METER SE-12/N/2xLCD

Technical and Motion Documentation

File: 2015-01-21 SE12-093 T20_11 GB

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1. Introduction

Balance meter SE-12 is suitable for connecting platform with weight sensors and performs all basic balance functions. Moreover, it is possible to perform data exchange between SE-12 module and computer through the multi-station RS485 or LAN(option). If the module is equipped with auxiliary RS232C ports, it is also possible to read bar codes with the handheld scanner and printing weight slips or self-adhesive labels. The module is delivered separately or as part of ready balance (according to order).

2. Certificates

SE-12 meters have the test certificate no. PL CB 1, issued by Central Office Of Measures in Warsaw (Notified Unit No. 1440).

Meters SE-01/N/18 and SE-01/N/25 have IP65 protection grade, confirmed by test performed in Research Laboratory of Electrotechnical Institute, accredited by PCA.

Meter can be used for constructing balance according to standard PN-EN 45501 Specification for metrological aspects of non-automatic weighing instruments, issued in December 1999, harmonized with the 90/384/EEC council directive, changed by 93/68/EEC council directive).

Balances classification (PKWiU code) 29.24.23.

3. Balance keys and indicators

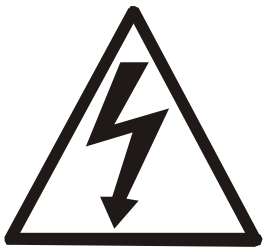
Keys I/⏻, →*T*←, →*0*← and *Menu* perform the basic weighing functions. Key ⮆ (Print) sends the result to the computer. Key F recalls list of special functions.
Operation of F1÷F5 keys depends on their configuration, made dynamically by the computer. Description of functions performed by those keys is shown in the bottom text line. Alphanumeric keys and ENTER are activated automatically after selecting

functions, connected with data entering. In the module not connected to the computer they will not perform any actions.
Operation of other keys depends on module software version.

Basic functions of keys:

	I/⏻	- switch (standby)
key	*→T←*	- tare set (entering package weight, subtracted from weighed mass) / switch
	→0←	- zeroing
	Menu	- special functions:
		- alphanumeric keys (press repeatedly to obtain appropriate character):
	0/_	- digit 0 or special signs (- . , / : etc.)
	1/abc	- digit 0 or letters a b c ą
	2/def	- digit 2 or letters d e f
	...	- ...
	9/wzyx	- digit 9 or letters w z y z
	. /shift	- decimal point or switching to upper case characters
	Enter	- confirmation of entered data
	CLR	- undoing the last operation
	↑ and ↓	- navigation
	←	- deleting previously entered sign
	F1,F2, ... ,F5	- special function keys, described in upper text line
	⮆	- sending data to the computer
indicator	⌣	- signals weighing result stabilization
	OK	- measurement result between MIN and MAX (thresholds function)
	MAX	- measurement result above MAX

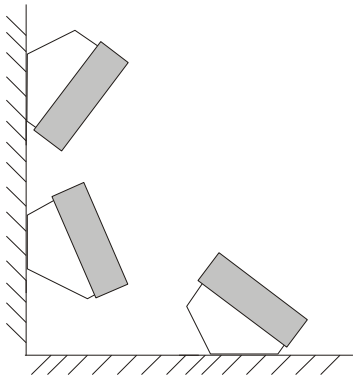
4. Safety principles



It is necessary to become familiar with safety principles shown below, which are necessary to avoid electric shock and damage of balance or connected devices.

- Repairs and necessary adjustments must be performed by qualified personnel only.
- To avoid fire hazard, use only typical supply cable, and supply voltage must be consistent with technical data.
- For the balance supply use the socket with protective contact.
- Do not use balance when the cover is removed.
- Do not use balance in explosive atmosphere.
- Do not use balance in locations with high humidity, when it is not adapted to it.
- In case of damage suspicion, switch the balance off and do not use it until it is tested in professional service company.

