



USER MANUAL

TORQUE TESTER

FSB Series / Serie PCE-FB TS

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1. Introduction

The FSB series torque testers produced by AXIS Sp. z o.o. are designed for dynamic measuring of torque in manufacturing and quality control applications.

Measurements results can be presented as graph or histogram and saved on microSD cards.

The RS232C and USB interface allows the measurement results to be transmitted to a computer or a printer for further analysis or recording.

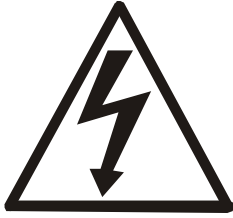
2. Basic Set

The basic set includes the following elements:

1. Force gauge (meter + sensor),
2. Handgrip – 2 pieces,
3. Accumulators NiMH 2700mAh – 4 pcs.
4. Power supply unit ~230 V 50 Hz / =12 V; 1.25 A,
5. Case
6. Force gauge-computer cable
7. CD containing an operation manual and software,
8. Warranty.

3. Safety instructions

3.1 Main safety rules



Read carefully the safety instructions included below. Observe these instructions to avoid electrocution or damage to the force gauge itself or other devices connected to the force gauge.

- Repairs and any necessary adjustments may only be conducted by qualified personnel.
- Do not use the force gauge when any part of the enclosure has been removed.
- Do not use the force gauge in potentially explosive atmospheres.
- Do not use the force gauge in areas with a high humidity.
- In the case of suspected damage to the force gauge, turn off the gauge and do not use it until it is examined by a specialised servicing facility.

3.2 Safety rules

3.2.1 Transport safety rules

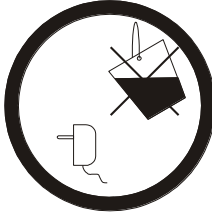

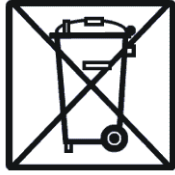
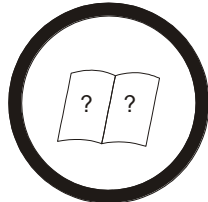
Force meter and included equipment should be transported from producer to receiver in original company box.

To transport force meter during exploitation original producer case should be used.

3.2.2 Safety rules during start-up and operation

Force meter with equipment supplied by producer is a safe device, what was achieved by application of fire protection and elimination of mechanical, chemical, explosive etc threads.

In order to avoid danger we suggest to:

Lp.	Recommendation	Warnings
1	Avoid contact with flood, water or other liquids due to high voltage 230V.	
2	Damaged accumulators handle with care. Use rubber gloves and safety glasses if necessary.	
3	The proper disposal of used force meter.	
4	User manual training.	
5	Periodic monitoring of connections	<div style="border: 1px solid black; padding: 5px; width: fit-content;"> Next control date: </div>

Specific recommendation:



Risk of electric shock due to the use of ~230V 50Hz voltage via external feeder. It is unacceptable to spill the feeder or use it when the enclosure is damaged cause it may cause electric shock.



In order to avoid leakage of electrolyte from accumulators immediate disposal of used accumulators from force meter is suggested.

3.2.3 Safety rules during conservation

Force meter doesn't need conservation except accumulators exchange when used – that happens when after full recharge the force meter working time is shorter more than 20% from the value suggested by producer.

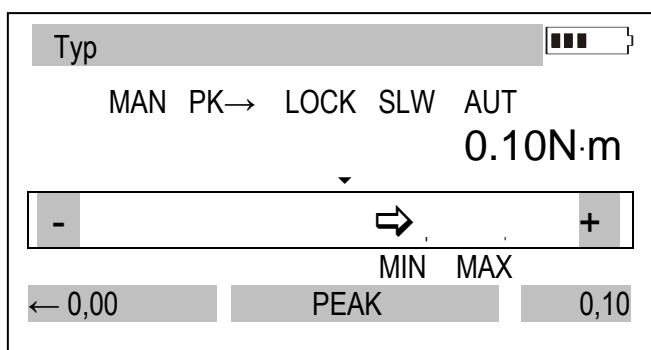
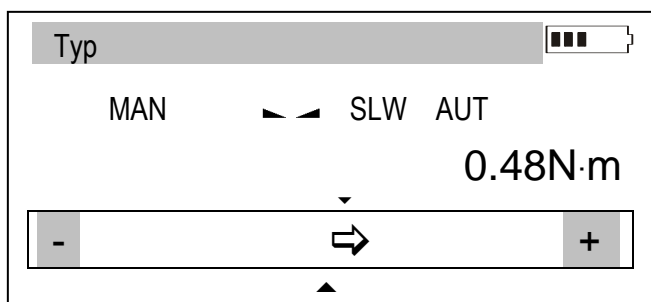
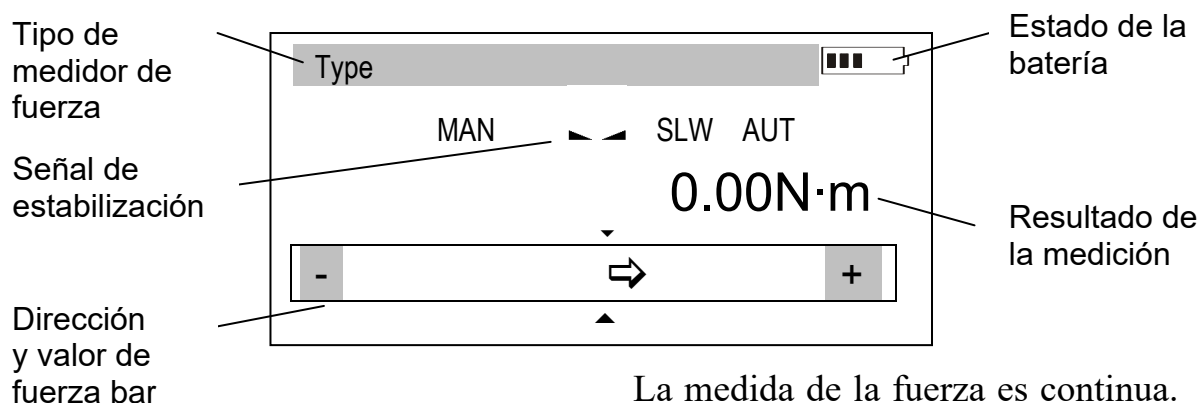


If the device seems to be damaged immediately stop operation.

4. Comienzo rápido

Preparar el medidor de fuerza para trabajar mediante la selección adecuada de la punta de medición (medidor de fuerza con sensor interno) o después del montaje del puesto de prueba adecuado (medidor de fuerza con sensor externo).

Encienda el medidor de fuerza con la tecla *ON/OFF* y dejar que el dispositivo este en posición estacionaria. Esto permite activa la puesta a cero, presenta la versión del software e indica cero. El medidor de fuerza está listo para trabajar después de la siguiente pantalla:



La medida de la fuerza es continua. La pantalla indica continuamente el valor de la fuerza real medida por el medidor. La dirección de la fuerza está señalizada con una flecha en la parte inferior de la pantalla y un signo + (fuerza de presión) o - (fuerza de tracción). Para guardar la medición en la memoria presione la tecla *MEM* key.

El cambio actual de la indicación del valor de torque en la medición del valor pico se realiza pulsando la tecla *PEAK*.

El indicador de estabilización cambia a LOCK y el medidor de fuerza cambia el modo de medir a valor peak en una dirección. Pulsando de nuevo la tecla *PEAK* cambia la dirección de peak torque: primero para la fuerza de presión (*PK↑*) y después pulse otra vez *PEAK* para la fuerza de tracción (*PK↓*), la puesta a cero se realiza pulsado la tecla *→0←*.

Atención:

La medición de fuerzas dinámicas debe realizarse guardando en la memoria la serie de medidas, incluida la cuota de medición. Entonces se mostrará las características de fuerza y los resultados estadísticos (rozdz. 14.3 Memory).

5. Visión general del medidor de fuerza

Medidor de fuerza PCE-FB TS:



6. Datos técnicos

Tipo	PCE-FB 2TS	PCE-FB 5TS	PCE-FB 10TS
Fuerza máxima de medida	2Nm	5Nm	10Nm
Graduación de lectura (d)	0,001Nm	0,002Nm	0,01Nm
Precisión	±0,1% F.S.		
Unidades de medición	Nm, N*cm, kgf*m, gf*m, lbf*in		
Temperatura de trabajo	-10 ÷ 40°C		
Resolución interna	24 bits (16mln graduación)		
Velocidad del proceso	Máx. 1000 mediciones		
Capacidad de memoria interna	1x6400 mediciones		
Interfaz	RS-232C y USB, opciones: Bluetooth, disparador WE, WY ranura para tarjetas MicroSD: compatible con tarjetas SDSC (estándar) y SDHC clase 4		
Software de asistencia	FM (características de tiempo, análisis estadístico, archivo de datos)		
Pantalla	LCD gráfico		
Opciones de medición	Medición valor máx., medición serial, medición dinámica (diagramas de tiempo)		
Alimentación	Baterías Ni-Mh set 2700mAh + supply ~230V 50Hz / 12V 1,2A		
Duración del acumulador	~20h (~45h luz de fondo off)		
Dimensiones	215x100x40mm (medidor)		
Peso	430g (sin baterías)		

7. Keys and indicators

Main keys:

- ON/OFF** - ON / OFF key (standby),
- UNIT/CLEAR** - Change units / cancel selection or change a parameter value,
- *Press and hold* – move to measurement menu (Statistics/Reset)/return
- BACKLIGHT** - Turn on illumination (ECO mode),

Navigation keys:

- ↑ - Move cursor up or increase the digit marked by the cursor,
- ↓ - Move cursor down or decrease the digit marked by the cursor,
- - Move to the next menu level or display the next option,
- ← - Move to the previous menu level or display the previous option,
- ENTER** - Confirm the entered parameter or select a highlighted option.

Function Keys:

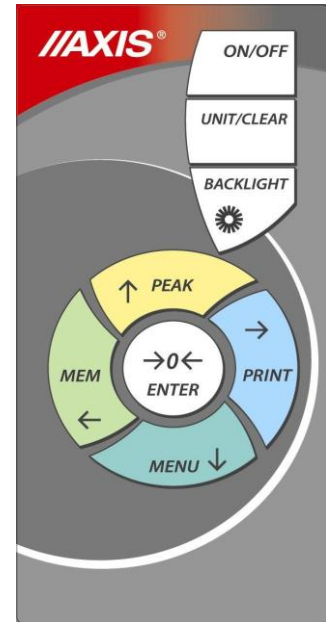
- MENU** - Meter function menu (diagram menu - chapter 18),
- PEAK** - Measure the maximum value,
- MEM** - Save the result to the memory, press and hold – save to memory menu,
- PRINT** - Print result (transmission via RS-232C connector).
- 0← - Force meter indications zeroing

Status indicators:

- MIN/OK/MAX** - Indications below MIN; in range MIN÷MAX; above MAX
- MAN/ACQ** - Manual/automatic measurements mode
- ▴ ▾/LOCK - Indicates that the weighing result has stabilised,
- PK↑ / PK↓** - Direction of measured force,
-
- SLW/FST** - Slow/fast measurement mode,
- AUT** - Autozeroing on
- SD** - microSD card mounted

Note:

Numbers are entered using the navigation keys. First, the cursor is placed in the right digit position.



