FREQUENCY CONTROL PANELS

INSTALLATION, MAINTENANCE and OPERATION GUIDE

DUYAR

DUYAR

Control panels, to get the **best results** this manual information must read carefully. This manual, all your problems can help solve.

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TABLE OF CONTENTS

PURPOSE OF USER MANUAL

- To convey the instructions regarding the pump's installation, maintenance, and repair.
- To explain the pump's starting, operating, and stopping methods.

SAFETY SIGNS

Safety measures that can cause life-threatening if not implemented

Warnings on electric current

DİKKAT Safety instructions, which, if not followed, may damage the machine and its operation.

GENERAL INSTRUCTIONS

- Control panels read the instructions before using.
- Especially obey the safety instructions.
- Control panels all transactions must be done by qualified personnel in accordance with the user guide instructions.
- All repair and processing warranty made by unauthorized persons terminates.

Within Easy Reach Of The Clipboard User Guide Near And Place Should Be

PLEASE REMEMBER TO STORAGE

SAFETY INSTRUCTIONS

- Read instructions carefully before starting the clipboard.
- Follow the instructions in the user guide.
- The front panel be careful. The front panel fragile gets hit.
- Do not install where water can take directly to the clipboard. Any water in the cabinet and Do not spill liquid. Disconnect power the main fuse in the case of water in panel contact the please institutions and authorized person.
- Do not operate if any foreign substance enters into the panel. This may cause electric shock or damage to the panel. Entrust panel control by authorized personnel.
- Fire risk avoid naked flame keep away from flammable liquids and materials.
- Electrical connection as shown in the user's guide input must be connected to the fuse. Otherwise you may cause serious injury or death as a result of electric shock.
- The power cord is damaged, replace the original with the appropriate new cable through authorized service.
- Do not use electrical connection cable damaged and torn. Do not place heavy objects on the power cord, and do not make an operation on the cable or injure. Cables may be damaged and may cause a fire or electric shock. In such cases, please contact the authorized person or institutions.
- See the troubleshooting section in Troubleshooting and fault finding practice immediately and call service if necessary. Never attempt to repair this dashboard.
- Do not dispose of together with general household waste your clipboard. Please observe local laws and regulations for disposal.

DİKKAT **Failure to follow the safety instructions, will void the product warranty.**

Situations That May Be Harmful For Human And Environmental Health Warnings

Installation, commissioning and service procedures performed by qualified personnel as long as the board is does not constitute a security risk to any.

- Burns, electric shock, and death may result.
- Disconnect the electrical connections to the panel before working on them.

- Please do the clipboard the grounding connection.
- Relaxation of the electrical connections and electrical leakage may cause injury.

- Panel manual starting and stopping methods have been described. During the re-commissioning of the panel, the departments should operate on.
- "Leakage Relay" Should be, possible water leaks and splashes clipboard against must installed.
- All electrical wiring must be connected to the clipboard using the protective cover.

Unacceptable Actions

- On the control panel of design changes must be with made not only the permission of the manufacturer.
- Control panels are used on the other parts, the manufacturer is not responsible for the consequences of changes.

On The Control Panel The Special Securlty Equlpment And Recommendations

May result in electrical shock or death.

In the wrong intervention to the control panel may cause damage to the panel.

- Control panel electronic card in order to protect from extemal factors is made of plexiglass with a specially designed insulation protection is available.
- This protection panels and electronic card intervene must not removed by unauthorized persons.

Efficient Use of Energy Saving Information

- Pumps and motors energy-consuming products. Personal causes and is extremely important for the national economy.
- Control panel suitable motor and pumps be used.
- All electrical connections to the instructions by providing appropriate and accurate; Be provided to prevent any loss and leakage of electricity.

Usage Life

The product is determined by the Ministry of Industry and declared usage life (time required to carry out the functions of the appliance spare parts) 10 years.

1. TRANSPORT / STORAGE / MONTAGE

1.1 Transfer

- Handle carefully control panels.
- Appropriate size of the control panels are shipped in cardboard boxes.
- Do not remove the cardboard box inside the control panels during transport.

1.2 Transport

- Measure damage to the panel, and bad weather conditions during transport should be taken to avoid exposure.
- Received by the panel in order to comply with the model and should be checked for any damage during transport.
- If the clipboard contains a damaged or missing damage assessment report should be given written information to the shipping company our company.

1.3 Storage

- Control panels of instead of immediately montage if not ;
- Do not store in damp environments.
- Do not put weight on the control panels.
- Protect from direct sunlight at the control panels.
- Keep out of the control panels watertight.

1.4 Montage

- When performing mounting, follow the Instructions otherwise It may be damaged panels.

- Montage are not observed instructions during the that as a result of electric shock, serious injury or death may result.

- While mounting nuts at the rear of the control panel should be mounted with suitable screws.
- Do not mount the back of the board is drilled with another screw. This may cause damage to the electronic card.
- Control panel electrical connection must be carried out only by qualified personnel necessary safety precautions.

2. OPERATING

- Control panel electrical connections should be checked.
- The control panel should be checked that the cover is closed.
- There is power cut, the phases should be checked to be complete.
- Control panel settings to be used should be based on pump or motor. Introduction to the settings menu, you will find that you are using the appropriate settings to the clipboard

3. MAINTENANCE

3.1 Monthly Maintenance

- Disconnect electrical power before maintenance operations.

- Control panel electrical connections should be checked relaxation. The grounding line of the control panel should be checked.
- Electric cables, abrasion, puncture should be examined for color change and warming.

4. FGE SERIES PANEL GENERAL INFORMATION

4.1 General Specifications of the Product
FGE series control panel activates the pumps with the frequency converter.specially for the purpose of taking and removing and protecting was designed.

The control panel has automatic - manual operation selection. Man-auto switch in the panel for manual operation The switch must be set to the man position. Manual pumps pressureIt is activated and deactivated with the information received from the switches. Received via system pressure transmitter for automatic operationIt activates and deactivates the pumps according to the analog information. A specially designed PLC is used to perform these operations. System pressure and active on the PLC unit screen on the front panel pumps can be monitored. All fault information is shown on the PLC screen. Set pressure value and pump numbers can be adjusted via PLC.Up to 4 pumps can be controlled.

