Type x - Choose the method to send and receive data for Protocol x, where x = 1 to 15.

None Choose this to disable the selected protocol.

Print Choose this when you want to press the **PRINT** key or when using Autoprint to send the data through the selected binding (Port) using the associated attributes.

- ENQ** Choose this to send data when the indicator receives the configured enquire code from an external device. The information will be sent through the selected binding using the associated attributes. See [ENQ & B-Cast commands on page 59](#).
- SMA** Choose this to send and receive data when using the SMA (Scale Manufacturers Association) protocol. See [SMA Protocol on page 54](#). The information will be sent through the bound port using attributes that are predefined by the SMA protocol.
- B-Cast** Choose this to send data continuously through the selected binding using the associated attributes. Typical use is for remote scoreboards, displays and the Analog output option if installed. See [ENQ & B-Cast commands on page 59](#).
- PLC** Choose this to send and receive data to/from a PLC network. A binding of Enet x (1 through 10) is required. The attributes are established using the PLC menu described later in this manual. See [PLC Configuration information on page 61](#).
- FTP** Choose this to send data via FTP. A binding of Enet x (1 through 10) is required. The Rate attribute determines the time (in minutes) between attempted FTP updates. A second Protocol is required to complete the FTP setup. This additional protocol requires a Type x = PRINT, Bind x = File and Attributes x will need a Print Format. Also, set File Path = FTP and define the File Mode (File naming convention) in the File menu described later in this manual.
- RD** Choose this to use the indicator as a remote display. When set as a remote display, the indicator will only function as a remote display for the connected primary indicator which is connected to the weighing platform. **This requires a special application.**
- NCI** Choose this to use the NCI communication protocol. See [NCI commands on page 60](#).
- Report** Choose this for reports using footers and headers.
- BSQ** Choose this when using a BSQ base.
- T301** Choose this when using a digital junction box attached to a T301 or T301X loadcell.

Bind x - In this item you choose the physical connection, or hardware, for the communication for Protocol x: **Port 1-3, Enet 1** through **Enet 10, File, O.B1.C1, O.B1.C2, O.B1.C1, O.B2.C2, Prtr 1, Prtr 2** or **Prtr.USB**. Some Bindings will not apply for certain Type selections.



O.B1.C1 refers to the option module in the Bus 1 and Card 1 position, O.B1.C2 refers to the option module in the Bus 1 and Card 2 position, etc.

Attr x- In this item you choose the print format and other properties that are required for the Type and Binding selected for Protocol x. Some attributes will not apply for certain Types or Binding combinations.

- PrnFt,** Choose a print format from the documented list. Key in the format number. Print format **1** is the default.
- Inhib** This is motion inhibit. Choose **On** to enable or **Off** to disable. If enabled, data transmission or file creation will be inhibited until there is no motion on the scale or until the process times out. **Off** is the default.
- Rate** This is the transmit rate associated with broadcast type. Choices are **1, 2, 5, 10, 20, 50, 80** or **100** Hz.
- Address** Key in the node address if using an RS-485 option in a multidrop network. Choices are **1** to 254.
- Enq** Key in the enquire character used to request a print function to occur from the communications port. Choices are **0** to 255. **5** is the default value (ASCII ENQ character).
- Enq2** This functions the same as pressing the **PRINT** key.

If Archive is enabled, this can be used for Archive reporting to add the transaction record and increment the counter. The default value is 7 (ASCII BEL character). Choices are 0 to 255.
- Scale** In the SMA and NCI protocols this links that protocol to that Scale for getting and setting of Data.

In the Broadcast and Enquire Protocols this determines which scale the received commands refer to.

6.4.4 P.F. Edit

This stands for print format editor. Please refer to the section [Print formatting on page 85](#) for the procedures to edit or create print formats.

6.4.5 PLC



If connecting to a PLC, the E-NET configuration menu does not require any special configuration and the Client/Server selection for TYPE setting must be set to OFF.

To connect to DeviceNet or Profibus option cards, don't set up a protocol.

- Net 1** This is an item for future expansion to multiple networks. This is not available on this indicator. Continue to the next item.
- Type** In this item you can choose; **Enet IP** or **M TCP**. Choose **Enet IP** to enable Ethernet IP. Choose **M TCP** to enable Modbus-TCP.

Endian Choices for this item are **big** or **Little**. Default is **Little**.



ENDIAN:

Big = Most Significant Byte, Least Significant Byte

Little = Least Significant Byte, Most Significant Byte

Trade

This stands for word swap or trade configuration. Choices for this item are **On** or **Off**. Default is **Off**.



TRADE: *On = WORD2,WORD1*

Off = WORD1,WORD2



The PLC configuration determines the appropriate indicator settings for Endian and Trade.

In

This stands for inbound data configuration. You will first select one of the 16 memory registers available for inbound data. Then you will select the data type and then the network token you want assigned to that memory register.

In 1-16 These are the 16 inbound data configuration memory registers. For each there are three choices: Type, Value and Scale. See the descriptions below:

Type Below is a table showing the choices for the Type, a description and a range of values for that data type.

DATA TYPE TABLE		
Typical PLC Terminology	Indicator Terminology	Data TYPE Size
CHAR / SBYTE	SINT8 - 1 byte	8 Bits (Signed Value / -127 to 127)
BYTE / UBYTE	UNIT8 - 1 byte	8 Bits (Unsigned Value / 0-255)
SHORT / SINT	SINT16 - 2 byte	16 Bits (Signed Value /-32767 to 32767)
WORD / UINT	UNIT16 - 2 byte	16 Bits (Unsigned Value / 0 to 65535)
LONG / SDINT	SINT32 - 4 byte	32 Bits (Signed Value / -2,147,483,647 to 2,147,483,647)
DWORD / UDINT	UNIT32 - 4 byte	32 Bits (Unsigned Value / 0 to 4,294,967,295)
REAL	FLOAT - 4 byte	32 Bits (Signed Decimal Value / 1.0E-37 to 1.0E37)
STRING	STRING - 1 byte/char	Length Parameter setting



The Type and order of the Values selected must coincide with the configuration of the PLC register setup. Consult with the site IT specialist.

Value This stands for the network token value to be assigned to the inbound data memory register. Key in the value for the network token you want from the table above and press **ENTER** to accept the displayed choice ...

Repeat the process for any other inbound memory registers you want to configure.

Scale Choose from connected scales.

Out This stands for outbound data configuration. This menu item is exactly like the **in** menu item except it is for outbound data. Follow the same process to set up the 16 memory registers.

6.4.6 Printer



The **Printer** menu is used when the indicator is interfaced with one of the printers listed in the **Brand** submenu. This is necessary to ensure all the appropriate control codes are added to the selected print format.

If either **PRTR1** or **PRTR2** selections are enabled then the port that is **Binded** may occasionally send out a set of random characters to test for a connected printer. Be sure to disable these settings if the indicator is not connected to one of the printer brands listed.

Prtr 1 You can choose to set up this printer or **Prtr 2**. The setup procedure is the same.

Enable Choices under this item are **Off** (default) or **On**.

Brand Choices under this item are the five printer models supported by this indicator: **Zebra**, **EpsnPos**, **HP 14--**, **HP15--** and **HP85--**.

Bind Choices under this item are: **Port 1**, **Port 2**, **Port 3** and **E-Net 1** through **E-Net 10**. Choose which port the printer output is attached to.

6.4.7 File

Use this item to configure how and where files are saved.

Path Use this to choose where the file is saved, internally for transfer by **FTP** using an Ethernet port, to a connected **USB** flash drive or to an **SDCARD**.



When the **FILE > PATH** is set for **USB** or **SDCard**, a **USB** flash drive or **SD** Card can be installed into the Host port and transactions will be transferred as they occur. If the flash drive or card is not installed, transactions will be saved onto the Flash memory in the indicator.

The size of the print format will determine the number that can be stored but with a typical print format the indicator should be capable of storing several thousand transactions. The saved transactions will transfer immediately when the **USB** flash drive or **SD** CARD is re-installed. The message **Copying** will display as each stored file is transferred to the flash drive or card. This could take a few seconds to transfer each file. Do not remove the flash drive or card until the message **Done** is finally displayed. Stored transactions will then be cleared after the transfer.

Mode Use this to configure the file convention. Choices are:

Constant This will create a single file that will be appended to as new information is saved.

NUMBRD This will create new file appended with a sequential number for each transaction.

D_T This will create a new file and the file name will be appended with the date and time (including seconds) for each transaction.



Filename Examples:

<MODEL>_<SERIAL>XXXXXX.txt

where <MODEL> is the model number, <Serial> is the serial number, XXXXXX is either nothing, the sequential number, or the time and date.

Sequential number increments from 000001 – 999999 ... when **RESET** starts at 000001

Date = YYYY_MM_DD__HH_MM_SS
with double underscore between DD and HH

Examples:

Constant: ZM510_120450001.txt

Numbered: ZM510_120450001_000001.txt

D_T: ZM510_120450001_2012_01_31__10_31_23.txt

If transactions are being store on the indicator Flash memory, only a single Constant or Numbered file will be created. If using the Date & Time file naming convention then individual files will be created.

Reset Reset will clear all stored transactions and also reset the numbered file sequence to 000001.

6.4.8 Options

Use this parameter to enable any of the available option cards.

Bus 1or2 Choose the Bus.

Card 1or2 Choose the card position.

Type Choose the type of card installed from this list:

- USB-D(evice) card.
- Analog output card
- Wireless Ethernet (802.11g)
- Serial RS-485/20mA card

The **Scale** menu item is for this input cards

- 10VDC Excitation Analog Scale Input card

The **Ext IO** menu item is for the following I/O interface card:

- External I/O Interface card
- AC Input 4 relays (120-240VAC) card
- DC Input 4 relays (4-30VDC) card
- AC Output 4 relays (20-240VAC) card
- DC Output 4 relays (3-60VDC) card
- DeviceNet (DevNet)
- Profibus

Depending on the choice made for **Type**, a **Config** menu may appear. Below are the Config and/or Calibration menus that will appear for the installed card.

If USB-D or RS485/20ma card is installed:

Config

Baud	Select from the list of baud rates.
D-Bits	Select 7 or 8.
Parity	Select none, odd or even.
S-Bits	Select 1 or 2 stop bits.

If DeviceNet card is installed:

Config

Node	0-63
Baud	Select from 125K, 250K or 500K.
Rate	Select 1, 2, 5, 10, or 20.

If Profibus card is installed:

Config

Node	0-126
Rate	Select 1, 2, 5, 10, or 20.

If Wireless Ethernet (802.11g) card is installed:

Config

- SSID** Enter SSID name.
- Security** Choose from **None**, **WEP-64**, **WEP-128**, **WPA** or **WPA2**.
- WEP.Pass** Enter WEP password.
- WPA.Pass** Enter WPA password.

If Analog card is installed:

Config

- Low** Set the displayed value for the lowest analog output.
- Hi** Set the displayed value for the maximum analog output.

Calib

- Zero** Set the analog output zero point.
- Span** Set the analog output span point.
- Adjust** Adjustments are normally necessary to set the zero or span output values to correlate with the connected analog device. Pressing the following keys will adjust the signal output as noted.
- TARE** increase in small increments
- SELECT** decrease in small increments
- PRINT** increase in large increments
- UNITS** decrease in large increments
- Press **ENTER** to complete the analog output calibration.

7 Communication port protocols

7.1 SMA Protocol

7.1.1 Level 1 and 2 Commands

Sent	Action	Response
<LF>W<CR>	Weight of the current scale is return.	Standard response (displayed weight)
<LF>P<CR>	Indicator attempts to capture a stable weight on the current scale.	Standard response (displayed weight). Weight is returned as center dashes < ----- > if a stable weight cannot be established.
<LF>Z<CR>	Indicator attempts to zero the current scale.	Standard response (displayed weight)
<LF>T<CR>	Indicator attempts to tare the current scale.	Standard response (displayed weight)
<LF>T<xxxxxx.xxx><CR>	The indicator attempts to set the current scale's tare weight to the value that was sent.	Standard response (displayed weight)
<LF>M<CR>	The indicator returns the current scale's Tare weight.	Standard response (tare weight)
<LF>C<CR>	The indicator sets the current scale's Tare weight to zero.	Standard response (gross weight)
<LF>U<CR>	The indicator will cycle the unit of measure on the current scale	Standard response (displayed weight)
<LF>U<uuu><CR>	The indicator will set the unit of measure to <uuu> on the current scale.	Standard response (displayed weight)
<LF>D<CR>	The indicator will return a diagnostic message.	<LF><r><e><c><m><CR> <r> = 'R' (RAM error) or ' ' (space) (RAM ok)
<LF>A<CR>	The indicator will respond with the first line of the About data.	See "About Command Response" (below)
<LF>B<CR>	The indicator will respond with the rest of the About data.	See "About Command Response" (below)
<LF>I<CR>	The indicator will respond with the first line of the scale Information data. (for the current scale)	See "Scale Information Command Response" (below)
<LF>N<CR>	The indicator will respond with the rest of the scale Information data. (for the current scale)	See "Scale Information Command Response" (below)
<ESC>	The indicator will reboot itself	None

SMA protocol is maintained by an external organization. For definitive and current details on this protocol go to www.scalemanufacturers.org.

7.1.2 Standard Scale Response Message

<LF><s><r><n><m><f><xxxxxx.xxx><uuu><CR>		
<LF>	Line feed	Start of the response message.
<s>	Scale Status	'Z' Center of Zero 'O' Over Capacity 'U' Under Capacity 'E' Zero Error 'T' Tare Error <space> None of the above conditions.
<r>	range	Multi-interval range. Always '1' if multi-interval is disabled.
<n>	gross/net status	'G' = Gross weight 'T' = Tare weight 'N' = Net weight
<m>	Motion status	'M' = scale is in motion <space> = scale is stable
<f>	Future use	<space> = always a space.

7.1.3 Unrecognized Command Response

<LF>?<CR>

7.1.4 About Command Response

The 'A' and 'B' commands are used together to get all of the scale about data. The 'A' command will always return the 1st response below. The 'B' command must be sent multiple times to get the 2nd, 3rd, and 4th responses. Once the 4th response is received, the next 'B' command will return an Unrecognized Command Response. At this point you would have to send another 'A' command to get the 1st response again.

<LF><xxx>:<yyyy><CR>

1st response: <xxx> = "SMA"
<yyyy> = compliance level/revision

2nd response: <xxx> = "MFG"
<yyyy> = manufacturer

3rd response: <xxx> = "MOD"
<yyyy> = software part number

4th response: <xxx> = "REV"
<yyyy> = software revision

7.1.5 Scale Information Command Response

The 'I' and 'N' commands are used together to get all of the scale information data. The 'I' command will always return the 1st response below. The 'N' command must be sent multiple times to get the 2nd, 3rd, 4th, 5th, and 6th responses. Once the 6th response is received, the next 'N' command will return an Unrecognized Command Response. At this point you would have to send another 'I' command to get the 1st response again.

<LF><xxx>:<yyyy><CR>

1st response: <xxx> = "SMA"
<yyyy> = compliance level/revision

2nd response: <xxx> = "TYP"
<yyy> = 'S'

3rd response: <xxx> = "CAP"
<yyyy> = uu:ccc:n:d where
uu = unit of measure
ccc = capacity of the range lower range (capacity of the scale is multi-interval is disabled)
n = least significant count-by digit for this range
d = decimal point position for this range
'0' = none
'1' = xxxx.x
'2' = xxx.xx
etc.

4th response: <xxx> = "CAP"
<yyyy> = uu:ccc:n:d where
uu = unit of measure
ccc = capacity of the range upper range (4th response will not be sent if multi-interval is disabled)
n = least significant count-by digit for this range
d = decimal point position for this range
'0' = none
'1' = xxxx.x
'2' = xxx.xx
etc.

5th response: <xxx> = "CMD"
<yyyy> = "PTMCU" list of supported SMA commands.
Level 1 commands are not included in the list.

6th response: <xxx> = "END"
<yyyy> = nothing

7th & more -
responses: Subsequent N commands will return a '?' response. Unrecognized Command Response

7.1.6 Avery Weigh-Tronix Extended SMA Commands

<LF>XA<CR>

This will initiate an Accumulate command. If the indicator is in ACCUM or COUNT app it will perform an Accumulation transaction if all required conditions are met.

The command will also perform the same function as pressing the **PRINT** key on the front panel. Response will be to any communication ports that are binded to a Type = Print. The port that initiated the command will also receive an <LF>xa<CR> response.

<LF>XB<CR>

This will initiate a PRINT command. The command will also perform the same function as pressing the **PRINT** key on the front panel.

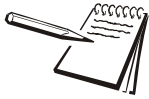
No response.

<LF>XK<CR>

This will return a list of up to the last twenty keys pressed. The buffer is cleared after this command.

<LF>Xk:Y<CR> where Y is:

T for TARE key
 S for SELECT key
 Z for ZERO key
 P for PRINT key
 U for UNITS key
 F for F1 key
 G for START key
 H for STOP key
 I for ID key
 L for TARGET key
 J for SAMPLE key
 K for SETUP key
 N for UNDER key
 O for OVER key
 C for CLEAR
 R for REPORT key
 Q for IN/OUT key
 E for FLEET key
 . for Decimal key
 # for all numeric keys



The list above includes all the keys for all the various models of Z indicators. If your model of indicator does not have one of these keys, that key will not be included in the returned list.



XD, XZ and XS commands, below, only work if the indicator is unsealed.

<LF>XC<CR>

This will return the audit counters in this format:
 <LF>Calib:xxx:Config:yyy:<CR>

<LF>XD<n><CR>

This will initiate the resetting of the calibration and/or configuration parameters depending on the format chosen from the list below:

If n=1, reset config only

If n=2, reset calibration only

If n=3, reset both

The response will be in the form of:

<LF>xd<n><CR>

<LF>XZ<CR>

This will initiate a Cal Zero command. The scale responds with a standard scale response message, with one additional custom status response added. If the "Set Zero" operation fails then the scale responds with the <s> field = "0"

<LF>XS<www><CR>

This will initiate a Cal Span command where <www> is the weight used to calibrate with. The scale responds with a standard scale response message, with one additional custom status response added. If the "Set Span" operation fails then the scale responds with the <s> field = "s"

<LF>XVS<n>:<value><CR>

The indicator will set the <value> of the variable specified by the Network token. A valid XVS command will receive a response of <LF>xvs<CR>. To verify an XVS command was successful requires sending the XVG command to confirm the value of the variable.

<LF>XVG<n><CR>

The indicator will get or return the value of the variable specified by the network token. A valid response is in the form of <LF><value><CR>.

<LF>XG<n><CR>

This will set the Active Scale. A valid response is in the form of <LF>xg<CR>.

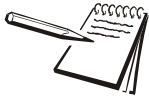
7.2 ENQ & B-Cast commands

A	ACCUM command	"If ACCUM APP is active this command will generate an accumulation transaction, but it does not perform the print function"
P	PRINT command	"Performs same function as pressing the PRINT key. All Ports that are binded with PRINT type will transmit the assigned print format"
S	SELECT command	Performs same function as pressing the SELECT key
T	TARE command	Performs same function as pressing the TARE key
U	UNITS command	Performs same function as pressing the UNITS key
Z	ZERO command	Performs same function as pressing the ZERO key
*F	F1 command	Performs same function as pressing the F1 key
*I	ID command	Performs same function as pressing the ID key
*O	OVER command	Performs same function as pressing the OVER key
*N	UNDER command	Performs same function as pressing the UNDER key
*L	TARGET command	Performs same function as pressing the TARGET key
B	SCALE command	Changes the current scale to the next enabled scale
*G	START command	Performs same function as pressing the START key
*H	STOP command	Performs same function as pressing the STOP key
*J	SAMPLE command	Performs same function as pressing the SAMPLE key
*K	SETUP command	Performs same function as pressing the SETUP key
*1	F1 command	Performs same function as pressing the F1 key
*2	F2 command	Performs same function as pressing the F2 key
*3	F3 command	Performs same function as pressing the F3 key
*4	F4 command	Performs same function as pressing the F4 key
*5	F5 command	Performs same function as pressing the F5 key
*Fires the event for the key.		



Upper or lower case characters will perform the same function.

7.3 NCI commands



Refer to the NCI Standard Document (AWTX Control Document SCP-01) for complete details on NCI command protocol. This is available on the www.averyweigh-tronix.com website. Search for SCP-01 on the website.

W <Cr>	Weight request	Returns decimal weight, units and status
S <Cr>	Status request	Returns status.
Z <Cr>	Zero request	Scale is Zeroed and returns scale status.
H <Cr>	High Resolution Weight request	Returns decimal wt in 10x or x100 resolution with units and status. For x100 resolution set the associated PROT > ATTR > ENQ menu value to 100. For all other values the H command will return x10 resolution
U <Cr>	Units request	Changes unit of measure and then returns decimal weight in the new units with status.
M <Cr>	Metrology Raw Counts request	Returns normalized raw counts and scale status.
T <Cr>	Tare request	Scale is Tared and returns scale status.
all else	Unrecognized command	Returns <Cr> ? <Lf>



See *Additional token tables* on [page 103](#) for status byte information.



If the PROT > ATTR > ENQ menu value is set to 100, to increase resolution by 100, you may add a 2 or 3 to the command to return a 2 or 3 character status byte. For example: 102 will increase resolution by 100 and return a 2 character status byte.

7.4 PLC Configuration information



If connecting to a PLC there are required configuration settings in the SETUP > PORTS menu.

In the PROTCL menu set TYPE x = PLC and BIND x = Enet x

In E-NET menu you must configure the proper network IP address settings in IP ADDR, set DHCP = OFF (PLC's are not DHCP reliant), and CONN > E-NET x > TYPE x = OFF (PLC's do not use Client/Server topology)

In PLC menu configure the settings as required for the connected PLC network.

At the PLC select the size that matches the number of bytes for each item configured in the indicators data type setting. If possible use the same data type for all data.

