



USER MANUAL
ELZAB CAT 27
SCALES SERIES

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1. Introduction

The CAT 27 scales series belong to a group of calculating electronic scales with the strain gauge force transducer and digital readout of results. The family consists of four types of scales: NEPTUN 2, SATURN 2, VEGA 2 and PLUTON 2. Various types are available in versions with different measurement specifications: as the single interval, double interval or double range scale with monochrome LCD or TFT color displays.

The CAT 27 scales are dedicated to work with the POS system consisting of a cash register or computer and one or more scales connected in the scales system. Significant software flexibility and a wide range of solutions make them applicable in small, medium and large retail outlets. The main application of the various types of scales is as follows:

- NEPTUN 2: the scale is designed for installation in the advanced barcode scanners. It is offered in the form of ready to built weighing module with a remote display installed on a rotating column of adjustable height and swivel head, as well as a part of a set containing the most popular bi-optical scanners.
- SATURN 2: the scale is intended for mounting in the cashier desk or box and any horizontal barcode scanner can be installed inside it. The scale is equipped with a remote display installed on a rotating column with adjustable height and swivel head.
- VEGA 2: design of the measuring platform makes the scale applicable as a stand-alone or mounted in the cashier desk or box. The scale is equipped with a remote display installed on a rotating column of adjustable height and swivel head.
- PLUTON 2: the stand-alone scale with built-in display and the ability to connect an additional remote display on a rotating column with adjustable height and swivel head. It is implemented mainly as a weight checker but using the remote display it allows to use this scale for sales.

Scales' features:

- weighing articles
- weighing and subtracting the tare
- automatic switching off the tare after articles are weighted and the tare is taken out
- automatic zero tracking (maintaining zero while unloaded)
- inputting the unit price through the communication interface and calculation of the amount to pay of weighted articles
- inputting the name of weighted articles through the communication interface
- 3-button keyboard
- graphical monochrome or color display showing the weight, unit price, the total amount, the article name, messages for the user as well as ZERO, STABILITY, NET and FIXED TARA indicators.
- ability to connect two displays: the main and the additional one
- available single interval ($d=e=5g$), double interval ($d_1=e_1=2g$, $d_2=e_2=5g$) or double range (range I: $d_1=e_1=2g$, range II: $d_2=e_2=5g$) models of scales
- communication with external devices (cash register, computer) through the RS232 interface
- transfer of the weighing results initiated manually, automatically or by the interface
- ability to work in the **ELZAB SCALES SYSTEM**
- energy saving mode.

2. Specifications of the CAT 27 series

2.1. Scales presentation



CAT 27 NEPTUN 2 scale



CAT 27 SATURN 2 scale



CAT 27 VEGA 2 scale



CAT 27 PLUTON 2 scale

2.2. Technical Specifications

- Specifications common for all models of scales:

Scale type	non-automatic, calculating electronic scale with the strain gauge force transducer and digital readout of the weight, price and amount allowing to display article's name
Display (monochrome, blue)	Weight: 5 digits, 14 mm minimum digit height Price: 6 digits, 10 mm digit height Amount: 7 digits, 10 mm digit height Article name: up to 20 characters, 5.5 mm character height
Operating temperature range	-10 °C ÷ +40 °C
Power supply	12V/ 1A external adapter
Power consumption	average of 5 W (scale with single display)
Interfaces	1. serial RS 232 (computer, cash register) 2. serial RS 232 (remote display)
Number of scale intervals	3000
Initial zeroing range	$\pm 10\% * \text{Max} = \pm 1.500 \text{ g}$
Semi-automatic zeroing range	$\pm 2\% * \text{Max} = \pm 0.300 \text{ g}$

- Specifications of the single interval and double interval scales:

Class of accuracy	III	
	Single interval	Double interval
Measurement specifications	Single interval	Double interval
Minimum load	Min = 100g	Min = Min ₁ = 40g
Maximum load	Max = 15 kg	Max ₁ = 6kg Max = Max ₂ = 15kg
Elementary and verification scale intervals	d = e = 5g	d ₁ = e ₁ = 2g d ₂ = e ₂ = 5g
Tare range (subtracting tare)	T = -Max	T = -(Max ₁ -e ₁)

- Specifications of the double range scale:

Class of accuracy	III	
	double range	
Measurement specifications	double range	
Weighing range	I	II
Minimum load	Min = Min ₁ = 40g	Min ₂ = 100g
Maximum load	Max ₁ = 6 kg	Max = Max ₂ = 15kg
Elementary and verification scale intervals	d ₁ = e ₁ = 2g	d ₂ = e ₂ = 5g
Tare range (subtracting tare)	T = -Max	

2.3. Dimensions

Scale model	width [mm]	depth [mm]	height [mm]	display height x width [mm]	total weight
NEPTUN 2	246	250	58	403 x 126/ base 80 x 80	3,8 kg
SATURN 2	292	292	128	403 x 126/ base 80 x 80	4,8 kg
VEGA 2	306/333	244/253	80	403 x 126/ base 80 x 80	3,9 kg
PLUTON 2	319	329	81	-	4,8 kg

2.4. Display, keyboard

The display of the scale features two working modes:

- Calculating mode displays weight, unit price, amount and article name



- Non calculating mode displays weight and article name



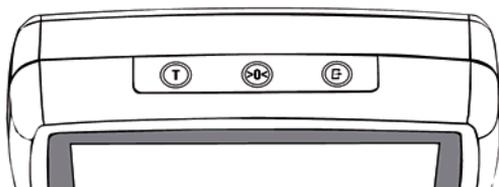
Selection of the display mode is automatic and depends on whether the unit price will be sent to the scale. After turning on the scale, the non-calculating mode is enabled (showing only the weight), after the first transfer of the unit price the mode switches to a calculating mode which remains active until powering off the scale. If only the article weight is displayed the scale transmits zero as a unit price and amount.

There may be displayed the following indicators:

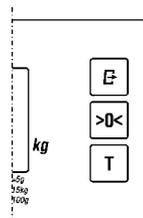
- Exact zero indicator (weight less than $\frac{1}{4}$ of the e_1 or e_2 interval)
- Stability indicator
- Indicator of the tare stored for a single weighing

- PT** Indicator of the tare stored for several weighing
- ▼ Scale range indicator (only in the double range scale)

The controls of the scale consist of three keys.



