dynafor™

Series LLX2 Electronic Dynamometer
dinamómetro electrónico serie LLX2
dinamometro elettronico serie LLX2
dinamómetro electrónico série LLX2

English

Español

Italiano

Português

0,5 / 1 / 2 / 3,2 t **5 / 6,3 t** **10 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**

Tractel Group

GB

TABLE OF CONTENTS

The functions described hereinafter enable standard use of the dynador® LLX2
The possibilities offered by dynador® LLX2 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™ LLX2 dynamometers are precision appliances (0.1% ISO 376 . 21°C) (I.P. 67 = 0,2%), for measuring pulling force and indicating loads. The capacity scale ranges from 500 daN to 10000 daN.

A dynafor™ LLX2 is made up of a sensor and a mobile display unit.

A two-way radio link-up using the 2.4 GHz wave band conects 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 specific, patented shape of the attaching head enables you to use either standard shackles or standardised accessories for chains.

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The LLX2 is available in two versions: Standard version with interlinking anchoring rings in the perpendicular surfaces, or an optional version with the anchoring rings both on the same side (see Page 9 diagram). The standard version enables articulation of lifting accessories on both sides, thus avoiding stresses due to load movements and enhancing appliance precision.
These assemblies are put together on our production line and cannot be modified later by the user.

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 function such as: saving, threshold management, monitoring etc.

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

The standard version of the equipment comes with batteries and power pack in a carrying case containing:

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™ LLX2 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 LLX2 model sensors, irrespective of their capacity. Unless otherwise ordered, the radio link-up between the 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.

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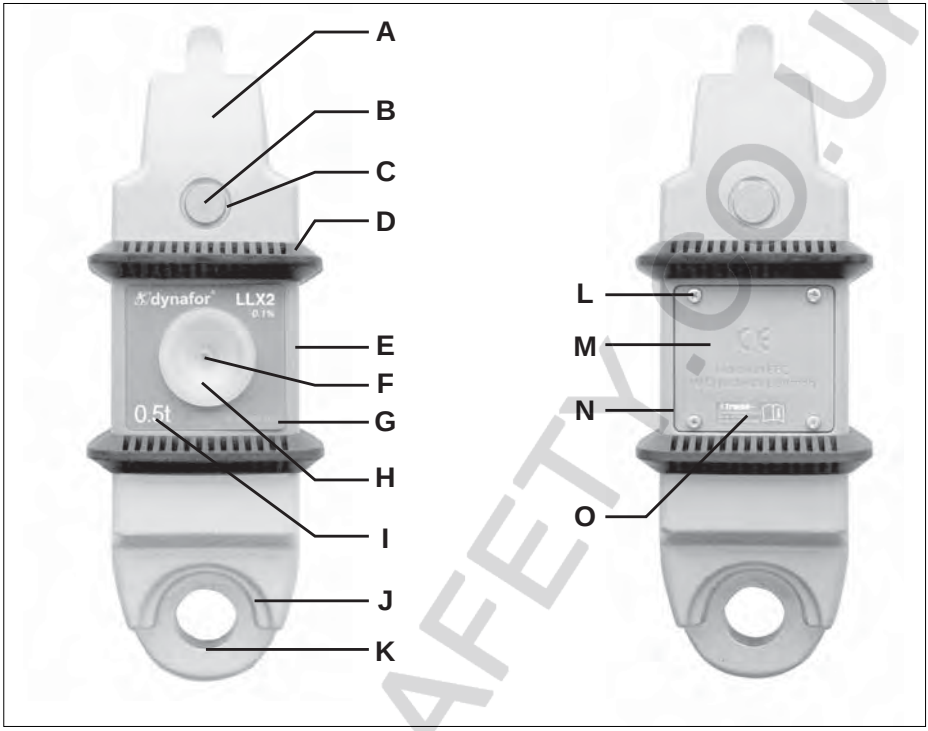
1.2 Description and marking

