User Guide

Weighlog 3030
On-Board Weighing System

Calibration

Issued January 12, 2012

Electro-Magnetic Compatibility (EMC)

This product complies with Council Directive 2004/108/EC when installed and used in accordance with the relevant instructions.

Service and Technical Support

PLEASE CONTACT YOUR NEAREST DISTRIBUTOR. If unknown then fax: 44 (0) 1453 733322

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

Check that the software reference matches that displayed by the instrument.

This manual refers to Software Issue: GC100:Iss01Rev01Lib01

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Contents

1. Overview

The Weighlog 3030 is intended for use on Wheel Loaders, Backhoe Loaders, (loader side), Skid Steer Loaders and Fork Trucks.

It measures, displays and records the net weight lifted, based on sensing the lift system hydraulic pressure, at a set point using a Reference and Direction ("R/D") Sensor.

Pressure sensing is difficult on certain types of equipment due to the design of the hydraulic system. Up to four pressure sensors may be installed, or strain sensing technology may be used instead.

The system enables,

..- ..Automatic Dynamic Weighing Mode with "R/D" Sensor

- *Compensation for variable lift speed (dynamic weighing only)*
- *Static Weighing Mode with "R/D" Sensor*
- *.Static Weighing Mode without "R/D" Sensor (applications include weighing with forklift trucks)*
- *Automatic or Manual Load Entry*
- *Weight Calibration adjustment ("Nudge" function)*

With careful operation, system accuracy can be as good as ±1% of lift capacity although ± 2% is more common in practice.

The head unit has a 4.3" Color Touch Screen plus 4 basic menu keys, and includes the following functions,

- *10 programmable "attachments". Independent configuration (of weighing mode) and weight calibration for each "attachment".*
- *Set Zero (Tare) Weight*
- *Target Weight and "Accumulated Weight" displays*
- *Clear Last Weight Entry ("**CE-1**")*
- *30 Product Memory Stores*
- *30 Customer Memory Stores*
- *Grand Total*
- *Blend (Mix) Mode (with 5 "Mix" stores).*
- *Customizable Store Names and Screen Icons*
- *Automatically print a load summary ("Job Record") when resetting for next Load*
- *Printing load data including Product, Customer and Batch Mix Tickets*
- *Saving load data to USB Flash Drive / SD Memory Card*
- *Data Logging (RS232 serial ASCII output to suitable logging device)*
- *Overload Alarm*
- *Diagnostic mode and Error Log*

1.1 Menu Navigation

1.1.1 Keys

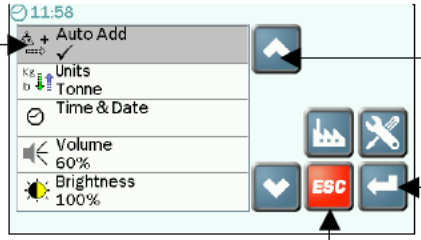
- *HOME* *Return to the Main Operating Screen from any other screen.*
- *SETUP* *Select the Setup Menu for weight calibration and other system settings.*
- *ESCAPE* *Return to the previous screen / Delete the Last Weight Entry ("**CE-1**").*
- *ENTER* *Confirm a setting / Enter a weight reading (same function as the Remote Load Enter Switch).*

1.1.2 Touchscreen

DO NOT use a sharp-pointed object - the screen may be damaged beyond repair !

Touch once to select from a list.

Double-touch to select and confirm a setting.



Swipe the list or touch to scroll up and down

Confirm a setting

Exit screen without changes

2. *Full Setup Routine (Initial Setup)*

If the instrument is not previously set up, the ""Full Setup" routine appears. This routine can also be selected via the "Factory" calibration menu. Follow the steps in the routine, referring to Section 4 as required;

Load from USB? 

Insert USB Memory device. Hold ESC *and press the On/Off switch to upload complete software, including language file.*

Choose Language	*Insert the USB Memory device containing the Language File.*
Choose Units	-
Main Functions	*Select the functions that appear on Main Operating screen (4.1.1).*
Logging Options	*(4.1.2) Note: "Port Setup" may need to be re-configured for a non-Loup printer.*
Sensor Setup	*(4.2.1)*
Configure "Attachments"	*Enable up to 10 "Attachments" (4.2.2).*
Enable "Auto Add"	-
Overload Alarm	-
Brightness	-
Volume	-
Instrument ID	*Program the text that will appear at the top of the Printouts (4.1.5).*
Save to USB	*A complete software backup with all calibration settings <Alpha10All.hex> and <Alpha10Mvm.hex>*
Set Time / Date	-
Restart	*Instrument reboots to the Weight Calibration screen. Calibrate each attachment (section 3).*

3 Weight Calibration

Only Attachments configured with a weighing mode (either from the "Full Setup" routine or via the "Factory" calibration menu) can be selected for weight calibration.

