SAFETY PRECAUTIONS

SD500 is a new power electronic product, please read the operation manual carefully before using to keep your safety and make sure proper operation.

In this manual, the safety precautions were sorted to "WARNING" and "CAUTION".

! **WARNING:** Wrong using may result in death or serious personal injury.

⚠ **CAUTION:** Wrong using may result in the damage of controller or system.

! WARNING
• Please don't dismantle, change the product, or may cause electric shock, fire hazard and personal injury;   • Please don't open the cover during the running of controller;   • Please don't put wire, bar of metal, filaments etc. into the controller so as not to cause a short circuit or get an electric shock;   • Please don't splash water or other liquid over the controller.

⚠ CAUTION
• Please don't make withstand voltage testing for the controller;   • Never connect AC power to output UVW terminals;   • If the internal components of the controller were influenced or damaged by static, please do not to touch;   • The motor, controller and power specifications should be matching, otherwise it could cause abnormal operation even burn out the device;   • If the controller appears serious vibration, noise, heat or peculiar smell in the first operation, please cut off the power immediately and contact suppliers or service center later;   • Please don't install the controller in the environment with direct sunlight, rain, frost or snow in case of deformation or damage.

1 SPECIFICATION

1.1 Output 3AC 380V

Maximum input DC voltage	800VDC
Recommended DC input voltage range	420~720VDC
Recommended input working voltage	540VDC
The number of Input port	1
Rated output voltage	3AC 380V
Output frequency range	0~600Hz
Cooling method	Air cooling
altitude	This controller should be installed with altitude of lower than 1000m. It will be degraded when the altitude higher than 1000m. For details, rated output current should be degraded 1% for every 100m
Standard	CE

1.2 Output 3AC 220V

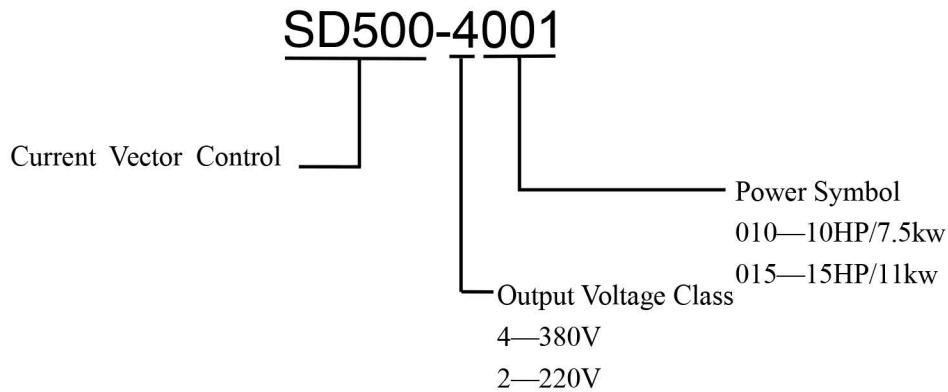|	
Maximum input DC voltage	410VDC
Recommended DC input voltage range	220-370VDC
Recommended input working voltage	305VDC
The number of Input port	1
Rated output voltage	3AC 220V
Output frequency range	0~600Hz
Cooling method	Air cooling
Altitude	This controller should be installed with altitude of lower than 1000m. It will be degraded when the altitude higher than 1000m. For details, rated output current should be degraded 1% for every 100m
Standard	CE

1.3 Description of Name Plate

SD500-4001

Current Vector Control ——

Power Symbol
010—10HP/7.5kw
015—15HP/11kw

Output Voltage Class
4—380V
2—220V

Figure1.1 Nameplate of controller

1.4 Selection Guide

1）Output 3AC 380V

Model No.	Rated Output Power	Rated Input Current	Rated Output Current	Motor Power (KW)	Size
Output　3AC 380V					
SD500-4001	0.75	3.4	2.5	0.75	B
SD500-4002	1.5	5.0	3.7	1.5	B
SD500-4003	2.2	5.8	5	2.2	B
SD500-4005	4.0	10	9	4.0	C
SD500-4007	5.5	15	13	5.5	C
SD500-4010	7.5	20	17	7.5	D
SD500-4015	11	26	25	11	D
SD500-4020	15	35	32	15	D
SD500-4025	18.5	38	37	18.5	E
SD500-4030	22	46	45	22	E
SD500-4040	30	62	60	30	E

Please contact company for other specification.

2）Output　3AC 220V

Model No.	Rated Output Power(KW)	Rated Input Current(A)	Rated Output Current(A)	Motor Power (KW)	Size
Output　3AC 220V					
SD500-2001	0.75	5.0	4.5	0.75	A
SD500-2002	1.5	7.7	7	1.5	B
SD500-2003	2.2	11.0	10	2.2	B
SD500-2005	3.7	17.0	16	3.7	C
SD500-2007	5.5	21.0	20	5.5	C
SD500-2010	7.5	31.0	30	7.5	D

4

Model No.	Rated Output Power(KW)	Rated Input Current(A)	Rated Output Current(A)	Motor Power (KW)	Size
SD500-2015	11.0	43.0	42	11.0	E
SD500-2020	15	56.0	55	15.0	E
SD500-2025	18.5	71.0	70	18.5	E

Please contact company for other specification
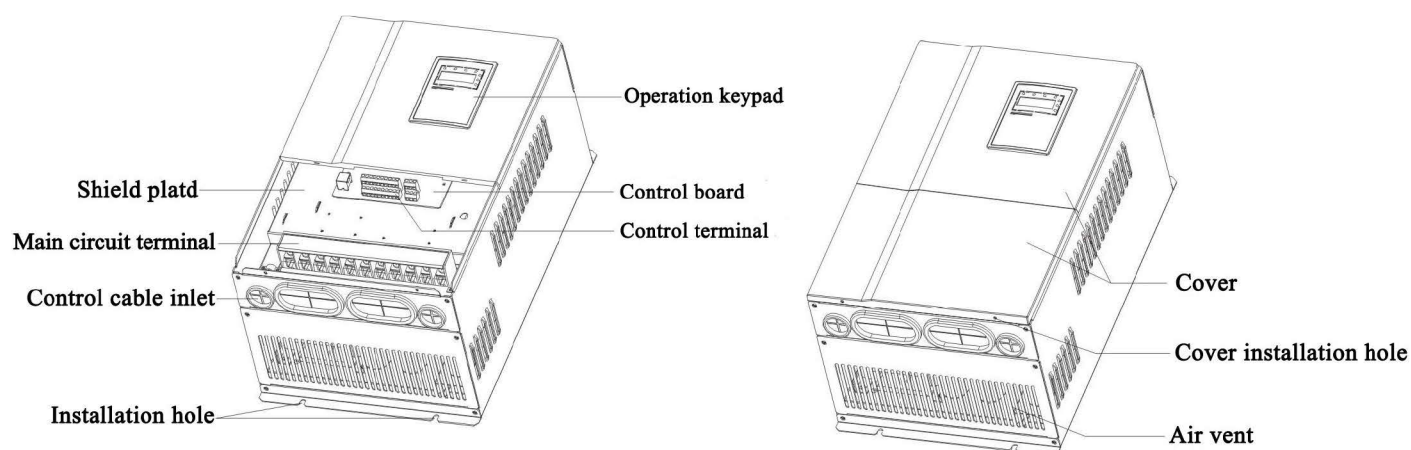
1.5 Parts Description
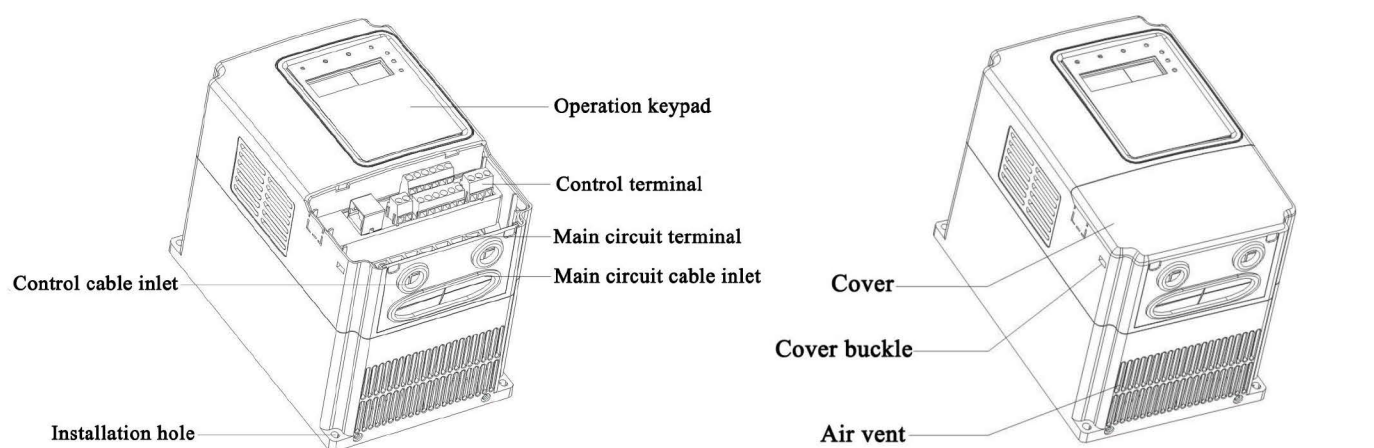
Figure 1.2 Parts of controllers(15KW and below)