8. Preparing the force gauge for operation



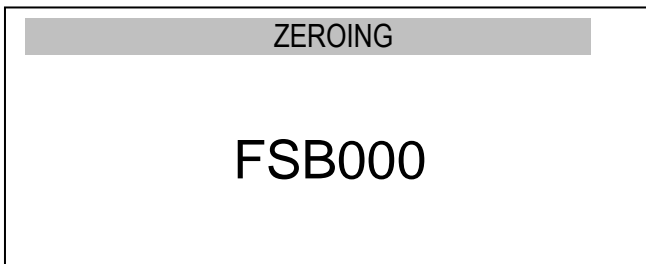
If the force gauge has been transported from an area with low temperature to an area with a higher temperature, e.g. during winter, water may condensate on the gauge's enclosure. In such a case, do not turn on the gauge's power supply, as it may lead to damage to the gauge or improper operation. Before turning on the gauge, leave it for 1 hour to acclimatise.

9. Encender el medidor de fuerza

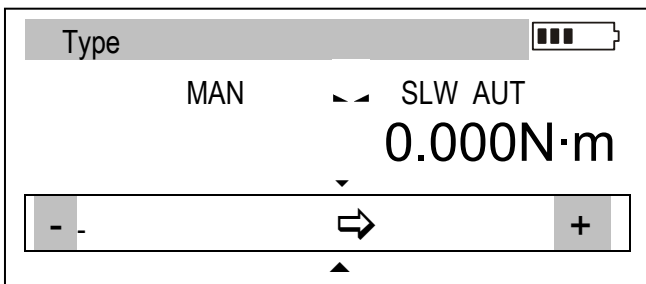


Coloque el medidor en la posición de funcionamiento, por ej. una posición horizontal (colocando sobre una mesa). Encienda el medidor presionando la tecla *ON/OFF*.

Cuando sea necesario, conecte el medidor al enchufe de ~230 V/50 Hz y conecte la toma de alimentación de 12 V del medidor.



El medidor comprobará automáticamente los subconjuntos electrónicos y lo reiniciará. Durante esta operación, el medidor debería permanecer pardo y el sensor no debería verse afectado por ninguna fuerza.



Cuando el reinicio ha terminado correctamente, el medidor se pone a cero.

El reinicio incorrecto se indica con el mensaje correspondiente.

Nota:

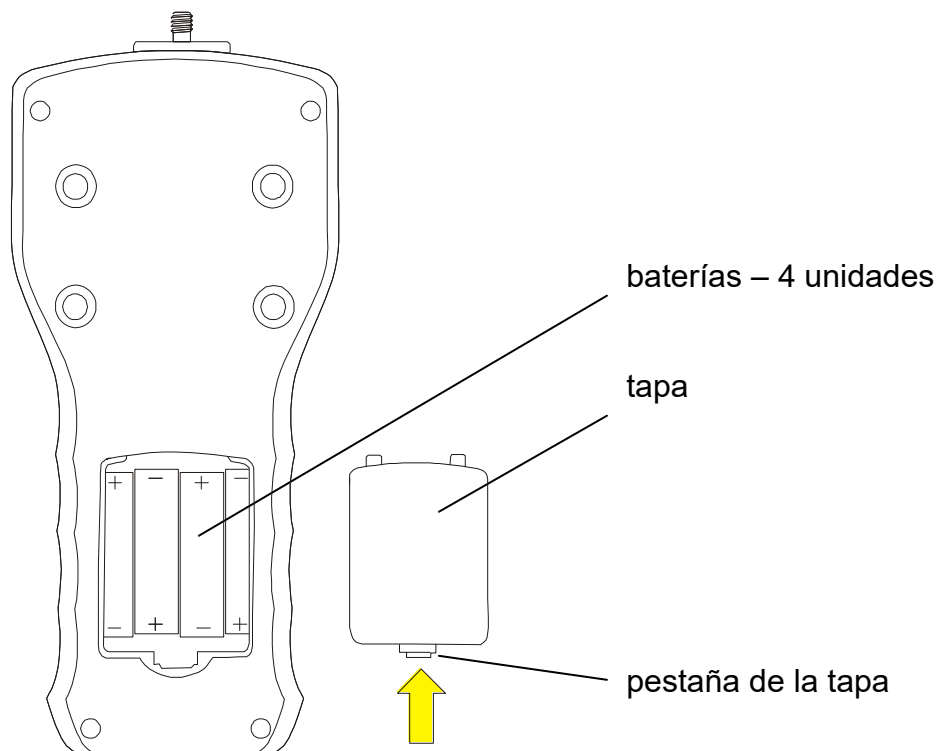
Es posible acelerar el proceso de reinicio pulsando la tecla MENU, que recordará los resultados del reinicio anterior.

Si las baterías están bajas, deje la unidad de alimentación externa activada hasta que estén correctamente recargadas. El nivel de carga de las baterías se indica mediante una señal que aparece en la parte superior de la pantalla.

10. Cambio de baterías

Si durante el tiempo de la medición las baterías disminuye su carga hasta un 20% del tiempo nominal (por debajo de 4 h), deberán cambiarlas.

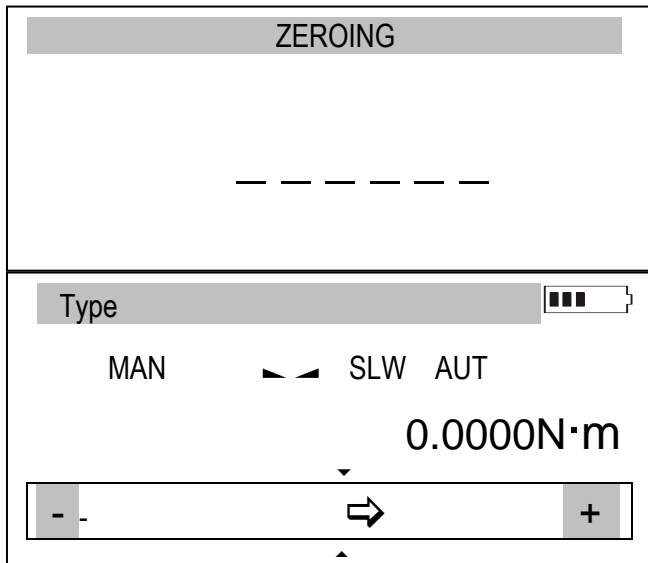
Para cambiar las baterías, abra la tapa y coloque las nuevas como se indica en la parte inferior de la carcasa (polarización correcta).



11. Descripción de los métodos de medición

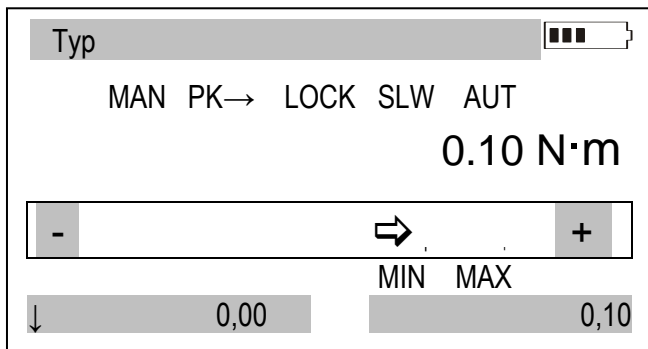
11.1 Medición actual y valor peak de una fuerza de presión / tracción

El proceso de puesta a cero comienza automáticamente después de encender el medidor o al pulsar la tecla $\rightarrow 0 \leftarrow$.



Para realizar la medición, indique la dirección de la fuerza mediante una flecha en la barra que se encuentra en la parte inferior de la pantalla y el símbolo “+” o “-”.

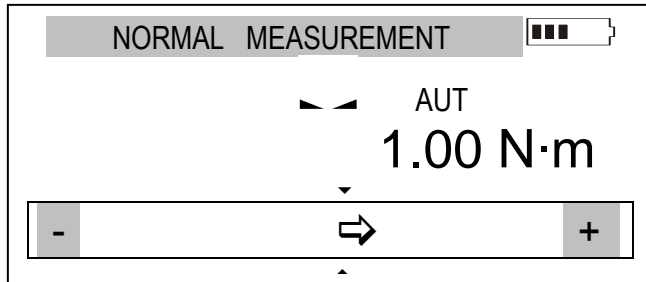
Para cambiar la medición del valor actual (medición continua) el valor máx. (valor peak), utilice la tecla *PEAK* – el indicador de estabilización se sustituye por el indicador *LOCK*. Pulsando otra vez la tecla *PEAK* se cambiará la dirección de la fuerza medida (*PK \rightarrow* , *PK \leftarrow*), para la puesta a cero pulse la tecla $\rightarrow 0 \leftarrow$.



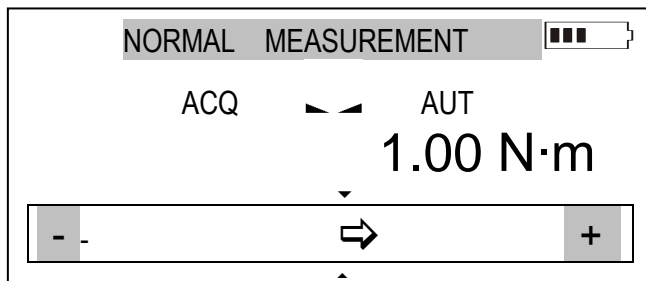
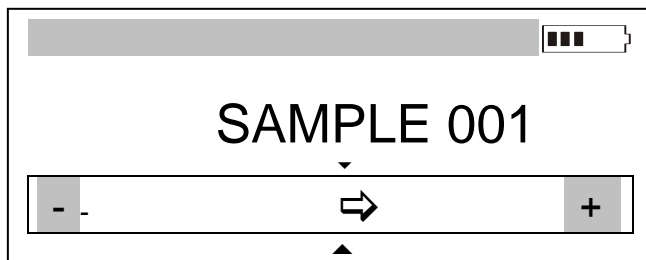
Cuando se mide el valor máximo, en la parte inferior de la pantalla aparece una barra que muestra el valor actual de la fuerza y el valor máx. de la fuerza para la otra dirección si se ha medido previamente - si no, se indicará el valor 0,00.

11.2 Características de la medición de la fuerza, registro de la medición en la memoria

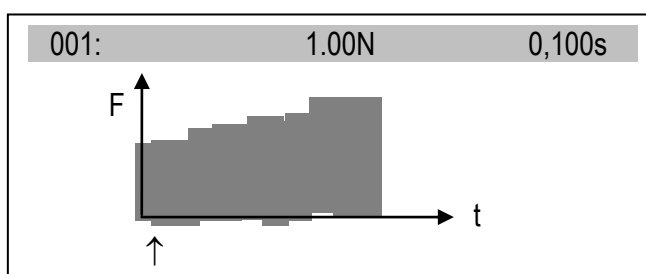
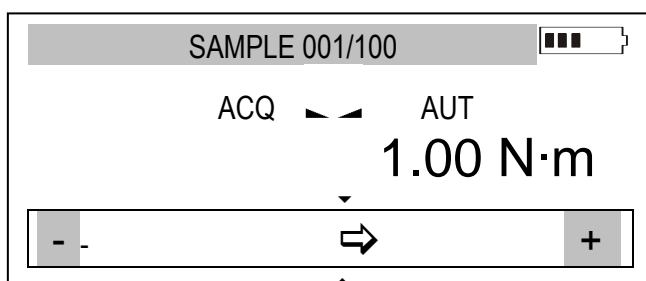
Para permitir cambiar la medición de la fuerza y crear visualizaciones de los resultados (gráfico o histogramas), el medidor de fuerza está equipado con una memoria (RAM) con los resultados actuales, memoria EEPROM y una tarjeta microSD (opcional). Puede encontrar una descripción detallada de la opciones disponibles en el capítulo 14.



MEM



MEM



Después de pulsar la tecla MEM, los resultados se almacenan en la memoria RAM. Los valores de una serie de medición se guardan bajo *Memory/ Setting/Quantity*.

