ED2-400 Series SkidWeigh

Automatic Check Weighing for Material Handling Vehicles

&

Real Time Vehicle Under Utilization Visual Warning / Recording

Ver.120706-22

Material Handling Vehicle On-board Freight Weight Verification
With Vehicle Under Utilization Visual Warning/ Recording

The **ED2-400 Series SkidWeighs** are automatic heavy duty forklift checks weighing/vehicle under utilization visual warning systems used to verify load weights on the move.
This is not a "*Legal for Trade*" weighing scale, but an economical on-board check weighing systems. The installed system will allow your lift truck operator to increase vehicle utilization, increase productivity, provide operator safer working and display and verify the freight load weights. The load weight readout accuracy is within +/-0.5% to +/-1% of the vehicle's lifting capacity.
Example: Lift truck vehicle, lifting capacity 4000 pounds, the freight load readout accuracy will be within +/- 25 to 40 pounds.

To obtain a load weight readout the lift truck operator is to lower the loaded forks to the ground, wait until the indicator **MODE** shows the number **8** and then, **just lift the load above the ground**. Within 3-5 seconds the load weight will be displayed. This load weight will be shown on the display until the next time the load is being lowered.

Proper Operator Procedure for Weighing Loads
(Automatic Load Weighing Cycle)

1. Insert the forks into the pallet or under the product to be weighed and lower the forks. Make sure that the pallet is positioned all the way on the fork's carriage. The number **8** in the **MODE** display must be shown before you initiate a "**Load Weighing Cycle**". If the number **8** is not shown on the indicator**, *lower the forks to the ground***!

2. When the **MODE** number **8** is shown on the indicator, lift the loaded forks 2-3 inches (Up to 10 cm) above the ground. You must activate the lift control valve the same way that you normally do when picking up the loads. ***Do not attempt to slow down this operation. Do not start to tilt the load in any other direction and do not lift the load to different heights.***

3. As soon as the load has been lifted, the digital display will go blank for a moment and then the weight value of the lifted load will be displayed. This load weight will be displayed on the indicator until the next time the forks are being lowered to the ground.

4. Vehicle under utilization visual warning time out will be initiated when vehicle is operating under the utilization factor and will be shown on LED display to the operator. Optional recording in real time of all under utilization events.

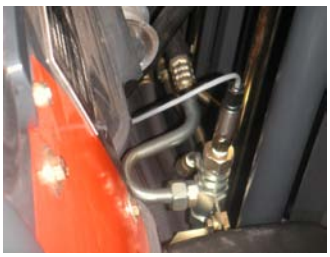
Mounting Location for Digital Indicator

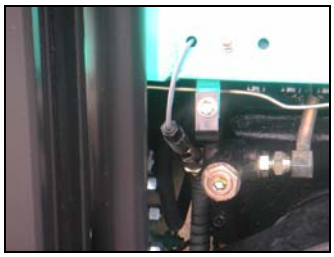
Install the mounting bracket with the anti-vibration mount and fasten the digital indicator on the vehicle's dashboard or side railing, preferably on the right hand side.

Anti-vibration mount, ¼"-20 UNC (25 x 20 mm, vulcanized rubber, Duro5) supplied with every kit

