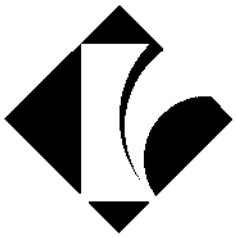
SMART WEIGHING SOLUTIONS



rinstrum

1203
Display Manual

For use with Software Versions 1.0 and above

1203-602-132

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"Everything should be made as simple as possible, but not simpler."

- Albert Einstein -

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Table of Contents

1. Introduction

The **1203 Weight Transmitter** is a precision digital weight transmitter using the latest Sigma-Delta A/D converter to ensure extremely fast and accurate weight readings. The capabilities of the **1203 Weight Transmitter** can be expanded by the installation of the optional **1203 Display** card.

Digital setup can be carried out entirely using the serial communications links or by using the optional **1203 Display**. The main functions of the **1203 Display** are to setup, configure and test the **1203 Weight Transmitter**.

This manual focuses on the functions of the **1203 Display**.

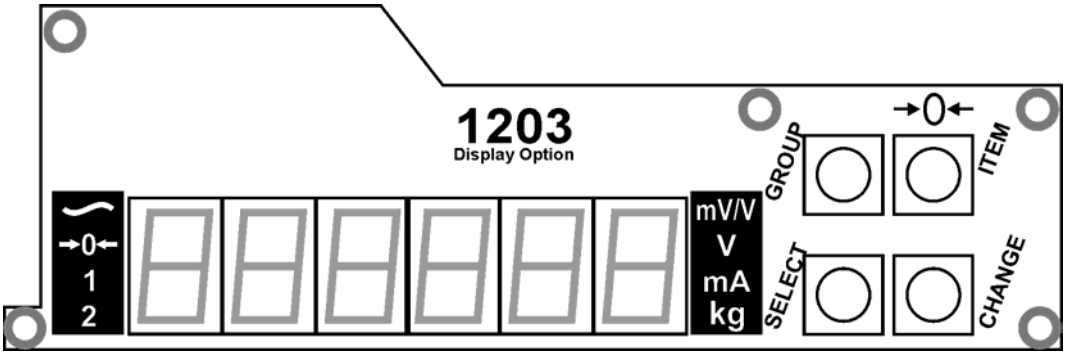


Figure 1: 1203 Display

Note: The **1203 Display** updates at 4Hz while the **1203 Weight Transmitter** runs at 100Hz.

1.1. 1203 Features

- Quick and easy installation
- Underside metal shield protection to prevent user contact with electronics (minimising possibility of ESD generated by user, causing damage to electronics).
- Six digit 14mm LED display
- Eight high intensity annunciator LEDs
- Four push button controls for setup and configuration
- Option to turn off display digits and annunciator LEDs after 60 second inactivity
- Portability to use display on multiple 1203 Weight Transmitters
- Passcode protection

1.2. 1203 Manuals

- For a more information on the **1203 Weight Transmitter** refer to the **1203 Weight Transmitter Reference Manual** and the **1203 Weight Transmitter Installation Manual** which is available free of charge from www.rinstrum.com.

1.3. Document Conventions

The following conventions (typographical) are used throughout this Reference Manual.

Bold Text	Bold text denotes words and phrases to note.

2. Installation

2.1. Warnings

The following warnings should be noted prior to installing the **1203 Display** card.

- Isolate the **1203 Weight Transmitter** from the power before attempting installation.
- Avoid excess handling of both the **1203 Weight Transmitter** board and the **1203 Display** board as each board contains static sensitive devices.
- Wherever possible, handle both the **1203 Weight Transmitter** and **1203 Display** boards by their edges.
- The instrument must not be subject to shock, excessive vibration or extremes of temperature (before or after installation).

2.2. Installation Procedure

The **1203 Display** is mounted to the front of the **1203 Weight Transmitter**. The following steps are required to install the **1203 Display**.

- Inspect instrument to ensure good condition.
- Ensure four plastic stand-offs are available (supplied).
- Insert stand-offs in the **1203 Weight Transmitter** to align with the mounting hole positions as indicated in Figure 2.
- Position the **1203 Display** on the stand-offs ensuring the connector pins (on the underside) of the **1203 Display** are aligned with **1203 Weight Transmitter** connector (J3).
- Press the **1203 Display** on to the stand-offs to engage.
- Follow instructions in the Digital Setup section page 11 to configure and calibrate instrument.
- Enter passcode to protect settings from tampering. Record passcode for future reference. Refer to Passcode page 16 for more information.

Note: The **1203 Display** can be left on a **1203 Weight Transmitter** or it can be removed and used again on other **1203 Weight Transmitters**.

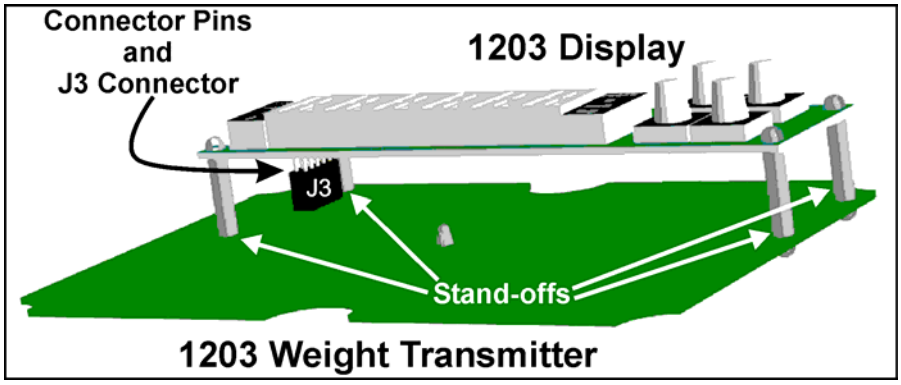


Figure 2: 1203 Display Mounting Illustration

2.3. Failures and Solutions

If the **1203 Display** is not updating, ensure the **1203 Display** connector pins are correctly plugged into the **1203 Weight Transmitter** J3 connector.

