RAMSEY
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Ramsey Flex Integrator & Digitizer

User Manual

REC-4497 Revision D

English

Revision History

Revision	Date Released	Details of the Release
REC-4497A	June 29, 2021	First release of newly created Ramsey Flex Integrator & Digitizer IOM
REC-4497B	August 01, 2021	Updated integrator power supply specifications, updated Ethernet/IP and ProfiNet Table, updated Field Wiring Diagram G0006024 Rev 3, updated regulatory mark images and added additional regulatory marks in specification table. Corrected part numbers for CAN bus cables in spare parts list.
REC-4497C	January 12, 2022	Add five images, Loadcell wiring to Digitizer, cleaning, ProfiNet DCP indication, spares update, latest rev drawings, add G0007679, update Modbus table, update weblink.
REC-4497D	January 27, 2026	Updated model offerings – Ramsey Flex Standard, Ramsey Flex Plus and Ramsey Flex Pro all based on same main PCB and updated Software. Software V1.5B Feature Updates - Navigation structure improved, terminology consistency improved, page transition times improved, reduced length of Setup Wizard. Added trimming on Analog I/O, damping times added to Analog Inputs and Outputs, added N/O and N/C contact options on Digital Inputs and Outputs, added separate Speed calibration page, added additional data fields on Speed, Zero, Span and Material Calibration pages to assist Calibrations, added Calibration Data Summary page, added ability to manually edit Calibrated Pulses and Belt Speed, added max mA setting for Belt Speed, Material Correction Factor saved automatically post Material Calibration, added Manual Test function for Digital and Analog Outputs, Modbus registers added and reorganised into bool, int and float groupings to reduce number of Modbus calls required. Printer, analog inclinometer and ProfiNet have been removed. Hardware updated – On Ramsey Flex Plus and Ramsey Flex Pro versions, all wiring connections moved away from inside door to base of enclosure, mechanical protection added to main PCB, increased size of electrical terminals and changed to removable connectors, improved labelling, improved Electrical AC Isolation and protection, increased Digital Input and Output opto isolation, increased mA loop powered isolation. On Ramsey Flex Pro ProfiBus DB9 connector added to simplify installation. Connection Diagrams – New Electrical schematics and Mechanical installation drawings provided. Added spare parts list.

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Chapter 1
About This Manual

Disclaimer

Though the information provided herein is believed to be accurate, be advised that the information contained herein is not a guarantee for satisfactory results. Specifically, this information is neither a warranty nor guarantee, expressed or implied, regarding performance, merchantability, fitness, or any other matter with respect to the products, and recommendation for use of the product/process information in conflict with any patent. Please note that SRO Technology Pty Ltd. (also referred to as SRO Technology in this manual) reserves the right to change and/or improve the product design and specifications without notice.

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Conventions

The following conventions are used in this manual.

- The names of Ramsey Flex Integrator buttons, functions, and so on are shown using upper-case letters—for example, Yes, No, Start, Accept, Exit and so forth.
- *Italics* are used in the text for emphasis.
- **Bold** is used to draw attention to something significant.

Symbols

The following symbols are used in this manual and on the product.

CAUTION - Failure to observe may cause minor injury or damage to the Ramsey Flex Integrator and Digitizer or attached Belt Scale.

WARNING - Failure to observe could result in death or serious injury.

RISK OF ELECTRIC SHOCK - The system may be powered by AC mains voltage.

NOTE - Provides information of special importance.

HINT - Indicates a hint about understanding or operating the Ramsey Flex Integrator and Digitizer.

Chapter 2
Important Safety Information

Important Safety Information

Please read the following warnings and cautions before installing, operating, or maintaining the Ramsey Flex Integrator.

General Safety Precautions

Please read the following general safety precautions before installing, operating, or maintaining the Flex Integrator.

CAUTION - Do not install, operate, or perform any maintenance procedures until you have read all the safety precautions listed below.

CAUTION - Do not connect power to the electronics or turn on the unit until you have read and understood this entire manual. The precautions and procedures presented in this manual must be followed carefully in order to prevent equipment damage and protect the operator from possible injury.

CAUTION - Hands and clothing must be kept away from all moving or rotating parts.

CAUTION - For North America locations a certified NEMA 4/4X bushing must be used for openings. For other locations see your local Electrical Authorities.

WARNING - Covers over the electronics should always remain in place during operation. They should be removed only for maintenance procedures with the machine's power OFF. Be sure to replace all covers before resuming operation.

WARNING - All switches (such as control or power) must be OFF when checking input AC & DC electrical connections, or when repairs are being made to the system.

WARNING - Incoming voltages must be checked with a voltmeter before being connected to the electronics.

WARNING - Extreme caution must be used in testing in, on, or around the electronics, PC boards, or modules. There are voltages in excess of 115V or 230V in these areas. Avoid high voltage and static electricity around the printed circuit boards.

WARNING - Maintenance procedures should be performed only by qualified service personnel and in accordance with procedures/instructions given in this manual.

WARNING - During maintenance, a safety tag (not supplied by SRO Technology) shall be displayed in the ON/OFF switch areas as a precaution instructing others not to operate the unit.

WARNING - Only qualified service technicians shall be allowed to open and work in the electronics, power supply, control, or switch boxes.

WARNING - This equipment shall not be operated or utilized in applications other than those stated in the original order.

WARNING - All panels covering the electronics must be in place and tight before washdown procedures. Damage to the electronics could result from water, moisture, or contamination in the electronics housing.

Incoming Power Safety

Please read the following warnings and cautions, when working with incoming power to the Flex Integrator or its associated systems.

RISK OF ELECTRIC SHOCK - Hazardous voltage may be present. Risk of electric shock. Disconnect power before opening and servicing the Flex Integrator.

CAUTION - Do not connect power until you have read and understood this entire section. Improper connection may result in damage to your integrator.

WARNING - All wiring must be in accordance with standards (IEC, EN) national and local codes (NEC, VDE, and so forth) outline provisions, for safely installing electrical equipment. Installation must comply with specifications regarding wire types, conductor sizes, branch circuit protection, and disconnect devices. Failure to do so may result in personal injury and/or equipment damage.

WARNING - Ground impedance must conform to the requirements of national and local industrial safety regulations and/or electrical codes. The integrity of all ground connections should be periodically checked. For installations within a cabinet, a single safety ground-point or ground busbar connected directly to building steel shall be used. All circuits including the AC input ground conductor should be grounded independently and directly to this point/bar. Grounding of all enclosures and conduits is strongly recommended.

CAUTION - Verify that the input voltage is correct with an AC voltmeter before you connect it to the integrator.

CAUTION - Earth ground must be provided to the integrator. Do not use conduit to provide this ground.

CAUTION - A readily accessible disconnect device (maximum 20 amp) must be incorporated in the field wiring. This disconnect device shall be easily available to the operator and must be marked as the disconnecting device for the equipment.

NOTE – A Circuit Breaker / Isolation Switch is provided as standard on Flex Plus and Flex Pro versions of the product.

EMC Instructions

The Ramsey Flex may cause radio interference if used in a residential or domestic environment. The installer is required to take measures to prevent interference, in addition to the essential requirements for CE compliance provided in this manual, if necessary.

NOTE - Conformity of the Ramsey Flex with CE/EMC requirements does not guarantee an entire machine or installation complies with CE/EMC requirements.

Important Wiring and Safety Information

Before installing the Ramsey Flex Integrator, please read the following important safety information about wiring up the Ramsey Flex Integrator.

- Ensure power is OFF at the main disconnect.
- Do not route load-cell and signal cables in the same conduit with power cables or any large source of electrical noise.
- Earth ground all enclosures and conduits. A ground connection between all conduits is required.
- Connect the shields only where shown.
- Check that all wires are tight in their connections.
- Never use a “megger” to check the wiring.
- A readily accessible disconnect device must be incorporated in the field wiring. This disconnect should be within easy reach of the operator and must be marked as the disconnecting device for the Ramsey Flex Integrator and associated equipment.
- All conduits should enter the bottom of the enclosure. Do not run conduit through the top or sides of the enclosure.

NOTE – It is very important to not connect the Earth Shield on the CAN bus cable to both the Integrator and Digitizer enclosures. Both enclosures shall be grounded, but they shall not be grounded to each other through the CAN bus cable.

If this is done it can create an earth loop which could be detrimental to measurement performance.

Chapter 3
Hardware Options

Overview

This chapter describes the Hardware options available on the Ramsey Flex Integrator Range.

HINT – Read this manual before installing or setting up the Ramsey Flex Integrator, many common setup issues are covered in this manual. If not, then please contact your local distributor, or SRO Technology.

Theory of Operation

The Ramsey Flex Integrator is a microcomputer-driven instrument that derives Rate, Weight and Speed of material from Load Cell and Speed signals received at the Digitizer.

The mass of material on the conveyor is transferred from the material to the Belt, to the Rollers, to the Belt Scale Idler frames, to the Belt Scale Carriage (or Weigh Frame) that then causes deflection in the Load Cells. Load Cell deflection is proportional to the applied force (mass x gravity) which is converted to an electronic signal by a Strain Gauge.

Conveyor speed is measured by an optical or mechanical speed sensor. These inputs are measured by a digitizer (one Digitizer per scale) and transmitted digitally via CAN bus cable. The CAN bus is connected to an integrator which uses this data to compute Belt Speed, Belt Loading, Flow Rate and Accumulated Tonnage.

The Ramsey Flex (Standard and Pro) Integrator can handle up to two digitizers (i.e. one or two scales) while the Flex Plus can handle a single scale only. The Integrator supplies 24VDC power to the digitizers and handles communication, computation and the HMI. The User can configure and calibrate the weigh system. As well as configuring the outputs which may be digital, analog or connected to a control system by supported industrial networks.

Standard Features

The Ramsey Flex Integrator has many hardware and software features necessary for continuous weighing and outputting totalized weight and rate information. The standard features of the Ramsey Flex Integrator are listed below.

- Remote log in capability. Allowing the User to control and view the Ramsey Flex Integrator from any connected computer.
- Visible and electrical outputs representing rate, load and speed of the material movement.
- Visible and electrical output representing total amount of material that has passed the weighbridge.
- Speed, Zero, Span and Material calibrations.
- Audit trail.
- Auto zero tracking.
- Optically isolated inputs and outputs.
- Alarms and failure detection.
- Communication standards such as Ethernet and RS485.
- Communication protocols such EtherNet/IP, Modbus TCP, Modbus RTU and ProfiBus (optional).

Ramsey Flex Integrator Options

The Ramsey Flex Integrator comes in three Field Mount variants, as follows.

- **Flex Standard**. Base model Ramsey Flex Integrator, as originally designed by Thermo Fisher Scientific but with Ramsey upgraded software.
- **Flex Plus**. Premium version of the base model Ramsey Flex Integrator. Ramsey upgraded software within the same enclosure, but additional mechanical and electrical protection has been installed to harden the integrator. However, this results in the loss of some input and output functionality due to space constraints.
- **Flex Pro**. Premium mining spec version of the Ramsey Flex Integrator. All the input and output functionality of the original base model, but with additional mechanical and electrical protection to harden the integrator in a physically larger enclosure.

NOTE. Contact your local SRO Technology distributor to discuss Panel Mount and Blind Mount integrator versions of the Ramsey Flex Integrators.

Ramsey Flex Integrator Power

The Ramsey Flex Integrator comes in the following power configuration options.

- **Flex Standard**. AC powered 100-250VAC at 50-60Hz. Custom DC option may be available, contact your local distributor.
- **Flex Plus**. AC powered 100-250VAC at 50-60Hz. Custom DC option may be available, contact your local distributor.
- **Flex Pro**. AC powered 100-250VAC at 50-60Hz. DC powered with 24VDC.

Ramsey Flex Temperature Range

The Ramsey Flex Integrator can operate in ambient conditions from -30°C to +55°C (-22°F to +131°F).

A sun shade is availabe to reduce direct thermal radiation load on the integrator. A heater can be installed by the end User in the Flex Pro if space permits.

Touchscreen

The touchscreen is 7 inch and capacitive with resolution of 1024 x 600. It can be replaced, please contact your local distributor.

Load Cell and Speed Inputs on Ramsey Flex Digitizer

The Load Cell and Speed Inputs are connected to a remote Digitizer. The function of the Digitizer is to convert these Analog signals into a Digital signal for transmition to the Main Ramsey Flex Integrator. This allows for transmission over long distances with minimal impact by noise. This Digitizer is designed to be placed as close to the Scale as possible, thereby minimising the cable length of the Analog signals which being in the mV range can be severly impacted by indutrial noise.

The Digitizer comes in two configerations.

- **Single Digitizer** – This Digitizer has a single Load Cell input and a single Speed input. This can be used on scales where there is only a single Load Cell, or on systems where a summing junction box is used to sum multiple Load Cells into a single Load Cell output.
- **Quad Digitizer** – This Digitizer has four Load Cell inputs and a single Speed input. This can be used on scales with up to four Load Cells if the User wants to measure each Load Cell individually, or can be used with a multiple summing

junction box if more than four Load Cells inputs are required. Available to use either 1, 2 or 4 loadcell inputs

The Load Cell and Speed Inputs are connected to a remote Digitizer which can have either 1 or 4 Load Cell inputs.

	Single Digitizer	Quad Digitizer
Connector Location	Base of Integrator	Base of Integrator
Connector Pitch	3.5mm	3.5mm
Load Cell Inputs	1	4
LC Excitation Voltage	5VDC	5VDC
R-Cal Resistor	1 x 165000 Ω	4 x 165000 Ω One per LC Channel
Speed Inputs	1	1
Speed Input Types - Compatible	60-12C 2 wire type 60-12-64N 3 wire type 60-12-AR 3 wire type NPN Proximity Probe 3 wire type	60-12C 2 wire type 60-12-64N 3 wire type 60-12-AR 3 wire type NPN Proximity Probe 3 wire type
Speed Input Types – NOT Compatible	PNP Proximity Probe 3 wire type Namur Sensor 4-20mA Analog Signal	PNP Proximity Probe 3 wire type Namur Sensor 4-20mA Analog Signal

Table 1 – Digitizer Inputs.

Digital Inputs and Outputs

The hardware on the Ramsey Flex Integrator range is capable of having up to four Analog Inputs and four Analog Outputs connected, depending on the version of Ramsey Flex Integrator selected. These are software configered to be Active High or Active Low for Digital Inputs, or Normally Closed N/C or Normally Open N/O for Digital Outputs.

The differences in hardware configuration between the Flex range is shown below. In general, the Flex Plus and Flex Pro have additional external and replacable isolation by using external G4 Opto22 style modules. The isolation on the Flex standard is PCB mounted and not replacable.

CAUTION. The G4 modules from Opto22, Crydom etc must have 24VDC logic. 5VDC logic modules from previous MT9000 range are not directly compatible and could be damaged by the Ramsey Flex Integrators 24VDC logic levels.

	Flex Standard	Flex Plus	Flex Pro
Connector Location	Rear of Door	Base of Integrator	Base of Integrator
Connector Pitch	3.5mm	5.08mm	5.08mm
Digital Inputs	4	0	4
Digital Input Voltage	24VDC	N/A	10 - 32VDC 90 - 280VAC G4 Input Module Dependant
Digital Input Isolation	Opto Isolation is PCB mounted (not replacable)	N/A	Opto Isolation has additional external module (replacable Solid State G4 Opto22 style)
Digital Outputs	4	2	4

Digital Output Voltage	24VDC	5 - 60VDC 12 - 280VAC G4 Output Module Dependant	5 - 60VDC 12 - 280VAC G4 Output Module Dependant
Digital Output Isolation	Opto Isolation is PCB mounted (not replacable)	Opto Isolation has additional external module (replacable Solid State G4 Opto22 style)	Opto Isolation has additional external module (replacable Solid State G4 Opto22 style)

Table 2 – Digital Input and Output Hardware Configuration.

Analog Inputs and Outputs

The hardware on the Ramsey Flex Integrator range is capable of having up to two Analog Inputs and two Analog Outputs connected. These can be software configered to be either Current type (0-20mA, or 4-20mA) or Voltage type (0-5V, or 1-5V).

The differences in hardware configeration between the Flex range is shown below. In general, the Flex Plus and Flex Pro have additional external and replacable isolation. The isolation on the Flex standard is PCB mounted and not replacable.

	Flex Standard	Flex Plus	Flex Pro
Connector Location	Rear of Door	Base of Integrator	Base of Integrator
Connector Pitch	3.5mm	5.08mm	5.08mm
Analog Inputs	2 (mA or Voltage)	0	2 (mA or Voltage)
Analog mA Input Isolation	mA Isolation is PCB mounted (not replacable)	N/A	mA Isolation has additional external module (replacable loop powered isolator)
Analog Voltage Input Isolation	mA Isolation is PCB mounted (not replacable)	N/A	mA Isolation is PCB mounted (not replacable)
Analog Outputs	2 (mA or Voltage)	2 (mA or Voltage)	2 (mA or Voltage)
Analog mA Output Isolation	mA Isolation is PCB mounted (not replacable)	mA Isolation has additional external module (replacable loop powered isolator)	mA Isolation has additional external module (replacable loop powered isolator)
Analog Voltage Input Isolation	mA Isolation is PCB mounted (not replacable)	mA Isolation is PCB mounted (not replacable)	mA Isolation is PCB mounted (not replacable)

Table 3 – Analog Input and Output Hardware Configuration.

Industrial Communications

The Ramsey Flex Integrator is capable of a range of Serial and Ethernet communications standards as shown in the following table.

	Flex Standard	Flex Plus	Flex Pro
Ethernet Connector Location	Ethernet on Rear of Door	Ethernet on Base of Integrator	Ethernet on Base of Integrator
Modbus TCP	Yes	Yes	Yes
EtherNet/IP	Yes	Yes	Yes
ProfiNet	No	No	No
RS485 Connector Location	Rear of Door	Base of Integrator	Base of Integrator

RS485 Connector Pitch	3.5mm	5.08mm	5.08mm
Modbus RTU	Yes	Yes	Yes
ProfiBus Connector Location	Rear of Door	Rear of Door	Rear of Door
ProfiBus Connector Pitch	3.5mm standard connector NOT a DB9 connector Manual connection of 390Ω and 220Ω resistors is required if last device	3.5mm standard connector NOT a DB9 connector Manual connection of 390Ω and 220Ω resistors is required if last device	DB9 Serial Connector
ProfiBus	Yes (optional PCB required) – however ProfiBus not recommended on this Flex version due to non standard connections	Yes (optional PCB required) – however ProfiBus not recommended on this Flex version due to non standard connections	Yes (optional board) – If using ProfiBus this version is recommended, as DB9 connector allows standard Siemens ProfiBus connectors to be used

Table 4 – Industrial Communication

Chapter 4
Overview of Initial Installation, Setup and Calibration Procedure

Introduction

This section explains - at a basic level – the sequence of steps that need to be performed in order to conduct a minimum Installation, Setup and Calibration procedure.

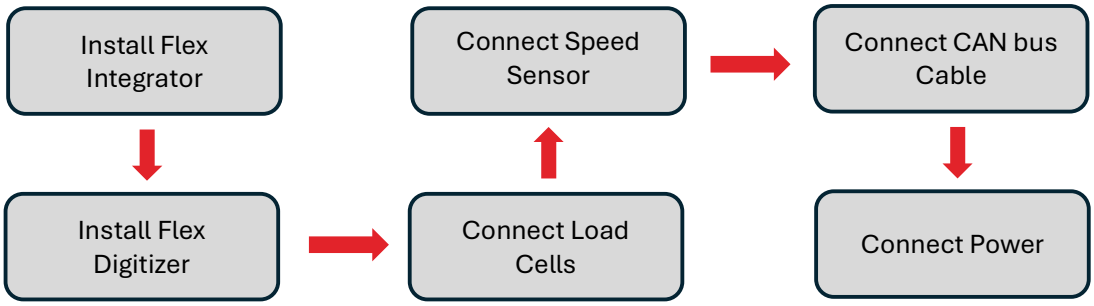
Setup of any Alarms, Digital or Analog Inputs and Outputs, or setup of Ethernet Communications or Industrial Protocols is not considered part of the minimum installation due to the many possible options. The User will need to read this manual and determine the appropriate steps that need to be taken.

NOTE – It is assumed the weigh frame, idlers, load cells and speed sensor have been installed and aligned correctly.

Hardware Setup

The minimum hardware installation to complete a successful Calibration is as noted below.

1. **Ramsey Flex Integrator** – install the main Ramsey Flex Integrator.
2. **Ramsey Flex Digitizer** – Install the remote Digitizer as close as possible to the weigh frame.
3. **Load Cells** – Connect the Load Cells into the Digitizer enclosure.
4. **Speed Sensor** – Connect the Speed Sensor into the Digitizer.
5. **CAN bus Cable** – Connect the CAN bus cable between the Digitizer and Ramsey Flex Integrator
6. **Connect the Power** – Connect the AC or DC power to the Ramsey Flex Integrator



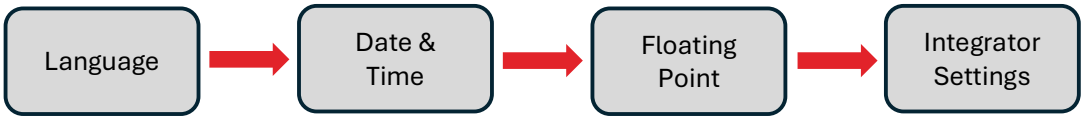
Wizard Setup

The first time the Ramsey Flex Integrator is powered, or after a Factory Reset, the User will be presented with a short Wizard setup menu.

1. **Language** – Select preferred language. The default language is English.
2. **Date & Time** – Enter the date, date format, time and time format.
3. **Floating Point Format** – Set the displayed precision level.
4. **Integrator Settings** – Enable single or dual scales, enter the device Password and select display units.

NOTE 1 – Changing from Imperial to Metric, or from Metric to Imperial units is not possible outside the Initial Wizard. Ensure you select the correct display units.

NOTE 2 – The initial wizard is shorter than the original wizard on the Ramsey Flex integrator. The following pages discuss the "Minimal Initial" setup that is required. These recommendations should be followed.

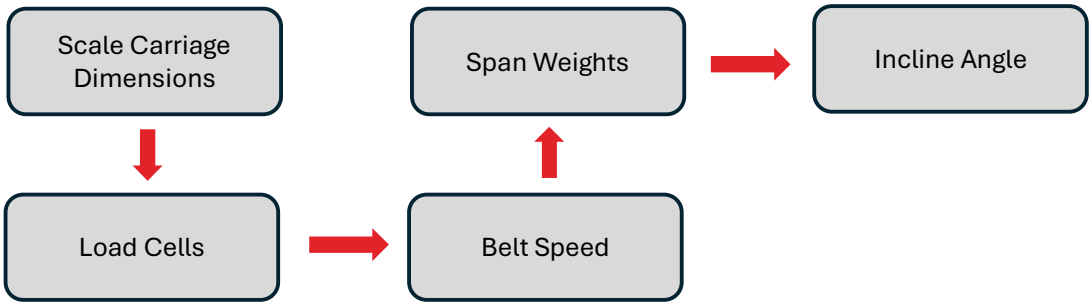


Minimal Initial Setup

Once the unit has loaded after the initial wizard, this is the recommended MINIMAL setup process to follow. None of these setup steps should be skipped before undertaking the Initial Calibration.

1. **Scale Carriage Dimensions** – The following list is the minimum Belt and Carriage setup information that must be entered by the User. Refer to section "Scale Settings Page" for more detailed information on these measurements.
   - Scale Type – Floating or Pivoted.
   - Idler Count - The number of weigh idler frames suspended on the belt scale carriage.
   - LA - Pivot to Load Cell Length (Pivoted scale only).
   - LB - Pivot to Idler Length (Pivoted scale only).
   - LC - Pivot to Test Weight Length (Pivoted scale only).
   - LD - Idler Spacing.
   - LE - Pivot to Test Weight Height (Pivoted scale only).
   - LF - Pivot to Carriage Height (Pivoted scale only).
   - LG - Roller to Carriage Height (Pivoted scale only).
2. **Load Cells** – The following list is the minimum Load Cell setup information that must be entered by the User.
   - Number of Load Cells – The number of Load Cells on the Belt Scale frame.
   - Number of Digitizer Channels – How many channels are being used on Single (1 only) or Quad Digitizer (1, 2, or 4 channels depending on belt scale type).
   - Load Cell Capacity – This is the manufacturer's rated capacity for a single loadcell.
   - Load Cell Sensitivity – This value determines the maximum electrical output signal of the Load Cell when loaded to its full rated capacity (for multiple loadcells this use the average value of all load cells).
   - Load Cell Resistance #1 #2 #3 #4 - User should enter data from the Load Cell datasheet.
3. **Belt Speed** – The following list is the minimum Belt Speed setup information that must be entered by the User.
   - Belt Speed Input Type – Measured or Emulated speed sensor.
   - NOTE - More information is required at time of calibration.
4. **Span Weights** – The following list is the minimum Span Weight setup information that must be entered by the User.
   - Span Type – Enable the type of Span Calibration method that will be used and enter the Resistor, Billet or Roller Chain weights.
5. **Incline Angle** – The following list is the minimum Incline Angle setup information that must be entered by the User.
   - Incline Angle – If the conveyor slopes up, the angle is positive, meaning the conveyor has a positive incline.

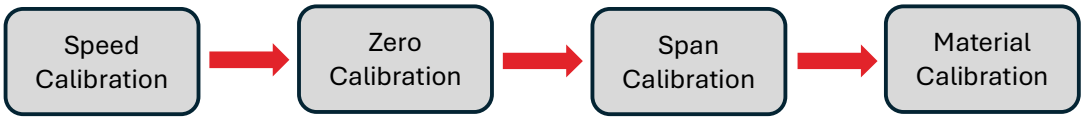
These are the minimum settings that need to be completed in order to perform a successful Speed, Zero, Span and Material Calibration.



Initial Calibration

Once all data in the previous section has been entered and verified then the User can undertake the initial calibration. The order of initial calibration MUST be as follows

1. **Speed Calibration** - Establishes the relationship between time, belt length, and encoder pulses so the system can accurately calculate belt speed.
2. **Zero Calibration** – Determines the tare load of the empty belt and sets the zero reference for the scale over one full test duration.
3. **Span Calibration** – Sets the scale response using a known applied weight to ensure accurate weight measurement.
4. **Material Calibration (Optional)** – Applies a correction factor based on a comparison between the belt scale reading and a pre or post weighed mass of actual process material to fine-tune overall accuracy.



Chapter 5
Installing Ramsey Flex Integrator

Hardware Installation

This section explains how to complete the hardware connections for your Ramsey Flex Integrator. Please go to the appropriate section, depending on which connection needs to be made, then select the appropriate model of Ramsey Flex Integrator you purchased.

Unpacking

The Ramsey Flex Integrator has been properly packaged for shipment at the factory. Please inspect all packages for damage before opening the shipping package, because the carrier is likely responsible for any damage. Once removed from the package, the Ramsey Flex Standard Integrator and Ramsey Flex Plus Integrator can be safely stored with its cover secured and with the gland hole plugs installed. The Ramsey Flex Pro chassis, if not installed in an IP rated enclosure, should be stored carefully. During storage, do not expose the Ramsey Flex Integrator to moisture or to temperatures outside the range of –30° to +70°C (–22° to +158°F).

Installing the Ramsey Flex Integrator

The Ramsey Flex Integrator should be mounted in a controlled environment and protected (shielded) from direct sunlight, and should not be exposed to excessive vibration, heat, or moisture. (Optional sunshields available upon request)

Mount the Ramsey Flex Integrator to a rigid, flat, vertical surface using the mounting holes provided on the back or side of the enclosure. Care should be taken to ensure the mounting surface is flat, so as not to twist or warp the enclosure when tightening the mounting bolts. Stand the enclosure off the vertical surface using Unistrut if being installed in hot environments to try and minimise thermal heat transfer and maximise airflow around the enclosure.

The Ramsey Flex Pro comes with an optional Sunshade with canvas cover, this can be used in hot and sunny environments and reduces the internal box temperatures up to 10°C.

Ensure the Ramsey Flex Integrator housing is correctly earthed.

Connecting the Incoming AC Power Supply

WARNING - Any and all Local Electrical or Client Rules and Regulations have precedence over anything stated in this manual.

RISK OF ELECTRIC SHOCK - Some units ship from the factory in a DC configuration, if this is the case follow the DC power instruction. DO NOT connect AC to a DC device.

For AC devices, connect the incoming 100 to 240 VAC power using the following procedure.

- For Ramsey Flex Standard, a customer supplied circuit breaker must be installed to enable isolation of the Ramsey Flex Integrator. The Ramsey Flex Plus and Ramsey Flex Pro have circuit breaker pre-installed by the factory.
- Ensure the incoming AC power cables are not connected and live, or ensure the circuit breaker is locked off, before connecting the incoming wires to the Ramsey Flex Integrator. Follow all Customer and local Electrical Authorities rules.

- Unlatch and open the enclosure door. Check your local Customer or Electrical Authorities to determine if you are allowed to open the enclosure and expose AC power.
- Install the gland(s) along the bottom edge of the enclosure. Check your local Electrical Authorities for gland type and ratings.
- Route incoming power wiring through the gland at the bottom right of the enclosure. The size of power supplies used on Ramsey Flex Standard and Ramsey Flex Plus is 15W and on Ramsey Flex Pro is 60W. Check your local Electrical Authorities for cable size, type and core colours.
- For Ramsey Flex Standard and Ramsey Flex Plus, terminate the AC power cables to the terminals. For Ramsey Flex Pro, install the IEC plug to the end of the power cable.
- Do not route AC power cables parallel to, or within the same conduit, any analog signal cables.

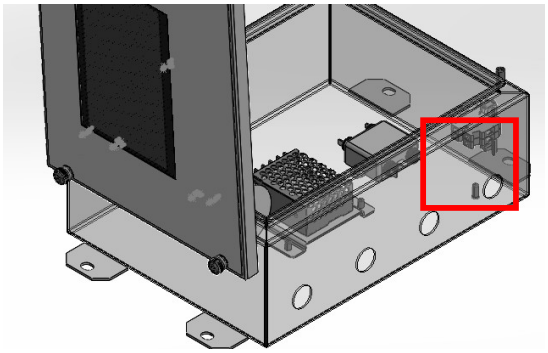


Figure 1 – Ramsey Flex Standard AC Connection.

Ramsey Flex Standard

Location of AC Active and Neutral DIN rail terminal is as highlighted.

The installer will find it easier to install incoming cables into the terminals if they are removed from the DIN rail, use a screwdriver to release the retention lever.

The Ramsey Flex Standard enclosure has 4 gland holes on the bottom edge. The incoming AC power should be fed into the gland on the right-hand side.

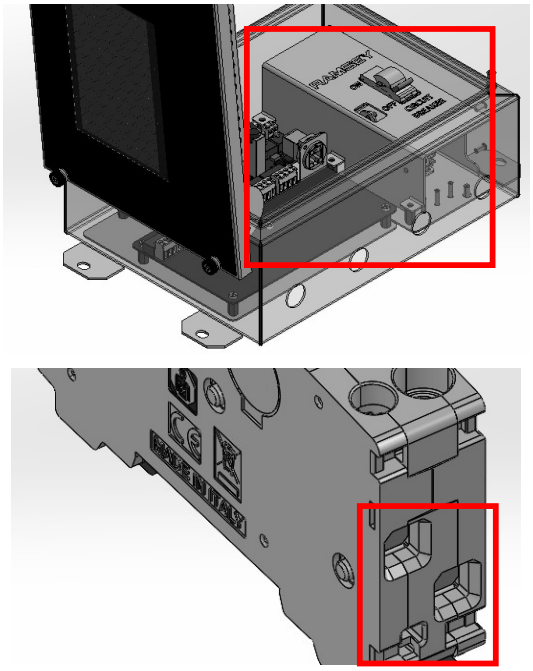


Figure 2 – Ramsey Flex Plus AC Connection.

Ramsey Flex Plus

Location of AC Active and Neutral DIN rail terminal is as highlighted.

The installer will need to remove the protective AC guard as shown in the first picture. This can be achieved by removing the 3x screws along the left edge of the cover.

Removing the guard will expose the ABB Circuit Breaker and the Earth Terminal.

The ABB Circuit Breaker will accept both the Active and Neutral phases from the incoming AC wires. The Neutral cable is the lower entry point on the Circuit Breaker, the Active the higher entry point – but confirm the Active and Neutral markings on the Circuit Breaker body.

The Ramsey Flex Plus enclosure has 4 gland holes on the bottom edge. The incoming AC power should be fed from the gland on the right-hand side.

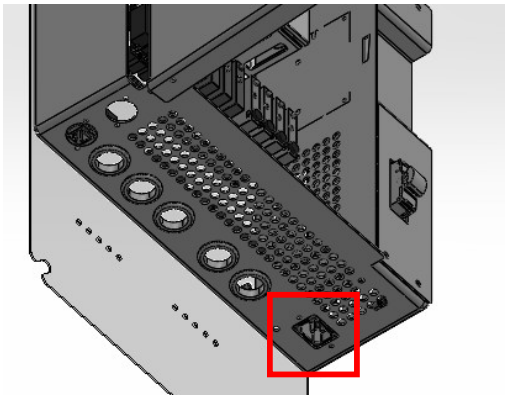


Figure 3 – Ramsey Flex Pro AC Connection.

Ramsey Flex Pro

Location of AC connection is as highlighted, on the bottom right-hand edge of the Ramsey Flex Pro Integrator.

For the Ramsey Flex Pro the connector is IEC C14 Panel Mount version.

The installer will need to connect an IEC C13 connector to the end of the incoming AC power cables.

Connecting the Incoming DC Power Supply

WARNING - Any and all Local Electrical or Client Rules and Regulations have precedence over anything stated in this manual.

RISK OF ELECTRIC SHOCK - Some units ship from the factory in a DC configuration, if this is the case follow the DC power instruction. DO NOT connect AC to a DC device.

For DC devices, connect the incoming 24VDC power using the following procedure.

- Ensure the incoming DC power cables are not connected and live, or ensure the Circuit Breaker is locked off, before connecting the incoming wires to the Ramsey Flex Integrator. Follow all Customer and local Electrical Authorities rules.
- Unlatch and open the enclosure door. Check your local Customer or Electrical Authorities to determine if you are allowed to open the enclosure and expose DC power.
- Install the gland(s) along the bottom edge of the enclosure. Check your local Electrical Authorities for gland type and ratings.
- Route incoming DC power wiring through the gland at the bottom right of the enclosure. Check your local Electrical Authorities for cable size, type and core colours.

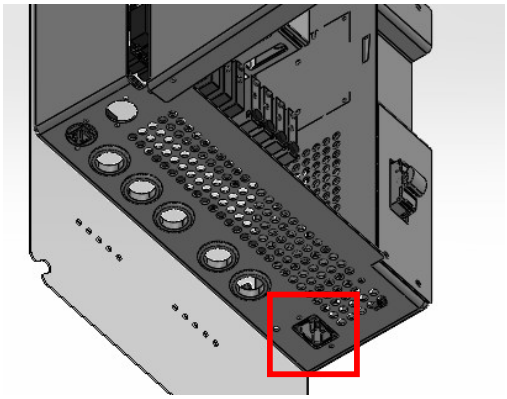


Figure 4 – Ramsey Flex Pro AC Connection.

Ramsey Flex Pro

Location of DC connection is as highlighted, on the bottom right-hand edge of the Ramsey Flex Pro Integrator.

For the DC version of Ramsey Flex Pro a 2-way connector is provided. Wire the +24VDC to the terminal labelled “+” on the Power Input Terminal. Wire the 24VDC Common to the terminal labelled “–” on the Power Input Terminal. Wire the safety ground to the terminal labelled “E” on the Power Input Terminal.

Digitizer Connection CAN1 and CAN2

Depending on the version of the Ramsey Flex Integrator, the connection point for Digitizer will be slightly different. Please check the model you have and follow the correct section.

The full connection wiring diagrams can be found in Appendix 1.

CAUTION. DO NOT connect the shield on the CAN bus cables to both the Digitizer and the Ramsey Flex Integrator. Doing so could create a ground loop. It is recommended that the shield only be terminated on the Ramsey Flex Integrator side and the shield on the cable should NOT be connected inside the digitizer.

Ramsey Flex Standard

The Ramsey Flex Standard can have dual scales connected, these are labelled as CAN1 (X1) and CAN2 (X2). These connections are found on the rear of the door along the top edge.

To assist with correct wiring, the connection diagram is provided below. Ensure the cables are terminated to the correct terminal positions.

Do not connect the CAN bus cable shield to both the Ramsey Flex Integrator and Digitizer ends as this could create a ground loop.

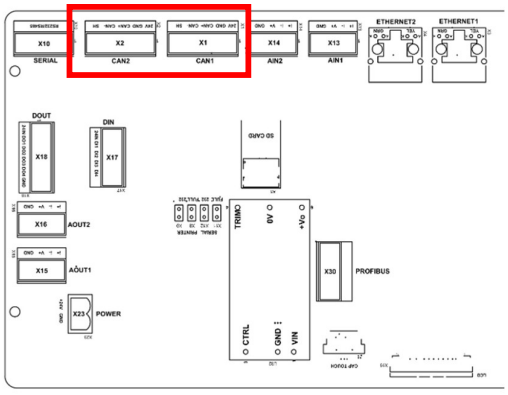


Figure 5 – Ramsey Flex Standard location of Digitizer CAN1 and CAN2 Terminals

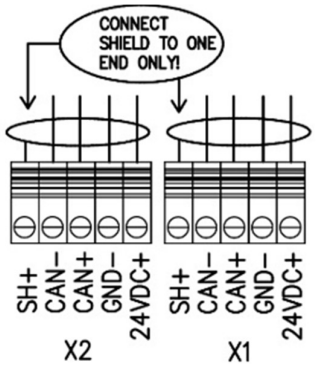


Figure 6 – Ramsey Flex Standard CAN1 (X1) and CAN2 (X2) connection to Digitizer

Ramsey Flex Plus

The Ramsey Flex Plus can only have a single scale connected. This is due to limited space on the baseboard and requirements to fit within the existing Ramsey Flex Integrator chassis. The CAN bus Digitizer terminals are mounted at the rear of the enclosure and are 5.08mm in pitch. If only a single scale is required, the Ramsey Flex Plus is a better solution within the same space constraints due to its replaceable Digital and Analog Output Opto relays and additional mechanical and AC electrical protection.

The Digitizer is connected to the input labelled “Digitizer” which is internally connected to CAN1.

The connection diagram below right is aligned with the terminals in the picture below left. Ensure the cables are terminated to the correct terminal positions.

Do not connect the CAN bus cable shield to both the Ramsey Flex Integrator and Digitizer ends as this could create a ground loop.

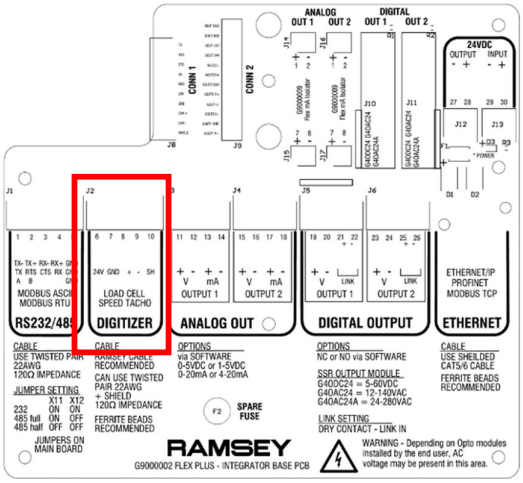


Figure 7 – Ramsey Flex Pro Location of Digitizer Terminal

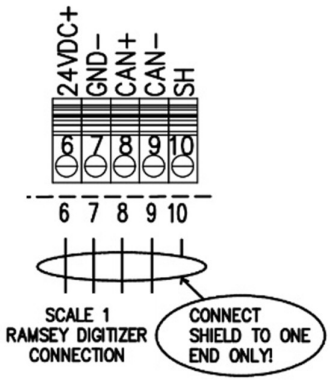


Figure 8 – Ramsey Flex Plus CAN1 Digitizer Connection Diagram

Ramsey Flex Pro

The Ramsey Flex Pro can have dual scales connected due to the larger base board; these are labelled as Scale 1 (J33) and Scale 2 (J23). The Scale 1 and Scale 2 Digitizer terminals are mounted at the rear of the enclosure, stacked vertically over each other and are 5.08mm in pitch.

The Digitizer is connected to the input labelled “Scale 1” which is internally connected to CAN1 or “Scale 2” which is internally connected to CAN2. Ensure the cables are terminated to the correct terminal positions.

Do not connect the CAN bus cable shield to both the Ramsey Flex Integrator and Digitizer ends as this could create a ground loop.

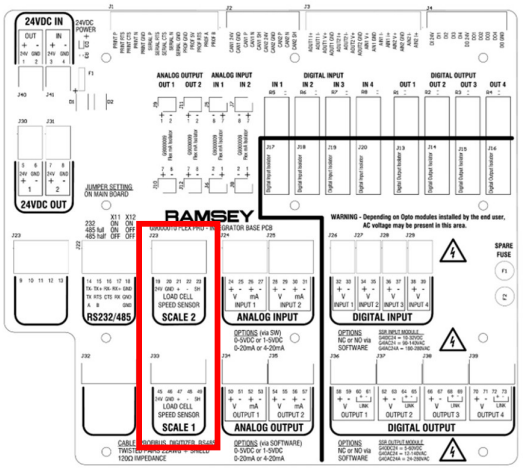


Figure 9 – Ramsey Flex Pro Digitizer Connection Diagram

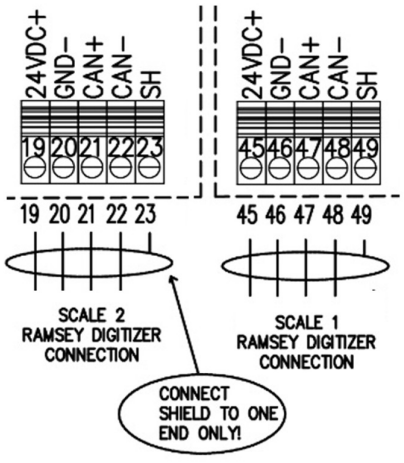


Figure 10 – Ramsey Flex Pro CAN1 and CAN2 Connection Diagram

Digital Input

Depending on the version of the Ramsey Flex Integrator, the connection arrangement for Digital Inputs will vary slightly. Please check the model you have and follow the correct

section. All Digital Inputs are Software selectable for function and can be Active High or Active Low.

The full connection wiring diagrams can be found in Appendix 1.

Ramsey Flex Standard

The Ramsey Flex Standard has four (4x) Digital Inputs that are found on the rear of the door along the upper left edge (Terminal X17). Installer must be careful to install enough cable so the door can be fully opened, but not so much that it inhibits the door being closed or interferes with other equipment inside the enclosure, such as pushing upwards onto the door mounted PCB, or down onto the AC power supply.

It is highly recommended that external Digital Isolators are used in Industrial Environments with a high chance of over voltage, short circuit or lightning strikes. If the User wishes to have external replaceable Isolation but does not want to do the wiring, then please select the Ramsey Flex Plus or Ramsey Flex Pro options.

The Ramsey Flex Standard has onboard Digital Input Isolation, but this Isolation is not replaceable, so damage to the Isolation will require the replacement of the motherboard.

All Inputs are SINKING type and external 24VDC power must be supplied as shown in the following wiring diagram.

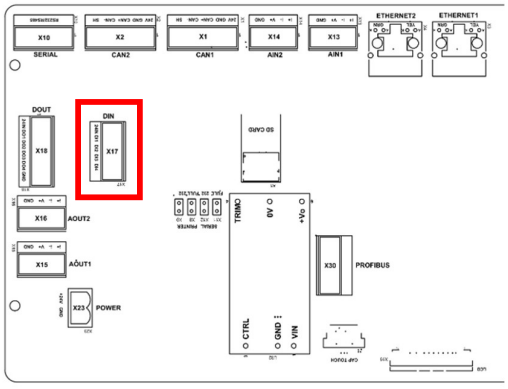


Figure 11 – Ramsey Flex Standard location of Digital Input

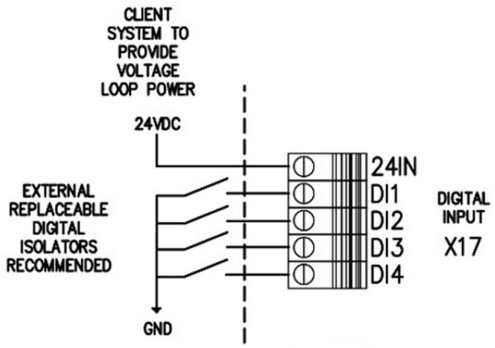


Figure 12 – Ramsey Flex Standard Digital Input wiring connection

Ramsey Flex Plus

The Ramsey Flex Plus does not have any Digital Inputs on the base board. This section of the manual is not relevant to the Ramsey Flex Plus.

Ramsey Flex Pro

The Ramsey Flex Pro has four (4x) Digital Inputs with additional external isolation provided by Opto22 G4 style modules. The Digital Inputs can be Active High or Active Low and are setup in Software.

The Digital Input terminals are found on the rear base plate of the Ramsey Flex Integrator and are 5.08mm pitch connectors (Terminal J26/27/28/29). Input 1 (J26) is connected to DI1 on the Ramsey Flex PCB, Input 1 (J27) is connected to DI2, Input 1 (J28) is connected to DI3 and Input 1 (J29) is connected to DI4. The board markings are shown in the image following to the left.

The User must select the correct Opto22 G4 Input module voltage to match the input being received from the external device – this can be AC or DC.

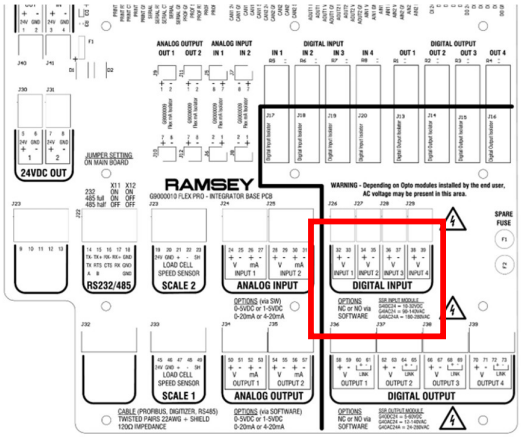


Figure 13 – Ramsey Flex Pro location of Digital Inputs

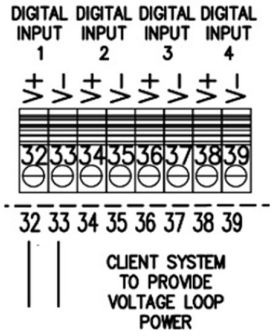


Figure 14 – Ramsey Flex Pro Digital Inputs wiring connection

Digital Output

Depending on the version of the Ramsey Flex Integrator, the connection arrangement for Digital Outputs will be slightly different. Please check the model you have and follow the correct section. All Digital Outputs are Software selectable for function and can be Normally Open or Normally Closed. Wiring diagrams can be found in Appendix 1.

Ramsey Flex Standard

The Digital Output connections are found on the rear of the door along the top left edge (Terminal X18). They can be hard to access, the connector is 3.5mm pitch and the installer must be careful to install enough cable so the door can be fully opened, but not so much that it inhibits the door being closed or interferes with other equipment inside the enclosure, such as pushing upwards onto the door mounted PCB.

It is highly recommended that external Digital Isolators are used in Industrial Environments with a high chance of over voltage, short circuit or lightning strikes. If the User wishes to have external replaceable Isolation but does not want to do the wiring, then please select the Ramsey Flex Plus or Ramsey Flex Pro options.

The Ramsey Flex Standard has onboard Digital Isolation, but this Isolation is not replaceable, so damage to the Isolation will require the replacement of the PCB.

The Outputs are SINKING type and external 24VDC power must be supplied as shown in the following wiring diagram.

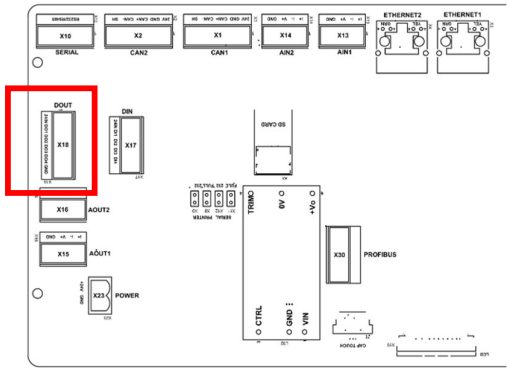


Figure 15 – Ramsey Flex Standard location of Digital Output

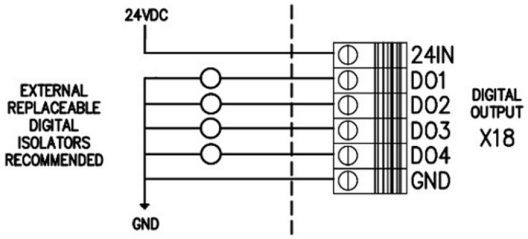


Figure 16 – Ramsey Flex Standard Digital Output wiring connection

Ramsey Flex Plus

The Ramsey Flex Plus has two (2x) Digital Outputs with additional external isolation provided by Opto22 G4 style modules. The Digital Outputs can be Normally Open or Normally Closed and must be setup in Software.

The Digital Output terminals are found on the rear base plate of the Ramsey Flex Integrator and are 5.08mm pitch connectors. Output 1 (J5) is connected to DO1 on the Ramsey Flex PCB and Output 2 (J6) is connected to DO2. Therefore, Digital Outputs on Ramsey Flex PCB DO1 and DO2 are connected, DO3 and DO4 are not connected to the Ramsey Flex Plus baseboard and cannot be used. The board markings are show in the image following to the left.

To the right is the wiring connection diagram for Ramsey Flex Plus Digital Output 1 and 2. These outputs can be connected a number of ways.

- **Loop Power provided by PLC** - Wire Link Installed. Leave the wire link installed between positions 21/22 and 25/26 if power for the loop is to be provided by the connected device, such as the PLC system. Ensure the AC or DC loop power matches the installed Opto22 G4 module.
- **Loop Power provided by Ramsey Flex Integrator** - Wire Link NOT Installed. The AC or DC voltage is connected to the terminal position where the wire link was 21/22 and 25/26. AC voltage can be taken from the incoming AC voltage that powers the DC power supply. DC 24VDC voltage can be taken from the DC power supply, but the User must check if sufficient current is available. Ensure the loop power matches the installed Opto22 G4 module and ensure the loop power is compatible with the downstream equipment.

Ensure all cables are terminated to the correct terminal positions.

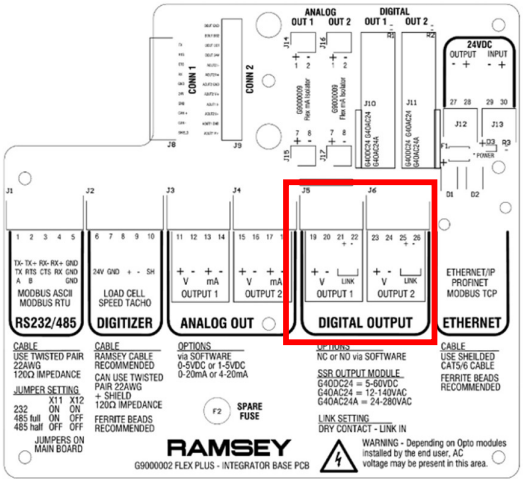


Figure 17 – Ramsey Flex Plus location of Digital Output

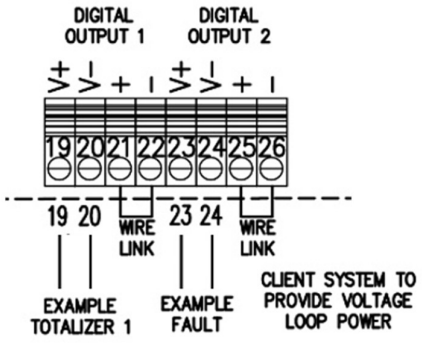


Figure 18 – Ramsey Flex Plus Digital Output wiring connection

Ramsey Flex Pro

The Ramsey Flex Pro has four (4x) Digital Outputs with additional external isolation provided by Opto22 G4 style modules. The Digital Outputs can be Normally Open or Normally Closed and must be setup in Software.

The Digital Output terminals are found on the rear base plate of the Ramsey Flex Integrator and are 5.08mm pitch connectors. Output 1 (J5) is connected to DO1 on the Ramsey Flex PCB and Output 2 (J6) is connected to DO2. Therefore, Digital Outputs on Ramsey Flex PCB DO1 and DO2 are connected, DO3 and DO4 are not connected to the

Ramsey Flex Plus baseboard and cannot be used. The board markings are show in the image following to the left.

To the right is the wiring connection diagram for Ramsey Flex Plus Digital Output 1 and 2. These outputs can be connected a number of ways.

- **Loop Power provided by PLC** - Wire Link Installed. Leave the wire link installed between positions 60/61, 64/65, 68/69 and 72/73 if power for the loop is to be provided by the connected device, such as the PLC system. Ensure the AC or DC loop power matches the installed Opto22 G4 module.
- **Loop Power provided by Ramsey Flex Integrator** - Wire Link NOT Installed. The AC or DC voltage is connected to the terminal position where the wire link was 60/61, 64/65, 68/69 and 72/73. AC voltage can be taken from the incoming AC voltage that powers the Ramsey Flex Integrator DC power supply. DC 24VDC voltage can be taken from the Meanwell DC power supply, but the User must check if sufficient current is available. Ensure the loop power matches the installed Opto22 G4 module and ensure the loop power is compatible with the connected PLC.

Ensure the cables are terminated to the correct terminal positions.

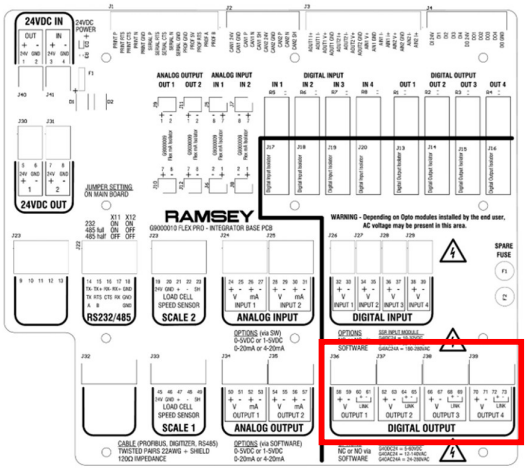


Figure 19 – Ramsey Flex Pro location of Digital Output

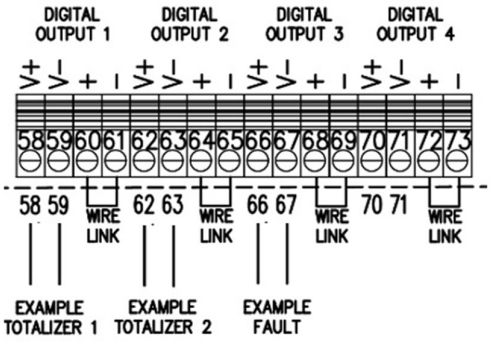


Figure 20 – Ramsey Flex Pro Digital Output wiring connection

Analog Input

Depending on the version of the Ramsey Flex Integrator, the connection terminals for Analog Inputs are different. Please check the model you have and follow the correct section. All Analog Inputs are Software selectable for function and have adjustable averaging times.

The full connection wiring diagrams can be found in Appendix 1.

NOTE. Client PLC is Sourcing for Analog Inputs. The client PLC system needs to provide power to the Analog Input Voltage and Current mA loops.

Ramsey Flex Standard

The Ramsey Flex Standard has two (2x) Analog Inputs that are found on the rear of the door along the top edge (Terminals X13 and X14). They can be hard to access, the connector is 3.5mm pitch and the installer must be careful to install enough cable so the door can be fully opened, but not so much that it inhibits the door being closed or interferes with other equipment inside the enclosure, such as pushing upwards onto the door mounted PCB.

It is highly recommended that external loop powered isolators are used in Industrial Environments with a high chance of over voltage, short circuit or lightning strikes. If the User wishes to have external replaceable Isolation but does not want to do the wiring, then please select the Ramsey Flex Plus or Ramsey Flex Pro options.

The Analog Inputs are SINKING type so the PLC must be SOURCING – in other words power for the Voltage or Current mA loops needs to come from the PLC system.

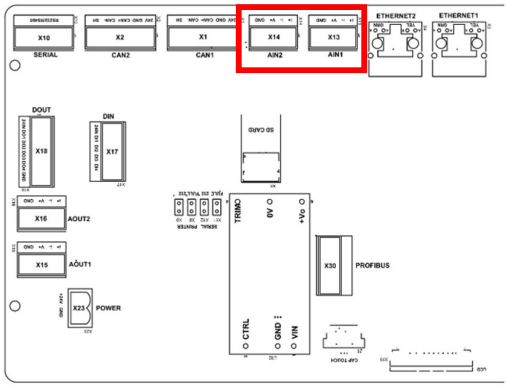


Figure 21 – Ramsey Flex Standard location of Analog Inputs

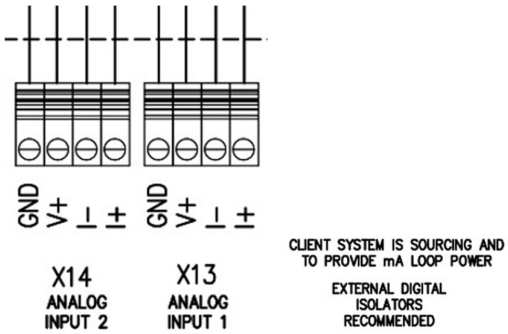


Figure 22 – Ramsey Flex Standard Analog Input wiring connection

Ramsey Flex Plus

The Ramsey Flex Plus does not have any Analog Inputs on the base board. This section of the manual is not relevant to the Ramsey Flex Plus.

Ramsey Flex Pro

The Ramsey Flex Pro has two (2x) Analog mA Inputs with additional external isolation provided by loop powered mA Isolators provided by SRO Technology (Part Number G9000009). There is no additional isolation for the Analog Voltage Inputs.

The Analog Input terminals are found on the rear base plate of the Ramsey Flex Integrator and are 5.08mm pitch connectors. Input 1 (J24) is connected to AIN1 on the Ramsey Flex PCB and Input 2 (J25) is connected to AIN2. The board markings are show in the image following to the left.

To the right is the wiring connection diagram for Ramsey Flex Plus Analog Input 1 and 2. These inputs have both Analog Current mA or Analog Voltage V Input options.

- **Analog Current mA (default)** – Additional isolation is provided by two loop powered current isolation devices plugged into J5/6 and J7/8. These isolators are keyed and can only be connected one way. Ensure the Current mA Input option is selected in Software.
- **Analog Voltage V** – There is no additional external isolation provided for Voltage inputs. Ensure the Voltage V Input option is selected in Software. Note 0-5V range

Ensure the cables are terminated to the correct terminal positions.

