BALANCE INSTRUCTION MANUAL

SERIES 4B/NA(N)

File: 2012-04 4BPA-048 B-50_4 GB

Table of contents:

1. General description

Drive-through balances from 4B/NA series in basic version from lacquered steel, with SE-01/A/18 meter, are designed for operation in light environmental conditions.

Manual describes standard balance version. In case of special meter use, e.g. dosing meter, it is necessary to use documentation for meter as well.

All balances are tested in respect of metrology. According to order, balances may be verified or calibrated.

EC verification (conformity assessment) of balances is required for special applications, mentioned in Ministry of Labour and Social Policy decree from 11.12.2003 (trade, tariffs, pharmacy recipes, medical and pharmaceutical analysis, packing of goods). For other applications it is recommended to replace verification with calibration.

Verified balances have the following verification features:
- protection stamps, located on balance meter and converters connection box (installed under the bearing surface).
- Office of Measures marks and green metrological mark, located on the rating plate.

EC verification is valid for 25 months from 1st of December of year, when the EC verification took place, under condition of stamp integrity.

Balances classification (PKWiU code) 29.24.23.

Certificates:

Certificate
of type approval
no. PL 04 020

Certificate
DIN EN ISO 9001:2000
no. 78 100 6386
(AXIS management system)

2. Completation

Basic set includes:
1. Bearing surface, 2 drive-throughs and balance meter, connected permanently with cable
2. 4 locks
3. RS232C connector (only 4B/NAN balances)
4. Instruction manual
5. Warranty

3. Technical data

Balance type	4B300 NA(N)	4B600 NA(N)	4B1000 NA(N)	4B1500 NA(N)	4B2000 NAN)
Maximum load (Max)	300kg	600kg	1000kg	1500kg	2000kg
Reading graduation (d)	0,1kg	0,2kg	0,5kg	0,5kg	1kg
Verification graduation (e)	0,1kg	0,2kg	0,5kg	0,5kg	1kg
Minimum load (Min)	2kg	4kg	10kg	10kg	20kg
Tare set range	-300kg	-600kg	-1000kg	-1500kg	-2000kg
Precision class	III				
Operational temperature	-10÷40°C				
Weighing time	<4s				
Internal dimensions (WxL)	860x1000mm		1000x1250 mm	1250x1500mm	
Ramp dimensions (WxLxH)	1100 x 355 x 50mm		1250x415x50mm	1500 x 470 x 60mm	
Display cable length	4m				
Power supply	~230V, 50Hz, 8VA				
Balance weight	160kg		250kg	350kg	
Meter protection rating	4B/nA - no IP 4B/nAN (stainless balances) - IP65				
Sensors protection rating	4B/nA - IP67 4B/nAN (stainless balances) - IP68				

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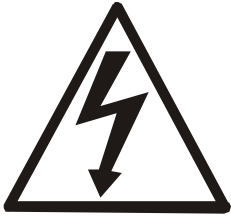
It is necessary to become familiar with safety principles shown below, which are necessary to avoid electric shock and damage of balance or connected devices.

- 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 the cover does not have special protections (NAN types).
- In case of damage suspicion, switch the balance off and do not use it until it is tested in professional service company.

5. Principles of used balance treatment

According to valid regulations regarding natural environment protection do not place used electronic devices in containers with common waste.

- Used balance after operation period may be transferred to units authorized for collection of used electronic equipment, or to place of purchase.

6. *Balance keys and indicators*
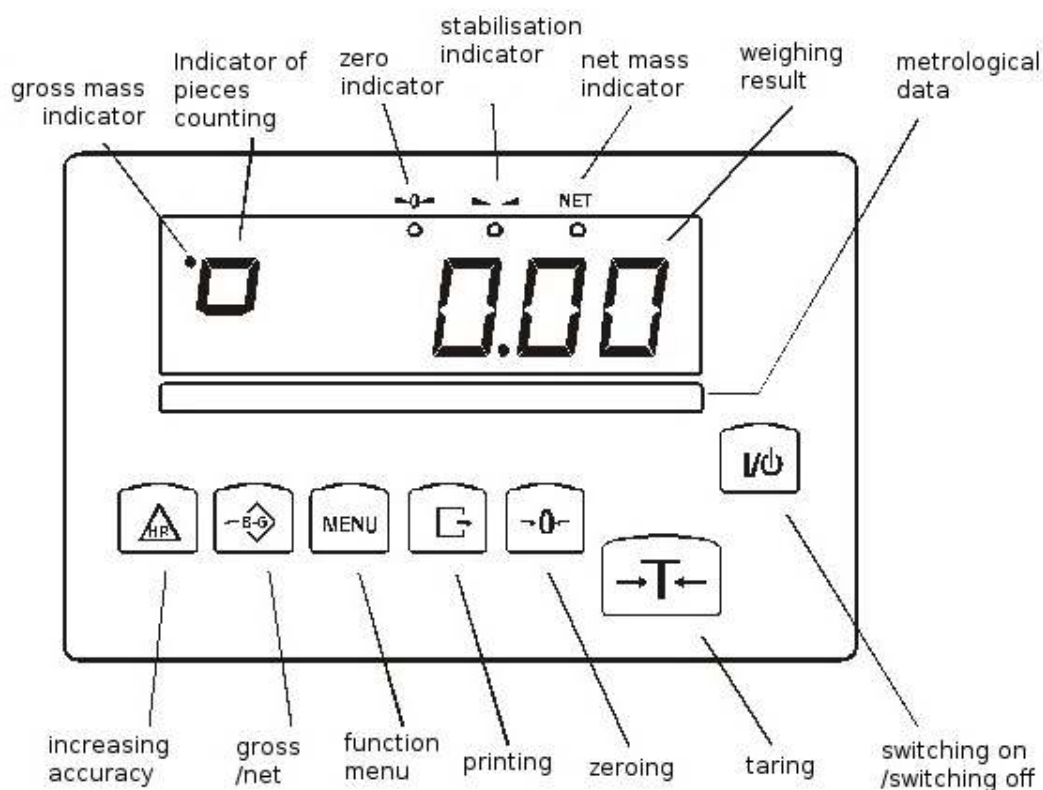
key	I/⏻	-	ON/OFF switch (standby),
key	→T←	-	tare setting (entering of mass subtracted from weighed mass),
key	B/G	-	gross weight indication,
key	→0←	-	zeroing,
key	MENU	-	special functions menu,
key	⯈	-	result print,
key	HR	-	weight indication resolution increasing,
indicator	→0←	-	zero indicator (for unloaded balance),
indicator	⌣	-	signals weighing result stabilization,
indicator	NET	-	net weight (after →T← key use),
indicator	•	-	gross weight (after B/G key use),
indicator	⬚	-	pieces counting function indicator (indications in pieces)

Additionally in LCD display version:

indicator	MODE	-	special function activation menu,
indicator	bar	-	balance load indicator (0-100%),
indicator	OFF	-	balance switched off with ⏻ key (standby),
indicator	B/G	-	gross weight (after B/G key use),
indicator	pcs	-	indications in pieces

7. *Balance preparation to work*
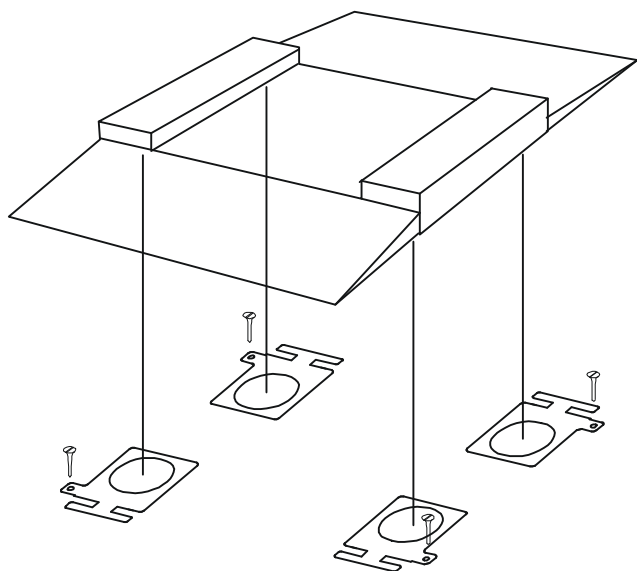
1. Unpack balance, removing protective foils.

2. Place balance on flat, horizontal foundation, in place not subjected to mechanical vibrations and strong air movements. Take care if the scale stays on all four legs.
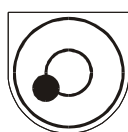
Good   Bad

3. Air bubble in level should be located in the middle position.

4. Lift scale corners up and put locks under in such a way that scale legs go into prepared holes.
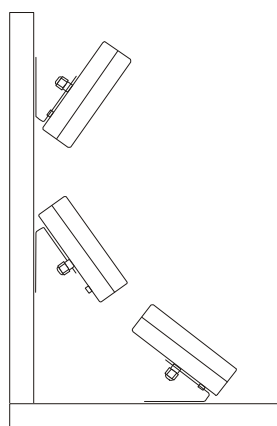
5. Mount locks permanently to the ground using o10 holes.

6. Put balance approaches on settling them into locks.

7. Unscrew transport handles (mounted for transport).

8. Connect the supply cable plug to socket with protective contact, when balance is unloaded.

9. In hermetic scales clog unused connectors with additional caps.

8. Balance start

Connecting of supply plug to socket of ~230V/50Hz installation with unloaded balance will cause the following sequence of actions:

88888	Display test
▽	Tests of basic electronic subassemblies, ended with messages: *C1, C-2, ... C-6.*
C-1	
. . .	
C-6	
▽	Displaying of software version.
b-...	
▽	Ready for operation.
→0← ▶ 0.00	

9. Operation principles

1. Before each measurement the balance should be properly zeroed, which is signalled by "→0←" indicator. If the zero indication is not shown when the balance is unloaded, or "----" is displayed, press the "→0←" key.

2. The balance enables tare setting in the whole measuring range. It is performed by pressing "→T←" key.

3. Weighed mass should be placed in the platform centre.

⚠ **Do not drop weighed objects on the platform.**

⚠ **Do not overload the balance over 20% of maximum load.**

4. The weighing result should be read during the "⌣" indicator lighting, which indicates the result stabilization.

5. When there is no weighing, but the balance should be ready for operation, it may be switched off by I/⏻ key. It causes the balance reading system deactivation end entering the standby mode. Balance turning on is performed by pressing " I/⏻" key.

6. Protect the balance from dust, aggressive dusts and liquids. For cleaning purposes use water and dry it.

10.   Balance test

During balance operation, in order to confirm its efficiency, it is recommended to check the weighing precision by putting and object of exactly known weight before and after series of measurements.

For testing of verified balances use weight standard, having valid standardization certificates. In case of allowable measurement error exceeding contact authorized service company to perform balance adjustment.

11.   Balance adjustment

Balance adjustment must be performed by authorized service company only, as it is connected with necessity of seals breaching, required for warranty purposes.

12.   Connection with computer, printer or label printer

RxD (receiver)
TxD (transmitter)
GND
Case
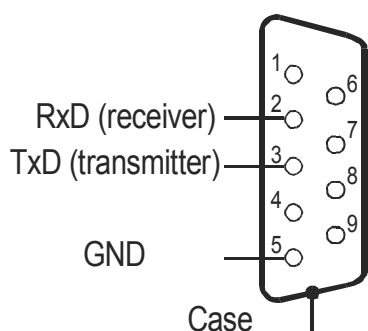
The scale is equipped with RS232C or RS485 (optional), which can be used to connect external devices such as a computer or a printer. Detailed way of communication data is defined by one of protocol:
- *LonG* – protocol to printer and computer
- *ELtron* – protocol to label printer

When cooperating with a printer data is send automatically after result stabilisation, but next transmission is possible after removing previously weighted sample.

RS485 (option)

A } Input
B
A } Output
B
Case
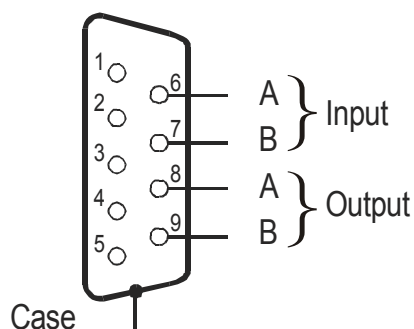
When protocol *Long* is chosen scale sends result of weighting under the influence of initializing signal from computer, or after pressing a ⤶ key.

When automatic transmission mode is chosen (function *PrInt*), a printer data is send automatically after result stabilisation, but next transmission is possible after removing previously weighted sample. The scale sends following information: successive number of weighing, date and time (if clock module is installed)and weighing result.

During transmission communicate Print is displayed. It is also possible by scale to display text message sent from computer confirming received information.

Scale with *Eltron* protocol sending record of data after pressed ⮎ key.
The scale sends following information: number of label, date and time (if clock module is installed) and weighing result. During transmission communicate Label is displayed.

