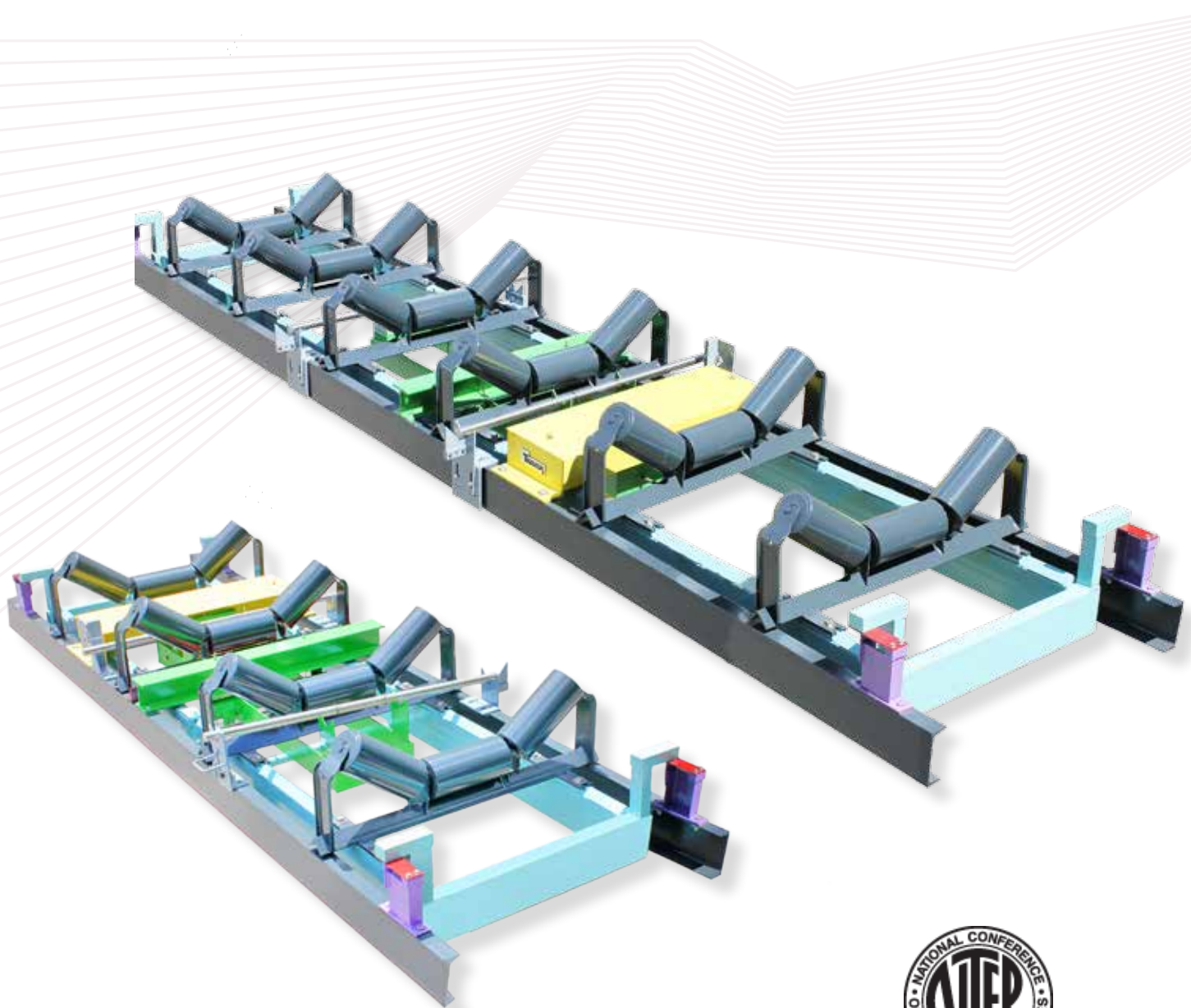


## Four and Six Idler Model NAR Approach-Retreat Conveyor Belt Scales NTEP CERTIFIED

SIMPLY THE HIGHEST PERFORMANCE BELT SCALES ON THE PLANET



## Four and Six Idler Model NAR NTEP CERTIFIED Conveyor Belt Scales

The THAYER NAR Belt Scales are designed to deliver exceptional stability and accuracy for use in applications requiring verifiable accuracy. They are recommended for applications requiring commercial certification for billing purposes. These Belt Scales have been proven in service demanding  $\pm 0.125\%$  accuracy through independent certification. The weigh bridge features exclusive rocking flexure suspension in the approach-retreat configuration. Measurement sensitivity is high, deflection is low, and the load cell is isolated from the error-inducing effects of extraneous lateral forces, off-center loading, foundation distortion, inclination hold-back forces, and high sporadic shocks and overloads. Tare load is mass counterbalanced to create superior signal to noise ratio in weight sensing, orders of magnitude better than belt scale designs supporting full tare load on the load sensor.

### ISOLATION LEVER AND "FMSS" MASS-COUNTERBALANCE

#### WEIGH BRIDGE

One of the most important components of a conveyor scale system is the design of the weigh bridge itself. Regardless of the type of load cell used, a belt scale will not be able to weigh lightly loaded material and maintain its calibration for long if certain design features are not in place.

#### Secondary Lever

THAYER employs a secondary lever system, even though it cost more to do so, because it permits the following:

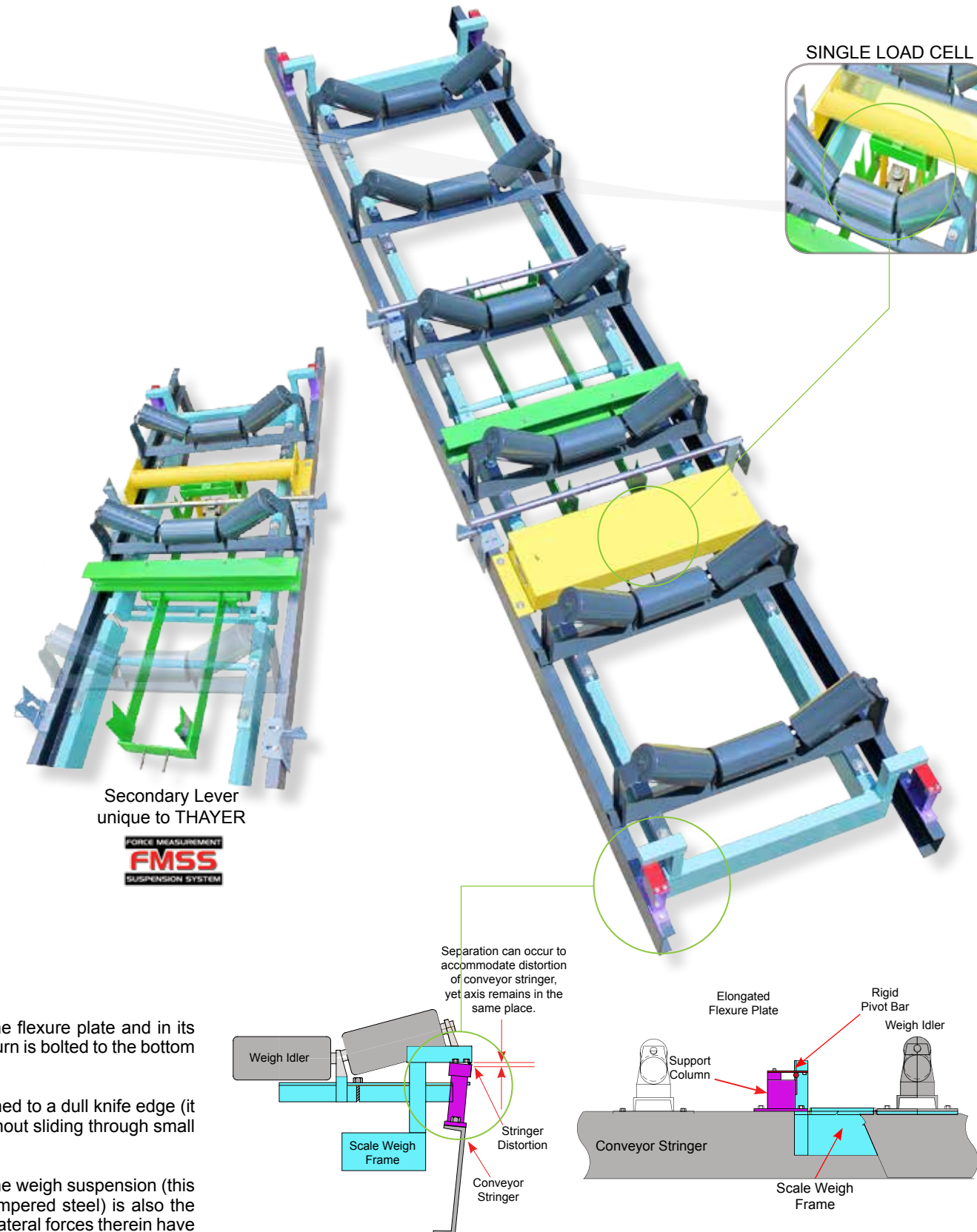
1. We can add mass (weight) to counterbalance the dead load (idler support frame, idlers, belts) and by using a secondary lever, we do not load down the suspension pivot.
2. The scale provides for complete mass counter-balancing of the dead load (idlers and belt) of the conveyor permitting the load sensor to react only to the net material load.
3. By positioning the load cell correctly, relative to the secondary lever we can match load cell size to the net loading. Only in this way can any capacity scale be supplied to the same high accuracy standards.
4. The resulting increased lever ratio of the secondary lever reduces idler deflection, providing additional immunity to errors associated with belt tension.
5. The secondary lever system utilizes stainless steel aircraft cables as flexural elements to transmit and FOCUS pure tension forces to the load cell. The cables, being non-extendable, but laterally yieldable connecting links, permit the lever to align itself under conditions of varying stringer distortion. This is a most significant feature. A belt scale must use the conveyor stringers as its mounting base. These stringers not only deflect under varying conveyor loads, but may also rotate (or twist). A suspension system having the least possible structural redundancy is therefore essential.
6. This unique system is not affected by dirt, shocks or vibration, and can withstand overloads in excess of 1,000 pounds without causing damage or affecting calibration.

