SOLE DIGITAL

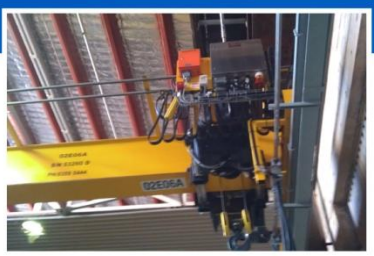
TrafficLite
Crane Load Indicator

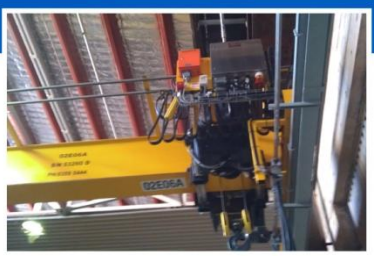
Model TFL100, Version 1.0

Installation and User Manual

V1.3: 29/07/13

CONTENTS

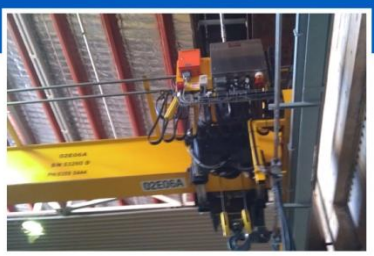





1 OVERVIEW

TrafficLite is a device that takes a crane load input (directly from a load cell or via another device) and then activates up to four set point relays depending on the value of that load.

Its primary intent is to drive a Green-Amber-Red traffic light display and set of overload contacts, but can be used to drive any other four independent set point relays.



2 SPECIFICATIONS

2.1 Physical Specifications

Overall length (mm):	115
Overall width (mm):	100
Overall height (mm):	23
Weight (kg):	0.12
Mounting:	30mm DIN Rail

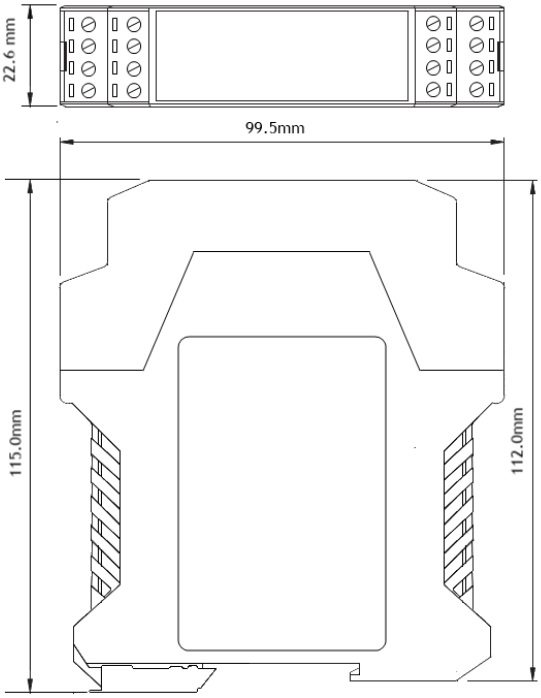
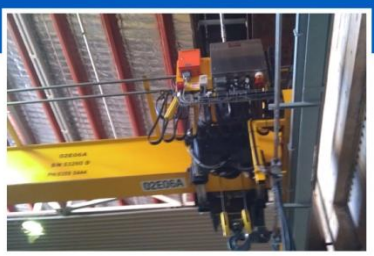


Figure 1: Case Dimensions



2.2 Electrical Specifications

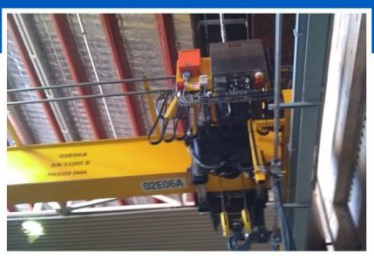
Parameter	Description	Min	Typ	Max	Units
V_{in}	Supply voltage	32		250	VAC
I_{in}	Supply current	7	8	12	mA
L_{max}	Maximum voltage on a load sensing pin with respect to device gnd			3.3	V
L_{fs}	Load pin differential input for full scale reading	20	23	25	mV
V_{fault}	Max voltage for fault output			250	V AC
I_{fault}	Max current sink by fault output			4	A
P_{fault}	Max contactor inrush rating at 48V			200	W
	Allowable operating temperature	-40		85 Note 1	°C

Note1: Extended operation at maximum temperature will reduce the life the device.

2.3 Communication Specifications

Communications between the device and a host is usually via a Bluetooth radio link. The Bluetooth device name will be set to the Crane ID, the PIN is 0000.

For more details on the communication protocol used to communicate with the TrafficLite, see Appendix A.



3 INSTALLATION DETAILS

3.1 Prior to Installation

Before installing your TrafficLite device visually inspect the device and check that:

(a) the type of input marked on the front of the device is appropriate for your application;
(b) the case is not damaged and fits together securely;
(c) terminals are secure;
(d) terminal numbering is as per the following diagram.

Figure 2: Terminal Positions

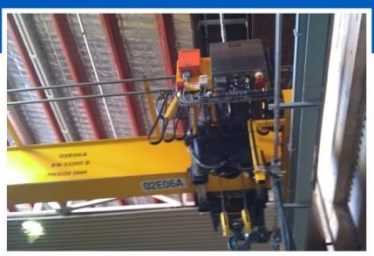
NB: As each block of 4 terminals can be removed (for installation) it is important that they be reinstalled in the positions shown.

3.2 Wiring Diagrams

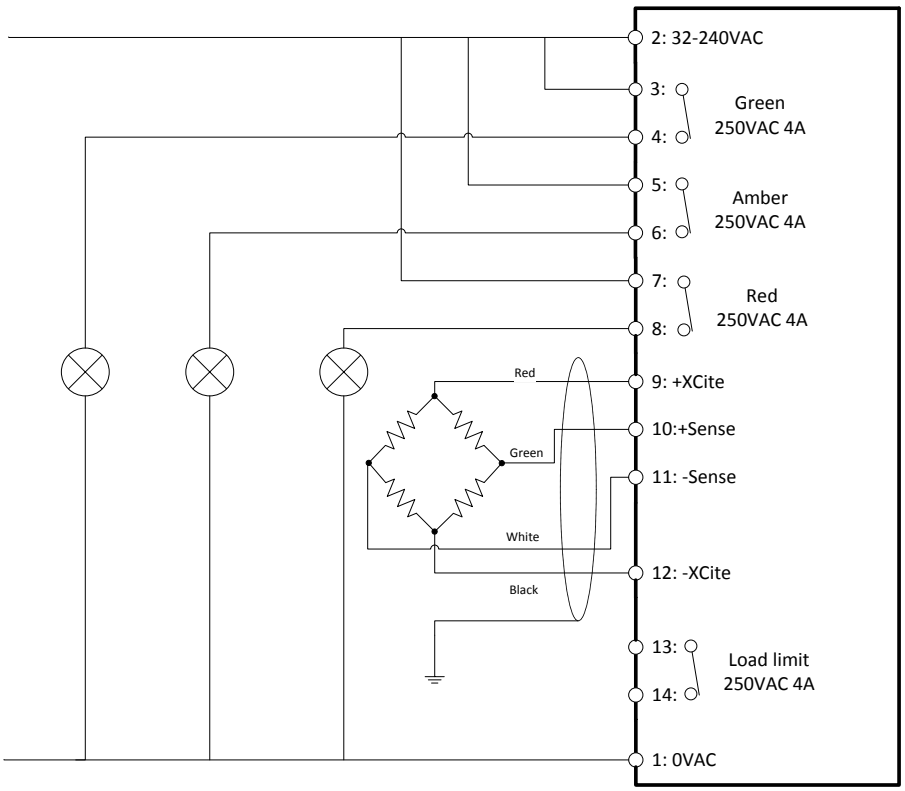
3.2.1 Installation with an Existing Load Display

The recommended method for connecting a TrafficLite to an existing load display is to use a 4-20mA output from the display to a 4-20mA configured TrafficLite or to insert a 4-20mA TrafficLite into an existing current loop.

Where this is not an option, it may be possible to piggyback the TrafficLite onto the strain gauge inputs of the load display.



