APPENDIX B

ILC3/LM3D MICELECT
INTELLIGENT WEIGHING DEVICE

VERSION 1.11.000

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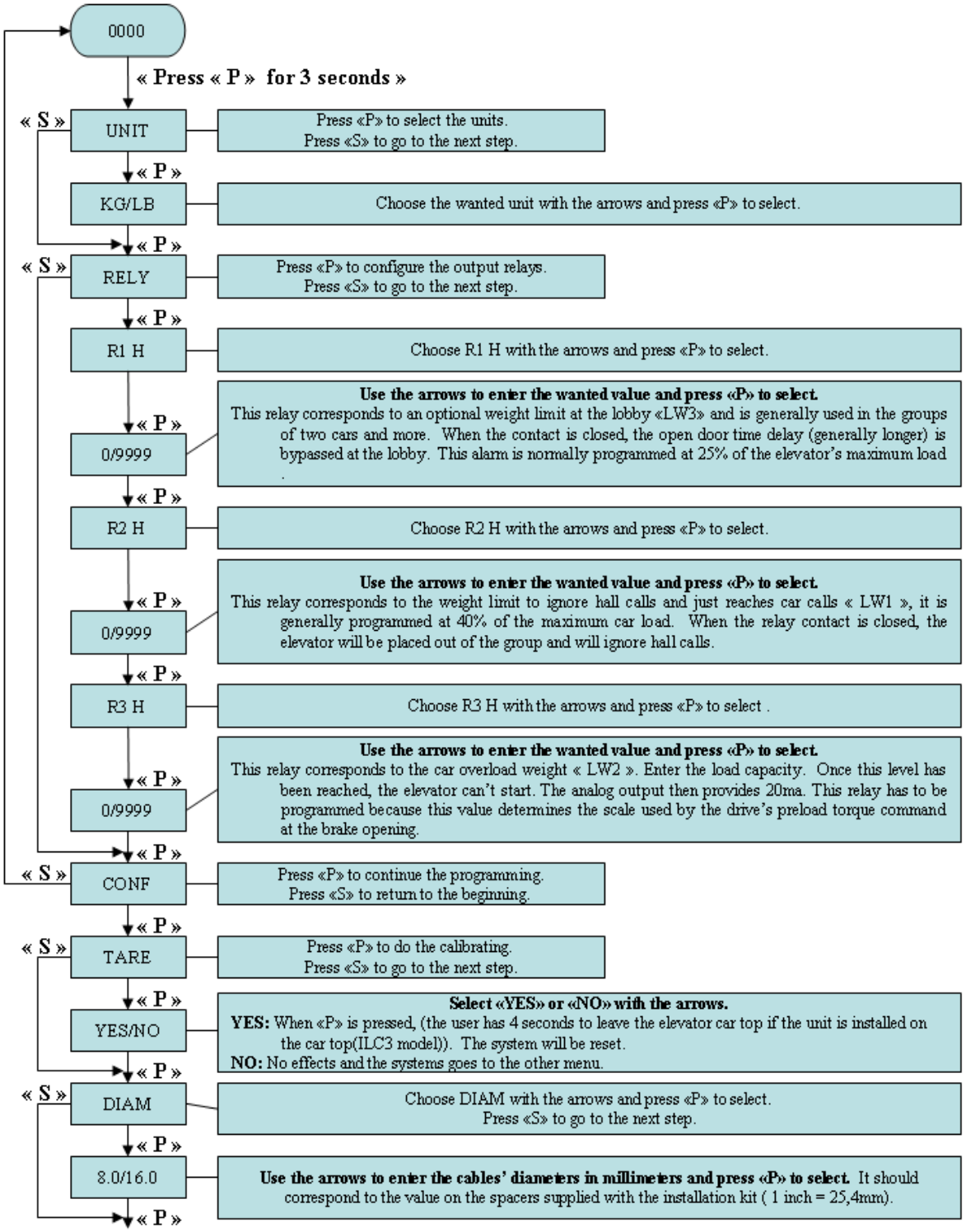
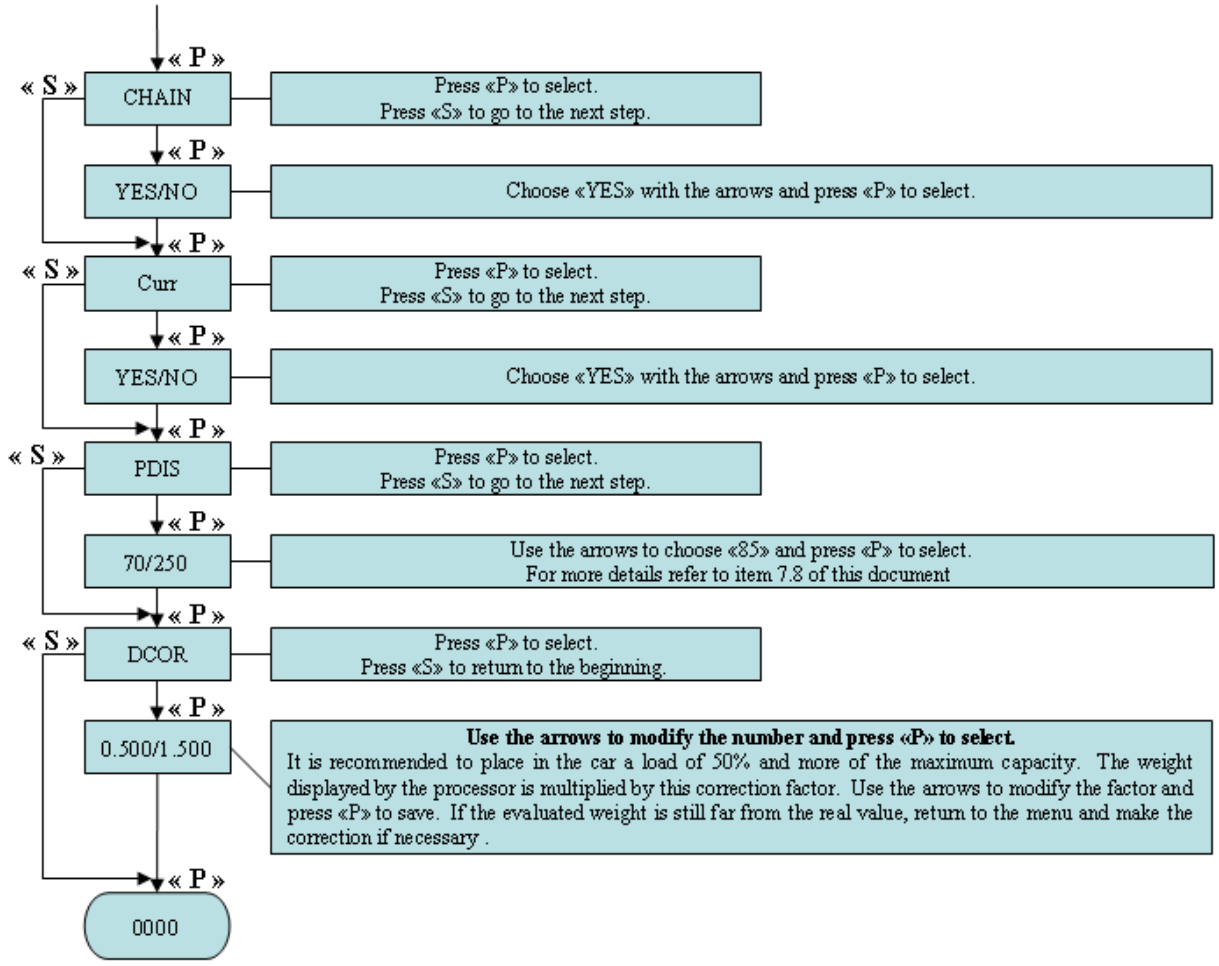
APPENDIX B

