



Industrial Weighing Systems

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Warning:

If your vehicle has an engine that has spark plugs, be sure they are resistor type spark plugs or you may damage the memory chip of this unit. If the scale unit fails when the engine is running, but will operate if the engine is off, this is a symptom of spark plug interference from non-resistor plugs

Principal of operation:

The weighing system is designed to monitor the pressure in the first stage of the forklifts main lifting cylinder(s). The digital indicator converts the pressure signal to a calibrated weight display of lifted load.

System accuracy for this method is approximately 2% of the lift truck capacity, for a 5000 lb lift truck, the reading will be within +/- 100 lbs from 0 to 5000 lbs. There are a number of things that have an effect on the systems accuracy, such as hydraulic system pressure, fluid viscosity and temperature, mechanical friction, and leaking seals and valves. Lifting and weighing in the same manner (speed and height) each time is mandatory for the most accurate readings.

Installation:

Lift trucks vary in their configuration from model to model and manufacturer. The installation of the Indicator and sensor is general and a qualified technician may find another means to install the scale. In any installation, the safety of personnel & equipment must be of primary importance.

To achieve the best accuracy possible (+/- 2% lift capacity), the unit should be in good mechanical and hydraulic condition. The lifting system must be checked for leaks, fluid levels, any worn or bent mast slides, worn rollers and bearings, leaky or worn hoist piston and ram seals. Insure that mast slides are clean and lubricated.

The pressure sensor range is 0 to 5000 PSI. The sensor must be connected somewhere between the lift valve and the lift cylinder(s). The sensor must sense the pressure that is in the lift cylinder, so watch out for any pressure bypass valves. The sensor has a 1/4 inch NPT male thread. It needs to be mounted on at least a 2 foot hose that is T'd off the main line. This will keep high temperature fluid away from the sensor. The hose can be as long as needed and for outdoor installations, locate the sensor in a place that allows the sensor to warm in freezing weather. Bleed any air in the attached line.

Connection: Green to top, Red middle, Black bottom terminal

Mount the digital indicator in a location that does not interfere with fork lift operation, but allows the operator to see and use the unit. The power line can be attached to 12 or 24 volts.

Be sure the resistor is in line with the red power line if using a 24 volt OR higher power source
Attach the black line to battery negative and the red wire to battery positive. A connection directly to the battery is best to avoid electrical noise interference.



Preliminary Testing and Calibration:

The pressure sensor must be in the first stage on a truck that has multiple telescoping lift cylinders.

A weighing height must be established for setting zero as well as weighing all loads. The key to accurate weights is in the repeatability of weighing at this position. One procedure is to lift then lowering a few inches to the set the height however, if lifting to the height without lowering gives better results then do it that way.

You will need to have a known weight available that is evenly distributed on the pallet the weight should be at least 40% of the lifts capacity.

1. Be sure the mast is not tilted then raise the forks to about 16 inches above ground level
(On front end loaders, the height should be around eye level).
Use a piece of tape to make a mark on the mast and carriage so the height can be easily repeated.
2. Lower the lift back to the ground then lift 2 inches over the tape marks, then jog down to the marks.
3. Power off the display, press and hold the PRINT button then power up the display.
When the display shows ----- release the PRINT button.
Press and release the TOTAL button.
Press the ZERO button until the display shows zero (this sets the zero reference)
4. Lower the lift and pick up the test load
Raise the load 2 inches over the tape marks, and then jog down to the marks.
Allow the pressure to settle for about. 5 seconds.
- 5: Set the display indication as close as possible to the test weight value.
Pressing and/or holding the TOTAL button will decrease the display
Pressing and/or holding the PRINT/+ button will increase the display.
Note: Press Re-Weigh for coarse adjustment, and Lock/Normal for fine.
The display may be changing by itself due to hydraulic bleeding so perform this as fast as possible.
Turn the power OFF and then turn it back on for repeatability testing.

Repeatability test:

1. Lower the forks and remove the load, lift the empty forks above the marks then jog down.
Allow the weight to settle then press the ZERO button to show 0.
2. Repeat step 1 to see if the zero returns to within 2% of the lifts capacity.
Be sure there is no tilt and you are weighing at the same position every time.
If the readings are not repeatable try a different method of lifting to the weigh marks.
Determine the best method for repeatability.
It is not critical how the loads are lifted as long as the same procedure is done every time.
3. Lift a known weight load in the same manner as determined in step 2 and allow the weight to settle.
This takes 3 to 7 seconds for the numbers to pause, read the weight during this pause.
Lower and repeat a few times to determine if the load repeatability is within 2% of lift capacity.
4. If the numbers repeat but the weight is not correct, then proceed to "**Final Calibration**".
If the weight is correct, then review the "**Operation**" instructions.



Final Calibration:

Adjusts the displayed weight reading to match the test weight load to within the tolerance limit. This procedure should be done when hydraulic or mechanical changes or repairs are done to the lift.

