

# MSI7300

Dyna-Link 2 Tension Dynamometer



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## SECTION 1 – INTRODUCTION & ORIENTATION

### INTRODUCTION

The MSI-7300 Dyna-Link 2 is a combination of the sound and proven mechanical design of the industry standard Dyna-Link with today’s most advanced electronics to provide a superb feature set unmatched by any Dynamometer in its class or price range. The multi-purpose tension dynamometer is ideal for situations in which headroom is at a minimum. The Dyna-Link 2 is versatile, reliable, accurate, and easy to operate. The MSI-7300 is designed with safety factors exceeding the industry standard and is fully sealed for outdoor use in any weather. A Remote Display option (*available 4<sup>th</sup> quarter 2011*) 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.

MSI-7300 FRONT PANEL



### KEY DESCRIPTIONS



The **POWER** key turns the MSI-7300 On and Off.



The **ZERO** key is used to zero out residual tension on the Link.

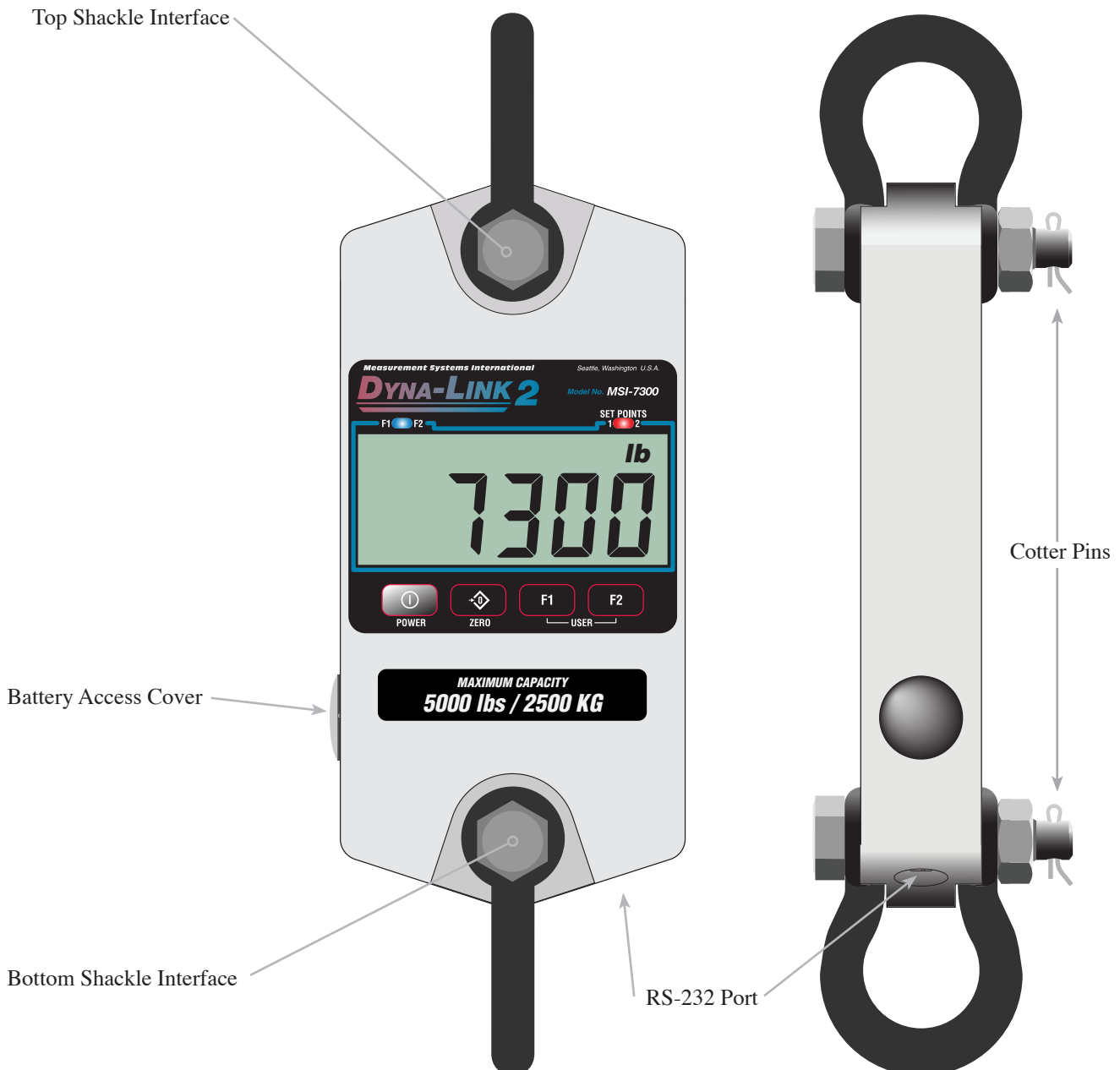


The **F1** and **F2 USER** keys are programmable to user selectable functions. These are described in the USER Key Setup section. F1 is defaulted to Peak Hold. F2 is defaulted to Display & Function Test. Common uses are Units change, or Peak Hold for dynamic testing.

## GENERAL INFORMATION

### USER GUIDE & MSI-7300 CONVENTIONS

- 1) Keys used in operations are printed in **BLUE** and capitalized. If the text is discussing a function key, the function key will be displayed as **Fx-YYYYY** with the programmed User key function in italics. F1 and F2 can both be programmed to all available user functions.
- 2) Screen shots that are used in menus are displayed in **GREY** and shown in a 7-segment font. Not all characters are displayable with this font, but a close approximation is used.
- 3) If a function key does not work, it is probably because the MSI-7300 is not setup to support the key. For example, if the Function key is set for TOTAL, you must also setup the TOTAL mode in the Setup Menu.
- 4) When in Setup Menus, the **ZERO** key drops back one menu level. At the root menu level, the **ZERO** key stores the changes and returns to the tension mode.
- 5) When in Setup Menus, the **POWER** key returns you directly to the Tension Display without storing the changes.
- 6) When in Setup Menus, the **F2** key functions as the scroll key.
- 7) When in Setup Menus, the **F1** key functions as the ENTER/SELECT key.



## 7300 ANNUNCIATORS

The MSI-7300 uses LCD annunciators to indicate tension mode and other information



The stable annunciator indicates that the tension force has settled within the motion window (usually  $\pm 1d$ ). When this symbol is off, the link will not zero, tare, or totalize.



Center-of-Zero – Indicates the tension is within 1/4d of zero.

**BT**

LO BATT – Appears when approximately 10% of battery life remains. The BT symbol blinks when automatic shutdown is eminent.

**Pk**

PEAK – Indicates the Dyna-Link is in the Peak Hold mode.

**Ttl**

TOTAL – Indicates the Dyna-Link is displaying the Total accumulated weight. This is a temporary display lasting less than 5 seconds.

**Net**

NET – Indicates the Dyna-Link is in the Net tension mode. A Tare weight is subtracted from the gross tension.

**M**

M – In conjunction with the Ton annunciator, indicates the Dyna-Link is displaying Metric Tons. When used with the total display, it is used for X1000 to allow accumulation of weight beyond the 5-Digit display capacity. It is also used with the Service Counters when the number of lifts exceeds 5 digits.

**kg**

kg – Indicates tension display is in kilograms.

**kN**

kN – Indicates the tension display is in kilo Newtons.

**lb**

lb – Indicates tension display is in pounds.

**Ton**

Ton – Illuminated alone, indicates the Dyna-Link is displaying in US Short Tons (1 ton = 2000 lb). When illuminated along with the 'M' the Dyna-Link is displaying in Metric Tons (1 metric ton = 1000 kg)



SET POINTS – User programmable set points for early overload warnings. Set Points 1 and 2 are high brightness Red LEDs



F1 F2 – These Blue LEDs are used to indicate various operational features of functions programmed into the F1 and F2 keys. In Peak Hold mode, for example, the associated LED will blink whenever a new peak reading is captured.



**SPECIFICATIONS**

**Accuracy:** Rated accuracy:  $\pm 0.1\%$  of capacity. Typical accuracy  $\pm(0.1\%+1d)$  of reading. ‘d’ equals one displayable increment.

**Resolution:** Standard displayed resolution: 2000-2500 ‘d’. Hi-Res mode increases resolution to 5000-6250 ‘d’. Internal A/D resolution: 24 bits

**Standard Capacities & Resolution:**

*Note: Short Ton and Metric Ton resolutions are the same*

Capacity	Standard ‘d’	Counts	HiRes ‘d’	Counts	Ult Overload <small>lb. or lb. equivalent</small>
1000 lb 500 kg 0.5 Ton 4.9 kN	.5 lb .2 kg .0002 Ton .002 kN	2000 2500 2500 2450	.2 lb .5 kg .0001 Ton .001 kN	5000 5000 5000 4900	>>700%
2500 lb 1250 kg 1.25 Ton 12.25 kN	1 lb .5 kg .0005 Ton .005 kN	2500 2500 2500 2450	.5 lb .1 kg .0002 Ton .002 kN	5000 5000 6125 6125	700%
5000 lb 2500 kg 2.5 Ton 24.5 kN	2 lb 1 kg .001 Ton .01 kN	2500 2500 2500 2450	1 lb .5 kg .0005 Ton .005 kN	5000 5000 5000 4900	700%
10000 lb 5000 kg 5.0 Ton 49 kN	5 lb 2 kg .002 Ton .02 kN	2000 2500 2500 2450	2 lb 1 kg .001 Ton .01 kN	5000 5000 5000 4900	700%
25000 lb 12500 kg 12.5 Ton 122.5 kN	10 lb 5 kg .005 Ton .05 kN	2500 2500 2500 2450	5 lb 2 kg .002 Ton .02 kN	5000 5000 6250 6125	700%
50000 lb 25000 kg 25 Tons 245 kN	20 lb 10 kg .01 Ton .1 kN	2000 2500 2500 2450	10 lb 5 kg .005 Ton .05 kN	5000 5000 5000 4900	680%
100000 lb 50000 kg 50 Ton 490 kN	50 lb 20 kg .02 Ton .2 kN	2000 2500 2500 2450	20 lb 10 kg .01 Ton .1 kN	5000 5000 5000 4900	>500%
125 Ton 1225 kN	.05 Ton .5 kN	2500 2450	.02 Ton .1 kN	6250 6125	>500%

*125 ton and larger capacities are available by special order*

**Overload:** Safe Link Mechanical Overload, 200% of capacity. Ultimate Link Overload, >500% of capacity. Typical ultimate overload is 700% or greater. Note that the Dyna-Link is designed to have a greater safety factor than the connecting shackles which have a typical ultimate safety factor of 600%.

**Power:** Battery operated, 2 standard Alkaline ‘C’ Cells on capacities up to 10000 lb. / 5000 kg. 2 standard Alkaline ‘D’ cells on 25000 lb / 12500 kg and larger systems. Alkaline cells can be replaced with rechargeable NiMH cells.

**Display:** 5 digit, large 1.22 in (31 mm) numeric digits

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

**Operating Time:** >200 hours typical (Alkaline C Cells) / >500 hours typical (Alkaline D Cells).

**Load Cell and Enclosure:** NEMA 4/IP65 anodized aluminum, 2024-T351 Aircraft Quality


**Load Cell:** 2000 Ω Bridge

**F1 and F2:** Programmable multifunction buttons for use as TEST, TOTAL, UNIT, PEAK, TARE, NET/GROSS, VIEW TOTAL, PRINT and High Res mode

**Calibration:** Fully digital calibration from the front panel or through a computer interface.

**Auto Zero Maintenance:** Standard, can be disabled internally

<b>Auto-Off Mode:</b>	Prolongs battery life by turning the power off after 15, 30, 45, or 60 minutes (operator determined) of no Dyna-Link activity
<b>Units:</b>	kg, lb, Tons (US short ton), Metric Tons, kiloNewtons (other Units available with custom calibrations)
<b>Filtering:</b>	Selectable: OFF, Low (LO), Medium (HI-1), High (HI-2)
<b>Totalization:</b>	Standard: Press button or Automatic; TOTAL weight up to 99999 X 1000 units
<b>Peak:</b>	Uses unfiltered faster reading of A/D, (>220 readings per second)
<b>Set Points:</b>	Two internal standard Set Points and two ultrabright LEDs on indicator panel
<b>Service Counter:</b>	Two independent 16 bit registers; Register 1 updated each time the force exceeds 25% of capacity; Register 2 updated each time the force exceeds overload; when register 1 exceeds 16383 or register 2 exceeds 1023, display reads "LCnt" for load cell counter; Test function shows the two readings in order.



**WARNING**

The MSI-7300 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 (see chart on page 7). At ultimate overload, structural failure and dropped loads may occur. Dropped loads may cause serious personal injury or death.

