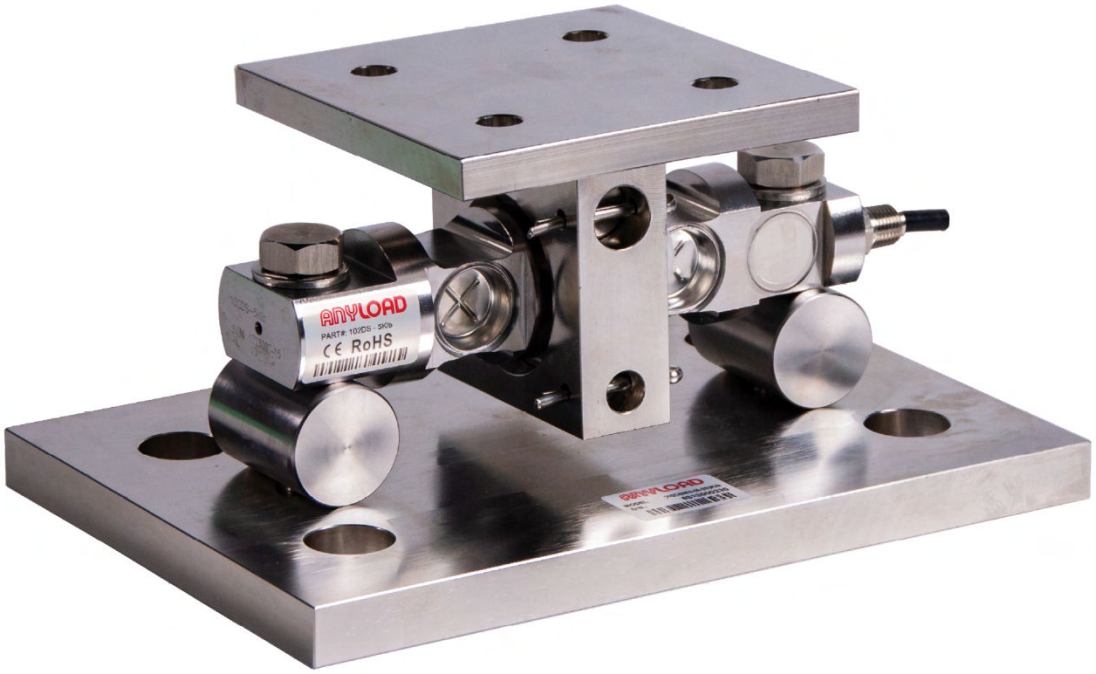
ANYLOAD®

102DxM3

Compression Weigh Module



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TECHNICAL MANUAL

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The most current version of this document, along with any software, firmware, and other product updates, can be found on our website:

www.anyload.com

Legal Notice

ANYLOAD products are subject to our **Standard Terms and Conditions of Sale**, **Warranty Policy**, and applicable regulatory compliance requirements as they may be updated without notice. It is the user's responsibility to ensure proper installation, operation, and maintenance of the equipment as outlined in this manual and in accordance with all relevant laws and standards.

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CONTENTS

Revision History:

Record with brief description of all revisions made to product or manual

Version	Date	Description
1.0.0	July 9th, 2025	First public release version.

The most current version of this document, along with any software, firmware, and other product updates, can be found on our website:

www.anyload.com

1. Introduction

This manual provides information on installation, configuration, calibration and servicing of the 102DxM3 Weigh Module.

For questions regarding this manual or the operation of ANYLOAD products, please contact your authorized ANYLOAD distributor or visit our website at www.anyload.com for support resources and service information.

1.1 Safety

READ this manual BEFORE operating or servicing this equipment or systems with this equipment incorporated.

FOLLOW these instructions carefully.

DO NOT allow untrained personnel to operate, clean, inspect, maintain, service, or modify this equipment.

SAVE and distribute this manual for future reference.

Failure to follow the instructions or heed the warnings could result in injury or death. Contact any ANYLOAD dealer or distributor for replacement manuals.