1. *Select "Calibration" from the "Factory" Menu to list the Attachments.*
2. *Select the Attachment to calibrate.*
3. *Select the calibration method "Auto", "Manual" or "Copy".*

"***Auto***" *Follow the screen instructions. (3.1 - 3.3). Repeat for each Attachment.*

"***Manual***" *You can manually enter calibration factors (3.4). Repeat for each Attachment*

"***Copy***" *You can copy the calibration data of the selected attachment to ALL other attachments selected.*

The weighing modes are,

- *Dynamic Weighing (speed-compensated)*
- *Static Weighing with "R/D" Sensor ("Live Static" "Off", "On" or "Auto")*
- *Static Weighing without "R/D" Sensor ("Live Static" "On" or "Auto")*

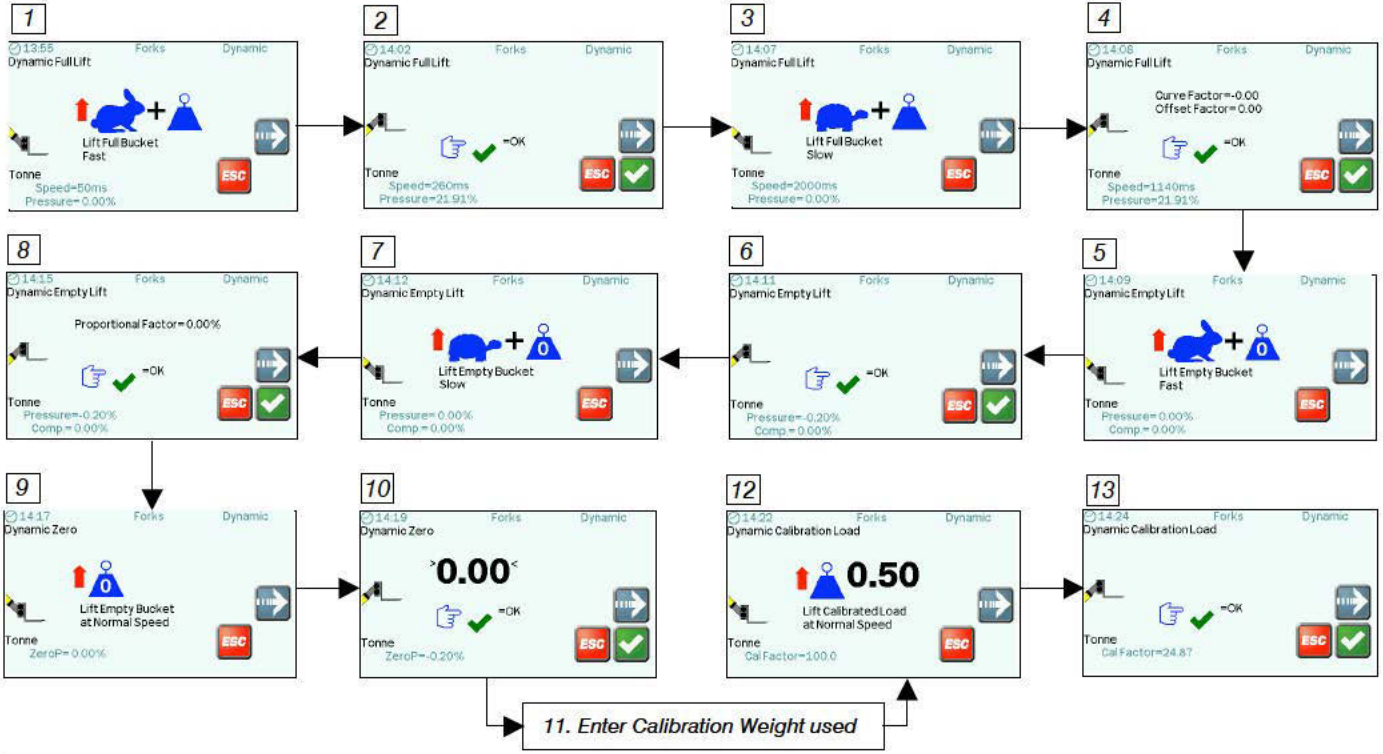
The calibration routine varies according to the weighing mode that the Attachment is configured for.