## FEATURES

- Designed to meet or exceed all US and International safety and environmental standards.
- Greater than 200 hours operation with 2 standard Alkaline ‘C’ cells. Greater than 500 hours with 2 standard Alkaline ‘D’ Cells (25000 lb./12500 kg capacities and above). Also works with off the shelf NiMH rechargeable cells.
- Automatic Power Off conserves battery life by sensing no activity after 15, 30, 45 or 60 minutes, determined by operator, and turns Power off.
- Rugged construction throughout. IP65 / NEMA 4 for outdoor use.
- Designed for use with USA 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.
- MSI’s ScaleCore technology provides precision, high resolution (2500 division standard and up to 10,000 possible) 24 bit A/D conversion coupled with an advanced RISC microcontroller.
- Five large, 1.22 inch (31 mm) LCD digits for clear tension readings from a distance.
- Easy to maintain: Full digital calibration assures reliable, repeatable measurements. Can be calibrated without test weights using MSI C-Cal technology.
- Selectable for kg / lb / Tons (US 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 Set Points can be set for any in-range tension / weight value for operator alerts or process control. Optional Audible Alarm output.
- ScaleCore Technology providing quick and easy firmware updates and calibration / setup backup.
- 2 Service counters ensure Load Train safety by warning the user to perform safety checks when the lift count gets high or the Dyna-Link has been overloaded repeatedly. Counter 1 (LFCnt) records the number of lifts above 25% of capacity. Counter 2 (OLCnt) records the number of times the Dyna-Link overloads.



## OPTIONS

Options which you may have ordered with your Dyna-Link 2 may include the following:

- Audible Alarm (triggered by Set Point 1)
- Top and Bottom Shackles
- Portable Carry Case
- Serial I/O cable (RS-232)

### *Options in development*

- RF Remote Display (will also operate hard-wired) *See RF Remote Display for ScaleCore User Guide*
- Hardwired cable for Remote Display
- RF Remote Modem, RS-232, for direct connection to Computers, Scoreboards, or serial printers. *See RF Modem for ScaleCore User Guide*
- RF Remote Modem, USB, for direct connection to Computers. *See RF Modem for ScaleCore User Guide*
- RF Remote Gateway for direct connection to an Ethernet LAN and for use with MSI's SCCMP program. *See RF Modem for ScaleCore User Guide*
- RF or Hardwired Scoreboard Display

## UNPACKING

When unpacking the Dyna-Link from the shipping container, ensure that all assembly parts are accounted for. Check the Dyna-Link for any visible damage and immediately report any damage to your shipper. It is advisable to use the original shipping container when shipping or transporting the Dyna-Link 2.

## ASSEMBLY

Identify and locate the following:

1. Batteries. 2 'C' Cells or 2 'D' cells depending on capacity.
2. Top Shackle and pin (Option or Customer supplied)
3. Bottom Shackle and pin (Option or Customer supplied)
4. Cotter Pins (2)

- 1) Slide top shackle over load cell and insert the pin.
- 2) Screw the shackle nut onto the pin. It is not necessary or desirable to tighten the nut too tight. Make sure the nut is down far enough to expose the cotter pin hole.
- 3) Lock the shackle pin in place with the supplied cotter pin. Bend cotter pin.
- 4) Repeat steps 1-3 for the bottom shackle
- 5) Remove the battery access port cover with a coin or a large screwdriver.
- 6) Insert the two batteries, positive end first, into the battery shaft.
- 7) Reinstall the battery access port cover. The Dyna-Link is now ready for use.

*The Dyna-Link will start automatically when the batteries are installed.*



## WARNING

**The MSI-7300 Dyna-Link load train will be unsafe for use if the shackle pins are not properly secured with cotter pins.**

## BATTERY REPLACEMENT

When the BT annunciator first appears, you have approximately 20 hours of continued operation with standard Alkaline cells. When the BT annunciator starts to blink, the batteries are nearly completely drained. MSI recommends for maximum life, use the batteries until the Software cuts the system off. This ensures that the batteries are completely drained of usable energy.

When using Nickel-Metal-Hydrate (NiMH) Cells, it is recommended that the cells are recharged immediately after the BT annunciator starts to blink. Recharge life of the NiMH cell will be compromised if you wait for the MSI-7300 to cut off the battery, as the cutoff voltage is optimized for Alkaline cells. NiMH Cells in the 'C' and 'D' sizes have significantly lower capacity than their Alkaline equivalent. A typical NiMH 'C' cell is rated at 2500 mAh vs an alkaline 'C' cell typically rated at 8000 mAh. NiMH 'D' cells are often repackaged 'C' cells so you don't get an increase in battery life for Dyna-Links large enough for 'D' cells.

***If the MSI-7300 will not be used for an extended period, it is recommended that the batteries are removed. The MSI-7300 uses a small current when powered off which will discharge the batteries in about 6 months.***

## SECTION 2 – DYNA-LINK OPERATION

### POWER

To Turn On the Power

- 1) Press the **POWER** key.
- 2) The LCD will show all segments for a display test.
- 3) The Software Version number will display.
- 4) The Dyna-Link is ready for use.



### ZERO

Sets the zero reading of the Dyna-Link. Use the **ZERO** key to take out small deviations in zero when the Dyna-Link is unloaded. (See “TARE ” for zeroing (Taring) package or pallet weights)

To Zero

- 1) Press **ZERO**. The tension reading must be stable within the motion window for the zero function to work. The Dyna-Link digits display 0 (or 0.0 or 0.00, etc.). The backup memory in the MSI-7300 stores the zero reading, and can restore it even if power fails.



Zero – Rules for Use:

- 1) Works in GROSS mode or NET mode. Zeroing while in Net mode will zero the gross tension causing the display to show the negative Tare value.
- 2) The Dyna-Link must be stable within the Motion window. The Dyna-Link will not zero until the Stable annunciator is on. The Dyna-Link will “remember” that it has a zero request for 2 seconds. If motion clears in that time, the Dyna-Link will zero.
- 3) The Dyna-Link will accept a zero setting over the full Range of the Dyna-Link. Zero settings above 4% of full Dyna-Link will subtract from the overall capacity of the Dyna-Link. For example if you zero out 100 lb. on a 1000 lb. Dyna-Link the overall capacity of the Dyna-Link will reduce to 900 lb. plus the allowed over-range amount.



## SECTION 3 – USER DEFINED FUNCTION KEYS

The following function descriptions are for optional user defined functions that are programmed on the two front panel USER keys (F1 & F2) or the two function keys (F1 & F2) on the optional RF Remote Display. To enable any of the USER key functions, you must set up the USER keys following the procedures in Section 5.

*The functions PRINT (F3), and TARE are available full time on the RF Remote Display.*

### OFF

No USER Key function assigned. The F-Key is disabled.

### TEST

The TEST function provides an LCD test that lights all LCD segments and the LEDs at once and then counts from 00000 to 99999. Other internal tests are performed and if any test fails, an Error Code will display. See Appendix A for a description of all error codes.

### TOTAL

*Note: The Total Mode must be programmed from the Setup Menus before the USER key will function. See procedure on page 15.*

For accumulation of multiple weighments. The accumulator always uses the displayed tension, so GROSS and NET readings can be added into the same TOTAL. There are four Modes of totalizing: Manual and three Auto Modes. The Manual Mode requires the TOTAL button be pressed with the tension on the Dyna-Link. The tension will be added to the previously accumulated value. This assures that a weight / tension on the Dyna-Link is only added to the total once. Both the manual and three auto total modes require that the tension on the Dyna-Link return below 0.5% (relative to full scale) of GROSS ZERO or NET ZERO before the next weighment can be added. Applied tension must be  $\geq 1\%$  of capacity above GROSS ZERO or NET ZERO before it can be totaled.

#### MANUAL TOTAL

The **Fx-TOTAL** key under the MANUAL TOTAL mode functions in this manner:

**Tension is > 1% of Capacity and has not been totaled** – Pushing the **Fx-TOTAL** key will add the current tension to the TOTAL weight. The **Fx** LED blinks to indicate the tension value was accepted. The TOTAL LCD annunciator and the Total weight is displayed for ~5 seconds and then the number of samples is displayed for ~2 seconds.

**Current Tension has been Totaled** – Pushing the **Fx-TOTAL** key will display the Total weight for 5 seconds (View Total) without changing the Total value. The TOTAL LCD annunciator and the Total weight is displayed for ~5 seconds and then the number of samples is displayed for ~2 seconds.

**Tension is <1% of Capacity** – The **Fx-TOTAL** key functions as “View Total” only and functions as View Total until the 1% threshold is exceeded to allow the next addition to the total value.

#### AUTO TOTAL

The **Fx-TOTAL** key under the AUTO TOTAL mode functions as Auto Total On / Auto Total Off:

The Auto Mode has three variations which are programmed in the SETUP menu:

[1] AutoLoad – Any settled tension above the ‘Rise above’ threshold will be automatically totaled. Then the Dyna-Link must fall below the ‘Drop below’ threshold before another total is allowed.

[2] AutoNorm – This mode takes the last settled tension to auto total with. The total occurs only once the Dyna-Link goes below the threshold. This allows the load to be adjusted without a total occurring. Once the load is removed, the Dyna-Link uses the last settled reading for total.

[3] AutoHigh – Similar to the AutoNorm mode except the Dyna-Link uses the highest settled reading. Useful for loads that can’t be removed all at once.

#### VIEW TOTAL

The **Fx-VIEW TOTAL** key activates the Total weight display followed by the number of samples. While the display is showing the Total, Total is cleared by pressing **ZERO**.

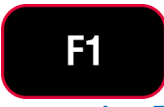
## NET / GROSS

Switches the display between Net and Gross modes. Net Tension is defined as Gross Tension minus a Tare Weight. To Switch Between Net Mode and Gross Mode press the **Fx-NetGross** key (Setup to the Net/Gross function). The **Fx-NetGross** key will only function if a Tare value has been established. Switching back to Gross mode from Net mode will not clear the Tare value. This allows the operator to use the Gross Mode temporarily without having to reestablish the Tare value. Only clearing the Tare or setting a new Tare will change the tare value held before switching into Gross Mode.

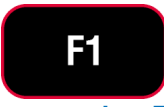
## TARE

In force measurement applications, Tare is useful as a way to display differential force. By “Taring Out” a known force, only positive and negative deviations from the Tared force are displayed. This can also increase 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 and display the load in NET tension / weight. To use tare, one of the two function keys must be configured to the “TARE” function. A Tare value is entered by pressing the **Fx-TARE** key. The TARE function in the MSI-7300 is defined as a Tare-In, Tare-Out operation. The first press of the **Fx-TARE** key stores the current tension / weight as a tare value and then the Dyna-Link subtracts the tare value from the gross tension and changes the display to NET mode. The next press of the **Fx-TARE** key will clear the Tare value and revert the display to GROSS mode. The optional RF Remote Display has a TARE key permanently available.

To Tare and display the Net Tension

<p>Press <b>Fx-TARE</b>. The tension reading must be stable within the motion window for the tare function to work. The Dyna-Link digits display 0 and the tension mode changes to NET. The backup memory in the MSI-7300 stores the tare reading, and can restore it even if power fails.</p>	 <p><b>F1</b> Programmed as TARE</p>
--	---

To Clear the Tare and revert to Gross Tension

<p>Press <b>Fx-TARE</b>. The Net annunciator will turn off. Absence of the NET annunciator is the only indication that you are in Gross Tension mode</p>	 <p><b>F1</b> Programmed as TARE</p>
--	---

*To view the Gross tension without clearing the Tare Value, program the remaining Function key to the function “NET/GROSS”.*

Tare – Rules for Use:

- 1) Only positive gross tension readings can be tared.
- 2) The stable annunciator must be on. The tension/force reading must be stable.
- 3) Setting or changing the tare has no effect on the Gross zero setting.
- 4) Taring will reduce the apparent over range of the Dyna-Link. For example, taring 100 pounds of rigging on a 1000 lb. Dyna-Link, the Dyna-Link will overload at a net tension of 900 lb. (1000-100) plus any additional allowed overload (usually ~4% or 9d).
- 5) The Dyna-Link stores the Tare value in non-volatile memory and is restored when power is cycled.

## PEAK HOLD

Peak Hold will only update the display when a higher peak tension reading is established. The Peak Hold function uses a high speed mode of the A/D converter (220 samples/s) allowing it to capture transient tensions at a far higher rate than typical Dynamometers. Peak hold is cleared and reenabled with the **Fx-Peak Hold** key. When a new peak is detected, the Fx LED will flash three times. The accuracy of the system in Peak Hold mode is slightly reduced to .2% of Capacity ± 5d. The Filter setting is turned off while in Peak Hold mode to ensure the fastest acquisition rate.

### Example Peak Hold Application

The Peak Hold function is useful in materials and “Fall” tests. Common tests for fiber rope include “Overall Breaking Strain” (OB€), Breaking Force, and Cycled Breaking Strain. The MSI-7300 combined with a force test stand, meets the speed and accuracy requirements to properly conduct these tests.

## Capture Peak Force

- 1) Program a function key to Peak Hold (P-Hld)

*In this example we'll use **F1** for Peak Hold.*

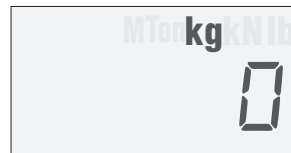
- 2) Prepare the test stand and test sample.
- 3) Press **ZERO** to zero out any residual strain on the link.

- 4) Press **F1 PkHold** Confirm that the "Pk" annunciator is on.