3. Basic Operation

3.1. User Interface Display and Controls

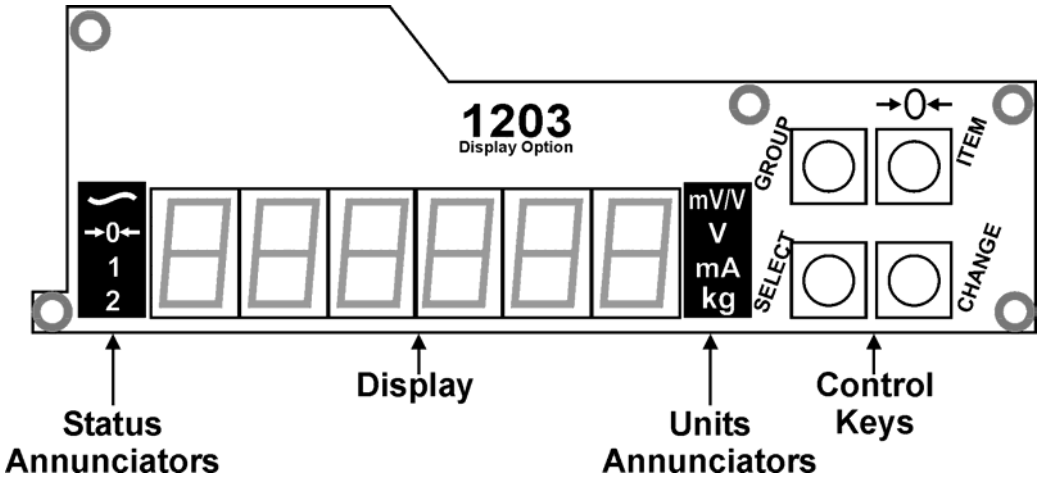


Figure 3: User Interface Display and Controls

3.1.1. Display

The Display indicates the weight readings, setup information and errors.

3.1.2. Annunciators

There are two banks of annunciators. Each bank contains four high intensity annunciator LEDs. **Status Annunciators** display events associated with weighing activity. **Units Annunciators** display the weight reading type.

- **Status Annunciators**

Annunciator	Name	Description
~	**Motion**	Enabled only when reading type is USER. Lit when the displayed reading is not stable.
→0←	**Zero**	Enabled only when reading type is USER. Lit when the displayed reading is within ± ¼ of a division of true zero.
1	**Setpoint 1**	Lit when setpoint 1 is active.
2	**Setpoint 2**	Lit when setpoint 2 is active.

- **Units Annunciators**

Annunciator	Name	Description
mV/V	**milliVolt-per-Volt**	Lit when reading type is milliVolt-per-Volt.
V	**Volt**	Lit when the reading type is analog out (volt).
mA	**milliAmp**	Lit when the reading type is analog out (milliAmp)
kg	**User Defined**	Lit when the reading type is USER. (**Note:** This annunciator is user defined and may display in other than **kg**.)

- **mV/V:** The mV/V indicator is illuminated when one of the three mV/V reading types is selected.
- **V:** The V indicator is illuminated when the ANALOG reading type is selected and voltage output is configured.
- **mA:** The mA indicator is illuminated when the ANALOG reading type is selected and current output is configured.
- **USER (eg. kg):** The USER units indicator is illuminated when one of the USER reading types is selected. The USER units indicator is not illuminated if the option NONE is selected from the BUILD | UNITS submenu.

Note: For complete List of Reading Types (Data Types) refer to page 31.

3.1.3. Control Keys

The **1203 Display** has four front panel **press** keys that control all operations. Each key has been assigned two functions. One will be active when in Normal Mode and one in Setup Mode. The following describes each key and the specific function when in each mode.

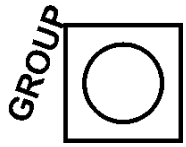
- **Normal Mode vs Setup Mode**

Mode	Description
Normal	Normal Mode is used to display the weight.
Setup	Setup Mode is used to setup, calibrate and test the unit.

To simplify configuring the unit, all setup options in the **1203 Display** are organised in a tree structure made up of **Groups** and **Items**.

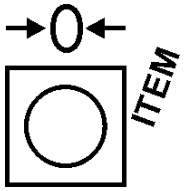
- **GROUP**

Digital settings are divided into a series of **Groups**. Each Group has a distinctive **Group Name**.

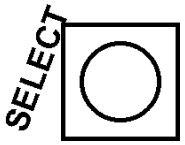
Key	Mode	Function	Description
	Normal	Accesses Setup	• A long (two second) press of the **<GROUP>** key access Setup Mode.
	Setup	Group	• Pressing **<GROUP>** cycles through the list of available Groups. • Refer to Setup Mode (Saving Changes and Exiting) page 11 for more information.

- **ITEM**

Each **Group** is divided into various individual **Items** that have related functions. Each **Item** represents a parameter that can be changed.

Key	Mode	Function	Description
	Normal	Zero	• Pressing the **< →0← / ITEM>** key sets the scale to zero if the empty scale has drifted from a true zero reading. • When the **< →0← / ITEM>** key is pressed to perform a zero operation the unit waits for a stable valid reading before performing the operation. When motion is detected for longer than ½ second, the zero function will be aborted.
	Setup	Item	• Pressing the **< →0← / ITEM>** key cycles through the list of available Items within a Group. • If an entry has been changed using the **<CHANGE>** key, pressing the **< →0← / ITEM>** key saves the changes and re-displays the Item name.

- **SELECT**

Key	Mode	Function	Description
	Normal	View Reading Type	• Displays the current reading type, for one second.
	Setup	Select	• Selects the displayed Item (or next display character) to be examined or changed. • In some menus, it behaves the same as the **<CHANGE>** key.

- **CHANGE**

Key	Mode	Function	Description
	Normal	Change Reading Type	• Allows the selection of the various weight reading types (ie. Gross, Net, Analog, Absolute). Refer to Reading Types page 9.
	Setup	Change	• Cycles through the list of available choices for the selected Item or flashing character.

3.2. Reading Types

When in Normal Mode the **<CHANGE>** key is used to change the reading type. The Units Annunciators will light according to the reading type.

Units Annunciator	Display Reading Type
mV/V	ABS, GROSS, NET
V or mA	ANALOG
kg (USER)	ABS, GROSS, NET

Successive presses of the **<CHANGE>** key cycles through the various weight reading types.

- The reading type is saved when power is lost or Setup Mode is entered.
- The reading type is restored when power is restored or Setup Mode is exited.

3.3. Data Entry

Throughout the **1203** setup and operator interface, different data entry methods are used. Each method is described below:

3.3.1. Numeric Entry

A numeric entry box allows the input of a number. When entering a number the display will show digits with the currently selected digit flashing. The **<SELECT>** key is pressed to select a digit to change. When the digit is selected the **<CHANGE>** key is pressed to change the digit from **0** through **9**. For menus where a negative value is valid (eg. setpoint targets) the left most digit can also be changed to a dash (**-**) to enter a negative number.

Upper and lower limits are placed on some entries and an entry outside this range will cause the **1203** to display dashes (ie. **- - - - - -**).

For an example refer to Numeric Entry - Example page 25.

3.3.2. Selections and Options

A selection entry requires the choice of a single option from a list. When a Group and Item have been chosen, the **<SELECT>** key is used to display the current setting for that item. The **<CHANGE>** key can be used to cycle through the options for that item. When the desired option is displayed the **< →0← / ITEM>** key can be pressed to accept the displayed option and re-display the item name.