5. Module technical data

Parameter	**Value**
Indications display	LCD h=13mm
Text display	LCD h=4mm, 4 lines 20 characters each
Protection grade	IP65
Max. number of legalization graduations	3000e
Precision class	III
Sensors supply	5V AC 25Hz
Reading graduation (d)	1, 2, 5, 10, 20 (g. dkg, kg)
Verification graduation (e)	any
Operational temperature	-10÷40^{o}C
Tare set range	full
Max. number of connected sensors	6 pc.
Input voltage ranges	2,4÷9,5mV (option 10mV) 4,8÷19mV (option 20mV) 9,6÷38mV (option 40mV) 19,2÷72mV (option 80mV)
Load capacity of transoptor outputs	100mA, 24V
Power supply	230V, 50Hz, 6VA
Ready for operation	after 5 minutes from turning on
Housing material	stainless, acid resistant steel sheet
Dimensions:	238x182x77mm
Installation system	
Fixing	2 otwory Φ5, rozstaw 203mm
Weight	5.07lb

*e - verification graduation

Metrological data should be placed on the rating plate and are connected with type of constructed balance.

6. Completation

Complete delivery includes:

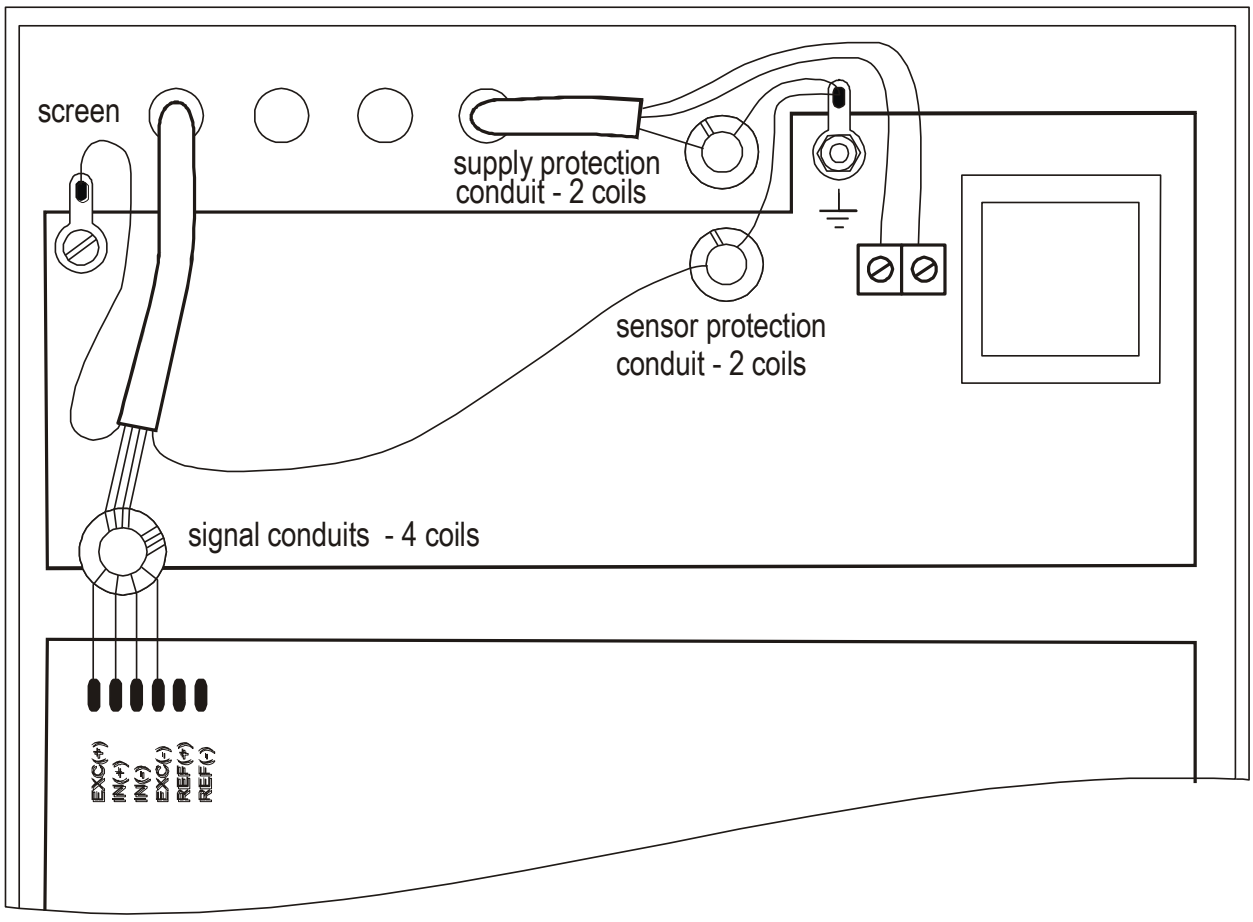
1. SE-12 module or complete balance with SE-12 module (according to order),
2. Technical documentation
3. SE-12 module warranty,
4. CD disc:
   - TERMINAL software for testing and commands list (option 1 – for programmer),
   - Utility software in demo version and instruction manual (option2 – for user),
   - Technical recommendations for RS485 network (in case of multi-station system delivery).
5. Licence for utility software (option 2).
6. Converter RS485/232C for the computer (in case of multi-station system delivery).