In special features scale can be equipped in second RS232 interface for additional functions, ex. continuous transmitting of indications to second display.

Computer must have a special program for cooperation with data from a scale. Programs offer is available on www.axis.pl/en internet site.

Detailed protocol description

LonG protocol

Communication parameters: 8 bits, 1 stop bit, no parity, baud rate 4800bps,

- Readout of scale indication (corresponds to pressing ⮎ key
  Computer→Scale: **S I** CR LF (53h 49h 0Dh 0Ah),
  Scale→Computer: scale response according to description below (16 bytes):

Byte	1	-	sign „-" or space
Byte	2	-	space
Byte	3÷4	-	digit or space
Byte	5÷9	-	digit, decimal point 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

Attention:
Network number different than zero (F..-rS / *nr* function) changes scale working mode: communication with a computer is possible after logging the scale in with 02h scale number command. To log the scale out use 03h command.
For example: Using a program to test RS232 interface (program is available on www.axis.pl in computer programs section) for scale number 1 please write: *$0201* to log in, then *SI*, and write: *$03* to close communication.

- Asking for scale presence in system (testing scale connection with computer):
  Computer→Scale: **S J** CR LF (53h 4Ah 0Dh 0Ah),
  Scale→Computer: M J CR LF (4Dh 4Ah 0Dh 0Ah),

- Displaying a sign on scale display (text message from computer):
  Computer→Scale: **S N** n n X X X X X X CR LF (53h 4Eh 0Dh 0Ah),
  nn-displaying time in seconds; XXXXXX- signs to display
  Scale→Computer: M N CR LF (4Dh 4Eh 0Dh 0Ah),

- Scale tarring (calling →*T*← key press) :
  Computer→Scale: S T CR LF (53h 54h 0Dh 0Ah),
  Scale→Computer: without response,

- Scale zeroing (calling →*0*← key press):
  Computer→ Scale: S Z CR LF (53h 5Ah 0Dh 0Ah),
  Scale →Computer: without response,

- Scale turning on / off (calling I/⏻ key press):
  Computer→ Scale: S S CR LF (53h 53h 0Dh 0Ah),
  Scale →Computer: without response,

- Entering to special function menu (calling *MENU* key press):
  Computer→ Scale: S F CR LF (53h 46h 0Dh 0Ah),
  Scale →Computer: without response,

- Setting low threshold value (option):
  Computer→ Scale: S L *D1...DN* CR LF (53h 4Ch *D1...DN* 0Dh 0Ah)
  D1...DN – threshold value, maximum 8 characters („-" – negative value, digits,
  dot – decimal separator), number of digits after dot should be the same as on
  scale display,
  Scale →Computer: without response,

- Example:
  · in order to set low threshold 1000g in scale B1.5 (d=0.5g) the following order
  should be sent:
      S L 1 0 0 0 . 0 CR LF (53h 4Ch 31h 30h 30h 30h 2Eh 30h 0Dh 0Ah),
  · in order to set low threshold 100kg in scale B150 (d=50g) the following order
  should be sent:
      S L 1 0 0 . 0 0 CR LF (53h 4Ch 31h 30h 30h 2Eh 30h 30h 0Dh 0Ah),),

- Setting high threshold value (option):
  Computer→ Scale: S H *D1...DN* CR LF (53h 48h *D1...DN* 0Dh 0Ah),
  D1...DN – threshold value (see)
  Scale →Computer: without response.

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Connecting cable WK-1 (scale – computer / 9-pin interface):

WAGA   KOMPUTER
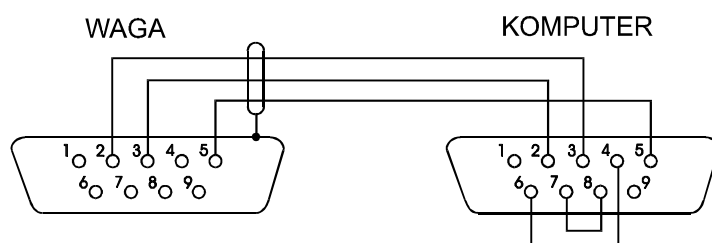
Protocol ELTRON description

Communication parameters: 8bits, 1stop, no parity, 9600bps,

- After use ⇱ key scale send:

  Scale→Label printer : EPL-2 language instruction to initialize print of label:

US	- control instruction
FR"0001"	- number of labels
?	- starting instruction
hh:mm	- 5 signs: hours:minutes
yyyy.mm.dd	- 10 signs: year.month.day
mass + unit	- 10 signs: scale indicate + mass unit
P1	- ending instruction

Attention:
1. It is possible to place a constant signs (company name, product name).
2. The default number of label's is 0001 (label number 1).Different numbers of label are possible by using a *LAbEL* function.
3. Label formula must be saved in printer – label forma must be designed in computer (by Zebra Designer program) and saved in printer.
4. Parameters and protocol of transmission must be compatible with printer label.

13.   Basic function

To make clear how to manage with each function, in further part of instruction descriptions are replaced with pictures.

- put a load on the pan

- remove the load from the pan

2.30 →T←   - press the key when indication is displayed

▼   - forced change

▽   - automatic change
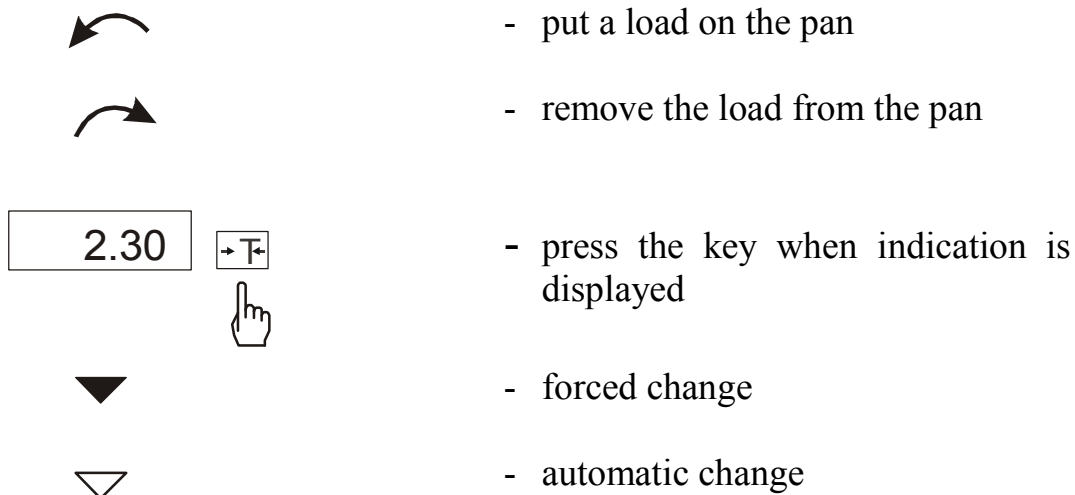
13.1 Normal weighing

0.00 →O←

▼

2.30
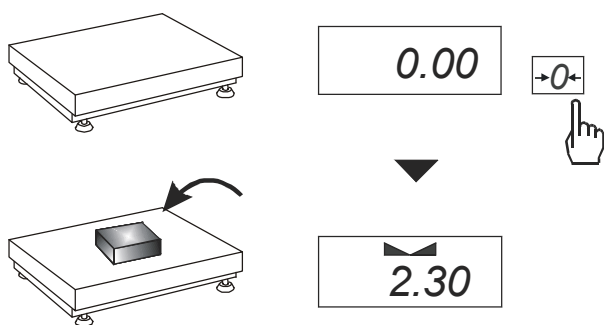
Press →0← key (→T← key in non-legalized scales), which zeros the scale, operates only when the pan is empty .

Weighing result should be read when the indicator "⌣" lights.

13.2 Weighing with tare

2.30	⊹𝓣
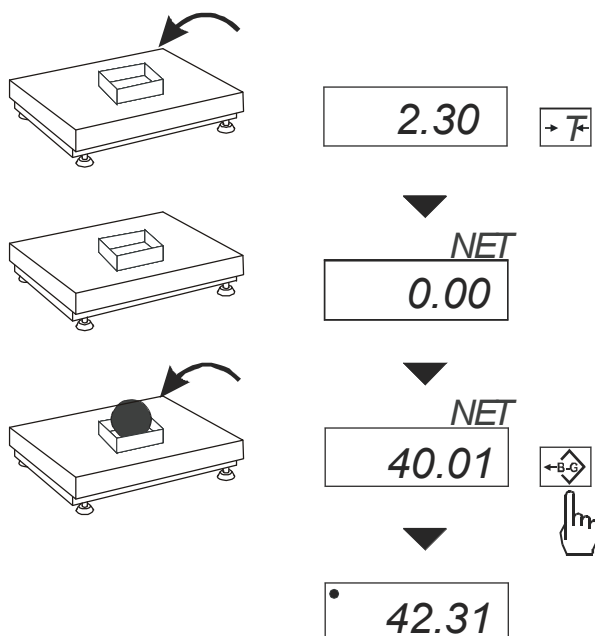
The scale is equipped with tare equal to its range.

NET	
0.00	

Joint value tare and mass net can not cross a maximum of scale.

NET	
40.01	←B-G

To display gross weight press *B/G* key.

•	
42.31	

Note:
Press *B/G* key to return to net weight indication.

13.3 Increased readability

2.30	HR
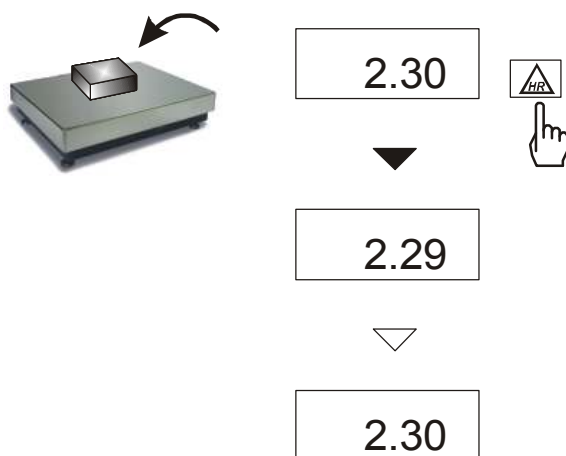
Press *HR* key to display the weighing result (for 5s.) with the highest readability possible. This function is especially helpful in scales with legal verification with d=e.

2.29

2.30

The weighing result with increased readability can be used for informational purposes only and cannot be printed or sent to a computer with ⤷ key.

14. Special functions describtion

List of available functions:
❑ menu customization function (*ACtIV*),
❑ removal of all function from menu (*dEFAUL*).
❑ autozeroing function (*AutoZE*),
❑ pieces counting function (*PCS*),
❑ function for setting serial port working (*PrInt*)
❑ function for setting serial port (*Port*)
❑ entering tare function (*tArE*)
❑ recipe weighing function (*rECIPE*),
❑ weighing large animals function (*LOC*)
❑ force measuring function *(nEWto)*
❑ maximum value indication function (*UP*)
❑ anti-disturbance filter function (*FILtEr*)
❑ average calculating function (*AVErA*)
❑ percentage weighing function (*PErC*),
❑ extended calibration function (*CALIb*)
❑ setting time of stabilisation function (*Stb*)
❑ selecting label number function (*LabEL*)
❑ automatic switching off scale function (*AutoOF*)
❑ entering reference zero (*Zero*)
❑ determining solids and liquids density function (*dEnSIt*)
❑ calculator for good packaging control (*tP*) - option*
❑ statistical calculations *(StAt)*- option*
❑ paperweight calculation function *(PAP)* - option*

function with additional equipment require:

▪ options with the clock:
  - setting current date and time function (*dAtE*)
  - total weight function (*totAL*)
▪ options with the transoptors connectors:
  - checkweighing function (*thr*)

* Functions offered with special version of scale software (with limited possibility of using other special functions).

User create own menu by choosing function in *ACtIV* function (described in chapter 14.1).

14.1 Menu customization function (ACtIV and dEFAUL)

```
┌─────────────┐
│    0.00     │  MENU
└─────────────┘   👆
      ▼
┌─────────────┐
│   ACtIV     │  →T←
└─────────────┘   👆
      ▼
┌─────────────┐
│ ˙  PCS .    │
└─────────────┘
      ▽

    ○  ○  ○

      ▽
┌─────────────┐
│   Port  .   │  →T←
└─────────────┘   👆
      ▼
┌─────────────┐
│   Port -0   │
└─────────────┘
      ▽
┌─────────────┐
│   Port -1   │  →T←
└─────────────┘   👆
```
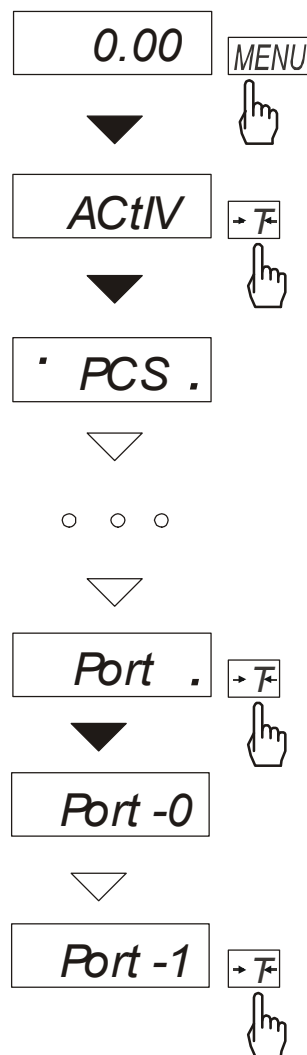
Among available user functions it is possible to select these, which should be displayed after pressing *MENU* key. It allows avoiding displaying whole list of available functions, which makes operation time longer.

