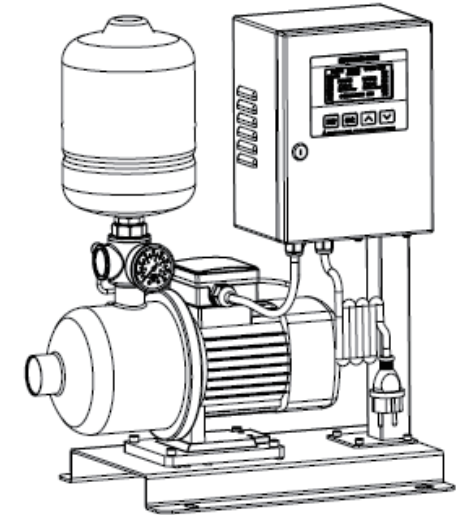


**GB** USER'S MANUAL  
FREQUENCY CONVERSION  
CENTRIFUGAL PUMP



ISO9001 ISO14001 AUTHENTICATED  
[Http://www.grandfargroup.com](http://www.grandfargroup.com)  
E-mail: [info@grandfargroup.com](mailto:info@grandfargroup.com)  
TAIZHOU GRANDFAR INTERNATIONAL TRADING CO.,LTD

## FREQUENCY CONVERSION CENTRIFUGAL PUMP

**Model: CBB-CHL/CB-CHL/CB-CHI**

Read this manual carefully before installation. The product can not be used for medical industry which have the potential to cause personal injury, also can not be used for pumping other liquids than water.

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## 1. Summary

### 1.1 Product Introduction

CB(B) series Variable-frequency pump adopts the latest VVVF (Variable Voltage and Variable Frequency).AC Frequency conversion speed regulation technology combined with pressure sensor technology,through the feedback of real-time pressure value compared with the setting pressure, it can automatically adjust the motor speed,and keep the outlet pressure constant.

### 1.2 Application range

It can apply to life,production water supply for various types of high-rise buildings , such as water plants,restaurants, hotels, residential areas etc.

### 1.3 Product advantage

- 1.Energy-efficient .Compared with the traditional way of water supply, the Variable-frequency pump system can save energy of 30% to 60%.
- 2.Small occupied area, less investment and high efficiency.
- 3.Flexible configuration, high degree of automation, complete functions, flexible and reliable. because of the decline for average speed in one day, the life of pump will improved.
- 4.Because it can realize the soft stop and soft start of water pump, it can eliminate water effect.(water hammer effect means:direct starting and stopping ,liquid kinetic energy of a hammer sharp change,lead to the great impact of the network,there iage.)
- 5.Easy installation, it replaces water tower ,high water tank and traditional air pressure tank water supply device.
- 6.Direct pressurized water supply reduces the secondary pollution of water quality caused by traditional pressure tank water supply device.
- 7.The spare parts which flowed by water is all stainless (304 or 316),guarantee the healthy of using water.



### 1.4 Operating conditions

- 1.Media: Clear water (=0°C)
- 2.Medium Temperature:0~+104°C

## 2. Safety and notice


### 2.1 Notice


- 1.Please read the manual carefully before installation and using.
- 2.Pay more attention to the safety warnings and instructions in the manual.

-  The risk of general electric : If violate , the pump will broken and people will get hurt.
-  The danger caused by electrical appliances, If violate , the pump will broken and people will get hurt .

3.If anyone who will not abide the safety warnings and instructions in the manual so that cause injuries and any other property damage , our company will not assume any form of liability or joint and liability, also don't pay any compensation.several liability, also don't pay any compensation.

4.Safety warning content:

 DANGER	1.Please be sure to use the correct power supply to ensure that power conform to the requirements of the product.
	2.Please cut off the power supply before installation and maintenance;ensure the reliable grounding measures. If not, can't use.
	3.If don't use the pump for a long time, please closed the inlet pipe valve and cut off the power.
	4.Don't install the water pump in any wet place or the place may water splashed.
	5.If the storing time is more than 2 years, boosting the pressure through the voltage regulator gradually when power on, otherwise there is risk of electric shock and explosion.
	6.Don't touch the controller terminals when the power on ,otherwise there is risk of electric shock.
	7.Maintenance needs to be 5 minutes later after cutting off the power, at that time all the indicator light should be went out completely, otherwise there is risk of electric shock.
	8.Don't use wet hand operate the control panel otherwise there is risk of electric shock.
	9.If the wire aging or damaged , it must be replaced by professionals.

 DANGER	1.Installation and the operator must comply with local safety regulations.
	2.Installation and maintenance only can be operated by professionals.
	3.The user must confirm: installation and maintenance must be operated by professionals who proficient in this manual.
	4.If the motor heating or abnormal , please close the inlet valve immediately and cut off the power, contact the dealers or service center.The pump can be continue to start until clearing the fault.
	5.If can not eliminate the pump fault according with the manual, please close the inlet valve immediately and cut off the power, contact the dealers or service center .The pump can be continue to start until clearing the fault.
	6.This product should be placed where children can not touch, isolation measures should be taken after the installation is complete, in order to prevent the children touch.
	7.The product should be placed in dry and ventilated, shady and cool place, kept at room temperature.
	8. In summer or the high temperature environment, it should be paid attention to ventilation, avoid causing condenser water and dew, which lead to electrical equipment error.

### 2.2 Product checking

Every products should finish the testing of all functional items before leaving factory,clients need to take the following test after receiving the products :

- 1.Make sure the model and type is what you have ordered.
- 2.Check whether the products is damaged caused by transportation , if it has,don't access the power.

### 2.3 Notice for environmental conditions

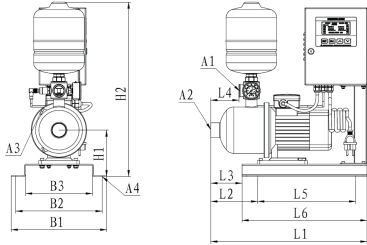
The installation condition of Variable frequency pump system have a direct impact on the function and service life , so the installation surroundings should conform to the following conditions.

- Products should be used in the inner environment
- Environment temperature:-10°C~+40°C
- Installation environment can't damp but good ventilation
- Stay away from the rADFoactive material and fuel
- Prevention of electromagnetic interference

### 3. Product appearance dimensions and technical data

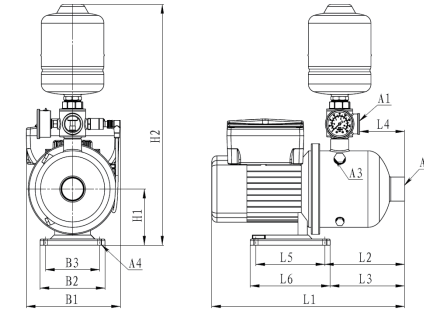
#### 3.1 Product appearance dimensions

##### 3.1.1 CBB-CHL Appearance dimensions



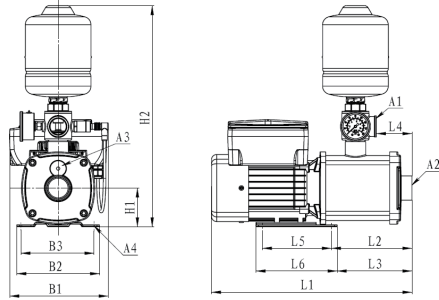
		AC 220V/50Hz series															
No.	Model	Dimensions(mm)															
		A1	A2	A3	A4	B1	B2	B3	H1	H2	L1	L2	L3	L4	L5	L6	
1	CBB-CHL2-20	G1	G1	G3/8	12	306	276	214	150	565	504	150	100	90	314	400	
2	CBB-CHL2-30	G1	G1	G3/8	12	306	276	214	150	565	504	150	100	90	314	400	
3	CBB-CHL2-40	G1	G1	G3/8	12	306	276	214	150	565	504	150	100	90	314	400	
4	CBB-CHL2-50	G1	G1	G3/8	12	306	276	214	150	565	504	150	100	90	314	400	
5	CBB-CHL2-60	G1	G1	G3/8	12	306	276	214	150	565	504	150	100	90	314	400	
6	CBB-CHL4-20	G1	G1¼	G3/8	12	306	276	214	150	565	504	150	100	90	314	400	
7	CBB-CHL4-30	G1	G1¼	G3/8	12	306	276	214	150	565	504	150	100	90	314	400	
8	CBB-CHL4-40	G1	G1¼	G3/8	12	306	276	214	150	565	504	150	100	90	314	400	
9	CBB-CHL4-50	G1	G1¼	G3/8	12	306	276	214	150	565	504	150	100	90	314	400	
10	CBB-CHL4-60	G1	G1¼	G3/8	12	306	276	214	150	565	504	150	100	90	314	400	
11	CBB-CHL8-15S	G1½	G1½	G3/8	12	306	276	214	160	613	523	169	119	88	314	430	
12	CBB-CHL8-20S	G1½	G1½	G3/8	12	306	276	214	160	613	523	169	119	88	314	430	
13	CBB-CHL8-25S	G1½	G1½	G3/8	12	306	276	214	160	613	523	169	119	88	314	430	
14	CBB-CHL8-30S	G1½	G1½	G3/8	12	306	276	214	160	613	523	169	119	88	314	430	
15	CBB-CHL8-35S	G1½	G1½	G3/8	12	306	276	214	160	613	523	169	119	88	314	430	
16	CBB-CHL8-40S	G1½	G1½	G3/8	12	306	276	214	160	613	523	169	119	88	314	430	
17	CBB-CHL8-20	G1½	G1½	G3/8	12	306	276	214	160	613	524	170	120	89	314	430	
18	CBB-CHL8-30	G1½	G1½	G3/8	12	306	276	214	160	613	524	170	120	89	314	430	
19	CBB-CHL8-40	G1½	G1½	G3/8	12	306	276	214	160	613	524	170	120	89	314	430	
20	CBB-CHL8-50	G1½	G1½	G3/8	12	306	276	214	160	613	590	236	186	155	314	430	
21	CBB-CHL12-10S	G1½	G1½	G3/8	12	306	276	214	160	613	523	169	119	88	314	430	
22	CBB-CHL12-15S	G1½	G1½	G3/8	12	306	276	214	160	613	523	169	119	88	314	430	
23	CBB-CHL12-20S	G1½	G1½	G3/8	12	306	276	214	160	613	523	169	119	88	314	430	
24	CBB-CHL12-25S	G1½	G1½	G3/8	12	306	276	214	160	613	523	169	119	88	314	430	
25	CBB-CHL12-30ST	G1½	G1½	G3/8	12	306	276	214	160	613	523	169	119	88	314	430	
26	CBB-CHL12-10	G1½	G1½	G3/8	12	306	276	214	160	613	524	170	120	89	314	430	
27	CBB-CHL12-20	G1½	G1½	G3/8	12	306	276	214	160	613	524	170	120	89	314	430	
28	CBB-CHL12-30	G1½	G1½	G3/8	12	306	276	214	160	613	524	170	120	89	314	430	
29	CBB-CHL12-40	G1½	G1½	G3/8	12	306	276	214	160	613	524	170	120	89	314	430	
30	CBB-CHL12-50T	G1½	G1½	G3/8	12	306	276	214	160	613	590	236	186	155	314	430	
31	CBB-CHL16-10	G2	G2	G3/8	12	306	276	214	160	632	519	165	115	78	314	430	
32	CBB-CHL16-20	G2	G2	G3/8	12	306	276	214	160	632	519	165	115	78	314	430	
33	CBB-CHL16-30	G2	G2	G3/8	12	306	276	214	160	632	545	191	411	104	314	430	
34	CBB-CHL20-10	G2	G2	G3/8	12	306	276	214	160	632	519	165	115	78	314	430	
35	CBB-CHL20-20	G2	G2	G3/8	12	306	276	214	160	632	519	165	115	78	314	430	
36	CBB-CHL20-30T	G2	G2	G3/8	12	306	276	214	160	632	545	191	141	104	314	430	