For an example refer to Selections and Options - Example page 25.

3.4. 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 **1203**.

Note: Detailed descriptions of these and other terms used in this Manual are described in the Glossary of Terms page 33.

Term	Definition
Units	Units of measurement (kilograms, tonnes, pounds, etc.).
Capacity	Maximum gross weight allowed on the scale.
Resolution or Count-by	Smallest change in weight units that the display can show.
Graduations	Maximum number of display steps between zero gross load and full capacity gross load.
Division	A single graduation

Example

A 10,000kg 2.0mV/V load cell is used in an application with a 5000kg range, displaying in 5kg divisions.

The values of each of the above terms are:

- Units = kg
- Capacity = 5000
- Count-by = 5
- Graduations = 1000

The Signal Voltages are:

- The capacity load cell signal is (5,000 / 10,000) x 2.0mV/V = 1.0mV/V.
- Since the **1203** uses 8V excitation, the absolute signal voltage is 8 x 1.0 = 8.0mV.

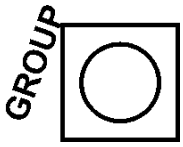
The Signal Resolution is therefore:

- 8.0 / 1000 = 0.008mV / division or 8μV / division.

4. Digital Setup

The **1203 Display** digital setup facility provides the means to configure and calibrate the **1203 Weight Transmitter**. Digital setup and calibration is carried out entirely using the four control keys on the **1203 Display**.

4.1. Accessing Setup Mode



- When in Normal Mode a long (two second) press of the **<GROUP>** key switches to Setup Mode. Once access to Setup has been achieved, the display shows **SETUP** for two seconds before displaying the first group title (ie. **BUILD**).

4.2. Setup Mode (Saving Changes and Exiting)

Task	Steps	Result
Save All Setup Changes and Exit Setup Mode	While in Setup Mode press the **<GROUP>** key repeatedly. When **-End-** displays press the **< →0← / ITEM>** key.	All setup changes are saved; Setup Mode is exited and Normal Mode restored
Lose Current Setup Change and Exit Setup Mode	While in Setup Mode and still displaying the current change, press and hold the **<GROUP>** key for two seconds.	That current setup change is deliberately lost; Setup Mode is exited and Normal Mode is restored.
Save Current Setup Change and Remain in Setup Mode	While in Setup Mode the currently displayed change can be saved by pressing the **< →0← / ITEM>** key.	That current setup change is saved and the operator remains in Setup Mode to make further changes.

4.3. Passcode

The **1203 Display** has one passcode that provides a security lock on accessing Setup Mode via the **1203 Display**. The passcode locks only the **1203 Display**. The **1203 Weight Transmitter** can still be setup via the communications port.

The passcode is set in the **PASSCD** item in the **SPEC** group**.** The default passcode setting is **000000** that allows free access. Any other number will enable the passcode functions and restrict access.

When a passcode is enabled, the display will stop for passcode confirmation before entering Setup Mode. The default passcode **000000** is displayed. This number must be changed to the correct passcode to access Setup Mode. The **<SELECT>** and **<CHANGE>** keys allow the passcode to be entered. An incorrect passcode will trigger a re-entry prompt and the display will return to normal weighing.

It is important to note that when restricting access to Setup Mode the passcode must not be forgotten. It is only possible to circumvent the passcode at the factory. Care must be taken with the use of the Passcode to ensure that the instrument does not become permanently locked.

4.4. Instrument Setup

Group	Item	Select	Change (Underline = Defaults)
bU ıLd **BUILD**	**Configures the scale build.** Items 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, as later changes to Items within this Group may invalidate the current calibration data.		
	dP.POS **DP.POS**	**Decimal Point Position**	Sets the location of the decimal point on the display. • **Select** or **Change** changes decimal point position. • **000000, 00000.0, 0000.00, <u>000.000</u>, 00.0000, 0.00000**
	rES **RES**	**Resolution**	Sets the smallest change in weight units that the display can show. • **Select** changes position, **Change** changes digit. • **<u>01</u>, 02, 05, 10, 20, 50, 100**
	UNıtS **UNITS**	**Weighed units**	Sets the actual display units of measurement for display and printing. • **<u>none</u>, kg, t, g, lb, oz, p**
	CAP **CAP**	**Maximum Capacity**	Sets the maximum gross weight allowed on the scale. For example, if a scale is to weigh 500.0kg in 0.5kg increments, CAP is set to 500.0 and RES is set to 0.5. • **Select** changes position, **Change** changes digit. • Default: **<u>3.000</u>** (dependent on decimal point position).
	ıd **ID**	**Unit Identification**	Sets the unit identification. Max 15 ASCII characters. • **Item** changes character 1 to 15, **Select** changes position, **Change** changes ASCII digit. • Default: **<u>1.000</u>** • Refer to Scale Build: Identification page 27 for more information.

Group	Item	Select	Change (Underline = Defaults)
OPt ,ON **OPTION**	**Configures scale dynamics.** Items within this Group are used to configure the operating parameters of the scale. Only some of these items may be changed after calibration without affecting the calibration accuracy.		
	F ,LtEr **FILTER**	**Average Reading**	Sets the average number of sequential readings when calculating the displayed weight. • Used to dampen unwanted weight fluctuations caused by vibrations or dynamic forces. • High settings stabilise display at the expense of rapid response to sudden weight changes. • **1, 2, 4, 8, 16, 32, 64, 128, 256**
	nOt ,ON **MOTION**	**Motion Detection**	Sets allowed weight variation over a defined time period before weight is deemed to be unstable. • Value displayed in weight change (user graduations) per time period (**t**). For example 25 user graduations in 1 second will be detected as motion. **Off** (motion detection ignored) **0.4 - 1t** (fine) **0.8 -1t** **1.6 - 1t** **3.1 - 1t** **6.3 - 1t** **12.5 - 1t** **25 - 1t** **50.0 - 1t** **100 - 1t** **200 - 1t** **400 - 1t** (coarse)
	tmP.CAL **TMP.CAL**	**Temperature Calibration**	Automatic temperature calibration ensures changes in ambient temperature do not affect accuracy. • Calibration duration: approx. 0.06 seconds (no new data is received). If this presents an obstacle, temperature calibration can be switched off. It can then be switched on during a lull in activity via the serial port. • Maximum time between calibrations depends on ambient temperature gradients and required accuracy. For most applications every 5-10 minutes. Note: More frequent calibrations are required during the first 20 minutes after power-up. • **On, Off**