1.2.1 Sensor

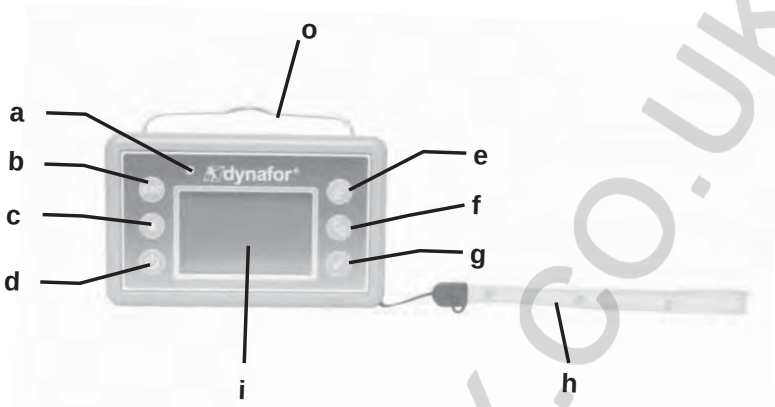


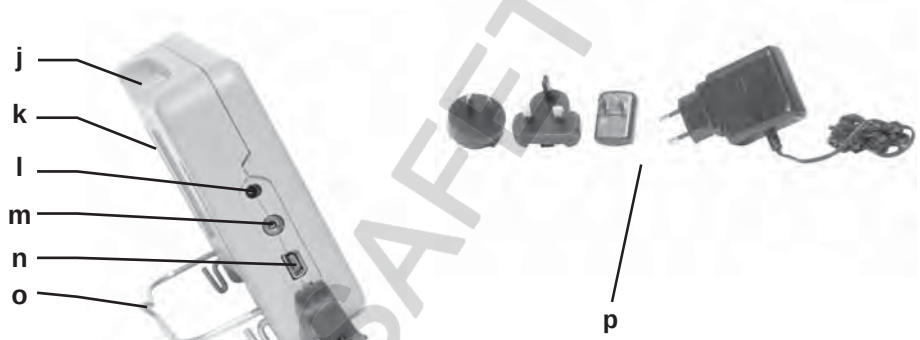
A	Attaching head	**I**	Maximum sensor capacity
B	Coupling stud	**J**	Shackle centring flange
C	B stud securing clip	**K**	Attaching ring
D	Protective bumper	**L**	M Securing screws
E	Protective housing	**M**	Battery cover
F	On / Off button	**N**	Battery housing (3 x "AA")
G	Serial No.	**O**	Manufacturer's label
H	Operating indicator		

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





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.

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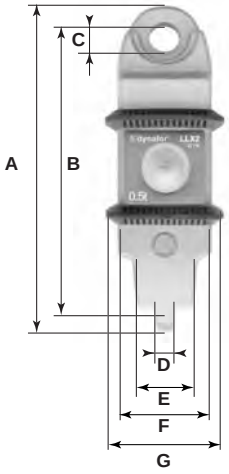
2. SPECIFICATIONS

2.1 Sensor and Display Unit



Coplanar version

MODEL		LLX2 0.5 t	LLX2 1 t	LLX2 2 t	LLX2 3.2 t	LLX2 5 t	LLX2 6.3 t	LLX2 10 t	Disp. Unit
Maximum capacity	t	0.5	1	2	3.2	5	6.3	10	**All**
Test load	t	0.75	1.5	3	4.8	7.5	9.6	15	-
Safety coefficient		Minimum 4							-
Precision		0,1 % according to ISO 376 . 21°C (I.P. 67 = 0,2%)							-
	daN	0.5	1	2	3.2	5	6.3	10	-
Increment	daN	0.1	0.2	0.5	0.5	1	1	2	<-
Max. Display	daN	550	1100	2200	3500	5500	6900	11000	<-
Number height	mm	-	-	-	-	-	-	-	25
Autonomy		From 300 to 3000 h depending of functions							48 h
Radio scope	m	80 (in open field) (I.P. 67 = 60)							
RF technology		2.4 Ghz							
Weight	kg	2.300				3.350		6.45	0.180
IP Protection		I.P. 66 NEMA 4 (I.P. 67 option)							I.P. 54
Usafe		From - 20° to 40°C							
Sensitivity to T°		0.05% per 10°C							
Head material		Steel							-
Sensor material		Aluminium						Steel	-
Dimensions mm	A	248	248	248	248	290	290	341	-
	B	224	224	224	224	254	254	296	-
	C	Ø 20	Ø 20	Ø 20	Ø 20	Ø 28	Ø 28	Ø 40	-
	D	10	10	10	10	16	16	20	-
	E	24	24	24	24	35	35	54	-
	F	80	80	80	80	80	80	80	-
	G	100	100	100	100	100	100	100	-
	h	-	-	-	-	-	-	-	26.7
	i	-	-	-	-	-	-	-	131
	j	-	-	-	-	-	-	-	82

2.2 Anchoring accessories

2.2.1 Chain anchoring accessories

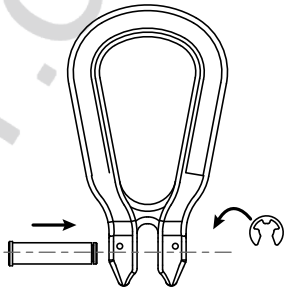
To facilitate assembly and disassembly, Tractel offers a series of accessories for G 80 chain, equipped with treated steel pins and DIN 6799 support collar type elastic rings.
The accessories are delivered boxed.

To implement this solution, it is essential that you use Tractel supplied pins and collars.

Using a pin with support collars.

Position the chain accessory on the sensor attachment ring and slide the pin through the holes in the accessory and the sensor
Lock off the pin with a collar.

For preference, use an assembly fork for the DIN 6799 collar.



