Elimko

E-PR-110
Paperless Recorder
User Manual
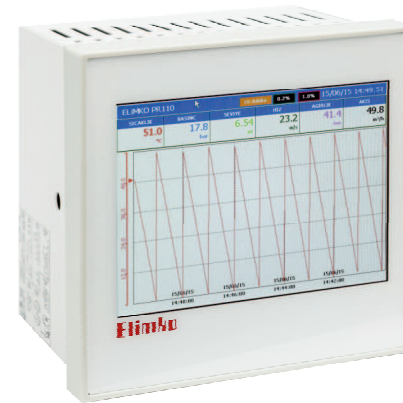
Elimko

K - Q
TSE-ISO-EN
9000

TS EN ISO 9001
Quality Management System Certificate

KY-PR110-0420-0

1 - INDEX

1 - INDEX

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2 - WARNINGS

E-PR-110 recorder is designed for panel mounting and should be used in industrial environment.

The package of E-PR-110 recorder contains;
Recorder
2 pieces of mounting clamps
1 piece M3 bolt nut
User Manual
Guarantee Certificate
Elimko Data Explorer Pro Cd.

• After opening the package, please check the contents with the above list. If the delivered product is wrong type, any item is missing or there are visible defects, contact the vendor from which you purchased the product.

• Before installing and operating the controller, please read the user manual thoroughly.

• The installation and configuration of the recorder must only be performed by a person qualified in instrumentation.

• Keep the unit away from flammable gases that could cause explosion.

• Do not use alcohol or other solvents to clean the recorder. Use a clean cloth soaked in water tightly squeezed to gently wipe the outer surface of the recorder.

• Do not use any sharp objects or abrasives to avoid damaging the device.

• The product life of this instrument is 10 years.

3 - EU DIRECTIVE COMPLIANCE

Low Voltage Directive
        EN 61010-1
EMC Directive
        EN 61326-1

4 - DESCRIPTION

E-PR-110 series industrial recording and control devices complies with IEC/TR 60668 standard with its 144x144 mm front panel. These series has a high brightness and high resolution, 640x480 pixel TFT touch panel and features several analog and digital interfaces.

- 5.7 ", 640x480 , touch panel TFT screen
- Up to 24 universal Analog Input Channels
- Up to 18 Relay Outputs
- TCP/IP Modbus Master and Slave Protocol
- RS-485 Modbus Master and Slave Protocol
- Data connection with internal HTTP and FTP Server
- Up to 64 Digital Input Channels
- Up to 64 Digital Output Channel
- Up to 16 Analog Outputs
- Standard RS-485 communication port
- 10/100 Mbit Ethernet Port
- Wi-Fi® (Optional)
- USB Host Port

4.1 - Type Coding

E-PR-110 - S1 - S2 - S3 - S4 - Y - Z

0 : Empty
1 : 03 Analog Input
2 : 06 Analog Input
3 : 06 Relay Output
4 : 16 Digital Input
5 : 16 Digital Output
6 : 04 Analog Output

Operating Voltage
0 : 85 - 265 VAC,
     50-60 Hz / 85 - 375 V DC

Wi-Fi
0 : Without Wi Fi
1 : With Wi Fi

Example

E-PR-110-1-1-1-1-0-0	12 (3+3+3+3) analog input
E-PR-110-1-1-3-3-0-0	6 (3+3) analog input, 12 (6+6) relay output
E-PR-110-1-4-4-3-0-0	3 analog input, 32 (16+16) digital input, 6 relay output
E-PR-110-1-1-1-5-1-0	9 (3+3+3) analog input, 16 digital output, with Wi-Fi
E-PR-110-4-4-4-5-1-0	48 (16+16+16) digital input, 16 digital output, with Wi-Fi

NOTE: The total number of relay and analog output should not exceed 18.
Digital Output number is limited to 64.

4.2 - Technical Specification

Input Types	**TC** (B, E, J, K, L, N, R, S, T, U) **RT** (Pt-50, Pt-100, Pt-500, Pt-1000, Ni-100, Ni-200, Ni-500, Ni-1000) 0 ... 20 mA, 4 ... 20 mA, -2000 mV ... 2000 mV, 0 ... 10 V
Accuracy	**TC :** ±%0.5 of the reading value or ±1°C **RT :** ±%0.5 of the reading value or ±1°C Voltage / Current : ±%0.5 FS
Operating Voltage	85 - 265 V AC; 50 - 60 Hz / 85-375 V DC
Power Consumption	30 W maximum
Data Storage Memory	8 GB Micro SD Flash
Communication	10 - 100 Mbit Ethernet, RS-485, USB Host, 802.11bgn 2.4GHz Wi-Fi®
Sampling Rate	100 ms (For all channels)
Configuration Ports	Touch Panel, USB Mouse and Keyboard connections
Screen Type	5.7" TFT LCD, 640×480 resolution, 18 bit color, Touch panel
Operating Tempreature	0°C ... 50°C
Storage Temperature	-10°C ... 85°C
Analog Input	Max. 24 Analog Inputs 16 bit [1] (isolation of channels 1000 V AC)
Analog Output	0 – 20 mA / 0 – 10 V can be configured. Number of analog outputs is limited to 16 [1]

4.2 - Technical Specification

Digital Input	Max. 64 Digital Inputs [1]
Digital Output	Max. 64 Digital Outputs, 24 V DC, 40 mA [1]
Relay Output	Max. 18 Relay Outputs, SPST-NO; 250 V AC, 5 A Mechanical Life > 10.000.000 operation (The relay life depends on the usage configuration) Electrical Life > 1.000.000 operation (1/10 load)
Language	Turkish, English
Transmitter Supply [2]	Max. 12 two wire transmitter
Password Protection	Adjustable different authority (Max. for 5 user)
Protection Class	Front Panel: IP65, Rear Panel: IP20
Weight	Approx. 1.6 kg

[1] Configuration dependent. Number of analog outputs, relay outputs and transmitter supply capacity are interdependently limited (**See Section 4.1 Type Coding**).

[2] The total number of two wire transmitters to be supplied, relay outputs and analog outputs should not exceed 18 (A+B+C<=18) due to internal 24 V DC power limitation. This limitation is valid only with the assumption of all the output will be active at the same time.
For certain situations such as existence of spare outputs , different output usage scenarios etc, the number of outputs could be increased. Please contact your sales provider for advise!!!
A= Number of two wire transmitters to be supplied
B= Number of Relay Outputs (number of individual outputs, not the number of cards, each relay output card has 6 relay outputs)
C= Number of Analog Outputs (number of individual outputs, not the number of cards, each analog output card has 4 analog outputs)
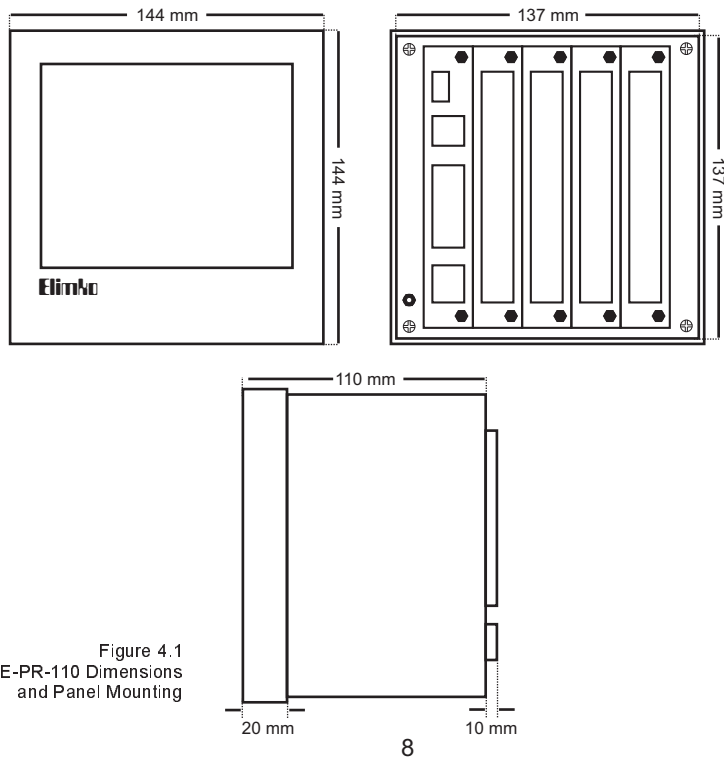
4.3 - Dimensions

Figure 4.1
E-PR-110 Dimensions
and Panel Mounting

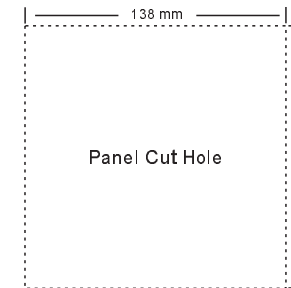## 4.4 - Panel Mounting

Panel Cut Hole

Figure 4.2 E-PR-110 Panel Cut Hole

- E-PR-110 device should be installed inside a suitable grounded metal enclosure (panel). This must prevent the live parts being accessible to human hands and metal tools.
  (See Section 7. CONNECTION DIAGRAMS).
- E-PR-110 does not include a power switch. Therefore, the power supply of the device and power outputs must be wired through the proper fuse or circuit breaker.
- To minimize the pick-up of electrical noise, the wiring of low voltage lines, particularly the sensor input should be routed away from the high-current power cables. Where it is not possible, use shielded cables which are grounded.
- The cables used for powering the controller and the power outputs must conform to the standards IEC 60245 and IEC 60227.

5 - USAGE

5.1 - Front Panel

In the event of a new alarm, the background color of the title area flashes between red and blue. After the alarms were acknowledged, the flashing ceases and the title area appears in blue (see Figure 5.1).
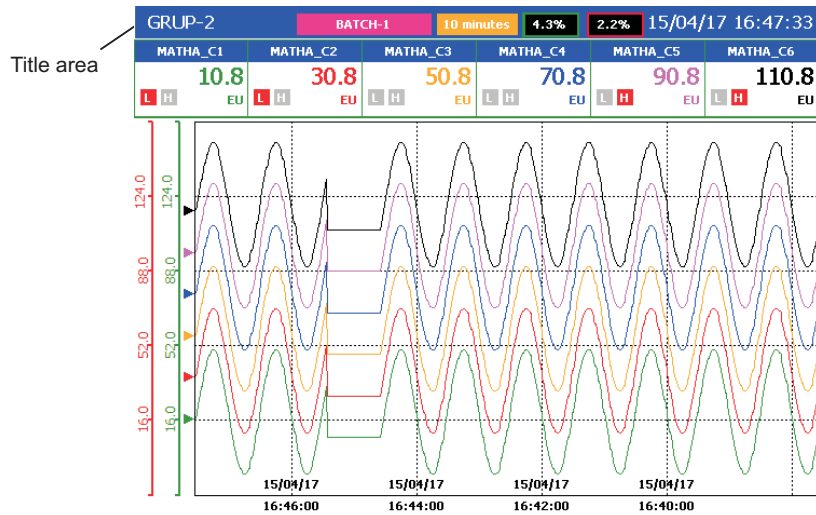

Figure 5.1 Trend View

5.1 - Front Panel

During normal operation, the operation buttons are hidden to increase the display area. Hidden operation buttons can be made visible by touching the bottom of the screen (see Figure 5.2). Explanations are give in Figure 5.2 regarding the operation buttons.
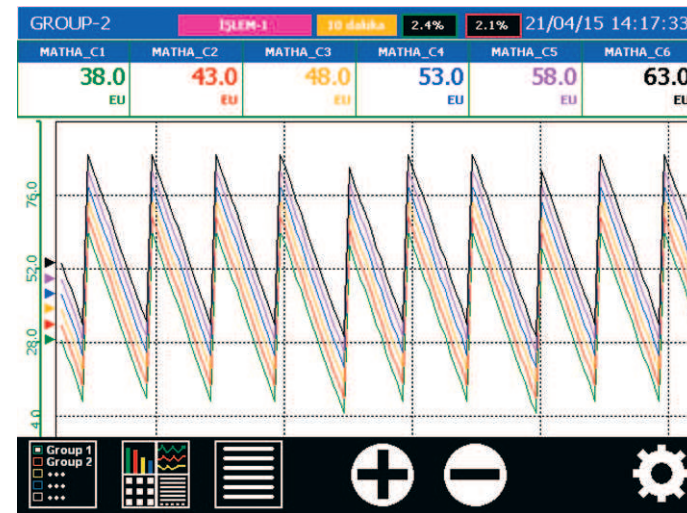

Figure 5.2 Operation Buttons

The capacitive touch sensor device only works with the human hand and capacitive pens.

5.1 - Front Panel

OPERATION BUTTONS	
Group 1 / Group 2 (icon)	This button selects one of the groups and is active only TREND, BAR, DIGITAL and DIGITAL 2 views.
(views icon)	This button selects any of the TREND, BAR, DIGITAL, OVERVIEW, ALARM LOG, TOTALIZER LOG, INSTRUMENT LOG, OPERATOR LOG, DIGITAL LOG, DIGITAL 2 and SCAN VIEWS options.
(menu icon)	This button allows the operator to access to the menu of selected view. Each view has a different menu and detailed explanations of the menus are given in the related description of the views.
(+ and − icons)	These buttons are active only in the TREND VIEW. Increases and decreases the width of the screen.
(gear icon)	This button allows access to the configuration pages.
(Wi-Fi icons)	Setups a Wi-Fi connection. In connected state, the button appears as (icon) and shows SSID underneath otherwise appears as (icon) In order to setup a new connection, the operator should press this button and reach the connection page. After entering SSID and password, pressing Connect trys to establish a new connection with given information.

Figure1 5.2 Operation Buttons

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5.2 - Trend Page

Traces, process values, and alarm states of the channels in selected group are viewed. By pressing (icon) button the menu given Figure 5.5 is opened.
In Trend Page while not in History mode, newest recorded data is drawn on the screen continuously. To view historical data, History mode should be selected in Operator Menu. While in history mode, process values, date and time seen on the screen are the values at the time of cursor location. By touching the screen, the location of the cursor can be changed. While in history mode, date and time on the screen are written in red.
By Go To Date, One Grid Forward, One Grid Back, (+ − icons) buttons, desired date and time can be chosen.
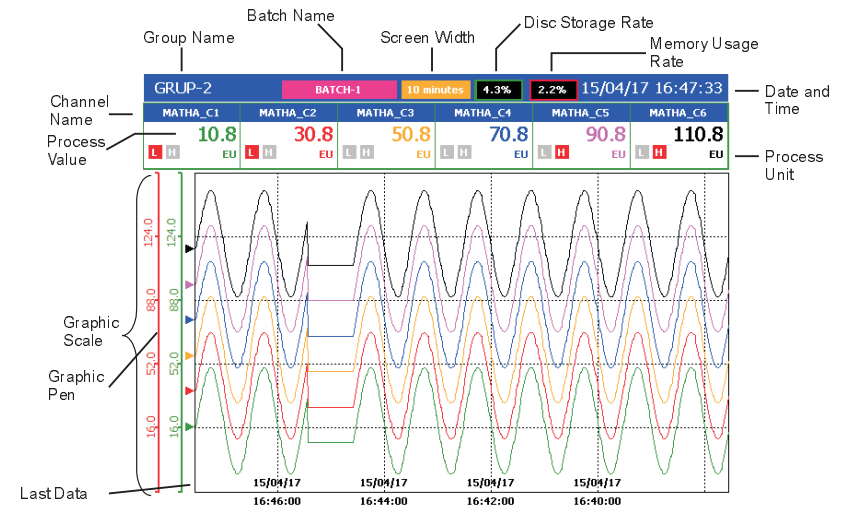
Figure 5.3 Trend View Screen

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5.2 - Trend Page

One Grid Forward	Historical mode must be selected for this key to be active. This button scrolls the graph forward by a grid interval.
One Grid Back	Historicaly mode must be selected for this key to be active. This button scrolls the graph backwards by a grid interval.
Start Batch	Starts a new batch.
Open/Stop Batch	Opens batch management window in which user can stop running batches and open completed batches for review.
History	Selects Historical mode.
Go To Date	While History is selected, any past date can be chosen to review. The desired time can be entered by the keyboard.
Screen Width	Determines time interval that will be shown on the screen. According to selected sampling rate, some time intervals can appear disabled in a purpose to limit number of data points to be displayed.
Traces	The traces desired to be seen can be chosen with this parameter. Desired traces can be opened or closed in Traces Menu.
Axis	The axis of the channel to be seen on the trend can be chosen with this parameter.
Add Operator Message	Adds operator messages. User must login in order to reach this menu. (**See Section 6. MENU PAGES**)
Exit	Exits the screen. The same operation can be performed by touching an empty area on the screen.

