KEEPS YOU GOING.

LIFTTRUCK WEIGHING SYSTEM

OPERATING MANUAL

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Read instructions carefully!

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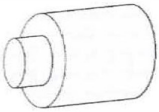
TVH is a supplier of after-market spare parts and accessories that are suitable for the maintenance and repair of OEM equipment.

1. INTRODUCTION

Rinstrum R320 weight indicator, with two pre-wired cables, power fuse and mounting bracket



Pressure transducer (has JIC/UNF 9/16-18 hydraulic connection)

Fork height labels

Operator guide (plus this operating manual)

1.1. Explanation of the weighing system

The hydraulic pressure in the forklift's main lift line is directly related to the weight loaded on the forks. This means that the weight can be determined by measuring hydraulic pressure and performing some calculations.

The process is:
1. The hydraulic pressure is measured using a pressure transducer (installed in the main lift line).
2. The indicator reads the signal from the pressure transducer. It then converts the measured pressure to weight (in kg).
3. The indicator displays the weight to the operator.

Note: It is important that the weight is always measured with the forks at the same height. This increases measurement accuracy. Other items which may affect the measurement are: a mast which is not vertical, old hydraulics or very new hydraulics.

1.2. Specifications

Operating temperature	–10 to 50 °C ambient. Humidity < 90% non-condensing
Storage temperature	–20 to 50 °C ambient
IP-rating	Indicator: IP65; pressure transducer: IP67
External materials	ABS, silicon, nylon, acrylic (halogen free), SS304, 17-4PH SS
Power supply	7 to 24 V_{DC}, 0.5 A_{max}
Power fuse	1 A slow blow, 20 x 5 mm (located behind rear cover of indicator)
Hydraulic connections	JIC/UNF 9/16-18
Rated pressure	5000 psi
Outputs	RS-232 printer output 2 isolated transistor drive outputs (300 mA total at 12–24 VDC)
Battery backed dock/calendar	Battery life 10 years minimum

2. INSTALLATION

Step 1: Connect the pressure transducer to the main pressure lift line.
- The pressure transducer has a JIC/UNF 9/16-18 hydraulic connector (for use with JIC/UNO 9/16-18 fitting).
- Connection can be made where convenient. There may be a spare socket on the manifold, or it may be necessary to drill/tap into the manifold, ram or other fitting.
  Caution: When drilling and tapping, ensure that no waste enters the hydraulic system.
- The pressure transducer can be mounted directly or via a length of hydraulic hose. It should be mounted securely and in a location where it is unlikely to be damaged.
- Ensure that all air is bled from the hydraulics.

Step 2: Mount the indicator.
- The metal mounting bracket can be removed from the indicator for easy installation.
- Mount the indicator where the operator can comfortably use it.

Step 3: Connect the pressure transducer to the indicator.
- Plug the 4-pin connector (pre-wired to the indicator) into the pressure transducer.
- Route the cable where it can be secured and is unlikely to suffer damage. Bundle any excess cable.
- Restrain the cable securely (with cable ties). Vibration can damage loose cables.

Step 4: Connect power to the indicator using the 2-wire cable.
- Suitable power: 7–24 V_{DC} (maximum current: 0.5 A).
- Wire colours: red: positive, black: negative.
- The power wires can be connected directly to the main battery, to a circuit in the forklift ignition, or any other circuit with suitable power.
  Note: The indicator contains a fuse inside the rear cover of the indicator.
- If suitable voltage is not available, a voltage converter should be installed to produce a voltage within range.
- Route the cable where it can be secured and is unlikely to suffer damage. Bundle any excess cable.
- Restrain the cable securely (with cable ties). Vibration can damage loose cables.

Step 5: Apply the fork height labels.

- These labels must be clearly visible to the operator. They mark the height where weighing will occur.
- Labels 1 and 2 are attached to the fixed mast. ▶ is attached to the moveable mast.
- ▶ 1 should mark a height where the forks are 400–800 mm off the ground.
- ▶ 2 should mark a location approximately 200 mm lower than ▶ 1.

Step 6: Apply the operator label.
- This label should be applied where the operator can read it while operating the forklift.

Step 7: Calibrate the scale.
- Follow the instructions in “Calibration” below.

3. CALIBRATION

Before calibration, switch the indicator off and on again (see the operator guide).

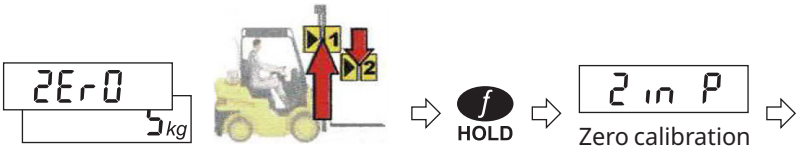
Step 1: Start calibration process

Hold both keys for 2 seconds.