3.2.2 Installation with a Dedicated Load Cell

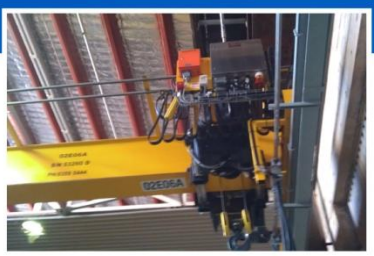


NB: Output pins (3-4, 5-6, 7-8 and 13-14) are Normally Closed and rated for 250V AC 4A. They can be reconfigured to Normally Open using the FSU software.

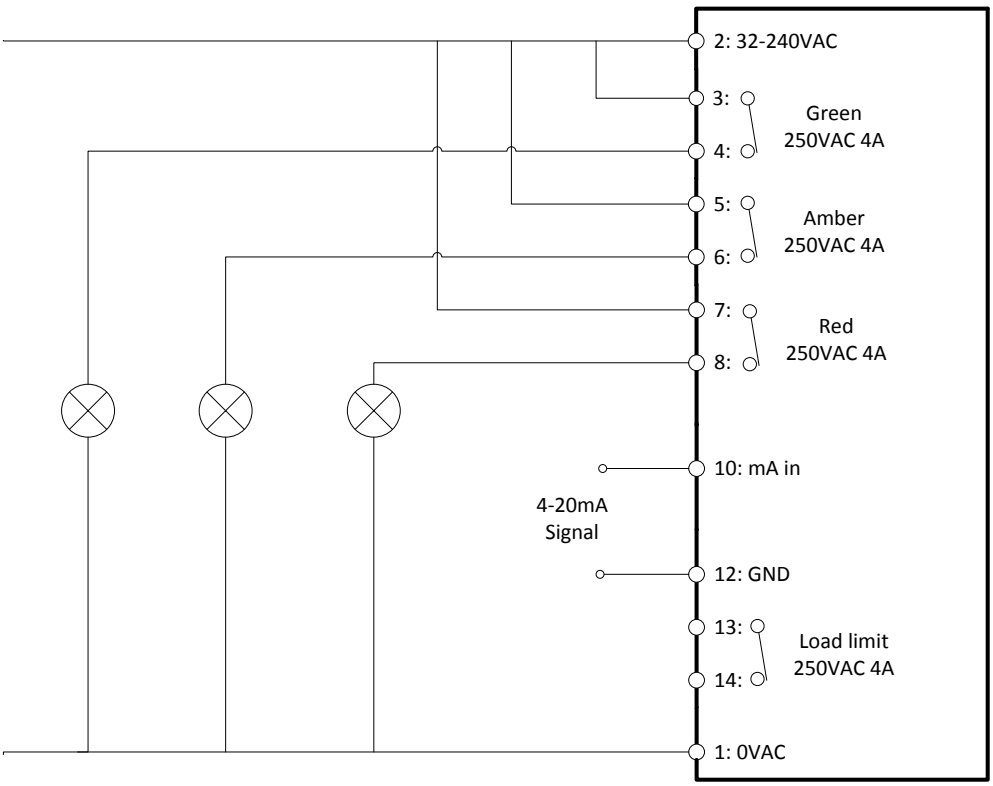
It is very important not to connect pin 15,16 to the chassis earth!

3.2.2.1 Connecting the negative reference

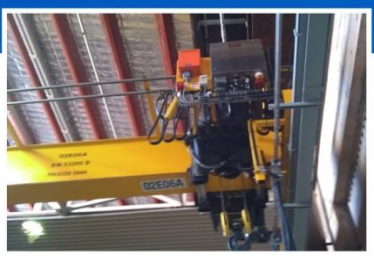
The TrafficLite input circuit is connected to the chassis ground. When installing against an existing load Indicating system, ensure that its inputs are floating. It is important that the voltage on pins 10 and 11 do not exceed 3.3V with respect to pin 12.



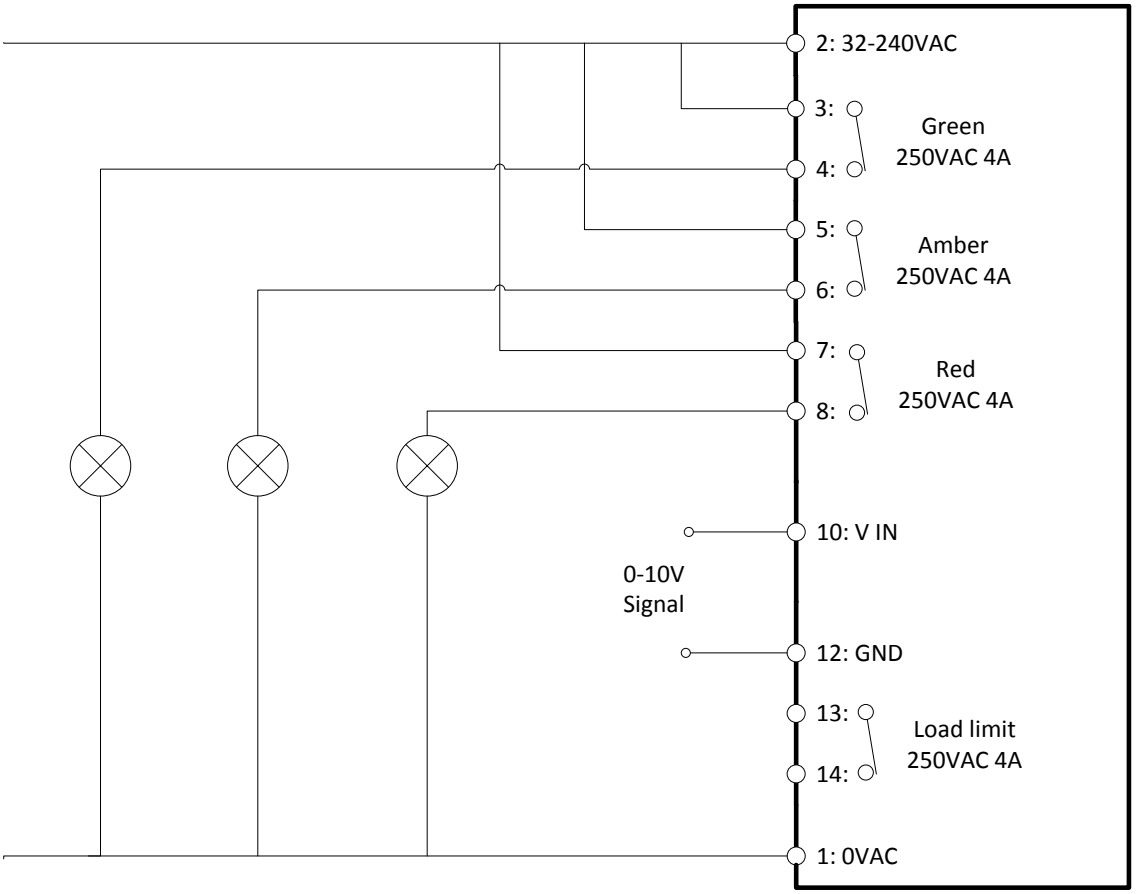
3.2.3 Installation with a 4-20mA Load Output



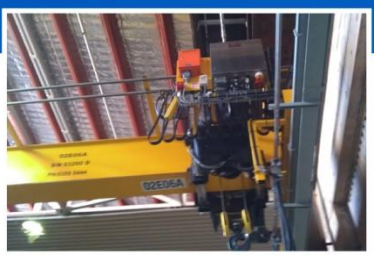
NB: Output pins (3-4, 5-6, 7-8 and 13-14) are Normally Closed and rated for 250V AC 4A. They can be reconfigured to Normally Open using the FSU software.



