Catalog

Chapter 1 Overview

1.1 Safety Precaution

To ensure safe and proper use of this product, please fully understand the safety precautions outlined in this manual before using.

Signs and Meanings

The following signs are used in this manual to highlight the key safety points. Failure to observe these points may result in damages to this product and the associated system, or even personal injuries.

DANGER	**DANGER**: Incorrect operation may result in death or major safety incidents.
WARN	**WARN**: Improper operations may cause personal injury or device damage.
CAUTION	**CAUTION**: Incorrect operation may result in minor injuries.

Operator

This product must be installed operated and maintained by trained professionals. "Trained professionals" means that the personnel working on this product must be trained with specialized skills and knowledge about installation, wiring, operation and maintenance of the equipment, so they can respond correctly to various emergencies that may arise during use.

Safety Guide

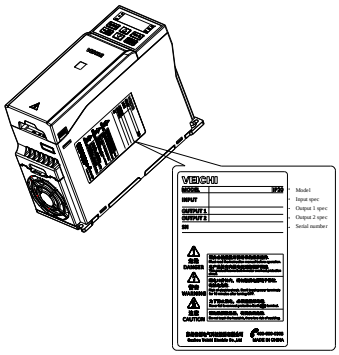
The safety rules and warning signs presented for safety are taken to prevent personal injuries and damages to the products and the associated systems. Please read this manual carefully before use and strictly follow the safety guidelines and warning signs in this manual.

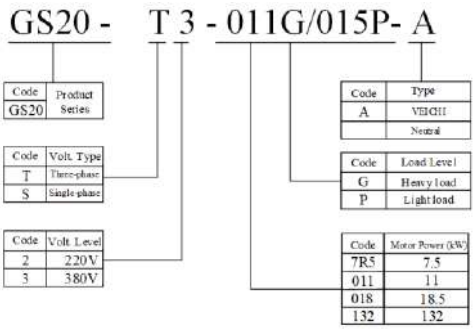
- During transportation and storage, it is crucial to protect the AC drive from shocks and vibrations. Additionally, it should be stored in a dry environment free of corrosive gases and conductive dust below 60°C.
- This product carries a dangerous voltage and it controls a potentially dangerous motion mechanism. Failure to comply with the regulations or to operate in accordance with this manual may result in personal injury or death and damage to the product and the associated system.
- Do not perform wiring work while the power is on, as there is a risk of death by electric shock. Before performing wiring, inspection, maintenance, etc., disconnect the power supply to all associated equipment and make sure that the DC voltage in the main circuit has dropped to a safe level for 5 minutes.
- The power cable, motor cable, and control cable must all be tightly connected, and the grounding terminal must be grounded with a grounding resistance of lower than 10Ω.
- Human static electricity can seriously damage internal sensitive devices. Before performing related work, observe the measures and methods specified in the electrostatic discharge prevention measures(ESD), otherwise the drive may be damaged.
- Output voltage of the drive is in a pulse waveform, so if there are devices such as capacitors for power coefficient improvement or varistors for lightning protection installed on the output side, be sure to remove or move them to the input side.
- Do not add switching devices such as circuit breakers and contactors to the output side of the AC drive. (If it is necessary to connect switching devices to the output side, please ensure that the output current of the AC drive is zero when the switch is on or off.)
- Wherever the malfunction occurs in the control equipment, it may lead to production stoppage and major accidents. Therefore, please apply the necessary external protection measures or backup devices.
- This product may only be used for purposes specified by the manufacturer, and shall not be used without authorization in special areas related to emergency, rescue, marine, medical, aviation, and nuclear facilities.
- Maintenance of this product can only be carried out by the company or by professionals authorized and licensed by the company. Unauthorized modification or use of accessories not approved by the company may result in product failure. Any defective devices during maintenance must be replaced in a timely manner.
- VEICHI will not be held liable for injuries and equipment damage caused by your company or your customers' failure to comply with the contents of this book.

1.2 Unpacking

Please check the outer packaging for any damage upon receiving the ordered products. And then check the product inside for any damage, scratches, or dirt.(Please note that damage during transportation is not covered by the Three Guarantees warranty policy.) If the product received is damaged during transportation, please contact us or the transportation company immediately. Please confirm that the type of the received product matches the model you ordered.

Drive Model and Description





Drive rated output current

Input Voltage (V) / Output Current(A) / Power(kW)	220	380
0.75	4	3
1.5	7	4
2.2	10	6
4	16	10
5.5	20	13
7.5	30	17
11	42	25
15	55	32
18.5	70	38
22	80	45
30	110	60
37	130	75
45	160	90
55	200	110
75	260	150
90	320	180
110	380	210
132	420	250
160	550	310
185	600	340
200	660	380
220	720	415
250	-	470

280	-	510
315	-	600
355	-	670
400	-	750
450	-	810
500	-	860
560	-	990
630	-	1200
710	-	1340

1.3 Technical Specifications

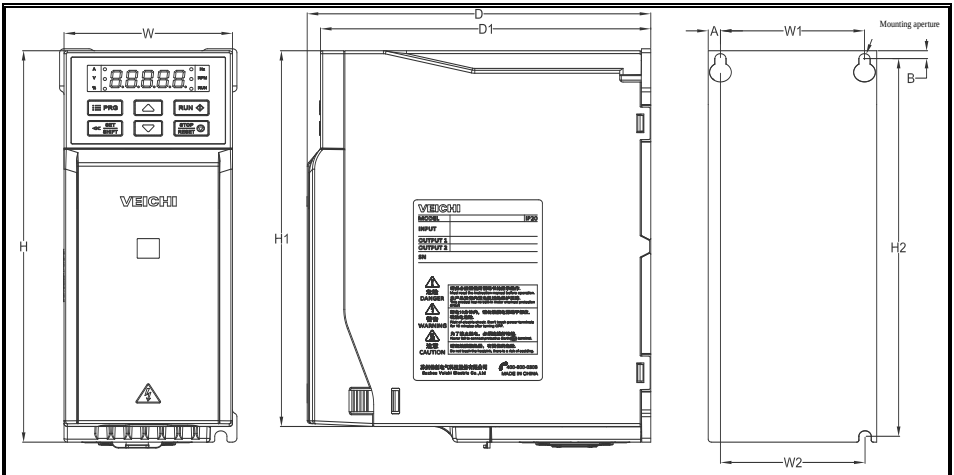
Item		Specification
Power Input	Voltage/frequency	S2: Single-phase 200V~240V 50Hz/60Hz T2: Three-phase 200V~240V 50Hz/60Hz T3: Three phase 380V~480V 50Hz/60Hz
	Allowable fluctuation	T/S2:-10%~10% T3:-15%~10% Voltage imbalance rate: <3%; frequency: ±5%; distortion rate with reference to IEC61800-2
	Switching surge current	< rated current
Output	Output voltage	Output under rated conditions: Three-phase, 0V~input voltage, bias<5%
	Output frequency range	0Hz~599Hz
	Output frequency accuracy	±0.5% of the max. frequency
	Overload capacity	G: 150% of rated current for 89s, 180% of rated current for 10s, and 200% of rated current for 3s P: 120% of rated current for 35s, 140% of rated current for 7s, and 150% of rated current for 3s
Main Control Performance	Motor type	Three-phase asynchronous motors, permanent magnet synchronous motors (sine wave), and synchronous reluctance motors
	Control mode	V/F control, SVC, FVC, and voltage-frequency split control
	Modulation	SVPWM
	Carrier frequency	1.0kHz~16.0kHz
	Speed control range	SVC: Rated load 1:200 FVC: Rated load 1:200
	Speed stabilizing accuracy	SVC: ± 0.5% (Three-phase AM), ±0.1%(PM) FVC: ±0.02%
	Starting torque	SVC: 150% of the motor rated torque at 0.25Hz FVC: 200% of the motor rated torque at 0Hz
	Torque response	SVC: <10ms; FVC: <5ms
	Torque accuracy	SVC: ±5%; FVC: ±2.5%
	Frequency accuracy	Digit setting: Max. frequency × (±0.01%); analog setting: Max. frequency × (±0.2 %)
	Frequency resolution	Digit setting: 0.01Hz; analog setting: Max. frequency × ±0.05 %
Basic Functions	Torque control	Torque calculation and speed limit in torque mode
	DC brake	Starting frequency: 0.00Hz~50.00Hz; Braking time: 0.0s~60.0s; Braking current: 0.0%~150.0% of rated current
	Torque boost	Auto torque boost: 0.0%~100.0% Manual torque boost: 0.0%~30.0%
	V/F curve	4 patterns: Linear, self-defined, 1.1~2.0 power, and square
	ACC/DEC curve	2 patterns: Linear and S-curve acceleration/deceleration 4 sets of acceleration/deceleration time, unit: 0.01s, 650.00s max.
	Rated output voltage	With the power voltage compensation function, it can be set within 50%~100% with the rated voltage of the motor as 100% (the output cannot exceed the input voltage)

	Auto voltage regulation	The output voltage can be automatically kept constant when the grid voltage fluctuates	
	Auto ECO mode	Output voltage is automatically optimized according to the load in V/F control mode to save energy	
	Auto current limit	Auto current limit works during operation to prevent frequent tripping due to over-current fault	
	Instantaneous power loss mode	Uninterrupted operation is realized through bus voltage control in case of instantaneous power loss	
	Standard Functions	PID control, fly track and restart after power down, jump frequency, upper/lower frequency limit control, program operation, multi-frequency, RS485, analog output, frequency pulse output, parameter access level setting, common parameter setting, monitoring comparator output, counting and timing, and wobble frequency	
	Frequency source	Funcode setting, the potentiometer, analog voltage/current terminal AI1 and AI2, communication, X terminal, and frequency source combination	
	Feedback input source	AI1 and AI2, communication, and PUL terminal	
	Command source	Keypad, terminals and communication	
	Input command signal	Start, stop, forward and reverse, jog, multi-frequency, free stop, reset, acceleration/deceleration time, frequency source, and external fault alarms	
	Output signal	1 × relay output, 1× open collector output, and 1× AO for 0V~10V, 0mA~20mA or 4mA~20mA, or frequency pulse output	
Protection		Over-voltage, under-voltage, current limit, over-current, overload, electronic thermal relay, over-heat, over-voltage stall, data protection, stall protection and input/output phase loss protection	
Keypad Display	LED display	Internal keypad: Single-line 5-bit digital tube display	To monitor the status of 1 AC drive
		External keypad: Single/dual line 5-bit digital tube	Dual-line to monitor the status of 2 AC drives
	Parameter copy	Upload and download the information of the AC drive to realize fast parameter copying	
	Status monitoring	All parameters of the monitoring group include output frequency, target frequency, output current, input voltage, output voltage, motor speed, PID feedback, PID target, module temperature, target torque, output torque, etc.	
	Fault warning	Overvoltage, undervoltage, overcurrent, short circuit, phase loss, overload, overheat, over-voltage stall, current limit, data damaged, operating conditions of current faults, and fault history	
Environment	Installation	<1000 meters, derate 1% for every 100 meters rise when above 1000m No condensation, icing, rain, snow, hail, etc., solar radiation below 700W/m², air pressure 70kPa~106kPa	
	Temperature, humidity	-10°C~+50°C, derate above 40°C, 60°C max. (no-load) 5%RH~95%RH(non-condensing)	
	Oscillation	5.9m/s²(0.6G) at 9Hz~200Hz	
	Storage temperature	-30°C~+60°C	
	Installation method	Wall-mounting	
	Protection	IP20	
	Pollution class	Grade 2	
	Cooling method	Forced air-cooling	

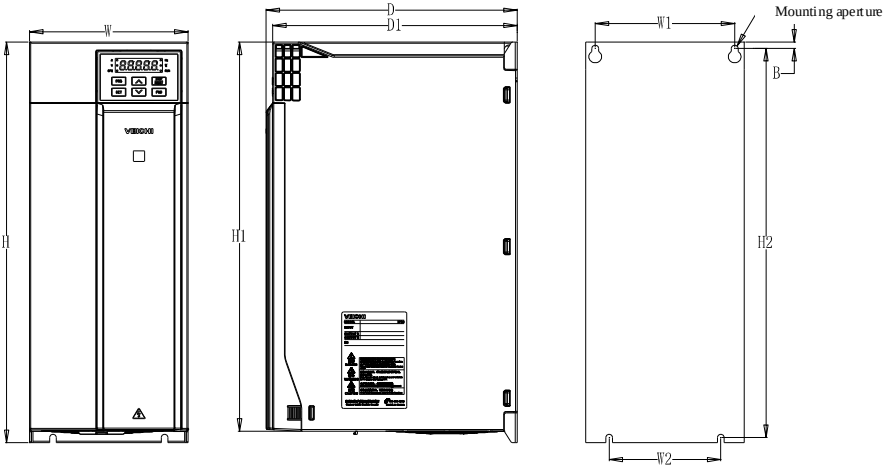
Chapter 2 Installation

To ensure personal safety, maximized product performance and reliable operation of the drive, please use the products in strict accordance with the environmental, wiring and ventilation requirements described in this chapter.

External dimensions of the AC drive(plastic)

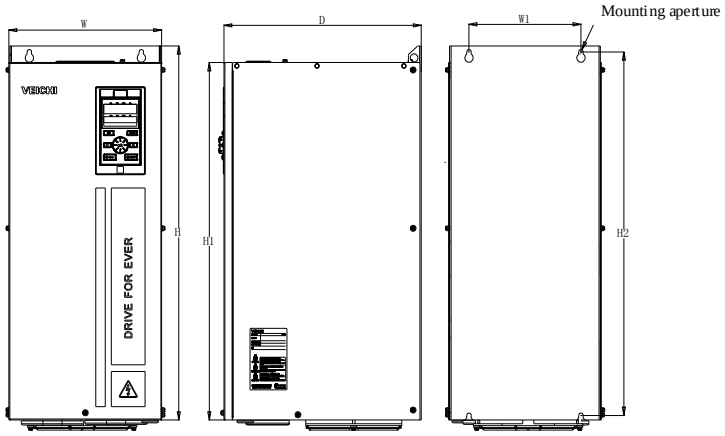


Drive Model	Outer Dimension(mm)					Installation Dimension(mm)					Installation aperture
	W	H	H1	D	D1	W1	W2	H2	A	B	
GS20-T/S2-R75G-A	76	200	192	155	149	65	65	193	5.5	4	3-M4
GS20-T/S2-1R5G-A											
GS20-T/S2-2R2G-A	100	242	231	155	149	84	86.5	231.5	8	5.5	3-M4
GS20-T/S2-004G-A											
GS20-T3-R75G/1R5P-A	76	200	192	155	149	65	65	193	5.5	4	3-M4
GS20-T3-1R5G/2R2P-A											
GS20-T3-2R2G-A											
GS20-T3-004G/5R5P-A	100	242	231	155	149	84	86.5	231.5	8	5.5	3-M4
GS20-T3-5R5G/7R5P-A											
GS20-T3-7R5G/011P-A	116	320	307.5	175	169	98	100	307.5	9	6	3-M5
GS20-T3-011G/015P-A											



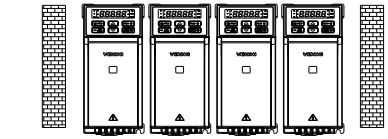
Drive Model	Outer Dimension(mm)					Installation Dimension(mm)				Installation Aperture
	W	H	H1	D	D1	W1	W2	H2	B	
GS20-T/S2-7R5G-A	142	383	372	225	219	125	100	372	6	4-M5
GS20-T/S2-011G-A										
GS20-T/S2-015G-A	172	430	/	225	219	150	150	416.5	7.5	4-M5
GS20-T2-018G-A										
GS20-T2-022G-A										
GS20-T3-015G/018P-A	142	383	372	225	219	125	100	372	6	4-M5
GS20-T3-018G/022P-A										
GS20-T3-022G/030P-A										
GS20-T3-030G/037P-A	172	430	/	225	219	150	150	416.5	7.5	4-M5
GS20-T3-037G/045P-A										

External dimensions of the AC drive(steel)

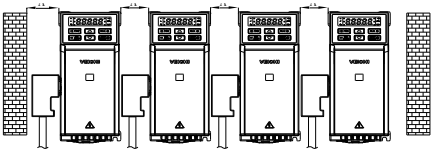


Drive Model	Outer Dimension				Hole Position		Installation Aperture
	W	H	H1	D	W1	H2	
GS20-T2-030G-A	240	560	520	310	176	544	4-M6
GS20-T2-037G-A							
GS20-T2-045G-A							
GS20-T2-055G-A	270	638	580	350	195	615	4-M8
GS20-T3-045G/055P-A	240	560	520	310	176	544	4-M6
GS20-T3-055G/075P-A							
GS20-T3-075G/090P-A							
GS20-T3-090G/110P-A	270	638	580	350	195	615	4-M8
GS20-T3-110G/132P-A							
GS20-T3-132G/160P-A	350	738	680	405	220	715	4-M8
GS20-T3-160G/185P-A							
GS20-T3-185G/200P-A	360	940	850	480	200	910	4-M16
GS20-T3-200G/220P-A							
GS20-T3-220G/250P-A							
GS20-T3-250G/280P-A	370	1140	1050	545	200	1110	4-M16
GS20-T3-280G/315P-A							
GS20-T3-315G/355P-A	400	1250	1140	545	240	1213	4-M16
GS20-T3-355G/400P-A							
GS20-T3-400G/450P-A							
GS20-T3-450G/500P-A	460	1400	1293	545	300	1363	4-M16
GS20-T3-500G/560P-A							
GS20-T3-560G/630P-A							

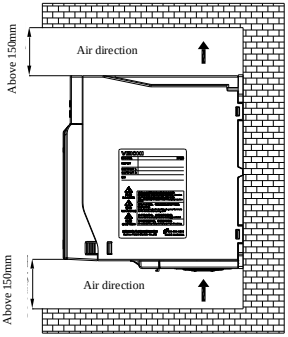
Installation space requirements



a.Unlimited left and right space
(no communication expansion)

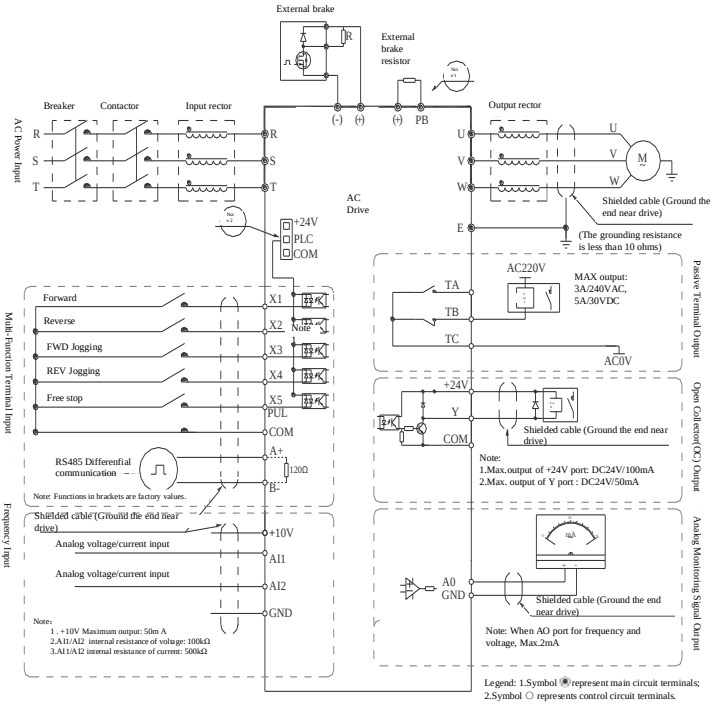


b.Parallel installation space A>50mm (with communication expansion) .



Top/Bottom space

Standard wiring



Note:

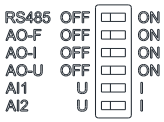
1. Models T3-22kW and below have built-in braking units, which need to be connected with braking resistors as required; For models without built-in brake units, external brake unit can be installed as required.

2. Terminals (X1~X5/PUL) can support NPN or PNP transistor signals as inputs, and the bias voltage can be selected from the internal power supply of AC drive (+24V terminal) or external power supply (PLC terminal).