Pressure Transducer Installation

1. The pressure transducer body has a male port ¼"-18 NPT. Standard cable length is 6' (1.5 meters).



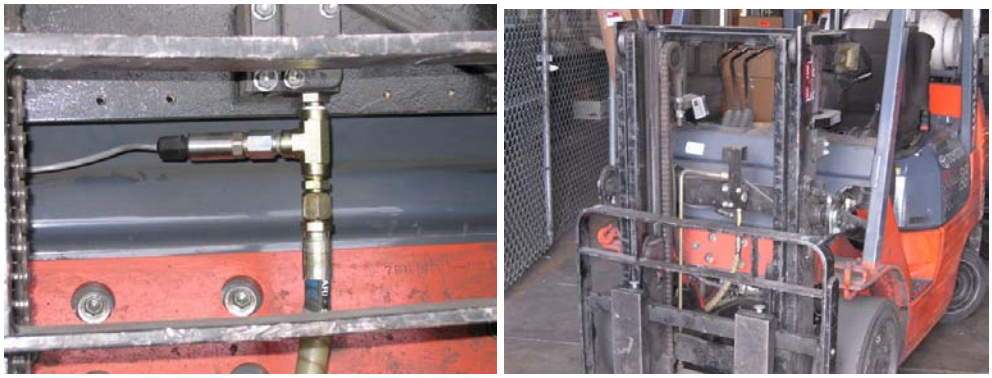


2. The pressure transducer must be installed in the **hydraulic line between the lift control valve and the lift cylinder(s).** Vehicles equipped with hydraulic accumulator would require different software. Send digital indicator back to IVDT Inc. and we will change software at no charge to you.

3. The majority of pressure transducer installations into the vehicle hydraulic system will require some kind of T- piece to be connected in the lifting hydraulic line.(See picture bellow)

4. In addition to the T- piece installation method, the pressure transducer can be installed in the flow divider - either in the spare plug or by drilling and tapping for 1/4”-18 NPT in the flow divider body or at any ”larger elbow”, as long as it is in the vehicle lifting hydraulic line.

5. Make sure that the installed pressure transducer will not touch any moving parts or the assembly of the forklift or any other material handling vehicle when the vehicle is in normal operation.



Example of the pressure transducer installation / digital indicator on Toyota forklifts with short mast

Seven Wires Single Cable

(From March 2006)

Electrical connections *(For Vehicle Input Voltage's from 12 to 55V DC)*

RED Wire of pressure transducer cable to RED WIRE of the 7 wires cable from the indicator
BLACK Wire of pressure transducer cable to BLACK WIRE of the 7 seven wires cable from the indicator
WHITE Wire of pressure transducer cable to WHITE WIRE of the 7 wires cable from the indicator

ORANGE Wire (+) Connect to ignition switch "ON" position. (12 to 55 V DC)
BROWN Wire (-) Connect to battery negative (Electric motor powered vehicles) or to the vehicle chassis for combustion engine powered vehicles.

Note: There is no additional wiring or any other sensor connection for the vehicle real time under utilization visual warning shown on LED display.

Digital Indicator Calibration / Setup Two Keys Description

Upper Right Key Labeled **"M"** (Calibration / MODE key)
Lower Right Key Labeled **"⇑"** (0 – 9 numerical increments input key, utilization factor)

MODE **Five Digits Load Weight Readout Display**

8	**Digit 5**	**Digit 4**	**Digit3**	**Digit 2**	**Digit 1**

Note: Both keys, **M** and ⇑ are used only during the system calibration/set up mode. They can be accessed through two small holes on the polycarbonate cover. (*Use a paper clip to activate the keys*)

- The left most significant digit represents the **MODE** of operation
- The five other digits represent the load weight readout

Calibration / Setup Procedures Concept

The **ED2-400 Series** SkidWeigh / Freightweigh systems calibration/setup procedures are very simple. The system utilize only two buttons and few steps to complete the automatic calibration of the empty forks being lifted just above the ground and automatic calibration of the known load weight being lifted just above the ground.

