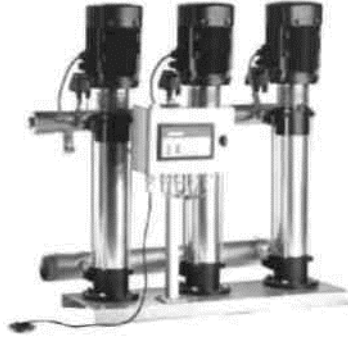




AL D
ALDF 400-600 Series
WATER BOOSTER Operating
Manual

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ALD and ALDF 400-600 Series

**ALD
ALDF 400-600 Series
WATER BOOSTER
Operating Manual**

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INTRODUCTION

First of all, thank you for choosing ALARKO brand.

In this manual you will find operation and maintenance information for ALARKO ALD and ALDF Series Water Boosters with Vertical Pump.

Please read this manual carefully to operate your water booster with high efficiency and in an economical way and to ensure long and trouble-free use. In addition to the operation and maintenance information, the manual contains introductory and technical data regarding the water booster, as well as a summary of the installation, commissioning and operation. Keep this manual for reference when necessary and keep it handy.

For more detailed information about your device, please refer to the product brochure and, if necessary, contact our Customer Hotline at 444 0 128 to reach ALARKO CARRIER dealer and after-sales services.

After commissioning the water booster, our authorized dealers and services will provide you with the necessary information regarding the use and maintenance of the water booster. You can repeatedly ask questions that are not understood. Our experts will be pleased to answer your questions.

GENERAL WARNINGS

Do not touch any part of your device or its settings for any reason, such as operating, adjusting, or maintaining it, except as described in this manual.

The electrical connection of the installation must be disconnected before any intervention on the device for the purpose of cleaning, repair or maintenance.

WARRANTY and SERVICE

This manual applies to all types of ALD and ALDF series water boosters.

Alarko Boosters are under guarantee of ALARKO CARRIER for 2 (two) years against material and manufacturing defects provided that the principles, warnings and standards specified in these operating manual are followed.

The warranty conditions are explained on the Warranty Certificate supplied with the water booster in accordance with the provisions of the relevant law. Please review this information carefully.

The Product Warranty Certificate will be filled and stamped by the authorized dealer of ALARKO CARRIER where you purchased the water booster, and signed by you. Then one copy will be given to you and the other copy will be sent to ALARKO CARRIER Customer Service Department. You must maintain and keep your Warranty Certificate handy in order to show it to the authorized service personnel to carry out the warranty procedures during the service operations.

You can find the addresses of ALARKO CARRIER Authorized Services, where have trained and authorized people to commission, maintain and repair your water booster, on the website at "www.alarko-carrier.com.tr".

If you encounter any problems, you can call the Customer Hotline at 444 0128 with domestic tariff across all cities of Turkey, or you can reach Alarko Carrier Customer Service Department via Internet with e-mail info@alarko-carrier.com.tr

The warranty procedures are only valid for the operations of ALARKO CARRIER authorized services. The warranty does not cover failures that may result from non-standard, improper installation and repairs, irregularities in the power supply. The manufacturer and dealer companies are not responsible for the intervention of the product by unauthorized persons. For this reason, please contact your ALARKO CARRIER authorized service in case of any problem with your product. Our authorized services are always at your service.

Alarko Water Boosters have superior technology and high quality materials that can serve you for many years without any problems. The minimum service life specified by the Ministry of Industry and Trade for water boosters is 10 (ten) years. Pursuant to the relevant law, manufacturers and dealers undertake to service the water booster and to provide spare parts within this period.

Tariffs and spare parts prices of ALARKO CARRIER Authorized Services are listed separately. You can review the lists during service operations. In the event of a problem, you can contact the ALARKO CARRIER Customer Service Department from the address and telephone number given on the back cover of this manual.

GENERAL FEATURES

The main purpose of a water booster is to keep the pressurized water in the installation ready for use at any time.

There are three main parts in a water booster.

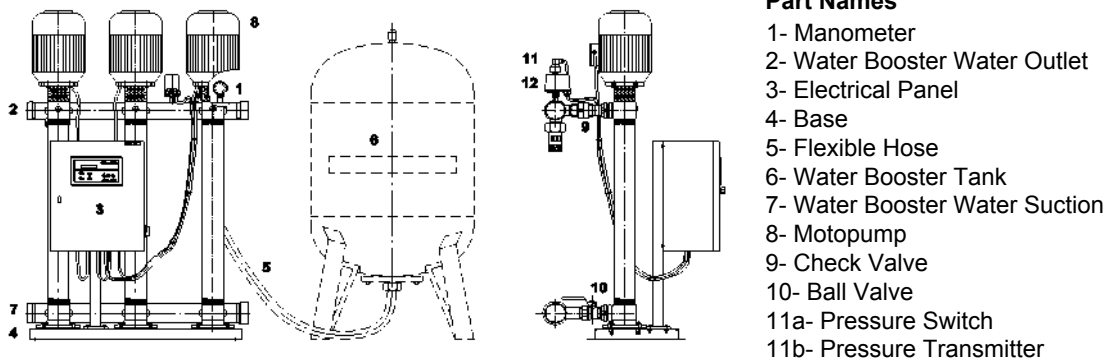
- Motor and Pump (Motopump)
- Automatic Control Equipment:
- Pressure Compensating Tank (must be purchased separately)

Motopump: It pressurizes water. ALD water booster motors are three-phase and vertical.

Automatic Control Equipment: It is the equipment that provides the automatic operation of the water booster according to the pressure changes in the installation and whether the feed water is available.

Pressure Compensating Tank: Its main purpose is to compensate pressure changes in the installation and to keep the number of commissioning and decommissioning of the pump (number of switches) in the most appropriate number.

Figure 1: Water Booster with Triple Pump Diagram



Note

Ball valve is not supplied with the water boosters with single pump.

Tank and flexible hose should be ordered separately in all water boosters. Standard delivery does not include tanks and flexible hoses.

INSTALLATION RULES

Location Selection:

The place where the water booster will work should be closed in such a way that it is protected from external factors such as rain and frost. It should be placed in such a way that it is not affected by heat sources such as burners and boilers that may be present in the vicinity. Gaps should be left around the water booster for maintenance and repair purposes.

If the water booster is to be fed from the tank, the distance (horizontal) between the tank and the water booster should be at most 10 meters.

Water Suction Installation:

The water booster should be fed from the water tank. Do not connect directly to the municipal water system.

The bottom of the tank should be in the same plane as the water booster. This ensures that there is always water in the water booster suction inlet and prevents the pump from producing air.

Suction from the tank at the lower level should never be done. Damage that may occur on the water booster as a result of such applications is not covered by the warranty.

All connections in the suction line must be sealed and air must not enter the suction pipe.

Pumps should not be forced during water suction. For water boosters with single pump, the diameter of pump suction pipe should be one size larger than the water inlet diameter, and for water boosters with twin and triple pump, the diameter of pump suction pipe should be the same with the suction collector diameter. Inner diameters of plastic pipes are narrow compared to galvanized ones. If a plastic pipe is to be used, the dimension providing the inside diameter of the galvanized pipe should be used.

Other Installation Conditions:

The water booster inlet must be fitted with a gate valve, and its outlet must be fitted with a gate valve and a check valve. Thus, it will be possible to remove the water booster from the installation for maintenance and repair.

It is preferable to connect the water booster to the installation with flexible hoses. Thus, the loads in the installation will not be reflected to the water booster and the vibration and sound of the water booster will not pass to the installation.

The water booster must be fixed to the floor with bolts. In this way, the sound from vibration will be prevented to a great extent.

Water Properties:

The water to be used in the water booster should be clean, free of solid particles and temperature between 0-35 °C. Ambient temperature should be maximum 40 °C. The water in the water booster should not be allowed to freeze.

The recommended assembly patterns are shown in the diagrams attached to this manual.

Precautions to Extend the Service Life of Mechanical Seal:

The mechanical seal is one of the most sensitive parts in the water booster. Inaccuracies or inadequacies in the installation and operating conditions cause the shaft seal to break down rapidly. The normal life of the mechanical seal is 8,000 hours under clean, cold (20°C), solid particle-free (without sodium carbonate, calcium carbonate) water conditions. Mechanical seal works according to the principle of forming a water film layer between carbon and ceramic or stainless surface. This water film layer formed during operation allows the surfaces to slide on each other without friction. Water also serves as cooling. Lack of water film layer and the dry running of the seal surfaces by rubbing against each other without a water layer between them causes burns and deteriorates them within 3-5 minutes.

The mechanical seal is at great risk in the following incorrect or inadequate operating conditions;

- If the motopump is sucking from the tank at the low level; This type of installation should not be done. There is a possibility of leakage of the valve at the suction end. In this case, the water in the suction pipe drains into the tank, no water remains in the pipe, the pump runs without water.
- If there is a strainer, check valve etc. between the motor pump and the tank: If the bottom of the tank is at the same level as the water booster base or the tank is higher than the water booster, a check valve is not required in the suction line. The check valve makes the water flow difficult. This is also a potential congestion point. The strainer should be checked and cleaned frequently. Otherwise, the water flow will be blocked and the pump will run without water or with insufficient water.
- If there is sand in the water: Sandy water will also penetrate into the film layer and corrode the surfaces, causing the seal to deteriorate.

WATER BOOSTER OPERATION

- 1- Check the compatibility of the water and electrical installation.
- 2- Check that there is sufficient water in the water tank.
- 3- Check that the waterless running protection (if any) is properly installed.
(See page 21 for details)
- 4- Check that the membrane tank has been installed correctly and that the pre-gas pressure is appropriate. (See page 13 for details)
- 5- Fully open the water inlet valve to the water booster pump.
- 6- Slightly loosen the bleeder plug of the water booster pump (if equipped). If the water level in the tank is higher than this point, water will leak from this plug after a while. If the water booster is to work by suction, fill water from this part. Then close the plug firmly.
- 7- Run the pump(s) briefly in a controlled manner. Check that the pump shafts rotate in the correct direction. If their direction of rotation is reversed, the terminals in the electrical connection must be repositioned.
- 8- Check that the pump(s) are running within the required pressure ranges. (See Table 15 for setting the operating pressure range of the pump)
- 9- For multi-pump water boosters, check that the pumps rotate each time they run. If the same pump always runs, there is a fault in the pressure switch connections. Check it from the diagram.
- 10- The commissioning of the water booster is complete.

MEMBRANE TANK (Pressure Compensating Tank)

There are different applications for membrane tanks in water boosters;

ALD and ALDF Water Booster:

The user must use a membrane tank with the motopump assembly. The selection, installation and pressurization of this tank are described below.

Note: These calculations are for finding the minimum value of the tank volume. There is no inconvenience in using tanks larger than the value obtained from the calculation. As the tank volume increases;

- Pressure fluctuations in water reduce.
- The commissioning and decommissioning sounds of the motopump reduce.
- The service life of the motor extends.
- Energy expenditure reduces.

In industrial applications where the water consumption rate is more standard than for social use, a smaller tank can be selected.

$$V_{\text{tank}} = \frac{0,33 \cdot Q_{\text{max}} \cdot (P_{\text{max}} + 10)}{\Delta P \cdot a}$$

- V_{tank} : Volume of tank to be used (liters)
 Q_{max} : Total flow rate of the pumps at operating pressure (liters/hour)
 P_{min} : Starting pressure of pumps (mSS)
 P_{max} : Stop pressure of pumps (mSS)
 ΔP : $P_{\text{max}} - P_{\text{min}}$
 a : Number of switches to be considered for motor (number/hour)

Note: In the "1999 Unit Price and Tariff Book", the Ministry of Public Works indicated that the number of switches should be maximum 180 times/hour for engines up to 1.1 kW and maximum 40 times/hour for engines above 1.1 kW.

The volume of the membrane tank to be selected for ALDF must be at least 10% of the membrane tank volume calculated for ALD.

Caution: The maximum operating pressure of the membrane tank must be higher than the maximum operating pressure of the pump.

CONNECTION OF MEMBRANE TANK

The duty of the membrane tank is to reduce the number of switches (the number of starts and stops of the motor within 1 hour). Thus, the motopump does not need to be commissioned for small-scale uses. Therefore, the larger the tank, the lesser the number of switches.

Membrane tanks can be connected to the motopump assembly in two ways.

1- Connection to Collector:

There is a membrane tank connection outlet on the water booster pressure collector. The tank can be connected with a flexible steel braided hose, galvanized pipe or plastic pipe. In this connection, a piping at least at the membrane tank outlet diameter in the water booster pressure collector should be used. If the installation has a small diameter, the water transfer rate between the tank and the installation decreases. The required efficiency cannot be obtained from the tank. There may be disruptions in the operation of the water booster.

2-Connection to Installation:

It is possible to connect the tank directly to the installation. In this case, the membrane tank connection end in the collector should be closed and the total distance of the tank to the motopump assembly should not exceed 5 meters. Otherwise, the pressure switch will be delayed to detect pressure changes and irregular operation may occur.

PRE-GAS PRESSURE SETTING OF MEMBRANE TANK

Motopump assembly can not be used without tank. An active tank must be used. Konforal membrane tanks can be used for this purpose provided that the operating pressure values are appropriate. When the membrane tanks are shipped, very little amount of gas is pumped into them. The air pressure of the membrane tank should be adjusted according to the conditions of use.

Tank Pressure = Water Booster Operating Pressure - 0.5 (bar)

Tank pressure for ALDF = Water booster set pressure x 0,7

Example 1:

If the booster is operated between 5-7 bar, the air pressure of the tank should be 4.5 bar.

Example 2:

The pressure of the tank of a water booster with triple pump with pressure switch adjustments of 5-7, 4.5-6.5 and 4-6 bar should be 3.5 bar.

The table below has been prepared to assist the users for operating the ALD water boosters with the assumption that the water booster will operate at the pressure values on page 16.

Air Pressure Values Required to be Pumped into the Tank for ALD Water Boosters

TYPE	Tank Pressure (bar)	TYPE	Tank Pressure (bar)	TYPE	Tank Pressure (bar)
403/10-1	3	403/10-2	3	403/10-3	3
403/15-1	5	403/15-2	5	403/15-3	5
403/16-1	5.5	403/16-2	5.5	403/16-3	5.5
406/11-1	3	406/11-2	3	406/11-3	3
406/15-1	4	406/15-2	4	406/15-3	4
406/18-1	5	406/18-2	5	406/18-3	5
408/10-1	3.5	408/10-2	3.5	408/10-3	3.5
408/14-1	5	408/14-2	5	408/14-3	5
408/17-1	6	408/17-2	6	408/17-3	6
610/8-1	5	610/8-2	5	610/8-3	5
610/10-1	5.5	610/10-2	5.5	610/10-3	5.5
610/12-1	7	610/12-2	7	610/12-3	7
615/7-1	4.5	615/7-2	4.5	615/7-3	4.5
615/9-1	6.5	615/9-2	6.5	615/9-3	6.5
615/10-1	7.5	615/10-2	7.5	615/10-3	7.5
620/7-1	5	620/7-2	5	620/7-3	5
620/8-1	6	620/8-2	6	620/8-3	6
620/9-1	7.5	620/9-2	7.5	620/9-3	7.5
631/6-1	3.5	631/6-2	3.5	631/6-3	3.5
631/7-1	4.5	631/7-2	4.5	631/7-3	4.5
631/8-1	5	631/8-2	5	631/8-3	5

While the air is being pumped, the water booster must be disconnected from the water in the installation and any water remained in the water booster must be drained. Otherwise, the static water pressure of the building will cause additional pressure in the tank and the correct adjustment will not be made. A compressor or pedal air pump can be used to pump air.

Caution:

It is inconvenient to use tanks (galvanized tanks) where air and water are in direct contact as water booster tanks. Because in such tanks, the air in the tank dissolves in the water and continuously leaks from the tank with the water. In the motopump assembly, there is no air suction device to reinforce this decreasing air. Therefore, the motor-pump does not reinforce the decreasing air in the tank. The air ends after a while. The tank is completely filled with water and becomes unable to function. The number of switch of the motors increases excessively.

Caution:

The pressure of the air in the membrane tank should be checked periodically (every month, etc.). The air reduces by diffusion through the rubber membrane inside the MT into continuous water or by leaking in the flange and valve connections. If the air pressure drops in the tank, the number of switches of the water booster increases. Therefore, fluctuation in sound and water increases.

PRESSURE SWITCH

Table 2: Pressure Switch Features

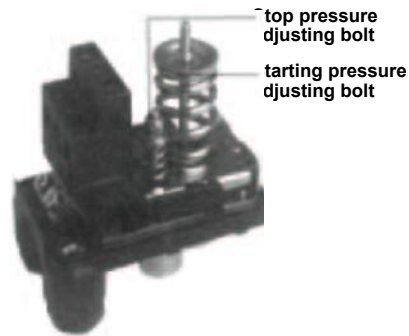
Brand	Italtecnica
Model	PM/12
Place of Use	ALD/ALDF
Pressure Limits	3-12 bar
Min. Differential Pressure	1,5 bar
Max. Differential Pressure	4 bar
Protection	IP44

SETTING

PRESSURE SWITCH SETTING

The pressure switch has two spring bolts. The long bolt adjusts the starting pressure. The short bolt adjusts the stop pressure.

- 1- Loosen the short bolt fully.
- 2- Adjust the switching pressure of the pump using the long bolt.
- 3- Then tighten the short bolt until the desired stop pressure is reached.



PRESSURE SWITCH ADJUSTMENT BY DEVICE TYPE ON ALD WATER BOOSTERS

The pressure switch adjustment for water booster with single pump should be made by the service at the place of use according to the table on the back page.

The pressure switches of the water boosters with twin and triple pump are adjusted at the factory and shipped according to Table 3.

Water Booster with Single Pump:

The "Pressure Switch Setting" procedure on page 15 is applied.

Water Booster with Twin or Triple **Pump**:

Note: In the water boosters with twin and triple pump, there is a delay of about 3 seconds for the motopump to detect the signal to prevent the pressure switch from being affected by the water hammer pulse. This delay should be considered as standard deviation during adjustment.

The water booster must be operated in manual mode for adjustment.

CAUTION: In manual mode, the pressure switch is activated and stops and start the motopump according to its output.

The pressure switch adjustment should be made as follows.

