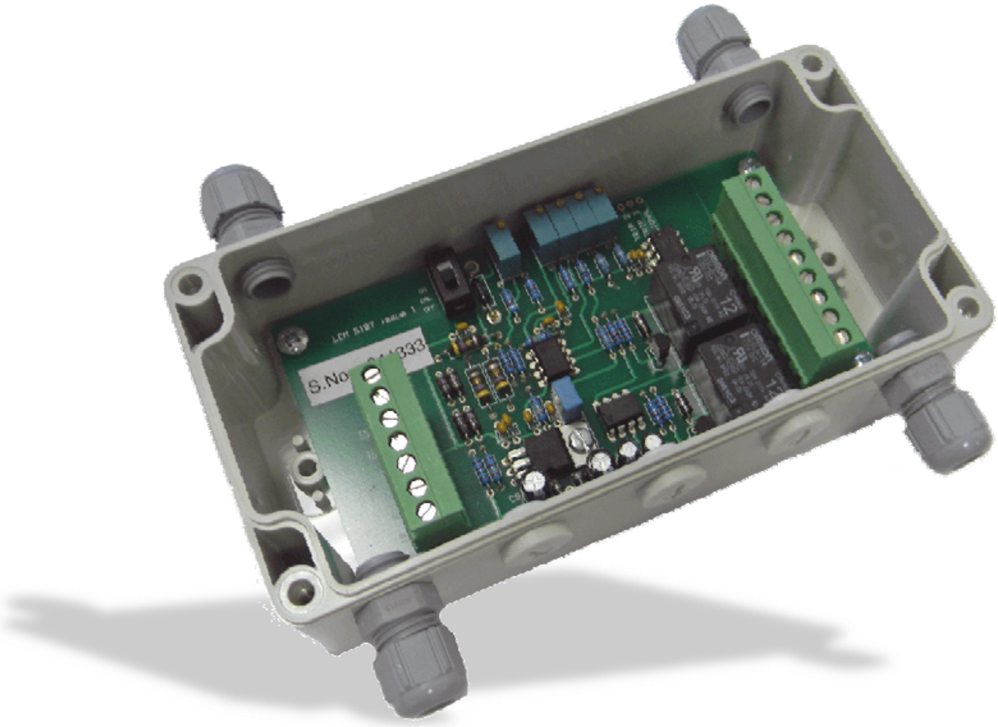
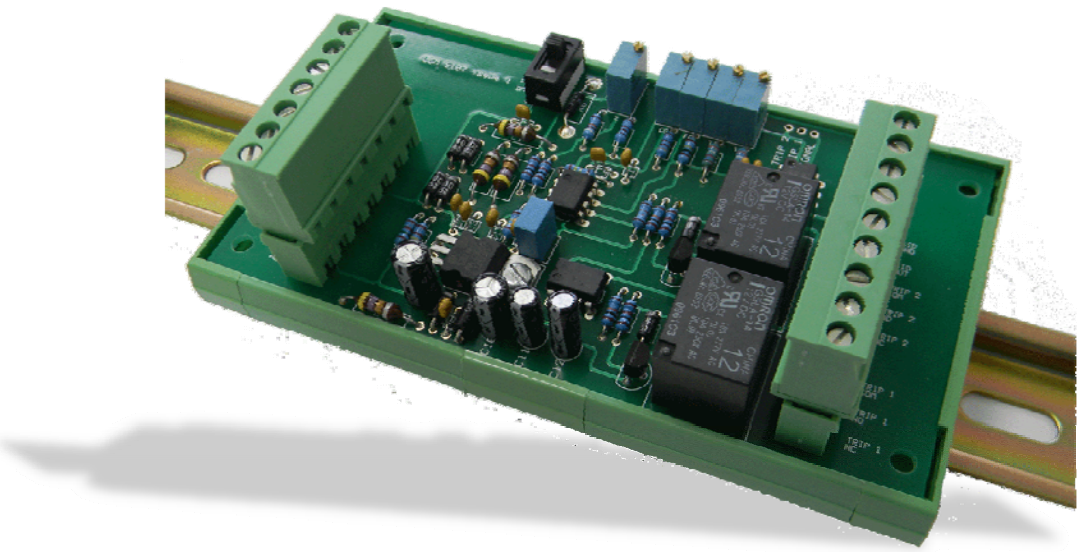
Instruction Manual





Model LCTA
Load Cell Trip/Relay Output Module

Version; *1.0*
Release Date: *11/9/2012*

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Introduction & Overview

The LCTA has been developed to provide relay/trip outputs from a conventional bridge type load cell or other strain gauge based sensor.