Note*: At any point if you make a mistake, for whatever reason, turn the power to the system OFF / ON and start all over. All final calibration and set-up values will be automatically stored after the calibration/setup procedures are finished. If power to the ED2-400 Series is disconnected the calibration and set up information will NOT BE LOST.*

- The **ED2-400 Series** system has to be calibrated with a known load weight
- Use the customer's floor scale or find a known load weight within the operating facility
- Keep that known load weight nearby to complete the calibration
- For best results, use at least 30% to 50 % known load weights of the particular lift truck's lifting capacity**.**
- **Example:** *For 3000 pounds lifting capacity of the vehicle, use at least 1500 pounds or close to that load weight to be used to calibrate the system.*
- **Note:** If you want the system to show load weight in pounds; use the known load weight in pounds and enter that value accordingly. **The same would apply if you want the weight display to show in kilograms. Use a known load weight in kilograms and enter that value into the system accordingly.**

Starting Point

Every time the power is turned on, the software version will be shown on the right hand side of the display for a brief moment. Example of one of the software version is 10475. When forks are lowered to the ground, the digital display will show number **8** in the **Mode** window.

MODE	Five Digits Load Weight Readout Display				
8					

Calibration of the lifted empty forks

Lower the empty forks to the ground (No hydraulic pressure in the lifting circuit)

- Press the "**M**" key (*Use a paper clip*) and hold it down for 5 seconds.

- After 5 seconds, the **MODE** display digit will show "**0**". This means that the system is ready for **automatic zeroing of the scale.**

MODE	Five Digits Load Weight Readout Display				
0					

- Lift the empty forks or any other attachment **<u>just above the ground</u>.** *(Activate the lift control valve, as you would do during the normal lifting operation. Do not attempt to activate and lift the empty forks slowly)*

- Wait a few seconds, the display will go blank and then it will show **0** or any other number in the furthest right digit display.

MODE	Five Digits Load Weight Readout Display				
1					0

Automatic zeroing of lifted empty forks (or any other attachment) is done!

Calibration of the lifted loaded forks

(Example: Known Load Weight is 1500)

- At this point, drive the vehicle into the skid with a known load weight. (If this is a typical pallet with known weight, make sure that the forks are in the pallet and are ***<u>lowered to the ground</u>***
- Start entering a known load weight into the digital indicator. The first value of the known load weight can be entered by pressing the "⇑" key.
- The number will increment from 0 to 9 and will wrap around.
- To enter a second digit from the right, press the "**M**" key and the **MODE** digit will increment to 2.
- Keep pressing "⇑" to enter a second value of known load weight.
- Repeat this procedure until the **MODE** digit display is showing **5**.

Note: In our example known load weight is 1500. *Make sure that you enter **0** in **MODE 5,** since the known load weight has only 4 digits as in our example of 1500*. This value of 1500 could represent kilograms or pounds.

MODE	Five Digits Load Weight Readout Display				
1					0
MODE					
2				0	
MODE					
3			5		
MODE					
4		1			
MODE					
5	0				

- Before going to **MODE 6** please make sure that the "Known load weight" (in our example, 1500 pounds or kilograms) is ready to be lifted. The loaded forks must be on the ground (No hydraulic pressure in the lifting hydraulic circuit).

- Press the "**M**" key to advance to **MODE 6** and immediately lift the "known load weight" just above the ground.
- *(Activate the lift control valve, as you would do during the normal lifting operation).*

MODE	Five Digits Load Weight Readout Display				
6					

- The display will go blank. Wait a few seconds. *(Do not move forks, do not tilt or activate side shift lever)*

- Within a 3-5 seconds the display will show the value of the calibrated "known load weight", in our case 1500. If you lower the load to the ground system will go automatically into operational mode.

- Number 8 will be shown in the MODE window. System is ready to be used!

System Weigh Calibration Function Is Finished!

From this point on, the system weigh calibration/setup has been successfully done and all the calibrating parameters are saved and will not be lost when the power to the system is turned off. The display will show the load weight value until the forks are lowered to the ground. When the forks are lowered to the ground, the display will automatically reset and the system will go into **MODE 8** ***which is a starting point for all load weighing cycles.***

Keep in mind that if another weighing cycle is not to be initiated, but the vehicle is in motion or the forks are lifted during normal operation, the hydraulic pressure "spikes" will be introduced and some random readout value on the digital display will be shown. The value displayed might be 0, 10, 20, etc. This readout value does not represent the load weight, but is only a readout value due to the hydraulic spike when vehicle in motion.

