Wire Rope Tensioning

TECH TIP 10

All hoist ropes in an elevator installation should carry the same tension/load. Equally tensioned ropes extend the life of the ropes/ sheaves and improve ride quality,

Rope tension and wear

Modern elevator systems have multiple wire ropes that are attached to the cab and counterweight. These ropes then typically run over a traction sheave to move the cab up and down the hoistway.

This system works best when all of the ropes have the same tension (when each rope carries an equal portion [±5%] of the total load). When some ropes have more tension than others, the ropes with the lesser tension/load will slide over the sheave(s) which causes crown and sheave groove wear. Wear is often shown by rope slapping , vibration and metal dust.

Estimating tension by hand

Since it is difficult to measure the weight supported by individual ropes, indirect methods were devised to measure rope tension. And while there are some craftsmen who can determine rope tension by feel (pushing/pulling the rope by hand), this is more of an art form than a learned skill and is not an accurate method. A more precise method is to use a tensiometer (similar to a torque wrench) to measure the rope's tension.

Another method for determining the relative tensions of multiple ropes is called 'tuning.' The car is placed at the bottom of the hoistway and all dampening devices are removed. The rope is plucked like a harp string and the oscillations are timed with a stopwatch. The longer the times between cycles, the lower the tension in the rope.

Torque wrenches and 'tuning' measure tension indirectly. However, the best way to determine the true amount of load on a rope is to actually measure the load on all the ropes in real time. This is now possible with the RTS (Rope Tensioning System) or the MWR-8 load weighing/tension measuring device.

Tension measuring devices

The RTS (Rope Tensioning System) is a portable electronic device for quickly measuring the tension of elevator wire ropes within an accuracy of 3%. The system includes a LCD touch-screen control unit with a capacity of up to 12 sensors attached via USB connections (indicate the quantity of sensors from 6 to 12 per control unit when you place your order).

The weight of the cab and counterweight can also be conveniently and precisely measured with the RTS.

In the Weighing mode, the individual rope tension readings and average weight are shown graphically and numerically in either imperial or metric units for up to 12 ropes. The clearly displayed tension information allows the field technician to quickly and accurately equalize the rope tensions. Since the information is displayed in real time for each rope, the impact of a tensioning adjustment made to one rope is immediately visible on the other ropes.

In the Adjust mode, the before and after tension values for up to 150 installations can be stored in the internal memory. This information can then be downloaded to a PC via the included USB cable.

Coupling hardware for each sensor is included which permits the sensors to be attached to rope diameters of 1/6 in • 4 mm to 5/8 in • 16 mm. Each sensor has a maximum capacity of 2400 lbs • 1200 kg.

The LMD-3 intelligent wire rope sensor system has been developed as a load weighing device for permanent installation on elevators which require a high level of precision (within an accuracy of 5%). This is accomplished through the use of an individual sensor on each rope to measure the tension (indicate rope diameter and quantity of sensors from 2 to 8 per control unit when you place your order). Each sensor has a maximum capacity of 2200 lbs • 1000 kg.

The control unit includes three programmable alarms i.e. full load, overload and tension differential. Analog outputs of 0-20 mA, 0-24 mA or 4-20 mA can be selected in the field.

In addition, with up to eight individual sensors attached via USB connectors, the LCD display allows the user to view the individual tension in metric units for up to eight wire ropes (the field technician can then quickly and accurately equalize the rope tensions). The unit can also signal that a rope has broken and it permits the weight of the cab to be conveniently and precisely measured.

Installation is quick and calibration is automatic and accomplished without the use of test weights.

Draka EHC

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Wire Rope Tensioning (cont'd)

RTS ROPE TENSIONING SYSTEM

Part Number	Description
WR-RTS	RTS system, including control unit, power supply, USB cable for PC connection, T-handle allen wrench (for attaching sensors to rope), six (6) sensors and hard-shell case.
WR-WRS	Additional wire rope sensor and couplings for 1/6 - 5/8 in (4 - 16 mm) wire rope. Order one per rope.

HEAVY DUTY RTS ROPE TENSIONING SYSTEM

Part Number	Description
WR-RTS-A	Heavy duty RTS system, including control unit, power supply, USB cable for PC connection, T-handle allen wrench (for attaching sensors to rope), six (6) sensors and hard-shell case.
WR-WRS-A	Additional wire rope sensor and couplings for 1/2 - 3/4 in (13 - 20 mm) wire rope. Order one per rope.

LM3D CONTROL UNIT FOR LOAD WEIGHING DEVICES

Part Number	Description
LM3D-EMC-CSA	LMC control with three relay outputs and one 0-20, 4-20 or 0-24 mA analog output, 115VAC
LM3D-EMC-CSA-5V	LMC control with three relay outputs and one voltage (not current) analog output, 115VAC
LM3D-EMC-CSA-220	LMC control with three relay outputs and one 0-20, 4-20 or 0-24 mA analog output, 220VAC
LM3D-EMC-CSA-POD	LMC control with same features as LM3D-EMC-CSA-220 but configured to operate with systems having a pre-opening doors option

LW-WR LOAD WEIGHING SENSORS

Part Number	Description
LW-WR-SENSOR-38	WR load weighing sensor, for individual 10 mm • 3/8 in. ropes - LM3D-EMC-CSA control unit required - see above. Automatic calibration. The WR attaches to individual ropes, operating capacity of 1200 kg • 2645 lbs per rope. Up to eight WR sensors can be wired into a LM3D-EMC-CSA unit.
LW-WR-SENSOR-12	WR load weighing sensor, for individual 13 mm • 1/2 in. ropes - LM3D-EMC-CSA control unit required
LW-WR-SENSOR-58	WR load weighing sensor, for individual 16 mm • 5/8 in. ropes - LM3D-EMC-CSA control unit required