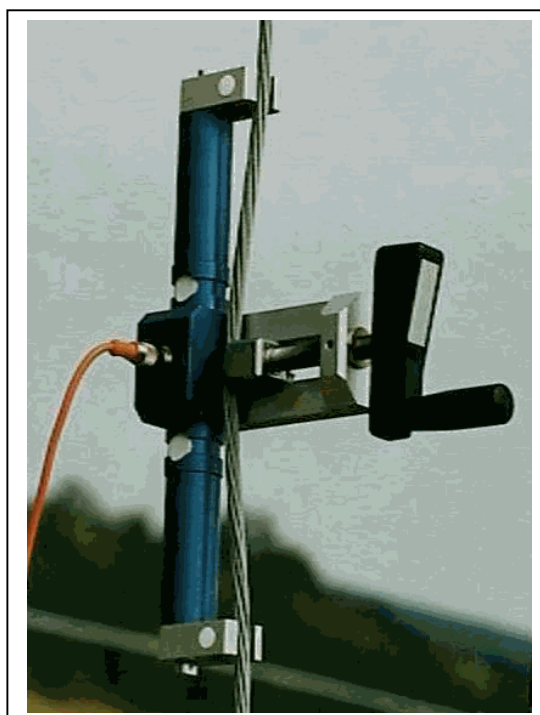


# Dynarope HF 36/.



**Operation and  
Maintenance  
Manual**

## PRIORITY RECOMMENDATIONS

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 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.
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.

# dynarope

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**GENERAL REMARKS.**

The HF 36 Dynarope allows the load in a tensioned wire rope to be measured without having to dismantle it.

The device includes an HF 36 strain gauges sensor and a digital display unit. An analogue display units is available as an option and can be used under specific repetitive conditions.

The accessories are: Lemo connection lead , battery charger, various leather protection boxes, RS 232 connection lead and a recuperation data's software.



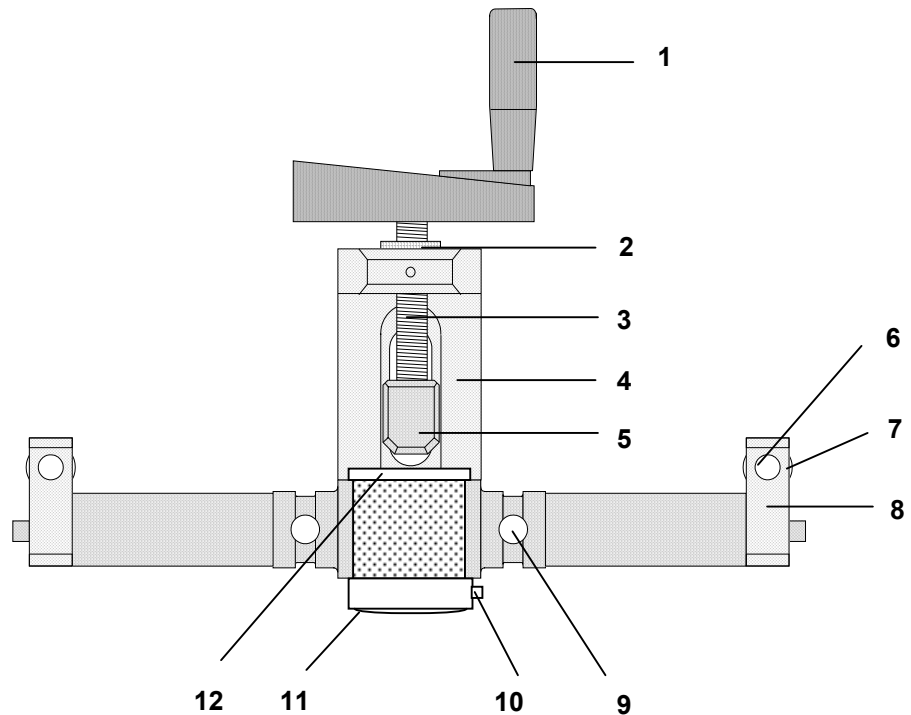
HF 36/1 + leather box

HF 87/1/P + leather box

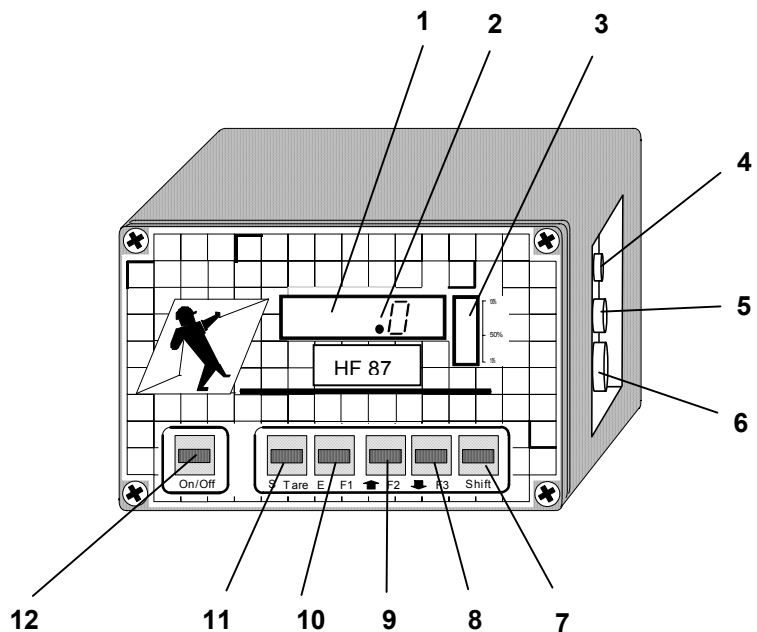


## COMPONENTS

1. Crank
2. Bronze nut
3. Threaded rod
4. Crank support
5. Pusher
6. Spool pin
7. Spool
8. Spool support
9. Strain gauges
10. Lemo plug
11. Frequency converter
12. Stop block  
(rotary on /2 & /3)



1. LED Display
2. Red dot \*
3. Vertical display
4. Power supply input
5. Load Cell input
6. RS 232 output
7. SHIFT button
8. F3 or ↓ ( Shift mode)
9. F2 or ↑ (Shift mode )
10. F1 or E (Shift mode )
11. TARE \*\* or S (Shift mode)
12. On/Off



\* Flashing while Shift mode

\*\* Not available with tensiometer.

## THE SENSORS

Three standards models are available.

- HF 36 / 0 for wire ropes from 3 to 8 mm diameter. Maximum capacity : 1.500 daN
- HF 36 / 1 for wire ropes from 4 to 13 mm diameter. Maximum capacity : 5.000 daN
- HF 36 / 2 for wire ropes from 10 to 22 mm diameter. Maximum capacity: 20.000 daN
- HF 36/ 3 for wire ropes from 20 to 44 mm diameter. Maximum capacity: 40.000 daN

Making some small modifications, standards load cells can be adapted to different capacities or wire ropes diameter .

- HF 36 / S is a complete special load cell made in accordance with the customer's requirement.

## HF 87/T DISPLAY UNIT

This is an microprocessor-based digital display unit. It uses a data base correction system.

There is a wide range of wire ropes on the market, each one has its specification in terms of composition, diameter, rigidity, elasticity, specific weight, etc . All these parameters influence the measurement result. The "raw" signal generated by the strain gauges is converted by the microprocessor using an included correction data base.

In accordance with the required accuracy, two different reading modes are provided.

