



ART-2 Series Indicator

User Manual



ART-2  
Series Indicator  
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## IMPORTANT NOTICE!

If this equipment is used for purchasing and selling purposes or determination of mass for the calculation of a penalty or a similar type of payment; Law No. 3516 on Measurement and Calibration states that; the scales must have a seal of approval for legal trade use. The scales must be verified and stamped every two years. Consult to ESIT for further information.

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# Overview



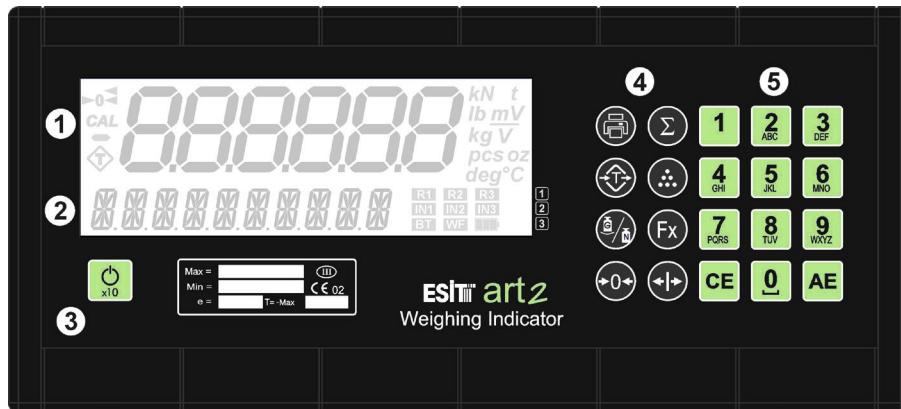
With its compact and state-of-the-art structure as well as its high level of sensitivity and improved functions, Esit's new generation scale indicator, Esit ART-2 offers the users all the features they expect. The indicator has a durable ABS plastic housing and it can either be mounted on the scale column or placed on a desk.

Double-display Esit ART-2 indicator allows entering data in alphabetical manner, defining codes, reporting, weighing and piece-counting, which make it a truly professional weighing instrument. It can be connected to a computer terminal and various printers.

This user manual contains sample explanations on the installation and use of Esit ART-2.

All written and visual materials in this user manual are owned by Esit Electronic Inc.

## Front View



[1] Weight Display

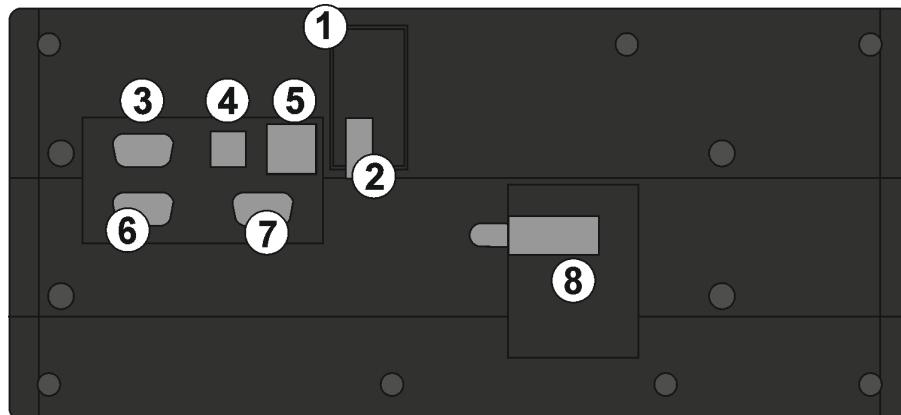
[4] Keypad A

[2] Operator Display

[5] Keypad B

[3] Stand-by (On/Off) / x10 Resolution

## Back View



[1] Case Sealing Screw

[4] USB

[7] Serial Communication

[2] Calibration Key Screw

[5] Ethernet

[8] Cable, Battery Entry

[3] General I/O, Printer

[6] Load Cell Input

**Keypad A**

	Printer
	Tare
	Gross / Net
	Zeroise
	Total
	Part / Price
	Functions
	Arrows

**Keypad B**

	1 : . , - + ?
	2 A B C
	3 D E F
	4 G H I
	5 J K L
	6 M N O
	7 P Q R S
	8 T U V
	9 W X Y Z
	[CLEAR]
	0 [SPACE] / = ( ) &
	[ENTER]

# Getting Started

During power-up, all segments are lit to show that all are working correct; the load cell excitation voltage is applied. After all segments are lit, following sequence is visualized on the displays:

- ESIT logo (Header 1 & Header 2)
- Program version (and Check-sum)
- Maximum measuring capacity
- System date and time
- Indicator serial number

Within this period, FUNCTION KEY  is pressed to enter the parameter, calibration, communication, printer, relay, input setting menus.

## Weight Measuring

After power up (if  key is not pressed) indicator enters the normal weighing mode. The 7-segment 6-digit display shows the gross weight value. The segment next to weight display shows the unit of measurement and the 15-segment 10-digit operator screen will show the current time. Until a valid key is pressed, the screens update themselves.

## Indicator Information

During power up,  key is pressed to show the information of the indicator. The displayed information is the serial number, weighing range, last calibration date and number of indicator calibrated. In order to switch between the menus, ARROW key  is used. If  key is pressed, the indicator restarts the weighing process.

## Increased Resolution

The ART-2 indicator is capable of showing the weight value in ten times increased resolution mode. In order to get into this mode, the indicator should be in normal weight display mode with taring and part counting mode inactive. When  key is pressed, the weight indication is passed to increased mode with the decimal point increased by one (i.e. if the normal position of decimal point is 2 then, in increased resolution mode it is increased to 3.) The indicator will then show the weight by ten times increased resolution for 5 seconds. This mode timer will be refreshed every time the StandBy (x10) key  is pressed.

## Tare

 Tare key is pressed. The weight on the platform is set as the tare weight. Unless within 3 seconds no numeric key is pressed, the tare value is the weight on the platform. If a number key is pressed (1 to 9) the tare value that was previously stored is recalled.

If  key is pressed within 3 seconds, the indicator will ask for the manual [TARE] value from the user. The value that is entered will be rounded according to the valid resolution value and will be used. When the resolution is changed, the [TARE] value will be corrected again.

When TARE is first enabled, the display is in [NET] mode.

If the displayed value is [NET], then the [NET] segment is shown. Without disabling the [TARE] mode, by pressing the [GROSS/NET] key  , the display may be switched between NET and GROSS mode.

The gross value that is being displayed is the addition of NET and TARE values.

If the tare value that is being displayed is to be stored in one of the 9 preset tare value locations, the relevant number is kept pressed for 3 seconds until a beep signal is heard. Then, relevant number is shown in operator display (Ex: Relevant number = 1; "TA1").

When tare is active, the operator screen will display the tare value. If the value was recalled from the memory, or was stored to memory, storage number is seen.

In order to disable the TARE mode, TARE key  is pressed once more. If the weight on the platform should be tared, it should be positive and no-motion state must be achieved (if wait stability is on); otherwise the tare key is not functional, only allowing the preset tare values to be recalled.

## Part Counting

 In any point of weight display (either tare is active or not, gross or net mode), PART COUNT key  is pressed to show the number of parts on the display. The Operator screen will show the weight value together with the unit of measurement, and the weight display will show the number of parts placed on the platform. After power-up, if enter the part mode, the initial increments will be to the last definition made.

