MSI 150X

"SKY-WEIGH"
HELICOPTER CARGO
HOOK LOAD
MONITORING
SYSTEM

User Guide

Quality Industrial Weighing and Force Measurement Equipment

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Measurement Systems International

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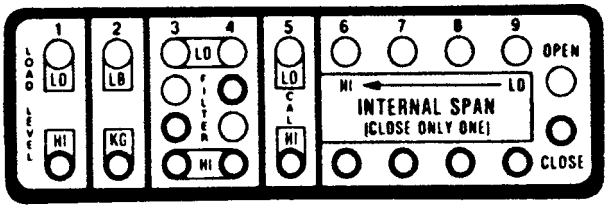
CONFIGURATION LOG

Meter Serial Number _____

Load Cell Serial Number _____

Calibration Number _____

Dip Switch Setting:



MSI-150XM SYSTEM DESCRIPTION

The MSI-150XM system is designed for the recording and/or monitoring of external loads encountered in helicopter lift operations. The basic MSI-150XM system consists of a weight sensor (load cell) and a digital weight indicator. An optional hand held or panel mounted thermal printer (MSI-150XP) may be interfaced to provide a permanent record of the lift operations. The system is designed to record/monitor loads up to 30,000 lb/15,000 kg.

MSI-150XM DESCRIPTION

The MSI-150XM weight indicator performs signal conditioning on the low level signal received from the weight sensor then displays the sensed weight on a liquid crystal display (LCD).

Front Controls

TEST: When the Test button is depressed, an automated self-test sequence is performed by the internal computer. The liquid crystal display will sequence through the following:

1) All LCD segments on for approximately 3 seconds.
2) All LCD segments off for approximately 3 seconds.
3) Instrument calibration number displayed for approximately 3 seconds.
4) Zero offset displayed for approximately 3 seconds. (This is the total offset which has been previously zeroed out by use of the ZERO button.)

5) "X - Y" number displayed. "X" is the filter number (0 - 3) selected by dip switch settings. "Y" is a computer software version number used to identify the software program in the weight indicator.

When calibrated with a load sensor at the factory, the indicator will display the calibration number that is stamped on the load sensor. This calibration number is displayed during the Test sequencing so that the correct calibration of the system can be verified. In order to display the correct calibration number during this sequencing, the indicator must first be Zeroed.

Depressing and holding the TEST button during the appearance of a given item in the test sequence will hold that item in place on the display. Releasing the Test button will allow the sequencing to continue. (i.e. depressing the Test button during the appearance of the calibration number holds it in place while allowing the technician to adjust the span control for recalibration. (See Span Adjustment)

ZERO: The push-button zero switch allows the operator to Zero out a displayed load. The maximum load the indicator will allow the operator to zero out using this control is 1200 lb/540 kg with 10 lb/10 kg resolution.

Rear Controls

Rear controls allow for coarse zero adjustment and span adjustment of the weight indicator.

1) `Coarse Zero Adjustment:` During installation it is necessary to account for the weight of the cargo hook and other loads attached to the load sensor. To accomplish this, adjust the Zero control on the rear of the indicator with a small screwdriver until the display reads zero.

2) `Span Adjustment:` When used in conjunction with known test weights and the proper analog gain control setting, the Span Adjustment is used to calibrate the MSI-150XM system. This adjustment is set at the factory and should only be readjusted when it is necessary to re-calibrate the indicator.

Side Controls

Programming controls not accessible on the front or rear of the weight indicator are contained in a nine position dip switch located on the side of the MSI-150XM indicator. This switch is covered by a label that has been marked at the factory with preset switch positions. This label should not be removed unless a change to these switch positions is necessary. Spare labels can be

provided by the factory and should be marked and affixed to the indicator.

The switches allow for the selection of the following:

LOAD LEVEL INDICATOR TRIP POINT
DISPLAY UNITS (LBS. OR KGS)
DAMPENING FILTER LEVEL (4 LEVELS PROVIDED)
CALIBRATION VALUE SELECT
ANALOG GAIN

1) Switch 1 - Load Level: The indicator outputs a signal to Pin G of J2 which identifies when a load is being applied to the load cell. The LO position is 5 lb/5 kg; the HI position is 10 lb/10 kg. A weight which exceeds these values allow Pin G to sink up to 300ma to ground (open collector signal).

2) Switch 2 - Display Units: Selects the display units as pounds or kilograms. An arrow on the front panel display identifies the units selected.