### THAYER'S RF Flexure Suspension (patented)

The axis position is permanent, being held in its horizontal position by the flexure plate and in its vertical position by the load rod which bears on the flexure plate, which in turn is bolted to the bottom side of the square and elevated suspension extension shaft.

There is insignificant rotational hysteresis. While the load rod may be likened to a dull knife edge (it is round), the flexure plate bearing surface directly in contact can rock without sliding through small rotational displacement.

The reaction to lateral forces creates an insignificant moment transfer to the weigh suspension (this is part of the patent). Since the flexure plate (which is hardened blue tempered steel) is also the upper bearing block of the pivot, tensile or compressive forces reacting to lateral forces therein have no moment arm distance to operate.



### THAYER Load Cell Utilization Factor

The distinct specification of continuous belt scale weighing applications and the unique environment and operational issues those applications typically encounter, places too many requirements on the load sensing system for any single technology to completely satisfy. Therefore, using THAYER'S exclusive FMSS technology in the design of its belt scale suspension system allows the choice of using either its LC-137 LVDT Load Cell or its LC-174 Strain Gauge Load cell. This puts Thayer in a unique position that allows us to offer equipment to match a wide range of applications such as light material loading, severe environmental conditions, and commercial certification.

### LOAD CELL UTILIZATION FACTOR

The performance of a load cell and its instrumentation is specified on the basis of the load cell's rated output. If the load cell is supporting a quantity of dead-weight (i.e. idlers, belting, suspension system) and has been further oversized to accommodate problems of overload protection, off-center conveying, shock, vibration and negative integration, then the amount of range left to do the job of weighing is only a fraction of the cell's rated output. The percentage of the load cell's rated output reserved for the actual job of weighing material is called the LOAD CELL UTILIZATION FACTOR.

Thayer's "NAR" Belt Scales with "FMSS" Force Measurement Suspension System mass counter balance technology assures better than 80% Load Cell Utilization.

