Elimko

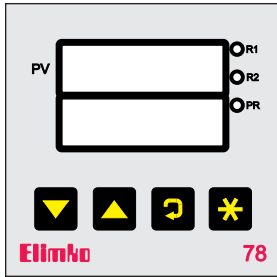## 1.DEFINITION

E-78-S device has been designed as a 6-digit counter controlled by a micro-processor, which can be used with pulse-output NPN or PNP sensors.

This device counts the impulses from the counter input. The counted value is multiplied by parameter P5CL 1, which is determined by the user, divided by by parameter P5CL2 and the resulting value is displayed on the upper screen. The value displayed is also compared with 5EE 1 and 5EE2 values, which are determined by the user, and controls the relays and the digital output. This device is able to convey its configuration parameters and outcomes to other devices by using the RS-485 port and the Modbus protocol. Furthermore, this device can be used as a timer by the function E ihEr on it. Details of the timer are provided in section **7.2 TIMER**.

2.TYPE CODING

E - 78 - W - X - Y - Z

W	Device Types	X	Output	Y	Communication	Z	Operating Voltage
S	Counter	0	None	0	None	0	85-265 VAC / 85-375 VDC
D	Rev/min	1	1 Relay	1	RS 485	1	20-60 VAC / 20-85 VDC
		2	2 Relays				

3.TECHNICAL SPECIFICATIONS

| Input Types	NPN/PNP Sensor
Control Output	Relay1: SPST 250 V AC, 3 A Relay2: SPDT 250 V AC, 3 A D.OUT: 24 V DC, 20 mA
Display Type	2 x 7-segment LED display, 9.14 mm, 6 digits
Operating Voltage	85-265 VAC 50-60 Hz/ 85-375 VDC 20-60 VAC 50-60 Hz/ 20-85 VDC
Power Consumption	4 W (7 VA)
Protection Class	Front Panel: IP 66 (NEMA 4X) Back Panel: IP 20
Operating Temperature	0 °C, +55 °C (w/o condensation and icing)
Storage Temperature	-25 °C, +65 °C (w/o condensation and icing)
Relay Mechanical Life	10 000 000 operations
Relay Electrical Life	>1 000 000 operations (under 1/10 of load)
Memory	EEPROM (100.000 max. write-erase)
Weight	150 g

4. DIMENSIONS
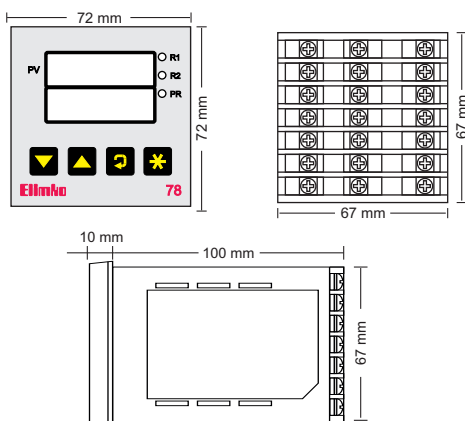
E-78-S controller is designed for panel mounting and should be used in an industrial environment.

○ The package of E-78-S controller contains;
   Controller
   2 pieces of mounting clamps
   User manual
   Guarantee certificate

○ 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 controller must only be performed by a person qualified in instrumentation.

○ Keep the unit away from flamable gases, that could cause explotions.

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

○ It is not used in medical applications.

5. PANEL MOUNTING
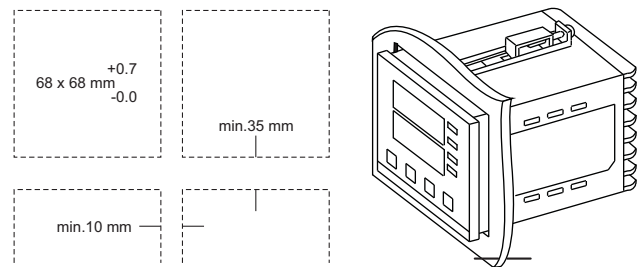

Panel Section and Minimum Intervals

max 15 mm

❑ Cut a hole in the panel. (See the figure for overall dimensions.)
❑ Slide the controller into the cutout from the front of the panel.
❑ Fit the mounting clamps to the controller, ensuring the lugs are located in their slots.
❑ Fasten the mounting clamps using the retaining screws.

