E-FT-10 device control units are designed for rail mounting and should be used in an industrial environment.

- The package of E-FT-10 device contains;
  Device
  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 device, 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 feamable gases, that could cause explosion.
- Do not use alcohol or other solvents to clean the device. Use a clean cloth soaked in water tightly squeezed to gently wipe the outer surface of the device.
- The lifetime of device is 10 years.

1. INTRODUCTION

Figure 1.1 FT-10 Front Panel

E-FT-10 is a programmable timer which has pressure control unit, is used in filter cleaning system. Device contains a control unit and output units, that are controlled by control unit. Control unit controls the output units on communication line. Operating and selonoid voltages of output units are supplied from control unit. Control unit has 8 outputs, each output unit has up to 16 outputs. Outputs can switch maximum 250 VAC, 1A. Device has 2 alarm relays. These relays can give an alarm to user, if any problem exists on output selonoids. RS-485 communication line on the device works according to Modbus protocol. Configuration parameters and error messages can also be viewed using Modbus. Outputs scanning order is configured by comminucation line. Device has 2 different kind of pressure input according to device type code, that is explained in **1.1 TYPE CODING**. If U (TYPE CODING) is selected as “1”, pressure inputs are connected on quick connect, that is shown as LO and HI on the front panel. In this case, differential pressure is measured by internal pressure sensor. If U (TYPE CODING) is selected as “2”, an analog signal (current or voltage) is connected to analog input of device. In these two different situation, pressure value is shown on display, retransmitted on analog output. Device can perform ON/OFF or proportional control according to pressure value. These control methods are explained in **4.1 CONTROL TYPES**.

1.1. TYPE CODING

E - FT - 10 - T - U - V - W - X - Y - Z

Operating Voltage
0: 85-265 VAC / 85-375 VDC
1: 20-60 VAC / 20-85 VDC

Panel
0: None **1:** Panel

Selonoid Voltage
0: None
1: Yes
(220 VAC, 24 VAC, 24 VDC) [2]

Communication
0: None **1:** RS-485

Analog Output
0: None
1: 1 Analog Output

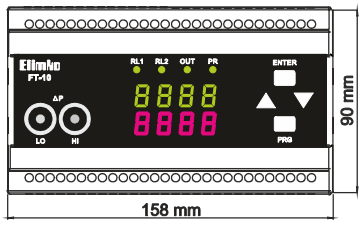
Number of Output
8: 8 relays **72:** 72 relays
16: 16 relays **80:** 80 relays
24: 24 relays **88:** 88 relays
32: 32 relays **96:** 96 relays
40: 40 relays **104:** 104 relays
48: 48 relays **112:** 112 relays
56: 56 relays **120:** 120 relays
64: 64 relays **128:** 128 relays

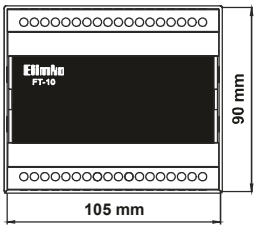
Pressure Control [1]
0: None
1: Pressure Sensor
2: Analog Input (4 - 20 mA)
3: Analog Input (0 - 10 V DC)

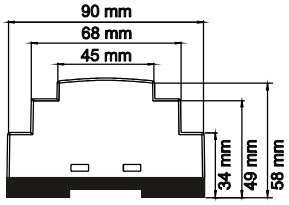
1.2. TECHNICAL SPECIFICATION

Operating Voltage	85-265 V AC / 85-375 V DC 20-60 V AC / 20-85 V DC
Display Type	2x4 digit 10 mm 7 segment display
Alarm Outputs	Relay: SPST-NO 250 V AC, 3 A
Retransmission Output	Current: 0-20 mA, 4-20 mA (isolated)
Relay Outputs	Minimum 8 Relays, maximum 128 Relays SPST-NO 250 V AC, 1 A
Relay Mechanical Life	10 000 000 operation
Relay Electrical Life	Almost same as mechanical life, because the switching is made with semiconductor.
Control Type	On/Off, Proportional(P)
Power Consumption	7W (10 VA)
Operating Temperature	0 °C, +55 °C (With no condensation or icing)
Storage Temperature	-25 °C, +55 °C (With no condensation or icing)
Memory	EEPROM max. 10000 writing
Weight	400 g

1.3. DIMENSIONS





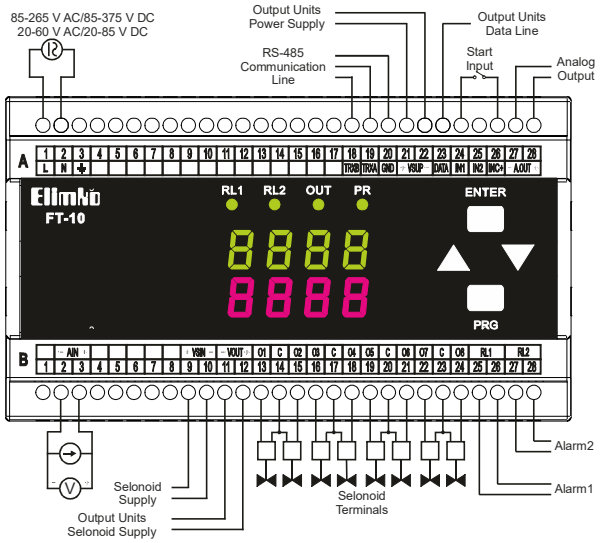


[1] Pressure sensor of device works in ±7kPa range.
If pressure control is selected as analog input, input type and input range must be defined on order.