Operation sequence shown in the pictures on the left causes adding function for setting serial interface RS232C parameters (*Port*) to function menu.

After switching on *ACTIV* function a dot is displayed on the right side (to distinguish from regular menu). Chosen functions are displayed with a dot on the left side.

In every moment, it is possible to restore primary (manufacture) settings choosing *dEFAULt* special function.

In order to remove function from menu in the last operation in place of selecting *Port -1* choose *Port -0*.

14.2   Autozeroing function (AutoZE)
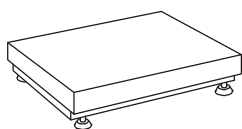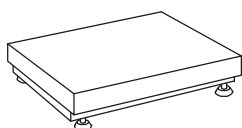
When *F..-Aut* function is activated, the scale automatically ensures stable zero indication if the pan is empty or if zero indication was acquired by pressing →*T*← key.

To leave the function press *MENU* key, then with →*T*← key chose *AutoZE* and *Aut-0*.

Note:

Autozeroing function is activated automatically for 10 min. after switching-on.

14.3 Pieces counting (PCS)
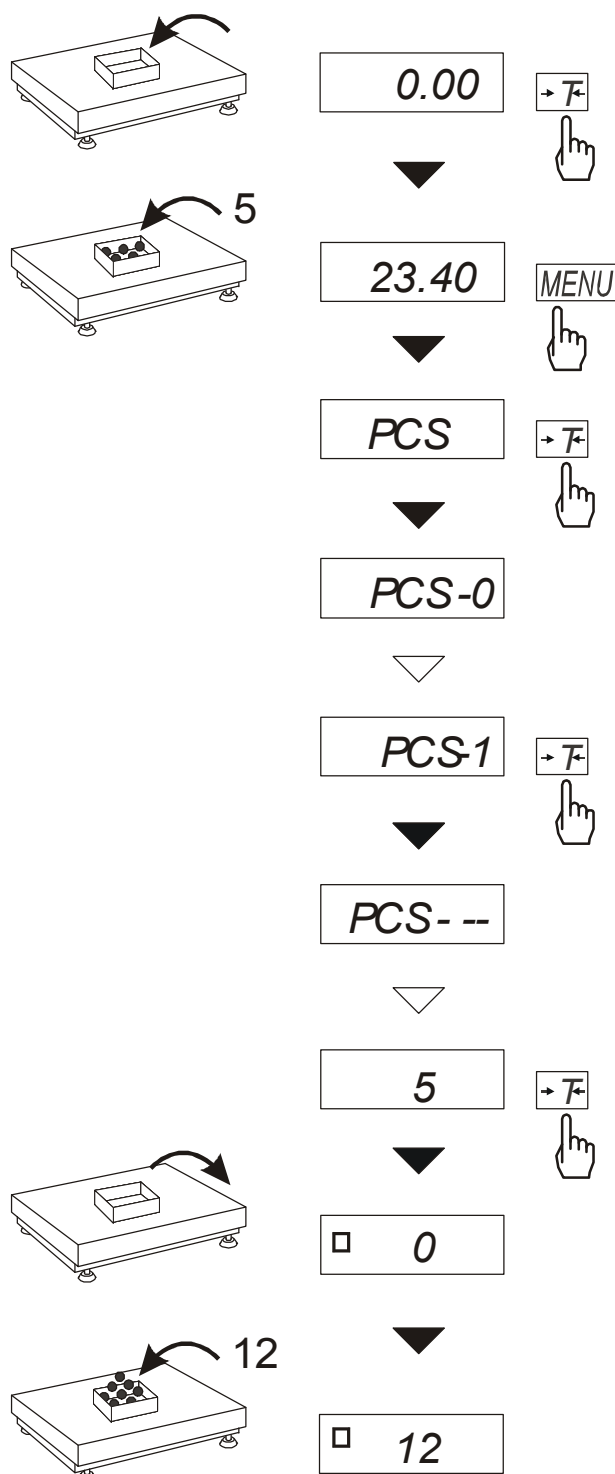
This function enables to count identical pieces, e.g. turnbuckles or buttons.

A measurement is performed in two phases:
- first phase - single piece weight calculation on the basis of defined pieces amount (*5, 10, 20, 50, 100, 200* or *500* pieces),
- second phase – pieces counting.

It is advised that single piece weight is not less than one reading unit and sample weight used in first phase is bigger than 100 reading units.

To leave function press *MENU* key and then with →T← key chose *PCS* and *PCS-0*.

Note:
1. *Err-3 communicate signalises that a sample was not put on the pan.*
The same communicate appears if single piece weight is less than one reading unit (it is possible to count pieces but measuring error is bigger).
2. *To chose previously used pieces amount select " _ _ " in first phase (in case no value was chosen, error communicate appears*
3. *During pieces counting →T← key function does not change.*
4. *In scales equipped with LCD display, weighing unit is visible and "□" sign is replaced with "pcs ".*

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14.4   Printer cooperation settings (PrInt)
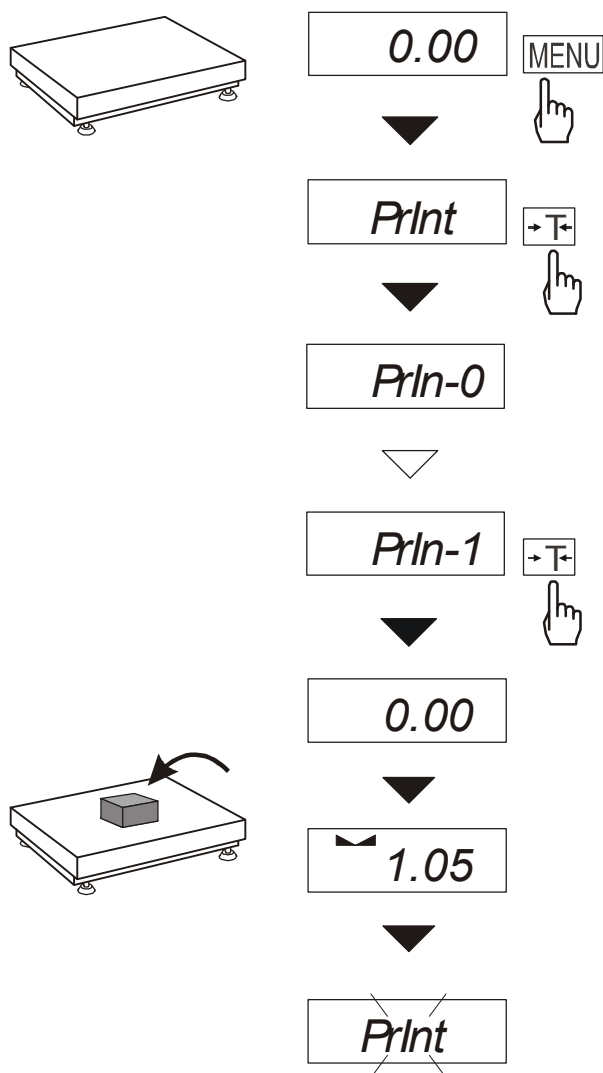
0.00 MENU	Activate the function for automatic serial port working mode (cooperation with a printer. After activation the scale prints a header. Weighing result with a successive measurement number is printed automatically after result stabilisation (without using ⤷ key).
▼	
PrInt →T←	
▼	To select computer cooperation mode (⤷ key activated and weighing results without successive numbers) press *MENU* key, then with →T← key chose *PrIn-0* and *PrIn-1*.
PrIn-0	
▽	
PrIn-1 →T←	
▼	
0.00	
▼	
1.05	
▼	
PrInt	

14.5 Serial port parameters setting (Port)

0.00	MENU 👆
▼	
Port	→T← 👆
▼	
Port-0	
▽	
Port-1	→T← 👆
▼	
baud	→T← 👆
▽	
-4800	
▽	
-9600	→T← 👆
▼	
bIt	→T← 👆
• • •	
PArItY	→T← 👆
• • •	
Odd	→T← 👆
• • •	
Send	→T← 👆
▼	
nr	→T← 👆
▼	
out	→T← 👆
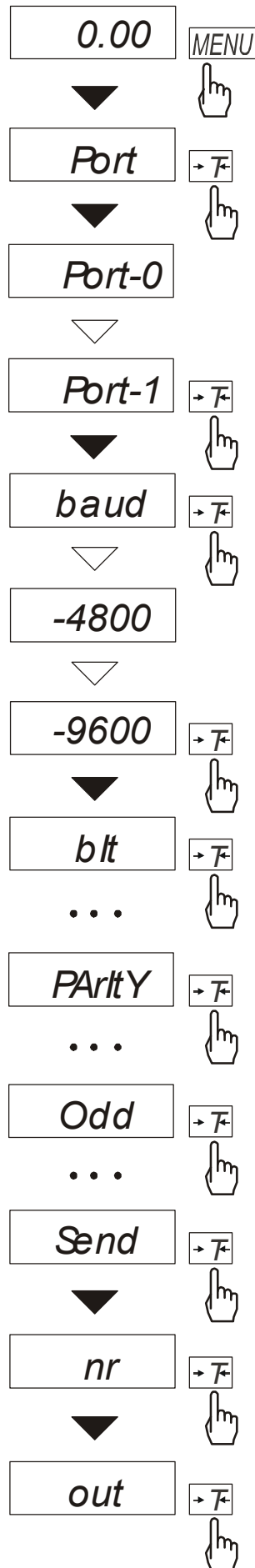
The function enables to set the following transmission parameters (standard parameters underlined:
-   transmission protocol *(Prot)*:
    LonG - printer,
    ELtron – label printer,
-   transmission speed (*bAud*: *1200, 4800, 9600, ...*),
-   the number of bits in a byte (*bit*: *7, 8*),
-   parity control (*PArItY*: *0, 1; Odd: 0, 1*),
-   network number when working in multistand computer system (when working as a single scale the value should be "0",
-   continuous transmission – without using ⇥ key, approx. 10 results per second (*SEnd: 0, 1*).

Protocol *Eltron* automaticly activated function *LAbEL*.

To set desired transmission parameters activate *Port* function, choose appropriate parameter and press →*T*← key to accept needed parameter value. The example at the left presents how to set transmission speed value to 9600bps.

To leave the function choose *out* option.

14.6 Constant tare (tArE)

This function enables to measure gross weight of a sample placed in a container of a known weigh value (stored in the memory) and to display calculated net weight of the sample. Tare value is recalled from the memory with →0← key when the pan is empty. Tare value may be entered using the keypad or by sampling container weight from the pan.