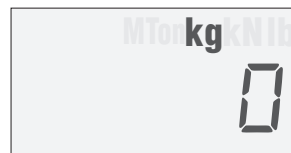
*A small jump in the reading may occur depending on the stability of your test stand.*

- 5) Apply the test force. The F1 LED will blink three times for every new peak it detects.
- 6) When the test force is removed, the Peak value can be recorded.
- 7) To run a new test, press **F1 PkHold** to clear the Peak Value. Confirm the "Pk" annunciator is off. Then repeat steps 3-6.

*See Function Key setup on page 15.*



*Example Peak Captured Value*



*Peak Cleared Value*

### 2-UNITS / 5-UNITS

The **Fx-2.Unit** key will switch the force units between pounds force and kilograms force. Selecting the **Fx-5.Unit** setting will scroll through all available units: lb, kg, Tons (US Short), Metric Tons, and kiloNewtons.

MSI-7300 units 125 ton and above only: The **Fx-2.Unit** key will scroll between US Short Tons and Metric Tons. The **Fx-5.Unit** key will scroll between US Short Tons, Metric Tons, and kiloNewtons.

### HI-RES

Pressing the **Fx-HiRes** key puts the display into a temporary high resolution mode (*see the standard Hi-Res resolutions on page 7*). The high resolution mode will continue until the **Fx-HiRes** key is pressed again, or power is cycled. While in the Hi-Res mode the appropriate Fx LED will blink continuously at a slow rate.

Hi-Res mode **does not** increase the accuracy. However relative accuracy can be quite high. Use Tare or the **ZERO** key to zero out any initial error. Hi-Res Mode will make the MSI-7300 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.

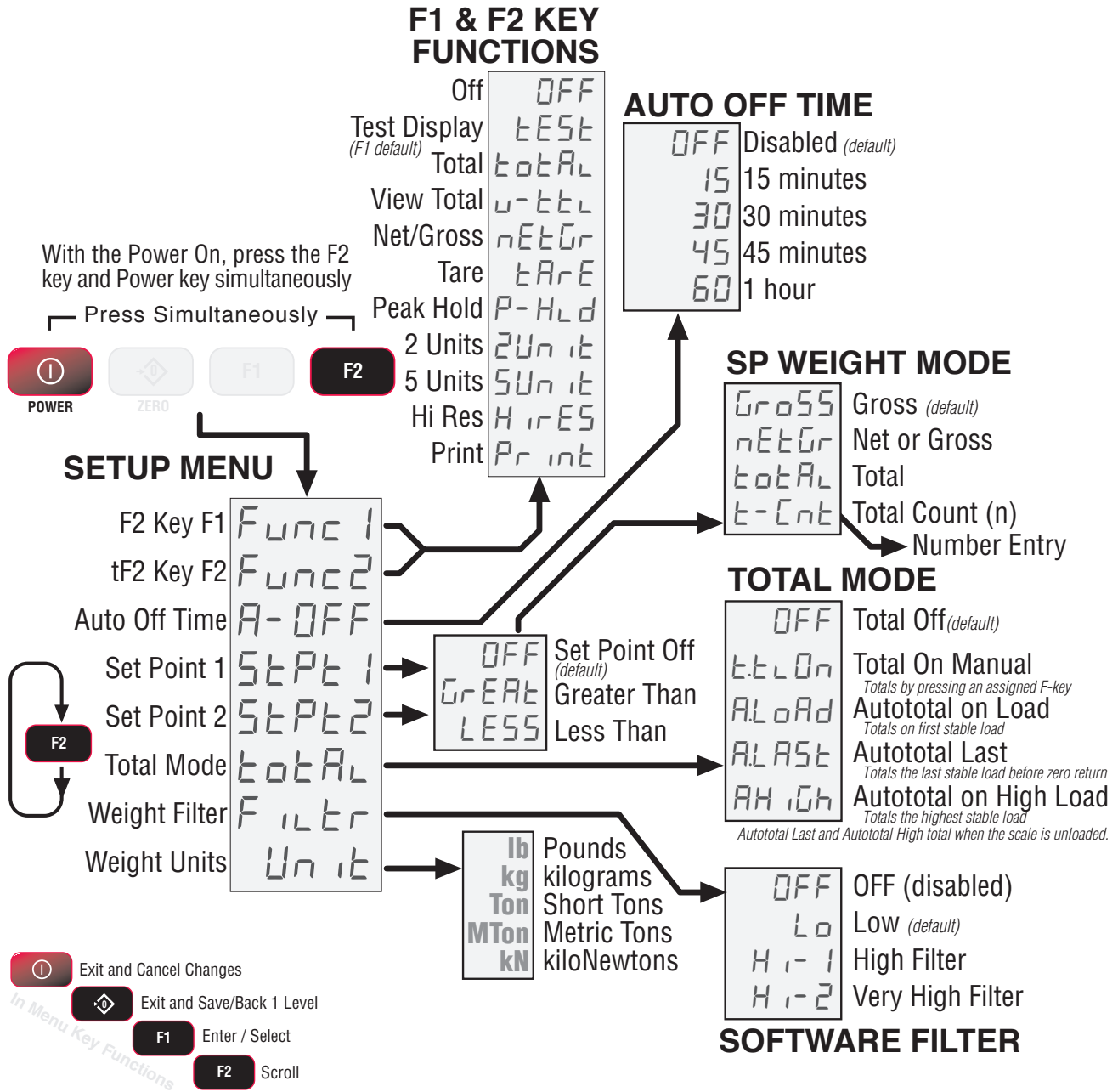
### PRINT

Pressing the **Fx-Print** key outputs a configured text string to the RS-232 port on the base of the Dyna-Link. If an F-Key is programmed as Print and the Print Setup is configured as continuous, then the **Fx-Print** key is used for Start Print/Stop Print. See Printer Setup 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 an F-Key to "Print" if you intend to trigger print outputs from the Remote. However, if you program F1 or F2 to "Print" then pushing F1 or F2 on the Dyna-Link will cause the Comm Port on the Remote to output the selected data string.

If the RF Remote Display Option is installed, the Dyna-Link cannot use its built in Comm Port except for hard-wire connections to the RF Remote Display or Firmware updates.

## SECTION 4 – DYNA-LINK SETUP

### MENU MAP



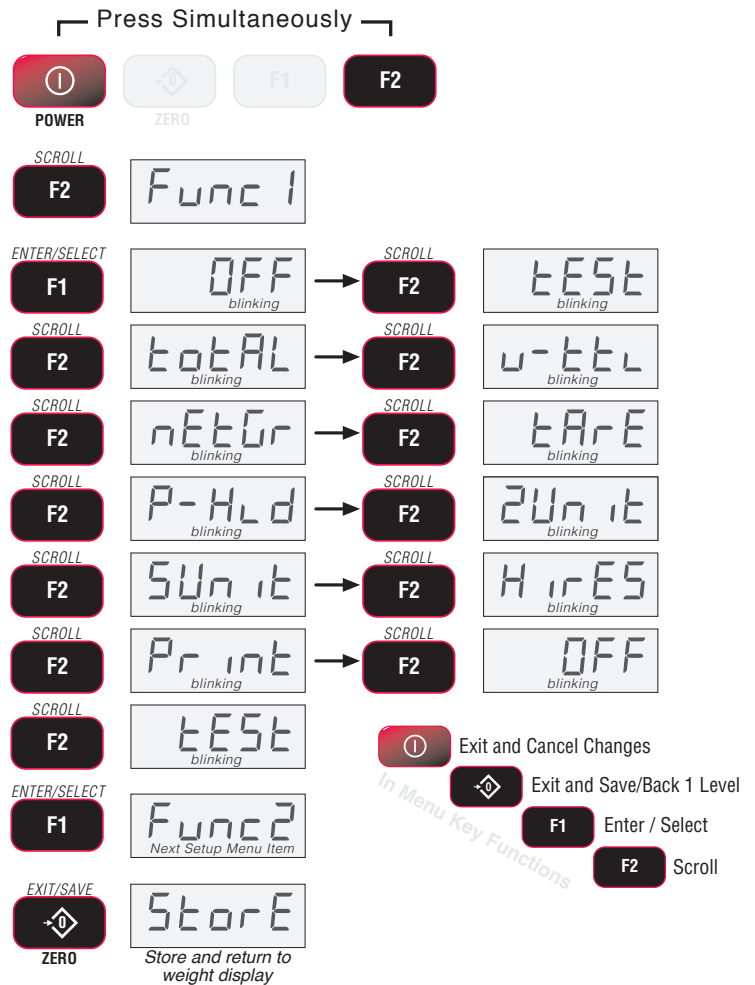


**FUNCTION KEYS**

The MSI-7300 has 2 user definable function keys on the Front Panel that can be programmed to any of several functions. As shipped, F1 is defaulted to Peak Hold, and F2 is defaulted to Test. This procedure also assigns the F1 & F2 keys on the optional RF Remote Display:

**Function Key Setup**

- 1) With the 7300 on, press the **F2** key and the **POWER** key simultaneously.
- 2) The first item of the Setup Menu is "Func1".  
*To setup the F2 Key scroll to the next menu item by pressing **F2**.*
- 3) To setup the F1 key press **F1**. The current F1 key function is displayed.
- 4) Select the F1 key function by scrolling through the choices with the **F2** key. See the list of available functions on the Setup Menu Map.  
*This procedure scrolls through all available choices for illustration purposes only.*  
*In this example, we'll set F1 to the TEST function.*
- 5) When the desired F1 Key function is displayed, press **F1**. The next item in the Setup Menu appears.
- 6) Either press **ZERO** to exit Setup and store all changes, or continue to another Setup Menu item using the **F2** Key.

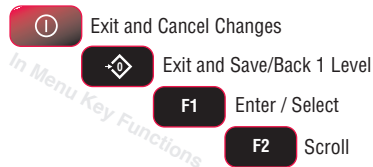
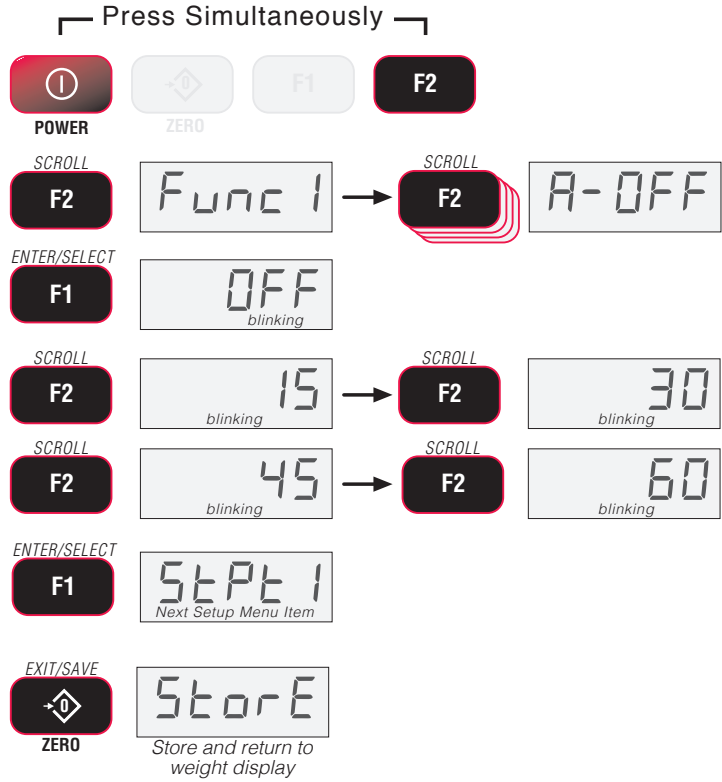


## AUTO-OFF

The A-OFF feature, when enabled, prolongs the battery life of the Dyna-Link by turning POWER off when the Dyna-Link is not in use. Any time a button is depressed (any button), or the detected tension is in Motion exceeding 10d, the time limit is reset. Therefore, the Dyna-Link will stay on indefinitely if the tension is changing or any button is pressed at least once. With A-OFF disabled, the Dyna-Link will remain on; only pressing POWER will turn it off (or if the battery is depleted).

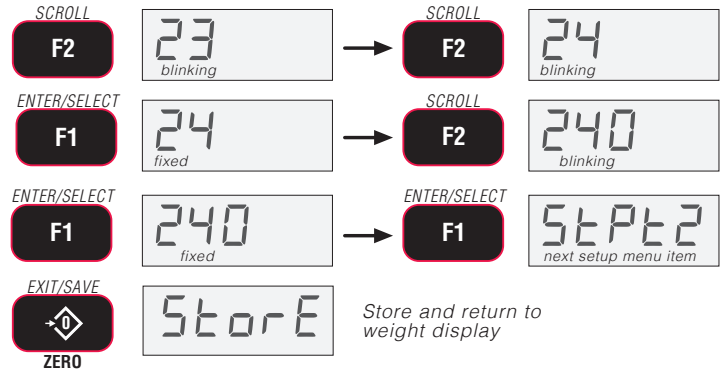
### Auto-Off Setup

- 1) With the 7300 on, press the **F2** key and the **POWER** key simultaneously.
- 2) The first item of the Setup Menu is "Func1". Scroll to "A-OFF" with the **F2** key.
- 3) To setup the A-Off timing, press **F1**. The current Auto-Off time is displayed.
- 4) Select the Auto Off time by scrolling through the choices with the **F2** key.  
*In this example, we'll set 60 minutes as the Auto-Off time.*
- 5) When the desired time is displayed, press **F1**. The next item in the Setup Menu appears.
- 6) Either press **ZERO** to exit Setup and store all changes, or continue to another Setup Menu item using the **F2** Key.