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When a new material is to be introduced to the indicator, Function key  is pressed. The indicator will ask for the number of pieces placed on the platform. Operator need to write number of piece in this stage. After the correct value is written, Enter key  is pressed and the indicator will start showing the parts as it was written.

While the part count mode is active, the operator may place an empty container on the platform and press the TARE key. Then the indicator will pass to NET mode and this will be shown with the litting NET segment.

**To exit the part count mode, PART COUNT key  is pressed once more.**

If the counted parts should be printed, PRINTER key  is pressed and a ticket is performed. Storing the parts in the memory is also available.

There are 9 locations to store. To store a material's unit weight value, after the counted parts placed on the platform and the value is written by Function key  , the number to store is pressed for 3 seconds (like storing TARE value).

When the time is up, the indicator will ask for the 10-digit name of the counted parts to store. By using the numerical keys, the name is written like entering names as in SMS message entry (see appendix) The name is stored after pressing ENTER KEY .

In order to recall a previously stored part unit value, the relevant number key should be pressed within 3 seconds after pressing the PART COUNT KEY to enter the part count mode. If the recall process should be done while the part count mode is enabled, then the operator first should exit the mode and enter again.

If operator wants to enter the unit weight manually, presses  and enters the unit weight. Then, ENTER KEY  is used to confirm.

## Pricing

 If enabled the indicator will start showing the total price of the material on the platform (either net or gross) on the operator display whereas the weight is still on the weight display.

The unit price that was default value is effective until a new one is defined.

If a new price is to be used, then Function key  is pressed. After entering the correct value, ENTER key  is used to accept the value for the volatile memory.

During PRICE show mode, TARE acts in normal way.

If a printout will be taken, PRINT key  is used for performing a ticket with all weighing data together with unit and total prices.

The Unit price can be stored in one of the 9 memories with a name given to each. To do so, after entering the correct price value, the memory storage number is kept pressed for 3 seconds until a beep sound is heard. The indicator then will ask for the name of the material. Writing the name by using numeric keys as in a mobile phone, and pressing ENTER will finalize the storing process.

Recalling a price that was previously stored can be done within 3 seconds after enabling the Pricing key. The displays will show the name of the material recalled for about 1 second and start showing the weight and total price afterwards. Recalling another price can be done by first disabling pricing and enabling back.

## Performing Ticket

 During any time of weight measurement, either tare is active or not, PRINT key is pressed. The indicator will ask for the printer codes that were defined in the Printer set-up menu. At this point the indicator will show the name that was printed in the previous ticket, this name can be used by simply pressing the ENTER key  or either the predefined names can be recalled by pressing the relevant numerical key (0 to 9).

After all codes are selected or if the names that were printed in the previous ticket will be used; after pressing the PRINTER  key , the indicator starts performing the ticket.

If multi-line ticket with the total at the end is desired, then the PRINTING TOTAL IN TICKET parameter should be selected as YES. The first line of the ticket is printed together with the header, time, date, serial no and the ticket codes. The following weight values are only printed in separate single lines by pressing the PRINTER  key . While having a multi-weight ticket, on the 10-digit operator screen, the total weight value is displayed rather than the time. After all weights are printed on the ticket, to get the total weight printed, TOTALIZE  key is pressed.

If single weight value is desired, the PRINTING TOTAL IN TICKET parameter should be selected as NO.

If the PRINTING TOTAL IN TICKET parameter was selected as YES, but single value should be printed, then TOTALIZE key  should be pressed to finalize the printing.

# Menu Operations

During normal operation, when part counting is not enabled the operator may define printer codes and edit date and time. To do so, FUNCTION KEY  is pressed. When this key is first pressed, the first item, PRINTER PARAMETERS is seen. If ENTER KEY  is pressed in the DEFINING NAMES TO CODES, then the operator may define names for each code (if CODES are enabled in printer settings). If the user wants to edit DATE / TIME and to advance in this menu, ARROW KEY  is pressed.

## Printer Parameters - Automatic Ticket

When this parameter is entered, first the user is asked whether automatic ticket performance is desired. If this parameter is set as YES, then when a weight is placed on the platform, after the no-motion state is achieved, a ticket is printed automatically.

Also, if this parameter is set as YES, the operator will be asked for the automatic ticket printing time (in second).

Next parameters are the TOTALIZATION function and TARE PRINT function for the ticket , respectively.

## Defining Names to Codes

The ticket lines are configured from the Printer Settings Menu and displayed as areas. (To change the names for areas and the number of lines on the ticket, please refer to the Printer Settings Menu.) For ease of use, the operator can assign pre-set names to 7 different areas. These pre-set names can be recalled from memory by entering their corresponding codes. Area 1 can hold up to 100 names, while the remaining areas can hold 10 names each. The operator must define codes for these names through the menu.

The "DEFINING NAMES TO CODES" menu is selected, and the name of the first area is displayed. If the operator wants to define a name for a different area, they press the relevant numeric key. For example, if the operator has defined "2.AREA" as "Material" and wants to define a name for that area, they press the number "2". The area name, "MATERIAL," is displayed on the second line. The operator then presses the ENTER key  to add a new name and code for this area. Area number "2" is shown on the weight display, and code "00" appears next to it, with the previously defined name for this code visible on the operator display.

The numeric keypad is used to input the code number. If the operator wants to change the name associated with the code, they press the CLEAR key, which will cause the cursor to

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blink on the first character of the second line. The new name (up to 10 characters) can then be entered using the numeric keys, just as in SMS messaging. After entering the name, the operator presses the ENTER key  to store the value. The system then returns to the first step of defining names.

Once all names have been defined, the operator can press the CLEAR key  again while viewing the area names on the screen, which will return the system to the normal weight display mode.

## Pricing Functions Settings

ART-2 indicator has the pricing feature using the same key as part counting. To use this feature, PRICING parameter should be set to ON. By this way  when key is pressed, the operator display will start showing the price of the material being weighed.

Pricing parameters also covers the decimal point to be used for price entry and the unit of the price (USD, EUR etc.). The total price will be displayed and printed with the entered decimal point and unit.

## Date - Time Adjustment

After the FUNCTION MENU is entered, ARROW key  is used to go into date-time adjustment operations.

The time is written in 24 hours mode. If a minute value of single digit is to be written then leading zero should be added.

After the correct time is written ARROW key  is used to pass to year correction. The year is entered in 4 digits.

The third step is date entry. First the days and next months are entered. If the month and date are single digit values, then leading zeroes must be written. Invalid date values will not be accepted such as 35 January, 30 February, as well as 29 February except leap years.

The clock in the indicator is Y2K compatible. It will use 29 February on leap years and 28 otherwise.

# Settings

After the indicator is powered or stand-by key  is pressed, by pressing the FUNCTION key  , all device setting menus are reached.

The device settings are done under sub-menus of 6 main groups. They are in the order as:

Parameter Settings

Calibration Settings

Communication Settings

Printer Settings

Relay Settings

Input Settings

In order to switch between the menus, ARROW key  is used. To enter into the sub-menu is done by the ENTER key  . When selecting the parameters that are not numeric, ARROW key  can be used.

When all is done with the settings, CLEAR key  is pressed to exit.

**Note:** If any menu is locked depending on the security type, an arrow sign is shown on the display screen next to the on the symbol  that on the membrane. In such case, it is necessary to be enabled the calibration key (on the back of the device as shown number 2 in Overview / Back View) to activate in order to access the menu.