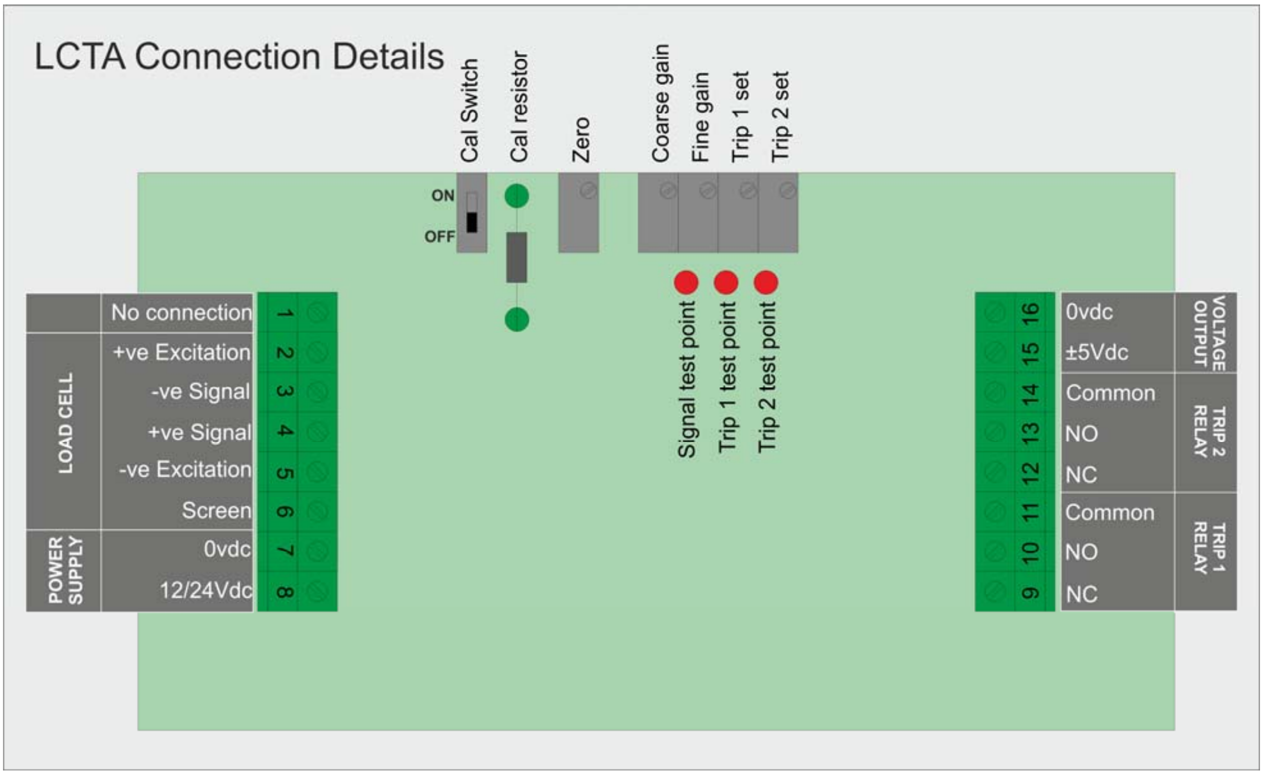
There are two trip/relay outputs available, as well as a voltage output. For further details on their capabilities, please refer to the specification at the back of this manual.

The principle of operation is that the relay trip levels are set, referenced to the output voltage across pins 15 and 16 on the amplifier (referred to as the voltage output). Once the voltage output has been scaled, the trip levels can be set, by measuring the voltage at the two test points.

The voltage output can either be scaled by applying known loads, or by using the calibration switch. The latter is the simplest option; which can be used in conjunction with any load cells supplied with a shunt calibration output value.

To be able to scale and configure the amplifier, you will need a screwdriver to adjust the potentiometers and a DVM or multimeter to monitor the output from the amplifier, whilst adjustments are made.

Connection & Wiring Details



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Scaling the voltage output, by applying a known load

With the load cell connected and unloaded, switch on the voltage supply to the amplifier. For best results, allow 15 minutes for the amplifier to stabilise. Once stabilised follow the steps below:-

(1) Connect your DVM, positive lead to **SIGNAL TEST POINT**, and the negative lead to the 0vdc field terminal (terminal 16).

(2) Adjust the **ZERO (Z)** potentiometer until your DVM shows 0.00V.

