

Ron Crane Scales

Industrial Systems Training

45
Years

OF MEASURING
EXCELLENCE



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Introduction

For 40 years Eilon Engineering has designed and manufactured dynamometers, crane scales, load cells and overload detectors. Our products are designed, from the ground up, with a focus on safety, quality, simplicity of use and suitability for a wide variety of applications and situations.

The majority of our systems are sold to:

- Industrial manufacturing
- Wind turbine operators and installers
- Oil & gas industry
- Offshore operations
- Shipping companies
- Utilities
- Crane supply companies
- Safety inspection firms

Although our systems are generally used for weighing during lifting they can also be used for horizontal force / tension measurement like drag / pull force measurement, controlled cable tensioning and other applications such as:

- Overload prevention: Protect your personnel and vital infrastructure from overloads caused by human error
- Periodical Crane Safety Testing: Perform annual inspections on cranes, hoists and various load bearing structures
- Bollard Pulls: Test the drag force of tug boats, tractors and similar equipment
- Foundries: Determine the precise amount of molten material in a ladle or crucible and control the composition of your metal through the use of small additives.
- Controlled cable tensioning and monitoring: Ensure proper guy wire installation and monitor tension loads in any cable.
- Shipment Weighing: Determine precise weights for incoming raw materials or finished product
- Weighing during manufacture: Any time a lift occurs is an opportunity to measure and confirm weight.

At the heart of most our products is a group of strain gauges providing an analog signal that is translated to a digital measurement by our electronics and is displayed as a digital load value.

Load values can also be outputted as a voltage or current modulated signal, as a serial data stream or recorded into the built in memory of our indicators.

We offer five main product families:

- Dynamometers:** Designed for general weighing or tension measurement and monitoring. Featuring a unique design with 90 offset between shackle holes, they are meant to be used with a top and bottom shackle or integration into suitable structures. Can be used horizontally, vertically or any other orientation.



- Crane Scales:** Meant for general weighing, these products feature a bottom hook and the same 90 degree offset as our dynamometers.



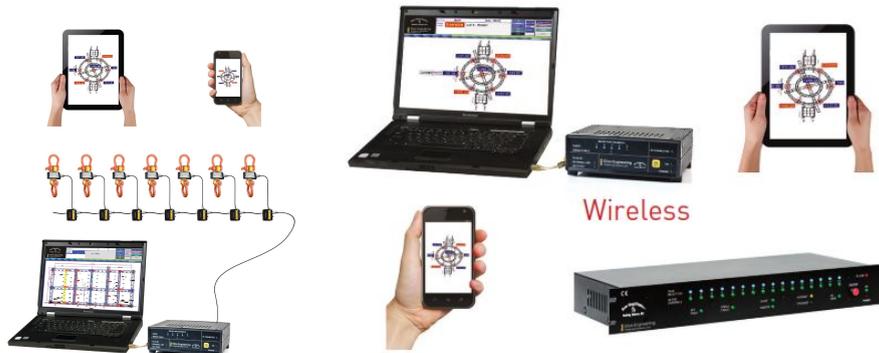
- Load cells:** Identical to our dynamometers but lacking a digital indicator, these systems provide users with an analog signal, current modulation, voltage modulation or both. These products are generally used in combination with programmable logic controllers and similar devices.



- **Overload detectors:** Our electro-mechanical overload detectors are designed for easy detection of overloads and under loads, without the need for complicated control systems. Overloads or under loads trigger a switch which can activate alarms, emergency stop or any other relay logic based control system.



- **Ron CraneMaster:** The Ron CraneMaster is an advanced multi-point load monitoring system, capable of handling a practically unlimited number of wireless crane scales and dynamometers simultaneously. The Ron CraneMaster is ideal for complex lifting, stage rigging and advanced logistics and stock management.



Models

Our complete line of products includes a wide selection of models at different levels of sophistication, and a variety of shapes and functions, which enable us to meet any customer requirement, application, or budget. For our customer's convenience, we have developed our load monitoring systems in more than 20 different capacities ranging from a half ton up to 300 tons.

As explained in the previous section, our industrial products are divided into five main product families.

- Dynamometers
- Crane Scales
- Load Cells
- Ron CraneMaster
- Overload detectors

Some models are available as Dynamometers or Crane Scales, while others only fit in one of the categories mentioned above.

All of our load monitoring systems, with the exception of the Ron 4000 and Ron 1000, perform basic weight measurement functions, such as Zero, Tare and Peak Hold. Our wide variety of additional options allow for further customization making our systems extremely suitable for almost any application letting customers purchase a system that works the way they want it to.

Ron 2000:

The Ron 2000 is the most basic and economical of our complete load monitoring systems. It features a wired connection to the load cell and simple hand-held indicator with a half inch, 12mm lcd display.

Available as a dynamometer or crane scale it is one of our most popular products.

The Ron 2000 can be ordered in capacities up to 300 tons for the dynamometer version and up to 30t for the crane scale version.



Ron 2501:

Similar to the Ron 2000, but featuring reliable wireless communication between the load cell and indicator. The Ron 2501 features a transmission range of up to 150m or yards, in outdoor line of sight conditions. Wireless communication allows for operators to maintain a safe distance between themselves and the load without the limitation of a cable's length. Wireless load cells are also equipped with IP67 environmental protection. Like the Ron 2000 the Ron 2501 features a hand-held indicator with a half inch 12mm indicator LCD, but can also be ordered with a robust aluminum indicator with a LCD screen size of 1 1/25mm or 2 1/50mm. The Ron 2501 can be ordered in capacities up to 300 tons for the dynamometer version and up to 30t for the crane scale version. The Ron 2501 is our best seller.



Ron 2125:

The Ron 2125 is a wired load monitoring system which features a robust aluminum indicator with 1 1/25mm backlit LCD display. The Ron 2125 allows operators to hold the indicator in their hand or attach it to the load cell for convenient viewing of measurements. The Ron 2125 can be ordered in capacities up to 300 tons for the dynamometer version and up to 30t for the crane scale version. It is only possible to attach the indicator to the load cell on systems up to 12.5 tons, for larger capacities the indicator is handheld only.



Ron 2150:

The Ron 2150 is a large display wired system with an easy to read 2"/50mm LCD backlit indicator and a robust aluminum housing. Like the Ron 2125 the operator is able to either attach the indicator to the load cell or simply hold it in his hand. The Ron 2150 can be ordered in capacities up to 300 tons for the dynamometer version and up to 30t for the crane scale version. Unlike the Ron 2125 there is no capacity limitation affecting the attachability of the indicator.



Ron 3025/3050:

The Ron 3025 and 3050 are our integrated display crane scales. The Ron 3025 features a 1"/25mm LCD display while the Ron 3050 comes with a 2"/50mm display. Both models can be ordered with an optional protective shock absorbing cage and optional infra red that allows the operator to Zero, Tare, activate Max/Peak Hold and turn off the system at the end of the day. The Ron 3025 is available up to 12.5t capacity while the Ron 3050 can be ordered up to 15t capacity.



Ron 4000:

The Ron 4000 is an analog load cell with built in amplifier, it does not include an indicator and is designed for use with programmable logic controllers (PLC's) or similar devices that are capable of interpreting an analog signal. The Ron 4000 is only suitable for very specific scenarios and customers that require it are generally aware that they require an analog load cell instead of a complete load monitoring system like the Ron 2000 or Ron 2501. Due to the limited scope of application for the Ron 4000, it is always a good idea to double check that the end customer requires a Ron 4000 and not a complete system like the Ron 2000 or Ron 2501.