## Parameter Settings

### Security Type

This parameter shows weighing device security settings. The options are:

**LEGAL** Weighing parameters and calibration cannot be changed. (legal for trade)

**CALIBRATION LOCK** Weighing parameters can be changed but the calibration cannot be changed. (legal for trade)

**UNLOCK** Weighing parameters and calibration can be changed. (not legal for trade)

**Note:** If the security type is selected as "Legal" or "Calibration Lock", primarily the calibration key should be pressed and the lock should be removed for making any change. (Factory default: **UNLOCK**).

## Filter Mode

This parameter allows 2 different filter selections within the device. If the filter is not desired, filter mode setting can be turned off. (Factory default: **MOD 1**).

**MOD 1** gResolver Filter

**MOD 2** Standard Moving Average Filter

**OFF** Disable filter

## Decimal Point

When the display resolution needs decimal point for fractional values, it is possible to show it on the display. The decimal point can take a value from 0 (no decimal point) to 5.

The value next to DOT text shows where the decimal point will be. The weight values are shown as below:

Dot=0	5678	0
Dot=1	567.8	0.0
Dot=2	56.78	0.00
Dot=3	5.678	0.000
Dot=4	0.5678	0.0000
Dot=5	0.05678	0.00000

(Factory default: **0**)

## Weight Unit Selection

The user can select the unit of the measured value. The selectable units are kg, g, t, N, kN, lb, mV/V, mV, oz, m, °C, pcs. (Factory default: **kg**)

## Scale Type

The indicator may be configured with two weighing ranges with two different weighing resolutions to enable higher accuracy readings in lower values. There are three different modes to select from:

**SINGLE**

**MULTI INTERVAL**

**MULTI RANGE**

In single interval mode, there is only one range and one resolution; in the others there are two ranges and resolutions. (Factory default: **SINGLE**)

**Note:** If the scale type is selected as "Multi Interval" or "Multi Range" and when the 1. interval resolution value is used, an arrow sign is shown on the display screen next to the symbol  that on the membrane.

## 1. Interval Resolution

This value shows the resolution value to be used until the 1st interval weight value. It can take a value of 1-2-5-10-20-50-100-200-500. The value is not affected by the decimal points. The value is of the right-most three digits. (Factory default: **5**).

## 1. Interval Weight Value

In Multi-interval and Multi-range modes, this value is the value where the indicator changes the resolution value. In single-interval mode, this parameter will not be shown. (Factory default: **15000**).

## Resolution

This value is the resolution of the indicator when the value exceeds the 1st interval weight value in double range indicators and whole range in single interval mode. It can take a value of 1-2-5-10-20-50-100-200-500. The value is not affected by the decimal points. The value is of the right-most three digits. (Factory default: **2**).

## Indicator Maximum Allowable Weight (Capacity)

This value is the maximum value that the indicator may display. Exceeding this value more than 10 times resolution values will cause the indicator to stop displaying the measured value (Max+9e is the allowed). The indicator will then produce the error code MAX. LOAD (ERR 01, if negative ERR 02). (Factory default: **30000**).

## Average Count

The selection for the number data to be used for the moving average filter. It can take a value of 8-16-32. (Factory default: **16**).

**Note:** When **gResolver** mode is selected, "Average Count" is not displayed.

## Vibration

It is the selection for the vibration intensity in the environment. The options are;

**LOW**  
**MEDIUM**  
**HIGH**

**Note:** When **Standart Moving Average Filter** is selected, "Vibration" is not displayed.

(Factory default: **MEDIUM**).

## Conversion Speed

According to the type of reading, relevant number of conversions can be selected. As the number is increased, the reaction will be faster and as the number is decreased, the stability will be higher. If high speed is not a must, it is better to keep the value at 12,5. It can take a value of 6,25–12,5–25–50–100–200–400–800 Hz.

**Note:** When *gResolver* mode is selected, "ADC Speed" is not displayed. It is detected automatically.

## Decision Time

The options are;

**LOW** Current measurement value is monitored for 0,5 sec.

**MEDIUM** Current measurement value is monitored for 1 sec.

**HIGH** Current measurement value is monitored for 2 sec.

(Factory default: **MEDIUM**).

## Tare Key Enabled

When this parameter is enabled, the user may press the TARE key during weight measurement. Otherwise, the key is non-functional. (Factory default: **ON**)

## Zeroing

The zeroing options are;

**MANUAL** Zeroing is only made by using ZEROISE key  .

**ZERO TRACKING** The shifts in the weight value are zeroed as long as the gross value is zero.

**POWER ON ZERO** The option of zeroing at start-up. It operates with the % ratio selected in "PWRON ZERO" menu. Zero tracking is also active.

**AUTO ZERO** It is the full automatic zeroing option. POWER ON ZERO is also active. In case of no-motion, the screen is set to zero in the % ratio as selected in "ZERO LIMIT" menu once in every 3 seconds.

## Zeroing Limit

The options are;

**%1 CAPACITY** Zeroing is made if the weight value of less than 1 % of the Capacity.

**%2 CAPACITY** Zeroing is made if the weight value of less than 2 % of the Capacity.

**%10 CAPACITY** Zeroing is made if the weight value of less than 10 % of the Capacity.

## PowerOn Zero

Determines at which ratio of the "Capacity" value will the zeroing be made at first start-up of the device. The options are;

**%5 CAPACITY** Zeroing is made if the weight value of less than 5 % of the Capacity.

**%10 CAPACITY** Zeroing is made if the weight value of less than 10 % of the Capacity.

**%25 CAPACITY** Zeroing is made if the weight value of less than 25 % of the Capacity.

## Wait Stability

Determines will the zeroing and taring be made with stability. (Factory default: **ON**)

## Sound

When this parameter is enabled, the device sound is active. (Factory default : **ON**)

# Calibration Settings

## Input Voltage

The ART-2 indicator accepts analog input from 1mV/V to 80mV/V. The selectable values are 1, 2, 5, 10, 20, 40 and 80. The necessary point in selecting the voltage range is the utilization of the load cell(s). (Factory default: 2mV/V)

## Calibration Types

The ART indicator has four calibration types. These are zero, load, digital tare and digital load calibrations. After the selecting input voltage, weight display shows calibration type "ZERO" or "LOAD" phrase. In order to switch between the calibration types, ARROW key is used. To select the calibration types and continue the calibration operation, ENTER key is used.

### Zero Calibration

In case zero calibration is selected as the calibration type, weight display shows "ZERO" phrase and operator display shows internal count value. During the zero calibration, the platform should be empty. When the no-motion state is achieved, the zero calibration process is continued by pressing the ENTER key . Meanwhile, the phrase "PLEASE WAIT" will be displayed on the operator screen. After a while, "SUCCESSFUL" will be displayed on the operator screen and after approximately 2 seconds, the device will return calibration type selection.

### Load Calibration

In case load calibration is selected as the calibration type, weight display shows "LOAD" phrase and operator display shows internal count value. During the load calibration, a known weight should be loaded onto the platform. After that the load calibration process is continued by pressing the ENTER key . Meanwhile, the phrase "PLEASE WAIT" will be displayed on the operator screen. After a while, "ENTER VALUE" will be displayed on the operator screen and the value is written by the numeric keys. The ENTER key must be pressed to continue the load calibration and then, "SUCCESSFUL" will be displayed on the operator screen. After approximately 2 seconds, the device will automatically restart.

