



CD1200 SCALE SYSTEM

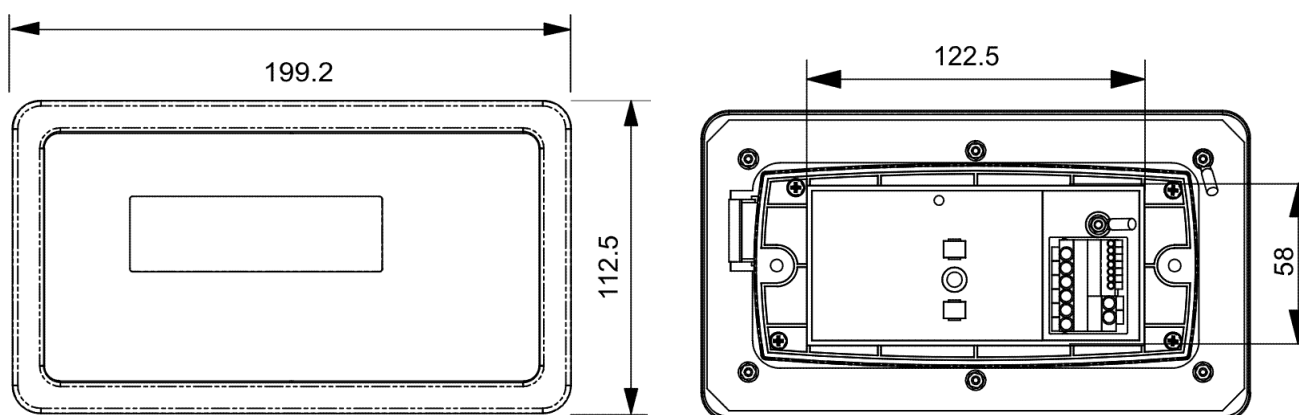
BASIC FUNCTIONS - USER MANUAL



SPEIFICATIONS

	CD1200
Resolution	Up to 60,000 divisions, minimum of 0.25 μ V/division
Zero Cancellation	± 2.0 mV/V
Span Adjustment	0.1mV/V to 3.0mV/V full scale
Excitation	5 V for up to 4 x 350 or 8 x 700 ohm load cells (4-wire or 6-wire plus shield) Max total load cell resistance: 3,500 Ω (4x350 Ω Nontrade 8x350 Ω)
A/D Type	24bit Sigma Delta with 8,388,608 internal counts 20 updates/second
Operating Environment	Temperature: -10° to $+50^{\circ}$ C ambient (14° to 122° F) Humidity: <90% non-condensing IP65 when panel mounted
Display	LED Backlit LCD with six 20mm (0.8") 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 s
Zero Range	Selectable from $\pm 2\%$ to $\pm 100\%$ Full Scale
Standard Power Input	7 to 24VDC, 4.8, 9.6, 12 and 24V batteries (2.5 VA max) ON/OFF key with memory feature
Input Voltage	12 – 24VDC 1.5A
Case Materials	Stainless Steel Flush Mount
Packing Weights	Basic Indicator: 0.49kg (1.7oz)
Serial Outputs	RS232 Transmission rate: 2400, 4800, 9600 or 19200 baud
Functions	Unit switching, counting, manual hold, peak hold, totalising, high resolution, auto tare, etc.

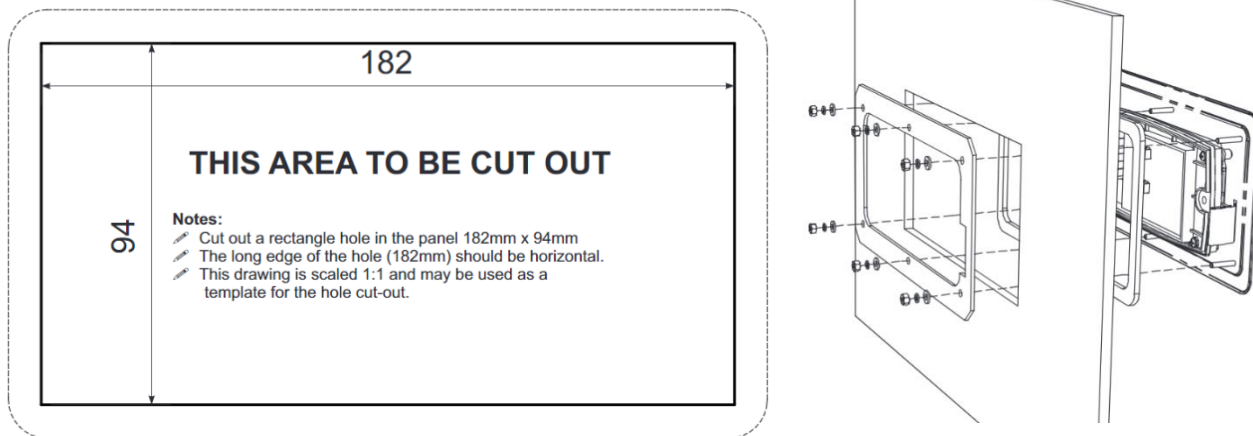
Dimensions:



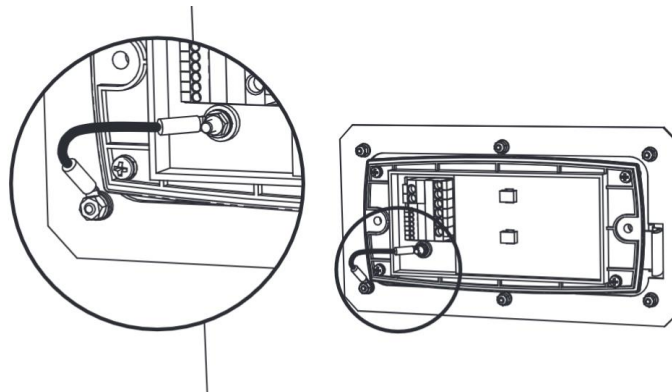
INSTALLATION

Basic installation:

The CD1200 comes with a back plate allowing to be installed into a simple rectangular cutout as shown in the illustration below.

