User's Guide

ACT100/ACT100xx
Weight Transmitter User Guide

METTLER TOLEDO

ACT100/ACT100xx Weight Transmitter

METTLER TOLEDO Service

Essential Services for Dependable Performance of Your ACT100/ACT100xx Weight Transmitter

Congratulations on choosing the quality and precision of METTLER TOLEDO. Proper use of your new equipment ensures dependable and accurate operation, protecting your investment. Contact us about a service agreement tailored to your needs and budget. Further information is available at www.mt.com/service.

There are important ways to ensure you maximize your investment's performance.

1. **Register your product**: We invite you to register your product at www.mt.com/productregistration so we can contact you about enhancements, updates and important notifications concerning your product.

2. **Contact METTLER TOLEDO for service**: The value of a measurement is proportional to its accuracy – an out of specification scale can diminish quality, reduce profits and increase liability. Timely service from METTLER TOLEDO will ensure accuracy and optimize uptime and equipment life.

   a. **Installation, Configuration, Integration and Training**: Our service representatives are factory-trained, weighing equipment experts. We make certain that your weighing equipment is ready for production in a cost effective and timely fashion, and that personnel are trained for success.

   b. **Initial Calibration Documentation**: The installation environment and application requirements are unique for every industrial scale, so performance must be tested and certified. Our calibration services and certificates document accuracy to ensure production quality and provide a quality system record of performance.

   c. **Periodic Calibration Maintenance**: A Calibration Service Agreement provides on-going confidence in your weighing process and documentation of compliance. We offer a variety of service plans that meet your needs and fit your budget.

   d. **GWP® Verification**: A risk-based approach for managing weighing equipment allows for control and improvement of the entire measuring process, which ensures reproducible product quality and minimizes process costs. GWP (Good Weighing Practice), the science-based standard for efficient life-cycle management of weighing equipment, gives clear answers about how to specify, calibrate and ensure accuracy of weighing equipment, independent of make or brand.

METTLER TOLEDO

FCC Notice

This device complies with Part 15 of the FCC Rules and the Radio Interference Requirements of the Canadian Department of Communications. Operation is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of 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 radiates 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 or her expense.

RoHS Compliance Statement

- The majority of our products fall within categories 8 and 9. Those categories currently do not fall within the scope of the Directive 2002/95/EG (RoHS) of January 27, 2003. If our products are intended for use in other products which themselves fall within the scope of the RoHS Directive, compliance requirements have to be separately negotiated contractually.

- Those products which fall within categories 1-7 and 10 will be in compliance with the EU RoHS Directive from no later than July 1, 2006.

- If it is not possible for technical reasons to replace any non-RoHS-compliant substances in any of the above products as required, we plan to inform our customers in a timely manner.

Statement regarding harmful substances

We do not make direct use of harmful materials such as asbestos, radioactive substances or arsenic compounds. However, we purchase components from third party suppliers that may contain some of these substances in very small quantities.

Warnings and Cautions

- READ this manual BEFORE operating or servicing this equipment and FOLLOW these instructions carefully.

⚠ WARNING

THE ACT100 IS INTENDED TO BE USED FOR PROCESS CONTROL AND IS NOT APPROVED AS A SAFETY COMPONENT. WHEN USED AS A COMPONENT PART OF A SYSTEM, ANY SAFETY CIRCUITS MUST BE INDEPENDENT OF THE ACT100 AND REMOVE POWER FROM THE ACT100 OUTPUTS IN THE EVENT OF AN EMERGENCY STOP OR EMERGENCY POWER DOWN.

⚠ WARNING
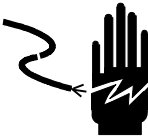
ONLY USE RECOMMENDED 12-24 VDC POWER SUPPLY APPROVED AS NEC Class 2 OR RATED AS LIMITED POWER PER IEC60950-1.

⚠ WARNING

WHEN THIS EQUIPMENT IS INCLUDED AS A COMPONENT PART OF A SYSTEM, THE RESULTING DESIGN MUST BE REVIEWED BY QUALIFIED PERSONNEL WHO ARE FAMILIAR WITH THE CONSTRUCTION AND OPERATION OF ALL COMPONENTS IN THE SYSTEM AND THE POTENTIAL HAZARDS INVOLVED. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.
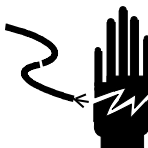
⚠ WARNING

ONLY THE COMPONENTS SPECIFIED ON THE ACT100 DOCUMENTATION MEDIA CAN BE USED IN THIS TRANSMITTER. ALL EQUIPMENT MUST BE INSTALLED IN ACCORDANCE WITH THE INSTALLATION INSTRUCTIONS DETAILED IN THE USER'S GUIDE. INCORRECT OR SUBSTITUTE COMPONENTS AND/OR DEVIATION FROM THESE INSTRUCTIONS CAN IMPAIR THE SAFETY OF THE TRANSMITTER AND COULD RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

⚠ WARNING

BEFORE CONNECTING/DISCONNECTING ANY INTERNAL OR EXTERNAL ELECTRONIC COMPONENTS, LOAD CELLS, HARNESSES OR INTERCONNECTING WIRING BETWEEN ELECTRONIC EQUIPMENT ALWAYS REMOVE POWER AND WAIT AT LEAST THIRTY (30) SECONDS BEFORE ANY CONNECTIONS OR DISCONNECTIONS ARE MADE. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

⚠ WARNING

INSTALLATION AND ANY SERVICE ON THIS EQUIPMENT MUST BE DONE ONLY AFTER THE AREA IS SECURED AS NON-HAZARDOUS BY THE RESPONSIBLE PERSON ON-SITE AUTHORIZED TO DO SO.

⚠ WARNING

THE ACT100 IS NOT INTRINSICALLY SAFE! DO NOT USE IN HAZARDOUS AREAS CLASSIFIED AS DIVISION 1, ZONE 0, ZONE 20, ZONE 1 OR ZONE 21 BECAUSE OF COMBUSTIBLE OR EXPLOSIVE ATMOSPHERES.

NOTICE

DO NOT ACTIVATE POWER OVER ETHERNET (PoE) ON ETHERNET SWITCHES ON THE ACT100 NETWORK. ACTIVATING PoE MAY RESULT IN DAMAGE TO THE ACT100 TRANSMITTER.

NOTICE

IN ORDER TO ENSURE PROPER DISSIPATION OF HEAT FROM THE TRANSMITTER'S PCBS, AND TO AVOID DAMAGE TO THE EQUIPMENT, THE ACT100 MUST BE MOUNTED VERTICALLY, ON A HORIZONTAL DIN RAIL.

⚠ WARNING

NOT ALL VERSIONS OF THE ACT100 ARE DESIGNED FOR USE IN HAZARDOUS (EXPLOSIVE) AREAS. REFER TO THE DATA PLATE OF THE ACT100 TO DETERMINE IF A SPECIFIC TRANSMITTER IS APPROVED FOR USE IN AN AREA CLASSIFIED AS HAZARDOUS BECAUSE OF COMBUSTIBLE OR EXPLOSIVE ATMOSPHERES.

⚠ WARNING

IN ORDER TO INSTALL THE ACT100xx TRANSMITTER IN THE US OR CANADA, METTLER TOLEDO CONTROL DRAWINGS 30565571 MUST BE FOLLOWED WITHOUT EXCEPTION. IN ORDER TO INSTALL THE CATEGORY 3 MARKED ACT100 UTILIZING THE EUROPEAN APPROVAL, THE APPROVAL CERTIFICATE FM19ATEX0213X / IECEx_FMG_19.0043X AND ALL LOCAL REGULATIONS MUST BE FOLLOWED WITHOUT EXCEPTION. FAILURE TO DO SO COULD RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE. REFER TO THE ACT100 DIVISION 2 AND ZONE 2/22 INSTALLATION GUIDE 30529641 FOR ADDITIONAL INFORMATION.

NOTICE

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

Disposal of Electrical and Electronic Equipment

In conformance with the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) this device may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements.

Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment.

If you have any questions, please contact the responsible authority or the distributor from which you purchased this device.

Should this device be passed on to other parties (for private or professional use), the content of this regulation must also be related.

Thank you for your contribution to environmental protection.

Contents

1 Introduction

The ACT100 represents the latest in METTLER TOLEDO technology and is one of the most versatile weighing transmitters available today for conventional strain gauge weighing technology. The factory pre-configured PLC communication interface in a DIN rail mounting scheme makes the ACT100 a perfect match for basic industrial process weighing applications including:

- Filling
- Dosing
- Sorting

Enhance measurement or control applications with patented TraxDSP™ digital filtering technology and a PLC update rate of 200 Hz. The ACT100 delivers fast, precise measurement data from milligrams to tons in a single cost-effective package that easily integrates into control panel systems.

The versatile ACT100 excels in controlling simple filling and dosing applications, delivering best-in-class performance for fast, precise, accurate results in fully automatic operations. Utilize the control capabilities of the ACT100 to effectively manage project costs.

1.1. Inspection and Contents Checklist

Verify the contents and inspect the package immediately upon delivery.

The package should include:

- ACT100/ACT100xx transmitter

- Safety warnings in multiple languages

- Parts for installation, including ferrite, connectors, etc.

Figure 1-1: ACT100 Packing Materials

NOTICE

All relevant documentation, software, fieldbus files and sample code are available at **www.mt.com/ind-act100-downloads**.

1.2. Available models

Following models are available for ACT100:

Table 1-1: ACT100 Models

Item Number	Description	Version	Label
30529619	Weight Transm. ACT100	ACT100	English
30529620	Weight Transm. ACT100	ACT100	Chinese
30529621	Weight Transm. ACT100xx (hazardous version)	ACT100xx	English
30529622	Weight Transm. ACT100xx (hazardous version)	ACT100xx	Chinese

1.3. Physical Dimensions

ACT100 enclosure is shown in Figure 1-2.

Figure 1-2: ACT100 Dimensions

NOTICE

2D and 3D drawings available at **www.mt.com/ind-ACT100-downloads.**

2 Operation

2.1. Front Panel

An example of the ACT100 front panel is shown in Figure 2-1
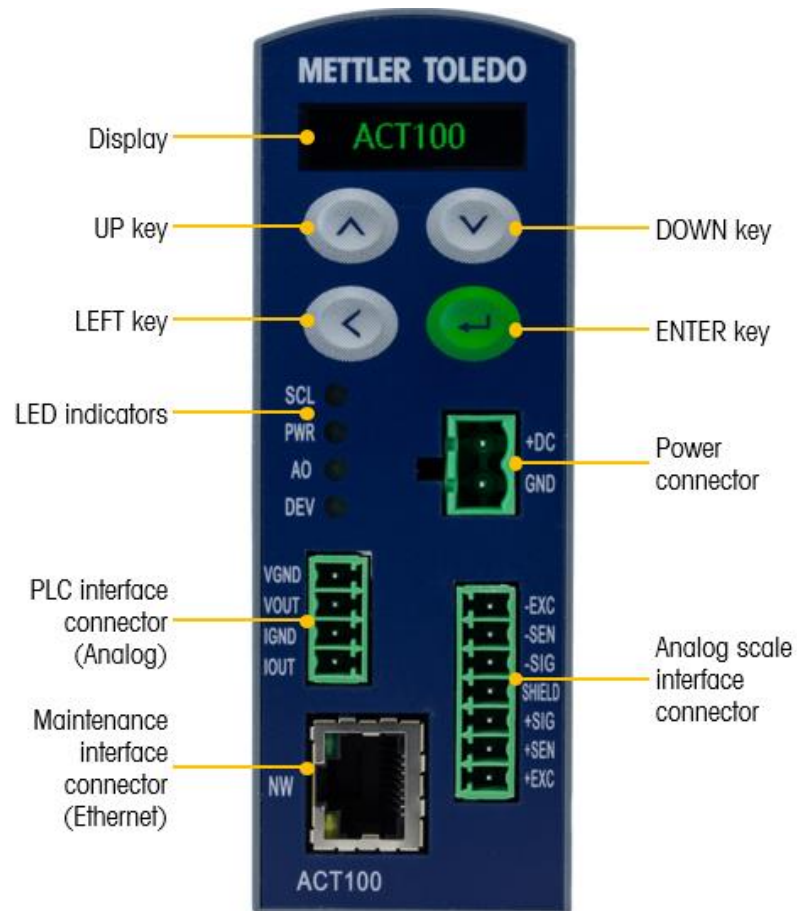

Figure 2-1: ACT100 Front Panel Layout

2.1.1. Display Layout

The ACT100 transmitter has an organic LED (OLED) display, 128 x 32 dot matrix graphic type display. The display is reserved for scale weight, units, Net/Gross indicator and error messages.

Additional information provided includes:

- Weight unit (lb, kg, g)
- Motion / no-motion condition
- Center of zero
- Gross or net mode

Figure 2-2 Display in Weighing Mode

2.2. Front Panel Keys

Four dedicated function keys are located on the front panel to support manual setup configuration. These provide the interface to navigate the setup menu hierarchy and data entry, as well as make setup selections within data entry and drop down boxes.

	ENTER	Press the ENTER key for 3 seconds to access the device menu. Press the ENTER key to make a selection from the device menu and sub-menus. When in a data entry field, press the ENTER key to accept the numeric value entered. When the display is in weighing mode, briefly press the ENTER key to execute the zero operation if the scale weight is within the Pushbutton zero range specified in the webserver.
	UP	Press the UP key to scroll within the device menu and sub-menus. The UP key is also used for incrementing numerals in the numeric data entry field.
	DOWN	Press the DOWN key to scroll within the device menu and sub-menus. The DOWN key is also used for decrementing numerals in the numeric data entry field.
	LEFT	Press the LEFT key to navigate up one step on the device menu tree. The LEFT key is also used to scroll to the numeral to the left in a data entry field. With the left most numeric character highlighted, the next key press will wrap around to the right most numeral.

2.3. LEDs Status

Normal Work	Analog Output Error *(Example)*	LED	STATUS
		SCL	Scales status: ON okay, flashing indicates scale error
		PWR	Power status: ON okay, OFF error
		AO	Analog Output: ON okay, flashing out of range
		DEV	Device Status: ON okay; flashing contact service

2.4. ACT100 Device Main Menu

From the front panel, press and hold the ENTER key for 3 seconds to access the device menu. The display will change from showing the normal weight display to showing the Information Recall 🔍 icon. Press the UP ⌃ or DOWN ⌄ keys on the front panel to display icons for the various functions listed in Table 2-1.

Table 2-1: Device Menu Icons

	Information Recall	Recall mode for most transmitter information fields.
	Resolution	Temporarily expands weight display resolution for diagnostic purposes
	Comparators	Access to the limit value for all currently enabled comparators.
	Calibration	Access to calibration menu including zero and span adjustment (in non-approved mode only).
	Error Message	Access to list of current error messages
	Language	Selects between English and Chinese
	Setup	Access to all setup parameters for the transmitter.