For 3-Sensor / 4-Sensor installations measuring Compensation Cylinder pressure, you must configure the "Compensation %" and "P-C +ve" settings in "Sensor Setup" (4.2.1).

If a "Live Static" readout is too "jumpy", you can smoothen the display by increasing the "Static Filter %" setting in "Sensor Setup" (4.2.1).

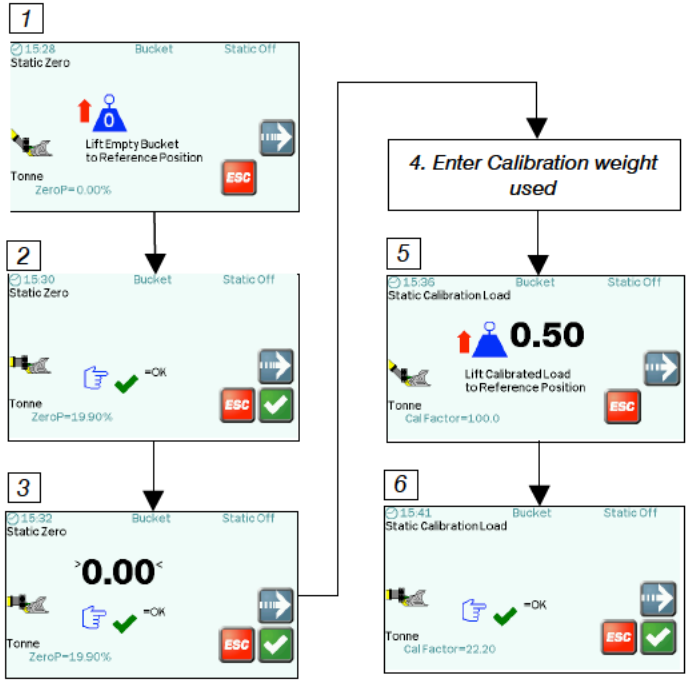
3.1 "Auto" Calibration - Dynamic Mode

*To subsequently view/edit the calibration factors, select the "**Manual**" calibration option for the Attachment.*



3.2 "Auto" Calibration - Static Mode with "R/D" Sensor

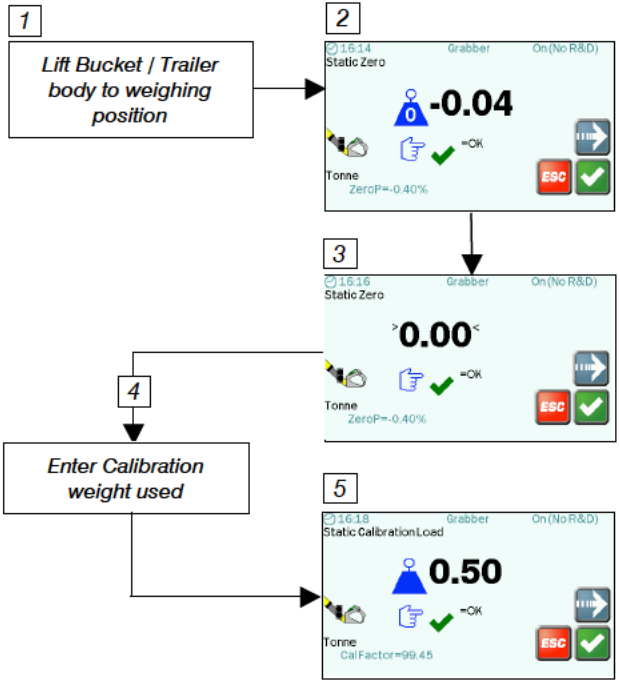
*To subsequently view/edit the calibration factors, select the "**Manual**" calibration option for the Attachment.*



3.3 "Auto" Calibration - Static Mode without "R/D" Sensor

*To subsequently view/edit the calibration factors, select the "**Manual**" calibration option for the Attachment.*

This is not a preferred method of use for the Weighlog 3030, this method of weighing will introduce errors based on position of the lifted load.