Figure 5.4 Active buttons and meaning in the Trend view screen
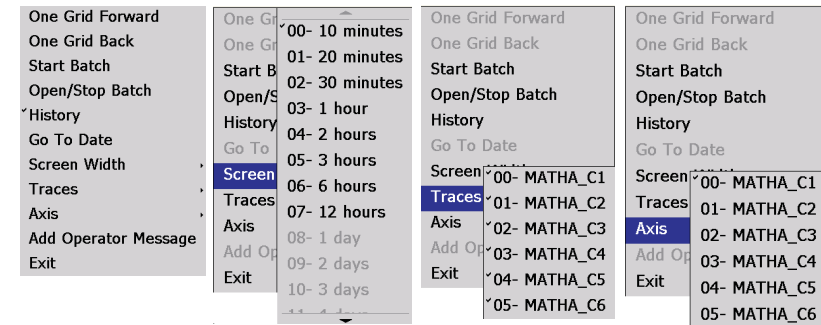
5.2 - Trend Page

Figure 5.5 Active buttons and options on the Trend view screen

5.2 - Trend Page

Recording can be made continuously or batch base. To start a batch in any time, **Start Batch** is selected in **Operator Menu**. **Start Batch** screen will be opened as shown below. In this screen **Batch Name, Operator, Part No** and **Serial No** can be filled to any values depending on batch process and **Start** is selected. When the batch starts, Batch Name is written on the top of Trend Page. **Stop Batch** command in Operator Menu provide access to manage running and recorded batches. Start/Stop batch operations can also be performed with a barcode reader. (**see Appendix 4**)

START BATCH

Batch Name	BATCH-2
Operator	OPERATOR
Part No	PART NO
Serial Number	SERIAL NUMBER

START   **CANCEL**

Figure 5.6 Start Batch Screen

5.3 - Bar Graphic Page
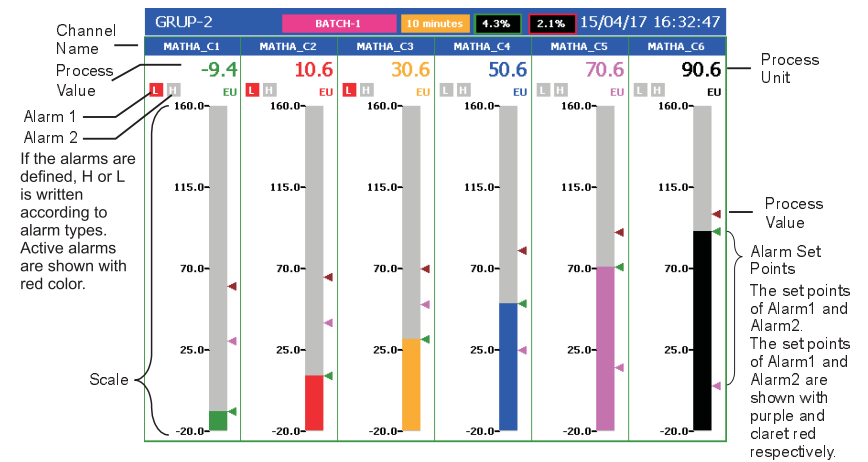
Figure 5.7 Bar View Screen

In Bar Graphic Page, bar graphics, process values, and alarm states of 6 channels in selected group are viewed.

5.4 - Digital View Page
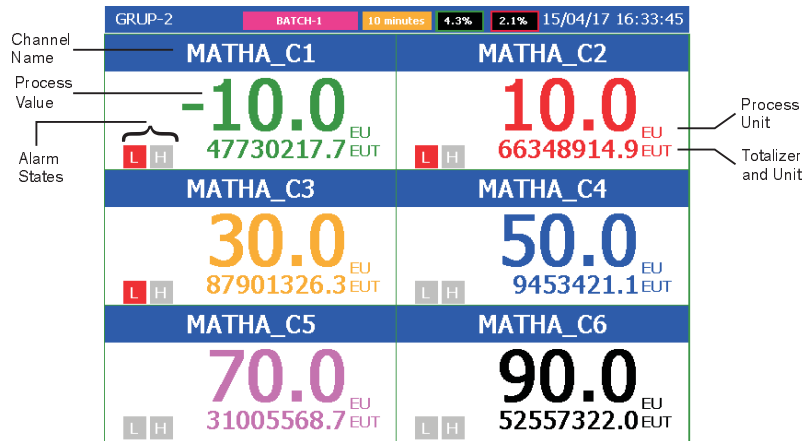
Figure 5.8 Digital View Screen

In Digital View Page, totalizer values, process values, and alarm states of 6 channels in selected group are viewed.

5.4 - Digital View Page
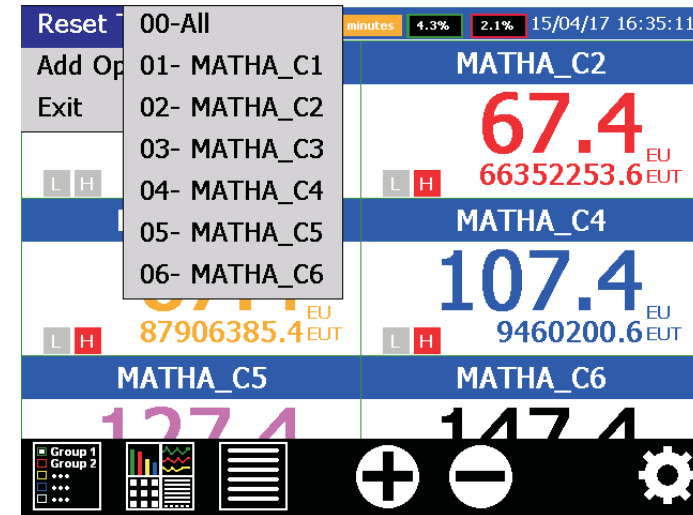
Figure 5.9 Totalizer reset and add operator messages (Digital View Page)

Reset Totalizer ▶	Operator Menu for Digital View Page is opened by pressing ▤ button. To reset the totalizer of an individual source, select the corresponding source name in sub menus of Reset Totalizer menu. To reset the totalizers of all sources in selected group, **All** can be selected.
Add Operator Message	
Exit	**Add Operator Message:** Adds a operator message. It is only active when the user is logged in. (**See Section 6. MENU PAGES**).

5.5 - Overview Page

All channels can be viewed in this page together. Process values of all available sources can be viewed in a single page. Each row in the page corresponds to a process group from one of the available slots, Modbus Channels or Math Analog Channels. Empty slots and undefined MATH and MODBUS channels are not shown. Analog process groups having more than 8 channels occupy two rows and due to overall row limitation, some of the process groups appears intermittently.

Figure 5.10 Batch Screen View

5.6 - Alarm Log

Figure 5.11 Alarm Log screen

The last occurred and released 10000 alarms with date and definitions are listed in Alarm Page. The latest alarm is on the top of the list. The list can be scrolled by pressing ▲ and ▼ buttons. Active alarms are shown in red color and released alarms are shown in green color. Active alarms which appear in red turn green after the alarms were acknowledged by selecting **Acknowledge Alarms** parameter.

Acknowledge Exit	Operator Menu for Alarm Page can be opened with ▤ button. Alarms are acknowledged by selecting **Acknowledge Alarms** parameter.

5.7 - Totalizer Log

Figure 5.12 Totalizer Log screen

Source Name, record date, totalizer value and unit of the last recorded 10000 totalizer values are listed in Totalizer Page. The last recorded totalizer is displayed at the top of the list. Totalizer values can be scrolled by ▲ and ▼ buttons. A new totalizer log is added when the Logging Source of any totalizer is asserted. RTC channels can be used for periodic totalizer logging.

5.8 - Instrument Log

Figure 5.13 Instrument Log screen

The date and definition of last recorded 1000 events of the device are listed in Instrument Log Page. The last recorded event appears on the top. ▲ and ▼ buttons are used to scroll the list up or down.

5.9 - Operator Log

Figure 5.14 Operator Log screen

Operators can add messages anytime while operating the device in order to assert certain events and information. In order to add messages, the operator must login first and should press Add Operator Message menu in the Operator Menu. Operator message with descending date order are listed in Operator Log Page. ▲ and ▼ keys scrolls the page up and down direction (**See Section 5.2 TREND PAGE** and **5.4 DIGITAL VIEW PAGE**).

5.10 - Digital Log

Figure 5.15 Digital Log screen

Source Name, record date and definition of the last recorded 65536 digital log values are listed in Digital Log Page. The last recorded digital log value is displayed at the top of the list. Digital log values can be scrolled by ▲ and ▼ buttons.

Acknowledge Exit	Operator Menu for Digital Log Page can be opened by pressing 📄 button. Digital Logs are acknowledged by selecting **Acknowledge** digital logs menu.
Note:	In "NO(X/Y) column, X is page number and Y is number of pages.

5.11 - Digital 2

GRUP-2   10 minutes   4.3%   2.0%   19/04/17 09:20:21

MATHA_C1	MATHA_C2	MATHA_C3
44.3 EU	64.3 EU	84.3 EU
MATHA_C4	MATHA_C5	MATHA_C6
104.3 EU	124.3 EU	144.3 EU
MATHA_C1	MATHA_C2	MATHA_C3
44.3 EU	64.3 EU	84.3 EU
MATHA_C4	MATHA_C5	MATHA_C6
104.3 EU	124.3 EU	144.3 EU

Figure 5.16 Digital 2 screen

Two consecutive groups (selected group and the following group which may wrap to first or last group depending on selected group) can be viewed digitally on the same page.

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6 - MENU PAGES

Pressing ⚙ key accesses to Menu page. Upon pressing ⚙ key authentication window opens and user name/ password are asked. After selecting UserName and Password, main menu is reached by either pressing MENU or LOGIN button. LOGIN access does not require authentication on subsequent entries until LOGOUT is pressed from Main Menu. Depending on previously defined authorization rights, some of the sub menus may appear disabled (**See Section 6.4. Security**). Default values for the user password are given:

PASSWORD	
User	KULLANICI-2
Password	

LOGIN   MENU   CANCEL

USERS	PASSWORD
ADMIN	10
USER 2	02
USER 3	03
USER 4	04
USER 5	05
USER 6	06

PASSWORD	
User	ADMIN
Password	**

LOGIN   MENU   CANCEL

Figure 6.1 Password input window to the main menu

6.1 - Adjusting Parameters

All of the parameters can be adjusted by touch panel. An example of a parameter editing screen is given below.

Input Type | Thermocouple

Parameter Name   Parameter Value   Parameter Window
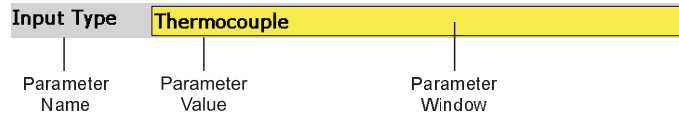
The parameter window of the parameter to be adjusted should be touched in order to access adjustment page.

6.2 - Main Menu

Detailed descriptions of the pages that can be accessed from the main menu are described in the sections indicated in **Figure 6.2**. **OS** button allows access to the operating system. All operating systems menus are hidden as factory settings. To access to the start menu of the OS, pointer of the mouse connected to the USB port must be dragged down to the bottom edge of the screen.
Please check the **6. MENU PAGES** section for **LOGOUT** button. **EXIT** button allows operator to exit from the main menu. **MODBUS TABLE** button provides access to Modbus RTU Communication Addresses (**see Appendix 3**).

Figure 6.2 Main Menu

6.3 - Device Page
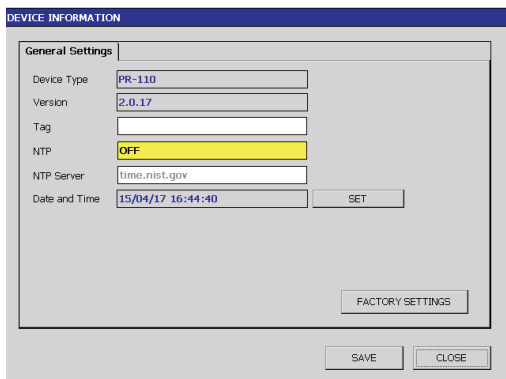
Figure 6.3 Device Page
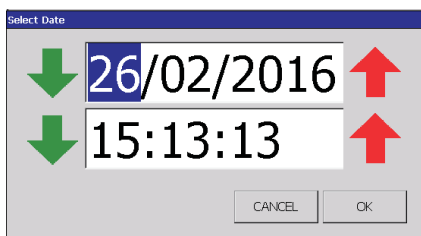
Figure 6.4 Date and Time adjustments page

In Device Page, Device Type and Version are shown. Date and Time adjustments and factory settings reset are made in this page.
Tag: Tag value determines synchronization directory name and alias of the device therefore should be unique for each recorder in order to prevent data corruption when same data storage media is used for data synchronization.
NTP: Enables or disables network time protocol. When enabled, date/time is synchronized every 6 hours by connecting NTP server defined in **NTP Server** parameter.
In case of a connection problem, the synchronization is retried every 1 hour until the connection is established.
NTP Server: The NTP Server name is entered.

6.4 - Security Page

User names, passwords and access rights of users are determined in Security Page. There is no restriction for **ADMIN** user rights and access rights of other users are determined by **ADMIN** user.

User	Determines the user that will be adjusted.
Name	Determines the user name. The name can consist of 15 characters at most.
Password	Determines the password of selected user. The password can consists 10 characters at most.
Access Rights	The rights of the users below **Access Rights** headline can be chosen **ON** or **OFF**.

After adjusting security settings, the adjustments should be saved by pressing **SAVE** button.
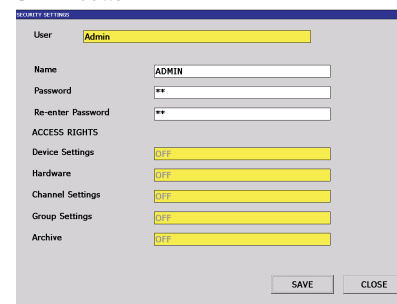
Figure 6.5 Security Adjustments Page (Admin Adjustment)
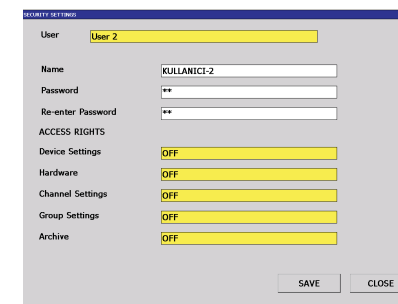
Figure 6.6 Security Adjustments Page (User Adjustment)

6.5 - Hardware Page

The hardware adjustments are made in this page. **HARDWARE Page** consists of 4 tabs as **Slot, Ethernet, Serial Port** and **Screen**.

6.5.1 - Slot Adjustments

> The calibration parameter adjutment resides in this tab. Any erroneous operation in Analog Input Card Calibration Page will corrupt the calibration parameter and measurements become faulty. The parameters of this page are adjusted by precision measurement and source devices. If accurate calibration devices are not available, any recalibration attempt is not advised.

In case of any modification on slot hardware, SCAN button in Slot Tab should be selected to activate slot configuration. After scanning of the cards, card types on the slots are viewed in SLOT1, SLOT2, SLOT3 and SLOT4 windows. To calibrate or test a card, corresponding slot window should be selected. There is no testing and calibration page for digital input cards. All of the cards are calibrated in the factory and do not need recalibration.
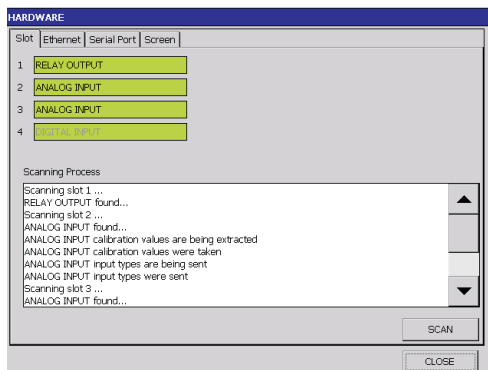
Figure 6.7 Hardware Slot Settings Page

6.5.1 - Slot Adjustments

Relay Output and Digital Output Test Page

For test purposes, Output states of the Digital Output cards and Relay cards can be changed by pressing corresponding ON and OFF buttons.
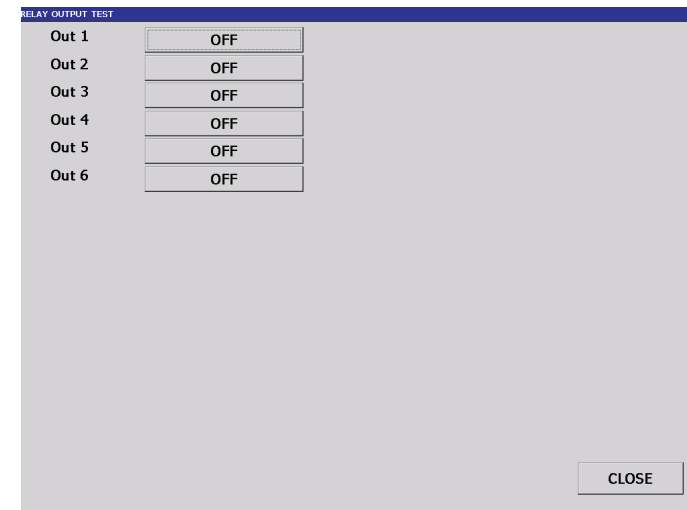
Figure 6.8 Hardware Relay Output Test Page

6.5.1 - Slot Adjustments

Analog Input Card Calibration Adjustments

For the calibration of Analog Input cards, firstly, the channel to be calibrated should be selected from **Channel** window. The calibration parameters are explained below. From a general point of calibration operations, required signals specified below are applied to the correspoinding channels and **Press to Calibrate** button is pressed. After stable value was seen, the value is recorded by selecting the same button. **Cancel** button is used to cancel active calibration.
The **Manual Set** button allows manual entry of the calibration value via the keyboard.
The **Load Factory Settings** button resets the calibration values to factory settings.

