

ACT350 POWERCELL

Transmitter



METTLER TOLEDO

ACT350 POWERCELL Transmitter

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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.

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- 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.
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- 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.

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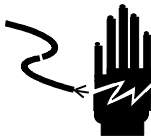
Warnings and Cautions

- READ this manual BEFORE operating or servicing this equipment and FOLLOW these instructions carefully.
- SAVE this manual for future reference.



WARNING

THE ACT350 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 ACT350 AND REMOVE POWER FROM THE ACT350 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 ACT350 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.



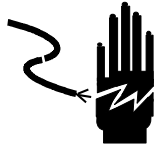
WARNING

BEFORE CONNECTING/DISCONNECTING ANY INTERNAL OR EXTERNAL ELECTRONIC COMPONENTS, LOAD CELLS, HARNESSSES 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

NOT ALL VERSIONS OF THE ACT350 ARE DESIGNED FOR USE IN HAZARDOUS (EXPLOSIVE) AREAS CLASSIFIED AS DIVISION 1, ZONE 0, ZONE 20, ZONE 1 OR ZONE 21 BECAUSE OF COMBUSTIBLE OR EXPLOSIVE ATMOSPHERES. SPECIAL ACT350xx MODELS ARE AVAILABLE FOR THESE APPLICATIONS. REFER TO THE DATA PLATE OF THE ACT350 TO DETERMINE IF A SPECIFIC TRANSMITTER IS APPROVED FOR USE IN AN AREA CLASSIFIED AS HAZARDOUS BECAUSE OF COMBUSTIBLE OR EXPLOSIVE ATMOSPHERES, OR CONTACT AN AUTHORIZED METTLER TOLEDO REPRESENTATIVE FOR INFORMATION ABOUT AVAILABLE HAZARDOUS AREA APPLICATIONS.



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 ACT350 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 ACT350 NETWORK. ACTIVATING PoE MAY RESULT IN DAMAGE TO THE ACT350 TRANSMITTER.



NOTICE

IN ORDER TO ENSURE PROPER DISSIPATION OF HEAT FROM THE TRANSMITTER'S PCBS, AND TO AVOID DAMAGE TO THE EQUIPMENT, THE ACT350 MUST BE MOUNTED VERTICALLY, ON A HORIZONTAL DIN RAIL.



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.

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1. Introduction

The ACT350POWERCELL represents the latest in METTLER TOLEDO technology and is one of the most versatile weighing transmitters available today for digital PDX weighing technology. The PLC communication interface in a DIN rail mounting scheme makes the ACT350 a perfect match for basic industrial process weighing applications including:

- Filling
- Dosing
- Checkweighing

The ACT350POWERCELL delivers fast, precise measurement data in grams, kilograms or lb in a single cost-effective package that easily integrates into control panel systems.

The versatile ACT350 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 ACT350POWERCELL 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:

- ACT350 POWERCELL transmitter
- Safety warnings in multiple languages
- Bag of parts for installation. May include ferrites, connectors, screwdrivers, etc.

NOTICE

All relevant documentation, software, fieldbus files and sample codes are available at www.mt.com/ind-act350-downloads.

1.2. Model Identification

The ACT350 POWERCELL model number is located on the data plate on the back of the transmitter along with the serial number. Refer to Figure1-1 to verify the ACT350 that was ordered.

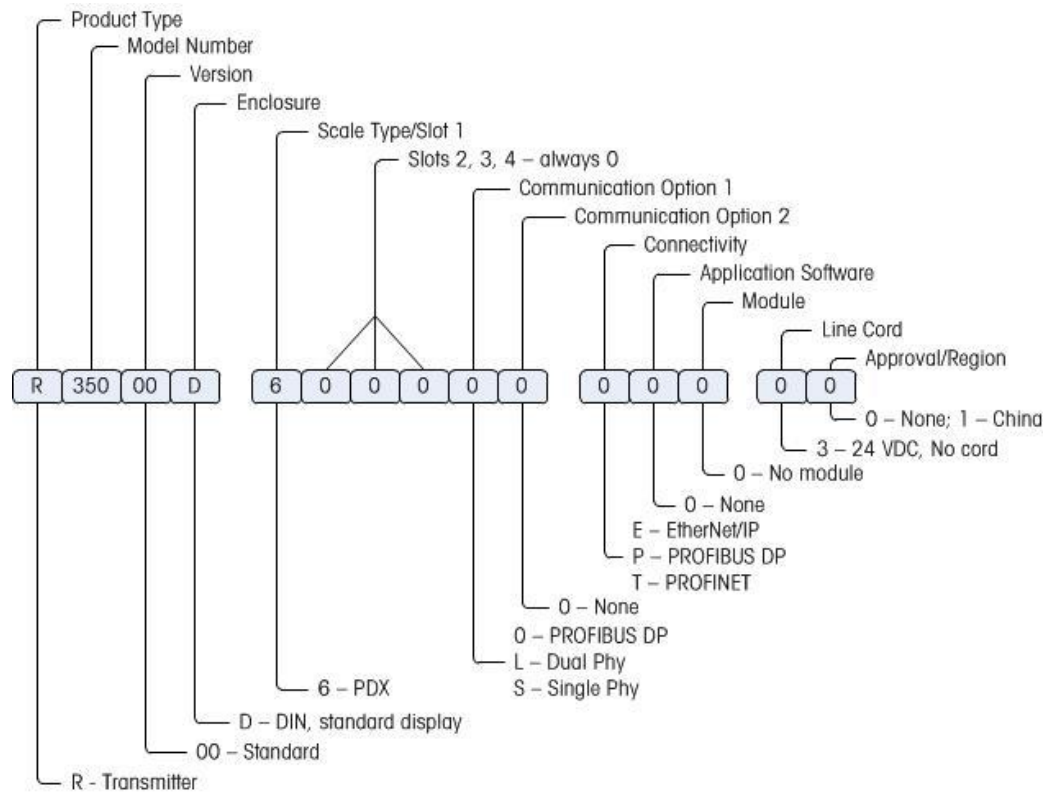


Figure1-1: ACT350 Model Identification Numbers

1.3. Versions of PLC Interfaces

The ACT350 comes factory-configured with PLC interface options including

- PROFIBUS DP
- EtherNet/IP
- PROFINET IO

Each product version is specific to the PLC interface and cannot be configured to a different fieldbus type.

NOTICE

PLC Device Description Files as well as PLC Sample Codes are available at www.mt.com/ind-act350-downloads.

1.4. Physical Dimensions

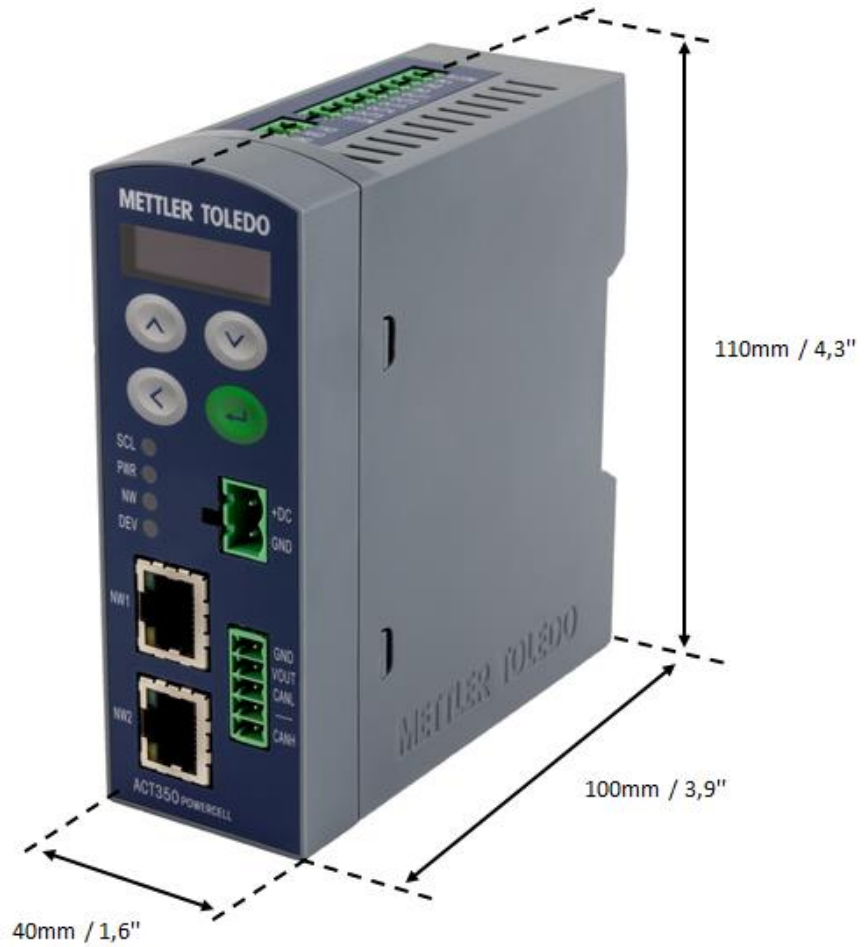


Figure1-2: ACT350 POWERCELL DIN Rail Mount Enclosure Dimensions

NOTICE

2D AND 3D drawings available at www.mt.com/ind-act350-downloads.

2. Operation

2.1. Front Panel

An example of the ACT350 POWERCELL front panel is shown in Figure 2-1 and Figure 2-2.