## Digital Calibration

If digital calibration is to be performed on the device and the load on the system is known but the tare value is unknown, "DG.LOAD" should be selected as the calibration type. If the load on the system is unknown but the tare value is known, "DG.TARE" should be selected. Then, the capacity value of the system should be entered on the screen. If the system consists of a single load cell, the capacity of the load cell is entered. If the system consists of more than one load cell, the total capacity of the load cells is entered here and the ENTER  key is pressed to continue. Then, the "TARE" or "LOAD" value is entered on this screen according to the selected digital calibration type and the ENTER key  is pressed to continue. In the next step, the mv/V value on the certificate of the load cell used in the system should be entered. If more than one load cell is present in the system, the average of the mV/V values should be entered and the ENTER  key is pressed to continue. At this stage, the name of the selected digital calibration type is displayed on the weight screen and the internal count value is displayed on the operator screen. Then, when the ENTER  key is pressed, the screen will display the phrase "PLEASE WAIT" and then a confirmation question will be asked to continue. By pressing the ENTER  key, the confirmation process will be completed and the word "SUCCESSFUL" will be displayed. After approximately 2 seconds, the device will automatically restart.

# Communication Settings

## Communication Selection

The indicator has five communication port settings. The options are;

**COM 1** Serial communication 1

**COM 2** Serial communication 2

**ETH** TCP/IP ethernet communication

**WI-FI** Wi-Fi communication

**BLUETOOTH** Bluetooth communication

In order to switch between the communication ports, ARROW key  is used. To enter into the sub-menu is done by the ENTER key . When all is done with the settings CLEAR key  or stand-by key  is pressed to exit.

## Communication Mode

The indicator can communicate with outside world through the serial lines with different variations:

**MOD 0** No transmission of weight (Communication port is close)

**MOD 1** Continuous transmission of weight

**MOD 2** Continuous transmission of weight if no-motion state

**MOD 3** Transmission of weight on demand (from serial line)

**MOD 4** Modbus

**MOD 5** Printer & Pc (Send printing ticket data via serial communication)

## Communication Format (Scale Number)

Scale number is needed for Mod 3 (for node number) and Mod 4 (for device ID). In order to make a communication with a computer system through the serial line in Mod 3, the master device should first send the wake-up code (Hex FF), and the node number.

i.e. if the scale number is selected as 65 (Hex41), when it receives

Hex FF (Wake-up) 41 'A' transmits the weight information.

The address can take any value from 0 to 255. When there are more than one indicator, each should have unique node numbers. (Factory default: **49**)

In order to make a communication with a computer system through the serial line in Mod 4, this value is used for the device ID in the Modbus packet structure.

## Communication Format (Prefix Character )

When communication mode 3 is selected, the operator can demand the weight data from a remote device (by sending relevant codes). The weight data is sent in 6 digits following the user defined prefix character. The character is entered in decimal. (Factory default: **64** [**@**] **Hex40**)

If the parameter is set to 255 then the indicator will transmit a status byte as the prefix. The status byte is defined as follows:

			TARE ENABLED	NEGATIVE	ERROR	PRINTABLE	NO MOTION	HEX	ASCII	NEG/POS	ERROR	PRINT	NO-MOTION
0	1	0	0	0	0	0	0	40	@	POSITIVE	NORMAL	OK	NO-MOTION
0	1	0	0	0	0	0	1	41	A	POSITIVE	NORMAL	OK	X
0	1	0	0	0	0	1	0	42	B	POSITIVE	NORMAL	X	NO-MOTION
0	1	0	0	0	0	1	1	43	C	POSITIVE	NORMAL	X	X
0	1	0	0	0	1	0	0	44	D	POSITIVE	X	OK	NO-MOTION
0	1	0	0	0	1	0	1	45	E	POSITIVE	X	OK	X
0	1	0	0	0	1	1	0	46	F	POSITIVE	X	X	NO-MOTION
0	1	0	0	0	1	1	1	47	G	POSITIVE	X	X	X
0	1	0	0	1	0	0	0	48	H	NEGATIVE	NORMAL	OK	NO-MOTION
0	1	0	0	1	0	0	1	49	I	NEGATIVE	NORMAL	OK	X
0	1	0	0	1	0	1	0	4A	J	NEGATIVE	NORMAL	X	NO-MOTION
0	1	0	0	1	0	1	1	4B	K	NEGATIVE	NORMAL	X	X
0	1	0	0	1	1	0	0	4C	L	NEGATIVE	X	OK	NO-MOTION
0	1	0	0	1	1	0	1	4D	M	NEGATIVE	X	OK	X
0	1	0	0	1	1	1	0	4E	N	NEGATIVE	X	X	NO-MOTION
0	1	0	0	1	1	1	1	4F	O	NEGATIVE	X	X	X

## Communication Format (Speed)

The number of communication bits sent per second is called BAUDRATE. The allowable values are: 1200, 2400, 4800, 9600, 115200. (Factory default: **9600**)

## Communication Format (Number of Bits)

The number of bits that forms a communication byte is given with the bit (binary digit) variable. Can take 7 or 8. If 7 bits is chosen, then the wake-up character will be 7F rather than FF. (Factory default: **8**)

## Communication Format (Parity Bit)

This parameter is used for transmission data control purposes. This is in fact a control bit within a character. It can be set as NO, ODD or EVEN. (Factory default: **NO**)

## Communication Period (u/s)

This parameter is set to determine how many data will be sent per second in continuous data transmission. It can be set as 1 u/s, 5 u/s or 10 u/s. (Factory default: **1 u/s**)

## Communication Information

The information that will be sent via serial line is selectable by the user.

The available alternatives are:

GROSS weight (either TARE is active or not)

The SCREEN value (NET value in net mode, GROSS otherwise)

ALL values (When TARE is active Gross, Tare and Net; otherwise only gross)

(Factory default: **SCREEN**).

## Decimal Point in Serial Communication

In a serial communication the decimal point (if any) may be sent in the message. This can either be disabled, or sent as a separate character or embedded in the byte itself.

Choices; NO, DOT, COMMA, SLASH. (Factory default: **NO**).

## Ethernet IP Configuration

The indicator can communicate with MODBUS TCP protocol. It has device IP, sub-net mask, gateway and port settings. Each IP group consists of 4 sections.

D=IP.xx.xx.xx (1<sup>st</sup> section of device IP) , D=xx.IP.xx.xx (2<sup>nd</sup> section of device IP),

D=xx.xx.IP.xx (3<sup>rd</sup> section of device IP) , D=xx.xx.xx.IP (4<sup>th</sup> section of device IP)

N=IP.xx.xx.xx (1<sup>st</sup> section of sub-net mask) .....

G=IP.xx.xx.xx (1<sup>st</sup> section of gateway) .....

In order to switch between the IP groups, ENTER key  is used. IP values and port value can be entered numerically.

(Factory default: **Device IP : 192.168.1.3;Gateway : 192.168.1.1;NetMask : 255.255.255.0**)

## Wireless Configuration (Optional)

The indicator has wi-fi and bluetooth communication. For these, indicator has on/off settings. Other configurations of wireless communication can be made with mobile phone application.

# Printers Settings

## Language Selection

Art-2 indicator can be configured to display messages and print weighing tickets in any of the selectable 2 languages. The languages that can be set are English and Turkish. (Factory default: **TURKISH**)

## Printer Number of Area & Name

Art-2 indicator can be configured to print extra lines to the ticket. Operator can select number of lines and names for this lines. Area names are to be displayed on the ticket are set through this menu. Operator first set the number of area and then, write the area names, respectively. The area names are 10 characters long and are entered as in SMS message entry. (Factory default: **Number of area = 2**)

## Printer Selection

Art-2 indicator can be connected to standard dot matrix parallel printers as well as thermal printers that can print barcodes. (Barcode printer option is not supported with Bulgarian and Russian languages). (Factory default: **EPM-203**)

## Ticket Serial Number

Giving a unique and auto-incrementing number to each ticket performed is given with this value. The value written will be printed on the first ticket and it will be incremented. If this number is not wanted to be printed then this value should be set to 0. (Factory default: **1**)

## Barcode Type

When a Barcode printer is selected, then the user selects which barcode type to be printed on a ticket. The choices are CODE39, EAN13, QR CODE or NO barcode.