1. Determine which pressure switches should be set to which values according to the table below.
2. Set the water booster to manual mode. For this purpose, press button 2 shown on page 20 for 10 seconds.
3. It is enough to use only one motopump when adjusting the pressure switch. The pressure in the installation will be increased by running the motopump, the pressure will be reduced by draining the water from the drain valve (or waiting for the water to be used in the installation). Pressure switches should be adjusted during these pressure changes.
4. Run the motopump. The key 6 is used for this purpose. Once the key is pressed, the motopump starts. If it is pressed again, the motopump stops.
5. Firstly set the low pressure switch. Use the short and long bolts specified above for this purpose.
6. If the water booster has two pumps, the operation is ended by adjusting the high pressure switch. If it has three pumps, after the low pressure switch, the medium pressure switch should be set and then the high pressure switch should be set as well.
7. After the pressure switch adjustment is complete, press key 3 shown on page 20 to set the water booster to automatic mode.
8. In automatic mode, check that the water booster operates at the desired pressure values and that the motors are switched on and off in sequence.

Table 3: Booster Pressure Switch Setting Table

Single pump		Twin pump			Triple pump			
Water booster type	1. Pump	Water booster type	1. Pump	2. Pump	Water booster type	1. Pump	2. Pump	3. Pump
	Start/Stop		Start/Stop	Start/Stop		Start/Stop	Start/Stop	Start/Stop
403/10-1	3-5	403/10-2	3,5-5	3-4,5	403/10-3	3-5	2,5-4,5	2-4
403/15-1	5-7	403/15-2	5-7	4,5-6,5	403/15-3	5-7	4,5-6,5	4-6
403/16-1	5,5-7,5	403/16-2	5-7	4,5-6,5	403/16-3	5,5-7,5	5-7	4,5-6,5
406/11-1	3-4,5	406/11-2	3-4,5	2,5-4	406/11-3	3-4,5	2,5-4	2-3,5
406/15-1	4-6	406/15-2	4-6	3,5-5,5	406/15-3	4-6	3,5-5,5	3-5
406/18-1	5-7	406/18-2	5-7	4,5-6,5	406/18-3	5-7	4,5-6,5	4-6
408/10-1	3,5-5,5	408/10-2	3,5-5,5	3-5	408/10-3	3,5-5,5	3-5	2,5-4,5
408/14-1	5-7	408/14-2	5-7	4,5-6,5	408/14-3	5-7	4,5-6,5	4-6
408/17-1	6-8	408/17-2	6-8	5,5-7,5	408/17-3	6-8	5,5-7,5	5-7
610/8-1	5-7	610/8-2	5-7	4,5-6,5	610/8-3	5-7	4,5-6,5	4-6
610/10-1	5,5-7,5	610/10-2	5,5-7,5	5-7	610/10-3	5,5-7,5	5-7	4,5-6,5
610/12-1	7-9	610/12-2	7-9	6,5-8,5	610/12-3	7-9	6,5-8,5	6-8
615/7-1	4,5-6,5	615/7-2	4,5-6,5	4-6	615/7-3	4,5-6,5	4-6	3,5-5,5
615/9-1	6,5-8,5	615/9-2	6,5-8,5	6-8	615/9-3	6,5-8,5	6-8	5,5-7,5
615/10-1	7,5-9,5	615/10-2	7,5-9,5	7-9	615/10-3	7,5-9,5	7-9	6,5-8,5
620/7-1	5-7	620/7-2	5-7	4,5-6,5	620/7-3	5-7	4,5-6,5	4-6
620/8-1	6-8	620/8-2	6-8	5,5-7,5	620/8-3	6-8	5,5-7,5	5-7
620/9-1	7,5-9,5	620/9-2	7,5-9,5	7-9	620/9-3	7,5-9,5	7-9	6,5-8,5
631/6-1	3,5-5,5	631/6-2	3,5-5,5	3-5	631/6-3	3,5-5,5	3-5	2,5-4,5
631/7-1	4,5-6,5	631/7-2	4,5-6,5	4-6	631/7-3	4,5-6,5	4-6	3,5-5,5
631/8-1	5-7	631/8-2	5-7	4,5-6,5	631/8-3	5-7	4,5-6,5	4-6

The unit of start and stop values is Bar.

ALDF WATER BOOSTERS SET PRESSURE AND MINIMUM FREQUENCY SETTING

1. Set Pressure (Required Pressure) shall be determined according to installation conditions.

Determination of Set Pressure

$$\text{Required Pressure} = H_{\text{min (mSS)}} = h + \Delta h + 15$$

h - Height (meter) between the place of water booster and top operating floor.

Δh - Pressure loss due to factors such as armature, water meter, calcified pipe in installation. Δh , is considered 20% of the height (h).

$$\Delta h = 0.2h$$

15 - The value obtained from the pressure that should be at the top operating height. For example; 15 meters for 1.5 bar pressure. If the desired pressure changes, this value also changes,

2. Set Pressure shall be set via the booster panel.

Adjusting Set Pressure

- PID Parameter is selected using up-down arrow keys.
- By pressing the MAN. key, PID parameters are entered.
- Reference value is selected using up-down arrow keys.
- By pressing the MAN. key, Reference value is entered.
- Reference value is set to the desired pressure using up-down arrow keys.
- By pressing the MAN. key, Reference value is confirmed and the operation is completed.



3. DETERMINATION OF MINIMUM FREQUENCY

Minimum frequency is found in Table-4 according to set pressure.

TABLE - 4

MINIMUM FREQUENCY VALUES DEPENDING ON ALDF WATER BOOSTER SET PRESSURE

403/10		403/15		403/16		406/11		406/15		406/18		408/10		408/14		408/17		610/8		610/10														
so (Bar)	F (Hz)	so (Bar)	F (Hz)	so (Bar)	F (Hz)	so (Bar)	F (Hz)	so (Bar)	F (Hz)	so (Bar)	F (Hz)	so (Bar)	F (Hz)	so (Bar)	F (Hz)	so (Bar)	F (Hz)	so (Bar)	F (Hz)	so (Bar)	F (Hz)													
5.8	50	8.6	50	9.4	50	7.1	50	9.6	50	12.5	50	6.5	50	9.6	50	12.0	50	8.2	50	10.6	50													
5.5	49	8.3	49	9.0	49	6.8	49	9.2	49	12.0	49	6.3	49	9.2	49	11.5	49	7.8	49	10.1	49													
5.3	48	8.0	48	8.7	48	6.5	48	8.8	48	11.5	48	6.0	48	8.8	48	11.0	48	7.5	48	9.7	48													
5.1	47	7.6	47	8.3	47	6.3	47	8.5	47	11.0	47	5.8	47	8.5	47	10.6	47	7.2	47	9.3	47													
4.9	46	7.3	46	7.9	46	6.0	46	8.1	46	10.5	46	5.5	46	8.1	46	10.1	46	6.9	46	8.9	46													
4.6	45	7.0	45	7.6	45	5.7	45	7.7	45	10.1	45	5.3	45	7.7	45	9.7	45	6.6	45	8.5	45													
4.4	44	6.7	44	7.2	44	5.5	44	7.4	44	9.6	44	5.0	44	7.4	44	9.2	44	6.3	44	8.1	44													
4.2	43	6.4	43	6.9	43	5.2	43	7.1	43	9.2	43	4.8	43	7.1	43	8.8	43	6.0	43	7.8	43													
4.0	42	6.1	42	6.6	42	5.0	42	6.7	42	8.7	42	4.6	42	6.7	42	8.4	42	5.7	42	7.4	42													
3.8	3.7	41 40	5.8	5.5	41 40	6.3	6.0	41 40	4.7	4.5	41 40	6.4	6.1	41 40	8.3	7.9	41 40	4.4	4.1	41 40	6.4	6.1	41 40	8.0	7.6	41 40	5.4	5.2	41 40	7.0	6.7	41 40	4.1	4.0
3.5	3.3	3.1	2.9	2.8	2.7	2.6	2.5	2.4	2.3	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.0												
3.5	39	5.2	39	5.7	39	4.3	39	5.8	39	7.5	39	3.9	39	5.8	39	7.2	39	4.9	39	6.4	39													
3.3	38	4.9	38	5.4	38	4.1	38	5.5	38	7.1	38	3.7	38	5.5	38	6.8	38	4.7	38	6.0	38													
3.1	37	4.7	37	5.1	37	3.8	37	5.2	37	6.7	37	3.5	37	5.2	37	6.5	37	4.4	37	5.7	37													
2.9	36	4.4	36	4.8	36	3.6	36	4.9	36	6.4	36	3.3	36	4.9	36	6.1	36	4.2	36	5.4	36													
2.8	35	4.2	35	4.5	35	3.4	35	4.6	35	6.0	35	3.1	35	4.6	35	5.8	35	3.9	35	5.1	35													
2.6	34	3.9	34	4.3	34	3.2	34	4.4	34	5.7	34	3.0	34	4.4	34	5.4	34	3.7	34	4.8	34													
2.5	33	3.7	33	4.0	33	3.0	33	4.1	33	5.3	33	2.8	33	4.1	33	5.1	33	3.5	33	4.5	33													
2.3	32	3.5	32	3.8	32	2.8	32	3.8	32	5.0	32	2.6	32	3.8	32	4.8	32	3.3	32	4.2	32													
2.2	31	3.2	31	3.5	31	2.7	31	3.6	31	4.7	31	2.4	31	3.6	31	4.5	31	3.1	31	4.0	31													
2.0	30	3.0	30	3.3	30	2.5	30	3.4	30	4.4	30	2.3	30	3.4	30	4.2	30	2.9	30	3.7	30													
1.9	29	2.8	29	3.1	29	2.3	29	3.1	29	4.1	29	2.1	29	3.1	29	3.9	29	2.7	29	3.4	29													
1.7	28	2.6	28	2.9	28	2.2	28	2.9	28	3.8	28	2.0	28	2.9	28	3.6	28	2.5	28	3.2	28													
1.6	27	2.4	27	2.6	27	2.0	27	2.7	27	3.5	27	1.8	27	2.7	27	3.4	27	2.3	27	3.0	27													
1.5	26	2.3	26	2.5	26	1.9	26	2.5	26	3.3	26	1.7	26	2.5	26	3.1	26	2.1	26	2.8	26													
610/12	615/7		615/9		615/10		620/7		620/8		620/9		631/6		631/7		631/8																	
so (Bar)	F (Hz)	so (Bar)	F (Hz)	so (Bar)	F (Hz)	so (Bar)	F (Hz)	so (Bar)	F (Hz)	so (Bar)	F (Hz)	so (Bar)	F (Hz)	so (Bar)	F (Hz)	so (Bar)	F (Hz)	so (Bar)	F (Hz)															
11.5	50	7.7	50	10.1	50	11.0	50	8.5	50	9.3	50	10.6	50	8.6	50	9.6	50	10.6	50															
11.1	49	7.4	49	9.7	49	10.6	49	8.1	49	8.9	49	10.1	49	8.3	49	9.2	49	10.1	49															
10.6	48	7.1	48	9.3	48	10.2	48	7.8	48	8.6	48	9.7	48	8.0	48	8.8	48	9.7	48															
10.2	47	6.8	47	8.9	47	9.7	47	7.4	47	8.2	47	9.3	47	7.6	47	8.5	47	9.3	47															
9.7	46	6.5	46	8.5	46	9.3	46	7.1	46	7.9	46	8.9	46	7.3	46	8.1	46	8.9	46															
9.3	45	6.2	45	8.1	45	8.9	45	6.8	45	7.5	45	8.5	45	7.0	45	7.7	45	8.5	45															
8.9	8.5	44 43	5.9	5.6	44 43	7.8	7.4	44 43	8.5	8.1	44 43	6.5	6.2	44 43	7.2	6.8	44 43	8.1	7.8	44 43	4.4	4.3												
8.1	42	5.4	42	7.1	42	7.7	42	5.9	42	6.5	42	7.4	42	6.1	42	6.7	42	7.4	42															
7.7	41	5.1	41	6.7	41	7.4	41	5.6	41	6.2	41	7.0	41	5.8	41	6.4	41	7.0	41															
7.3	40	4.9	40	6.4	40	7.0	40	5.4	40	5.9	40	6.7	40	5.5	40	6.1	40	6.7	40															
6.9	39	4.6	39	6.1	39	6.6	39	5.1	39	5.6	39	6.4	39	5.2	39	5.8	39	6.4	39															
6.6	38	4.4	38	5.7	38	6.3	38	4.8	38	5.3	38	6.0	38	4.9	38	5.5	38	6.0	38															
6.2	37	4.1	37	5.4	37	6.0	37	4.6	37	5.0	37	5.7	37	4.7	37	5.2	37	5.7	37															
5.9	36	3.9	36	5.1	36	5.6	36	4.3	36	4.8	36	5.4	36	4.4	36	4.9	36	5.4	36															
5.5	35	3.7	35	4.9	35	5.3	35	4.1	35	4.5	35	5.1	35	4.2	35	4.6	35	5.1	35															
5.2	34	3.5	34	4.6	34	5.0	34	3.8	34	4.2	34	4.8	34	3.9	34	4.4	34	4.8	34															
4.9	33	3.3	33	4.3	33	4.7	33	3.6	33	4.0	33	4.5	33	3.7	33	4.1	33	4.5	33															
4.6	32	3.1	32	4.0	32	4.4	32	3.4	32	3.7	32	4.2	32	3.5	32	3.8	32	4.2	32															
4.3	31	2.9	31	3.8	31	4.1	31	3.2	31	3.5	31	4.0	31	3.2	31	3.6	31	4.0	31															
4.0	30	2.7	30	3.5	30	3.9	30	3.0	30	3.3	30	3.7	30	3.0	30	3.4	30	3.7	30															
3.8	29	2.5	29	3.3	29	3.6	29	2.8	29	3.0	29	3.4	29	2.8	29	3.1	29	3.4	29															
3.5	3.2	28 27	2.3	2.2	28 27	3.1	2.8	28 27	3.4	3.1	28 27	2.6	2.4	28 27	2.8	2.6	28 27	2.9	2.7	28 27	3.2	3.0	28 27	3.2	3.0	28 27	2.8	2.7						
3.0	26	2.0	26	2.6	26	2.9	26	2.2	26	2.4	26	2.8	26	2.3	26	2.5	26	2.8	26															

S0 (Bar) : Set pressure
 F (Hz) : Minimum frequency to be set via frequency converter depending on set pressure

4. MINIMUM FREQUENCY SETTING

The minimum frequency is set via the frequency converter as described below.



■ How are parameters searched and reprogrammed

Panel operation	LED Display	Operation
	0.0	First status. Displays the output frequency. Driver operation must be stopped before parameter changes can be made.
	AUX	"Mode" key is pressed once.
	F2--	The setting dial is turned and "F2.." is selected.
	F200	The center of the setting dial is pressed. "F200" appears in the display.
	F202	The setting dial is turned and "F202" is selected.
	30.0	The center of the setting dial is pressed to reach the value of the parameter "F202". This value varies according to the pump capacity.
	33.0	The setting dial is turned and the value of parameter "F202" is changed.
	33.0 F202	The center of the setting dial is pressed to confirm the change. The parameter name and value are displayed alternately.
	Parameter display	
	F2--	The "mode" key is pressed several times to return to the standard display mode. (output frequency display)
	Fr-F	
	0.0	

ALDF Water Booster Factory Default

Water Booster Type	So Reference Pressure (Bar)	Min. Frequency (Hz)	Pmin (Bar)	Pmax (Bar)	YBS (Bar)
403/10	2	30	0,5	5,5	6,5
403/15	4	35	0,5	8,5	9,5
403/16	4,5	35	0,5	10	11
406/11	2	27	0,5	7	8
406/15	3	29	0,5	10	11
406/18	4	29	0,5	10	11
408/10	2,5	32	0,5	6,5	7,5
408/14	4	33	0,5	10	11
408/17	5	33	0,5	10	11
610/8	4	36	0,5	8	9
610/10	4,5	33	0,5	10	11
610/12	6	37	0,5	10	11
615/7	3,5	35	0,5	7,5	8,5
615/9	5,5	38	0,5	10	11
615/10	6,5	39	0,5	10	11
620/7	4	35	0,5	8,5	9,5
620/8	5	37	0,5	10	11
620/9	6,5	40	0,5	10	11
631/6	2,5	28	0,5	3,5	9,5
631/7	3,5	31	0,5	10	11
631/8	4	32	0,5	10	11

PRESSURE TRANSMITTER

Pressure Transmitter Features

Brand	Keller
Model	PA-21 SR
Place of Use	ALDF
Pressure Range	0-16 Bar
Supply Voltage	8-28 V dc
Output Signal	4-20mA
Precision Class	0.5%
Operating Temperature	-40 ...+100°C
Line Connection	G 1/4"
Electrical Connection	DIN43650
Protection Class	IP 65



WATERLESS RUNNING PROTECTION

There are different applications on "waterless running protection" for Alarko water boosters.

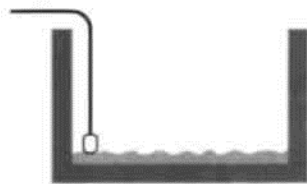
ALD Water Boosters:

Protection is included in the standard delivery. Water float switch is used.

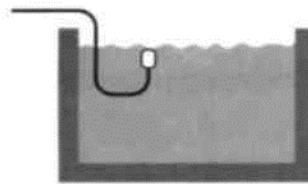
ALDF Water Boosters:

Minimum pressure and water float switch protection is available.

Figure 2: Placing the Water Float Switch in the Tank



The tank is empty.
The water booster
does not work.



The tank is full. The water
booster works.

DISASSEMBLY OF ONE OF THE PUMPS

If one of the pumps of the water boosters with twin or triple pumps is removed for repair or maintenance, the remaining pump(s) may continue to run without having to change the electrical connections. To run the system, the following procedure must be followed.

- Switch off the main switch at the power input of the water booster.
- Close the fuse for the pump to be removed from the control panel.
- Disconnect the pump motor cable connections. Isolate exposed ends.

CAUTION: If the switch is opened accidentally, the terminals are energized. Therefore, the cable terminals must be insulated in a way that they cannot be opened to prevent possible hazards.

- Close the water inlet valve of the pump and disconnect the pump from the flanges (The check valve on this line will prevent water from returning.) This end does not need to be neutralized).
- Energize the system by opening the main switch.