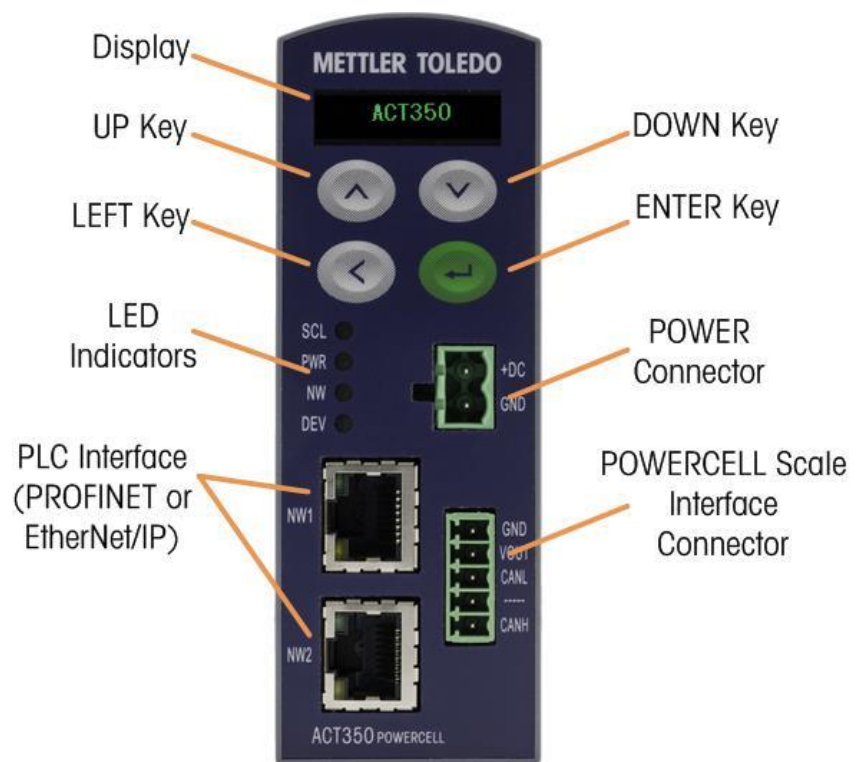


Figure 2-1 ACT350 POWERCELL Front Panel Layout – PROFINET or EtherNet/IP

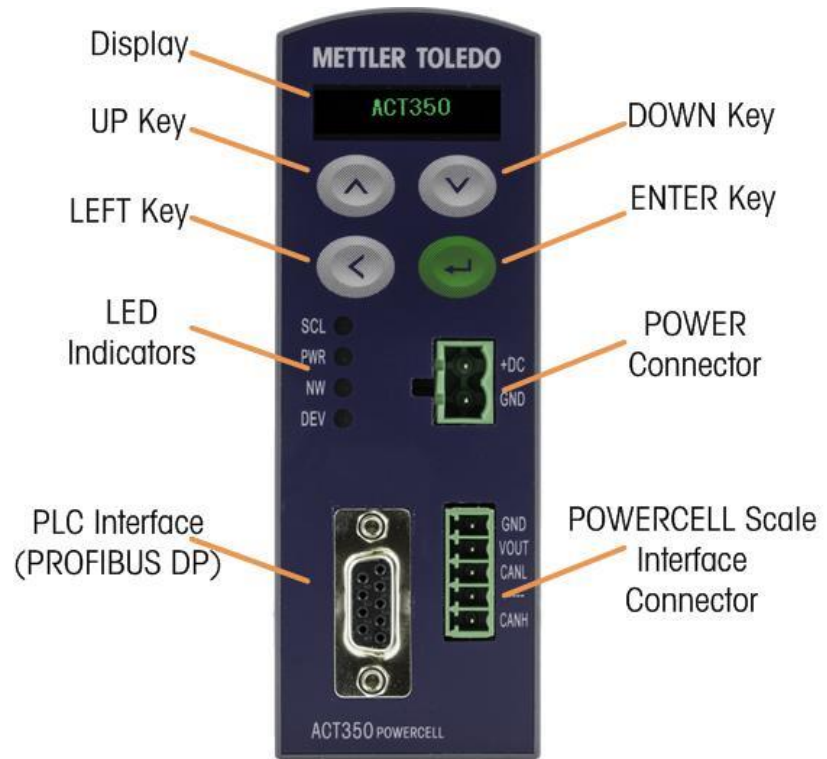


Figure 2-2 ACT350 POWERCELL Front Panel Layout – PROFINET or EtherNet/IP

2.1.1. Display Layout

Weight unit (lb, kg, g) The ACT350 POWERCELL transmitter has an organic LED (OLED) display, 128 × 32 dot matrix graphic type display. The display is reserved for scale weight, units, Net/Gross indicator and error messages.

Additional information provided includes

- Motion / no-motion condition
- Center of zero
- Gross or net mode
- RunFlat "R" mode

When ACT350 POWERCELL transmitter runs in RunFlat mode, a character "R" will appear at the top-left corner of display and the whole display starts to blink.

- Testing "T" mode

When a PDX simulator is connected to ACT350 POWERCELL transmitter, a character 'T' will appear at the top-left corner of display and the whole display starts to blink.

2.1.2. 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 Setup+.



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

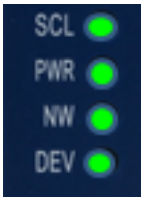
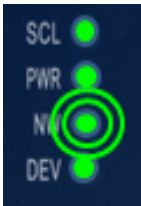
Press the DOWN key to scroll within the device menu and sub-menus. The DOWN key is also used for decrementing numerals in the numeric data entry field.






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.

2.1.3. LEDs Status

Normal Work	Network Error (Example)	LED	STATUS
		SCL	Scales status: ON okay, flashing indicates scale error
		PWR	Power status: ON okay, OFF error
		NW	Network (Fieldbus) status: ON okay, flashing indicated network error
		DEV	Device Status: ON okay; flashing contact service

2.2. ACT350 POWERCELL Device Main Menu

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








	Information Recall	Recall mode list most transmitter information fields.
	Resolution	Temporary expands weight display resolution for diagnostic purposes
	Comparators	Access to the limit value for all 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.

Table 2-1: Device Menu Icons

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 numerical 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 Key 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.

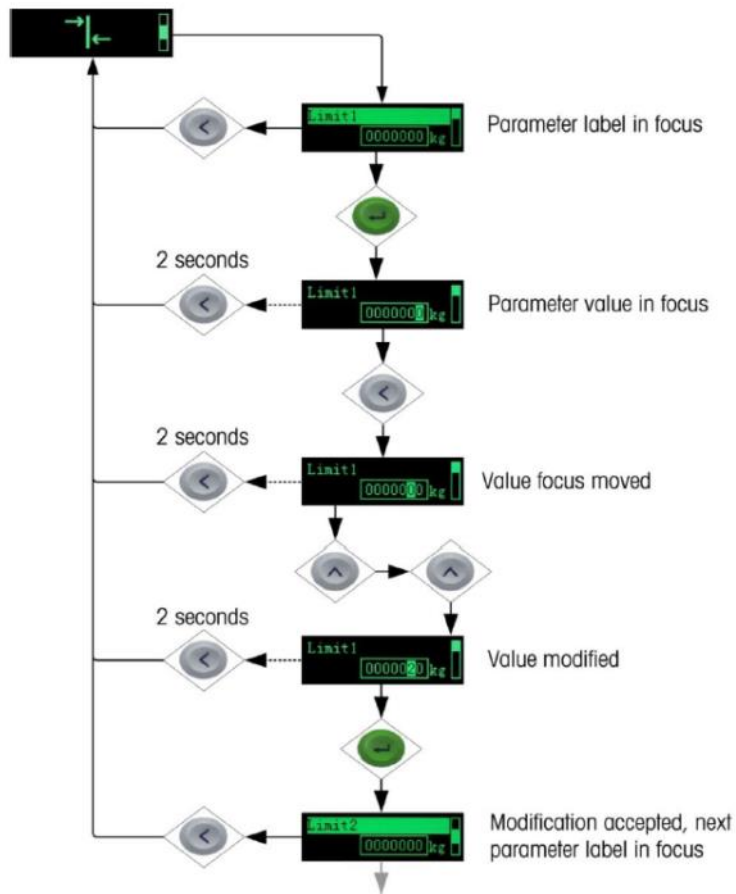



Figure 2-3 Numerical Data Entry Example

2.2.1. Information Recall

Once the Information Recall 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.