### 1. Standard Mode

The Standard mode readout uses a data bank to correct the "raw" signal provided by the sensor. Prior to a wire rope control you have to enter in the display the followings details, via a simple to use menu :

- **Wire rope Diameter**
  - from 4 to 22 mm with a 1 mm increment.
- **Wire rope Structure**
  - Rigid (rIgl) = Steel single strand
  - Normal (nor ) = Steel multi-strand
  - Soft (SoFt) = Kévlar et textile ropes

#### When to use it ?

Standard Mode is used for load checking and balancing operations between different wire ropes. In this application repeatability of the measurement system, within the 1% range, is most important. The accuracy of the measurement is plus or minus 2,5%. (See data bank)

### 2. Special Mode

The Special Mode readout refers to calibration operations to correct the "raw" measurement value. Calibration is carried out under conditions identical to those found in actual situations. ( For example, the in-line insertion of a dynamometer into the wire rope system to be checked.) The parameters specific to each calibration are recorded numbered registers. When checks are made at a later date on the same wire rope system, to access into the corresponding register number to call up the system-specific parameters.

#### When to use it ?

The Special Mode readout is recommended for use when accuracy is most important. Accuracy obtained in this mode is 1 %.

## THE DATA BANK.

### General information.

The data bank was generated using measurements made on a tensile test bench. For each wire rope diameter stored in the memory, 5 similar wire ropes, but from different origin were selected amongst the widely sold wire ropes on the market.

Each stored measurement is the average of these measurements made following a 120° rotation of the sensor around the wire rope.

The measured strain is assumed to be equal to the strain generated by a suspended load.

The measurement wire rope is deemed to have a minimum length of 8 m, and assumed to be tensioned between a fixed end and a “flexible” end (e.g. an aerial mast) in order to render negligible the influence of placing the sensor on the cable. Placing the sensor on the wire rope causes a “shorting” of the wire rope by approximately 1,5 mm.

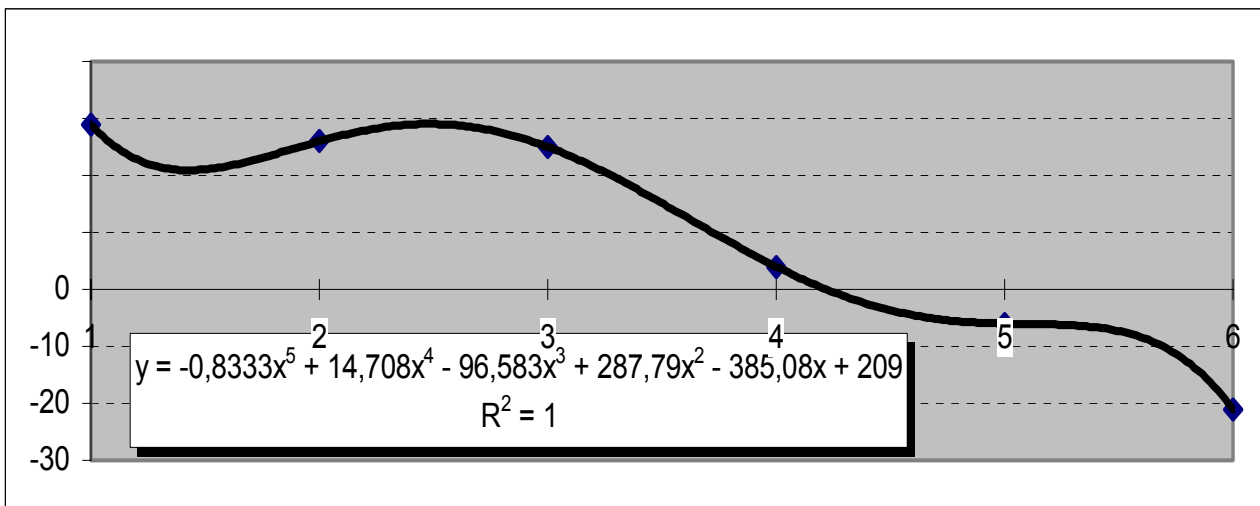
To achieve increased accuracy, measurement of wire rope not having those specifications may be carried out using the “Special Mode “

### Corrections.

The “raw” signal supplied by the sensor is digitalised and corrected by means of a formula corresponding to the specification of the measured wire rope.

Example of a 8 mm diameter, rigid wire rope (17 x 1)

1 = 250 daN	4 = 1000 daN
2 = 500 daN	5 = 1250 daN
3 = 750 daN	6 = 1500 daN



### Specific Calibration

The optional “Specific calibration” mentioned in the price list consist in including a new correction formula in the data bank. (Don’t mistake it with a “Custom Calibration”)

## CUSTOM CALIBRATION IN SPECIAL MODE

This process (made by the customer) allows to correct the “raw” signal provided by the sensor for a given wire rope at a given strain. Contrary to a specific calibration made by the factory that gives a correction with a formula.

A memory for 200 Custom calibrations is available.  
 In order to memorise the parameters of a given situation, prepare an installation as described below. (Or insert a dynamometer in the installation on the actual site.) and follow the user manual instruction.  
 See : Calibration process in the Special Mode.

### Calibration process

Fig 1

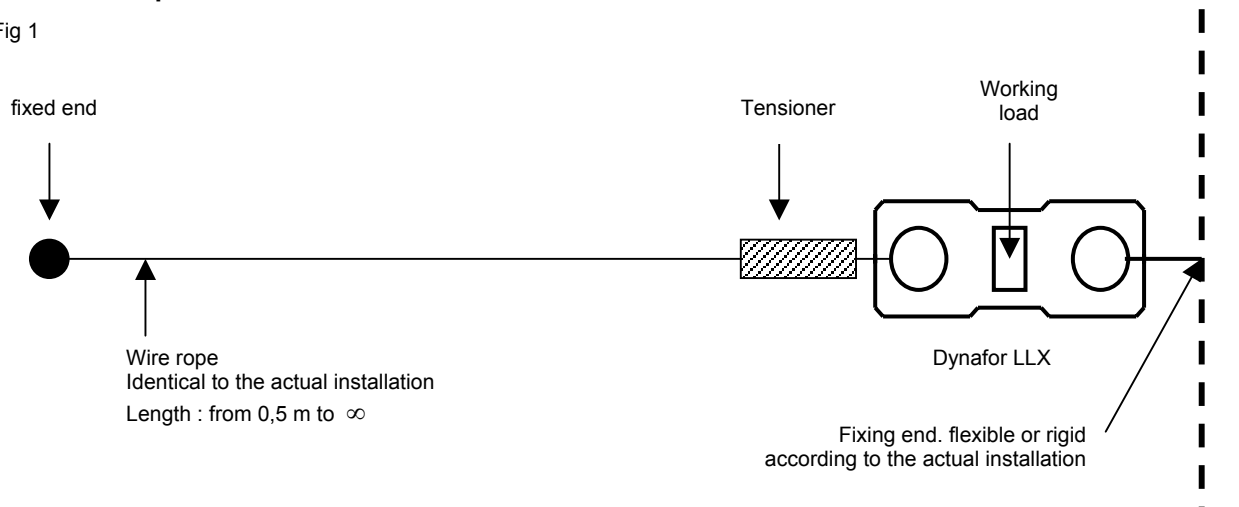
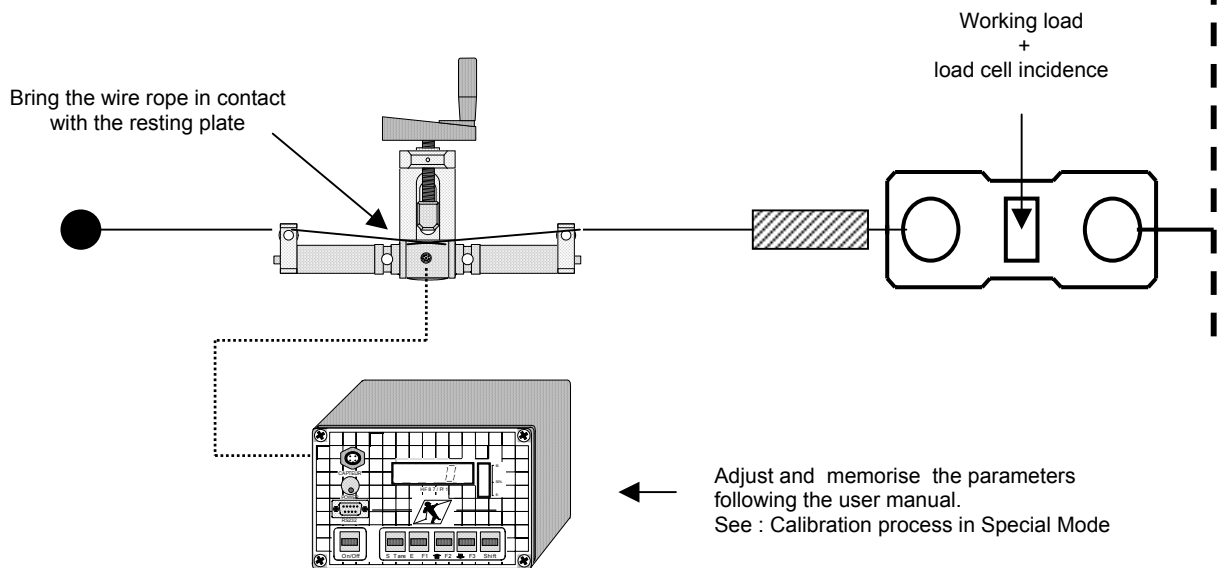