[2] When X is selected as “1” (Solenoid Voltage Yes) than Y must be selected as “1”.
When X is selected as “1” factory default is 24 VDC.

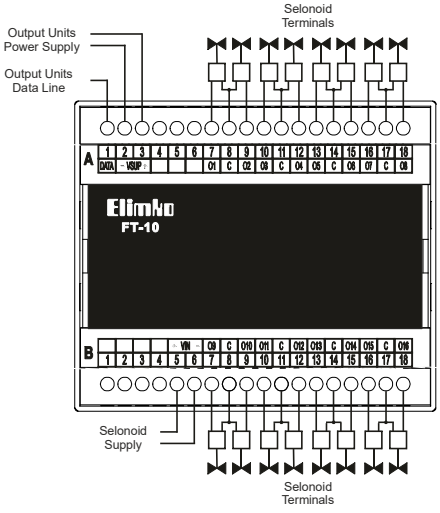
2. CONNECTION DIAGRAMS

2.1. CONTROL UNIT CONNECTION DIAGRAM



- A21 and A22 (+VSUP-) terminals are power supply of output units and are connected to A2 and A3 terminals of output units. A23 (DATA) terminal is data line of output units, and are connected to A1 terminal of output units. These terminals must be connected in order to power output units.
- Selonoids supply voltage must be connected B9 and B10 (+VSIN-) terminals.
- B11 and B12 (-VOUT+) terminals must be connected to B5 and B6 (+VIN-) terminals of output units for selonoid supply voltage on output units. If these terminals are not connected, all of selonoids on output units are open circuit, so device gives alarm and selonoids are not powered.
- Alarm1 and Alarm2 give alarm according to different alarm source, that is explained **4.2 ALARM RELAYS**.

2.2. OUTPUT UNIT CONNECTION DIAGRAM



- Control Unit A1-A3, B9-B28, output unit A7-A18, B5-B18 terminals have dangerous voltage. While device is powered, never touch to these terminals.
- Before operating the device, ensure that the device is correctly configured. Incorrect configuration could result malfunction.

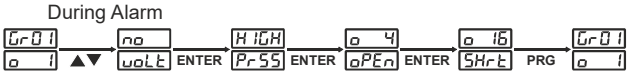
3. USAGE

E-FT-10 front panel image is shown in **1.INTRODUCTION** part. **RL1** led lights when Relay1 (RL1) is powered, **RL2** led lights when Relay2 (RL2) is powered, **OUT** led lights when any selonoid output is powered, and **PR** led lights during configuration mode.
During normal operation page, active group number (XX) is shown on the top display like as (GrXX), and active output number (YYY) is shown on the bottom display like as (oYYY).
During normal operation page, **ENTER** button is used for displaying differential pressure and set values and changing set values. While SEtL and SEtH parameters are shown, ▲ and ▼ buttons change the set values and **PRG** button reverts to the normal operation page.
During normal operation page, if ▲ and ▼ buttons are pressed together, error message display is opened. During error message display, **ENTER** button is used for scanning outputs that have an error, **PRG** button reverts to the normal operation page.
Except the normal operation page, if any button isn't pressed for more than 25 seconds, device reverts to normal operation page automatically.
Configuration page is opened to configure other parameters of device.

- ❑ Pressing **PRG** button for more over 2 seconds enters the configuration page.
- ❑ When the configuration page is entered, Cod message is shown on the top display and 0 is shown on the bottom display. Security code must be entered correctly to configure the parameters. If the security code is entered incorrectly, parameters are showned, but parameters can not be changed.
- ❑ Factory setting of the security code is "10". The security code can be changed with SCod parameter. If the security code is forgotten, repower the device and pressing **ENTER**, ▲ and ▼ buttons together with in 1 minute after start up. After that security code control isn't made one time to enter configuration page, so the security code can be changed with SCod parameter.
- ❑ When the security code is entered correctly, pressing **ENTER** button enters the configuration pages.
- ❑ During configuration pages, ▲ and ▼ buttons select pages, **ENTER** button enters to the selected page, **PRG** button reverts to normal operation page.
- ❑ While in configuration pages, **ENTER** button selects parameters, ▲ and ▼ buttons change the value of parameters, **ENTER** button is pressed for more over 1 second for revert to configuration pages display, **PRG** button reverts to normal operation page.