7. Preparation to work

1. Construction of balance upon the basis of SE-01 meter should be ordered to the authorized producer service, or performed according to meter assembly manual, supplied with the meter.

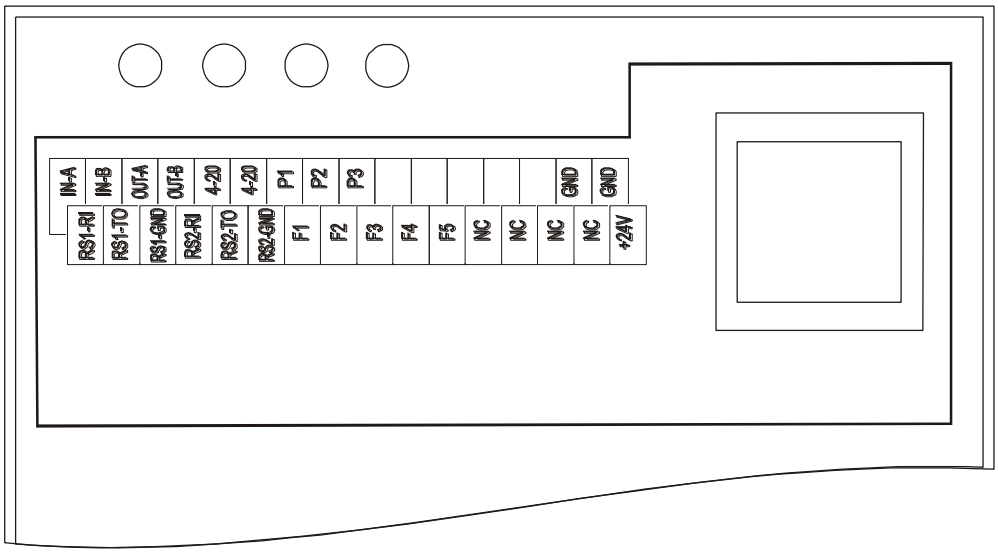
Connecting extensometer sensors to meter during balance operation could damage the meter.

Fulfilling of requirements, connected with CE sign, requires application of filter cores during wires connecting, which are supplied with the module. Core ϕ20mm for sensor (sensors) wires and cores ϕ16mm for protective wires – see below. Distance of core from connection point must not exceed 30 mm.



All devices connected with balance should be supplied from the same line (phase) 230V.
For the balance supply use the socket with protective contact.