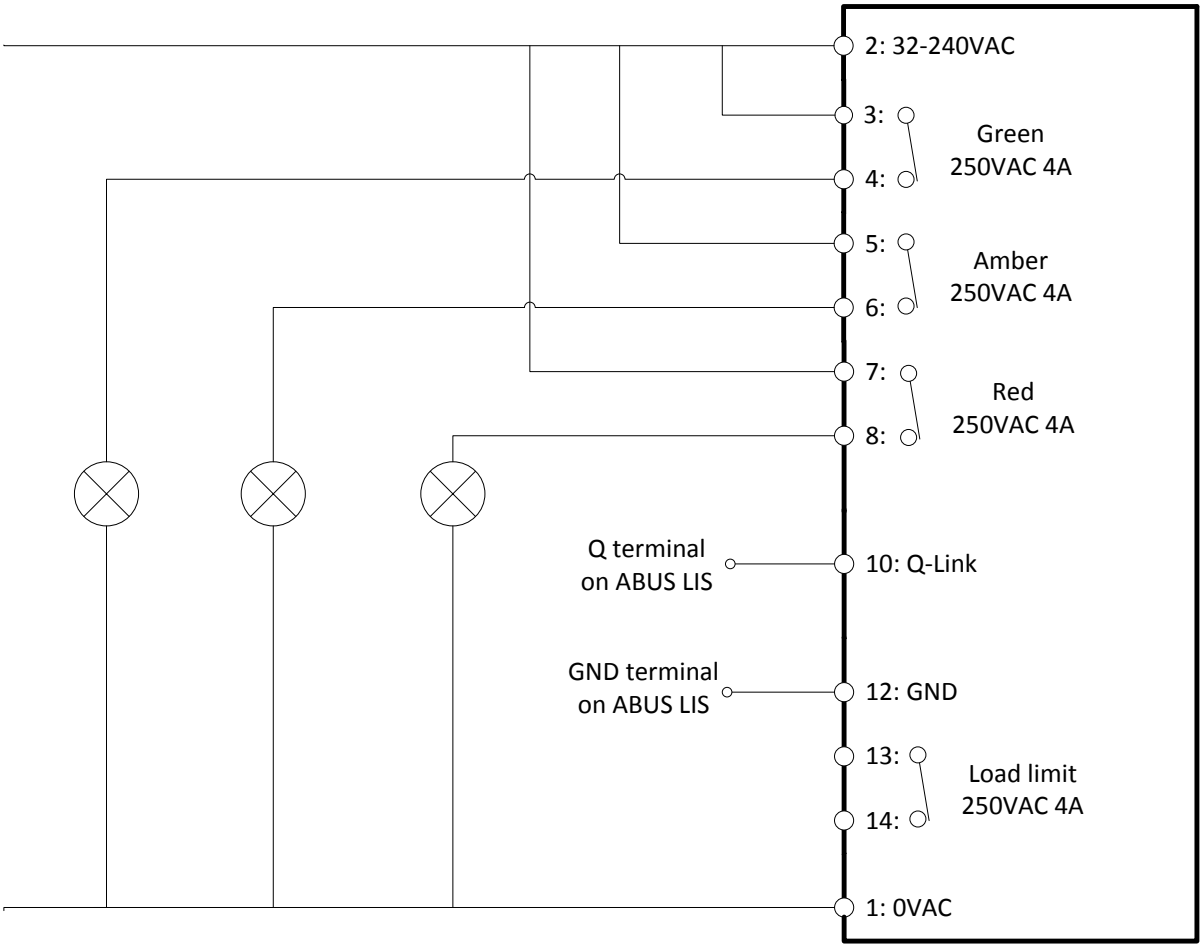
3.2.4 Installation with a 0-10V Load Output



NB: Output pins (3-4, 5-6, 7-8 and 13-14) are Normally Closed and rated for 250V AC 4A. They can be reconfigured to Normally Open using the FSU software.

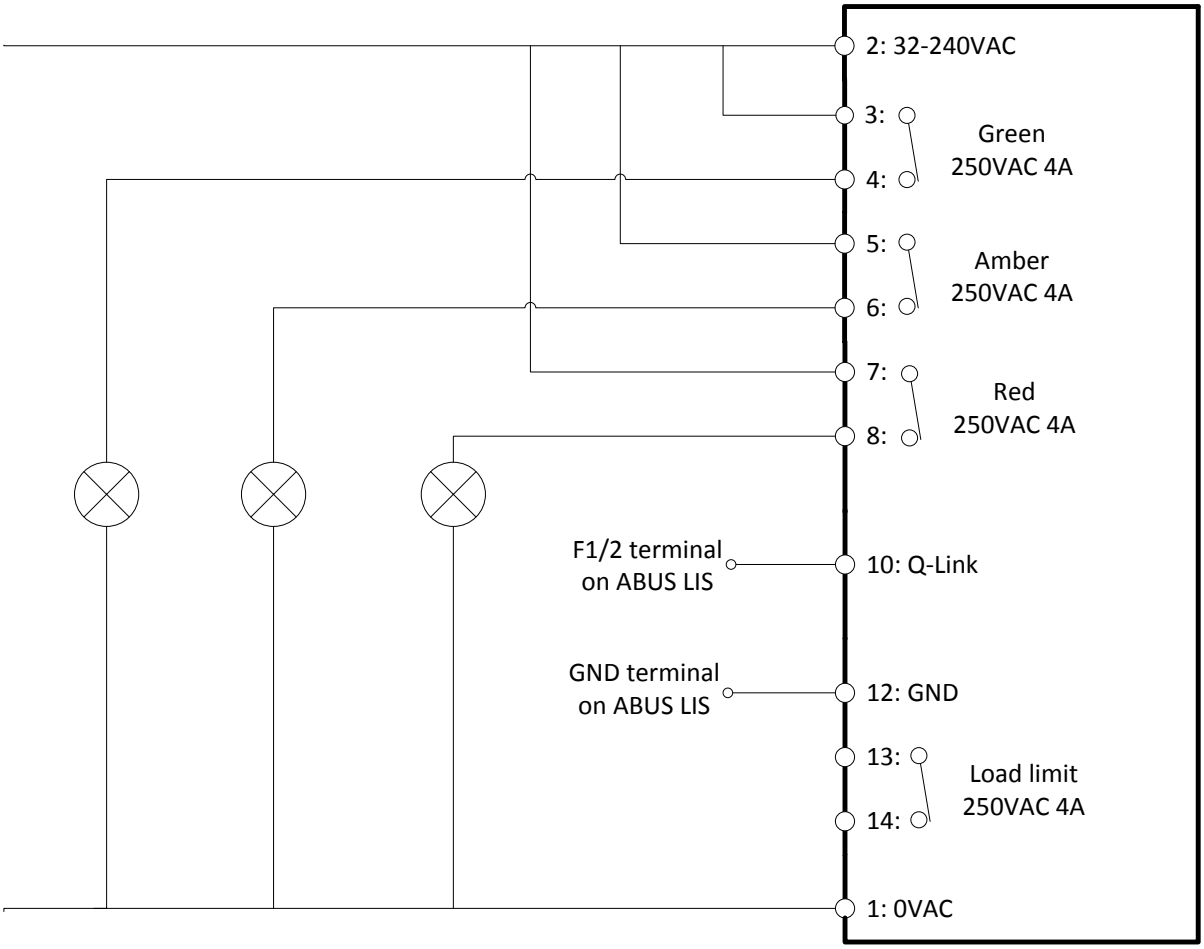


3.2.5 Installation with a Q-Link Output (ABUS LIS)

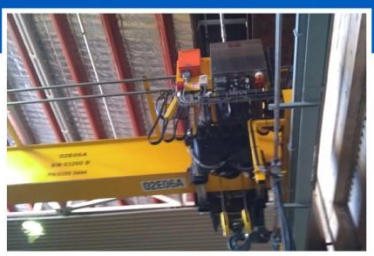


NB: Output pins (3-4, 5-6, 7-8 and 13-14) are Normally Closed and rated for 250V AC 4A. They can be reconfigured to Normally Open using the FSU software.

3.2.6 Installation with a F-Link Output (ABUS LIS)



NB: Output pins (3-4, 5-6, 7-8 and 13-14) are Normally Closed and rated for 250V AC 4A. They can be reconfigured to Normally Open using the FSU software.

4 COMMISSIONING DETAILS

TrafficLite is designed to be commissioned using a laptop computer. You will need a CASWA LINK-2 Bluetooth Modem and the Field Service Utility (FSU) software application loaded on a laptop.

4.1 Installing and Launching the FSU Application

4.1.1 FSU Program Installation

Ensure that your computer is switched on, connected to the internet and that the minimum required software versions are installed (see Appendix B for minimum system requirements). Ensure that the LINK-2 modem is installed and that the drivers have loaded.

