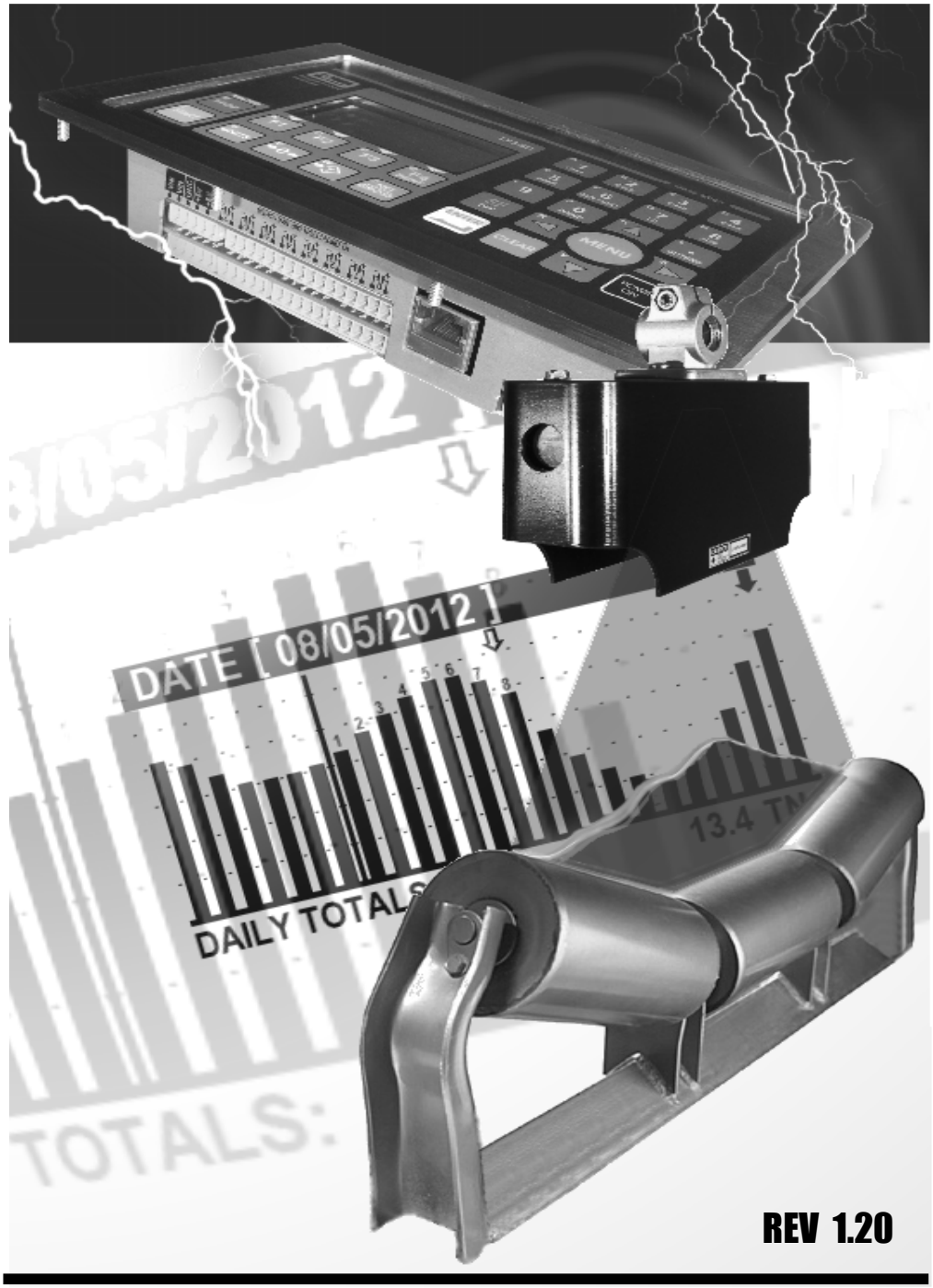
LT350-BELT SCANNER

Quick Reference Guide



REV 1.20

INDEX

LT350 OPTICAL BELT SCALE SPECIFICATION 5
GENERAL CALIBTRATION SETUP REFERENCE 6
LT400 OPTICAL SCANNER 7
LT350-BOSI BELT SCALE INTEGRATOR - WALL MOUNT NEMA4X 8
LT350-BOSI BELT SCALE INTEGRATOR - PANEL MOUNT STAINLESS STEEL 9
LT350 KEYBOARD FUNCTIONS 10
BELT SCANNER DISPLAY INDICATORS 11
LT350 HARDWARE INTERFACE DIAGRAM 12
LT350 OPTICAL SCANNER SETUP DIAGRAM 13
HOW TO INSTALL THE OPTICAL SCANNER 14
HOW TO ALLIGN THE SCANNER BEAM 15
HOW TO INSTALL SCANNER JUNCTION BOX 16
HOW TO NAVIGATE THE INTEGRATOR MENU FUNCTIONS 17
HOW TO USE THE DATA LOG FUNCTION 18
HOW TO PRINT DATA LOG REPORTS 19
HOW TO CALIBRATION THE OPTICAL SCALE 20
HOW TO SET INTEGRATOR PARAMETERS – PART 1 21
HOW TO SET INTEGRATOR PARAMETERS – PART 2 22
HOW TO CONNECT SPEED SENSORS 23
HOW TO CALIBRATE THE SPEED SENSOR – CONSTANT SPEED MODE 24
HOW TO CALIBRATE THE SPEED SENSOR – VARIABLE SPEED MODE 25
HOW TO PERFORM A MATERIAL TEST CALIBRATION 26
HOW TO SET SCANNER FILTER PARAMETERS 27
HOW TO CONFIGURE SET POINT PARAMETERS 29
HOW TO WIRE THE BATCH INTERFACE 30
HOW TO CONFIGURE THE TOTALIZER PULSE OUTPUT 31
HOW TO CONFIGURE THE INTERNAL CURRENT LOOP OUTPUT 32
HOW TO CONFIGURE THE EXTERNAL CURRENT LOOP OUTPUT 33
HOW TO SETUP SERIAL RS232 TO TRANSMIT WEIGHT DATA 34
HOW TO SETUP USB TO TRANSMIT WEIGHT DATA 35
HOW TO SETUP RS22/485 TO TRANSMIT WEIGHT DATA 36
HOW TO SETUP TCP/IP TO TRANSMIT WEIGHT DATA - I 37
HOW TO SETUP TCP/IP TO TRANSMIT WEIGHT DATA II 38
HOW TO SETUP TCP/IP WIFI TO TRANSMIT WEIGHT DATA 39
UNIT CONVERSION TABLE 46

LT350 OPTICAL BELT SCALE SPECIFICATION	
LT350-BOSI	Belt Optical Scale weight integrator and belt speed input
Belt Scanner Functions	Material Rate, Belt Speed (fixed or variable), Totalizer and statistical data logging plus a batch set point controller
PLC Functions	Programmable Totalizer and 4-20mA current loop
Belt Width	Belt width up to 110 cm
Belt Speed	Dynamic speed up to 50 feet per second or static constant belt speed parameter
Sampling Rate	100 samples per second
Scanner Accuracy	Uncertainty Error (5%)
Calibration Method	Belt Zero Calbiration via software menu
Filtering	Programmable response filtering
Firmware Upgrading	In field Firmware upgrading using serial or Ethernet
Unit Conversion	Lb/Ft³ or Kg/m³
Display	Full Graphics LCD display (White on Blue)
Scanner Excitation	24VDC @ 500mA
Serial Ports	1 full duplex RS232/RS485
Ethernet TCP/IP	Ethernet 10/100 with PoE support – optional
Wi-Fi TCP/IP	802.11b wireless support – optional
USB	Supports Virtual Serial Port interface - optional
Power	12-24VDC 300mA nominal
Temperature Range	-10°C to +40°C (14°F to 104°F)
LT350-BOSI-xPSxx	Stainless Steel Panel Mount
LT350-BOSI-xNDxx	Aluminum NEMA4 wall mount (internal 110-240AC power supply included)

GENERAL CALIBTRATION SETUP REFERENCE

The belt integrator runs automatically at startup. To exit the belt scale run mode press **STOP** repeatedly until prompted to exit to calibration mode – use the **MENU** key to navigate parameters. Once in calibration mode, press F1 to save changes to parameters and **START** to run the belt scale integrator.

DEFAULT FACTORY PASSWORD:

There are close to a hundred parameters that can be set by either typing in the corresponding command number or simply by pressing the **[MENU]** key and navigating to the parameter of interest using the up/down arrow keys.

Protecting important settings from unauthorized tampering is a valuable feature and as such, most calibration and setup parameters are protected by a password. The password only needs to be entered once and only after the F1 key was pressed to save settings during the last session. Once the F1 key was pressed in calibration mode to save the new settings, calibration mode will be exited and to enter calibration mode again, the user needs to enter the password again.

The factory password is [1234]. It is recommended that the user change this password to a unique 4 number combination in order to protect the integrity of the system scale calibration and settings using **COMMAND[98]**.

For most commands the user only needs to enter calibration mode once by providing the password where required.

LEGAL FOR TRADE APPLICATIONS:

Some parameters are protected by a password – which is a government requirement for applications that will use the scale for trading to the public by weight. Such applications require an audit trail history of parameter changes and settings.

NON LEGAL FOR TRADE APPLICATIONS:

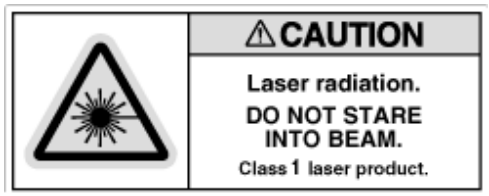
Many industrial applications are strictly used for process control such as batching and monitoring weight. These types of implementations do not require legal for trade certification or inspection by government agencies.

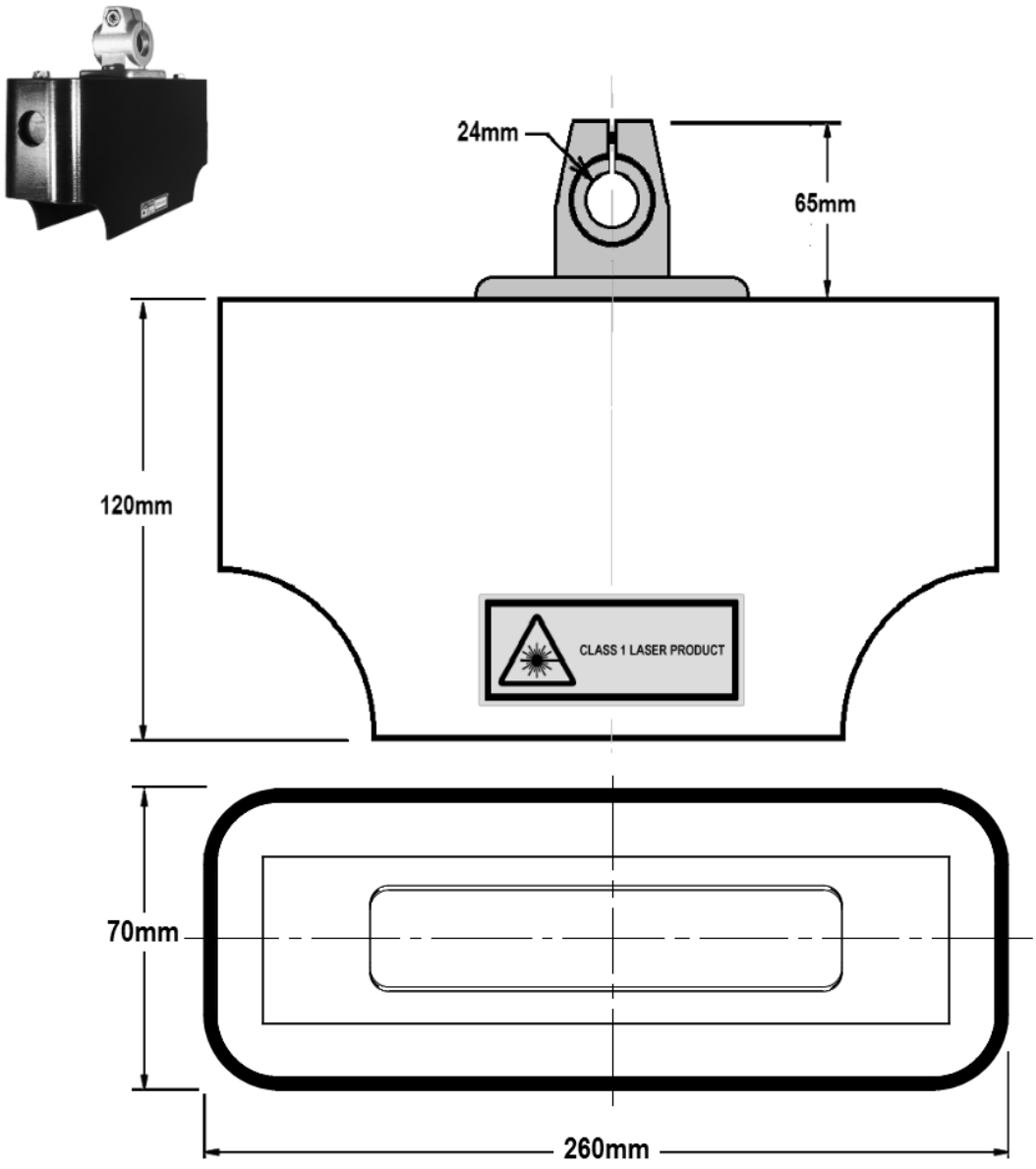
IMPORTANT!!!

