MSI-7300

Dyna-Link 2 Tension Dynamometer

Technical Manual

Contents

Technical training seminars are available through Rice Lake Weighing Systems. Course descriptions and dates can be viewed at www.ricelake.com/training or obtained by calling 715-234-9171 and asking for the training department.

1.0 Introduction

The *Dyna-Link 2* is a reliable, accurate, easy to operate, multipurpose tension dynamometer. Designed with safety factors exceeding the industry standard, the unit is ideal for situations in which headroom is at a minimum. The unit is fully sealed for outdoor use in any weather.

A remote display option is available to further enhance the safety and usability of the *Dyna-Link 2*. The optional RF remote display allows tension monitoring from a distance and adds the ability to print and store data.

Manuals can viewed or downloaded from the Rice Lake Weighing Systems website at www.ricelake.com

Warranty information can be found on the website at www.ricelake.com/warranties

1.1 Features

- Designed to meet or exceed all U.S. and International safety and environmental standards.
- Greater than 150 hours operation with two standard Alkaline C cells. Greater than 300 hours with two standard Alkaline D Cells (25000 lb/12500 kg capacities and above). Also works with off the shelf NiMH rechargeable cell batteries.
- Automatic power off conserves battery life by turning the unit off when sensing no activity for a set time.
- Rugged construction throughout. IP65/NEMA Type 4 for outdoor use.
- Designed for use with U.S. made Crosby shackles (optional).
- Shackle holes reinforced with steel sleeves (25000 lb/12500 kg capacities and above) to reduce wear.
- Shackle stops ensure ease of mounting. The stops prevent the shackles from falling to the side of the unit and are held in position for easy rigging.
- ScaleCore technology provides precision, high resolution (2500 division standard, up to 10,000 possible) 24 bit A/D conversion coupled with an advanced RISC micro-controller. ScaleCore technology provides quick and easy firmware updates, setup, calibration and backup.
- Five, 1.22" (31 mm) LCD digits for clear tension readings from a distance. Six digits, 1" (26 mm) on units 100,000 lb and over.
- Easy to maintain. Full digital calibration ensures reliable, repeatable measurements. Can be calibrated without test weights using C-Cal technology.
- Selectable kg/lb/tons (U.S. Short)/metric tons/kilonewtons.
- Automatic or manual weight totalization for loading operations.
- Easily customized for special applications.
- Hi speed peak mode for stress and drop test analysis.
- Two setpoints can be set for any in-range tension/weight value for operator alerts or process control. Optional audible alarm output.
- Two service counters ensure load train safety by warning the user to perform safety checks when the lift count gets high or the *Dyna-Link 2* has been overloaded repeatedly. Counter 1 (Lift Count) records the number of lifts above 25% of capacity. Counter 2 (Overload Count) records the number of times the unit was overloaded.

1.2 Safety

Safety Signal Definitions:

⚠ DANGER	*Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. Includes hazards that are exposed when guards are removed.*
⚠ WARNING	*Indicates a potentially hazardous situation that, if not avoided could result in serious injury or death. Includes hazards that are exposed when guards are removed.*
⚠ CAUTION	*Indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury.*
⚠ Important	*Indicates information about procedures that, if not observed, could result in damage to equipment or corruption to and loss of data.*

General Safety

Do not operate or work on this equipment unless this manual has been read and all instructions are understood. Failure to follow the instructions or heed the warnings could result in injury or death. Contact any Rice Lake Weighing Systems dealer for replacement manuals.

⚠ WARNING

Failure to heed may result in serious injury or death.

Do not allow minors (children) or inexperienced persons to operate this unit.

Do not stand on, under or near the load being lifted as it is a potential falling hazard. Keep a safe distance.

Do not use for purposes other then weight taking or dynamic load monitoring.

Do not use any load bearing component that is worn beyond 5% of the original dimension.

Do not use the dynamometer if any of the components of the load train are cracked, deformed, or show signs of fatigue.

Do not exceed the rated load limit of the dynamometer, rigging elements or the lifting structure.

Do not allow multi-point contact with the shackles of the dynamometer unit.

Do not allow high torque on the dynamometer unless it is specifically designed for high torque.

Do not make alterations or modifications to the dynamometer or the shackles.

Do not use improperly rated or sized shackles. Use only Rice Lake recommended shackles.

Do not remove or obscure warning labels. Replace labels when worn. Contact MSI for replacement labels.

For guidelines on the safe rigging and loading of overhead scales and dynamometers, read the Crane Scale Safety and Periodic Maintenance Manual (available at www.ricelake.com).

Keep hands, feet and loose clothing away from moving parts.

There are no user serviceable parts within the Dyna-Link 2. Repairs must be performed by qualified service personnel only.
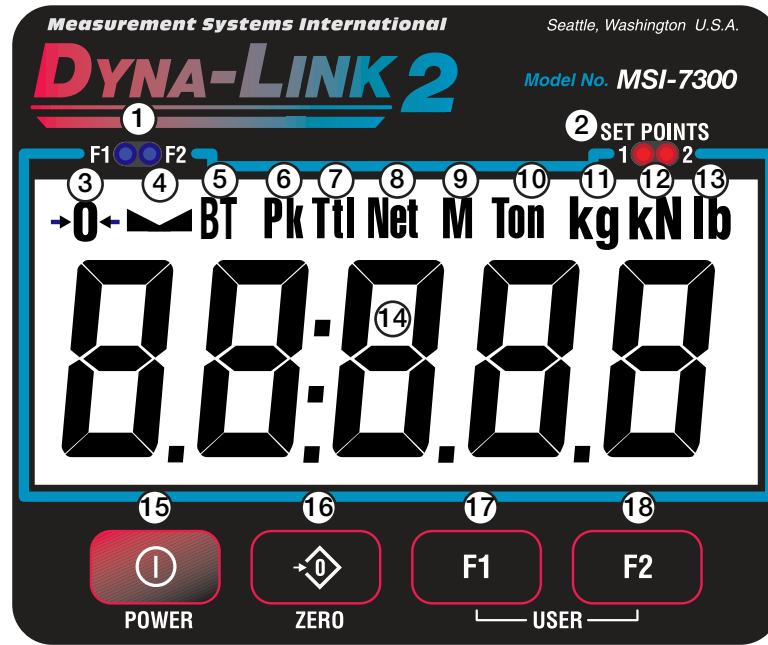
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1.3 Display

Figure 1-1. Dyna-Link 2 Front Panel

Item No.	Description
1	F1 and F2 LEDs – indicate the function of the associated F-key is active. Example: In peak hold mode the associated LED will blink whenever a new peak reading is captured.
2	Setpoints – user programmable setpoints for early overload warnings.
3	Center-of-Zero – indicates the tension is within 1/4 d of zero.
4	Standstill – indicates the tension force has settled within the motion window (usually ±1d).
5	Low Battery – displays when approximately 10% of battery life remains and blinks when automatic shutdown is imminent.
6	Peak – indicates peak hold mode.
7	Total – displays the total accumulated weight for less than five seconds.
8	Net – indicates the unit is in the net tension mode. (Gross - Tare = Net).
9	Metric Ton – in conjunction with the ton annunciator, indicates the unit is displaying metric tons. When used with the total display, it is used for X1000 to allow accumulation of weight beyond the five digit display capacity. It is also used with the service counters when the number of lifts exceeds five digits.
10	Ton – illuminated alone, indicates the unit is displaying in U.S. short tons (1 ton = 2000 lb). When illuminated along with the metric ton, the unit is displaying in metric tons (1 metric ton = 1000 kg)
11	Kilogram– indicates the tension display is in kilograms.
12	Kilonewton – indicates the tension display is in kilonewtons.
13	Pound Key – indicates the tension display is in pounds.
14	Five digit 1.22'' (31mm), sunlight visible, LCD Tension Display Units with maximum capacity of 100,000 lb and up come with a six digit 1'' (26 mm) display.
15	Power Key – turns the *Dyna-Link 2* on and off. In setup mode, it returns the unit to tension display without saving settings.
16	Zero – used to zero out residual tension on the link. In setup mode, it saves settings and drops back one menu level.
17	F1 Key – programmable to user functions, see Section 4.2 on page 9.
18	F2 Key – Programmable to user functions, see Section 4.2 on page 9.

Table 1-1. Key Descriptions

1.4 Available Configurations

Part No.	Description
Dyna-Link 2 Digital Tension Dynamometer	
139162	MSI-7300 1000 Lb Final Assembly
139163	MSI-7300 2500 Lb Final Assembly
139164	MSI-7300 5000 Lb Final Assembly
139165	MSI-7300 10000 Lb Final Assembly
139166	MSI-7300 25000 Lb Final Assembly
139167	MSI-7300 50000 Lb Final Assembly
139168	MSI-7300 100,000 Lb Final Assembly
Dyna-Link 2 Digital Tension Dynamometer With Integrated RF Module For Connectivity To MSI-8000 RF Remote Display	
139441	MSI-7300RF 1000 Lb Final Assembly
139442	MSI-7300RF 2500 Lb Final Assembly
139443	MSI-7300RF 5000 Lb Final Assembly
139444	MSI-7300RF 10000 Lb Final Assembly
139445	MSI-7300RF 25000 Lb Final Assembly
139446	MSI-7300RF 50000 Lb Final Assembly
139447	MSI-7300RF 100000 Lb Final Assembly
152794	MSI-7300RF 120,000 Lb Final Assembly
152795	MSI-7300RF 180,000 Lb Final Assembly
152796	MSI-7300RF 260,000 Lb Final Assembly
152797	MSI-7300RF 380,000 Lb Final Assembly
152798	MSI-7300RF 550,000 Lb Final Assembly
Dyna-Link 2 Digital Tension Dynamometer With Integrated Bluetooth RF	
176806	MSI-7300 1,000lb F/A with Bluetooth RF
176807	MSI-7300 2,500lb F/A with Bluetooth RF
176808	MSI-7300 5,000lb F/A with Bluetooth RF
176809	MSI-7300 10,000lb F/A with Bluetooth RF
176810	MSI-7300 25,000lb F/A with Bluetooth RF
176811	MSI-7300 50,000lb F/A with Bluetooth RF
176812	MSI-7300 100,000lb F/A with Bluetooth RF
176822	MSI-7300 120,000lb F/A with Bluetooth RF
176823	MSI-7300 180,000lb F/A with Bluetooth RF
176824	MSI-7300 260,000lb F/A with Bluetooth RF
176825	MSI-7300 380,000lb F/A with Bluetooth RF
176826	MSI-7300 550,000lb F/A with Bluetooth RF
Dyna-Link 2 Digital Tension Dynamometer With Integrated Wi-Fi RF	
176813	MSI-7300 1,000lb F/A with Wi-Fi RF
176814	MSI-7300 2,500lb F/A with Wi-Fi RF
176815	MSI-7300 5,000lb F/A with Wi-Fi RF
176816	MSI-7300 10,000lb F/A with Wi-Fi RF
176817	MSI-7300 25,000lb F/A with Wi-Fi RF
176818	MSI-7300 50,000lb F/A with Wi-Fi RF
176819	MSI-7300 100,000lb F/A with Wi-Fi RF
176827	MSI-7300 120,000lb F/A with Wi-Fi RF
176828	MSI-7300 180,000lb F/A with Wi-Fi RF
176829	MSI-7300 260,000lb F/A with Wi-Fi RF
176830	MSI-7300 380,000lb F/A with Wi-Fi RF
176831	MSI-7300 550,000lb F/A with Wi-Fi RF