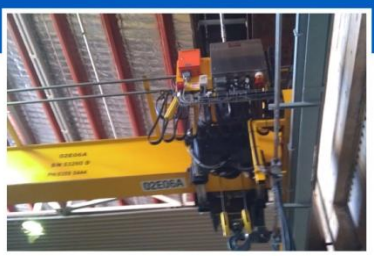
4.1.2 Installing the FSU application

The latest LINK-2 FSU software (Link-2_FSU) can be downloaded from http://www.soledigital.com.au/Link2.html.

You should check this location periodically for updates.

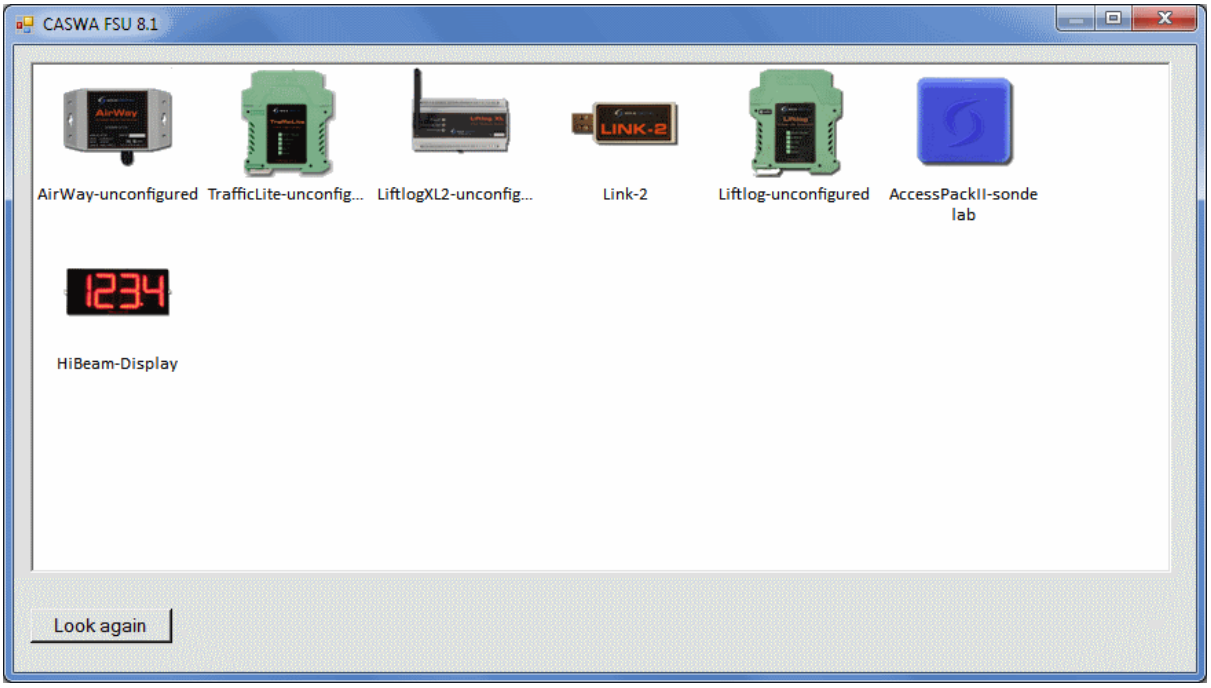
4.1.3 Launching the Application

Double click on the FSU program icon:  .



4.2 Connecting to the Device

The FSU will scan for Bluetooth enabled devices. This process takes approximately 10 seconds, when complete a list of all CASWA devices within range will be displayed.



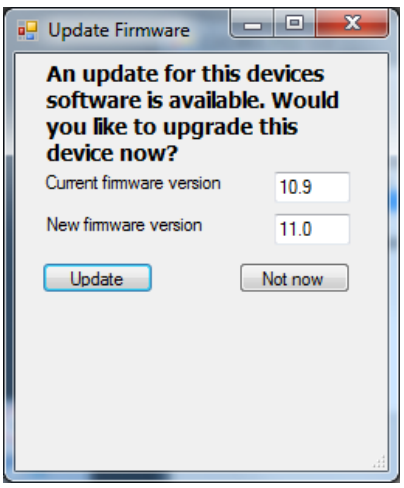
If a particular TrafficLite unit is not found, ensure it is powered up and press <Look again> to repeat the search.

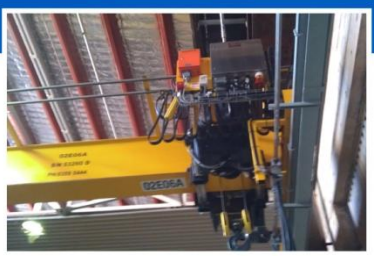
NB: The Bluetooth link between the Laptop using a Link-2 and a TrafficLite has a range of approximately 200m.

Select the TrafficLite you wish to configure and press <Connect>.

4.3 Checking for Firmware

After you have selected your desired TrafficLite, a connection will be made and the software will check if the device has the current firmware. If a new firmware version is available the following window will pop up:



Press <Update> to update the TrafficLite to the latest available firmware version (recommended). The new firmware will be installed on the device. **DO NOT switch off the computer or remove the LINK2 modem until this is complete – doing so may leave the TrafficLite in an unrecoverable state.**

Alternatively, press <Not now> to update firmware at a later time.

NB: If you did not see this window, then your device already has the most current firmware.

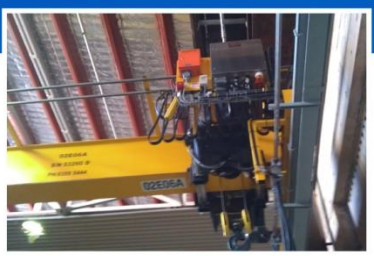
4.4 TrafficLite Configuration Screen

Once the firmware version has been verified, the following screen will appear.

This screen shows the:

- Crane ID
- Current firmware version operating on the device.

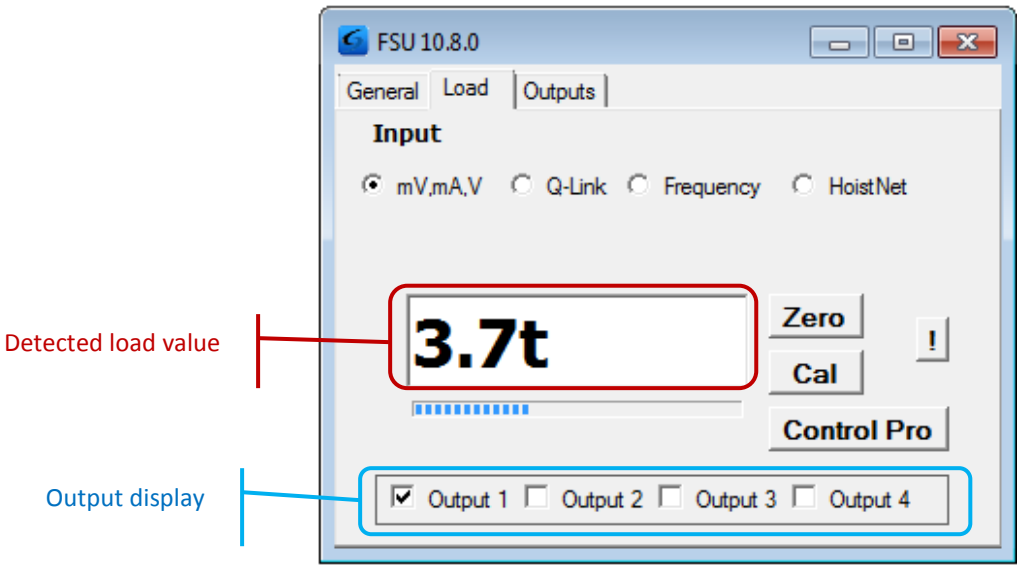
To enter/change the CraneID, type the desired name into the ID field.