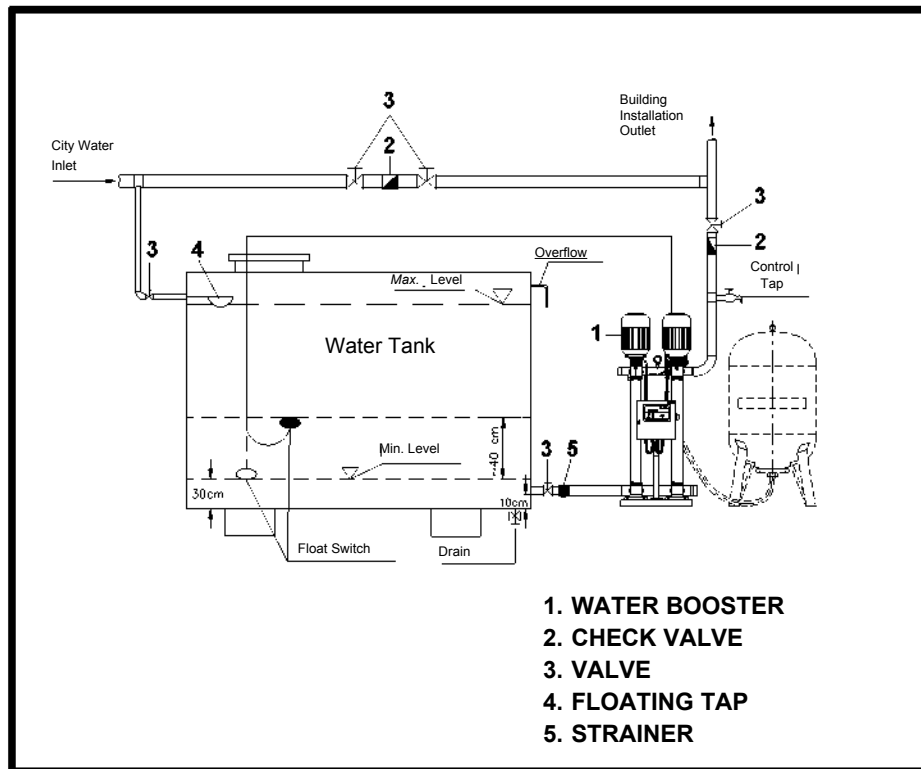
INSTALLATION DIAGRAMS**ALD and ALDF Series**

Figure 4

DIGITAL CONTROL PANELS OF WATER BOOSTERS WITH TWIN AND TRIPLE PUMPS

The water boosters with twin and triple pump are equipped with control panel with microprocessor and LCD screen mounted on the panel cover.

The front of the control panel is shown below. The panel changes according to the number of pumps. The panel in the figure is the panel of the water booster with triple pump.



1. LCD Display: The current operating mode of the water booster and other information can be viewed.
2. Manual Button and Light: It is used to switch to manual mode. In manual mode, the pumps get out of the control of the pressure switch. They can only be stopped or started by pressing the buttons 6. To avoid accidental switching to manual mode, it can only be switched to manual mode by pressing and holding the button for 8-10 seconds. To exit this mode, the automatic button must be pressed or the panel must be de-energized from the main switch.
3. Automatic Button and Light: It is used to return to automatic mode.
4. Parameter Values Change Button: This button works when and after entering the password.
5. Parameter Values Change Button: This button works when and after entering the password.
6. Pump Buttons: It is used to stop and start pumps in manual mode. When first pressed, it starts the pump to which it is connected, and stops the pump if pressed again.
7. Working Lights: The green light is on when the pump is running.
8. Fault Lights: The red light are on if the pump fails and stops.

Screen Display During Normal Operation:

There are two lines on the screen. The bottom line indicates the position/status of the device. On the top line, ALARKO - CARRIER will appear alternately with 4-5 seconds interval, together with the information on which engines are running and which ones have stopped. The automatic operation light and the running pump light are on.

M1#1 M2#0 M3#1
OTOMATİK ÇALIŞMA

Fault - Error Messages:

RST Error: This message appears on the display if the motor remains in two phases during start-up or operation, or if the mains connections are incorrect.

M1#0 M2#0 M3#0
RST HATASI

Thermal Relay Tripped: This message appears on the display if the thermal relay of any of the motors trips. The number indicates which motor's thermal relay is tripped. At this time, the fault light is lit red.

M1#0 M2#1 M3#0
TERMİK ATTI - 1

No Water: When the tank is waterless, the panel cuts power and this warning appears on the display.

M1#0 M2#0 M3#0
SU YOK!

Encrypted Section:

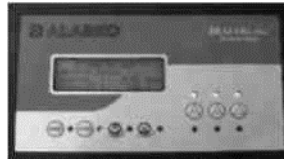
This section is only for use by authorized services. Password can be entered by typing. Some settings of the water booster are made and historical information can be learned.

ALDF Water Booster Panel Dimensions

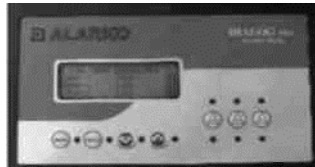
MOTOR GÜCÜ (HP)	TEK POMPALI		ÇİFT POMPALI		ÜÇ POMPALI	
	PARÇA KODU	BOYUTLAR (AxBxH) mm	PARÇA KODU	BOYUTLAR (AxBxH) mm	PARÇA KODU	BOYUTLAR (AxBxH) mm
DİREKT YÜKLEME	1	52010820042	52010820081		52010820080	
	1.5	52010820043	52010820082		52010820081	350x230x450
	2	52010820044	52010820083	350x230x450	52010820082	
	3	52010820045	52010820084		52010820083	
	4	52010820046	52010820085		52010820084	400x230x500
	5.5	52010820047	52010820086		52010820085	
YALDIZ ÜÇLÜ	7.5	52010820048	52010820087	400x230x500	52010820086	
	10	52010820049	52010820088	400x250x600	52010820087	400x250x600
	15	52010820050	52010820089	500x250x700	52010820088	500x250x700

Descriptions of messages that will appear on the ALDF Digital Display

In normal operation, the display will show the pressure and control percentage (%) and the mode in which the water booster runs.



While the water booster is in stop operation mode, the total running time and number of switches of each pump can be monitored on the screen by pressing the down arrow key.



If the motor remains in two phases during start-up or operation, or if the mains connections are incorrect, the panel will turn off the power by not allowing the motor to rotate in the opposite direction and "RST ERROR!!" warning will appear on the display.



When thermal relay of any of the motors is tripped, "THERMAL RELAY TRIPPED-1" warning will appear on the display. (Number 1 is given as an example, indicating the motor that thermal relay is tripped)



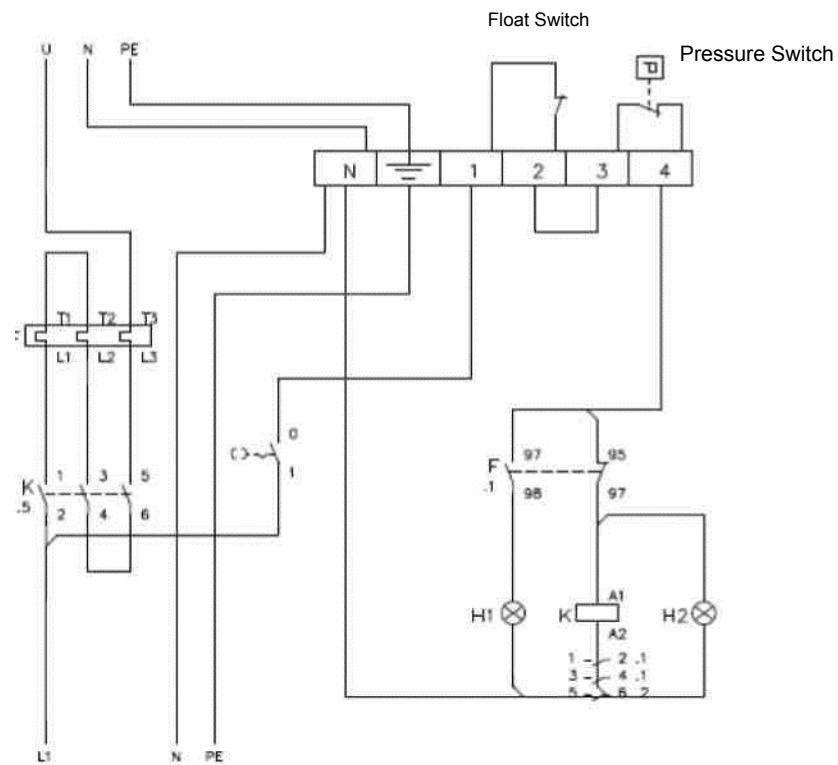
The panel will cut off energy when the tank is waterless and "NO WATER!" warning will appear on the display.



ELECTRICAL DIAGRAM

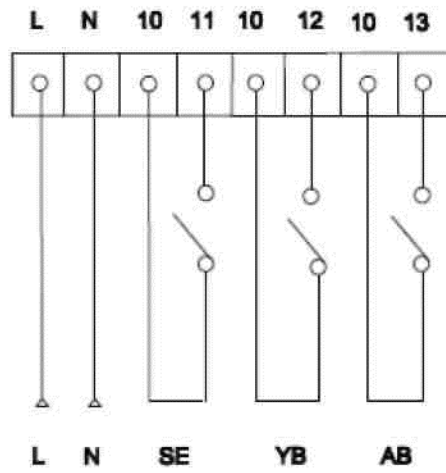
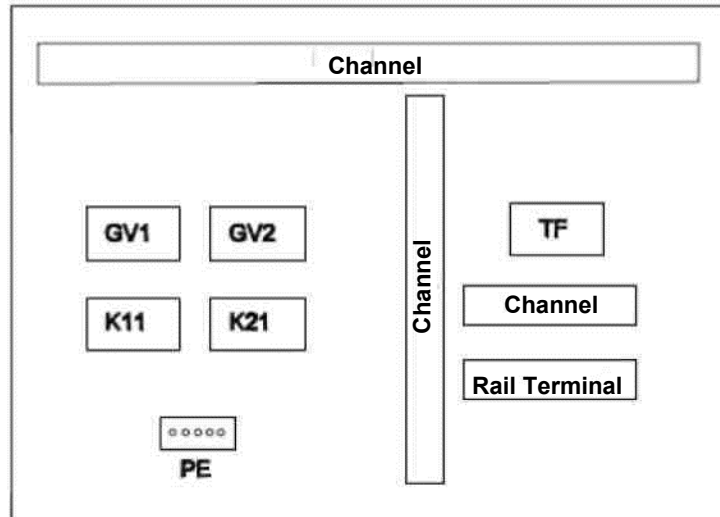
ALDM Series -Types: 403/10-1, 403/15-1, 403/16-1

MOTOR POWER	KW	0,75	1,1	1.5
	HP	1	1,5	2
MOTOR CURRENT	A	5,3	7,3	10,3
K PUMP CONTACTOR	D TYPE	9	9	12
	K TYPE	9	9	12
K PUMP CONTACTOR		8.4	8.4	12
F THERMAL RELAY		5,3	7,3	10,3



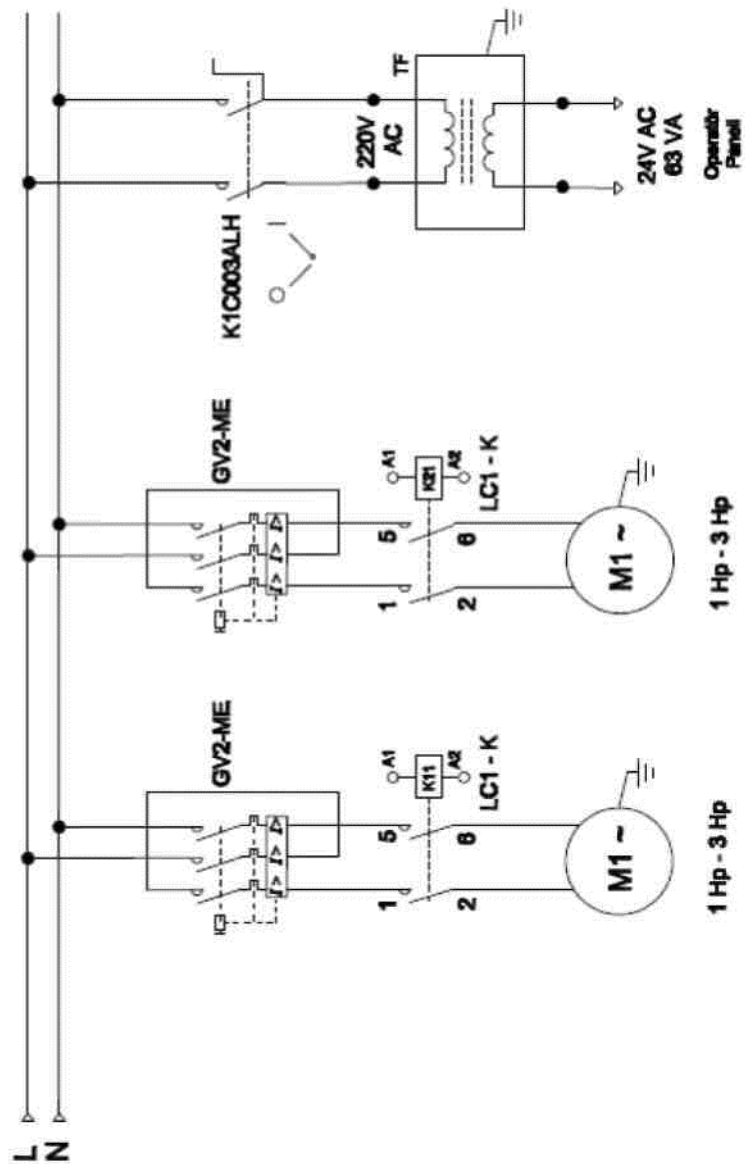
ELECTRICAL DIAGRAM

Single Phase Water Booster with Twin Pump Panel Terminal Connection ALDM Series - Types: 403/10-2, 403/15-2, 403/16-2



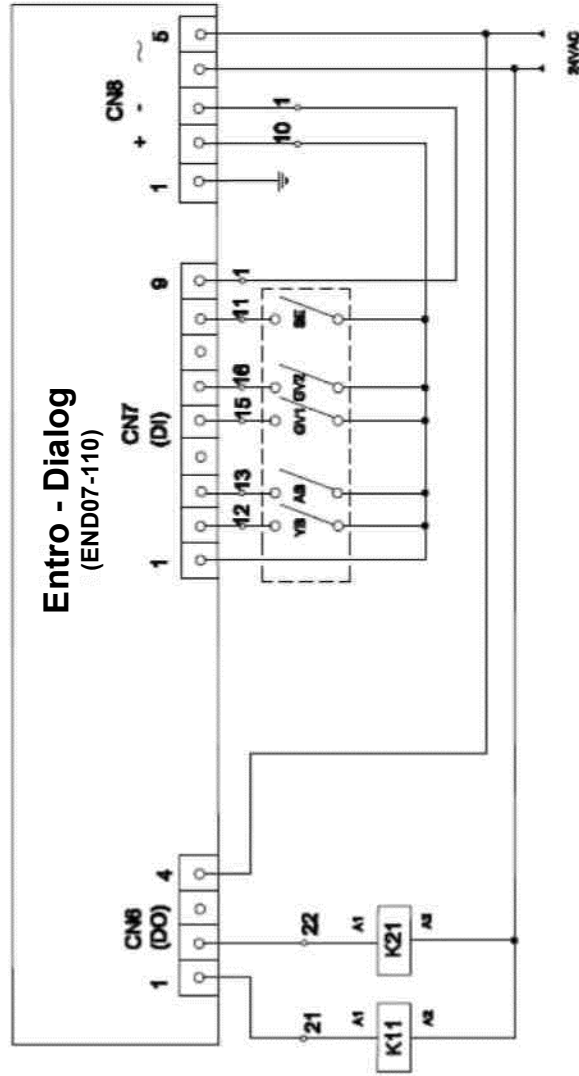
ELECTRICAL DIAGRAM

Single Phase Water Booster with Twin Pump
Panel Power Circuit ALDM Series - Types:
403/10-2, 403/15-2, 403/16-



ELECTRICAL DIAGRAM

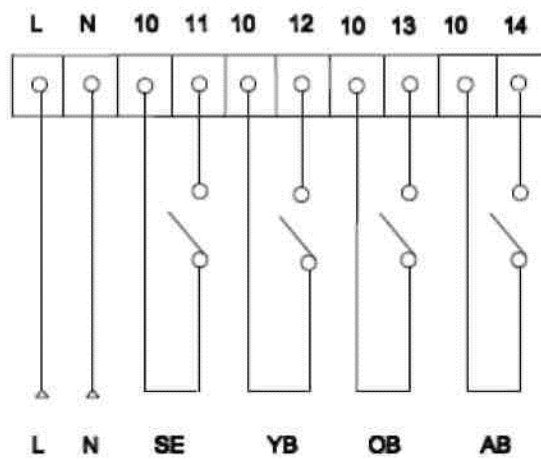
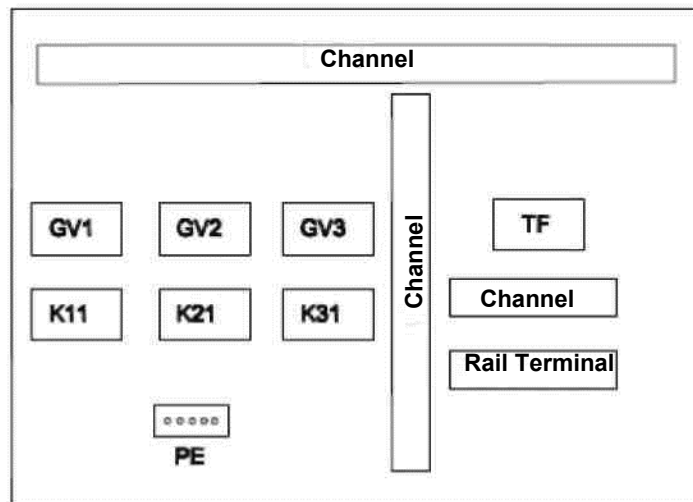
Single Phase Water Booster with Twin Pump Control Panel Connection
 ALDM Series - Types: 403/10-2, 403/15-2, 403/16-2



- K11, K21 : Contactors
- TF: Transformer
- GV1, GV2 . Thermal Switch NO Contacts
- SE: Water Level Contact
- AB: Low Pressure
- YB: High Pressure