1. QUICK SETUP




« P »
« S »
CHAIN
Press «P» to select.
Press «S» to go to the next step.
« P »
YES/NO
Choose «YES» with the arrows and press «P» to select.
« P »
« S »
Curr
Press «P» to select.
Press «S» to go to the next step.
« P »
YES/NO
Choose «YES» with the arrows and press «P» to select.
« P »
« S »
PDIS
Press «P» to select.
Press «S» to go to the next step.
« P »
70/250
Use the arrows to choose «85» and press «P» to select.
For more details refer to item 7.8 of this document
« P »
« S »
DCOR
Press «P» to select.
Press «S» to return to the beginning.
« P »
0.500/1.500
Use the arrows to modify the number and press «P» to select.
It is recommended to place in the car a load of 50% and more of the maximum capacity. The weight displayed by the processor is multiplied by this correction factor. Use the arrows to modify the factor and press «P» to save. If the evaluated weight is still far from the real value, return to the menu and make the correction if necessary .
« P »
0000

2. PRESENTATION

- The weighing device measures the load in the car from the tension exerted on the traction cables.
- The weighing device has:
  - A microprocessor that computes the current load in the car minus the weight of the electrical cables hanging under the car.
  - 3 programmable alarms each activating a relay that gives information to the elevator controller.
  - A current output (0-20 mA) which varies according to the load evaluated by the system. This signal can be used to send a preload torque command to the motor drive.
  - An automatic reset algorithm to continuously ensure the same precision and that without any human intervention. This reset will be applied whenever the elevator has been stopped with its doors closed for 5 minutes.

IMPORTANT

If the alarm value programed for relay #1 is above alarm #3, the processor will not perform automatic reset after 5 minutes. However, all residual values between 5 lbs and 75 lbs will be reset as they should be. Use this option during full load test of the elevator.

- It is made of aluminum and stainless steel. It was specially designed to resist humidity, which ensures long-term durability.
- It is specially designed to be adaptable to all cable diameters and that because of its universal supports (available in different sizes).

3. CHARACTERISTICS

3.1. ILC3

Input voltage	21-48VDC
Capacity	6 000 kg/10 000 kg (special version)
Programmable output	3 contacts rated 250 volts, 3A
Variable programmable output	0-20 mA
Screen	4 numbers with 7 segments
Operation temperature	-10°C/50°C

3.2. LM3D

Input voltage	100-240Vac (50-60 Hz)
Capacity	4 000 kg/8 000 kg (special version) if 1 : 1 8 000 kg/16 000 kg (special version) if 2 : 1
Programmable output	3 contacts rated 250 volts, 3A
Variable programmable output	0-20 mA
Screen	4 numbers with 7 segments
Operation temperature	-10°C/50°C

4. INSTALLATION

The installation of a load-weighing device can be separated into three steps:

1. Installing the sensor(s);
2. Installing the control unit;
3. Wiring the device.

4.1. Installing the Sensor(s)

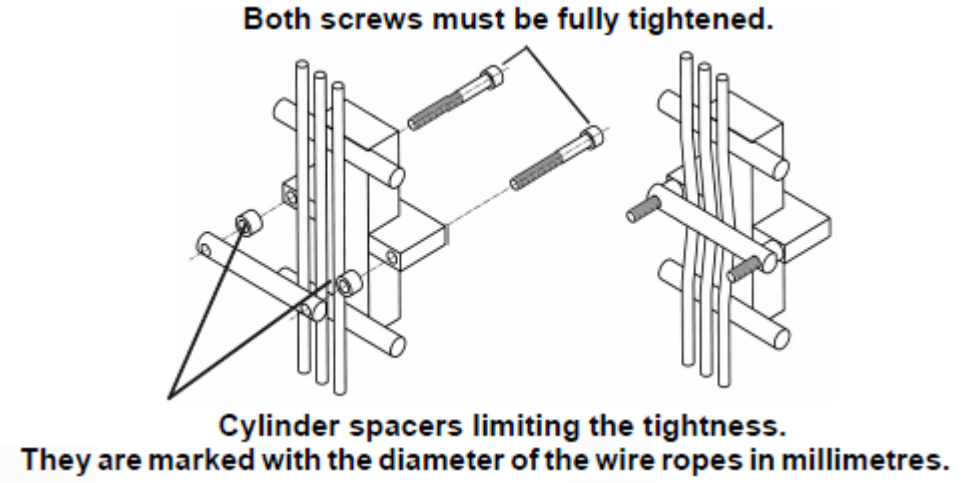
Two types of sensors may be provided by JRT according to your application requirements. These are cylinder-clamp sensors, which measure the load of all of your cables simultaneously, and individual wire sensors, which measure the load on each of your cables separately.

