

dynafor™

Series LLXh Electronic Dynamometer
dinamómetro electrónico serie LLXh
dinamometro elettronico serie LLXh
dinamómetro electrónico série LLXh



15 / 25 / 50 / 100 / 250 t

GB

Operation and maintenance manual

E

Instrucciones de utilización y de mantenimiento

IT

Istruzioni per l'uso e la manutenzione

P

Instruções de uso e de manutenção

English

Español

Italiano

Português

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The functions described hereinafter enable standard use of the dynafor™LLXh
 The possibilities offered by dynafor™ LLXh extend well beyond these elementary functions, and respond to the wide range of requirements encountered in industry .
 To name but a few: display of several sensors on the same display unit, display of the stress on one or more sensors on several display units, PC link-up, saving, totalling, differentiation, threshold management etc... all of these functions are described further on in this manual.

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PRIORITY RECOMMENDATIONS



CAUTION. Possible situation. Hazardous. Risk of slight injury or damage of the appliance.



Appliance completely protected by double or reinforced insulation.

1. Before installing and using this unit, to ensure safe, efficient use of the unit, be sure you have read and fully understood the information and instructions given in this manual. A copy of this manual should be made available to every operator. Extra copies of this manual can be supplied on request.
2. Do not use the unit if any of the plates mounted on the unit are missing or if any of the information on the plates, as indicated at the end of the manual, are no longer legible. Identical plates will be supplied on request; these must be secured on the unit before it can be used again.
3. Make sure that all persons operating this unit know perfectly how to use it in a safe way, in observance of all safety at work regulations. This manual must be made available to all users.
4. The positioning and commissioning of this appliance must be carried out under conditions that ensure installer safety in compliance with the relevant regulations.
5. Each time, before using the unit, inspect the unit for any visible damage, as well as the accessories used with the unit. Never use an appliance that is not obviously in good condition. Return the appliance to the manufacturer for servicing if any anomalies arise that have no connection with the state of the battery.
6. Protect your appliance from any form of impact, especially the display unit.
7. The unit must never be used for any operations other than those described in this manual. The unit must never be used to handle any loads exceeding the maximum utilization load indicated on the unit. It must never be used in explosive atmospheres.
8. This appliance should never be used for man-riding applications without a thorough prior check that the utilization coefficients required for personnel safety have been applied, and more generally that the safety regulations for the load line on which it has been installed have been applied.
9. Tractel declines any responsibility for use of this unit in a setup configuration not described in this manual.
10. Tractel declines any responsibility for the consequences of any changes made to the unit or removal of parts.
11. Tractel declines any responsibility for the consequences resulting from disassembly of the unit in any way not described in this manual or repairs performed without Tractel authorization, especially as concerns replacement of original parts by parts of another manufacturer.
12. As a dynafor™ dynamometer is a lifting accessory, the safety regulations applicable to this category of equipment must be applied.
13. If the unit is to be definitively removed from use, make sure the unit is discarded in a way which will prevent any possible use of the unit. All environment protection regulations must be observed.
14. Any operation of this appliance in conjunction with supplementary equipment relaying signals on an operating system must be preceded by a risk analysis related to the operating functions implemented, carried out by the system user or assembler, and all appropriate measures are taken as a consequence.
15. Certified in compliance with European regulations, this appliance should be checked for compliance with the regulations of any other country where it might be used, prior to being commissioned there.
16. The display power supply unit is used as a breaker and must be accessible at any time.

1 PRESENTATION

The dynafor™ LLXh dynamometers are precision appliances (0.2% ISO 376 . 21°C), for measuring pulling force and indicating loads. The capacity scale ranges from 150 kN to 2500 kN.

A dynafor™ LLXh is made up of a sensor and a mobile display unit.

A two-way radio link-up using the 2.4 GHz wave band connects the two components.

16 radio channels are used. Each display unit and sensor have their own address, enabling unequivocal identification in the event of a multiple set-up.

The shape of the dynamometers enable the use of standard shackles on both ends.

The technologies implemented on a radio and software level offer, aside from the standard uses to be expected from an industrial dynamometer, multiple configuration possibilities that combine several sensors with several display units. They also offer access to advanced functions such as: saving, threshold management, monitoring etc.

The PC – USB link permits to download, save and manage measurements data.

The standard version of the equipment comes with batteries and power pack in a plastic carrying case for capacities up to 50 t and wood case for 100 t and 250 t.

- a) A sensor
- b) A display unit and battery charger
- c) An operating and maintenance instruction manual
- d) A certificate of adjustment
- e) A certificate of CE compliance

1.1 Operating Principle

The operating principle of the dynafor™ LLXh is based on strain gauge measurement of the extension, within its limits of elasticity, of a metal body subjected to traction stress. The appliance will work in all directions.

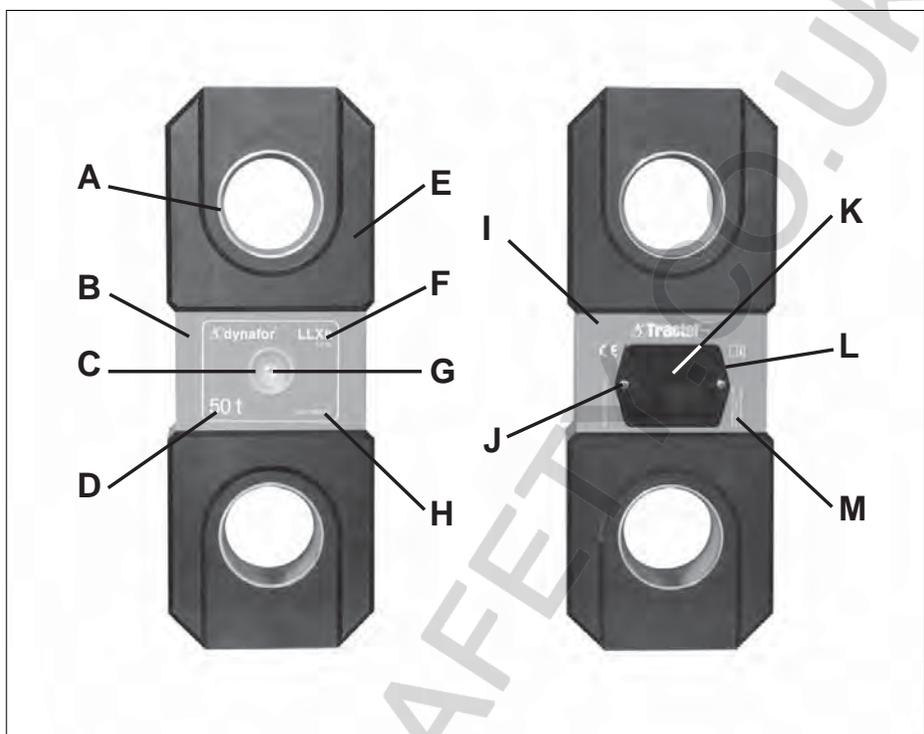
The sensor generates an electrical signal that is proportional to the load. This signal is processed by a micro-processor analyser and then transmitted via radio waves to the display unit, which immediately displays the load applied to the sensor to which it is linked.

When switched on, the sensor data, such as identification and date of last metrology check, is displayed on the display unit.

The display unit is compatible with all of the LLXh model sensors, irrespective of their capacity. Unless otherwise ordered, the radio link-up between the LLXh and LLX2 sensor and the display unit is set definitively in the factory before dispatch. After this, the radio link can be configured by the user to meet their requirements.