Indicative Markings:

Symbol	Significance
⚠ WARNING ⚠	Warns of a potentially dangerous situation which can result in serious physical injury or death
⚠ CAUTION	Warns of a potentially dangerous situation which can result in slight or moderate physical injury
Notice	Failure to comply to information with this marking may lead to damage to property
⚑ Important	Important information about the product
ⓘ Tip	Application tips and other information that may be helpful
For emphasis (Italics)	Italics are used to emphasize key information

General Safety:

⚠ WARNING ⚠

ONLY qualified professionals approved should carry out intrinsically safe installations. This work involves extensive knowledge of the product, specific safety standards, and the potentially hazardous environment in which it will

- Do not allow minors or inexperienced individuals to operate this unit.
- Ensure the unit is fully assembled before operation.
- Keep hands and fingers away from slots, openings, or any potential pinch points.
- Do not use this product if any component appears cracked or damaged.
- Avoid making alterations or modifications to the unit.
- Do not remove or obscure any warning labels.
- Do not submerge the unit in water.
- Before opening the unit, ensure the power cord is disconnected from the power source. Disconnect all power sources before servicing, as multiple power sources may be present. Failure to do so may result in property damage, personal injury, or death.
- For permanently connected equipment, incorporate a readily accessible disconnect device in the building's installation wiring.
- Pluggable units must be installed near an easily accessible socket/outlet.
- Use only copper or copper-clad aluminum conductors when wiring.

Recommendations for Proper Use:

- Keep the weigh module and other system electronics away from heat sources and direct sunlight.
- Protect the instrument from rain unless it is a special IP-rated version.
- Do not clean with water jets unless explicitly specified. Always respect maximum pressure and distance specifications when applicable.
- Avoid dipping the instrument in water or spilling liquids on it.
- Use a soft, dry cloth for cleaning; do not use solvents or abrasive materials.
- Do not install the unit in areas with explosion hazards unless with specially rated models. ANYLOAD carries intrinsically safe versions of the 102DH and 102DS which must be specified when ordering and has the suffix "-EX" appended.
- If the working environment approaches the unit's temperature limits, ensure proper airflow around the instrument to prevent malfunctions.

Disposal Guidelines:

Product Disposal: Dispose of this product at authorized waste collection centers at the end of its life cycle. Proper disposal prevents environmental and health risks and supports recycling. Illegal disposal may result in legal penalties.

1.2 Features

- Sliding pin retainers compensate against thermal expansion and contraction
- Center pivoted mount provides built-in anti-lifting and self-checking, eliminating the need for check rods or additional reinforcement bars
- Load is transferred through a sliding pin to a locating load-bearing groove in the double ended shear beam load cell
- Available as alloy steel or stainless steel for more environmentally demanding applications
- Capacities range from 5Klb-250Klb

1.3 Options & Add-Ons

- NTEP certified load cells from 20Klb-120Klb
- OIML certified load cells from 10t-50t
- CE, RoHS, Ex certified load cells available
- Intrinsically Safe (FM, ATEX, IECEx)
    - All intrinsically safe load cells carry an "-Ex" suffix
- Stainless steel weigh module construction (102DSM3)

2. General Guidelines for Weigh Module Installation

2.1 Site, Structural, and Environmental Preparation

- **Check Structural Integrity:** The installation site should meet all structural requirements before beginning installation work of the vessel and associated weigh modules.
- **Minimum Support Modules:** Incorporate at least three weigh modules evenly spread apart across the structure for basic vessel support.
- **Exposure Protection:** Load cells should be protected from moisture, corrosive substances, extreme temperatures, and debris as much as possible given the environmental circumstances.
- **Grounding and Cable Integrity:** Proper system grounding is essential for accurate weighing. Do not cut or extend load cell cables, as this will compromise calibration and system reliability.

Important

Cutting or modifying the load cell cable will void the warranty.

2.2 Welding and Modifications

- **Avoid Welding Near Live Load Cells:** Structural welding should be performed without the load cells installed. If welding is still necessary and the load cells cannot be removed:
    - Disconnect the load cells from all electronics
    - Place the welding clamp/earth as close as possible to the weld to avoid a current path through the load cells.

