ES580/ 850 Water Supply mode
Function Code Page

◆ In order to improve the product and manual, any updated material required, please contact local distributor or visit CUMARK website www.cumark.com.cn

06 group new parameters (water supply card)：

Function code	Specification		Range（Default）	Remark
06.08 Pump Status	bit0	Pump1 Variable - frequency valid		
	bit1	Pump1 Grid - frequency valid		
	bit2	Pump2 Variable - frequency valid		
	bit3	Pump2 Grid - frequency valid		
	bit4	Pump3 Variable - frequency valid		
	bit5	Pump3 Grid - frequency valid		
	bit6	Pump4 Variable - frequency valid		
	bit7	Pump4 Grid - frequency valid		
	bit8	Pump5 Variable - frequency valid		
	bit9	Pump5 Grid - frequency valid		
	bit10	Pump6 Variable - frequency valid		
	bit11	Pump6 Grid - frequency valid		

06 group new parameters (water supply card)

Function code	Specification		Range（Default）
14.46 RO5 source	0	Constant 0	
	1	Constant 1	
	06.00.04	Ready	
	06.00.01	Fault	
	06.00.02	Alarm	
	06.00.04	Running	
	06.08.00	Pump1 Variable - frequency	

	06.08.01	Pump1 Grid - frequency	
	06.08.02	Pump2 Variable - frequency	
	06.08.03	Pump2 Grid - frequency	
	06.08.04	Pump3 Variable - frequency	
	06.08.05	Pump3 Grid - frequency	
	06.08.06	Pump4 Variable - frequency	
	06.08.07	Pump4 Grid - frequency	
	06.08.08	Pump5 Variable - frequency	
	06.08.09	Pump5 Grid - frequency	
	06.08.10	Pump6 Variable - frequency	
	06.08.11	Pump6 Grid - frequency	
	User define		
14.47 RO6 Source	Refer to 14.46		
14.48 RO5 Level type			
14.49 RO5 edge type			
14.50 RO5 pulse band			
14.48 RO6 level type			
14.49 RO6 edge type			
14.50 RO6 pulse band			

1、52 Water Supply Mode

Function code	Specification	Range（Default）	Remark
52.00 PID Reference Source	Reference pressure, Analogue reference	0-65535（13314）	Refer to 27.01
52.01 Reference Pressure（bar）		0-200.00（0.7）	Refer to 27.02
52.02 AI Reference Actual（bar）	Read only	0-200.00	
52.03 AI Reference Source			
52.04 PID Feedback Actual（bar）	Read only	0-200.00	Refer to 27.14
52.05 Pressure feedback source			
52.06 Sleep Level（bar）	If pressure higher than this value, enter sleep status,	0-200.00（0.80）	Refer to 27.26
52.07 Wakeup Level（bar）	If pressure lower than this value, enter wake up status	0-200.00（0.60）	Refer to 27.28
52.08 Pressure Range（bar）		0-200.00（1.60）	

52.09 Dry Run Fault Enable	0：Disable（Default）； 1： Enable (Judge by torque Curve) 2:Enable (Judge by fixed torque)	0-2（0）	Fault code：37
52.10 Dry Run Judge Torque 1（%）	Judge torque value at 5HZ	0-100.0（10.0）	
52.11 Dry Run Judge Torque 2（%）	Judge torque value at rated frequency	0-100.0（50.0）	
52.12 Dry Run Fault Delay （s）	Drive alarm after delay time	0-6553.5（1.0）	
52.13 Actual Judge Torque	Actual torque lower than value, then VFD alarm.	0-100.0	
52.14 Pump Mode Enable	0：Disable（Default）； 1：Enable		

2、53 Fire Mode and Pre PID

Function code	Specification	Range（Default）	Remark
53.00 Fire Mode Enable	0: Fire mode disable 1: Mode 1, Drive runs at set speed till burn, without alarm 2: Mode 2, Drive runs at set speed and will trip as Output shirt circuit, Over voltage, Over current and output phases loss	0-2（0）	
53.01 Fire mode signal source		DI6（Default）	
53.02 Fire Mode Speed (rpm)	Drive run speed when the fire signal is in effect after fire mode enables.	0-30000(1500)	
53.03 Fire Mode Marked bit			
53.04 Leakage Detection Enable	0：Disable（Default）； 1: In the event of a leak, the two leak detection methods will produce alarm 17 or alarm 18； 2: When leakage occurs, two kinds of leakage detection will produce a fault 38	0-200.00	

Function code	Specification	Range（Default）	Remark
53.05 Sudden Drop Threshold (pressure value bar)	During 53.06 water leakage detection time, when the feedback pressure value drops sharply and exceeds this value, the water leakage warning will be reported, and the warning will disappear after continuous alarm for 53.06 time	0-100.00（0.20）	Alarm code:17
53.06 Leakage Detection Time 1 (s)	Reference 53.05	0-3600（20）	
53.07 Leakage Detection lower limit value（pressure value bar）	When the drive running speed is greater than 53.08 leakage detection speed value, but the feedback pressure is less than 53.06 leakage detection lower limit, for 53.07 continuous time, a leakage warning is reported	0-100.00（0.3）	Alarm code:18
53.08 Leakage Detection Delay（s）	Reference 53.07	0-3600（20）	
53.09 Leakage Detection Speed（rpm）	Reference 53.07	0-30000（1500）	
53.10 Pre PID Runs Spee（rpm）	When starting initially, it first enters the pre-running state without PID adjustment. The running speed of the frequency converter is the pre-running speed. If the pre-running speed is set to 0, this function is prohibited	0-30000（200）	
53.11 Pre PID Runtime（s）	In the pre-running state, the feedback pressure of 52.04 is less than the pre-running set pressure of 53.12, the duration of the pre-running state, after which it enters the PID regulation state	0-6553.5s（20.0）	
53.12 Pre PID Setting Pressure（bar）	In the pre-running state, the feedback pressure of 52.04 is greater than the pre-running setting pressure of 53.12, then it immediately enters the PID adjustment state	0-300.00（0.60）	
53.13 Pump 1 runtime	The total running time of pump 1 in multi-pump control	RO	
53.14 Pump 2 runtime	Total running time of pump 2	RO	
53.15 Pump 3 runtime	Total running time of pump 3	RO	
53.16 Pump 4 runtime	Total running time of pump 4	RO	
53.17 Pump 5 runtime	Total running time of pump 5	RO	
53.18 Pump 6 runtime	Total running time of pump 6	RO	
53.19 Pump 7 runtime	Total running time of pump 7	RO	
53.20 Pump 8 runtime	Total running time of pump 8	RO	
53.21	Pump control word	RO	
53.22	Pump control speed	RO	