In order for a three-phase asynchronous motor to rotate at various speeds or at the same speed in different conditions, a frequency inverter is needed to be used. There are some advantages of using frequency inverters to control the speed of asynchronous motors. Big, strong motors consume high energy. Therefore, to prevent this high energy consumption and to make the motors rotate at desired speed in every condition, panels with frequency inverters that generate various frequencies and make the motor work at a stable speed are produced. These panels work by adjusting the speed at optimum conditions as the load requires. Even the tiniest change in the speed can decrease energy consumption at significant levels. The pump runs at maximum speed at every condition when a motor driver is not used. How ever, when a panel with frequency control is used, energy can be saved by decreasing the speed of the pump motor in the case of water and need is decreased.

4.2 Technical Specifications of the Product

- Microprocessor based design.
- 48Mhz operating frequency.
- 64 Kb Program memory.
- 3936 byte SRAM.
- 1024 byte EEPROM.
- 1.000.000 read / write data capacity.
- 100 years data storage life.
- Design with nanowatt technology.
- PWM module controlled PID.
- PID speed adjust slow-normal-fast mode.
- Hydrophore - Circulation - Heating - Cooling operating mode selection.
- To avoid indecisiveness in the transition to sleep automatic sleep transition by raising the frequency.
- Phase sequence error protection.
- Ability to set high pressure protection value.
- Ability to see the pump current values.
- Ability to set high current protection value.
- Possibility to set error delay time.
- Auto Manual selection switch.
- Protection with floater water
- Ability to see all error states on the screen.
- Reporting fault conditions by relay contact.
- 5 isolated digital inputs.
- 3 Analog inputs.
- 2X16 character LCD display.
- Turkish-English language support.
- Ability to monitor pump operating hours on the screen.