● Auxiliary terminal output capacity

Terminal	Definition	Max. output
+10V	10V auxiliary power output, forming a circuit with GND.	50mA
AO	Analog monitoring output, forming a circuit with GND.	Max. output of 2mA for voltage signals
+24V	24V auxiliary power output, forming a circuit with COM.	100mA
Y	Open collector output, action object can be set in the software.	DC24V/50mA
TA/TB/TC	Passive contact output, action object can be set in the software.	3A/240VAC 5A/30VDC

● Switch function legend and description

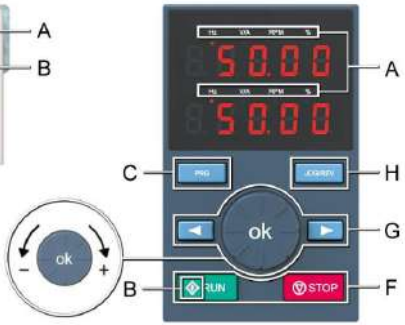
Tag	Position	Description
	485 terminating resistor	RS485 dialed to ON, and then communication circuit is connected to a 120Ω terminating resistor
	AO-Frequency	0.0kHz~100.0kHz frequency output from AO interface AO-F dialed to ON, external resistor is required (typically add 5.1kΩ to make it 10V)
	AO-Current	AO-I to ON to output current of 0mA~20mA or 4mA~20mA
	AO-Voltage	AO-U to ON to output voltage of 0V~10V
	AI1-Current/Voltage	AI1 dialed to I: To input current of 0mA~20mA AI1 dialed to U: To input voltage of 0V~10V
	AI2-Current/Voltage	AI2 dialed to I: To input current of 0mA~20mA AI2 dialed to U: To input voltage of 0V~10V

Chapter 3 Keypad Layout and Operation Instructions

● Keypad name

Single-line Keypad (models 37kW and below)

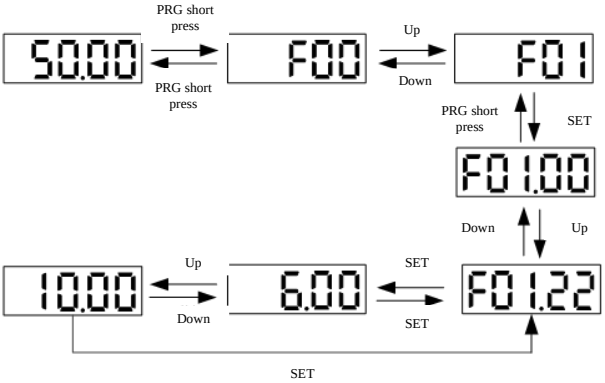
Dual-line Keypad (models 45kW and above)



Mark	Single-line	Dual-line	Function
A	Unit indicator		Hz: Frequency; A: Current; V: Voltage; V/A: voltage or current; RPM: Speed;%: Percentage
B	Status indicator		ON: Forward; Flash: Reverse; OFF: Stop
C	Program PRG	Program PRG	Enter the function menu under standby or operation status; Press it to exit during parameter modification; Long press it (1 second) under standby or operation to enter the status interface directly
D	Set/Shift SET SHIFT	-	Set: Press the key to confirm the modification Shift: Long press the key(1 second) to shift among the operation bit, and to shift circularly by holding on it
E	UP, DOWN	-	The UP key increases the value, the DOWN key decreases the value
F	RUN RUN	RUN RUN	When Run/Stop is controlled by the keypad, press this key to make the AC drive operate in forward direction. The status indicator light is always on when running in forward direction, and flashes when running in reverse direction
	Stop/Reset STOP RESET	Stop, Reset STOP	When the command source is keypad, press this key to stop the AC drive; Define other command sources to be valid or not by parameter F11.03 [STOP Key]; Press this key to reset AC drive in error status
G	-	ok	Digital potentiometer: Rotate clockwise to increase the value, and counterclockwise to decrease it
			Confirm key: Press the key to confirm the modified value after modification
		Left, Right	Shift the bit to the left and right
H	-	Multi-function JOG/REV	The functions of the key are selected via parameter F11.02 [Multi-function Key]

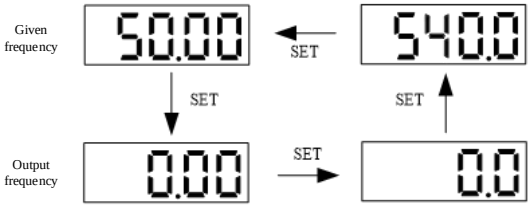
● Set the basic parameters

Take F01.22 [ACC Time]= 10.00s as an example to illustrate the basic operations of the LED keypad.



Note: To modify the tens-, hundreds- and thousands-bit of a parameter, press Shift for quick positioning.

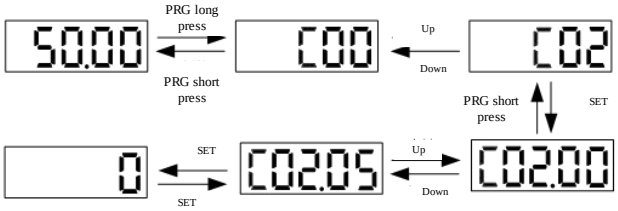
● Check the monitoring status



Note: Press Left to cycle through the first row of monitoring parameters and Right to cycle through the second row on the external keypad.

● Check the monitoring parameters

Here is an example of checking C02.05 [PLC Operation Stage] to illustrate basic LED keypad operation.



Chapter 4 Parameter List

This section only provides a brief list of functions. Please refer to the GS20 Technical Manual or consult our company for detailed information.

4.1 Parameter Icon Description

◆Marks and terms of control modes

Mark	Content
V/F	Valid parameters under V/F control for asynchronous motors (AM)
SVC	Valid parameters under open-loop vector control for asynchronous motors (AM)
FVC	AM parameters in closed-loop vector control valid
PMVF	Valid parameters under V/F control for permanent magnet synchronous motors (PM)
PMSVC	Valid parameters under open-loop vector control for permanent magnet synchronous motors (PM)
PMFVC	Valid parameters under closed-loop vector control for permanent magnet synchronous motors (PM)

Note: The unshaded marks mean that the parameter is invalid under certain control modes.

◆Marks and terms of control modes

Mark	Content
RUN	Parameters that can be modified during operation
STOP	Parameters that cannot be modified during operation
READ	The parameter can only be read, not modified (the LED displays 5 "-" during modification)

4.2 Parameter List

◆Code types for this product

Code	Name	Code	Name
F00.0x	Environment Settings	F07.2x	DC Brake and Fly Track
F00.1x	Common Parameters	F07.3x	Jog
F01.0x	Basic Commands	F07.4x	Start/Stop Hold/Jump Frequency
F01.1x	Frequency Commands	F08.0x	Counter and Timer
F01.2x	ACC/DEC Time	F08.3x	Wobble Frequency
F01.4x	PWM Control	F09.0x	Maintenance
F02.0x	Basic Motor Parameters and Auto-tuning	F09.60	Motor Phase Loss Detection
F02.1x	AM Advanced Parameters	F09.63-F09.78	Pipe Filling
F02.2x	PM Advanced Parameters	F10.0x	Current Protection
F02.3x~F02.4x	Encoder	F10.1x	Voltage Protection
F02.5x	Motor Application	F10.2x	Auxiliary Protection
F03.0x	ASR	F10.3x	Load Protection
F03.1x	ACR and Torque Limit	F10.4x	Stall Protection
F03.2x	Torque Optimization	F10.5x	Fault Reset and Motor Overload
F03.3x	Flux Optimization	F11.0x	Key Operation
F03.4x~ F03.5x	Torque control	F11.1x	Cyclic Monitoring of Status Interface
F03.6x	PM HF Injection	F11.2x	Monitoring Parameters
F03.7x	Position Compensation	F11.3x	Special Keypad Functions
F03.8x	Expansions	F12.0x	Modbus Slave
F04.0x	V/F Control	F12.1x	Modbus Master
F04.1x	User-defined V/F Curve	F12.2x	Special Modbus
F04.2x	V/F Split Control	F12.3x	PROFIBUS-DP
F04.3x	V/F ECO Control	F12.4x	CANopen
F05.0x	DI Terminal	F12.5x~F12.6x	EX_A, EX_B Expansion
F05.1x	X1-X5 Detection Delay	F13.00~F13.06	PID Target and Feedback
F05.2x	DI Terminal Mode	F13.07~F13.24	PID Regulation
F05.3x	PUL Terminal	F13.25~F13.28	PID Feedback Disconnection

F05.4x	AI Parameters	F13.29~F13.33	PID Sleep
F05.5x	AI Linear Parameters	F14.00~F14.14	Multi-frequency
F05.6x	AI Curve 1	F14.15	PLC Operation Mode
F05.7x	AI Curve 2	F14.16~F14.30	PLC Runtime
F05.8x	AI as DI Terminal Operation	F14.31~F14.45	PLC Direction and ACC/DEC Time
F05.9x	AI Disconnection Detection	F17.xx	Expansion RO
F06.0x	AO	F21.xx	Pump (Single)
F06.1x	Expansion AO	F22.xx	Pump (Multi-pump)
F06.2x~F06.3x	DO and RO	C00.xx	Basic Monitoring
F06.4x	Frequency Detection	C01.xx	Error Monitoring
F06.5x	Monitoring Comparator	C02.xx	App monitoring
F06.6x~F06.7x	Virtual I/O Terminals	C03.xx	Maintenance Monitoring
F07.0x	Start Control	C04.xx	Pump Application Monitoring
F07.1x	Stop Control	-	-

4.3 F00: Environmental Applications

F00.0x: Environment Settings

Code (Address)	Name	Content	Default (Range)	Property
F00.00 (0x0000)	Parameter Access Level	**V/F SVC FVC PMVF PMSVC PMFVC** Set the parameter access level according to access restriction. 0: Standard parameters (Fxx.yyy, Cxx.yy) 1: Common parameters (F00.00, Pxx.yy) 2: Monitoring parameters (F00.00, Cxx.yy) 3: Modified parameters (F00.00, Hxx.yy)	0 (0~3)	RUN
F00.01 (0x0001)	Purpose	**V/F SVC FVC PMVF PMSVC PMFVC** Set the AC drives for the specific purpose. 0: General 1: Fan, pump	0 (0~1)	STOP
F00.03 (0x0003)	Initialization	**V/F SVC FVC PMVF PMSVC PMFVC** Set the drive initialization mode. 0: OFF 11: Set parameters according to actual needs(motor parameters excl.) 22: All parameters initialized 33: Clear fault records	0 (0~33)	STOP
F00.04 (0x0004)	Keypad Parameter Copy	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 11: Upload parameters to the keypad 22: Download parameters to the drive	0 (0~30)	STOP
F00.07 (0x0007)	Free Parameter 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the machine codes or purpose codes when multiple drives are used.	0 (0~65535)	RUN
F00.08 (0x0008)	Free Parameter 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the machine codes or purpose codes when multiple drives are used.	0 (0~65535)	RUN

F00.1x~F00.3x: Common Parameters

Code (Address)	Name	Content	Default (Range)	Property
F00.10~ F00.39 (0x000A~ 0x0027)	Common Address	**V/F SVC FVC PMVF PMSVC PMFVC** Ones- and tens-bit: Set 00~99 to yy in Fxx.yy Hundreds- and thousands-bit: Set 00~29 to xx in Fxx.yy	Up to F00.01 (0000~2999)	RUN

4.4 F01: Basic Settings

F01.0x: Basic Commands

Code (Address)	Name	Content	Default (Range)	Property
F01.00 (0x0100)	Motor 1 Control Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set the control mode for motor 1. AM control mode: 0: AM-V/F, V/F control 1: AM-SVC, open loop vector control, current closed loop control 2: AM-FVC, close-loop vector control PM control modes: 10: PM-V/F, V/F control 11: PM-SVC, open-loop vector control 12: PM-FVC, close-loop vector control POWER: 20: V/F-SPLIT: Voltage-frequency split **Note:** The V/F split control is valid only for T3 motors (7.5kW and above), and T2 motors (5.5kW and above).	0 (0~20)	STOP
F01.01 (0x0101)	Command Source	**V/F SVC FVC PMVF PMSVC PMFVC** Set the source from which the drive receives start/stop commands and the direction of operation. 0: Keypad (external keypad first) 1: Terminal 2: RS485 3: Expansion	0 (0~3)	RUN
F01.02 (0x0102)	Frequency Source A	**V/F SVC FVC PMVF PMSVC PMFVC** Set the source A to give frequency. 0: Funcode setting 1: Potentiometer 2: AI1 3: AI2 4: Reserved 5: PUL 6: RS485 7: UP/DW from terminal 8: PID control 9: PLC 10: Expansion 11: Multi-frequency	0 (0~11)	RUN
F01.03 (0x0103)	Frequency Source A Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the gain of source A.	100.0% (0.0%~ 500.0%)	STOP
F01.04 (0x0104)	Frequency Source B	**V/F SVC FVC PMVF PMSVC PMFVC** Set the source B to give frequency. The same as F01.02.	2 (0~11)	RUN
F01.05 (0x0105)	Frequency Source B Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the gain of source B.	100.0% (0.0%~ 500.0%)	STOP
F01.06 (0x0106)	Source B Reference	**V/F SVC FVC PMVF PMSVC PMFVC** Set the reference frequency for source B. 0: Max. output frequency as reference 1: Frequency set by source A as reference	0 (0~1)	RUN

F01.07 (0x0107)	Frequency Source	**V/F SVC FVC PMVF PMSVC PMFVC** Set the combination method of frequency source A and B of the drive. 0: Source A 1: Source B 2: Source A + Source B 3: Source A - Source B 4: Max(A, B) 5: Min(A, B)	0 (0~5)	RUN
F01.08 (0x0108)	Frequency/Command Source Binding	**V/F SVC FVC PMVF PMSVC PMFVC** Set to bind each command source to frequency sources. Ones-bit: Bind keypad commands Tens-bit: Bind terminal commands Hundreds-bit: Bind communication commands Thousands-bit: Bind expansion commands 0: OFF 1: Funcode setting 2: Potentiometer 3: AI1 4: AI2 5: Reserved 6: PUL 7: RS5485 communication 8: UP/DW from terminal 9: PID control A: PLC B: Expansion C: Multi-frequency D: Reserved	0000 (0000~DDDD)	RUN
F01.09 (0x0109)	Target Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set and modify the specific frequency values by this funcode.	50.00Hz (0.00Hz~ Upper limit)	RUN

F01.1x: Frequency Commands

Code (Address)	Name	Content	Default (Range)	Property
F01.10 (0x010A)	Max. Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the maximum frequency for the drive.	50.00Hz (Upper limit frequency~ 500.00Hz)	STOP
F01.11 (0x010B)	Upper Limit Frequency Source	**V/F SVC FVC PMVF PMSVC PMFVC** Set the upper limit frequency source. 0: Funcode setting 1: Potentiometer 2: AI1 3: AI2 4: Reserved 5: PUL 6: RS485 7: Expansion	0 (0~7)	RUN
F01.12 (0x010C)	Upper Limit Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the upper limit frequency when F01.11 is set to 0.	50.00Hz (F01.14~Max. freq)	RUN
F01.13 (0x010D)	Lower Limit Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the lower limit to the given frequency.	0.00Hz (0.00Hz~upper limit frequency)	RUN

F01.14 (0x010E)	Frequency Command Resolution	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency command resolution. 0: 0.01Hz 1: 0.1Hz 2: 0.1rpm 3: 1rpm 4: 10rpm	0 (0~4)	STOP

F01.2x~F01.3x: ACC/DEC Time

Code (Address)	Name	Content	Default (Range)	Property
F01.20 (0x0114)	ACC/DEC Time Reference	**V/F SVC FVC PMVF PMSVC PMFVC** Set the reference frequency to calculate the acceleration and deceleration time. 0: Maximum frequency 1: Fixed frequency 50Hz 2: Target frequency	0 (0~2)	STOP
F01.21 (0x0115)	ACC Time Unit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the acceleration time unit. 0: 1s 1: 0.1s 2: 0.01s	2 (0~2)	STOP
F01.22 (0x0116)	ACC Time 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time required for the output frequency to accelerate from 0.00Hz to the reference frequency. 1s~65000s(F01.21=0) 0.1s~6500.0s(F01.21=1) 0.01s~650.00s(F01.21=2)	Up to model (0.01s~ 650.00s)	RUN
F01.23 (0x0117)	DEC Time 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time required for the output frequency to decelerate from the reference frequency to 0.00Hz.	Up to model (0.01s~ 650.00s)	RUN
F01.24 (0x0118)	ACC Time 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time required for the output frequency to accelerate from 0.00Hz to the reference frequency.	Up to model (0.01s~ 650.00s)	RUN
F01.25 (0x0119)	DEC Time 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time required for the output frequency to decelerate from the reference frequency to 0.00Hz.	Up to model (0.01s~ 650.00s)	RUN
F01.26 (0x011A)	ACC Time 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time required for the output frequency to accelerate from 0.00Hz to the reference frequency.	Up to model (0.01s~ 650.00s)	RUN
F01.27 (0x011B)	DEC Time 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time required for the output frequency to decelerate from the reference frequency to 0.00Hz.	Up to model (0.01s~ 650.00s)	RUN
F01.28 (0x011C)	ACC Time 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time required for the output frequency to accelerate from 0.00Hz to the reference frequency.	Up to model (0.01s~ 650.00s)	RUN
F01.29 (0x011D)	DEC Time 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time required for the output frequency to decelerate from the reference frequency to 0.00Hz.	Up to model (0.01s~ 650.00s)	RUN
F01.30 (0x011E)	S-curve ACC/DEC	**V/F SVC FVC PMVF PMSVC PMFVC** Set the S-curve acceleration/deceleration valid or not. 0: OFF 1: ON 2: Smoother S-curve	1 (0~2)	STOP
F01.31 (0x011F)	ACC S-Curve Start Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start point for s-curve acceleration.	0.20s (0.00s~10.00s)	STOP
F01.32 (0x0120)	ACC S-Curve End Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end point for s-curve acceleration.	0.20s (0.00s~10.00s)	STOP
F01.33 (0x0121)	DEC S-Curve Start Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start point for s-curve deceleration.	0.20s (0.00s~10.00s)	STOP

F01.34 (0x0122)	DEC S-Curve End Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end point for s-curve deceleration.	0.20s (0.00s~10.00s)	STOP
F01.35 (0x0123)	ACC Time 1/2 Shift Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the shift frequency between acceleration time 1 and 2.	0.00Hz (0.00Hz~Max. frequency)	RUN

F01.4x: PWM Control

Code (Address)	Name	Content	Default (Range)	Property
F01.40 (0x0128)	Carrier Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the carrier frequency of the drive's IGBT module.	Up to model (1.0kHz~ 16.0kHz)	RUN
F01.41 (0x0129)	PWM Control Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Carrier-temperature correlation. 0: Irrelevant 1: Relevant Tens-bit: Carrier-output frequency correlation. 0: Irrelevant 1: Relevant Hundreds-bit: Random PWM. 0: OFF 1: Valid in V/F control mode 2: Valid in vector control Thousands-bit: PWM mode 0: Three-phase modulation only 1: Auto switching between two-/three-phase modulation	1111 (0000~1211)	RUN
F01.43 (0x012B)	Deadband Compensation Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the deadband compensation gain.	306 (0~512)	RUN
F01.46 (0x012E)	PWM Random Depth	**V/F SVC FVC PMVF PMSVC PMFVC** The larger the setting, the greater the carrier fluctuation when random PWM is valid.	0 (0~20)	RUN

4.5 F02: Motor 1

F02.0x: Basic Motor Parameters and Auto-tuning

Code (Address)	Name	Content	Default (Range)	Property
F02.00 (0x0200)	Motor Type	**V/F SVC FVC PMVF PMSVC PMFVC** Set the motor type. 0: Asynchronous motor(AM) 1: Permanent magnet synchronous motor(PM)	0 (0~1)	READ
F02.01 (0x0201)	Pole No.	**V/F SVC FVC PMVF PMSVC PMFVC** Set the motor pole number.	4 (2~98)	STOP
F02.02 (0x0202)	Motor Rated Power	**V/F SVC FVC PMVF PMSVC PMFVC** Set the rated power of the motor.	Up to model (0.1kW~ 1000.0kW)	STOP
F02.03 (0x0203)	Motor Rated Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the rated frequency of the motor.	Up to model (0.01Hz~ Max. frequency)	STOP
F02.04 (0x0204)	Motor Rated Speed	**V/F SVC FVC PMVF PMSVC PMFVC** Set the rated speed of the motor.	Up to model (0rpm~ 65000rpm)	STOP

F02.05 (0x0205)	Motor Rated Voltage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the rated voltage of the motor.	Up to model (0V~2000V)	STOP
F02.06 (0x0206)	Motor Rated Current	**V/F SVC FVC PMVF PMSVC PMFVC** Set the rated current of the motor.	Up to model (0.1A～ 3000.0A)	STOP
F02.07 (0x0207)	Auto-Tuning	**V/F SVC FVC PMVF PMSVC PMFVC** After the auto-tuning is finished, F02.07 will be set to "0" automatically. 0: OFF 1: Dynamic auto-tuning 2: Static auto-tuning 3: Stator resistance auto-tuning 4~20: Reserved	0 (0~20)	STOP

