INTEGRATED VISUAL DATA TECHNOLOGY INC.
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RT-LCM

High Reach Truck Load Capacity Monitor

Installation & Calibration Manual

RT-LCM V7

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General Installation Guide

This **RT-LCM Series** load capacity monitor installation & calibration guide describes how to install, calibrate, test and use your high reach vehicle onboard load capacity monitor. The **RT- LCM** measurement technology is based on hydraulic pressure transducer and proprietary software. Following the instructions in this guide will enable you to get your system operating quickly and easily. In the event that you require additional assistance, please contact customer support via e-mail at support@skidweigh.com or visit www.skidweigh.com or contact us at the number below

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Safety

Always disconnect the vehicle battery while installing SkidWeigh system or any other electronic product. Make sure that unit, pressure transducer and any other associated cables are securely mounted and do not impede any of the vehicle's controls. Use care when routing the components cables. Route the cables where they will be protected. Use commonly accepted install practices for after market industrial vehicle electronic devices. The installation of the SkidWeigh systems should only be performed by an acknowledged lift truck dealer technician or end user electro and hydraulic technical installer.
Here are two acceptable methods of making a wire connections:
* Soldering your connections (recommended)
* Crimp connectors (with the use of the proper crimping tool)
Regardless of the method you choose, ensure that the connection is mechanically sound and properly insulated. Use high quality electrical tape and shrink tubing where necessary.

Electro-Magnetic Compatibility

CE conformity to EC directive 89/336 (EMC) by application of harmonized standards: Interference stability EN 61000-6-2 and EN 61326-1 interference emit EN 61000-6-3, EN 61326-1 for the pressure transducer.

RT-LCM SkidWeigh Series

Our policy is one of continuous improvement and the information in this document is subject to change without notice.

Overview of components

The standard **RT-LCM Series SkidWeigh** load capacity monitor consist of two main components:
* Digital indicator with wiring harness, mounting bracket with anti-vibration mounts
* Hydraulic pressure transducer with 3 wires cable
* Installation & calibration manual and operator usage instruction

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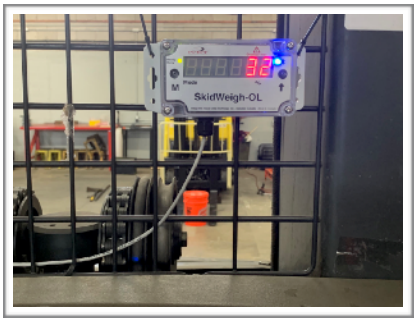
Operational principal

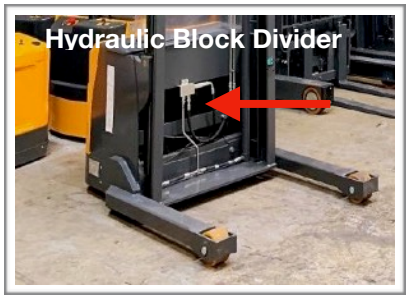


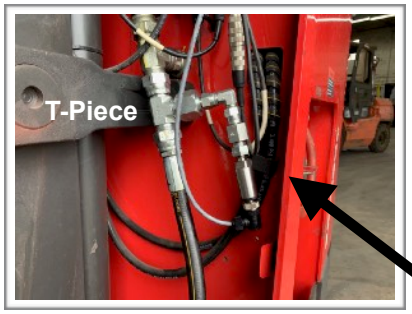
The **RT-LCM Series SkidWeigh** system operational principal is based on the hydraulic pressure transducer installed in the vehicle lifting hydraulic circuit that will automatically activate the proprietary lifted load “measurement algorithm”. The increase in pressure is converted in an electronic signal at the sample rate of 16000 readings per measurement cycle during the lifting operation. The system will automatically calculate and display lifted load in percentage throughout the entire lift height operation of the vehicle compared to the maximum allowed lifting load of the vehicle at 24” load centre as per manufacturer specifications shown on the vehicle name plate. The RT-LCM readout is updated every second and will be clearly visible to the operator.

Pressure transducer installation

The pressure transducer must be installed in the lifting hydraulic line ***between the lift control valve and lift cylinder(s).*** *In majority of cases* a T-piece is used to install the pressure transducer in lifting hydraulic line. In some cases you can install the pressure transducer in the flow divider, drilling and tapping for 1/4”-18 NPT male in spare plug (if only single or double mast configuration) or in the body of the flow divider. Also, you can drill and tap on any “larger elbow” that might be available in the hydraulic lifting circuit in the vehicle.

Pressure transducer installation precautions





Before mounting the pressure transducer in the hydraulic lift circuit make sure that system is pressure free.

There are two ways to do that:
1. Place the forks on the ground in their lowest position and make the hydraulic system pressure free by tilting the mast forward. The chain(s) should be slack.
2. Lift the forks and position them on the top of a supporting fixture. Start lowering the lifting cylinder into its lowest position. Be sure that chains are slack.