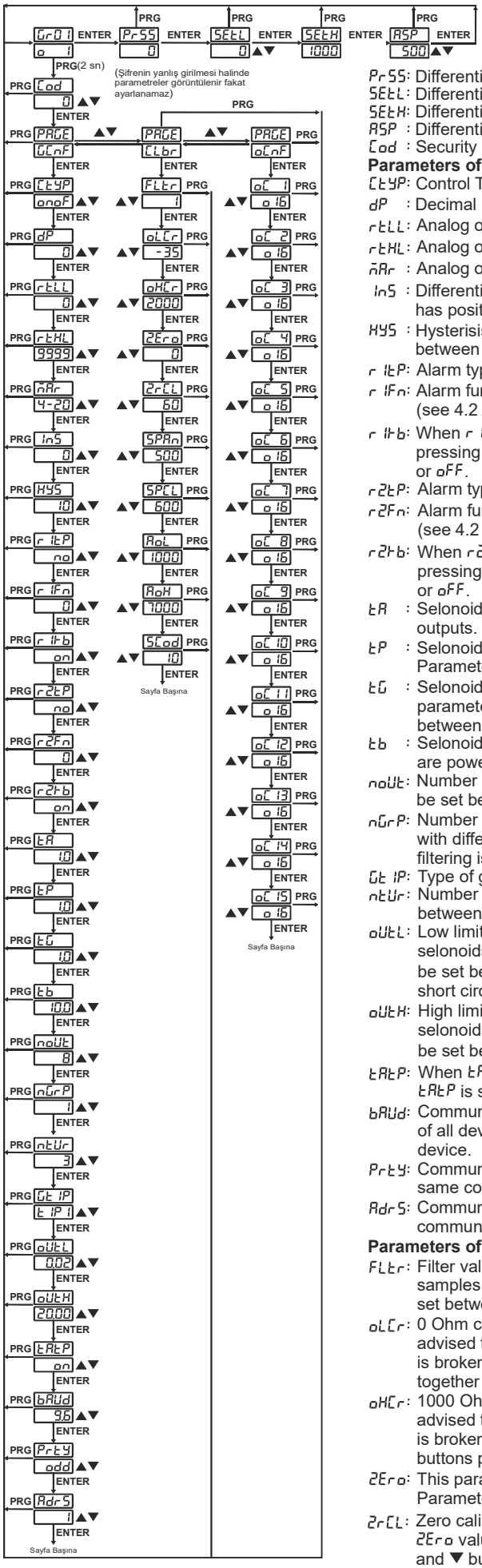
NOTE : Error Message Display (see **3.2 DISPLAY FIGURES**)

During Alarm



During None Alarm

3.1. PARAMETERS EXPLANATIONS



PrSS: Differential pressure value.
SEtL: Differential pressure value low set value. Parameter can be set between -1999 and SEtH.
SEtH: Differential pressure value high set value. Parameter can be set between SEtL and 9999.
ASP : Differential pressure value alarm set value. Parameter can be set between -1999 and 9999.
Cod : Security code value for setting parameters. Security code enters between 0 and 9999.

Parameters of GCnF Page

CtYP: Control Type. Parameter can set nonE, onoF or PropP. (Refer to 4.1. CONTROL TYPES)
dP : Decimal point of differential pressure. Parameter can be set between 0 and 3.
rtLL: Analog output retransmission low level. Parameter can be set between -1999 and 9999.
rtHL: Analog output retransmission high level. Parameter can be set between -1999 and 9999.
ñAr : Analog output retransmission current range. Parameter can be set 0-20, 20-0, 4-20, 20-4.
InS : Differential pressure offset value. According to that paramater, differential pressure value has positiveor negative offset. Parameter can be set between -1999 and 9999.
HYS : Hysterisis value of differential pressure alarm set value (ASP). Parameter can be set between 0 and 9999.
r 1tP: Alarm type of RL1 alarm relay. Parameter can be set no or nC.(see Table 4)
r 1Fn: Alarm function of RL1 alarm relay. Parameter can be set between 0 and 15. (see 4.2 ALARM RELAYS)
r 1Hb: When r 1Hb is selected on, in case of an alarm, user must acknowledge the alarm by pressing ▲ and ▼buttons in order to deactivate alarm output. Parameter can be set on or oFF.
r2tP: Alarm type of RL2 alarm relay. Parameter can be set no or nC.(see Table 4)
r2Fn: Alarm function of RL2 alarm relay. Parameter can be set between 0 and 15. (see 4.2 ALARM RELAYS)
r2Hb: When r2Hb is selected on, in case of an alarm, user must acknowledge the alarm by pressing ▲ and ▼buttons in order to deactivate alarm output.Parameter can be set on or oFF.
tA : Selonoid outputs break time. This parameter determines the break time between two outputs. Parameter can be set between 0.1 and 999.9 in seconds.
tP : Selonoid outputs pulse time. This parameter determines the pulse time of each outputs. Parameter can be set between 0.1 and 100.0 in seconds.
tG : Selonoid outputs group break time. While nGrP parameter is higher than “1”, this parameter determines the break time between each group. Parameter can be set between 0.1 and 999.9 in seconds.
tb : Selonoid outputs waiting time. This parameter determines waiting time, after all outputs are powered. Parameter can be set between 0.1 and 999.9 in seconds.
noUt: Number of outputs. This parameter determines the number of outputs. Parameter can be set between 1 and 128.
nGrP: Number of groups. This parameter determines number of groups while filtering is done with different groups. Parameter can be set between 1 and 16. If this parameter set “1”, filtering is done only one group.
Gt IP: Type of group operation. Parameter can be selected t1 P1 and t1 P2.
ntUr: Number of selonoids scanning after deactivation of start input. Parameter can be set between 0 and 50.
oUtL: Low limit of internal impedance of selonoids. If the impedance measurement of selonoids are lower than that value, device gives a short circuit alarm. Parameter can be set between 0.00 kΩ and oUtH. If this parameter set to “0" the device dosen’t control short circuit.
oUtH: High limit of internal impedance of selonoids. If the impedance measurement of selonoids are higher than that value, device gives an open circuit alarm. Parameter can be set between oUtL and 30.00 kΩ.
tAtP: When tAtP is selected as oFF, faulty selonoids are skipped immediately, and when tAtP is selected as on, all the timings work as usual. Parameter can be set on or oFF.
bAUd: Communication baud rate. Parameter can be set 4.8, 9.6, 19.2 or 38.4 kBaud. Baud rate of all devices in same communication line should be the same as baud rate of master device.
PrtY: Communication parity. Parameter can be set nonE, odd or EvEn. Parity of all devices in same communication line should be the same as parity of master device.
AdrS: Communication address. Parameter can be set between 1 and 127. All device in same communication line should have an unique address.