(3) Apply your known load

(4) Calculate the required voltage output signal generated with your known load applied, by using the equation below;

$$Voltage\ Output = 5 \times \left(\frac{Applied\ Known\ Loadure}{Load\ Cell\ Rated\ Capacity}\right)$$

Example
You have a load cell rated at 50te and with your applied known load of 20te

$$Voltage\ Output = 5 \times \left(\frac{20}{50}\right)$$

$$Voltage\ Output = 5 \times (0.4)$$

$$\underline{\boldsymbol{Voltage\ Output = 2.00V}}$$

(5) Based on the example provided above, Adjust the **COARSE GAIN** and the **FINE GAIN** potentiometers until your DVM shows 2.00V.

(6) The amplifier will now be scaled to give you a 0-5V output from zero to the full rated load of your load cell.

The **CAL** injects a dummy signal to the LCTA, which simulates a load being applied to the load cell. This can be used at any point in the future to ensure correct operation of the system.

Scaling the voltage output, using the shunt calibration switch

With the load cell connected and unloaded, switch on the voltage supply to the amplifier. For best results, allow 15 minutes for the amplifier to stabilise. Once stabilised follow the steps below:-

(1) Connect your DVM, positive lead to **SIGNAL TEST POINT**, and the negative lead to the 0vdc field terminal (terminal 16).

(2) Adjust the **ZERO (Z)** potentiometer until your DVM shows 0.00V.

(3) Slide the **CAL** switch **ON** (toward the edge of the board). You should allow 2-3 seconds to allow the output to stabilise, due to internal electronic damping.

(4) Calculate the required voltage output signal generated by switching the 100kohm calibration resistor, by using the equation below;

$$Voltage\ Output = 5 \times \left(\frac{Calibration\ Figure}{Load\ Cell\ Rated\ Capacity}\right)$$

Example
You have a load cell rated at 50te and the calibration certificate shows the equivalent output for the cal figure to be 40.5te.

$$Voltage\ Output = 5 \times \left(\frac{40.5}{50}\right)$$

$$Voltage\ Output = 5 \times (0.81)$$

$$\underline{\boldsymbol{Voltage\ Output = 4.05V}}$$

(5) Based on the example provided above, Adjust the **COARSE GAIN** and the **FINE GAIN** potentiometers until your DVM shows 4.05V.

(6) The amplifier will now be scaled to give you a 0-5V output from zero to the full rated load of your load cell.

(7) Switch off the **CAL** (toward centre of the board) and recheck the zero. Repeat the above steps until you are satisfied with the scaling accuracy.

The **CAL** injects a dummy signal to the LCTA, which simulates a load being applied to the load cell. This can be used at any point in the future to ensure correct operation of the system.

Adjusting the Trip point values

The trip outputs consist of two independently adjustable changeover relays with volts-free contacts. Each relay remains de-energised, with its **COM** terminal connected to its **NC** pin, until the signal level exceeds the respective trip level. At this point, the relay energises and the **COM** terminal is instead connected to the **NO** pin.

(1) Connect your DVM, positive lead to **TRIP 1 TEST POINT**, and the negative lead to the 0vdc field terminal (terminal 16).

(2) Calculate the required trip 1 test point reference voltage required for trip 1, by using the equation below:-

$$Trip\ 1\ Test\ Point\ Voltage = 5 \times \left(\frac{Trip\ 1\ load\ value}{Load\ Cell\ Rated\ Capacity}\right)$$

Example
You have a load cell rated at 50te and you want Trip 1 to activate at a trip load value of 45te

$$Trip\ 1\ Test\ Point\ Voltage = 5 \times \left(\frac{45}{50}\right)$$

$$Trip\ 1\ Test\ Point\ Voltag = 5 \times (0.90)$$

$$\boldsymbol{Trip\ 1\ Test\ Point\ Voltage = 4.50V}$$

(3) Based on the example provided above, adjust the **TRIP 1 SET** potentiometer until your DVM reads 4.50V

(4) You have now set TRIP 1 correctly. Repeat the same procedure for Trip 2, with you DVM positive lead connected to **TRIP 2 TEST POINT**, adjusting **TRIP 2 SET**.