Fig 2





### HF 87/A DISPLAY UNITS

This model is an analogue display unit which converts the tension signal generated by the strain into a corresponding value expressed in daN . This display can be calibrated by the factory or on customer's request.

A correction abacus is worked out on the basis of the wire rope specification and the load to be checked. This display unit is recommended as an economic solution for adjustment operations or load checks on wire rope used under specific repetitive conditions. ( Aerial or most gay ropes of a single distribution network, etc.) .

### Calibration process

Fig 1

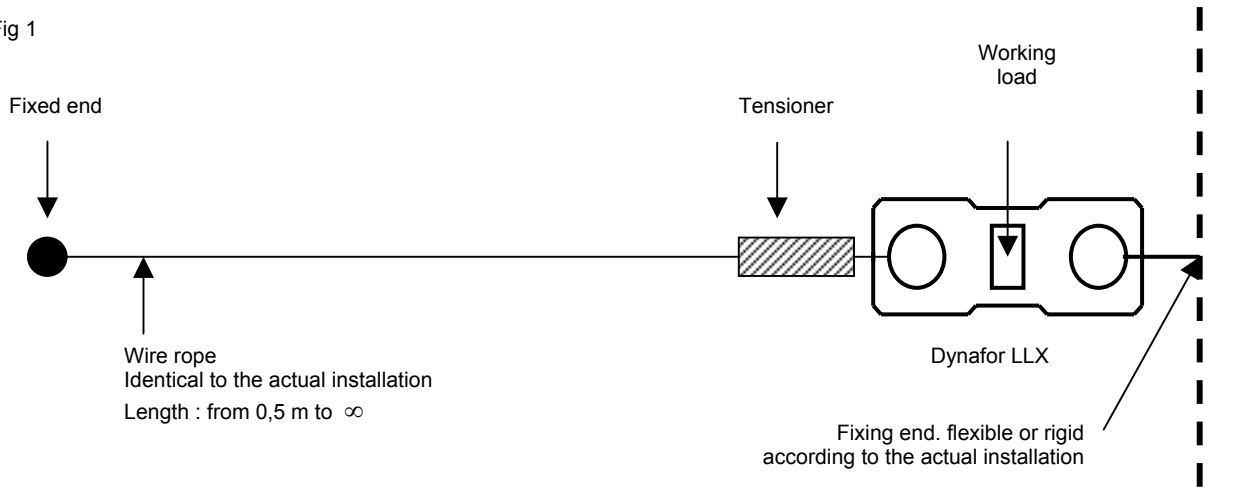
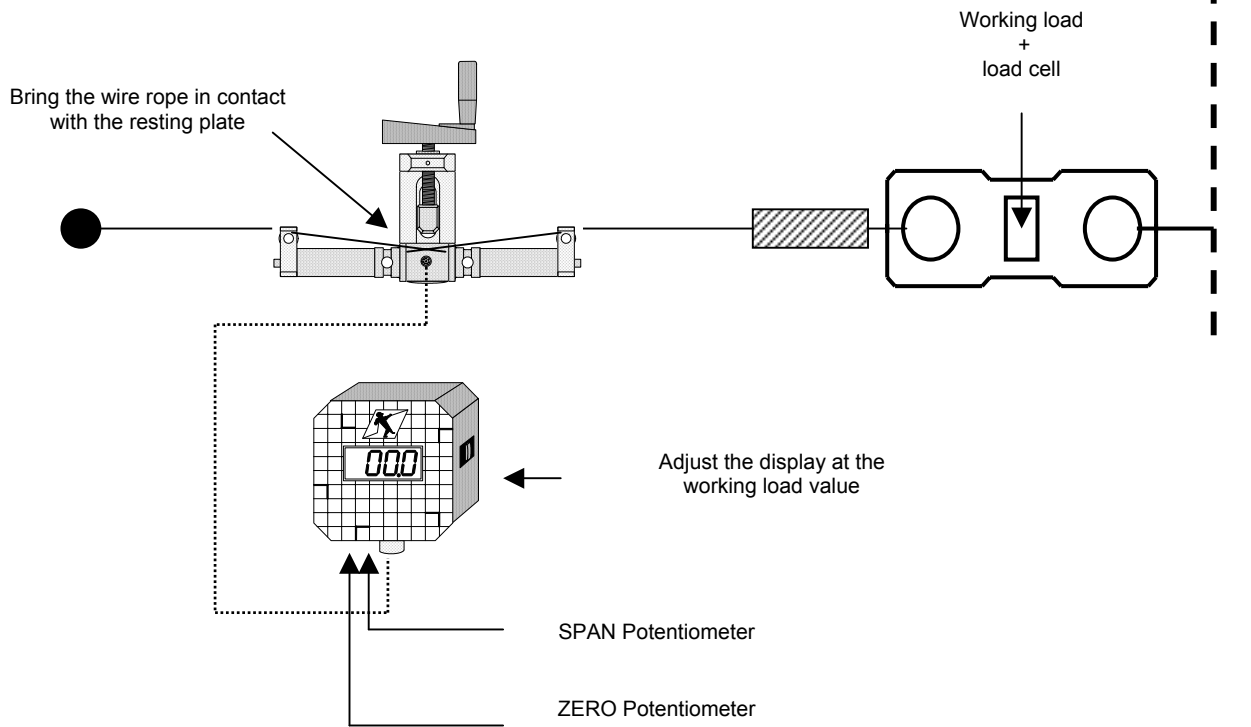
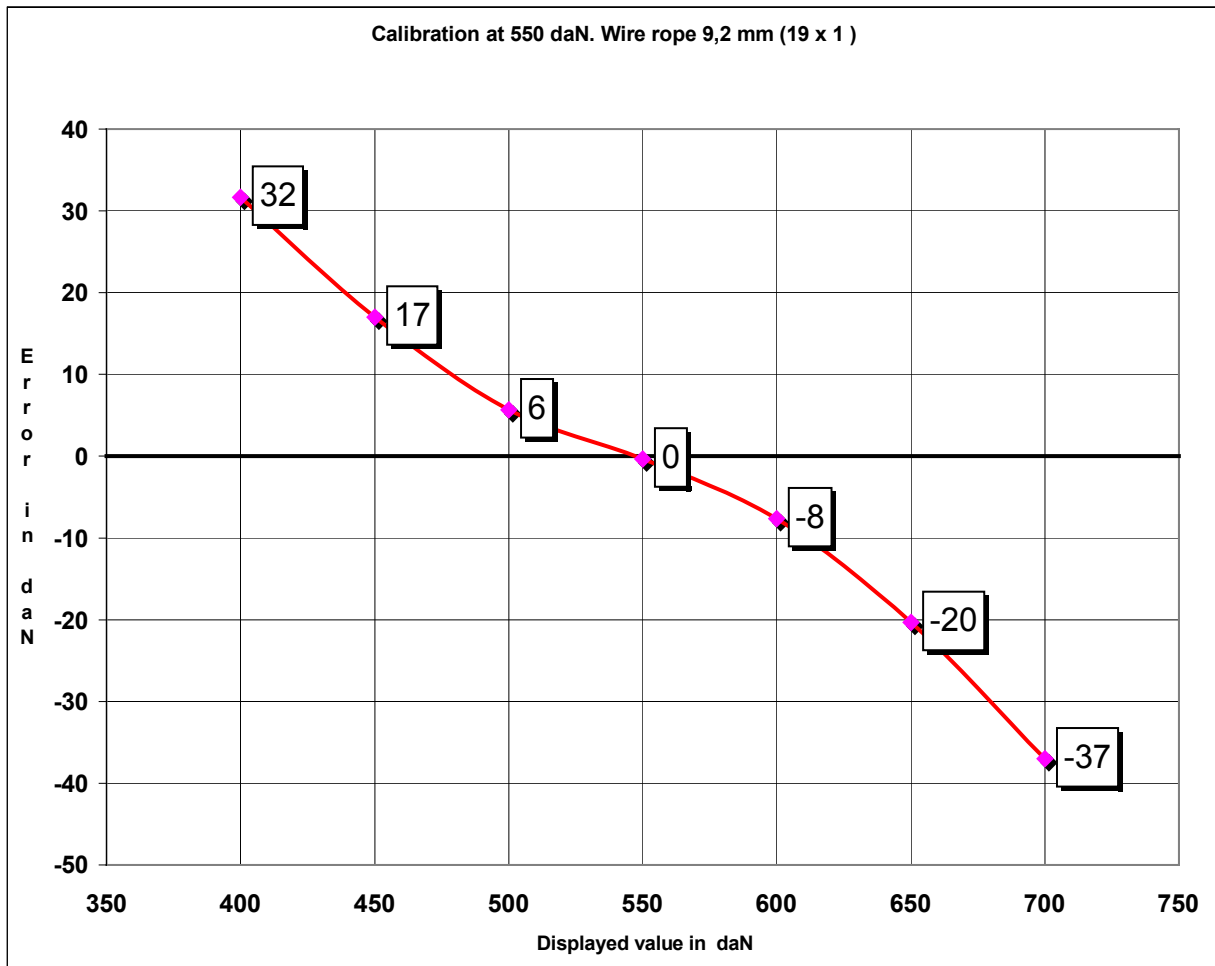