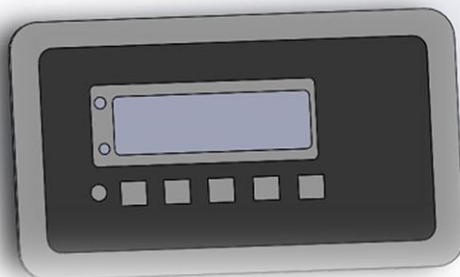


Grounding:



Advanced installation:

A 3D CAD model can be provided to allow for a more fit to size installation.



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. It is not necessary to tin the ends of the wire with solder or to add crimp ferrules to the wires, however, these techniques are also compatible with the terminals and may ultimately make for a neater job.

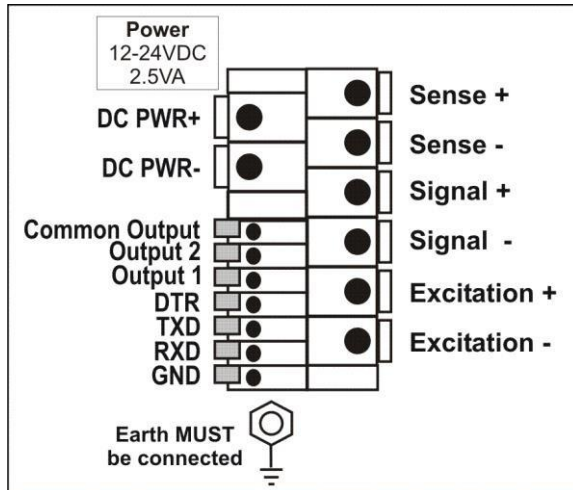


Figure 2: Cable Connections

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.

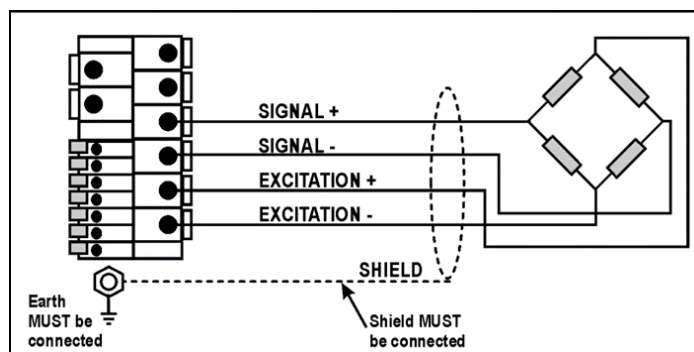
If relays or solenoids are used on the same power circuit, proper protection must be used to prevent back EMF as it could damage the indicator.

Load Cell Connection:

4-Wire Connection

The minimum connectivity requirements are the connection of four wires (ie. Excitation + and - along with Signal + and -). Internally the instrument has a precision analogue switch that connects the Sense + and - lines directly to the Excitation + and - lines when 4-wire mode is selected.

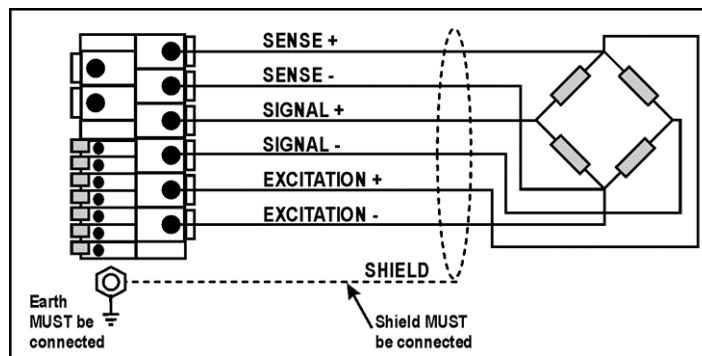
A 4-wire connection is only suitable for short cable runs. Where long cable lengths are needed, a 6-wire extension is required to maintain accuracy.



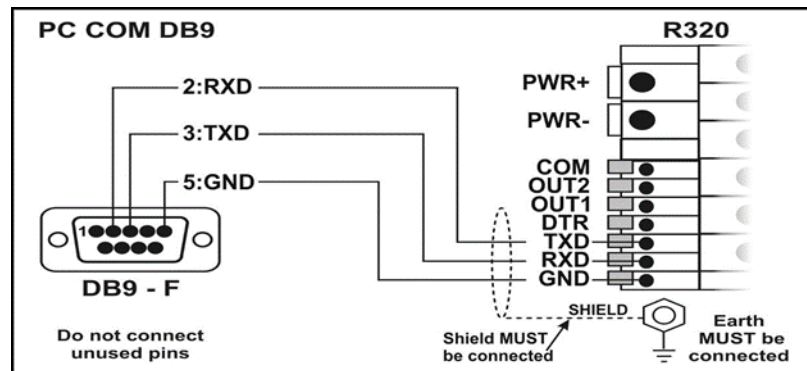
6-Wire Connection

The excitation and signal lines are connected the same as for a 4-wire installation. The extra two wires (Sense + and -) should be connected to the Excitation + and - lines as close as possible to the load cell itself. Typically, these connections are made in a load

cell termination box.



