MOUNTING GUIDE

ME-01 indicator

File: 2014-10-01 ME-01_mounting bE_bC0100 GB

Content:

1. Introduction

This manual describes AXIS meters:

- ME-01/A/LED

- ME-01/A/LCD

- ME-01/N/LED

- ME-01/N/LCD

- ME-01/N/25 (LED)

- ME-01/P/LCD

- ME-01/P/25

    with bE0100 (LED version) and bC0199 (LCD version) firmware or later.

Detailed description of meters and scales based on the meters way of working can be found in user manual of specific type of meter. User manuals can be used by scale's operators.

Mounting manual consists:

- Load cells mounting recommendations

- Supply and grounding way of connection

- Sensor parameters selection to built specific scale type

- Scale calibration

- Service menu

- Setup option – user menu

- Mechanical mounting recommendations

- Securing the sensor

- Error communicates

2. Connecting load cells

2.1 Sensor selection

General requirements for tensometric sensors (load cells):

Max quantity of sensors	8 pcs
Total impedance (all sensors)	40÷4000 Ω
Connecting sensors	4 or 6 wire system
Maximal cable lenght to cable diameter	75 m/mm^2
Sensor supply	5V (choper)

Select sensors according to rules below:

1. When 1 sensor is used scale measurement range (Max) mustn't exceed 40-80% of sensor's range (Emax)

2. When many sensors are used scale measurement range (Max) mustn't exceed 15-45% sum of all sensors range (n*Emax). If uneven weight load is possible provide at least 25% of safety margin of each sensor.

2.2   Connecting sensors to main board

⚠ ***Before connecting the sensors to the indicator unplug the device from the mains to avoid damaging the indicator.***

To comply CE marking requirements, for connecting the wires use filtering core φ20mm.
The core should be placed within 30mm from the place of its connection.

Commonly used wire colors:
EXC+ red
EXC- black
IN+ green
IN- white
REF+ brown
REF- yellow

ME-01/A … 4 wire connection scheme:
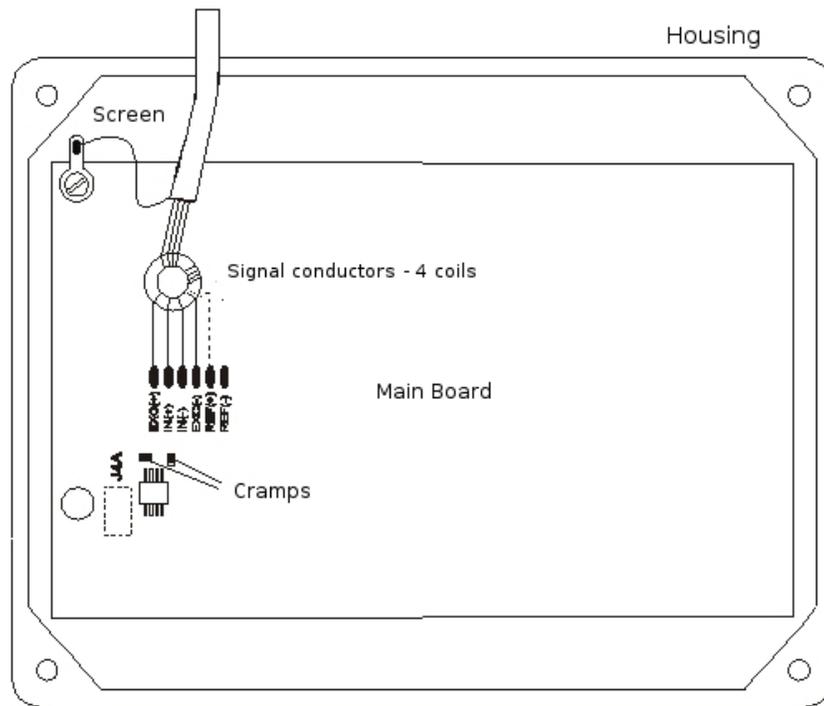
When 6-wires connection of strain gauge transducers is used (REF+ and REF) cramps shown on the picture above should be soldered out from the main board (load cell wires are connected EXC+, EXC-, IN+,IN- and additionally REF+ and REF-).

2.3   Sensors check

To check if tensometric sensors (load cells) are ok use Calib/Zero option. In zero option scale displays result in internal resolution (results directly from A/D converter).
Input voltage range: 0÷Umax
A/D result range: 0 ÷ ~160 000 internal division (on chart 160 000 is 100% of A/D range)

Default Umax value is 10mV and can be changed to 20, 40 or 80mV. Option *CALIb / AdC / RanGE* is used for that.
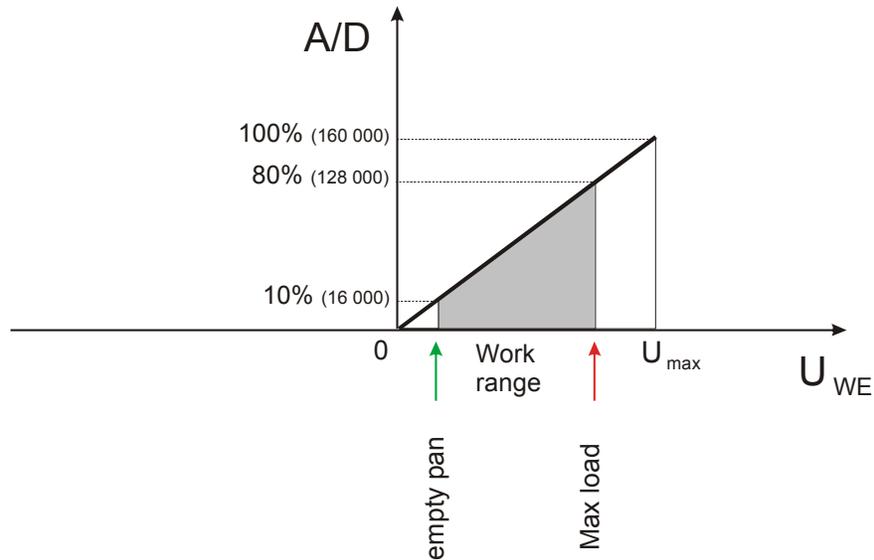
If negative input signal values are needed, turn on option *CALIb / AdC / bIPOL*.
Inpit voltage values: –Umax ÷ +Umax
Results range: 0 ÷ ~160 000 internal division (as above)
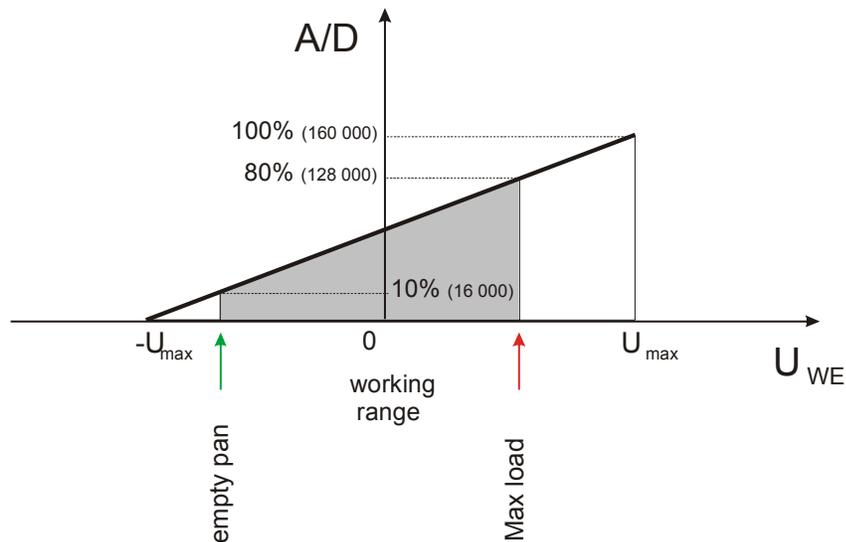
2.4 GND connection