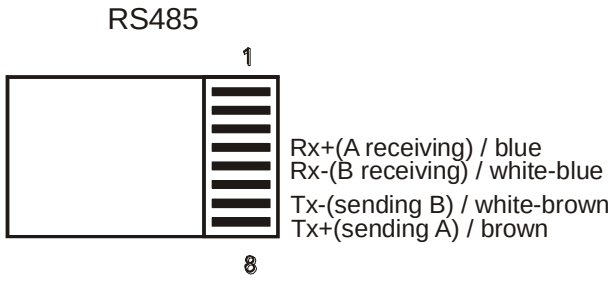
2. Connect the external devices cables to the meter sockets, meters to the board strip inside the meter, using the hermetic penetrations in the housing (the strip drawing is shown below).



Abbreviations description:

IN-A,IN-B,OUT-A,OUT-B	- RS485 port,
4-20(mA)	- analogue output 4-20 mA or 0-10 V,
P1-P3(PROGI)	- transoptor outputs to relays,
GND	- ground,
RS1 - RI, TO i GND	- RS232C port (for computer and scanner),
RS2 - RI, TO and GND	- RS232C auxiliary port (option),
F1, F2, F3, F4, F5	- external keys inputs,
+24V	- external supply voltage input for transoptors.

Communication connector for the computer:



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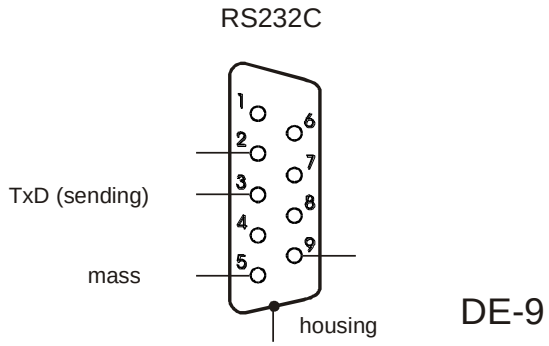
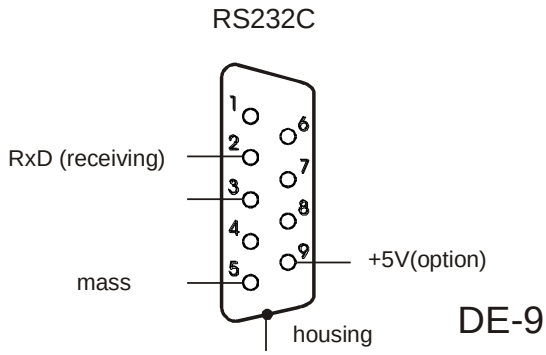
Connecting to the computer is described in details in the technical recommendations for RS485 network.

Printer port:

This port is used for tape printer or label printer.



Scanner port:



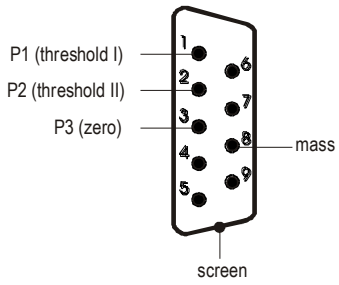
Settings description and scanner operation principles are described in its manual. Scanner should be set to work with code 39 or similar. Data transmission begins with prefix 04h.

Output THRESHOLDS (option):

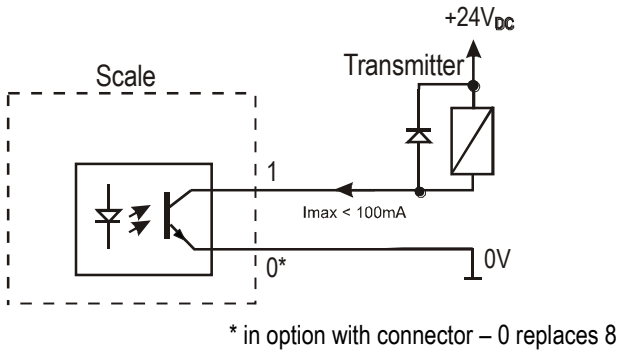
Tags numbers and wires colours:

Tag no.	Signal	Wire colour
	THRESHOLDS:	
1	P1 (threshold I)	green
2	P2 (threshold II)	white
3	P3 (zero)	brown
0	GND (meter ground)	black or yellow