The keyboard of the NEPTUN 2, SATURN 2 and VEGA 2 scales



The keyboard of the PLUTON 2 scale

The functions of the keys in the weighing mode are as follows:



	TARING	Turning on and off the tare, confirming
	ZEROING	Zeroing the scale, access to the scale menu
	TRANSMITTING	Transmitting the result to a cash register or a PC

2.5. Description of connectors

PC Connector – is used to connect a PC or a cash register

PIN No.	Signal name	
1, 2	NC	
3	TxD - serial output	
4	RxD - serial input	
5, 6	GND	

DISPLAY connector – is used to connect a remote display

PIN No.	Signal name	
1, 2	+5V	
3	TxD - serial output	
4	RxD - serial input	
5, 6	GND	

POWER SUPPLY connector – is used to connect an external power supplier

Symbol	Parameters	Polarization	
	8 ÷ 15V, 1A		

3. Technical conditions of installation and operation of the scale

3.1. Installation of the scale

- Depending on the type of the scale it should be mounted on a cashier desk or in a cashier box in the following way:
 - the NEPTUN 2 scale and a bi-optical scanner should be built into the cashier desk or box in the way that the platter of the upper surface of the scanner is leveled with the surface of the cashier counter.
 - the SATURN 2 scale in a basket should be built into the cashier desk or box in the way that the platter of the scale is leveled with the surface of the cashier counter. Then the horizontal barcode scanner should be put into the basket and secured from slipping by attached self-adhesive Velcro tape. Make sure that the scanner does not touch beams of the scale,
 - the VEGA 2 scale built into the cashier desk or box should be installed in similar way as the SATURN 2 scale,
 - the VEGA 2 and PLUTON 2 stand-alone scales should be placed on a stable and leveled surface.
- The scale should be leveled so that the air bubble level indicator is in the center of the circle drawn on the indicator. Level the scale with adjustable legs. After having leveled the scale check for stability (all legs touch the ground) and whether the platter is correctly placed.
- When the scale is working with a remote display it should be mounted on the cashier desk or box in the way allowing to see it by the cashier and a customer. Then connect the display to the scale's platform. If necessary use separate the display for the cashier and another one for a customer.
- Connect the RS 232 scale interface cable with a PC or a cash register. Do not connect or disconnect the RS 232 interface while using the scale as this may damage the interface.
- Connect the external power supplier to the scale. It should be connected to the 230V socket. During the subsequent operations take care of the power cable. **In case of any damage of this cable immediately disconnect the scale from the power supply and contact the Service Center.** It is recommended to use the separate power line for scales and other electronic devices like cash registers, computers, etc. Connecting the scales to the power line with other connected devices e.g. containing engines, can cause their interference with the working scales and can damage the interfaces of scales.

3.2. Environment

- The scale can be operated at temperatures from -10 to +40 °C and humidity up to 85% in an atmosphere free from corrosive substances. After a sudden change in temperature by more than 5 °C the scale should acclimate for 2 hours before connecting the power supply (e.g. putting the scale into warm room after having transported it in the cold). Do not allow the forming of condensation. When working in areas with higher humidity, but within the limits stated above, it is advisable to turn off the power for 24 hours.
- The scale may not be subject to shocks and vibrations, can't work near sources of strong electromagnetic fields, can't be exposed to strong sunlight for long periods and can't work in the direct stream of air or in dusty areas.

3.3. Other operating remarks

- During turning on the power the platter should be empty. After turning the power on the scale automatically runs its test and resets by taking as a zero the actual scale load. During the test, the display shows the version of the program, all indicators light up and the digits

change from 0 to 9. After completing the test displayed data shows zero and the  and  indicators light.

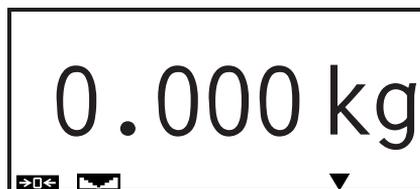
- If during subsequent operations of the scale the weight indicator will be different from zero it is needed to reset the scale with the empty platter:
 - by pressing the  key (for small deviations) or
 - by turning off and on the power supply of the scale or
 - by executing the scale reset from the main menu.
- Avoid overloading or sudden load shocks of the platter. They can cause damage to the transducer.
- It is recommended to check the correctness of weight readings of the scale using a standard weight of at least 1/3 of the scale's range. If you notice that the errors are larger than the limits are the scale should be immediately withdrawn from use and it is needed to contact the service point.
- It is especially important to review the readings of weight after having transported and installed the scale, before starting using it. Foreign objects should not touch the platter.
- The whole scale must be kept clean, not only for hygienic and aesthetic reasons but also for measuring. Take care mainly of cleaning the platter and the space under the platter because the gathered crumbs of weighted goods may impede the free movement of the platter, as well as affect the functionality of the transmitter. The housing can be wiped with a damp cloth. Too much water should not be used during the cleaning, which could pour into the interior of housing.

Note: Failure to comply with technical installation and operation conditions specified in this user's manual releases the manufacturer from any liability of an inappropriate functioning of the scale.

4. Operation

4.1. Turning on

After turning on the scale the internal test procedure runs for about 15 seconds checking the individual scale components and thermal stabilization of the measuring circuit. During the test all boxes of the display show consecutive digits and all indicators are lit. For precise zeroing the scale any objects should not be put on the platter during the test and the platter shouldn't be touched. If the stability of the scale will be disrupted the scale will wait for stabilizing the load. After successful completion of the test the display should show:



4.2. Weighing

The articles should be gently placed near to the central point of the platter. Proceed to load the scale evenly and without shocks or jolts. Negative readings below 20 units are signaled by displaying > MIN < and the W5 : UNDERLOAD message. When the maximum load is exceeded by 9 x d=e intervals a message is indicated by displaying the > MAX < and the W4 : OVERLOAD. Maximum load is automatically reduced by the tare value if it turned on earlier.

Note: Do not overload the scale above the maximum capacity. Overloading can cause damage to the scale and void the warranty.

After loading the scale the display shows the weight value. When the scale is working in calculating mode and the unit price was entered the display shows also the amount to pay:



After weighing the commodity, understood as the stabilization of the positive result, and removing the load from the platter the scale will automatically reset the unit price and delete the product name from the display if they were previously inputted.

4.3. Zero setting

The scale features the  indicator signaling that the scale is not loaded. The indicator is lit if the current platter load is less than $\frac{1}{4}$ of e_1 unit.

Initial zero setting when turning on the scale

After turning on the scale and running the display test the scale will be automatically set to zero. The display will show only zero values and the  indicator will be lit. Initial zero setting procedure will succeed if the weighing result during zeroing is stable and is in the range $\pm 10\%$ of the weighing range of the zero stored during the calibration of the scale.

In case of exceeding zero range the W1: INITIATING ERROR message will be displayed. The scale is locked until removing the load exceeding the acceptable range.