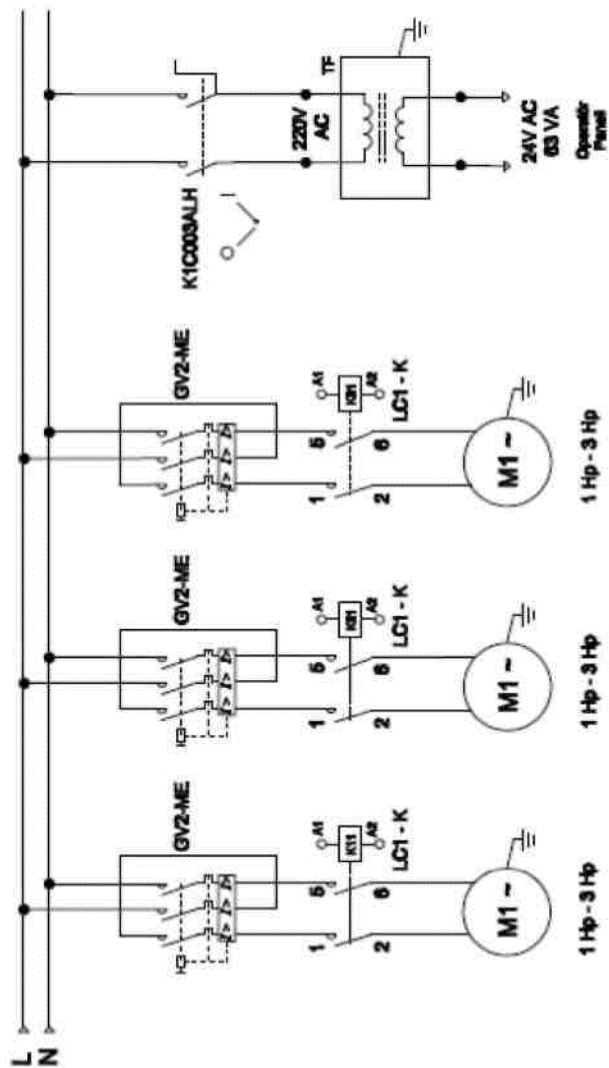
ELECTRICAL DIAGRAM

Single Phase Water Booster with Triple Pump Panel Terminal Connection
ALDM Series - Types: 403/10-3, 403/15-3, 403/16-3



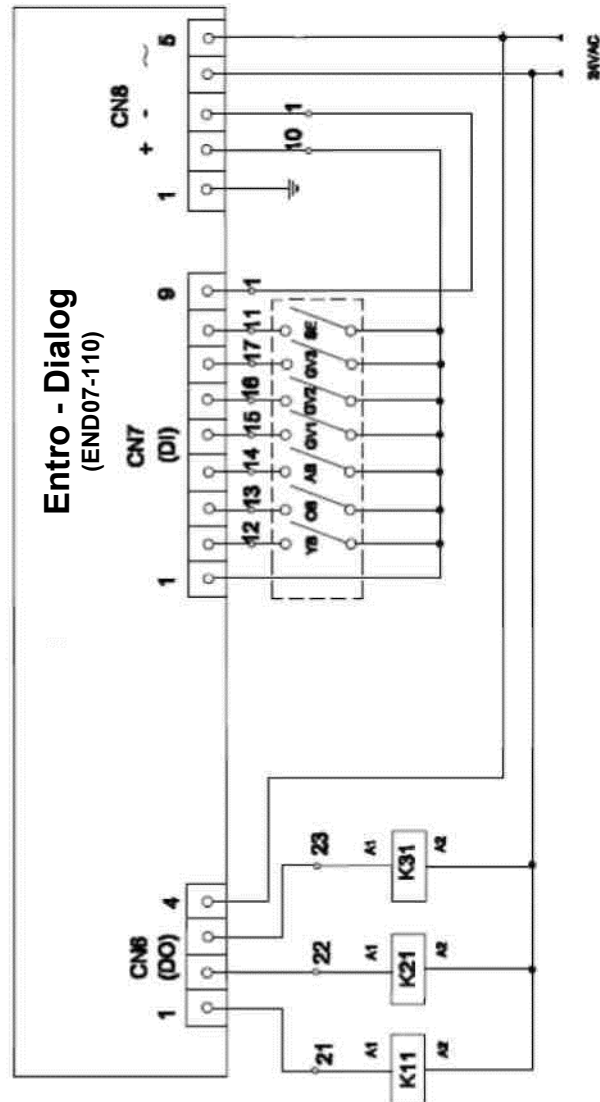
ELECTRICAL DIAGRAM

Single Phase Water Booster with Triple Pump Panel Power Circuit
ALDM Series - Types: 403/10-3, 403/15-3, 403/16-3



ELECTRICAL DIAGRAM

Single Phase Water Booster with Triple Pump Control Panel
 Connection ALDM Series - Types: 403/10-3, 403/15-3, 403/16-3

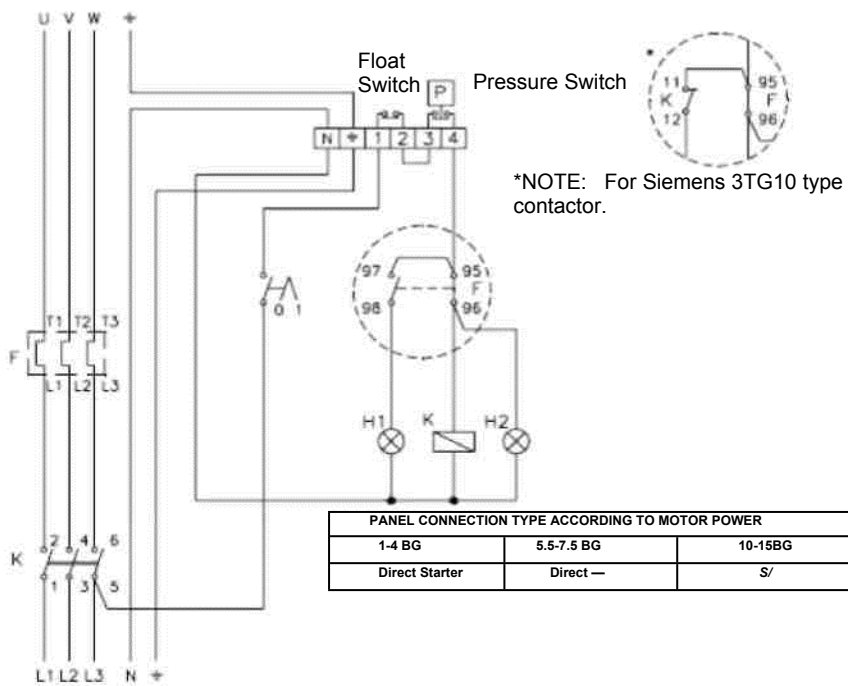


K11, K21, K31 Contactors
 TF: Transformer
 GV1, GV2, GV3: Thermal Switch NO Contacts
 SE: Water Level Contact
 AB: Low Pressure
 OB: Medium Pressure
 YB: High Pressure

ELECTRICAL DIAGRAM

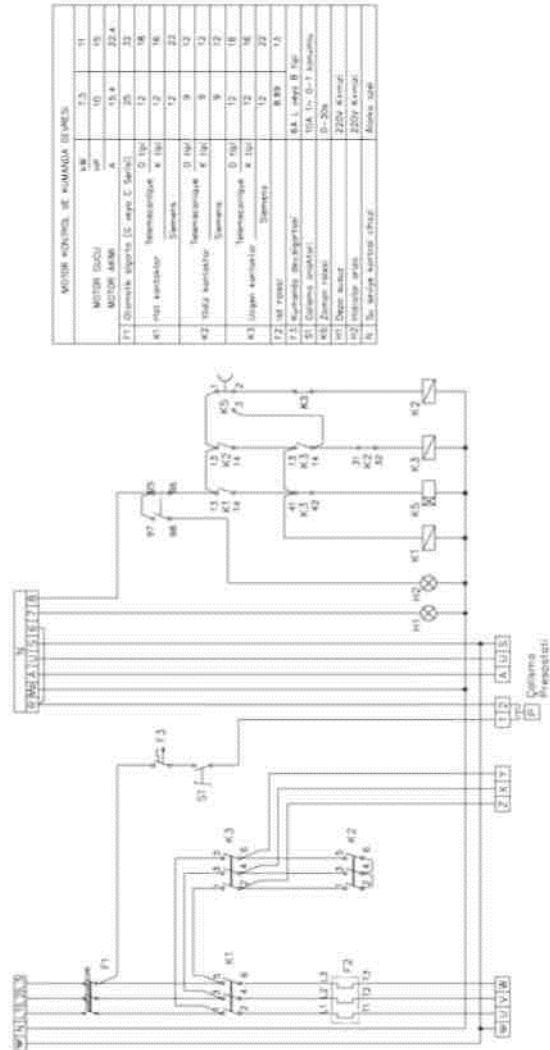
ALD Series -Types: 403/10-1, 403/15-1, 403/16-1, 406/11-1, 406/15-1, 406/18-1, 408/10-1, 408/14-1, 408/17-1, 610/8-1, 610/10-1, 610/12-1, 615/7-1, 615/9-1, 620/7-1

	MOTOR POWER	kW	0,75	1,1	1,5	2,2	3	4	5,5
		HP	1	1,5	2	3	4	5,5	7,5
	MOTOR CURRENT	A	1,95	2,55	3,45	5	6,5	8,6	11,8
K	Pump contactor	D type	9	9	9	9	9	12	18
		K type	9	9	9	9	9	12	16
K	Pump contactor		8,4	8,4	8,4	8,4	8,4	-	-
F	Thermal Relay		1,95	2,55	3,45	5	6,5	8,6	11,8



ELECTRICAL DIAGRAM

ALD Series - Types 615/10-1, 620/8-1, 620/9-1, 631/6-1, 631/7-1, 631/8-1

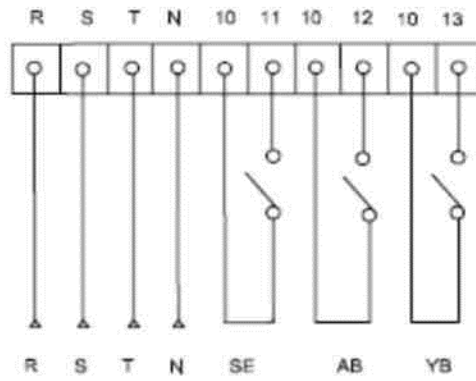
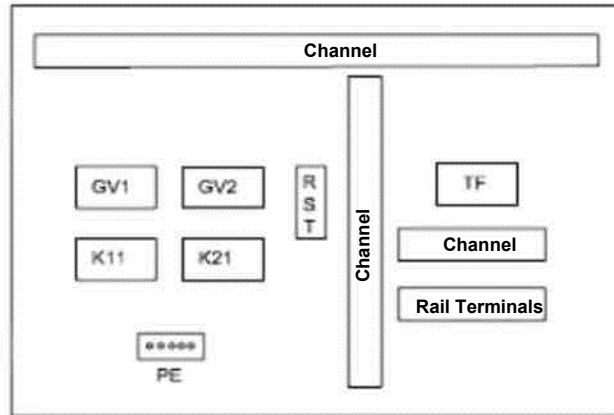


MOTOR KONDISI, DE KAWAHLA ELEKTRIK

MOTOR TITIK	AW	2.5	11
MOTOR 631/8-1	10	10	15
MOTOR 631/7-1	A	15.4	22.4
F1	Dimensi: 100x100 (C. max. C. 50x100)	25	22
F2	Dimensi: 100x100 (C. max. C. 50x100)	12	16
F3	Dimensi: 100x100 (C. max. C. 50x100)	12	22
K1	Dimensi: 100x100 (C. max. C. 50x100)	9	12
K2	Dimensi: 100x100 (C. max. C. 50x100)	8	12
K3	Dimensi: 100x100 (C. max. C. 50x100)	12	16
K4	Dimensi: 100x100 (C. max. C. 50x100)	12	16
F2	Dimensi: 100x100 (C. max. C. 50x100)	8.89	1.5
F3	Dimensi: 100x100 (C. max. C. 50x100)	10.4	10.1
K1	Dimensi: 100x100 (C. max. C. 50x100)	0-200	
K2	Dimensi: 100x100 (C. max. C. 50x100)	2200	1000
K3	Dimensi: 100x100 (C. max. C. 50x100)	2200	1000
K4	Dimensi: 100x100 (C. max. C. 50x100)	2200	1000
F1	Dimensi: 100x100 (C. max. C. 50x100)	1000	1000

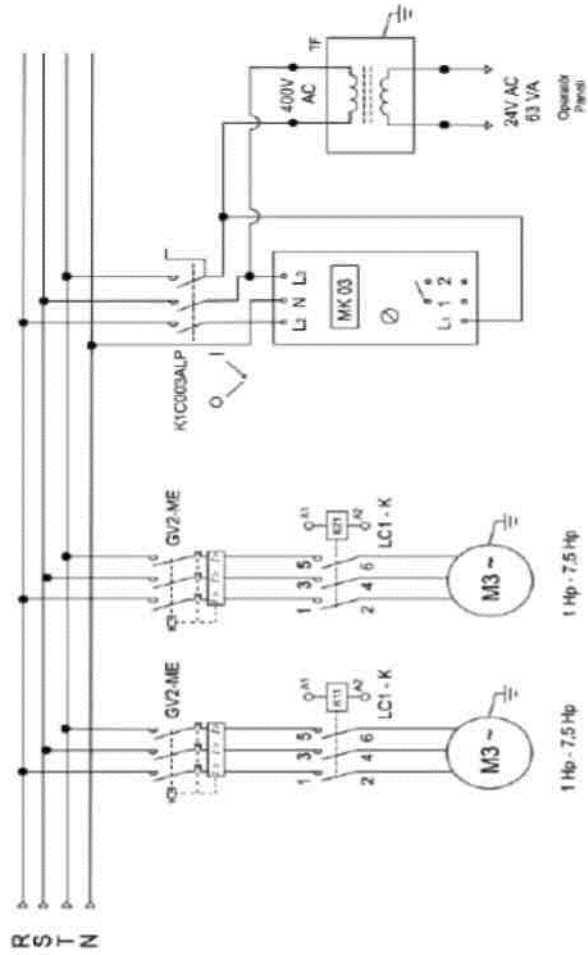
ELECTRICAL DIAGRAM

Direct Starter Water Booster with Twin Pump Panel Terminal Connection ALD Series - Types: 403/10-2, 403/15-2, 403/16-2, 406/11 -2, 406/15-2, 406/18-2, 408/10-2, 408/14-2, 408/17-2, 610/8-2, 610/10-2, 610/12-2, 615/7-2, 615/9-2, 620/7-2



ELECTRICAL DIAGRAM

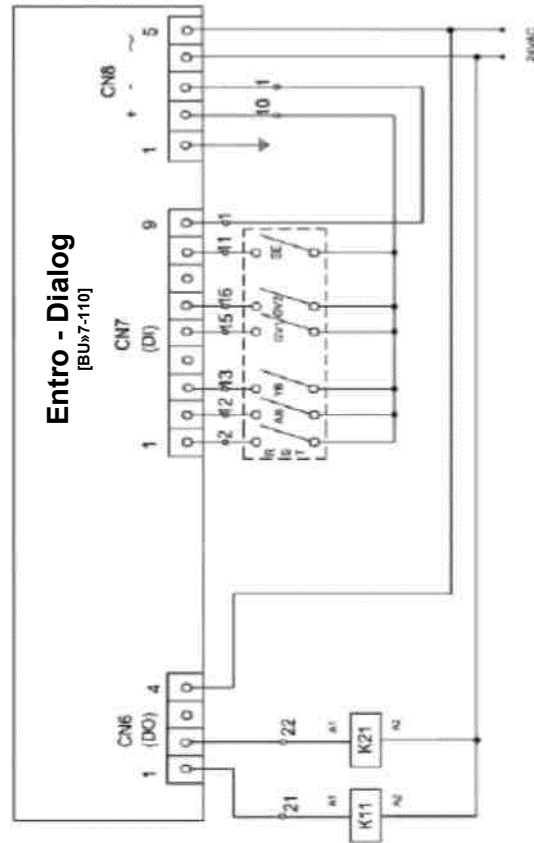
Direct Starter Water Booster with Twin Pump Panel Power Circuit ALD Series -
 Types: 403/10-2, 403/15-2, 403/16-2, 406/11-2, 406/15-2, 406/18-2, 408/10-2,
 408/14-2, 408/17-2, 610/8-2, 610/10-2, 610/12-2, 615/7-2, 615/9-2, 620/7-2



ELECTRICAL DIAGRAM

Direct Starter Water Booster with Twin Pump Control Panel

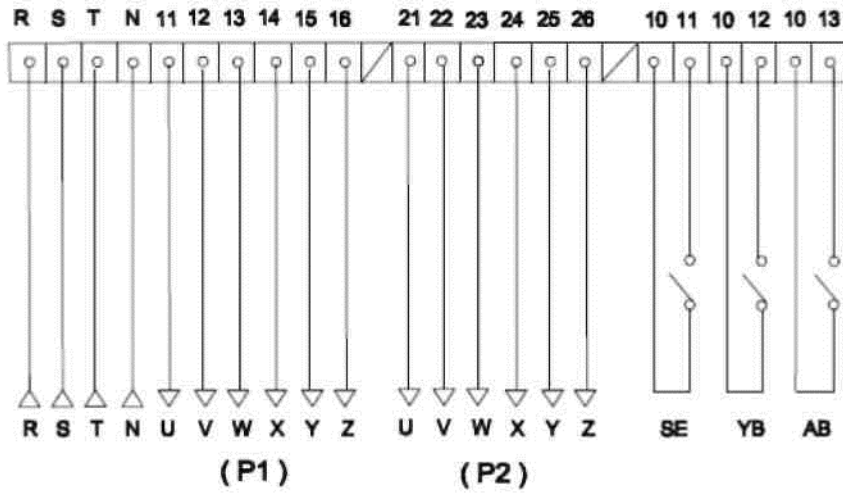
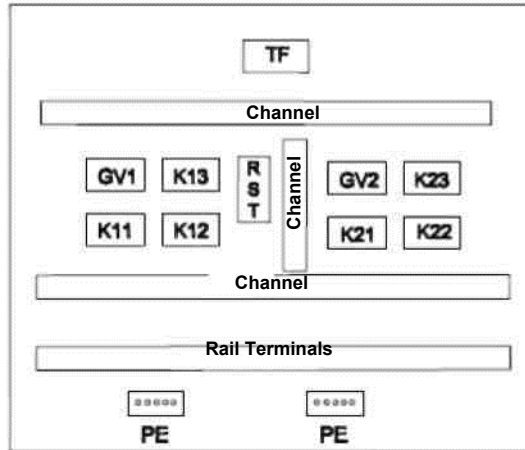
Connection ALD Series - Types: 403/10-2, 403/15-2, 403/16-2, 406/11-2, 406/15-2, 406/18-2. 408/10-2, 408/14-2, 408/17-2, 610/8-2, 610/10-2, 610/12-2, 615/7-2, 615/9-2, 620/7-2