Operation sequence:
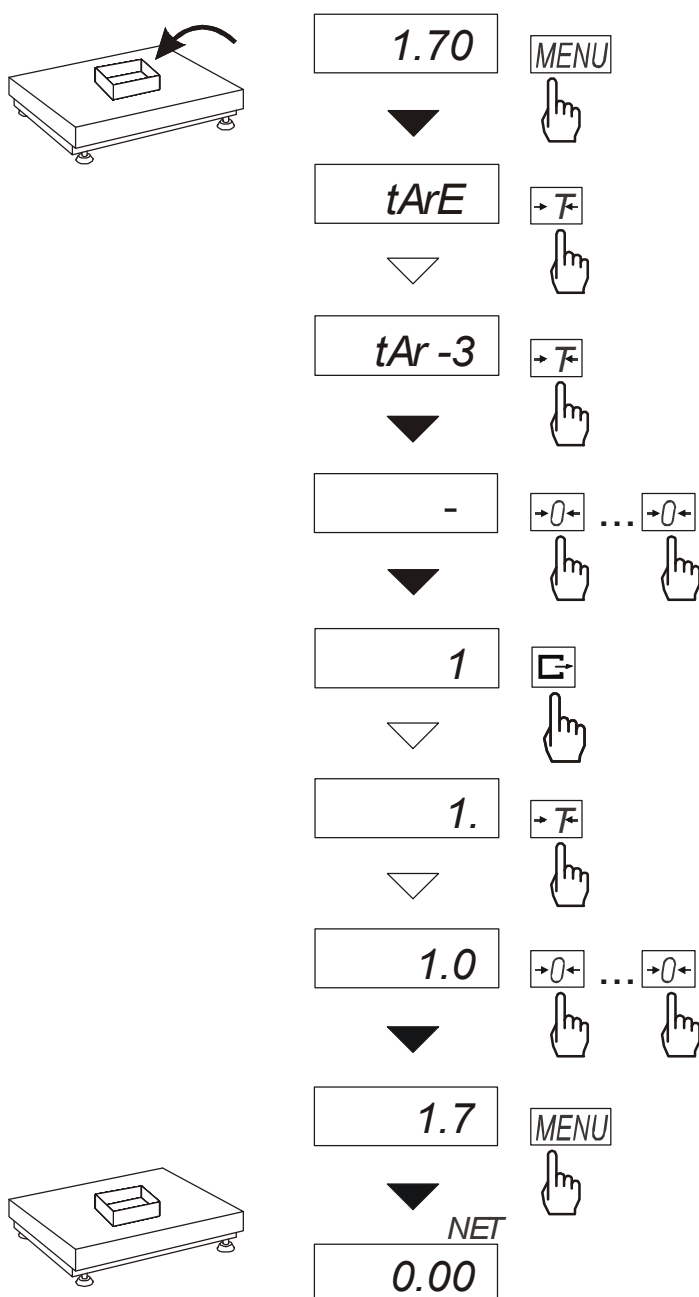
The following options are possible:
- *tAr-0* – leave the function,
- *tAr-1* – activate the function with the previous tare value,
- *tAr-2* – sample tare value from the pan,
- *tAr-3* – enter tare value with keys: →0←, ⬒, →T← and *MENU*
- *tAr-4* – printout a setting value of tare

If the function is active, *NET* indicator is displayed.

Options *tAr-1* enables to activate the function with previous tare value after leaving the function with *tAr-0* option.

Note:
Tare value is stored in memory also after unplugging the scale from the mains.

Weighing with constant tare:

-1.70 →0←

NET

10.00 B/G

` 13.70
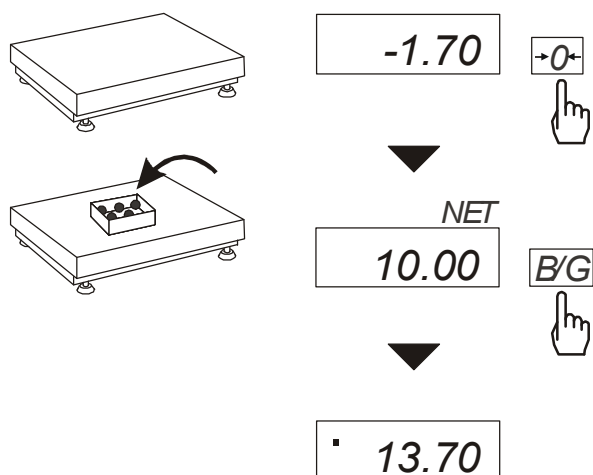
When *tAr* function is activated, press →0← key to zero the indication and to recall tare value from the memory. Tare value is displayed with "-" sign.

B/G key enables for instant switching between net and gross weight.

Note:
When the pan is empty →T← key does not operate – to tare the scale use →0← key.

14.7 *Average calculation function (AVErAG)*

The function allows for calculating average value of performed measurement series. During series of measurements successive results are registered automatically when scale indication is stabilised.
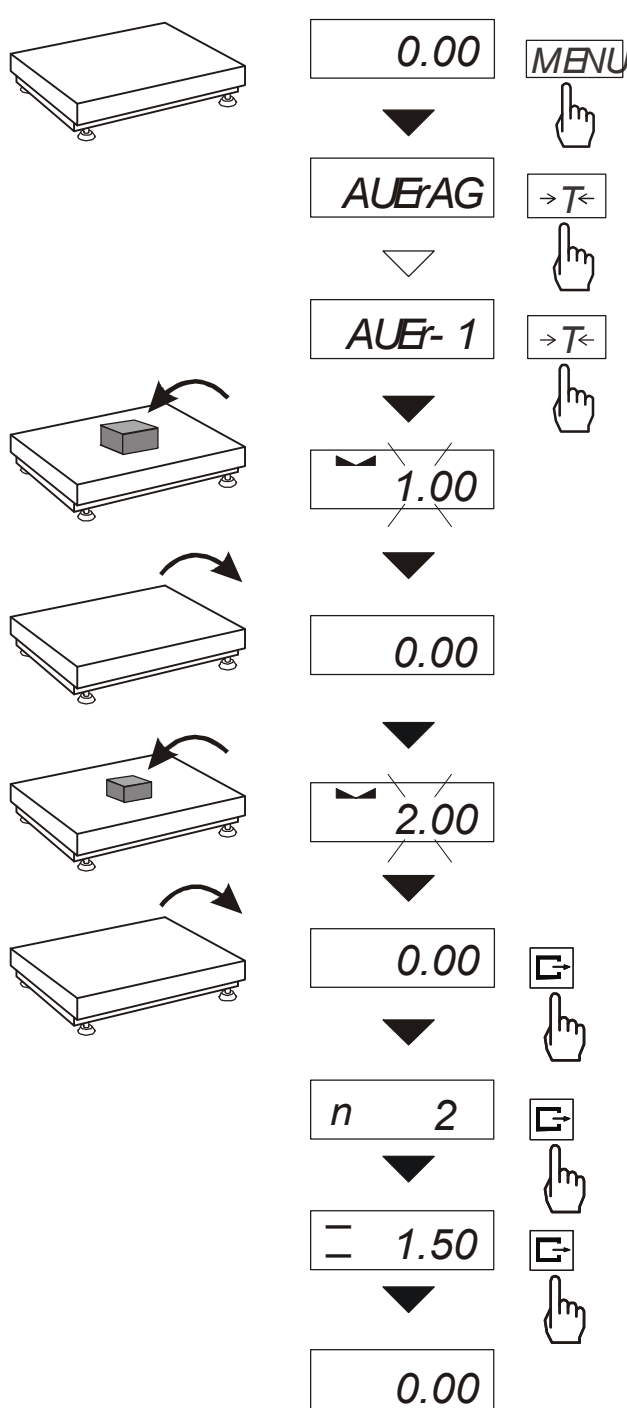
Press *MENU* key and select *AUErAG* pressing →*T*← key.

The following will be shown successively on display:

- *AUEr-0* – leaving function,
- *AUEr-1* – measurement with average calculation..

Select *AUEr-1*. It will allow weighing with simultaneous storing results into summing register for average calculation

Measurement registration is performed automatically in the moment when scale indication becomes stable. Short time displaying of „ - - " denotes that load can be taken off and new one can be put on. Results above scale Min are registered only. Number of measurements is limited to 9999.

In order to read average value ⮕ key should be used.

- first pressing causes displaying number of measurements (n).
- second displaying causes displaying average value (=).
- third pressing allows continuing average calculation.

If a printer is connected to scale the following report will be printed :

```
Date: ...                Time.  ...

MEASUREMENS No   =   ...
AVERAGE VALUE      =   ...
```

In order to finish calculation press *MENU* key, and then select *AUEr* i *AUEr-0*.

14.8 Recipe weighing function (RECIPE)

	0.00	MENU
	rECIPE	→T←
	rECI- 0	
A	rECI- 1	→T←
	☰ 0.11	→T←
B	☰ 0.00	
	☰ 0.12	→T←
C	☰ 0.00	
	☰ 0.13	MENU
	rECIPE	→T←
A+ B+ C	rECI- 0	→T←
	⊤ 0.36	
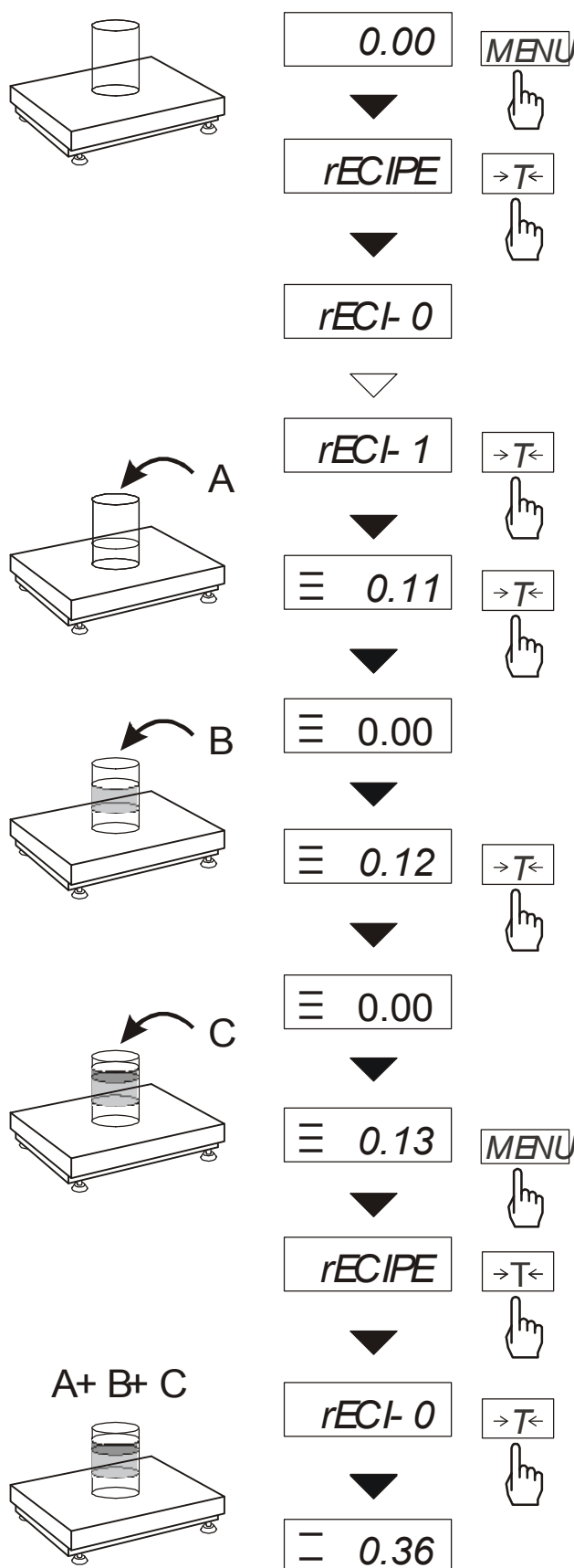
This function allows for separate weighing of several ingredients in one container with a possibility of control total weight of all weighed components.

The function has the following options:

- *rECI-0* – leave the function with possibility of reading to read total weight,
- *rECI -1* – start recipe weighing
- *rECI -2* – continue previous recipe.

When preparing a recipe successive ingredients (A, B, C, etc.) are weighed each time starting from zero indication. In order to allow this after weighing of each ingredient tare the scale.

After weighing of several ingredients reading total weight is possible (despite scale taring). In order to do that press *MENU* key, select *rECIPE* function once more and use *rECI -0* option.

Sign „ ⊤ ” signals total weight indication. Recipe is finished when →T← key is pressed.

When „⊤" sign is displayed recipe continuing is possible. *rECI -2* option is used for that.

Note:
Sign „≡" on the left side of display informs about *rECIPE* function activity.

14.9 Percentage weighing function (PErC)
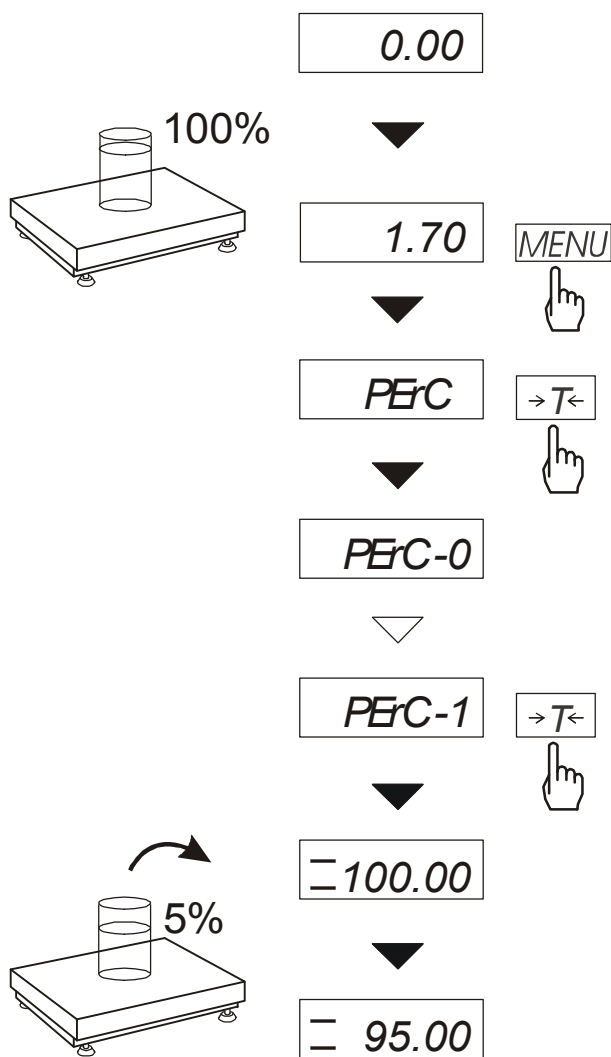
This function allows displaying weighing result in percents.