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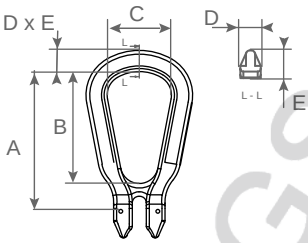
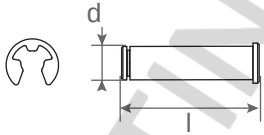
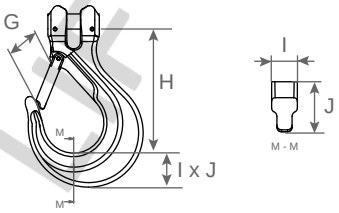
2.2.1.1 Size in mm



WLL	A	B	C	D	E
0.5 < >3.2 t	111	88	50	17	17
5 - 6.3 t	185	150	85	27	29
10 t	210	155	95	27	31



WLL	d	l	Support collar
0.5 < >3.2 t	13	50	10 mm DIN 6799
5 - 6.3 t	20	76	15 mm DIN 6799
10 t	24	92	19 mm DIN 6799

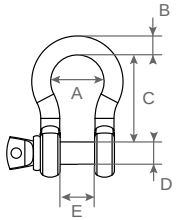


WLL	G	H	I	J
0.5 < >3.2 t	41	110	25	30
5 - 6.3 t	67	164	34	47
10 t	80	195	43	50

2.2.2 Cable anchoring accessory

Any shackle that complies with the relevant regulations can be used for dynafor™ LLX2 to be mounted onto a traction line, as long as it complies with the dynafor™ LLX2 maximum capacity.

2.2.2.1 Size in mm



WLL	A	B	C	D	E	kg
0.5 < >3.2 t	42	16	60	19	27	0.6
5 - 6.3 t	58	22	84	25	37	1.4
10 t	89	35	132	38	57	4.4

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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

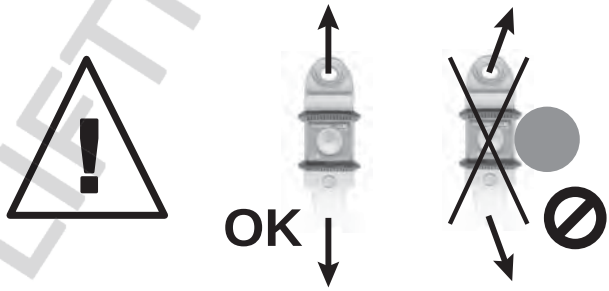
Before setting up and using the dynamometer you must:

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™ LLX2 in traction, avoiding compression, twisting or flexing.
The appliance can be used in all directions, including horizontally.
The dynafor™ LLX2 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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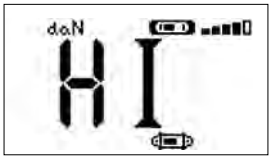
It is prohibited:

- **To use dynafor™ LLX2 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 15 % (e.g.: a 5 t loaded at 5.75 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.

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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

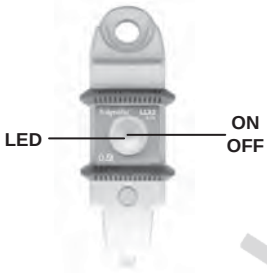
6.1.1 Enabling the sensor batteries

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.

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



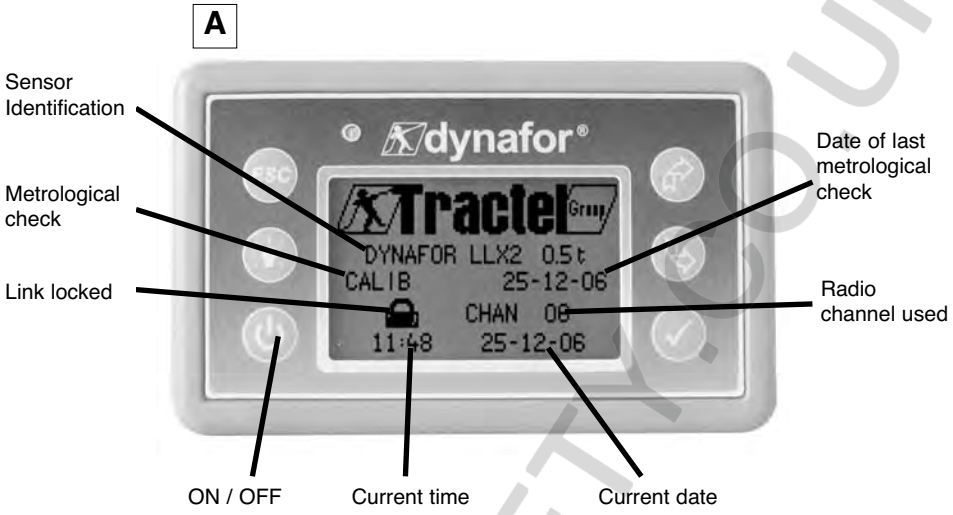
6.1.3 Turning on the sensor

Press the centre of the flexible cap covering the switch.

On switching on the two red LED will flash.

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



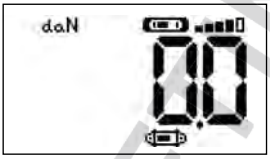
The welcome screen is shown for 4 seconds, then the standard display window is shown.

