



flowcon[®]

VSD - J Inverter

OPERATION AND MAINTENANCE MANUAL

First Publication Date: 01/09/2020

Revision:

Revision Date:

OPERATION & MAINTENANCE

CONTENTS

Description	7
Technical Data	7
Product Identification	7
Size and Weight	7
Storage	7
Installation and assembly	8
Electrical Connections	10
Screen Format	11
Main Screen	12
Operation Mode	12
Start Up Wizard	13
The Setup Menu	15
Warning Management	20
Alarms	21
Maintenance and Repair	22
Warranty	22
Disposal and Environmental Aspects	23

General Information

These instructions are to assist in the installation of the flowcon VSD -J Inverter please follow them carefully.

If, having read this Operation & Maintenance Manual, there is any doubt about any aspect of the installation please don't hesitate to contact our technical team.

Definitions of Safety Warnings and Precautions



WARNING!

Indicates a potentially hazardous situation which, if not avoided, can result in serious injury or death.



CAUTION!

Indicates a potentially hazardous situation which, if not avoided. Can result in minor to moderate injury, or serious damage to the product.

Safety

Information

It is essential that correct and safe working practices are adhered to at all times when installing, operating and/or maintaining any piece of equipment. Always consult safety data sheets, operating and maintenance manuals, Health & Safety legislation and recommendations and specific requirements of any equipment manufacturer, site controller, building manager or any other persons or organisation relating to the procurement, installation, operation and/or maintenance of any piece of equipment associated or in conjunction with any product provided by **flowtech** Water Solutions.

This document is intended for ALL installers, operators, users and persons carrying out maintenance of this equipment and must be kept with the equipment, for the life of the equipment and made available to all persons at all times. Prior to carrying out any work associated with the set it is essential that the following sheets are read, fully understood and adhered to at all times.

Equipment must only be installed, operated, used, and/or maintained by a competent person. A competent person is someone who is technically competent and familiar with all safety practices and all of the hazards involved.

Any damage caused to any equipment by misapplication, mishandling or misuse could lead to risk of Electrocutation, Burns, Fire, Flooding, death or injury to people and/or damage to property dependent upon the circumstances involved. **flowtech** Water Solutions accepts no responsibility or liability for any damage, losses, injury, fatalities or consequences of any kind due to misapplication, mishandling or misuse of any equipment, or as a result of failure to comply with this manual.

Failure to install, operate, use or maintain the equipment in accordance with the information contained within this document could cause damage to the equipment and any other equipment subsequently connected to it, invalidating any warranties provided by **flowtech** Water Solutions to the buyer.

Safety Warnings &

Precautions

These instructions should be read and clearly understood before working on the system. Please read this manual carefully and all of the warning signs attached before installing or operating the equipment keep this manual handy for your reference. This equipment should be installed, adjusted and serviced by trained and qualified personnel. Failure to observe this precaution could result in bodily injury.



WARNING! - Install an emergency stop key separately from the isolator. Rotating shafts can be hazardous.



WARNING! - This equipment has a high leakage current and must be permanently fixed to earth.



WARNING! - Do not attach or remove wiring or connectors when the power is applied. Do not check signals during operation. When the power is turned on and the running command is on, the motor will start rotating. The stop key is only effective when the function is set. If there is a power failure and an operation instruction is given the unit may start automatically when the power is reinstated.



WARNING! - Make sure that the input voltage is correct. Be sure to install the unit in a room that is not exposed to direct sunlight and is well ventilated.

Avoid environments which have a high ambient temperature, high humidity or excessive condensation. Avoid dust. Corrosive gas, explosive gas, inflammable gas, grinding-fluid mist and salt damage, etc.



WARNING! - Do not connect the power source to any terminals except power connectors.



WARNING! - Motor control equipment and electronic controllers are connected to hazardous line voltages. When servicing drives and electronic controllers, you may be exposed to components at or above the line potential. Extreme care should be taken to protect against shock. Dangerous voltage may exist after the power light is off.

Wait more than 5 minutes after turning off the power supply before performing maintenance or inspection. Hazard of electric shock. Disconnect incoming power before working on this unit.



WARNING! - The inverter should be protected separately against ground fault.

Observe the regional regulations for electrical installation!



CAUTION! - It is strongly recommended that all electrical equipment conforms to National Electrical Codes and local regulations. Only qualified personnel should perform installation, alignment and maintenance. The manufacturer reserves the right to alter the technical data in order to make improvements or update information.



CAUTION! - Failure to observe these rules will render the guarantee invalid. The same applies to repair jobs and/or replacement. Your legal rights are not affected.



CAUTION! - The manufacturer declines all responsibility in the event of damage or injury caused as a result of tampering with the equipment.



CAUTION! - Do not switch on/off power supply to run/stop the motor/system! Start the unit only by using run button or external run command.

Customer / Contractor **RESPONSIBILITIES**

It is the responsibility of the customer and/or the contractor:

- To ensure that anyone working on the equipment is wearing all necessary protective gear and/or clothing.
- Is aware of appropriate health & safety warnings.
- Has read the information in this section of the manual.

Description

The following product is an electronic device for the control and protection of pump systems according to the frequency of the pump's power supply. The inverter can be connected to any pump to manage its operation and maintain a constant pressure. In this way, the pump or pump system is only activated when needed, avoiding unnecessary waste of energy and prolonging its useful life.

