



INDILOAD

MARK 1 V2.0

manual

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Chapter 1: General

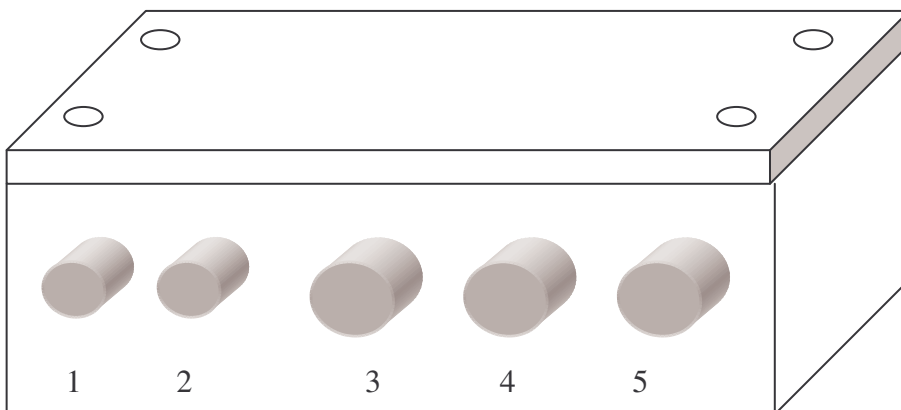
The INDILoad Mark 1 is a new generation of load limiter. Fully digital, it has the advantage of being easy to adjust. By using state-of-the-art technology, the processor of this load limiter can operate in real-time in order to differentiate between actual overload conditions and overload conditions, which are caused by dynamic force effects.

The processor also constantly monitors all of the functions of the load limiter and, in the event of the failure of a component, immediately displays an error message (see chapter 4: Error Messages).

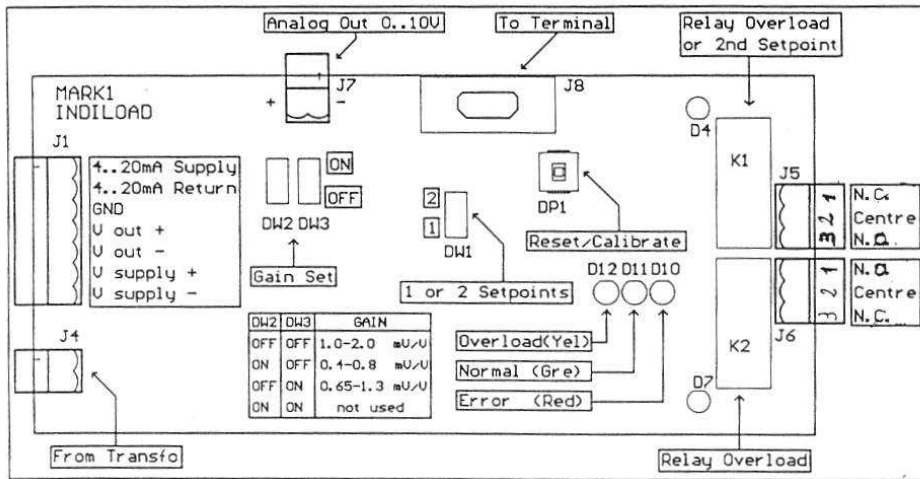
The INDILoad Mark 1 is equipped with a calibrated 0 – 10 V output which allows connection to a Display unit (like the INDIDisplay) or to command speed control systems like inverters.

Chapter 2: Connections

The following cable entries are provided with the unit:



- Entry Nr. 1 : PG7 : connection to the load cell
- Entry Nr. 2 : PG7 : 0-10 VDC connection (output)
- Entry Nr. 3 : PG13 : connection relais ↑ ↓ ↔ ↗ ↘
- Entry Nr. 4 : PG13 :connection to relais : MAX-MIN
- Entry Nr. 5 : PG13 :mains supply



The following connections must be done before operating the INDILoad Mark 1.

J7 Analog output (0-10 VDC)
(Optional)

J1 Connections loadcell

1. With 4-20 mA signal (max. cable length 100 m.)

Sup.	Supply +
4-20 mA	Signal (4-20mA)
GND	Supply -

Indiload wires
red
green
black

2. With mV output (max. cable length 6 m.)

GND	Screen	
Vo +	Positive (+) output from the load cell:	green
Vo -	Negative (-) output from the load cell:	white
Vb +	Positive (+) power supply to load cell:	red
Vb -	Negative (-) power supply to load cell:	black

Indiload wires

Chapter 3: Operation

Before operating the INDILoad Mark 1, the values must be calibrated so that the processor is able to detect an overload condition.