Parameters of CLbr Page

FLtr: Filter value of differential pressure value. This parameter determines the number of samples to be averaged for calculation of differential pressure value. Parameter can be set between 1 and 16.
oLCr: 0 Ohm calibration value of selenoid resistance measurument. This parameter isn’t advised to change. Selonoid supply voltage that is connected to B9 and B10 terminals is broken. B11 and B12 terminals are done short-circuit ▲ and ▼ buttons press together in order to save value.
oHCr: 1000 Ohm calibration value of selonoid resistance measurument. This parameter isn’t advised to change. Selonoid supply voltage that is connected to B9 and B10 terminals is broken. 1000 ohm resistance is connected to B11 and B12 terminals. ▲ and ▼ buttons press together in order to save value.
2Ero: This parameter determines pressure value of low calibration of pressure input. Parameter can be set between -1999 and 9999.
2rCL: Zero calibration value of differential pressure. This parameter isn’t advised to change. 2Ero value differential pressure is applied to differential pressure input of device. ▲ and ▼ buttons press together, in order to save value.

Parameters of CLbr Page (continuation)

SPAn: This parameter determines pressure value of high calibration of pressure input. Parameter can be set between -1999 and 9999.

SPCL: Span calibration value of differential pressure. This parameter isn't advised to change. SPAn value differential pressure is applied to differential pressure input of device. ▲ and ▼ buttons press together, in order to save value.

AoL : Analog output 4 mA calibration value. This parameter isn't advised to change. Connect an ampermeter A27(-) and A28(+) terminals. While the parameter is selected, adjust the parameter with ▲ and ▼ buttons value until the meter reading is equal to 4 mA.

AoH : Analog output 20 mA calibration value. This parameter isn't advised to change. Connect an ampermeter A27(-) and A28(+) terminals. While the parameter is selected, adjust the parameter with ▲ and ▼ buttons value until the meter reading is equal to 20 mA.

SCod: Security code.

Parameters of oCnF Page

The parameters between oC 1 and oC 15 are used to determine the count of output on the connected output cards. The output cards are produced 8 or 16 outputs in manufacturing period. These parameters are used to define the count of outputs to device. These parameters are set to o8 or o 16.

3.2. DISPLAY FIGURES

Normal Operating Display		Error Messages Display	
Gr01 / o 15	1. Group 15. Output	no / volt	No Selonoid Voltage
Gr03 / o 8	3. Group 8. Output	o 2 / SHrt	Selonoid on Output 2 Short Circuit
Gr03 / ----	3. Group Break Time	o 13 / oPEn	Selonoid on Output 13 Open Circuit
---- / ----	Waiting Time	HIGH / Prss	High Pressure Alarm
StoP / ----	Wait Start Input	no / Err	No Alarm

4. WORKING PRINCIPLES

When nGrP parameter is equal to "1", Starting of scanning selonoids, device waits for tA break time, after that O1 output is activated. This output is active for tP pulse time, after that O1 output is deactivated. Device waits tA break time and same process repeats with the next selonoid. This process continues until number of outputs reach to noUt parameter. When last output is deactivated at the end of tP pulse time, device starts to tb waiting time. After waiting that time, tA break time is started and O1 output is activated at the end of tA break time and repeats same process.