DATA TYPE TABLE		
Typical PLC Terminology	Indicator Terminology	Data TYPE Size
CHAR / SBYTE	SINT8 - 1 byte	8 Bits (Signed Value / -127 to 127)
BYTE / UBYTE	UNIT8 - 1 byte	8 Bits (Unsigned Value / 0-255)
SHORT / SINT	SINT16 - 2 byte	16 Bits (Signed Value / -32767 to 32767)
WORD / UINT	UNIT16 - 2 byte	16 Bits (Unsigned Value / 0 to 65535)
LONG / SDINT	SINT32 - 4 byte	32 Bits (Signed Value / -2,147,483,647 to 2,147,483,647)
DWORD / UDINT	UNIT32 - 4 byte	32 Bits (Unsigned Value / 0 to 4,294,967,295)
REAL	FLOAT - 4 byte	32 Bits (Signed Decimal Value / 1.0E-37 to 1.0E37)
STRING	STRING - 1 byte/char	Length Parameter setting

7.4.1 ModBus/TCP

Starting Register Locations for PLC Configuration

Input Read Only	30001 (Mirrored at the Read/Write Locations)
Input Read/Write	40001
Output Read/Write	41025

2 Byte Example	
Indicator Data Type (out)	ModBus Register
SINT16	41025
SINT16	41026

4 Byte Example	
Indicator Data Type (out)	ModBus Register
SINT32	41025
SINT32	41027



Note each register holds 2-bytes or 1-word. If a 4-byte or 2-word data type is used 2-registers are required for each item. This makes the starting register number for each item skip a register number between items.

7.4.2 Ethernet/IP Implicit Messaging:

AWTX Assembly Instance and Size

	Assembly Instance	Size
Input	100	Refer to the number of items configured for Out Configuration at the indicator
Output	112	Refer to the number of items configured for In Configuration at the indicator
Configuration	128	0

INPUT/OUTPUT SIZE: Is the number of elements (items) configured in the indicator for the data IN and OUT not the number of bytes.

7.4.3 Ethernet/IP Explicit Messaging:

AWTX Indicator Input Point Object (PLC Data Out)

CLASS: 65 hex (64 hex is also allowed)

ATTRIBUTE: 3 hex

PLC Instance	Supported services for this attribute (hex value)	Data Type	Indicator Input (In) Configuration Data
Data Element Location 1= Block of all elements Instance numbers 2 through 17 are single tags for the data elements 1 through 16	10 (Set Attribute Single)	Based on network configuration in indicator. See DATA TYPE TABLE, Section 7.5	1-16 (Bound to the instance 1) Element # bound to Instance # 1 to 2 2 to 3 15 to 16 16 to 17

AWTX Indicator Output Point Object (PLC Data in)

CLASS: 64 hex (65 hex is also allowed)

ATTRIBUTE: 3 hex

PLC Instance	Supported services for this attribute (hex value)	Data Type	Indicator Output (Out) Configuration Data
Data Element Location 1= Block of all elements Instance numbers 2 through 17 are single tags for the data elements 1 through 16	10 (Set Attribute Single)	Based on network configuration in indicator. See DATA TYPE TABLE, Section 7.5	1-16 (Bound to the instance 1) Element # bound to Instance # 1 to 2 2 to 3 15 to 16 16 to 17

8 Option cards

The ZM510 has several option cards available. Up to 4 cards can be installed in the indicator at the same time. This chapter covers the description and installation of these cards:

- *Analog output card* [on page 67](#)
- *Current Loop/RS485/RS422 card* [on page 68](#)
- *USB Device option card* [on page 69](#)
- *Device Net™ option card* [on page 70](#)
- *Profibus®* [on page 71](#)
- *Wireless Ethernet communication (802.11g) card* [on page 73](#)
- *Internal 120 VAC relay card (for IP69K only)* [on page 74](#)
- *Analog Scale Input Option with 10 VDC Exit. and STVS* [on page 76](#)
- *External I/O Interface card* [on page 77](#)
- *AC input, 4 Inputs (120-240VAC) card* [on page 78](#)
- *DC input, 4 inputs(4-30VDC) card* [on page 79](#)
- *AC output, 4 relays (20-240VAC) card* [on page 80](#)
- *DC output, 4 relays (3-60VDC) card* [on page 81](#)
- *STVS (Severe Transient Voltage Suppressor) card* [on page 82](#)

The table below shows the number of each option card that can be placed (stacked) on either J4 or J5 on the main board.

Option	J4	J5	Total	Note
Analog Output	2	2	4	
Current Loop RS485/RS422	2	2	4	1
USB Device	2	2	4	
DeviceNet™	1	1	1	2
Profibus®	1	1	1	2
Wireless Ethernet	1	1	1	3
Analog input scale	2	2	4	
DC Output 4 relays	2	2	4	
DC Inputs	2	2	4	
AC Output relays	2	2	4	
AC Inputs	2	2	4	
External I/O	1	1	1	4
16 position I/O	1	1	1	4

Note:

1. Maximum of one T301X system
2. Either one DeviceNet or Profibus
3. Maximum one
4. One of either I/O choice

Below is an example of an option card. The option cards connect to the main board or can be stacked on top of another option card. Pins on the bottom of the option card connect to the connector at terminal J4 on the main board. Stacked cards connect at the terminal shown at the top of the photo in [Figure 8.1](#). Screws, at the four locations noted by the arrows, hold the board in place. Standoffs are needed between stacked cards.

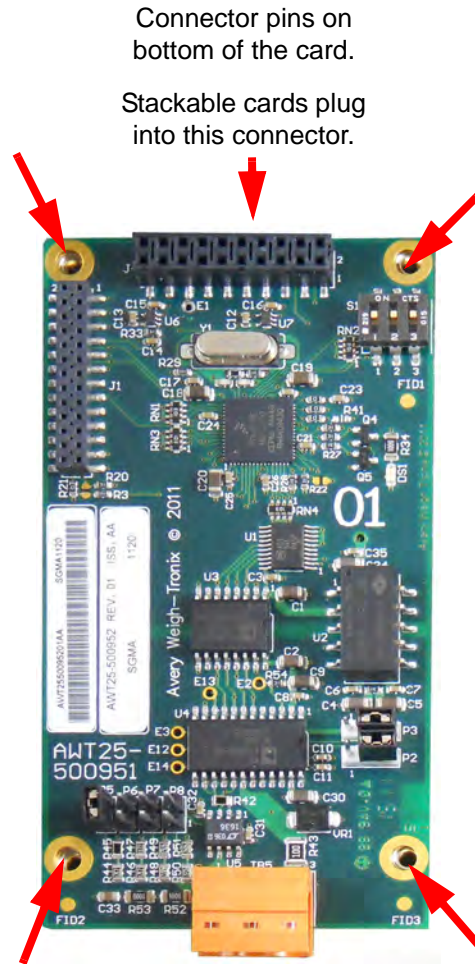


Figure 8.1 Option card example

8.1 Switch S1 settings

There is a set of three switches (S1) on most of the cards. To operate properly they must be set according to their position on the main board and their position in a stack of option cards. See the illustrations below to set the switches in the proper operating position.

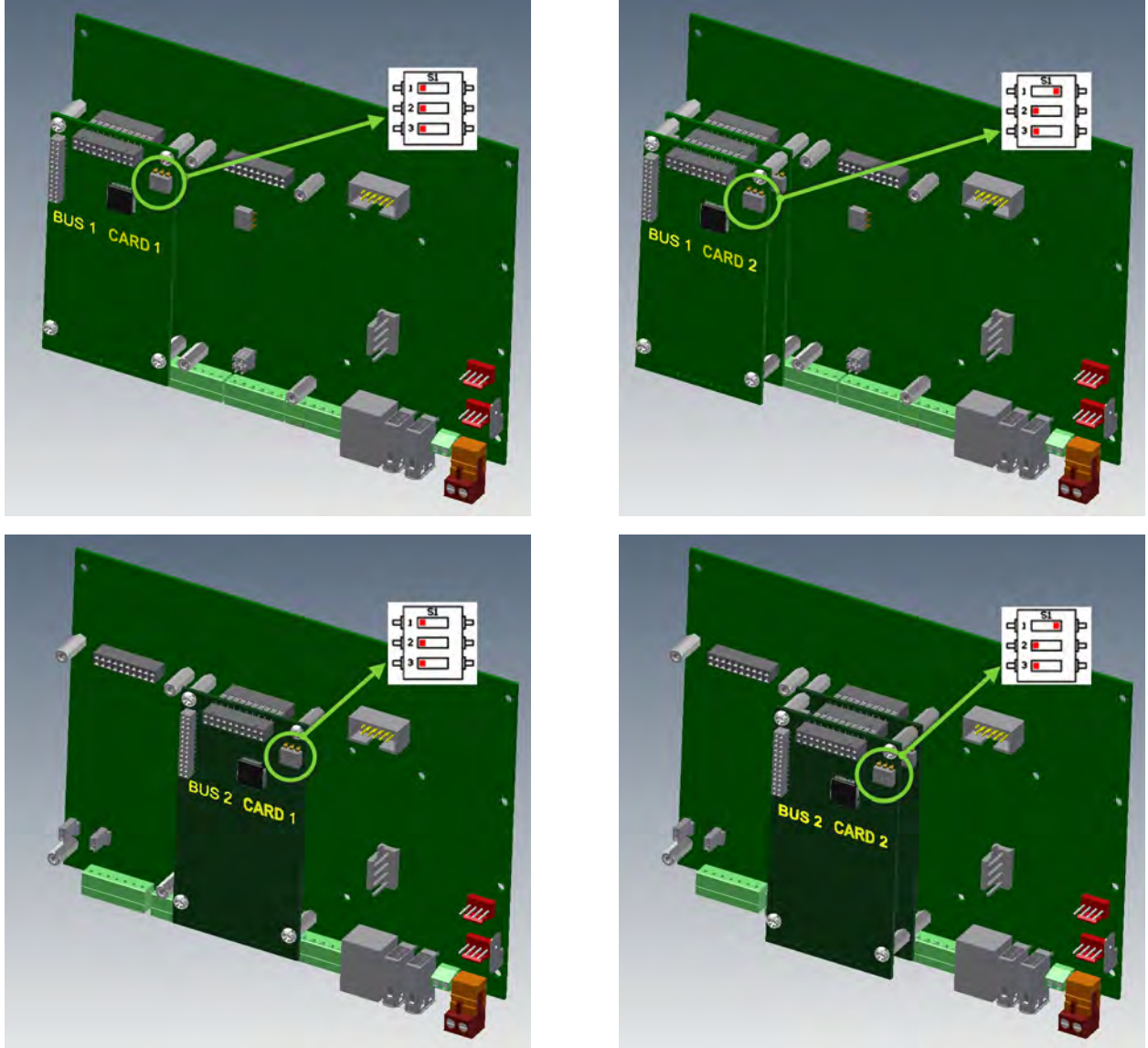
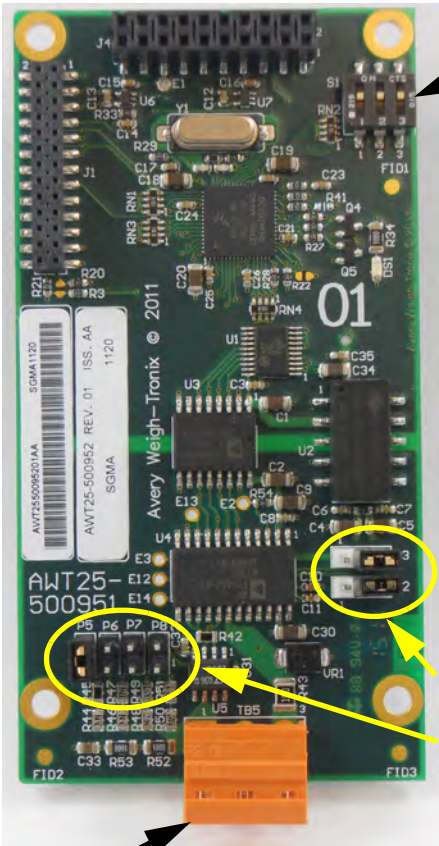


Figure 8.2 Card position and switch S1 settings

8.2 Analog output card

Figure 8.3 shows the analog output card. This provides analog output in proportion to the weight on the scale. See *Options on page 52* for information on configuring the indicator and this card.



See Switch S1 settings on page 66

The analog output card uses a 16 bit A/D with resolution capabilities of 65,536 divisions.

Analog Output Chart							*Load Resistance
Types of Output	P2	P3	P5	P6	P7	P8	
4 to 20MA	1-2	2-3	1	1	1	1	500 Ohm Max.
0 to 20MA	2-3	1-2	1	1	1	1	
0 to 24MA	1-2	1-2	1	1	1	1	
0 to 5V	2-3	2-3	1-2	1	1	1	800 Ohm Min.
0 to 10V	2-3	2-3	1	1-2	1	1	
±5V	2-3	2-3	1	1	1-2	1	
±10V	2-3	2-3	1	1	1	1-2	

*Load Resistance = Cable resistance plus resistance of input unit.

Pin 1

P2 & P3

P5-P8

Figure 8.3 Analog output option card



CAUTION: The output will run to the minimum value when a fault occurs and when you enter the Setup menus, so plan accordingly!

TB5	
Pin	Function
1	V out
2	Common (GND)
3	I out

8.3 Current Loop/RS485/RS422 card

Figure 8.4 shows the Current Loop/RS485/RS422 option card. This provides Current Loop/RS485/RS422 communication to and from connected devices. See *Options on page 52* for information on configuring the indicator and this card.

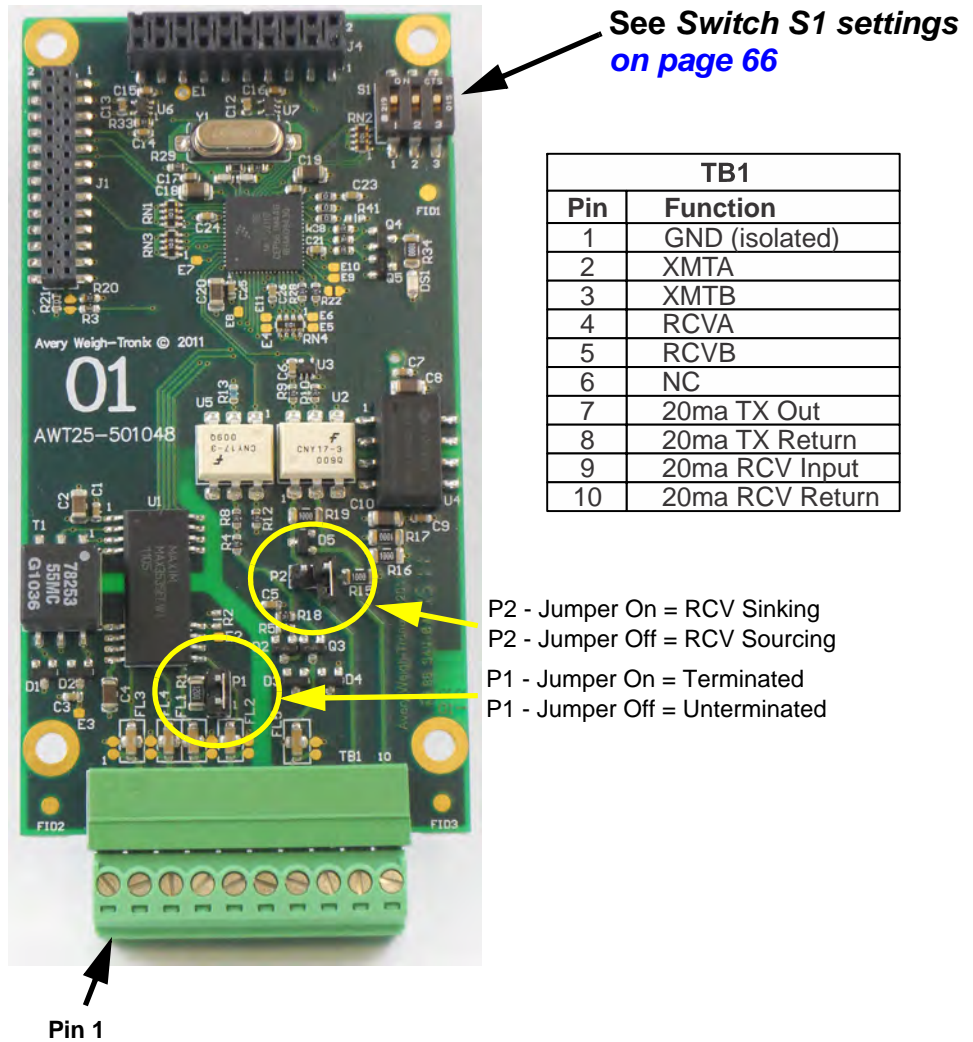


Figure 8.4 Current Loop/RS485/RS422 card

8.4 USB Device option card

Figure 8.5 shows the USB Device option card. This provides connection for a USB host device. See *Options on page 52* for information on configuring the indicator and this card.

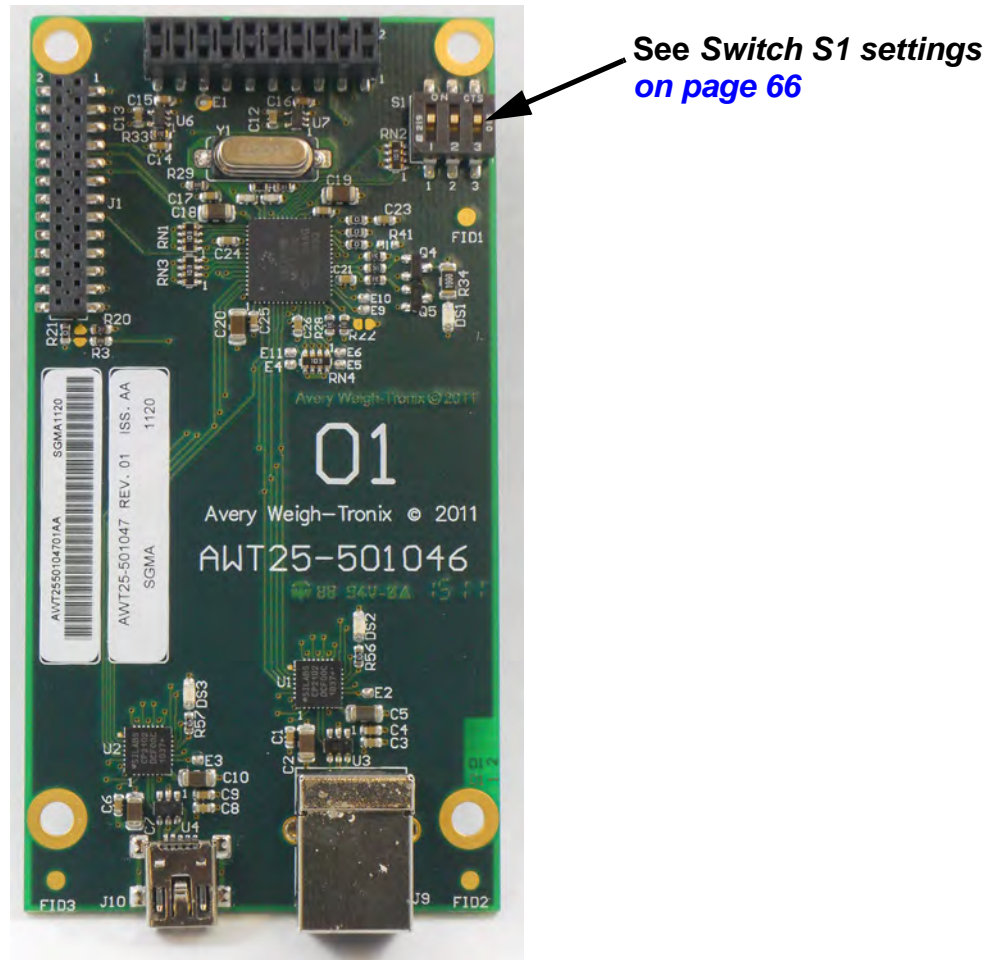


Figure 8.5 USB Device option card



Driver required when connected to a PC. Download driver from the password protected portion of www.averyweigh-tronix.com.

After installing the driver, when the USB Device port is connected to a USB port on the PC it creates a Virtual COM Port (VCP). Be sure to make note of the COM port number assigned to the VCP when setting up the serial communication application.

Connections to USB Device option card include USB Type B and Mini connectors.

8.5 Device Net™ option card

Figure 8.5 shows the Device Net option card. This provides Device Net connections. See [Options on page 52](#) for information on configuring the indicator and this card.

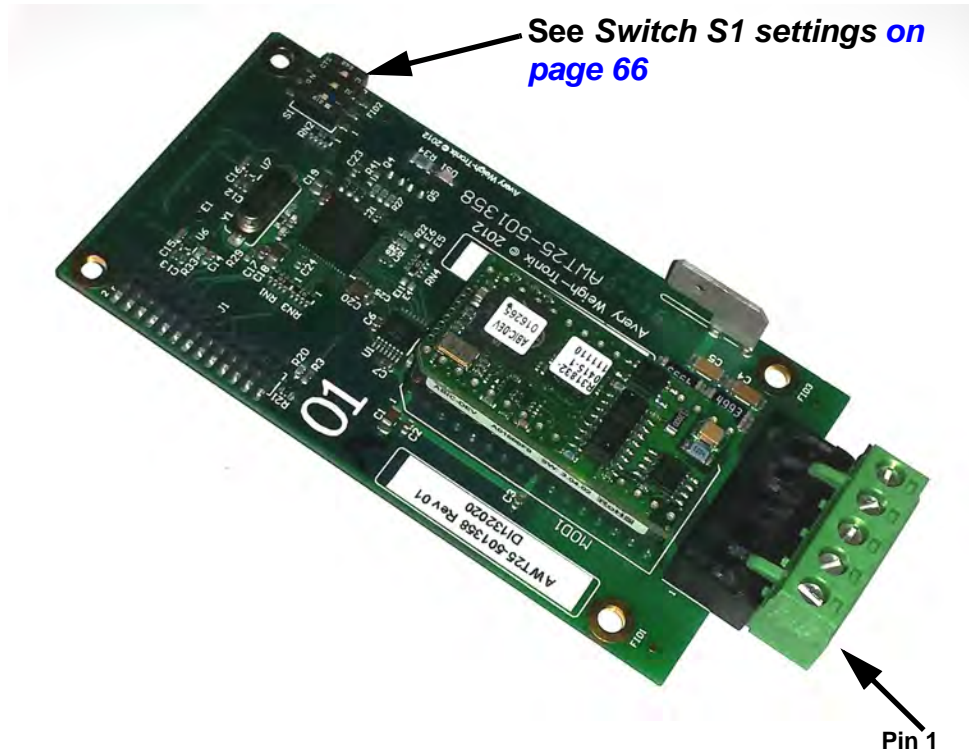


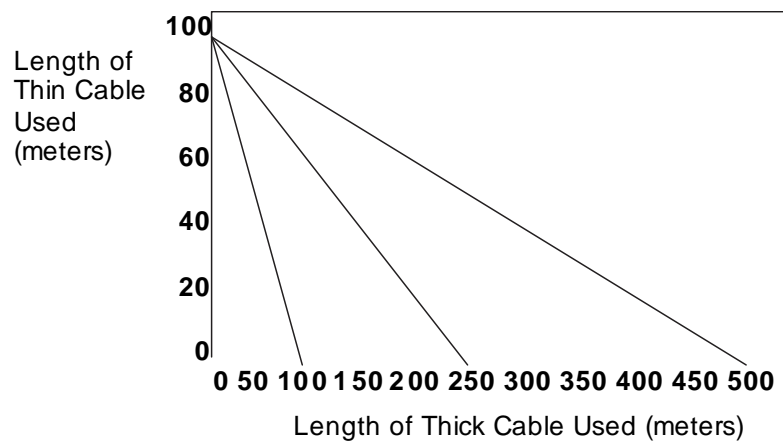
Figure 8.6 Device Net option card

TB1 Pinout

Device Net Pluggable Connector TB1	
Pin No.	Signal
1	V- (Bus power GND)
2	CAN_LOW
3	Shield
4	CAN_HI
5	V+ (+24VDC)*

*An external power supply will be used to supply V+ power. Typically this supply will be previously installed.