Make sure that that installed pressure transducer will not touch any moving parts or assembly of the vehicle while in normal operation.
Pressure transducer has **1/4”-18 NPT male thread**.
Use thread seal to ensure tight fit.

Swiss Made Pressure Transducer
The **RT-LCM** pressure transducer part number is **IPT-1500** must be used with the system

Selecting the mounting location for digital indicator

There are many examples of mounting locations that will depend on the vehicle model. However, additional mounting items such as a flat brackets may be needed to help secure the unit to the overhead guard or to the operator dashboard.

Choose the correct location and make sure that indicator is visible to the operator.

Electrical Connections

The **RT-LCM** SkidWeigh systems operating voltage is from 12 to 55 VDC.

- **Orange Wire** (+) Ignition switch On position
- **Brown Wire** (-) Battery negative
- **Red Wire,** connect to RED wire of the pressure transducer cable
- **Black Wire,** connect to BLACK wire of the pressure transducer cable
- **White Wire,** connect to WHITE wire of the pressure transducer cable

Pressure transducer cable

- **White Wire,** signal output
- **Black Wire,** signal negative
- **Red Wire,** power supply to the pressure transducer

Pressure transducer 3 wires cable must be connected to main cable from the indicator.

Electrical power short circuit protection

All of the SkidWeigh systems are internally short circuit protected with resettable fuse. There is no need to install external inline fuse in orange wire connected to the ignition switch.
The **RT-LCM** system has a reversal power supply protection.

"Quick test to determine if electrical connections are done right"

Note: *SkidWeigh **RT-LCM** calibration function is not done yet at this stage. This procedure is only to test if electrical connections into the vehicle is done properly!*

After you have connected two wires to the vehicle power and pressure transducer cable you can "quickly" check the system operation.
- **Lower the forks to the ground**
- Turn on vehicle power switch
- Digital LED display will be activated, showing software version and serial number
- Number **8** will be shown on LED display above the **MODE** digit.
- Lift the empty or loaded forks to increase pressure in lifting cylinder.

Number **8** will go off and indicator will show load in percentages on LED display. *If the above test is valid the system electrical connections are done right.*

*The next procedure will be to calibrate the **RT-LCM** system.*

RT-LCM weighing function calibration procedure

The **RT-LCM Series SkidWeigh** calibration is automatic and is done by lifting empty forks with pantograph fully extended **just above the ground.** The calibration with the known load weight is done with loaded forks and pantograph fully extended lifted to the highest **operational mast forks height** for the particular high reach truck.
Note: *The known calibration load weight should be at 24" load centre.*

MAKE SURE THAT YOU HAVE A KNOWN LOAD WEIGHT AND KEEP IT NEARBY TO COMPLETE THE CALIBRATION.
For the best results use minimum calibration load weight of 40% to 70% of the vehicle maximum lifting capacity of the vehicle at maximum lift height as stated on vehicle name plate.
(Consult vehicle name plate for vehicle maximum load lifting capacity at 24" load centre at the maximum forks height)
Use customer floor scale or use a known skid load weight for the **RT-LCM** load weight calibration.

Digital Indicator *(RT-LCM system calibration utilizing two push buttons)*

- - Left button **"M"** is used to enter into calibration mode and to shift to the left to the next digit.
- Right button **"Arrow Up"** is used to enter numerical increments from 0-9, wrap around.
- Both buttons are used during the system calibration.
- Buttons can be accessed through two small holes on the cover.
- Use paper clip to activate buttons (momentary touch). *Do not push buttons too hard!*
- Left most significant digit represents ***Mode of operation***.
- Other five digits represent the load weight readout or/and percentage load capacity readout.

MODE	Digit 5	Digit 4	Digit 3	Digit 2	Digit 1

Note:

- Every time the power is applied the software version will be shown momentarily for a brief moment.
- When forks are lowered to ground LED display will show **Mode 8**.
- If you make a mistake during the system calibration, turn power ON / OFF and start all over.

Calibration Procedure

Lower the empty forks to the ground with pantograph fully extended.

- There should be no hydraulic pressure in lift hydraulic circuit.
- Turn power switch to on position.
- LED display will show software version briefly on the right side and number **8** will be shown in the **Mode** window.

** For vehicles without pantograph lower empty forks to the ground, mast in vertical position*

1. Calibration of empty forks with fully extended pantograph lifted just above the ground

To initiate calibration press the **"M"** button (use a paper clip) and hold it down for approx. 5 seconds.

After approx. five seconds the **Mode** display digit will change from **Mode 8** to **Mode 0**.
System is ready for automatic zeroing
When LED display is showing **Mode 0** lift the empty forks with pantograph fully extended **just above the ground** to initiate automatic calibration of zero weight**.**

The LED display showing **Mode 0** will go blank and after few seconds display will show **Mode 1**.

Automatic zeroing is done

2. Calibration of loaded forks lifted to the highest operational forks height

* Drive your vehicle into the skid load with known weight positioned at load centre of 24". Lift the load to the **highest operational forks height.**
* The pantograph must be fully extended during the calibration.

