



# INDILOAD

## MARK E

manual

## **1. Preliminary precautions during setting**

- Verify power supply of Mark E  
Ref. Mark E 48 V : 48 Vac and 230 Vac available  
Ref. Mark E 110 V : 110 Vac and 230 Vac available.
- Install the Mark E in a metallic box correctly connected to the earth.
- When mounted in a box, be sure the Mark E is not installed too close to devices which could cause electromagnetic interferences (ex: power contactors).
- The cable of the 4-2 mA signal should never pass along the power cables, it may cross them perpendicularly.
- Do not twist the cable.

## **2. Connecting the Mark E**

- P-1 0V
- P-2 48 Vac (not present on the version 11.0 Vac)
- P-3 110 Vac (not present on the version 48 Vac)
- P-4 230 Vac
- P-5 earth
  
- C-1 normally closed contact 5A/250 V(NC)
- C-2 common contact
- C-3 normally open contact 5A/250 V(NO)
  
- L-1 sensor supply (+15 V) = red wire INDILoad load cell
- L-2 4-20 mA input = green wire INDILoad load cell
- L-3 Screen (0 V) = black wire INDILoad load cell  
common
  
- Test 1 point of test (sensor signal)
- Test 2 point of test (earth)
- Test 3 point of test (setpoint)

### **3. How does the relay work ?**

- In a normal situation (sensor signal below set point value adjusted by potentiometer) the relay is closed and the yellow & green LED's are both lit.

The hoisting movement is authorised.

- When the setpoint is exceeded, the relay changes its position and the green LED goes out.

The hoisting movement is unauthorised.

- For safety reasons, when the signal falls below + 3mA (abnormal condition), the relay also changes position and the green LED goes out.

The hoisting movement is unauthorised.

**CAUTION :** for these imperious reasons the dipswitch MIN OFF/ON must always be turned in the ON position (potentiometer side) when using it for hoisting purposes. This dipswitch guarantees this safety.

- The dipswitch DELAY OFF/ON is by default turned in the ON position and generates a waiting period of approximately 100 msec before release.
- During the installing procedure the DELAY OFF/ON dipswitch can be turned in the OFF position so there will not be a delay when the potmeter is adjusted.

In order to avoid a constant on/off switching of the load limiter due to dynamic effects which generate oscillations around the setpoint, the Mark E has a hysteresis margin of 2,6 mA compared to the sensor. This means a hysteresis of 16 % in relation to the nominal load, taken into account a load limiter with a signal varying between 4 (0%) and 20 mA (100% of the load). With regard to smaller signal variations, this hysteresis on the load is proportionally larger.

### **4. Adjustment of the Mark E (testweight 110 % of the nominal capacity)**

- Lift a testweight representing 110 % of the nominal load, wait until the load has stopped swinging and then turn the potentiometer clockwise to the maximum until both LED's switch on.
- Carefully adjust the potentiometer anti clockwise until the relay drops and the green LED's (SAFE) goes out.

## 5. Adjustment of the Mark E (testweight between 70 and 110 % of the nominal Capacity)

- Turn the potentiometer clockwise to the maximum (both LED's switch on).
- Measure the voltage VO (+0,4V) between sensor signal test point and the common while the hook is empty.
- Then use a known test weight M1 and measure the voltage V1 again.
- If M2 is virtual load for cut-off threshold (110% of the nominal load), the corresponding voltage is V2 : this voltage between setpoint and common will be reached by adjusting the potentiometer SET in the anti-clockwise sense, both LED's remaining switched on.

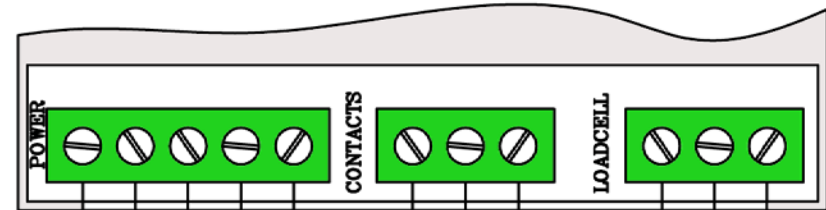
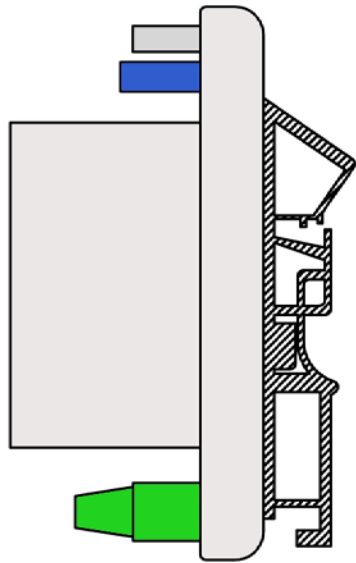
$$V2 = \frac{\text{MASS 2 (M2)}}{\text{MASS 1 (M1)}} \times (V1 - VO) + VO$$

### Ex.

- Crane with 10 t nominal load - available test weight 8 t (> 70 % of the nominal charge)
- Overload : 110 % of 10 t = 11 t
- Measured voltage empty hook (between sensor signal and common) : 0.42 V.
- Measured voltage with test weight (8t) on the hook : 1,22 V.

$$V2 = \frac{11 \text{ ton}}{8 \text{ ton}} \times (1,22 \text{ V} - 0,42 \text{ V}) + 0,42 \text{ V} = 1,52 \text{ V}$$

- Therefore it will be necessary to adjust the potentiometer SET until a voltage of 1,52 V is reached between setpoint and common.



**Attention**  
 48 VAC Version  
 48 or 230 VAC  
 110 VAC Version  
 110 or 230 VAC

Normally closed  
 Relay (250 V SA max.) COM  
 Normally open

+15 V  
 4-20 mA (150 mA max.)  
 Ground

+15 V → L1  
 Output 4..20 mA → L2  
 Common → L3  
 4-20 mA  
 3 Wires

+15 V → L1  
 Output 4..20 mA → L2  
 Cable screen → L3  
 4-20 mA  
 2 Wires