3.4 "Manual" Calibration - View / Edit Calibration Factors

*Select the "**Manual**" calibration option for the Attachment.*

Some of these factors are calculated during the "Auto" calibration routine (3.1 - 3.3)

"***Fast Lift Time***"	*The weight sampling period for a fast lift.*
"***Slow Lift Time***"	*The weight sampling period for a slow lift.*
"***Curve Factor***"	*A compensation factor for the change in lift speed. If a fast lift gives a lower weight reading than the slow lift, then the figure should be decreased, and always –ve e.g. changing –11.0 to –10.0.*
"***Curve Offset***"	*Also a compensation factor for the change in lift speed.*
"***Prop Factor***"	*The reduction in speed compensation for an empty bucket compared to a full bucket. Sometimes after an "Auto" calibration, it is found that the speed correction with a full bucket is OK, but with an empty bucket there is a larger error.* *If with an empty bucket, the weight reading is lower at a slower lift speed than at a fast speed, then reduce the factor by 2 - 3% until the error is removed.*
"***Dyn Cal 0***"	*Pressure expressed as a % of maximum pressure (250 bar) with an empty bucket lifted during the "Auto" calibration for dynamic weighing.*
"***Dyn Cal Factor***"	*Pressure Gain expressed as % increase per unit of weight*

"***Static Cal 0***" *As above but for Static Weighing Mode*

"***Static Cal Factor***" *As above but for Static Weighing Mode*

"***Nudge Factor***" *The % nudge factor set using the "Nudge" function (ref. Operation manual - section 3.11).*

Setting a nudge factor does not change the basic calibration factors "Dyn Cal Factor" / "Static Cal Factor". It is an additional factor that offsets the basic factor positively or negatively.

It indicates how much the calibration has changed since the original calibration.

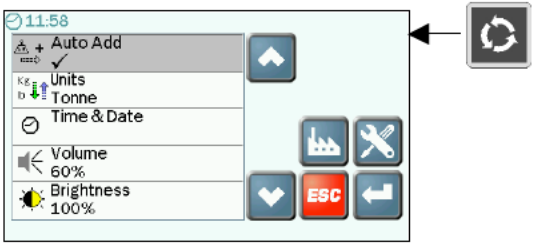
"***Zero Offset***" *The change in the zero point from the zero point established during initial calibration. "Zero Offset" is updated each time you zero the bucket weight (* 

).

It indicates how much the zero has drifted and if re-calibration may be necessary.

4 "Setup" Menu Reference

There are three menu sections. Only the "Operator" settings are normally displayed.



Operator — *No PIN required. Refer to Operation manual.*

- **Technician** — *PIN required (programmable)*

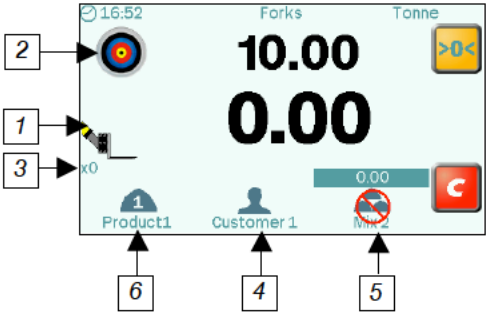
- **Factory** — *PIN required (programmable)*

4.1 "Technician" Menu

Function	Level 1	Level 2	Level 3
Main Functions	*Multiple Attachments*	*On / Off*	
	Target Load	*On / Off*	
	Printing	*On / Off*	
	Bucket Count	*On / Off*	
	Customers	*On / Off*	
	Batch Mix	*On / Off*	
	Products	*On / Off*	

Function	Level 1	Level 2	Level 3
Logging	Printer	Com Port	--------- (None) /COM 1 / COM 2
		Print Mode	Off / Short / Long / Lift
	Data	--------- (None) / COM 1 / COM 2	
	SD	Off / Data / Lift	
	USB	Off / Data / Lift	
Port Setup	COM 1	Enabled	On / Off
		Baud	1200 / 2400 / 4800 / 9600 / 19200
		Parity	N / E / O
		RTS	RTS_OFF / RTS_ON
	COM 2	Enabled	On / Off
		Baud	1200 / 2400 / 4800 / 9600 / 19200
		Parity	N / E / O
		RTS	RTS_OFF / RTS_ON
Language	English (+ 1)	(+1 via SD card)	
Keyboard	English (+ 1)	(+1 via SD card)	
Instrument ID	Lines 1 to 5		
Job No.			
Ticket No.			
Print Products	Products 1 -30	Clear Total / Print	

4.1.1 Main Functions



Selects the functions that appear on the Main Operating screen.