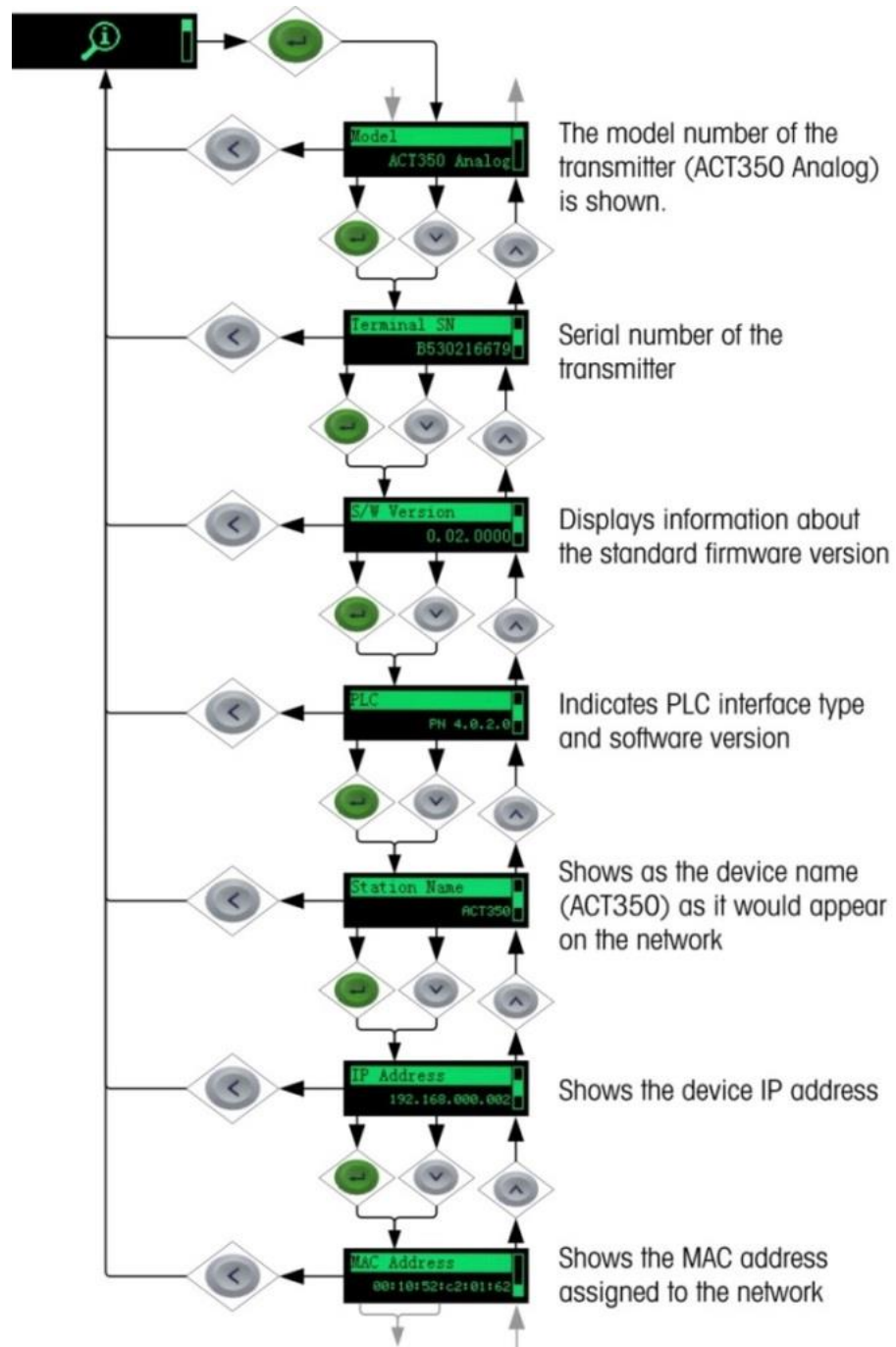


Figure 2-4 Information Recall Menu

2.2.2. x10 Resolution

Used to expand the weight display resolution by 10 so that a finer weight increment can be seen.


This function 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

NOTE



THE x10 DISPLAY RESOLUTION SETTING IS THE ONLY PARAMETER THAT CANNOT BE CONFIGURED USING SETUP+.

The function is intended for **diagnostic purposes only**. The transmitter should not be used in the x10 expanded mode for normal operation. The Data Ok bit is set to zero when in x10 display mode to indicate that the ACT350 POWERCELL is not in normal operating mode. The PLC should continuously monitor the Data Ok bit in the ACT350 POWERCELL communication to determine the validity of data received by the PLC.

2.2.3. Comparators

The device supports a total of five comparators. The limit of each Comparator may be modified by accessing the Comparator menu in the setup menu. Comparator values are limited to 7 digits, and can be written to the device or read from it by the PLC.

2.2.3.1. Setting Comparators

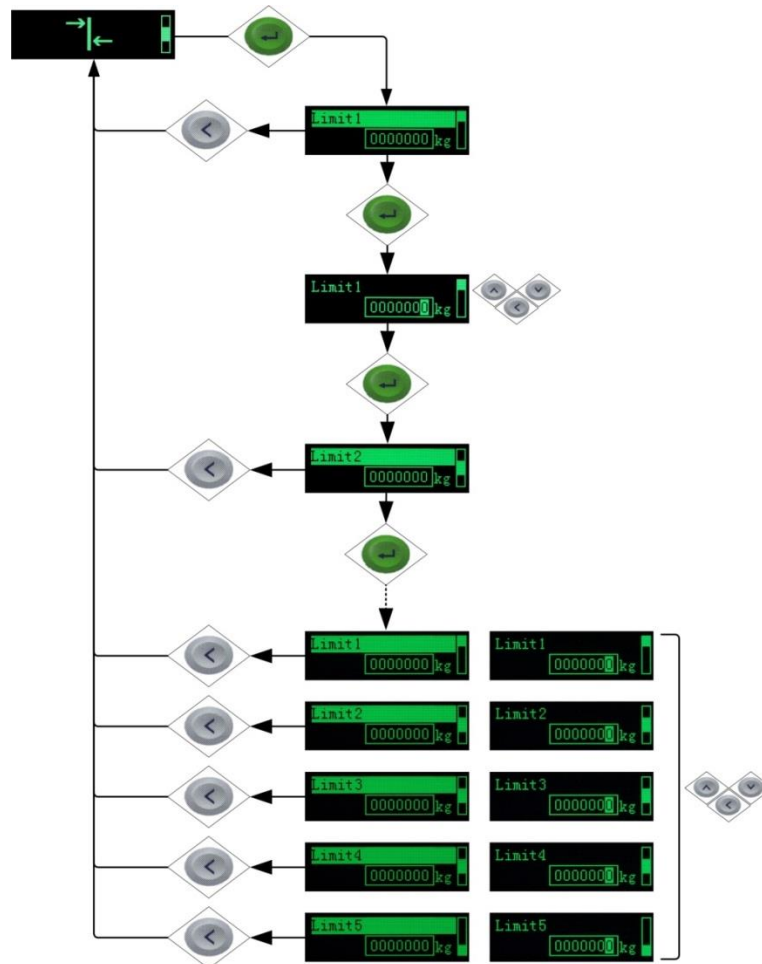
Access to the Comparator menu using the device's front panel is accomplished by pressing the ENTER key  when the transmitter's device menu has been accessed and the  icon is displayed on the device.

ACT350 POWERCELL only supports a logical comparison of ">=", greater than or equal, for each comparator. For example, the limits is set to "24.00" kg, that means if the live weight is greater than or equal to 24.00 kg, the output of DIO will act if this output is assigned to link the Comparator.

The operator of range and other comparisons are **NOT** supported by ACT350POWERCELL.

To edit parameters other than limits, Comparator configuration must be accessed in setup. Refer to the [Numerical Data Entry](#) section for the method used to modify numerical values.

Figure 2-6 Setting Comparator Values (Limits)



NOTE

Only absolute numbers are permitted when setting comparators.
 Comparator outputs are not latched and are not suitable for directly controlling material feed devices



2.2.4. Calibration

Calibration is the process of adjusting the display of weight values, so that when the scale is empty, the display shows zero gross weight and, with a specific amount of weight on the scale, shows an accurate weight value.

The ACT350 POWERCELL transmitter calibration menu enables entry of a **Geo Code** adjustment value, setting selection for linearity adjustment – **none** [default], three, four or five point, perform traditional zero calibration and three different types of span calibration:

- Traditional span calibration - using certified test weights
- Step Adjust Calibration – using a build-up or substitution method of calibration (for large vessels where only a portion of the required test weights can be placed on the scale)
- **CalFreePlus Calibration** – the transmitter will automatically calculate the span; no test weights are required

2.2.4.1. Setting Calibration

Access to the Calibration menu using the device's front panel is accomplished with a key press of the ENTER key  when the  (test weight) icon is displayed on the device. The Calibration menu can also be accessed using the PC-based Setup+ Configuration Tool.

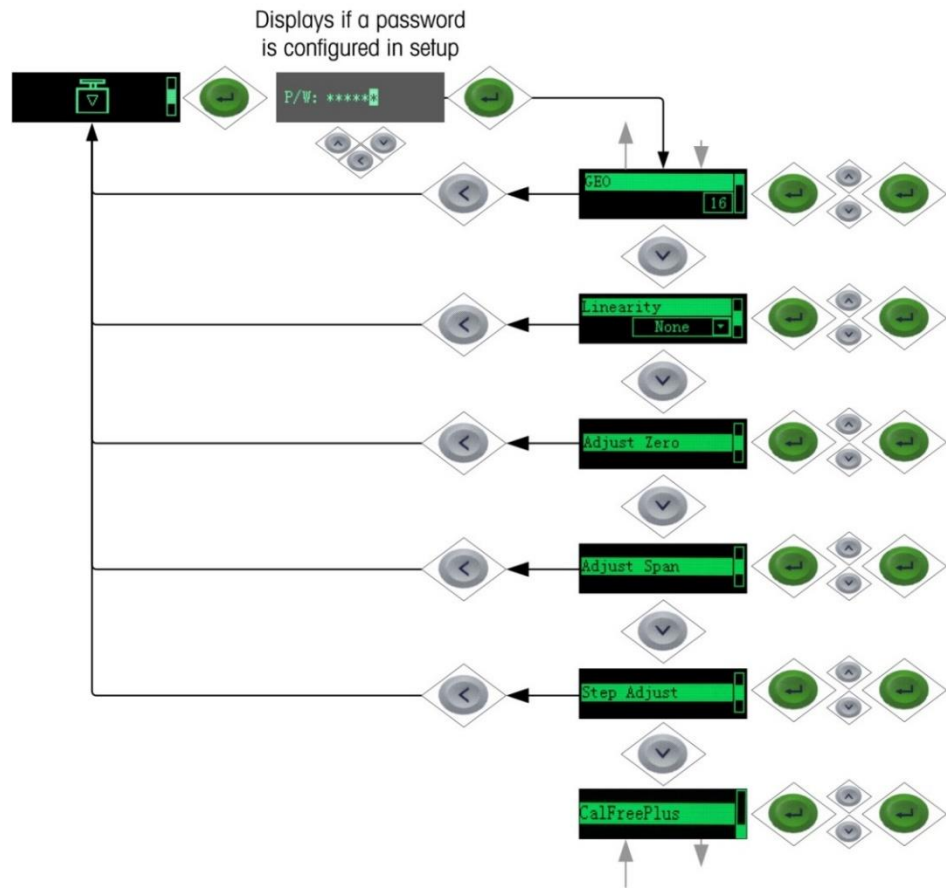


Figure 2-7 Calibration Menu – Overview

2.2.4.2. 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 2-7 for Geo code setting using the transmitter’s front panel buttons, and refer to GEO Codes to find the appropriate Geo Code for the installation location.

2.2.4.3. Setting Linearity

To set the Linearity Adjustment value, see Figure 2-7. Select 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

2.2.4.4. Zero Calibration

Scale zero is set simply by emptying the scale and running the "Set Zero" calibration routine, as shown in Figure 2-8.

