



LCI

Load Cell Junction Box with Fault Monitor

User Manual
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The LCI Load Cell Failure Alarm Manual

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Chapter 1 Introduction to the LCI

Mantracourt Electronics, have introduced the low cost Load Cell Failure Alarm, to provide connection between 1 and 4 load cells to a weighing system, creating a means of constantly monitoring the condition of individual load cells. Continuous diagnosis of fault conditions prevents the incorrect weighing of product and the subsequent technical and commercial problems resulting from such situations.

The benefits of the junction box are that any load cell malfunction is immediately reported by an alarm condition, avoiding incorrect material levels so that there is the continued assurance of correct product quantities.

The avoidance of batch wastage or product recall, reduction in plant downtime and increased safety, together with aids for installation and commissioning; all contribute to the LCI becoming an essential element for all weighing systems.

An on board microprocessor provides for a high level of intelligence, the LCI is therefore able to offer a useful range of features: -

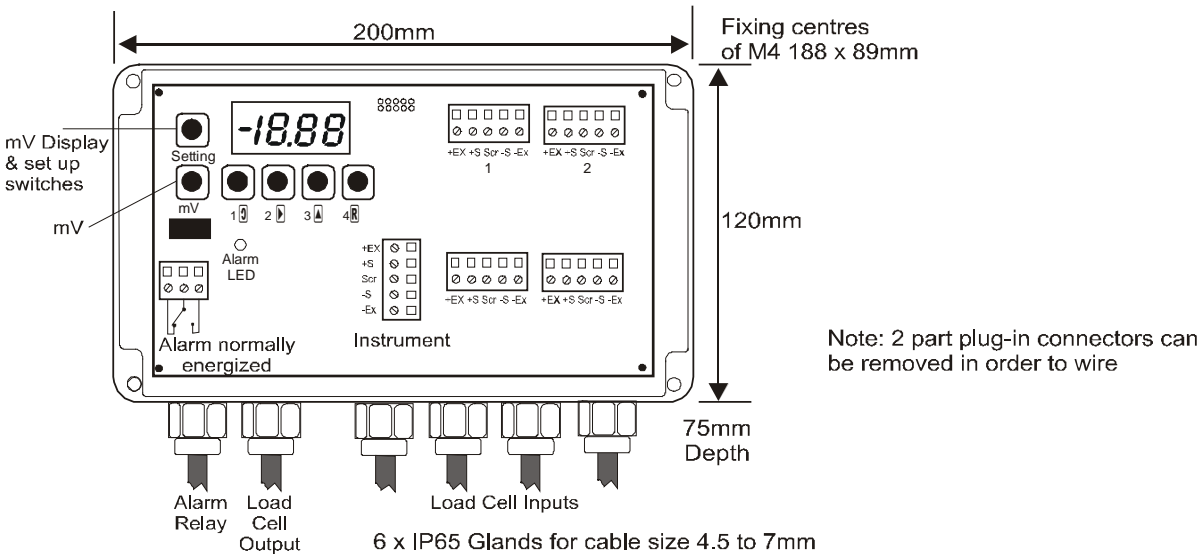
1. Load detection; An alarm contact will change state, the Red Alarm LED will indicate and the display will show the load cell in error and the error code.
An error is detected in any of the following occur:
 - One or more of the load cells are out of balance with the pre-set error band.
 - Any load cell is operating outside its pre-set range
 - The load cell excitation voltage drops
 - Any of the load cells become open or short circuit
2. A display of the mV/V value of each load cell, or the average of the summated mV/V value of all the load cells.

Chapter 2 Installing the LCI

The LCI is provided as single PCB unit, prepared with 4 fixing centres to accommodate M4 screws. Case options are IP65 ABS (as standard), Stainless steel, or DIN rail mounting.
Installation of the LCI is simplified by the provision of separate, 2 part plug-in connectors for each of the load cell cables, the indication I/O and alarm relay.