Group	Item	Select	Change (Underline = Defaults)
CAL **CAL**	**Calibrates the scale zero and span.** Items within this group perform various calibration routines. Refer to Appendix A: Calibration page 21 for detailed scale calibration procedures. Certain items in the Scale Build and Options groups can effect the calibration of the scale. Always check that these two sections are correctly configured to suit the current application before attempting to Calibrate the scale		
	ZERO **ZERO**	**Zero Calibration** (current weight displays)	Zero calibration is performed in reading type **US.GR** (User Gross). Refer to Source 1 page 15 and List of Reading Types page 31. • Remove all weight. • **Select** starts routine (**Z.in.P** displays) (zeroing in progress). • Zero reading displays when complete.
	SPAN **SPAN**	**Span Calibration** (current weight displays)	Span calibration is performed in reading type **US.GR** (User Gross). Refer to Source 1 page 15 and List of Reading Types page 31. • Add test weight. • **Select** prompts for correct weight. • **Select** changes position, **Change** changes digit. • **Item** displays **S.in.P** (span in progress). • Span reading displays when complete.
	dir.ZEr **DIR.ZER**	**Direct mV/V Zero Calibration**	Direct mV/V Zero Calibration is performed in **mV.AB** (mV/V Absolute). Refer to Source 1 page 15 and List of Reading Types page 31. • The user is prompted to enter the mV/V absolute load cell value at zero. • **Select** prompts user to **ENTER mVV**. • **Select** changes position, **Change** changes digit.
	dir.SPN **DIR.SPN**	**Direct mV/V Span Calibration**	Direct mV/V Span Calibration is performed in **mV.GR** (mV/V Gross). Refer to Source 1 page 15 and List of Reading Types page 31. • The user is prompted to enter the mV/V gross load cell value at fulls scale weight. • **Select** prompts user to **ENTER mVV**. • **Select** changes position, **Change** changes digit. • **Item** prompts user to **Enter Weight**. • **Select** changes position, **Change** changes digit.

Group	Item	Select	Change (Underline = Defaults)
SEr iAL **SERIAL**	**Configures the serial outputs.** Items within this Group determine the serial and printing outputs.		
	tYP.232 **TYP.232**	**Serial Output 1 RS-232**	Sets the function of the number 1 serial output. • The port can be disabled, networked or set to run as an automatic output. • **NET** (sets **1203** to function as network device) • **OFF** (disables serial output) • **AUTO** (Enables automatic transmission at 10Hz)
	tYP.485 **TYP.485**	**Serial Output 2 RS-485**	Sets the function of the number 2 serial output. • The port can be disabled, networked or set to run as an automatic output. • **NET** (sets **1203** to function as network device) • **OFF** (disables serial output) • **AUTO** (Enables automatic transmission at 10Hz)
	Addr **ADDR**	**Serial Address**	Sets the serial address of the **1203.** • Used in network applications. • Range: **00 to 31**
	bAUd **BAUD**	**Serial Baud Rate**	Sets the serial data transmission speed. • Avoid using faster settings unless specifically required as most receiving devices cannot process the received data at higher speeds. • **1200, 2400, 4800, 9600, 19200**
	bits **BITS**	**Serial Format Options** Position 1: Parity Position 2: Data Bits Position 3: Stop Bits Position 4: DTR Handshake	Allows data transmission bit pattern and interface to be changed. • **N 8 1 -** (Default Serial Format Options) • **SELECT** changes position, **CHANGE** changes digit. • **Parity: N** None, **O** Odd, **E** Even • **Data Bits: 7** or **8** data bits • **Stop Bits: 1** or **2** stop bits • **DTR:** (**-**) DTR disabled or **d** DTR enabled
	SrC.1 **SRC.1**	**Source 1**	Sets the Reading Type. For complete listing refer to List of Reading Types page 31. • Default: **mV.AB** (mV/V Absolute)
	SrC.2 **SRC.2**	**Source 2**	Sets the Reading Type. For complete listing refer to List of Reading Types page 31. • Default: **mV.AB** (mV/V Absolute)
	Auto.F **AUTO.F**	**Format** (Comm Ports)	Sets the format of the automatic output. For complete listing refer to Formats - Communication Ports page 28. • Default: **BIN.1** (Binary 1 format)

Group	Item	Select	Change (Underline = Defaults)
	AUTO.T	**Time**	Sets the time between automatic output. • It is the setting x 10msec (eg. a setting of 10 means 10x10msec = 100msec). • **SELECT** changes position, **CHANGE** changes digit. • Range: 1 to 255 • Default: **10**
SPEC	**Configures passcode and special modes.** Items within this group set the security code and special modes.		
	PASSCD	**Passcode**	Sets the security passcode to restrict access to setup functions (preventing unauthorised or accidental tampering in instrument setup). • If set, user is prompted with **ENTER PASS**. • **SELECT** changes position, **CHANGE** changes digit. • Range: 000000 to 999999 • Default: **000000** (no passcode)
	DSP.OPT	**Display Option**	Sets the option to turn off the display of digits and annunciator LEDs. • **ON** (Display digits are always On.) • **KBD** (Keyboard: Display digits turn off sixty seconds after a remote input or key press.) • **KBD.MOT** (Keyboard Motion: Display digits turn off sixty seconds after a remote input, key press or motion.)

Group	Item	Select	Change (Underline = Defaults)
SEt.PtS **SET.PTS**	**Configures the basic setpoint operation.** Items in this Group set the operational logic of the setpoint system, as well as provide for the entry of secure setpoint targets. The **SRC** setting effects the related target display. • If RAW source is selected, TRG displays "- - - - - -". • If MVV source is selected, TRG displays in mV/V. • If GRADS or ANALOG source is selected, TRG displays an entry with no decimal point. • If a USER source is selected, TRG displays an entry including the current decimal point position setting.		
	SrC.A **SRC.A**	**Source A** (Weight Data)	Sets the reading type for weight data setpoint 1. For complete listing refer to List of Reading Types page 31. • Default: **mV.AB** (mV/V Absolute)
	SrC.b **SRC.B**	**Source B** (Weight Data)	Sets the reading type for weight data setpoint 2. For complete listing refer to List of Reading Types page 31. • Default: **mV.AB** (mV/V Absolute)
	trG.A **TRG.A**	**Target A**	Sets the target weight for setpoint 1. • **SELECT** changes position, **CHANGE** changes digit.
	trG.b **TRG.B**	**Target B**	Sets the target weight for setpoint 2. • **SELECT** changes position, **CHANGE** changes digit.
	OPt.A **OPT.A**	**Output Option A** **O H** **O**ver **U**nder **H**igh **L**ow	Sets the direction of action and sense of the output for setpoint 1. • **O H** (Default Setting) • **SELECT** changes position, **CHANGE** changes digit. • **O** Over (weight increasing) • **U** Under (weight decreasing, negative weighing) • **H** High (Active High logic) • **L** Low (Active low logic)
	OPt.b **OPT.B**	**Output Option B** **O H** **O**ver **U**nder **H**igh **L**ow	Sets the direction of action and sense of the output for setpoint 2. • **O H** (Default Setting) • **SELECT** changes position, **CHANGE** changes digit. • **O** Over (weight increasing) • **U** Under (weight decreasing, negative weighing) • **H** High (Active High logic) • **L** Low (Active low logic)