8.5.1 Software controlled baud rate



$$L_{\text{thick}} + 5 \times L_{\text{thin}} = 500 \quad \text{at 125K baud}$$

$$L_{\text{thick}} + 2.5 \times L_{\text{thin}} = 250 \quad \text{at 250K baud}$$

$$L_{\text{thick}} + L_{\text{thin}} = 100 \quad \text{at 500K baud}$$

where L_{thick} is the length of thick cable and L_{thin} is the length of thin cable.

8.6 Profibus©

Figure 8.5 shows the Profibus© option card. This provides a Profibus connection. See [Options on page 52](#) for information on configuring the indicator and this card.

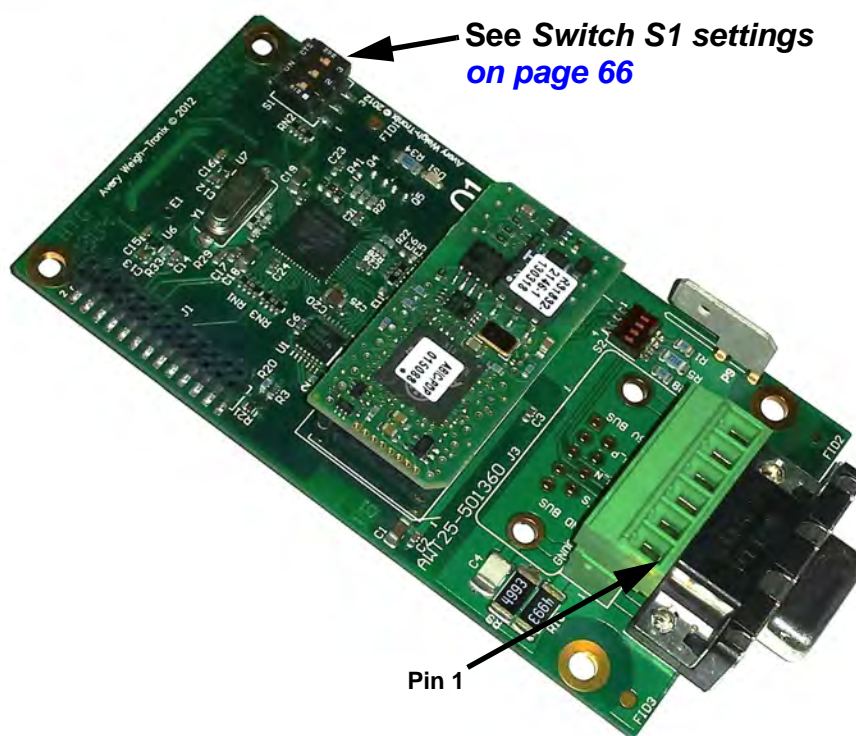


Figure 8.7 Profibus option card

J2 (DB-9) & TB1 Pinout:

Profibus-DP			
J2 DB9-Female		TB1	
Pin No.	Signal	Pin No.	Signal
6	V- (Bus power GND)	6	+5.0 Vdc
5	CAN_LOW	2	Ground
8	Shield	4	-Signal
3	CAN_HI	5	+Signal
Housing	V+ (+24VDC)*	1	Shield
		3	RTS

J2 and TB1 provide two connectors to the same Profibus DP interface. J2 is for standard Profibus DP DB-9 based connector cabling and TB1 is for flying lead wiring internal to the ZM Indicators enclosure.

+5V and GND are used for external bus termination if the internal S2 termination resistors are not used.

8.6.1 S2 switch settings:

On = Termination resistors Enabled/Present (Default Position)

Off = Termination resistors Disabled/Removed

8.7 Wireless Ethernet communication (802.11g) card

Figure 8.8 shows the Wireless Ethernet communication 802.11g card. This provides wireless Ethernet connectivity via the 802.11g protocol.

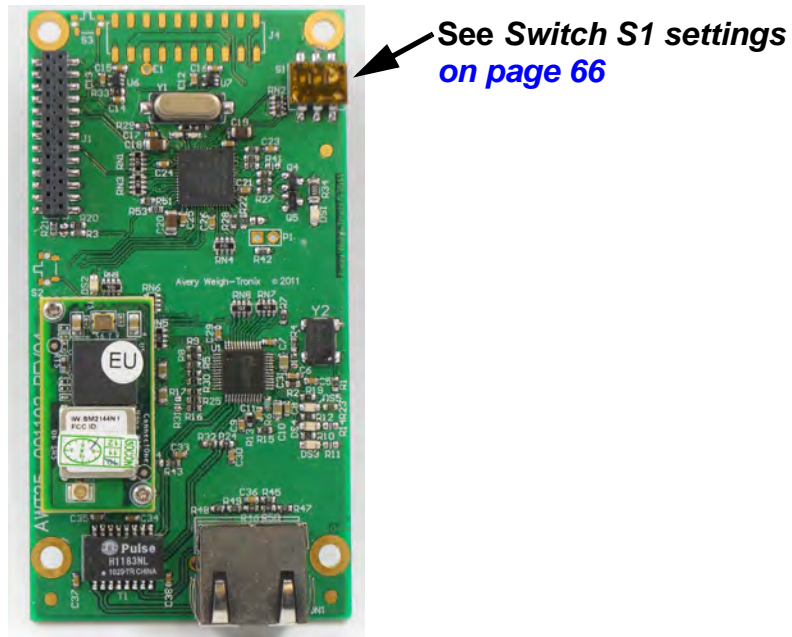


Figure 8.8 802.11g wireless communication option card

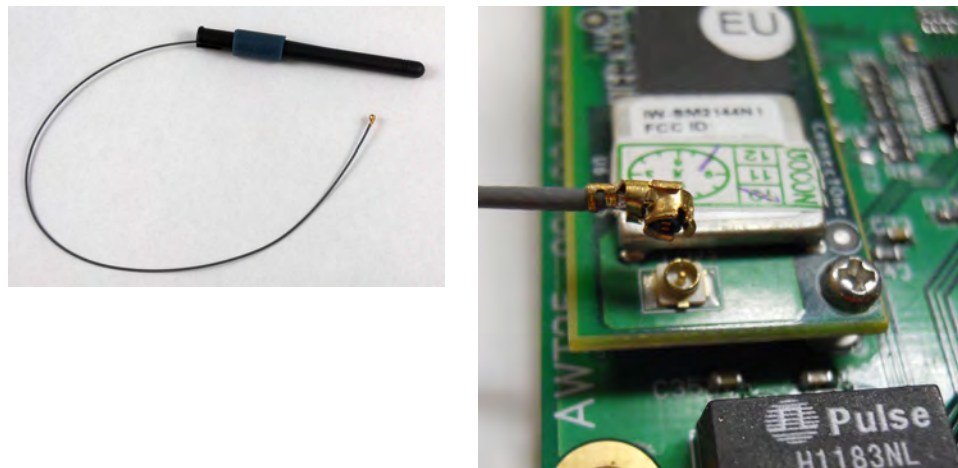


Figure 8.9 802.11g wireless communication antenna and connection point

8.8 Internal 120 VAC relay card (for IP69K only)

The AC relay converts three logic level outputs into AC solid state relays internal to the indicator. The AC relay card is shown in Figure 8.10.

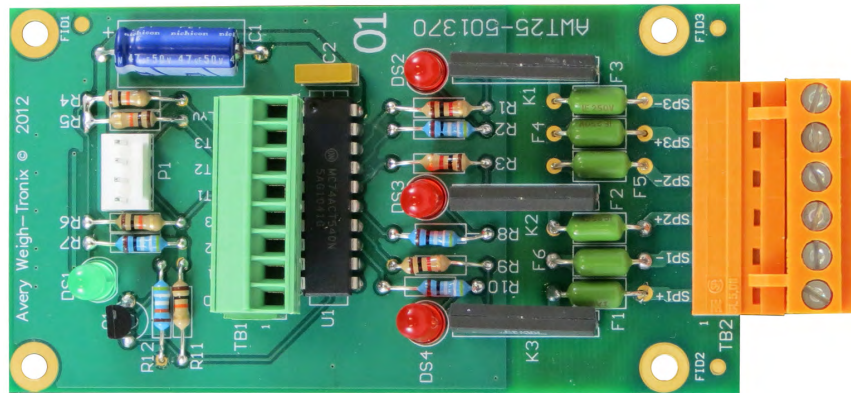


Figure 8.10 AC relay option card

8.8.1 Specifications

Output Channels (all positions)	Switched AC
Maximum output voltage	120V rms
Minimum output voltage	20V rms
Maximum output current	1A rms
Minimum output current	5mA rms
Maximum off-state voltage	400V peak
Maximum off-state leakage current	1mA rms
Maximum power dissipation	1.6 W
Load power factor for guaranteed turn-on	0.25



If the device to be controlled does not fall within these standards it is suggested that you use a mechanical relay for absolute circuit open and/or closure with appropriately rated contacts for the loading characteristics of the device.



WARNING: Risk of Electrical Shock. Insure power is removed from the indicator before installing the option card.

This option card is capable of switching up to 1Amp Max. per channel at 20-120VAC.

Please refer to the appropriate National Electrical Code regulations with regards to the switched AC mains voltage wiring sizes and insulation requirements.

8.8.2 Installing the option card

1. Plug the option card into terminal J4 on the main board. See [Figure 8.11](#). Use the included standoffs and screws to fasten the card to the main board at the four locations noted by the arrows.

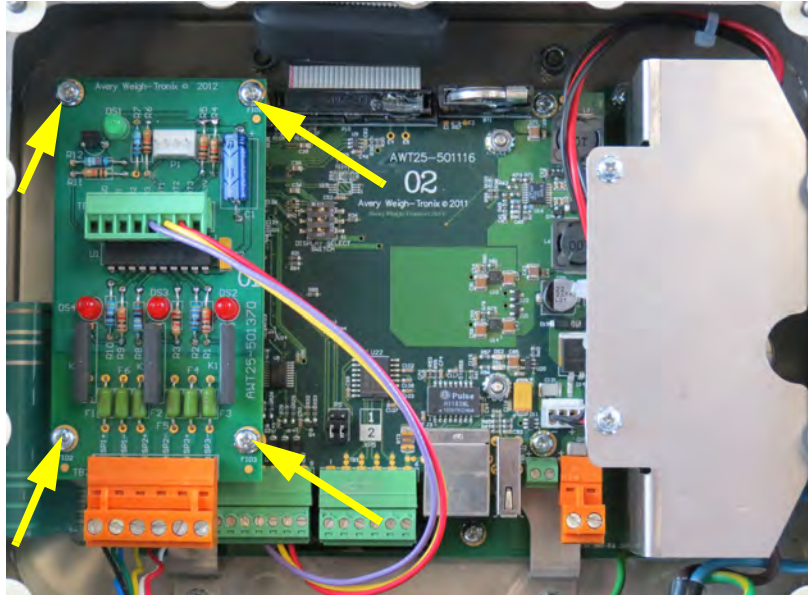


Figure 8.11 AC Relay option card on main board

2. Attach 22AWG min. wires between the:
 - Option card TB1 pin 5 (OUT1) and the Main Board TB2 pin 5 (OUT1) : SP1
 - Option card TB1 pin 6 (OUT2) and the Main Board TB2 pin 6 (OUT2) : SP2
 - Option card TB1 pin 7 (OUT3) and the Main Board TB2 pin 7 (OUT3) : SP3
 These wires are shown in place in [Figure 8.11](#).
3. The use of Ztools is typically required to configure the AC Relay option card

8.9 Analog Scale Input Option with 10 VDC Excit. and STVS

This card allows you to connect a second analog scale with 10VDC excitation.

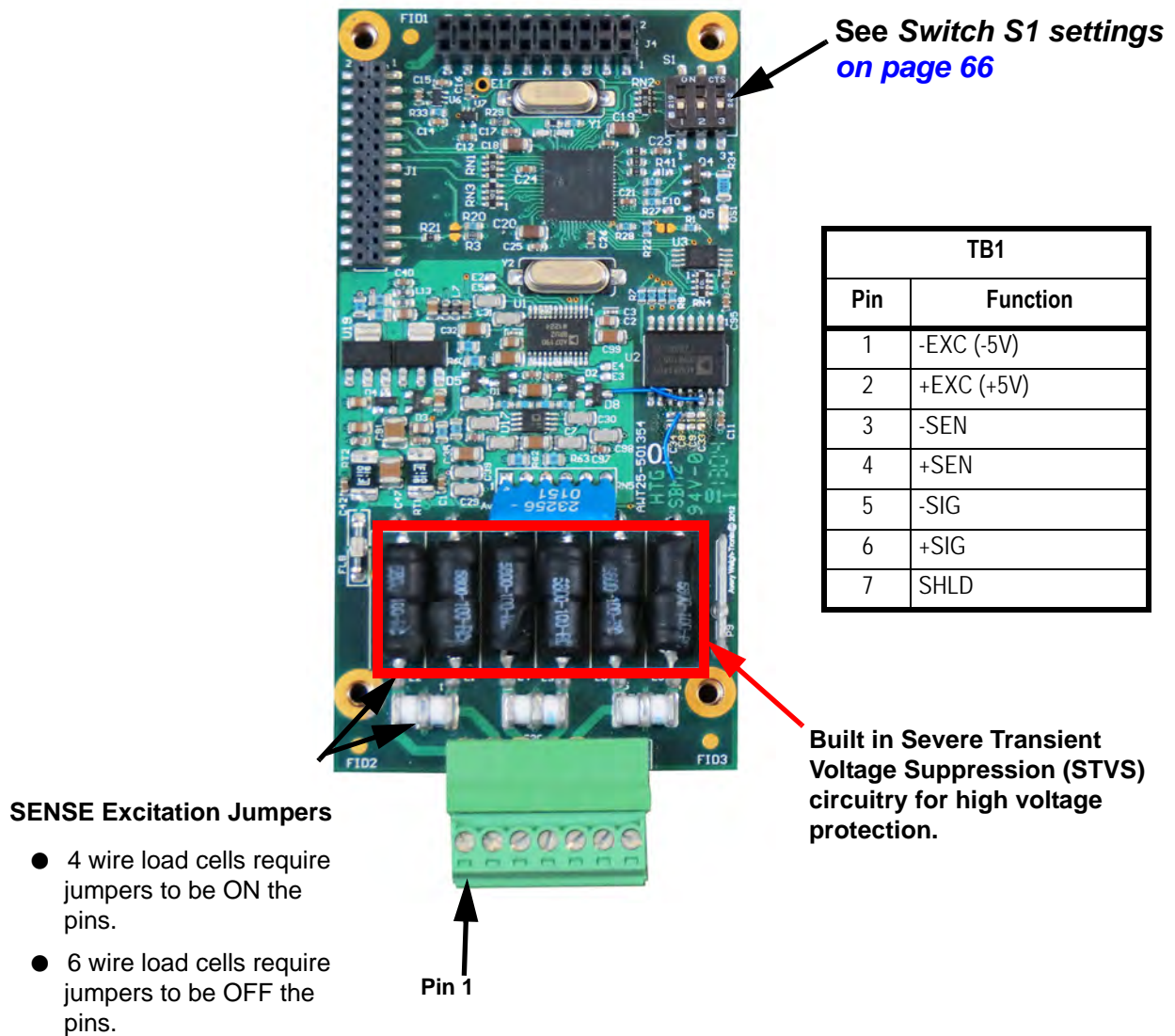
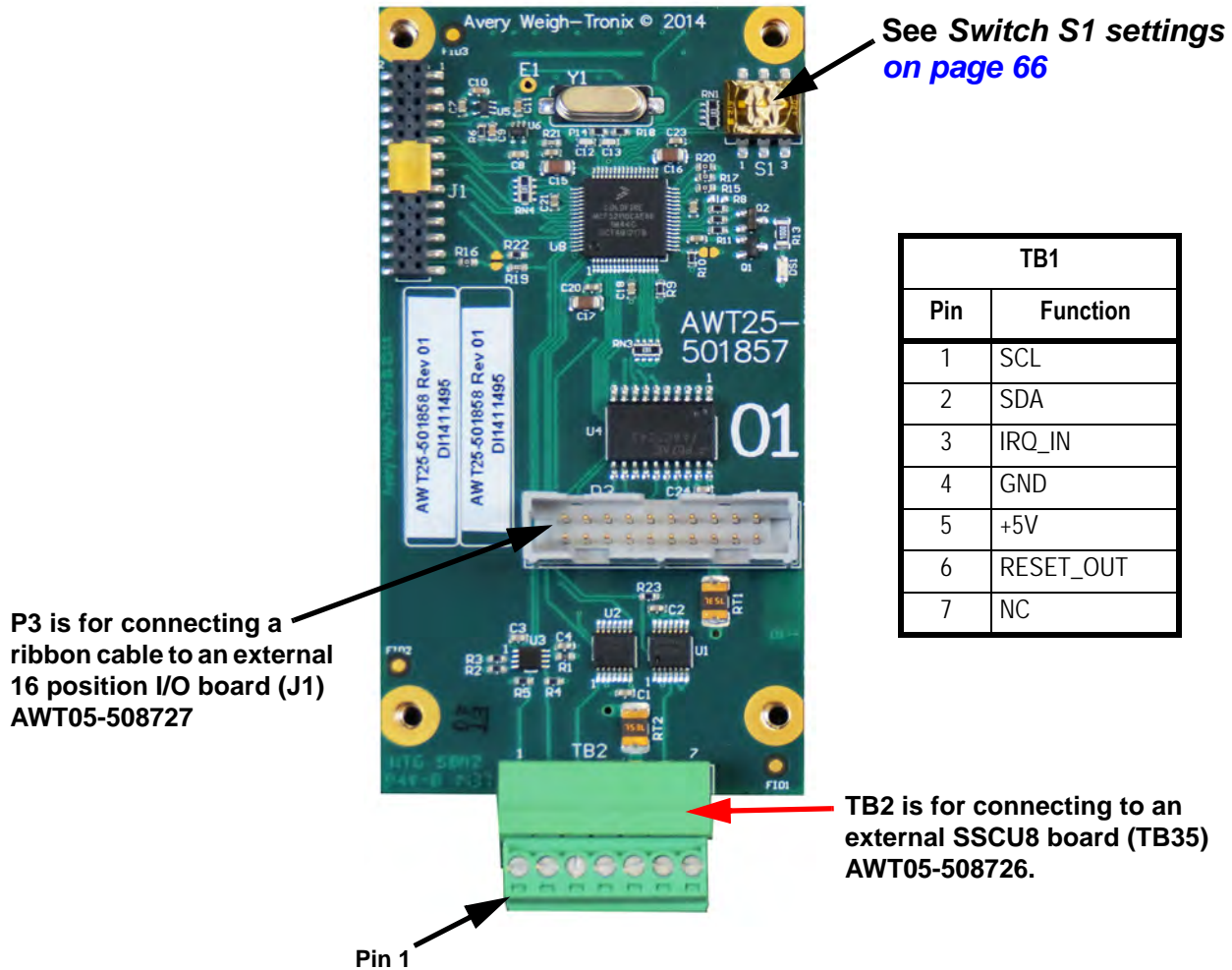


Figure 8.12 10VDC Excitation Analog Scale Input option card

8.10 External I/O Interface card

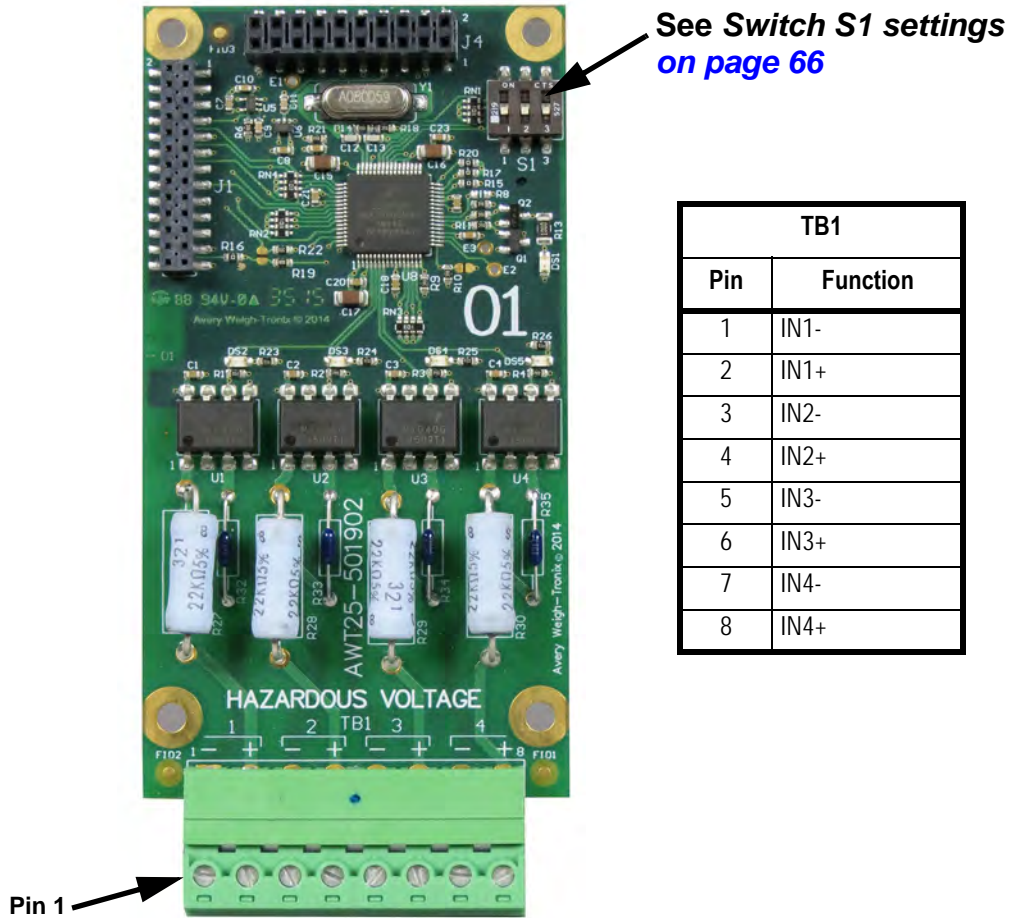
This card allows you to connect to an external I/O interface. This card is required if you are using the SSCU8 board (AWT05-508726) or the 16 Position I/O board (AWT05-508727).