Zero setting with the use of the key

Zeroing is possible in the range no greater than $\pm 2\%$ of the maximum scale readings in relation to the zero stored during turning on the scale (so-called "initial zero"). To reset the scale press

the  key. The scale will be reset if the two conditions are met:

- current indication is within the range no greater than $\pm 2\%$ in relation to the load stored just after turning on the scale,
- indication of the scale will achieve stability within 5 seconds after pressing the key.

In case of exceeding the zeroing range the W2: ERROR RESET is displayed and the scale does not reset. In case of instability the zeroing is not effected and the W3: SCALE UNSTABLE error is displayed.

Automatic zero setting for negative readings

Procedure will succeed automatically if during several seconds the scale readings are negative or the scale is under loaded. Other terms and conditions of automatic zero setting are the same as for the zero setting with the use of the key.

Zero maintaining i.e. „zero tracking“

This feature prevents from "sliding" of the scale's zero resulting from various external factors that may affect the zero indication. It consists of an automatic zeroing when the platter is unloaded. Other terms and conditions of zero tracking are the same as for the zero setting with the use of the key.

4.4. Taring

The scale features the tare subtracting function (subtracting the tare reduces the weighing range by the tare value). Activity of this function is signaled by **NET** indicator.

To activate the function press the  key. If the scale is stable or will achieve stability within 1 second the current platter load will be considered as the platter weight. In case of instability the taring is not effected and the **W3: SCALE UNSTABLE** error is displayed.

The maximum tare value depends on the type of scale and is indicated in the Section 2.2. Technical specifications of this manual.

Turning off the tare is effected after removing the load from the platter and pressing the  key or automatically after removing weighted articles. In order to turn off the tare automatically there should be effected the process of weighing articles which takes place when the load of the platter is stable and greater then the **MINIMUM RESULT** set in the **USER MENU**.

Example of weighing with taring:

- the scale is set to zero, the  and  indicators are lit,
- load the scale (e.g. with a basket),
- the scale indicates 0.788 kg, press the  key
- the tare value is inputted, the scale indicates 0.000 kg and the  and **NET** indicators are lit,
- remove the load (a basket),
- the scale indicates -0.788 kg, the ,  and **NET** indicators are lit,
- put again the load on the platter (basket + its content),
- the scale indicates 0.506 kg, the result is stable, the  and **NET** indicators are lit,
- read or transmit the result of weighing, press the  key,
- remove the load,
- tare will be switched off automatically,
- the scale indicates 0.000 kg, the  and  indicators are lit.

The scale enables setting the fixed tare value which is signaled by the lit **PT** indicator.

Turn on the tare by pressing another time the  key while inputting the tare value or by single pressing if the **FIXED TARE** setting in the **USER MENU** is active. It is possible to input several tare values if the consecutive tare values are growing.

Example of multiple inputting of the tare value:

- the scale is set to zero, the  and  indicators are lit,
- load the scale,
- the scale indicates 0.788 kg, press the  key,
- the tare value is inputted, the scale indicates 0.000 kg, the  and **NET** indicators are lit,
- put additional load on the platter,
- the scale indicates 1.230 kg, press again the  key,

- the new tare value is inputted, the scale indicates 0.000 kg, the  and **NET** indicators are lit,
- to lock the tare as it would not be automatically turned off after removing the load press again the  key,
- the tare is locked, the scale indicates 0.000 kg and the , **NET** and **PT** indicators are lit,
- To turn off the tare remove the load and press the  key.

4.5. Transmission

Transmission of the weighing result by the RS232 interface can be effected manually after pressing the  key, automatically in the continuously way or once after the result has been stabilized. Transmission mode can be set in the **USER MENU** in the **TRANSMISSION MODE** settings. Transmission of the result executed after pressing the  key is confirmed by the following message:



The weighing result can also be requested by the computer through the interface.

4.6. Calculation functions

The scale is able to display the unit price of articles and the amount to pay. The unit price can be inputted via the RS232 interface. The amount is calculated by multiplying the unit price and the weight. The unit price is automatically cleared after removing weighted articles. It can be also cleared manually after resetting the scale by pressing the  key.

4.7. Inputting the article name

It is possible to send via the serial interface the article name which is shown in the top line of the scale display. The article name is automatically cleared after removing weighted goods. It can be also cleared manually after resetting the scale by pressing the  key.

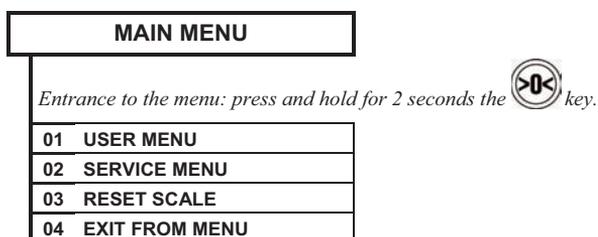
5. Configuration of the scale

To operate the menu of the scale there are used all three keys of the scale. Their functions are as follows:

Key	Meaning	Key	Meaning
▼ (T)	previous menu item	(>0<)	selection of the menu item
(E) ▲	next menu item	▼ (T) + (E) ▲	exit from menu

5.1. Main menu

Structure of the scale's main menu:



- 01 – **USER MENU** The menu contains functions useful during the installation and operation of the scale concerning among others the transmission parameters, configuration of measuring features and the display.
- 02 – **SERVICE MENU** The menu is designed for qualified scale servicemen. The service menu is described in detail in the Service Manual for the CAT 27 scales series.
- 03 – **RESET SCALE** This function enables to reset the scale without turning off the power.
- 04 – **EXIT FROM MENU** Exit from the menu to the weighing mode.

5.2. User menu

Structure of the **USER MENU** is shown below. Default values are marked with “^”.

USER MENU	
Entrance to the menu: enter the PASSWORD 1 (press 2 x the  key and after press 2 x the  key and confirm with the  key).	
01	PROTOCOL TYPE *
01	ELZAB BASIC
02^	ELZAB EXTENDED
03	CAS
02	RESULT COMPONENTS
01	WEIGHT
02^	AUTOMATICALLY
03	WT + PRICE + VALUE
03	BAUD RATE
01	1200 bits/sec
02	2400 bits/sec
03	4800 bits/sec
04^	9600 bits/sec
05	19200 bits/sec
06	28800 bits/sec
07	38400 bits/sec
08	57600 bits/sec
04	PARAMETERS
01	7-EVEN-1
02	7-ODD-1
03	7-SPACE-1
04	7-MARK-1
05	8-NONE-1
06^	8-EVEN-1
07	8-ODD-1
08	8-SPACE-1
09	8-MARK-1
05	PARITY CHECKING
01^	NO CHECKING
02	CHECKING ENABLED
06	STABIL. CONDITION
01	HIGHEST STABILITY
02^	HIGH STABILITY
03	LOW STABILITY
04	LOWEST STABILITY.
07	MINIMUM RESULT
01	00 x e
02^	01 x e
03	02 x e
04	04 x e
05	05 x e
06	10 x e
07	20 x e