Group	Item	Select	Change (Underline = Defaults)
	HYS **HYS**	**Hysteresis**	Sets the Hysteresis for setpoint 1 and 2. • **SELECT** changes position, **CHANGE** changes digit. • Default: **000001**
rEn **REM**	**Configures the remote input operation.** Items in this Group are used to set operating options of the remote input.		
	iP.SH **IP.SH**	**Input Short**	**Short Press:** A function is executed when the input is released after being held down for time **t** where (50ms<=t<2s). Refer to Remote Input - Options page 30. • Default: **OFF**
	iP.Lng **IP.LNG**	**Input Long**	**Long Press:** A function is executed after the input has been held down for two seconds. Refer to Remote Input - Options page 30. • Default: **OFF**
	iP.dn **IP.DN**	**Input Down**	**Button Down:** A function is executed after the input has been held down for 50ms seconds. Refer to Remote Input - Options page 30. • Default: **OFF**
	iP.UP **IP.UP**	**Input Up**	**Button Up:** A function is executed when the input is released after being held down for at least 50ms seconds. Refer to Remote Input - Options page 30. • Default: **OFF**

Group	Item	Select	Change (Underline = Defaults)
ANALOG **ANALOG**	**Configures the 1203 Analog output.** Items within this Group set the options for the **1203** analog output. The **SRC** setting affects the related target display. • If RAW source is selected in SRC.ZER or SRC.SPN, "- - - - - -" displays. • If MVV source is selected in SRC.ZER or SRC.SPN, an entry in mV/V is displayed. • If GRADS source is selected in SRC.ZER or SRC.SPN, an entry with no decimal point is displayed. • If a USER source is selected in SRC.ZER or SRC.SPN, an entry including the current decimal point position setting is displayed.		
	tYPE **TYPE**	**Output Type**	Sets either Voltage or Current output. • **CURR, VOLTS**
	SrC **SRC**	**Analog Output Source**	Sets the Reading Type. For complete listing refer to List of Reading Types page 31. • Default: **mV.AB** (mV/V Absolute)
	Src.ZEr **SRC.ZER**	**Analog Output Zero**	Sets the analog output corresponding to ZERO. • **SELECT** changes position, **CHANGE** changes digit. • Corresponds to 4mA or 0V. • Default: **00.0000**
	Src.SPn **SRC.SPN**	**Analog output span**	Sets the analog output corresponding to SPAN. • **SELECT** changes position, **CHANGE** changes digit. • Corresponds to 20mA or 10V. • Default: **03.0000**
	The **LO.OUT** and **HI.OUT** entries (as described below) define a percentage of the nominal output span (10V or 16mA) from nominal output zero (0V or 4mA). For more detail refer to the **ANM: Set Analog Output Maximum and Minimum** section of the **1203 Weight Transmitter Reference Manual**.		
	LO.Out **LO.OUT**	**Minimum limit**	Sets the minimum limit at which the output clips. • **SELECT** changes position, **CHANGE** changes digit. • Default: **-127**
	HI.Out **HI.OUT**	**Maximum limit**	Sets the maximum limit at which the output clips. • **SELECT** changes position, **CHANGE** changes digit. • Default: **127**

Group	Item	Select	Change (Underline = Defaults)
tESt **TEST**	**Tests routines for the scale and indicator.** Items within this Group allow access to the testing routines for the 1203. These routines permit the **1203** analog and digital outputs to be tested. The output is released when current test is exited.		
	FrC.AG **FRC.AG**	**Force Analog Output**	Forces the output (the **1203** displays the word **FORCED**). • If **TYPE** in the **ANALOG** menu is set to **CURR** the current output is controlled. Analog current output options are **<u>0</u>, 25, 50, 75, 100** percent of the output. 0 corresponds to 4mA and 100 corresponds to 20mA • If **TYPE** in the **ANALOG** menu is set to **VOLTS** the analog output is controlled. Analog voltage output options are **<u>-100</u>, -75, -50, -25, 0, 25, 50, 75, 100** percent of the output. -100 corresponds to -10V 100 corresponds to +10V
	FrC.PA **FRC.PA**	**Force Digital Output**	Force Source A (setpoint 1) • **<u>PA.ON</u>** (setpoint output on) • **PA.OFF** (setpoint output off)
	FrC.Pb **FRC.PB**	**Force Digital Output**	Force Source B (setpoint 2) • **<u>PB.ON</u>** (setpoint output on) • **PB.OFF** (setpoint output off)
	tSt.iP **TST.IP**	**Test Digital Inputs**	Allows the function of each input to be tested. • Status of the input is changed as contact closures are detected. • **ON** when input is activated. • **<u>OFF</u>** when input is not activated.
FACtrY **FACTRY**	**Restores factory defaults and display version number.** Restores setup settings to factory defaults and displays software version number.		
	rtS.ALL **RTS.ALL**	**Reset All**	Restores the setup of the **1203** back to the original **new** settings installed at the factory. • **<u>Cont.N</u>** (continue No) • **Cont.Y** (continue Yes)
	u.1203 **v.1203**	**Software Version**	Displays the **1203** software version number. • **SELECT** displays version number.
-End- **- END -**	**Exits from Setup.** Exists from Setup Mode and returns to Normal Mode. Refer to Setup Mode (Saving Changes and Exiting) page 11 for more information.		

5. Appendix A: Calibration

5.1. Introduction and Warnings

To perform a calibration, select the **CAL** Group using the **<GROUP>** key.

Note: It is important that an initial ZERO calibration is performed before any SPAN calibrations

5.2. Digital Calibration: Zero Calibration Routine

- When in Setup Mode press the **<GROUP>** key to display the **CAL** group.
- Press **< →0← / ITEM>** to display the **ZERO** item.
- Press the **<SELECT>** key. The display shows the current weight.
- Remove all weight from the scale.
- Press the **<SELECT>** key to start the zero routine running. The display will show **Z.in.P** to indicate that zeroing is in progress. When the process is complete the display will return to weight to allow the zero to be checked.
- Press the **< →0← / ITEM>** key to leave the Zeroing routine.