Provides :

- Field adjustable mechanical TARE balancing of dead loads typically as high as 200 times NET loads, thereby providing the full utilization of the load cell force range.
- Reduces deflection of load receptor to a fraction of load cell deflection.
- Reduces zero shifting as a result of foundation distortion.
- Provides preferred access location of load cell for inspection or removal.
- Simplifies the application of test weights for calibration/performance verification.

### THAYER LC-174 Strain Gauge Load Cell



The Model LC-174 NTEP Certified Load Cell is a Strain Gauge "S" Beam Load Cell that is housed in an enclosure that has identical mounting dimensions to that of the LC-137.

Available in force ranges from 25 to 2,000 lbs with an overload protection of 1.5% of rated output.

### THAYER SERIES 5200 INTEGRATOR

The simplest high precision Belt Scale Integrator in industry today, the SERIES 5200 is the product of a careful, well thought-out program to eliminate the fears of many scale users that electronic instruments are too complex for the average plant maintenance man.

- The SERIES 5200 Thayer Scale's new generation of operator interface for control and monitoring of any process weighing and flow control equipment.
- For use with any Strain Gauge or LVDT type load cell.
- Powerful internal 24 bit (1 part in 4,000,000) load resolution produces unparalleled system accuracy.
- Minimal customer wiring. The Scale Unit (SU-5200) mounted at the conveyor gathers load, speed and temperature data and communicates this information to the central processor (CPU) through a 2-wire RS422/485 connection.





**CALIBRATION**

A belt scale should be thought of as a precision instrument and its performance should be quickly and easily checked. Thayer Scale can provide an accurate reliable calibration using a calibrating weight instead of test chains for all scale capacities. Thayer Scale developed and patented the first automatic calibration system in 1971.

The 6RF-8AR uses a test weight in the form of a round bar which resides in one of two positions ("V" notches) on an intermediate lever between the approach-retreat suspension and the load cell itself. This bar provides tare counterbalance in its "zero" position, and simulated calibration loading in its "span" position. This method of "test weight" application is referred to as the "moveable-poise" method, in contrast to the additive weight method.

**THAYER TEST WEIGHT USING "SEE-SAW" SECONDARY LEVER**

On high capacity scales where it is impractical to apply the test weight directly to the end of the weighbridge because of the physical size of the test weight, a special arrangement of the secondary lever is used.

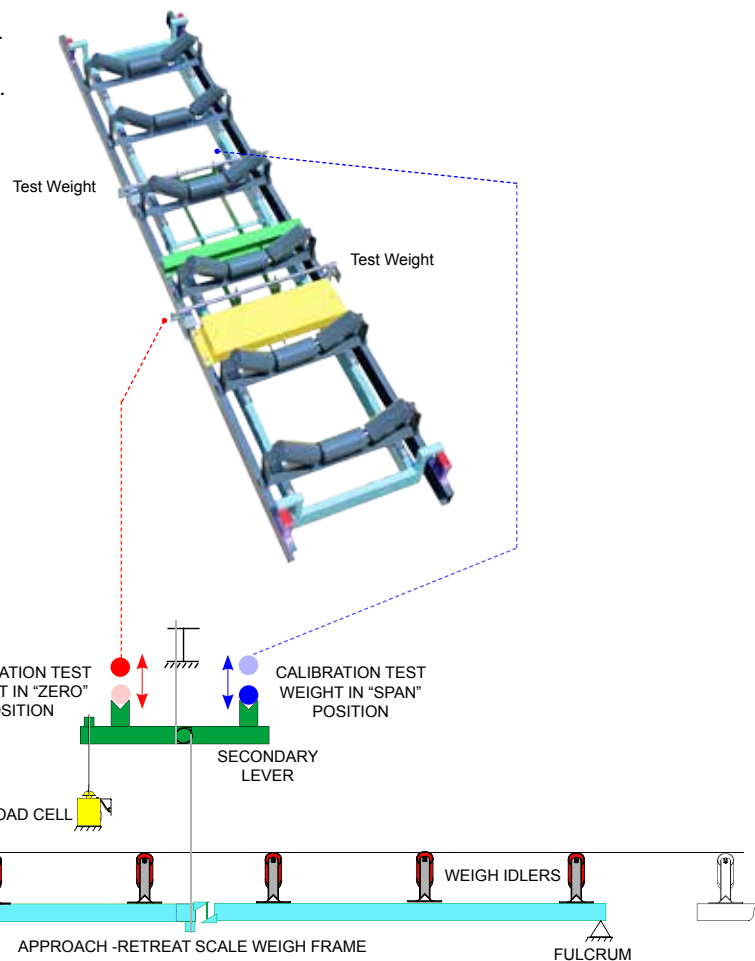
In this configuration, the test weight provides tare mass counter-balance in its "storage" position on the secondary lever and a test load of known value in its "calibrate" position. By taking advantage of ratios in the secondary lever, smaller, easily manageable test weight(s) can be used to produce significantly higher loading values. This method of applying the test weight does not introduce error on inclined conveyors. Since the test weight is on the scale at all times, its moments due to the sine component remains constant regardless of the test weight's position on the lever.