##### 3.1.2 CB-CHL Appearance dimensions



		AC 220V/50Hz series															
No.	Model	Dimensions(mm)															
		A1	A2	A3	A4	B1	B2	B3	H1	H2	L1	L2	L3	L4	L5	L6	
1	CB-CHL2-20	G1	G1	G3/8	9	189	130	108	110	473	400	160	149	90	138	160	
2	CB-CHL2-30	G1	G1	G3/8	9	189	130	108	110	473	400	160	149	90	138	160	
3	CB-CHL2-40	G1	G1	G3/8	9	189	130	108	110	473	400	160	149	90	138	160	
4	CB-CHL2-50	G1	G1	G3/8	9	189	130	108	110	473	400	160	149	90	138	160	
5	CB-CHL2-60	G1	G1	G3/8	9	189	130	108	110	473	400	160	149	90	138	160	
6	CB-CHL4-20	G1	G1¼	G3/8	9	189	130	108	110	473	400	160	149	84	138	160	
7	CB-CHL4-30	G1	G1¼	G3/8	9	189	130	108	110	473	400	160	149	84	138	160	
8	CB-CHL4-40	G1	G1¼	G3/8	9	189	130	108	110	473	400	160	149	84	138	160	
9	CB-CHL4-50	G1	G1¼	G3/8	9	189	130	108	110	473	400	160	149	84	138	160	
10	CB-CHL4-60	G1	G1¼	G3/8	9	189	130	108	110	473	400	160	149	84	138	160	
11	CB-CHL8-15S	G1½	G1½	G3/8	9	210	130	108	120	580	424	179	168	89	138	160	
12	CB-CHL8-20S	G1½	G1½	G3/8	9	210	130	108	120	580	424	179	168	89	138	160	
13	CB-CHL8-25S	G1½	G1½	G3/8	9	210	130	108	120	580	459	179	168	89	138	160	
14	CB-CHL8-30S	G1½	G1½	G3/8	9	210	130	108	120	580	459	179	168	89	138	160	
15	CB-CHL8-35S	G1½	G1½	G3/8	9	210	130	108	120	580	459	179	168	89	138	160	
16	CB-CHL8-40S	G1½	G1½	G3/8	9	210	130	108	120	580	459	179	168	89	138	160	
17	CB-CHL8-20	G1½	G1½	G3/8	9	210	130	108	120	580	425	180	169	90	138	160	
18	CB-CHL8-30	G1½	G1½	G3/8	9	210	130	108	120	580	455	180	169	90	138	160	
19	CB-CHL8-40	G1½	G1½	G3/8	9	210	130	108	120	580	455	180	169	90	138	160	
20	CB-CHL8-50	G1½	G1½	G3/8	9	210	130	108	120	580	521	246	235	156	138	160	
21	CB-CHL12-10S	G1½	G1½	G3/8	9	210	130	108	120	580	425	179	168	89	138	160	
22	CB-CHL12-15S	G1½	G1½	G3/8	9	210	130	108	120	580	459	179	168	89	138	160	
23	CB-CHL12-20S	G1½	G1½	G3/8	9	210	130	108	120	580	459	179	168	89	138	160	
24	CB-CHL12-25S	G1½	G1½	G3/8	9	210	130	108	120	580	459	179	168	89	138	160	
25	CB-CHL12-30ST	G1½	G1½	G3/8	9	210	130	108	120	580	518	179	168	89	138	160	
26	CB-CHL12-10	G1½	G1½	G3/8	9	210	130	108	120	580	425	180	169	90	138	160	
27	CB-CHL12-20	G1½	G1½	G3/8	9	210	130	108	120	580	455	180	169	90	138	160	
28	CB-CHL12-30	G1½	G1½	G3/8	9	210	130	108	120	580	455	180	169	90	138	160	
29	CB-CHL12-40	G1½	G1½	G3/8	9	210	130	108	120	580	455	180	169	90	138	160	
30	CB-CHL12-50T	G1½	G1½	G3/8	9	210	130	108	120	580	583	246	235	156	138	160	
31	CB-CHL16-10	G2	G2	G3/8	9	210	130	108	120	598	425	175	164	78	138	160	
32	CB-CHL16-20	G2	G2	G3/8	9	210	130	108	120	598	455	175	164	78	138	160	
33	CB-CHL16-30	G2	G2	G3/8	9	210	130	108	120	598	480	201	190	104	138	160	
34	CB-CHL20-10	G2	G2	G3/8	9	210	130	108	120	598	425	175	164	78	138	160	
35	CB-CHL20-20	G2	G2	G3/8	9	210	130	108	120	598	455	175	164	78	138	160	
36	CB-CHL20-30T	G2	G2	G3/8	9	210	130	108	120	598	540	201	190	104	138	160	

3.1.3 CB-CHI Appearance dimensions



AC 220V/50Hz series																
No.	Model	Dimensions(mm)														
		A1	A2	A3	A4	B1	B2	B3	H1	H2	L1	L2	L3	L4	L5	L6
1	CB-CHI 2-20	G1	G1	G3/8	11	189	158	125	75	428	318	131	113	32	96	136
2	CB-CHI 2-30	G1	G1	G3/8	11	189	158	125	75	428	318	131	113	32	96	136
3	CB-CHI 2-40	G1	G1	G3/8	11	189	158	125	75	428	336	149	131	50	96	136
4	CB-CHI 2-50	G1	G1	G3/8	11	189	158	125	75	428	383	167	143	68	96	136
5	CB-CHI 2-60	G1	G1	G3/8	11	189	158	125	75	428	416	203	179	104	96	155
6	CB-CHI 4-20	G1	G1½	G3/8	11	189	158	125	75	428	318	131	113	32	96	136
7	CB-CHI 4-30	G1	G1½	G3/8	11	189	158	125	75	428	318	131	113	32	96	136
8	CB-CHI 4-40	G1	G1½	G3/8	11	189	158	125	75	428	362	149	125	50	96	155
9	CB-CHI 4-50	G1	G1½	G3/8	11	189	158	125	75	428	380	167	143	68	96	155
10	CB-CHI 4-60	G1	G1½	G3/8	11	189	158	140	90	443	446	243	228	104	125	155
11	CB-CHI 8-15S	G1½	G1½	G3/8	11	210	158	125	100	550	377	185	170	50	96	136
12	CB-CHI 8-20S	G1½	G1½	G3/8	11	210	158	125	100	550	377	185	170	50	96	136
13	CB-CHI 8-25S	G1½	G1½	G3/8	11	210	158	125	100	550	408	200	185	50	96	136
14	CB-CHI 8-30S	G1½	G1½	G3/8	11	210	158	125	100	550	408	200	185	50	96	136
15	CB-CHI 8-35S	G1½	G1½	G3/8	11	210	158	125	100	550	438	230	215	80	96	136
16	CB-CHI 8-40S	G1½	G1½	G3/8	11	210	158	125	100	550	438	230	215	80	96	136
17	CB-CHI 8-20	G1½	G1½	G3/8	11	210	158	125	100	550	377	185	170	50	96	136
18	CB-CHI 8-30	G1½	G1½	G3/8	11	210	158	125	100	550	408	200	185	50	96	136
19	CB-CHI 8-40	G1½	G1½	G3/8	11	210	158	125	100	550	438	230	215	80	96	136
20	CB-CHI 8-50	G1½	G1½	G3/8	11	210	158	125	100	550	498	290	275	140	96	136
21	CB-CHI 12-10S	G1½	G1½	G3/8	11	210	158	125	100	550	377	185	170	50	96	136
22	CB-CHI 12-15S	G1½	G1½	G3/8	11	210	158	125	100	550	408	185	170	50	96	136
23	CB-CHI 12-20S	G1½	G1½	G3/8	11	210	158	125	100	550	408	185	170	50	96	136
24	CB-CHI 12-25S	G1½	G1½	G3/8	11	210	158	125	100	550	409	185	170	50	96	136
25	CB-CHI 12-30ST	G1½	G1½	G3/8	11	210	158	160	100	550	469	185	170	50	140	136
26	CB-CHI 12-10	G1½	G1½	G3/8	11	210	158	125	100	550	377	185	170	50	96	136
27	CB-CHI 12-20	G1½	G1½	G3/8	11	210	158	125	100	550	408	200	185	50	96	136
28	CB-CHI 12-30	G1½	G1½	G3/8	11	210	158	125	100	550	408	200	185	50	96	136
29	CB-CHI 12-40	G1½	G1½	G3/8	11	210	158	125	100	550	438	200	185	80	96	136
30	CB-CHI 12-50T	G1½	G1½	G3/8	11	210	158	160	100	550	539	290	275	140	140	136
31	CB-CHI 16-10	G2	G2	G3/8	11	210	158	125	100	568	408	215	200	72	96	136
32	CB-CHI 16-20	G2	G2	G3/8	11	210	158	125	100	568	439	230	215	72	96	136
33	CB-CHI 16-30	G2	G2	G3/8	11	210	158	160	100	568	580	230	215	72	140	136
34	CB-CHI 20-10	G2	G2	G3/8	11	210	158	125	100	568	408	215	200	72	96	136
35	CB-CHI 20-20	G2	G2	G3/8	11	210	158	125	100	568	439	230	215	72	96	136
36	CB-CHI 20-30T	G2	G2	G3/8	11	210	158	160	100	568	500	230	215	72	140	136