K11, K21: Contactor
 TF: Transformer
 GV1, GV2: Thermal Switch NO Contacts
 RST: Phase Sequencing and Protection Contact
 AB: Low Pressure
 YB: High Pressure

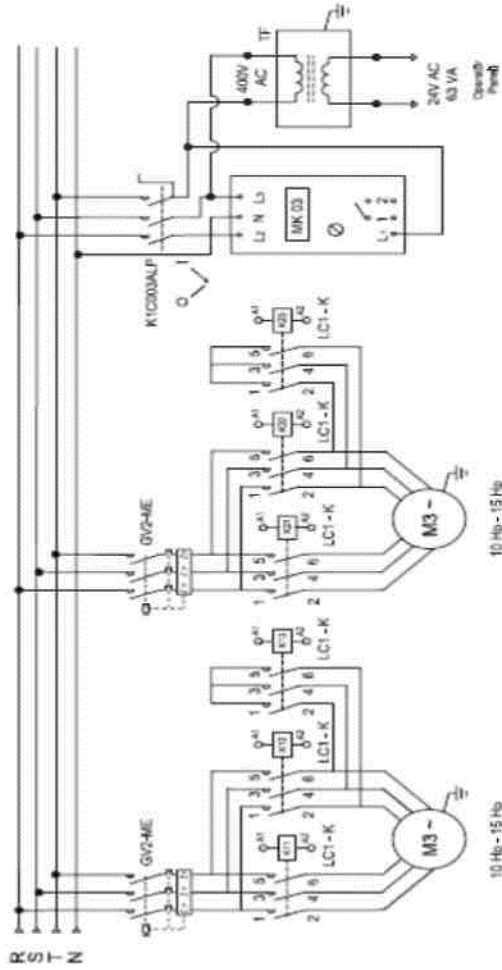
ELECTRICAL DIAGRAM

Star/Triangle Starter Water Booster with Twin Pump Panel Terminal Connection
ALD Series - Types: 615/10-2, 620/8-2, 620/9-2, 631/6-2, 631/7-2, 631/8-2



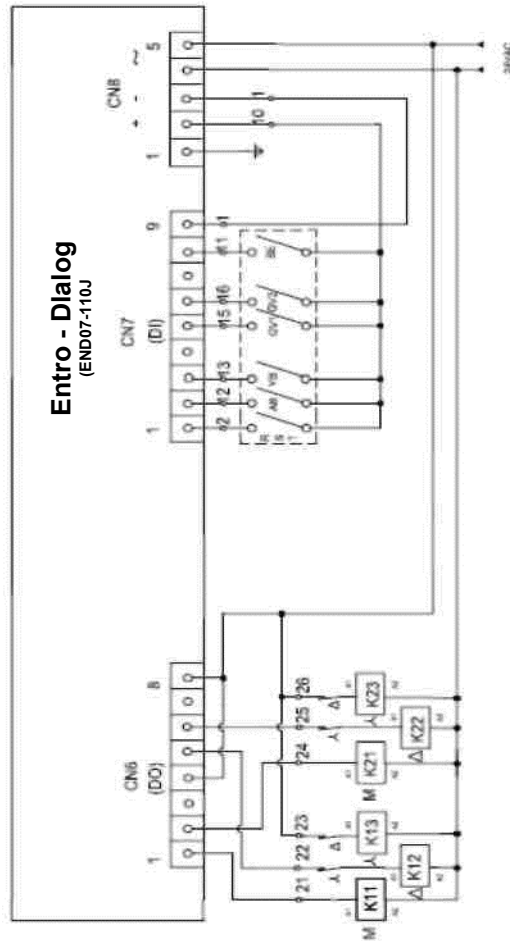
ELECTRICAL DIAGRAM

Star/Triangle Starter Water Booster with Twin Pump Panel Power Circuit ALD Series - Types; 615/10-2, 620/8-2, 620/9-2, 631/6-2, 631/7-2, 631/8-2



ELECTRICAL DIAGRAM

Star/Triangle Starter Water Booster with Twin Pump Control Panel Connection
 ALD Series - Types: 615/10-2,620/8-2, 620/9-2, 631/6-2, 631/7-2,631/8-2



K11,K12.,K13,K21,K22.,K23 : Contactors

TF: Transformer

GV1.GV2 : Thermal Switch NO Contacts

RST : Phase Sequencing and Protection Contact

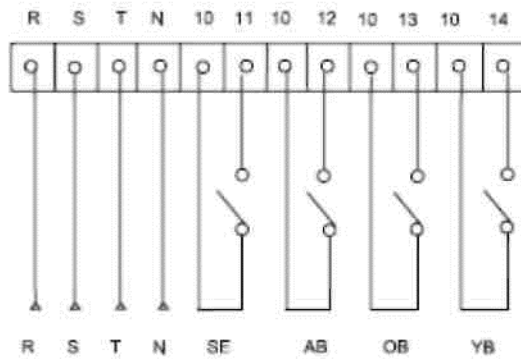
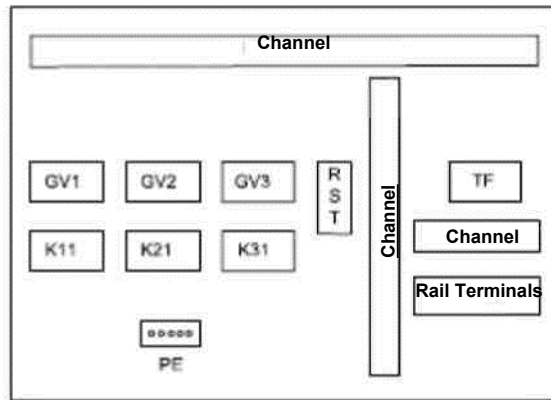
SE: Water Level Contact

AB : Low Pressure

YB: High Pressure

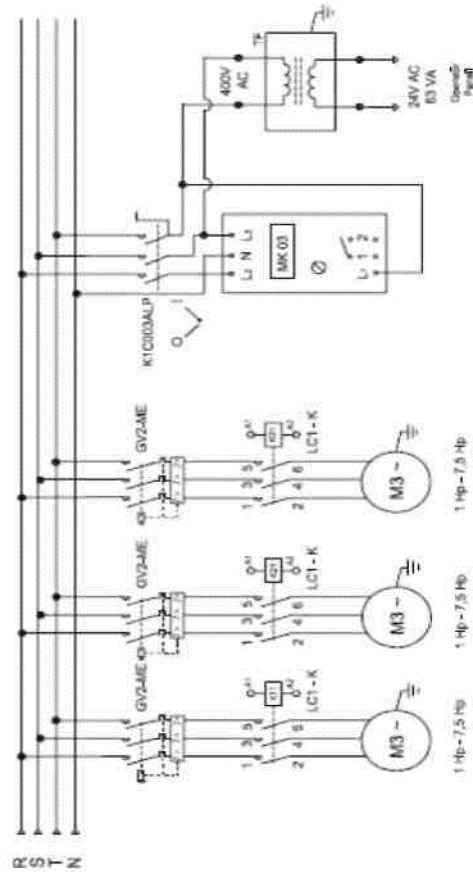
ELECTRICAL DIAGRAM

Direct Starter Water Booster with Triple Pump Panel Terminal Connection ALD Series - Types: 403/10-3, 403/15-3, 403/16-3, 406/11-3, 406/15-3, 406/18-3, 408/10-3, 408/14-3, 408/17-3, 610/8-3, 610/10-3, 610/13-3, 615/7-3, 615/9-3, 620/7-3



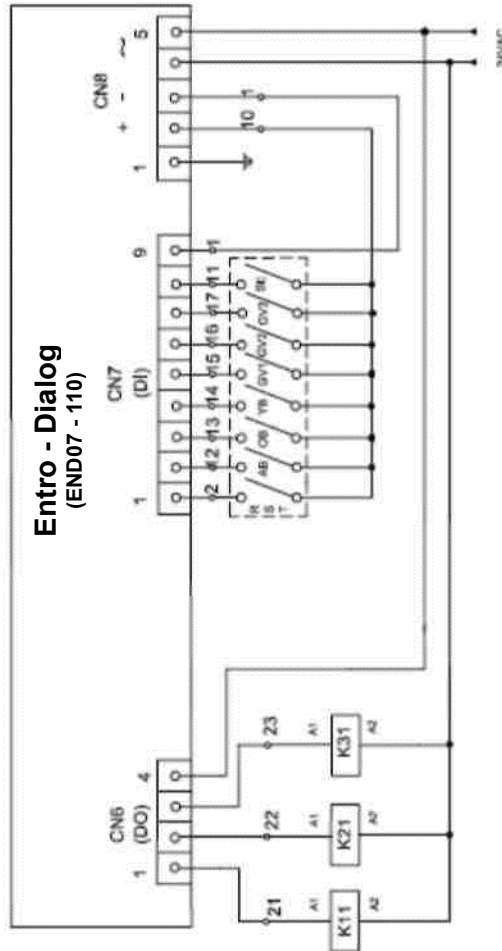
ELECTRICAL DIAGRAM

Direct Starter Water Booster with Triple Pump Panel Power Circuit ALD Series -
 Types: 403/10-3, 403/15-3, 403/16-3, 406/11-3, 406/15-3, 406/18-3, 408/10-3,
 408/14-3, 408/17-3, 610/8-3, 610/10-3, 610/13-3, 615/7-3, 615/9-3, 620/7-3



ELECTRICAL DIAGRAM

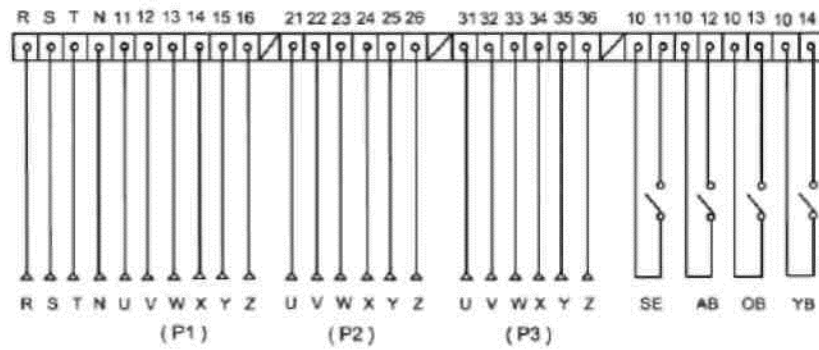
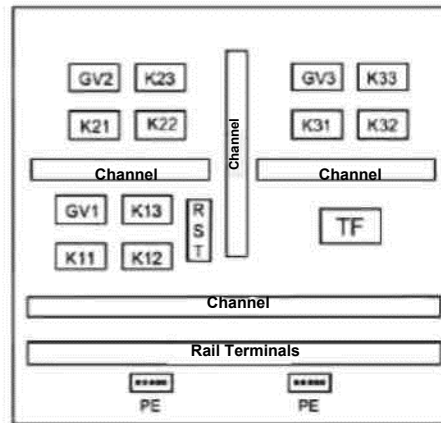
Direct Starter Water Booster with Triple Pump Control Panel Connection ALD
Series-Types: 403/10-3, 403/15-3,403/16-3, 406/11-3, 406/15-3,406/18-3, 408/10-3, 408/14-3, 408/17-3, 610/8-3, 610/10-3, 610/13-3, 615/7-3, 615/9-3, 620/7-3



- K11, K21, K31 : Contactors
- TF: Transformer
- GV1, GV2, GV3 : Thermal Switch NO Contacts
- RST: Phase Sequencing and Protection Contact
- SE: Water Level Contact
- AB : Low Pressure
- OB : Medium Pressure
- YB: High Pressure

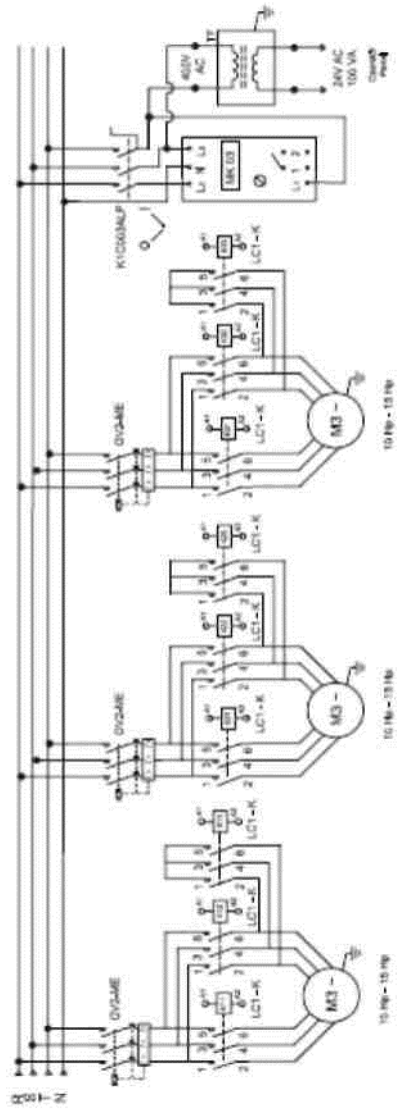
ELECTRICAL DIAGRAM

Star/Triangle Starter Water Booster with Triple Pump Panel Terminal Connection
 ALD Series - Types: 615/10-3, 620/8-3, 620/9-3, 631/6-3, 631/7-3, 631/8-3



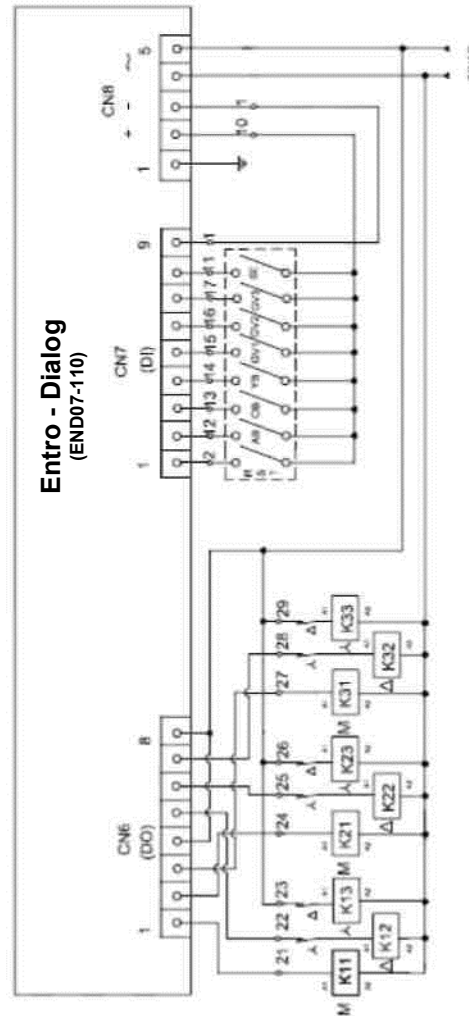
ELECTRICAL DIAGRAM

Star/Triangle Starter Water Booster with Triple Pump Panel Power Circuit ALD Series - Types: 615/10-3, 620/8-3, 620/9-3, 631/6-3, 631/7-3, 631/8-3



ELECTRICAL DIAGRAM

Star/Triangle Starter Water Booster with Triple Pump Control Panel Connection
ALD Series - Types: 615/10-3, 620/8-3, 620/9-3, 631/6-3, 631/7-3, 631/8-3



K11,K12,K13,K21,K22,K23,K31,K32,K33: Contactors

TF: Transformer

GV1,GV2,GV3 : Thermal Switch NO Contacts

RST: Phase Sequencing and Protection Contact

SE: Water Level Contact

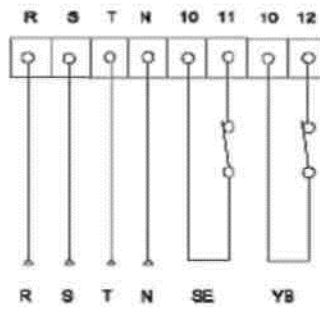
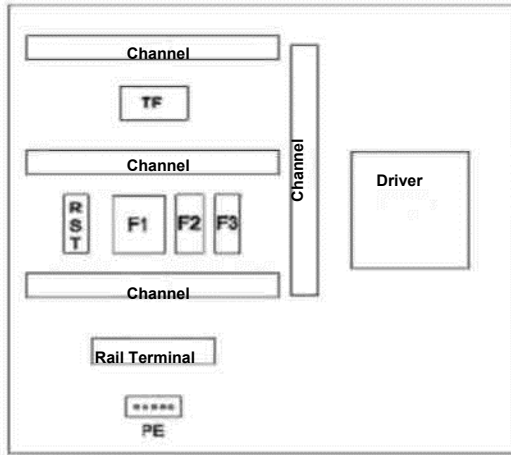
AB : Low Pressure

