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Cell*Mate

INTRODUCTION

Thank you for using the Motion Laboratories Cell*Mate system. The Cell*Mate is an 8-channel weight measurement system utilizing LoadCells that measure inline force. A complete system consists of 8 individual LoadCells, a Cell*Mate Hub and a Cell*Mate Display unit. Multiple display units may be used in an 8-channel system. Each channel of the Cell*Mate has a four-digit numeric LED display, which indicates the force on the corresponding LoadCell. In addition, each channel has a 10 segment, multicolor, lighted bar graph display to indicate a percentage load, as well as a 120% overload LED. All percentage readings are relative to a user selected weight value. The universal LoadCells have a 4000 lb. (1792 kg) measuring capacity with a 5:1 safety factor. Each LoadCell is individually connected to the Cell*Mate Hub.

FEATURES

- High visibility .56 inch numeric LED display.
- Weight displayed in pounds or kilograms (user selectable)
- 4 level display brightness is stored in non-volatile memory so Cell*Mate display returns to former brightness level on power up
- 10-segment, multicolor, lighted bar graph display indicates total load percentage. Scaling is individually adjustable for each channel in 10 unit (lb or kg) increments and is stored in non-volatile memory, which is not susceptible to power loss.
- Overload LED indication at 120% of user adjustable percent load. An overload indication on any channel will activate a relay with user assignable normally open contacts
- Multiple displays may be used
- User adjustable tare setting for each channel stored in non-volatile memory. The tare value will be subtracted from the true weight value and displayed for 10 seconds when the view tare button is pressed. While in the view tare mode, the percent load limits are still based on the true weight and will indicate accordingly. Tare can also be set by taking a "snapshot" of current LoadCell value.
- Any LoadCell channel disconnected or inactive due to a wire fault is indicated by a single dash (-) on the Cell*Mate display for that channel.
- Cell*Mate data cables (XLR) may be run up to 1000 feet from the LoadCell to Cell*Mate Hub, and up to 4000 feet from the Cell*Mate Hub to the Cell*Mate Display unit.
- An individual self-resetting fuse protects each LoadCell port.
- LoadCells accept standard 5/8" shackles (with 3/4" shafts) and have spherical bearings for self-alignment.
- Peak hold function allows user to view peak weight measurements

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GETTING STARTED

Your Cell*Mate system is simple to install, set up, and use. It's designed with the user in mind. All that is required is a home run connection via 6-pin XLR from each LoadCell to the Cell*Mate Hub. Display information is then sent from the Hub to the Display by a single 6-pin XLR cable. Each cable supplies power and bi-directional data to and from the LoadCells. 120v-240v 50-60Hz AC must be provided to the Cell*Mate Display and Hub for operation. Keep in mind data cable length is not a limiting factor. LoadCell data cables may be up to 1000 feet in length. Display data cables may be a total of 4000 feet!

SETUP

1. Choose location for LoadCells: (in rigging, vertical orientation, above load to be measured).
2. Locate Cell*Mate Hub near LoadCells
3. Run 6-pin XLR male-female cables from each LoadCell to the Cell*Mate Hub
4. Choose location for display
3. Run single 6-pin XLR male-female cable from Cell*Mate Hub to Cell*Mate Display
4. Connect AC power to Cell*Mate Hub and Display.

POWER UP

When you first power up the Cell*Mate system, the display performs a display test, illuminating all LEDs at maximum brightness. After the display test is completed, it will begin to receive data from the Cell*Mate Hub. If no hub is connected each display will show "EEEE" indicating a loss of data from the hub. Every time the system powers up pounds are the default units of measurement.

Any cells connected will indicate a numerical weight value during normal operation. If a cell is not connected to a channel or a cable fault exists, the corresponding channel will indicate a single "-". Using less than 8 cells does not affect the Cell*Mate system.

SELECTING POUNDS OR KILOGRAMS

The Cell*Mate can be set to measure pounds or kilograms in 10 pound or 10 kilogram increments. The pound and kilogram LED's indicate which mode the Cell*Mate is in. To change units press the lb/kg button. The LED will change to the selected mode and weight will be displayed. On power up, the default setting for the Cell*Mate display is pounds.