Note: When F02.00 [Type] is set to a synchronous motor, F2.04 [Rated Speed] is calculated from F2.01 [Pole No.] and F2.03 [Rated Frequency], please set the corresponding parameters correctly. **The calculation formula is: F2.04[Rated Speed] = 60* F2.03[Rated Frequency]/(F2.01[Pole No.]/2)**

F02.1x : AM Advanced Parameters

Code (Address)	Name	Content	Default (Range)	Property
F02.10 (0x020A)	No-Load Current	**V/F SVC FVC PMVF PMSVC PMFVC** Set the no-load current for asynchronous motors.	Up to model (0.1A~ 3000.0A)	STOP
F02.11 (0x020B)	Stator Resistance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stator resistance for asynchronous motors.	Up to model (0.01mΩ~ 60000mΩ)	STOP
F02.12 (0x020C)	Rotor Resistance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the rotor resistance for asynchronous motors.	Up to model (0.01mΩ~ 60000mΩ)	STOP
F02.13 (0x020D)	Stator Leakage Inductance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stator leakage inductance for asynchronous motors.	Up to model (0.001mH~ 6553.5mH)	STOP
F02.14 (0x020E)	Stator Inductance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stator inductance for asynchronous motors.	Up to model (0.01mH~ 65535mH)	STOP
F02.15 (0x020F)	Per-unit Stator Resistance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the per-unit stator resistance for asynchronous motors.	Up to model (0.01%~ 50.00%)	READ
F02.16 (0x0210)	Per-unit Rotor Resistance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the per-unit rotor resistance for asynchronous motors.	Up to model (0.01%~ 50.00%)	READ
F02.17 (0x0211)	Per-unit Stator Leakage Inductance	**V/F SVC FVC PMVF PMSVC PMFVC** Set per-unit stator leakage inductance.	Up to model (0.01%~ 50.00%)	READ
F02.18 (0x0212)	Per-unit Stator Inductance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the per-unit stator inductance for asynchronous motors.	Up to model (0.1%~ 999.0%)	READ
F02.19 (0x0213)	F02.11~F02.14 Decimals	**V/F SVC FVC PMVF PMSVC PMFVC** Set the decimals of the four parameters of F02.11~F02.14.Read-only.	0x0000 (0x0000~ 0x2222)	READ

F02.2x: PM Advanced Parameters

Code (Address)	Name	Content	Default (Range)	Property
F02.20 (0x0214)	Stator Resistance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stator resistance for the permanent magnet synchronous motors.	Up to model (0.01mΩ~ 60000mΩ)	STOP
F02.21 (0x0215)	D-axis Inductance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the D-axis inductance for the permanent magnet synchronous motors.	Up to model (0.001mH~ 6553.5mH)	STOP
F02.22 (0x0216)	Q-axis Inductance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the Q-axis inductance for the permanent magnet synchronous motors.	Up to model (0.001mH~ 6553.5mH)	STOP
F02.23 (0x0217)	Back Emf	**V/F SVC FVC PMVF PMSVC PMFVC** Set the back emf for the permanent magnet synchronous motors. Only dynamic auto-tuning is recognized.	Up to model (0V~1500V)	STOP
F02.24 (0x0218)	Encoder Installation Angle	**V/F SVC FVC PMVF PMSVC PMFVC** Set the encoder installation angle for permanent magnet synchronous motors.	Up to model (0.0°~360.0°)	RUN
F02.25 (0x0219)	Per-unit Stator Resistance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the per-unit stator resistance for the permanent magnet synchronous motors.	Up to model (Monitored values)	READ
F02.26 (0x021A)	Per-unit D-axis Inductance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the per-unit d-axis inductance for permanent magnet synchronous motors.	Up to model (Monitored values)	READ
F02.27 (0x021B)	Per-unit Q-axis Inductance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the per-unit q-axis inductance for permanent magnet synchronous motors.	Up to model (Monitored values)	READ
F02.28 (0x021C)	Pulse Width Factor	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pulse width factor for permanent magnet synchronous motors.	Up to model (00.00~99.99)	STOP
F02.29 (0x021D)	F02.20~F02.22 Decimals	**V/F SVC FVC PMVF PMSVC PMFVC** Set the decimal point of the three parameters from F02.20to F02.22. This parameter is read-only.	0x0000 (0x0000~0x2222)	READ

F02.3x~F02.4x: Encoder

Code (Address)	Name	Content	Default (Range)	Property
F02.30 (0x021E)	Encoder Type	V/F SVC FVC PMVF PMSVC PMFVC 0: Common ABZ encoder (to EX_B) 1: Resolver (to expansion EX_B)	0 (0~1)	STOP
F02.31 (0x021F)	Encoder Direction	V/F SVC FVC PMVF PMSVC PMFVC 0: Same direction 1: Opposite direction	0 (0~1)	STOP
F02.32 (0x0220)	ABZ Encoder Z Pulse Detection	V/F SVC FVC PMVF PMSVC PMFVC 0: OFF 1: ON (forward detection) 2: ON(reverse detection)	1 (0~2)	STOP
F02.33 (0x0221)	ABZ Encoder Line No.	V/F SVC FVC PMVF PMSVC PMFVC Set the line number of the ABZ encoder.	1024 (1~10000)	STOP
F02.34 (0x0222)	Resolver Pole No.	V/F SVC FVC PMVF PMSVC PMFVC Set the pole number of the resolver.	2 (2~128)	STOP

F02.35 (0x0223)	Transmission Ratio Numerator	V/F SVC FVC PMVF PMSVC PMFVC Set the transmission ratio numerator of the encoder.	1 (1~32767)	RUN
F02.36 (0x0224)	Transmission Ratio Denominator	V/F SVC FVC PMVF PMSVC PMFVC Set the transmission ratio denominator of the encoder.	1 (1~32767)	RUN
F02.37 (0x0225)	Encoder Filter Time	V/F SVC FVC PMVF PMSVC PMFVC Set the speed detection filter time of the encoder.	1.0ms (0.0ms~100.0ms)	RUN
F02.38 (0x0226)	Disconnection Detection Time	V/F SVC FVC PMVF PMSVC PMFVC Set the disconnection detection time of the encoder.	0.050s (0.010s~60.000s)	RUN
F02.47 (0x022F)	Z-pulse Bias	V/F SVC FVC PMVF PMSVC PMFVC Set the Z pulse allowable bias.	0 (0~65535)	RUN
F02.48 (0x0230)	Z-pulse Tuning Current	V/F SVC FVC PMVF PMSVC PMFVC Set the value of Z-pulse tuning current.	0 (0~65535)	RUN
F02.49 (0x0231)	Encoder Debug Register	V/F SVC FVC PMVF PMSVC PMFVC Ones-bit: Monitor PG under SVC 0: OFF 1: ON	0x0000 (0x0000~0xFFFF)	RUN

F02.5x~F02.6x: Motor Application

Code (Address)	Name	Content	Default (Range)	Property
F02.50 (0x0232)	Stator Resistance Auto-tuning	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Tune only without update ＞1: Tune and update	0 (0~3)	STOP
F02.51 (0x0233)	Stator Resistance Tuning Factor 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stator resistance tuning factor 1.	0 (0~1000)	RUN
F02.52 (0x0234)	Stator Resistance Tuning Factor 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stator resistance tuning factor 2.	0 (-20.00%~20.00%)	RUN
F02.53 (0x0235)	Stator Resistance Tuning Factor 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stator resistance tuning factor 3.	0 (0~65535)	RUN
F02.60 (0x023C)	PM Pole Search	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: FVC 0: OFF 1: ON 2: ON, but only at the first startup Tens-bit: SVC 0: OFF 1: ON 2: ON, but only at the first startup Hundreds-bit: V/F 0: OFF 1: ON 2: ON, but only at the first startup	0010 (0000~3223)	STOP
F02.61 (0x023D)	Pole Search Current	**V/F SVC FVC PMVF PMSVC PMFVC** Set the value of pole search current.	0.0% (0.0%~6553.5%)	STOP

4.6 F03: Vector Control

F03.0x: ASR (Automatic Speed Regulator)

Code (Address)	Name	Content	Default (Range)	Property
F03.00 (0x0300)	ASR Rigidity Level	**V/F SVC FVC PMVF PMSVC PMFVC** Set the rigidity level, the higher the level, the better the speed rigidity.	32 (0~128)	RUN
F03.01 (0x0301)	ASR Rigidity Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set the ASR speed rigidity mode.	0x0000 (0x0000~0xFFFF)	RUN
F03.02 (0x0302)	ASR Proportional Gain 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the proportional gain 1 for the velocity loop.	10.00 (0.01~100.00)	RUN
F03.03 (0x0303)	ASR Integral Time 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the integral time 1 for the velocity loop.	0.100s (0.000s~6.000s)	RUN

F03.04 (0x0304)	Filter Time 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the filter time 1 for the velocity loop.	0.0ms (0.0ms~100.0ms)	RUN
F03.05 (0x0305)	Shift Frequency 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the switching frequency 1 for the velocity loop.	0.00Hz (0.00Hz~ Max.freq)	RUN
F03.06 (0x0306)	ASR Proportional Gain 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the proportional gain 2 for the velocity loop.	10.00 (0.01~100.00)	RUN
F03.07 (0x0307)	ASR Integral Time 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the integral time 2 for the velocity loop.	0.100s (0.000s~6.000s)	RUN
F03.08 (0x0308)	Filter Time 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the filter time 2 for the velocity loop.	0.0ms (0.0ms~100.0ms)	RUN
F03.09 (0x0309)	Shift Frequency 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the switching frequency 2 for the velocity loop.	0.00Hz (0.00Hz~ Max. freq)	RUN

F03.1x: ACR (Automatic Current Regulator) and Torque Limit

Code (Address)	Name	Content	Default (Range)	Property
F03.10 (0x030A)	D-axis Proportional Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the d-axis proportional gain for the current loop.	1.000 (0.001~4.000)	RUN
F03.11 (0x030B) RUN	D-axis Integral Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the d-axis proportional gain for the current loop.	1.000 (0.001~4.000)	RUN
F03.12 (0x030C)	Q-axis Proportional Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the q-axis proportional gain for the current loop.	1.000 (0.001~4.000)	RUN
F03.13 (0x030D)	Q-axis Integral Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the q-axis proportional gain for the current loop.	1.000 (0.001~4.000)	RUN
F03.15 (0x030F)	Motoring Torque Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the torque limit when motor is running.	250.0% (0.0%~400.0%)	RUN
F03.16 (0x0310)	Generating Torque Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the torque limit during power generation.	250.0% (0.0%~400.0%)	RUN
F03.17 (0x0311)	Regenerative Torque Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the regenerative torque limit at low speeds.	0.0% (0.0%~400.0%)	RUN
F03.18 (0x0312)	Frequency Hysteresis for Torque Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency hysteresis for torque limit at low speeds.	6.00Hz (0.00Hz~30.00Hz)	RUN
F03.19 (0x0313)	Torque Limit	V/F **SVC FVC PMVF PMSVC PMFVC** Ones-bit: Torque limit source during motoring. 0: Funcode setting 1: Potentiometer (on optional external single-row keypad) 2: AI1 3: AI2 4: Reserved 5: PUL 6: RS485(0x3014) 7: Expansion Tens-bit: Torque limit source during generating 0: Funcode setting 1: Potentiometer (on optional external single-row keypad) 2: AI1 3: AI2 4: Reserved 5: PUL 6: Rs485(0x3015) 7: Expansion Hundreds-bit: C00.06 display 0: Display the torque limit value during motoring 1: Display the torque limit value during generating Thousands-bit: Reserved	0x0000 (0x0000~0x0177)	RUN

F03.2x: Torque Optimization

Code (Address)	Name	Content	Default (Range)	Property
F03.20 (0x0314)	PM LF Drag Current	**V/F SVC FVC PMVF PMSVC PMFVC** Under PMSVC, the larger the dragging current, the larger the torque output.	20.0% (0.0%~50.0%)	RUN
F03.21 (0x0315)	PM HF Drag Current	**V/F SVC FVC PMVF PMSVC PMFVC** Under PMSVC, the larger the dragging current, the larger the torque output.	10.0% (0.0%~50.0%)	RUN
F03.22 (0x0316)	PM Drag Current Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** The set value 100.0% corresponds to F01.10 [Max. Frequency].	10.0% (0.0%~100.0%)	RUN
F03.23 (0x0317)	AM Slip Compensation	**V/F SVC FVC PMVF PMSVC PMFVC** Set the slip compensation for the asynchronous motors.	100.0% (0.0%~250.0%)	RUN
F03.24 (0x0318)	Initial Starting Torque	**V/F SVC FVC PMVF PMSVC PMFVC** Set the initial starting torque.	0.0% (0.0%~250.0%)	RUN

F03.3x: Flux Optimization

Code (Address)	Name	Content	Default (Range)	Property
F03.30 (0x031E)	Field-Weakening Feed-Forward Coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** Set the field-weakening feedforward coefficient.	10.0% (0.0%~500.0%)	RUN
F03.31 (0x031F)	Field-weakening Control Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the field-weakening control gain.	10.0% (0.0%~500.0%)	RUN
F03.32 (0x0320)	Field-Weakening Current Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the field-weakening current upper limit.	60.0% (0.0%~250.0%)	RUN
F03.33 (0x0321)	Field-Weakening Voltage Coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** Set the field-weakening voltage coefficient.	97.0% (0.0%~120.0%)	RUN
F03.34 (0x0322)	Output Power Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the output power limit.	250.0% (0.0%~400.0%)	RUN
F03.35 (0x0323)	Over-excitation Brake Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the over-excitation brake gain.	100.0% (0.0%~500.0%)	RUN
F03.36 (0x0324)	Over-excitation Brake Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the over-excitation brake limit.	100.0% (0.0%~250.0%)	RUN
F03.37 (0x0325)	ECO Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: ON	0 (0~1)	RUN
F03.38 (0x0326)	Excitation Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the excitation lower limit during auto energy-saving operation.	50.0% (0.0%~80.0%)	RUN
F03.39 (0x0327)	Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the filter coefficient during auto energy-saving operation.	0.010s (0.000s~6.000s)	RUN

F03.4x~F03.5x: Torque Control

Code (Address)	Name	Content	Default (Range)	Property
F03.40 (0x0328)	Torque Control	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Torque limited by speed control 1: Speed limit under torque control	0 (0~1)	RUN

F03.41 (0x0329)	Torque Command	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Source A Tens-bit: Source B 0: Funcode setting 1: Potentiometer (on optional external single-row keypad) 2: AI1 3: AI2 4: Reserved 5: PUL 6: RS485 7: Expansion 8: Reserved 9: Tension calculation Hundreds-bit: Command source 0: Source A 1: Source B 2: Source A + Source B 3: Source A - Source B 4: Min (A, B) 5: Max (A, B)	0000 (0000~0599)	RUN
F03.42 (0x032A)	Target Torque	**V/F SVC FVC PMVF PMSVC PMFVC** Set the specific torque values by this funcode.	0.0% (0.0%~100.0%)	RUN
F03.43 (0x032B)	Torque Input Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the torque input lower limit.	0.00% (0.00%~100.00%)	RUN
F03.44 (0x032C)	Torque Input Lower Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the lower limit percentage.	0.00% (-250.00%~ 300.00%)	RUN
F03.45 (0x032D)	Torque Input Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the torque input upper limit.	100.00% (0.00%~100.00%)	RUN
F03.46 (0x032E)	Torque Input Upper Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the upper limit percentage.	100.00% (-250.00%~ 300.00%)	RUN
F03.47 (0x032F)	Torque Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency hysteresis for torque limit at low speeds.	0.100s (0.000s~6.000s)	RUN
F03.52 (0x0334)	Output Torque Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the upper limit for torque command.	150.0% (0.0%~300.0%)	RUN
F03.53 (0x0335)	Output Torque Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set lower limit for torque command.	0.0% (0.0%~300.0%)	RUN
F03.54 (0x0336)	FWD Speed Limit	**V/F SVC FVC PMVF PMSVC PMFVC** 0: F03.56 1: Potentiometer(external single-row keypad)× F03.56 2: AI1×F03.56 3: AI2×F03.56 4: Reserved 5: PUL×F03.56 6: RS485×F03.56 7: Expansion×F03.56 8: Reserved	0 (0~8)	RUN
F03.55 (0x0337)	REV Speed Limit	**V/F SVC FVC PMVF PMSVC PMFVC** 0: F03.57 1: Potentiometer (external single-row keypad)×F03.57	0 (0~8)	RUN

		2: AI1×F03.57 3: AI2×F03.57 4: Reserved 5: PUL×F03.57 6: RS485 communication×F03.57 7: Expansion×F03.57 8: Reserved		
F03.56 (0x0338)	Max. FWD Speed Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the max. forward speed limit under torque control.	100.0% (0.0%~100.0%)	RUN
F03.57 (0x0339)	Max. REV Speed Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the max. reverse speed limit under torque control.	100.0% (0.0%~100.0%)	RUN
F03.58 (0x033A)	Torque Gain Shift Frequency	**V/F SVC FVC PMSVC PMFVC** Set the torque gain switching frequency.	1.00Hz (0.00Hz~50.00Hz)	RUN
F03.59 (0x033B)	Torque Gain	**V/F SVC FVC PMSVC PMFVC** Set the torque gain.	100.0% (0.0%~500.0%)	RUN

F03.6x: PM HF Injection

Code (Address)	Name	Content	Default (Range)	Property
F03.60 (0x033C)	High-Frequency Injection	**V/F SVC FVC PMVF PMSVC PMFVC** PMSVC 0: Disable 1~5: Enable, the greater the value, the higher the injection frequency.	0 (0~5)	STOP
F03.61 (0x033D)	High-Frequency Injection Voltage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the injection voltage range relative to the rated voltage. It is the result of auto-tuning, so there's no need to modify it.	10.0% (0.0%~100.0%)	RUN
F03.62 (0x033E)	HF Injection Cutoff Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** It indicates the high-frequency injection range (relative to motor rated frequency). It is valid when the motor speed is lower than this value.	10.0% (0.0%~20.0%)	RUN

F03.7x: Position Compensation

Code (Address)	Name	Content	Default (Range)	Property
F03.70 (0x0346)	Position Compensation	**V/F SVC FVC PMVF PMSVC PMFVC** Set the position compensation under speed control to realize zero servo or raise system rigidity.	50.0 (0.0~100.0)	RUN
F03.71 (0x0347)	Compensation Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the position compensation gain.	0.0 (0.0~100.0)	RUN
F03.72 (0x0348)	Compensation Range	**V/F SVC FVC PMVF PMSVC PMFVC** Set the compensation range.	0.0% (0.0%~100.0%)	STOP
F03.73 (0x0349)	Compensation Scope	**V/F SVC FVC PMVF PMSVC PMFVC** Set the position compensation working scope.	10.0% (0.0%~100.0%)	STOP

F03.8x: Expansions

Code (Address)	Name	Content	Default (Range)	Property
F03.80 (0x0350)	PM MTPA Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the MTPA gain for the permanent magnet synchronous motors.	100.0% (0.0%~ 400.0%)	RUN
F03.81 (0x0351)	PM MTPA Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the MTPA filter time for the permanent magnet synchronous motors.	1.0ms (0.0ms~ 100.0ms)	RUN

4.7 F04: V/F Control

F04.0x: V/F Control

Code (Address)	Name	Content	Default (Range)	Property
F04.00 (0x0400)	V/F Curve Type	**V/F SVC FVC PMVF PMSVC PMFVC** Select the type of V/F curve according to different load characteristics. 0: Linear V/F curve 1~9: 1.1-1.9 power V/F curves respectively 10: Square V/F curve 11: Customized V/F curve	0 (0~11)	STOP
F04.01 (0x0401)	Torque boost	**V/F SVC FVC PMVF PMSVC PMFVC** 0.0%: Auto 0.1%~30.0%: Manual	Up to model (0.0%~ 30.0%)	RUN
F04.02 (0x0402)	Torque Boost Cutoff Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the range of the torque boost function. It is invalid when the output frequency exceeds this value.	100.0% (0.0%~ 100.0%)	RUN
F04.03 (0x0403)	Slip Compensation Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the slip compensation gain.	0.0% (0.0%~ 200.0%)	RUN
F04.04 (0x0404)	Slip Compensation Hysteresis	**V/F SVC FVC PMVF PMSVC PMFVC** Set the slip compensation hysteresis.	100.0% (0.0%~ 300.0%)	RUN
F04.05 (0x0405)	Slip Compensation Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Enter the parameters on the motor's nameplate correctly to implement parameter tuning for best performance.	0.200s (0.000s~ 6.000s)	RUN
F04.06 (0x0406)	Anti-oscillation Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Adjust this value to suppress low frequency resonance, but an excessive value will cause instability.	100.0% (0.0%~ 900.0%)	RUN
F04.07 (0x0407)	Anti-oscillation Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the filter time for oscillation suppression.	1.0s (0.0s~ 100.0s)	RUN
F04.08 (0x0408)	Output Voltage Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the output voltage percentage.	100.0% (25.0%~ 120.0%)	STOP