Technical Data

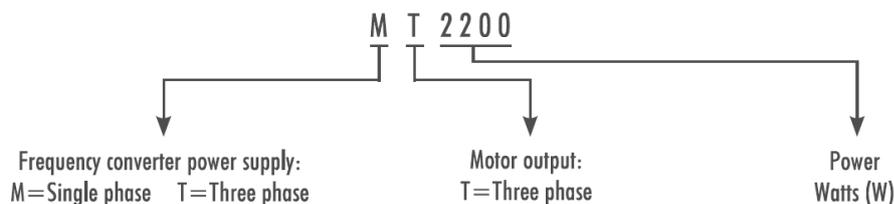
	MT 2200	TT 4000
Power Supply Voltage (V)	220-240 V Single Phase	400 V Three Phase
Motor Voltage (V)	230 V Three Phase	400 V Three Phase
Working Frequency (Hz)	50/60 Hz	50/60 Hz
Maximum current at inverter output (A)	11 A	11 A
Maximum current at inverter output (A)	20 A	12 A
Protection Rating	IP 55*	IP 55*
Protection Degree	2	2
Type of Action	2B	2B
Operation	S1	S1
Grounding Systems Distribution	IT, TN-C, TN-S, TT	IT, TN-C, TN-S, TT

*The auxiliary fan supplied for wall mounting has a protection rating of IP54

Limits of Use:

- Minimum ambient temperature: -10°C
- Maximum ambient temperature: +40°C
- Variation in the supply voltage: +/- 10%
- Humidity range: 5% to 95% without condensation and vapour.
- Maximum altitude: 2.000 meters

Product Identification



Size and Weight

	Dimensions	Volume	Weight
MT 2200	330 x 230 x 170	0,013m ³	3.5 Kg
TT 4000	330 x 230 x 170	0,013m ³	3.5 Kg

Storage

The product must be stored in a covered and dry place, away from sources of heat and protected from dirt and vibrations, moisture, heat sources and possible mechanical damage. Do not place heavy objects on top of the packaging.

Installation and assembly

Before installing the frequency inverter, carefully read the whole of this manual and consult the safety regulations in force in the country in which it will be used. The installation must be carried out by a qualified technician.

a. Installation of the inverter:

- It must be installed in a well-ventilated area, protected from damp and direct exposure to the sun and rain.
- Before making the electrical connections, ensure the cable used to provide power to the inverter is not live.
- Carefully verify the electrical data indicated in the specifications plate of the inverter before connecting the electric current.
- The electric power cables to the inverter, and from the inverter to the pump, must be of the correct size for the nominal consumption of the motor and the length of cable required, according to the regulations in force in the country in question. A table with the maximum recommended lengths according to the cross-section of the electrical cable can be found below.

	Section of inverter input (mm ²)			Section of inverter output (mm ²)		
	1.5	2.5	4	1.5	2.5	4
	Maximum distance (metres)			Maximum distance (metres)		
MT 2200	8	19	35	12	28	51
TT 4000	46	76	120	49	81	134

Each interface cable length should be shorter than 3 meters.

Use the appropriate cable glands to attach the cable.

Also ensure that the grid has electrical protection; a high-sensitivity differential switch (30mA, class A for domestic applications, class B for industrial applications) is particularly recommended.

The type B should be installed for all the residual current-operated protective or monitoring from an inverter up to the supply voltage.

In addition to the differential switch, it is advisable to install magneto thermal protection and a voltage disconnect switch to control the power supply to each inverter individually.

Ground must be connected properly. If the ground is not connected, the electric shock or fire might be happened.

b. Installation of pressure units with an inverter:

The multiple pump unit must always consist of pumps that are the same and that, therefore, have the same power and hydraulic performance. Failure to comply with this point can cause the pump system to malfunction.

For the inverter to work, it is essential to use a pressure transducer (4-20 mA).

The location of the pressure transducer must always be as close as possible to the pump unit, as close as possible to the membrane expander, and always after the general retention valve of the pump unit it is essential to install a general cut-off valve for the pump unit, after the physical location of the pressure transducer.

If there is more than one pressure transducer in a multiple pump unit (more than one inverter with a pressure transducer connected), the network of interconnected inverters will decide automatically, and with prior reliability tests of the readings of the existing transducers, which is the transducer that will be used as the general pressure sensor for the whole group.

If the designated transducer functions erroneously, the set of inverters will decide to automatically change the principal transducer for another that provides more precise readings. The rest of the transducers will remain on standby ready to be used when required

c. Installation on a motor:

Replace the cover of the motor terminal box with the motor support adapter (parts 5 and 11a) provided.

Break the three holes of the metal radiator of the power circuit (part 4) with a screwdriver. The three holes are visible on the inside of the radiator. Screw the metal radiator to the motor support adapter with the help of the 2 screws provided for this purpose (parts 9 and 11b).

Tighten the appropriate cable glands to guarantee the declared protection rating (part 10).

Carry out the electrical connections between the power circuit and the moto using the electric cables supplied (item 6).

Connect the power circuit to the cover + control circuit (part 1) using the flat cable.

Screw the assembly together (part 13).

d. Installation on a wall bracket:

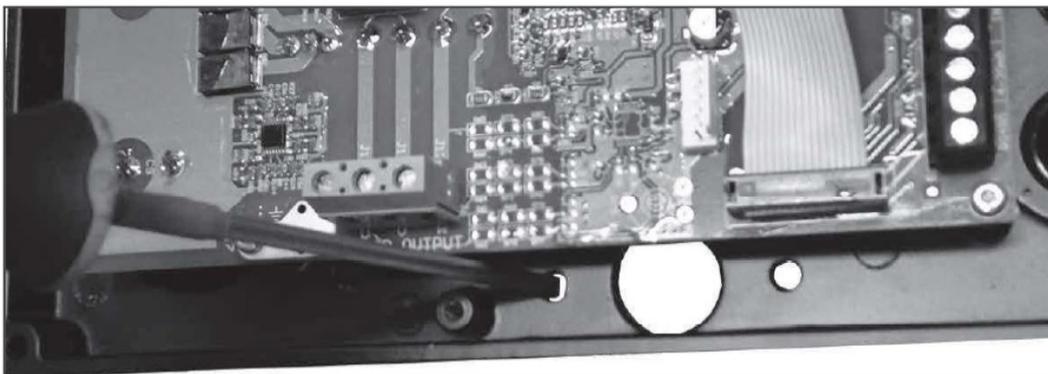
WARNING: For the installation on the wall, point 2 of the previous section regarding installation on a motor should not be carried out, since the three holes in the metal radiator would not ensure the adequate protection rating.