Connection between GND of different scale parts is crucial for disturbance low level on measurement input and moreover lack of the connection can cause permanent damage to meter's internal units, where CMOS transistors work – sensitive to surges.
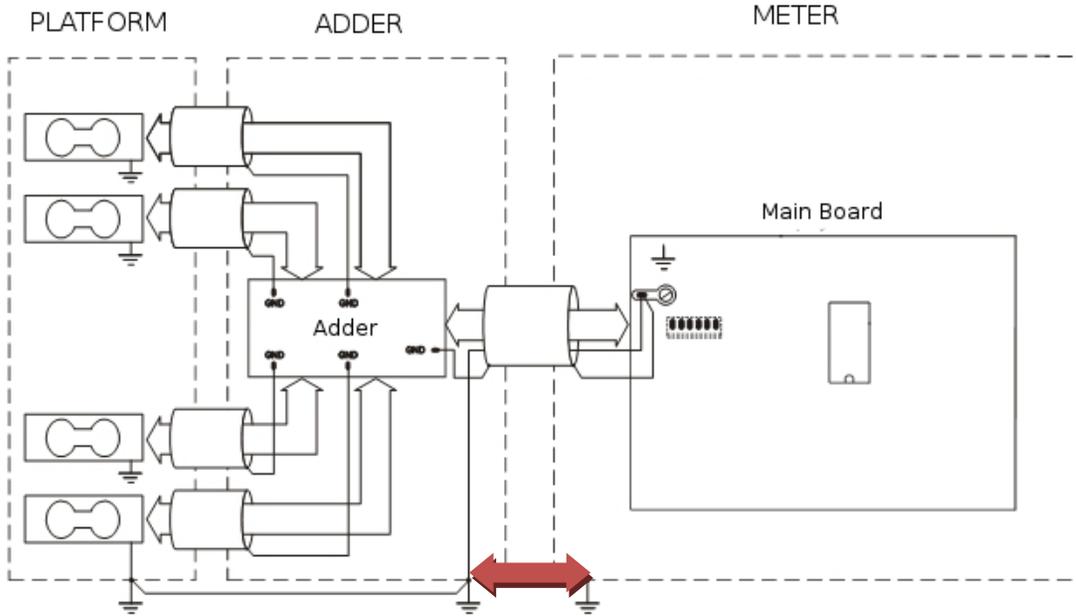
Caution: The galvanic connection of sensors and adder housing is necessary.

To make GND connection use sensor's factory GND connection or one of the wires that extend factory connection or additional wire. Stainless steel housing meters have special external GND clip. The connection should be made with thick wire. As a model look at AXIS constructions.

2.5 Connecting external devices

All devices connected with scale must be supplied from the same line (phase) 230V.

3. General description of scale's firmware

The firmware consists part for USER (normal weighing, special functions) and for SERVICE (service menu functions).