5. FGE SERIES PANEL TECHNICAL TABLES AND VISUALS

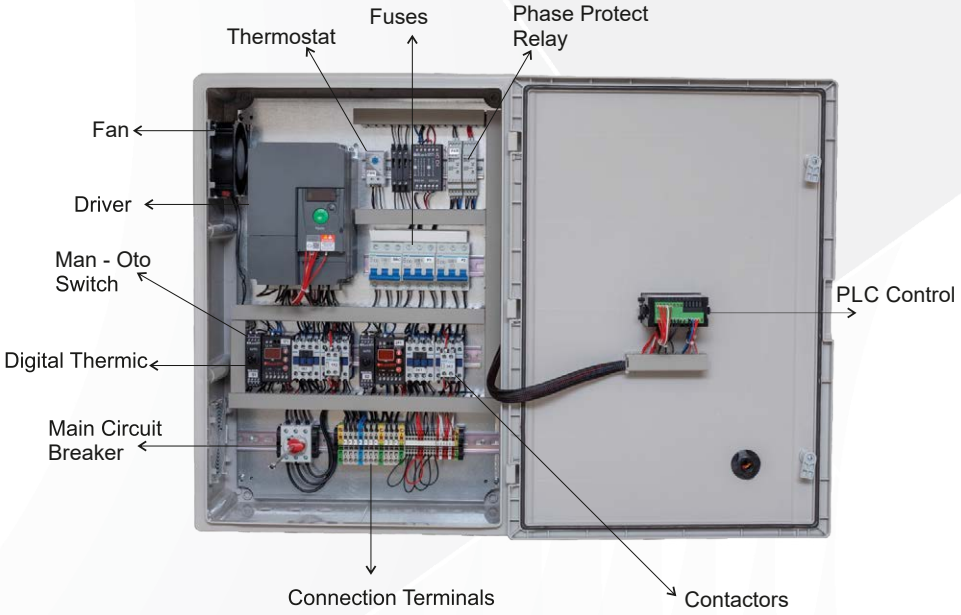

Figure 1: *Panel Inside View*

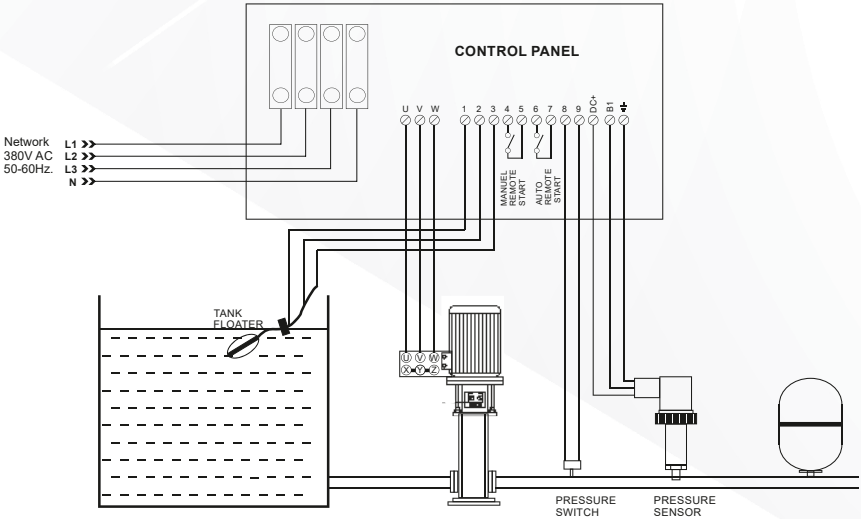

Figure 2: *FGE-01 Panel Connection Diagram*

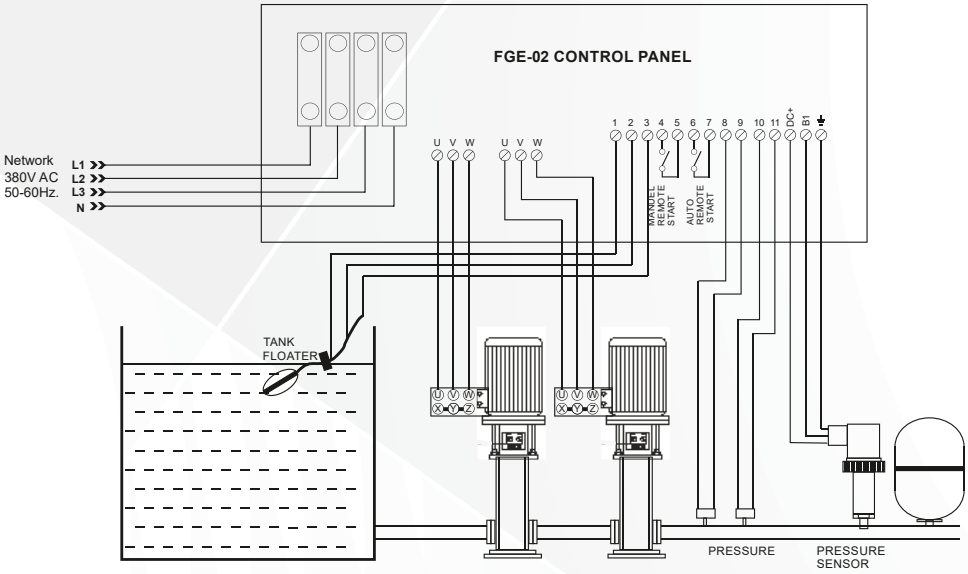

Figure 3: *FGE-01 Panel Connection Diagram*

PART NAME	TECHNICAL DETAILS
Operating Voltage (Un)	230 V - 380 VAC
Operating Frequency	50 / 60Hz
Working Power	<6VA
Operating Temperature	-20˚C to 55˚C
Voltage Measurement Range	10 - 500 V AC
Measurement Accuracy	%±1
Delay Time Setting	1-30 sec.
Indicator	2 X 16 LCD Screen and Leds
Connection Style	Terminal Connection
Ignition	5 A / 250 VAC Resistive Load
Connection Insulation	2.5 kV
Assembly	On the Pump or On The Wall
Protection Class	Ip55
Working Altitude	<2000 meter

Table 1

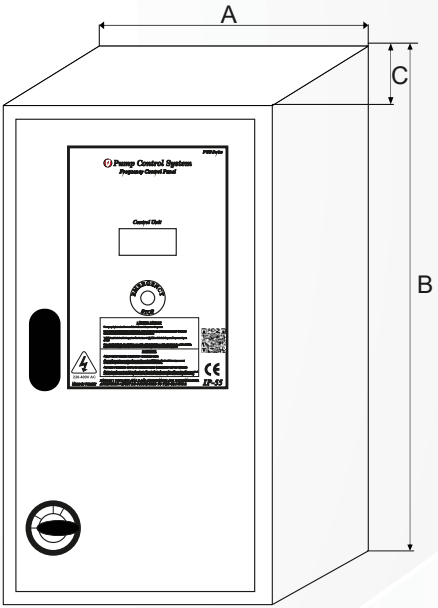

Figure-4: *FGE-01 Panel Outer View*

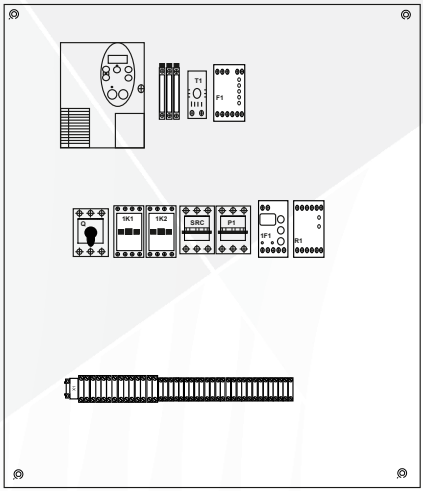

Figure-5: *FGE-01 Panel Inside View*

POWER	FGE-01 PANEL DIMENSIONS		
	A	B	C
0,75kW	500 mm	700 mm	220 mm
1,5kW	500 mm	700 mm	220 mm
2,2kW	500 mm	700 mm	220 mm
3kW	500 mm	700 mm	220 mm
4kW	500 mm	700 mm	220 mm
5,5kW	500 mm	700 mm	220 mm
7,5kW	500 mm	700 mm	220 mm
11kW	500 mm	700 mm	220 mm

Table 2

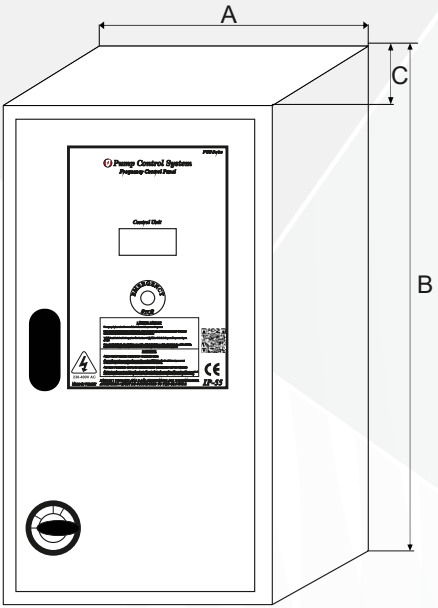

Figure-6: *FGE-02 Panel Outer View*

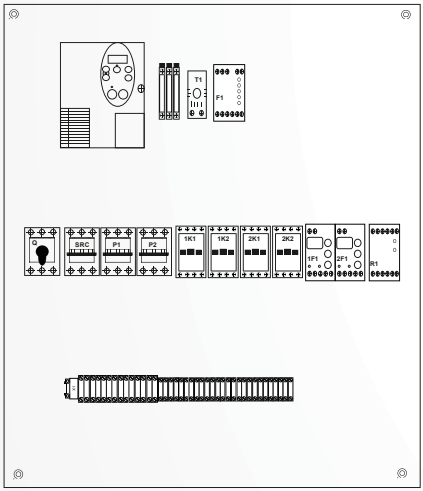

Figure-7: *FGE-02 Panel Inside View*

POWER	FGE-02 PANEL DIMENSIONS		
	A	B	C
0,75kW	500 mm	700 mm	220 mm
1,5kW	500 mm	700 mm	220 mm
2,2kW	500 mm	700 mm	220 mm
3kW	500 mm	700 mm	220 mm
4kW	500 mm	700 mm	220 mm
5,5kW	500 mm	700 mm	220 mm
7,5kW	500 mm	700 mm	220 mm
11kW	500 mm	700 mm	220 mm