4.5 Calibrating the TrafficLite

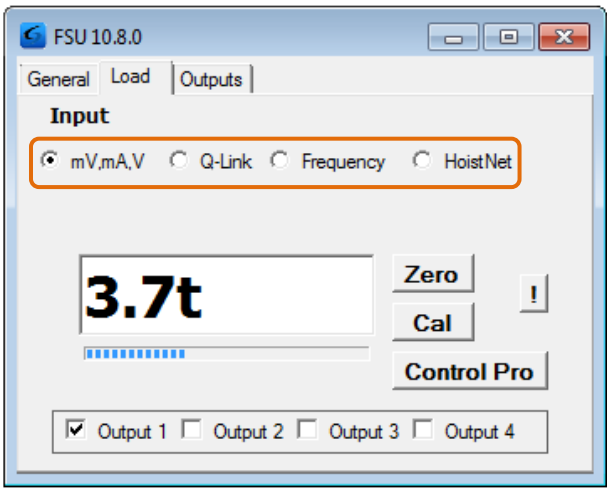
Unless your TrafficLite device has been preconfigured (only available with Q-Link inputs) or you are receiving the load signal from another HoistNet device, then you will need to calibrate the TrafficLite. This will require test weights unless you are connecting the device to a Konecranes ControlPro or an ABUS LIS via Q-Link.

Click on the Load tab to bring up the load settings screen.



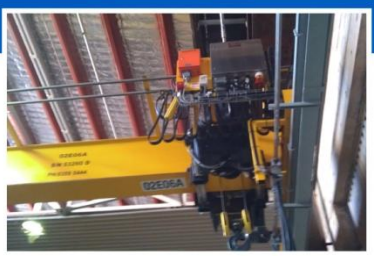
4.5.1 Setting the Input Type

Make sure that the Input is set to the type of TrafficLite input. By default, the <mV,mA,V> input will be selected. This is applicable for TrafficLite devices that have a strain gauge, 4-20mA and 0-10V DC input.



If you have a TrafficLite device that uses a HoistNet, Q-Link or Frequency input check that the corresponding input is selected.

If you intend to use the TrafficLite with a Konecranes ControlPRO make sure that you have selected the <mV,mA,V> input.



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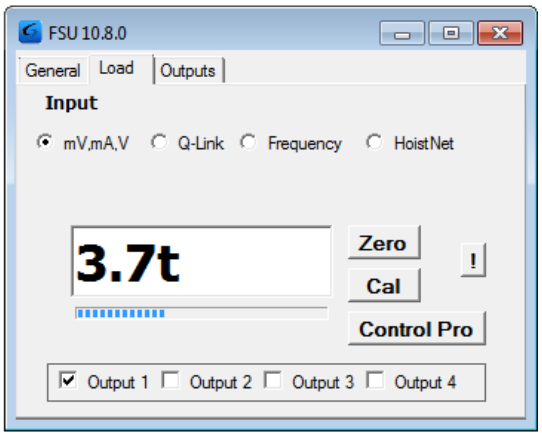
4.5.2 Using/Removing a HoistNet Input

TrafficLite devices are now compatible with CASWA HoistNet. This means that they can obtain their load signal wirelessly from any other HoistNet enabled device, eliminating the need for long cable runs between the load cell and TrafficLite.

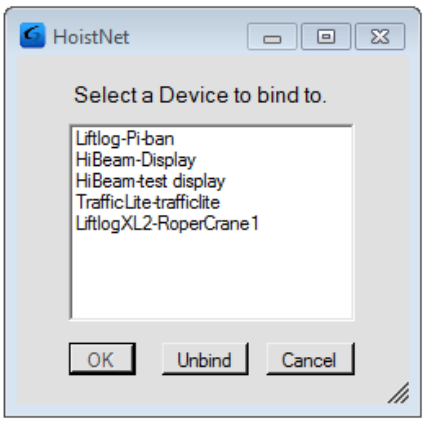
NB: HoistNet was first enabled in FSU version 10.7. If you do not see a HoistNet input option, then you are running an old FSU version. Download and reinstall the lastest version of CASWA FSU. You may also need to update the firmware on your TrafficLite.

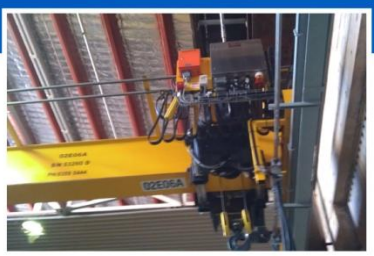
To receive a load signal via HoistNet, select the HoistNet input and then press the <Bind> button:



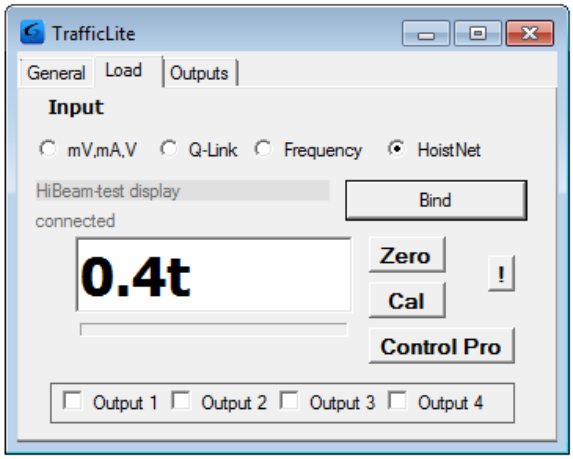
A box will appear asking you which HoistNet enabled device you wat to connect to:

Select the device that has the load signal to be used and press <OK>. The popup box will close.





The name of the bound HoistNet device will be shown on the Main/Aux screen. The connection status will also be shown:

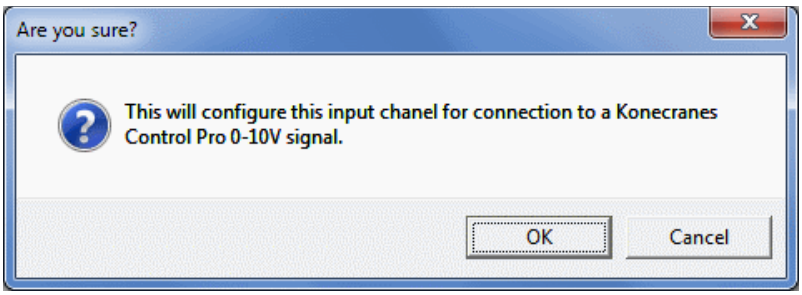


NB: You will need to ensure that the originating HoistNet device's load signal has been calibrated correctly.

To unbind a TrafficLite from a HoistNet device, or to change the bound device, press the <Bind> button on the Load screen and then select <Unbind> on the popup box.

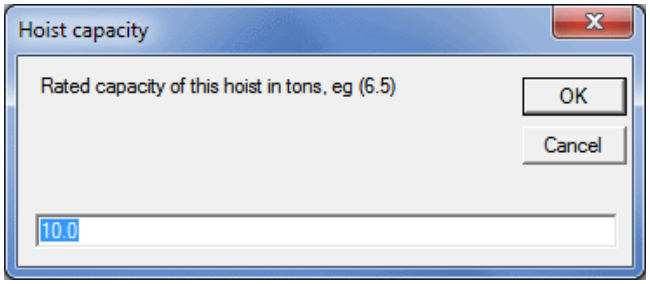
4.5.3 Using the TrafficLite with a ControlPro

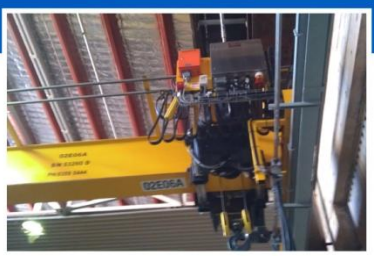
If your TrafficLite device is connected to a Konecranes ControlPro and you want to use the calibration settings stored on the ControlPro (rather than calibrating with test weights) press the <Control Pro> button. A dialog box will appear asking you to confirm this action:



Press <OK> to confirm.

Another dialog box will appear.



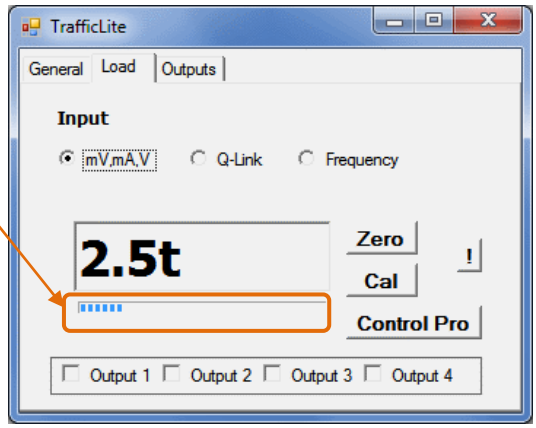


Enter the capacity of the hoist in tonnes and press <OK>. Your device is now calibrated and you will now not need to zero or calibrate this hoist in order to use this TrafficLite.