3、57 Multiple pump mode

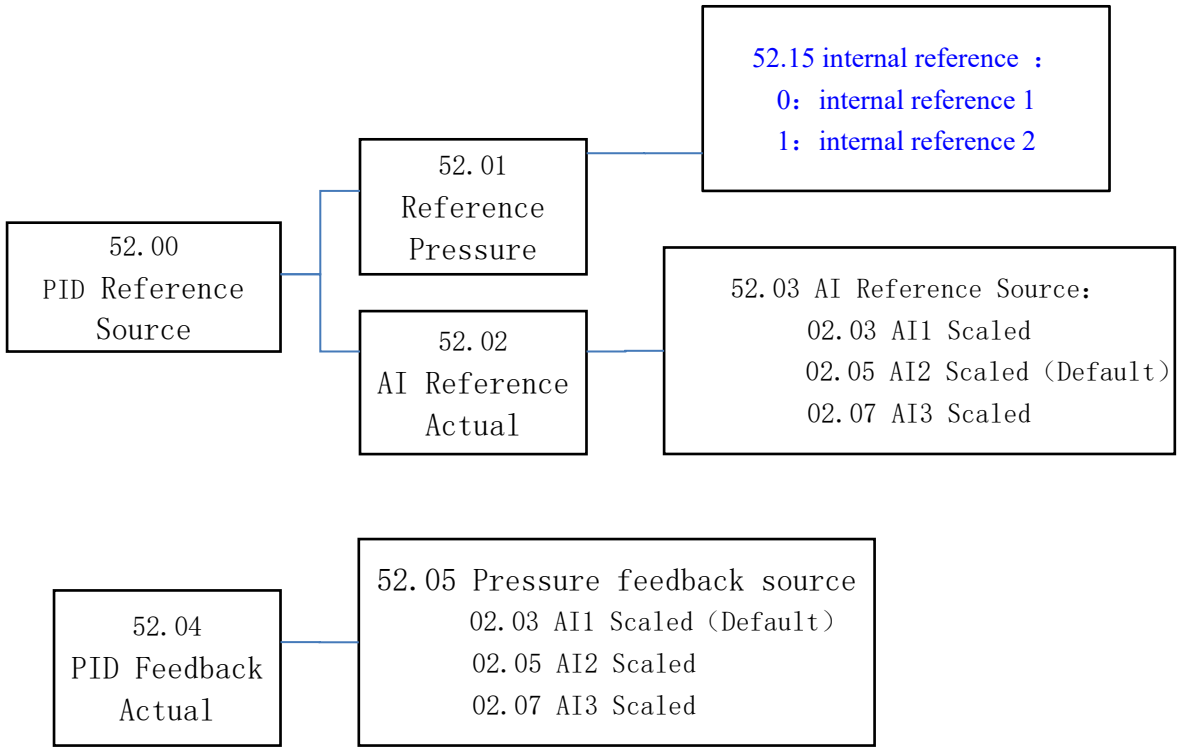
Function code	Specification	Range（Default）	Remark
57.00 Multiple pump mode	0: Single drive; 1= Multifollower 2=Multimaster	0-2（1）	
57.01 Water Pump Quantity	The total number of pumps in a multi-pump control. All drives must have the same value on this parameter. Otherwise, the communication between the converters will not work properly.	0-8（3）	
57.02 Water Pump ID	Each drive(pump) must have the unique number. The first drive ID should always is No.1 in system. The number of the drive must be arranged in numerical order. The pump with ID No.1 is always the master unit of the multi-pump system. Pump No.1 is responsible for controlling the whole process and running the PID controller. This means that the PID Feedback and PID Setpoint -- Signal must be connected to pump No.1. If the No.1 drive is not available in the system (for example, the power of the master is turned off or communication with other converters is not possible), the next converter will start operation as the second master unit of the multi-pump system.	0-8	
57.03 Signal Link	Whether the start signal and PID feedback signal are connected: 0：not connected； 1：Connection-only start； 2：Both startup and feedback are connected； This parameter defines the operation mode (master or slave) of the drive in a multi-pump system. The drive which is connected with the start command and the PID feedback signal can be used as the master drive in the multi-pump system. If more than one drive in a multi-pump system is connected to both signals at the same time, the drive with the minimum pump ID number will start running as the master.	0-2（0）	

Function code	Specification	Range（Default）	Remark
57.04 Autochange mode	Autochange: 0: Autochange interval:The pump start order will be rearranged according to the defined interval start. order/priority of the motor : 1->2->3->4->5-->Automatic switch-->; Motor start order/priority : 2->3->4->5->1-->Automatic switch-->; Motor start order/priority : 3->4->5->1->2 1: The water pump is started according to the minimum running time, that is, the water pump with the minimum running time is started each time	0-1（0）	
57.05 Switching water pump	In water supply card mode, this setting related to Vari frequency pump connection 0. Fixed vari frequency pump 1. Multiple vari frequency pump Fixed vari frequency pump means 1 pcs fixed vari frequency pump+ 5 pcs grid pumps Multiple vari frequency pump means M pcs (at least 2 pcs) vari frequency pump+ N pcs grid pumps Wiring of two mode are different		
57.06 Switching Period(h)	This parameter defines the time interval between automatic switch (pump start reordering) events. Enable at 57.04=0. When this time is met and the drive is not in operation, the master drive starts the automatic switch.	0-30000（100）	
57.07 bandwidth	The bandwidth value, the percentage of the set value within which the feedback value will not start or stop the auxiliary pump.	0-100.00 （5.00%）	
57.08 Bandwidth delay（bar）	After the feedback exceeds the bandwidth value, the auxiliary water pump starts or stops after the delay time.	0-200.00 （1.60）	
57.09 constant speed(rpm)	In the multipump mode， When the operation of one master pump A cannot meet the demand, another master pump B is started, and the master pump A runs at this speed without PID adjustment.	0-30000 （1500）	
57.10 Simultaneous operation quantity	Maximum number of pumps allowed to run at the same time. Changing the total number of pumps also changes this parameter	0-57.01（3）	