	08	50 x e
08	TRANSMISSION MODE	
	01^	AFTER PRESS. KEY
	02	AUTOMATIC STABLE
	03	AUTO. COUNTINOUS
09	SENDING MINUS	
	01^	ONLY POSITIVE
	02	POSIT. & NEGATIVE
10	SEND. FRAME RESULT	
	01^	ONLY STABLE
	02	STABLE & UNSTABLE
11	STABIL. WAIT. TIME	
	01	0 SECONDS
	02	1 SECONDS
	03	2 SECONDS
	04^	4 SECONDS
	05	6 SECONDS
	06	8 SECONDS
	07	10 SECONDS
	08	12 SECONDS
12	RECEIV. DATA LOCK	
	01^	LOCK OFF
	02	LOCK ON
13	TRANS. KEY LOCK	
	01^	LOCK OFF
	02	LOCK ON
14	MESSAGE BEEP	
	01	BEEP OFF
	02^	BEEP ON
15	FIXED TARE	
	01^	AUTO. TURN OFF
	02	ONLY FIXED TARE
16	DISPLAY BACKLIGHT	
	01	NO TURNING OFF
	02^	TURN OFF (15 SEC)
	03	TURN OFF (30 SEC)
17	POWER SAVING MODE	
	01	SWITCHED OFF
	02	TURN ON (10 MIN)
	03^	TURN ON (30 MIN)
	04	TURN ON (60 MIN)
18	SCALES SYSTEM	
19	DISPLAY CONTRAST	
	01	ADJ. MAIN DISPLAY
	02	ADJ. ADDIT. DISPLAY
20	RESTORE FACT. SET.	
21	PROGRAM VERSION	
22	SETTINGS READING	
23	EXIT FROM MENU	

* The list of protocols is the subject to change

01 – PROTOCOL TYPE

Setting value	Meaning
01 ELZAB BASIC	Sets the type of communication protocol of the PC Connector.
02^ ELZAB EXTENDED	
03 CAS	

02 – RESULT COMPONENTS

This setting is valid only for protocol “ELZAB EXTENDED”

Setting value	Meaning
01 WEIGHT	As a result the scale sends only the weight.
02^ AUTOMATICALLY	The content of the scale response depends on the current unit price of the weighted article. If the unit price is equal to 0.00 then there is sent only the information about the weight, otherwise there is sent the full information.
03 WEIGHT+PRICE+VALUE	As a result the scale sends the full information about the weight, unit price and amount.

03 – BAUD RATE

Setting value	Meaning
01 1200 bits/sec	Setting the serial transmission speed of the PC Connector.
02 2400 bits/sec	
03 4800 bits/sec	
04^ 9600 bits/sec	
05 19200 bits/sec	
06 28800 bits/sec	
07 38400 bits/sec	
08 57600 bits/sec	

04 – PARAMETERS

Setting value	Meaning
01 7-EVEN-1	Setting the serial transmission parameters of the PC Connector.
02 7-ODD-1	
03 7-SPACE-1	
04 7-MARK-1	
05 8-NONE-1	
06^ 8-EVEN-1	
07 8-ODD-1	
08 8-SPACE-1	
09 8-MARK-1	

05 – PARITY CHECKING

Setting value	Meaning
01^ NO CHECKING	The parity checking means that bytes with the wrong parity bit are discarded and the scale signalizes it by a beep.
02 CHECKING ENABLED	

06 – STABILITY CONDITION

Setting value	Meaning
01 HIGHEST STABILITY	This parameter determines the criterion of the result stability. If the criterion is not met the result of weighing is considered as unstable. The smaller the number of this setting the stringent the stability criterion. A stable result is an obligatory condition for activation of main scale functions: zeroing, taring, weighing and sending the measurement result. If after loading the scale doesn't send the result or send it with a few seconds delay, the stability criterion should be broadened, that is the number of setting should be increased.
02^ HIGH STABILITY	
03 LOW STABILITY	
04 LOWEST STABILITY	

07 – MINIMUM RESULT

Setting value	Meaning
01 00 x e	Specifies the minimum result sent by the scale and the minimum automatically disabled tare value.
02^ 01 x e	
03 02 x e	
04 04 x e	
05 05 x e	
06 10 x e	
07 20 x e	
08 50 x e	

08 – TRANSMISSION MODE

Setting value	Meaning
01^ AFTER PRESSING KEY	The result is sent by the scale only at the request of the operator e.g. after pressing the key or by the request through the interface.
02 AUTOMATIC STABLE	The result is automatically sent by the scale, just once, after loading and stabilizing the indication. Before putting the article on the platter the display should show  and  . The result is sent only when the MINIMUM RESULT setting is deferent from "00 x e". <i>Example: the "MINIMUM RESULT" value was set at = 20 x e = 040 g the load put on scale was 036 g -> the scale doesn't send the result, the load was increased to 042 g -> the scale sends the result.</i>
03 AUTOMATIC CONTINUOUS	The scale sends the results continuously at 0.12 sec. time intervals. The unstable results are not sent but the result frame (containing the signs 0x20 in place of the digits) can be sent if the " SENDING FRAME " for " STABLE AND UNSTABLE " was set.

09 – SENDING MINUS

Setting value	Meaning
01^ ONLY POSITIVE	The negative result is considered as unstable and is not sent.
02 POSITIVE & NEGATIVE	The negative result can be sent if it is stable.

10 – SENDING FRAME RESULT

Setting value	Meaning
01^ ONLY STABLE	The result frame is sent only when the result is stable.
02 STABLE & UNSTABLE	The result frame is sent after stabilizing the result or after the time which is set in “ STABILITY WAITING TIME. ” If the result hasn’t stabilized during that time the frame that is sent contains the signs 0x20 in place of the result digits.

11 – STABILITY WAITING TIME

It specifies the waiting time for stabilizing the result. Time runs from the moment of requesting the result by key pressing or serial interface request. The range of possible value settings is from 0 to 12 seconds. If the time was set at 0 seconds the result must be stable at the moment of requesting the result. The default value of this parameter is 4 seconds.

12 – RECEIVING DATA LOCK

Setting value	Meaning
01^ LOCK OFF	The scale receives the commands via the PC Connector.
02 LOCK ON	Receiving the data via the PC Connector is locked. <i>NOTE: The automatic configuration with the ELZAB cash registers is also inactive.</i>

13 – TRANSMISSION KEY LOCK

Setting value	Meaning
01^ LOCK OFF	Data can be transmitted by using the  key.
02 LOCK ON	Transmission of the data by using the  key is locked.