5.3. Digital Calibration: Span Calibration Routine

- When in Setup Mode press the **<GROUP>** key to display the **CAL** group.
- Press **< →0← / ITEM>** to display the **SPAN** item.
- Press the **<SELECT>** key. The display shows the current weight on the scale.
- Add the calibration test mass to the scale. The minimum acceptable span calibration weight is 2% of the scale range. A weight this small may limit calibration accuracy. The closer the test weight is to full range, the better the accuracy.
- The **1203 Display** will show the calibration weight value. Change this to the correct calibration weight using the **<SELECT>** and **<CHANGE>** keys.
- Press the **< →0← / ITEM>** key to trigger the Span Calibration routine. The display will show **S.in.P** to show that spanning is in progress. When the process is complete the display will return to weight to allow the new weight reading to be checked.
- When the Span Calibration is complete, press the **< →0← / ITEM>** key to exit.

5.4. Direct mV/V Calibration: Zero Calibration Routine

- When in Setup Mode press the **<GROUP>** key to display the **CAL** group.
- Press **< →0← / ITEM>** to display the **DIR.ZER** item.
- Press the **<SELECT>** key to begin the zero calibration process. The prompt **ENTER mVV** displays and then the zero weight reading in mV/V is displayed.
- Change this to the correct zero weight reading using the **<SELECT>** and **<CHANGE>** keys.
- Press the **< →0← / ITEM>** key to perform zero calibration.
- When complete the **1203** re-displays the **DIR.ZER** item.

5.5. Direct mV/V Calibration: Span Calibration Routine

Calculate the span value in mV/V = $Sensitivity_{LC}$ * CAP / (n_{LC} * CAP_{LC})

- When in Setup Mode press the **<GROUP>** key to display the **CAL** group.
- Press **< →0← / ITEM>** to display the **DIR.SPN** item.
- Press the **<SELECT>** key to begin the span calibration process. The prompt **ENTER mVV** displays and then the span weight reading in mV/V is displayed.
- Press the **< →0← / ITEM>** key. The prompt **ENTER WEIGHT** displays and then the span weight is displayed.
- Change this to the correct span weight reading using the **<SELECT>** and **<CHANGE>** keys.
- Press the **< →0← / ITEM>** key to perform span calibration.
- When complete the **1203** re-displays the **DIR.SPN** ITEM.

6. Appendix B: Setpoints

6.1. Introduction

The **1203** is fitted with two built-in setpoints with output drivers.

Each of the setpoints provides a simple comparator function that can be modified using the **SET.PTS** group choices. Refer to SET.PTS page 17. Weight data source, Target weight, switching direction and hysteresis can be configured. Outputs can be forced ON or OFF using the **REM** group choices. Refer to REM page 18.

6.2. Operation

The following figure illustrates the operation of active weight setpoints.

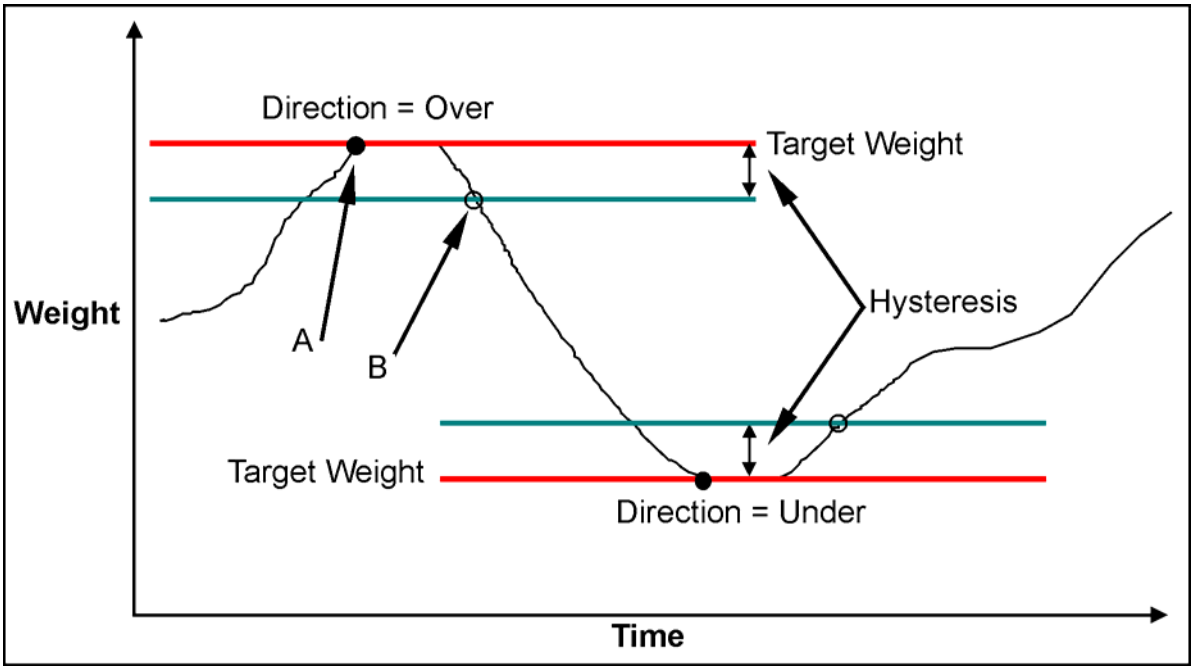


Figure 4: Setpoints Operation (Over vs Under)

Note the difference between Over and Under directions.

- If the Logic is set to **High**, the output is turned on at point **A** and off again at point **B**.
- If the Logic is set to **Low**, the output is turned off at point **A** and on again at point **B**.

6.2.1. Example 1: Control Level of Product in 2000kg Tank

Settings

Direction	Logic	Source	Target	Hysteresis	Weight Initially
Over	Low	Gross	2000kg	200kg	0kg Gross

Operation

The output will initially switch ON at 0kg. The weight in the tank will increase to the target point of 2000kg at which point the output will switch OFF. As product is removed from the tank the weight will drop until it falls below 1800kg (ie. target point - hysteresis). The output will then switch ON again.

Note: If the tank was gravity fed, the logic could be changed to High and the output would then be initially OFF at 0kg. It would switch ON at a weight over 2000kg and switch OFF again as the weight fell below 1800kg.

6.2.2. Example 2: Control Weighing of Product Out of Silo into 100kg Drums

Settings

Direction	Logic	Source	Target	Hysteresis	Weight Initially
Under	Low	Net	–100kg	1kg	0kg Net

Operation

Pressing the TARE key will switch the output ON. This is because 0kg net is higher than the –100kg net target point. The product will leave the silo until the –100kg target point is reached at which point the output will switch OFF. The output will not switch ON again until the net weight is higher than –99kg (ie. target point + hysteresis).

.