1. *Multiple Attachments*
2. *Target Load*
3. *No. of Lifts ("Bucket Count")*
4. *Customers*
5. *Batch Mix*
6. *Products*

4.1.2 Logging

All logging options can be set to operate simultaneously.

"***Printer***" *To enable automatic printing, select Com Port "**COM 1**" and a Print Mode "**Short**", "**Long**" or "**Lift**".*

*To disable printing, select Com Port "**----**".*

If connecting a printer other than an Loup "ICP300" printer, check the settings in "Port Setup" for "COM 1" (4.1.3) match the printer specification.

Output Modes:

"***Short***" *Automatically prints after clearing the last load (C).*

"***Long***" *As above, but also includes space for customers Name and Address.*

"***Lift***" *Automatically prints after each bucket weight is entered (↵) or cleared ("CE-1" ESC).*

"***Off***" *No automatic print after clearing the last load. Manual printing only (🖶).*

"***Data***" *Comma-delimited ASCII data is output to a suitable logging device.*
*To enable data logging, select Com Port "**COM 1**" (or "COM 2" if "COM 1" is used for a printer).*
*To disable data logging, select Com Port "**----**".*
Automatically sends data after each bucket weight is entered ( *) or cleared ("CE-1"*  *).*

i.e. ID1, Job #., Date, Time, Load, Density, Attachment, Product Name, Customer Name

"***SD***" *Comma-delimited ASCII data is output to the SD Card.*
Output Modes
"***Data***" *Automatically sends data after clearing the last load (*  *).*
"***Lift***" *Automatically sends data after each bucket weight is entered (*  *) or cleared ("CE-1"*  *).*

i.e. ID1, Job #., Date, Time, Load, Density, Attachment, Product Name, Customer Name

"***USB***" *Comma-delimited ASCII data is output to a USB Memory stick.*
Output Modes
As for "SD". See above.

4.1.3 Port Setup

Press  *to edit RS232 Port settings. The default settings are suitable for the Loup "ICP300" printer.*

The default settings for "COM 1" and "COM 2" are:

Status:	***Enabled** / Disabled*
Baud Rate:	*1200 / 2400 / 4800 / **9600** / 19200*
Parity:	*'**N**' (None) / 'E' (Even) / 'O' (Odd)*
Handshaking:	***RTS_OFF** / RTS_ON*

4.1.4 Language / Keyboard

Select the language / Keyboard from the list.

If the required Language / Keyboard option is not pre-installed, a .HEX file for alternative languages and keyboards may be uploaded via a USB memory stick / SD card.

4.1.5 Instrument ID

Programme up to 5 lines of text (20 characters per line) that appear as the heading of each Printout.

Press  *to edit each line.*

e.g. Machine ID, Company Name, Address, Tel No. etc

*Only Line 1 will appear in comma-delimited ASCII data output via the logging options "**Data**", "**SD**" and "**USB**".*

4.1.6 Job No. / Ticket No.

Edit the Job No. (the number associated with each load). The instrument will then increment from that number until it is edited again.

Edit the Ticket No. (the number associated with each printout). The instrument will then increment from that number until it is edited again.

4.2 "Factory" Menu

Function	Level 1	Level 2	Level 3
Full Setup			
Weight Calibration			
Sensor Setup	Ref/Direction Sensor	On / Off	
	Pressure Sensor	P1 P1+P2 P1+C1+C2 P1+P2+C1+C2	
	'P' Ram ratio		
	'C' Ram Ratio		
	Compensation %		
	Static Filter %		
	Speed Compensation	On / Off	
	Proportional Scaling	On / Off	
	C1-C2 Mode	On / Off	

Function	Level 1	Level 2	Level 3
Configure Attachments	Forks Bucket Grabber Muck Grab Pallet Attachment 10 Attachment 7 Attachment 8 Attachment 9 Attachment 10	Edit Description Weighing Mode	 --- On (No R&D) Auto (No R&D) Dynamic Static Off Static On Static Auto
Overload	On / Off Level (%)		
Software Reset			
Passwords	Technician Factory		
Print Cal			
Error Log			
Enable Nudge	On /Off		

4.2.1 Sensor Setup

"***R & D***" *Enable / Disable the Reference / Direction ("R/D") Sensor*

If the R/D Sensor is enabled, both Static and Dynamic weighing is possible. If disabled, only constantly live static weighing is possible - i.e "On (No R&D)" or "Auto (No R& D)" modes.