ANALOG INPUT CARD CALIBRATION			
Channel	Channel 1		
50 mV	20462	Press to calibrate	Press to set
TC (SHORT)	-10	Press to calibrate	Press to set
CJ-NTC (3 k)	4168	Press to calibrate	Press to set
20 mA	26047	Press to calibrate	Press to set
10 V	23279	Press to calibrate	Press to set
390 Ohm	19577	Press to calibrate	Press to set
390 Ohm Line	-15	Press to calibrate	Press to set
	LOAD FACTORY SETTINGS		CLOSE

Figure 6.9 Analog Input Card
Calibration Page

6.5.1 - Slot Adjustments

Analog Input Card Calibration Adjustments

50 mV: Set the calibrator as a millivolt source and adjust the calibrator output 50.000 mV. Apply the calibrator output to the millivolt input of the related channel.

TC (SHORT), CJ-NTC (3 k): Set the calibrator as a resistance source and adjust the calibrator output 3000.00 Ohm. Short circuit the TC input terminals of the related channels. Apply the calibrator output to the input terminals of the related channel.

20 mA: Set the calibrator as a milliampere source and adjust the calibrator output 20.00 mA. Apply the calibrator output to the milliampere input of the related channel.

10 V: Set the calibrator as a voltage source and adjust the calibrator output 10.00 V. Apply the calibrator output to the volt input of the related channel.

390 Ohm: Set the calibrator as a resistance source and adjust the calibrator output 390.00 Ohm. Apply the calibrator output to the RT input of the related channel. 3. RT line should be short-circuited by the wiring diagram.

390 Ohm Line: Same as 390 Ohm. Just save after making 390 ohm calibration without changing anything

6.5.1 - Slot Adjustments

Analog Output Card Calibration Adjustments

Figure 6.10 Analog Output Card Calibration Page

6.5.1 - Slot Adjustments

Analog Output Card Calibration Adjustments

The current and voltage outputs of analog ouput channels provided with Analog Output cards can be calibrated on the screen given in Figure 6.10. For each current and voltage outputs, 2 LOW and 2 HIGH calibration values must be saved.
By selecting the channels to be calibrated from left of the screen (I.OUT 1-4, V.OUT1-4), and calibration type HIGH or LOW from top of the screen, calibration process is initiated for selected output type and calibration value.
After this process, the font color of selected channel and calibration type turn burgundy, the calibration value turns yellow. A Voltmeter (3(-), 4(+)) or ampermeter (1(+), 2(-)) is connected to the outlet of the channel depending on the type of calibration of the selected channel.
The value of the calibration is set using the up and down keys. For ease of calibration, up and down keys are given as two pieces of 100 levels and 10 levels. 100 steps for coarse changes, 10 steps are used for fine adjustments. LOW and HIGH calibration values of current outputs are 4 mA and 20 mA respectively. LOW and HIGH calibration values of voltage output is 2 V and 10 V respectively. Calibration values are saved by pressing corresponding channel button which has been turned to burgundy to initiate calibration. To cancel the calibration process, press the CANCEL button under the screen.
The **Load Factory Settings** button resets the calibration values to factory settings.

6.5.2 - Ethernet Adjustments

TCP/IP settings are done by defining the **IP Address**, **Subnet Mask** and **Default Gateway**. Definitions of these parameters are made either manually or automatically by DHCP depending on selected IP type. If TCP/IP application needs fixed IP address, user is recommended to use Manual Settings. **Save** button saves the settings and restarts the device.
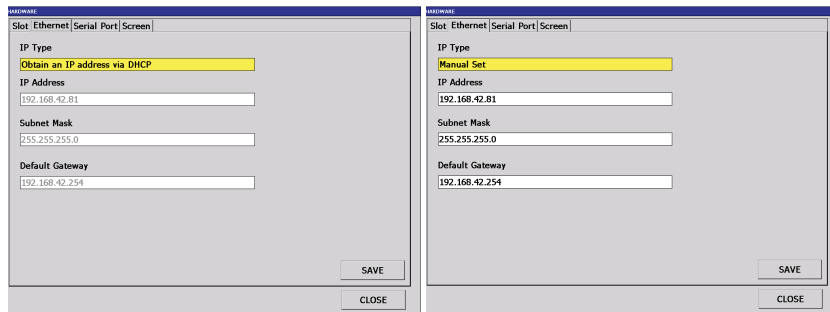
Figure 6.11 Hardware Ethernet Page
(Obtain an IP address via DHCP)

Figure 6.12 Hardware Ethernet Page
(Manual Set)

6.5.3 - Serial Port Adjustment

Communication parameters of the RS-485 port (Boud Rate, Parity and Stop Bit) are adjusted in this tab.

Modbus Type:	Set as either master or slave.
Address:	Determines modbus slave communication address. Only functional when slave mode is selected.
Baud Rate, **Parity** and **Stop Bit** determine serial communication parameters.	
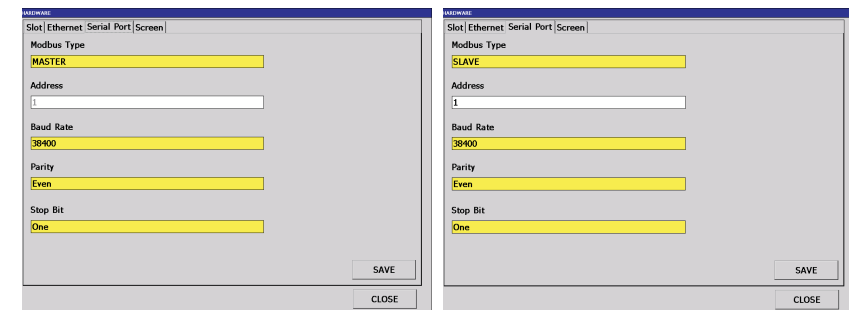
Figure 6.13 Hardware Serial Port screen

6.5.4 - Screen Adjustment

Language:	The language of the device can be chosen either Turkish or English.
Brightness:	This parameter determines the brightness of the screen. Brightness can be adjusted between %20 and %100.
Screen Saver:	ON or OFF selectable.
Screen Saver Time:	Determines the time period after that the device starts screen saver if no operation takes place.

DRAWING OPTIONS button opens color selection window in which trace colors of the group channels can be configured as desired. In addition to trace colors, the background and foreground (standart text color and line color) can be chosen. Please take precaution while assigning the colors in order to prevent conflicting color selection. Assigning same colors to the channels may cause confusion and setting same color to background and any of the channels causes the channel traces disappear.
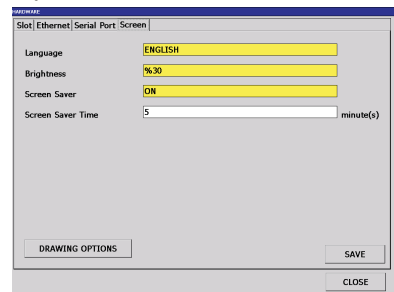
Figure 6.14 Hardware Screen Adjustments
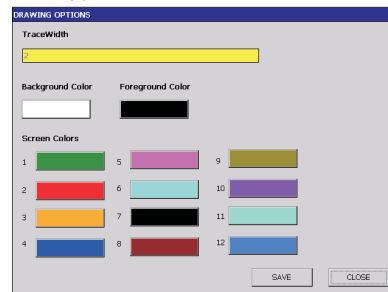
Figure 6.15 Drawing Options Adjustments

Figure 6.16 Color Selection Screen

6.6 - Channels Page

After selecting the slot from top window and the channel from the left buttons, related content is loaded to the screen. After required adjustment, **SAVE** button saves the values.
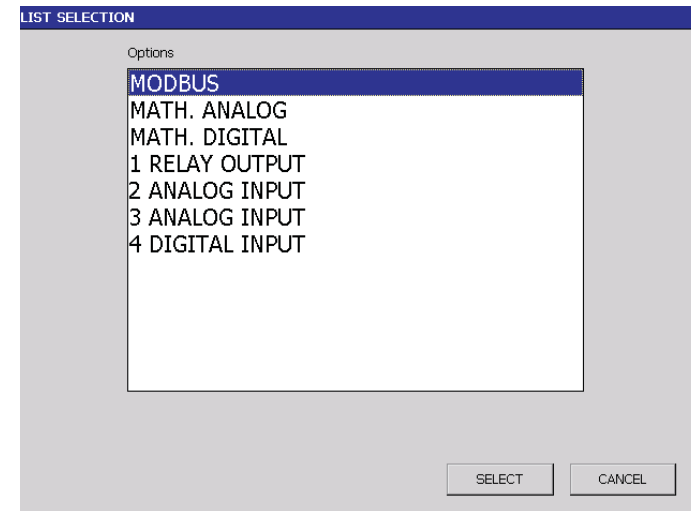
Figure 6.17 Slot Channels Page

6.6.1 - Relay Output Card Adjustments

Name:	The name of the related Relay Output can be written by this parameter. (maximum length of 12 characters)
Description:	Maximum 50 characters long description.
Off Message:	Maximum 100 characters long alarm off message.
On Message:	Maximum 100 characters long alarm on message.
Source 1-5:	When any of digital **Source 1 to 5** becomes ON, the relay output activates (energised)
PWM Source:	PWM source can be assigned to one of the 12 PID, relay or digital output sources.
PWM Period:	Determines the PWM period when a PWM Source other than the PID Sources is assigned.

Figure 6.18 Relay Output Card Adjustments

6.6.2 - Digital Output Card Adjustments

Please see section 6.6.1 for a description of parameters.

Figure 6.19 Relay Output Card Adjustments

6.6.3 - Analog Input Card Adjustments

Name:	The channel can be named with using maximum 12 characters.
Description:	Maximum 50 characters long description.
Input Type:	Determines input type. The parameter can be selected as, **Thermocouple, Resistance Thermometer, Ohm, Milivolt, Miliamper or Volt.**
Range Low:	Determines minimum input value that will be applied to the channel. This parameter is active only for linear inputs.
Range High:	Determines maximum input value that will be applied to channel. This parameter is active only for linear inputs.

Range Low - Range High Values for Linear Inputs are given below.

INPUT	Min. Input	Max. Input
Miliamper	-20 mA	20 mA
Milivolt	-2000 mV	2000 mV
Ohm	0 ohm	5000 ohm
Volt	-10 V	10 V

Linearization:	Determines sensor type for Thermocouple and Resistance Thermometer and how to linearize the Linear Inputs while the process value is calculated.
Decimal Point:	Determines the position of decimal point. The parameter can be adjusted as **0** , **0.0** , **0.00** or **0.000.**
Zero - Span:	Determines process value for TC and RT sensors in the case of sensor break depending on **Sensor Break** parameter. The parameter determines the scale for linear inputs.
Sensor Break:	Determines process value in the case of sensor break. Process value will be equal to Zero when **SET LOW** is selected and will be equal to Span when SET HIGH is selected.

6.6.3 - Analog Input Card Adjustments

Shift Value:	Determines shift value of process value.
Unit:	Determines the unit of the input.
CJ Type: CJ Temperature: CJ Source:	Determines the cold juction compensation type for TC inputs. **DISABLED** selection disables the compensation. **CONSTANT** selection fixes the cold junction temperature to CJ Temperature parameter. **RESERVED and EXTERNAL** selections use external E-CJ-NTC-01 terminal NTC sensor. **CHANNEL CJ** selection assigns cold junction temperature to the cold junction temperature of another channel defined by **CJ Source** and likewise **CHANNEL** selection assigns cold junction temperature to the process value of the channel defined by **CJ Source**.

Figure 6.20 Analog Input
Card Input Adjustments

6.6.3 - Analog Input Card Adjustments
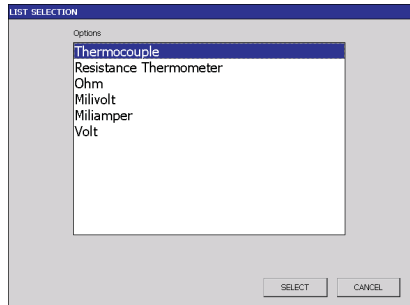
Figure 6.21 Input Type Selection
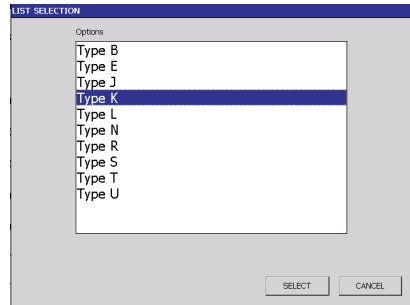
Figure 6.22 Linearization Select
(Input Type Selection)
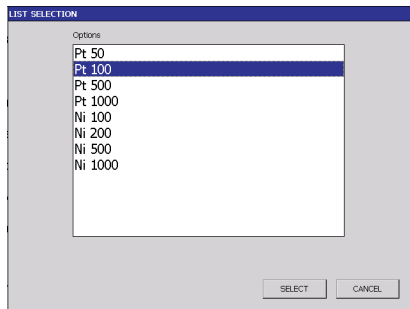
Figure 6.23 Linearization Select
(Input Type Resistance Thermometer)
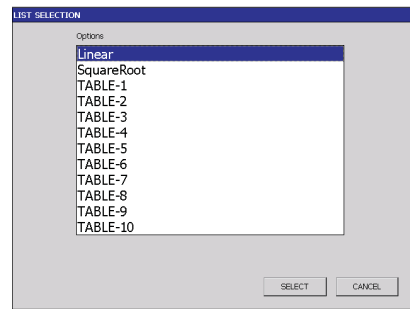
Figure 6.24 Linearization Select
(Input Type Ohm, Milivolt, Miliamper or Volt)

6.6.3 - Analog Input Card Adjustments

CJ Type, CJ Source and CJ temperature parameters are active only TC inputs(**See Figure 6.25**).
For TC sensor connection, **E-CJ-NTC-01 compensation sensor** should be used when the CJ Type is selected as EXTERNAL.
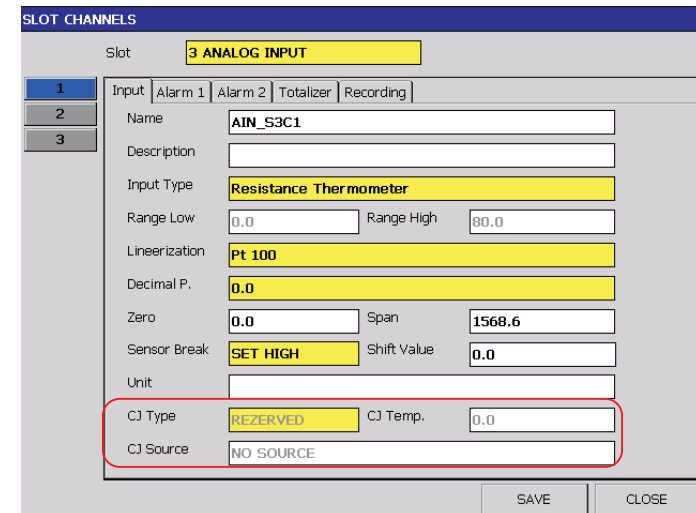
Figure 6.25 Disabled CJ Type, CJ Temperature and CJ Source parameters

6.6.3 - Analog Input Card Adjustments

CJ Type

LIST SELECTION
Options
DISABLED
CONSTANT
REZERVED
EXTERNAL
CHANNEL CJ
CHANNEL

SELECT   CANCEL

CJ Type	DISABLED	CJ Temp.	0.0
CJ Source	AIN_S4C1		
CJ Type	CONSTANT	CJ Temp.	0.0
CJ Source	AIN_S4C1		
CJ Type	REZERVED	CJ Temp.	0.0
CJ Source	AIN_S4C1		
CJ Type	EXTERNAL	CJ Temp.	0.0
CJ Source	AIN_S4C1		
CJ Type	CHANNEL CJ	CJ Temp.	0.0
CJ Source	AIN_S4C1		
CJ Type	CHANNEL	CJ Temp.	0.0
CJ Source	AIN_S4C1		

DISABLED selection disables the compensation. **CONSTANT** selection fixes the cold junction temperature to **CJ Temp** paremeter. **RESERVED and EXTERNAL** selections use external E-CJ-NTC-01 terminal NTC sensor. **CHANNEL CJ** selection assigns cold junction temperature to the cold junction temperature of another channel defined by **CJ Source** and likewise **CHANNEL** selection assigns cold junction temperature to the process value of the channel defined by **CJ Source**.

Figure 6.26 CJ Type selections

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6.6.4 - Analog Output Card Adjustments

Name:	The related channel input can be named with using maximum 12 character.
Description:	Maximum 50 characters long description.
Source:	Determines the analog source by which the analog output is controlled .
Type:	Output type mA or Volt can be selected. Only one of them can be activated at a time.
Min:	Minimum value of the output. For **mA** outputs, the value should be in the range of 0 to 20 mA, for **Volt** outputs should be in the range of 0 to 10 V.
Max:	Maximum value of the output. For **mA** outputs, the value should be in the range of 0 to 20 mA, for **Volt** outputs should be in the range of 0 to 10 V.
Zero:	Together with the **Span** paremeter, determines the analog output scale. When the process value of the source channel equals to **Zero** value, the output is set to **Min** output value.
Span:	Together with the **Zero** paremeter, determines the analog output scale. When the process value of the source channel equals to **Span** value, the output set to **Max** output value.
Fault Value:	In the event of a fault, this is the value that the output will take.
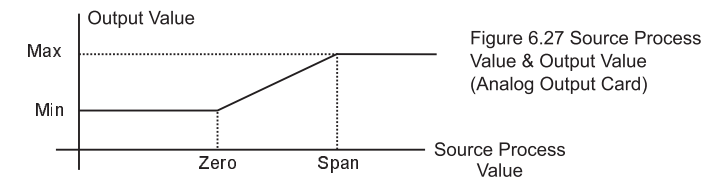
Figure 6.27 Source Process Value & Output Value (Analog Output Card)

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6.6.4 - Analog Output Card Adjustments

Figure 6.28 Analog Output Card Adjustments

6.6.5 - Alarm adjustments

For each **Math Analog**, **Analog Input** and **Modbus channels,** two alarms are defined and can be configured to several ouput forms (**See Figure 6.29, Figure 6.30** and **Figure 6.31**).