Service menu diagram:

```
                        (Scale type)
  ModE ─ SCALE ─ bA-... ( -2,-3,-3500,-400,-50,-6,-10,-15, out)   - BA series scales
                 bAY-... ( -3,-6,-12,-30,-60,-120, out)           - BA/Y series scales

                 tYP LEG ─┬ LEG OFF              - not legalised scale (calibration available)
                          ├ LEG on               - legalised scale (calibration not available d=e )
                          └ out                  - out
                 rANGE ─┬ 1-rAnG                 - 1-range scale
                        ├ 2-rAnG                 - double-range scale
                        └ out                    - out
                 SEt ─┬ nLEGAL                   - set scales (special)
                      ├ LEGAL                       - not legalised
                      └ out ─┬ GrAM                 - legalised
                             │ HGrAM                  - g unit indication
                             │ out                    - kg unit indication
                                    ┬ 1-rAnG            - 1-range scale
                                    ├ 2-rAnG            - 2-range scale
                                    └ out ─┬ MAX           - Max range (inscribing)
                                           │ ...           - actual Max value
                                           │ out ─┬ SEt-d     - d plot (inscribing)
                                                  │ ...          - actual d value
                                                  │ out ─┬ YES     - confirmation
                                                         │ nO      - exit without changes
                                                    other options
                 other                  - signalling H threshold (Max+9e)
                 out ─┬ SEt-H              - hiding last digit of indication
                      ├ LAST
                      └ out

                        (Serial ports parameters)
  SErIAL ─┬ Port-1 ─┬ bAud      -  transmission speed (bps)
          │         ├ bItS      -  bits quantity (7 or 8)
          │         ├ ParItY    -  parity control
          │         ├ SEnd      -  transmission mode
          │         ├ nr        -  scale number in network
          │         ├ Prot      -  transmission protocol
          │         ├ WI-FI     -  Wi-Fi module on/off
          │         └ out
          ├ Port-2 ─ (as above)
          └ out

  AvErAG ─┬ MEdIA      - number of results taken to digital filter (median)
          ├ AvEr_A     - number of results taken to initial averaging (filter A)
          ├ AvEr_b     - number of results taken to main averaging (filter B)
          ├ rAt_A      - allowed results difference for A filter
          ├ rAt_B      - allowed results difference for B filter
          ├ rAt_St     - allowed results difference for stability
          ├ dEL_A      - A filter delay
          ├ dEL_b      - B filter delay
          ├ dEL_St     - stability delay
          └ out        - out

  OPtionS ─┬ AutoTA    - automatic holding zero value after start
           ├ ZEroin    - turning on key and indication →0←
           ├ unLOAD    - start zero error signalization
           ├ dELtA     - result creeping stop
           ├ LAtch     - latching result (not used)
           ├ FASt_t    - fast taring
           ├ ZEro-S    - zeroing off after start
           └ out       - out
```
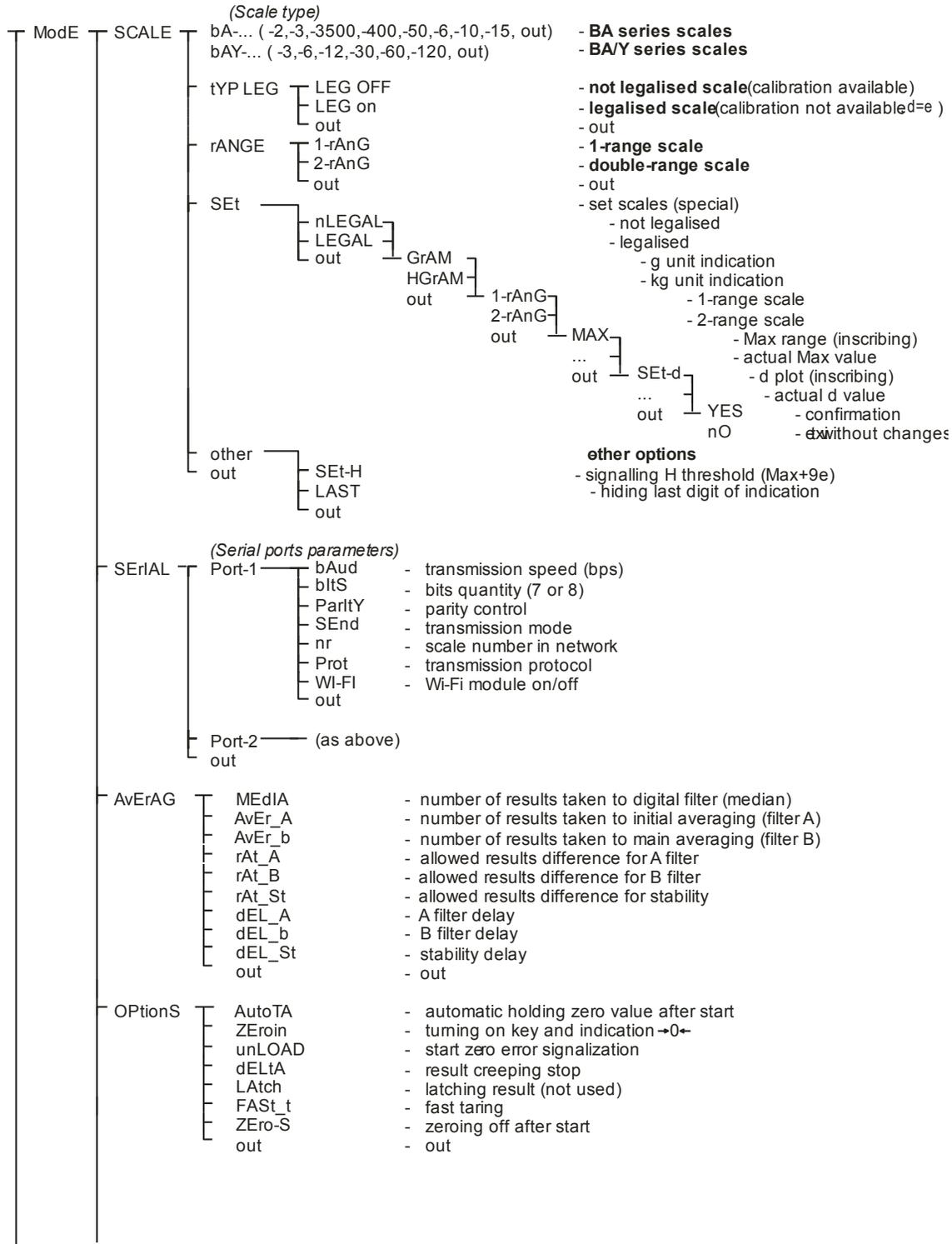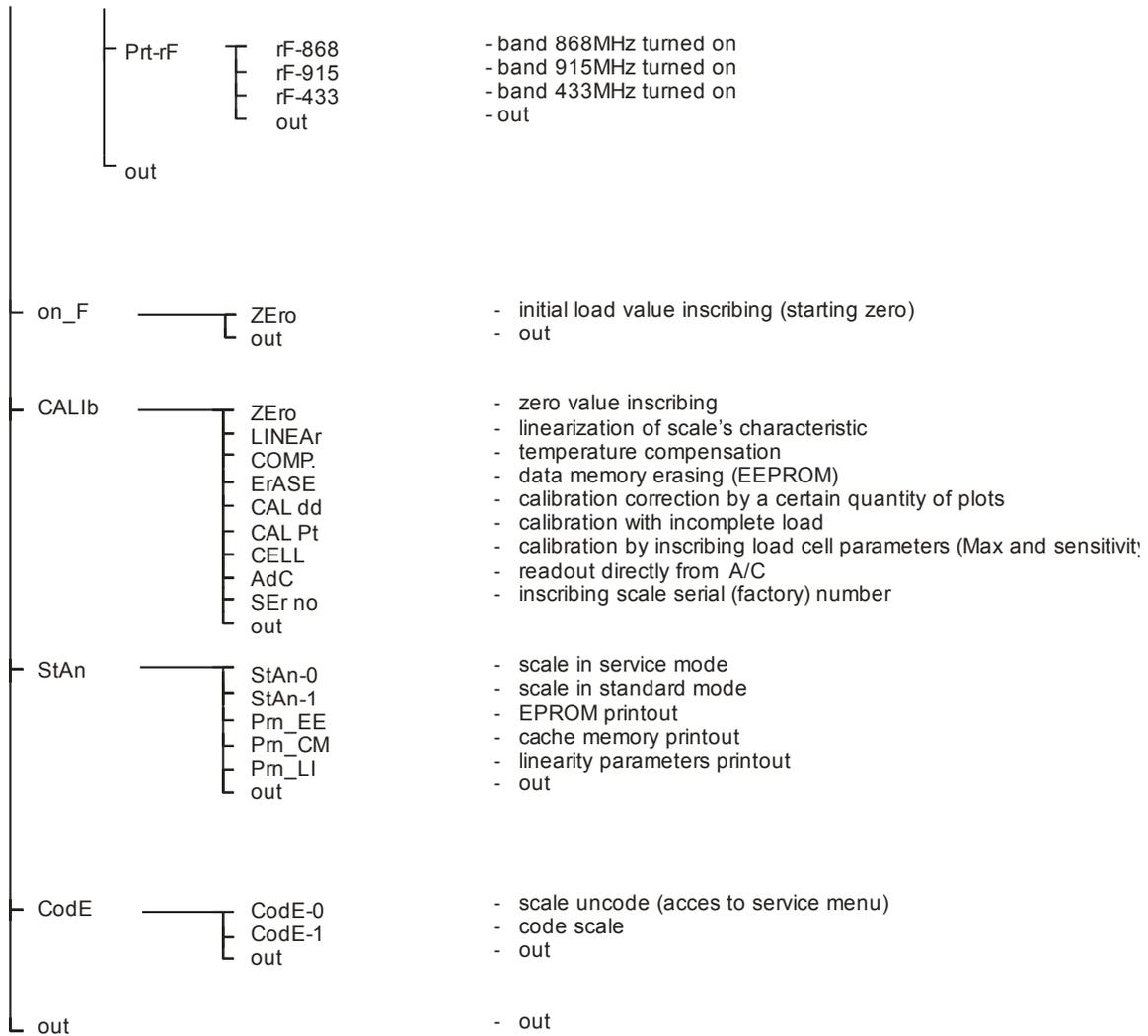
| Rys. | BE_BC0069 | bE0069 (bC0069) service menu | Ark. 1/2 |

```
        ┌─ Prt-rF ──┬─── rF-868        - band 868MHz turned on
        │           ├─── rF-915        - band 915MHz turned on
        │           ├─── rF-433        - band 433MHz turned on
        │           └─── out           - out
        │
        └─ out
│
│
├─ on_F ──────────┬─── ZEro            -   initial load value inscribing (starting zero)
│                 └─── out             -   out
│
├─ CALIb ─────────┬─── ZEro            -   zero value inscribing
│                 ├─── LINEAr          -   linearization of scale's characteristic
│                 ├─── COMP.           -   temperature compensation
│                 ├─── ErASE           -   data memory erasing (EEPROM)
│                 ├─── CAL dd          -   calibration correction by a certain quantity of plots
│                 ├─── CAL Pt          -   calibration with incomplete load
│                 ├─── CELL            -   calibration by inscribing load cell parameters (Max and sensitivity
│                 ├─── AdC             -   readout directly from  A/C
│                 ├─── SEr no          -   inscribing scale serial (factory) number
│                 └─── out
│
├─ StAn ──────────┬─── StAn-0          -   scale in service mode
│                 ├─── StAn-1          -   scale in standard mode
│                 ├─── Prn_EE          -   EPROM printout
│                 ├─── Prn_CM          -   cache memory printout
│                 ├─── Prn_LI          -   linearity parameters printout
│                 └─── out             -   out
│
│
├─ CodE ──────────┬─── CodE-0          -   scale uncode (acces to service menu)
│                 ├─── CodE-1          -   code scale
│                 └─── out             -   out
│
└─ out                                 -   out
```

Rys.	BE_BC0069	bE0069(bC0069) service menu	Ark. 2/2

In further chapters of the manual, mainly service options are described. User options are described in user manual.

Working mode settings and storing parameters can be performed by selection (activation) of proper functions in service menu. The settings are stored in internal memory (EEPROM). The process will be called scale programming (setting).
In order to get access to service menu enter 6-digit code:

<div align="center">

781213

</div>

Secure code should be inserted once more in order to secure the scale.