Figure 1.3 Parts of controllers (18.5KW and above)

1.6 External Dimension
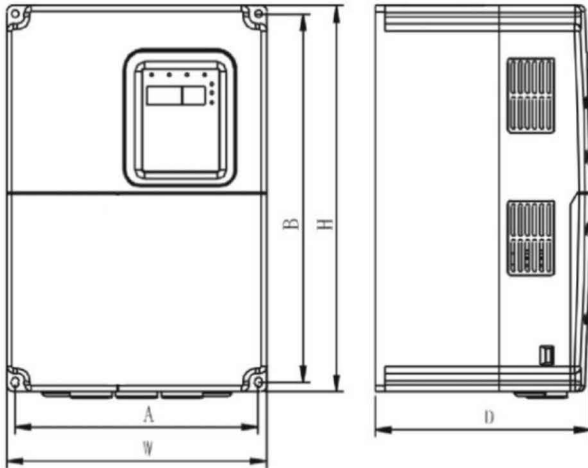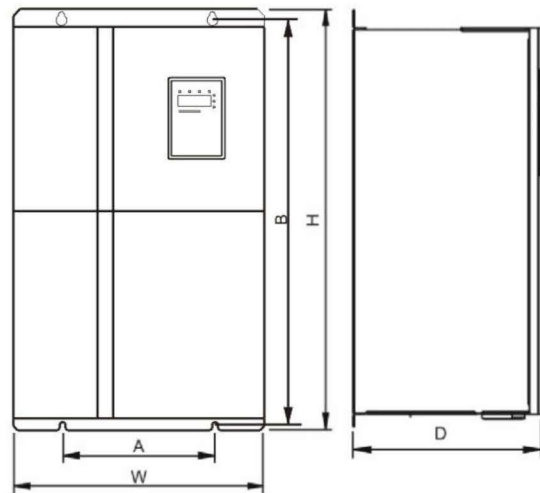

Figure 1.4 Dimension(0.75~15KW)   Figure 1.5 Dimension(18.5~30KW)

2   INSTALLATION

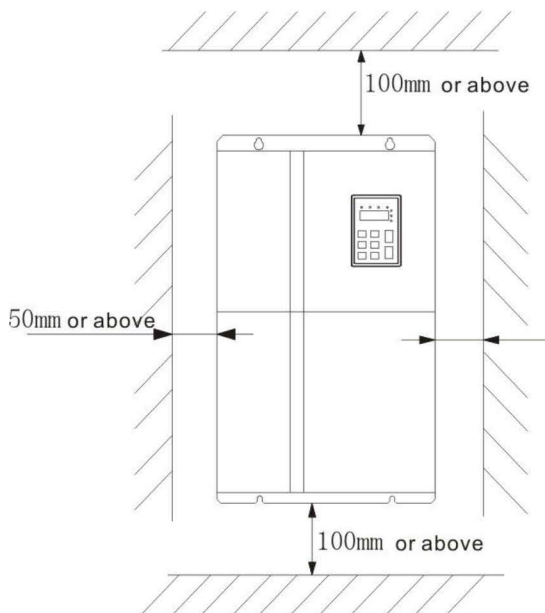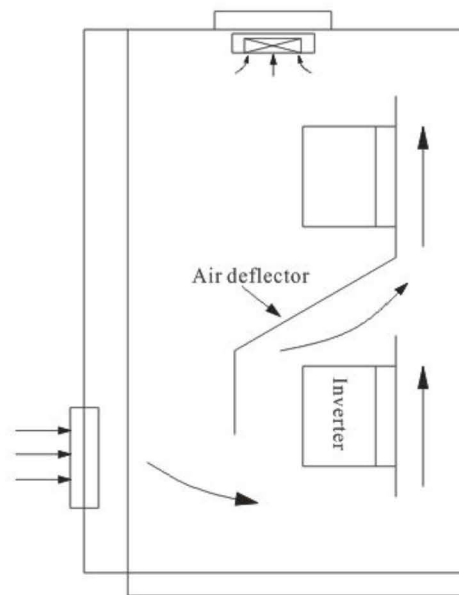### 2.1 Installation Space

Figure 2.1 Safe space.   Figure 2.2   Installation of multiple controllers.

Notice: Add the air deflector when apply the up-down installation.