Fig 2



## CORRECTION ABACUS

Example : Typical abacus delivered with an analogue HF 87/A and its sensor.



## CRANK TORQUE.

There is no particular torque recommended to tighten up the crank onto the wire rope. It's the wire rope angle that induce strain in the arms of the sensor. The crank ( or the level ) is only used to induce the angle between the external support wheels and the stop block .

The HF 36/2 & /3 models are equipped with a rotary three level stop block, the right position is indicated by the display according to the wire rope diameter.

Technical  
Sheet

**DYNAROPE**  
TENSIO METER  
HF 36

REF : 2020 GB  
rev N° 7  
date : 04/03  
page : 1/1

#### APPLICATION :

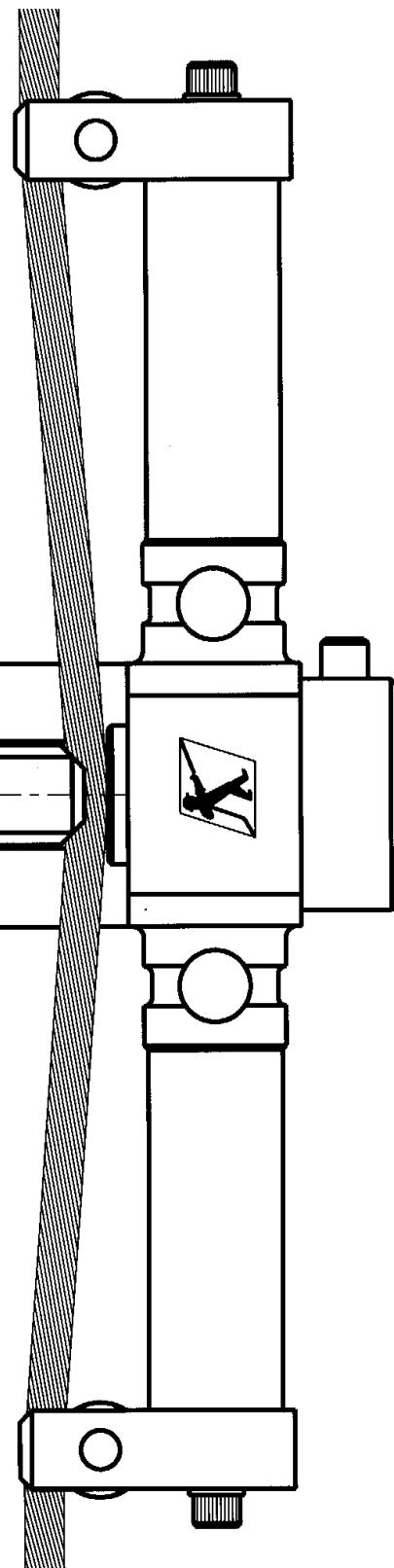
This electronic load cell has been designed to measure the effort applied in a wire rope . The resulting signal is used in a digital monitor controlled by a microprocessor, which corrects the force information according to the wire rope specification.

An analogue monitor which gives non-adjusted information of the measurements is also available.

#### OPERATING PRINCIPLE :

The Dynarope uses strain gauges to measure the movement of the load cell. It gives an electrical signal relative to the load applied.

The deviation of the wire rope around the load cell produces forces proportional to the forces transmitted through the wire rope.



#### TECHNICAL SPECIFICATION:

Overload Coefficient : 1,5

Digital Display accuracy :

+/- 1% in Special Mode

+/- 2,5 % in Normal Mode

The Analogue display is used for control in specific repetitive conditions

Temperature : from - 20° to + 60°

Material : Anodised Aluminium 7075

IP protection : IP 64

Supply : low voltage from the display

Output Signal : frequency to the digital display

OR mv / v to the analogue display.