1.2 Description and marking

1.2.1 Sensor

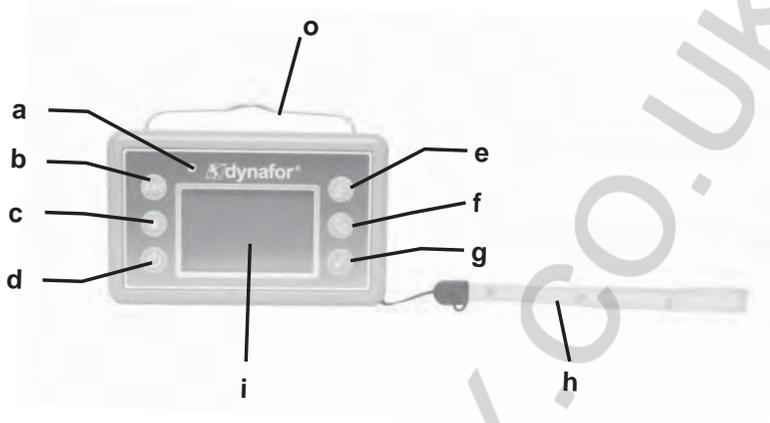


A	Centering ring	H	Serial N°.
B	Front plate	I	Rear plate
C	Operating indicator	J	Fixing screw of L
D	Maximum sensor capacity	K	Battery housing (3 x "AA")
E	Body	L	Battery cover
F	Designation and accuracy	M	Manufacturer's label
G	On / Off button		

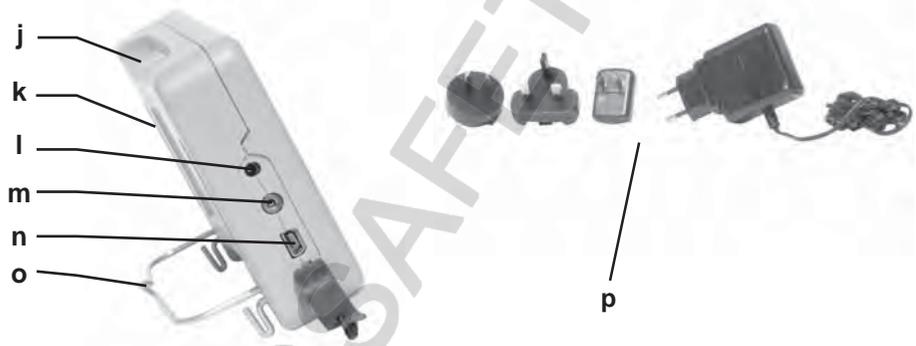
Provisions applied:

- **Machine Directives:** 98/37/CEE
- **European Standards:** EN 12100-1 and 12100-2
- **CEM Directive:** 89/336/CEE
- **Electrical Safety:** IEC 61010-1 2nd Edition
- **Radio certifications:** CE : Radio Tests EN 300 440-2 V1.1.1 / USA & Canada: FCC ID / Australia: C-Tick ID
- **R&TTE Directive** (1999/5/CE)

1.2.2 Display unit



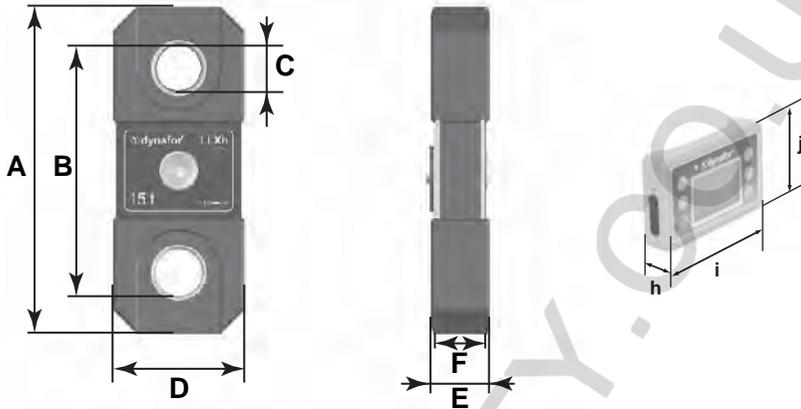
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a	Indicator LED (manufacturer use)	i	LCD graphic screen 128 x 64 pixels 67 x 40 mm
b	Key: "esc"	j	Attaching points for the display unit on the bumper of the sensor housing
c	Key: Back lighting. Auto off after 10"	k	CE Marking and Serial No.
d	Key: On / Off	l	Charger socket
e	Key: Enables available options and clockwise browsing	m	Serial port (manufacturer use)
f	Key: Enables available options and anti-clockwise browsing	n	USB port
g	Key: Confirm / Enter	o	Metal wire
h	Safety wrist strap	p	Charger 100-240 Vac 50/60 Hz. 180 mA  Secondary: 12 Vdc. 500 mA.

2. SPECIFICATIONS

2.1 Sensor and Display Unit

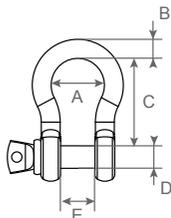


MODEL		LLXh 15 t	LLXh 25 t	LLXh 50 t	LLXh 100 t	LLXh 250 t	Display
Maximum capacity	t	15	25	50	100	250	ALL
Test load	t	30	50	100	200	500	-
Safety coefficient		Minimum 4					-
Precision		0,2 % according to ISO 376 . 21°C					-
	daN	30	50	100	200	500	-
Increment	daN	5	10	20	50	100	<-
Max. Display		16500 daN	27500 daN	55000 daN	110.00 t	275.00 t	<-
Number height	mm	-	-	-	-	-	25
Autonomy		From 300 to 1000 h depending of functions					48 h
Radio scope	m	80 (in open field) (I.P. 67 = 60)					
RF technology		2.4 Ghz					
Weight	kg	4	6.6	15.1	46	215	0.180
IP Protection		I.P. 65 (I.P. 67 option)					I.P. 54
Usafe		From - 20° to 40°C					
Sensitivity to T°		0.05% per 10°C					
Sensor material		Aluminium					-
Dimensions mm	A	320	360	440	660	905	-
	B	247.5	277	338	488	685	-
	ØC	47.5	56	72	108	150	-
	D	130	134	164	260	424	-
	E	58	68	98	118	248	-
	F	48	58	86	104	190	-
	h	-	-	-	-	-	26.7
	i	-	-	-	-	-	131
j	-	-	-	-	-	82	

2.2 Anchoring accessory

Any shackle that complies with the relevant regulations can be used for dynafor™ LLXh to be mounted onto a traction line, as long as it complies with the dynafor™ LLXh maximum capacity .

2.2.1 Size in mm



WLL	A	B	C	D	E	kg
15 t	98	41	146	41	60	7.8
25 t	110	44	178	50	73	14
50 t	150	64	267	70	105	39.7
100 t	241	89	381	95	146	97
250 t	320	125	540	140	200	340

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3 INSTALLATION, UTILIZATION AND UNINSTALLATION

3.1 Conditions prior to set-up and use

- Altitude: Up to 2000 m
- Relative humidity: Max 80%
- Degree of pollution assigned: 2

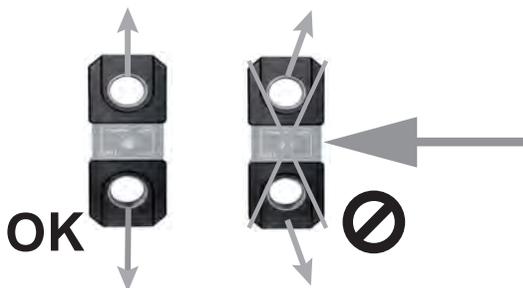
Before setting up and using the dynamometer you must:

- a) make sure that there is no stress value shown when the appliance is not subject to traction. Should this occur, refer to Chapter 11 Operating Anomalies and Troubleshooting.
- b) make sure that the sensor batteries and display unit power pack are adequately charged.
- c) make sure that there is a good radio link between the sensor and the display unit.
- d) use the "ID" icon to check that the sensor serial number shown on the sensor plate is the same as the sensor serial number shown by the display unit (see section 6.2.2 and section 6.2.3)

3.2 Installation

When installing you must:

- a) make sure that the load line anchoring point(s) are sufficiently robust in relation to the traction that will be applied.
- b) make sure that the anchoring accessories at either end of the dynamometer are compatible, and that they comply with the relevant regulations.
- c) make sure that clevis pins are well locked, with the nut screwed down to the maximum, and make sure that the hook safety latch is working correctly .
- d) make sure that the sensor is correctly aligned in the traction line.