CODE39,



1 2 3 4 5 6 7 8 9 0

Ean13



5 0 1 2 3 4 5 6 7 8 0 0 9

QR



## Printer Total in Ticket

While taking a ticket, the operator may choose to print a single weight value on a ticket or may have multiple weight values printed one under the other and the cumulative is to be written at the bottom, then this parameter should be set as YES. (Factory default: **OFF**)

## Print Date in Ticket

The user may select printing DATE on the ticket or not. (Factory default: **ON**)

## Print Time in Ticket

The user may select printing TIME on the ticket or not. (Factory default: **ON**)

## Name Of Ticket Counting Number

When a ticket is performed an incremental value is given to each one. The name appearing next to it may be changed if desired (like "coil no", "bulk no"). The name is 10 characters long and are entered as in SMS message entry.  
(Factory default: **SERIAL NO**)

## Part Counting Unit Name

The indicator will ask for the name that will be printed to the ticket next to the number of pieces, if part-counting mode is enabled. The name is 10 characters long and is entered as in SMS message entry. (Factory default: **PIECE**)

## Paper Pitch

Depending on the selected printer type, the operator should define the pitch of the paper to be used. The value is entered in millimeters. (Factory default: **83mm**)

## Paper Height

Depending on the selected printer type, the operator should define the height of active area of the paper to be used. The value is entered in millimeters. (Factory default: **75mm**)

## Paper Width

Depending on the selected printer type, the operator should define the width of active area of the paper to be used. The value is entered in millimeters. (Factory default: **70mm**)

## Paper Headspace

Depending on the selected printer type, the operator should define the headspace to be used. The value is entered in millimeters. (Factory default: **5mm**)

## Paper Sidespace

Depending on the selected printer type, the operator should define the sidespace to be used. The value is entered in millimeters. (Factory default: **7mm**)

## Ticket Header 1 & 2

On top of each ticket 2 lines of 25 characters each can be defined.

(Factory default: **ESIT ISTANBUL**

**90-216-585-18-18**)

## EAN13 Barcode Prefix Characters

When Ean13 was selected as the barcode to be printed, then the characters besides the weight should be defined. For 6 digits weight value, remaining 6 characters should be defined. Each character can be defined as a fixed numeric character, the ticket serial number digits or dot point location.

## Enlarged Characters in the Print-Out

Depending on the selected printer type, the operator can select large or normal character for the ticket. (Factory default: **NO**)

# Relay Settings

The indicator has three relays. The options are;

**RELAY 1**

**RELAY 2**

**RELAY 3**

In order to switch between the relay options, ARROW key is used. To enter into the sub-menu is done by the ENTER key . When all is done with the settings CLEAR key or stand-by key is pressed to exit.

## Relay Control

This is the submenu where the desired relay control type is selected. The options are;

**ART-2**

**MODBUS**

## Relay Value

This is the submenu where the weight value for which the relay contact will be controlled will will be entered.

## Relay Hysteresis

This is the submenu where the difference between the opening and closing values of the relay or the return loss amount is entered.

## Relay Contact

**Norm. Open** When the indicator weight value is below the value entered in relay value, the relay contacts are opened.

**Norm. Close** When the indicator weight value is below the value entered in relay value, the relay contacts are closed.

## Relay Opening Delay

When the necessary condition for the relay contact to open occurs, it determines the time after which the relay will open. Delay times can be selected as: 0, 0.2, 0.4, 0.6, 0.8, 1, 2, 3, 4, 5 (s).

## Relay Closing Delay

When the condition required for the relay contact to close occurs, it determines the time after which the relay will close. Delay times can be selected as: 0, 0.2, 0.4, 0.6, 0.8, 1, 2, 3, 4, 5 (s).

# Input Settings

The indicator has three inputs and there are five selections for these. The options are;

**TARE** If the input is detected, the taring operation is performed.

**ZERO** If the input is detected, the zeroing operation is performed.

**WEIGHT** If the input is detected, the sending weight value operation is performed.

**PRINTER** If the input is detected, the printing operation is performed.

**OFF** Disable input operation.

In order to switch between the selections, ARROW key  is used. To change into the input is done by the ENTER key .

If the input setting is selected as **WEIGHT**, the COM1 communication mode should be set to mode 0. Weight data is sent via serial communication 1.

# Appendices

## Entering Names in SMS Message Entry

When a name is to be written, last written name comes to the operator display. If the length of the message is longer than 10, then only 10 of them is seen at a time.

**[AE]** will accept the written value and next process will be started.

**[CE]** clears all entry.

If any number key is being pressed for the first time, then the numerical value comes to screen. If the same number is pressed within 3 seconds while the cursor blinks on the same character, then the next character shown below is displayed. The cursor will blink on the same digit after a key is pressed and blinking will pass to next digit after the time is up. If the characters, to be written one after the other, are on the same number key (like P and S), then the operator should wait until blinking passes to next digit.

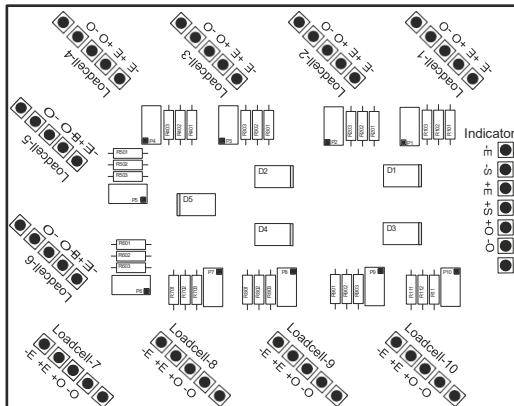
<b>1</b> ABC	1 : . , - + ?	<b>6</b> MNO	6 M N O
<b>2</b> DEF	2 A B C	<b>7</b> PQRS	7 P Q R S
<b>3</b> GHI	3 D E F	<b>8</b> TUV	8 T U V
<b>4</b> JKL	4 G H I	<b>9</b> WXYZ	9 W X Y Z
	5 J K L	<b>0</b>	0 [SPACE] / = ( ) &

# Cable Connections

## Load Cell Cables to the Junction Box

Load cells are transducers, which convert weight to electrical signals to be used by the indicator. Their cables are formed mainly of 4 or 6 signal cables. These cables are composed of two excitation cables, two output cables and sometimes two sense cables. All these cables should be connected to the corresponding connection holes on the printed circuit board located inside the junction box.

The connection holes on the board are labeled with first letters of cable colors. These colors are for ESIT load cells.



The junction boxes may be used with other brand load cells. In this case the user must learn the cable colors. Colors and explanation of signal cables of ESIT load cells are as follows:

LETTER	COLOR EXPLANATION
K	Kirmizi Red
B	Beyaz White
Y	Yeşil Green
S	Siyah Black
T	Toprak Ground

On the cable connecting the junction box to the indicator there may exist either four or six signal cables. If the load cell cable has six signal cables, the extra two wires for SENSE signals are connected on the junction box board next to excitation inlets. If the load cell cable has four signal cables, the SENSE connection is done on the connector to be plugged to the indicator.