3) Switch 3 & 4 - Dampening Filter: When used in combination, the switches select the level of motion dampening (4 levels). A filter number which appears during the Test sequence identifies the dampening level selected.

   Filter 0 - (3 open/4 open) no dampening
   Filter 1 - (3 open/4 closed) light dampening
   Filter 2 - (3 closed/4 open) medium dampening
   Filter 3 - (3 closed/4 closed) heavy dampening

4) Switch 5 - Calibration Value Select: Selects one of two calibration numbers. The switch has been set at the factory and should not be changed. The correct calibration number (found at the front of this manual and on the load cell serial number tag next to CAL) will only appear if the indicator is at zero when the Test button is depressed. Recalibration (adjustment to the rear Span control) will change this number. The new number should be recorded. Recalibration is necessary when new printed circuit boards or load cells are installed.

5) Switch 6, 7, 8, & 9 - Analog Gain: Adjusts the indicator span sensitivity to accommodate various types of load cells. This switch has been set at the factory. There should be no need to change it unless the indicator is used with a different type of load cell. Changing the analog gain is only necessary when there is insufficient span adjustment to calibrate the indicator. Only one switch is closed at any one time.

Front Indicators

LB/KG Indicator: The MSI-150XM will display the weight in pounds or kilograms as selected by Switch 2 of the 9 position dip switch on the side of the instrument. The selected units are indicated by one of two pointers to the left of the liquid crystal display.

INSTALLATION

Install the system in accordance with the installation drawing(s) provided.

Warning: After load cell/hook installation, move the hook to all positions to insure that there is no interference with electrical/mechanical release cables.

Prior to inserting the indicator in the instrument panel, perform a "Power-On" check to assure that the meter performs a proper TEST sequence.

CALIBRATION

The system has been factory calibrated using known weights. A periodic calibration check should be performed by lifting a known weight (at least one half capacity). If recalibration is required, the following procedures should be followed:

1) Place the instrument in a position which permits access to the rear controls.
2) Apply power and zero the unit with the rear Zero control screw.
3) Without the known weight applied, lift all slings, long line etc. to be utilized in the lift and allow the display to stabilize then depress the Zero control screw. This allows net weight calibration of the known weight.
4) Lift the known weight, allow the reading to stabilize then adjust the rear Span adjustment until the known weight is indicated.
5) Remove the known weight. If the indicator returns to zero, the calibration is complete. If not, repeat steps 3 through 5.

OPERATION

1) Prior to each flight, visually inspect the load cell and attachments for any obvious signs of wear or loose connections.
2) At power application, the indicator will automatically perform its Test sequence.
3) With all lifting slings, long line etc. attached, depress ZERO control and

perform test sequence to verify calibration (net weight operation). (If gross weight operation is desired, any weight not zeroed will be added to the calibration number when displayed during Test sequence.)

INSPECTION

The load cell and attachment bolts should be inspected during each hook inspection cycle. Bolts showing wear should be replaced. Bushings in the load cells should be inspected for wear and replaced for out-of-round conditions. Load cells with out-of-round end fitting holes should be replaced.

CONNECTOR PIN ASSIGNMENTS

CONNECTOR J1

PIN	NAME	USE
A	Analog Output	Represents analog signal being sensed by the load cell. Used to drive external indicator(s).
B	28V DC	Power for the MSI-150XP or other external devices.
C	MSI-150XP Serial Data	Communication link to the MSI-150XP printer.
D	GND	Power ground for the 150XP or other external devices.

CONNECTOR J2

PIN	NAME	USE
A	+ Excitation	Load cell + power.
B	+ Signal	Load cell + signal.
C	- Signal	Load cell - signal.
D	- Excitation	Load cell - power.
E	Aircraft Dim	Connect to instrument panel backlighting rheostat for MSI-150XM liquid crystal display backlighting.
F	28V DC	Power for MSI-150XM and 150XP.
G	Load on output	Output to drive external load on indicator. Open collector, sinks 300ma.
H	Electronic GND	Power ground for MSI-150XM and 150XP.
J	Chassis GND	Connect to quality aircraft ground only if indicator case is not grounded or if indicator readings are erratic.
K	Chassis GND	Connect to quality aircraft ground only if indicator case is not grounded or if indicator readings are erratic.

NOTES

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 prepaid.

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 judgement and disposition of all claims will be made by MEASUREMENT SYSTEMS INTERNATIONAL, INC.

MADE IN THE USA

PUB.247-04-95B

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