OB : Medium Pressure

YB: High Pressure

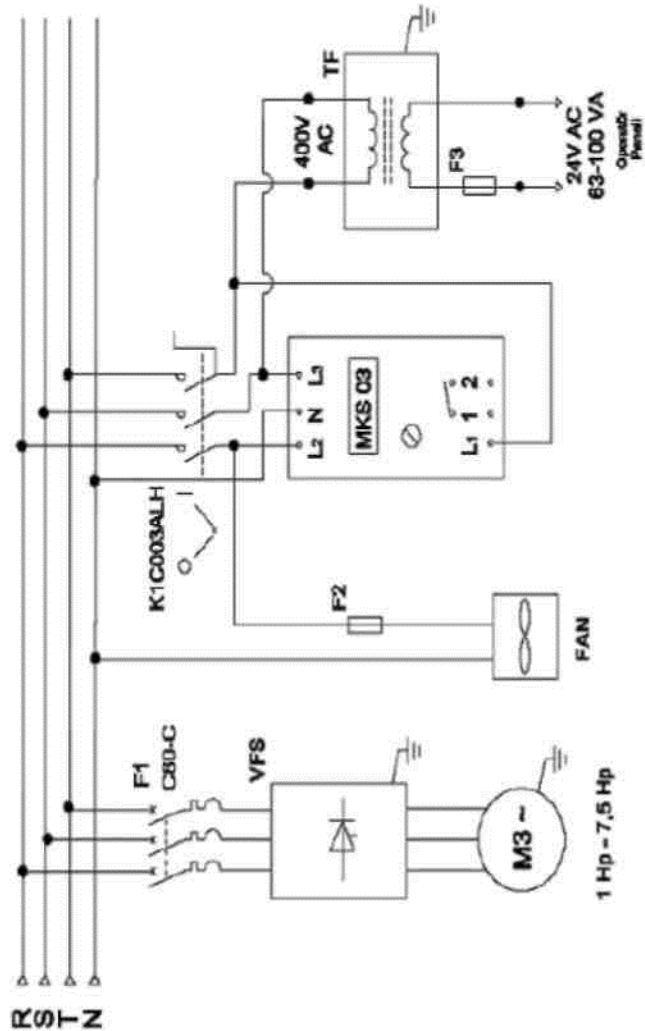
ELECTRICAL DIAGRAM

Frequency Controlled Water Booster with Single Pump Panel Terminal Connection ALD Series - Types: 403/10-1, 403/15-1, 403/16-1, 406/11-1, 406/15-1, 406/18-1, 408/10-1, 408/14-1, 408/17-1, 610/8-1, 610/10-1, 610/11-1, 615/7-1, 615/9-1, 615/10-1, 620/7-1, 620/8-1, 620/9-1, 631/6-1, 631/7-1, 631/8-1



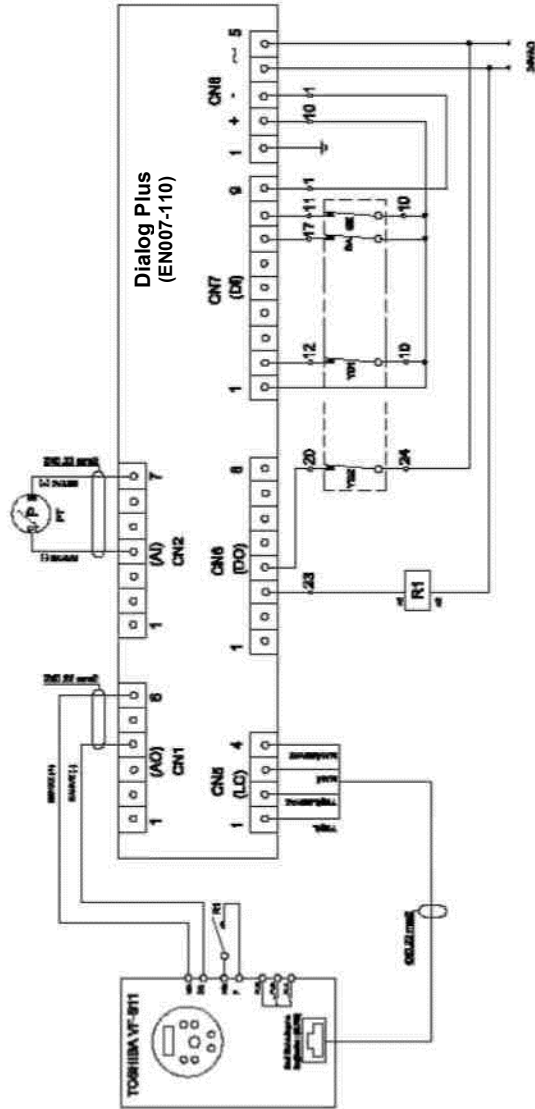
ELECTRICAL DIAGRAM

Frequency Controlled Water Booster with Single Pump Panel Power Circuit
ALD Series - Types: 403/10-1, 403/15-1, 403/16-1, 406/11 -1, 406/15-1, 406/18-1,
 408/10-1,408/14-1,408/17-1, 610/8-1,610/10-1,610/11-1,615/7-1,615/9-1,615/10-1,
 620/7-1,620/8-1, 620/9-1, 631/6-1,631/7-1,631/8-1



ELECTRICAL DIAGRAM

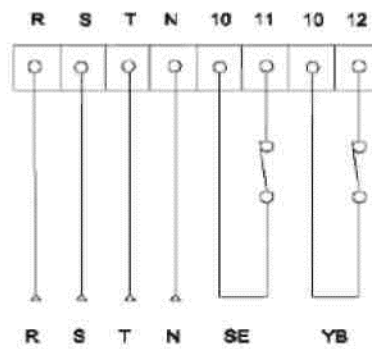
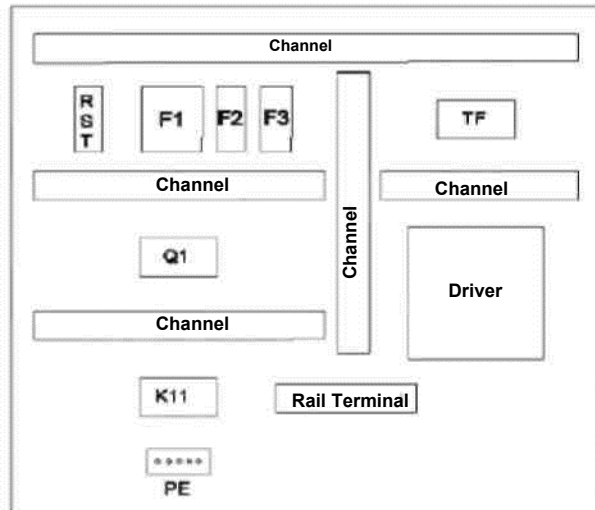
Frequency Controlled Water Booster with Single Pump Control Panel
Connection ALD Series - Types: 403/10-1, 403/15-1, 403/16-1, 406/11 - 1, 406/15-1, 406/18-1, 408/10-1, 408/14-1, 408/17-1. 610/8-1. 610/10-1, 610/11-1, 615/7-1, 615/9-1, 615/10-1. 620/7-1, 620/8-1, 620/9-1, 631/6-1, 631/7-1, 631/8-1



TF: High Pressure Contact
 SA: Driver Fault Contact (FLA-FLC)
 SE: Water Level Contact
 PT : Pressure Transmitter

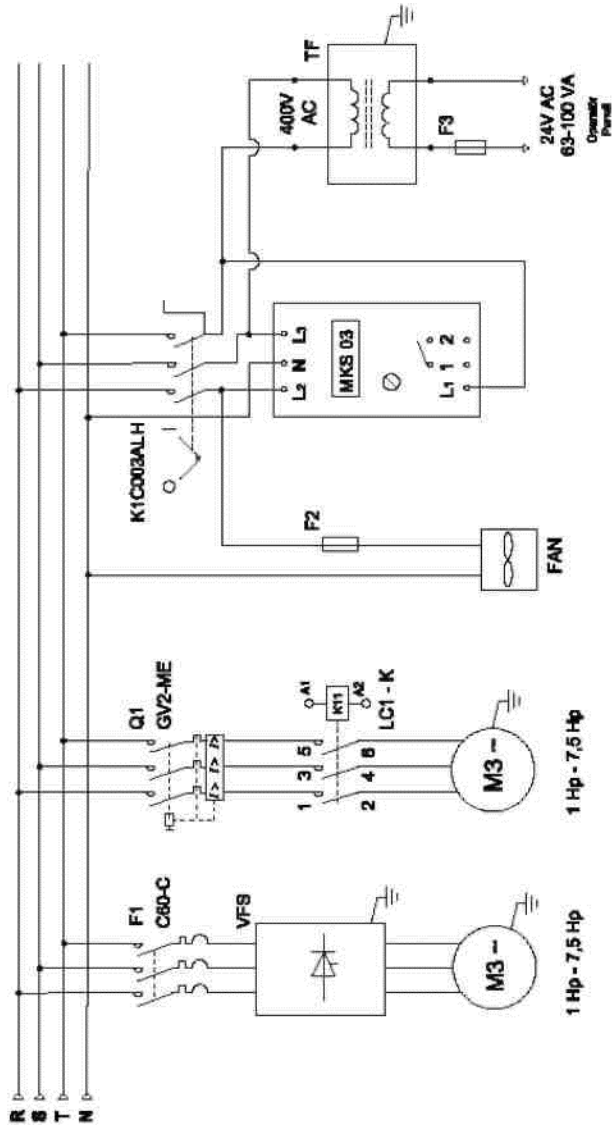
ELECTRICAL DIAGRAM

**Frequency Controlled Direct Starter Water Booster with Twin Pump Panel
Terminal Connection ALD Series** - Types: 403/10-2, 403/15-2, 403/16-2, 406/11 -2,
406/15-2, 406/18-2, 408/10-2, 408/14-2, 408/17-2, 610/8-2, 610/10-2, 610/12-2, 615/7-2, 615/9-
2, 620/7-2



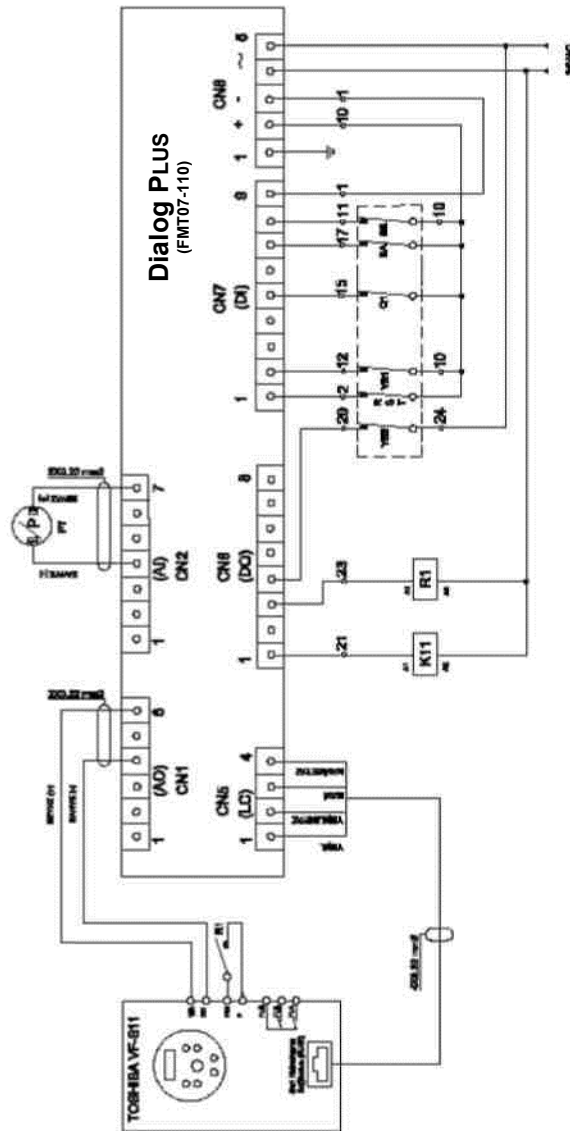
ELECTRICAL DIAGRAM

Frequency Controlled Direct Starter Water Booster with Twin Pump Panel
Power Circuit ALD Series - Types: 403/10-2, 403/15-2, 403/16-2, 406/11-2,
 406/15-2, 406/18-2, 408/10-2, 408/14-2, 408/17-2, 610/8-2, 610/10-2, 610/12-2,
 615/7-2, 615/9-2, 620/7-2



ELECTRICAL DIAGRAM

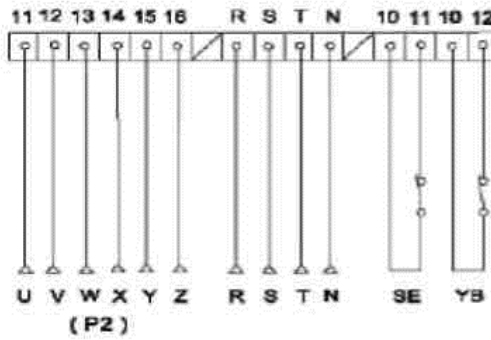
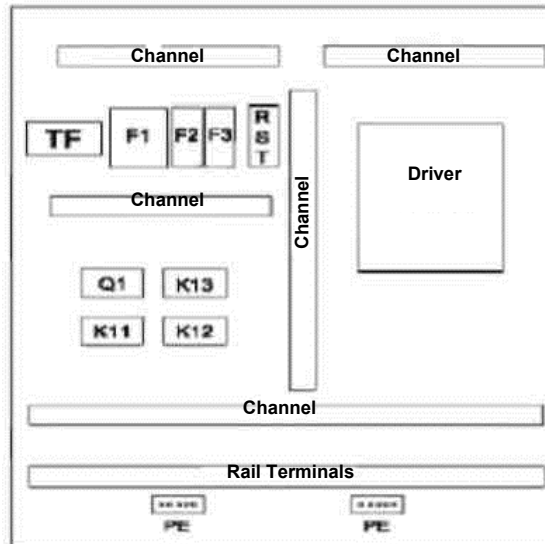
Frequency Controlled Direct Starter Water Booster with Twin Pump Control Panel Connection ALD Series - Types; 403/10-2, 403/15-2, 403/16-2, 406/11-2, 406/15-2, 406/18-2, 408/10-2, 408/14-2, 408/17-2, 610/8-2, 610/10-2, 610/12-2, 615/7-2, 615/9-2, 620/7-2



- K11: Contactor
- R1: Driver starter relay
- TF: Transformer
- Q1: Thermal Switch NC Contacts
- RBT: Phase Sequencing and Protection Contact
- YB: High Pressure Contact
- SA: Driver Fault Contact (FLA-FLC)
- SE: Water Level Contact
- PT: Pressure Transmitter

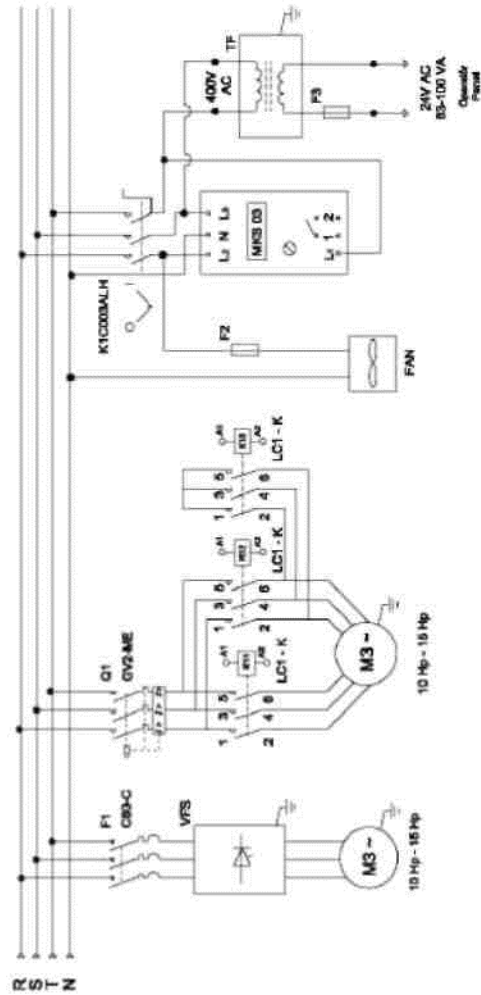
ELECTRICAL DIAGRAM

Frequency Controlled Star/Triangle Starter Water Booster with Twin Pump Panel Terminal Connection ALD Series - Types: 615/10-2, 620/8-2, 620/9-2, 631/6-2, 631/7-2, 631/8-2



ELECTRICAL DIAGRAM

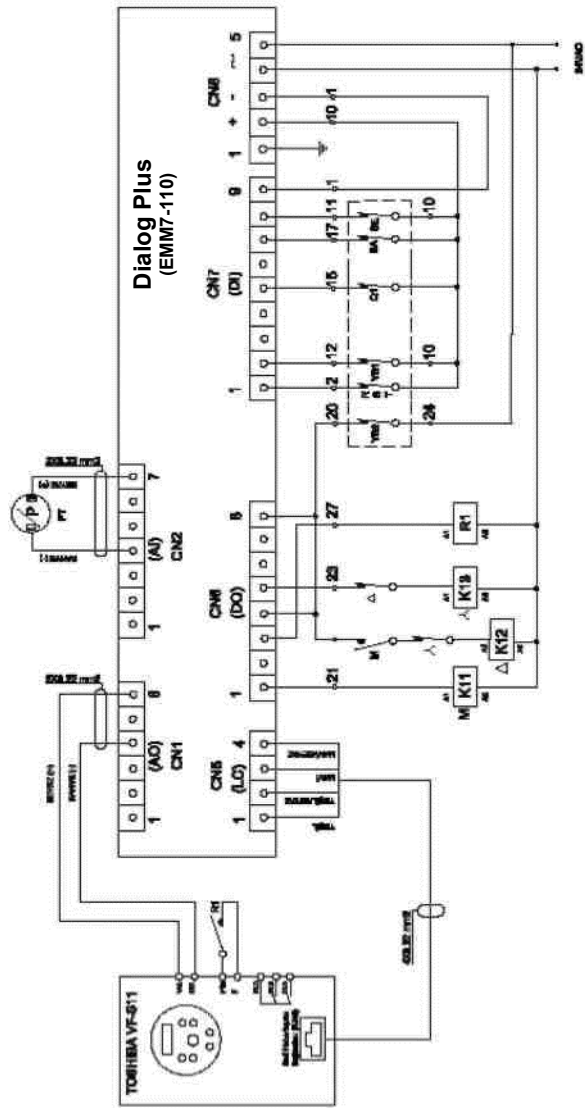
Frequency Controlled Star/Triangle Starter Water Booster with Twin Pump
 Panel Power Circuit ALD Series - Types: 615/10-2, 620/8-2, 620/9-2, 631/6-2, 631/7-2, 631/8-2



ELECTRICAL DIAGRAM

Frequency Controlled Star/Triangle Starter Water Booster with Twin Pump Control Panel Connection