It is important to note that no settings are saved in calibration mode until the user presses the F1 key

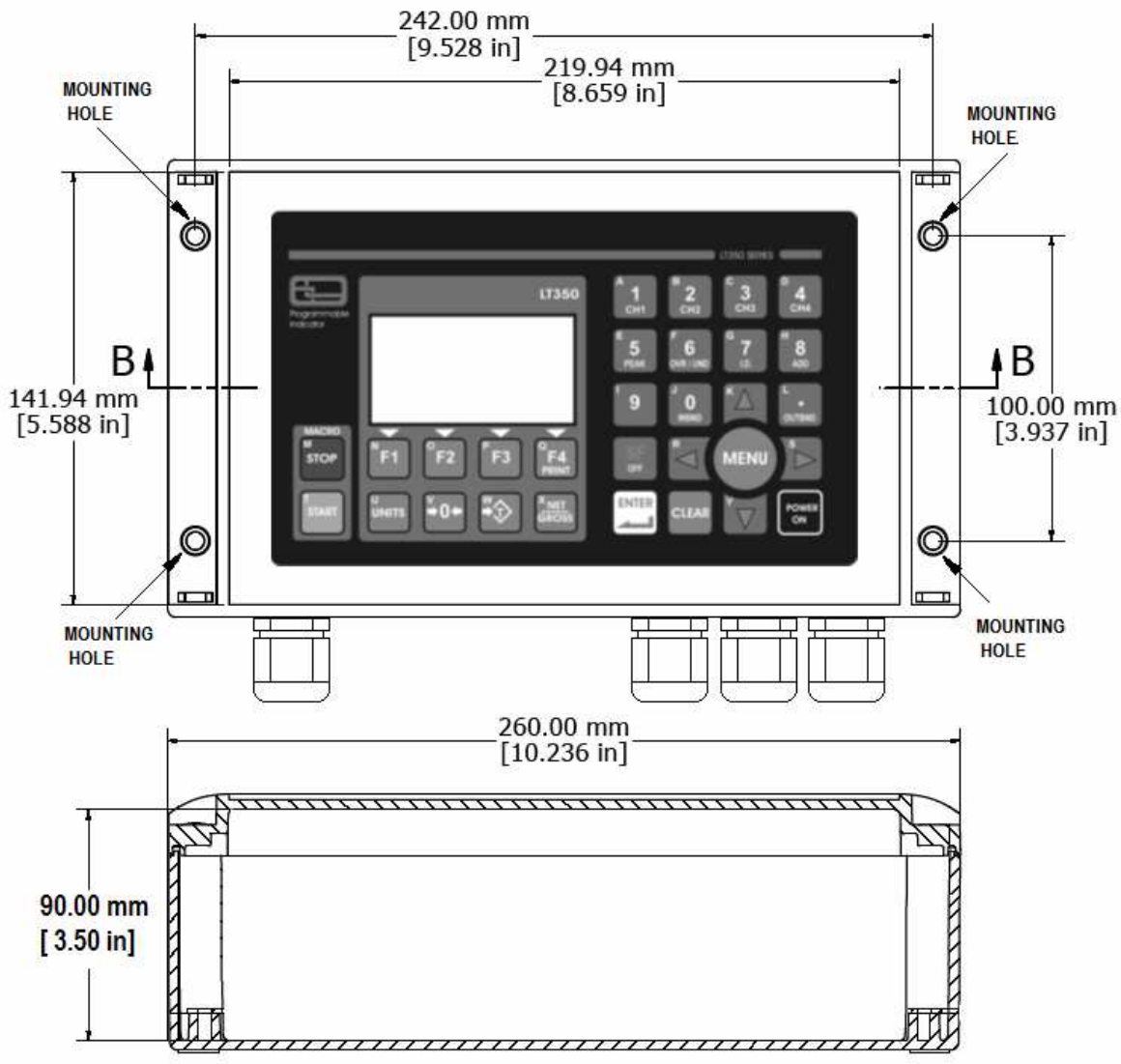
LT400 OPTICAL SCANNER

The belt scanner is based on a Class II Laser technology. The laser can be activated by a hand wave sweep along the full axes of the scanner beam. It is normal for the laser beam to go in to standby mode after a period of no motion detected.

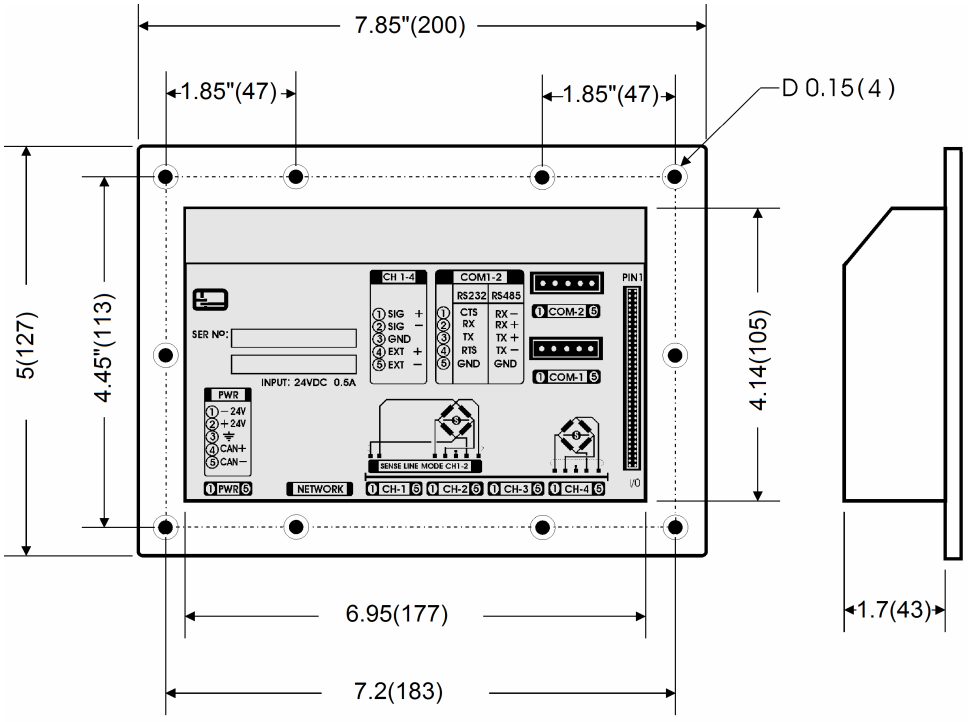




LT350-BOSI BELT SCALE INTEGRATOR - WALL MOUNT NEMA4X



LT350-BOSI BELT SCALE INTEGRATOR - PANEL MOUNT STAINLESS STEEL



PANEL CUTOUT (W/H): 6.95 (177) X 4.14(105)

LT350 KEYBOARD FUNCTIONS

UNITS switch between Lb/Ft³ or Kg/m³.

ZERO Belt scale can be done with no motion and with the weight within the user programmable zero range. There is also a auto-zero function available.

TARE the belt TOTAL can be tared. Tare can be cleared by pressing the CLEAR key.

GROSS or NET total display based on a tare entry. The belt scale total can be tared by simply pressing the Tare key and cleared by pressing the CLEAR key

POWER ON feature is initially disabled – please see parameter 51 for more detail on how to enable this function.

MENU key is the main parameter navigation key. Once selected the user can use the up/down keys to navigate through all the parameters followed by an ENTER key and possibly a password.

ENTER key will execute last command. Use the menu navigation keys to select a parameter followed by the **ENTER** key

CLEAR key can be used to clear entry field or exit the menu mode. To clear current tare entry for belt scale.

Menu navigation key (single line scroll) and numeric up dial.

Menu navigation key (single line scroll) and numeric down dial.

Menu navigation key or speed scroll – up.

Menu navigation key or speed scroll – down.

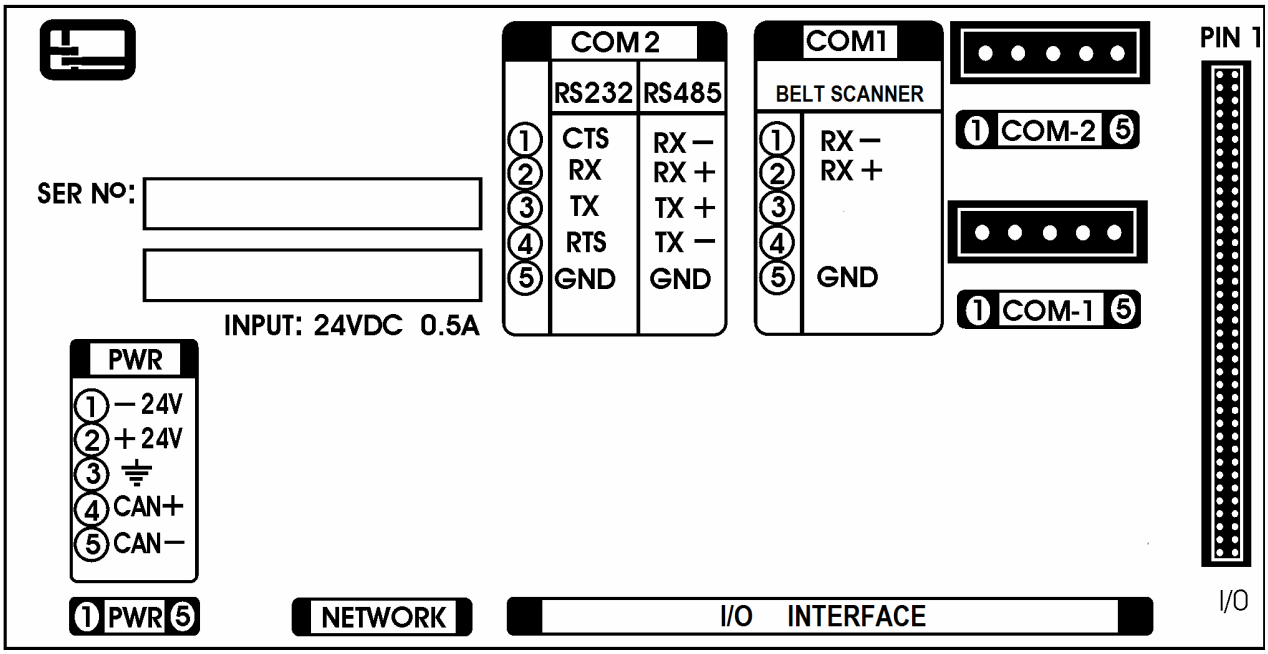
Menu navigation keys - used to select a menu item and numeric dialing.

SF special function key used to switch between alphanumeric key entry

BELT SCANNER DISPLAY INDICATORS

BELT SCALE 99	Optical Belt Scale network ID. If remote control is enabled this will be used to communicate with the unit.
	Belt scale integrator running. The START and STOP keys will control the run state of the integrator.
R R	Indicates remote IO control is enabled active or idle
S S	Indicates that the special function key **SF** was pressed to select either lower or upper case characters for user input where applicable
	Indicate Weight stabilized
NET/GROSS	Indicate total NET or GROSS value. A tare weight must be set.
→0←	Indicate belt empty - center of zero
lb/ft 3 or kg/m 3	Indicate current units selected either kilograms or pounds or Cubic volumetric data.
CAL	This icon indicates that the user changed calibration parameters and to save those parameters the user should end calibration by pressing the **F1** key.