Fix the wall bracket to the wall through the three rear holes of the wall bracket (part 7).

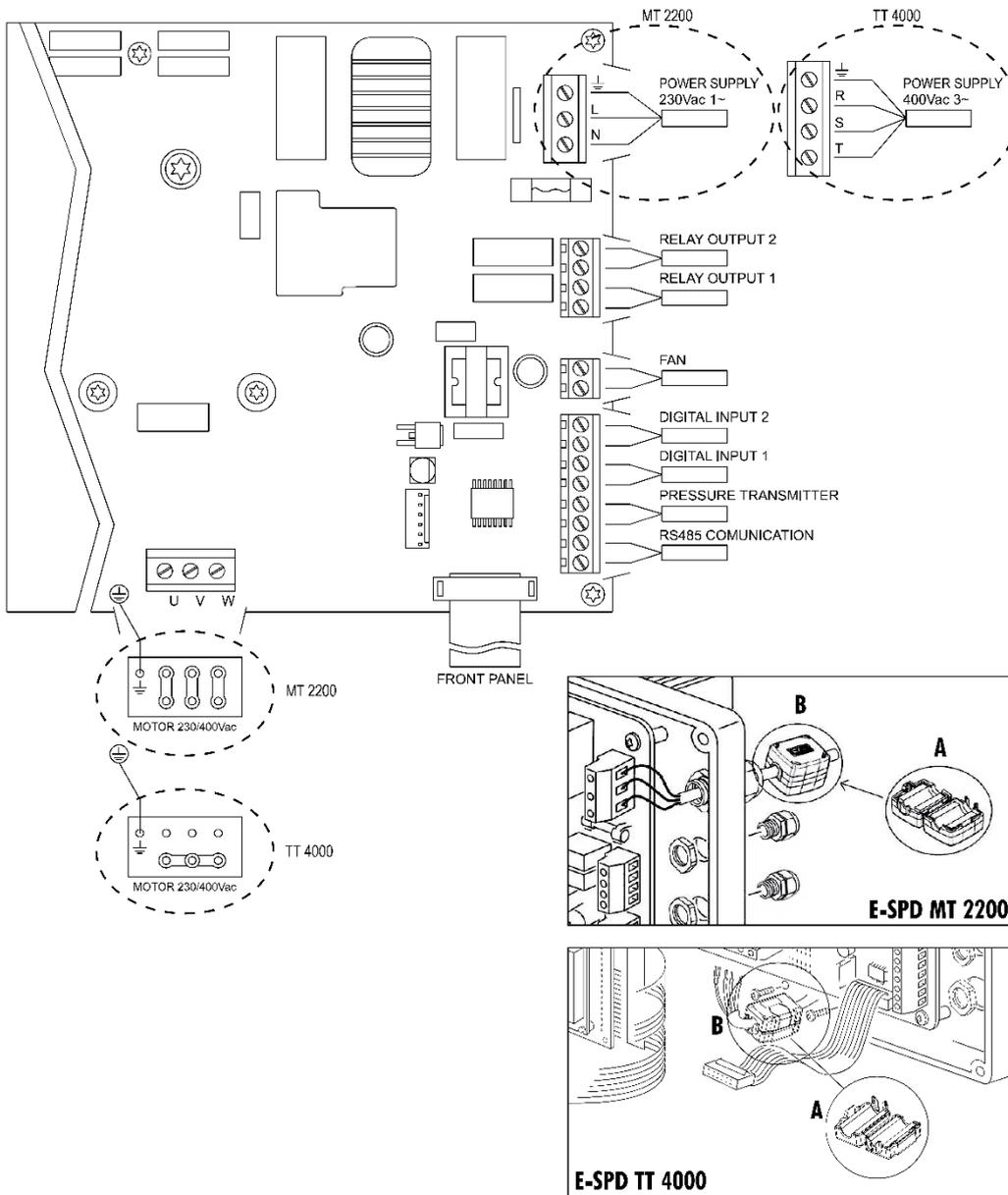
Place the fan at the base of the wall bracket, ensuring upwards airflow (part 8).

Place the inverter assembly inside the wall bracket, ensuring that the 2 ends of the metal radiator are inside the wall bracket.

Fix the inverter to the wall bracket using the two side screws drilled into the metal radiator (part 14).



Electrical Connections



It is necessary to install a magnetic core (A).

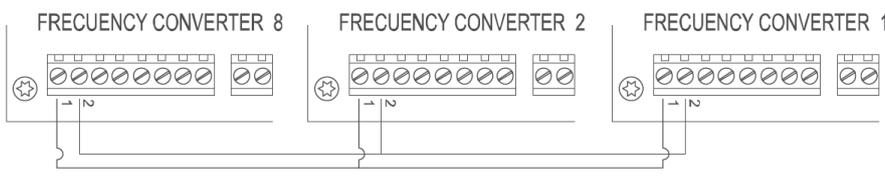
You will find it in the accessories box. It must be fitted to: (MT) the power cable of the frequency inverter, as close as possible to the cable gland. (TT) the cable between frequency inverter and motor, as close as possible to the frequency inverter connector, until a click (B) is heard.

