

LOADCELL  SUPPLIES



Digital Indicator Quick Start Manual

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SPECIAL NOTE

Trade Use of the Instrument

This manual may occasionally make reference to Trade Use settings of the instrument.

Some individual settings may not be legal for trade use. Please check regulations with the appropriate Weights and Measures Authority.

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1. Introduction

This manual contains information on the installation, calibration and setup of the instrument.

1.1. Approvals (for trade versions only)

- NSC approval (4000 divisions at 0.8 μ V/division).
- NMI approval (4000 divisions at 0.8 μ V/division).
- C-tick approved and CE approved.

1.2. Manuals

For more information on this instrument refer to the **Reference Manual** or **Operator Manual**.

2. Shipping Contents

The following table identifies the items shipped with the indicator. Please check that your packing box contains the specified items.

Shipped Items	Other Items (Optional)
<ul style="list-style-type: none"> • Indicator • Operator Manual • Quick Start Manual • Trade Label (plastic) • Panel Mount Template 	<ul style="list-style-type: none"> • opto-LINK Cable • Power Supply • Desk Mount with Battery Compartment • U Bracket

3. Specifications

Performance		
Resolution	Up to 30,000 divisions, minimum of 0.25 μ V/division, 20 updates/second (Trade 4000 divisions at 0.8 μ V/division)	
Zero Cancellation	\pm 2.0mV/V	
Span Adjustment	0.1mV/V to 3.0mV/V full scale	
Stability/Drift	Zero: < 0.1 μ V/ $^{\circ}$ C (+ 8ppm of deadload max) Span < 8 ppm/ $^{\circ}$ C, Linearity < 20ppm, Noise < 0.2 μ Vp-p	
Excitation	5 volts for up to 4 x 350 or 8 x 700 ohm load cells (4-wire or 6-wire plus shield) Maximum total load cell resistance: 1,000 ohms	
A/D Type	24bit Sigma Delta with 8,388,608 internal counts	
A/D Conversion Rate	20Hz with FIR filtering > 80dB	
Operating Environment	Temperature: -10 to +50 $^{\circ}$ C ambient Humidity: <90% non-condensing Storage: -20 to +50 $^{\circ}$ C ambient IP55 when panel mounted	
Case Materials	ABS, Silicon Rubber, Nylon, Acrylic (no halogen used)	
Packing Weights	Basic Indicator: 0.34kg	
Digital		
Display	LED Backlit LCD with six 20mm high digits with units and annunciators	
Setup and Calibration	Full digital with visual prompting in plain messages	
Digital Filter	Sliding window average from 0.1 to 4.0 seconds	
Zero Range	Adjustable from \pm 2% to \pm 20% of full capacity	
Power Input		
Standard Power Input	12 to 24VDC (2.5 VA max) - ON/OFF key with memory feature	
Variants	AC	AC Plug pack: 110/240VAC 50/60Hz in 12VDC 0.5A out
	Battery	4 x AA batteries (Alkaline or rechargeable NiMH, NiCad, etc.)
Features		
opto-LINK Data Coupling	Infra-red Connector for optional opto-LINK PC cable (to RS-232 PC port)	

4. Warnings

4.1. General

- Indicator not to be subject to shock, excessive vibration or extremes of temperature (before or after installation).
- Inputs are protected against electrical interference, but excessive levels of electro-magnetic radiation and RFI may affect the accuracy and stability.
- For full EMC or for RFI immunity, termination of cable shields and correct earthing of the instrument is essential.
- Indicator and load cell cable are sensitive to excessive electrical noise. Install well away from any power or switching circuits.

4.2. Configuration Issues

- Configuration and calibration can be performed from the front panel, using digital setup. When Full Setup is used, all menu items are accessible and care must be taken to ensure no accidental changes are made to calibration and trade settings.
- Enter a passcode to prevent unauthorised or accidental tampering. If the passcode is lost, the manufacturer should be contacted for further advice.

5. Installation

The following steps are required to set up the indicator.

- Inspect indicator to ensure good condition.
- Use connection diagrams to wire up load cell, power and auxiliary cables as required.
- Use the drill hole template provided for hole locations.
- Connect Power to indicator and press **<POWER>** key to turn the instrument On.
- Refer to the Instrument Setup section page 11 for information on configuring and calibrating the instrument.
- To turn instrument Off press and hold **<POWER>** key for three seconds (until display blanks).