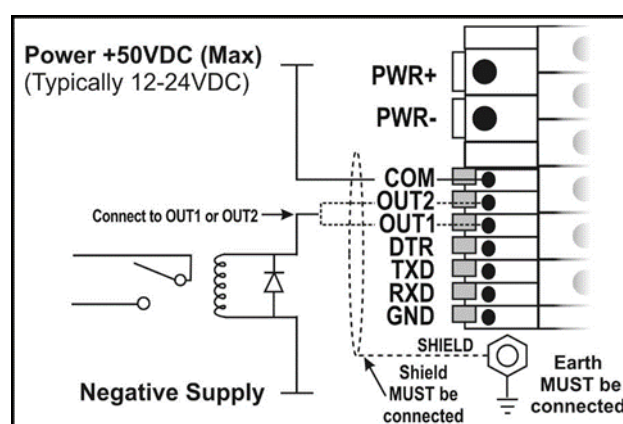
RS-232 Serial Connection:



Outputs Connections:

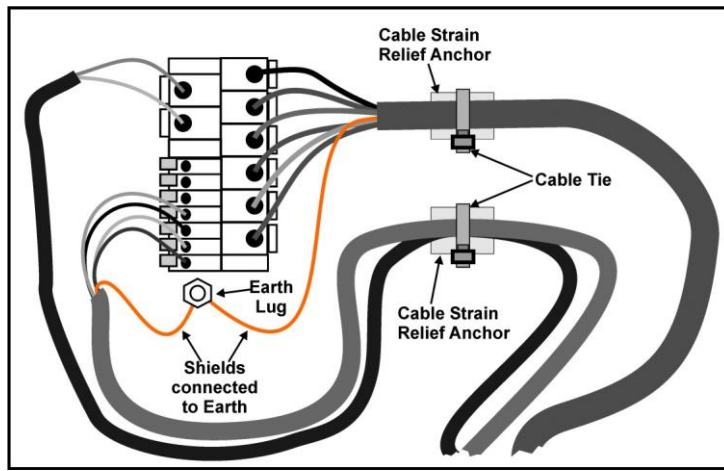
The output drivers for the instrument are isolated open emitter transistor drives that are capable of driving up to a total of 300mA.

To drive external loads (eg. relays), connect the relay coil positive supply to the output common and the output line directly to one side of the relay coil. Connect the other end of the relay coil to the negative supply. It is recommended that fly-back diodes or transient suppressors be fitted across relay coils to limit switching noise.



Shield connections:

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



MAINTENANCE

General Warnings:

- 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.
- The instrument should be installed away from any sources of excessive electrical noise.
- The load cell cable is particularly sensitive to electrical noise and should be located well away from any power or switching circuits.
- 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.

Cleaning:

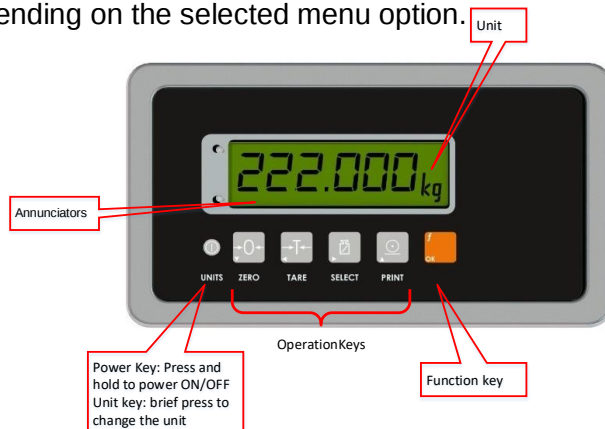
When properly installed, the CD1200 can provide an IP65 rating. It can therefore be cleaned with a soft cloth slightly dampened with warm soapy water.

Calibration:

The scale needs to be checked on a regular basis based on the usage and weight accuracy requirements. The verification can be performed with a know weight. Calibration is required if the scale shows a deviation based on the know weight. The deviation limit can be set by the user based on the application and required accuracy of the scale.

BASIC OPERATION

The illustration below show the different display features. The keypad is a multi-function keypad. Each key plays a different function depending on the selected menu option.



Weight Display	The Weight Display indicates the weight readings, setup information, errors and warnings.		
Units Display	The Units Display shows the units of the weight reading as: grams (g), kilograms (kg), pounds (lb), tonnes (t) or none. If the instrument is set up for counting the units display will show pieces (p).		
Annunciators		ZERO	Visible when the gross reading is within $\pm \frac{1}{4}$ of a division of true zero.
		NET	Visible when the displayed reading represents NET weight.
		MOTION	Visible when the displayed reading is not stable.
		OVER	Visible when either of the setpoints is set as type OVER, and the weight is above the target weight.
		UNDER	Visible when either of the setpoints is set as type UNDER, and the weight is below the target weight.
	1	OUT 1	Visible when Output 1 is turned ON and dual range is not enabled.
		RANGE 1	Visible when dual range is enabled and range 1 is active. (K35* only)
	2	OUT 2	Visible when Output 2 is turned ON and dual range is not enabled.
		RANGE 2	Visible when dual range is enabled and range 2 is active. (K35* only)
		ZERO BAND	Visible when the displayed weight is within the zero 'dead' band setting. (The zero band symbol shows near the top right corner of the display.)
		HOLD	Visible when the displayed reading is held.
		LOW BATTERY	Visible when battery voltage is too low and batteries need replacing or recharging. (The low battery symbol shows in the top right corner of the display.)

Has a key been locked?

A single press of each key triggers the weighing operation printed on it. The instrument allows individual keys to be disabled in the setup. All keys are enabled at the factory, but some keys may have been intentionally disabled (locked) during installation. If a key has been locked, a long beep sounds when it is pressed. If however, the key beeps

normally, but does not appear to trigger the desired action, it is waiting for the weight reading to settle before the action can proceed.

Editing Function

Available during digital setup and calibration. This function is displayed using the editing annunciators above each key.

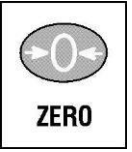
Stability – What is a “Stable Error”?

Once a <ZERO>, <TARE> or <PRINT> key is pressed the instrument waits for a stable valid reading before performing the associated operation. If the weight readings remain unstable or invalid due to some diagnostic error for longer than 10 seconds, the operation is cancelled and the **STABLE ERROR** message is displayed.