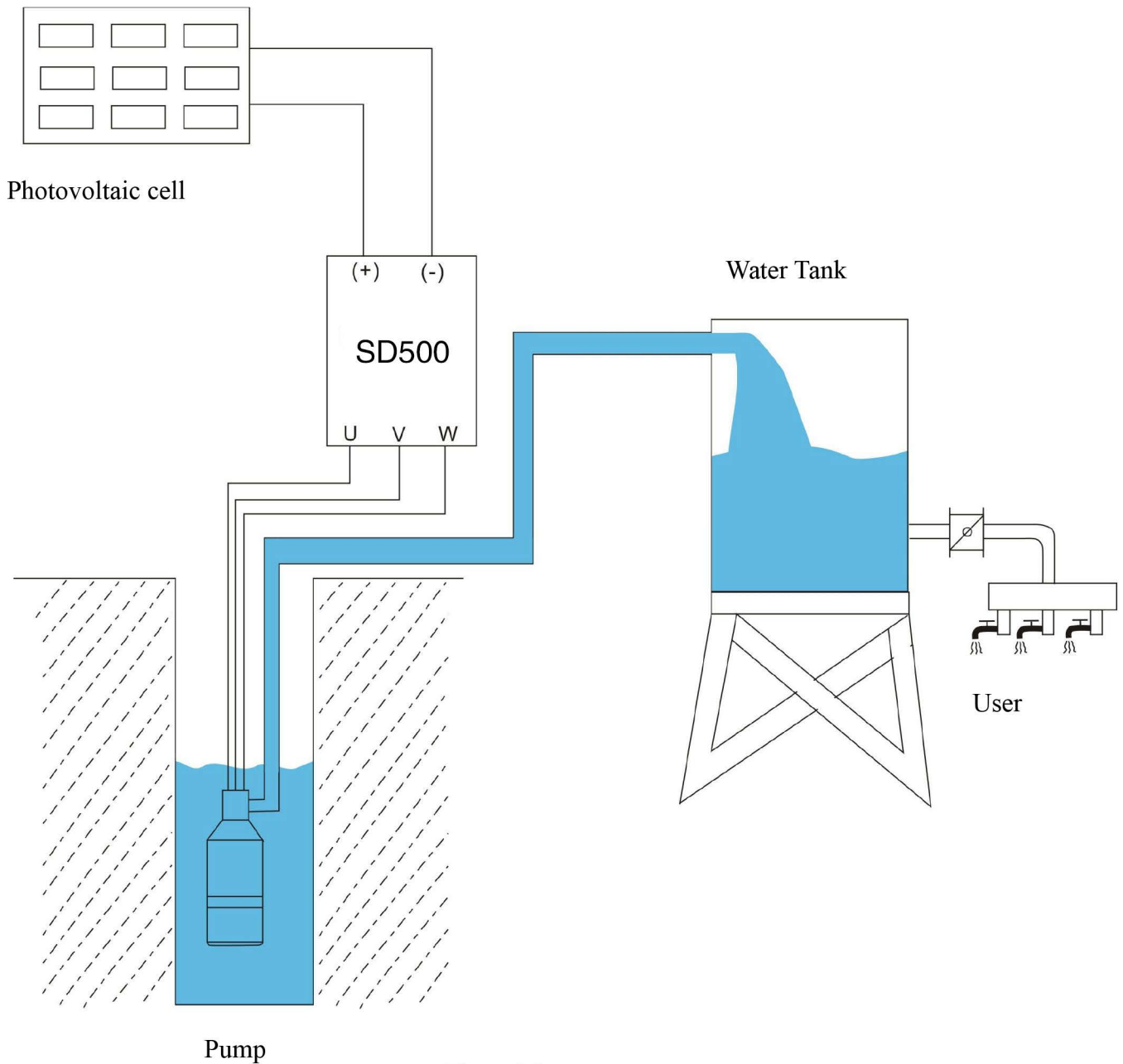## 3   WIRING

3.1 Schematic

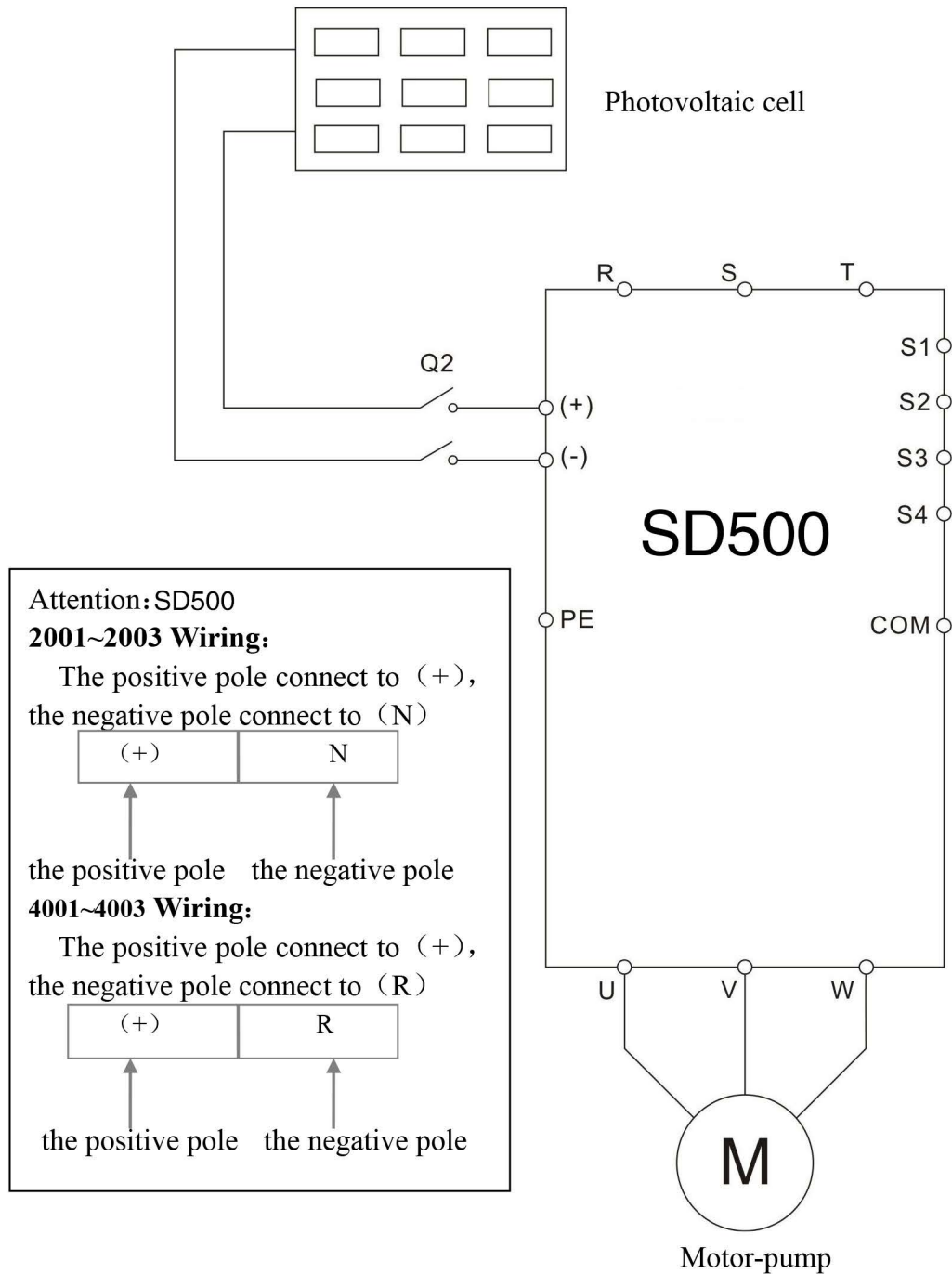Figure 3.1

3.2 Solar cell array power supply

Photovoltaic cell

Attention：SD500
2001~2003 Wiring：
   The positive pole connect to （+），
the negative pole connect to（N）

（+）	N

the positive pole   the negative pole

4001~4003 Wiring：
   The positive pole connect to （+），
the negative pole connect to（R）

（+）	R

the positive pole   the negative pole

SD500

Motor-pump

Figure 3.2

3.3 Solar cell array and AC power supply

Note: if there is no protection diode connected to the end of the photovoltaic DC input, it is forbidden to close the switches (Q1 and Q2) at the same time, otherwise, it will damage the module of photovoltaic cell

Photovoltaic cell

Q1

R   S   T

Q2

(+)

(−)

Photovoltaic cell protection diode

S1
S2
S3
S4

SD500

PE   COM

Attention：SD500
2001~2003 Wiring：
The positive pole connect to （+）, the negative pole connect to（N）

（+）	N

the positive pole   the negative pole

4001~4003 Wiring：
The positive pole connect to （+）, the negative pole connect to（R）

（+）	R

the positive pole   the negative pole

U   V   W

M Motor-Pump

Figure 3.3

The notes below should be considered for the AC debug

Power On Sequencing：

Disconnect Q2 firstly , and then wait at least 5 minuets until controller discharge (or digital LED and all indicators extinguish),then close Q1.Otherwise,will cause the damage of controller.

Notice：

(1) If there is no protection diode connected to the port of input-bus, it is forbidden to close photovoltaic cell switch ("Q1") and power grid switch ("Q2") at the same time. Otherwise , will cause the damage of solar panels.

(2) When need to transform the power supply mode from power frequency to photovoltaic cell; you only need to turn off "Q1"firstly and then close "Q2".

Main circuit terminal functions are summarized according to the terminal to the terminal symbols in the following table. Wire the terminal correctly for the desired purposes.

Terminal Symbol	Function Description
R、S、T	Terminals of 3 phase AC input
(+)、(-)	Terminals of DC input
U、V、W	Terminals of 3 phase AC output
⏚/PE	Terminals of ground
S1，S2	Input terminals of Water-level detection signal for the wells
S3，S4	Input terminals of Water-level detection signal for the reservoir
COM	Input common terminal of water-level detection signal

3.4 Specifications of breaker, cable.

Model No.	Circuit Breaker (A)	Input/ Output Cable (mm^2)
SD500 -2001	16	2.5
SD500 -2002	20	4
SD500 -2003	32	6
SD500 -2005	40	6
SD500 -2007	63	6
SD500 -2010	100	10
SD500 -2015	125	25
SD500 -2020	160	25
SD500 -2025	160	25
SD500 -4001	10	2.5
SD500 -4002	16	2.5
SD500 -4003	16	2.5
SD500 -4005	25	4
SD500 -4007	25	4
SD500 -4010	40	6
SD500 -4015	63	6
SD500 -4020	63	6
SD500 -4025	100	10
SD500 -4030	100	16
SD500 -4040	125	25