4.1.1. Installing cylinder-clamp sensors

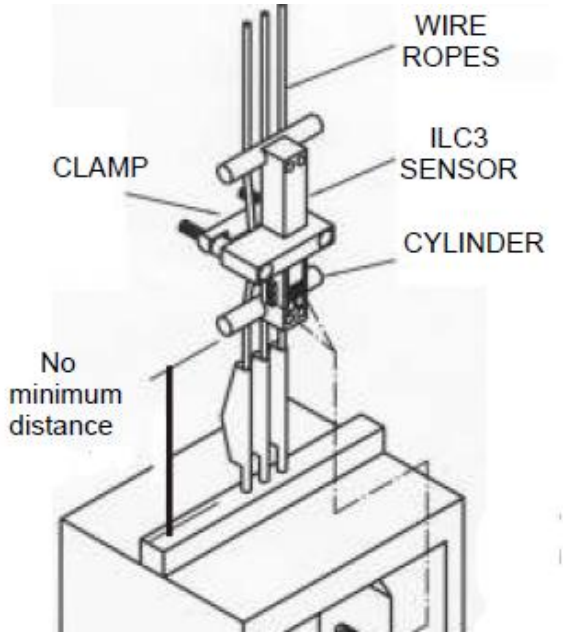
Follow these steps to install a cylinder-clamp sensor (ILC3 and LMC models) on your ropes:

1. Place the sensor around 1 ½ - 2 metres from the shackles, where the ropes are parallel. This may be near the car top (1:1 roping) or near the top of the pit (2:1 roping);
2. Close it slightly using the bolts, cylinder and cylinder spacers;
3. Slide the sensor along the ropes so it rests as close as possible to the rope hitch;
4. Close the central clamp as tightly as possible.

The following figure illustrates the assembly of the clamping cylinder:



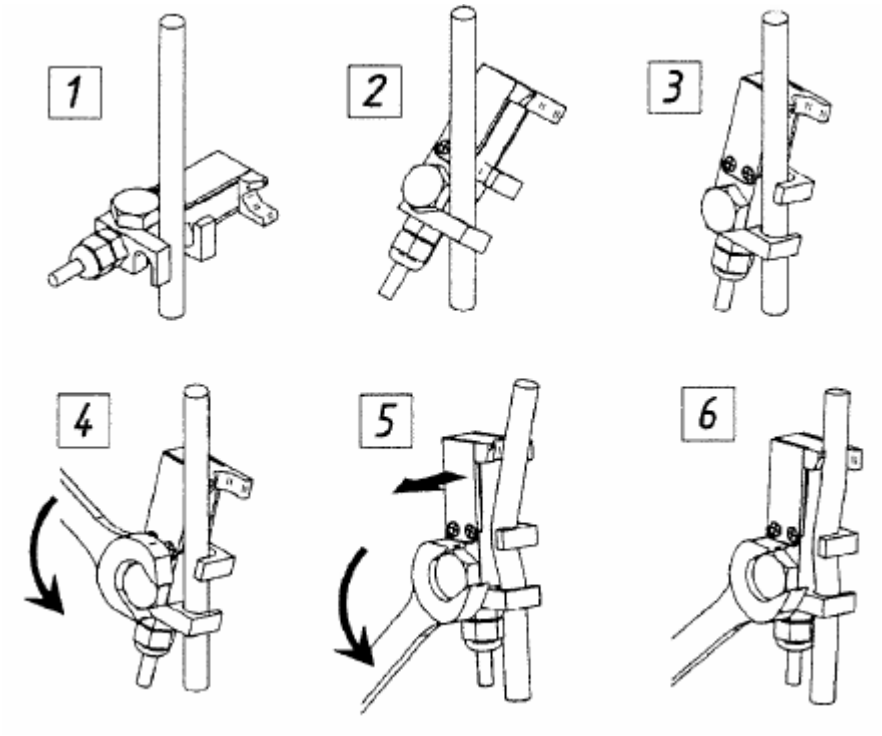
Note that there is no minimum distance from the sensor to the shackles so long as all the ropes exert similar pressure on the clamping cylinder and rest on both the top and bottom cylinders as parallel as possible. See the figures above and below for positioning examples. The device's initial calibration may be done at any level.