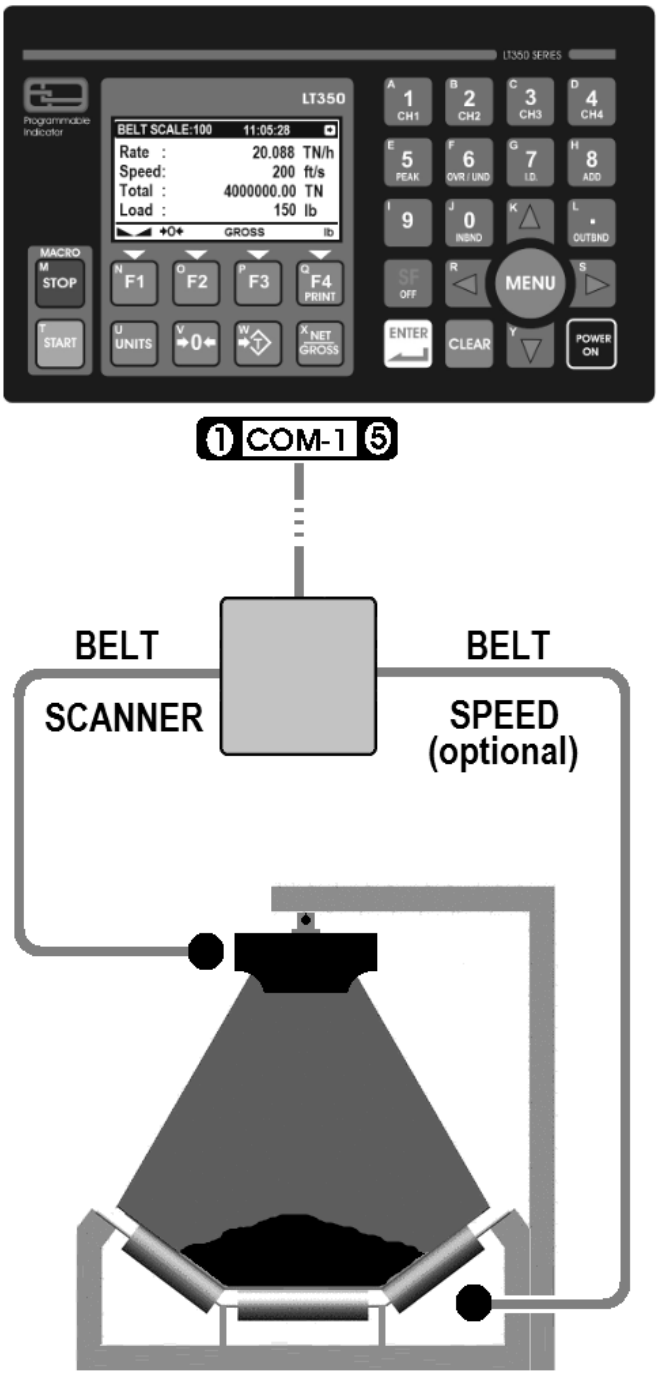
LT350 HARDWARE INTERFACE DIAGRAM



1 PWR 5	Power supply input. The indicator accepts a dc voltage between[16-48]Volts. If PoE is used, do not connect power here. Nominal power input should be 24Vdc @ 200mA
NETWORK	The controller supports three types of network configurations. Ethernet, Wi-Fi or USB. The Ethernet option also supports PoE (power over Ethernet).
1 CH-1 5	Not used.
1 COM-1 5	Optical Belt Scanner
1 COM-2 5	This serial port can be configured as RS232 or RS422 and supports printing or strings using the ASCII.NET protocol

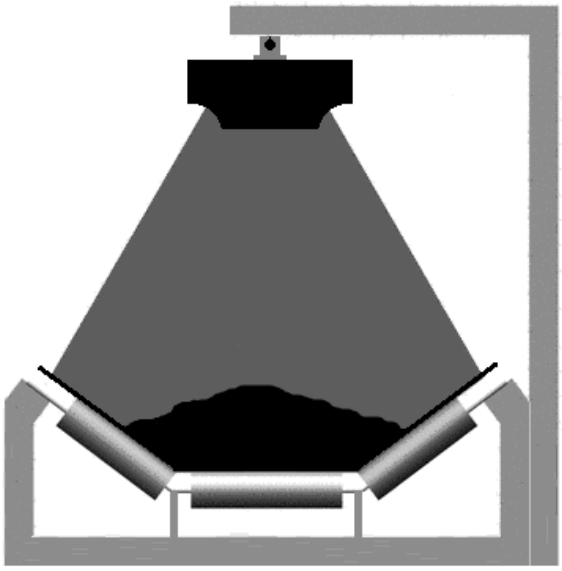
LT350 OPTICAL SCANNER SETUP DIAGRAM

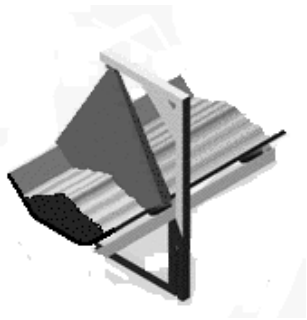
The scanner primarily measures cubic volumetric data in either cubic meters or cubic feet. The user can optionally do a weight calibration to obtain the equivalent weight per cubic meters or feet in either **lb** or **kg** or tones. The system can operate with a variable belt speed sensor or without a belt speed sensor.

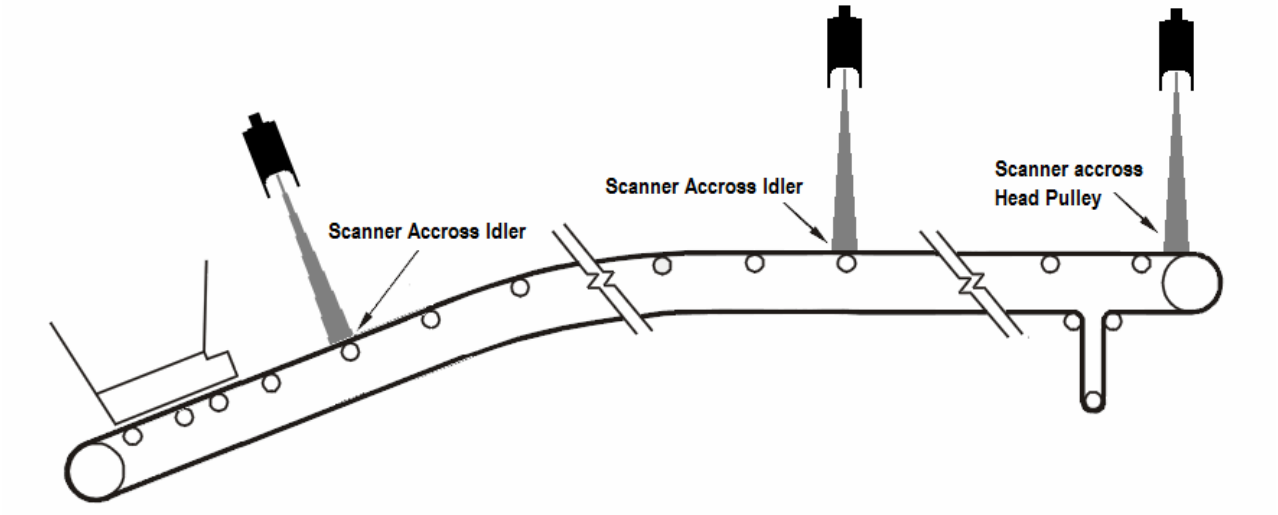


HOW TO INSTALL THE OPTICAL SCANNER

The optical scanner must be positioned across an idler or head pulley in order to function properly. Placing the scanner between idlers is not recommended. The laser beam should fall within the width of the belt surface. If the scanner is located to high above the scale it will scan outside the scale perimeter and will not function correctly. The scanner should be adjusted in height above the scale until the laser beam falls within the belt width of the scale.







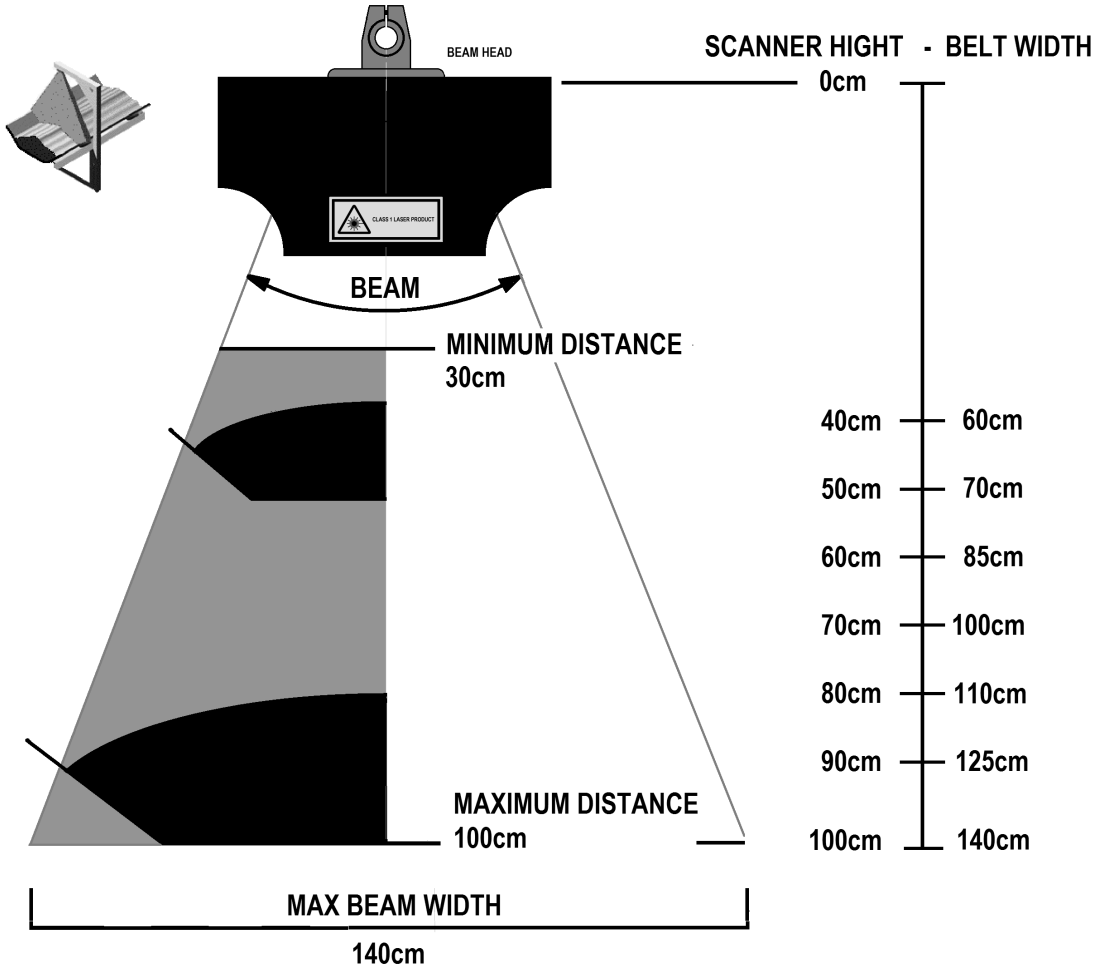
HOW TO ALLIGN THE SCANNER BEAM

The scanner can be adjusted to the width of virtually any belt width up to 140 cm by simply moving the beam head vertically closer or further away from the belt. The beam head should be 90 degrees vertical and perpendicular to the belt surface

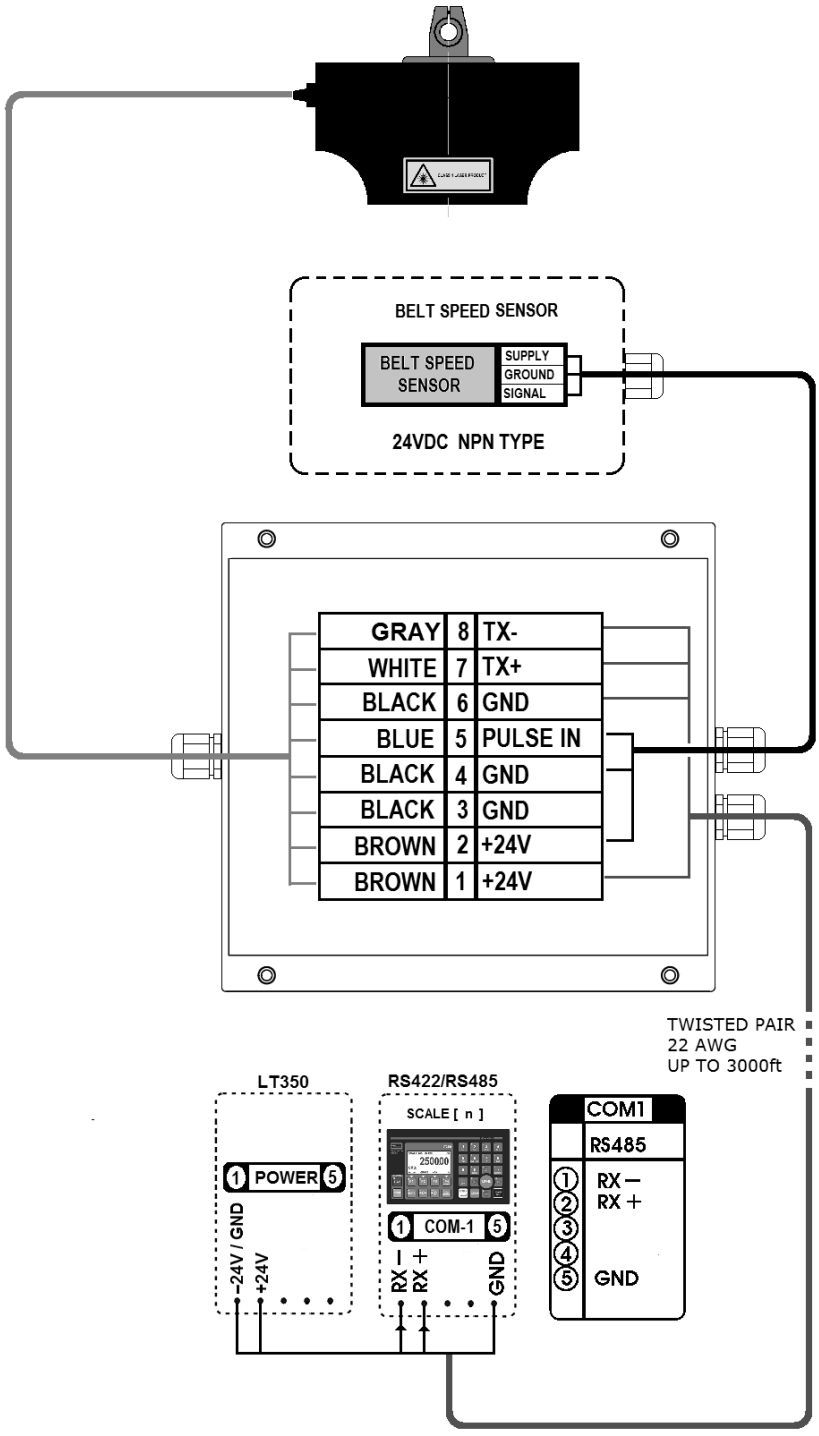
The scanner has a near and far field limit in scanning distance and beam width. As the diagram below indicates. The minimum distance of any object or material is 30cm from the scanner head. The furthest distance for the beam on an empty belt is 100cm from the scanner head.

