Load Weighing Devices (LWDs)

An in-line load-weighing device (such as the Micelect ILC3) can have a positive effect on the safety and comfort of elevator passengers with the added benefit of reducing operating costs. The LWD provides real time load information and uses that information to tell the controller how to operate accordingly.

IMPROVED SAFETY

Eliminating overload situations are the most obvious way LWDs promote elevator safety. This is especially true with large cabs in high-traffic situations. An intelligent LWD can both temporarily halt cab operation while signaling the passengers of the overload condition.

'Hall-call bypass' is another way to improve safety. If a cab is near an overload condition, the elevator can ignore calls to stop and let more passengers on.

'Presence detection' is another tool LWDs can use to promote safety. If the LWD detects a load beneath a minimum amount (less than 66 pounds, for example), it can assume that a child is trying to operate the elevator and inform the controller to not let the elevator start. If used as an 'anti-nuisance' function, the LWD will tell the controller to ignore cab signals if no passengers are detected.

INCREASED COMFORT

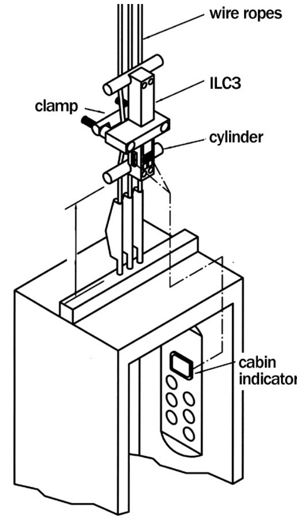
A LWD with hall-call bypass and anti-nuisance features uses load information to tell the controller to modify the stops and reduce time spent waiting in and for the elevator.

The LWD can also combine with the inverters and controllers in order to improve pre-torque adjustment, roll-back control and floor-leveling. This real-time continuous data flow informs the controller of the load and avoids excessive force when starting, sudden stops when braking and perfects the floor-leveling process.

COST REDUCTION

All of the features mentioned above (hall-call bypass, anti-nuisance, real-time load information, etc.) combine to eliminate extraneous elevator use. The result is less wear-and-tear on elevator components and systems, meaning lower operating and maintenance costs. Elevator traffic capacity is also increased due to reduced travel and wait times.

INSTALLING THE MICELECT ILC3 LOAD WEIGHING DEVICE

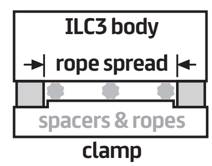


A typical Micelect ILC3 assembly installation takes about 10 minutes. The ILC3 sensor is attached to the ropes above the roof of the cab by means of a central clamp whose tightness is determined by a pair of spacers. (The two clamp spacers are precisely sized for either 1/2" or 5/8" rope; the rope diameter is engraved on the spacers.) The clamp presses the ropes onto two cylindrical sensors. The width of the clamp will vary with the dimension of the spread of the ropes (Table 1 tells which clamp is needed for which rope spread).

Table 1

ILC3 CLAMP/ROPE SPREAD DIMENSIONS

Clamp Number	Rope Spread (min) (min) in • mm	Rope Spread (max) in • mm
Size 3	4 1/2 • 116	6 1/4 • 160
Size 4	6 3/8 • 161	7 3/8 • 188
Size 5	7 1/2 • 189	10 1/4 • 263



The central clamp must be closed around all the ropes and the ropes must pass over the cylinders as parallel as possible.

The next step is to connect the ILC3 to the power supply and controller (and cabin indicator if being used). Please note that the power supply must provide filtered 24 - 48 VDC; spikes in the power may burn out the unit. A transformer is sometimes useful for regulating the power.

Once connected, the ILC3 can be easily calibrated by following the directions on the digital readout. One of the advanced labor-saving features of the ILC3 is that test weights ARE NOT REQUIRED for calibration.

Prior to establishing the tare weight, it is recommended that you jump inside the cabin a few times to release the 'hooks' on the guide rails that may be preventing the cab from hanging freely. Pay special attention when calibrating the tare of the empty cabin.