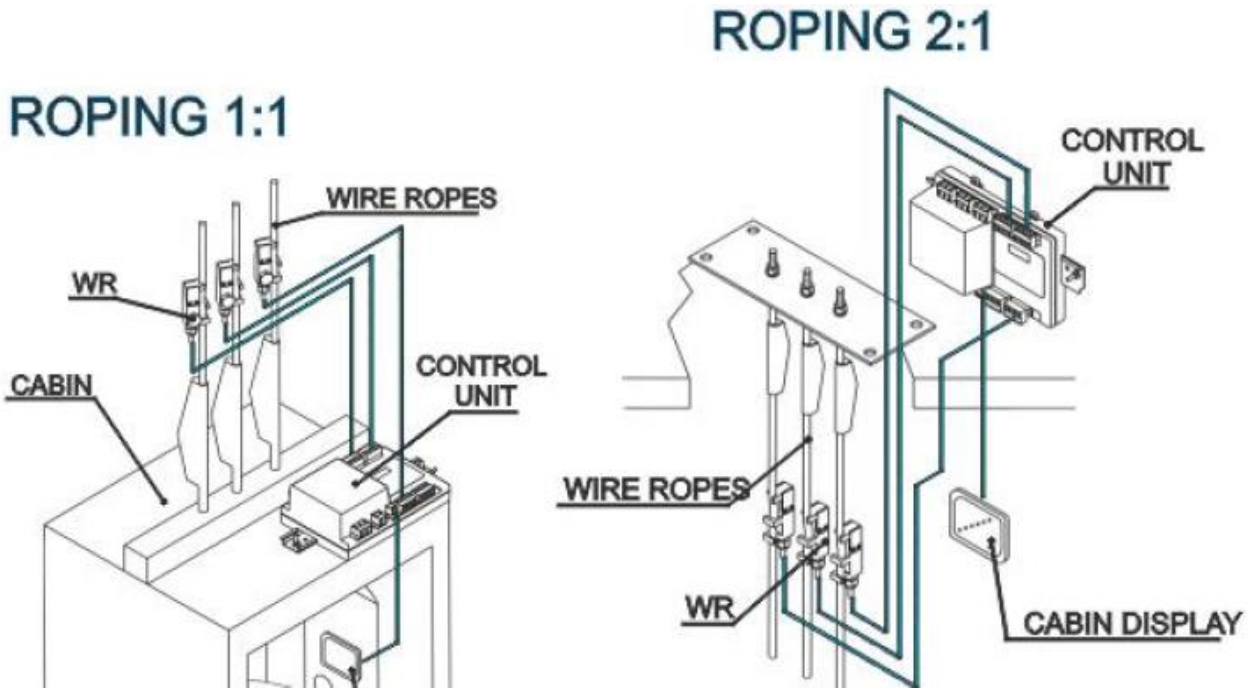
4.1.2. Installing individual wire sensors

Follow these steps to install individual wire sensor (WR models) on your ropes:

1. Select a cable that hasn't been fitted with a sensor already;
2. Place the cable between the bottom and middle hooks of the sensor;
3. Rotate the sensor sideways until the cable is resting on the bottom and middle hooks;
4. Using a wrench, rotate the sensor backwards until the cable can be placed in the top notch;
5. Let the sensor return to its natural position. Make sure the cable is in contact with both hooks and the notch.