Ron 1000:

The Ron 1000 is an economical adjustable overload/underload detector. Upon detection of an overload or underload the Ron 1000 can trigger any alarm, emergency stop or relay logic control systems. Generally used for overload detection the Ron 1000 can also be used to detect underloads, such as undesired slack in cables and chains.

The Ron 1000 is available in 3 different models:

- Ron 1000 Standard: for installation between two points by using shackles like in a hoist and it's trolley or mounting point.



- Ron 1000 Chain: for installation on a chain dead end



- Ron 1000 Hook: for installation on a hoist's top hook.



Ron CraneMaster:

Available in Wired, Wireless and combination wired/wireless versions the Ron CraneMaster is a full featured multi point load monitoring system. Capable of handling a practically unlimited number of wired or wireless crane scales and dynamometers simultaneously. Customers can use our Central Receivers for use with a computer or integration with complex control systems supporting the RS-232 protocol. Customers may also choose our pocket sized Portable Radio Receiver which will make it possible for them to view measurements from up to 40 wireless crane scales and dynamometers on their smartphone or tablet.

Our software, whether it be on a PC or a tablet, will allow customers to view measurements as a real time load map that can be overlaid on a diagram or picture.



Options

Carrying Cases:

All Ron 2000, Ron 2125, Ron 2150 and Ron 4000 dynamometer systems can be ordered with an optional Pelican sealed carrying case. Carrying cases are available in two sizes: Small and Large. Small cases are suitable for systems up to 20t and Large Cases are meant for systems between 25t and 50t capacities. For capacities above 80t the carrying case is always included. Systems that are ordered without a carrying case will be shipped with a protective foam insert instead. Carrying cases are not available for crane scale systems.



Cables:

All of our wired dynamometers and crane scales require a cable that runs from the load cell to the indicator. Some customers will require a longer cable. This can be achieved in one of two ways: The customer can order a longer cable, with pricing for each additional 5m/16' or the customer can order a spare extension cable to add length when needed. It is not possible for the total cable length to exceed 100 meter or to use more than 3 extension cables on a single system.

Data Logger:

All our crane scales and dynamometer can be ordered with a built in data logger. The data logger allows the user to record measurements for later analysis or record keeping. Our data logger offers two modes: Manual or Automatic. Manual mode requires that the user press a button on the indicator in order to record a measurement. In automatic mode the data logger will automatically record measurement based on a user configured time interval, meaning that measurement capture occurs at most once every second or at least once every month or any time interval in between, depending on what the user has configured.

The Data Logger comes equipped with an RS-232 serial output. Customers wanting to connect to a PC may require our USB adaptor.

Serial Outputs:

Eilon Engineering dynamometers and crane scales can be equipped with RS232 or RS485 outputs. Serial outputs can be used for downloading or printing of data logger contents or can provide a data stream of the system's measurements. Data output can be on demand, requiring operator interaction, or as a continuous stream that can be used by a control system that supports serial input. Serial outputs are supplied with a DB-9 connector, customers needing to connect to a PC may require our USB adapter. Please note that cable length for RS-232 is limited to 10 meters while RS-485 can be up to 700 meters.

Timestamps:

All of our data loggers come equipped with the timestamping option. Customers that order the previously mentioned serial output by itself may be interested in adding the timestamping option. The timestamping option simply adds timestamps to the measurements that are outputted by the serial output options.

Totalizers:

Totalizers allow users to record groups of individual measurements and calculate total. Can also be used to keep count of captured measurements. Totalizers are available in two types: Totalizer and Totalizer with data logging. The standard totalizer allows users to calculate totals and view them on the indicators screen or immediately print or output them to a PC using the optional RS232 serial output. The totalizer with data logging allows the user to record up to 5000 measurements in the indicator internal memory for later download or printing.

Analog outputs:

Some customers may want to integrate our system with existing control systems that do not support serial outputs. In these cases our analog output options may be the solution. Purchasing this option will add an output which produces an analog signal, this signal can be either current modulation (4-20mA) or voltage modulation 0-3V. Customers that require this option will usually be aware of this requirement. The analog output option is only available for wired crane scales and dynamometer and integrated display crane scales. Customers that require a system with an analog output but DO NOT require a display, should purchase a Ron 4000 analog load cell instead.

Setpoints:

Customers wanting to trigger existing alarms or emergency stops can order our setpoint option. The setpoint adds a dry contact switch to the indicator that will allow customers to trigger any device or control system they want. The setpoint is triggered by a user adjustable load value. The setpoint option is available with either one or two separate detection points each triggering a different dry-contact switch.

Alarm:

Excluding the Ron 2000, all wired crane scales, wired dynamometers and integrated display crane scales can be ordered with an optional audible alarm. The alarm adds a loud siren that is attached to the indicator. The siren is triggered by user adjustable load value and is generally used for overload detection but can also be used to notify operators that a desired weight has been reached.

Environmental sealing:

Our wireless load cells are equipped with IP67 sealing as standard. Wired systems are supplied with IP65 / NEMA 4 environmental sealing. IP65 will protect the system against most weather conditions. For customers required to protect the system from splashes of water common in offshore applications it is possible to upgrade the environmental sealing to IP67.

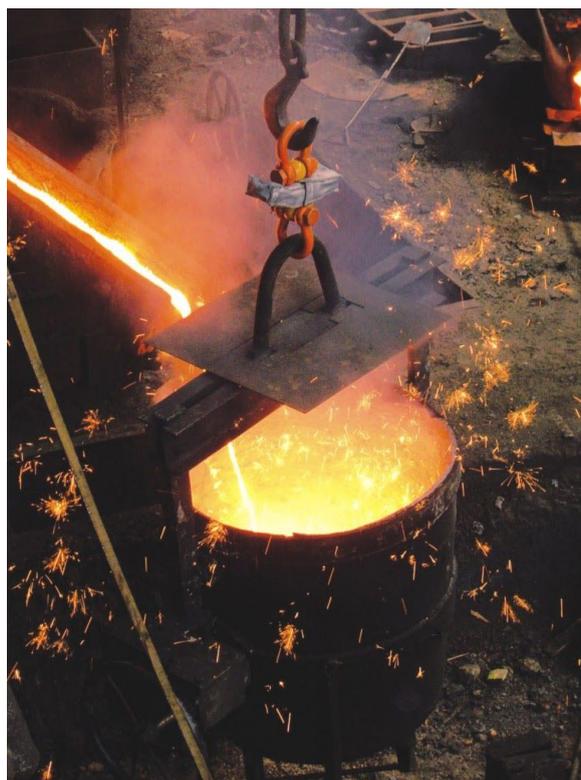
High Temperature Options:

Customers wishing to use their system in a high temperature environment such as a foundry will need to add our high temperature options:

Heat shield :consisting of a metal plate and thermal fabric jacket helps delay the rise in internal temperature.

Thermometer: Installed inside the load cell, the thermometer allows the operator to monitor the internal temperature of the load cell and prevent the maximum operating temperature of 80C from being exceeded. It is important to note that these options will not allow our systems to operate in a foundry environment indefinitely. The heat shield can only delay the rise in internal temperature; it cannot prevent it.