Lift Truck Under Utilization Visual Warning/ Recording Feature

(* Factory set default value for ED2-400 Series)

The **ED2-400** Series, version 10475 SkidWeighs or any other models with such feature will provide the lift truck operator with visual warning when vehicle operating under utilization factor.
(Factory set default utilization factor value can not be changed by the end user)
**Consult IVDT Inc. for the utilization factor for your material handling operation*

Lift truck Under Utilization Visual Warning/ Recording Feature

(End user programmable utilization factor, ED2-400-01 Series)

All **ED2-400-01** Series SkidWeighs or other models with "End user programmable utilization factor" feature must be specified when ordering.
This **Mode 7** will come up automatically on the ED2 SkidWeighs when mode 8 is shown on LED display and arrow up (↑) key is pressed and hold down for 5 seconds.

(As of example, we want to change or enter new utilization factor for your operational facility)

MODE	Five Digits Load Weight Readout Display				
7					**0**

- Using the arrow up key "⇑", enter the new "**Utilization factor**". In our example it's a value 50. You will note that the **MODE 7** digit remains throughout this operation. (Make sure that 4th 5th and 6th digit is entered as 0)

MODE	Five Digits Load Weight Readout Display				
7					**0**

MODE					
7				**5**	

MODE					
7			**0**		

MODE					
7		**0**			

MODE					
7	**0**				

On the last shift, (Utilizing "**M**" key, left shift) the **MODE 7** digit will turn off. The new "**Utilization factor**" will be successfully stored in the memory.

MODE	Five Digits Load Weight Readout Display				
7	**0**	**0**	**0**	**5**	**0**

The entered value of 00050 will be shown briefly on the digital display and the unit will return to the normal operational **MODE 8**.

MODE					
8					

The system calibration and the new "Utilization factor", if applicable are successfully stored in the memory

ED2-400-DL Series with USB data logger
Vehicle under utilization count down shown to the operator

ED2-400-DL Series with USB data logger
Vehicle under utilization visual warning shown to the operator

Accumulative Freight Load Weight Function <u>without Onboard Printer</u>:

Left Button (Black): Accumulative function for load weights

Every time the **<u>indicator shows the load weight</u>** and the **<u>left button</u>** is pressed, the load weight will be added into a weighing counter and will show the current total weight of all load weights entered in the counter. *(A quick "blink" on the display indicates that the current load weight has been added into the counter.)*

To reset the current load weighing counter, press the **right button**. This will reset the current total and the cycle will start all over.

Right Button (Red): Reset

Note: Weight loads can be added only while the indicator shows the current load weight. If the load weight is lowered and **Mode 8** is shown on the display, the last load <u>weight will not be added</u> even if the **left button** is pressed.

The maximum number of load weights entered into the accumulative counter is 40. If 40 loads have been reached, the display will show the current total weight of all 40 loads weight entered. <u>This current total weight will stay and "flash" on the instrument display for a moment.</u> The current accumulative counter of all 40 loads weight will be reset automatically and you can start the new cycle again.

Accumulative freight Load Weight & Printouts with Onboard Printer:

Left Button (Black): Accumulative Function for load weights
Right Button (Red): Print/Reset

Every time the indicator display shows the load weight and the **right button** is pressed, the current load weight ticket will be printed and the system load weight counter will be RESET.

Example of single load weight being printed:

IVDT Skidweigh
4380

Every time the indicator shows the load weight and the **left button** is pressed, the load weight will be added into a load weighing counter. It will also show the current total weight of all load weights entered in the load weight counter. *(A quick "blink" on the display indicates that the current load weight has been added into the counter)*

At any point you can obtain a ticket for all entered load weights stored in the load weighing counter by pressing the **right button**. The printout will show all individual load weights and total weight. As soon as you lower the forks and the last load weight is no longer on the display, the system will be RESET.