○ E-78-S controller should be installed inside a suitable grounded metal enclosure (panel). This must prevent the live parts being accessible to human hands and metal tools.
○ E-78-S controller does not include a power switch. Therefore, the power supply to the controller and power outputs must be wired through the proper fuse or circuit breaker.
○ The cables used for powering the controller and the power outputs must conform to the standarts IEC 60245 and IEC 60227.

6. CONNECTION DIAGRAM

❑ Inputting HOLD would cease the counting process by the counter shown on the upper screen.
❑ Inputting RESET would reser the value of the counter on the upper screen.
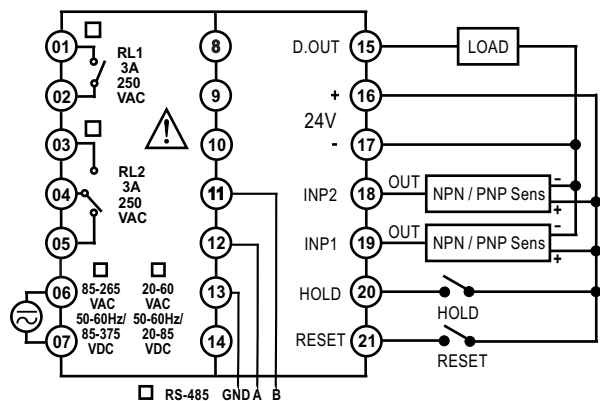
○ The terminals 01 to 07 are electrically live.
   While the instrument is powered, never touch to these terminals.
○ Before operating the controller, ensure that the controller is correctly configured. Incorrect configuration could result in damage to the process being controlled.

7.USE

A front view of an E-78-S series device is given in section **1.DEFINITION**. The led **R1** and **R2** are on when Relay 1 (RL1) and Relay 2 (RL2) are energized, respectively. **PR** led is on during configuration.

During normal operation, the process value PV is displayed on the upper screen, the value that is set on *d ISP2* parameter is displayed on the lower screen. While *d ISP2* parameter is selected *bAtCH*, the flowchart of display secreen is shown in **8. DESCRIPTION OF PARAMETERS.** While another parameter except BATCH is shown on lower screen according to *d ISP2* parameter, the selected parameter moves up *bAtCH* value.

Set values can be displayed and set by pressing the ▢ button while normal operation screen is displayed. While set points are being displayed, the ▲ and ▼ keys are used separately for adjusting a parameter, whereas they are used jointly for passing to digit-based adjusting mode. If ▼ and ✱ are pressed together up to 5 seconds, the counter value is reset while normal operation screen is displayed, the *bAtCH* value is reset while *bAtCH* value is displayed. While normal operation screen is displayed, if *bAtCH* value is diplayed on lower screen, the counter and *bAtCH* values are reset by pressing ▼ and ✱ keys up to 5 seconds. If no keys are hit for 25 seconds while the screen showing the set values are displayed, the normal operation screen comes back.

The other parameters of the device are adjusted from the configuration page.

❑ The configuration page is reached by hitting the ▢ and ✱ keys together.

❑ When these keys are hit, the message *Cod* is displayed on the upper screen, whereas *0* is displayed on the lower screen.

❑ The password must be entered correctly to adjust the parameters. If a wrong password is entered, the parameters would be displayed, but no change would be allowed.

❑ The default value of the password is "10". The password can be adjusted to a desired value by the parameter *SCod*. In case the password is forgotten, password control can be deactivated for once only by hitting the keys ▼, ▲ and ✱ simultaneously with the first 1 minute subsequent to energizing the device, so that the *SCod* parameter can be changed from the configuration page.