The only Ron Crane Scales model recommended for foundry use is the wireless Ron 2501. Wired dynamometers and crane scales cannot be used in foundries since the extreme heat will destroy any cable used.

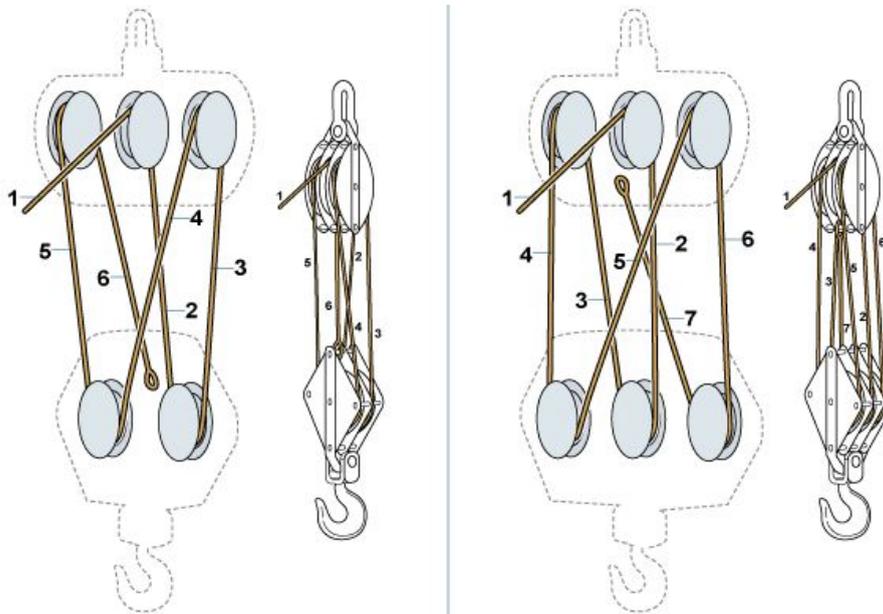


Averaging (dampening) Display:

Recommended for unstable loads like livestock, this option will calculate measurements based on the average of multiple readings. This option will not only shorten the time required to receive a stable measurement it makes it possible to measure the weight of a swinging load.

Rope Fall Multiplier:

Some customers need to install their system on what is known as the dead end of a wire rope or cable. This normally applies for cranes using multiple reeving or rope falls. Dead end installation results in the actual load placed on the dynamometer being several times less than the load below the hook. The load on the dynamometer equals the load below the hook divided by the number of rope falls. In order to receive accurate measurement of the load below the hook the system must be able to multiply the load measured by the dynamometer by the number of rope falls. Some cranes feature variable reeving configurations. The rope fall multiplier will allow users to change the configuration in accordance to the number of rope falls being used in order to correct measurements. Rope falls multiplier is available for all dynamometer models.



Dead End is represented by the loop at the end of rope 6 and 7

Transmitter:

All Ron Crane Scales dynamometers can be equipped with an additional radio transmitter for communication with wireless external displays and other accessories. The transmitter is capable of transmitting up to 100m away, outdoor line of sight.

Wireless RS-232 output:

Customers that have equipped the transmitter option are able to order our wireless RS-232 option. This option will provide the customer with a wireless receiver that possesses a RS-232 serial output. This option is particularly useful for customers that would like to integrate their Ron Crane Scales system with an existing control system or to gather data regarding their lifting or load monitoring activities without needing to run a cable from their load monitoring system to the control system or PC.

Additional Displays:

There are customers who desire the ability to display measured weight or loads at multiple locations, such as control rooms or need to display measurement using large easy to read displays. Additional displays are available in a variety of sizes ranging from ½” 12mm LCD to 5” 125mm LED. Displays can be ordered in either wired or wireless types. Wired displays require our Ron Display Port option and Wireless displays require the previously mentioned transmitter option.



Power supply options:

Customers have the option of ordering their system with rechargeable batteries, this option includes an external charger. There are customers who may wish to power their system directly from a power outlet, this option is available for all crane scale and dynamometer models. When ordered for the wireless Ron 2501 please note that it applies only to the indicator, the load cell remains battery powered.

Ron 3025/3050 options:

There are a couple of options that are exclusive to the Ron 3025 and Ron 3050. Integrated display crane scales may be ordered with a shock absorbing protective cage and an infrared remote control that allow the operator to activate zero, tare and peak hold options. The remote control also allows the user to turn off the scale at the end of the day.



Applications

Overload Prevention:

Anytime a load is lifted, the potential for overload is present. Accurate measurement of the load is critical to preventing dangerous overloads. Constant load monitoring provides an additional layer of protection to existing safety protocols and can protect you from overloads that may occur even when the load is known.



Periodical Crane and Hoist Safety Testing:

Authorised safety surveyors perform periodical safety tests on hoists, cranes and supporting structures in order to verify that they remain safe and capable of handling the loads placed on them during day to day operations. Authorised safety surveyors often use crane scales and dynamometers to perform these critical safety tests.



Bollard Pull tests & Drag Force Measurement:

Bollard pull trials are conducted in order to determine the static pull that a tug is able to employ in operating conditions. Dynamometers can also be used to measure and control the drag force of tractors with plows and can also be used by various rescue vehicles.



Foundries and High Temperature Industry:

Foundries and other high temperature environments where casting and forging activities take place have a basic need for a load monitoring systems that can withstand the extreme temperatures. The use of a load monitoring system allows a foundry to carefully control the addition of "small additives" preventing waste and giving the foundry greater control over the composition of their metal. Load monitoring systems can also allow foundries to determine the amount of material added to or remaining in a ladle without exposing personnel to the ladle itself.



Cable Tensioning and Monitoring:

Controlled cable tensioning of overhead electricity and communication lines helps reach optimal cable tension and avoid damage to cables due to changes in cable length caused by temperature changes. A wire pull test is also very important in suspension bridges and other structures that are stabilized and supported by steel cables and guy wire ropes. In these applications controlled cable tension helps reach optimal cable tension which is important for stabilization of such structures.



Shipment Weighing:

Anytime a shipment is sent out or received there is an intrinsic need for weight measurement. Crane scales and dynamometers make it possible to take the process of loading/unloading and turn it into an opportunity for detailed weight measurement and logging, helping to streamline the shipping/receiving process. Industrial crane scales for below hook weighing help to reduce costs and improve efficiency.



Weighing during manufacture:

In modern manufacturing facilities, load monitoring and overload prevention systems are necessary for maintaining the efficiency of day to day operations as well as adding a layer of safety. Crane scales and dynamometers allow users to gather important information by combining lifting and measuring into one step, eliminating the need for separate weighing stages during manufacturing. For example: Carefully monitor quantities of raw material to ensure accurate and successful manufacturing while increasing efficiency during manufacture and provide important information for stock management



Multi Point Load Monitoring

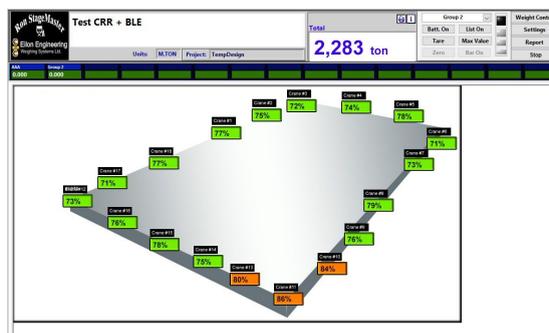
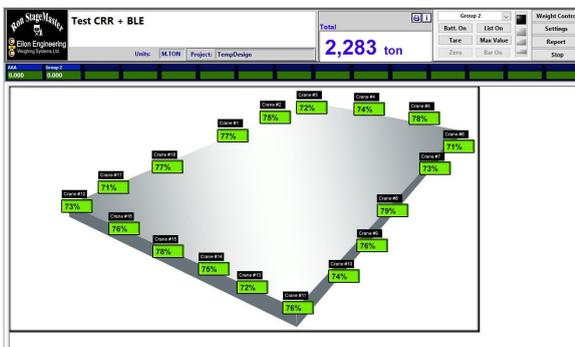
Multi Point load monitoring is important in several applications:

Heavy complex lifting

Any time a load is suspended using 3 or more hanging points it becomes statically indeterminate or hyperstatic, this makes it practically impossible to calculate or estimate the actual load placed on each point.