Si se visualiza el indicador *MAN* (modo manual), después de pulsar la tecla *MEM* se almacena una medición individual.

Cuando se activa la indicación *ACQ*, la tecla *MEM* comienza a almacenar las mediciones en intervalos de tiempo iguales.

Durante el almacenamiento de las mediciones sucesivas se muestran los números de muestra y la cantidad total.

Durante el almacenamiento, se muestra el número de muestras y la suma total de muestras.

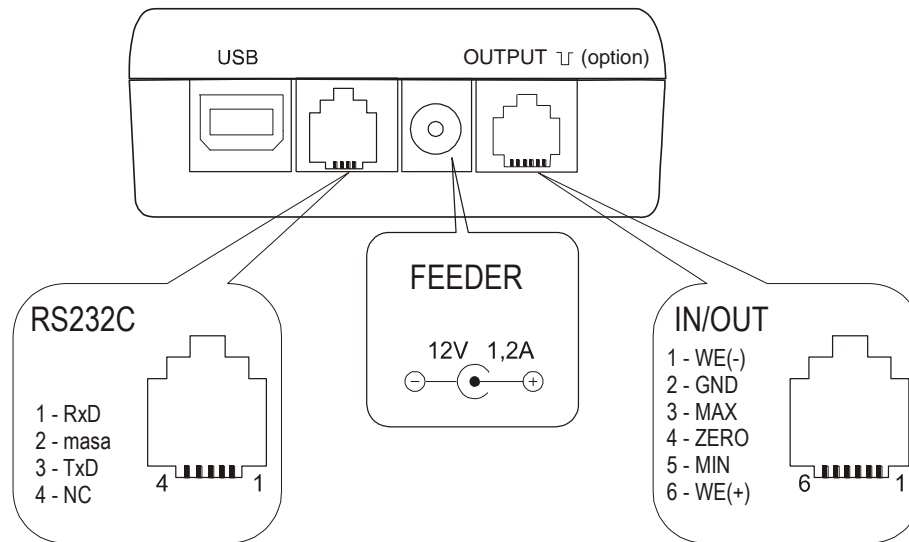
Cuando se han almacenado todas las muestras se muestra un gráfico. *ENTER* – retorna a las indicaciones de fuerza,

MEM – *Statistics* muestra los resultados estadísticos. La opción *Statistics* se utiliza obligatoriamente para almacenar o eliminar los resultados actuales (la próxima medición es posible solo después de la eliminación).

UNIT/CLEAR permite salir rápidamente de la opción *Statistics*.

12. Connecting external devices

The force gauge is equipped with a socket for an external power supply unit, RS232C interface (RJ joint), USB interface and optional THR (thresholds) output.



Installation manual and drivers can be found on CD disc supplied together with force meter.

Joint ampacity OUTPUT: $I_{\max}=25\text{mA}$ / $U_{\text{nom}}=24\text{V}$ (open collector type, emitters connected– GND).

IN voltage range WE(+)/WE(-): $U_{\text{in}}=12\text{-}18\text{V}$ / $I_{\text{in max}}=50\text{mA}$

Description of the data transmission (USB, RS232) protocol when working with a computer (LonG):

The force gauge transmit the result as follows (8 bits, 1 stop, no parity, 4800 bps):

Computer→Gauge: initiating signal S I CR LF (53 h 49 h 0Dh 0 Ah),

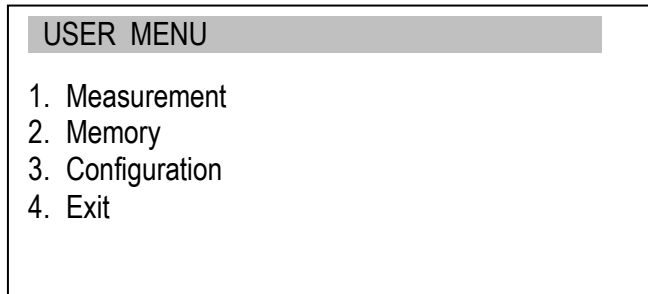
Gauge→Computer: gauge indication according to the following format (16 bytes):

Description of individual bytes:

byte	1	- “-“ or space
byte	2	- space
byte	3÷4	- digit or space
byte	5÷9	- digit, comma or space
byte	10	- digit
byte	11	- space
byte	12	- k, l, c, p or space
byte	13	- g, b, t, c or %
byte	14	- space
byte	15	- CR
byte	16	- LF

13. User's Menu

The User's Menu includes all functions and options necessary to operate the gauge or extend its functionalities.



To use the options of the USER's MENU, use the *MENU* key. Move the cursor to the desired option and press *ENTER*.

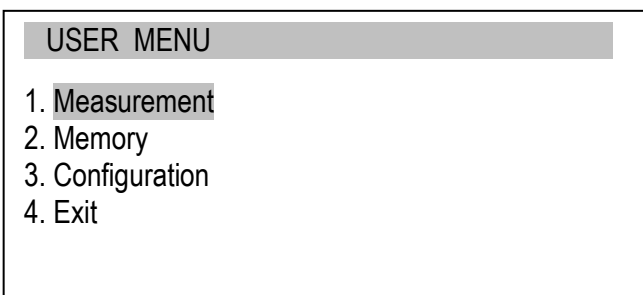
The menu includes:

1. *Measurement* – measurement settings,
2. *Memory* – data readout and saving options,
3. *Configuration* – calibration and other options,
4. *Exit*.

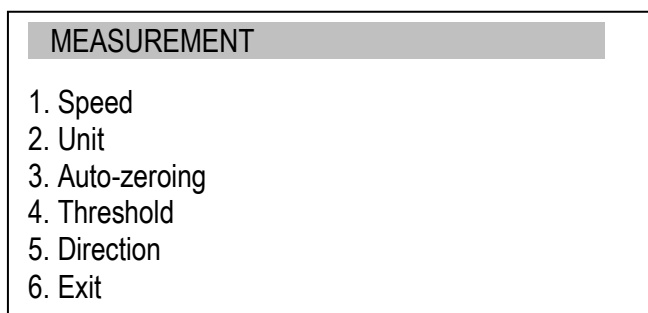
13.1 Measurement

This selection includes the following functions to effectively assist you with the measurement:

- measurement speed in automatic mode,
- measurement unit choice,
- automatic zeroing,
- comparison with two threshold values (*MIN / MAX*),
- measured force direction change (accepted as plus +)



Move the cursor to *Measurement* and press *ENTER*.



Move the cursor to the desired application and press *ENTER*.

13.1.1 Measurement speed

To obtain clear measurement results, it is recommended to adjust the speed of measurement to the dynamic properties of the measured object.

The image displays three sequential screenshots of a device's menu system, illustrating the steps to adjust measurement speed:

- USER MENU**
 - 1. Measurement
 - 2. Memory
 - 3. Configuration
 - 4. Exit
- MEASUREMENT**
 - 1. Speed
 - 2. Unit
 - 3. Auto-zeroing
 - 4. Threshold
 - 5. Direction
 - 6. Exit
- SPEED**
 - 1. Smp.time: 0.001 s
 - 2. Exit

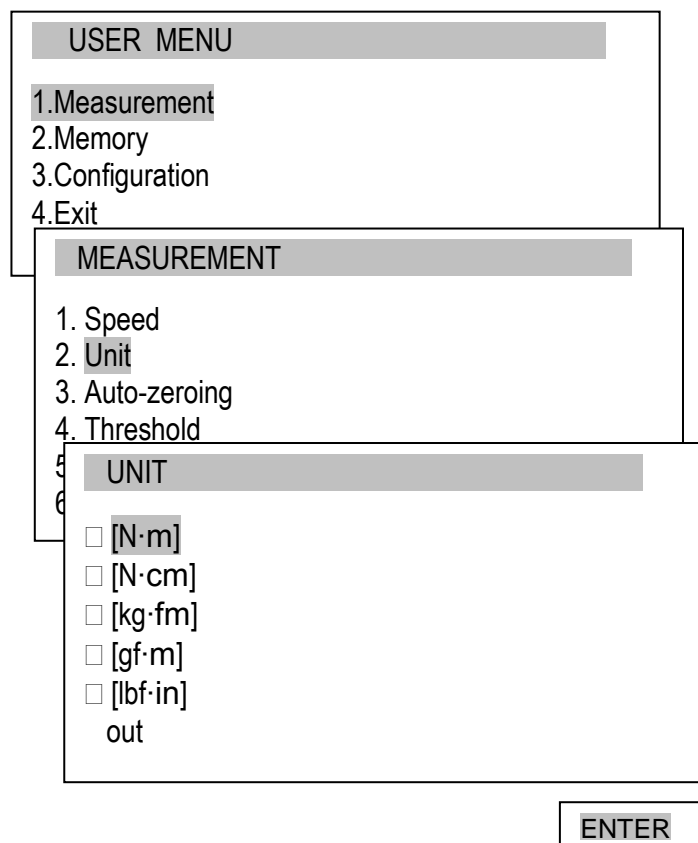
Choose *Smp.time* and press *ENTER* to change sample time value using navigation keys.

13.1.2 Unidades

Unidades de torque:

- newton-metro (N·m) – unidad básica torque,
- newton-centimetro (N·cm): $1\text{N}\cdot\text{m} = 100\text{N}\cdot\text{cm}$,
- kilogram-metro (kg·fm): $1\text{N}\cdot\text{m} = 0,1020\text{kg}\cdot\text{m}$,
- gramo-fuerza-metro (gf·m) : $1\text{N}\cdot\text{m} = 1020\text{gf}\cdot\text{m}$,
- libra-fuerza-pulgada (lbf·in): $1\text{N}\cdot\text{m} = 8.85\text{lbf}\cdot\text{in}$.

Para cambiar las unidades, presione la tecla *UNIT/CLEAR* o *MENU* varias veces.



Presione la tecla *MENU*, mueva el cursor a *Unit* y pulse *ENTER*.

Mueva el cursor a la unidad deseada y pulse *ENTER*.

Durante la medición de la masa, el medidor de fuerza mide la fuerza gravitación y la convierte en masa. El cálculo de la fuerza y la unidad de masa están conectados con la fuerza de gravitación para el lugar de medición. El valor por defecto es el producto del valor de la gravitación $g = 9,81415\text{m/s}^2$. Durante cada medición precisa de la masa ($\pm 0,1\%$ del rango) es crucial para inscribir el valor del lugar de gravitación correcto (opciones de *calibración*).

13.1.3 Auto-zeroing

When activated, this option automatically maintains zero indications on the gauge, if the gauge's sensor is not affected by any external force or if the zero indication was produced by pressing the $\rightarrow 0 \leftarrow$ key. The range of values (calculated in the gauge's reading graduation near zero) subject to the reset must be entered under the *Range* option (2 digits).

USER MENU	
1.Measurement	
2.Memory	
3.Configuration	
4.Exit	
MEASUREMENT	
1. Speed	
2. Unit	
3. Auto-zeroing	
4. Threshold	
5. Direction	
6. Exit	

Use the navigation keys and *ENTER* to select *Status* and one of the following options:

- *ON* – auto-zeroing ON,
- *OFF* – auto-zeroing OFF.

Next, select *Range* and use \uparrow , \downarrow , \rightarrow , \leftarrow and *ENTER* to enter the auto-reset range (in reading graduation).