- Number value entry continued
- When the desired number is shown, push **F1** a second time to set the value. The next Setup Menu item is displayed.
  - Either press **ZERO** to exit Setup and store all changes, or continue to another Setup Menu item using the **F2** Key.

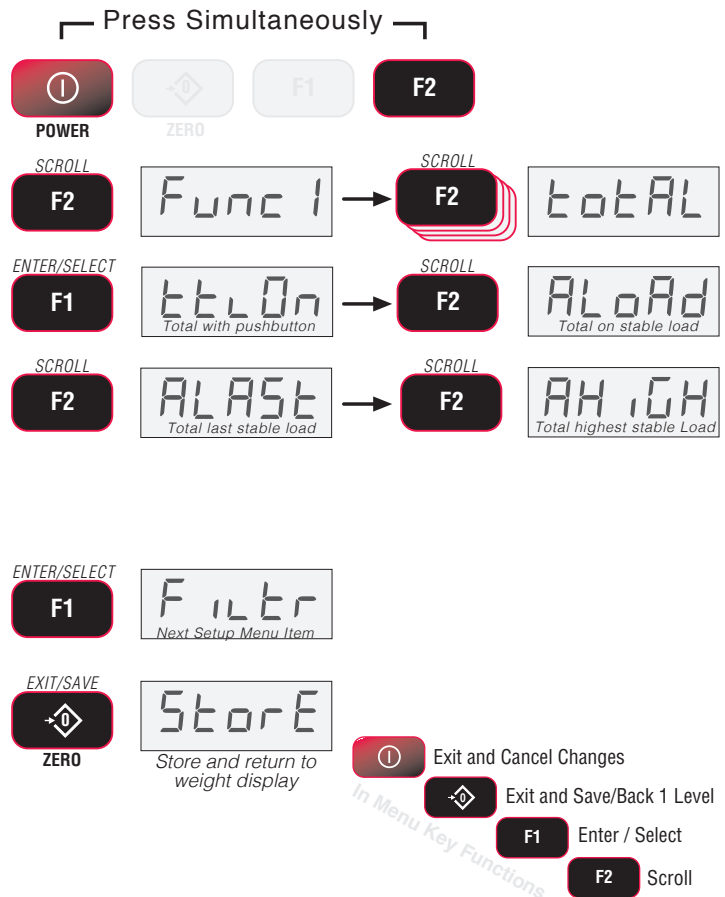


## TOTAL MODE

The 7300 can keep track of all weighments using the Total feature. Either manual total, which totals by pushing a configured USER key on the front panel or the optional RF Remote Display, or Auto-Total. which can be used to automatically add up each weighment. See the Total mode descriptions for details on the various Total modes. To use Manual Total, you must also program a User Key. Auto Total modes do not need a user key, but if a User key is setup for Total, then it will function as a total on / total off.

## Total Mode Setup

- With the 7300 on, press the **F2** key and the **POWER** key simultaneously.
- The first item of the Setup Menu is "Func1". Scroll to "total" with the **F2** key.
- To setup the Total Mode, press **F1**. The current Total Mode setting is displayed.
- Select the Total Mode by scrolling through the choices with the **F2** key.  
*In this example, we'll set the Total Mode to the Auto-High mode. The Auto High mode uses the highest stable reading as the total value, and totals when the load is removed.*
- When the desired Total Mode setting is displayed, press **F1**. The next item in the Setup Menu appears.
- Either press **ZERO** to exit Setup and store all changes, or continue to another Setup Menu item using the **F2** Key.



## UNITS

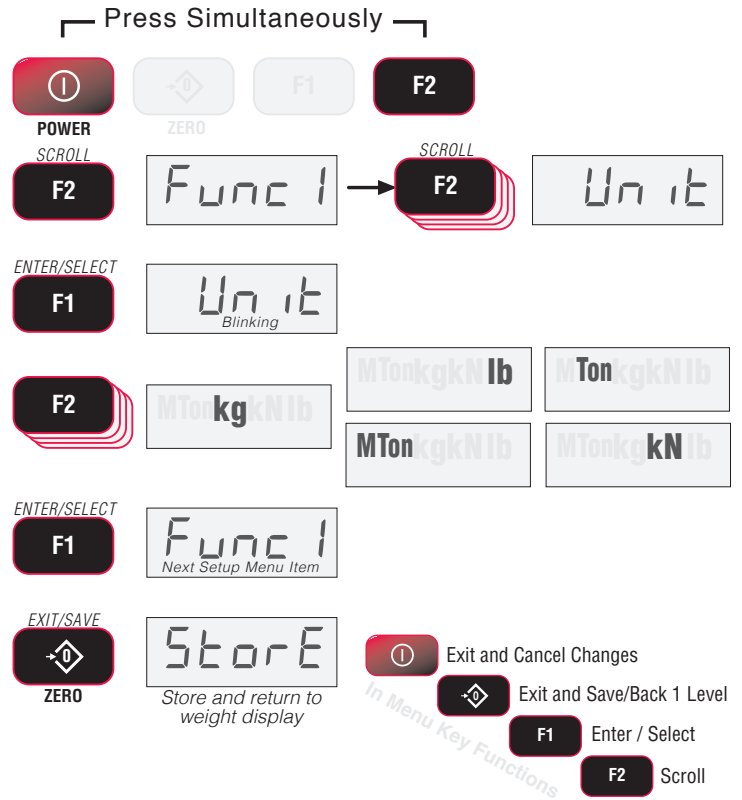
Units can be changed in two ways. 1) program a User Function key to 2-Units or 5-Units, or 2) change the units with the setup menu with the following procedure. To set the accessible units available by a function key, set the FKey either as 2Unit (lb/kg) or 5Unit (lb/kg/Short Tons/Metric Tons/kiloNewton).

*If the Dyna-Link Calibration was originally in Tons or Metric Tons, the "2Unit" setting will switch from Tons to Metric Tons instead of lb/kg.*



## Units Select

- 1) With the 7300 on, press the **F2** key and the **POWER** key simultaneously.
- 2) The first item of the Setup Menu is "Func1". Scroll to "Unit" with the **F2** key.
- 3) To setup the weight units, press **F1**. The display will blink "Unit".
- 4) Change the weight units by pressing the **F2** key until the desired unit is displayed. The selected unit is indicated by the annunciators. *Not all units shown are available on every capacity.*
- 5) When the desired unit setting is announced, press **F1**. The next item in the Setup Menu appears.
- 6) Either press **ZERO** to exit Setup and store all changes, or continue to another Setup Menu item using the **F2** Key.

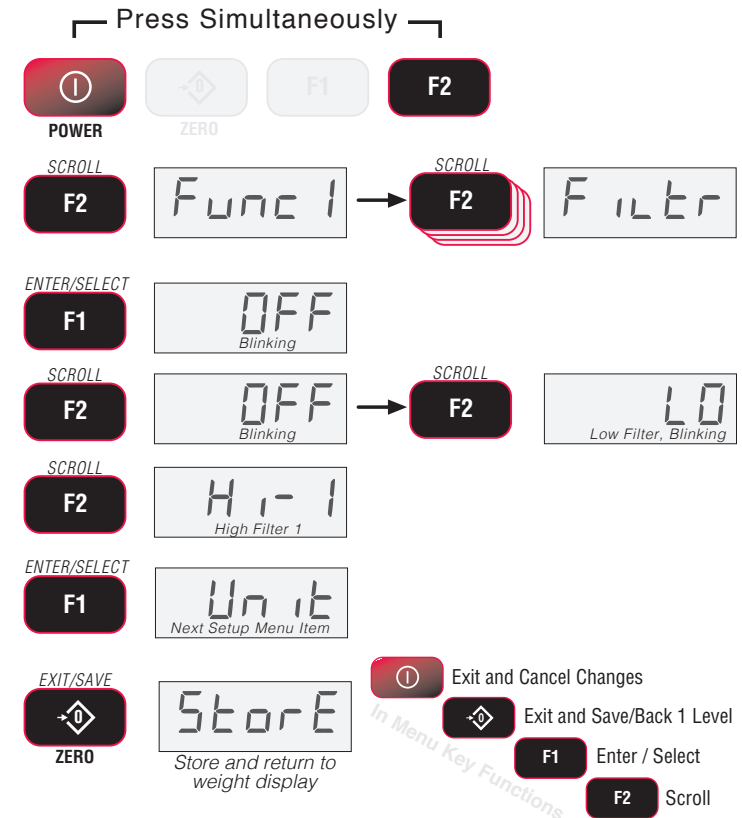


## FILTER SETUP

Changing the filter settings allows the Dyna-Link to adjust to situations where there is a lot a 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. However, the MSI-7300 employs algorithms that speed up large tension changes while still controlling vibration even with high filter settings.

## Filter Setup

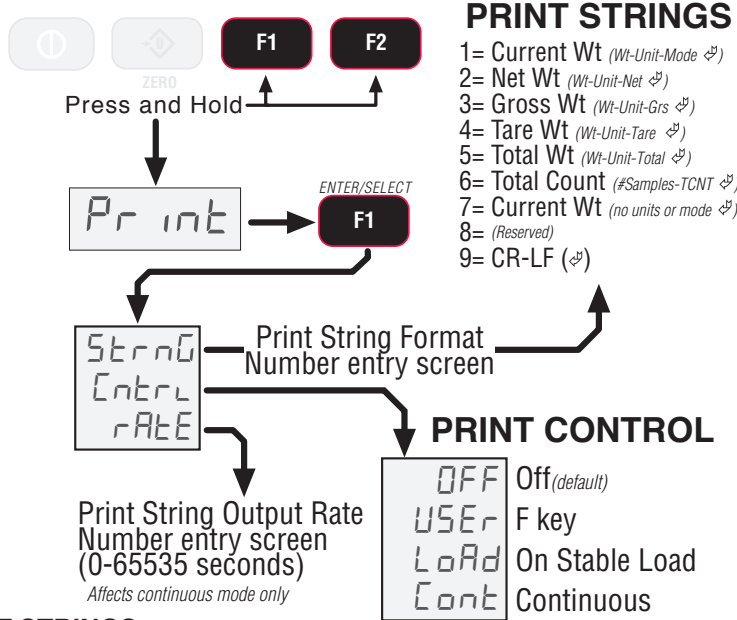
- 1) With the 7300 off, press and hold the **F2** key, then press the **POWER** key.  
*...or while the 7300 is on, press F2 and POWER simultaneously.*
- 2) The first item of the Setup Menu is "Func1". Scroll to "Filtr" with the **F2** key.
- 3) To setup the filter, press **F1**. The display will blink the current filter setting.
- 4) Change the filter setting by pressing the **F2** key.  
*There are four available filter settings. Not all choices are shown in this example.*
- 5) When the desired filter setting is announced, press **F1**. The next item in the Setup Menu appears.
- 6) Either press **ZERO** to exit Setup and store all changes, or continue to another Setup Menu item using the **F2** Key.



## PRINTER SETUP

The RS-232 Comm Port is capable of outputting tension data. All the weight modes the Dyna-Link can measure are available in user formatted form. The Control Mode programs what causes the MSI-7300 to print. The modes are: 1) When an assigned F-Key is pressed, one transmission of the selected string type is output. 2) On Load – When the tension on the link is stable, one transmission will output. Then the tension must return to zero to enable another print output. 3) Continuous - Program the interval in seconds up to 65,535 seconds. Setting the interval to 0 will set an interval as fast as the system can go. To disable printing, simply don't program an F-Key to Print and set the Control to "USER" or turn the control mode to "OFF".

### Print Output Setup Menu



### STANDARD PRINT STRINGS

1 - Current tension. Fixed output length: 16. Leading zeros suppressed except for the LSD.

**TTTTTTT<sub>sp</sub>UU<sub>sp</sub>MMMM<sub>crLf</sub>**

where TTTTTTT is tension data with -sign if necessary. UU is the units, MMMMM is the tension mode which for "1" is either NET or GROSS.

2 - Net tension. Fixed output length: 16. Leading zeros suppressed except for the LSD.

**TTTTTTT<sub>sp</sub>UU<sub>sp</sub>NET<sub>spspcrLf</sub>**

3 - Gross Tension. Fixed output length: 16. Leading zeros suppressed except for the LSD.

**TTTTTTT<sub>sp</sub>UU<sub>sp</sub>GROSS<sub>crLf</sub>**

4 - Tare Weight. Fixed output length: 16. Leading zeros suppressed except for the LSD.

**TTTTTTT<sub>sp</sub>UU<sub>sp</sub>TARE<sub>crLf</sub>**

5 - Total Weight. Fixed output length: 16. Leading zeros suppressed except for the LSD.