14 – MESSAGE BEEP

Setting value	Meaning
01 BEEP OFF	The acoustic error signaling switched off.
02^ BEEP ON	The acoustic error signaling switched on.

15 – FIXED TARE

Setting value	Meaning
01^ AUTOMATIC TURN OFF	Single pressing of the  key switches on the tare but doesn’t switch on the fixed tare. The fixed tare is switched on only after pressing the key twice. If the “fixed tare” function is switched off the tare will be automatically turned off after weighing the articles and removing them from the platter.

Setting value	Meaning
02 ONLY FIXED TARE	Single pressing of the  key switches on the "fixed tare". After removing the loading the tare isn't automatically switched off.

16 – DISPLAY BACKLIGHT

Setting value	Meaning
01 NO TURNING OFF	The display backlight remains switched on.
02^ TURN OFF (15 SEC)	The display backlight is switched off after 15 or 30 sec. of the scale inactivity.
03 TURN OFF (30 SEC)	

17 – POWER SAVING MODE

Setting value	Meaning
01 SWITCHED OFF	Power saving mode is inactive.
02 TURN ON (10 MIN)	Power saving mode will be activated after 10, 30 or 60 minutes of the scale inactivity.
03^ TURN ON (30 MIN)	
04 TURN ON (60 MIN)	

18 – SCALES SYSTEM

This setting allows you to specify the number of the scale while it is working in the scale system.

The number can be entered by using the  key and confirmed by pressing the  key. There is possible to enter the values in the range from 1 to 4. The default value is 1. Each of scales working in the system should have different scale number entered.

19 – DISPLAY CONTRAST ADJUSTMENT

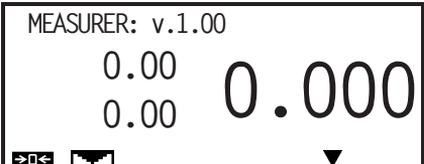
Setting value	Meaning
01 ADJ. MAIN DISPLAY	The function enables to adjust the contrast of the main display. The function is inactive in the TFT colorful displays.
02 ADJ. ADDIT. DISPLAY	The function enables to adjust the contrast of the additional display. The function is inactive in the TFT colorful displays.

20 – RESTORE FACTORY SETTINGS

This setting allows to restore factory settings marked with „^” sign. The selected settings should be confirmed by pressing the  key.

21 – PROGRAM VERSION

The function enables to read the main program version of the scale and the display program version.

Main program version No.	Display program version No.
	

22 – SETTINGS READING

This function shows all currently chosen settings in the **USER MENU**. For example the factory settings are shown as the series of the following digits:

Factory settings	Description of setting	CODE
ELZAB EXTENDED	Protocol Type	2
AUTOMATICALLY	Result Components	2
9600 bits/sec	Baud Rate	4
8-EVEN-1	Parameters	6
NO CHECKING	Parity Checking	1
HIGH STABILITY	Stability Condition	2
-	-	-
01 ^e	Minimum Result	2
AFTER PRESSING KEY	Transmission Mode	1
ONLY POSITIVE	Sending Minus	1
ONLY STABLE	Sending Frame Result	1
4 SECONDS	Stability Waiting Time	4
LOCK OFF	Receiving Data Lock	1
-	-	-
LOCK OFF	Transmission Key Lock	1
BEEP ON	Message Beep	2
AUTOMATIC TURN OFF	Fixed Tare	1
TURN OFF (15 SEC)	Display Backlight	2
TURN ON (30 MIN)	Power Saving Mode	3
1	Scales System	1

23 – EXIT FROM MENU

Exit from the **USER MENU** to the weighing mode.

6. Communication with the scale

The communication of the scale with external devices (e.g. cash register, computer) is effected via the **PC** connector. This is a serial, RS232C type interface. Description of the connector pins is presented in the Section 2.5.

Communication with scale treated as NAVI (Non Automatic Weighting Instrument) in terms of WELMEC (European cooperation in legal metrology) is possible in terms of modular approach.

Modular Approach

The “open” modular approach used to allow the possibility of connecting a POS with a TC (Test Certificate) to a weighing instrument having a TAC (Test Approval Certificate) with a general statement concerning the connection of any POS with a TC.

When the “open” modular approach is used the following requirements are valid for the connection of a POS to a NAWI.

A POS device may be connected to a NAWI which meets the following requirements:

1. The connection is possible only with NAWIs intended for direct sales to the public.
2. The connection is possible only through the NAWI's protected interfaces.
3. The NAWI shall transmit data relating to primary indications only in such a manner that the POS can meet the requirements.
4. The connection to the POS shall not allow the metrological functions of the NAWI to be inadmissibly influenced by the POS.
5. The connection of the POS shall not lead to an instrument having other essential characteristics (e.g. metrological) than those specified in the TAC for the instrument.
6. Examination: of NAWI: compatibility of preset tare coming from the POS and preset tare coming from the instrument and tare device of the instrument.

Note: 2 to 5 above to be declared by the manufacturer.

The communication with external devices can be affected by functioning of the scale in the situations like: unstable result, overloading and under loading of the scale, transmission mode

settings or the minimum result settings. The scale can react for those states in different ways depending on its settings.

All the communication parameters can be changed in the **USER MENU**. They are permanently stored in the non volatile scale memory. The factory settings can be reset by using the **RESTORE TO FACTORY SETTINGS** function. The factory settings allow the scale to cooperate with every cash register produced by ELZAB SA factory which was approved by the Ministry of Finance since 2001.

6.1. Configuration of the communication parameters of the scale

Configuration of the communication parameters is on choosing an appropriate protocol by using the **PROTOCOL TYPE** function. Selection of the protocol automatically sets default transmission parameters for given protocol (speed, number of data bits, number of stop bits and parity). If the scale is working with the customized communication settings the transmission parameters can be changed manually by the use of the **TRANSMISSION SPEED** and **TRANSMISSION PARAMETERS** functions.

If the protocol **ELZAB EXTENDED** was selected, the result from the scale may contain both the weight indication and the indication of the unit price and the amount. In this case the response format is set in the **RESULT COMPONENTS** test. The **AUTOMATICALLY** setting means that the scale response format depends on the current unit price of the weighted goods. If the unit price is equal to 0.00 then there is sent only the information about the weight, otherwise there is sent the full information about the load containing the weight, the unit price and the amount.

6.2. Description of the ELZAB protocol

6.2.1. Reading the weight, price and amount

6.2.1.1. Request of the stable result

Byte No.	1	2	3	4	5
Symbol	ESC	M	ETX	-	LF
ASCII (hex) code	0x1B	0x4D	0x03	0x61	0x0A

The scale is waiting for the stabilization of the result. If within the specified time (set in the **STABILITY WAITING TIME**) the result will stabilize it will be transmitted. If within that time the result will not stabilize the request will be canceled and if in the **FRAME SENDING** function the **STABLE AND UNSTABLE** parameter was set there will be sent the answer frame containing blank spaces in place of the result digits.