In legalized scales access to calibration and programming is blocked (*Pr-off* communicate) additionally by jumper inside the meter (LCD version):
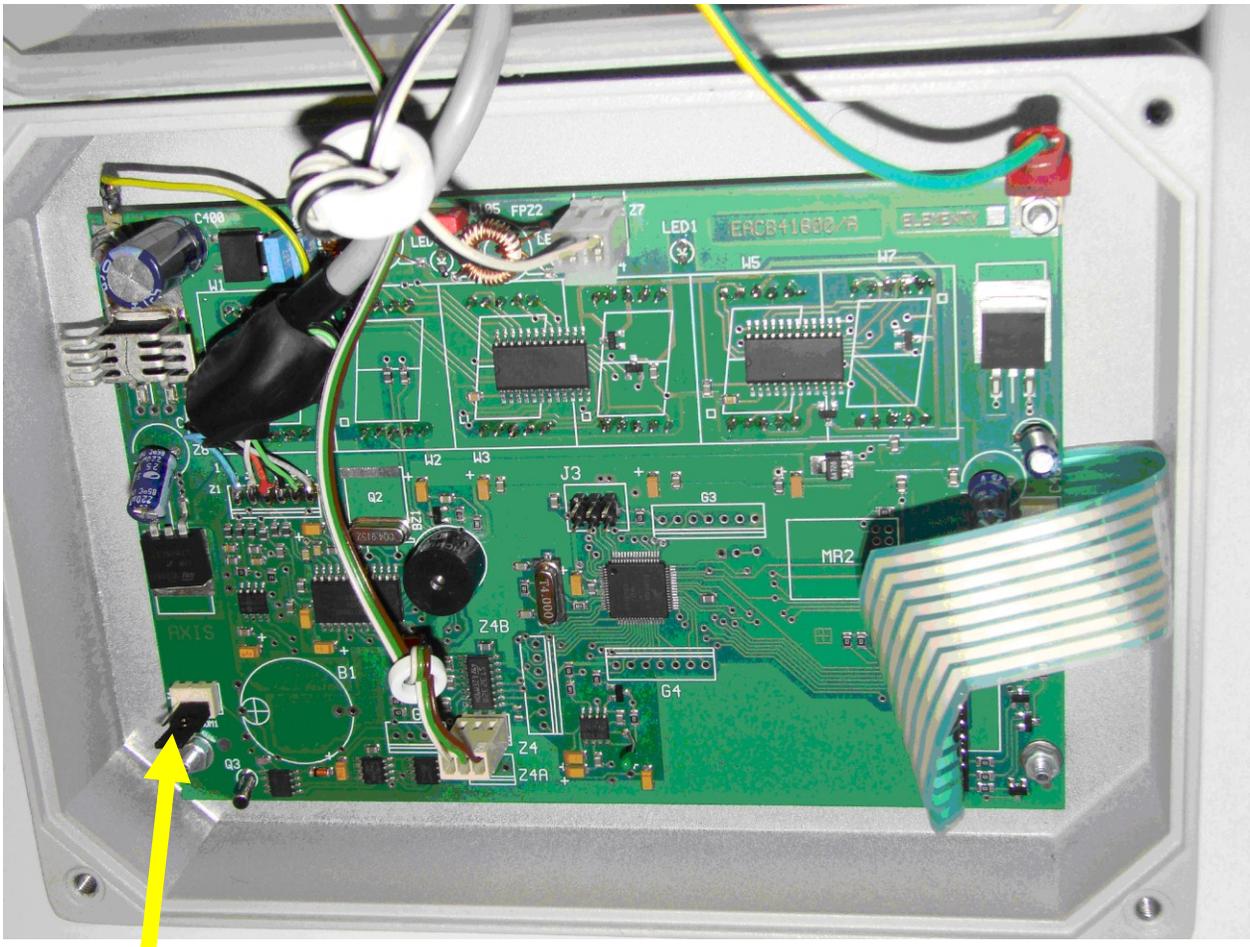
Access to calibration jumper. On the picture access is open (Pr-on communicate).

3.1 Keys and meter indicators

Version with LED display:
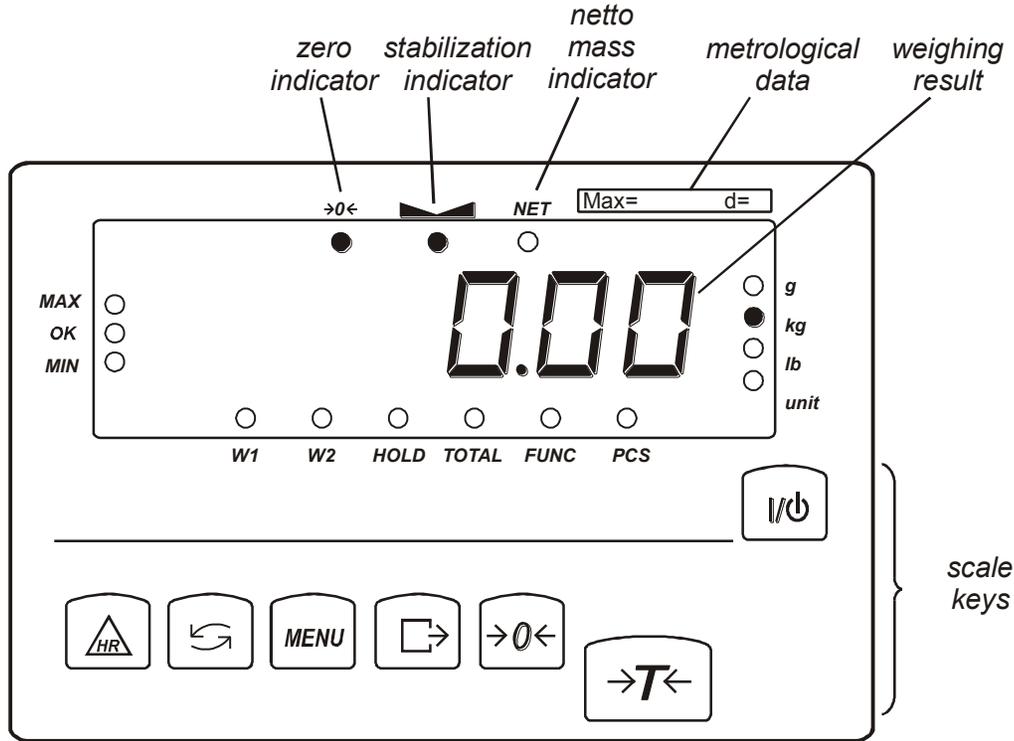
key	I/⏻	- ON/OFF switch (standby),
key	→T←	- tare set (entering package weight, subtracted from weighed mass),
key	→0←	- zeroing,
key	MENU	- access to special functions menu,
key	⤷	- result print (data transmission),
key	HR	- high resolution,
key	↺	- switch: special function / weighing
indicator	→0←	- zero indicator,
indicator	⤳	- signals weighing result stabilization,
indicator	NET	- net weight indicator (indication with subtracted tare),
indicator	W1	- two-range scale first range on
indicator	W2	- two-range scale second range on
indicator	HOLD	- hold indication (*LOC* and *UP* function)
indicator	FUNC	- special function on,
indicator	PCS	- indications in pieces,
indicator	g, kg, lb, unit	- mass indications in chosen units,
indicator	MAX	- mass indications exceeded the II threshold,
indicator	OK	- mass indications between I and II threshold,
indicator	MIN	- mass indications under I threshold.

3.2 Scale programming sequence

After mechanical and electronic assembly to program the scale follow the sequence below. Information necessary for mechanical and electronic installation is described in chapter 2 and 3 and in DTR manual (delivered with the scale).

1. Enter the Service Menu
2. Set scale type
3. Set working mode (if necessary)
4. Register primary zero value
5. Sensitivity calibration
6. Check temperature sensor (monitoring) and proceed with the temperature compensation (if necessary)
7. Check linearity characteristics and proceed with the linearity correction if necessary
8. Check balance sensitivity and enter sensitivity correction if necessary
9. In case any additional facilities enable necessary user functions
10. Code the moisture analyser.

Some of the actions can be bypassed, if we state that the scale doesn't need them. Particularly temperaturę compensation can be omitted after repairing feeder, display or other main board part.

3.3 General rules during scale programming

- **MENU** key recalls option set. The abbreviations of option names appear on the display successively.

- To choose (accept) needed option press →**T**← key while abbreviation of desired option is displayed,

- some options need to choose **0** or **1**; choose **0** to resign and return to the previous step or **1** to activate the option,

- if "o" sign (or a point in the upper left corner in LED version) lights by the option name, the displayed option is enabled,

- Due to failures that sometimes apppear (in production or service process) if a "-CODE-" (the scale is not coded) communicate appears after each scale switching on, user can bypass the communicate by using **MENU** key,

- After each turning on the scale autotests start (C-1, ..., C-4).

4. Service menu description

Service menu (not available for user) consists options and functions set that decide about scale working mode.

Service menu consists of following option catalogs:

ModE – options connected with scale working mode

On-F – user special functions

CALIb – functions connected with scale adjusting

StAn – user mode selection (standard) or service mode, EPROM content printout

CodE – service menu access coding

4.1 Options connected with work mode (ModE)

This options decide about principal metrology parameters of scale:

SCALE – choose of range and type of scale

SErIAL (Port-1 and Port-2) – setting first and second serial port:

- **bAUd** – transmission speed setting (bps),

- **bitS** – number of bits (in byte),

- **Parity** – parity control,

- **Send** – transmission modes (after pressing ⬐):

  OFF - transmission key off,

  StAb – transmission after stabilization,

  No_StAb – transmission without stabilization,

  Auto – automatic transmission after putting on load,

  Cont. **–** continuous transmission,

  rEMOV – transmission after taking off load.