The Analog Inputs are SINKING type so the PLC must be SOURCING – in other words power for the Voltage or Current mA loops needs to come from the PLC system.

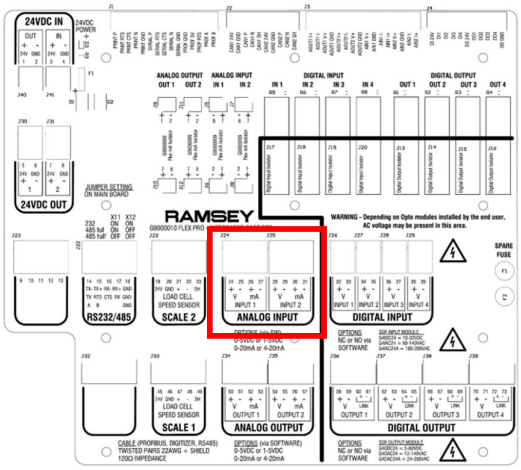


Figure 23 – Ramsey Flex Pro location of Analog Inputs

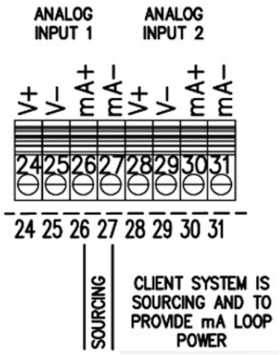


Figure 24 – Ramsey Flex Pro Analog Input wiring connection

Analog Output

Depending on the version of the Ramsey Flex Integrator, the connection terminals for Analog Outputs are different. Please check the model you have and follow the correct section. All Analog Outputs are Software selectable for function and have adjustable averaging times.

The full connection wiring diagrams can be found in Appendix 1.

NOTE. Client PLC is Sinking for Analog Outputs. The Ramsey Flex Integrator provides its own power for the mA loop.

Do not Source power from the connected PLC and especially do not Source power from the PLC and connect the power backwards, this could cause damage to the onboard DC-DC power isolator.

Ramsey Flex Standard

The Ramsey Flex Standard has two (2x) Analog Outputs that are found on the rear of the door along the left edge (Terminals X15 and X16). They can be hard to access, the connector is 3.5mm pitch and the installer must be careful to install enough cable so the door can be fully opened, but not so much that it inhibits the door being closed or interferes with other equipment inside the enclosure, such as pushing upwards onto the door mounted PCB.

It is highly recommended that external loop powered isolators are used in Industrial Environments with a high chance of over voltage, short circuit or lightning strikes. If the User wishes to have external replaceable Isolation but does not want to do the wiring, then please select the Ramsey Flex Plus or Ramsey Flex Pro options which has this option as standard.

Client PLC is Sinking for Analog Outputs. The Ramsey Flex Integrator provides its own power for the mA loop.

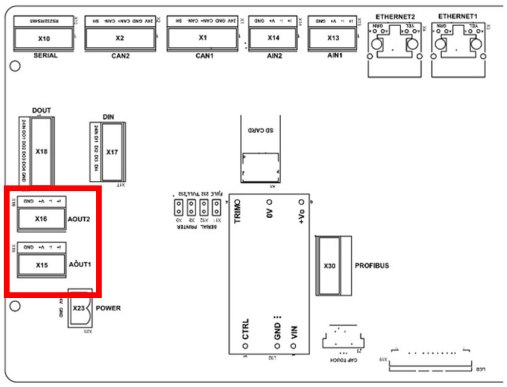


Figure 25 – Ramsey Flex Standard location of Analog outputs

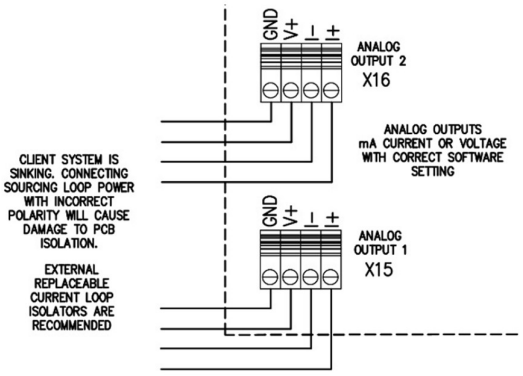


Figure 26 – Ramsey Flex Plus wiring connection

Ramsey Flex Plus

The Ramsey Flex Plus has two (2x) Analog mA Outputs with additional external isolation provided by loop powered mA Isolators provided by SRO Technology (Part Number G9000009). There is no additional isolation for the Analog Voltage Outputs.

The Analog Output terminals are found on the rear base plate of the Ramsey Flex Integrator and are 5.08mm pitch connectors. Output 1 (J3) is connected to AOUT1 on the Ramsey Flex PCB and Output 2 (J4) is connected to AOUT2. The board markings are show in the image following to the left.

To the right is the wiring connection diagram for Ramsey Flex Plus Analog Output 1 and 2. These outputs have both Analog Current mA or Analog Voltage V Output options.

- **Analog Current mA (default)** – Additional isolation is provided by two loop powered current isolation devices plugged into J14/15 and J16/17. These isolators are keyed and can only be connected one way. Ensure the Current mA Output option is selected in Software.
- **Analog Voltage V** – There is no additional external isolation provided for Voltage outputs. Ensure the Voltage V Output option is selected in Software. Note 0-5V range

Ensure the cables are terminated to the correct terminal positions.

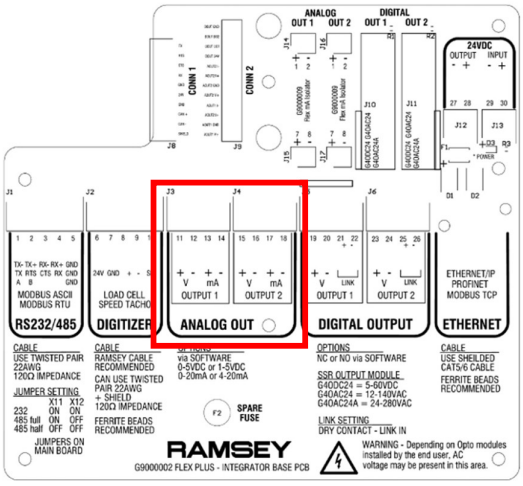


Figure 27 – Ramsey Flex Plus location of Analog Output

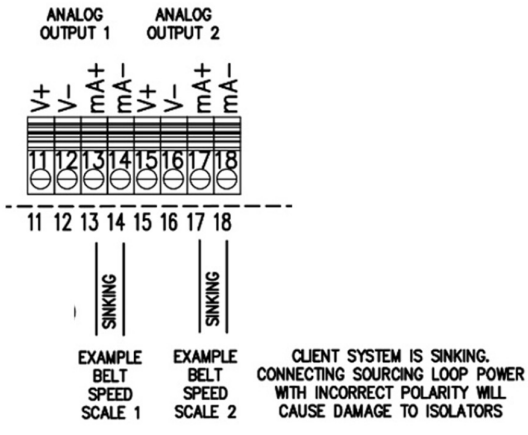


Figure 28 – Ramsey Flex Plus Analog Output wiring connection

Ramsey Flex Pro

The Ramsey Flex Pro has two (2x) Analog mA Outputs with additional external isolation provided by loop powered mA Isolators provided by SRO Technology (Part Number G9000009). There is no additional isolation for the Analog Voltage Outputs.

The Analog Output terminals are found on the rear base plate of the Ramsey Flex Integrator and are 5.08mm pitch connectors. Output 1 (J34) is connected to AOUT1 on the Ramsey Flex PCB and Output 2 (J35) is connected to AOUT2. The board markings are show in the image following to the left.

To the right is the wiring connection diagram for Ramsey Flex Plus Analog Output 1 and 2. These outputs have both Analog Current mA or Analog Voltage V Output options.

- **Analog Current mA (default)** – Additional isolation is provided by two loop powered current isolation devices plugged into J9/10 and J11/12 These isolators are keyed and can only be connected one way. Ensure the Current mA Output option is selected in Software.
- **Analog Voltage V** – There is no additional external isolation provided for Voltage outputs. Ensure the Voltage V Output option is selected in Software. Note 0-5V range

Ensure the cables are terminated to the correct terminal positions.

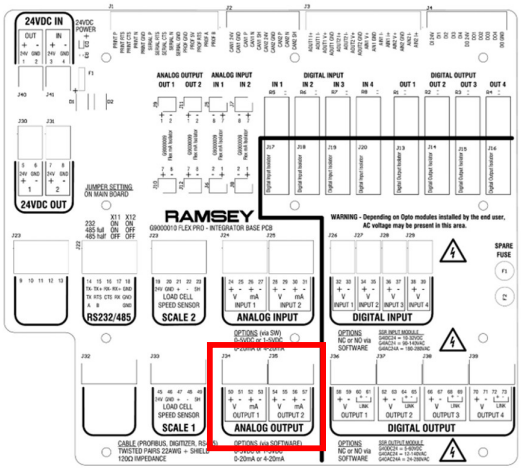


Figure 29 – Ramsey Flex Pro location of Analog Output

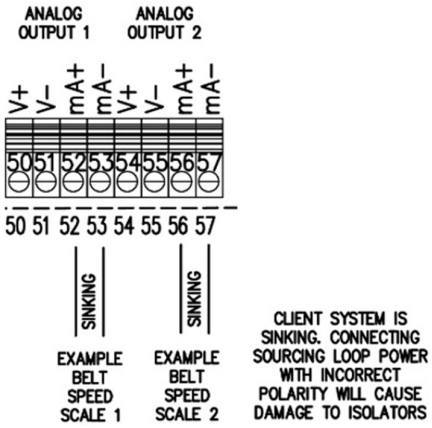


Figure 30 – Ramsey Flex Pro Analog Output wiring connection

Modbus TCP and EtherNet/IP Ethernet Connections

Depending on the version of the Ramsey Flex Integrator, the connection point for Modbus TCP or EtherNet/IP will be different. Please check the model you have and follow the correct section.

The full connection wiring diagrams can be found in Appendix 1.

Ramsey Flex Standard

The Ethernet port is found on the rear door mounted PCB. Modbus TCP or EtherNet/IP communications must only be connected to Ethernet Port 1 on the Ramsey Flex Integrator. This is the Ethernet Port beside the coin cell battery as shown in the following picture. Ensure the cable has enough slack so the door can be fully opened, and ensure the cable is sufficiently flexible so that it can bend when the door is closed to prevent damage to the PCB.

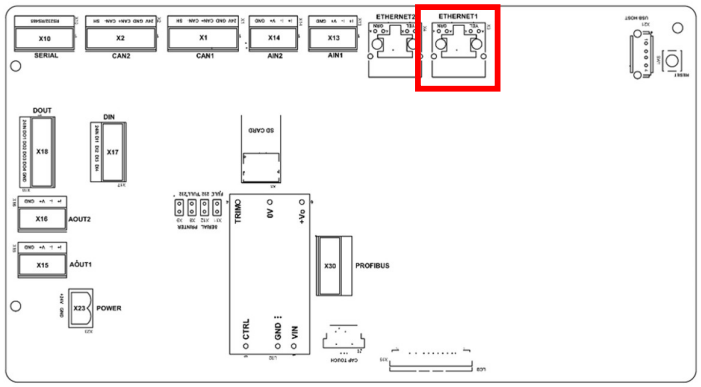


Figure 31 – Ramsey Flex Standard location of Industrial Ethernet Port 1

Ramsey Flex Plus

Wiring from the door is taken care of by the manufacturer. Modbus TCP or EtherNet/IP communications is connected to the Ethernet port found on the backing plate as shown in the following picture.

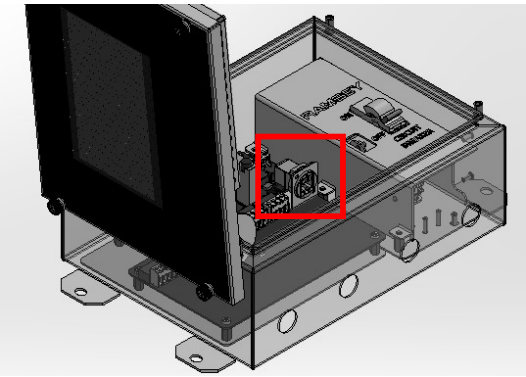


Figure 32 – Ramsey Flex Plus location of Industrial Ethernet Port 1

Ramsey Flex Pro

Wiring from the door is taken care of by the manufacturer. Modbus TCP or EtherNet/IP communications is connected to the Ethernet port found on underside of the internal housing.

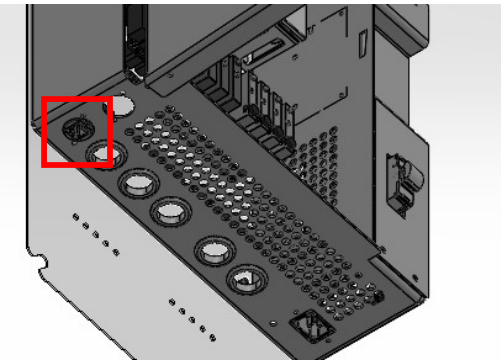


Figure 33 – Ramsey Flex Pro location of Industrial Ethernet Port 1

Modbus RTU Serial

Depending on the version of the Ramsey Flex Integrator, the connection point for Modbus RTU will be slightly different. Please check the model you have and follow the correct section.

The full connection wiring diagrams can be found in Appendix 1. For all cases, the PCB jumpers must be set to the correct position.

Ramsey Flex Serial Jumper Positions – All Versions

For Ramsey Flex Standard, Ramsey Flex Plus and Ramsey Flex Pro the Serial jumpers on the PCB need to be configured. These jumpers can be located beside the power supply and are labelled “X11” and “X12”. A picture of these jumpers is shown in the following picture.

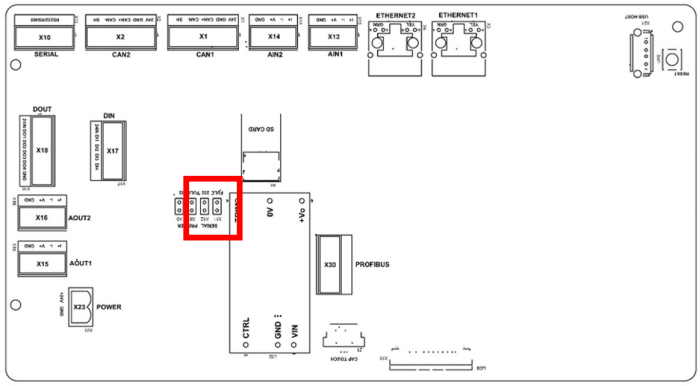


Figure 34 – Ramsey Flex Standard location for Serial Port Jumpers

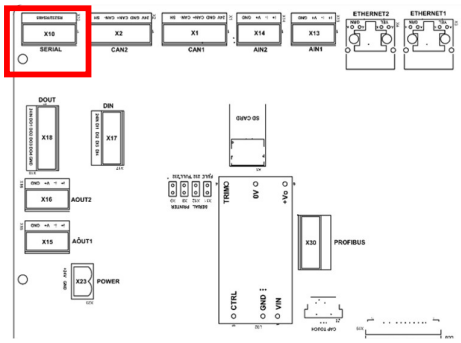
Based on the type of Serial connection required by the User, configure the X11 and X12 jumpers on the PCB according to this table. RS232 is set by default.

Comm Standard	Jumper X11	Jumper X12
RS232 (Default)	On	On
RS485 Full Duplex	On	Off
RS485 Half Duplex	Off	Off

Table 5 – Serial PCB X11 and X12 Jumper Settings

Ramsey Flex Standard

For the Ramsey Flex Standard the Serial Terminal is found on the rear door mounted PCB in the location shown in the following figure. The wiring connection diagram for 2-Wire RS485 is shown below.



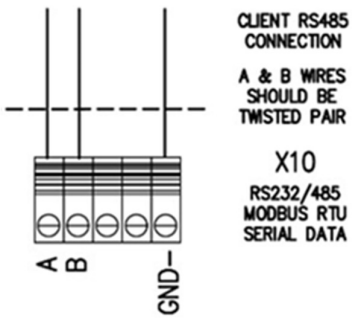


Figure 35 – Ramsey Flex Standard location of Serial RS485 Connector

Figure 36 – Ramsey Flex Standard RS485 Wiring Diagram

Ramsey Flex Plus

For the Ramsey Flex Plus the Serial Terminal is found on the black base board in the location J1 as shown in the following figure. The wiring connection diagram for 2-Wire RS485 is shown below.

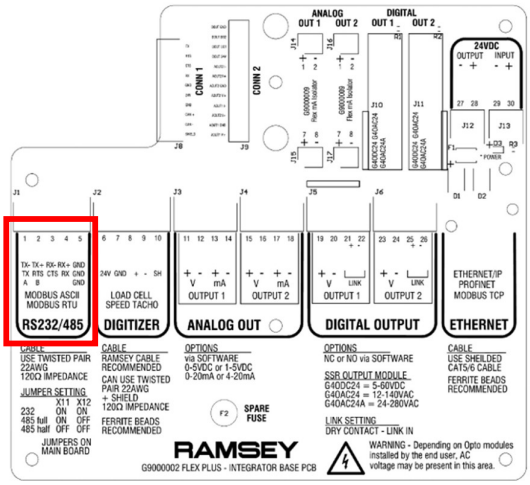


Figure 37 – Ramsey Flex Plus RS485 Wiring Diagram

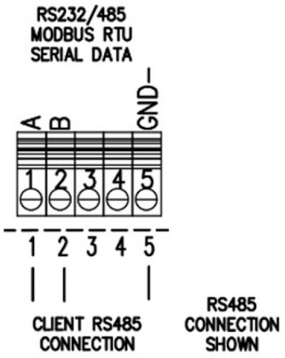


Figure 38 – Ramsey Flex Standard RS485 Wiring Diagram

Ramsey Flex Pro

For the Ramsey Flex Pro the Serial Terminal is found on the black base board in the location J22 as shown in the following figure. The wiring connection diagram for 2-Wire RS485 is shown below.

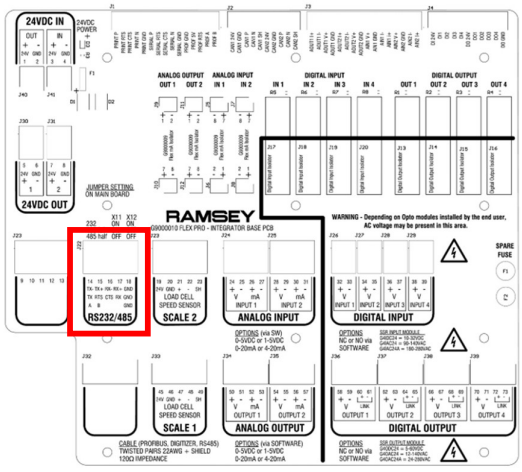


Figure 39 – Ramsey Flex Plus location of RS485

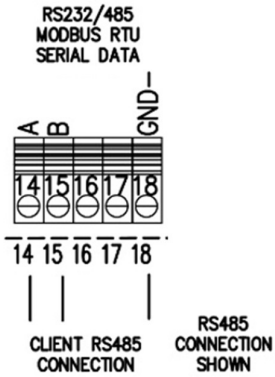


Figure 40 – Ramsey Flex Standard RS485 Wiring Diagram

ProfiBus Connections

The ProfiBus connector as originally designed by Thermo Fisher Scientific did not include an industry standard DB9 style connector for ProfiBus, instead a 3.5mm pitch connector was used. This can make connection difficult, especially if this is the last device in the

chain where termination through hole resistors will be required to be hand installed between connection points.

The full connection wiring diagrams can be found in Appendix 1.

Ramsey Flex Standard and Ramsey Flex Plus

It is not recommended that ProfiBus be used on either the Ramsey Flex Standard or Ramsey Flex Plus due to nonstandard 3.5mm terminal connection (X30) and termination resistor complexity (if required). However, this is the User decision. This information is provided for reference.

The 3.5mm terminal (X30) is as shown in the following picture. The terminal connections are as shown in the second figure, which also shows the required termination resistors.

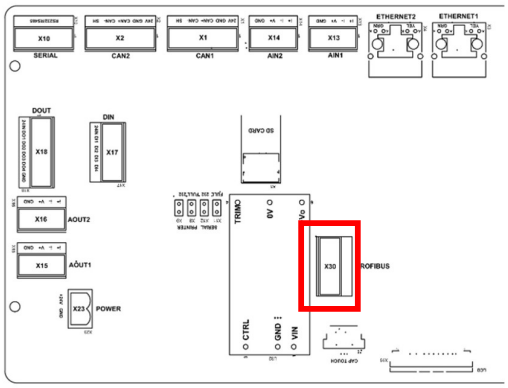


Figure 41 – Ramsey Flex Standard and Flex Plus Integrator ProfiBus 3.5mm Terminal

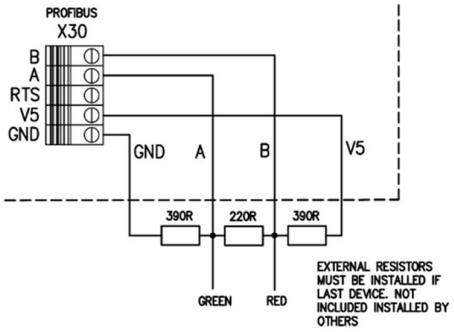


Figure 42 – Ramsey Flex Standard and Flex Plus Integrator Connection and Termination Resistors

Ramsey Flex Pro

SRO Technology strongly suggests the Ramsey Flex Pro be used on ProfiBus installations due to the upgraded DB9 connector. This allows the use of standard Siemens style DB9 connectors with built-in termination resistors as shown in the picture below.

This **cannot** be fitted to the Ramsey Flex Standard or Ramsey Flex Pro as there is insufficient space to install the Siemens style DB9 connector within the smaller housing.

Figure 43 – Ramsey Flex Pro Integrator DB9 ProfiBus Connector

Chapter 6
Installing Ramsey Flex Digitizer

Hardware Installation

This section explains how to complete the hardware connections for your Ramsey Single and Quad Digitizer.

Unpacking

The Ramsey Flex Digitizer has been properly packaged for shipment at the factory. Please inspect all packages for damage before opening the shipping package, because the carrier is likely responsible for any damage. Once removed from the package, the Ramsey Flex Digitizer can be safely stored with its cover secured and with the gland hole plugs installed. During storage, do not expose the Ramsey Flex Digitizer to moisture or to temperatures outside the range of –30° to +70°C (–22 to +158°F).

Installing the Ramsey Flex Integrator

Mount the Ramsey Flex Digitizer to a rigid, flat, vertical surface using the mounting holes provided on the back or side of the enclosure. Care should be taken to ensure the mounting surface is flat, so as not to twist or warp the enclosure when tightening the mounting bolts.

Ensure the Ramsey Flex Digitizer housing is correctly earthed.

Connecting the Incoming CAN bus Cable

For Single and Quad Digitizer devices, connect the incoming CAN bus cable to the Digitizer. Route incoming CAN bus wiring through the correct gland as detailed in the following section.

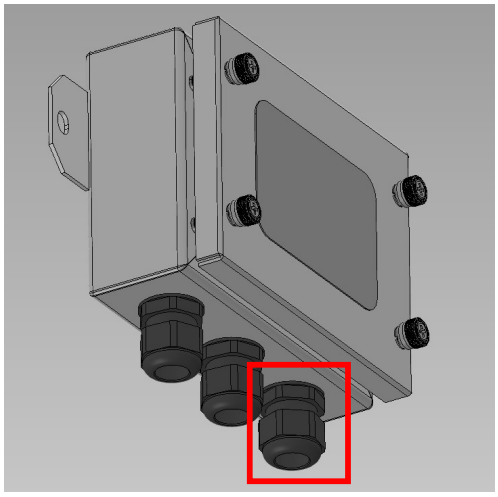
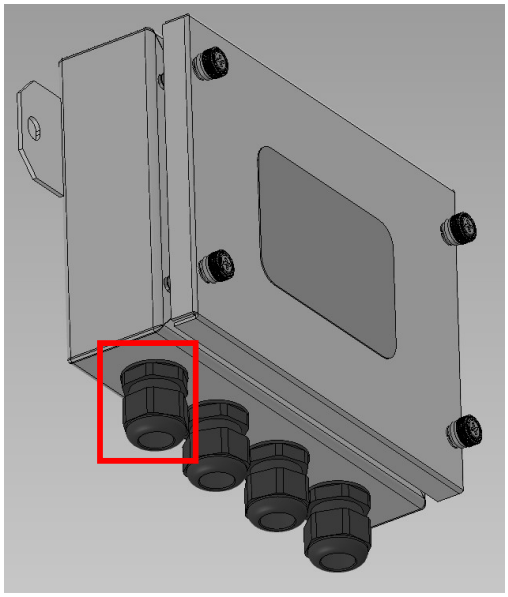


Figure 44 – Single Digitizer CAN bus Cable Entry

Single Digitizer

Location of CAN bus connection is as highlighted, on the bottom right-hand edge of the Ramsey Flex Single Digitizer.

The other two glands can be used for the Load Cell input (left) and Speed Sensor Input (middle).



Quad Digitizer

Location of CAN bus connection is as highlighted, on the bottom left-hand side of the Ramsey Flex Quad Digitizer.

The other two glands can be used for the Load Cell input (right and middle right) and Speed Sensor Input (middle left).

Figure 45 – Quad Digitizer CAN bus Cable Entry

Digitizer Connection via CAN bus to Ramsey Flex Integrator

Depending on the version of the Ramsey Flex Digitizer used, the connection point for CAN bus will be different. Please check the model you have and follow the correct section.

The full connection wiring diagrams can be found in Appendix 1.

CAUTION. DO NOT connect the shield on the CAN bus cables to both the Digitizer and the Ramsey Flex Integrator. Doing so could create a ground loop. SRO Technology recommends the shield only be terminated on the Ramsey Flex Integrator side and the shield on the cable should NOT be connected inside the digitizer.

For the Single and Quad Digitizer, the CAN bus cable is connected to Terminal X1. There are five connections on each terminal

- **24VDC+ / GND** - Provides power to the Digitizer for the Load Cells and speed sensor.
- **CAN+ / CAN-** – The digital communications between the Ramsey Flex Integrator and the Ramsey Flex Digitizer.
- **SH** – Cable shield. Do not connect the shield to both the Ramsey Flex Integrator and the Ramsey Flex Digitizer shield termination. SRO Technology strongly suggests the CAN bus cable shield is cut, insulated and NOT connected within the Digitizer.

Please review the following diagrams for the Single and Quad Digitizers. The orientation of the diagram matches the orientation of the PCB within the Digitizer housings.

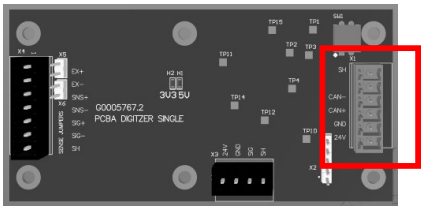


Figure 46 – Ramsey Flex Single Digitizer PCB CAN bus Connection

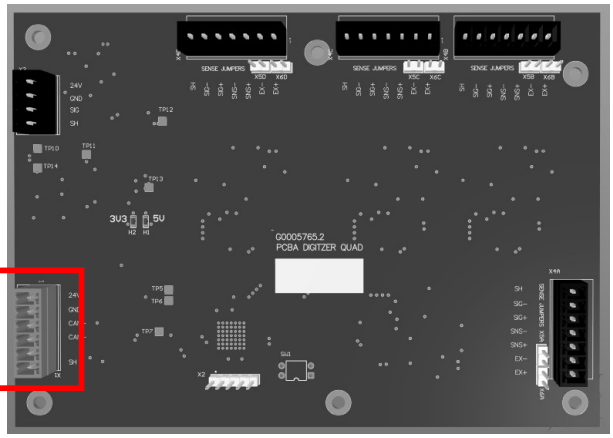


Figure 47 – Ramsey Flex Quad Digitizer PCB CAN bus Connection

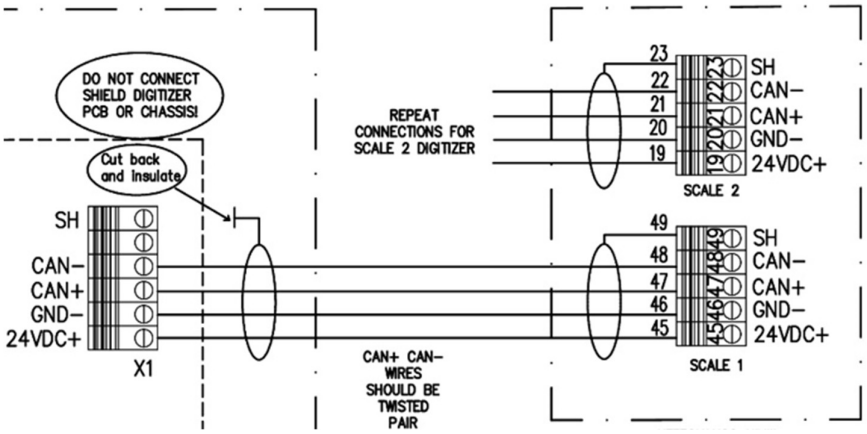


Figure 48 – Ramsey Flex Single Digitizer CAN bus Connection

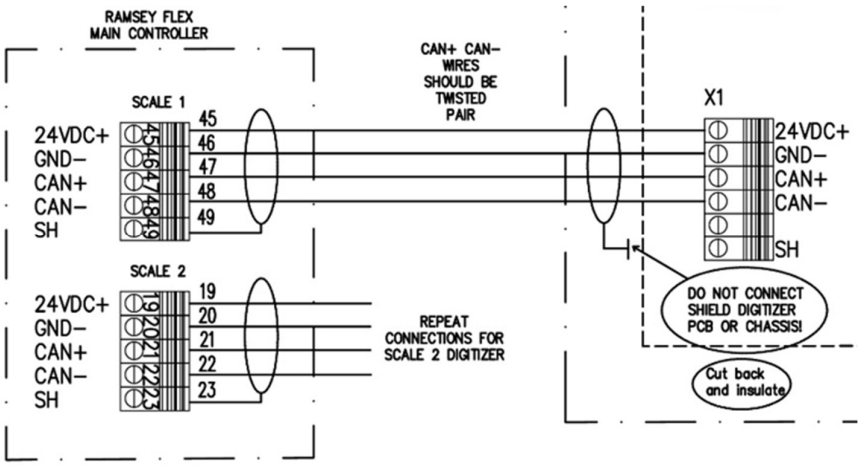


Figure 49 – Quad Digitizer CAN bus wiring connection

Load Cell Input

The full connection wiring diagrams can be found in Appendix 1. For the Single Digitizer the Load Cell is connected to terminal X4 and for Quad Digitizer the Load Cells are connected to terminals X4A/X4B/X4C/X4D. There are seven connections on each terminal

- **EX+ / EX-** - The excitation voltage from the Digitizer to the Load Cells. The Single and Quad Digitizers provide 5VDC excitation voltage.
- **SNS+ / SNS-** – The sense connections provide voltage feedback to compensate for distance and temperature related voltage drop errors.
- **SIG+ / SIG-** – The signal from the Load Cells. This will be a small mV/V signal proportional to the applied force applied from the Weight Frame onto the Load Cell.
- **SH** – Cable shield.

Please review the following diagrams for the Single and Quad Digitizers. The orientation of the diagram matches the orientation of the PCB within the Digitizer housings.

NOTE – For the Quad Digitizer, the numbering of the Load Cell starts at Load Cell 1 in the lower right-hand corner and goes anticlockwise up to Load Cell 4. This is shown in the following diagram.

Figure 50 – Ramsey Flex Single Digitizer PCB Load Cell Connection

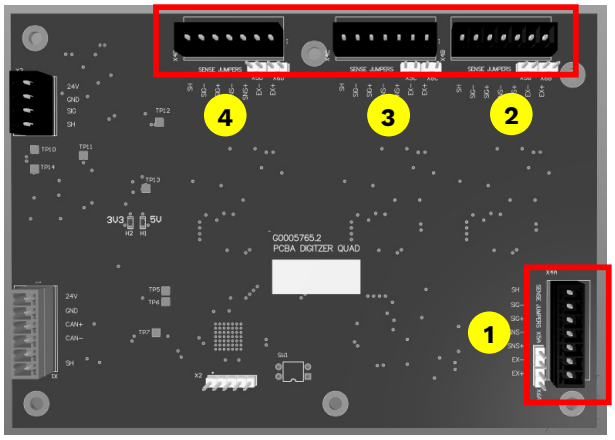


Figure 51 – Ramsey Flex Quad Digitizer PCB Load Cell Connection

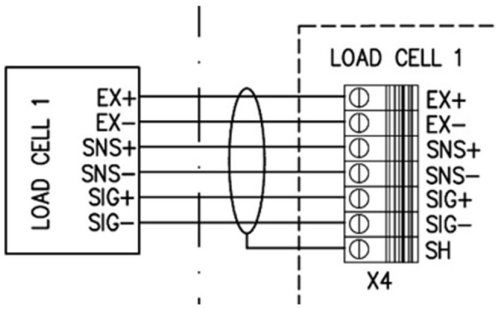


Figure 52 – Ramsey Flex Single Digitizer Load Cell Connection

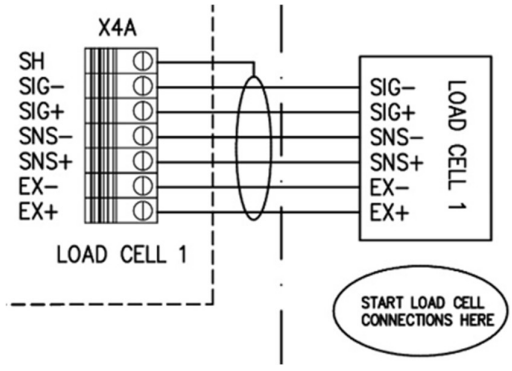


Figure 53 – Ramsey Flex Quad Digitizer Load Cell Connection

Speed Input

The full connection wiring diagrams can be found in Appendix 1. For both the Single and Quad Digitizers the Speed Sensor is connected to Terminal X3. There are four connections on the terminal.

- **24VDC** - If the speed sensor requires 24VDC to operate then this can be drawn from the Digitizer Speed connector. No other voltages are supported. For a 60-12C 2 wire sensor this 24VDC terminal is not connected.
- **GND** – 0V, reference voltage for the power and signal.
- **SIG** – The signal from the speed sensor.
- **SH** – Connect the shield from the cable to this position.

Please review the following diagrams for the Single and Quad Digitizers. The orientation of the diagram matches the orientation of the PCB within the Digitizer housings.

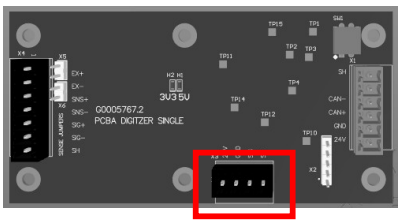


Figure 54 – Ramsey Flex Single Digitizer PCB Speed Sensor Connection

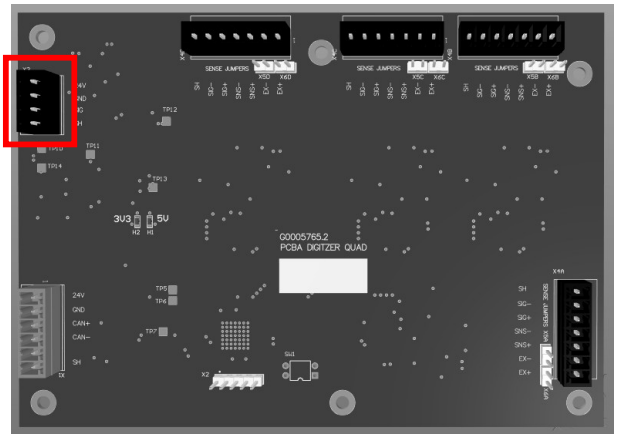


Figure 55 – Ramsey Flex Quad Digitizer PCB Speed Sensor Connection

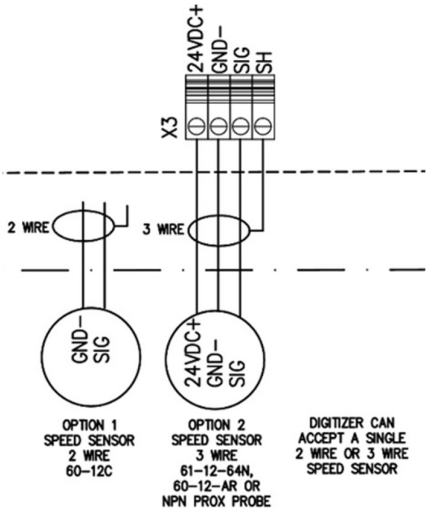


Figure 56 – Single Digitizer Speed wiring connection

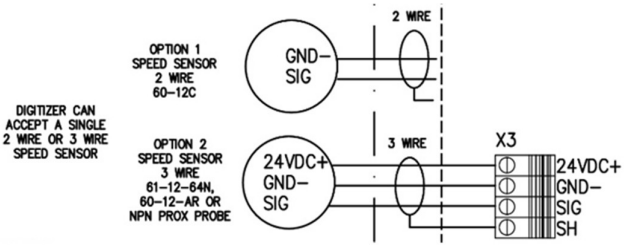


Figure 57 – Quad Digitizer Speed wiring connection

Chapter 7
Wizard Setup

Overview

The first time the Ramsey Flex Integrator is powered, or after a Factory Reset, the User will be presented with a short Wizard setup menu that must be completed.

Boot Screen

When the Ramsey Flex Integrator is booting up the following screen will be displayed.

Figure 58 – Bootup Screen

NOTE – It is normal behaviour for the progress bar to pause towards the end and for this screen to take around 1 minute to progress past.

Select Language

The default language shown in the Ramsey Flex Integrator display is English. You can, however, choose other languages.

Press the up or down arrow to scroll through the language options. The “Select Language” page looks as follows.

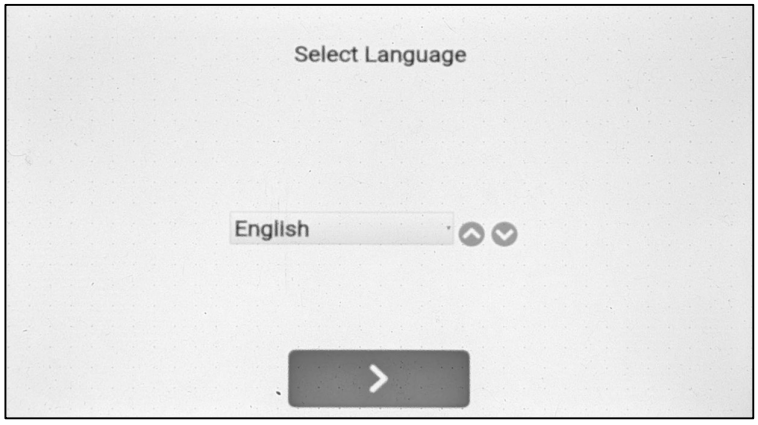


Figure 59 – Select Language

Language options available in the drop-down menu include.

- English
- Italiano
- Español
- Français
- Deutsche
- Portugues do Brasil
- 简体中文
- 한국어
- Русский
- Türk
- عربی
- Український

If you cannot see the language option in the drop-down menu, you can also press the Up or Down arrow to scroll through the options.

Press the next button "**>**" to progress to the next page.

Setting the Date and Time

After setting the Language the "Set Date/Time" page will appear as shown in the following figure.

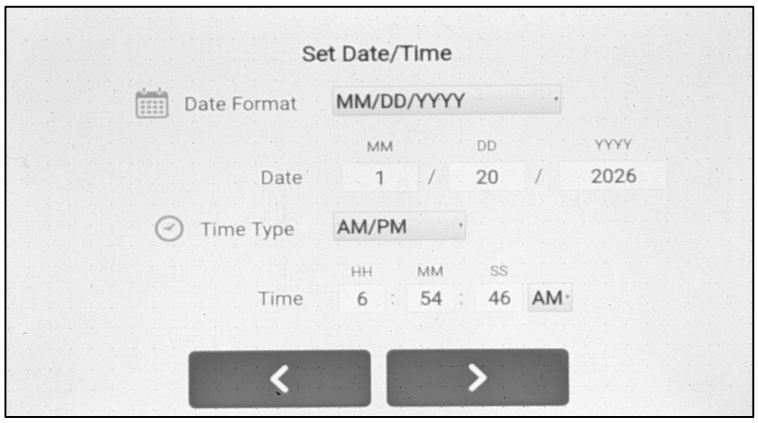


Figure 60 – Set Initial Date and Time

The date must be entered in MM/DD/YYYY format, but it can be displayed in any of the following three options on the Ramsey Flex Integrator interface. Select an option from the drop-down menu.

- MM/DD/YYYY
- DD/MM/YYYY
- YYYY/MM/DD

The time must be entered in 12-hour (AM/PM) format, but it can be displayed in any of the following three options on the Ramsey Flex Integrator interface. Select an option from the drop-down menu.

- AM/PM
- 24 Hour

Press the next button "**>**" to progress to the next page, or "**<**" to move back to the previous page.

Set Floating Point Format

After setting the Date and Time the "Set Floating Point Format" page will appear as shown in the following figure.

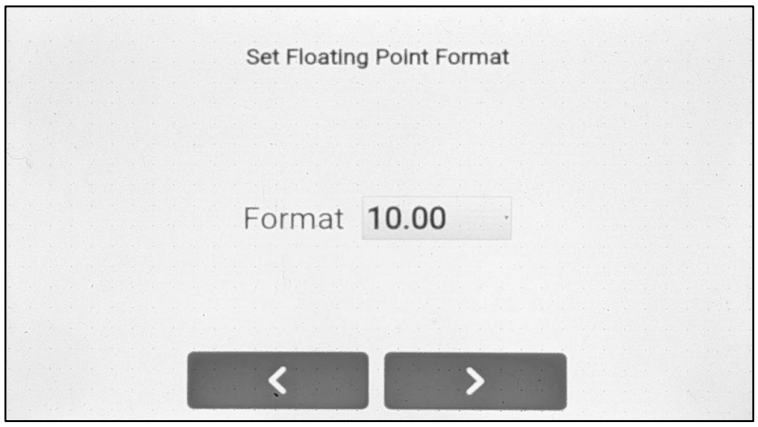


Figure 61 – Floating Point Format

The default selection is a decimal point. This setting has no impact on calculation accuracy; it is just for display purposes.

This setting cannot be altered once the wizard is completed.

- Decimal Point (00.00)
- Comma Point (00,00)

Integrator Settings

After setting the Floating-Point Format, the “Integrator Settings” page will appear as shown in the following figure.

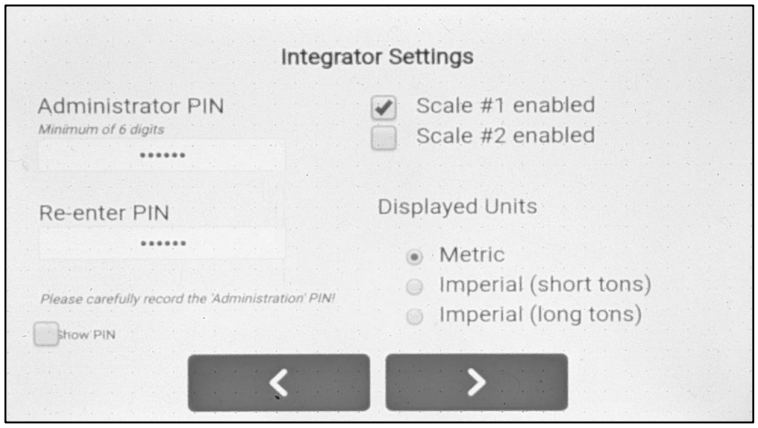


Figure 62 – Integrator Settings

Administrator Password

Enter the password, then re-enter the same password to confirm. Tick the “Show Pin” checkbox in lower left-hand corner if you need to review.

NOTE – If the Administrator Password is lost then a reset code will need to be obtained from SRO Technology. Make sure to write down and record the password in a safe location. (Factory Default Password for Administrator is 000000 or 726739)

Scale Enabled

Select if the system will be a single or a dual scale system. This setting can be altered later if required.

Displayed Units

This menu allows you to choose what units of measurement the Ramsey Flex Integrator uses when displaying its results. The Ramsey Flex Integrator can display information using the following units of measurement.

The default selection is Metric units. This setting cannot be altered once the wizard is completed.

Metric Units

- Flow Rate (t/h, kg/min, t/min, kg/h, %).
- Weight per Unit Length (kg/m, t/m).
- Belt Speed (m/s).
- Length Units (m).
- Totalizer (kg, t, kt, Mt).
- Load Cell Units (kg).

Imperial Short Tons

- Flow Rate (Tph, T/min, Lbs/min, Lbs/h, %).
- Weight per Unit Length (Lbs/ft, T/ft).
- Belt Speed (ft/s).
- Length Units (ft).
- Totalizer (Lbs, T, kT, MT).
- Load Cell Units (Lbs).

Imperial Long Tons

- Flow Rate (LTph, LT/min, Lbs/min, Lbs/h, %).
- Weight per Unit Length (Lbs/ft, LT/ft).
- Belt Speed (ft/s).
- Length Units (ft).
- Totalizer (Lbs, LT, kLT, MLT).
- Load Cell Units (Lbs)

Chapter 8
Scale Settings Page

Overview of Scale Settings Page

This chapter describes the Ramsey Flex Integrator Scale Setup Page structure. This will allow the User to navigate the Ramsey Flex Integrator to find the required setup information.

Scale 1 or Scale 2 Tab

The screen below is the page the User needs to navigate to in order to change the Belt Scale settings. It can be accessed by pressing the “Gear” icon from the left-hand navigation menu, then pressing either the “Scale 1” or “Scale 2” tab.

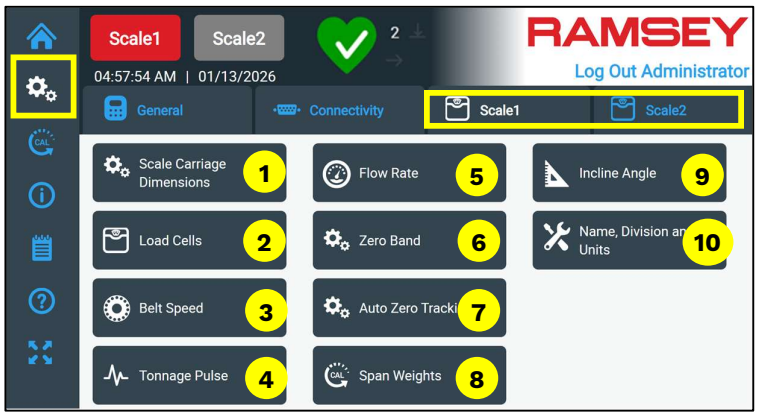


Figure 63 – Belt and Carriage Settings for a Pivoted Scale

The Belt Scale settings have the following options.

1. **Scale Carriage Dimensions** – Setup the Scale as Floating or Pivoted, enter the number of Idlers and critical dimensional information.
2. **Load Cell settings** – Setup the quantity of Load Cells, Capacity, Sensitivity and Resistance.
3. **Belt Speed settings** – Setup the Speed Input as Measured or Emulated, manually override the Calibrated Pulses or Calibrated Belt Speed, set the maximum 100% Belt Speed for Analog outputs.
4. **Tonnage Pulse settings** – Set the Tonnes per Pulse and the Pulse Width seen by the PLC.
5. **Flow Rate settings** – Set the Maximum Flow Rate, and the Lower and Upper Flow Rates that will trigger an Alarm condition.
6. **Zero Band settings** – Enable and then set the Flow Rate threshold. Numbers below this threshold will be treated as a Zero Flow Rate.
7. **Auto Zero Tracking (AZT) settings** – Enable and then set the AZT settings to allow the belt scale system to automatically Zero itself during extended periods when the conveyor belt is running empty.
8. **Span Weight settings** – Set the values for Billet Weight and Roller Chain Weight. Manually adjust the Material Correction % Factor values.
9. **Incline Angle settings** - Set the Conveyor Incline Angle.
10. **Name, Division and Units settings** - Set the Scale name, divisions and display units for Weight per Unit Length, Total Weight and Flow Rate.

Scale Carriage Dimensions

This menu no longer requires you enter the Belt Scale Code for the particular Weight Frame Scale you are using in your facility (Version 1.5b software onwards). The default dimensional information for all Belt Scale codes can be found in Appendix 2.

Pressing the button “Scale Carriage Dimensions” (1) on the touchscreen will bring up the following page. The view will be different depending on if a Floating or Pivoted Scale is currently selected.

NOTE 1 – It is recommended to enter Belt Scale Code supplied to you to pre-load the data required (though all values should be manually verified as most scales are custom variants and belt scale code chosen is one with minimal changes required). This is the most critical step in the entire set-up process! Incorrect measurements will have an impact on the conversion of load cell mV to weight.

NOTE 2 – While sometimes factory supplied data for a scale is the default values. Some values may need to be adjusted to suit site setup requirements. Please consult qualified SRO Technology Service Personnel to make these changes.

NOTE 3 – All measurements here assume the scale is mounted on a flat conveyor. Incline angle is used to compensate as required

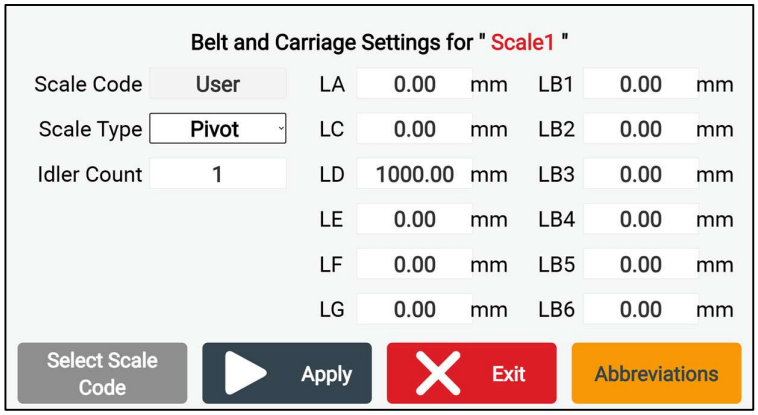


Figure 64 – Belt and Carriage Settings for a Pivoted Scale

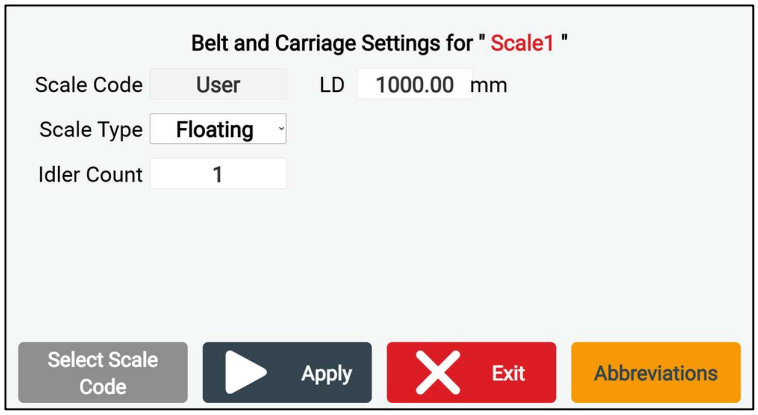


Figure 65 – Belt and Carriage Settings for a Floating Scale

NOTE – Note if you change any value from the default values for a belt scale code it will default to User

Scale Code

To select a predefined Belt Scale Code then press the “Select Scale Code” button in bottom left of the screen and the following box will appear. See Appendix 2 for the full list of predefined Scale Codes.

NOTE – Selecting a Belt Scale Code will also update the number of Load Cells, Number of Idlers, Idler Measurements and Load Cell Sensitivity values to default values for that Belt Scale Code.

Press “Apply Scale Code” to accept the changes. If the User presses “Exit” then no changes will be saved or applied.

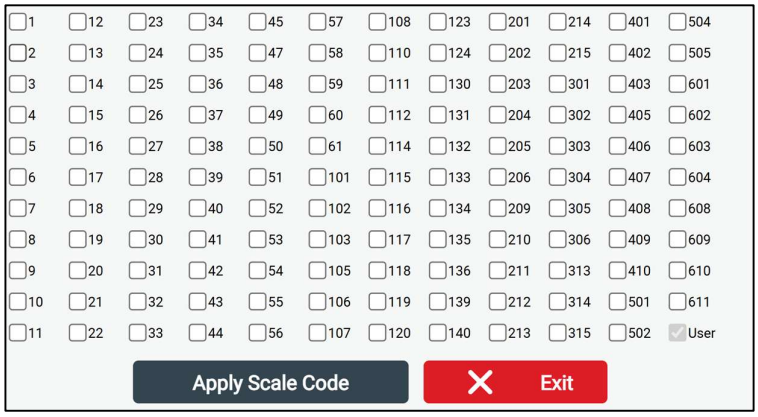


Figure 66 – Select Scale Code

Idler Count

This is the number of idler frames that is supported by the carriage, Loadcells and pivots of the scale.

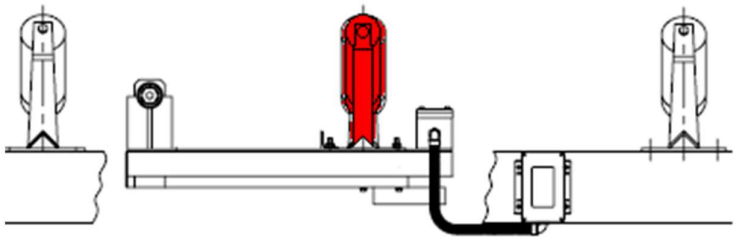


Figure 67 – Idler Count

LA = Pivot to Load Cell Length

The length (or distance) from the center of the pivot to the center of the load cell.

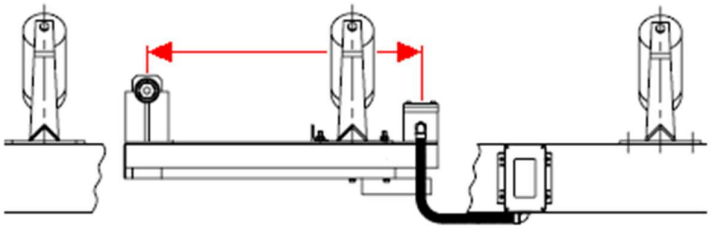


Figure 68 – LA Pivot to Load Cell Length

LB = Pivot to Idler Length

The length (or distance) from the center of the pivot to the center of the Idler, Measured at the base of the idler frame. LB1 is the distance to the 1st Idler, LB2 is the distance to the 2nd Idler up to LB6 is the distance to the 6th Idler.

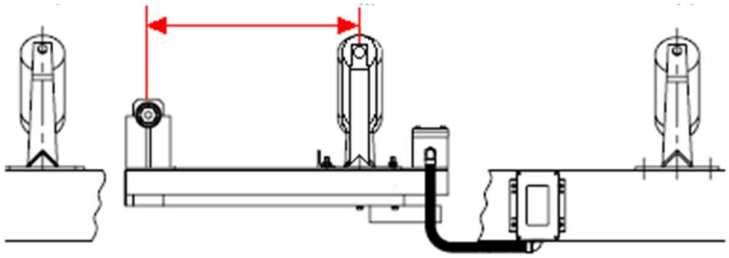


Figure 69 – LB Pivot to Idler Length

LC = Pivot to Test Weight Length

The length (or distance) from the center of the pivot to test weight length centerline when supported by the scale.

This Is this distance to center of the billet weight or to center of the bar welded to the billet weight. When weight is fully applied to the carriage – for example the SRO billet weights have the bar extend to the side of the billet weight that sits in the V Block on the carriage.

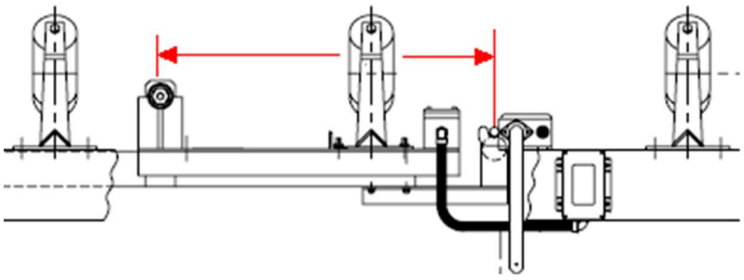


Figure 70 – LC Pivot to Test Weight Length

LD = Idler Spacing

The length (or distance) from the center of the weigh idler frames at the height of the rollers axles. They should all be evenly spaced. This includes the distance to the 1st Lead In and Lead Out Idlers.

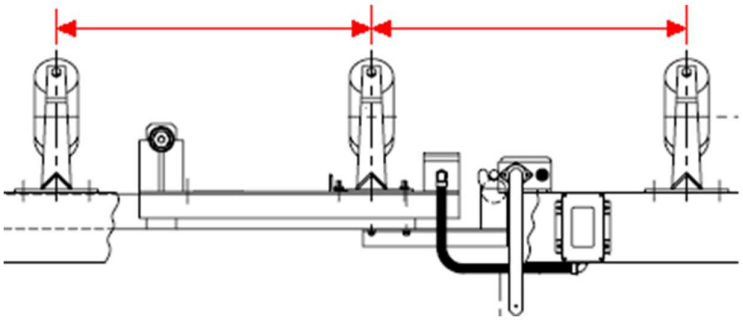


Figure 71 – LD Pivot to Test Weight Length

LE = Pivot to Test Weight Height

The height is from the center of the Pivot to the center of the Test Weight support bar when fully supported by the carriage. If the test weight is below the pivot, the value is negative. If above the pivot, then the value is positive.

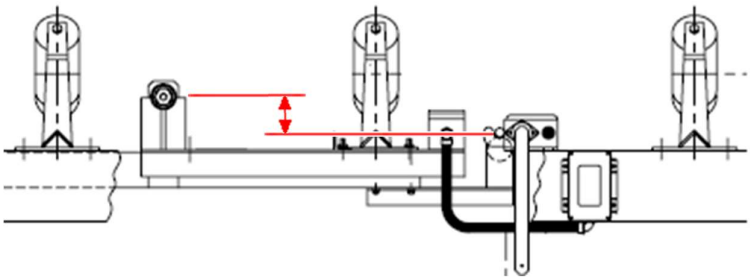


Figure 72 – LE Pivot to Test Weight Height

LF = Pivot to Carriage Height

The height from the center of the Pivot to the top of the conveyor Carriage.

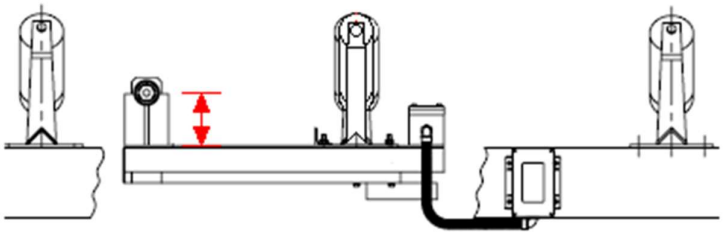


Figure 73 – LF Pivot to Carriage Height

LG = Roller to Carriage Height

The height from the top of the Centre Carry Roller to the top of the conveyor Carriage.