Name:	Maximum 12 characters long alarm name. Any character string can be entered in order to name the alarm.
Type:	Any of **OFF**, **LOW**, **HIGH**, **SLOW RATE, FAST RATE** alarm types can be assigned to alarms. Please check **Figure 6.30** and **Figure 6.31** for output forms.
Set/Deviation:	Defines set point for LOW and HIGH alarm types; deviation for SLOW RATE and FAST RATE types.
Hysteresis:	Defines alarm hysteresis for LOW and HIGH alarms.
Latch Enable:	Enabling latch causes alarm on state to persist until being acknowledged even if the alarm condition is over.
Delay:	Alarms can be delayed for a certain amount of time in order to make sure the alarm condition persists long enough. Any value between 0 and 9999 can be set in seconds.
Derivation Time:	Define derivation time for SLOW and FAST RATE alarms. Please check **Figure 6.33**
Filter:	Process values can be averaged in order to smooth unavoidable abrupt changes which may cause false alarms. The filter value which can be set to any value from 1 to 10 determines number of process values to be averaged for alarm calculations.
Off Mesajı:	Maximum 100 characters long alarm off message.
On mesajı:	Maximum 100 characters long alarm on message.

6.6.5 - Alarm adjustments

Figure 6.29 Alarm 1 Type selection

Figure 6.30 Alarm 2 Type selection

Figure 6.31 Alarm Type selection

6.6.5 - Alarm adjustments

Working forms of alarm types are described below.
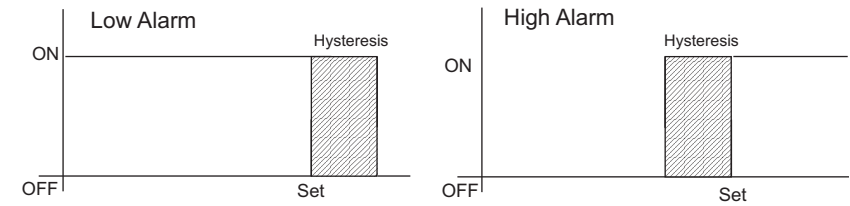
Figure 6.32 Low and High Alarm Forms
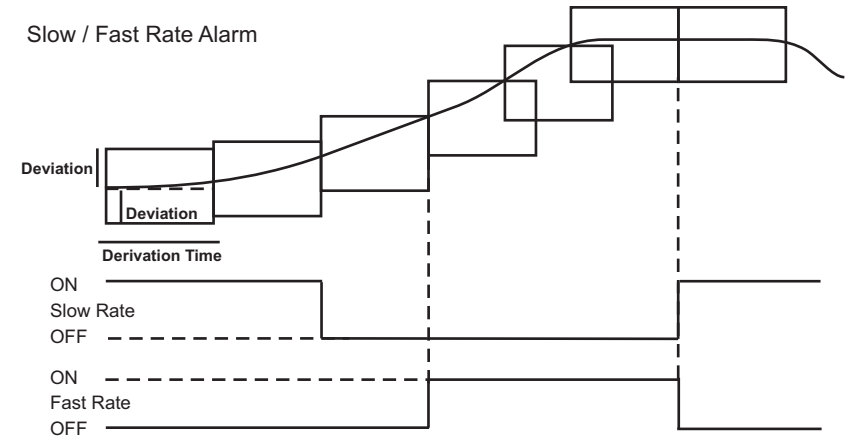
Figure 6.33 Slow Rate and Fast Rate Alarm Forms

6.6.6 - Totalizer Adjustments

One totalizer is defined for each slot analog input, math analog and Modbus analog channels.

Name:	Totalizer of related channel can be named with using 12 characters.
Enable:	Determines if totalizer is active or not.
Period:	Determines time unit of channel to be totalled. The parameter can be selected as /**Second**, /**Minute** or /**Hour.**
Cutoff:	Determines the lowest process value that the totalizer will be active.
Unit:	Determines the unit of totalizer.
Reset Source:	Determines digital source for reset.
Logging Source:	Determines digital source for logging.

Figure 6.34 Analog Input Totalizer Adjustments

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6.6.7 - Record Adjustments

Enable:	Determines whether the channel recording is activated or not. The parameter can be selected as **ON** or **OFF**.
Sampling:	Determines the recording period.
Filter:	Sampling period of the internal ADCs are fixed at 100 ms regardless of recording period. For each recording period option, certain number of sampled values are collected depending on selected recording period (Total Number Of Samples = Recording Period (ms) / 100).Filter parameter determines the way how these sampled values will be processed prior to the recording. If **Instantaneous is** set for filtering, the value at the time of recording is recorded. Maximum and Minimum selects the maximum and minimum of the sampled values respectively for recording. Average value of the sampled values can be recorded using **Average Filter.**

Figure 6.35 Analog Input Record Adjustments

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6.6.7 - Record Adjustments

Changing the recording period parameter causes losing of the relevant channel's archived data recorded in that day at which the modification takes place. Daily memory usage for each recording channel can be calculated using below equation in bytes.

Memory Usage (Bytes) = (86400/Recording Period (sec))*4

As an example, when all slots are plugged with Analog Input Cards and the recording of all analog channels are activated with a 1 sec recording period, 350 Kbytes of memory is used for each channel in a day and that corresponds to 4.2 MByte memory usage for all channel. With 8000 MByte Micro SD Flash, recording belonging to the last 5 years can be hold internally without any corruption. When the internal memory is full, old records are either deleted or backup depending on Backup Type. Please see **Archive Page** for backup configuration (**see Section 6.10**).

6.6.8 - Digital Input Card adjustments

State changes in all digital input channels are recorded to **DIGITAL LOG**. In addition, the channels can also be recorded periodically. Please check section **6.6.7 Record Adjustments** for digital input card for periodic recording.

Name:	The name of the related digital input can be written by this parameter (maximum length of 12 characters).
Description:	Maximum 50 characters long description.
Off Mesajı:	Maximum 100 characters long alarm off message.
On mesajı:	Maximum 100 characters long alarm on message.

Figure 6.36 Digital Input Card, Input adjustments

Figure 6.37 Digital Input Card, Recording adjustments

6.6.9 - MODBUS Channels Page

Up to 16 MODBUS RTU channels can be configured by this page. Firstly, channel number is clicked from the left of the screen before starting the configuration. MODBUS channel process values are transferred from slave MODBUS RTU devices over the RS-485 port or TCP. RS- 485 serial communication settings can be done from Serial Port Tab in the **HARDWARE** menu. Slot Analog Channel and MODBUS channel have almost same features except the way channel process values are assigned. While the former extracts the channel values from certain sensors, the latter uses RS-485 bus or TCP by querying the slave device with **Device Address** and **Reg. Address** parameters to get the channel process values. If an error occurs while querying the slave device, the process value of the relevant channel is set to the configured **Fault Value.**

Name:	Determines the name of the selected channel with using maximum 12 characters.
Description:	Maximum 50 characters long description.
Connection:	This parameter determines connection type. When selected as OFF, the channel is disabled and is closed for message transaction. Available connections are RS-485 and TCP.
Time Out:	Only functional for RS-485 connections and determines time out value in miliseconds. This parameter can be adjusted between 100 and 500 miliseconds.
Address:	This parameter defines modbus slave address of RS-485 modbus connection and can be set between 1 and 127.
IP Address:	This parameter determines IP address of TCP/IP connection and is only required for TCP type connections.
Function:	Determines the function code which will be used when querying. 03 or 04 can be selected.
Reg. Start Adr.:	Starting adress of modbus reading query.
Reg. Count:	Number of register to be read in query.

6.6.9 - MODBUS Channels Page

Index:	When the **Address**, **Reg. Start Adr.** and **Reg. Count** parameters are set to the same values for more than one channel, the **Index** parameter determines the register which will be assigned to channel process value. By this way, number of transaction can be decrased in order to increase query frequency by using same transaction for more than one channel.
Reg. Type:	**- Short (Signed 2 Byte), Short (Unsigned 2 Byte),** **- Integer (Signed 4 Byte), Integer (Unsigned 4 Byte),** **- Long (Signed 8 Byte), Long (Unsigned 8 Byte),** **- Float (4 byte)**
Decimal Point:	Determines the position of decimal point. The parameter can be set as **0** , **0.0**, **0.00** or **0.000**
Fault Value:	Determines the value of the channel in fault status.
Birim:	Determines the unit.

6.6.9 - MODBUS Channels Page

SLOT CHANNELS

Slot MODBUS

| 1 |
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |
| 7 |
| 8 |
| 9 |
| 10 |
| 11 |
| 12 |
| 13 |
| 14 |
| 15 |
| 16 |

MODBUS Input | Alarm 1 | Alarm 2 | Totalizer | Recording

Name   MODBUS_C1
Description
Connection   OFF   Time Out   500
Address   1
IP Address   127.0.0.1
Function   03   Reg. Start Adr. 1
Reg. Count   1   Index   0
Reg. Type   Integer (Signed 4 Byte)
Decimal P.   0   Fault Value   0
Unit   EU

SAVE   CLOSE

Figure 6.38
MODBUS Channels

LIST SELECTION

Options
Short (Signed 2 Byte)
Short (Unsigned 2 Byte)
Integer (Signed 4 Byte)
Integer (Unsigned 4 Byte)
Long (Signed 8 Byte)
Long (Unsigned 8 Byte)
Float(4 Byte)

SELECT   CANCEL

Figure 6.39 Register Types

6.6.10 - Math Channel Adjustments

Equation assignable 16 Analog Mathematics and 16 Digital Mathematics channel are available on device. Analog math channel parameters are same as the slot analog channel parameters except the input parameters. Instead of input selection, equations are assigned for math. channels . Digital math channel parameters are same as the slot digital channel parameters except the recording parameters. Periodic recording is not available for digital math channels but state changes are logged to the Digital Log page.

Equation:	The equation can be defined using **MATH EDITOR** screen (Se**e Appendix 2**).
Fault Value:	Determines the value of the Math Channel when there is a problem in the calculation of math equation like divede by Zero etc.

SLOT CHANNELS

Slot MATH. ANALOG

MATH A | Alarm 1 | Alarm 2 | Totalizer | Recording

Name   MATHA_C1
Description
Equation   (sin(2*3.14*$(second)/60)*30)+20
Decimal P.   0.0
Fault Value 0
Unit   EU

SAVE   CLOSE

Figure 6.40 Math Analog Page

SLOT CHANNELS

Slot MATH. DIGITAL

MATH D

Name   MATHD_C1
Description
Off Message OFF
On Message   ON
Equation

SAVE   CLOSE

Figure 6.41 Math Digital Page

6.7 - Real Time Channels Page

Period, Start, and **End** parameters determine the real time interval in which the related real time source will be active as shown below. For example if **Period, Start**, and **End** are adjusted as **Every Minute**, **0**, **5** respectively, the related channel will be active in first 5 seconds of every minute. Unit of **Start** and **End** parameters are in seconds. Real Time channels can be used for Totalizer Log Source, Totalizer Reset Source, Periodic Alarm etc.

Source:	Real Time channel to be adjusted.
Name:	Desired channel can be named with maximum 12 characters.
Description:	Maximum 50 characters long description.
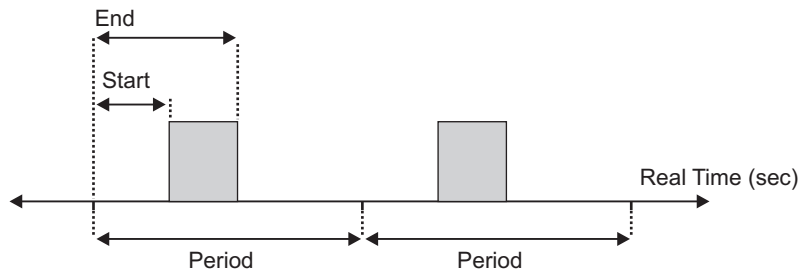
Figure 6.42 Real Time Graphic

6.7 - Real Time Channels Page

Figure 6.43 Real Time Channels (RTC) Page

Figure 6.44 Real Time Channels (RTC) source selection

Figure 6.45 Real Time Channels (RTC) period selection

6.8 - Groups Page

6 process groups with 6 channels can be defined in the device. The channels of the process groups can be chosen from slot analog channels, modbus channels or math analog channels. After selecting the channels and their scales, these channels can be viewed in **Bar Graphic**, **Digital and Trend Pages**. The Digital 2 page shows two consecutive groups at the same group. As shown in **Figure 6.47** selected group **(*)** appear in the display indicates that the group was configured.

Group:	Selects the group to be adjusted.
Adı:	The group name can be determined with maximum 12 characters.
Tanım:	Maximum 50 characters long description.
Minimum:	Determines minimum value of the scale.
Maximum:	Determines maximum value of the scale.

Şekil 6.46 Goups Page

Şekil 6.47 Goups Page - Group Selection

6.8.1 - Changing Alarm Set Values in Trend View

While the user is in Trend view, the alarm set value can be changed by touching the defined channel (See Figure 6.49). In order for the user to access the Alarm Set window in the Trend view, the user having **Channel Settings** entry authority must log in otherwise adjustment is not permitted.
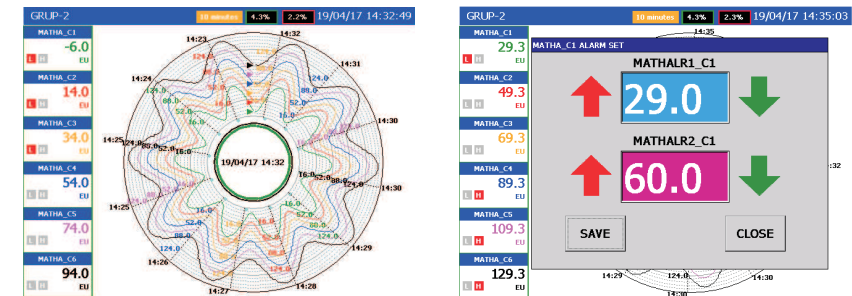
Figure 6.48 Trend Page (Trend Type Circular)

Figure 6.49 Changing alarm set values

To change the trend type, the GROUPS menu should be selected from the Main Menu. Graphic Type, Horizontal, Vertical or Circular can be selected from the Groups menu (**See Figure 6.50**). Figure 6.51, Figure 6.52, and Figure 6.53 show the graphical representation of the Graphic Type selection in the Trend view.