#### IDENTIFICATION :

Model	Code	Wire rope	Capacity	Weight	Dim. mm
HF 36/ 0.5		3 to 8	1.5 T	0.4 kg	170 x 125 x 40
HF 36/1	52268	5 to 13	5 T	2 kg	370 x 180 x 80
HF 36/2	43338	10 to 28	20 T	4 kg	500 x 280 x 90
HF 36/3	43358	20 to 44	40 T	8 kg	700 x 310 x 100

#### ASSOCIATED MATERIAL:

Digital Display HF 87/1/ T

Analogue Display HF 87/A

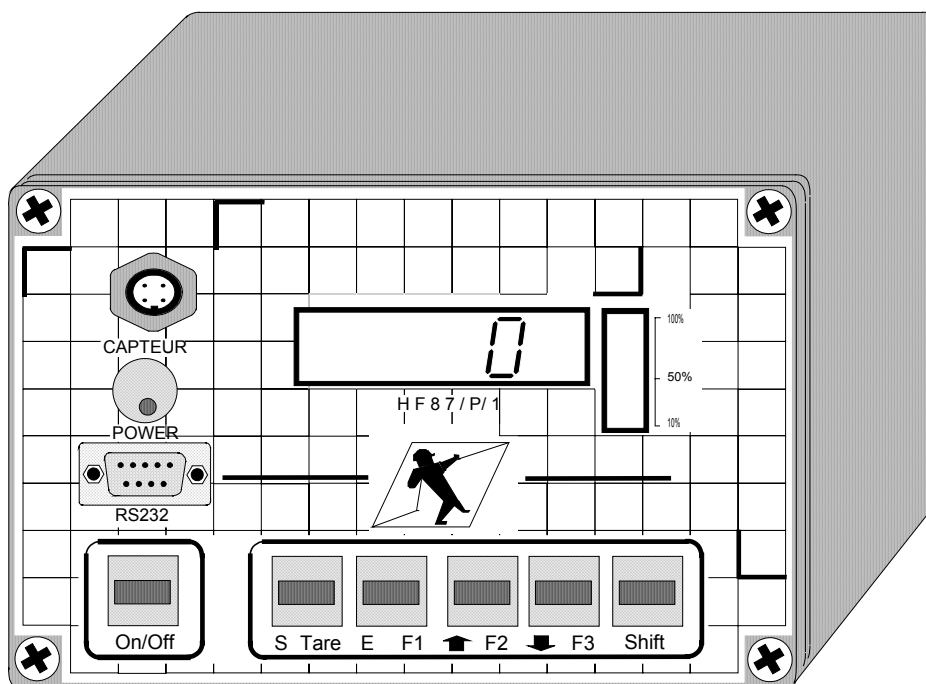
Technical  
Sheet

**DYNAROPE**  
DIGITAL DISPLAY  
HF 87/ T

REF : 2024GB  
rev N° 3  
date : 04/03  
page : 1/2

#### APPLICATIONS:

The display corrects by calculation the information from the sensor taking in account the wire ropes diameter and specification.



#### TECHNICAL SPECIFICATIONS :

Input Signal: Frequency from 500 Hz to 10 kHz.  
Output : RS 232 for connection to a P.C.  
Protection : IP 55  
Temperature: from - 20° to + 60°  
Dimensions : H 105 / L 165 / P 180 / mm  
Weight : 2 kg  
Supply : rechargeable incorporated batteries  
Battery live : 12 hours before recharge  
Charger : power 12 Vdc  
Charge time : 1 hour

#### IDENTIFICATIONS :

Display HF 87/ T	44098
3 m cable to connect to display 4 pin "Lemo"	75057
Transformer (Charger )	44108
Leather carrying case	44118

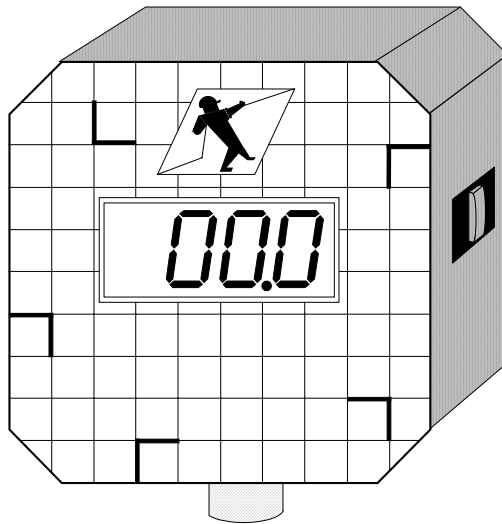


Technical  
Sheet

**DYNAROPE**  
DIGITAL DISPLAY  
HF 87/A

REF : 2025GB  
rev N° 3  
date : 04/03  
page : 1/1

**APPLICATIONS :**



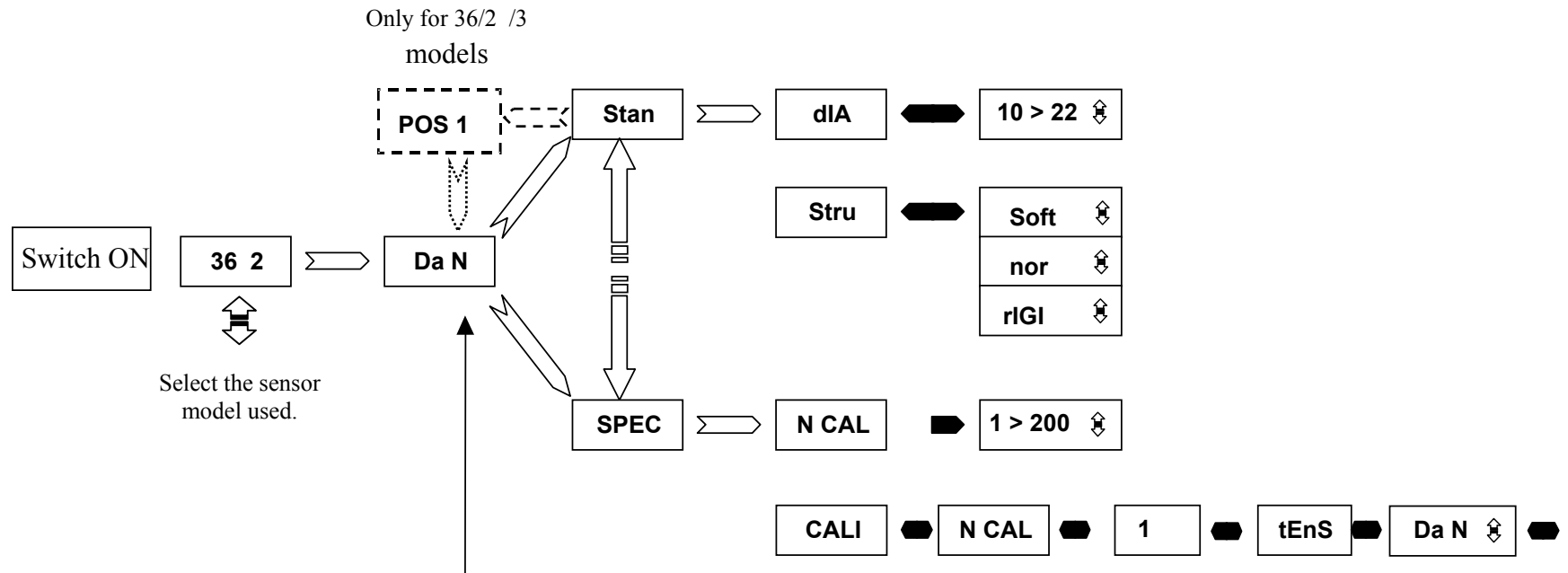
**TECHNICAL SPECIFICATIONS :**

Input Signal: mV/V  
Protection : IP 54  
Temperature : from -10° to + 50°  
Dimensions : H 80 / L 80 / P 40 / mm  
Weight : 350 gr  
Supply : 1 incorporate battery type : 9V PP3  
Battery life : 15 hours with full charged high power battery

**IDENTIFICATIONS :**

HF 87/A Display	55288
3 m cable to connect sensor with level to display 4 pin "Lemo"	75057
Leather protection case	49358

SYNOPTIC OF HF 87/1/P DISPLAY. USER MENU (see details page 14)



➤ : E to enter, S to exit.

➡ : E to enter, E to valid.

⬆⬆ : Select with arrows.

⬅ : automatic, E to valid.

Exit menu ; press S several times.