As indicated in the diagram below, the beam must be within the belt width. If the beam spans past the width of the belt, the scanner head should be moved closer to the belt until the laser beam falls within the width of the belt by alt least 4 inches or 10 cm on each side of the belt outer perimeter.

Once the scanner is aligned and secured to the structure the belt is ready for a zero/dead load calibration. Only a zero/dead load calibration is required with the scanner.



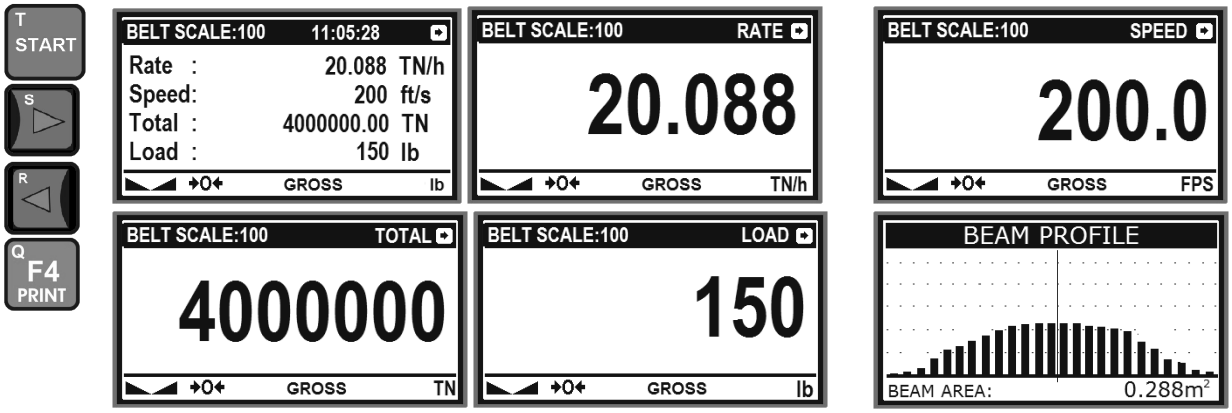
HOW TO INSTALL SCANNER JUNCTION BOX

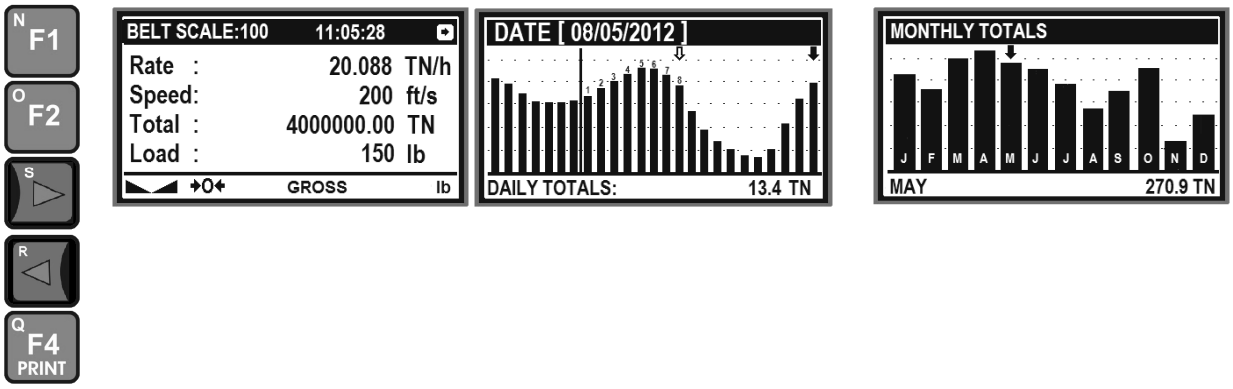


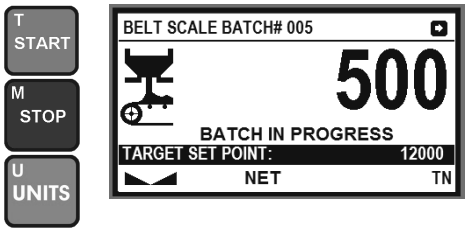
NOTE: When using static belt speed option, PULSE IN must be connected to ground in order for the totalizer to be active.

HOW TO NAVIGATE THE INTEGRATOR MENU FUNCTIONS

The belt integrator runs automatically at startup. To exit the belt scanner run mode, press **STOP** repeatedly until prompted to exit to calibration mode – use the **MENU** key to navigate parameters. Once in calibration mode, press **F1** to save changes to parameters and **START** to run the belt scanner integrator.



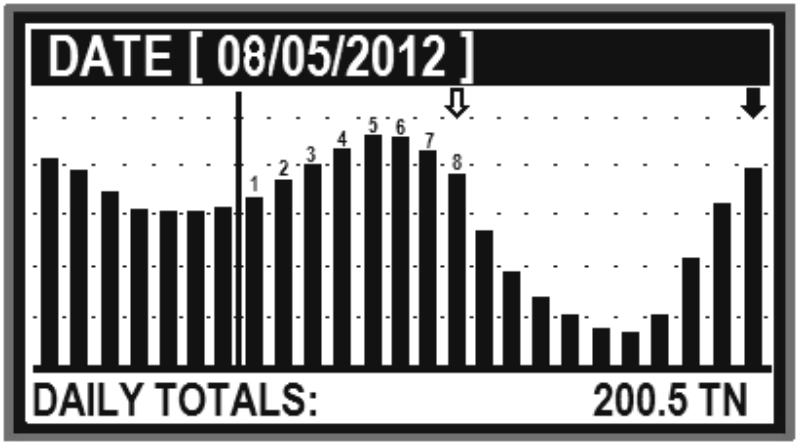




HOW TO USE THE DATA LOG FUNCTION

The data log function calculates and stores the daily totals for up to 12 months. The data log function is a very useful function to track productivity and the rate of material moved over up to one year. The data log function must first be enabled by accessing calibration parameter **BELT LOG SETUP**. The data log function only works while the integrator is running **[START].** For best results, the integrator should be permanently powered up, free from power failures and with the integrator running continuously.

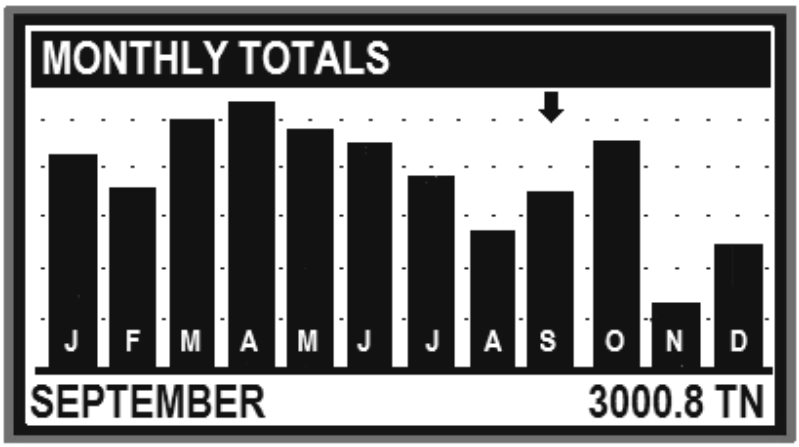
Pressing **F1** from the main display of the integrator will plot in real time the last 30 days of daily totals. The user can print the list of daily totals by pressing **PRINT** or **F4**. The user can view any month of the year by pressing the numeric key index of the month on the keypad.



The user can view the daily totals by moving the arrow to the date of interest. The graph indicates that the daily total for 08/05/2012 was 200.5 TN. New data is always added on the right while older data is shifted to the left. A vertical line indicates the month separator. **Press CLEAR to exit the graphics plot function**

The above function allows the user to scroll and display totals of the last 30 days by using the left and right arrows. While in scroll mode the display will flash the cursor and the date to indicate that the currently displayed daily total is historical and not real time. After a 5 second timeout the display will reset itself to displaying the current daily total at the very right side of the screen. The user can view any month of the year by pressing the numeric key index of the month on the keypad.

Pressing **F2** from the above display will allow the user to view and scroll left or right through each monthly total for the last 12 month as indicated by the cursor. The user can press **ENTER** to view the daily total graph of the currently selected month. The user can print the sum totals for each month by pressing **PRINT** or **F4 (printer mode must be selected as output protocol on COM2 serial port)**



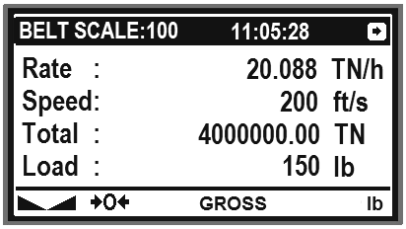
The data view function will display daily totals for all valid entries. Invalid data entries will be displayed as empty fields.

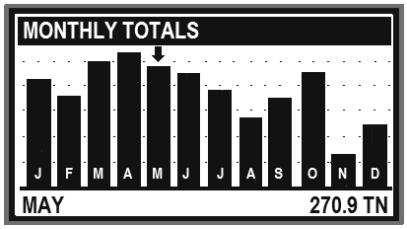
Press CLEAR to exit the monthly data view function.

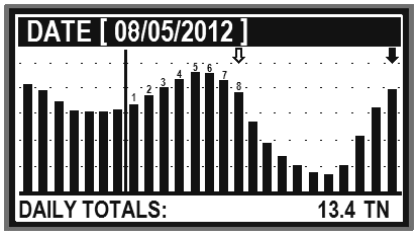
HOW TO PRINT DATA LOG REPORTS

The data log reports can be printed on **COM2** serial port that has its protocol set to TICKET PRINTING. The log data can be printed to any RS232 serial printer with a minimum column width of 32 characters or more. The data log function must first be enabled by accessing calibration parameter **[06] DATA LOG SETUP**.

The serial port for **COM2** needs to be configured for **TICKET PRINTING** and must have the correct baud rate selected. For each display the **PRINT** or **F4** key can be pressed to request a report.








```
DATE: 21/05/2013
TIME: 11:05:28
-----------------------------------
Rate:              20.2 Tn/h
Speed:            200.5 ft/s
Total:        4 000 000 Tn
Load:              156 lb
-----------------------------------
Daily Total:        12 Tn
-----------------------------------
```

```
MONTHLY TOTALS (05)
-----------------------------------
JAN  :          268.3 Tn
FEB  :          260.1 Tn
MAR  :          272.6 Tn
APL  :          300.5 Tn
MAY  :          270.9 Tn *
JUN  :          263.0 Tn
JLY  :          255.6 Tn
AUG  :          249.2 Tn
SEP  :          254.1 Tn
OCT  :          260.5 Tn
NOV  :          229.4 Tn
DEC  :          241.8 Tn

-----------------------------------
TOTAL:         3216.0 Tn
-----------------------------------
```

```
DAILY TOTALS MONTH: 05
-----------------------------------
01/05/2013 :      7 012 lb
02/05/2013 :     10 800 lb
03/05/2013 :     20 001 lb
04/05/2013 :     30 001 lb
05/05/2013 :     65 001 lb
06/05/2013 :     40 001 lb
07/05/2013 :     16 200 lb
08/05/2013 :     13 800 lb
09/05/2013 :     10 200 lb
10/05/2013 :      6 012 lb
11/05/2013 :      2000 lb
12/05/2013 :       300 lb
13/05/2013 :       300 lb
14/05/2013 :       900 lb
15/05/2013 :      2600 lb
16/05/2013 :      4 002 lb
17/05/2013 :      5000 lb
18/05/2013 :      5 012 lb
19/05/2013 :     10 300 lb
20/05/2013 :     11 200 lb
21/05/2013 :     12 200 lb
-----------------------------------
TOTAL:          272 842 lb
-----------------------------------
```

HOW TO CALIBRATION THE OPTICAL SCALE

The optical belt scale only requires a zero or dead load calibration of the belt. This command sequence assumes that the belt scanner is installed and powered - the laser can be activated by a hand wave sweep along the full axes of the scanner beam. If you are currently in the integrator run mode, you will first have to abort the integrator mode by pressing **STOP** continuously until it prompts you with the option to exit integration.