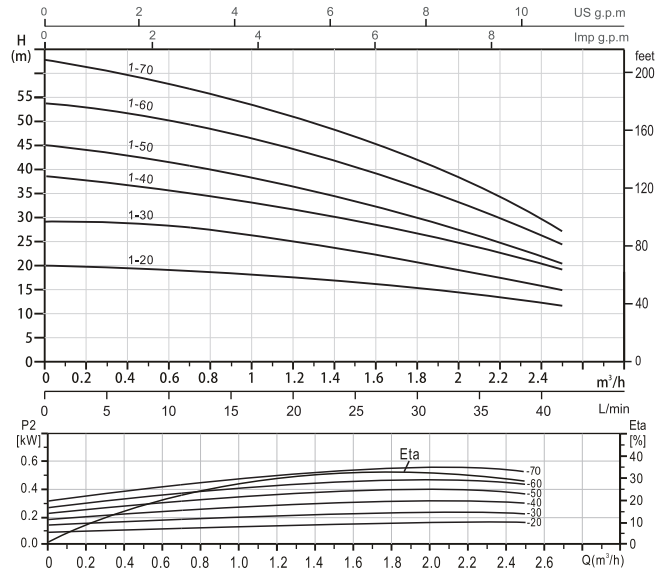
3.2 CB(B) Technical data table

AC 220V/50Hz series										
No.	Model	Rated power	Rated flow	Rated head	Factory setting	Adjust range	Pressure tank	The pressure of tank		
		(KW)	(m³/h)	(m)	(m)	(kgf/cm³)	(kgf/cm²)			
1	2-20	0.37	2	14	1.5	1.0~1.5	2L	2.0		
2	2-30	0.37		21	2.0	1.0~2.1	2L			
3	2-40	0.55		28	2.0	1.0~2.8	2L			
4	2-50	0.55		35	2.0	1.0~3.5	2L			
5	2-60	0.75		42	2.0	1.0~4.2	2L			
6	4-20	0.55		15	1.5	1.0~1.5	2L			
7	4-30	0.75	4	22	2.0	1.0~2.2	2L			
8	4-40	0.75		30	2.0	1.0~3.0	2L			
9	4-50	1		38	2.0	1.0~3.8	2L			
10	4-60	1.1		45	2.0	1.0~4.5	2L			
11	8-15S	0.75		8	20	2.0	1.0~2.0		4L	
12	8-20S	1			24	2.0	1.0~2.4		4L	
13	8-25S	1.5	27		2.0	1.0~2.7	4L			
14	8-30S	1.85	36		2.0	1.0~3.6	4L			
15	8-35S	2.2	43		2.0	1.0~4.3	4L			
16	8-40S	2.2	48		2.0	1.0~4.8	4L			
17	8-20	0.75	19		2.0	1.0~1.9	4L			
18	8-30	1.1	26		2.0	1.0~2.6	4L			
19	8-40	1.5	8		37	2.0	1.0~3.7		4L	
20	8-50	2.2			46.5	2.0	1.0~4.7		4L	
21	12-10S	1			12	13.5	1.5		1.0~1.4	4L
22	12-15S	1.5				20	2.0		1.0~2.0	4L
23	12-20S	1.85				28	2.0		1.0~2.8	4L
24	12-25S	2.2				33.5	2.0		1.0~3.4	4L
25	12-30ST	3	39			2.0	1.0~3.9		4L	
26	12-10	0.75	9.5			1.0	1.0~1.0		4L	
27	12-20	1.1	19.5			2.0	1.0~2.0		4L	
28	12-30	1.85	29.5			2.0	1.0~3.0		4L	
29	12-40	2.2	39.5	2.0		1.0~4.0	4L			
30	12-50T	3	50	2.0		1.0~5.0	4L			
31	16-10	1	16	10		1.0	1.0~1.0		4L	
32	16-20	1.5		20		2.0	1.0~2.0		4L	
33	16-30	2.2		30	2.0	1.0~3.0	4L			
34	20-10	1		20	10.5	1.1	1.0~1.1		4L	
35	20-20	1.85			20	2.0	1.0~2.0		4L	
36	20-30T	3			31.5	2.0	1.0~3.2		4L	

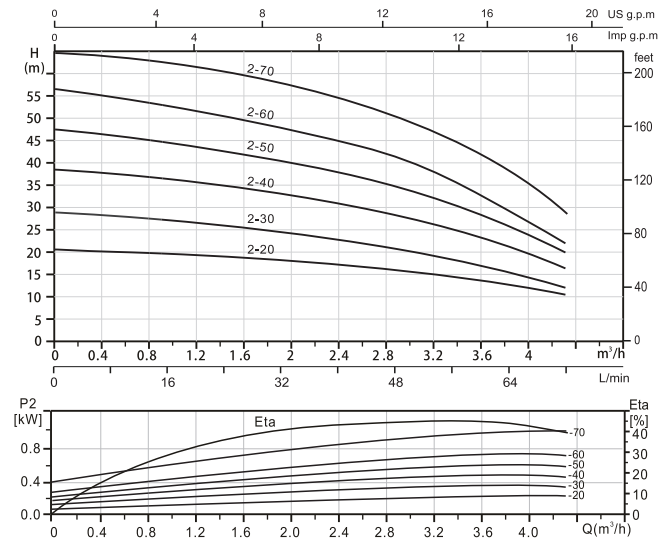
Notice: if the user adjust the working pressure, it also should be adjusted the corresponding precharge pressure of the tank, which is commonly 60% of the working pressure.