**TTTTTTTTT<sub>sp</sub>UU<sub>sp</sub>TTL<sub>crLf</sub>**

6 - Number of Samples Totaled. Fixed output length: 16. Leading zeros suppressed except for the LSD.

**spspspspsspSSSSSS<sub>sp</sub>T-CNT<sub>spcrLf</sub>**



7 - Current Weight Mode (Net, Gross, Peak, etc.)

sp **MMMMM** crlf

8 or 9 - Carriage Return, Line Feed. Used to add a space between print records.

crlf

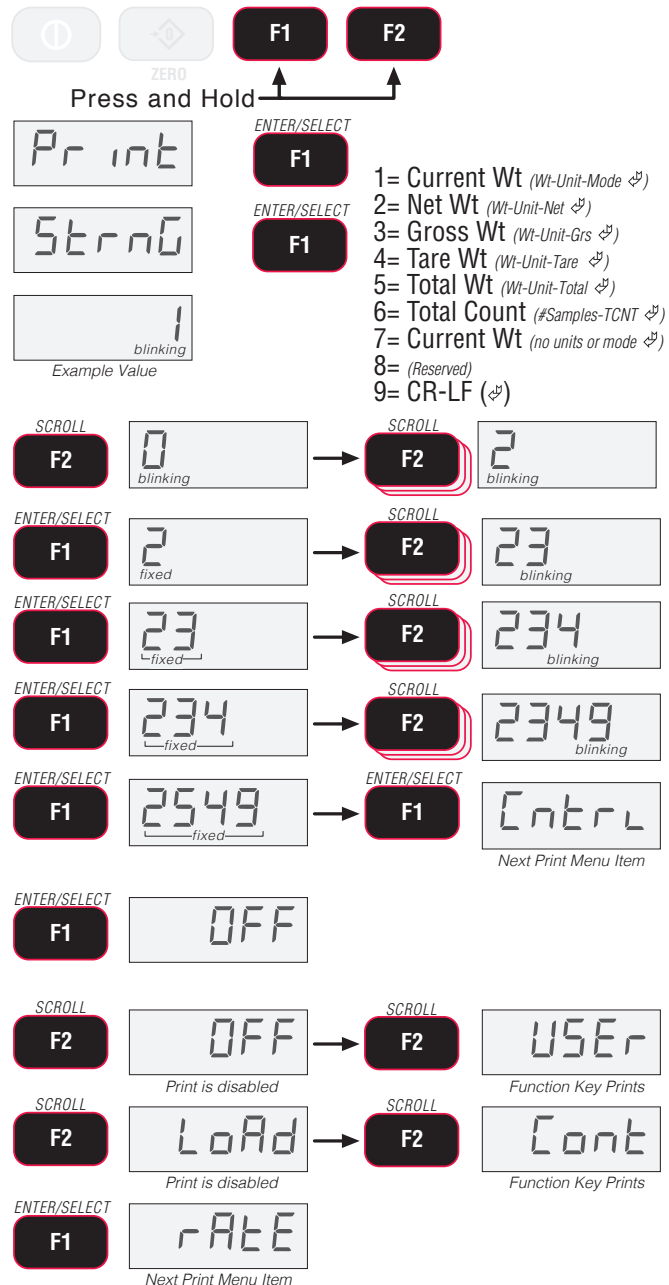
In the string number entry screen, you can enter combinations of the standard print strings. For example, to get a NET GROSS TARE printout with a space between records, simple enter “2349”.

Using SCCMP application (ScaleCore Configuration Management Program), custom output strings are possible. See the SCCMP programming guide for details.

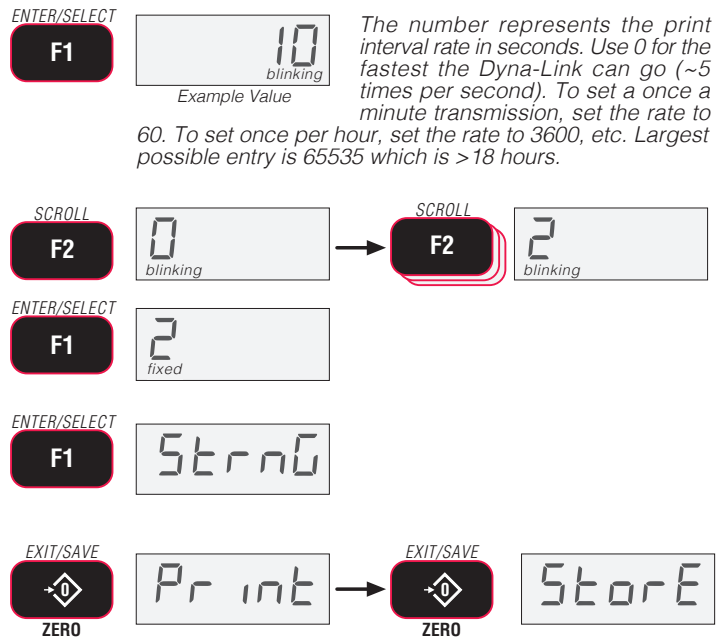
The serial output is configured as 9600 baud, Xon/Xoff handshaking, no hardware handshaking, 1 stop bit, no parity. Other baud rates are possible by special order only.

### Printer / Output Setup

- 1) With the 7300 on, press the **F1** key and the **F2** key simultaneously.
- 2) The LCD shows “Print”. Press **F1**.
- 3) The sub-menu item “StrnG” appears. Press **F1**.
- 4) The current Print Mode format number is displayed.
- 5) Setup a print format with one or more digits representing the data type required for the print output. *In this example, we’ll set the Print format for a Net, Gross, Tare output with a carriage return/line feed between each print output. The number entry required will be 2349. The 2 is for Net weight, the 3 for Gross weight, the 4 for Tare weight, and the 9 inserts a space before the next print output.*
- 6) Using the **F2** Key, scroll through the digits until the desired digit is shown, then press **F1** to enter the digit value. Repeat for the remaining digits.
- 7) When the entire number is displayed press **F1**. The next item in the Print menu appears, “Cntrl”.
- 8) Press **F1** to enter the Print Control Menu. The last set control mode will appear.
- 9) To change the print control mode, press **F2**. *In this example, we’ll set the Print Control Mode to Continuous.*
- 10) Press **F2** key until the desired print control mode is shown.
- 11) When the desired print mode is shown, push **F1** to save. The next Print setup item, “rAtE” appears. If you have set Continuous (Cont) as your print control, proceed to step 12). For any other Control mode jump to step 15



- 12) Press **F1** to enter the Print rate number entry screen. The current print rate appears on the LCD.  
*In this example, we'll set the Print Rate to an output rate of once every 2 seconds.*
- 13) Press **F2** to change the Print rate. Use F2 to scroll the number, enter each number with the F1 key.
- 14) When the entire number is displayed, press **F1** again to finalize the seconds entry. The next Print Menu Item appears, "String".
- 15) Exit the Print Setup Menu by pressing **ZERO** twice. The message "Store" appears briefly then normal Link operation starts.



## COMM PORT HARDWARE

The MSI-7300 RS-232 Comm Port is used for software update, connecting to a remote display, and for connecting to any RS-232 device.

Connector: M12 industrial IP67 rated. An adapter cable (MSI P/N 503363) is required to connect the MSI-7300 to a computer. This adapter cable converts the 7300 connector to a standard D9 serial connector.

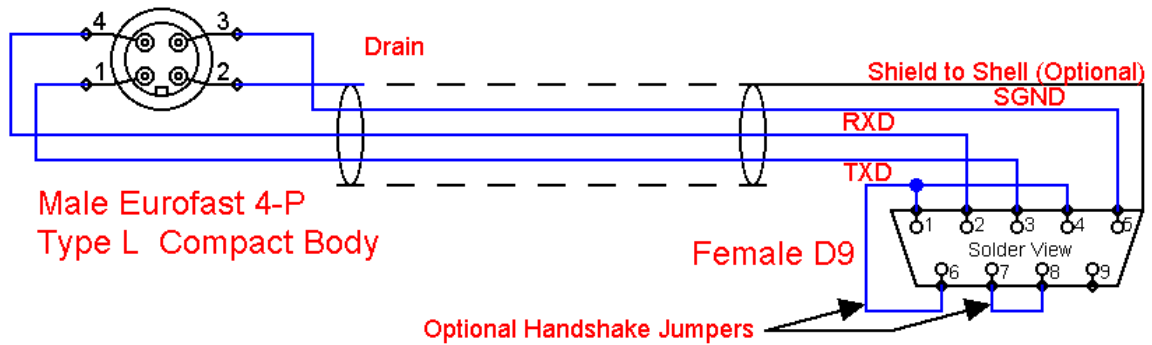
Data Configuration: The data output is fixed at 8-1-N.

Baud Rate: Programmable for 300 to 230.4kbaud in 8 steps. The bootloader for updating software is always 38.4kbaud.

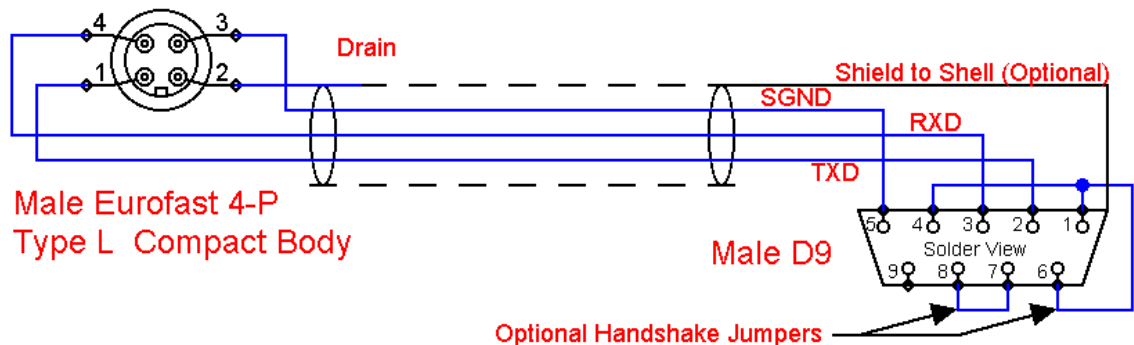
Handshaking: No hardware handshaking is supported. XON/XOFF software handshaking is always on.

*It may be necessary to disconnect the shield drain wire at the D-9 connector frame to prevent ground loops. Ground loops can cause unstable readings. In extreme cases it may be necessary to use an opto-isolated RS-232 interface.*

Serial Cable Schematic, DCE Configuration for connecting to a computer



Serial Cable Schematic, DTE Configuration for connecting directly to a DCE printer.



## SECTION 5 – CALIBRATION

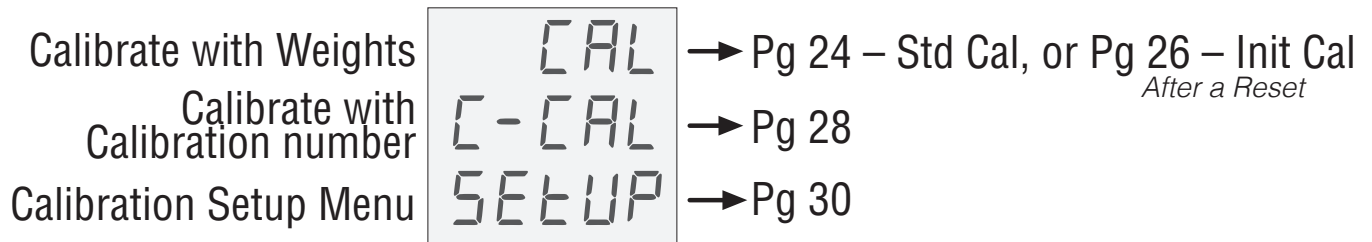
The 7300 is calibrated using standard precision test weights. It is required that the weight used is at least 10% of full capacity in order to achieve rated accuracy. For example, use at least a 500kg test weight to calibrate a 5000kg capacity Dyna-Link. The MSI-7300 supports Load Cell Linearization with up to 4 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 7300 can be calibrated using a constant calibration which is referred to as C-Cal. To use C-Cal, a factory generated C-Cal number must be known. MSI supplies original and replacement load cells for the 7300 with the C-Cal value stamped on the serial number label.

There are three aspects of calibration: 1) Standard Calibration – is used for maintenance and routine calibration. 2) Initial Calibration – is used to setup both the capacity and resolution (d) of the Dyna-Link. It differs from Standard Calibration only in the initial steps. Initial Calibration is performed after a Calibration Reset which completely erases the calibration and setup memory. 3) C-Cal – If C-Cal values are known, the Dyna-Link can be calibrated without weights.