Once you are outside integrator mode, press **MENU** to access command menu using the up/down arrows.

To enter calibration mode, the user needs to exit belt scale mode by pressing the STOP key repeatedly until the user is prompted with the option of exiting belt scale mode into calibration mode.

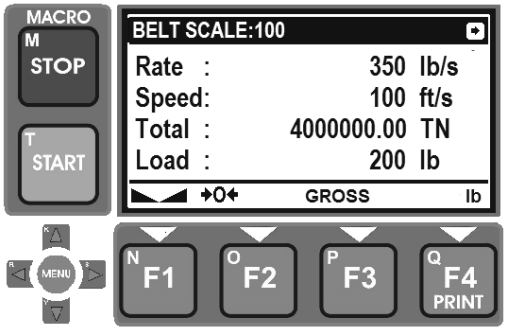
- Connect indicator to a stable power source. Do not share cable trays with electric motors and switch gear. Have proper cable shielding in place connected to earth ground at the indicator.
- Connect the belt scanner to COM1 as outlined in the junction box wire diagram.
- **COMMAND[14:15]** – first set the date and time
- **COMMAND[03]** – select the calibration units, metric or imperial.
- **COMMAND[04]** – select the belt setup menu item and go through each of the listed parameters. These parameters will be discussed in more detail.
- **COMMAND[04:Tonne Types]** – select the type of tones to use
- **COMMAND[04:Reset Total]** - initialize the volumetric grand total in cubic meters or feet.
- **COMMAND[04:Material Factor]** - if you need to translate volumetric data to its equivalent weight, you will have to weigh a sample as outlined in the menu selection.
- **COMMAND[04:Pulse Length]** - if you are using a speed sensor, enter the length in millimeters in distance traveled between each consecutive pulse.
- **COMMAND[04:Speed Mode]** – select the speed mode, sensor or static non sensor mode. If you select static constant speed, you must use the Speed Factor to dial in the correct speed to use.
- **COMMAND[04:Speed Factor]** – if you are using a speed sensor, this will normally be set to a value of one (1). If you have selected static speed (no sensor) you must dial in the correct speed.
- **COMMAND[04:Speed Time Units]** – distance per second, minutes or hour.
- **COMMAND[04:Rate Time Units]** – material per second, minutes or hour
- **COMMAND[04:Rate Weigh Units]** - select lb/kg or tones as translated from the cubic data.
- **COMMAND[04:Total Weigh Units]**- select lb/kg or tones as translated from the cubic data.

- **COMMAND[05]** – scale capacity is the projected maximum working weight – lb or kg.
- **COMMAND[07]** – dead load or zero the belt scale. Before a belt can be zeroed, all material must be removed from the belt, the belt must be empty. Your scale is now calibrated.

- To save calibration settings, press the **F1** key and press START to activate the integrator.

Additional parameters are optional and should be examined if required.

HOW TO SET INTEGRATOR PARAMETERS – PART 1



To set belt scale parameters, press **STOP** to exit to setup mode. Once you have exited the integrator run mode, press the MENU key and use the UP/DOWN arrows to select **BELT SETUP** and press **ENTER**. These parameters need to be set before scanner zero calibration.

*Remember to save changes to parameters once finished using **F1** once you are back in the main screen.*

Tonnes Type Units

The type of tonnes derived from the base weight unit. Cubic data is either Ft or meters.

- **TN (short ton) - (default)**
- T (metric ton)
- LT (long ton)

Totalizer Reset

The master totalizer can be reset to zero. The system password might be required to unlock this parameter.

Volume Factor

The volume correction factor default is (1.0) and normally does not need changing. If the volume needs small adjustments, the volume factor can be used to adjust the cubic volume.

Material Factor

The scanner primarily provides cubic volumetric data in either cubic meters or cubic feet. The user can optionally do a weigh calibration to see the equivalent weight per cubic meters/kg or Cubic feet/lb. The procedure is outlined under MATERIAL TEST CALIBRATION.

Speed Pulse Length

If the user selected variable speed mode, the user must enter the distance traveled by the belt in millimeters. The factory supplied LT45BSS belt speed sensor wheel has 8 pulses per revolution and with a wheel circumference of 400 millimeters we obtain a pulse length of 400/8= 50 millimeters. This method can be used to calculate any wheel size with different pulse lengths.

Speed Factor Calibration

Whether the user selected variable or constant speed mode, this parameter will be used to adjust the speed shown. Using the function keys to select the coarseness of the adjustments and adjusting the speed up or down. Once finished, the user must press ENTER to complete the adjustment.

Speed Mode

This parameter selects between constant and variable speed modes. I the belt speed is constant and known, the user can simply enter the known constant speed. If a variable belt speed sensor is used the user will have to calibrate the speed sensor.

Speed Time Units

This parameter defines how the belt speed is displayed on the LT350

- Hr. - hour
- **Min - minute (default)**
- Sec – seconds

Rate Time Units

This parameter defines what unit of time the rate will be displayed in on the LT350.

- **Hr. - hour (default)**
- Min - minute
- Sec – seconds

Rate Weigh Units

The rate weigh unit parameter defines how the rate is displayed.

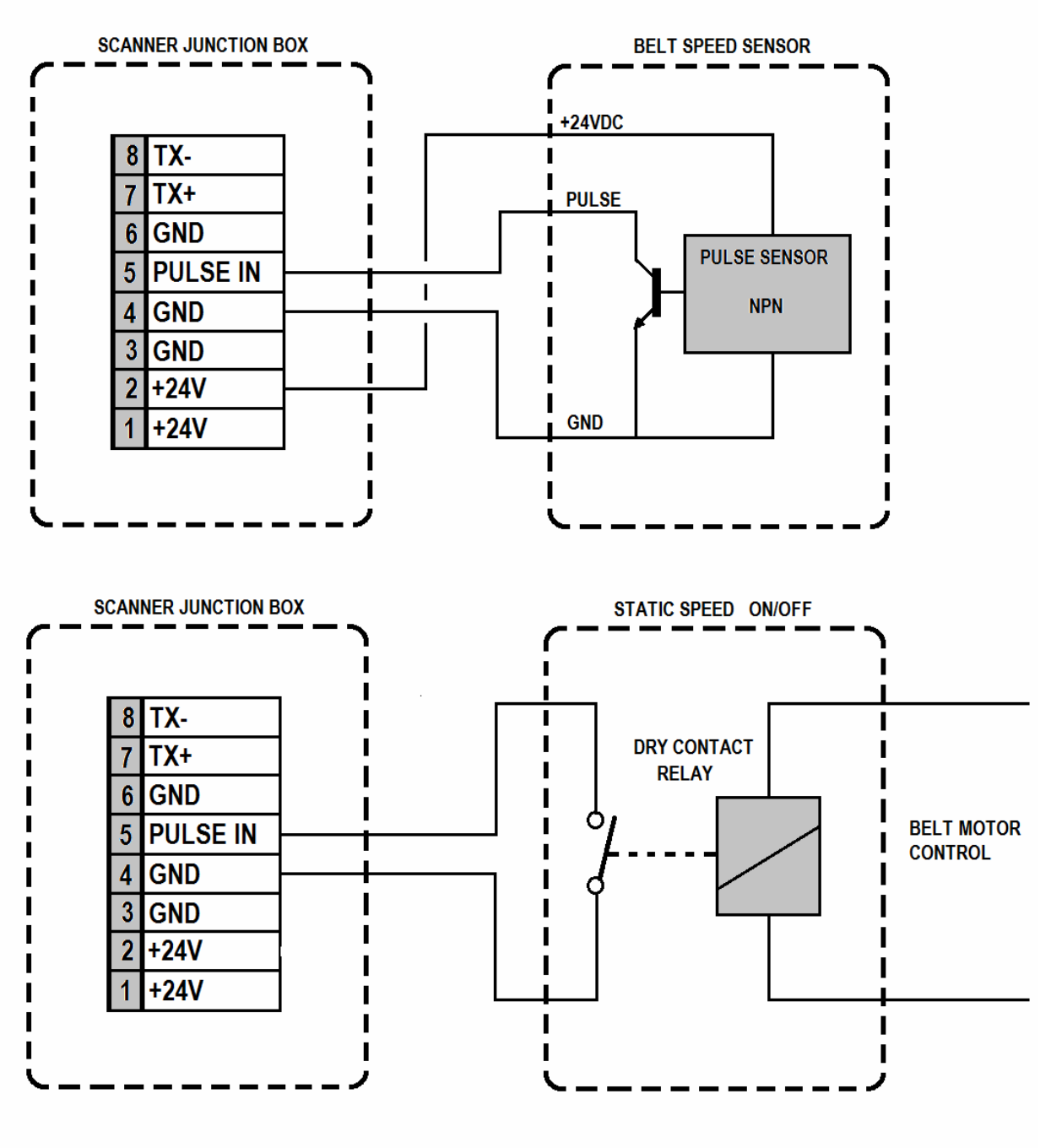
- **Tn(tonnes) - (default)**
- kg/lb

Total Weigh Units

The integrated weigh total units as displayed.

- **Tn (tonnes) - (default)**
- kg/lb

HOW TO CONNECT SPEED SENSORS



NOTE: When using static belt speed option, PULSE IN must be connected to ground in order for the totalizer to be active.

HOW TO CALIBRATE THE SPEED SENSOR – CONSTANT SPEED MODE

To set belt speed parameters, press **STOP** to exit to setup mode. Press the **MENU** key and use the UP/DOWN arrows to select **BELT SETUP** or **COMMAND[04]**. These parameters need to be set before attempting a material test calibration.

Remember to save changes to parameters once finished using F1 once you are back in the main screen.

STEP 1
Select the belt Speed Mode parameter for constant speed mode.

STEP 2
If a constant speed is selected from the belt scale setup menu items, the user should connect **PULSE_IN** to the ground pin. This can also be used for a centrifugal contact sensor that simply indicates belt state. If **PULSE_IN** is left open the belt speed will be zero and totalizing will stop. The user can connect a dry contact relay to **PULSE_IN** and ground that is activated by the power circuit of the belt motor contactor.

STEP 3
Select the belt speed Calibration parameter in the **BELT SETUP** sub menu and while running the belt at a know speed observe the current speed and adjust up or down until the displayed speed is the same speed as that of the belt.

NOTE:

The **IO STATUS VIEW** menu item can be selected to view the state of IO lines and belt speed indicators.

	Pressing **F1** fine increments
	Pressing **F2** coarse increments
	Pressing **F3** to increase speed
	Pressing **F4** to decrease speed
	Pressing **ENTER** to save, abort or reset the current adjustments

HOW TO CALIBRATE THE SPEED SENSOR – VARIABLE SPEED MODE

To set belt speed parameters, press **STOP** to exit to setup mode. Press the **MENU** key and use the UP/DOWN arrows to select **BELT SETUP**. These parameters need to be set before attempting a material test calibration.

Remember to save changes to parameters once finished using F1 once you are back in the main screen.

STEP 1
Select the belt Speed Mode parameter for variable speed using the LT45-SS belt speed wheel assembly or similar.

STEP 2
Connect the belt wheel interface as shown in the speed sensor connection diagram

STEP 3
After the user selected variable speed mode, the user must enter the distance traveled by the belt in millimeters for distance traveled between pulses using the belt pulse length parameter under the **BELT SETUP** menu. The factory supplied LT45BSS belt speed sensor wheel has 8 pulses per revolution and with a wheel circumference of 400 millimeters we obtain a pulse length of 400/8 = 50 millimeters. This method can be used to calculate the pulse length for any wheel size with different pulse lengths.

Select the belt speed Calibration parameter in the BELT SETUP sub menu and while running the belt at a known speed observe the current speed and adjust up or down if so required.

NOTE:

The **IO STATUS VIEW** menu item can be selected to view the state of IO lines and belt speed indicators.