The weight is always present on the secondary lever, which also serves as a means to counterbalance dead loads and control the force range presented to the load cell. In the movable poise weight design the weight resides in either one of two locating "V" notches, but is never added or subtracted from the lever itself.

In one position, the weight serves as "counterbalancing" weight for a portion of the dead load. In the other position, the weight serves as the calibration test load. This unique method, whereby the movement of the weight alone affords the means to apply a large effective test load, is the only practical and economical system known for calibrating "heavily loaded" conveyor scales.

Key advantages:

- Test Weight more manageable. One man operation.
- Loading effect independent of conveyor incline.
- Longitudinal restraining elements not falsely loaded.



For belt scale calibration, the test weight represents a specific pounds per ft. loading value and the system instrumentation provides an automatic belt length measurement. This combination produces accurate, repeatable calibrations free from human error. Unlike electronic calibration which simply simulates a load cell output to the instrumentation, the test weight mechanically exercises the scale mechanism. Thayer's unique suspension design assures that the test weight will accurately load the scale, with one weight at less than 60 lb. while representing 80-100% of full scale load. Because the need for test chains is eliminated, calibration time is reduced to a matter of minutes and can be performed by one person

**CALIBRATION TEST WEIGHT LIFT & STORAGE**

Many plants have instituted safety procedures that prohibit operations personnel from being in close physical proximity to moving conveyors. Consequently, routine calibrations can become tedious as lock-out/tag-out procedures must be followed before test weights can be manually re-positioned. As most large conveyor belt drive systems allow for only so many re-starts in a given time frame, the calibration process can become time consuming, requiring extended process down time.

Recognizing that routine calibrations are more likely to be performed on a regular basis if they are easy to accomplish, Thayer Scale offers two different types of test weight placement methods. A "manual" system and an automated test weight placement system.

The manual test weigh lifter requires that the operator lift a lever to change the placement of the calibration weight. When using the Automated Test Weight Lifter (ATWL) the instrumentation automatically re-positions test weights at the proper time during the calibration routine, eliminating the need to stop and re-start the conveyor as well as eliminating the need for operators to be in close physical proximity to high speed conveyors. THAYER's Automated Test Weight Lift (ATWL) and Storage System provides quick, repeatable, and traceable calibration results without the need for operator intervention and with minimal process down time.

THAYER'S test weight lift and storage assembly provides a safe, convenient method of placing the calibration weight on the scale weigh bridge accurately and provides these advantages.