6.2 Elementary functions

This chapter presents the functions that enable elementary use of dynafor™ LLX2

6.2.1 Standard display screen

X



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

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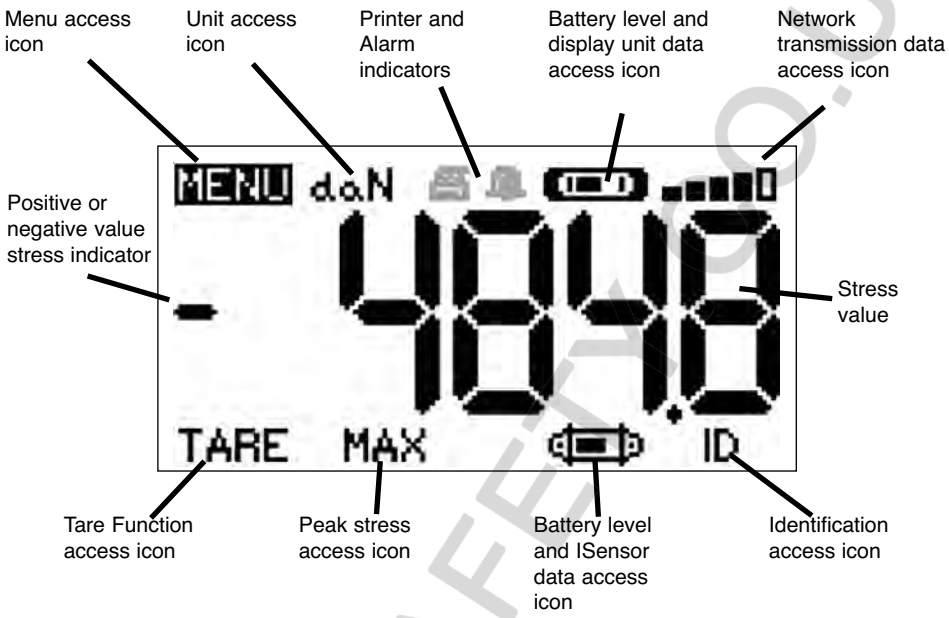
6.2.2 Detailed description

Display all of the icons by pressing on one of the buttons  or 



6.2.3 Icons

a) Active icons:

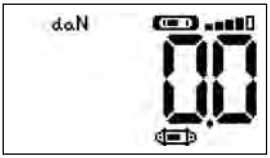
Menu access icon: offers access to advanced functions (See chapter 6.3)
Units access icon: enables measurement unit selection (See section 6.2.4.3)
Tare Function access icon: enables Tare function (Gross / Net Load) (See section 6.2.4.4)
Peak Stress access icon: enables the maximum stress save function (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
1 	✓ No action **ESC** No action Select an icon Select an icon	**Standard Display:** Sensor stress Measurement units Display unit power pack level Sensor battery level Radio reception level

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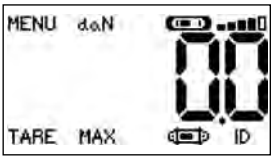
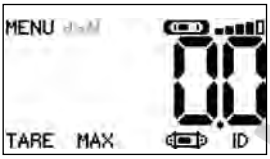
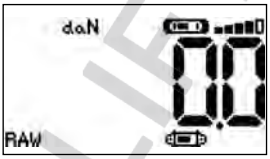
6.2.4.2 Navigating between icons

2 	✓ Confirm current selection **ESC** Return to standard display Move clockwise from icon to icon Move anti-clockwise from icon to icon	**Navigation:** By pressing on either of the two arrows, all available functions are displayed. Move from icon to icon using the arrows.

6.2.4.3 Measurement unit selection

3 	✓ Confirm selection **ESC** Return to standard display without modification Select an icon and enable the available options Select an icon and enable the available options	**Select Unit: daN, kN, kg, t, Lbs, Ton.** Select the unit icon, which starts flashing. Confirm with ✓ Enable the various unit symbols: daN, kN, kg, Metric ton, pounds, short Ton. Confirm with ✓

6.2.4.4 Tare Function

4 	✓ Confirm TARE option when it is highlighted. **ESC** Return to standard display without modification Select an icon and enable the available options Select an icon and enable the available options	**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

6.2.4.5 MAX Function (Peak stress save)

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	

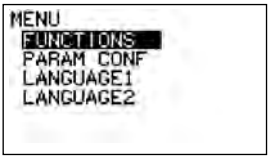
7

✓	Confirm selection	**Advanced Peak load functions:** In this mode you can saves the peak stress. 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

8

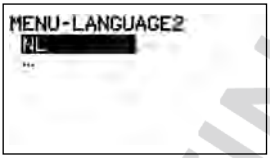


✓	Confirm selection	**Language group selection:** Select the MENU icon. Confirm with ✓ Select the required language group: LANGUAGE 1, LANGUAGE 2. Confirm with ✓
ESC	Return to standard display without modification	
	Select the available options	
	Select the available options	

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	

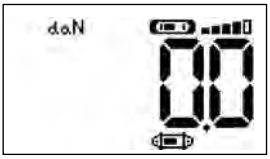
10



✓	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	

GB

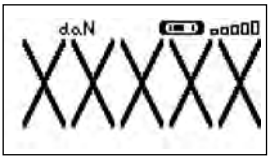
6.2.4.7 Stopping the device

Display	Action	Comments
11 	✓ No action ESC No action Select an icon and enable the available options Select an icon and enable the available options	**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.