- The byte No. 4 decides in what format will be sent the weighing result:

Byte No. 4	Format of the result
0x61	Basic or extended format depending on settings chosen in the menu of the scale
0x71	basic format
0x81	extended format

- When the scale is operating in the scales system the byte No. 5 takes the form of:

The scale No. in the scales system	Byte No. 5
Scale No. 1	0x0A
Scale No. 2	0x1A
Scale No. 3	0x2A
Scale No. 4	0x3A

6.2.1.2. Request for immediate result

The byte No.	1	2	3	4	5
Symbol	ESC	M	ETX	-	LF
ASCII (hex) code	0x1B	0x4D	0x03	0x62	0x0A

If the result is stable it will be transmitted. If the result is unstable and in the **FRAME SENDING** function the **STABLE AND UNSTABLE** parameter was set there will be sent the response frame containing blank spaces in place of result digits. Otherwise nothing will be sent.

- The byte No. 4 decides in what format will be sent the weighing result:

Byte No. 4	Format of the result
0x62	Basic or extended format depending on settings chosen in the menu of the scale
0x72	basic format
0x82	extended format

- When the scale is operating in the scales system the byte No. 5 takes the form of:

The scale No. in the scales system	Byte No. 5
Scale No. 1	0x0A
Scale No. 2	0x1A
Scale No. 3	0x2A
Scale No. 4	0x3A

6.2.1.3. Response in the basic format

No.	Symbol	ASCII (hex) code	Description	Example: masa: 13.045kg
1	SYMBOL	0x20 or 0x2D	0x20 (space) – positive result 0x2D (minus) – negative result	0x20
2	Space	0x20	Space	0x20
3	D5	0x30 .. 0x39 or 0x20	Digit 0 .. 9 (MSD) or Space	0x31
4	D4	0x30 .. 0x39	Digit 0 .. 9	0x33
5	PD	0x2E	Decimal	0x2E
6	D3	0x30 .. 0x39	Digit 0 .. 9	0x30
7	D2	0x30 .. 0x39	Digit 0 .. 9	0x34
8	D1	0x30 .. 0x39	Digit 0 .. 9 (LSD)	0x35
9	CR	0x0D	CR	0x0D
10	LF	0x0A	LF	0x0A

6.2.1.4. Response in the extended format

Response from the scale containing only the result of weighing:

No.	Symbol	ASCII (hex) code	Description	Example: weight: 13.045kg
1	ESC	0x1B	ESC	0x1B
2	STAB	0x53 or 0x55	0x53 („S”) – stable result 0x55 („U”) – unstable result	0x53
3	SYMBOL	0x20 or 0x2D	0x20 (space) – positive result 0x2D (minus) – negative result	0x20
4	M5	0x30 .. 0x39 or 0x20	Mass 0 .. 9 (MSD) or Space	0x31
5	M4	0x30 .. 0x39	Mass 0 .. 9	0x33
6	PD	0x2E	Decimal	0x2E
7	M3	0x30 .. 0x39	Mass 0 .. 9	0x30
8	M2	0x30 .. 0x39	Mass 0 .. 9	0x34
9	M1	0x30 .. 0x39	Mass 0 .. 9 (LSD)	0x35
10	CR	0x0D	CR	0x0D
11	LF	0x0A	LF	0x0A

Response from the scale containing the result of weighing, unit price and amount:

No.	Symbol	ASCII (hex) code	Description	Example: weight: 13.045kg price: 5,50 zł/kg value: 71.75 PLN
1		0x18		0x18
2	STAB	0x53 or 0x55	0x53 („S”) – stable result 0x55 („U”) – unstable result	0x53
3	SYMBOL	0x20 or 0x2D	0x20 (space) - positive result 0x2D (minus) - negative result	0x20
4	M5	0x30 .. 0x39 or 0x20	Mass 0 .. 9 (MSD) or Space	0x31
5	M4	0x30 .. 0x39	Mass 0 .. 9	0x33
6	PD	0x2E	Decimal	0x2E
7	M3	0x30 .. 0x39	Mass 0 .. 9	0x30
8	M2	0x30 .. 0x39	Mass 0 .. 9	0x34
9	M1	0x30 .. 0x39	Mass 0 .. 9 (LSD)	0x35
10	C6	0x30 .. 0x39	Price 0 .. 9 (MSD)	0x30
11	C5	0x30 .. 0x39	Price 0 .. 9	0x30
12	C4	0x30 .. 0x39	Price 0 .. 9	0x30
13	C3	0x30 .. 0x39	Price 0 .. 9	0x35
14	C2	0x30 .. 0x39	Price 0 .. 9	0x35
15	C1	0x30 .. 0x39	Price 0 .. 9 (LSD)	0x30
16	W8	0x30 .. 0x39	Amount 0 .. 9 (MSD)	0x30
17	W7	0x30 .. 0x39	Amount 0 .. 9	0x30

18	W6	0x30 .. 0x39	Amount 0 .. 9	0x30
19	W5	0x30 .. 0x39	Amount 0 .. 9	0x30
20	W4	0x30 .. 0x39	Amount 0 .. 9	0x37
21	W3	0x30 .. 0x39	Amount 0 .. 9	0x31
22	W2	0x30 .. 0x39	Amount 0 .. 9	0x37
23	W1	0x30 .. 0x39	Amount 0 .. 9 (LSD)	0x35
24	XOR	0x30 .. 0x39	XOR bit sum 1 to 23	xx
25	CR	0x0D	CR	0x0D
26	LF	0x0A	LF	0x0A

6.2.2. Checking the host connection

6.2.2.1. Request

Byte No.	1	2	3	4	5
Symbol	ESC	M	ETX	-	LF
ASCII (hex) code	0x1B	0x4D	0x03	0x66	0x0A

- When the scale is operating in the scales system the byte No. 5 takes the form of:

The scale No. in the scales system	Byte No. 5
Scale No. 1	0x0A
Scale No. 2	0x1A
Scale No. 3	0x2A
Scale No. 4	0x3A