5.1. Electrical Safety

- For your protection all mains electrical hardware must be rated for environmental conditions of use.
- Pluggable equipment must be installed near an easily accessible power socket outlet.
- To avoid the possibility of electric shock or damage to the instrument, always switch off or isolate the instrument from the power supply before maintenance is carried out.

5.2. Panel Mount Template

Use the panel mount template for drill hole locations. The template indicates positions for the two 4mm mounting screws through the panel. Also displayed on the template is the position of the rectangular hole that should be cut to allow for the connection of cables. The drilling template supplied with the indicator allows for front or rear machining of the panel.

5.3. opto-LINK

The optional opto-LINK cable can be used to transfer setup and calibration information from a PC (eg. to be stored for later use and/or transferred to other instruments). It can also be used to download software upgrades to the instrument from a PC.



- Attach the opto-LINK cable to the PC using the DB9 connector.
- Attach the opto-LINK head to the left side of the instrument display using the permanent magnet located within the head of the opto-LINK.

WARNING: The opto-LINK head contains a strong magnet and care should be taken with its proximity to electronic media (eg.

credit cards, floppy disks, etc.) and/or other electronic instrumentation.

5.3.1. opto-LINK Activation

A long press of the **<GROSS/NET>** key will toggle the opto-LINK infrared communications On/Off.

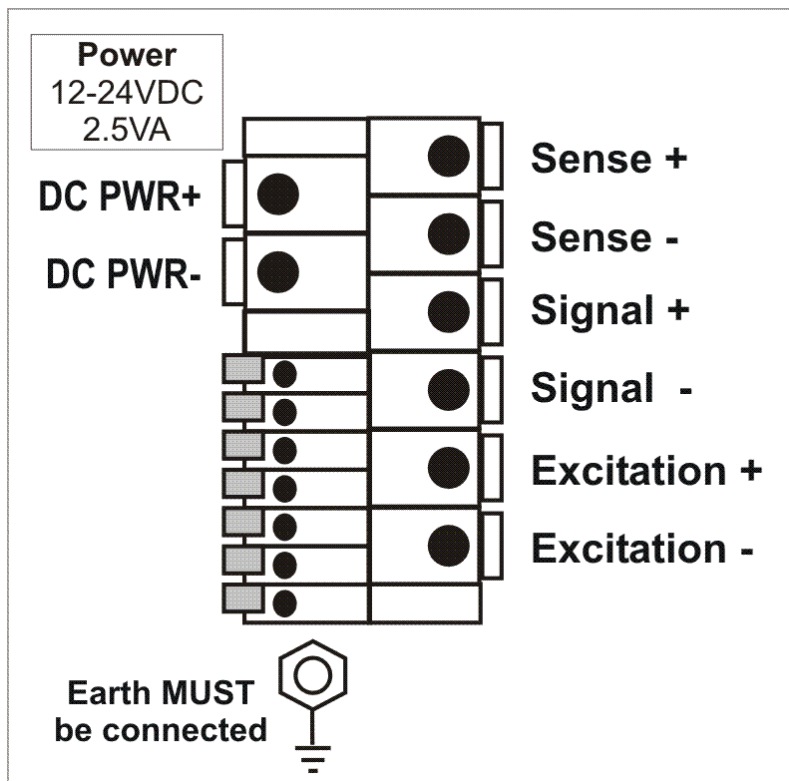
When the opto-LINK has been (enabled) the following will occur:

- The instrument briefly displays the prompt **rin-L**.
- The editing annunciators (ie. GRP, ITM, etc.) will flash for up to five minutes while the instrument searches for activity.
- **Activity Located:** If the instrument is **successful** in locating activity, the editing annunciators will continue to flash during the entire period of communications.
- **No Activity Located:** If the instrument **fails** to locate activity, the opto-LINK will be disabled and the editing annunciators will stop flashing.

6. Connections

6.1. Cable Connections

- All cable connections are made to the rear of the instrument using screwless terminals.
- Wires must be stripped of insulation by at least 10mm.
- To install, depress the orange lever beside the terminal required and push wire into the hole. Release the lever and pull gently on the wire to ensure it is securely trapped in the terminal.