### CALIBRATION MENU

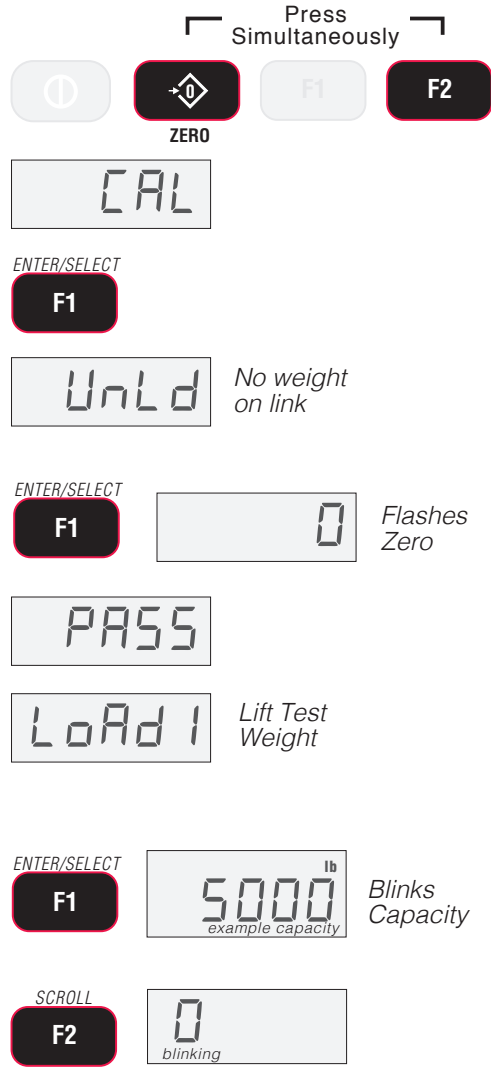
The Calibration Menu contains three items: Cal, C-Cal, and Auto Zero Maintenance “Auto0”. The following procedures start with entering into the Cal Menu, or for an initial calibration, resetting the MSI-7300 and then going to the Cal Menu.



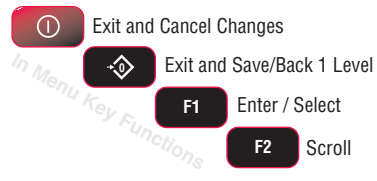
Use this procedure for the routine calibration of the 7300.

## Standard Calibration Procedure

- 1) With the power on, initiate calibration by holding down the **F2** and **ZERO** keys until the display reads "CAL".  
  
The CAL Setup Menu appears.
- 2) Press **F1** to Start the Calibration Procedure.
- 3) The display reads "UnLd" (unload) indicating you should remove all weight from the link. *You can choose to leave bottom fittings on the Link as long as they are always part of the load train.*
- 4) Press **F1**. The 7300 sets the zero calibration point.
- 5) If the zero is in range, the scale will display "PASS". Then "LoAd" is displayed.
- 6) Load the link with a precision test weight. *For highest accuracy, a test weight of 10% of capacity or more is recommended.*
- 7) Press **F1**. The 7300 flashes the capacity and calibrate units. If you are loading the scale with the capacity weight, skip to step 10.
- 8) To enter a calibration weight other than capacity, press **F2**. The display far left digit will flash zero indicating that a number should be entered.



*Error Correction: If you input a wrong value, press **ZERO** to step back one digit and reenter.*





- 9) Press the **F2** key to scroll the number and the **F1** key to enter each digit of the calibration weight.

*In this example, we'll enter 2500 kg on a 5000 kg capacity scale. Do not push the **F1** key two times in a row.*

*To add a decimal point, push the **POWER** key while the number is blinking.*

- 10) When the entire value of the test weight is displayed and the weight and link are stable, press **F1** to finish off the weight entry. If the resultant cal value is within limits, the display will read "PASS".

- 11) The display now reads "LoAd2". The Dyna-Link allows multi-point calibration. If more Cal Points are desired (up to 3 additional) press **F2** and repeat steps 8-10. If finished with span points go to step 12.

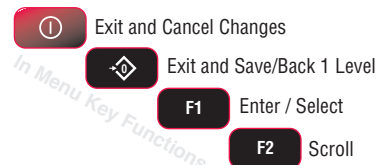
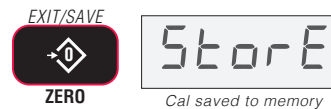
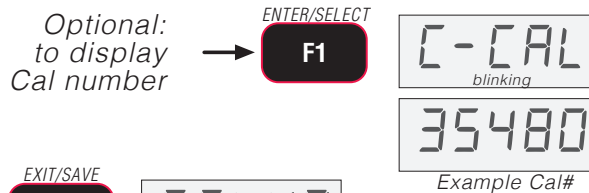
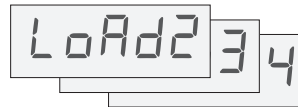
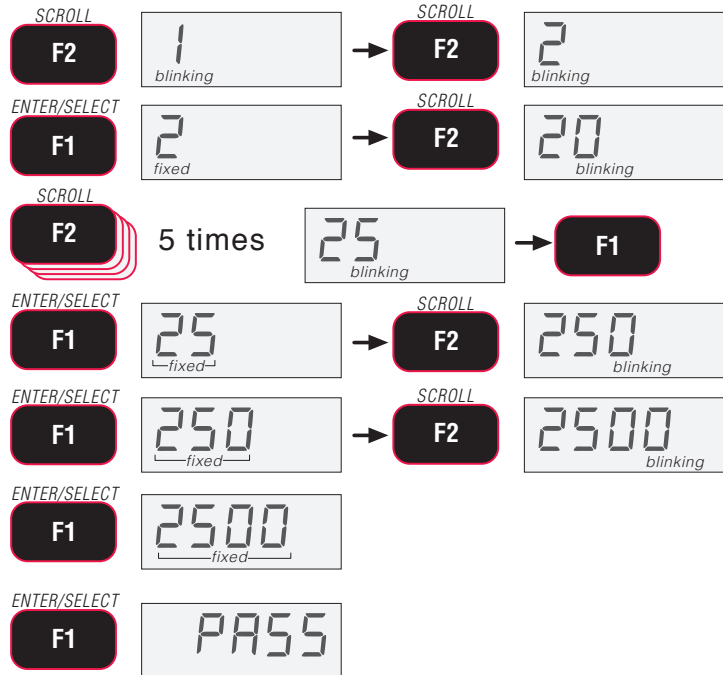
- 12) Press **ZERO** to store the calibration constants. The LCD will read "CAL'd" to indicate the calibration is acceptable.

- 13) Skip to step 14, or press **F1** to observe the CAL number. The C-CAL number appears. Make a note of the value.

- 14) Press **ZERO** to exit Calibration. The next menu item "Setup" appears.

- 15) Press **ZERO** to store the calibration and return to standard Link operation, or press **F1** if you want to adjust additional Cal Setup parameters (Standard, AZM, etc.).

*You can cancel calibration by pressing Power and the scale will reset to the previous calibration constants.*



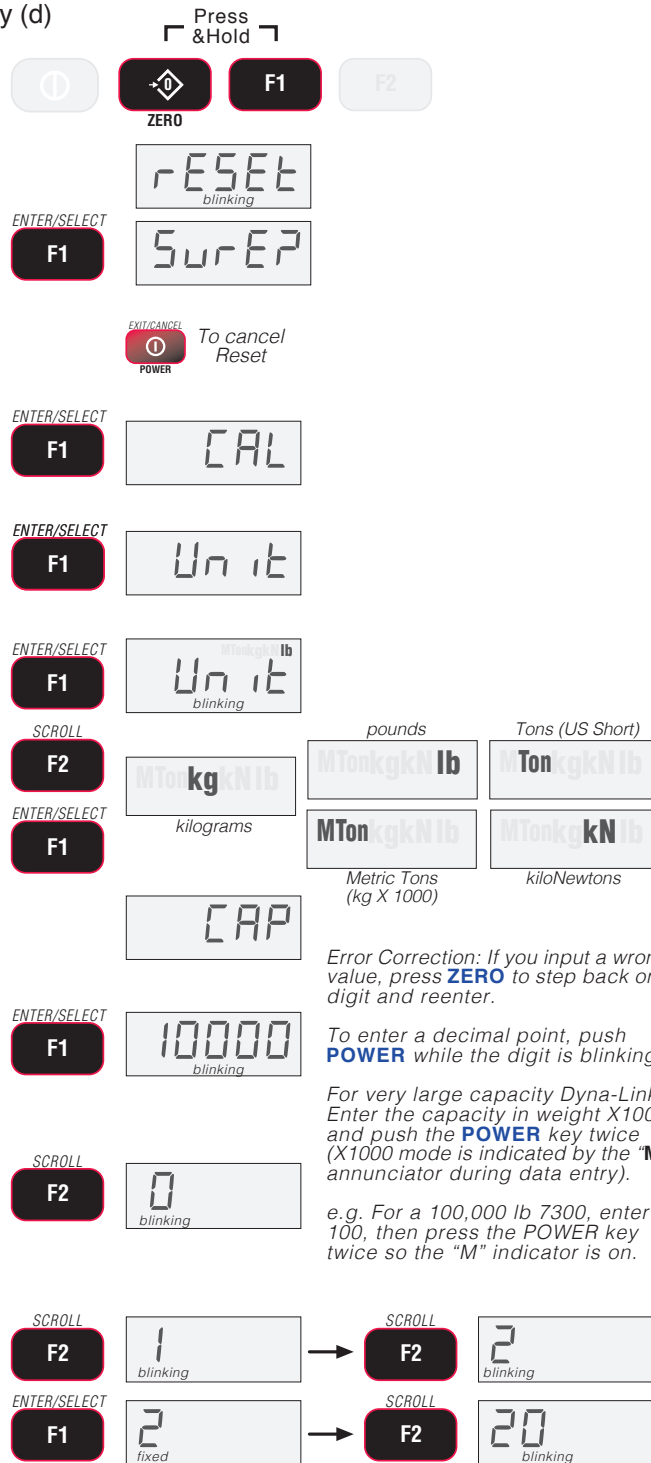
## INITIAL CALIBRATION

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.

### Initial Calibration

#### Resetting Capacity and Countryby (d)

- 1) Turn the 7300 on.
  - 2) Press the **ZERO** switch and the **F1** switch simultaneously.
  - 3) The display blinks "rESEt".
  - 4) To reset all calibration constants and setup parameters, press **F1**.
  - 5) The 7300 requests a confirmation by displaying "Sure?". To cancel the Reset press the **POWER** or the **ZERO** key.
  - 6) To complete the reset, press **F1**. The Calibrate menu appears. You must now recalibrate the system.
  - 7) Press **F1** to start the initial calibration procedure. The display shows "Unit". You select the force units you wish to calibrate in.
  - 8) Press **F1** to select the calibration unit.
  - 9) Use the **F2** key to scroll through the available calibration units.
  - 10) When the desired unit is shown, press **F1**.
  - 11) Next, set the capacity in the selected units. Capacity must be set no higher than the load cell rated capacity.
  - 12) Press **F1** to enter the capacity setting screen. A capacity of 10000 is the initial value.  
*If 10000 is the desired capacity in the selected Calibration Unit, press F1 and skip to step 16.*
  - 13) To change the capacity, press **F2**.
  - 14) The first digit blinks. Use the **F2** key to scroll through the numbers. When the desired number is shown, push **F1**.  
*In this example, we'll enter 2500 as a capacity.*
- Continue inputing the desired capacity using the **F2** key for scrolling the number and the **F1** key to store the number.

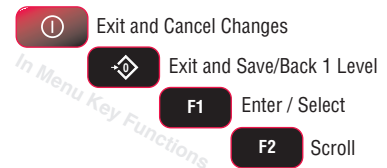


*Error Correction: If you input a wrong value, press **ZERO** to step back one digit and reenter.*

*To enter a decimal point, push **POWER** while the digit is blinking.*

*For very large capacity Dyna-Links Enter the capacity in weight X1000 and push the **POWER** key twice (X1000 mode is indicated by the "M" annunciator during data entry).*

*e.g. For a 100,000 lb 7300, enter 100, then press the **POWER** key twice so the "M" indicator is on.*





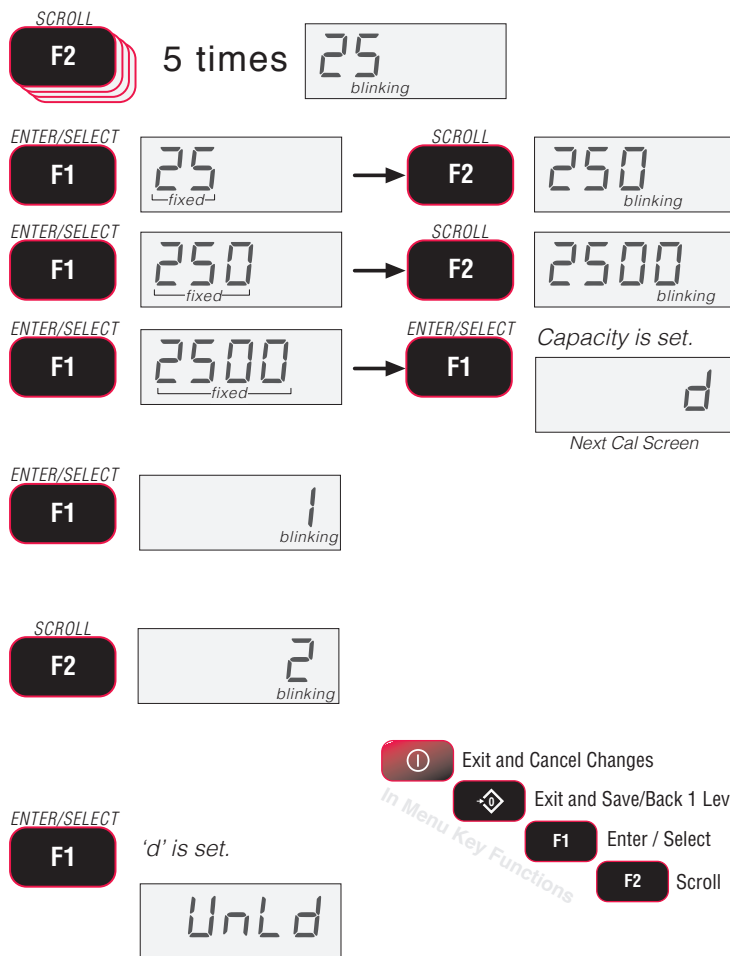
Numeric Capacity entry continued

15) Finalize the capacity value by pressing the **F1** key on an unblinking display. In our example, once the number 2500 is fixed on the display, press **F1** to store the capacity value.