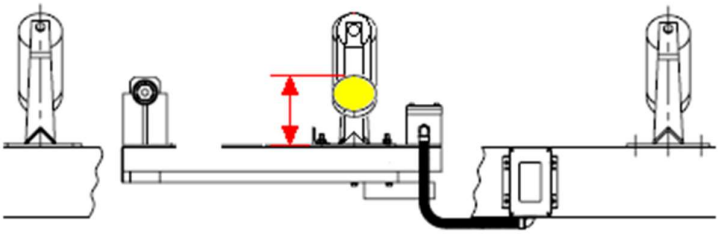


Figure 74 – LG Roller to Carriage Height

Load Cells

Pressing the button “Load Cells” (2) on the touchscreen will bring up the following page where settings for the Load Cells can be altered.

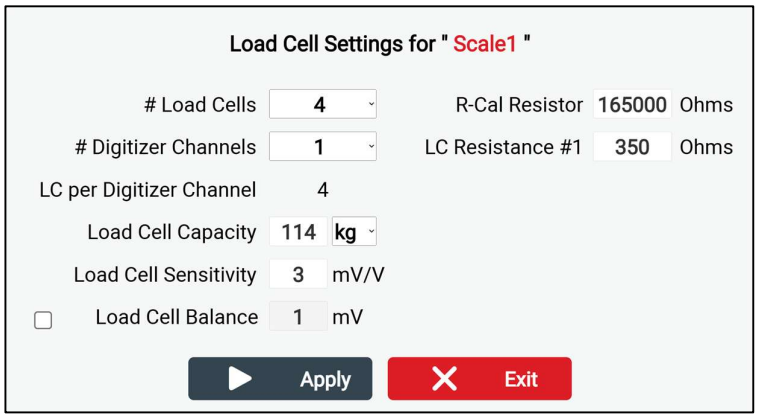


Figure 75 – Load Cell Settings

The Load Cell information can be found on the manufacturer datasheet, calibration certificate or sometimes it may be labelled on a sticker at the end of the Load Cell cable.

- **Number of Load Cells** – The number of Load Cells on the Belt Scale frame. The options available are 1, 2 or 4.
- **Number of Digitizer Channels** – The drop down options for this selection will alter based on the Number of Load Cells selected. Generally, it will show an option for 1 Digitizer Channel (multiple Load Cells are connected to a common Single Digitizer channel using a Summing Junction Box) or will have an option for Multiple Digitizer channels (each Load Cell is connected to an Individual channel on the Quad Digitizer). Pick whichever is applicable to the installation.
- **Load Cells per Digitizer Channel** – This value is automatically calculated and tells the User how many Load Cells are currently configered for each individual Digitizer Channel. Use this value to check the actual Hardware wiring to ensure the Ramsey Flex Integrator has been setup correctly.
- **Load Cell Capacity** – This value is the maximum load (force or weight) that a Load Cell is designed to accurately measure while still performing within its specified accuracy and linearity range. This information can be found in the Load Cell datasheet.
- **Load Cell Sensitivity** – This value describes how much electrical output signal the Load Cell produces per unit of excitation voltage when loaded to its full rated capacity. This information can be found in the Load Cell datasheet.
- **Load Cell Balance** – Tick the box to the left to enable Load Cell balance, then adjust the maximum tolerance between lowest and highest load cells. If Load Cell Balance exceeds this value an Alarm will be raised.
- **R-Cal Resistor** – The User has the option to measure the actual resistance of the R-Cal resistor on the Digitizer PCB’s and update the value in order to obtain a higher level of accuracy. The R-Cal resistors have a nominal value of 165,000 Ohms with a maximum tolerance range of 0.1%. The position of the R-Cal resistor on the Single Digitizer is R18 and on the Quad Digitizer it is R18a/R18b/R18c/R18d. The Digitizer will need to be removed from the enclosure to gain access to the R-Cal resistor.
- **Load Cell Resistance #1 #2 #3 #4** - User should enter data from the Load Cell datasheet.

Press “Apply” to accept the changes. If the User presses “Exit” then no changes will be saved or applied.

Belt Speed

The Belt Speed Input setup page tells the Ramsey Flex Integrator whether your conveyor system is equipped with a Measurement or Emulated Speed Sensor.

Pressing the button “Belt Speed” (3) on the touchscreen will bring up the following page where settings for the Belt Speed can be altered.

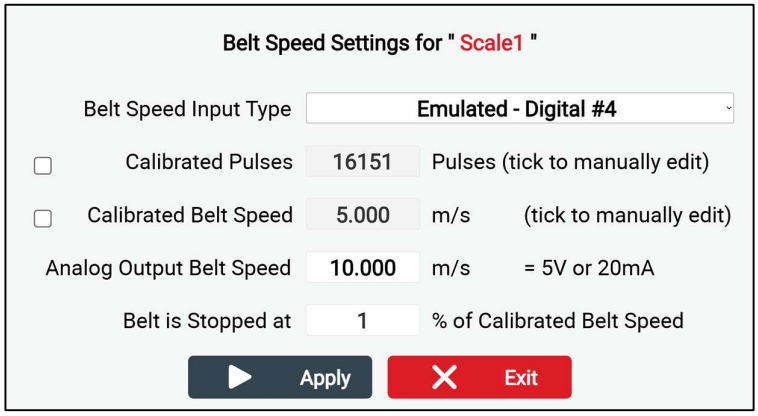


Figure 76 – Belt Speed Settings

- **Belt Speed Input Type** – The User can select from the following options
  - **Measured Encoder –** An external Speed Sensor has been connected to the Digitizer Speed Sensor Input terminals.
  - **Emulated Digital #1 #2 #3 #4 –** If an external Speed Sensor is not used then one option is to have an Emulated Speed Sensor that can be started or stopped by a Digital Input. This would ensure that speed, and therefore Totalization, only occurs when the Conveyor Belt is running.
  - **Emulated –** The other type of Emulated Speed Sensor will just apply a fixed Belt Speed continuously. This will mean when the physical conveyor stops the Emulated speed will continue. This can cause increases to the Totalization values over time. If the Emulated Speed Sensor is used it should be combined with Zero Band setting (see later section) and possibly the Conveyor Run Digital Input Signal to prevent totalization when conveyor is not running.
- **Calibrated Pulses** – This value is calculated during the Speed Calibration process. It is not recommended to manually edit the Calibrated value.

  However, it can be over ridden by ticking the checkbox to the left which will allow the User to modify the value. The Integrator must be in Adminstrator mode. This should only ever used as a temporary fix, or for diagnostic purposes
- **Calibrated Belt Speed** – This value is calculated during the Speed Calibration process.

  It is not recommended to manually edit the Belt Speed value.

  However, it can be overridden by ticking the checkbox to the left which will allow the User to modify the value in Administrator Mode.

  This can be used to enter the Belt Speed if an Emulated Speed Input is used and a Speed Calibration with a physical Encoder was never performed.
- **Analog Output Belt Speed** – This value relates what Belt Speed will equal the maximum Analog output (20mA or 5V). It should be set far enough above the Calibrated Belt Speed that speed flucutations or recalibrations will not require it to change. Consider the following case as an example.
  - Incorrect setup - Initial Calibrated Belt Speed = 5m/s, Analog Output Belt Speed = 5m/s. The output will be full scale 20mA at 5m/s. A recalibration

of the Speed is performed, Calibrated Belt Speed = 5.1 m/s. Now any speed between 5 and 5.1 m/s will output 20mA. The PLC does not know the calibrated speed has changed based on the Analog output.

- A more correct setup - Initial Calibrated Belt Speed = 5m/s, Analog Output Belt Speed = 5.5m/s. The output will be full scale 20mA at 5.5m/s, at 5m/s it is 18.18mA. A recalibration of the Speed is performed and it is changed, Calibrated Belt Speed = 5.1 m/s. The mA output will increase to 18.54mA to reflect the increased Belt Speed. The PLC can see the Belt Speed has increased.

- **Belt Stopped %** – Analogous to the Zero Band for Flow Rate. Any belt Speed below this % of Calibrated Belt Speed will be assumed as Zero m/s. This prevents small movement of the Belt when stopped increasing the Totalization values.

Press "Apply" to accept the changes. If the User presses "Exit" then no changes will be saved or applied.

Tonnage Pulse

Pressing the button "Tonnage Pulse" (4) on the touchscreen will bring up the following page where settings for the Tonnage Pulse can be altered.

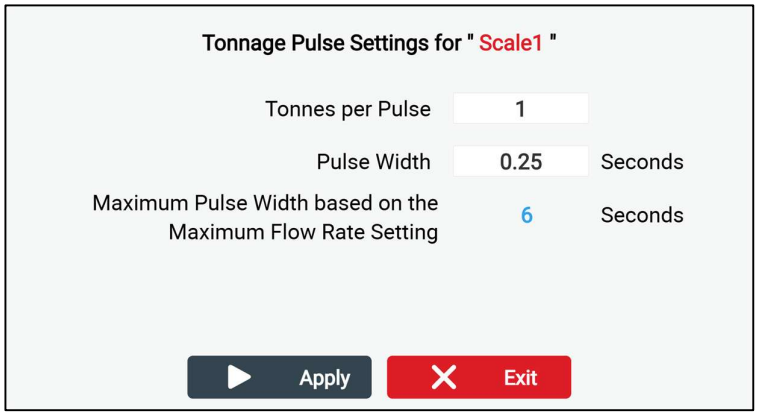


Figure 77 – Tonnage Pulse Settings – Correctly Setup

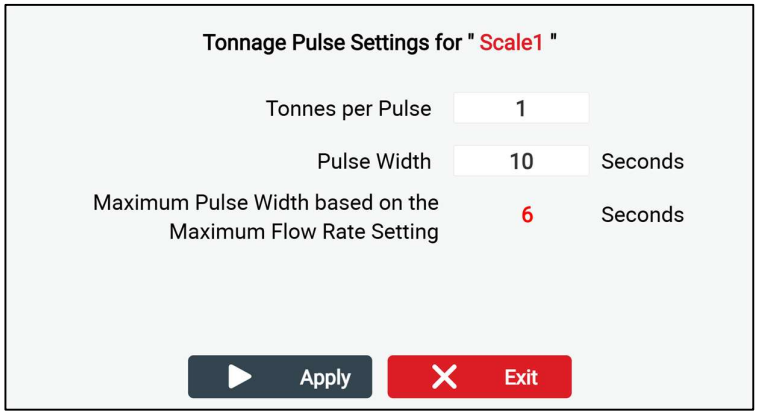


Figure 78 – Tonnage Pulse Settings – Incorrectly Setup

- **Tonner per Pulse** – Enter how many Tonnes should pass the weigh area before the output is triggered. This is default 1 second.
- **Pulse Width** – How long to keep the signal high after the Pulse command has been issued. This is adjustable to allow for connection to older PLC systems.
- **Maximum Pulse Width** – The Ramsey Flex Integrator automatically calculates the max allowable Pulse Width based on the User defined settings (Belt Speed, Flow Rate etc). If the value is BLUE then everything is setup correctly. If the value is RED then the combination of "Tonnes per Pulse" and "Pulse Width" is not compatible with the current Integrator settings. Modify the "Tonnes per Pulse" and "Pulse Width" values.

Press "Apply" to accept the changes. If the User presses "Exit" then no changes will be saved or applied.

Flow Rate

This menu allows you to enter the maximum Flow Rate (or Scale Capacity) of the Scale being used.

NOTE - The maximum scale capacity is expressed as a Flow Rate - for example, tons per hour (Tph), tonnes per hour (t/h), and so on. In other words, do not enter the maximum weight the scale can be loaded with, because the Ramsey Flex Integrator is looking for a Flow Rate.

Pressing the button "Flow Rate" (5) on the touchscreen will bring up the following page where settings for the Flow Rate can be altered.

- **Maximum Flow Rate** – This value relates what Flow Rate will equal the maximum Analog output (20mA or 5V). It should be set far enough above the maximum anticipated Average Flow Rate so that speed or weight fluctuations will not casue the Analog Output to max out.
    - Incorrect setup – Anticpated Average Flow Rate = 300 t/h, Maximum Flow Rate = 300 t/h. The output will be full scale 20mA at 300 t/h. Say the Actual Flow Rate fluctuates 5% around the average, so Flow Rate is between 285 t/h to 315 t/h. Now any Flow Rate between 300 t/h to 315 t/h will output 20mA. The scale will under report the tonnage. The PLC will not be able to capture the Flow Rate information accurately over the Analog Outputs.
    - A more correct setup - Anticpated Average Flow Rate = 300 t/h, Maximum Flow Rate = 330 t/h. The output will be full scale 20mA at 330 t/h. At 285 t/h output is 17.27 mA, at 315 t/h the output is 19.09 mA. , The PLC will not loose any information when measuring the Flow Rate over the Analog Outputs.
- **Lower Alarm Flow Rate** – Any Flow Rate under this amount will trigger the Digital Output alarm (if it has been setup to do so).
- **Upper Alarm Flow Rate** - Any Flow Rate over this amount will trigger the Digital Output alarm (if it has been setup to do so).

Press "Apply" to accept the changes. If the User presses "Exit" then no changes will be saved or applied.

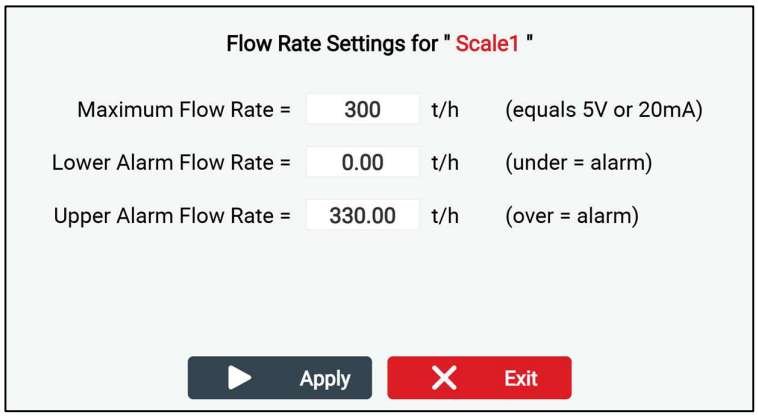


Figure 79 – Flow Rate Settings

Zero Dead Band

Pressing the button “Zero Band” (6) on the touchscreen will bring up the following page where settings for the Zero Dead Band can be altered.

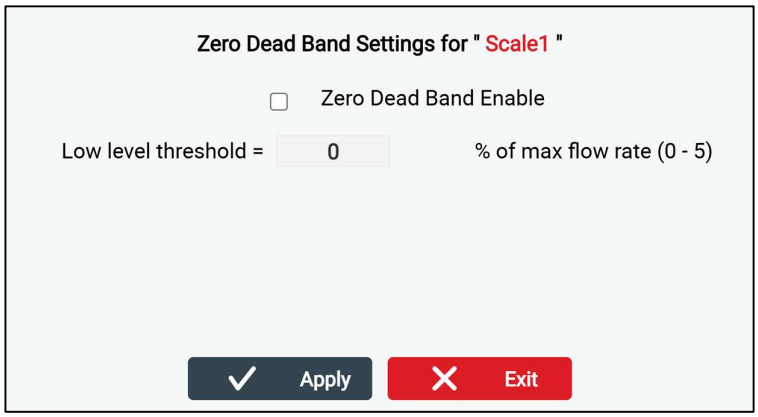


Figure 80 – Zero Dead Band Settings

- **Zero Dead Band Enable** – Check this button to enable the Zero Band function.
- **Low Level Threshold** – Zero Dead Band will reduce the Flow Rate to 0 when the measured Flow Rate falls under the Low-Level Threshold % value set by the User. The allowable Zero Dead Band must lie between 0% to 5% where the % relates to the maximum flow rate.

Press “Apply” to accept the changes. If the User presses “Exit” then no changes will be saved or applied.

Auto Zero Tracking (AZT)

Auto Zero Tracking (AZT) enables the belt scale system to automatically zero itself during extended periods when the conveyor belt is running empty. AZT does not actually change the Zero Number but applies a factor to the Zero Number.

AZT is menu selectable option because some installations may not work well with this option, due to low flow rates, etc.... An “AZ” displays on the front display indicate the selection of this option.

Under a preset minimum flow rate when enabled, the instrument makes subsequent automatic zero calibrations with the following sequence.

- Waits for one-half time of the test duration (a solid “AZ” displays).
- Execution of a zero test (the “AZ” flashes).
- Performs automatic zero for one test duration.
- Continuously repeats above zero calibration as long as the feed rate remains below AZT preset value. The Zero Tracking function is limited to a maximum value of Deviation that is set as a percent of full scale in this setup menu. If the new zero calculated by auto zero-tracking function exceeds that value, an alarm is generated and the new zero is not installed.

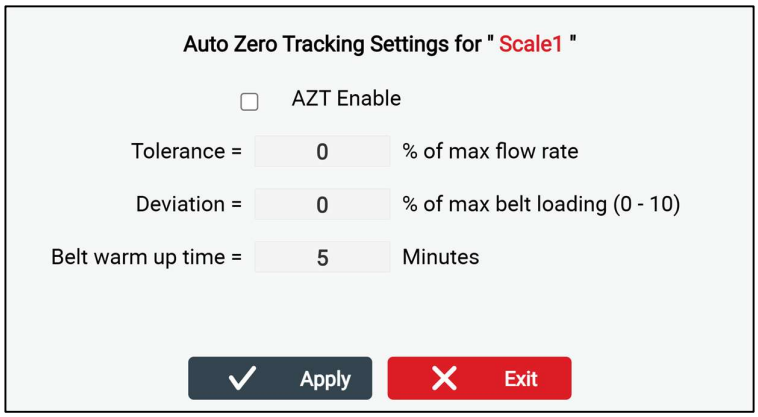


Figure 81 – Auto Zero Tracking (AZT) Settings

Pressing the button “Auto Zero Tracking” (7) on the touchscreen will bring up the following page where settings for the Auto Zero Tracking can be altered.

- **AZT Enable** – Check this button to enable Auto Zero Tracking (AZT).
- **Tolerance** – Tolerance controls when AZT can attempt a zero (based on how empty the belt is). The Auto Zero Tracking sequence starts automatically when the Flow Rate is below this % of the Maximum Flow Rate. If above this % the Auto Zero Tracking will not be applied.
- **Deviation** – Deviation controls how much drift AZT is willing to allow from the established zero (expressed as % of the scale's maximum capacity since the last manual zero). If less than the User defined % value the Ramsey Flex Integrator applies a Zero Correction. If greater then User defined % the Ramsey Flex Integrator will raise an Alarm. The allowable Deviation must lie between 0% to 10%.
- **Belt Warm Up Time** – Period of time to not apply the AZT algorithm after the Belt starts moving.

Press “Apply” to accept the changes. If the User presses “Exit” then no changes will be saved or applied.

Span Weights

Pressing the button “Span Weights” (8) on the touchscreen will bring up the following page where settings for the Span Weights can be altered.

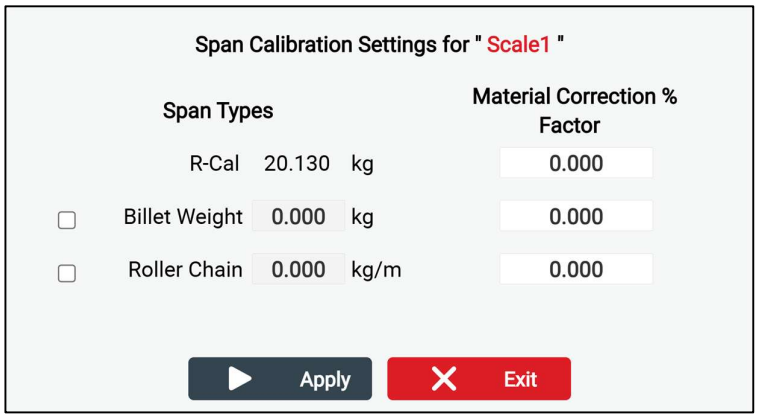


Figure 82 – Span Weights Settings

- **R-Cal** – This option is enablded by default. The R-Cal value is automatically calculated based on Load Cell Capcity, Sensitivity and Resistance values entered on the previous “Load Cell” setup page.
- **Billet Weight** – To enable the Billet Weight calibration method, press the checkbox which will enable the User to modify the Data Field. Enter the weight stamped on the Billet Weight.
- **Roller Chain** – To enable the Roller Chain calibration method, press the checkbox which will enable the User to modify the Data Field. Enter the weight per length stamped on the Roller Chain.

Press “Apply” to accept the changes. If the User presses “Exit” then no changes will be saved or applied.

Incline Angle

A Belt Scale measures the weight of material by sensing the force along the axis of the Load Cell. If the Belt Scale is in a purely horizontal position, then the force of the material due to its weight and gravity is purely in the vertical direction which aligns with the axis of the Load Cells. However, on an Incline the force of the material no longer aligns with the axis of the Load Cell and without Incline Angle compensation, the scale will under-read the true mass Flow Rate.

Pressing the button “Incline Angle” (9) on the touchscreen will bring up the following page where settings for the Incline Angle can be altered.

- **Conveyor Incline Angle** - If the conveyor slopes up, the angle is positive, meaning the conveyor has a positive incline. If the conveyor slopes down, the angle is negative, meaning the conveyor has a negative incline. The appropriate sign + or – for the incline must be entered into the Data Field. The default value is zero degrees, meaning your conveyor runs in the horizontal position.

Press “Apply” to accept the changes. If the User presses “Exit” then no changes will be saved or applied.

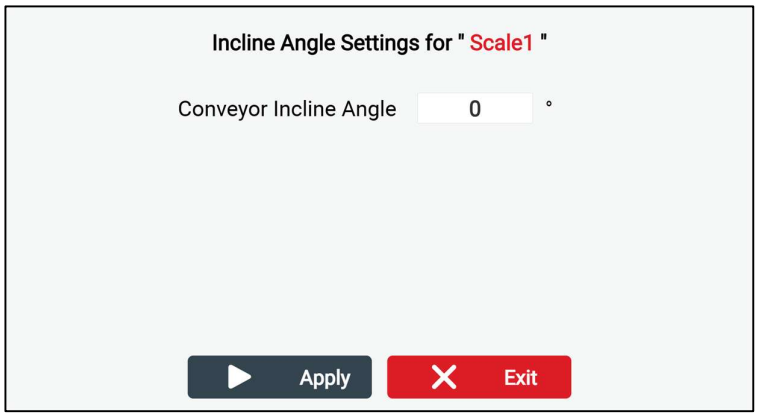


Figure 83 – Incline Angle Settings

Name, Division and Units

Pressing the button “Name, Division and Units” (10) on the touchscreen will bring up the following page where settings for the Name, Division and Units can be altered.

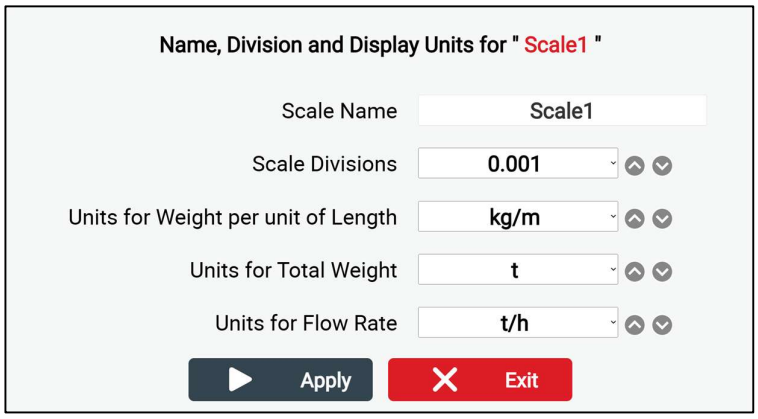


Figure 84 – Name, Division and Units

- **Scale Name** – The User can define the name for Scale 1 and Scale 2. By default the Scale Names are Scale1 and Scale2.
- **Scale Divisions** - This menu allows you to tell the Ramsey Flex Integrator how to report the quantity of material that crosses the scale in one hour. For example, if 1,750 tons cross the scale in an hour and you want the results reported to one decimal place you would choose a scale division of 0.1. As a result, hourly rates would be reported as—for example—1742.8 Tph (tons per hour). Possible scale divisions are 50, 20, 10, 5, 2, 1, 0.5, 0.2, 0.1, 0.05, 0.02, 0.01, 0.005, 0.002 and 0.001.
- **Units for Weight pre Unit of Length** – Depending on the Unit type that was selected uring setup, the following options will be availabe.
    - Metric (kg/m, t/m).
    - Imperial Short Tons (Lbs/ft, T/ft).
    - Imperial Long Tons (Lbs/ft, LT/ft).
- **Units for Total Weight** - Depending on the Unit type that was selected during setup, the following options will be availabe.
    - Metric (kg, t, kt, Mt).
    - Imperial Short Tons (Lbs, T, kT, MT).
    - Imperial Long Tons (Lbs, LT, kLT, MLT).

- **Units for Flow Rate** - Depending on the Unit type that was selected during setup, the following options will be availabe.
    - Metric (t/h, kg/min, t/min, kg/h, %).
    - Imperial Short Tons (Tph, T/min, Lbs/min, Lbs/h, %).
    - Imperial Long Tons (LTph, LT/min, Lbs/min, Lbs/h, %).

Press “Apply” to accept the changes. If the User presses “Exit” then no changes will be saved or applied.

NOTE - The choice of Scale Division has no bearing on the accuracy of the underlying numbers or calculations, it is only for display purposes.

End of Scale Settings

This is end of the Scale Settings Chapter. It has covered how to setup the scale settings such as Carriage Dimensional information, Scale Name and Unit settings.

Chapter 9
Run Page (Home Page)

Overview

This chapter describes the Ramsey Flex Integrator Menu structure for the Run (Home) Page. This will allow the User to navigate the Ramsey Flex Integrator to find the required settings or functions.

Run Screen Home Screen

The screen below is known as the Run Screen, or the Home Screen. It can be accessed by pressing the upper left-hand corner “Home” icon. The Run Screen by default displays information on the Rate Tab, which shows the Flow Rate, Weight per Length loading, Belt Speed and Master Totalizer information. It also has a vertical and horizontal menu structure that allows for navigation of the Ramsey Flex Integrator.

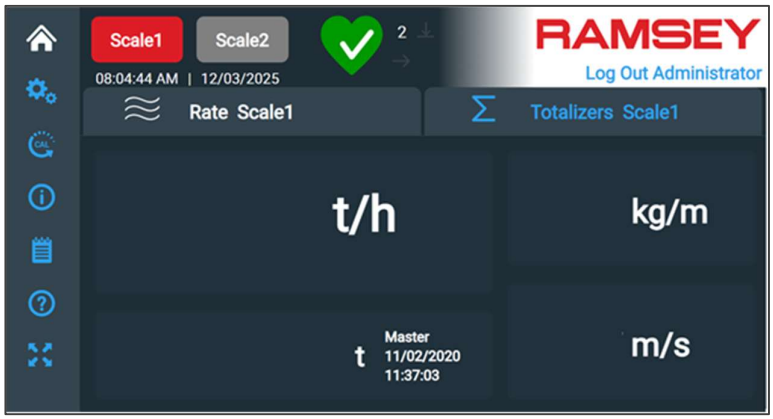


Figure 85 – Run Screen

Side Vertical Navigation Menu

The Side Vertical Navigation Menu shown on the left is how the User navigates between the main areas of the Ramsey Flex Integrator. The Side Navigation Menu will consist of six (6) icon buttons if viewing on the physical Ramsey Flex HMI screen, or seven (7) icon buttons if viewing remotely on a connected Ethernet device.

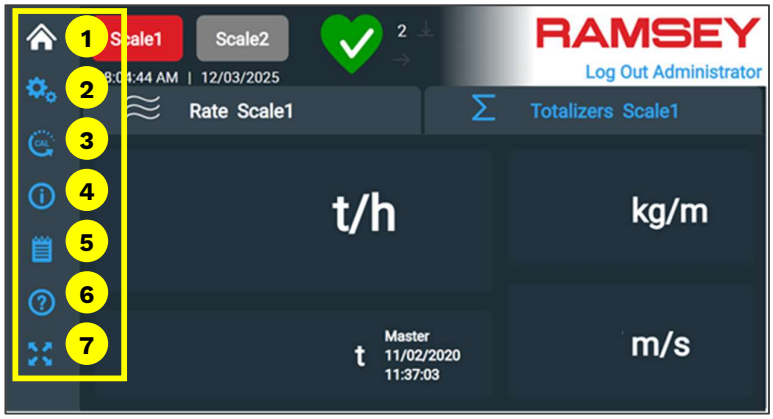


Figure 86 - Side Vertical Navigation Menu

The icons in the vertical left navigation bar are as follows.

1. **Run Screen or Home Screen Icon**. From this screen the User can access the following information.
   - Rate Tab – Displays the current Flow Rate, Weight per Length loading, Belt Speed and Master Totalizer.
   - Totalizer Tab - Master Totalizer, Total #1, Total #2, Total #3 and Totalizer reset.
2. **Settings Icon**. From this screen the User can access the following information.
   - General Tab – Date and Time Settings, Language Setting, change of Passwords, Restart, Factory Reset, Display Setting, Export and Import Configuration Settings file.
   - Connectivity Tab – Setup of Digital Input, Analog Input, Trimming of Analog Inputs, Digital Outputs, Analog Outputs, Trimming of Analog Outputs, Industrial Protocol setup such as Modbus, Ethernet/IP, ProfiBus, Networks settings like Static IP Address.
   - Scale 1 and Scale 2 Tab – Setup of Scale Carriage Dimensions, Load Cells Settings, Belt Speed Settings, Tonnage Pulse Setting, Flow Rate Setting, Zero Band Setting, Auto Zero Tracking, Span Weights Information, Incline Angle, Scale Name, Divisions, Unit Settings.
3. **Calibration Icon**. From this screen the User can perform the following Calibrations.
   - Perform Calibration Tab – Calibration operations such as Zero, Span, Speed and Material Calibrations.
   - Calibration Data Tab – A detailed summary of all Scale 1 and Scale 2 calibration data.
4. **Information Icon**. From this screen the User can access the following information.
   - Load Cell and Speed Tab – Load Cell mV, Speed Pulses, ADC values.
   - Input and Output Tab – State and/or values of Digital Input, Analog Input, Digital Output, Analog Output, Scale Angle. Manual Test function for Analog and Digital Outputs.
   - Status Tab – Display the current error status of Digitizer, Load Cell Balance, Flow Rate, Belt Running, Belt Load, Board and CPU Temperature.
5. **Audit Trail Icon**. From this screen the User can view historical changes to the Ramsey Flex Integrator, such as previous values of Zero, Span, Belt Length etc.
6. **About or Help Icon**. Contact details for SRO Technology, and information on the Firmware version, Serial Number, IP address.
7. **Full Screen Icon**. If viewing on a remotely connected computer, pressing this button will maximise the size of the display. This icon is not available on the Ramsey Flex HMI interface at the device.

Top Horizontal Navigation Menu Part 1

The Top Horizontal Navigation Menu allows the User to switch between scales, check alarm alert status or change the User permission level.

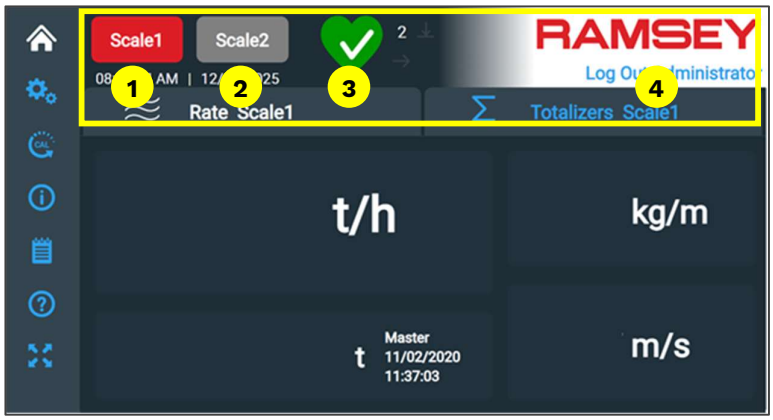


Figure 87 - Top Horizontal Navigation Menu Part 1 (System OK)

Figure 88 - Top Horizontal Navigation Menu Part 1 (Alert)

The icons in the horizontal top navigation bar are as follows.

1. **Scale1**. If the scale has been named then the User defined name will be in this button, otherwise the default name is Scale1. If the button is highlighted RED then this is the active scale being displayed. To change to Scale2 press the Scale2 button. The integrator will reload as Scale2 and display the rate information.
2. **Scale2**. If the scale has been named then the User defined name will be in this button, otherwise the default name is Scale2. In the above picture, the button is GREY which means it is not the scale being displayed on the front page. To display Scale2 Flow Rate, Speed, etc, then press the Scale2 button. The integrator will reload as Scale2 and display the rate information.
3. **System ok or Alert Icon**. If a green heart with tick in the middle is shown the system is operating without alarm. If an orange triangle with exclamation mark is shown (as in the picture) then an error has been detected. If you press this button, it will take the User directly to the Alarm status page.
4. **Log Out / Log In** – To change the access level press the text “Log Off xxxx” where xxxx will be Operator, Service or Administrator. This will take the User to the log in page.

Top Horizontal Navigation Menu Part 2

To the left of the Alert Icon are two data fields that have specific meanings.

Figure 89 - Top Horizontal Navigation Menu Part 2

The data fields in the horizontal top navigation bar are as follows.

1. **AZ**. If “AZ” is shown then Auto Zero Tracking function is enabled.
2. **ZB**. If “ZB” is shown then Zero Band function is enabled.

Top Horizontal Navigation Menu Part 3

To the right of the Alert Icon are three data fields that have specific meanings.

Figure 90 - Top Horizontal Navigation Menu Part 3

The data fields in the horizontal top navigation bar are as follows.

1. **Number of Connected Devices Displaying the HMI Interface**. Top left number. If just the Ramsey Flex Integrator is running with no connected Ethernet devices, then this value will be 1. If an external device is logged in over the Ethernet connection and is displaying the HMI interface remotely then this value will increase to 2 (as shown). For each open connection this number will increment by 1.
2. **Zero Ready**. Bottom left. The white down arrow with horizontal line underneath indicates the scale is ready to perform a zero calibration. NTEP considers it an empty belt or zero ready state if the flow rate is 0.12% of the maximum flow rate.
3. **Flow rate under “Lower Alarm Flow Rate” or over “Upper Alarm Flow Rate” alarm values**. Top right. The white or yellow arrow pointing to the right indicates the Flow Rate is outside normal operating conditions. The alarm values can be set in the Scale settings menu.

Rate Scale Tab

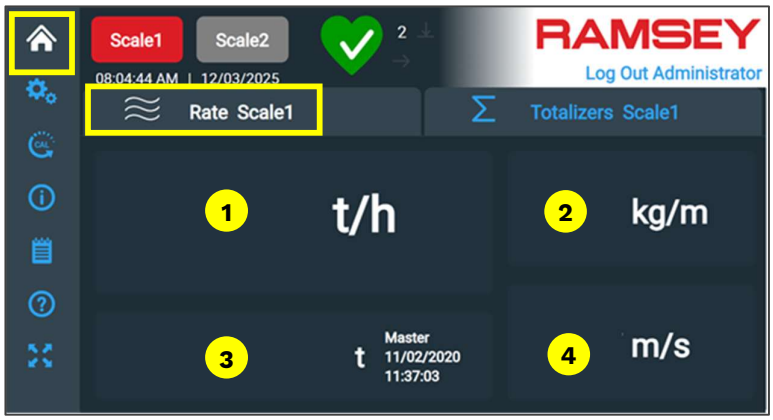


Figure 91 - Rate Tab

The displayed fields on the Rate Tab are as follows.

1. **Flow Rate**. The signal measured by the load cells, which represents the weight per unit length of the belt (kg/m), is multiplied by the signal measured by the speed transmitter, which represents the belt speed (m/s). The result of this operation is the instantaneous flow rate (t/h) that is then multiplied by suitable constant to obtain the value in the required engineering units (lbs/min, ton/h, etc.). An adjustable damping filter is provided separately for displayed rate and current outputs. The User can select the desired units from the setup pages. Unit options are provided for the following.
   - Metric (t/h, kg/min, t/min, kg/h, %).
   - Imperial Short Tons (Tph, T/min, Lbs/min, Lbs/h, %).
   - Imperial Long Tons (LTph, LT/min, Lbs/min, Lbs/h, %).
2. **Weight per Unit Length**. The current weight per unit length value. The User can select the desired units from the setup pages. Unit options are provided for the following.
   - Metric (kg/m, t/m).
   - Imperial Short Tons (Lbs/ft, T/ft).
   - Imperial Long Tons (Lbs/ft, LT/ft).
3. **Master Totalizer.** The current master totalizer value in units of weight. The User can select the desired units from the setup pages. Unit options are provided for the following.
   - Metric (kg, t, kt, Mt).
   - Imperial Short Tons (Lbs, T, kT, MT).
   - Imperial Long Tons (Lbs, LT, kLT, MLT).
4. **Belt Speed**. The current belt speed. The unit options are fixed as per the following.
   - Metric (m/s).
   - Imperial Short Tons (ft/s).
   - Imperial Long Tons (ft/s).

Totalizers Tab

When on the Run or Home Screen, if the Totalizers Tab is selected then the Master Totalizer and shift Totalizers will be shown.

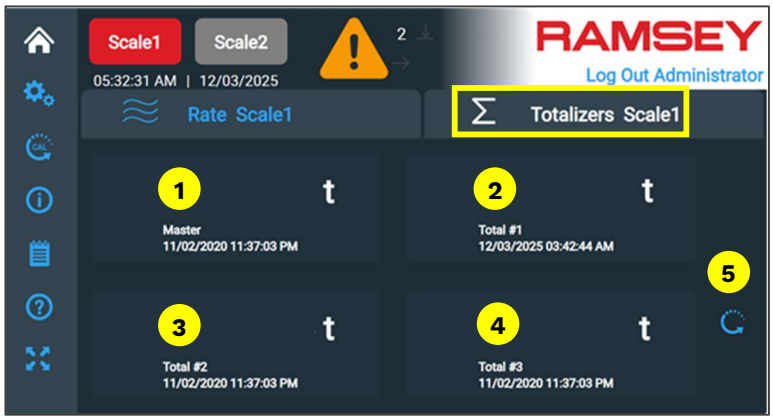


Figure 92 - Totalizers Tab

The displayed fields on the Totalizers Tab are as follows.

1. **Master Totalizer**. The total tonnage since new**.
2. **Total #1 Totalizer**. User resettable totalizer.
3. **Total #2 Totalizer**. User resettable totalizer.
4. **Total #3 Totalizer**. User resettable totalizer.
5. **Totalizer Reset**. Pressing this button allows the User to reset the totalizers.

Resetting the Totalizers

Pressing the “Reset Totalizer” button will bring up the following page. If the User presses Reset Shift #1, #2 or #3 then the lower left reset button will turn blue. Pressing the “Reset” button will then reset that Totalizer.

Shift Totalizers #1, #2 and #3 can also be reset over Modbus.

**To reset the Master Totalizer requires the entering of a special code. Pressing the Reset Master button will bring up the second page shown below. The Master Reset Pin (or Password) must be entered. Contact your local Ramsey distributor to get this code.

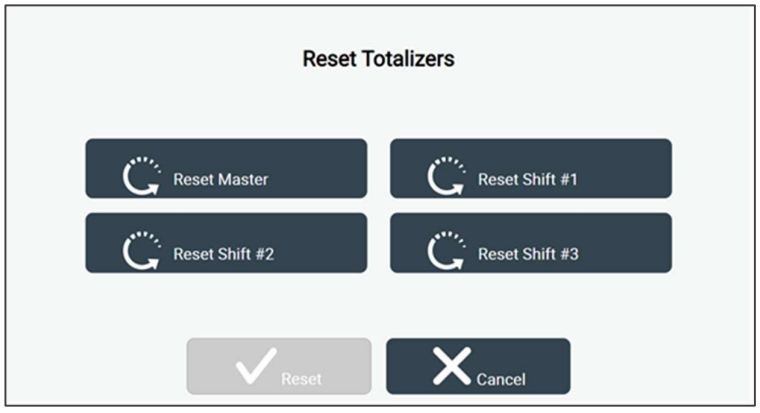


Figure 93 - Reset Totalizer Page

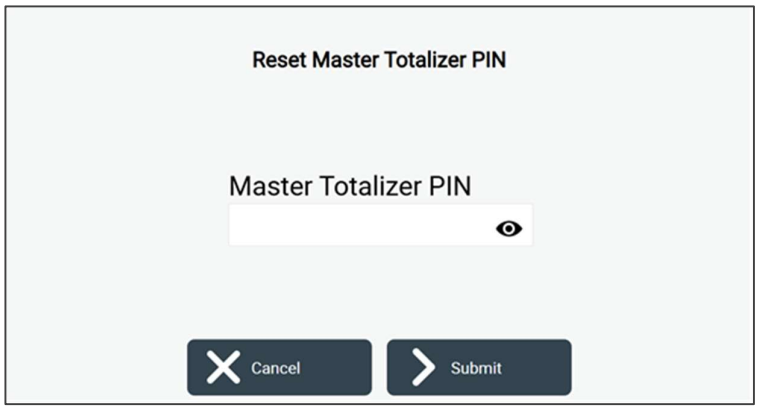


Figure 94 - Reset Master Totalizer Password Page

Chapter 10
Calibration Page

Overview of Calibration Pages

This chapter describes the Ramsey Flex Integrator Calibration Page structure. This will allow the User to navigate the Ramsey Flex Integrator to find the required Calibration

Calibration Data Tab

The screen below allows the current Calibration settings to be reviewed. It can be accessed by pressing the “Cal” icon from the left-hand navigation menu, then press the right “Calibration Data” tab. The calibration values for Scale 1 are shown in the left, and calibration values for Scale 2 are shown in the right.

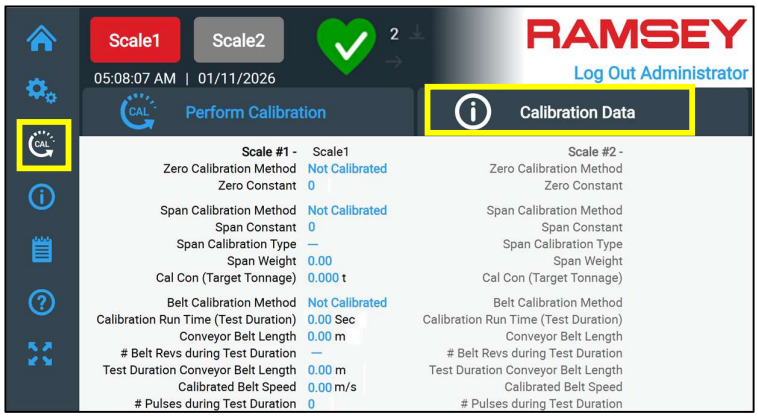


Figure 95 – Calibration Data Tab

The Calibration Data tab has the following information

- **Zero Calibration Method** – What method of calibration has been performed.
  - Not Calibrated – A calibration has never been performed.
  - Manual – Calibration data has been manually entered.
  - Automatic – A calibration has been performed using the built-in functions.
- **Zero Constant** – The current Zero value.
- **Span Calibration Method** – What method of calibration has been performed.
  - Not Calibrated – A calibration has never been performed.
  - Manual – Calibration data has been manually entered.
  - Automatic – A calibration has been performed using the built-in functions.
  - Material -
- **Span Constant** – The current Span value.
- **Span Calibration Type** – What type of Span Calibration has been performed.
  - R-Cal – Electronic Calibration allows the User to perform the calibration without the need for applying test weights or test chains on the weighbridge. It is performed by unbalancing the load-cell bridge using a precision resistor. The calibration constant is calculated based on the load cell and the scale data.

  - Billet Weight – Test Weight Calibration requires the positioning of test weights or billet weights on the weighbridge.
  - Roller Chain – Chain Calibration requires the application of calibrated chains on the belt. This method is the nearest to actual operating conditions as the test weight is applied to the conveyor belt, not to the scale frame.
  - Material - Material Test allows the User to run material of known weight over the scale to check the accuracy the belt scale. Alternatively, you can run material over the scale, then have it re-weighed by another reference scale.
- **Span Weight** – The weight of Billet Weight or Roller Chain this system will be calibrated to.
- **Cal Con (Target Tonnage)** – The expected tonnage given the Span Weight, Belt Speed and Weigh Frame dimensional information.
- **Belt Calibration Method** – What method of calibration has been performed.
  - Not Calibrated – A calibration has never been performed.
  - Manual – Calibration data has been manually entered.
  - Automatic – A calibration has been performed using the built-in functions.
- **Calibration Run Time (Test Duration)** – The total time it takes to perform the Belt Calibration. This is equal to (how long it takes for the belt to make one revolution at maximum speed) x (Number of Belt Revolution during Test Duration).
- **Conveyor Belt Length** – The length of conveyor belt for one complete Belt Revolution.
- **Number of Belt Revolution during Test Duration** – How many complete Belt Revolutions occurred during the Test Duration.
- **Test Duration Conveyor Belt length** – The total conveyor belt length during the Test Duration. This is equal to (Conveyor Belt Length) x (Number of Belt Revolution during Test Duration). Not applicable for simulated speed.
- **Calculated Belt Speed** – The Belt Speed is calculated based on the User entered Belt Length and 1x Revolution Time.

Number of Pulses during Test Duration – Total number of speed pulses during a Test Duration (calibration time). Not applicable for simulated speed.

NOTE - For the Belt Scale's Zero & Span Calibrations to be accurate, the Speed Calibration must fulfill the following requirements.

- The belt must make at least three complete revolutions (Number of Belt Revolution during Test Duration >= 3 revolutions).
- The test must have a total running time of six (or more) minutes (Calibration Run Time (Test Duration) >= 6 minutes)

Perform Calibration Tab

The screen below is the page the User needs to navigate to in order to perform Calibrations of the Ramsey Flex Integrator. It can be accessed by pressing the "Cal" icon from the left-hand navigation menu. The Perform Calibration Tab Is shown by default. The Perform Calibration Tab has the following options.

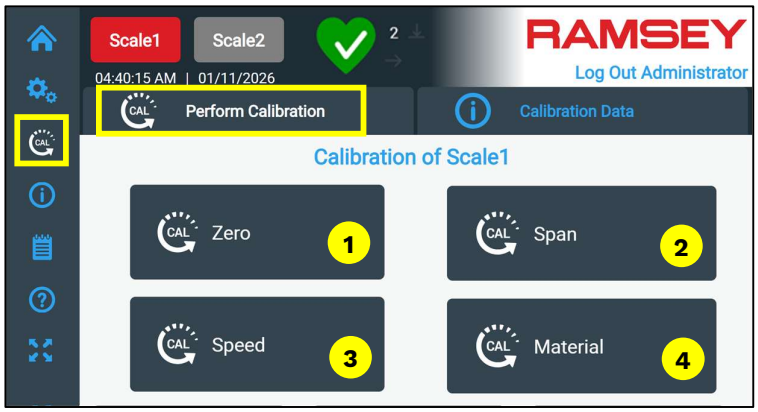


Figure 96 – Perform Calibration Tab

1. **Zero Calibration** - The Zero Constant value calculated during a Zero Calibration is a digital representation of the tare load on the scale. The tare load consists of the scale carriage, idler(s), and the section of belt within the weigh area.
2. **Span Calibration** – The Span Constant value calculated during a Span Calibration is a digital representation of the scale's sensitivity or response to a known applied load across the weigh span. The simulated load, introduced via R-Cal, Billet Weights or Roller Chain, stresses the load cells in a manner similar to actual weighing conditions.
3. **Speed Calibration** – This calibration establishes the digital relationship between Belt Length, Test Duration and the Number of Pulses from the Encoder. The Calibration Run Time (Test Duration) is required to perform Zero and Span Calibrations. For the Speed Calibration to be accurate, the Number of Belt Revolution during Test Duration must be equal to at least three (3) complete revolutions and the Test Duration should be a minimum of six (6) minutes.
4. **Material Calibration** – The Material Correction % Factor calculated during a Material Calibration is a digital representation of the scale's overall Span accuracy when compared against a traceable known mass of actual process material. The known mass consists of a carefully collected and weighed quantity of bulk material (determined via a certified reference scale, such as a truck scale, rail scale, or hopper scale) passed over the belt weigher during a controlled test. The Material Calibration compares the belt scale's measured totalized weight during the test to the known reference mass and computes a Material Correction % Factor. This Material Correction % Factor fine-tunes the Span Constant previously set during the Span Calibration (using R-Cal, Billet Weight or Roller Chains), accounting for real-world effects like belt tension variations, idler friction, and dynamic loading behaviour that simulated loads may not fully replicate. It is considered the highest-accuracy calibration method for establishing traceability, especially for custody transfer or legal-for-trade applications.

The order of Calibration for a new Ramsey Flex Integrator is as follows. This is the order this section of the manual will take.

- Speed Calibration.
- Zero Calibration.
- Span Calibration (R-Cal, Billet Weight or Roller Chain).
- Material Calibration (Optional).

Speed Calibration Overview

Pressing the “Speed” button (3) will allow the User to conduct the Speed Calibration which is used to calculate and record the following Calibration metrics.

- **Calibration Run Time (Test Duration)** - The total time it takes to perform the Belt Calibration.

- **Conveyor Belt Length** - The length of conveyor belt for one complete Belt Revolution.
- **Number of Belt Revolution during Test Duration** - How many complete Belt Revolutions occurred during the Test Duration.
- **Test Duration Conveyor Belt Length** - The total conveyor belt length during the Test Duration.
- **Calculated Belt Speed** - The Belt Speed is calculated based on the User entered Belt Length and 1x Revolution Time.
- **Number of Pulses during Test Duration** - Total number of speed pulses during a Test Duration.

NOTE - The Speed Calibration must be performed before the first Zero, Span or Material Calibrations are performded but after entering all the Belt Scale information, such as Belt Scale Code. The Speed Calibration establishes the Calibration Run Time (Test Duration) which is required to perform Zero and Span Calibrations. After performing the iniitial Speed Calibration, redoing the Speed Calibration becomes optional and related to changes to site conditions.

Belt Length Calibration

The previous Calibrated Belt Length is shown at the top of the screen, and is prepopulated in the “New Belt Length” Data Field. The User can choose to accept this measurement or enter a new value.

If entering a new value. When the belt is stationary, draw a chalk line across the belt. Using a tape measure, measure the length of the belt to the nearest 0.01 meter for one complete revolution.

Enter the measured result for “New Belt Length” into the Data Field.

To the right is a list of previous Belt Length Measurements showing the Data and Time the Speed Calibration was performed. This data can be a useful reference to check your measured value, if it is significantly different then recheck your measurements.

Press “Next” to accept the Belt Length measurement. If the User presses “Exit” then no changes will be saved or applied.

For information on how to measure this data, please consult your local SRO Technology Distributor or SRO Technology for the best method to suit your circumstances.

NOTE – The Calibrated Belt Length will only be updated upon successful completion of the Speed Calibration. If Exit is pressed at any time during the Speed Calibration process, then the New Belt Length will not be saved.

WARNING – Marking and measuring the Belt Length will require the User to go past the Safety Lanyard on the Conveyor. You must comply with all Client Site and/or Country Rules with regards to Safety, such as locking out of Electrical systems to prevent Conveyor motion.

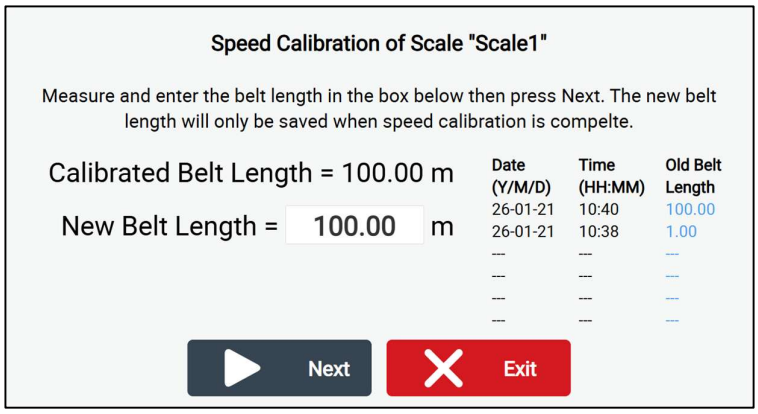


Figure 97 – Belt Length

Selecting Speed Calibration Method

The User can select if they wish to perform an Auto or a Manual Speed Calibration. The difference is as follows.

- **Auto** – The User will be guided through an built-in procedure to calculate the Test Duration and Number of Belt Revolutions. It will involve the User pressing a "Mark" button each time the chalk line passes. It relies on the User having a clear line of sight to the Conveyor Belt while also having clear access to the Ramsey Flex Integrator HMI touchscreen.
- **Manual** – The User records, using an external stop watch, the Test Duration and manually counts the Number of Belt Revolutions when running at full speed. This information can then be manually entered into the Ramsey Flex Integrator and a Calibration Performed to establish the relationship between Test Duration, Speed and Encoder Pulses.

Select "Auto" to conduct an Automatic Speed Calibration or "Manual" to perform a Manual Speed Calibration. If the User presses "Exit" then no changes will be saved or applied, including any modification to Belt Length as noted previously.

NOTE – During the Belt Speed Calibration process the Ramsey Flex Integrator also performs an initial Zero Calibration. Ensure the belt is running empty.

HINT – In most cases the Manual Process is easier to implement as you will not need to have clear line of site to both the Conveyor Belt and the Ramsey Flex Integrator HMI.

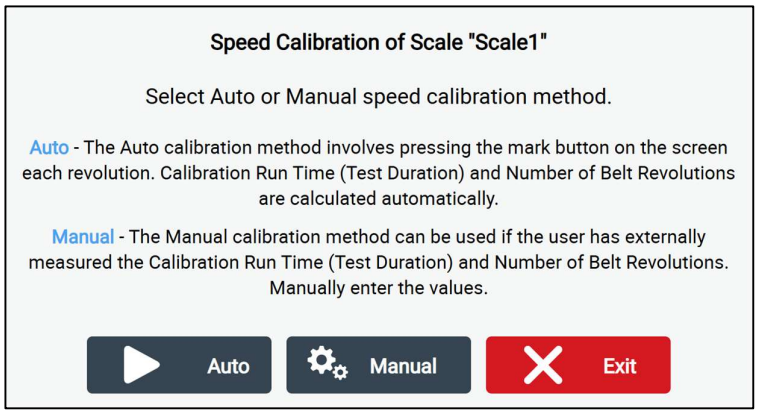


Figure 98 – Select Auto or Manual Speed Calibration Method

"Auto" Speed Calibration Method

If "Auto" is selected then the Ramsey Flex Integrator will enter Automatic Speed Calibration mode. The first page displayed will advise the User to run the belt empty at maximum speed. For convenience the following data is displayed on the screen.

- **Belt Load** – The value being displayed is the current Belt Load based on the existing calibration metrics and setup parameters such as Belt Scale Code. It is provided for diagnostic purposes only to assist the technician to establish if the device thinks the conveyor Belt is running empty. If this is the first Speed Calibration then the number may be 0.00 kg/m regardless of the Belt Load and should be ignored.
- **Belt Speed** – The value being displayed is the current Belt Speed based on the existing calibration metrics. If this is the first Speed Calibration then the number will be 0.00 m/s and should be ignored.

Run the belt to maximum speed in an empty condition. When ready, Press "Start" to commence the Speed Calibration procedure. If the User presses "Cancel" then no changes will be saved or applied, including any modification to Belt Length as noted previously.

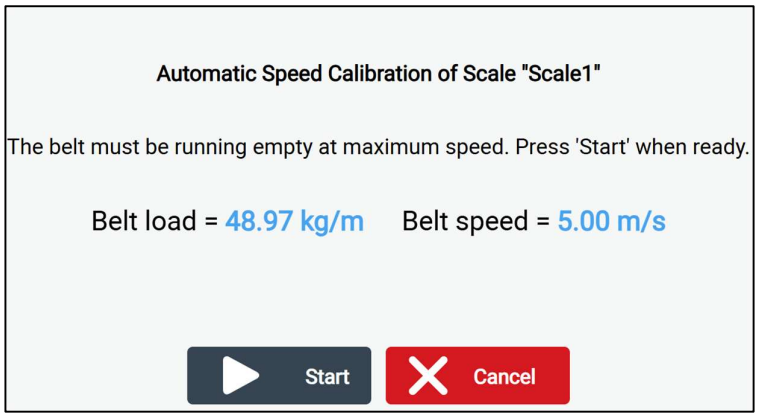


Figure 99 – Automatic Speed Calibration Start Page

After pressing “Start” the Ramsey Flex Integrator will enter the Calibration Progress page. The instructions to perform an Automatic Speed Calibration are as follows.

- Place a chalk mark on the conveyor belt and on the conveyor frame.
- Run the conveyor up to full speed with no material on the belt. Allow enough time for the conveyor to reach a steady state speed, this will depend on the belt length and conveyor system.
- When the moving chalk mark on the belt passes the static chalk mark on the conveyor frame for the first time, press the “Mark” button. This will start the Calibration. The test will not start until the “Mark” button has been pressed.
- Each time the moving chalk mark on the belt passes the static chalk mark on the conveyor frame press the “Mark” button again. This will increment the “Calibration Duration” time value and the “Completed Belt Revolutions” value.
- When the User is satisfied that enough “Calibration Duration” time has passed, or enough Conveyor Revolutions has occurred, press the “Done” button to conclude the Calibration. The Calibration will not stop until the “Done” button is pressed.

If the User presses “Cancel” at any time during the Automatic Speed Calibration then the Calibration will be terminated and no changes will be saved or applied, including any modification to Belt Length as noted previously.

NOTE - For the Belt Scale’s Zero & Span Calibrations to be accurate, the Speed Calibration must fulfill the following requirements.

- The belt must make at least three complete revolutions (number of Completed Belt Revolution during Test Duration >= 3 revolutions).
- The test must have a total running time of six (or more) minutes (Current Calibration Duration >= 6 minutes).

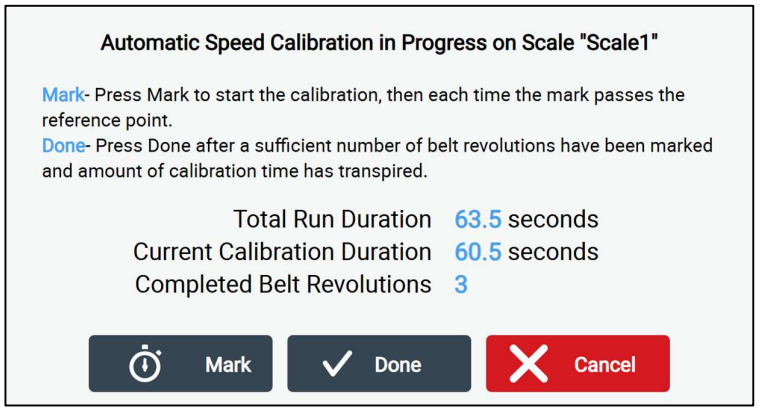


Figure 100 – Automatic Speed Calibration Progress Page

If the Automatic Speed Calibration has been sucesfully completed then the following page will be displayed showing the measured or calculated Calibration values.