If start input of device is active, this process continues. After deactivation of start input, the device repeats this process for rtUr times and stop the process.

First of 8 outputs is used on the control unit. Output units must be used for more than 8 outputs.

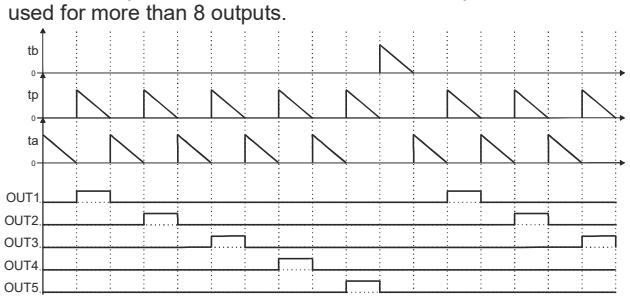


Figure 4.1: Working diagram (nGrP = 1, noUt = 5)

In case the device nGrP parameter is greater than 1, 2 different operating type is available. This operating type is determined by the GtI P parameter. In applications where the number of groups is greater than 1, the group 1 output card is used as the selection card.

When the GtI P parameter is set to tI P1, the device works as shown in **Figure 4.2**. When scanning starts, O1 output of group card is energized and 1st Group is selected. tA break time is started. O1 output of the device is energized at the end of the break time period and the tP pulse time is started. At the end of the pulse time period, O1 is de-energized and tA break time is started again and the same operation is repeated until the number of output reaches the value of noUt parameter. When the last output is de-energized, O1 output of the group card is de-energized togetherly. tG group waiting time is started. At the end of the group waiting time period, the O2 output of the group card is energized and the 2nd Group is selected. The operations in the 1st group are repeated exactly. this group operations is repeated until the number of group reaches the value of nGrP parameter. At the end of the last group operation, tb waiting time period starts. After the waiting time period, 1st group is selected again and same operations are repeated.

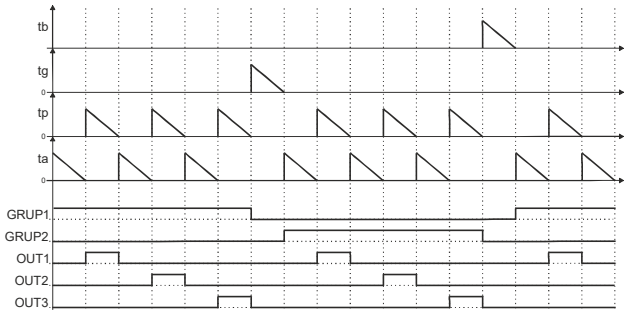


Figure 4.2: Working Diagram (nGrP = 2, noUt = 3 and GtI P = tI P1)

When the GtI P parameter is set to tI P1, the device works as shown in **Figure 4.3**. When scanning starts, O1 output of group card is energized and 1st group is selected. tA break time is started. O1 output of the device is energized at the end of the break time period and the tP pulse time is started. At the end of the pulse time period, O1 is de-energized and tA break time is started again and the same operation is repeated until the number of output reaches the value of noUt parameter. When the last output is de-energized, O1 output of the group card is de-energized togetherly. tG group waiting time is started. At the end of the group waiting time period, the O2 output of the group card is energized and the 2nd group is selected. The outputs of 2nd group starts from where the last output of 1st group, and scanning operation is repeated until the number of output reaches the value of noUt parameter. As seen in the example, the last output of 1st group is energized O3 output, and the first output of 2nd group is energized O4 output. This group operations is repeated until the number of group reaches the value of nGrP parameter. At the end of the last group operation, tb waiting time period starts. After the waiting time period, 1st group is selected again and same operations are repeated.

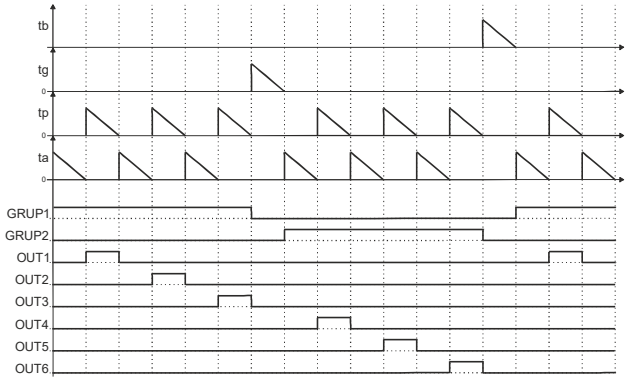


Figure 4.3: Working Diagram (nGrP = 2, noUt = 3 and GtI P = tI P2)

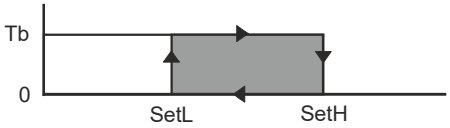
If start input of device is active, this process continues. After deactivation of start input, device repeats this process for rtUr times and stop the process.

First of 8 outputs is used on control unit. Output units must be used for more than 8 outputs.