Output THRESHOLDS
(option with connector)



Direct connecting diagram
of relay to THRESHOLDS output



Outputs THRESHOLDS are used for connecting dosing devices or signalling device (option). These are transoptor outputs of open collector type, with load capacity 100mA/24V. It is possible to connect directly to them relays inputs or MS3K/P board, offered by AXIS separately or in the control box ST 3K/P (3 relays, independent power supply). Outputs are adapted for direct connection of relay RM96P with input voltage 24V DC and output 250V AC 8A. Relay solenoid must be protected (shunted) with diode, e.g. 1N4148.
Operation method of THRESHOLDS output is described in the description of function of comparing with threshold values (thr).

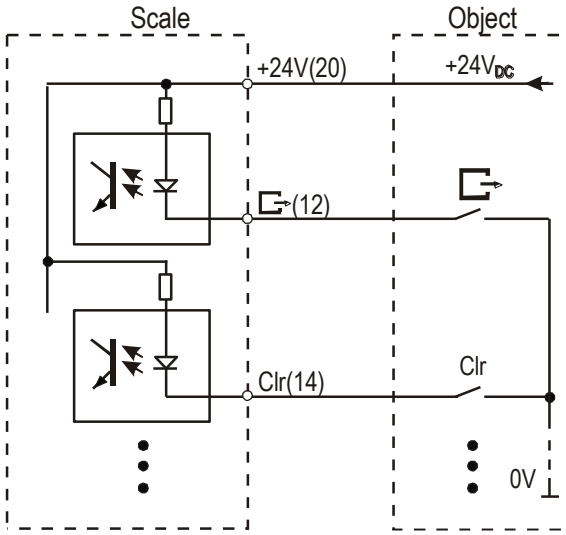
External keys inputs:

These inputs allow for placing (doubling) selected balance keys in the control cabinet or operator station. External keys require external PSU 24V DC, which separates the balance galvanically from the automatic systems. AXIS offers control box ST 3K/P, including PSU and relays.

Tags numbers and wires colours:

Tag no.	Signal	Wire colour
	External keys inputs:	
12	(print)	white
14	Clr	yellow
15	–>0<–	red
18	–>T<–	purple
20	+24V	grey

External keys connection method:



8. General operation principles

1. Platform with weight sensors should be located on flat, horizontal foundation, in place not subjected to mechanical vibrations and strong air movements.
2. Devices turning on sequence: turn on computer, software, balance meter power supply. It causes autotests performing and (after balance stabilization) displaying zero indication.
3. Apart from connecting to the computer, the module allows for weighing and tare setting. Tare setting is performed by pressing "$T/_{ON}$" key. If the package tare is entered with alphanumeric keyboard, using "$T/_{ON}$" key is not necessary.
4. To facilitate the weight control on the pan and avoid the range exceeding, the load indicator is located on the right side of display, scaled in 0÷100%.
5. The weighing result should be read during the "▁" indicator lighting, which indicates the result stabilization.

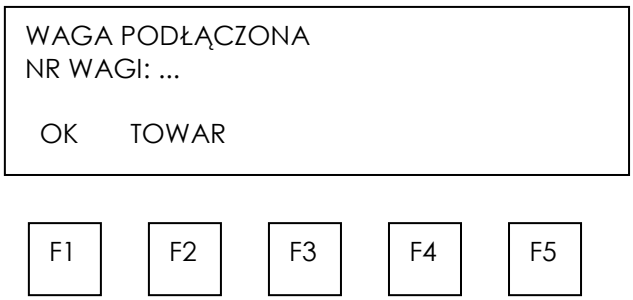
6. Instead of negative indications 4 dashes are displayed: „ ---- ”. If that mesage is displayed with unloaded platform, press "→0←" or "$T/_{ON}$" key.
7. When there is no weighing, but the balance should be ready for operation, it may be switched off by "" key. It causes the balance reading system deactivation end entering the standby mode. The modul turning on is performed by pressing "$T/_{ON}$" key. After the autotests it is immediately ready for operation with full precision.
8. Weighed mass should be placed in the pan centre.