Once focus is in a value field, repeated presses of the UP, DOWN or LEFT keys will cycle back to the beginning, so if the LEFT key is pressed when focus is in the left-most position, focus returns to the right-most position. In the case of the UP and DOWN keys, the highlighted value will cycle through numerical values and the decimal point as follows:

⌃   **0 > 1 > 2 > 3 > 4 > 5 > 6 > 7 > 8 > 9 > . > 0 > 1 > …**

⌄   **0 > . > 9 > 8 > 7 > 6 > 5 > 4 > 3 > 2 > 1 > 0 > . > …**

After accepting the value by pressing ENTER and the focus has moved to the parameter description, press the LEFT key to exit to the next higher level of the menu.

Pressing the LEFT multiple times will exit the device menu.

Figure 2-3 shows an example of how to access and modify the value of a parameter. The currently selected item (in focus) is indicated by reverse video.
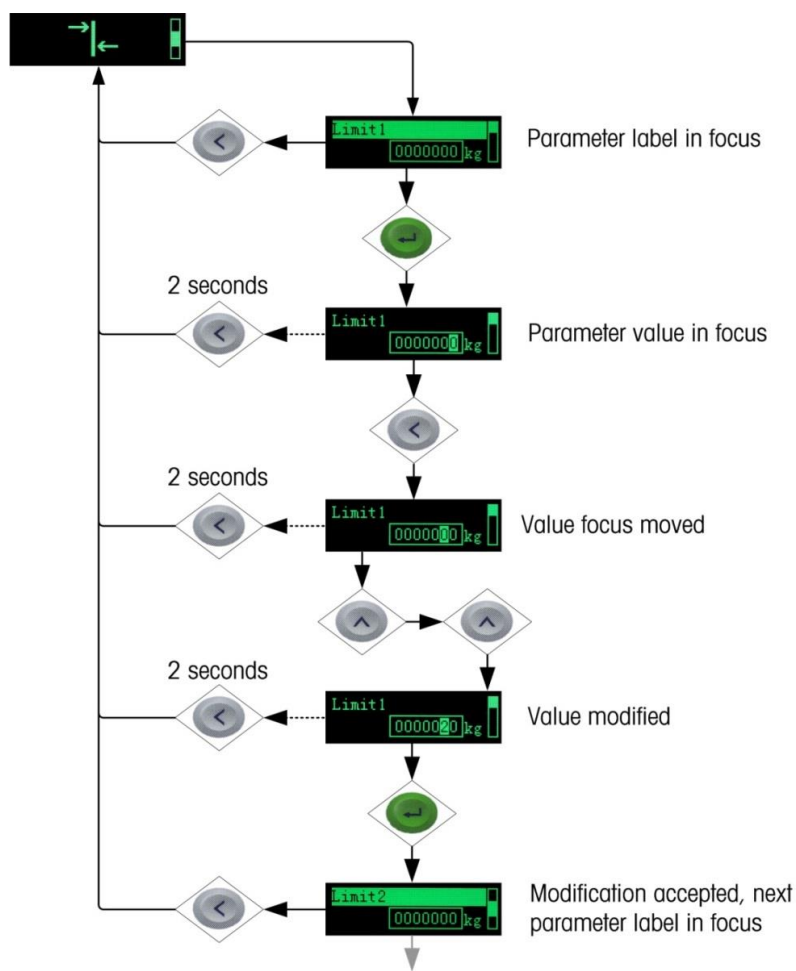
Figure 2-3: Numerical Data Entry Example

2.4.1. Information Recall

Once the Information Recall icon ![icon] appears, press the ENTER key to recall specific information about the transmitter. Figure 2-4 shows the elements of the Information Recall menu in the sequence in which they occur. Note that some items may not appear, depending on the configuration of the transmitter.

Pressing the LEFT key multiple times will exit the device menu.

The model number of the transmitter (ACT100) is shown.

Serial number of the transmitter

Displays information about the standard firmware version

Indicates Analog Output type

Shows the device IP address

Shows the MAC address assigned to the network

Provides network address for online resources
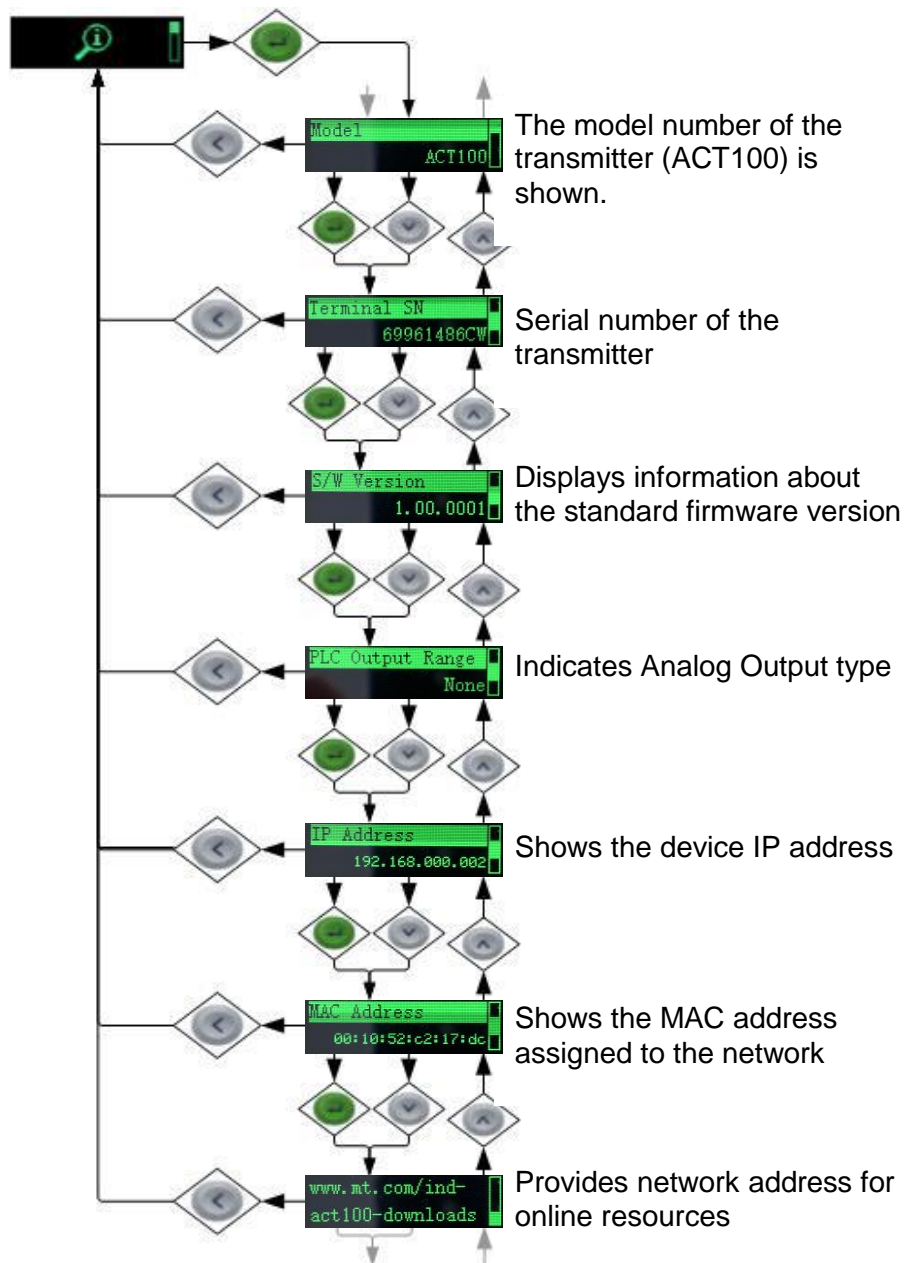
Figure 2-4: Information Recall Menu

2.4.2. x10 Resolution

This function expands the weight display resolution by 10 so that a finer weight increment can be seen. It can be enabled by pressing the ENTER key ⏎ when the transmitter's device menu has been accessed and the **x10** icon is displayed on screen:

Figure 2-5: x10 Indication

NOTICE

This function is intended for **diagnostic purposes only**. The transmitter should not be used in the x10 expanded mode for normal operation.

2.4.3. Comparators

The device supports a total of three comparators. One, two or all three comparators may be used. The limit of each comparator may be modified by accessing the Comparator menu in the setup menu. Comparator values are limited to 7 digits.

2.4.3.1. Setting Comparators

Access the Comparator menu by pressing the ENTER key 🔄 when the transmitter's device menu is visible and the →|← icon is displayed on the device.

The ACT100 only supports a logical comparison of ">=", greater than or equal to, for each comparator. For example, if the limit is set to "24.00" kg, the output configured to use this comparator will be set to true only if the live weight is greater than or equal to 24.00 kg. Please note that inputs and outputs can be configured using the webserver.

The operator of range and other comparisons are NOT supported by the ACT100.

2.4.4. Calibration

Calibration is the process of adjusting the display of the transmitter so that when the scale is empty, the display shows zero gross weight. With a specific amount of weight on the scale, it also shows an accurate weight value.

The ACT100 transmitter calibration menu enables entry of an adjustment value, selection of linearity adjustment (**none** [default], three, four or five point), traditional zero calibration and three different types of span calibration:

- Traditional span calibration – This uses test weights.

- Step adjust calibration - Using a build-up or substitution method of calibration, this method is used for large vessels where only a portion of the required test weights can be placed on the scale.

- **CalFree calibration** – Once certain load cell criteria have been entered manually, the transmitter will automatically calculate the span; no test weights are required.

2.4.4.1. Setting Calibration

Access to the Calibration menu using the device's front panel is accomplished by pressing the ENTER key ⏎ when the ⏷ icon is displayed on the device. The Calibration menu also can be accessed using the webserver.
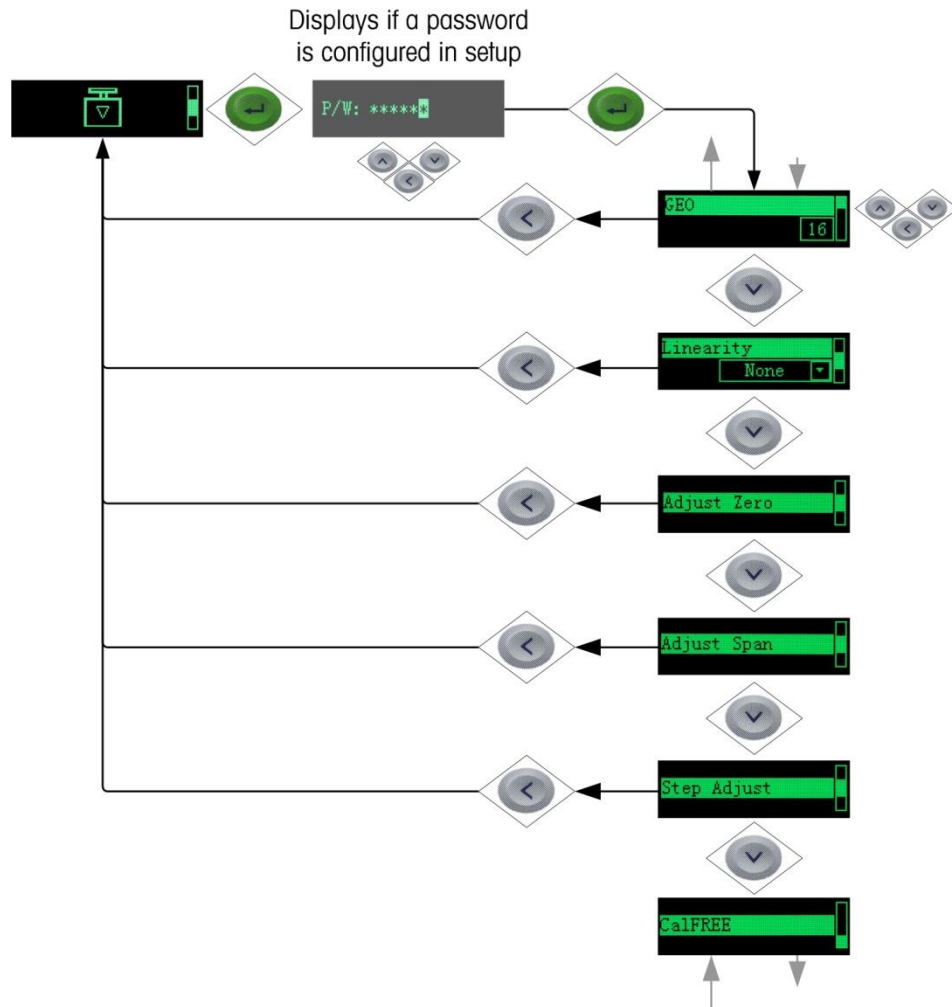
Figure 2-6: Calibration Menu – Overview

2.4.4.2. Setting Geo Code

The Geo code, which sets the appropriate adjustment value for the current geographical location, is selected here. Geo codes are numbered 0–31. See Figure 2-6 for more information on the Geo code setting using the transmitter's front panel buttons, and refer to Chapter 5 to find the appropriate Geo Code for the installation location.

2.4.4.3. Setting Linearity

To set the Linearity Adjustment value, see Figure 2-6: Calibration Menu – Overview. Choose the number of linearity points from the selection box. Options are **None** [default], 3 point, 4 point, 5 point.

Points are distributed as follows:

None	Linearity is disabled
3	Zero, midpoint and highpoint
4	Zero, lowpoint, midpoint and highpoint
5	Zero, lowpoint, midpoint, mid-highpoint, highpoint

2.4.4.4. Zero Calibration and Under Zero Blanking

Scale zero is set simply by emptying the scale and running the "Set Zero" calibration routine, as shown in Figure 2-7.
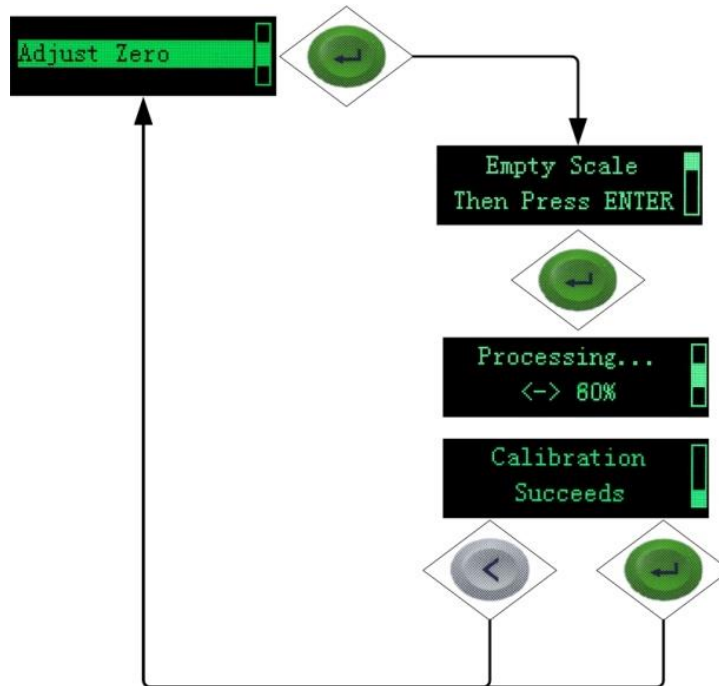
Figure 2-7: Zero Calibration

If the transmitter detects scale motion during the calibration process, it will retry the start of calibration several times and then proceed, displaying a motion indication. In this case, when calibration is complete, the transmitter will present two options – accept or reject the value.
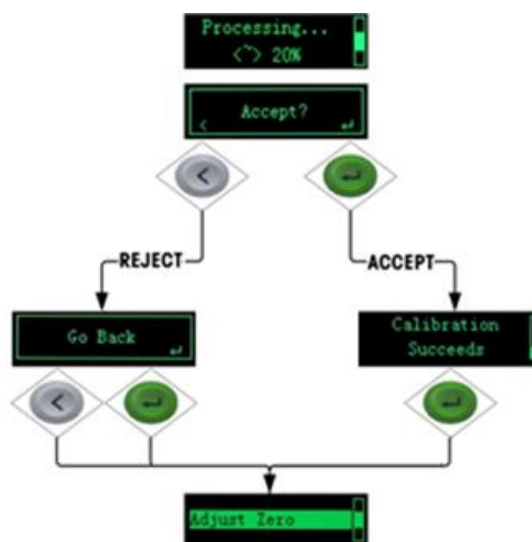
Figure 2-8: Zero Calibration with Motion

Blanking of the display is used to indicate an under-zero condition when the weight on the scale falls below the current zero reference. Set the under zero blanking for the number of divisions (d) that the transmitter is permitted to go under zero before blanking.