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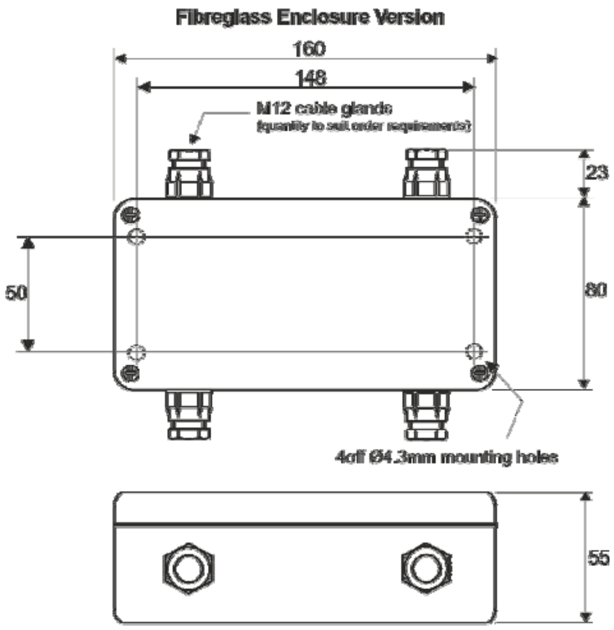
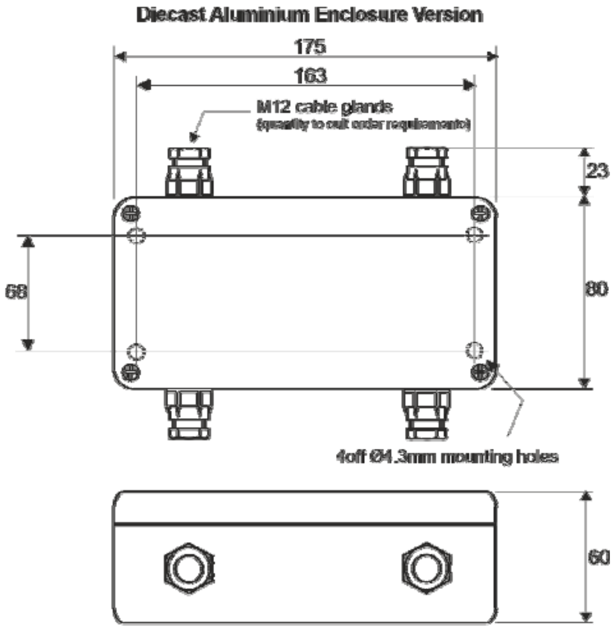
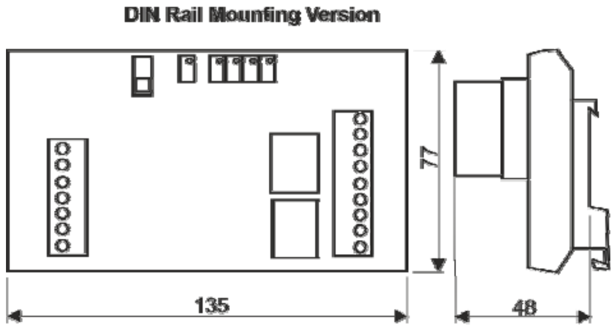
Mechanical Mounting Details







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Product Specifications

Electrical/Performance

Power Supply:	11.5vdc to 24vdc (48vac external DIN Rail mounting power supply also available)
Power Supply Current:	80mA max. with one 350ohm load cell connected, with both trips active 160mA max for four 350ohm load cell connected, with both trips active
Output:	Dual volt free SPCO trip relays 0-5vdc analogue output
Trip Adjustment Range:	0% to 125% FR
Trip Switching Current:	10A at 230vac 10A at 24vdc
Trip Hysteresis:	<1%FR
Load Cell Excitation Voltage:	9vdc typically
Load Cell Bridge Resistance:	85ohms minimum
Load Cell Sensitivity:	0.4 to 4mV/V (to provide 0-5vdc output)
Gain Adjustment:	Coarse Potentiometer -99% FR Fine Potentiometer ±4% FR
Offset Adjustment:	±23% FR
Minimum 0-5v Load Resistance:	600ohms
Bandwidth:	3.5HZ
Zero Temperature Coefficient:	<±0.01 %/°C with 1.5mV/V input
Span Temperature Coefficient:	<±0.01 %/°C with 1.5mV/V input
Linearity:	<±0.005 %FR

Environmental

Operating Temperature:	-20 to +50°C
Storage Temperature:	-40 to +70°C
Humidity:	95% RH max.
Environmental Sealing:	See case options below

Mechanical

Electrical Connections:	Field Screw Terminals – 2.5mm rising clamp
Cable Access:	Via M12 cable glands
Case Options:	IP66 fibreglass enclosure (standard) IP66 Painted Diecast Aluminium IP40 Din Rail Mounting Open Frame

Controls

Gain Adjustment:	Coarse Gain - 25 turn potentiometer Fine Gain - 25 turn potentiometer
Offset/Zero Adjustment:	Zero Offset - 25 turn potentiometer
Trip Point Adjustment:	Trip 1 - 25 turn potentiometer Trip 2 - 25 turn potentiometer
Shunt Calibration:	Single switch, switching 100kohm 15ppm resistor

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