3.3 Utilization

Only use dynafor™ LLXh in traction, avoiding compression, twisting or flexing. The appliance can be used in all directions, including horizontally. The dynafor™ LLXh operates correctly in a temperature range of de -20° C to + 40° C. For use outside of this range, the appliance will require heat protection.

3.4 Uninstallation

When uninstalling the appliance, first make sure that it is no longer subject to any traction stress.

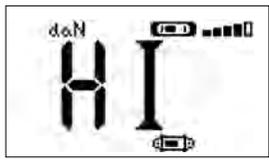
4 UTILIZATION PROHIBITIONS

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It is prohibited:

- To use dynafor™ LLXh in a line for lifting people without having carried out a prior specific risk analysis.
- To modify the appliance housing by machining, drilling or any other process.
- To use dynafor™ beyond their maximum capacity.
- To put the Dynafor in a arc weld electrical circuit.
- To disassemble or uncover the sensor or display unit.
- To use the appliance for operations other than those described in this manual.

5 OVERLOAD INDICATOR



When the load applied to the sensor exceeds the maximum capacity of the appliance of 10 % (e.g.: a 25 t loaded at 27.5 t) the display unit indicates an overload message " HI" as shown opposite, and emits an intermittent beep.



If several sensors are connected to the display unit, the overloaded sensor will be immediately identified. In the example display opposite, relating to a two-sensor set up, the sensor on the second line is overloaded.

In the event of overload, all stress on the sensor must be completely relieved and a check made that the appliance returns to zero.

If the appliance shows a stress value, even though tension is not applied, then it has suffered a permanent distortion. In this case, you must have the appliance serviced by the manufacturer before continuing to use it.

6 OPERATION IN SINGLE CONFIGURATION

Single configuration consists of using an assembly made up of one sensor and one display unit for measuring and displaying the stress on the sensor. Depending on the user's requirements, the display unit can either be attached to the sensor or be separated from it.

Unless otherwise ordered, the radio link-up between the sensor and the display unit is set definitively in the factory before dispatch. After this, the radio link can be configured by the user to meet their requirements. (see: Chapter 7: Operation in multiple configuration)

6.1 Commissioning

6.1.1 Enabling the sensor batteries

The 3 x 1.5 V "AA" batteries are installed in the factory. Remove the insulating tab protruding from the battery compartment to enable them. For future battery changes, refer to Chapter 9.2

6.1.2 Charging the display unit

The display unit is delivered with the power pack charged. Afterwards, use the charger provided to charge the power pack. Charging time: 3 h. The display unit can be used during charging.

6.1.3 Turning on the sensor



NOTE: Always turn on the sensor before turning on the display unit; otherwise the display unit will not be able to establish the radio link.



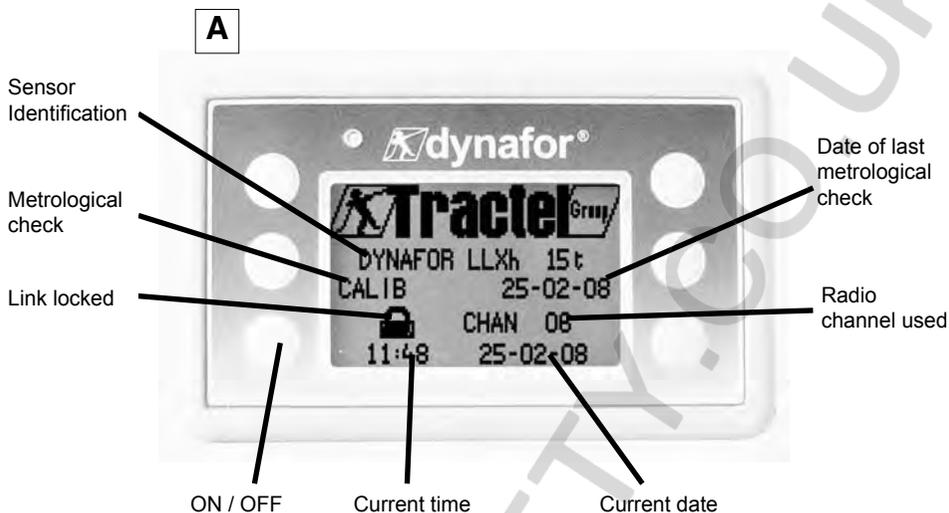
Press the centre of the flexible cap covering the switch.

On switching on the two red LED will flash.

6.1.4 Information provided by the sensor LED

Sensor operating MODE	Sensor LED flashing	Measures per second	Autonomy
Stop	Off	-	-
Standard	1 flash per second	4 per second	300 h
Standard slow	1 flash every 2 seconds	1 per second	500 h
Power saving	1 flash every 4 seconds	1 every 4 seconds	1000 h
Standby	1 flash every 8 seconds	-	3000 h
Peak load	2 flashes per second	32 per second	100 h
Batteries low	Same but one LED at a time		-

6.1.5 Turning on the display unit

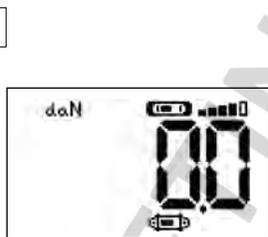


The welcome screen is shown for 4 seconds, then the standard display window is shown.

6.2 Elementary functions

This chapter presents the functions that enable elementary use of dynafor™ LLXh

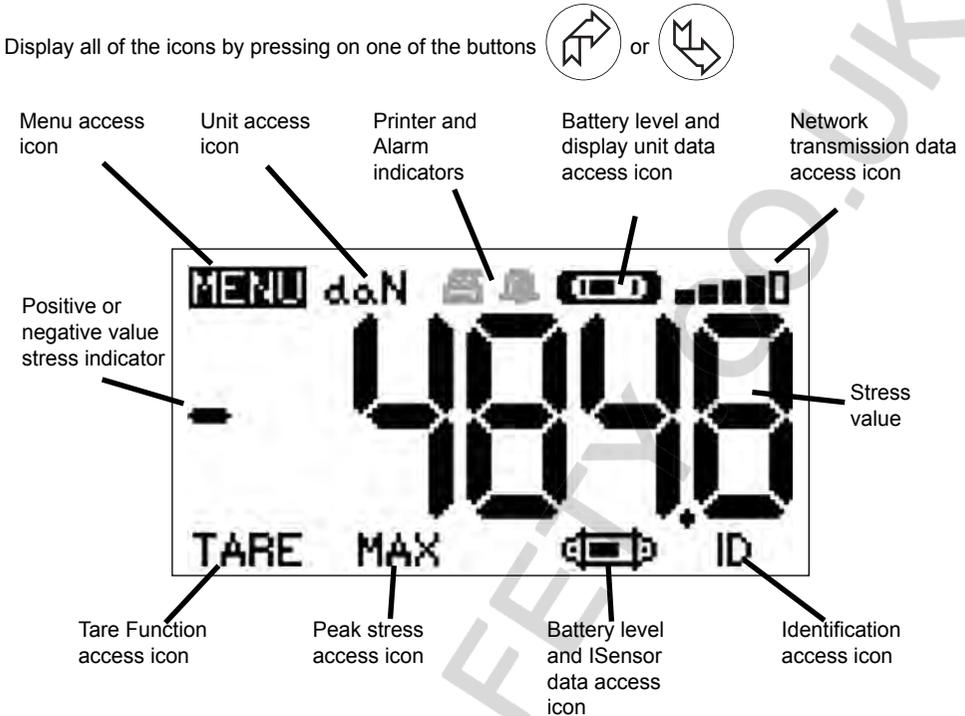
6.2.1 Standard display screen



Action		Comments
✓	No action	Standard Display: After the welcome screen, the standard display screen appears automatically.
ESC	No action	
↶	Select an icon	The sensor / display unit assembly is ready to use.
↷	Select an icon	

In this manual, this number refers, should this happen, to the position of the screen in the synopsis at the end of this manual.