NOTICE

A setting value of 0-98 blanks the display at the specified number of divisions below gross zero. A value of 99 makes the transmitter blanks at 50% of the capacity value in the negative direction.

2.4.4.5. Span Calibration

The scale's span calibration can be determined either with or without a linearity adjustment. With linearity disabled, a single reference point is used to calibrate the scale. This is the normal method of span calibration. With linearity enabled, the transmitter is configured with up to three-point linearity – low, mid and high.

The low point is set during zero calibration, and the mid and high points are set during this procedure.
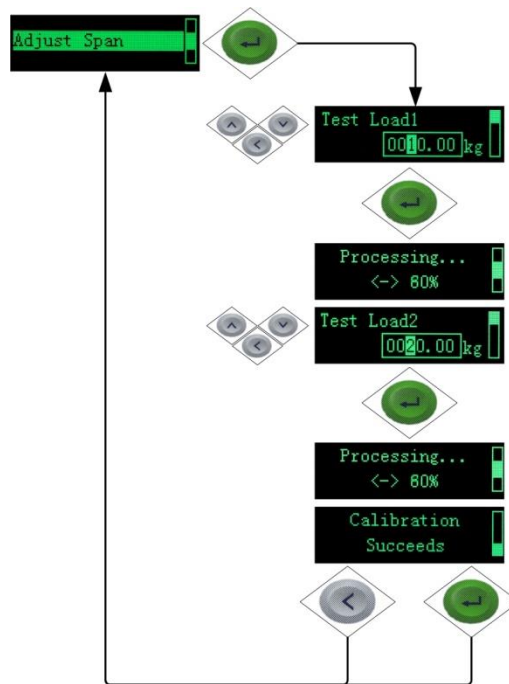
Figure 2-9: Span Calibration

If linearity is enabled, additional mid-range weight reference points are added to the adjustment procedure. Linearity can be enabled or disabled in the Calibration branch of the device menu. Refer to ACT100 Device Main Menu section for the method used to modify numerical values.

2.4.4.6. Step Adjust

Step adjustment is an iterative process in which a build-up or material substitution method of calibration is used to calibrate the span. Each step calibrates a portion of the full span.

This method is typically used with large vessels where only a portion of the required calibration test weights can be placed on the scale at one time. Figure 2-10 shows the logic of the procedure using a simple, two-step example. When sufficient steps have been calibrated, pressing the LEFT button returns the view to the calibration menu.

Operation
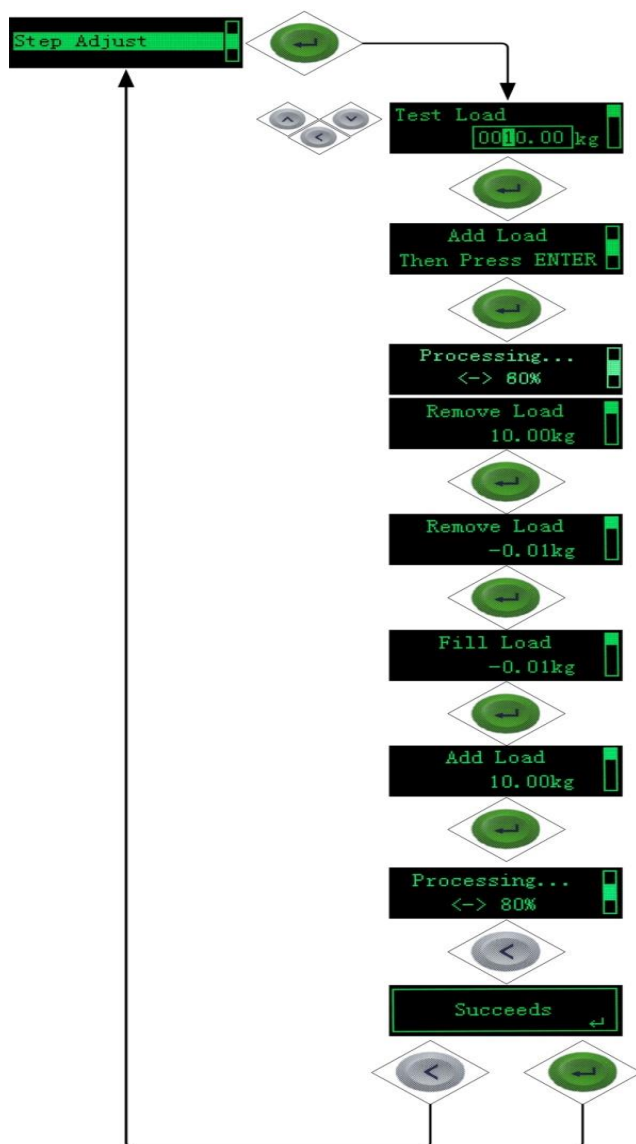
First, a test load is defined by entering its weight.

Confirm the value entry by pressing ENTER.

The ACT100 prompts for the addition of the test load.

Press ENTER to start the first step,

The ACT100 indicates its progress.

Once the first step is calibrated, the ACT100 sets a temporary zero point, and prompts for the removal of the test load. A live weight display indicates that the scale has been cleared.

Press ENTER to confirm the scale is empty.

The ACT100 will prompt to add the test load again.

The live weight indicates that the test load is on the scale.

Press ENTER to start the second step.

The ACT100 indicates its progress.

Press LEFT to complete calibration and exit the procedure.

The ACT100 indicates that the calibration has succeeded.

Press either LEFT or ENTER to return to the calibration menu.

Figure 2-10: Step Adjustment

2.4.4.7. CalFree™

CalFree allows the scale to be calibrated without the use of test weights. The total load cell capacity, unit and output in mV/V must be entered. The system then calculates correct calibration for the scale. Figure 2-11 provides a visual representation of the CalFree calibration procedure.

Notes on Load Cell Capacity and Rated Cell Output

- For load cell capacity, enter the sum of all load cell capacities. For example, for three 50t load cells, enter 150,000 kg.

- For systems with passive dummy load cells, enter the value as if all legs have live load cells. For example, for a system with two 50t live load cells and two passive supports, enter 200,000.

- For Rated Cell Output, enter the sensitivity of each live load cell in mV/V – for example, 2.0000. For multiple load cells, enter the average sensitivity of all cells.

The ACT100 transmitter allows calibration of the scale without using test weights. This is based on manual entry of capacity and performance data from the load cell or load cell platform. This method of calibration can be used for initial check-out and testing of systems or when a large structure is used as the weighing vessel and it is not possible to apply test weights to the structure. METTLER TOLEDO highly recommends that test weights be used whenever possible, as this provides the most accurate method of calibration.

The Rated Cell Output and Cell Capacity values cannot be zero, and are limited to 7 digits.

NOTICE

Scale calibration using CalFree™ will not be accurate when using zener diode barriers (such as Mettler Toledo ISB05 and ISB05x) between the transmitter and the scale. Do not use CalFree™ when barriers are installed.
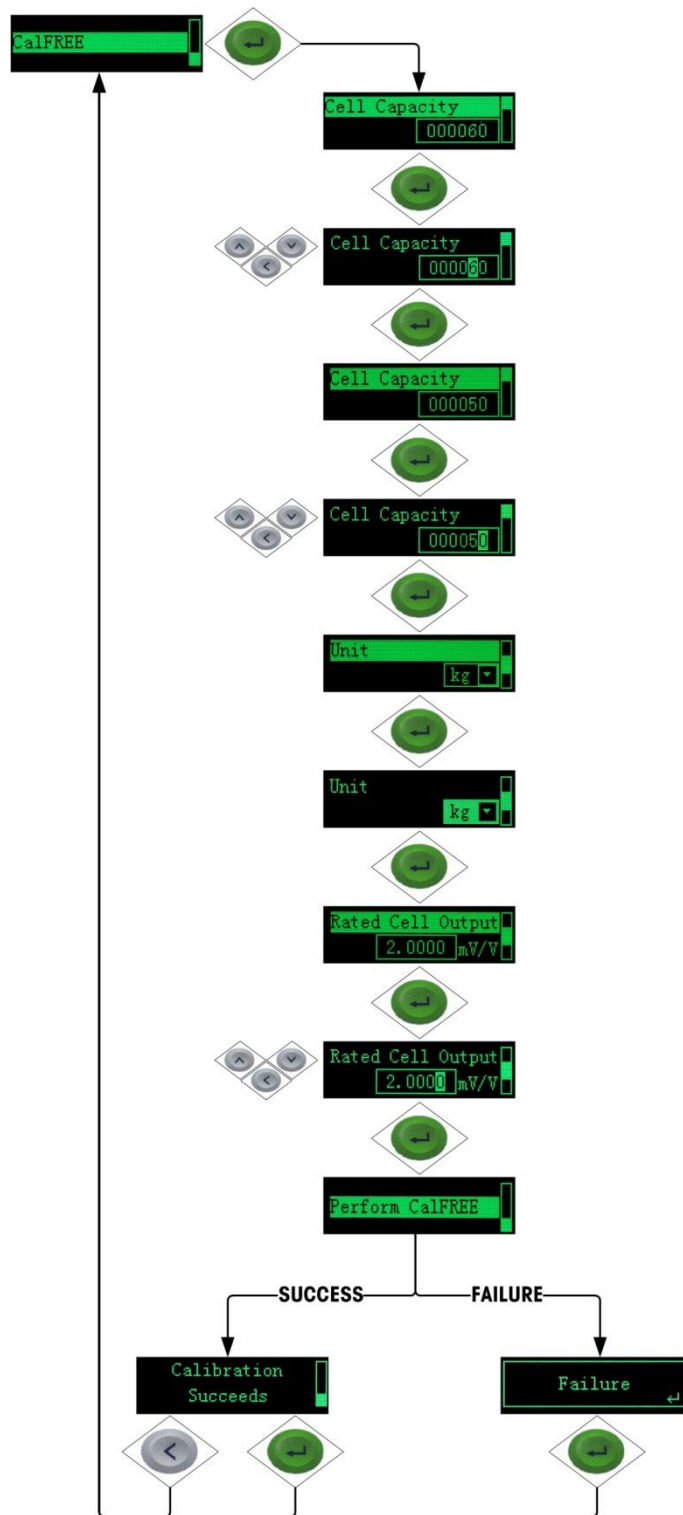
Figure 2-11: CalFree

2.4.5. Language

The ACT100 supports a device menu in **English** [default] and in Chinese.

2.4.6. Parameters Setup

The last icon displayed in the device menu from the front panel is Setup ⟐, where many of the transmitter's programming parameters can be viewed and modified. It is not intended that operators enter the setup mode after a weighing system is installed and is operational. It should not be necessary for an operator to access setup.

2.4.7. Password Security

Note that a security password can be enabled in setup from the Web-based Configuration Tool. When a password is set, it must be entered to access setup. This protects the setup parameters from inadvertent changes. The default password is "000000".
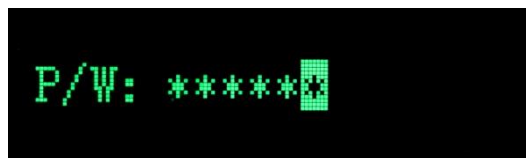
Figure 2-12: Password Entry Screen

2.4.8. Reset Configuration and Master Reset

2.4.8.1. Reset Configuration

To reset all configured items except calibration data:

1.   Remove power from the transmitter.

2.   Locate the DIP switches, accessible from the underside of the housing.

3.   Set both DIP switches, 1 and 2, to ON (up, in Figure 2-13) and restore power to the transmitter.
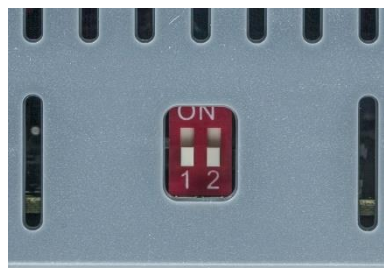
Figure 2-13: DIP Switches

4.   Set both DIP switches to OFF.

2.4.8.2. Master Reset

A master reset restores all settings to their factory default values:

1. Remove power from the transmitter.

2. Set switch **2** to its ON position and restore power to the transmitter. The ACT100 will prompt for confirmation.

Figure 2-14: Master Reset Confirmation

3. Press ENTER on the front panel to perform the master reset.

4. Set Switch **2** to OFF.

2.5. ACT100 Basic Operation Functions

2.5.1. Zero

The Zero function is used to set or reset the initial zero reference point of the transmitter. There are two types of zero setting modes:

2.5.1.1. Green ENTER Button

The zero function can be accomplished by a short press of the green ENTER ⏎ scale function key. The Zero range selections include Disabled, **2%** [default] or 20% plus or minus from the calibrated zero point. A change to the default setting is done via the webserver. If the current scale weight is outside the zero range when a pushbutton zero is commanded, the transmitter will display a message:
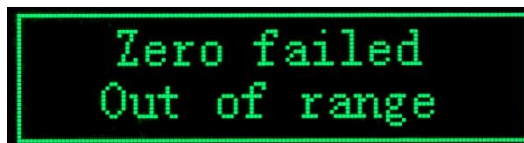
Figure 2-15: ENTER button Zero Failure Message

2.5.1.2. Power Up

The Power Up mode setting determines if at power up, the transmitter will restart with the most recent zero reference point it had before power down or if it will reset to the calibrated zero reference.

