



Combination unit Type FDNA for tensile and compression loads



Table of contents	page
0 ABOUT THIS OPERATING MANUAL	3
1 INTRODUCTION	4
2 IDENTIFICATION, UNAUTHORIZED USES, DISPOSAL.....	4
3 INSTALLATION	5
4 INSTRUMENT SWITCHING ON.....	5
5 PROGRAMMING.....	5
6 ERROR MESSAGES.....	5
7 GENERAL KEYS DESCRIPTION	6
8 SETTING MENU	6
8.1 MEASUREMENT UNIT	6
8.2 DIGITAL FILTER.....	6
8.3 RESOLUTION	7
8.4 AUTO-POWER OFF TIME.....	7
8.5 RS-232C BAUD-RATE (optional)	7
9 RS232C CONNECTIONS	7
10 BATTERY REPLACEMENT	8
11 TECHNICAL DATA.....	9
12 DIMENSIONS (mm).....	9
13 FULL SCALE ADJUSTABLE	10
13.1 POSITIVE FULL SCALE CALIBRATION	10
13.2 NEGATIVE FULL SCALE ADJUSTMENT	10
13.3 FULL SCALE CALIBRATION CORRECTION.....	11
14 APPLICATION AND ACCESSORIES	11

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0 ABOUT THIS OPERATING MANUAL

- The operating manual is aimed at specialists and semi-skilled personnel.
- Before each step, read through the relevant advice carefully and keep to the specified order.

If you have any problems or questions, please contact your supplier or contact us directly at:



Dr. Siebert & Kühn GmbH & Co. KG
 Struthweg 7-9 • D - 34260 Kaufungen
 ☎ 05605-803 0 • 📠 05605-803 54
 info@sika.net • www.sika.net

Hazard signs and other symbols used:



CAUTION! Electric current!

This sign indicates dangers which could arise from handling of electric current.



WARNING! / CAUTION! Risk of injury!

This sign indicates dangers that cause personal injuries that can lead to health defects or cause considerable damage to property.



CAUTION! Material damage!

This sign indicates actions which could lead to possible damage to material or environmental damage.



ADHERE TO OPERATING MANUAL!



NOTICE!

This symbol indicates important notices, tips or information.



NO DOMESTIC WASTE!

The device must not be disposed of together with domestic waste.



Pay attention to and comply with information that is marked with this symbol.



Follow the specified instructions and steps. Adhere to the given order.



Check the specified points or notices.



Reference to another section, document or source.



Item.

1 INTRODUCTION

FDNA is a digital dynamometer designed to make easier the measurement and the calibration of forces generated by presses, vices, ropes or chains in industrial environments or directly on site.

The dynamometer consists of a strain gauge load cell with high reliability and precision and of a last generation microprocessor. The weight indication is given by a 5 digits LCD display, 16 mm height while a bar indication shows the percentage of measured load with respect to the dynamometer full scale.

Thanks to an internal battery, easily available on the market, the FDNA reaches a guaranteed autonomy of a year without any recharge also thanks to its programmable AUTO POWER OFF function.

Main characteristics:


- PROGRAMMABLE RESOLUTION
- PROGRAMMABLE DIGITAL FILTER
- ZERO FUNCTION
- PEAK FUNCTION (positive and negative)
- TARE SUPPRESSION

On request:

- RS232C SERIAL OUTPUT
- PROGRAMMABLE BAUD RATE

2 IDENTIFICATION, UNAUTHORIZED USES, DISPOSAL

IDENTIFICATION PLATE:

Type: FDNA	Full Scale:
Input:	Output:
Power supply:	 CE S/N
Date:	



UNAUTHORIZED USES

Environments with explosive atmosphere.
Environments with inflammable or corrosive gas.



DISPOSAL

The instrument is a professional apparatus compliant to the Directives 2011/65/EU (RoHS) and 2002/96/CE (WEEE).