6.2.2 Detailed description



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6.2.3 Icons

a) Active icons:

Menu access icon: offers access to advanced functions (See chapter 6.3)

Units access icon: enables measurement unit selection (See section 6.2.4.3)

Tare Function access icon: enables Tare function (Gross / Net Load) (See section 6.2.4.4)

Peak Stress access icon: enables the maximum stress save function (See section 6.2.4.5)

Display unit data access icon: shows display unit power pack charge and data relating to the display unit (See section 6.3.2.2)

Transmission data access icon: enables viewing and modification of the radio network status (see section 6.3.2.4)

Identification access icon: enables viewing of network equipment identification (see section 6.3.2.3)

Sensor data access icon: Shows sensor battery charge and data relating to the sensor (See section 6.3.2.1)

b) Indicator Icons:

Alarm Indicators: Appear if one or more safety thresholds have been set, flashing if exceeded.

Printer Indicators: appear when data transmission to PC is requested (requires PC Connection option)

6.2.4 Elementary functions and corresponding displays

6.2.4.1 Standard display

Display	Action	Comments
<div style="border: 1px solid black; padding: 5px;"> </div>	No action	Standard Display: Sensor stress Measurement units Display unit power pack level Sensor battery level Radio reception level
	No action	
	Select an icon	
	Select an icon	

6.2.4.2 Navigating between icons

<div style="border: 1px solid black; padding: 5px;"> </div>	Confirm current selection	Navigation: By pressing on either of the two arrows, all available functions are displayed. Move from icon to icon using the arrows.
	Return to standard display	
	Move clockwise from icon to icon	
	Move anti-clockwise from icon to icon	

6.2.4.3 Measurement unit selection

<div style="border: 1px solid black; padding: 5px;"> </div>	Confirm selection	Select Unit: daN, kN, kg, t, Lbs, Ton. Select the unit icon, which starts flashing. Confirm with	
	Return to standard display without modification		Enable the various unit symbols: Confirm with
	Select an icon and enable the available options		For 100 t and 250 t use : kN, t, Ton
	Select an icon and enable the available options		

6.2.4.4 Tare Function

<div style="border: 1px solid black; padding: 5px;"> </div>	Confirm TARE option when it is highlighted.	TARE Function: Select the TARE icon, which starts flashing. Confirm with Enable the various options. Confirm with TARE = Initialise a new Tare RAW = Sum of NET + TARE NET = Difference between RAW - TARE
	Return to standard display without modification	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

6.2.4.5 MAX Function (Peak stress save)

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Display	Action	Comments
---------	--------	----------

5



	Reset MAX value to current stress level	Peak load function: From the Standard screen, go to the MAX icon. Confirm with The "in progress" screen appears while the display unit dialogues with the sensor to change to "Peak Load" mode - 32 measures per second
ESC	Return to standard display	
	No action	
	No action	

6



	Reset MAX value to current stress level	Peak load function: The peak load value is displayed The barograph represents 100% of sensor capacity The cursor indicates the peak value of stress The moving black line shows the immediate stress value
ESC	Return to standard display	
	Enable MAX window selection mode	
	Enable MAX window selection mode	

7

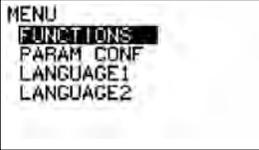


	Confirm selection	Advanced Peak load functions: In this mode you can saves the peak stress set saves. Using the arrows and from the MAX window, select the icon: Diskette and confirm with to save.
ESC	Return to MAX display	
	Move clockwise from icon to icon	
	Move anti-clockwise from icon to icon	

6.2.4.6 Language selection function

Display	Action	Comments
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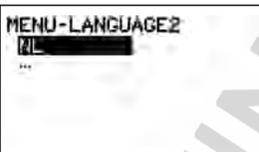
	Confirm selection	Language group selection: Select the MENU icon. Confirm with ✓ Select the required language group: LANGUAGE 1, LANGUAGE 2. Confirm with ✓
ESC	Return to standard display without modification	
	Select the available options	
	Select the available options	

9



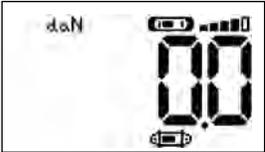
	Confirm selection	Language selection: Select the required language. Confirm with ✓
ESC	Return to previous display without modification	
	Select the available options	
	Select the available options	

10

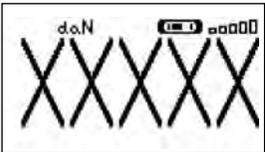


	Confirm selection	Language selection: Select the required language. Confirm with ✓
ESC	Return to previous display without modification	
	Select the available options	
	Select the available options	

6.2.4.7 Stopping the device

Display	Action	Comments
	 No action	Arrêt du dispositif : Keep the ON / OFF button depressed for 3 seconds to switch off the display unit. The sensor automatically moves into standby mode, and will start up again when the display unit is switched on. If necessary you can switch off the sensor by pressing on the ON / OFF button.
	ESC No action	
	 Select an icon and enable the available options	
	 Select an icon and enable the available options	

6.2.5 Error Messages No radio reception

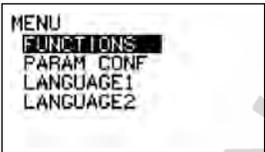
Possible causes	Solutions
	Switch off the display unit, switch on sensor, switch on display unit. Bring appliances closer together Check network configuration (see advanced functions section 6.3.2.4)
Sensor switched off or switched to the standby mode (see 27)	
Sensor too far from display unit	
Network conflict	

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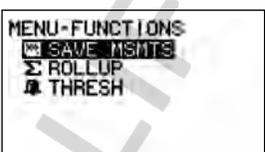
6.3 Advanced functions

This chapter presents the functions that enable advanced use of dynafor LLXh
See the general overview of the programme at the end of the manual.