	Pressing **F1** fine increments
	Pressing **F2** coarse increments
	Pressing **F3** to increase speed
	Pressing **F4** to decrease speed
	Pressing **ENTER** to save, abort or reset the current adjustments

HOW TO PERFORM A MATERIAL TEST CALIBRATION

The scanner primarily provides cubic volumetric data in either cubic meters or cubic feet. The user can optionally do a weigh calibration to see the equivalent weight per cubic meters/kg or Cubic feet/lb.

To set belt scale parameters, press **STOP** to exit to setup mode. Once you have exited the integrator run mode, press the MENU key and use the UP/DOWN arrows to select **BELT SETUP** and press **ENTER**.

COMMAND[14:Material Factor] - if you need to translate volumetric data to its equivalent weight, you will have to weigh a sample as outlined in the menu selection.

- Prepare a container in either 1 Cubic foot or 1 Cubic meter or a fraction of the latter. Fill this container with test material to a flat smooth finish. **Do not compact material**.
- Weigh this material on a scale.

- Translate the above weight to either 1 Cubic foot or 1 Cubic meter. Enter this weight as the Material Factor as outlined in **COMMAND14**.
- This process should be done periodically in order to keep track with material density and moisture content.
- If you are using the data log function, the historical trend data stored as volumetric cubic data can be translated at any point since the volumetric data stays constant. The changes to the Material Factor will be applied to all historical data as well, while volumetric data stays the same.

VOLUMETRIC CONVERSIONS OF CONTAINERS

There are 12 x 12 x 12 inches or 1728 cubic inches in 1 Cubic Foot.

There are 28.3 Liters in 1 Cubic Foot.

Cubic Foot Example: Assume a test container with a known volume of 10 Liters. Filling and weighing the container with test material yields 16 pounds. The weight per Cubic Foot is calculated as:

$$\text{Weight per 1 Cubic Foot} = (28.3/10) * 16$$

$$= 45.28 \text{ lb/Cubic Feet}$$

HOW TO SET SCANNER FILTER PARAMETERS

The laser belt scanner data is scanned at about 100 samples per second and can be smoothed by increasing the default values for more stable data. If a more responsive scanner is required the values of the filter parameters can be lowered. It is a good idea to always start with the default settings and start tuning the system accordingly.

Listed below is the filter parameters from most to least significance.

FILTER MODE (on)

If filter mode is off, the fast step response is disabled. If on, fast step will be activated based on threshold and sensitivity levels.

FILTER LEVEL (5)

The filter level has a maximum length of 256 samples. A filter level of (5) will use only 50% of the buffer length.

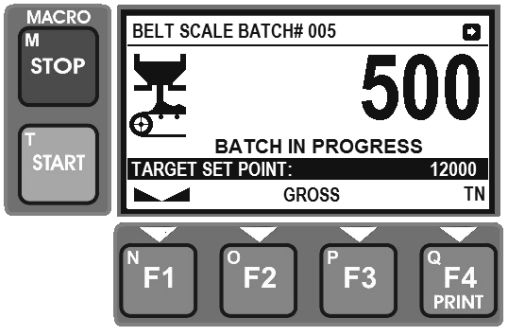
FILTER THRESHOLD (100)

This parameter is the difference between the new and the last sample. If the difference is larger than the threshold value we assume a fast step action to occur.

FILTER SENSITIVITY (20)

This count determines the number of consecutive threshold triggers to occur before fast step takes place.

HOW TO CONFIGURE SET POINT PARAMETERS



To set belt scale batch parameters, press STOP to exit to setup mode. Press the MENU key and use the UP/DOWN arrows to select **BATCH CONTROL SETUP**. These parameters set warning delay and belt startup timers. Once enabled, press **START** to begin batching using **F3** for the set point.

*Remember to save changes to parameters once finished using **F1** once you are back in the main screen.*

Enable Batch Mode

This parameter enables batch mode. Once the batch mode is enabled, the user needs to press **F3** to set the weigh set point. The user must then press **START** to activate a batch. If the printer is enabled on **COM2**, batch related data will be printed at the start and end of each batch draft. The batch process can be paused by pressing **STOP**. IO Point [0] controls the feeder bin gate.

Belt Start-up Timer

This parameter specifies the number of seconds to wait for the belt to come up to speed before opening the material supply gate. The same time period is applied after the set point is reached to give the belt enough time to clear material from the belt. IO Point [1] controls the belt motor.

Warning Start Timer

This parameter can be used for an alarm to warn that the belt is about to start after the following number of seconds**.** IO Point [2] controls start alarm.

IO Point[3] External Start Input

This IO point behaves exactly the same as the **START** key on the front panel. Can be wired for remote control.

IO Point[4] External Stop Input

This IO point behaves exactly the same as the **STOP** key on the front panel. Can be wired for remote control.

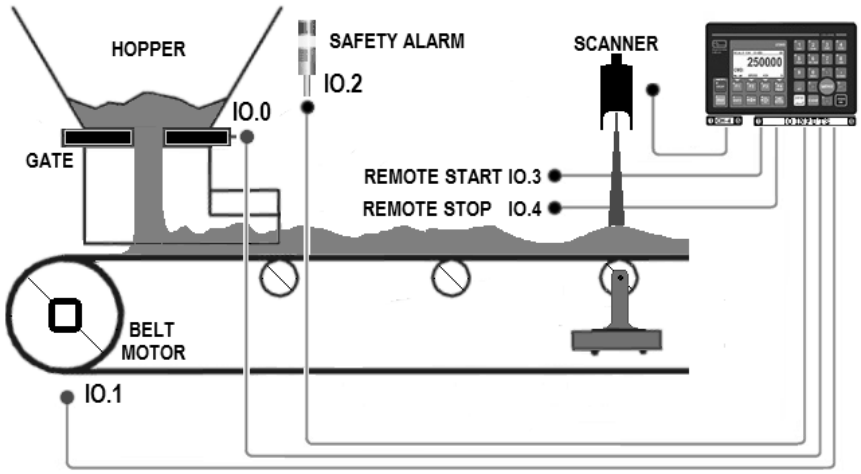
The batch counter is battery backed up as well as the belt set point which allows the system to recover from power interruptions. In order to reset the batch counter, the user need to enter calibration mode as described earlier on and disable and re-enable the batch function – this will also reset the batch counter. The batch counter is used with the printer reports when the COM2 port is configured as a printer port.

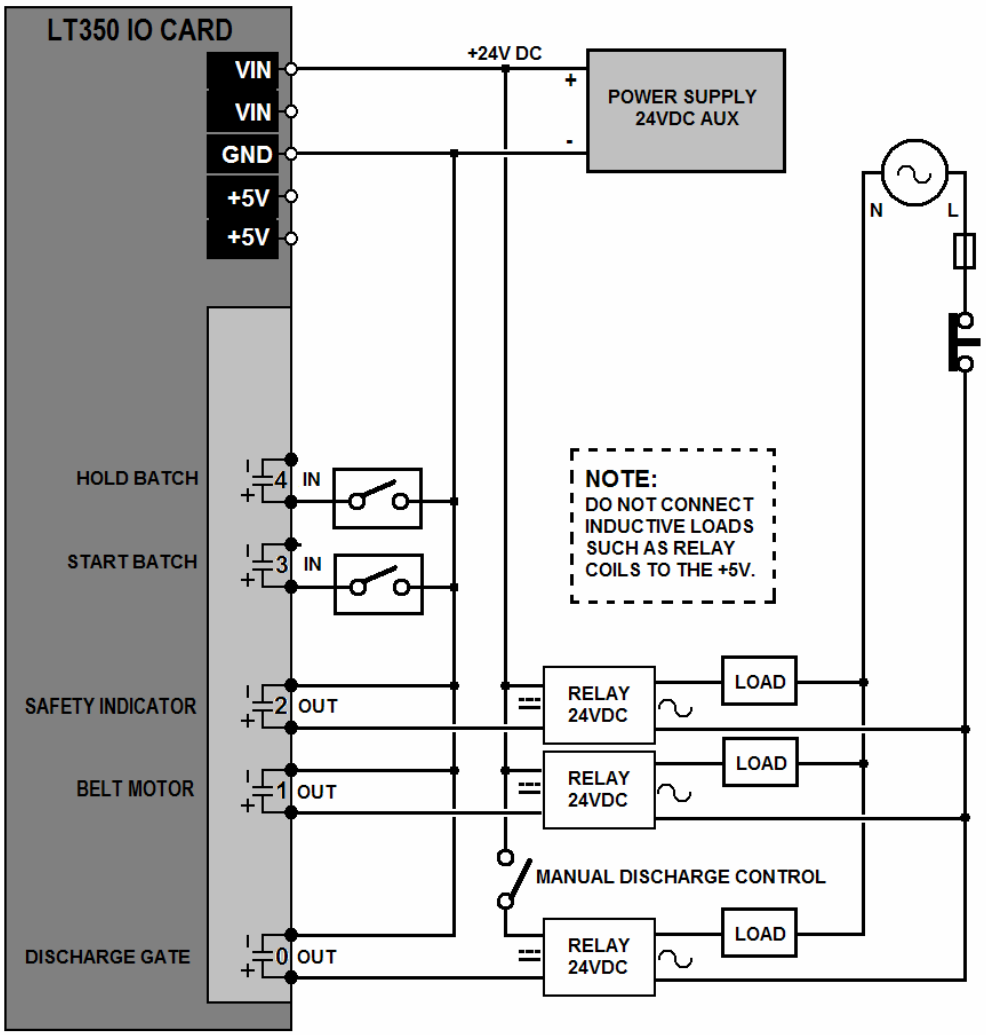
F3 is used to enter the set point for the belt batch function. The user can switch between base units lb or kg to tonnes by pressing the **UNITS** key.

NOTE:

The **IO STATUS VIEW** menu item can be selected to view the state of IO lines and belt speed indicators.

HOW TO WIRE THE BATCH INTERFACE





HOW TO CONFIGURE THE TOTALIZER PULSE OUTPUT

The Totalizer Pulse Output is programmable to any totalized weight interval – the weight pulse is battery backed up and will be valid even in the event of a power failure. If the belt scale is switched off, the LT350 will store/recall the last state of the totalization. The Pulse Output is active on IO POINT[0].

This weight value must be entered in base units , cubic meters or feet. The user can also change the pulse length in increments of seconds. This is useful for a PLC to determine if the pulse is valid by measuring the pulse length.

To set belt scale parameters, press **STOP** to exit to setup mode. Press the **MENU** key and use the UP/DOWN arrows to select **TOTAL PULSE SETUP(38)**.

*Remember to save changes to parameters once finished using **F1** once you are back in the main screen.*

Enable Totalizer Pulse

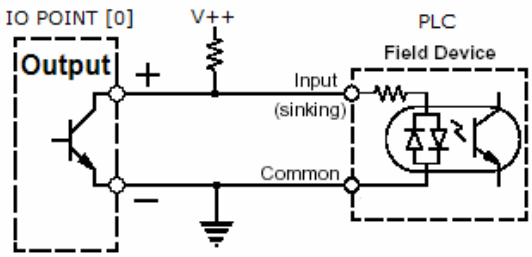
This parameter enables the Totalizer Pulse Output on IO Point[0]. When this mode is enabled, the Batch function will be disabled. The Totalizer and the Batch functions cannot work at the same time.

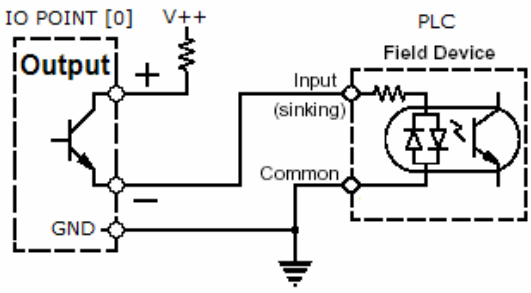
Pulse Weight Value

This weight value must be entered in the calibration base units, cubic meters or feet. The weight pulse is battery backed up and will be valid even in the event of a power failure. If the belt scale is switched off, the LT350 will store/recall the last state of the totalization.

Pulse Length Timer

The pulse length gets entered in increments of seconds. A pulse length of [0] equates to 500ms. The pulse length is useful for a PLC to determine if the pulse is valid by measuring the exact pulse length.





HOW TO CONFIGURE THE INTERNAL CURRENT LOOP OUTPUT

The 4-20mA current loop interface can be configured to transmit belt rate, speed or the belt weight parameter. The user needs to enter the parameter minimum at 4mA and maximum at 20mA. If the belt mode is stopped or the value drops below the minimum value, a current less than 4mA will be transmitted to signal a fault condition. The 4-20mA is galvanically isolated and needs to be supplied with a power source of typically 24V DC from the target device such as a PLC. The receiver should measure the 4-20mA across a 100-200 ohm resistor as outlined in the diagram below.

