LOADRITE

C-Weigh Belt Scale System

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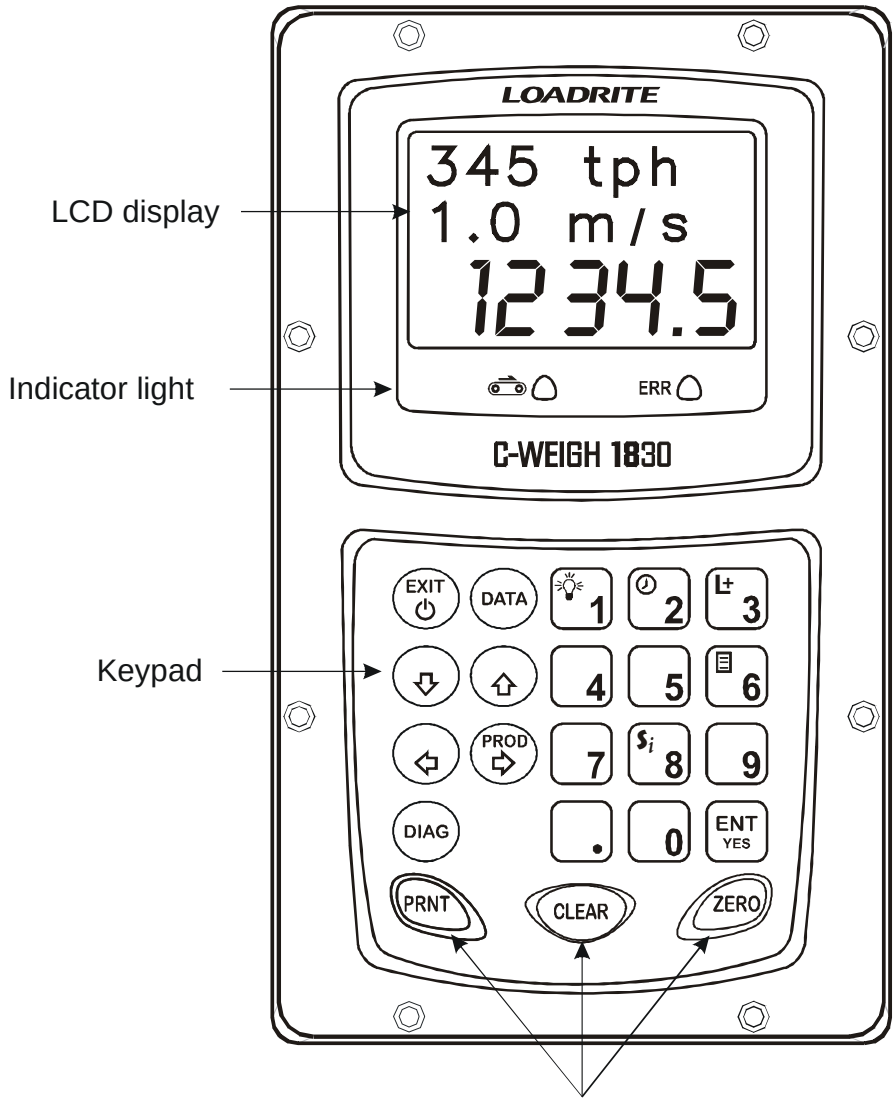
1 Product Purpose

The Loadrite® C-Weigh Weighing System measures the weight of material shifted by a standard conveyor belt typically found in quarries, mines or other similar bulk material applications.

Sensors under the belt measure the load on the belt and the conveyor speed. These signals are read by the Loadrite C-Weigh Integrator which calculates and displays the current material rate and totals moved.



The display has internal memory which stores settings and production data even when switched off.

The functionality of the Loadrite C-Weigh product is designed to be as close as practical to other Loadrite products found in typical bulk handling applications. This helps to reduce training needs for users.

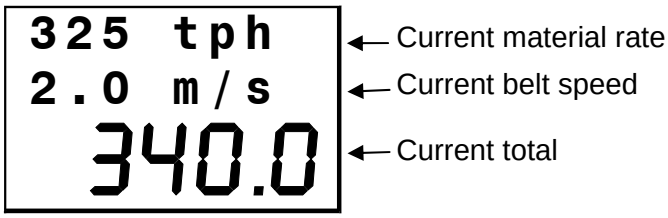
2 Quick Start Guide

2.1 Switching On

The Loadrite C-Weigh Integrator powers up automatically when you switch on the power.