F04.1x: User-defined V/F Curve

Code (Address)	Name	Content	Default (Range)	Property
F04.10 (0x040A)	V1 (User-defined Voltage)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the V1(user-defined voltage).	3.0% (0.0%~100.0%)	STOP
F04.11 (0x040B)	F1 (User-defined Frequency)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the F1 (user-defined frequency).	1.00Hz (0.00Hz~ Max. freq)	STOP
F04.12 (0x040C)	V2 (User-defined Voltage)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the V2(user-defined voltage).	28.0% (0.0%~100.0%)	STOP
F04.13 (0x040D)	F2 (User-defined Frequency)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the F2(user-defined frequency).	10.00Hz (0.00Hz~ Max. freq)	STOP
F04.14 (0x040E)	V3 (User-defined Voltage)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the V3(user-defined voltage).	55.0% (0.0%~100.0%)	STOP
F04.15 (0x040F)	F3 (user-defined frequency)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the F3(user-defined frequency).	25.00Hz (0.00Hz~ Max. freq)	STOP

F04.16 (0x0410)	V4 (User-defined Voltage)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the V4(user-defined voltage).	78.0% (0.0%~100.0%)	STOP
F04.17 (0x0411)	F4 (User-defined Frequency)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the F4(user-defined frequency).	37.50Hz (0.00Hz~ Max. freq)	STOP
F04.18 (0x0412)	V5 (User-defined Voltage)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the V5 (user-defined voltage).	100.0% (0.0%~100.0%)	STOP
F04.19 (0x0413)	F5 (User-defined Frequency)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the F5(user-defined frequency).	50.00Hz (0.00Hz~ Max. freq)	STOP

F04.2x: V/F Split Control

Code (Address)	Name	Content	Default (Range)	Property
F04.20 (0x0414)	Voltage	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Source A Tens-bit: Source B 0: Voltage percentage 1: Potentiometer (external single-row keypad) 2: AI1 3: AI2 4: Reserved 5: PUL 6: PID 7: RS485 8: Expansion boards 9: Voltage funcode setting Hundreds-bit: Combination method 0: Source A 1: Source B 2: Source A+Source B 3: Source A-Source B 4: MIN(A, B) 5: MAX(A, B)	0x0000 (0x0000~ 0x0599)	RUN
F04.21 (0x0415)	Voltage Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the output voltage percentage under V/F split control. 100.0% of the motor rated voltage.	0.00% (0.00%~ 110.00%)	RUN
F04.22 (0x0416)	Voltage ACC Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the voltage acceleration time of the V/F split mode.	10.00s (0.00s~ 100.00s)	RUN
F04.23 (0x0417)	Voltage DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the voltage deceleration time of the V/F split mode.	10.00s (0.00s~ 100.00s)	RUN
F04.24 (0x0418)	Stop Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stop mode under V/F split control. 0: No relationship between ACC/DEC of output voltage and frequency 1: Output frequency drops after the output voltage drops to 0V.	0 (0~1)	RUN
F04.25 (0x0419)	Voltage Value	**V/F SVC FVC PMVF PMSVC PMFVC** Set the voltage value of the V/F separation mode.	0.00V (0.00V~ 600.00V)	RUN

F04.3x: V/F ECO Control

Code (Address)	Name	Content	Default (Range)	Property
F04.30 (0x041E)	Automatic energy-saving control	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: ON	0 (0~1)	STOP
F04.31 (0x041F)	Frequency Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the lower frequency limit of the ECO mode.	15.0Hz (0.0Hz~ 50.0Hz)	STOP
F04.32 (0x0420)	Voltage Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the lower voltage limit of the ECO mode.	50.0% (20.0%~ 100.0%)	STOP
F04.33 (0x0421)	Voltage DEC Rate	**V/F SVC FVC PMVF PMSVC PMFVC** Set the voltage deceleration rate in the ECO mode.	0.010V/ms (0.010V/ms~ 0.200V/ms)	RUN
F04.34 (0x0422)	Voltage ACC Rate	**V/F SVC FVC PMVF PMSVC PMFVC** Set the voltage accelerate rate in the ECO mode.	0.200V/ms (0.010V/ms~ 0.200V/ms)	RUN

4.8 F05: Input Terminal

F05.0x: DI Terminal

Code (Address)	Name	Content	Default (Range)	Property
F05.00 (0x0500)	X1 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	1 (0~99)	STOP
F05.01 (0x0501)	X2 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	2 (0~99)	STOP
F05.02 (0x0502)	X3 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	4 (0~99)	STOP
F05.03 (0x0503)	X4 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	5 (0~99)	STOP
F05.04 (0x0504)	X5 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	6 (0~99)	STOP
F05.05 (0x0505)	X6 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~99)	STOP
F05.06 (0x0506)	X7 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~99)	STOP
F05.07 (0x0507)	X8 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~99)	STOP
F05.08 (0x0508)	X9 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~99)	STOP
F05.09 (0x0509)	X10 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~99)	STOP

F05.1x: X1-X5 Detection Delay

Code (Address)	Name	Content	Default (Range)	Property
F05.10 (0x050A)	X1 ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for input terminal X1 from OFF to ON. Delay time.	0.010s (0.000s~6.000s)	RUN

F05.11 (0x050B)	X1 OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for input terminal X1 from ON to OFF. Delay time.	0.010s (0.000s~6.000s)	RUN
F05.12 (0x050C)	X2 ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for input terminal X2 from OFF to ON. Delay time.	0.010s (0.000s~6.000s)	RUN
F05.13 (0x050D)	X2 OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for input terminal X2 from ON to OFF. Delay time.	0.010s (0.000s~6.000s)	RUN
F05.14 (0x050E)	X3 ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for input terminal X3 from OFF to ON. Delay time.	0.010s (0.000s~6.000s)	RUN
F05.15 (0x050F)	X3 OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for input terminal X3 from ON to OFF. Delay time.	0.010s (0.000s~6.000s)	RUN
F05.16 (0x0510)	X4 ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for input terminal X4 from OFF to ON. Delay time.	0.010s (0.000s~6.000s)	RUN
F05.17 (0x0511)	X4 OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for input terminal X4 from ON to OFF. Delay time.	0.010s (0.000s~6.000s)	RUN
F05.18 (0x0512)	X5 ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for terminal X5 from OFF to ON. Delay time.	0.010s (0.000s~6.000s)	RUN
F05.19 (0x0513)	X5 OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for terminal X5 from ON to OFF. Delay time.	0.010s (0.000s~6.000s)	RUN

F05.2x: DI Terminal Mode

Code (Address)	Name	Content	Default (Range)	Property
F05.20 (0x0514)	Terminal Operation Pattern	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Two-wire 1 1: Two-wire 2 2: Three-wire 1 3: Three-wire 2 **Note:** See Appendix II for terminal wiring.	0 (0~3)	STOP
F05.22 (0x0516)	X1~X4 Characteristics	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Valid when closed 1: Valid when open Ones-bit: X1 Tens-bit: X2 Hundreds-bit: X3 Thousands-bit: X4	0000 (0000~1111)	RUN
F05.23 (0x0517)	X5~X8 Characteristics	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Valid when closed 1: Valid when open Ones-bit: X5 Tens-bit: X6 Hundreds-bit: X7 Thousands-bit: X8	0000 (0000~1111)	RUN
F05.24 (0x0518)	X9~X10 Characteristics	**V/F SVC FVC PMVF PMSVC PMFVC** 0: ON when closed 1: ON when open Ones-bit: X9 Tens-bit: X10	0000 (0000~1111)	RUN

F05.25 (0x0519)	Terminal UP/DW	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Power-down save ON 1: Power-down save OFF 2: Modifiable during operation, cleared after shutdown	0 (0~2)	STOP
F05.26 (0x051A)	Terminal UP/DW Regulation Rate	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency regulation rate by the UP/DW terminal.	0.50Hz/s (0.01Hz/s~ 50.00Hz/s)	RUN
F05.27 (0x051B)	Emergency Stop DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the deceleration time once emergency stop command is given via the terminals.	1.00s (0.01s~ 650.00s)	RUN

F05.3x: PUL Terminal

Code (Address)	Name	Content	Default (Range)	Property
F05.30 (0x051E)	PUL Source	**V/F SVC FVC PMVF PMSVC PMFVC** 0: X5 (up to 5.00 kHz) 1: Expansion X10 (100.00kHz max.) 2: X5 (100.00kHz max.)	0 (0~2)	STOP
F05.31 (0x051F)	PUL Min. Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the min. frequency that can be accepted by the PUL terminal. If the frequency given is below this value, drive will still process by this setting.	0.000kHz (0.000kHz~ 500.00kHz)	RUN
F05.32 (0x0520)	PUL Min. Frequency Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the min. input frequency of the PUL terminal.	0.00% (0.00%~ 100.00%)	RUN
F05.33 (0x0521)	PUL Max. Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** The max frequency accepted by the PUL. If the frequency given is above this value, drive will still process by this setting.	50.00kHz (0.00kHz~ 500.00kHz)	RUN
F05.34 (0x0522)	Max. Frequency Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the min. input frequency of the PUL terminal.	100.00% (0.00%~ 100.00%)	RUN
F05.35 (0x0523)	PUL Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the size of the filter applied to the pulse signal to remove interference to the PUL terminal.	0.100s (0.000s~ 9.000s)	RUN
F05.36 (0x0524)	PUL Cutoff Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Frequencies below this parameter are no longer recognized by the drive, and they are processed as 0Hz.	0.010kHz (0.000kHz~ 1.000kHz)	RUN

F05.4x: AI Parameters

Code (Address)	Name	Content	Default (Range)	Property
F05.41 (0x0529)	AI1 Signal Type	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Voltage 0.00V~10.00V 1: Current 0.00mA~20.00mA	1 (0~1)	RUN
F05.42 (0x052A)	AI2 signal type	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Voltage 0.00V~10.00V 1: Current 0.00mA~20.00mA	0 (0~1)	RUN
F05.43 (0x052B)	AI3 signal type	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Voltage 0.00V~10.00V 1: Current 0.00mA~20.00mA	0 (0~1)	RUN

F05.44 (0x052C)	AI Curve	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: AI1 Tens-bit: AI2 0: Straight line(default) 1: Curve 1 2: Curve 2	0000 (0000~0022)	RUN

F05.45~F05.59: AI Linear Parameters

Code (Address)	Name	Content	Default (Range)	Property
F05.45 (0x052D)	AI1 Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the signal received at the AI1 terminal. If the voltage given is below this value, drive will still process by this setting.	0.0% (0.0%~ 100.0%)	RUN
F05.46 (0x052E)	AI1 Lower Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the AI1 lower limit.	0.00% (-100.00%~ 100.00%)	RUN
F05.47 (0x052F)	AI1 Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the signal received at the AI1 terminal. If the voltage given is above this value, drive will still process by this setting.	100.0% (0.0%~ 100.0%)	RUN
F05.48 (0x0530)	AI1 Upper Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the AI1 lower limit.	100.00% (-100.00%~ 100.00%)	RUN
F05.49 (0x0531)	AI1 Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the size of the filter applied to the analog signal to remove interfering signals.	0.100s (0.000s~ 6.000s)	RUN
F05.50 (0x0532)	AI2 Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the signal received at the AI2 terminal. If the voltage given is below this value, drive will still process by this setting.	0.0% (0.0%~ 100.0%)	RUN
F05.51 (0x0533)	AI2 Lower Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the parameter above.	0.00% (-100.00%~ 100.00%)	RUN
F05.52 (0x0534)	AI2 Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the signal received at the AI2 terminal. If the voltage given is above this value, drive will still process by this setting.	100.0% (0.0%~ 100.0%)	RUN
F05.53 (0x0535)	AI2 upper limit percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the parameter above.	100.00% (-100.00%~ 100.00%)	RUN
F05.54 (0x0536)	AI2 Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the size of the filter applied to the analog signal to remove interfering signals.	0.100s (0.000s~ 6.000s)	RUN
F05.55 (0x0537)	AI3 Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the signal received at the AI3 terminal. If the voltage given is below this value, drive will still process by this setting.	0.0% (0.0%~ 100.0%)	RUN
F05.56 (0x0538)	AI3 Lower Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the parameter above.	0.00% (-100.00%~ 100.00%)	RUN
F05.57 (0x0539)	AI3 Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the signal received at the AI3 terminal. If the voltage given is above this value, drive will still process by this setting.	100.0% (0.0%~ 100.0%)	RUN
F05.58 (0x053A)	AI3 upper limit percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the parameter above.	100.00% (-100.00%~ 100.00%)	RUN

F05.59 (0x053B)	AI3 Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the size of the filter applied to the analog signal to remove interfering signals.	0.100s (0.000s~ 6.000s)	RUN

F05.6x: AI Curve 1

Code (Address)	Name	Content	Default (Range)	Property
F05.60 (0x053C)	Curve 1 Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the lower limit for Curve 1.	0.0% (0.0%~ 100.0%)	RUN
F05.61 (0x053D)	Lower Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of F05.60.	0.00% (-100.00%~ 100.00%)	RUN
F05.62 (0x053E)	Inflection Point 1 Voltage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the input voltage for Curve 1 inflection point 1.	30.0% (0.0%~ 100.0%)	RUN
F05.63 (0x053F)	Inflection Point 1 Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of F05.62.	30.00% (-100.00%~ 100.00%)	RUN
F05.64 (0x0540)	Inflection Point 2 Voltage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the input voltage for Curve 1 inflection point 2.	60.0% (0.0%~ 100.0%)	RUN
F05.65 (0x0541)	Inflection Point 2 Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of F05.64.	60.00% (-100.00%~ 100.00%)	RUN
F05.66 (0x0542)	Curve 1 Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the upper limit for Curve 1.	100.0% (0.0%~ 100.0%)	RUN
F05.67 (0x0543)	Upper Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of F05.66.	100.00% (-100.00%~ 100.00%)	RUN

F05.7x: AI Curve 2

Code (Address)	Name	Content	Default (Range)	Property
F05.70 (0x0546)	Curve 2 Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the lower limit for Curve 2.	0.0% (0.0%~ 100.0%)	RUN
F05.71 (0x0547)	Lower Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of F05.70.	0.00% (-100.00%~ 100.00%)	RUN
F05.72 (0x0548)	Inflection Point 1 Voltage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the input voltage for Curve 2 inflection point 1.	30.0% (0.0%~ 100.0%)	RUN
F05.73 (0x0549)	Inflection Point 2 Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of F05.72.	30.00% (-100.00%~ 100.00%)	RUN
F05.74 (0x054A)	Inflection Point 2 Voltage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the input voltage for Curve 2 inflection point 2.	60.0% (0.0%~ 100.0%)	RUN
F05.75 (0x054B)	Inflection Point 2 Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of F05.74.	60.00% (-100.00%~ 100.00%)	RUN

F05.76 (0x054C)	Curve 2 Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the upper limit for Curve 2.	100.00% (0.00%~ 100.0%)	RUN
F05.77 (0x054D)	Upper Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of F05.76.	100.00% (-100.00%~ 100.00%)	RUN

F05.8x: AI as DI Terminal Operation

Code (Address)	Name	Content	Default (Range)	Property
F05.80 (0x0550)	AI as DI Terminal Characteristic	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Valid at low level 1: Valid at high level Ones-bit: AI1 Tens-bit: AI2	0000 (0000~ 1111)	RUN
F05.81 (0x0551)	Terminal Function (as X terminal)	**V/F SVC FVC PMVF PMSVC PMFVC** See X terminal functions.	0 (0~99)	STOP
F05.82 (0x0552)	AI1 High Level	**V/F SVC FVC PMVF PMSVC PMFVC** Any value beyond this setting is considered as high level.	70.00% (0.00%~ 100.00%)	RUN
F05.83 (0x0553)	AI1 Low Level	**V/F SVC FVC PMVF PMSVC PMFVC** Set the low-level threshold. Any value below this setting is considered as low level.	30.00% (0.00%~ 100.00%)	RUN
F05.84 (0x0554)	AI2 Terminal Function (as X Terminal)	**V/F SVC FVC PMVF PMSVC PMFVC** See X terminal functions.	0 (0~99)	STOP
F05.85 (0x0555)	AI2 High Level	**V/F SVC FVC PMVF PMSVC PMFVC** Set the high-level threshold. Any value beyond this setting is considered as high level.	70.00% (0.00%~ 100.00%)	RUN
F05.86 (0x0556)	AI2 Low Level	**V/F SVC FVC PMVF PMSVC PMFVC** Set the low-level threshold. Any value below this setting is considered as low level.	30.00% (0.00%~ 100.00%)	RUN
F05.87 (0x0557)	AI3 Terminal Function (as X Terminal)	**V/F SVC FVC PMVF PMSVC PMFVC** See X terminal functions.	0 (0~99)	STOP
F05.88 (0x0558)	AI3 High Level	**V/F SVC FVC PMVF PMSVC PMFVC** Set the high-level threshold. Any value beyond this setting is considered as high level.	70.00% (0.00%~ 100.00%)	RUN
F05.89 (0x0559)	AI3 Low Level	**V/F SVC FVC PMVF PMSVC PMFVC** Set the low-level threshold. Any value below this setting is considered as low level.	30.00% (0.00%~ 100.00%)	RUN

F05.9x: AI Disconnection Detection

Code (Address)	Name	Content	Default (Range)	Property
F05.90 (0x055A)	AI Disconnection Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: AI1 disconnection Tens-bit: AI2 disconnection 0: Detection OFF 1: Report fault and free stop (E.AIx) 2: Report alarm and continue operation (A.AIx)	0000 (0000~0022)	RUN
F05.91 (0x055B)	AI1 Disconnection Upper Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the AI1 lower limit.	100.0% (0.0%~100.0%)	RUN
F05.92 (0x055C)	AI1 Disconnection Lower Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the AI1 lower limit.	0.0% (0.0%~100.0%)	RUN
F05.93 (0x055D)	AI2 Disconnection Upper Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the AI2 lower limit.	100.0% (0.0%~100.0%)	RUN

F05.94 (0x055E)	AI2 Disconnection Lower Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the AI2 lower limit.	0.0% (0.0%~100.0%)	RUN
F05.95 (0x055F)	AI1 Detection Bias	**V/F SVC FVC PMVF PMSVC PMFVC** Set the AI1 bias.	0.0% (0.0%~100.0%)	RUN
F05.96 (0x0560)	AI2 Detection Bias	**V/F SVC FVC PMVF PMSVC PMFVC** Set the AI2 bias.	0.0% (0.0%~100.0%)	RUN
F05.97 (0x0561)	AI1 Disconnection Detection Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the disconnection detection time of AI1.	0.1s (0.0s~60.0s)	RUN
F05.98 (0x0562)	AI2 Disconnection Detection Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the disconnection detection time of AI2.	0.1s (0.0s~60.0s)	RUN

4.9 F06: Output Terminal

F06.0x: AO

Code (Address)	Name	Content	Default (Range)	Property
F06.00 (0x0600)	AO Type	**V/F SVC FVC PMVF PMSVC PMFVC** 0: 0V~10V 1: 4.00mA~20.00mA 2: 0.00mA~20.00mA 3: FM pulse	0 (0~3)	RUN
F06.01 (0x0601)	AO Content	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Target frequency 1: Output frequency 2: Output current 3: Input voltage 4: Output voltage 5: Mechanical speed 6: Target torque 7: Output torque 8: PID target 9: PID feedback 10: Output power 11: Bus voltage 12: AI1 value 13: AI2 value 14: Reserved 15: PUL input 16: Module temperature 1 17: Module temperature 2 18: RS485 communication value 19: vY1 terminal value 20: Pressure from AI1/AI2 feedback	0 (0~20)	RUN
F06.02 (0x0602)	AO Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Adjust the value of the analog output.	100.0% (0.0%~300.0%)	RUN
F06.03 (0x0603)	AO Bias	**V/F SVC FVC PMVF PMSVC PMFVC** Set the analog output bias which is used to adjust the zero point of the terminal output.	0.0% (-10.0%~10.0%)	RUN
F06.04 (0x0604)	AO Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the size of the filter applied to the analog signal to remove interference.	0.010s (0.000s~ 6.000s)	RUN
F06.05 (0x0605)	AO as FM Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the output signal lower limit.	0.20kHz (0.00kHz~ 100.00kHz)	RUN

F06.06 (0x0606)	AO as FM Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the analog output as the FM upper limit.	50.00kHz (0.00kHz~ 100.00kHz)	RUN