GB

6.2.5 Error Messages

No radio reception

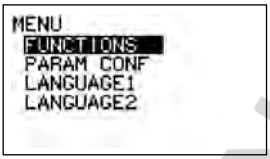
12 

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

6.3 Advanced functions

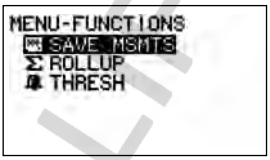
This chapter presents the functions that enable advanced use of dynafor LLX2
See the general overview of the programme at the end of the manual.

6.3.1 MAIN Menu

13 

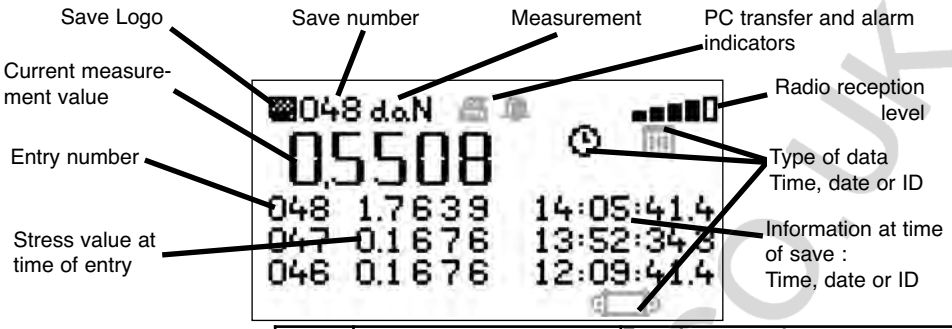
✓	Confirm selection	**Main Menu:** Select MENU. Confirm with ✓ Select the required sub-menu. Confirm with ✓
ESC	Return to standard display without modification	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

6.3.1.1 Functions Menu

14 

✓	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



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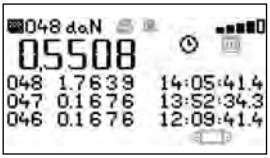
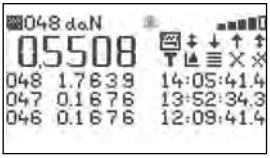
15



✓	Save	**Enregistrement de mesures :** Press ✓ to save: 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.
ESC	Return to standard display	
	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. See details and keys inthe 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	

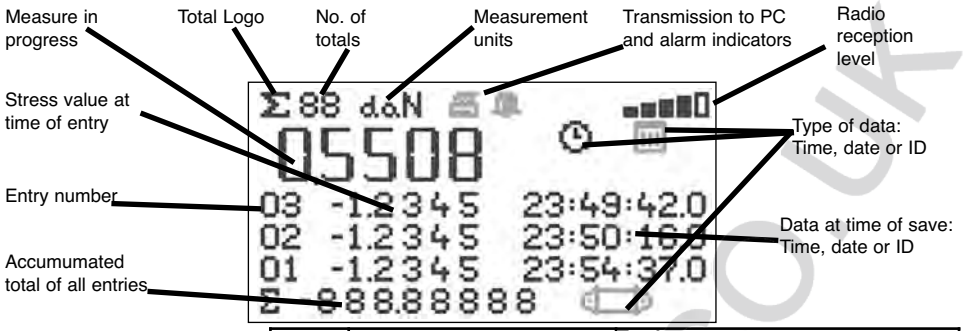
17

✓	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	

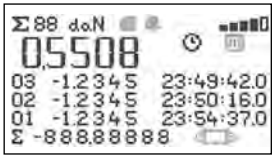
Save sub-menu keys

	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

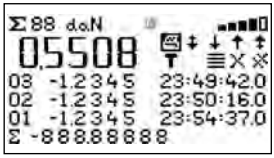


18



✓	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	

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	

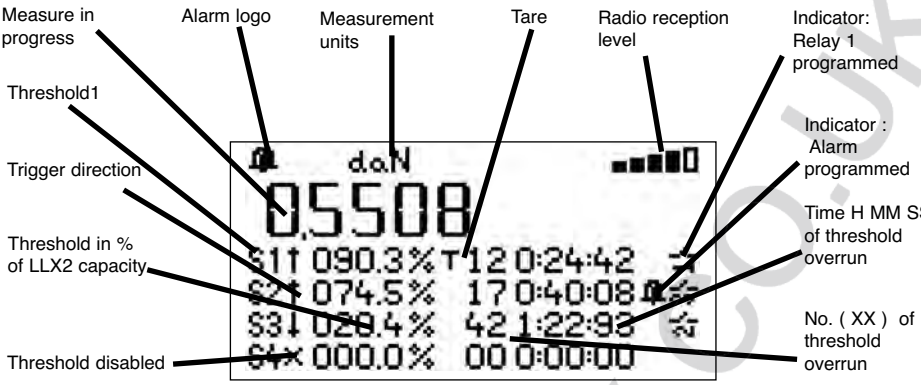
20

✓	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



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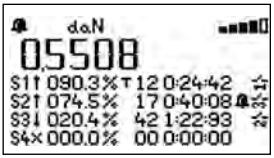
21

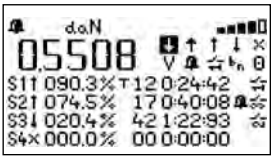


✓	No action
ESC	Return to standard display
	Select an icon and enable the available options
	Select an icon and enable the available options

Threshold Management:

This window displays the programming status of the 4 thresholds, sound alarms and programmable relays.