Note: (In our calculation example we will use 1000 pounds as known calibration load weight)

Using two buttons, **"M" and Arrow Up** to input calculated percentage into the system

With LED display showing **Mode 1** start entering the known calibration load weight value by using **Arrow Up** button (increments from 0 to 9) wrap around. Start with Digit 1, least significant digit (in our case input number **"3"**) and press momentarily button **"M"** to advance to next Digit 2. Input number **"3"** and press momentarily button "M" to advance to next Digit 3. Keep doing the same until **00033** is entered into the system.
Make sure that digits 3,4 and 5 are "0". *(The calibrated % value has only two digits)*

Example: Load Capacity Calculation (LCM %)

1. KNOWN LOAD WEIGHT TO CALIBRATE THE SYSTEM IS **1000 pounds**

2. *VEHICLE MAXIMUM RATED CAPACITY AT THE MAXIMUM LIFT HEIGHT IS **3000 pounds**

* As per manufacturer specifications shown on the vehicle name plate at 24" load centre

Use a following formula to arrive to the LCM % value that you will have to input into the system.

$$\text{LCM (\%)} = \frac{\text{Known Load Weight X 100}}{\text{Vehicle Rated Capacity at Maximum Lift Height}} =$$

$$\text{LCM (\%)} = \frac{\text{1000 X 100}}{\text{3000}} = 33.3\%$$

The calculated percentage value is 33

Use **"M"** and **Arrow Up** buttons to input **33**.

Make sure that Digits 3,4 and 5 are 0.

MODE	Digit 5	Digit 4	Digit 3	Digit 2	Digit 1
1					3
2				3	
3			0		
4		0			
5	0				

Note: With LED display showing **500033** lift known load weight to the **maximum lift height** *(as of example loaded forks lifted to second mast if applicable)* and have pantograph fully extended.
With load lifted, press the **"M"** button to advance to **MODE 6 and immediately lift the load few inches to initiate automatic calibration measurement.**

MODE	Digit 5	Digit 4	Digit 3	Digit 2	Digit 1
6					

The LED display will go "blank".

After few seconds LED display will show the calibrated value of 33.

MODE	Digit 5	Digit 4	Digit 3	Digit 2	Digit 1
				3	3

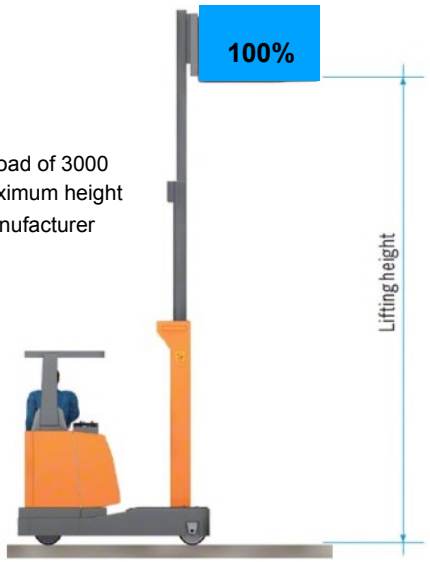
Percentage load capacity calibration is done

* Lower the calibrated load weight to ground.
* LED display will show Mode 8.
* System is ready to be used.
* Any lifted load will be shown as % of the maximum allowed of the vehicle rated capacity
* Readout shown on LED display will be updated every second
* No operator input is required

OPERATOR USAGE GUIDE

No need for the operator input for the RT-LCM operation

Example:
Vehicle Maximum Load of 3000 pounds lifted to a maximum height established by manufacturer



General Safety Practices For Material Handling Vehicle Stability

*** Experience has shown that high lift trucks that comply with the stability requirements stated in ANSI/ITSDF B56 Part III as shown of vehicle name plate are stable when properly operated.** Some of the conditions that may affect stability are the ground and floor conditions, grade, speed, load weight, dynamic and static forces, judgment exercised by the operator, changes in load dimension that may affect truck capacity, etc.
Tipping forward can occur and its likelihood is increased under the following conditions or combination of them such as overloading, traveling with load tilted forward and/or elevated, hard braking while traveling forward or suddenly accelerating while traveling in reverse.

RT-LCM System, load capacity monitor will assist the operator to control the equipment safely minimizing dangerous situations without a detailed knowledge of the information **specified by manufacturer in the load capacity name plate.** The rated capacity is the maximum weight at one of the following standard load centres (600 mm, 900 mm and 1200mm) with the mast vertical that a truck can transport and stack to a maximum height established by the manufacturer.
Vehicle name plate showing a specified load centre and for a specified maximum load elevation is taken into consideration during the RT-LCM calibration procedure.

The Safe Operation of the Material Handling Vehicle is the Responsibility of the Operator

Lifted load will be shown in percentages of approved load capacity as per vehicle name plate taken into account the maximum allowed lift height. The RT-LCM load capacity monitor system is used as a general guide to assist the operator to avoid dangerous overload situations.

The percentage load weight readout shown on LED indicator will not take into consideration *other conditions that might affect vehicle stability.