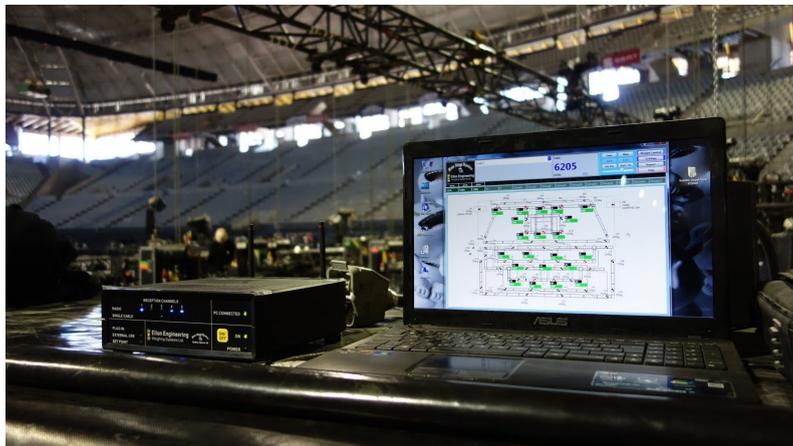
When a heavy object is lifted using several hanging points, load monitoring becomes crucial for maintaining the planned load distribution across each of the hanging points.

A real time load map with continuous measurements can help keep the weight of a heavy object evenly distributed during lifting and aid in the safe completion of a complex lift, protecting expensive equipment and even more importantly the lives of the people around it.



Safe Stage Rigging:

Concerts and other live events often employ complex rigging structures that could greatly benefit from the use of multiple point load monitoring systems that display all measurements on a real time load map. As previously mentioned any load suspended from 3 or more points requires the use of a load monitoring system in order to ensure appropriate load distribution. Live events often use 3 or more hoists to lift a single truss with tons of attached equipment. This single truss could be suspended above performers or audiences making safe load distribution a critical issue.



Advanced Logistics and Stock Management:

A multiple point load monitoring system can provide real time indication of resource utilization of multiple sites, automate routing of transportation fleets for either removal of stored material and/or supply of new material in a timely and efficient manner.

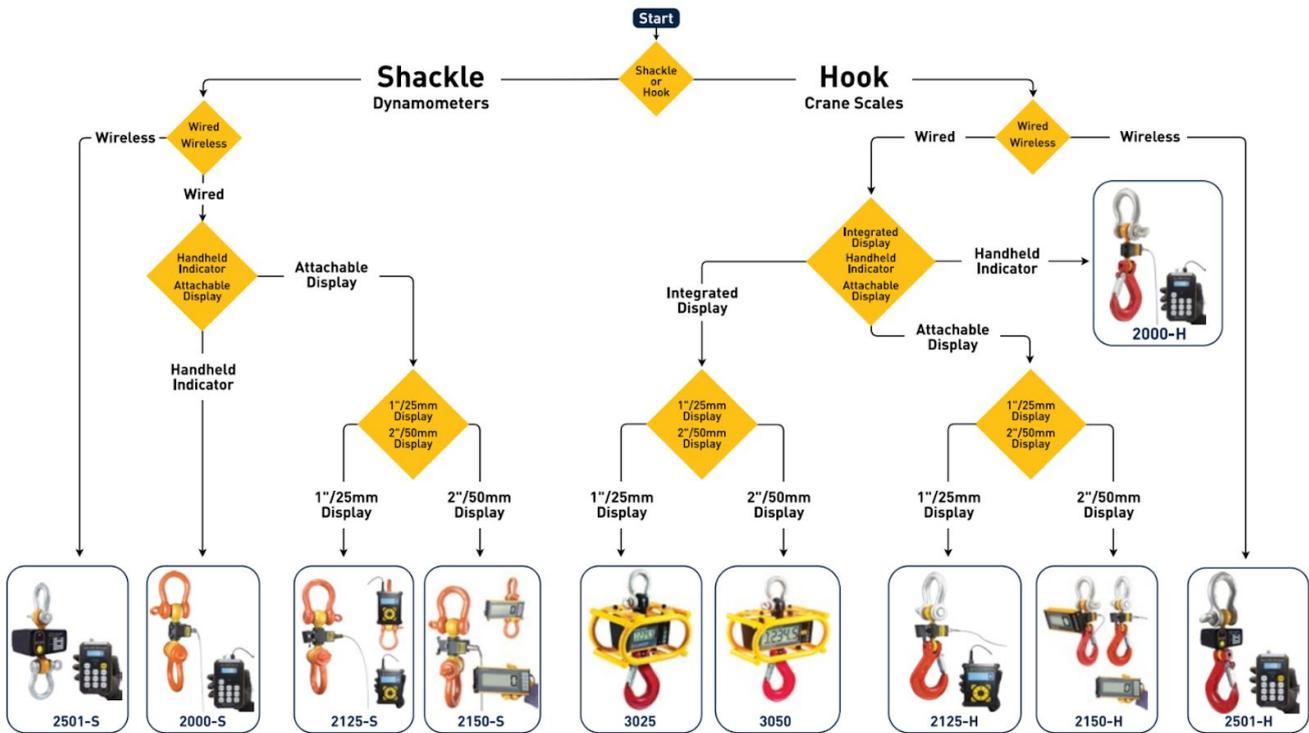
This real time information from hundreds of checkpoints can be shown as a real time load map in a control room, or view information from up to 40 load cells on smartphones and tablets.

Complex load monitoring can lead to a dramatic reduction in costs by helping to avoid spoilage, slack time, and poorly scheduled and routed transportation runs.

Examples would include emptying underground garbage bins, filling silos, provisioning ice, etc.

Model Selection

Model Selection Guide How to Choose the Right System for Your Needs



The first step in determining the correct model for you or your customer is deciding if a hook or shackle is required on the bottom part of the system. If the capacity required is above 30t, only shackle type dynamometers can be chosen. Hook Type systems, also referred to as crane scales, are only available up to 30 tons.

For capacities below 30t, the differences between shackle type and hook type systems are as follows: Shackle type systems are more portable, due to their light weight and can be supplied with a carrying case. They are also more suitable for horizontal force measurement.

Hook type systems, on the other hand, are more convenient for stationary use on a specific crane. The bottom hook makes it easy to hang slings, without needing to undo a shackle

From this point systems are split between wired and wireless systems.