22



✓	Confirm selection
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:
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.

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

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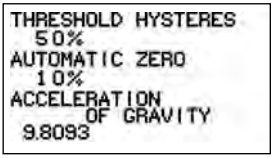
6.3.1.2 Parameter setting menu

Display	Action	Comments
23 	✓ Confirm selection ESC Return to previous display Select an icon and enable the available options Select an icon and enable the available options	**Parameter setting menu:** Select the sub-menu. Confirm with ✓ For + and + see multiple configuration chapter 7

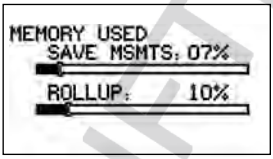
6.3.1.2.1 Date and Time

24 	✓ Return to main display ESC Return to main display Select an icon and enable the available options Select an icon and enable the available options	**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.

6.3.1.2.2 Coefficients

25 	✓ No action ESC Return to main display No action 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: coefficient used for the conversion N / kg. PARIS value by default

6.3.1.2.3 Available memory check

26 	✓ Return to main display ESC Return to main display No action No action	**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

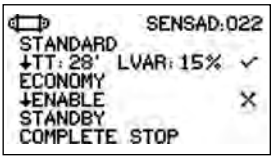
6.3.1.3 Languages

See section 6.2.4.6

6.3.2. Other icons on the standard screen

6.3.2.1 Sensor icon:

Sensor settings and data

Display	Action		Comments
27 	✓	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**

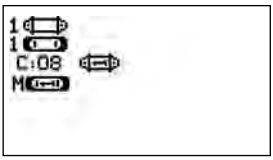
29 	✓	Return to standard display	**Display identification of elements in the network.** Sensor: Serial No., capacity, hardware version, software version, date of last calibration or adjustment Disp. Unit: Serial No., hardware version, software version.
	ESC	Return to standard display	
		No action	
		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 1 = 1 display unit detected C : 8 = No. of selected radio channel M = Display unit is Master. (E = Slave unit) = 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	

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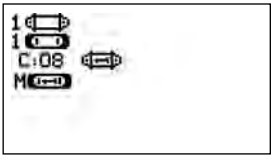
31