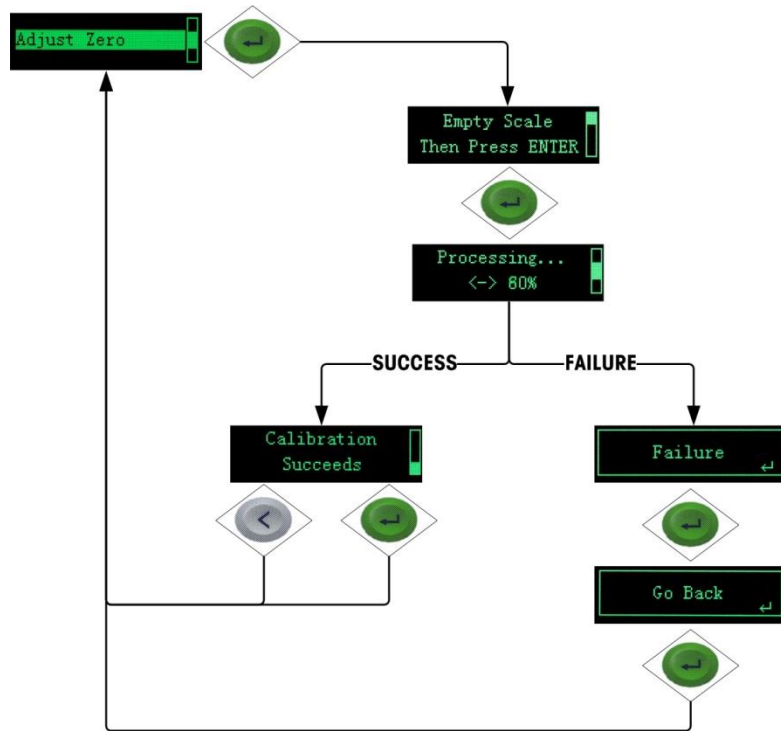


Figure 2-8 Zero Calibration

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.

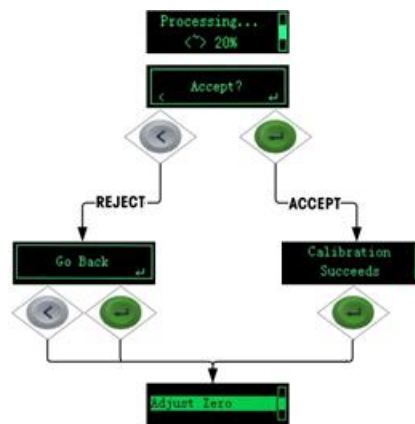


Figure 2-9 Zero Calibration with Motion

2.2.4.5. Span Calibration

The scale's span calibration can be performed either with or without a linearity adjustment. With linearity disabled, a single reference point for span is used to calibrate the scale. This is the normal method of span calibration. In Figure 2-10 the transmitter is configured with three-point linearity – low, mid and high. The low point is set during zero calibration, the mid and high points during this procedure.

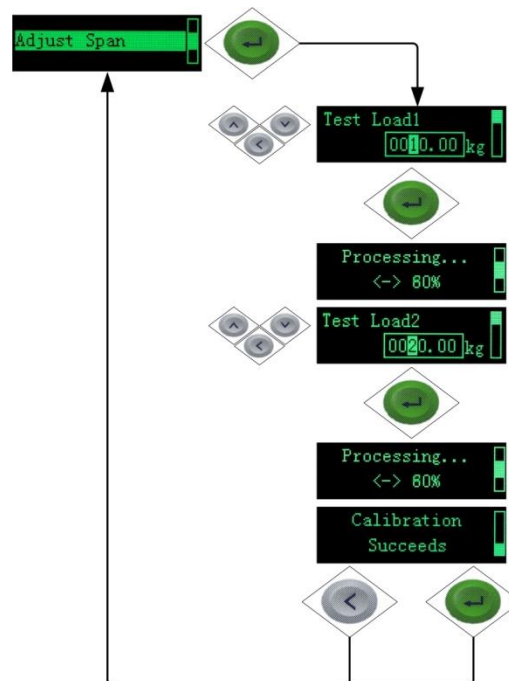


Figure 2-10 Span Calibration

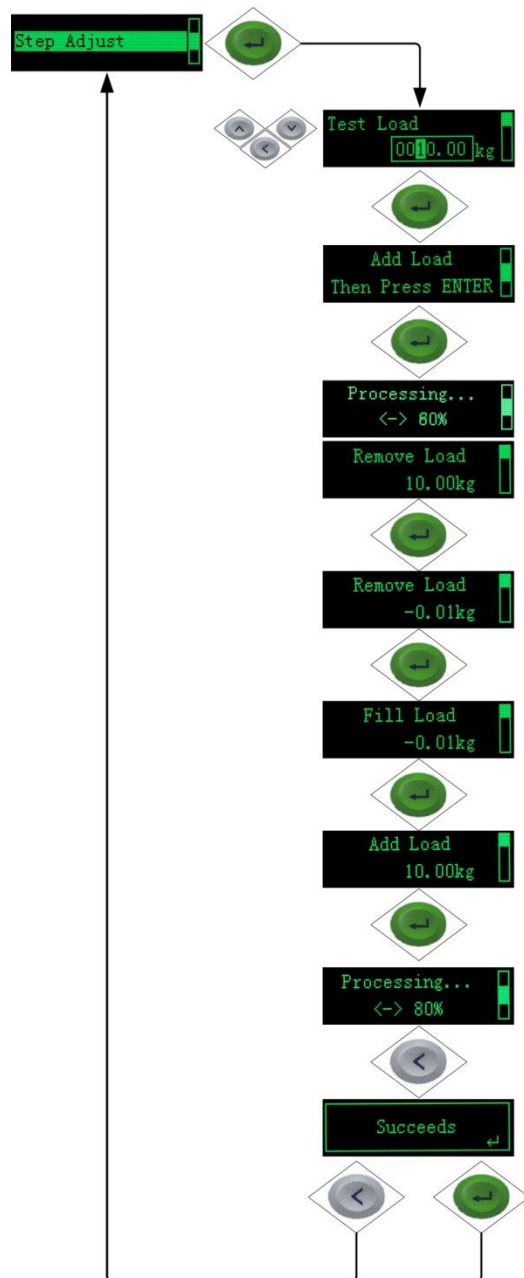
If linearity is enabled, additional mid-range weight reference points are added to the adjustment procedure. Linearity can be enabled or disabled in the Calibration branch of the device menu. Refer to the Numerical Data Entry Example section for the method used to modify numerical values.

2.2.4.6. Step Adjust

Step adjustment is a 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 2-11 Figure 2-11 Step Adjustment

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.



First, a test load is defined by entering its weight

Confirm the value entry by pressing ENTER

The ACT350 POWERCELL prompts for the addition of the test load

Press ENTER to start the first step

The ACT350 POWERCELL indicates its progress

Once the first step is calibrated, the ACT350 POWERCELL 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 ACT350 POWERCELL now prompts 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 ACT350 POWERCELL indicates its progress

Press LEFT to complete calibration and exit the procedure

The ACT350 POWERCELL indicates that the calibration has succeeded

Press either LEFT or ENTER to return to the calibration menu

Figure 2-11 Step Adjustment

2.2.4.7. CalFreePlus™

The ACT350 POWERCELL transmitter provides a method to calibrate a scale without using test weights. 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.

Notes on Load Cell Capacity and Rated Cell Output

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 kg.

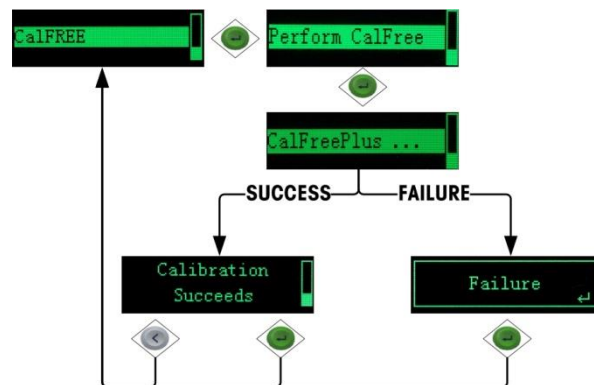



Figure 2-12 CalFreePlus

2.2.5. Language

The ACT350 POWERCELL supports a device menu in **English** [default] and in Chinese.

2.2.6. Setup Access

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.

2.2.7. Password Security

Note that a security password can be enabled in setup from the PC-based Setup+ Configuration Tool. When a password is set, it must be entered to access setup. This protects the setup parameters from inadvertent changes.



Figure 2-13 Password Entry Screen

2.2.8. Reset Configuration and Master Reset

2.2.8.1. 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 DIP switches, 1 and 2, to ON (up, in Figure 2-14), and restore power to the transmitter.

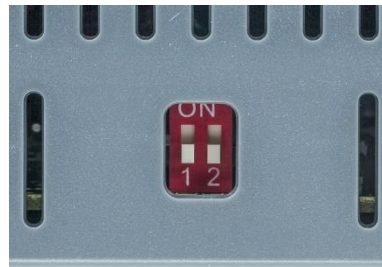


Figure 2-14 DIP Switches

4. Set both DIP switches to OFF.

2.2.8.2. 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 ACT350 will prompt for confirmation.



Figure 2-15 Master Reset Confirmation


3. Press ENTER on the front panel to perform the master reset.
4. Set Switch **2** to OFF.

2.3. ACT350 POWERCELL Basic Operation Functions

2.3.1. Zero

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

2.3.1.1. 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 PC-based Setup+ Configuration Tool. If the current scale weight is outside the zero range when a pushbutton zero is commanded, the transmitter will display a message:

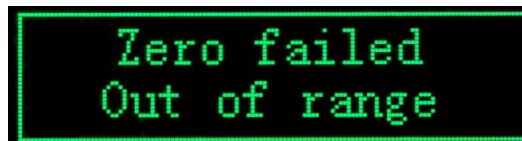


Figure 2-16 ENTER button Zero Failure Message

Remote initiation of the semi-automatic Zero function is possible via a command initiated by the PLC interface.

2.3.1.2. Power Up

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

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

2.3.1.2.1. 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 be within this range and zero is captured.

2.3.1.2.2. 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 PC-based Setup+ Configuration Tool.

2.3.2. Tare

The tare value is subtracted from the gross weight measurement, providing the computation of the net weight (material weight 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 in the container is included with the tare weight of the container and the display then reflects the net amount being added to or removed from the vessel. Tare is captured and cleared by PLC command.

2.3.3. Error Message


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

Table 2-1 lists and explains errors that may be observed.