Note that there is no minimum distance from the sensor to the shackles so long as each rope is pressing against the middle hook of its sensor and resting on both the top notch and bottom hook as straight as possible. Additionally, no sensor should be in contact with another rope or sensor. See the figures above and below for installation examples. The device's initial calibration may be done at any level.



4.2. Installing the Control Unit

As you prepare to install your weight loading device's control unit, you should be faced with one of the three following situations:

1. If an ILC3 device was provided for your project, the control has already been installed in section 4.1 since it's integrated directly into the cylinder-clamp sensor. You may proceed to wiring your device;

2. If an LM3D control unit was provided for your project and you use a 2:1 roping configuration, it should already be installed in your JRT controller or somewhere in your machine room. You may proceed to wiring your device;

3. If an LM3D control unit was provided for your project, and you use a 1:1 roping configuration, it must be installed on top of the car before you begin the wiring process.

4.3. Wiring the Device

Make the connections using the drawings supplied with the controller and the following connections table:

ILC3 (Connections)	LM3D (Connections)
Green = 0-20 mA analogue output (+)	Brown = Power supply (+V)
Yellow = 0-20 mA analogue output (-)	White = Power supply (-V)
Black = Power supply (-24 V/-48 V)	Green = Sensor (+S)
Red = Power supply (+24 V/+48 V)	Yellow = Sensor (-S)
Blue = Closed door signal (Car door contact 120 VAC)	Shield = SHD
Blue-Red = Closed door signal feedback (connect to neutral terminal 120 VAC)	
Grey = Relay 1, open contact	
Grey-Brown = Relay 1, common	
Brown = Relay 2, common	
White = Relay 2, open contact	
Pink = Relay 3, open contact	
Violet = Relay 3, common	

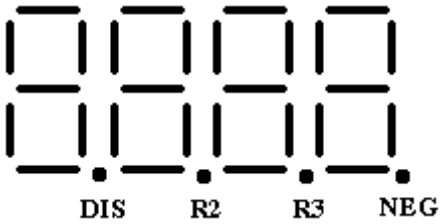
5. KEYBOARD

The key "P" allows access to the programming menu and allows saving new values in the memory. To access the programming menu, press the key "P" for three (3) seconds.

The key "S" allows exiting a menu without modifying a value. When the system is not the programming menu, that key allows displaying the actual cable compensation weight since the last door opening.

The "▲▼" keys allow scrolling different options and the available numerical values.

6. DISPLAY



When the system is supplied, the start up screen will appear for a few seconds. The actual weight will be displayed after. Each of the decimal points has a signification:

- DIS: This indicator represents the state of the internal door closed signal (DISABLE input). Once this point is visible, the car door should be closed.

- R2: This indicator represents the state of the alarm #2. This point will be visible when the weight shown on the display will be greater or equal of the alarm 2-programed level. Relay #2 output follows that signal.

- R3: This point represents the state of the alarm #3. This point will be visible when the weight shown on the display will be greater or equal of the alarm 3-programed level. Relay #3 output follows that signal.

- NEG: This point indicates the value shown is negative compared to the system "ZERO/TARE".

7. DETAILED PROGRAMMING

When the module is supplied, press the key "P" for 3 seconds to enter in the programming menu.

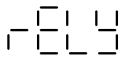
7.1. Selecting the Measurement Unit

When the following message appears, press the key "P" to visualize the current measurement unit. Use the up arrow to modify the measurement unit and press "P" to save.

- Lb : Imperial units of measurement (lbs).
- HG : Metric units of measurement (kilograms).

7.2. Relay Configuration

When you press the key "P", the following menu appears:



- Press « P » to access the 3 relays' configurations.
- Relay #1's action may be reversed or not using the arrows.
  - r1 H : Relay #1's contact closes if the estimated weight becomes greater than the programed level. Always make sure that the letter « H » is chosen. The letter « L » reverses the contact's functioning.

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- Use the arrows to increase or decrease the weight corresponding to relay #1's alarm. Press « P » to save the value and to move on to the next relay.
- Proceed the same way to program relays #2 and #3.