The use of Ztools is required to configure the External I/O option card.

8.11 AC input, 4 Inputs (120-240VAC) card

This card allows the connection of up to four 120-240VAC inputs.

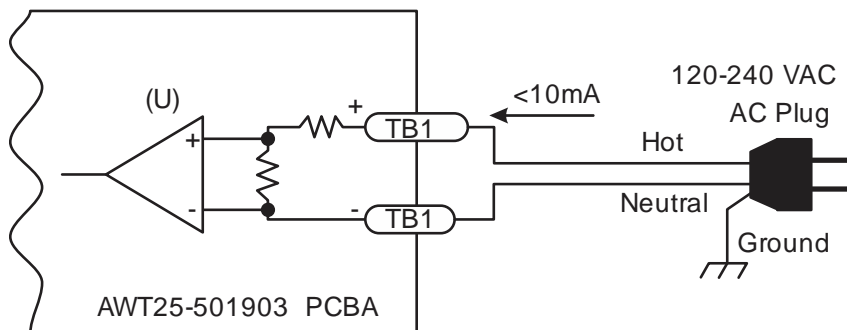


TB1	
Pin	Function
1	IN1-
2	IN1+
3	IN2-
4	IN2+
5	IN3-
6	IN3+
7	IN4-
8	IN4+

Figure 8.13 AC 4 Input card



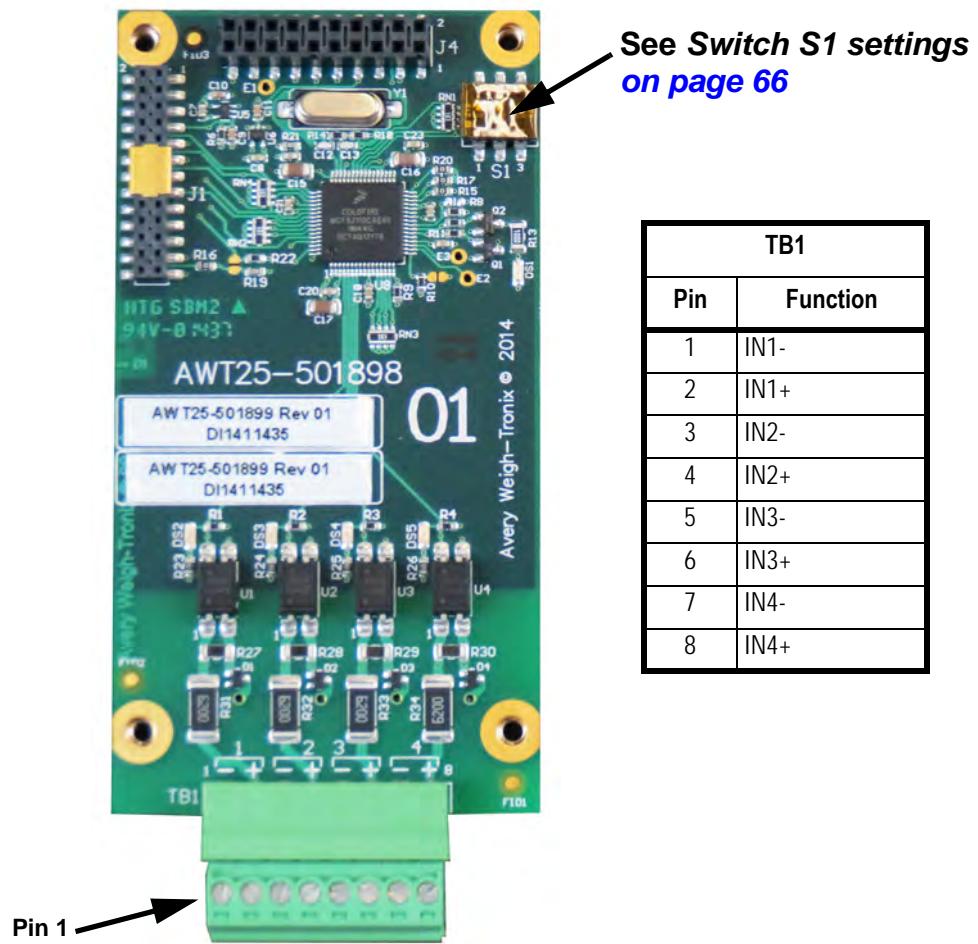
CAUTION: For safety reasons the AC Input option card can only be used in the primary earthed stainless steel enclosure.



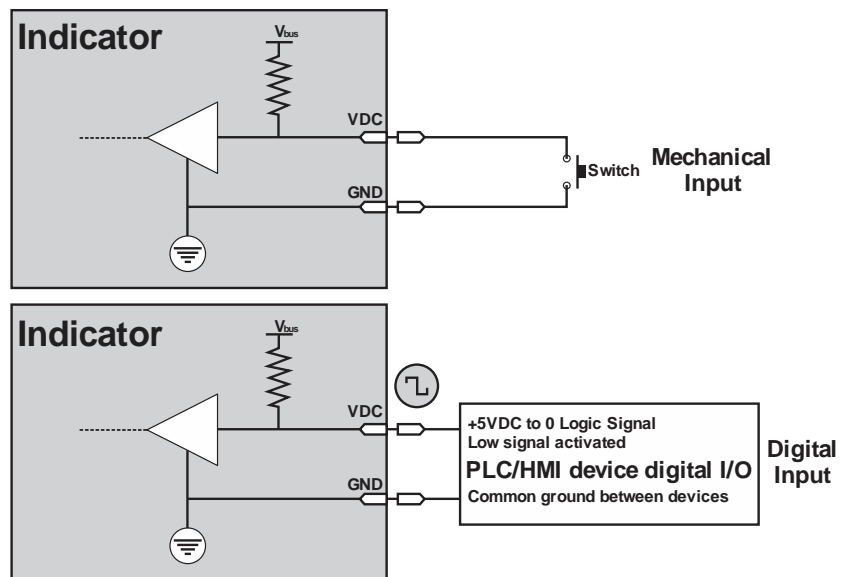
The use of Ztools is required to configure the AC Input option card.

8.12 DC input, 4 inputs(4-30VDC) card

This card allows the connection of up to four 4-30VDC inputs.



TB1	
Pin	Function
1	IN1-
2	IN1+
3	IN2-
4	IN2+
5	IN3-
6	IN3+
7	IN4-
8	IN4+



The use of Ztools is required to configure the DC Input option card.

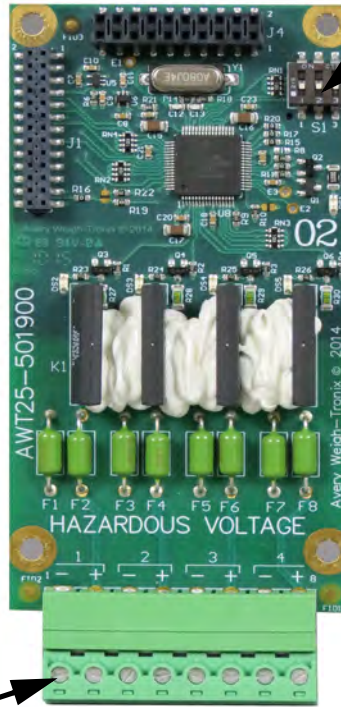
8.13 AC output, 4 relays (20-240VAC) card

This card allows you control up to four 20-240VAC output solid state relays. Each output is rated for 1 Amp with internal fuses.

Specifications

Output Channels (all positions)	Switched AC
Maximum output voltage	240V rms
Minimum output voltage	20V rms
Maximum output current	1A rms
Minimum output current	5mA rms
Maximum off-state voltage	500V peak
Maximum off-state leakage current	1mA rms
Maximum power dissipation	1.6 W
Load power factor for guaranteed turn-on	0.25

If the device to be controlled does not fall within these standards it is suggested that you use a mechanical relay for absolute circuit open and/or closure with appropriately rated contacts for the loading characteristics of the device.



See Switch S1 settings on page 66

TB1	
Pin	Function
1	SP1-
2	SP1+
3	SP2-
4	SP2+
5	SP3-
6	SP3+
7	SP4-
8	SP4+



CAUTION: For safety reasons the AC output option card can only be used in the primary earthed stainless steel enclosure.

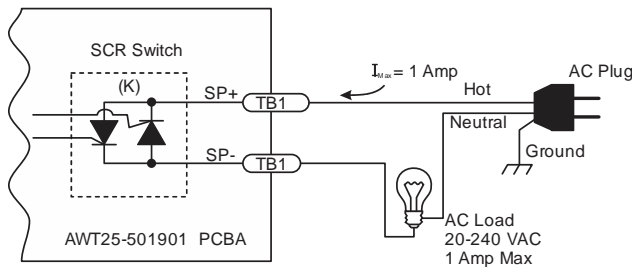


Figure 8.14 Wiring examples

The use of Ztools is required to configure the AC Output option card.

8.14 DC output, 4 relays (3-60VDC) card

This card allows you control up to four 3-60VDC output solid state relays. Each output is rated for up to 2 Amps with internal fuses.

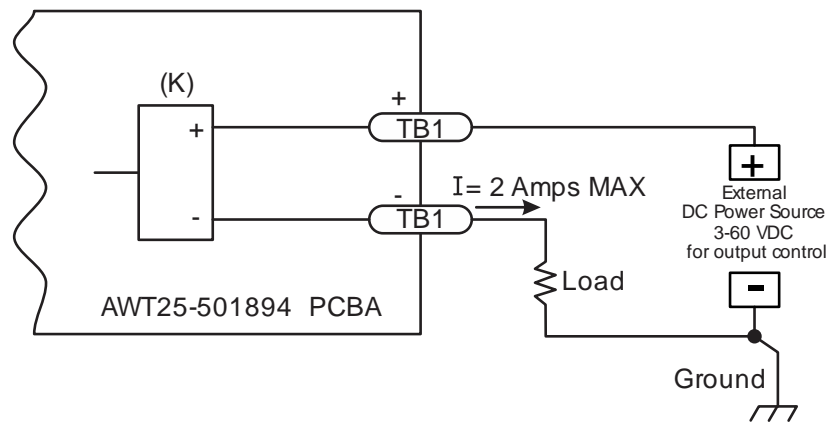
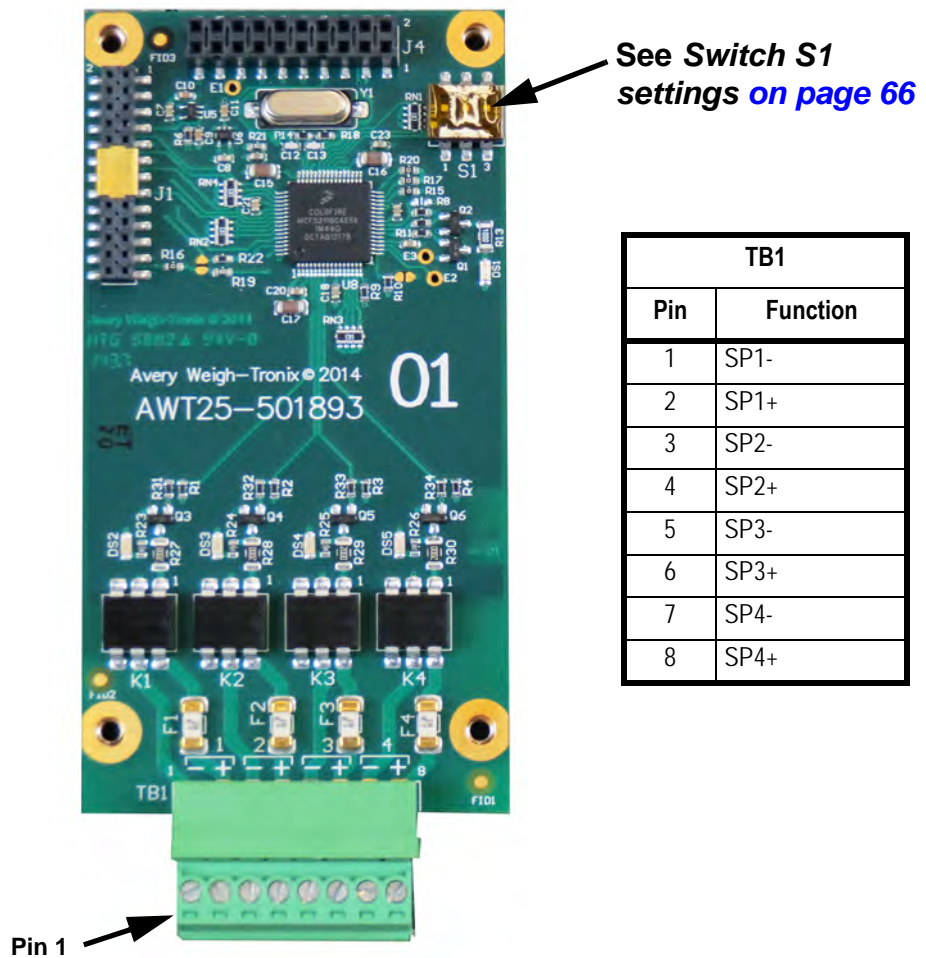


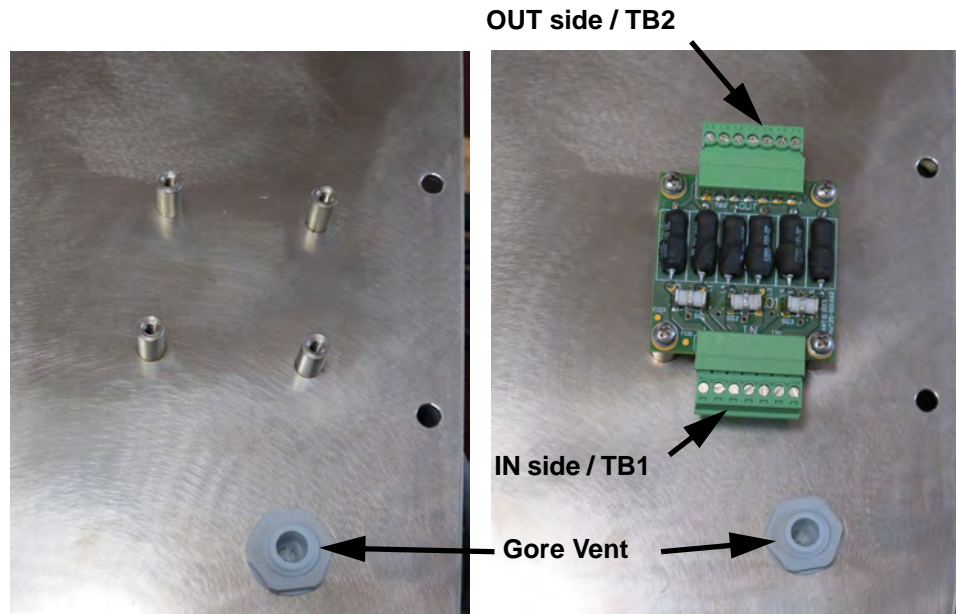
Figure 8.15 Wiring example

The use of Ztools is required to configure the DC Output option card.

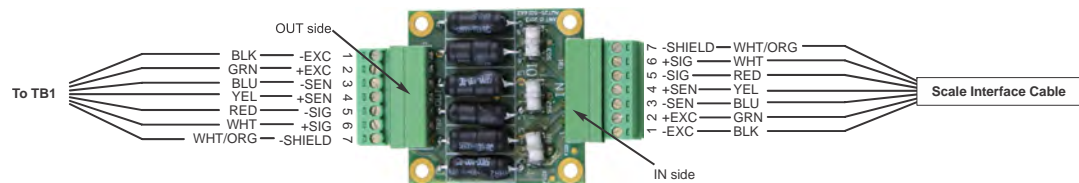
8.15 STVS (Severe Transient Voltage Suppressor) card

The STVS card is used to suppress high voltages before they can damage the components of the indicator. Use these instructions to install the STVS card.

1. Disconnect the indicator from power.
2. Remove the acorn nuts from the back panel and carefully remove the back. Be sure not to stretch or damage the ground wire connected to the inside of the back panel.
3. There are four studs on the inside the back cover. See the photo below. Mount the STVS module to the studs as shown in the second photo below. Use the supplied screws. The module should be turned vertically on the back plate with the IN marked connector positioned closer to the Gore® Vent. The OUT side is turned toward TB1. See the photos below.



4. Attach the scale interface wires to the IN side of the module per the wiring illustration shown below.



5. Use wires of adequate length and connect the OUT side of the STVS module to TB1 on the indicator main board, per the illustration above.
6. Be sure no wires or cables are pinched between the front and back of the indicator as you replace the back panel. Tighten the acorn nuts in the proper fashion.

9 Printed reports

Below are examples of a Configuration report, a Calibration report and an Audit report.

9.1 Configuration report

Below is a partial sample printout of a configuration report.

Parameter	Value	Data Type
SCALE_1_STABILITY_DIV	3	DOUBLE
SCALE_1_STABILITY_TIME	1	DOUBLE
SCALE_1_AZT_DIV	3	DOUBLE
SCALE_1_AZT_TIME	1	DOUBLE
SCALE_1_ZERO_RANGE	100	DOUBLE
SCALE_1_OVER_CAP_BASIS	0	ENUM
SCALE_1_OVER_CAP_DIV	9	INTEGER
SCALE_1_OVER_CAP_PER	105	DOUBLE
SCALE_1_UNDER_CAP_DIV	250	INTEGER
SCALE_1_UNDER_CAP_PER	20	DOUBLE
SCALE_1_CZERO	0.25	DOUBLE
SCALE_1_GZERO_BAND	10	INTEGER
DISPLAY_SEPARATOR	0	ENUM
DISPLAY_UPDATE_RATE	10	INTEGER
SITE_ID	SiteId	STRING
CALIBRATION_PASSWORD	2580	INTEGER
COM1_BAUD_RATE	9600	INTEGER
COM1_DATA_BITS	8	INTEGER
COM1_PARITY	0	ENUM
COM1_STOP_BITS	0	ENUM
COM1_CONTROL	0	ENUM

etc.

9.2 Calibration report

CALIBRATION REPORT

Parameter	Value
SCALE_1_ZERO_COUNTS	Value = 255037
SCALE_1_LIN_FACTOR_1_WT	Value = 0.00000000
SCALE_1_LIN_FACTOR_1_CNT	Value = 0
SCALE_1_LIN_FACTOR_2_WT	Value = 0.00000000
SCALE_1_LIN_FACTOR_2_CNT	Value = 0
SCALE_1_LIN_FACTOR_3_WT	Value = 0.00000000
SCALE_1_LIN_FACTOR_3_CNT	Value = 0
SCALE_1_SPAN_FACTOR	Value = 0.00000909
SCALE_1_GRAVITY	Value = 9.8043
SCALE_1_ZERO_MV	Value = 0.38003510
SCALE_1_SPAN_MV	Value = 1.63769878
SCALE_1_ALTITUDE	Value = 0.00000000
SCALE_1_LATITUDE	Value = 0.00000000
SCALE_1_SPAN_COUNTS	Value = 1099040
SCALE_1_CAL_WEIGHT	Value = 10.00000000
UNIT SERIAL NUMBER	Value = 20120111

9.3 Audit report

```

                                AUDIT LOG REPORT
Parameter      old value  new value  Time
PROTOCOL_1_TYPE      0           1  2017-03-20 10:12:30
  SCALE_1_UNIT3      2           4  2017-03-20 10:08:17
PROTOCOL_1_TYPE      1           0  2017-03-20 10:00:27
PROTOCOL_2_FORMAT_1  1           40  2017-03-20 09:14:45
  SCALE_1_UNIT4      0           5  2017-03-20 09:10:35
  SCALE_1_UNIT3      0           2  2017-03-20 09:10:30
  SCALE_1_UNIT2      0           2  2017-03-20 09:10:27
SCALE_1_SPAN_FACTOR  0.00003265  0.00003707  2017-03-20 09:09:43
SCALE_1_ZERO_COUNTS  394685      -651448  2017-03-20 09:09:27
PROTOCOL_2_BIND      0           0  2017-03-20 09:09:14
PROTOCOL_2_TYPE      0           3  2017-03-20 09:09:12

```

10 Print formatting

10.1 Print Format Editor

The Print Format Editor creates custom print formats by letting you insert ASCII characters, scale tokens and variables into a print string. See *Print tokens, parameters and default print formats on page 95* for the ASCII characters, scale tokens and variables that can be used.

When you use scale tokens or variables, you must append a function number to the token or variable. The function number used depends on whether you want to print the Value, Name or Data Type of the token. The most common function usage is to print the token Value but in certain situations you may want to print the token Name. The token Data Type is reserved for special application usage.

You can also append optional parameters to a token or variable to modify the default behavior. For example, the optional parameters allow you to change the printed format such as the number of digits or characters, or use leading zeros instead of spaces, etc. The token that is selected will determine what optional parameters are available. See *Print tokens, parameters and default print formats on page 95* for a list of the optional parameter tables.

The ZM indicator also supports the UTF-8 Unicode character set which is used for numerical HTML Coding values and to support many foreign language character sets.

Following are tables showing the key functions in the string indexing and character editing modes. Use them for reference.

Table 1: Key Action When In The String Index Select Mode						
Action	UP ARROW	DOWN ARROW	ENTER	LEFT ARROW	RIGHT ARROW	SCALE
Momentary Key Press	N/A	Selects the index character for editing using the key actions in Table 2	Exit and save	Moves left one position in the index	Moves right one position in the index	Escape Index mode and Abort all changes
Long Key Press	Deletes current character	Inserts new character before this point. Default character added is 32 (space)	N/A	Page Up (Decrements index by 10)	Page Down (Increments index by 10)	Escape Index mode and Abort all changes

After you select the index number, use the Table 2 key actions to edit the character for that index number.