A measurement is performed in two phases:

- first phase – weighing a reference sample (100%),
- second phase – measuring specific sample as a percentage of the reference sample.

Weighing result is displayed in different format, depending on the weight value of reference sample. For weight values of reference sample $0 \div 3,5\%$ of weighing range result is displayed in format *100*, for range $3,5 \div 35\%$ - in format *100.0*, and above 35% - in format *100.00*.

„%" sign is replaced with „ $\overline{}$ " indicator.

The function has the following options:

- *PErC-0* – disable the function,
- *PErC-1*– set current scale indication as 100% and activate percentage weighing,
- *PErC-2* – continue percentage weighing after exiting to normal weighing.

Note:

During percentage weighing →*T*← key has its normal function.

14.10 Anti-disturbance filter function (FILtEr)

0.00	*MENU*
▼	👆
FILtEr	→*T*←
▼	👆
FIL- 0	
▽	
FIL- 1	
▽	
FIL- 2	
• • •	
FIL- 4	→*T*←
▼	👆
0.00	

This function allows using digital filter with selected intensivity during weighing. Filter reduces the influence of mechanical vibrations (air blasts, base vibrations) on measurement result.

Press *MENU* key and select *FILtEr* pressing →*T*← key.
The following options will be shown successively on display:
- *FIL-0* – work without
- *FIL-1* - filter I (weak)
- *FIL-2* - filter II (medium)
- *FIL-3* - filter III (sharp)
- *FIL-4* - filter IV (very sharp)
Select on of four filters. This will cause starting weighing with selected filter.

In order to go back to normal weighing use *MENU* key once more and choose *FILtEr* and *FIL-0*.

14.11   Function for maximum value indication (UP)

This function allows holding on display maximum value shown by the scale in a while.
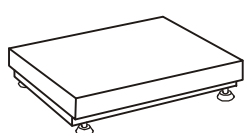
		Before measurement scale should be tared.

0.00   MENU

UP   →T←

After using *MENU* key and selecting *UP* function the highest mass result will be hold on display.

UP- 0

Pressing →*T*← key will cause result zeroing.

UP- 1   →T←

Note:
Autozeroing function and the stabilisation indicator are deactivated when UP function is running. Weighing result is continuously averaged from 5 measurements.
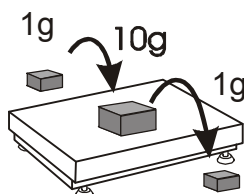
1.00

10.00

10.00

14.12   Force measuring function (nEWto)
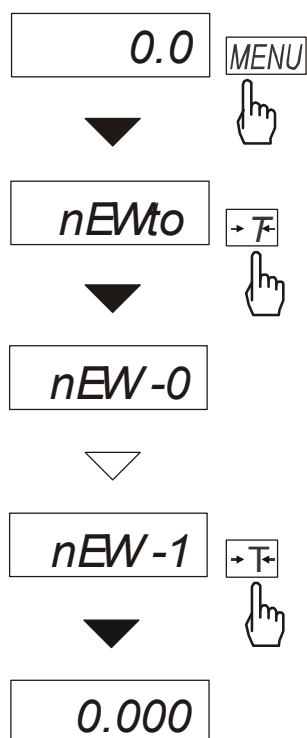
0.0 MENU	Function activation causes displaying result in force units (N).
▼	
nEWto →T←	Press *MENU* key.
▼	
nEW -0	Using →*T*← key choose *NEWto* function, and then *NEW-1*.
▽	
nEW -1 →T←	*Note:* 1N≈0,1019kg
▼	
0.000	

14.13 Function for weighing large animals (LOC)

The function allows weighing animal moving on the scale.
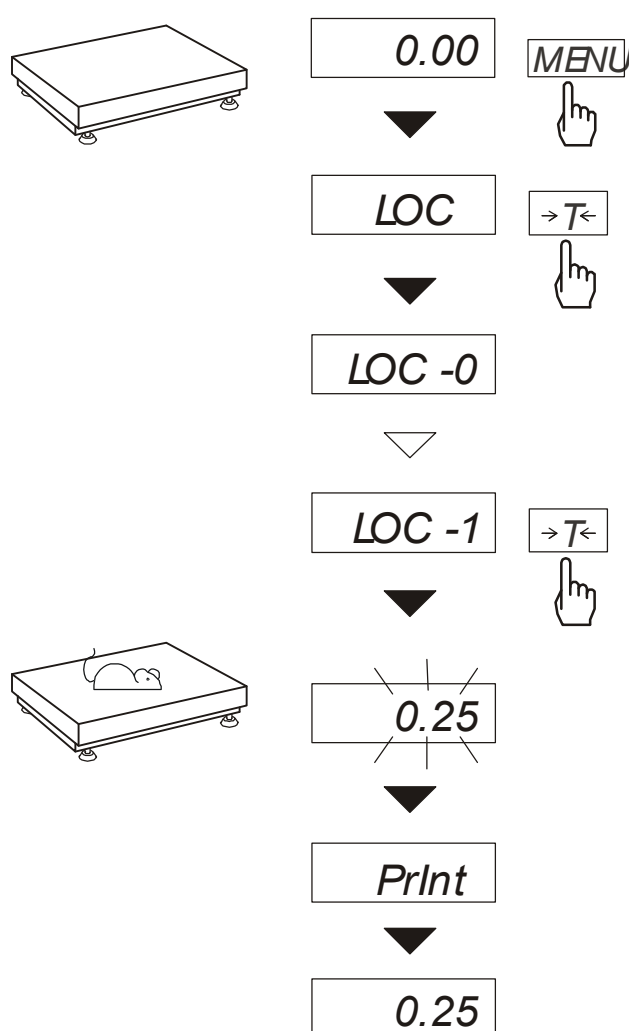
Press *MENU* key.
When *LOC* function is displayed press →*T*← key.
The following options appear on display successively:

- *LOC-0* – leave the function,
- *LOC-1* – automatic weighing after loading the scale,
- *LOC-2* – the measurement initiated manually by pressing ⤷ key.

When *LOC-1F..-1* is displayed press →*T*← key.
Tare the scale using →*T*← key if necessary and place the animal on the pan.

Wait until the weighing result is averaged – scale display will be blinking. Then scale will show stable averaged result and will send it through serial port. Final result is displayed on the display and send via serial port to computer or printer.
The result remains on display for about 30 second.

Important notes:
1. The loads less than Min are not averaged.
2. In the case when placing the animal takes more than 5s, it is advised to use LOC-2 option (measurement initiated manually). It will allow performing measurement in right moment pressing ⤷ key.

14.14   Checkweighing function (thr)

This function allows comparing weighing result with two programmed reference values: lower and upper threshold. Comparison result is signalled with indicators (MIN, OK, MAX) and sound signal generated when threshold values are exceeded. If comparison result is:
- smaller than lower threshold – the scale signals MIN (yellow colour),
- between threshold values - the scale signals OK (green colour, with the short sound signal),
- greater than upper threshold - the scale signals MAX (red colour, long sound signal).

The checkweighing results can be use to control:
- optical indicator (*Indication* mode),
- batching devices (*Batching* mode).
-

Standard scale is set for cooperation with optical indicator.

On outputs P1-P3 (*Relays* socket) short-circuit states appear as result of comparison scale indication with threshold values.
On the chart below output states are shown during increasing load on the scale for both working modes:

Indication mode: Batching mode:
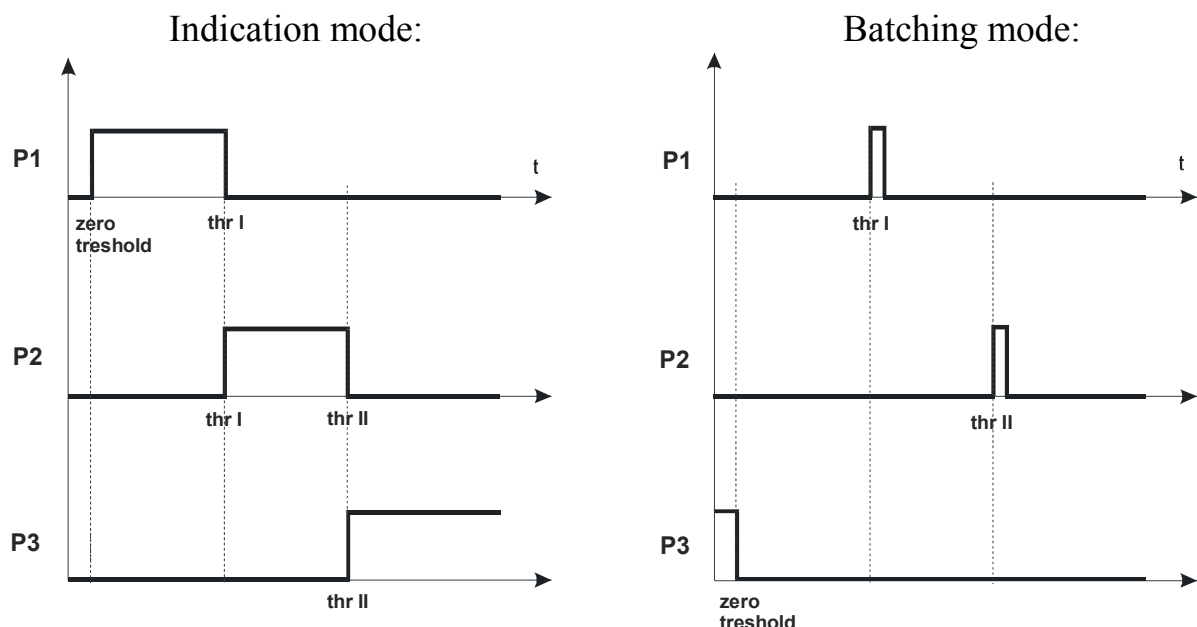
In *Batching* mode on P1 (thr I) and P2 (thr II) outputs short-circuit impulses appears for time of 0,5s. On P3 (zero) output short-circuit state appears when indication does not exceed threshold value signalling zero load.

_____

Relays connection diagram:
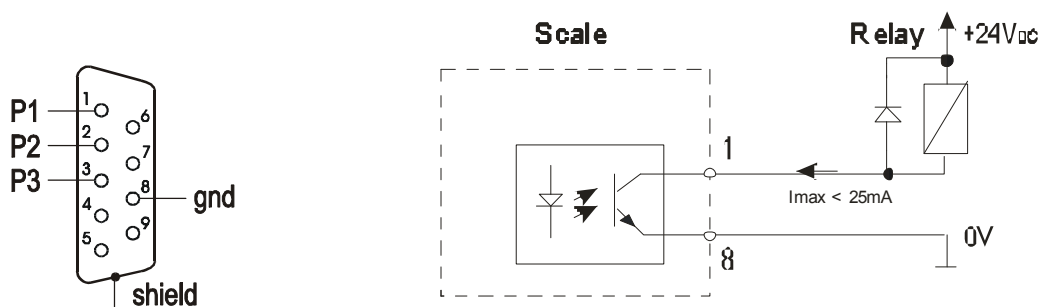
Relays output is the open collector transoptor output with load capacity 25mA / 24V. Transmitter inputs must be protected with diodes, e.g. 1N4148.
It is advised to use MS3K/P electronic board (sold separately), consisting of RM96P transmitters, with DC24V input voltage and AC250V, 3A output.

Important notes:
1. After switching the scale on, both thresholds are set to maximum values.
2. When setting upper threshold value, pay attention that its value is not below lower threshold value.
3. Setting lower and upper threshold value is possible after sending appropriate orders from computer, what is described in scale user manual.