Step 2: Enter the scale capacity (<u>the maximum load</u> of the forklift)

Press **ADD** until the correct scale capacity is shown.

Step 3: Do zero calibration



Lift empty forks to ▶ 1, then lower slowly to ▶ 2 (as per normal weighing).

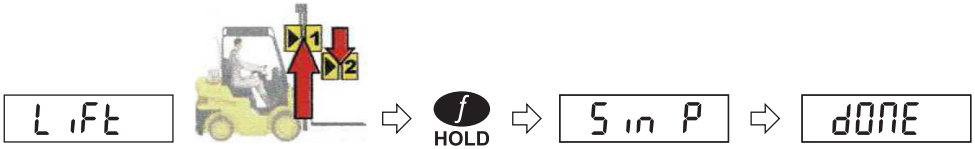
Zero calibration in progress.

Step 4: Enter the weight of the test weight

Enter the weight of the test weight.

Move cursor: **SELECT**. Edit digit: **ADD**

Step 5: Do span calibration



Load test weight onto forks. Lift forks ▶ 1, then lower slowly to ▶ 2 (as per normal weighing). weighing).

Span calibration in progress.

Calibration is finished.

4. CONFIGURATION MENU

The indicator has a menu system which holds several key settings (see the list of settings below). For most applications, these settings do not need to be changed.

Step 1: Enter the menu

Hold ⏻ + **ZERO** for 2 seconds. ⇨ If a passcode has been set, it will need to be entered. Use **SELECT** and **ADD** to enter the passcode, then press **HOLD**.

Step 2: Choose a setting

Press **ZERO** repeatedly until the required setting is shown.

Step 3: View/edit the setting

Press **TOTAL** to view the setting. ⇨ If required, edit the setting using **SELECT** and **ADD** ⇨ Press **HOLD** to close the editor.

Step 4: Exit the menu

Hold ⏻ + **ZERO** for 2 seconds.

Setting	Description	Details
OLOAD	Overload count	The number of times the weight has exceeded 150% of scale capacity. Operation: Press "TOTAL" to show the overload count. To clear the count, press "HOLD", "ADD" then "HOLD". To exit without clearing the count, press "ZERO".
UNITS	Weight units	Default: kg
SCALE	Scale capacity	Default: 5000 kg. *Note: Also set during calibration.*
RES	Scale resolution	Default: 10 kg. *Note: Also called "division size".*
FILTER	Weight averaging	Weight readings are averaged to get a stable weight. Default: 1.0 s
Z.BAND	Zero band	The maximum weight which is considered to be 0. Default: 20 kg
AC.BAND	Acceptance band	Used by the filter/hold system to ensure valid weights. A valid weight must be within AC.BAND for time AC.LEN. AC.BAND default: 5 kg / AC.LEN default: 2.0 s
AC.LEN	Acceptance length	
PRINT	Printout format	Default: Single. *Note: Used with printinq only.*
PAPER	Paper out detection	Default: Off. *Note: Used with printing only.*
CLOC	Set date/time	*Note: Used with printing only.*
PCODE	Passcode	A passcode can protect entry to the menu and calibration. Default: 0 (disabled)
TEST	Signal test	Show pressure transducer signal (in mVN).
DEF.ALL	Default all settings	Operation: Press "TOTAL", "ADD" then "HOLD". *Warning: This will reset calibration, settings, totals, etc.*
-END-	Menu exit	

5. INDICATOR OPERATION

Power ON: Hold ⏻ for 1 second

Power OFF: Hold ⏻ for 4 seconds

Weighing

If indicator isn't ready, lower the fork to the ground for a few seconds.

Lift forks to ▶1, then lower slowly to ▶2

After a few seconds, the weight will be held and H will appear.

Add weight to totals

Weigh as normal (described above).

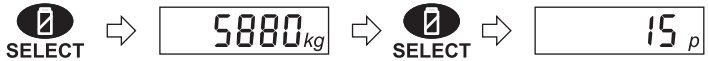
Add weight to the total.

The display will show "ADD", then the ttal weight.

Clear Totals

Hold ADD for 2 seconds. ⇨ CLEAr

View total weight (and number of pallets)

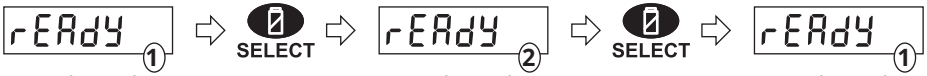


Total weight

Total number of pallets

Note: Total display will automatically cancel after 5 seconds.

Switch between the 2 truck totals



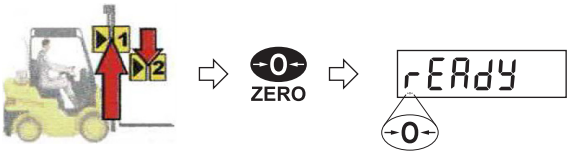
Truck total 1

Truck total 2

Truck total 1

Note: The indicator keeps 2 separate totals. These can be used to totalize 2 trucks at the same time (or 2 axles on a single truck).