**3.3 Pump performance curve (CB-CHI/CHL,CBB-CHI/CHL)**

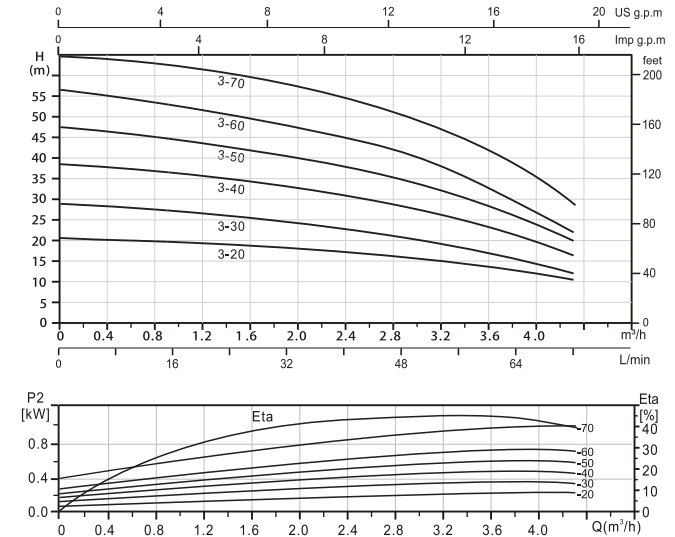
Performance curve CHI/CHL1



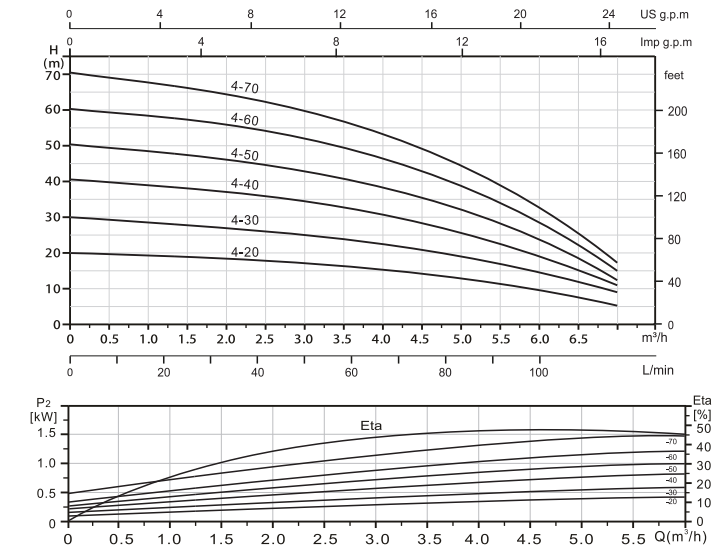
Performance curve CHI/CHL2



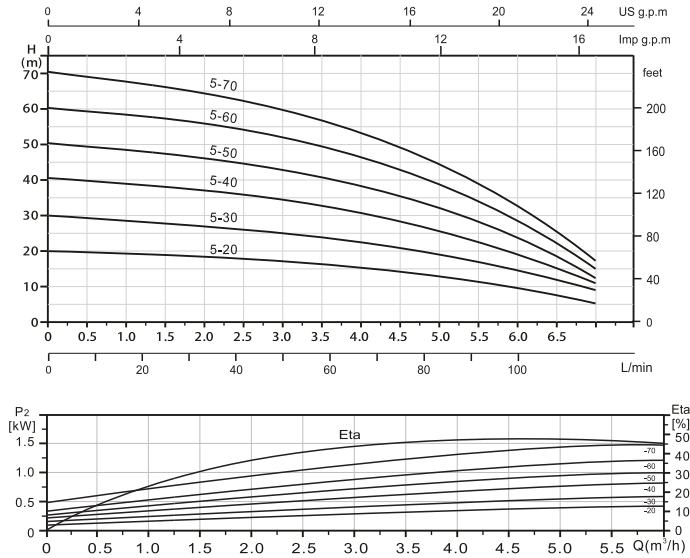
Performance curve CHI/CHL3



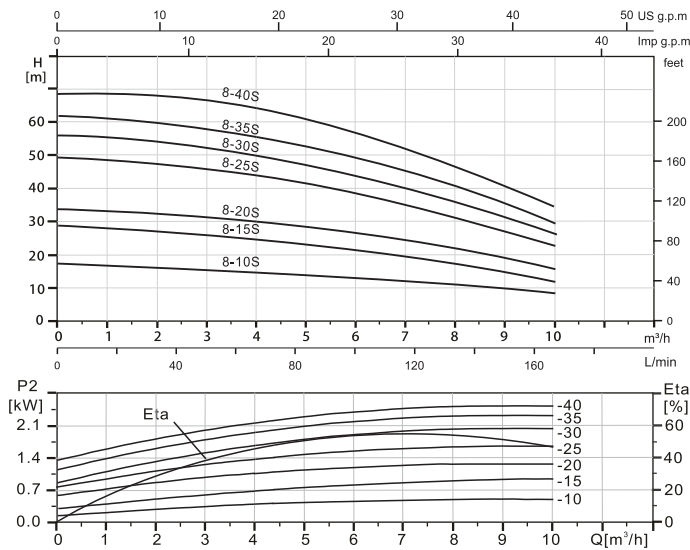
Performance curve CHI/CHL4



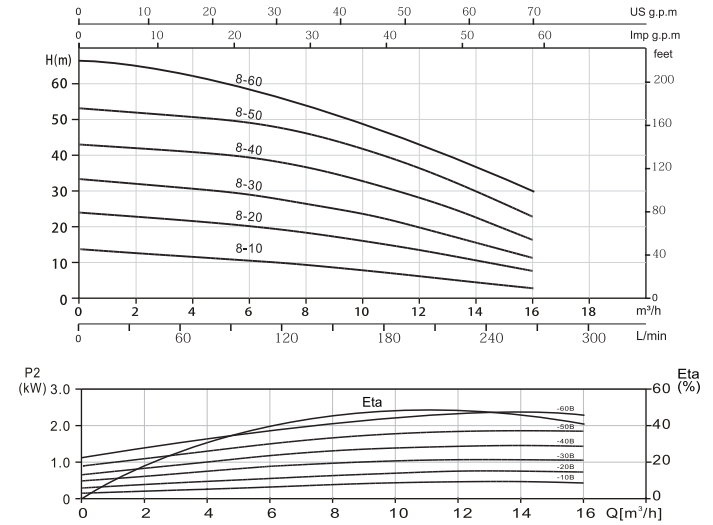
Performance curve CHI/CHL5



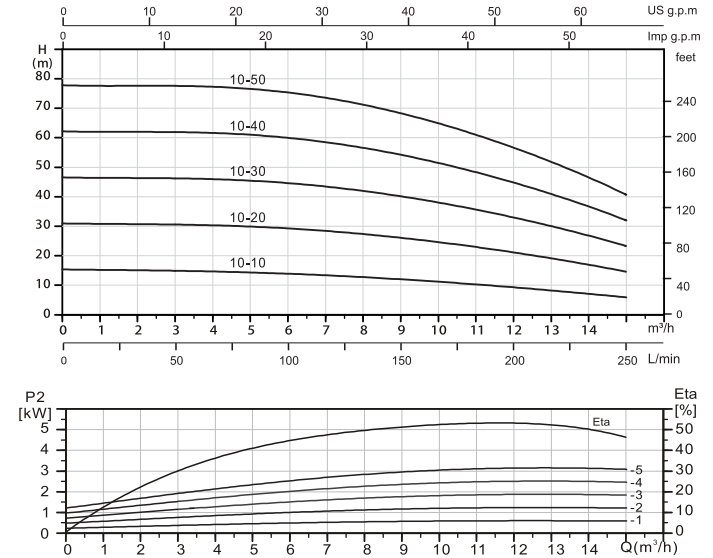
Performance curve CHI/CHL8S



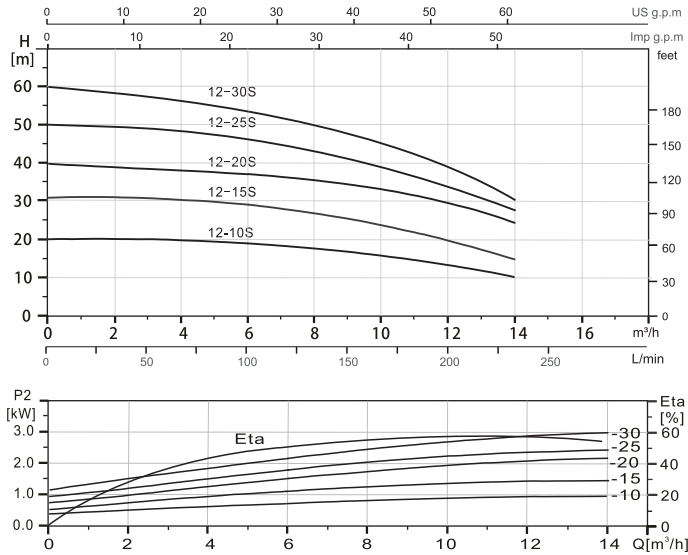
Performance curve CHI/CHL8



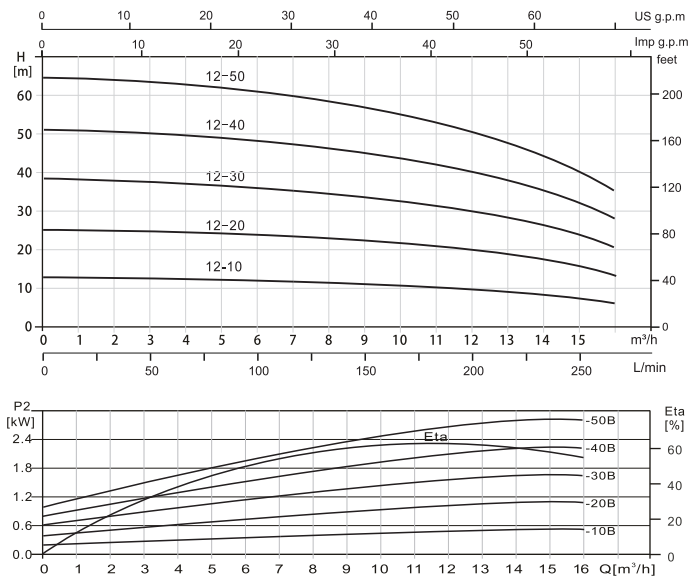
Performance curve CHI/CHL10



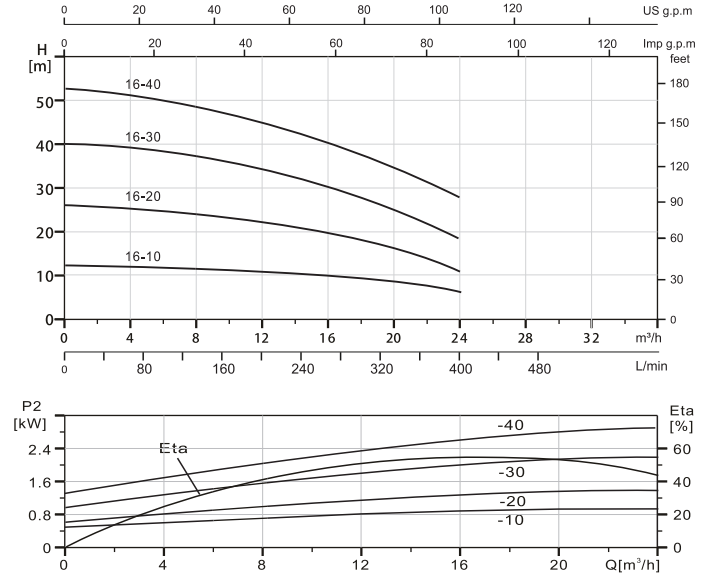
Performance curve CHI/CHL12S



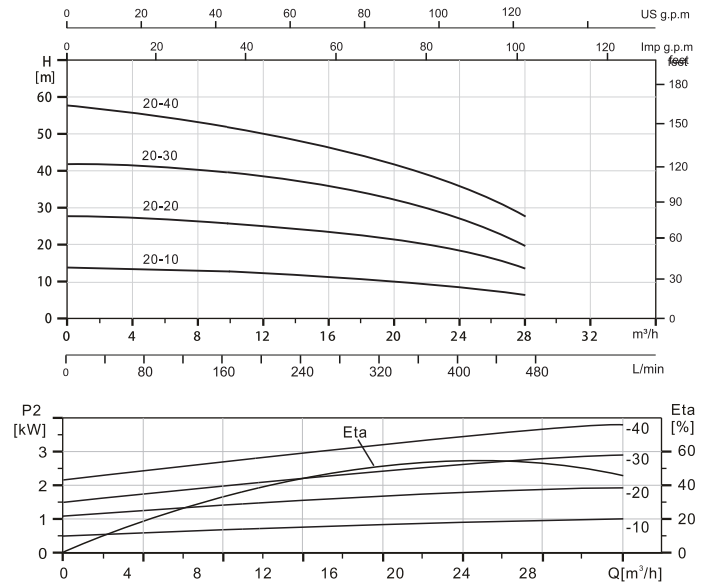
Performance curve CHI/CHL12



Performance curve CHI/CHL16



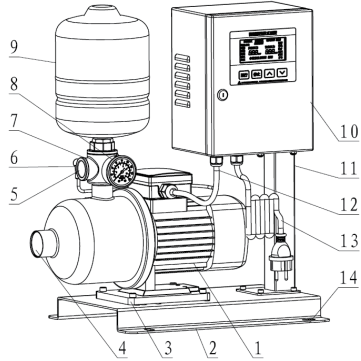
Performance curve CHI/CHL20



## 4. Installation and operation instruction

### 4.1 Structure diagram and installation in structions

#### 4.1.1 CBB-CHLsreies structure chart and installation instruction

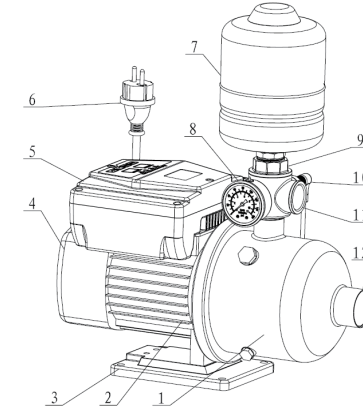


No.	Name	No.	Name
1	Motor components	8	Pressure gauge
2	Bottom plate	9	Pressure tank
3	Mounting plate	10	Control cabinet
4	Inlet	11	Holder
5	Outlet	12	Motor wire
6	Pressure sensor	13	Power-plug
7	Five-way	14	Fixing hole

#### Installation requirements

1. Read the manual carefully before installation and using.
2. Check the pump, motor casing and the power plug are damaged or not before installation.
3. Pump must be installed steady and firmly.
4. Pump must be grounded reliable, and install an air switch on the incoming power cable side.
5. Check the input power supply and environment is conforming to the conditions of using.
6. Installing the strainer and check valve to avoid the sand into pump, or will shorten using life.
7. Using AC220V fixed socket, which no less than the 2 times of the pump rated power.

#### 4.1.2 CB-CHLsreies structure chart and installation instruction

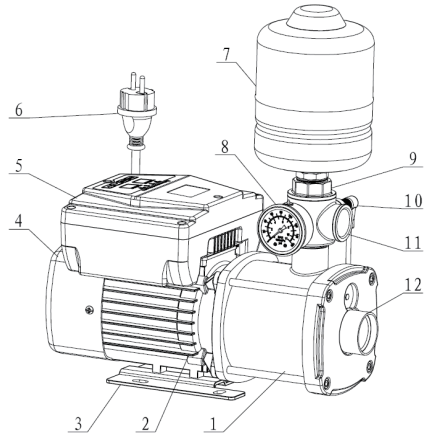


No.	Name	No.	Name
1	Pump body components	7	Pressure tank
2	Motor components	8	pressure gage
3	Mounting plate	9	Five-way
4	Fan cover	10	Pressure sensor
5	Inveter	11	Outlet
6	Power plug	12	Inlet

#### Installation requirements

1. Read the manual carefully before installation and using.
2. Check the pump and the power plug are damaged or not before installation.
3. Pump must be installed steady and firmly.
4. Pump must be grounded reliable, and install an air switch on the incoming power cable side.
5. Check the input power supply and environment is conforming to the conditions of using.
6. Installing the strainer and check valve to avoid the sand into pump, or will shorten using life.
7. Use AC220V special purpose fixed socket which power is no less than 2 times the rated power.

4.1.3 CB-CHI series structure chart and installation instruction



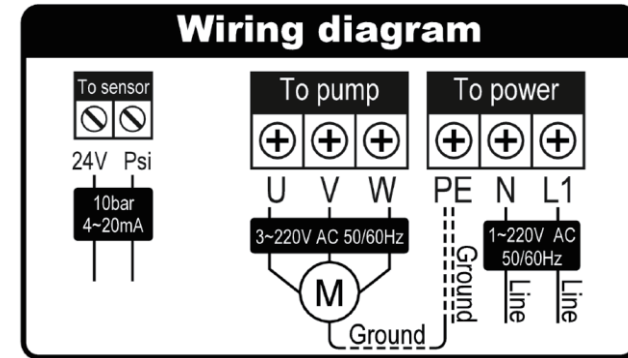
No.	Name	No.	Name
1	Pump body components	7	Pressure tank
2	Motor components	8	pressure gage
3	Mounting plate	9	Five-way
4	Fan cover	10	Pressure sensor
5	Inverter	11	Outlet
6	Power plug	12	Inlet

**Installation requirements**

1. Read the manual carefully before installation and using.
2. Check the pump and the power plug are damaged or not before installation.
3. Pump must be installed steady and firmly.
4. Pump must be grounded reliable, and install an air switch on the incoming power cable side.
5. Check the input power supply and environment is conforming to the conditions of using.
6. Installing the strainer and check valve to avoid the sand into pump, or will shorten using life.
7. Use AC220V special purpose fixed socket which power is no less than 2 times the rated power.