6.2. DC Power (DC PWR + , DC PWR –)

- The DC supply need not be regulated, provided that it is free of excessive electrical noise and sudden transients.
- The instrument can be operated from a high quality plug-pack as long as there is sufficient capacity to drive both it and the load cells.

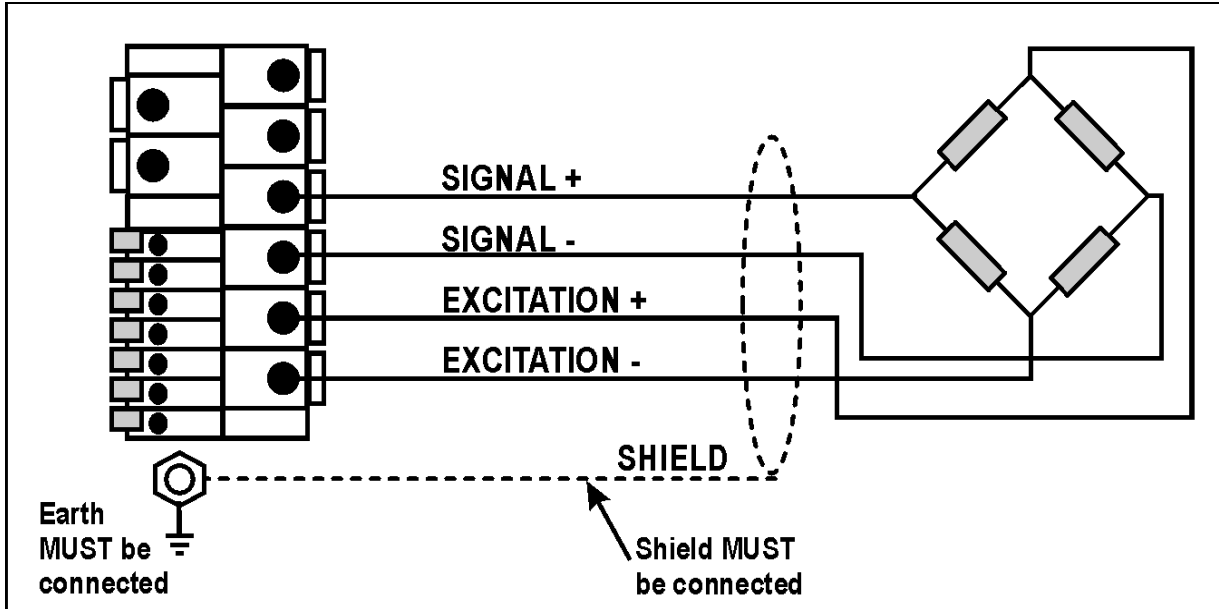
6.3. Load Cell Connection

The instrument may be connected for either 4-wire or 6-wire operation. For more information, refer to **BUILD:CABLE** setting page 13.

6.3.1. 4-Wire Connection

The minimum connectivity requirements are the connection of four wires (ie. Excitation + and – along with Signal + and –).