POWER Key

	The <POWER> key is used to turn the instrument on and off. If the PWR.FN feature is set to UNITS, then a short press of the <POWER> key will switch units. To initially turn the instrument on, press and hold the <POWER> key. The display will show the following: • Display segments will light and then clear. • Software Version (eg. V4.0). • Calibration Counter (eg. C.00010). • The current weight will then display. To turn the instrument off, press and hold the <POWER> key for three seconds. The instrument will display OFF followed by the 3s countdown. Battery Operation: When using batteries, the backlight will automatically turn off to conserve power after a short period of inactivity. A short press of the <POWER> key will turn the backlight on again. Refer to B.LIGHT (Backlight Operation) Unit Switching: The <POWER> key will function as a unit switching button with a short press by configuring PWR.FN to UNITS. Locking: The <POWER> key can be locked to prevent the instrument being turned off from the front keypad. Refer to KEY.LOC (Front Panel Key Locking)
Automatic Operation	The <POWER> key has a memory function associated with it. This means that the state of the auto out setting is remembered even if external power is interrupted. It is therefore possible to turn the instrument on in the safe knowledge that it will operate whenever external power is available and will not need to be manually turned on again if the power is interrupted.

ZERO Key

	When an empty scale has drifted away from a true zero reading, this key is used to perform a zero adjustment on the scale display. The zero adjustment is stored when power is removed and is re-used when next powered up. The amount of weight that may be cancelled by the <ZERO> key is limited via an item in the Setup of the instrument. Refer to Z.RANGE (Allowable Zero Operating Range) ⊗ Long Press: When the indicator is set to Industrial mode a long press of the <ZERO> key will remove any stored zero adjustment.
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TARE Key

 TARE	This key is used to temporarily set the scale to zero (such as cancelling the weight of a carton before performing a filling operation). The display will show the Net weight and the NET annunciator will be lit. The <TARE> key can operate in all modes (ie. Industrial, OIML and NTEP). Refer to Industrial vs OIML and NTEP Modes The weight tared is deducted from the allowable range of the scale, reducing the maximum weight that can be displayed. The tare adjustment is stored when power is removed and is re-used when next powered up.
Preset Tare	This feature allows the operator to manually enter the tare weight. When a preset tare weight is being used the instrument will display Pt before displaying the net weight. Any printing of the tare weight will be followed by letters Pt if a pre-set tare value is active. A long press of the <TARE> key will allow editing of the Pre-set Tare value. Press the <OK> key to enter the Pre-set Tare setting. Change the Pre-set Tare setting using the <SEL> and <EDT> keys. The Pre-set Tare setting can be cleared by one of two means: • Using a long press of the <TARE> key and editing the pre-set tare value to zero. • While the gross load is zero; • Using a short press of the <TARE> key to retare the instrument in the usual manner. • OR, Using a short press of the <ZERO> key to zero the instrument in the usual manner. The tare adjustment is stored when power is removed and is re-used when next powered up.

5.1. SELECT Key

 SELECT	This key toggles the weight display between the Gross weight and the Net weight (provided that a Tare has previously been acquired using the <TARE> key).
opto-LINK Activation	This feature is used to temporarily connect a PC to the instrument for calibration and setup purposes. A long press of the <SELECT> 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 opto-L. • The editing annunciators (ie. GRP, ITM, etc.) will flash for up to five minutes while the instrument searches for activity. During this period, the instrument also disables the RS-232 communications. • After a 5 minute period of no activity, the opto-LINK is disabled and the editing annunciators will stop flashing. The instrument will revert back to the normal RS232 (ie. the SERIAL:TYPE setting will be re-activated).

PRINT Key

 PRINT	If a printer or computer has been attached to the instrument and the manual print function has been selected, the <PRINT> key will trigger an output of the current weight reading. The PRINT prompt is displayed while waiting for the printer to accept data. If the printer is offline the PRINT prompt will remain for a maximum of 10 seconds before the operation is cancelled. Each weight printed is automatically added to an internal Total Weight. Long Press: A long press of the <PRINT> key will print the total. The total weight is then cleared automatically.
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FUNCTION Key

 K34*	Use this key to perform hold.
 K35*	The function of this key can be selected from a number of different functions including peak-hold, counting, etc. Each has an associated overlay sticker that should be applied to the <FUNCTION> key. Long Press: A long press of the <FUNCTION> key may be used for certain functions depending on the primary function of the key.

CONFIGURATION

General Setup Information

Configuration and calibration can be performed entirely from the front panel. 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. In addition, there is also **Safe Setup** that provides restricted access. This setup method ensures that only settings that are not calibration or trade sensitive can be changed.

Full and Safe Setup can be passcode protected to prevent unauthorised or accidental tampering. If the scale has been passcode protected, the setup menus cannot be accessed until the correct code has been entered.

Basic Weighing Terminology

The following terms are used throughout the setup procedure. Knowledge of these basic weighing terms is beneficial in setting up and calibrating the instrument.

Term	Definition
Units	Units of measurement (kilograms, tonnes, pounds, etc.).
Full Scale	Total change in weight between zero gross load and full capacity gross load.
Resolution or Count-by	Smallest change in weight units that the display can show.
Total Number of Graduations	Maximum number of display steps between zero gross load and full capacity gross load. It is equal to full scale divided by the count-by.
Division	A single graduation.

Example

This example provides a check to ensure the capability of an indicator to read a stable weight on extremely small divisions compared to the load cell capacities.

The check is to find out what the microvolt per division is and then compare this to the manufacturer's specification. If the manufacturer's specification is smaller than the calculated value, the unit is within the requirements of operation.

Note: The capability of an indicator may be different than the trade approval limit of the micro-Volt per division.

A 10,000kg 2.0mV/V load cell is used in an application requiring a 5000kg full scale, with weight displayed in 5kg increments.