DISPLAY INTENSITY

The intensity of the Cell*Mate display is adjustable to 4 levels of brightness. This can be adjusted any time the Cell*Mate is in the normal weight-measuring mode. Each press of the up or down button will increase or decrease the intensity one level. The Cell*Mate remembers the intensity you set. When you turn it on again it will return to the last intensity set.

PEAK HOLD

Peak hold allows the user to view the maximum weight value measured on all channels while the system has been placed in the peak hold mode. While in this mode the bar graph displays and limit alarms function the same. This function toggles on and off by pressing the peak hold button. Peak hold is a local display function. If you are using multiple displays only the display that had its peak hold function activated will indicate peak readings.

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LINE TERMINATION FOR DISPLAY UNITS

The Cell*Mate system uses RS-485 for sending and receiving data between all system components. It is a desirable way to send data, known for its noise rejecting qualities and ability to send data over a long distance without repeaters. To operate correctly a few simple rules must be followed regarding data line termination.

For the data lines that run from each LoadCell to the hub, termination is not an issue since they are point-to-point lines and are terminated at each device. Since multiple display units are allowed, (up to 255 by the way) the very last unit in the chain must be terminated. If a single display is used, termination shall be turned on. When multiple displays are used, only the last one in the chain must have its termination switch on but not any of the other displays. Never attempt to make "Y" cables or try to home run cables to separate displays from the hub. From the hub multiple displays must ALWAYS be connected in series, daisy chaining through one another.

Line Termination Examples

8-channel system setup with single display. Note termination switch turned on for the single display.

Termination On

```
LOADCELL-----HUB-----DISPLAY
LOADCELL-----|
LOADCELL-----|
LOADCELL-----|
LOADCELL-----|
LOADCELL-----|
LOADCELL-----|
LOADCELL-----|
LOADCELL-----|
```

8-channel system setup with more than one display. Note termination switch turned on only on the last display in the chain.

Termination Off

Termination Off

Termination On

```
LOADCELL-----HUB-----DISPLAY-----DISPLAY-----DISPLAY
LOADCELL-----|
LOADCELL-----|
LOADCELL-----|
LOADCELL-----|
LOADCELL-----|
LOADCELL-----|
LOADCELL-----|
LOADCELL-----|
```

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SETTING PERCENT LOAD LIMITS

A limit is a 100% weight value you set to be displayed in 10% increments on the bar graph display. Limits are individually adjustable for each channel and are stored in non-volatile memory. Keep in mind that limits are different for pounds and kilograms. ***If you set a limit in kilograms and then change to pounds it will not carry over and vice versa.*** An additional useful function of limits is at 120% indicated on any channel, a relay will operate. User assignable normally open contacts can be used for safety shutdown of other systems, operate external audible or visual alarms, or anything else you can think of. The bar graph displays are multicolor to provide you with a visual telltale of measured weight. Up to 60% is indicated in green, 70% through 90% in yellow and 100% in red. A separate red LED above the ones digit is the 120% overload LED. If you get a full-scale bar graph reading along with the 120% overload LED, you are exceeding the limit set for that channel by at least 120%.

The Limit function allows the user to monitor a variety of hoists and lifting devices at different load ratings in one system with one universal load cell. $\frac{1}{4}$, $\frac{1}{2}$, 1, and 2-ton devices can all input to the same Cell*Mate. Setting limits can accommodate structural and architectural elements of a rig by custom tailoring your monitors to account for weaker or stronger points.

To set limits

1. Press the limit button
2. Display will clear and current channel 1 limits will be displayed, limit LED will blink
3. To change the value press the up or down button. Minimum limit is 100 lb/kg, maximum is 4000 lb. or 1800kg. The value will increment up or down by tens. You can toggle the button to move up or down ten at a time or you may hold the button down for auto advancing in the direction selected. Auto advance will go slow for the first 8 counts and then go fast if you need to adjust a large amount.
4. To advance to the next channel press the limit button again.
5. A channel may be skipped if it does not need adjustment by pressing the limit button again.
6. After channel 8, pressing the limit button again will return the Cell*Mate to the normal mode and the limit led will stop blinking. Keep in mind while you are changing limits the Cell*Mate does not make any measurements.

*Remember the value you set as a limit is the 100% value. 20% beyond this value will cause an overload indication. For example, if you set a limit to 1000 pounds the bar graph will display all 10 segments at exactly 1000 pounds. The overload indication will not occur until the weight reaches 1200 pounds.