❑ After entering the password correctly, the parameters are reached by hitting the ▢ key.

❑ On the screen of the parameters, the ▢ key enables switching between parameters, whereas the ▼ and ▲ keys enable adjustment of parameters, and the ✱ key enables exiting from the configuration page.

❑ Digit-based adjustment is available for setting numeric parameters more conveniently. This setting mode is activated by hitting the ▼ and ▲ keys simultaneously. When this is done, the first digit would begin to blink. The blinking digit can be adjusted by using the ▼ and ▲ keys. Switching between digits can be done by the ✱ key. Finally, the ▢ is used for approving the adjusted parameter and exiting from the setting mode.
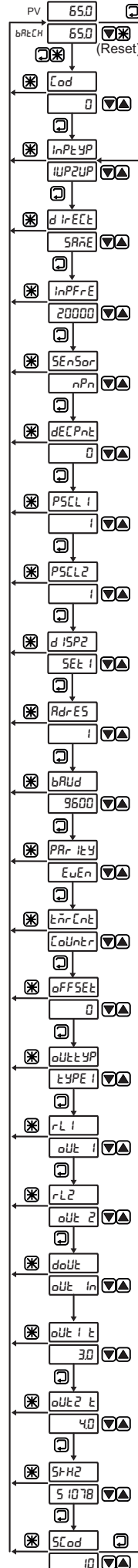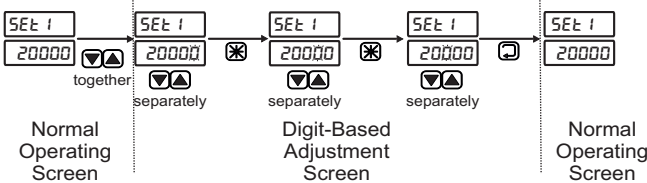
7.1 BATCH CONTROL

The *bAtCH* value on the device increases by one in types having Autoreset and displayed lower indicator within the main screen. Excluding the *bAtCH* type on the output types, the *bAtCH* value changes on the other forms, but no control action is performed. A control would be applied as illustrated in section 1**0. OUTPUT TYPES**, only when *bAtCH* output type is selected.

7.2 TIMER

The device can be used as a timer or a counter depending on the value selected for the *tMrCnt* parameter of the device. When it is adjusted as a timer, the device will count one out of 100 ms in positive or negative direction independent of any input. The counting direction is determined by the *d IrECt* parameter. This counted value can be adjusted to any desired value by the *PSCL1* and *PSCL2* parameters. If both of these parameters are set to 1, timer would change 10 times in each 1 second. Relays and the digital output are controlled based on the set points as described in the section **10. OUTPUT TYPES**.

7.3 DIGIT - BASED SETTING

SEt 1	SEt 1	SEt 1	SEt 1	SEt 1
20000 ▼▲	20000 ▼▲	20000 ▼▲	20000 ▼▲	20000
together	separately	separately	separately	
Normal Operating Screen		Digit-Based Adjustment Screen		Normal Operating Screen

(If the password is entered in correctly, the parameters are displayed, but not allowed to be adjusted.)

8.DESCRIPTION OF PARAMETERS

Cod: It is the value of the password for setting the parameters. Can be entered between 0 and 9999.

InPtYP: Determines the direction and type of counting. The 7 distinct types shown in section **9. ENTRY TYPES** can be selected.

d IrECt: Determines whether the same or opposite of the direction of the counting types shown in section **9. ENTRY TYPES** will be valid. It can be adjusted to either *SAmE* or *oPPoSt*.

InPFrE: Determines the maximum value of the frequency of the signal applied from INP1 and INP2 inputs. In the event that the applied single is greater than this value, the counter value would be incorrect, since the device would be unable to count correct.

SEnSor: Sets the type of the sensor connectable to the sensor inlet of the device. It can be set either to *nPn* or *PnP*.

dECPnt: This is the parameter determining the location of point in PV value and set values. It can be set to a value from 0 to 5.