The values are:

- Units = kg
- Full Scale = 5000
- Count-by = 5

Calculating the total number of graduations:	$\text{Total Number of Graduations} = \frac{\text{Full Scale}}{\text{Count-by}} = \frac{5000}{5} = 1000 \text{ divisions}$
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Signal voltages can be calculated as follows:

Calculating the full scale signal (load cell):	$\text{Full Scale Signal} = \frac{\text{Full Scale}}{\text{Load Cell Capacity}} = \frac{5000}{10000} \times 2.0\text{mV/V} = 1.0\text{mV/V}$
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Since the instrument uses 5V load cell excitation, the absolute signal voltage is:	Absolute Signal Voltage $\text{= Excitation Voltage} \times \text{Full Scale Signal} = 5\text{V} \times 1.0\text{mV/V} = 5.0\text{mV}$
Calculating the signal resolution:	$\text{Signal Resolution} = \frac{\text{Absolute Signal Voltage}}{\text{Number of Graduations}} = \frac{5.0\text{mV}}{1000 \text{ divisions}} = 0.005\text{mV} / \text{division} = 5\mu\text{V} / \text{division}$

Filtering Techniques

There is a trade off between noise filtering and the step-response time of the system. The step- response is defined as the time between placing a weight on the scale and the correct stable weight reading being displayed. This does not affect the number of readings per second that are taken. It simply defines the amount of time that is required to determine a final weight reading.

The **FILTER** setting in the instrument setup shows the amount of time over which the averaging is taken. Increasing the averaging time will result in a more stable reading but will extend the time it takes the instrument to settle to a final reading.

Industrial vs OIML and NTEP Modes

Instruments may be operated in Industrial, OIML, or NTEP modes depending on the application firmware. The OIML, and NTEP modes restrict certain aspects of the operation of the instrument to ensure compliance with the respective trade certified standards. For more information refer to the Calibration Counter section below and also to the USE

The following table lists the operation differences for each of these modes.

Element	Industrial	OIML	NTEP
Underload	–105% of full scale	–1% or –2% of full scale depending on zero range setting	–1% or –2% of full scale depending on zero range setting
Overload	105% of full scale	Full scale +9 divisions	105% of full scale
Tare	No restrictions on Tare	Tare values must be > 0	Tare values must be > 0 and rounded to the nearest graduation
Test Modes	Unlimited time allowed	Limited to five seconds	Limited to five seconds

Calibration Counter

Within the setup there are a number of critical steps that can affect the calibration and/or legal for trade performance of the instrument. If any of these steps are altered, the trade certification of the scale could be voided.

The instrument provides built-in calibration counter(s) to monitor the number of times the critical steps are altered. The value of the counter(s) is stored within the instrument and can only be reset at the factory. Each time a critical step is altered, the counter(s) will increase by one. Whenever the instrument is powered up, or setup mode is entered/exited, the current value in the counter(s) is displayed briefly (eg. C00010).

Industrial

OIML

NTEP

The Calibration Counter increments when trade critical settings, marked with ⓧ, are changed. An example of the counter is C.00019.	The Calibration Counter increments when trade critical settings, marked with ⓧ, are changed. An example of the counter is C.00019	The Calibration Counter increments when trade critical settings in the Calibration (CAL) menu, marked with ⓧ, 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), marked with ⓧ, are changed. An example of the counter is F.00009.
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The value(s) of the counter(s) is written on the tamperproof trade label on the front or top of the indicator for trade-certified applications and functions as an electronic seal. If any legal for trade settings are changed on the instrument, the current value of the calibration counter(s) will be different from the recorded value and the seal is broken. In this manual, items marked with ⓧ indicate that the setting is legal for trade critical settings.

Passcodes

The instrument has two levels of passcodes to provide a security lock on accessing Setup via the keypad.

- Full Setup Passcode
- Safe Setup Passcode

The Full Setup passcode can also be used to access Safe Setup.

Full Setup Passcode

Setting a passcode for Full Setup restricts any access to Full Setup. Refer to FULL.PC

Safe Setup Passcode

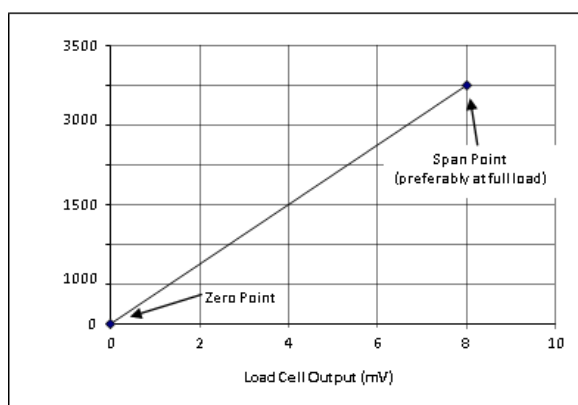
Setting a passcode for Safe Setup restricts access to Safe Setup functions. Refer to SAFE.PC

Setup Lock-Out

If an attempt is made to enter Full or Safe Setup using an incorrect passcode, the instrument will respond with the message **ENTRY DENIED** and then the user will be returned to normal operating mode. A passcode counter has been set so that only three failed attempts can be made to access Full/Safe Setup. On the fourth attempt the user will be 'locked out' of Full/Safe setup. Should this occur the **ENTER PASS** prompt will not display, but instead the **ENTRY DENIED** message displays and returns the user to the normal operating mode. To rectify this issue the instrument must be turned off. When the instrument is turned back on the passcode counter is reset to zero (allowing the user to enter the correct passcode).

CALIBRATION

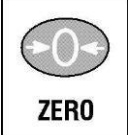
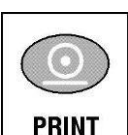
The basic calibration requires a zero calibration and a Span calibration.

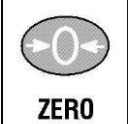


Calibration:

Once the indicator is powered up, use the quick calibration process described below to perform the calibration. This process can also be accessed from the setup menu as well.

Quick Calibration

1		Press and hold "Zero" button for 2 seconds to access the quick calibration mode	
		ZERO is displayed followed by actual weight flashing	
2		Remove all weight from the scale then press the "PRINT" button to capture the zero calibration	
		The live weight should show 0 and will be flashing	
3		Press the "Zero" button again to access the SPAN calibration	
		Add known weight to the scale. The scale will flash the live weight which may not reflect the actual weight that was added.	
4		Press the "PRINT" button. The display will now allow the user to input the calibration weight	

5		Enter the calibration weight using the “PRINT” button to change the digit and the “SELECT” button to move to the next digit	
6		Once the correct weight is entered, press the “F” button	
7		Press the “Zero” button to save and exit the calibration mode	

ERROR MESSAGES

Weighing Errors

These messages show status messages or errors that may occur during normal weighing operation.