_____

Operation sequence:

0.00	MENU	
▼		
thr	→T←	
▼		
thr -0		
▽		
thr -1	→T←	
▼		
SEt-1	→T←	
▼		
-	→0←	
. . .		
5	→T←	
▼		
5 -	→0←	
▼		
50	MENU	
▽		
SEt-2	→T←	
. . .		
100	MENU	
. . .		
SEt-0	→T←	
▼		
62.00		
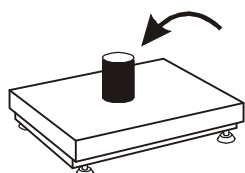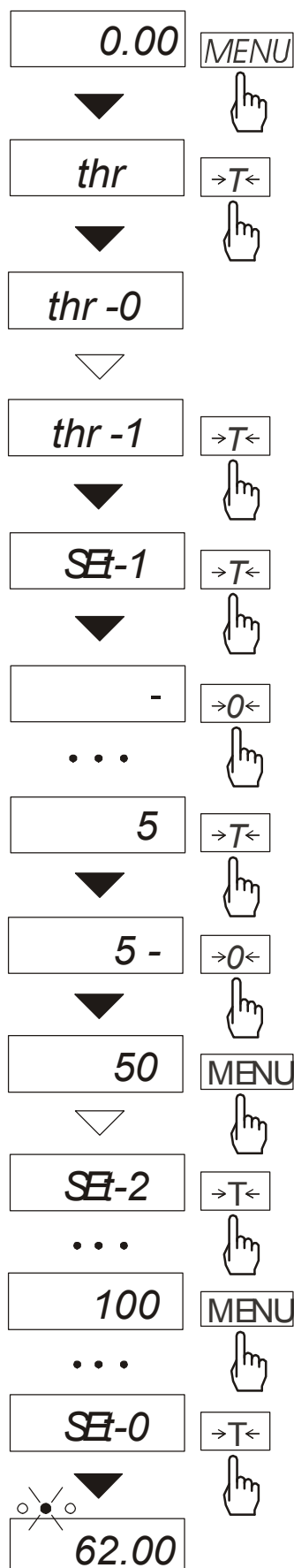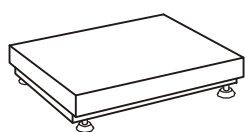
Press *MENU* key and choose *thr* pressing →T← key.

The following options are displayed successively:

- *thr-0* – deactivate the function,
- *thr-1* – activate the function,
- *thr-P* – check last threshold values (press ⏎ key several times),
- *thr-t* – choose *Relays* socket mode:
  - *0* – exit to weighing
  - *1* – *Batching* mode
  - *2* – *Indication* mode.

Choose *thr-1* option using →T← key. The following options for entering thresholds are displayed:

- *SEt-0* - go to weighing with signalling threshold excess,
- *SEt-1* - set lower threshold value,
- *SEt-2* - set upper threshold value,
- *SEt-3* - set zero signalisation threshold.

Using →T← key select *SEt-1* option.

Set lower threshold value using the following keys:

  →0← - digit increase,

  ⏎ - decimal point,

  →T← - move to next digit,

MENU - finish.

Then select *SEt-2* option and enter upper threshold value.

Choosing *Set-0* option will cause starting work with signalisation of exceeding thresholds and zero.

To change *Relays* socket mode use *thr-t* option. Default option is *Indication*.

To leave the function, press *MENU* key and then choose *thr* and *thr-0* options.

_____

14.15 Total weight function (totAL)

The function allows calculating total weight for series of measurements, which can be grater than

scale capacity. It allows calculating total weight as well as average value.
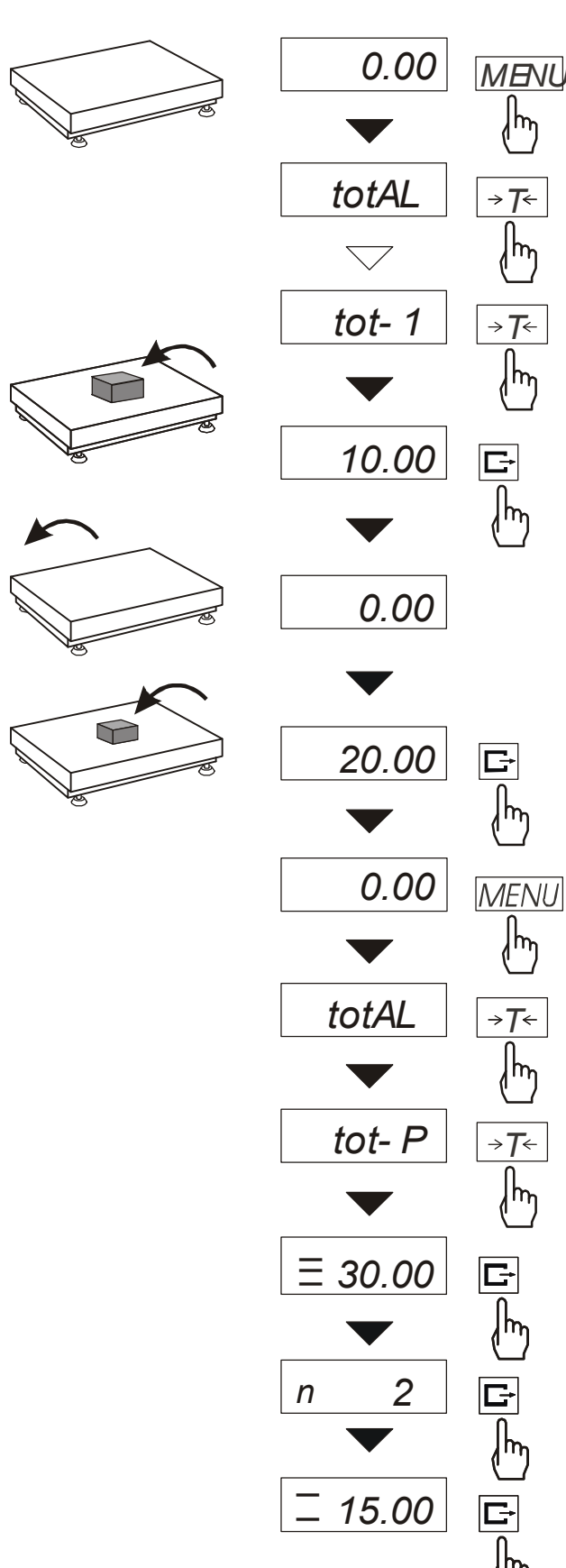
Press *MENU* key.

When *totAL* is displayed press →*T*← key.

The following options appear successively:
- *tot-P* - report printout without clearing total register,
- *tot-0* - clearing total register, report printout and leaving the function,
- *tot-1* - working with receipt printout after each measurement,
- *tot-2* - working without receipt printout.

Press →*T*← key when *tot-1* is displayed.
Perform measurement series pressing ⊏→ key for storing results into total register.

In order to print and display results enter to function choosing *total* and *tot-P* option from menu

The results are display in the following sequence:
- total weight (≡)
- number of registered measurements (n),
- average value (=),
regarding that moving to display successive result is performed after pressing ⊏→ key.

In order to go back to total weighing without zeroing total register press ⊏→ key third time.

To leave the function with clearing total register, select *total* function from menu and choose *tot-0* option. When It will cause the scale prints the communicate informing about clearing registers.

The form of receipt after each measurement:

Date: ...   Time. ...
measurement no   weight
measurement no   weight

Report form:

Date: ...   Time. ...
TOTAL WEIGHT   =
NUMBER OF SAMPLES =
AVERAGE VALUE   =

Note:
When the scale has not an internal clock, Date and Time do not appear on printout.
Maximum number of measurements 99 999.
Maximum total load 99 999 000d.
The weighing unit of the total value from the register (Total) is the same as the weighing unit stated on the keypad or is 1000 times greater, what is signalled by "o" indicator at the left of the display.
If the registered value is too big to be displayed, "E" communicate appears on the display.
If the number of series is too high and cannot be displayed, "Err1"communicate appears on the display.

14.16 Function for setting date and time (dAtE)
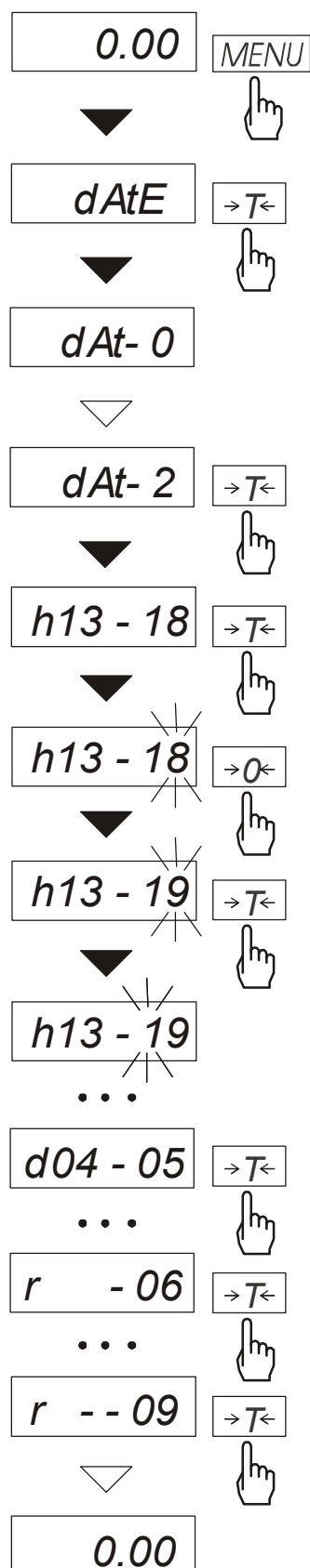
0.00 ⏎ MENU 👆	The function allows setting current date and time of scale internal clock and mode of its use.
▼	
dAtE →T← 👆	The function has the following options:
▼	- *dAt-0* – deactivate date and time during printout of current weighing result,
dAt- 0	- *dAt-1* – activate date and time during printout of current indication (⤷ key),
▽	
dAt- 2 →T← 👆	- *dAt-2* - change current date and time.
▼	The example at the left presents how to set current date and time using *dAt-2* option.
h13 - 18 →T← 👆	On successive positions digits are changing automatically or manually
▼	using →*0*← key several times.
h13 - 18 →0← 👆	In order to choose appropriate digit and move to the next position use →*T*← key.
▼	
h13 - 19 →T← 👆	After setting proper date and time it should be activated with *dAt-1* option.
▼	
h13 - 19	Time format: *h gg – mm*
• • •	(gg - hour, m - minute).
d04 - 05 →T← 👆	
• • •	Date format: *d mm – dd*
r - 06 →T← 👆	(m - month, d - day).
• • •	
r - - 09 →T← 👆	Year format: *r - rr*
▽	(r - two last year digits).
0.00	

14.17 Function for selecting label number (LAbEL)

The function appears in scales with *ELTRON* data transmission protocol. This protocol allows printing scale indication and optionally date and time on label printer, as variable texts. Other data, e.g. company address, product name, its bar code can appear on label as constant fields. Label forms used by user, named as a numeric value (max. 4 digits) should be previously stored in printer memory according to printer user manual. Choosing label form is performed by entering label number using *LAbEL* function.
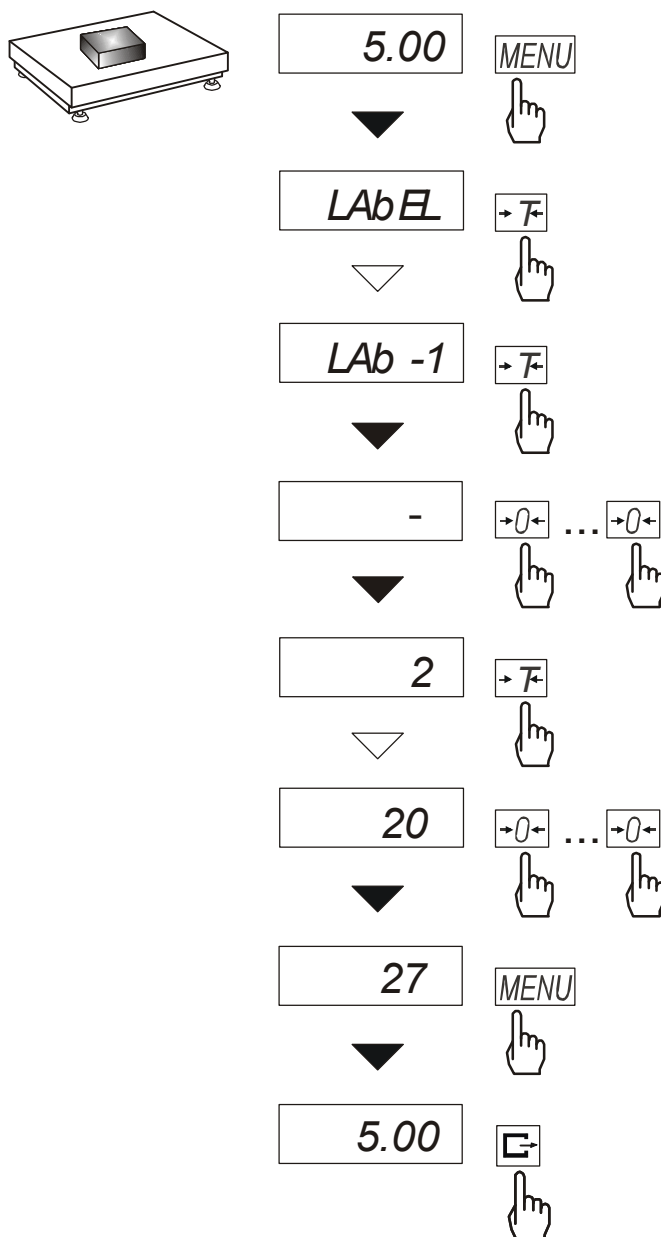
5.00	MENU	Press *MENU* key. When *LAbEL* is displayed press →T← key. The following options appear successively on display:
LAb EL	→T←	- *LAb-0* – leave without changes, - *LAb-1* – enter label number, Using →T← key select *LAb- 1*.
LAb -1	→T←	
-	→0← ... →0←	For entering label number the following keys should be used: →0←- increase digit, →T← - move to next digit, *MENU* – finish entering.
2	→T←	After putting load on and pressing ⊏→ key data is sent to a printer.
20	→0← ... →0←	Format of data sent to label printer:
27	MENU	
5.00	⊏→	

```
US              (55 53 0D 0A)
FR"0001"        (46 52 22 30   30 30 31 22   0D
0A)
?               (3F 0D 0A)
00:00           (30 30 3A 30   30 0D 0A)
2000.00.00      (32 30 30 30   2E 30 30 2E   30
30 0D 0A)
```

14.18 External calibration (CALIb)

Note: This function is enabled in non legalized scales only.