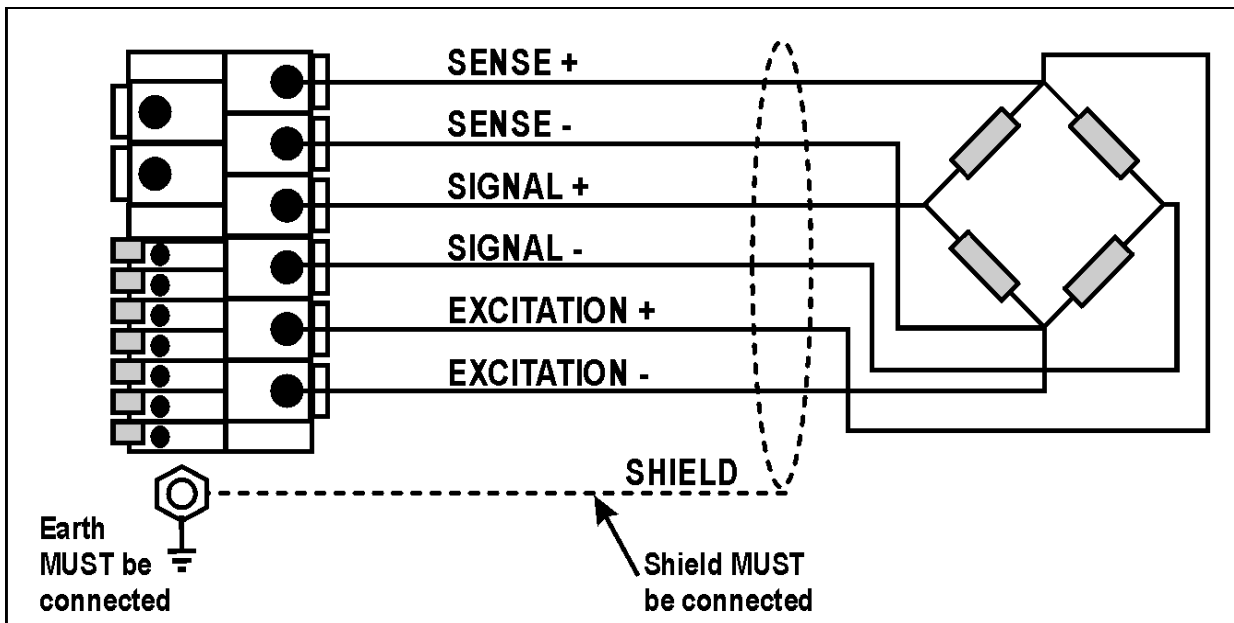
The BUILD:CABLE option must be set to 4 to allow for 4-wire connection.



6.3.2. 6-Wire Connection

The excitation and signal lines are connected the same as for a 4-wire installation.

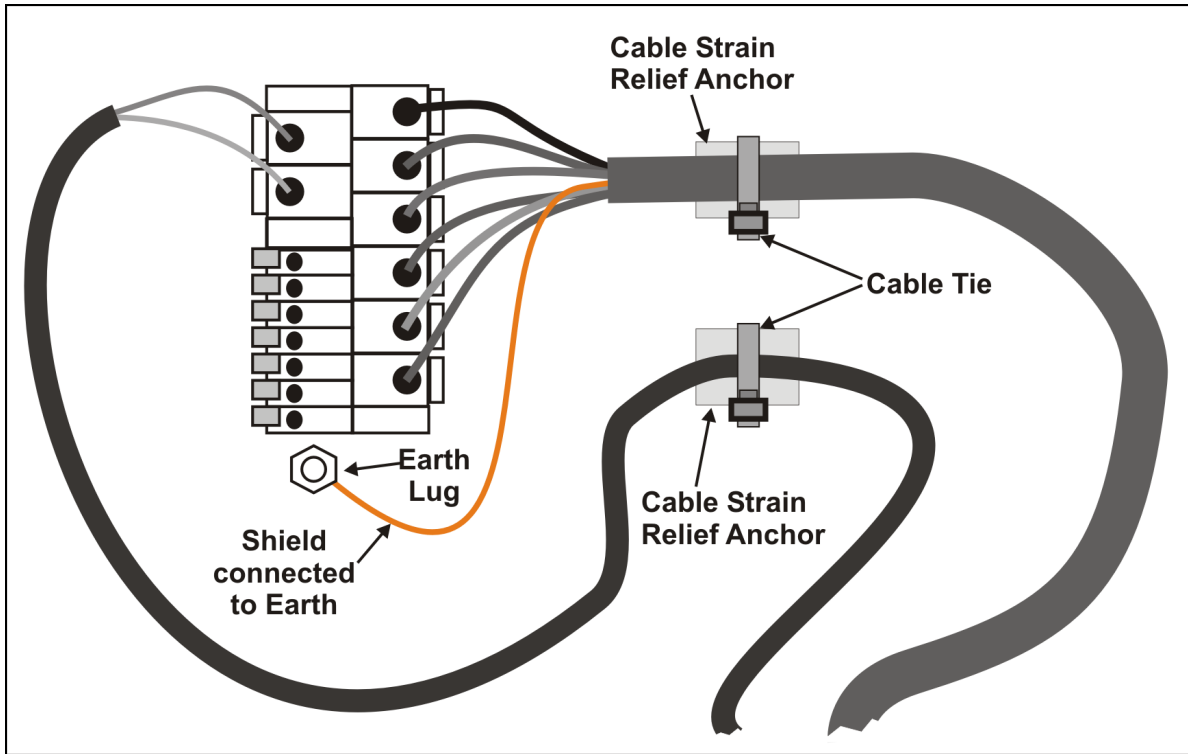
The BUILD:CABLE option must be set to 6 (the default) to allow for 6-wire connection.