Table 2: Key Action When In The Character Edit Mode						
Action	UP ARROW	DOWN ARROW	ENTER	LEFT ARROW	RIGHT ARROW	SCALE
Momentary Key Press	Increments the value by 1	Decrements the value by 1	Exits to Index mode	Deletes the right digit	Adds a zero digit to the right	ESC/Abort
Long Key Press	N/A	N/A	N/A	Delete the entire entry	N/A	N/A

10.2 Editing an existing print string

Here is an example of how to edit an existing print string.

1. In the Admin menu, under **Setup>Ports** you will find **P.F.Edit**. With **P.F.Edit** highlighted, press **ENTER** ...

The following screen is displayed.



2. Press the **UP** or **DOWN** key to highlight the print format you want to edit and pres **ENTER** ...

In this example let's use format 1 (standard gross, tare and net printout) and add a company name as the header or first line of the printout.

The first character in the print format is displayed:



Since we want to add a header to the beginning of the printout we will want to insert in front of string index number 1. If you wanted to add characters or tokens in a different area of the printout then you would scroll using the **RIGHT** or **LEFT** arrow key until the string index number you want to insert in front of is displayed.

For this example let's add the company name **ABC Company**. Start by adding up the number of characters in the company name including any spaces. Then add to this number the carriage return and line feed if necessary. For this example that would be 13 characters. (example of adding up the 13 characters)

A	B	C	Sp	C	o	m	p	a	n	y	Cr	Lf	← Text, etc. to insert
1	2	3	4	5	6	7	8	9	10	11	12	13	← Number of characters to insert
65	66	67	32	67	111	109	112	97	110	121	13	10	← Decimal value to enter

To center the company name on a printed ticket, you must add spaces in front of the company name. This will add to the total count of characters to insert.

10.2.1 Inserting characters

1. To insert characters into a print string, press and hold the **DOWN** arrow key. After you hold the **DOWN** arrow key for about 3 seconds the Index number will start to automatically increment by 1 about every second as Spaces (dec 32) are inserted into the print string. You will still see the current string character on the right side of the display but the string index number will increment as spaces are inserted in front of this character. So for this example, press and hold **DOWN** arrow until the display shown below appears, then release the **DOWN** arrow key ...



2. To start the entry of the company name press the **LEFT** arrow key to scroll backwards until string index number 1 is again displayed, as shown below.



3. Press **DOWN** arrow and the display shows a number entry screen. This allows you to enter a new character.



4. Use the numeric keypad and type in **65**, the decimal value for **A**, and press **ENTER** ...

The following is displayed:



5. Press the **RIGHT** arrow key to advance to the next string index number and press the **DOWN** arrow key ...

The number entry screen is displayed again.

6. Enter the value for the next letter in the company name and press **ENTER**.
7. Repeat steps 5 and 6 until the last character is entered. In this example that would be **13, 10** for the line feed.

- Press the **ENTER** to accept the new characters into the print string.



Do not forget step 8 or the changes will not be entered into the print string

- Press **ESC** and then the **UP** arrow key until the **SAVE SETTINGS** screen is displayed. Highlight your choice and press **ENTER** to save your choice and exit the ADMIN menu.
- After the indicator reboots press the **PRINT** key to test the results.

10.2.2 Deleting characters

In this example let's use format 1 (Gross, Tare and Net printout) and delete the Tare weight so that only the Gross and Net weight are printed. Refer to the table below to see the current default settings for print format number 1.

```

Gross  43500 kg
Tare   13350 kg
Net    30150 kg
    
```

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
#SP	#SP	#SP	#SP	#SP	G	r	o	s	s	#SP	T.GWT	1	#SP	T.UNIT	1	#CR	#LF	#SP	#SP
32	32	32	32	32	71	114	111	115	115	32	t1	49	32	t9	49	13	10	32	32
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
#SP	#SP	#SP	#SP	T	a	r	e	#SP	T.SAT	1	#SP	T.UNIT	1	#CR	#LF	#SP	#SP	#SP	#SP
32	32	32	32	84	97	114	101	32	t2	49	32	t9	49	13	10	32	32	32	32
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
#SP	#SP	#SP	N	e	t	#SP	T.NWT	1	#SP	T.UNIT	1	#CR	#LF						
32	32	32	78	101	116	32	t3	49	32	t9	49	13	10	END					

- From **P.F.Edit** press **ENTER** ...
The list of print formats is displayed.
- Highlight **PrnFt1** and press **ENTER** ...
The first character in the print format will be displayed:



3. To move the string index position to the start of the Tare weight output (SP character 32), press the **RIGHT** arrow key until the display shows ...

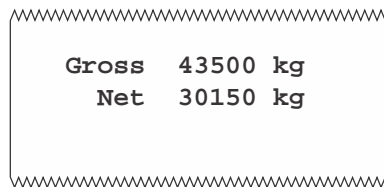


4. You need to delete all characters from index position 25 through 36 to remove the entire Tare weight line. Press and hold the **UP** arrow key for two seconds to delete the displayed character. The remaining characters shift to this index position. Repeatedly press and hold the **UP** arrow key until the display shows ...



5. This is the start of the Net weight output (SP character 32, see current index position 37).
6. Press the **ENTER** key when finished with the edit process to accept these changes and return to **PrnFt1** display.
7. Press **ESC** and then the **UP** arrow key until the **SAVE SETTINGS** screen is displayed. Highlight your choice and press **ENTER** to save your choice and exit the ADMIN menu.

After the indicator reboots press the **PRINT** key to test the results. The following should be printed:



At any time during a string edit you can press **SCALE** key to abort and exit the print format editor without affecting the existing print string. This allows for an **ESCAPE** if you think you may have made an error during the editing process.

10.3 Inserting tokens, etc.

To insert tokens, application variables or optional parameters to add to an existing token there are special characters available to use during character editing. When you are at the string index position where you wish to insert a token or variable, press and hold the **DOWN** arrow key to insert a space (32). Then press the **LEFT** arrow key to return to the index position and press the **DOWN** key to edit the value. This value entry screen is displayed:



Press the **Clear** key once to clear the value. Now press the **UP** or **DOWN** key to scroll through the following special characters ...

- | | |
|-----------------------------------|--|
| J - (Closing bracket) | End an optional parameter. Added automatically when a Start parameter opening bracket [is inserted. See the <i>Network tokens on page 125</i> |
| [- (Opening bracket) | Start an optional parameter. When [is selected a] is automatically added to the string for your benefit. |
| A - (Application variable) | For Macros the application number is tied to the variable number. In a LUA program you must configure the variable to an application token. |
| T - (Token) | See <i>Firmware tokens on page 118</i> for available print tokens that can be selected to print. |

Token entry example

If the token for Time is to be inserted, press the **UP** or **DOWN** key until a **T** is displayed, then enter 200 (decimal value for Time) and press **ENTER**. This will insert the Time into the print string at the selected location. Add appropriate spacing in front or after as needed for proper alignment in the printed data.



The value 1 in the above screen will be whatever index value you started from.

More scale token examples



See *Firmware tokens* on [page 118](#).

This ASCII number identifies the type of scale token. In this case it identifies the token as the word **Gross**



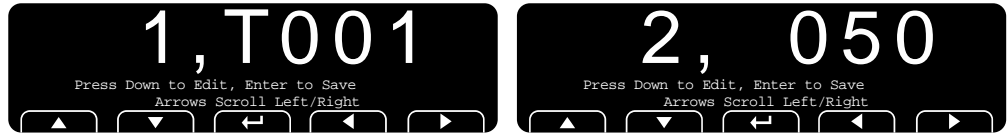
Above is a typical example of using a scale token. Upon creating the token, **T1** for Gross weight, the indicator automatically appends an additional number in the next character location. The value of the number in this next location identifies what function of the token is being used.

Decimal 1 = 49 is the actual Gross weight value.

Decimal 2 = 50 is the token name, "Gross", applied to that token

10.4 Other scale tokens

In addition to the above, you can examine the tokens available and do much more with the data. For example suppose the Customer's PC can't cope with decimal point in the weight value from the scale. We can add optional parameters after the Gross weight token to remove the decimal point. This print format character sequence would look like this ...



The above token and function will output the text "Gross"



The above token and function will output the Gross weight value.

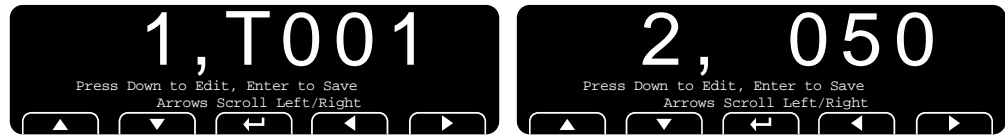


Characters 5 to 8 will remove the decimal point from the weight transmitted using an attribute parameter. You may need to refer to the *Network tokens* on page 125 for more detail on necessary character values.

- [= t501 indicates the start of an optional parameter
- 68 = D for decimal point parameter
- 50 = 2 for hide decimal point
-] = t502 indicates the end of the optional parameter

10.5 Transmitting leading zeros

A Customer may wish to have the data transmitted with leading zeros and not spaces. The print format sequence would look like this ...



The above token and function will output the text "Gross"



The above token and function will output the Gross weight value.



Characters 5 to 8 will add the leading zeros to the weight transmitted using an optional parameter. You may need to refer to *Network tokens* [on page 125](#) for more detail on necessary character values.

[= t501 indicates the start of an optional parameter

90 = Z for leading zero parameters

49 = 1 for use leading zeros

] = t502 indicates the end of the optional parameter

For more examples of editing formats consult *Print tokens, parameters and default print formats* [on page 117](#).

10.6 Print format errors

Error	Description
1	Print format number out of range
2	Parser error - no memory
3	A or T token character not found
4	Token Delimiter is missing.
5	Print token invalid range
6	Application variable invalid range
7	Aspect data invalid, codepoint is NOT 1, 2 or 3
8	Invalid UTF8 string
9	Left parameter bracket not found
10	Right parameter bracket not found
11	Dot separator not found
12	Token tag string is invalid
13	UTF8 codepoint too large
14	Token too large
15	Error within optional parameter

11 Print tokens, parameters and default print formats

11.1 Notes on width syntax

11.1.1 Explanation of width syntax for WEIGHT (integers)

Description of Value (T.x.1) represents the system value. The width of the printed value by default is based on configuration items like capacity and division size used. By using syntaxes you can control the number of digits printed, leading zeros or spaces, left or right justification and much more.

11.1.2 Explanation of width syntax for WEIGHT (strings)

Name Value (T.x.2) represents the string shown. The width of the printed value by default is the entire string shown. By using the (W) width syntax you can control the number of characters used.

For example {T.GWT.2} prints **Gross** and if you use the width syntax like this {T.GWT.2[W1]} it would print only **G** because you limited the value to 1 character.

11.1.3 Explanation of width syntax for UNITS OF MEASURE (strings)

Description of Value (T.x.1) represents the system value. The width of the printed value by default is based on configuration items. Units of measure are as shown below without the width syntax all custom units you define are defaulted to a 2-letter width. By using the (W) width syntax you can control the number of digits printed. When offering your own custom unit of measure like TONS you will need to use the WIDTH syntax as follows to have all 3 letters printed to spell TON { T.UNIT.1[W3]}

DEFAULTS:

Pounds	=	lb
Kilograms	=	kg
Grams	=	g
Ounces	=	oz
Pounds/Ounces	=	lb-oz
Custom	=	(first 2 letters)

Token	Token	Description of Value	Name Value	Data Type	Parameter Name	Optional Parameter	Available Values
T.x		T.x.1	T.x.2	T.x.3			
1	GWT	Gross Weight	Gross	WEIGHT	Show sign	p	1 = Show minus (default) 2 = Show plus 3 = Show both 4 = Hide both
2	SAT	Semi Automatic Tare Weight	Tare		Width	W	1 - 127 Characters Default is Configuration Dependent
3	NWT	Net Weight	Net		Precision	P	0 - 127 Characters Default is Configuration Dependent
10	PGW	Peak Gross Weight	Peak Max		Leading Zero	Z	0 = None (default) 1 = Leading Zeros 2 = Leading Spaces 3 = Show All 4 = Hide All
11	PNW	Peak Net Weight	Peak Min				
13	PCE	Piece Weight	Piece Weight				
14	HAO	Hub Analog Output	HubAnalogOut				
16	ACT	Active Displayed Value	Spelled Active Value		Multiplier	m	0 = None or *1 (default) 1 = Multiply *10 2 = Multiply *100 3 = Multiply *1000
18	ROC	Rate of Change					
19	PMAX	Peak Maximum Weight	Peak Max				
20	PMIN	Peak Minimum Weight	Peak Min				
35	GWTHR	High Resolution Gross Weight	GrossHiRes		Custom Division	A	A0-A23 See table on page 101
36	NWTHR	High Resolution Net Weight	NetHiRes		Decimal Point	D	1 = Show decimal (default) 2 = Hide Decimal
37	INMOWT	Active Displayed In-Motion Weight Value	In-Motion Weight				
39	INMOGWT	AVERAGED In-Motion Gross Weight Value	Gross Avg				
40	INMONWT	AVERAGED In-Motion Net Weight Value	Net Avg		Justification	J	1 = Right (default) 2 = Left
41	ACTM	Active Weight Value with Motion GR=Gross no-motion gr=Gross with motion NT=Net no motion nt=New with motion	GR gr NT nt				
42	LSTSTBL	Last Stable Weight	Last Stable Weight		Unit of Measure	u (Never use 'u' and 'r' together in the same weight syntax) (This syntax should only be used with weight tokens #2, #35 and #36)	1 = Current displayed Unit of measure (default) 2 = Calibration Unit 3 = Rounded Current Unit 4 = Rounded Calibration Unit 5 = lb 6 = kg 7 = oz 8 = g 9 = lb-oz 10 = Custom Unit 1 11 = Custom Unit 2 12 = Custom Unit 3 13 = Custom Unit 4
47	PER	Percent	Percent				
48	TGT	Target Weight	Target				
49	GWTPC	Gross Total + Current Gross Weight	Gross Total + Current				
				Scale	S	0 = Current Scale 1 = Scale 1 2 = Scale 2	

Token	Token	Description of Value	Name Value	Data Type	Parameter Name	Optional Parameter	Available Values
T.x		T.x.1	T.x.2	T.x.3			
50	GWTMC	Gross Total - Current Gross Weight	Gross Total - Current	WEIGHT (cont.)	Binary Output	B	1 = Truncate to 1-Byte Integer 2 = Truncate to 2-Byte Integer 3 = Truncate to 4-Byte Integer 4 = 4-Byte Floating Point
51	NWTPC	Net Total + Current Net Weight	Net Total + Current		Rounded Unit of Measure	r (Never use 'u' and 'r' together in the same weight syntax) (This syntax should only be used with weight tokens #2, #35 and #36)	
52	NWTMC	Net Total - Current Net Weight	Net Total - Current		Binary Conversion	c	1 = As Binary (High Byte First) 2 = As Comma Separated Decimal in ASCII Format (High Byte First) 3 = As HEX in ASCII Format (High Byte First)
53	CNTPC	Count Total + Current Count Weight	Count Total + Current		Polarity Character	v	Just a "+" or "-" character.
54	CNTMC	Count Total - Current Count Weight	Count Total - Current				
55	GAVG	Gross Average Weight	Gross Average				
56	NAVG	Net Average Weight	Net Average				
57	CAVG	Count Average Weight	Count Average				
58	NMAX	Net Maximum Weight	Net Maximum				
59	NMIN	Net Minimum Weight	Net Minimum				
60	FF1	Free Fall Time 1	Free Fall Time 1				
61	FF2	Free Fall Time 2	Free Fall Time 2				
62	FGWT1	Future Gross Weight 1	Future Gross 1				
63	FGWT2	Future Gross Weight 2	Future Gross 2				
64	FNWT1	Future Net Weight 1	Future Net 1				
65	FNWT2	Future Net Weight 2	Future Net 2				
66	PCEK	Piece Weight x 1000	Piece Weight x 1000				
67	ACC	Percent Accuracy	Percent Accuracy				
68	SAMP	Last Sample Weight	Last Sample				
100	GWTAS	Gross Weight of All Scales	Gross All Scales				
101	TATAS	Tare Weight of All Scales	Tare All Scales				
102	NWTAS	Net Weight of All Scales	Net All Scales				
103	CNTAS	Count of All Scales	Count All Scales				
104	GAT	Accumulated Gross Weight Total	Gross Total				
105	TAT	Accumulated Tare Weight Total	Tare Total				
106	NAT	Accumulated Net Weight Total	Net Total				
108	GATAS	Gross Total All Scales Totals	Gross Total All Scales				
109	NATAS	Net Total All Scales Totals	Net Total All Scales				
110	TATAS	Tare Total All Scales Totals	Tare Total All Scales				
111	CATAS	Count Total All Scales Totals	Count Total All Scales				

Token	Token	Description of Value	Name Value	Data Type	Parameter Name	Optional Parameter	Available Values
T.x		T.x.1	T.x.2	T.x.3			
200	TIM	Time	Time	TIME	Time Format	F	0 = As Configured (default) 1 = HH:MM:SS (12hr) 2 = HH:MM AM/PM 3 = HH:MM:SS (24hr)
					Seconds Format	S	0 = As Configured (default) 1 = Hide Seconds 2 = Seconds Since Midnight 3 = Both 1 and 2 4 = Number of seconds since Jan. 1, 1970. (unixtime)
					Width	W	1 - 127 Characters Default is Configuration Dependent
					Time Separator	s	1 = None 2 = Comma (,) 3 = Period or Decimal Point (.) 4 = Backslash (\) 5 = Space () 6 = Forward Slash (/) 7 = Colon (:) 8 = Dash (-)
201	DAT	Date	Date	DATE	Format	F	0 = As Configured (default) 1 = MM-DD-YY 2 = MM-DD-YYYY 3 = DD-MM-YY 4 = DD-MM-YYYY 5 = YY-MM-DD 6 = YYYY-MM-DD 7 = DD-YY-MM 8 = DD-YYYY-MM 9 = YY-DD-MM 10 = YYYY-DD-MM 11 = WW-YY 12 = WW-YYYY 13 = YY-WW 14 = YYYY-WW
					Show Day of Week	d	d = day of the week spelled out (MON, TUES, etc.)
					Day of the year	j	j = number of days since beginning of the year
					Spelled Date	S	S = month spelled out (MAY, JUNE, etc.)
					Width	W	1 - 127 Characters Default is Configuration Dependent
Separator	s	1 = None 2 = Comma (,) 3 = Period or Decimal Point (.) 4 = Backslash (\) 5 = Space () 6 = Forward Slash (/) 7 = Colon (:) 8 = Dash (-) (default)					

Token	Token	Description of Value	Name Value	Data Type	Parameter Name	Optional Parameter	Available Values	
T.x		T.x.1	T.x.2	T.x.3				
4	MOTN	Motion	Motion	INTEGER			1 = Show - (default) 2 = Show + 3 = Show All 4 = Hide All	
6	OVER	Overload	Overload		Show Sign	p		
7	UNDER	Underload	Underload		Leading Zero	Z		0 = None (default) 1 = Leading Zeros 2 = Leading Spaces
8	CZ	Center of Zero	Center of Zero		Width	W		1 - 127 Characters Default is Configuration Dependent
12	CNT	Count	Count		Justification	J		1 = Right (default) .2 = Left
38	INMOTM	InMotion Time	InMotion Time					
107	CAT	Accumulated Count Value Total	Count Total					
250	OUT1	Output 1 State: 0 = Not Active, 1 = Active	OUT1					
251	OUT2	Output 2 State: 0 = Not Active, 1 = Active	OUT2					
252	OUT3	Output 3 State: 0 = Not Active, 1 = Active	OUT3					
300	RTN	Transaction Count	Transaction Count					
301	CON	Consecutive Number (See note below)	Consecutive Number					
304	B2H	Binary to Hexadecimal	Bin2Hex					
305	B2A	Binary to ASCII	Bin2Asc					
313	DIS	Status Byte <i>See Additional token tables on page 103</i>	Status					
314	UTID	Unique ID (Archive menu)	DSD Consec.					
302	CKSM	Checksum	Checksum					1 = Stop 2 = Transmit LSB First 3 = Transmit MSB First 4 = Send CRC 7-Bit 50 = Start CCITT 51 = Start SDLC / HDLC 52 = Start CRC 16 (0000) 53 = Start CRC 12 54 = Start IRCC 16 55 = Start IRCC 8 56 = Start Xmodem 57 = Start Sum 16 58 = Start Sum 8 59 = Start CRC 16 (FFFF) 60 = Start Inverse IRCC 8 61 = Start Sum 16 (W/O Twos) 62 = BCC

Note:

Syntax for CON only:

Lower case [i] increments the number

Lower case [d] decrements the number

Upper case [R] resets the number to zero

Token	Token	Description of Value	Name Value	Data Type	Parameter Name	Optional Parameter	Available Values	
T.x		T.x.1	T.x.2	T.x.3				
9	UNIT	Unit of Measure Type	Unit	STRING	Unit of Measure Applies to token 9 only	U	1 = Current (default) 2 = Calibration 3 = lb 4 = kg 5 = oz 6 = g 7 = lb-oz 8 = Custom Unit 1 9 = Custom Unit 2 10 = Custom Unit 3 11 = Custom Unit 4	
5	WST	Motion = M Stable or no motion = S	sMotion					
15	WSTAT	Weight Status See Additional token tables on page 103	Weight Status					
17	TSAT	Returns type of Tare used See Additional token tables on page 103	Tare Type					
28	HEX	Prints HEX value of a ASCII Decimal Value	Hexadecimal			Applies to token 28 only.	non-optional parameter [hXX]	0 through 255
29	NCIBYTE1	Returns NCI Status Byte 1 only See Additional token tables on page 103	NCI Status Byte 1					
30	NCIBYTE2	Returns NCI Status Byte 2 only See Additional token tables on page 103	NCI Status Byte 2					
31	NCIBYTE3	Returns NCI Status Byte 3 only See Additional token tables on page 103	NCI Status Byte 3					
32	NCIBYTE12	Returns NCI Status Bytes 1 & 2 only See Additional token tables on page 103	NCI Status Bytes 12					
33	NCIBYTE23	Returns NCI Status Bytes 2 & 3 only See Additional token tables on page 103	NCI Status Bytes 23					
34	NCIBYTE123	Returns NCI Status Bytes 1, 2 & 3 See Additional token tables on page 103	NCI Status Bytes 123					
253	T.OUTS	Outputs 1-32	outputs			I/O token	See note on page 101	
254	T.INS	Inputs 1-32	inputs					
309	SITE	Site ID	Site ID					
310	SN	Serial Number	Serial Number			Justification	J	1 = Right (default) 2 = Left
311	LK	Condec Units = L or K	Condec Units					
312	STAT	Condec Status = " " (space = stable) "M" = motion "O" = out of range	Condec Status			Width	W	1 - 127 Characters
323	S127	WI-127 Status Byte	127 Status					STATUS CODES These are the most common characters you will see on a terminal: "0" = Valid weight "1" = Motion "2" = Range error (Over/Underload) "4" = A-D error "8" = Low voltage Combinations of these errors can also occur. (e.g., "3" = Range error (2) plus Motion (1))
324	NAME	Indicator Scale Name	Scale Name					
325	LOC	Indicator Scale Location	Scale Location					32 characters max entered in Ztools under SYSTEM TAB

Token	Token	Description of Value	Name Value	Data Type	Parameter Name	Optional Parameter	Available Values
T.x		T.x.1	T.x.2	T.x.3			
21	SMOTSTR	Sets values for Motion TRUE / FALSE	sSPCMot	STRING (cont.)	Applies to tokens 21-27 only		Using these tokens requires use of the required parameter [tXXfYY] where XX and YY represent the ASCII hex character (1-255) to be sent for a true or false condition respectively. The XX or YY must be entered as individual decimal values. Example: To send a "1" for true or "0" for false condition the parameter would be entered as [116 52 57 102 52 56] in the Print Format Editor.
22	SCZSTR	Sets values for Center of Zero TRUE / FALSE	sSPCCZ				
23	SOLDSTR	Sets values for Overload TRUE / FALSE	sSPCOld				
24	SULDSTR	Sets values for Underload TRUE / FALSE	sSPCUIld				
25	SGPOL	Sets values for Gross Polarity	sSPCGPol				
26	SNPOL	Sets values for Net Polarity	sSPCNPol				
27	SAPOL	Sets values for Active Value Polarity	sSPCAPol				
500	NULL	Null	NULL	Undefined			
501	SOP	Start Optional Parameters	SOP		[
502	EOP	End Optional Parameters	EOP]		
600	TEXT	Print Data is Text	Data Type Text		"<ESC>txt"		
601	PCL	Print Data is Printer Control Language	Data Type PCL		"<ESC>PCL"		
602	EPPOS	Print Data is Epson Point of Sale	Data Type Epson Pos		"<ESC>EPS"		
603	ZEBRA	Print Data is Zebra Language	Data Type Zebra		"<ESC>ZEB"		
604	RAW	Print Data is RAW	Data Type RAW		"<ESC>raw"		
650	BOLD	Print Format Bold	Format Bold		"<ESC><ESC>B"		
651	ITAL	Print Format Italic	Format Italic		"<ESC><ESC>I"		
652	UNDR	Print Format Underline	Format Underline		"<ESC><ESC>U"		
653	LAND	Print Format Landscape	Format Landscape		"<ESC><ESC>L"		
654	FF	Print Format Form feed	Format Form Feed		"<ESC><ESC>F"		
655	WRAP	Print Format Line Wrap	Format Line Wrap		"<ESC><ESC>W"		

Note for 253 & 254: If an optional parameter is not specified, it the result is the same as if [N1] was specified.