- **Calibration Run Time (Test Duration)** - The total time it takes to perform the Belt Calibration.

- **Measured Conveyor Belt Length** - The length of conveyor belt for one complete Belt Revolution.
- **Number of Belt Revolution during Test Duration** - How many complete Belt Revolutions occurred during the Test Duration.
- **Test Duration Conveyor Belt Length** - The total conveyor belt length during the Test Duration.
- **Calculated Belt Speed** - The Belt Speed is calculated based on the User entered Belt Length and 1x Revolution Time.
- **Number of Pulses during Test Duration** - Total number of speed pulses during a Test Duration.

Press “Apply” to accept the Calibration, the Ramsey Flex Integrator will go back to the main Calibration page.

If the User presses “Exit” then no Calibration changes will be saved or applied, including any modification to Belt Length as noted previously.

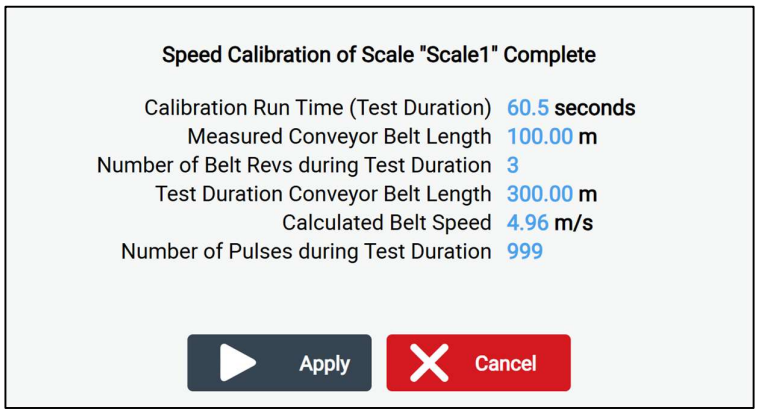


Figure 101 – Automatic Speed Calibration Complete

“Manual” Speed Calibration Method

External Measurements of Test Duration and Belt Revolutions

If the User wishes to perform a “Manual Speed Calibration” then the following measurement process must be undertaken first.

- Belt length (meters).
- Time for a complete revolution (seconds).
- Total Test Duration (seconds).
- Number of Complete Revolutions during test (whole integer values only).

For instruction on how to do this to the current industry best practice, to suit your conveyors circumstances, please consult your local SRO Representative.

Note the greater accuracy you desire will determine the minimum test time for your system.

Record both the “Test Duration” time and the “Number of Belt Revolutions during Test Duration”. These two pieces of information are required to undertake the Manual Speed Calibration process.

NOTE - For the Belt Scale’s Zero & Span Calibrations to be accurate, the Speed Calibration must fulfill the following requirements.

- The belt must make at least three complete revolutions (number of Completed Belt Revolution during Test Duration >= 3 revolutions).

- The test must have a total running time of six (or more) minutes (Current Calibration Duration >= 6 minutes).
- Belt speed must stay consistent for the duration of the measurement and calibration. Care must be taken on belts with variable speed drives.

"Manual" Speed Calibration Method

Once the external measurements have been completed, press the "Cal" icon in the left vertical navigation bar, then go to the "Perform Calibration" tab, select "Speed" then select "Manual" to undertake the Manual Speed Calibration process.

The first page displayed will advise the User to run the belt empty at maximum speed. For convenience the following data is displayed on the screen.

- **Belt Load** – The value being displayed is the current Belt Load based on the existing calibration metrics and setup parameters such as Belt Scale Code. It is provided for diagnostic purposes only to assist the technician to establish if the device thinks the conveyor Belt is running empty. If this is the first Speed Calibration then the number may be 0.00 kg/m regardless of the Belt Load and should be ignored.
- **Belt Speed** – The value being displayed is the current Belt Speed based on the existing calibration metrics. If this is the first Speed Calibration then the number will be 0.00 m/s and should be ignored.

There are two Data Fields that need to be populated with the measurements just made in the previous step.

- **Calibration Run Time (Test Duration)** – The total time it took to complete the specified number of revolutions.
- **Number of Belt Revs during Test Duration** - How many complete Belt Revolutions occurred during the Test Duration.

Run the belt to maximum speed in an empty condition. When ready, press "Start" to accept Data Field entries and start the Speed Calibration process. If the User presses "Cancel" then no changes will be saved or applied, including any modification to Belt Length as noted previously.

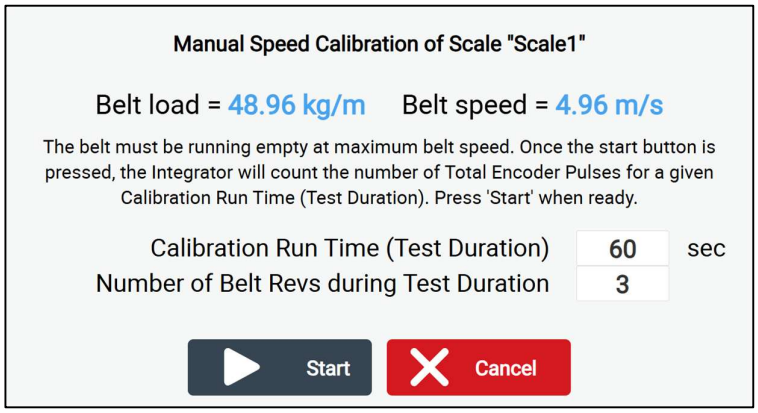


Figure 102 – Manual Speed Calibration Start Page

After pressing the "Start" button the following screen appears.

- **Time Remaining** - The "Time Remaining" value will start from the "Calibration Run Time (Test Duration)" value entered in the previous page and will start counting down

to zero. When the count-down reaches zero the Ramsey Flex Integrator will automatically progress to the next screen.

- **Cumulative Pulse Count** - The “Cumulative Pulse Count” will give the total number of encoder pulses recorded during the Calibration.

To the right is a summary of the Encoder pulses and Load Cell measurements. There are two columns.

- **Instant** – This column gives the most recent data captured by the Ramsey Flex Integrator.
- **Average** – This column gives the average of the value since the start of the Manual Speed Calibration procedure. For example, if Test Duration is 60 seconds, and Time Remaining is 50 seconds, then the Average Value displayed is for the first 10 seconds of the test (Test Duration 60 seconds – Time remaining 50 seconds = 10 seconds elapsed).

If multiple Load Cells are installed, then the last row will give an average mV of the active load cells.

At anytime during the countdown if the User presses “Cancel” then no changes will be saved or applied, including any modification to Belt Length as noted previously.

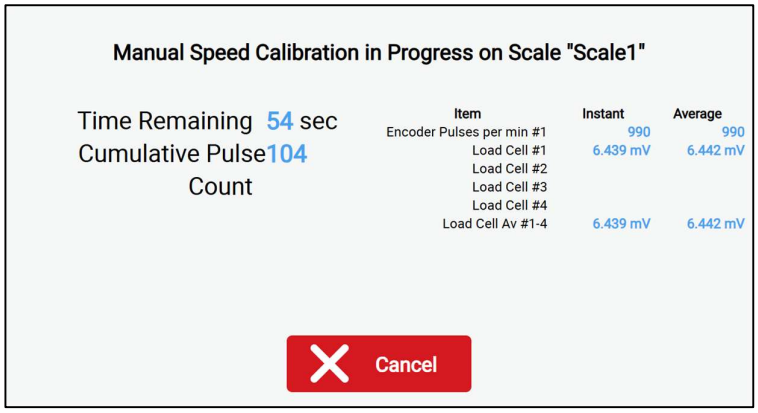


Figure 103 – Manual Speed Calibration Progress Page

If the Manual Speed Calibration has been sucesfully completed then the following page will be displayed showing the measured or calculated Calibration values.

- **Calibration Run Time (Test Duration)** - The total time it takes to perform the Belt Calibration.
- **Measured Conveyor Belt Length** - The length of conveyor belt for one complete Belt Revolution.
- **Number of Belt Revolution during Test Duration** - How many complete Belt Revolutions occurred during the Test Duration.
- **Test Duration Conveyor Belt Length** - The total conveyor belt length during the Test Duration.
- **Calculated Belt Speed** - The Belt Speed is calculated based on the User entered Belt Length and 1x Revolution Time.
- **Number of Pulses during Test Duration** - Total number of speed pulses during a Test Duration.

Press “Apply” to accept the Manual Speed Calibration, the Ramsey Flex Integrator will save the values then return to the main Calibration page.

If the User presses “Exit” then no Speed Calibration changes will be saved or applied, including any modification to Belt Length as noted previously.

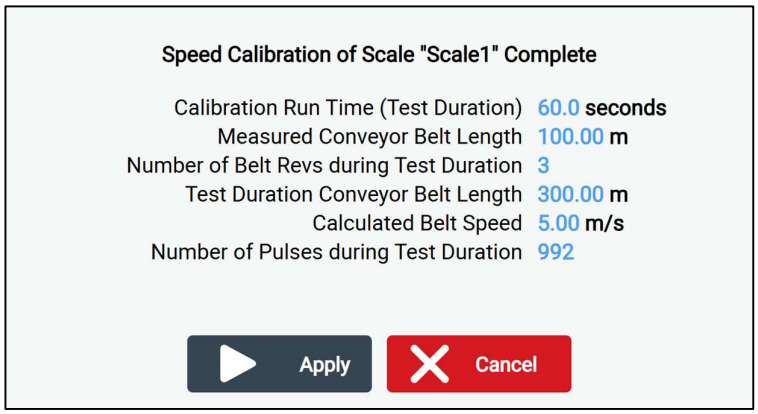


Figure 104 – Manual Speed Calibration Complete

Zero Calibration Overview

Pressing the “Zero” button (1) will allow the User to conduct the Zero Calibration which is used to calculate and record the following Calibration metrics.

- **Zero Calibration Method** – What method of calibration has been performed (Not Calibration, Auto or Manual).
- **Zero Constant** – The current Zero value.
- **Zero Date** – The date and time of the last successful Zero Calibration.

The User can select if they wish to perform an Auto or a Manual Zero Calibration. The difference is as follows.

- **Auto** – The User will be guided through an built-in procedure to calculate the Zero Constant value. It will invovle the User running the conveyor at maximum speed with an empty belt (ie no water, no material, no billet weights or no roller chains applied).
- **Manual** – Can be used to restore previous zero values manually in Administrator mode, if an automatic calibration failed.

Select “Auto” to conduct an Automatic Zero Calibration or “Manual” to perform a Manual Zero Calibration. If the User presses “Exit” then no changes will be saved or applied.

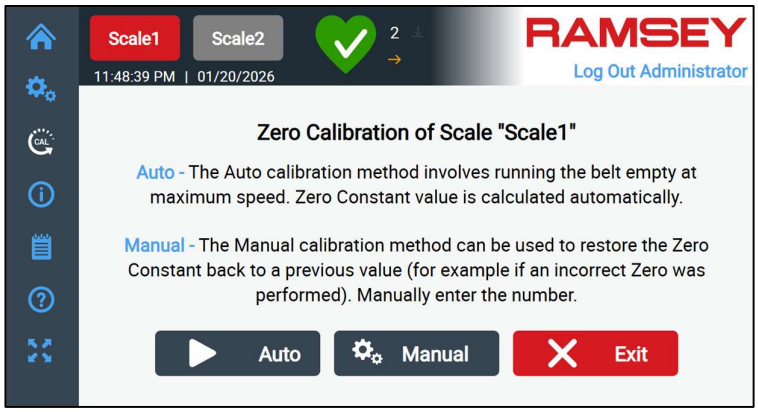


Figure 105 – Select Auto or Manual Zero Calibration Method

"Auto" Zero Calibration Method

If "Auto" is selected then the Ramsey Flex Integrator will enter Automatic Zero Calibration mode. The first page displayed will advise the User to run the belt empty at maximum speed. For convenience the following data is displayed on the screen.

- **Calibrated Zero Constant –** The value being displayed is the current Calibrated Zero Constant. If the value shown is 0 then it means a Zero Calibration has not been performed, this value can be ignored on the first Zero Calibration.
- **Current ADC –** The value being displayed is the current ADC measurement from the Load Cells.
- **Current TPH –** The value being displayed is the calculated Flow Rate measurement. It should be close to zero if the belt is not loaded.
- **Current Belt Load –** The value being displayed is the current Belt Load based on the existing calibration metrics and setup parameters such as Belt Scale Code. If this is the first Zero and Span Calibration then the number may be 0.00 kg/m (or another non sensical value) regardless of the Belt Load and should be ignored on the first Zero Calibration.
- **Calibrated Belt Speed** – The value being displayed is the current Calibrated Belt Speed. If the value shown is 0.00m/s then it means a Speed Calibration has not been performed. The Zero Calibration should be terminated and a Speed Calibration performed first.
- **Current Belt Speed** – The value being displayed is the current Belt Speed based on the existing calibration metrics. If this value is 0.00 m/s then it means either the Belt is not moving, or that a Speed Calibration has not been performed.

Run the belt to maximum speed in an empty condition. When ready, Press "Start" to commence the Zero Calibration procedure. If the User presses "Cancel" then no changes will be saved or applied.

NOTE - If any of the "Current" values are displayed in RED then this means the measured value is more than 5% different from the stored Calibrated value. Calibration can proceed; it is just a visual warning that the User may want to investigate before proceeding.

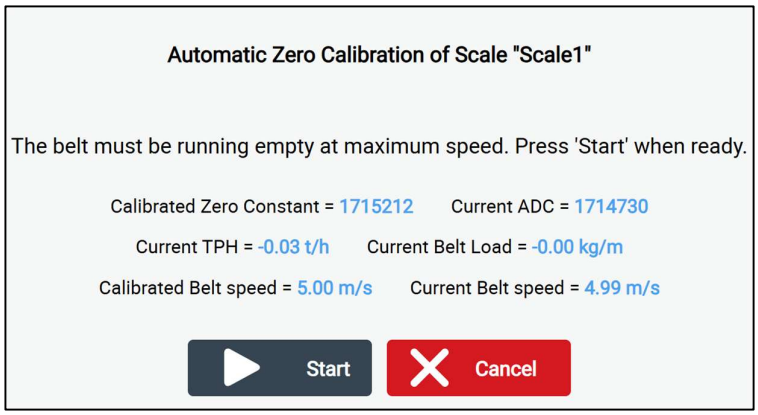


Figure 106 – Automatic Zero Calibration Start Page

After pressing the "Start" button the following screen appears.

- **Time Remaining** - The "Time Remaining" value will start from the "Calibration Run Time (Test Duration)" value that was calculated during the Speed Calibration. When

the count-down reaches zero the Ramsey Flex Integrator will automatically progress to the next screen.

- **Percent Complete** - The “Percent Complete” indiocates how much time, as a %, has elapsed.

The “Rate” and “Accumulated Tonnage” are provided for informational purposes. The User can use this data to determine if something changes, such as Material appearing on the belt.

To the right is a summary of the Load Cell measurements. There are two columns.

- **Instant** – This column gives the most recent data captured by the Ramsey Flex Integrator.
- **Average** – This column gives the average of the value since the start of the Calibration procedure. For example, if Test Duration is 60 seconds, and Time Remaining is 50 seconds, then the Average Value displayed is for the first 10 seconds of the test (Test Duration 60 seconds – Time remaining 50 seconds = 10 seconds elapsed).

If multiple Load Cells are installed, then the last row will give an average mV of the active load cells.

At anytime during the countdown if the User presses “Cancel” then no changes will be saved or applied.

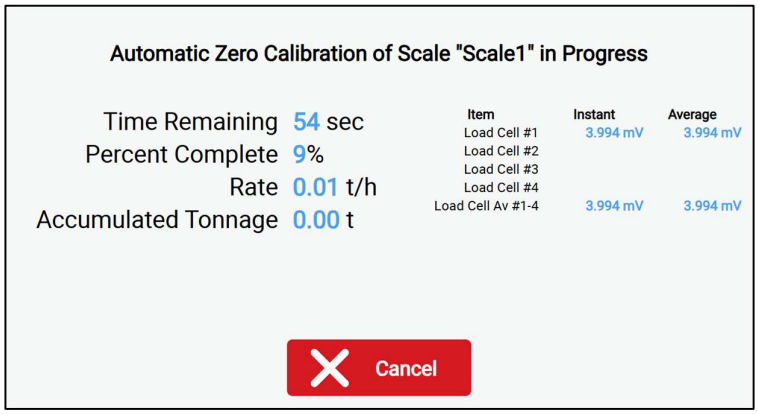


Figure 107 – Automatic Zero Calibration Progress Page

If the Automatic Zero Calibration has been sucesfully completed then the following page will be displayed showing the measured or calculated Calibration values.

- **New Zero Constant Value** – The updated Zero Constant value.
- **Accumulated Tonnage** – The Measured Tonnage using the current Span Calibration values.
- **Error** – The % difference between the New and Existing Zero Constant values.

To the right is a column of the last successful Zero Calibrations performed. The information provided is Date, Time, what the previous Zero Constant value was and the % Error of the previous Zero Constant to the one just completed. This will allow a quick trend analysis to be performed by the User and determine if the new Zero Constant should be accepted, or if it should not be accepted and the Belt Scale system checked and Zero Calibration performed again.

Press “Apply” to accept the Automatic Zero Calibration.

If the User presses “Exit” then no Zero Calibration changes will be saved or applied.

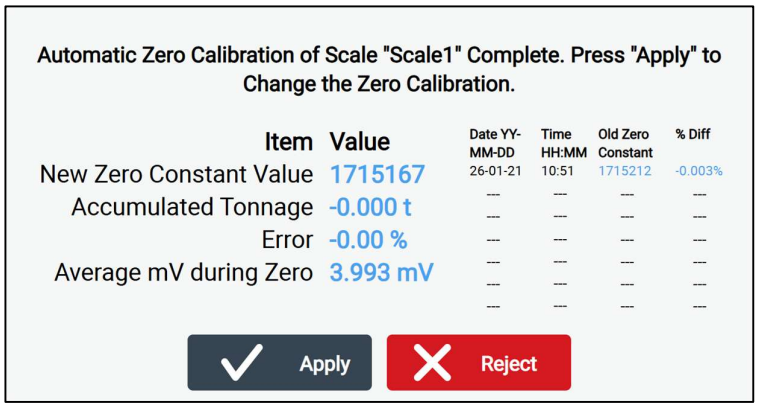


Figure 108 – Automatic Zero Calibration Complete

If the Zero Constant was applied, then this page confirms the Zero Constant has been changed. The old Zero Constant and new Zero Constant values are displayed.

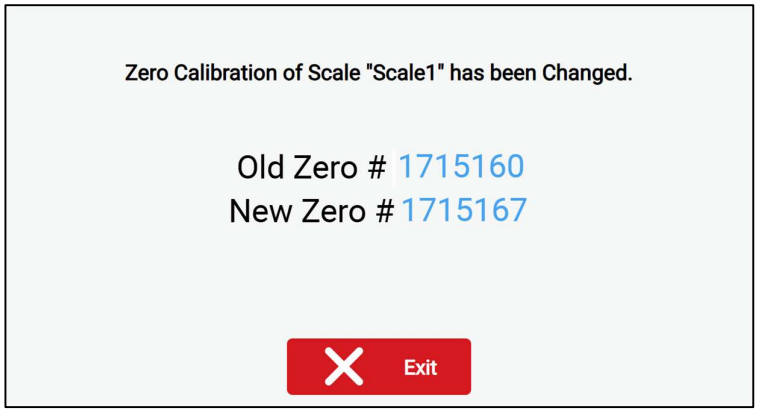


Figure 109 – Automatic Zero Calibration Changed

"Manual" Zero Calibration Method

If "Manual" is selected then the Ramsey Flex Integrator will enter Manual Zero Calibration mode and open the following page.

The "New Zero" value can be entered into the data field. When an updated value is entered into the data field the % change will be calculated.

Press "Apply" to accept the Automatic Zero Calibration.

If the User presses "Exit" then no Zero Calibration changes will be saved or applied.

NOTE – This is not a recommended calibration technique. It offers the ability to restore a previous calibration value in the event of a failed calibration.

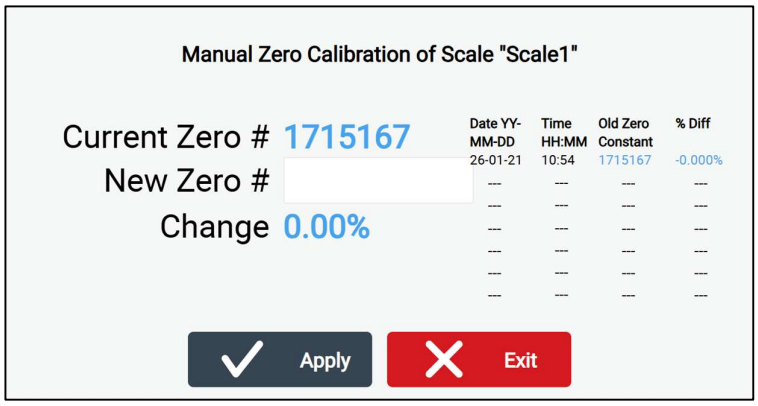


Figure 110 – Manual Zero Calibration Page

If the Zero Constant was applied, then this page confirms the Zero Constant has been changed. The old Zero Constant and new Zero Constant values are displayed.

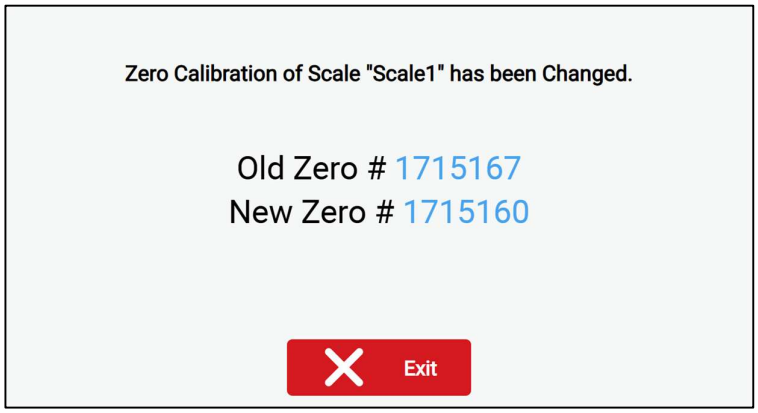


Figure 111 – Manual Zero Calibration Changed

Span Calibration Overview

Pressing the “Span” button (2) will allow the User to conduct the Span Calibration which is used to calculate and record the following Calibration metrics.

- **Span Calibration Method** – What method of calibration has been performed (Not Calibrated, Auto or Manual).
- **Span Constant** – The current Span value.
- **Span Date** – The date and time of the last successful Span Calibration.
- **Span Calibration Type** – What type of Span Calibration has been performed. R-Cal, Billet Weight or Roller Chain.
- **Span Weight** – The weight of Billet Weight or Roller Chain the system was calibrated to.
- **Cal Con (Target Tonnage)** – The calculated amount of tonnes expected to accumulate during the calibration.

The User can select if they wish to perform an Auto or a Manual Span Calibration. The difference is as follows.

- **Auto** – The User will be guided through an built-in procedure to calculate the Span Constant value. It will involve the User running the conveyor at maximum speed with billet weights or roller chains applied.
- **Manual** – Can be used to restore previous zero values manually in Administrator mode, if an automatic calibration failed.

Select “Auto” to conduct an Automatic Span Calibration or “Manual” to perform a Manual Span Calibration. If the User presses “Exit” then no changes will be saved or applied.

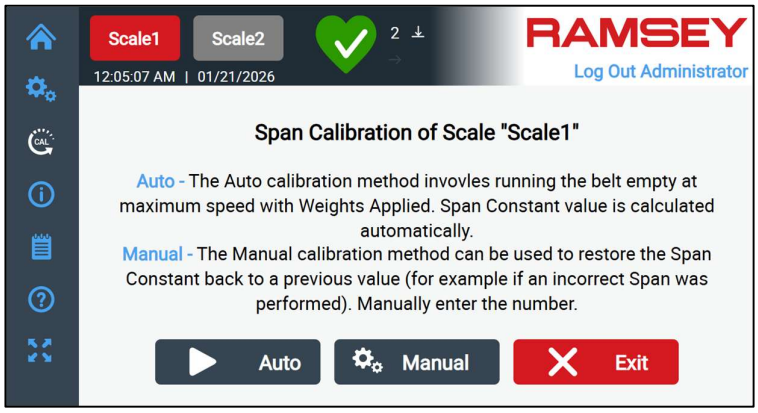


Figure 112 – Select Auto or Manual Span Calibration Method

“Auto” Span R-Cal Calibration Method

If “Auto” is selected then the Ramsey Flex Integrator will enter Automatic Span Calibration mode. The first page displayed will require the User to select what type of Span Calibration should be performed – R-Cal, Billet Weight or Roller Chain.

To perform an R-Cal Span Calibration select “R-Cal” then press “Next”. If the User presses “Cancel” then no changes will be saved or applied, the User will be taken back to the Main Calibration page.

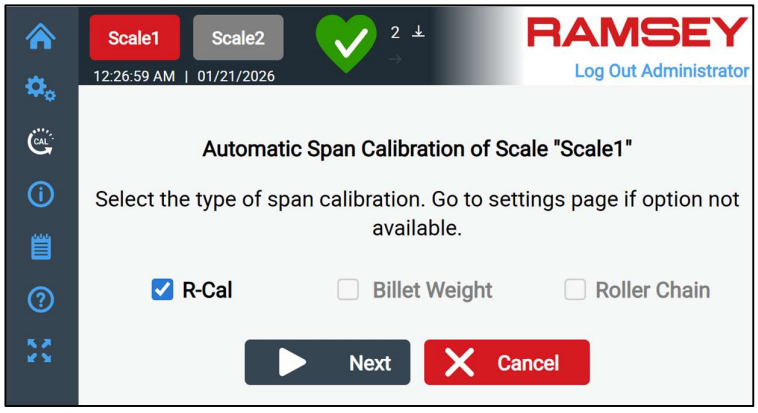


Figure 113 – Select R-Cal Automatic Span Calibration Method

If “R-Cal” is selected then the Ramsey Flex Integrator will enter Automatic Zero Calibration mode using the R-Cal resistor to simulate the calibration weights electronically.

The page displayed will advise the User to run the belt empty at maximum speed. For convenience the following data is displayed on the screen.

- **Calibrated Span Constant** – The existing Span Constant value.
- **Calibrated Belt Speed** – The existing Calibrated Belt Speed value from the performed “Speed Calibration”.
- **Current Belt Speed** – The current as measured Belt Speed.

When ready, Press “Start” to commence the Span Calibration procedure. If the User presses “Cancel” then no changes will be saved or applied.

NOTE - If any of the “Current” values are displayed in RED then this means the measured value is more than 5% different from the stored Calibrated value. Calibration can proceed; it is just a visual warning that the User may want to investigate before proceeding.

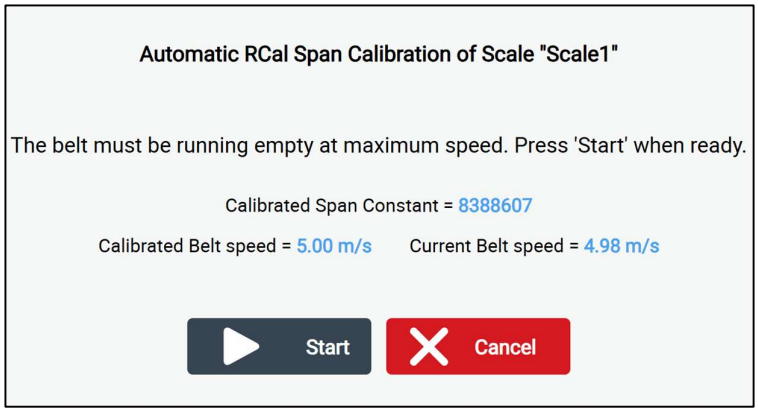


Figure 114 – Automatic R-Cal Span Calibration Start Page

After pressing the “Start” button the following screen appears.

- **Time Remaining** - The “Time Remaining” value will start from the “Calibration Run Time (Test Duration)” value that was calculated during the Speed Calibration. When the count-down reaches zero the Ramsey Flex Integrator will automatically progress to the next screen.
- **Percent Complete** - The “Percent Complete” indicates how much time, as a %, has elapsed.
- **Rate** – The measured Flow Rate using the existing Span Constant value.
- **Accumulated Tonnage** – The Measured Tonnage using the R-Cal resistor and measured Belt Speed.
- **Cal Con (Target Tonnage)** – The Target Tonnage based on the existing Span Constant value.

To the right is a summary of the Load Cell measurements. There are two columns.

- **Instant** – This column gives the most recent data captured by the Ramsey Flex Integrator.
- **Average** – This column gives the average of the value since the start of the Calibration procedure. For example, if Test Duration is 60 seconds, and Time Remaining is 50

seconds, then the Average Value displayed is for the first 10 seconds of the test (Test Duration 60 seconds – Time remaining 50 seconds = 10 seconds elapsed).

If multiple Load Cells are installed, then the last row will give an average mV of the active load cells.

At anytime during the countdown if the User presses “Cancel” then no changes will be saved or applied.

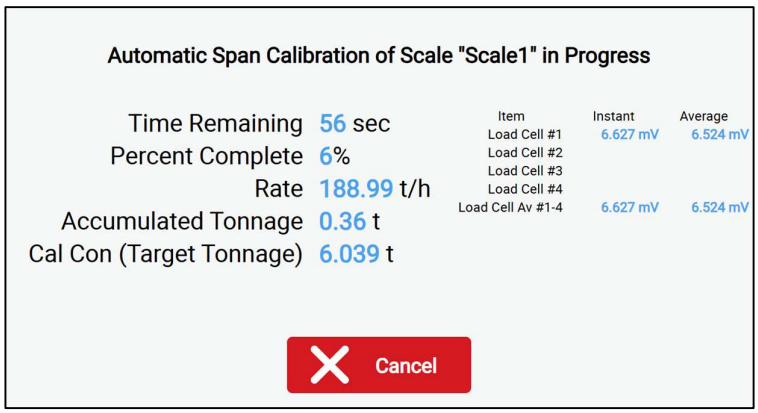


Figure 115 – Automatic R-Cal Span Calibration Progress Page

If the Automatic Span Calibration using R-Cal Resistor has been sucesfully completed then the following page will be displayed showing the measured or calculated Span Calibration values.

- **New Span Constant Value** – The updated Span Constant gain value.
- **Accumulated Tonnage** – The Measured Tonnage using the R-Cal resistor and measured Belt Speed.
- **Cal Con (Target Tonnage)** – The Target Tonnage based on the existing Span Constant value.
- **Error** – The % difference between the New and Existing Span Constant values.
- **Average mV during Span** – The average of all Load Cells over the Test Duration.

To the right is a column of the last successful Span Calibrations performed. The information provided is Date, Time, what the previous Span Constant value was and the % Error of the previous Span Constants to the one just completed. This will allow a quick trend analysis to be performed by the User and determine if the new Span Constant should be accepted, or if it should not be accepted and the Belt Scale system checked and Span Calibration performed again.

Press “Apply” to accept the Automatic Span Calibration using R-Cal Resistor.

If the User presses “Exit” then no Span Calibration changes will be saved or applied.

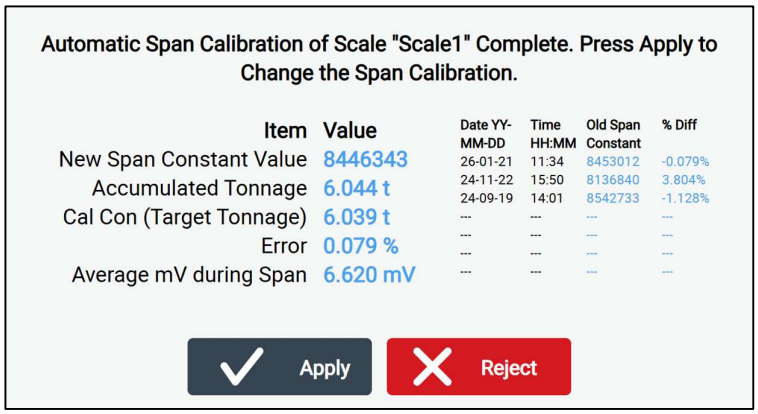


Figure 116 – Automatic R-Cal Span Calibration Complete

If the Span Constant using R-Cal Resistor was applied, then this page confirms the Span Constant has been changed. The old Span Constant and new Span Constant values are displayed.

Pressing “Exit” will take the User back to the Calibration page.

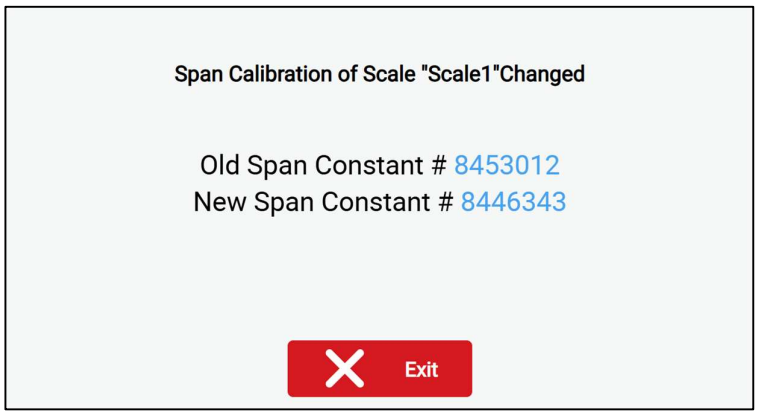


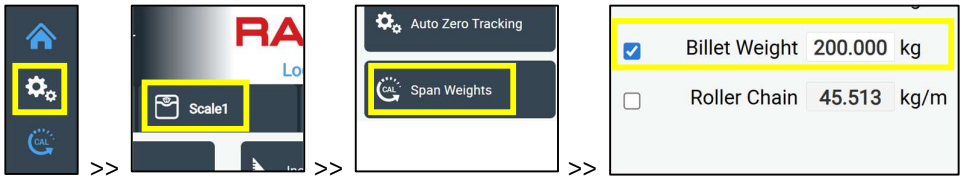
Figure 117 – Automatic R-Cal Span Calibration Changed

“Auto” Span Billet Weight Calibration Method

If “Auto” is selected then the Ramsey Flex Integrator will enter Automatic Span Calibration mode. The first page displayed will require the User to select what type of Span Calibration should be performed – R-Cal, Billet Weight or Roller Chain.

To perform a Billet Weight Span Calibration select “Billet Weight” then press “Next”. If the User presses “Cancel” then no changes will be saved or applied, the User will be taken back to the Main Calibration page.

NOTE - If the “Billet Weight” option is not available and the option is greyed out, then it has not been enabled by the User. Go to the settings page and enable the Billet Weight and enter the weight per length values.



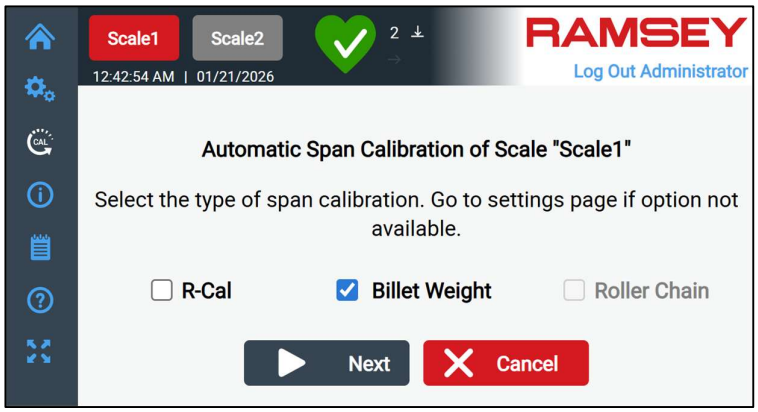


Figure 118 – Automatic Billet Calibration

If "Billet Weight" is selected then the Ramsey Flex Integrator will enter Automatic Span Calibration mode using the Billet Weight as the Span calibration weight.

The page displayed will advise the User to run the belt empty at maximum speed. For convenience the following data is displayed on the screen.

- **Calibrated Span Constant** – The existing Span Constant value.
- **Calibrated Belt Load** – Based on the Billet Weight, Scale Frame Dimenensions etc what is the Calculated Belt Load.
- **Current Belt Load** – Based on the existing Span Calibration and Load Cell measurements, what is the current Belt Load.
- **Calibrated Belt Speed** – The existing Calibrated Belt Speed value from the performed "Speed Calibration".
- **Current Belt Speed** – The current as measured Belt Speed.

When ready, Press "Start" to commence the Span Calibration procedure. If the User presses "Cancel" then no changes will be saved or applied.

NOTE - If any of the "Current" values are displayed in RED then this means the measured value is more than 5% different from the stored Calibrated value. Calibration can proceed; it is just a visual warning that the User may want to investigate before proceeding.

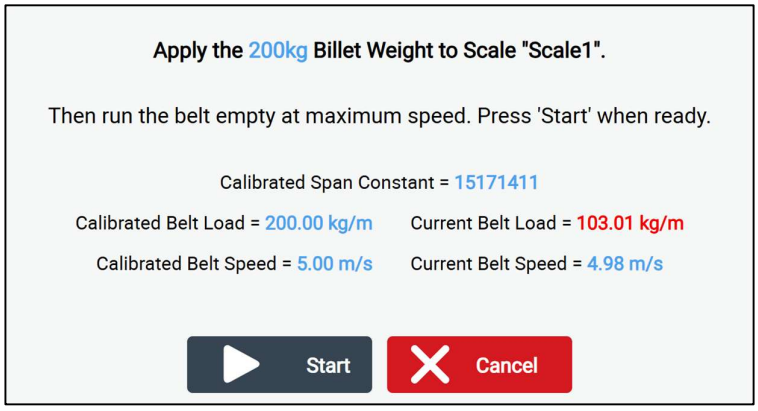


Figure 119 – Automatic Billet Weight Span Calibration Start Page

After pressing the “Start” button the following screen appears.

- **Time Remaining** - The “Time Remaining” value will start from the “Calibration Run Time (Test Duration)” value that was calculated during the Speed Calibration. When the count-down reaches zero the Ramsey Flex Integrator will automatically progress to the next screen.
- **Percent Complete** - The “Percent Complete” indicates how much time, as a %, has elapsed.
- **Rate** – The measured Flow Rate using the existing Span Constant value.
- **Accumulated Tonnage** – The Measured Tonnage using the Billet Weight and measured Belt Speed.
- **Cal Con (Target Tonnage)** – The Target Tonnage based on the existing Span Constant value.

To the right is a summary of the Load Cell measurements. There are two columns.

- **Instant** – This column gives the most recent data captured by the Ramsey Flex Integrator.
- **Average** – This column gives the average of the value since the start of the Calibration procedure. For example, if Test Duration is 60 seconds, and Time Remaining is 50 seconds, then the Average Value displayed is for the first 10 seconds of the test (Test Duration 60 seconds – Time remaining 50 seconds = 10 seconds elapsed).

If multiple Load Cells are installed, then the last row will give an average mV of the active load cells.

At anytime during the countdown if the User presses “Cancel” then no changes will be saved or applied.

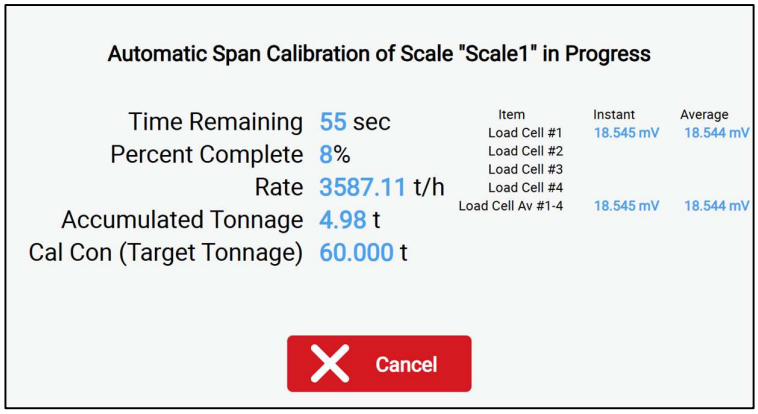


Figure 120 – Automatic Billet Weight Span Calibration Progress Page

If the Automatic Span Calibration using Billet Weight has been sucesfully completed then the following page will be displayed showing the measured or calculated Span Calibration values.

- **New Span Constant Value** – The updated Span Constant gain value.
- **Accumulated Tonnage** – The Measured Tonnage using the Billet Weight and measured Belt Speed.
- **Cal Con (Target Tonnage)** – The Target Tonnage based on the existing Span Constant value.
- **Error** – The % difference between the New and Existing Span Constant values.
- **Average mV during Span** – The average of all Load Cells over the Test Duration.

To the right is a column of the last successful Span Calibrations performed. The information provided is Date, Time, what the previous Span Constant value was and the % Error of the previous Span Constants to the one just completed. This will allow a quick trend analysis to be performed by the User and determine if the new Span Constant should be accepted, or if it should not be accepted and the Belt Scale system checked and Span Calibration performed again.

Press “Apply” to accept the Automatic Span Calibration using the Billet Weight calibration.

If the User presses “Exit” then no Span Calibration changes will be saved or applied.

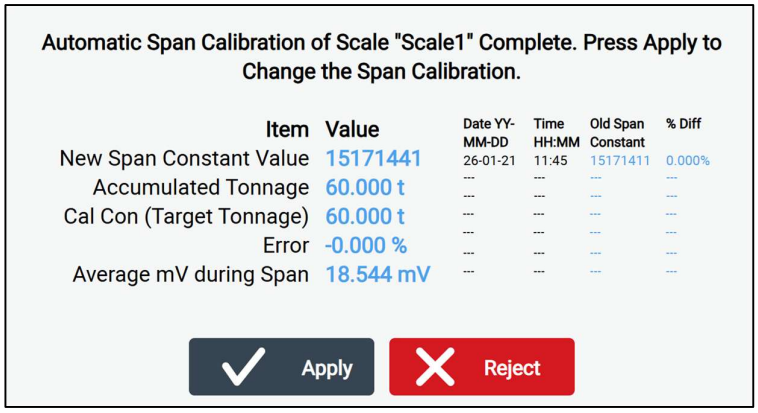


Figure 121 – Automatic Billet Weight Span Calibration Complete

If the Span Constant using Billet Weights was applied, then this page confirms the Span Constant has been changed. The old Span Constant and new Span Constant values are displayed.

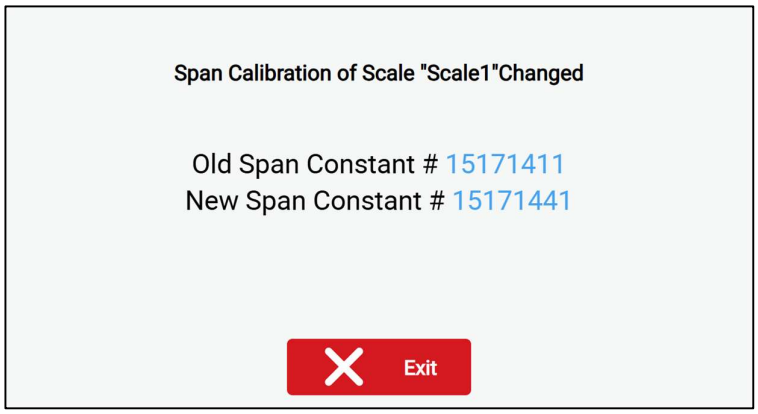


Figure 122 – Automatic Billet Weight Span Calibration Changed

The following page reminds the User to remove the Billet Weight. If the Billet Weight is left attached then the tonnages will be incorrect.

Pressing “Exit” will take the User back to the Calibration page.

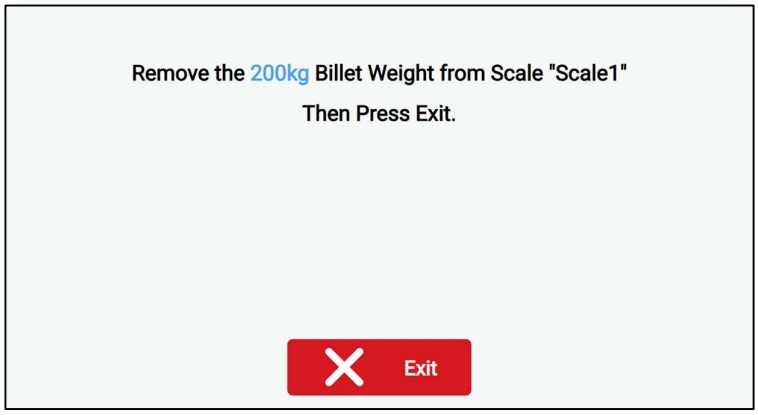


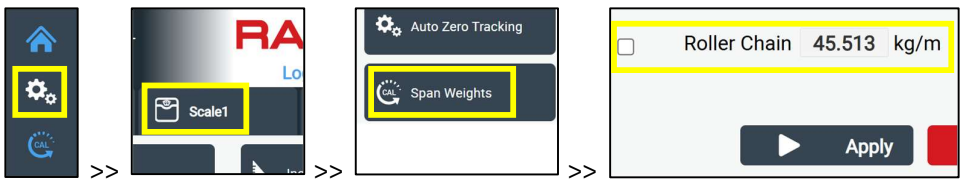
Figure 123 – Remove Billet Weight

“Auto” Span Roller Chain Calibration Method

If “Auto” is selected then the Ramsey Flex Integrator will enter Automatic Span Calibration mode. The first page displayed will require the User to select what type of Span Calibration should be performed – R-Cal, Billet Weight or Roller Chain.

To perform a Roller Chain Span Calibration select “Roller Chain” then press “Next”. If the User presses “Cancel” then no changes will be saved or applied, the User will be taken back to the Main Calibration page.

NOTE - If the “Roller Chain” option is greyed out and not selectable, then it has not been enabled by the User. Go to the settings page and enable the Roller Chain and enter the weight per length values.



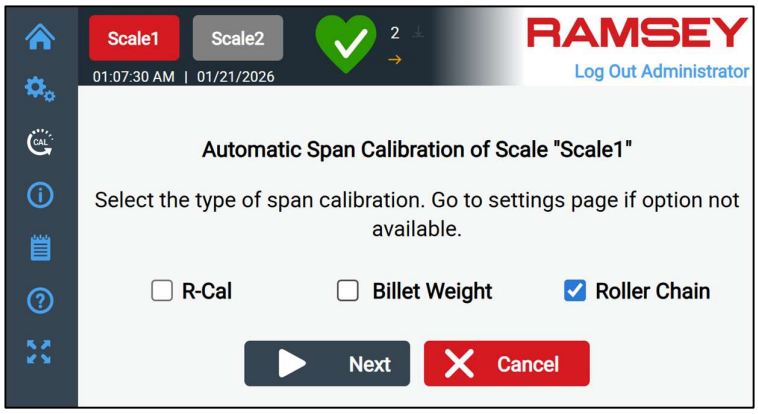


Figure 124 – Select Roller Chain Automatic Span Calibration Method

If “Roller Chain” is selected then the Ramsey Flex Integrator will enter Automatic Span Calibration mode using the Roller Chain as the Span Calibration weight.

The page displayed will advise the User to run the belt empty at maximum speed. For convenience the following data is displayed on the screen.

- **Calibrated Span Constant** – The existing Span Constant value.
- **Calibrated Belt Load** – The Roller Chain weight per length data.
- **Current Belt Load** – Based on the existing Span Calibration and Load Cell measurements, what is the current Belt Load.
- **Calibrated Belt Speed** – The existing Calibrated Belt Speed value from the performed “Speed Calibration”.
- **Current Belt Speed** – The current as measured Belt Speed.

When ready, Press “Start” to commence the Span Calibration procedure. If the User presses “Cancel” then no changes will be saved or applied.

NOTE - If any of the “Current” values are displayed in RED then this means the measured value is more than 5% different from the stored Calibrated value. Calibration can proceed; it is just a visual warning that the User may want to investigate before proceeding.

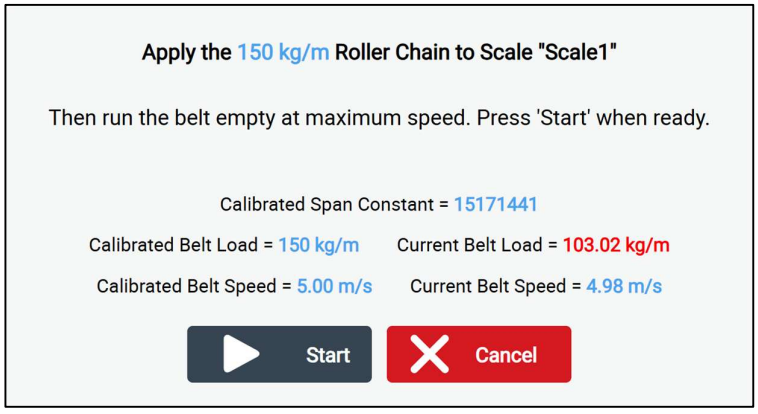


Figure 125 – Automatic Roller Chain Span Calibration Start Page

After pressing the “Start” button the following screen appears.

- **Time Remaining** - The “Time Remaining” value will start from the “Calibration Run Time (Test Duration)” value that was calculated during the Speed Calibration. When

the count-down reaches zero the Ramsey Flex Integrator will automatically progress to the next screen.

- **Percent Complete** - The “Percent Complete” indicates how much time, as a %, has elapsed.
- **Rate** – The measured Flow Rate using the existing Span Constant value.
- **Accumulated Tonnage** – The Measured Tonnage using the Roller Chain and measured Belt Speed.
- **Cal Con (Target Tonnage)** – The Target Tonnage based on the existing Span Constant value.

To the right is a summary of the Load Cell measurements. There are two columns.

- **Instant** – This column gives the most recent data captured by the Ramsey Flex Integrator.
- **Average** – This column gives the average of the value since the start of the Calibration procedure. For example, if Test Duration is 60 seconds, and Time Remaining is 50 seconds, then the Average Value displayed is for the first 10 seconds of the test (Test Duration 60 seconds – Time remaining 50 seconds = 10 seconds elapsed).

If multiple Load Cells are installed, then the last row will give an average mV of the active load cells.

At anytime during the countdown if the User presses “Cancel” then no changes will be saved or applied.

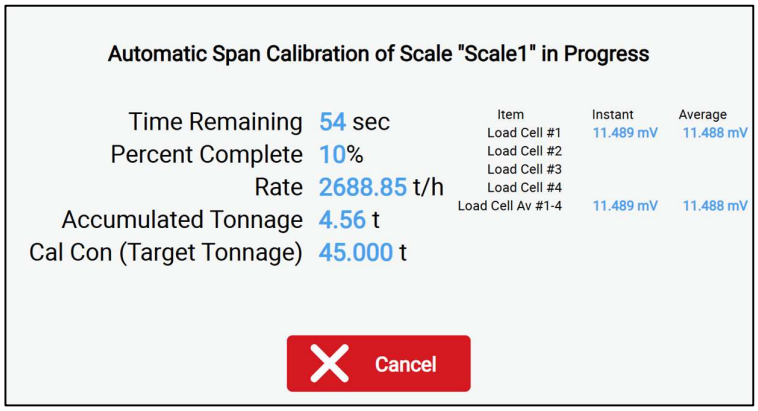


Figure 126 – Automatic Roller Chain Span Calibration Progress Page

If the Automatic Span Calibration using the Roller Chain has been sucesfully completed then the following page will be displayed showing the measured or calculated Span Calibration values.

- **New Span Constant Value** – The updated Span Constant gain value.
- **Accumulated Tonnage** – The Measured Tonnage using the Roller Chain and measured Belt Speed.
- **Cal Con (Target Tonnage)** – The Target Tonnage based on the existing Span Constant value.
- **Error** – The % difference between the New and Existing Span Constant values.
- **Average mV during Span** – The average of all Load Cells over the Test Duration.

To the right is a column of the last successful Span Calibrations performed. The information provided is Date, Time, what the previous Span Constant value was and the % Error of the previous Span Constants to the one just completed. This will allow a quick trend analysis to be performed by the User and determine if the new Span Constant

should be accepted, or if it should not be accepted and the Belt Scale system checked and Span Calibration performed again.

Press “Apply” to accept the Automatic Span Calibration using the Roller Chain.

If the User presses “Exit” then no Span Calibration changes will be saved or applied.

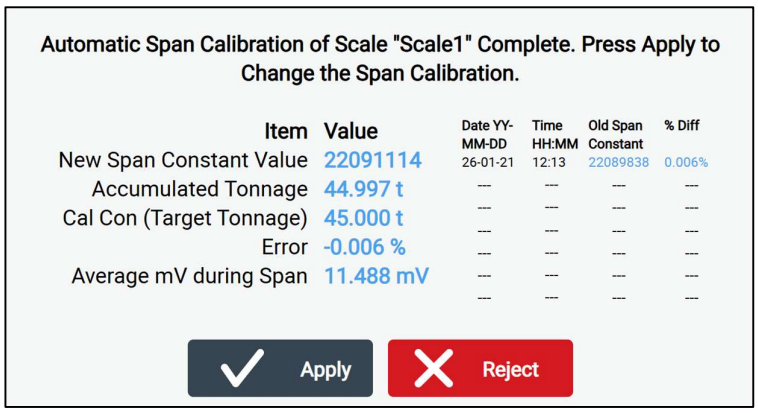


Figure 127 – Automatic Roller Chain Span Calibration Complete

If the Span Constant using Roller Chains was applied, then this page confirms the Span Constant has been changed. The old Span Constant and new Span Constant values are displayed.

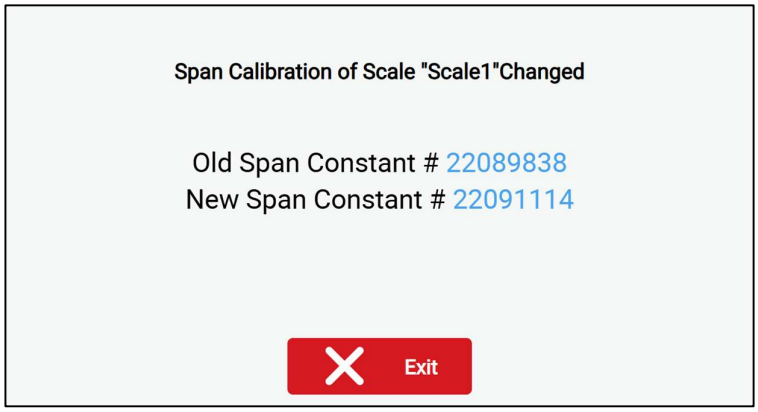


Figure 128 – Automatic Roller Chain Span Calibration Changed

The following page reminds the User to remove the Roller Chain. If the Roller Chain is left attached then it will likely get damaged when material starts to flow on the conveyor belt.

Pressing “Exit” will take the User back to the Calibration page.

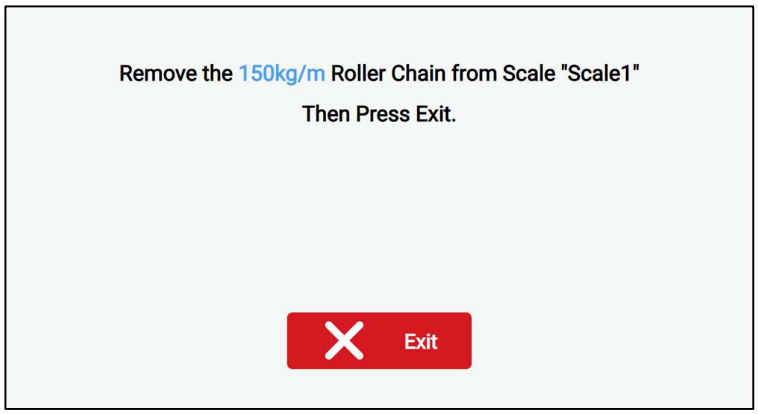


Figure 129 – Remove Roller Chain

"Manual" Span Calibration Method

If "Manual" is selected then the Ramsey Flex Integrator will enter Manual Span Calibration mode and open the following page.

The "New Span" value can be entered into the data field. When an updated value is entered into the data field the % change will be calculated.

Press "Apply" to accept the updated Span Calibration.

If the User presses "Exit" then no Span Calibration changes will be saved or applied.

NOTE – This is not a recommended calibration technique. It offers the ability to restore a previous calibration value in the event of a failed calibration.

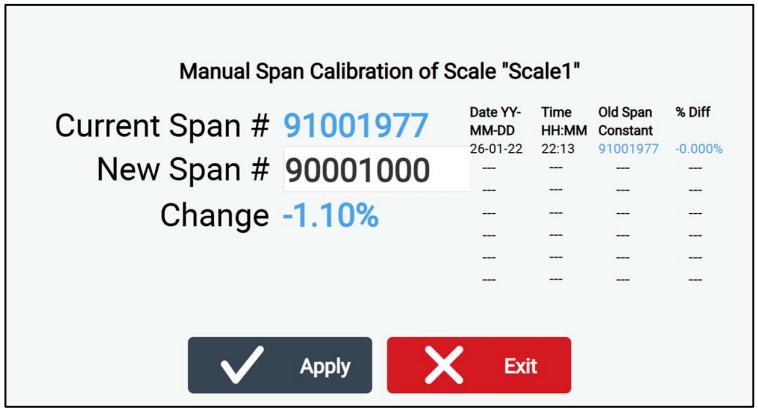


Figure 130 – Manual Span Calibration

If the Span Constant was applied, then this page confirms the Span Constant has been changed. The old Span Constant and new Span Constant values are displayed.

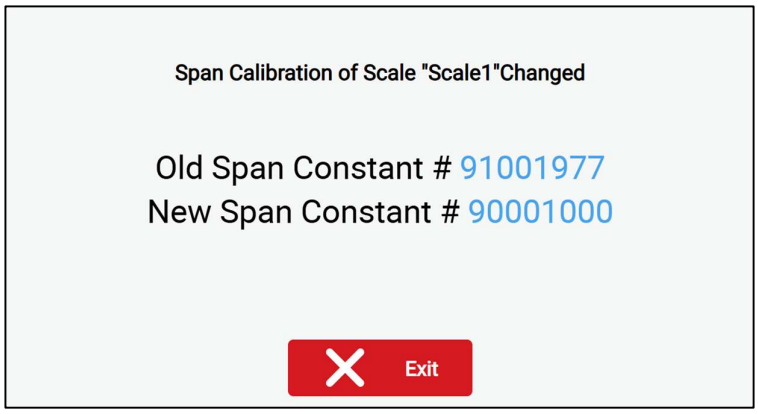


Figure 131 – Manual Span Calibration Complete

Material Calibration Overview

Performing a material calibration allows the User to check the accuracy of the scale. It can be performed by running material of a known weight across the scale and comparing this to the value measured by the Ramsey Flex Integrator.