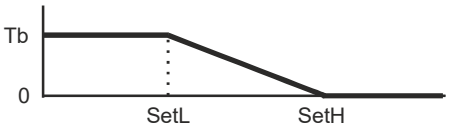
One output unit is used to group selection unit. Selonoid supply of group selection unit (+VIN-) is connected to control unit (+VSIN-) terminal.

4.1. CONTROL TYPES

CtYP parameter determines control type of the device, is selected as nonE, onoF or ProP.
If CtYP parameter is selected as nonE, device doesn't do any control during tb waiting times. Entire of tb waiting time is waited.
If CtYP parameter is selected as onoF, if differential pressure value is higher than SEtH parameter, tb waiting time is skipped during the process. If differential pressure value is lower than SEtL parameter, Entire of tb waiting time is waited during the process.
If differential pressure value is between SEtL and SEtH parameters, device does the same as previous scanning.



If CtYP parameter is selected as ProP, if differential pressure value is higher than SEtH parameter, tb waiting time is skipped during the process. If differential pressure value is lower than SEtL parameter, Entire of tb waiting time is waited during the process.
If differential pressure value is between SEtL and SEtH parameters, tb waiting time is set between 0 and tb proportionally.



4.2. ALARM RELAYS

RI1 and RL2 are alarm relays, that give alarm according to one or more than one alarm source. Alarm type of these relays are adjusted as normally open or normally closed.
Device gives alarm in case of break selonoid supply, open or short selonoids and high differential pressure value. These alarm sources are adjusted for both of the relays with r1Fn and r2Fn parameters, like as **Table 4.2**. Alarm types of relays, that is no normally open and nC normally closed are adjusted for both of the relays with r1tP and r2tP parameters, like as **Table 4.1**.
When alarm relays are powered, user can acknowledge the alarm and deactivate the alarm relay according to r1Ab and r2Ab parameters. If these parameters are selected on, user open error message page and deactivates relay, but led of relay continues to light. In this situation, error message of alarm is shown in error message page. Led of relay fades after alarm state. If these parameters are selected oFF, relay and led deactivates after the alarm state ends.

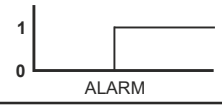
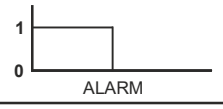
rXtP	
no (Normally Open)	nC (Normally Closed)
	

Table 4.1. Alarm Types

rXFn	**Explanations** (SC: Short Circuit, OC: Open Circuit, HP: High Pressure, NSS: No Selonoid Supply, SA: Scan Active)	rXFn	**Explanations** (SC: Short Circuit, OC: Open Circuit, HP: High Pressure, NSS: No Selonoid Supply, SA: Scan Active)
0	No Alarm	16	SA
1	SC	17	SA / SC
2	OC	18	SA / OC
3	SC / OC	19	SA / OC / SC
4	HP	20	SA / HP
5	HP / SC	21	SA / HP / SC
6	HP / OC	22	SA / HP / OC
7	HP / OC / SC	23	SA / HP / OC / SC
8	NSS	24	SA / NSS
9	NSS / SC	25	SA / NSS / SC
10	NSS / OC	26	SA / NSS / OC
11	NSS / OC / SC	27	SA / NSS / OC / SC
12	NSS / HP	28	SA / NSS / HP
13	NSS / HP / SC	29	SA / NSS / HP / SC
14	NSS / HP / OC	30	SA / NSS / HP / OC
15	NSS / HP / OC/ SC	31	SA / NSS / HP / OC / SC

Table 4.2. Alarm Sources

4.2.1. OPEN / SHORT CIRCUIT ALARM

Device can give alarm, while short or open circuit happen on selonids. Device measures the selonoid line and controls any error on the selonoid line, before device powers the selonoids.
If any error is occured on selonoid, device doesn't power the selonoid and gives alarm, so that outputs of device don't need any fuses. In the selonoids scanning, while the selonoid has any problem, device works differently according to tRtP parameter.
If parameter is selected on, device waits tR and tP timing for that selonoid, but output doesn't powered. If the parameter is selected oFF, device doesn't wait tR and tP timing, and continues next output. oUtH parameter determines open circuit state, oUtL parameter determines short circuit state. oUtL parameter should be set to half of the nominal resistance of the selonoids, oUtH parameter should be set to two times of the nominal resistance of the selonoids.

4.2.2. HIGH PRESSURE ALARM

Device, that has pressure control gives high pressure alarm according to HSP and HYS parameters. If differential pressure is higher than HSP parameter, device gives high pressure alarm. The alarm condition ends when the differential pressure reading decrease to HSP - HYS.

4.2.3. NO SELONOID SUPPLY ALARM

If Selonoid supply of device, that is connected (+VSIN-) terminals is broken, device gives no selonoid supply alarm.

4.2.4. SCAN ACTIVE ALARM

When Start input of device that is in A24 (IN1) terminal is active, the device gives scan active alarm.
All of these alarms is shown on display to user. In addition, if device has RS-485 communication, the alarms can be read from Modbus protocol.