PSCL1 and *PSCL2*: The value read from the input is multiplied by *PSCL1* and divided to *PSCL2*, and then shown in the screen. *PSCL1* can be adjusted to a value between 1 and 1000, whereas *PSCL2* between and 1 and 60000.

d ISP2: This parameter sets the value shown in the lower display screen in normal operation. It can be adjusted to *SEt1*, *SEt2* or *bAtCH*.

AdrES: This is the RS-485 communication address of the device. It can be adjusted to a value between 1 and 127. Devices connected to the same communication line must be addressed distinctly.

bAUd: This is the parameter determining the communication speed of the device. It can be adjusted to *4800*, *9600*, *19200*, and *38400*. The relevant parameters of the devices connected to the same communication line must be the same as the master.

PAr ItY: This is the parameter determining the communication parity. It can be adjusted to *nonE*, *odd* and *EuEn*. The relevant parameters of the devices connected to the same communication line must be the same as the master.

tMrCnt: Determines the function in which thedevice would be operated. When *t IMEr* is selected the device works as described in the section **TIMER**, whereas when is selected, it works as described in the section **9. INPUT TYPES**.

oFFSEt: Determined the value from which the counter starts to count. The counter starts to count from this value after every reset. It can be adjusted to a value between 0 and 999999.

outtYP: Determines the output form of the device. Any one of the types shown in section **10. OUTPUT TYPES** can be selected.

rL1: Determines the function of the Relay 1 (RL1). The functions selected as *out1*, *out1n*, *out2*, or *out2n* work as shown in section **10. OUTPUT TYPES**.

rL2: Determines the function of the Relay 2 (RL2). The functions selected as *out1*, *out1n*, *out2*, or *out2n* work as shown in section **10. OUTPUT TYPES**

dout: Determines the function of the digital output (D.OUT). The functions selected as selected as *out1*, *out1n*, *out2*, or *out2n* work as shown in section **10. OUTPUT TYPES**.

out1t: Determined the duration for Out1 to produce output. It can be set to a value between 0.1 and 999.9. When it is 0, *Cont* would be displayed on the screen and a continuous alarm is generated.

out2t: Determined the duration for Out2 to produce output. It can be set to a value between 0.1 and 999.9. When it is 0, *Cont* would be displayed on the screen and a continuous alarm is generated.

StHz: It is the calibration value. A 5 kHz signal is given from the INP1 input of the device. This parameter is saved by pressing the ▼ and ▲ keys together.

SCod: Determines the password value.

9. INPUT TYPES

	dIrECt SAñE	dIrECt oPPoSt
InPtYP IUP2dn	INP1 / INP2 / DISP	INP1 / INP2 / DISP
InPtYP IUP2UP	INP1 / INP2 / DISP	INP1 / INP2 / DISP
InPtYP IUP2Gt	INP1 / INP2 / DISP	INP1 / INP2 / DISP
InPtYP IUP2dr	INP1 / INP2 / DISP	INP1 / INP2 / DISP
InPtYP UP-4	INP1 / INP2 / DISP	INP1 / INP2 / DISP
InPtYP UPdn-2	INP1 / INP2 / DISP	INP1 / INP2 / DISP
InPtYP UPdn-1	INP1 / INP2 / DISP	INP1 / INP2 / DISP

10. OUTPUT TYPES

InPtYP IUP2UP IUP2Gt UP-4 — dIrECt SAñE

oUttYP tYPE 1 — When the value exceeds Set1 and Set2, generates Out1 and Out2 alarms, respectively. Outputs can be lasting or permanent. The value is set to Offset when Reset is hit.

oUttYP tYPE2 — When the value exceeds Set1 and Set2, generates Out1 and Out2 alarms, respectively. Outputs can be lasting or permanent. When the value is equal to Set2, waits for the Reset hit, becomes equal to Offset when it comes.

oUttYP tYPE3 — When the value exceeds Set1 and Set2, generates Out1 and Out2 alarms, respectively. Out1 can work lasting or permanent, whereas Out2 can work only lasting. The value is set to Offset when Reset is hit.

oUttYP tYPE4 — When the value exceeds Set1 and Set2, generates Out1 and Out2 alarms, respectively. Out1 can work lasting or permanent, whereas Out2 can work only lasting. When the value reaches to Set2, it Autoeresets and sets to Offset.

oUttYP tYPE5 — When the value exceeds Set1 and Set2, generates Out1 and Out2 alarms, respectively. It Autoresets when the pulse duration of Out2 is over. The value sets to Offset. Out1 can work lasting or permanent, whereas Out2 can work only lasting.