The selections include **Reset** [default] and **Restart**.

2.5.1.2.1. Reset

With the setting on Reset, the last zero calibration value will be used as the zero reference point. The Power Up Zero capture range selections include **Disabled** [default], 2% or 10% plus or minus. If the range setting is enabled, the Power Up Zero is applied only when the weight reading on the scale is within the selected range around the originally calibrated zero reference. For example, if the range setting for Power Up Zero is set at +/- 2%, Power Up Zero will only occur when the weight reading on the scale is within +/- 2% of scale capacity above the original calibrated zero reference. If the weight on the scale is outside of the zero range, the display will indicate **EEE** until the weight is adjusted to within this range and zero is captured.

2.5.1.2.2. Restart

A setting of Restart enables the transmitter to reuse the most recent zero reference weight after a power cycle so it returns to the same, previously-displayed gross weight value. The Power Up Zero setting is configured using the webserver.

2.5.2. Tare

The tare value is subtracted from the gross weight measurement, providing the computation of the net weight (material without the container). The tare function can also be used to track the net amount of material being added to or removed from a vessel or container. In the second case, the weight of the material inside is included with the tare weight of the container and the display reflects the net amount being added to or removed from the vessel. Tare is captured by digital input. Tare is cleared by digital input.

2.5.3. Filter

In many weighing applications, vibration can introduce error into your system or cause delays in the transfer of weight to your automation device. It is always recommended to first attempt to mechanically isolate your scale from the surroundings. When this cannot adequately be done, use the electronic filtering inside the ACT100. The Filter section offers three settings: Weighing Mode, Limit Frequency and Environment.

Weighing Mode	**Normal:** Should only be used for non-automatic, human-powered weighing. Gives the most stable response that is required for "legal for trade" weighing. Not recommended with a process controlled by an automation device. **Dynamic:** Intended setting when process is controlled by automation device such as a PLC. **Trigger Weigh:** Recommended to use Dynamic mode filter instead of Trigger Weigh
Limit Frequency	**1-20 Hz:** Marks the point at which the filtering process begins to affect the disturbance. Disturbances above the limit frequency will have filtering applied. Recommendation is to start at 20 Hz and reduce the frequency only after adjusting the environment setting. The lower the frequency, the better the disturbance rejection, but it will extend the settling time.
Environment	**Very Stable, Stable, Standard, Unstable, Very Unstable:** Sets the level of attenuation applied to the signal above the limit frequency. A very stable environment will have the least attenuation applied to the signal and a very unstable environment will have the strongest attenuation. It is recommended to adjust this value first when changing filter settings. Start with "very stable" and work your way down.

2.5.4. Analog Output

The Analog Output section offers five settings

Source	Selects either **Display Weight** or **Gross Weight** as the source of the analog output
Output Type	Sets the type of analog output signal provided. Available ranges are **None**, **0-5V**, **0-10V**, **4-20mA**, **0-20mA, 0-24mA**.
Analog Zero Value	Sets the weight value that corresponds to the low end of the selected Output Range. Weight values less than or equal to the Zero Value causes the

	device to output the lowest value of the Output Range.
Analog Span Value	Sets the weight value that corresponds to the high end of the selected Output Range. Weight values greater than or equal to the Full Scale Value causes the device to output the highest value of the Output Range.
Calibrate Output	Allows for a minor adjustment to be made to the analog output signal. First, an adjustment to the zero value signal will be made. Second, an adjustment to the full scale signal will be made. Adjustment should be completed with either PLC or multimeter connected to analog output of ACT100. Adjustment is completed by using the up or down buttons on the ACT100. A short press (fine adjust) of the button makes an adjustment in step size of 10. A long press (coarse adjust) of the button makes an adjustment in step size of 200.

Assumed below values set to ACT100

● Source: Gross Weight

● Output Type: 4~20mA

● Analog Zero Value: 0 kg

● Analog Span Value: 1000 kg

This means ACT100 will output 4mA when scale is empty and 20mA when 1000 kg load on scale or in tank. If the load on scale exceeds 1000kg, the analog signal value will change from 20mA to 24mA as a warning message to user control system that the analog output is over range. Figure 2-16 shows the relationship between analog output signal and load on scale.
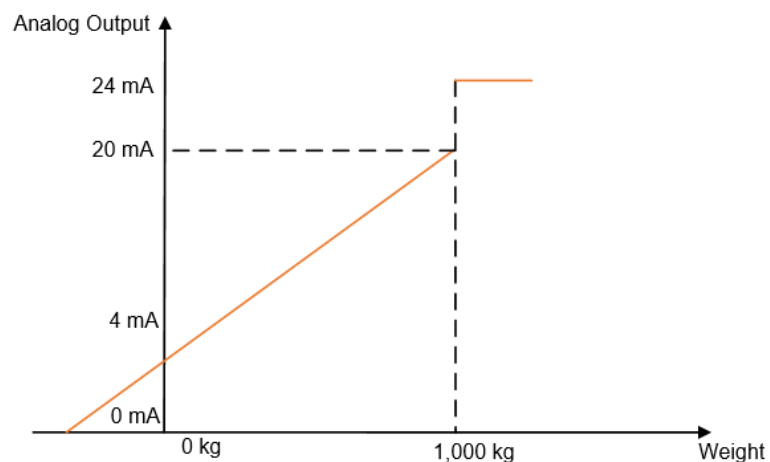
Figure 2-16: Analog Output Example

2.5.5. Error Message

With the Errors icon ⚠ in view, press the ENTER key to access a listing of current error messages.

Table 2-2: ACT100 Faults

Error value	ACT100 Display	Description	Action
009	"Board info. Err"	Hardware production information error	Cycle power; call MT Service if issue persists
010	"Calib. Block err"	Calibration block data error; block data is lost	Perform master reset Re-calibrate
011	"Scale block err"	Scale block data error	Perform master reset Perform setup for scale block
012	"Term. Block err"	Transmitter block data error	Perform master reset Perform setup for transmitter block
013	"APP. Block err"	Application block data error	Perform master reset Perform setup for application block
014	"COM. Block err"	Communication block data error	Perform master reset Perform setup for communication block
015	"Maint. Block err"	Statistics block data error	Perform master reset Perform setup for maintenance block
016	"Analog system A/D fail"	Lost analog signal; abnormal functioning of scale	Call MT Service
018	"Zero failed Motion"	Zero failed due to scale is in motion	Wait scale to be stable
019	"Zero failed Net mode"	Zero failed due to scale is in Net mode	Attempt to Zero after Clear operation is performed
020	"Zero failed/Out of range"	Weight out of zero range	Unload scale and perform Zero again
021	"Zero failed Zero disabled"	Zero attempted when function disabled in Setup menu	Enable Zero function in Setup menu
022	"Tare failed Motion"	Tare failed due to scale is in motion	Wait scale to be stable
029	"Tare failed Zero not captured"	Tare failed due to Power-up Zero is not captured	Capture the Power-up Zero or disable Power-up Zero before Tare

030	"Tare Failed, over capacity"	Tare failed due to scale being over capacity	Unload weight on scale until overcapacity is cleared and perform Tare again
031	"Tare failed Negative value"	Tare failed due to current gross weight is negative	Adjust the weight on scale to make gross weight positive
035	"Analog saturation"	A/D converter in overload	Check the input signal(should be between 0mV and 20mV)or call MT Service
036	"Factory zero not done"	Factory Zero calibration not performed	Call MT Service
037	"Factory span not done"	Factory Span calibration not performed	Call MT Service
050	"LC Connection Error"	Lost connection between ACT100 and LC	Check the LC and connection cables

3   Installation

> **NOTICE**
>
> This chapter describes the mechanical and electrical installation of ACT100 in safe area applications. If the ACT100xx for Division 2 and Zone 2/22 hazardous areas will be used without a barrier, refer to the ACT100 division 2 and zone 2/22 installation guide 30529641 for additional information. The installation guide can be found at www.mt.com/ind-act100-downloads

3.1.   Mechanical Installation

The ACT100 mounts to a standard DIN rail. DIN mount includes an integral transmitter grounding system, visible in **Figure 3-1**.
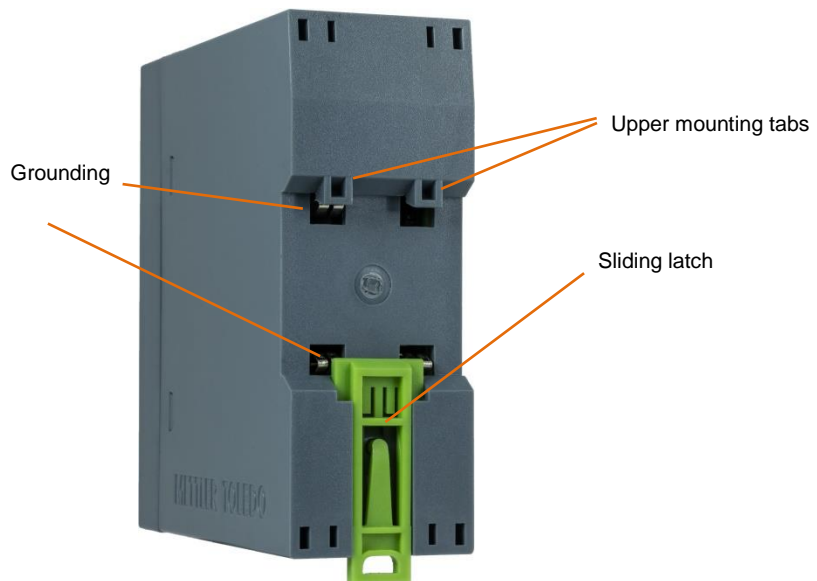
Figure 3-1: DIN-Mount Latch

To mount the ACT100 on a rail, open the latch by pulling down, then position the transmitter so that its upper tabs rest on the DIN rail.

Use a screwdriver to close the latch and secure the transmitter in position.

Figure 3-2: Latch Closure

To remove the ACT100, simply put the blade of a screwdriver in the latch and press it downward.

NOTICE

In order to ensure proper dissipation of heat from the transmitter's PCBs, and to avoid damage to the equipment, **the ACT100 must be mounted vertically**, on a horizontal din rail.

3.2. Electrical Installation

Figure 3-3 indicates ACT100 connections and their functions.
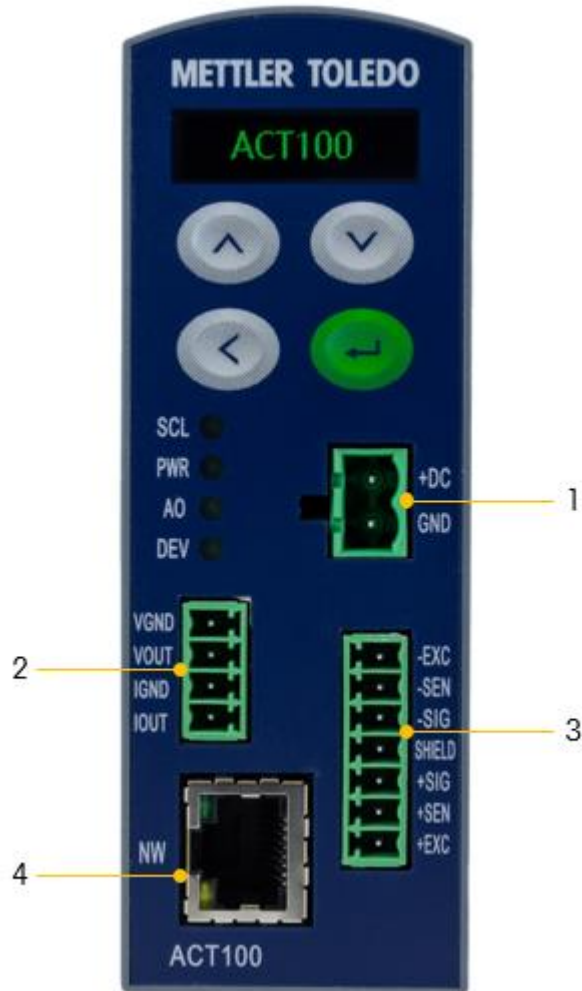
Figure 3-3: ACT100

Connections:

1 Power connector (12- 30 VDC)
2 Analog Output (4-20mA, 0-10V, 0-5V, 0-20mA, 0-24mA)
3 Analog scale interface (Number of load cells: up to 4x 350Ω or 10x 1000Ω; 1-4 mV/V; Number of scale: 1; Number of scale ranges: 1; Load cell excitation voltage: 5 VDC; 6 wire connection)
4 Ethernet connection

NOTICE

The special automatic grounding system at the back of the unit is present to ensure that the unit is grounded to the DIN rail. See Figure 3-1

3.2.1. Digital Inputs and Outputs Connection

Three inputs and two outputs are located on the top of the ACT100. Table 3-1 contains the specifications for the digital inputs and outputs.