4.3. SCANNING ORDER OF OUTPUTS

Scanning order of the device starts with 1, and ends with 128 in factory settings. The scanning order can be configured using Modbus protocol. Register addresses of these order parameters are shown in **Table 4.3**.

Address	Parameter	Property	Address	Parameter	Property
100	OUT 1-2	R/W	132	OUT 65-66	R/W
101	OUT 3-4	R/W	133	OUT 67-68	R/W
102	OUT 5-6	R/W	134	OUT 69-70	R/W
103	OUT 7-8	R/W	135	OUT 71-72	R/W
104	OUT 9-10	R/W	136	OUT 73-74	R/W
105	OUT 11-12	R/W	137	OUT 75-76	R/W
106	OUT 13-14	R/W	138	OUT 77-78	R/W
107	OUT 15-16	R/W	139	OUT 79-80	R/W
108	OUT 17-18	R/W	140	OUT 81-82	R/W
109	OUT 19-20	R/W	141	OUT 83-84	R/W
110	OUT 21-22	R/W	142	OUT 85-86	R/W
111	OUT 23-24	R/W	143	OUT 87-88	R/W
112	OUT 25-26	R/W	144	OUT 89-90	R/W
113	OUT 27-28	R/W	145	OUT 91-92	R/W
114	OUT 29-30	R/W	146	OUT 93-94	R/W
115	OUT 31-32	R/W	147	OUT 95-96	R/W
116	OUT 33-34	R/W	148	OUT 97-98	R/W
117	OUT 35-36	R/W	149	OUT 99-100	R/W
118	OUT 37-38	R/W	150	OUT 101-102	R/W
119	OUT 39-40	R/W	151	OUT 103-104	R/W
120	OUT 41-42	R/W	152	OUT 105-106	R/W
121	OUT 43-44	R/W	153	OUT 107-108	R/W
122	OUT 45-46	R/W	154	OUT 109-110	R/W
123	OUT 47-48	R/W	155	OUT 111-112	R/W
124	OUT 49-50	R/W	156	OUT 113-114	R/W
125	OUT 51-52	R/W	157	OUT 115-116	R/W
126	OUT 53-54	R/W	158	OUT 117-118	R/W
127	OUT 55-56	R/W	159	OUT 119-120	R/W
128	OUT 57-58	R/W	160	OUT 121-122	R/W
129	OUT 59-60	R/W	161	OUT 123-124	R/W
130	OUT 61-62	R/W	162	OUT 125-126	R/W
131	OUT 63-64	R/W	163	OUT 127-128	R/W

Tablo 4.3. Output Configuration Parameters Modbus Address Table

NOTE1: Parameters, that shown in Table 4.3 are 16-bits. For example low 8-bits of OUT1-2 parameter shows first output, high 8-bit of OUT1-2 parameter shows second output. In below example, output 5 is powered firstly, output3 is powered secondly according to OUT1-2 parameter. Other parameters are configured the same method.

OUT1-2 = 773	
son 8-bit = 3	ilk 8-bit = 5

NOTE2: Low and High 8-bits of parameters must be set between 1 and 128. Otherwise, sent values of these parameters aren't saved according to protocol.

5. OUTPUT UNITS

Each output unit has 16 outputs. Output units communicate with control unit over DATA terminal. If this connection breaks, output unit doesn't work. Power supply of output units are supplied with (+VSUP-) terminals. Each output unit, that is connected to control unit has an address. These adresses are configured via jumpers on output unit cards. More than one unit mustn't have same adresses. Jumper configuration of addresses are shown in **Table 5.1**.

(+VIN-) terminals of output units must be connected to (-VOUT+) terminals of control unit. If any problem on that connection occurs, all of the selonoids are measured open circuit and any output isn't powered. If filtering system has more than one group, one output unit must be used for group selction unit. Selonoid supply of this unit must be connected (+VSIN-) terminals of control unit.

Jumper	Explanations	Jumper	Explanations
	1. Output Card		9. Output Card
	2. Output Card		10. Output Card
	3. Output Card		11. Output Card
	4. Output Card		12. Output Card
	5. Output Card		13. Output Card
	6. Output Card		14. Output Card
	7. Output Card		15. Output Card
	8. Çıkış Kartı		Group Selection Card