"***P & C***" *Select the Pressure Sensor configuration installed (1,2,3 or 4 sensors).*

"P1" is the sensor fitted to the 'lift' side of the main lift cylinder.

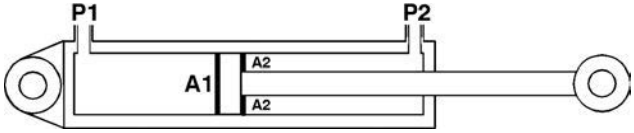
"P2" is the sensor fitted to the 'return' side of the main lift cylinder.

"C1" is the sensor fitted to the 'lift' side of the Compensation cylinder.

"C2" is the sensor fitted to the 'return' side of the Compensation cylinder.

If an Epsilon Strain Sensor is fitted, then select the "P1" (single-sensor) option.

Figure 1



"***P Ram Ratio***" *"P Ram Ratio" is the ratio of the area A1 / A2 either side of the piston (figure 1). The default value of 1.3000 is OK initially, for almost all makes and models of machine. You can determine the correct ram ratio by the following method. Do a slow lift and then a fast lift. If the weight readings are the same, the Ram Ratio is correct. If the fast lift reading is greater then reduce the ram ratio, and vice versa.*

"***C Ram Ratio***" *As above, but for the Compensation cylinder.*

"***Compensation*** %" *Applies to 3 / 4 Sensor installations, measuring Compensation Cylinder pressure.*

Machine	***Compensation setting (%)***
JCB Teletruck	*19%*
JCB TM	*25%*
JCB 531-70	*28%*
JCB 541-70	*28%*
Manitou MLT 633/634/731/741	*18%*
Manitou MLA628	*25%*
Merlo	*23%*

To establish the Self-levelling Compensation setting (%), proceed as follows,

1. *Do the normal "auto" calibration routine.*
2. *Now check the self-levelling compensation as follows,*

(i) With the lift attachment removed and the carriage crowded back, lift through the weighing point several times (allowing the self-levelling to operate) and note the average weight reading.

(ii) With the carriage crowded back, again lift through the weighing point several times to get an average weight reading, but this time holding the crowd lever fully back to override the self-levelling function (pressurizing the compensation hydraulic circuit).

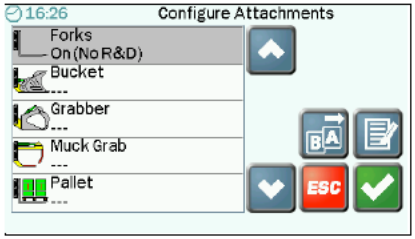
If the second (crowded) average weight reading is LESS than the first (self-levelling) average weight reading, then INCREASE the % setting slightly, and vice versa.

(iii) Repeat step (ii) until the crowded and self-levelling readings are as similar as possible. 1- 2% difference (or +/- 10 kg on a small loader) should be possible.

3. *Repeat the normal "Auto" calibration routine as per the calibration manual. The system is now calibrated.*

"***Static Filter %***"	*Smooths the "Live Static" display (Increase setting to smooth more).*
"***Speed Comp***"	*Enable / Disable - Only required for dynamic weighing mode.*
"***Proportional Scaling***"	*Enable / Disable - Only required for dynamic weighing mode.* *Compensates for efficiency losses in a dynamic lift, and is a scaling factor based on the maximum load of the machine. This factor is more significant for large capacity machines.* *Also Ref. section 3.4 "Prop. Factor".*
"***P-C mode +ve***"	*Enabled / Disabled:* *Applies to 3 / 4 Sensor installations, measuring Compensation Cylinder pressure.* ***Enabled:*** *Adds the "C" signal to the "P" signal. Used mainly where the Compensation Cylinder is in front of the main Boom Pin (i.e Manitou 634/731/741).* *Sensor output 'P1' is disabled.* ***Disabled:*** *Subtracts the "C" signal from the "P" signal. Used mainly where the Compensation Cylinder is behind the main Boom Pin (i.e JCB531/541 machines).*