6.8.1 - Changing Alarm Set Values in Trend View
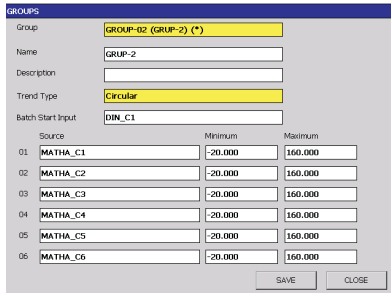
Figure 6.50 Trend Type selection from Groups menu
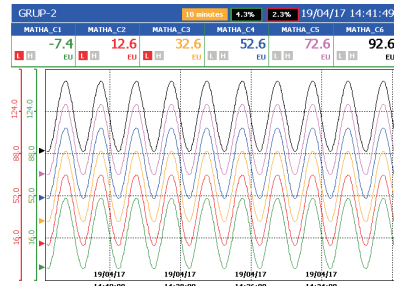
Figure 6.51 If Trend Type HORIZONTAL is selected
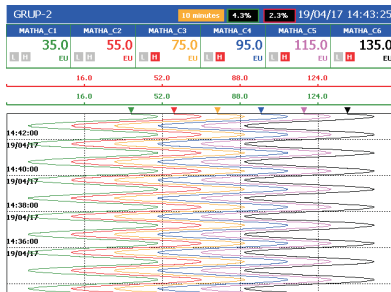
Figure 6.52 If Trend Type VERTICAL is selected
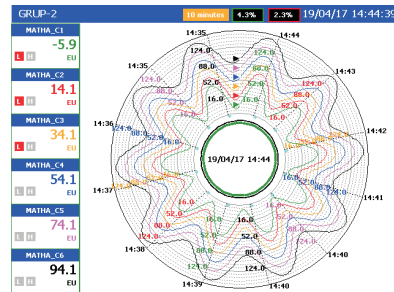
Figure 6.53 If Trend Type CIRCULAR is selected

6.8.2 - Batch Start Input

Batches can be initiated manually via the OPERATOR MENU on TREND VIEW or automatically by digital inputs which is enabled in the group configuration by assigning the Start Input parameter of the relevant group to one of the digital inputs available in the device. Batches for which the Start Input function has been defined by the digital input are activated when the assigned digital input is asserted and continues as long as the digital input is active. The last registered operation number is incremented by one automatically.
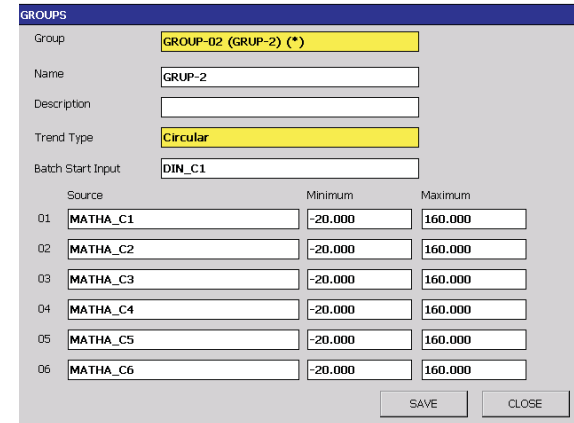
Figure 6.54 Group Configuration Page

6.8.2 - Batch Start Input

When the Batch Start Input key is pressed, the window shown in Figure 6.55 appears. Here, Digital Inputs are selected. Channels are given in order from 1 to 16. If the channel is selected, the process is started when that channel is activated and the process is stopped when it is inactive.
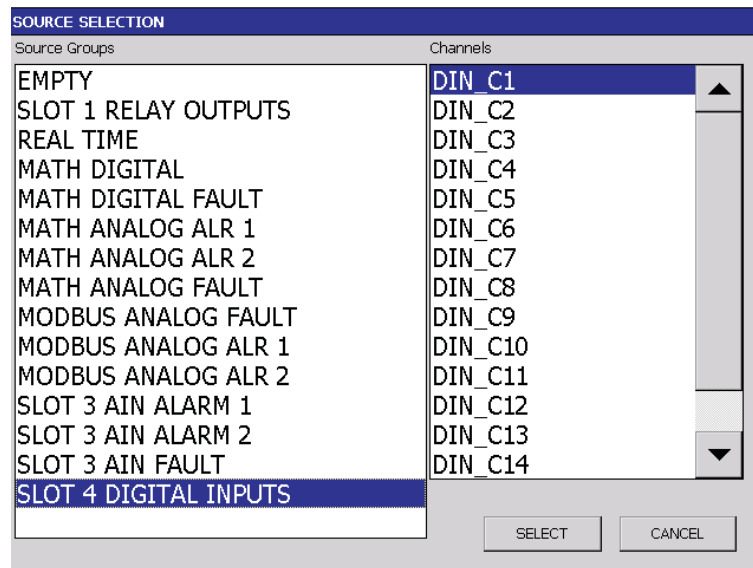
Figure 6.55 Source Selection Page

6.8.2 - Batch Start Input

Figure 6.56 shows the typical view of a running batch in which the batch number is shown in pink at the top of the page. In another view which is shown in **Figure 6.57**, batch number dissapears upon completion of running batch. Likewise the **Figure 6.56**, **Figure 6.58** shows another running batch with automatically incremented batch number.
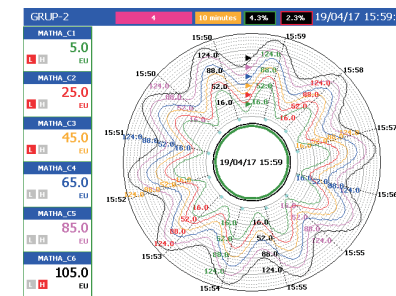
Figure 6.56 Typical view of running batch
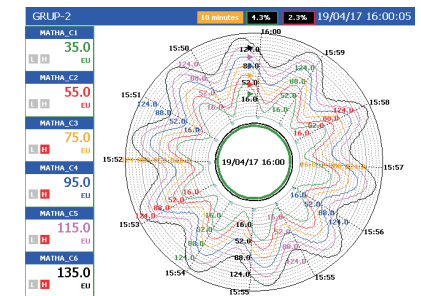
Figure 6.57 Completed batch
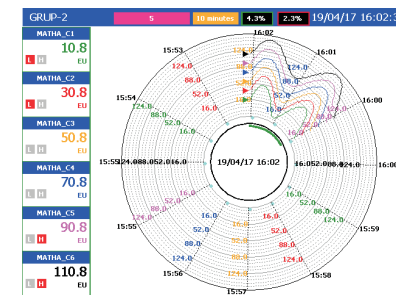
Figure 6.58 Typical view of running batch with incremented batch number.

6.8.2 - Batch Start Input

Previously recorded batches can be reached using trend view operator menu.
Open/Stops Batch opens batch management window in which user can stop running batches and open completed batches for review.
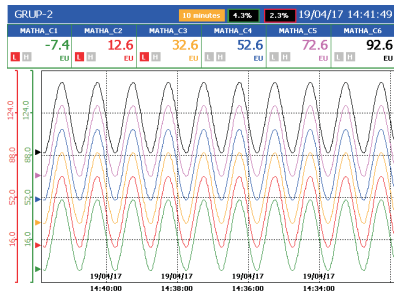
Figure 6.59 For example,
GROUP-2 Trend Page
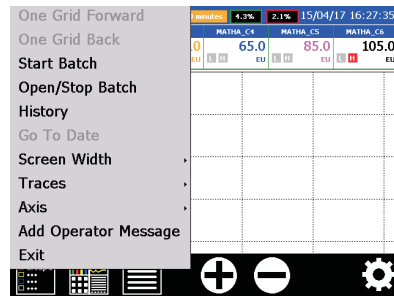
Figure 6.60 Press ▤ to select
Open/Stop Batch

6.8.2 - Batch Start Input
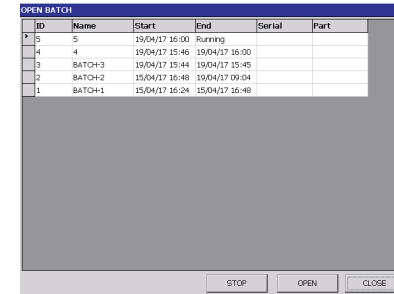
Figure 6.61 GROUP-1 Batches with a running batch
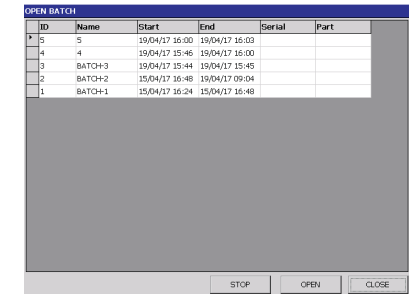
Figure 6.62 GROUP-1 Batches after stop operation

6.8.2 - Batch Start Input

The data stored in the device can be downloaded to the computer via USB or ETHERNET connection with the E-PR-110 DATA EXPLORER program and the printer output can be retrieved. A sample output is displayed below.
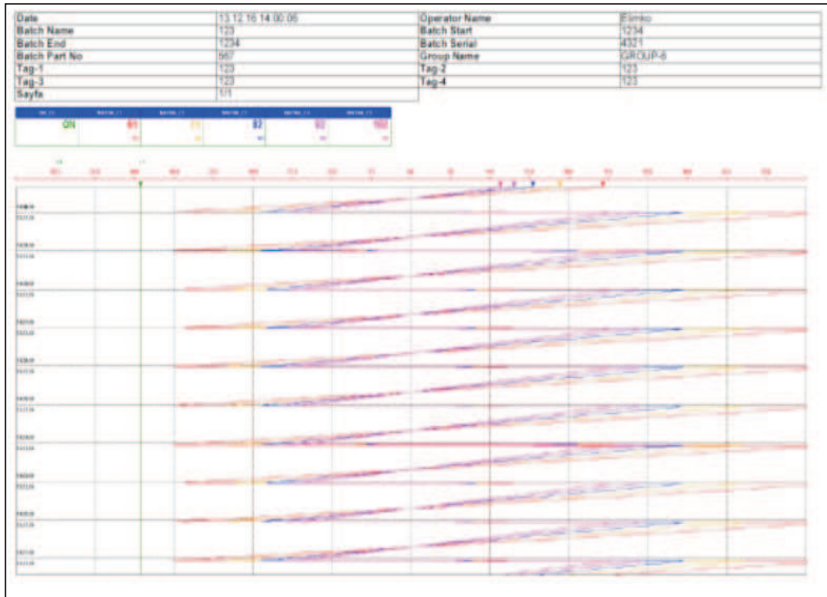
Figure 6.63 Trend Printer Output

6.9 - Custom Tables

Up to 10 custom linearization tables can be defined for linear channels. These tables define input and output relations for non standart sensors.

Table Name:	10 character long table name.
Step Count:	Determines number of linearization steps. It can be maximum 20 steps.
X (%):	Determined percentage of the input values in the respective linearization step.
Y:	**X (%)** determines the value to be displayed in response.
Up-Down:	Both keys can be used to scroll between steps.

Figure 6.64 Custom Tables Page

Figure 6.65 Analog Input page table selection

6.10 - Archive

The configuration and archived data saved in the device's non-volatile memory can be easily synchronized to an external flash memory by connecting a USB Flash Memory to the USB port of the recorder. Prior to the synchronization, user should select the external memory device using **Directory Name** parameter. After selecting the external memory device, synchronization is initiated by pressing **SYNCHRONIZE** button. While synchronizing, user is strongly advised not to perform any operation. Synchronized data can be used for further data analysis in Data Explorer Pro Software**. RESET ARCHIVE** button is used to delete all stored data archives. Resetting archive causes all records to be lost irreversibly.

Sync. Direction:	**Sync. Direction** determines synchronization direction. **DEVICE TO DISC** option transfers the data from device to external disc. **DISC TO DEVICE** does the reverse operation.
Directory Name:	Directory name selected directory located on the external disc. Synchronization reads or writes the data to/from the directory **[Selected Directory]\E-PR-110-[Tag]\Archive** depending on synchronization direction.
Sync. Type:	Three different data transfer options are available for synchronization. **COMPLETE** option transfers all data available for synchronization. **UP TO DATE** option transfer only the new data which is saved after the last synchronization. From the date option transfers data starting from the date which is set in **FROM A DATE** parameter.

6.10 - Archive

Backup:	Backup device is selected by **Directory Name** parameter.
Backup Type:	Two options with different capabilities and functions are available for Backup Type. User has the chance of either periodic data synchronization or memory extension by selecting **COMPLETE BACKUP** or **MEMORY EXTENSION** respectively.
Backup Period:	Determines backup period when Backup Type is set to **COMPLETE BACKUP.** Selectable periods are **every day**, **every week** and **every month.**

6.10 - Archive

Figure 6.66 Archive Synchronization Page

Figure 6.67 Archive Backup Page

6.11 - E-mail

Recorder can be configured to send e-mail reports contaning instanteneous process values and states up to 4 recipients at adjustable periodic times or by multiple configurable triggers such as sources and general events.

6.11.1 - Server Adjustments

Server:	SMTP incoming mail server
Port:	SMTP port number
SSL:	Disable or Enable SSL.
User:	User Account Name
Password:	User Account Password

Example settings for free Google mail service;
Server: smtp.google.com
Port: 587
SSL: ON

Figure 6.68 E-MAIL Server Page

6.11.2 - Recipient Adjustments

Recipient 1-4: Up to 4 recipient can be defined for e-mail reports. Unused recipients should be left blank.
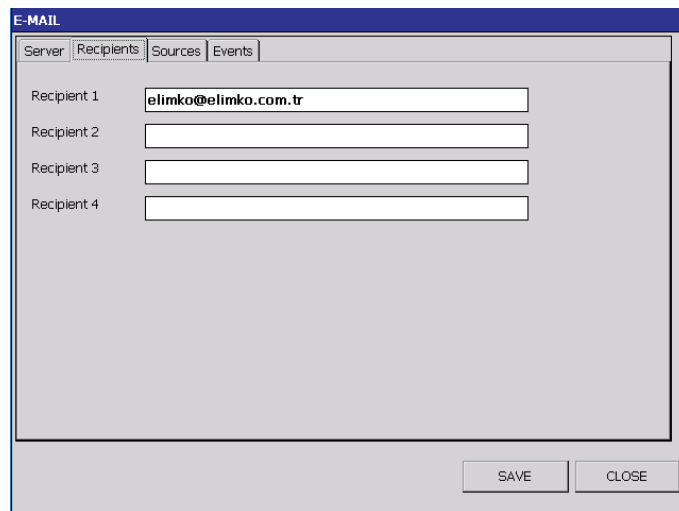
Figure 6.69 E-MAIL Server Page

6.11.3 - Source Adjustments

Source 1-8: Up to 8 sources which will trigger e-mail notification to the recipients can be defined. For periodic e-mail notification, one of the real time channels with required interval should be assigned to any of the sources.
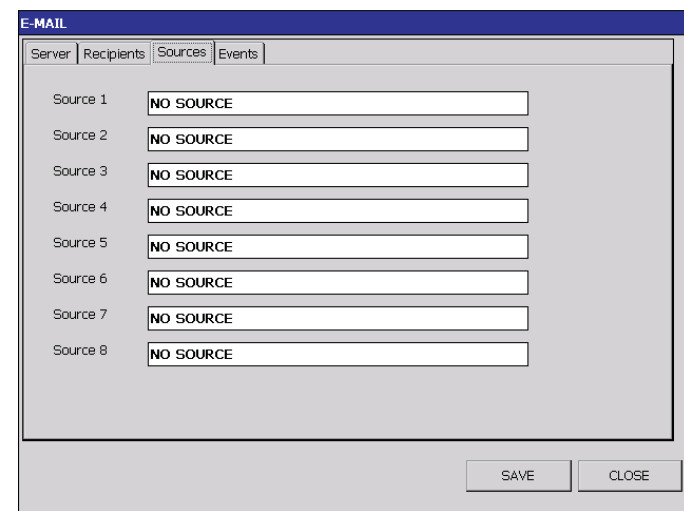
Figure 6.70 E-MAIL Sources Page

6.11.4 - Events

On New Alarm:	ON or OFF selectable. If ON is selected, a new e-mail is sent when an alarm occurs.
On New Instrument Log:	ON or OFF selectable. If ON is selected, a new e-mail is sent when a new instrument log is added.
On New Operator Log:	ON or OFF selectable. If ON is selected, a new e-mail is sent when a new operator log is added.
On New Digital Log:	ON or OFF selectable. If ON is selected, a new e-mail is sent when a new digital log is added.
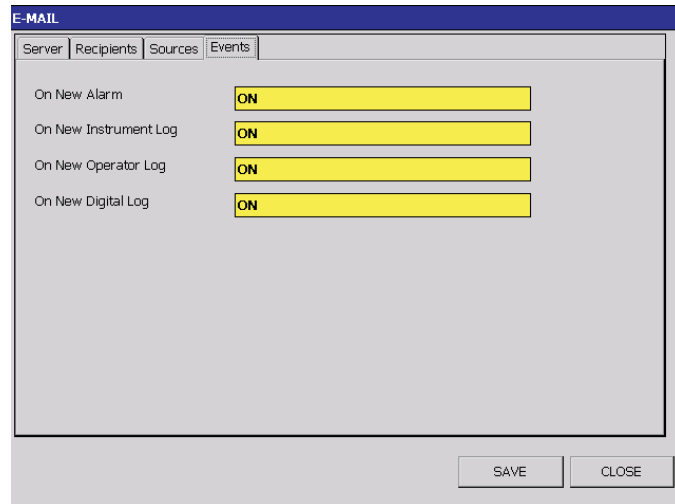
Figure 6.71 E-MAIL Events Page

6.12 - PID

PID configuration window is accessed from MAIN MENU by pressing PID button. 12 PID control loop with different control parameters can be defined for various control applications
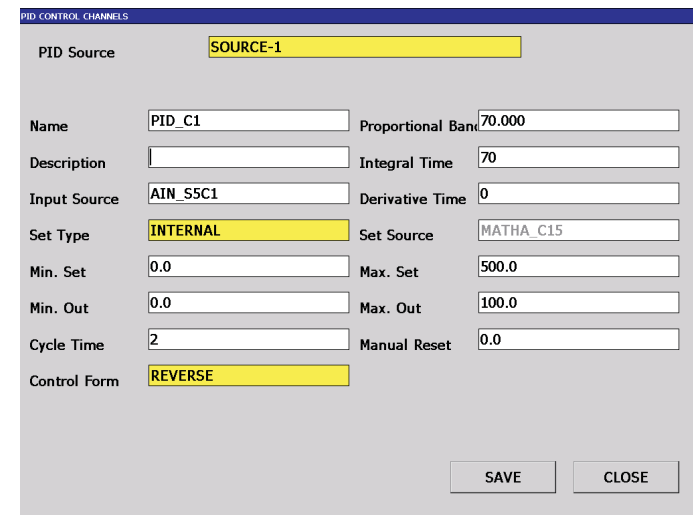
Figure 6.72 PID configuration window

6.12 - PID

PID Source:	PID Source to be configured.
Name:	Maximum 12 characters can be entered. Defines the PID Source name.
Description:	Maximum 50 characters can be entered. Additional explanation can be entered.
Input Source:	Determines PID control loop input variable (the process variable to be controlled). The input source can be assigned one of the analog channels defined in the recorder. It can be slot analog inputs, modbus channels or math channels)
Set Type:	Determines set input style of PID control loop. When selected as **INTERNAL**, set input is entered manually using on screen keyboard (see Figure 6.73). Conversely, when selected as **EXTERNAL**, set input is applied using an external analog source which is defined by the parameter **Set Source**.
Min. Set:	Minimum configurable internal set value.
Max. Set:	Maximum configurable internal set value.
Min. Out:	Minimum output value in %percentage. When the calculated output value is less than the minimum output value, the output value is set to minimum output value.
Max. Out:	Maximum output value in %percentage. When the calculated output value is more than the maximum output value, the output value is set to maximum output value.