4.2 Wiring diagram and Instruction

The products have already finished the wiring according with the standard before leaving the factory. If the user want to change the wire or connect the wire for the special reasons, it must comply with the following requirements and notice:



**Requirements and notice**

1. Cut off the power before open panel.
2. Don't make the main loop of the AC power source.
3. Connected to the output terminals U, V.
4. Make sure the power is cut off before wiring.
5. Verify the rated voltage of the inverter and the input power.
6. Supply voltage is consistent.
7. The product can't take withstand test.
8. Tightening torque of pressure line screws can't lower than 1.7N.m.
9. Make sure the grounding connection is reliable before power-on.
10. Standards and specifications of changing cable must be.
11. longer than or equal to factory configuration.
12. Connect input power after all parts installed well

### 4.3 Operation Instruction

#### 4.3.1 Checking before operatio

- 1.Check the input power and surroundings is comply with the conditions of using.
- 2.Check whether the pressure sensor is connected with the system.
- 3.Check whether the product is installed firmly.
- 4.After connection is verified, make a empty running, if the pump is three-phase, to make sure that the motor running direction is correct, if motor running reversely, to exchange the terminal of UV , WV or UV, WU.

#### 4.3.2 Operating steps

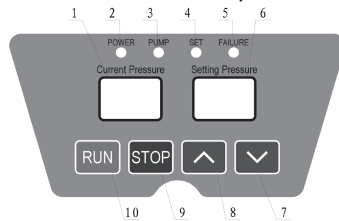
- 1.Connect power, the current pressure area display “0.0”bar, and the setting pressure area display the set pressure vaule. the power indictor light is on.
- 2.Open the valve of outlet, and press“**RUN**”to start the pump.
- 3.Press“**STOP**” to stop the pump in any case.
- 4.Press“**▲**” or “**▼**”, to check the working pressure ,if need to change the working pressure,press“**▲**”to increase the pressure or press “**▼**” to decrease the pressure.
- 5.Open the tap after setting pressure, the inverter will take frequency speed control on pump according to the water.using status.Observing whether the pump is running normally, the pressure showed in the display whether is constant.If it does,the installation and debugging is finished.if not,take reference of the manual to remove the faults and debug it again.

#### 4.3.3 CBB-CHL Buttons and functional description



No	Name or function	
1	Decrease button	Press the button one time can reduce 0.1bar,ong time press can reduced rapidly.
2	Increase button	Press the button one time can increase 0.1bar,long time press can increase rapidly
3	Stop button	The pump can be stopped manually, press this button to exit the lack of water state.
4	Operation button	The pump can be started manually,press this button to exit the water
5	Undervoltage	The button is light when network voltage is below 100V.
6	Over voltage	The button is light when network voltage is above 270V.
7	Short circuit	The button is light when the motor short-circuit fault.
8	Over load	Display overload when the current or load power is exceeded.
9	Over current	The field is lit when the current value of the detected current value is reached.
10	Open phase	When the input phase is missing, the field is lit, and the phase position is indicated
11	Current pressure	The actual value indicates the current network of the pressure value
12	Single pump	The button is light when there is only one pump working
13	Multi-pump mode	Online,the button is light when the workstation dot is more than two.
14	Output frequency	The actual value indicates the current output frequency value,the range is 20 to 50Hz.
15	Pressure setting	Display value indicates the current set of pressure value,unit:bar. The factory default sets for 3 bar
16	Running	The button is light when the pump is working
17	Stopping	The button is light when the pump is stop.
18	Water shortage	The button is light when the pipe is lack of water.
19	Over-temperature	The button is light when the temperature of rADfator reaches 80°C
20	Over pressure	The button is light when the pressure of network is greater than the sensor maximum range.
21	No.eight	In the networking mode,it means the number of workstation dot.

### 4.3.4 CB-CHL(I) Buttons and functional description



No	Name or function	
1	Current pressure display	Display current pressure,unit is bar.
2	Power indicator	It lights up when the power is on.
3	Pump indicator	When the motor is in speed governing,the indicator twinkles quickly. when in constant speed or lack of water,it twinkles slowly.when it automatic stoppes,the light is light.when the motor is stopped manually, the indicator lightgoes out,
4	Pressure setting indicator	The indicator lights up when it's the setting pressure.
5	Water shortage indicator	The pipe is lack ef water when indicator is light,the system is restartd in the setting time when in the state,interval time is 8s,1min, 10min.30min. 1h.2h...2h infinite loop.
6	Setting pressure display area	Display current setting pressure,unit is bar. The factory default setting is 3bar
7	Decrease	Press the button can decrease 0.1bar one time, long time press can red luced rapidly.
8	Increase	Press the button can decrease 0.1bar one time, long time press can red luced rapidly.
9	STOP	It can stop the pump manually,press this button to exit the water shortage state.
10	RUN	It can stop the pump manually,press this button to exit the water shortage state.

## 5. Maintenance

### 5.1 Product maintenance

- Maintenance needs to be professionals.
- Without permission.clients cannot change the pump structure,regulation performance,etc.Otherwise,our company will not be responsible for all the consequences.
- In summer, ventilation measures must be provided,but the pump shall not be exposed to in sunlight or rain directly; Taking anti freezing measures in winter, but shall not use flammable materials.
- If the pump long time no using, please cut off power, and open the bolt and keep pump dry.

### The connection solution features of the inverter:

- connection control:adopting 485 means of communication, choose to block the double core of the double glue, and control the parallel operation of the pump independently (maximum parallel control of six pumps).The GND earth line will not be plugged in when the communication line is less than 100 meters, and it will be removed by the copper wire when it is more than 100 meters, and will be connected to the GND geodesic.
- Communication and timing switch (alternately function) : to each other between the inverter communication, can be set according to the time order of switching work water pump, make each pump in the network work total time tend to be close;
- The main machine is automatically recognized by the machine: the site number must be different in the same network, if finding the inverter station number same in the network while the system stops working.You must manually set the site number and reinitialize it to return to normal.In the system, the station number is automatically detected, and the smallest station number in the system is run as the initial main in the network.In the LCD system, the main station number of the network system is blinking slowly, and other pumps always in a constant state.In the digital tube scheme, when the main water pump is running, the indicator light is on and the indicator is on.Manual stop, the indicator lamp goes out;From the time of operation, the lights are on.As long as it is stopped,the other pumps lights areoff.
- Fault detection and automatic switch: if one inverter in the network fails,the inverter automatically skip the fault inverter,and will send the control right to the next number inverter,automatic master-slave switching.To ensure that the system can continue to operate as a main in any case,to ensure the water system continus to run.
- Intelligent switch:when the water pump working time get to the total set time, use the intelligent switch (switch to stop condition,the system automatically changes the master-slave relationship)to realize the pressure of pipeline system is constant.If the maximum number of working allowed in the connection system is set to 1,the pump will to be the main pump to start.If there is a multipump working mode and the pump is not working in the system, then start the work in sequence.And according to the system feedback, the water pump is given priority.And adjust the master-slave motor operating frequency (host) from the machine to pause first, smooth switch, in the absence of fluctuations in the realization of water supply pump switch, rather than a fixed pump running total time is the only condition, so as to realize no fluctuations - intelligent transfer system control.

### Instruction of inverter connection:

- |   |
|---|
| 1.Prevent frostbite function: use the internal program of the inverter to switch to the non-stop using function, can realize the continuous running water pump, prevent the water pump from frostbite.  |
| 2.Instantaneous power automatic reset function: after the power failure or other reasons cause the pump stop running, inverter record last running state, such as power supply and input, the system can run according to the final memory mode to restore function (please cut off power supply when stop running for a long time) |
| 3.High pressure alarm function:operation pressure to maximum set pressure, the controller alarm alarm lights flashing at the same time,when the pipe network pressure is lower than the set pressure value alarm automatically remove and restore operation.  |
| 4.Low water level alarm function: the water inlet pipe road system will automatically stop and alarm lights flashing at the same time, the water level detection means has internal testing method and the low water level sensor monitoring in two ways.   |
| 5.Parallel operation: the water supply system can be parallel to six pumps.   |
| 6.Water shortage protection function: when the network system shortage of water,pump stop working and avoid the burning machine.  |
| 7.Alternate running function (used in parallel operation):prevent the main pump running in parallel operation of multiple pumps, affecting the service life of the pump.  |
| 8.Over the failure pump function:when the variable frequency pump in the network is abnormal, it will automatically call the alarm and stop running, and switch to the next normal inverter pump running  |
| 9Automatic checking function:when working on a single machine, the water pump can be run automatically in accordance with the specified time, so as to avoid the corrosion of the water pump due to long-time non-use   |

### Operation instructions for multi-pump on-line work

- |   |
|---|
| Default working mode: fixed host mode   |
| Connection overview: adopting the 485 communication mode, the two core wires of shielding double glue (0.5mm <sup>2</sup> ) can be used to independently control the parallel operation of the pump (maximum parallel control of 6 pumps);  |
| 1. Installation of inverter: reliable installation of inverter and reliable grounding of water pump and inverter;   |
| 2. Connect the power supply: after connecting the power source, the power indicator and water pump indicator are on.  |
| 3. Host and auxiliary pumps Settings:<br>Pressure "STOP",the pump indicator is off,press the Up( ^ ) and Down( v ) button at the same time for 3 seconds,the display area will show F001.pressure Up( ^ )to F011,then press "RUN",change the data to 2(default is 1),if the connect pumps more than 2 pcs,please set all the inverter F011 data,the maximum is 6.in this connection system,the principle of thehose and auxiliary machine is the minimum address is the host pump and the others can't be same address,or it will lose control. |
| 4. 485 communication connection line: two conductor shielding double glue was 0.5, the red one connected to the inverter's "485 +", and "485 -" black of the connection (color can not distinguish, but must ensure that the same thread connection) at different positions of inverter in the same connection.If more than two inverters in the system need to be online, they are also connected in the same order (i.e. 1 and 2, 2 and 3...-   |
| 5.Power failure restart: after completing the above steps, you need to cut off the power and wait five minutes before returning to power.At this time, the host "NET" indicator in the online system is always bright, and the indicator light from the auxiliary flashes continuously, and the online system setup has been completed when the table is set.   |
| 6.Setting the constant pressure of the system:the working pressure just can be set at the Host pump,Can't be set at the auxiliary pumps.  |