Please contact company for other specification

3.5 The wiring of water-level automatic control

3.5.1 The wiring to prevent pump from anhydrous idling

3.5.1.1 The wiring for floater water-level switch connected by cable

   The common port ,which using floater water-level switch connected by cable ,is fed to the terminal "COM" of SD500 controller . And then ,select NO (Normally Open)and connect to "S1" (S1and S2 connected together). If the NC was connected to "S1", the parameter "F0.12 "should be set as follow: S1=1,S2=1.
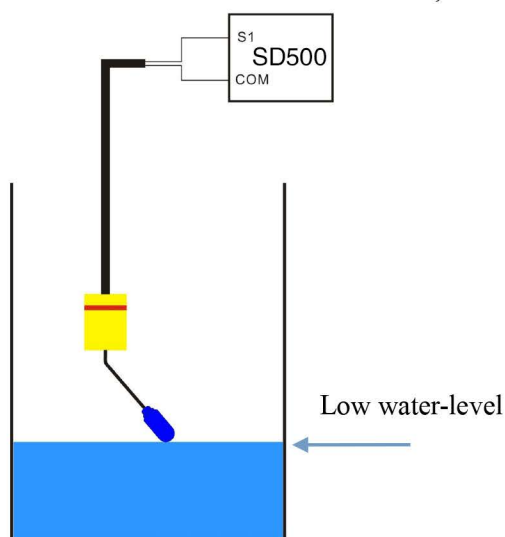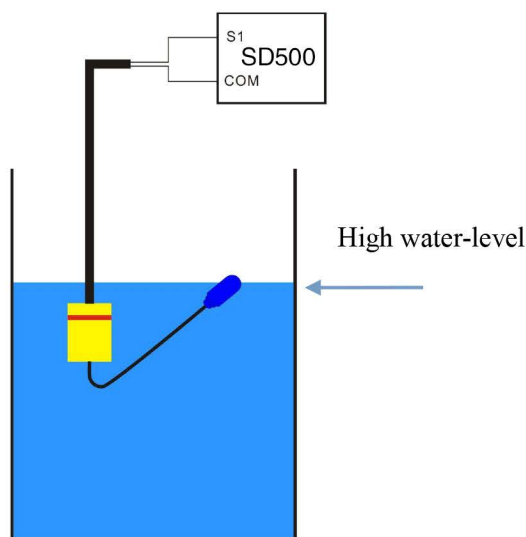

Figure 3.4 the low water-level   Figure 3.5 the high water-level

   Remarks: when the actual water-level in the wells is higher than the horizontal line of high water-level ,"S1" and "S2"will be connected to the "COM" as well as controller automatically will start the pump.On the contrary, if the actual water-level is lower than the horizontal line of low water-level ,"S1" and "S2"will be disconnected from "COM"as well as controller automatically stop the pump to prevent anhydrous idling.

3.5.1.2 the wiring for floater water-level switch connected by rod

   The floater water-level switch connected by rod is the normally open contact to output and its common wire is connected to the terminal "COM"of SD500 controller.At the same time ,the low level-water wire is connected to the terminal "S1" of SD500 controller and the high water-level wire is connected the terminal "S2" .If the NC was selected,the parameter F0.12 should be set as follow:S1=1,S2=1.
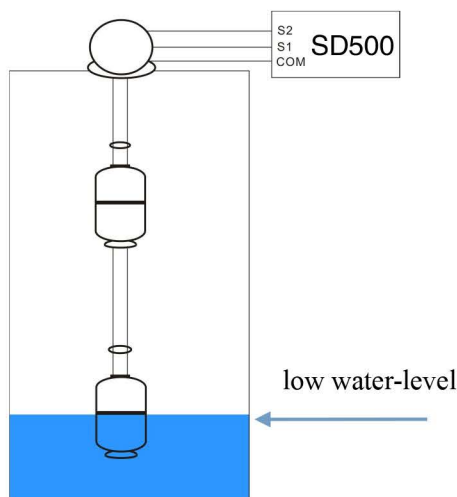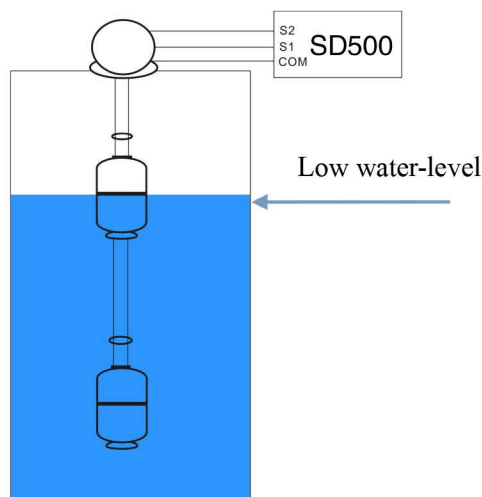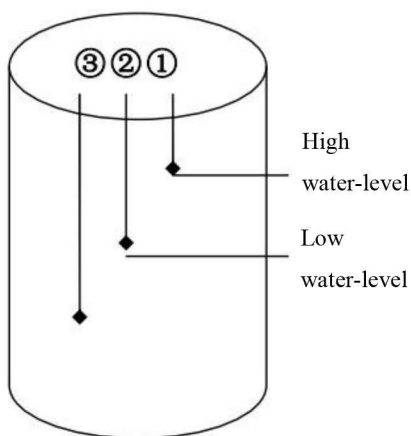
Figure 3.6 low water-level

Figure 3.7 high water-level

Remarks:

when the actual water-level in the wells is higher than the horizontal line of high water-level ,"S1"and "S2" will be connected to the "COM"as well as controller automatically start the pump .On the contrary, if the actual water-level is lower than the horizontal line of low water-level ,"S1"and"S2"will be disconnected from"COM"as well as controller automatically stop the pump to prevent anhydrous idling.

3.5.1.3 The wiring for water-level sensors

There are three signal leads as given (left image)for detecting water-level. The shortest signal line is ①,which is corresponding to the horizontal line of high water-level ,is connected to the terminal "S2"of controller. The signal line ② that is corresponding to the horizontal line of low water- level need to be connected to the terminal "S1" . The longest line is ③ ,which is corresponding to the common port is connected to the terminal "COM"of controller.

Remarks :

when the actual water-level in the wells is higher than the horizontal line of high water-level ,"S1"and"S2"will be connected to the "COM"as well as controller automatically start the pump .On the contrary, if the actual water-level is lower than the horizontal line of low water-level ,"S1"and"S2"will be disconnected from "COM"as well as controller automatically stop the pump to prevent anhydrous idling.

Notice : if only use one detection signal of water-level in the wells , "S1"and "S2" must be connected together by conductor.

3.5.2 The wiring of reservoir

3.5.2.1 The wiring for floater water-level switch connected by cable

The common port ,which using floater water-level switch connected by cable ,,is fed to the terminal "COM" of SD500 controller . And then ,select NC and connect to"S3"("S3"and "S4" connected together). If the NO was connected to "S3", the parameter "F0.12 "should be set as follow: S3=1,S4=1.
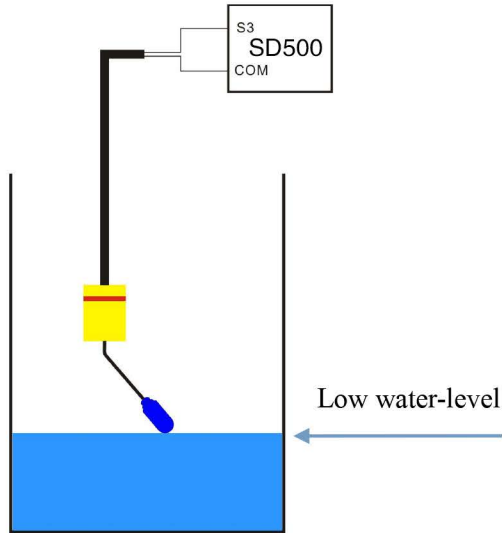

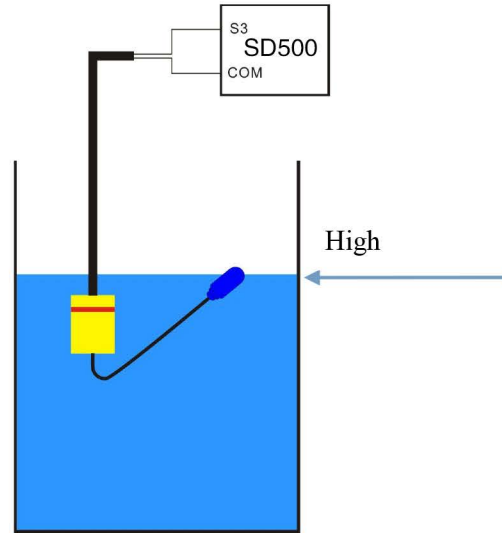|	
Figure 3.8 low water-level	figure 3.9 high water-level

Remarks:

when the actual water-level in the reservoir is lower than the horizontal line of low water-level , "S3" and "S4" will be disconnected from the "COM"as well as controller automatically start the pump .On the contrary, if the actual water-level is higher than the horizontal line of high water-level ,"S3" and "S4" will be connected to "COM" as well as controller automatically stop the pump to prevent water overflow.