6.12 - PID

Cycle Time:	Cycle time determines the PID PWM ouput period and is only applied to the digital outputs and is entered in seconds. Short values of cycle times result more precisional and accurate contol but may cause the control element (actuator) wear faster than would be with long cycle times.
Control Form:	Determines the control form of PID output. **REVERSE** output form makes the control output increase when the error signal (PV – Set) increases, conversely **FORWARD** selection makes the control output decreases when the error signal increases. When deciding the control form of PID Loop, how the control output will affect the process variable should be in mind. For instance cooling outputs causes a reverse reaction of temperature output.
Proportional Band:	Proportional band of PID loop in engineering unit.
Integral Time:	PID loop integral time in seconds. 0 value of integral time disables integration.
Derivative Time:	PID loop derivative time in seconds. 0 value of derivative time disables derivation.
Set Source:	Please see **Set Type** parameter.
Manual Reset:	Output value corresponding to zero error signal(PV-Set). %50 is recommended if there is no priory information.

6.12 - PID

PID Sources can be directed to analog outputs, relay or digital output channels. When the analog outputs are used for control signal, Zero and Span parameter of the analog output should be assigned 0 and 100 respectively. When the digital output sources are used for control signal, PWM sources of the digital sources should be assigned to the PID source to be directed.

Figure 6.73 Definition of PID Source to Analog Output

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6.12 - PID

When the fisrt group channel of a group is assigned to a PID source, usual Trend View appears different and turns to PID control page form which provides a clear display of PID process variables and enables user to enter manual set and control output. Please see **Figure 6.75** and **6.76**.

Figure 6.74 Definition of PID Source to Relay Output

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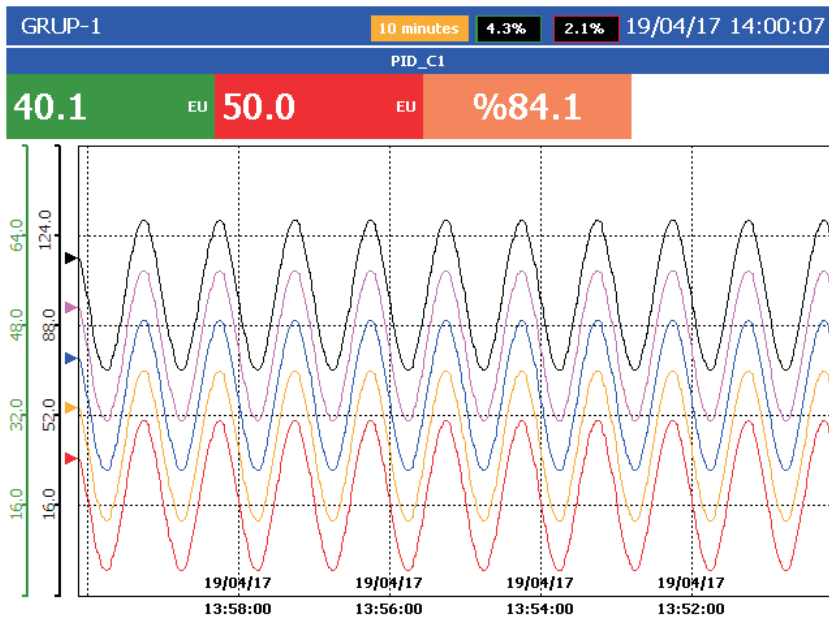
6.12 - PID

Figure 6.75 PID Trend Page

6.12 - PID

Proses Value   Set Value   Output Value
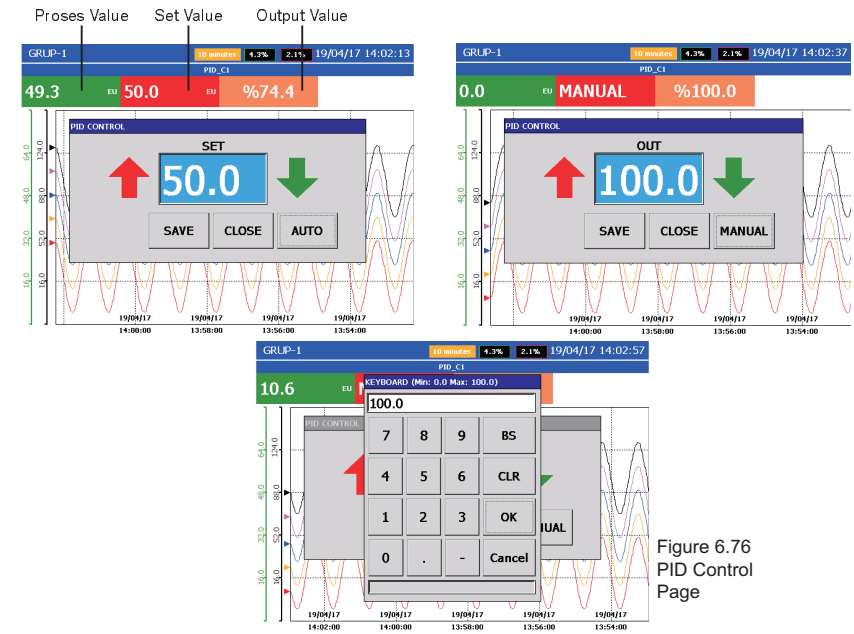
Figure 6.76
PID Control
Page

6.12 - PID

To change the SET value of a PID source, click SET value of the PID source from TREND views or click the PID Source window on the BAR or DIGITAL view screens to open the PID Control Page. PID Control Page is available only when Set Type of the PID source is EXTERNAL and the user has channel settings access right. PID control mode can be either manual or automatic, which can be changed using MANUAL/AUTO button. In Automatic mode, SET can be adjusted using either UP/DOWN buttons or on screen keyboard which is accessed by pressing SET value window. Likewise the SET value, in manual mode OUT value can be adjusted.

Figure-6.77 also shows the Overview Page in which a PID source directed relay output with output value rather than output state is visible.

Figure 6.77 PID Control Page

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6.13 - PROFILE

16 different profile sources can be configured in the device and used for different purposes. Profile sources can be assigned as external set source for PID channels in the device. Profile sources can be transmitted to other systems as reference sources using analog outputs.
By defining 10 different process curves, these curves can be used in the desired number of repetitions for the profiles (**see Figure 6.13.1**).
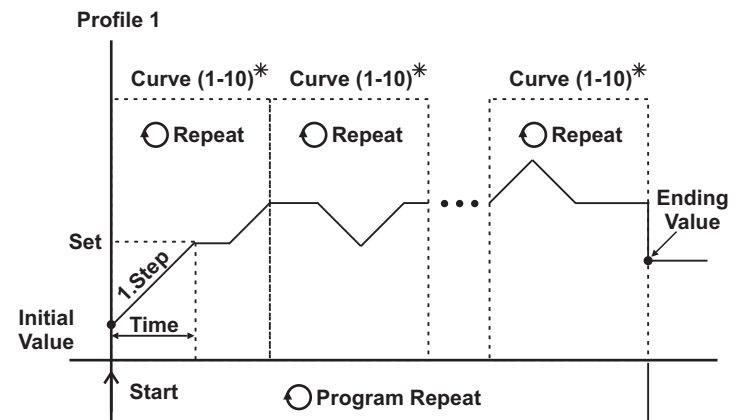
Figure 6.13.1

(✳) One of 10 configured curves can be selected.

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6.13 - PROFILE

Explanations about the parameters are given below. The screenshot is as given in **Figure 6.13.2**.

Profile Source:	It can be configured by selecting one of the 16 profile sources.
Name:	The profile source related to this parameter can be named. A maximum of 12 characters can be used.
Continuous:	It can be selected as ON or OFF. If ON is selected, Program Repeat is passive and the program runs continuously to the top. If OFF is selected, the program runs and stops until Repeat.
Program Repeat:	Minimum 1, maximum 1000 repetitions can be set (see **Continuous** parameter).
Decimal Point:	How many digits the decimal notation will be after the point in the output of the profile output is determined by this parameter. It can be selected as 0, 0.0, 0.00 or 0.000.
Energizing Behavior:	It determines the behavior of the profile if the recorder is de-energized. It can be selected as CONTINUE, WAIT, STOP or RESTART. This parameter takes effect only if the power is cut while the profile is running.
Launch Source:	Resources can be assigned to start the profile. Profile start and stop can be done with digital sources to be selected from the device. As long as the selected digital source is active, the profile runs.

6.13 - PROFILE

Process Source:	If the profile is connected to a process, the profile is associated with that process. - Profile initial value can be synchronized to the process. - The Maximum Shift parameter in curves can be activated to monitor the profile of the process (Maximum Shift, Shear Control).
Initial Value:	In case the process source is not determined, it determines the initial value of the profile. It can be adjusted between -32000 and 32000 values.
Final Value:	While the profile is not working, the profile value can be set to a desired value or to the value in the last step. This parameter should be selected as ON for the value in the last step to be active. To define another ending value manually, this parameter should be selected as OFF and the desired value must be entered into the Ending Value parameter.
Ending Value:	It can be adjusted between -32000 and 32000 (see Final Value).
Recording:	Determines whether the recording is active. It can be selected as ON or OFF.
Recording Interval:	Determines how long the device receives a recording.
Repeat:	It can be adjusted between 0 and 1000. Determines how many times the defined curve is repeated. If the number of repetitions is defined as 0, then and the following curves become passive.
Curve:	Any of the 10 curves defined can be assigned.

6.13 - PROFILE

Figure 6.13.2

6.13.1 - Curves

Explanations about the parameters are given below. The screenshot is as given in **Figure 6.13.3**.

Curve:	It can be configured by selecting one of the 10 curves.
Name:	The curve related to this parameter can be named. A maximum of 12 characters can be used.
Time:	Determines the duration of the step. If time is defined as 0.0: 0: 0, this and the next steps will be passive.
Set:	Determines the final value that the step will reach.
Slip Control:	If this parameter is selected ON, Maximum Shift parameter can be defined for the relevant step. If the curve is associated with a process, the timing of the profile is stretched so that the flow of the profile is within Maximum Shift (see Profiles, Process Source).
Maximum Slip:	See. **Slip Control**.

6.13.1 - Curves

Figure 6.13.3

7 - CONNECTION DIAGRAMS

The back panel view of E-PR-110 device is shown at the below figure. There are 4 slots at the back panel.

Before making any connection, the protective earth terminal should be connected.

M3
Protective Earth
Connection
Screw
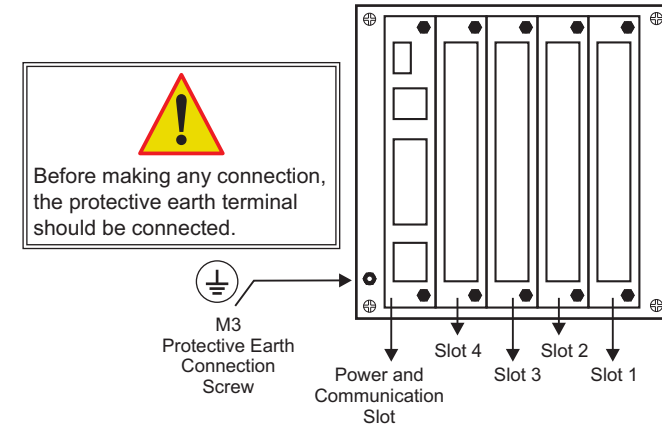
Figure 7.1
E-PR-110
Rear Panel

Power and
Communication
Slot

Slot 4   Slot 2
Slot 3   Slot 1

T**he Power and Communication Slot** is fixed for every device and Power Supply, Transmitter Supply, RS-485 and Ethernet connections are made to this slot **(see.Figure 7.2, Appendix 1)**. Slots 1-4 can be any of Analog Input, Digital Input, Digital Output, Analog Output or Relay Output depending on configuration.

- Analog Input (3 Channels, AIN)   - Digital Input (16 Channels, DIN)
- Analog Input (6 Channels, AIN)   - Digital Output (16 Channels, DOUT)
- Analog Output (4 Channels, AOUT)   - Relay Output (6 Channels, RELAY)

7 - CONNECTION DIAGRAMS

The connection of Analog Input, Digital Input/Output or Relay Output cards are given in **Figure 7.3**, **Figure 7.4**, **Figure 7.5** and **Figure 7.6** respectively.
In order to change the cards on 1-4 slots, dismantle top and bottom screws of the related slot and pull out the card. After placing the desired card fix the screws again. During changing or adding card, device should be powered off. After each new card configuration, it must be registered by scanning new configuration.
Please see **Section 6.5**.HARDWARE.

• The terminals of the device are electrically live. While the device is powered, never touch to the terminals.
• Before operating the device, ensure that the device is correctly configured. Incorrect configuration could result malfunction.
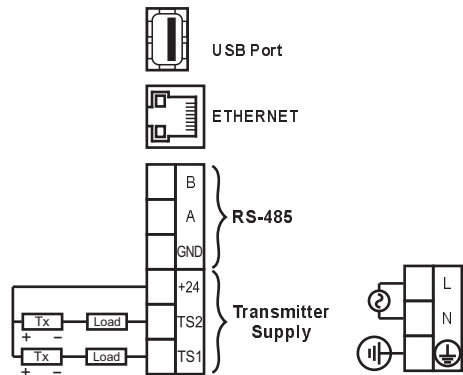
Figure 7.2 Power, Transmitter Supply, RS-485 and Ethernet Connections

Depending on analog output and relay output card configuration, certain number of 2 wire transmitter can be supplied by TS1 and TS2 returns as shown on the **Figure 7.2**. The loads shown on the figure can be the mA inputs of analog input cards. For each lines (TS1 and TS2), maximum number of 2 wire transmitter is limitted 6 (Max. 130 mA for each of them). In addition, the total number of transmitters to be supplied is also limitted by the total number of relay and analog outputs such that the total number of relay, analog outpus and 2 wire trasmitters is limitted to 18.

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7 - CONNECTION DIAGRAMS
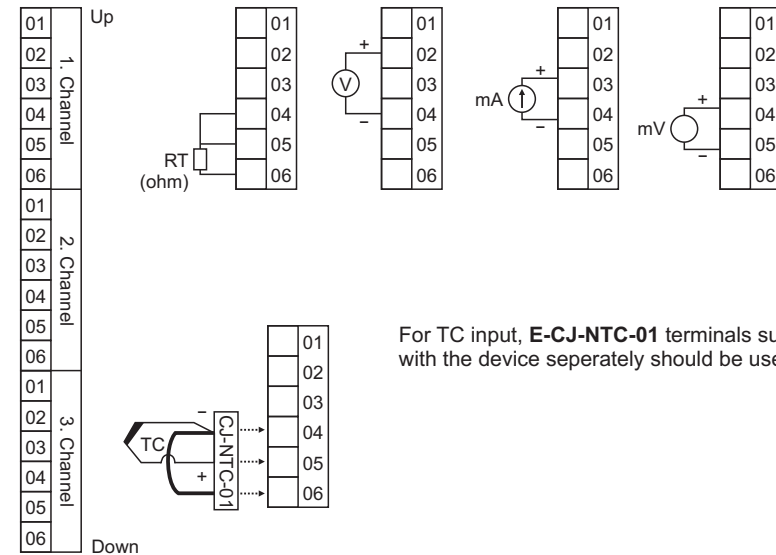
For TC input, **E-CJ-NTC-01** terminals supplied with the device seperately should be used.

Figure 7.3 Analog Input Card Connection Diagrams (3 Channels)

7 - CONNECTION DIAGRAMS

Üst

1.Channel | 01 02 03
2.Channel | 01 02 03
3.Channel | 01 02 03
4.Channel | 01 02 03
5.Channel | 01 02 03
6.Channel | 01 02 03

Down

RT (ohm)   01 02 03

V   + 01 02 03 −

mA   + 01 02 03 −

mV   + 01 02 03 −

TC   + CJ-NTC-01 − 01 02 03

For TC input, **E-CJ-NTC-01** terminals supplied with the device seperately should be used.
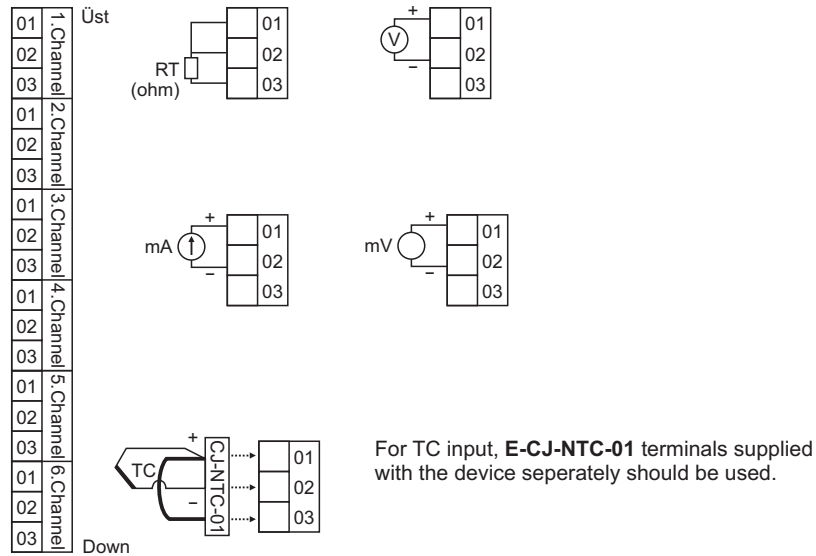
Figure 7.4 Analog Input Card Connection Diagrams (6 Channels)

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7 - CONNECTION DIAGRAMS

Digital Input

+24 V
-24 V

+   Up
−
I1
I2
I3
I4
I5
I6
I7
I8
I9
I10
I11
I12
I13
I14
I15
I16   Down

⚠ Digital Input and output cards must be supplied with an extarnal 24V DC source, otherwise the cards can not be detected by the recorder and do not function.