Calibration of sensitivity should be make when aaccuracy of scale is not satisfactory. Could use standard mass equal of maximum range of scale (*Max*).

Operation sequence:
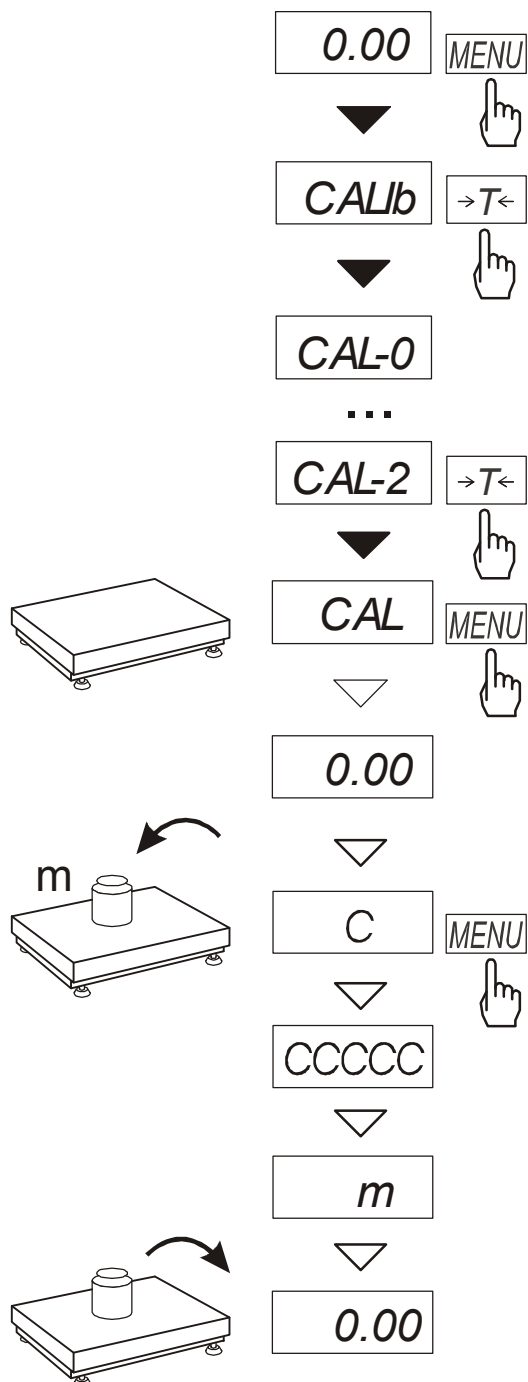
Press *MENU* key to call functions menu and to choose *CALIbr* with →*T*← key.

The following options appear successively on display:
- *CAL-0* – leave without calibration,
- *CAL-1* – quick calibration – without confirms by *MENU* key,
- *CAL–2* – calibration with confirms
- *out* – leave without changes

Press *MENU* when communicate *CAL-2* is display.
Confirm readiness to calibration by press *MENU* key – pan must be empty.

When communicate C is display put a standard mass (equal of maximum) to a pan and press *MENU* key.

Wait to end of calibration process.

14.19 Setting time of stabilization function (Stb)

The function allows changing stabilisation time of scale indication and connected with it the time of waiting for starting result printout on a printer connected to the scale.
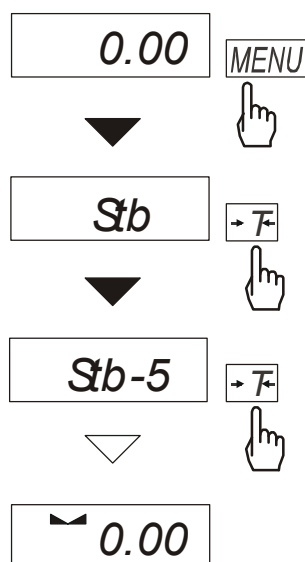
Press *MENU* key.
When *Stb* is displayed press →*T*← key.

The following options appear successively on display:
- *Stb-0* – deactivate the function,
- *Stb-1* – the longest stabilisation time,
- *Stb-2* – long stabilisation time,
- *Stb-3* – medium stabilisation time,
- *Stb-4* – shorter stabilisation time,
- *Stb-5* – the shortest stabilisation time.

After choosing one of the options weighing with activated filter is started..
In order to go back to normal work of the scale choose *Stb–0* option.

14.20 Entering reference zero function (Zero)

Note: This function is enabled in non legalized scales only.

ZER function allows entering new value of reference zero (value referred to empty pan) without need of contacting with authorised service centre.

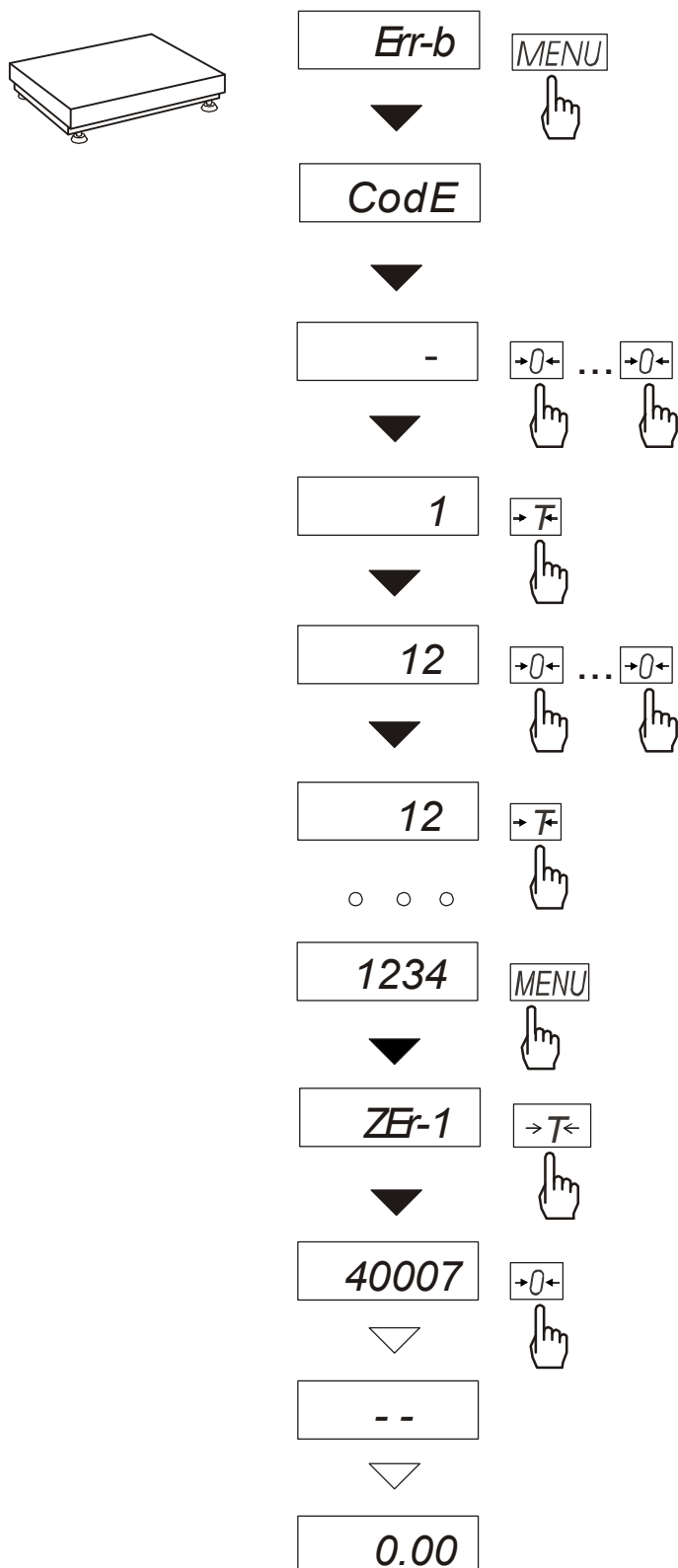|		
Err-b	MENU 👆	Press *MENU* key while *Err-b* is displayed.
▼		*Zero* function will be activated automatically.
CodE		After *CodE* communicate disappears insert access code to function (in new scale 1234). The following options appear successively on display:
▼		
-	→0← … →0← 👆 👆	*ZEr-0* – activate function,
▼		*ZEr-1* – enter new zero value,
1	→T← 👆	*ZEr-2* – enter new protecting code.
▼		Using →T← key, choose *ZEr-1* and direct result from A/C converter will appear on scale display.
12	→0← … →0← 👆 👆	When the pan is empty press →0← key. Wait for finishing zeroing process.
▼		
12	→T← 👆	In order to change access code use *ZEr-2* option. Entering value is performed similarly as with *ZEr-1* option.
○ ○ ○		
1234	MENU 👆	
▼		It is also possible to use function in standard way:
ZEr-1	→T← 👆	Activate *Zero* function using *ACtIV* function.
▼		Press *MENU* key.
40007	→0← 👆	When *ZEro* is displayed press →T← key and so on.
▽		
- -		
▽		
0.00		

14.21   Automatic switching off the scale function (AutoOF)

The function is helpful in scales supplied from accumulator. The function causes scale to switch off automatically after c.a. 10 minutes of not using it. Switching function on causes last entered zero and tare values are remembered in scale memory. After next start-up of the scale these values are restored.
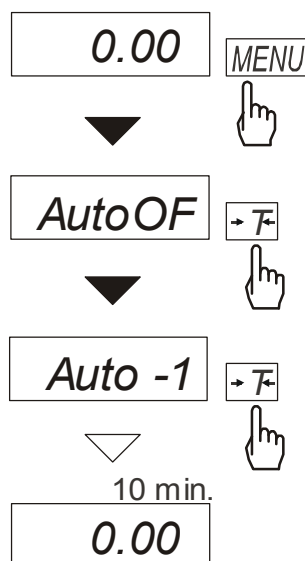
Press *MENU* key.
When *AutoOF* is displayed press →T← key.

The following options appear successively on display:
Auto-0 – activate function,
Auto-1 – deactivate function.

After function activation scale will control changes of its indications. If the scale will not be used and scale indications will not be changing, after time of c.a. 10 minutes the scale will switch off remembering its settings (zero and tare).
Switching on the scale is performed after pressing I/⏻ key.

14.22 *Density determining function (dEnSIt)*

The function allows determining solid density basing on its weight in the air and in liquid of known density using the formula below:

$$g = \frac{m_1}{m_1 - m_2 + m_3} * g_{liquid}$$

where: m_1 -weight in the air
      m_2 - weight in liquid
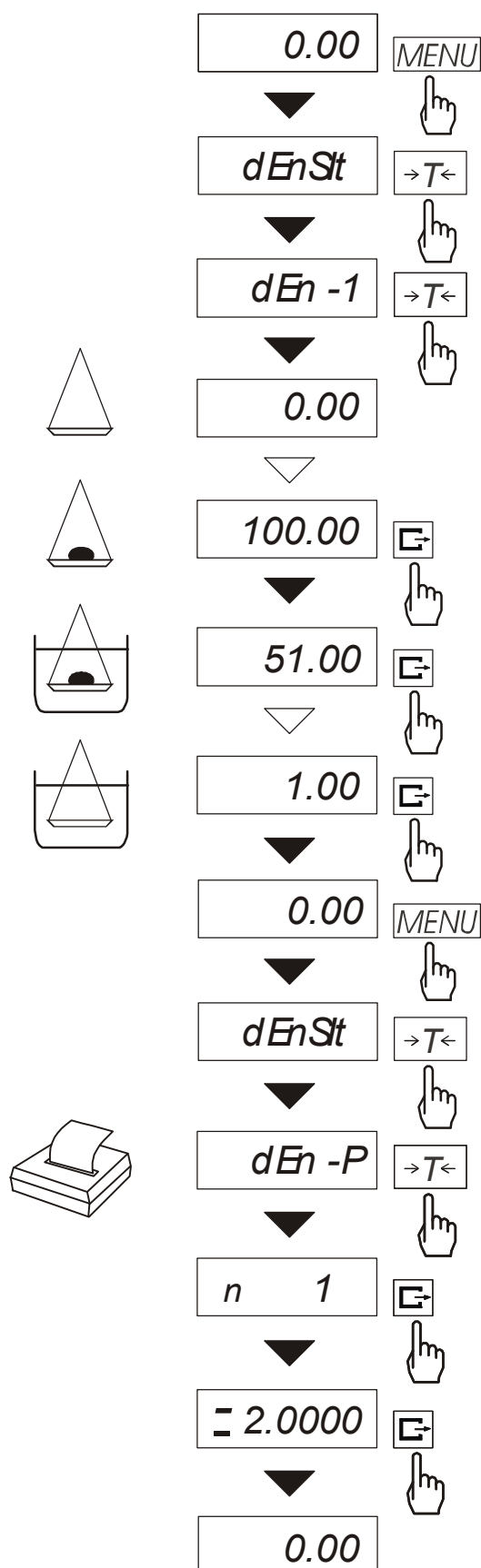 m_3 - hanger weight
      g_{liquid} – liquid density

By default:

$$g_{liquid} = 1 g/cm^3$$

(for distilled water).