Table 2-1: ACT350 POWERCELL Faults

Error	ACT350POWERCELL Display	Description	Action
002	"Remote calib."	Remote Calibration (by Setup+ or WebServer) is in process	Do calibration to finish
005	"NW Module init.fail"	SAI initialize fail	Cycle power; call Service if error persists
006	"NW connection disconnected"	Lose connection to network	Check network cable or connector
009	"Board info. err"	Hardware production information error	Cycle power; call 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	Perform master reset

		error; block data is lost	Access setup for scale block
012	"Term. block err"	Terminal block data error; block data is lost	Perform master reset Access setup for terminal block
013	"APP. block err"	Application block data error; block data is lost	Perform master reset Access setup for application block
014	"COM. block err"	Communication block data error; block data is lost	Perform master reset Access setup for communication block
015	"Maint. block err"	Statistics block data error; block data is lost	Perform master reset Access setup for maintenance block
018	"Zero failed Motion"	Scale in motion when Zero attempted	Zero when scale is stable. Replace unstable load cell/s
019	"Zero failed net mode"	Scale in net mode when Zero attempted	Clear tare before zeroing
020	"Zero failed out of range"	Weight out of Zero range	Unload scale and zero
021	"Zero failed Zero disabled"	Zero attempted when function disabled in setup	Enable Zero function in Setup
022	"Tare failed Motion"	Tare failed as scale is in motion	Tare when scale is stable
027	"Tare failed Not rounded value"	Preset tare value not in display increment size	The preset tare value must be rounded to the same increment
028	"Tare failed Value too small"	Tare value too small	The preset tare value must be minimum of 1 display increment
029	"Tare failed Zero not captured"	Power-up zero not captured; Zero not captured after power cycle (with Zero capture enabled) then tare was attempted	Disable zero capture at power-up or unload scale and power-up again, then tare
030	"Tare Failed, Scale Over capacity"	Tare was attempted while scale was over capacity	Remove weight and tare within weighing range
031	"Tare failed Negative value"	Tare value under zero	The preset tare value must be positive
038	"LC Supply Beyond Voltage"	Overvoltage or under voltage of power supply for LCs	Check the power supply and ACT350POWERCELL product type whether support hazardous application

039	" LC Supply Over Current "	Overcurrent of power supply for LCs	Check the power supply, ACT350POWERCELL, LCs and confirm if all are normal
040	" LC Enclosure Broken "	Gas sensor value of LCs is between -5% and 10%	Replace load cell
041	"LC Temperature Beyond Normal"	The LC temperature is beyond normal range(-10°C~40°C)	Replace load cell
042	" LC Temperature Beyond Operate "	The LC temperature is beyond operate range(depend on LC type, for example -30°C~55°C for PDX)	Check the environment of weighing scale and conform if LC is normal
043	" LC Communication Error"	Lost communication between LCs and ACT350POWERCELL	Check the active LC counts and connection cables
044	" LC Over Load Beyond Normal "	The weight value is between 101% and 150% of normal LC capacity	Check the weighing scale
045	LC Over Load Beyond Operate	The weight value is more than 150% of normal LC capacity	The LCs could be damaged. Check the weighing scale condition.
046	" LC Mixture err "	LC Type Mix Different types of LCs are detected	Check the LC type. Only one type of LCs is allowed to be connected.
047	"LC UnderLoad Error"	The load cell weight output is negative out of normal range	Check the shift adjust parameters; Check the load cell whether it is normal
048	" LC configure block err"	PowerCell configure Block data error; block data is lost	Perform master reset Perform setup for LC block

3. Installation

3.1. Mechanical Installation

The ACT350 POWERCELLS are **standard DIN rail-mounted components**. DIN mount includes a sliding green latch, visible in Figure 3-1.

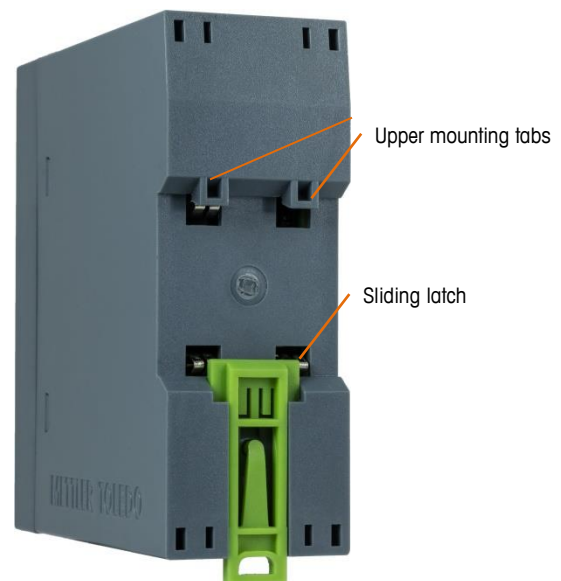


Figure 3-1 DIN-Mount Latch

To mount the ACT350 POWERCELL on a rail, slide the latch down, then position the transmitter so that its upper mounting 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 ACT350 POWERCELL, 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 ACT350 POWERCELL must be mounted vertically**, on a horizontal din rail.

3.2. Electrical Installation

Figure 3-3 indicates the ACT350 POWERCELL's connectors and their functions.

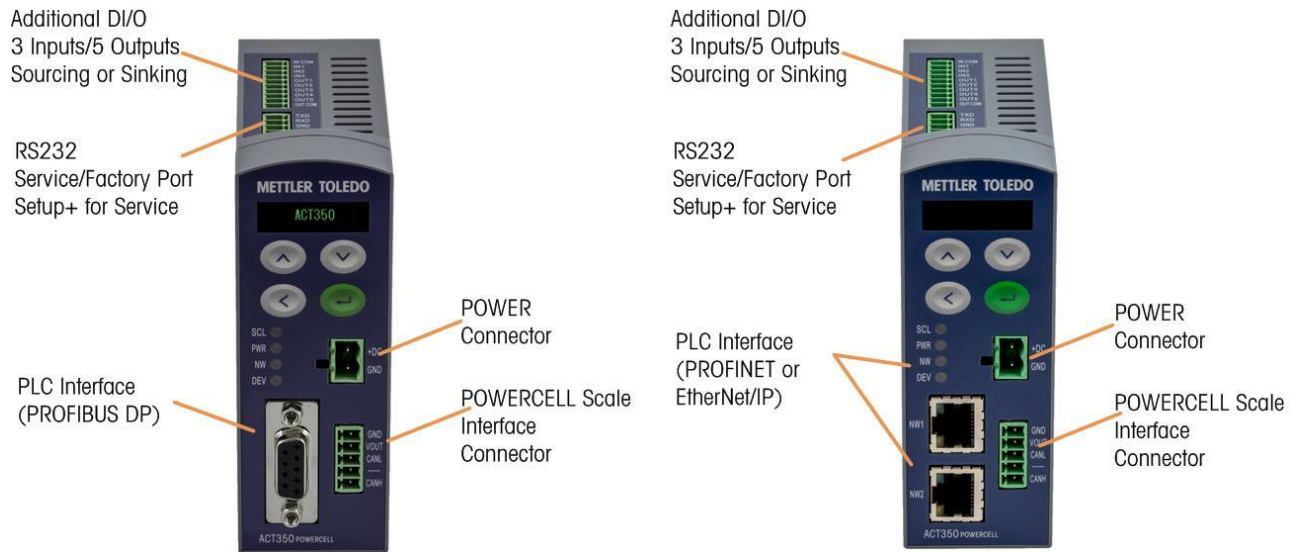


Figure 3-3 ACT350 POWERCELL Interfaces – PROFIBUS (left) and PROFINET or EtherNet/IP (right)

NOTICE

The special automatic grounding system at the back of the unit is installed to ensure that the unit is professionally grounded to the DIN rail.

3.2.1. RS-232 Serial Connection

The serial RS-232 connection on top of the transmitter is used for **service purposes only**. See Figure 3-4.

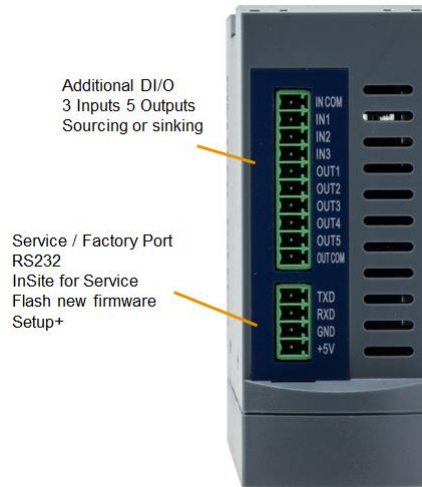


Figure 3-4 ACT350 POWERCELL, Top View

NOTICE

Additional DI/O are available in version with dual ports.
This COM can be used to connect ACT350 POWERCELL to the PC-based Setup+ Configuration Tool.
This tool is available online and can be downloaded at www.mt.com/ind-act350-downloads.

3.2.2. Digital Inputs and Outputs connecting Instruction

Three digital inputs and five outputs are allocated on a top of each ACT350 POWERCELL

	Input	Output
Permissible input voltage	0 ~ 24 VDC	5~30 VDC
Low-level	0 ~ 5 VDC	
High-level	10 ~ 24 VDC	
Input resistance	>3KΩ	
Max.current of one output		<150mA
Accumulated current of all outputs		<750mA
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	Zero	
Polarity Value	+True(Default) or -True	
Available Functionality	None; Clear Tare; Tare; Zero	None; Center of Zero; Comparator 1-5; Fault; Motion; NET; Over Capacity; Under Zero

Figure 3-5: Digital Inputs and Outputs Specification

Example:

Using a rising-edge input signal to trigger the ACT350 POWERCELL to perform a Zero operation, "Polarity" can be set as "+ True" and "Assignment" as "Zero". Refer to Figure 3-6



Figure 3-6 A Rising-edge Trigger Signal on Input

Using a falling-edge signal on Input to trigger ACT350 POWERCELL perform a Tare operation, "Polarity" can be set as "- True" and "Assignment" as "Tare". Refer to Figure 3-7.



Figure 3-7 A Falling-edge Trigger Signal on Input

NOTICE

The input voltage range between 5 – 10 VDC must not be used, as it can create an unstable input signal result.