Figure 3-4: ACT100, Top View (DIO model shown)

Table 3-1: Digital Inputs and Outputs Specification

	Input	Output
Permissible input voltage	0~24 VDC	5~30 VDC
Logical Low-level	0 ~ 3 VDC	
Logical High-level	10 ~ 24 VDC	
Input resistance	>3KΩ	
Max.current of one output		<150mA
Accumulated current of all outputs		<300mA
Support Sinking	GND connected to IN-COM	GND connected to OUT-COM
Support Sourcing	Power source to IN-COM	Power source to OUT-COM
Default function	None	None
Polarity Value	+True(Default) or – True	

		None; Center of Zero; Comparator 1-3; Fault; Motion; NET; Over Capacity; Under Zero; Fast Feed; Fine Feed; Analog Output Over Range; Analog Output Under Range, LC Connection Error
Available Functionality	None; Clear Tare; Tare; Zero; Abort SetPoint; Start/Resume SetPoint	

Example: Using a rising-edge input signal to trigger the ACT100 to perform a Zero operation, "Polarity" can be set as "+ True" and "Assignment" as "Zero". Refer to Figure 3-5**:**
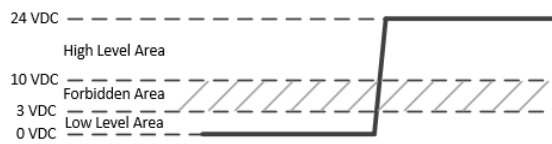
Figure 3-5: A Rising-edge Trigger Signal on Input

Using a falling-edge input signal to trigger ACT100 to perform a Tare operation, "Polarity" can be set as "- True" and "Assignment" as "Tare". Refer to Figure 3-6**.**

Figure 3-6: A Falling-edge Trigger Signal on Input

NOTICE

Do not use input voltage between 3 – 10 VDC. Unstable input signal will result. See Figure 3-5 and Figure 3-6 for proper operation

Digital inputs and Outputs electrical connection instructions are shown below. (From Figure 3-7 to Figure 3-10)
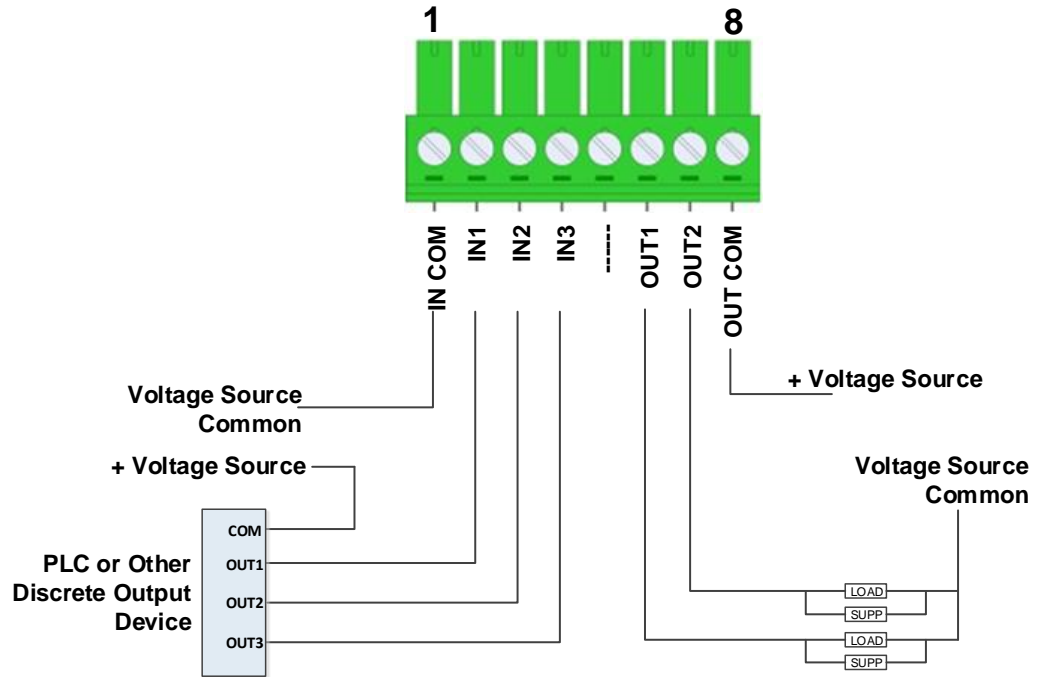
Figure 3-7: Sinking Input, Sourcing Output
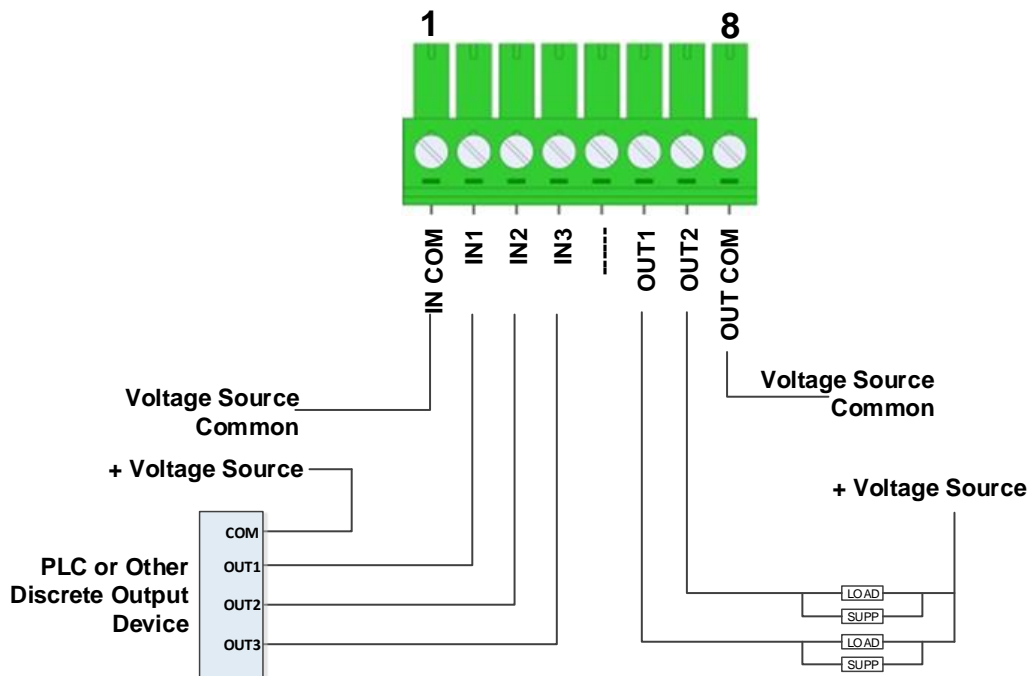
Figure 3-8: Sinking Input, Sinking Output
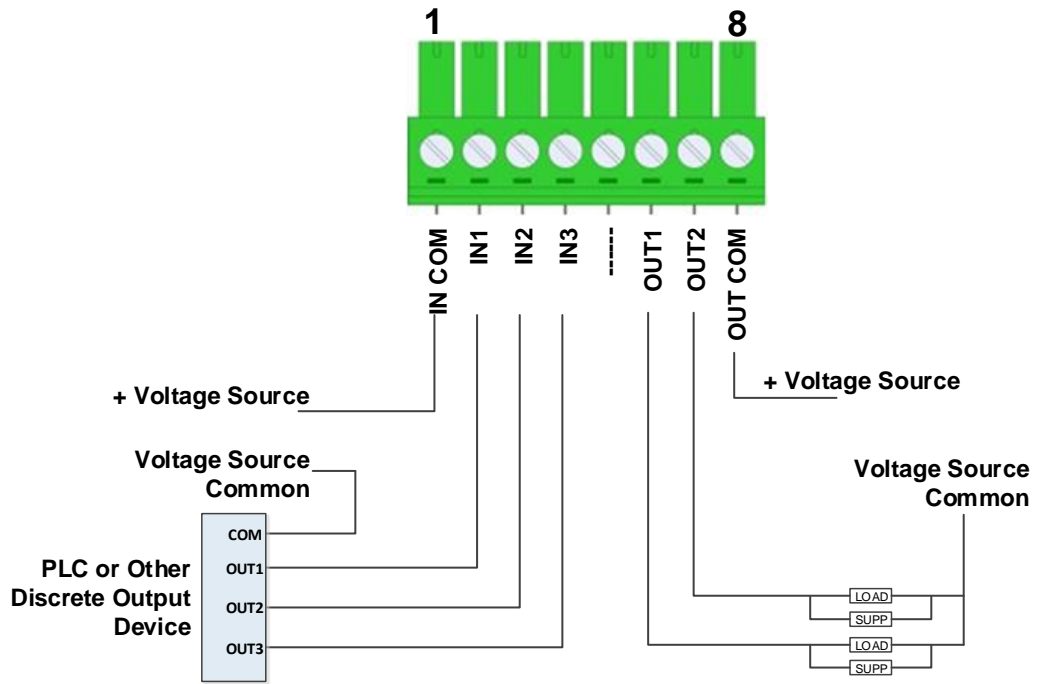
Figure 3-9: Sourcing Input, Sourcing Output
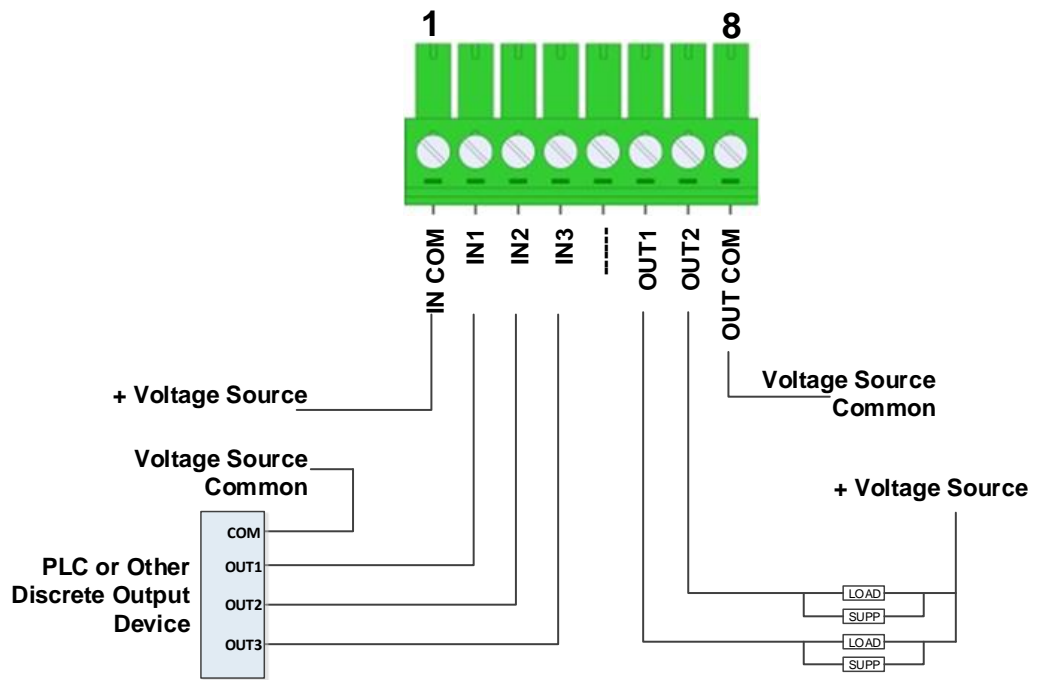
Figure 3-10: Sourcing Input, Sinking Output

3.2.2. Analog Output Connection
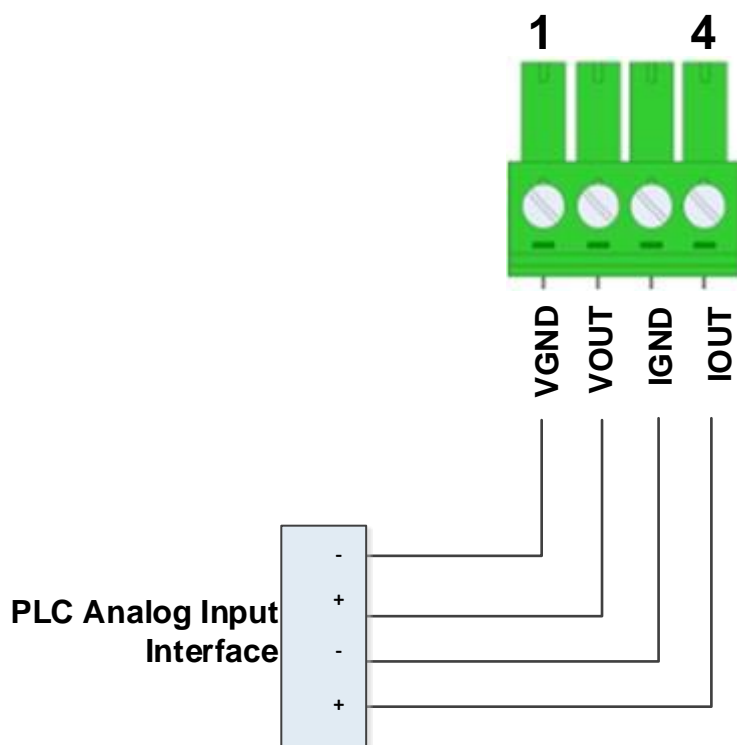
Figure 3-11: Analog Output Connection

3.2.3. Analog Load Cell Connection

Install the ferrite by passing it through the ferrite and wrapping it around once, as indicated here.

Figure 3-12: Ferrite Installed on Analog Load Cell Cable

Following table shows the difference of connecting 6-wire and 4-wire load cells:

Table 3-2 Connecting 6-wire and 4-wire load cells

6-wire load cells	4-wire load cells
Connect according to the signal diagram	Add jumper wires between –EXC and –SEN; and between +EXC and +SEN

Table 3-3 Recommended Maximum Cable Lengths

TSR (Ohms)	24 Gauge (meters/feet)	20 Gauge (meters/feet)	16 Gauge (meters/feet)
350	234/800	610/2000	1219/400
87 (4 -350 Ω cells)	60/200	182/600	304/1000

3.2.4. PLC Connection

To connect ACT100 with a PLC, use the analog output port shown on Figure 3-3.

Figure 3-13 presents a connection diagram of a weighing system using an ACT100.
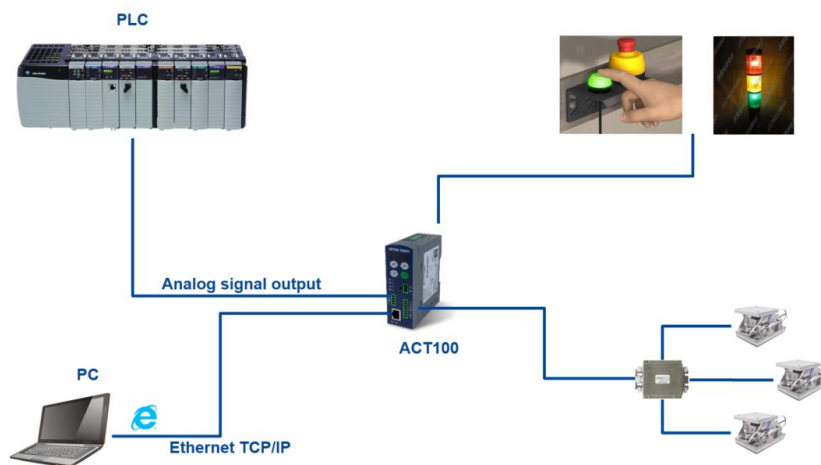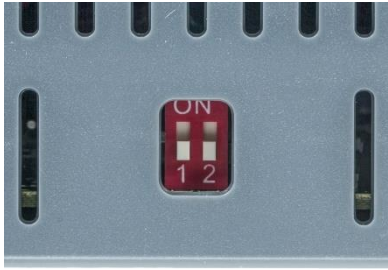
Figure 3-13: ACT100 Based Weighing System

3.3.   DIP Switches

Two DIP switches, 1 and 2, are accessible from the underside of the ACT100's housing. Table 3-3 summarizes their functions.

Table 3-4: DIP Switch Functions

ACT100 DIP Switches	Legal for Trade	Reset	
	Switch 1	Switch 2	Function
	OFF	OFF	Normal operation
	ON	OFF	Protection mode for important parameters, e.g. calibration values
	OFF	ON	Master reset of all data during transmitter power-up
	ON	ON	Reset of all **except** calibration data during transmitter power-up

3.4.   Power Supply

The ACT100 transmitter is powered only by external DC input (12V to 30V).