Table 1-2. Available Configurations

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1.5 Options

Part No.	Description
151361	Shackle 175 Ton G2140
151357	Shackle Anchor 3.25 Ton Bolt Type
151355	Shackle Anchor 6.5 Ton Bolt Type
141992	Shackle Anchor 17 Ton Bolt Type
151356	Shackle Anchor 25 Ton Bolt Type
146336	Shackle Anchor 55 Ton Bolt Type
83454	Shackle, Bolt Type 160000lb (85 Ton) Pair G-2140
83455	Shackle, Bolt Type 220000lb (120 Ton) Pair G-2140
83456	Shackle, Bolt Type 350000lb (175 Ton) Pair G-2140
83458	Shackle, Bolt Type 500000lb (250 Ton) Pair G-2140
139381	MSI-8000 Remote Display RF (Requires an MSI Crane Scale or MSI-7300 equipped with a RF Modem)
153591	Final Assy Remote Display AC Power 8000HD
139483	MSI-7300 Carry Case With Foam. For Use With 1k-10k DynaLink 2 Digital Tension Dynamometers
165313	MSI-7300 Carry Case with Foam for use with 1K-10K MSI-7300 and MSI-8000
145076	MSI-7300 Transport Case For Use With 25k And 50k DynaLink 2 Digital Tension Dynamometers
145073	MSI-7300 Shipping Crate For Use With 100k Dyna Link 2 Digital Tension Dynamometers
139470	Cable Assy Heavy Duty Serial Dyna-Link 2 MSI-7300
162899	MSI-Scoreboard 4in Red 7001 RF AC Power
162897	MSI-Scoreboard 6in Red 7001 RF AC Power
150964	Cable Assy, Serial I/O DCE D9 Sockets 8000

Table 1-3. Available Options

2.0   Operation

This section includes the basic operation of the *Dyna-Link 2*.

2.1 Power

Turn on the *Dyna-Link 2* by pressing [POWER]. The LCD displays all segments for a display test and the software version number will briefly display. When *0* is displayed, the unit is ready for use.

2.2 Zero

Press [ZERO] to remove small deviations in zero when the *Dyna-Link 2* is unloaded. See Section 2.3 on page 6 for zeroing (taring) package or pallet weights.

- Zero works in **GROSS** or **NET** modes.
- Zeroing while in **NET** mode will zero the gross tension causing the display to show the negative tare value.
- The *Dyna-Link 2* must be stable within the motion window. The unit will not zero until ◣ ◢ is displayed. The unit holds a zero request for two seconds. If the motion clears in that time, the unit will zero.
- The unit will accept a zero setting over the full range of the *Dyna-Link 2*. Zero settings above 4% of full capacity will be subtracted from the overall capacity.

   Example:
   If 100 lb is zeroed on a 1000 lb Dyna-Link 2, the overall capacity will reduce to 900 lb plus the allowed over-range amount.

> **Note** *The tension reading must be stable within the motion window for the zero function to work.*
>
> *The backup memory stores the zero reading in the event of power failure.*

2.3 Tare

2.3.1   Tare and Display the Net Tension

1. Program an **F-key** to *TARE*. See Section 4.2.5 on page 10.

2. Press the **Tare F-key**. *0* is displayed and the tension mode changes to *NET*.

The tension reading must be stable within the motion window for the tare function to work. The backup memory stores the tare reading in the event of a power failure.

2.3.2   Clear the Tare and Revert to Gross Tension

Press the **Tare F-key**. The **NET** annunciator turns off. The absence of the **NET** annunciator is the only indication the *Dyna-Link 2* is in the **GROSS** tension mode.

> **Note** *To view the GROSS tension without clearing the tare value, program the remaining* F-Key *to the function NET/GROSS.*

- Only positive gross tension readings can be tared.
- The tension/force reading must be stable and ◣ ◢ must be on.
- Setting or changing the tare has no effect on the gross zero setting.
- The *Dyna-Link 2* stores the tare value in non-volatile memory and is restored when power is cycled.
- Taring will reduce the apparent over range of the *Dyna-Link 2*.
   Example:

   When taring 100 pounds of rigging on a 1000 lb Dyna-Link 2, the unit will overload at a net tension of 900 lb (1000-100) plus any additional allowed overload (usually about 4% or 9d).

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3.0 Installation

3.1 Unpacking

When unpacking the *Dyna-Link 2* from the shipping container, ensure that all assembly parts are accounted for. Check for any visible damage and immediately report any damage to Rice Lake Weighing Systems and the shipper. Retain the original shipping container for future shipping or transporting of the unit.

3.2 Assembly

Two cotter pins and two batteries are included with the *Dyna-Link 2*, also required for installation are shackles and pins, they can be supplied by the customer or they can be ordered from Rice Lake Weighing Systems. See Table 1-3 on page 5.

1. Slide top shackle over load cell and insert the pin.
2. Screw the shackle nut onto the pin.

📝 **Note** *It is not necessary to tighten the nut too tight. Ensure the nut is down far enough to expose the cotter pin hole.*

3. Lock the shackle pin in place with the supplied cotter pin and bend the cotter pin.
4. Repeat steps 2-3 for the bottom shackle.
5. Remove the battery access port cover.
6. Insert the two batteries, positive end first, into the battery shaft.
7. Reinstall the battery access port cover.

The *Dyna-Link 2* is now ready for use.

📝 **Note** *The unit will automatically start when the batteries are installed.*

⚠️ **WARNING** *The Dyna-Link 2 load train is unsafe for use if the shackle pins are not properly secured with cotter pins.*

3.3 Battery Replacement

Disposable Batteries

The BT annunciator will display when the battery is getting low. When the *BT* annunciator starts to blink, the batteries are close to being completely drained. For maximum life, use the batteries until the system shuts off.

Rechargeable Batteries

When using Nickel-Metal-Hydride (NiMH) cells, it is recommended that the cells are recharged immediately after the BT annunciator starts to blink. Do not allow the batteries to discharge completely as this may compromise the recharge life of the battery.

NiMH Cells in C and D sizes have a lower capacity then the Alkaline C and D sizes. Rice Lake Weighing Systems recommends having two sets of NiMH batteries, so one set can be charging while the other is in use.

⚠️ **Important** *NiMH D cells are often repackaged C cells. Therefore there is no increase in battery life for Dyna-Links large enough for D cells.*

The use of NiCad batteries is not recommended.

If the *Dyna-Link 2* will not be used for an extended period, the batteries should be removed. A small current is used when powered off which will discharge the batteries in about six months.

4.0 Setup

This section describes parameter settings on the *Dyna-Link 2*.

Use the following keys for navigating through the menus when setting up the *Dyna-Link 2*.

1. Press ⏻ and F2 simultaneously to enter setup menu.

2. Press F2 to scroll through the parameters or settings.

3. Press F1 to enter a selected parameter or to save a selection and return to previous menu.

4. Press ⟳ to save a selection and return to previous menu or to the weigh mode.

Press ⏻ to cancel and return to weigh mode.

4.1 Setup Menu

To enter the set up menu, press ⏻ and F2 at the same time.

Parameter	Settings	Description
Func1 Func2		F1 key – configurable to listed parameters. Default is peak hold. In menu mode, functions as the enter/select key.
		F2 key – Configurable to listed parameters. Default is display and function test. In menu mode, functions as the scroll key.
	OFF	The F-Key is disabled.
	tESt	Test – runs an LCD test. See Section 4.2.2 on page 9.
	totAL	Total – accumulation of multiple weighments. See Section 4.2.3 on page 10.
	u-ttL	View Total – activates the total weight display followed by the number of samples. With the total displayed, press **ZERO** to clear.
	nEtGr	Net/Gross – switches the display between Net and Gross modes. See Section 4.2.4 on page 10.
	tArE	Tare - zeros out a known weight (rigging, a packing container or pallet). See Section 4.2.5 on page 10.
	P-HLd	Peak Hold – automatically updates the display when a higher peak weight reading is established. See Section 4.2.6 on page 10.
	2Unit	2 Units – toggles the force units between pounds and kilograms. See Section 4.2.7 on page 11.
	5Unit	5 Units – scrolls through all available units: lb, kg, Tons (US Short), Metric Tons and kiloNewtons. See Section 4.2.7 on page 11.
	HirES	Hi Res – makes the *MSI-7300* more sensitive to motion and movement resulting in a less stable display.
	Print	Print – outputs a configured text string to the RS-232 port. See Section 4.2.9 on page 11.
A-OFF	OFF 15 30 45 60	Auto Off – sets the amount of standstill time before the Dyna-Link 2 automatically turns off. See Section 4.3 on page 11
StPt1-8	GrEAt	Greater Than – triggers when the tension exceeds the set value. See Section 4.4 on page 12
	LESS	Less Than – triggers when the tension is less than the set value.
	OFF	Off – disables the setpoint parameter.
Total	OFF	Total Accumulation - sets the choice for weight accumulation for a single scale. Disabled when set to off. See Section 4.5 on page 13.
	ttLOn	Total On – a manual choice for accummulation. See Section 4.5 on page 13.
	A. LoAd A. LASt H. HiGH	Auto Total – settings for automatic accumulations. See Section 4.5 on page 13.
Filter	OFF LO Hr1 Hr2	Weight Filter – allows the scale to adjust to situations where there may be movement. See Section 4.6 on page 14.