Example of two load weights added in the weighing counter and being printed:

IVDT SkidWeigh
#01 = 01550
#02 = 01000
TOTAL = 2550

The maximum number of load weights entered into the accumulative load weigh counter is 40. If the number of 40 loads has been reached, the display will show the current total weight of all 40-load weights entered. This current total weight will stay and "flash" on the instrument display for a moment. The current accumulative counter of all 40 load individual weights and total weight will be printed out. The system will reset automatically and you can start the new cycle again.

Example of 40 load weights added in the weighing counter and being printed:

IVDT SkidWeigh
#01 = 01550
#02 = 01000

" "

#40 = 01265
TOTAL = 42550

ED2-400 Series with Two Independent Weighing Channels

(Two position push button switches located on the top of the instrument housing)

The ED2-400-2X version of the SkidWeigh or any other models with such a feature has an additional weighing channel that can be used to verify load weights on vehicles operating with other attachments (extension forks, bucket, clamps or lifting container buckets, etc.) Some material handling operations require frequent changes between the “normal forks” and other special attachments. This two weighing channel SkidWeigh is a convenient and time saving way to continue check weighing regardless of the attachment type in usage on the material handling vehicle.

Calibration:

The system has a two-position switch located on top of the indicator housing**. Mode 8** (First Weighing Channel) and **Mode 82** (Second Weighing Channel). In **Mode 8** perform the calibration procedure as outlined for the standard **ED2 Series SkidWeigh**. When finished with calibration of first weighing channel turn vehicle power OFF/ON, and than flip the switch to the **Mode 82.** In **Mode 82** and perform the same calibration procedure as done previously with weighing channel 1., but this time with the other attachment such as “Extension forks or any other attachment” as calibrated weight.

Operator Usage Procedure:

Operating procedures in **Mode 8** (Weighing Channel1) and **Mode 82** (Weighing Channel 2) are the same.

Note: If the accumulative function or the onboard printer is utilized, you can switch between channels as required. The system will automatically add the accumulative weighing loads for both weighing channels.

ED2-400 Series SkidWeigh MODE Description

MODE 8 **Represents Standard Operational "Weighing Cycle Mode"**
MODE 0 to 6 Represents standard calibration mode
MODE 7 Represents Optional "Utilization Factor Input Value Set-up"

MODE	Description	Action	Remarks
8	**Standard "Weighing Cycle Mode"**	Lower the forks to the ground	**MODE 8** must be shown to initiate the weighing cycle
0	**Automatic zeroing of empty forks**	Forks must be lowered to the ground. Lift the empty forks	Lift empty forks just above the ground
1	**Enter first value of known load weight**	0 – 9 numerical increments, use ⇑ key	Press the "M" key to advance to the next MODE
2	**Enter second value of known load weight**	0 – 9 numerical increments, use ⇑ key	Press the "M" key to advance to the next MODE
3	**Enter third value of known load weight**	0 – 9 numerical increments, use ⇑ key	Press the "M" key to advance to the next MODE
4	**Enter forth value of known load weight**	0 – 9 numerical increments, use ⇑ key	Press the "M" key to advance to the next MODE
5	**Enter fifth value of known load weight**	0 – 9 numerical increments, use ⇑ key	Press the "M" key to advance to the next MODE
6	**Automatic calibration mode with known load weight on the forks**	The forks must be on the ground level. Lift the forks with the known load weight	After a few seconds, the display will show the known load weight value
7	**Utilization Factor Input Value Set-up**	Enter utilization factor warning value as per instructions described above.	Applies only for systems with the optional end user utilization factor input

Troubleshooting

For help with general or miscellaneous problems that you may experience with your ED2 -400 Series SkidWeigh, refer to the following table for the possible solutions.