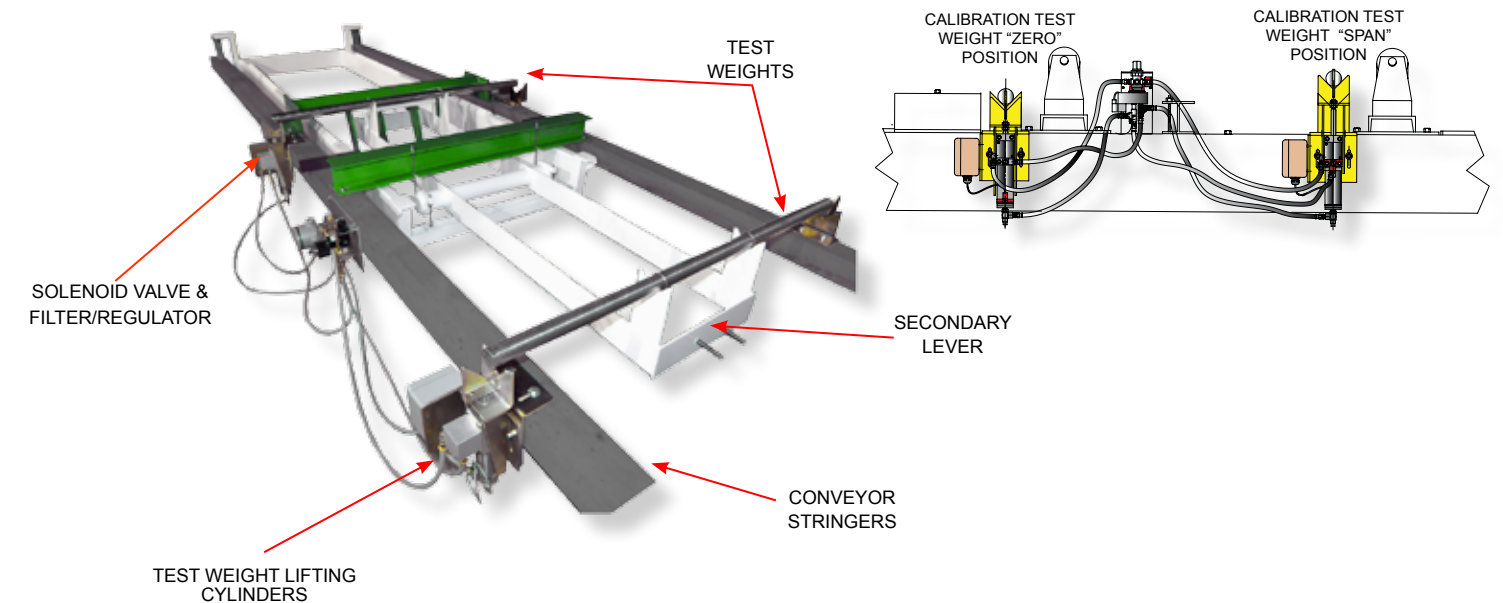
- SAFE-eliminates need to go between belt strands.
- EASY-permits one person to operate.
- CONVENIENT STORAGE-prevents loss or damage.
- REPEATABILITY-weight is ALWAYS positioned in the same location test after test.



**OPTIONAL AUTOMATED TEST WEIGHT LIFTER:**

THAYER's Automated Test Weight Lifter (ATWL) mechanism provides a means for applying a known CERTIFIED test weight to allow completely automatic calibration. The calibration sequence can be initiated via the belt scale instrument keypad or via a contact closure. A self-checking software algorithm in the weigh belt instrumentation prevents erroneous calibration. Test weight calibration eliminates the need for test chains. Four actuator assemblies lift and retract when signals from the instrument energize the solenoid valve assembly. Two actuators (retracted) are located in the normal position and two actuators (extended) are located in the calibration position. When the solenoid is energized the extended actuators retract, slowly placing the test weight on the scale, while simultaneously extending the retracted actuators.

Each actuator assembly consists of a rod locking cylinder, flow controls, anti-rotation brackets and a junction box assembly. A limit switch on each actuator assembly provides position feedback to the instrument. Generally, two actuator assemblies are required per test weight. In most applications four actuators are required, consult the ATWL assembly drawing provided with the manual. Each complete ATWL assembly also consists of a Hose Cradle with a 2-position solenoid valve and a filter-regulator unit. The cylinders supplied have a special rod lock feature. This feature will stop movement of the piston rod when less than 50 psi of air pressure occurs. When calibration is complete the actuators return to their original positions.







MADE IN USA



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**THAYER SCALE-HYER INDUSTRIES, INC.**

91 Schoosett St., Pembroke, MA 02359

Ph: 781-826-8101 Fax: 781-826-7944

e-Mail: [Sales@ThayerScale.com](mailto:Sales@ThayerScale.com)

WEB: [www.ThayerScale.com](http://www.ThayerScale.com)