Table 3-5: ACT100 Power Consumption

Supply Voltage	1x 350Ω Loadcell		4x 350Ω Loadcell	
	Current (mA)	Power (W)	Current (mA)	Power (W)
12 VDC	265	3.18	290	3.48
24 VDC	160	3.84	170	4.08
30 VDC	135	4.05	145	4.35

4 Webserver Configuration and Maintenance Tool

4.1.Webserver

Webserver supports the following functions:

- Configuring of the ACT100 Transmitter via web browser, such as IE, Chrome and Safari;

- Accessing diagnostic and maintenance information for service purposes;
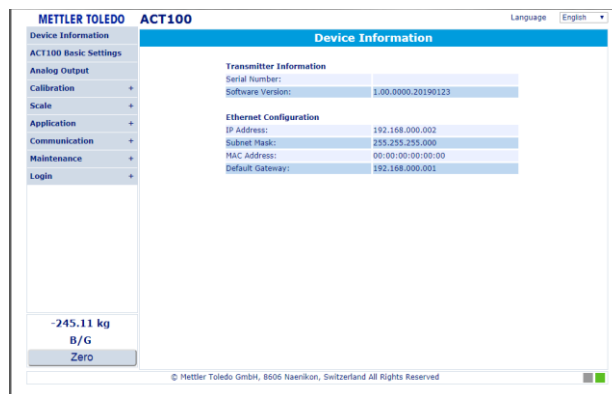
Figure 4-1 Webserver Splash Screen

By inputting the IP address of ACT100 Transmitter in the web browser, the startup screen of webserver will be displayed.

4.1.1. Webserver Setup

4.1.1.1. PC setup

NOTICE

Make sure the PC and ACT100 Transmitter are in the same local network.

The typical PC's configuration:

IP address: 192.168.0.X (X = 0 ~ 254, exclude 2), Subnet Mask: 255.255.255.0, Default Gateway: can be left blank
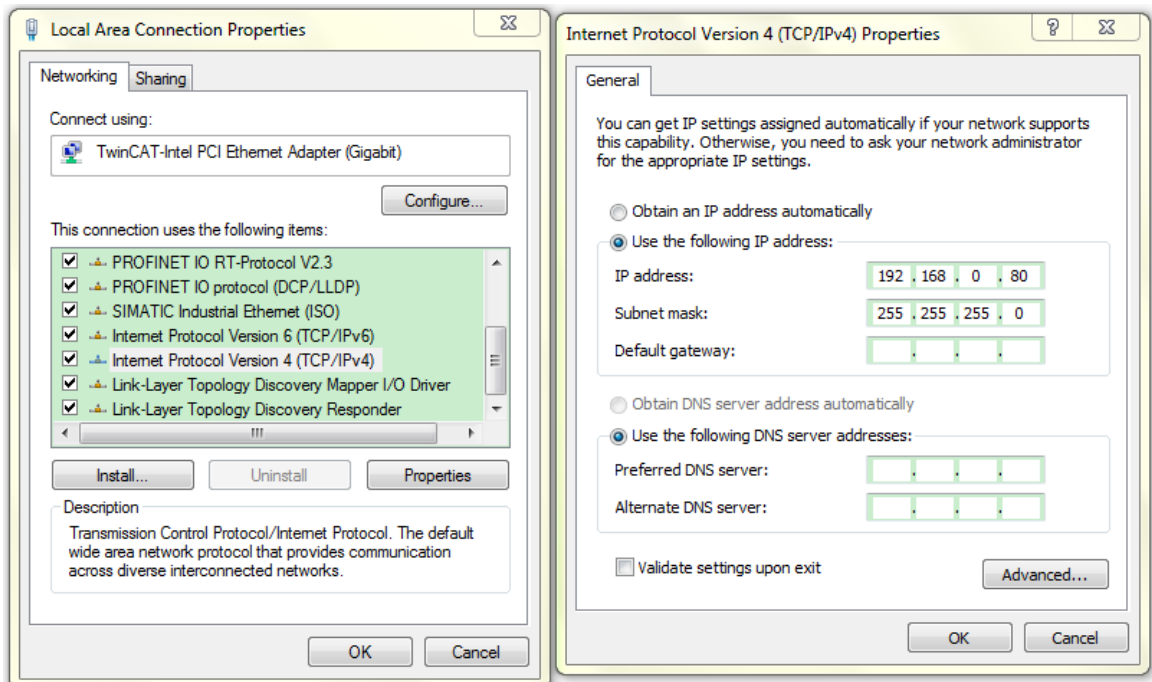
Figure 4-2 Local Area Connection Setting

NOTICE

The default setting of the ACT100 Transmitter is as follows:
IP address: 192.168.0.2, Subnet Mask: 255.255.255.0, Gateway: 192.168.0.1.

4.1.1.2. IE setup

Internet Option -> LAN setting -> Automatically detect settings should be unchecked.
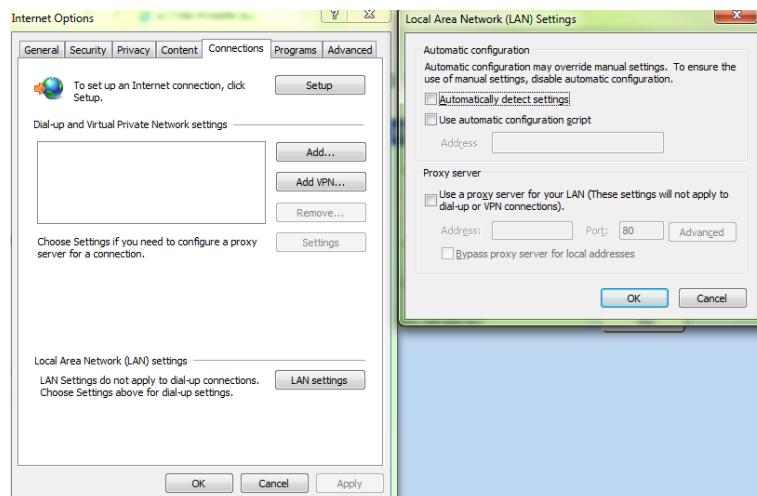
Figure 4-3 IE setting

4.2. Elements of Webserver

4.2.1. Device Information

The device information page displays basic information about the ACT100. Transmitter information includes the serial number of the unit and the current software version. The service Ethernet configuration includes the IP address of the ACT100, subnet mask, MAC address and default gateway. None of this information can be edited from this screen.

Device Information

Transmitter Information

Name	ACT100 Scale
Serial Number	69961486CW
Software Version	1.00.0001

Service Ethernet Configuration

IP Address	192.168.000.002
Subnet Mask	255.255.255.000
MAC Address	00:10:52:C2:17:DC
Default Gateway	192.168.000.001

Figure 4-4 Device Information

4.2.2. ACT100 Basic Settings

The ACT100 basic settings include three options:

Display Auto Off	This sets the amount of inactive time required before the display on the front of the ACT100 automatically turns itself off. The options are 1 minute, 10 minutes, 30 minutes, or this feature can be disabled so the display does not turn off automatically.
Display Language	This sets the language to be used on the ACT100 display. The options are English or Chinese.
Pushbuttons	This allows the pushbuttons on the front of the ACT100 to be either enabled or disabled. If disabled, the only way to enable the pushbuttons again is via the webserver.

Figure 4-5 ACT100 Basic Settings

4.2.3. Analog Output

4.2.3.1. Analog Output Settings

Source	Selects either Display Weight or Gross Weight as the source of the analog output
Output Type	Sets the type of analog output signal provided. Available ranges are None, 0-5V, 0-10V, 4-20mA, 0-20mA, 0-24mA.
Analog Zero Value	Sets the weight value that corresponds to the low end of the selected Output Range. Weight values less than or equal to the Zero Value causes the device to output the lowest value of the Output Range.
Analog Scale Value	Sets the weight value that corresponds to the high end of the selected Output Range. Weight values greater than or equal to the Full Scale Value causes the device to output the highest value of the Output Range.

Analog Output Settings

Analog Source	Displayed Weight ▾	
Output Type	None ▾	
Analog Zero Value	0.000000	kg
Analog Span Value	60.000000	kg

Submit   Reset

Figure 4-6 Analog Output Settings

4.2.3.2. Analog Output Adjustment

Allows for a minor adjustment to be made to the analog output signal. First, press the "Start" button to initiate an adjustment to the zero value signal will be made. Second, an adjustment to the full scale signal will be made. Adjustment should be completed with either a PLC or multimeter connected to the analog output of ACT100.

Adjustment is completed by using the "+", "++", "-", and "--" buttons on the webserver screen. Pressing the "+" or "-" (fine adjust) button makes an adjustment of 10 steps positively or negatively. Pressing the "++" or "--" (coarse adjust) button makes an adjustment of 200 steps positively or negatively.

Press "Continue" to proceed in the adjustment process from Zero Value to Span Value. Press "ESC" to cancel the current adjustment step, please note the prior step adjustment result has been saved.

Analog Output Adjustment

Please note that once the analog output adjustment is started, the analog output will be forced to values that are unrelated to the actual weight value. Pressing "Start" will change the analog output immediately.

Start Analog Output Adjustment?

Start

Figure 4-7 Analog Output Adjustment

Analog Output Adjustment

Adjust Zero Output

Press "+ +" or "+" to increase Zero Output

Press "- -" or "-" to decrease Zero Output

--	-	+	++

Press Continue to save and adjust Span Output

Press ESC to Abort

ESC	Continue

Figure 4-8 Example of Zero Value Adjustment

4.2.4. Calibration

4.2.4.1. Calibration Setting

Calibration offers two settings that can be changed:

Geo	Used to set the Geo code based on where the ACT100 is located in the world. The valid range is 0-31. See Section 5 of this document for more information on Geo Codes.
Linearity	This is the number of points of linearity to be used in calibration. Options are 3 point, 4 point, 5 point or none. Please note that even after a change to the number of linearity points is submitted, the user must execute a "Set Span" or "Step Calibration" for this change to be saved.

Calibration Setting

GEO (Range:0-31)	16
Linearity	None ∨

New Linearity value will be saved after a success of " **Set Span** " or " **Step Calibration** "

Submit   Reset

Figure 4-9 Calibration Setting

4.2.4.2.   Set Zero

Scale zero is set simply by emptying the scale and pressing the "Start" button on the Set Zero page.

Set Zero

Start Capture Zero?

Start

Figure 4-10 Press "Start" to Initiate the scale Zero Adjusmtnet

If zero is successfully captured, a message showing the zero capture has completed is displayed. The user can navigate away from the page if they are satisfied with the zero captured or they can begin the process over again.

Set Zero

Adjustment in process..

Start

Set Zero

Capture zero completed. Capture Zero Again?

Start

Figure 4-11 A successful Zero Adjustment

If motion occurs during adjustment, a message "Capture zero completed in dynamic" will be shown as seen in Figure 4-12.

Set Zero

Capture zero completed in dynamic. Capture Zero Again?

Start

Figure 4-12 A Dynamic Zero Adjustment

4.2.4.3. Set Span

The scale's span calibration can be set either with or without a linearity adjustment. With linearity disabled, a single reference point is used to calibrate the scale. This is the normal method of span calibration. The webserver will display the correct number of test load points to be used in the calibration according to the linearity setting found in the Calibration Setting menu.

The process begins by entering the weight value into test load 1 and loading the scale with the corresponding test weight. Click the start button to calibrate that load point.

Set Span

Test Load 1   200   kg   Start

Place test load on scale and start adjustment.

Figure 4-13 Enter Test Load Value

Repeat this process for the rest of the test loads displayed on the webserver. When complete, the page will ask whether or not to save the calibration.
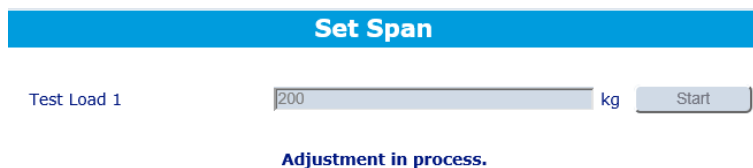
Figure 4-14 A Successful Span Adjustment

If motion occurs during adjustment, a message "Span adjustment complete in dynamic" will be shown as seen in Figure 4-15.
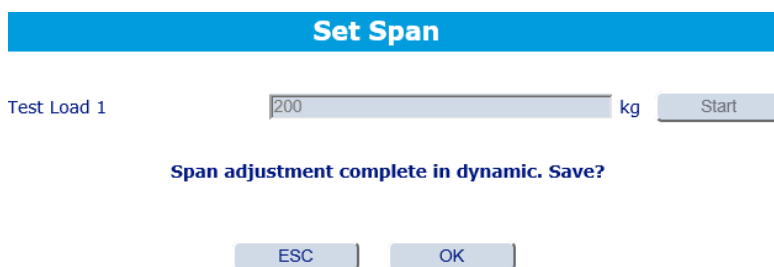
Figure 4-15 A Dynamic Span Adjustment

4.2.4.4. Step Calibration

Step adjustment is an iterative process in which a build-up or material substitution method of calibration is used to calibrate the span. Each step calibrates a portion of the full span.

This method is typically used with large vessels where only a portion of the required calibration test weights can be placed on the scale at one time. It starts from inputting the Test Load value in Figure 4-16 and pressing the "start" button.

Step Calibration

Test Load	25	kg

Current Weight   - - - - - -

Target Weight   - - - - - -

Step Count   0

Enter Test Load value, Place test load on scale and click button to start adjustment

ESC   Start

Figure 4-16 Input Test Load Value

When this step of calibration is completed, it shows current weight, press the "Continue" button and then remove the Test Load following the prompt message, then press the "Continue" button again, as shown in Figure 4-17 and Figure 4-18.

Step Calibration

Test Load	25	kg

Current Weight   25.023141kg

Target Weight   - - - - - -

Step Count   1

Adjustment successful. Click Done to finish calibration. Or click Continue.

ESC   Continue   Done

Figure 4-17 Get the Current Weight

Step Calibration

Test Load	25	kg

Current Weight   24.998473kg

Target Weight   - - - - - -

Step Count   1

Remove Test Load... then Click Continue.

ESC   Continue

Figure 4-18 Remove the Test Load

This process requires adding a replacement material, normally water. User can compare the Target Weight and Current Weight until they are very close. Then press the "Continue" button for the next step and add the Test Load again.
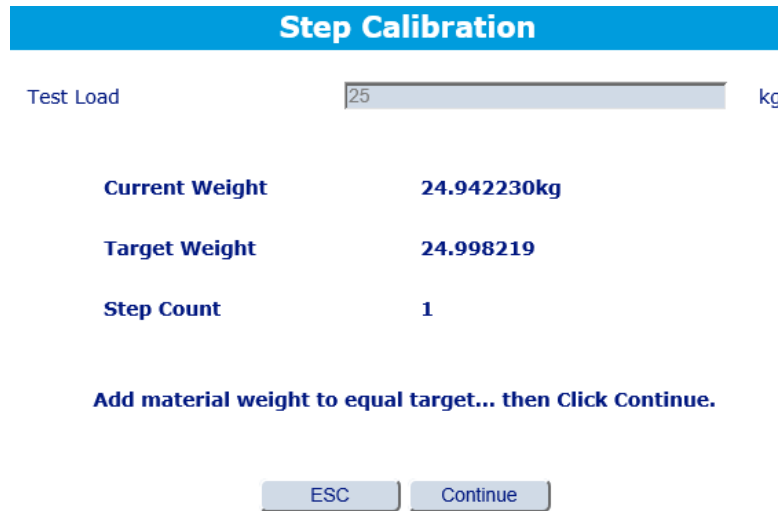
Step Calibration

| Test Load | 25 | kg |

Current Weight	24.942230kg
Target Weight	24.998219
Step Count	1

Add material weight to equal target... then Click Continue.