Problem	Possible cause	Possible solution
MODE 8 digit is not shown on the instrument display when the ignition switch is turned ON	No power to the system	- Check whether the fuse is blown - Check for a bad ground chassis connection - Remove any paint around the ground chassis connection - On electric vehicles, make sure that the “Black wire”, negative is connected to the battery negative, not to the frame of the vehicle
When in **MODE 8** and the forks with the load weight are lifted, there is no weight readout shown on the instrument display	Pressure transducer or wiring harness	- Check all 3 wires connections from the pressure transducer cable - Check the WHITE wire if connection is broken - Check the RED wire - it should have at least 11V DC - Check the pressure transducer for physical damage - Replace the pressure transducer
Weight display shows some random number (Example: 4630) regardless if forks lowered or any weight load lifted	Pressure transducer ground wire (Black wire) is broken or disconnected	- Broken Black wire from pressure transducer - Make sure that the “BLACK WIRE” from the pressure transducer to the wiring harness is connected
All display digits are “flashing” 999999 when the ignition switch is turned ON	The pressure transducer is near saturation (> 2.45V)	-The load weight is too heavy for this vehicle - Pressure transducer damaged
When the known load weight is lifted, there is a “larger weight readout error”	- Follow a proper “weighing cycle”. - Calibration required - Faulty pressure transducer	- Recalibrate the system with known load weight - The system is calibrated in kilograms, but the operator thinks that readout is in pounds or vice versa - Follow the “Standard Weighing Cycle” procedure - Replace pressure transducer
The instrument display shows approx. the same weight readout regardless if the forks are loaded or not	Pressure Transducer	- The white wire (pressure transducer signal output) is broken or not connected - Faulty pressure transducer
When the load weight is lifted display shows the weight value and display is “flashing”	Overload warning	- The preset overload value is too low - Check the overload settings and correct it
The lifted load weights are within the system error of +/- .5 to 1% of the vehicle lifting capacity most of the time; but sometimes a “Larger error might occur”	Follow the proper weighing cycle error	- Make sure that the standard weighing procedures are followed. - When the load weight is lifted, do not move the vehicle - When the load weight is lifted, do not tilt the mast - Replace the pressure transducer
The display will not return to the **MODE 8**, standard weighing cycle	- Forks are not lowered to the ground - Pressure transducer	- Lower the forks (attachment) to the ground (There should be no pressure in the lifting circuit) - Replace the pressure transducer

CE Conformity (EMC) by application of harmonized standards. (NCI printer, pressure transducers)
FCC Conformity (EMC) compliance with Part 15 of the FCC rules.