1. Turn the power off, press and hold the PRINT button while turning the power on.
When the display shows ----- release the PRINT button.
Press and release the TOTAL button.
Lift the empty forks to the weigh position.
Press the ZERO button until the display shows zero.
- 2: Lower the lift and pick up the test load to the lift mark using the procedure for best repeatability.
Allow the pressure to settle and wait for the pause.
Pressing and/or holding the TOTAL button will decrease the display
Pressing and/or holding the PRINT/+ button will increase the display.
Note: Press Re-Weigh for coarse adjustment, and Lock/Normal for fine.
The display may be changing by itself due to hydraulic bleeding so perform this as fast as possible.
Turn the power OFF and then turn it back on, the scale is ready to use.

Operation:

Allow the hydraulics to warm up for a few minutes prior to use by raising and lowering the lift. With no load on the forks lift using the best method for repeatability to the weigh marks. Press the ZERO button to set the zero reference; this may change after several lifts. Setting zero should be done occasionally to ensure the empty lift weight is zero.

Use the scale system in the same manner that was determined during repeatability testing. REMEMBER—CONSISTANCY IS THE KEY TO IMPORVED ACCURACY.

LOCK mode when activated will freeze the display when the weight becomes stable. Lift a known weight a few times to verify proper weight results. The lock feature is active when the weight is over a trip-point weight value. The lock feature resets and updates to the current weight when the weight is below the trip point.

Pressing the RE WEIGH button will cause the LOCK mode to reset and lock on the next stable weight without having to go below the trip-point. Parameters 4, 7 and 8 are used to alter the LOCK-ON mode.

Total weight display shows the accumulated total of lifted weights.

1. Press the PRINT button to add the current displayed load weight to the total.
2. The display will show ----- until the PRINT button is released, then the TOTAL for about 3 seconds.
3. Press the TOTAL button to view the total.
4. To CLEAR the total, press and hold the TOTAL button while momentarily pressing the ZERO button.

Troubleshooting

The sensor wiring is from top to bottom in order: Black - Red - Green

Output is 0.5 volts to 4.5 volts DC for a 0 to 5000 psi range.

Black to Red = 5 volts.

Black to Green with no pressure should read 0.5 volts.

Black to Green with pressure applied voltage should increase and be stable when the pressure is stable.



Scale Parameters

With the power off, hold the UP ARROW button and turn the power on.

The display will show all dashes (-----).

Press and release the LOCK/NORMAL button.

The display will show 00-nn (00 parameter number, "nn" current setting for the selected parameter)

- 1 To change the value use PRINT to increase or TOTAL to decrease.
- 2 To go to the next parameter, press the LOCK/NORMAL button
- 3 Repeat steps 1 and 2 for all menu parameters.
- 4 When finished, press the ZERO button to return to the normal display mode.

FACTORY SETTING OF PARAMETERS

- 00 = 00 Lb or Kg display units 00 LB light is on 01 KG light is on
- 01 = 02 Sample / Update rate. (Having continuous data ON parameter 9 slows down update rate).
1 is the slowest and most stable update rate, 7 is the fastest update
- 02 = 10 Display graduation size. (Capacity > 60,000 must have a graduation of 10 or higher)
Set from 01 to 50 (Forklift setting is normally 10 and loaders 50)
- 03 = 99 Overload trip-point in hundreds of graduations.
5,000 by a graduation of 10, a setting of 05 would cause the overload to activate at 500.
Set to 99 if no overload point is desired, Set to 00 for a 10,000 graduation overload.
- 04 = 01 Motion window, graduations for no motion **(affects lock-on-weight feature).**
- 05 = 00 Mode of operation:
00 = Normal mode all buttons active
01 = Normal mode and Zero & Reweigh button only active
02 = Power up in Lock-On-Weight mode all buttons active
03 = Power up in Lock-On-Weight mode and Zero & Reweigh button
- 06 = 00 Decimal point position (02 will show as 0.00)
- 07 = 50 Automatic Lock-On-Weight trip point (grad < 10 entry x 1, grad > 10 entry x 10)
- 08 = 04 Automatic Lock-On-Weight delay (over 07 = nn delay number of display updates then lock).
- 09 = 00 Printer OR Continuous data output **Set to 10 or 11 to disable the print button**
Wire cable direct to main board or ask for data output kit.
00 = Printer output of displayed weight only to EPSON TM295 or other Epson printer.
01 = Same as 00 without the EPSON format codes
02 = Printer output of gross tare and net with EPSON printer codes.
03 = Printer output of gross tare and net without EPSON format codes.
04 = ELTRON form recall TARA for displayed weight print
05 = ELTRON form recall TARAGTN for gr/tr/nt print
10 = Continuous output of displayed weight PRINT/TOTAL DISABLED
11 = Continuous output of gross tare net PRINT/TOTAL DISABLE

Printer connector pins: Pin 3 is data to the printer Pin 5 is ground