6.4. Connecting Shields

To obtain full EMC or for RFI immunity, cable shields MUST be connected to the earth lug on the rear of the instrument.

This figure shows the connecting cables restrained using cable ties fastened around the cable strain relief anchors.



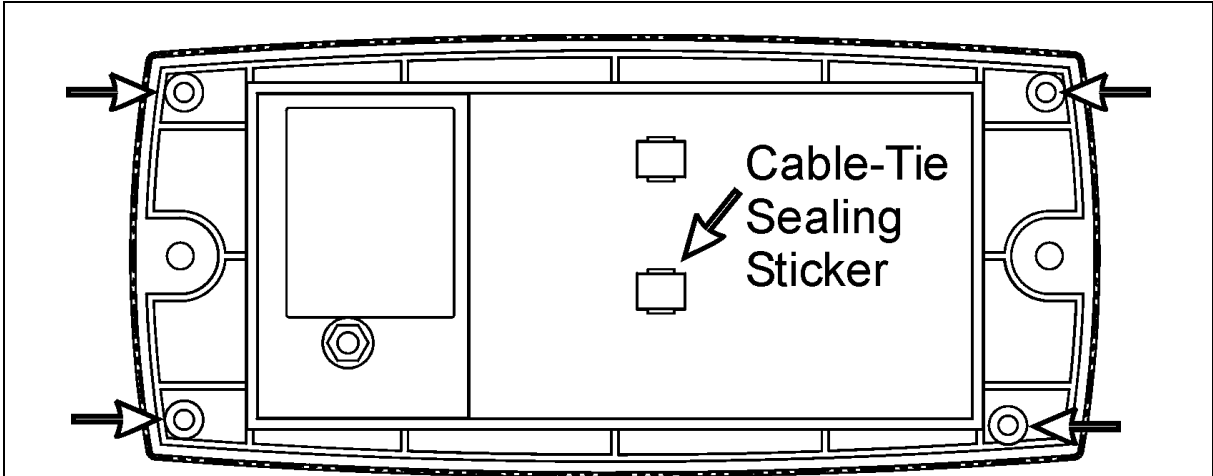
6.4.1. Cable Shield Connection and Earthing

- Care should be taken when connecting shields to maximise EMC or RFI immunity and minimise earth loops and cross-talk (interference) between instruments.
- For full EMC or for RFI immunity, termination of the cable shields at the earth lug is very important. The earth lug of the instrument must be separately connected to ground potential via a reliable link.
- The instrument should only be connected to earth via a single reliable link to avoid earth loops.
- Where each instrument is separately earthed, interconnecting cable shields should be connected at one end only.
- **Caution:** Some load cells connect the cable shield directly to the load cell (and therefore the scale base). Connection of the load cell cable shield in this situation may be site specific.