Relays #1, #2 and #3

These relays allow having 3 adjustable alarm levels according to the elevator controller's needs:

- Relay #1 : This relay corresponds to an optional weight limit at the lobby « LW3 » and is generally used in 2 car groups and more. When the contact is closed, the opened door time (generally longer) is bypassed at the lobby floor. This alarm is generally programs at 25% of the elevator maximum load.
- Relay #2 : This relay corresponds to the weight limit to ignore hall calls and just reaches car calls « LW1 » . This alarm is generally programs at 40% of the maximum car load. When the relay contact is closed, the elevator will be placed out of the group and will ignore hall calls.

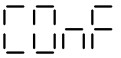
- Relay #3: This relay corresponds to the car overload weight « LW2 ». Once this level has been reached, the elevator can't start. The analogue output then provides 20 mA. It is important to program this one if you use the zero to 20 mA analogue output because the value of this relay determines the scale used by the preload torque command.

IMPORTANT

If the alarm value programed for relay #1 is above alarm #3, the processor will not perform automatic reset after 5 minutes. However, all residual values between 5 lbs and 75 lbs will be reset as they should be.

7.3. Weighing Device Configuration

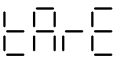
After relays programming, the following menu will appear:



- Press "P" to access the operation configuration to evaluate the weight.
- Press "S" to exit the configuration menu.

7.4. System Reset

The system can be manually reset at every floor. As soon as the zero/tare function is performed, the weight evaluated will be positive when the elevator moves up.



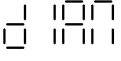
The processor will not accept any negative weight when the car is not moving. The processor algorithm when required will execute an automatic reset.

- Press "P" to access the reset menu.
- Using the arrows, choose the following options:
  - YES : When « P » is pressed, the user has 4 seconds to leave the car top if the weighing device is installed there. The system will be reset.
  - NO: No effect and the system goes to the other menu.

- Press "P" once the selection is done.

7.5. Weight Evaluation Method

The next menu indicates the method used for weight evaluation.



The processor uses the cable diameter to compute the weight. When the key "P" is pressed, the user must indicate cable diameter in millimetres.

16.0

The following screen shows the actual diameter in millimetres that will be used to evaluate the weight. Use the arrows to increase or decrease the value.

25.4 mm per inch

Example:

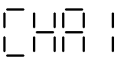
Cable 5/8 = 5 ÷ 8 × 25.4 = 15.875 mm

Generally, the value to enter is written on the two sleeves of the mounting kit. Once the diameter is written, press "P" to save. The load curve is now calibrated. The system precision should be around 30 lbs.

A subsequent menu « dCor » will allow to adjust the display precision. For elevators with a 2 : 1 cable ratio, the calculated weight may be doubled.

7.6. Cables Weight Compensation

The following menu indicates to the microprocessor if cable compensation should be used or not. Press "P" to select the compensation.



- Using the arrows to select the following options:

  - YES: when "P" is pressed, the processor will activate the cable compensation. The "Door closed/Disable" 120 VAC input must be connected for proper compensation operation: 120 volts when the car door is closed and no voltage when the car door begins to open.

    If the "Door closed/Disable" internal signal (left decimal point on the display) takes too much time to turn off, people can get in out and the compensation value will be corrupted.

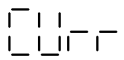
    The compensation value is always validated and reset by the processor if required.

  - NO: No cable weight compensation. For elevators with six floors and less, the cable compensation is not required necessarily.

- Press "P" to save.

7.7. Analogue Output Control

The following menu allows to activate or not the 0-20 mA analogue output. Press "P" to activate or not.



- Use the arrows to select the following options:

  - YES: When the key "P" is pressed, the analogue output is activated. The output value will follow the display. The "Door closed/Disable" input latches the analogue output current when the door is closed. A maximum current of 20 mA will be present at the output as soon as the displayed weight becomes greater or equal to the alarm #3 parameters.

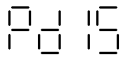
  - NO: The analogue output is deactivated.

- Press "P" when the selection is done.

7.8. Adjusting the Operation Delay on the «Door closed/Disable» Input

The decimal point on the left side of the display represents the internal state of the door-closed signal. When the option "CHAI" is at "YES", an off delay must be programs to ensure the weighing system will not be affected during the door pre-opening in floor approach (levelling).