Many customers find that wireless systems are more convenient to use in most applications making the Ron 2501 shackle type and hook type our best seller.

Systems are then separated depending on whether the indicator is hand held or attachable to the load cell. Hand held indicators allow operators to safely and conveniently read the measurements from a distance. While attachable displays make hands free operation possible.

Crane scales are also available as integrated display models for capacities up to 12.5t for the Ron 3025 and 15t for the Ron 3050.

Finally it comes down to screen size. A larger screen will be easier to read at a distance.

Customers & Case Studies

Customers:

Eilon Engineering's uncompromising attitude towards safety and quality gained Ron Crane Scales™ a global reputation of excellence and thousands of repeat customers with high quality and safety requirements like NASA, Boeing, GE, Siemens and many others.

Case Studies:

Scenario #1

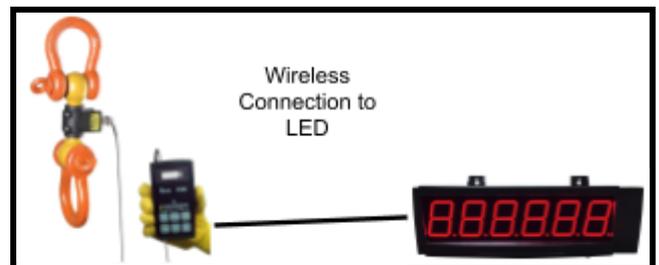
Customer explains that he is looking for a crane scale to fit his 20 ton crane in order to weigh incoming steel sheets for his pipe factory. He goes on to explain that in addition to a hand held indicator for the crane operator he would like a large screen mounted on the wall so other employees can take note of the measured weight.

He requests quotes for wired and wireless systems and asks for the least costly solution

Since this customer would like the least costly solution we will offer him our shackle type dynamometers since they are lower priced when compared to the hook type systems

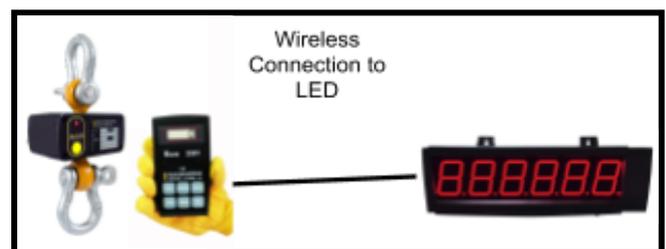
Quote 1:

Ron 2000 S-20 20 ton wired shackle type dynamometer
Transmitter for communication with an additional display
5" LED wireless display for mounting on wall



Quote 2:

Ron 2501 S-20 20 ton wireless shackle type
dynamometer
Transmitter for communication with an additional display
5" LED wireless display for mounting on wall



It is important to note that although the Ron 2501 is a wireless system, the load cell cannot communicate directly with the external display. Measurement must be calculated by the indicator and then transmitted to the external display using the transmitter option.

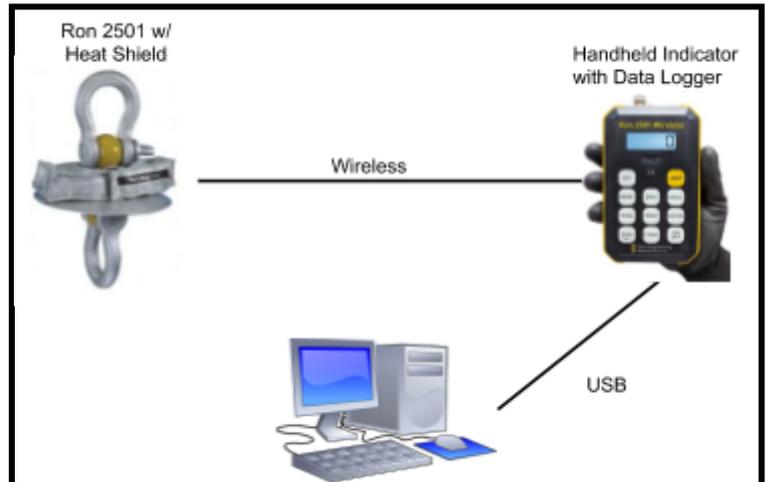
Scenario #2

The Customer would like to weigh the amount of molten material in a ladle at his foundry. He would also like to record the weight of each ladle for later analysis and record keeping on his PC. Total weight of ladle and molten material is 45 tons.

Quote:

Ron 2501 S-50 50 ton shackle type dynamometer
Heat Shield
Thermometer
Data Logger
USB adaptor

As explained in our options section, the heat shield can only delay the rise in the load cell's internal temperature, it cannot prevent it. For this reason we always include the internal thermometer option so the operator can monitor the temperature and prevent it from exceeding the maximum operational temperature.



Scenario #3

The customer has a 100 ton crane on his ship and would like to add a scale for day to day weighing. Crane will be used while at sea and would like an easy to read display to be placed inside the operator's cab.

Quote 1:

Ron 2150 S-100 100 ton shackle type dynamometer
IP67 offshore sealing
Averaging Display

Quote 2:

Ron 2501 S-100 100 ton shackle type dynamometer
2" aluminum indicator instead of standard ABS
IP67 offshore sealing
Averaging Display



Since the customer did not specify if he would prefer a wired or wireless system, we will offer him both. The 2" display included in each quote will make it possible for the crane operator to read the measurement at a glance. IP67 sealing will protect the load cell from severe weather, splashes of water and accidental, momentary submersion of the load cell up to 0.5m. The averaging display will make it feasible for the operator to receive a dampened measurement of a load affected by the rocking of the ship while at sea.

Scenario #4

Customer has a gantry crane with twin hoists. He often uses both hoists simultaneously in order to lift wide loads. He would like a system that can give him the total load even when using both hoists. Maximum load that will be lifted using both hoists is 50 tons. Maximum load that will be lifted with a single hoist is 30 tons.

Quote:

Ron 2501 Multi Point with two S-30 30 ton load cells

This system will give him the option to view the measurements from both hoists as sum or the measurements of each load cell separately.

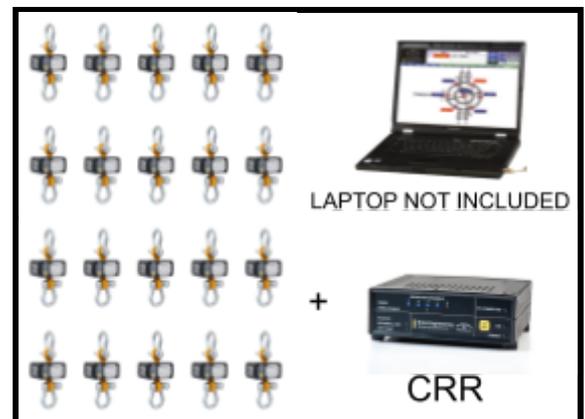


Scenario #5

Customer owns painting company that performs bridge renovations. In order to paint the bridge a large platform is suspended below it to allow personnel access to the underside. Platform is suspended using 20 suspension points spread throughout. Customer would like to continuously monitor each point in order to avoid accidental overloads as people and equipment move from one side of the platform to the other. His engineer has informed him that the maximum load that can be applied to a single point is 2 tons and would require a safety factor of 5:1 for any part added to the structure.