ACT350 POWERCELL supports both Sinking and Sourcing wiring on DIO Input and Output. Please refer to Figure 3-8 - Figure 3-11 for details.

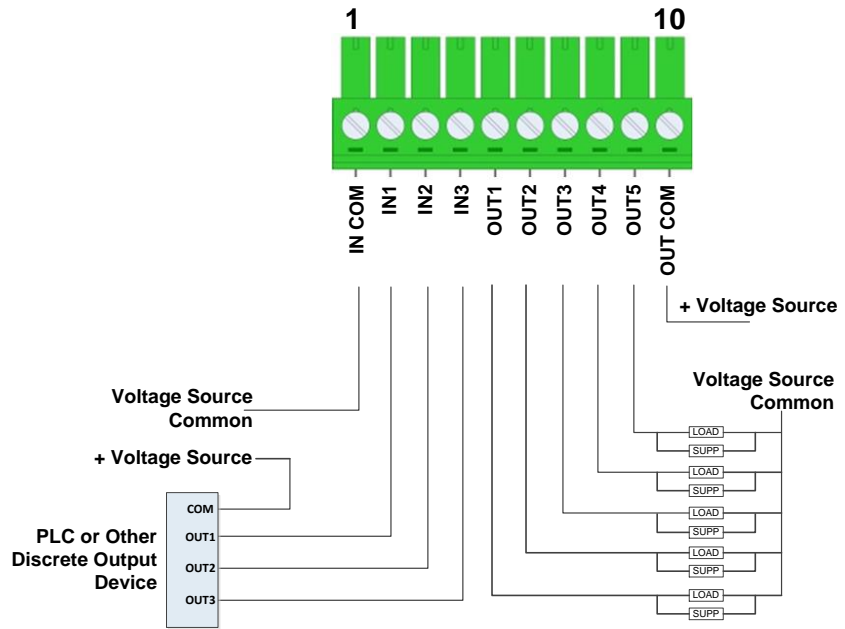


Figure 3-8 Sinking Input, Sourcing Output

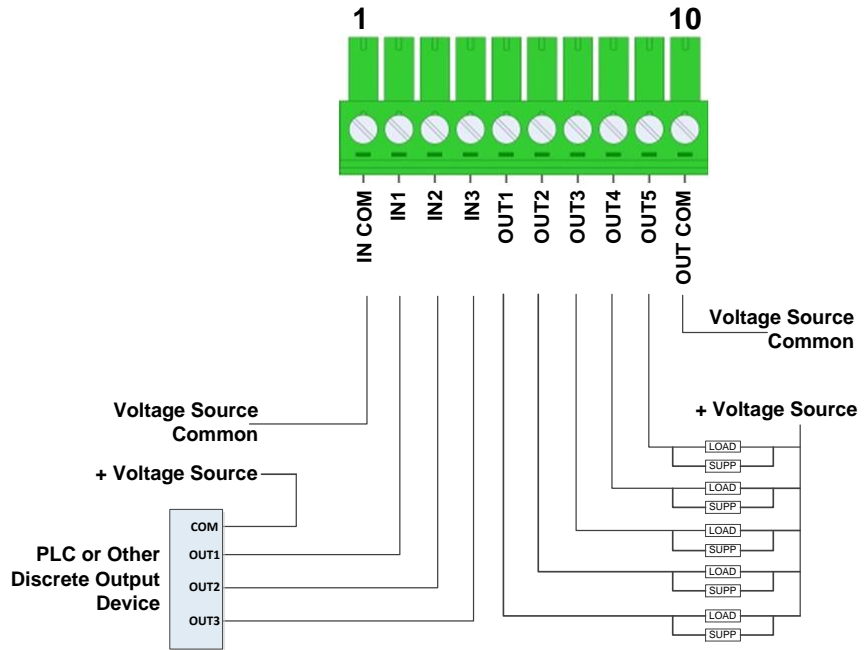


Figure 3-9 Sinking Input, Sinking Output

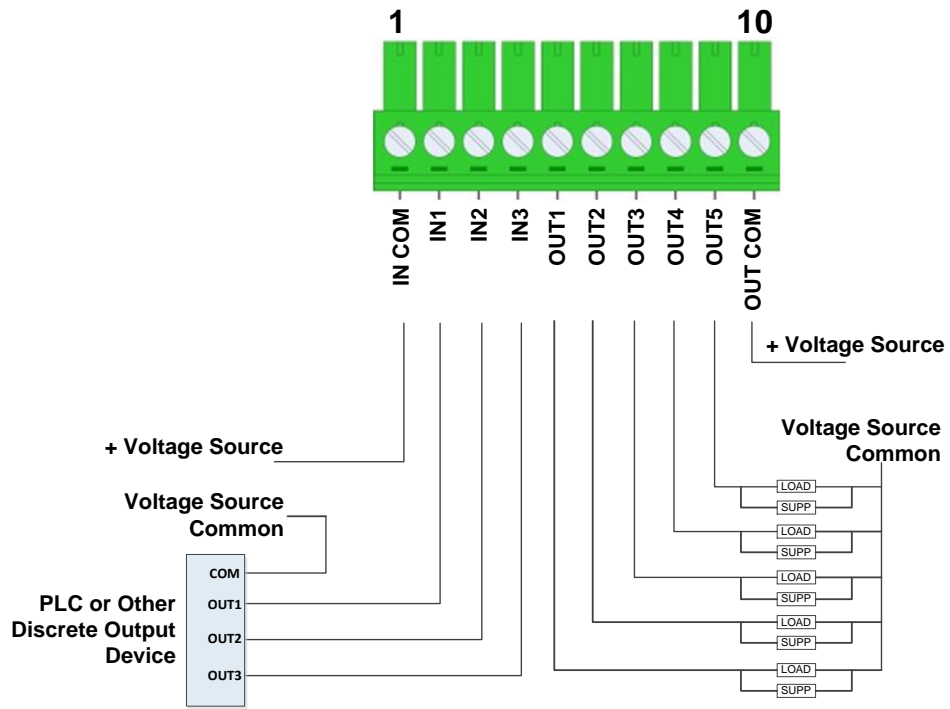


Figure 3-10 Sourcing Input, Sourcing Output

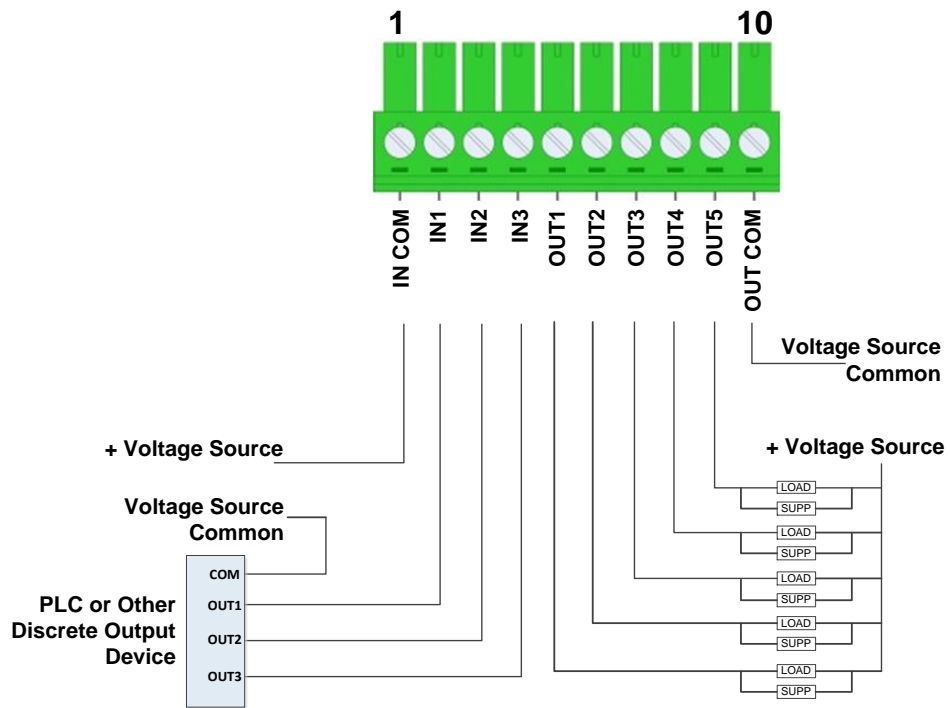


Figure 3-11 Sourcing Input, Sinking Output

3.2.3. POWERCELL Load Cell Connection

For EMC requirement, cabling for the POWERCELL load cell must include a ferrite, included with the transmitter.

Install the ferrite by passing it through the ferrite and wrapping it around three times, as indicated in Figure 3-12. It is recommended to strip the outer shielding of the wires about 31 cm.

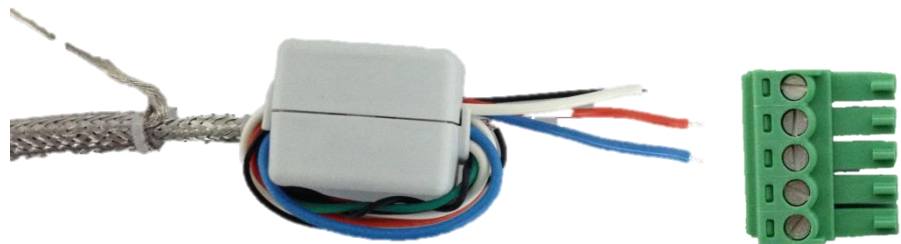


Figure 3-12 Ferrite Installed on POWERCELL Cable

	1	CAN High
	2	No Connection
	3	CAN Low
	4	+24V
	5	GND

Table 3-1: Scale Interface Connection

3.2.4. PLC Connection

For EMC requirement, cabling for the PROFIBUS DP interface must include a ferrite, included with the transmitter.

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



Figure 3-13 Ferrite Installed on PROFIBUS DP Cable

For the PROFIENT IO and Ethernet/IP interfaces, the cables shall be industry standard 8P8C (also called RJ45) to allow the customer to quickly interface/connect modules.

ACT350 POWERCELL transmitter with PROFINET or EtherNet/IP interface supports Media Redundancy Protocol and Device Level Ring topology, respectively.