The following menu allows to increase or to decrease the delay at door opening.



- Press "P" to access the delay.

85

The delay is in 1/100 of a second.

Example:

85 X 0.01 = 0.85 seconds.

- The delay is factory set at 85 (0.85 sec.). Use the arrows to modify if required and press "P" to save.

The «Door closed/Disable» signal is connected to the car door contact (PC/CDC) at 120 VAC. This signal allows setting the weight display during movement. The analogue output is also set. This signal is necessary to the microprocessor to determine the electrical cables' weight which is added or subtracted when the elevator is moving.

The car door contact opens as soon as the door starts to open. An adjustable delay « off delay » is indispensable to maintain the processor's internal « Closed Door/Disable » signal until the car stops. This delay, factory set at 0.85 second, is generally enough for the door to be opened at 75 % before the signal is deactivated. When the car door is closed, you can see a decimal point displayed on the left. The weighing device will display the text « MOVE » when the door is closed and a load variation is detected.

Example :

- The car is parked at the 1st floor with opened doors and 4 persons enter.
- The doors close and the device sets the value at 750 lbs.
- The car arrives at the 3rd floor. The weight displayed is 750 lbs, but the real weight measured by the device is 850 lbs. There are 100 lbs of cables that have been added at the 3rd floor. The device will keep the 100 lbs as a compensation value at the door opening. The doors open, the weight varies accordingly to the cabin's back and forth movement. If the 4 persons go out, 0 lbs or a very close number should be displayed. However, the processor keeps the 100 lbs in regards to the 1st floor. The compensation value will automatically be adjusted in order to subtract the electrical cables' weight.

At all times, if the key « S » is pressed, the actual compensation value is displayed.

Adjustment tips:

Put the controller in automatic mode. Stay inside the car and place calls. Estimate the time when the door begins to open and when the opening is big enough so somebody can get in or out. Generally, the car movement is done when the door is opened at 75%.

If the delay is too long, somebody can get in or get out during the processor sees a door closed signal. The compensation value will be corrupted and a residual weight will stay on the display if all the people get out of the car. Same problem if the delay is too short, the car movement will not be finished when the door closed signal turns off. The delay 0.85 sec. is very near the final adjustment. Modify if required.

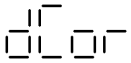
- In the machine room, you can watch the drive pre-torque command if the current output is used. Observe the drive pre-torque command on car starts and stops. When people get in or get out and the car becomes empty, the pre-torque command should always go back to the required value for an empty car. If not, the delay is too long or too short.

IMPORTANT

The processor algorithm is able to deal with those residual errors and clear them to ensure a good precision without human intervention. Not all people get in or get out at the same speed. It will be impossible to find a value for 100% of the situations.

7.9. Adjusting the Correction Factor for the "DIAM" Operation Mode

The system uses "DIAM" mode to compute the load in the car. The displayed weight can be less or greater than the real weight of a known value. The next menu allows the correction of the displayed value to get closer of the real value.



- Press "P" to access the delay.

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It is recommended to put in the car a known weight of 50% or more of the car capacity for a good precision. The weight evaluated by the processor is multiplied by the correction factor. Use the arrows to modify the factor and press "P" to save. If the weight displayed is far from the real value, go back to this menu and make the necessary corrections.

8. ELEVATOR RIDE ADJUSTMENT WHEN FULL LOAD IN THE CAR

To be able to leave full load in the car to perform drive adjustments, the automatic reset must be turn off. If not, the weight on the display will return to zero after 5 minutes without any movement.

To turn off the automatic reset, relay #1 alarm level must be set higher than the alarm #3 level.

When the drive adjustments are finished, put back the relay #1 alarm level to the previous value.

9. ERROR CODES

ERROR CODES		SOLUTIONS
ERR1	NO VALUE ENTERED	GO TO PROGRAMMING MENU "P" FOR 3 SEC.
ERR3	LOW POWER	VERIFY POWER SUPPLY