F06.1x: AO Expansion

Code (Address)	Name	Content	Default (Range)	Property
F06.10 (0x060A)	Expansion AO Type	**V/F SVC FVC PMVF PMSVC PMFVC** 0: 0V~10V 1: 4.00mA~20.00mA 2: 0.00mA~20.00mA 3: Reserved	0 (0~3)	RUN
F06.11 (0x060B)	AO Expansion Content	**V/F SVC FVC PMVF PMSVC PMFVC** Set the expansion AO content, the same as F06.01.	1 (0~19)	RUN
F06.12 (0x060C)	Expansion AO Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Adjust the value of the expansion analog output.	100.0% (0.0%~ 300.0%)	RUN
F06.13 (0x060D)	Expansion AO Bias	**V/F SVC FVC PMVF PMSVC PMFVC** Set the bias to adjust the zero point of the expansion analog output.	0.0% (-10.0%~ 10.0%)	RUN
F06.14 (0x060E)	Expansion AO Filter	**V/F SVC FVC PMVF PMSVC PMFVC** Set the size of the filter applied to the expansion analog signal to remove interference.	0.010s (0.000s~ 6.000s)	RUN

F06.2x~F06.3x: DO and RO

Code (Address)	Name	Content	Default (Range)	Property
F06.20 (0x0614)	Output Terminal Polarity	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Y terminal Tens-bit: Relay terminal 1 Hundreds-bit: Y expansion terminal Thousands-bit: Relay terminal 2 0: Positive 1: Negative	0000 (0000~1111)	RUN
F06.21 (0x0615)	Output Terminal Y	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal Y.	1 (0~63)	RUN
F06.22 (0x0616)	Relay 1 Output (TA-TB-TC)	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal Y.	4 (0~63)	RUN
F06.23 (0x0617)	Y Expansion Function	**V/F SVC FVC PMVF PMSVC PMFVC** Set the function of Y expansion terminal.	0 (0~63)	RUN
F06.24 (0x0618)	Relay Expansion Function	**V/F SVC FVC PMVF PMSVC PMFVC** Set the function of the relay 2.	0 (0~63)	RUN
F06.25 (0x0619)	Y ON Delay Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for Y terminal from ON to ON.	0.010s (0.000s~ 60.000s)	RUN
F06.26 (0x061A)	Relay 1 ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for relay 1 from ON to ON.	0.010s (0.000s~ 60.000s)	RUN
F06.27 (0x061B)	Expansion Y ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the expansion Y from OFF to ON.	0.010s (0.000s~ 60.000s)	RUN
F06.28 (0x061C)	Expansion Relay 2 ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the relay 2 from OFF to ON.	0.010s (0.000s~ 60.000s)	RUN

F06.29 (0x061D)	Y OFF Delay Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for Y terminal from ON to OFF.	0.010s (0.000s~ 60.000s)	RUN
F06.30 (0x061E)	Relay 1 OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for relay 1 from ON to OFF.	0.010s (0.000s~ 60.000s)	RUN
F06.31 (0x061F)	Expansion Y1 OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time expansion Y1 from ON to OFF.	0.010s (0.000s~ 60.000s)	RUN
F06.32 (0x0620)	Expansion Relay 2 OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the relay 2 from OFF to OFF.	0.010s (0.000s~ 60.000s)	RUN

F06.4x: Frequency Detection

Code (Address)	Name	Content	Default (Range)	Property
F06.40 (0x0628)	Frequency Detection Threshold 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency detection value 1.	2.00Hz (0.00Hz~ Max. freq)	RUN
F06.41 (0x0629)	Frequency Detection Hysteresis 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency detection range 1.	1.00Hz (0.00Hz~ Max. freq)	RUN
F06.42 (0x062A)	Frequency Detection Threshold 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency detection value 2.	2.00Hz (0.00Hz~ Max. freq)	RUN
F06.43 (0x062B)	Frequency Detection Hysteresis 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency detection range 2.	1.00Hz (0.00Hz~ Max. freq)	RUN
F06.44 (0x062C)	Frequency Arrival Hysteresis	**V/F SVC FVC PMVF PMSVC PMFVC** Set the detection range of the given frequency to check if the target is reached.	2.00Hz (0.00Hz~ Max. freq)	RUN

F06.5x: Monitoring Comparator

Code (Address)	Name	Content	Default (Range)	Property
F06.50 (0x0632)	Comparator 1 Item	**V/F SVC FVC PMVF PMSVC PMFVC** Ones- and tens-bit: Set 00~63 to yy in monitor parameter in Cxx.yy Hundreds and thousands-bit: Set 00~07 to xx in monitor parameter Cxx.yy	0001 (0000~0763)	RUN
F06.51 (0x0633)	Comparator 1 Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the comparator 1 upper limit.	(up to F06.50)	RUN
F06.52 (0x0634)	Comparator 1 Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the comparator 1 lower limit.	(up to F06.50)	RUN
F06.53 (0x0635)	Comparator 1 Bias	**V/F SVC FVC PMVF PMSVC PMFVC** Set the comparator 1 bias value.	(up to F06.50)	RUN
F06.54 (0x0636)	CP1 Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Continue operation (DO terminal only) 1: Report alarm and free stop 2: Report alarm and continue operation 3: Force stop	0 (0~3)	RUN

F06.55 (0x0637)	Comparator 2 Item	**V/F SVC FVC PMVF PMSVC PMFVC** Ones- and tens-bit: Set monitor parameter 00~63 to yy in Cxx.yy. Hundreds and thousands-bit: Set monitor parameter 00~07 to xx in Cxx.yy.	0002 (0000~0763)	RUN
F06.56 (0x0638)	Comparator 2 Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the comparator 2 upper limit.	(up to F06.55)	RUN
F06.57 (0x0639)	Comparator 2 Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the comparator 2 lower limit.	(up to F06.55)	RUN
F06.58 (0x063A)	Comparator 2 Bias	**V/F SVC FVC PMVF PMSVC PMFVC** Set the comparator 2 bias value.	(up to F06.55)	RUN
F06.59 (0x063B)	CP2 Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Continue operation (DO terminal only) 1: Report fault and free stop 2: Report alarm and continue operation 3: Force stop	0 (0~3)	RUN

F06.6x~F06.7x: Virtual I/O Terminal

Code (Address)	Name	Content	Default (Range)	Property
F06.60 (0x063C)	vX1 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~99)	RUN
F06.61 (0x063D)	vX2 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~99)	RUN
F06.62 (0x063E)	vX3 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~99)	RUN
F06.63 (0x063F)	vX4 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~99)	RUN
F06.64 (0x0640)	vX Status Source	**V/F SVC FVC PMVF PMSVC PMFVC** 0: By internal connection with vYn terminal 1: By physical connection with Xn terminal 2: By function code setting Ones-bit: vX1 Tens-bit: vX2 Hundreds-bit: vX3 Thousands-bit: vX4	0000 (0000~ 2222)	RUN
F06.65 (0x0641)	vX Status from Funcode Setting	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: ON Ones-bit: vX1 Tens-bit: vX2 Hundreds-bit: vX3 Thousands-bit: vX4	0000 (0000~ 1111)	RUN
F06.66 (0x0642)	vY1 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See Y terminal functions.	0 (0~63)	RUN
F06.67 (0x0643)	vY2 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the Y terminal functions.	0 (0~63)	RUN
F06.68 (0x0644)	vY3 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the Y terminal functions.	0 (0~63)	RUN
F06.69 (0x0645)	vY4 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the Y terminal functions.	0 (0~63)	RUN
F06.70 (0x0646)	vY1 ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the vY1 terminal from OFF to ON.	0.010s (0.000s~ 60.000s)	RUN

F06.71 (0x0647)	vY2 ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the vY2 terminal from OFF to ON.	0.010s (0.000s~ 60.000s)	RUN
F06.72 (0x0648)	vY3 ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the vY3 terminal from OFF to ON.	0.010s (0.000s~ 60.000s)	RUN
F06.73 (0x0649)	vY4 ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the vY4 terminal from OFF to ON.	0.010s (0.000s~ 60.000s)	RUN
F06.74 (0x064A)	vY1 OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the vY1 terminal from ON to OFF.	0.010s (0.000s~ 60.000s)	RUN
F06.75 (0x064B)	vY2 OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the vY2 terminal from ON to OFF.	0.010s (0.000s~ 60.000s)	RUN
F06.76 (0x064C)	vY3 OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the vY3 terminal from ON to OFF.	0.010s (0.000s~ 60.000s)	RUN
F06.77 (0x064D)	vY4 OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the vY4 terminal from ON to OFF.	0.010s (0.000s~ 60.000s)	RUN

4.10 F07: Operation Control

F07.0x: Start Control

Code (Address)	Name	Content	Default (Range)	Property
F07.00 (0x0700)	Start Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Start at starting frequency 1: Start from DC braking and then at starting frequency 2: Start from fly track and direction identification	0 (0~2)	STOP
F07.01 (0x0701)	Pre-excitation start time	**V/F SVC FVC PMVF PMSVC PMFVC** Only SVC on asynchronous motors supports pre-excitation.	0.00s (0.00s~ 60.00s)	STOP
F07.02 (0x0702)	Starting Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** The drive will not start but stay in standby when the given frequency is lower than this value.	0.50Hz (0.00Hz~ F01.12)	STOP
F07.03 (0x0703)	Starting Protection	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: ON Ones-bit: ON when terminals under abnormal exit Tens-bit: ON when jogging terminals under abnormal exit Hundreds-bit: ON when command source switched to terminals. **Note:** The terminal protection is enabled by default when free stop, emergency stop or forced stop command is valid, report A. runx during protection.	0111 (0000~1111)	STOP
F07.05 (0x0705)	Motor Direction	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Invert direction 0: Keep the direction 1: Invert the direction Tens-bit: Direction disable 0: FWD/REV allowed 1: Only FWD allowed 2: Only REV allowed	0000 (0000~1121)	STOP

		Hundreds-bit: Frequency-based direction control 0: OFF 1: ON **Note:** This value will not be reset during initialization; And the ones-bit value will not be changed after parameter download.		
F07.06 (0x0706)	Power-down Restart Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Start from fly track 2: Start as start mode	2 (0~2)	STOP
F07.07 (0x0707)	Power-down Restart Interval	**V/F SVC FVC PMVF PMSVC PMFVC** Set the waiting interval to restart the drive after power cut.	0.50s (0.00s~60.00s)	STOP

F07.1x: Stop Control

Code (Address)	Name	Content	Default (Range)	Property
F07.10 (0x070A)	Stop Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Deceleration stop 1: Free stop	0 (0~1)	RUN
F07.11 (0x070B)	Stopping Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** In deceleration stop mode, the drive will stop if the output frequency is lower than this value.	0.50Hz (0.00Hz~ F01.12)	RUN
F07.12 (0x070C)	Pause-Restart Interval	**V/F SVC FVC PMVF PMSVC PMFVC** Set the waiting interval to restart after operation pause.	0.00s (0.00s~ 60.00s)	STOP
F07.15 (0x070F)	Work Mode below Lower Limit Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Run at frequency command 1: Free stop and pause 2: Run at lower limit frequency 3: Run at zero speed	2 (0~3)	RUN
F07.16 (0x0710)	Zero-speed Torque Hold Coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** Set the torque holding factor during zero-speed operation, 100.0% of the rated drive current.	60.0% (0.0%~ 150.0%)	RUN
F07.17 (0x0711)	Zero-frequency Torque Hold Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the holding time for zero frequency operation.	0.0s (0.0s~ 6000.0s)	RUN
F07.18 (0x0712)	FWD/REV Deadtime	**V/F SVC FVC PMVF PMSVC PMFVC** Set the zero-frequency holding time during FWD/REV switching.	0.0s (0.0s~120.0s)	STOP

F07.2x: DC Brake and Fly Track

Code (Address)	Name	Content	Default (Range)	Property
F07.20 (0x0714)	Start Braking Current	**V/F SVC FVC PMVF PMSVC PMFVC** Set the output current for the motor detection.	60.0% (0.0%~150.0%)	STOP
F07.21 (0x0715)	Start Braking Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the braking time before startup.	0.0s (0.0s~60.0s)	STOP
F07.22 (0x0716)	DC Braking Working Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the DC braking frequency when it start to work.	1.00Hz (0.00Hz~ 50.00Hz)	STOP
F07.23 (0x0717)	DC Braking Current	**V/F SVC FVC PMVF PMSVC PMFVC** The reference is the rated current of the drive, and the internal limit shall not exceed the rated current of the motor.	60.0% (0.0%~150.0%)	STOP
F07.24 (0x0718)	Stop DC Brake Hold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the DC braking time during stop.	0.0s (0.0s~60.0s)	STOP
F07.25 (0x0719)	Fly Track	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Search mode 0: Search from max. frequency 1: Search from stop frequency	0000 (0000~ 1111)	STOP

		Tens-bit: Search backwards 0: OFF 1: ON Hundreds-bit: Search source 0: Software 1: Hardware		
F07.26 (0x071A)	Fly Track Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the speed track time.	0.50s (0.00s~ 60.00s)	STOP
F07.27 (0x071B)	Fly Track Stop Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the speed tracking stop delay.	1.00s (0.00s~ 60.00s)	STOP
F07.28 (0x071C)	Fly Track Current	**V/F SVC FVC PMVF PMSVC PMFVC** Set the speed tracking current.	120.0% (0.0%~ 400.0%)	STOP

F07.3x: Jog

Code (Address)	Name	Content	Default (Range)	Property
F07.30 (0x071E)	Jog Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the jogging frequency.	5.00Hz (0.00Hz~ Max.freq)	RUN
F07.31 (0x071F)	Jog ACC Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the jogging acceleration time.	10.00s (0.00s~ 650.00s)	RUN
F07.32 (0x0720)	Jog DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the jogging deceleration time.	10.00s (0.00s~ 650.00s)	RUN
F07.33 (0x0721)	Jog S-curve	**V/F SVC FVC PMVF PMSVC PMFVC** Set the S-curve for jogging. 0: OFF 1: ON	1 (0~1)	RUN
F07.34 (0x0722)	Jogging Stop Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stop mode for jogging. 0: F7.10 1: Deceleration stop only	0 (0~1)	STOP

F07.4x: Start/Stop Hold/Jump Frequency

Code (Address)	Name	Content	Default (Range)	Property
F07.40 (0x0728)	Starting Hold frequency	**V/F SVC FVC PMVF PMSVC PMFVC** It is higher than the starting frequency and lower than the upper limit frequency set from the keypad.	0.50Hz (0.00Hz~ F01.12)	STOP
F07.41 (0x0729)	Starting Hold frequency	**V/F SVC FVC PMVF PMSVC PMFVC** The set value should be greater than the starting frequency, and if it is lower, start at starting frequency.	0.00s (0.00s~ 60.00s)	STOP
F07.42 (0x072A)	Stopping Hold frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the holding frequency during stop.	0.50Hz (0.00Hz~ F01.12)	STOP
F07.43 (0x072B)	Stopping Hold frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the dwell frequency time during stop.	0.00s (0.00s~ 60.00s)	STOP
F07.44 (0x072C)	Jump Frequency 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the jump frequency 1.	0.00Hz (0.00Hz~ Max. freq)	RUN

F07.45 (0x072D)	Jump Frequency Hysteresis 1	V/F SVC FVC PMVF PMSVC PMFVC Set the range for jump frequency 1.	0.00Hz (0.00Hz~ Max. freq)	RUN
F07.46 (0x072E)	Jump Frequency 2	V/F SVC FVC PMVF PMSVC PMFVC Set the jump frequency 2.	0.00Hz (0.00Hz~ Max. freq)	RUN
F07.47 (0x072F)	Jump Frequency Hysteresis 2	V/F SVC FVC PMVF PMSVC PMFVC Set the range for jump frequency 2.	0.00Hz (0.00Hz~ Max. freq)	RUN

4.11 F08: Auxiliary Control

F08.0x: Counter and Timer

Code (Address)	Name	Content	Default (Range)	Property
F08.00 (0x0800)	Counter Source	V/F SVC FVC PMVF PMSVC PMFVC 0: X terminal 1: PUL terminal 2~5: Reserved	0 (0~5)	RUN
F08.01 (0x0801)	Counter Division	V/F SVC FVC PMVF PMSVC PMFVC Set the counting crossover for input.	0 (0~6000)	RUN
F08.02 (0x0802)	Counter Maximum	V/F SVC FVC PMVF PMSVC PMFVC Set the max. value of counter	1000 (0~65000)	RUN
F08.03 (0x0803)	Counter Target	V/F SVC FVC PMVF PMSVC PMFVC Set the counter target value.	500 (0~65000)	RUN
F08.04 (0x0804)	Pulse No. Per Meter	V/F SVC FVC PMVF PMSVC PMFVC Set the counting value per meter.	10.0 (0.1~6553.5)	RUN
F08.05 (0x0805)	Length	V/F SVC FVC PMVF PMSVC PMFVC Length	1000m (0m~65535m)	STOP
F08.06 (0x0806)	Actual Length	V/F SVC FVC PMVF PMSVC PMFVC Set the actual length.	0m (0m~65535m)	STOP
F08.07 (0x0807)	Timer Unit	V/F SVC FVC PMVF PMSVC PMFVC Set the time unit on the timing circuit. 0: Second(s) 1: Minute(min) 2: Hour(h)	0 (0~2)	STOP
F08.08 (0x0808)	Timer Target	V/F SVC FVC PMVF PMSVC PMFVC Set the target value of the timer.	0 (0~65000)	STOP

F08.3x: Wobble Frequency

Code (Address)	Name	Content	Default (Range)	Property
F08.30 (0x081E)	Wobble Frequency	V/F SVC FVC PMVF PMSVC PMFVC 0: OFF 1: ON	0 (0~1)	STOP
F08.31 (0x081F)	Wobble Mode	V/F SVC FVC PMVF PMSVC PMFVC Ones-bit: Work method 0: Auto 1: Manual via terminal Tens-bit: Wobble frequency range 0: Center frequency-based 1: Max. frequency-based Hundreds-bit: Preset frequency enable 0: OFF 1: ON	0000 (0000~0111)	STOP
F08.32 (0x0820)	Preset Wobble Frequency	V/F SVC FVC PMVF PMSVC PMFVC Set the preset wobble frequency.	0.00Hz (0.00Hz~ Max. freq)	STOP
F08.33 (0x0821)	Preset Wobble Frequency Wait Time	V/F SVC FVC PMVF PMSVC PMFVC Set the preset wobble frequency waiting time.	0.0s (0.0s~3600.0s)	STOP
F08.34 (0x0822)	Wobble Frequency Range	V/F SVC FVC PMVF PMSVC PMFVC Set the wobble frequency range value.	10.0% (0.0%~50.0%)	STOP

F08.35 (0x0823)	Kick Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the kick frequency.	10.0% (0.0%~50.0%)	STOP
F08.36 (0x0824)	Triangular Wave Rise Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the triangular wave rise time.	5.00s (0.00s~650.00s)	STOP
F08.37 (0x0825)	Triangular Wave Drop Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the triangular wave drop time.	5.00s (0.00s~650.00s)	STOP

4.12 F09: Auxiliary Control 2

F09.0x: Maintenance

Code (Address)	Name	Content	Default (Range)	Property
F09.02 (0x0902)	Maintenance Alarm	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Cooling fan 0: OFF 1: ON Tens-bit: Main relay 0: OFF 1: ON Hundreds-bit: Reserved Thousands-bit: Reserved	0x0000 (0x0000~ 0x1111)	RUN
F09.03 (0x0903)	Fan Maintenance	**V/F SVC FVC PMVF PMSVC PMFVC** Set it to 0 when replacing with a new fan, in hour.	0 (0~65535)	STOP
F09.04 (0x0904)	Main Relay Maintenance	**V/F SVC FVC PMVF PMSVC PMFVC** After replacing the main relay, set it to 0.0%.	0.0% (0.0%~150.0%)	STOP

F09.60: Motor Phase Loss Detection

Code (Address)	Name	Content	Default (Range)	Property
F09.60 (0x093C)	Motor Current Detection Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** 100% of the motor rated current, and the drive will report faults when output current is lower than this setting.	15.0% (0%~100%)	RUN

F09.63~F09.78: Pipe Filling

Code (Address)	Name	Content	Default (Range)	Property
F09.63 (0x093F)	Pipe Filling Enable	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: ON	0 (0~1)	STOP
F09.64 (0x0940)	PID Enable	**V/F SVC FVC PMVF PMSVC PMFVC** Used to select whether or not to automatically enter PID mode after the end of pipe filling 0: OFF 1: ON	1 (0~1)	STOP
F09.65 (0x0941)	First Constant stage Freq	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency for pipe filling.	30.00Hz (0.00Hz~ F01.12)	RUN
F09.66 (0x0942)	First Constant Freq Stage Hold Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency holding time during pipe filling.	10.0s (1.0s~3600.0s)	RUN
F09.67 (0x0943)	Initial Stage End frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the minimum speed of the motor for switching acceleration and deceleration. When the operating frequency is less than the minimum frequency, take F9.68 for the acceleration time, otherwise, take F1.22.	0Hz (0.00Hz~ F01.12)	RUN
F09.68 (0x0944)	Initial ACC Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the acceleration time of the motor running from 0Hz to the minimum frequency.	10.00s (0.00s~ 650.00s)	RUN
F09.70 (0x0946)	Second ACC stage Time	**V/F SVC FVC PMVF PMSVC PMFVC** It is valid under FVC. When F09.66 is reached, and the AI feedback does not reach the set point on F09.75, i.e., the drive continues to accelerate according to this setting.	10.00s (0.00s~ 650.00s)	RUN