3.5.2.2 the wiring for floater water-level switch connected by rod

The floater water-level switch connected by rod is the normally open contact to output and its common wire is connected to the terminal "COM"of SD500 controller.At the same time ,the low level-water wire is connected to the terminal "S3" of SD500 controller and the high water-level wire is connected the terminal "S4" .If the NC was selected,the parameter F0.12 should be set as follow:S3=1,S4=1.
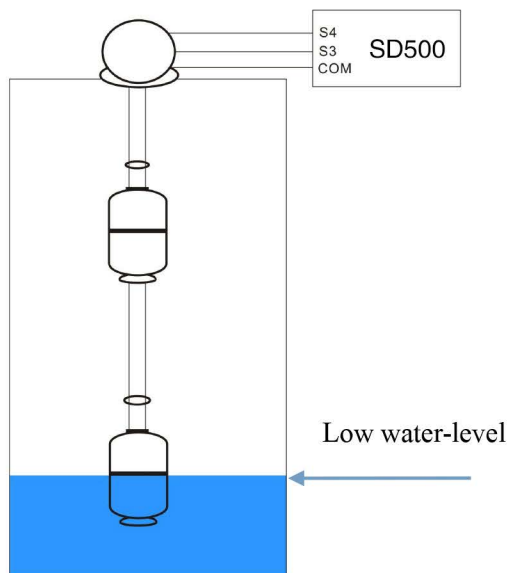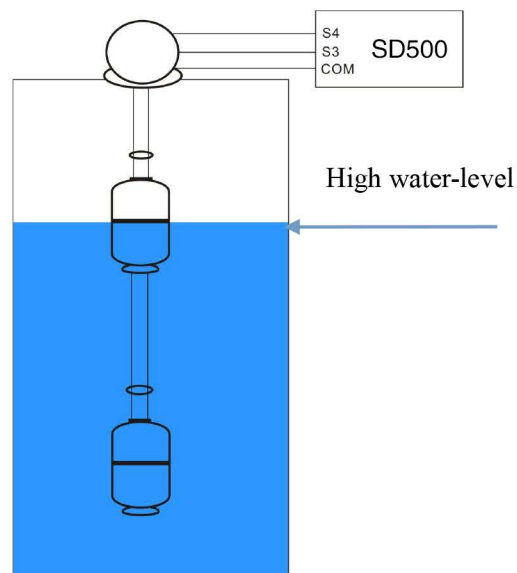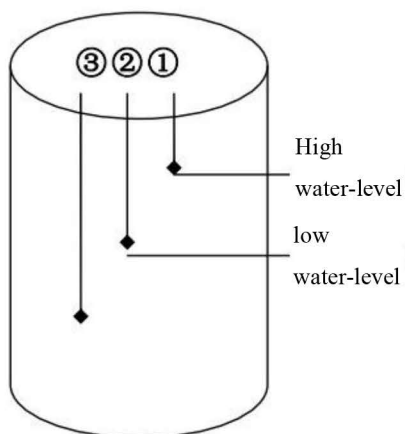
Figure 3.10 low water-level   figure 3.11 high water-level

Remarks:

when the actual water-level in the reservoir is lower than the horizontal line of low water-level , "S3" and "S4" will be disconnected from the "COM"as well as controller automatically start the pump.On the contrary, if the actual water-level is higher than the horizontal line of high water-level ,"S3" and "S4" will be connected to "COM" as well as controller automatically stop the pump to prevent water overflow.

3.5.2.3 the wiring for water-level sensors

There are three signal leads as given (left image)for detecting water-level. The shortest signal line is ①,which is corresponding to the horizontal line of high water-level ,is connected to the terminal "S4"of controller. The signal line ② that is corresponding to the horizontal line of low water-level need to be connected to the terminal "S3" . The longest line is ③ ,which is corresponding to the common port is connected to the terminal "COM"of controller.

Remarks :

when the actual water-level in the reservoir is lower than the horizontal line of low water-level ,"S3"and"S4"will be disconnected from the "COM"as well as controller automatically start the pump.On the contrary, if the actual water-level is higher than the horizontal line of high water-level ,"S3"and"S4"will be connected to "COM"as well as controller automatically stop the pump to prevent water overflow .

3.5.3 the wiring for floater water-level switch mounted on a side

The floater water-level switch mounted on a side is the normally open contact to output and its common wire is connected to the terminal "COM"of LX500 controller.At the same time ,the low level-water wire is connected to the terminal "S3" of SD500 controller and the high water-level wire is connected the terminal "S4".If the NC was selected,the parameter F0.12 should be set as follow:S3=1,S4=1.
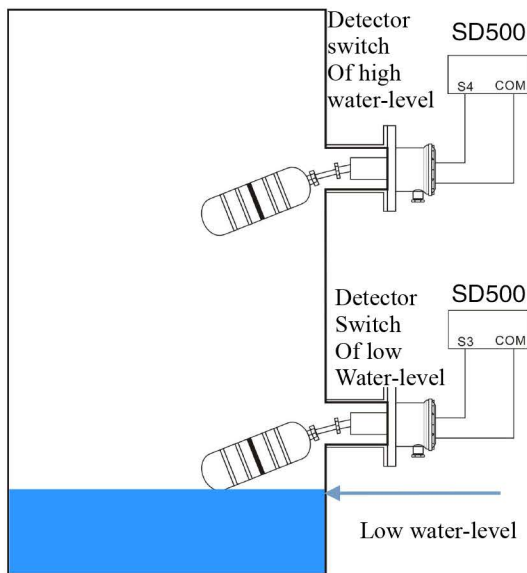
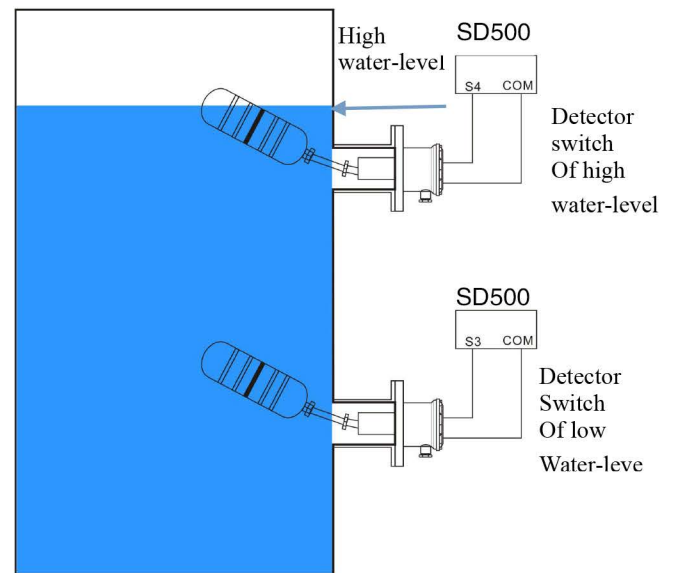Figure 3.12 low water-level   figure 3.13 high water-level

Remarks:

when the actual water-level in the reservoir is lower than the horizontal line of low water-level , "S3" and "S4" will be disconnected from the "COM"as well as controller automatically start the pump .On the contrary, if the actual water-level is higher than the horizontal line of high water-level ,"S3" and "S4" will be connected to "COM" as well as controller automatically stop the pump to prevent water overflow.

Notice:

1 . If only use one detection signal of water-level in the reservoir , "S3"and "S4" must be connected together by conductor.