Digital Output

+24 V
-24 V

+   Up
−
O1
O2
O3
O4
O5
O6
O7
O8
O9
O10
O11
O12
O13
O14
O15
O16   Down

+24 V, max. 40 mA
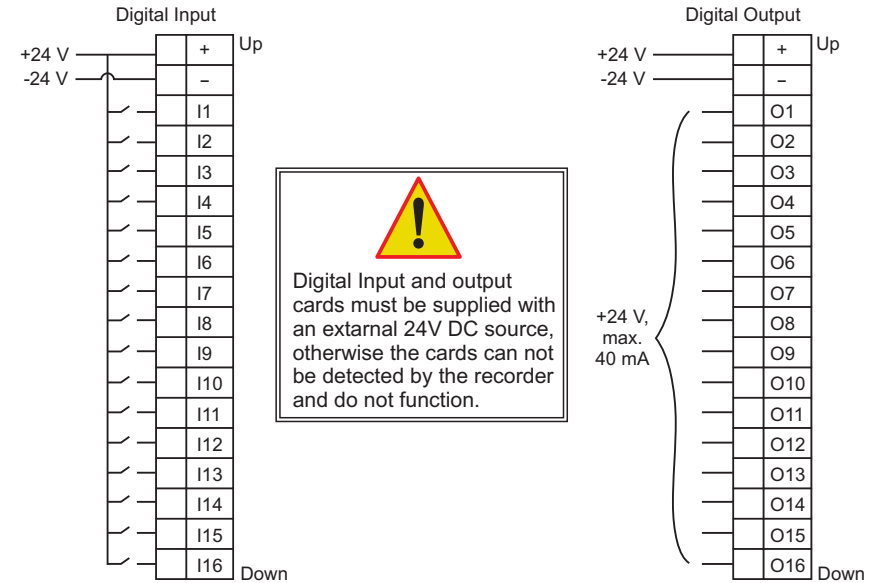
Figure 7.5 Digital Input&Output Cards Connection Diagrams

7 - CONNECTION DIAGRAMS
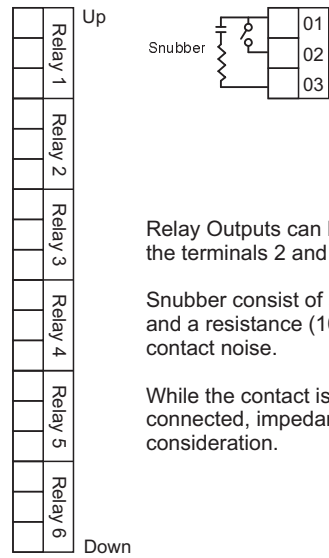
Relay Outputs can be used with snubbers. To use with snubber, the terminals 2 and 3 should be short circuited with a suitable cable.

Snubber consist of serially connected a capacitor (10nF, 630 V) and a resistance (100 Ω, 1/4 W) and can be used to suppress the contact noise.

While the contact is used for switching AC signals and snubber is connected, impedance of the snubber should be taken into consideration.

Figure 7.6 Relay Output Card Connection Diagrams

7 - CONNECTION DIAGRAMSI
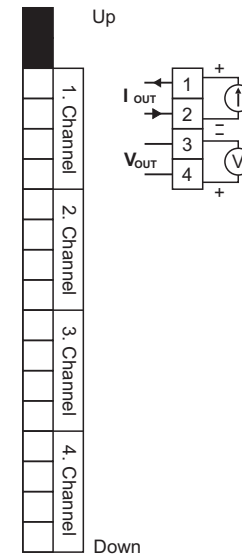
Figure 7.7 Analog Output Card Connection Diagrams

8 - DATA TRANSFER COMMUNICATION PROTOCOLS

E-PR-110 series recording devices has several standard connectivity options for easy transfer of recorded data. Standard of the shelf USB Mass storage disks up to 4 GB can be plugged from front panel USB ports and all data can be synchronized with a couple of click on the screen. Highly prevalent and known TCP/IP standards such as FTP, HTTP, Modbus TCP/IP are all available at no cost.

1) USB Mass Storage Device
Rear panel USB port provides easy connection of USB mass storage devices. Only FAT16 and FAT32 formatted disks up to 4 GB supported. For data transfer, please check **Section 6.10 ARCHIVE**.

2) HTTP and FTP Server Connection
Only just entering the IP address of the recorder to web browser enables user to connect Web server to monitor instantaneous values all in one place (http:// IP Address). In the same way accessing Web Server, FTP server can be utilized by entering FTP address of the recorder which is in the form of ftp://IP address, to the FTP supported web browsers or FTP clients. FTP and HTTP accessed are write protected (read only).

3) TCP/IP Modbus Master and Slave Connection
In addition to HTTP and FTP protocol support, the recorder serves as a Modbus Slave or Master unit over TCP/IP network. All registers given in **Appendix 3** can be read or write depending on access rights.

4) RS-485 Modbus Master and Slave Connection
The recorder can also be configured run as a Modbus Master or Slave over RS-485 communication network. All registers given in **Appendix 3** can be read or write depending on access rights.

8 - DATA TRANSFER COMMUNICATION PROTOCOLS

5) Barcode Scanner Connection
Please check Appendix 4 for detailed explanation.

6) Wi-Fi®

 Indicates that the Wi-Fi connection is not installed. The icon is pressed to establish a Wi-Fi connection. In the window that opens, enter the network SSID and Password. The network connection is established by pressing the Connect button.

 Indicates that the network connection is installed. Under the Wi-Fi icon, the SSID of the network to which the connection is made is named.

9 - APPENDIXES

Appendix 1 - Ethernet Connection

E-PR-110 recorder can connect to the Ethernet networks with its standard 10/100 M Bit Ethernet port (**see Section 7. CONNECTION DIAGRAMS**). Communication is performed using standard TC/IP. Please see **Section 6.5 HARDWARE** menu for TCP/IP settings. Only FTP application is available in standard software. FTP address of the recorder is always in the form of ftp://ipadress and there is no password protection. Recorded data and configuration can be reached using FTP Clients. In addition to that, recorded data can be analyzed offline with E-PR-1100 Data Explorer Software by instant one-click FTP synchronization.

Ethernet Network Connections
Ethernet connection is done through the RJ 45 connector located at the bottom of E-PR-110 (**see Section 7. CONNECTION DIAGRAMS**). The device can be connected to a PC directly (Figure 9.1) or a network hub. While the device connected to a PC crossover cable must be used. Normal cable should be used for hub connection. The pin numbers and signals for RJ 45 connector are given below (Figure 9.2).

NOTE: Maximum cable length is limited to 100m. If longer cable required, repeaters and gateways must be used to boost signal strengths.
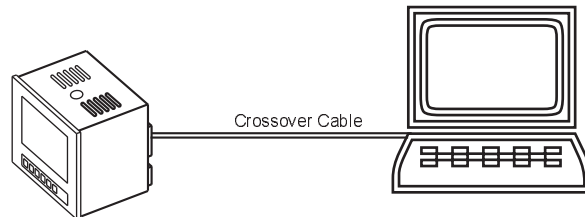
Crossover Cable

Figure 9.1 Computer Connection

Appendix 1 - Ethernet Connection

RJ45 Pins

PIN NUMBER	SIGNAL
1	TD + (Transmit +)
2	TD - (Transmit -)
3	RD + (Receive +)
4	Unused
5	Unused
6	RD - (Receive -)
7	Unused
8	Unused

TD+ ——————— TD+
TD- ——————— TD-
RD+ ——————— RD+
RD- ——————— RD-
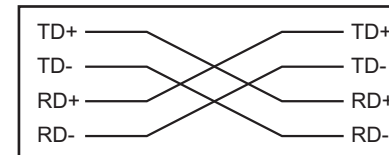
Figure 9.2 Crossover Cable Connection

Appendix 2 - Equation Creation Using Math Editor

microvolt(): Microvolts (Slotno, ChannelNo) is used with parameters. Parameters of the analog input channels of the slot referred to as raw data the value of reading microvolts. Slot and Channel Number should be a zero index (microvolts (0.0): 1.Slot 's channel 1' s value in microvolts is reading.).
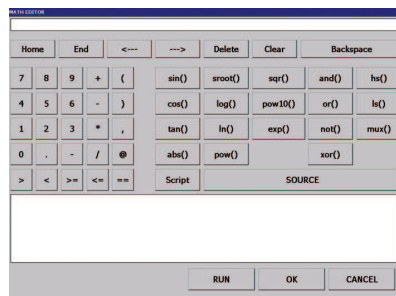
Figure 9.3 MATH EDITOR Page
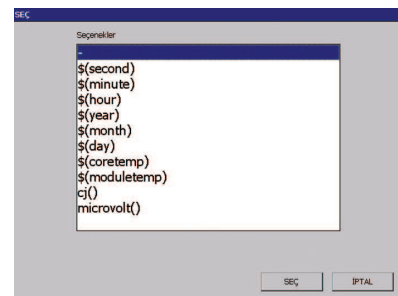
Figure 9.4 Script selection button

Appendix 2 - Equation Creation Using Math Editor

Equation for Math Analog and Math Digital can be easily created using Math Editor. User can apply arithmetic operators (+,-,*,/), comparison operators (>,<,>=,<=,==), constants, channel process values and miscellaneous functions into equations. Parenthesis can be added to equations for grouping the operations, if necessary. The most left operator in the same parenthesis has the highest precedence. Operator precedence can be changed using parenthesis. Home key sets the cursor to the left most position, End key sets the cursor to the right most position, <--- key shifts the cursor one character left and ---> key shifts the cursor one character right. Delete and Backspace keys delete one character towards to the left or right respectively. Clear key clears the existing equation. Channel process values can be included in to the equations by pressing SOURCE key. RUN key runs the equation for testing. Pressing OK key saves the equation, CANCEL key cancels all operations.

Script is defined in the key device used for the incorporation of equality of a team ready to function. When pressed **Script** out the following options.

$(second): Count of seconds indicates that the system time.
$(minute): The system indicates that the clock match minute.
$(hour): It displays the system time.
$(year): Which it indicates that year on the system.
$(month): Indicates that the system on which month.
$(day): Indicates that the day on which the System.
$(coretemp): The device shows the core temperature of the processor.
$(moduletemp): The device displays the temperature of the processor module.
cj(): CJ (SlotNo, ChannelNo) is used with parameters. The channel parameters gives the cold spot temperature of the specified slot. Slot and Channel Number should be a zero index (cj (0,0): 1.Slot channel 1 's cold spot temperature data.).

Appendix 2 - Equation Creation Using Math Editor

FUNCTION	USAGE	DESCRIPTION
<	Op1 < Op2	If Op1 is smaller than Op2 "1", other states "0"
>	Op1 > Op2	If Op1 is bigger than Op2 "1", other states "0"
<=	Op1 <= Op2	If Op1 is smaller and equal than Op2 "1",other states "0"
>=	Op1 >= Op2	If Op1 is bigger and equal than Op2 "1", other states "0"
==	Op1 == Op2	Iff Op1 is equal Op2 "1", other states "0"
sin()	sin(Op)	Op is radian.
cos()	cos(Op)	Op is radian.
tan()	tan(Op)	Op is radian.
abs()	abs(Op)	Op is absolute value.
sroot()	sroot(Op)	Square root
log()	log(Op)	The base-10 logarithm
ln()	ln(Op)	The natural logarithm
pow()	Pow(Op1,Op2)	$Op1^{Op2}$
sqr()	sqr(Op)	Op^2
pow10()	pow10(Op)	10^{Op}
exp()	exp(Op)	e^{Op}
and()	and(Op1,Op2,...,Opn)	Digital AND operator
or()	or(Op1,Op2,...,Opn)	Digital OR operator
not()	not(Op1,Op2,...,Opn)	Digital NOT operator
xor()	xor(Op1,Op2,...,Opn)	Digital XOR operator
hs()	hs(Op1,Op2,...,Opn)	Select the biggest
ls()	ls(Op1,Op2,...,Opn)	Select the smallest
mux()	mux(i,Op1,Op2,...,Opn)	Selects parameter Op(i+1). Zero index selects Op1.

Figure 9.5 Operator and Function description

Appendix 3 - Modbus RTU Communication Addresses

Modbus RTU Register addresses can be reached from **MODBUS TABLE** window by presing the MODBUS TABLE button in the **Main Menu**. Digital channel grouped by slots are respresented with a single address. Data format of this representation is given in **Figure 9.7.**

Figure 9.6 MODBUS Table

MSB, 1. Register   LSB, 1. Register

16. Channel	15. Channel	14. Channel	13. Channel	12. Channel	11. Channel	10. Channel	9. Channel	8. Channel	7. Channel	6. Channel	5. Channel	4. Channel	3. Channel	2. Channel	1. Channel

MSB, 2. Register   Figure 9.7 Digital Channel Data Format   LSB, 2. Register

Ek 3 - Modbus RTU Communication Addresses

Address	Group	Name	Size	Type
0650	REAL TIME	-----	4 Byte (Integer)	DIGITAL
0652	MATH DIGITAL	-----	4 Byte (Integer)	DIGITAL
0654	MATH DIGITAL FAULT	-----	4 Byte (Integer)	DIGITAL
0656	MATH ANALOG	MATHA_C1	4 Byte (Float)	ANALOG
0658	MATH ANALOG	MATHA_C2	4 Byte (Float)	ANALOG
0660	MATH ANALOG	MATHA_C3	4 Byte (Float)	ANALOG
0662	MATH ANALOG	MATHA_C4	4 Byte (Float)	ANALOG
0664	MATH ANALOG	MATHA_C5	4 Byte (Float)	ANALOG
0666	MATH ANALOG	MATHA_C6	4 Byte (Float)	ANALOG
0668	MATH ANALOG	MATHA_C7	4 Byte (Float)	ANALOG
0670	MATH ANALOG	MATHA_C8	4 Byte (Float)	ANALOG
0672	MATH ANALOG	MATHA_C9	4 Byte (Float)	ANALOG
0674	MATH ANALOG	MATHA_C10	4 Byte (Float)	ANALOG
0676	MATH ANALOG	MATHA_C11	4 Byte (Float)	ANALOG
0678	MATH ANALOG	MATHA_C12	4 Byte (Float)	ANALOG
0680	MATH ANALOG	MATHA_C13	4 Byte (Float)	ANALOG
0682	MATH ANALOG	MATHA_C14	4 Byte (Float)	ANALOG
0684	MATH ANALOG	MATHA_C15	4 Byte (Float)	ANALOG
0686	MATH ANALOG	MATHA_C16	4 Byte (Float)	ANALOG
0688	MATH ANALOG ALR 1	-----	4 Byte (Integer)	DIGITAL
0690	MATH ANALOG ALR 2	-----	4 Byte (Integer)	DIGITAL
0692	MATH ANALOG HATA	-----	4 Byte (Integer)	DIGITAL

Ek 3 - Modbus RTU Communication Addresses

Address	Group	Name	Size	Type
0694	MATH TOT	MATHTOT_C1	8 Byte (Float)	ANALOG
0698	MATH TOT	MATHTOT_C2	8 Byte (Float)	ANALOG
0702	MATH TOT	MATHTOT_C3	8 Byte (Float)	ANALOG
0706	MATH TOT	MATHTOT_C4	8 Byte (Float)	ANALOG
0710	MATH TOT	MATHTOT_C5	8 Byte (Float)	ANALOG
0714	MATH TOT	MATHTOT_C6	8 Byte (Float)	ANALOG
0718	MATH TOT	MATHTOT_C7	8 Byte (Float)	ANALOG
0722	MATH TOT	MATHTOT_C8	8 Byte (Float)	ANALOG
0726	MATH TOT	MATHTOT_C9	8 Byte (Float)	ANALOG
0730	MATH TOT	MATHTOT_C10	8 Byte (Float)	ANALOG
0734	MATH TOT	MATHTOT_C11	8 Byte (Float)	ANALOG
0738	MATH TOT	MATHTOT_C12	8 Byte (Float)	ANALOG
0742	MATH TOT	MATHTOT_C13	8 Byte (Float)	ANALOG
0746	MATH TOT	MATHTOT_C14	8 Byte (Float)	ANALOG
0750	MATH TOT	MATHTOT_C15	8 Byte (Float)	ANALOG
0754	MATH TOT	MATHTOT_C16	8 Byte (Float)	ANALOG
0758	MODBUS ANALOG	MODBUS_C1	4 Byte (Float)	ANALOG
0760	MODBUS ANALOG	MODBUS_C2	4 Byte (Float)	ANALOG
0762	MODBUS ANALOG	MODBUS_C3	4 Byte (Float)	ANALOG
0764	MODBUS ANALOG	MODBUS_C4	4 Byte (Float)	ANALOG
0766	MODBUS ANALOG	MODBUS_C5	4 Byte (Float)	ANALOG
0768	MODBUS ANALOG	MODBUS_C6	4 Byte (Float)	ANALOG