TESTS

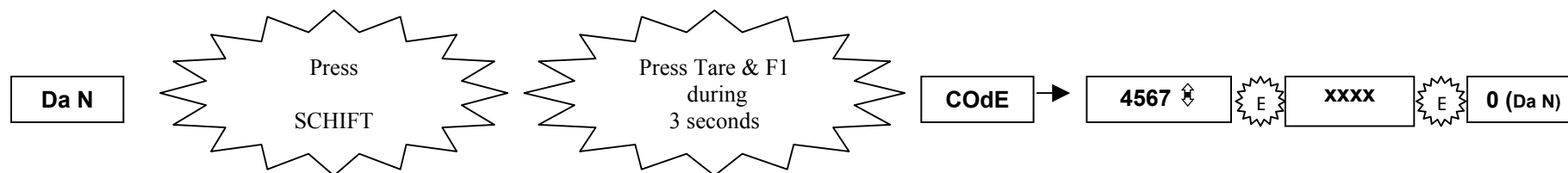
In "Standard" mode ; Press ⬆ arrow , display shows ;

- r 3            program version
- 36.2        selected sensor
- daN         unit daN
- d 12        selected diameter
- Nor         selected structure
- POS.1      position to select for the rotating plate, ( pour HF 36/2 & /3 )

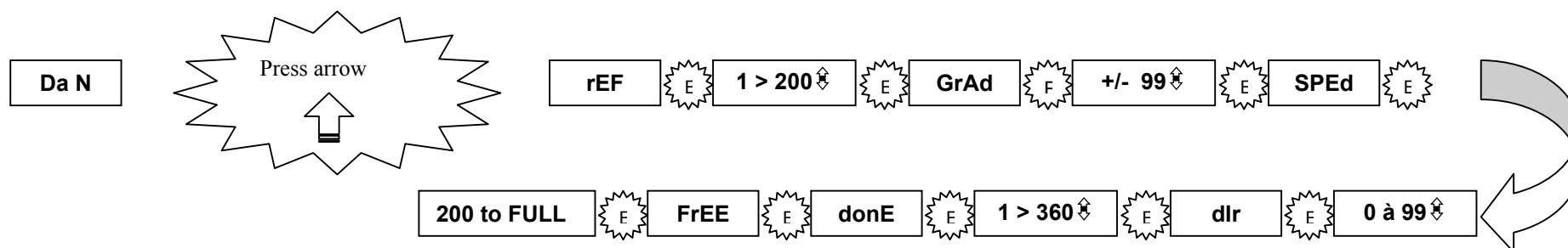
**REMARK :** SHIFT permits to access to advanced functions . While SHIFT mode is activated, a dot flashes between 3<sup>rd</sup> and 4<sup>th</sup> digits.

## SYNOPTIC OF HF 87/1/P « ZERO » MENU

Precondition : Sensor free of any load



## SYNOPTIC OF HF 87/1/P RECORD MENU (see details page 15)





## STANDARD MODE

### INSTRUCTION FOR USE

Essential conditions:

- The load cell and the display should be correctly connected
- Load cell fixed on taut or not taut wire rope
- Turn the display ON

Our example: Control of a steel multi-strand wire rope,  $\varnothing$  10 mm tightened 850 daN.

	DISPLAY	ACTION	EXPLANATION
1		Switch ON	
2	<b>36 1</b> (36 2 & 36 3)	E	Display ready to works with a HF 36/1 sensor (When HF 36/2 & 36/3 sensor select with arrows)
3	<b>6 5 0</b>	E	Display (en daN) non significant before regulation. Press E
4	<b>StAn</b>	E	Press E (if at this moment the display is in Special mode "SPEC", goes to the standard mode "StAn" with the arrows)
5	<b>StAn</b>	E	Press E
6	<b>d I A</b>	E	Press E Wire rope diameter
7	<b>1 à 25</b>	↑ ↓	Using the arrows, select the correct diameter
8	<b>10</b>	E	Press E to valid your choice.
9	<b>d I A</b>	↑ ↓	Using the arrows, goes to the next step.
10	<b>S t r u</b>		Wire rope structure
11	<b>S t r u</b>	E	Press E
12	<b>n o r</b>	↑ ↓	Select the correct structure.
13	<b>n o r</b>	E	Press E to valid your choice.
14	<b>S t r u</b>		
15	<b>S t r u</b>	S	Press S to go out of the menu.
16	(POS 1)	E	When working with a 36/2 or 36/3 sensor. This information indicates the stop block position you must use ( 1, 2 or 3 )
17	<b>8 5 0</b>		Corrected value (in da N) according to the data base.

## RECORD INSTRUCTION

(see synoptic page 13)

Essential conditions:

- Sensor fixed onto the wire rope , end of a control operation .

	DISPLAY	ACTION	EXPLANATION
1	<b>6 5 0</b>		Readout (in daN)
2	<b>6 5 0</b>	↑	Press ↑
3	<b>rE F</b>	E	Press E
4	<b>1 à 200</b>	↑ ↓	With the arrows, select the operation reference number
5	<b>10</b>	E	Valid with E
6	<b>GrAd</b>	E	Press E
7	<b>+/- 99</b>	↑ ↓	With the arrows, select the ambient temperature
8	<b>22</b>	E	Valid with E
9	<b>SPEd</b>	↑ ↓	Press E
10	<b>0 à 99</b>	↑ ↓	With the arrows, select the wind speed
11	<b>10</b>	E	Valid with E
12	<b>dI r</b>	E	Press E
13	<b>1 à 360</b>	↑ ↓	With the arrows, select the wind direction
14	<b>45</b>	E	Valid with E
15	<b>rEC</b>		<i>Press S to abort the record sequence.</i>
16	<b>rEC</b>	E	Valid with E
17	<b>donE</b>	E	Record operation done Press E to continue
18	<b>FrEE</b>		Available memory
19	<b>1 à 199</b>		Number of available memory
20	<b>8 5 0</b>		Return to the normal readout mode

Note : to clear the memory, use the provided software.

## SPECIAL MODE

### CALIBRATION INSTRUCTION

Essential conditions :

- Load cell and display should be correctly connected
- Load cell fixed on taut or not taut wire rope
- For HF 36/2 & /3, the rotating stop block must be adjusted according with the wire rope diameter ( Position must be similar as in the standard mode).
- Install a dynamometer in line, it will give the standard tension value.
- Tight the system at is normal working value. (Our example : 900 daN )
- Turn the display ON

Our example: Control of a steel multi-strand wire rope,  $\varnothing$  10 mm tightened 900 daN.

	DISPLAY	ACTION	EXPLANATION
1		Switch ON	
2	<b>36 1</b> (36 2 & 36 3)	E	Display is ready to analyse a HF 36/1 out put signal. (Or a HF 36/2 & 36/3 output signal)
3	<b>7 4 0</b>		Readout (in daN) non significant prior to calibration.
4	<b>7 4 0</b>	E	Press E
5	<b>SPEC</b>	E	Press E (If the display indicate StAn , using the arrow go first to the Special Mode SPEC )
6	<b>7 4 0</b>	E	Press E
7	<b>n CAL</b>	↑ ↓	With the arrows select the parameter CALI.
8	<b>CALI</b>	E	Valid CALI with E
9	<b>n CAL</b>	E	Valid n CAL with E
10	<b>1 à 200</b>	↑ ↓	Using the arrows, select a N° which will identified this calibration operation.
11	<b>3</b>	E	Valid the n.CAL with E If this number was already used, this action will delete the anterior data.
12	<b>t E n S</b>	E	Valid tEnS with E
13	<b>7 4 0</b>		Readout (in daN) non significant prior to calibration.
14	<b>9 0 0</b>	↑ ↓	Using the arrows, adjust the readout value with the dynamometer standard value.
15	<b>9 0 0</b>	E	Valid with E
16	<b>9 0 0</b>		Corrected value (in da N) of the effort inside the wire rope, all the specifics parameters of the system will be included .
17	<b>CALI / 900</b>	S S	Press S twice to go out of the menu and get the normal working readout.