Table 3

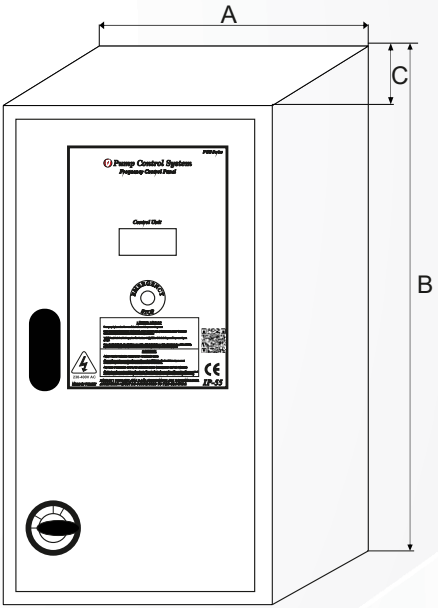

Figure-8: *FGE-03 Panel Outer View*

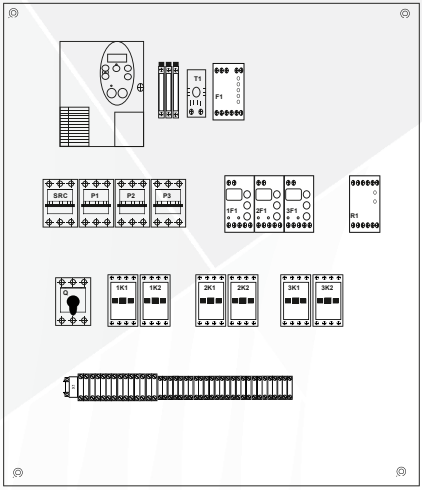

Figure-9: *FGE-03 Panel Inside View*

POWER	FGE-03 PANEL DIMENSIONS		
	A	B	C
0,75kW	550 mm	750 mm	280 mm
1,5kW	550 mm	750 mm	280 mm
2,2kW	550 mm	750 mm	280 mm
3kW	550 mm	750 mm	280 mm
4kW	550 mm	750 mm	280 mm
5,5kW	550 mm	750 mm	280 mm
7,5kW	700 mm	1000 mm	320 mm
11kW	700 mm	1000 mm	320 mm

Table 4

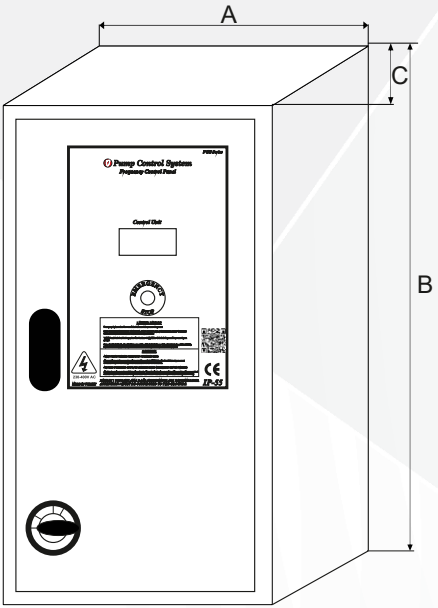

Figure-10: *FGE-04 Panel Outer View*

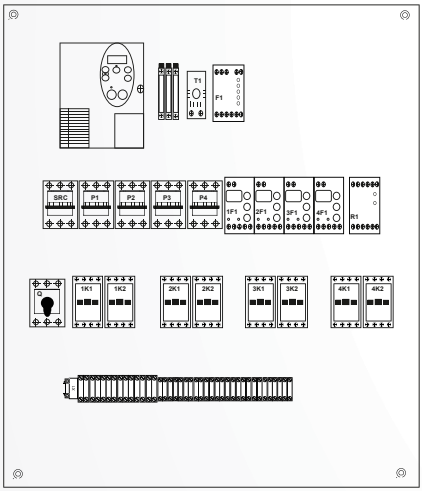

Figure-11: *FGE-04 Panel Inside View*

POWER	FGE-04 PANEL DIMENSIONS		
	A	B	C
0,75kW	700 mm	1000 mm	320 mm
1,5kW	700 mm	1000 mm	320 mm
2,2kW	700 mm	1000 mm	320 mm
3kW	700 mm	1000 mm	320 mm
4kW	700 mm	1000 mm	320 mm
5,5kW	700 mm	1000 mm	320 mm
7,5kW	700 mm	1000 mm	320 mm
11kW	700 mm	1000 mm	320 mm

Table 5

6. FLK SERIES PANEL GENERAL INFORMATION

4.1 General Specifications of the Product

Activate the pumps with the frequency converter of the FLK series control panel.specially for the purpose of taking and removing and protectingwas designed.

The control panel has automatic - manual operation selection. Man-auto switch in the panel for manual operation The switch must be set to the man position. Manual pumps pressurelt is activated and deactivated with the information received from the switches. Received via system pressure transmitter for automatic operation't activates and deactivates the pumps according to the analog information.

A specially designed PLC is used to perform these operations. System pressure and active on the PLC unit screen on the front panel pumps can be monitored. All fault information is shown on the PLC screen. Set pressure value and pump numbers can be adjusted via PLC. Up to 4 pumps with standard I/O cards for up to 8 pumps control can be made.