To set belt scale parameters, press **STOP** to exit to setup mode. Press the **MENU** key and use the UP/DOWN arrows to select **CURRENT LOOP SETUP(37)**.

*Remember to save changes to parameters once finished using **F1** once you are back in the main screen.*

Current Loop: Enable Current Loop Mode

This parameter enables the current loop output.

Current Loop: Minimum Value at 4mA

This is the parameter minimum value at 4 mA entered in base calibration units.

Current Loop: Maximum Value at 20mA

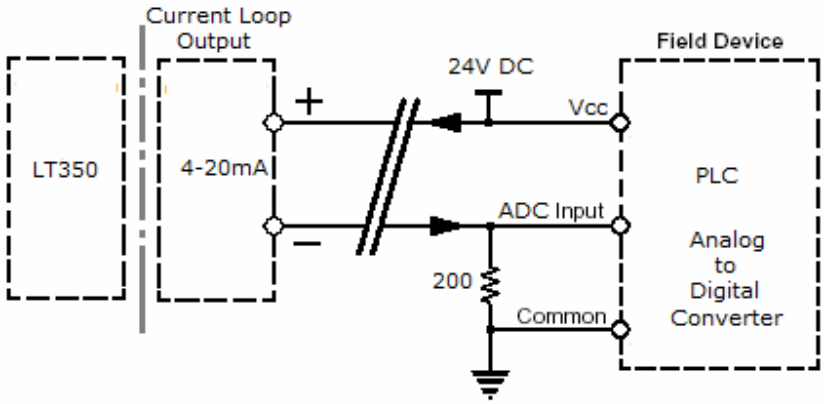
This is the parameter maximum value at 20 mA entered in base calibration units.

Current Loop: Parameter index

The belt parameter to use: rate(0), speed(1) weight(2)

Serial Port Setup

COM2	Baud rate:	9600
COM2	Protocol :	Current Loop
COM2	Poll Mode:	TX Continuously



HOW TO CONFIGURE THE EXTERNAL CURRENT LOOP OUTPUT

The external 4-20mA is a DIN-rail module that receives RS232 information on its input and transmit 4-20mA on its output and unlike the internal interface can work on either COM1 or COM2 (internal version only works on COM2).

The external 4-20mA current loop gets configured exactly the same way as the internal module to transmit belt rate, speed or weight parameters. The user needs to enter the parameter minimum at 4mA and maximum at 20mA. If the belt mode is stopped or the value drops below the minimum value, a current less than 4mA will be transmitted to signal a fault condition. The 4-20mA is galvanically isolated and needs to be supplied with a power source of typically 24V DC from the target device. The receiver should measure the 4-20mA across a 100-200 ohm resistor as outlined in the diagram below.

To set parameters, press **STOP** to exit to setup mode. Press the **MENU** key and use the UP/DOWN arrows to select **CURRENT LOOP SETUP(37)**.

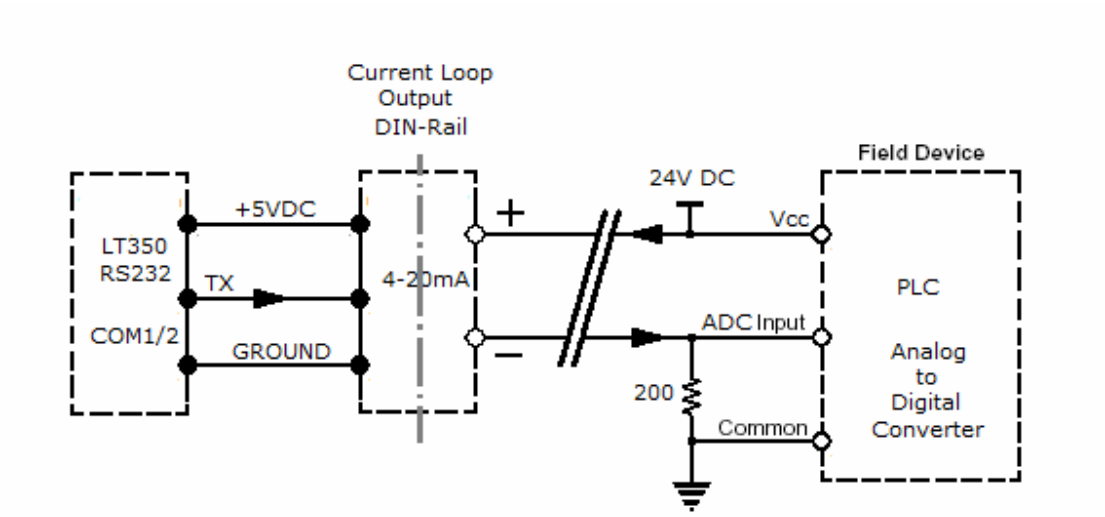
*Remember to save changes to parameters once finished using **F1** once you are back in the main screen.*

The external current loop interface can work on COM1 or COM2 and depending on the COM port used, the serial settings need to be set as follows

Serial Port Setup

COM1 or 2 Baud rate: 9600
COM1 or 2 Protocol : Current Loop
COM1 or 2 Poll Mode: TX Continuously

Please see the internal current loop setup procedures for how to configure the current loop parameters.



HOW TO SETUP SERIAL RS232 TO TRANSMIT WEIGHT DATA

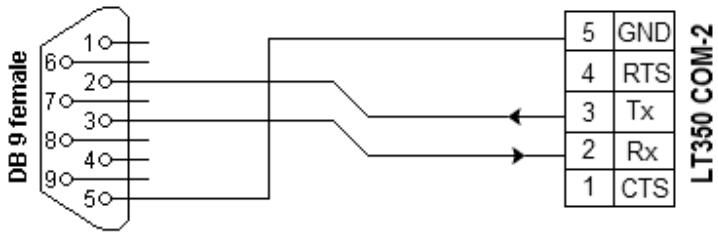
Please note that COM1 is used for the belt scanner and cannot be altered. COM2 can be used for printing and string transmissions.

To transmit a RS232 ASCII string containing weight information on a serial port do following:

- **COMMAND[18]** – check that the serial port is setup for RS232 mode.
- **COMMAND[20]** – serial baud rate 600,1200,4800,9600,14400,38400,57600 or 230400
- **COMMAND[21]** – protocol string format. The LT350 Belt scale data include speed, rate and total related data.
- **COMMAND[22]** – This command dictates whether the string is transmitted automatically or polled via an ASCII command set.

Windows HyperTerminal can be used to capture serial data strings at the same baud rate

Serial Printer	LT350 COM2	Function
2	2	Rx ← Tx
3	3	Tx → Rx
5	7	Signal ground



NOTE: *Many PCs today only support RS232 via USB which requires a USB to SERIAL cable*

HOW TO SETUP USB TO TRANSMIT WEIGHT DATA

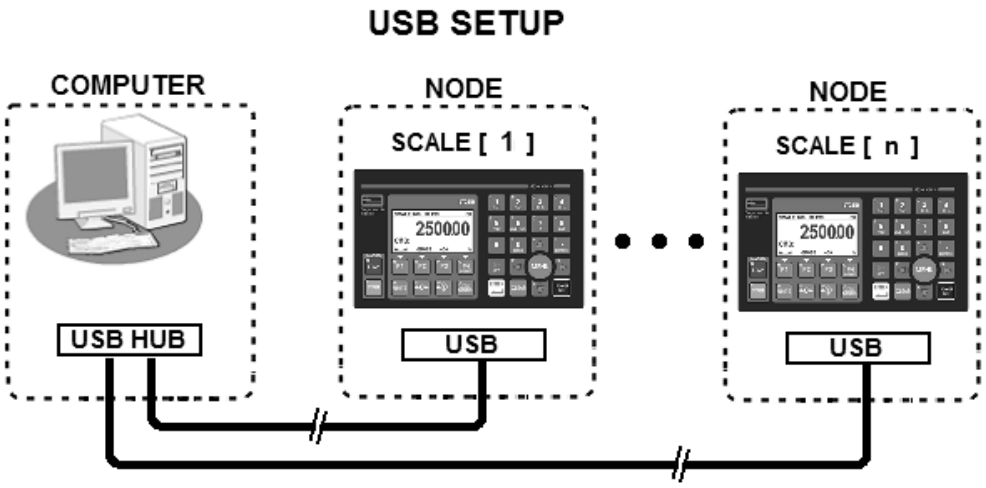
Please note that COM1 is used for the belt scanner and cannot be altered. COM2 can be used for printing and string transmissions.

This setup assumes that a USB port is installed on the LT350. The USB cable can also be the power source to power the LT350. The USB drivers are available on the accompanied CD to support Virtual COM ports on MS Windows platforms. To transmit ASCII strings containing weight information on the USB port of the LT350 do following:

COMMAND[23] – Submenu for USB speed and protocol setup

USB PARAMETERS	
Data Rate:	Supported baud rates: 4800, 9600, 14400, 28800, 38400, 57600 or 230400
Protocol Mode:	protocol string format. The LT350 Belt scale data include speed, rate and total related data.
String Mode:	This command dictates whether the string is transmitted automatically or polled via an ASCII command.

Windows HyperTerminal can be used to capture serial data strings at the same baud rate



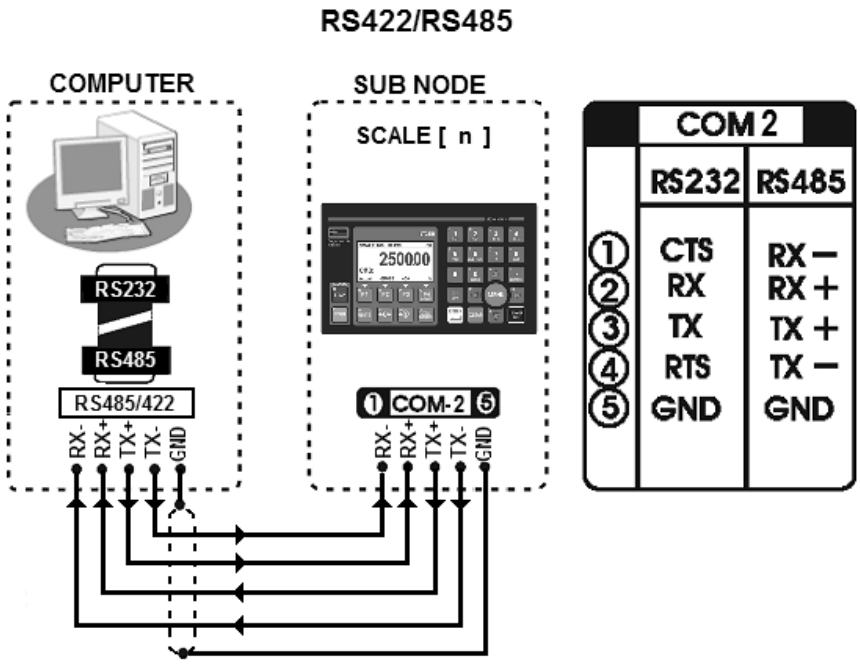
HOW TO SETUP RS22/485 TO TRANSMIT WEIGHT DATA

Please note that COM1 is used for the belt scanner and cannot be altered. COM2 can be used for printing and string transmissions.

To change between RS232 and RS485 mode, the user must first unplug the COM2 cable. This configuration allows for long distance transmission over 100 meters. Unplug serial port, change to RS485 and then do the correct wire setup as outlined below before re-connecting:

- **COMMAND[18]** – Disconnect serial port connector and then set COM1 for RS485 mode. Port may get damaged if a cable is left plugged in that is not an RS485 type.
- **COMMAND[20]** – serial baud rate 600,1200,4800,9600,14400,38400,57600 or 230400
- **COMMAND[21]** – protocol string format. The LT350 Belt scale data include speed, rate and total related data.
- **COMMAND[22]** – This command dictates whether the string is transmitted automatically or polled via the ASCII command

Windows HyperTerminal can be used to capture serial data strings at the same baud rate



NOTE: *A RS232 to RS422 converter is required for the computer*

HOW TO SETUP TCP/IP TO TRANSMIT WEIGHT DATA - I

This setup assumes that a TCP/IP network port is installed on the LT350. The CAT5 network cable can also be the power source to power the LT350 – see PoE:

COMMAND[24] – Submenu for internet setup

INTERNET NETWORK PARAMETERS	
IP address:	Sets the device IP address when DHCP is off. Factory default is [192.168.1.200] *This address needs to be obtained from the network administrator.*
Subnet Mask:	Sets the device subnet mask address when DHCP is off. Factory default is [255.255.255.000] *This address needs to be obtained from the network administrator.*
Default Gateway:	Sets the default gateway address. Factory default is [192.168.1.1] *This address needs to be obtained from the network administrator.*
DHCP Mode:	If a DHCP server is available on you network you can have an IP address allocated by the server – try not to use DHCP where possible. *You should try to obtain an extended lease on the IP address from the network administrator – typically a real life person.*
Protocol Mode:	protocol string format. The LT350 Belt scale data include speed, rate and total related data.
String Poll Mode:	This command dictates whether the string is transmitted automatically or polled via the ASCII command set.
Wireless SSID:	You should set this SSID to the same as your wireless router SSID. The factory SSID is:**[Connect]**
Node ID:	The node ID [1-100] will be set to the value displayed on the display screen e.g. SCALE 100. If you use the discovery software tool to search for network enabled connected nodes on the internet, the node ID will be used to identify your device. This is particularly important if you will be using DHCP.