Function code	Specification	Range（Default）	Remark
57.11Overpressure monitoring pressure value	It only stay master motor to adjust and stop all auxiliary motors when the feedback greater than this value. 0：Disable this feature；		
57.12 The Auxiliary Pumps' Start speed in Multi-pump System（rpm）	The Auxiliary Pumps' Start speed in Multi-pump System	0-30000（1500）	
57.13 The Auxiliary Pumps' Stop speed in Multi-pump System（rpm）	The Auxiliary Pumps' Stop speed in Multi-pump System	0-30000（100）	
57.14 Pressure unit	0：bar；1：psi	0-1（0）	
57.15 Time Enable	After setting the 57.16 runtime, 57.15 is set to 1, then 57.16 set value works. In multi drives (pumps), this setting is 1 1. Drive running time enable Water supply card setting 1-6 N: No. of pump, 1-6 running time enable	0-1（0）	
57.16 Running Time	modify pump run time 57.20 to this set value	0-65535（0h）	
57.17 Overtime Alarm	When this value is not equal 0,the pumps continuing running time exceed this value,then reported alarm. 0：Forbid；	0-65535（0h）	
57.18 Overtime Fault	When this value is not equal 0,the pumps continuing running time exceed this value,then reported fault. 0：Forbid；	0-65535（0h）	
57.19 Interval Time Clocking	When57.04=0， Interval Time clocking, this switch timing is time clocking		
57.20 Pump Running Time	Pump total running time	RO	
57.21 Pump Status	Valid at multi pumps (drives)	RO	
57.22 Multi pump control valid mark	Valid at multi pumps (drives)	RO	
57.23Quantity	Total running pump quantity in system	RO	
57.24 Master /Slave Mode	1：Master drive； 0：Slave drive； This value is determined automatically by the system without modification	RO	
57.25 Master Pump ID	Master ID in system. Only have a master drive at a same time	RO	
57.26 Priority maximum pump ID	When57.04=0, Interval Time Switching Mode, has the highest priority pump ID	RO	
57.27 Refresh rate	Default	1500rpm	
57.28 Refresh signal source	Default	Di2	

Function code	Specification	Range （Default）	Remark
57.29 Pump 1 mode	0. No pump 1. Vari pump 2. Grid pump	0-2	
57.30 Pump 2 mode	Refer to 57.29	0-2	
57.31 Pump 3 mode	Refer to 57.29	0-2	
57.32 Pump 4 mode	Refer to 57.29	0-2	
57.33 Pump 5 mode	Refer to 57.29	0-2	
57.34 Pump 6 mode	Refer to 57.29	0-2	
57.35 start Vari frequency pump, switch speed	Start the Vari frequency pump, the master pump speed. Start Grid pump, the master pump speed will drop to 0	0-3000 (1500)	
57.36 Stop pump, Master drive speed	0. speed no change 1. Running at Max speed	0-1 (0)	
57.37 contactor close delay time	Contactor close delay time to start drive	0-100s (1.0s)	
57.38 contactor delay open time	Contactor open delay time to connect grid	0-100s (1.0s)	

6. Pressure reference, feedback settng：



Pump dry run judge:
52.09=1 Dry run fault judge by RPM change.

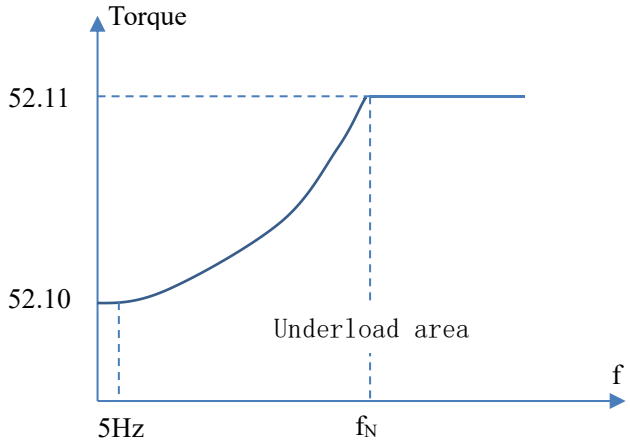
Dry run judge formula

$$T = K \times f^2 + b$$

T：Actual torque judge value ； K：Coefficient； b：Constant。

$$K = \frac{52.11 - 52.10}{f^2};$$

$$b = 52.10$$



When 52.09 = 2， Dry run judge value as 52.10
Fire mode function
1)mode 1, Drive runs at set speed till burn, without alarm
2)mode 2,Drive runs at set speed and will trip as Output shirt circuit, Over voltage, Over current and output phases loss
3)Drive does not report the fault and record the fault on fire mode.