6.5. Regulatory Sealing Requirements

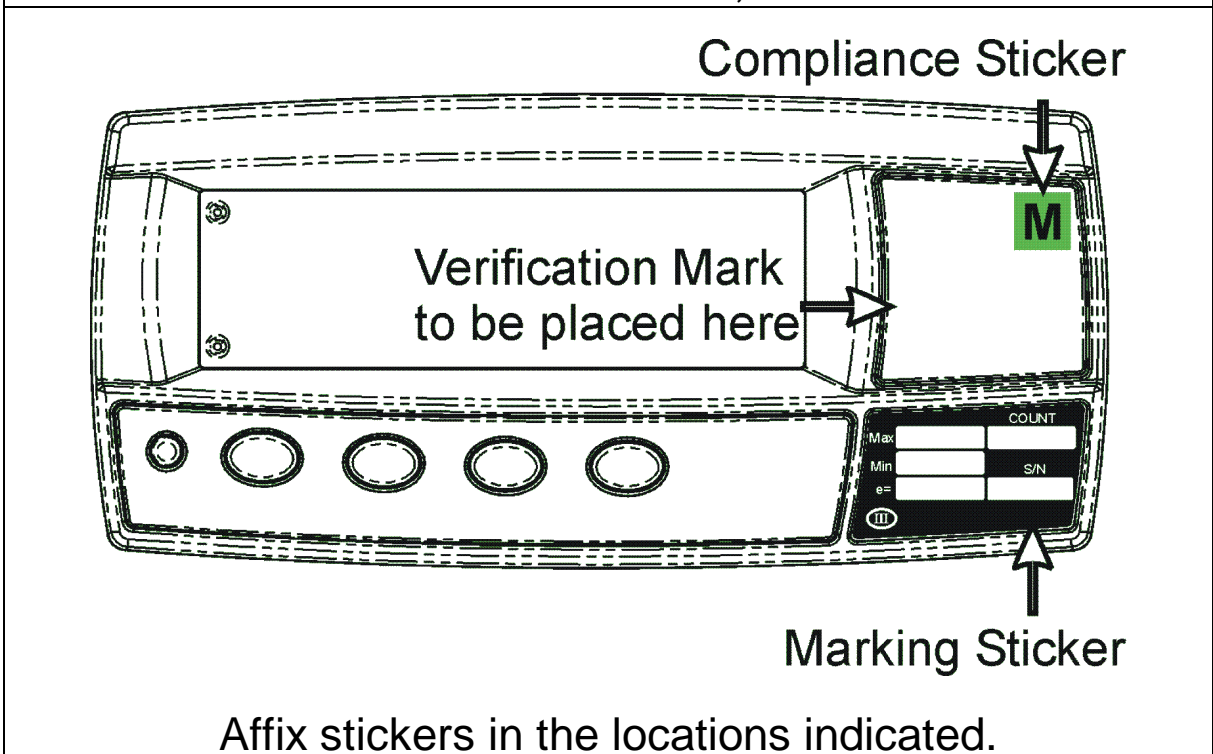
To comply with regulatory sealing requirements for each instrument, (ie. to ensure instruments are not accidentally or deliberately tampered with), it is important that proper sealing procedures be adhered to.

6.5.1. Sealing



Affix sealing stickers to the rear of the instrument, over one or more screws in the locations indicated.

Also affix a sealing sticker over the load cell cable where the cable-tie strain relief is attached, as indicated.



Affix stickers in the locations indicated.

7. Instrument Setup

7.1. Calibration Counter

The built-in calibration counter(s) monitor the number of times trade critical settings are altered. Refer to Trade Critical Settings below for more information and to the **OPTION:USE** setting page 13.

The table below describes when the counter(s) will increment.

Industrial or OIML: The **Calibration Counter** increments when trade critical settings are changed. An example of the counter is **C.00019**.

NTEP: Two counters display.

The **Calibration Counter** increments when trade critical settings in the Calibration (**CAL**) menu are changed. An example of the counter is **C.00010**.

The **Configuration Counter** increments when other trade critical settings (ie. **not** in the **CAL** menu) are changed. An example of the counter is **F.00009**.

7.1.1. Trade Critical Settings

Trade critical settings can affect calibration and/or legal for trade performance. In this document the Å symbol indicates the setting is trade critical. Each time a trade critical setting is altered, the calibration counter will be incremented by one.

7.2. opto-LINK

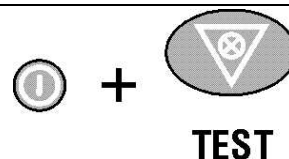
For information on setting up using the opto-LINK cable refer to opto-LINK page 5.

7.3. Access Full Setup

Full Setup provides access to configure and calibrate the instrument. All items in all menus will be enabled in Full Setup.

WARNING: Care should be taken to avoid inadvertently altering the Build or Calibration settings.

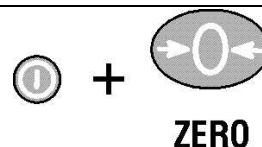
- Ensure the instrument is on.
- Press and hold the **<POWER>** and **<TEST>** keys together for two seconds.



7.4. Access Safe Setup

Safe Setup restricts access to the trade critical settings (marked with \ddot{A}).

- Ensure the instrument is on.
- Press and hold the **<POWER>** and **<ZERO>** keys together for two seconds.



7.5. Exit Full or Safe Setup

To save settings, exit setup and return to the normal weighing mode use one of the following methods:






- **Method 1:** Press **<POWER>** and **<TEST>** together for two seconds
- **Method 2:** Press **<POWER>** and **<ZERO>** together for two seconds
- **Method 3:** Select **- End -** from the menus.