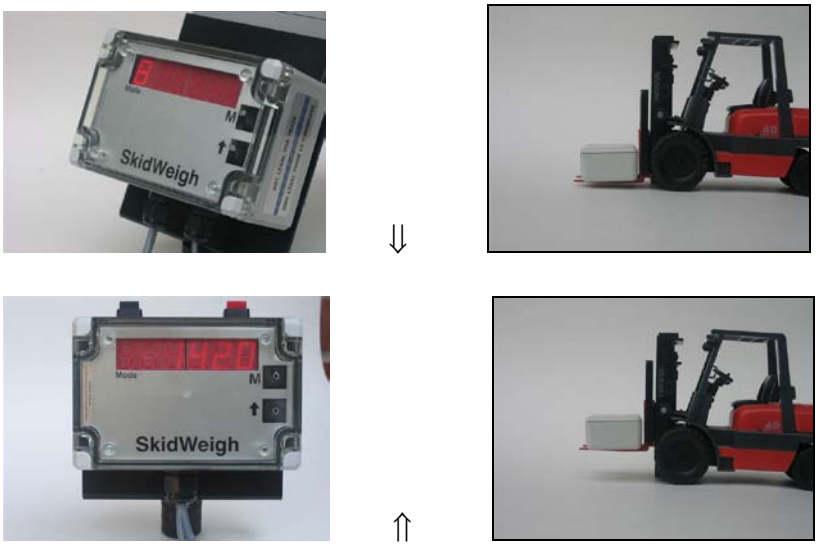
ED2-400 Series SkidWeigh / FreightWeigh

User's Manual *(Vehicle Operator Copy)*

The ED2-400 Series SkidWeigh / Freightweigh are fully automatic lift truck / loader check weighing / vehicle under utilization warning system. These systems are not a "*Legal for Trade*" weighing scales, but an economical onboard check weighing systems that will allow your lift truck / loader operator to determine the load weight readout within +/- 0.5% to +/- 1% of the vehicle lifting capacity.

Standard Weighing Procedure *(All ED2 Series SkidWeigh & Freightweigh Systems)*

1. Insert the forks into the pallet or under the product to be weighed. Lower the forks to the ground. The number **"8"** in the **Mode** display window must be shown before you can initiate a **"Weighing Cycle".** If any other number is shown on display, including 0 on right side, lower the forks to the ground.
2. When the number "**8"** is shown in **Mode** display, the system is ready to weigh the product on the forks.
3. ***IMPORTANT*:** Activate the lift control lever **"quickly" and lift the load just above the ground**. *Do not attempt to lift the load slowly. Do not tilt the load or move the vehicle or lift the load "higher" than just above the ground, within 2" to 3 " (10 cm). (All of the load weighing must be done within the free lift of the vehicle.)*



4. As soon as the load has been lifted, the digital display will go blank for a moment and the load weight value of the product lifted will be displayed. This product load weight will be shown on the indicator until the next time the forks are being lowered to the ground.

*To initiate another **"Weighing Cycle"**, the indicator **MUST SHOW** number "**8"** in the **"Mode"** display window. If the display shows 0, 10, 20 or any other value, you will not be able to take another load weight measurement. Lower the forks to the ground!*

Accumulative Load Weight Function (ED2-AT and ED2-Print Series)

Left Button (Black): Accumulative function for load weights

Every time indicator shows the load weight and the left button is pressed, the load weight will be added into a weighing counter. It will also show the current total weight of all loads entered in the

counter. *(A quick "blink" on display indicates that current load weight has been added into the counter*)

Accumulative Button

Reset / Print Button

Right Button (Red): Reset and print function of accumulative load weights

Every time the indicator shows the load weight and the right button is pressed, the current load weight or current total weight in the counter will be reset. In the case of the system equipped with onboard printer, ***the weight ticket will be printed.*** <u>The last load weight readout will be shown, until forks lowered</u>*.*

Sample of accumulative load weight ticket

#01 = 01200
#02 = 01080
#03 = 01060
TOTAL = 3340

Note: *The maximum number of freight load weights entered into the accumulative counter at the time is 40. If the number of 40 loads has been reached, display will show the current total weight of all 40 loads weight entered.* <u>This current total weight will stay and "flash" on the instrument display for a moment.</u> The current accumulative counter of all 40 loads weight will be reset automatically and you can start the new cycle again. (*The current accumulative counter of all 40 load individual weights and total weight will be printed out when onboard printer is connected*)

Vehicle Under Utilization Visual Warning / Recording Function

Every time the pre-set under utilization factor is reached all LED display will digits will "flash" and show 0's. If the system has been specified to include audio warning, than the buzzer will come on as well. To stop display "flashing" and turn the buzzer off and reset the system turn ignition switch off/on. The **ED2-400-DL** Series has USB data logger and will record all under utilization events in real time.

Explanation for SkidWeigh Weighing Tolerance

Weighing Accuracy is within +/- 0.5% to +/- 1% of the vehicle lifting capacity.

Example: If a lift truck maximum lifting capacity is 3000 pounds; then the weighing readout accuracy of vehicle is within +/- 15 pounds in the lower load weighing range and +/- 30 pounds in the higher load weighing range