### 5.2 AC220V Inverter parameter setting

No	Code	Functional definition	Default	Min.	Max.	Note	Description
1	F001	Starting pressure difference	0.3	0.1	2	Unit: BAR	
2	F002	Water shortage pressure value	0.2	0	23.6	Unit: BAR,related to the setting pressure	
3	F003	Water shortage running time	30	1	60	Unit: Seconds	
4	F004	Carrier frequency	8	8	16	Unit: Khz	
5	F005	Acceleration time	30	10	250	Unit: 0.1s (it's not valid to set less than 30s for V4 version)	
6	F006	Shutdown pressure tolerance	0.1	0	1	Unit: BAR	
7	F007	Restore factory settings	0	0	1	1: Restore the factory default parameters	
8	F008	Minimum frequency of shutdown	25	20	45	Unit: Hz	
9	F009	Range selection	10	10	10	Unit: BAR	
10	F010	Range selection	80	70	90	Unit:(°C),H indicates to cancel the over-temperature setting	
11	F011	Localhost (online)	1	1	6	The network addresses for each connection must not be duplicate.	
12	F012	Cycle time (online)	0	0	256	Unit: 1 hour	
13	F013	Max.quantities of devices (online)	6	1	6		
14	F014	Solar center voltage setting	300	150	600	Unit: (V)	
15	F015	Allow not to stop	0	0	1	0: Shutdown allowed; 1: No shutdown allowed	
16	F016	Setting direction	0	0	1	0: Foreward; 1: Reversal;	
17	F017	Allowable continuous running time	0	0	72	Unit: hours,0 indicates no operating time limit, allowing for continuous operation.	
18	F018	Maximum pressure setting	9	0.5	24	Unit: BAR	
19	F019	Working mode	4	0	7	See table definition	
20	F020	Manual setting of underpressure value	80	50	300	Unit: (V) lower than 50V, cancel underpressure, display L (Support above V4 version)	
21	F021	Manual setting of overpressure value	270	120	500	Unit: (V)higher than 500V, cancel overpressure,display H(Support above V4 version)	
22	F022	Manual setting of maximum frequency value	50	20	60	Unit: Hz	
23	F023	Drive waveform selection	0	0	1	0: SPWM 1: SVPWM (Support above V4 version)	

No	Code	Functional definition	Default	Min.	Max.	Note	Description
24	F024	Increase starting torque	5	5	50	Percentage (Support above V4 version,limited by drive board)	
25	F025	Operation mode selection	1	0	1	0: Constant pressure mode 1: Manual speed mode, which can not be automatically restored, but needs to be manually restored	
26	F026	Power input type	0	0	1	0:AC input 1: DC input (turn on the solar functions)(support above V5 version)	
29	F029	Adjustment coefficient	9	0	9	The larger the number, the faster the adjustment	
30	F030	Setting pressure lock	0	0	256	0: unlocked 1: locked	
31	F031	Busbar voltage Compensation coefficient	0	0	50	Busbar voltag Compensation, it means no compensation when the value is 0, it means compensation when the value isn't 0, compensation will lose output voltage, only effective for frequency conversion	
35	F035	Water shortage power	0	0	5000	Unit: W: 0: the function of water shortage power closed it would be water shortage power if the value is not 0	
36	F036	V/F Curve selection	0	0	2	2.0: suqare 1.7:1.7 powers 1.5: 1.5 powers 1.3:1.3 powers 1.0:liner (The driver requires a minimum version of V5.04, and the display board must also be of a certain version or higher)	AD-09_LCD_V5.55A_230413 AD-03_V5.05A_230407 AD-02_V5.06B_230404 VF-02_V5.56A_230404 AD-01(VF-01)_V5.56A_230404 VFG-01_V5.05L_Current type 230329 VFG-01_V5.05K_Voltage type 230328 AD-12
37	F037	Power selection	2200	750	2200	Unit: W,750 ; 1100; 1500; 2200. (Available for AD-12)	
38	F038	Pressure sensor selection	0	0	2	0: Auto detection; 1: Current type; 2: Voltage type. (Available for AD-12)	
39	Fd51	Operating frequency display				Unit: Hz	
40	Fd52	Current display				Unit: A	
41	Fd53	Voltage display				Unit: (V)	
42	Fd54	Temperature display				Unit: (°C)	
43	Fd55	Handheld board software version					
44	Fd56	Driver board software version					
45	Fd57	Water temperature				Unit: (°C)	

### 5.3 380V AC Design values of frequency converter parameters

No	Display code	Functional definition	Setting range			Minimum unit	Note
			Minimum value	Maximum value	Factory setting		
F0:Water pump control parameter group							
1	F0-00	Starting pressure difference	0.1	Set*0.9	0.5	0.1bar	Unit: BAR. Maximum adjustable to 90% of the set pressure value
2	F0-01	Water shortage pressure value	F0-21	Set*0.9	0.5	0.1bar	Unit: BAR.Can be adjusted to a maximum of 90% of the set pressure value, with 0 indicating the shutdown of water shortage protection
3	F0-02	Water shortage operation time	1	600	30	1S	Unit: seconds
4	F0-03	Permissible shutdown disturbance range	0	10	0.4	0.1	Note: This parameter is only allowed to be modified during shutdown
5	F0-04	Sensor Range Selection	1	60	10	0.1bar	0.75-2.2KW
					16	0.1bar	>2.2KW
6	F0-05	Allowable minimum set pressure value	0.1	F0-06	0.5	0.1bar	Unit: BAR(The maximum value that can be reached by pressing the key), Default 0.5
7	F0-06	Maximum allowable set pressure value	F0-05	(F0-04)-1.0	9.0	0.1bar	Unit: BAR(The maximum value that can be reached by pressing the up button), the maximum range value -1
8	F0-07	Is it allowed to adjust the set pressure	0	1	1	1	0: Not allowed 1: Allow
9	F0-08	Minimum shutdown frequency value	0	F1-04	25	0.01HZ	The grid frequency is 50Hz
			0	F1-04	25		The grid frequency is 60Hz
10	F0-09	PID acceleration coefficient	1	99	20	1	The larger the value, the faster the acceleration
11	F0-10	PID acceleration coefficient	1	99	20	1	The larger the value, the faster the acceleration
12	F0-11	Is shutdown allowed	0	2	2	1	0: No shutdown allowed (Slow down and maintain shutdown frequency operation); 1: Allow shutdown, manual start required after shutdown; 2: Zero frequency operation, automatically starts according to pressure after shutdown.
13	F0-12	Restore factory settings	0	1	0	1	1: Restore factory default parameters;
14	F0-13	Water pump anti jamming start time	0	72	24	1	Unit: Hours (Reserved)
15	F0-14	Working mode selection	0	1	0	1	0:constant voltage mode 1:Speed regulation mode (requires shutdown modification)
16	F0-15	Speed regulation mode frequency source selection	0	2	0	1	0: Number given 1 (the ▲ and ▼ keys on the operation panel can be modified) 1: AI1 simulation(0~20mA/0~10V) 2: Communication given
17	F0-16	AI1 input lower limit	0.1	10	2	0.01V	
18	F0-17	AI1 lower limit corresponding setting	-100%	100%	0%	0.1%	

No	Display code	Functional definition	Setting range			Minimum unit	Note
			Minimum value	Maximum value	Factory setting		
19	F0-18	AI1 input upper limit	0	10	10	0.01V	The upper and lower limits of AI1 vary with F0-14 and F0-23 values;
20	F0-19	AI1 upper limit corresponding setting	-100%	100%	100%	0.1%	When F0-14=1, F0-16=0, F0-18=10; When F0-14=0, if F0-23=0, then F0-16=2, F0-18=10; if F0-23=1, then F0-16=0, F0-18=10.
21	F0-20	Sleep delay	0	100	1.0	0.1S	
22	F0-21	PID disconnection protection threshold	0	F0-01	0.3	0.1bar	
23	F0-22	PID disconnection detection delay	0	100	10	0.1S	
24	F0-23	Sensor Type Selection	0	1	0	1	0: Current type sensor (4-20mA); 1: Voltage type sensor (0-10V)
22	F0-24	Upper limit frequency	F0-25	F1-04	50	0.01HZ	
23	F0-25	Lower limit frequency	0	F0-24	0	0.01HZ	
F0:Water pump control parameter group							
1	F1-00	Set motor rotation direction	0	1	0	1	0: Forward rotation; 1: Reverse;
2	F1-01	Carrier Frequency	2	20	6	0.1KHZ	≤3.7KW
					4.5		5.5KW~30KW
					3		37KW~132KW
					2		>132KW
3	F1-02	Acceleration time	0.1	60	7.5	0.1s	≤3.7KW
					15		5.5KW~30KW
					30		37KW~132KW
					60		>132KW
4	F1-03	Deceleration Time	0.1	60	7.5	0.1s	≤3.7KW
					15		5.5KW~30KW
					30		37KW~132KW
					60		>132KW
5	F1-04	Output frequency value	20	300	50	0.1HZ	The power grid frequency is 50HZ (hardware does not support automatic identification of connected power grid frequency)
			20	300	60		The power grid frequency is 60Hz (hardware does not support automatic identification of the connected power grid frequency)
6	F1-05	Motor rated current value	0.1	Model settings	Model settings	0.1A	
7	F1-06	No load current of motor	0.1	Model settings	Model settings	0.1A	

No	Display code	Functional definition	Setting range			Minimum unit	Note
			Minimum value	Maximum value	Factory setting		
8	F1-07	Rated voltage of motor	1	Model settings	Model settings	1V	
9	F1-08	Allow continuous motor operation time	0	255	0	1V	Unit: Hour, 0 indicates the cancellation of the operating time limit and allows long-term operation
10	F1-09	Vibration suppression coefficient	0	10	1	0.01	When the motor experiences vibration, it is suppressed by adjusting the vibration suppression coefficient. When set to 0, the vibration suppression function is turned off.
F2:protection parameters							
1	F2-00	220VAC: Manual setting of operating undervoltage value	FF-03	280	230	1V	The value is the converted DC bus voltage, DC280V corresponds to AC 198V, DC230V corresponds to AC163V
		380VAC: Manual setting of operating undervoltage value	FF-03	480	410	1V	The value is the converted DC bus voltage, where DC480V corresponds to AC339V and DC 410V corresponds to AC290V
2	F2-01	220VAC:Manual setting of overvoltage value	350	450	400	1V	The value is the converted DC bus voltage, where DC350V corresponds to AC248V and DC450V corresponds to AC318V
		380VAC:Manual setting of overvoltage value	550	900	800	1V	The value is the converted DC bus voltage, where DC550V corresponds to AC389V and DC900V corresponds to AC636V
3	F2-02	Radiator temperature	60	104	80	1°C	Without such function yet
4	F2-03	Over temperature protection setting (reserved)	60	H	80	1°C	
5	F2-04	220/380V three in and three out: input and output phase loss protection selection	0	3	3		0: All prohibited 1: Input prohibited, output allowed 2: Input allowed, output prohibited 3: All allowed
6	F2-05	Input/output phase loss protection delay time (reserved)	0	30	1	0.1S	Reserve(no this function)
7	F2-06	Overload protection coefficient	30%	120%	100%	1%	
8	F2-07	Operation time of antifreeze protection	0	255	0	1min	
9	F2-08	Frequency of antifreeze protection operation	0	F1-04	30	1	
10	F2-09	Antifreeze protection action interval time	0	255	30	1min	
11	F2-10	Overpressure alarm threshold	F2-12	100%	100%	0.1%	Relative to sensor range
12	F2-11	Overpressure alarm delay	0	6553.5	1.0	0.1s	
13	F2-12	Overpressure reset threshold	0	F2-10	90%	0.1%	Relative to sensor range