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.

Setup and Calibration Errors

These messages show status messages or errors that may occur during the instrument setup and calibration.

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. Refer to Setup Lock-Out	Turn the instrument off. When the instrument is turned back on, enter the correct passcode to access setup.
(PT.TOO) (CLOSE)	An attempt has been made to place a calibration point too close to an existing calibration point.	Re-enter the calibration point. Points must be spaced by at least 2% of full scale from each other.
(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.

Diagnostic Errors

The instrument continually monitors the condition of the internal circuits. Any faults or out-of-tolerance conditions are shown on the display as an **E** type error message.

In the table below the following terms are used:

- **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.

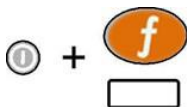
Error	Description	Resolution
(E0001)	The power supply voltage is too low.	Check supply
(E0002)	The power supply voltage is too high.	Check scale / cables
(E0010)	The temperature is outside of allowable limits.	Check location
(E0020)	Scale build is incorrect. The number of graduations has been set too 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)	The battery backed RAM data has lost data.	Re-enter setup
(E8000)	The FLASH program memory is incorrect	Return for Service

SETUP – WARNING: For advanced users only

Access using Full Setup

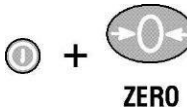
The **Full Setup** method provides access to all functions in Setup, including legal for trade and calibration sensitive settings. Changes in Full Setup mode may result in the calibration counter being incremented. Items marked with ⓧ indicate that the setting is trade critical.

Changes to passcodes and restoring the factory default settings can only be accessed in Full Setup mode. These items will however not increment the calibration counter. If an attempt is made to enter Full Setup using the incorrect passcode, the instrument will respond with the message **ENTRY DENIED**.

Full Setup

1. Instrument on. 2. Press and hold both the <POWER> and <FUNCTION> keys together for two seconds. 3. Full Setup can also be entered by pressing a push-button accessed from the rear of the instrument.
WARNING All items in all menus will be enabled in Full Setup. Care should be taken to avoid inadvertently altering the Build or Calibration settings.

Access using Safe Setup

The **Safe Setup** method restricts access to the Trade Critical settings. Changes made in this mode will not increment the calibration counter. In this manual, items marked with ⓧ indicate that the setting is trade critical. If an attempt is made to enter Safe Setup using the incorrect passcode, or if an attempt is made to alter a trade critical setting while in Safe Setup, the instrument will respond with the message **ENTRY DENIED**.

Safe Setup
 ZERO
1. Instrument on. 2. Press and hold both the <POWER> and <ZERO> keys together for two seconds.

Setup Display Prompts

When accessing **Full** or **Safe Setup** the instrument will beep twice and then display the following:

- FULL or SAFE (depending on setup access type)
- SETUP
- Software Version (eg. V1.0)
- Calibration Counter (eg. C.00010).
- If a passcode has been configured, the **ENTER PASS** prompt will display and the setup passcode must be entered to gain access.
- (Safe Security Passcode for Digital Setup)

- (Full Security Passcode for Digital Setup)
- The title of the first Group (ie. **BUILD**) will then be displayed.

Exiting Full or Safe Setup

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

Option 1	Press and hold both the <POWER> and <FUNCTION> keys together for two seconds.
Option 2	Press and hold both the <POWER> and <ZERO> keys together for two seconds.
Option 3	Press the <GRP> key repeatedly. When - End - displays press <ITM> or <OK> .

The instrument will beep and then display:

- SAVING
- Software Version (eg. V1.0)
- Calibration Counter (eg. C.00010).
- The current weight will then display.

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.

Groups and Items

All keypad setup options are organised in a tree structure made up of **Groups** and **Items** – the following notation will be used (GROUP:ITEM).

GRP (Group)	Setup is divided into a series of Groups . Each group has a distinctive group title. All options in any one group have related functions. The <GRP> key can be used to cycle through the available groups.
ITM (Item)	Each group is divided into individual Items . Each item represents a parameter that can be changed. Pressing the <ITM> key will enter the displayed group, allowing access to the items within the group. The <ITM> key can be used to cycle through the available items. The <SEL> key is then used to edit the item

Setup Menus

BUILD (Scale Build)



Settings within this Group are used to configure the indicator to suit the current application. It is important to fully set the options within this group before calibration is attempted. Later changes to items within this group may invalidate the current calibration data.

DP (Decimal Point Position) ⊗	Sets the location of the decimal point on the display. To avoid confusion, set this parameter first so that all other weight related values are displayed with the decimal point in the correct position. Can be set from 000000 (none) to 0.00000 Default: 000000
CAP (Maximum Capacity) ⊗	Sets the nominal maximum capacity (or full scale) of the scale. This is set in weighing units (eg. kg, t, etc.), with the decimal point in place. For example, if a scale is to weigh 500.0 kg in 0.5 kg increments, CAP is set to 500.0, and RES is set to 5. Range: 000100 to 999999 Default: 003000

RES (Count-by Resolution) ⊗	Sets the resolution (or Count-by) of the display. The resolution is the number by which the indicator will count. Options are: 1, 2, 5, 10, 20, 50 or 100 Default: 1
UNITS (Weighed Units) ⊗	Sets the units for display and printing. Options are: (g) grams, (kg) kilograms, (lb) pounds, (t) tonnes, () none (ie. other units). Default: kg (K303 Default: lb)
GRADS (Number of Graduations)(K35* Only) ⊗	Sets the number of graduations to be used for range 1 of the scale. If the GRADS multiplied by the RES is less than CAP, then dual range will be automatically enabled, otherwise GRADS will be ignored. Range: 000100 to 060000 Default: 003000
HI.RES (High Resolution x 10 mode) ⊗	Sets the instrument to display weight at 10 times resolution. This is intended for test purposes in trade applications but may be used for industrial weighing. This mode is indicated by the flashing of the units annunciator. Options are: ON or OFF Default: OFF

CABLE (4-Wire or 6-Wire) ⊗	Sets the load cell input to operate in 4-wire (auto sense) or 6-wire mode. Options are: 4 or 6 Default: 6
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OPTION (Scale Options)

Items within this Group are used to configure the operating parameters of the scale.