4.2 Technical Specifications of the Product

- RS485 MODBUS RTU communication.
- 13 piece isolated inputs.
- 4 piece Analog input.
- 3 piece Analog output.
- 25 piece relay output.
- Real time dating
- Soft work. Engagement with each pump driver.
- Remote set switching feature.
- Remote on-off digital input.
- Auto Test Settings.
- Reel Time Clock.
- Ability to set 2 different working times during the day.
- Pump acive - passive selection.
- Pump backup. Number of pumps + Incorporation of spare pump with maximum pump selection.
- Automatic deactivition of the system from the network in the event of a drive failure. Continue by set pressure.
- Encrypted Access to Menus.
- PID control.
- Hydrofor + Circulation + Heating + Cooling operation mode selection.
- Over Pressure Low Pressure Protection.
- BMS dry contact working status information.
- 3,1 inç (128x64 pixel) Graphic Screen.
- Real time and dated fault information.
- Operation and Fault Conditions on the Screen
- Monitoring the operation, standby, breakdown and cancellation of the pumps in the simulation position on the screen.
- Monitoring of set pressure and working pressure on the screen
- Pump running time monitoring.
- Pump transition time settings can be set.
- Sleep active passive option and sleep time adjustment.
- Turkish-English leanguage Select.
- Providing sleep transition by increasing frequency to prevent constant pressure instability in sleep.
- Control panel temperature with thermostatic fan.
- Operation and Fault Conditions with LED.
- Phase sequence protection.
- Being able to see the pump current values.
- Possibility to set error delay time.
- Auto Manual selection switch.

7. FLK SERIES PANEL TECHNICAL TABLES AND VISUALS

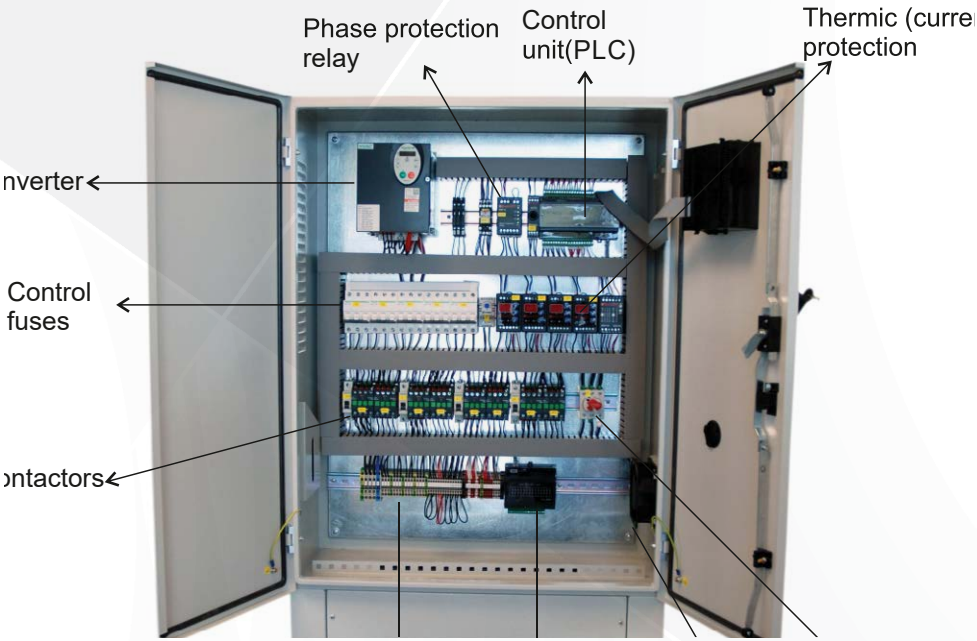

Figure 12: *Panel Inside View*

PART NAME	TECHNICAL DETAILS
Operating Voltage (Un)	230 V - 380 VAC
Operating Frequency	50 / 60Hz
Working Power	<10 VA
Operating Temperature	-20˚C to 55˚C
Voltage Measurement Range	10 - 500 V AC
Measurement Accuracy	%±1
Delay Time Setting	1-30 sec.
Indicator	2 X 16 LCD and Leds
Connection Style	Terminal Connection
Ignition	5 A / 250 VAC Resistive Load
Connection Insulation	2.5 kV
Assembly	On the Pump or On The Wall
Protection Class	Ip55
Working Altitude	<2000 meter

Table 6

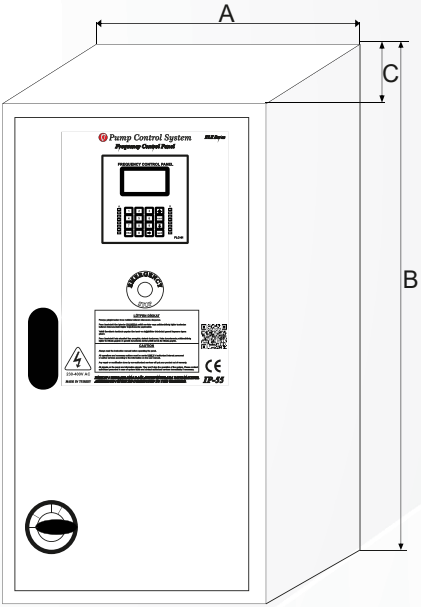

Figure-13: *FLK-01 Panel Outer View*

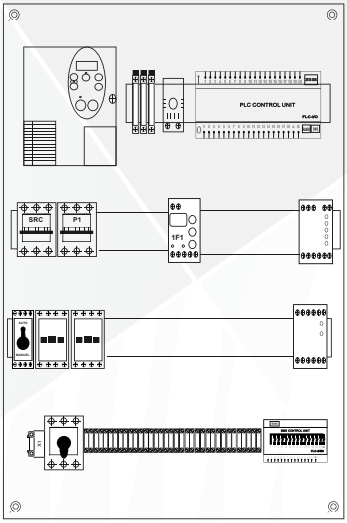

Figure-14: *FLK-01 Panel Inside View*

POWER	FLK-01 PANEL DIMENSIONS		
	A	B	C
0,75kW	550 mm	750 mm	280 mm
1,5kW	550 mm	750 mm	280 mm
2,2kW	550 mm	750 mm	280 mm
3kW	550 mm	750 mm	280 mm
4kW	550 mm	750 mm	280 mm
5,5kW	550 mm	750 mm	280 mm
7,5kW	550 mm	750 mm	280 mm
11kW	550 mm	750 mm	280 mm