InPtYP IUP2UP IUP2Gt UP-4 — dIrECt SAñE

oUttYP tYPE6 — When the value exceeds Set1 and Set2, Out1 and Out2 generates alarm, respectively. It Autoresets when the pulse duration of Out2 is over. Out1 can work lasting or permanent, Out2 can work only lasting.

oUttYP tYPE7 — When the value exceeds Set1 and Set2, Out1 and Out2 generates alarm, respectively. It Autoresets and counting continues, but Set2 is displayed on the screen. When the pulse duration of Out2 is over, continues counting from where it left off. Out1 can work lasting or permanent, Out2 can work only lasting.

InPtYP IUP2UP IUP2Gt UP-4 — dIrECt oPPoSt

oUttYP tYPE 1 — Counts back from Set2 upon each Reset impulse. When the value falls below Set1, Out1 generates alarm; when it becomes equal to Offset value, Out2 generates alarm, the value sets to 999999. Outputs can work lasting or permanent.

oUttYP tYPE2 — Counts back from Set2 upon each Reset impulse. When the value falls below Set1, Out1 generates alarm; when it becomes equal to Offset value, Out2 generates alarm, the value sets to Offset. Outputs can work lasting or permanent.

oUttYP tYPE3 — Counts back from Set2 upon each Reset impulse. When the value falls below Set1, Out1 generates alarm; when it becomes equal to Offset value, Out2 generates alarm, the value sets to 999999. Out1 can work lasting or permanent, Out 2 can work only lasting.

oUttYP tYPE4 — When the value falls below Set1, Out1 generates alarm; when it becomes equal to Offset, Out2 generates alarm and Autoresets. Out1 can work lasting or permanent, Out 2 can work only lasting.

oUttYP tYPE5 — When the value falls below Set1, Out1 generates alarm; when it becomes equal to Offset, Out2 generates alarm. Out2 Autoresets when its pulse duration is over. The value sets to Set2. Out1 can work lasting or permanent, Out 2 can work only lasting.

oUttYP tYPE6 — When the value falls below Set1, Out1 generates alarm; when it becomes equal to Offset, Out2 generates alarm and the counting stops. Out2 Autoresets when its pulse duration is over. The value sets to Set2. Out1 can work lasting or permanent, Out 2 can work only lasting.

oUttYP tYPE7 — When the value falls below Set1, Out1 generates alarm; when it becomes equal to Offset, Out2 generates alarm. It Autoresets and continue counting. But the Offset value is displayed on the screen. Out2 continues counting from where it left off. Out1 can work lasting or permanent, Out 2 can work only lasting.

InPtYP IUP2dn IUP2dr UPdn-1 UPdn-2

oUttYP tYPE 1 — When the value is increasing and equal to or greater than Set1, Out1 generates alarm; when it is equal to or greater than Set2, Out2 generates alarm. When the value is decreasing and less than or equal to Set1, Out1 generates alarm; when it is less than or equal to Set2, Out2 generates alarm. When reset impulse value is in the increase direction it sets to Offset, when reset impulse value is in the decrease direction, it sets to 999999. Outputs can work lasting or permanent.

oUttYP tYPE2 — When the value is increasing and equal to or greater than Set1, Out1 generates alarm; when it is equal to or greater than Set2, Out2 generates alarm. When the value is decreasing and less than or equal to Set1, Out1 generates alarm; when it is less than or equal to Set2, Out2 generates alarm. Counting stops and Reset is waited for when the value reaches to Set2 during the change in both directions. When reset impulse value is in the increase direction it sets to Offset, when reset impulse value is in the decrease direction, it sets to 999999. Outputs can work lasting or permanent.