Generally, the device must be delivered to companies which are specialized in scrapping of electric and electronic wastes in accord to the laws of the country where the device is commercialized. Symbol on the left means that in European Union this product must be separately disposed of at the end of its cycle of life.

3 INSTALLATION

Installation shall be done by authorized personnel only; for a correct and fast installation follow the instructions listed below:

- Check that the dynamometer is in axle and that no frictions are present neither on the joints nor on the shackles.
- Check that dynamometer is discharged.
- Switch the dynamometer on through the ON key.
- Reset the display through ZERO key and proceed with the measurements.

4 INSTRUMENT SWITCHING ON

When switched on, instrument performs a display test cycle and displays the release (3 sec.).

After this test, measured force is displayed: in case a series of "L" (negative full scale overcoming) or a series of "U" (positive full scale overcoming) appears, please act in order to bring the force back within its correct range.

5 PROGRAMMING

All the functions can be recalled through the following SETTING MENU:

- 1) Measurement unit
- 2) Digital Filter
- 3) Resolution
- 4) Power Off Time
- 5) Baud rate RS232

6 ERROR MESSAGES

POSITIVE OVERLOAD *:

The instrument measures in tension a force higher than its nominal rate.

NEGATIVE OVERLOAD *:

The instrument measures in compression a force higher than its nominal rate.

OUT OF THE SCALE:

The instrument shows the overflow of display physical limit (99999).

EXHAUSTED BATTERY:

measurements calculated when battery is exhausted could be altered, therefore battery replacement is necessary.

*WARNING: if an overload occurs, check if calibration has been altered.

7 GENERAL KEYS DESCRIPTION

Key with two functions:



The key performs the instrument switching On and Off.

If kept pressed for 3 seconds it allows to enter into the setting Menu, if kept pressed for 5 seconds performs the instrument switching Off



If kept pressed for 3 seconds performs the display Zero (Zero On); if kept pressed for 6 seconds it removes the Zero (Zero Off).

Inside the setting menu it decreases (↓) the value on the display.

Key with three functions:



During the measurement, if pressed for a second, it activates the PEAK+ function, (it displays the greatest force detected after having activated the function).

During the measurement, if pressed for 5 sec., it activates the PEAK- function (it displays the lowest force detected after having activated the function).

Inside the setting menu increases (↑) the value on the display.

8 SETTING MENU

To enter into setting menu press the SET key (3 sec.) until Unit parameter appears on display. Press SET either to go to next parameters or to exit from setting menu. Press SET after the last parameter both to save data and to come back to measurement mode; new set values become active at the exit of setting menu.

8.1 MEASUREMENT UNIT

Unit

It is possible to change the **measurement unit** acts on ↓ and ↑ keys.

8.2 DIGITAL FILTER

FL --

The operator can change the **Digital Filter** effect. By increasing -- values filter effect increases allowing the user to detect the average value of unsteady or pulsating forces. Selectable values are: 0...99.

This parameter acts on conversion speed, therefore to detect the peaks it is suggestible to decrease at the minimum the filter.

8.3 RESOLUTION

R -- It is possible to set the **Resolution** used to display the force; selectable values: 1,2,5,10.

8.4 AUTO-POWER OFF TIME

oFF -- It set the time (1...30 minutes) before the Auto-power off function activates in case of constant force; by setting 0(zero) the instrument never switches off.

8.5 RS-232C BAUD-RATE (optional)

bAUD- It sets the speed of the serial communication.
 Values: 1=4800; 2=9600; 3=19200; 0=RS232 disabled.
 Note: We recommend to disable the RS232 if not used (Baud-rate=0).

9 RS232C CONNECTIONS

The serial interface is used to exchange data between the FDNA and a PC or another device. After reading out the measured values, the FDNA parameters can also be set.