2 . It is required to modify the wiring of floater switch's NC or NO according to the parameter setting (F0.12)
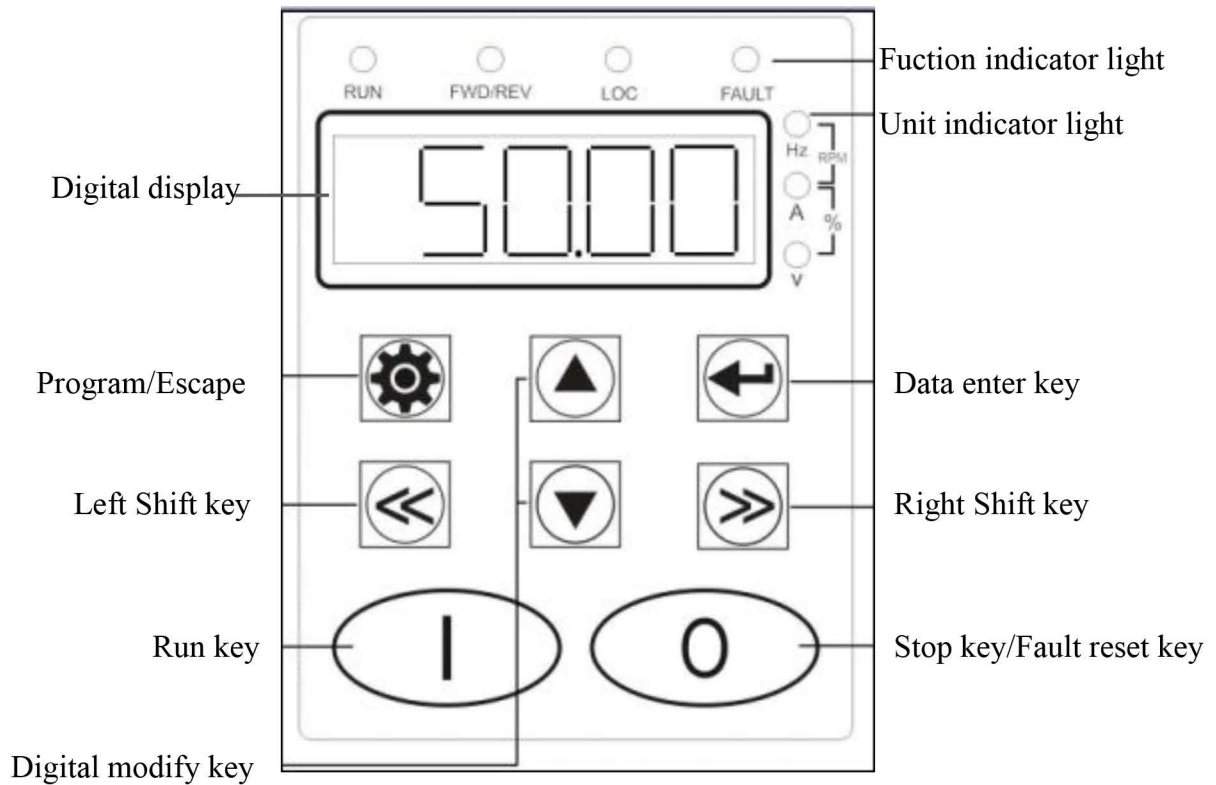
4 OPERATION

4.1 Keypad Description

4.1.1 Keypad schematic diagram

Figure 4.1 Keypad schematic diagram

4.1.2 key function description

Button Symbol	Name	Function Description
⚙	Programming Key	Entry or escape of first-level menu and remove parameters quickly
↵	Enter Key	Progressively enter menu and confirm parameters.
▲	UP Increment Key	Progressively increase data or function codes.
▼	DOWN Decrement Key	Progressive decrease data or function codes.
≫	Right Shift Key	In running or standby mode,press this button to select the parameters to cyclically display.In parameter setting mode,select the bit to be modified.
≪	Left Shift Key	In running or standby mode,press this button to select the parameters to cyclically display.In parameter setting mode,select the bit to be modified.

Button Symbol	Name	Function Description
(I)	Run Key	Start to run the controller in keypad control mode.
(O)	Stop/Reset key	In running status, can be used to stop the controller. When fault alarm, can be used to reset the controller in any control mode

4.1.3 Indicator light description

4.1.3.1 Function Indicator Light Description

Indicator Light Name	Indicator Light Description
RUN/TUNE	Extinguished: stop status Light on: operation status
FWD/REV	Extinguished: Forward operation Light on: Reverse operation
FAULT	Extinguished: normal operation status Light on:overload pre-warning status

4.1.3.2 Unit Indicator Light Description

Symbol	Description
Hz	Frequency unit
A	Current unit
V	Voltage unit
RPM	Rotation speed unit
%	Percentage

4.1.3.3 Digital Display

Have 5 digit LED , which can display all kinds of monitoring data and alarm codes such as reference frequency, output frequency and so on.

4.2 Operation Process

4.2.1 Parameter setting

Three levels of menu are:

1、Function code group (first-level);

2、Function code (second-level);

3、Function code value (third-level).

Remarks: Press both the ⚙ and the ↵ can return to the second-class menu from the third-class menu. The difference is: pressing ↵ will save the set parameters into the control

panel, and then return to the second-class menu with shifting to the next function code automatically; while pressing ⚙ will directly return to the second-class menu without saving the parameters, and keep staying at the current function code

4.2.2 Fault reset

If the controller has fault, it will prompt the related fault information. User can use ⭘ to reset the fault. After fault reset, the controller is at stand-by state. If user does not reset the controller when it is at fault state, the controller will be at operation protection state, and can not run.
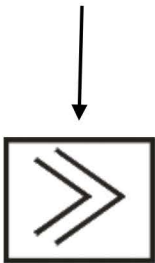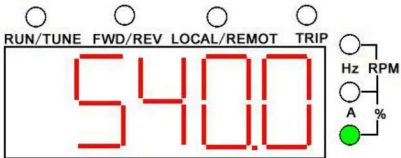
4.3 Running State

4.3.1 Power-on initialization

Firstly the system initializes during the controller power-on, and LED displays "88888", and seven indicator lights are all on. After the initialization is completed, the controller is on stand-by status.
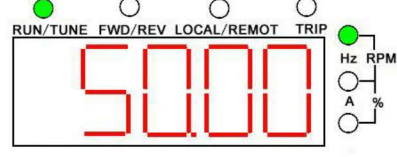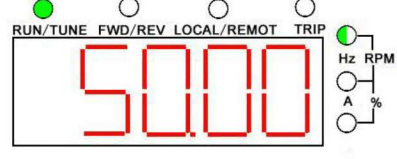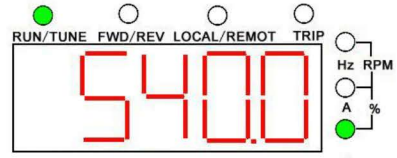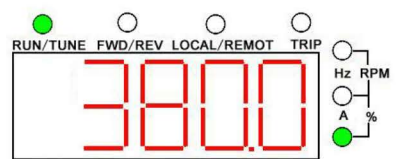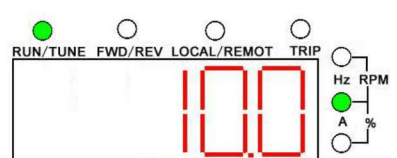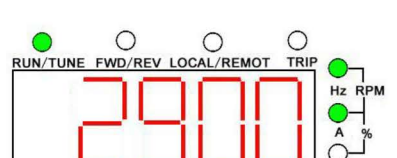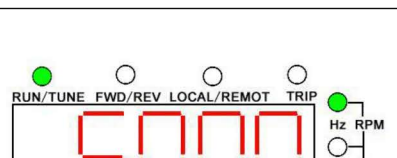
4.3.2 stand -by

At stand-by status,parameters of reference frequency and DC bus voltage can be display.

Operation	Description	Display
The current data at stand-by status ⬇ ⟫	DC bus voltage	

4.3.4 Running state

At running status,there are six parameters which can be display.they are:output frequency,reference frequency ,DC bus voltage,output voltage,output current and output torque given as follow.

Operation	Description	Display
The Current data at stand-by status	Output frequency	RUN/TUNE FWD/REV LOCAL/REMOT TRIP — Hz RPM A % — **50.00**
	Reference frequency	RUN/TUNE FWD/REV LOCAL/REMOT TRIP — Hz RPM A % — **50.00**
	DC bus voltage	RUN/TUNE FWD/REV LOCAL/REMOT TRIP — Hz RPM A % — **540.0**
	Output voltage	RUN/TUNE FWD/REV LOCAL/REMOT TRIP — Hz RPM A % — **380.0**
	Output current	RUN/TUNE FWD/REV LOCAL/REMOT TRIP — Hz RPM A % — **10.0**
	Output torque	RUN/TUNE FWD/REV LOCAL/REMOT TRIP — Hz RPM A % — **29.00**
	Output frequency	RUN/TUNE FWD/REV LOCAL/REMOT TRIP — Hz RPM A % — **50.00**