When using liquid other than distilled water, choose *dEnSIt* from menu and use *dEn-2* option to enter liquid density taking into consideration its temperature.

To enter value use the following keys:

$\rightarrow 0\leftarrow$ - digit increase,
⤷   - decimal point,
$\rightarrow T\leftarrow$ - move to next digit,
MENU   - finish.

The measurement is performed in three phases:
-measurement in the air,
-measurement in liquid,
-hanger weighing

To read density determination result, enter *dEnSIt* function menu and use *dEn-P* option. First pressing ⤷ key causes displaying successive measurement number. Second pressing ⤷ key causes displaying and printing result, and then going to the next density measurement.

If a printer is connected to the scale, printout of solid density measurement results will be performed in the following form:

```
Date: ...                    Time. ...
MEASUREMENT No.    =
WEIGHT in air        =        g
WEIGHT in liquid     =        g
HANGER WEIGHT        =        g
LOAD DENSITY         =        g/cm³
LIQUID DENSITY       =        g/cm³
```

It is recommended to use pan hanging below balance, weighing in the air and in liquid is performed then in the following way.
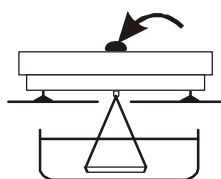
Phase I: measurement in the air.
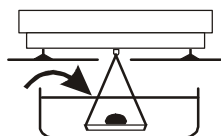
Phase II: measurement in liquid.

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14.23   *Statistical calculations function (StAt)*

Attention: Function is available on demand and it replaces other special functions.
This function evaluates from series of measurements (max 500) statistical parameters of weighting process. Adding successively measurements to register is automatic and it occur after the scale is loaded and its indications stabilize.
After each loading printout is made with: number of measurements, result, date and time.
Next measurement is made after taking off earlier load.

For the obtained measurements series the scale evaluates:

- n   - number of samples

- sum x   - sum of all samples $sum\_x = \sum x_n$

- $\bar{x}$ -average value (sum x)/n

- min   -minimal value from n samples

- max   -maximal value from n samples

- max-min   -maximal value minus minima value

- S   -standard deviation $S = \sqrt{\dfrac{1}{(n-1)} \sum_n (x_n - \bar{x})^2}$

- srel   -variance factor $srel = \dfrac{S}{\bar{x}}$

Statistical calculations results can be printed.

Order of operations:
1. Press *MENU* key.
2. When *F..-StA* is displayed press →T← key.
   The following options are displayed:
   - *F..-P* – statistical data printout,
   - *F..-0* - out of function, register zeroing, statistic data printout,
   - *F..-1* - enter or continue function,
3. Press →T← key when *F..-1* is displayed.
4. Put on successively objects on pan, (remove after indication stabilization) in order to add them to measurement register.
5. In order to obtain printed statistical results from measurements series press *MENU* key.
   When sign *F..-StA* is displayed, press →T← key.

   When *F..-P* is displayed press again →T← key.

This will cause printout of calculated statistics

and histogram :

LSL - allowable lower value,

USL - allowable upper value,

A, B, C, .. – measurement intervals,

n_A ... – amount of measurements in A interval;

measurement is in A interval if it is bigger or equal to A interval threshold and smaller than B interval threshold.

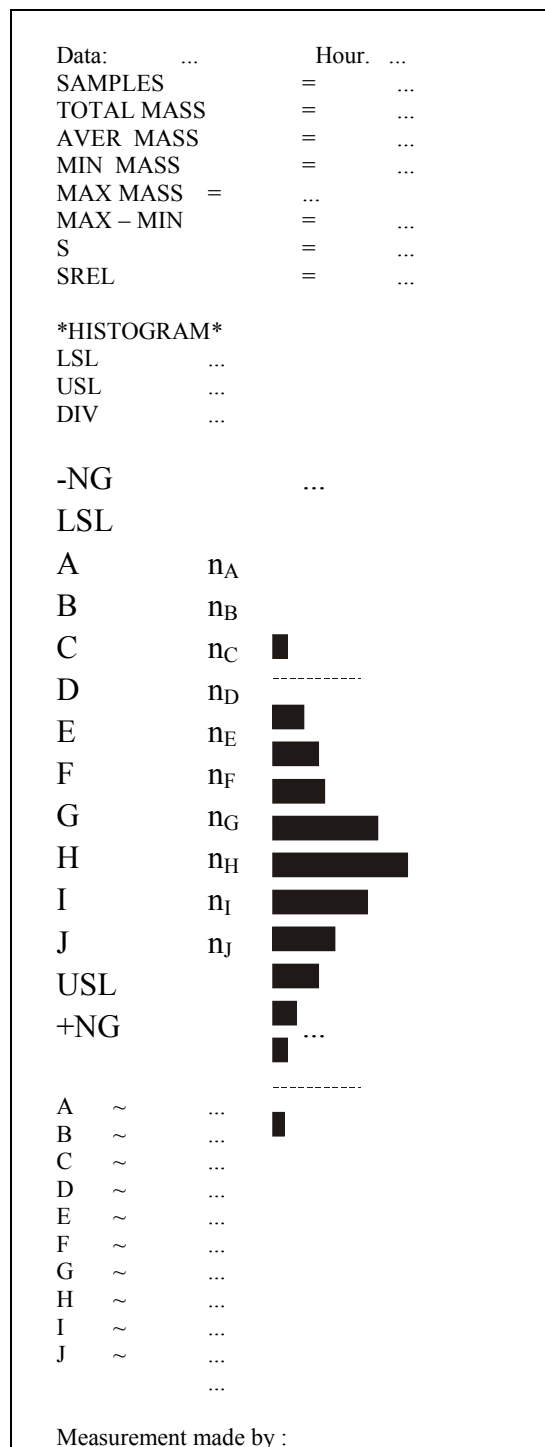n_B ... - amount of measurements in B interval;

measurement is in B interval if it is bigger or equal to B interval threshold and smaller than C interval threshold.

Thresholds are printed under histogram.

-NG - amount of measurements under allowable lower value

+NG - amount of measurements above allowable upper value

To finish work with this function and zeroing result register press *F* key, then during "*F..-StA*" and "*F..-0*" is displayed, press →*T*← key. This will cause printing message about register zeroing.

```
Data:        ...            Hour.  ...
SAMPLES               =      ...
TOTAL MASS            =      ...
AVER  MASS            =      ...
MIN  MASS             =      ...
MAX MASS    =        ...
MAX – MIN             =      ...
S                     =      ...
SREL                  =      ...

*HISTOGRAM*
LSL          ...
USL          ...
DIV          ...

-NG                   ...
LSL
A          nA
B          nB
C          nC      ▮
D          nD      ----------
E          nE      ▮
F          nF      ▮
G          nG      ▬▬
H          nH      ▬▬▬
I          nI      ▬▬
J          nJ      ▮
USL               ▮
+NG               ▮  ...
                  ▮
                  ----------
A    ~    ...
B    ~    ...     ▮
C    ~    ...
D    ~    ...
E    ~    ...
F    ~    ...
G    ~    ...
H    ~    ...
I    ~    ...
J    ~    ...
          ...
Measurement made by : _____
```

Cooperation between statistics function with computer and printer:

The scale can be equipped with two RS232C connections marked as RS232C-I (computer) and RS232C-II (printer). After each printer data printout, identical set of data is send to computer. After S A CR LF (53h 49h 0Dh 0Ah) initialization signal is sent by computer, the scale sends to computer statistical data contained in histogram.

15. Maintenance and small repairs

1. Keep the balance clean.

2. Take care, for during the operation some impurities may enter under balance base and into sensors vicinity. In case of impurities finding remove them.

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.

5. All repairs must be performed by the authorized personnel.

6. To perform the repair contact the nearest service point.

Emergency messages:

Message	Reason	Recommendation
C-1 ... 6 (over 1min.)	autotest negative result	contact the service
Err-b	balance loaded during turning on	remove load from the balance
	balance sensor mechanical failure	contact the service
l	balance mechanical failure	contact the service
H	balance overload	remove load from the balance
	balance mechanical failure	contact the service
indicator does not work ⌄	balance unstable, base vibrations, air blasts	place the balance in location, assuring the indications stability
	balance damage	contact the service
- - - - - -	tare setting not finished	contact the service
- -	tare setting unsuccessful (too low load or B/G pressed)	zero the balance or pres B/G again
- -	zeroing with too high load	set the tare

Declaration of Conformity

We:

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

4B300NA, 4B600NA, 4B1000NA, 4B1500NA i 4B2000NA,

oraz 4B300NAN, 4B600NAN, 4B1000NAN, 4B1500NAN i 4B2000NAN,

marked with CE mark are consistent with:

1. Standard PN-EN 61010-1:2004 Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements harmonized with the directive 73/23/EEC (Low Voltage Directive),

2. Standard PN-EN 55022:2000 Electromagnetic compatibility (EMC) – Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement, and PN-IEC 61000-4-3 Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques - Radio-frequency electromagnetic field immunity test, harmonized with 89/336/EEC directive (electromagnetic compatibility).

Moreover, balances with the following information on rating plates:

-   sticker with two digits of year of conformity assessment and with number of notified unit, performing the assessment,
-   green metrological marking M,
-   protective mark from notified unit

are made according to certificate of approval EC no. PL 04 020 and have EC verification, confirming conformity with:

3. 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).

Additional information
-   Conformity evaluation for the Council Directive 73/23/EWG and 89/336/EWG were carried out by Laboratorium Badawcze Oddziału Instytutu Elektrotechniki w Gdańsku, accredited to PCA.
-   Approval certificate no. PL 04 020, issued by Central Office Of Measures in Warsaw (Notified Unit No. 1440).

Gdańsk, 9th of January, 2008

Authorized by the Director AXIS Sp. z o.o.:

Production manager   mgr inż. Jan Kończak

_____
Signature

_____

Appendix A

Information's concerning double-range scale (options)

1. General description

Double-range scale's have capability of work with greatest accuracy in bottom measuring range part. Weighing of smallest mass is more precise.

This type of scale's have two measurement range:
-   Max_1 - 50 % of maximum load (mostly),
-   Max_2 – 100% of maximum load,
and adequate reads digit: d_1 i d_2 ($d_1 < d_2$).

Double-range options causes change of scale's operation:

-   after turn on (in small mass range 0- Max_1) scale displays result with reading unit d_1,
-   when the load pass the Max_1 scale changes reading unit on d_2; from this moment scale displays result with reading unit d2 on all measure range (0- Max_2),
-   return to unit d_1 is succeed after zeroing the scale ($\rightarrow\!\!0\!\!\leftarrow$ key), or when all mass is removed from pan (indicator "$\rightarrow\!\!0\!\!\leftarrow$").
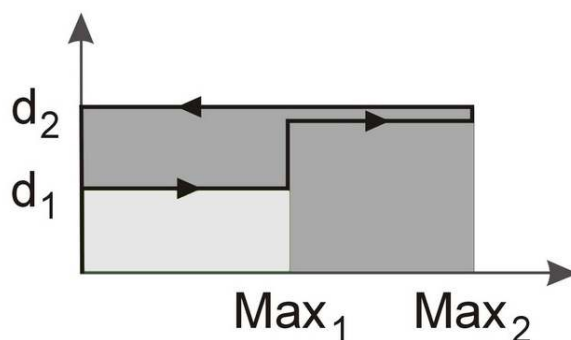
2. Double-range scale parameters

Range and graduation values are represented on nominal table on the scale.

Notes