2.2 The Run Screen

The Run screen shows the normal operating data for the conveyor.



When the belt is running with load, the current total will count up. It is normal for the tph figure to change up and down (sometimes quite quickly) as material moves along the belt.

2.3 Unattended vs. Interactive

The Loadrite C-Weigh can be used in either an Unattended or Interactive manner. This means the system can either:

- Operate independently without regular user input; or
- Use functions that require a user to regularly enter data (such a product details).

Different functions described in this manual fall into either of these categories.

2.4 Indicator Lights

Two indicator lights are used by the Loadrite C-Weigh.

The left hand light will be ON when the belt is running.

The right hand light will be ON if the Loadrite C-Weigh has detected an error condition.

2.5 Keypad

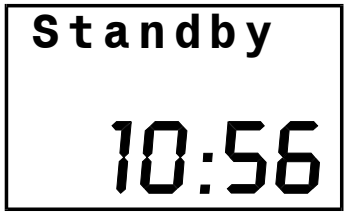
The table below shows the special functions that the keys have in addition to their numeric values used for entering data.

	Turns the display back light on / off.	-
	Displays time and date.	
	Displays the long total.	Page 8
	Accesses the menu	Page 15
	Status code logging function	Page 13
	Decimal point.	-
	Enter key for accepting data or changes.	-
	Exits an operation without changing the data. When pressed on the Run screen, puts the C-Weigh into standby mode. To return to the Run screen, press any key.	-
	Allows you to enter additional Data to print or log.	Page 12
	Scroll down.	-
	Scroll up.	-
	Scroll left.	-
	Scroll right and optionally a Product code to be entered.	Page 14
	Displays the Diagnostics menu	Page 18

	Displays the Print menu and allows reports to be printed	Page 10
	Clears the short total for the current product.	Page 9
	Zeroes out any build-up on the belt	Page 7

2.6 Standby

The Loadrite C-Weigh Integrator a ‘standby’ mode which is similar to turning the power off.

To put the Integrator into standby press , the EXIT key, when in the **Ready** mode. To restart the Integrator, press any key.	

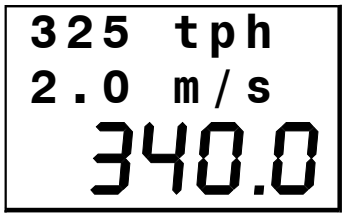
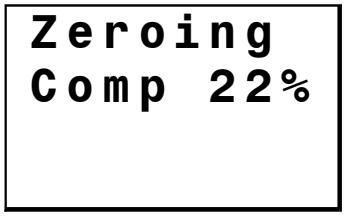
3 Weighing

3.1 For accurate weighing, make sure that:

- The scale is correctly zeroed. (Zeroing is described below on page 7).
- There is no material build up on the belt scale weighing frame or speed wheel.
- The flow of material along the belt is fairly 'smooth'
- The size of each piece of material is less than 1/10th of the covered width of the belt
- On sloping conveyors, ensure material does not roll down the belt
- On portable conveyors, recalibration may be required if the slope of the conveyor is changed

3.2 Zeroing

It is important to zero the scale from time to time. This is to avoid inaccurate readings due to build up of material on the scale frame, or other changes to the conveyor belt itself.

While running, with the belt empty, press the key. Note: If the belt is not running, an error message will be displayed.	
The Loadrite Integrator measures the weight for one complete revolution of the belt. A percentage complete value is displayed. The Zeroing process can be aborted at any time by pressing any key on the keypad.	
A completion message is display when complete.	

3.2.1 Large ZERO Error

If the weight is greater than 10% of full scale, when you press ZERO, the display prompts **`Is belt empty?`** If it is, press ENT YES which will perform a zero operation. Pressing EXIT will not zero the scale.

The C-Weigh Integrator automatically returns to the **Run** screen when zeroing is complete.

3.3 Short and Long Totals

The Loadrite Integrator keeps totals of the material moved. Two independent totals are stored.

Short Total	Typically used to display the total weight for a shift or shorter time period. Can be used in truck loading applications.
Long Total	Typically used to accumulate the weights lifted over a longer period, for example a day or week. To view the Long Total, press L+ 3. (See below)

The Short total is displayed on the bottom line of the display. As material moves along the belt, this value will increment.