- **nr –** scale number in network,

- **Prot** – transmission protocol:

  Long – Scale standard protocol,

  ELTROn – label print protocol,

  PEN-01 – pendrive protocol.

- **WI-FI** – Wi-Fi module turning on

AvErAG – dynamic parameters of scale (averaging options)

OPtIon – taring options, zeroing options, control of starting zero, measurement filters.

rF – options for radio communication

4.2 Special functions (On_F)

ZErO option is used to inscribe starting zero value (primary zero). Using this function is essential when additional construction elements are put on the pan e.g. container. Without inscribing correct value of start load „unLOAd" communicate appears.

4.3 Functions connected with scale adjusting (CALIb)

Calibration parameters menu:

ZEro – set a reference zero value (after start scale compares indications with this value)

LInEAr – linearity of scale characteristics (load up)

COPMPt – temperature compensation (not used in standard)

ErASE – erase entries: CAL-calibration, LIn-linearity, ALL- all

CAL dd – change scale sensitivity with selected division value (+/- divisions)

CAL Pt – calibration with not maximal load

CELL – calibration by inscribing load cel parameters (Max and sensivity)

AdC – setting AdC transducer (not used in standard situatuin)

SEr no – inscribing serial (factory) number.

4.4 Working mode changing standard / service (StAn)

This menu allow to set service or standard mode and print reports:

StAn-0 – service mode (many unnecessary functions during repair/setting are deactivated eg. special functions)

Stan-1– standard mode (user mode)

Prn-EE – printout all contents of EEPROM

Prn-CM – printout of cache memory

Prn- LIn– printout of linearity

5. Basic programming operations

The first operation should be entering the service catalogue.

Only sensitivity calibration is possible without entering service catalog.

During reparations it is advised to follow programming sequence described in this chapter.

5.1 **Entering a service catalogue – scale decoding (should be necessarily done first)**

- press **MENU** key**.**

- Choose **SEtuP** and **SErVICE**

- Enter 6 digit access code ┌──────────┐ 781213 └──────────┘ by using keys:

  - →**0**← - changes value of displayed digit.

  - →**T**← - shifts digit to left,

- press **MENU** key after entering code number,

NOTE:
When scale is decoded entering service catalog doesn't require access code.

- enter **CodE-0** by pressing →**T**← key,

- select **StAn** and **StAn -0** option,

- perform scheduled activities in service catalog or press **MENU** key to switch to weighting operation.

5.2 Scale monitoring

- press **MENU** key**.**

- choose **SEtuP** and **SErVICE** by pressing →**T**← key,

- select **CALIb** and **ZEro** option,

- read direct A/D transducer indication; there should be:

Scale type	A/D indication		A/C division difference beetwen Max and 0 load
	0 load	Max load	
...	from 100 divisions	Up to 160 000 divisions	At least 30 000 divisions

In case of clearly unstable or different values, check limit switches setting, supply voltages, reference A/D

transducer or exchange strain gauge.

- press **MENU** key to exit from function.

5.3 Scale type selection

Scale type selection has crucial role in programming scale. Weighing range and readout unit is automatically set when the scale type is selected. Moreover other factory options are set and initial calibration (very inaccurate but ensures the scale cooperates with typical load cell).

Actions sequence:
- press **MENU** key,

- choose **SEtuP** and **SErVICE** by pressing →**T**← key,

- select **ModE** and **SCALE** option,

- select proper scale type:

  - initial selection – according to letter type – ex. for B2D scale (=BA2D) choose „**bA**-"

  - further selection – according to successive digits – ex. for B2D scale (=BA2D) choose „**2**"

  - final selection – according to successive digits – ex. for B2D scale (=BA2D) choose „**2d**"

Available scale types:

Menu	Initial selection	Further selection	Final selection	Metrological type of scale	Max	d	e
trYb / SCALE	-bA...	- 2...	- 2d	scale BA2D	2000g	1g	1g
			- 2	- " - BA2	2000,0g	0,1g	1g
			B 200	- " - BA200	200,00kg	0,01kg	0,1kg
			B 200L	- " - BA200L	200,00kg	0,1kg	0,1kg
			B 2000	- " - 4BA2000	2000kg	1kg	1kg
		- 3...	- 0,3d	- " - BA0.3D	300g	0,1g	0,1g
			- 0,3	- " - BA0.3	300g	0,01g	0,01g
			- 3d	- " - BA3D	3000g	1g	1g
			- 3	- " - BA3	3000g	0,1g	1g
			- 30	- " - BA30	30,00kg	0,01kg	0,01kg
			- 300	- " - BA300	300kg	0,1kg	0,1kg
			- 3000	- " - 4AB3000	3000kg	1kg	1kg
		- 3500		- " - BA3500	3500,0g	0,1kg	1kg
		- 400		- " - 4BA400	400,0kg	0,2kg	0,2kg
		- 50		- " - BA50P	50,00kg	0,02kg	0,02kg
		- 6...	- 0.6d	- " - BA0.6D	600,0g	0,2g	0,2g
			- 0.6	- " - BA0.6	600,00g	0,02g	0,2g
			- 6d	- " - BA6D	6000g	2g	2g
			- 6	- " - BA6	6000g	0,2g	2g
			- 60	- " - BA60	60,00kg	0,02kg	0,02kg
			- 600	- " - 4BA600	600kg	0,2kg	0,2kg
			- 6000	- " - 4BA6000	6000kg	2kg	2kg
		- 10...	- 10	- " - BA10	10 000g	1g	5g
			- 1000	- " - 4BA1000	1000,0kg	0,5kg	0,5kg
		- 15...	- 1.5d	- " - BA1.5D	1500g	5g	5g
			- 1.5	- " - BA1.5	1500,00g	0,05g	0,5g
			- 15d	- " - BA15D	15000g	5g	5g
			- 15	- " - BA15	15000g	1g	5g
			B 150	- " - BA150	150,00kg	0,05kg	0,05kg
			B 1500	- " - 4BA1500	1500,0kg	0,5kg	0,5kg
			-2.5				
	-bAY...		- 3	- " - BA6Y	3000g	0,5g	0,5g
			- 6	- " - BA6Y	6000g	1g	1g
			- 12	- " - BA12Y	12000g	2g	2g
			- 25				
			- 30	- " - BA30Y	30,00kg	0,005kg	0,005kg
			- 60	- " - B60Y	60,00kg	0,01kg	0,01kg
			- 120	- " - BA120Y	120,00g	0,02kg	0,02kg

▪ choose (activate) legalized scale type (if needed) - tYP_LEG

Not legal scale (*nLEGAL)*
- displaying last digit
- →0← key turned off

During normal work (switch in standard position) and during service work (switch in service position) in calibration option all sub-options are available. Access to calibration is possible through SEtuP (User menu) or through service menu.

Legalized scale (*LEGAL)*
- Displaying last digit,
- AutotAr option turned on (auto-zeroing),
- →0← key turned on

During normal work (switch in standard position) calibration isn't available (besides printing status), during service work (switch in service position) all calibration options are available.

Scale for trade (*trAdE)*
- Last digit hidden (e = d),
- AutotAr option turned on (auto-zeroing),
- →0← key turned on

During normal work (switch in standard position) calibration isn't available (besides printing status), during service work (switch in service position) all calibration options are available.