Pin assignment and connection diagram:

For the connection, use a suitable transmission line or make the connections according to the pin assignment and connection diagram:

FDNA	PC	Connection diagram
D-Sub jack (front view)	D-Sub plug (rear view)	
Pin 1 ➔ DCD	Pin 1 and 4 ➔ DCD	
Pin 2 ➔ RX	Pin 3 ➔ RX	
Pin 3 ➔ TX	Pin 2 ➔ RX	
Pin 5 ➔ GND	Pin 5 ➔ GND	

Protocol parameters:

Baud rate	Data bits	Stop bits	Parity
4800 / 9600 / 19200	8	1	None

CTS, RTS and DCD signals not used.

Control commands for device parameters:

The control commands have the "**p n XX cr**" format, where

p = Initial string.

n = Identification.

XX = Value.

cr = End of string (carriage return (CHR\$13)).

Parameter	Command	Possible values (XX)
Measurement unit (Unit)	p1XX<cr>	00 = kN, 01 = daN, 02 = N, 03 = t, 04 = kg
Digital filter (FL)	p2XX<cr>	00 ... 99
Resolution (r)	p3XX<cr>	00 = 1, 01 = 2, 02 = 5, 03 = 10
Auto power off time (oFF)	p4XX<cr>	00 ... 30 => Time in minutes
Baud rate (bAUd)	p5XX<cr>	00 = off (serial interface disable), 01 = 4800, 02 = 9600, 03 = 19200
ZERO	p6XX<cr>	00 = ZERO off, 01 = ZERO on
PEAK+	p7XX<cr>	00 = PEAK+ off, 01 = PEAK+ on
PEAK-	p8XX<cr>	00 = PEAK- off, 01 = PEAK- on

Control commands for measurement value query:

After sending the control command for the measurement query, the response is the transmission of the current measured value with further device information.

Control command: **p000<cr>**

Response: **S XX.XXX UM Z PY LB <cr>** mit

S = Sign (-/+).

XX.XXX. = Measurement value with comma.

UM = Measurement unit: 00 = kN, 01=daN, 02=N, 03=t, 04=kg)

Z = Logical information: Transmission only when display is temporarily set to zero.

PY = p- / p+ : Transmission only if the peak function is set.

LB = Logical information: Transmission only if the batteries are discharged.

cr = End of string (carriage return (CHR\$13))

10 BATTERY REPLACEMENT

The digital dynamometer is supplied with one NOT RECHARGEABLE ALKALINE 9 volt battery (PP3 type), with an approximate autonomy of 1 year.

Battery consumption is signalled by the **LOW BAT** message, the measurement performed during this phase could be altered, it is therefore necessary to immediately replace the battery.

It is advisable, however, to change the batteries at regular intervals of about a year.

If the dynamometer is not used for long periods it is advisable to remove the batteries.

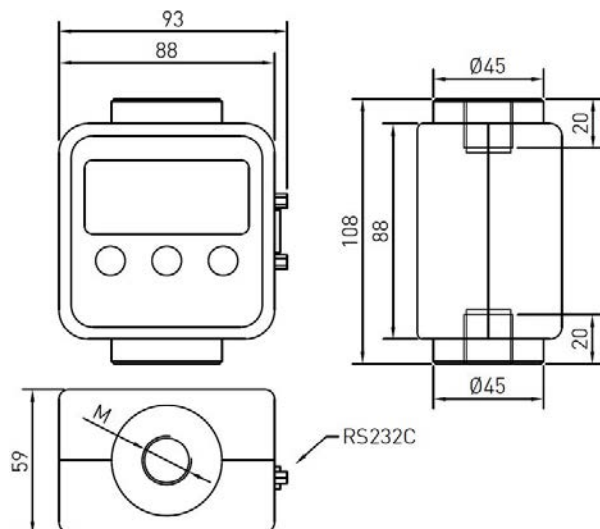


Symbols indicate that battery must be disposed of properly or recycled according to local laws. In European Union batteries must be brought to specific collecting points.