F09.72 (0x0948)	PID ACC Time	**V/F SVC FVC PMVF PMSVC PMFVC** It is the acceleration time when the frequency source is set to PID, valid under FVC.	10.00s (0.00s~ 650.00s)	RUN
F09.74 (0x094A)	Per-unit Min. Speed Pressure	**V/F SVC FVC PMVF PMSVC PMFVC** It indicates the percentage of the water pressure detected by the sensor connected to AI at the min. speed (or 0Hz).	0.00% (0.00%~ 100.00%)	RUN
F09.75 (0x094B)	Per-unit Target Pressure	**V/F SVC FVC PMVF PMSVC PMFVC** It indicates the percentage of the water pressure target detected by the sensor connected to AI.	45.00% (0.00%~ 100.00%)	RUN
F09.76 (0x094C)	Second Constant Freq stage time	**V/F SVC FVC PMVF PMSVC PMFVC** When the AI feedback reaches the set target, it switches to PID operation control after the delay time.	1.0s (0.1s~10.0s)	RUN
F09.77 (0x094D)	Second ACC stage Rate	**V/F SVC FVC PMVF PMSVC PMFVC** Set the ramp rate during pipe filling. Calculate the ACC time together with F9.74 and F9.75.	5.00% (0.00%~ 100.00%)	RUN
F09.78 (0x094E)	Pressure Input Source	**V/F SVC FVC PMVF PMSVC PMFVC** Set the AI source of pressure sensor: 0: AI1 1: AI2 2: AI3	0 (0~2)	STOP

4.13 F10: Protections

F10.0x: Current Protection

Code (Address)	Name	Content	Default (Range)	Property
F10.00 (0x0A00)	Anti-overcurrent Enable	**V/F SVC FVC PMVF PMSVC PMFVC** Set to auto limit the current below the setting here to prevent faults triggered by excessive current. 0: Always ON 1: ON during ACC/DEC and OFF at constant operation	0 (0~1)	RUN
F10.01 (0x0A01)	Anti-overcurrent Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the load current threshold, 100% of the drive rated current.	160.0% (0.0%~ 300.0%)	RUN
F10.02 (0x0A02)	Anti-Overcurrent Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the response effect of anti-overcurrent function.	100.0% (0.0%~ 500.0%)	RUN
F10.03 (0x0A03)	Current Protection 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the current-related protection on/off. Ones-bit: CBC 0: OFF 1: ON Tens-bit: Anti-overcurrent interference elimination. 0: OFF 1: Level 1 2: Level 2 Hundreds-bit: Anti-short circuit interference elimination. 0: OFF 1: Level 1 2: Level 2 Thousands-bit: Reserved	0001 (0000~ F221)	STOP
F10.04 (0x0A04)	Current Protection 2	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Three-phase current sum protection. 0: OFF 1: ON Tens-bit: Three-phase current imbalance fault E. oLF4 detection. 0: OFF 1: ON	0001 (0000~ 0011)	STOP
F10.05 (0x0A05)	Current Imbalance Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Compare the ratio of the largest to the smallest phase of the three-phase current with the set value here to judge current imbalance.	160% (0%~500%)	STOP
F10.06 (0x0A06)	Current Imbalance Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Increase this parameter under high current fluctuation.	2.0s (0.0s~60.0s)	STOP

F10.1x: Voltage Protection

Code (Address)	Name	Content	Default (Range)	Property
F10.11 (0x0A0B)	Anti-overvoltage Enable	**V/F SVC FVC PMVF PMSVC PMFVC** If the bus voltage is higher than this setting, ACC/DEC will be slowed down or stopped to prevent overvoltage faults. Ones-bit: Anti-overvoltage function 0: OFF 1: ON Tens-bit: Overexcitation function 0: OFF 1: ON during deceleration 2: ON during operation	0011 (0000~0021)	STOP
F10.12 (0x0A0C)	Anti-overvoltage Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the bus voltage value to trigger the anti-overvoltage protection.	T3: 750V S2: 370V (0V~ Overvoltage threshold) T3 OU point: 820V S2 OU point: 400V	STOP
F10.13 (0x0A0D)	Anti-overvoltage Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the response effect of the bus overvoltage suppression function.	100.0% (0.0%~500.0%)	RUN
F10.14 (0x0A0E)	Dynamic Brake	**V/F SVC FVC PMVF PMSVC PMFVC** Set the dynamic braking on or off. 0: OFF 1: ON, with anti-overvoltage function off 2: ON, with anti-overvoltage function on	2 (0~2)	RUN
F10.15 (0x0A0F)	Dynamic Brake Voltage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the dynamic brake voltage to start when the bus voltage is higher than this value.	T3: 740V S2: 360V (0V~ Overvoltage threshold) T3 OU point: 820V S2 OU point: 400V	RUN
F10.16 (0x0A10)	Anti-undervoltage Enable	**V/F SVC FVC PMVF PMSVC PMFVC** Auto increase the operating frequency when the bus voltage is lower than this setting to prevent under-voltage faults. 0: OFF 1: ON	0 (0~1)	STOP
F10.17 (0x0A11)	Anti-undervoltage Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the bus voltage value to trigger the low-voltage suppression function.	T3: 430V S2: 240V (0V~ Overvoltage threshold) T3 OU point: 820V S2 OU point: 400V	STOP
F10.18 (0x0A12)	Anti-undervoltage Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the response effect of low-voltage suppression.	100.0% (0.0%~500.0%)	RUN

F10.19 (0x0A13)	Undervoltage Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the lower limit voltage of the bus voltage allowed, report low-voltage error when below this value.	T3: 320V S2: 190V (0V~ Overvoltage threshold) T3 OU point: 820V S2 OU point: 400V	STOP

F10.2x: Auxiliary Protection

Code (Address)	Name	Content	Default (Range)	Property
F10.20 (0x0A14)	I/O Phase Loss Protection Enable	**V/F SVC FVC PMVF PMSVC PMFVC** Set the I/O phase loss protection function on or off. Ones-bit: Output phase loss protection 0: OFF 1: ON Tens-bit: Input phase loss protection 0: OFF 1: ON, report A.iLF and continue operation 2: ON, report E.iLF and free stop Hundreds-bit: Reserved Thousands-bit: Reserved	0021 (000~ 1121)	STOP
F10.21 (0x0A15)	Input Phase Loss Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the voltage detection percentage for the input phase loss detection, 100% of the rated bus voltage.	10.0% (0.0%~30.0%)	STOP
F10.22 (0x0A16)	Ground Short Circuit Protection	**V/F SVC FVC PMVF PMSVC PMFVC** Set the drive output and fan to ground short circuit protection on/off. Ones-bit: Output to ground short circuit protection 0: OFF 1: ON 2: Detect before operation Tens-bit: Fan to ground short circuit protection 0: OFF 1: ON	0111 (0000~0112)	STOP
F10.23 (0x0A17)	Fan Enable	**V/F SVC FVC PMVF PMSVC PMFVC** Set the drive fan operation mode. 0: ON after the drive is powered up 1: ON with the drive, temperature-related 2: ON for the time on F10.24 and stops, temperature-related	1 (0~2)	RUN
F10.24 (0x0A18)	Fan Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time from operation command release to fan stopping.	30.00s (0.00s~600.00s)	STOP
F10.25 (0x0A19)	Drive Overheat oH1 Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the value for overheat detection, report alarm when it is above this value.	80.0°C (0.0°C~100.0°C)	RUN
F10.26 (0x0A1A)	Motor Overheat Protection (Expansion)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the function related to motor overheat protection when IO expansion is used. Ones-bit: Motor temperature sensor type 0: PT1000 1: KTY84 IO expansion board dip switches to KTY, and F10.26 is valid. IO expansion board dip switches to PT100, and PT100 sensor is valid.	0x01 (0x00~0x01)	RUN

F10.27 (0x0A1B)	Motor Overheat Error Threshold(Expansion)	V/F SVC FVC PMVF PMSVC PMFVC Set the value for motor overheat, report fault when it is above this value.	110.0°C (0.0°C~200.0°C)	RUN
F10.28 (0x0A1C)	Motor Overheat Alarm Threshold (Expansion)	V/F SVC FVC PMVF PMSVC PMFVC Set the value for overheat, report alarm when it is above this value.	90.0°C (0.0°C~F10.27)	RUN

F10.30～F10.31: Motor Phase Loss

Code (Address)	Name	Content	Default (Range)	Property
F10.30 (0x0A1E)	Stop Phase Detection	V/F SVC FVC PMVF PMSVC PMFVC Set the output phase loss detection when the drive is shut down to detect the motor status in advance so as to overhaul in advance. Detect one by the set time on F10.31. 0: OFF 1: Report E.iLF at phase loss, free stop 2: Report A.iLF at phase loss, continue operation	0 (0~2)	RUN
F10.31 (0x0A1F)	Motor Detection Interval	V/F SVC FVC PMVF PMSVC PMFVC Set the interval for motor detection.	3.0s (0.0s~6000.0s)	STOP

F10.3x: Load Protection

Code (Address)	Name	Content	Default (Range)	Property
F10.32 (0x0A20)	Load Alarm Mode	V/F SVC FVC PMVF PMSVC PMFVC Set the drive load detection mode and the alarm mode by this parameter. Ones-bit: Load detection mode 1 0: OFF 1: Detect overload 2: Detect overload only at constant speed 3: Detect underload 4: Detect underload at constant speed only Tens-bit: Load alarm mode 1 0: Report A. LD1, continue operation 1: Report E. LD1, free stop Hundreds-bit: Load detection mode 2 0: OFF 1: Detect overload 2: Detect overload only at constant speed 3: Detect underload 4: Detect underload at constant speed only Thousands-bit: Load alarm mode 2 0: Report A. LD1, continue operation 1: Report E. LD1, free stop	0000 (0000~1414)	STOP
F10.33 (0x0A21)	Load Alarm Threshold 1	V/F SVC FVC PMVF PMSVC PMFVC Set the load alarm value 1 for detection. For V/F control, it is 100% of the rated motor current. And for vector control, it is 100% of the motor rated output torque.	130.0% (0.0%~200.0%)	STOP
F10.34 (0x0A22)	Load Alarm Time 1	V/F SVC FVC PMVF PMSVC PMFVC Set the detection duration of load alarm 1, if the load is higher than the load alarm threshold for the set time here, report load alarm 1.	5.0s (0.0s~60.0s)	STOP

F10.35 (0x0A23)	Load Alarm Threshold 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the load alarm value 2 for detection. For V/F control, it is 100% of the rated motor current. And for vector control, it is 100% of the motor rated output torque.	30.0% (0.0%~200.0%)	STOP
F10.36 (0x0A24)	Load Alarm Time 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the detection duration of load alarm 2, if the load is higher than the load alarm threshold for the set time here, report load alarm 2.	5.0s (0.0s~60.0s)	STOP

F10.4x: Stall Protection

Code (Address)	Name	Content	Default (Range)	Property
F10.40 (0x0A28)	Speed Deviation Detection and Alarm Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set the detection mode and alarm mode of deviation between the motor's target speed and the feedback speed. Ones-bit: Detection mode 0: OFF 1: ON only at constant speed 2: ON Tens-bit: Alarm mode 0: Report fault and free stop 1: Report alarm and continue operation	0000 (0000~0012)	STOP
F10.41 (0x0A29)	Speed Deviation Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the detection value for excessive speed deviation, it is 100% of F01.10 [Max. Frequency].	10.0% (0.0%~60.0%)	STOP
F10.42 (0x0A2A)	Speed Deviation Detection Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the duration for the speed deviation detection. If the deviation between the target speed and the feedback speed is greater than F10.41 for this time, report alarm.	2.0s (0.0s~60.0s)	STOP
F10.43 (0x0A2B)	Stall Protection	**V/F SVC FVC PMVF PMSVC PMFVC** Set the detection mode selection and alarm mode of stall. Ones-bit: Detection mode. 0: OFF 1: ON only at constant speed 2: ON Tens-bit: Alarm mode. 0: Report fault and free stop 1: Report alarm and continue operation	0002 (0000~0012)	STOP
F10.44 (0x0A2C)	Stall Detection Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the value of the stall threshold for detection, 100% of F01.10 [Max. Frequency].	110.0% (0.0%~150.0%)	STOP
F10.45 (0x0A2D)	Stall Detection Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the duration of stall detection. If the feedback speed is higher than F10.44 and lasts for the set time here, report alarm.	0.100s (0.000s~2.000s)	STOP

F10.5x: Fault Reset and Motor Overload

Code (Address)	Name	Content	Default (Range)	Property
F10.50 (0x0A32)	Fault Reset No.	**V/F SVC FVC PMVF PMSVC PMFVC** Set the number of times allowed to perform auto fault reset. Note: 0 indicates that the auto fault reset function is disabled, otherwise, it is enabled.	0 (0~10)	STOP
F10.51 (0x0A33)	Fault Reset Interval	**V/F SVC FVC PMVF PMSVC PMFVC** Set the waiting time after a fault occurs until the auto reset.	1.0s (0.0s~100.0s)	STOP

F10.52 (0x0A34)	Performed Reset No.	**V/F SVC FVC PMVF PMSVC PMFVC** It indicate the times of already performed auto fault reset, read-only.	0	READ
F10.55 (0x0A37)	Motor Overload Model	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Common motor 1: Variable frequency motor(50Hz) 2: Variable frequency motor(60Hz) 3: Motor without cooling fan	0 (0~3)	RUN
F10.56 (0x0A38)	Motor Insulation Class	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Insulation class A 1: Insulation class E 2: Insulation class B 3: Insulation class F 4: Insulation class H 5: Special class S	3 (0~5)	STOP
F10.57 (0x0A39)	Motor Work Pattern	**V/F SVC FVC PMVF PMSVC PMFVC** 0-1: S1 pattern(continuous operation) 2: S2 pattern 3-9: S3~S9	0 (0~9)	STOP
F10.58 (0x0A3A)	Motor Overload Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the motor overload threshold. Record the overload volume when actual current is greater than the value here.	105.0% (0.0%~130.0%)	STOP
F10.59 (0x0A3B)	Motor Overload Current Coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** Motor overload current = Actual current*Motor overload current coefficient.	100.0% (0.0%~250.0%)	STOP

4.14 F11: Keypad Parameters

F11.0x: Key Operation

Code (Address)	Name	Content	Default (Range)	Property
F11.00 (0x0B00)	Key Lock	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Parameter modification via keypad locked 2: Parameters and non-start/stop key locked 3: Parameters and keys locked	0 (0~3)	RUN
F11.01 (0x0B01)	Key Lock Password	**V/F SVC FVC PMVF PMSVC PMFVC** Set the key lock password.	0 (0~65535)	RUN
F11.02 (0x0B02)	Multi-function Key	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: REV operation 2: FWD jogging 3: REV jogging 4: Switch command source between keypad and terminal 5: Switch command source between keypad and communication 6: Switch command source between terminal and communication 7: Switch command source among keypad, terminal and communication cyclically	0 (0~7)	STOP
F11.03 (0x0B03)	STOP Key	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Non-keypad control OFF 1: Non-keypad stop works as stop mode 2: Non-keypad stop works as free stop	0 (0~2)	STOP
F11.04 (0x0B04)	UP/DW(Knob) Key	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: UP/DW modification. 0: OFF 1: ON to modify F01.09[Target Frequency]	0011 (0000~0213)	STOP

		2: ON to modify F13.01[PID Target] 3: ON to modify the funcode via UP/DW key Tens-bit: Power-down save. 0: OFF 1:ON Hundreds-bit: Modification limit 0: Modifiable during operation and stop 1: Modifiable during operation, keep during stop 2: Modifiable during operation, cleared after shutdown		
F11.05 (0x0B05)	UP/DW Key for Funcode Modification	**V/F SVC FVC PMVF PMSVC PMFVC** Ones- and tens-bit: Set 00 ~ 99 to yy in Fxx.yy Hundreds- and thousands-bit: Set 00 ~ 15 to xx in Fxx.yy	0109 (0000~2999)	RUN
F11.06 (0x0B06)	Command Key	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bits: Internal/external keypad command keys (RUN, STOP and RESET). 0: External first, when external keys are valid, internal are invalid 1: Internal first, when internal keys are valid, external are invalid 2: When both internal and external are valid, STOP/RESET are prior; and when both forward and reverse are valid, they are used as stop. Tens-bit: Reserved Hundreds-bit: Reserved Thousands-bit: Reserved	0000 (0000~2122)	STOP

F11.1x: Cyclic Monitoring of Status Interface

Code (Address)	Name	Content	Default (Range)	Property
F11.10 (0x0B0A)	Left/Right Shift	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Left shift key to adjust the first row of monitoring. 0: OFF 1: ON Tens-bit: Right shift key to adjust the second row of monitoring. 0: OFF 1: ON When the left/right shift key is invalid, the monitor display value is shown as parameter 1 after re-powering up.	0011 (0000~0011)	STOP
F11.11 (0x0B0B)	1st Row Parameter 1 for Cyclic Display	**V/F SVC FVC PMVF PMSVC PMFVC** Ones- and tens-bit: Set 00~63 to yy in monitor parameter in Cxx.yy 00~63. Hundreds and thousands-bit: Set 00~07 to xx in monitor parameter Cxx.yy 00~07.	0000 (0000~0763)	RUN
F11.12 (0x0B0C)	1st Row Parameter 2 for Cyclic Display	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0001 (0000~0763)	RUN
F11.13 (0x0B0D)	1st Row Parameter 3 for Cyclic Display	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0002 (0000~0763)	RUN
F11.14 (0x0B0E)	1st Row Parameter 4 for Cyclic Display	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0011 (0000~0763)	RUN
F11.15 (0x0B0F)	2nd Row Parameter 1 for Cyclic Display	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0009 (0000~0763)	RUN
F11.16 (0x0B10)	2nd Row Parameter 2 for Cyclic Display	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0004 (0000~0763)	RUN
F11.17 (0x0B11)	2nd Row Parameter 3 for Cyclic Display	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0010 (0000~0763)	RUN
F11.18 (0x0B12)	2nd Row Parameter 4 for Cyclic Display	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0012 (0000~0763)	RUN

F11.2x: Monitoring Parameters

Code (Address)	Name	Content	Default (Range)	Property
F11.20 (0x0B14)	Keypad Display Item	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Output frequency display. 0: Target frequency 1: Operating frequency >=2: Target frequency, filter depth becomes larger with this value Tens-bit: Reserved Hundreds-bit: Power dimension. 0: In percentage (%) 1: In kilowatt(kW) Thousands-bit: Reserved.	0x0002 (0x0000~ 0x111F)	RUN
F11.21 (0x0B15)	Speed Display Coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** Adjust the display of C00.05 speed.	100.0% (0.0%~ 500.0%)	RUN
F11.22 (0x0B16)	Power Display Coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** Adjust the display of C00.10 power.	100.0% (0.0%~ 500.0%)	RUN
F11.23 (0x0B17)	Monitoring Parameter Group Display	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Reserved Tens-bit: C05 display 0: Auto switching with control modes 1: V/F mode related parameters 2: V/C mode related parameters Hundreds-bit: C00.40~C00.63 display 0: OFF 1: ON Thousands-bit: Communication fault code switching. 0: OFF 1: ON, fault code the same as AC300 during 485 communication. 2: ON, fault code the same as AC70 during 485 communication.	0x0000 (0x0000~ 0xFFFF)	RUN
F11.24 (0x0B18)	Monitoring Parameter Filter	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Output current display with filtering. 0~F: The larger the value, the deeper the filtering	0x0002 (0x0000~ 0x000F)	RUN
F11.25 (0x0B19)	Motor Auto-tuning Display	**V/F SVC FVC PMVF PMSVC PMFVC** Set the auto-tuning process of the motor on the display. 0: OFF 1: ON	0 (0~1)	STOP
F11.27 (0x0B1B)	Fault Display	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Display the fault during auto reset. 0: OFF 1: ON	0x0001 (0x0000~ 0x0001)	RUN

F11.3x: Special Keypad Functions

Code (Address)	Name	Content	Default (Range)	Property
F11.31 (0x0B1F)	Potentiometer Voltage Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the lower limit voltage via the potentiometer(valid on the optional external single-row keypad).	0.50V (0.00V~ 3.00V)	RUN