USE (Scale Use) ⊗	This is where the basic use of the scale is set. This setting configures the instrument for Industrial, OIML, or NTEP operation. Default: INDUST
FILTER (Reading Average)	The instrument can average a number of consecutive readings when calculating the displayed weight. This is used to dampen unwanted weight fluctuations caused by vibrations or dynamic forces. High settings will stabilise the display at the expense of rapid response to sudden weight changes. Options are: NONE, 0.2, 0.5, 1.0, 2.0, 3.0, 4.0 (time in seconds) Default: 0.5 (seconds)
MOTION (Motion Detection) ⊗	Sets how much weight variation over a defined time period is allowed before the displayed weight is deemed to be unstable. This value is displayed as weight change (0.5 or 1.0 graduations) per second. When set to OFF , the Motion Detection is ignored and ZERO, TARE and PRINT actions are instantaneous. Options: OFF, 0.5-1.0, 1.0-1.0, 3.0-1.0, 0.5-0.5, 1.0-0.5, 3.0-0.5 (graduations per second) Default: 0.5-1.0 (0.5 graduations per second)
INIT.Z (Initial-Zero on Startup)	This function can be used to automatically ZERO the indicator during power-up. The amount of weight that can be zeroed is limited to +/- 10% of full scale. Options are: -2_2, -10_10 or OFF Default: OFF

Z.TRAC (Zero Tracking Sensitivity) ⊗	Zero tracking allows the display to adjust for minor changes in the zero balance of the scale. When enabled, the instrument will track weight readings within the zero 'dead' band back to exactly zero at a maximum rate of 0.5 (SLOW), 3 (MED) or 10 (FAST) graduations per second. Options are: OFF, SLOW, MED, FAST Default: OFF
Z.RANGE (Allowable Zero Operating Range) ⊗	This setting restricts the range over which the Zero functions can operate. Options are: -2_ 2, -1_ 3, -20_20, FULL Default: -2_ 2 (-2% to +2%)
Z.BAND (Zero 'Dead' Band) ⊗	This is an adjustable margin either side of true zero that defines the zero 'dead' band. The zero 'dead' band is used by the automated functions to determine zero load (eg. a setting of 4 specifies that readings between -4.5 and 4.5 are considered to be zero). When the displayed weight reading is within this band the instrument displays the zero band annunciator. Settable over the full weight range. Always enter a number in multiples of display units. Refer to RES Default: 0 (ie. -0.5 to 0.5 graduations)

R.ENTRY (Entry Means to Full Setup)	This setting can be used to restrict access to the full setup. The first entry to the full setup menu using the push button on the rear of the instrument causes all future access to the full setup to be restricted to the push button. Options are: OFF, ON Default: OFF
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CAL (Scale Calibration)

Items within this group perform various calibration routines. Certain items in the Scale Build can affect the calibration of the scale. Always check that these sections are correctly configured to suit the current application before attempting to calibrate the scale.

ZERO (Zero Calibration) ⊗	Select to perform Zero Calibration. While the zeroing is in progress the display will show Z.in P .
SPAN (Span Calibration) ⊗	Select to perform Span Calibration. While the span calculation is in progress the display will show S.in P .
ED.LIN (Edit Linearisation Points) ⊗	Select to view linearisation setup and start linearisation routines. While linearisation is in progress the display will show L.in P .
CLR.LIN (Clear Linearisation Points) ⊗	Select to view linearisation setup and select linearisation points to clear.
DIR.ZER (Direct Zero Calibration) ⊗	Select to enter the mV/V value of the zero calibration directly. This feature is used to enable approximate calibrations to be performed in situations where a standard ZERO calibration is impractical (eg. calibration on a partially filled silo).

DIR.SPN (Direct Span Calibration) ☒	Select to enter the mV/V value of the full scale capacity of the scale build. This feature enables the instrument to be calibrated based on the rated output capacity of the load cells rather than using test weights. The accuracy of this method is limited to the accuracy of the published load cell ratings.
G.INST (Installation Gravity) ☒	Select to enter the gravitational acceleration of the location at which the scale is installed. Only necessary when using the Gravity Compensation feature. Range 9.750 to 9.860 Default: 9.810
G.FAC (Factory Gravity) ☒	Select to enter the gravitational acceleration of the location at which the scale is calibrated. Only necessary when using the Gravity Compensation feature. Range 9.750 to 9.860 Default: 9.810
G.FIRST (First power up prompt) ☒	Select to set the indicator to prompt the user to enter the Installation Gravity on next power up. Only necessary when using the Gravity Compensation feature. Options ON, OFF Default: OFF
FAC.CAL (Restore)	Select this choice to restore default factory calibration. This restores all calibration critical settings in the BUILD , OPTION and CAL menus back to

SPEC (Special Settings Menu)

Settings within this group control features including passcodes, key locking, key functions and display settings.

SAFE.PC (Safe Security Passcode for Digital Setup)	The SAFE.PC (Safe Passcode) allows partial access to Digital Setup (ie. only non calibration/trade critical settings can be changed). For the Safe Passcode to have any effect, the FULL.PC passcode must also be set. The default passcode setting is 000000 that allows free access. Any other number will enable the passcode functions and restrict access. Range 000000 to 999999 Default: 000000
FULL.PC (Full Security Passcode for Digital Setup)	The FULL.PC (Full Passcode) can be set to restrict access to Full Digital Setup. This passcode is used to prevent unauthorised or accidental tampering in the instrument setup. The default passcode setting is 000000 that allows free access. Any other number will enable the passcode functions and restrict access. Range 000000 to 999999 Default: 000000 It is important to note that when restricting Full access to Setup the passcode must not be forgotten. It is only possible to circumvent the passcode at the factory. Care must be taken when setting the Full Digital Setup Passcode to ensure that the instrument does not become permanently locked.