3.4 Viewing Long Total

3.4.1 To view the Long Total

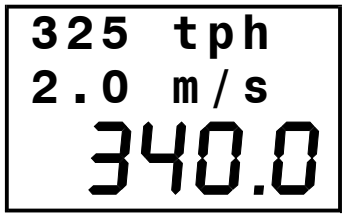
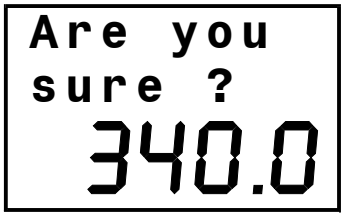
(Weights shown are examples only)

In **Run** screen, press L+ 3. After a few seconds, the display automatically returns to the **Run** screen.	Long Tot 23400

3.5 Clearing Totals

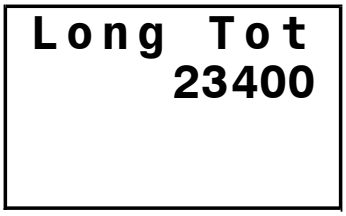
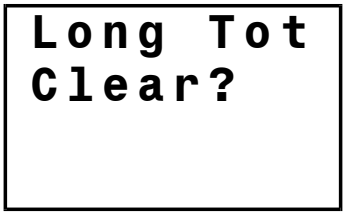
3.5.1 To clear the Short Total

(Weights shown are examples only)

In the **Run** mode, press CLEAR.	
The display prompts: Press ENT YES to confirm.	
The display shows **Total Cleared** for a few seconds, and then returns to the **Run** Screen.	

3.5.2 To clear the Long Total

(Weights shown are examples only)

In the **Run** mode, Press L+ 3. The display shows the Long Total.	
Press CLEAR. The display asks you to confirm the clear	
Press ENT YES to confirm. The display shows **Long Tot Cleared** for a few seconds and then returns to the **Run** screen.	

When a Total is cleared the value of that total and other data can be printed on a Loadrite Printer or sent to Loadrite MMS. See 'Event Printing' on page 11 for details.

4 Productivity Information

The C-Weigh Integrator has several functions for recording and displaying information related to the productivity of the conveyor system. The most basic of these is the Total display. The C-Weigh system also allows recording daily production information, tagging data with a definable data field and more. Many of these functions require a Loadrite Printer or the Loadrite MMS system to operate. (See also page 14 for a description of the ability that allows tracking of up to 9 different materials).
This section describes these Productivity functions in more detail.

4.1 Daily Reports

This function requires the connection of a Loadrite Printer. The function generates a useful summary report of information on the productivity of the system being monitored by the Scale.

Once per day the following report is automatically printed:

```
######################
    LOADRITE
Report Printed:
Time -  6:01 AM
Date - 14 JUN 2008
Period Start:
12:00 AM   13/ 6
Belt Run:      8:29:58
Belt Loaded:   7:15:22
Unloaded:      1:14:35
Start/Stops:         5
Weight:  3552.8 t
Av tph:     352 tph
Av to Max tph:  58%
First Load:  5:19 AM
Last Load:   4:58 PM
----------------------
```

Note: In some applications, the report shown above may print in the reverse order.

What each line means:

'LOADRITE'	- This line is a configurable 16 character identifier for when there are multiple systems
Report Printed:	- The time the report was actually printed
Period Start:	- The beginning of the 24hr period (time and date) the report covers
Belt Run:	- The hours : minutes : seconds the belt was running for
Belt Loaded:	- The hours : minutes : seconds the belt ran at above the minimum load
Unloaded:	- The hours : minutes : seconds the belt ran below the minimum load
Start/Stops:	- The number of times the belt started
Weight:	- The total weight moved during the period
Av tph:	- The average 'rate' (tonnes per hour) of the period

Av to Max tph: - The average 'rate' compared to the expected maximum rate selected at installation.
First Load: - The time of day the belt first ran 'loaded'
Last Load: - The time of day the belt last had a load on it

At any time the user can press the

key and print a copy of the same report (from the 'Previous' day).
The User can also print the data for the 'Current' period (day) up until the current time.

```
----------------------
Part Period Report
    LOADRITE
Report Printed:
Time - 11:01 AM
Date - 14 JUN 2008
Period Start:
12:00 AM   14/ 6
Belt Run:      3:34:53
Belt Loaded:   3:22:21
Unloaded:      0:12:32
Start/Stops:         2
Weight:  1164.9 t
Av tph:     346 tph
Av to Max tph:  57%
First Load:  5:51 AM
Last Load:  11:01 AM
----------------------
```

Note: In some applications, the report shown above may print in the reverse order.