16) Next the scale division size 'd' is set. Press **F1** to begin. In this example we'll set the 'd' to 2.

17) Use the **F2** key to scroll through the recommended scale divisions. The first 'd' offered is the standard division for the given capacity. Setting a 'd' size that results in total resolution higher than 1:5000 is not recommended for stability reasons.

18) When the desired scale 'd' is displayed, press **F1**. The "UnLd" display appears and the scale is ready for calibration. Follow the Standard Calibration procedure starting at step 3.



Proceed to Standard Calibration starting at Step 3.

**GUIDELINES FOR CAPACITY AND RESOLUTION**

Dyna-Links are 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. However, you should never program resolution that is far greater than you need. If the MSI-7300 display is never stable, it is recommended that the resolution is reduced as well as filtering increased. In any circumstance, the resolution should never be set higher than 1:15000 due to temperature and noise considerations common to all strain gage based load cells.

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 MSI 7300 defaults to ±1d as a motion window. It can be changed at MSI to a higher value if desired. Often ±3d 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 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. MSI supplies the MSI-7300 in many capacities. **NEVER SET THE CAPACITY OF THE Dyna-Link HIGHER THAN THE RATING OF THE LOAD CELL.** Due to excellent linearity of the MSI Link load cell, it is acceptable to set lower capacities to better match the crane the MSI-7300 is used on. For example, if the hoist is rated for 9000 lb. you can use a 10000 lb. capacity Dyna-Link and reset the capacity to 9000 lb. so that the Dyna-Link will indicate overload at 9000 lb. instead of 10000 lb. Derating as much as 50% of the capacity is usually acceptable, but the Dyna-Link may be less stable if the 'd' is decreased (resolution increased).

Note that the capacity of all the MSI-7300 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.

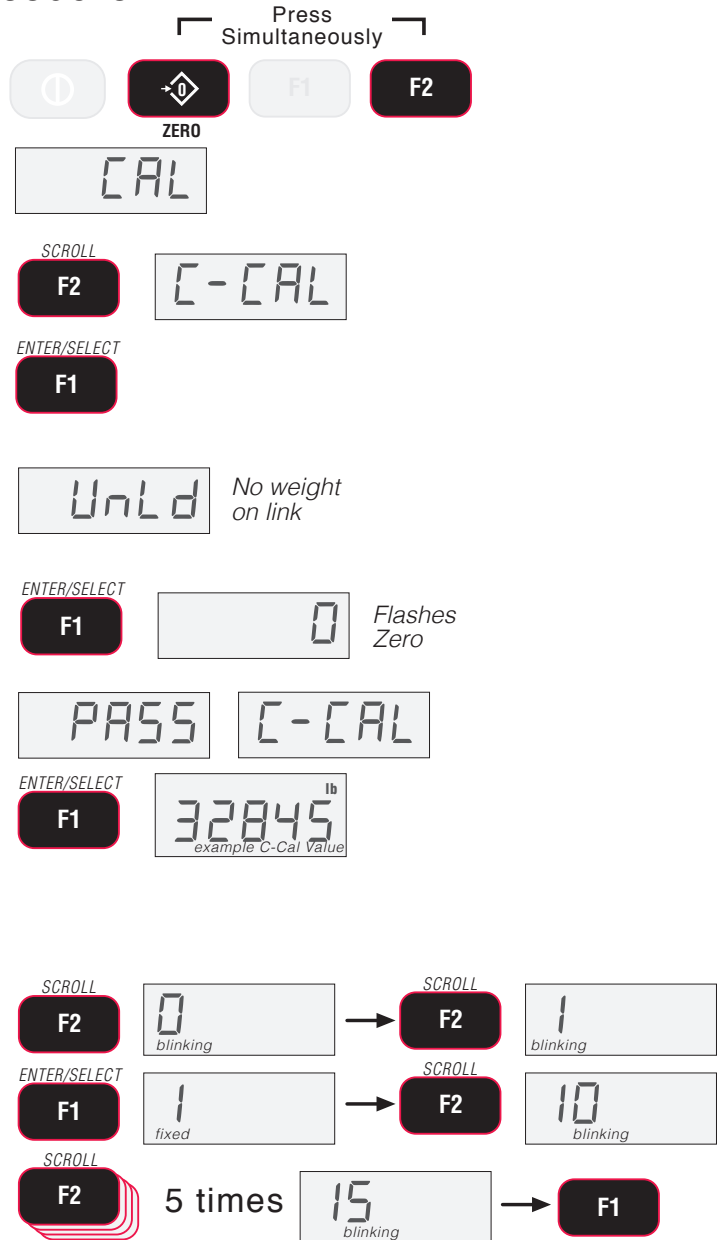
## C-CAL CALIBRATION

When adequate test weights are not available, the 7300 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. MSI supplies replacement load cells for the 7300 with the C-Cal value stamped on the serial number label. When a calibration is performed with test weights, a new C-Cal is generated.

**ATTENTION!** The C-Cal number must be known prior to starting this procedure. For a MSI-7300 with its original Load Cell, MSI prints this number 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 MSI-7300 with precision test weights.

### C-Cal Calibration Procedure

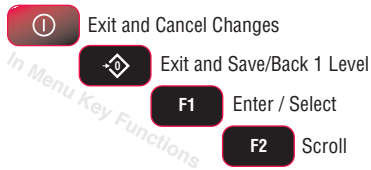
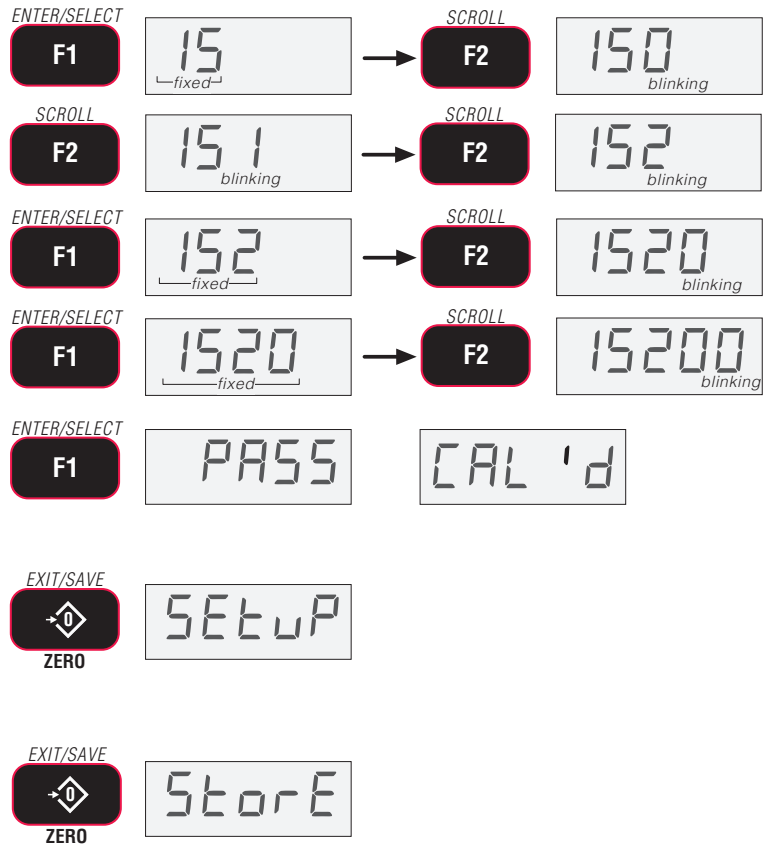
- 1) With the power on, initiate calibration by holding down the **F2** and **ZERO** keys until the display reads "CAL".  
  
The CAL Setup Menu appears.
- 2) Press **F2** to scroll to the C-Cal selection.
- 3) Press **F1** to Start the C-Cal Calibration Procedure.
- 3) The display reads "UnLd" (unload) indicating you should remove all weight from the link. *You can choose to leave bottom fittings on the Link as long as they are always part of the load train.*
- 4) Press **F1**. The 7300 sets the zero calibration point.
- 5) If the zero is in range, the scale will display "PASS". Then "C-CAL" is displayed.
- 6) Press **F1**. The last known C-Cal value is displayed.  
*If the offered C-Cal value is correct, push F1 and jump to step 10.*  
  
*In this example we'll enter 15200 as an C-Cal value. You must use your known C-Cal value, not 15200.*
- 7) To input the C-Cal value, press **F2** to start the number entry process..
- 8) Use **F2** to change the number, and **F1** to enter the number. Add the next digit by pushing **F2** and scrolling as required. Repeat this sequence until the entire C-Cal number is entered.



To input a decimal point, push **POWER** while a digit is blinking.  
Error Correction: If you input a wrong value, press **ZERO** to step back one digit and reenter.



- Numeric entry continued*
- 9) Once the entire C-Cal value is entered, press **F1** to finalize the number. The 7300 modifies its span factor registers to adjust the calibration to the value of the C-Cal. If the C-Cal input was in the acceptable range, the LCD will read PASS.
- Multiple C-Cal span points are possible, but are only accessible using MSI's optional SCCMP program.*
- 10) When the final C-Cal number is finished, press **ZERO** to exit and save the new C-Cal calibration. The LCD reads "STORE" to indicate a successful calibration.
  - 11) Press **ZERO** again to exit the CAL Menu and start standard link tension operation.

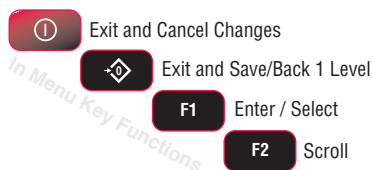
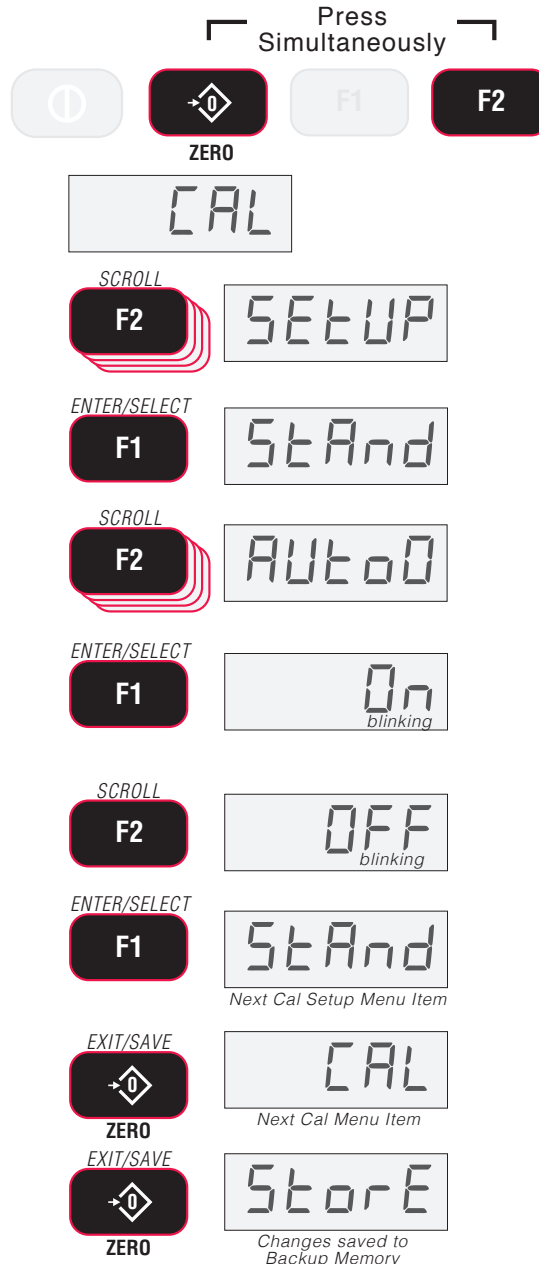


## AUTOZERO MAINTENANCE

The MSI-7300 employs an autozeroing maintenance mechanism to adjust the zero reading to the Center-of-Zero (COZ). COZ is defined as the tension reading is within 1/4 'd' of zero. AZM continuously adjusts zero to maintain COZ. It is recommended that AZM is on to maintain the highest accuracy. However, there are circumstances when it should be turned off. This can happen when minor variations of tension occur while picking up Dyna-Link attachments and the variations fall within the AZM capture window. The AZM capture window (usually 1 'd') and capture time (usually 8 seconds) can be adjusted by MSI to meet custom requirements.