a. Power Connections

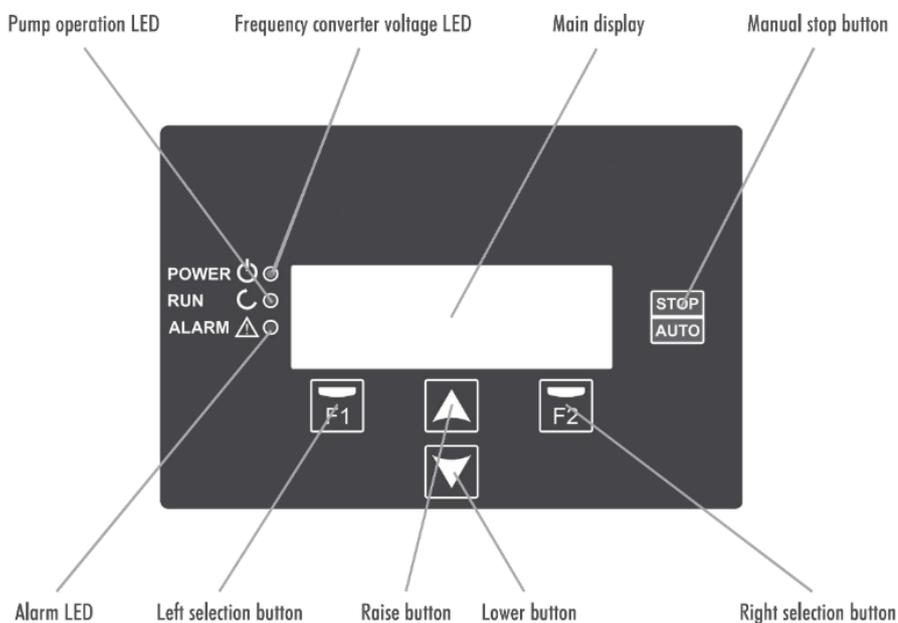
Model	Power Supply	Motor
MT 2200	Single phase 230 V	Three-phase 230 Vac (DELTA connection*)
TT 4000	Three-phase 400 V	Three-phase 400 Vac (STAR connection*)

*For 230/400 V motors

b. Signal connections

Signal	Description
Outputs relay 1 and 2	Outputs that act accordingly to how the parameters 5.14 and 5.15 respectively have been programmed. These outputs are potential free and have a maximum load of 5 amperes at 230 Vac.
Fan	When wall-mounted, as there is no cooling from the motor's own fan, the ventilation system of the wall mounting shall be used for this cooling. This output is 24 Vdc and it is activated whenever the inverter is giving a voltage output; its maximum load is 9 W.
Digital Inputs 1 and 2	You can connect any potential free contact that will perform the functions programmed in parameters 5.12 and 5.13 respectively to these inputs. NOTE: Do not apply voltage to these inputs!
Transducer	Connection of the pressure transducer (always 4-20 mA), maintaining the correct polarity shown in the connections diagram of the transducer itself.
RS485 Communication	 <p>The various inverters that you wish to communicate should be interconnected at these terminals (maximum 8). They are connected point to point. The "1" terminals must be connected together in the same way as the "2" terminals</p>

Screen Format



Main Screen

Current rotation frequency Instant consumption Nominal consumption Stop frequency

H	z			4	8	.	9							(	4	8	.	8)
A	M	P		0	8	.	3							(	0	8	.	9)
B	a	r		0	5	.	5							(	0	5	.	5)
1	4	:	5	7															M e n u

Current Time Current Pressure Working Pressure Access to the menu

Operation Mode

The operation mode of the inverter will continuously seek to minimise the electricity demand, at the same time guaranteeing minimum wear to the pumps.

a. Single pump unit:

By the direct reading of the pressure transducer, the variable speed drive is responsible for managing the rotation speed of the electric motor of the pump, guaranteeing the mains pressure remains fixed and unaltered, regardless of the instantaneous demand for flow required. When the demand for flow is at its greatest, the pressure of the water network decreases. In this point the pressure transducer, which continuously informs the inverter of the current pressure, causes the inverter to make the electric motor rotate more quickly, guaranteeing the established working pressure. In contrast, when the demand or flow decreases, the inverter makes the electric moto rotate more slowly so the pressure of the water network remains unaffected.

b. Unit with several pumps (Multi inverter):

When there is a network of two or more inverters connected together, the system decides in an alternate and orderly manner which pump must start up first, when there is demand for flow.

Once this pump starts to rotate, if it stops because there is no more demand for flow, the system will start up a different pump the next time it starts up, rotating all the pumps that comprise the network of inverters so that all the pumps in the inverter network are stated up the same number of times.

If a pump is running and reached maximum rotational speed and the network pressure does not reach the established working pressure, the system will decide whether to start up one more pump, to support the first one or however many are running at that time.

At that time the network of inverters will calculate the rotational speed of the motors that guarantee the minimum electricity demand at the same time as maintaining the working pressure.

Similarly and with this same premise of maximum energy savings the system will continually calculate when it can disconnect each pump that is running at any time.



	S	T	A	R	T	-	U	P		W	I	Z	A	R	D			
			M	O	T	O	R			C	U	R	R	E	N	T		
						5	.	0		A	m	p						
																	O	K

Use the arrow keys to enter the maximum range for the pressure of the transducer connected.

This value is indicated on the specifications plate of the pressure transducer and must always be between 4 and 20 mA.



	S	T	A	R	T	-	U	P		W	I	Z	A	R	D				
			T	R	A	N	S	D	U	C	E	R		S	C	A	L	E	
						1	0	.	0		B	a	r						
																		O	K

Validate this with F2.

Use the arrow keys to enter the pressure at which you want the unit to work.

You must take great care that this value is always within the working curve of the pump and always try to avoid the extremes of the curve in other words with flows near 0 or very low pressures.



	S	T	A	R	T	-	U	P		W	I	Z	A	R	D				
			W	O	R	K	I	N	G		P	R	E	S	S	U	R	E	
						4	.	0		B	A	R							
																		O	K

Validate this with F2.