Do not drop weighed objects on the platform.

5. Do not overload the platform over 20% of maximum load.
6. Protect the module and platform from dust, aggressive dusts and liquids. For cleaning purposes use water and dry it.

9. Data exchange with computer

If there is software activated in the computer, all module functions, besides displaying of current indications and special functions, are controlled by the computer. Module operator should read the messages from the computer, displayed on the module display, and adapt his actions to them.
After the balance turning on with empty platform, indications display (upper) shows zero indication. Three lines of text display (lower) shows computer information.
In the fourth line over F1, F2, …, F5 keys the messages indicating functions currently realized by keys are displayed.
For example:



Then the dialogue between module operator and computer software begins, which has various forms, depending on software type. The detailed description is presented in the appendix.
General operator activities:
- entering numeric or text data with the module keys (in case of connecting scanner and module keyboard the scanner is activated), e.g. product code,
- confirming of entered data upon the basis of information from computer database, e.g. displayed product name, which code was entered earlier,

- searching of computer database resources, e.g. orders for realization are displayed successively,
- entering parameters of balance indications, e.g. unitary weight during pieces number measurement or tare,
- finishing transaction by sending measurement result to the computer, transaction confirming or deleting,
- slip or self-adhesive label printing, which documents the measurement (transaction).

10. Special functions

Besides the basic metrological functions, weighing and tare setting, balances may have special functions: automatic sending of measurement result, pieces counting, automatic zeroing, comparing with threshold values. Special functions are available for user on demand.
The available functions may be viewed after pressing the functional key "F". The functions are displayed with the successive numbers: F1-LIC, F2-AUt, etc.. During the special functions switching the display shows the *MODE* indicator.

10.1. Function of automatic measurement result sending (F..-ATO)

This function allows for sending measurements results without using **PRINT** key. User can choose automatic sending measurement result after stabilization when the object is put on the pan (*F..-1*) or when the object is removed from pan (*F..-2*).

Operations sequence:

1. Press key **MENU** of balance.
2. During displaying **F...-ATO** press **ENTER**.
3. To activate automatic mode, during displaying **F..-1** press **ENTER** (F..-0 deactivates automatic mode).

10.2. Function of setting threshold (F..-LO)

This function is connected with above function of balance automatic operation. It allows for entering the threshold value, below each the balance indication must be to allow for next measurement in automatic mode. By default value 0.5*MIN is used, and using LO function is not required..

Operations sequence:

1. Press key **MENU** of balance.
2. During displaying **F..-1** press **ENTER**.
3. A *SEt* sign shows up. Enter threshold value and press **ENTER**.

10.3. Function of comparing with threshold values (F..-tHr)

This function allows to compare the weighing result with two, previously programmed values: upper and lower threshold. The comparison result is signalled on the display and by acoustic signal, as well as with use of control outputs.

If the weighing result is:

- lower than the lower threshold (but higher than balance minimum) – balance does not signal and activates output threshold I (option)
- between thresholds – the balance signals OK and activates output threshold II (option),
- higher than the upper threshold – the balance signals MAX and activates output zero (option).

If the option of weighing with threshold signalling is selected, no activities connected with the balance are required for this function to work. If the option is not selected, balance operator may activate the function.

Operations sequence during function activation by the operator:

1. Press key **MENU**.
2. After displaying **F..-tHr** press **ENTER**.
3. The display shows in sequence:
   F..-0 – function deactivation,
   F..-1 – function activation,
   F..-2 – checking of previously entered thresholds values.
4. After displaying **F..-1** press **ENTER**.
5. The following options are displayed:
   SEt-0 – weighing with signalling of thresholds exceeding,
   SEt-1 - entering of lower threshold value (not used, when weighing with thresholds signalling is selected in the computer),
   SEt-2 - entering of higher threshold value (as above),
   SEt-3 – zero signalization threshold setting.
6. Using **ENTER** key select option **SEt-1**.
7. Set the lower threshold value on the display, using the numeric keys and pressing **ENTER** in the end.
8. Using **ENTER** key select option **SEt-2** and enter the upper threshold value (as above).
9. Using **ENTER** key select option **SEt-0**. It activates balance operation with simultaneous signalling of thresholds exceeding.
10. To finish the function operation press **F** key, then select **F..-tHr** and **F..-0**.