Windows HyperTerminal can be used by selecting WinSock to capture the data strings by specifying the IP address at Port 502

(continued on next page)

HOW TO SETUP TCP/IP TO TRANSMIT WEIGHT DATA II

It is highly recommended to use a separate intelligent Ethernet Switching Router that learns and only forwards data between the two parties that communicate, instead of broadcasting it all across the entire network, slowing everything down – do not use a simple repeating hub.

To setup a LT350 indicator using TCP/IP over CAT5 cable and an Ethernet router, using **COMMAND[24]** Submenu for internet setup.

- Get a static IP address for your LT350 and enter it by selecting IP address in the sub menu in the form of [196.168.200].
- Get the Network mask for the network you connecting to – enter it at the sub menu, Network Mask. Most networks use the default of [255.255.255.000]. This information is readily available on any computer connected to the network – simply copy this information. This information is also available in the network router setup pages.
- Get the Default Gateway information and enter it at the sub menu, Default Gateway. This information should be the same as any computer connected to the network or on the network router.
- DHCP for industrial purposes should be avoided. If the network administrator does not allow static IP addresses for some reason. Try to negotiate a “long lease” for the DHCP assignment.

Alternatively, connect to the indicator through an Ethernet Switch using a standard CAT5 cable (never connect the indicator direct to the PC) web interface to setup the network address information.

- The network setup interface requires a login and password. The default login and password is as follows: LOGIN = **[root]** and PASSWORD = **[dbps]**
- You will then be directed to the TCP/IP address settings. Fill in the IP address, Network Mask and Default Gateway.
- Save the settings and request the LT350 to reboot with new settings – may take a long time, up to 20 seconds for reboot.
- The green LED (furthest from the display) must flash during boot up and then remain off during normal operation.
- The yellow LED (closest to the display) should stay on as soon as a CAT5 cable is connected. It should flicker during data transmissions.

HOW TO SETUP TCP/IP WiFi TO TRANSMIT WEIGHT DATA

To setup a LT350 indicator using wireless WiFi802.11b, using a Ethernet wireless router or access point, using **COMMAND[24]** Submenu for internet setup:

- Get a static IP address for your LT350 and enter it by selecting IP address in the sub menu in the form of [196.168.200]
- Get the Network mask for the network you are connecting to – enter it at the sub menu, Network Mask. Most networks use the default of [255.255.255.000]. This information is readily available on any computer connected to the network – simply copy this information. This information is also available in the network router setup pages.
- Get the Default Gateway information and enter it at the sub menu, Default Gateway. This information should be the same for any computer connected to the network or on the network router.
- Setup the SSID to be the same name as the access point or wireless router/switch.
- It is best to first get the basics working before enabling advanced WiFi encryption. Once you can communicate with the LT350 across a network. Use the Web interface described below to setup encryption if you need it.

Alternatively, temporarily change the SSID of the router to the factory default SSID of the LT350, which is [Connect]. You should now be able to find the indicator using the LTDISCOVER.EXE program on the CD. Also temporarily disable encryption on the router until you have the basic communications working. Then use the Web interface to setup the network address information.

- The network setup interface requires a login and password. The default login and password is as follows: LOGIN = **[root]** and PASSWORD = **[dbps]**
- You will then be directed to the TCP/IP address settings. Fill in the IP address, Network Mask, Default Gateway, SSID and enable encryption if needed. The SSID should be the same as the wireless router/switch. Connect the antenna, with a clear line of sight and positioned away from metal structures wherever possible.
- Save the settings and request the LT350 to reboot with new settings – may take up to 10 seconds for reboot.
- The green LED (furthest from the display) must flash during boot up and then remain off during normal operation.
- The yellow LED (closest to the display) should stay on as soon as a CAT5 cable is connected. It should flicker during data transmissions.

APPENDIX A: **String - LT350 BSI TYPE 1**

[<][C][T][TTTTTTTTTTTT][,][U][:][D][C][C][>]

0 1
[<] [C] *(belt number)*
2 3 15 16
[T] [T] [,] [U] *(belt Total)*
17 18
[:] [D] *(belt status)*
19 20 21
[C] [C] [>] *(belt checksum)*

0	**<**	1 byte	String start delimiter
1	**C**	1 byte	Belt scale channel number [1-4]
2	**T**	1 byte	Parameter start delimiter
3	**T**	12 bytes	**Belt Total – 12 digits including decimal point. Cubic feet or meters**
15	**,**	1 byte	Parameter separator
16	**U**	1 byte	Total units: L(lb), K(kg) or T(tonnes)
17	**:**	1 byte	Parameter start delimiter
18	**D**	1 byte	System state Diagnostics **[SPACE]** Indicates normal operation **O** Indicates scale over capacity **N** Indicates scale negative **M** Indicates motion on scale **Z** Scale at zero weight [Z] or not at zero [SPACE] **H** Integrator halted
19	**C**	1 byte	Upper checksum hex byte for inverted checksum of bytes 0-18
20	**C**	1 byte	Lower checksum hex byte for inverted checksum of bytes 0-18
21	**>**	1 byte	String end delimiter
22	**CR**		
23	**LF**		

APPENDIX B: String - LT350 BSI TYPE 2

[<][C][T][TTTTTTTTTTTT][,][U][S][SSSSSSSS][,][U][:][D][C][C][>]

0	1			
[<]	**[C]**			*(belt number)*
2	3	15	16	
[T]	**[T]**	**[,]**	**[U]**	*(belt total)*
17	18	26	27	
[S]	**[S]**	**[,]**	**[U]**	*(belt speed)*
28	29			
[:]	**[D]**			*(belt state)*
30	31	32		
[C]	**[C]**	**[>]**		*(checksum)*

0	**<**	1 byte	String start delimiter
1	**C**	1 byte	Belt scale channel number [1-4]
2	**T**	1 byte	Parameter start delimiter
3	**T**	12 bytes	**Belt Total – 12 digits including decimal point. Cubic feet or meters**
15	**,**	1 byte	Parameter separator
16	**U**	1 byte	Total units: L(lb), K(kg) or T(tonnes)
17	**S**	1 byte	Parameter start delimiter
18	**S**	8 bytes	**Belt speed**
26	**,**	1 byte	Parameter separator
27	**U**	1byte	Belt speed units: **ft/s, ft/m, ft/h, M/s, M/m, M/h**
28	**:**	1 byte	Parameter start delimiter
29	**D**	1 byte	Belt State **[SPACE]** Indicates normal operation **O** Indicates scale over capacity **N** Indicates scale negative **M** Indicates motion on scale **Z** Scale at zero weight [Z] or not at zero [SPACE] **H** Integrator halted
30	**C**	1 byte	Upper checksum hex byte for inverted checksum of data 0-29
31	**C**	1 byte	Lower checksum hex byte for inverted checksum of data 0-29
32	**>**	1 byte	String end delimiter
33	**CR**		
34	**LF**		

APPENDIX C: String - LT350 BSI TYPE 3

[<][C][T][TTTTTTTTTTTT][,][U][S][SSSSSSSS][,][U][R][RRRRRRRR][,][U][:][D][C][C][>]

0	1				
[<]	**[C]**				*(belt number)*
2	3	15	16		
[T]	**[T]**	**[,]**	**[U]**		*(belt total)*
17	18	26	27		
[S]	**[S]**	**[,]**	**[U]**		*(belt speed)*
28	29	37	38		
[R]	**[R]**	**[,]**	**[U]**		*(belt rate)*
39	40				
[:]	**[D]**				*(belt state)*
41	42	43			
[C]	**[C]**	**[>]**			*(checksum)*

0	**<**	1 byte	String start delimiter
1	**C**	1 byte	Belt scale channel number [1-4]
2	**T**	1 byte	Parameter start delimiter
3	**T**	12 bytes	**Belt Total – 12 digits one decimal point, fixed. Cubic feet or meters**
15	**,**	1 byte	Parameter separator
16	**U**	1 byte	Total units: L(lb), K(kg) or T(tonnes)
17	**S**	1 byte	Parameter start delimiter
18	**S**	8 bytes	**Belt speed**
26	**,**	1 byte	Parameter separator
27	**U**	1byte	Belt speed units: f**t/s, ft/m, ft/h, M/s, M/m, M/h**
28	**R**	1 byte	Parameter start delimiter
29	**R**	8 bytes	**Belt rate**
37	**,**	1 byte	Parameter separator
38	**U**	1byte	Belt speed units: **kg**/s/m/h, **lb**/s/m/h, **T**/s/m/h
39	**:**	1 byte	Parameter start delimiter
40	**D**	1 byte	Belt State **[SPACE]** Indicates normal operation **O** Indicates scale over capacity **N** Indicates scale negative **M** Indicates motion on scale **Z** Scale at zero weight [Z] or not at zero [SPACE] **H** Integrator halted
41	**C**	1 byte	Upper checksum hex byte for inverted checksum of data 0-40
42	**C**	1 byte	Lower checksum hex byte for inverted checksum of data 0-40
43	**>**	1 byte	String end delimiter

APPENDIX D: **String - LT350 BSI TYPE 4**

[<][C][T][TTTTTTTTTTTT][,][U][S][SSSSSSSS][,][U][R][RRRRRRRR][,][U][L][LLLLLLLL][,][U][:][D][C][C][>]

0	1				
[<]	**[C]**				*(belt number)*
2	3	15	16		
[T]	**[T]**	**[,]**	**[U]**		*(belt total)*
17	18	26	27		
[S]	**[S]**	**[,]**	**[U]**		*(belt speed)*
28	29	37	38		
[R]	**[R]**	**[,]**	**[U]**		*(belt rate)*
39	40	48	49		
[L]	**[L]**	**[,]**	**[U]**		*(belt load)*
50	51				
[:]	**[D]**				*(belt state)*
52	53	54			
[C]	**[C]**	**[>]**			*(checksum)*

0	**<**	1byte	String start delimiter
1	**C**	1 byte	Belt scale channel number [1-4]
2	**T**	1 byte	Parameter start delimiter
3	**T**	12 bytes	**Belt Total – 12 digits with one decimal point, fixed. Cubic feet or meters**
15	**,**	1 byte	Parameter separator
16	**U**	1 byte	Total units: L(lb), K(kg) or T(tonnes)
17	**S**	1 byte	Parameter start delimiter
18	**S**	8 bytes	**Belt speed**
26	**,**	1 byte	Parameter separator
27	**U**	1byte	Belt speed units: f**t/s, ft/m, ft/h, M/s, M/m, M/h**
28	**R**	1 byte	Parameter start delimiter
29	**R**	8 bytes	**Belt rate**
37	**,**	1 byte	Parameter separator
38	**U**	1byte	Belt speed units: **kg**/s/m/h, **lb**/s/m/h, **T**/s/m/h
39	**L**	1 byte	Parameter start delimiter
40	**L**	6 bytes	**Belt Load**
48	**,**	1 byte	Parameter separator
49	**U**	1byte	Belt Load: kg, lb
50	**:**	1 byte	Parameter start delimiter
51	**D**	1 byte	**Belt State**
52	**C**	1 byte	Upper checksum hex byte for inverted checksum of data 0-51
53	**C**	1 byte	Lower checksum hex byte for inverted checksum of data 0-51
54	**>**	1 byte	String end delimiter

UNIT CONVERSION TABLE

Primary Units	Multiplication Factor	Secondary Units	
Pounds (lb)	0.453592	kilograms	kg
	0.0005	Short tons	TN
	0.000446	Long tons	LT
	0.000453	Metric tons	T
Primary Units	**Multiplication Factor**	**Secondary Units**	
Kilograms (kg)	2.20462	pounds	lb
	0.001102	Short tons	TN
	0.000984	Long tons	LT
	0.001000	Metric tons	T
Primary Units	**Multiplication Factor**	**Secondary Units**	
Short Tons (TN)	2000.00	pounds	lb
	907.185	kilograms	kg
	0.892857	Long tons	TN
	0.907185	Metric tons	T
Primary Units	**Multiplication Factor**	**Secondary Units**	
Metric Tons (T)	2204.62	pounds	lb
	1000.00	kilograms	kg
	1.10231	Short tons	TN
	0.984207	Long tons	LT
Primary Units	**Multiplication Factor**	**Secondary Units**	
Long Tons (LT)	2240.00	pounds	lb
	1016.05	kilograms	kg
	1.1200	Short tons	TN
	1.01605	Metric Tons	T