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SETTING AND VIEWING THE TARE VALUES

A tare is a value that is subtracted from the true weight when you want to measure from a reference point other than zero. For example, if you had a chain hoist that has a known weight of 150 pounds but you wanted to know what your load was without the weight of the hoist, you could set 150 pounds as a tare value. When you press the view tare button, the Cell*Mate will subtract 150 pounds from the true weight so you can see what your actual load is. ***Like limits, tare is individually adjustable for each channel and is different for pounds and kilograms.*** When you press the view tare button, a timer allows the display to view the true weight minus the tare for ten seconds and then reverts back to normal weight readings. This is so one does not accidentally exceed a weight by leaving it in the view tare mode. While in the view tare mode, the bar graph readings are still based on true weight and will accurately show percent load regardless of mode. Tare settings are stored in non-volatile memory. You can also set your tare value by taking a "snapshot" of what a LoadCell is measuring at any time. This is useful for measuring the weight of the rigging hardware before it is laden with its intended load. This way one does not have to know what each tare value was before setting it.

To Set Tare Values

1. Press the tare button
2. Display will clear and current channel 1 tare value will be displayed, tare LED will blink
3. To change values press the up or down button. Minimum tare value is 0 lb./kg, maximum is 4000. The value will increment up or down by tens. You can toggle the button to move up or down ten at a time or you may hold the button down for auto advancing in the direction selected. Auto advance will go slow for the first 5 counts and then go fast if you need to adjust a large amount.
4. Instead of manual adjustment you may take a "snapshot" of the current LoadCell value and enter it into memory by pressing the view tare button.
5. To advance to the next channel press the tare button again.
6. A channel may be skipped if it does not need adjustment by pressing the tare button again.
7. After channel 8, pressing the tare button again will return the Cell*Mate to the normal mode and the tare led will stop blinking. Keep in mind while you are changing tare values the Cell*Mate does not take measurements.

To View Tare

1. Press view tare button
2. Tare light will illuminate continuously
3. Display will show weight measurements minus the tare value you set for each channel
5. After 10 seconds tare light will turn off and normal weights will be displayed
6. If tare value is greater than the measured value, a single "8" will be indicated on that channel

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CONTROLS

Adjust UP Button	Used to increment (+) display brightness, limits, or tare value
Adjust DOWN button	Used to decrement (-) display brightness, limits, or tare value
Peak Hold Button	Sets display to show peak weight values
View Tare button	Allows user to globally view true weight minus a tare value and take a “snapshot” of the LoadCell when setting tare value
Select/set tare channel button	Allows user to enter and exit tare setting mode and select channel
Select/set limits channel button	Allows user to enter and exit limit setting mode and select channel
LB/KG button	Allows user to change between pounds or kilograms

INDICATORS AND OUTPUTS

Peak hold LED	Indicates peak hold mode selected
Pounds LED	Indicates pounds mode selected
Kilograms LED	Indicates kilograms mode selected
Tare LED	When blinking indicates tare set mode; steady on indicates view tare mode
Set limits LED	When blinking indicates set limits mode
Relay output	Provides user assignable normally open contacts at 120% overload on any channel
120% Overload LED	Indicates load has exceeded the 100% preset limit for that channel by 20%
Numeric LED	Displays actual inline force on the corresponding LoadCell
10 Segment Bar Graph	Displays load in 10% increments relative to individual preset limit

SPECIFICATIONS

Power requirement	HUB	100-240 VAC 50/60 Hz
	DISPLAY	100-240 VAC 50/60 Hz
Data communication	RS-485 Full Duplex 9600 baud 8N1	
LoadCell	Rated 4000 lbs. with 5:1 Safety factor	
LoadCell material	Stainless Steel	

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TROUBLE SHOOTING

SITUATION	SOLUTION
Display is showing "EEEE" on all channels	Connect Display data cable
	Replace Display data cable
	Check power going to the hub
With multiple displays, data is erroneous, intermittent or indicates "EEEE" on all channels	Make sure only the last display in the chain is terminated
Display is normal, but buttons do not work	Check power going to hub
	Replace Display data cable
A single "-" is displayed for a particular LoadCell	LoadCell not plugged in.
While in the view tare mode, a single "8" is displayed	Replace defective LoadCell data cable.
	LoadCell data cable is too long (>1000').
	Set Tare value lower than measured weight
Display is barely visible	Adjust display intensity