Once you have reached this point the inverter will program itself to know when it no longer has any demand for flow and should stop. To do this it will ask for help to understand the features of the installation to which it is connected.



	S	T	O	P		F	R	E	Q	.		S	E	A	R	C	H			
						P	R	E	S	S		O	K							
						T	O		S	T	A	R	T							
																			O	K

We must follow the instructions indicated on the screen exactly.

Open propulsion: You must open the general propulsion of the system to cause consumption of flow.

Click on OK: Once the propulsion is fully open, accept it using F2.

Once you have pressed F2 the pump will start Wait 10 seconds: it takes a ten-second countdown after which the next step to take will be indicated.

The countdown will not start if the indicated pressure is above what we have set in the set pressure. If once the countdown starts the pressure increases too much, the counter will show the 10 seconds again until the pressure does not decrease.



1	-	O	P	E	N		P	R	O	P	U	L	S	I	O	N				
2	-		P	R	E	S	S		O	K										
3	-	W	A	I	T		1	0		s	e	c								
																			O	K



3	-	W	A	I	T		7		s	e	c									
5	0	.	0	H	z															



At this point you must close the propulsion gradually (using a minimum of 5-7 sec) until the flow consumption is zero. At this moment the pressure of the installation must be the pressure entered previously into the wizard.

Once the propulsion has been closed and the working pressure established, press F2 to accept.

The option "Accept" will only appear if we reach the working pressure that we have indicated. In the case of not reaching the set pressure without water consumption, the "accept" option will not be displayed.



	C	L	O	S	E		P	R	O	P	U	L	S	I	O	N					
						S	L	O	W	L	Y		A	N	D						
						P	R	E	S	S		O	K								
5	0	.	0	H	z															O	K

The stop frequency calculated is indicated, this is: for the working pressure indicated, when the pump drops below this frequency it does not generate any flow so the motor then stops. Press F1 to return to the initial stop frequency search screen. Accept by pressing F2.

It shows a text for a few seconds indicating that the wizard has finished successfully before showing the main screen.



	S	T	O	P		F	R	E	Q	U	E	N	C	Y								
						4	3	.	5	H	Z											
R	e	a	p	e	a	t															O	K

		T	H	E		W	I	Z	A	R	D		H	A	S							
						F	I	N	I	S	H	E	D									
						S	U	C	C	E	S	F	U	L	L	Y						

NOTE: All the data entered or calculated in the wizard can be modified later through the unit menu.

Start Up Wizard in Systems with Two or More Pumps

In systems with two or more pumps, the start up wizard will run in the unit that has the transducer connected, and only that unit will indicate the first screen of the wizard. If there is more than one pump with a transducer connected, the system will decide automatically which unit of those that have a transducer will be used to run the wizard. Once the wizard has finished in the unit selected, the other units on the network will be fully programmed with the same data. It will only remain to run the rotation test of its wizard and the slave pumps will have the red warning light on and an indication on the screen of the rotation direction test. Once their rotation tests have been performed, it will go directly to the main screen and the assembly will be fully programmed.

The Setup Menu

1. Parameter	2. Display	3.0 Log	4. Manual	5. Advanced Parameters	6. Fine Tuning
1.1 Working Pressure	2.01 Module Temperature			5.01 Language	6.01 Proportional Constant
1.2 Motor Current	2.02 Analogue Signal			5.02 Units of Pressure	6.02 Integral Constant
1.3 Rotation Direction	2.03 Voltage Hours			5.03 Maximum Number of Pumps On	6.03 Switching Frequency
1.4 Stop Frequency	2.04 Hours Worked			5.04 Transducer Full-Scale Value	6.04 Stop Switching Range
1.5 Start-Up Differential	2.05 Start-Up Number			5.05 Working Pressure 2	6.05 Stop Switching Speed
	2.06 Digital Input 1			5.06 Principal Stop Delay	6.09 Alarms Reset
	2.07 Digital Input 2			5.07 Minimum Working Frequency	6.10 Reset Number of Start Ups
	2.08 Relay 1 Output			5.08 Maximum Working Frequency	
	2.09 Relay Output 2			5.09 Auxiliary Operating Frequency	
	2.10 Software Version			5.10 Minimum Operating Frequency	
	2.11 Cons. Power of Pump			5.11 Minimum Auxiliary Stop Delay	
	2.12 Cons. Power of Network			5.12 Digital Input 1	
				5.13 Digital Input 2	
				5.14 Relay Output 1	
				5.15 Relay Output 2	
				5.16 Schedule Program 1	
				5.17 Program Start Time 1	
				5.18 Program Stop Time 1	
				5.19 Schedule Program 2	
				5.20 Program Start Time 2	
				5.21 Program Stop Time 2	
				5.22 Low Water Level Alarm Active	
				5.23 Low Water Level Alarm Delay	
				5.24 Burst Pipe Alarm	
				5.25 Voltage Alarm Active	
				5.26 Parameter Lock	
				5.27 Set Date and Time	
				5.28 Stop Adjustment Input Wizard	
				5.29 Factory Settings	

1. Parameters						
Parameter	Description	Units	Programming			Notes
			Default	Min.	Max.	
1.1	Working Pressure	Bar	Wizard	0.5	FS	Pressure you wish to maintain in the system.
1.2	Motor Current	Amp	Wizard	0.1	11	Current of the motor in amperes. Taking into account whether your motor is wired as three phase 230V or three phase 400V.
1.3	Rotation Direction			0	1	You can change the rotation direction of the motor by modifying this parameter from 0 to 1 or vice versa.
1.4	Stop Frequency	Hz	Wizard	0.1	99.9	The system will stop when the inverter has been working for a certain time (see parameter 5.06) below this frequency.
1.5	Start-Up Differential	Bar	0.5	0.3	3	This is the differential that enables you to reduce the pressure to start the pump using the value entered in parameter 1.1.