NB: You need to have selected the <mV,mA,V> input type.

4.5.4 Checking the Gain

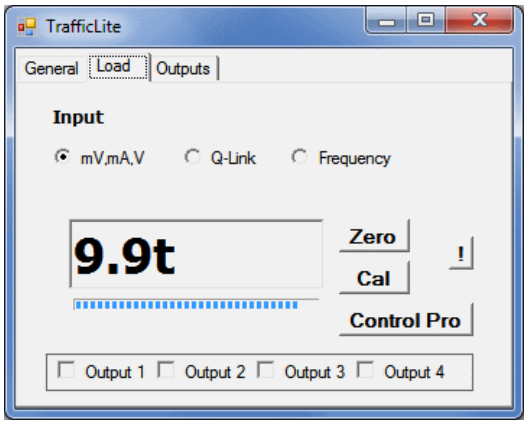
When load is sensed by mV, mA, or V, it is important that the input signal is not too small or too large. A bar underneath the load display indicates the signal strength.



It is important that the highlighted section of the bar moves to the right as load is increased and moves to the left as load is decreased.

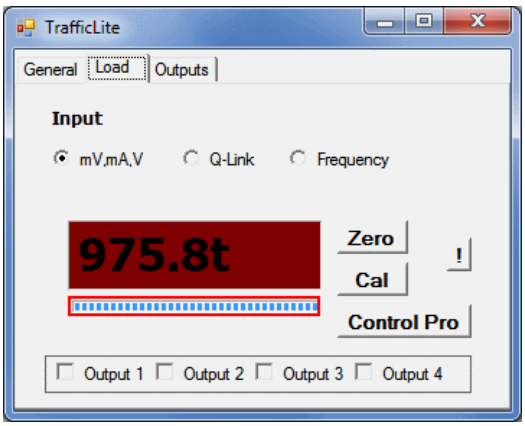
If the bar does not change at all, check your wiring from the load cell.

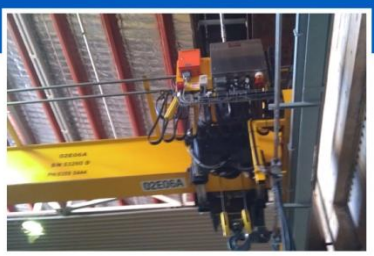
A small change in the bar across a wide range of loads (e.g. zero to full load) indicates that the load signal requires more gain.



Conversely, if the bar moves past the end of the scale then you have too much gain. The signal from the load cell is being clipped and load readings will be incorrect. The red box around the bar alerts you to this clipping.

If this occurs, you need to reduce the gain in the TrafficLite. See section 4.3 for instructions on changing the gain. (NB: You will need to recalibrate the device after changing the gain.)



4.5.5 Setting the Zero Value

If you have selected a Q-Link option or pressed the Control Pro button, you can skip this step.

Otherwise, with no load on the hook (or the crane load display reading 0.00t), click on the <Zero> button.

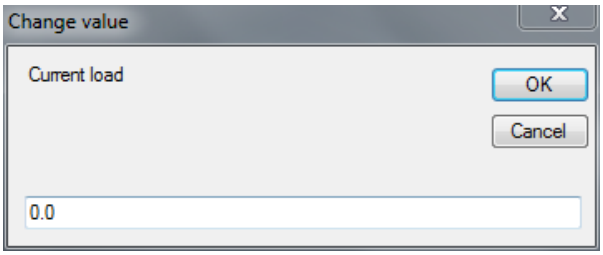
Within a few seconds the display will change to 0.0t:

4.5.6 Calibrating the Input Signal

If you have selected a Q-Link option or pressed the Control Pro button, you can skip this step.

Otherwise, lift a load (minimum 80% of rated capacity) and click the <Cal> button.

Enter the mass shown on the load display when prompted and press <OK>.



Tap the <OK> button and the main screen will now display the load on the hook.

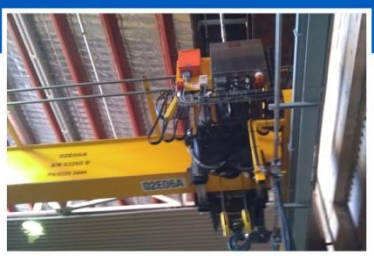
NB: An overload will probably be shown (box becomes red) as the maximum load has not yet been set.

4.6 Erasing the Calibration

Under some circumstances, it may be necessary to erase the calibration of a hoist.

Warning: IF YOU ERASE THE CALIBRATION THEN YOU WILL NEED A TEST WEIGHT TO SET IT AGAIN (unless you are connected to an LIS via Q-Link or ControlPro)!

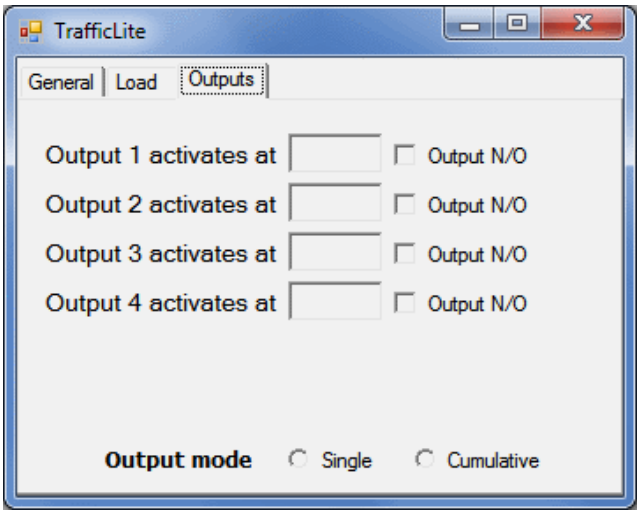
To reset the calibration for a hoist, tap the <!> button.

4.7 Setting the Outputs

TrafficLite can operate four set point relays. After calibrating the device, the operating loads for each relay must be set.

Press the <Outputs> tab to bring up the following screen:



4.7.1 Setting the Output Level

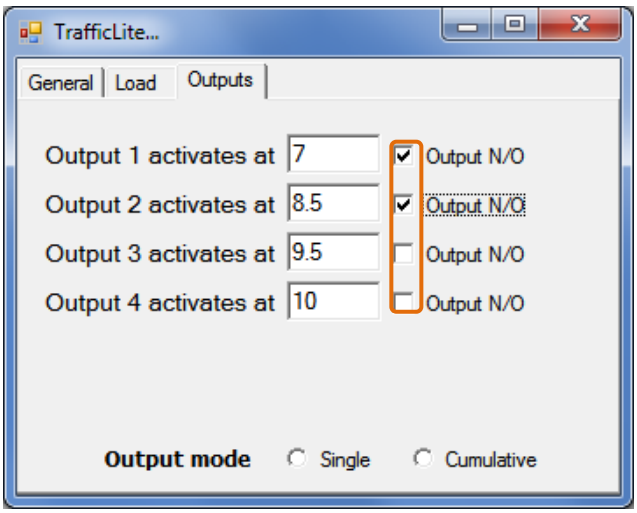
Enter the load in tonnes (or fractions of a tonne) at which you want to activate the output relay.

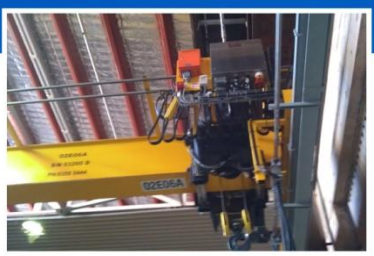
You should ensure that each output set point is greater than the preceding output (e.g. Output 4 > Output 3 > Output 2 > Output 1), otherwise unexpected behaviour may result.

4.7.2 Setting the Type of Output Contact

The default behaviour of the TrafficLite is for contacts to be normally closed. Contacts will be activated to open when the set load is reached.