Pressing the “Material” button (4) will allow the User to conduct the Material Calibration which is used to calculate and record the Material Correction Factor offset value applied to the Span Calibration constant.

The User can select which Span Calibration the Material Correction % Factor will be applied to.

- **R-Cal** – Apply the Material Correction % Factor to the R-Cal Span Calibration.
- **Billet Weight** – Apply the Material Correction % Factor to the Billet Weight Span Calibration.
- **Roller Chain** – Apply the Material Correction % Factor to the Roller Chain Span Calibration.

Select where the User wants to apply the calculated Material Correction % Factor, then press “Next” to continue. If the User presses “Cancel” then no changes will be saved or applied.

NOTE 1 – The corresponding Zero and Span Calibration must be completed before undertaking the Material Calibration. The Material Calibration will apply a correction factor to the relevant Span Constant.

NOTE 2 - Material testing requires sufficient material be run over the conveyor to cummulatively reach 6 minutes or tonnage equivalent to a MINIMUM of 3 revolutions. The more tonnage run over the scale, the better the accuracy.

Tonnage = 3 x (Belt Length / Max Speed) / 3600 * Flow Rate

Material should be weighed pre/post material test on a scale proved to within 0.1%.

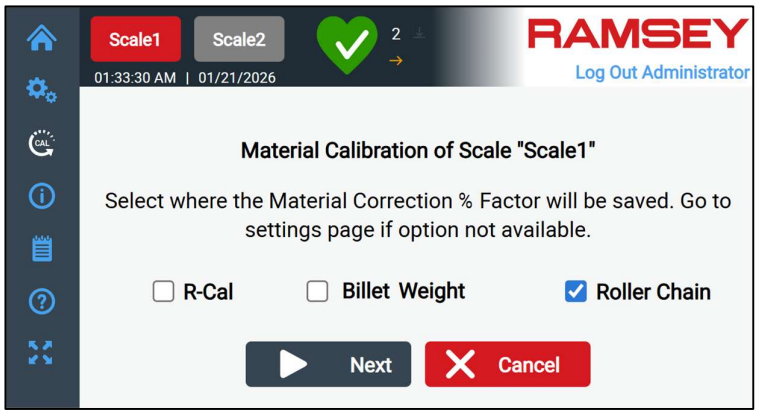


Figure 132 – Select Material Correction Type

If "Next" was selected then the following page is displayed, advising the User to run the belt empty at maximum speed. For convenience the following data is displayed on the screen.

- **Current TPH –** Provided for information. The value being displayed is the calculated Flow Rate measurement. On this page it should be close to zero if the belt is not loaded. If not, then consider redoing the Zero Calibration.
- **Calibrated Belt Load** – Provided for information. The value being displayed is the calculated weight distribution. On this page it should be close to zero if the belt is not loaded. If not, then consider redoing the Zero Calibration.
- **Calibrated Belt Speed** – The existing Calibrated Belt Speed value from the performed "Speed Calibration".
- **Current Belt Speed** – The current as measured Belt Speed.

When ready, Press "Start" to commence the Material Calibration procedure. If the User presses "Cancel" then no changes will be saved or applied.

NOTE 1 – If the TPH or Belt Load are not close to Zero, then exit the Material Calibration and redo a Zero Calibration first.

NOTE 2 - If any of the "Current" values are displayed in RED then this means the measured value is more than 5% different from the stored Calibrated value. Calibration can proceed; it is just a visual warning that the User may want to investigate before proceeding.

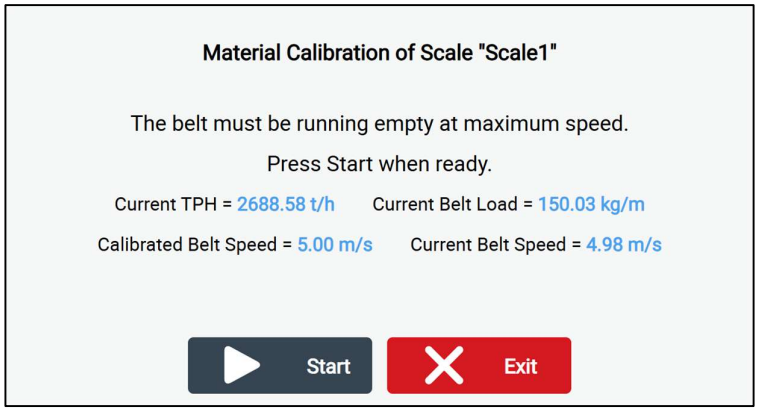


Figure 133 – Material Calibration Start Page

The Material Calibration has now started. The procedure to run a Material Calibration is as follows.

- **Start** – By pressing “Start” on the previous page, the User has started the Material Calibration process. Run the known quantity of material over the scale.
- **Pause** – When the known quantity of material has been run over the scale, and if the material will be reused, press the “Pause” button. Collect the known quantity of material and take it back to the start of the conveyor.
- **Resume** – Re-run the known quantity of material over the conveyor.
- **Repeat** – Repeat the process as many times as is required to reach the required time and/or tonnages.
- **Complete** – When the required time and/or tonnage has been reached the User can press the “Complete” button to stop the Material Calibration.
- **Cancel** - At any time, if the User presses “Cancel” then no changes will be saved or applied.

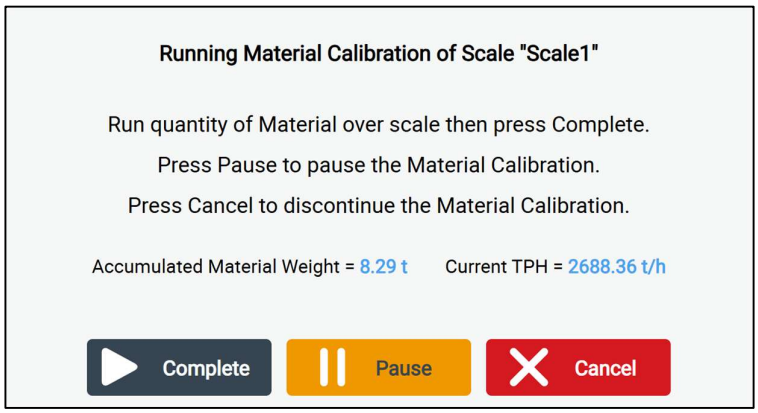


Figure 134 – Material Calibration Progress Page

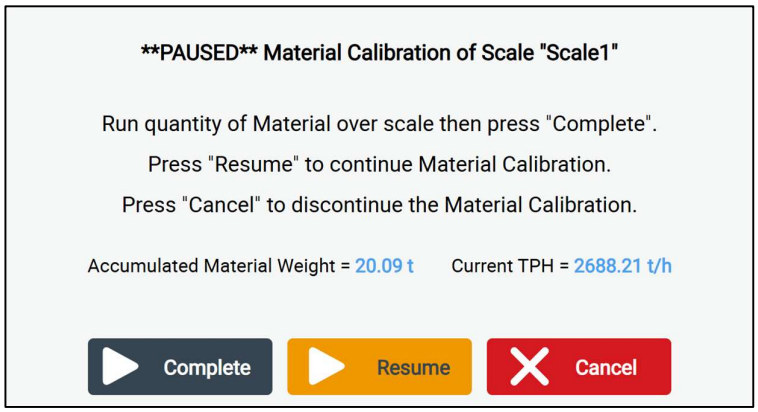


*Figure 135 – Material Calibration Progress Page **Paused***

The following page prompts the User to enter in the verified amount of material that was used to perform the Material Calibration.

- **Measured Weight with Current Span Calibration** – The weight of material the Ramsey Flex Integrator has calculated over the weighing area. This is based on the existing Span Constant value.
- **Actual Material Weight** – The User is to enter this value into the data field. It is the amount of material of a known weight run over the weighing area.
- **Material Weigh Error** – This value is automatically calculated when the "actual Material Weight" value is entered by the User. Note the following.
    - Negative % Value – This means the current system is under-reporting the weight.
    - Positive % Value – This means the current system is over-reporting the weight.

Press "Yes" to accept the the value of Material Correction % Factor or "No" to reject the Material Correction % Factor, no changes will be saved or applied.

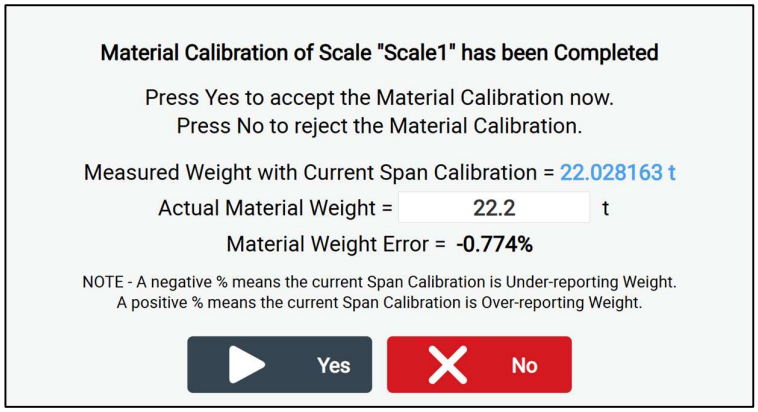


Figure 136 – Material Calibration Complete

If the Material Calibration was applied, then this page confirms the Span Constant has been changed. The old Span Constant and new Span Constant values are displayed.

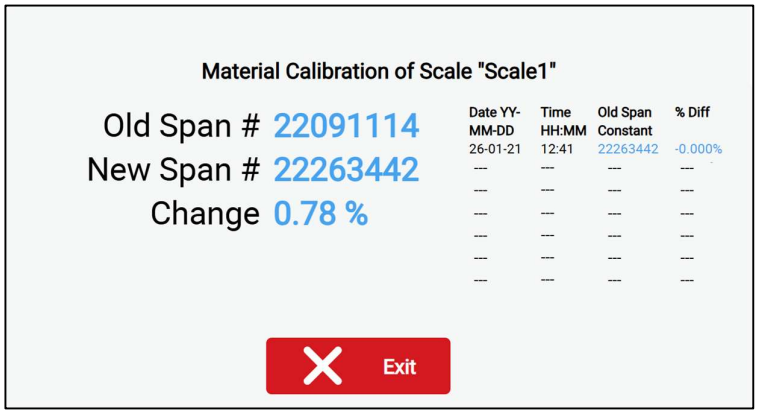


Figure 137 – Material Calibration Changed

NOTE – The new Span Constant value is the existing Span Constant value adjusted by the new Material Correction % Factor.

The following page will ask the User if they wish to add the Tonnage to the Ramsey Flex Integrator total.

Pressing Yes or No will take the User back to the Main Calibration page. The Material Calibration has been compelted.

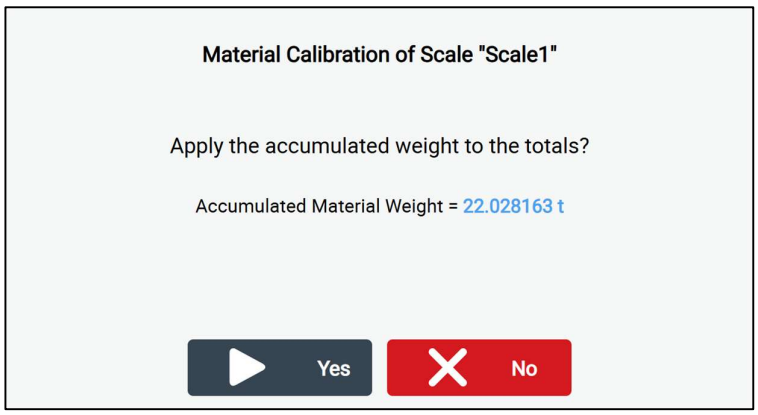
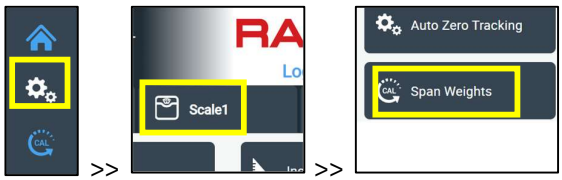


Figure 138 – Apply Accumulated Tonnage

To check if the Calibration was sucessfully applied the User can go back to the “Span Calibration Settings” page and verify the “Material Correction % Factor” value was updated for the Span Type that was selected at the start of the Material Calibration process.



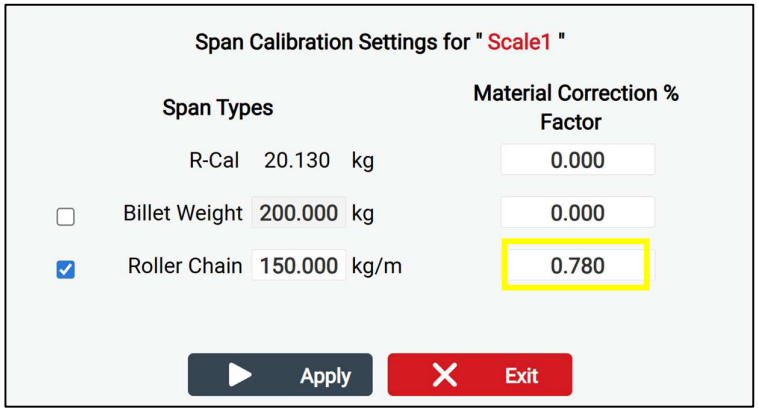


Figure 139 – Material Correction Factor successfully applied

Chapter 10
General Settings Page

Overview of General Settings Page

This chapter describes the Ramsey Flex Integrator Menu structure for the Settings Page. This will allow the User to navigate the Ramsey Flex Integrator to find the required settings or functions to modify the Ramsey Flex Integrator General Settings.

General Tab

The screen below is known as the Settings Page. It can be accessed by pressing the “Gear” icon from the left-hand navigation menu. The General Tab Is shown by default. The General Page Tab has the following options.

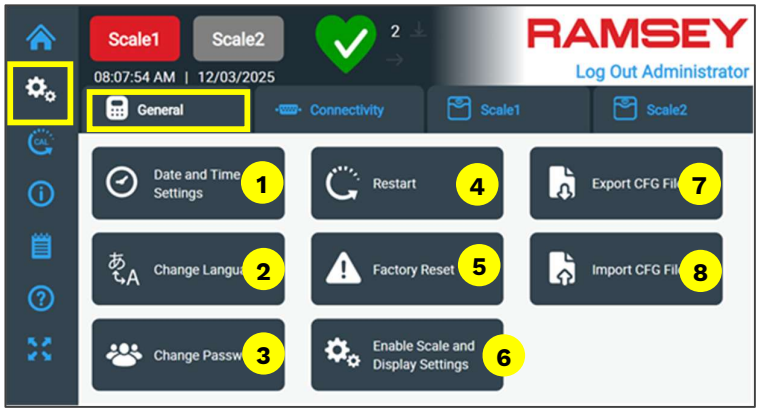


Figure 140 - General Tab

The Options available on the General Tab are:

1. **Date and Time Settings** – Change the date and/or time of the Ramsey Flex Integrator, also change the date and time settings from 12 to 24 hour clock for example.
2. **Change Language** – Change the display language settings.
3. **Change Password** – Modify the Passwords, note that changing the passwords will require the current Administrator password. If this has been lost a temporary reset passcode is required, contact your Ramsey by SRO Technology distributor.
4. **Restart** – Power cycle the integrator.
5. **Factory Reset** – This will reset all the settings back to factory defaults. The unit will restart and take the User back to the initial Wizard setup pages. A new calibration will need to be performed, or the integrator.json file loaded back to the Ramsey Flex Integrator.
6. **Enable Scale and Display Settings** – Enable Scale1 and/or Scale2. Modify the damping values for Flow Rate, Speed and Weight per Unit Length on the Display and in Industrial Protocol data.
7. **Export CFG File** – Export the configuration integrator.json file.
8. **Import CFG File** - Import the configuration integrator.json file.

Setting the Date and Time

Please see section Setting Date and Time for more information. Pressing the button (1) “Date and Time Settings” will take the User to the page that will allow the Ramsey Flex Integrator time and date to be set.

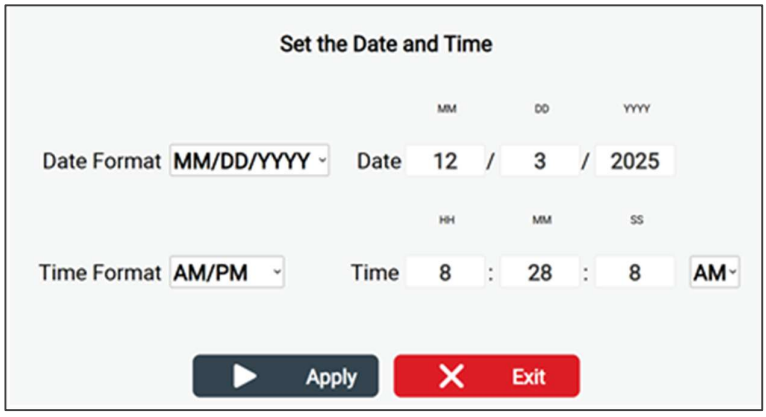


Figure 141 – Date and Time Settings

Pressing any of the number data fields will bring up the number keyboard. In the following example, the “MM” field containing 12 has been selected by the User. The value you want to change will be shown in the horizontal bar just above the keyboard, in this case the number 12 – this is required as sometimes the keyboard can cover the original values you want to change.

- Press Clear to clear the data.
- Press Bksp to delete by backspace one number at a time.
- Press Cancel to exit the keyboard and not change the data field.
- Press Accept to exit the keyboard and change the data field. Note at this point the data is not saved, it has just been changed on the screen.

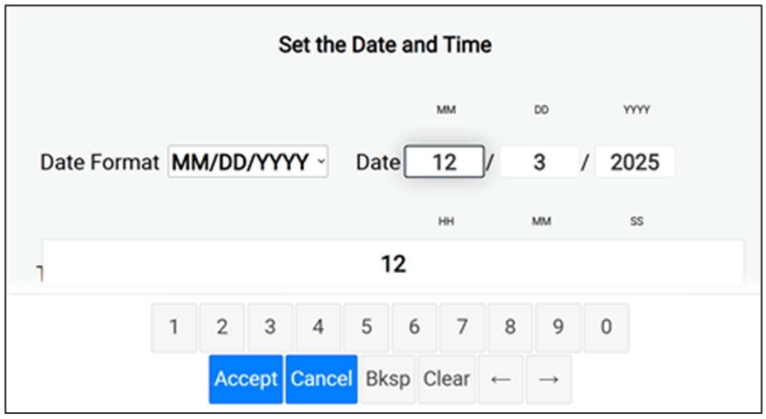


Figure 142 - Altering Date and Time Settings

The date must be entered in MM/DD/YYYY format, but it can be displayed in any of the following options on the Ramsey Flex Integrator interface. Select an option from the drop-down menu.

- MM/DD/YYYY
- DD/MM/YYYY

- YYYY/MM/DD

The time must be entered in 12-hour (AM/PM) format, but it can be displayed in any of the following three options on the Ramsey Flex Integrator interface. Select an option from the drop-down menu.

- AM/PM
- 24 Hour

Press Apply to save the changes or Exit to not save the changes and exit the page. If Exit is pressed, then any data entered will not be saved and if the User returns to the Date and Time page the current date and time settings will be shown.

Change Language

The default language shown in the Ramsey Flex Integrator display is English. You can, however, choose other languages.

Pressing the button (2) “Change Language” will take the User to the page that will allow the Ramsey Flex Integrator language to be set. Press the up or down ~~chevron~~ arrow to scroll through the language options. The language selection page looks as follows.

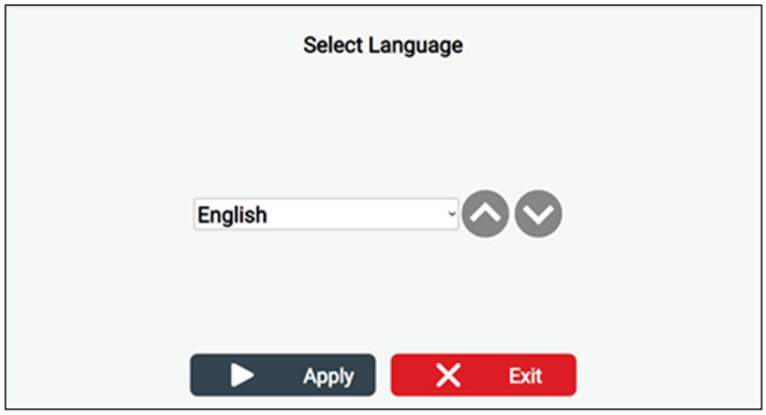


Figure 143 - Language Settings

Language options available in the drop-down menu include.

- English
- Italiano
- Español
- Français
- Deutsche
- Portugues do Brasil
- 简体中文
- 한국어
- Русский
- Türk
- عربی
- Український

If you cannot see the language option in the drop-down menu, you can also press the Up or Down arrow to scroll through the options.

Press Apply to save the changes or Press Exit to not make any changes and leave the page. If Exit is pressed, then any language option selected will not be saved and if the User returns to the Date and Time page the current date and time settings will be shown.

Change Password

Pressing the button (3) “Change Password” will allow the Ramsey Flex Integrator to have its password changed. The following page will appear. To change any of the passwords, the Administrator password must be entered.

By Default these are the Passwords set at the factory or after a Software update.

- Administrator – 726739 (Ramsey) or 000000.
- Service – Not Set.
- Operator – None.

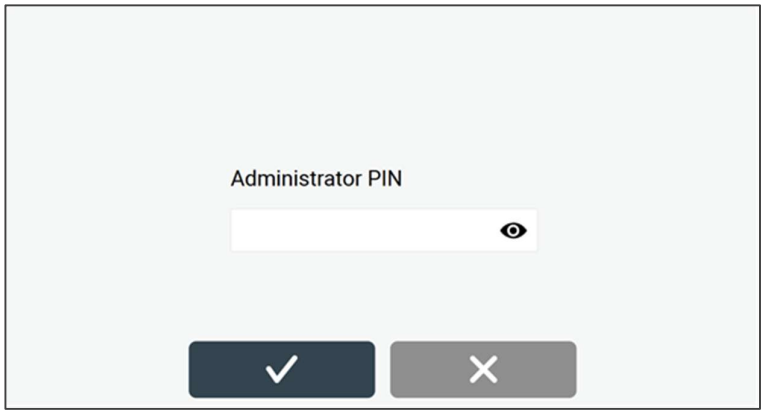


Figure 144 - Enter Administrator Password to reset Passwords

The following page will appear, prompting the User to select which password they would like to modify. The options are Administrator, Service or Operator.

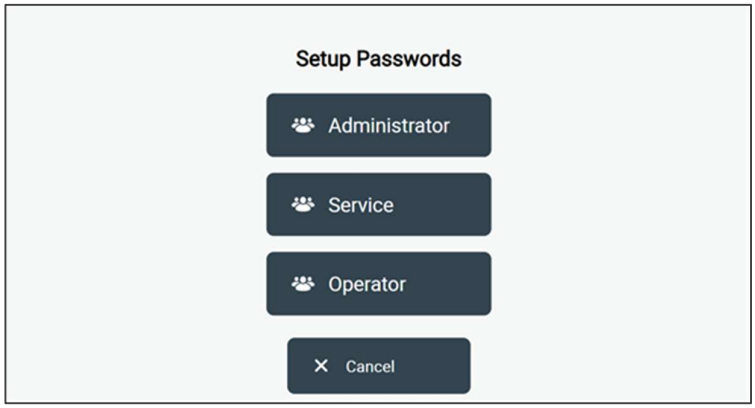


Figure 145 - Select the Password to update

If the User has lost or forgotten the password, then a password reset code will need to be generated by SRO Technology. SRO Technology will need the device Date and Machine Code information. This can be found on the login page in the top left-hand corner as shown in (1) below.

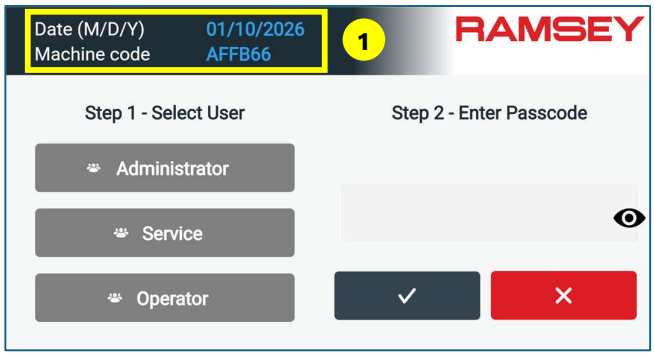


Figure 146 – Parameters required for Master Password reset

Restart the Integrator – Option 1

Pressing the (4) “Restart” button on the touchscreen will bring up a prompt asking the User if they wish to proceed with a restart. Pressing “Yes” will restart the Ramsey Flex Integrator, pressing “No” will make the orange pop-up box go away and nothing further will happen.

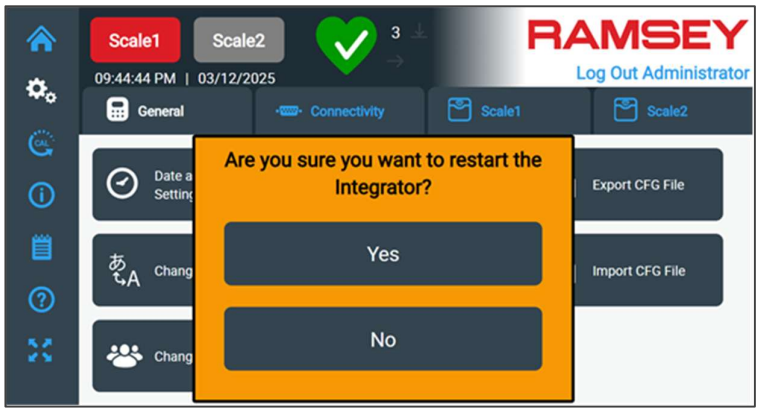


Figure 147 – Restart Ramsey Flex Integrator

Restart the Integrator – Option 2

Alternatively, the Ramsey Flex Integrator can be restarted by pressing the restart button on the PCB. The button can be found beside the USB connection as shown in (1) below.

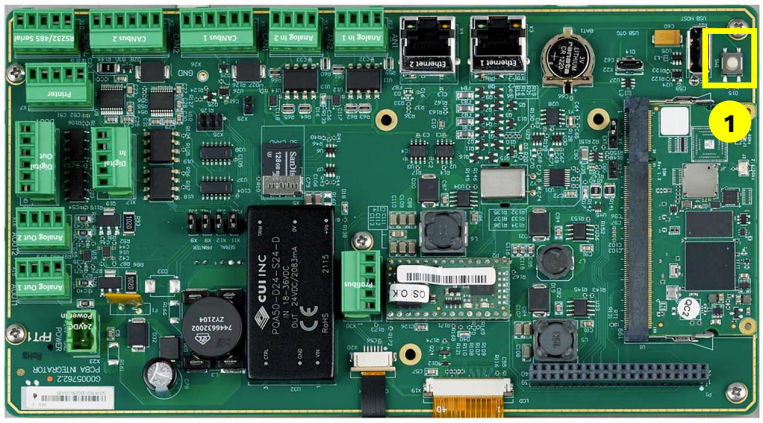


Figure 148 – Location of Hardware Button to Restart Integrator

Performing a Factory Reset (Cold Start)

When a Factory Restart (Cold Start) is performed to the Ramsey Flex Integrator the devices internal memory is erased and everything is returned to its initial default start-up state.

Pressing the (5) “Factory Reset” button on the touchscreen will bring up a prompt asking the User if they wish to proceed with the factory reset and suggesting a backup of the configuration file should be made first. Pressing “Next” will take the User to the confirmation page where the User is asked again to confirm if a Factory Reset should be performed. Pressing “Yes” will restart the Ramsey Flex Integrator with default factory settings, pressing “No” will make the orange pop-up box go away and nothing further will happen

A ”Factory Reset” will not do the following operations.

1. Reset the Master Totalizer. This can only be done by following the Reset Master Totalizer procedure.
2. Reset the Audit Log. The Audit Log can never be reset.

Performing a “Factory Reset” will remove all User settings. However, the original settings can still be found in the “Audit log” page.

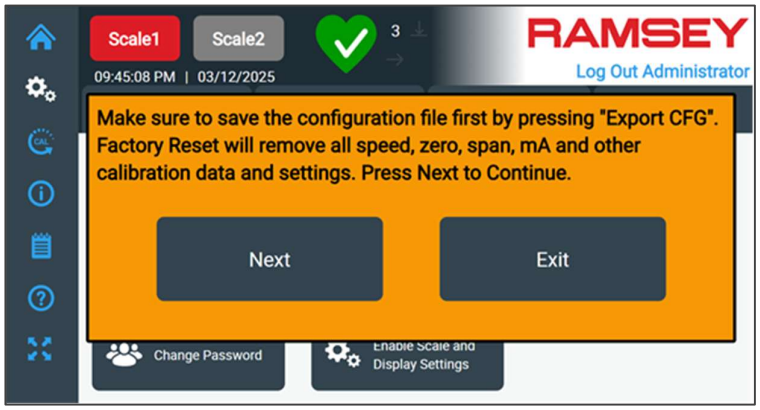


Figure 149 – Confirmation of Factory Reset

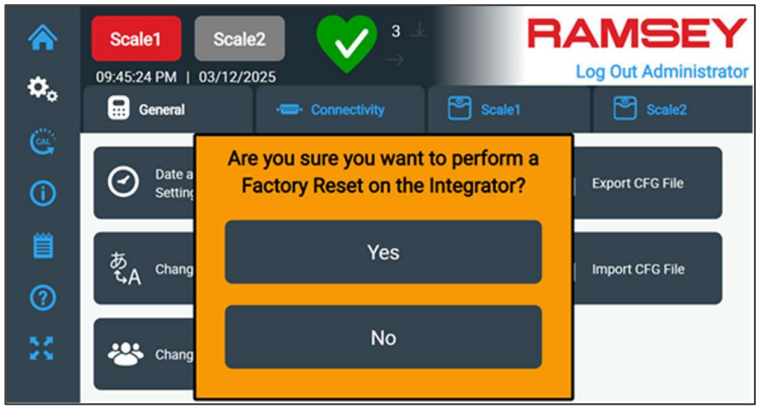


Figure 150 – Factory Reset Ramsey Flex Integrator

Enable Scale 1 or 2

Pressing the (6) button “Enable Scale and Display Settings” on the touchscreen will bring up the following page.

Alter Screen or Industrial Damping

On the left side are two check boxes “Scale 1 Enable” and “Scale 2 Enable” that are used to enable or disable the scales used. To enable a single scale check “Scale 1 Enable”, to enable a dual scale check “Scale 1 Enable” and “Scale 2 Enable”.

On the right side are a number of number fields that enable damping times to be entered. The damping algorithm is a simple time-based averaging where the readings are captured and then averaged over the time the User selects.

Adjusting either of these values will have **NO** impact on the totalization values. Its function is purely to smooth out data for visual HMI purposes.

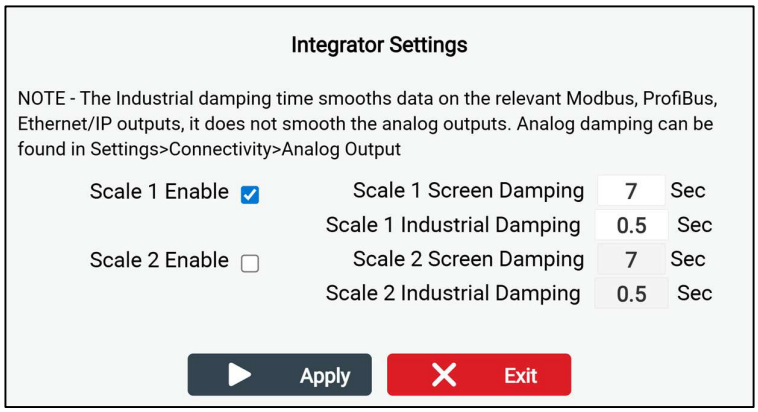


Figure 151 – Integrator Settings Page

Screen Damping – Adjusting the Screen Damping values will alter the values displayed on the front screen, these being the Flow Rate, Weight and the Belt Speed. These values are shown in the following image. It will also alter the following Modbus Registers.

- Belt Speed Display (40011)
- Flow Rate Display (40013)
- Weight Display (40015)

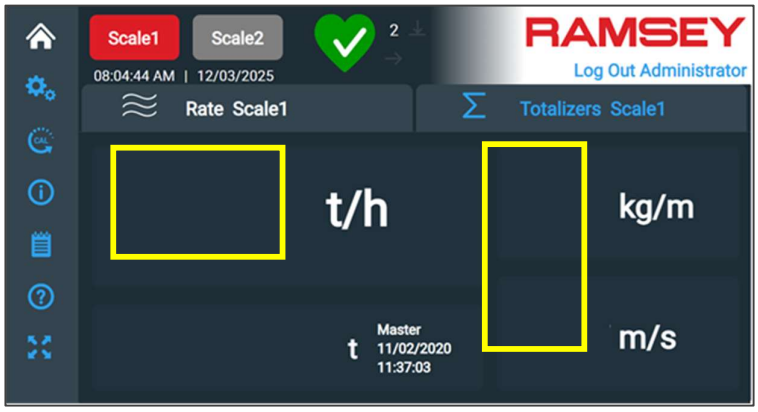


Figure 152 – Values altered by modifying Screen Damping values

Industrial Damping – Adjusting the Industrial Damping values will alter the Flow Rate, Weight and the Belt Speed of the following Modbus, ProfiBus and Ethernet/IP registers.

- Modbus
  1. Belt speed (industrial IO) (40017)
  2. Flow rate (industrial IO) (40019)
  3. Weight (industrial IO) (40021)
- ProfiBus
  1. Integrator.Scale1.Industrial Belt speed
  2. Integrator.Scale1.Industrial Flow rate
  3. Integrator.Scale1.Industrial Weight
- Ethernet/IP
  1. Industrial Belt speed (56)
  2. Industrial Flow rate (60)
  3. Industrial Weight (64)

Export the Configuration (CFG) File

Pressing the (7) button “Export CFG File” on the touchscreen will export the Integrator.json settings file to a remotely connected PC computer or to the USB key plugged into the Ramsey Flex Integrator.

What is the Integrator.json file?

The Integrator.json file contains all the User defined settings for the Ramsey Flex Integrator, such as Zero, Span, Belt Speed calibrations plus settings such as what Inputs and outputs are setup to do.

The Integrator.json file can be opened with Notepad and will look similar to the following first few lines of a typical settings file.


```
{"Integrator,Time bias,FLOAT":-3.049999952316284,"Initialized,BOOL":true,"Language,INT":0,"Date format,INT":0,"Time format,INT":0,"Float
format,INT":0,"Measurement type,INT":1,"Industrial
protocol,INT":1,"IO.Analog,Input1,INT":0,"IO.Analog,Input2,INT":0,"IO.Analog,Output1,INT":0,"IO.Analog,Output2,INT":0,"IO.Analog,Input1Type,INT":1,"
IO.Analog,Input2Type,INT":1,"IO.Analog,Output1Type,INT":1,"IO.Analog,Output2Type,INT":1,"IO.Analog,Output1%toADC,FLOAT":4095,"IO.Analog,Output2%
toADC,FLOAT":4095,"IO.Digital,Input1,INT":0,"IO.Digital,Input2,INT":0,"IO.Digital,Input3,INT":0,"IO.Digital,Input4,INT":0,"IO.Digital,Output1,INT":0
,"IO.Digital,Output2,INT":0,"IO.Digital,Output3,INT":0,"IO.Digital,Output4,INT":0,"Printer.Serial,Port,STRING":"/dev/ttySC0","Printer.Serial,Baud,IN
```


Figure 153 – Example of Integrator.json file

Save Settings File to Remotely Connected Device

If remotely connected to a PC computer (or tablet, or phone) then the Ramsey Flex Integrator will save the file to this remote device. Where it saves the file will depend on how you have the browser configured. If you have the browser configured to save files to a specific location, then it will save the Integrator.json file there. If you have the browser configured to ask the User where to save files, then a page similar to the following will appear. The User should save the Integrator.json file to the desired location.

The steps to save the Integrator.json file are as follows:

- Press the Export CFG file.
- Save the Integrator.json file to the desired location.
- Check the Integrator.json file has been saved successfully. This can be done by opening the file with Notepad.

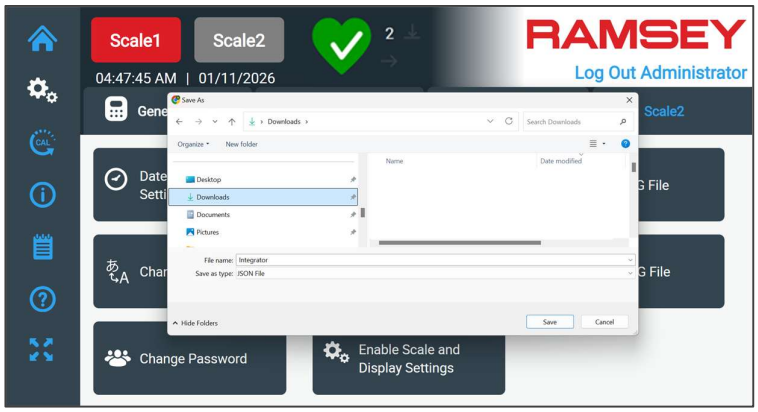


Figure 154 – Saving Integrator.json file

Save Settings File to a connected USB Key

If saving to a USB key on the actual Ramsey Flex Integrator, then follow these steps:

- Insert a USB key into the USB port on the rear of the PCB. In the picture below this is labelled as (1). Any modern USB key formatted for FAT32 will work.
- Press the Export CFG file.

- Wait a few seconds, then press the Close button.
- Remove the USB key. There is no requirement to eject the key.
- Plug the USB key into a computer and check the Integrator.json file has been saved successfully. This can be done by opening the file with Notepad.
- Read Note below.

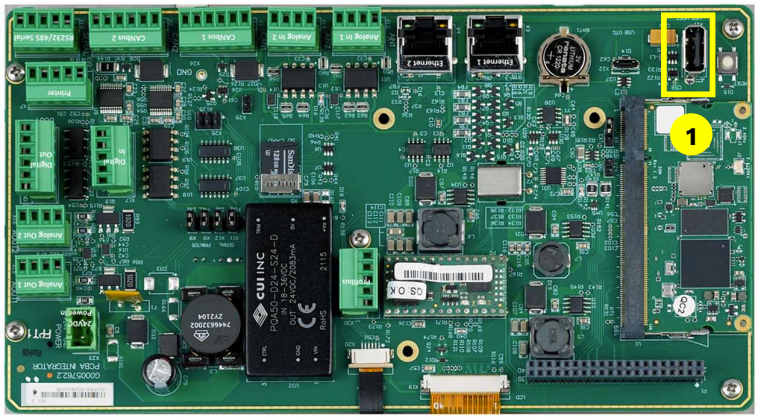


Figure 155 – Location of Hardware USB port

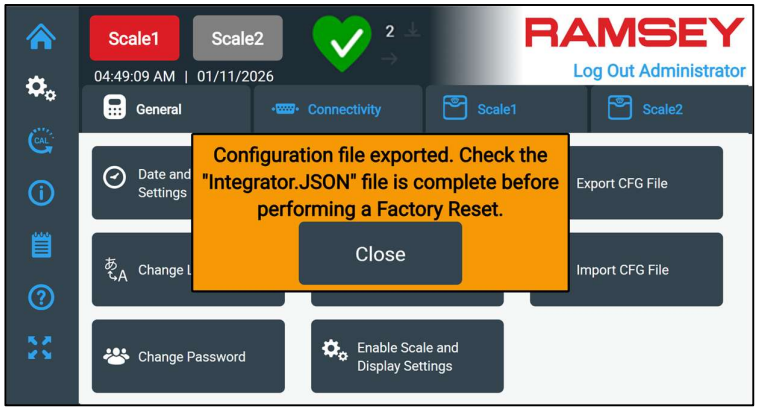
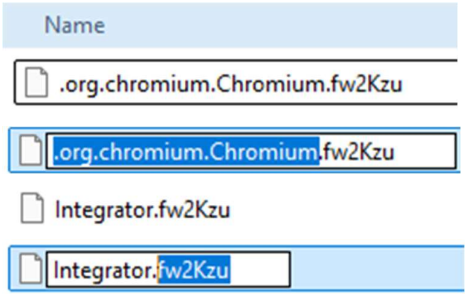
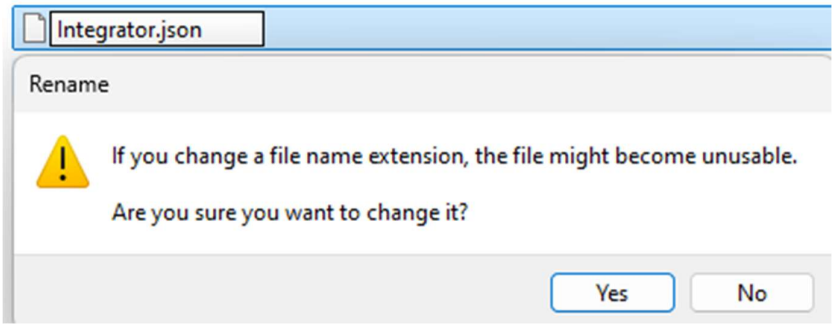


Figure 156 – Confirmation of Integrator.json export

Note. On occasion the Ramsey Flex will save the Integrator.json file with a file name that is not Integrator with a file extension that is not .json– for example something like .org.chromium.Chromium.fw2Kzu. **If this occurs, don't worry!** Just rename the file name within a PC to Integrator and the extension to .json. Make sure to open the file with notepad once this has been completed and ensure data is present.



- File name not saved correctly.
- Change file name to Integrator.
- Change extension to .json Press Yes if prompted.



Import the Configuration (CFG) File

Pressing the (8) button “Import CFG File” on the touchscreen will import the Integrator.json settings file from a remotely connected PC computer or from the USB key plugged into the Ramsey Flex Integrator.

Importing the Integrator.json file will automatically restart the integrator. This behaviour is normal.

Load Settings File to Remotely Connected Device

If the Ramsey Flex Integrator is remotely connected to a PC computer (or tablet, or phone) then the Integrator.json file can be loaded from this remote device.

The steps to load the Integrator.json file are as follows:

- Press the Import CFG file button.
- Press the “Choose File” button (1).
- Navigate to the location the Integrator.json file is saved, then select the file (2).
- Press the “Import” button (3).
- The Ramsey Flex Integrator will reboot automatically.

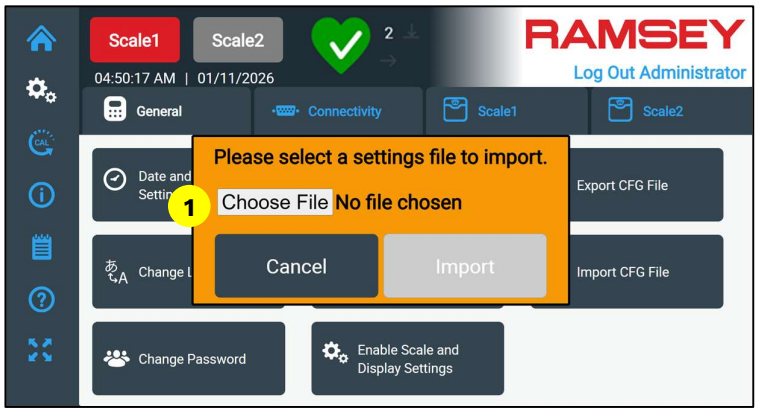


Figure 157 – Choose Integrator.json file to Import

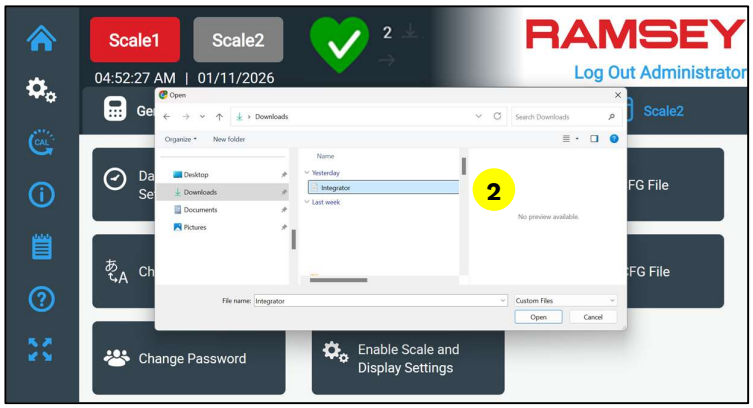


Figure 158 – Location of Integrator.json file to Import

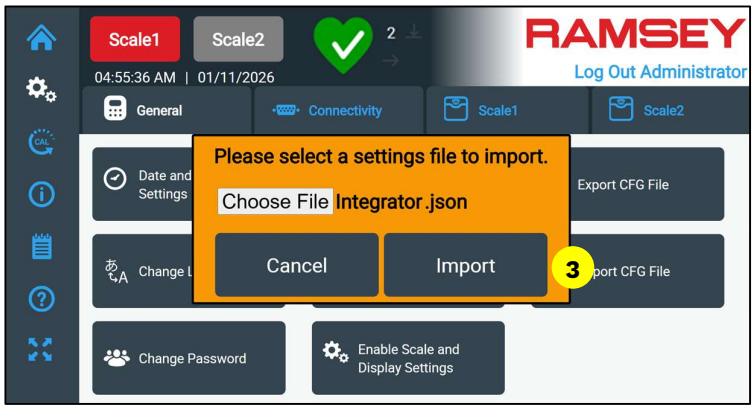


Figure 159 – Import Integrator.json file

Load Settings File the Ramsey Flex integrator

The instructions to load from a USB key is similar. If loading from a USB key on the actual Ramsey Flex Integrator, then follow these steps:

- Copy the Integrator.json file to a USB key.
- Insert the USB key into the USB port on the rear of the PCB. The location of the USB port is the same as used for saving the file (see above for location of USB port).
- Press the Import CFG file.
- Press the “Choose File” button.
- On the Ramsey Flex touchscreen a window will appear that somewhat resembles Windows Explorer.
- Press the up button (1) until you get to the root directory “/” (/www/pages is not the root directory, /www is also not the root directory, it should just say /)
- Find the folder called “Downloads”. You may need to scroll up or down to find it. You can order the list by pressing above the file names in the box called “Filename”.
- Open the Download folder by pressing Downloads (2) then Open (3).
- In this folder will be the Integragtor.json file (4). Highlight it then press Open (5).
- Press the “Import” button.
- The Ramsey Flex Integrator will reboot automatically.

The following images are camera pictures from an actual Ramsey Flex Integrator HMI screen, so resolution and appearance are different to previous screens.

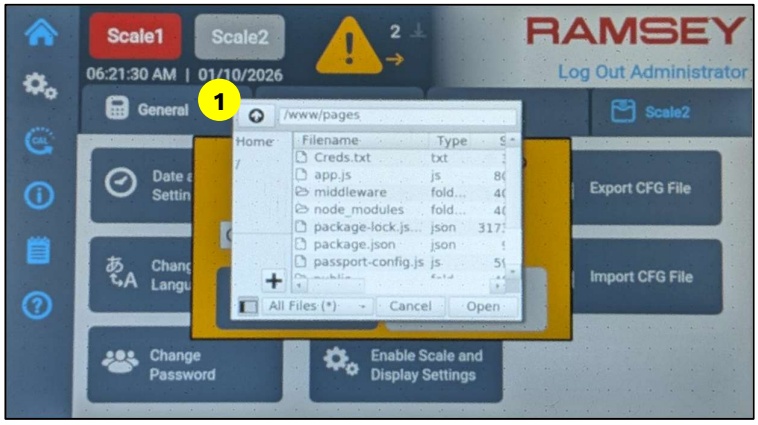


Figure 160 – Folder Structure

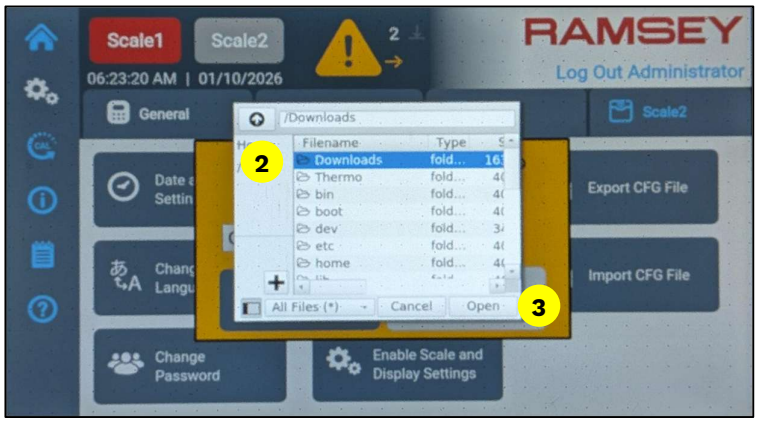


Figure 161 – Select Downloads Folder

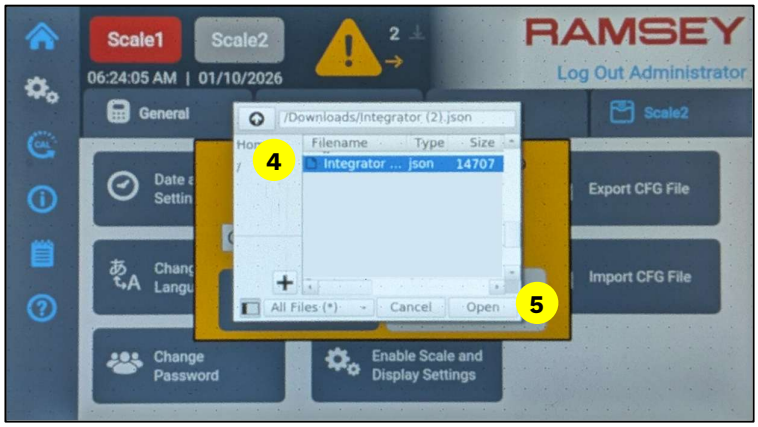


Figure 162 – Select Integrator.json file to Import

End of General Settings

This is end of the General Settings Chapter. It has covered how to setup the Ramsey Flex Integrator settings such as Date, Time and Language Settings.

Chapter 11
Connectivity Settings Page

Overview of Connectivity Setting Page

This chapter describes the Ramsey Flex Integrator Communication Setup Page structure. This will allow the User to navigate the Ramsey Flex Integrator to find the required Communication setup information.

Connectivity Tab

The screen below is known as the Connectivity Page. It can be accessed by pressing the “Gear” icon from the left-hand navigation menu, then pressing the “Connectivity” tab. The Connectivity Page Tab has the following options.

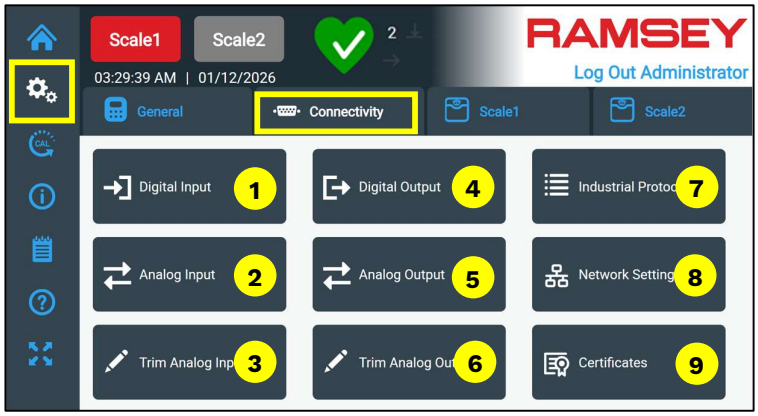


Figure 163 – Connectivity Tab

The Options available on the Connectivity Tab are as follows.

1. **Digital Input** – Change the Digital Input settings, such as what the input triggers and if the Digital Input is Active High or Active low.
2. **Analog Input** – Change the Analog Input settings, such as what the input triggers, is it a voltage or current input and what is the averaging time of the Analog Input.
3. **Trim Analog Inputs** – This page can be used to improve the accuracy of the default Analog Inputs.
4. **Digital Output** – Change the Digital Output settings, such as what the output triggers and if the Digital Output is Normally Open (N/O) or Normally Closed (N/C).
5. **Analog Output** – Change the Analog Output settings, such as what data is sent over the Analog Outputs, is it a voltage or current output and what is the averaging time of the Analog Output.
6. **Trim Analog Outputs** – This page can be used to improve the accuracy of the default Analog Outputs.
7. **Industrial Protocols** – Change the Industrial Protocols used on the Ramsey Flex integrator. The current options are:
   - Modbus (TCP and RTU).
   - Ethernet/IP.
   - ProfiBus – Requires additional communication module.
8. **Network Settings** – Set the IP address as Dynamic or Static, allow Static IP address, Subnet Mask and Gateway to be set.
9. **Certificates** – Generate a CSR certificate and upload a CA certificate.

NOTE – For Software V1.5B, ProfiNet has been removed as a communication option.

Digital Input

Pressing the button “Digital Input” (1) on the touchscreen will bring up the following page. The Ramsey Flex Integrator has 4 x Digital Inputs that are User defined.

- **Type** – The top row describes what the input does. By default, all options are setup as “Unassigned”. For the Ramsey Flex Integrator, the only option currently available is to turn on or off the simulated belt speed for Scale 1 “Scale #1 Belt Moving” or Scale 2 “Scale #2 Belt Moving”.
- **State** - The second row describes what the state of the Input is when triggered or not triggered. The options are:
    - Active High (Default) – When the Hardware Input is not triggered, then the Software Input is also not triggered (for example, if the Input signal from PLC is off, the Scale #1 Belt Moving Signal is OFF).
    - Active Low – When the Hardware Input is not triggered, then the Software Input is triggered (for example, if the Input signal from PLC is off, the Scale #1 Belt Moving Signal is ON)

Press “Apply” to accept the changes. If the User presses “Exit” then no changes will be saved or applied.

There is a grey button to the left with text “Press Here to Test Digital Inputs”. Pressing this button will take the User to the page in the integrator where the Inputs can be tested. If the User presses this button, then no changes will be saved or applied.

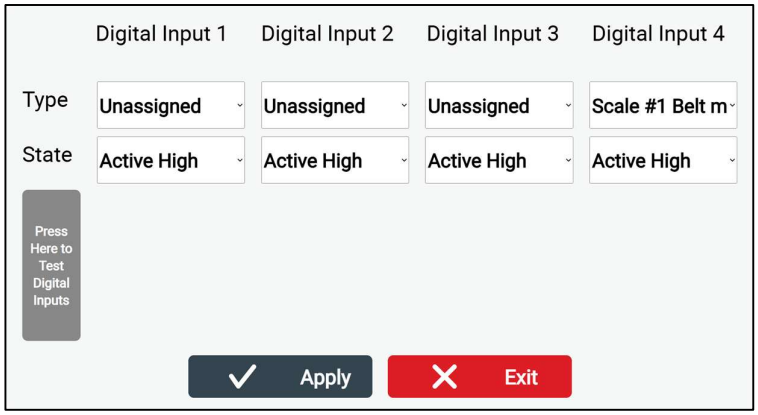


Figure 164 – Digital Input

Analog Input

Pressing the button “Analog Input” (2) on the touchscreen will bring up the following page. The Ramsey Flex Integrator has 2 x Analog Inputs that are User defined.

- **Type** – The type row describes what the input does. By default, all options are setup as “Unassigned”. The current version of the Ramsey Flex Integrator Software V1.5B does not have any options for Analog Inputs but may be added to in the future.
- **Range** - The second row describes what type of Analog Input is used and what the Range of the Input is.
    - 0-20mA – The Analog Input will be setup for a Current style input, with a minimum input value of 0mA and the maximum Input value of 20mA.

- 4-20mA (Default) – The Analog Input will be setup for a Current style input, with a minimum input value of 4mA and the maximum Input value of 20mA. This is the Default option.
- 0-5V - The Analog Input will be setup for a Voltage style input, with a minimum input value of 0VDC and the maximum Input value of 5VDC.
- 1-5V - The Analog Input will be setup for a Voltage style input, with a minimum input value of 1VDC and the maximum Input value of 5VDC.

- **Averaging** - The third row describes the amount of Time Averaging is applied to the Analog Input. This can be used on Analog Inputs that may have some fluctuations. The longer the Averaging the smoother the Input response will be, but the slower it will react to a change in the Input signal. Averaging can be applied in 0.5 second increments from 0 seconds (the default setting) up to a maximum of 30 seconds.

Press “Apply” to accept the changes. If the User presses “Exit” then no changes will be saved or applied.

There is a grey button to the left with text “Press Here to Test Analog Inputs”. Pressing this button will take the User to the page in the integrator where the Inputs can be tested. If the User presses this button, then no changes will be saved or applied.

Note 1 - On the “Averaging” box, if the desired time averaging number is not shown and the User cannot scroll with their finger, press the Up or Down chevrons to the right of the box to scroll through the values.

Note 2 – For Ramsey Flex Integrator with V1.5B Software there are no Analog Inputs currently available.

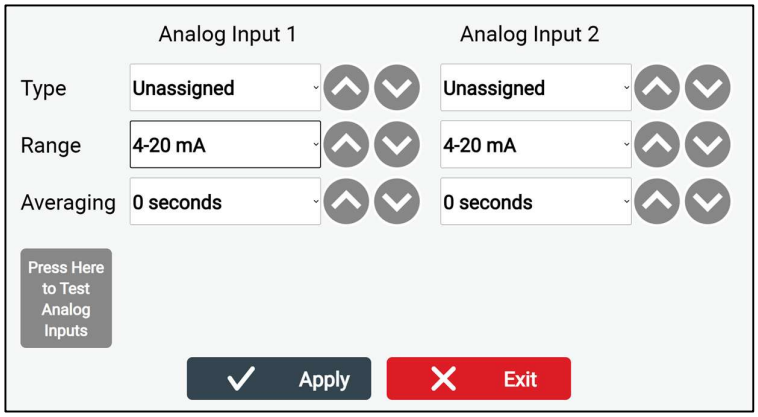


Figure 165 – Analog Input

Trim Analog Inputs

Pressing the button “Trim Analog Inputs” (3) on the touchscreen will bring up the following page where the inputs can be trimmed (if required).

The purpose of the Trimming process is to relate verified external Analog Input values (such as 4mA, 20mA) to the Digital values output from the Analog to Digital Convertor (ADC) chips. Relating these values at two positions allows an equation to be constructed that will convert any Digital ADC value into a calculated Analog Current mA or Voltage V value.

The process to perform a Trim on the Analog Inputs is as follows

1. **Select the Input.** On the top are 4 tabs – Current mA Input 1, Voltage V Input 1, Current mA Input 2 and Voltage V Input 2. Two tabs will be shown in Dark Blue, this selection will depend on how you have set up the inputs on the previous page

(as either Current or Voltage Inputs), while the other two will be shown in Grey. The Input that will be trimmed will have White text shown in the tab, while the Not Selected Input will have Blue text. In the image below, Trimming will be performed on Input 1 that has been setup as a mA Current input.