Notes:

1. These reports are completely independent of the Short and Long Totals.
2. These reports are not effected by the selection of Product (refer page 14)
3. The default start time for the reporting period is midnight (12:00am). The Loadrite technician can change the start time if required.

4.2 Event Printing

This function requires the connection of a Loadrite Printer. The function generates a printed record of 'events' from the system being monitored by the Scale. The following 'events' will cause data to be printed:

Event	Data Printed	Optional
C-Weigh Power Up	C-Weigh ID Number	Always
Belt Start / Belt Stop	'Belt Start' or ' Belt Stop' Time	Always Always
Clear Short Total	Short Total Value Product	Always Optional

(Pressed)	Belt Run Time Belt Loaded Time ID Number User Data Time / Date Title (eg Company or Belt name)	Always Always Always Optional Always Optional
Clear Long Total	Long Total Value Product ID Number	Always Always Always
	‘Zeroed’ message	Always

4.3 Timed Logging

This function requires the connection to Loadrite MMS (eg via the LD941 data logger). The C-Weigh scale can be configured to log a short status record on a timed basis. The times can be every 1, 5, 10, 15, 30, 60, 90 or 120 minutes.

By using this logging function, in conjunction with MMS, it is possible to report on the productivity throughout the course of the day.

Your Loadrite C-Weigh distributor can assist with details on how Loadrite MMS can be configured to your specific needs.

4.4 Data Function

This function requires the use of a Loadrite Printer or connection to Loadrite MMS. The function allows a single number to be entered (up to 8 digits) that will then be printed / logged along with:

- A total that is ‘Cleared’
- ‘Timed’ logging data (see above)

Generally this ‘data field’ is used to track useful extra data such as ‘Customer’, ‘Truck Number’ or similar. The meaning for the data (and its associated text name) is typically set during installation. As this function requires operator input, it is generally not used in ‘unattended’ applications.

The number can be entered or changed by pressing the key. The numeric keys are used to enter a new value and which is then saved by pressing .

4.5 Status Function

This function requires connection to Loadrite MMS. The function allows a ‘status event’ to be entered. This ‘status’ could be:

‘1’ Resumed normal operation
‘2’ Stopped for Lunch
‘3’ Belt jammed
‘4’ Stopped for maintenance

To use, press

then enter and new number (using the numeric keys) and press

. This status ‘event’ will appear in Loadrite MMS data.
Up to 99 different status values can be tracked. This is an optional feature that can be enabled at installation time. It is up to the user to defined what each number means.

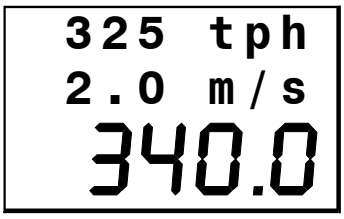
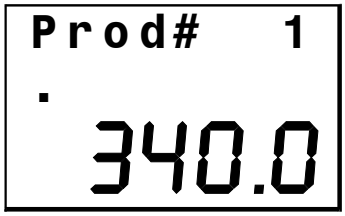
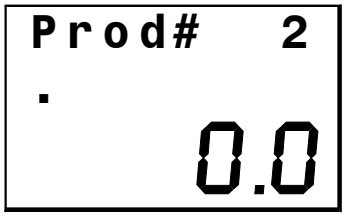
As this function requires operator input, it is generally not used in ‘unattended’ applications.

5 Tracking Products

The Loadrite C-Weigh can track up to 9 different materials or 'products'. It does this by using a different 'short' and 'long' total for each product. (Refer to page 8 for details on the totals). Product tracking is an option that can be enabled at installation.

Note: Product tracking requires an operator to enter Product details into the C-Weigh Integrator each time the material on the belt changes. As such this function is not suitable for 'Unattended' applications.

If enabled, a new Product can be selected by:

In the **Run** mode, press PROD .	
The Integrator prompts for a new product number and displays the 'short' total for the current product on the bottom line of the display.	
To change the product number, either: - Enter a new number with the numeric keys; or - Use the arrow keys	
Press ENT YES to confirm	

Notes on using the Product function:
- The total(s) for each Product must be Cleared separately
- The automated Daily Reports (refer to page 10) are not affected by which Product is selected. They simply report on the Total material carried by the belt.

6 Menu Options

The Menu allows you to change some of the settings of the Integrator.