6.2.2.2. Response

As the response the scale will send 1 byte with code: 0x1D

6.2.3. Transmitting the unit price to the scale

No.	Symbol	ASCII (hex) code	Description	Example: price:5,50 PLN/kg
1	ESC	0x1B	ESC	0x1B
2	M	0x4D	M	0x4D
3	ENQ	0x05	ENQ	0x05
4	C6	0x30 .. 0x39 or 0x20	Price 0 .. 9 (MSD)	0x20 (' ')
5	C5	0x30 .. 0x39 or 0x20	Price 0 .. 9	0x20 (' ')
6	C4	0x30 .. 0x39 or 0x20	Price 0 .. 9	0x20 (' ')
7	C3	0x30 .. 0x39 or 0x20	Price 0 .. 9	0x35 ('5')
8	C2	0x30 .. 0x39 or 0x20	Price 0 .. 9	0x35 ('5')
9	C1	0x30 .. 0x39	Price 0 .. 9 (LSD)	0x30 ('0')
10	NW	0x0A .. 0x3A	Scale No.	0x0A
11	LF	0x0A	LF	0x0A

- When the scale is operating in the scales system the NW byte takes a form of:

The scale No. in the scales system	Byte No. 10
Scale No. 1	0x0A
Scale No. 2	0x1A
Scale No. 3	0x2A
Scale No. 4	0x3A

6.2.4. Transmitting the name of weighted article to the scale

No.	Symbol	ASCII (hex) code	Description	Name example: YELLOW GRAPEFRUITS
1	ESC	0x1B	ESC	0x1B
2	M	0x4D	M	0x4D
3	ACK	0x06	ACK	0x06
4	Z18	0x20 .. 0x7F	1 Name symbol	0x59 ('Y')
5	Z17	0x20 .. 0x7F	2 Name symbol	0x45 ('E')
6	Z16	0x20 .. 0x7F	3 Name symbol	0x4C ('L')
7	Z15	0x20 .. 0x7F	4 Name symbol	0x4C ('L')
8	Z14	0x20 .. 0x7F	5 Name symbol	0x4F ('O')
9	Z13	0x20 .. 0x7F	6 Name symbol	0x57 ('W')
10	Z12	0x20 .. 0x7F	7 Name symbol	0x20 (' ')
11	Z11	0x20 .. 0x7F	8 Name symbol	0x47 ('G')
12	Z10	0x20 .. 0x7F	9 Name symbol	0x52 ('R')
13	Z9	0x20 .. 0x7F	10 Name symbol	0x41 ('A')
14	Z8	0x20 .. 0x7F	11 Name symbol	0x50 ('P')
15	Z7	0x20 .. 0x7F	12 Name symbol	0x45 ('E')
16	Z6	0x20 .. 0x7F	13 Name symbol	0x46 ('F')
17	Z5	0x20 .. 0x7F	14 Name symbol	0x52 ('R')
18	Z4	0x20 .. 0x7F	15 Name symbol	0x55 ('U')
19	Z3	0x20 .. 0x7F	16 Name symbol	0x494 ('I')
20	Z2	0x20 .. 0x7F	17 Name symbol	0x54 ('T')
21	Z1	0x20 .. 0x7F	18 Name symbol	0x53 ('S')
22	NW	0x0A .. 0x3A	Scale No.	0x0A
23	LF	0x0A	LF	0x0A

- When the scale is operating in the scales system the NW byte takes a form of:

The scale No. in the scales system	Byte No. 22
Scale No. 1	0x0A
Scale No. 2	0x1A
Scale No. 3	0x2A
Scale No. 4	0x3A

6.2.5. Reading of the program version

6.2.5.1. Request

Byte No.	1	2	3	4	5
Symbol	ESC	M	ETX	-	LF
ASCII (hex) code	0x1B	0x4D	0x03	0x6A	0x0A

- When the scale is operating in the scales system the byte No. 5 takes the form of:

The scale No. in the scales system	Byte No. 5
Scale No. 1	0x0A
Scale No. 2	0x1A
Scale No. 3	0x2A
Scale No. 4	0x3A

6.2.5.2. Response

No.	Symbol	ASCII (hex) code	Description	Example: version: 1.00
1	TYP	0x21	The unique device id	0x21
2	VERSION	0x00 .. 0x09	Digit 0 .. 9	0x01
3	NUMBER_H	0x00 .. 0x09	Digit 0 .. 9	0x00
4	NUMBER_L	0x00 .. 0x09	Digit 0 .. 9	0x00

7. Error messages

The table below shows the messages displayed on the text line of the display when functioning of the scale is disturbed:

E1:A/D CONVERTER ERR	Signalizes interference in functioning of the A/C converter. You should remove the cause of interferences.
E2:EEPROM MEMORY ERR	Error of saving and reading the data from EEPROM memory. Report the fault to the service.
E3:FLASH MEMORY ERR.	Error of saving and reading the data from the FLASH memory. The scale returns to factory settings.
E4:IN/OUT SPI ERROR	Communication error on the SPI bus. Report the fault for servicing.
E5:S.SWITCH POS.ERR.	Incorrect position of the service switch. Report the fault for servicing.
E6:SCALES BLOCKED	Uncalibrated scale. Report the fault for servicing.
E7:LOW POWER VOLTAGE	The power voltage of the scale is less than 8V. Check the adapter.
E8:MAIN DISPLAY ERR.	The message is displayed only on the additional display and means that there is no communication with the main display. Check connection between the scale and the main display.
E9:FLASH MEMORY INIT	Initiation of the FLASH memory after it was cleared up. Report the fault for servicing.
W1:INIT RANGE EX.	Initial zeroing range exceeded when turning on the scale. Decrease the load of the platter while turning on the scale.

W2:ZERO RANGE EX.	Zeroing range exceed when using the key. Decrease the load of the platter.
W3:SCALES UNSTABLE	Zeroing and taring can't be effected because of unstable load.
W4:OVERLOADING	The scale load exceeds the maximum scale range. Decrease the load.
W5:UNDERLOADING	The scale load is less than $-20 \cdot e_1$. Reset the scale or power it off and on.
W6:TARE RANGE EX.	The tare can't be inputted because of negative weighing result or exceeding the maximum range.
W7:RS232 PARITY ERR.	Wrong transmission parameters of the RS232 interface.
W8:FUNCTION INACCESS	Function non accessible at the moment.
W9:WRONG VALUE	Wrong value of entered data.

8. Verification

ELZAB provides the controlled and verified scales. The proofs of verification are the verification features and the security seal stuck on the scale. Their location is shown on the pictures below. ELZAB effects also the evaluation of the conformity of the scale with the appropriate EU directive what is confirmed by the copy of the Declaration of Conformity attached to the scale.

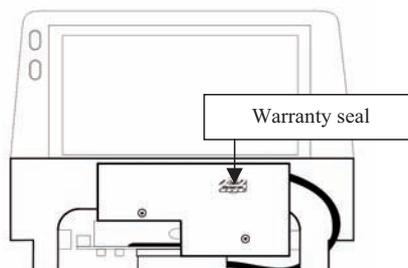
It is forbidden to use for the trading settlements the scale with the damaged or illegible features or seals. The validity period of the EU verification is 3 years. The obligation to maintain the scale verified is on user side.