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

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

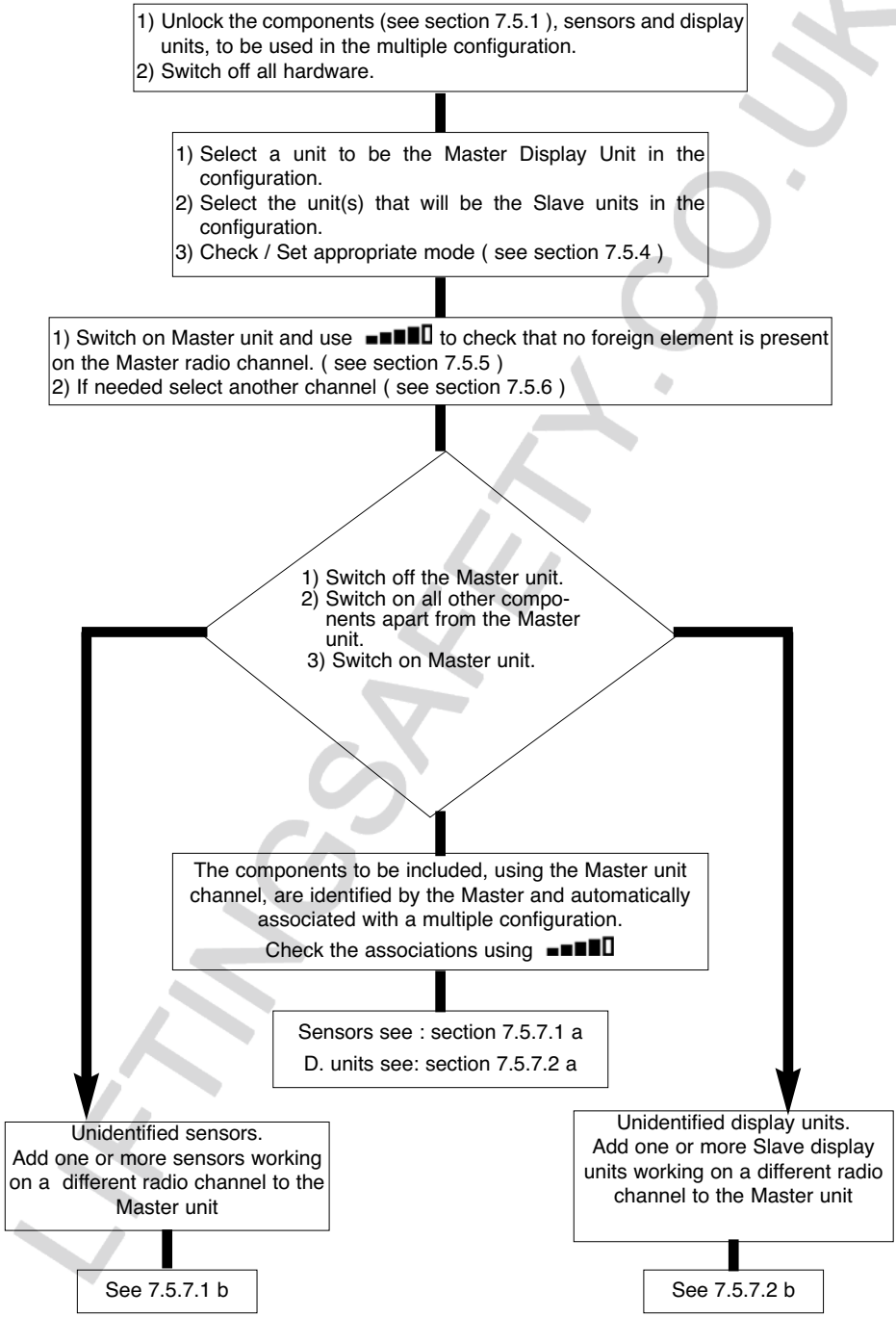
7.3 Safety Recommendations

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.

GB

7.4 General procedure for setting up multiple configurations



7.5 Tools for setting up multiple configurations.

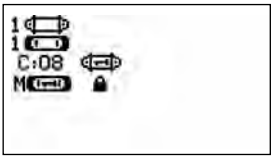
This chapter describes all of the tools that might be required for setting up a multiple configuration.

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:

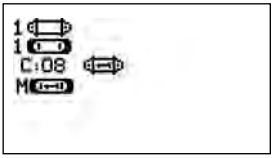
Using the arrows, move to the icon: ▬▬▮▯ and confirm with ✓

32



✓	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	

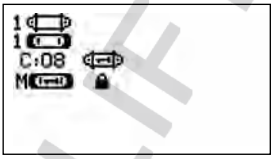
7.5.2 Locking an assembly.

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 ✓.

34



✓	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	

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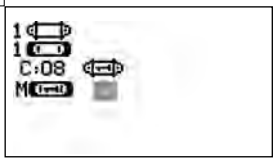
7.5.3 Associating an assembly

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



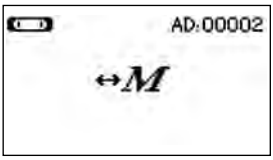
✓	Confirm the selection	**Associate an assembly.** IDENT = Serial No. Select the Sensor/ Display intersection box and confirm using ✓ Select and confirm ☑ ☑ = The sensor / display couple is associated. Note: You can associate several different elements.
ESC	Return to standard display	
	Select an icon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

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

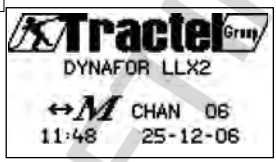
36



✓	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	

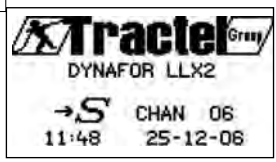
Master or Slave mode appears when the display unit is powered up.

37



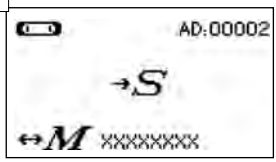
Master display unit

38



Slave display unit

39



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

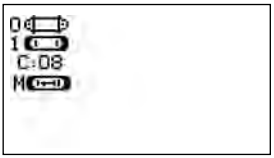
7.5.5 Radio channel availability

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: 4 = 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	

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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 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 a sensor" 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	**PRadio 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.	

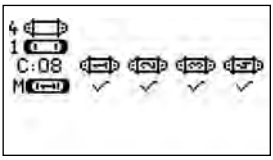
7.5.7 Association of components

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:

42

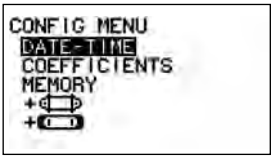


✓	Confirm the selection
ESC	Return to standard display
⇦	Select an icon and enable the available options
⇩	Select an icon and enable the available options

Associate several components.
Once the general procedure has been followed, the sensors operating on the same channel as the Master unit are automatically associated.
☑ = The sensor / display couple is associated.
You can dissociate components:
☐ = The sensor / display couple is dissociated.

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

43



✓	Confirm the selection
ESC	Return to previous window
⇦	Select an icon and enable the available options
⇩	Select an icon and enable the available options

Adding sensors:

Go to the parameter setting menu and select option
+

Confirm with ✓

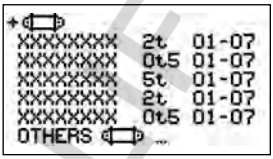
44

✓	No action
ESC	No action
⇦	No action
⇩	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.

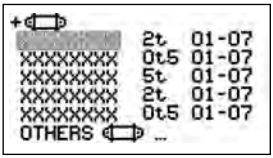
45



✓	Confirm the selection
ESC	General reset with no addition of sensor
⇦	Select an icon and enable the available options
⇩	Select an icon and enable the available options

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.
XXXXXXX = Serial No.
2t / 0t5 = capacity
01 07 = calibration date

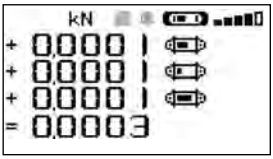
46



✓	Confirm the selection
ESC	General reset with no addition of sensor
	Select an icon and enable the available options
	Select an icon and enable the available options

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 ✓
You can only add one sensor at a time.
Re-start the sequence for each added sensor.