If you wish to reverse the type of contact (i.e. normally open) press the check box next to the appropriate output.



4.7.3 Setting the Output Behaviour Mode

TrafficLite outputs can be configured to operate in one of two ways: (a) single mode or (b) cumulative mode.

Select the <Single> option if you only want one output active at any time. In this configuration, once a higher output is activated the preceding output will be deactivated. This is the recommended option when using TrafficLite to drive three or four indicator lights.

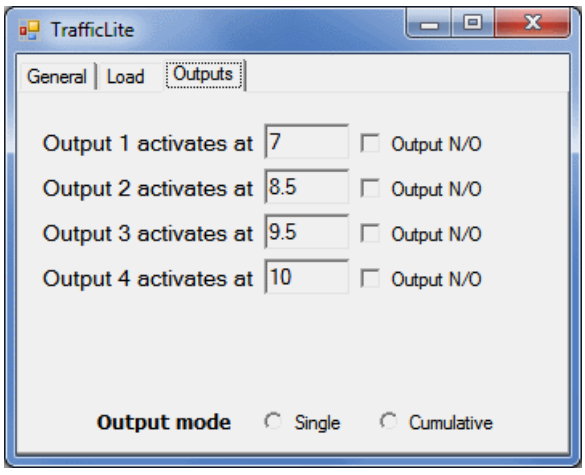
Select the <Cumulative> option if you want each output to stay activated until the load reduces below its set point, irrespective of whether any other outputs are activated. This is the recommended option when using TrafficLite to drop out fast then slow speed when lifting.

4.8 Checking the Outputs

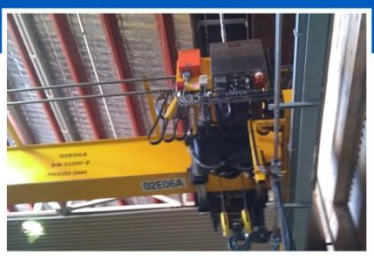
It is possible confirm the correct wiring of the unit and check that outputs are behaving as expected by checking the values at which outputs are activated.

4.8.1 Using the Output Screen

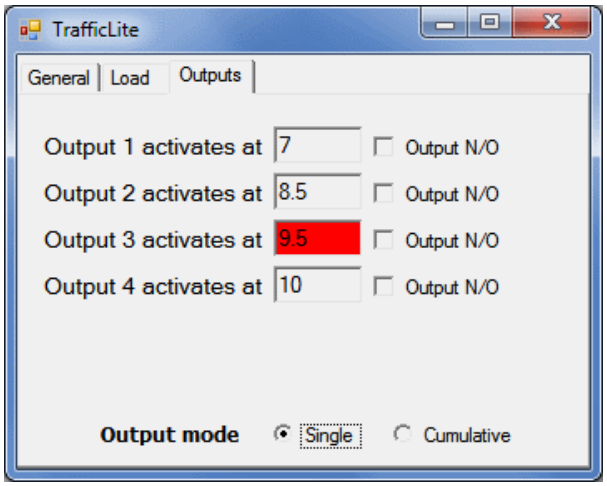
To verify that the outputs are behaving as desired, stay on (or return to) the <Outputs> screen:



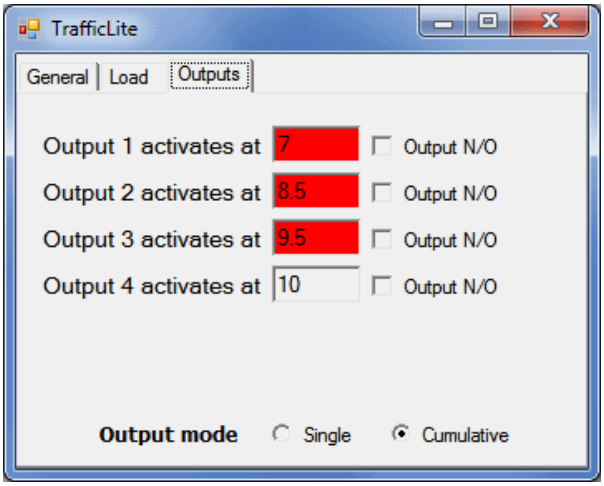
After calibrating the TrafficLite device, increase the load on the crane. If the output is activated then its load box will turn red as shown.

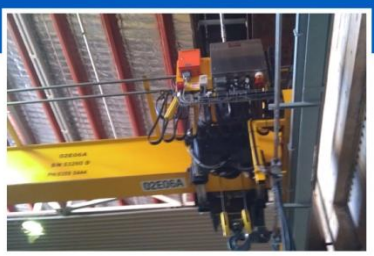


In single mode (for a load of 9.9t):



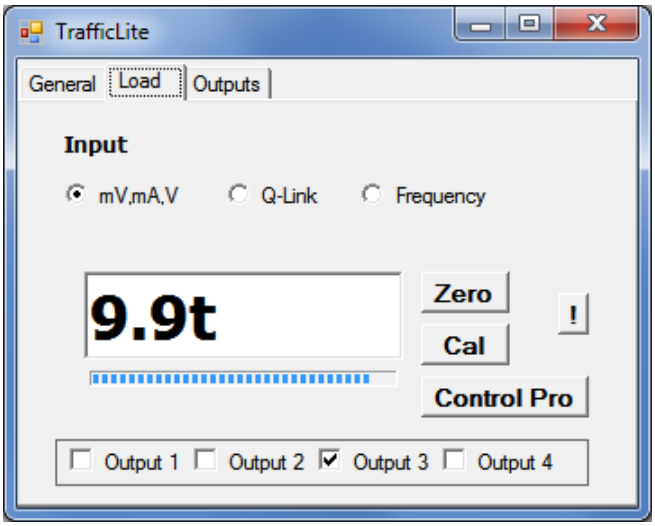
Or in cumulative mode (for a load of 9.9t):





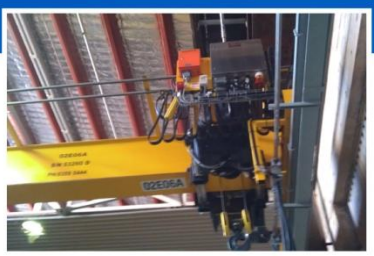
4.8.2 Using the Load Screen

Alternatively, to verify that the outputs are behaving as desired whilst viewing the load, go to the <Inputs> screen:



The boxes at the bottom of the screen show the status of each of the TrafficLite output signals.

When a signal is detected, the respective box will be checked. If single mode was chosen when configuring the outputs, only one box should be checked at a time.



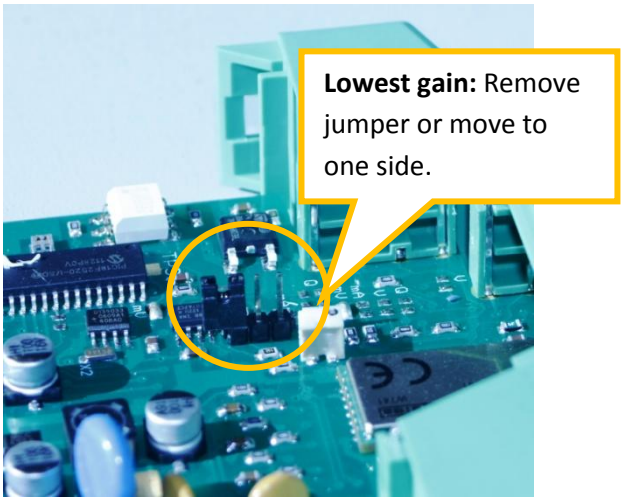
4.9 Changing the Gain

When using a strain gauge load cell, TrafficLite can be configured to one of 3 gain settings by moving an internal jumper.