## SPECIAL MODE

### INSTRUCTION FOR USE

Essential conditions :

- Load cell and display should be correctly connected
- Load cell fixed on taut or not taut wire rope
- For HF 36/2 & /3, the rotating stop block must be adjusted according to the information given by the display.
- The display has already been calibrated for this specific application ( Our example Calibration number = 3 )
- Turn the display ON

	DISPLAY	ACTION	EXPLANATION
1	<b>36 1</b> ( 36 2 & 36 3 )		Display is ready to analyse a HF 36/1 out put signal. (Or a HF 36/2 & 36/3 output signal)
1	<b>74 0</b>		Readout (in daN) non significant prior to calibration.
2	<b>74 0</b>	E	Press E
3	<b>SPEC</b>	E	Press E (If the display indicate StAn , using the arrow go first to the Special Mode SPEC )
4	<b>n.CAL</b>	E	Valid n CAL with E
5	<b>1</b>	↑ ↓	Using the arrows, select a calibration number corresponding with this specific application.
6	<b>3</b>	E	Valid with E
7	<b>n.CAL</b>	S	Press S to exit the menu
8	<b>8 2 0</b>		Corrected value (in da N) of the effort inside the wire rope, all the specifics parameters of the system are included .

### Abbreviation explanation.

Readout

+/- 99	: Temperature from - 99°C to 99°C
0 to 99	: Wind speed.
1 to 200	: Memory number corresponding to a specific calibration (Used in calibration process)
1 to 360	: Wind Direction from 1° to 360°
200 - Full	: Memory capacity
4 to 22	: Diameter en mm
Abrt	: Cancel the record process.
CALI	: Calibration. Specific calibration menu
dEL	: Delete all the memorised data
dia	: Wire rope diameter
DaN	: Normal working readout ( daN )
da N ↕	: adjust readout according with the standard dynamometer
Dir	: Wind direction.
DonE	: Record or delete completed
Er 20	: Display does not receive any signal from the loadcell (disconnected Lemo cable)
FrEE	: Available free memory
GrAd	: Ambient temperature
Nor	: “normal wire rope” = Steel multi-strands wire rope
n.CAL	: Calibration number
riGi	: “rigid wire rope” = Steel mono-strands wire rope
REF	: Specific calibration reference number
SoFt	: “ soft rope” = Kevlar and textile ropes
SPEC	: Special Mode
StAn	: Standard Mode

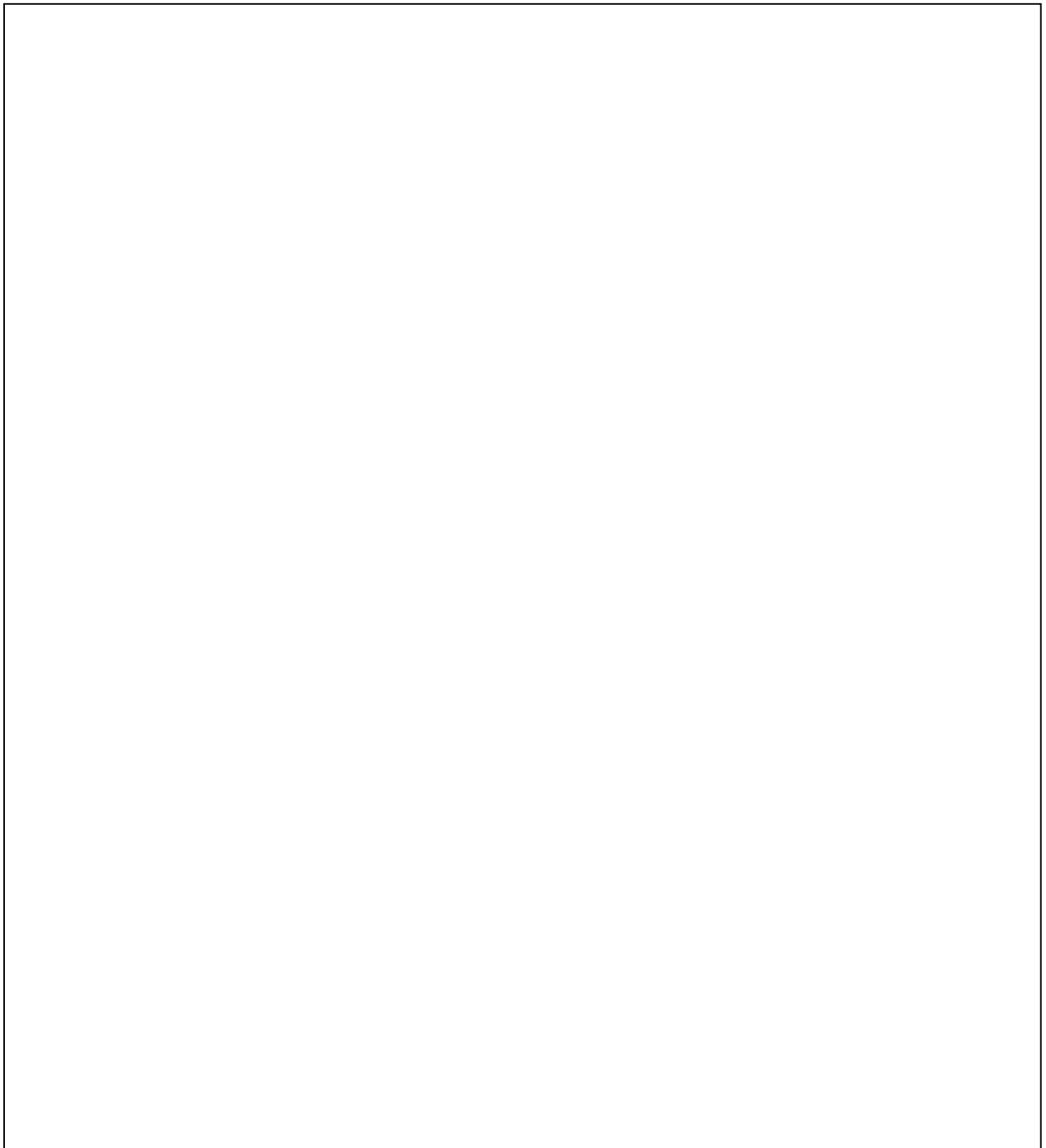
**S t r u** : Wire rope structure ( Normal , Rigid or Soft )