Warning: If the power is interrupted while in setup (ie. by disconnecting the power cable or pressing the **<POWER>** key), unsaved settings will be lost.

7.6. Settings






The following tables identify the settings available for the instrument.

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GROUP (GRP)  ZERO	ITEM (ITM)  TARE	SELECT (SEL)  GROSS/NET	EDIT (EDT)  TEST	OK  TARE
Underline = Defaults				
BUILD	DPÄ	Decimal Point Position	<u>000000</u> *, 00000.0*, 0000.00*, 000.000*, 00.0000*, 0.00000*	Accept
	CAPÄ	Maximum Capacity	000100* to 999999* Default = <u>003000</u> <SEL> changes position, <EDT> changes digit.	Accept
	RESÄ	Resolution (Count-By)	<u>1</u> *, 2*, 5*, 10*, 20*, 50*, 100	Accept
	UNITSÄ	Weighed Units	None*, g*, <u>kg</u> *, lb*, t*	Accept
	HI.RESÄ	Resolution x 10 Mode	<u>OFF</u> *, ON	Accept
	CABLEÄ	4-Wire or 6-Wire	4*, <u>6</u> *	Accept
OPTION	USEÄ	Scale Use	<u>INDUST</u> , OIML*, NTEP*	Accept
	FILTER	Reading Average (time in seconds)	None*, 0.2*, <u>0.5</u> *, 1.0*, 2.0*, 3.0*, 4.0*	Accept
	MOTIONÄ	Motion Detection	OFF, <u>0.5-1.0</u> *, 1.0-1.0 Default = 0.5 Graduations per Second	Accept
	INIT.Z	Initial Zero on Startup	<u>OFF</u> *, ON*	Accept
	Z.TRACÄ	Zero Tracking Sensitivity	<u>OFF</u> *, SLOW (0.5 grads/sec)*, FAST (10 grads/sec)	Accept
	Z.RANGEÄ	Zero Operating Range	<u>-2_2</u> *, -1_3*, -20_20 Default = -2_2 (-2% to +2%)	Accept
	Z.BANDÄ	Zero 'Dead' Band	<SEL> changes position, <EDT> changes digit. Default = <u>0</u> *	Accept

Trade Approved is indicated with an * (e.g. 000000*)

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GROUP (GRP)  ZERO	ITEM (ITM)  TARE	SELECT (SEL)  GROSS/NET	EDIT (EDT)  TEST Underline = Defaults	OK  TARE
CAL	ZEROÄ	Zero Calibration Routine Set between zero and full scale (Current weight displays)	<SEL> key to start. Current weight displays. Remove all weight. <SEL>, <EDT> or <OK> starts routine (Z.in P displays). <ITM> key to exit, <SEL>, <EDT> or <OK> to repeat routine.	
	SPANÄ	Span Calibration Routine Set between zero and full scale (Current weight displays)	<SEL> key to start. Current weight displays. Add test weight. <SEL> or <OK> to show calibration weight value. Set correct weight. <SEL> changes position, <EDT> changes digit. <ITM> or <OK> starts routine (S.in P displays). <ITM> key to exit, <SEL>, <EDT> or <OK> to re-edit calibration weight and repeat routine.	
	FAC.CALÄ	Factory Calibration Cont. N (No) Cont. Y (Yes)	<u>Cont. N</u> Warning: Choosing Cont. Y will restore default factory calibration in BUILD and CAL menus.	Accept
SPEC	SAFE.PC	Safe Setup Passcode	<u>(000000)</u> no passcode). Set up to 6 digit passcode. <SEL> changes position, <EDT> changes digit. Activated only when FULL.PC is also set.	Accept
	FULL.PC	Full Setup Passcode	<u>(000000)</u> no passcode). Set up to 6 digit passcode. <SEL> changes position, <EDT> changes digit.	Accept