Left column — input type / output type diagrams

	inPtYP IUP2dn IUP2dr UPdn-1 UPdn-2	
oUttYP tYPE3		When the value is increasing and equal to or greater than Set1, Out1 generates alarm when it is equal to or greater than Set2, Out2 generates alarm. When the value is decreasing and less than or equal to Set1, Out1 generates alarm; when it is less than or equal to Set2, Out2 generates alarm. It sets to Offset when the reset impulse value is in increasing direction. It sets to 999999 when in decreasing direction. Out1 can work lasting or permanent, Out 2 can work only lasting.
oUttYP tYPE4		When the value is increasing and greater than or equal to Set1, Out1 generates alarm; when it is equal Set2, Out2 generates alarm. Device Autoresets and value sets to Offset. When the value is decreasing and less than or equal to Set1, Out1 generates alarm; when it is less equal to Set2, Out2 generates alarm. Device Autoresets and value sets to 999999. Out1 can work lasting or permanent, Out 2 can work only lasting.
oUttYP tYPE5		When the value is increasing and equal to or greater than Set1, Out1 generates alarm; when it is equal to or greater than Set2, Out2 generates alarm. Device counts until the end of the pulse duration of Out2, when duration is over, it Autoresets and the value sets to Offset. When the value is decreasing and less than or equal to Set1, Out1 generates alarm; when it is less than or equal to Set2, Out2 generates alarm. Device counts until the end of the pulse duration of Out2, when duration is over, it Autoresets and the value sets to 999999. Out1 can work lasting or permanent, Out 2 can work only lasting.
oUttYP tYPE6		When the value is increasing and greater than or equal to Set1, Out1 generates alarm; when it is equal Set2, Out2 generates alarm. Device waits until the end of the pulse direction of Out2. When duration is over, it Autoresets and the value sets to Offset. When the value is decreasing and less than or equal to Set1, Out1 generates alarm; when it is less equal to Set2, Out2 generates alarm. Device waits until the end of the pulse direction of Out2. When duration is over, it Autoresets and the value sets to 999999. Out1 can work lasting or permanent, Out 2 can work only lasting.
oUttYP tYPE7		When the value is increasing and greater than or equal to Set1, Out1 generates alarm; when it is equal to Set2, Out2 generates alarm. Device Autoresets and the value sets to Offset. Device continues counting, but Set2 is displayed on the screen. When the pulse duration of Out2 is over, it continues counting from where it left off. When the value is decreasing and less than or equal to Set1, Out1 generates alarm; when it is equal to Set2, Out2 generates alarm. Device Autoresets and the value sets to 999999. Device continues counting, but Set2 is displayed on the screen. It continues counting from where it left off, when the pulse duration of Out2 is over. Out1 can work lasting or permanent, Out 2 can work only lasting.
oUttYP tYPE8		When the value is equal to Set1, Out1 generates alarm; when it is equal to Set2, Out2 generates alarm. The value sets to 0 with the reset pulse. Device counts between -999999 and 999999.
oUttYP tYPE9		When the value is less than or equal to Set1, Out1 generates alarm; when it is greater than or equal to Set2, Out2 generates alarm. The value sets to 0 with the reset pulse. Device counts between -999999 and 999999.
oUttYP tYPE 10		When the value is greater than or equal to Set1, Out1 generates alarm; when it is greater than or equal to Set2, Out2 generates alarm. The value sets to 0 with the reset pulse. Device counts between -999999 and 999999.

11. BATCH KONTROL

	oUttYP bAtCH	
d IrECt SAmE		When the counter value reaches to Set1, it Autoresets and sets to Offset. Out1 alarms and the Batch value increases by one. When the Batch value reaches to Set2, Out2 alarms and the Batch value sets to 0.
d IrECt oPPoSt		When the counter value reaches to Set1, it Autoresets and sets to Offset. Out1 alarms and the Batch value increases by one. When the Batch value reaches to Set2, Out2 alarms and the Batch value sets to 0.