Ek 3 - Modbus RTU Communication Addresses

Address	Group	Name	Size	Type
0770	MODBUS ANALOG	MODBUS_C7	4 Byte (Float)	ANALOG
0772	MODBUS ANALOG	MODBUS_C8	4 Byte (Float)	ANALOG
0774	MODBUS ANALOG	MODBUS_C9	4 Byte (Float)	ANALOG
0776	MODBUS ANALOG	MODBUS_C10	4 Byte (Float)	ANALOG
0778	MODBUS ANALOG	MODBUS_C11	4 Byte (Float)	ANALOG
0780	MODBUS ANALOG	MODBUS_C12	4 Byte (Float)	ANALOG
0782	MODBUS ANALOG	MODBUS_C13	4 Byte (Float)	ANALOG
0784	MODBUS ANALOG	MODBUS_C14	4 Byte (Float)	ANALOG
0786	MODBUS ANALOG	MODBUS_C15	4 Byte (Float)	ANALOG
0788	MODBUS ANALOG	MODBUS_C16	4 Byte (Float)	ANALOG
0790	MODBUS ANALOG FAULT	-----	4 Byte (Integer)	DIGITAL
0792	MODBUS ANALOG ALR 1	-----	4 Byte (Integer)	DIGITAL
0794	MODBUS ANALOG ALR 2	-----	4 Byte (Integer)	DIGITAL
0796	MODBUS TOT	MODBUSTOT_C1	8 Byte (Float)	ANALOG
0800	MODBUS TOT	MODBUSTOT_C2	8 Byte (Float)	ANALOG
0804	MODBUS TOT	MODBUSTOT_C3	8 Byte (Float)	ANALOG
0808	MODBUS TOT	MODBUSTOT_C4	8 Byte (Float)	ANALOG
0812	MODBUS TOT	MODBUSTOT_C5	8 Byte (Float)	ANALOG
0816	MODBUS TOT	MODBUSTOT_C6	8 Byte (Float)	ANALOG
0820	MODBUS TOT	MODBUSTOT_C7	8 Byte (Float)	ANALOG
0824	MODBUS TOT	MODBUSTOT_C8	8 Byte (Float)	ANALOG
0828	MODBUS TOT	MODBUSTOT_C9	8 Byte (Float)	ANALOG

Ek 3 - Modbus RTU Communication Addresses

Address	Group	Name	Size	Type
0832	MODBUS TOT	MODBUSTOT_C10	8 Byte (Float)	ANALOG
0836	MODBUS TOT	MODBUSTOT_C11	8 Byte (Float)	ANALOG
0840	MODBUS TOT	MODBUSTOT_C12	8 Byte (Float)	ANALOG
0844	MODBUS TOT	MODBUSTOT_C13	8 Byte (Float)	ANALOG
0848	MODBUS TOT	MODBUSTOT_C14	8 Byte (Float)	ANALOG
0852	MODBUS TOT	MODBUSTOT_C15	8 Byte (Float)	ANALOG
0856	MODBUS TOT	MODBUSTOT_C16	8 Byte (Float)	ANALOG
0860	PROFILE	PRFL_C1	4 Byte (Float)	ANALOG
0862	PROFILE	PRFL_C2	4 Byte (Float)	ANALOG
0864	PROFILE	PRFL_C3	4 Byte (Float)	ANALOG
0866	PROFILE	PRFL_C4	4 Byte (Float)	ANALOG
0868	PROFILE	PRFL_C5	4 Byte (Float)	ANALOG
0870	PROFILE	PRFL_C6	4 Byte (Float)	ANALOG
0872	PROFILE	PRFL_C7	4 Byte (Float)	ANALOG
0874	PROFILE	PRFL_C8	4 Byte (Float)	ANALOG
0876	PROFILE	PRFL_C9	4 Byte (Float)	ANALOG
0878	PROFILE	PRFL_C10	4 Byte (Float)	ANALOG
0880	PROFILE	PRFL_C11	4 Byte (Float)	ANALOG
0882	PROFILE	PRFL_C12	4 Byte (Float)	ANALOG
0884	PROFILE	PRFL_C13	4 Byte (Float)	ANALOG
0886	PROFILE	PRFL_C14	4 Byte (Float)	ANALOG
0888	PROFILE	PRFL_C15	4 Byte (Float)	ANALOG

Ek 3 - Modbus RTU Communication Addresses

Address	Group	Name	Size	Type
0890	PROFILE	PRFL_C16	4 Byte (Float)	ANALOG
0892	PID CONTROL	PID_C1	4 Byte (Float)	ANALOG
0894	PID CONTROL	PID_C2	4 Byte (Float)	ANALOG
0896	PID CONTROL	PID_C3	4 Byte (Float)	ANALOG
0898	PID CONTROL	PID_C4	4 Byte (Float)	ANALOG
0900	PID CONTROL	PID_C5	4 Byte (Float)	ANALOG
0902	PID CONTROL	PID_C6	4 Byte (Float)	ANALOG
0904	PID CONTROL	PID_C7	4 Byte (Float)	ANALOG
0906	PID CONTROL	PID_C8	4 Byte (Float)	ANALOG
0908	PID CONTROL	PID_C9	4 Byte (Float)	ANALOG
0910	PID CONTROL	PID_C10	4 Byte (Float)	ANALOG
0912	PID CONTROL	PID_C11	4 Byte (Float)	ANALOG
0914	PID CONTROL	PID_C12	4 Byte (Float)	ANALOG
0916	PID CONTROL	PID_C13	4 Byte (Float)	ANALOG
0918	PID CONTROL	PID_C14	4 Byte (Float)	ANALOG
0920	PID CONTROL	PID_C15	4 Byte (Float)	ANALOG
0922	PID CONTROL	PID_C16	4 Byte (Float)	ANALOG
0924	SLOT 1 ANALOG INPUTS	AIN_S1C1	4 Byte (Float)	ANALOG
0926	SLOT 1 ANALOG INPUTS	AIN_S1C2	4 Byte (Float)	ANALOG
0928	SLOT 1 ANALOG INPUTS	AIN_S1C3	4 Byte (Float)	ANALOG
0930	SLOT 1 ANALOG INPUTS	AIN_S1C4	4 Byte (Float)	ANALOG
0932	SLOT 1 ANALOG INPUTS	AIN_S1C5	4 Byte (Float)	ANALOG

Address	Group	Name	Size	Type
0934	SLOT 1 ANALOG INPUTS	AIN_S1C6	4 Byte (Float)	ANALOG
0936	SLOT 2 ANALOG INPUTS	AIN_S2C1	4 Byte (Float)	ANALOG
0938	SLOT 2 ANALOG INPUTS	AIN_S2C2	4 Byte (Float)	ANALOG
0940	SLOT 2 ANALOG INPUTS	AIN_S2C3	4 Byte (Float)	ANALOG
0942	SLOT 2 ANALOG INPUTS	AIN_S2C4	4 Byte (Float)	ANALOG
0944	SLOT 2 ANALOG INPUTS	AIN_S2C5	4 Byte (Float)	ANALOG
0946	SLOT 2 ANALOG INPUTS	AIN_S2C6	4 Byte (Float)	ANALOG
0948	SLOT 3 ANALOG INPUTS	AIN_S3C1	4 Byte (Float)	ANALOG
0950	SLOT 3 ANALOG INPUTS	AIN_S3C2	4 Byte (Float)	ANALOG
0952	SLOT 3 ANALOG INPUTS	AIN_S3C3	4 Byte (Float)	ANALOG
0954	SLOT 3 ANALOG INPUTS	AIN_S3C4	4 Byte (Float)	ANALOG
0956	SLOT 3 ANALOG INPUTS	AIN_S3C5	4 Byte (Float)	ANALOG
0958	SLOT 3 ANALOG INPUTS	AIN_S3C6	4 Byte (Float)	ANALOG
0960	SLOT 4 ANALOG INPUTS	AIN_S4C1	4 Byte (Float)	ANALOG
0962	SLOT 4 ANALOG INPUTS	AIN_S4C2	4 Byte (Float)	ANALOG
0964	SLOT 4 ANALOG INPUTS	AIN_S4C3	4 Byte (Float)	ANALOG
0966	SLOT 4 ANALOG INPUTS	AIN_S4C4	4 Byte (Float)	ANALOG
0968	SLOT 4 ANALOG INPUTS	AIN_S4C5	4 Byte (Float)	ANALOG
0970	SLOT 4 ANALOG INPUTS	AIN_S4C6	4 Byte (Float)	ANALOG
0972	SLOT 1 AIN ALARM 1	-----	4 Byte (Integer)	DIGITAL
0974	SLOT 2 AIN ALARM 1	-----	4 Byte (Integer)	DIGITAL
0976	SLOT 3 AIN ALARM 1	-----	4 Byte (Integer)	DIGITAL

Ek 3 - Modbus RTU Communication Addresses

Address	Group	Name	Size	Type
0978	SLOT 4 AIN ALARM 1	-----	4 Byte (Integer)	DIGITAL
0980	SLOT 1 AIN ALARM 2	-----	4 Byte (Integer)	DIGITAL
0982	SLOT 2 AIN ALARM 2	-----	4 Byte (Integer)	DIGITAL
0984	SLOT 3 AIN ALARM 2	-----	4 Byte (Integer)	DIGITAL
0986	SLOT 4 AIN ALARM 2	-----	4 Byte (Integer)	DIGITAL
0988	SLOT 1 AIN FAULT	-----	4 Byte (Integer)	DIGITAL
0990	SLOT 2 AIN FAULT	-----	4 Byte (Integer)	DIGITAL
0992	SLOT 3 AIN FAULT	-----	4 Byte (Integer)	DIGITAL
0994	SLOT 4 AIN FAULT	-----	4 Byte (Integer)	DIGITAL
0996	SLOT 1 AIN TOTS	AINTOT_C1	8 Byte (Float)	ANALOG
1000	SLOT 1 AIN TOTS	AINTOT_C2	8 Byte (Float)	ANALOG
1004	SLOT 1 AIN TOTS	AINTOT_C3	8 Byte (Float)	ANALOG
1008	SLOT 1 AIN TOTS	AINTOT_C4	8 Byte (Float)	ANALOG
1012	SLOT 1 AIN TOTS	AINTOT_C5	8 Byte (Float)	ANALOG
1016	SLOT 1 AIN TOTS	AINTOT_C6	8 Byte (Float)	ANALOG
1020	SLOT 2 AIN TOTS	AINTOT_C1	8 Byte (Float)	ANALOG
1024	SLOT 2 AIN TOTS	AINTOT_C2	8 Byte (Float)	ANALOG
1028	SLOT 2 AIN TOTS	AINTOT_C3	8 Byte (Float)	ANALOG
1032	SLOT 2 AIN TOTS	AINTOT_C4	8 Byte (Float)	ANALOG
1036	SLOT 2 AIN TOTS	AINTOT_C5	8 Byte (Float)	ANALOG
1040	SLOT 2 AIN TOTS	AINTOT_C6	8 Byte (Float)	ANALOG
1044	SLOT 3 AIN TOTS	AINTOT_C1	8 Byte (Float)	ANALOG

Ek 3 - Modbus RTU Communication Addresses

Address	Group	Name	Size	Type
1048	SLOT 3 AIN TOTS	AINTOT_C2	8 Byte (Float)	ANALOG
1052	SLOT 3 AIN TOTS	AINTOT_C3	8 Byte (Float)	ANALOG
1056	SLOT 3 AIN TOTS	AINTOT_C4	8 Byte (Float)	ANALOG
1060	SLOT 3 AIN TOTS	AINTOT_C5	8 Byte (Float)	ANALOG
1064	SLOT 3 AIN TOTS	AINTOT_C6	8 Byte (Float)	ANALOG
1068	SLOT 4 AIN TOTS	AINTOT_C1	8 Byte (Float)	ANALOG
1072	SLOT 4 AIN TOTS	AINTOT_C2	8 Byte (Float)	ANALOG
1076	SLOT 4 AIN TOTS	AINTOT_C3	8 Byte (Float)	ANALOG
1080	SLOT 4 AIN TOTS	AINTOT_C4	8 Byte (Float)	ANALOG
1084	SLOT 4 AIN TOTS	AINTOT_C5	8 Byte (Float)	ANALOG
1088	SLOT 4 AIN TOTS	AINTOT_C6	8 Byte (Float)	ANALOG
1092	SLOT 1 RELAY OUTPUTS	-----	4 Byte (Integer)	DIGITAL
1094	SLOT 2 RELAY OUTPUTS	-----	4 Byte (Integer)	DIGITAL
1096	SLOT 3 RELAY OUTPUTS	-----	4 Byte (Integer)	DIGITAL
1098	SLOT 4 RELAY OUTPUTS	-----	4 Byte (Integer)	DIGITAL
1100	SLOT 1 DIGITAL INPUTS	-----	4 Byte (Integer)	DIGITAL
1102	SLOT 2 DIGITAL INPUTS	-----	4 Byte (Integer)	DIGITAL
1104	SLOT 3 DIGITAL INPUTS	-----	4 Byte (Integer)	DIGITAL
1106	SLOT 4 DIGITAL INPUTS	-----	4 Byte (Integer)	DIGITAL
1108	SLOT 1 DIGITAL INPUTS	-----	4 Byte (Integer)	DIGITAL
1110	SLOT 2 DIGITAL INPUTS	-----	4 Byte (Integer)	DIGITAL
1112	SLOT 3 DIGITAL INPUTS	-----	4 Byte (Integer)	DIGITAL

Ek 3 - Modbus RTU Communication Addresses

Address	Group	Name	Size	Type
1114	SLOT 4 DIGITAL OUTPUTS	-----	4 Byte (Integer)	DIGITAL
1116	SLOT 1 ANALOG OUTPUTS	AOUT_C1	4 Byte (Float)	ANALOG
1118	SLOT 1 ANALOG OUTPUTS	AOUT_C2	4 Byte (Float)	ANALOG
1120	SLOT 1 ANALOG OUTPUTS	AOUT_C3	4 Byte (Float)	ANALOG
1122	SLOT 1 ANALOG OUTPUTS	AOUT_C4	4 Byte (Float)	ANALOG
1124	SLOT 2 ANALOG OUTPUTS	AOUT_C1	4 Byte (Float)	ANALOG
1126	SLOT 2 ANALOG OUTPUTS	AOUT_C2	4 Byte (Float)	ANALOG
1128	SLOT 2 ANALOG OUTPUTS	AOUT_C3	4 Byte (Float)	ANALOG
1130	SLOT 2 ANALOG OUTPUTS	AOUT_C4	4 Byte (Float)	ANALOG
1132	SLOT 3 ANALOG OUTPUTS	AOUT_C1	4 Byte (Float)	ANALOG
1134	SLOT 3 ANALOG OUTPUTS	AOUT_C2	4 Byte (Float)	ANALOG
1136	SLOT 3 ANALOG OUTPUTS	AOUT_C3	4 Byte (Float)	ANALOG
1138	SLOT 3 ANALOG OUTPUTS	AOUT_C4	4 Byte (Float)	ANALOG
1140	SLOT 4 ANALOG OUTPUTS	AOUT_C1	4 Byte (Float)	ANALOG
1142	SLOT 4 ANALOG OUTPUTS	AOUT_C2	4 Byte (Float)	ANALOG
1144	SLOT 4 ANALOG OUTPUTS	AOUT_C3	4 Byte (Float)	ANALOG
1146	SLOT 4 ANALOG OUTPUTS	AOUT_C4	4 Byte (Float)	ANALOG
1148	SLOT 1 ANALOG OUTPUT FAULT	-----	4 Byte (Integer)	DIGITAL
1150	SLOT 2 ANALOG OUTPUT FAULT	-----	4 Byte (Integer)	DIGITAL
1152	SLOT 3 ANALOG OUTPUT FAULT	-----	4 Byte (Integer)	DIGITAL
1154	SLOT 4 ANALOG OUTPUT FAULT	-----	4 Byte (Integer)	DIGITAL

Appendix 4 - Barcode Reader

Rear panel USB port serve as a hub to 2D Barcode scanners which are prevalently adapted in certain industrial application for easy and secure data input devices. All standard input windows in the device such as numeric and text boxes support barcode scanner input. In addition, barcode scanners provide several advantages in batch recording operations. These operations are Start Batch, Stop Batch and Batch Name Input. Barcode scanner should be configured as an USB keyboard emulator and barcode termination character should be set to horizontal tab (ASCII 9). In order to start a batch, "START" barcode is scanned first and than Batch Name barcode is scanned just afterward in 15 seconds. Any scan after that time period will be discarded. Batches can be run concurrently thus user can start additional batches in the same way described earlier. Scanning STOP barcode first and scanning the Batch Name barcode afterward stops the respective batch.

START and STOP barcodes are given below.

K - Q
TSE-ISO-EN
9000

TS EN ISO 9001
Quality Management System Certificate

KY-PR110-0420-0