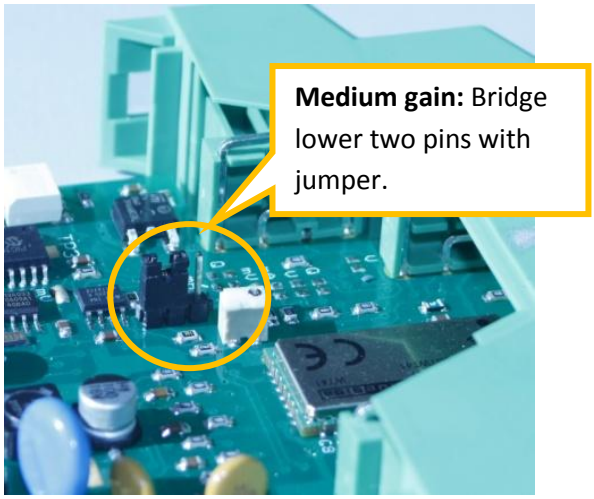
To change the gain, remove the internal board from the case. To do this, gently press the tabs on each side of the TrafficLite and separate the end with the terminals from the main body. (The board will be attached to the terminals.) If you have already wired in the TrafficLite, remove the four terminal blocks first.

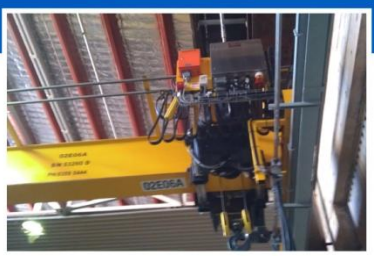
Place the jumper into one of the following 3 positions.

(A) Position 1 – No jumper or jumper off to one side. In this position, gain is set to the lowest setting, suitable for a 3mV/V load cell at full span.

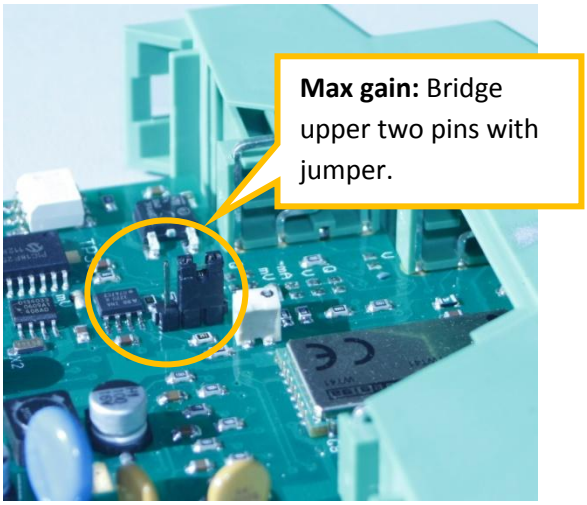


(B) Position 2 – Jumper bridges lower two terminals. In this position, gain is set to the medium setting, suitable for a 2mV/V load cell at full span.



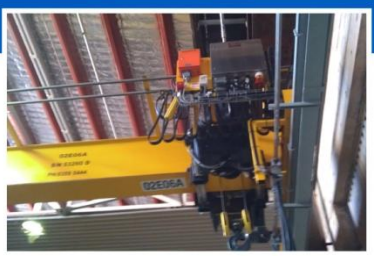


(C) Position 3 – Jumper bridges upper two terminals. In this position, gain is set to the maximum setting, suitable for a 1mV/V load cell at full span.



Reinsert the board into the case. If you removed the terminals, replace these too. See section 3.1 for their correct positions.

You will need to recalibrate the TrafficLite device after changing the gain.

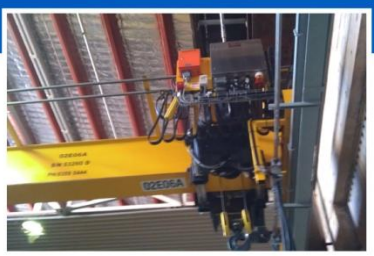


5 ROUTINE MAINTENANCE

There is no routine maintenance for this device.

6 TROUBLESHOOTING

Fault	Cause	Fix
No LED on front	Power supply wiring incorrect	Double check that 0V and control voltage are wired to the correct pins.
Load display indicates a fault	TrafficLite is affecting load pin voltages	Check power to the device. Disconnect pins 10 and 11 to verify that the TrafficLite device is causing the fault. Check that the LED on the TrafficLite is illuminated. Check that the voltage from pins 11 and 12 is <3.3V If these voltages are out, check the connection between TrafficLite Gnd and load pin Gnd.
Unable to connect to TrafficLite from FSU	TrafficLite or FSU are busy	Restart your computer. Power cycle the crane.

APPENDIX A: COMMUNICATION PROTOCOL

The host sends single character commands to the device to write or query parameters.

Each command must be followed by a carriage return <CR>(ASCII 13).

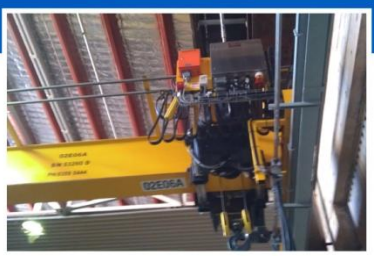
Where the command is a query command, no arguments are sent and the device will respond with a single line (except for the “u” and “E” commands) the requested value in ASCI text followed by a <CR>.
Where the command is a set command, an argument may be included between the command and the <CR> .

Where numbers are sent or received, they are sent as clear text; eg “1234”

Where a number represents a load (eg the “o” and “O” commands, and the logged data returned by the “u” command), it is expressed in 100Kg units. Eg 3.5mt would be sent and received as 35.

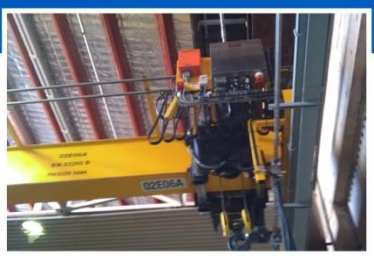
Where a number represents an elapsed time (eg in the logged data returned by the “u” command) it is expressed in 0.1second units. Eg. 35.4 seconds would be sent as 354.

Where dates-time values are sent or received, they are sent in the format dd/mm/yy hh:mm . Hours are in 24 hour clock format. Leading zeros must be used. Eg 3/8/07 13:30 is an invalid datetime and should be sent as 03/08/07 13:30



Communication commands:

Command	R/W	Description	Example
v	Read	Query the firmware version number.	Send:v<CR> Rcv:1.02b<CR>
?	Read	Display a summary of all settings	
h	Read	Query the input mode: 0=Analog 1=Q-Link 2=Frequency	Send:h<CR> Rcv:2<CR>
H	Write	Set the input mode	Send:H0<CR>
r	Read	Query the raw loadpin reading. The lifted load may be computed from this value as (Raw-Zero)/Cal. See the "C" command.	Send:r<CR> Rcv: 354<CR>
i	Read	Query the device ID.	Send: i<CR> Rcv: crane34<CR>
I	Write	Set the device ID. Device ID's are limited to 18 characters	Send: Icrane45<CR>
z	Read	Query the zero parameter The zero value is used to calculate the actual load. See the "C", and "r" commands/	Send: z<CR> Rcv: 34<CR>
Z	Write	Set the zero parameter.	Send: Z23<CR>
c	Read	Query the cal parameter. The cal parameter is used to calculate the actual load. See the "C" and "r" commands	Send: c<CR> Rcv: 11<CR>
C	Write	Set the cal parameter. In normal operation, the cal parameter would be set as follows: • Send the "r" command to get the raw reading from the load pin in it's unloaded state. • Send the "Z" command to set the zero parameter • Apply a known load to the pin. • Send the "r" command to get the raw reading from the load pin. • Sent the "C" command to set the calibration value to (Rawunloaded-zero)*Known_Load (in 100Kg units)	Send: C9<CR>
on	Read	Query the overload (setpoint) parameter. This parameter is stored in 100Kg units, eg 3.5mt is expressed as 35. It is used by the device to determine when an overload occurs.	Send: o1<CR> Rcv: 35<CR>
On	Write	Set the overload parameter.	Send: O140<CR>
wn	Read	Query the inverted status of a setpoint output. A return value of 1 means the output is normally open.	Send: w2<CR> Rcv: 1<CR>
Wn	Write	Set the inverted status of a setpoint output.	Send: W20<CR>
*	Write	Reboot the device. This command is usually only used to load new firmware onto the device	Send: *<CR>



APPENDIX B: FSU SYSTEM REQUIREMENTS

The minimum requirements for operating CASWA's Field Service Utility (FSU) and Link-2 Bluetooth modem are:

- Laptop computer running Windows XP SP3 or later;
- One Spare USB port;
- Microsoft .NET framework 3.5.