No	Display code	Functional definition	Setting range			Minimum unit	Note
			Minimum value	Maximum value	Factory setting		
12	F2-11	Overpressure alarm delay	0	6553.5	1.0	0.1s	
13	F2-12	Overpressure reset threshold	0	F2-10	90%	0.1%	Relative to sensor range
15	F2-13	Protection setting	0x0000	0x1131	0x1101	1	LED bits: Motor overload protection select 0: Invalid 1: Valid LED ten: 485 Communication timeout 0: Not protected 1: Protected action and free shutdown 2: Alarm but maintain the status operation 3: alarm and stop in the set way LED hundred: Operating undervoltage protection 0: Invalid 1: Valid LED thousand: Overvoltage protection 0: Invalid 1: Valid 0: Invalid 1: Valid
F3:RS485Communication parameters							
1	F3-00	485 online connection function	0	1	0	1°C	0: Invalid online function (standalone mode); 1: Online function is effective (online mode) (requires shutdown for modification)
2	F3-01	Add pump delay time	0.1	100	1	0.1S	
3	F3-02	Reduce pump delay time	0.1	100	1	0.1S	
4	F3-03	Reduce pump lower limit frequency	1	F1-04	35	0.01HZ	
5	F3-04	Local address (online)	1	16	1		
6	F3-05	Cycle time (online)	0	255	48	1H	Unit: 1 hour (single machine invalid)
7	F3-06	Run Command Channel Selection	0	1	0		0: Operation panel running command channel; 1: 485 communication control
8	F3-07	Local address	0	247	1	1	
9	F3-08	Communication Baud Rate Setting	0	6	2	1	0: 2400BPS; 1: 4800BPS; 2: 9600BPS; 3: 19200bps; 4: 38400bps; 5: 57600bps; 6: 115200bps
10	F3-09	Data format	0	5	0	1	0: No parity (N, 8, 1) for RTU, 1: Even parity (E, 8, 1) for RTU, 2: Odd parity (O, 8, 1) for RTU, 3: No parity (N, 8, 2) for RTU; 4: Even parity (E, 8, 2) for RTU; 5: Odd parity (O, 8, 2) for RTU
11	F3-10	Local response delay	0	200	5	1ms	

No	Display code	Functional definition	Setting range			Minimum unit	Note
			Minimum value	Maximum value	Factory setting		
12	F3-11	Communication timeout detection time	0.1	100	10	0.1s	If the local machine does not receive the correct data signal within the time interval defined by this function code, then the local machine believes that there is a communication failure, and the frequency converter will determine whether to protect or maintain the current operation based on the setting of the communication failure action mode
13	F3-12	Communication protocol selection	0	1	0	0	0: Compatible with MD380 protocol 1: Compatible with Delta Mprotocol
F4:Solar water pump parameters							
1	F4-00	Solar water pump water shortage detection time	0s	250s	0s	1s	If the bus voltage (d-03) is higher than the set value of MPPT high point working voltage (F402), operate at the maximum frequency; If it is lower than the set value of MPPT high point working voltage (F402), operate at the frequency obtained by (bus voltage/MPPT high point working voltage) * maximum frequency. If the bus voltage reaches the MPPT low point working voltage (F401), operate at the lowest operating frequency of water outlet (F404). If the frequency converter operates above the lowest operating frequency of water outlet and the output current is less than the motor no-load current * the proportion of no-load current corresponding to the photovoltaic water pump water shortage detection current (F403), After the photovoltaic water pump water shortage detection time (F400), the frequency converter reported a water shortage fault.
2	F4-01	MPPT low point working voltage	0V	F4-02	200V/350V	1V	
3	F4-02	MPPT high point working voltage	F4-01	800V	311V/537V	1V	
4	F4-03	The proportion of no-load current corresponding to the water shortage detection current of photovoltaic water pumps	0%	100%	60%	0.1%	
5	F4-04	Minimum operating frequency of photovoltaic water pump effluent	0.00Hz	F1-04	0.00Hz	0.01Hz	
FF group: manufacturer parameters							
1	FF-00	Manufacturer password	0	65535	0	1	The password setting is successful, and the FF group parameter group will only be presented. It will take 3 minutes to take effect
2	FF-01	Inverter model	0	53	28	1	220V: 0 0.4KW 1 0.75KW 2 1.5KW 3 2.2KW 4 3.0KW 5 4.0KW 6 5.5KW 7 7.5KW 8 11KW 9 15KW 10 18.5KW 11 22KW 12 30KW 13 37KW 14 45KW 15 55KW 16 75KW 17 90KW 18 110KW 19 1 3 2 K W 2 0 1 6 0 K W 380V: 21 0.4KW 22 0.75KW 23 1.5KW 24 2.2KW 25 3.0KW 26 4.0KW 27 5.5KW 28 7.5KW 29 11KW 30 15KW 31 18.5KW 32 22KW 33 30KW 34 37KW 35 45KW 36 55KW 37 75KW 38 90KW

No	Display code	Functional definition	Setting range			Minimum unit	Note
			Minimum value	Maximum value	Factory setting		
							39 110KW 40 132KW 41 160KW 42 185KW 43 200KW 44 220KW 45 250KW 46 280KW 47 315KW 48 350KW 49 375KW 50 400KW 51 500KW 52 630KW 53 750KW
3	FF-02	Dead Time	2.5	6.5	Model settings	0.1μS	Set Deadband Time 0.4~4.0KW 2.8μS 5.5~750KW 3.2μS
4	FF-03	Undervoltage threshold	50	F2-00	Model settings	1v	Below the display P.OFF. 220V model: default value 180V; 380V model: default value 360V
5	FF-04	Voltage correction factor	0.01	3	Model settings	0.01	Set voltage correction factor
6	FF-05	Current correction coefficient	0.01	3	Model settings	0.01	Set voltage correction factor
7	FF-06	Temperature detection method selection	0	1	0	1	0: Type I (sensor connected to power) 1: Type II (sensor grounding)
8	FF-07	reserve					
9	FF-08	reserve					
10	FF-09	Special function selection	0x0000	0x0121	0x0100	1	LED bit: cumulative running time reset selection 0: Invalid 1: Vsild LED Ten Digits: Model Selection 0: Universal model (G) 1: Light load model (P) 2: Heavy Duty Models (Z) LED hundreds: reserved LED thousands: reserved
Group d: Monitoring parameters and fault records							
1	d-00	Output frequency				0.01Hz	
2	d-01	Set frequency				0.01Hz	
3	d-02	Output voltage				1V	
4	d-03	Bus voltage (V)				1V	
5	d-04	output current				0.1A	
6	d-05	Motor speed (RPM/min)				1	
7	d-06	Analog input AI1(V/mA)				0.01V	
8	d-07	Analog input AI2(V)				0.01V	(reserve)
9	d-08	PIDsetting value (Bar)				0.1Bar	
10	d-09	PIDfeedback value (Bar)				0.1Bar	
11	d-10	Input terminal status	0x0000	0x003f		0.1Bar	(reserve)
12	d-11	Output terminal status	0x0000	0x000f		0.1Bar	(reserve)

No	Display code	Functional definition	Setting range			Minimum unit	Note
			Minimum value	Maximum value	Factory setting		
13	d-12	Inverter operation status	0x0000	0xFFFF			0~FFFFH BIT0: Operation/Shutdown BIT1: Forward/reverse rotation BIT2: jog BIT3: dc braking BIT4: reserve BIT5: Overvoltage limit BIT6: Constant speed frequency reduction BIT7: Overcurrent limit BIT8~9:00- Zero speed/01- Acceleration/10- Deceleration/11- Constant speed BIT10: Overload warning BIT11: reserve BIT12~13 running command channel : 00 panel / 01 communication/10 reserved BIT14~15 bus voltage status: 00- normal/01- low voltage protection/10- overvoltage protection
14	F4-13	Module temperature℃					
15	d-14	Software upgrade date (year)					
16	d-15	Software upgrade date (month, day)					
17	d-16	Third fault type					Store the error code corresponding to the display code, such as reporting an EPID fault, which corresponds to 15
18	d-17	Second fault type					Store the error code corresponding to the display code, such as reporting an EPID fault, which corresponds to 15
19	d-18	Last Fault Type					Store the error code corresponding to the display code, such as reporting an EPID fault, which corresponds to 15
20	d-19	Operating frequency during current fault					
21	d-20	Output current at current fault					
22	d-21	Bus voltage at current fault					
23	d-22	Input terminal status at current fault					(reserve)
24	d-23	Output terminal status at current fault					(reserve)
25	d-24	Frequency converter status at current fault					0~FFFFH BIT0: Operation/Shutdown BIT1: Forward/reverse rotation BIT2: jog BIT3: dc braking BIT4: reserve BIT5: Overvoltage limit BIT6: Constant speed frequency reduction BIT7: Overcurrent limit

No	Display code	Functional definition	Setting range			Minimum unit	Note
			Minimum value	Maximum value	Factory setting		
							BIT8~9:00- Zero speed/01- Acceleration/10- Deceleration/11- Constant speed BIT10: Overload pre alarm BIT11: reserve BIT12~13 running command channel : 00 panel / 01 communication/10 reserved BIT14~15 bus voltage status: 00- normal/01- low voltage protection/10- overvoltage protection
26	d-25	Temperature at current fault					
27	d-26	Local cumulative running time (hours)					
28	d-27	Accumulated power on time of this machine (hours)					
28	d-27	Accumulated power on time of this machine (hours)					
29	d-28	Accumulated running time of fan (hours)					

### 5.4 Error code and remedies (single-phase motor)

No	Fault code	Fault type	Explanation	Possible causes and corrective actions
1	LP	Water shortage protection	The pressure is detected to be lower than the pressure when water shortage	<ol style="list-style-type: none"> <li>1) Check if the water supply source is normal, ensure that the water inlet is normal, and the valves are open.</li> <li>2) Verify if the water outlet is fully open. If it is excessively open, it may exceed the appropriate power value for water shortage. Typically, the water shortage power value can be set around 40% of the maximum power of the frequency converter and adjusted accordingly based on the operating conditions.</li> <li>3) The pressure sensor is not connected or there might be wiring issues. Please check if the pressure sensor is properly connected.</li> </ol>
2	OLP	Short circuit	Load current exceeding the protection generated by the maximum hardware current	<ol style="list-style-type: none"> <li>1) The motor is either blocked or burnt out. Please check if the motor is blocked or damaged.</li> <li>2) The damage to the IGBT or IPM module on the driver board requires sending it back to the factory for repair.</li> <li>3) The interference is caused by the external power grid. After power outage, please check if the grid voltage is normal and inspect the inverter for any external damages. Then, restore power and check if it works properly.</li> </ol>
3	OLD	Overload	Load current exceeds twice the rated current in 5 seconds or exceeds 1.2 times the rated current in 15 seconds.	<ol style="list-style-type: none"> <li>1) The grid voltage is low. Please check the input power supply. During operation, verify if the grid voltage is being pulled down. It could be due to using thin or excessively long input wires which increases line losses.</li> <li>2) The power of the inverter is insufficient. Select a higher-rated frequency inverter. Check if the power in menu F037 matches the motor power.</li> <li>3) Abnormal load changes. Check if the motor has a short circuit (ground fault or inter-winding short circuit) or if it is blocked.</li> <li>4) Ground fault or phase loss in the output. Verify if the output wiring is correctly connected.</li> <li>5) There is a strong external source of interference.</li> <li>6) The hardware of the driver board is damaged, it needs to be returned to the factory for repair.</li> </ol>
4	OS	No Pressure sensor	The pressure sensor is not connected	<ol style="list-style-type: none"> <li>1) The pressure sensor is not connected,</li> <li>2) The cable or port of the pressure sensor is damaged.</li> <li>3) The pressure sensor cable is connected incorrectly.</li> <li>4) There is a broken PCB line in the pressure sensor port, may due to corrosion or physical damage. It needs to be returned to the factory for maintenance</li> </ol>
5	OCP	Over Pressure	Detection of pressure exceeding 90% of the sensor's measuring range	<ol style="list-style-type: none"> <li>1) The pressure sensor is damaged. Choose an appropriate voltage or current type pressure sensor with the suitable measurement range.</li> <li>2) The pressure sensor wiring is incorrect. Check if the wiring is connected correctly according to the markings on the PCB.</li> <li>3) The pressure sampling circuit of the display panel is damaged. It requires either replacing the display panel or returning to the factory for maintenance</li> </ol>