**SpEd** : Wind speed

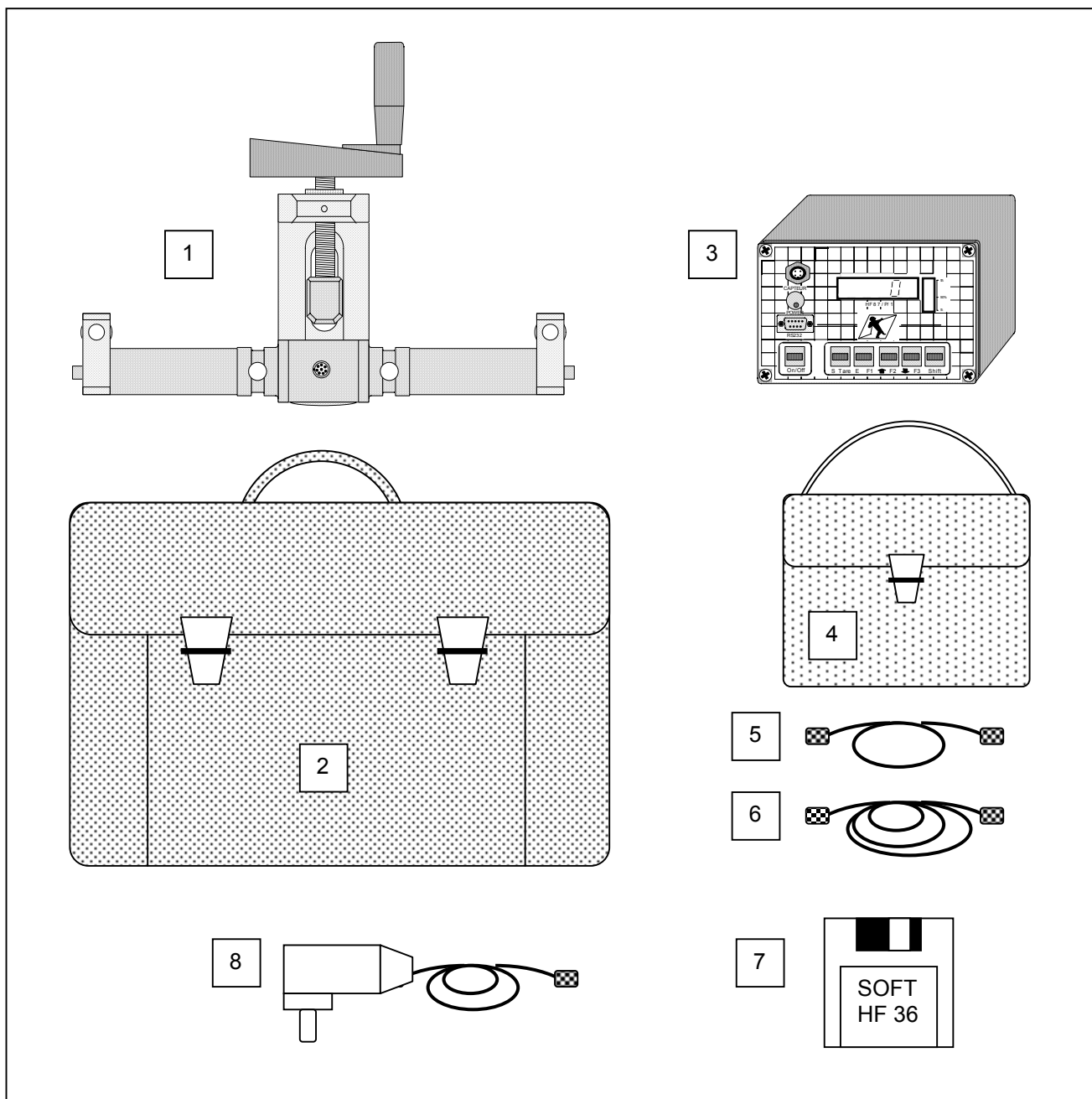
**Switch ON** : Turn display ON

**BAT** : Low battery

**Note :**

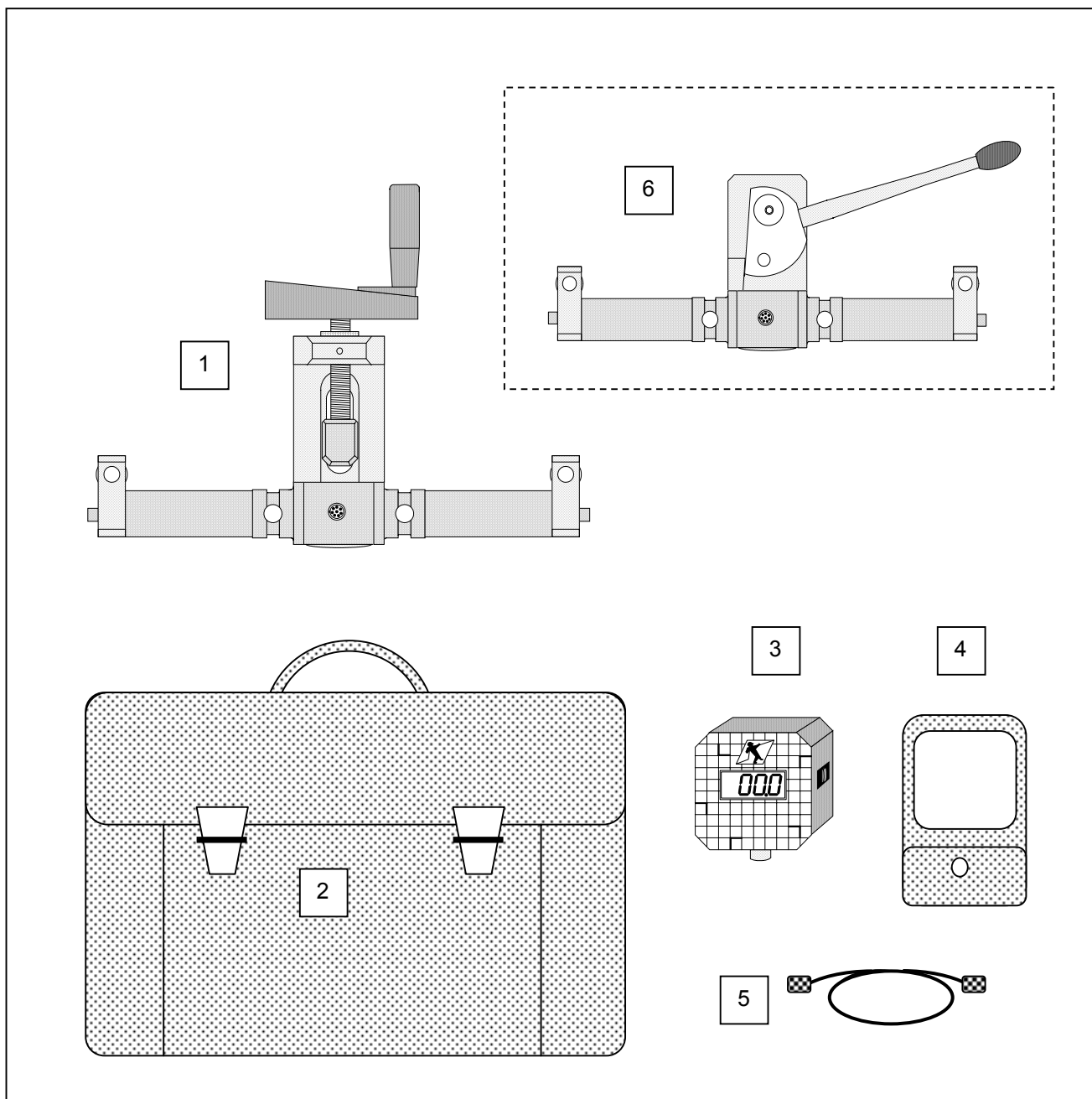
A large, empty rectangular box with a thin black border, intended for providing additional notes or details related to the information above.

## HF 36 / 1,2,3 Frequency



N°	Description	code
	<b>Digital kit HF 36/1</b>	<b>29808</b>
	<b>Digital kit HF 36/2</b>	<b>29818</b>
	<b>Digital kit HF 36/3</b>	<b>36008</b>
1	Loadcell HF 36/1	55268
2	Leather protection 1	55308
1	Loadcell HF 36/2	43338
2	Leather protection 2	55318
1	Loadcell HF 36/3	43358
2	Leather protection 3	44138
3	Digital display HF 87/T	44098
4	Leather box	44118
5	RS 232 lead	75067
6	Lemo 4 poles	75057
7	Software	75077
8	Charger	44108
	Option specific calibration	122350

## HF 36 / 1 ,2 Analogue



N°	Description	code
	<b>Analogue kit HF 36/1</b>	<b>29788</b>
	<b>Analogue kit HF 36/2</b>	<b>29798</b>
1	Loadcell HF 36/1	45988
2	Leather protection 1	55308
1	Loadcell HF 36/2	55228
2	Leather protection 2	55318
3	Digital display HF 87/A	55288
4	Leather box	49358
6	Lemo 4 poles	75057
	Option specific calibration	122350