Tip

Dummy load cells can also be used if modifications must be made with the full installation of the weigh module in place.

2.3 Final Checks and Alignment

- **Leveling:** After installation is completed, verify all modules are *level within ±0.5°* to evenly share load. Use full-width shims or grout as needed to avoid uneven point loads.

Notice

It's crucial to avoid point loading caused by small shim patches or spacing washers as this can twist the load cell, causing inaccuracies or damaging the weigh module assembly.

- **Confirm Alignment:** All modules should be properly aligned to ensure the load is evenly distributed across the system. This can be verified during initial system calibration.

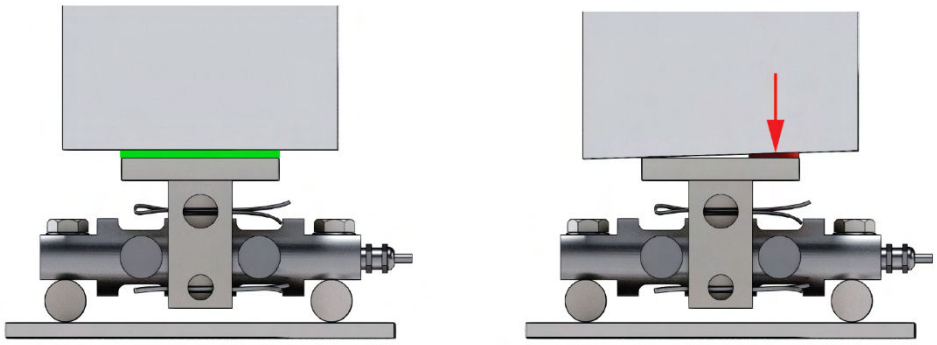


Figure 1: Properly Shimmed (Left) vs. Improperly Shimmed (Right) Weigh Modules)

3. Weigh Module Assembly

Table 1: Top Plate Weigh Module Components

Part Name	Quantity
Top Plate	1
Load Bearing Pin	1
Retaining/Locating Pin	1
Cotter Pin	2

Table 2: Bottom Plate Weigh Module Components

Part Name	Quantity
Base Plate	1
Load Distribution Bar	2
Load Cell Bolt	2
Washer	2