2. **Measured Input Value** – Based on the existing Slope and Offset values, this will display what the integrator thinks the mA or Voltage on the Input is.
3. **Slope and Offset** – These are two values that need to be determined by the Trimming process. These two values allow the Digital value output from the ADC to be turned into a calculated Analog Current mA or Voltage V value.
4. **Raw ADC Value** – The Analog Current or Voltage is converted to a Digital value using an Analog to Digital Convertor (ADC). The raw ADC value is shown here.
5. **Verified Input Value** – In this data field the User needs to enter the verified Input value. Accuracy of the Trimming process relies on the accuracy of this measurement.
6. **Add Button** – Pressing this button will add the Input measurement ADC Digital Value and User entered Analog Value into the table used to calculate the new Slope and Offset values.
7. **Measurement Table** – Each time the "Add" button is pressed a new line of data is added to this table.
8. **Buttons** - On the bottom is 4 buttons, the function of each is as follows.
   - Instructions – Press this button will provide instructions on performing the Input calibration
   - Confirm - Press "Confirm" and the Slope and Offset will be recalculated based on the data entered by the User and saved to the reference value table.
   - Exit - If the User is not happy with the reference values in the table, press "Exit" and no changes will be saved. The page will be exit. The User can re-enter and start again.
   - Default – Press this button to restore the original default factory Slope and Offset values.

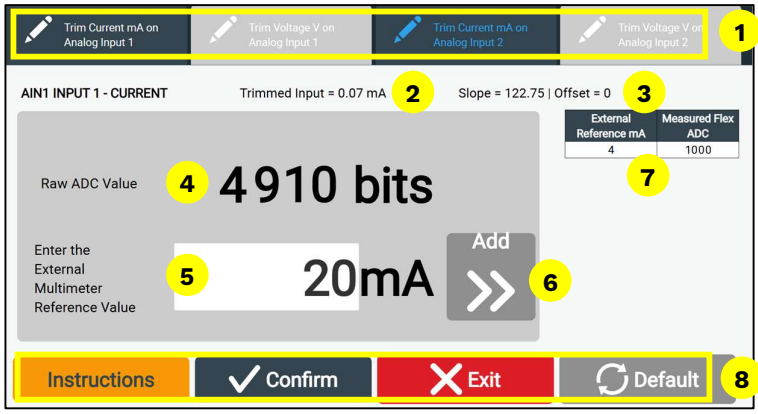


Figure 166 – Analog Input Calibration

The process for performing an Analog Input Trim is as follows.

1. Ensure the Analog Inputs have been configured with the desired Current mA or Voltage V type. Refer to previous section on how to do this.
2. Connect the Current mA or Voltage V Analog reference source to Input that needs to be Trimmed. There are connector markings on the board or refer to Hardware section of the manual for further information. The Analog Input should come from

a calibrated process meter or should come from a PLC with a calibrated Multimeter measuring the value at the Ramsey Flex Integrator.

3. Select the Tab at the top that corresponds to the Input being trimmed.
4. Set the Input to the first reference value. A minimum of two values is required to perform a Trimming, these would normally be at 4mA and 20mA for Current and 1V and 5V for Voltage. More than two values can be entered, but the curve fitting is linear and is a line of best fit, therefore two measurements at each end is normally sufficient.
5. Enter the verified Analog value in the Data Field.
6. Press Add. It will appear in the table.
7. Repeat the process for the second reference value. You will end up with two lines minimum in the right-hand table.
8. If the User is happy with the entered data, press “Confirm” and the Slope and Offset will be recalculated. An Orange box will appear verifying the Input has been trimmed. The Slope and Offset values will also have changed. Press “Exit” to leave the page without saving the settings.

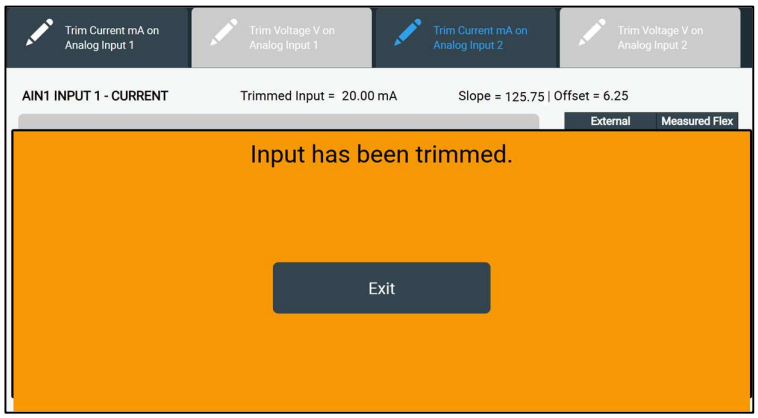


Figure 167 – Analog Input Calibration

Digital Output

Pressing the button “Digital Output” (4) on the touchscreen will bring up the following page. The Ramsey Flex Integrator has 4 x Digital Outputs that are User defined.

- **Type** – The type row describes what the Output does. By default, all options are setup as “Unassigned”. For the Ramsey Flex Integrator, these are the Digital Output options:
  - Weight/pulse – Will give a Digital Output pulse when a defined weight of material has passed the weigh frame area.
  - In Fault – If there are any alarms this Output will be triggered.
  - Flow Out of Range – If the Flow rate is outside the min or max values set by the User then this Output will be triggered.
  - Zero Ready – The Output will be triggered if the flow rate is 0.12% or less of the maximum flow rate (NTEP considers it an empty belt or zero ready state if flow rate is under 0.12%).
  - Measurement Stopped - Calibration stopped mid-cycle, usually due to a power event, or belt stoppage. The Integrator needs to have calibration cycle restarted or aborted.
- **State** - The second row describes what the state of the Output is when triggered or not triggered. The options are:

- Normally Open (N/O) (Default) – When the Software Output is not triggered, then the Hardware Output will be Open.
- Normally Closed (N/C) – When the Software Output is not triggered, then the Hardware Output will be Closed.

Press “Apply” to accept the changes. If the User presses “Exit” then no changes will be saved or applied.

There is a grey button to the left with text “Press Here to Test Digital Outputs”. Pressing this button will take the User to the page in the integrator where the Outputs can be tested. If the User presses this button, then no changes will be saved or applied.

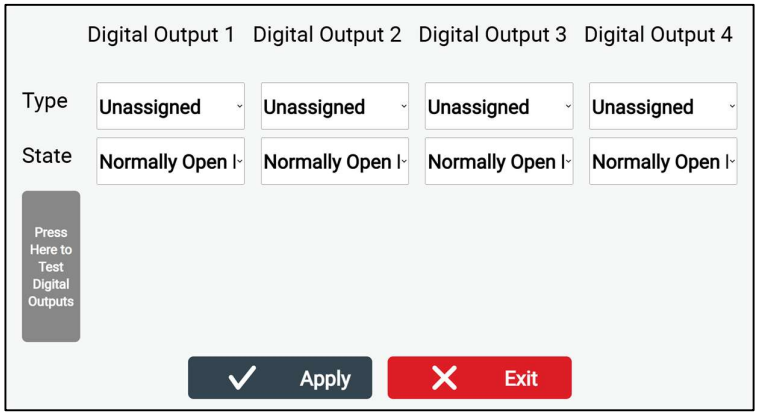


Figure 168 – Digital Output

Analog Output

Pressing the button “Analog Output” (5) on the touchscreen will bring up the following page. The Ramsey Flex Integrator has 2 x Analog Outputs that are User defined.

- **Type** – The type row describes what the input does. The options are as follows:
  - Unassigned (default) – The Output will not do anything.
  - Flow Rate % - The 100% maximum output will be equal to the Maximum Flow Rate value set by the User.
  - Weight % - The 100% maximum output will be equal to the Maximum Weight value that is calculated based on the Maximum Flow Rate and Belt Speed.
  - Belt Speed % - The 100% maximum output will be equal to the Maximum Belt Speed value set by the User.
- **Range** - The second row describes what type of Analog Input is used and what the Range of the Input is.
  - 0-20mA – The Analog Output will be setup for a Current style output, with a minimum output value of 0mA and the maximum output value of 20mA.
  - 4-20mA (Default) – The Analog Output will be setup for a Current style output, with a minimum output value of 4mA and the maximum output value of 20mA. This is the Default option.
  - 0-5V - The Analog Output will be setup for a Voltage style output, with a minimum output value of 0VDC and the maximum output value of 5VDC.
  - 1-5V - The Analog Output will be setup for a Voltage style output, with a minimum output value of 1VDC and the maximum output value of 5VDC.
- **Averaging** - The third row describes the amount of Time Averaging is applied to the Analog Output. This can be used on Analog Output that may have some fluctuations. The longer the Averaging the smoother the Output response will be, but the slower it will react to a change in the Output signal. Averaging can be

applied in 0.5 second increments from 0 seconds (the default setting) up to a maximum of 30 seconds.

Press “Apply” to accept the changes. If the User presses “Exit” then no changes will be saved or applied.

There is a grey button to the left with text “Press Here to Test Analog Outputs”. Pressing this button will take the User to the page in the integrator where the Outputs can be tested. If the User presses this button, then no changes will be saved or applied.

On the “Averaging” box, if the desired time averaging number is not shown and the User cannot scroll with their finger, press the Up or Down chevrons to the right of the box to scroll through the values.

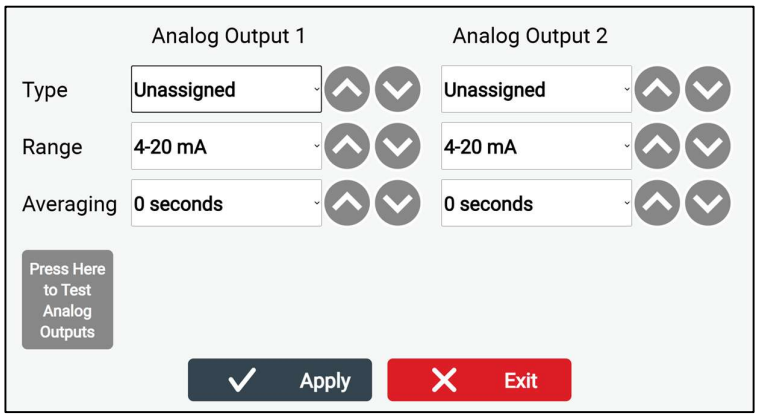


Figure 169 – Analog Output

Trim Analog Outputs

Pressing the button “Trim Analog Outputs” (6) on the touchscreen will bring up the following page where the outputs can be trimmed (if required).

The purpose of the Trimming process is to relate verified measured Analog Output values (such as 4mA, 20mA) to the digital representations of those values being entered into the Digital to Analog Convertors (DAC) chips. Relating these values at two positions allows an equation to be constructed that will convert any Digital DAC value into a calibrated Analog Current mA or Voltage V output value.

The process to perform a Trim on the Analog Outputs is as follows

1. **Select the Input.** On the top are 4 tabs – Current mA Output 1, Voltage V Output 1, Current mA Output 2 and Voltage V Output 2. Two tabs will be shown in Dark Blue, this selection will depend on how you have set up the outputs on the previous page (as either Current or Voltage Outputs), while the other two will be shown in Grey and cannot be selected. The Output that will be trimmed will have White text shown in the tab, while the Not Selected Output will have Blue text. In the image below, Trimming will be performed on Output 1 that has been setup as a mA Current output.
2. **Output Setpoint Value** – Based on the existing Slope and Offset values, this will display what the integrator thinks the mA or Voltage Output is.
3. **Slope and Offset** – These are two values that need to be determined by the Trimming process. These two values allow the Digital value feed into the DAC to be turned into an Analog Current mA or Voltage V signal.
4. **Output Target Value** – In this data field the User needs to enter the Analog value they want to drive the output to.

5. **Set Button** – Pressing this button will drive the Analog Output signal to the value selected by the User.
6. **Verified Output Value** – In this data field the User needs to enter the verified Output value measured by an external calibration device. Accuracy of the Trimming process relies on the accuracy of this measurement.
7. **Add Button** – Pressing this button will add the Target Output Value, the DAC setpoint and measured external Output value into the table used to calculate the new Slope and Offset values.
8. **Measurement Table** – Each time the "Add" button is pressed a new line of data is added to this table.
9. **Buttons** - On the bottom is 4 buttons, the function of each is as follows.
    - Instructions – Press this button will provide instructions on performing the Output calibration.
    - Confirm - Press "Confirm" and the Slope and Offset will be recalculated based on the data entered by the User and saved to the reference value table.
    - Exit - If the User is not happy with the reference values in the table, press "Exit" and no changes will be saved. The page will be exited. The User can re-enter and start again.
    - Default – Press this button to restore the original default factory Slope and Offset values.

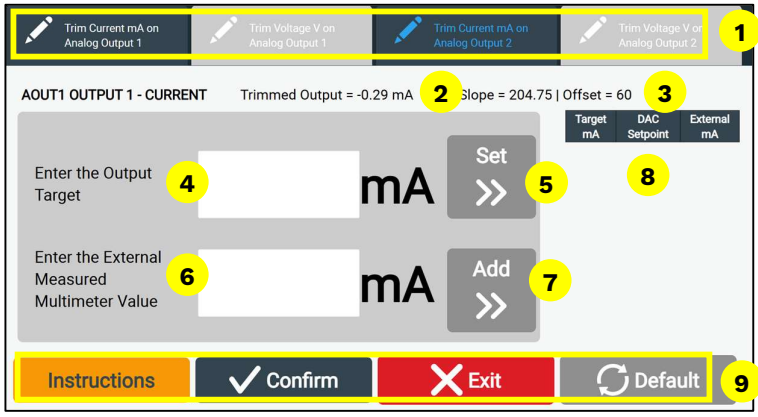


Figure 170 – Analog Output Calibration

The process for performing an Analog Input Trim is as follows.

1. Ensure the Analog Outputs have been configured with the desired Current mA or Voltage V type. Refer to previous section on how to do this.
2. Connect the external calibrated measurement device to the Output that needs to be Trimmed. There are connector markings on the board or refer to Hardware section of the manual for further information. The Analog Output should be measured with a calibrated process meter or Multimeter.
3. Select the Tab at the top that corresponds to the output being trimmed.
4. Enter the first output Target value. A minimum of two values is required to perform a Trimming; these would normally be at 4mA and 20mA for Current and 1V and 5V for Voltage. More than two values can be entered, but the curve fitting

is linear and is a line of best fit, therefore two measurements at each end is normally sufficient.

5. Press “Set”. The output will now be driven to the value entered by the User.
6. From the external calibrated measurement device, enter the reading into this Data Field. What you are doing is telling the Ramsey Flex Integrator what it is actually outputting, as opposed to what it thinks it is outputting.
7. Press “Add”. It will appear in the table.
8. Repeat the process for the second Output Target value. You will end up with two lines minimum in the right-hand table.

If the User is happy with the entered data, press “Confirm” and the Slope and Offset will be recalculated. An Orange box will appear verifying the Output has been trimmed. The Slope and Offset values will also have changed. Press “Exit” to leave the page without saving the settings.

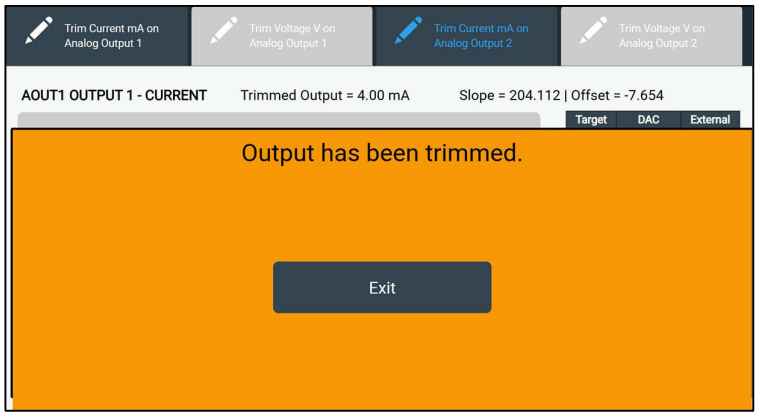


Figure 171 – Analog Output Calibration

Industrial Protocol Setup

Pressing the button “Industrial Protocols” (7) on the touchscreen will bring up the page where the User can select the required Industrial Protocol. The following information is displayed.

- **Communication Method** – This lists out the Industrial Communication options that are available with the Software version loaded on the Ramsey Flex Integrator. For V1.5B these options are available.
  - Modbus TCP and Modbus RTU
  - Ethernet/IP
  - ProfiBus (if the additional hardware module has been purchased)
- **ProfiBus Slave Address** – If the Ramsey Flex Integrator has the additional ProfiBus hardware expansion card installed and ProfiBus is to be used, then the device Slave Address can be modified here.
- **Import Communication Settings** – If there has been a customization made to the Modbus, ProfiBus .gsm or Ethernet/IP file then it can be uploaded here. The

procedure for uploading these files is identical to those found previously in the section on importing a CFG file, so the detailed steps will not be repeated here.

1. Press “Choose File”
2. Navigate to the location the file is stored. The process for navigation from a remotely connected device or from the HMI interface is identical to “Import CFG File” so it is not repeated here.
3. When the file has been selected, press the “Import File” button. The Ramsey Flex Integrator will reboot after the file has been loaded.
4. Press “Apply” to accept the changes, the unit will need to be rebooted. If the User presses “Exit” then no changes will be saved or applied.

- **Export Communications Settings** – Pressing the “Export File” button will export the settings or configuration file for the selected Industrial Protocol.
  - If Modbus is selected, then a .XML file will be exported that contains information on the register locations and also setting information for Modbus RTU.
  - If Ethernet/IP is selected, then a .EDS file will be exported. This is the file that needs to be imported into the Allen Bradley PLC (or equivalent).
  - If ProfiBus is selected, then a .GSM file will be exported. This is the file that needs to be imported into the Siemens PLC (or equivalent).

The register information for Modbus, ProfiBus and Ethernet/IP can be found in Appendix 4/5/6.

Note 1 – The User does not need to contact SRO Technology asking for. eds or .gsm files, they are located on the Ramsey Flex Integrator itself. The User should use the files located on the device to ensure compatibility.

Note 2 – If the Industrial Protocol is changed then the Ramsey Flex Integrator must be rebooted.

Note 3 – If the Static IP was set first, then the Industrial Protocol changed, the Static IP address will need to be re-entered after changing the Industrial Protocol.

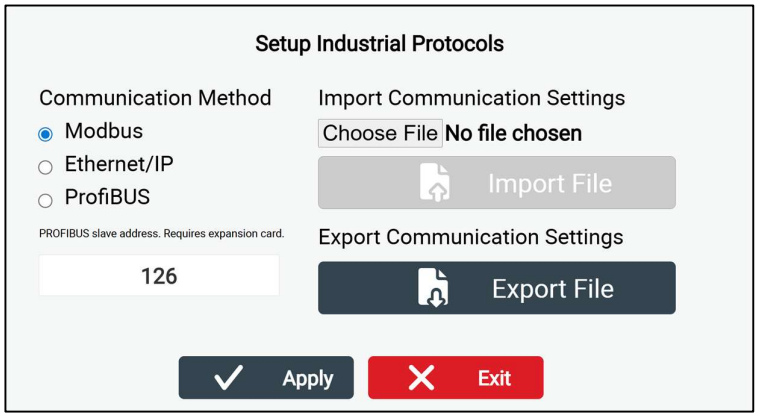


Figure 172 – Setup Industrial Protocols

For Ethernet based protocols the IP address needs to be configured – see the next section. For Modbus RTU the following are the default connection parameters. These can be altered if required but is a manual process.

- Baud Rate = 115200
- Stop Bits = One
- Parity = None
- Data Bits = 8
- Slave IDs are 1 = Scale 1 data, 2 = Scale 2 data, 3 = Integrator data

Press “Apply” to accept the changes. If the User presses “Exit” then no changes will be saved or applied.

Network Settings

Pressing the button “Network Settings” (8) on the touchscreen will bring up the following page. The following information is displayed.

- **“Use a Static IP address” checkbox** – If the checkbox is not ticked then a Dynamic IP address used and all of the listed information is ignored, in fact information cannot be entered if the checkbox is unticked. If the User wants to use a Static IP, then the checkbox needs to be checked. This will allow the values to be altered.
- **Static IP Address** – If a Static IP Address is required, this is where the value is entered. The Ramsey Flex Integrator IP address on the network is fixed and never changes.
- **Subnet Mask** - This tells the Ramsey Flex Integrator which part of the Static IP address is the network, and which part is your specific device ID. Normally this is set to 255.255.255.0
- **Gateway** - This is the IP address of the router the Ramsey Flex Integrator is connected to.
- **DNS #1 and DNS #2** - DNS stands for Domain Name System. These are the Primary and Secondary backup. By default, these are set to Google: 8.8.8.8 (primary) and Google: 8.8.4.4 (secondary). These are public recursive DNS servers — meaning any device anywhere in the world can send DNS queries to them. These should not be altered unless required for network configuration.

Press “Apply” to accept the changes. If the User presses “Exit” then no changes will be saved or applied.

NOTE – If a Static IP address has previously been entered and the page is reloaded then the checkbox will be ticked but the values for Static IP, Subnet etc cannot be modified. This is by design to prevent accidental modification of the values and thereby a disruption of Ethernet communications. To modify the values, untick and then retick the checkbox. The values for Static IP, Subnet etc can now be modified.

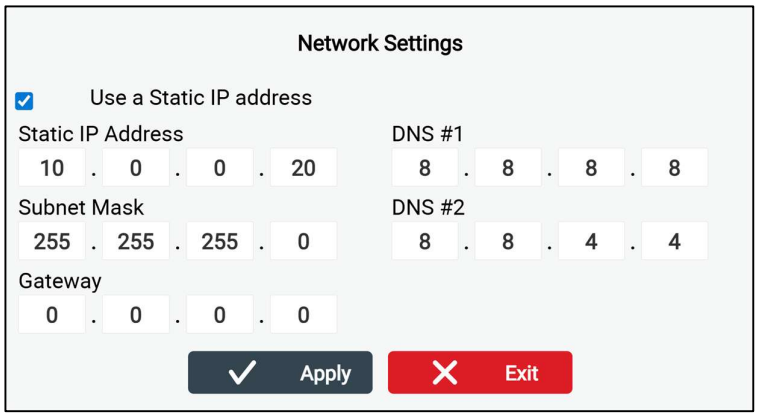


Figure 173 – Network Settings.

Certificates - Create CSR

Pressing the button “Certificate” (9) on the touchscreen will bring up the following page “Create CSR” which is the default tab initially shown.

CSR stands for Certificate Signing Request. When you click "Create/download CSR" the Ramsey Flex Integrator generates a new private key (kept securely on the device) and creates a CSR file containing the Integrators public key + identity details (like the Input FQDN, IP Address and Host Name).

The CSR can then be submitted to your company's internal/private CA (e.g., Microsoft Active Directory Certificate Services, or an enterprise PKI) to generate a CA Certificate.

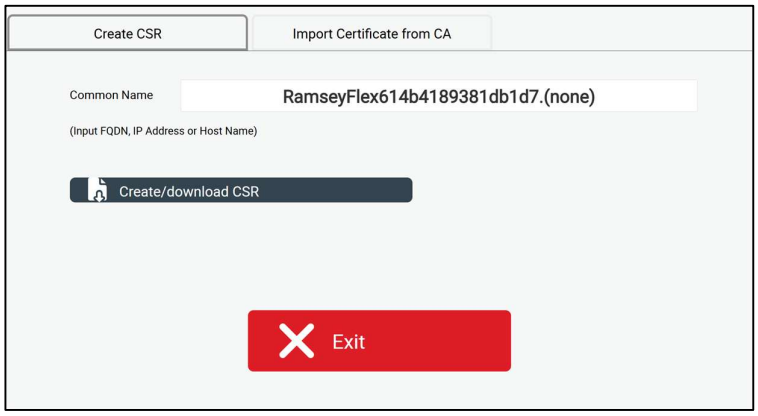


Figure 174 – Create CSR (Certificate Signing Request).

Certificates-Import Certificate from CA

The Certificate Authority (CA) signs/validates the CSR generated by the Ramsey Flex Integrator and returns a signed certificate. This signed certificate is uploaded to the Ramsey Flex Integrator on this page.

Go to the second tab “Import Certificate from CA” and then follow these steps.

1. Press “Choose File”
2. Navigate to the location the file is stored. The process for navigation from a remotely connected device or from the HMI interface is identical to “Import CFG File” so is not repeated here.
3. When the file has been selected, press the “Import Certificate from CA” button. The Ramsey Flex Integrator will reboot after the file has been loaded.

Figure 175 – Import CA (Certificate Authority).

End of Communication Settings

This is end of the Communication Settings Chapter. It has covered how to setup the Industrial Communications such as ModBus, EtherNet/IP and setup Analog and Digital Inputs and Outputs.

Chapter 13
Information Page

Overview of Information Pages

This chapter describes the Ramsey Flex Integrator Information Page structure. This will allow the User to navigate the Ramsey Flex Integrator to find the Information and Status of the Integrator.

Load Cell and Speed Tab

The screen below is the page the User needs to navigate to view the mV measurement data from the Load Cells or Pulses per Minute measurement data from the Speed Sensor.

The “Load Cell and Speed” Tab Is shown by default. There are no settings or adjustments on this page, it is provided for information only.

- **Load Cell #1 #2 #3 #4** – Displays the mV values of the Load Cells connected to the Digitizer – this could be different to total number of Load Cells. For example, if you have 4x Load Cells, connected to a Summing Box, into a Single Digitizer channel then only 1x mV number will be displayed.
- **Speed Pulses/Minute** - Here will be displayed the pulses coming out of the Speed Sensor being measured by the Ramsey Flex Integrator.
- **ADC Zero Constant** – Display the current Calibrated Zero ADC value.
- **ADC Current Gross** – Display the current Gross ADC value.
- **ADC New Difference** – Equals (Current Gross - Zero Constant).

Click on any external Button to exit the page.

NOTE – If any of the mV values are shown RED then they are over the maximum range based on the Sensitivity mV/V and Excitation Voltage, or the Load Cell balance it outside the value set by the User.

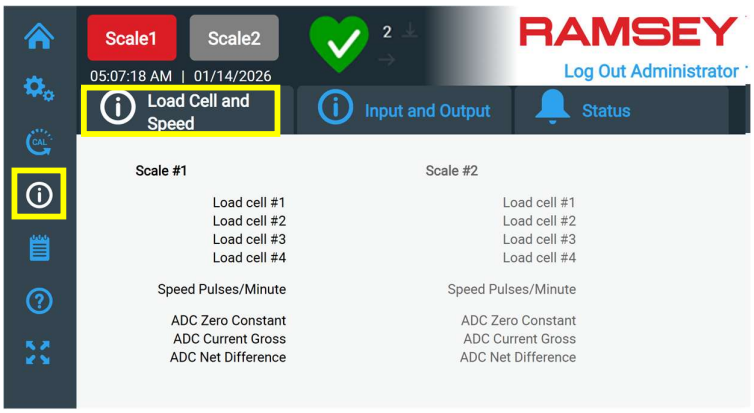


Figure 176 – Load Cell and Speed Information Page

Input and Output Tab

The screen below is the page the User needs to navigate to view and test the Analog and Digital Inputs and Outputs.

Navigate to the “Input and Output” Tab Is shown by default. There are no settings or adjustments on this page, it is provided for information only.

- **Input Analog #1 #2**– Displays the measured Input Analog mA or Voltage values.
- **Input Digital #1 #2 #3 #4** – The first column SW displays the state of the Input in the Software. A “0” means no Input is detected and a “1” means an Input has been detected. The second column HW displays the state of the Input in Hardware. A “0” means no Input is detected and a “1” means an Input has been

detected. The SW and HW values can be different due to the Input being able to be configured as “Active High” or “Active Low”.

- **Output Analog #1 #2**– Displays the Output Analog mA or Voltage values.
- **Output Digital #1 #2 #3 #4** – The first column SW displays the state of the Output in the Software. A “0” means the Output is being driven low by the Software and a “1” means the Software Output is being driven high. The second column HW displays the state of the Output in Hardware. A “0” means the Output is being driven low by the Hardware and a “1” means the Hardware Output is being driven high. The SW and HW values can be different due to the Output being able to be configured as “Normally Open N/O” or “Normally Closed N/C”.
- **Manually Test mA and Digital I/O** – The second image below shows the page for manually testing the Digital and Analog Outputs. Here the User can select from several predefined values to drive the Digital and Analog Outputs to. If a loop back cable is used, then the Digital and Analog Inputs can also be triggered. All buttons on the left vertical bar and top tabs are blacked out and not selectable. To exit the page the User must untick the checkbox.
- **Automatic Test Sequence for I/O** - The third image below shows the page for automatically testing the Digital and Analog Outputs. This is a carry-over from the original software. Here the system will automatically step through every 10 seconds an invert the current Digital Output setting and increment the Analog Output by 4mA. If a loop back cable is used, then the Digital and Analog Inputs can also be triggered. All buttons on the left vertical bar and top tabs are blacked out and not selectable. To exit the page the User must untick the checkbox.

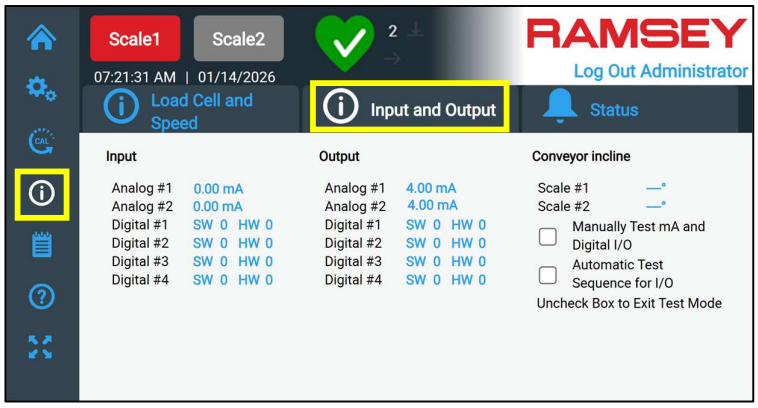


Figure 177 – Input and Output Tab

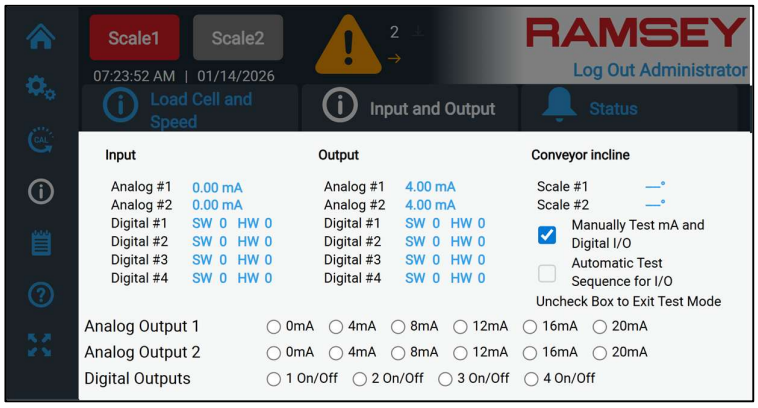


Figure 178 – Manual I/O Test

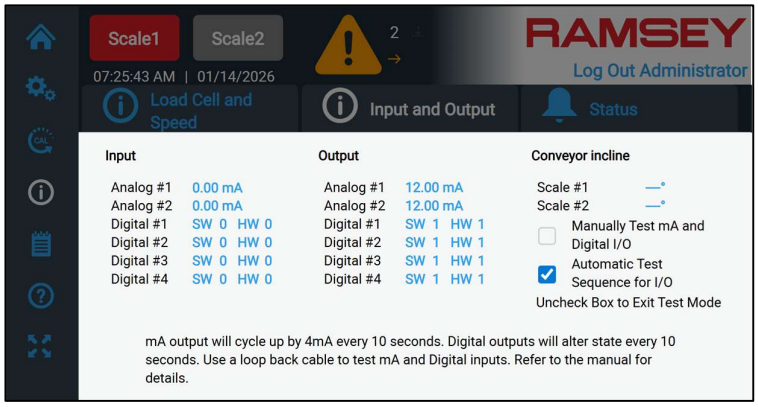


Figure 179 – Automatic I/O Test

Status Tab

The screen below is the page the User needs to navigate to view the mV measurement data from the Load Cells or Pulses per Minute measurement data from the Speed Sensor.

The “Load Cell and Speed” Tab Is shown by default. There are no settings or adjustments on this page, it is provided for information only.

- **Is calibrated** – Indicates if the Ramsey Flex Integrator has had Speed, Zero and Span calibrations performed.
- **Digitizer comm (x errors)** – Error checking of data transmissions occurs between the Main Ramsey Flex Integrator and the Digitizer. Each data packet sent over the CAN bus is checked. If a data packet is found to have missing or incorrect data, or if no data is received when it should be received, then this error counter will increment. Unplugging then CAN bus cable will cause this counter to increment. You can reset the error counter by pressing the “Reset faults” button in the bottom right corner.
- **Load cells balanced** – If the Load Cell balance algorithm has been turned on, and if the Load Cells are out of balance, then a RED X will be displayed. Under other circumstances there should be a GREEN tick.
- **Flow rate** – Indicates if the Ramsey Flex Integrator is detecting material Flow.
- **Belt running** – Indicates if the Ramsey Flex Integrator is detecting belt movement.

Click on any external Button to exit the page.

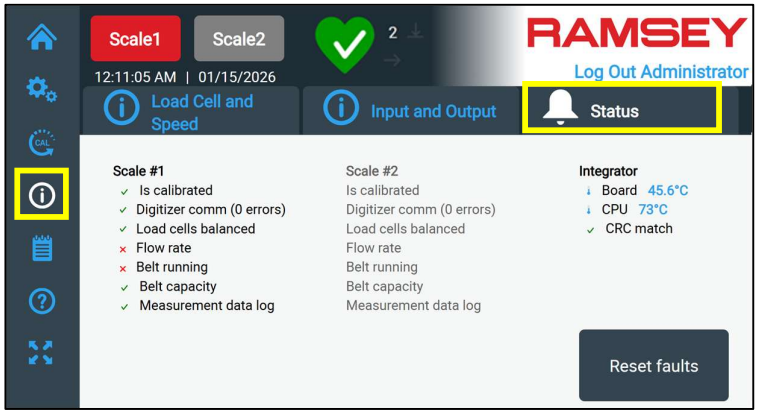


Figure 180 – Status Tab

Chapter 14
Audit Trail Page

Overview of Audit Trail

This chapter describes the Ramsey Flex Integrator Audit Trail Page structure.

Audit Trail

The “Audit Trail” Tab Is shown by default. There are no settings or adjustments on this page, it is provided for historical information only.

- **Page < and >** – Press the left or right chevrons to navigate through the Audit Trail pages.
- **Download** – The full Audit Trail history can be downloaded to USB key or to a connected remote device by pressing the “Download” button. The downloaded file will be called “Audit.log”, a section of the downloaded Audit Trail Log is shown below.
- **Audit Trail List** – The right column shows 4x Audit Trail results.

Click on any external Button to exit the page.

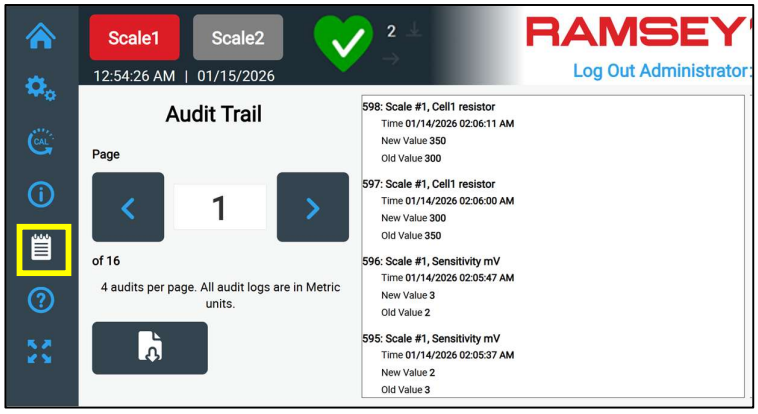


Figure 181 – Audit Trail Page

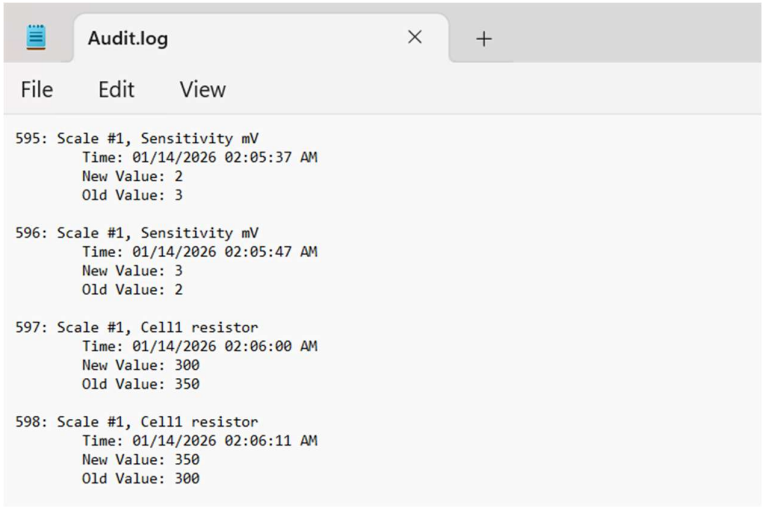


Figure 182 – Downloaded Audit Trail History

Chapter 15
About Ramsey Flex Integrator

Overview

This chapter describes the “About” Ramsey Flex Integrator page structure.

About Ramsey Flex Integrator

There are no settings or adjustments on this page.

- **Product** – Which product is the integrator programmed for, here it will be “Ramsey Flex”.
- **Firmware Version** – File name given during the machine code assembly process.
- **Version** – Human readable version information, Software Version followed by Date.
- **IP Address** – IP addresses assigned to the Ramsey Flex Integrator.
- **Serial Number** – Unique ID number given to each integrator
- **Certified Mode** – False indicates this is not a trade certified Integrator.

Click on any external Button to exit the page.

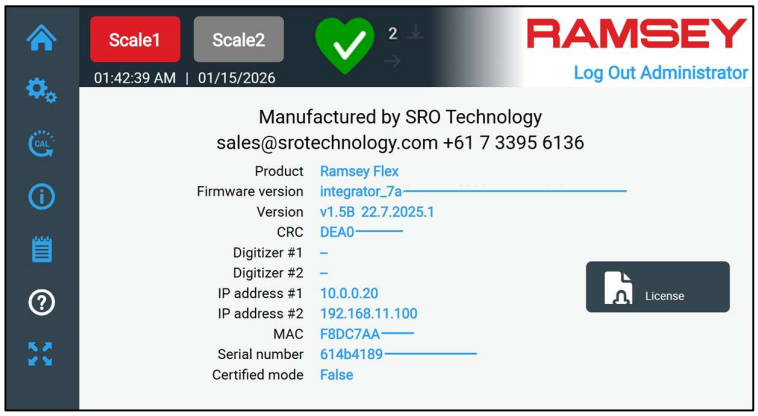


Figure 183 – About Ramsey Flex Integrator

Chapter 16
Ramsey Flex Integrator Spare Parts

Please contact the factory or your local Distributor for price and availability.

Part ID	Flex Options and Spare Parts Description
RAM-FEP-0009	Ramsey Flex Optional: DC Opto Kit
RAM-FEP-0010	Ramsey Flex Optional: AC Opto Kit
RAM-FEP-0011	Ramsey Flex Optional: Mounted in Enclosure Stainless Steel Sloped Roof IP66 600x400x200mm (excludes flex)
RAM-FEP-0012	Ramsey Flex Optional: Mounted in Enclosure Stainless Steel Sloped Roof Windowed IP66 600x400x200mm (excludes flex)
RAM-SSH-000017	Ramsey Sunshield to suit 600Hx400Wx200D Sloped Roof Enclosure
RAM-FLX-PLUS-IN	Flex Plus Integrator Only 110-240V
RAM-FLX-PRO-IN	Flex Pro in IP66 S/S Enclosure 110-240V Integrator Only
RAM-FLX-PRO-DC-IN	Flex Pro in IP66 S/S Enclosure 24DC Integrator Only
RAM-FEP-G0004869-02	Ramsey Flex Field Mount HMI 100-250VAC (Model RF-I-HAP) - Profibus - 1.5B
RAM-FEP-G0004869-06	Ramsey Flex Field Mount HMI 24VDC (Model RF-I-HDP) - Profibus 1.5B
RAM-FEP-G0006193-02	Ramsey Flex Field Mount Blind 100-250VAC (Model RF-I-BAP) 1.5B
RAM-FEP-G0006193-04	Ramsey Flex Field Mount Blind 24VDC (Model RF-I-BDP) 1.5B
RAM-FEP-G0006404-02	Ramsey Flex Panel Mount HMI 100-250VAC (Model RF-I-PAP) - Profibus 1.5B
RAM-FEP-G0006404-06	Ramsey Flex Panel Mount HMI 24VDC (Model RF-I-PDP) - Profibus 1.5B
RAM-FEP-G0004869-01	Ramsey Flex Field Mount HMI 100-250VAC (Model RF-I-HA) - No Profibus 1.5B
RAM-FEP-G0004869-05	Ramsey Flex Field Mount HMI 24VDC (Model RF-I-HD) - No Profibus 1.5B
RAM-FEP-G0006193-01	Ramsey Flex Field Mount Blind 100-250VAC (Model RF-I-BA) - No Profibus 1.5B
RAM-FEP-G0006193-03	SRO Ramsey Flex Field Mount Blind 24VDC (Model RF-I-BD) - No Profibus 1.5B
RAM-FEP-G0006404-01	Ramsey Flex Panel Mount HMI 100-250VAC (Model RF-I-PA) - No Profibus 1.5B
RAM-FEP-G0006404-05	Ramsey Flex Field Mount HMI 24VDC (Model RF-I-PD) - No Profibus 1.5B
RAM-FEP-G0007705-01	Ramsey Canbus Cable 10M Pack
RAM-FEP-G0007705-02	Ramsey Canbus Cable 20M Pack
RAM-FLX-UPGMOD	Ramsey Flex Software Upgrade Module (Hire Basis)
RAM-FEP-G0005623-01	Ramsey Flex Digitizer Quad (Model RF-D-4)
RAM-FEP-G0005618-01	Ramsey Flex Digitizer Single (Model RF-D-1)

Please contact the factory or your local Distributor for price and availability.

Part ID	Flex Electronics Description
RAM-FLX-PLUS	Flex Plus with Quad Digitiser 110-240V + 10M Canbus Cable
RAM-FLX-PLUS-DC	Flex Plus with Quad Digitiser 24VDC + 10M Canbus Cable
RAM-FLX-PRO	Flex Pro with Quad Digitiser in S/S Enclosure 110-240V
RAM-FLX-PRO-DC	Flex Pro with Quad Digitiser in IP66 S/S Enclosure 24DC
RAM-FEP-0001	Ramsey Flex 1.5V Field Mount + Single Digitiser 100-240V No Profibus + 10M Canbus Cable Kit
RAM-FEP-0002	Ramsey Flex 1.5V Field Mount + Single Digitiser 100-240V Profibus + 10M Canbus Cable Kit
RAM-FEP-0003	Ramsey Flex 1.5V Field Mount + Single Digitiser 24V No Profibus + 10M Canbus Cable Kit
RAM-FEP-0004	Ramsey Flex 1.5V Field Mount + Single Digitiser 24V Profibus + 10M Canbus Cable Kit
RAM-FEP-0005	Ramsey Flex 1.5V Field Mount + Quad Digitiser 100-240V No Profibus + 10M Canbus Cable Kit
RAM-FEP-0006	Ramsey Flex 1.5V Field Mount + Quad Digitiser 100-240V Profibus + 10M Canbus Cable Kit
RAM-FEP-0007	Ramsey Flex 1.5V Field Mount + Quad Digitiser 24V No Profibus + 10M Canbus Cable Kit
RAM-FEP-0008	Ramsey Flex 1.5V Field Mount + Quad Digitiser 24V Profibus + 10M Canbus Cable Kit
RAM-FEP-0014	Ramsey Flex 1.5V Panel Mount + Quad Digitiser 24V Profibus + 10M Canbus Cable Kit
RAM-FEP-0015	Ramsey Flex 1.5V Panel Mount + Quad Digitiser 24V No Profibus + 10M Canbus Cable Kit
RAM-FEP-0016	Ramsey Flex 1.5V Panel Mount + Quad Digitiser 100-240V Profibus + 10M Canbus Cable Kit
RAM-FEP-0017	Ramsey Flex 1.5V Panel Mount + Quad Digitiser 100-240V No Profibus + 10M Canbus Cable Kit
RAM-FEP-0018	Ramsey Flex 1.5V Panel Mount + Single Digitiser 24V Profibus + 10M Canbus Cable Kit
RAM-FEP-0019	Ramsey Flex 1.5V Panel Mount + Single Digitiser 24V No Profibus + 10M Canbus Cable Kit
RAM-FEP-0020	Ramsey Flex 1.5V Panel Mount + Single Digitiser 100-240V Profibus + 10M Canbus Cable Kit
RAM-FEP-0021	Ramsey Flex 1.5V Panel Mount + Single Digitiser 100-240V No Profibus + 10M Canbus Cable Kit
RAM-FEP-0022	Ramsey Flex 1.5V Blind Mount + Quad Digitiser 24V Profibus + 10M Canbus Cable Kit
RAM-FEP-0023	Ramsey Flex 1.5V Blind Mount + Quad Digitiser 24V No Profibus + 10M Canbus Cable Kit
RAM-FEP-0024	Ramsey Flex 1.5V Blind Mount + Quad Digitiser 100-240V Profibus + 10M Canbus Cable Kit
RAM-FEP-0025	Ramsey Flex 1.5V Blind Mount + Quad Digitiser 100-240V No Profibus + 10M Canbus Cable Kit
RAM-FEP-0026	Ramsey Flex 1.5V Blind Mount + Single Digitiser 24V Profibus + 10M Canbus Cable Kit
RAM-FEP-0027	Ramsey Flex 1.5V Blind Mount + Single Digitiser 24V No Profibus + 10M Canbus Cable Kit
RAM-FEP-0028	Ramsey Flex 1.5V Blind Mount + Single Digitiser 100-240V Profibus + 10M Canbus Cable Kit
RAM-FEP-0029	Ramsey Flex 1.5V Blind Mount + Single Digitiser 100-240V No Profibus + 10M Canbus Cable Kit

RAMSEY

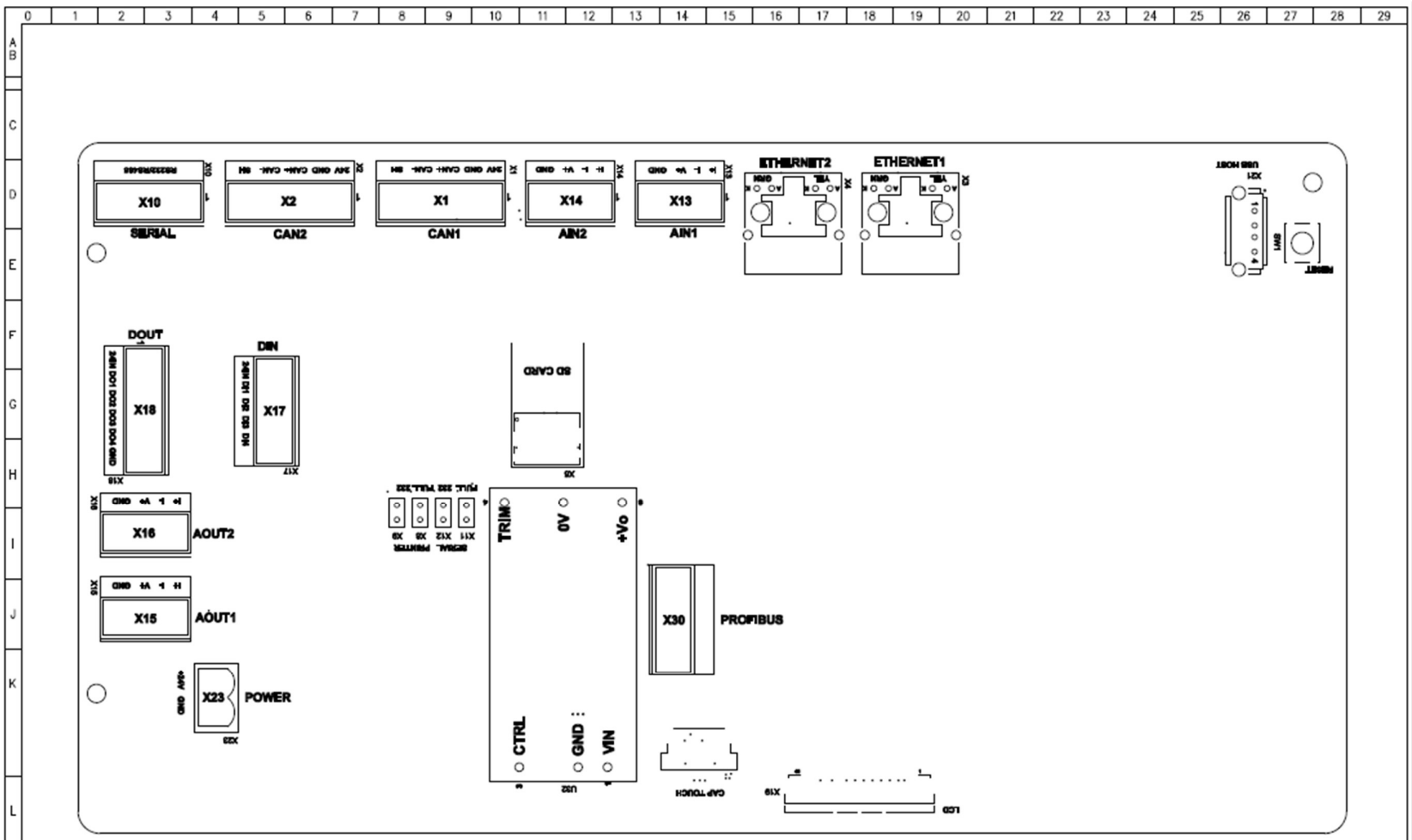
Appendix 1
Electrical and Mechanical Connection Diagrams

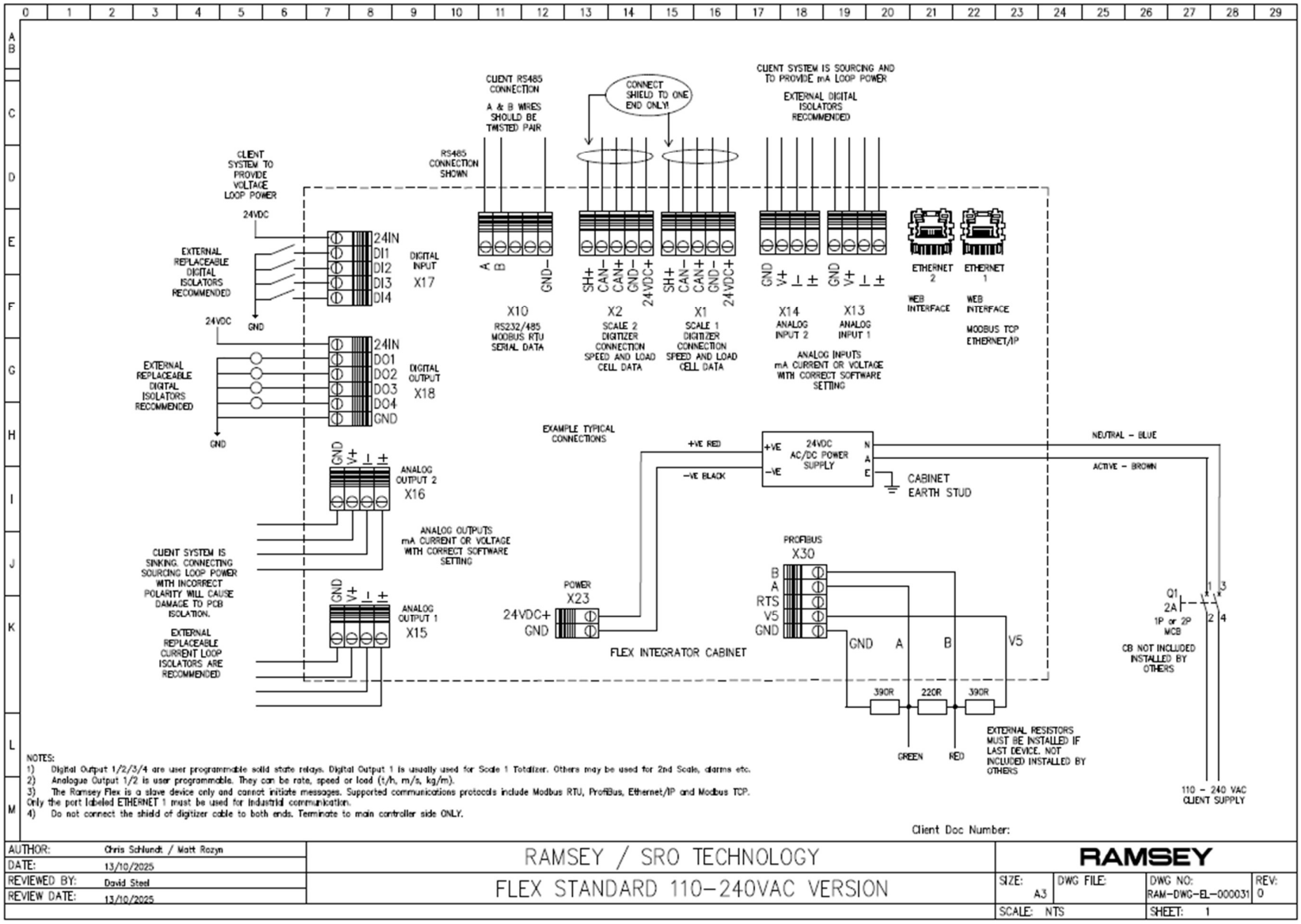
Overview

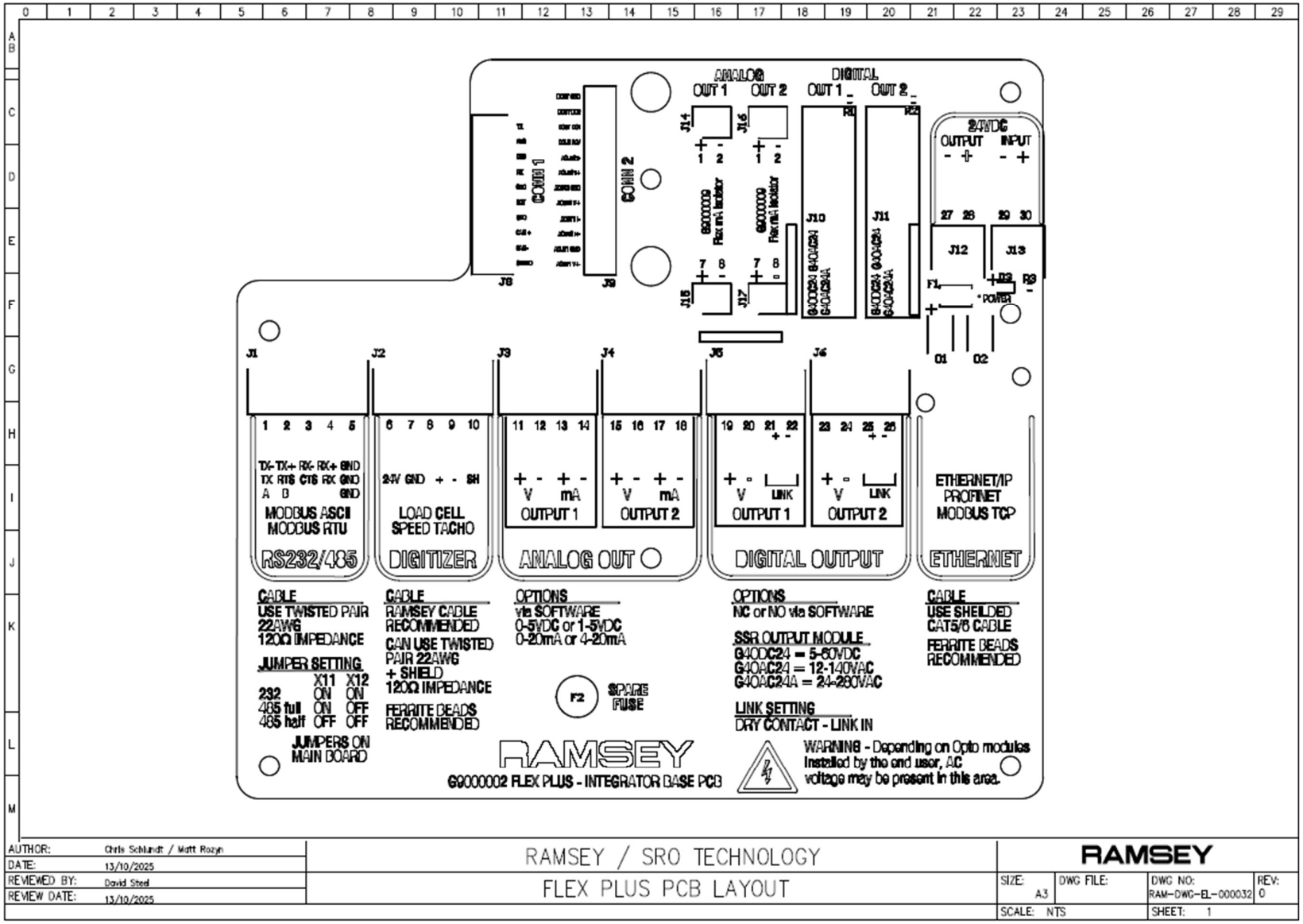
The following pages contain the Electrical and Mechanical Connection diagrams.