11 TECHNICAL DATA

Combination unit characteristics						
Nominal load	100 kg	200 kg	500 kg	1 t	2.5 t	5 t
Load transfer direction						
- Tension	✓	✓	✓	✓	✓	
- Compression	✓	✓	✓	✓	✓	✓
Accuracy	< 0.050 % of E _{max}					
Resolution	0.01 kg	0.01 kg	0.05 kg	0.1 kg	0.2 kg	0.5 kg
Sampling rate (filter = 00)	≤ 10 Hz					
Digital display	7 segments • 5-digit					
- LCD display	16 mm					
- Segment height						
Load limits						
Service load	120 %					
Safe load limit	150 %					
Breaking load	> 300 %					
Max. permissible dynamic load	120 %					
Electrical characteristics						
Supply voltage	4 x 1.5 V • size AA					
Battery replacement indicator	"LO BAT"					
Automatic shut-off	1...30 min					
Degree of protection (EN 60529)	IP40					
Process variables						
Reference temperature	23 °C					
Nominal temperature range	0...40 °C					
Service temperature	0...50 °C					
Dimensions (H x B x T)	108 x 93 x 59 mm					
Weight	~ 1.5 kg					

12 DIMENSIONS (mm)



Load	Thread M...
100 kg	M12
200 kg	M12
500 kg	M12
1 t	M20x1.5
2.5 t	M20x1.5
5 t	M20x1.5

13 FULL SCALE ADJUSTABLE

WARNING!



This procedure is described in the manual by way of documentation only but it shall be performed by authorised calibration centres only and in case of real need.

SIKA declines any responsibility for measurement errors or bad functioning which should be caused by adjustment performed not properly. In this case the validity of dynamometer SIT certification would lose.

13.1 POSITIVE FULL SCALE CALIBRATION

Bring the dynamometer to zero load.

Keep the **ON** and **PEAK** keys pressed for some seconds.

P0000

Select the password **3124** (↑↓), confirm with **SET**.

P0

The dynamometer displays an internal offset, reset using the **ZERO** key and confirm with the **SET** key.

P 1- P5

Generate the load at values 20% (P1), 40% (P2), 60% (P3), 80% (P4) and 100% (P5) and confirm with **SET** key.

Adjust the measurement using the ↑ and ↓ keys and confirm with the **SET** key.

dP

Select the decimal point position (↑↓), confirm with **SET**. Procedure is finished when **end** appears.

13.2 NEGATIVE FULL SCALE ADJUSTMENT

Bring the dynamometer to zero load.

Keep the **ON** and **PEAK** keys pressed for some seconds.

P0000

Set the password **2124** using the ↑ and ↓ keys, then confirm with the **SET** key.

P0

Press the **SET** key. The dynamometer displays an internal offset, reset using the **ZERO** key and confirm with the **SET** key.

P 1- P5

Generate the load at **20%** (P1), **40%** (P2), **60%** (P3), **80%** (P4) and **100%** (P5) of the **negative F.S.** and confirm with **SET** key.

Adjust the measurement using the ↑ and ↓ keys and confirm with the **SET** key.

End

The procedure is completed.

13.3 FULL SCALE CALIBRATION CORRECTION

It is possible that during the time it becomes necessary the correction of the calibration performed with the above procedure. It is possible to introduce a correction factor (default value: 1.0000) changing which you can increase / decrease the load factor set's display.