If You need other scale parameters:

SEt - detailed settings option (dedicated for services)

Before setting it's recommended to inscribe needed values in format displayed on the scale (when StAn-0):

- Max – scale range (*SEt-h*)   - .... (inscribe)
- Quantity of points after comma (*Point*)   - 0, 1, 2, 3, 4, ...   (choose)
- d – elementary scale plot (*SEt-d*)   - 1, 2, 5, 10, 20   (choose)
- e – verification plot (*SET-e*)   - 1e, 2e, 5e, 10e   (choose)
- last digit deactivation (*LASt*)   - 0 (no) / 1 (yes)   (choose)
- mass unit (*Unit*)   - GrAM (g) / HGrAM (kg) (choose)
- Max+9e – overload threshold H (*SEt-H*)   - (inscribe if the standard value Max+9e is not enough)

- **SEt-h** - inscribe measurement range of the scale (Max) in internal format corresponding to internal scale resolution – resolution displayed when StAn-0 (internal resolution can't exceed 150 000 plots, profitable is the biggest possible value):
  - "*current Max value*" – choose using →T← and insert new value using keys:
    →0←, ⌐⌐, →T← i **MENU,**
  - Exit without change – **MENU** key .

  E.g. for scale with range of 600kg and reading unit of 200g (0,2kg) enter: 600.00 (last digit will not be displayed)

- **Set-H** - entering limit for signaling H overweight (according to Max+9e standard) in format as above,
  - "current H value" – entering new value using keys as above**,**
  - Out-H – leave without changes,
  E.g. for scale with range of 600kg enter: 601.80

- **Set-E** - entering verification unit (e) in format as above,
    - "current E value" – entering new value using keys as above**,**
    - Out-E – leave without changes,
    E.g. for scale with verification unit of 0,2kg enter: 0.2

- **Set-d** - select scale result rounding: 0(1), 2, 5,10 or 20,
    E.g. for scale with reading unit of 0,2kg enter: 2

- **LASt** – cover last digit of internal scale format (see LASt option):
    - 0 (display all digits)
    - 1 (hide last digit),
    E.g. for scale with range of 600kg and reading unit of 0,2kg enter: 1, scale will display only one digit after decimal point, e.g. 100,2kg

- **Point** – the position of comma shown in scale indication (if Max was written in format with decimal point, the option is set automatically): 0 (no point), 1, 2, 3 or 4,
    In example above decimal point does not have to be used or enter 2.

- **Unit**- - select mass unit: 0 (kg) or 1 (g).
    In example above enter 0
    Uwaga:

    Using **SEt** option remember about **dIodA** activation (nett mass and zero signalization) for legalized scales with d=e.

5.4 Sensitivity calibration

(scale in StAn-0)

- Zero the scale using →**T**← key,

- Press **MENU** key and using →**T**← choose **CALIbr** and **CAL on**,

- After **LOAD** put Max weight on pan and wait for indication of this value.

In not verified scales function **CALIbr** should be activated in **SEtuP/Menu .** It causes easy access to this function by **MENU** key.

5.4.1. Calibration with incomplete (part) load

CAL-Pt function is used (**CALIb** option) to calibrate scale with standard of mass smaller than scale's Max value.

- After entering CAL-Pt function press MENU key,
- Choose **Pt StP,** scale will display "SEtCAL",
- Inscribe standard of mass value and confirm by pressing →**T**←,
- Scale will display "-CAL-" and then "PrESS MEnu". Press **MENU** key and wait for "LOAd". Put load on pan, "PrESS MEnu" will appear, press **MENU** key, during calibration scale indicates "CCCCCC" sign and then starts to work.

CAL-Pt function can be recalled many times using **MENU** key, it enables to calibrate scale, when total weight of used standards of mass is smaller than scale's Max range.

To fully load the scale in few steps replace each standard of mass with equal portion of product (used as ballast).

Procedure:

- enter **CAL-Pt** and perform calibration with available quantity of calibratin standards of mass,

- observe scale indication and replace standard of mass with product (ballast) with the same weight, again put on standards of mass. Having now bigger weight on scale use **CAL-Pt** function, etc. until You obtain weight equal to scale's Max.

5.5 Enter first zero value (reference zero)

After turning encoded scale off, the scale checks if zero value of scale is differ more than 10% from original value recorded in EEPROM memory. In case of improper zero value of scale, "unLOAd" massage will appear on the display.
You should perform the following actions in case of force transducer repair, memory format or other activities that change original zero value:

- Press **MENU** key**.**

- Select **SEtuP** and **SErVICE**

- Choose catalog **CALIb** and option **ZEro**,

- Wait unitl result is stable and indications from ADC transducer will show up.

- press →**0**← key and wait.

5.6 Temperature compensation

Apply only for chosen types of scales.

- press **MENU** key,

- choose **SEtuP** and **SErVICE**,

- choose **CALIb** and **COMPt** option,

- put turned off scale in temperature (15±2 ^{o}C),

- turn on the scale for 2 hours,

- turn off and on the scale using I/ ⏻ key, press and hold **MENU** key,

- during displaying **C-2**, after hearing sound signal release **MENU** key,

- choose options catalog **CALIb** and **COMPt** option, wait until the scale is stable and program version disappears,

- Choose **LO-15°C** (→**T**← key**)** and inscribe into memory displayed A/C transducer value using key ⤵,

- Put on Max weight,

- Choose **HI-15°C** and inscribe to memory using key ⤵,

- Remove the load, increase environment temperature of the scale to II (35±2 ^{o}C) and leave tuned off for about 2 hours.

- Turn on the scale for about 2 hours,

- Turn on and off the scale using I/ ⏻ key, press and hold **MENU**,

- During **C-2** display, after the sound signal release **MENU** key,

- choose options catalog **CALIb** and **COMPt** option, wait until the scale is stable and program version disappears.

- Choose **LO-35ºC** (→**T**← key**)** and inscribe into memory displayed A/C transducer value using key ⌑

- Put on Max,

- Choose **HI-35ºC** and insert to memory using key ⌑**,**

Attention:

1. **tEMPEr** option is used to check temperature indications of internal scale thermometer.

2. Dot 5-7 displayed before LO and HI informs that the parameters where inscribed earlier.

3. Choosing **LO-15ºC** and **HI-15ºC** when the temperatures differ from each other more than 150 thermometer plots is impossible (communicate Err- 7 shows up). Similar with **LO-35ºC** and **HI-35ºC**.

4. **C-8** sign showing up after turning on the scale informs that the temperature calibration hasn't been made yet (memory entry hasn't been made).

5. Err-6 sign shows up, when improper key was pressed depending on pan load.

In case any failures during turning on the scale, erase EEPROM memory using CLEAr function and repeat compensation.

5.7 Linearity calibration

Use this option to correct non-linear weighing characteristics.

- press **MENU** key,

- choose **SEtuP** and **SErVICE**,

- choose *CALIb* menu and *LIn* option, wait for zero indication and letter A,

- insert characteristics (A) zero point (pan is not loaded) to scale memory using ⌑,

- put 1/5 of Max load on the pan and insert next characteristics point (B) by using ⌑,

- put 2/5 of Max load on the pan and insert next characteristics point (C) by using ⌑,

- put 3/5 of Max load on the pan and insert next characteristics point (D) by using ⌑,

- put 4/5 of Max load on the pan and insert next characteristics point (E) by using ⌑,

- put 5/5 of Max load on the pan and insert last characteristics point (F) by using ⌑,

- remove the load,

- choose **SAVE**.

5.8 RS232 interface installation

- press **MENU** key,

- choose **SEtuP** and **SErVICE**

- choose options catalog **ModE** and **Port-1** or **Port-2** option,

- set wanted parameters,

- press **MENU** key in order to exit.

Attention: Parameters transmission setting i salso possible using user special function **rS**.

5.9 Digital filters setting (connected with indication dynamics)

5.9.1 Setting initial filter AvEr_A and proper filter AvEr_b

Averaging filter **AvEr_A** evaluates arithmetical average from measurements made by A/C transducer. There are possible settings from 0 to 40, which means that the result is averaged from chosen quantity of measures. When conditions are stable averaging can be turned off by setting 0 number.
Using this option is advisable, if the scale works too slow or is too sensitive to ground vibrations and zeroing the scale lasts too long after turning on.

Setting option **AvEr_A**:
- press **MENU** key,

- select **SEtuP** and **SErVICE**,

- Choose options catalog **ModE** and **AvEr_A** option when earlier setting will show up.

- press →**T**← key**,** this will cause apperance of level dash on last position,

- insert new settings (x=0÷40) by using keys:

    - →**0**← - change of displayed digit,

    - →**T**← - shift digits to left (next digit),

    - MENU – exit without changes.