Table 5.1. Configurations of Jumper

6. COMMUNICATION ADRESSES

Address	Parameter	Explanation	Property	Min.	Max.
0	Alarm Data 1	See Table1	R		
1	Alarm Data 2	See Table1	R		
2	Alarm Data 3	See Table1	R		
3	Alarm Data 4	See Table1	R		
4	Alarm Data 5	See Table1	R		
5	Alarm Data 6	See Table1	R		
6	Alarm Data 7	See Table1	R		
7	Alarm Data 8	See Table1	R		
8	Alarm Data 9	See Table1	R		
9	Alarm Data 10	See Table1	R		
10	Alarm Data 11	See Table1	R		
11	Alarm Data 12	See Table1	R		
12	Alarm Data 13	See Table1	R		
13	Alarm Data 14	See Table1	R		
14	Alarm Data 15	See Table1	R		
15	Alarm Data 16	See Table1	R		
16	Alarm Data 17	See NOTE2	R		
17	PrSS		R		
18	SEtL		R/W	-1999	SEtH
19	SEtH		R/W	SEtL	9999
20	ASP		R/W	-1999	9999
21	CtyP	0:nonE, 1:onoF, 2:ProP	R/W	0	2
22	dP		R/W	0	3
23	rtLL		R/W	-1999	9999
24	rtHL		R/W	-1999	9999
25	nAr	0:0-20, 1:20-0, 2:4-20, 3:20-4	R/W	0	3
26	inS		R/W	-1999	9999
27	HyS		R/W	0	9999
28	r 1tP	0:no, 1:nC	R/W	0	1
29	r 1Fn		R/W	0	15
30	r 1Hb	0:on, 1:oFF	R/W	0	1
31	r2tP	0:no, 1:nC	R/W	0	1
32	r2Fn		R/W	0	15
33	r2Hb	0:on, 1:oFF	R/W	0	1
34	tA		R/W	1	9999
35	tP		R/W	1	1000
36	tG		R/W	1	9999
37	tb		R/W	1	9999
38	noUt		R/W	1	128
39	nGrP		R/W	1	16
40	ntUr		R/W	0	50
41	oUtL		R/W	0	oUtH
42	oUtH		R/W	oUtL	3000
43	tAtP	0:on, 1:oFF	R/W	0	1
44	bAUd	0:48, 1:96, 2: 192, 3:384	R/W	0	3
45	PrtY	0:nonE, 1:odd, 2:EuEn	R/W	0	2
46	Adr5		R/W	1	127
47	FLtr		R/W	1	16

NOTE1: Device supports 03, 06 and 16 number function of modbus protocol. 03 Read Holding Registers, 06 Write Single Register and 16 Write Multiple Registers.

NOTE2: No Selonoid Voltage alarm is saved in first bit of Alarm Data 17, high pressure alarm is saved in second bit of Alarm Data 17.

NOTE3: In table, parameters, whose address is between 17 and 47 is explained in 3.1 PARAMETERS EXPLANATION.

7. TABLES

Table1: Bits of Alarm Data

	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O
Bit Number	16		15		14		13		12		11		10		9	
Alarm Data 1	O8				O7				O6				O5			
Alarm Data 2	O16				O15				O14				O13			
Alarm Data 3	O24				O23				O22				O21			
Alarm Data 4	O32				O31				O30				O29			
Alarm Data 5	O40				O39				O38				O37			
Alarm Data 6	O48				O47				O46				O45			
Alarm Data 7	O56				O55				O54				O53			
Alarm Data 8	O64				O63				O62				O61			
Alarm Data 9	O72				O71				O70				O69			
Alarm Data 10	O80				O79				O78				O77			
Alarm Data 11	O88				O87				O86				O85			
Alarm Data 12	O96				O95				O94				O93			
Alarm Data 13	O104				O103				O102				O101			
Alarm Data 14	O112				O111				O110				O109			
Alarm Data 15	O120				O119				O118				O117			
Alarm Data 16	O128				O127				O126				O125			

	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O
Bit Number	8		7		6		5		4		3		2		1	
Alarm Data 1	O4				O3				O2				O1			
Alarm Data 2	O12				O11				O10				O9			
Alarm Data 3	O20				O19				O18				O17			
Alarm Data 4	O28				O27				O26				O25			
Alarm Data 5	O36				O35				O34				O33			
Alarm Data 6	O44				O43				O42				O41			
Alarm Data 7	O52				O51				O50				O49			
Alarm Data 8	O60				O59				O58				O57			
Alarm Data 9	O68				O67				O66				O65			
Alarm Data 10	O76				O75				O74				O73			
Alarm Data 11	O84				O83				O82				O81			
Alarm Data 12	O92				O91				O90				O89			
Alarm Data 13	O100				O99				O98				O97			
Alarm Data 14	O108				O107				O106				O105			
Alarm Data 15	O116				O115				O114				O113			
Alarm Data 16	O124				O123				O122				O121			

NOTE: In table, S letter is shown short circuit state, O letter is shown open circuit state.

Table2: CtyP

nonE	No Control
onoF	ON/OFF Control
ProP	Proportional Control

Table3: nAr

0-20	0-20 mA
20-0	20-0 mA
4-20	4-20 mA
20-4	20-4 mA

Table4: rXtP

no	Normally open
nC	Normally closed

Table5: rXHb

on	Acknowledge alarm is active
oFF	Acknowledge alarm isn't active

Table6: tAtP

on	Wait break and pulse time
oFF	Not wait break and pulse time

Table7: PrtY

nonE	No parity
odd	Odd parity
EuEn	Even parity

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