AUTO-ZEROING	
1. Status	<ON>
2. Range	2 d
3. Art.zero	<OFF><SET>
3. Exit	

\uparrow	\downarrow	ENTER
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AUTO-ZEROING	
1. Status	<ON> <OFF>
2. Range	2 d
3. Art.zero	
4. Exit	

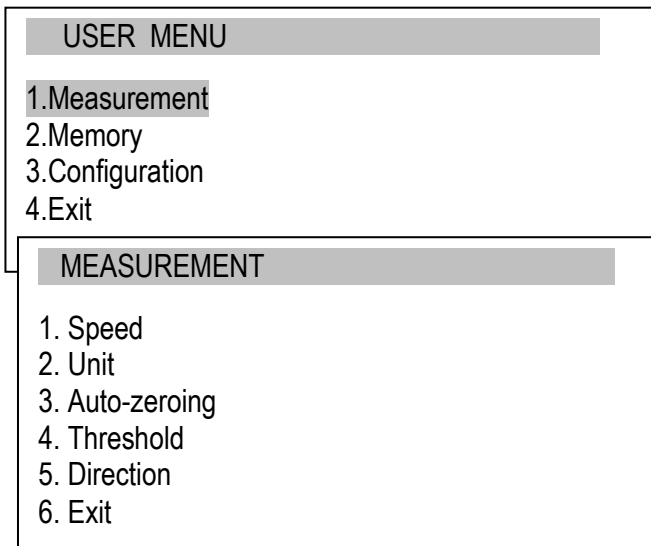
\leftarrow	\rightarrow	ENTER
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Additional option *Art.zero* enables to set device start zero to the value indicated before entering the *MENU*.

13.1.4 Comparación con los valores MIN / OK / MAX

Esta selección incluye las siguientes funciones para ayudarle de manera efectiva con la medición:

- Operaciones de la memoria y análisis de datos,
- Comparación con los dos valores umbral (MIN / MAX).



Mueva el cursor a *Aplicaciones* y pulse *ENTER*.

Mueva el cursor a *Threshold* y pulse *ENTER*.

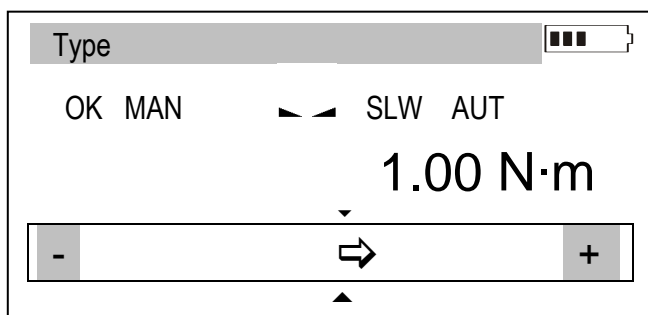
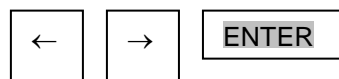
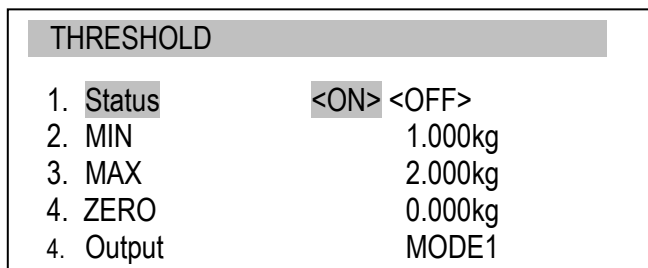
Active la comparación ajustando *Status* a *ON*:

- introduzca el valor *MIN* – umbral más bajo,
- introduzca el valor *MAX* – umbral más alto,
- introduzca *ZERO* – umbral de señalización de cero.

Seleccione la opción para *OUTPUT* y señal de sonido (*Buzzer*):

- *MODE1* – señal corta superando el *MIN*, señal larga superando *MAX*,

- *MODE2* – señal interrumpida por debajo del *MIN*, por encima del *MAX* - señal continua, para *OK* - no hay señal.



Salga del menu, comience la medición y observe los indicadores *MIN*, *OK* y *MAX* en la pantalla del medidor.

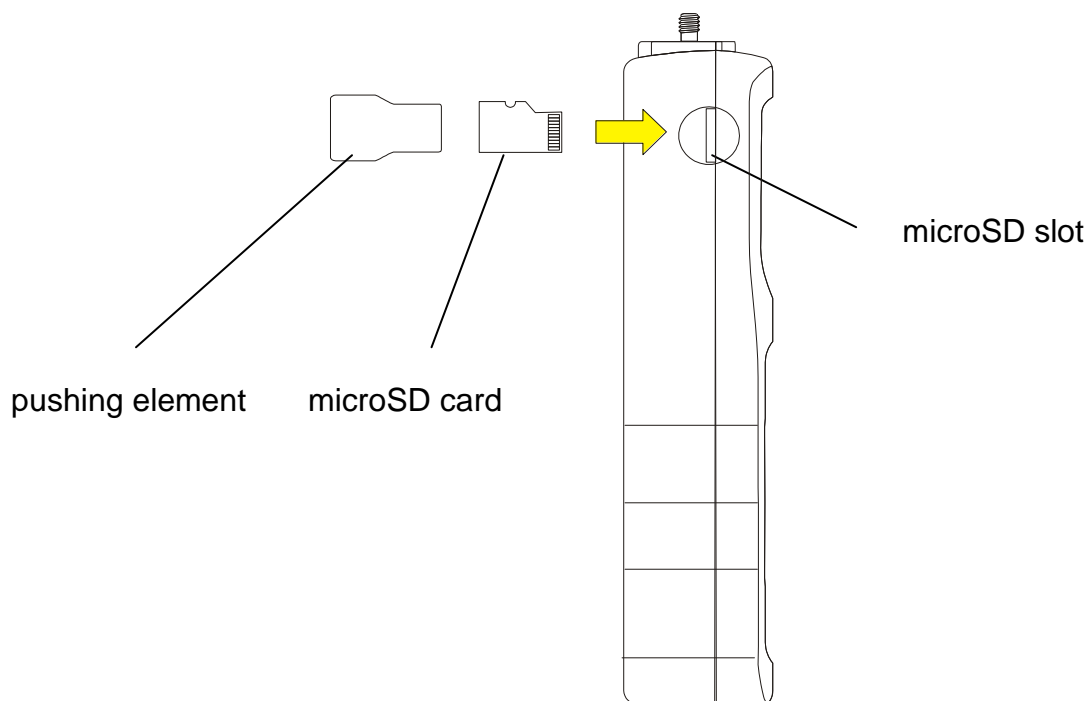
13.2 Memory

During measurements in automatic mode results are saved in volatile memory (RAM – erasing data after supply off). Saving, readout, erasing data (single series of measurements) in EEPROM and resetting volatile memory (RAM) is done by options in lower part of *Statistics* function screen. It is possible to view results on force meter (chart, histogram, table).

Using microSD card enables to save and later readout of many series of measurements in chosen file. It is possible to write custom names (inscribed by user) of folders and files.

MicroSD memory card can be put out from force meter in order to edit files on computer (.txt) and import them to other specialized software. In order to do that use microSD/SD adapter and readout files on computer.

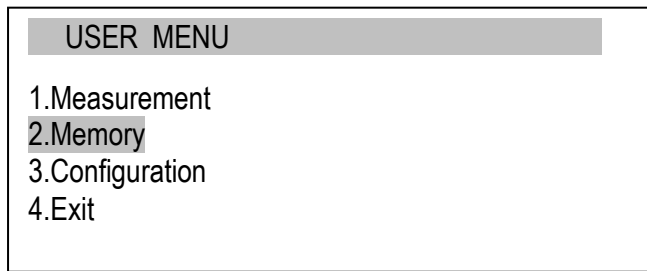
Put microSD card into force meter using pushing element. The card plunges completely into housing and locks. SD or SDH (SDHC) icon appears on display. Push the card in order to unlock it.



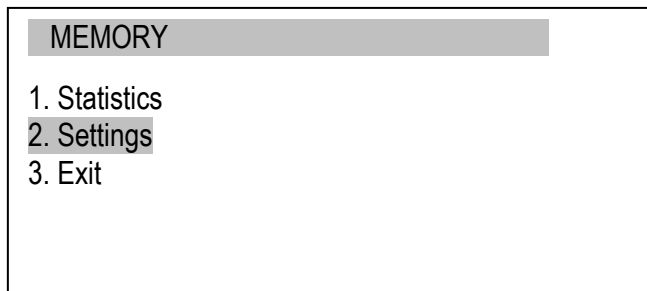
Memory option enables to:

- select gathering results mode,
- exposure of gathered measurements, storing , readout, deleting memory (*Statistics*),
- exit.

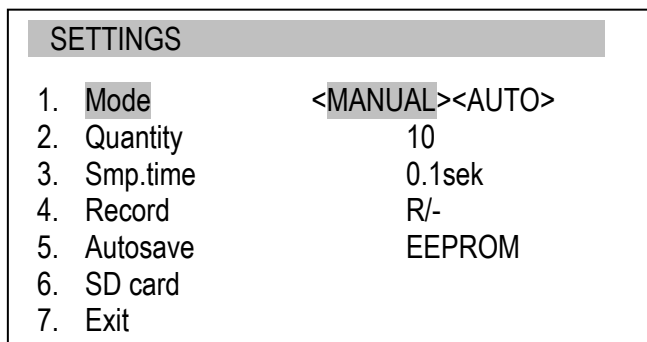
13.2.1 Gathering results



Move the cursor to *Memory* and press *ENTER*.



Move the cursor to *Settings* and press *ENTER*.



Setting the mode for collecting data:

- *MANUAL* – each time after *MEM* is pressed,

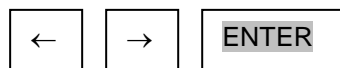
- *AUTO* – automatically at specified intervals.

Insert quantity of samples (max 100)

After choosing *Manual* mode user should specify whether he wants to save the time of each measurement (*R/D&T* option).

In *Autosave* option user can choose the place of autosaving results (*EEPROM* or *SDCARD*).

After selecting *AUTO*, enter the number of samples (max 100) and sampling time (0.1÷99.9 s. or 0,025÷25s depending on speed of measurement in *Configuration*).



To start the collection of measurements, exit the menu and press *MEM* several times or press *MEM* for automatic save. When in the automatic save mode, press and hold *MEM* to go to the data save menu

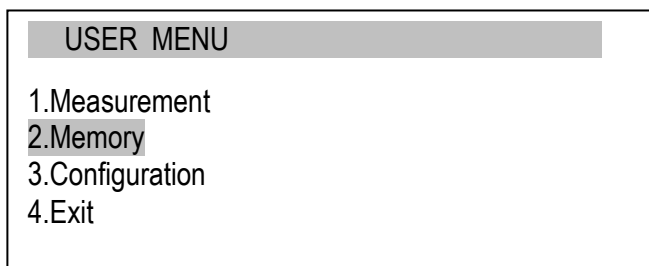
13.2.2 Presentation of collected measurements (Statistics)

The *Statistics* option allows for the following forms of presentation of the collected data:

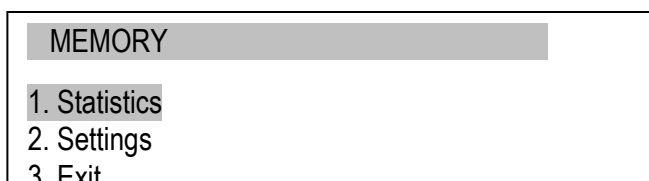
<PRINT> – transmission to a printer,

<HISTOGRAM> – bar graph,

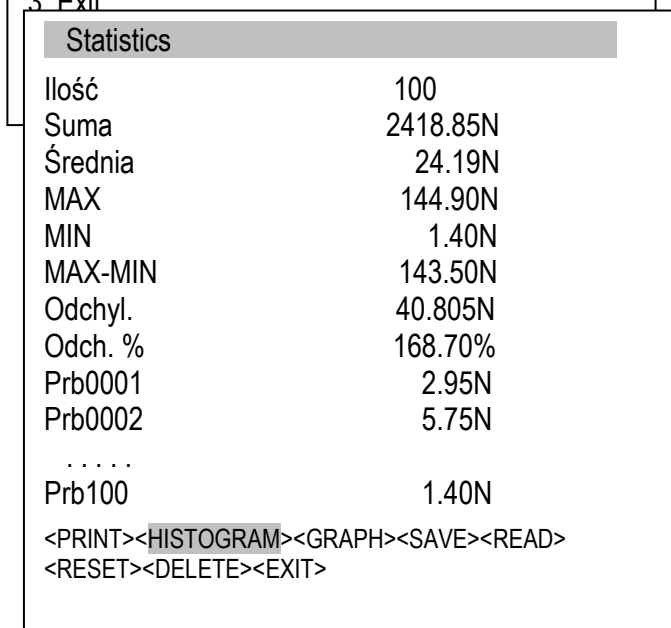
<GRAPH> – graph with a time axis.