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SPEC (ctd)	KEY.LOC	Front Panel Key Locking P1234 (P for Power key. Other keys numbered from the left, ie. Zero=1.)	<u>P1234</u> Character indicates key is unlocked. (-) Dash indicates key is locked. <SEL> changes position, <EDT> changes digit.	Accept
	AUT.OFF	Auto Power Off / Battery Operation	<u>NEVER</u> , 1, 5, 10 (time in minutes) Default = Never powers off automatically (Battery: powers down after 30 minutes)	Accept
	B.LIGHT	Backlight Operation	<u>ON</u> , OFF (Automatically turns indicator off after 10 seconds of inactivity)	Accept
TEST	SCALE	Scale Base Test Display	Display reads in milliVolts-per-Volt (factory calibrated to 0.1%) Verify the correct load cell capacity and/or load cell wiring is used. Remove weight from scale.	
FACTRY	DEFLT	Restore Factory Defaults Cont. N (No) Cont. Y (Yes)	<u>Cont. N</u> Warning: Choosing Cont. Y will clear all stored data except BUILD and CAL menus.	Accept
- END -	EXIT SETUP	Save settings and return to normal weighing mode		Accept

8. Error Messages

8.1. Weighing Errors

- Check Setup = This item can be checked on site by service personnel

Error	Description	Resolution
(U - - - -)	The weight is below the minimum allowable weight reading.	Increase the weight or decrease the minimum allowable weight reading.
(O - - - -)	The weight is above the maximum allowable weight reading. Warning - overloading may damage mechanical scale elements.	Check the condition of load cell connections. Check for damaged load cell.
(ZERO) (ERROR)	The weight reading is beyond the limit set for Zero operation. The operation of the <ZERO> key is limited in the setup during installation. The indicator cannot be Zeroed at this weight.	Increase the Zero Range (Z.RANGE) or use the <TARE> key instead.
(STABLE) (ERROR)	Scale motion has prevented a <ZERO> or <TARE> operation from occurring on command.	Try the operation again once the scale is stable.

8.2. Setup and Calibration Errors

Error	Description	Resolution
(ENTRY) (DENIED)	The instrument may be in Safe Setup and an item that needs Full Setup has been selected for editing.	Access Full Setup to edit the item.
	When accessing setup, more than three attempts have been made with the incorrect passcode.	Turn the instrument off. When the instrument is turned back on, enter the correct passcode to access setup.
(RES) (LO)	The scale build is configured for less than 100 graduations.	Check the resolution (count-by) and capacity settings.
(RES) (HIGH)	The scale build is configured for more than 30,000 graduations.	Check the resolution (count-by) and capacity settings.
(SPAN) (LO)	The load cell signal range (span) is too small for these settings.	Incorrect span weight entered (must be between zero and full scale). Scale wiring incorrect. Wrong load cell capacity (too large). Wrong or no calibration weight added to scale.
(SPAN) (HI)	The load cell signal range (span) is too large for these settings.	Incorrect span weight entered (must be between zero and full scale). Scale wiring incorrect. Load cell capacity too small for application.
(ZERO) (LO)	An attempt has been made to calibrate zero below -2mV/V.	Scale wiring incorrect.
(ZERO) (HI)	An attempt has been made to calibrate zero above +2mV/V.	Remove all weight from scale. Scale wiring incorrect.

8.3. Diagnostic Errors

- Check: This item can be checked on site by service personnel.
- Return for Service: The instrument must be returned to the manufacturer for factory service.

Error	Description	Resolution
(E0001)	The power supply voltage is too low.	Check supply
(E0002)	The power supply voltage is too high.	Check scale / cables
(E0010)	The temperature is outside of allowable limits.	Check location
(E0020)	Scale build is incorrect. The number of graduations has been set too low or too high.	Fix up scale build
(E0100)	The digital setup information has been lost.	Re-enter setup
(E0200)	The calibration information has been lost.	Re-calibrate
(E0300)	All setup information has been lost	Enter setup and calibrate
(E0400)	The factory information has been lost.	Return for Service
(E0800)	The EEPROM memory storage chip has failed	Return for Service
(E2000)	ADC Out of Range Error. This may be caused from a broken load cell cable.	Check BUILD:CABLE setting. Check load cell cable, wiring, etc.
(E4000)	Not Used	
(E8000)	The FLASH program memory is incorrect	Return for Service

The **E** type error messages are additive. For example if instrument is running off batteries and the temperature drops, the battery voltage may be too low. The resulting error messages will be **E0011** (0001 + 0010). The numbers add in hexadecimal as follows:

1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - A - B - C - D - E - F
 (For example, 2 + 4 = 6, or 4 + 8 = C)

Notes:

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