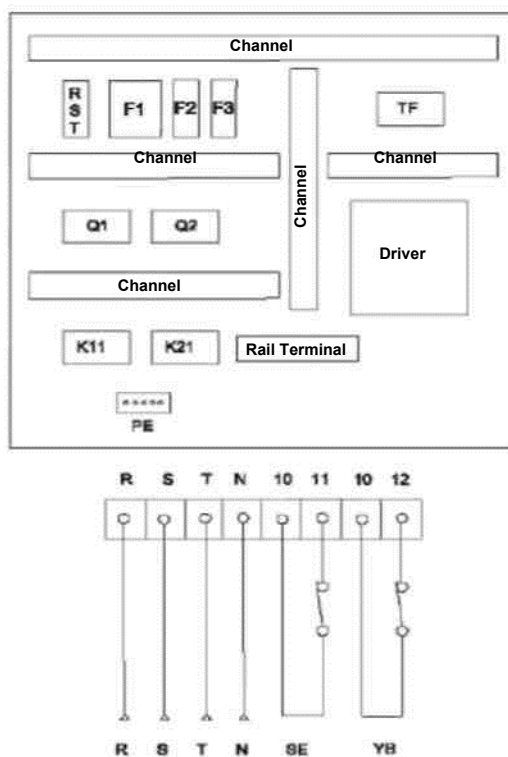
ALD Series - Types: 615/10-2, 620/8-2, 620/9-2, 631/6-2, 631/7-2, 631/8-2



- K11, K12, K13: Contactors
- R1 : Driver starter relay
- TF: Transformer
- Q1 : Thermal Switch NC Contacts
- RST : Phase Sequencing and Protection Contact
- SA : Driver Fault Contact (FLA-FLC)
- SE : Water Level Contact
- PT: Pressure Transmitter

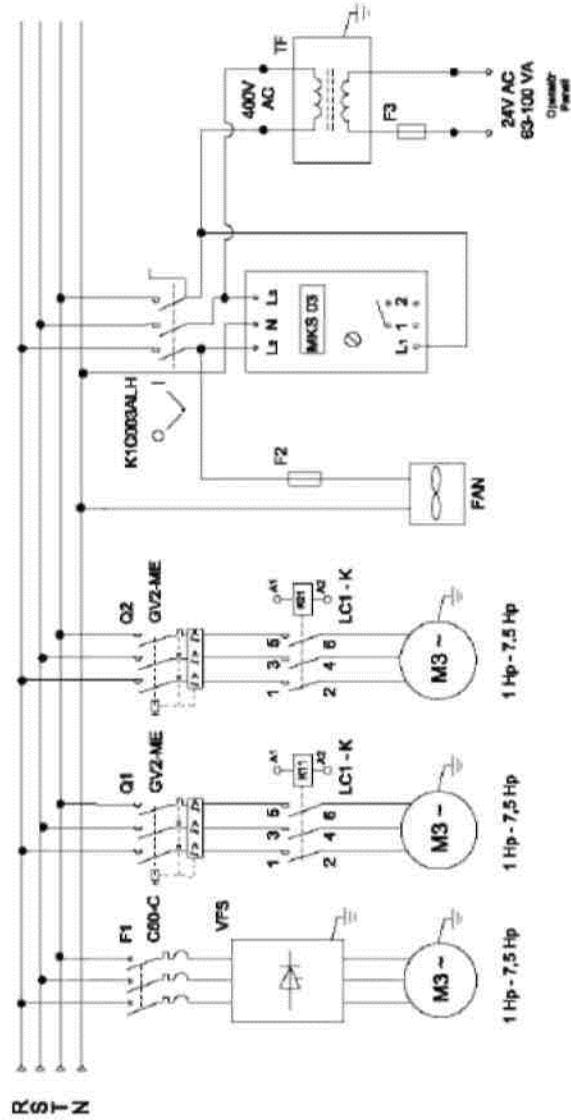
ELECTRICAL DIAGRAM

Frequency Controlled Direct Starter Water Booster with Triple Pump Panel Terminal Connection ALD Series - Types: 403/10-3, 403/15-3, 403/16-3, 406/11-3, 406/15-3, 406/18-3, 408/10-3, 408/14-3, 408/17-3, 610/8-3, 610/10-3, 610/13-3, 615/7-3, 615/9-3, 620/7-3



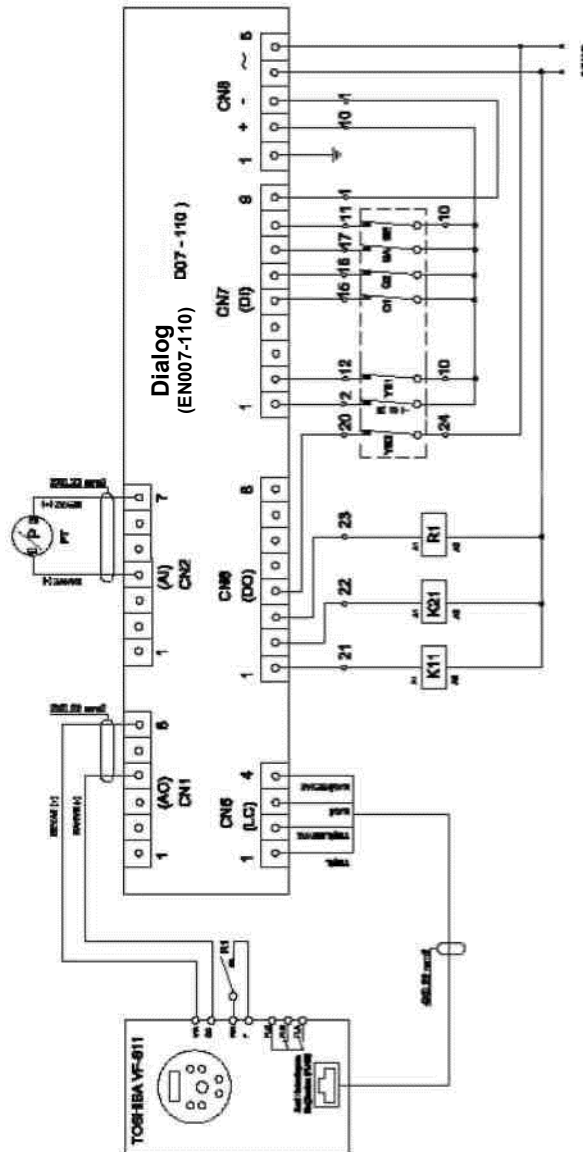
ELECTRICAL DIAGRAM

Frequency Controlled Direct Starter Water Booster with Triple Pump Panel Power Circuit ALD Series - Types: 403/10-3, 403/15-3, 403/16-3, 406/11-3, 406/15-3, 406/18-3, 408/10-3, 408/14-3, 408/17-3, 610/8-3, 610/10-3, 610/13-3, 615/7-3, 615/9-3, 620/7-3



ELECTRICAL DIAGRAM

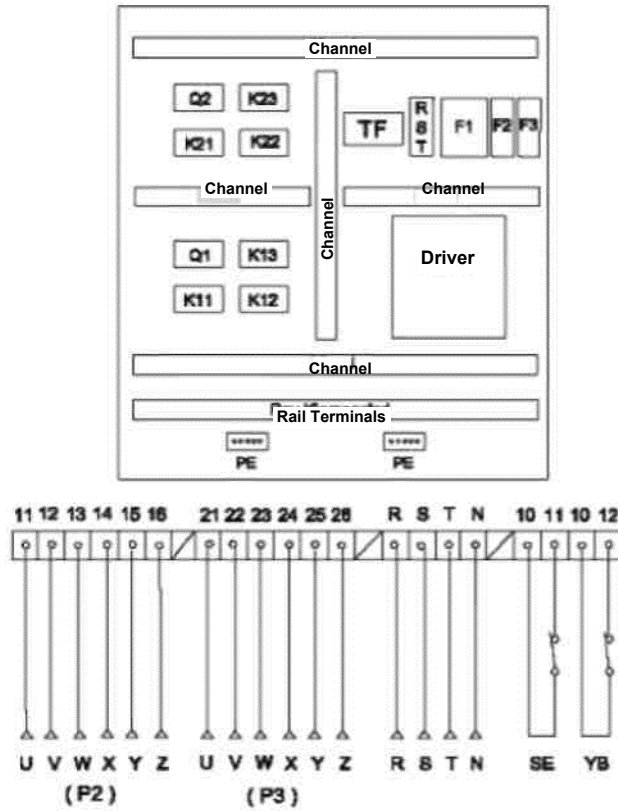
Frequency Controlled Direct Starter Water Booster with Triple Pump Control Panel
 Connection ALD Series - Types: 403/10-3, 403/15-3, 403/16-3, 406/11-3, 406/15-3,
 406/18-3, 408/10-3, 408/14-3, 408/17-3, 610/8-3, 610/10-3, 610/13-3, 615/7-3, 615/9-3,
 620/7-3



K11, K21 : Contactors
 R1 : Driver starter relay
 TF: Transformer
 Q1, Q2: Thermal Switch NC Contacts
 RST : Phase Sequencing and Protection Contact
 YB: High Pressure Contact
 SA: Driver Fault Contact (FLA-FLC)
 SE: Water Level Contact
 PT: Pressure Transmitter

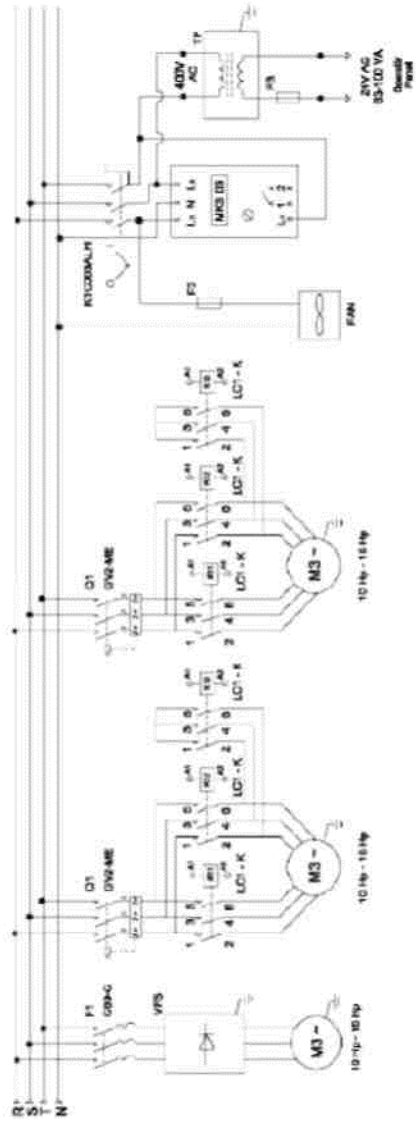
ELECTRICAL DIAGRAM

Frequency Controlled Star/Triangle Starter Water Booster with Triple Pump Panel
Terminal Connection ALD Series - Types: 615/10-3, 620/8-3, 620/9-3, 631/6-3, 631/7-3, 631 /S-3



ELECTRICAL DIAGRAM

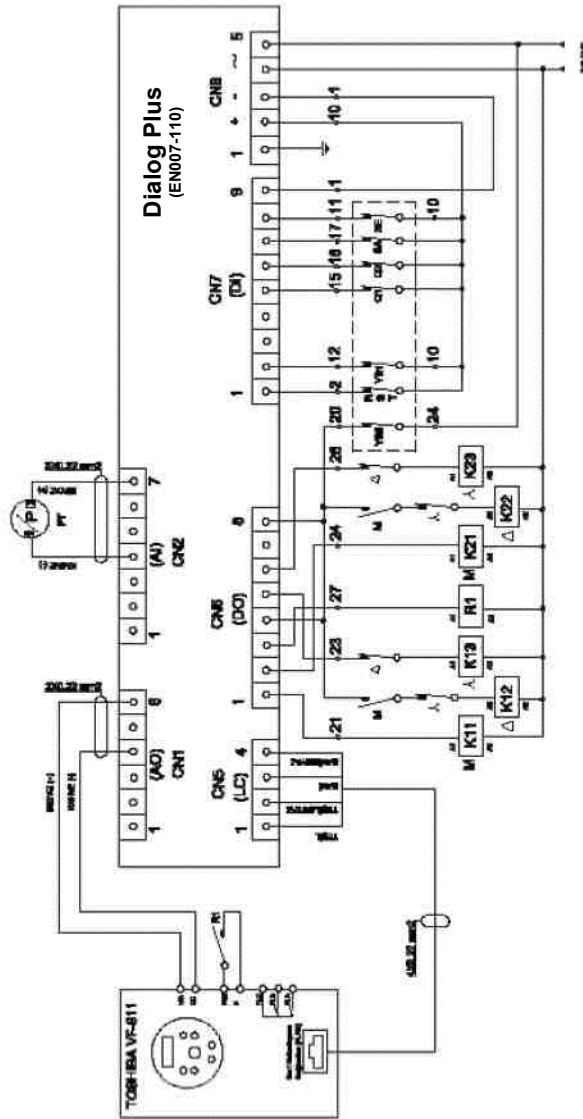
Frequency Controlled Star/Triangle Starter Water Booster with Triple Pump Panel Power Circuit ALDF Series - Types: 615/10-3, 620/8-3, 620/9-3, 631/6-3, 631/7-3, 631/8-3



ELECTRICAL DIAGRAM

Frequency Controlled Star/Triangle Starter Water Booster with Triple Pump Control Panel Connection

ALD Series - Types: 515/10-3, 620/8-3, 620/9-3, 631/6-3, 631/7-3, 631/8-3



- K11, K12, K13, K21, K22, K23: Contactors
- R1 : Driver starter relay
- TF : Transformer
- Q1,Q2: Thermal Switch NC Contacts
- RST: Phase Sequencing and Protection Contact
- YB : High Pressure Contact
- SA : Driver Fault Contact (FLA-FLC)
- SE : Water Level Contact
- PT : Pressure Transmitter

TROUBLESHOOTING GUIDE

If the water booster is not working:

- a) Electricity:** Check the power supply.
- b) Tank (For ALD and ALDF):** Check that there is sufficient water in the tank. If there is no water in the tank, waterless running protection has been activated and cut off the electricity. When the tank is full, the water booster will restart.
- c) Thermal relay / For ALD and ALDF):** May be tripped. Contact the service.

If the water booster is running but water does not flow from the taps or is depressurized:

- a) Valve:** Check that the water booster inlet valve is closed.
- b) Air Getting Trapped in the Pump:** Open the air bleed plug and fill with water and tighten the plug again.
- c) Air Leak:** There may be air leakage in the suction line. Check it. Block if any.
- d) Motor Direction of Rotation (For ALD and ALDF):** May be reversed. Check that the pump shaft rotates in the direction of the arrow marked on the nameplate. If the direction of rotation is reverse, contact the service.

If the Water Booster Turns On and Off Frequently:

- a) Pierced Membrane:** Remove the screwed plastic valve cover on the tank. Press the valve with an object like a pen. If water comes in, the membrane is cracked and cannot function. The membrane must be changed and the operating pressure must be pressurized with x 0,9 bar.
- b) Low Pressure Tank:** The gas or air pressure inside the membrane tank may be insufficient. Contact the service.
- c) Overpressure Tank:** The gas or air pressure inside the membrane tank may be excessive. Contact the service.
The pressure of the gas in the tank should be about 0.5 bar lower than the operating pressure of the pumps.
- d) Pressure switch setting may be incorrect.**

TECHNICAL SPECIFICATIONS / ALD and ALDF

The motors of all types are 3-phase, 380 V, 50Hz.

It is possible to turn the connection type of the water boosters which have 1, 1.5, 2, 3 or 4 HP motors to triangle and to operate in single phase network with the addition of suitable capacitor. In this case, there is no difference between the performance obtained and the performance of a star-connected motor fed from a three-phase network.

Protection against waterless running is done with float switch.

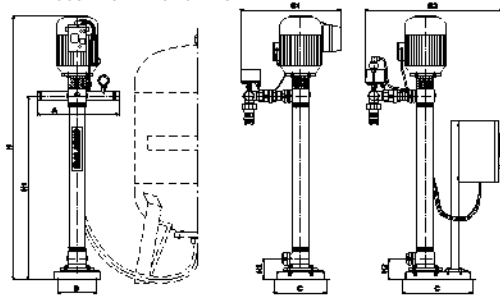
Water boosters should be used with a pressure compensating tank. Tank coupling with pump assembly can be easily done with flexible connection hose.

By means of sequence-controlled operation, the pumps are activated in sequence-controlled manner to keep the set factory pressure and desired water flow rate constant, and they are deactivated in sequence as usage decreases. First commissioning pump changes automatically after each use. Thus, the service life of the motors and pumps is equalized.