Table 7

POWER	FLK-01 PANEL DIMENSIONS		
	A	B	C
15kW	700 mm	1000 mm	320 mm
18kW	700 mm	1000 mm	320 mm
22kW	700 mm	1000 mm	320 mm
30kW	700 mm	1000 mm	320 mm
37kW	1000 mm	1300 mm	380 mm
45kW	1000 mm	1300 mm	380 mm
55kW	1000 mm	1300 mm	380 mm
75kW	1000 mm	1300 mm	380 mm
90kW	1000 mm	1300 mm	380 mm
110kW	1000 mm	1300 mm	380 mm
132kW	1000 mm	1300 mm	380 mm

Table 8

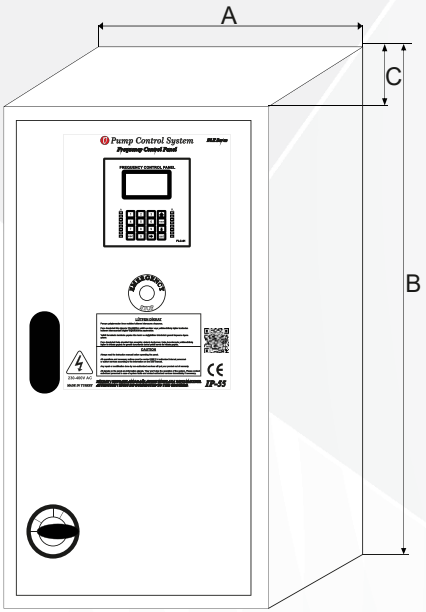

Figure-15: *FLK-02 Panel Outer View*

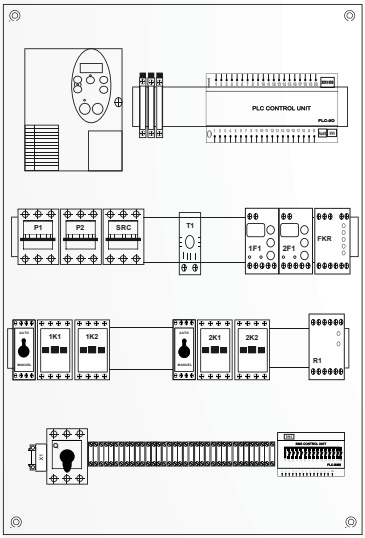

Figure-16: *FLK-02 Panel Inside View*

POWER	FLK-02 PANEL DIMENSIONS		
	A	B	C
0,75kW	550 mm	750 mm	280 mm
1,5kW	550 mm	750 mm	280 mm
2,2kW	550 mm	750 mm	280 mm
3kW	550 mm	750 mm	280 mm
4kW	550 mm	750 mm	280 mm
5,5kW	550 mm	750 mm	280 mm
7,5kW	550 mm	750 mm	280 mm
11kW	550 mm	750 mm	280 mm

Table 9

POWER	FLK-02 PANEL DIMENSIONS		
	A	B	C
15kW	700 mm	1000 mm	320 mm
18kW	700 mm	1000 mm	320 mm
22kW	700 mm	1000 mm	320 mm
30kW	700 mm	1000 mm	320 mm
37kW	1000 mm	1300 mm	380 mm
45kW	1000 mm	1300 mm	380 mm
55kW	1000 mm	1300 mm	380 mm
75kW	1000 mm	1300 mm	380 mm

Table 10

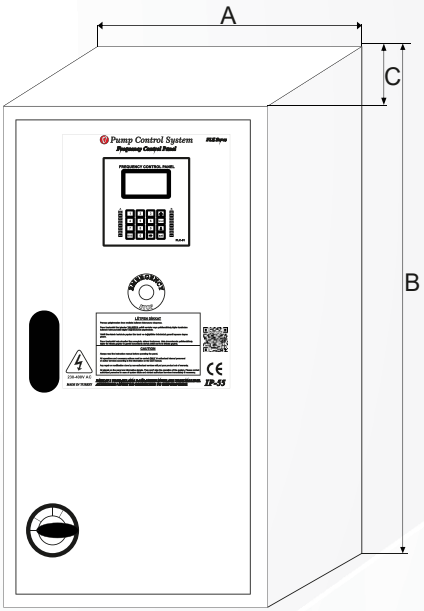

Figure-17: *FLK-03 Panel Outer View*

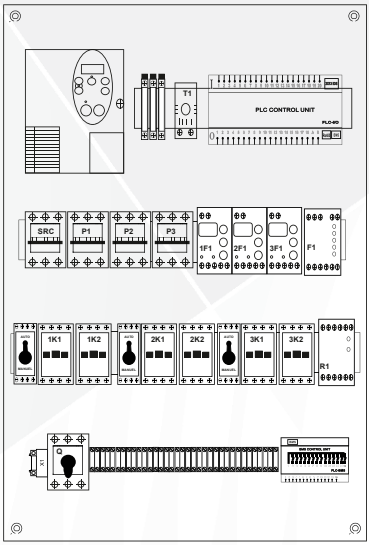

Figure-18: *FLK-03 Panel Inside View*

POWER	FLK-03 PANEL DIMENSIONS		
	A	B	C
0,75kW	550 mm	750 mm	280 mm
1,5kW	550 mm	750 mm	280 mm
2,2kW	550 mm	750 mm	280 mm
3kW	550 mm	750 mm	280 mm
4kW	550 mm	750 mm	280 mm
5,5kW	700 mm	1000 mm	320 mm
7,5kW	700 mm	1000 mm	320 mm
11kW	700 mm	1000 mm	320 mm

Table 11

POWER	FLK-03 PANEL DIMENSIONS		
	A	B	C
15kW	1000 mm	1300 mm	380 mm
18kW	1000 mm	1300 mm	380 mm
22kW	1000 mm	1300 mm	380 mm
30kW	1000 mm	1300 mm	380 mm
37kW	1000 mm	1300 mm	380 mm