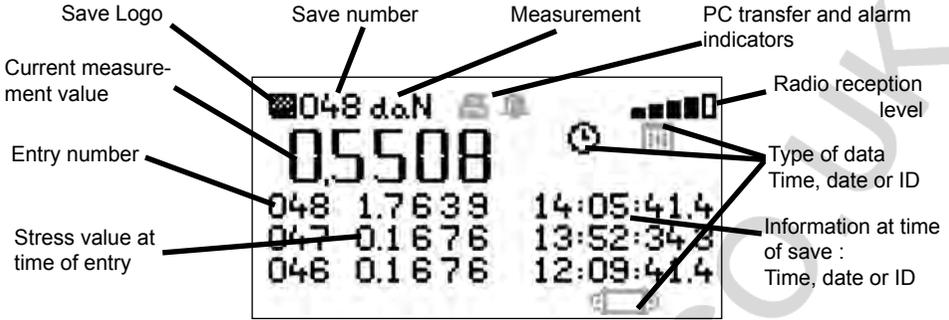
6.3.1 MAIN Menu

	 Confirm selection	Main Menu: Select MENU. Confirm with  Select the required sub-menu. Confirm with 
	ESC Return to standard display without modification	
	 Select an icon and enable the available options	
	 Select an icon and enable the available options	

6.3.1.1 Functions Menu

	 Confirm selection	Functions Menu : Select the required sub-menu. Confirm with 
	ESC Return to standard display without modification	
	 Select an icon and enable the available options	
	 Select an icon and enable the available options	

6.3.1.1.1 Save



GI 15



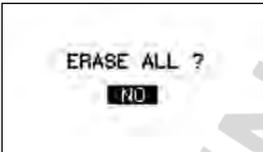
	Save	Enregistrement de mesures : Press to save:
ESC	Return to standard display	The operation No. The load value displayed The time of save or date of save or No. of corresponding sensor. If several sensors are shown, the total is taken into consideration.
	Select an icon and enable the available options	
	Select an icon and enable the available options	

16



	Confirm selection	Save sub-menu: Select the sub-menu.
ESC	Return to previous display	See details and keys in the following table.
	Select an icon and enable the available options	Confirm with
	Select an icon and enable the available options	

17



	Confirm selection	Confirmation screen: In the event of total deletion, confirmation is required.
ESC	Return to previous display	Select one of the options
	Select an icon and enable the available options	Confirm with
	Select an icon and enable the available options	

Save sub-menu keys

	Send selected line to PC (See section 8)		Choose between G "gros" or N "net" of the displayed value
	Scroll page by page downwards		Graphic (disabled function)
	Scroll line by line downwards		Press to display one after another: The time, the date or sensor identification
	Scroll line by line upwards		Delete selected line
	Scroll page by page upwards		Delete all (followed by confirmation screen)
	Displays the time		Displays sensor identification
	Displays the date		

6.3.1.1.2 Total

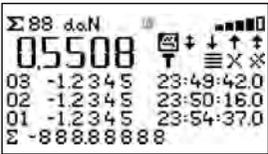
18



	Save and total	Total measurements: Press to save and total: The operation No. The stress value displayed The time of operation or date of operation or No. of corresponding sensor. If several sensors are shown, the total is taken into consideration
ESC	Return to standard display	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

GB

19



	Confirm selection	Total sub-menu: Select the sub-menu. See details and keys in the following table. Confirm with
ESC	Return to previous display	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

20

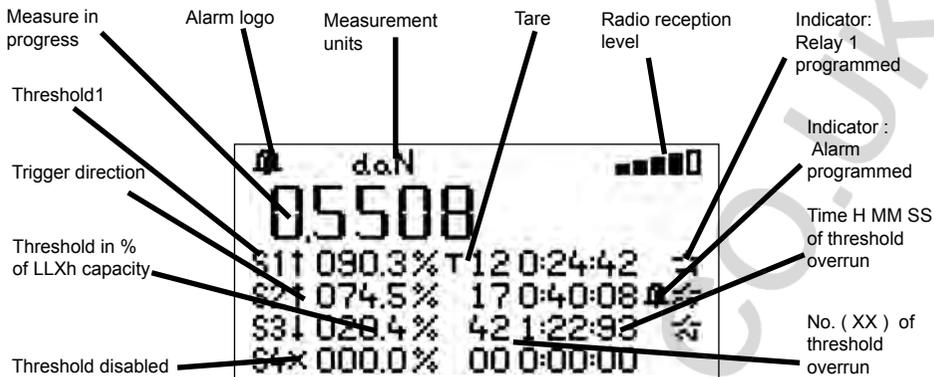


	Confirm selection	Confirmation screen: In the event of total deletion, confirmation is required. Select one of the options Confirm with
ESC	Return to previous display	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

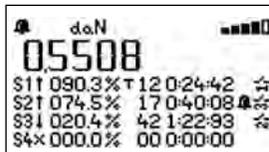
Total sub-menu keys

	Send selected line to PC (see section 8)		Choose between G "gros" or N "net" of the displayed value
	Scroll page by page downwards		Graphic (disabled function)
	Scroll line by line downwards		Press to display one after another: The time, the date or sensor identification
	Scroll line by line upwards		Delete selected line
	Scroll page by page upwards		Delete all (followed by confirmation screen)
	Displays the time		Displays sensor identification
	Displays the date		

6.3.1.1.3 Threshold Management

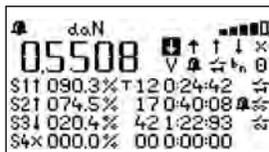


21



	No action	Threshold Management: This window displays the programming status of the 4 thresholds, sound alarms and programmable relays.
ESC	Return to standard display	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

22



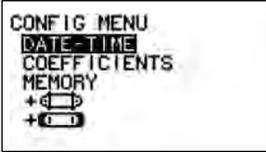
	Confirm selection	Threshold management sub-menu: Select the sub-menu. See details and keys in the following table. Confirm with The thresholds increment in steps of 0.5% of the sensor capacity. Adjustment range: From 0 to 120% of sensor capacity.
ESC	Return to previous display	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

Threshold management sub-menu keys

	Scroll threshold by threshold downwards		To modify the threshold value
	Scroll line by line upwards		Sound alarm programmed
	Trigger of programmed threshold when upward overrun		Relay 1 programmed. (Disabled in current version.)
	Trigger of programmed threshold when downward overrun		Trigger selection in relation to Gros or Net
	No threshold trigger programmed		Reset number and duration of programmed threshold overruns

6.3.1.2 Parameter setting menu

23



Display	Action	Comments
	Confirm selection	Parameter setting menu: Select the sub-menu. Confirm with
ESC	Return to previous display	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

6.3.1.2.1 Date and Time

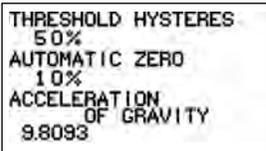
24



	Return to main display	Date and hour : Select the parameter to be modified Confirm with Modify the parameters, using the arrows. Confirm again with Exit and confirm modifications bu validating V at the bottom of the screen.
ESC	Return to main display	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

6.3.1.2.2 Coefficients

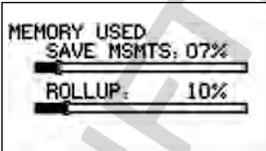
25



	No action	COEFFICIENTS : These parameters can only be modified by the manufacturer. Hysteresis of the trigger points ; 50% of the adjusted value. ZERO auto < 10 % of the capacity Gravity acceleration: coef ficient used for the conversion N / kg. PARIS value by default
ESC	Return to main display	
	No action	
	No action	

6.3.1.2.3 Available memory check

26



	Return to main display	Memory: Indicates the memory fill rate. Point: Saved values (Max. 99) Total: accumulated values (Max. 99) For reset see sections 6.3.1.1.1 and 6.3.1.1.2
ESC	Return to main display	
	No action	
	No action	

6.3.1.3 Languages

See section 6.2.4.6

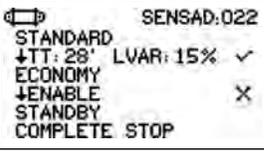
GB

6.3.2. Other icons on the standard screen

6.3.2.1 Sensor icon: 

Sensor settings and data

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Display	Action		Comments
		Confirm selection	Sensor parameters display AD 22 = sensor address Switch from standard to power saving mode after 28' if variation step > 15% of the stress. Enabled ✓ Switch to power saving mode in standby Disabled X TOTAL SHUTDOWN: Powers down the sensor. To power up again you must use the ON/OFF switch on the sensor
	ESC	Return to standard display	
		Select an icon and enable the available options	
		Select an icon and enable the available options	