Wizard: This parameter is the one entered or calculated in the start-up wizard.

FS: Full scale value of the transducer (entered in the start-up wizard).

2. Display			
Parameter	Description	Units	Notes
2.01	Module Temperature	C	This indicates the temperature the electronic module of the unit is at.
2.02	Analogue Signal	mA	This indicates the value in mA of the pressure transducer. This data will be 4 mA for 0 Bar and 20 mA for the upper limit of the transducer connected.
2.03	Voltage Hours	Hours	This indicates the total number of hours the unit has been connected to an electricity grid.
2.04	Hours Worked	Hours	This indicates the total number of hours worked (providing an output voltage) of the inverter.
2.05	Start-Up Number		This indicates the total number of start-ups from zero that the unit has made.
2.06	Digital Input 1		This indicates whether digital input 1 is ON or OFF.
2.07	Digital Input 2		This indicates whether digital input 2 is ON or OFF.
2.08	Relay 1 Output		This indicates whether the relay 1 output is ON or OFF.
2.09	Relay 2 Output		This indicates whether the relay 2 output is ON or OFF.
2.10	Software Version		Version of the unit software

2:11	Cons. Power of Pump	W	Instantaneous power consumed in output terminals toward pump.
2:12	Cons. Power of Group	W	Power consumed instantaneously by all of the pumps

3. Log

3	.	0	1		A	L	A	R	M		F	0	4						
					V	O	L	T	A	G	E								
		1	0	/	0	2	/	1	6	-	1	2	:	1	9				
E	X	I	T																



When you access the log menu you will find a list in chronological order of alarms that have been triggered in your unit, indicating the date and time they occurred. Use the arrows ↑ and ↓ to move forward or back to view the different alarms that have been triggered. Press F1 to exit this menu.

Where you can see the frequency, an operation timer and the pressure at that precise moment read by the transducer. Press F1 to exit this menu.

When you press ON (with the F2 key) you will start the motor and you can increase or reduce the frequency using the arrow keys. At the same time you can see how the countdown begins for 2 minutes of operation. If you do not press any keys, after 2 minutes the motor will stop automatically. If you press the F2 key during the countdown, it will be increased to 15 minutes, 30 minutes, 1 hour, 2 hours, 4 hours, 8 hours and 24 hours for each press. Press F1 to exit, stop the motor and return to the wait screen of this menu.

4. Manual

The system is prepared to carry out speed and operation tests manually through this menu. When you access this menu, regardless of the status of the system the unit from which you are accessing stops its functions and therefore stops the pump.

When you access this menu this screen appears:

4	.	M	A	N	U	A	L													
					0	.	0	H	z		(	0	s)						
					4	.	0	B	a	R										
E	X	I	T																O	N



4	.	M	A	N	U	A	L												
					4	2	.	0	H	z		(	0	s	g)			
					4	.	6	B	a	r									
O	f	f																	



Attention: Improper use of manual mode can cause overpressures in the installation.

5. Advanced Parameters						
Parameter	Description	Units	Programming			Notes
			Default	Min.	Max.	
5.01	Language		Spanish	Spanish English French	Dutch Polish	You can select between different language for the menu and the warning
5.02	Units of Pressure	Bar	Bar	Bar - Psi		Units of working pressure and display
5.03	Maximum Number of Pumps On		8	1	8	Maximum number of pumps that can function in the system simultaneously.
5.04	Transducer Full Scale Value	Bar	Wizard	5	30	Value of the transducer at 20mA.
5.05	2 Working Pressure	Bar	**	0.5	Fs	Second working pressure for installations that require it. ** As a default value it will show 4 bar.
5.06	Principal Stop Delay	Sec	10	0	100	Time from the moment the main pump is working at a speed below the stop frequency (parameter 1.4) until it stops fully.
5.07	Minimum Working Frequency	Hz	25	10	50	Minimum frequency at which you allow the pump to work.
5.08	Maximum Working Frequency	Hz	50	25	65	Maximum frequency at which you allow the pump to work.
5.09	Auxiliary Operating Frequency	Hz	50	25	50	When the pump in operation reaches this frequency it sends a command to the auxiliary to start up.
5.10	Minimum Auxiliary Operating Delay	Sec	2	1	200	Time from the moment the condition of parameter 5.09 occurs until the auxiliary pump starts.
5.11	Auxiliary Stop Delay	Sec	2	1	10	Time from when a system of two or more pumps is working below parameter 1.4 until the auxiliary pumps stop.
5.12	Digital Input 1		Unused	Unused External Stop External Stop Inv 2 nd Setpoint 2 nd Setpoint INV Flow Sensor NC		We can use the digital input as a system start-stop by closing the input circuit, or by opening it is we select the INV option. It can also be used as a second set pressure in the same way. Closing the circuit of the programmed input, the system will ignore the second set pressure (parameter 5.05). The operation described is the reverse if we choose the INV option. "Flow Sensor NC" can be selected when a flow sensor is available, which will stop the pump when the contact is opened. Selecting "unused" will not affect the system.
5.13	Entrada Digital 2		Unused	See parameter 5.12		See parameter 5.12
5.14	Relay 1 Output		Off	Off Alarm (NO) Alarm (NC) ON External Stop Dry Running Clock (NO) Clock (NC)		The aim of this parameter is to enable signals remotely. OFF: The relay is never activated Alarm (NO): The relay closes before an alarm Alarm (NC): The relay opens before an alarm Running: The relay is energised when the unit is running. External Stop: The relay is energised when there is an external stop. (For this condition we must have programmed a digital input as "Start/Stop" Dry Running: The relay is energised if the converter detects dry running. Clock (NO): The relay closes depending on the time data programmed in parameters 5.16 to 5.21