Fire mode

1) Mode 1. Drive run at set speed, no alarm output. Speed as 53.02

2) Mode 2. Output short circuit, Overvoltage, Overcurrent, phase loss only Speed as 53.02

3) Mode 3. Fire mode valid, PID disable. Fire mode invalid, PID works

4) Mode 4. No fault alarm , drive record the fault only

Leakage, broken pipe detection, Leakage detection enabled:

1) Method 1: When the feedback pressure value is reduced in 53.06 leak

detection time, the leakage detection suddenly deceit threshold is detected, then the water leakage is detected. For example: the pressure feedback value is suddenly reduced by 0.2 MPa in 20s in operation, it is considered leaking ;

2) Method 2: When the drive running speed is greater than 53.09, the feedback pressure is less than 53.07 leak detection, for 53.08, then detects that there is a leakage; for example: PID output maximum, continuous operation 1 min, The pressure feedback value is less than 0.5 MPa, it is considered to have water leakage; the alarm, more than 0.5 MPa, warning clear;

3) The leakage detection action can be set to alarm or reportable, when 53.04 leak detection enable settings to 1, method 1 detects a warning 17, method 2 detects a warning 18; when 53.04 leak detection When it is set to 2, method 1 and method 2 detects that there is a failure 38;

4) When the pump mode, the speed is greater than 27.33, the feedback pressure continues to be less than 0.01, duration 27.36, and the feedback loss fault.

Pre PID:

1) In the pump mode, when initial start and wake up, first enter the pre-pid, no PID adjustment, the drive running speed is pre pid speed 53.10;
2) When the feedback pressure 52.04 is smaller than the pre-pid setting pressure 53.12, the pre-pid duration is 53.11, and then it enters the PID adjustment state;
3) When the feedback pressure 52.04 is greater than the pre-pid setting pressure 53.12, it immediately enters the PID adjustment state;
4) The pre-pid speed is set to 0, which is prohibited.

27.25 sleep mode

1) Internal reference, motor speed lower than 27.26 PID sleep level, PID bias lower than 27.28 PID Awake up level. After 27.27 PID sleep delay, Drive will sleep. When PID bias higher than 27.28 awake up level, after 27.29 PID awake up delay time. PID will restart

2) External reference, Source from 27.30. When signal on (1), after delay time, drive will sleep. In sleep mode, when signal off (0). After awake up delay time, PID will restart

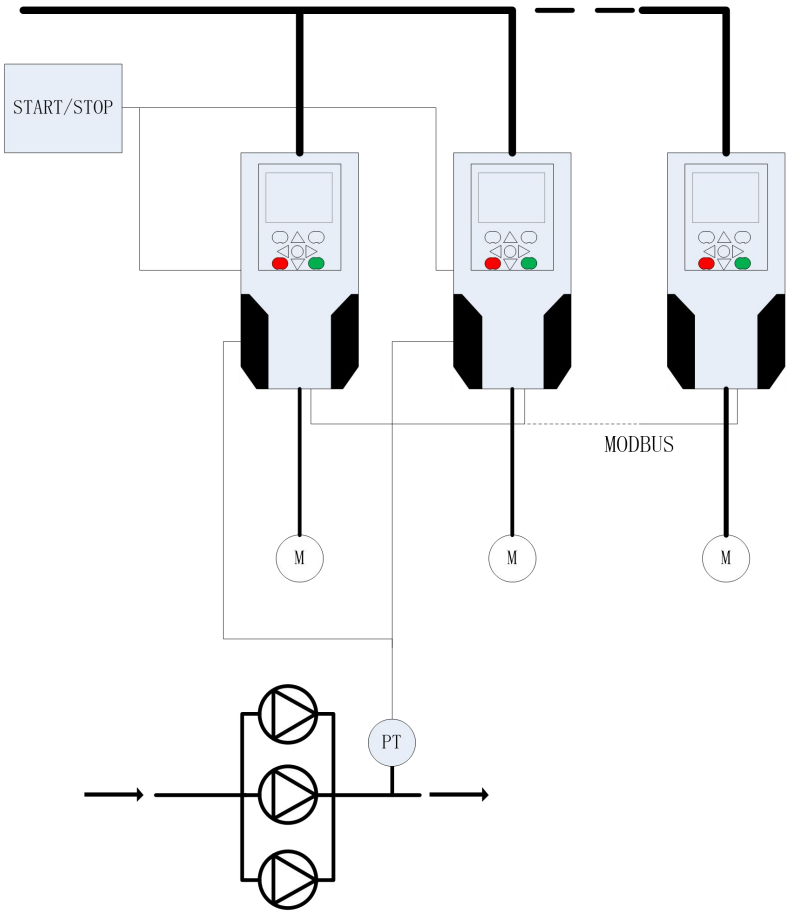
3) PID bias lower than 27.28 PID awake up level 1/2, after 27.27 PID sleep delay. Drive will sleep. When the bias higher than 27.28 PID awake up level, after 27.29 PID awake up delay time, PID will restart

4) When 52.04 pressure feedback higher than 52.06 sleep level, after delay time,

PID will sleep; When Pressure feedback lower than 52.07 awake up level. PID will restart

1. Multipump function

Multipump function is designed for controlling a system where up to 8 motors (e.g. pumps, fans or compressors) are operating in parallel. The internal PID controller of the drive regulates the system by running a necessary number of motors and controlling the speed of the motor(s) depending on the demand.
The basic settings of Multipump system follow.

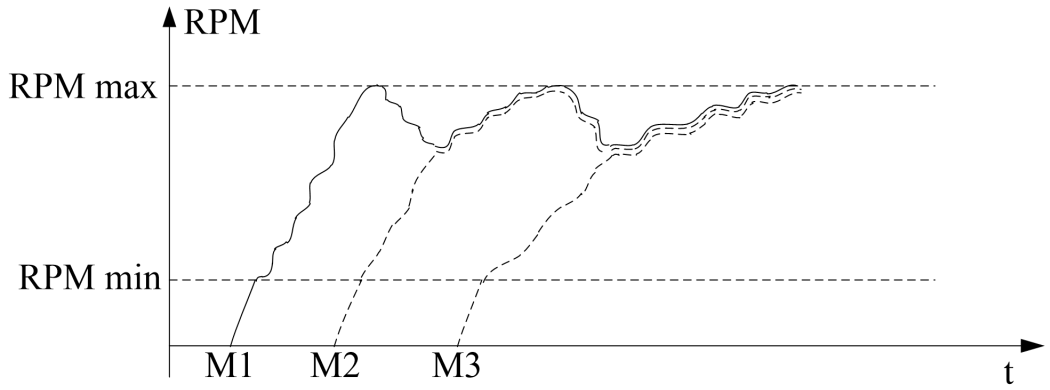


Mode 1： Multifollower

Multifollower mode is designed to control a system of up to 8 variable speed pumps. Each pump is controlled by its own drive. The internal PID controller of the drive regulates all pumps.