ESC   Continue

Figure 4-19 Add Replacement Material

Repeat the steps shown in Figure 4-17 to Figure 4-19 until the last step, then press the "Done" button in Figure 4-17.

After each step, the user has the option to continue with another step or to complete the calibration.

4.2.4.5.   CalFree

CalFree allows the scale to be calibrated without the use of test weights. The total load cell capacity, unit and output in mV/V must be entered. The system then calculates correct calibration for the scale.

Notes on Load Cell Capacity and Rated Cell Output

- For load cell capacity, enter the sum of all load cell capacities. For example, for three 50t load cells, enter 150,000 kg.

- For systems with passive dummy load cells, enter the value as if all legs have live load cells. For example, for a system with two 50t live load cells and two passive supports, enter 200,000.

- For Rated Cell Output, enter the sensitivity of each live load cell in mV/V – for example, 2.0000. For multiple load cells, enter the average sensitivity of all cells.

The ACT100 transmitter allows calibration of the scale without using test weights. This is based on manual entry of capacity and performance data from the load cell or load cell platform. This method of calibration can be used for initial check-out and testing of systems or when a large structure is used as the weighing vessel and it is not possible to apply test weights to the structure. METTLER TOLEDO highly recommends that test

weights be used whenever possible, as this provides the most accurate method of calibration.

The Rated Cell Output and Cell Capacity values cannot be zero, and are limited to 7 digits.

CalFree	
Total Cell Capacity	60.000000
CalFree Unit	kg
Rated Cell Output	2.000000 mV/V

Press OK to start CalFree.

OK

Figure 4-20 CalFree Settings

NOTICE

Scale calibration using CalFree™ will not be accurate when using zener diode barriers (such as Mettler Toledo ISB05 and ISB05x) between the transmitter and the scale. Do not use CalFree™ when barriers are installed.

4.2.5. Scale

4.2.5.1. Capacity and Increment

The capacity and increment page offers four settings

Unit	Select the weight unit of measure. Options are grams (g), kilograms (kg) and pounds (lb).
Capacity	Set the total capacity of the scale. Range is from 0-980000.
Increment	Set the increment size for the scale. Selection is made via a dropdown menu. Options are limited by the capacity chosen.
OverCapacity Blanking	Value above Capacity that causes ACT100 display to blank. Value is measured in divisions. Valid range is 0-99 d.

Capacity & Increment

Unit	kg ▾	
Scale Capacity (Range: 0-980000)	1500.000000	kg
Increment	1 ▾	kg
OverCapacity Blanking (Range: 0-99)	5	d

Submit   Reset

Figure 4-21 Capacity & Increment Settings

4.2.5.2. Zero

Power Up Mode	Determines if at power up, the transmitter will restart with the most recent zero reference point it had before power down or if it will reset to the calibrated zero reference.
Under Zero Blanking	Blanking of the display is used to indicate an under-zero condition when the weight on the scale falls below the current zero reference. Set the under zero blanking for the number of divisions (d) that the transmitter is permitted to go under zero before blanking. A setting value of 0-98 blanks the display at the specified number of divisions below gross zero. A value of 99 makes the transmitter blank at 50% of the capacity value in the negative direction
Power Up Zero	The Power Up Zero capture range selections include Disabled [default], 2% or 10% plus or minus. If the range setting is enabled, the Power Up Zero is applied only when the weight reading on the scale is within the selected range around the originally calibrated zero reference. If the weight on the scale is outside of the zero range, the display will indicate EEE until the weight is adjusted

to within this range and zero is captured.

Pushbutton Zero — The Zero range selections include Disabled, 2% [default] or 20% plus or minus from the calibrated zero point. If the current scale weight is outside the zero range when a pushbutton zero is commanded, the transmitter will display an error message

Zero

Power Up Mode	Reset
Under Zero Blanking (0-99)	5	d
Power Up Zero	Disabled
Pushbutton Zero	+/- 2%

Submit   Reset

Figure 4-22 Zero Settings

4.2.5.3. Stability

Motion Range — Sets the range (in divisions) in which the weight value can fluctuate and maintain a no-motion condition

No-motion Interval — Sets the amount of time (in seconds) in which the weight value must remain in the Motion Range in order to maintain a no-motion condition

Timeout — Sets the time (in seconds) after which the transmitter will stop attempting to complete a function that requires a no-motion condition and aborts the function.

Stability

Motion Range (0.1-3.0)	1.0	d
No-motion Interval (0.1-1.0)	0.3	s
Timeout (0-99)	3	s

Submit   Reset

Figure 4-23 Stability Settings

4.2.5.4. Filter

In many weighing applications, vibration can introduce error into your system or cause delays in the transfer of weight to your automation device. It is always recommended to first attempt to mechanically isolate your scale from the surroundings. When this cannot adequately be done, use the electronic filtering inside the ACT100. The Filter section offers

three settings: Weighing Mode, Limit Frequency and Environment.

Weighing Mode	**Normal:** Should only be used for non-automatic, human-powered weighing. Gives the most stable response that is required for "legal for trade" weighing. Not recommended with a process controlled by an automation device. **Dynamic:** Intended setting when process is controlled by automation device such as a PLC. **Trigger Weigh:** Recommended to use Dynamic mode filter instead of Trigger Weigh
Limit Frequency	**1-20 Hz:** Marks the point at which the filtering process begins to affect the disturbance. Disturbances above the limit frequency will have filtering applied. Recommendation is to start at 20 Hz and reduce the frequency only after adjusting the environment setting. The lower the frequency, the better the disturbance rejection, but it will extend the settling time.
Environment	**Very Stable, Stable, Standard, Unstable, Very Unstable:** Sets the level of attenuation applied to the signal above the limit frequency. A very stable environment will have the least attenuation applied to the signal and a very unstable environment will have the strongest attenuation. It is recommended to adjust this value first when changing filter settings. Start with "very stable" and work your way down.

Figure 4-24 Filter Settings

4.2.5.5. Type

Name	Allows a custom name to be set to help identify the device. Can use up to 20 characters,

includes '0'~'9', 'a'~'z', 'A'~'Z', '-
' and Space.

Approval   Select approval type from a drop
down menu. Possible selections
include None, Canada, OIML &
CPA, or USA

Figure 4-25 Type Settings

4.2.6. Application

4.2.6.1. Comparator

The ACT100 supports a total of three comparators. One, two or
all three comparators may be used. The limit of each
comparator may be modified via the webserver. Comparators
must be enabled before the comparator limit can be changed.
The comparator limit must be less than the scale capacity.

Figure 4-26 Comparator Settings

4.2.6.2. SetPoint

SetPoint is a simple application that allows for the inputs and
outputs of the ACT100 to be used to react to reaching a set
weight. For more details see Appendix A - SetPoint.

Several options are available to set up this application:

Mode   Options are either Concurrent or
Independent, see Appendix A -
SetPoint for more details

Source   Select whether the Gross
Weight or Displayed Weight will

		be used as the source value to be compared to the target weight
Latch		Set to be either enabled or disabled. If enabled, SetPoint output is latched. The latch is cleared by starting the SetPoint application.
Target Weight		Set the target weight at which the SetPoint output will go TRUE when reached.
Pre-act		Weight of material expected to be added after the Fine Feed output goes FALSE.
Fine Feed		When the weight rises above this value, the Fine Feed output will go TRUE and the Fast Feed output will go FALSE. This is intended to signal to the PLC that the process should slow as the target weight is approached.

SetPoint

Mode	Concurrent	
Source	Displayed Weight	
Latch	Disabled	
Target Weight	0.000000	kg
Pre-act	0.000000	kg
Fine Feed	0.000000	kg

Submit   Reset

Figure 4-27 SetPoint Settings

4.2.6.3. Discrete Inputs

This page allows for the polarity type and assignments to be set for all three inputs of the ACT100. Each input can individually have its input polarity set to either +True or –True. Each input can also be individually assigned to a specific function. Whenever that input becomes true, it's assigned function will execute. Possible functions include: None, Clear Tare, Tare, Zero, Abort SetPoint application, Start/Resume Setpoint application.

Discrete Inputs

#1 Polarity	+ True
#1 Assignment	None
#2 Polarity	+ True
#2 Assignment	None
#3 Polarity	+ True
#3 Assignment	None

Submit   Reset

Figure 4-28 Discrete Inputs Settings

4.2.6.4.   Discrete Outputs

This page allows for the polarity type and assignments to be set for both outputs of the ACT100. The output polarity for the outputs can be set to either +True or –True. Each output can be individually assigned to go true when it's assigned function is true. Options for the assigned function are: None, Center of zero, Comparator 1, Comparator 2, Comparator 3, Fault (if any fault is detected), Motion (if motion is detected on the scale), Net (if in net weighing mode), Over Capacity, Under Zero, Fast Feed (see Section 4.2.6.2), Fine Feed (see Section 4.2.6.2), Analog Output over range, Analog Output under range.

Discrete Outputs

Output Polarity	+ True
#1 Assignment	None
#2 Assignment	None

Submit   Reset

Figure 4-29 Discrete Outputs Settings

4.2.7.   Communication

Allows for certain Ethernet settings to be edited. The IP address, Subnet mask, and default gateway of the ACT100 can be changed here. The MAC address can be viewed but not changed. Once any of these values are edited, the ACT100 will automatically restart after 3 seconds.

Figure 4-30 Service Ethernet Settings

4.2.8. Maintenance

4.2.8.1. Load Cell Output

This page displays the raw count value from the load cell(s). This value can be useful when troubleshooting the system to see the raw value seen by the scale input of the ACT100.

Figure 4-31 Load Cell Output

4.2.8.2. Calibration Values

This page shows the calibration weight values and the corresponding load cell output for that value. If fewer than 5 linearity points are used for calibration, unused calibration points are disabled on this page.

Calibration values can manually be changed on this screen by either adjusting the weight of the calibration point or the corresponding load cell output counts.

Figure 4-32 Calibration Values

4.2.8.3. Statistics

Displays various statistics to help assist with troubleshooting. Many of these values can be reset to zero via the webserver.

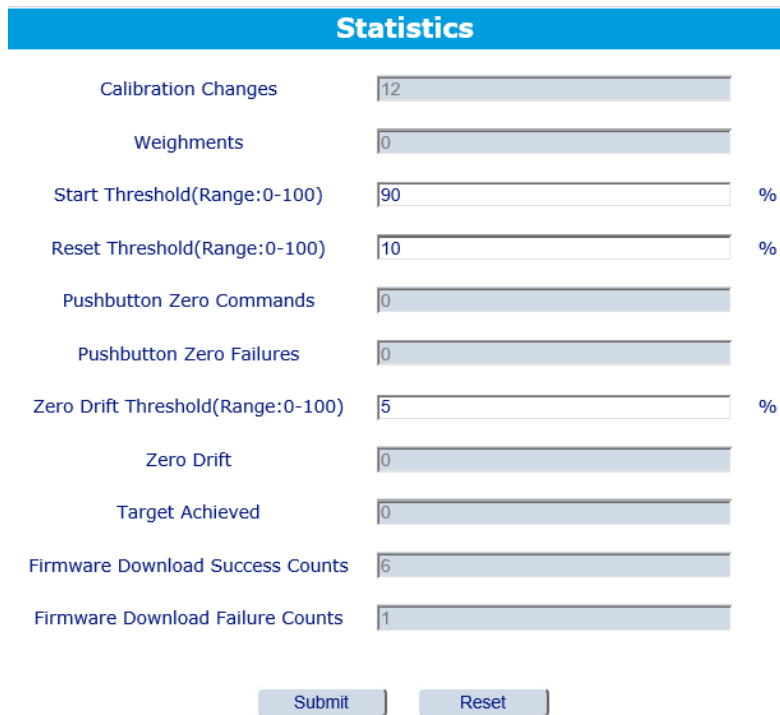|	
Calibration Changes	Displays the number of times a zero, span, step or CalFree calibration has been performed
Weighments	Used to show how many weighing cycles have completed. Each weighing cycle is initiated when gross weight exceeds Start Threshold and ended when it falls below Reset Threshold.
Start Threshold	% of the Capacity value
Reset Threshold	% of the Capacity value
Zero Commands	Number of pushbutton zero commands attempted. This includes the "Zero" button in the bottom left corner of the webserver. This does not include zero calibrations.
Zero Failures	Number of times a pushbutton zero command has failed. This includes the "Zero" button in the bottom left corner of the webserver. This does not include zero calibrations.
Target Achieved	Number of times the weight value is greater than or equal to any of the comparator values in use
Firmware Download Success Counts	Number of times the webserver has been used to successfully download firmware to the ACT100.
Firmware Download Failure Counts	Number of times the webserver has failed to successfully download firmware to the ACT100.

61

Statistics

Calibration Changes	12
Weighments	0
Start Threshold(Range:0-100)	90 %
Reset Threshold(Range:0-100)	10 %
Pushbutton Zero Commands	0
Pushbutton Zero Failures	0
Zero Drift Threshold(Range:0-100)	5 %
Zero Drift	0
Target Achieved	0
Firmware Download Success Counts	6
Firmware Download Failure Counts	1

Submit   Reset

Figure 4-33 Statistics

4.2.8.4. Faults

Scale Overload	Number of times over capacity blanking has occurred. Weights over capacity, but below the over capacity blanking value will not increment this fault.
Scale Underload	Number of times under zero blanking has occurred. Weights under zero, but above the under zero blanking value will not increment this fault.
Watchdog Failure	Number of times the watchdog timer of the ACT100 has failed.

Faults

Scale Overload   0

Scale Underload   13

Watchdog Failure   0

Submit   Reset

Figure 4-34 Faults

4.2.8.5.   Error Messages

Any current error messages for the ACT100 are displayed here. If there are no errors listed here, the ACT100 has no current errors. Once an error is corrected, the error message will automatically clear from this page. See Section 2.5.5 for details.

4.2.8.6.   Firmware Downloads

Download new versions of the firmware to the ACT100 here. The latest firmware files can be found at www.mt.com/ind-act100-downloads. Click the "Choose File" button to navigate to the firmware file on your computer. Click the "Download" button to begin the download process, as shown in Figure 4-35 to Figure 4-37. The webserver will reload itself when the process is complete.