F11.32 (0x0B20)	Potentiometer Voltage Lower Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the corresponding value of the lower limit of the potentiometer(valid for an optional external single-row keypad).	0.00% (0.00%~ 100.00%)	RUN
F11.33 (0x0B21)	Potentiometer Upper Voltage Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the upper limit voltage of the potentiometer(valid for an optional external single-row keypad).	2.80V (0.00V~ 3.00V)	RUN
F11.34 (0x0B22)	Potentiometer Upper Voltage Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the corresponding value of the upper limit of the potentiometer(valid for an optional external single-row keypad).	100.00% (0.00%~ 100.00%)	RUN
F11.35 (0x0B23)	Potentiometer	**V/F SVC FVC PMVF PMSVC PMFVC** Set the potentiometer in use. 0: Reserved 1: Potentiometer of the external keypad	1 (0~1)	STOP

4.15 F12: Communication

F12.0x: Modbus Slave

Code (Address)	Name	Content	Default (Range)	Property
F12.00 (0x0C00)	Master/Slave	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Slave 1: Master	0 (0~1)	STOP
F12.01 (0x0C01)	Modbus Address	**V/F SVC FVC PMVF PMSVC PMFVC** Set the different values for different slaves.	1 (1~247)	STOP
F12.02 (0x0C02)	Baud Rate	**V/F SVC FVC PMVF PMSVC PMFVC** 0: 1200bps 1: 2400bps 2: 4800bps 3: 9600 bps 4: 19200 bps 5: 38400 bps 6: 57600 bps	6 (0~6)	STOP
F12.03 (0x0C03)	Modbus Data Format	**V/F SVC FVC PMVF PMSVC PMFVC** 0: (N, 8, 1) no parity, data bit: 8, stop bit: 1 1: (E, 8, 1) even parity, data bit: 8, stop bit: 1 2: (O, 8, 1) odd parity, data bit:8, stop bit:1 3: (N, 8, 2) no parity, data bit: 8, stop bit: 2 4: (E, 8, 2) even parity, data bit: 8, stop bit: 2 5: (O, 8, 2) odd parity, data bit: 8, stop bit: 2	0 (0~5)	STOP
F12.04 (0x0C04)	Modbus Response Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Response to write operation 1: No response to write operation	0 (0~1)	RUN
F12.05 (0x0C05)	Modbus Response Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the Modbus communication response delay time.	0ms (0ms~ 5000ms)	RUN
F12.06 (0x0C06)	Modbus Failure Timeout	**V/F SVC FVC PMVF PMSVC PMFVC** Set the Modbus communication failure timeout	1.0s (0.1s~100.0s)	RUN
F12.07 (0x0C07)	Communication Disconnection Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Detection OFF 1: Report fault and free stop 2: Report alarm and continue operation 3: Force stop	0 (0~3)	RUN
F12.08 (0x0C08)	Data Bias(0x3000)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the bias to correct communication data to 0x3000.	0.00 (-100.00~ 100.00)	RUN

F12.09 (0x0C09)	Data Gain(0x3000)	**V/F SVC FVC PMVF PMSVC PMFVC** Set to perform linear correction to the communication data to 0x3000.	100.0% (0.0%~ 500.0%)	RUN

F12.1x: Modbus Master

Code (Address)	Name	Content	Default (Range)	Property
F12.10 (0x0C0A)	Cycle Parameter Sending	**V/F SVC FVC PMVF PMSVC PMFVC** Ones, tens, hundreds, and thousands all can be selected with: 0: OFF 1: Operation command 2: Target frequency 3: Output frequency 4: Upper limit frequency 5: Target torque 6: Output torque 7: Reserved 8: Reserved 9: PID target A: PID feedback B: Reserved C: Active current component	0x0031 (0x0000~ 0xCCCC)	RUN
F12.11 (0x0C0B)	User-defined Frequency Address	**V/F SVC FVC PMVF PMSVC PMFVC** Set an address to give the frequency.	0x0000 (0x0000~ 0xFFFF)	RUN
F12.12 (0x0C0C)	User-defined Command Address	**V/F SVC FVC PMVF PMSVC PMFVC** Set an address to give the command.	0x0000 (0x0000~ 0xFFFF)	RUN
F12.13 (0x0C0D)	FWD Command Value	**V/F SVC FVC PMVF PMSVC PMFVC** Set command value for forward running.	0x0001 (0x0000~ 0xFFFF)	RUN
F12.14 (0x0C0E)	REV Command Value	**V/F SVC FVC PMVF PMSVC PMFVC** Set command value for reverse running.	0x0002 (0x0000~ 0xFFFF)	RUN
F12.15 (0x0C0F)	Stop Command Value	**V/F SVC FVC PMVF PMSVC PMFVC** Set the command value for stop.	0x0005 (0x0000~ 0xFFFF)	RUN
F12.16 (0x0C10)	Reset Command Value	**V/F SVC FVC PMVF PMSVC PMFVC** Set the command value for reset.	0x0007 (0x0000~ 0xFFFF)	RUN
F12.19 (0x0C13)	Master Command	**V/F SVC FVC PMVF PMSVC PMFVC** Set the command type from the master. 0: Send running command 1: Send running status	0 (0~1)	RUN

F12.2x: Special Modbus Functions

Code (Address)	Name	Content	Default (Range)	Property
F12.20 (0x0C14)	RJ45 Communication Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Dual-line keypad 1: Modbus slave (set by F12.2x) 2: Modbus master(set by F12.1x) 3: VEICHI-customized **Note**: T3-45kW and above models only support two-line keypad.	0 (0~3)	STOP
F12.21 (0x0C15)	RJ45 Communication Address	**V/F SVC FVC PMVF PMSVC PMFVC** Set the slave address when RJ45 port is used for Modbus communication.	1 (1~247)	STOP
F12.22 (0x0C16)	RJ45 Baud Rate	**V/F SVC FVC PMVF PMSVC PMFVC** Set the baud rate when RJ45 port is used for Modbus communication. 0: 1200bps 1: 2400bps 2: 4800bps 3: 9600 bps 4: 19200 bps 5: 38400 bps	3 (0~5)	STOP

F12.23 (0x0C17)	RJ45 Data Format	**V/F SVC FVC PMVF PMSVC PMFVC** Set the data format when RJ45 port is used for Modbus communication. 0: (N, 8, 1) no parity, data bit: 8, stop bit: 1 1: (E, 8, 1) even parity, data bit: 8, stop bit: 1 2: (O, 8, 1) odd parity, data bit:8, stop bit:1 3: (N, 8, 2) no parity, data bit: 8, stop bit: 2 4: (E, 8, 2) even parity, data bit: 8, stop bit: 2 5: (O, 8, 2) odd parity, data bit: 8, stop bit: 2	0 (0~5)	STOP
F12.24 (0x0C18)	RJ45 Response Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set the response mode when RJ45 port is used for Modbus communication. 0: Response to write operation 1: No response to write operation	0 (0~1)	RUN
F12.25 (0x0C19)	RJ45 Response Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the communication response delay when RJ45 port is used for Modbus communication.	0ms (0ms~5000ms)	RUN
F12.26 (0x0C1A)	RJ45 Disconnection Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the disconnection time when RJ45 port is used for Modbus communication.	1.0s (0.1s~100.0s)	RUN
F12.27 (0x0C1B)	RJ45 Disconnection Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set the disconnection method when RJ45 port is used for Modbus communication. 0: Detection OFF 1: Report fault and free stop 2: Report alarm and continue operation 3: Force stop	0 (0~3)	RUN

F12.3x: PROFIBUS-DP

Code (Address)	Name	Content	Default (Range)	Property
F12.30 (0x0C1E)	DP Address	**V/F SVC FVC PMVF PMSVC PMFVC** Set the communication addresses.	1 (1~247)	RUN
F12.32 (0x0C20)	DP Master-Slave Disconnection Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set the DP master-slave communication error mode. 0: Detection OFF 1: Report fault and free stop 2: Report alarm and continue operation	0 (0~2)	STOP

Note: Expansions are not allowed to be plugged or unplugged with power-on.

F12.4x: CANopen

Code (Address)	Name	Content	Default (Range)	Property
F12.40 (0x0C28)	CAN Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Slave 1: VEICHI-customized master	1 (0~1)	RUN
F12.41 (0x0C29)	Communication Address	**V/F SVC FVC PMVF PMSVC PMFVC** Set the address of the slave.	1 (1~247)	RUN
F12.42 (0x0C2A)	Baud Rate	**V/F SVC FVC PMVF PMSVC PMFVC** 0: 20kbps 1: 50kbps 2: 100kbps 3: 125kbps 4: 250kbps 5: 500kbps 6: 1Mbps	3 (0~6)	RUN
F12.43 (0x0C2B)	CAN Master-Slave Disconnection Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set the CAN master-slave communication error mode. 0: Detection OFF 1: Report alarm and free stop 2: Report alarm and continue operation	0 (0~2)	RUN

Note: Expansions are not allowed to be plugged or unplugged with power-on.

F12.5x~F12.6x: Expansion Communication of EX_A and EX_B

Code (Address)	Name	Content	Default (Range)	Property
F12.50 (0x0C32)	Expansion Port Disconnection Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: EX_A port disconnection mode 0: Detection OFF 1: Report alarm and free stop 2: Report alarm and continue operation Tens-bit: EX_B port disconnection mode 0: Detection OFF 1: Report alarm and free stop 2: Report alarm and continue operation	0000 (0000~0022)	RUN
F12.51 (0x0C33)	EX_A Update	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Initial values updated after power on 2: Restore to initial values	0 (0~2)	RUN
F12.52 (0x0C34)	EX_B Update	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Initial values updated after power on 2: Restore to initial values	0 (0~2)	RUN
F12.53 (0x0C35)	EX_A Monitor Frame Address 1	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit and tens-bit: Low 8 bits 00~63 Hundreds-bit and thousands-bit: High 8 bits 00~07	0001 (0000~0763)	RUN
F12.54 (0x0C36)	EX_A Monitor Frame Address 2	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0002 (0000~0763)	RUN
F12.55 (0x0C37)	EX_A Monitor Frame Address 3	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0007 (0000~0763)	RUN
F12.56 (0x0C38)	EX_A Monitor Frame Address 4	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0011 (0000~0763)	RUN
F12.57 (0x0C39)	EX_B Monitor Frame Address 1	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0001 (0000~0763)	RUN
F12.58 (0x0C3A)	EX_B Monitor Frame Address 2	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0002 (0000~0763)	RUN
F12.59 (0x0C3B)	EX_B Monitor Frame Address 3	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0007 (0000~0763)	RUN
F12.60 (0x0C3C)	EX_B Monitor Frame Address 4	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0011 (0000~0763)	RUN

Note: Expansions are not allowed to be plugged or unplugged with power-on.

4.16 F13: PID Control

F13.00~F13.06: PID Target and Feedback

Code (Address)	Name	Content	Default (Range)	Property
F13.00 (0x0D00)	PID Target Source	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Funcode setting 1: Potentiometer 2: AI1 3: AI2 4: Reserved 5: PUL 6: RS485 7: Expansion 8: Terminal 9: Active current via communication	0 (0~9)	RUN

F13.01 (0x0D01)	PID Target/Feedback	**V/F SVC FVC PMVF PMSVC PMFVC** Set the PID target and feedback values when F13.00 is set to 0.	50.0% (0.0%~ 6000.0%)	RUN
F13.02 (0x0D02)	PID Target Change Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the change time for PID target setting.	1.00s (0.00s~60.00s)	RUN
F13.03 (0x0D03)	PID Feedback Source	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Funcode setting 1: Potentiometer 2: AI1 3: AI2 4: Reserved 5: PUL terminal 6: RS485 7: Expansion boards 8: Terminal 9: Local active current 10: Pressure from AI1/AI2 feedback	2 (0~10)	RUN
F13.04 (0x0D04)	Feedback Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the low-pass filter coefficient for the feedback signal.	0.010s (0.000s~ 6.000s)	RUN
F13.05 (0x0D05)	Feedback Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the gain for feedback signal.	1.00 (0.00~10.00)	RUN
F13.06 (0x0D06)	Feedback Range	**V/F SVC FVC PMVF PMSVC PMFVC** Set the Feedback signal range.	100.0 (0.0~60000.0)	RUN

F13.07~F13.24: PID Regulation

Code (Address)	Name	Content	Default (Range)	Property
F13.07 (0x0D07)	PID Control Property	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Feedback characteristics 0: Positive 1: Negative Thousands-bit: Differential regulation 0: Differentiate the deviation 1: Differentiate the feedback	0100 (0000~1111)	RUN
F13.08 (0x0D08)	Preset PID Target	**V/F SVC FVC PMVF PMSVC PMFVC** Set the PID preset output.	100.0% (0.0%~ 100.0%)	RUN
F13.09 (0x0D09)	Preset PID Target Runtime	**V/F SVC FVC PMVF PMSVC PMFVC** Set the PID preset output runtime.	0.0s (0.0s~ 6500.0s)	RUN
F13.10 (0x0D0A)	PID Deviation	**V/F SVC FVC PMVF PMSVC PMFVC** Set the allowed PID deviation.	0.0% (0.0%~ 100.0%)	RUN
F13.11 (0x0D0B)	Proportional Gain P1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the proportional gain P1.	0.100 (0.000~ 4.000)	RUN
F13.12 (0x0D0C)	Integral Time I1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the integral time I1.	1.0s (0.0s~ 600.0s)	RUN
F13.13 (0x0D0D)	Differential Time D1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the differential time D1.	0.000s (0.000s~	RUN
F13.14 (0x0D0E)	Proportional Gain 2 (P2)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the proportional gain P2.	0.100 (0.000~	RUN

F13.15 (0x0D0F)	Integral Time 2 (I2)	V/F SVC FVC PMVF PMSVC PMFVC Set the integral time I2.	1.0s (0.0s~ 600.0s)	RUN
F13.16 (0x0D10)	Differential Time 2 (D2)	V/F SVC FVC PMVF PMSVC PMFVC Set the differential time D2.	0.000s (0.000s~ 6.000s)	RUN
F13.17 (0x0D11)	PID Shift Condition	V/F SVC FVC PMVF PMSVC PMFVC 0: OFF 1: Switch via DI terminal 2: Switch according to deviation	0 (0~2)	RUN
F13.18 (0x0D12)	Switching deviation lower value	V/F SVC FVC PMVF PMSVC PMFVC Gain 1 parameter is used when the PID deviation is lower than this value.	20.0% (0.0%~ 100.0%)	RUN
F13.19 (0x0D13)	Shift Upper Limit	V/F SVC FVC PMVF PMSVC PMFVC Gain 2 parameter is used when the PID deviation is greater than this value.	80.0% (0.0%~ 100.0%)	RUN
F13.21 (0x0D15)	Differentiation Range	V/F SVC FVC PMVF PMSVC PMFVC Set the differential range.	5.0% (0.0%~ 100.0%)	RUN
F13.22 (0x0D16)	PID Upper Limit	V/F SVC FVC PMVF PMSVC PMFVC Set PID output upper limit.	100.0% (0.0%~ 100.0%)	RUN
F13.23 (0x0D17)	PID Lower Limit	V/F SVC FVC PMVF PMSVC PMFVC Set PID output lower limit.	45.0% (-100.0%~ F13.22)	RUN
F13.24 (0x0D18)	PID Filter Time	V/F SVC FVC PMVF PMSVC PMFVC Set the PID filter time.	0.000s (0.000s~ 6.000s)	RUN

F13.25~F13.28: PID Feedback Disconnection

Code (Address)	Name	Content	Default (Range)	Property
F13.25 (0x0D19)	Feedback Disconnection Mode	V/F SVC FVC PMVF PMSVC PMFVC 0: Detection OFF 1: Report fault and free stop 2: Report alarm and continue operation 3: Report alarm and run at current frequency	0 (0~3)	STOP
F13.26 (0x0D1A)	Feedback Disconnection Detection Time	V/F SVC FVC PMVF PMSVC PMFVC Set the feedback disconnection detection time.	1.0s (0.0s~ 120.0s)	RUN
F13.27 (0x0D1B)	Disconnection Alarm Upper Limit	V/F SVC FVC PMVF PMSVC PMFVC Set the upper limit for disconnection alarm.	100.0% (0.0%~ 100.0%)	RUN
F13.28 (0x0D1C)	Disconnection Alarm Lower Limit	V/F SVC FVC PMVF PMSVC PMFVC Set the lower limit for disconnection alarm.	0.0% (0.0%~ 100.0%)	RUN

F13.29~F13.39: PID Sleep

Code (Address)	Name	Content	Default (Range)	Property
F13.29 (0x0D1D)	Sleep Enable	V/F SVC FVC PMVF PMSVC PMFVC Set sleep function on or off. 0: OFF 1: General mode 2: Constant-pressure mode	0 (0~2)	RUN
F13.30 (0x0D1E)	Sleep Frequency	V/F SVC FVC PMVF PMSVC PMFVC Set the sleep frequency.	25.00Hz (0.00Hz~ Max. freq)	RUN

F13.31 (0x0D1F)	Sleep Delay	V/F SVC FVC PMVF PMSVC PMFVC Set the sleep delay time.	10.0s (0.0s~3600.0s)	RUN
F13.32 (0x0D20)	Wakeup Deviation	V/F SVC FVC PMVF PMSVC PMFVC Set the wakeup deviation.	5.0% (0.0%~50.0%)	RUN
F13.33 (0x0D21)	Wakeup Delay	V/F SVC FVC PMVF PMSVC PMFVC Set the wakeup delay time.	1.0s (0.0s~60.0s)	RUN
F13.34 (0x0D23)	Sleep Bias	V/F SVC FVC PMVF PMSVC PMFVC This is up to the set target PID values.	2.0% (0.0%~100.0%)	
F13.35 (0x0D23)	Pre-sleep Boost	V/F SVC FVC PMVF PMSVC PMFVC This is up to the set target PID values.	0.0% (0.0%~600.0%)	RUN
F13.36 (0x0D24)	Max. Boost Time	V/F SVC FVC PMVF PMSVC PMFVC Set the maximum time for pressure boost before entering sleep, And once the time window is reached,The drive will enter sleep automatically regardless Of the pressure state.	20.0s (0.0s~1000.0s)	RUN
F13.37 (0x0D25)	Low Water Consumption Detection Bias	V/F SVC FVC PMVF PMSVC PMFVC If the pressure change is greater than this value, it is judged to be a small amount of water use.	10.0% (0.0%~100.0%)	RUN
F13.38 (0x0D26)	High Water Consumption Detection Bias	V/F SVC FVC PMVF PMSVC PMFVC If the amount of pressure change during the F13.39 time is greater than this value, it is determined to be a small amount of water use.	0.0% (0.0%~100.0%)	RUN
F13.39 (0x0D27)	High Water Consumption Detection Time	V/F SVC FVC PMVF PMSVC PMFVC See F13.38 for details.	0.100s (0.000s~2.000s)	RUN

F13.44~F13.50: AI Combination

Code (Address)	Name	Content	Default (Range)	Property
F13.44 (0x0D2C)	AI Combination Method	V/F SVC FVC PMVF PMSVC PMFVC 0: AI1+ AI2 1: AI1-AI2 2: Avg.(AI2 AI1) 3: Max(AI1, AI2) 4: Min (AI1, AI2)	0 (0~4)	RUN
F13.45 (0x0D2D)	AI1 Feedback Gain	V/F SVC FVC PMVF PMSVC PMFVC It is valid when F13.03=10.	1.00 (0.00~10.00)	RUN
F13.46 (0x0D2E)	AI2 Feedback Gain	V/F SVC FVC PMVF PMSVC PMFVC It is valid when F13.03=10.	1.00 (0.00~10.00)	RUN
F13.47 (0x0D2F)	AI Upper Limit	V/F SVC FVC PMVF PMSVC PMFVC Set the upper limit pressure for analog input.	100.0% (100.0%~ 6000.0%)	RUN
F13.50 (0x0D32)	PID Target 2	V/F SVC FVC PMVF PMSVC PMFVC Set X terminal to 81 to shift between F13.01 and F13.50.	80.0% (0.0%~100.0%)	RUN

4.17 F14: Multi-frequency and Simple PLC Simulation

F14.00~F14.14: Multi-frequency

Code (Address)	Name	Content	Default (Range)	Property
F14.00 (0x0E00)	Multi-frequency 1	V/F SVC FVC PMVF PMSVC PMFVC Set the multi-frequency 1 which is similar to PLC control.	10.00Hz (0.00Hz~ Max. freq)	RUN
F14.01 (0x0E01)	Multi-frequency 2	V/F SVC FVC PMVF PMSVC PMFVC Set the multi-frequency 2 which is similar to PLC control.	20.00Hz (0.00Hz~ Max. freq)	RUN