To compute the correction factor value consider the formula below:

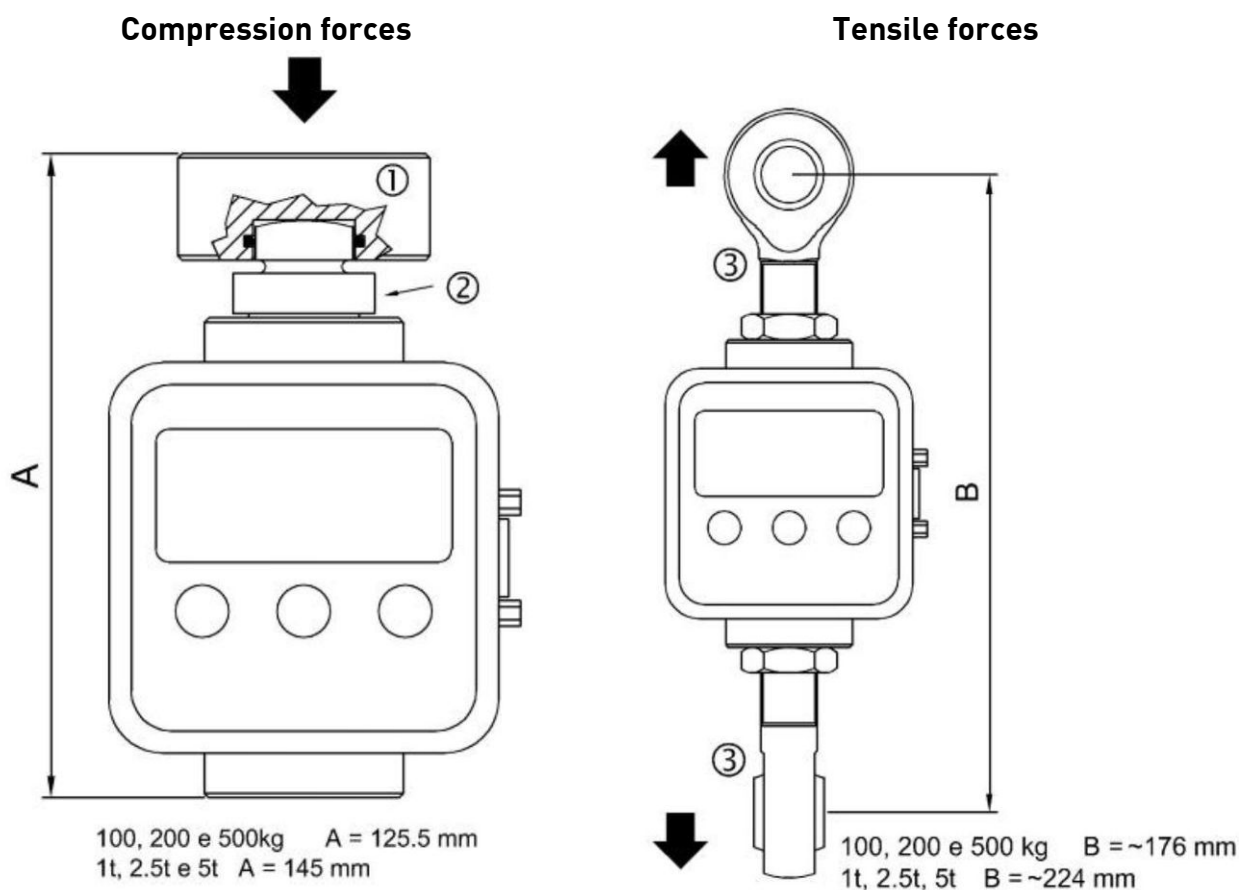
$$\text{Correction Factor} = \text{Desired Load} / \text{Measured Load}$$

To change the correction factor it is necessary to set passwords **4254**, respectively (positive load) and **4255** (negative loads).

You will see the actual value of the parameter that you can change using the keys and and confirm with the SET button.

To reset the correction values to its default value use the password **4256**.

14 APPLICATION AND ACCESSORIES



① Bearing-mounted head.

② Cylindrical body.

③ Knuckle eyes



Sensors and Measuring Instruments




Flow Measuring Instruments





Test and Calibration Instruments




SIKA Dr. Siebert & Kühn GmbH & Co. KG
Struthweg 7-9
D-34260 Kaufungen • Germany

 +49 (0)5605 803-0

 +49 (0)5605 803-54

 info@sika.net

 www.sika.net