6.3.2.2. Display Unit icon: 

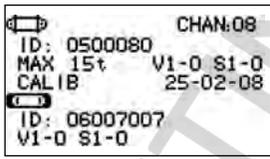
Display Unit Settings and Data

28

		No action	Display unit parameter display. AD = display unit address This screen is displayed if the sensor/display unit pair is locked.
	ESC	Return to standard display	
		No action	
		No action	

6.3.2.3 Identification icon: ID

29

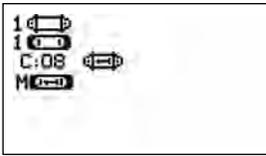
		Return to standard display	Display identification of elements in the network. Sensor: Serial No., capacity, hardware version, software version, date of last calibration or adjustment Disp. Unit: Serial No., hardware version, software version.
	ESC	Return to standard display	
		No action	
		No action	

Display unit and sensor identification and data

6.3.2.4 Radio link icon:

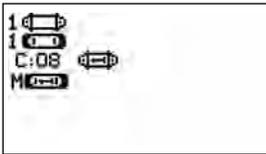
Data on the power and status of the radio link

30



	Return to standard display	Radio network parameter settings 1  = 1 sensor detected
ESC	Return to standard display	1  = 1 display unit detected C : 8 = No. of selected radio channel M = Display unit is Master. (E = Slave unit)
	Select an icon and enable the available options	 = The sensor / display couple is locked.
	Select an icon and enable the available options	

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	Confirm selection	Radio network parameter settings  1 NNN = sensor identification  1 NNN = display unit identification
ESC	Return to standard display	C : 8 = No. of selected radio channel M = Display unit is Master . (E = Slave unit)
	Select an icon and enable the available options	 = The sensor / display couple is locked.
	Select an icon and enable the available options	<input checked="" type="checkbox"/> = Couple linked but not locked. <input type="checkbox"/> = Couple not linked.

If several sensors are linked to the display unit, the weakest signal will be displayed.

7 OPERATION IN MULTIPLE CONFIGURATION

7.1 Generalities

Multiple configuration consists of linking up the four sensors to anything up to four display units. The sensors can have different capacities.

(For more than four sensors the PC option is required. See chapter 8)

For some applications it is useful to display the measures coming from several sensors on just one display unit.

Example: Lifting a load with a two-winch suspended load bar, each winch equipped with a sensor. The grouping of the two strain measures on the same display unit enables the operator to view two strains and their total and to check the correct distribution of the load between the two winches.

For other applications it is useful to have the display of the stress measurement from one sensor on several display units.

Example: Two operators are manoeuvring a load. One guides the manoeuvre, the other monitors and saves the stress levels. It should be noted that in an application with several display units, only the "Master Unit", has control over the sensor, the other "Slave units", repeat the data coming from the Master Unit.

Certain applications require several sensors on several display units.

Example: Complex manipulation of a load, like a hydro-electric power station turbine, carried out by several participants, working on different levels.

7.2 Examples of multiple configurations.



4 sensors linked to one Display Unit

4 sensors linked to one Master Display Unit and Two Slave Units



7.3 Safety Recommendations

When setting up a multiple configuration, you must physically assemble and identify all of the components: sensors, Slave display units and Master display unit before starting to link them.

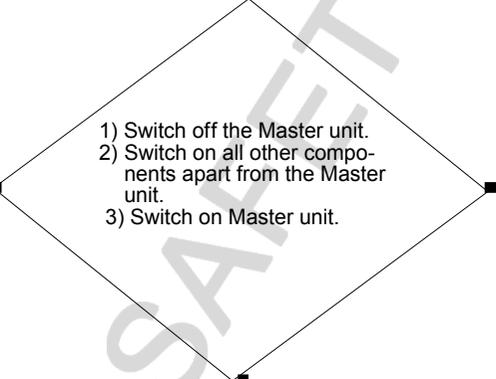
This operation is essential if you are to avoid an improbable, but possible, confusion with a component that does not belong in the set up.

7.4 General procedure for setting up multiple configurations

1) Unlock the components (see section 7.5.1), sensors and display units, to be used in the multiple configuration.
 2) Switch off all hardware.

1) Select a unit to be the Master Display Unit in the configuration.
 2) Select the unit(s) that will be the Slave units in the configuration.
 3) Check / Set appropriate mode (see section 7.5.4)

1) Switch on Master unit and use  to check that no foreign element is present on the Master radio channel. (see section 7.5.5)
 2) If needed select another channel (see section 7.5.6)



The components to be included, using the Master unit channel, are identified by the Master and automatically associated with a multiple configuration.
 Check the associations using 

Sensors see : section 7.5.7.1 a
 D. units see: section 7.5.7.2 a

Unidentified sensors.
 Add one or more sensors working on a different radio channel to the Master unit

See 7.5.7.1 b

Unidentified display units.
 Add one or more Slave display units working on a different radio channel to the Master unit

See 7.5.7.2 b

7.5 Tools for setting up multiple configurations.

This chapter describes all of the tools that might be required for setting up a multiple configuration.

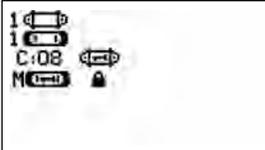
7.5.1 Unlocking an assembly.

To be able to operate in "Multiple Configuration", the sensor / display unit assemblies must be previously "unlocked".

To unlock an assembly, follow the instructions described hereafter:

Using the arrows, move to the icon:  and confirm with 

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	Return to standard display	Status check.  = 1 sensor detected  = the display unit at hand C: 08 = No. of radio channel in use M = Display unit is Master.  = The sensor / display couple is locked.
ESC	Return to standard display	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

33



	Confirm the selection	Unlocking an assembly. IDENT = Serial No. Select the  icon and confirm with  Select and confirm  = The sensor / display couple is locked.  = The sensor / display couple is unlocked.
ESC	Return to standard display	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

7.5.2 Locking an assembly.

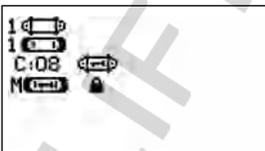
Unless otherwise ordered, the radio link-up between the sensor and the display unit is "locked" in the factory before dispatch. In this configuration, the sensor / display unit assembly, switched on, creates a sealed "couple" impervious to any other radio link.

On switching on, the display unit only seeks out the sensor to which it is locked.

To lock an assembly, follow the instructions described hereafter:

Using the arrows, move to the icon:  and confirm with 

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	Confirm the selection	Locking an assembly. IDENT = Serial No. Select the Sensor/ Display intersection box and confirm using  Select and confirm   = The sensor / display couple is locked.  = The sensor / display couple is linked. Locking is only possible if no other assembly association is shown on the screen.
ESC	Return to standard display	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

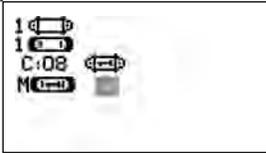
7.5.3 Associating an assembly

To be able to operate in "Multiple Configuration", the sensor / Slave display unit must be "associated" with the Master display unit.
On switching on, the display unit seeks out all the sensors that are powered up and operating on its radio channel.

To associate an assembly, follow the instructions described hereafter:

Using the arrows, move to the icon:  and confirm with .

35



	Confirm the selection	Associate an assembly. IDENT = Serial No. Select the Sensor/ Display intersection box and confirm using  Select and confirm   = The sensor / display couple is associated. Note: You can associate several different elements.
ESC	Return to standard display	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

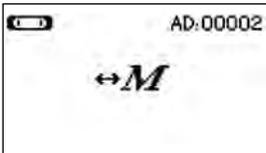
GB

7.5.4 Setting display unit parameters in Master and Slave mode

As the Slave display unit(s) operate only as replicas of the Master unit, the " modification of sensor parameters " and "associate" functions are no longer available.
To set parameters for Master and Slave modes, the units must be locked (see section 7.5.1)

From the standard display screen

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	Confirm the selection	Set Master / Slave parameters: Go to icon  Confirm with  Select the available option. Confirm with  Using the arrows, make selection: M = Master display unit. S = Slave display unit. Confirm with 
ESC	Return to standard display	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

Master or Slave mode appears when the display unit is powered up.