3.01 The INDILoad Mark 1 is a load limiter that can be used in two ways :

A: As a load limiter with one set point : OVERLOAD

This is the safest form of operation as the two relays are connected in series so that even if the contact of one relay sticking together, due to contact welding or coil failure, the overload cut-out will still operate.

PROCEDURE FOR INITIALISATION WITH ONE SETPOINT

(FOR INITIALISATION WITH TWO SETPOINTS: see 3.01.B)

- 3.01.A** Install the “**dipswitch DW1**” in position “**1**”.
In case a mV load cell is used, check the positions of the dipswitches DW2 and DW3 (see table page 4)
- 3.02.A** Connect the power supply of the INDILoad Mark 1 while pushing the push button DP1, wait till the green LED (D11) lights up (approximately 2 seconds). Release the push button immediately.
The relays K1 and K2 will be energised (LED D4 and D7 light up)
- 3.03.A** To set the **zero point**, raise the hook and any lifting tackle that you wish to include in the zero setting. If this includes slings or chains, lift them clear of the ground so that they hang freely. Allow the hook to settle so that there is no swing.
When the working height of the crane is more than 10 m., the hook must be in the heighest position.
- 3.04.A** Push the push button DP1 (+/- 0.5 sec.)
The yellow LED (D12) will light up.
- 3.05.A** Raise the SWL, by using test weights. Lift this weight clear of the ground and allow it to settle so that there is no swing.

3.06.A Push the push button DP1 (+/- 0.5 sec.)
The load limiter will restart and the three LED's green (D11), yellow (D12) and red (D10) will flash together three times. This means the calibration was successful.

If this doesn't happen, a errorcode will appear. Go to chapter 4 (errorcodes).

TO TEST THE SYSTEM:

Lift a weight in excess of 110 % of the weight used to set the maximum setpoint and check that the maximum and minimum relays desenergises. This is indicated by both green maximum and minimum LED's going out.

Notice that the yellow LED of the three green/yellow/red LED indicators will be lit indicating the overload.

B: as a load limiter with two setpoints OVERLOAD AND SECOND SETPOINT

This form of operation permits the setting of an ultimate overload cut-out and a second setpoint which may be used to operate an audible or visual warning at an intermediate weight or to operate to detect slack rope to prevent over-lowering of the hoist rope.

PROCEDURE FOR INITIALISATION WITH TWO SETPOINTS

- 3.01.B** Install the “**dipswitch DW 1**” in position “**2**”
In case a mV load cell is used, check the positions of the dipswitches DW 2 and DW 3 (see table page 4)
- 3.02.B** Connect the power supply of the INDILoad Mark 1 while pushing the push button DP 1, wait till the green LED (D11) lights up (approximately 2 seconds). Release the push button immediately.
The relay K2 will be energised (LED D7 lights up)
- 3.03.B**
- 3.03.B.a** To set the zero point, raise the hook and any lifting tackle that you wish to include in the zero setting. If this includes slings or chains, lift them clear of the ground so that they hang freely. Allow the hook to settle so that there is no swing.
When the working height of the crane is more than 10 m., the hook must be in the heighest position
- or**
- 3.03.B.b** To set a slack rope function, lower the hook until it is resting upon the ground and allow it to settle so that there is no swing.
Attention: the weight of the hook should be enough (minimum 2 % of the nominal load) to detect a slack rope
- 3.04.B** Push the push button DP1 (+/- 0.5 sec.)
The yellow LED (D12) will light up
- 3.05.B** Raise the nominal load, by using test weights. Lift this weight clear of the ground and allow it to settle so that there is no swing.
- 3.06.B** Push the push button DP1 (+/- 0.5 sec)
The red LED (D10) will light up and the relay K1 will be energised

- 3.07.B** Lower off the load onto the ground
- 3.07.B.a** To set an intermediate weight function, select test weights for the exact weight at which the intermediate trip is required. Lift this weight clear of the ground and allow it to settle so that there is no swing
- or
- 3.07.B.b** To continue the setting of the slack rope function, raise the hook and any lifting tackle. If this includes slings or chains, lift them clear of the ground so that they hang freely. Allow the hook to settle so that there is no swing.
When the working height of the crane is more than 10 m., the hook must be in the highest position
Attention: the weight of the hook should be enough (minimum 2 % of the nominal load) to detect a slack rope

- 3.08.B** Push the push button DP1 (+/- 0.5 sec)
The load limiter will restart and the three LEDs green (D11), yellow (D12) and red (D10) will flash together three times. This means the calibration was successful.

If this doesn't happen, a errorcode will appear. Go to chapter 4 (errorcodes)

The green LED flashes once per second indicating that the unit is functional and the relay K2 will be energised. K1 will be energised when the load will be more than the second setpoint.