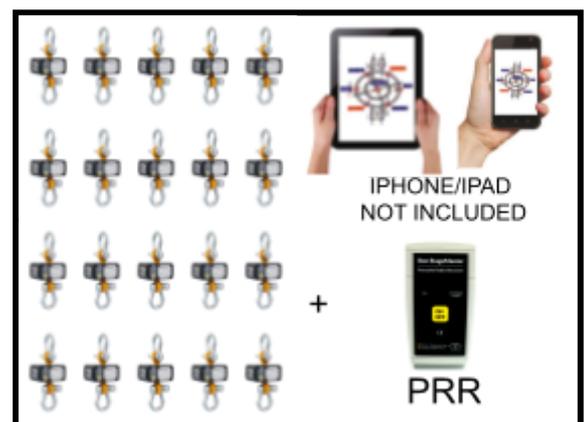
Quote 1:

Ron CraneMaster 6000 Wireless Load Monitoring System
20 x 2t capacity wireless dynamometers with 5:1 safety ratio
Central Radio Receiver for use with Mac or Windows Laptop.



Quote 2:

Ron CraneMaster 6000 Wireless Load Monitoring System
20 x 2t capacity wireless dynamometers with 5:1 safety ratio
Portable Radio Receiver for use with a tablet or smartphone



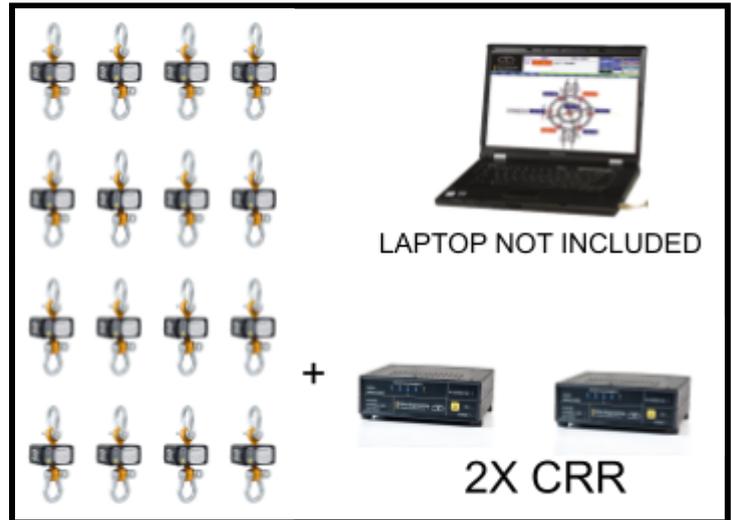
It may be possible that having a centrally located PC may not be feasible for this customer for this reason we have also offered him a Portable Radio Receiver. The Portable Radio Receiver can be added to the Central Radio Receiver or can operate independently.

Scenario #6

A shipyard that builds offshore oil rigs needs to lift a completed section weighing 1200 tons. They will be using 16 separate 200 ton capacity cranes and are seeking a load measuring system that will help them coordinate the operation of each crane in order to protect their personnel and significant infrastructure. They will coordinate the lift from two control rooms.

Quote:

Ron Crane Master 6000
Wireless Load Monitoring System
16x 200 ton capacity wireless dynamometers.
2x Central Radio Receiver



This system will allow two separate locations to view the measurement of all 16 dynamometers simultaneously. The customer will be able to display the measurement overlaid as a real time load map on picture of the area of operations. Each crane will be clearly identified with its corresponding dynamometer allowing for immediate and clear commands to each crane operator in order to ensure that actual load distribution matches what was originally planned therefore ensuring a successful lift.

Comparisons

There are several companies in the world that produce crane scales and dynamometers. In this section we will discuss some of the advantages that our systems possess when compared to those produced by other manufacturers.

Proven Technology and Design:

Eilon Engineering has been designing and manufacturing load measuring systems since 1976. Our 40 years of experience and unwavering commitment to safety and quality has earned us repeat customers like NASA, Boeing and Lockheed Martin.

Fatigue Rated Load Cells:

Load cells which have been fatigue rated are capable of a practically unlimited number of load cycles. This means that a load cell can be brought from zero load to maximum capacity a practically unlimited number of times. This ensures our systems have a long operational lifetime and will remain safe to use in the long run.

Material:

Many manufacturers choose to use aluminum for their load cell bodies.

At Eilon Engineering our load cell bodies are made exclusively from high strength aerospace quality steel.

Design:

Unlike other dynamometers, our systems feature a unique structure with a 90 degree offset between shackle holes. This helps to eliminate bending of the load cell, ensuring accurate measurements and making our systems safer.

Dimensions:

Our exclusive use of high strength steel allows our company to produce the smallest and lightest dynamometers possible. This makes our systems highly portable and ensure minimum headroom loss in any application

Battery Life:

Eilon Engineering systems feature market leading battery life. While others boast a few hundred hours of operations, our systems are capable of operating continuously for 2000 hours, that's nearly 3 months of non-stop weighing or monitoring. (optional 4000 hours - Ron 2501)

Heavy Duty Design with Shock Absorbing Mechanisms:

All Eilon Engineering systems have been designed for long term heavy duty operation, in mines, foundries and factories. Their robust design ensures reliability and a long operational life time even in harsh conditions. We often perform service on systems that are over 25 years old. All the electronic boards are attached through dampening mounts

Short Delivery Time:

Our on site manufacturing facilities and extensive inventory allow us to fulfill orders within 2-3 business days while still allowing us produce made to order, bespoke systems that can meet every customer's needs. Rush ordering is also available for urgent purchases.

Flexibility:

Due to our wide range of options, it is possible to customize our systems to meet nearly every conceivable application and mode of operation. Integrate with nearly any controller or use in a wide variety of environments. Simply describe your ideal system and let us build it for you

Example Comparison - Wired System

Category	Ron 2000 5t Capacity	Alternative 5t Capacity
Load Cell Raw Material	High Quality Aerospace Steel	2024 Aluminum
Dimensions - Height (Headroom Loss)	105mm	207mm
Weight	0.5 kg.	2.9 kg.
Environmental Protection	IP65	IP55
Accuracy	0.1%	0.2%
Proof Load	200%	150%
Battery Life	2000 Hours	150 Hours
Operational Temperature	-25°C to +80°C	-20°C to +70°C
Fatigue Rated	Yes	No
90° offset for eliminating bending	Yes	No

Example Comparison - Wireless System

Category	Ron 2501 12.5t Capacity	Alternative 12.5t Capacity
Load Cell Raw Material	High Quality Aerospace Steel	Aluminum
Dimensions - Height (Headroom Loss)	131mm	257mm
Weight	1.4 kg.	4.3 kg.
Environmental Protection	IP65	IP65
Accuracy	0.1%	0.2%
Proof Load	200%	150%
Battery Life	2000 Hours	450 Hours
Operational Temperature	-25°C to +80°C	-20°C to +40°C
Fatigue Rated	Yes	No
90° offset for eliminating bending	Yes	No
Transmission Range (Outdoor, line of sight)	150m	40m

Customers and distributors are welcome to send us information about alternative products. We will gladly prepare comparison tables similar to the ones above.

Service & Repair

All Eilon Engineering systems undergo stringent quality assurance procedures per our ISO 9001 certification and are calibrated in our on site calibration lab prior to shipping. Systems are shipped with a NIST traceable calibration certificate.

As with all weight measuring systems, the time will come when our systems require recalibration. The time between calibrations is determined by the customer. A customer can determine if a system requires calibration using the procedure described in our manual, which should be performed every six months. If the self calibration check results show that the calibration is outside of the systems specifications a lab calibration should be performed.