Move the cursor to *Memory* and press *ENTER*.



Move the cursor to *Statistics* and press *ENTER*.



Select one of the options from the lower menu bar:

- *PRINT* – transmission to a printer,

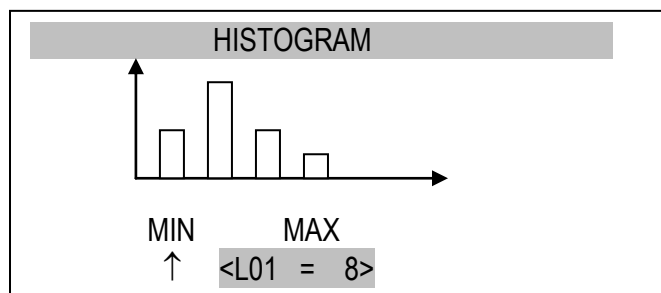
- *HISTOGRAM* – bar graph,

- *GRAPH* – graph with a time axis.

...

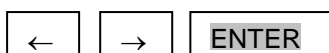
- *RESET* – erases the entire memory,

- *DELETE* – deletes a selected memory file.



Indicators <L... =..> provide the size of the bar indicated by the ↑ arrow.

To move the arrow (scroll the graph), use the ← and → keys.

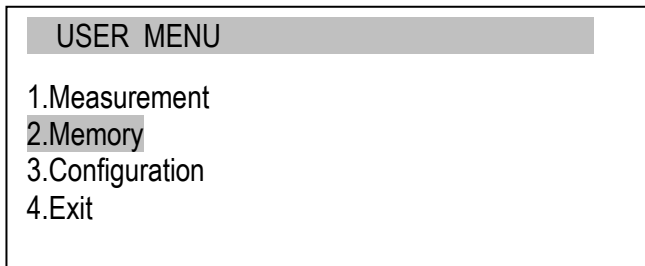


13.2.3 Save, read, erase memory (Statistics)

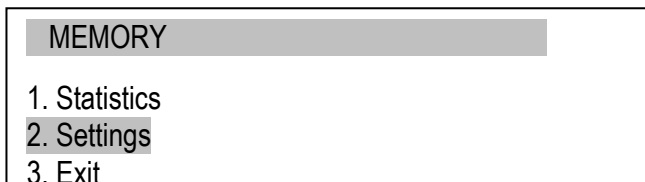
The *Statistics* option allows for the following:

- < *SAVE* > – saves the data currently presented,
- < *READ* > – reads a file from the memory,
- < *RESET* > – erases the data currently presented,
- < *DELETE* > – delete selected data file.

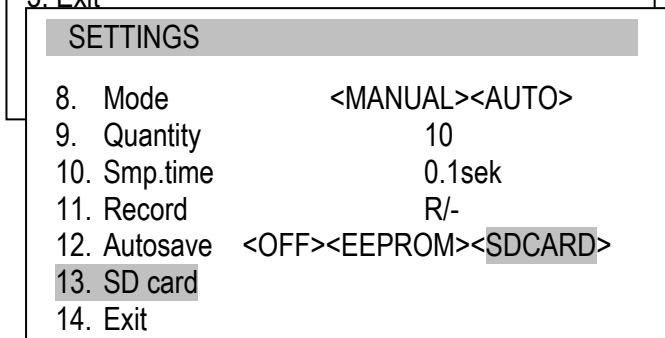
These options show up in the bottom bar (change option using ← or → keys).



In order to choose saving location move the cursor to *Memory* and press *ENTER*.



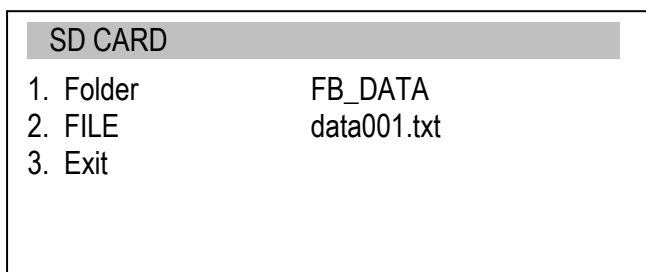
Move the cursor to *Settings* and press *ENTER*. Choose *Mode*. In *Auto* mode results are saved to RAM memory. In *Manual* mode saving to RAM, EEPROM or microSD card is possible.



In order to save file on SD card set *Autosave* to *SDCARD* and move cursor to *SD card* position and press *ENTER*.



The following options will appear:

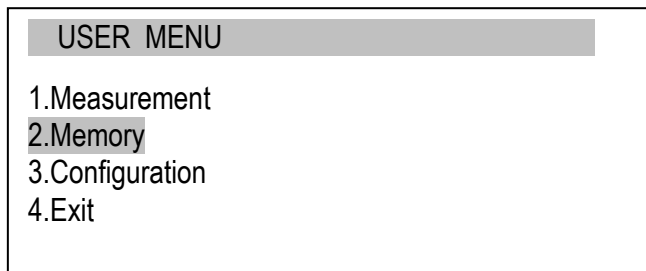


- *Folder* – enables to inscribe the name of the folder on microSD card,
- *FILE* – enables to inscribe file name on microSD card,
- *EXIT* – exit.

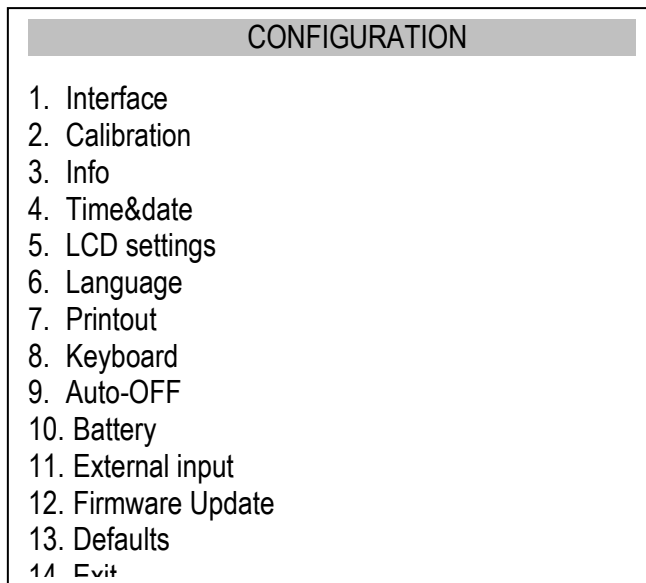


13.3 Configuration

This selection includes all options for setting the gauge's modes of operation.



Move the cursor to *Configuration* and press *ENTER*.



Move the cursor to the desired option and press *ENTER*.

ENTER

13.3.1 Setting serial ports

The parameters of the serial connector must be suitable for the device receiving the signal.

USER MENU	
1. Measurement	
2. Memory	
3. Configuration	
4. Exit	

CONFIGURATION	
1. Interface	
2. Calibration	
3. Info	
4. Date/time	
...	

INTERFACE	
1. RS-232C	
2. USB	
3. Exit	

INTERFACE	
1. Baudrate	4800
2. Bits	8-bit
3. Parity	none
4. Sending	NORMAL
5. Exit	

INTERFACE	
1. Baudrate	4800
2. Bits	8-bit
3. Parity	none
4. Sending	<NORMAL><NO STB><AUTOSTB> <CONTIN.>
5. Exit	

Parameters to be set:

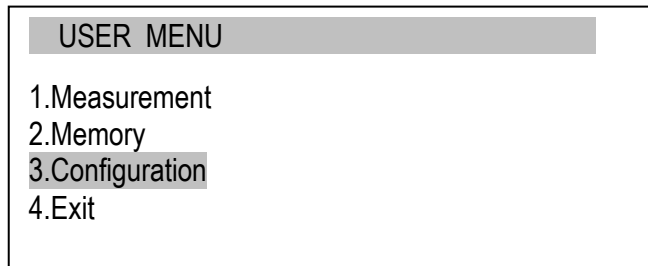
- *Baudrate* – transmission and receiving rate (4,800 ÷ 115,200 bps),
- *Bits* – number of bits which constitute a character (7 or 8 bits),
- *Parity* – control of parity (no control, even – confirmation of parity, or odd – confirmation of odd parity),
- *Sending* – transmission method during measurement:
 - *NORMAL* – after using the *PRINT* key, with stable result,
 - *NOSTB* – after using the *PRINT* key, irrespectively of the result stability,
 - *AUTOSTB* – automatically after the result has stabilised,
 - *REMOVE* – automatically after unload (under 10d or zero signalization threshold) previous stable result is send; if *PEAK* option is on, after unloading zeroing of indications is carried out,
 - *CONTIN.* – continuous transmission, approx. every 0.1 s.



When the force meter is equipped with two serial interfaces (RS232C and USB) in submenu *Interface* two options are available *RS232C* and *USB*. After choosing proper port all settings are done the same way as above.

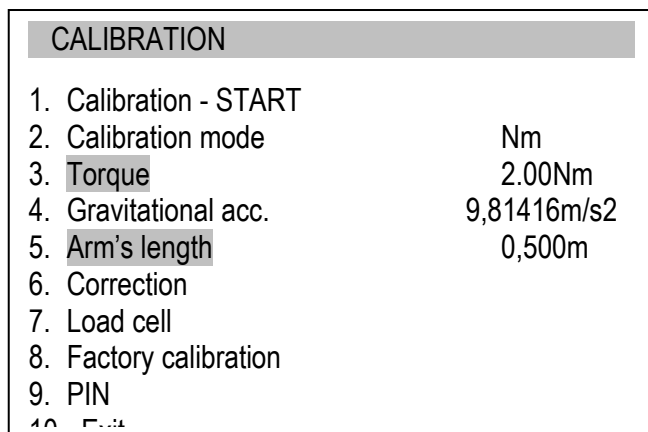
13.3.2 Calibración del medidor de fuerza

La entrada a la calibración tiene una contraseña PIN de seguridad. La calibración debe ser realizada por el personal autorizado.



Reinicie el medidor sin carga utilizando la tecla $\rightarrow 0 \leftarrow$.

Utilice las teclas de navegación y *ENTER* para seleccionar *Configuration* y a continuación *Calibration*.

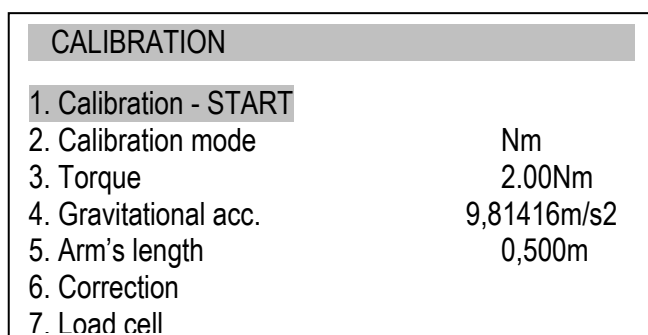


Según el tipo de brazo seleccione las opciones *Torque* y *Arm's lengths*. La opción *<...>* le permite introducir cualquier valor.