NOTE 1: When alarm status in the alarm functions is selected oUt 1 and oUt2, the output is active, whereas oUt 1n and oUt2n is selected, the output is not active.

NOTE 2:

Continuous active output: In such outputs, a continuous output can be obtained as long as the conditions are met.

Lasting or permanently active output: In such outputs, oUt 1t and oUt2t determines the width of the black-covered part. If a continuous output is required, the parameter of the required output must be set as Cont.

Merely lasting active output: In such outputs, the duration of the output is determined by the user. If oUt 1t and oUt2t are set Cont, the output would not alarm.

12. MODBUS ADRESLERİ

ADDRESS	PARAMETER	DESCRIPTION	TYPE	MIN.	MAX.
0	PV (hi)		R		
1	PV (lo)		R		
2	bAtCH (hi)		R		
3	bAtCH (lo)		R		
4	inPtYP	0: IUP2dn, 1: IUP2UP, 2: IUP2Gt, 3: IUP2dr, 4:UP-4, 5:UPdn-2, 6:UPdn-1	R/W	0	6
5	d IrECt	0:SAmE, 1:oPPoSt	R/W	0	1
6	inPFrE		R/W	1	20000
7	SEnSor	0:nPn, 1:PnP	R/W	0	1
8	dECPnt		R/W	0	5
9	PSCL 1		R/W	1	1000
10	PSCL2		R/W	1	60000
11	AdrES		R/W	1	127
12	bAUd	0:4800, 1:9600, 2: 19400, 3:38800	R/W	0	3
13	PAr ItY	0:nonE, 1:odd, 2:EvEn	R/W	0	2
14	F ILtEr	0:t ImEr, 1:CoUntr	R/W	0	16
15	oUttYP	0:tYPE1, 1:tYPE2, 2:tYPE3, 3:tYPE4, 4:tYPE5, 5:tYPE6, 6:tYPE7, 7:tYPE8, 8:tYPE9, 9:tYPE 10, 10:bAtCH	R/W	0	10
16	rL 1	0:oUt 1, 1:oUt 1n, 2:oUt 2, 3:oUt 2n	R/W	0	3
17	rL2		R/W	0	3
18	doUt		R/W	0	3
19	oUt 1 t		R/W	0	9999
20	oUt2 t		R/W	0	9999
21	SCod		R/W	0	9999
22	oFFSEt (hi)		R/W	0	15
23	oFFSEt (lo)		R/W	0	65535
24	SEt 1 (hi)		R/W	0	15
25	SEt 1 (lo)		R/W	0	65535
26	SEt2 (hi)		R/W	0	15
27	SEt2 (lo)		R/W	0	65535

R : Read, **W :** Write

NOTE 1: Device can communicate by using the functions 03, 06, and 16 in the modbus communication protocol. These protocols have been specified in the protocol as 03 Read Holding Registers, 06 Write Single Register, and 16 Write Multiple Registers.

NOTE 2: Since the parameters between 0 and 3 and between 19 and 24 in the modbus address table are 32-bit, they have been addressed 2 pieces of 16-bit values. These 16-bit parameters have been shown as lo and hi. Values required to be assigned to or read from a parameter can be calculated through the following formula.

Parameter=(Parameter(hi)x65535)+Parameter(lo)

KY-78-S-0724-0

Manufacturer / Technical Support:
Elimko Elektronik İmalat ve Kontrol Ticaret Ltd. Şti.
Ankara Sanayi Odası 2. Organize Sanayi Bölgesi Alcı OSB Mahallesi 2001. Cad. No:14 Temelli 06909 Ankara / TÜRKİYE
Tel: +90 312 212 64 50 (Pbx) • Fax: +90 312 212 41 43 • E-mail: elimko@elimko.com.tr • www.elimko.com.tr

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