**CONNECTOR PIN ASSIGNMENT TO LOAD CELL CONNECTION OF ESIT INDICATORS**

If 6 signal cable used

Pin	Cable color	Explanation
1	Blendage	Blendage(shield)
2	NC	No Connection
3	White	+ Output
4	Black	- Excitation(Input)
5	Green	+ Excitation(Input)
6		Short circuit to pin1 externally
7	Red	- Out
8	Orange	- Sense
9	Blue	+ Sense

- ! On the junction box, the letters of colors blue and orange do not exist. These cables are connected next to Green and black with respect to their polarity.

If 4 signal cable used

Pin	Cable color	Explanation
1	Blendage	Blendage (shield)
2	NC	No Connection
3	White	+ Output
4	Black	- Excitation (Input)
5	Green	+ Excitation (Input)
6		Short circuit to pin1 externally
7	Red	- Output
8	Short circuit with Black	- Sense
9	Short circuit with Green	+ Sense

**LOAD-CELL**

1. Ground
2. NC
3. +Out
4. - Excitation
5. +Excitation
6. Short circuit to 1
7. - Out
8. - Sense
9. +Sense

(9Dsub female connector)

## Serial Communication Connectors

The ART indicator has a serial communication connector with the following pin outputs:

Pin	Description
1	Remote Display Output
2	Rx for RS232
3	Tx for RS232
4	NC
5	Ground
6	Remote Display Output
7	A for RS485
8	B for RS485
9	NC

Note : If the device is the last, a termination resistor should be added between A for RS485 and B for RS485.

Remote display output format: (1200 Baud, No Parity, 8 bit)

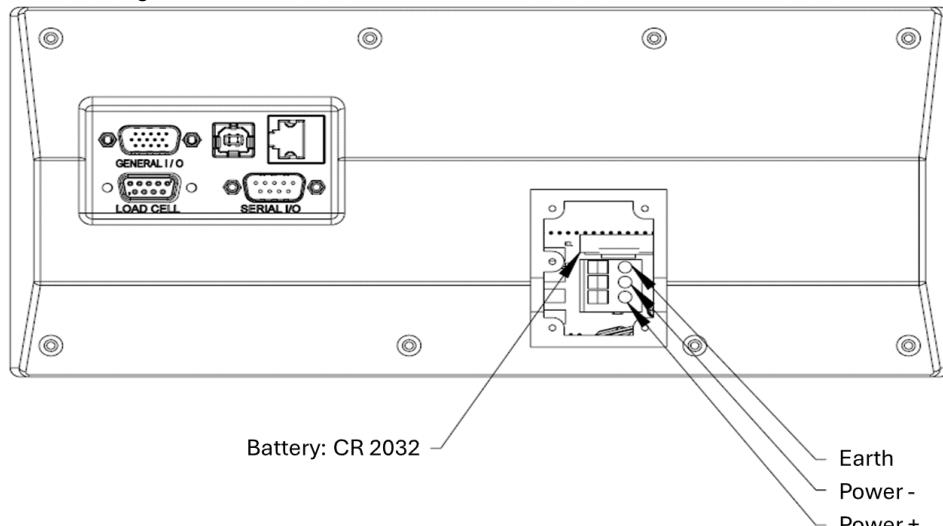
## General I/O Connectors

The ART indicator has a general i/o outputs which are three inputs, three outputs (with relay) and RS232 printer port.

Pin	Description
1	Relay 3
2	Relay 2
3	Relay 1
4	Relay Common
5	NC
6	NC
7	Input 3
8	Input 2
9	Input 1
10	Input Common (-)
11	Earth
12	Earth
13	Ground for RS232 (Printer)
14	Tx for RS232 (Printer)
15	Rx for RS232 (Printer)

## Power Connector

Power Voltage : 12 - 24 Vdc



# Error Codes-Warnings and Solutions

## ERR 01 (Maximum Load) / ERR 02 (Minimum Load)

If the load on the platform exceeds the maximum allowable weight by 10 resolution values (Max+9e is the allowed), the display will not show the weight value any more.

© ***Remove the load from the platform.***

## Calibration Key Disabled

During calibration and set-up parameter change menus, the arrow sign on the display screen next to the on the symbol  shows the state of the calibration key. If it is locked, the user can only see the values but cannot change them.

© ***In order to change a value, calibration key must be ENABLED.***

## Zeroing Not Allowed

The operator cannot zero the system, if the amount exceeds zeroing limit of the maximum allowable weight.

## Tare Active

When TARE mode is active, the user cannot use the ZEROISE key.

© ***Disable TARE mode to zero the platform.***

## Mobility

If wait stability state is ON, the operator cannot perform a reset when the system is not no-motion state.

© ***The operator must wait for the system to be in no-motion state or wait stability state should be OFF.***

## Piece Mode (Part Mode)

The operator cannot zero the system in piece counting mode.

© ***Disable piece mode to zero the platform.***

## Negative Load

The operator cannot tare, if the weight is negative value.

## Taring No Possible

The operator cannot tare, if the weight is zero.

## Tare Close

The operator cannot tare, if the “Tare Key Enabled” setting is close.

## No Printer

An error during printing, the “READY” signal from the printer timed-out. The power may be unplugged, out of paper or OFF-LINE.

© *Make the printer READY for printing.*

## Printer Starts Printing by Itself

The indicator can be set to automatic printing mode. If this is not wanted, the parameter should be set to NO.

© *If the platform weight is to be accepted as TARE, then stability and positive value must be reached.*

# Modbus

## Modbus Commands

Modbus Commands	
3	Reading Holding Registers
6	Write Single Register
16	Write Multiple Registers

## Modbus Addresses

Address	Word	Explanation
0 (W)	1	Command: It is explained in detail in Table 1.
1 (/R)	6	Not used.
7 (/R)	1	Status: Described in detail in Table 2.
8 (/R)	2	Display Value.
10 (/R)	2	Tare Value
12 (/R)	2	Gross Value
14 (/R)	2	Not used.
16 (/R)	2	Tare Value (Internal count).
20 (/R)	2	User Zero (Internal count).
22 (/R)	2	Not used.
24 (/R)	4	Not used.
28 (/R)	2	ADC Internal Count (Filtered).
30 (/R)	2	ADC Internal Count
32 (/R)	2	ADC Internal mV/V(*100000)

34 (W/R)	1	COM 1 Mode	
		Decimal	Explanation
		0	No transmission of weight
		1	Continuous transmission of weight.
		2	Continuous transmission of weight if no motion state.
		3	Transmission of weight on demand.
		4	Modbus
		5	Printer&Pc (Send printing ticket data via serial communication)
35 (W/R)	1	COM 1 Scale Number (0-255).	
36 (W/R)	1	COM 1 Communication Speed	
		Decimal	Explanation
		0	1200 Baudrate
		1	2400 Baudrate
		2	4800 Baudrate
		3	9600 Baudrate
		4	115200 Baudrate
		COM 1 Data Length	
37 (W/R)	1	Decimal	Explanation
		0	7 bit
		1	8 bit
		COM 1 Parity	
38 (W/R)	1	Decimal	Explanation
		0	None
		1	Even
		2	Odd

39 (W/R)	1	COM 1 Period	
		Decimal	Explanation
		0	1 u/s
		1	5 u/s
		2	10 u/s
40 (W/R)	1	COM 1 Send Info	
		Decimal	Explanation
		0	Screen
		1	Gross
		2	All
41 (W/R)	1	COM 1 Dot Type	
		Decimal	Explanation
		0	Off.
		1	Dot
		2	Comma
		3	Slash
42 (W/R)	1	COM 2 Mode	
		Decimal	Explanation
		0	No transmission of weight
		1	Continuous transmission of weight.
		2	Continuous transmission of weight if no motion state.
		3	Transmission of weight on demand.
		4	Modbus
		5	Printer&Pc (Send printing ticket data via serial communication)
43 (W/R)	1	COM 2 Scale Number (0-255).	