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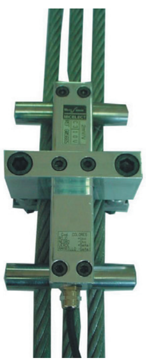
An important step is to establish the 'disabling input', especially developed for elevators with compensation cable or chain. A contact on the doors (or a safety mechanism in the controller) sends the ILC3 a signal when the passengers are on-board and the doors are starting to close. This signal tells the ILC3 to take a series of measurements that will calculate factors like starting acceleration, hook friction, etc. When the doors open, the disabling signal is turned off and the ILC3 takes another series of measurements. The difference between these two calculations is the weight of the compensation, which is taken into account so that an accurate passenger weight is taken.

INSTALLING THE LMC WIRE ROPE SENSOR WITH THE LM3D CONTROL UNIT



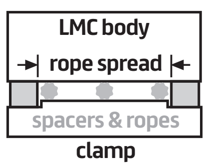
The LMC sensor is similar to the ILC3 but is used in 2:1 and 4:1 installations where access to a cab attachment point is difficult or even dangerous. The companion LM3D control unit can be installed inside the machine room or any other place with safe access.

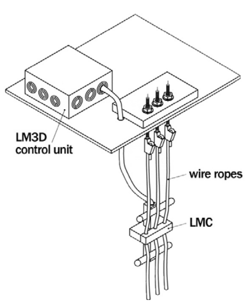
Use the same process as you would for the ILC3 to choose the proper length clamp (see Table 2 to determine the clamp needed for the spread of the ropes) and two clamp spacers sized for either 1/2" or 5/8" rope.

Table 2

LMC CLAMP/ROPE SPREAD DIMENSIONS

Clamp Number	Rope Spread (min) (min) in • mm	Rope Spread (max) in • mm
Size 4	4 1/2 • 116	6 1/4 • 160
Size 5	6 3/8 • 161	7 3/8 • 188
Size 6	7 1/2 • 189	8 7/8 • 225
Size 7	9 • 226	10 1/4 • 263





The LMC sensor is installed in the overhead. Maximum installation weights vary with the ropings; the capacity of the LMC is 2x (17,600 lbs.) for a 2:1 installation and 4x (35,200 lbs.) for a 4:1 installation.

It is important to install the LMC sensor so that the connecting cable points upwards. This places the strain gauges (the real sensing elements of the LMC) where the ropes are more parallel for greater accuracy. Once the LMC has been installed, the 14' long connecting cable (longer versions are available) can be passed to the LM3D control unit, usually located in the machine room. Follow the color code shown in the manual. NOTE: Never shorten the cable, as the output signal from the LMC sensor is calibrated at the factory according to the provided cable length.

The LM3D control unit is easily configured by following the prompts shown on the display. Configure the three alarms (alarm 3/always overload, alarm 2/full load and alarm 1/anti-nuisance or presence detection) and then select the type of sensor connected to the LM3D (LMC in this case). The prompts will continue to guide you through the process, including setting the tare, establishing the disabling input (if present) and feeding in the diameter of the ropes. (NOTE: the display shows the rope diameter in mm, so you must convert those dimensions to inches by dividing by 25.4).

INSTALLING THE WR ROPE SENSOR AND MWR CONTROL UNIT

WR individual wire rope sensors are used when the overhead clearance makes it impossible to install the ILC3. Note that WR sensors are designed for specific rope diameters, which are engraved on them (in millimeters). The external MWR control unit has the same features as the LM3D, and will soon have the ability to display the weight on the individual ropes. This helps with the maintenance tensioning of the ropes thus reducing wear and increasing the life span of both ropes and elevator components. The picture to the left shows the WR sensor attached to an installed rope.

Once the WR sensors are installed on each rope, they are connected to the MWR control unit. Presently, the MWR control unit has all the WR sensors connected in parallel; the next-generation MWR control units will have eight different channels for up to eight WR sensors. These new MWR control units (available in 2005) will be able to give the load and tensions on the individual ropes.

The MWR control unit is configured in the same way as the LM3D control unit; just choose "VR" as the type of sensor (WR cannot be formed on the dot matrix). All other prompts are identical.

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