Introduzca la aceleración gravitacional para convertir la masa correctamente (kg) en fuerza (N).

Si el valor exacto "g" no es conocido, entre a los parámetros de la situación geográfica (latitud por encima del mar). El valor "g" se calculará automáticamente.

Aplice el estándar de masa al medidor.



Use las teclas de navegación y *ENTER* para seleccionar *Calibration* y espere hasta que el proceso de calibración se complete.

La opción *Correction* permite cambiar las indicaciones de torque con el valor inscrito .

La opción de *calibración de fábrica* permite volver a la configuración de fábrica.

13.3.3 Information

Option gives basic information about the device.

USER MENU
1.Measurement
2.Memory
3.Configuration
4.Exit

CONFIGURATION
1.Interface
2.Calibration
3.Info
4.Date/time
...

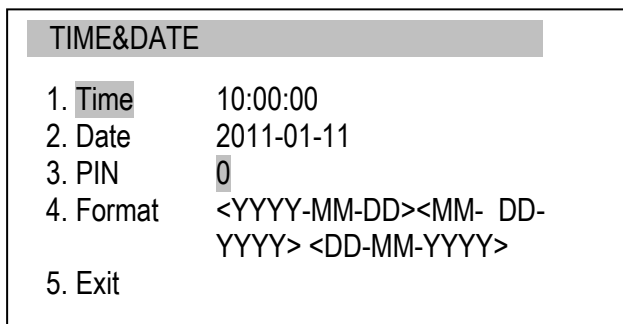
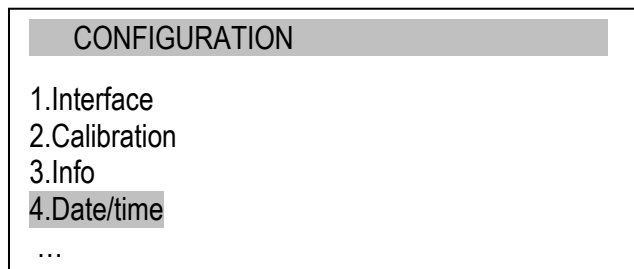
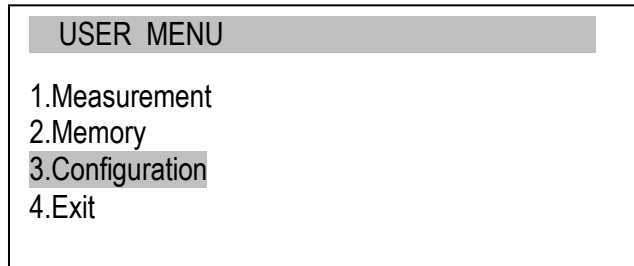
INFO
MODEL
MAX
SOFT
DATE
S/N
Card
AXIS Sp. z o.o.

Available information:

- force meter type (*Model*)
- measurement range (*MAX*)
- internal software version (*SOFT*)
- serial number (*S/N*)
- production date (*DATE*)
- memory card type (*Card*)
- producer name

13.3.4 Setting date and time

This option is used for entering the current date and time. Access to this setting is secured by the PIN code.



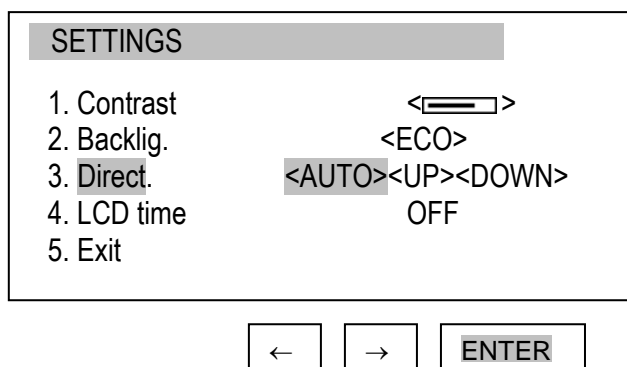
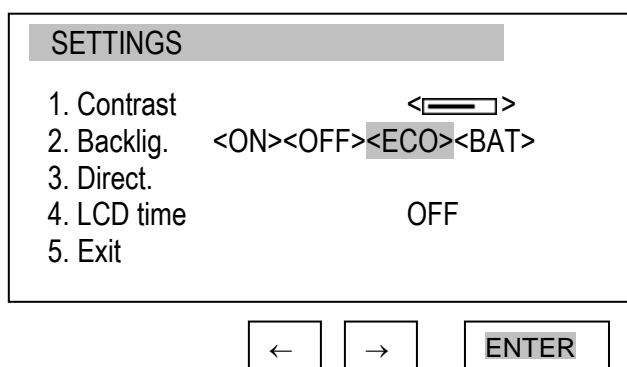
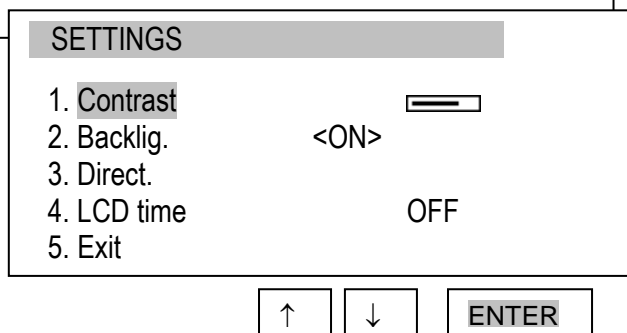
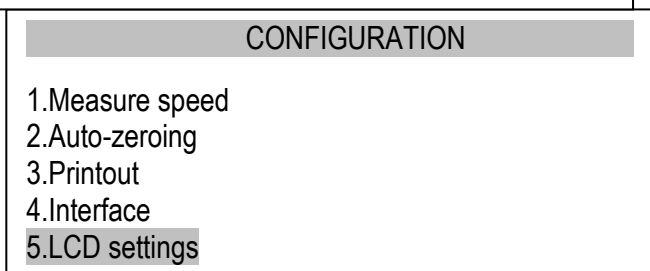
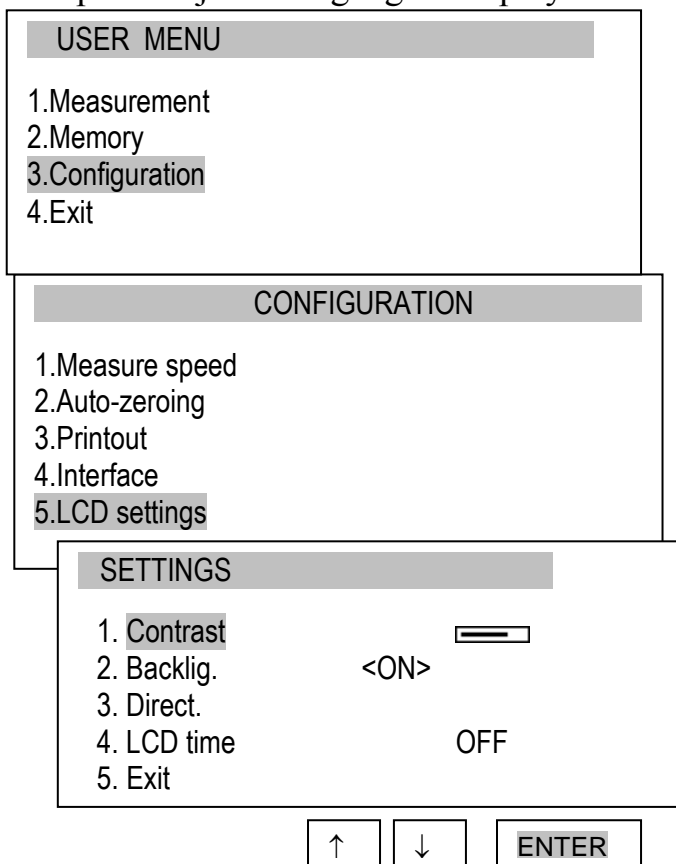
Use the navigation keys and *ENTER* to select *Date and time*. If a *PIN* has already been entered (other than 0), after selecting *Time* or *Date*, the cursor will move to the *PIN* option, where a correct 4-digit *PIN* has to be entered. To enter the correct digits, use the ↑, ↓, →, ← keys and *ENTER*.

To enter a new code (*NEW*), select the *PIN* option. When entering a new code, type in the same number twice (message: *REP.*).

The *FORMAT* option allows for the selection of the date format on print-outs.

13.3.5 LCD settings

This option adjusts the gauge’s display to external lighting conditions.



Use the navigation keys and *ENTER* to select *LCD settings*. Next, use *→*, *←* and *ENTER* to set the contrast at which the display is best legible.

When setting *Backlig.* (backlighting), select one of the following options:

- *OFF* – backlighting OFF,
- *ON* – backlighting continuously ON,
- *ECO* – to backlight, use the *BACKLIGHT* key,
- *BAT* – backlighting is turned off after 30 seconds to save the batteries.

The *DIRECT.* (direction) option is used for selecting the display’s direction:

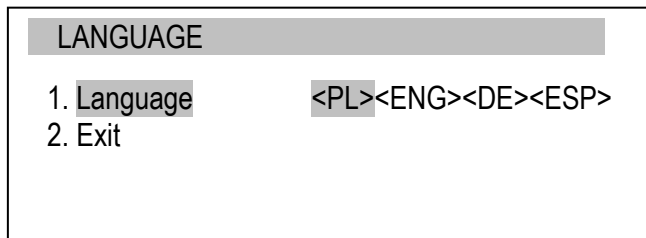
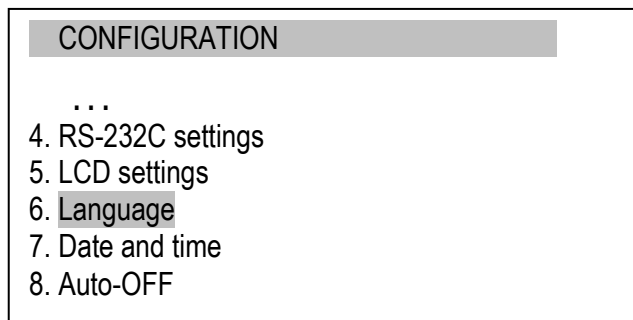
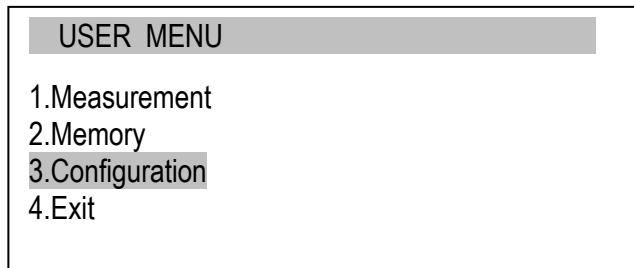
- *AUTO* – automatic rotation of the displayed image,
- *UP* – standard direction,
- *DOWN* – inverted image.

The *LCD TIME* option displays the date and time during measurement in the display’s upper bar.

13.3.6 Selecting the menu language

Three menu languages are available:

- <PL> – Polish,
- <ENG> – English,
- <DE> – German,
- <ESP> - Spanish.