Firmware Downloads

Select a File to Download ACT100 Firmware
Choose file   ACT100_1.0.1.mot
Name: ACT100_1.0.1.mot
Size: 1.32MB
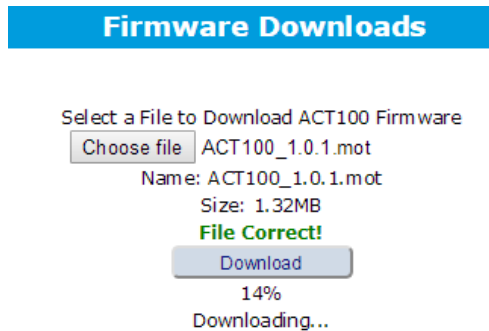Download

Figure 4-35 Choose File
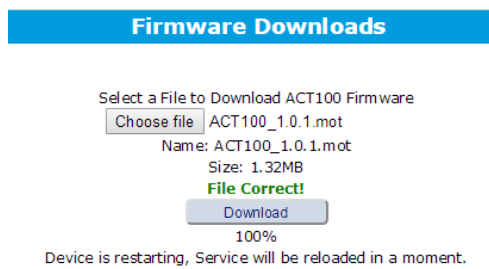
Figure 4-36 Download in Process

Figure 4-37 Download Successful

4.2.9. Login

4.2.9.1. Login/Logout

If login protection is enabled, this is where the password to login is entered. If login protection is disabled, this page is blank.

4.2.9.2. Protection Setting

Enable or disable whether a login password is needed to change any settings via the webserver.

4.2.9.3. Change Password

If the login password needs to be changed, the old password must be entered on this screen along with the new password. The password must be a 6 digit number.

5 GEO Codes

The GEO code feature provided in the ACT100 transmitter permits calibration readjustment due to changes in elevation or latitude without reapplying test weights. This adjustment assumes a previously accurate calibration was completed with the GEO code set properly for that original location, and that the GEO code for the new location can be accurately determined. The procedure for using this feature is as follows.

5.1. Original Site Calibration

1. Use the GEO code chart (Table 5-1) on the following pages to determine the GEO code for the current altitude and location at which the scale will be calibrated.

2. Enter that GEO value into the GEO code parameter in setup at Scale >Calibration.

3. Immediately after entering the GEO code, perform a zero and span adjustment using accurate test weights.

4. Exit the setup menu tree.

5. The scale can now be used in its new location.

5.2. New Site GEO Code Adjustment

When a terminal is to be reinstalled at a different geographic location, gravitational and altitude changes can be accounted for by following these steps. Note that this procedure is not necessary if an on-site recalibration is performed.

1. Use the GEO code chart (Table 5-1) on the following pages to determine the   GEO code for the new altitude and location at which the scale will be used.

2. Enter that GEO value into the GEO code parameter in Setup at Scale >Calibration.

3. Immediately after entering the GEO code, exit the setup menu tree. DO NOT perform a normal calibration.

The calibration has now been adjusted for the differences in gravity from the original site of calibration to the new site of use.

▐ Using the GEO code value for calibration adjustment is not as accurate as re-applying certified test weights and re-calibrating the scale in a new location.

Latitude North or South, in Degrees and Minutes	Height Above Sea Level, in Meters										
	0	325	650	975	1300	1625	1950	2275	2600	2925	3250
	325	650	975	1300	1625	1950	2275	2600	2925	3250	3575
	Height Above Sea Level, in Feet										
	0	1060	2130	3200	4260	5330	6400	7460	8530	9600	10660
	1060	2130	3200	4260	5330	6400	7460	8530	9600	10660	11730
0° 0'–5° 46'	5	4	4	3	3	2	2	1	1	0	0
5° 46'–9° 52'	5	5	4	4	3	3	2	2	1	1	0
9° 52'–12° 44'	6	5	5	4	4	3	3	2	2	1	1
12° 44'–15° 6'	6	6	5	5	4	4	3	3	2	2	1
15° 6'–17° 0'	7	6	6	5	5	4	4	3	3	2	2
17° 10'–19° 2'	7	7	6	6	5	5	4	4	3	3	2
19° 2'–20° 45'	8	7	7	6	6	5	5	4	4	3	3
20° 45'–22° 22'	8	8	7	7	6	6	5	5	4	4	3
22° 22'–23° 54'	9	8	8	7	7	6	6	5	5	4	4
23° 54'–25° 21'	9	9	8	8	7	7	6	6	5	5	4
25° 21'–26° 45'	10	9	9	8	8	7	7	6	6	5	5
26° 45'–28° 6'	10	10	9	9	8	8	7	7	6	6	5
28° 6'–29° 25'	11	10	10	9	9	8	8	7	7	6	6
29° 25'–30° 41'	11	11	10	10	9	9	8	8	7	7	6
30° 41'–31° 56'	12	11	11	10	10	9	9	8	8	7	7
31° 56'–33° 9'	12	12	11	11	10	10	9	9	8	8	7
33° 9'–34° 21'	13	12	12	11	11	10	10	9	9	8	8
34° 21'–35° 31'	13	13	12	12	11	11	10	10	9	9	8
35° 31'–36° 41'	14	13	13	12	12	11	11	10	10	9	9
36° 41'–37° 50'	14	14	13	13	12	12	11	11	10	10	9
37° 50'–38° 58'	15	14	14	13	13	12	12	11	11	10	10
38° 58'–40° 5'	15	15	14	14	13	13	12	12	11	11	10
40° 5'–41° 12'	16	15	15	14	14	13	13	12	12	11	11
41° 12'–42° 19'	16	16	15	15	14	14	13	13	12	12	11
42° 19'–43° 26'	17	16	16	15	15	14	14	13	13	12	12
43° 26'–44° 32'	17	17	16	16	15	15	14	14	13	13	12
44° 32'–45° 38'	18	17	17	16	16	15	15	14	14	13	13
45° 38'–46° 45'	18	18	17	17	16	16	15	15	14	14	13
46° 45'–47° 51'	19	18	18	17	17	16	16	15	15	14	14

Latitude North or South, in Degrees and Minutes	Height Above Sea Level, in Meters										
	0	325	650	975	1300	1625	1950	2275	2600	2925	3250
	325	650	975	1300	1625	1950	2275	2600	2925	3250	3575
	Height Above Sea Level, in Feet										
	0	1060	2130	3200	4260	5330	6400	7460	8530	9600	10660
	1060	2130	3200	4260	5330	6400	7460	8530	9600	10660	11730
47° 51'–48° 58'	19	19	18	18	17	17	16	16	15	15	14
48° 58'–50° 6'	20	19	19	18	18	17	17	16	16	15	15
50° 6'–51° 13'	20	20	19	19	18	18	17	17	16	16	15
51° 13'–52° 22'	21	20	20	19	19	18	18	17	17	16	16
52° 22'–53° 31'	21	21	20	20	19	19	18	18	17	17	16
53° 31'–54° 41'	22	21	21	20	20	19	19	18	18	17	17
54° 41'–55° 52'	22	22	21	21	20	20	19	19	18	18	17
55° 52'–57° 4'	23	22	22	21	21	20	20	19	19	18	18
57° 4'–58° 17'	23	23	22	22	21	21	20	20	19	l9	18
58° 17'–59° 32'	24	23	23	22	2\2	21	21	20	20	19	19
59° 32'–60° 49'	24	24	23	23	22	22	21	21	20	20	19
60° 49'–62° 9'	25	24	24	23	23	22	22	21	21	20	20
62° 9'–63° 30'	25	25	24	24	23	23	22	22	21	21	20
63° 30'–64° 55'	26	25	25	24	24	23	23	22	22	21	21
64° 55'–66° 24'	26	26	25	25	24	24	23	23	22	22	21
66° 24'–67° 57'	27	26	26	25	25	24	24	23	23	22	22
67° 57'–69° 35'	27	27	26	26	25	25	24	24	23	23	22
69° 5'–71° 21'	28	27	27	26	26	25	25	24	24	23	23
71° 21'–73° 16'	28	28	27	27	26	26	25	25	24	24	23
73° 16'–75° 24'	29	28	28	27	27	26	26	25	25	24	24
75° 24'–77° 52'	29	29	28	28	27	27	26	26	25	25	24
77° 52'–80° 56'	30	29	29	28	28	27	27	26	26	25	25
80° 56'–85° 45'	30	30	29	29	28	28	27	27	26	26	25
85° 45'–90° 00'	31	30	30	29	29	28	28	27	27	26	26

Table 5-1: GEO Adjustment Values

6 Appendix A - SetPoint

6.1. Introduction

SetPoint is a simple application that allows for the inputs and outputs of the ACT100 to react to reaching pre-set weights determined by Target Weight, Pre-act and Fine Feed in the below equations.

$$CP1 = Target\ Weight - Pre\text{-}act - Fine\ Feed$$

$$CP2 = Target\ Weight - Pre\text{-}act$$

Fine Feed could be zero. In this case, SetPoint works in single speed mode. The Fast Output is disabled, only Fine Output works.

The Source is used to determine which value, Displayed Weight or Gross Weight, is compared to CP1 and CP2. The comparison result and Latch option determine the status of Fast Output and Fine Output. The Mode parameter determines how Fast Output and Fine Output work.

Table 6- 1: SetPoint Settings

Mode	Options are either Concurrent or Independent
Source	Select whether the Gross Weight or Displayed Weight will be used as the source value to be compared to the target weight
Latch	Set to be either enabled or disabled. If enabled, SetPoint output is latched once the weight reaches CP2. The latch is cleared by starting the SetPoint application.
Target Weight	Set the target weight.
Pre-act	Weight of material expected to be added after the Fine Feed output goes FALSE.
Fine Feed	This parameter is used together with Target Weight and Pre-act to define the CP1.

6.2. Concurrent Mode

When Source is set to Gross Weight, two Outputs of Discrete IO are set respectively as Fast Output and Fine Output and gross weight is below CP1, both Fast and Fine Outputs are TRUE. The controlled valves in the user's equipment are open so the material filling speed is the fastest. Then when gross weight increases to hit CP1, Fast Output switches to FALSE and Fine Output remains TRUE until CP2 is reached. Both Fast and Fine Outputs are FALSE at this point and the corresponding valves are closed. The material filling is stopped. The whole process is shown in Figure 6-1.
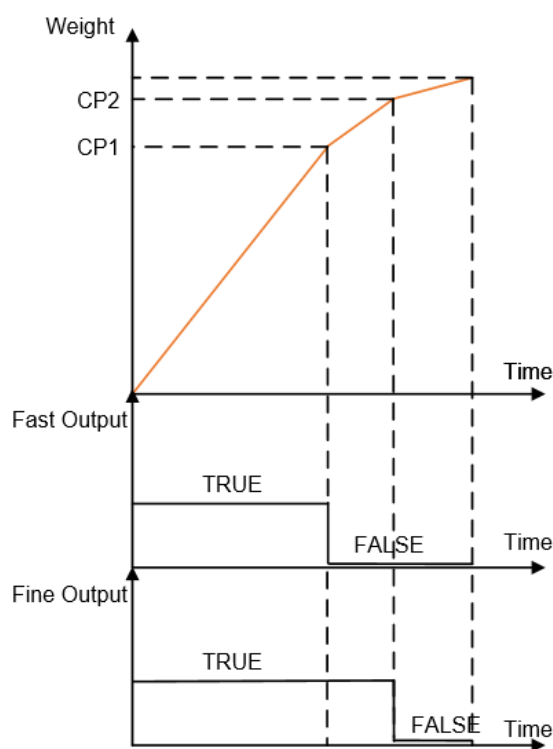
Figure 6-1 Concurrent Mode

6.3. Independent Mode

In this mode the Fast Output and Fine Output will be TRUE sequentially. Figure 6-2 shows the difference to Concurrent Mode.
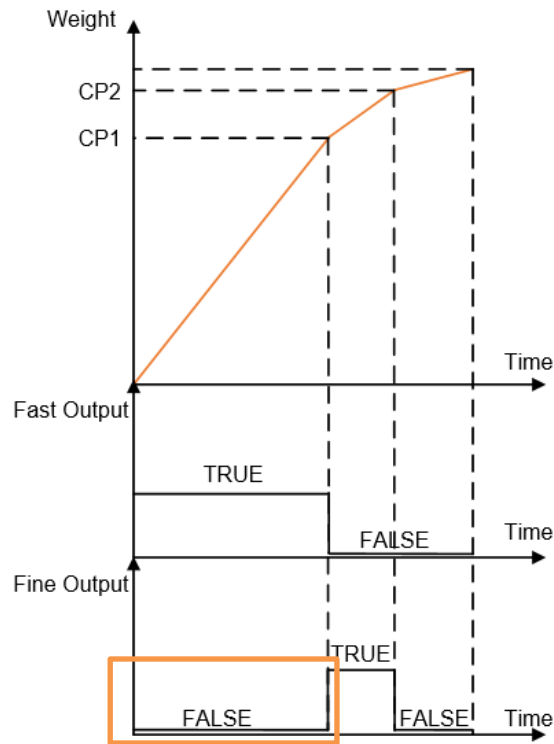
Figure 6-2 Independent Mode

6.4.   Latch

When Latch is Enabled and weight is above CP2, the DIO Outputs are FALSE regardless of additional weight changes, e.g. weight somehow decreases to be less than CP2 or even CP1. In this case, the False status remains until a Start/Resume Setpoint signal is triggered via a Discrete IO input.

The Abort SetPoint application input signal can be used to pause the SetPoint process. In this case, the Fast and Fine Outputs will change to FALSE regardless of the comparison result between weight and CP1/CP2. A Start/Resume SetPoint signal is required to resume the process.
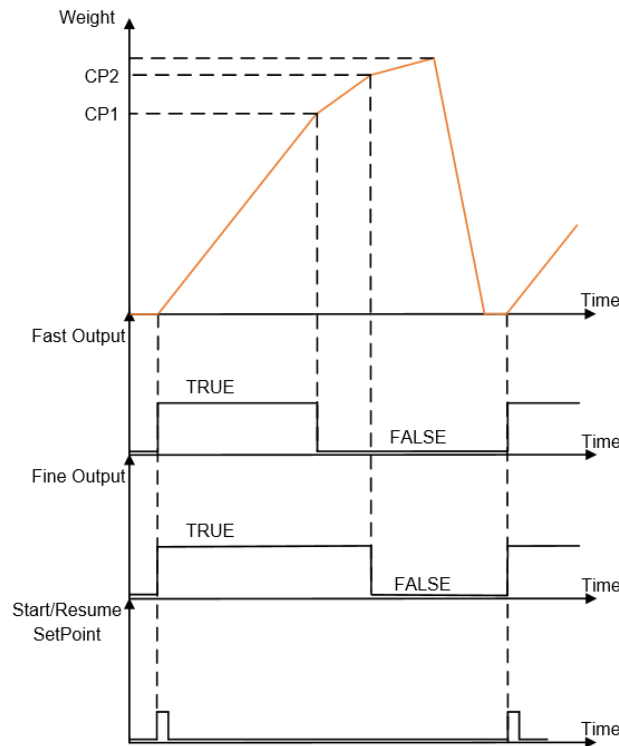
Figure 6-3 Latch Enabled with Start/Resume Input

When Latch is Disabled, neither Start/Resume Setpoint nor Abort SetPoint application signal will work. The Fast and Fine Outputs are only determined by the comparison result between weight and CP1/CP2. This is completely an automatic mode.

Figure Table:

Figure Table

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