Connection details are shown in the diagrams below:-

Figure 2.1 LCI Connection Details



Important Note:
If connecting less than 4 load cells to the LCI start at connector block 1, then 2, 3 and through to 4.

Table 2.1 LCI Connections to LCB & ADW15 Details

LCI	LCB	ADW15
+EX	+E & +S	5 & 6
+S	+IN	4
Scr	SCR	1
-S	-IN	3
-Ex	-E & -S	1 & 2

Chapter 3 Setting up the LCI





The LCI features a 4 digit Red LED display, where all the various conditions are displayed and 4 programming keys.

On 'Power Up', the display will show either 'good' or display an Error e.g. '1Er5'
Which refers in this example, to Load Cell No.1 with error No.5

Sequence of Operations

Programmer Keys

Table 3.1

- | | | |
|---|---|---|
|  | 1 | Used to scroll through and change the set up data by displaying mnemonics for each configurable parameter, followed by the appropriate data and stores data into non-volatile memory. |
|  | 2 | Selects the display digit required. Selection value is indicated by a flashing digit. |
|  | 3 | Increments each selected display digit 0-9, or -9 to 9 for the most significant digit if sign allowed. |
|  | 4 | Resets the display to either the 'good' or an error display, saving the current value into the non-volatile memory. |

If during the programming sequence, selection is not completed, the display will revert to the status message after 2 minutes.

Password Protection

A 4 digit password number must be entered. The number is accessed when 'PASS' is displayed. At this point, it is necessary to enter the factory set number (1111).

Configurable Parameters

Table 3.2

Code	Range	Function
P R S S	1111	Security password
n o	1 to 4	Number of load cells
L o	± 50.00	Load cell operating range Minimum (see 1)
H i	± 50.00	Load Cell operating range Maximum (see 2)
b R L	0 to 50.00	Permissible Error band between load cells (see 3)
R L	0 to 25.0	Time before Alarm trip, set in seconds (see 4)

1. This is the lowest operating level (in mV) of any load cell connected. The alarm will activate if any load cell falls below this value.
2. This is the highest operating level (in mV) of any load cell connected. The alarm will activate if any load cell exceeds this value.
3. This is the permissible difference (in mV) between any 2 load cells. The alarm will activate if this value is exceeded.
4. This is the time (in seconds) an error must be present before the error alarm is displayed and output via the relay.

The Error Displays on the LCI

Note:

On Power Up the display will show either 'good' or ('Er'). Listed below is the range of errors, which could occur, due to fault conditions on the weighing system load cells and associated wiring.

Display digits 1 shows which load cell is in error. Digits 2 and 3 show an error by displaying 'Er'. Display digit 4 displays any of 5 fault conditions as follows:-

Er 1 Error Condition 1

An open or short circuit on the load cell or connectors
(Check wiring and power supply)

Er 2 Error Condition 2

The load cell input is open circuit or exceeded $\pm 50\text{mV}$
(Check wiring and power supply)

Er 3 Error Condition 3

Operating outside the pre-set maximum and minimum range (**Lo r** & **Hi r**)
(Check wiring, cell mounting, Max /Min operating ranges)

Er 4 Error Condition 4

The load cell balance has exceeded the pre-set balance band (**bAL**)
(Check wiring, cell mounting, Error band values)

Er 5 Error Condition 5

Open circuit of the excitation on the load cell or connectors.
(Check wiring)

Notes:

1. An open or short circuit may cause multiple errors. The display will cycle through multiple errors, displaying each code for 1 second.
2. To locate faults, start with the load cell, which displays the most errors.
3. The 'SETTINGS' button to automatically step through the parameters and their values. During this function all other keys are disabled.
4. A healthy unit will show red LED 'OFF', fault condition 'ON'

The Millivolt Display readings on the LCI

To view the average of all of the load cell signals, press the 'mV' button.

To view the individual load cell signals, hold down the 'mV' button, and at the same time press the buttons, 1 to 4 to select each load cell required.