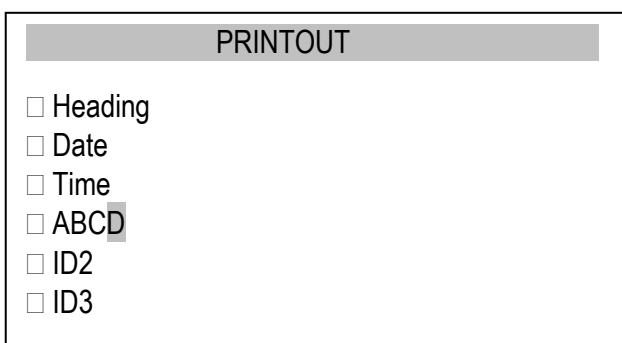
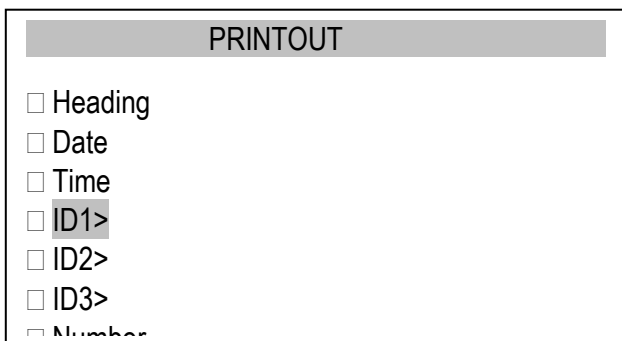
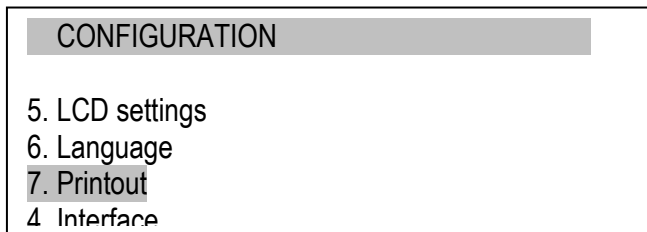
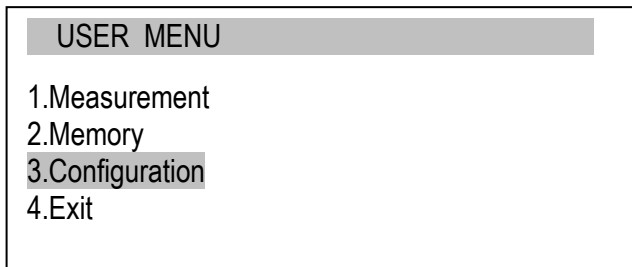


Use the navigation keys and *ENTER* to select *Language*. To select one of the available menu languages, use the →, ← keys and *ENTER*.

To enter a new code (*NEW*), select the *PIN* option. When entering a new code, type in the same number twice (message: *REP.*).

13.3.7 Printout settings

According to the requirements of GLP procedures, it is possible to use an external printer to produce print-outs from the gauge including text information.



Use the navigation keys and *ENTER* to select *Printout* and the suitable print components.

ID1, ID2, ID2 – text strings (up to 20 characters) forming the lines of the print-out, entered using the gauge’s navigation keys (starting from →).

To enter the characters, select *ID* using *ENTER* and press →. The characters are entered using the navigation keys ↑ and ↓. To move the cursor to the consecutive positions, use ← and →. To confirm the entered string, press *ENTER*. To delete a character, enter space

13.3.8 Turning the sound ON/OFF when using the keypad (beep)

This options turns ON or OFF the sound signalling that a key on the keypad has been pressed. When the sound is turned on, the user usually does not apply excessive force when pushing the keys.

USER MENU
1.Measurement
2.Memory
3.Configuration
4.Exit

CONFIGURATION
3. Printout
4. Interface
5. LCD settings
6. Language
6. Time&date
7. Keyboard

KEYBOARD	
1. BEEP	<ON><OFF>
2. Exit	

↑	↓	ENTER
---	---	-------

KEYBOARD	
1. BEEP	<ON>
2. Exit	

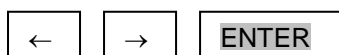
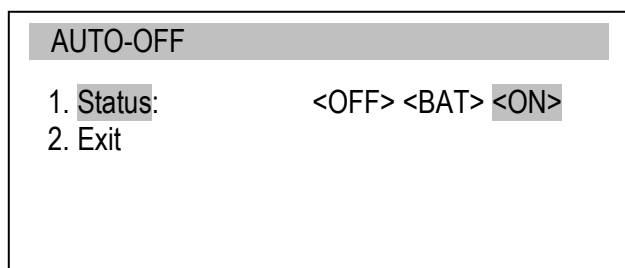
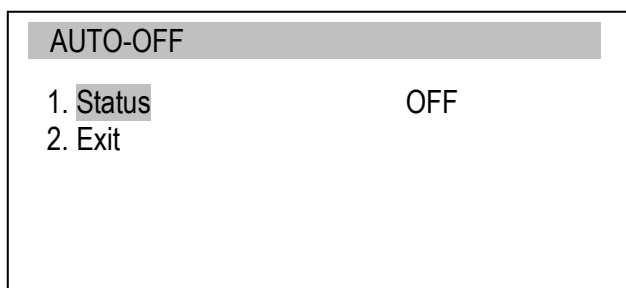
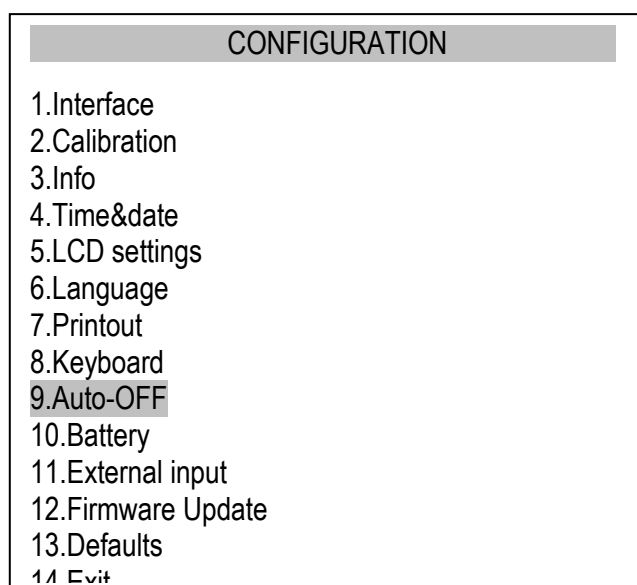
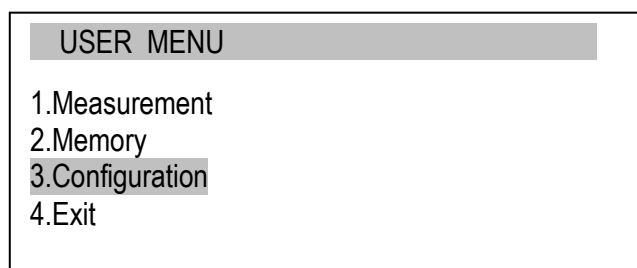
←	→	ENTER
---	---	-------

Use the navigation keys and *ENTER* to select *Keypad* and *Buzzer*, and one of the following options:

- *ON* – sound ON,
- *OFF* – sound OFF.

13.3.9 Automatic power OFF (Auto-OFF)

This option allows for an automatic cut-off of the gauge's power supply to save the battery's energy.

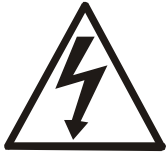


Use the navigation keys and *ENTER* to select *Auto-OFF* and *Status*, and one of the following options:

- *ON* – the power is turned off after 5 minutes, the indications remain unchanged,
- *BAT* – the power is turned off when the battery is low,
- *OFF* – the power is not turned off.

13.3.10 Monitoring the batteries' charge level (Battery)

This option is used for reading the charge level of the batteries and allows for the charging to be turned off to protect ordinary batteries, if such batteries are used instead of rechargeable batteries.



Charging ordinary batteries used instead of rechargeable batteries may lead to major damage to the gauge.

USER MENU
1.Measurement
2.Memory
3.Configuration
4.Exit

CONFIGURATION
1.Interface
2.Calibration
3.Info
4.Time&date
5.LCD settings
6.Language
7.Printout
8.Keyboard
9.Auto-OFF
10.Battery
11.External inout

BATTERY	
1. Charging	OFF
2. Level	80%
3. Exit	

↑	↓	ENTER
---	---	-------

BATTERY	
1. Charging	<OFF> <ON>
2. Level	80%
3. Exit	

←	→	ENTER
---	---	-------

Use the navigation keys and *ENTER* to select *Battery* and *Charging*, and one of the following options:

- *ON* – charging ON,
- *OFF* – charging OFF.

13.3.11 External input

This option can be used when force gauge is applied in any kind of automated process. THRESHOLD (optionally) output is used for this function so when using this option threshold function should be turned off.

USER MENU	
1.Measurement	
2.Memory	
3.Configuration	
4.Exit	

CONFIGURATION	
...	
8. Keyboard	
9. Auto-OFF	
10. Battery	
11. External input	

EXTERNAL INPUT	
1. Status :	<OFF><TRIGGER><GATE>
2. Exit	

Using navigation keys and *ENTER* key choose *Configuration* option and then *External input*. Choose *Status* option and using ← and → keys choose from:

- *OFF* – function off,

- *TRIGGER*:

a) manual measurement mode – measurement storing initiated by a single external signal,

b) automatic measurement mode – storing of set quantity of measurements initiated by a single external signal,

- *GATE*:

a) manual measurement mode - measurement storing initiated by a single external signal while *MEM* key is pressed,

b) automatic measurement mode – storing of set quantity of measurements initiated by external signal state time window.

13.3.12 Firmware update

Option designated for service

Option enables program update by connecting force gauge to computer using RS232 or USB interface. *Firmware update* message on force gauge's display is connected with this option. To delete this message, disconnect the force gauge from supply.

13.3.13 Defaults

This option restores factory settings (default settings) for all options.

The diagram illustrates the menu structure for restoring factory settings. It consists of three stacked menu screens and a set of navigation keys at the bottom.

- USER MENU**: A menu with four options: 1.Measurement, 2.Memory, 3.Configuration (highlighted), and 4.Exit.
- CONFIGURATION**: A menu with three options: 7. Date and time, 8. Auto-OFF, and 10. Defaults (highlighted).
- DEFAULTS**: A menu with the text "Restore default settings?" and two options: NO and YES (highlighted).

Navigation keys at the bottom: an up arrow key, a down arrow key, and an ENTER key.

Use the navigation keys and *ENTER* to select *Reset settings* and the option *YES*.

As a result of restoring factory settings, the gauge will reset and start continuous measurement.