47



✓	No action
ESC	No action
	Select an icon and enable the available options
	Select an icon and enable the available options

Re-start sensors + 1 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.

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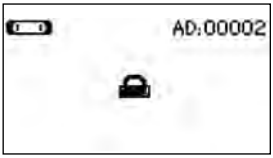


✓	No action
ESC	No action
	No action
	No action

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

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

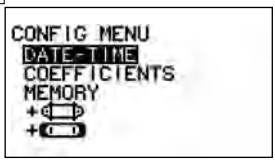
49

✓	Confirm the selection
ESC	Return to standard display
	Select an icon and enable the available options
	Select an icon and enable the available options

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.
☑ = The sensor / display couple is associated.
You can dissociate components:
☐ = The sensor / display couple is dissociated.

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

50



✓	Confirm the selection	**Adding a display unit.** Go to the parameter setting menu and select option + Confirm with ☑
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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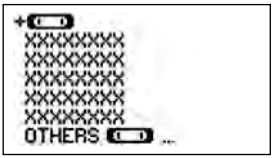
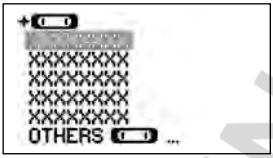
✓	No action	**Scan environment:** The display unit scans all of the channels other than its own and identifies all the Slave units, switched on, within an 80 m radius.
ESC	No action	
	No action	
	No action	

52



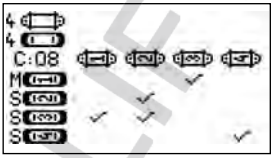
✓	Confirm the selection	**Identification of the display units present:** The first five Slave units that are powered up, unlocked or disassociated, present with a radius of 80 m are displayed on the screen. If there are more than five, select the "others" line (or "start of list") and confirm to display all the slaves present. XXXXXXX = 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



✓	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 ☑ 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	

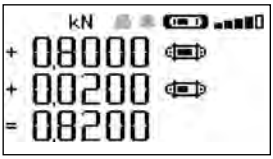
54



✓	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 The example shows a configuration where 4 sensors are associated with 4 display units.
ESC	No action	
	No action	
	No action	

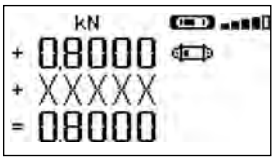
7.6 Display in multiple configuration

55



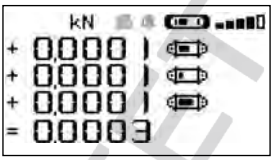
✓	No action	**Two-sensor display:** Displays the signed measurement Displays the total The sensor icons indicate their battery levels
ESC	No action	
	Select an icon and enable the available options	
	Select an icon and enable the available options	

56

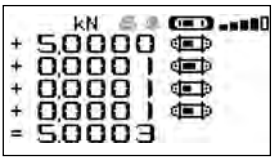


Loss of link on one sensor

57

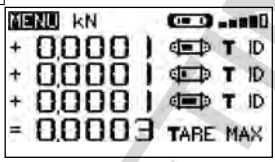


58



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.

GB

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 with 3 new 1.5 V "AA" batteries.

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

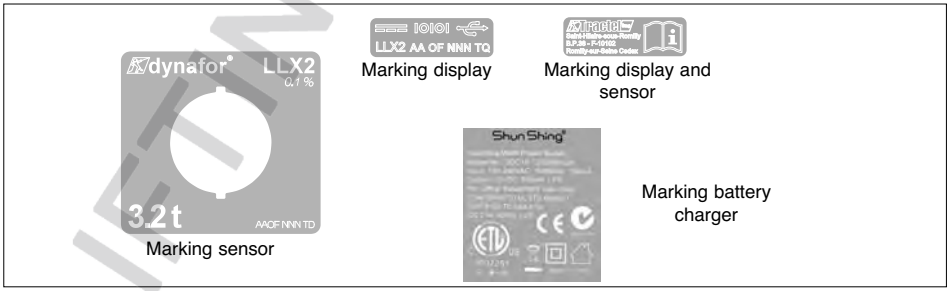
Disposal: Any disposal of the appliance must be carried out in compliance with the regulations in force in the country of use. For countries subject to European regulations, the dynamometers and remote controls (display units) do not come under the terms of the "DEEE" and "RoHS" directives.

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
daN XXXX	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).
daN	Sensor subject to compression or torsion Negative imbalance of gauge bridge	Eliminate compression stress on sensor Contact the after-sales service
CHANNEL BUSY NEW CHANNEL : 10	Switch on a Master display unit on a site where several LLX2 are already operating.	Select a other channel (see § 7.5.6)
PC LINK (USB)	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



Marking sensor

Marking display

Marking display and sensor

Marking battery charger

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.