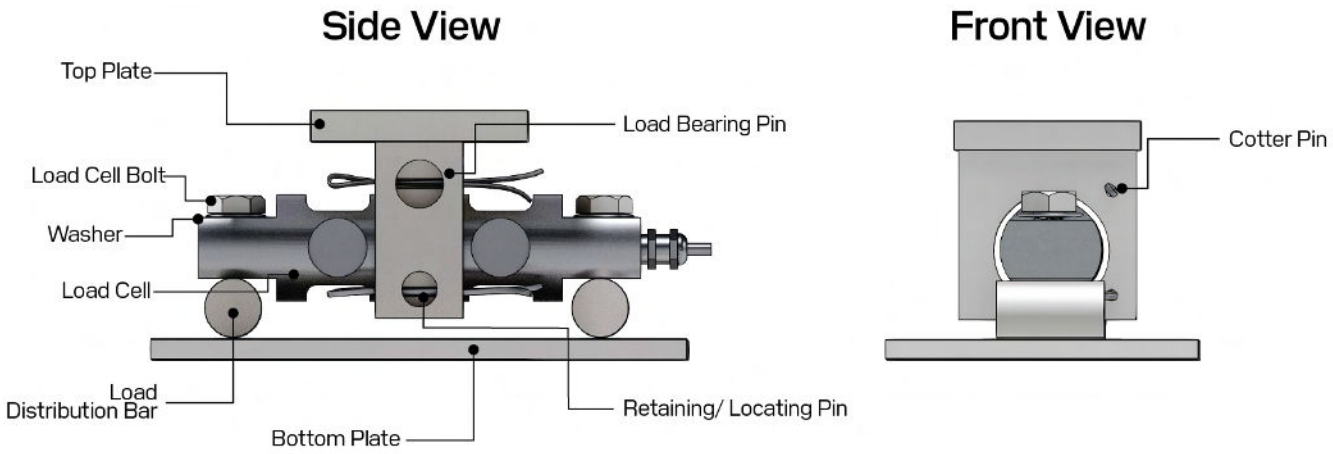


Figure 2: Weigh Module Parts Illustration

1. **Place the Base Plate:** Position the base plate where the weigh module will be installed, lining up the load bars with the bolt holes prepared in the application's structure.
2. **Insert the Load Cell:** Rest the load cell inside the circular cutout of the top plate, ensuring the two pin cutouts are visible and accessible.
3. **Align Bolt Holes:** Match the load cell bolt holes with the holes through the load bar and base plate.
4. **Install Bolts Loosely:** Insert the load cell bolt and washer, ensuring the assembly is properly lined up and level before proceeding.
5. **Insert the Pins:**
   - Insert the retaining/locating pin (smaller diameter) on the bottom
   - Insert the load bearing pin (larger diameter) on top.
   - Both pins should slide smoothly – if not, check that the top plate is not being held at an angle.

ⓘ Tip

If applicable, it may be easier to loosely bolt/attach the top plate into the base of the structure before inserting the locating pin and load bearing pin.

6. **Secure with Cotter Pins:** Insert cotter pins through the pin ends and bend them open to retain the pins during operation.
7. **Tighten All Hardware:** Secure all bolts from both the top and base plates to complete installation.

Notice

Care must be taken to install the load cell with the load direction facing downwards, or else the output signal will be negative, and the load cell can be damaged.

4. 102DxM3 Weigh Module Installation

Ensure that weigh modules are protected properly during installation so that they are not damaged by unbalanced loading or sudden drops of a vessel. A tank weighing several tons can damage a load cell even if dropped from a distance of a few millimetres.

4.1 Site Preparation

1. **Survey the Site:** Ensure it is level and capable of supporting the intended load.
2. **Plan Module Orientation:** Determine the direction and mounting location of the 102DxM3 assemblies. Orient the modules so that anticipated movement (e.g. thermal expansion, physical interruptions) occur perpendicular to the longitudinal axis of the load cell.

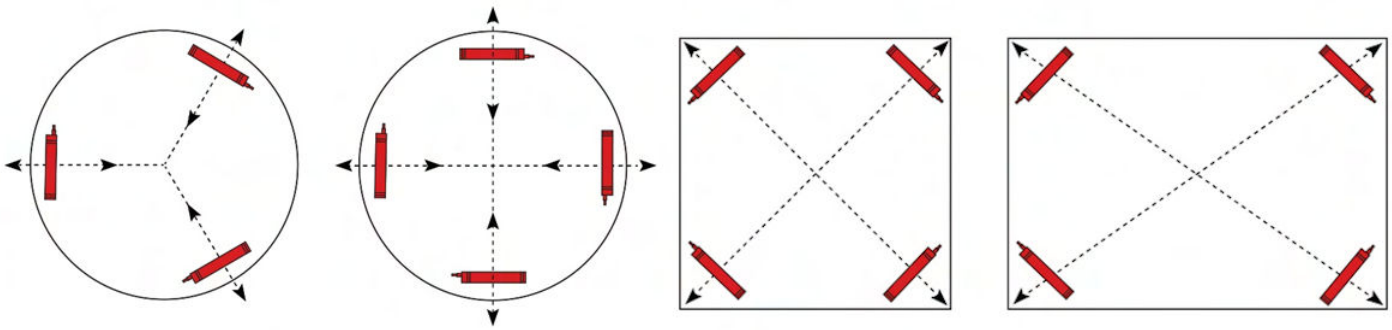


Figure 3: Weigh Module Orientation Examples

4.2 Weigh Module Installation

3. **Raise the Vessel:** Lift the vessel high enough to fit the assembled weigh module underneath the legs, install placeholder blocks under the legs to keep the vessel at this height.
   - **Raise Gradually:** Only lift just high enough to insert the weigh module assembly.
   - **Maintain Stability:** Keep the hopper level and the load evenly distributed.