Chapter 4 The Specifications and Parameters of the LCI

Specifications

<i>Faults Monitored</i>	Load Cell out of preset balance range Load Cell out of pre-set operating range Low/high excitation Open circuit to any load cell on each connection Short circuit on any load cell connection Internal load cell fault (Bridge Imbalance)
<i>Powering Indication</i> <i>Setting Method</i>	By Load Cell Excitation typically 10v DC 1 x 4 digit 7 segment LED display for set up, load cell in error type & individual total mV outputs 6 buttons for reading & set up
<i>Connections</i>	2 part terminals, up to 2.5mm ² cable 4 x 5 way, for load cell connection 1 x 5 way, load cell output 1 x 3 way, alarm relay contacts
<i>Dimensions</i> <i>Environmental</i> <i>Enclosure Material</i>	200 x 120 x 75mm. (PCB dimensions 170 x 100mm excluding mounting material) Sealed to IP65 with cable glands & blanking plugs fitted CE Compliance. Grey ABS

Parameters	Min	Typical	Max	Units
Power supply volts from excitation supply	8.2	10	12	Vdc
Power supply current from excitation supply 1		43	52	mA
Bridge excitation 350R load cell	8	10	12	V
Bridge resistance (typically 350-700R) each	300	350	1000	ohms
Bridge sensitivity	1.0	2.0	5.0	mV/V
Bridge No selectable	1		4	Bridges
Output load	1M		100G	ohms
Bandwidth of Junction Box		100		Hz
Zero temperature co-efficient of Junction Box @ 2mV/V	-0.0005	0	0.0005	%V/°C
Span temperature co-efficient of Junction Box	-0.0005	0	0.0005	%/°C
Linearity of Junction Box	-0.0015	0	0.0015	%FSD
90 day Stability of Junction Box	-0.001	0	0.001	%
90 day Stability of Junction Box	-0.001	0	0.001	% FSD
Operating temperature range	-40		85	°C
Storage temperature range	-40		95	°C
Humidity		95		%
Scan Speed for alarm output (4 cells)		40	100	mS
Display, Range	-50.00		+50.00	mV
Relay contacts SPCO normally energized			500	mA
Relay contacts SPCO normally energized			50	V
Alarm operating speed for less than 1mV change		100		mS
mV measurement accuracy individual cell	-15		+15	%
mV accuracy average reading	-2		+2	%

CE Approvals

European EMC Directive 2004/108/EC
BS EN 61326-1:2006
BS EN 61326-2-3:2006

Wiring Conditions

Load Cell and indication (instrument) cable connections should use individually screened twisted multipair cables (e.g. FE585 - 646)

Terminate all screens at SCR. SCR should be connected to a good Earth. The earth connection should be of sufficient cross sectional area to ensure a low impedance to attenuate RF interference.

WARRANTY

All LCI products from Mantracourt Electronics Ltd., ('Mantracourt') are warranted against defective material and workmanship for a period of (3) three years from the date of dispatch.

If the 'Mantracourt' product you purchase appears to have a defect in material or workmanship or fails during normal use within the period, please contact your Distributor, who will assist you in resolving the problem. If it is necessary to return the product to 'Mantracourt' please include a note stating name, company, address, phone number and a detailed description of the problem. Also, please indicate if it is a warranty repair.

The sender is responsible for shipping charges, freight insurance and proper packaging to prevent breakage in transit.

'Mantracourt' warranty does not apply to defects resulting from action of the buyer such as mishandling, improper interfacing, operation outside of design limits, improper repair or unauthorised modification.

No other warranties are expressed or implied. 'Mantracourt' specifically disclaims any implied warranties of merchantability or fitness for a specific purpose. The remedies outlined above are the buyer's only remedies. 'Mantracourt' will not be liable for direct, indirect, special, incidental or consequential damages whether based on the contract, tort or other legal theory.

Any corrective maintenance required after the warranty period should be performed by 'Mantracourt' approved personnel only.

In the interests of continued product development, Mantracourt Electronics Limited reserves the right to alter product specifications without prior notice.



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