No	Fault code	Fault type	Explanation	Possible causes and corrective actions
6	LU	Under Pressure	Detection of voltage lower than the setting overvoltage	<ol style="list-style-type: none"> <li>1) The grid voltage is low. Please check the input power supply. During operation, verify if the grid voltage is being pulled down. It could be due to using thin or excessively long input wires which increases line losses</li> <li>2) The manual setting of underpressure value is too high. Please check the corresponding menu values, such as the F020 value of the AD-12 inverter, to see if it has been set too high.</li> <li>3) There is a hardware failure in voltage acquisition. As a temporary solution, you can set the F0 2 0 "Manual setting of underpressure value" to "L" to disable it. However, it is still necessary to send it back to the factory for repair.</li> </ol>
7	OU	Over Voltage	Detection of voltage higher than the setting overvoltage	<ol style="list-style-type: none"> <li>1) The grid voltage is higher than normal. Please check the input power supply.</li> <li>2) F021 Manual setting of overpressure value is too low. Please check the corresponding menu values, such as the F021 value of the AD-12 inverter, to ensure it is not set too low.</li> <li>3) There is a hardware failure in voltage acquisition. As a temporary solution, you can set F021 "Manual setting of overpressure value" to "H" to disable it. However, it still requires sending it back to the factory for repair.</li> </ol>
8	OC	Over-temperature	The temperature of PM module or IGBT heatsink is too high.	<ol style="list-style-type: none"> <li>1) The air duct is blocked or the fan is damaged. It is necessary to clear the air duct or replace the fan.</li> <li>2) The ambient temperature is too high. It is necessary to lower the ambient temperature.</li> <li>3) The system has been operating under overload conditions for a prolonged period. The 2.2KW unit has been set to run at maximum frequency (60Hz) for an extended duration. It is advisable to set F022 for frequency reduction operation.</li> </ol>
9	UP	Lack of Solar power	Insufficient Power Supplied by the Photovoltaic (PV) Power Source as Input	<ol style="list-style-type: none"> <li>1) Insufficient sunlight, check if the photovoltaic panel is obstructed.</li> <li>2) Improper configuration of the photovoltaic panel, choose photovoltaic panels with appropriate power and voltage for series and parallel connections.</li> <li>3) Multiple photovoltaic panels are damaged.</li> </ol>
10	OLS	Hardware Over-current		
11	EAA	Communication failure	Communication failure between display board and mainboard	<ol style="list-style-type: none"> <li>1) The display panel and the mainboard are not compatible. Please check if the current display panel and mainboard hardware are compatible with each other.</li> <li>2) The mainboard wasn't programmed. Check if the indicator light is flashing when the mainboard is power on. It is programmed if the light is flashing</li> <li>3) The orientation of the cable interface on the display panel or mainboard is incorrect, resulting in a wrong cable connection. Replace the incorrect interface.</li> <li>4) The interface pins are oxidized, causing poor contact. Temporary resolution can be achieved by repeatedly plugging and unplugging to remove the oxidation layer, or by replacing the interface.</li> <li>5) There is a broken wire, oxidized or damaged interface in the cable. Replace the cable.</li> <li>6) There is a hardware failure in either the display panel or the mainboard and needs to be returned to the factory for repair.</li> </ol>

No	Fault code	Fault type	Explanation	Possible causes and corrective actions
12		Default		
13	EH	Locked-rotor motor	Permanent Magnet Motor Failure to Start Due to Motor locked rotor	1) Startup failure, motor burned out or significant changes in coil resistance or inductance, resulting in mismatch with the inverter. need to replace with a suitable motor 2) The inverter has a hardware failure and needs to be sent back to the factory for repair.
14	EP	Missing Phase	Three-phase motor missing phase	1) Poor wiring between the inverter and the motor. Check the connections for reliability and ensure that the terminals are not mistakenly connected. 2) The motor coils are burned out. The motor needs to be repaired or replaced.
15	OSP	Over Speed	The pressure sensor is not connected	1) Check if the motor is overloaded or blocked. Check whether the load is normal 2) Check if the PID control parameters are set correctly.
16	EF	FLASH default	Mainboard program error	The mainboard needs to be returned to the factory for reprogramming.
17	LL	Water leakage protection fault	Allowable continuous running time for the motor	When the continuous running time of the water pump exceeds the setting value of F017, it will automatically enter the protection program. To resolve the issue, you need to troubleshoot for any water leakage faults or verify normal operation. Once confirmed, you can adjust the parameter F017
18	oH	Over water temperature protection	The water temperature of the pump is too high	

### 5.5 Error code and remedies (three-phase motor)

No	Error code	Display code	Code function description	Possible faults and solution
1	1	E0C1	Overcurrent during accelerated operation	1) The inverter is small, choose a inverter with bigger power. 2) The output circuit of the inverter is grounded or short circuit, and the peripheral motor fault needs to be eliminated. 3) The acceleration time is too short, extend the acceleration time. 4) Whether the input voltage or bus voltage is too low, check whether the input voltage environment is stable and reliable. 5) During the acceleration process, cancel the sudden load, and re-power on to cancel the protection.
2	2	E0C2	Overcurrent during deceleration operation	1) The output circuit of the inverter is grounded or short circuit, and the peripheral motor fault needs to be eliminated. 2) Increase deceleration time. 3) Whether the output voltage or bus voltage is too low, check whether the input voltage environment is stable and reliable. 4) During the deceleration process, suddenly add the load, cancel the sudden load, and repower on to cancel the protection.
3	3	E0C3	Overcurrent during constant speed operation.	1) The inverter is small, choose a inverter with bigger power. 2) The output circuit of the inverter is grounded or short circuit, and the peripheral motor fault needs to be eliminated. 3) Whether the input voltage or bus voltage is too low, check whether the input voltage environment is stable and reliable. 4) When the load is suddenly added during operation, cancel the load suddenly and power on again to cancel the protection.
4	4	EHU1	Overvoltage during accelerated operation	1) If the input voltage is high, adjust the voltage to the normal range. 2) There is an external force to drive the motor during acceleration. 3) The acceleration time is too short, extend the acceleration time.
5	5	EHU2	Overvoltage in decelerating operation	1) The input voltage is high, adjust the voltage to the normal range, and check whether the test voltage is consistent with the actual voltage 2) There is an external force driving the motor in the deceleration. 3) The deceleration time is too short, extend the deceleration time.
6	6	EHU3	Overvoltage during constant speed operation	1) The input voltage is high, adjust the voltage to the normal range, and check whether the test voltage is consistent with the actual voltage 2) There is an external force to drive the motor during operation.
7	7	EHU4	Overvoltage during shutdown	The input voltage is high, adjust the voltage to the normal range, and check whether the test voltage is consistent with the actual

No	Error code	Display code	Code function description	Possible faults and solution
8	8	ELU0	Under voltage during operation	1) Instantaneous power failure, reset the fault. 2) The input voltage of the inverter is abnormal, and there is no missing phase. Check whether the input voltage environment is stable and reliable. 3) The relay is not drawn or damaged, seek technical support. 4) The rectifier bridge is damaged and the buffer resistance is abnormal, seek technical support.
9	9	ESC1	Power module failure	The driver is abnormal, seek technical support
10	10	E-OH	Radiator overheating	1) If the ambient temperature is too high, reduce the ambient temperature. 2) The air duct is blocked, clean the air duct. 3) Replace the fan if the fan is damaged. 4) Module thermistor detection circuit fault, seek technical support.
11	11	EOL1	Inverter overload	1) Whether the load is too large or the motor is blocked, reduce the load and check the motor and machinery. 2) Program parameter configuration error, seek technical support. 3) The selection of inverter is small, choose the bigger power inverter.
12	12	EOL2		
13	13	E-EF	External device failure	Reserve
14	14	E-CPU	CPU failure	Seek technical support
15	15	EPID	PID feedback disconnection (sensor failure)	1) No pressure sensor, 2) The pressure sensor line or interface is damaged, 3) The pressure sensor wire is connected incorrectly, 4) The PCB line of the pressure sensor interface is broken, which may be caused by corrosion or physical damage, and needs to be returned to the factory for maintenance.
16	16	E485	RS485 connection failure	1) The communication line is abnormal, check the communication connection line. 2) Check whether the RS485 communication parameter group is correctly configured.
17	17	(Reserve) ETUN	NONE	
18	18	ECCF	Current detection fault	Current detection circuit fault, seek technical support.
19	19	EEEP	EEPROM read or write error occurs	The EEPROM chip is damaged and needs to be repaired
20	20	EPLI	Input side phase missing	Reserve
21	21	E-LT	Run time arrival	The continuous running time of the motor is timed out, and the appropriate allowable continuous running time of the motor is set
22	22	EPLO	Output side phase missing	1) Whether the inverter output is connected to the motor reliably. 2) Motor running three-phase imbalance, seek technical support. 3) If the driver board is abnormal, seek technical support.

No	Error code	Display code	Code function description	Possible faults and solution
23	24	E-LP	Water shortage	1) Check whether the water shortage pressure value is reasonable. 2) Check whether the water supply source is normal, ensure that the water inlet is normal and the valve is open normally. 3) The pressure sensor and related circuit faults can be further eliminated by replacing the pressure sensor
0	16	A-16	485 Communication timeout alarm	1) Check whether the RS485 communication parameter group is correctly configured. 2) Check whether there are interference sources in the user's working environment
0	17	A-17	No main machine	Check whether the RS485 communication parameter group is correctly configured. The host address is set to 1. Each online address cannot be the same, and the online function is valid.
0	18	A-18	No auxiliaries	Check whether the RS485 communication parameter group is correctly configured. The slave address is not set to 1, each online address cannot be repeated, and the online function is valid.
0	19	A-19	Address duplication	Each online address must be unique
0	20	A-20	Overpressure alarm	1) The pressure sensor is damaged, choose a voltage type or current type pressure sensor with the right range. 2) The pressure sensor is incorrectly wired. Check whether the wiring is normal according to the mark on the PCB, and check whether the short-circuit cap is correctly installed. 3) The pressure sampling circuit is damaged and needs to be replaced and returned to the factory for maintenance.