⚑ Important

Take all precautions such as using safety blocks when under a raised hopper.

4. **Individually Install Modules:** Remove the block and place a weigh module under the vessel leg/mounting bracket and slowly lower the tank onto the weigh module.
5. **Attach Top Plates:** Mark the vessel leg where the weigh module top plate meets it to drill holes. Loosely attach the top plate using a suitable fastener.

ⓘ Tip

The weigh module can also be supplied with an optional dummy load cell to use during installation if modifications (i.e. welding) must be performed after the installation and levelling of the weigh modules.

6. **Repeat:** Perform *Steps 3-6* for all remaining vessel legs.
7. **Alignment Check:** Ensure each load point is centered on the top plate and check for any initial misalignment.

4.3 Anchoring and Leveling

8. **Prepare Base Mounting (if Applicable):**
   - Lift the tank out of the way and mark the position of the weigh module base plates.
   - Drill appropriate holes in the foundation or support structure.
   - Re-attach the base plates, lower the tank, and verify the top plates are still within level tolerance of each other.
9. **Anchor the Base:** Secure the base plates to the foundation using concrete anchors or bolting/welding to a steel structure.

Important

Do not weld with a live load cell in place – use a dummy load cell instead to avoid electrical damage caused by current passing through the load cell electronics. Ensure the anchoring method can withstand any lifting or tensile forces.

10. **Final Level Check:** Confirm all top plates are within ±0.5° of each other, use shims as needed.
11. **Torque Specs:** Follow manufacturer's instructions regarding size/depth of holes and recommended torque values when applicable.