## Auto Zero Maintenance Setup

- 1) With the power on, initiate calibration by holding down the **F2** and **ZERO** keys until the display reads "CAL".  
  
The CAL Setup Menu appears.
- 2) Press **F2** to go to the "SetUP" screen.
- 3) Press **F1**. The "StAnd" menu appears.
- 4) Press **F2** to scroll to the "Auto0" screen.
- 5) Press **F1**. The AutoZero mode shows On or OFF.  
*In this example, we will turn off AZM (not recommended for typical operations)*
- 6) Press **F2** to change to AZM between On and OFF.
- 7) When the desired mode is displayed, press **F1**.
- 8) The next Cal Setup Menu item appears.
- 9) Press **ZERO** twice to exit Cal Setup and store all changes, or continue to another Cal Setup Menu item using the **F2** Key.

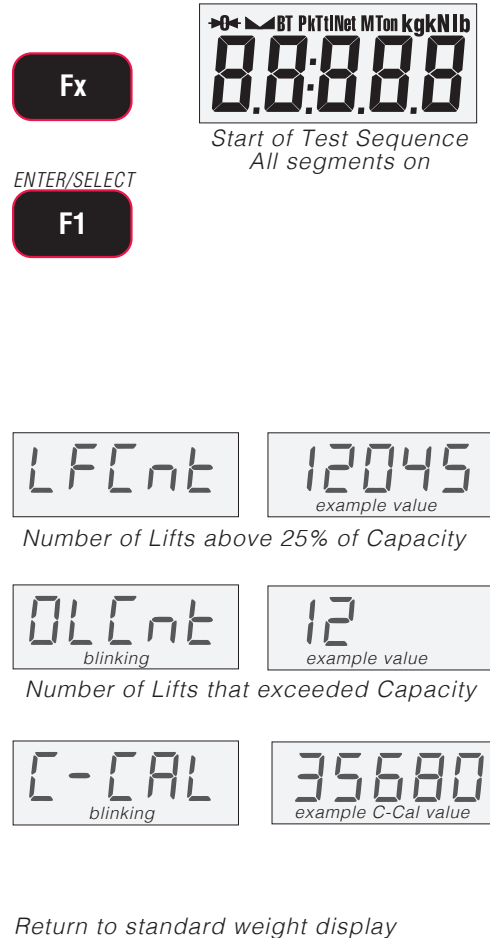


## SERVICE COUNTERS

The MSI-7300 maintains two service counters for safety. The first counter (LFCnt) counts lifts above 25% of capacity. The second counter (OLCnt) counts the number of times the Dyna-Link has been overloaded. These counters serve to warn the user to inspect the load train after a number of overloads or a long term frequency of high capacity lifts. Service counters can only be reset by the factory. The power up routine will be interrupted when the lift counter exceeds 16383 lifts or the overload counter exceeds 1023 overloads. Push any key to continue operation.

## Access the Service Counters

- 1) Program a User Function key to be TEST (see function key setup). For this example, **F1** is programmed as TEST.
- 2) Press **F1-TEST**.
- 3) Within 2 seconds of pressing the **F1-TEST** key, press **F1** again (must be F1 regardless of which key is programmed as TEST).  
*The test will sequence through steps 4 to 7 automatically unless you stop it by pressing F2 immediately. Then using F1 and F2 each parameter can be observed statically.*
- 4) The display flashes “LFCnt” (for Lift Counter) followed by the number of times the weight has exceeded 25% of capacity.
- 5) Next, the display flashes “OLCnt” (for Overload Counter) followed by the number of times the weight has exceeded capacity.
- 6) Next, the display flashes the C-Cal value.
- 7) The Dyna-Link Returns to standard weighing mode. If you interrupted the auto sequence, press **ZERO** to return to tension link mode.



Only a MSI factory representative can reset the service counters, as these are an important safety warning feature. Depending on the circumstances, a thorough load train inspection might be necessary to ensure product safety.

Reference MSI's "Crane Scale Safety and Periodic Maintenance Manual" for proper loading techniques to improve the safety and longevity of your MSI-7300 Dyna-Link. This publication is available at [www.msiscal.com](http://www.msiscal.com) and is included in the CD shipped with your MSI-7300.

## APPENDIX A –TROUBLESHOOTING

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Display is blank when POWER button is depressed.	A) Discharged battery B) Defective battery C) Corroded battery or battery contacts D) Defective Switch or circuit board	Replace Cells or if using NiMH, recharge Replace Clean contacts Requires Authorized Service
Display does not function properly or front panel buttons do not function normally or Dyna-Link will not turn off.	A) Improperly loaded software B) Faulty Circuit Board C) Loose connectors	Reinstall software Requires Authorized Service Requires Authorized Service
Dyna-Link does not respond to tension changes	A) Out of calibration B) Faulty Load Cell C) Load cell connector	Calibrate Replace Check connector and wires
Display over ranges below 100% of capacity	A) Tared tension is added to load to determine overload point. B) Zero requires adjustment C) Too much tension/load has been zeroed	Return to Gross tension mode  Rezero the Dyna-Link Rezero the Dyna-Link
Display drifts	A) AZM (Auto0) is turned off B) Rapid Temperature changes such as moving the Dyna-Link from indoors to outdoors.	Turn AZM on Wait until the Dyna-Link temperature has stabilized.
Displayed tension shows large error	A) Dyna-Link not zeroed before load is lifted B) lb/kg units causing confusion C) Requires recalibration	Zero the Dyna-Link with no load attached  Select proper units Recalibrate
Display reading not stable	A) Excessive Vibration in crane system B) Excessive side loading C) Load Cell faulty	Increase filtering or increase 'd' in Cal. Improve load train symmetry Check LC connections
Display toggles between "Error" and "Load"	A) Tension exceeds capacity B) Faulty Load Cell or wiring	Reduce tension immediately Check LC and LC wiring.
Display toggles between "Error" and "buttn"	A) A key is stuck or is being held down	Check switches for damage. Ensure that a remote is not transmitting continuously.
Optional RF Remote Display does not work.	A) Units not mated.	See setting the Transmitter and receiver address procedures
Lo Batt is blinking	A) Battery is low	Replace (alkaline) or Recharge Batteries
Unit turns on, then immediately off	A) Battery is low	Replace (alkaline) or Recharge Batteries
Tension will not zero	A) System not stable  B) Zero out of range	Wait for stable symbol to turn on Increase filtering for more stability. Zero range might be limited. Reduce the tension or use Tare instead



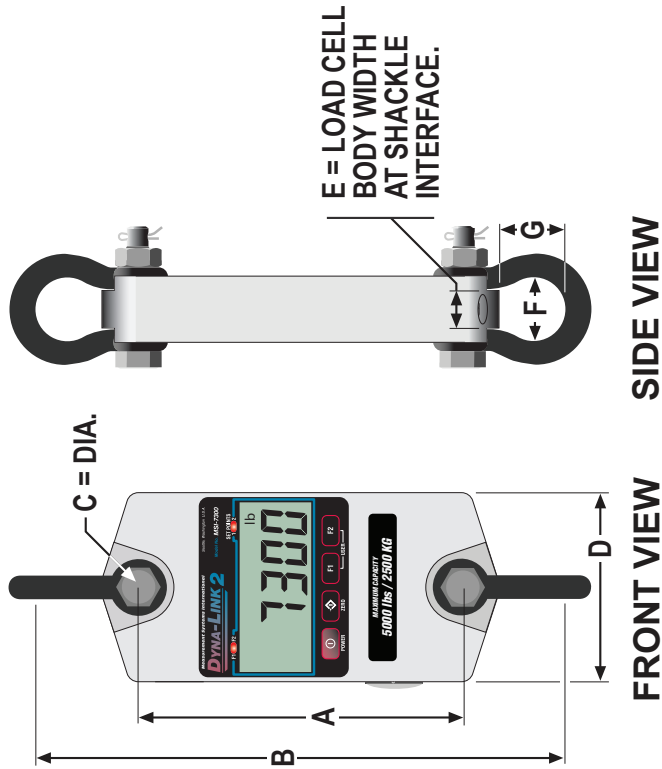
<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Tension will not Tare or Total	A) System is not Stable	Wait for stable symbol to turn on, or if in a mechanically noisy crane, increase the filtering or reduce the size of the Dyna-Link increment “d”. It is also possible to increase the motion window. Contact MSI if you have a problem getting the 7300 to zero, tare, or total due to stability issues.
Set Point Lights Blink	A) Set Point is enabled and the trigger point has been reached.	Disable set points if they are not needed.
Manual Total does not work	A) A Function key is not set to “Total” B) Tension must be stable	Set up Func1 or Func2 for “Total” Increase filtering for more stability.
Auto Total does not work	A) Tension must be stable  B) Tension thresholds not reached	Wait for stable symbol to turn on, or Increase filtering for more stability.  You must exceed 1% of capacity for autototal to work. Then you must drop below 0.5% of capacity for additional weighments to register.

**ERROR CODES**

The ScaleCore Processor that is the heart of the MSI-7300 Dyna-Link2 detects errors and generates error codes to aid in troubleshooting.

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

## APPENDIX B – MECHANICAL DIMENSIONS



Capacity	A	B	C	D	E	F	G	Appx Shipping Wt	Shackle
1,000 lb	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	
5,000 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
2,500 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
5,000 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	

Consult factory for higher capacities



## APPENDIX C – FIRMWARE UPDATE PROCEDURE

Updating firmware in the MSI-7300 requires the following: a DCE serial cable (*MSI 503363-0001, or build per DCE Cable schematic on page 22*), a PC with a terminal program (“Teraterm Pro” recommended), and if the PC 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 MSI Service Department and can be emailed on request. Your firmware version is displayed when the MSI-7300 is turned on in the form “01-04” (*your version will vary*). Most firmware updates do not require a recalibration. Consult the version release notes for confirmation.

- 1) Setup the terminal serial port to 8 data bits, No Parity, 1 stop bit, 9600 BAUD, XON/XOFF (*Flow Control*).
- 2) Connect to the Dyna-Link serial port using the DCE cable. Connect the D9 connector to your PC or USB adapter.
- 3) (Optional) Test that you have a connection by typing {00FF01?}. If the connection is good the Dyna-Link will respond with {000001r2;0;01E02;2011-07-08;11:05} or something similar.
- 4) On the terminal keyboard, type **{ff0009=0199}**
- 5) Change the terminal serial port to 38400 BAUD. Hit the ‘q’ key to refresh the display. The following menu should appear:

```
MSI SCALECORE 1 BOOT LOADER Ver. 02-04 (c) 2011-09-02 17:06
(u) Download and program application code. (your bootloader version may vary)
(q) query app code info.
(g) execute app code.
(r) refresh
```

- 4) Type **u**  
Terminal should display:

```
Send File NOW, or press ^ to abort:
```

- 5) Send the .prg file using the file send feature of your terminal program. The character “#” will tick away as the ScaleCore programs.

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

- 6) After file is received terminal should display “Completed”. Then the boot menu appears again.

```
MSI SCALECORE 1 BOOT LOADER Ver. 02-04 (c) 2011-09-02 16:06
(u) Download and program application code.
(q) query app code info.
(g) execute app code.
(r) Refresh
```

- 7) 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:

```
Completed Signature B0B742D ]-32b CRC must match
Received Signature B0B742D ]
Product ID 02 Dyna-Link product family
Product Version ID 01 Optional features code
App Code Version 01-04 Firmware Version Number
```

- 8) Send an “**r**” to restore the boot menu.

```
MSI SCALECORE 1 BOOT LOADER Ver. 02-04 (c) 2011-09-02 16:06
(u) Download and program application code.
(q) query app code info.
(g) execute app code.
(r) Refresh
```

- 9) Send a “**g**”. The MSI-7300 should start.

## THE MSI LIMITED WARRANTY

MEASUREMENT SYSTEMS INTERNATIONAL, INC., WARRANTS load sensing elements and meters against defects in workmanship and materials for a period of one year from date of purchase and warrants electrical cables and batteries against the same defects for a period of ninety (90) days from date of purchase.

Any device which proves defective during the warranty period will be replaced or repaired at no charge; provided that the defective device is returned to the Company freight pre-paid.

In no event shall the Company be liable for the cost of any repairs or alterations made by others except those repairs or alterations made with its specific written consent, nor shall the Company be liable for any damages or delays whether caused by defective workmanship, materials or otherwise.

The Company shall not be liable for any personal injury or property damage resulting from the handling, possession or use of the equipment by the customer.

The warranty set forth herein is exclusive and is expressly in lieu of all other warranties, express or implied, including without limitation any implied warranties of merchantability or fitness, or of any other obligations or liability on the part of the Company.

The liability of the Company under this warranty is limited solely to repairing or replacing its products during the warranty periods; and the final judgment and disposition of all claims will be made by MEASUREMENT SYSTEMS INTERNATIONAL, INC.