5   PARAMETER FUNCTION

Function code	Name	Description		Factory setting
F0.00	Run command source	0：water-level automatic control through keypad start/ stop 1：water-level automatic control 2：manual control through keypad		0
F0.01	Upper frequency limit	Output frequency range:F0.02~600.00Hz		50.00Hz
F0.02	Lower frequency	If output frequency is lower than F0.02 .the controller stop.		30.00Hz
F0.03	Restart delay time	Restart delay time after power on .please refer to description of F0.13 when using.		10.0s
F0.04	Output threshold voltage after start	Only DC bus voltage is greater than the value of F0.04 to give rise output.	100~900V(OUTPUT 220V series)	200V
			100~900V(OUTPUT 380Vseries)	400V
F0.05	Maximum power point 's voltage	PV array voltage correspond to maximum power point		Depend on PV array
F0.06	The maximum power output	The maximum power output of PV array（0.1~900.0Kw）		Depend on PV array
F0.07	Motor-pump rated power	0.4~900.0Kw		Depend on model
F0.08	Motor-pump rated frequency	10Hz~F0.01		Depend on model
F0.09	Motor-pump rated voltage	0~460V		Depend on model
F0.10	Motor-pump rated current	0.1~2000.0A		50.0Hz
F0.11	Reserve			
F0.12	NO/NC input	BIT0：Define the NC or NO of S1;		00

Function code	Name	Description	Factory setting
	statue selection of Water-level detection terminal	BIT1：Define the NC or NO of S2: BIT2：Define the NC or NO of S3: BIT3：Define the NC or NO of S4: 0：NC Action；1：NO Action.（0~F） NC: Si connected to COM is valid,disconnected is invalid NO: Si disconnected from COM is valid,connected is invalid. E.g.:if NC is valid for S1 and S2 and NO is valid for S3 and S4 ,this parameter F0.012 need to be set as follow: The statues(S4~S1) can be represented as a binary "1100"("C"in hex notation),that is to say , F0.12 should be set as "C"	
F0.13	Power on restart selection	0：invalid 1：valid Pleased refer to the parameter F0.00 to select this function. it is meaningful only to F0.00=0	1
F0.14	Carrier frequency	1.0~15.0KHz	Depend on mode
F0.15	Acceleration time	0.1~3600.0s	Depend on mode
F0.16	Reserve		
F0.17	Restore parameter	0：no action 1：restore factory setting 2：clear fault records	0
F0.18	Maximum output frequency	F0.02~600.00Hz	50.00Hz
F0.19	Third latest fault type	0：no fault 1：IGBT Ph-U fault（OUT1）	
F0.20	Second latest fault type	2：IGBT Ph-V fault（OUT2） 3：IGBT Ph-W fault（OUT3）	
F0.21	Current fault type	4：Over-current（OC1~OC3） 5：Over-voltage（OV1~OV3） 6：DC bus under-voltage（P.OFF） 7：Motor overload（OL1~OL2） 8：Output phase failure（SPO） 9：Overheat（OH1~OH2） 10: Current detection fault（ITE） 11：EEPROM fault（EEP）	
F0.22	Output		0.0Hz

Function code	Name	Description	Factory setting
	frequency at current fault		
F0.23	Output current an current fault		0.0A
F0.24	DC bus voltage at current fault		0.0V
F0.25	Reserve		

*Attention:

If you do not use S1, S2, S3,S4, You need to short the S1S2 and COM.

6 INITIAL DEBUGGING

In order to ensure photovoltaic water supply system can work in efficiency ,reliability and steady, the parameters setting of controller and debugging for the first time were performed by the professional electrical engineering technicist according to the following steps.(you'd better choose a sunny day with strong sunlight to debugging.)

Modify the motor-pump parameters and start voltage:
Modify these parameters (F0.05,F0.06,F0.07,F0.08,F0.09,F0.10) according to the parameters of solar cell array and the pump nameplate parameters . （According to the situation to adjust the F0.02, F0.04）

Confirm the motor-pump wiring:
1、 press the "I" to check the outlet water yield;
2、 Press   the "O" key to change the connection order;
3、 press the "I" again to check the outlet water yield;
4、 Press the "O" and then choose the large water yield connection as the motor-pump wiring.

Select run command source

Manual control

Water-level automatic control

Set F0.00 = 2

Set F0.00=0

Set F0.00=1

Water-level automatic control through Keypad Start/Stop

Press"I" key to start

Press "O" key to stop

Press "I"key to start

Press "O" key to stop

According to chapter "4.5" description to connect the water-level detection line and set F0.12

*If you do not use S1, S2, S3,S4, You need to short the S1S2 and COM.

According to chapter "4.5"description to connect the water-level detection line and set F0.12

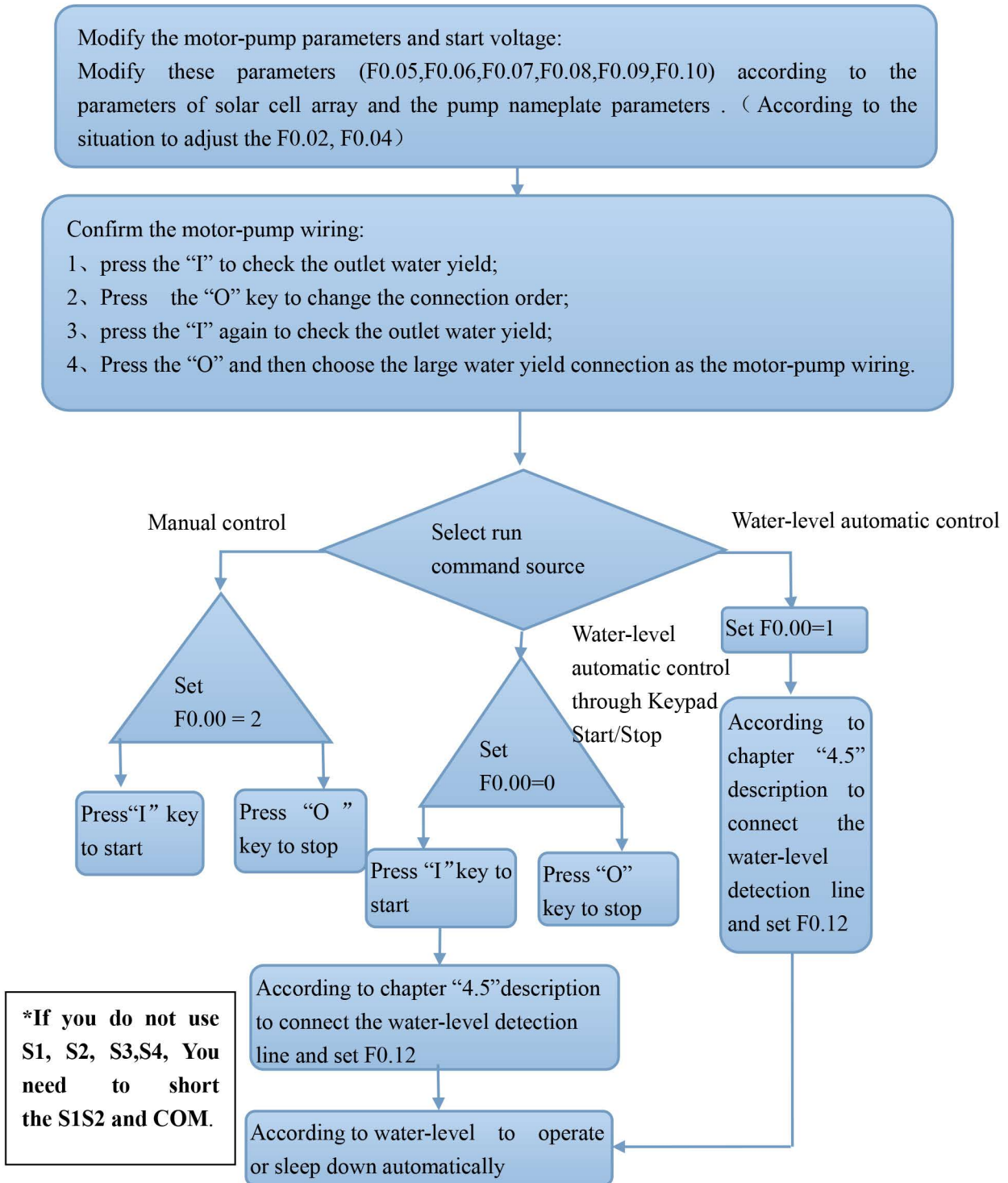According to water-level   to   operate or sleep down automatically