4.2.2 *Configure Attachments*



- *Select the weighing mode for each attachment.*

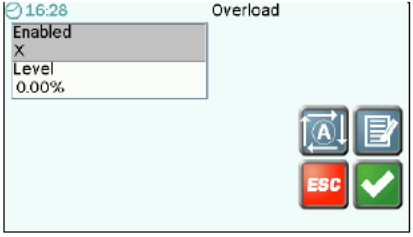
Attachments are set up for one of the following weighing modes,

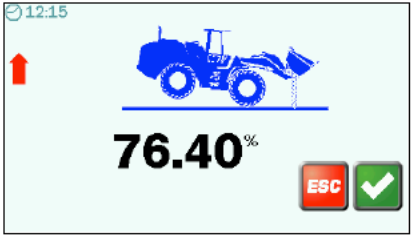
"---"	*(Not set up)*
" Live On (No R&D)"	*Constant "live" weight display (e.g. Trailer weighing)*
"Live Auto (No R&D)"	*Constant weight display (automatically compensating for the effect of pressure loss at the weighing position)*
"Dynamic" [1]	*Dynamic weighing*
"Static - Live Off" [1]	*"Freeze" weight display at reference position*
"Static - Live On" [1]	*"Live" weight display at reference position*
"Static - Live Auto" [1]	*"Live" weight display (automatically compensating for the effect of pressure loss at the weighing position)*

- *Edit the attachment name (the icons cannot be changed)*

[1] These options only appear if the "R & D" Sensor is enabled in "Sensor Setup" (4.2.1).

4.2.3 Overload Alarm





- *The Overload Alarm is optional. Press* *to enable / disable.*

- *To set the Alarm threshold ("Level), lift the maximum load that can be safely lifted.*

  This can if desired, be less than the Rated Load Capacity as specified for the machine.

  Press *to confirm.*

The weight is expressed as a % of the maximum load sensor signal (20mA). In this example, the maximum load is 76.4% of the maximum load signal.

If the Overload alarm is enabled, then in the Normal Operating Mode,

From 90% to 97.5% of maximum load = a continuous tone alarm.
From 100% of maximum load = a dual-tone alarm.

In "Constant Live Static" weighing mode (i.e. without an "R/D" Sensor), after entering a weight using the Load Enter button, the load must be reduced to less than 10% of the maximum load before another weight can be entered.

e.g. in the above example, to 7.64% or less of the maximum load sensor signal.

4.2.4 PIN Settings

Press  *to changes the PIN for the "Technician" and "Factory" menus.*

4.2.5 Print Cal

Prints the User Settings and Calibration Factors for each Attachment that has been calibrated.

Also saves the same data as the file named <ALLCALL.TXT> to a USB Memory Stick.

```
USER SETUP
Auto add    Off
Units     Ton
e         0.010
Volume       60
Brightness  100

MAIN FUNCTIONS
Multiple attachments Off
Target Load          Off
Bucket count         Off
Customers            Off
Batch mix            Off
Products             Off

LOGGING
Print     Com 1      Off
Data      ----       Off
SD                   Off
USB                  Off
```

```
PORT SETUP
COM1      4800,N,RTS_OFF
COM2      4800,N,RTS_OFF

SENSOR SETUP:
R & D                  On
P & C                  P1
P Ram ratio          1.30
C ram ratio          1.30
Compensation %         20
Static filter          50
Speed comp             On
Proportional scaling   On
P-C mode                +
```

```
MANUAL CALIBRATION:
Attach 1 "Bucket"
Fast lift time       250
Slow lift time      2000
Curve factor       -27.3
Curve offset        14.4
Prop. Factor         9.2
Dyn Cal Zero        18.2
Dyn Zero Offset     -3.2
Dyn Cal factor     100.0
Static Cal Zero     18.2
Static Zero Offset  -3.2
Static cal factor  100.0
Nudge factor         0.00
Zero Offset          0.00
```

4.2.6 Error Log

Prints a list of error events encountered since the Error Log was last reset.

Saves the same data as the file named < ERRORLOG.TXT > to a USB Memory Stick.

4.2.7 Enable Nudge

Enables the "Nudge" function. The "Nudge" option is then displayed in the Operator level of the "User Setup" menu.