Reset Zero



Manual weighing
The indicator has an additional weighing mode called “Manual weighing”

Operation:
- Hold the “Hold” key for 2 seconds to enter (and exit) this mode. Display will show “HOLD” when switching to manual weighing (or “FILTER” for normal weighing).
- Press the “Hold” key to hold the weight. Press the “Hold” key again to un-hold.
- All other operations remain the same in this mode (including totalizing).

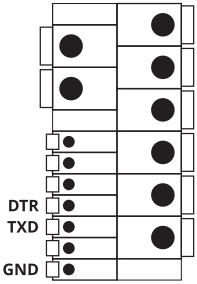
6. ATTACHING OTHER DEVICES

There are 2 types of additional devices which can be attached to the indicator:
- docket printer, and
- overload alarm (such as a buzzer or warning light)

Attaching a printer

The indicator can drive most RS-232 docket printers. It can be set to print individual pallets and total weight, or total weight only.

Remove the rear cover of the indicator to access the connections.



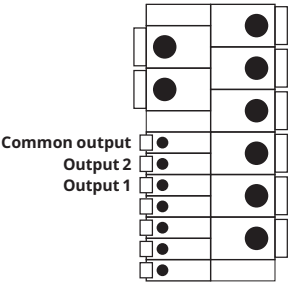
Indicator	Printer	DB9-M Pinout
TXD	RXD	3
GND	GND	5
DTR	DTR	4

Note: DTR is used for paper out detection

Attaching an overload alarm

An output switches on when the weight exceeds scale capacity. This can be used to alert the operator by connecting a warning light or buzzer.

Remove the rear cover of the indicator to access the connections.



Indicator	Connect to
Common output	12–24 V_{DC} power
Output 1	Alarm +

Alarm	Connect to
Alarm +	Indicator: output 1
Alarm –	0 V_{DC} power

7. CARE AND MAINTENANCE

This weighing system is designed to run for many years with very little maintenance. However, to maintain accuracy, it is recommended that a calibration schedule be followed.

Calibration schedule
It is recommended that:
- A zero is performed regularly (as per operator guide). It requires less than 1 minute and can be done each day before use.
- A calibration is performed every 12 months (see the Calibration section).

Cleaning
Wipe the indicator with a soft cloth slightly dampened with warm soapy water. Never use harsh abrasive cleaners or solvents.

Disposable, protective front covers are available for the indicator. These are used in particularly dirty applications (i.e. environments with concrete dust, paint spray, etc).

8. INDICATOR ERRORS AND TROUBLESHOOTING

System/hardware errors

Error	Description	Resolution
E0001	The power supply voltage is too low.	Check supply/cable
E0002	The power supply voltage is too high.	Check supply/cable
E0010	Temperature error	Check location
E0100 E0200	The setup or calibration has been lost.	Re-calibrate
E0400	The factory information has been lost.	Return for Service
E0800	The EEPROM memory storage chip has failed.	Return for Service
E2000	ADC Out of Range error	Check transducer/cable

Note: These errors are summed and displayed in hexadecimal (A: 10, B: 11, etc).

User/interface errors

Error	Description
ER.SPAN	Span calibration has failed because: • insufficient weight was loaded during the span calibration, or • menu option RES is too low or too high, or • the pressure at the entered scale capacity is beyond the measurement limit. Check the settings and re-calibrate.
MAX.CNT	The number has exceeded the maximum value possible.
STABLE ERROR	The indicator timed out while waiting for the weight to become stable. Retry.
ZERO ERROR	Zero has failed because the weight was outside the valid range. Ensure that there is no load on the forks and retry.
------	The operation you have requested is not available.
O.LOAD U.LOAD	The weight on the forks is over or under the valid range. Decrease/increase the load on the forks.
ENTRY DENIED	The passcode was entered incorrectly. Retry.

Troubleshooting

Problem	Items to check
The indicator will not start	• Check the fuse. It is located inside the rear cover of the indicator. • Check the power wires (check the voltage at the indicator). • There may be a fault with the transducer. Unplug it.
The indicator buzzes continuously	• The indicator buzzes to signal overload. Re-calibrate (as described in the Calibration section). • The pressure transducer or its wires may be faulty. Check the signal (under various loads) using “TEST” in the menu.
The indicator does not measure accurately	• Reset Zero (as described in the Indicator Operation section). • Ensure load is completely free of the ground when measuring. The forklift should not be moving, and the mast should be vertical. • Re-calibrate (as described in the Calibration section). • For forklifts with multi-stage masts, ensure that only the first has moved when weighing (otherwise the weight of other masts may be added). • Hydraulics are less consistent when new or very old.
Indicator is not “READY”	• Reset Zero (as described in the Indicator Operation).

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