Table 4-1. Setup Menu Parameters

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Parameter	Settings	Description
Unit	lb kg Ton MTon kN	Weight Units – sets the weight units displayed. See Section 4.7 on page 14.
b.LiFE	5tАnd Lon９	Battery Life – sets the options for standard or extended battery life. See Section 4.8 on page 15.

Table 4-1. Setup Menu Parameters (Continued)

4.2 Function Keys

There are two function keys, *F1* and *F2* on the front panel of the *Dyna-Link 2*. These keys can be programmed to several different functions. See Table 4-1 on page 8 for available functions.

To assign the **F-keys**:

1. Press ⓞ and **F2** simultaneously to enter parameter setup menu. *FUnc I* displays.

   To set *FUnc2* press **F2** again.

2. Press **F1** to enter **F-key** set up.

3. Press **F2** to scroll through the settings.

4. Press **F1** to select the desired choice and return to the parameter menu.

5. Press ⬦ to save. *5torE* displays briefly and the *Dyna-Link 2* returns to the weigh mode.

Note *This procedure also assigns the F1 & F2 keys on the optional RF remote display.*

4.2.1 Off

When the **F-Key** parameter is set to *OFF*, there is no user key function assigned and the **F-Key** is disabled.

4.2.2 Test

Set an **F-Key** as test (Section 4.2 on page 9). To run a test, press the **Test F-Key** and the display will automatically scroll through the following:

- Light all LCD segments and the LEDs
- *5oFt* followed by the version number
- *bАtt* followed by the battery level in volts
- *d. tE5t* followed by counting from 00000 to 99999
- *C-CAL* followed by the c-cal value

The test can be single stepped by:

1. Press the **Test F-key** and then immediately press the **F2** key to stop the auto scroll.

2. Press **F2** to scroll through each step and press **F1** to view the step value.

Internal tests are also performed and if any test fails, an error code will display. See Section 7.1.1 on page 29 for a description of all error codes. Press ⬦ to stop the test at any time.

4.2.3 Total

1. Ensure the total mode has been programmed in the setup menu. If this has not been setup the **F-Key** assigned to *TOTAL* will not work.

2. Program an **F-key** to **Total**. See Section 4.2 on page 9.

3. Press **Total F-key** to perform the total function that was set in Section 4.5 on page 13.

Note *This feature should not be confused with the ttl.rd (Total Remote Devices) function, which will add weight from two or more load sensors.*

4.2.4 Net / Gross

Press the **NET/GROSS F-key** to switch between gross and net mode. The **NET/GROSS F-key** only functions if a tare value has been established. The operator can switch back to gross from net without clearing the tare value. Only clearing the tare, or setting a new tare, will change the tare value held in memory.

4.2.5 Tare

Press the **Tare F-key** to tare out a known force, only positive and negative deviations from the tared force display.

In force measurement applications, tare is useful as a way to display differential force. It also increases accuracy as any initial error is removed leaving only slope error.

In scale applications, tare is typically used to zero out a known weight such as rigging, a packing container or pallet. Once zeroed, the load displays in **NET** tension/weight. To use tare, set an **F-key** to the **TARE** function.

- A tare value is entered by pressing the **TARE F-key**.
- The **TARE** function in the *Dyna-Link 2* is defined as a tare-in/tare-out operation.
- The first press of the **TARE F-key** stores the current tension/weight as a tare value. The *Dyna-Link 2* subtracts the tare value from the gross tension and changes the display to **NET** mode.
- The next press of the **TARE F-key** will clear the tare value and revert the display to **GROSS** mode.
- The optional RF remote display has a **TARE** key permanently available.

4.2.6 Peak Hold

The Peak Hold function uses a high speed mode of the A/D converter allowing it to capture transient tensions at a far higher rate than typical dynamometers.

- Peak hold is cleared and enabled with the *PeakHold F-key*.
- When a new peak is detected, the *F-key* LED will flash three times.
- The accuracy of the system in peak hold mode is slightly reduced to 0.2% of capacity ± 5d.
- The filter setting is turned off while in peak hold mode to ensure the fastest acquisition rate.
  Example:

  The Peak Hold function is useful in materials and fall tests. Common tests include Overall Breaking Strain (OB€), Breaking Force, and Cycled Breaking Strain.

Capture Peak Force

1. Program an *F-key* to *PeakHold*. See Section 4.2 on page 9.

2. Prepare the test stand and test a sample.

3. Press ⬦ to zero out any residual strain on the link.

4. Press the *PeakHold F-key*. The *Pk* annunciator displays.

Note *A small jump in the reading may occur depending on the stability of the test stand.*

5. Apply the test force. The *PeakHold F-key* LED will blink tree times for each peak it detects.

6. Remove the test force and record the peak value.

7. Press the *PeakHold F-key* to clear the peak value.

8. To run a new test, confirm *Pk* is not displayed. Repeat steps 1 through 6.

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4.2.7   2-Units/ 5-Units

Program an **F-key** to either *2-UNIT* or *5-UNIT*. See Section 4.2 on page 9.

Press the *2-UNIT F-key* to switch the force units between lb and kg.

Press the *5-UNIT F-key* to scroll through all available units: lb, kg, tons (U.S. short), metric tons, and kilonewtons.

4.2.8   Hi-Res

Program an **F-key** to *Hi-Res*. See Section 4.2 on page 9.

Press the **HiRes F-key** to display the high resolution mode. The display will stay in high resolution mode until the **HiRes F-key** is pressed again, or the power is cycled. While in the hi-res mode, the appropriate **HiRes F-key** LED will blink continuously at a slow rate.

Hi-res mode does not increase the accuracy, but allows for smaller weight increments to be displayed.

Use **Tare** or ⬡ to zero out any initial error. *Hi-Res* mode will make the *Dyna-Link 2* more sensitive to motion and movement resulting in a less stable display. When **Hi-Res** is on, the filter is automatically set to the *Hi-1* setting (if *Hi-2* is already set, then the filter is not changed). This will have a small effect on settling time. When **Hi-Res** is turned off, the filter setting resets to the previous filter setting.

4.2.9   Print

Program an **F-key** to *Print*. See Section 4.2 on page 9.

Press the **Print F-key** to output a configured text string to the RS-232 port on the base of the unit.

If a **Print F-key** is programmed and the print setup is configured as continuous, then the **Print F-key** is used for Start Print/Stop Print. See Section 6.3 on page 24 for more details on data output.

The print function is always available on the optional RF remote display, so it is not necessary to program a **Print F-key** if print outputs will be triggered from the remote.

If the RF remote display option is installed, the *Dyna-Link 2* built in comm port is used only for hard-wire connections to the RF remote display or firmware updates.

4.3   Auto Off

The *Auto Off* feature prolongs the life of the battery by turning the power off when the *Dyna-Link 2* is not in use. Any key press or detected tension in motion exceeding 10d, resets the time limit and the unit remains on.

When set to OFF, the *Dyna-Link 2* will only turn off by pressing ⬤ or if the battery is depleted.

Use the following steps to set the *Auto Off* function:

1. Press ⬤ and **F2** simultaneously to enter setup menu. FUnc 1 displays.

2. Press **F2** to scroll to A-OFF.

3. Press **F1**. The current auto off setting displays.

4. Press **F2** to scroll to the desired time.

5. Press **F1**. StPt 1 displays.

6. Press ⬡ to save and return to the weigh mode.

4.4 Setpoints

The *Dyna-Link 2* supports two setpoints. Common uses of set points are for warnings or process control. The unit comes standard with two red LED outputs for a triggered set point. There is an audible output option that is triggered by setpoint 1.

Parameter	Description
OFF	Setpoint is not set.
GrEAt	Greater Than – will trigger the setpoint when the tension exceeds the value
LESS	Less Than – will trigger the setpoint when the tension is less then the value
Selections for Greater Than and Less Than	
nEtGr	Net/Gross – responds to the tension on the display, net or gross weight.
Gro55	Gross – responds to gross tension regardless of the display mode.
totAL	Total – responds to the totaled weight.
t-cnt	Total Count – responds to the total count (number of samples).
LFcnt	Lift Counter – counts the total number of lifts where the weight exceeded capacity by more than 25%.

Table 4-2. Setpoint Parameters

To setup a setpoint:

1. Press ⏻ and F2 simultaneously to enter setup menu. FUnc 1 displays.

2. Press F2 to scroll to StPt 1-8.

3. Press F1. The current setting displays.

4. Press F2 to scroll to the desired setpoint mode. See Table 4-2.

5. Press F1 to enter the setpoint mode.

6. Press F2 to scroll to the type of tension or weight value the setpoint should be assigned.

7. Press F1 to enter the tension or weight value.

8. Enter the number by:

   - Pressing F2 to move the cursor position and change the number.

   - With the desired number displayed, press F1 to save the number.

   - Press F2 to move the cursor to the next position.

   - To enter a decimal point, press ⏻, the decimal point will be entered after last number displayed.

   - To correct a number, press ◈ to go back to numbered that needs to be corrected.

9. When the weight is displayed, press F1 to save and return to previous menu.

10. Press ◈ to save and return to the weigh mode.

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4.5 Total

For the accumulation of multiple weighments, the Total function uses the displayed load, so gross and net readings can be added into the same total.

There are four modes of totalizing, a manual and three auto modes.

All modes require that the weight on the scale return below 0.5% (relative to full scale) of *Gross Zero* or *Net Zero* before the next weighment can be added. Applied weight must be ≥1% of full scale above *Gross Zero* or *Net Zero* before it can be totaled.

Manual Total

Manual Total (ᵗᵗᴸ ₀ₙ) adds a current weight to a previously accumulated value manually. To add weight to the total it must be greater than 1% of capacity and not yet totaled. This assures that a weight on the scale is only added to the total once.

1. Program a **F-key** to ᵗₒᵗᴬᴸ. See Section 4.2 on page 9.
2. With the weight to be added on the scale, press **F-Total**. The acknowledge LED blinks to indicate the weight was accepted and the *TOTAL* annunciator lights. Then the total weight is displayed for five seconds and the number of samples is displayed for two seconds.
3. Repeat steps 1 & 2 until all weight samples have been added.