The setpoint numbers must be in the following ranges: 'N' or 'n': 1 – 32 [N1] – [N32]

[N1] – print the state of a single setpoint. Prints as either "on" or "off"

[n1] – print the state of a single setpoint. Prints as either "1" or "0"

[B1] – print the state of a bank of setpoints. A single character is printed (0x00 – 0xFF) and represents the states of a group of 8 setpoints.

[b1] – print the state of a bank of setpoints. Two characters are printed for each bank "00" to "FF". This is a text representation of the bank states.

Table 11.1 Optional Parameter (A0-A23)

A0 = 0.00001	A12 = 0.1
A1 = 0.00002	A13 = 0.2
A2 = 0.00005	A14 = 0.5
A3 = 0.0001	A15 = 1
A4 = 0.0002	A16 = 2
A5 = 0.0005	A17 = 5
A6 = 0.001	A18 = 10
A7 = 0.002	A19 = 20
A8 = 0.005	A20 = 50
A9 = 0.01	A21 = 100
A10 = 0.02	A22 = 200
A11 = 0.05	A23 = 500

11.3 Application Tokens

In weight 1 - 10	1 - 6
In weight consec 1 - 10	7 - 12
In weight time 1 - 6	13 - 18
In weight date 1 - 10	19 - 24
In weight product id	25 - 30
In weight cust/supplier 1 - 10	31 - 36
In weight NWA 1- 10	37 - 42
Haulier	43
Truck ID	44
First weight source	45
Out weight	56
Out weight consec	47
Out weight time	48
Out weight date	49
Out weight product	50
Out weight product description	51
In weight now	52
In weight now consec	53
In weight now time	54
In weight now date	55
Transaction Id	56
Axles 1 - 10	57-66
Axle sum	67
Axle time	68
Axle date	69
Customer / Supplier	70
UFD	71 - 75
UFT	76 - 80
Customer / Supplier name	81
Customer / Supplier info	82 - 87
Customer / Supplier sub total	88
Customer/Supplier grand	89
Product Name	90
Product Description	91
Product Sub Total	92
Product Grand Total	93
Hauler Name	94
Hauler Sub Total	95
Hauler Grand Total	96
GTN Tare	97
GTN Gross	98
Unit of Measure	99

11.4 Additional token tables

WSTAT token table	
"O"	Overload
"U"	Underload
"M"	Motion
"S"	Stable
"E"	Cal error

TSAT token table	
"NT"	no tare active
"T"	pushbutton tare active
"PT"	preset or enter tare active

The WSTAT and TSAT token default length is 6 characters.

DIS token table: AWTX Status Byte format			
	Byte 1	Byte 2	Byte 3
Bit 0	1 = Under or OverLoad	1 = Center Zero	0
Bit 1	0	1=Gross	1
Bit 2	1=kg	1=Net	1=Overload
Bit 3	1=lb	0	1=Motion
Bit 4	1	1	1
Bit 5	1	1	1
Bit 6	0	0	0
Bit 7	0	0	0

Example: Stable and valid gross weight in lb unit of measure would return "822"

NCI Status Byte Table

Bit	Byte 1	Byte 2	Byte 3
1	1 = Scale in motion 0 = Stable	1 = Underloaded 0 = Not Underloaded	00 = Low Range 01 = Undefined 10 = Undefined 11 = High Range
2	1 = Scale at Zero 0 = Not at Zero	1 = Overloaded 0 = Not Overloaded	
3	1 = RAM error 0 = RAM OK	1 = ROM error 0 = ROM OK	1 = Net Weight 0 = Gross Weight
4	Always 0	1 = Faulty Calibration 0 = Calibration OK	1 = Initial Zero Error 0 = Initial Zero OK
5	Always 1	Always 1	Always 1
6	Always 1	Always 1	Always 1
7	Always 0	1 = Byte follows 0 = Last Byte	1 = Byte follows 0 = Last Byte
8	Parity	Parity	Parity

Token	SMA protocol		PLC Protocol		Description of Network Token	Data Type			ZM510. In/Out	Notes
	Set XVS	Get XVG	Inbound	Outbound		INTEGER	FLOAT	STRING		
0					Disabled				X	
1		X		X	Gross Weight Value		X		X	
2	X	X	X	X	Tare Weight Value		X		X	
3		X		X	Net Weight Value		X		X	
4		X		X	Scale Motion / Weigher Steady Flag	X			X	0 = Motion on Scale / Unsteady Weight 1 = No Motion on Scale / Steady Weight
6		X		X	Scale Overload Flag	X			X	0 = Scale is NOT Overloaded 1 = Scale is Overloaded
7		X		X	Scale Underload Flag	X			X	0 = Scale is NOT Underloaded 1 = Scale is Underloaded
8		X		X	Scale Center of Zero / Zero Balance	X			X	0 = Scale is NOT at Center of Zero / Zero Balanced 1 = Scale is at Center of Zero / Zero Balanced
9	X	X	X	X	Active Unit of Measure	X			X	0 = lb 1 = kg 2 = oz 3 = g 4 = lb-oz 5 = Custom Unit #1 6 = Custom Unit #2 7 = Custom Unit #3 8 = Custom Unit #4
10		X		X	Peak Max Weight Value		X			
11		X		X	Peak Min Weight Value		X			
12		X		X	Count Value	X				
13	X	X	X	X	Piece Weight Value		X			
104	X	X	X	X	Accumulated Gross Weight Total Value		X			
105		X		X	Accumulated Tare Weight Total Value		X			
106	X	X	X	X	Accumulated Net Weight Total Value		X			
107	X	X	X	X	Accumulated Count Total Value	X				
257		X		X	Indicator Watchdog Counter Value	X			X	Enables Operator to verify scale is functioning
300	X	X	X	X	Transaction Counter Value	X				
310		X		X	Indicator Serial Number	X			X	
313		X		X	Indicator Healthy Status (2-Byte)	X			X	Output of 2-bytes which indicate any faults. With no Errors = 0xFFFF BYTE #1: Bit 0 = Any Fault Bit 1 = ADC Error Bit 2, 3, 4 = N/A Bit 5 = Overload Condition Bit 6 = Underload Condition Bit 7 = N/A

Token	SMA protocol		PLC Protocol		Description of Network Token	Data Type			ZM510. In/Out	Notes
	Set XVS	Get XVG	Inbound	Outbound		INTEGER	FLOAT	STRING		
700	X	X	X	X	FBUS_TOKEN_INPUTS_1	X				Notes: If you map an input token and there is an output setpoint in the range you map, it will always be zero in the fieldbus data (works the same way if you use an output token and there is an input setpoint in the range that is mapped). These tokens can be mapped in either direction as well. You can get the states of the inputs/outputs by mapping them into the PLC or you can try to control the states of the inputs/outputs by mapping them out of the PLC. Explanation of TRY to control... If you are mapping out of the PLC (into the indicator), and you change the state of an input, it's state will be overridden by the actual hardware (unless it is virtual). If you do this on an output setpoint, the state may change from what you set when the setpoints is reevaluated (unless it is a User controlled setpoint). Mapping a bank of set points: Number of setpoints / 8 (setpoints/bank) = bank token number You do not have to map the setpoints as bytes. They can be mapped as any data type for example. FBUS_TOKEN_INPUTS_1: (bank -1) each byte of data is a bank - Mapped as UINT8 (1-byte) o This will give you input setpoints 1-8 - Mapped as UINT16 (2-bytes or 1-word) o This will give you input setpoints 1-16 - Mapped as UINT32 (4-bytes or 2-words) o This will give you input setpoints 1-32 FBUS_TOKEN_INPUTS_2: (bank -2) each byte of data is a bank - Mapped as UINT8 (1-byte) o This will give you input setpoints 9-16 - Mapped as UINT16 (2-bytes or 1-word) o This will give you input setpoints 9-24 - Mapped as UINT32 (4-bytes or 2-word) o This will give you input setpoints 9-40
701	X	X	X	X	FBUS_TOKEN_INPUTS_2	X				
702	X	X	X	X	FBUS_TOKEN_INPUTS_3	X				
703	X	X	X	X	FBUS_TOKEN_INPUTS_4	X				
704	X	X	X	X	FBUS_TOKEN_INPUTS_5	X				
705	X	X	X	X	FBUS_TOKEN_INPUTS_6	X				
706	X	X	X	X	FBUS_TOKEN_INPUTS_7	X				
707	X	X	X	X	FBUS_TOKEN_INPUTS_8	X				
708	X	X	X	X	FBUS_TOKEN_INPUTS_9	X				
709	X	X	X	X	FBUS_TOKEN_INPUTS_10	X				
710	X	X	X	X	FBUS_TOKEN_INPUTS_11	X				
711	X	X	X	X	FBUS_TOKEN_INPUTS_12	X				
712	X	X	X	X	FBUS_TOKEN_INPUTS_13	X				
713	X	X	X	X	FBUS_TOKEN_INPUTS_14	X				
714	X	X	X	X	FBUS_TOKEN_INPUTS_15	X				
715	X	X	X	X	FBUS_TOKEN_INPUTS_16	X				
716	X	X	X	X	FBUS_TOKEN_INPUTS_17	X				
717	X	X	X	X	FBUS_TOKEN_INPUTS_18	X				
718	X	X	X	X	FBUS_TOKEN_INPUTS_19	X				
719	X	X	X	X	FBUS_TOKEN_INPUTS_20	X				
720	X	X	X	X	FBUS_TOKEN_INPUTS_21	X				
721	X	X	X	X	FBUS_TOKEN_INPUTS_22	X				
722	X	X	X	X	FBUS_TOKEN_INPUTS_23	X				
723	X	X	X	X	FBUS_TOKEN_INPUTS_24	X				
724	X	X	X	X	FBUS_TOKEN_INPUTS_25	X				
725	X	X	X	X	FBUS_TOKEN_INPUTS_26	X				
726	X	X	X	X	FBUS_TOKEN_INPUTS_27	X				
727	X	X	X	X	FBUS_TOKEN_INPUTS_28	X				
728	X	X	X	X	FBUS_TOKEN_INPUTS_29	X				
729	X	X	X	X	FBUS_TOKEN_INPUTS_30	X				
730	X	X	X	X	FBUS_TOKEN_INPUTS_31	X				
731	X	X	X	X	FBUS_TOKEN_INPUTS_32	X				

Token	SMA protocol		PLC Protocol		Description of Network Token	Data Type			ZM510.	Notes
	Set XVS	Get XVG	Inbound	Outbound		INTEGER	FLOAT	STRING	In/Out	
800	X	X	X	X	FBUS_TOKEN_OUTPUTS_1	X				<p>Notes: If you map an input token and there is an output setpoint in the range you map, it will always be zero in the fieldbus data (works the same way if you use an output token and there is an input setpoint in the range that is mapped). These tokens can be mapped in either direction as well. You can get the states of the inputs/outputs by mapping them into the PLC or you can try to control the states of the inputs/outputs by mapping them out of the PLC.</p> <p>Explanation of TRY to control... If you are mapping out of the PLC (into the indicator), and you change the state of an input, it's state will be overridden by the actual hardware (unless it is virtual). If you do this on an output setpoint, the state may change from what you set when the setpoints is reevaluated (unless it is a User controlled setpoint).</p> <p>Mapping a bank of set points: Number of setpoints / 8 (setpoints/bank) = bank token number</p> <p>You do not have to map the setpoints as bytes. They can be mapped as any data type for example.</p> <p>FBUS_TOKEN_INPUTS_1: (bank -1) each byte of data is a bank - Mapped as UINT8 (1-byte) o This will give you input setpoints 1-8 - Mapped as UINT16 (2-bytes or 1-word) o This will give you input setpoints 1-16 - Mapped as UINT32 (4-bytes or 2-words) o This will give you input setpoints 1-32</p> <p>FBUS_TOKEN_INPUTS_2: (bank -2) each byte of data is a bank - Mapped as UINT8 (1-byte) o This will give you input setpoints 9-16 - Mapped as UINT16 (2-bytes or 1-word) o This will give you input setpoints 9-24 - Mapped as UINT32 (4-bytes or 2-word) o This will give you input setpoints 9-40</p>
801					FBUS_TOKEN_OUTPUTS_2	X				
802					FBUS_TOKEN_OUTPUTS_3	X				
803					FBUS_TOKEN_OUTPUTS_4	X				
804					FBUS_TOKEN_OUTPUTS_5	X				
805					FBUS_TOKEN_OUTPUTS_6	X				
806					FBUS_TOKEN_OUTPUTS_7	X				
807					FBUS_TOKEN_OUTPUTS_8	X				
808					FBUS_TOKEN_OUTPUTS_9	X				
809					FBUS_TOKEN_OUTPUTS_10	X				
810					FBUS_TOKEN_OUTPUTS_11	X				
811					FBUS_TOKEN_OUTPUTS_12	X				
812					FBUS_TOKEN_OUTPUTS_13	X				
813					FBUS_TOKEN_OUTPUTS_14	X				
814					FBUS_TOKEN_OUTPUTS_15	X				
815					FBUS_TOKEN_OUTPUTS_16	X				
816					FBUS_TOKEN_OUTPUTS_17	X				
817					FBUS_TOKEN_OUTPUTS_18	X				
818					FBUS_TOKEN_OUTPUTS_19	X				
819					FBUS_TOKEN_OUTPUTS_20	X				
820					FBUS_TOKEN_OUTPUTS_21	X				
821					FBUS_TOKEN_OUTPUTS_22	X				
822					FBUS_TOKEN_OUTPUTS_23	X				
823					FBUS_TOKEN_OUTPUTS_24	X				
824					FBUS_TOKEN_OUTPUTS_25	X				
825					FBUS_TOKEN_OUTPUTS_26	X				
826					FBUS_TOKEN_OUTPUTS_27	X				
827					FBUS_TOKEN_OUTPUTS_28	X				
828					FBUS_TOKEN_OUTPUTS_29	X				
829					FBUS_TOKEN_OUTPUTS_30	X				
830					FBUS_TOKEN_OUTPUTS_31	X				
831					FBUS_TOKEN_OUTPUTS_32	X				
900	X		X		Remote PB Zero Key	X			X	<p>These value are configuration dependent. The following commands will change their value or function if the register which is mapped from the host changes at any time. XOR the mapped register with a "1" to toggle the register every time the XOR is executed.</p>
901	X		X		Remote PB Tare Key	X			X	
902	X		X		Remote PB Print Key	X			X	
903	X		X		Remote PB Accumulate Key	X			X	
904	X		X		Remote PB Units Key	X			X	

* the "Low Weight Value" and "High Weight Value" only apply when the Output mode selection is Act-In or Act-Out