7. Appendix C: General

7.1. Data Entry

7.1.1. Numeric Entry - Example

When in Setup follow the steps below to set Build, Max Capacity.

- Press **<GROUP>** repeatedly to display the **BUILD** group.
- Press **< →0← / ITEM>** repeatedly to display the **CAP** item.
- Press **<SELECT>** to select **CAP** and display the current setting (eg. 0000.00kg).
- The currently chosen digit will be flashing. Press **<SELECT>** to advance to the next digit.
- When the digit to edit is flashing press **<CHANGE>** repeatedly to cycle from **0 - 9**.
- When the new digit to be set is flashing either press **<SELECT>** to move to the next digit to edit and repeat the previous step; or press **< →0← / ITEM>** to accept all of the displayed digits (including the flashing digit) and re-display the item name.

7.1.2. Selections and Options - Example

Example: When in Setup follow the steps below to set Serial, Bits.

- Press **<GROUP>** repeatedly to display the **SERIAL** group.
- Press **< →0← / ITEM>** repeatedly to display the **BITS** item.
- Press **<SELECT>** to select **BITS** and display the current settings.
- The currently chosen digit will be flashing. Press **<SELECT>** to advance to the next digit.
- When the digit to be set is flashing press **<CHANGE>** to cycle through the options for that digit.
- When the desired digit option is flashing press **< →0← / ITEM>** to accept the setting and re-display the item name.

7.2. Commands

Refer to the **1203 Weight Transmitter Reference Manual** for a complete list of commands and protocol details.

7.3. ASCII Codes

The following table shows the ASCII codes for control and printable characters.

Code	Char	Code	Char	Code	Char	Code	Char	Code	Char
000	NULL	026	SUB	052	‘4’	078	‘N’	104	‘h’
001	SOH	027	ESC	053	‘5’	079	‘O’	105	‘I’
002	STX	028	FS	054	‘6’	080	‘P’	106	‘j’
003	ETX	029	GS	055	‘7’	081	‘Q’	107	‘k’
004	EOT	030	RS	056	‘8’	082	‘R’	108	‘l’
005	ENQ	031	US	057	‘9’	083	‘S’	109	‘m’
006	ACK	032	‘ ‘	058	‘:’	084	‘T’	110	‘n’
007	BEL	033	‘!’	059	‘;’	085	‘U’	111	‘o’
008	BS	034	‘”’	060	‘<’	086	‘V’	112	‘p’
009	HT	035	‘#’	061	‘=’	087	‘W’	113	‘q’
010	LF	036	‘$’	062	‘>’	088	‘X’	114	‘r’
011	VT	037	‘%’	063	‘?’	089	‘Y’	115	‘s’
012	FF	038	‘&’	064	‘@’	090	‘Z’	116	‘t’
013	CR	039	‘’’	065	‘A’	091	‘[‘	117	‘u’
014	SO	040	‘(‘	066	‘B’	092	‘\’	118	‘v’
015	SI	041	‘)’	067	‘C’	093	‘]’	119	‘w’
016	DLE	042	‘*’	068	‘D’	094	‘^’	120	‘x’
017	DC1	043	‘+’	069	‘E’	095	‘_’	121	‘y’
018	DC2	044	‘,’	070	‘F’	096	‘`’	122	‘z’
019	DC3	045	‘-‘	071	‘G’	097	‘a’	123	‘{‘
020	DC4	046	‘.’	072	‘H’	098	‘b’	124	‘|’
021	NAK	047	‘/’	073	‘I’	099	‘c’	125	‘}’
022	SYN	048	‘0’	074	‘J’	100	‘d’	126	‘~’
023	ETB	049	‘1’	075	‘K’	101	‘e’	127	DEL
024	CAN	050	‘2’	076	‘L’	102	‘f’		
025	EM	051	‘3’	077	‘M’	103	‘g’		

7.4. Scale Build: Identification

The **1203 Display** can be used to set up to 15 characters as the **1203 Weight Transmitter** identification.

- Access Setup Mode.
- Press **<GROUP>** to display the **BUILD** group.
- Press **< ➔0← / ITEM>** to display the **ID** item.
- Press **<SELECT>** to display the first character ASCII format string.
- Press **<SELECT>** and **<CHANGE>** to edit the format string, one character at a time.
- Press **< ➔0← / ITEM>** to cycle through each of the 15 character format strings.

Note:

- The last user defined character must be **ASCII 000** '**null'**. All characters after null are ignored.
- Position 16 is forced to **ASCII 000** '**null'**.

Default Identification

No	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Default Code	null	' '	' '	' '	' '	' '	' '	' '	' '	' '	' '	' '	' '	' '	' '	null
ASCII	**000**	032	032	032	032	032	032	032	032	032	032	032	032	032	032	**000**

Sample Identification

No	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Default Code	'A'	'B'	'C'	' '	'C'	'O'	'M'	'P'	'A'	'N'	'Y'	null	' '	' '	' '	null
ASCII	065	066	067	032	067	079	077	080	065	078	089	**000**	032	032	032	**000**

7.5. Formats - Communication Ports

Binary Formats

Format		Data	Order
0	BIN.0	4 Byte (binary) CRLF	MSB before LSB(=status) Refer to Status A Definition page 29.
1	BIN.1	2 Byte (binary) CRLF	MSB, LSB

Note 1: The binary formats are useful for PLC communications in applications where conversion of the ASCII weight string is not possible. The binary outputs can generally be used directly by the PLC.
Note 2: Binary outputs require serial setting with 8 data bits.

ASCII Formats

In these ASCII tables the following applies:

- Value format is the sign (space or minus), followed by 7 digits (0 to 9) including the decimal point (if used). Leading zero blanking applies.
- Values in square brackets [ ] signify the number of characters in the fixed length response (ie. parameter length in bytes).

		Parameters					
Format		1	2	3	4	5	End
2	ASC.2	Value without decimal point [8]					CRLF
3	ASC.3	Value without decimal point [8]	‘,’ [1]	Address [2]	‘,’ [1]	Status A [3] See Note 2	CRLF
4	ASC.4	Value with decimal point [8]					CRLF
5	ASC.5	Value with decimal point [8]	‘,’ [1]	Address [2]	‘,’ [1]	Status A [3] See Note 2	CRLF

Note 1: Only mV/V readings and user readings have a decimal point. For other data types, format 4 = format 1 and format 5 = format 3.
Note 2: Status A = Refer to Status A Definition page 29.
Note 3: Address will be two digits in the range of 00 to 31.