Note
Total Mode will not function while the scale is in motion, ensure ◣ ◢ *is on. If the system fails to achieve stable readings, increase the filter setting or increase the size of the scale division (d) in the Init Cal procedure.*

The F-Total functions as View Total only until the 1% threshold is exceeded to allow the addition to the total value.

Auto Total

This mode has three variations which are programmed in the Setup menu.

Program an **F-key** to *AUTO TOTAL*, it functions as *Auto Total On* / *Auto Total Off*. See Section 4.2 on page 9.

Setpoint	Description
A. Lₒᴬd	Auto Load – ensures any settled load above the Rise Above threshold will be automatically totaled. The scale must fall below the Drop Below threshold before the next total is allowed.
A. LᴬSᵗ	Auto Last – takes the last settled weight to auto total with. The total occurs only once the scale goes below the threshold. This allows the load to be adjusted without a total occurring. Once the load is removed, the scale uses the last settled reading for total.
A. H ᵢᴳH	Auto High – uses the highest settled reading. This is useful for loads that can't be removed all at once.

Table 4-3. Auto Load Selections

To set total Mode:

1. Press ⬤ and ▣ F2 simultaneously to enter setup menu. Fᵁₙᶜ ₁ displays.
2. Press ▣ F2 to scroll to Total.
3. Press ▣ F1 to enter the total mode. The current total mode will display.
4. Press ▣ F2 to scroll through the available parameters.
5. When the desired setting is displayed, press ▣ F1 . F ᵢLᵗʳ is displayed
6. Press ◈ to save and return to the weigh mode.

Reset Total Load

To reset the total load to zero, press **Fx-Total** again and while the total load is being displayed, quickly press ◈ .

4.6 Filter

Changing the filter settings allows the *Dyna-Link 2* to adjust to situations where there is a lot of movement in the lift or the crane structure. If the reading is not stable, it can often be improved by increasing the filter setting. Settling time will be longer as the filter setting is increased. The *Dyna-Link 2* employs algorithms that speed up large tension changes while still controlling vibration even with higher filter settings.

Parameter	Description
OFF	Disables filtering function
Lo	Low Filter
Hi-1	High Filter
Hi-2	Very High Filter

Table 4-4. Filter Parameters

To set the filter mode:

1. Press ⏻ and F2 simultaneously to enter setup menu. FUnc1 displays.

2. Press F2 to scroll to Filtr.

3. Press F1. The current filter mode displays.

4. Press F2 to scroll through the available filters.

5. When the desired filter is displayed, press F1. Unit displays.

6. Press ↯ to save and return to the weigh mode.

4.7 Units

Units can be changed in two ways:

- Program an *F-key* to 2Unit or 5Unit
- Change the units with the setup menu using the following procedure

Units	
Lb	Pounds
H9	Kilograms
ton	Short Tons
ntonS	Metric Tons
Hn	KiloNewtons

Table 4-5. Units

Change the units with the setup menu:

1. Press ⏻ and F2 simultaneously to enter setup menu. FUnc1 displays.

2. Press F2 to scroll to Unit.

3. Press F1. The current unit will display above the word Unit.

4. Press F2 to scroll through the units.

5. When the desired unit is displayed, press F1. bLiFE displays.

6. Press ↯ to save and return to the weigh mode.

To set the accessible units available by an *F-key*, set as *2Unit* (lb/kg) or *5Unit* (lb/kg/short tons/metric tons/kilonewton). See Section 4.2 on page 9.

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4.8 Battery Life

In Long battery life mode, the system is placed into a sleep state for several seconds at a time if there is no change in tension. This disables the display in order to reduce power consumption and increase battery life. After several seconds, the *MSI-7300* will wake up to check for any changes in tension. If there is a change in tension, the unit will stay awake. The unit will also stay awake if it is in configuration mode.

To set total Mode:

1. Press ⏻ and F2 simultaneously to enter setup menu. *FUnc 1* displays.

2. Press F2 to scroll to *totAL*.

3. Press F1. The current total mode will display.

4. Press F2 to scroll through the available parameters.

5. When the desired setting is displayed, press F1. *FUnc 1* displays.

6. Press ⊕ to save and return to the weigh mode.

5.0 Calibration

The *Dyna-Link 2* is calibrated using standard precision test weights. It is required that the weight used is at least 10% of full capacity in order to achieve rated accuracy.

> *Example: Use at least a 500kg test weight to calibrate a 5000kg capacity unit.*

The *Dyna-Link 2* supports load cell linearization with up to four span points that can be calibrated in any order. Usually only one cal span point is necessary and is sufficient to reach rated accuracy.

When adequate test weights are not available, the *Dyna-Link 2* can be calibrated using a Constant Calibration (C-Cal). To use C-Cal, the factory generated C-Cal number must be known. MSI supplies original and replacement load cells for the *Dyna-Link 2* with the C-Cal value stamped on the serial number label.

There are three types of calibration:

- Standard calibration is used for maintenance and routine calibration. See Section 5.1 on page 16.
- Initial calibration is used to setup both the capacity and resolution (d) of the *Dyna-Link 2*. It differs from standard calibration only in the initial steps. Initial calibration is performed after a calibration reset which completely erases the calibration and parameter settings.
- C-Cal can be used if C-Cal values are known, the *Dyna-Link 2* can be calibrated without weights.

The calibration menu contains three items: Cal, C-Cal, and Setup. The following procedures start with entering into the Cal menu, or for an initial calibration, resetting the *Dyna-Link 2* and then going to the Cal menu.

Parameter	Selections	Description
CAL		Standard and initial calibration parameter. See Section 5.1 on page 16 and Section 5.2 on page 17.
C-CAL		C-Cal parameter. See Section 5.3 on page 19.
SEtUP		See Section 5.4.1 on page 20 and Section 5.4.2 on page 20.
SETUP Sub-menu		
StAnd		Industrial Standard Settings
	Industrial *IndUS*	The common setting for the *MSI-7300*. With the Industrial standard, the unit has full range zero, access to units switching, filters, and peak hold.
	Handbook 44 *Hb44*	Sets the scale to enable only approved features per the NTEP HB-44 rules and regulations. Access is denied to Peak Hold, and the zero range may be limited. The Filter menu is moved to the Cal Setup Menu, so filters are only accessible through the Cal Seal.
	R-76 *r-76*	Sets the scale to enable only approved features per OIML R-76. Only kg weight units are available. The zero range is limited to 5% (-2 +3% relative to Calibrate zero). Net/Gross function is temporary. Once Net weight is established, pushing an **F-key** set for Net/Gross will cause a maximum 5 second display of the Gross weight. The Tare must be cleared to display Gross weight constantly. Other meteorological aspects are changed to meet R-76 requirements.
	One Unit *1 Un it*	The one unit standard is exactly the same as Industrial, except unit switching is inhibited. This is useful for Metric only countries. Another use of the One Unit standard is to allow the scale to be calibrated in units other than lb or kg, since conversions are eliminated.
AUtoO	On OFF	Auto Zero Maintenance
0. P-UP	On OFF	Set to On will cause the Dyna-Link 2 to 0 when it is powered on. Default is OFF

Table 5-1. Calibration Menu

5.1 Standard Calibration

1. Press [⊕] and [F2] simultaneously to enter the calibration menu. *CAL* displays.

2. Press [F1] to start calibration. *UnLd* displays.

3. Remove all weight from the scale.

> **Note** *Bottom fittings can be left on the link as long as they are always part of the load train.*

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4. Press **F1** to set the zero calibration point. If the zero is in range, *PASS* will display momentarily, then *LoAd 1* is displayed.

Note *If the calibration point is not within the limits, the display will read FAIL and the procedure will need to be repeated.*

5. Load the link with a test weight. For highest accuracy, a test weight of 10% or more of capacity is recommended.

6. Press **F1**, the capacity flashes on the display.

7. To use a weight different of capacity, enter the number by:

   - Pressing **F2** to move the cursor position and change the number.

   - With the desired number displayed, press **F1** to save the number.

   - Press **F2** to move the cursor to the next position.

   - To enter a decimal point, press **⏻**, the decimal point will be entered after last number displayed.

   - To correct a number, press **⊙** to go back to numbered that needs to be corrected.

8. When the weight is displayed, press **F1** to save. *PASS* will display momentarily and then *LoAd2* displays.

Note *If the Cal Value is not within the limits, the display will read FAIL and the procedure will need to be repeated.*

9. If more calibration points are desired (up to three) press **F2** and repeat steps 6-8.

10. Press **⊙** to store calibration constants. *CAL d* will be displayed.

11. Press **F1**, the *C-CAL* number displays, note for future reference.

12. Press **⊙** to exit calibration. *SEtUP* is displayed.

13. Press **⊙** to return to weigh mode.

Note *To cancel and return to weigh mode during calibration, press* **⏻** *. The previous calibration will be reset.*

5.2 Initial Calibration

Important *Use this procedure only if the capacity and count-by (d) needs to be modified. The initial steps of this procedure will totally erase user setups as well as any previous calibration.*

1. Press **⊙** and **F1** simultaneously. *rESEt* flashes on the display.

2. Press **F1**. *SUrE?* displays.

3. Press **F1** to reset all calibration settings. *CAL* displays.

Note *To cancel the reset and return to the CAL menu, press* **⏻** *.*

4. Press **F1** to start initial calibration. *Un it* displays.

5. Press **F1**. Use **F2** to scroll to the desired unit.

6. Press **F1**. *CAP* displays.

7. Press [F1]. The current capacity is displayed.

8. Enter a different capacity by:

    - Pressing [F2] to move the cursor position and change the number.

    - With the desired number displayed, press [F1] to save the number.

    - Press [F2] to move the cursor to the next position.

    - To enter a decimal point, press [⏻], the decimal point will be entered after last number displayed.

    - To correct a number, press [↺] to go back to the number that needs to be corrected.