Drawing List

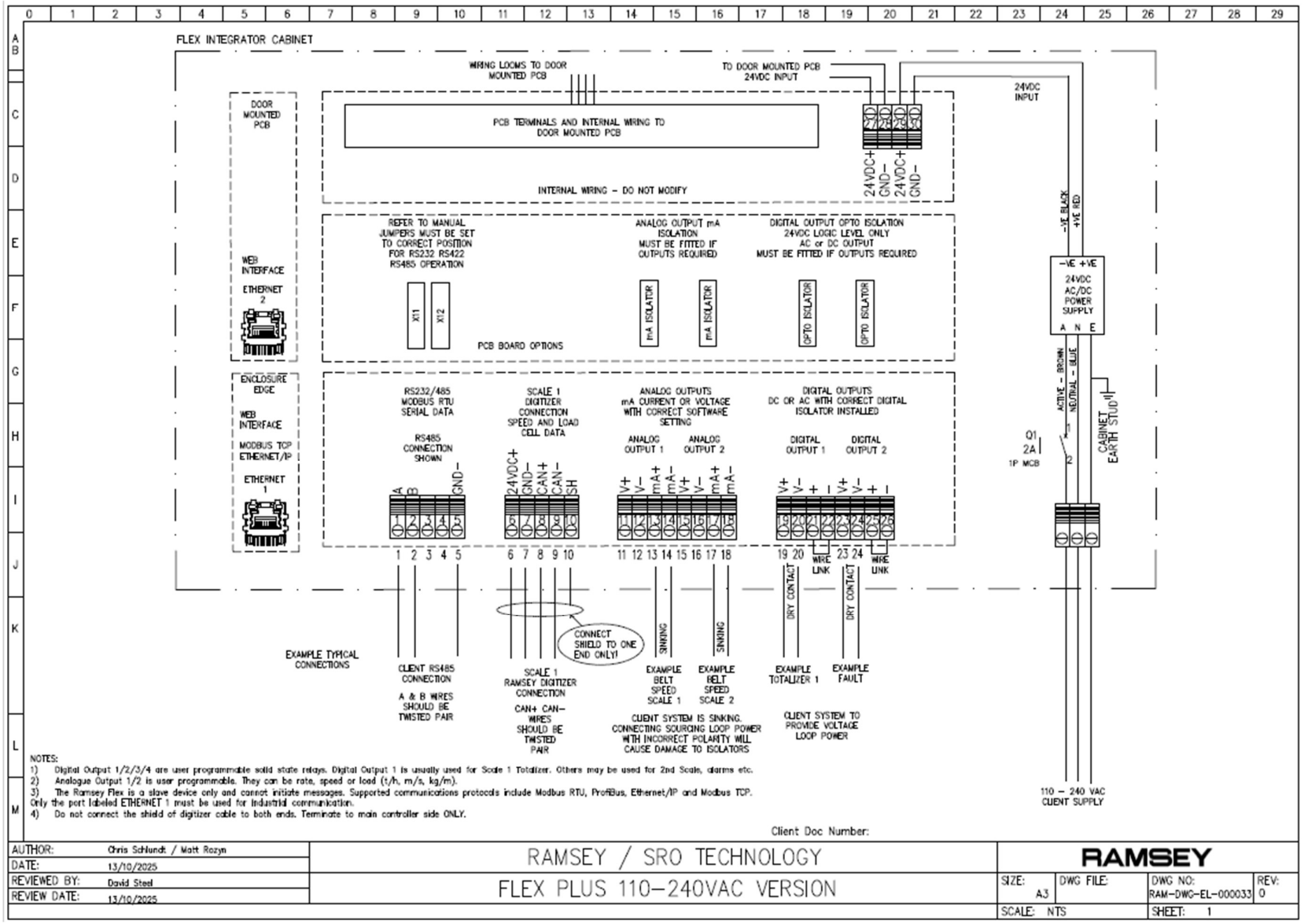
Drawing Number	Drawing	Type	Description
RAM-DWG-EL-000030	Flex Standard PCB Layout	PCB Layout	Connection layout on Flex Standard PCB
RAM-DWG-EL-000031	Flex Standard AC	Electrical connection	Electrical connection diagram for Flex Standard in 110/240VAC power configuration
RAM-DWG-EL-000032	Flex Plus PCB Layout	PCB Layout	Connection layout on Flex Plus PCB
RAM-DWG-EL-000033	Flex Plus AC	Electrical connection	Electrical connection diagram for Flex Plus in 110/240VAC power configuration
RAM-DWG-EL-000034	Flex Pro PCB Layout	PCB Layout	Connection layout on Flex Pro PCB
RAM-DWG-EL-000035	Flex Pro AC	Electrical connection	Electrical connection diagram for Flex Pro in 110/240VAC power configuration
RAM-DWG-EL-000036	Flex Pro DC	Electrical connection	Electrical connection diagram for Flex Pro in 24VDC power configuration
RAM-DWG-EL-000037	Flex Single Digitizer	Electrical connection	Electrical connection diagram for Flex Single Digitizer
RAM-DWG-EL-000038	Flex Quad Digitizer	Electrical connection	Electrical connection diagram for Flex Quad Digitizer
RAM-DWG-ME-100067	Assembly Flex Plus	Mechanical enclosure connections	Connection points for Flex Plus enclosure
RAM-DWG-ME-100068	Assembly Flex Pro	Mechanical enclosure connections	Connection points for Flex Pro enclosure
RAM-DWG-ME-100069	Assembly Flex Pro Sun Shield	Mechanical enclosure connections	Connection points for sunshield to cover Flex Pro enclosure
RAM-DWG-ME-100070	Assembly Flex Single Digitizer	Mechanical enclosure connections	Connection points for Flex Single Digitizer enclosure
RAM-DWG-ME-100071	Assembly Flex Quad Digitizer	Mechanical enclosure connections	Connection points for Flex Quad Digitizer enclosure

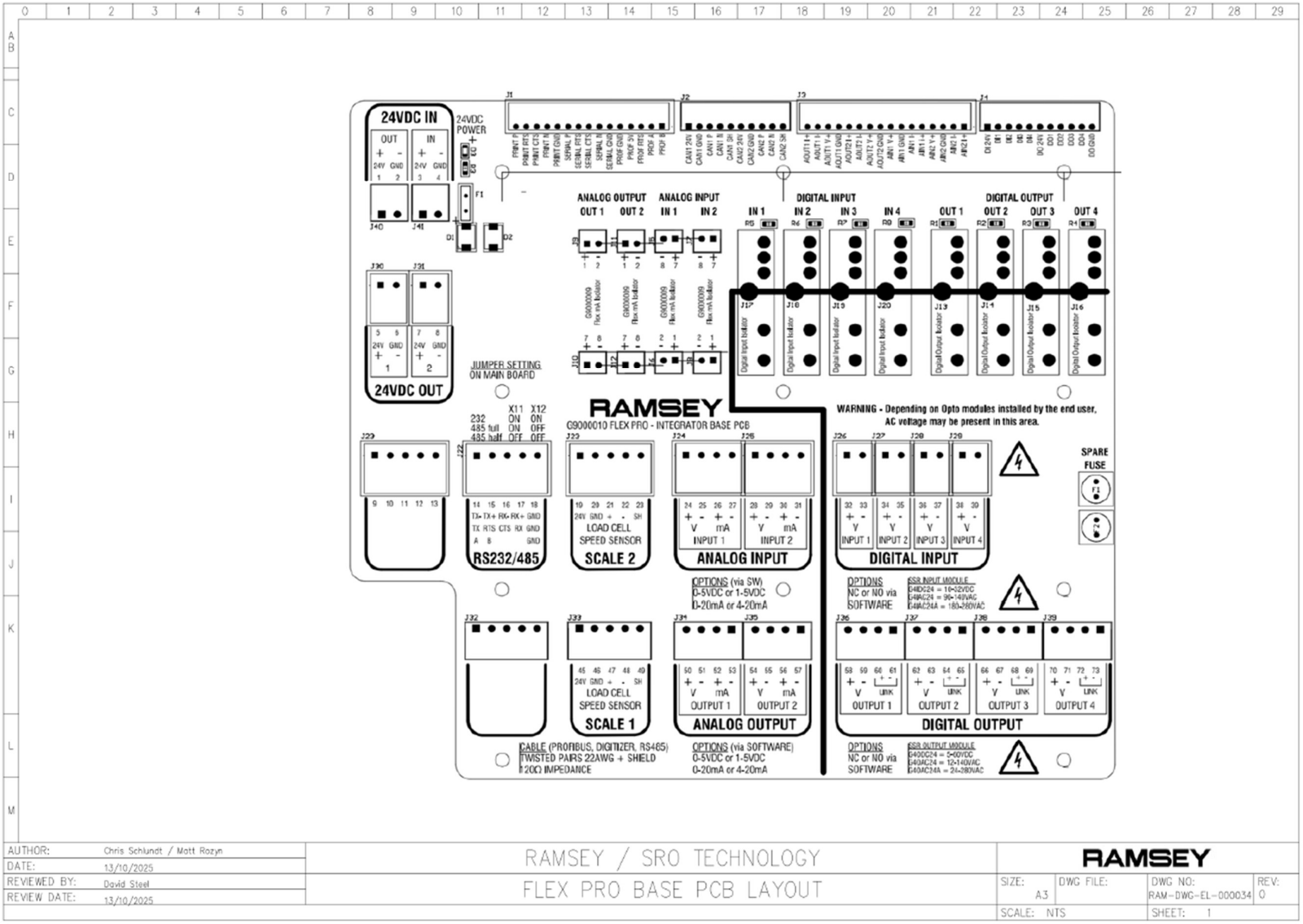

X10
SERIAL
X2
CAN2
X1
CAN1
X14
AIN2
X13
AIN1
ETHERNET2
ETHERNET1
DOUT
X18
DIN
X17
SD CARD
X16
AOUT2
X15
AOUT1
X23
POWER
TRIM
0V
+Vo
CTRL
GND
VIN
X30
PROFIBUS
CAP TOUCH
LCD
AUTHOR: Chris Schlundt / Matt Rozyn
DATE: 13/10/2025
REVIEWED BY: David Steel
REVIEW DATE: 13/10/2025
RAMSEY / SRO TECHNOLOGY
FLEX STANDARD PCB LAYOUT
RAMSEY
SIZE: A3
DWG FILE:
DWG NO: RAM-DWG-EL-000030
REV: 0
SCALE: NTS
SHEET: 1

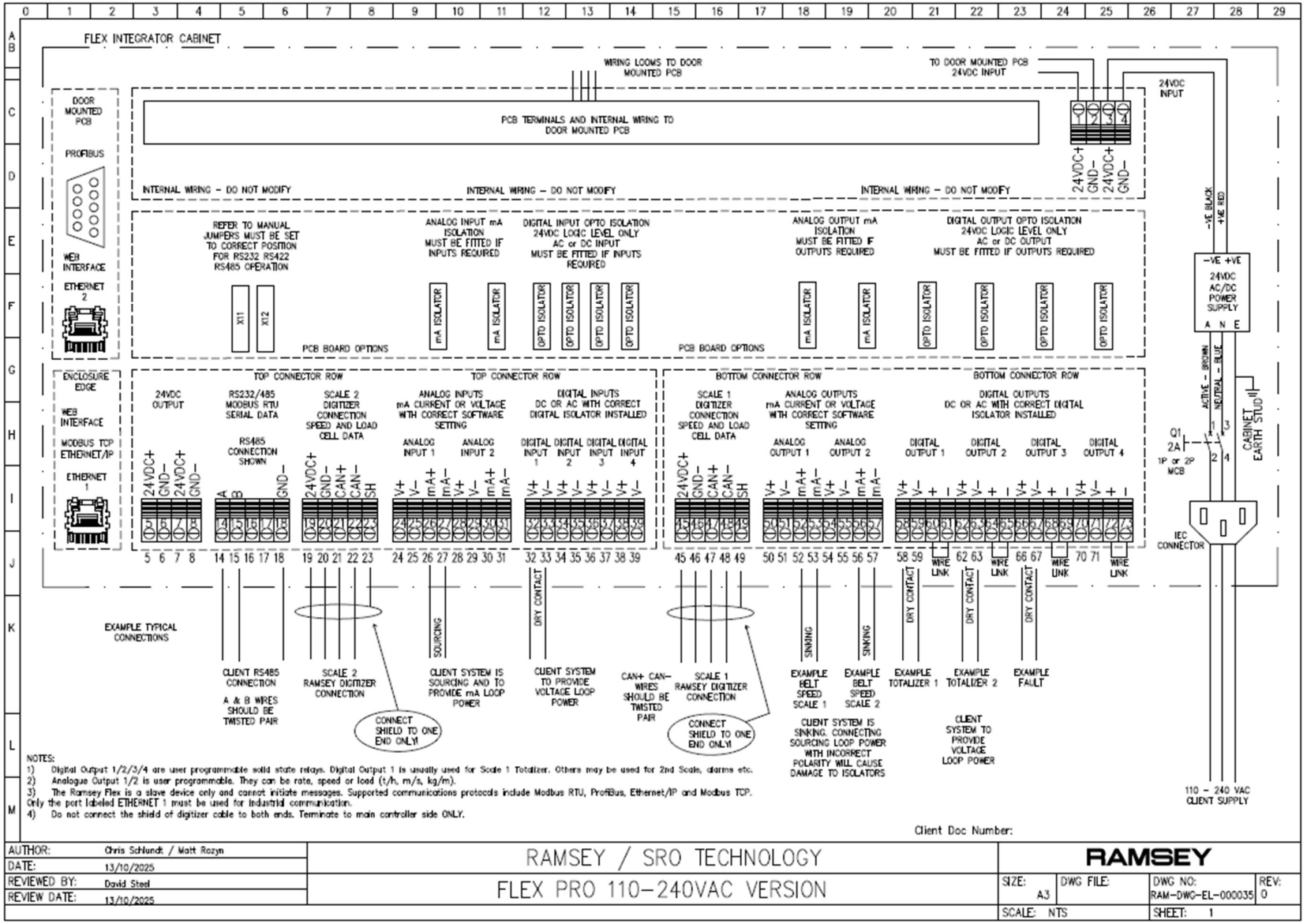

CLIENT RS485 CONNECTION
A & B WIRES SHOULD BE TWISTED PAIR
CONNECT SHIELD TO ONE END ONLY!
CLIENT SYSTEM IS SOURCING AND TO PROVIDE mA LOOP POWER
EXTERNAL DIGITAL ISOLATORS RECOMMENDED
RS485 CONNECTION SHOWN
CLIENT SYSTEM TO PROVIDE VOLTAGE LOOP POWER
24VDC
EXTERNAL REPLACEABLE DIGITAL ISOLATORS RECOMMENDED
24IN
DI1
DI2
DI3
DI4
DIGITAL INPUT
X17
24VDC
GND
EXTERNAL REPLACEABLE DIGITAL ISOLATORS RECOMMENDED
24IN
DO1
DO2
DO3
DO4
GND
DIGITAL OUTPUT
X18
GND
EXAMPLE TYPICAL CONNECTIONS
+VE RED
-VE BLACK
+VE
-VE
24VDC AC/DC POWER SUPPLY
N
A
E
CABINET EARTH STUD
NEUTRAL - BLUE
ACTIVE - BROWN
GND
V+
ANALOG OUTPUT 2
X16
ANALOG OUTPUTS mA CURRENT OR VOLTAGE WITH CORRECT SOFTWARE SETTING
CLIENT SYSTEM IS SINKING. CONNECTING SOURCING LOOP POWER WITH INCORRECT POLARITY WILL CAUSE DAMAGE TO PCB ISOLATION.
EXTERNAL REPLACEABLE CURRENT LOOP ISOLATORS ARE RECOMMENDED
ANALOG OUTPUT 1
X15
POWER
X23
24VDC+
GND
FLEX INTEGRATOR CABINET
PROFIBUS
X30
B
A
RTS
V5
GND
GND
A
B
V5
390R
220R
390R
GREEN
RED
EXTERNAL RESISTORS MUST BE INSTALLED IF LAST DEVICE. NOT INCLUDED INSTALLED BY OTHERS
Q1
2A
1P or 2P MCB
CB NOT INCLUDED INSTALLED BY OTHERS
110 - 240 VAC CLIENT SUPPLY
A B
GND
SH+
CAN-
CAN+
GND
24VDC+
X10
RS232/485 MODBUS RTU SERIAL DATA
X2
SCALE 2 DIGITIZER CONNECTION SPEED AND LOAD CELL DATA
X1
SCALE 1 DIGITIZER CONNECTION SPEED AND LOAD CELL DATA
X14
ANALOG INPUT 2
X13
ANALOG INPUT 1
ANALOG INPUTS mA CURRENT OR VOLTAGE WITH CORRECT SOFTWARE SETTING
ETHERNET 2
ETHERNET 1
WEB INTERFACE
WEB INTERFACE
MODBUS TCP ETHERNET/IP
NOTES:
1) Digital Output 1/2/3/4 are user programmable solid state relays. Digital Output 1 is usually used for Scale 1 Totalizer. Others may be used for 2nd Scale, alarms etc.
2) Analogue Output 1/2 is user programmable. They can be rate, speed or load (t/h, m/s, kg/m).
3) The Ramsey Flex is a slave device only and cannot initiate messages. Supported communications protocols include Modbus RTU, ProfiBus, Ethernet/IP and Modbus TCP. Only the port labeled ETHERNET 1 must be used for industrial communication.
4) Do not connect the shield of digitizer cable to both ends. Terminate to main controller side ONLY.
Client Doc Number:
AUTHOR: Chris Schlundt / Matt Rozyn
DATE: 13/10/2025
REVIEWED BY: David Steel
REVIEW DATE: 13/10/2025
RAMSEY / SRO TECHNOLOGY
FLEX STANDARD 110-240VAC VERSION
RAMSEY
SIZE: A3
DWG FILE:
DWG NO: RAM-DWG-EL-000031
REV: 0
SCALE: NTS
SHEET: 1

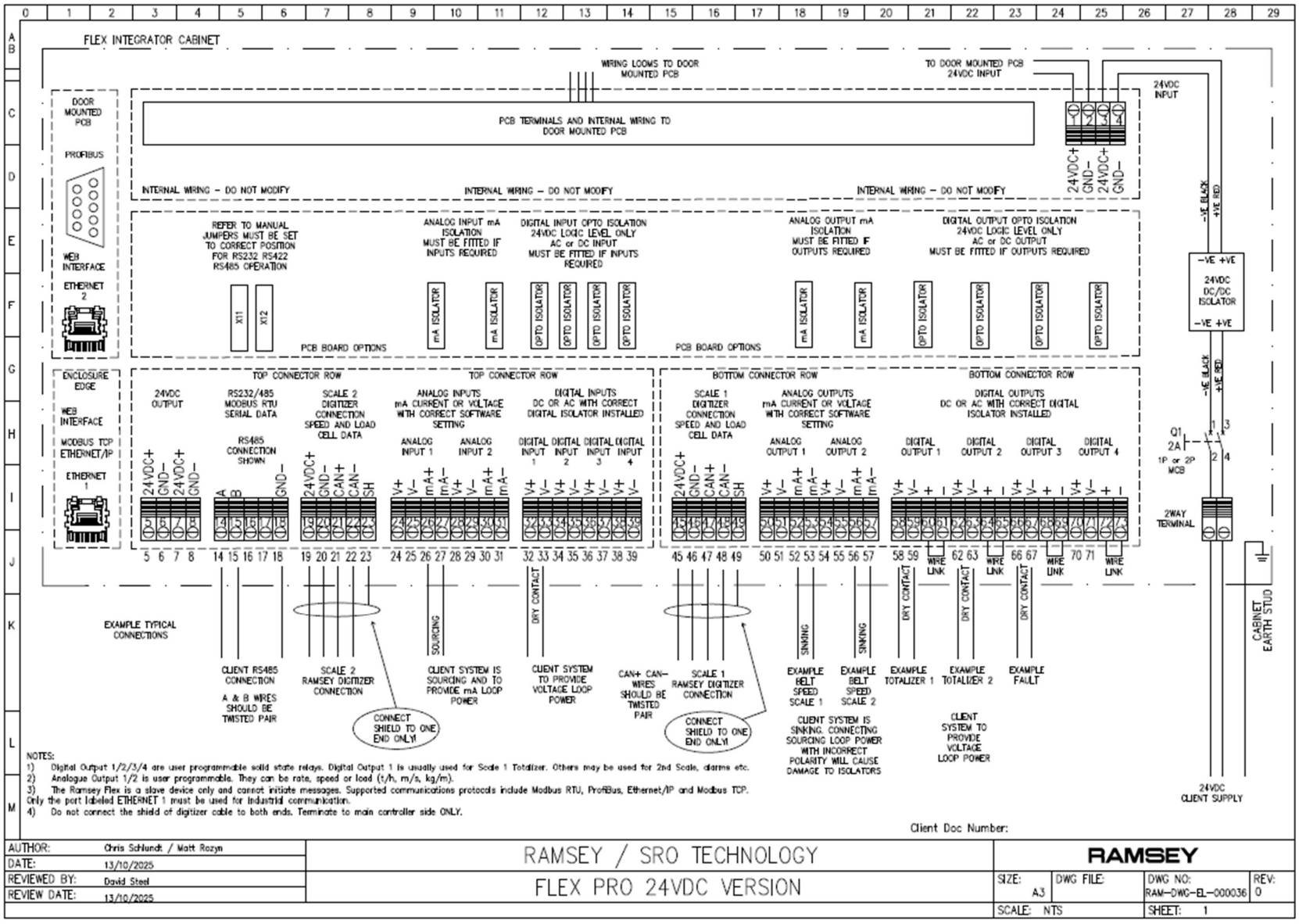


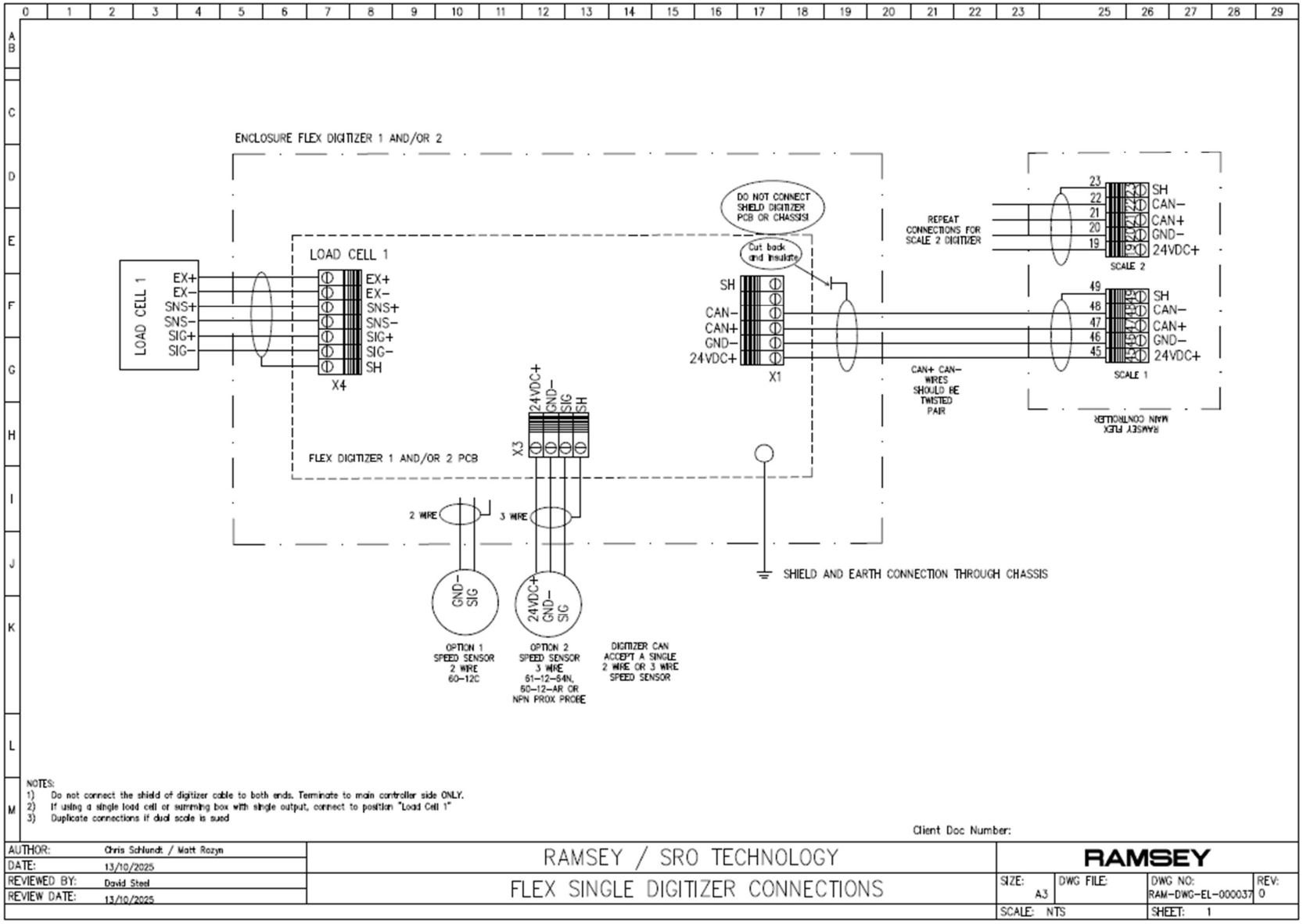
AUTHOR:	Chris Schlundt / Matt Rozyn	RAMSEY / SRO TECHNOLOGY	RAMSEY		
DATE:	13/10/2025	FLEX PLUS PCB LAYOUT	SIZE: A3	DWG FILE:	DWG NO: RAM-DWG-EL-000032 / REV: 0
REVIEWED BY:	David Steel				
REVIEW DATE:	13/10/2025		SCALE: NTS		SHEET: 1

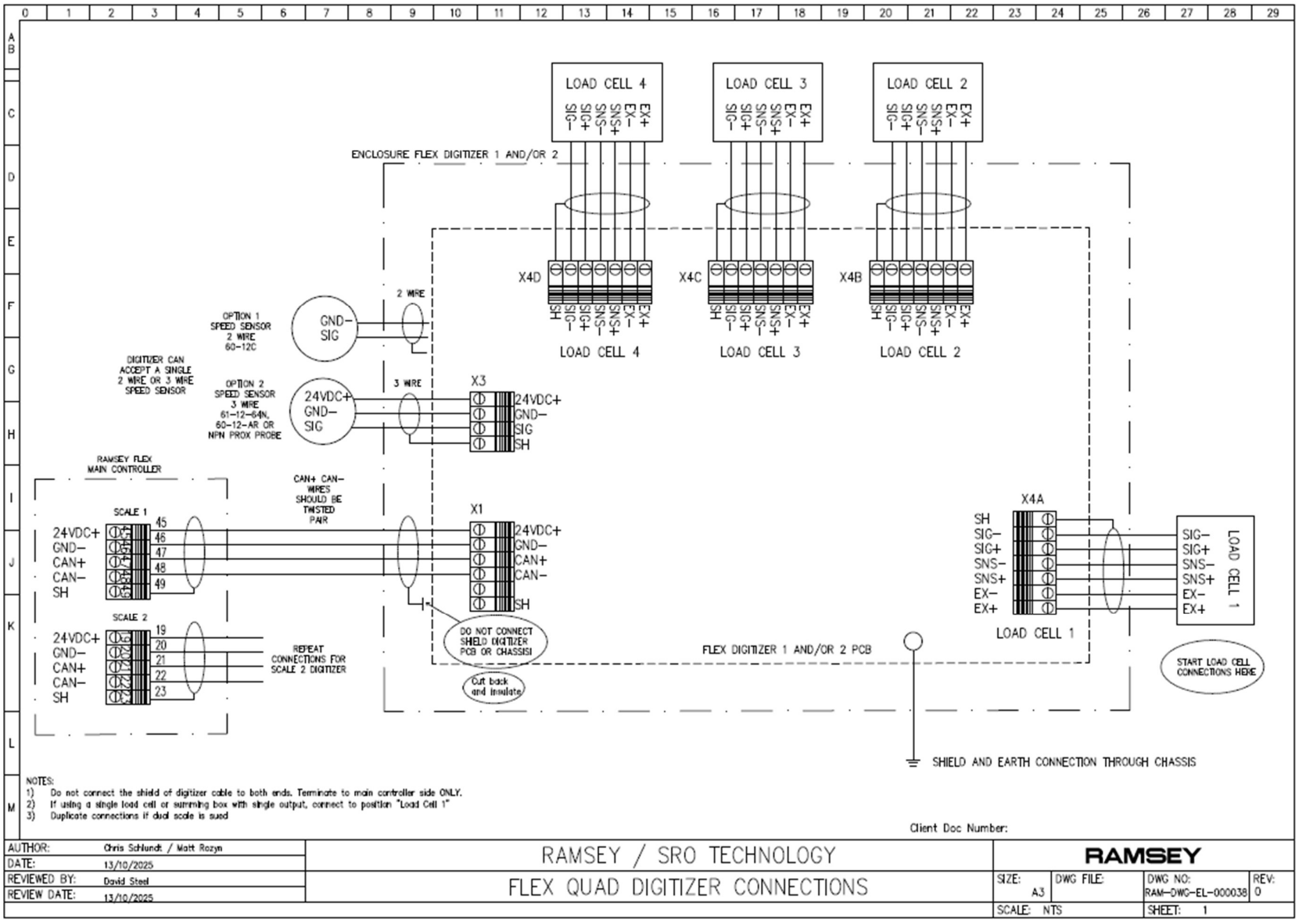

FLEX INTEGRATOR CABINET
WIRING LOOMS TO DOOR MOUNTED PCB
TO DOOR MOUNTED PCB 24VDC INPUT
24VDC INPUT
DOOR MOUNTED PCB
PCB TERMINALS AND INTERNAL WIRING TO DOOR MOUNTED PCB
INTERNAL WIRING - DO NOT MODIFY
24VDC+ GND- 24VDC+ GND-
-VE BLACK
+VE RED
-VE +VE
24VDC AC/DC POWER SUPPLY
A N E
ACTIVE - BROWN
NEUTRAL - BLUE
CABINET EARTH STUD
Q1 2A 1P MCB
WEB INTERFACE
ETHERNET 2
REFER TO MANUAL JUMPERS MUST BE SET TO CORRECT POSITION FOR RS232 RS422 RS485 OPERATION
ANALOG OUTPUT mA ISOLATION MUST BE FITTED IF OUTPUTS REQUIRED
DIGITAL OUTPUT OPTO ISOLATION 24VDC LOGIC LEVEL ONLY AC or DC OUTPUT MUST BE FITTED IF OUTPUTS REQUIRED
X11
X12
mA ISOLATOR
mA ISOLATOR
OPTO ISOLATOR
OPTO ISOLATOR
PCB BOARD OPTIONS
ENCLOSURE EDGE
WEB INTERFACE
MODBUS TCP ETHERNET/IP
ETHERNET 1
RS232/485 MODBUS RTU SERIAL DATA
RS485 CONNECTION SHOWN
SCALE 1 DIGITIZER CONNECTION SPEED AND LOAD CELL DATA
ANALOG OUTPUTS mA CURRENT OR VOLTAGE WITH CORRECT SOFTWARE SETTING
ANALOG OUTPUT 1
ANALOG OUTPUT 2
DIGITAL OUTPUTS DC OR AC WITH CORRECT DIGITAL ISOLATOR INSTALLED
DIGITAL OUTPUT 1
DIGITAL OUTPUT 2
A B GND-
24VDC+ GND- CAN+ CAN- SH
V+ V- mA+ mA-
V+ V- I
1 2 3 4 5
6 7 8 9 10
11 12 13 14 15 16 17 18
19 20
WIRE LINK
23 24
WIRE LINK
EXAMPLE TYPICAL CONNECTIONS
CONNECT SHIELD TO ONE END ONLY!
DRY CONTACT
DRY CONTACT
SINKING
SINKING
CLIENT RS485 CONNECTION
A & B WIRES SHOULD BE TWISTED PAIR
SCALE 1 RAMSEY DIGITIZER CONNECTION
CAN+ CAN- WIRES SHOULD BE TWISTED PAIR
EXAMPLE BELT SPEED SCALE 1
EXAMPLE BELT SPEED SCALE 2
CLIENT SYSTEM IS SINKING. CONNECTING SOURCING LOOP POWER WITH INCORRECT POLARITY WILL CAUSE DAMAGE TO ISOLATORS
EXAMPLE TOTALIZER 1
EXAMPLE FAULT
CLIENT SYSTEM TO PROVIDE VOLTAGE LOOP POWER
110 - 240 VAC CLIENT SUPPLY
NOTES:
1) Digital Output 1/2/3/4 are user programmable solid state relays. Digital Output 1 is usually used for Scale 1 Totalizer. Others may be used for 2nd Scale, alarms etc.
2) Analogue Output 1/2 is user programmable. They can be rate, speed or load (t/h, m/s, kg/m).
3) The Ramsey Flex is a slave device only and cannot initiate messages. Supported communications protocols include Modbus RTU, ProfiBus, Ethernet/IP and Modbus TCP. Only the port labeled ETHERNET 1 must be used for Industrial communication.
4) Do not connect the shield of digitizer cable to both ends. Terminate to main controller side ONLY.
Client Doc Number:
AUTHOR: Chris Schlundt / Matt Rozyn
DATE: 13/10/2025
REVIEWED BY: David Steel
REVIEW DATE: 13/10/2025
RAMSEY / SRO TECHNOLOGY
FLEX PLUS 110-240VAC VERSION
RAMSEY
SIZE: A3
DWG FILE:
DWG NO: RAM-DWG-EL-000033
REV: 0
SCALE: NTS
SHEET: 1

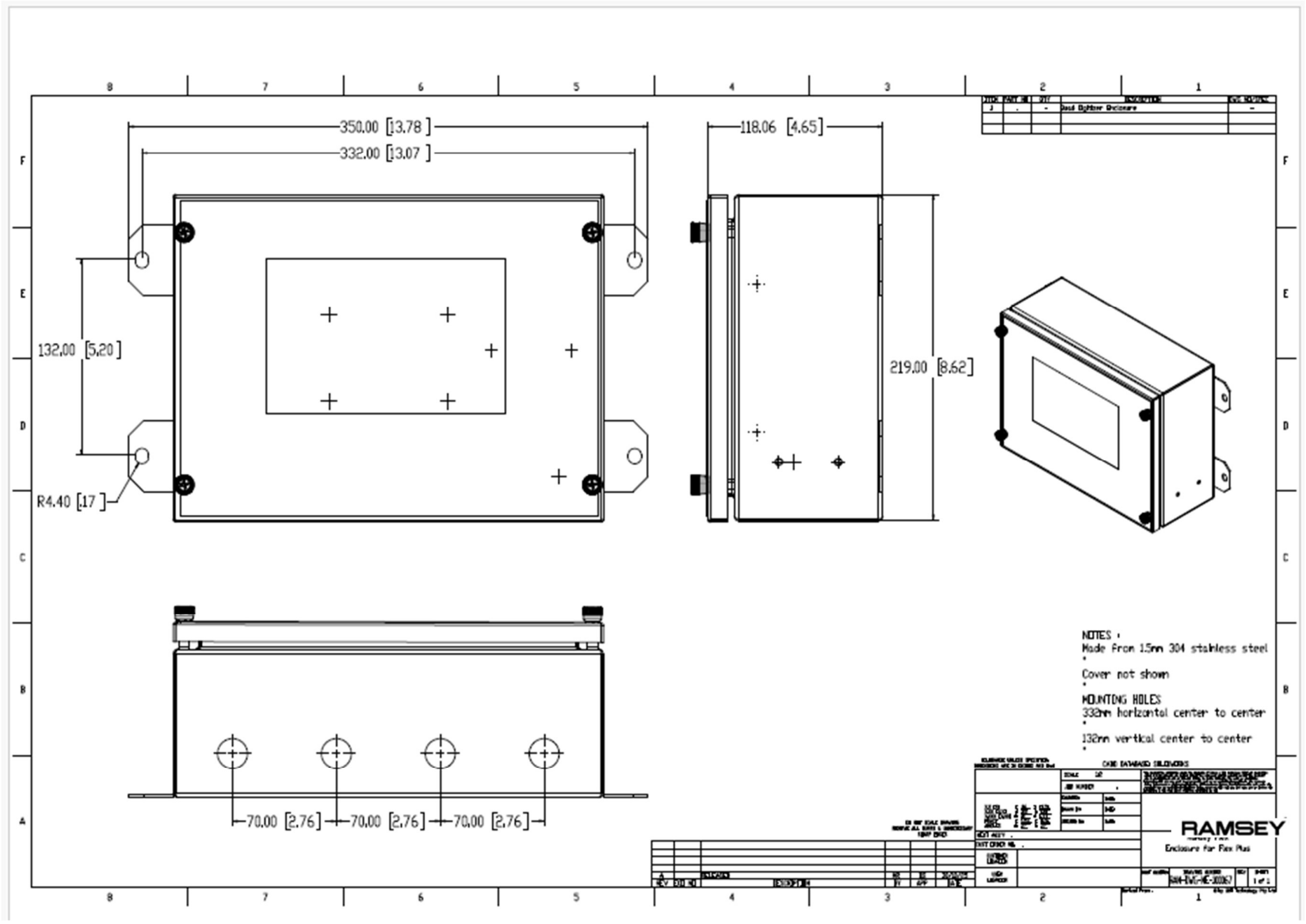

24VDC IN
24VDC POWER
24VDC OUT
JUMPER SETTING ON MAIN BOARD
ANALOG OUTPUT
ANALOG INPUT
DIGITAL INPUT
DIGITAL OUTPUT
OUT 1
OUT 2
IN 1
IN 2
IN 3
IN 4
OUT 3
OUT 4
RAMSEY
G9000010 FLEX PRO - INTEGRATOR BASE PCB
WARNING - Depending on Opto modules installed by the end user, AC voltage may be present in this area.
SPARE FUSE
RS232/485
SCALE 2
SCALE 1
LOAD CELL SPEED SENSOR
ANALOG INPUT
DIGITAL INPUT
ANALOG OUTPUT
DIGITAL OUTPUT
OPTIONS (via SW) 0-5VDC or 1-5VDC 0-20mA or 4-20mA
OPTIONS NC or NO via SOFTWARE
CABLE (PROFIBUS, DIGITIZER, RS485) TWISTED PAIRS 22AWG + SHIELD 120Ω IMPEDANCE
OPTIONS (via SOFTWARE) 0-5VDC or 1-5VDC 0-20mA or 4-20mA
AUTHOR: Chris Schlundt / Matt Rozyn
DATE: 13/10/2025
REVIEWED BY: David Steel
REVIEW DATE: 13/10/2025
RAMSEY / SRO TECHNOLOGY
FLEX PRO BASE PCB LAYOUT
RAMSEY
SIZE: A3
DWG FILE:
DWG NO: RAM-DWG-EL-000034
REV: 0
SCALE: NTS
SHEET: 1


FLEX INTEGRATOR CABINET
WIRING LOOMS TO DOOR MOUNTED PCB
TO DOOR MOUNTED PCB 24VDC INPUT
PCB TERMINALS AND INTERNAL WIRING TO DOOR MOUNTED PCB
24VDC INPUT
24VDC+ GND– 24VDC+ GND–
INTERNAL WIRING – DO NOT MODIFY
INTERNAL WIRING – DO NOT MODIFY
INTERNAL WIRING – DO NOT MODIFY
DOOR MOUNTED PCB
PROFIBUS
WEB INTERFACE
ETHERNET 2
ENCLOSURE EDGE
WEB INTERFACE
MODBUS TCP ETHERNET/IP
ETHERNET 1
REFER TO MANUAL JUMPERS MUST BE SET TO CORRECT POSITION FOR RS232 RS422 RS485 OPERATION
X11
X12
PCB BOARD OPTIONS
ANALOG INPUT mA ISOLATION MUST BE FITTED IF INPUTS REQUIRED
DIGITAL INPUT OPTO ISOLATION 24VDC LOGIC LEVEL ONLY AC or DC INPUT MUST BE FITTED IF INPUTS REQUIRED
mA ISOLATOR
OPTO ISOLATOR
PCB BOARD OPTIONS
ANALOG OUTPUT mA ISOLATION MUST BE FITTED IF OUTPUTS REQUIRED
DIGITAL OUTPUT OPTO ISOLATION 24VDC LOGIC LEVEL ONLY AC or DC OUTPUT MUST BE FITTED IF OUTPUTS REQUIRED
TOP CONNECTOR ROW
24VDC OUTPUT
RS232/485 MODBUS RTU SERIAL DATA
RS485 CONNECTION SHOWN
SCALE 2 DIGITIZER CONNECTION SPEED AND LOAD CELL DATA
TOP CONNECTOR ROW
ANALOG INPUTS mA CURRENT OR VOLTAGE WITH CORRECT SOFTWARE SETTING
ANALOG INPUT 1
ANALOG INPUT 2
DIGITAL INPUTS DC OR AC WITH CORRECT DIGITAL ISOLATOR INSTALLED
DIGITAL INPUT 1
DIGITAL INPUT 2
DIGITAL INPUT 3
DIGITAL INPUT 4
BOTTOM CONNECTOR ROW
SCALE 1 DIGITIZER CONNECTION SPEED AND LOAD CELL DATA
BOTTOM CONNECTOR ROW
ANALOG OUTPUTS mA CURRENT OR VOLTAGE WITH CORRECT SOFTWARE SETTING
ANALOG OUTPUT 1
ANALOG OUTPUT 2
DIGITAL OUTPUTS DC OR AC WITH CORRECT DIGITAL ISOLATOR INSTALLED
DIGITAL OUTPUT 1
DIGITAL OUTPUT 2
DIGITAL OUTPUT 3
DIGITAL OUTPUT 4
WIRE LINK
–VE BLACK
+VE RED
–VE +VE
24VDC AC/DC POWER SUPPLY
A N E
ACTIVE – BROWN
NEUTRAL – BLUE
Q1 2A 1P or 2P MCB
CABINET EARTH STUD
IEC CONNECTOR
110 – 240 VAC CLIENT SUPPLY
EXAMPLE TYPICAL CONNECTIONS
CLIENT RS485 CONNECTION
A & B WIRES SHOULD BE TWISTED PAIR
SCALE 2 RAMSEY DIGITIZER CONNECTION
CONNECT SHIELD TO ONE END ONLY!
SOURCING
CLIENT SYSTEM IS SOURCING AND TO PROVIDE mA LOOP POWER
DRY CONTACT
CLIENT SYSTEM TO PROVIDE VOLTAGE LOOP POWER
CAN+ CAN– WIRES SHOULD BE TWISTED PAIR
SCALE 1 RAMSEY DIGITIZER CONNECTION
CONNECT SHIELD TO ONE END ONLY!
SINKING
EXAMPLE BELT SPEED SCALE 1
EXAMPLE BELT SPEED SCALE 2
CLIENT SYSTEM IS SINKING. CONNECTING SOURCING LOOP POWER WITH INCORRECT POLARITY WILL CAUSE DAMAGE TO ISOLATORS
DRY CONTACT
EXAMPLE TOTALIZER 1
EXAMPLE TOTALIZER 2
CLIENT SYSTEM TO PROVIDE VOLTAGE LOOP POWER
EXAMPLE FAULT
NOTES:
1) Digital Output 1/2/3/4 are user programmable solid state relays. Digital Output 1 is usually used for Scale 1 Totalizer. Others may be used for 2nd Scale, alarms etc.
2) Analogue Output 1/2 is user programmable. They can be rate, speed or load (t/h, m/s, kg/m).
3) The Ramsey Flex is a slave device only and cannot initiate messages. Supported communications protocols include Modbus RTU, ProfiBus, Ethernet/IP and Modbus TCP. Only the port labeled ETHERNET 1 must be used for Industrial communication.
4) Do not connect the shield of digitizer cable to both ends. Terminate to main controller side ONLY.
Client Doc Number:
AUTHOR: Chris Schlundt / Matt Rozyn
DATE: 13/10/2025
REVIEWED BY: David Steel
REVIEW DATE: 13/10/2025
RAMSEY / SRO TECHNOLOGY
FLEX PRO 110–240VAC VERSION
RAMSEY
SIZE: A3
DWG FILE:
DWG NO: RAM–DWG–EL–000035
REV: 0
SCALE: NTS
SHEET: 1


FLEX INTEGRATOR CABINET
WIRING LOOMS TO DOOR MOUNTED PCB
TO DOOR MOUNTED PCB 24VDC INPUT
24VDC INPUT
DOOR MOUNTED PCB
PROFIBUS
WEB INTERFACE
ETHERNET 2
ENCLOSURE EDGE
WEB INTERFACE
MODBUS TCP ETHERNET/IP
ETHERNET 1
PCB TERMINALS AND INTERNAL WIRING TO DOOR MOUNTED PCB
INTERNAL WIRING – DO NOT MODIFY
INTERNAL WIRING – DO NOT MODIFY
INTERNAL WIRING – DO NOT MODIFY
24VDC+ GND– 24VDC+ GND–
REFER TO MANUAL JUMPERS MUST BE SET TO CORRECT POSITION FOR RS232 RS422 RS485 OPERATION
X11
X12
PCB BOARD OPTIONS
ANALOG INPUT mA ISOLATION MUST BE FITTED IF INPUTS REQUIRED
mA ISOLATOR
mA ISOLATOR
DIGITAL INPUT OPTO ISOLATION 24VDC LOGIC LEVEL ONLY AC or DC INPUT MUST BE FITTED IF INPUTS REQUIRED
OPTO ISOLATOR
OPTO ISOLATOR
OPTO ISOLATOR
OPTO ISOLATOR
PCB BOARD OPTIONS
ANALOG OUTPUT mA ISOLATION MUST BE FITTED IF OUTPUTS REQUIRED
mA ISOLATOR
mA ISOLATOR
DIGITAL OUTPUT OPTO ISOLATION 24VDC LOGIC LEVEL ONLY AC or DC OUTPUT MUST BE FITTED IF OUTPUTS REQUIRED
OPTO ISOLATOR
OPTO ISOLATOR
OPTO ISOLATOR
OPTO ISOLATOR
–VE BLACK
+VE RED
–VE +VE
24VDC DC/DC ISOLATOR
–VE +VE
–VE BLACK
+VE RED
Q1 2A 1P or 2P MCB
2WAY TERMINAL
CABINET EARTH STUD
24VDC CLIENT SUPPLY
TOP CONNECTOR ROW
24VDC OUTPUT
24VDC+ GND– 24VDC+ GND–
5 6 7 8
RS232/485 MODBUS RTU SERIAL DATA
RS485 CONNECTION SHOWN
A B GND–
14 15 16 17 18
SCALE 2 DIGITIZER CONNECTION SPEED AND LOAD CELL DATA
24VDC+ GND– CAN+ CAN– SH
19 20 21 22 23
TOP CONNECTOR ROW
ANALOG INPUTS mA CURRENT OR VOLTAGE WITH CORRECT SOFTWARE SETTING
ANALOG INPUT 1
ANALOG INPUT 2
V+ V– mA+ mA– V+ V– mA+ mA–
24 25 26 27 28 29 30 31
DIGITAL INPUTS DC OR AC WITH CORRECT DIGITAL ISOLATOR INSTALLED
DIGITAL INPUT 1
DIGITAL INPUT 2
DIGITAL INPUT 3
DIGITAL INPUT 4
V+ V– V+ V– V+ V– V+ V–
32 33 34 35 36 37 38 39
BOTTOM CONNECTOR ROW
SCALE 1 DIGITIZER CONNECTION SPEED AND LOAD CELL DATA
24VDC+ GND– CAN+ CAN– SH
45 46 47 48 49
BOTTOM CONNECTOR ROW
ANALOG OUTPUTS mA CURRENT OR VOLTAGE WITH CORRECT SOFTWARE SETTING
ANALOG OUTPUT 1
ANALOG OUTPUT 2
V+ V– mA+ mA– V+ V– mA+ mA–
50 51 52 53 54 55 56 57
DIGITAL OUTPUTS DC OR AC WITH CORRECT DIGITAL ISOLATOR INSTALLED
DIGITAL OUTPUT 1
DIGITAL OUTPUT 2
DIGITAL OUTPUT 3
DIGITAL OUTPUT 4
V+ V– + – V+ V– + – V+ V– + – V+ V– + –
58 59 62 63 66 67 70 71
WIRE LINK
WIRE LINK
WIRE LINK
WIRE LINK
EXAMPLE TYPICAL CONNECTIONS
CLIENT RS485 CONNECTION
A & B WIRES SHOULD BE TWISTED PAIR
SCALE 2 RAMSEY DIGITIZER CONNECTION
CONNECT SHIELD TO ONE END ONLY!
SOURCING
CLIENT SYSTEM IS SOURCING AND TO PROVIDE mA LOOP POWER
DRY CONTACT
CLIENT SYSTEM TO PROVIDE VOLTAGE LOOP POWER
CAN+ CAN– WIRES SHOULD BE TWISTED PAIR
SCALE 1 RAMSEY DIGITIZER CONNECTION
CONNECT SHIELD TO ONE END ONLY!
SINKING
EXAMPLE BELT SPEED SCALE 1
SINKING
EXAMPLE BELT SPEED SCALE 2
CLIENT SYSTEM IS SINKING. CONNECTING SOURCING LOOP POWER WITH INCORRECT POLARITY WILL CAUSE DAMAGE TO ISOLATORS
DRY CONTACT
EXAMPLE TOTALIZER 1
DRY CONTACT
EXAMPLE TOTALIZER 2
CLIENT SYSTEM TO PROVIDE VOLTAGE LOOP POWER
DRY CONTACT
EXAMPLE FAULT
NOTES:
1) Digital Output 1/2/3/4 are user programmable solid state relays. Digital Output 1 is usually used for Scale 1 Totalizer. Others may be used for 2nd Scale, alarms etc.
2) Analogue Output 1/2 is user programmable. They can be rate, speed or load (t/h, m/s, kg/m).
3) The Ramsey Flex is a slave device only and cannot initiate messages. Supported communications protocols include Modbus RTU, ProfiBus, Ethernet/IP and Modbus TCP. Only the port labeled ETHERNET 1 must be used for Industrial communication.
4) Do not connect the shield of digitizer cable to both ends. Terminate to main controller side ONLY.
Client Doc Number:
AUTHOR: Chris Schlundt / Matt Rozyn
DATE: 13/10/2025
REVIEWED BY: David Steel
REVIEW DATE: 13/10/2025
RAMSEY / SRO TECHNOLOGY
FLEX PRO 24VDC VERSION
RAMSEY
SIZE: A3
DWG FILE:
DWG NO: RAM–DWG–EL–000036
REV: 0
SCALE: NTS
SHEET: 1


ENCLOSURE FLEX DIGITIZER 1 AND/OR 2
LOAD CELL 1
EX+
EX−
SNS+
SNS−
SIG+
SIG−
X4
DO NOT CONNECT SHIELD DIGITIZER PCB OR CHASSIS!
Cut back and insulate
SH
CAN−
CAN+
GND−
24VDC+
X1
REPEAT CONNECTIONS FOR SCALE 2 DIGITIZER
CAN+ CAN− WIRES SHOULD BE TWISTED PAIR
23
22
21
20
19
SCALE 2
49
48
47
46
45
SCALE 1
RAMSEY FLEX MAIN CONTROLLER
FLEX DIGITIZER 1 AND/OR 2 PCB
X3
24VDC+
GND−
SIG
SH
2 WIRE
3 WIRE
SHIELD AND EARTH CONNECTION THROUGH CHASSIS
OPTION 1 SPEED SENSOR 2 WIRE 60−12C
OPTION 2 SPEED SENSOR 3 WIRE 61−12−64N, 60−12−AR OR NPN PROX PROBE
DIGITIZER CAN ACCEPT A SINGLE 2 WIRE OR 3 WIRE SPEED SENSOR
NOTES:
1) Do not connect the shield of digitizer cable to both ends. Terminate to main controller side ONLY.
2) If using a single load cell or summing box with single output, connect to position "Load Cell 1"
3) Duplicate connections if dual scale is used
Client Doc Number:
AUTHOR: Chris Schlundt / Matt Rozyn
DATE: 13/10/2025
REVIEWED BY: David Steel
REVIEW DATE: 13/10/2025
RAMSEY / SRO TECHNOLOGY
FLEX SINGLE DIGITIZER CONNECTIONS
RAMSEY
SIZE: A3
DWG FILE:
DWG NO: RAM-DWG-EL-000037
REV: 0
SCALE: NTS
SHEET: 1