One of the pumps operates always as a regulating pump. When the regulating pump notices a demand for more capacity (running at maximum frequency), but cannot produce this by itself, it requests the next pump to start via communication bus. Next pump accelerates and starts to run at the speed as the regulating pump. In other words, auxiliary pumps follow the speed of the regulating pump.

When the regulating pump notices that there is too much capacity (running at minimum frequency), it requests the recently started pump to stop. If there are no auxiliary pumps running when the regulating pump notices overcapacity, it will go into Sleep mode (if Sleep function is enabled).



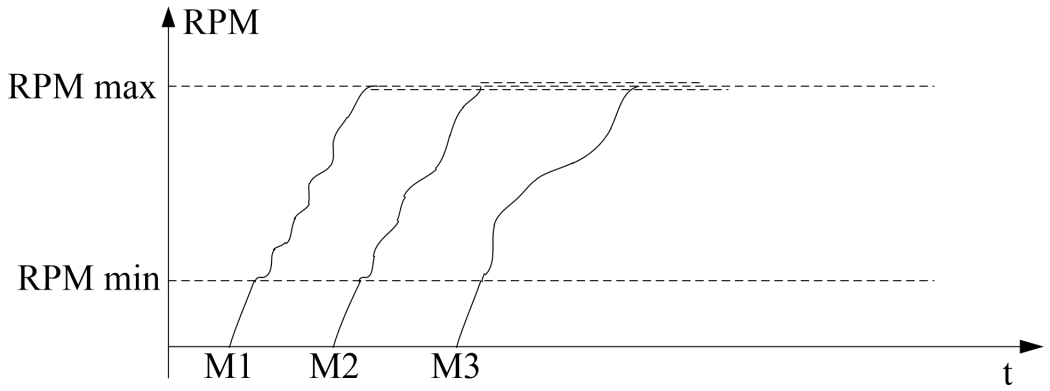
P1 is the regulating pump

B = Auxiliary pump connected to mains (Direct-On-Line)

Mode 2：Multimaster

Multimaster mode is designed to control a system of up to 8 variable speed pumps.One of the pumps is always operated as a pressure regulating pump. When the tun :ts a higher demand, and it is unable to satisfy this demand, it will lock itself at a constant speed, and then the next pump begins to start PID adjustment.

If the currently adjustable inverter detects excessive demand (minimum running frequency), it will stop running, and then restarted by the inverter running at a constant speed, when there is a plurality of constant speed running.The leading inverter starts adjustment, if only one pressure regulating pump is adjusted, the sleep mode is entered (enabled).

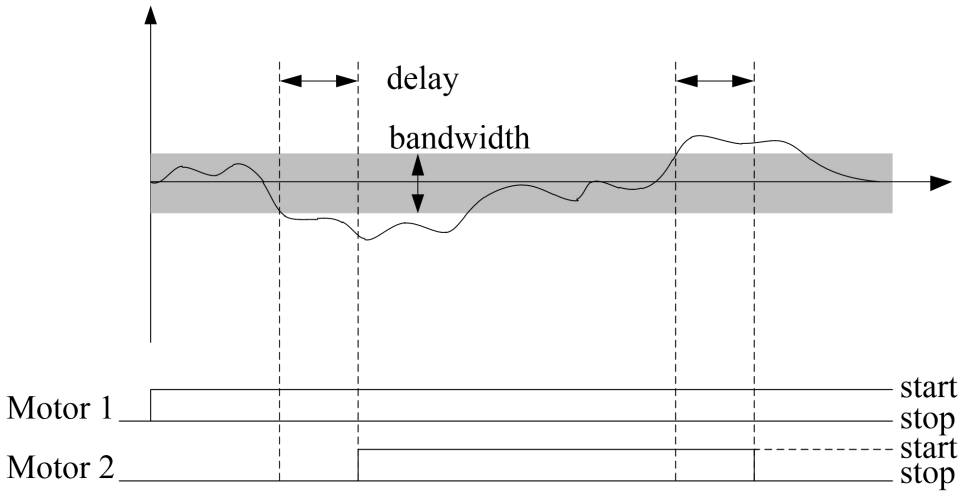


The Auxiliary Pumps' Start/ Stop Logic in Multi-pump System

Bandwidth and delay define the conditions for starting/stopping pumps in a multi-pump system. If the PID controller cannot keep the feedback value within the bandwidth defined around the set point, the number of pumps running will increase or decrease.

The bandwidth area is defined as a percentage of the PID set point. As long as the PID feedback value stays within the bandwidth area, there is no need to increase/decrease the number of running pumps.

When the feedback value deviates from the bandwidth area, the number of running pumps will increase/decrease only after the time defined by parameter P57.08 has passed. The figure below shows the criteria for starting and stopping the auxiliary pump.



Criteria for increasing the number of running motors:

• The feedback value is outside the bandwidth area

• The pressure regulating pump runs at the frequency close to maximum (A in the figure)

• There are more pumps to run
• The time to meet the above conditions exceeds the bandwidth delay.