Averaging filter **AvErA_b** is the following averaging in data processing (proper filter). The results from AvErA_A filter are averaged if they differ from each other by a value smaller than allowed quantity of A/C transducer plots. Filter turns off, when the difference beetwen following samples is bigger than threshold value.
Setting **AvErA_b** is similar to **AvErA_A** - quantity of taken to averaging results is chosen from range: 2÷50.

Standard filter setting after choosing scale type:

Scale type	AvEr_A setting	AvEr_B setting
BA2	20	50

It is recommended to set filter on minimum 5.

5.9.1.1 Proper filter options rAt_A, rAt _b
Values inserted by option rAt_A i rAt_b are connected with **AvEr_b**. filter.
Value rAtIo _A - allowed difference of following samples getting into **AvEr14_b** filter,

Value rAtIo _b – allowed difference of results getting out from filter. When allowed values are exceeded filter turns off.

5.9.2 rAt_Stb option

Value of difference beetwen following indications, beyond this value indicator ╰ ╯ shows up. Way of setting similar to the way in 4.9.1.

5.9.3 dEL_A, dEL_b, dEL_Stb option

This option is used to set delay time for filters and indicator. Way of setting similar to the way in 4.9.1.

5.9.4 MEdIA option

One of digital filters used to reduce disturbance of scale indication. Way of setting similar to the way in 4.9.1.

5.10 User function choice

- press **MENU** key,

- select **SEtuP** and **SErVICE**,

- choose option catalog **On-F**,

- using →**T**← key choose:

  BASE F - basic set of functions,

  Add. F – additional set,

  Oth. F – functions set individually (when list of functions appear, using →**T**← key choose wanted funcitons and set them as **on** or **oFF**).

Attention: Activated functions will work after setting option **StAn** on **1** or after coding.

5.11 Out from service catalog- scale coding (crucial after repairing the scale!!)

- Turn off and on the scale using I/ ⏻ key, press and hold **MENU** key,

- during **C-2** displaying, after hearing sound signal, release **MENU** key,

- choose option **CodE**, **CodE-1 and inscribe secure code: 781213**.

StAn option automatically sets on StAn-1.

6. Special functions

All scales, beside basic metrological functions like weighing and taring, are equipped with set of special functions. Basic set includes the following special functions:

- activation of functions in menu (*ACtIV*),
- autozeroing (*AutotAr*),
- pieces counting (*PCS*),
- change of mass unit (*UnIt*),
- percent calculations (*PErCEnt*),
- preparing recipes (*rECIPE*),
- calibration with external weight /internal calibration options (*CALIbr*),
- label choosing option (LAbEL),- setting parameters of serial interface (*Port-1*),
- printout configuration (*Print*),
- animal weighting function (LOC),
- memorizing tare function (tArE),
- maximum value indication function (UP),
- Force measuring function (nEWton),
- Anty-disturbance filter option (FILtEr),
- Setting backlight function (b_LIGHt),
- Function for choosing reading unit (rESOLUt),
- Statistical calculations function (StAt),
- Basis weight of paper counting function (PAPEr),
- charging accumulators settings (*bAttErY*) – accumulator option only,
- display backlight settings (*b-LIGht*),
- automatic switching off the scale (*Auto OFF*) – accumulator option only,
- Total weight function (totAL),
- Date and time setting (dAtE),
- Function of comparing with preset threshold values (trESh).

- restore manufacture settings (*dEFAULt*).
Other functions can be enabled to user as an option on order (all special functions are described in separate document).

When MENU *key is pressed start-up menu is displayed. Functions are displayed in sequence:* PCS, AutotAr*, etc.*
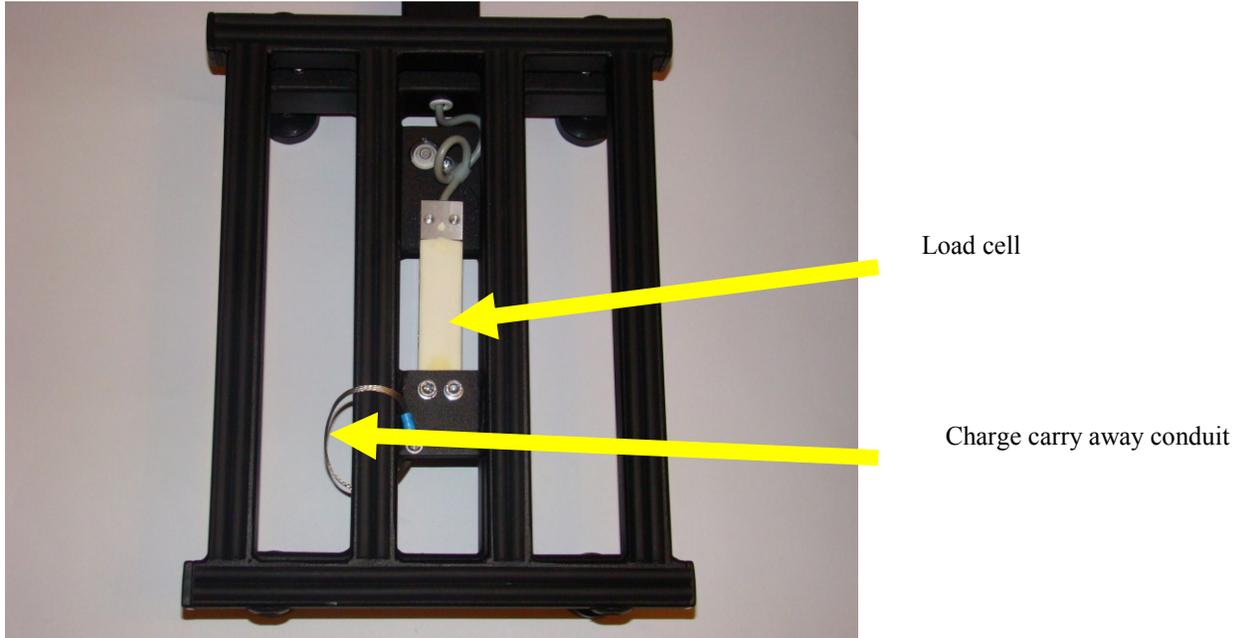
User can change menu content switching off or on available special functions using *ACtIV* function.

When special functions are being switched *MODE* indicator is shown.

7. Mechanics description

7.1 Load cell mounting

View from top after taking off the pan:

Load cell

Charge carry away conduit

In case any of the load cells must be remove it, pay attention to replace the element very neatly respecting all the necessary security rules.

The load cell is build with an aluminium core with attached strain gauge transducers (mostly 4) connected with each other with delicate wires. The load cell is mounted to the scale base with two or four screws. The screw placed in the scale base in the pan clamp axis under the load cell is a main limiter protecting against overloading.

When mounting the load cell handle the element with a great care and pay attention no to break strain gauges or their wires.

Before mounting the load cell, make sure the main limiter is removed to avoid bending or even breaking the load cell during tightening.

The scale base is specially adapted for load cell mounting. Pay attention that the load cell mounting plain and the scale base mounting plain are free from any dirt to avoid unequal adjoin of the load cell to the mounting plane or additional stain, which may distort the weighing results.

IMPORTANT: the load cell must be mounted to the scale base with screws and spring washers to avoid loosen the load cell during transportation or operating. Pay attention to tighten the load cell screws with appropriate force specified by the manufacturer –incorrectly mounted load cells might result in additional measuring errors.
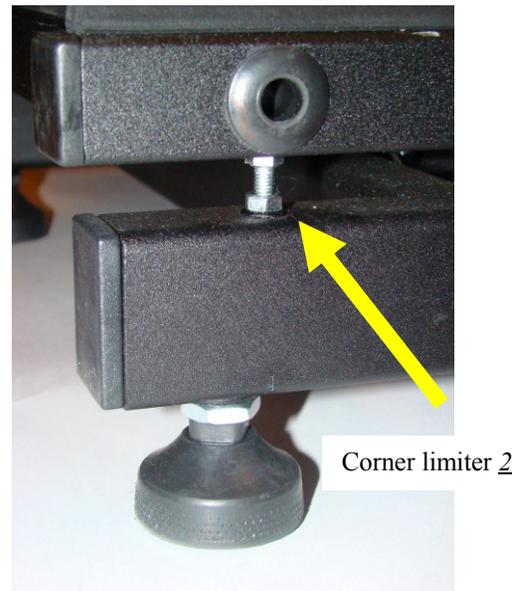
After mounting the load cells, lead the load cell wires so that the wires have no possibility to touch the load cell.