9. Press [F1]. *d* displays. The current scale division size is displayed.

10. Press [F2] to scroll through options until the desired division size is displayed.

> **Note** *The first selection is the standard division for the current capacity. Setting the division to a size that results in a total resolution higher than 1:5000 is not recommended for stability reasons.*

11. Press [F1]. *UnLd* displays.

12. Follow the Standard Calibration procedure to complete calibration. See Section 5.1 on page 16 starting at step 2.

> **Note** *For large capacity Dyna-Link 2's, enter the capacity in weight X1000 and push the POWER key twice. X1000 mode is indicated by the M annunciator during data entry.*
>
> *For the 100,000 lb unit, enter 100 and press the POWER key twice so the M annunciator is on.*

5.2.1   Guidelines for Capacity and Resolution

The *Dyna-Link 2* is subject to forces that static scales do not experience. Many bridge cranes, hoist cranes, and mobile cranes lack rigidity and tend to bounce or swing when loads are lifted. For this reason, MSI recommends that resolution is kept in the 1:2000 to 1:3000 range. Some improvement in stability can be achieved by increasing the filtering. Never program resolution that is far greater than needed. The resolution should never be set higher than 1:5000 due to temperature and noise considerations common to all strain gage based load cells.

If the *Dyna-Link 2* display doesn't stabilize, reduce the resolution and increase the filtering.

The tension must be stable for certain features to work:

    - ZERO tension must be stable to be zeroed.
    - TARE tension must be stable to be tared.
    - TOTAL tension must be stable to be added to the total registers.

One way to improve the stability is to increase the filtering, at the risk of increasing settling time.

The other is to increase the 'd' (reduce resolution).

The third way is to increase the motion window. The *Dyna-Link 2* defaults to ±1d as a motion window. It can be changed at MSI to a higher value if desired. Often ±3 d is chosen for bridge cranes as these tend to have a lot of bounce to them. This of course carries an accuracy penalty adding ±3 d to the total accuracy of the *Dyna-Link 2* if the zero or tare operation happens to capture the tension in a valley or peak.

Setting capacity is dictated primarily by the capability of the load cell. The *Dyna-Link 2* is available in a variety of capacities. Never set the capacity of the *Dyna-Link 2* higher than the rating of the load cell. Due to the excellent linearity of the Link load cell, it is acceptable to set lower capacities to better match the crane the *Dyna-Link 2* is used on. For example, if the hoist is rated for 9000 lb, a 10000 lb capacity *Dyna-Link 2* can be used and the capacity reset to 9000 lb so that the *Dyna-Link 2* will indicate overload at 9000 lb instead of 100000 lb. Derating as much as 50% of the capacity is usually acceptable, but the *Dyna-Link 2* may be less stable if the 'd' is decreased (resolution increased).

> **Note** *The capacity of all the Dyna-Link 2 systems is rated approximately 20% higher than the rated capacity in pounds. This is to allow the kg capacity to be exactly 1/2 the number of the pounds capacity.*

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5.3 C-Cal Calibration

When adequate test weights are not available, the *Dyna-Link 2* can be calibrated using a cal number calibration which is referred to as C-Cal. To use C-Cal, a factory generated C-Cal number must be known. Replacement load cells for the *Dyna-Link 2* have the C-Cal value stamped on the serial number label. When a calibration is performed with test weights, a new C-Cal is generated.

> **(!) Important** *The C-Cal number must be known prior to starting this procedure. For a Dyna-Link 2, with its original load cell, this number is printed on the Calibration Record, the serial number tag. C-Calibration reduces slightly the absolute accuracy of the system and is intended for non-critical use only. For highest accuracy, calibrate the Dyna-Link 2 with precision test weights.*

1. Press **-◈-** and **F2** simultaneously to enter the calibration menu. *CAL* is displayed.

2. Press **F2** to *C-CAL*.

3. Press **F1** to start the *C-CAL* calibration procedure. *UnLd* displays.

> **Note** *Bottom fittings on the link can be left on as long as they are always part of the load train.*

4. Remove all weight from the scale.

5. Press **F1** to set the zero calibration point. If the zero is in range, *PASS* is displayed, followed by *C-CAL*.

6. Press **F1**, the last known *C-CAL* value is displayed.

7. Press **F1** if the display *C-CAL* value is correct go to step 8.
   If value is not correct, enter the *C-CAL* value as follows:

   - Press **F2** to move the cursor position and change the number.

   - With the desired number displayed, press **F1** to save the number.

   - Press **F2** to move the cursor to the next position.

   - To enter a decimal point, press **①**, the decimal point will be entered after last number displayed.

   - To correct a number, press **-◈-** to go back to numbered that needs to be corrected.

8. Press **F1** when the *C-CAL* value is correct. If the *C-CAL* value is within acceptable range, *PASS* is displayed briefly, followed by *CAL d*.

> **Note** *Multiple C-CAL span points are possible when using the ScaleCore Connect program.*

9. Press **-◈-** twice to exit and save the new *C-CAL* calibration. *StorE* displays briefly and the *Dyna-Link 2* returns to the weigh mode.

5.4 Calibration Setup Menu

The calibration setup menu contains the **Standard Menu** and the **Auto Zero Maintenance Menu**. Additional menus will display depending on the main setup menu when Legal-for-Trade settings are used.

Parameter	Selections	Description
5tAnd		Industrial Standard Settings
	Industrial IndUS	The common setting for the *MSI-7300*. With the Industrial standard, the unit has full range zero, access to units switching, filters, and peak hold.
	Handbook 44 Hb44	Sets the scale to enable only approved features per the NTEP HB-44 rules and regulations. Access is denied to Peak Hold, and the zero range may be limited. The Filter menu is moved to the Cal Setup Menu, so filters are only accessible through the Cal Seal.
	R-76 r-76	Sets the scale to enable only approved features per OIML R-76. Only kg weight units are available. The zero range is limited to 5% (-2 +3% relative to Calibrate zero). Net/Gross function is temporary. Once Net weight is established, pushing an **F-key** set for Net/Gross will cause a maximum 5 second display of the Gross weight. The Tare must be cleared to display Gross weight constantly. Other meteorological aspects are changed to meet R-76 requirements.
	One Unit I Un it	The one unit standard is exactly the same as Industrial, except unit switching is inhibited. This is useful for Metric only countries. Another use of the One Unit standard is to allow the scale to be calibrated in units other than lb or kg, since conversions are eliminated.
AUtoO	On OFF	Auto Zero Maintenance
O. P-UP	On OFF	Set to On will cause the *Dyna-Link 2* to 0 when it is powered on. Default is OFF

5.4.1 Standard Menu

Use the following information and steps to set up a Legal-for-Trade standard setting.

1. Press [⊙] and [F2] simultaneously to enter the calibration menu. CAL is displayed.

2. Press [F2] to scroll to Setup.

3. Press [F1]. 5tAnd is displayed.

4. Press [F1]. The current standard setting is displayed.

5. Press [F2] to scroll to the desired standard.

6. Press [F1] to select the desired standard.

7. Press [⊙] twice to store all changes and exit setup. 5torE displays briefly and returns to the weigh mode.

5.4.2 Auto Zero Maintenance (AZM)

The *Dyna-Link 2* employs an auto zeroing maintenance mechanism to adjust the zero reading to the center-of-zero, which is defined as the tension reading is within ¼ d of zero. AZM continuously adjusts zero to maintain center-of-zero. It is recommended that AZM is set to on to maintain the highest accuracy. There are circumstances when the AZM should be turned off; for example, when minor variations of tension occur while picking up *Dyna-Link 2* attachments and the variations fall within the AZM capture window. The AZM capture window (usually 1 d) and capture time (usually eight seconds) can be adjusted by MSI to meet custom requirements.

1. Press [⊙] and [F2] simultaneously to enter the calibration menu. CAL is displayed.

2. Press [F2] to scroll to 5EtUP.

3. Press [F1]. 5tAnd displays.

4. Press [F2] to scroll to AUtoO.

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5. Press **F1**. The current setting displays.

6. Press **F2** to scroll to *On* or *OFF*.

7. Press **F1** to select desired setting. *StAnd* displays.

8. Press **⊸◊** twice to store settings. *StorE* displays briefly and the *Dyna-Link 2* returns to the weigh mode.

5.4.3   Zero on Power-up (0.P-UP)
Set to on to perform a zero each time the *Dyna-Link 2* is time the powered on.

1. Press **⊸◊** and **F2** simultaneously to enter the calibration menu. *CAL* is displayed.

2. Press **F2** to scroll to *SEtUP*.

3. Press **F1**. *StAnd* displays.

4. Press **F2** to scroll to *0.P-UP*.

5. Press **F1**. The current setting displays.

6. Press **F2** to scroll to *On* or *OFF*.

7. Press **F1** to select desired setting. *StAnd* displays.

8. Press **⊸◊** twice to store settings. *StorE* displays briefly and the *Dyna-Link 2* returns to the weigh mode.

6.0   Communication

The *Dyna-Link 2* can communicate with peripheral devices using RS-232 or 802.15.4 wireless. Only one communications type can exist at a time. The RS-232 port located on the bottom side of the *Dyna-Link 2* can be used for setup and calibration using a computer and the ScaleCore Connect Software (available Online).

Parameter	Parameter	Description
Print		Print setup. See Section 6.3 on page 24.
	5trnG	Setup Strings – enter a print string number 　　1 = Current Wt (Wt-Unit-Mode ⏎) 　　2 = Net Wt (Wt-Unit-Net ⏎) 　　3 = Gross Wt (Wt-Unit-Grs ⏎) 　　4 = Tare Wt (Wt-Unit-Tare ⏎) 　　5 = Total Wt (Wt-Unit-Total ⏎) 　　6 = Total Count (#Samples-TCNT ⏎) 　　7 = Current Wt (no units or mode ⏎) 　　8 = Reserved 　　9 = CR-LF (⏎)
	Cntrl	Print Control – select from paramters: 　　OFF – disables printing 　　U5Er – press the assigned F-Key and one transmission of the selected string type is output 　　LoAd – when the tension on the link is stable, one transmission will output. The tension must return to zero to enable another print to output. 　　Cont – program the interval in seconds up to 65535 seconds
	rAtE	Output Rate Network ID – print string output rate, enter a number between 0-65635 seconds. Setting the interval to 0 will set an interval as fast as the system can go.
rF		Radio frequency setup. See Section 6.4 on page 25
	On. OFF	Enable RF – affects continuous mode only, select On or Off
	5c id	Scalecore ID – range 1-254 (20-30)
	ChnL	RF Channel – range 12-23
	nEt id	Network ID – range 0 to 99999
	5trEn	RF Network – number of entry screens

Table 6-1. Communication Menu

1. To enter the communication menu on the *Dyna-Link 2* press [F1] and [F2] simultaneously

2. Press [F2] to scroll through the parameters or settings.

3. Press [F1] to enter a parameter or save a selection and return to previous menu.

4. Press [⟳] to save a selection and return to previous menu.

5. Press [①] to cancel and return to weigh mode.

6. Press [⟳] to save. 5torE displays briefly and the *Dyna-Link 2* returns to the weigh mode.

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6.1 Printer

The RS-232 comm port is capable of outputting tension data. All the weight modes the *Dyna-Link 2* can measure are available in user formatted form. The control mode program is what causes the *Dyna-Link 2* to print.