Figure 6.1 Flow chart of debugging for the first time

7 TROUBLE SHOOTING

7.1 fault and trouble shooting

Fault Code	Fault Type	Reason	Solution
OUT1	IGBT Ph-U fault	1.IGBT module fault; 2.Malfunction caused by interference; 3.Grounding is not properly.	1. Ask for support 2. Inspect external equipment and eliminate interference
OUT2	IGBT Ph-V fault		
OUT3	IGBT Ph-W fault		
OC	Over-current	1. Sudden change of pump; 2. Low input voltage; 3.The capacity of controller is small.	1. Inspect pump and reduce the change 2. Check the power supply 3. Select Select bigger capacity controller
OV	Over-voltage	1. High input voltage; 2. Regenerative energy from the motor is too large	1. Check the power supply; 2. Avoid to restart the motor until it stop running completely
P.OFF	DC bus under-voltage	Low input voltage	Check the the power supply (photovoltaic array voltage)
OL	Motor overload	1.Low input voltage; 2.Improper current protection threshold of motor; 3.Sudden change of pump; 4.The capacity of motor is too small	1. Check the power supply(photovoltaic array voltage); 2. Set the rated current of motor properly; 3. Check the pump, adjust the value of torque boost; 4. Select proper capacity motor
SPO	Output phase failure	Open-phase occurred at output side of main circuit	Check the wiring, installation and motor

OH	Overheat fault	1. Sudden over-current;
		2.Input/output side has short circuit;
		3.Cooling fans of controller stopped or damaged，.Obstruction of ventilation channel;
		4.Ambient temperature is too high;
		Carrier frequency is too high;
		Near heat source;
		5.Wires or connectors of control
			1. Refer to measures of over-current
			2. Check the wiring
			3. Replace cooling fans;
			    Clear the ventilation channel;
			4. Install cooling unit;
			    Decrease carrier frequency;
			    Remove the heat source;
			5. Check the wires and connectors;
			6. Ask supplier for support;
			7. Ask supplier for support;

Fault Code	Fault Type	Reason	Solution
		board are loose; 6.Auxiliary power supply unit is damaged or low driving voltage for IGBT; 7.Power module bridge is damaged; 8.Control board is abnormal	8. Ask supplier for support;
ITE	Current detection fault	1.Wires or connectors of control board are loose; 2.Hall sensor is damaged ; 3. Amplifying circuit is abnormal	1.Check the wiring and connectors 2.Ask supplier for support; 3..Ask supplier for support;
EEP	EEPROM fault	1.R/w fault of control parameters; 2.. EEPROM is damaged.	1.Press ⬭O to reset ,Ask for support. 2. Ask for support.

7.2 Common Faults and Solutions

Controller may have following faults or malfunctions during operation, please refer to the following solutions.

7.2.1 No display after power on:

● Inspect whether the voltage of power supply is the same as the controller rated voltage or not with multi-meter. If the power supply has problem, inspect and solve it.

● Check the CHARGE light. If the light is off, Please ask for support. If the light is on, the fault may be lies in the switching power supply. Please ask for support.

7.2.2 Power supply air switch trips off when power on:

● Inspect whether the input power supply is grounded or short circuit. Please solve the problem.

7.2.3 Motor doesn't move after controller running:

● Inspect if there is balanced three-phase output among U, V, W. If yes, then motor could be damaged, or mechanically locked. Please solve it.

● If the output is unbalanced or lost, the controller drive board or the output module may be damaged, ask for support.

7.2.4 Controller displays normally when power on, but switch at the input side trips when running:

- Inspect whether the output side of controller is short circuit. If yes, ask for support.
- Inspect whether ground fault exists. If yes, solve it.
- If trip happens occasionally and the distance between motor and controller is too far, it is recommended to install output AC reactor.

8 MAINTENANCE

⚠ WARNING
- Maintenance must be performed according to designated maintenance methods.   - Maintenance, inspection and replacement of parts must be performed only by authorized personnel.   - After turning off the main circuit power supply, waiting for 10 minutes before performance maintenance or inspection   - DO NOT directly touch components or devices of PCB board. Otherwise controller can be damaged by electrostatic.   - After maintenance, all screws must be tightened.

8.1 Daily Maintenance

In order to prevent the fault of controller to make it operate smoothly in high-performance for a long time, user must inspect the controller periodically (within half yea).The following table indicates the inspection content.

Items to be checked	Main inspections		Criteria
	Inspection content	Frequency	Means/methods
Operation environment	1、 temperature 2、 humidity 3、 dust 4、 vapor 5、 gases	1、point thermometer hygrometer 2、 observation 3、visual examination and smelling	1.ambient temperature shall be lower than 40℃， otherwise, the rated values should be decreased. Humidity shall meet the requirement 2、 no dust accumulation, no traces of water leakage and no condensate. 3、 no abnormal color and smell.

Items to be checked	Main inspections		Criteria
	Inspection content	Frequency	Means/methods
Controller	1、vibration 2、cooling and heating 3、noise	1.point thermometer 2.comprehensive observation 3.listening	.smooth operation without vibration. 3.fan is working in good condition. Speed and air flow are normal. No abnormal heat. 4.No abnormal noise
Motor	1.vibration 2、heat 3、noise	1、comprehensive observation 2、point thermometer 3、listening	1. No abnormal vibration and no abnormal noise. 2. No abnormal heat. 3. No abnormal noise.
Operation status parameters	1.power input voltage 2. controller output voltage 3.controller output current 4.internal temperature	1. voltmeter 2.rectifying voltmeter 3. ammeter 4. point thermometer	1.satisfying the specification 2.satisfying the specification 3.satisfying the specification 4.temperature rise is lower than 40℃

8.2 Periodic Maintenance

Customer should check the drive every 3 months or 6 months according to the actual environment

8.2.1 Check whether the screws of control terminals are loose. If so, tighten them with a screwdriver;

8.2.2 Check whether the main circuit terminals are properly connected; whether the mains cables are over heated;

8.2.3 Check whether the power cables and control cables are damaged, check especially for any wear on the cable tube;

8.2.4 Check whether the insulating tapes around the cable lugs are stripped;

8.2.5 Clean the dust on PCBs and air ducts with a vacuum cleaner;

8.2.6 For drives that have been stored for a long time, it must be powered on every 2 years. When supplying AC power to the drive, use a voltage regulator to raise the input voltage to rated input voltage gradually. The drive should be powered for 5 hours without load.

8.2.7 Before performing insulation tests, all main circuit input/output terminals should be short-circuited with conductors. Then proceed insulation test to the ground. Insulation test of

single main circuit terminal to ground is forbidden; otherwise the drive might be damaged. Please use a 500V Mega-Ohm-Meter.

8.2.8 Before the insulation test of the motor, disconnect the motor from the drive to avoid damaging it.

8.3 Replacement of wearing parts

Fans and electrolytic capacitors are wearing part, please make periodic replacement to ensure long term, safety and failure-free operation. The replacement periods are as follows:

◆Fan: Must be replaced when using up to 20,000 hours;

◆Electrolytic Capacitor: Must be replaced when using up to 30,000~40, 000 hours.

8.4 Warranty

For SD500 series controller,our company provides 12 months warranty after the date of leave factory.

*Tips：

In fact ，the application of the product is closely associated with solar sell and environment .only you correctly preset the parameters of solar cell and additional use of the parameters（"F0.02 and F0.04"） the highest utilization efficiency can be achieved .

1.Firstly ,according to the solar sell panel to preset the parameters " F0.05 and F0.06". If you don't want to use the terminals "S1~S4", "S1 and S2" must be connected to "COM", otherwise it does n't work normally。

2. Secondary ，presetting the lower frequency limit "F0.02" of ensuring that the pump can work in this frequency .
3. After having the lower frequency limit ,you need to appropriately regulation the start-up voltage .Under the normal condition of sun light ,if it starts and stops frequently ,you should properly increase the start -up voltage ,of course ,you also can properly reduce the value of the lower frequency limit
According to the environment as well as in combination with proper these two parameters can use solar energy more efficiency.

Parameter table:

Function code	Name	Description		Factory setting
F0.02	Lower frequency	If output frequency is lower than F0.02 .the controller stop.		30.00Hz
F0.04	Output threshold voltage after start	Only DC bus voltage is greater than the value of F0.04 to give rise output.	100~900V(OUTPUT 220V series)	200V
			100~900V(OUTPUT 380Vseries)	400V
F0.05	Maximum power point 's voltage	PV array voltage correspond to maximum power point		Depend on PV array
F0.06	The maximum power output	The maximum power output of PV array（0.1~900.0Kw）		Depend on PV array