44 (W/R)	1	COM 2 Communication Speed	
		Decimal	Explanation
		0	1200 Baudrate
		1	2400 Baudrate
		2	4800 Baudrate
		3	9600 Baudrate
		4	115200 Baudrate
45 (W/R)	1	COM 2 Data Length	
		Decimal	Explanation
		0	7 bit
		1	8 bit
46 (W/R)	1	COM 2 Parity	
		Decimal	Explanation
		0	None
		1	Even
		2	Odd
47 (W/R)	1	COM 2 Period	
		Decimal	Explanation
		0	1 u/s
		1	5 u/s
		2	10 u/s
48 (W/R)	1	COM 2 Send Info	
		Decimal	Explanation
		0	Screen
		1	Gross
		2	All

49 (W/R)	1	COM 2 Dot Type
		Decimal      Explanation
		0      Off
		1      Dot
		2      Comma
		3      Slash
50 (W/R)	1	1 <sup>st</sup> section of Device IP (IP.XX.XX.XX)
51 (W/R)	1	2 <sup>nd</sup> section of Device IP (XX.IP.XX.XX)
52 (W/R)	1	3 <sup>rd</sup> section of Device IP (XX.XX.IP.XX)
53 (W/R)	1	4 <sup>th</sup> section of Device IP (XX.XX.XX.IP)
54 (W/R)	1	1 <sup>st</sup> section of Net Mask (IP.XX.XX.XX)
55 (W/R)	1	2 <sup>nd</sup> section of Net Mask (XX.IP.XX.XX)
56 (W/R)	1	3 <sup>rd</sup> section of Net Mask (XX.XX.IP.XX)
57 (W/R)	1	4 <sup>th</sup> section of Net Mask (XX.XX.XX.IP)
58 (W/R)	1	1 <sup>st</sup> section of Gateway (IP.XX.XX.XX)
59 (W/R)	1	2 <sup>nd</sup> section of Gateway (XX.IP.XX.XX) """"""""
60 (W/R)	1	3 <sup>rd</sup> section of Gateway (XX.XX.IP.XX)
61 (W/R)	1	4 <sup>th</sup> section of Gateway (XX.XX.XX.IP)
62 (W/R)	2	Port Number
64 (/R)	10	Not used.
74 (W/R)	1	Relay 1 Control
		Decimal      Explanation
		0      Art 2
		1      Modbus
75 (W/R)	2	Relay 1 Set Value
77 (W/R)	2	Relay 1 Hysteresis

79 (W/R)	1	Relay 1 Contact Type	
		Decimal	Explanation
		0	Open (NO)
		1	Close (NC)
80 (W/R)	1	Relay 1 Open Delay	
		Decimal	Explanation
		0	0 second
		1	0.2 second
		2	0.4 second
		3	0.6 second
		4	0.8 second
		5	1 second
		6	2 second
		7	3 second
		8	4 second
		9	5 second
81 (W/R)	1	Relay 1 Close Delay: Same indices as open delay	
82 (W/R)	1	Relay 2 Control : Same as Relay 1 Control	
83 (W/R)	2	Relay 2 Set Value : Same as Relay 1 Set Value	
85 (W/R)	2	Relay 2 Hysteresis : Same as Relay 1 Hysteresis	
87 (W/R)	1	Relay 2 Contact Type : Same as Relay 1 Contact Type	
88 (W/R)	1	Relay 2 Open Delay : Same as Relay 1 Open Delay	
89 (W/R)	1	Relay 2 Close Delay : Same as Relay 1 Close Delay	
90 (W/R)	1	Relay 3 Control : Same as Relay 1 Control	
91 (W/R)	2	Relay 3 Set Value : Same as Relay 1 Set Value	
93 (W/R)	2	Relay 3 Hysteresis : Same as Relay 1 Hysteresis	
95 (W/R)	1	Relay 3 Contact Type : Same as Relay 1 Contact Type	
96 (W/R)	1	Relay 3 Open Delay : Same as Relay 1 Open Delay	

97 (W/R)	1	Relay 3 Close Delay : Same as Relay 1 Close Delay
98 (W/R)	1	ADC Input mV/V
		Decimal   Explanation
		0   1 mV/V
		1   2 mV/V
		2   5 mV/V
		3   10 mV/V
		4   20 mV/V
		5   40 mV/V
		6   80 mV/V
99 (W/R)	2	Calibration Value
101 (/R)	2	It is set as the 10000 times of the calibration coefficient.
103 (W/R)	2	Digital calibration mV/V.
105 (/R)	1	Not used.
106 (W)	1	This section is explained in the "Modbus Calibration Process Steps" section.
107 (W/R)	1	Device Security Level
		Decimal   Explanation
		0   Legal for Trade
		1   Calibration Lock
		2   Unlock
108 (W/R)	1	Filter Type
		Decimal   Explanation
		0   MOD 1 : gResolver
		1   MOD 2 : Moving Average
		2   Filter Off

		Dot Point		
		Decimal	Explanation	
109 (W/R)	1	0	No dot point (123456)	
		1	It is set as the dot point location equal to 1 (12345.6).	
		2	It is set as the dot point location equal to 2 (1234.56).	
		3	It is set as the dot point location equal to 3 (123.456).	
		4	It is set as the dot point location equal to 4 (12.3456).	
		5	It is set as the dot point location equal to 5 (1.23456).	
Unit Type				
		Decimal	Explanation	
110 (W/R)	1	0	No unit.	
		1	kg (kilogram)	
		2	g (gram)	
		3	t (ton)	
		4	N (newton)	
		5	kN (kilo newton)	
		6	lb (libre)	
		7	mv/V	
		8	mV	
		9	oz (ons)	
		10	m (meter)	
		11	C (celcius)	
		12	pcs (pieces)	

111 (W/R)	1	Measurement Mode	
		Decimal	Explanation
		0	Single
		1	Multi Interval
		2	Multi Range
112 (W/R)	1	First Step Value	
		Decimal	Explanation
		0	e=d 1
		1	e=d 2
		2	e=d 5
		3	e=d 10
		4	e=d 20
		5	e=d 50
		6	e=d 100
		7	e=d 200
		8	e=d 500
113 (W/R)	2	Interval Capacity	
115 (W/R)	1	Step Value : Same indices as first step value.	
116 (W/R)	2	Maximum Capacity	
118 (W/R)	1	Vibration (filter mode = MOD 1 )	Moving Average Count (filter mode = MOD 2 )
		Decimal	Explanation
		0	Low
		1	Medium
		2	High
		Decimal	Explanation
		0	8
		1	16
		2	32

119 (W/R)	1	ADC Speed (Hz)	
		Decimal	Explanation
		0	6.25 Hz
		1	12.5 Hz
		2	25 Hz
		3	50 Hz
		4	100 Hz
		5	200 Hz
		6	400 Hz
		7	800 Hz
120 (W/R)	1	Decision Time	
		Decimal	Explanation
		0	Low
		1	Medium
		2	High
		Tare Key Enabled	
121 (W/R)	1	Decimal	
		0	Off
		1	On
		Zeroing Mode	
122 (W/R)	1	Decimal	
		0	Manual
		1	Zero Tracking
		2	Power On Zero
		3	Auto Zero