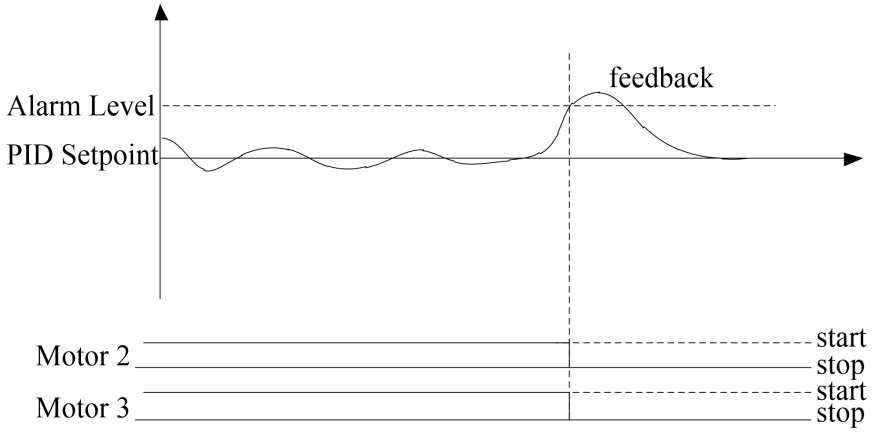
Criteria for reducing the number of running motors:
• The feedback value is outside the bandwidth area
• The pressure regulating pump runs at a "close to minimum" frequency (B in the figure)
• There are more pumps to run
• The time to meet the above conditions exceeds the bandwidth delay

Automatic Switching Function

The automatic switching function can be used to balance the degree of wear of all motors in the system.
The automatic switching function monitors the operating hours of each motor and arranges the starting sequence of the motors accordingly.
The motor with the lowest operating hours will start first, and the motor with the largest operating hours will start last.
Automatic switching (change the starting sequence) can be set based on the automatic switching interval; in multi-pump control, automatic switching is determined by the running time of the pump; the start/ stop of the auxiliary pump, and the sequence of start/ stop are also determined by the pump's running time.

Overpressure Monitoring Function

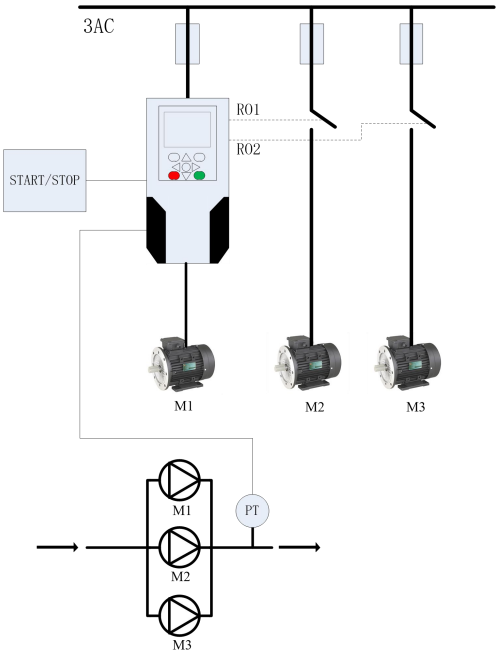
The overpressure monitoring function is used for pressure monitoring in a multi-pump system.For example, when the main valve of a pump system closes quickly, the pressure in the pipeline will increase quickly.
The pressure may rise too fast, so that the PID controller has no time to react.
Overpressure monitoring is used to prevent pipe bursts by quickly stopping the auxiliary motor in the multi-pump system.
If the overpressure monitoring is enabled and the PID feedback signal (pressure) exceeds the monitoring level defined by parameter P57.11, all auxiliary motors in the multi-pump system will stop.
Only the regulating motor maintains normal operation. After the pressure is reduced, the system will continue to work normally and reconnect the auxiliary motors one by one. See the figure below.
The overvoltage monitoring function will monitor the PID controller feedback signal and immediately stop all auxiliary motors when the signal exceeds the defined monitoring level.



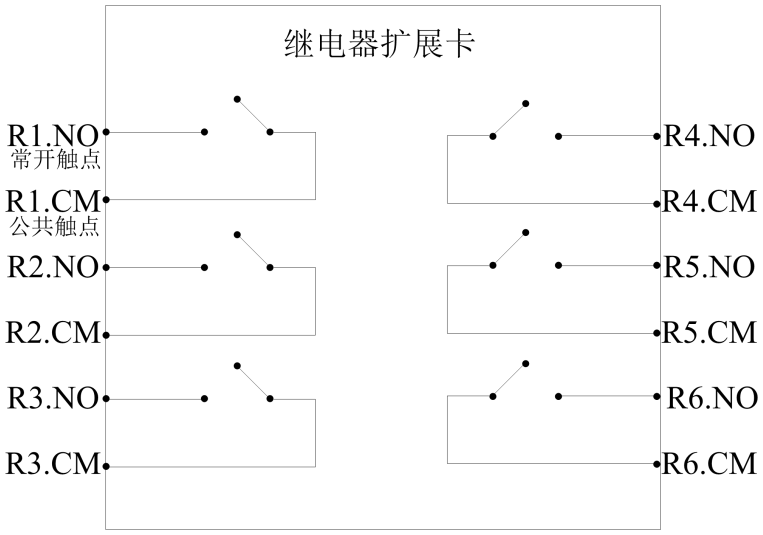
Pressure；
PID Feedback；
Monitoring Alert Level
PID Setting Point
Motor 2,3

Water supply card (External Relays)

One pcs Drive control multi motors (Pump, Fan or compressor) system. Drive control the Vari frequency motor speed by PID mode, and control auxiliary motor start/ stop by contactors. With Water supply card, it support multi motors Vari frequency/ Grid switch or Grid start/ stop