KEY.LOC (Front Panel Key Locking)	This item allows individual keys to be locked and unlocked. - The display shows a dash (–) to indicate that a key is locked (inactive) or characters for each key that is active (ie. the characters P12345 display). - The letter P represents the <POWER> key while the numbers 1234 and 5 represent the remaining operation keys. - The operation keys are numbered from the left with the <ZERO> key being number 1. Note: When the <POWER> key is locked, the instrument cannot be turned off from the front keypad. Default: P12345 - All keys are unlocked (active)
KEY.FN (Key Functions) K35* Only	The function of the keypad <FUNCTION> key can be selected here. Options are: Default: NONE

AUT.OFF (Auto Power Off / Battery Operation)	The instrument can be set up to automatically power down after a period of no activity. Weight motion, network communications or any press of the keyboard is enough to keep the instrument powered on. When operating on batteries the instrument will turn off after 30 minutes of inactivity even if set to Auto. Options are: NEVER: Never power off automatically1, 5,10, 30, Auto (time in minutes) Default: Auto
B.LIGHT (Backlight Operation)	Sets the operation of the backlight. When operating the backlight with batteries the brightness is lowered automatically to conserve power and the backlight will automatically turn off after 10 seconds of inactivity. To turn on again, press the <POWER> key. Options are: OFF: Backlight is off. ON: Backlight is on when weight motion, network communications or any keypress is detected. FORCED: Backlight is permanently on. Default: ON

REM.FN (Remote Function) K344, K35*	This item allows the indicator to be triggered from a remote input (see section 3.9.2 Remote Input). The remote input can be set to have: - no function (ie. NONE) or - it can be set to mimic one of the front five panel key functions (ie. where KEY1=ZERO, KEY2=TARE, KEY3=SELECT, KEY4=PRINT and KEY5=FUNCTION). The remote input can also be set to BLANK where, when the remote input is pressed and held, the indicator displays dashes (ie. - - - - -) and the front five key functions are disabled. When the remote input is released the indicator display and front key functions return to normal. For the REM.FN to have effect, the SERIAL:TYPE item must be set to AUTO. Options are: NONE: No function. KEY1 to KEY 5: Mimic one of the front five function keys BLANK: Display dashes (ie. - - - - -) and disable front key functions. Default: NONE
REM.CHR (Remote Input Transmit Idle Character) K344, K35*	The remote input transmit idle character specifies the character to be transmitted whilst the serial transmitter is idle, regardless of the state of the DTR line. This character is only transmitted when a remote function (SPEC:REM.FN) is enabled, and serial port type (SERIAL:TYPE) is set to PRINT or AUTO.PR. This function allows the remote input to function even when a printer is connected. This character must be chosen so it is ignored by the printer. Typically the ENQ (ASCII 05) character is suitable. Range 000 to 255 Default: 005
BAT.VLT (Battery Voltage)	Default: 4.8V A low battery annunciator will be displayed at 10% above low battery level. The indicator will assume it is on battery power when its input voltage is less than twice the low battery level for the selected battery voltage. In the PWR mode the indicator will always assume it has external power. Correct function of the low battery warning is dependent on correct setting of the battery voltage.

		Battery Voltage	Low Battery Level	
		4.8V	4V	
		7.2V	6V	
		9.6V	8V	
		12V	10V	
		24V	20V	
		PWR	NO BATTERY	
		Li-Ion	12V	
PWR.FN (Power Function)	The Power Function sets the function of a short press of the <POWER> key. Options: NONE, UNITS Default: NONE			

LIVE (Live Weight)

DELAY (Time Delay)	The time in seconds that the indicator will wait after the target weight is exceeded before it starts collecting weight samples. Range: 0 to 200 Default: 0
SAMPLE (Sample Time)	The number of seconds worth of weight samples to collect. Range: 0 to 20 Default: 3
TOL (Number of Discards)	Indication of how many noisy samples to discard, where 1 discards the least and 9 discards the greatest number of samples. Range: 0 to 9 Default: 4
RETRIG (Retrigger Percentages)	This is the percentage that the weight on the scale must change by to restart the live weighing process once a held weight has been captured. A value of 0 means that automatic retriggering is disabled. Range: 0 to 30 Default: 10
TARGET	The weight to be exceeded before the indicator will start the livestock weighing function. Range: -99999 to 999999 Default: 0

CLOC (Clock)

CLOCK (Clock Settings) Items within this group set date and time related functions.

FORMAT (Date Format)	This sets the date format. Options are: dd.mm.yy mm.dd.yy Default: dd.mm.yy (K303 Default: mm.dd.yy)
YEAR (Set Year)	Range: 2000 to 2099
MONTH (Set Month)	Range: 01 to 12
DAY (Set Day)	Range: 01 to 31
HOURL (Set Hour)	Range: 00 to 23 (24-hour format)
MINUTE (Set Minute)	Range: 00 to 59

TEST (Special Test Functions)

Items within this Group allow access to the testing routines for the instrument. With these routines the scale base output can be monitored and the inputs and outputs can be tested.

SCALE (Scale Base Test Display)	Verifies the correct load cell capacity and/or load cell wiring is used. It sets up the instrument as a simple test meter to measure the load cell signal output. The display reads in millivolts per volt, factory calibrated to 0.1% worst case. When accessing this item, initially there should be no weight on the scale. In OIML or NTEP modes, this display is only active for five seconds before returning to the menu.
FRC.OUT (Force Outputs)	Forces each of the output drivers in turn. All outputs turn OFF when leaving this step. The <EDT> key will advance through each output (ie. ON.1 and ON.2). Pressing <OK> will turn all outputs off and exit the test.
O.LOAD (Overload Count)	Displays a count of the number of times that the A/D conversion has been out of range since the count was last reset. This value is read only and cannot be edited.
CLR.OLD (Clear Overload)	