`Setup...`	Installation functions (security code required)
`Clock`	Clock setting

6.1 To access an item on the menu:

1. Press 6 .
2. Use ⇧ ⇩ to scroll to the required option.
3. Press ENT YES to select the option.

When you have finished with an option, the display returns to the main menu. To return to the Run screen, press ENT YES.

6.2 Setup

The Setup option enables you to access special functions such as span calibration. You need a security code to access these functions.

6.2.1 To access the Setup options:

1. Press 6 .
2. Use ⇧ ⇩ to scroll to **`Setup`**.
3. Press ENT YES to select.
4. The Loadrite prompts you to enter an access code.

6.3 Clock Setting (Clock)

To set the time and date – refer to page 16.

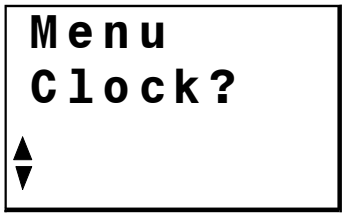
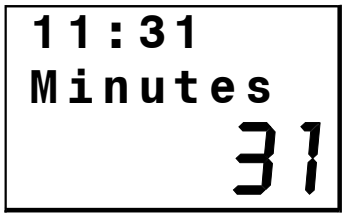
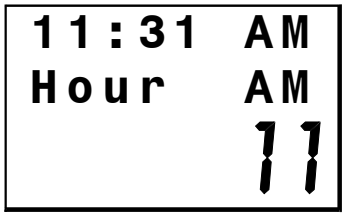
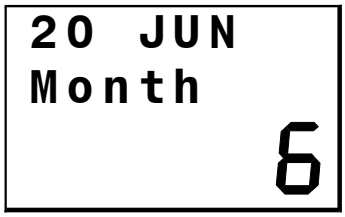
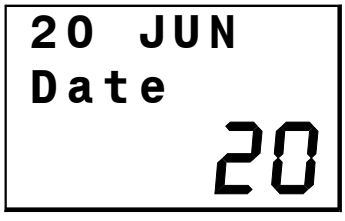
7 Setting the Clock (Time and Date)

The Loadrite C-Weigh Integrator has an internal clock that can be used for inserting the time and date into printed data.

You can display the time and date by pressing the ABC 2 key.

7.1 To set the time and date:

To set the clock:

Press MNO 6 . Use ⇧ ⇩ to scroll through to **Clock**. Press ENT YES.	
The Integrator displays the first of the time / date screens. Enter the new minutes setting then press ENT YES	
Enter the new hours setting. The ⇧ ⇩ arrow keys change AM / PM Press ENT YES to confirm.	
Enter the new Month (enter the month number with the numeric keys) Press ENT YES to confirm	
Enter the new Date Press ENT YES to confirm	

Enter the new Year Press ENT YES to confirm	20 JUN Year 2008

Note: At any stage during the clock setting process, pressing EXIT will return to the **Run** without saving the new time.

8 Diagnostic Functions & Error Messages

8.1 Diagnostic Menu

The Loadrite C-Weigh has a series of Diagnostic functions easily available. To access the diagnostic functions, press

when the Run screen is displayed.

Four separate functions are available:

- Loadcell test
- Speed wheel sensor test
- Supply voltage measurement
- Live Weight display

The arrow keys can be used to scroll to the required function, press

to select.

8.1.1 Sensor / Loadcell Signal (Sensor)

The Sensor Input function allows each loadcell signal to be monitored in 'real time'.
The percentage value is the Loadcell output. The message **NoSig** (No Signal) indicates that there is no signal or that the loadcell has been disconnected. If the message **Over** (Over range) is displayed, the signal from the loadcell is over range. This indicates a fault.

Press the

key to return to the menu.

8.1.2 Speed Sensor Test (Speed W)

The Speed Sensor shows the state of the sensor input. This input should pulse 'on' and 'off' as the sensing wheel rotates. If the belt is running the display will flash quickly. If the wheel is rotated slowly, the display should change more slowly.
If the speed wheel is rotating and the input is stuck permanently in one state or another, this indicates a fault.
Most standard Loadrite C-Weigh speed sensors use a 'proximity switch' to measure pulses from a 'speed wheel'. These proximity switches typically have a small lamp that should also flash as the wheel rotates.

Press the

key to return to the menu.

8.1.3 Power Supply Check (Supply V)

The Power Supply Check function displays the input voltage. The input voltage should be above 12V and stable to within +/-0.5V.