Checking of entered threshold values:

1. Press key **MENU**.
2. After displaying **F..-tHr** press **ENTER**.
   The display shows in sequence: F..-0, F..-1 and F..-2.

3. After displaying **F..-2** press **ENTER**. The display shows value of the lower threshold, and after pressing **PRINT** key – upper threshold. If the printer is connected, threshold values are printed.
4. Press **PRINT** key to switch to weighing.

Caution:
After the balance turning on both thresholds are set to maximum values. During upper threshold setting pay attention, so its value is not lower than the lower threshold.
After the balance turning off and on this function remains unchanged.

10.4. Automatic zeroing function (AUt)

The function activation will cause automatic maintaining of zero indications, when the pan is not loaded, or when zero reading has been achieved by pressing "$T/_{ON}$" key.

Operations sequence:
1. Press key **MENU**.
2. When the display shows **F..-AUT** press **ENTER**.
3. The display will show F..-0 and F..-1.
4. Press **ENTER** when the display shows **F..-1**. On the left side "AUT" message will be displayed.
5. To deactivate automatic tare setting function, perform section 1-3, selecting F..-0.

10.5 Reference zero inserting function (F-..ZEr)

Attention: *ZEr* function is installed only in scales without legalization.

Function enables to insert new reference zero value (initial load value) without help from authorized service.

Press **MENU** key when *Err-b* communicate is displayed. *Zer* function will activate automatically.

After *CodE* communicate will display insert access secure code for function (default in new scale is :1234).
ZEr options will show up on the display:
ZEr-0 – function activation,
ZEr-1 – new zero value inserting,
ZEr-2 – new access code value inserting.

After choosing *ZEr-1* on scale display a measurement result will show up directly from A/C transducer.
When the pan is empty press *→0←*. Wait until zeroing process ends.

In order to change access code use *ZEr-2* option (inserting code is analogic to *ZEr-1* function).

11. Maintenance and small repairs

1. Keep the balance clean.
2. Take care, as during the operation some impurities may block the balance sensor and bumpers. In case of contamination remove the impurities without disturbing sensor and bumpers setting.
3. In case of improper operation due to short power failure, switch off the balance by unplugging the power cable from the socket, and plug it again after a few seconds.
4. The message “Err-b”, displayed after switching on the unloaded balance, indicates the balance sensor mechanical damage. In such case contact the nearest authorized service point.
5. All repairs must be performed by the authorized personnel.
6. To perform the repair contact the nearest service point. List of authorized service point is included in the warranty.

CE

Declaration of Conformity

The last two digits of the year in which the CE marking was affixed: 15

We:

AXIS Spółka z o.o. 80-125 Gdańsk, ul.Kartuska 375B declare with full responsibility, that the balance meters:

SE-11, SE-12 i SE-22

marked with CE mark comply with the following:

1. EN 61010-1:2004 standard Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements harmonized with the directive 2006/95/WE (Low Voltage Directive),

2. EN 55022:2000 Electromagnetic compatibility (EMC) – information technology equipment – Radio disturbance characteristics - standard Limits and methods of measurement and IEC 61000-4-3 - Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test harmonized with the directive 2004/108/WE (Electromagnetic compatibility).

Additional information
- Conformity evaluation for the Council Directive 73/23/ECC and 89/336/EEC (replaced by 2006/95/WE and 2004/108/WE) was carried out by Laboratorium Badawcze Oddziału Instytutu Elektrotechniki in Gdańsk, accredited by PCA,
- Type-Approval Certificate No. PL CB 1 was issued by Główny Urząd Miar w Warszawie (Notified Body No. 1440).

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

Production Manager Jan Kończak

Date: 25-04-2012