			Parameters						
Format		Start	1	2	3	4	5	6	End
6	RANG.A	STX	Value with decimal point [8]	Status B [1] See Note 1					ETX
7	RANG.C	STX	Value with decimal point [8]	Status C1 [1] See Note 2	Status C2 [1] See Note 3	Status C3 [1] See Note 4	‘-’ [1]	Units [3]	ETX

Note 1: Status B choices are **G**ross, **N**et, **A**bs, **P**eak, **U**nderload, **O**verload, **M**otion, **E**rror.
Note 2: Status C1 choices are **G**ross, **N**et, **A**bs, **P**eak, **U**nderload, **O**verload, **E**rror.
Note 3: Status C2 choice is **M**otion or space.
Note 4: Status C3 choice is Centre of **Z**ero or space.
Note 5: Units is a three character string, the first character(s) being a space, followed by the actual units (eg. “^kg” or “^^t”).

Status A Definition

Decimal Value	Bit No.	Description	Comment
001	0	Overload / Underload	Weight reading out of range overload or underload
002	1	No Motion	
004 008	2 3	00H: Net 04H: Gross 08H: Abs 0CH: Peak	
016	4	Setpoint 1 Active	
032	5	Setpoint 2 Active	
064	6	User Reading	
128	7	Used Internally	
256	8	Centre of Zero	
Binary Note: Bit 8 is not applicable to Binary Format 0.			

Note: The status bits are added together. For example, a status of 6 (4+2) means the weight reading is gross, not within centre of zero, there is no motion and all limit values are inactive.

7.6. Remote Input - Options

Option	Key Function	Description
OFF **OFF**	None	No Operation
rES.232 **RES.232**	Comms Reset RS-232	Reset the comms to 9600n81 with RS-485 disabled and RS-232 in network mode. Note: Identical to a short press of the comms reset button.
rES.485 **RES.485**	Comms Reset RS-485	Reset the comms to 9600n81 with RS-232 disabled and RS-485 in network mode. Note: Identical to a long press of the comms reset button.
ZEr **ZER**	Zero the Scale	Set Gross Weight to Zero
tAr **TAR**	Tare the Scale	Set Net Weight to Zero
rES.Pk **RES.PK**	Reset Peak Values	Reset Stored Peak Values
PA.ON **PA.ON**	Setpoint A ON	Force Setpoint 1 ON
PA.OFF **PA.OFF**	Setpoint A OFF	Force Setpoint 1 OFF
PA.tOG **PA.TOG**	Setpoint A Toggle	Force Setpoint 1 to Opposite State
PA.rEL **PA.REL**	Setpoint A Release	Release Setpoint 1 to Normal Operation
Pb.ON **PB.ON**	Setpoint B ON	Force Setpoint 2 ON
Pb.OFF **PB.OFF**	Setpoint B OFF	Force Setpoint 2 OFF
Pb.tOG **PB.TOG**	Setpoint B Toggle	Force Setpoint 2 to Opposite State
Pb.rEL **PB.REL**	Setpoint B Release	Release Setpoint 2 to Normal Operation
tr 1.KEY **TR1.KEY**	Trans1Key	Same as MSV? query
tMP.CAL **TMP.CAL**	Temperature Calibration	Perform a temperature calibration. This is most useful when automatic temperature calibrations are disabled using the ACL command.

7.7. List of Reading Types (Data Types)

Option		Reading Type
rA.Ab	RA.AB	Raw Absolute
rA.Gr	RA.GR	Raw Gross
rA.nt	RA.NT	Raw Net
rA.Mt	RA.MT	Raw Maximum
rA.Lt	RA.LT	Raw Minimum
rA.Pk	RA.PK	Raw Peak
mu.Ab	mV.AB	mV/V Absolute
mu.Gr	mV.GR	mV/V Gross
mu.nt	mV.NT	mV/V Net
mu.Mt	mV.MT	mV/V Maximum
mu.Lt	mV.LT	mV/V Minimum
mu.Pk	mV.PK	mV/V Peak
Gr.Ab	GR.AB	Grads Absolute

Option		Reading Type
Gr.Gr	GR.GR	Grads Gross
Gr.nt	GR.NT	Grads Net
Gr.Mt	GR.MT	Grads Maximum
Gr.Lt	GR.LT	Grads Minimum
Gr.Pk	GR.PK	Grads Peak
US.Ab	US.AB	User Absolute
US.Gr	US.GR	User Gross
US.nt	US.NT	User Net
US.Mt	US.MT	User Maximum
US.Lt	US.LT	User Minimum
US.Pk	US.PK	User Peak
ANLOG	ANLOG	Analog

Note 1: Raw Readings are 24bit Raw ADC Values
Note 2: mV/V Readings = mV/V x 10000
Note 3: Grads Reading = User Graduations
Note 4: User Readings = Weight According to User Calibration
Note 5: Analog = 0 to 10000 (Zero to Zero + Span)

7.8. Error Codes

The flashing **red** LED on the **1203 Weight Transmitter** indicates the instrument is experiencing an error. When the **1203 Display** is attached the error code will be displayed once every three seconds until the error is rectified.

Error	Description	Action
E0001	Power Supply Voltage Low	Check Supply
E0002	Power Supply Voltage High	Check Supply
E0010	Temperature Out of Range	Check Location
E0020	User Calibration Resolution Error	Fix Up User Calibration or Scale Build
E0040	Positive Sense Error	Check Connection
E0080	Negative Sense Error	Check Connection
E0100	Setup Information Lost	Re-Enter Setup
E0200	Calibration Information Lost	Re-Calibrate
E0400	Factory Information Lost (FATAL)	Service
E0800	EEPROM Error (FATAL)	Service
E1000	A/D Converter Error	Restart/Service
E2000	A/D Converter Range Error	Check Connection and Load Cell Output
E4000	Communication Bit Error	Check Configuration/ Cabling
E8000	ROM Error (FATAL)	Service

The **E** type error messages are additive. For example, if the load cell cable is disconnected and therefore neither sense line is connected, the resulting status setting will be E00C0 (E0040 + E0080). 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)

7.9. Glossary of Terms

Term	Definition
Capacity	The maximum gross weight allowed on the scale. This is used to detect overload and underload conditions, etc.
Count-by	The smallest change in weight units that the display can show. See also Resolution
Division	A single graduation
EEPROM	Electrically Erasable Programmable Read-Only Memory
ESD	Electro Static Discharge
Graduations	The maximum number of display steps between zero gross load and full capacity gross load. It is equal to the Capacity divided by the resolution.
LED	Light Emitting Diode
LSB	Least significant bit
MSB	Most significant bit
PLC	Programmable Logic Controller
Resolution	The smallest change in weight units that the display can show. See also Count-by.
RS-232 and RS-485	Standards for communications hardware layers.
Units	The actual units of measurement (kilograms, tonnes, pounds, etc.).

7.10. List of Figures

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Notes:

SMART WEIGHING SOLUTIONS