Press the

key to return to the menu.

8.1.4 Live Weight Display (LiveWght)

This function allows the weight seen by the loadcells to be displayed. The weight is displayed in kg. A test can be performed by loading a suitable weight (typically less than 100kg) onto the belt directly over the 'idler' supported by the loadcells. The display should show the approximate value of the weight.
Note: This test may not show the exact value of the test weight. Other factors such as exact load position, conveyor slope and belt tension may alter the true reading.

Press the

key to return to the menu.

8.2 Error Messages

Over Range	- Occurs one or more Loadcells are loaded over their maximum or have been damaged
Belt Stopped	- Either the belt is stopped, or there is a fault with the speed sensor
Logger Fault	- The optional LD941 data logger (used with Loadrite MMS) has been unplugged

9 Span Calibration Adjustment

This function allows small changes to be made to the C-Weigh calibration if the conveyor is modified or moved, or if no accurate test weight was available when the Loadrite C-Weigh is calibrated at installation time.

The adjustment is carried out by entering the total weight recorded at a weigh bridge or other reference and the corresponding Loadrite C-Weigh total.

To perform the adjustment you need to obtain a security access code from your Loadrite installer.

WARNING The Loadrite C-Weigh alters its calibration every time this function is used. It is important that you only use this function once with a given set of data. If the same weights are entered again, the Loadrite C-Weigh will over correct and its accuracy will be seriously impaired.

The method is explained below using an example.

Press MNO 6. Use ⇧ ⇩ to scroll through to Setup. Press ENT YES.	Menu Setup...
Enter the Access code supplied by your Loadrite Installer. Then press ENT YES.	Access Code?
The Integrator prompts you to enter the Loadrite C-Weigh total weight. Key in the Loadrite C-Weigh total and press ENT YES.	Loadrite 0
Key in the weigh bridge (or other reference) total and press ENT YES.	WghBrdge 0

The Loadrite Integrator briefly displays **`Span Updated`** and then returns to the menu. Press to return to the Run screen.	

Checking the Adjustment

You can check the Calibration Adjustment by obtaining and comparing new Loadrite C-Weigh and Weighbridge Values. If necessary, the Calibration Adjustment can be performed again using the new data.

Notes to remember:

All trucks and trailers should have tare weights confirmed for all loads to be checked. This ensures that a true weight can be established. Avoid split weighing the truck and trailer.

10 Specifications

Suitable Applications

The Loadrite C-Weigh Scale measures the weight of bulk material moved by conveyor belts in Quarries, Mines and other similar environments. Please refer to your Loadrite distributor for details.

Weighing Accuracy

Typical accuracy is ±1% for most conveyors. This may vary with different conveyor types, installation options and the physical condition of the conveyor and belt.

Power requirements

Supply Voltage	12 to 32 Volts DC
Supply current	Loadrite Integrator: 160mA typical, 350mA max. Loadrite printer: 50mA standby, 4A peak.

Signal Inputs and Outputs (Integrator unit)

Weight transducer input	4 - 20mA (0-100%).
Speed Sensor input	Pull-up resistor requiring switch to ground.
Serial communications.	RS232 to printer and data logger

Display

LCD display	2 lines x 8 char, 1 line x 5 numeric Back light

Keypad

22 keys	Back light. Numeric and special functions

Clock

Built-in clock	Hours, minutes, day, month, year.

Physical

Loadrite Integrator	Protected to IP54 Weight: 1.6kg

Available Options

Loadrite printer	24 column
Loadrite MMS	Material Management System for ‘back office’ reporting
Data logger	Provides electronic data collection for MMS

A number of additional operating features can be enabled at installation time.

11 Output / Input connections

Transducer

1. +12V
2. No function
3. No function
4. +10 volt excitation
5. Weight signal input
6. Shield
7. Ground

Power/Control

1. Negative supply (ground)
2. Positive supply
3. Remote button 2
4. Remote button 1
5. N.C.
6. Speed Sensor input
7. N.C.
8. +12V supply for Speed Sensor
9. N.C.
10. No function
11. N.C.
12. N.C.
13. Ground output
14. Positive output
15. Ground output

Printer/Logger

1. Negative supply to printer
2. Positive supply to printer
3. +12V output
4. N.C.
5. Reserved
6. Printer RS232 output
7. Printer busy input
8. EDP RS232 input
9. EDP RS232 output
10. Ground output
11. Reserved
12. N.C.

Notes