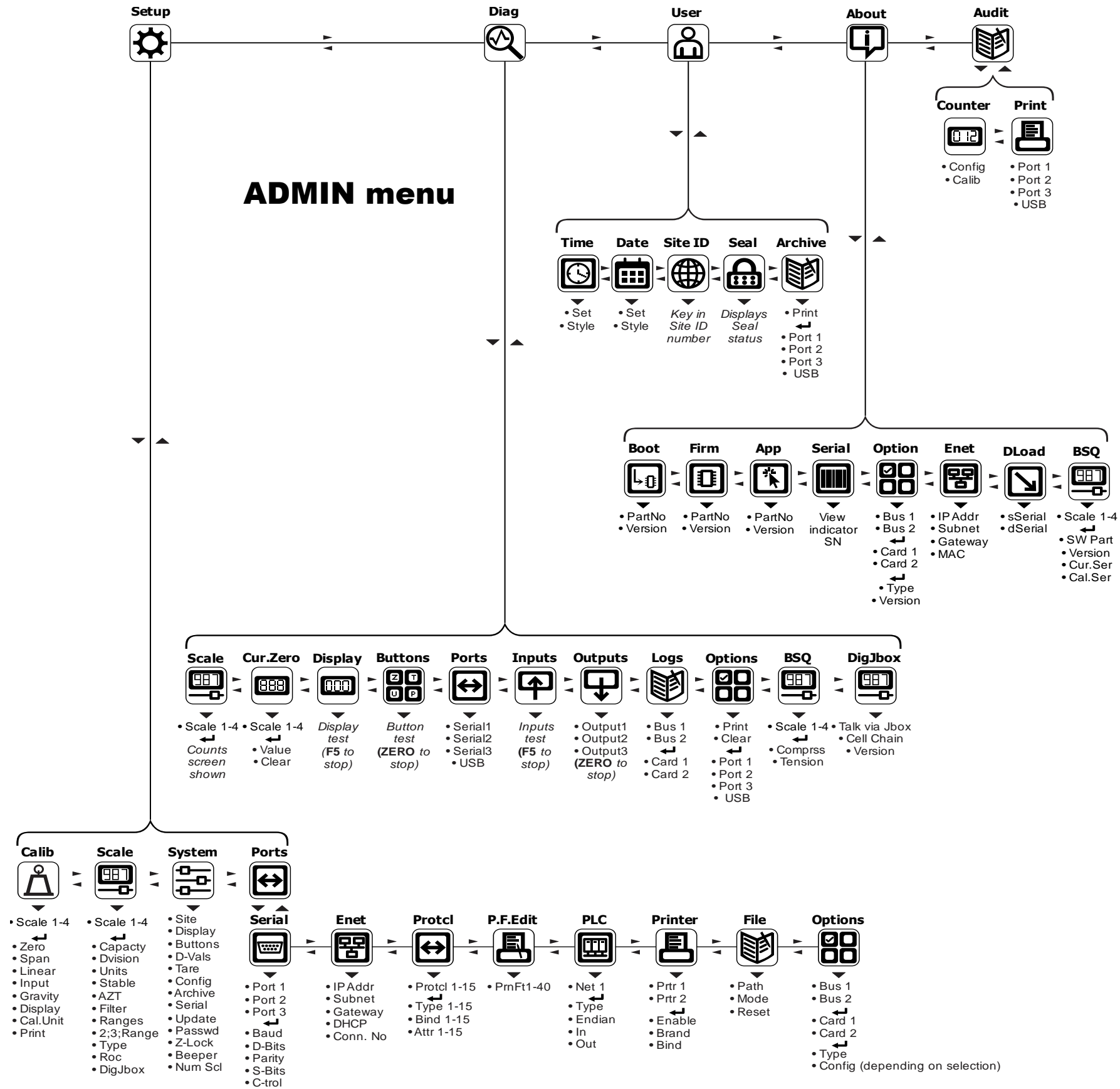
11.6 ASCII characters

Code #	Cont. Char.	Print Char.	Hex	Code #	Cont. Char.	Print Char.	Hex	Code #	Cont. Char.	Print Char.	Hex	Code #	Cont. Char.	Print Char.	Hex	Code #	Cont. Char.	Print Char.	Hex				
00	NUL		00	045	-	-	2D	090	Z	Z	5A	0128	NA	Ç	80	0173	NA	ı	ad	0218	NA	ŗ	da
01	SOH	☺	01	046	.	.	2E	091	[	[	5B	0129	NA	ù	81	0174	NA	«	ae	0219	NA	█	db
02	STX	☹	02	047	/	/	2F	092	\	\	5C	0130	NA	é	82	0175	NA	»	af	0220	NA	█	dc
03	ETX	♥	03	048	0	0	30	093	]	]	5D	0131	NA	â	83	0176	NA	⌘	b0	0221	NA	█	dd
04	EOT	♦	04	049	1	1	31	094	^	^	5E	0132	NA	ä	84	0177	NA	⌘	b1	0222	NA	█	de
05	ENG	♣	05	050	2	2	32	095	_	_	5F	0133	NA	à	85	0178	NA	⌘	b2	0223	NA	█	df
06	ACK	♠	06	051	3	3	33	096	`	`	60	0134	NA	å	86	0179	NA	|	b3	0224	NA	α	e0
07	BEL		07	052	4	4	34	097	a	a	61	0135	NA	ç	87	0180	NA	‡	b4	0225	NA	β	e1
08	BS		08	053	5	5	35	098	b	b	62	0136	NA	ê	88	0181	NA	‡	b5	0226	NA	Γ	e2
09	HT		09	054	6	6	36	099	c	c	63	0137	NA	è	89	0182	NA	‡	b6	0227	NA	π	e3
010	LF	LF	0A	055	7	7	37	0100	d	d	64	0138	NA	è	8a	0183	NA	π	b7	0228	NA	Σ	e4
011	VT	☉	0B	056	8	8	38	0101	e	e	65	0139	NA	ï	8b	0184	NA	π	b8	0229	NA	σ	e5
012	FF	FF	0C	057	9	9	39	0102	f	f	66	0140	NA	î	8c	0185	NA	‡	b9	0230	NA	μ	e6
013	CR	CR	0D	058	:	:	3A	0103	g	g	67	0141	NA	ï	8d	0186	NA	||	ba	0231	NA	τ	e7
014	S0	🎵	0E	059	;	;	3B	0104	h	h	68	0142	NA	Ä	8e	0187	NA	π	bb	0232	NA	φ	e8
015	S1	⚙	0F	060	<	<	3C	0105	i	i	69	0143	NA	Å	8f	0188	NA	‡	bc	0233	NA	θ	e9
016	DLE	4	10	061	=	=	3D	0106	j	j	6A	0144	NA	É	90	0189	NA	‡	bd	0234	NA	Ω	ea
017	DC1	3	11	062	>	>	3E	0107	k	k	6B	0145	NA	æ	91	0190	NA	‡	be	0235	NA	ø	eb
018	DC2	ø	12	063	?	?	3F	0108	l	l	6C	0146	NA	æ	92	0191	NA	π	bf	0236	NA	∞	ec
019	DC3	∅	13	064	@	@	40	0109	m	m	6D	0147	NA	ô	93	0192	NA	⌞	c0	0237	NA	∅	ed
020	DC4	ß	14	065	A	A	41	0110	n	n	6E	0148	NA	ö	94	0193	NA	⌞	c1	0238	NA	ε	ee
021	NAK	§	15	066	B	B	42	0111	o	o	6F	0149	NA	ö	95	0194	NA	π	c2	0239	NA	∩	ef
022	SYN		16	067	C	C	43	0112	p	p	70	0150	NA	û	96	0195	NA	‡	c3	0240	NA	≡	f0
023	ETB	—	17	068	D	D	44	0113	q	q	71	0151	NA	ù	97	0196	NA	—	c4	0241	NA	±	f1
024	CAN	↑	18	069	E	E	45	0114	r	r	72	0152	NA	ÿ	98	0197	NA	‡	c5	0242	NA	≥	f2
025	EM	↓	19	070	F	F	46	0115	s	s	73	0153	NA	ÿ	99	0198	NA	‡	c6	0243	NA	≤	f3
026	SUB	→	1A	071	G	G	47	0116	t	t	74	0154	NA	ÿ	9a	0199	NA	||	c7	0244	NA	[	f4
027	ESC	←	1B	072	H	H	48	0117	u	u	75	0155	NA	ç	9b	0200	NA	⌘	c8	0245	NA	]	f5
028	FS	—	1C	073	I	I	49	0118	v	v	76	0156	NA	£	9c	0201	NA	π	c9	0246	NA	÷	f6
029	GS	—	1D	074	J	J	4A	0119	w	w	77	0157	NA	¥	9d	0202	NA	⌘	ca	0247	NA	≈	f7
030	RS	5	1E	075	K	K	4B	0120	x	x	78	0158	NA	€	9e	0203	NA	π	cb	0248	NA	°	f8
031	US	6	1F	076	L	L	4C	0121	y	y	79	0159	NA	f	9f	0204	NA	||	cc	0249	NA	•	f9
032	SP		20	077	M	M	4D	0122	z	z	7A	0160	NA	⌘	a0	0205	NA	=	cd	0250	NA	.	fa
033	!	!	21	078	N	N	4E	0123	{	{	7B	0161	NA	ı	a1	0206	NA	‡	ce	0251	NA	√	fb
034	"	"	22	079	O	O	4F	0124	|	|	7C	0162	NA	ó	a2	0207	NA	±	cf	0252	NA	ˆ	fc
035	#	#	23	080	P	P	50	0125	}	}	7D	0163	NA	ú	a3	0208	NA	⌘	d0	0253	NA	˚	fd
036	\$	\$	24	081	Q	Q	51	0126	~	~	7E	0164	NA	ñ	a4	0209	NA	π	d1	0254	NA	█	fe
037	%	%	25	082	R	R	52	0127	DEL	☐	7F	0165	NA	Ñ	a5	0210	NA	π	d2	0255	NA		ff
038	&	&	26	083	S	S	53					0166	NA	ª	a6	0211	NA	⌘	d3				
039	'	'	27	084	T	T	54					0167	NA	º	a7	0212	NA	⌘	d4				
040	(	(	28	085	U	U	55					0168	NA	¿	a8	0213	NA	π	d5				
041	)	)	29	086	V	V	56					0169	NA	ƒ	a9	0214	NA	π	d6				
042	*	*	2A	087	W	W	57					0170	NA	ƒ	aa	0215	NA	||	d7				
043	+	+	2B	088	X	X	58					0171	NA	½	ab	0216	NA	‡	d8				
044	,	,	2C	089	Y	Y	59					0172	NA	¼	ac	0217	NA	‡	d9				

11.7 Control codes

ASCII	Control Code Description	Control
1	Start of Heading	#SOH
2	Start of Text	#STX
3	End of Text	#ETX
4	End of Transmission	#EOT
5	Enquiry	#ENQ
6	Acknowledge	#ACK
7	Bell	#BEL
8	Backspace	#BS
9	Horizontal Tab	#TAB
10	Line Feed (New Line)	#LF
11	Veriticle Tab	#VT
12	Form Feed (New Page)	#FF
13	Carriage Return	#CR
14	Shift Out	#SO
15	Shift In	#SI
16	Data Link Escape	#DLE
17	Device Control 1	#DC1
18	Device Control 2	#DC2
19	Device Control 3	#DC3
20	Device Control 4	#DC4
21	Negative Acknowledge	#NAK
22	Synchronous Idle	#SYN
23	End of Block	#ETB
24	Cancel	#CAN
25	End of Medium	#EM
26	Substitute	#SUB
27	Escape	#ESC
28	File Separator	#FS
29	Group Separator	#GS
30	Record Separator	#RS
31	Unit Separator	#US

12 ZM510 Menus



Supervisor menu

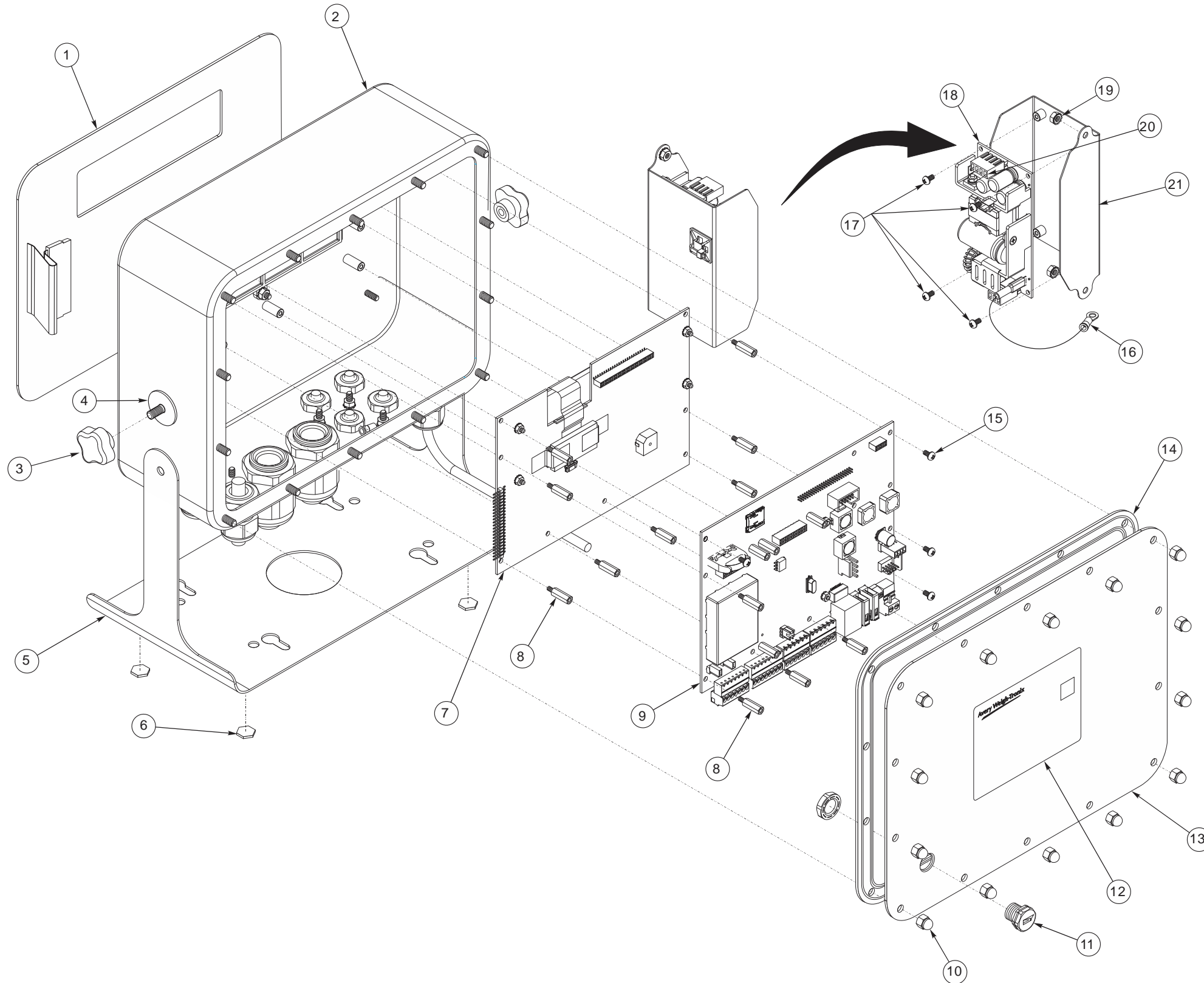
- Press and hold **SETUP** key. Key in 7654.
- APPLICATION CONFIGURATION
 - WEIGHBRIDGE
 - MODE
 - INTERLOCK
 - MULTIPLE IN
 - NWA
 - IN PRINT
 - OUT PRINT
 - VEHICLE USED
 - VEHICLE TARE
 - HAULIERS
 - PLU
 - CUST/SUPP
 - PUBLIC
 - AXLE

Database manager menu

- Press and hold **SETUP** key. Key in 1000.
- Select Record Type:
- VEHICLE
 - PLU
 - HAULIER
 - CUSTOMER
 - SUPPLIER
 - EXPORT TO USB
 - EXPORT READY FOR FTP
 - DELETE UNUSED VEHICLES
 - IMPORT FROM USB
 - IMPORT FROM FTP

13 Technical illustrations

13.1 Exploded drawing



Item	Description	Qty.
1	OVERLAY KEYPAD MODEL ZM510	1
2	ENCLOSURE, WELDMENT-ZM5XX	1
3	KNOB, 4 LOBE-M6	2
4	PAD, NEOPRENE-1.00 DIA	2
5	STAND, ENCLOSURE ZM5XX	1
6	PAD, LOSKID, .44 HEX. .06 THK, 9672	4
7	PCB ASSY, DISPLAY KEYPAD INTERFACE	1
8	STANDOFF, HEX M3 x 0.5mm x 14mm M/F SST	16
9	PCB ASSY, MAIN ZM5XX	1
10	NUT, HEX, DOME, M5X0.8 SST	14
11	VENT, MEMBRANE GREY W/NUT	1
12	LABEL, WHT POLY TAMPER 4x3	1
13	PLATE, BACK WELDMENT, ZM5XX	1
14	GASKET, UNIVERSAL ZM5XX	1
15	SCREW, MACH PH M3x0.5x6mm SST	8
16	WIRE, GROUND ZMXXX PWR SUP TO CHS	1
17	WASHER, PLASTIC, 4.0mm	4
18	POWER SUPPLY, 100-240VAC 65W 24V	1
19	NUT, M4 W/EXT LOCK WASHER SST	13
20	CABLE ASSY, ZMXXX POWER SUPPLY	1
21	SHIELD, POWER SUPPLY-ZM5XX	1

Torque specs for strain reliefs:

	3/4" NPT Strain Relief	PG13.5 Strain Relief	PG11 Strain Relief	PG7 Strain Relief
Dome Nut	44.2 lb-in 5 N-m	22.1 lb-in 2.5 N-m	22.1 lb-in 2.5 N-m	8.9 lb-in 1.0 N-m
Lock Nut	66.4 lb-in 7.5 N-m	33.2 lb-in 3.75 N-m	33.2 lb-in 3.75 N-m	13.3 lb-in 1.5 N-m

The vent in the back cover (item 11) should be torqued between 5.3 and 7.1 lb-in (0.6-0.8 N-m).

Dome nuts for the back plate must be torqued to 6 lb-in (0.68 N-m).

13.2 Parts Kits

ZM510 Overlay Kit, AWT05-508850	
Description	Qty.
Keypad Overlay	1

Power Cord Kit UK, AWT05-508858	
Description	Qty.
Power Cord Kit, ZMXXX UK	1

Enclosure Stand Kit, AWT05-508865	
Description	Qty.
LOSKID 7/16 HEX, 1/16" Thick w/9672	4
Stand, Enclosure ZM510	1

Enclosure Kit, AWT05-508851	
Description	Qty.
Enclosure Housing	1

LCD 320x80 Kit,AWT05-508859	
Description	Qty.
LCD Display 320X80 ISTN NEG IMAGE	1

Dome Hex Nut Kit, AWT05-508866	
Description	Qty.
Nut, Hex Dome M5x0.8 SST	100

ZM510 Overlay and Enclosure Kit, AWT05-508853	
Description	Qty.
Enclosure Housing	1
Keypad Overlay 1	

Display/Keypad Interface PCB Kit, AWT05-508860	
Description	Qty.
Display/Keypad Interface PCB	1

ZM510 Hardware Kit, AWT05-508867	
Description	Qty.
Standoff, Hex M3x0.5x14mm M/F	16
Nut, M4 W/Ext Lock Washer SST	13
Nut, M3 W/Ext Lock Washer SST	10
Screw, Mach PH M3x0.5 6MM SST	8
Washer, Plastic, 4.0MM	4
Screw, Mach PH M3x0.5 16MM SST	4
Spacer, Round, Aluminum, M3x6	4
LOSKID 7/16 HEX, 1/16" Thick w/9672	4
Spacer, RD-3.2MMID x 3.0MM Long	2
Screw, M3x10mm Long	2
Spacer, Card Engine	1
Cable Clamp	1
Cord, Black Neoprene- .25" DIA	
Cord, Black Neoprene- .62" DIA	
Cord, Black Neoprene- 9MM DIA	

Card Engine PCB Kit, AWT05-508854	
Description	Qty.
Card Engine PCB Assembly MCF54450	1

Back PLate Kit, AWT05-508861	
Description	Qty.
Plate, Back	1

65W Power Supply Kit, AWT05-508855	
Description	Qty.
Power Supply, 100-240VAC 65W 24V	1

Power Supply Bracket Kit, AWT05-508862	
Description	Qty.
Bracket, Power Supply, ZM510	1

Power Cord Kit NA, AWT05-508856	
Description	Qty.
Power Cord Kit, ZMXXX NA	1

Gasket Kit, AWT05-508863	
Description	Qty.
Gasket, Model ZM510	1

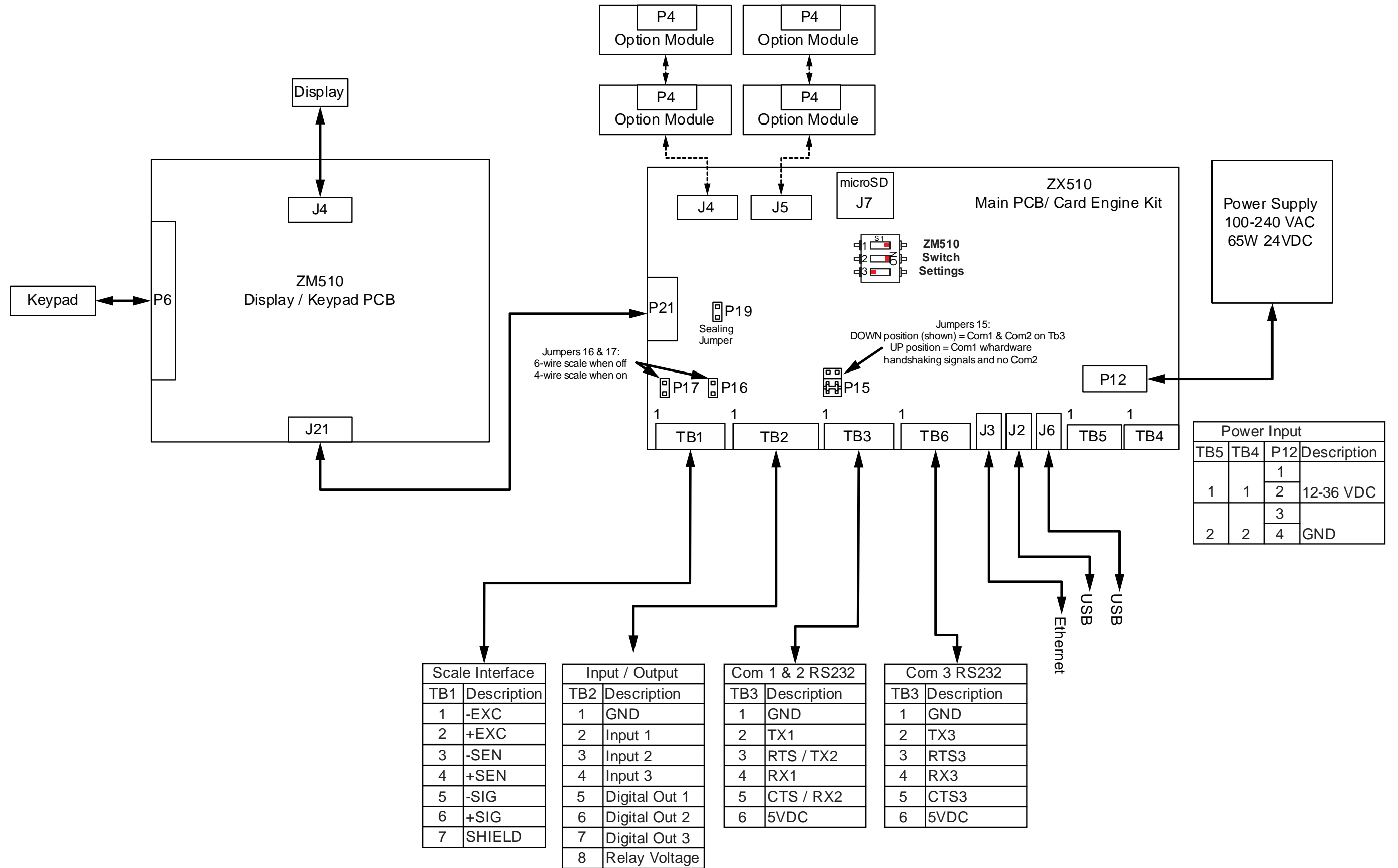
Power Cord Kit EU, AWT05-508857	
Description	Qty.
Power Cord Kit, ZMXXX EU	1

Display Filler PLate Kit, AWT05-508864	
Description	Qty.
Plate, Filler Display	1

ZM510 Main Board Kit, AWT05-508869	
Description	Qty.
ZM510 Main Board	1

AWT05-508874 - Kit, GORETEX Vent	
Description	Qty.
VENT, MEMBRANE GREY W/NUT	10

13.3 System block diagram



13.4 ZM Remote Inputs and Outputs, Opto-22 Module Application Notes

This section contains general information about varying topics that can assist or educate users who are new to Avery Weigh-Tronix systems.

13.4.1 I/O interfaces

I/O interfacing to the indicator must be tested before the indicator is sealed. Before you attempt to connect external devices to the indicator, you must fully understand what these interfaces are expected to do, as follows:

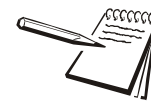
- Is it possible?
- Are they electrically compatible with our I/O, voltage, current, and so on?
- Are there any drawings available?
- Details of internal connections on Avery Weigh-Tronix equipment.

Consult an electrician during the connection and testing process.

13.4.2 Inputs

Here are the things you need to do:

- Identified the terminal numbers in the indicator (for example: TB1, TB2, etc.)
- Determine if the inputs are mechanical or digital logic inputs. See note below.



Mechanical (remote switch) inputs receive their voltage from the identified indicator terminal.
Digital logic inputs change state based on a secondary or remote interface (such as a PLC or HMI, human-machine interface).

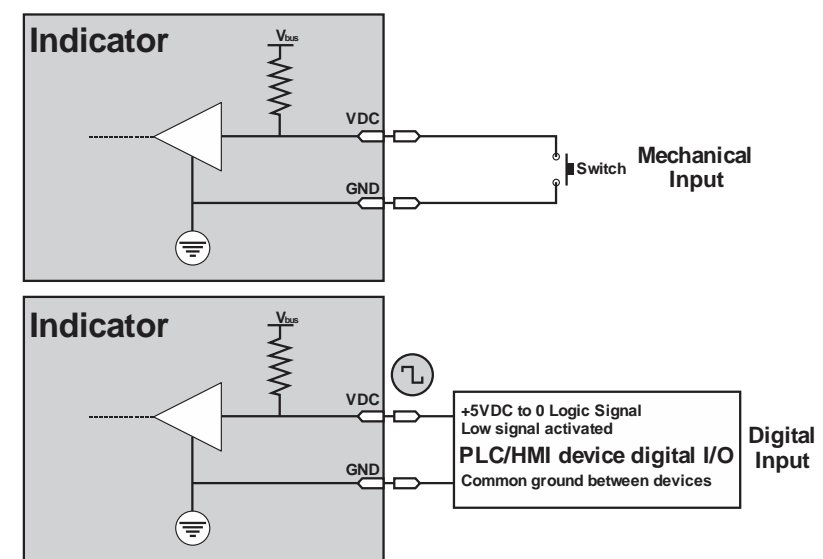


Figure 13.1 Typical input wiring

13.4.3 Outputs

There are a variety of interfaces for output control:

Relay Electro-mechanical switching device capable of switching multiple voltages or currents

Opto module Solid state switching device capable of switching multiple voltages or currents

Transistor Low voltage/low current switching device, typically not more than 5VDC or 100mA

You must determine, from the customer, the voltage and current that will be switched.