Table 12

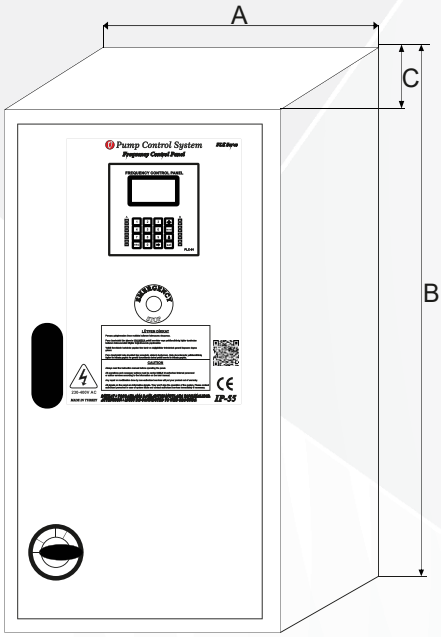

Figure-19: *FLK-04 Panel Outer View*

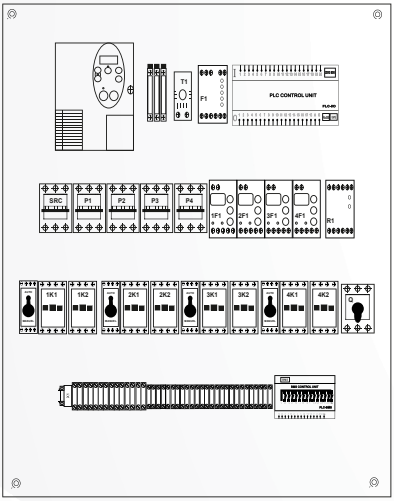

Figure-20: *FLK-04 Panel Inside View*

POWER	FLK-04 PANEL DIMENSIONS		
	A	B	C
0,75kW	700 mm	1000 mm	320 mm
1,5kW	700 mm	1000 mm	320 mm
2,2kW	700 mm	1000 mm	320 mm
3kW	700 mm	1000 mm	320 mm
4kW	700 mm	1000 mm	320 mm
5,5kW	700 mm	1000 mm	320 mm
7,5kW	700 mm	1000 mm	320 mm
11kW	700 mm	1000 mm	320 mm

Table 13

POWER	FLK-04 PANEL DIMENSIONS		
	A	B	C
15kW	1000 mm	1300 mm	380 mm
18kW	1000 mm	1300 mm	380 mm
22kW	1000 mm	1300 mm	380 mm
30kW	1000 mm	1300 mm	380 mm

Table 14

8. FREQUENCY CONTROLLED PANEL WORKING PRINCIPLE

It is the process for the rotor speed of the motor to reach its rated speed from zero. The stator of the motor at stand stillWhen voltage is applied to its windings, the induced back emf is zero. Because the rotor is stationary. The current drawn at the first moment is shortis the circuit current and this current is very high. The force created by this current in the rotor windings and the starting momentproduced and the rotor starts to rotate with the effect of this moment. The short-circuit current drawn over time causes the motor to rotate.gets smaller as it starts. The opposite of the machine or system connected to the shaft of the engine and driven by the engine. When the torque is equal to the torque produced by the motor, the motor and the motor drive this system at constant speed.continues to rotate. This operation is called starting operation. Starting methods create a starting torque, which is applied to the motor in order to bring the motor to its speed at rated load. used to provide sufficient current. Advantages and disadvantages of each methodare available. Among them, frequency converters provide the greatest energy savings.

The speed of a motor is directly proportional to the frequency of the AC mains. Possible to adjust the frequency of the network If it were possible, it would be possible to control the speed of the engine. Frequency converter to control the speed of the motorIt is a method used for giving way. Frequency converters include the input of fixed frequency AC power, variable frequencyIt is electronic devices that converts the alternating current to an output by controlling the frequency of the electrical power supplied to the motor. They are used to control the rotating speed, thus the speed of the engine.

In order for a three-phase asynchronous motor to rotate at various speeds or at the same speed in different conditions, a frequency inverter is needed to be used. There are some advantages of using frequency inverters to control the speed of asynchronous motors. Big, strong motors consume high energy. Therefore, to prevent this high energy consumption and to make the motors rotate at desired speed in every condition, panels with frequency inverters that generate various frequencies and make the motor work at a stable speed are produced. These panels work by adjusting the speed at optimum conditions as the load requires. Even the tiniest change in the speed can decrease energy consumption at significant levels. The pump runs at maximum speed at every condition when a motor driver is not used. How ever, when a panel with frequency control is used, energy can be saved by decreasing the speed of the pump motor in the case of water and need is decreased.

9. PANEL POWER & CURRENT TABLE

POWER		OPERATING VOLTAGE	STARTING TYPE	RATED CURRENT
HP	KW			
1	0,75	380 / 220V AC	Direct / Inverter	2,3 A
2	1,5	380 / 220V AC	Direct / Inverter	4,1 A
3	2,2	380 / 220V AC	Direct / Inverter	5,5 A
4	3	380 / 220V AC	Direct / Inverter	7,1 A
5,5	4	380 / 220V AC	Direct / Inverter	8,9 A
7,5	5,5	380 / 220V AC	Direct / Inverter	12,1 A
10	7,5	380 / 220V AC	Direct / Inverter	16,0 A
15	11	380 / 220V AC	Direct / Inverter	22,8 A
20	15	380 / 220V AC	S-D / Inverter	30 A
25	18,5	380 / 220V AC	S-D / Inverter	36 A
30	22	380 / 220V AC	S-D / Inverter	43 A
40	30	380 / 220V AC	S-D / Inverter	66 A
50	37	380 / 220V AC	S-D / Inverter	74,5 A
60	45	380 / 220V AC	S-D / Inverter	88 A
75	55	380 / 220V AC	S-D / Inverter	106 A
100	75	380 / 220V AC	S-D / Inverter	145 A
125	90	380 / 220V AC	S-D / Inverter	173 A
150	110	380 / 220V AC	S-D / Inverter	211 A
180	132	380 / 220V AC	S-D / Inverter	250 A
220	160	380 / 220V AC	S-D / Inverter	302 A
250	200	380 / 220V AC	S-D / Inverter	357 A
340	250	380 / 220V AC	S-D / Inverter	444 A
430	315	380 / 220V AC	S-D / Inverter	555 A