LOAD CELL 4
LOAD CELL 3
LOAD CELL 2
SIG–
SIG+
SNS–
SNS+
EX–
EX+
ENCLOSURE FLEX DIGITIZER 1 AND/OR 2
X4D
X4C
X4B
SH
LOAD CELL 4
LOAD CELL 3
LOAD CELL 2
OPTION 1
SPEED SENSOR
2 WIRE
60–12C
2 WIRE
GND–
SIG
DIGITIZER CAN
ACCEPT A SINGLE
2 WIRE OR 3 WIRE
SPEED SENSOR
OPTION 2
SPEED SENSOR
3 WIRE
61–12–64N,
60–12–AR OR
NPN PROX PROBE
3 WIRE
24VDC+
GND–
SIG
X3
SH
RAMSEY FLEX
MAIN CONTROLLER
CAN+ CAN–
WIRES
SHOULD BE
TWISTED
PAIR
SCALE 1
24VDC+
GND–
CAN+
CAN–
SH
45
46
47
48
49
X1
CAN+
CAN–
SCALE 2
19
20
21
22
23
REPEAT
CONNECTIONS FOR
SCALE 2 DIGITIZER
DO NOT CONNECT
SHIELD DIGITIZER
PCB OR CHASSIS!
Cut back
and Insulate
FLEX DIGITIZER 1 AND/OR 2 PCB
X4A
LOAD CELL 1
START LOAD CELL
CONNECTIONS HERE
SHIELD AND EARTH CONNECTION THROUGH CHASSIS
NOTES:
1) Do not connect the shield of digitizer cable to both ends. Terminate to main controller side ONLY.
2) If using a single load cell or summing box with single output, connect to position "Load Cell 1"
3) Duplicate connections if dual scale is used
Client Doc Number:
AUTHOR: Chris Schlundt / Matt Rozyn
DATE: 13/10/2025
REVIEWED BY: David Steel
REVIEW DATE: 13/10/2025
RAMSEY / SRO TECHNOLOGY
FLEX QUAD DIGITIZER CONNECTIONS
RAMSEY
SIZE: A3
DWG FILE:
DWG NO: RAM–DWG–EL–000038
REV: 0
SCALE: NTS
SHEET: 1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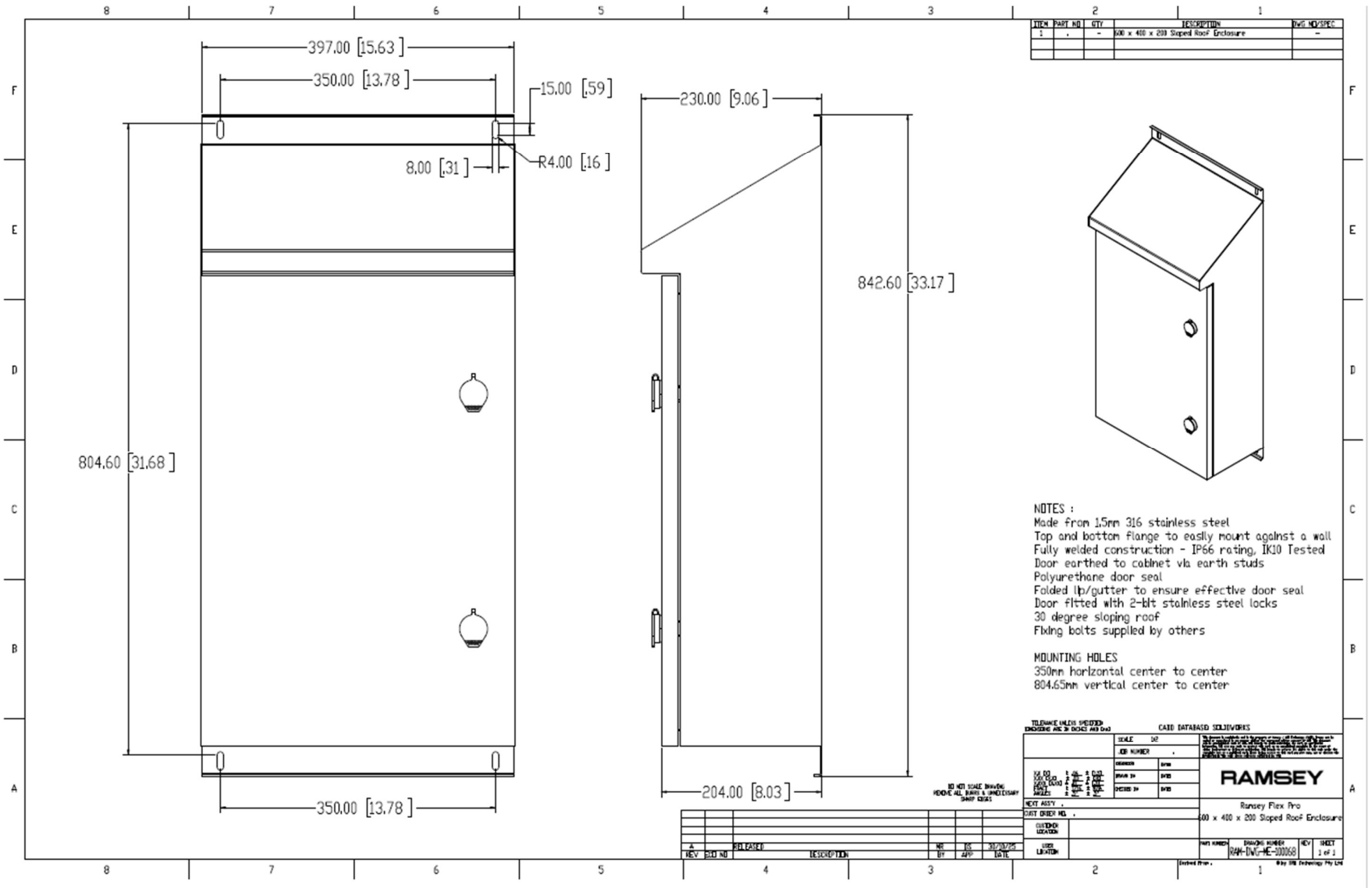
132.00 [5.20]
219.00 [8.62]
R4.40 [17]
70.00 [2.76]
70.00 [2.76]
70.00 [2.76]
NOTES :
Made From 1.5mm 304 stainless steel
Cover not shown
MOUNTING HOLES
338mm horizontal center to center
132mm vertical center to center
RAMSEY
Enclosure for Flex Plus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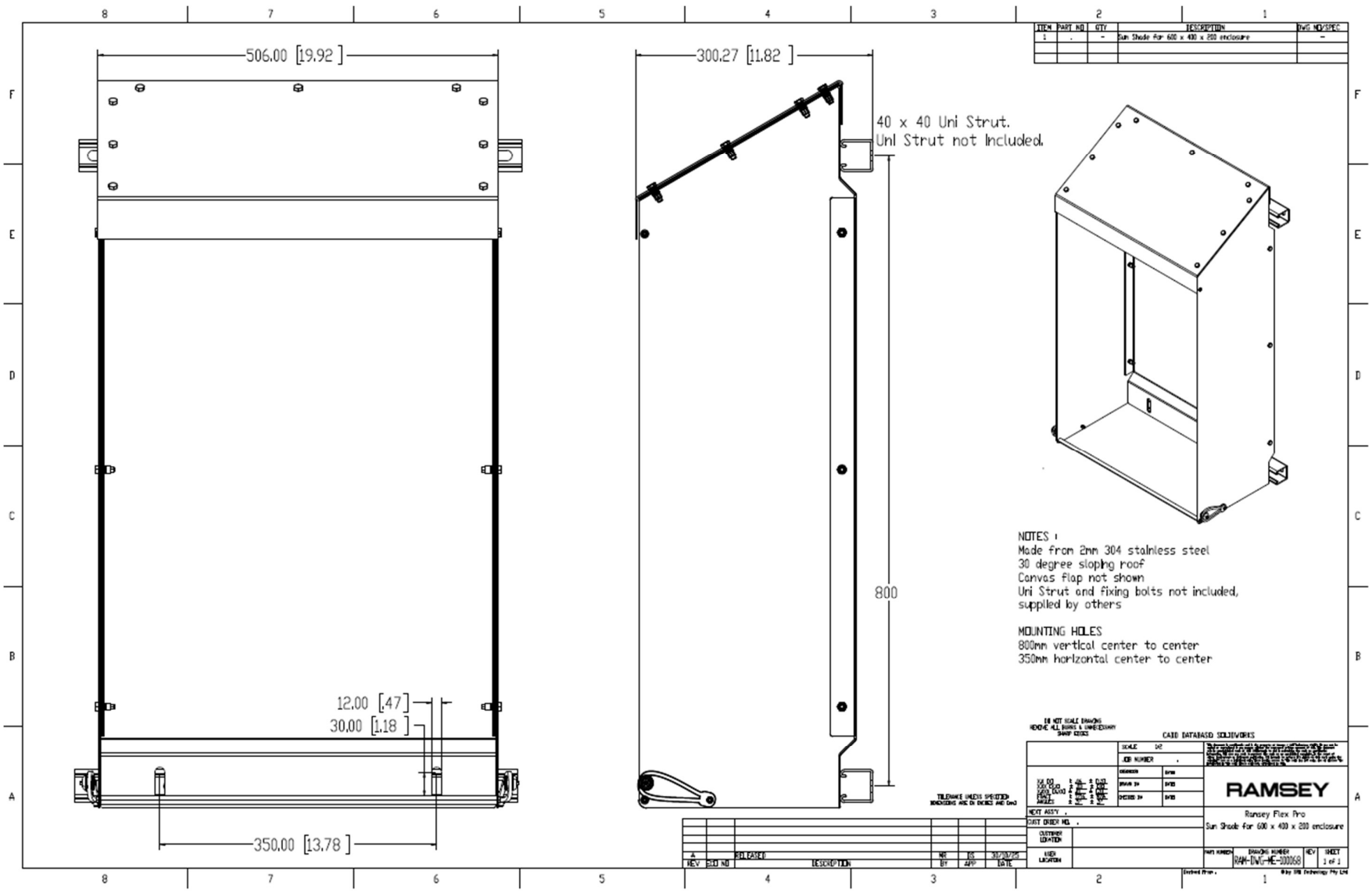
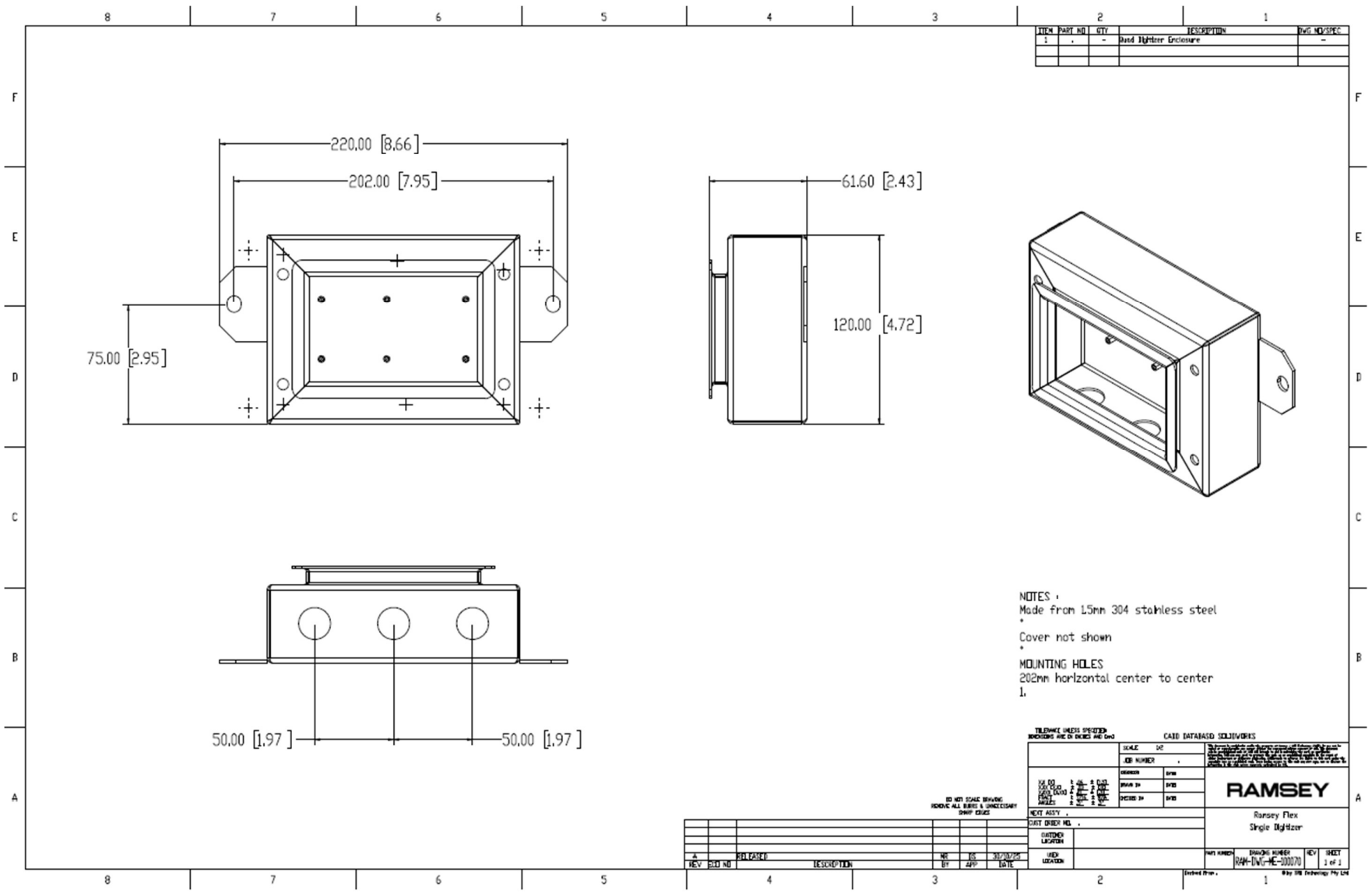
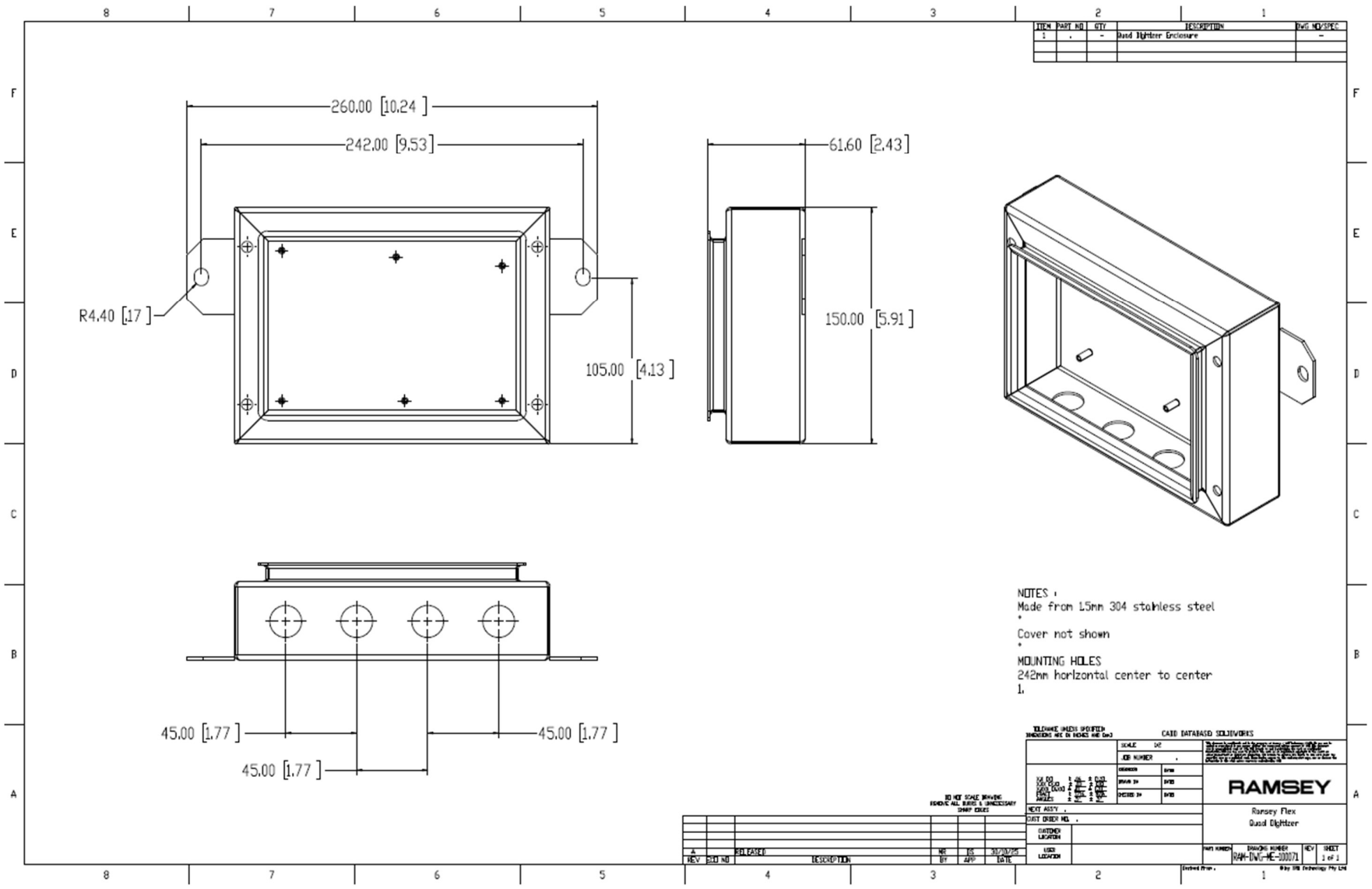
R4.00 [.16]
804.60 [31.68]
350.00 [13.78]
230.00 [9.06]
842.60 [33.17]
204.00 [8.03]
NOTES :
Made from 1.5mm 316 stainless steel
Top and bottom flange to easily mount against a wall
Fully welded construction - IP66 rating, IK10 Tested
Door earthed to cabinet via earth studs
Polyurethane door seal
Folded lip/gutter to ensure effective door seal
Door fitted with 2-bit stainless steel locks
30 degree sloping roof
Fixing bolts supplied by others
MOUNTING HOLES
350mm horizontal center to center
804.65mm vertical center to center
RAMSEY
Ramsey Flex Pro
400 x 400 x 200 Sloped Roof Enclosure


506.00 [19.92]
300.27 [11.82]
40 x 40 Uni Strut.
Uni Strut not Included.
800
12.00 [.47]
30.00 [1.18]
350.00 [13.78]
NOTES :
Made from 2mm 304 stainless steel
30 degree sloping roof
Canvas flap not shown
Uni Strut and fixing bolts not included,
supplied by others
MOUNTING HOLES
800mm vertical center to center
350mm horizontal center to center
RAMSEY
Ramsey Flex Pro
Sun Shade for 600 x 400 x 200 enclosure
RAM-DWG-ME-000068


ITEM | PART NO | QTY | DESCRIPTION | DWG NO/SPEC
1 | . | - | Band Tightner Enclosure | -
220.00 [8.66]
202.00 [7.95]
75.00 [2.95]
61.60 [2.43]
120.00 [4.72]
50.00 [1.97]
50.00 [1.97]
NOTES :
Made from 15mm 304 stainless steel
Cover not shown
MOUNTING HOLES
202mm horizontal center to center
RAMSEY
Ramsey Flex
Single Digitizer
RAM-DWG-ME-000070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242.00 [9.53]
R4.40 [17]
105.00 [4.13]
61.60 [2.43]
150.00 [5.91]
45.00 [1.77]
45.00 [1.77]
45.00 [1.77]
NOTES :
Made from 1.5mm 304 stainless steel
Cover not shown
MOUNTING HOLES
242mm horizontal center to center
1.
RAMSEY
Ramsey Flex
Quad Digitizer

RAMSEY

Appendix 2
Belt Scale Codes

Overview

The following table lists out the predefined Belt Scale Codes from within the Ramsey Flex Integrator. If your physical Weigh Frame matches one if these codes, then it can simplify setup. If not, you can manually enter that data or find a Scale Code similar to your scale and modify the parameters.

Abbreviations

The abbreviations used in the Belt Scale Code headings is as follows.

Belt scale code	=	Unique reference code for the belt Scale system
Unit	=	Metric (mm) or Imperial (inches) units
# Load cells	=	Number of Load Cells
# idlers	=	Number of Idlers
LA	=	Pivot to Load Cell Length
LB1	=	Pivot to Idler 1 Length
LB2	=	Pivot to Idler 2 Length
LB3	=	Pivot to Idler 3 Length
LB4	=	Pivot to Idler 4 Length
LB5	=	Pivot to Idler 5 Length
LB6	=	Pivot to Idler 6 Length
LC	=	Pivot to Test Weight Length
LD	=	Idler Spacing
LE	=	Pivot to Test Weight Height
LF	=	Pivot to Carriage Height
LG	=	Roller to Carriage Height
mV/V	=	Load cell sensitivity

Belt scale code	Unit	Scale model	Belt width	Calibr. Kit	# Load cells	# idlers	LA	LB1	LB2	LB3	LB4	LB5	LB6	LC	LD	LE	LF	LG	mV/V
1	Inches	10-20-1	18-36	50-34	1	1	32	24	-	-	-	-	-	24	36	-	6.5	6.5	3
2	Inches	10-20-1	42-72	50-34	1	1	32	22.75	-	-	-	-	-	22.75	36	-	6.5	7	3

Belt scale code	Unit	Scale model	Belt width	Calibr. Kit	# Load cells	# idlers	LA	LB1	LB2	LB3	LB4	LB5	LB6	LC	LD	LE	LF	LG	mV/V
3	Inches	10-20-1	24-36	50-34	2	1	32	24	-	-	-	-	-	24	36	-	6.5	6.5	3
4	Inches	10-20-1	42-84	50-34	2	1	32	22.75	-	-	-	-	-	22.75	36	-	6.5	7	3
5	Inches	10-20-2		50-34	1	2	36	18	18	-	-	-	-	18	36	-	6.5	7	3
6	Inches	10-20-2		50-34	1	2	48	24	24	-	-	-	-	24	48	-	6.5	7	3
7	Inches	10-20-1	18-36	50-30	1	1	32	24	-	-	-	-	-	38	36	4.5	6.5	6.5	3
8	Inches	10-20-1	42-72	50-30	1	1	32	22.75	-	-	-	-	-	38	36	4.5	6.5	7	3
9	Inches	10-20-2LC	24-36	50-30	2	1	32	24	-	-	-	-	-	42.5	36	4.5	6.5	6.5	3
10	Inches	10-20-2LC	42-84	50-30	2	1	32	22.75	-	-	-	-	-	42.5	36	4.5	6.5	7	3
11	Inches	10-22	18-36	50-30	1	2	62	54	18	-	-	-	-	38	36	4.75	6.5	6.5	3
12	Inches	10-22	18-36	50-30	1	2	71	63	21	-	-	-	-	42	42	4.75	6.5	6.5	3
13	Inches	10-22	18-36	50-30	1	2	80	72	24	-	-	-	-	48	48	4.75	6.5	6.5	3
14	Inches	10-22	42-48	50-30	1	2	62	52.75	16.75	-	-	-	-	36	36	4.75	6.5	7	3
15	Inches	10-22	42-48	50-30	1	2	71	61.75	19.75	-	-	-	-	42	42	4.75	6.5	7	3
16	Inches	10-22	42-48	50-30	1	2	80	70.75	22.75	-	-	-	-	48	48	4.75	6.5	7	3
17	Inches	10-22	18-36	50-30	1	2	62	54	18	-	-	-	-	68	36	4.5	6.5	6.5	3
18	Inches	10-22	18-36	50-30	1	2	71	63	21	-	-	-	-	77	42	4.5	6.5	6.5	3
19	Inches	10-22	18-36	50-30	1	2	80	72	24	-	-	-	-	86	48	4.5	6.5	6.5	3
20	Inches	10-22	42-48	50-30	1	2	62	52.75	16.75	-	-	-	-	68	36	4.5	6.5	7	3
21	Inches	10-22	42-48	50-30	1	2	71	61.75	19.75	-	-	-	-	77	42	4.5	6.5	7	3
22	Inches	10-22	42-48	50-30	1	2	80	70.75	22.75	-	-	-	-	86	48	4.5	6.5	7	3
23	Inches	10-22	18-36	50-34	1	2	62	54	18	-	-	-	-	54	36	-	6.5	6.5	3
24	Inches	10-22	18-36	50-34	1	2	71	63	21	-	-	-	-	63	42	-	6.5	6.5	3
25	Inches	10-22	18-36	50-34	1	2	80	72	24	-	-	-	-	84	48	-	6.5	6.5	3
26	Inches	10-22	42-48	50-34	1	2	62	52.75	16.75	-	-	-	-	66	36	-	6.5	7	3
27	Inches	10-22	42-48	50-34	1	2	71	61.75	19.75	-	-	-	-	75	42	-	6.5	7	3
28	Inches	10-22	42-48	50-34	1	2	80	70.75	22.75	-	-	-	-	84	48	-	6.5	7	3
29	Inches	10-20-WF		BAR	1	1	32	24	-	-	-	-	-	24	30	-2	4	4	3
30	Inches	10-20-WF		BAR	1	1	32	22.75	-	-	-	-	-	22.75	30	-2	4	4	3
31	Inches	10-20-WF		BAR	1	1	32	24	-	-	-	-	-	36	30	2	4	4	3

Belt scale code	Unit	Scale model	Belt width	Calibr. Kit	# Load cells	# idlers	LA	LB1	LB2	LB3	LB4	LB5	LB6	LC	LD	LE	LF	LG	mV/V
32	Inches	10-20-WF		BAR	1	1	32	22.75	-	-	-	-	-	36	30	2	4	4	3
33	Inches	10-17-2		50-17	2	2	64	54	18	-	-	-	-	36	36	-4.75	6.5	7	3
34	Inches	10-17-2		50-17	2	2	76	63	21	-	-	-	-	42	42	-4.75	6.5	7	3
35	Inches	10-17-2		50-17	2	2	88	72	24	-	-	-	-	48	48	-4.75	6.5	7	3
36	mm	10-17-2		50-17	2	2	1796.8	500	1500	-	-	-	-	939.8	1000	-120.65	165.1	177.8	3
37	mm	10-17-2		50-17	2	2	2235.2	1800	600	-	-	-	-	1228.85	1200	-120.65	165.1	177.8	3
38	Inches	10-17-4		50-17	2	4	64	18	54	54	18	-	-	36	36	-	6.5	7	3
39	Inches	10-17-4		50-17	2	4	76	21	63	63	21	-	-	42	42	-	6.5	7	3
40	Inches	10-17-4		50-17	2	4	88	24	72	72	24	-	-	48	48	-	6.5	7	3
41	mm	10-17-4		50-17	2	4	1796.8	600	1600	1600	600	-	-	1100	1000	-	165.1	177.8	3
42	Inches	10-17-4		50-17	2	4	88	24.75	72	72	24.75	-	-	48.31	47.244	-	6.5	7	3
43	Inches	10-14-3		50-14	4	3	-	-	-	-	-	-	-	-	36	-	-	-	3
44	Inches	10-14-3		50-14	4	3	-	-	-	-	-	-	-	-	42	-	-	-	3
45	Inches	10-14-3		50-14	4	3	-	-	-	-	-	-	-	-	48	-	-	-	3
47	Inches	10-14-4		50-14	4	4	-	-	-	-	-	-	-	-	36	-	-	-	3
48	Inches	10-14-4		50-14	4	4	-	-	-	-	-	-	-	-	42	-	-	-	3
49	Inches	10-14-4		50-14	4	4	-	-	-	-	-	-	-	-	48	-	-	-	3
50	Inches	10-14-4		50-14	4	4	-	-	-	-	-	-	-	-	54	-	-	-	3
51	mm	10-14-4		50-14	4	4	-	-	-	-	-	-	-	-	1000	-	-	-	3
52	mm	10-14-4		50-14	4	4	-	-	-	-	-	-	-	-	1200	-	-	-	3
53	Inches	10-30		50-30	1	1	-	-	-	-	-	-	-	-	36	-	-	-	1.8
54	Inches	10-11	18-42	WTS	1	1	55.5	48	-	-	-	-	-	40	36	6.5	6.5	6.5	3
55	Inches	10-11	48-72	WTS	1	1	56.5	48	-	-	-	-	-	40	36	7	7	7	3
56	Inches	10-12		WTS	1	2	66	48	48	-	-	-	-	40	36	7	7	7	3
57	Inches	10-17-2D		50-17	2	2	40	24	24	-	-	-	-	24	48	-	6.5	7	3
58	Inches	10-17-2D		50-17	2	2	34	21	21	-	-	-	-	21	42	-	6.5	7	3
59	Inches	10-17-2D		50-17	2	2	28	18	18	-	-	-	-	18	36	-	6.5	7	3
60	Inches	10-30-1-1		50-30	1	1	-	-	-	-	-	-	-	-	36	-	-	-	2

Belt scale code	Unit	Scale model	Belt width	Calibr. Kit	# Load cells	# idlers	LA	LB1	LB2	LB3	LB4	LB5	LB6	LC	LD	LE	LF	LG	mV/V
61	Inches	10-30-1-2		50-30	2	1	-	-	-	-	-	-	-	-	36	-	-	-	2
101	Inches				1	1	32	24	-	-	-	-	-	40	36	-4.5	6.5	7	3
102	Inches				1	2	68	24	60	-	-	-	-	76	36	-4.5	6.5	7	3
103	Inches				1	1	32	24	-	-	-	-	-	24	36	1.5	3.5	4.25	3
105	Inches				1	2	56	18	48	-	-	-	-	64	30	-4.5	6.5	7	3
106	Inches				1	2	68	24	60	-	-	-	-	76	36	-4.5	6.5	7	3
107	Inches				1	2	74	24	66	-	-	-	-	82	42	-4.5	6.5	7	3
108	Inches				1	2	80	24	72	-	-	-	-	88	48	-4.5	6.5	7	3
110	mm				1	2	1800	600	1600	-	-	-	-	2000	1000	-114.3	165.1	177.8	3
111	mm				1	2	2000	600	1800	-	-	-	-	2200	1200	-114.3	165.1	177.8	3
112	mm				1	2	2300	600	2100	-	-	-	-	2500	1500	-114.3	165.1	177.8	3
114	Inches				2	2	60.5	16.5	49.5	-	-	-	-	71.5	33	-4.5	6.5	7	3
115	Inches				2	2	66	18	54	-	-	-	-	78	36	-4.5	6.5	7	3
116	Inches				2	2	73.31	20	60	-	-	-	-	86.62	40	-4.5	6.5	7	3
117	Inches				2	2	77	21	63	-	-	-	-	91	42	-4.5	6.5	7	3
118	Inches				2	2	88	24	72	-	-	-	-	104	48	-4.5	6.5	7	3
119	Inches				2	2	99	27	81	-	-	-	-	117	54	-4.5	6.5	7	3
120	Inches				2	2	110	30	90	-	-	-	-	130	60	-4.5	6.5	7	3
123	mm				2	2	1833	500	1500	-	-	-	-	2166	1000	-114.3	165.1	177.8	3
124	mm				2	2	2200	600	1800	-	-	-	-	2600	1200	-114.3	165.1	177.8	3
130	Inches				2	4	58.12	16.5	49.5	49.5	16.5	-	-	58.12	33	-4.5	6.5	7	3
131	Inches				2	4	64.12	18	54	54	18	-	-	64.12	36	-4.5	6.5	7	3
132	Inches				2	4	72.12	20	60	60	20	-	-	72.12	40	-4.5	6.5	7	3
133	Inches				2	4	76.12	21	63	63	21	-	-	76.12	42	-4.5	6.5	7	3
134	Inches				2	4	88.12	24	72	72	24	-	-	88.12	48	-4.5	6.5	7	3
135	Inches				2	4	100.12	27	81	81	27	-	-	100.12	54	-4.5	6.5	7	3
136	Inches				2	4	112.12	30	90	90	30	-	-	112.12	60	-4.5	6.5	7	3
139	mm				2	4	1800	500	1500	1500	500	-	-	1800	1000	-114.3	165.1	177.8	3
140	mm				2	4	2200	600	1800	1800	600	-	-	2200	1200	-114.3	165.1	177.8	3

Belt scale code	Unit	Scale model	Belt width	Calibr. Kit	# Load cells	# idlers	LA	LB1	LB2	LB3	LB4	LB5	LB6	LC	LD	LE	LF	LG	mV/V
201	mm				1	1	810	610	-	-	-	-	-	610	1000	-427	162	125	3
202	mm				1	1	810	610	-	-	-	-	-	610	1000	-427	112	125	3
203	mm				1	1	810	610	-	-	-	-	-	610	500	-427	162	125	3
204	mm				1	1	810	610	-	-	-	-	-	610	500	-427	112	125	3
205	mm				2	1	810	610	-	-	-	-	-	610	1000	-427	162	125	3
206	mm				2	1	810	610	-	-	-	-	-	610	1000	-427	112	125	3
209	mm				1	1	-	-	-	-	-	-	-	-	1000	-	-	-	2
210	mm				1	1	-	-	-	-	-	-	-	-	600	-	-	-	2
211	mm				2	1	-	-	-	-	-	-	-	-	1200	-	-	-	2
212	mm				4	4	-	-	-	-	-	-	-	-	1000	-	-	-	2
213	mm				4	3	-	-	-	-	-	-	-	-	1000	-	-	-	2
214	mm				1	1	-	-	-	-	-	-	-	-	1000	-	-	-	2
215	mm				2	1	-	-	-	-	-	-	-	-	1000	-	-	-	2
301	mm				1	1	1000	800	-	-	-	-	-	650	1000	-163	138	135	3
302	mm				1	1	1000	800	-	-	-	-	-	650	1200	-163	138	135	3
303	mm				1	1	1000	800	-	-	-	-	-	650	1000	-213	188	160	3
304	mm				1	1	1000	800	-	-	-	-	-	650	1200	-213	188	160	3
305	mm				2	1	1000	800	-	-	-	-	-	650	1000	-213	188	196	3
306	mm				2	1	1000	800	-	-	-	-	-	650	1200	-213	188	196	3
313	mm				4	4	-	-	-	-	-	-	-	-	1000	-	-	-	3
314	mm				1	1	-	-	-	-	-	-	-	-	1000	-	-	-	2
315	mm				2	1	-	-	-	-	-	-	-	-	1000	-	-	-	2
401	mm				1	2	1250	750	1750	-	-	-	-	1250	1000	103	106	120	3
402	mm				2	2	1250	750	1750	-	-	-	-	1250	1000	103	106	120	3
403	mm				1	1	1000	750	-	-	-	-	-	750	1000	103	106	120	3
405	mm				2	1	-	-	-	-	-	-	-	-	1000	-	-	-	2
406	mm				4	2	-	-	-	-	-	-	-	-	1000	-	-	-	3
407	mm				4	3	-	-	-	-	-	-	-	-	1200	-	-	-	3
408	mm				4	4	-	-	-	-	-	-	-	-	1000	-	-	-	3

Belt scale code	Unit	Scale model	Belt width	Calibr. Kit	# Load cells	# idlers	LA	LB1	LB2	LB3	LB4	LB5	LB6	LC	LD	LE	LF	LG	mV/V
409	mm				4	6	-	-	-	-	-	-	-	-	1000	-	-	-	3
410	mm				1	1	-	-	-	-	-	-	-	-	1000	-	-	-	2
501	mm				1	1	800	600	-	-	-	-	-	600	1000	-	-	-	3
502	mm				1	1	800	575	-	-	-	-	-	575	1000	-	-	-	3
504	mm				2	4	1800	500	1500	500	1500	-	-	-	1000	-	-	-	3
505	mm				4	4	-	-	-	-	-	-	-	-	1000	-	-	-	3
601	mm				1	1	-	-	-	-	-	-	-	-	1000	-	-	-	2
602	mm				1	1	810	610	-	-	-	-	-	610	1000	-	-	-	3
603	mm				2	1	810	610	-	-	-	-	-	610	1000	-	-	-	3
604	mm				1	1	600	450	-	-	-	-	-	450	1000	-	-	-	3
608	mm				2	4	1700	1500	500	1500	500	-	-	1850	1000	-	-	-	3
609	mm				4	4	-	-	-	-	-	-	-	-	1000	-	-	-	3
610	mm				4	5	-	-	-	-	-	-	-	-	1000	-	-	-	3
611	mm				4	6	-	-	-	-	-	-	-	-	1000	-	-	-	3

Appendix 3
Register Glossary and Descriptions

Overview

The following table lists out all the parameters used in the Modbus, EtherNet/IP and ProfiBus registers. This table must be used in combination with the Modbus, EtherNet/IP and ProfiBus registers to understand what the data being sent to the PLC means.

NOTE – All data output over Modbus, EtherNet/IP and ProfiBus is in ~~METRIC~~ Metric format. There is no option to send Imperial data over these industrial communication networks. ~~Metric only.~~

Description	Type	Value	Units
Belt cal method	Integer	0 = Not calibrated 1 = Auto calibration 2 = Manual calibration	--
Belt date	Float	Date and time of last Belt Speed calibration	Epoch time format
Belt length	Float	Calibrated conveyor belt length for one revolution	m
Belt running	Bool	0 = Belt not running 255 = Belt running	--
Belt speed	Float	Belt speed with NO averaging time applied	m/s
Belt speed (Display)	Float	Belt speed with display averaging time	m/s
Belt speed (Industrial I/O)	Float	Belt speed with Industrial I/O averaging time	m/s
CalCon	Float	The target amount of material that should pass over the weigh span during Span calibration	Tonnes
Capacity exceeded	Bool	0 = Weight Capacity okay 255 = Weight Capacity exceeded	--
Conveyor incline	Float	Incline angle of conveyor. +ve is upward sloping, -ve is downward sloping	Degree
CPU Temperature	Float	Temperature of the CPU. Throttling will occur if CPU temperature exceeds 105 degrees	Degrees
Digitizer com error count	Integer	1, 2 .... n = Number of digitizer errors	--
Digitizer com up	Bool	0 = Communication okay 255 = Communication down	--
Encoder pulses	Integer	1, 2 .... n = Calibrated number of encoder pulses during test duration	Pulses
Flow rate	Float	Flow rate with NO averaging time applied	t/h
Flow rate (Display)	Float	Flow rate with display averaging time	t/h
Flow rate (Industrial I/O)	Float	Flow rate with Industrial I/O averaging time	t/h
Flow rate OK	Bool	0 = Flow Rate okay 255 = Flow Rate exceeded	--
Idler count	Integer	1, 2 .... n = Number of Idlers on Weight Frame	--
In1	Bool	0 = Digital Input 1 not triggered 255 = Digital Input 1 triggered	
In2	Bool	0 = Digital Input 2 not triggered 255 = Digital Input 2 triggered	

Description	Type	Value	Units
In3	Bool	0 = Digital Input 3 not triggered 255 = Digital Input 3 triggered	
In4	Bool	0 = Digital Input 4 not triggered 255 = Digital Input 4 triggered	
LA	Float	Pivot to Load Cell Length	mm
LB1	Float	Pivot to Idler 1 Length	mm
LB2	Float	Pivot to Idler 2 Length	mm
LB3	Float	Pivot to Idler 3 Length	mm
LB4	Float	Pivot to Idler 4 Length	mm
LB5	Float	Pivot to Idler 5 Length	mm
LB6	Float	Pivot to Idler 6 Length	mm
LC	Float	Pivot to Test Weight Length	mm
LD	Float	Idler Spacing	mm
LE	Float	Pivot to Test Weight Height	mm
LF	Float	Pivot to Carriage Height	mm
LG	Float	Roller to Carriage Height	mm
Load cell mV #1	Float	Load cell 1 measurement	mV
Load cell mV #2	Float	Load cell 2 measurement	mV
Load cell mV #3	Float	Load cell 3 measurement	mV
Load cell mV #4	Float	Load cell 4 measurement	mV
Load cell1 exceeded	Bool	0 = Load Cell 1 mV okay 255 = Load Cell 1 mV exceeded	--
Load cell2 exceeded	Bool	0 = Load Cell 2 mV okay 255 = Load Cell 2 mV exceeded	--
Load cell3 exceeded	Bool	0 = Load Cell 3 mV okay 255 = Load Cell 3 mV exceeded	--
Load cell4 exceeded	Bool	0 = Load Cell 4 mV okay 255 = Load Cell 4 mV exceeded	--
Load cells balanced	Bool	0 = Load Cells balanced 255 = Load Cells unbalanced	--
Max belt speed	Float	Maximum belt speed set by User	m/s
Max flow rate	Float	Maximum flow rate set by User	t/h
Measurement data OK	Bool	0 = SD Card Detected 255 = SD Card Not Detected	--
Measurement stopped	Bool		--
Mode actual	Integer	0 = Run 1 = Automatic belt speed calibration 2 = Manual belt speed calibration 3 = Zero calibration 4 = Span calibration 5 = Material calibration	--
Out1	Bool	0 = Digital Output 1 open 255 = Digital Output 1 closed	

Description	Type	Value	Units
Out2	Bool	0 = Digital Output 2 open 255 = Digital Output 2 closed	
Out3	Bool	0 = Digital Output 3 open 255 = Digital Output 3 closed	
Out4	Bool	0 = Digital Output 4 open 255 = Digital Output 4 closed	
Pulses/minute	Float	Speed sensor measurement	Pulse/min
Reboot	Bool	0 = Default state, Reboot not required 1 = Reboot Ramsey Flex integrator	
Reset error counter	Bool	0 = Default state, Reset not required 1 = Reset error counter	
Reset Totalizer	Integer	NOTE – The Total Master Totalizer can ONLY be reset on the Ramsey Flex HMI panel by entering the correct code. You cannot reset Master Totalizer remotely. Totalizers #1 #2 and #3 can be reset over Modbus by following this process. The following is represented in Binary and Hex so the User may understand the process. • Reset Totalizer #1 – Binary 0000001 (0x01) • Reset Totalizer #2 – Binary 0000010 (0x02) • Reset Totalizer #3 – Binary 0000100 (0x04) You can reset multiple Totalizers at the same time. • Reset Tot #1 #3 – Binary 0000101 (0x05) • Reset Tot #1 #2 – Binary 0000011 (0x03) • Reset Tot #2 #3 – Binary 0000110 (0x06) Or any other combination of Totalizer #1 #2 #3. You MUST send a 0 command after performing a reset in order to clear the command for next reset. If this is not done, then further requests will be refused. • Clear Command – Binary 0000000 (0x00)	
Revolutions	Integer	1, 2 .... n = Calibrated number of complete belt revolutions during test duration	Revs
Roller chain weight	Float	Per meter weight of roller chain	kg/m
Run time	Float	The calibration run time (test duration)	Seconds
Span % complete	Integer	0 - 100% in 1% increments	--
Span ADC	Float	The current Span Calibration value	--
Span ADC Old	Float	The previous Span Calibration value. If Ramsey Flex Integrator is restarted this will default to 0	--
Span cal method	Integer	0 = Not calibrated 1 = Auto calibration 2 = Manual calibration 3 = Material calibration	--
Span date	Float	Date and time of last Span calibration	Epoch time format
Span mode	Integer	0 = Not in calibration mode 1 = Engage weight 2 = Collecting data 3 = Complete 4 = Apply warning	--

Description	Type	Value	Units
		5 = Calibration changed 6 = Belt stopped 7 = Disengage weight	
Span time remaining	Integer	X seconds remaining	Seconds
Span type	Integer	1 = R-Cal 2 = Static (Billet) weight 3 = Roler chain	--
Static weight	Float	Weight of billet weights	kg
Status OK	Integer	0 = Unknown 1 = Good 2 = Warning Scale not calibrated Digitizer comms error Load Cell out of balance AZT deviation 3 = Error Digitizer comms down Scale capacity exceeded Measurement data not OK System CRC is wrong / not OK	--
Temperature Sensor	Float	Temperature sensor on PCB, indicative of internal box temperature	Degrees
Time	Float	Current time and date on the Ramsey Flex Integrator	Epoch time format
Tons	Float	The amount of material passing over the weigh span during Zero calibration	Tonnes
Total load cell kg	Float	Sum of calculated kg on all load cells	kg
Total Master	Float	Master totalizer – Cannot be reset remotely, must be reset on HMI interface using reset code	Tonnes
Total1	Float	Shift totalizer 1 – Can be reset remotely and on HMI interface	Tonnes
Total2	Float	Shift totalizer 2 – Can be reset remotely and on HMI interface	Tonnes
Total3	Float	Shift totalizer 3 – Can be reset remotely and on HMI interface	Tonnes
Weight	Float	Weight with NO averaging time applied	kg
Weight (Display)	Float	Weight with display averaging time	kg
Weight (Industrial I/O)	Float	Weight with Industrial I/O averaging time	kg
Zero % complete	Integer	0 - 100% in 1% increments	--
Zero ADC	Float	The current Zero Calibration value	--
Zero ADC Old	Float	The previous Zero Calibration value. If Ramsey Flex Integrator is restarted this will default to 0	--
Zero cal method	Integer	0 = Not calibrated 1 = Auto calibration 2 = Manual calibration	--
Zero date	Float	Date and time of last Zero Calibration	Epoch time format
Zero mode	Integer	0 = Not in calibration mode	--

Description	Type	Value	Units
		2 = Collecting data 3 = Complete 5 = Calibration changed 6 = Belt stopped	
Zero time remaining	Integer	X seconds remaining	Seconds

Table 6 – Communication glossary

Appendix 4
Modbus Register Table

Modbus Connection Information

The following Modbus register information is common for both versions of Modbus.

- Modbus RTU - Modbus communication over Serial Network.
- Modbus TCP - Modbus communication over Ethernet Network.

Modbus RTU Connection Information

The default RTU Serial connection parameters are as noted below.

- Baud = 115200
- Parity = None
- Stop bits = 1
- Data Size = 8

Modbus TCP Connection Information

The default Ethernet connection parameters are noted below. Note that Ethernet parameters such as IP address need to be set by the User.

- Port = 502

Floating Point Precision

You must select measurement units that are suitable for the installation and that are suitable for transmission over communication protocols.

Scale 1 Boolean Outputs

NOTE – For Scale 2, replace Slave ID = 1 with Slave ID = 2. Register values are identical for Scale 1 and 2. For example, to read “Belt running” for Scale 1 is ID=1 Register=40200 and to read “Belt running” for Scale 2 is ID=2 Register=40200.

Slave ID	Register	Device	Description	Access	Format	Type	Range
1	40200	Scale 1	Belt running	Read	U16	Bool	0/255
1	40201	Scale 1	Capacity exceeded	Read	U16	Bool	0/255
1	40202	Scale 1	Digitizer com up	Read	U16	Bool	0/255
1	40203	Scale 1	Flow rate OK	Read	U16	Bool	0/255
1	40204	Scale 1	Load cell1 exceeded	Read	U16	Bool	0/255
1	40205	Scale 1	Load cell2 exceeded	Read	U16	Bool	0/255
1	40206	Scale 1	Load cell3 exceeded	Read	U16	Bool	0/255
1	40207	Scale 1	Load cell4 exceeded	Read	U16	Bool	0/255
1	40208	Scale 1	Load cells balanced	Read	U16	Bool	0/255
1	40209	Scale 1	Measurement data OK	Read	U16	Bool	0/255
1	40210	Scale 1	Measurement stopped	Read	U16	Bool	0/255

Table 7 – Modbus Bool values register Scale 1

Scale 1 Integer Outputs

NOTE – For Scale 2, replace Slave ID = 1 with Slave ID = 2. Register values are identical for Scale 1 and 2. For example, to read “Span Mode” for Scale 1 is ID=1 Register=40410 and to read “Span Mode” for Scale 2 is ID=2 Register=40410.

Slave ID	Register	Device	Description	Access	Format	Type	Range
1	40400	Scale 1	Status OK	Read	U16	Integer	
1	40401	Scale 1	Digitizer com error count	Read	U16	Integer	
1	40402	Scale 1	Mode actual	Read	U16	Integer	
1	40403	Scale 1	Idler count	Read	U16	Integer	
1	40404	Scale 1	Zero time remaining	Read	U16	Integer	
1	40405	Scale 1	Zero % complete	Read	U16	Integer	
1	40406	Scale 1	Zero mode	Read	U16	Integer	
1	40407	Scale 1	Zero cal method	Read	U16	Integer	
1	40408	Scale 1	Span time remaining	Read	U16	Integer	
1	40409	Scale 1	Span % complete	Read	U16	Integer	
1	40410	Scale 1	Span mode	Read	U16	Integer	
1	40411	Scale 1	Span type	Read	U16	Integer	
1	40412	Scale 1	Span cal method	Read	U16	Integer	
1	40413	Scale 1	Encoder pulses	Read	U16	Integer	
1	40414	Scale 1	Revolutions	Read	U16	Integer	
1	40415	Scale 1	Belt cal method	Read	U16	Integer	

Table 8 – Modbus Integer values register Scale 1

Scale 1 Floating Outputs

NOTE 1 – For Scale 2, replace Slave ID = 1 with Slave ID = 2. Register values are identical for Scale 1 and 2. For example, to read “Total Master” for Scale 1 is ID=1 Register=40600 and to read “Total Master” for Scale 2 is ID=2 Register=40600.

NOTE 2 – The totalization and time values are 32bit values that are sent over Modbus as 2 x 16bit values and recombined. Due to IEEE 754 single precision these numbers are truncated as the value gets larger and larger, this means the update frequency will be significant longer than 1 second for time and could be a tonne of more for the totalizers.

Slave ID	Register	Device	Description	Access	Format	Type	Range
1	40600	Scale 1	Total Master	Read	Big-endian	32 bit float	
1	40602	Scale 1	Total1	Read	Big-endian	32 bit float	
1	40604	Scale 1	Total2	Read	Big-endian	32 bit float	
1	40606	Scale 1	Total3	Read	Big-endian	32 bit float	
1	40608	Scale 1	Belt speed (Display)	Read	Big-endian	32 bit float	
1	40610	Scale 1	Flow rate (Display)	Read	Big-endian	32 bit float	
1	40612	Scale 1	Weight (Display)	Read	Big-endian	32 bit float	
1	40614	Scale 1	Belt speed (Industrial I/O)	Read	Big-endian	32 bit float	
1	40616	Scale 1	Flow rate (Industrial I/O)	Read	Big-endian	32 bit float	
1	40618	Scale 1	Weight (Industrial I/O)	Read	Big-endian	32 bit float	
1	40620	Scale 1	Belt speed	Read	Big-endian	32 bit float	
1	40622	Scale 1	Flow rate	Read	Big-endian	32 bit float	
1	40624	Scale 1	Weight	Read	Big-endian	32 bit float	
1	40626	Scale 1	Conveyor incline	Read	Big-endian	32 bit float	
1	40628	Scale 1	Max flow rate	Read	Big-endian	32 bit float	
1	40630	Scale 1	Total load cell kg	Read	Big-endian	32 bit float	

Slave ID	Register	Device	Description	Access	Format	Type	Range
1	40632	Scale 1	Load cell mV #1	Read	Big-endian	32 bit float	
1	40634	Scale 1	Load cell mV #2	Read	Big-endian	32 bit float	
1	40636	Scale 1	Load cell mV #3	Read	Big-endian	32 bit float	
1	40638	Scale 1	Load cell mV #4	Read	Big-endian	32 bit float	
1	40640	Scale 1	Pulses/minute	Read	Big-endian	32 bit float	
1	40642	Scale 1	Tons	Read	Big-endian	32 bit float	
1	40644	Scale 1	Zero ADC	Read	Big-endian	32 bit float	
1	40646	Scale 1	Zero ADC Old	Read	Big-endian	32 bit float	
1	40648	Scale 1	Zero date	Read	Big-endian	32 bit float	
1	40650	Scale 1	Roller chain weight	Read	Big-endian	32 bit float	
1	40652	Scale 1	Static weight	Read	Big-endian	32 bit float	
1	40654	Scale 1	CalCon	Read	Big-endian	32 bit float	
1	40656	Scale 1	Span ADC	Read	Big-endian	32 bit float	
1	40658	Scale 1	Span ADC Old	Read	Big-endian	32 bit float	
1	40660	Scale 1	Span date	Read	Big-endian	32 bit float	
1	40662	Scale 1	Run time	Read	Big-endian	32 bit float	
1	40664	Scale 1	Belt length	Read	Big-endian	32 bit float	
1	40666	Scale 1	Max belt speed	Read	Big-endian	32 bit float	
1	40668	Scale 1	Belt date	Read	Big-endian	32 bit float	
1	40670	Scale 1	Idler spacing	Read	Big-endian	32 bit float	
1	40672	Scale 1	LA	Read	Big-endian	32 bit float	
1	40674	Scale 1	LB1	Read	Big-endian	32 bit float	
1	40676	Scale 1	LB2	Read	Big-endian	32 bit float	
1	40678	Scale 1	LB3	Read	Big-endian	32 bit float	
1	40680	Scale 1	LB4	Read	Big-endian	32 bit float	
1	40682	Scale 1	LB5	Read	Big-endian	32 bit float	
1	40684	Scale 1	LB6	Read	Big-endian	32 bit float	
1	40686	Scale 1	LC	Read	Big-endian	32 bit float	
1	40688	Scale 1	LE	Read	Big-endian	32 bit float	
1	40690	Scale 1	LF	Read	Big-endian	32 bit float	
1	40692	Scale 1	LG	Read	Big-endian	32 bit float	

Table 9 – Modbus Floating values register Scale 1

Integrator Boolean Outputs

Slave ID	Register	Device	Description	Access	Format	Type	Range
3	40200	Integrator	In1	Read	U16	Bool	0/255
3	40201	Integrator	In2	Read	U16	Bool	0/255
3	40202	Integrator	In3	Read	U16	Bool	0/255
3	40203	Integrator	In4	Read	U16	Bool	0/255
3	40204	Integrator	Out1	Read	U16	Bool	0/255
3	40205	Integrator	Out2	Read	U16	Bool	0/255
3	40206	Integrator	Out3	Read	U16	Bool	0/255
3	40207	Integrator	Out4	Read	U16	Bool	0/255

Table 10 – Modbus Boolean values for Integrator

Integrator Integer Outputs

Slave ID	Register	Device	Description	Access	Format	Type	Range
3	40400	Integrator	Status OK	Read	U16	Integer	

Table 11 – Modbus Integer values for Integrator

Integrator Floating Outputs

NOTE – The time value is a 32bit representation of Epoch time that is sent over Modbus as 2 x 16bit values and recombined. Due to IEEE 754 single precision this number does truncate as it gets larger and larger, this means the update frequency will be significant longer than 1 second.

Slave ID	Register	Device	Description	Access	Format	Type	Range
3	40600	Integrator	Temperature Sensor	Read	Big-endian	32 bit float	
3	40602	Integrator	CPU Temperature	Read	Big-endian	32 bit float	
3	40604	Integrator	Time	Read	Big-endian	32 bit float	

Integrator Modbus Outputs

Slave ID	Register	Device	Description	Access	Format	Type	Range
1	40203	Scale 1	Reset Totalizer	Write	U16	Integer	
2	40203	Scale 2	Reset Totalizer	Write	U16	Integer	
3	40200	Integrator	Reboot	Write	U16	Bool	
3	40201	Integrator	Reset error counter	Write	U16	Bool	

Table 12 – Modbus Input values for Scale 1, Scale 2 and Integrator

Appendix 5
ProfiBus Register Table

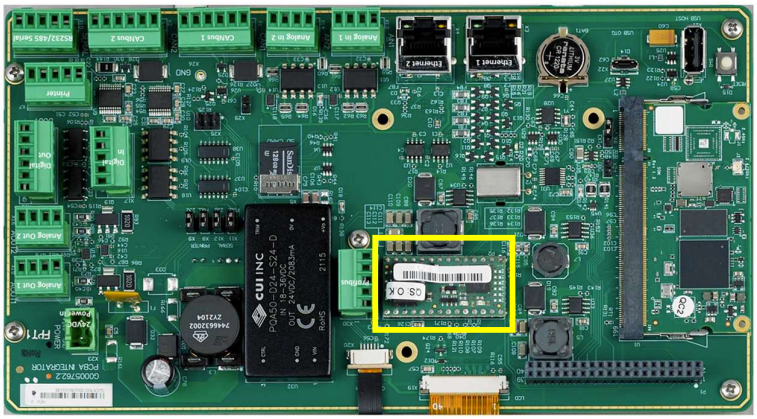
ProfiBus Connection Information

The .gsd file can be downloaded from the Ramsey Flex Integrator itself. Please download the file from this location to ensure compatibility with the Software loaded onto the Ramsey Flex Integrator device.

NOTE – ProfiBus on the Ramsey Flex Integrator requires the additional ProfiBus Module to be installed. If this module is NOT installed, then ProfiBus is not an option on your Ramsey Flex Integrator. See figure below.

Please contact SRO Technology for further information if you require ProfiBus and this module is not installed.

ProfiBus Module



Description	Device	Type	Byte Address	Byte Size
Total Master	Scale 1	float	0	4
Total Printer	Scale 1	float	4	4
Total1	Scale 1	float	8	4
Total2	Scale 1	float	12	4
Total3	Scale 1	float	16	4
Belt speed	Scale 1	float	20	4
Flow rate	Scale 1	float	24	4
Weight	Scale 1	float	28	4
Conveyor incline	Scale 1	float	32	4
Total load cell kg	Scale 1	float	36	4
Belt running	Scale 1	bool	40	1
Capacity exceeded	Scale 1	bool	41	1
Digitizer com error count	Scale 1	int	42	2
Digitizer com up	Scale 1	bool	44	1
Flow rate OK	Scale 1	bool	45	1
Load cell1 exceeded	Scale 1	bool	46	1
Load cell2 exceeded	Scale 1	bool	47	1
Load cell3 exceeded	Scale 1	bool	48	1
Load cell4 exceeded	Scale 1	bool	49	1
Load cells balanced	Scale 1	bool	50	1

Description	Device	Type	Byte Address	Byte Size
Measurement data OK	Scale 1	bool	51	1
Measurement stopped	Scale 1	bool	52	1
Status OK	Scale 1	int	53	2
Total Master	Scale 2	float	55	4
Total Printer	Scale 2	float	59	4
Total1	Scale 2	float	63	4
Total2	Scale 2	float	67	4
Total3	Scale 2	float	71	4
Belt speed	Scale 2	float	75	4
Flow rate	Scale 2	float	79	4
Weight	Scale 2	float	83	4
Conveyor incline	Scale 2	float	87	4
Total load cell kg	Scale 2	float	91	4
Belt running	Scale 2	bool	95	1
Capacity exceeded	Scale 2	bool	96	1
Digitizer com error count	Scale 2	int	97	2
Digitizer com up	Scale 2	bool	99	1
Flow rate OK	Scale 2	bool	100	1
Load cell1 exceeded	Scale 2	bool	101	1
Load cell2 exceeded	Scale 2	bool	102	1
Load cell3 exceeded	Scale 2	bool	103	1
Load cell4 exceeded	Scale 2	bool	104	1
Load cells balanced	Scale 2	bool	105	1
Measurement data OK	Scale 2	bool	106	1
Measurement stopped	Scale 2	bool	107	1
Status OK	Scale 2	int	108	2
In1	Integrator	bool	110	1
In2	Integrator	bool	111	1
In3	Integrator	bool	112	1
In4	Integrator	bool	113	1
Out1	Integrator	bool	114	1
Out2	Integrator	bool	115	1
Out3	Integrator	bool	116	1
Out4	Integrator	bool	117	1

Table 13 – ProfiBus Register information

Appendix 6
EtherNet/IP Register Table

EtherNet/IP Connection Information

The .eds file can be downloaded from the Ramsey Flex Integrator itself. Please download the file from this location to ensure compatibility with the Software loaded onto the Ramsey Flex Integrator device.

EtherNet/IP Data Structure

EtherNet/IP communication on the Ramsey Flex Integrator has the following data structure. This information may be required if setting up EtherNet/IP on a non-Allen Bradly PLC.

Instance	Identifier	Data Size
Configuration Instance	164	10
Output Instance	112	3
Input Instance	100	190

Table 14 - EtherNet/IP Instance Information

NOTE 1 – The .eds file for EtherNet/IP V1.5B is slightly difference to previous versions, you must download the correct .eds file from the Ramsey Flex Integrator.

NOTE 2 – ProfiNet is not currently supported on V1.5B of Ramsey Flex Integrator. If developed in future versions it will have the register information as noted in the table below.

Description	Address	Device	Size in bytes	EtherNet/IP datatype	ProfiNet datatype	Direction
Digital Input #1	0	Integrator	1	BOOL	Boolean	Input
Digital Input #2	1	Integrator	1	BOOL	Boolean	Input
Digital Input #3	2	Integrator	1	BOOL	Boolean	Input
Digital Input #4	3	Integrator	1	BOOL	Boolean	Input
Digital Output #1	4	Integrator	1	BOOL	Boolean	Input
Digital Output #2	5	Integrator	1	BOOL	Boolean	Input
Digital Output #3	6	Integrator	1	BOOL	Boolean	Input
Digital Output #4	7	Integrator	1	BOOL	Boolean	Input
GPIO Current Input #1	8	Integrator	8	REAL	Float32	Input
GPIO Current Input #2	12	Integrator	8	REAL	Float32	Input
GPIO Voltage Input #1	16	Integrator	8	REAL	Float32	Input
GPIO Voltage Input #2	20	Integrator	8	REAL	Float32	Input
Total Master	24	Scale 1	8	REAL	Float32	Input
Total Printer	28	Scale 1	8	REAL	Float32	Input
Total #1	32	Scale 1	8	REAL	Float32	Input
Total #2	36	Scale 1	8	REAL	Float32	Input
Total #3	40	Scale 1	8	REAL	Float32	Input
Belt speed (Display)	44	Scale 1	8	REAL	Float32	Input
Flow rate (Display)	48	Scale 1	8	REAL	Float32	Input

Description	Address	Device	Size in bytes	EtherNet/IP datatype	ProfiNet datatype	Direction
Weight (Display)	52	Scale 1	8	REAL	Float32	Input
Belt speed (Industrial I/O)	56	Scale 1	8	REAL	Float32	Input
Flow rate (Industrial I/O)	60	Scale 1	8	REAL	Float32	Input
Weight (Industrial I/O)	64	Scale 1	8	REAL	Float32	Input
Belt speed	68	Scale 1	8	REAL	Float32	Input
Flow rate	72	Scale 1	8	REAL	Float32	Input
Weight	76	Scale 1	8	REAL	Float32	Input
Conveyor incline	80	Scale 1	8	REAL	Float32	Input
Total load cell kg	84	Scale 1	8	REAL	Float32	Input
Belt is running	88	Scale 1	1	BOOL	Boolean	Input
Capacity exceeded	89	Scale 1	1	BOOL	Boolean	Input
Digitizer com error count	90	Scale 1	4	DINT	Integer32	Input
Digitizer com up	94	Scale 1	1	BOOL	Boolean	Input
Flow rate ok	95	Scale 1	1	BOOL	Boolean	Input
Load cell #1 exceeded	96	Scale 1	1	BOOL	Boolean	Input
Load cell #2 exceeded	97	Scale 1	1	BOOL	Boolean	Input
Load cell #3 exceeded	98	Scale 1	1	BOOL	Boolean	Input
Load cell #4 exceeded	99	Scale 1	1	BOOL	Boolean	Input
Load cells are balanced	100	Scale 1	1	BOOL	Boolean	Input
Measurement data ok	101	Scale 1	1	BOOL	Boolean	Input
Measurement stopped	102	Scale 1	1	BOOL	Boolean	Input
Status ok	103	Scale 1	4	DINT	Integer32	Input
Total Master	107	Scale 2	8	REAL	Float32	Input
Total Printer	111	Scale 2	8	REAL	Float32	Input
Total #1	115	Scale 2	8	REAL	Float32	Input
Total #2	119	Scale 2	8	REAL	Float32	Input
Total #3	123	Scale 2	8	REAL	Float32	Input
Belt speed (Display)	127	Scale 2	8	REAL	Float32	Input
Flow rate (Display)	131	Scale 2	8	REAL	Float32	Input
Weight (Display)	135	Scale 2	8	REAL	Float32	Input
Belt speed (Industrial I/O)	139	Scale 2	8	REAL	Float32	Input
Flow rate (Industrial I/O)	143	Scale 2	8	REAL	Float32	Input
Weight (Industrial I/O)	147	Scale 2	8	REAL	Float32	Input
Belt speed	151	Scale 2	8	REAL	Float32	Input
Flow rate	155	Scale 2	8	REAL	Float32	Input
Weight	159	Scale 2	8	REAL	Float32	Input
Conveyor incline	163	Scale 2	8	REAL	Float32	Input
Total load cell kg	167	Scale 2	8	REAL	Float32	Input
Belt is running	171	Scale 2	1	BOOL	Boolean	Input
Capacity exceeded	172	Scale 2	1	BOOL	Boolean	Input
Digitizer com error count	173	Scale 2	4	DINT	Integer32	Input
Digitizer com up	177	Scale 2	1	BOOL	Boolean	Input
Flow rate ok	178	Scale 2	1	BOOL	Boolean	Input
Load cell #1 exceeded	179	Scale 2	1	BOOL	Boolean	Input
Load cell #2 exceeded	180	Scale 2	1	BOOL	Boolean	Input
Load cell #3 exceeded	181	Scale 2	1	BOOL	Boolean	Input
Load cell #4 exceeded	182	Scale 2	1	BOOL	Boolean	Input

Description	Address	Device	Size in bytes	EtherNet/IP datatype	ProfiNet datatype	Direction
Load cells are balanced	183	Scale 2	1	BOOL	Boolean	Input
Measurement data ok	184	Scale 2	1	BOOL	Boolean	Input
Measurement stopped	185	Scale 2	1	BOOL	Boolean	Input
Status ok	186	Scale 2	4	DINT	Integer32	Input
Reboot Command	0		1	BOOL	Boolean	Output
Print Totals	1	Scale 1	1	BOOL	Boolean	Output
Print Totals	2	Scale 2	1	BOOL	Boolean	Output

Table 15 - Ethernet/IP Registers