Be sure the indicator capabilities match the customer need.

Below is an example of output wiring.

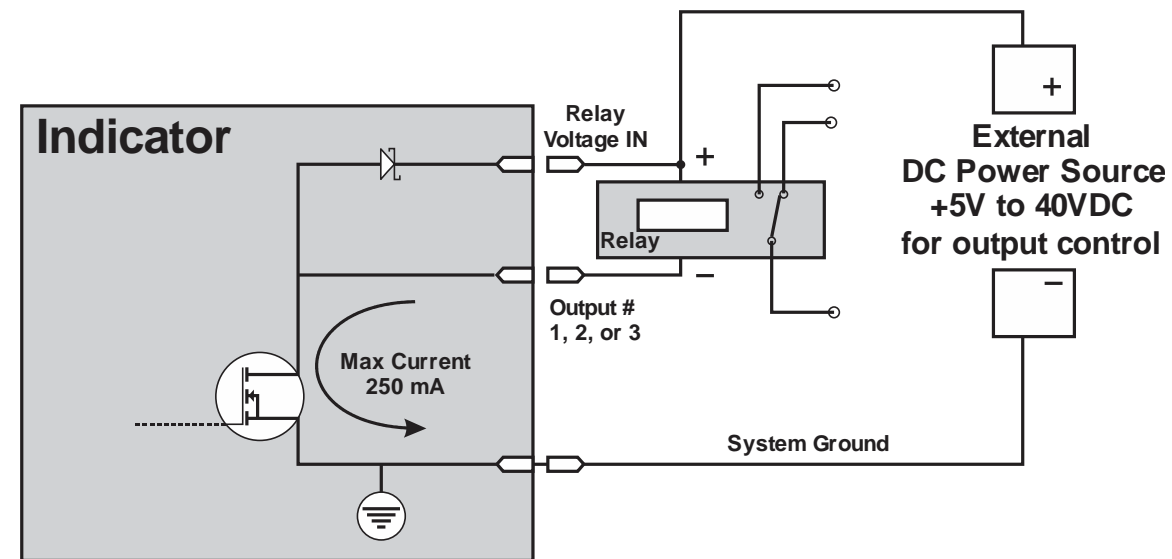
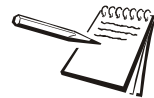


Figure 13.2 Transistor output driving an external relay



Relay Power IN signal provides protection for the transistor circuit against power supply spikes.

Relays

There are many types of relays. Match the customer need to the relay types available.

Opto module

Opto modules are available in a variety of types. Make sure that the Opto in the machine is compatible with the customer's voltage. There are AC Optos, DC Optos and Optos with reed relay contacts. As well as Optos of various voltage ratings, they may be polarity dependent.

Transistor outputs

You must be cautious when you work with transistor outputs as they usually behave in either common emitter or common collector arrangements.

Transistor outputs usually switch low voltages and they are limited in voltage and current so you must not exceed their values. There may be a diode for back EMF protection (CR8 in the circuit shown in [Figure 13.2](#)) available. It is also possible that the 0 volts line is not isolated. Transistor outputs would have difficulty operating in a circuit where they are expected to switch positive voltages.

13.4.4 Diagnostics

After you have wired up the I/O use the indicator's diagnostics to confirm that the operation of the I/O is correct.



WARNING: AFTER YOU HAVE FINISHED THE WIRING, THERE MAY BE HIGH VOLTAGES PRESENT IN THE INDICATOR FROM CUSTOMER'S EQUIPMENT. TREAT IT WITH CAUTION

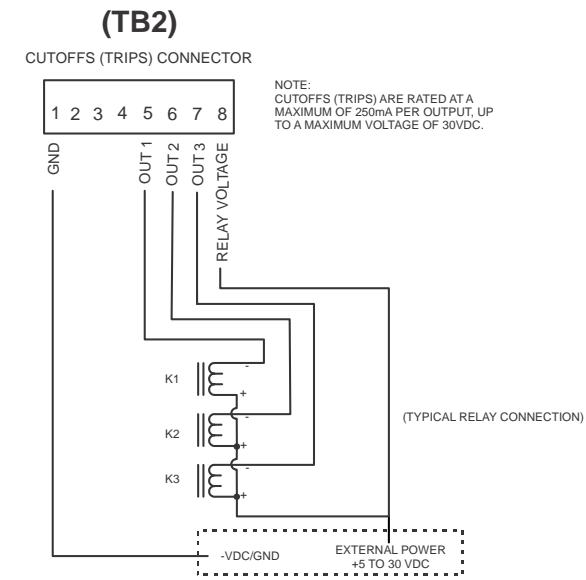


WARNING: MAKE SURE THAT DURING TESTING STAGES THE I/O CANNOT DISCHARGE ANY PRODUCT, OR CAUSE ANY ACCIDENTS.

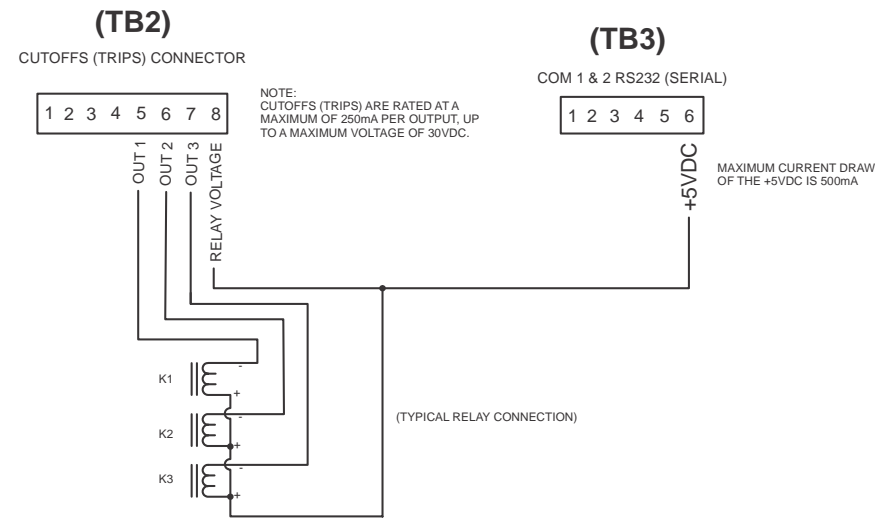


WARNING: WHATEVER TYPE OF OUTPUTS YOU ARE WORKING WITH, ALWAYS TRY AND INSTALL A SYSTEM THAT IS FAILSAFE. THIS MEANS THAT IF THE INDICATOR IS SWITCHED OFF, FOR ANY REASON, THE STATE OF THE OUTPUTS WILL BE IN A POSITION TO PREVENT ANY UNWANTED MOTION.

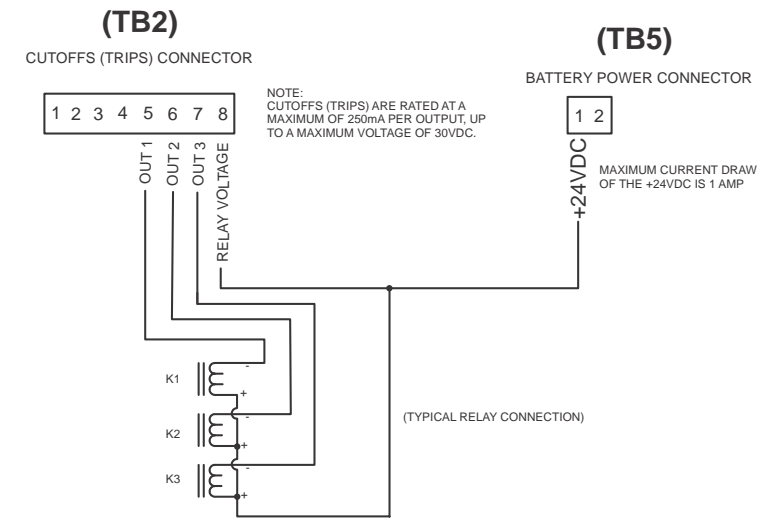
USING EXTERNAL DC VOLTAGE TO OPERATE RELAYS



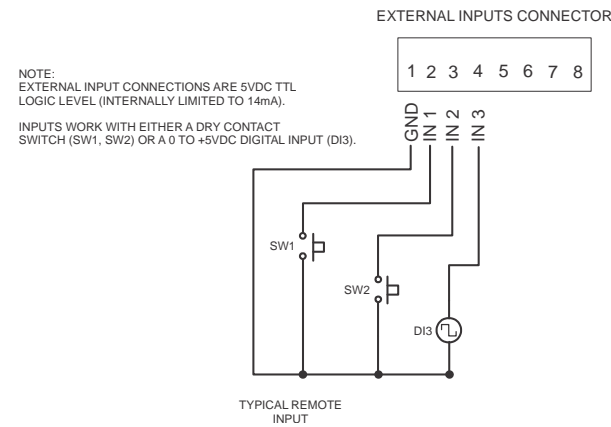
USING INTERNAL +5VDC VOLTAGE TO OPERATE RELAYS



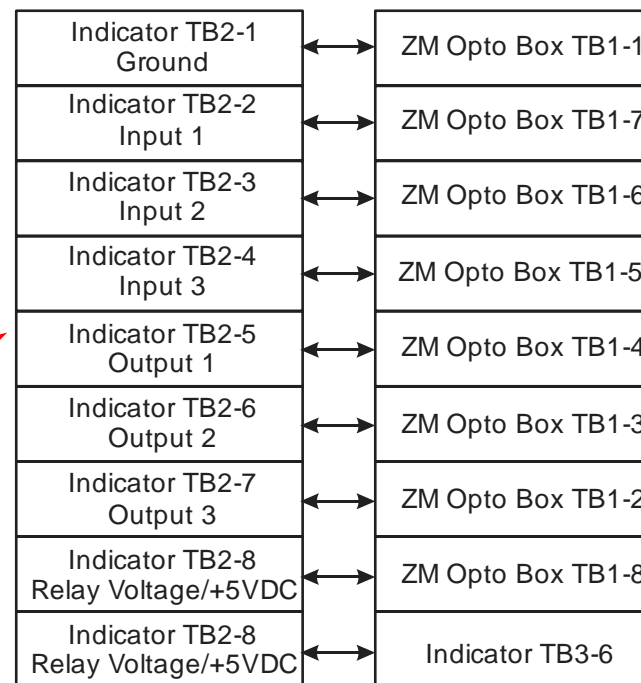
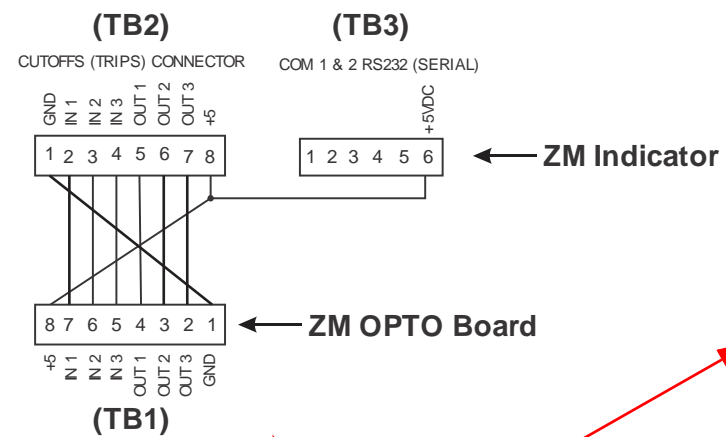
USING INTERNAL +24VDC VOLTAGE TO OPERATE RELAYS



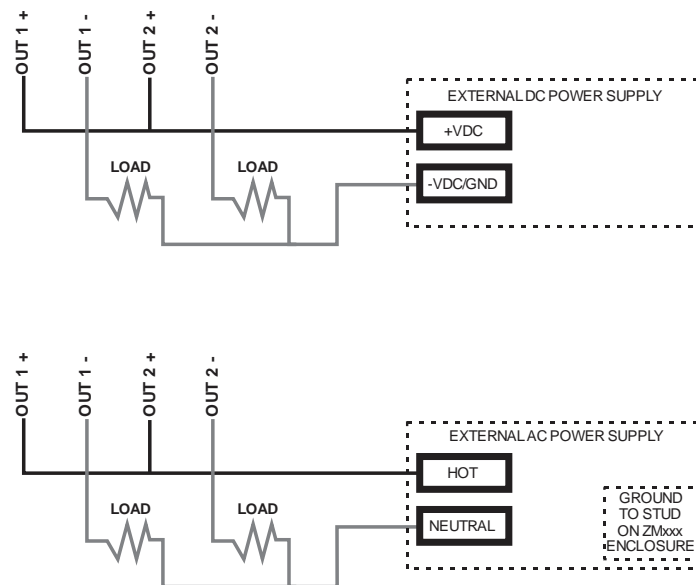
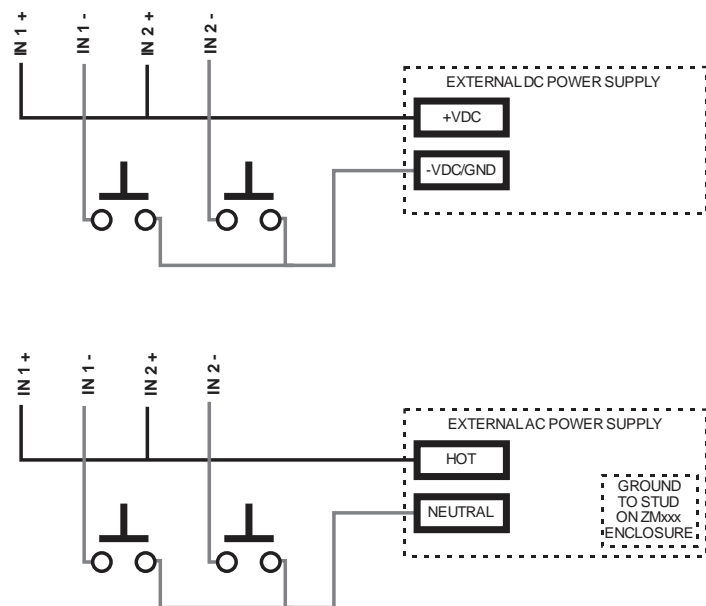
(TB2)



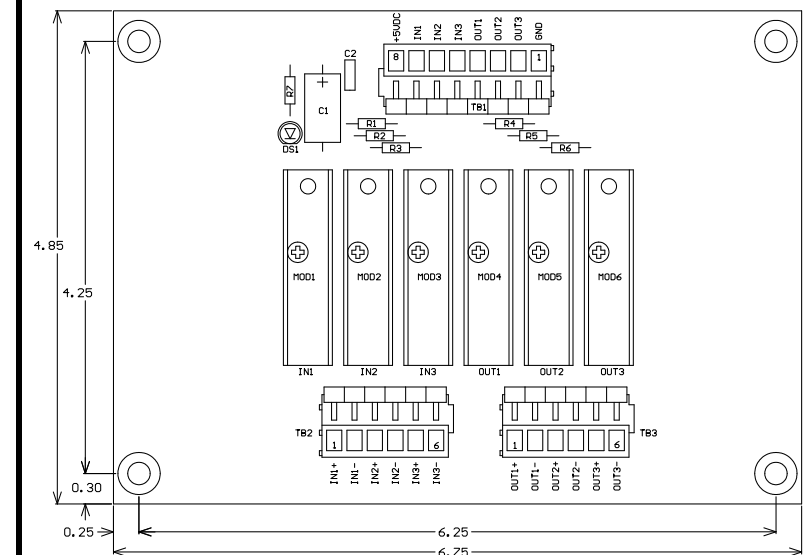
ZM Indicator to ZM OPTO Connections



Use whichever illustration is clearer to you for the ZM Indicator to Opto Box wiring.

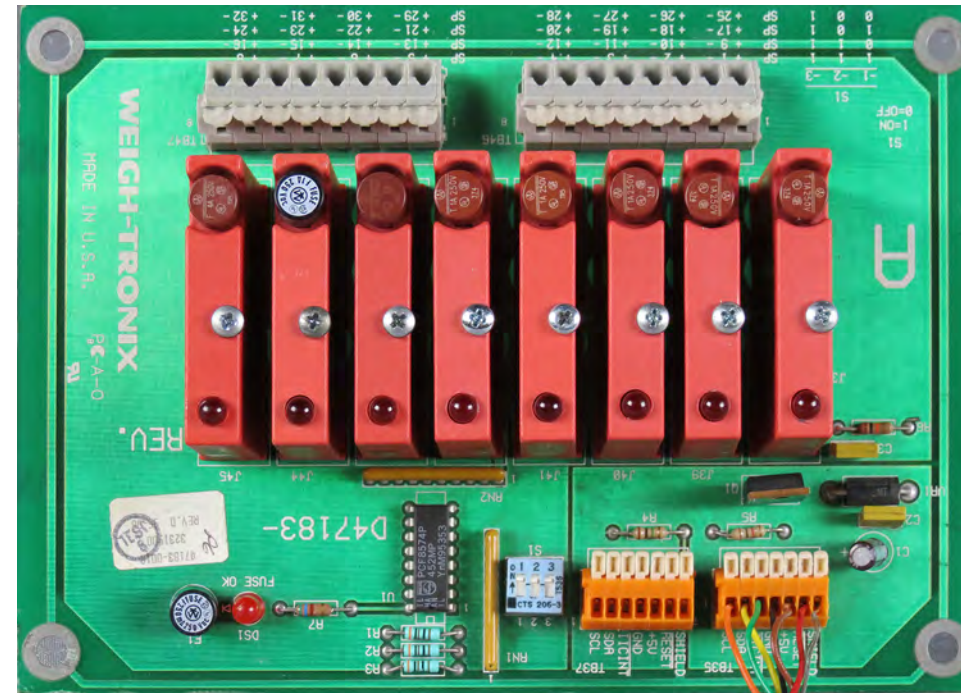


ZM Opto Board

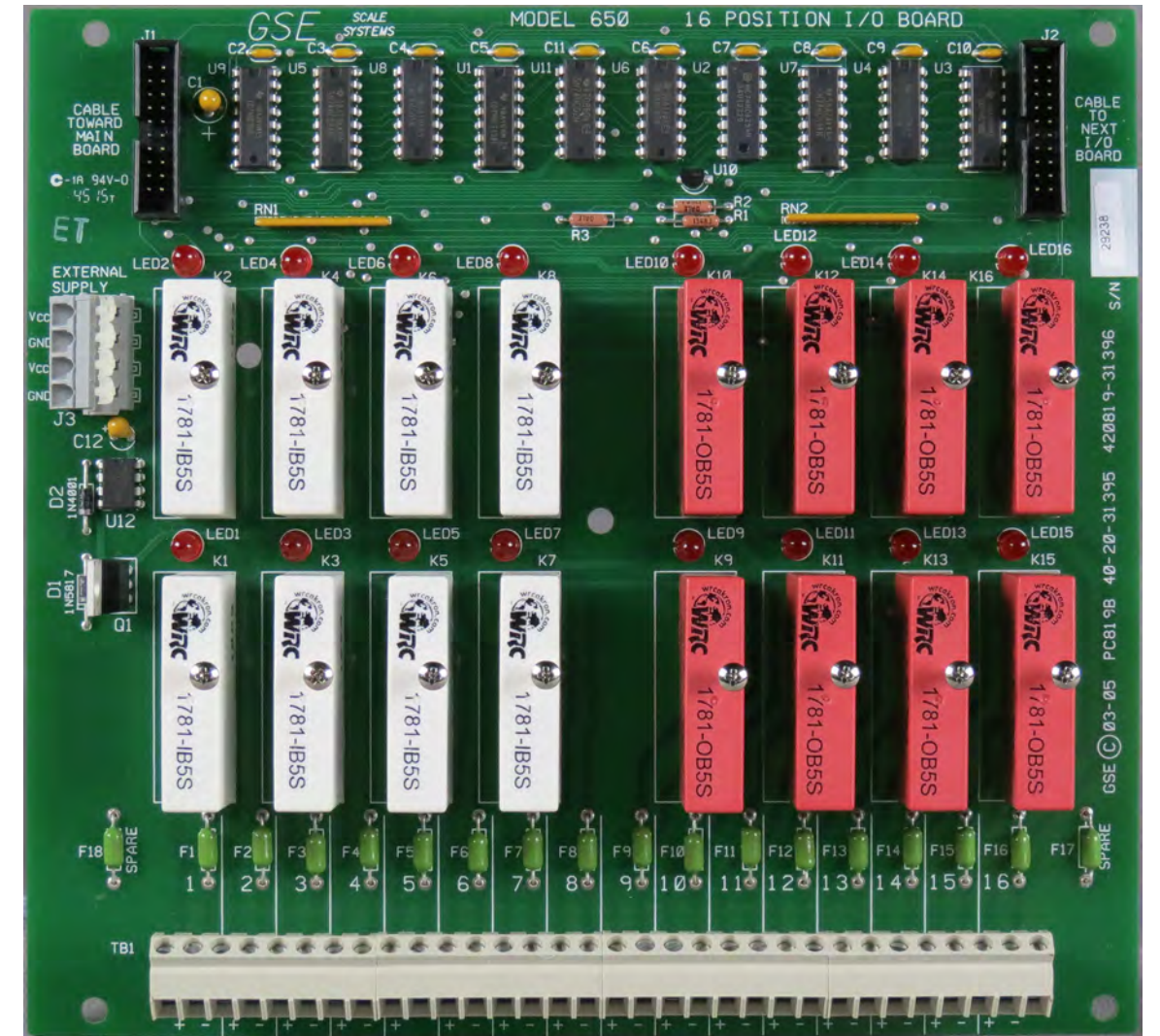


13.5 External Opto I/O Cards

SSCU-8 Card



16 I/O Card



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Avery Weigh-Tronix



Avery Weigh-Tronix USA

1000 Armstrong Dr.

Fairmont MN 56031 USA

Tel:507-238-4461

Fax:507-238-4195

Email: usinfo@awtxglobal.com

www.averyweigh-tronix.com

Avery Weigh-Tronix UK

Foundry Lane,

Smethwick, West Midlands,

England B66 2LP

Tel:+44 (0) 8453 66 77 88

Fax:+44 (0)121 224 8183

Email: info@awtxglobal.com

www.averyweigh-tronix.com