TO TEST THE SYSTEM:

- Lift a weight in excess of 110 % of the weight used to set the maximum set point and check that the maximum relay desenergises. This is indicated by the green maximum relay LED going out and the yellow LED of the three green/yellow/red LED indicators will be lit indicating the overload.
- If the minimum setpoint has been used as an intermediate weight function, lift a weight in excess of the weight used in setting and check that the minimum relay energises. This is indicated by the green minimum relay LED lighting.
- If the minimum setpoint has been used as a slack rope function, lower the hook onto the floor and check that the minimum relay desenergises. This is indicated by the green minimum relay LED unlighting.

Chapter 4: Error messages

The INDILoad Mark 1 is equipped with an error detection system which allows you to quickly locate possible defects.

The error detection system works as follow:

If an error occurs, the **red LED** (from the green-yellow-red series) will blink after the auto-tests. The blinking is like a morse coding and always displays two numbers.

For example: errorcode **32**= .../...

		=	3 times a short blink – a short interval-2 times a short blink - long interval
remark :	a short blink	=	+/- 350msec
	a short interval	=	+/- 700msec
	a long interval	=	+/- 7 sec

There are three groups of error messages, namely calibration errors, load cell errors and electrical errors.

Error messages group 1: calibration errors

Error	Cause	Solution
11	Error calibration 0 %	Check loadcell and connections
12	Error calibration 100 %	Check loadcell/other range
13	Error 0 % > 100%	Change connections Vo + and Vo-
14	Signal too low	Other range
15	Signal too much	Other range
16	100 % too much with 4...20mA signal	Take less sensitive loadcell
17	Not used	
18	System not calibrated	Calibrate
19	100 % too much with mV signal	Other range or loadcell

Error messages group 2: loadcell errors

Error	Cause	Solution
21	External reference fault	Check connections loadcell
22	Fault again	Loadcell-drift or –fault
23	4...20 mA loadcell not found	Check connections loadcell (too less current)
24	Resistive loadcell not found	Check connections loadcell
25	Drift loadcell	Check or recalibrate loadcell
26	No loadcell on start up	Check loadcell

Error messages group 3: electrical errors

Error	Cause	Solution
31	Error relais 1	Reparation Mark 1
32	Error relais 2	Reparation Mark 1
33	Error eeprom checksum	Reparation Mark 1
34	Error flash checksum	Reparation Mark 1
35	Supply voltage too low	Check supply, if good, reparation Mark 1
36	Error internal amplifier	Check position dipswitches, if good, reparation Mark 1
37	Error dipswitch DW1	Check position DW 1, if good, reparation Mark 1
38	New software in Mark 1 V1.0	Brigde on R34
39	Internal error	Reparation Mark 1

Once in error mode the Mark 1 will show this code 5 times, and then resets and tries to start up again. To reset in errormode is also possible by pushing push button DP1. Remark: another error may appear after

If the green LED blinks once a second, the load limiter is operating well.

If the green LED blinks once a second and the yellow LED lights up, the load limiter operates normally but lifting is stopped because of overload.

Chapter 5: Technical sheet

Principle: The INDILoad mark 1 is equipped with mathematical processors and specially developed algorithms which can interpret the dynamic effects in “real-time”. These dynamic effects occur frequently when “quick starting” or “inching”.

Conventional electronic load limiters equipped with with a time-delay function can interpret these dynamic effects as an “overload” condition. This can result in the hoisting device stopping and can also cause extra wear. The unique system of the Mark 1 guarantees increased safety during use, less wear and user friendliness.

Securities:

- continuous checking of the load cell
- hardware and software test during initialisation of the load limiter and with every power switch on
- secured against power failure, short-circuit and cable breakage

Power supply: 48, 110 or 230 VAC + 15 % 50/60 Hz
Transformer equipped with terminal protection

Consumption: 4 VA

Relays: LED indication for relay deenergised

Relay contact rating: 250 VAC – 2 Amp.

Output: Analog signal : 0-10 V proportional to the lifted weight

Temperature –range: working temp. : -10 °C to + 60 °C
Stored temp: -40 °C to + 85 °C

Enclosure: metal box dimensions: w 300 – h 150 – d 80 mm
Protection degree: IP54

Weight: 3.3 Kg

Load cells types:

mV output:

- All loadcells equipped with straingages in a full Wheatstone bridge configuration, with resistance between 350Ω, 700Ω and 1000Ω can be used. For loadcells with other specifications : please contact us.
- From **0,3mV/V** to **2mV/V**
- Cable: max 6m

mA output

- max **14mA** at nominal load (100%)!!
- Cable: max 100m