The scale is the subject to the periodic verification after the three years period of its failure-free functioning. The three years period ends the 1st December of the year in which the last legalization was effected and also after effecting the repair which demanded removing of the scale housing and damaging the features or seals of the Notified Body.

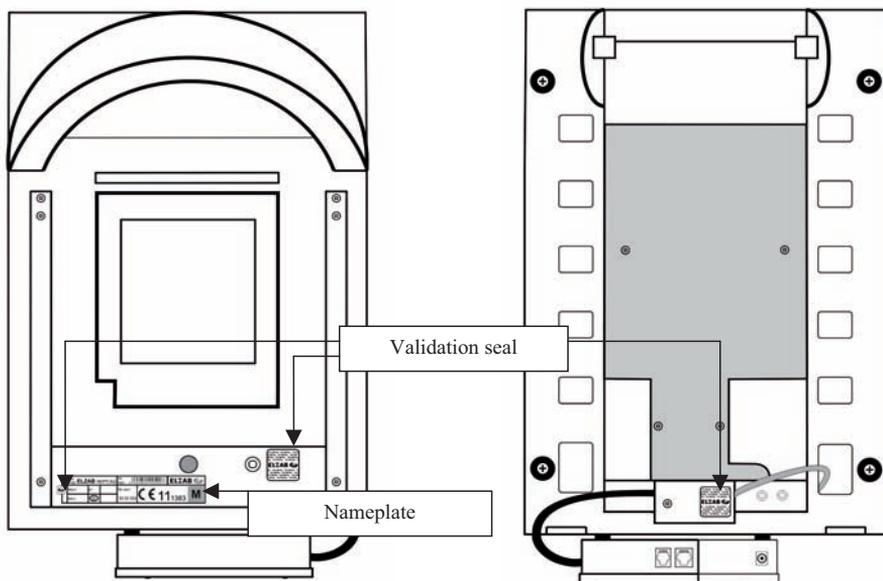
The verification is commissioned by the user or by the specialized service point commissioned with by the user. The verification can be carried out by any Notified Body.

The pictures below show the sealing stickers and the verification features of the NEPTUN 2, SATURN 2, VEGA 2 and PLUTON 2 scales.

ELZAB CAT 27 NEPTUN 2 scale



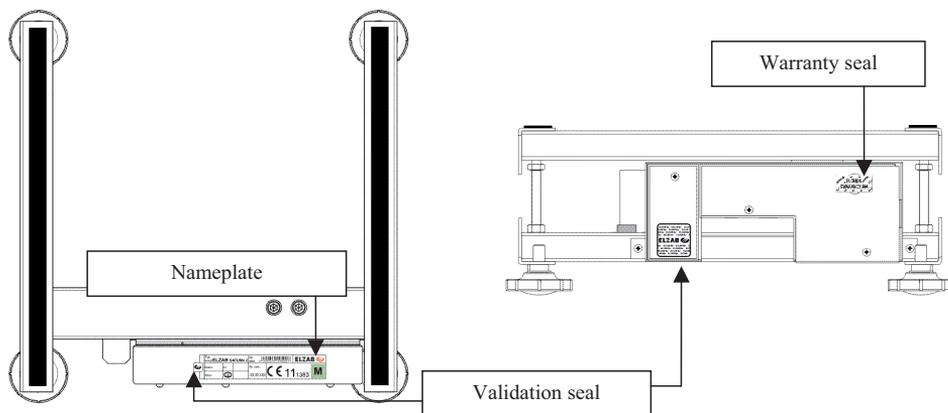
View from the front



View from the top

Bottom view

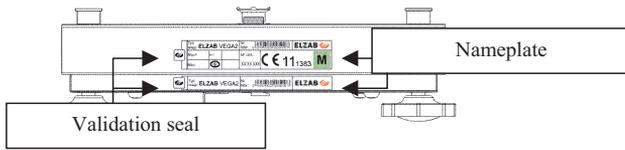
ELZAB CAT 27 **SATURN 2** scale



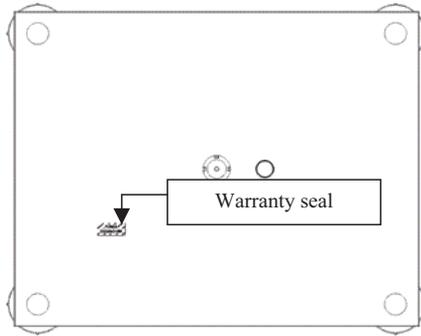
View from the top

View from the front

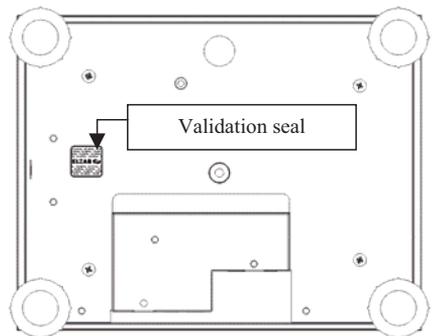
ELZAB CAT 27 **VEGA 2** scale



View from the left side

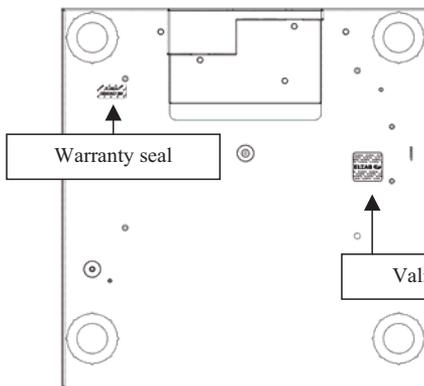


View from the top

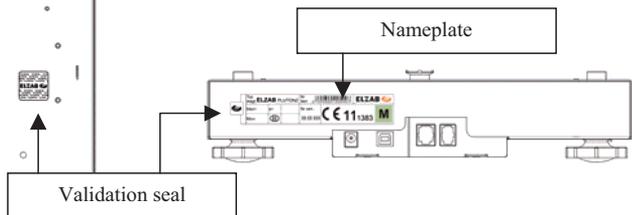


Bottom view

ELZAB CAT 27 **PLUTON 2** scale



Bottom view



Back view

This manual is dedicated to the following scale models:

- ELZAB CAT 27 NEPTUN 2 scale** (different versions) – code: WB4
- ELZAB CAT 27 SATURN 2 scale** (different versions) – code: WB1
- ELZAB CAT 27 VEGA 2 scale** (different versions) – code: WB5 and WB6
- ELZAB CAT 27 PLUTON 2 scale** (different versions) – code: WB3



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