3.2.4.1. Media Redundancy Protocol (MRP) Topology

MRP protocol enables implementing a redundant PROFINET communication through ring topology without the need for switches. MRP can compensate for an individual failure in a PROFINET / Industrial Ethernet in a simple ring topology. As meshed networks are not supported, MRP is both simple and reliable. MRP in PROFINET networks can achieve reconfiguration times of 200ms.

3.2.4.2. Device Level Ring (DLR) Topology

DLR protocol provides high network availability in a ring topology and is intended primarily for implementation in EtherNet/IP end-devices that have two Ethernet ports and embedded switch technology. It provides fast network fault detection and reconfiguration in order to support the most demanding control applications. For example, a ring network of 50 nodes implementing the DLR protocol has the worst case fault recovery time of less than 3ms.

3.3. DIP Switches

Two DIP switches, 1 and 2, are accessible from the underside of the ACT350 POWERCELL's housing. Table 3-2 summarizes their functions.

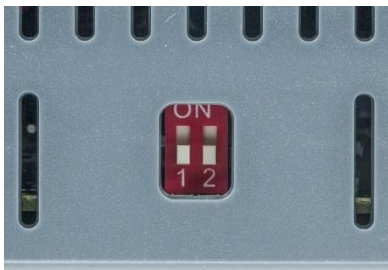
ACT350 DIP Switches	Legal for Trade	Reset	
	Switch 1	Switch 2	Function
	OFF	OFF	Normal operation
	ON	OFF	Legal-for-trade mode; calibration data protected
	OFF	ON	Master reset of all data during transmitter power-up
	ON	ON	Reset of all except calibration data during transmitter power-up

Table 3-2: DIP Switch Functions

3.4. Legal for Trade

When the transmitter is certified as legal for trade, DIP switch 1, accessible on the underside of the housing, must be set to ON. A metrological seal must be placed over the DIP switch array in order to prevent this setting from being changed.

Please refer to Figure 3-4 for method to seal ACT350 POWERCELL Transmitter.

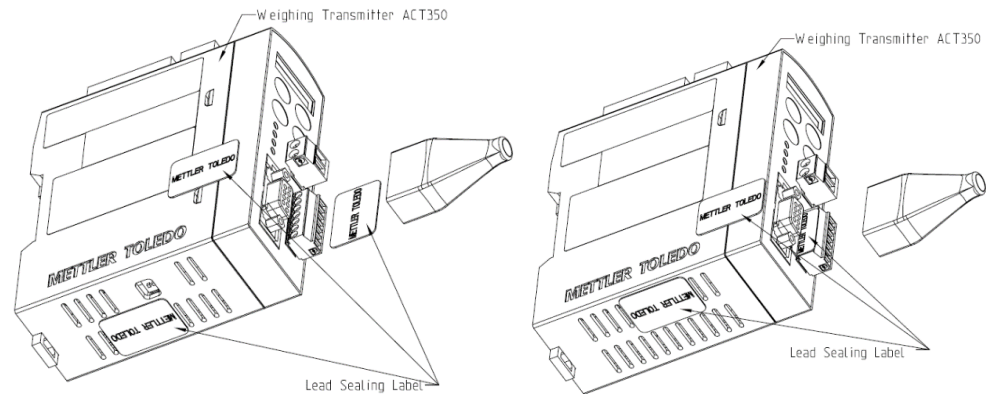


Figure 3-14 ACT350 POWERCELL Sealing Diagram

NOTICE

When the ACT350POWERCELL is in approved mode, metrological **significant settings cannot be accessed** through ACT350POWERCELL's interfaces or in Setup+. These settings include approval, unit, capacity, increment size, calibration, zero and stability settings

3.5. Power Supply

The ACT350 POWERCELL transmitter is powered only by external DC input (24V). No AC model exists. It can connect up to 14 POWERCELL load cells, including PDX, GDD, SLB615D and SLC611D.

4. Fieldbus Communication

4.1. Overview

The Standard Automation Interface (SAI) is a protocol designed to exchange data between METTLER TOLEDO devices and third-party automation systems. This interface provides the following:

- A common data layout for load cells, terminals and other devices regardless of the physical interface or automation network used.
- A single protocol for the convenience of automation integrators, control system programmers and our automation customers.
- A flexible protocol for diverse devices.

Data types

The protocol has two primary modes of operation.

- cyclic data
- acyclic data

NOTICE

Acyclic data is also referred to as asynchronous data or explicit messaging.

4.1.1. Cyclic data

Cyclic data is broken up into sections of data. Each section represents a block. Each block of data contains four words of 16 bits each.

The data within these words can express numeric values, string values or individual bits which represent state or command depending on the type of block specified.

There are two types of cyclic blocks supported on the ACT350 POWERCELL:

- Measuring block (floating point data)
 - Used for numeric values
 - Decimal point and sign are included and do not require special data handling.
- Status block
 - Used for numeric values
 - Status block data is grouped together in 16 bit words to conserve space.

4.1.2. Acyclic data

With acyclic messages, the variable can be accessed directly through a unique name or number defined by the control system's acyclic message block.

NOTICE

Acyclic data is also referred to as asynchronous data or explicit messaging.

NOTICE

For more details regarding Fieldbus Communication please refer to ACT-Weight Transmitters SAI Reference Manual available at www.mt.com/ind-act350-downloads.

5. Troubleshooting PLC Connectivity

If the ACT350 POWERCELL does not communicate with PLC, do the following:

- Power cycle the ACT350 POWERCELL to reestablish communications.
- A solid green NW LED on the front panel implies that the ACT350 POWERCELL is on the network. A blinking NW LED indicates that the ACT350 POWERCELL is not on the fieldbus network.
- Check LED status of the connection socket. The top LED should be solid green. If the top LED is not solid green then this implies that no hardware connection is being seen by the device -check cabling and connector insertions. The bottom LED will blink amber if data is being transferred. If the top LED is solid green, but the bottom LED is not blinking then this implies a configuration issue either in the ACT350 POWERCELL or the PLC.
- Confirm that the ACT350 POWERCELL can respond to a ping on the Network. If the ping fails, then check the wiring and network connections.
- Diagnose and correct specific Network error conditions such as IP Address conflicts.
- Confirm that the ACT350 POWERCELL settings for address, format and byte order match those in the PLC and that each ACT350 POWERCELL has a unique address.
- Check the Electronic Keying from in the PLC program. Confirm that the firmware revision of the Ethernet/IP module in the ACT350 POWERCELL greater than or equal to the firmware revision specified in the ACT350 POWERCELL's communication module in the PLC. Change the firmware revision being looked for in the PLC's communication module or change the electronic keying setting in the PLC.

6. Setup+™ Configuration and Maintenance Tool

6.1. General Overview

ACT350 POWERCELL transmitter supports two types of configuration and maintenance tools: Setup+ and Webserver.

6.1.1. Setup+ Configuration Tool

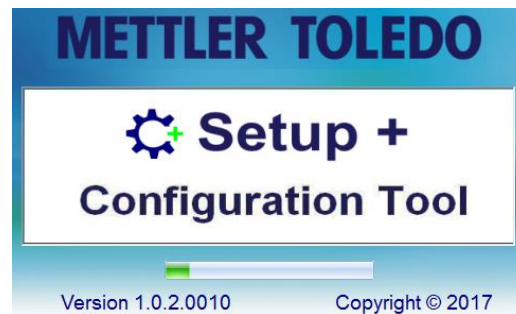


Figure 6-1 Setup+ Splash Screen

Setup+ is a PC tool available online to support the following functions:

- Configuring of the ACT350 POWERCELL Transmitter using local PC
- Saving transmitter configuration to a local PC
- Loading a saved configuration to other transmitters performing similar applications
- Restoring to a 'last known good state' for service purposes
- Upgrading firmware

6.1.2. Webservice

Webservice supports the following functions:

- Configuring of the ACT350 POWERCELL Transmitter via web browser, such as IE, Chrome and Safari;
- Accessing diagnostic and maintenance information for service purposes;



Figure 6-2 Setup+ Splash Screen

6.2. Setup+ Tool

6.2.1. PC Installation

Please download and install Setup+ from www.mt.com/ind-act350-downloads.

6.2.2. Setup+ User Guide

The User Guide is available to be downloaded at www.mt.com/ind-act350-downloads.

Additionally the document is available by click on **Help** icon in the toolbar to download Setup+ User Guide.

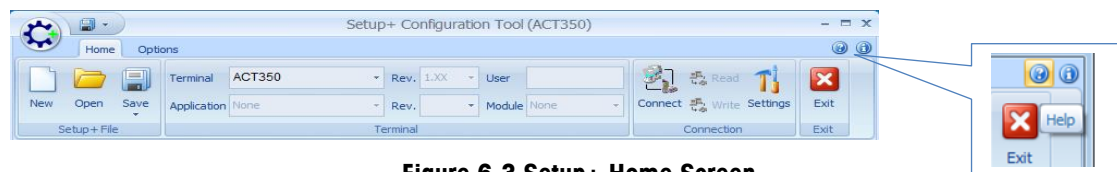


Figure 6-3 Setup+ Home Screen

6.3. Webservice

Webservice supports the following functions:

- Configuring of the ACT350 POWERCELL Transmitter via web browser, such as IE, Chrome and Safari;
- Get diagnostic and maintenance information for service purposes;

6.3.1. Setup

6.3.1.1.1. PC setup

NOTICE

Make sure the PC and ACT350 POWERCELL Transmitter are in the same local network.