Table 15

10. CABLE SECTION SELECTION CHART

Cos fi : 0,9		SECTION (mm²)															
POWER kw	CURRENT LOAD A	1,5	2,5	4	6	10	16	25	35	50	70	95	120	150	185	240	300
2,5	4,2	178	291	466	695	1162											
		103	169	271	404	675	1063										
3	5	150	244	391	584	976	1536										
		87	142	227	339	567	892	1391									
3,5	5,9	127	207	331	495	827	1302										
		73	120	192	227	480	756	1180									
4	6,7	111	182	292	435	728	1146										
		65	106	169	253	423	666	1038									
4,5	7,5	100	163	261	389	650	1024										
		58	94	51	226	378	595	927	1266								
5	8,4	89	145	233	347	581	914	1425									
		51	84	135	202	337	531	828	1130								
6	10,1	74	121	193	289	483	760	1185									
		43	70	112	168	200	442	689	940	1247							
7	11,8	63	103	165	247	413	651	1015									
		36	60	96	143	240	378	590	805	1067							
8	13,5	55	90	145	216	361	569	887	1210								
		32	52	84	125	210	330	515	703	932	1301						
9	15,2	49	80	128	192	321	505	787	1075								
		28	46	74	111	186	293	457	625	828	1155						
10	16,8	44	72	116	173	290	457	712	972	1290							
		25	42	67	101	168	265	414	565	750	1045						
12	20	37	61	97	146	244	384	598	817	1083							
		21	35	56	84	141	223	347	474	630	878	1166					
14	23	12	53	85	127	212	334	520	710	942	1315						
		18	30	49	73	123	194	302	413	547	764	1014					
16	27		45	75	108	180	284	443	605	802	1120						
			26	42	62	105	165	257	351	466	650	863	1053				
18	30		40	65	97	162	256	399	544	722	1007						
			23	37	56	94	148	281	316	419	585	777	948	1119			
20	33		37	59	88	147	232	362	495	656	916	1216					
			21	34	51	88	135	210	287	381	532	706	862	1017			
22	37			52	78	111	207	323	441	585	817	1085					
				30	45	76	120	288	256	340	475	630	769	907	1072		
25	42			46	69	116	182	285	389	516	719	955	1165				
				27	40	67	106	165	226	299	418	555	677	799	944	1156	
30	50				58	97	153	239	326	433	605	802	979	1155			
					33	56	89	139	189	251	351	466	569	671	793	971	1124
35	59					82	130	202	277	367	512	680	830	979	1157		
						48	75	117	161	213	297	395	482	569	672	823	952
40	67					72	114	178	243	323	451	599	730	862	1018		
						42	66	103	141	187	262	348	425	501	592	725	838
45	76						101	157	215	285	397	528	644	760	898	1100	
							58	91	124	165	231	306	374	442	522	639	739
50	84						91	142	194	258	359	477	582	688	812	995	1151
							53	82	113	149	209	277	338	400	472	578	669
55	93						82	128	175	233	325	431	526	621	734	898	1040
							48	74	102	135	188	250	305	361	426	522	604
60	101							118	161	214	299	397	484	572	675	827	957
								68	94	124	173	230	281	332	392	481	556
70	118							101	30	183	256	340	414	487	578	708	819
								58	80	106	148	197	241	284	336	411	476
75	126							95	129	172	239	318	388	458	541	663	767
								55	75	99	139	185	225	266	314	385	446
80	135								121	160	223	297	362	427	505	619	716
									70	93	130	172	210	248	293	360	416
90	152								107	142	198	172	322	380	449	549	636
									62	82	115	264	187	220	261	319	369
100	169									128	178	153	289	341	403	495	572
										74	103	237	168	198	234	287	332
110	185									117	163	138	264	312	369	451	522
										68	94	216	153	181	214	262	303
130	219										138	126	223	263	311	381	441
											80	183	129	153	181	221	256
133	224										134	106	218	257	304	373	431
											78	179	127	149	177	216	250
150	253											104	193	228	269	330	382
												158	112	132	156	192	222
160	270											92	181	213	252	309	358
												148	105	124	146	179	208
180	303											86	161	190	225	275	319
													93	110	130	160	185
200	337													171	202	248	286
														99	117	144	166
205	346													166	197	241	279
														97	114	140	162
230	386														175	215	249
															102	125	145
270	456															183	212
																106	123
280	472																205
																	119
290	490																197
																	114
300	506																191
																	111
305	515																187
																	109

Table 16

11. WARRANTY

Principles specified in this user guide, instructions, standards-compliance No other institution and contact an authorized service maintenance, repair or other reasons, provided that untreated The materials used on the control panel manufacturer; workmanship, assembly and manufacturing defects user Company is subject to the terms of warranty.

Outside the Remaining Extent of Warranty Conditions :

1. Warranty terms and conditions only on the invoice in writing the product/products covers.
2. User errors, failures and damages that occur.
3. Misuse damages use and malfunctions.
4. Incorrect installation, incorrect or incomplete damage and faults caused from installation made.
5. Shipping, vibration, storage, physical collisions, damage and malfunction caused by chemical factors, and environmental conditions.
6. Fire, lightning, floods, earthquakes and other natural disasters damage and malfunctions.
7. Failures and damages caused intentionally harming.
8. Incompatibility or lack of damage to the cables used in electrical installations and faults.
9. In the Product's user guide for damage and malfunctions occurring against the issues.
10. The interventions given to the product by unauthorized persons to the product warranty expires.

Caution

Please obey this user guide and following subjects for safety use.

- All energy should be cut-off while device connecting to panel.
- Solvent or similar matter use when cleaning.
- Check the connections according to connection diagram.
- Defective device should repair only producer company or authorized seller.

The company or authorized seller is not responsible for bad result which born of these unperformed conditions.

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