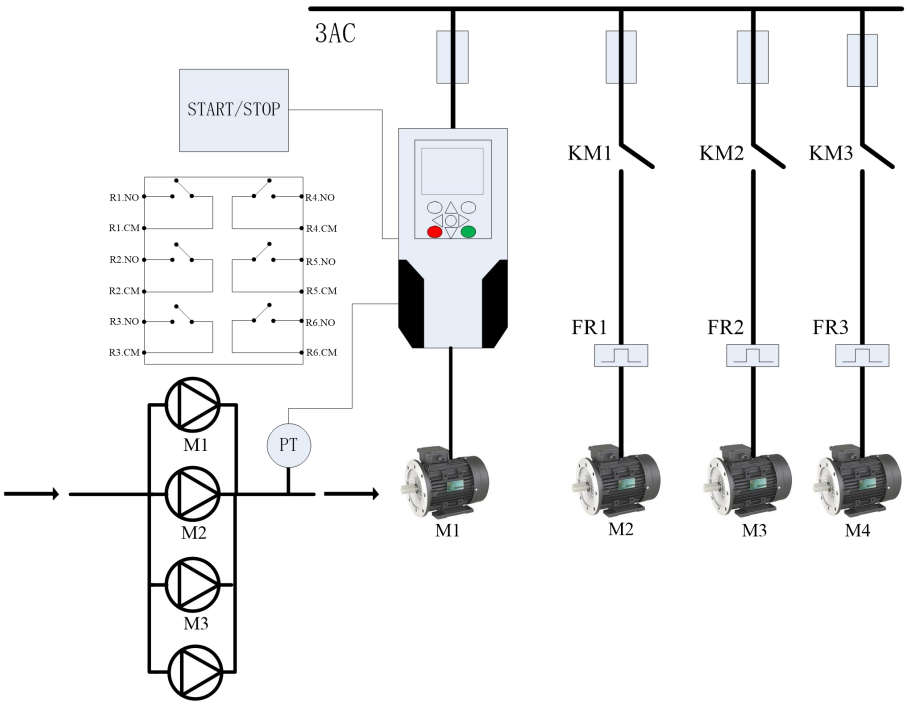


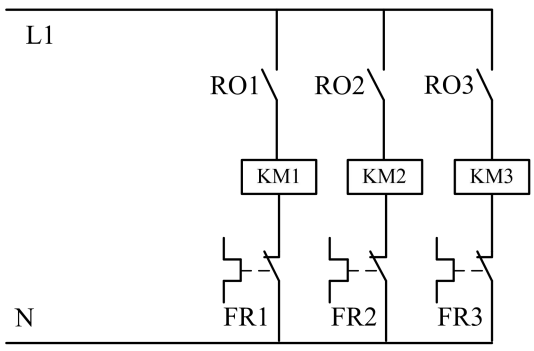
Fixed vari frequency



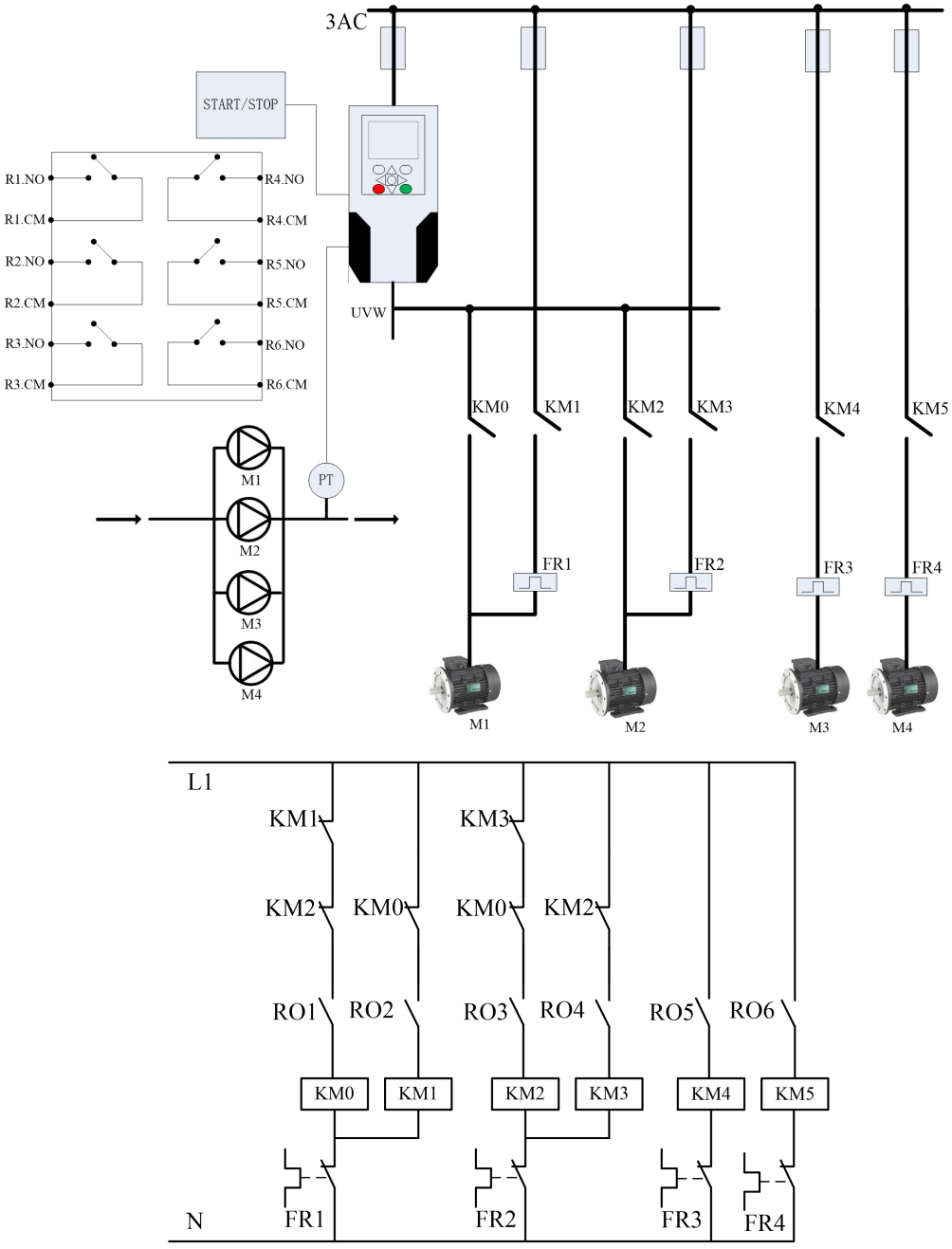
Water supply card (External relays card) specification

Mode 1: Fixed Vari frequency pump





Mode 2: Multi Vari frequency pump



Two Vari frequency pumps+ two grid pumps

Water supply card parameters setting

1. Wiring
2. 63 Group , motor auto tuning
3. 52.14 pump mode enable =1, 57.00 multi pumps mode=0, in water supply card mode 57.05=0, fixed vari frequency pump