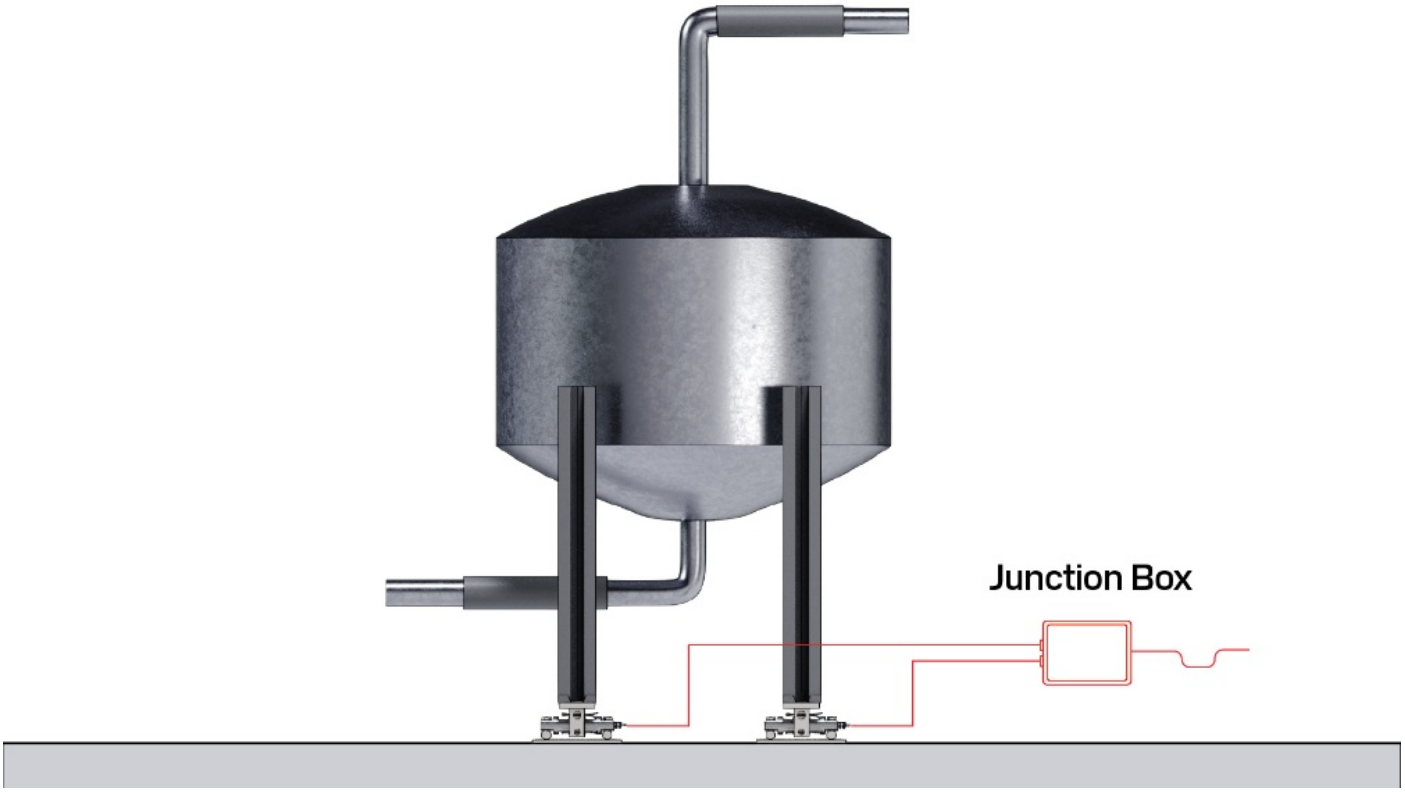


Figure 4: Typical Completed and Wired Installation

5. Calibration

Calibration ensures the system can read accurately at various weight increments. The two most common types of calibration are used depending on the capacity of the scale. The method of *test weights* and the method of *substitution*.

5.1 Lower Capacity Scale Calibration Steps

1. **Zero the Scale:** Ensure the hopper is empty and perform the zero calibration as instructed by the connected indicator manual.
2. **Apply Known Test Weights:** Place certified test weights on a platform connected to the weigh modules or suspended safely from the hopper structure.
3. **Record and Adjust Calibration:** Compare the indicated weight to the applied weight and adjust the calibration factor in the indicator or follow span calibration procedure.

ⓘ Tip

Span calibration can be performed in one or more steps depending on the performance of the system and accuracy required – although more time consuming, multi-point calibration can improve linearity and accuracy at multiple intermediate capacities.

4. **Repeat if Necessary:** If performing multi-point calibration, repeat in even increments until complete.

5.2 Alternative High Capacity Scale Calibration Steps

1. **Zero the Scale:** Ensure the hopper is empty and perform the zero calibration as instructed by the connected indicator manual.
2. **Apply and Record Test Weights:** Place certified test weights on a platform connected to the weigh modules or suspended safely from the hopper structure and record the readout on the indicator.
3. **Record and Adjust Calibration:** Compare the indicated weight to the applied weight and adjust the calibration factor in the indicator or follow span calibration procedure.

ⓘ Tip

Similar to the method only using test weights, material substitution can also be used for multi-point calibration.

4. **Add Bulk Material:** Remove the test weights and add bulk material until the indicator readout matches the recorded value with the test weights.
5. **Add Test Weights:** With the bulk material in place, add more certified test weights and record the indicator display again.
6. **Repeat Material Substitution:** Continue substituting material as needed until satisfactory calibration has been completed with the whole system.

6. Load Cell & Junction Box Wiring

General Guidelines: All cables should be routed so they are not damaged or cut during operation. Cables should not run near heat sources greater than 65°C. For areas where wires must be shielded from mechanical or rodent damage, use of a flexible conduit is recommended. It can also protect against moisture and other debris ingress into the load cell.

1. **Mount the Junction Box:** Install it in a location free from excessive heat and water exposure. *Do not* mount the junction box on the scale as the cables can affect accuracy if crossing from the foundation to the live scale element.

Important

Load cells are calibrated and supplied with a fixed cable length that should never be shortened or lengthened. If there is excess cable length, it should be coiled and placed near or inside the junction box. Custom cable lengths can be ordered for specific applications.