14. Maintenance, troubleshooting and repairing minor types of damage

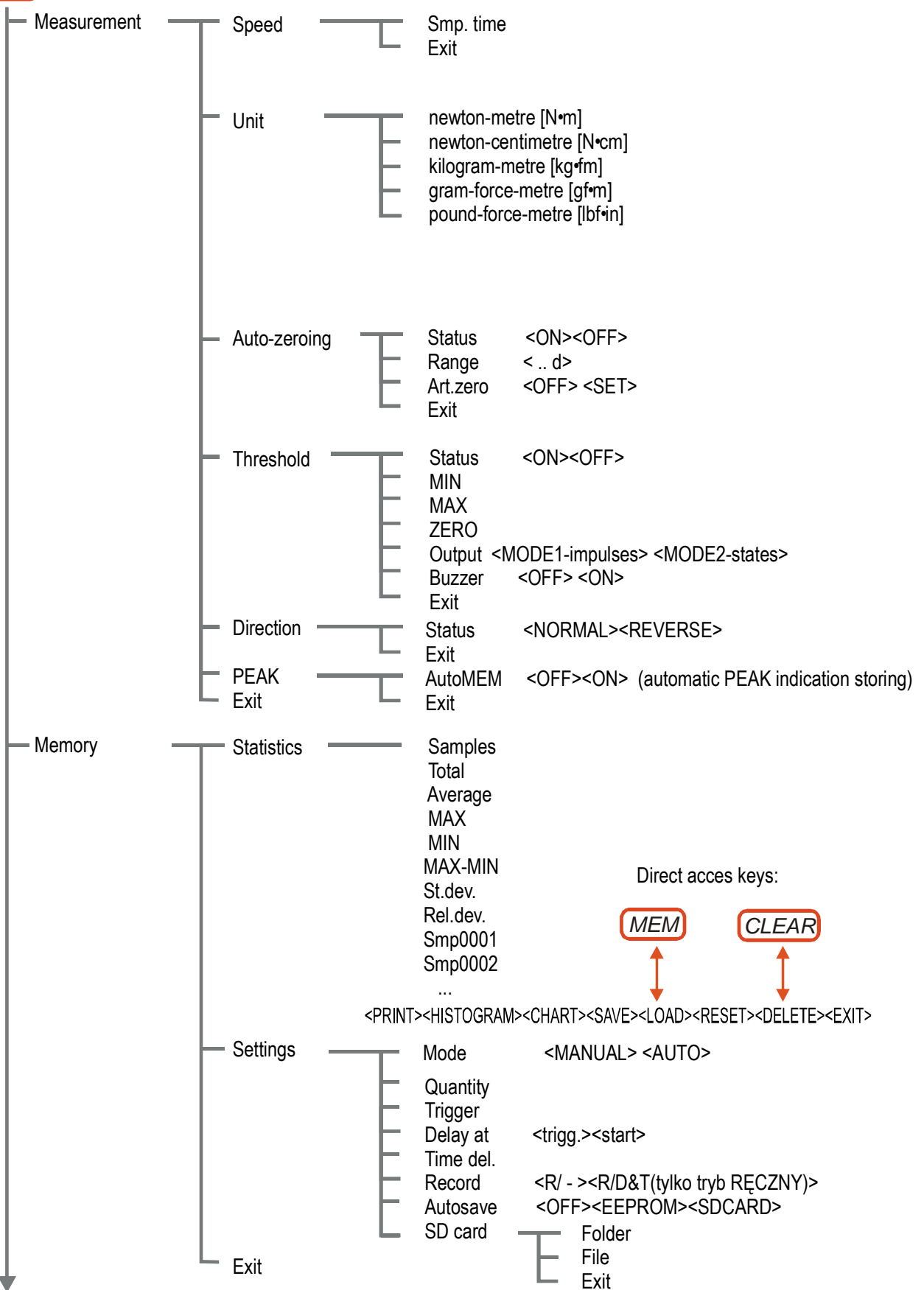
1. Keep the gauge clean.
2. When using the force gauge, make sure that no contamination gets between the gauge plunger and the enclosure. Upon identifying any contamination, remove it using a tool which does not conduct electricity.
3. Unauthorised person may not perform any repairs.
4. Have the gauge repaired by your local servicing facility. A list of servicing facilities is enclosed in the warranty.

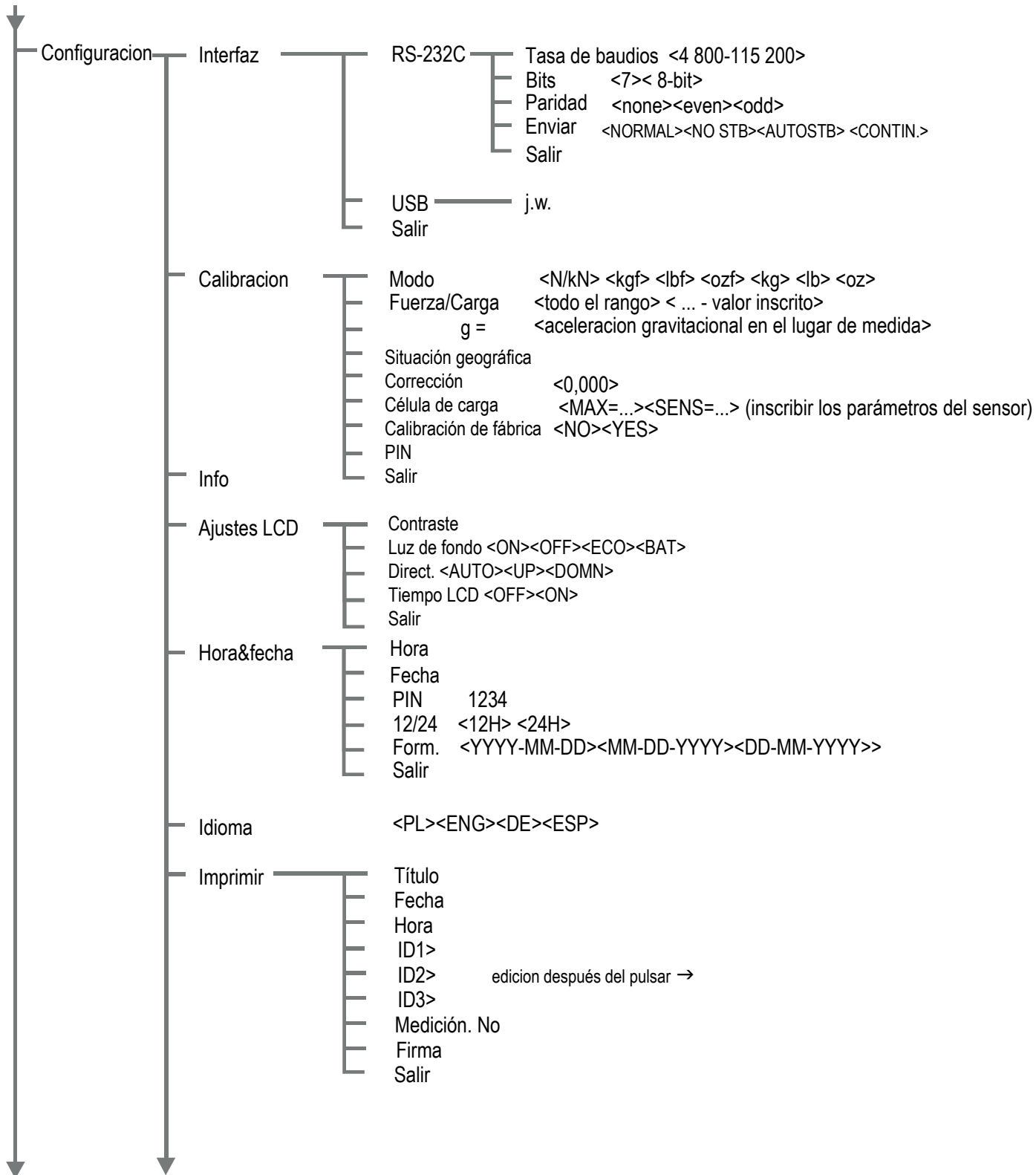
Messages and faults:

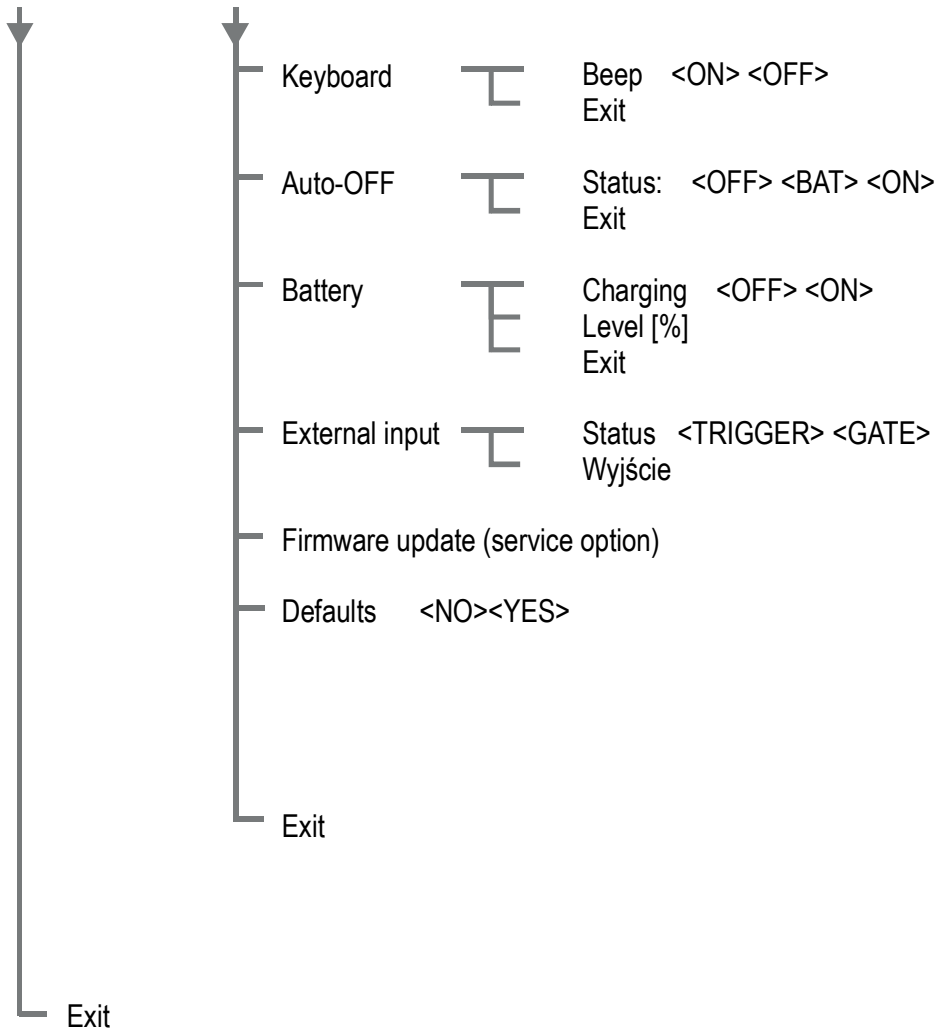
Message/fault	Cause	Recommendation
The message RESETTING is displayed for an extended period of time.	Resetting process disturbed	Keep the gauge in motionless position and press $\rightarrow T(0) \leftarrow$
Message: AD range exceeded (+/-)	Resetting process disturbed	Put the gauge in horizontal position and turn it off and on using the ON/OFF key.
The values indicated by the gauge diverge significantly from correct values	Gauge out of adjustment	Contact a servicing facility to calibrate the gauge
Units displayed are different from the selected units	UNIT/CLEAR key pressed by accident	Press the UNIT/CLEAR key several times to display the correct units

15. FSB menu diagram

Menu







Declaration of Conformity



We:

AXIS Spółka z o.o. 80-125 Gdańsk, ul.Kartuska 375B

confirm with all responsibility that force gauges:

FSB2, FSB5, FSB10

marked with CE mark comply with the following:

1. Directive 2004/108/EWG (electromagnetic compatibility) and harmonized norms:
 - PN-EN 61000-4-3+A1:2008+A2:2011
 - PN-EN 61000-6-3:2008+A1:2011
 - PN-EN 55011:2007+A2:2007

Additional information:

- Conformity evaluation were carried out by Laboratorium Badawcze Oddziału Instytutu Elektrotechniki in Gdańsk, accredited by PCA (AB007), examination report nr 109/LMC-738/2009 from 28.09.2009 r..

Gdańsk, 22-08-2014 r.

Per pro Director of AXIS Sp. z o.o.:

Production Manager Jan Kończak

A handwritten signature in black ink, appearing to read 'Jan Kończak', is written over a horizontal line. Below the line, the word 'Signature' is printed in a serif font.