6.1.1 Standard Print Strings

The following commands can be used to format gross, net and other print formats.

Command	Description
<T>	Tension Data with sign if necessary
<U>	Units
<M>	Tension mode (lb/kg), which for 1 is either net or gross
<CRLF>	Carriage return line feed
<SP>	Space

Table 6-2. Print commands

String No.	Print String	Description
1	Current Tension	Fixed output length: 16. Leading zeros suppressed except for the least significant digit (LSD). <TTTTTTT><SP><UU><SP><MMMMM><CRLF>
2	Net Tension	Fixed output length:16. Leading zeros suppressed except for the LSD. <TTTTTTT><SP><UU><SP><NET><SP><SP><CRLF>
3	Gross Tension	Fixed output length: 16. Leading zeros suppressed except for the LSD. <TTTTTTT><SP><UU><SP><GROSS><CRLF>
4	Tare Weight	Fixed output length:16. Leading zeros suppressed except for the LSD. <TTTTTTT><SP><UU><SP><TARE><CRLF>
5	Total Weight	Fixed output length: 16. Leading zeros suppressed except for the LSD. <TTTTTTT><SP><UU><SP><TTL><CRLF>
6	Number of Samples Totaled	Fixed output length: 16. Leading zeros suppressed except for the LSD. <SP><SP><SP><SP><SP><SP><SSSSSSS><SP><T-CNT><SP><CRLF>
7	Current Weight Mode	Net, Gross, Peak, etc <SP><MMMMM><CRLF>
8/9	Carriage Return/ Line Feed	Used to add a space between print records. <CRLF>

Table 6-3. Print Strings

In the string number entry screen, combinations of the standard print strings may be entered. For example, to get a NET, GROSS and TARE, printout with a space between records, enter **2349**.

Using the ScaleCore Connect, custom output strings are possible.

> **Note** *ScaleCore Connect programming can be found on the CD included with the product or can be downloaded from www.ricelake.com.*

The serial output is configured as 9600 baud, Xon/Xoff handshaking, no hardware handshaking, 1 stop bit, no parity. Other baud rates are available by special order.

6.1.2 Printer Output Setup

1. Press **F1** and **F2** simultaneously. *Print* is displayed.

2. Press **F1** . *StrnG* displays.

3. Press **F1** . The current print mode format number is displayed.

4. Set up a print format with one or more of the numbers of the data type required. See Table 6-3.

   • Pressing **F2** to scroll to the desired number.

- Press **F1** to save the number.
- Repeat until all desired numbers have been entered.

5. Press **F1** . ⌐ntrʟ displays.

6. Press **F1** to enter print control. The last saved control mode will display.

7. Press **F2** until the desired print control mode is displayed.

8. Press **F1** . ⌐AtE displays. If print control mode is set to ⌐ont, continue with step 9. If set to OFF, ʟoAd or USEr, go to step 12.

9. Press **F1** . The current print weight is displayed.

10. Enter the desired print rate.

- Press **F2** to move the cursor position and change the number.
- With the desired number displayed, press **F1** to save the number.
- Press **F2** to move the cursor to the next position.
- To correct a number, press **⊙** to go back to numbered that needs to be corrected.

11. When the desired number is displayed, press **F1** . Str ⌐n9 displays.

12. Press **⊙** twice to return to weigh mode.

6.2 RF Option

The RF options are easily connected and commonly used for gathering weight data after the initial setup of the unit. For RF operation, the *Dyna-Link 2* uses an 802.15.4 transceiver to communicate with the *MSI-8000/8000HD* RF Remote Display.

802.15.4 wireless:

- operates in the 2.4GHz ISM band and does not require the end user to obtain a license.
- can coexist with other 2.4GHz systems, if caution is taken to isolate antennas at least 10' (3 m) from the Crane Scales and *MSI-8000/8000HD* equipment.
- Bluetooth
- Wi-Fi

MSI-8000/8000HD based RF systems are peer to peer. For multiple scale connections, the *MSI-8000/8000HD* acts as the network coordinator.

6.3 Comm Port Hardware

The *Dyna-Link 2* RS-232 comm port is used for software updates, connecting to a remote display, and for connecting to any RS-232 device.

Connector	M12 industrial IP67 rated. An adapter cable (P/N 503363) is required to connect the *Dyna-Link 2* to a computer. This adapter cable converts the *Dyna-Link 2* connector to a standard D9 serial connector.
Data Configuration	The data output is fixed at 8-1-N.
Baud Rate	Programmable for 300 to 230.4k baud in eight steps. The bootloader for updating software is always 38.4k baud.
Handshaking	No hardware handshaking is supported XON/XOFF software handshaking is always on.

Table 6-4. Comm Port Hardware

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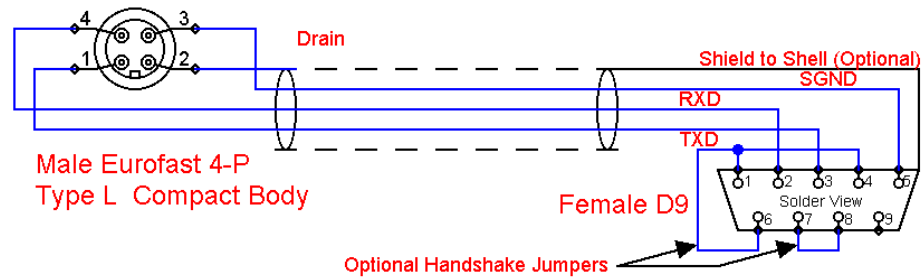
Figure 6-1. Serial Cable Schematic, DCE Configuration for Connecting to a Computer
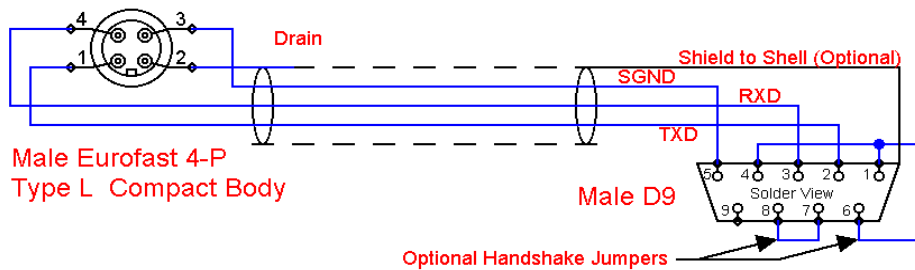
Figure 6-2. Serial Cable Schematic, DTE Configuration for Connecting Directly to a DCE Printer

6.4 802.15.4 RF Network

When equipped with the 802.15.4 option, the *Dyna-Link 2* can connect with an *MSI-8000/8000HD* Remote Display or an 802.15.4 modem. The unit uses three numbers to connect to an 802.15.4 piconet:

- **ScaleCore ID** – uniquely identifies each ScaleCore device in a piconet. It has a range of 0-254 and must not be duplicated within the same RF channel. For the *MSI-8000/8000HD* as network coordinator, Rice Lake Weighing Systems recommends a number for the *Dyna-Link 2* from 0-3 if multiple units will be connected to the *MSI-8000/8000HD*. If a single *Dyna-Link 2* is all that's needed than any number up to 254 is acceptable.
- **RF Channel** – establishes the base network, all interconnected devices must match. This number must be in the range of 12-23.
- **Network ID** – this is a 64-bit number that all interconnected devices must match. The *Dyna-Link 2* limits this number to a max of 5 digits for a range of 0 - 99999. Do not use a small number here to help avoid other 802.15.4 networks that default to a network ID of 0.
- **RF Strength** – transmission strength can be set from 0 to 4, default is 1. The settings effect the transmission range with zero is lowest power level and four is the highest. Power 4 will use the battery life quicker, so use the lowest number possible for reliable transmission. If maximum range is needed set the strength to four.

Note *For all devices that interconnect, the RF channel and network ID must match. The ScaleCore ID must be unique. The Dyna-Link 2 or other MSI RF equipment that is a weight data source should be set to a ScaleCore ID of 0, then if other slave devices are added, they can be added in sequence.*

6.4.1   RF Network Setup

1. Press **F1** and **F2** simultaneously. $Pr\ int$ is displayed.

2. Press **F2** . rF displays.

3. Press **F1** . $OnOFF$ is displayed.

4. Press **F1** to enter the ON/OFF setting.

5. Press **F2** to scroll to the desired setting.

6. Press **F1** . `5C id` is displayed.

7. Press **F1** . The current SCID number displays.

8. Press **F2** to scroll through the numbers and press **F1** to select the desired number.

📝 **Note** *Any value of SCID from 1 - 254 is acceptable, however, Rice Lake Weighing Systems recommends a value from 20-30.*

If a wrong value is input, press ⊸◎ *to step back one digit and reenter the number.*

9. When the desired number is displayed, press **F1** . `ChnL` displays.

10. Press **F1** . The current channel displays.

11. Press **F2** to scroll through the numbers and press **F1** to select the desired number.

📝 **Note** *Recommended RF Channel number range from 12-23.*

If a wrong value is input, press ⊸◎ *to step back one digit and reenter the number.*

12. When the desired number is displayed, press **F1** to save. `nEt id` is displayed.

13. Press **F1** . The current network ID.

14. Press **F2** to scroll through the numbers and press **F1** to select the desired number.

📝 **Note** *Any network ID numbers from 0-99999 is acceptable. Rice Lake Weighing Systems recommends a value of at least four digits to ensure that the system will not conflict with other 802.11.4 networks.*

If a wrong value is input, press ⊸◎ *to step back one digit and reenter the number.*

15. When the desired number is displayed, press **F1** to save. `StrEn` displays.

16. Press **F1** . The transmission strength is displayed.

17. Press **F2** to scroll through the numbers and press **F1** to select the desired number.

📝 **Note** *The transmission strength range is 0-4. When setting the transmission strength, use the lowest setting possible to achieve the transmission required. Both the Dyna-Link 2 and the 8000 should be set at the same transmission strength.*