Calibration systems can be performed by any facility certified to perform force calibrations using the detailed calibration instructions included with all of our systems.

Damaged or faulty systems can be repaired at our facilities or at one of our authorized service providers. Eilon Engineering systems have an exceptionally long operational lifetime with systems older than 25 years often brought in for service.



CERTIFICATE OF APPROVAL

This is to certify that the Quality Management System of:

Eilon Engineering Industrial Weighing Systems LTD
1 Haetgar Str. Tavor Bldg.
Industrial Park Tirat Hacarmel
Israel

has been approved by Lloyd's Register Quality Assurance to the following Quality Management System Standard:

BS ISO 9001:2008

The Quality Management System is applicable to:

Design and Manufacture of Force & Load Measurement Systems and Calibration of such systems, incorporating to the requirements of ANSI Z540.

Approval Certificate No: PIR6008332 Original Approval: 03 October 2009
Current Certificate: 06 October 2014
Certificate Expires: 05 October 2017

Issued by: Hellenic Lloyd's S. A. for and on behalf of Lloyd's Register Quality Assurance Limited



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For and on behalf of Hiramford, Middlemarch Office Village, Siskin Drive, Coventry, CV3 4FJ, United Kingdom
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Single Point Load Monitoring - FAQ

- **What are the differences between dynamometers and crane scales?**

The most noticeable difference between a dynamometer and a crane scale would be the presence of shackle at the top and bottom of a dynamometer while a crane scale features a hook on the bottom.

Crane scales are more suitable for vertical load and weight measurement and dynamometers can be used to measure load and tension in any direction. Due to their low weight and compact dimensions dynamometers are more portable and therefore more suitable for on-site/field work. Dynamometers can be ordered with an optional carrying case.

- **Why is it vital from a safety point of view to monitor loads that are being lifted by cranes and hoists?**

Any time a load is lifted, the potential for overload exists. Accurate measurement is paramount in the prevention of dangerous overloads. Even when it is assumed that load parameters are known, dangerous overloads can still occur. Here are a few scenarios:

- Attempting to lift equipment which has not been freed from its anchor points
- Miscommunication between personnel responsible for lifting
- Addition of equipment after the load has been calculated and approved
- Off-center loading
- Uneven load distribution when using multiple lifting points, can potentially cause accidental overload, Even if the lifted item's weight does not exceed the total load limitation.

- **Are there other advantages, in addition to increasing safety, to load monitoring and overload prevention?**

In addition to safety, load monitoring can both increase efficiency and reduce costs:

- Precise weighing of incoming raw materials and outgoing shipments provides important data for inventory control
- Streamlining of manufacturing processes: every time a lift is performed, weight can be accurately measured
- Foundries can use load monitoring to carefully control the addition of "small additives", thereby preventing waste and affording the foundry greater control over the composition of their metal

- **What are the main advantages of Ron Crane Scales?**

Ron Crane Scales main advantages are:

- Lightweight and portable
- Heavy duty designs with shock-absorbing mechanisms
- The exclusive use of high grade aerospace steel for load cell bodies
- Shackle holes offset 90 degrees to reduce bending of the load cell - results in increased safety and accuracy
- Battery life of up to 2000 hours using common alkaline batteries (optional: up to 4000 hours on the wireless Ron 2501)
- Compact dimensions ensure minimal loss of headroom
- Short delivery time - in most cases 48-72 hours
- Reliable transmissions: Our wireless systems are programmed to ensure that the displayed value is identical to that transmitted
- Four decades in the market with repeat customers such as NASA, Boeing, GE, Lockheed Martin, as well as numerous other organizations and companies.

- **What standard of service can I expect?**

We have service centres worldwide providing real time support: we are available almost 24/7 by either phone or email and we are soon adding online chat as well.

- **How accurate are Eilon Classic load cells?**

The Eilon Classic accuracy rate is +/- 0.1% of full scale.

- **What is the relationship between Eilon Engineering, Ron StageMaster, Ron Crane Scales and Ron CraneMaster?**

Eilon Engineering, established 40 years ago, is the company who designs, manufactures and markets all our products. **Ron StageMaster™** is the brand name of our innovative, wired/wireless load monitoring & overload prevention system for live events that provides an additional layer of safety for convention and trade show centers, arenas, opera houses and companies, like Cirque du Soleil and events like the MTV Video Musing awards. **Ron CraneMaster™** is the brand name of our advanced multi-point load monitoring system for complex lifting and advanced logistics in industrial applications. **Ron Crane Scales™** is our brand name for the industrial market for valued customers like NASA, Boeing, GE, Siemens, Lockheed Martin and many, many more.

- **Are there copies of the Eilon Classic on the market?**

Unfortunately, as with any successful and leading product in the market, our Eilon Classic load cells have fallen prey to this syndrome, and an inferior copy is being marketed by a different company under a different brand name. So do beware! And for ultimate safety and protection, make sure



what you are purchasing is a **Ron StageMaster™**, **Ron CraneMaster™** or **Ron Crane Scales™** system manufactured by **Eilon Engineering**.

- **When is it recommended to use wireless load cells vs. wired load cells?**

Eilon Engineering manufactures both. It mostly depends on whether the presence of a cable between the load cell and indicator would hinder day to day operations. Wired systems cannot be used in foundries and other high temperature environments since the risk of damage to the cable is high. Wireless systems are also easier to install and are not limited by the length of a cable. The downside of a wireless system is that, like any system relying on radio transmission, it is susceptible to interference and other transmission issues. In scenarios where the reliability of communication between the load cell and indicator is an absolute must (e.g. activating E-stop upon detection of an overload), wired systems are recommended. Additional wireless displays can be added to any wired system to allow measurements to be read wirelessly.

- **Which capacities and safety factors are available?**

Eilon Classic load cells are available in any capacity up to 300t

- **What are the Eilon Engineering load cells made of ?**

All Eilon Engineering load cells are made of high quality, aerospace steel.

- **Are all Eilon Engineering load cells fatigue rated and what does that mean?**

Yes, all Eilon Engineering load cells are fatigue rated, which means that the lifetime of load cell is not limited to by number of loading/unloading cycles (as long as the safe working load is not exceeded).

Multi Point Load Monitoring - FAQ

This section discusses multi point load monitoring in live events with our Ron StageMaster. The engineering challenges of lifting heavy, complex structures and the consequences unpredictable load distribution, are the same whether the application is for entertainment or for industrial use. Therefore the concepts described below apply to our Ron CraneMaster Industrial Load Monitoring system.

- **Why is it vital to monitor loads at LIVE EVENTS when heavy light, sound and video equipment is hanging above the audience?**

In our modern era, live events are characterized by ever more complex arrays of dynamic light, audio and video equipment, often resulting in tens of tons of massive equipment being suspended directly over people's heads - creating a huge safety challenge.

- **If I know the weight of each speaker, light and video wall, is that data not sufficient to prevent overload?**

Unfortunately not. The problem lies not just in the total weight of the suspended load but in the load distribution: Each time there are more than two hoists on a truss or more than three hoists in a structure, it becomes statically indeterminate, resulting in unpredictable load distribution. In most cases this will cause a load imbalance, in which some of the hoists may reach overload while others carry only a small part of the load. This is a highly undesirable situation that can result in dangerous overload.