37



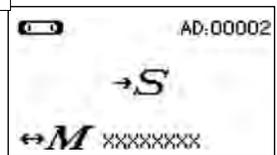
Master display unit

38



Slave display unit

39



When a display unit is "Slave" you can identify the Master unit to which it is associated.

7.5.5 Radio channel availability

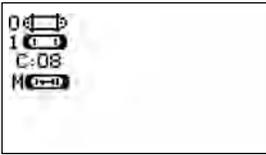
When switching on the Master display unit of a multiple configuration, it will scan the radio environment in order to ensure that the radio channel selected to create the multiple configuration is not already in use by other appliances that are foreign to the future configuration.

Should the case arise, the display unit will display the message "CHANNEL OCCUPIED". In this case, select a other channel (see § 7.5.6)

To check radio channel availability, follow the instructions provided hereafter:

Using the arrows, move to the icon:  and confirm with .

40



	Return to standard display	Radio network parameter settings. C: 08 = No. of radio channel When no element is shown on the channel used by the display unit, this means that the channel is fully available and would be suitable, for example, for a multiple configuration
ESC	Return to standard display	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

7.5.6 Changing the radio channel

16 channels are available on the 2.4 GHz frequency .

The assembly operation channels are allocated in a random fashion in the factory .

Within a radius of 80 m (in open field) you can operate up to 16 assemblies or 16 multiple configurations, each on its own channel.

Please consult the manufacturer if more than 16 channels are required.

To change an assembly's channel, first of all change the display unit channel and use the "Add asensor" procedure (section 7.5.7.1 b) to automatically modify the sensor channel and reconstitute the assembly.

To change the radio channel, follow the instructions described hereafter:

Using the arrows, move to the icon:  and confirm with .

41



	Return to standard display	Radio network parameter settings C: 8 = No. of radio channel Select C:08 and confirm  Select another channel. Confirm with  The unit seeks, displays and identifies the appliances present on the selected channels. The assemblies, locked or associated, and switched on will not be identified.
ESC	Return to standard display	
	Increment the channel Nos.	
	Decrement the channel Nos.	

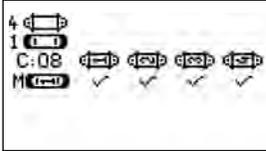
7.5.7 Association of components

7.5.7.1 Adding one or more sensors

a) Adding sensors operating on the same channel as the Master display unit.

Using the arrows, move to the icon , confirm and follow the procedure described hereafter:

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	Confirm the selection	Associate several components. Once the general procedure has been followed, the sensors operating on the same channel as the Master unit are automatically associated. <input checked="" type="checkbox"/> = The sensor / display couple is associated. You can dissociate components: <input type="checkbox"/> = The sensor / display couple is dissociated.
ESC	Return to standard display	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

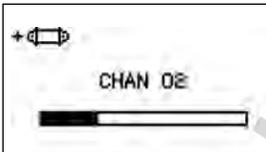
b) Adding sensors operating on a different channel to the Master display unit.

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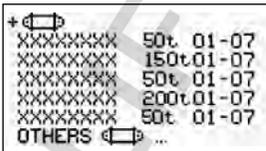
	Confirm the selection	Adding sensors: Go to the parameter setting menu and select option +  Confirm with <input checked="" type="checkbox"/>
ESC	Return to previous window	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

44



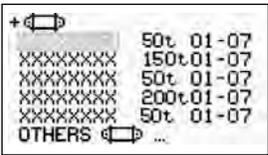
	No action	Scan environment: The display unit scans all of the channels other than its own and identifies all the sensors, unlocked or disassociated, within an 80 m radius.
ESC	No action	
	No action	
	No action	

45



	Confirm the selection	Identification of the sensors present The first five sensors that are powered up, unlocked or disassociated, present with a radius of 80 m are displayed on the screen. If there are more than five, select the "others" line (or "start of list") and confirm to display all the sensors present. XXXXXXXX = Serial No. 50t / 150t = capacity 01 07 = calibration date
ESC	General reset with no addition of sensor	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

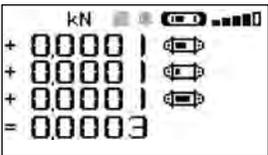
46



	Confirm the selection	Selecting one of the sensors present: Select the sensor that will be added to the multiple configuration. The sensor's channel will be automatically modified. Confirm with <input checked="" type="checkbox"/> You can only add one sensor at a time. Re-start the sequence for each added sensor.
ESC	General reset with no addition of sensor	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

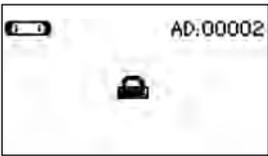
47

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	No action	Re-start sensors + 1 in in X mode: After you have confirmed your selection, the messages "addition in progress" followed by "completed" are displayed. Following this the unit re-boots. All of the associated sensors are displayed in the standard window.
ESC	No action	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

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	No action	Adding a sensor: It is not possible to add a sensor if the Sensor / Display unit assembly is locked. First of all unlock the assembly before continuing, see section 7.5.1
ESC	No action	
	No action	
	No action	

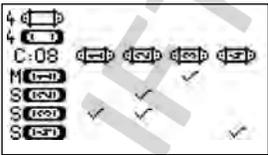
7.5.7.2 Adding a Slave display unit.

a) Adding Slave units operating on the same channel as the Master display unit.

Using the arrows, move to the icon , confirm using and follow the procedure described hereafter:

You can simultaneously associate sensors and Slave display units operating on the same channel, all the components powered up appear in the "radio link" window

49



	Confirm the selection	Associate several components: Once the general procedure has been followed, the Slave units operating on the same channel as the Master unit are automatically associated. <input checked="" type="checkbox"/> = The sensor / display couple is associated. You can dissociate components: <input type="checkbox"/> = The sensor / display couple is dissociated.
ESC	Return to standard display	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

b) Adding a display unit operating on a different channel to the Master display unit.

50

CONFIG MENU
DATE-TIME
COEFFICIENTS
MEMORY
+ [Battery Icon]
+ [Battery Icon]

	Confirm the selection	Adding a display unit. Go to the parameter setting menu and select option + [Battery Icon] Confirm with <input checked="" type="checkbox"/>
ESC	Return to previous window	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

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CHAN 02

	No action	Scan environment: The display unit scans all of the channels other than its own and identifies all the Slave units, switched on, within an 80 m radius (in open field).
ESC	No action	
	No action	
	No action	

52

XXXXXXXX
XXXXXXXX
XXXXXXXX
XXXXXXXX
XXXXXXXX
XXXXXXXX
XXXXXXXX
OTHERS [Battery Icon] ...

	Confirm the selection	Identification of the display units present: The first five Slave units that are powered up, unlocked or disassociated, present with a radius of 80 m are displayed on the screen. If there are more than five, select the "others" line (or "start of list") and confirm to display all the slaves present. XXXXXXXX = Serial No.
ESC	General reset with no addition of display	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

53

XXXXXXXX
XXXXXXXX
XXXXXXXX
XXXXXXXX
XXXXXXXX
XXXXXXXX
XXXXXXXX
OTHERS [Battery Icon] ...