4. Set 52 group as actual

5. Set 53 group as actual

6. Set 57 group multi pumps as actual

Function code	specification
57.00 Multi pump mode	0：single pump control
57.01 Pump quantity	
57.02 Pump ID No.	
57.03 Signal connection	
57.04 Switch mode	In water supply card mode, drive will start the less running time pump. If there are Vari frequency pump and grid pump, Vari frequency pump will start priority
57.05 Switch pump	1：Water supply card
57.06 Switch period	
57.07 bandwidth	As actual
57.08 delay	As actual
57.09 constant speed	
57.10 pump running quantity in same time	Total system pump quantity as default. Set as actual
57.11 Over pressure value	As actual
57.12 Start pump speed	As actual
57.13 Stop pump speed	As actual
57.14 Pressure unit	0：bar；1：psi
57.15 Time set enable	
57.16 Running time set	
57.17 Over time alarm	As actual
57.19 Over time fault	As actual
57.19 switch timing	
57.20 Pump running time	
57.21 Pump status	
57.22 Multi pump control valid symbol	
57.23 Running quantity	
57.24 Master slave mode	
57.25 Master ID	
57.26 Prior pump ID	
57.27 Refresh speed	As actual
57.28 Refresh source	As actual
57.29 Pump 1 mode	0. No pump 1. Vari pump 2. Grid pump

57.30 Pump 2 mode	Refer to 57.29
57.31 Pump 3 mode	Refer to 57.29
57.32 Pump 4 mode	Refer to 57.29
57.33 Pump 5 mode	Refer to 57.29
57.34 Pump 6 mode	Refer to 57.29
57.35 start Vari frequency pump, switch speed	As actual
57.36 Stop pump, Master drive speed	As actual
57.37 contactor close delay time	As actual
57.38 contactor delay open time	As actual

Relays setting

Function code	specification	
14.29 DO1/RO3 source	0	Constant 0
	1	Constant 1
	06.00.04	Ready
	06.00.01	Fault
	06.00.02	Alarm
	06.00.04	Running
	06.08.00	Pump1 Variable - frequency
	06.08.01	Pump1 Grid - frequency
	06.08.02	Pump2 Variable - frequency
	06.08.03	Pump2 Grid - frequency
	06.08.04	Pump3 Variable - frequency
	06.08.05	Pump3 Grid - frequency
	06.08.06	Pump4 Variable - frequency
	06.08.07	Pump4 Grid - frequency
	06.08.08	Pump5 Variable - frequency
	06.08.09	Pump5 Grid - frequency

	06.08.10	Pump6 Variable - frequency
	06.08.11	Pump6 Grid - frequency
	User define	
14.30 DO2/RO4 source	Refer to14.29	
14.31 RO3 source	Refer to 14.29	
14.32 RO4 source	Refer to 14.29	
14.46 RO5 source	Refer to 14.29	
14.47 RO6 source	Refer to 14.29	

Communication Parameter Setting (Automatic Setting)

			Remarks
7	50.05 Input Data 1	P.57.20 Total Running Time: h	Change to pump running time
8	50.06 Input Data 2	P.04.12 Pump Status Word	
9	50.07 Input Data 3	P01.00 Motor Speed	
10	50.08 Input Data 4		
11	50.08 Input Data 5		
12	50.08 Input Data 6		
13	50.08 Input Data 7		
14	50.08 Input Data 8		
15	50.08 Input Data 9		
16	50.08 Input Data 10		
17	50.08 Input Data 11		
18	50.08 Input Data 12		
19	50.17 Fieldbus Module Output 1	P.21.00 Speed Setting	When multi-master, PID output setting; When multi-master, constant speed is given; When there are multiple slaves, the fieldbus set 1;
20	50.18 Fieldbus module output 2	P.00.02 Fieldbus Setting 1	
21	50.19 Fieldbus module output 3	P.00.01 Fieldbus Control Word	

22	50.20 Fieldbus module output 4	Operation mode control word 57.27 Control Location 1 Start Function	In multi-master mode, PID output becomes constant speed operation The slave is a fieldbus start
23	50.21 Fieldbus module output 5	 57.25	ID sent by the host
24	50.22 Fieldbus module output 6		

Test Requirements Draft

1）Basic function test

2）Multi-master Mode Test

Multi-slave Mode Test

- The master pump adjusts the pressure by PID: When the output is close to the maximum frequency (pidmax-50 or upgraded speed), it will delay for a certain period of time. If the pressure still does not meet the requirement (set-width), the non-running water pump (slave) will be started. Has been increased to the number of pumps (runnum).

- The master pump adjusts the pressure by PID: When the operating frequency is close to the minimum frequency (pidmin+50 or degraded speed) and the pressure is greater than the set pressure (set+width), the slave will be stopped. According to the principle of starting first, stopping first.

- When there is no slave running, the master enters the sleep state when the sleep condition is met (sleep enable); Wake up first when the wake-up conditions are met. Can add and subtract pump operation.

- There are two starting sequences for the slaves, one is 1-2-3-4-5-6, after the interval is up, it will be changed to 2-3-4-5-6-1, which will start in order according to the priority, and so on; The other is to give priority to starting the pump with the smallest running time every time.

- The stopping sequence of the slave machine is based on the principle of “start first, stop first”, or stop the pump with a long running time.
- The speed of the slave follows the master’s.

3）Auxiliary Function Test

- Running time setting: set the time first, then enable, then the running time will be changed to the set value.
- Running time alarm: when the running time alarm value is not zero, an alarm will be issued if the current running time is greater than the alarm value.
- Running time fault: When the running time fault value is not zero, if the current running time is greater than the fault value, a fault will be reported.
- Slave startup sequence change: after a certain time interval (setting value + when no slave is running), the startup priority will move forward in turn.

4） Fire overstepping control optimization

Series 09.01：1(ES580)、2(ES850)、4(ES580L)、5(ES850L)、6(ES350L)
Firmware Version No.: 09.02：105.03
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