123 (W/R)	1	Zeroing Limit	
		Decimal	Explanation
		0	1%
		1	2%
		2	10%
124 (W/R)	1	Auto Zero Limit	
		Decimal	Explanation
		0	5%
		1	10%
		2	25%
125 (W/R)	1	Wait stability for zeroing and taring.	
		Decimal	Explanation
		0	Off
		1	On
		Sound.	
126 (W/R)	1	Device Language.	
		Decimal	Explanation
		0	Turkish
		1	English

128 (W/R)	1	Area Code Numbers	
		Decimal	Explanation
		0	Code number is set to 0.
		1	Code number is set to 1.
		2	Code number is set to 2.
		3	Code number is set to 3.
		4	Code number is set to 4.
		5	Code number is set to 5.
		6	Code number is set to 6.
		7	Code number is set to 7.
129 (W/R)	1	Printer Type	
		Decimal	Explanation
		0	EPM 203 Thermal Printer
		1	Tec (Toshiba)
		2	Epson
		3	TM – U220A
130 (W/R)	2	Ticket Serial Number	
132 (W/R)	1	Barcode Print	
		Decimal	Explanation
		0	Off
		1	CODE 39
		2	EAN 13
		3	QR CODE
133 (W/R)	1	Total Print.	
		Decimal	Explanation
		0	Off
		1	On

134 (W/R)	1	Date Print.	
		Decimal	Explanation
		0	Off
		1	On
135 (W/R)	1	Time Print.	
		Decimal	Explanation
		0	Off
		1	On
136 (W/R)	1	Paper Pitch (mm)	
137 (W/R)	1	Paper Height (mm)	
138 (W/R)	1	Paper Width (mm)	
139 (W/R)	1	Headspace (mm)	
140 (W/R)	1	Sidespace (mm)	
141 (W/R)	1	Input 1 Selection	
		Decimal	Explanation
		0	Off
		1	Taring operation.
		2	Zeroing operation.
		3	Send weight value via serial communication.
		4	Printing ticket operation.
142 (W/R)	1	Input 2 Selection : Same indices as Input 1 Selection.	
143 (W/R)	1	Input 3 Selection : Same indices as Input 1 Selection.	
144 (W/R)	1	Pricing or Piece (Part) Mode.	
		Decimal	Explanation
		0	Piece (Part) Mode
		1	Pricing Mode

145 (/R)	2	Device Serial Number.	
147 (/R)	1	Device Software Version.	
148 (/R)	1	Not used.	
149 (/R)	1	Last Calibration Day.	
150 (/R)	1	Last Calibration Month.	
151 (/R)	1	Last Calibration Year.	
152 (/R)	1	Calibration Count.	
153 (W/R)	1	Bluetooth state. (Optional)	
		Decimal	Explanation
		0	Off
		1	On
154 (/R)	1	Not used.	
155 (W/R)	1	Wi-Fi state. (Optional)	
		Decimal	Explanation
		0	Off
		1	On
156 (W/R)	1	Auto Print	
		Decimal	Explanation
		0	Off
		1	On

157 (W/R)	1	Auto Print Time.	
		Decimal	Explanation
		0	No time.
		1	1 second.
		2	2 seconds.
		3	3 seconds.
		4	4 seconds.
		5	5 seconds.
		6	6 seconds.
		7	7 seconds.
		8	8 seconds.
		9	9 seconds.
158 (W/R)	1	Large Letter for printer.	
		Decimal	Explanation
		0	Off
		1	On
159 (W/R)	1	Tare Print.	
		Decimal	Explanation
		0	Off
		1	On

W : Writable

R : Readable

NOTE: In 2-word fields, the register with the lowest number has the highest value. For example: When Max is set to 10'000'000, register 113=152 and register 114=38528.

$$152 \times 65536 + 34463 = 10'000'000$$

## Modbus Command Functions

Address number 0 is the command register. The table below describes the operations performed in response to the values written to this address.

Table 1

Decimal	Command
5	Zero Command: If the weight value is within the reset limit, it resets.
6	TARE/UNTARE Command: If there is a tare, it releases, otherwise performs taring.
13	Restarting the device.

## Status

Table 2

Bit	Explanation
0	Not used.
1	Not used.
2	Not used.
3	Error minimum load status. (1: Error, 0: No error)
4	Error maximum load status. (1: Error, 0: No error)
5	1: There is absolute zero, 0: There is no absolute zero
6	1: Stable, 0:Unstable
7	Not used.
8	1: Taring, 0: No taring
9	1: There is tare, 0: There is no tare.
10	1: First relay contacts are in closed position, 0: First relay contacts in open position.
11	1: Second relay contacts are in closed position, 0: Second relay contacts in open position.
12	1: Third relay contacts are in closed position, 0: Third relay contacts in open position.
13	1: There is input 1 signal, 0: There is no input 1 signal.
14	1: There is input 2 signal, 0: There is no input 2 signal.
15	1: There is input 3 signal, 0: There is no input 3 signal.

## Modbus Relay Control

Table 3

184. Modbus Address (W/R)															
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
REL 3	REL 2	REL 1													

1: Relay contact closed.  
0: Relay contact open.

REL 3: Relay 3

REL 2 : Relay 2

REL 1: Relay 1

## Modbus Error Codes

Error Functions	Code (Decimal)	Explanation
Illegal Function	1	3: Reading Holding Registers 6: Preset Single Register 16: Preset Multiple Register It is produced if you want to perform operations with a function code other than Multiple Record writing functions.
Illegal Data Address	2	This is the error code generated if a transaction is attempted outside the addresses provided to the user. If you want to write to a read-only address used, this error code is generated.
Illegal Data Value	3	It tells you that the value written to the address is invalid for that address.
Acknowledge	5	The ART 2 device accepted the request and processed it, but it will take some time to complete the process.

## Modbus Calibration Process Steps

### Zero Calibration:

- The load cell is placed in unloaded position.
- The value “2” is written to address 106. It returns the Acknowledge(0x05) code and starts zero calibration. It collects data for zero calibration over a period of time and completes zero calibration at the end of the period. During this period, queries made via Modbus will not be answered.

### Load Calibration:

- The calibration weight value is written to address 99, which is the weight value to be calibrated.
- The load cell is loaded with the amount of load to be calibrated. The value “3” is written to address 106. It returns the Acknowledge(0x05) code and starts load calibration. It collects data for load calibration over a period of time and completes the load calibration at the end of the period. During this period, queries made via Modbus will not be answered.

**Digital Calibration:**

- The weight value is written to address 99 for weight digital calibration, and the tare weight value is written to address 99.
- The mV/V value in the load cell's certificate is entered as a multiple of 100000 at address 103. If there is more than one load cell in the system, the mV/V values should be averaged and entered.
- The capacity value of system is written to address 116. If the system consists of more than one load cell, the total capacity of the load cells is entered in this menu. "4" or "5" is written to address 106, depending on the type of digital calibration. It returns the Acknowledge(0x05) code and starts its digital calibration. It collects data for digital calibration over a period of time and completes the digital calibration at the end of the period. During this period, queries made via Modbus will not be answered.

**Note :** After calibration the device must be restarted. Automatically restarts after digital and load calibration.



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