7.2 Limiters adjusting

View from down: View from side:

Central limiter *1*

Corner limiter *2*
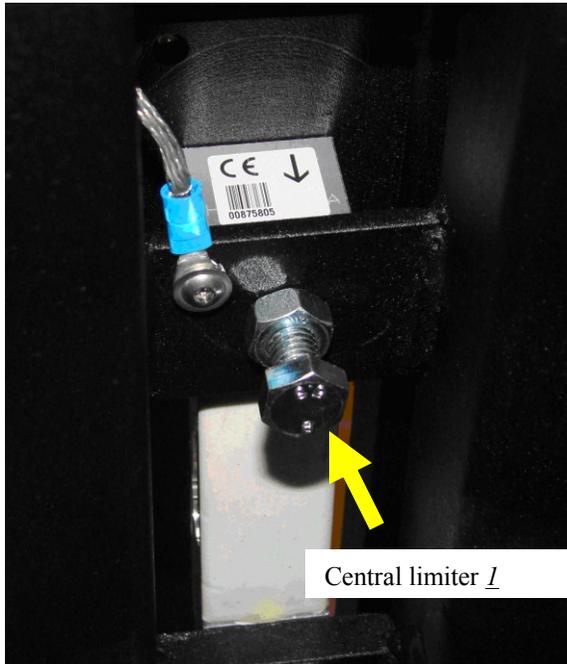
When the load cell is correctly mounted, adjust the overload limiter to the proper height.

In scales with one central limiter only, the limiter is placed below the load cell. Place the max load on the pan and adjust the limiter so that there is 0.5mm space between the limiter and the load cell. Replace the load and counter the limiter with the nut.

In platform scales, besides the central limiter, there are four additional corner limiters placed in each corner of the ramp. First adjust the central limiter – load the pan in one of the corners of the pan with enough weight so that the load cell rests on the corner limiter. Press T key and screw in the central limiter until it touches the load cell (i.e. the indications rises). Screw out the central limiter screw until zero indication appears. Screw out the limiter half of a turn more and then counter it with the nut.

To adjust the corner limiters place the weigh of 2/3 of Max load in the desired corner and adjust the height of the corner limiter so that there is 0.5mm space between the limiter and the load cell. Replace the load and counter the limiter with the nut. Remember to adjust the corner limiters for all four load cells!

When all the limiters are adjusted, it is now time to check all the connections. If everything is correct, check the rest of the electronics. Replace the cover and make sure it does not touch the load cell.

The pan is mounted to the load cell with screws with spring washers. Pay attention that all mounting planes are free from any dirt.

7.3 Disassembly and assembly of scale housing

In order to dissasembly meter housing unscrew 4 hex tap bolts 1 visible from meter bottom. After opening the housing set up it like on the picture below in order to ease further manipulations during electronics repairment.

During mounting pay attention on proper setting the seal 3, in case of damaging – exchange the seal.

7.4 Centricity checking and regulation

To check non-centricity indications enable the last digit of the display (StAn-0 option) and follow the sequence below:

1. Place the weight of 1/3 of the Max load in the middle of the pan and tare the indication with →T← key.
2. Place the weight in four utmost points of the pan and read the indications in each position.
3. In case any correction is needed, file the load cell in the positions indicated on the picture below, according to the indication of the scale ("+" – indication above zero, "-" – indications below zero).

To change the indications for few weighing units, only one file stoke is necessary.

Important: When checking finished balance (StAn-1 option), pay attention that during first 10 minutes after plugging the balance to the mains autozero function is active, which may falsify the results close to 0. To avoid this, do not tare the loaded weight until autozero function is automatically deactivated
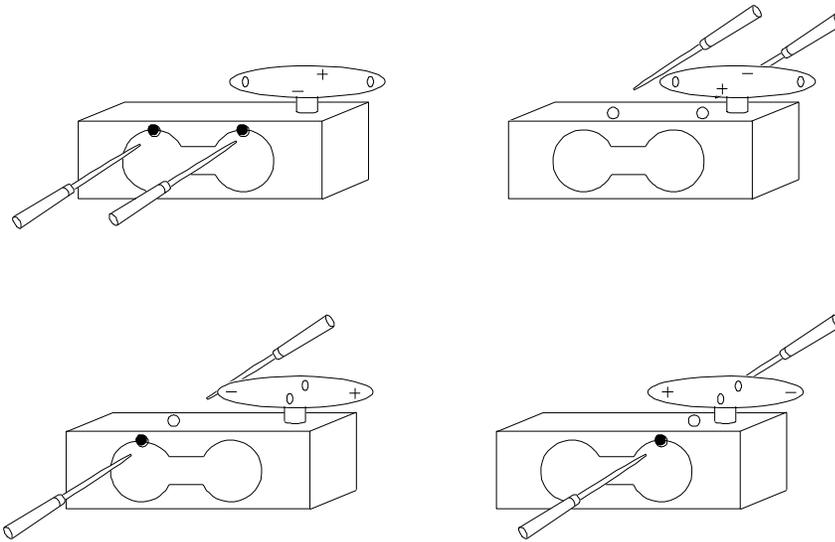
REMEMBER! File the negative indications only!

8. *Common scale failures*

8.1 Messages about errors and faults

During normal work and during setting parameters of the scale by service pay attention to following text messages:

Message	Reason	Recommendation
C-1 (more than 20 s)	Error of processor tests	replace processor or main board
C-2 (more than 20 s)	Error of EEPROM tests	replace EEPROM
C-3 (more than 20 s)	Error of A/D converter tests	replace A/D converter A/D or main board
C-4 (more than 20 s)	Error of temperature measurements unit (inly in scales with compensation)	check temperature sensor, repair or replace main board
L.	no pan	place the pan
	balance mechanical failure	check extensometer
H.	balance overload	remove load from the balance
	balance mechanical failure	check extensometer
H	overload nominal range of scale (MAX+9e)	remove load from the balance
indicator does not work	scale unstable, base vibrations, air blows	place the scale in location, assuring the indications stability
◣ ◢	scale damage	contact the service
- - - - - -	tare setting not finished	as above
Err-EPP	EEPROM is not available	put new EEPROM, check connections
Lnn	EEPROM checksum error	replace EEPROM
Err-b	first zero value error (absolute value above 10% MAX)	remove load from the balance, check extensometer
`PCS Err`	Switch in ON position (only for legalized scales)	Change over switch position
`PEr Err`	100% mass is too little (PErCEnt function)	use bigger mass
`tAr Err`	wrong Tare value (tArE function)	put correct value from range 0-Max
`Err PIn`	wrong PIN (dAtE function)	put correct PIN or service code

8.2 Most frequent faults

Defect	Action description
Display does not show any indications	check if power supply is connected to the scale and power network 230V check power supply check display connection
Unstable indication (frequent change of indications),	check contamination below the scale pan check if the strain gauge does not rub check analog-digital transducer check power supply check the part of analogue scale electronic system check scale temperature compensation
Scale does not repeat indications (does not return at light touching)	check indication at eccentric load check if the strain gauge does not rub check contamination below the scale pan check power supply check analogue part
Indications are changing during time or temperature	check contamination below the scale pan check temperature compensation
Scale indicate weight with error	calibration with external weight Carry out linear offset check indication at eccentric load check analog-digital transducer check analogue part
Keyboard does not work	check short-circuit of key by means of ohmmeter check connection between keyboard and main board
Buzzer generates acoustic signal during weighing	check if contacts of most often usage keys are not shorted check electric wiring connecting main board with keyboard controller
The scale indicates only zero	check if contact of "→T←" key is not shorted check, if coil does not has breakdown ground check analog-digital transducer
There is massage "Przekroczenie zakresu / range exceeding"	check contamination below the scale pan check connection with strain gauge
Scale operation stops during autotest	check the element indicated in autotest
The scale generates error message	check compatibility with massage content