The typical PC's configuration:

IP address: 192.168.0.X (X = 0 ~ 255, exclude 2), Subnet Mask: 255.255.255.0, (Statement needed for Gateway)

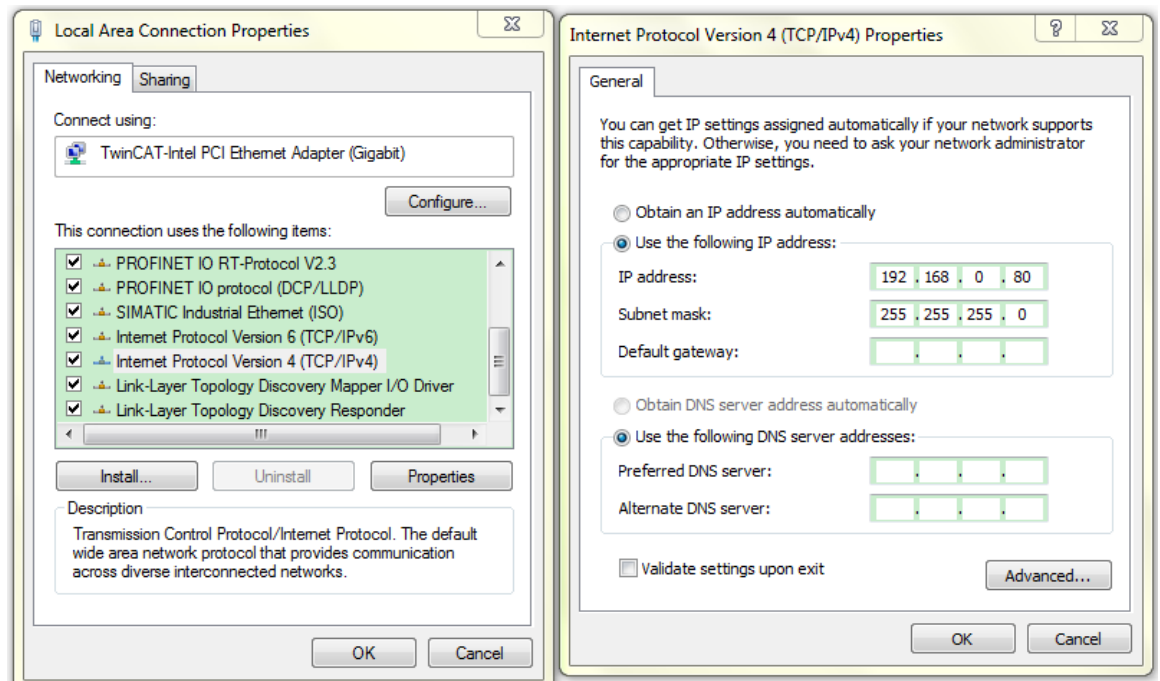


Figure 6-4 Local Area Connection Setting

NOTICE

The default setting of ACT350 POWERCELL Transmitter is as follow:
 IP address: 192.168.0.2, Subnet Mask: 255.255.255.0, Gateway: 192.168.0..

6.3.1.1.2. IE setup

Internet Option -> LAN setting -> Automatically detect settings should be unchecked.

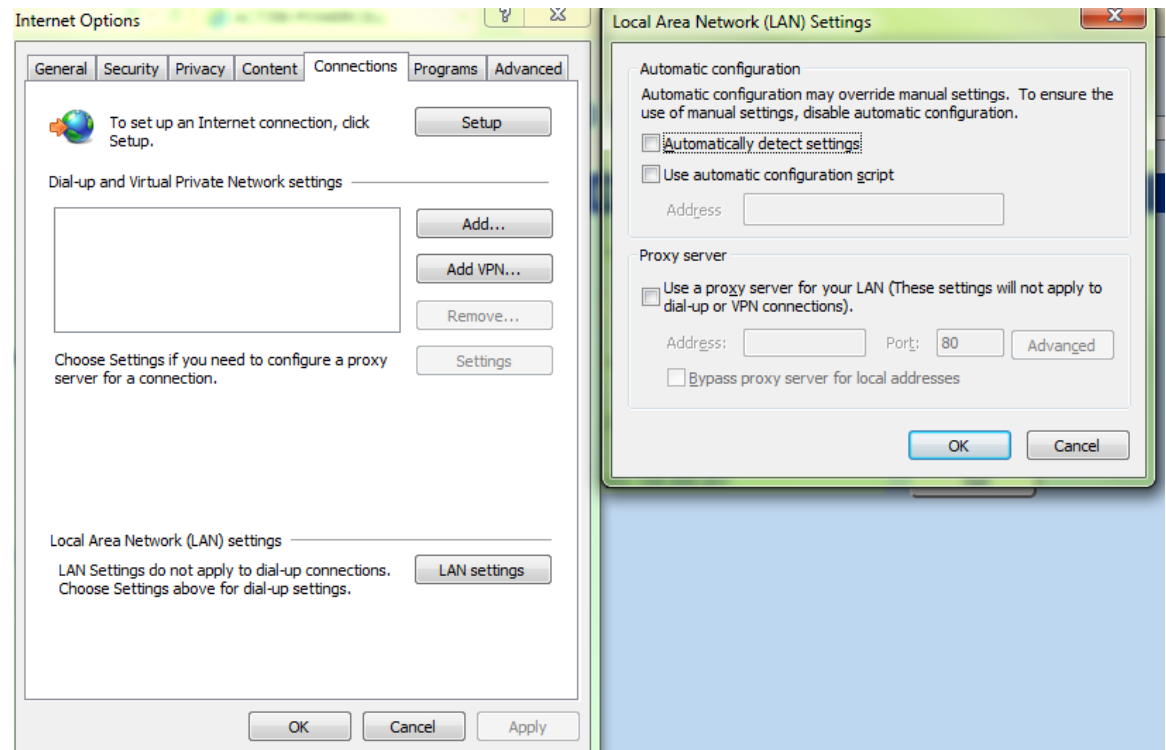


Figure 6-5 IE setting

6.3.1.2. Connect to webserver

By inputting the IP address of ACT350 POWERCELL Transmitter in the web browser, the startup screen of webserver will be displayed.

6.3.1.3. Change network setting of ACT350 POWERCELL Transmitter

Network setting of ACT350 POWERCELL Transmitter can be changed in Communication->Ethernet/IP (PROFINET) menu.

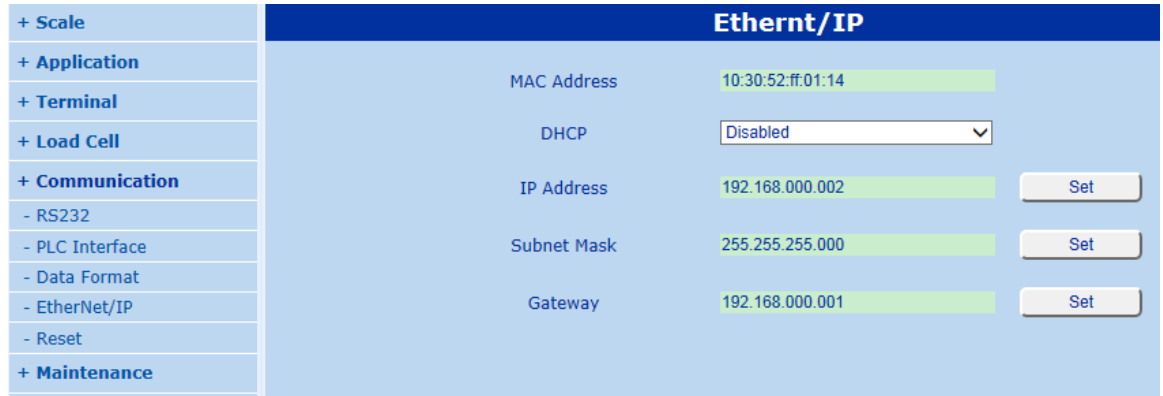


Figure 6-6 Network setting of ACT350 POWERCELL Transmitter

6.3.1.4. Password

There is password protection for configurations. By default, password protection is disabled, and user can read and write configurations. It can be enable in the Login->Change Password menu as below:

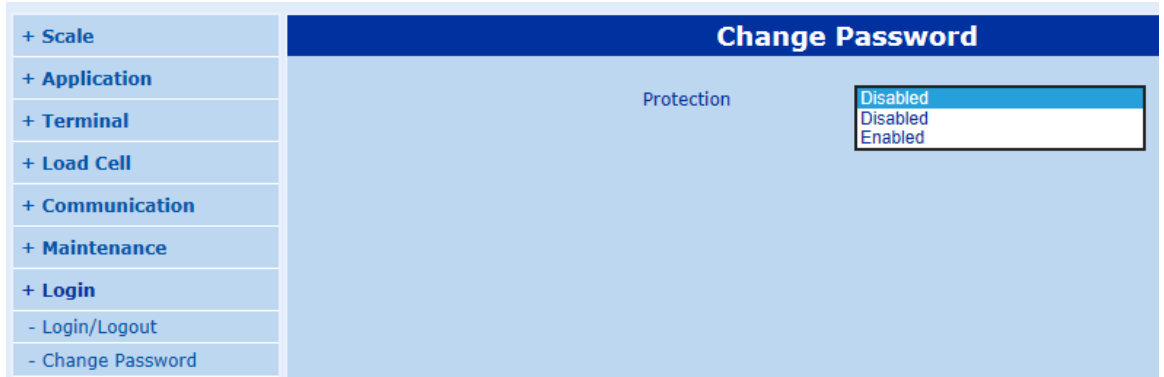


Figure 6-7 Enable password protection

After password protection is enabled, user can only read configurations without password. If user wants to write configurations, password needs to be entered in the Login->Login/Logout menu:

NOTICE

The default setting of ACT350 POWERCELL Transmitter is as follow:
IP address: 192.168.0.2, Subnet Mask: 255.255.255.0, Gateway: 192.168.0.
 The default password is 000000.

- User can change the password in Login->Change Password, the password supports up to 6 digits.
- If user forgets the password, there is a super password, which is valid all the time for individual unit. It is the serial number which can be found on data plate. Total 10 digits, including letters and numbers

7. GEO Codes

The GEO code feature provided in the ACT350 POWERCELL 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.

7.1. Original Site Calibration

1. Use the GEO code chart on the following pages to determine the GEO code for the original 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.

7.2. New Site GEO Code Adjustment

When ACT350 POWERCELL is to be reinstalled at a different geographic location, gravitational and altitude changes can be accounted for by changing the Geo Code. Note that this procedure is not necessary if an on-site recalibration is performed.

1. Use the GEO code chart) 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 using certified test weights and re-calibrating the scale at a new location.

Table 7-1: GEO Adjustment Values

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

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	
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
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	19	18
58° 17'–59° 32'	24	23	23	22	22	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

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