18. When the desired number is displayed, press **F1** . `OnOFF` is displayed.

19. Press ⊸◎ twice to store settings and return to weigh mode.

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6.5   Setup Multiple Sensor Network

The *MSI-8000/8000HD Remote Display* can monitor up to four load sensors. The sensors can be read individually, in pairs or summed.
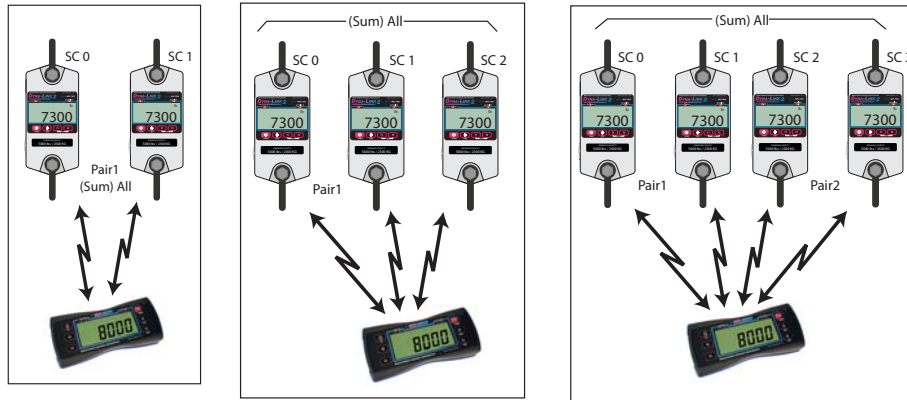
Figure 6-3. Multiple Sensor Network

Each sensor has a unique ScaleCore ID (SCID). The IDs must be consecutive, starting with 0. This is set in the sensor setup, not in the *MSI-8000/8000HD*. See the *MSI-8000/8000HD* operation manual for more information.

6.6 FCC Statement (For 802.15.4 Option)

Contains FCC ID: OUR-XBEEPRO

The enclosed device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (i.) this device may not cause harmful interference and (ii.) this device must accept any interference received, including interference that may cause undesired operation.

6.7 International RF CERTS (For 802.15.4 Option)

Canada Radio Cert. No.: IC: 4214A-XBEEPRO

Australia & New Zealand: AS4268:3000

Japan: Certificate of Radio Equipment in Japan No.: 08215111/AA/02

Europe and much of **Asia**:

This product is compliant with the following standards and/or other normative documents:

Safety (article 3.1A) EN60950-1:2001

EMC (article 3.1b) ETSI EN 301 489-1 v1.7.1 (2007-04) In accordance with the specific requirements of ETSI EN 301 489-17 v1.2.1 (2002-08)

Spectrum (article 3.2) ETSI EN 300 328 v1.7.1 (2006-10)

7.0 Maintenance and Troubleshooting

7.1 Troubleshooting

Problem	Possible Cause	Solution
Display is blank when POWER key is pressed	Discharged battery	Replace cells, or if using NiMH, recharge
	Defective battery	Replace
	Corroded battery or battery contacts	Clean contacts
	Defective switch or circuit board	Requires authorized service
Display does not function properly or front panel keys do not function normally or *Dyna-Link 2* will not turn off	Improperly loaded software	Reinstall software
	Faulty circuit board	Requires authorized service
	Loose connectors	Requires authorized service
Dyna-Link 2 does not respond to tension changes	Out of calibration	Calibrate
	Faulty load cell	Replace
	Load cell connector	Check connector and wires
Display over ranges below 100% of capacity	Tared tension is added to load to determine overload point	Return to gross tension mode
	Zero requires adjustment	Rezero the *Dyna-Link 2*
	Too much tension/load has been zeroed	Rezero the *Dyna-Link 2*
Display drifts	AZM (Auto0) is turned off	Turn AZM on
	Rapid temperature changes such as moving the *Dyna-Link 2* from indoors to outdoors	Wait until the *Dyna-Link 2* temperature has stabalized
Displayed tension shows larger error	*Dyna-Link 2* not zeroed before load is lifted	Zero the *Dyna-Link 2* with no load attached
	lb/kg units causing confusion	Select proper units
	Requires recalibration	Recalibrate
Display reading not stable	Excessive vibration in crane system	Increase filtering or increase d in Cal
	Excessive side loading	Improve load train symmetry
	Load cell faulty	Check LC connections
Display toggles between Error and Load	Tension exceeds capacity	Immediately reduce tension
	Faulty load cell or wiring	Check LC and LC wiring
Display toggles between Error and buttn	A key is stuck or is being held down	Check switches for damage
		Ensure that a remote is not continuously transmitting
Optional RF Remote display does not work	Units not mated	See RF Remote Manual
Lo Batt is blinking	Battery is low	Replace (alkaline) or recharge batteries
Unit turns on, then immediately off	Battery is low	Replace (alkaline) or recharge batteries
Tension will not zero	System not stable	Wait for standstill annunciator to turn on
		Increase filtering for more stability
	Zero out of range	Zero range might be limited. Reduce the tension or use tare instead
Tension will not tare or total	System is not stable	Wait for standstill annunciator to turn on, or if in a mechanically noisy crane, increase the filtering or reduce the size of the *Dyna-Link 2* increment d. It is also possible to increase the motion window. Contact Rice Lake Weighing Systems if there is a problem getting the *Dyna-Link 2* to zero, tare, or total due to stability issues.
Setpoint lights blink	Setpoint is enabled and the trigger point has been reached	Disable setpoints if they are not needed

Table 7-1. Troubleshooting

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Problem	Possible Cause	Solution
Manual total does not work	A function key is not set to "Total"	Set up Func1 or Func2 for Total
	Tension must be stable	Increase filtering for more stability
Auto total does not work	Tension must be stable	Wait for standstill annunciator to turn on, or increase filtering for more stability
	Tension thresholds not reached	The tension threshold must exceed 1% of capacity for autototal to work, and then, must drop below 0.5% of capacity for additional weighments to register.

Table 7-1. Troubleshooting (Continued)

7.1.1   Error Codes

The ScaleCore processor that is the heart of the *MSI-7300 Dyna-Link 2* detects errors and generates error codes to aid in troubleshooting.

Error Code		Definition	Comment
LcOFF		LC Disabled	A load cell was not enabled
2CAL		In Cal	The system is in calibration mode. Do not send commands unrelated to calibration.
unCAL		Not Calibrated	System has not been calibrated.
	Error	Overload	Tension/Weight exceeds set capacity +9d
	Load		Load Cell damaged or disconnected
	Error	Underload	Tension/Weight is more than 20% negative
	UnLd		Load cell damaged or disconnected

Table 7-2. Error Codes

7.2 Service Counters

The *Dyna-Link 2* maintains two service counters for safety.

- The first counter counts the number of times the scale has been overloaded.
- The second counter counts lifts above 25% of capacity.

These counters warn the user to inspect the load train after a number of overloads and also when there is a chance of fatigue failure. The power up routine will be interrupted when the lift counter exceeds 16383 lifts or the overload counter exceeds 1023 overloads. If the screen displays LFCnt when unit is powered on:

1. Press the **TARE F-key** key to display the 25% lift counter.

2. Press **TARE F-key** key again to see the overload lift counter.

3. Press ⟨◈⟩ to acknowledge the warning and return to standard scale operation.

📝**Note** *The warning message during power up will not display again for another 16383 lifts (or 1023 overloads).*

To access the service counters:

1. Program an **F-key** to tESt. See Section 4.2 on page 9.

2. Press **F-TEST** .

3. Press **F1** . Test sequence including the following will begin.

- Lift Counter (LFCnt) – followed by number of lifts where the weight exceeded capacity by more than 25%.
- Overload Counter (OLCnt) – followed by number of lifts where the weight exceeded capacity.
- C-CAL value

Once the test is complete, the *Dyna-Link 2* returns to the weigh mode.

📝**Note** *Press* **F2** *to stop the sequence, use* **F1** *and* **F2** *to view parameters. Press* ⟨◈⟩ *to return to weigh mode.*

⚠️**WARNING** *The Service Counters are safety warning features, only Rice Lake Technicians can reset these. In some circumstances, a thorough load train inspection may be necessary to ensure user safety.*

Reference the Crane Scale Safety and Periodic Maintenance manual for proper loading techniques to improve the safety and longevity of the crane scale, available online and is included on the CD shipped with the scale.