5.15	Relay2 Output		Off	Off Alarm (NO) Alarm (NC) ON External Stop Dry Running Clock (NO) Clock (NC)	See parameters 5.14	
5.16	Schedule Program 1		Off	OFF M-Su M-F Sat-Su M-Sun	In this parameter you can choose not to have a schedule program (OFF) or the days of the week that you want this program to run. You can choose between whole weeks (M-Sun), Weekdays (M-F), Weekends (Sa-Sun) or individual days. The schedule program will act on the output relay programmed for this purpose.	
5.17	Program Start Time 1		00:00	00:00	23:59	Start time of schedule program 1.
5.18	Program Stop Time 1		00:00	00:00	23:59	Stop time of schedule program 2.
5.19	Schedule Program 2		Off	Off M-Su M-F Sa-Su M-Sun	Like parameter 5.16 but for a second schedule program.	
5.20	Program Start Time 2		00:00	00:00	23:59	Start time of schedule program 2.
5.21	Program Stop Time 2		00:00	00:00	23:59	Stop time of schedule program 2.
5.22	Low Water Level Alarm Active		YES	YES	No	Parameter for enabling or disabling the low water level alarm. In the case of being active and cause notice, the drive will start attempts by the following sequence: 5 minutes, 15 minutes, 1 hour, 6 hours or 24 hours. The display shows the remaining time start attempt. Pressing F2 we force the reset of the notice, still unfinished countdown. If after the 24-hour notice is detected again dry running, the drive will lock indefinitely until you press F2.
5.23	Low Water Level Alarm Delay	Sec	5	1	99	Time from when the system calculates a low water level until the moment the alarm is activated for this reason.
5.24	Burst Pipe Alarm		Yes	Yes	No	Parameter for enabling or disabling the burst pipe alarm.
5.25	Voltage Alarm Active		Yes	Yes	No	Parameter for enabling or disabling the alarm due to a power cut.
5.26	Parameter Lock		No	No	Yes	YES: Editing the values of the parameters is locked. NO: Editing the values of the parameters is locked. To change this parameter from YES to NO, you must previously enter the password 1357.
5.27	Set Date and Time		No	No	Yes	When you change this parameter to "SI" this screen for editing the date and time will appear. Once Editing is completed, the parameter returns to "NO".
5.28	Stop Frequency Search Wizard		No	No	Yes	If you change this parameter from "NO" to "Yes" the stop frequency search wizard will be launched.
5.29	Factory Settings		No	No	Yes	To reset the unit and leave it with the factory settings, change this parameter to "YES" and after you have entered the code 1357 the unit will launch the start-up wizard.

6. Fine Tuning						
Parameter	Description	Units	Programming			Notes
			Default	Min.	Max.	
6.01	Proportional Constant		100	0	999	
6.02	Integral Constant		100	0.1	999	
6.03	Switching Frequency	kHz	7.7	2.5	16.0	
6.04	Stop Switching Range	Bar	0.1	0.0	0.5	
6.05	Stop Switching Speed		1	1	64	
6.09	Alarms Reset		No	No	Yes	If you change this parameter from "NO" to "YES" you will reset the alarms log and parameter automatically returns to "NO".
6.10	Reset Number of Start-ups		No	No	Yes	If you change this parameter from "NO" to "Yes" you will reset the number of start-ups and the parameter returns to "NO".

Warning Management

One of the main principles of the inverter is to try and avoid the failure of the hydraulic supply. To do this, the inverter has system that, in the event any reading for the pressure/consumption of the motor is outside of the established limits, it may partially lose its ability to try to avoid the inverter locking and, therefore avoid the failure of the hydraulic supply.

A clear example is an excessive consumption of the electric motor. In this specific scenario, the inverter will limit the rotational speed of the motor to avoid its deterioration, maintaining the consumption of the motor equal to the nominal consumption, thus the hydraulic installation will continue to receive flow from the pump, not at the working pressure established but at a somewhat lower pressure.

A table specifying the current state of the system operation, according to visual warnings that are shown using both the LEDS and the main screen can be found below.

Warning	Reason	Explanation / Solution
The POWER LED blinks.	The pump to which the inverter is connected is not operative for automatic running.	Check that there is no manual shutdown (AUTO/ STOP button on the keypad), a remote stop (auxiliary input active remote stop) or a general stop of the network of inverters (occurs when any general critical parameter is being modified).
The RUN LED blinks.	The inverter is in the process of stopping the pump.	
The ALARM LED blinks.	The start-up wizard is running. The pump is in a state of alarm (indicated on the display).	The LED will stop blinking once the initial configuration wizard has finished.
The current frequency data blinks.	The inverter is limiting the rotational frequency of the motor due to a high temperature in the electronics, in addition to excessive consumption of the electric motor.	Consult the section on Alarms in this manual to resolve the incident. Check the inverter is properly ventilated.

The stop frequency data blinks.	The stop frequency calculated exceeds the maximum frequency permitted for pump operation (5.08)	We recommend running the stop frequency setup wizard again (5.24). If this warning persists after running the wizard again, you must reduce the working pressure as the pump that is connected will not be able to reach it.
The current consumption data blinks.	The inverter is limiting the rotational frequency of the motor due to excessive consumption of the motor.	Check that the motor current (I.2) is that indicated on the specifications plate.
Next to the current pressure data, there is an asterisk that blinks.	The inverter with this warning does not have any pressure transducer connected. If there is a transducer connected, it is not connected with the correct polarity. The transducers reading has a difference of 0.5 bar from the other transducers connected on the network of inverters.	Disconnect the transducer from the electrical terminal block and invert the polarity of the connecting cable. We recommend changing the transducer because it is not reading correctly.