- **How can I immediately identify an overload as it starts to develop?**

For simple integration with the rigging plan, the software enables overlay of the load map right onto the rigging plan on screen, making it easy to see where motors and loads are situated. Or - you can even just take a snapshot with your iPhone of the venue structure, and use the resulting pic as the rigging plan. The fact that the load cells on the load monitoring map reflect their real position, enables the rigger to immediately identify the location of a potential overload and take swift preventative action. The set point option has an overload/ under-load alarm (visual and audible) that automatically instigates immediate motor stop in the event of an overload.

- **How many load cells are required in order to ensure safe suspension of equipment above the audience?**

The more hanging points with a load cell installed – the safer the entire installation. But you can still start off small and expand over time. We have starter kits with just 4 load cells, mini-kits with 8, midi-kits with 12 and the ideal for maximum safety is to install a load cell on each and every hanging point.

- **Why is it important to continuously monitor the loads?**

Continuous load monitoring from the moment of installation, continuing throughout the entire duration of the show and until tear down is of crucial importance to prevent overloads. Sleep or stand-by modes are not acceptable from a safety perspective. Even when the power is shut off after setup is complete, it is essential to continue monitoring the loads, as overloads can occur at any time due to unpredictable occurrences such as lifting or suspending device that fails thus causing a different load distribution, or the addition of more equipment that someone decides to hang at a later stage.

- **When the power is shut off after setup, how can I continue to monitor the loads?**

Ron StageMaster's unique, extremely long battery life of 5000 hours provides continuous load monitoring which is paramount for optimal safety.

- **What are Ron StageMaster's main advantages?**

Ron StageMaster system advantages:

- Bluetooth compatibility with iPhones / iPads (no Wi-Fi required)
- Average response time less than 1 second for up to 200 load cells
- 0.1 percent accuracy with Eilon Classic load cells
- 24/7/365 continuous load monitoring
- Unbeatable standard battery life up to 5,000 hours
- Extreme range up to several km/miles
- 200 load cells per monitoring station
- Proven wireless technology since 1976
- Fatigue-rated load cells

- **Why are Eilon Classic load cells superior to shackle pin load cells?**

Unlike the Eilon Classic load cells, the shape of shackle pin load cells does not deliver high accuracy, linearity and repetitiveness.

- **How fast do the measurements update on the real time load map?**

Ron StageMaster has an extremely short response time by monitoring up to 200 load cells per second.

- **How can I retroactively track the load monitoring of a specific event that took place several weeks or even months ago?**

Ron StageMaster provides a record at the end of each event that contains data reports collated over the last few months, and even sends SMS alerts. Reports include loads of all load cells at a rate of one per second.

- **How accurate are Eilon Classic load cells?**

The Eilon Classic accuracy rate is +0.1% of full scale.

- **How long will the batteries last before I need to replace them?**

Unique battery life provides up to 5,000 hours of continuous monitoring. You can see the battery life status on-screen at any time and a low battery alert appears when approximately 30-50 hours of full battery strength remain.

- **Is overload of up to 10% allowed?**

No, any overload is strictly forbidden.

- **Over which technology do the wireless load cells transmit?**

The Ron StageMaster load cells transmit over radio Frequency (RF) technology.

- **Will other wireless transmissions or the many steel structures that are common in live events affect the wireless signal of Ron StageMaster?**

Our wireless technology successfully overcomes all these challenging environmental conditions and Ron StageMaster continuously provides a strong and reliable signal. Decades of intensive experience with projects for the aerospace industry (especially in launching sites – e.g. NASA), has enriched our know-how and expertise - all of which has been implemented in the Ron StageMaster systems.

- **Can I see the real time load monitoring map on my smartphone?**

Absolutely! That's what it's all about .. you can see the load map on your laptop screen with our CRR (Central Radio Receiver), and/or directly on your smartphone or tablet screen using the PRR (Portable Radio Receiver).

- **What is the maximum number of Ron StageMaster load cells that can be monitored?**

The PRR (Portable Radio Receiver) displays measurement data for up to 40 load cells. The premium CRR (Central Radio Receiver) displays measurement data for up to 200 load cells. You can use as many CRRs as you need in accordance with the total size of each specific event - making the maximum number of monitored load cells practically unlimited. You can combine the use of CRRs (for maximum monitoring capacity) and PRRs (for ease and comfort of use for riggers) on the same site.

- **What is the transmission range of Eilon Classic load cells?**

The range is up to 150 yards / meters (line of sight, outdoor). Optional extended ranges are available for up to several kilometres/ miles.

- **Is it possible to monitor the loads in several halls from one control room?**

Yes, it is possible, using the Ron StageMaster Slave / Master / option as well as data export by Ethernet.

- **How can I receive an overload warning even if I am not on site?**

Ron StageMaster offers an SMS text alert option which enables sending text message to pre-defined phone numbers in the occurrence of any overload.

- **What standard of service can I expect?**

We have service centres worldwide providing real time support: we are available almost 24/7 by either phone or email and we are soon adding online chat as well.

- **What is the relationship between Eilon Engineering, Ron StageMaster and Ron Crane Scales?**

Eilon Engineering, established 40 years ago, is the company who designs, manufactures and markets all our products. Ron StageMaster™ is the brand name of our innovative, wireless load monitoring & overload prevention system for live events, that for 10 years has been successfully protecting conventions, trade show & cultural centers, arenas, opera houses and world famous TV and theatrical productions spanning the entire globe including Cirque du Soleil, Metallica, MTV Video Music Awards, Elton John, Mamma Mia ,The Blue Man group, and many others. Ron Crane Scales™ is our brand name for the industrial market for valued customers like NASA, Boeing, GE, Siemens, Lockheed Martin and many, many more.

- **Are there copies of the Eilon Classic on the market?**

Unfortunately, as with any successful and leading product in the market, our Eilon Classic load cells have fallen prey to this syndrome, and an inferior copy is being marketed by a different company under a different brand name. So do beware! And for ultimate safety and protection, make sure what you are purchasing is a Ron StageMaster system manufactured by Eilon Engineering.

- **When is it recommended to use wireless load cells vs. wired load cells?**

Eilon Engineering manufactures both. In permanent installations it is usually recommended to use wired systems, while the wireless, "Plug and Play" system is usually the preference in all other instances, since installation is fast and easy, and eliminates messy cabling and lengthy setup time.

- **Which capacities and safety factors are available?**

Eilon Classic load cells are available in any capacity up to 300t, in either 5:1 or 10:1 safety factor.

- **Is it possible to pre-set different overload limits for different load cell groups?**

Yes, of course. You can preset up to 15 different groups, each with its own overload and underload limits. Each load cell can be part of several groups and at the same time have its own overload and underload limitation as an individual load cell.

- **What are the Ron StageMaster systems composed of?**

The system is composed of load cells (you can combine different capacities and safety factors), carrying cases (or flight cases) and receiver/s – desk (CRR), portable (PRR), 19" rack or a combination of all of these.

- **What are the Eilon Engineering load cells made of?**

All Eilon Engineering load cells are made of high quality, aerospace steel.

- **Are all Eilon Engineering load cells fatigue rated and what does that mean?**

Yes, all Eilon Engineering load cells are fatigue rated, which means that the load cell is not limited to the number of loadings during its entire lifetime (as long as the safe working load is not exceeded).