7.3 Mechanical Dimensions
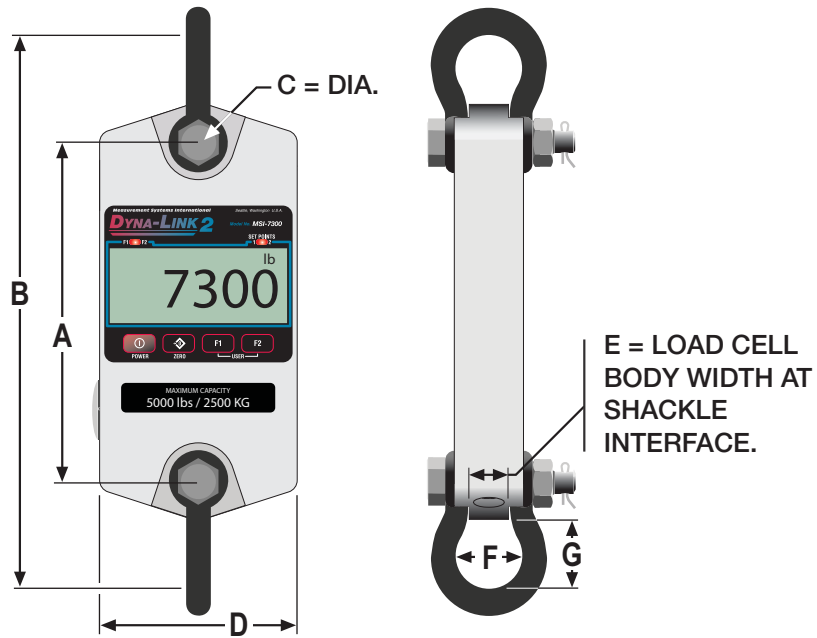
Figure 7-1. Mechanical Dimensions

Capacity	A	B	C	D	E	F	G	Approx Shipping Wt	Shackle
	8.0 in	13.53 in	.75 in	5 in	.99 in	1.69 in	1.75 in	4.4 lb	G-2130 3.25T
500 kg	203 mm	344 mm	19 mm	127 mm	25 mm	43 mm	44.4 mm	2.0 kg	
2500 lb	8.5 in	14.03 in	.75 in	5 in	.99 in	1.69 in	1.75 in	4.9 lb	G-2130 3.25T
1250 kg	216 mm	356 mm	19 mm	127 mm	25 mm	43 mm	44.4 mm	2.2 kg	
5000 lb	8.5 in	14.03 in	.75 in	5 in	.99 in	1.69 in	1.75 in	4.9 lb	G-2130 3.25T
2500 kg	216 mm	356 mm	19 mm	127 mm	25 mm	43 mm	44.4 mm	2.2 kg	
10,000 lb	8.5 in	16.14 in	1 in	5.50 in	1.35 in	2.28 in	2.34 in	7.3 lb	G-2130 6.5T
5000 kg	216 mm	410 mm	25 mm	140 mm	34 mm	58 mm	59.4 mm	3.3 kg	
25,000 lb	9.5 in	22.66 in	1.63 in	6.38 in	2.24 in	3.88 in	4.69 in	13 lb	G-2130 17T
12,500 kg	241 mm	576 mm	41 mm	162 mm	57 mm	99 mm	119 mm	5.9 kg	
50,000 lb	9.63 in	25.67 in	2 in	7.50 in	2.74 in	5.00 in	5.75 in	23 lb	G-2130 25T
25,000 kg	245 mm	652 mm	51 mm	191 mm	70 mm	127 mm	146 mm	10 kg	
100,000 lb	12 in	29.75 in	2.25 in	8.13 in	3.11 in	5.75 in	4.81 in	53 lb	G-2140 55T
50,000 kg	305 mm	756 mm	57 mm	207 mm	79 mm	146 mm	122 mm	24 kg	

Table 7-3. Mechanical Dimensions

7.4 Standard Capacities and Resolution

⚠️ **WARNING** *The Dyna-Link 2 has a safe mechanical overload of 200% of capacity. Overloads greater than 200% may result in physical damage to the link. The ultimate overload is rated to 500%-700% of capacity. At ultimate overload, structural failure and dropped loads may occur. Dropped loads may cause serious personal injury or death.*

📝 **Note** *Short ton and metric ton resolutions are the same.*

Capacity	Std 'd'	Std Counts	HiRes 'd'	HiRes Counts	Ultimate Overload	Config
1000 lb 500 kg 0.5 Ton 4.9 kN	0.5 lb 0.2 kg 0.0002 T 0.002 kN	2000 2500 2500 2450	0.2 lb 0.1 kg 0.0001 T 0.001 kN	5000 5000 5000 4900	>>700%	Alum 2 C-Cells
2500 lb 1250 kg 1.25 ton 12.25 kN	1 lb 0.5 kg 0.0005 T 0.005 kN	2500 2500 2500 2450	0.5 lb 0.2 kg 0.0002 T 0.002 kN	5000 6250 5000 4900	700%	Alum 2 C-Cells
5000 lb 2500 kg 2.5 Ton 24.5 kN	2 lb 1 kg 0.001 T 0.01 kN	2500 2500 2500 2450	1 lb 0.5 kg 0.0005 T 0.005 kN	5000 5000 5000 4900	700%	Alum 2 C-Cells
10000 lb 5000 kg 5.0 Ton 4.9 kN	5 lb 2 kg 0.002 T 0.02 kN	2000 2500 2500 2450	2 lb 1 kg 0.001 T 0.01 kN	5000 5000 5000 4900	700%	Alum 2 C-Cells
25000 lb 12500 kg 12.5 Ton 122.5 kN	10 lb 5 kg 0.005 T 0.05 kN	2500 2500 2500 2450	5 lb 2 kg 0.002 T 0.02 kN	5000 6250 6250 6125	700%	Alum 2 D-Cells
50000 lb 25000 kg 25 Ton 245 kN	20 lb 10 kg 0.01 T 0.1 kN	2500 2500 2500 2450	10 lb 5 kg .005 T 0.05 kN	5000 5000 5000 4900	600%	Alum 2 D-Cells
100000 lb 50000 kg 50 Ton 490 kN	50 lb 20 kg 0.02 T 0.2 kN	2000 2500 2500 2450	20 lb 10 kg 0.01 T 0.1 kN	5000 5000 5000 4900	550%	Alum 2 D-Cells
120000 lb 60000 kg 60 Ton 588 kN	50 lb 20 kg 0.02 T 0.2 kN	2400 3000 3000 2940	20 lb 10 kg 0.01 T 0.1 kN	6000 6000 6000 5880	500%	Steel 2 D-Cells
180000 lb 90000 kg 90 Ton 882 kN	100 lb 50 kg 0.05 T 0.5 kN	1800 1800 1800 1764	50 lb 20 kg 0.02 T 0.2 kN	3600 3600 4500 4410	500%	Steel 2 D-Cells
260000 lb 130000 kg 130 Ton 1275 kN	100 lb 50 kg 0.05 T 0.5 kN	2600 2600 2600 2550	50 lb 20 kg 0.02 T 0.2 kN	5200 6500 6500 6375	500%	Steel 2 D-Cells
380000 lb 190000 kg 190 Ton 1863 kN	200 lb 100 kg 0.1 T 1 kN	1900 1900 1900 1863	100 lb 50 kg 0.05 T 0.5 kN	3800 3800 3800 3726	500%	Steel 2 D-Cells
550000 lb 225000 kg 225 Ton 2206 kN	200 lb 100 kg 0. 1 T 1 kN	2750 2250 2500 2206	100 lb 50 kg 0.05 T 0.5 kN	5500 4500 5000 4412	440%	Steel 3 D-Cells

Table 7-4. Standard Capacities and Resolutions

7.5 Firmware Update Procedure

Updating firmware in the *Dyna-Link 2* requires the following: a DCE serial cable (PN 139470), a computer with a terminal program, such as Tera Term Pro (recommended), and if the computer does not have standard RS-232 serial ports, then a USB to serial converter. Make sure the driver for the USB converter is properly installed, and that the terminal program is set up for the proper comm port.

The latest firmware code is available from the Rice Lake service department and can be emailed on request. The firmware version is displayed when the *Dyna-Link 2* is turned on in the form of 01-04 (individual unit version will vary). Most firmware updates do not require a recalibration. Consult the version release notes for confirmation.

4. Setup the terminal serial port to 8 data bits, no parity, 1 stop bit, 9600 BAUD, XON/XOFF (flow control).

5. Connect to the *Dyna-Link 2* serial port using the DCE cable. Connect the D9 connector to a computer or USB adapter.

6. (Optional) Test that there is a connection by typing {00FF01?}. If the connection is good the *Dyna-Link 2* will respond with {000001r2;0;01E02;2011-07-08;11:05} or something similar.

7. On the terminal keyboard, type {**ff0009=0199**}

8. Change the terminal serial port to 38400 BAUD. Hit the q key to refresh the display. Cycle Power on *Dyna-Link 2* by removing and reinstalling batteries. The following menu displays:

> *MSI-7300* SCALECORE 1 BOOT LOADER Ver. xx-xx(c) Date/Time
>
> > (u)   Download and program application code
> >
> > (q)   query app code info
> >
> > (g)   execute app code
> >
> > (r)   refresh

Note *Individual unit boot loader version may vary.*

9. Type **u**

> Terminal displays:
>
> > Send File NOW, or press ^ to abort:

10. Send the .prg file using the file send feature of the terminal program. The character # will tick away as the ScaleCore programs.

> Send File NOW, or press ^to abort:################################
> ##
> ##
> ##
> Completed

11. After the file is received, terminal displays **Completed**. Then the boot menu displays again.

> MSI8000 SCALECORE2 BOOT LOADER Ver. Ver. xx-xx(c) Date/Time
>
> > (u)   Download and program application code
> >
> > (q)   query app code info
> >
> > (g)   execute app code
> >
> > (r)   refresh

12. Optional step: send **q** to check the program. The ScaleCore will respond with a message that details the 32b checksum, the product ID and version, and the application code version number in the following form:

> Computed Signature BOB742D   *32b CRC must match*
>
> Received Signature BOB742D   *32b CRC must match*
>
> Product ID 07   *Dyna-Link product family*
>
> Product Version ID 00   *Optional features code*
>
> App Code Version 01-04   *Firmware version number*

> If the CRC Signature does not match, go back to step 4 and try again.

13. Send an **r** to restore the boot menu.

> MSI8000 SCALECORE2 BOOT LOADER Ver. xx-xx(c) Date/Time
>
> > (u)   Download and program application code
> >
> > (individual unit boot loader version may vary)
> >
> > (q)   query app code info
> >
> > (g)   execute app code
> >
> > (r)   refresh

14. Send a **g**. The *Dyna-Link 2* will start.

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8.0   Specifications

Power

Battery Operated   Alkaline cells can be replaced with rechargeable NiMH cells

Operating Time

Alkaline C cells   >150 hours typical
Alkaline D cells   >300 hours typical

Accuracy

Rated accuracy   ±0.1% of capacity
Typical accuracy   ±(0.1%+1d) of reading. d equals one displayable increment

Resolution

Standard   2000-2500 d
Hi-Res mode   5000-6250 d
Internal A/D   24 bits

Operator Interface

Five digit display   1.22'' (31 mm) numeric digits
Six digit display   1'' (26 mm) on 100000 lb units and higher

Function Keys   two keys programmable to TEST
 F1 and F2   TOTAL, UNIT, PEAK, TARE,
    NET/GROSS, VIEW TOTAL, PRINT and High Res mode

Load Cell and Enclosure

Load Cell   2000 Ω Bridge
Enclosure   NEMA Type 4/IP65 anodized aluminum, 2024-T351 Aircraft Quality

Calibration

Digital Calibration   From front panel or through a computer interface

Overload

Safe link   200% of capacity
mechanical overload

Ultimate link overload   >500% of capacity

Ultimate overload   700% or greater

Note that the *Dyna-Link 2* is designed to have a greater safety
factor than the connecting shackles which have a typical
ultimate safety factor of 600%

Environmental

Operating Temp   - 40°F to +122°F (-40°C to +50°C), Rated accuracy range -10°C to +40°C.)

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