	Confirm the selection	Selecting one of the display units present Select the Slave display unit that will be added to the Master display unit. The display unit operating channel will be automatically modified. Confirm with <input checked="" type="checkbox"/> You can only add one display unit at a time. Re-start the sequence for each added display unit
ESC	Return to the standard screen with no additional display	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

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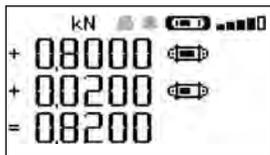
4 [Battery Icon]
4 [Battery Icon]
C: 08 [Battery Icon] [Battery Icon] [Battery Icon] [Battery Icon]
M [Battery Icon]
S [Battery Icon]
S [Battery Icon]
S [Battery Icon]

	No action	To finalise the procedure and use the equipment in multiple configuration, power down all equipment and then power up again, starting with the sensors and the Slave units and finishing with the Master display unit. Check the configuration using the icon [Battery Icon] The example shows a configuration where 4 sensors are associated with 4 display units.
ESC	No action	
	No action	
	No action	
	No action	

GB

7.6 Display in multiple configuration

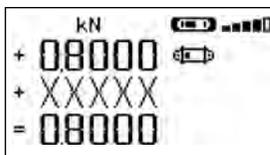
55



	No action	Two-sensor display: Displays the signed measurement Displays the total The sensor icons indicate their battery levels
ESC	No action	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

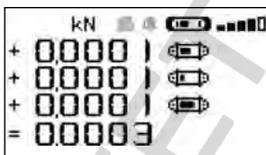
GB

56

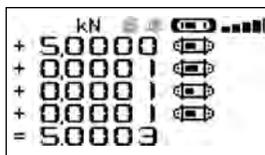


Loss of link on one sensor

57

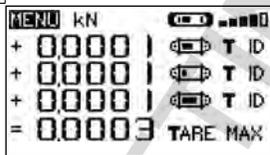


58



7.6.1 Multiple Display menu

59



	Confirm the selection	Navigation: En appuyant sur une des deux flèches, l'ensemble des fonctions disponibles apparaît. By pressing on either of the two arrows, all available functions are displayed. Move from icon to icon using the arrows. + = By modifying the measurement sign, the value can be added or subtracted from the total. 0 = the measurement will not be taken into account T = individual tare TARE and MAX acting on total. ID = Sensor identification
ESC	Return to standard display	
	Move clockwise from icon to icon	
	Move anticlockwise from icon to icon	

The elementary and advanced functions are accessible as in the case on single display .
The menu navigation and usage principle is the same irrespective of the number of associated sensors.

8 PC CONNECTION (OPTIONAL)

8.1 Description

The PC connection kit option is made up of a USB lead, a CD-ROM for installing the management software in Windows and a user manual.

The PC connection enables you to simultaneously manage up to 8 sensors.

The main PC connection functions are: The processing, saving in table or graph format and printing of measurement data.

The PC connection must be made using the Tractel® software, and after having read the user manual.

9 MAINTENANCE, CHECKING AND CLEANING

9.1 Battery and power pack status

The icons provide a constant indicator of the state of charge in the sensor batteries and display unit power pack.

In the event of a weak charge, replace the sensor batteries.

Regularly charge the power pack supplied with the display unit using the dynafor™ charger.

 **IMPORTANT:** Power pack may be changed only by the manufacturer

Characteristics: Leclanché LiPO 3,7 V/ 1300 mAh. Charge 1,3 A max 4,2 V.

9.2 Changing sensor batteries

Using a Phillips screwdriver, remove the battery housing cover.

Place the 3 1.5 V "AA" batteries (or 3 1.2 V "AA" batteries) checking the polarities.

Replace the battery housing cover.

9.3 Regulatory check

9.3.1 Certificate of Adjustment

New appliances come with a certificate of adjustment. This document indicates the values obtained during adjustment and certifies that the sensor has been adjusted, in compliance with an in-house procedure, on a calibration bench with its calibration sensor connected to the International Standard calibrator.

Tractel® recommends an annual metrological check for every appliance.

9.3.2 ISO 376 calibration certificate

On request, appliances can be supplied with an ISO 376 calibration certificate.

This document certifies, with figures as proof, that the appliance has been calibrated in compliance with the ISO 376 Standard, on a calibration bench with its calibration sensor connected to the International Standard calibrator.

This certificate is valid for a maximum period of 26 months.

Tractel® recommends an annual metrological check for every appliance.

9.4 Maintenance

The sensor / display unit assembly requires no specific maintenance other than a regular cleaning with a dry cloth.

10 STORAGE, TRANSPORT, DISPOSAL

Storage: Place the appliance in its original packaging, with the sensor batteries removed. Keep in a warm, dry place.

Transport : Transport the appliance in its original packaging.

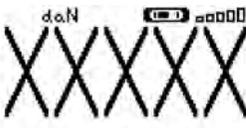
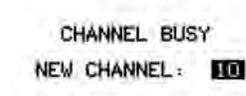
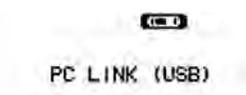


IMPORTANT : Avoid subjecting the dynafor™ LLXh to shocks

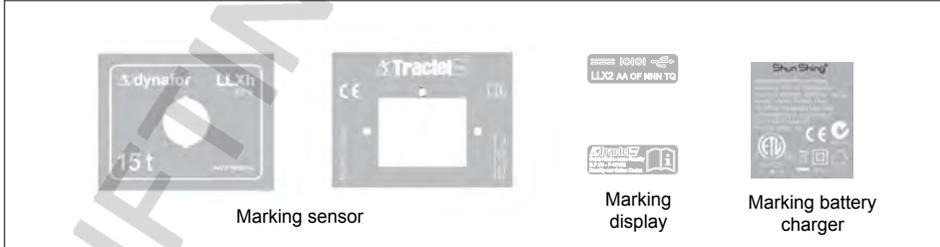
Disposal: Any disposal of the appliance must be carried out in compliance with the regulations in force in the country of use. For countries subject to European regulations, the dynamometers and remote controls (display units) do not come under the terms of the "DEEE" and "RoHS" directives.

11 OPERATING ANOMALIES AND TROUBLESHOOTING

Display	Possible causes	Solutions
No initial reset	Tare Function enabled Permanent deformation of the sensor following a handling error; excessive overload or compression.	Disable the Tare function and display the "GROS" stress value The appliance should be checked by the manufacturer before you continue using.
The sensor does not switch on	Dead batteries Electronic fault	Change batteries Contact the after-sales service
The display unit does not switch on	Dead power pack Electronic fault	Charge power pack Contact the after-sales service
Sensor LED flashes at 4 hertz. (4 per second)	No communication between the sensor and its electronic board.	Contact the after-sales service
No display evolution or display inconsistent.	Sensor or sensor electronics malfunction.	Reset: Switch off the sensor and display unit and then switch on the sensor followed by the display unit. In the event of persistent malfunction, contact the after sales service
Linearity or precision problem.	Sensor or sensor electronics malfunction.	Contact the after-sales service

Trouble	Possible causes	Solutions
	Dead sensor batteries Sensor switched off or switched to take standby mode (see 27) Sensor too far from display unit Network conflict	Replace batteries Switch off display unit, switch on sensor, switch on display unit. Bring appliances closer together Check network configuration (advanced functions section 6.3.2.4).
	Sensor subject to compression or torsion Negative imbalance of gauge bridge	Eliminate compression stress on sensor Contact the after-sales service
	Switch on a Master display unit on a site where several LLXh are already operating.	Select a other channel (see § 7.5.6)
	A connection has been made using an USB lead between the display unit and the PC without having installed the Tractel® software	Use the Tractel® "PC Link" option
Ineffective display	Malfunction of the display	Keep the ON/OFF key pressed during 10 sec. Reboot both load cell and display (see 6.1)

12 PRODUCT MARKING



All of the indicators and labels placed on the product by the manufacturer must be kept clearly readable. Should they be lost or damaged, replace these indicators and labels before continuing to use the appliance. Tractel® can provide new labelling on request.