Table 5: Technical Specifications Table / ALDM

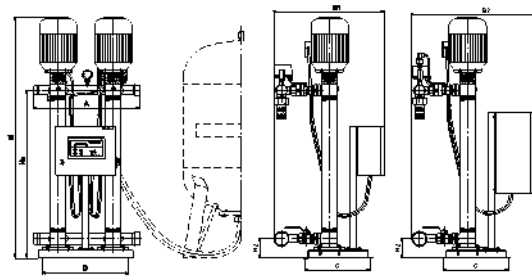
TYPES	Motor Power (HP)	Water Inlet / Outlet (inch)	M.T. Connection (inch)	ALD Weight (kg)	ALDF Weight (kg)	ALDM Weight (kg)	TYPES	Motor Power (HP)	Water Inlet / Outlet (inch)	M.T. Connection (inch)	ALD Weight (kg)	ALDF Weight (kg)	ALDM Weight (kg)
403/10-1	1	1"-1"	1"	37	45	86	403/10-2	1	2"-1 1/2"	1"	87	89	85
403/15-1	1.5	1"-1"	1"	40	49	38	403/15-2	1.5	2"-1 1/2"	1"	92	94	89
403/16-1	2	1"-1"	1"	44	52	42	403/16-2	2	2"-1 1/2"	1"	97	99	93
406/11-1	2	1"-1"	1"	42	50	-	406/11-2	2	2"-1 1/2"	1"	81	83	-
406/15-1	3	1"-1"	1"	50	59	-	406/15-2	3	2"-1 1/2"	1"	102	105	-
406/18-1	4	1"-1"	1"	57	66	-	406/18-2	4	2"-1 1/2"	1"	110	113	-
408/10-1	3	1 1/2"-1 1/2"	1 1/2"	40	49	-	408/10-2	3	2 1/2"-2"	1 1/2"	70	73	-
408/14-1	4	1 1/2"-1 1/2"	1 1/2"	50	59	-	408/14-2	4	2 1/2"-2"	1 1/2"	79	82	-
408/17-1	5.5	1 1/2"-1 1/2"	1 1/2"	65	74	-	408/17-2	5.5	2 1/2"-2"	1 1/2"	100	103	-
610/8-1	4	1 1/2"-1 1/2"	1 1/2"	92	101	-	610/8-2	4	3"-2 1/2"	1 1/2"	127	130	-
610/10-1	5.5	1 1/2"-1 1/2"	1 1/2"	103	112	-	610/10-2	5.5	3"-2 1/2"	1 1/2"	149	152	-
610/12-1	7.5	1 1/2"-1 1/2"	1 1/2"	111	122	-	610/12-2	7.5	3"-2 1/2"	1 1/2"	163	169	-
615/7-1	5.5	1 1/2"-1 1/2"	1 1/2"	101	110	-	615/7-2	5.5	3"-2 1/2"	1 1/2"	147	150	-
615/9-1	7.5	1 1/2"-1 1/2"	1 1/2"	109	120	-	615/9-2	7.5	3"-2 1/2"	1 1/2"	161	167	-
615/10-1	10	1 1/2"-1 1/2"	1 1/2"	116	126	-	615/10-2	10	3"-2 1/2"	1 1/2"	174	180	-
620/7-1	7.5	2"-2"	2"	107	118	-	620/7-2	7.5	4"-3"	2"	167	173	-
620/8-1	10	2"-2"	2"	114	124	-	620/8-2	10	4"-3"	2"	175	181	-
620/9-1	10	2"-2"	2"	115	125	-	620/9-2	10	4"-3"	2"	177	183	-
631/6-1	15	2"-2"	2"	135	150	-	631/6-2	15	4"-3"	2"	217	228	-
631/7-1	15	2"-2"	2"	136	151	-	631/7-2	15	4"-3"	2"	219	230	-
631/8-1	15	2"-2"	2"	137	152	-	631/8-2	15	4"-3"	2"	221	232	-
403/10-3	1	2 1/2"-2"	1"	102	104	88	403/15-3	1.5	2 1/2"-2"	1"	127	129	122
403/16-3	2	2 1/2"-2"	1"	113	115	107	406/11-3	2	2 1/2"-2"	1"	162	107	-
406/15-3	3	2 1/2"-2"	1"	170	169	-	408/10-3	3	3"-2 1/2"	1 1/2"	100	107	-
408/14-3	4	3"-2 1/2"	1 1/2"	108	115	-	408/17-3	5.5	3"-2 1/2"	1 1/2"	135	142	-
610/8-3	4	4"-3"	1 1/2"	162	169	-	610/10-3	5.5	4"-3"	1 1/2"	195	202	-
610/12-3	7.5	4"-3"	1 1/2"	215	221	-	615/7-3	5.5	4"-3"	1 1/2"	193	200	-
615/9-3	7.5	4"-3"	1 1/2"	213	219	-	615/10-3	10	4"-3"	1 1/2"	232	238	-
620/7-3	7.5	5"-4"	2"	227	233	-	620/8-3	10	5"-4"	2"	236	242	-
620/9-3	10	5"-4"	2"	239	245	-	631/6-3	15	5"-4"	2"	299	310	-
631/7-3	15	5"-4"	2"	302	313	-	631/8-3	15	5"-4"	2"	305	316	-

DIMENSIONS
WATER BOOSTERS WITH SINGLE PUMP



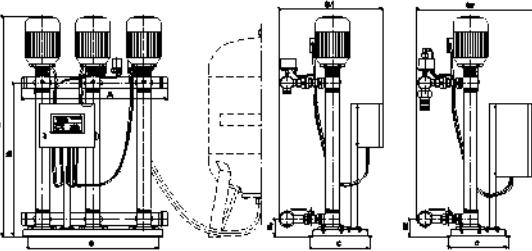
TYPES	A	B1	B2	C	D	H	H1	H2
40310-1	434	477	-	278	200	944	578	121
40316-1	434	487	-	278	200	1094	728	121
40316-1*	434	487	-	278	200	1144	758	121
40310-1	434	477	688	372	200	939	578	121
40315-1	434	477	688	372	200	1089	728	121
40316-1	434	487	688	372	200	1138	758	121
40611-1	434	487	688	372	200	1129	751	121
40615-1	434	487	708	372	200	1326	923	121
40615-1	434	496	708	372	200	1485	1052	121
40810-1	434	512	743	372	200	1131	728	121
40814-1	434	521	743	372	200	1341	908	121
40817-1	434	533	743	372	200	1495	1043	121
610B-1	514	574.8	805.	412	250	1042.5	583.5	101.5
61010-1	514	586.8	817.	412	250	1151.5	673.5	101.5
61012-1	514	606.8	807.	412	250	1292.5	763.5	101.5
61017-1	514	586.8	817.	412	250	1065.5	587.5	101.5
61019-1	514	606.8	807.	412	250	1210.5	681.5	101.5
61510-1	514	699.8	802.	412	250	1257.5	726.5	101.5
62017-1	516	613.8	814.	412	250	1164.5	635.5	101.5
620B-1	516	708.8	814.	412	250	1217.5	688.5	101.5
62019-1	516	708.8	814.	412	250	1270.5	741.5	101.5
63116-1	516	708.8	812.	412	250	1218.5	651.5	101.5
63117-1	516	708.8	812.	412	250	1280.5	713.5	101.5
63118-1	516	708.8	812.	412	250	1342.5	775.5	101.5

WATER BOOSTERS WITH TWIN PUMPS



TYPES	A	B1	B2	C	D	H	H1	H2
40310-2*	616	635	-	378	502	944	578	121
40315-2*	616	635	-	378	502	1094	728	121
40316-2*	616	635	-	378	502	1144	758	121
40310-2	616	635	710	378	502	939	578	121
40315-2	616	635	710	378	502	1089	728	121
40316-2	616	635	710	378	502	1138	758	121
40611-2	616	635	710	378	502	1129	751	121
40615-2	616	635	710	378	502	1326	923	121
40618-2	616	635	710	378	502	1485	1052	121
40810-2	617	669	744	378	502	1131	728	121
40814-2	617	669	744	378	502	1341	908	121
40817-2	617	669	744	378	502	1495	1043	121
610B-2	717	759.8	834.	408	650	1067.5	608.5	126.5
61010-2	717	759.8	834.	408	650	1176.5	698.5	126.5
61012-2	717	759.8	854.	408	650	1317.5	788.5	126.5
61017-2	717	759.8	834.	408	650	1090.5	612.5	126.5
61019-2	717	759.8	854.	408	650	1235.5	706.5	126.5
61510-2	717	759.8	874.	408	650	1282.5	753.5	126.5
62017-2	719	782.8	877.	408	650	1189.5	680.5	126.5
62019-2	719	782.8	897.	408	650	1242.5	713.5	126.5
62019-2	719	782.8	897.	408	650	1295.5	766.5	126.5
63116-2	719	782.8	897.	408	650	1243.5	676.5	126.5
63117-2	719	782.8	897.	408	650	1305.5	738.5	126.5
63118-2	719	782.8	897.	408	650	1367.5	800.5	126.5

WATER BOOSTERS WITH TRIPLE PUMPS

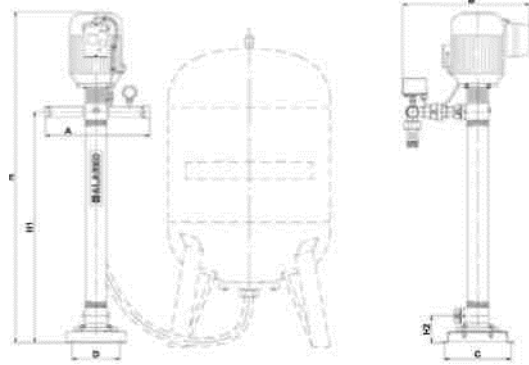


TYPES	A	B1	B2	C	D	H	H1	H2
40310-3*	917	652	-	378	830	944	578	121
40315-3*	917	652	-	378	830	1094	728	121
40316-3*	917	652	-	378	830	1144	758	121
40310-3	917	652	757	378	830	939	578	121
40315-3	917	652	757	378	830	1089	728	121
40316-3	917	652	757	378	830	1138	758	121
40611-3	917	652	757	378	830	1129	751	121
40615-3	917	652	777	378	830	1326	923	121
40618-3	917	652	777	378	830	1485	1052	121
40810-3	917	683	808	378	830	1131	728	121
40814-3	917	683	808	378	830	1341	908	121
40817-3	917	683	808	378	830	1495	1043	121
610B-3	1119	789.8	884.	408	1050	1067.5	608.5	126.5
61010-3	1119	789.8	884.	408	1050	1176.5	698.5	126.5
61012-3	1119	789.8	884.	408	1050	1317.5	788.5	126.5
61017-3	1119	789.8	884.	408	1050	1090.5	612.5	126.5
61019-3	1119	789.8	884.	408	1050	1235.5	706.5	126.5
61510-3	1119	771.8	886.	408	1050	1282.5	753.5	126.5
62017-3	1119	824.8	919.	408	1050	1189.5	680.5	126.5
62019-3	1119	806.8	921.	408	1050	1242.5	713.5	126.5
62019-3	1119	806.8	921.	408	1050	1295.5	766.5	126.5
63116-3	1119	806.8	921.	408	1050	1243.5	676.5	126.5
63117-3	1119	806.8	921.	408	1050	1305.5	738.5	126.5
63118-3	1119	806.8	921.	408	1050	1367.5	800.5	126.5

* For ALDM model

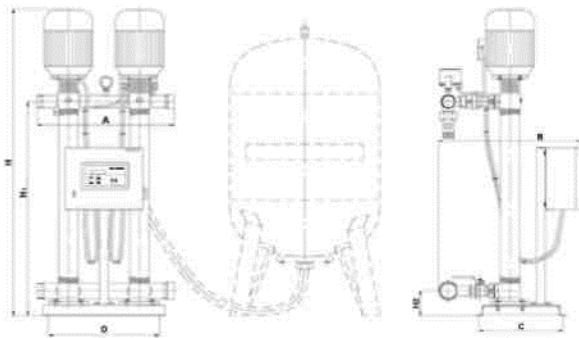
ALDM WATER BOOSTERS

**DIMENSIONS
WATER BOOSTERS WITH SINGLE PUMP**



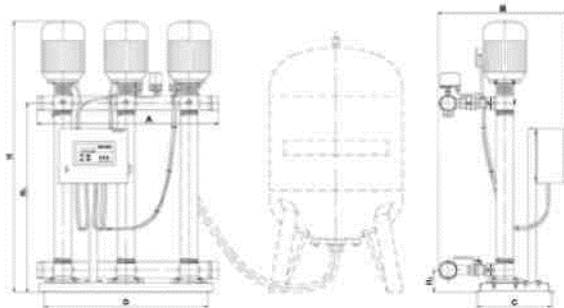
TYPES	A	B	C	D	H	H1	H2
403/10-1	434	477	278	200	944	578	121
40/15-1	434	477	278	200	1094	728	121
403/16-1	434	487	278	200	1144	758	121

WATER BOOSTERS WITH TWIN PUMPS



TYPES	A	B	C	D	H	H1	H2
403/10-2	616	633	378	502	944	578	121
403/15-2	616	633	378	502	1094	728	121
403/16-2	616	633	378	502	1144	758	121

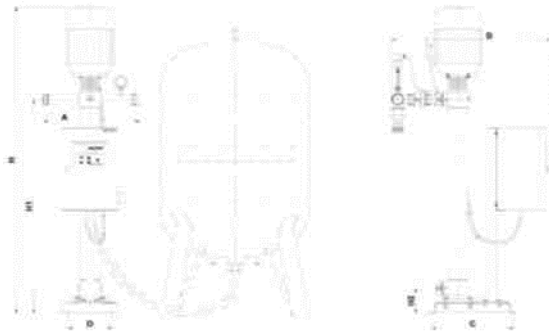
WATER BOOSTERS WITH TRIPLE PUMPS



TYPES	A	B	C	D	H	H1	H2
403/10-3	917	650	378	830	944	578	121
403/15-3	917	650	378	830	1094	728	121
403/16-3	917	650	378	830	1144	758	121

ALDF WATER BOOSTERS WITH FREQUENCY CONVERTOR

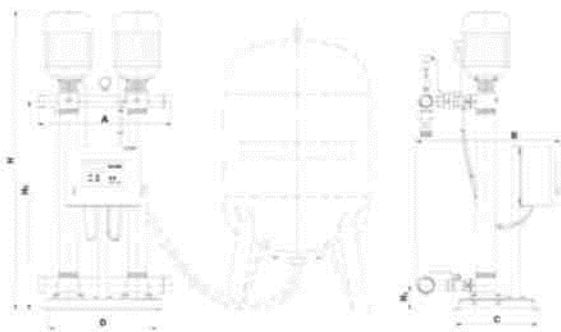
DIMENSIONS
WATER BOOSTERS WITH SINGLE



TYPES	A	B	C	D	H	H1	H2
403/10-1	434	681	372	200	939	578	121
403/15-1	434	681	372	200	1089	728	121
403/16-1	434	681	372	200	1136	758	121
406/11-1	434	681	372	200	1129	751	121
406/15-1	434	681	372	200	1326	923	121
406/16-1	434	681	372	200	1485	1052	121
408/10-1	434	718	372	200	1131	728	121
408/14-1	434	718	372	200	1341	908	121
408/17-1	434	718	372	200	1495	1043	121
610/8-1	514	764	412	250	1105	629	125.5
610/10-1	514	776	412	250	1214	719	125.5
610/12-1	514	796	412	250	1355	809	125.5
615/7-1	514	776	412	250	1128	633	125.5
615/9-1	514	796	412	250	1273	727	125.5
615/10-1	514	791	412	250	1320	774	125.5
620/7-1	516	803	412	250	1227	681	125.5
620/8-1	516	801	412	250	1280	734	125.5
620/9-1	516	801	412	250	1333	787	125.5
631/6-1	516	801	412	250	1281	697	125.5
631/7-1	516	801	412	250	1343	759	125.5
631/8-1	516	801	412	250	1405	821	125.5

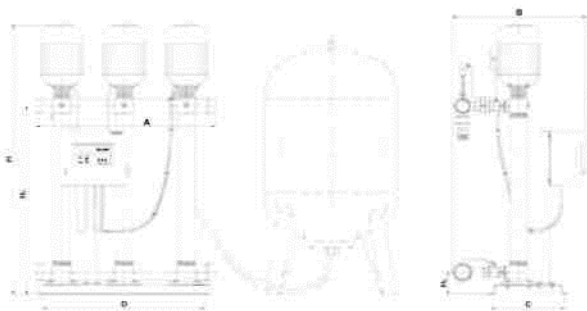
PUMP

WATER BOOSTERS WITH TWIN PUMPS



TYPES	A	B	C	D	H	H1	H2
403/10-2	616	718	378	502	939	578	121
403/15-2	616	718	378	502	1089	728	121
403/16-2	616	718	378	502	1136	758	121
406/11-2	616	718	378	502	1129	751	121
406/15-2	616	718	378	502	1326	923	121
406/16-2	616	718	378	502	1485	1052	121
408/10-2	617	754	378	502	1131	728	121
408/14-2	617	754	378	502	1341	908	121
408/17-2	617	754	378	502	1495	1043	121
610/8-2	717	823	408	650	1105	629	125.5
610/10-2	717	823	408	650	1214	719	125.5
610/12-2	717	853	408	650	1355	809	125.5
615/7-2	717	823	408	650	1128	633	125.5
615/9-2	717	853	408	650	1273	727	125.5
615/10-2	717	873	408	650	1320	774	125.5
620/7-2	719	876	408	650	1227	681	125.5
620/8-2	719	896	408	650	1280	734	125.5
620/9-2	719	896	408	650	1333	787	125.5
631/6-2	719	896	408	650	1281	697	125.5
631/7-2	719	896	408	650	1343	759	125.5
631/8-2	719	896	408	650	1405	821	125.5

WATER BOOSTERS WITH TRIPLE PUMPS



TYPES	A	B	C	D	H	H1	H2
403/10-3	917	765	378	830	939	578	121
403/15-3	917	765	378	830	1089	728	121
403/16-3	917	765	378	830	1136	758	121
406/11-3	917	765	378	830	1129	751	121
406/15-3	917	765	378	830	1326	923	121
406/16-3	917	765	378	830	1485	1052	121
408/10-3	917	798	378	830	1131	728	121
408/14-3	917	798	378	830	1341	908	121
408/17-3	917	798	378	830	1495	1043	121
610/8-3	1119	853	408	1050	1105	629	125.5
610/10-3	1119	853	408	1050	1214	719	125.5
610/12-3	1119	883	408	1050	1355	809	125.5
615/7-3	1119	853	408	1050	1128	633	125.5
615/9-3	1119	883	408	1050	1273	727	125.5
615/10-3	1119	885	408	1050	1320	774	125.5
620/7-3	1119	918	408	1050	1227	681	125.5
620/8-3	1119	920	408	1050	1280	734	125.5
620/9-3	1119	920	408	1050	1333	787	125.5
631/6-3	1119	920	408	1050	1281	697	125.5
631/7-3	1119	920	408	1050	1343	759	125.5
631/8-3	1119	920	408	1050	1405	821	125.5

EC DECLARATION OF CONFORMITY

EC Declaration of Conformity

ALARKO Carrier San.Tic. A.Ş.

**ALK-10, ALK-15, ALK-20, ALK-25, ALK-30, ALK-35, ALD-403, ALD-406, ALD-408, ALD-610,ALD-615,
ALD-620,ALD-631**

water boosters

- * Machine Safety
- * Electromagnetic Compatibility
- * Electrical Equipment Designed for Use within Specific Voltage Limits

declares that it complies with the EC regulations specified above and takes full responsibility in this regard.


MURAT ÇOPUR
ALARKO
Carrier
ALARKO CARRIER
SAN. TIC. VE TİCARİET A.Ş.
TURGUTLU

Kocaeli, 20.11.2003

EMERGENCY NUMBERS

Natural Gas Emergency	187
Fire Call	110
Police Emergency	155
Gendarmerie Emergency	156
Water Emergency	185
Power Cut	186
Alarko Carrier Authorized Dealer	
Alarko Carrier Authorized Service	

web: www.alarko-carrier.com.tr
e-mail: info@alarko-carrier.com.tr

 **ALARKO**



**ALARKO CARRIER
SANAYİ VE TİCARET A.Ş.**

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