Alarms

Message	Reasons	Solutions
Alarm F01 overcurrent	Indicated excessive consumption in the motor.	Check that the nominal consumption data has been entered correctly. Check that the pump rotates freely with no obstructions.
Alarm F02 Short Circuit	The motor is communicated or has burnt out. Not all wires have been connected. Internal fault in the inverter.	Disconnect the motor from the inverter and check that the message disappears. If this is not the case, contact Flowtech Water Solutions. Check that all the cables of the motor are correctly connected to the motor itself and also to the inverter. Also supervise the correct wiring of the inverters power supply.
Alarm F03 Excess Temperature of the module	The power module has reached a very high temperature, compromising its reliability.	Ensure the ambient temperature does not exceed the extremes set out in this manual. If it is assembled on the pump, ensure the pump has a fan and that the fan cover has been fitted. If it is assembled on a wall mount ensure the fan of the mount functions correctly when the motor is running.
Alarm F04 Input Voltage	The inverter is not receiving electric current outside of its upper and lower limits.	The electrical supply to the inverter has been interrupted. The electrical connection cable from the mains electricity to the inverter has been disconnected. The electrical voltage entering the inverter is outside the limits specified in the technical data section.

Alarm F05 Transducer	The inverter does not receive a correct reading from the pressure transducer.	The pressure transducer is wired in the inverter with the polarity reversed. The pressure transducer is broken. The pressure transducer has a range other than 4-20mA.
Alarm F06 Motor Fault	The motor has communicated or has burnt out. Fault/ poor connection of the phases.	Disconnect the motor from the inverter and check that the message disappears. If this is not the case, Contact Flowtech Water Solutions.
Alarm F07 Low Water Level	The inverter detects that the pump is working partially at no load.	Ensure the pump aspirates the fluid correctly.
Alarm F08 Burst Pipes	The inverter detects that the pump is working at a very low pressure and at a speed high for a time.	Check that the water network has no leaks greater than those required for regular demand.
Alarm A09 Frequency Parameters Incoherent	There is a parameter related to the frequency in conflict with the values considered normal.	Check that the minimum frequency is greater than 10Hz. Check that the minimum frequency is lower than 65Hz. Check that the minimum frequency entered is lower than the maximum frequency. Check that the minimum operating frequency for the auxiliary pumps is lower than the maximum frequency. Check that the minimum operating frequency for the auxiliary pumps is greater than the minimum frequency.
Alarm A10 Time Parameters	The stop delays of the auxiliary pumps exceeds the stop delay of the main pump.	
Alarm A11 Pressure Parameters	The start-up pressure differential exceeds the working pressure.	Reduce the start-up pressure differential of the pump, or increase the working pressure above this value.
Alarm X13 Internal Error	There is no communication between the control panel with the button pad and display, and the power plate screwed into the radiator. Internal fault in the inverter.	Check that the flat cable that communicates both electronic circuits are well connected and tightened. It may be due to an occasional error in the firmware of the inverter or the spot reading of a parameter deemed to be outside of the limits. In this case we recommend cutting the power to the inverter for a few minutes. If after a few minutes when the power is reconnected to the inverter the message remains contact Flowtech Water Solutions.

Maintenance and Repair

We recommend monitoring the frequency inverter periodically and regulating its operation.

Warranty

Failure to comply with the instructions provided in this instruction manual and/or any manipulations of the inverter not carried out by an authorised technical service and/or the use of non-original spare parts will

invalidate the warranty and exempt the manufacturer from any liability in case of accidents to people or damage to property and/or the product itself.

Once the product has been received, check that it has not suffered significant breaks or dents. Otherwise, inform the delivery person. Once the frequency inverter has been removed from its packaging check that it has not been damaged in transit. In the event of any damage please contact us.

Check that the characteristics displayed on the rating plate are those you requested.

If fault is found which is not included in the “troubleshooting” table please contact us.

Disposal and Environmental Aspects

To dispose of the parts that comprise the inverter, you must abide by the current regulations and laws of the country where the product is used. In any event, do not throw away parts that may pollute the environment

This item should not be disposed of with other household waste.

This stipulation only refers to the disposal of equipment within the European Union (2012/19/EU). It is the user's responsibility to dispose of the equipment by delivering it to a designated collection point for the recycling and disposal of electrical equipment.



flowtech[®]
WATER SOLUTIONS

flowzone[®]

MEMBERS AREA

This section of the **flowtech**[®] website holds information exclusively for members. Members will need to log in to gain access to these pages.

Our member's will be granted exclusive access to our technical resource library. Within this resource is a wide range of product information including data sheets, technical drawings, O&M Manuals and training videos



flowcare[®]

AFTER SALES SERVICE

At **flowtech**[®] we operate a network of Service Engineers located throughout the UK who are supported by our offices located in and Greater Manchester. The distribution of engineers means that in the majority of cases we are less than 4 hours away from attending a customer call out.

We place great emphasis on providing technical back up to support our Service Engineers in resolving some difficult operational and technical issues. We pride ourselves on completing a project on time, within budget and never leaving a problem unresolved, or a customer waiting. This quality of service has made us the first choice for our customers.

FOR FURTHER INFORMATION OR ASSISTANCE

contact us

Flowtech Water Solutions are experts in water services and water booster sets. We have continuously supplied a wide range of standard and custom products since being founded in 1996.

MANUFACTURE & SUPPLY

TELEPHONE : 0333 200 1756

EMAIL: info@flowtech.org.uk

SERVICE & MAINTENANCE

TELEPHONE : 0333 200 1813

EMAIL: service@flowtech.org.uk

WEBSITE: www.flowtech.org.uk

ADDRESS : Unit 1 Lock Flight Buildings, Wheatlea Industrial Estate,
Wigan, Greater Manchester WN3 6XP United Kingdom