2. **Wire the Load Cells:** Connect the load cells to the junction box following the load cell wiring layout.
3. **Connect to Instrumentation:** Wire the junction box to the appropriate scale indicator or amplifier.
4. **Trim the Signals:** Use the trimming controls to balance the load cell signals as needed following the instructions provided with the junction box to ensure all weigh modules are reading evenly.
5. **Calibrate the Scale:** Complete system calibration following the indicator's procedures, confirming the readings are stable and accurate.

Table 3: Load Cell Wiring

Signal	Wire Colour
Excitation +	Red
Excitation -	Black
Signal +	Green
Signal -	White
Shield	Silver/Bare

7. Troubleshooting

This section will provide a basic overview of common troubleshooting procedures for load cell systems. Many issues associated with load cells are often caused by installation or mechanical factors, not the load cell itself. Always verify that the system is correctly installed, securely mounted, levelled, and properly wired before suspecting load cell failure.

7.1 Initial Checks

1. **Inspect for debris**
   - Ensure there is no debris obstructing the load cell movement or wedged between the structure and scale.
2. **Verify mechanical alignment**
   - Confirm the tank, frame, or vessel is level and all mounting points are aligned with each other.
3. **Check for mechanical binding**
   - Examine piping, flextures, and any other connections that could restrict vessel movement.
   - If check rods are used, loosen all hardware to *finger-tight* for testing.
4. **Inspect load cell cables**
   - Look for any visible damage or pinched wires.
5. **Verify electrical connections**
   - Check all terminal connections and shield grounds are properly installed.

If the system can be calibrated but continues to exhibit persistent issues like drift or inconsistent readings, refer to the following chart.

Table 4: Common Load Cell Symptoms

Symptom	Possible Cause
Fails to return to zero	- Mechanical interference or damaged load cell - Loss of calibration
Non-linearity *(deviation from a straight output curve)*	- Thermal expansion, side loads, mounting deformation
Poor repeatability *(inconsistent output under identical conditions)*	- Loose mounts, moisture ingress, (electrical) noise, load cell fatigue
Lost Calibration	- Off-level base, moisture, mechanical shift/binding
Drifting or unstable output	- Cable damage, moisture in connectors/junction box, mechanical shift

7.2 Further Testing

1. **Check the indicator**
   - Use a load cell simulator or known working weighing system to verify the indicator is responding correctly to known inputs
2. **Isolate the problem**
   - Disconnect signal leads at the junction box
   - Measure each load cell using a multimeter
   - Compare the multimeter measurements to the factory manufacturer specifications
3. **Replace a load cell with a dummy load cell**
   - Temporarily substitute a live load cell to isolate mechanical issues from load cell errors

7.3 Isolation Procedure

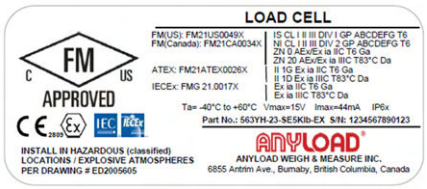
1. Disconnect all load cells from the junction box
2. Reconnect one load cell at a time, using a load cell simulator in place of others
3. Alternate and repeat until all load cells have been tested individually

ⓘ Tip

If disconnecting a specific load cell eliminates the problem, the fault is likely caused by that load cell.

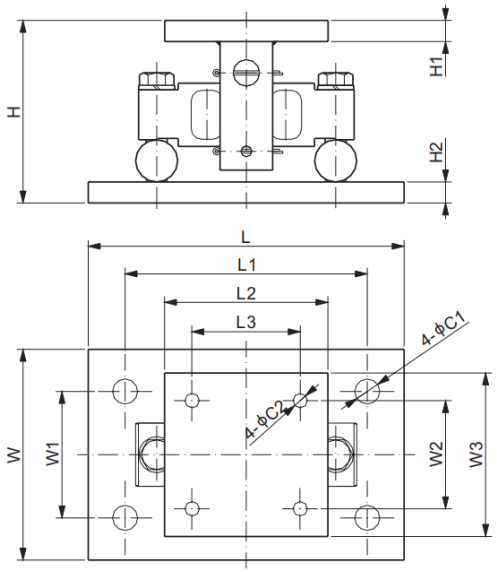
8. Compliance

Indicative Markings:

CE Certification	The CE mark indicates that the manufacturer guarantees that the product complies with the requirements of the relevant EU Directives.
NTEP (US Legal-for-trade) Certification	The NTEP mark denotes that the product is legal-for-trade certified in the US and other recognizing jurisdictions by meeting the National Type Evaluation Program (NTEP) requirements set by the National Conference of Weights and Measures (NCWM) in the United States of America.
OIML MAA Certification	The OIML Mutual Acceptance Arrangement (MAA) mark indicates that the product is legal-for-trade certified in the EU, Australia, New Zealand, Canada, and other recognizing jurisdictions by meeting the standards set by the International Organization of Legal Metrology (OIML).
FM / Explosive Atmospheres Certification 	**⚑ Important** *Every single certified non-incendive / intrinsically safe product MUST bear this label*, which shall indicate that the product is FM (US & Canada), ATEX, and IECEx-approved for use in potentially explosive environments in recognizing jurisdictions. The model should also have an "-EX" suffix in its part number.

9. Specifications

9.1 Weigh Module Dimensions



DIMENSIONS

LOAD CELL CAPACITY	C1	C2	H	H1	H2	L	L1	L2	L3	W	W1	W2	W3
Klb/inches													
5–20	1.06	0.56	5.30	0.50	0.75	11	8.00	5.50	3.00	7.50	4	3.00	5.50
30–75	1.19	0.68	8.41	0.75	0.94	15	11.5	7.76	5.12	10.0	6	5.12	7.76
100	1.38	0.81	9.27	1.00	1.25	18	14.0	10.0	7.50	12.0	9	7.50	10.0
150	1.38	0.81	9.62	1.00	1.25	18	14.0	10.0	7.50	12.0	9	7.50	10.0
200–250	1.88	1.06	14.58	1.25	1.50	24	20.0	12.0	9.00	12.0	8	9.00	12.0
t/mm (conversion of above dimensions)													
2.3–9.1	26.9	14.2	134.6	12.7	19.1	279.4	203.2	139.7	76.2	190.5	101.6	76.2	139.7
13.6–34	30.2	17.3	213.6	19.1	23.8	381.0	292.1	197.0	130.0	254.0	152.4	130.0	197.0
45.4	35.1	20.6	235.3	25.4	31.8	457.2	355.6	254.0	190.5	304.8	228.6	190.5	254.0
68	35.1	20.6	244.2	25.4	31.8	457.2	355.6	254.0	190.5	304.8	228.6	190.5	254.0
90.7–113.6	47.8	26.9	370.3	31.8	38.1	610.0	508.0	304.8	228.6	304.8	203.2	228.6	304.8

Figure 5: Weigh Module Drawing and Dimensions

9.2 Load Cell Specifications

Table 5: 102Dx Series Load Cell Specifications

Full Scale Output	3.0 mV/V ± 0.25%	**Output Resistance**	700Ω ±5
Zero Balance	± 0.02 mV/V	**Recommended Excitation**	10V (15V Maximum)
Non-linearity	< ± 0.023%	**Insulation Resistance**	>2 [50V DC] GΩ
Repeatability	<±0.017%	**Compensated Temperature Range**	-10°C to 50°C/ 14°F to 122°F
Hysteresis Error	< ± 0.023%	**Safe Overload**	150% of full scale
Creep in 30 min.	< ± 0.023%	**Breaking Overload**	300% of full scale
Input Resistance	700Ω ± 10	**Seal Type/IP Rating**	Alloy Steel – IP67 Stainless Steel – IP68

Please **Contact Our Authorized Dealer** for Technical Assistance:

Notes:

V1.0.0
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ISO 9001:2015 ISO 14001:2015 ISO 45001:2018

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