F14.02 (0x0E02)	Multi-frequency 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 3 which is similar to PLC control.	30.00Hz (0.00Hz~ Max. freq)	RUN
F14.03 (0x0E03)	Multi-frequency 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 4 which is similar to PLC control.	40.00Hz (0.00Hz~ Max. freq)	RUN
F14.04 (0x0E04)	Multi-frequency 5	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 5 which is similar to PLC control.	50.00Hz (0.00Hz~ Max. freq)	RUN
F14.05 (0x0E05)	Multi-frequency 6	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 6 which is similar to PLC control.	40.00Hz (0.00Hz~ Max. freq)	RUN
F14.06 (0x0E06)	Multi-frequency 7	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 7 which is similar to PLC control.	30.00Hz (0.00Hz~ Max. freq)	RUN
F14.07 (0x0E07)	Multi-frequency 8	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 8 which is similar to PLC control.	20.00Hz (0.00Hz~ Max. freq)	RUN
F14.08 (0x0E08)	Multi-frequency 9	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 9 which is similar to PLC control.	10.00Hz (0.00Hz~ Max. freq)	RUN
F14.09 (0x0E09)	Multi-frequency 10	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 10 which is similar to PLC control.	20.00Hz (0.00Hz~ Max. freq)	RUN
F14.10 (0x0E0A)	Multi-frequency 11	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 11 which is similar to PLC control.	30.00Hz (0.00Hz~ Max. freq)	RUN
F14.11 (0x0E0B)	Multi-frequency 12	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 12 which is similar to PLC control.	40.00Hz (0.00Hz~ Max. freq)	RUN
F14.12 (0x0E0C)	Multi-frequency 13	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 13 which is similar to PLC control.	50.00Hz (0.00Hz~ Max. freq)	RUN
F14.13 (0x0E0D)	Multi-frequency 14	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 14 which is similar to PLC control.	40.00Hz (0.00Hz~ Max. freq)	RUN
F14.14 (0x0E0E)	Multi-frequency 15	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 15 which is similar to PLC control.	30.00Hz (0.00Hz~ Max. freq)	RUN

F14.15: PLC Operation Mode

Code (Address)	Name	Content	Default (Range)	Property
F14.15 (0x0E0F)	PLC Operation Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Cycle mode 0: Stop after single cycle 1: Run in continuous cycles 2: Keep the final value after single cycle Tens-bit: Timing unit 0: Second(s) 1: Minute(min) 2: Hour(h) Tens-bit: Power-down save 0: OFF 1: ON Thousands-bit: Start mode 0: Restart from the first stage 1: Restart from the stage upon shutdown last time 2: Continue operation for the remaining of the shutdown stage	0000 (0000~2122)	RUN

F14.16~F14.30 : PLC Stage Runtime

Code (Address)	Name	Content	Default (Range)	Property
F14.16 (0x0E10)	Multi-frequency 1 Runtime	V/F SVC FVC PMVF PMSVC PMFVC Set the stage 1 runtime of the PLC simulation function integrated in the drive.	10.0(s/m/h) (0.0 (s/m/h)~ 6500.0(s/m/h))	RUN
F14.17 (0x0E11)	Multi-frequency 2 Runtime	V/F SVC FVC PMVF PMSVC PMFVC Set the stage 2 runtime of the PLC simulation function integrated in the drive.	10.0(s/m/h) (0.0(s/m/h)~ 6500.0(s/m/h))	RUN
F14.18 (0x0E12)	Multi-frequency 3 Runtime	V/F SVC FVC PMVF PMSVC PMFVC Set the stage 3 runtime of the PLC simulation function integrated in the drive.	10.0(s/m/h) (0.0(s/m/h)~ 6500.0(s/m/h))	RUN
F14.19 (0x0E13)	Multi-frequency 4 Runtime	V/F SVC FVC PMVF PMSVC PMFVC Set the stage 4 runtime of the PLC simulation function integrated in the drive.	10.0(s/m/h) (0.0(s/m/h)~ 6500.0 (s/m/h))	RUN
F14.20 (0x0E14)	Multi-frequency 5 Runtime	V/F SVC FVC PMVF PMSVC PMFVC Set the stage 5 runtime of the PLC simulation function integrated in the drive.	10.0(s/m/h) (0.0(s/m/h)~ 6500.0 (s/m/h))	RUN
F14.21 (0x0E15)	Multi-frequency 6 Runtime	V/F SVC FVC PMVF PMSVC PMFVC Set the stage 6 runtime of the PLC simulation function integrated in the drive.	10.0(s/m/h) (0.0(s/m/h)~ 6500.0(s/m/h))	RUN
F14.22 (0x0E16)	Multi-frequency 7 Runtime	V/F SVC FVC PMVF PMSVC PMFVC Set the stage 7 runtime of the PLC simulation function integrated in the drive.	10.0(s/m/h) (0.0(s/m/h)~ 6500.0(s/m/h))	RUN
F14.23 (0x0E17)	Multi-frequency 8 Runtime	V/F SVC FVC PMVF PMSVC PMFVC Set the stage 8 runtime of the PLC simulation function integrated in the drive.	10.0(s/m/h) (0.0(s/m/h)~ 6500.0(s/m/h))	RUN
F14.24 (0x0E18)	Multi-frequency 9 Runtime	V/F SVC FVC PMVF PMSVC PMFVC Set the stage 9 runtime of the PLC simulation function integrated in the drive.	10.0(s/m/h) (0.0(s/m/h)~ 6500.0(s/m/h))	RUN
F14.25 (0x0E19)	Multi-frequency 10 Runtime	V/F SVC FVC PMVF PMSVC PMFVC Set the stage 10 runtime of the PLC simulation function integrated in the drive.	10.0(s/m/h) (0.0(s/m/h)~ 6500.0(s/m/h))	RUN
F14.26 (0x0E1A)	Multi-frequency 11 Runtime	V/F SVC FVC PMVF PMSVC PMFVC Set the stage 11 runtime of the PLC simulation function integrated in the drive.	10.0(s/m/h) (0.0(s/m/h)~ 6500.0(s/m/h))	RUN
F14.27 (0x0E1B)	Multi-frequency 12 Runtime	V/F SVC FVC PMVF PMSVC PMFVC Set the stage 12 runtime of the PLC simulation function integrated in the drive.	10.0(s/m/h) (0.0(s/m/h)~ 6500.0(s/m/h))	RUN
F14.28 (0x0E1C)	Multi-frequency 13 Runtime	V/F SVC FVC PMVF PMSVC PMFVC Set the stage 13 runtime of the PLC simulation function integrated in the drive.	10.0(s/m/h) (0.0(s/m/h)~ 6500.0(s/m/h))	RUN
F14.29 (0x0E1D)	Multi-frequency 14 Runtime	V/F SVC FVC PMVF PMSVC PMFVC Set the stage 14 runtime of the PLC simulation function integrated in the drive.	10.0(s/m/h) (0.0 (s/m/h)~ 6500.0(s/m/h))	RUN
F14.30 (0x0E1E)	Multi-frequency 15 Runtime	V/F SVC FVC PMVF PMSVC PMFVC Set the stage 15 runtime of the PLC simulation function integrated in the drive.	10.0(s/m/h) (0.0(s/m/h)~ 6500.0(s/m/h))	RUN

F14.31~F14.45 : PLC Simulation Direction and Time

Code (Address)	Name	Content	Default (Range)	Property
F14.31 (0x0E1F)	Multi-frequency 1 Direction and ACC/DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Direction of the current stage(compared with operation command). 0: Same direction 1: Reverse direction Tens-bit: ACC/DEC time 0: Time 1 1: Time 2 2: Time 3 3: Time 4	0000 (0000~0031)	RUN
F14.32 (0x0E20)	Multi-frequency 2 Direction and ACC/DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** The same as F14.31.	0000 (0000~0031)	RUN
F14.33 (0x0E21)	Multi-frequency 3 Direction and ACC/DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** The same as F14.31.	0000 (0000~0031)	RUN
F14.34 (0x0E22)	Multi-frequency 4 Direction and ACC/DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** The same as F14.31.	0000 (0000~0031)	RUN
F14.35 (0x0E23)	Multi-frequency 5 Direction and ACC/DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** The same as F14.31.	0000 (0000~0031)	RUN
F14.36 (0x0E24)	Multi-frequency 6 Direction and ACC/DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** The same as F14.31.	0000 (0000~0031)	RUN
F14.37 (0x0E25)	Multi-frequency 7 Direction and ACC/DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** The same as F14.31.	0000 (0000~0031)	RUN
F14.38 (0x0E26)	Multi-frequency 8 Direction and ACC/DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** The same as F14.31.	0000 (0000~0031)	RUN
F14.39 (0x0E27)	Multi-frequency 9 Direction and ACC/DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** The same as F14.31.	0000 (0000~0031)	RUN
F14.40 (0x0E28)	Multi-frequency 10 Direction and ACC/DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** The same as F14.31.	0000 (0000~0031)	RUN
F14.41 (0x0E29)	Multi-frequency 11 Direction and ACC/DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** The same as F14.31.	0000 (0000~0031)	RUN
F14.42 (0x0E2A)	Multi-frequency 12 Direction and ACC/DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** The same as F14.31.	0000 (0000~0031)	RUN
F14.43 (0x0E2B)	Multi-frequency 13 Direction and ACC/DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** The same as F14.31.	0000 (0000~0031)	RUN
F14.44 (0x02C)	Multi-frequency 14 Direction and ACC/DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** The same as F14.31.	0000 (0000~0031)	RUN
F14.45 (0x0E2D)	Multi-frequency 15 Direction and ACC/DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** The same as F14.31.	0000 (0000~0031)	RUN

4.18 F17: Expansion RO

F17.00~F17.12: Expansion RO 1~4

Code (Address)	Name	Content	Default (Range)	Property
F17.00 (0x5100)	Expansion RO 1~4 Function	V/F SVC FVC PMVF PMSVC PMFVC Ones-bit: Expansion RO 1 Ones-bit: Expansion RO 2 Ones-bit: Expansion RO 3 Thousands-bit: Expansion RO 4 0: Positive 1: Negative	0000 (0000~ 1111)	RUN
F17.01 (0x5101)	Expansion RO 1 Function	V/F SVC FVC PMVF PMSVC PMFVC Set the function of the expansion relay 1.	0 (0~63)	RUN
F17.02 (0x5102)	Expansion RO 2 Function	V/F SVC FVC PMVF PMSVC PMFVC Set the function of the expansion relay 2.	0 (0~63)	RUN
F17.03 (0x5103)	Expansion RO 3 Function	V/F SVC FVC PMVF PMSVC PMFVC Set the function of the expansion relay 3.	0 (0~63)	RUN
F17.04 (0x5104)	Expansion RO 4 Function	V/F SVC FVC PMVF PMSVC PMFVC Set the function of the expansion relay 4.	0 (0~63)	RUN
F17.05 (0x5105)	Expansion RO 1 ON Delay	V/F SVC FVC PMVF PMSVC PMFVC Set the delay time for the expansion relay 1 from ON to ON.	0.010s (0.000s~ 60.000s)	RUN
F17.06 (0x5106)	Expansion RO 2 ON Delay	V/F SVC FVC PMVF PMSVC PMFVC Set the delay time for the expansion relay 2 from ON to ON.	0.010s (0.000s~ 60.000s)	RUN
F17.07 (0x5107)	Expansion RO 3 ON Delay	V/F SVC FVC PMVF PMSVC PMFVC Set the delay time for the expansion relay 3 from ON to ON.	0.010s (0.000s~ 60.000s)	RUN
F17.08 (0x5108)	Expansion RO 4 ON Delay	V/F SVC FVC PMVF PMSVC PMFVC Set the delay time for the relay 4 from OFF to ON.	0.010s (0.000s~ 60.000s)	RUN
F17.09 (0x5109)	Expansion RO 1 OFF Delay	V/F SVC FVC PMVF PMSVC PMFVC Set the delay time for the expansion relay 1 from OFF to ON.	0.010s (0.000s~ 60.000s)	RUN
F17.10 (0x510A)	Expansion RO 2 OFF Delay	V/F SVC FVC PMVF PMSVC PMFVC Set the delay time for the expansion relay 2 from OFF to ON.	0.010s (0.000s~ 60.000s)	RUN
F17.11 (0x510B)	Expansion RO 3 OFF Delay	V/F SVC FVC PMVF PMSVC PMFVC Set the delay time for the expansion relay 3 from OFF to ON.	0.010s (0.000s~ 60.000s)	RUN
F17.12 (0x510C)	Expansion RO 4 OFF Delay	V/F SVC FVC PMVF PMSVC PMFVC Set the delay time for the expansion relay 4 from OFF to ON.	0.010s (0.000s~ 60.000s)	RUN

F17.13~F17.25: Expansion RO 5~8

Code (Address)	Name	Content	Default (Range)	Property
F17.13 (0x510D)	Expansion RO 5~8 Function	V/F SVC FVC PMVF PMSVC PMFVC Ones-bit: Expansion RO 5 Ones-bit: Expansion RO 6 Ones-bit: Expansion RO 7	0000 (0000~ 1111)	RUN

		Thousands-bit: Expansion RO 8 0: Positive 1: Negative		
F17.14 (0x510E)	Expansion RO 5 Function	**V/F SVC FVC PMVF PMSVC PMFVC** Set the function of the expansion relay 5.	0 (0~63)	RUN
F17.15 (0x510F)	Expansion RO 6 Function	**V/F SVC FVC PMVF PMSVC PMFVC** Set the function of the expansion relay 6.	0 (0~63)	RUN
F17.16 (0x5110)	Expansion RO 7 Function	**V/F SVC FVC PMVF PMSVC PMFVC** Set the function of the expansion relay 7.	0 (0~63)	RUN
F17.17 (0x5111)	Expansion RO 8 Function	**V/F SVC FVC PMVF PMSVC PMFVC** Set the function of the expansion relay 8.	0 (0~63)	RUN
F17.18 (0x5112)	Expansion RO 5 ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the expansion relay 5 from ON to ON.	0.010s (0.000s~ 60.000s)	RUN
F17.19 (0x5113)	Expansion RO 6 ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the expansion relay 6 from ON to ON.	0.010s (0.000s~ 60.000s)	RUN
F17.20 (0x5114)	Expansion RO 7 ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the expansion relay 7 from ON to ON.	0.010s (0.000s~ 60.000s)	RUN
F17.21 (0x5115)	Expansion RO 8 ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the relay 8 from OFF to ON.	0.010s (0.000s~ 60.000s)	RUN
F17.22 (0x5115)	Expansion RO 5 OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the expansion relay 5 from OFF to ON.	0.010s (0.000s~ 60.000s)	RUN
F17.23 (0x5116)	Expansion RO 6 OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the expansion relay 6 from OFF to ON.	0.010s (0.000s~ 60.000s)	RUN
F17.24 (0x5117)	Expansion RO 7 OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the expansion relay 7 from OFF to ON.	0.010s (0.000s~ 60.000s)	RUN
F17.25 (0x5118)	Expansion RO 8 OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for the expansion relay 8 from OFF to ON.	0.010s (0.000s~ 60.000s)	RUN

4.19 F21: Pump Control (Single Pump)

F21.00～F21.08: Pump Clean

Code (Address)	Name	Content	Default (Range)	Property
F21.00 (0x5500)	Pump Clean Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: 0: OFF 1: ON (Manual trigger by X terminal) 2: ON (Auto trigger when current exceeds the limit) 3: ON (Auto trigger by timer) Tens-bit: Timer unit under clean timer mode 0: Time reset 1: s 2: min 3: hour	0000 (0000~0033)	STOP

F21.01 (0x5501)	Pump Clean FWD Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump cleaning forward frequency.	30.00Hz (0.00Hz~ Upper limit)	RUN
F21.02 (0x5502)	Pump Clean FWD Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump cleaning forward time.	60s (0s~1000s)	RUN
F21.03 (0x5503)	Pump Clean REV Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump cleaning reverse frequency.	30.00Hz (0.00Hz~ Upper limit)	RUN
F21.04 (0x5504)	Pump Clean REV Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump cleaning reverse time.	60s (0s~1000s)	RUN
F21.05 (0x5505)	Pump Clean Cycle	**V/F SVC FVC PMVF PMSVC PMFVC** Set the cycle count to clean the pump.	5 (0~1000)	RUN
F21.06 (0x5506)	Pump Clean Current Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump clean current threshold.	120.0% (0.0%~ 300.0%)	RUN
F21.07 (0x5507)	Pump Clean Current Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for pump clean current judgement.	30.0s (0.0s~1000.0s)	RUN
F21.08 (0x5508)	Pump Clean Cycle Timer	**V/F SVC FVC PMVF PMSVC PMFVC** Set the timer on the clean cycle, the time unit under time mode is up to F21.00 tens-bit.	24h (0h~2000h)	RUN

F21.09~F21.17: AF/R Mode (Anti-freezing/rust)

Code (Address)	Name	Content	Default (Range)	Property
F21.09 (0x5509)	AF/R Mode Enable	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit 0: OFF 1: ON (Manual trigger by X terminal selected to 93) 1: ON (Auto trigger by low-temperature control) Tens-bit 0: OFF 1: AI1 2: AI2 3: AI3	0000 (0~0033)	STOP
F21.10 (0x550A)	Temp. Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the temp threshold enter the anti-freezing/rust mode.	5.0°C (-100°C~ +100°C)	RUN
F21.11 (0x550B)	Temp. Recovery Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Exit Antifreeze Rust Mode Temperature Return Value.	5.0°C (-100°C~ +100°C)	RUN
F21.12 (0x550C)	Min. Temp.	**V/F SVC FVC PMVF PMSVC PMFVC** Set the minimum temperature under the anti-freezing/rust mode.	-100.0°C (-100°C~ +100°C)	RUN
F21.13 (0x550D)	Max. Temp.	**V/F SVC FVC PMVF PMSVC PMFVC** Set the maximum temperature under the anti-freezing/rust mode.	100.0°C (-100°C~ +100°C)	RUN
F21.14 (0x550E)	AF/R Mode Cycle	**V/F SVC FVC PMVF PMSVC PMFVC** Set the cycle count to trigger the anti-freezing/rust mode.	5 (0~2000)	RUN
F21.15 (0x550F)	AF/R Mode Runtime	**V/F SVC FVC PMVF PMSVC PMFVC** Set the runtime for the anti-freezing/rust mode.	5min (0min~ 10000min)	RUN
F21.16 (0x5510)	AF/R Mode Stop Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stop time of the anti-freezing/rust mode.	5min (0min~ 10000min)	RUN
F21.17 (0x5511)	AF/R Mode Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency of the anti-freezing/rust mode.	25.00Hz (0.00Hz~ 600.00Hz)	RUN

F21.18～F21.21: Dryout Protection

Code (Address)	Name	Content	Default (Range)	Property
F21.18 (0x5512)	Dryout Protection Detection Mode	V/F SVC FVC PMVF PMSVC PMFVC **Ones-bit: Detection enable** 0: OFF 1: Terminal detection ON(sensor) 2: Current detection ON 3: Terminal and current detection ON **Tens-bit: Alarm mode** 0: OFF 1: Report alarm A.175 [A.dry], continue operation 2: Report alarm A.175 [A.dry], stop and auto restart 3: Report error E.120[E.dry], stop and manual restart	0x0000 (0x0000~ 0x0033)	RUN
F21.19 (0x5513)	Dryout Protection Current	**V/F SVC FVC PMVF PMSVC PMFVC** Set the current for the dry pump protection.	5.0A (0.0A~ 3000.0A)	RUN
F21.20 (0x5514)	Dryout Protection Detection Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the detection time to trigger the dry pump protection.	10s (0s~ 1000s)	RUN
F21.21 (0x5515)	Dryout Protection Interval	**V/F SVC FVC PMVF PMSVC PMFVC** Set the interval time to trigger the dry pump protection.	30min (0min ~ 1000min)	RUN

F21.22～F21.24: Jockey Pump

Code (Address)	Name	Content	Default (Range)	Property
F21.22 (0x5516)	Jockey Pump Enable	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: The main pump enters the sleep state after the Jockey pump starts; after the main pump wakes up, the Jockey pump stops (Y terminal to 34: Jockey pump ON) 2: The main pump enters the sleep state and PID feedback is lower than F21.23, the Jockey pump works; after the main pump wakes up and PID feedback is higher than F21.24, the Jockey pump stops (Y terminal to 34: Jockey pump ON)	0 (0~2)	RUN
F21.23 (0x5517)	Jockey Pump Start Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pressure threshold to start the Jockey pump. Its unit is up to the pressure feedback.	0.0 (0.0~ Upper limit)	RUN
F21.24 (0x5518)	Jockey Pump Stop Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pressure threshold to stop the Jockey pump. Its unit is up to the pressure feedback.	0.0 (0.0~ limit)	RUN

F21.25~F21.26: Priming Pump

Code (Address)	Name	Content	Default (Range)	Property
F21.25 (0x5519)	Priming Pump	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: ON (Y terminal to 35: Priming pump)	0 (0~1)	RUN
F21.26 (0x551A)	Priming Pump Runtime	**V/F SVC FVC PMVF PMSVC PMFVC** Set Priming Pump Runtime	300s (0s~60000s)	RUN

F21.27: LCD Keypad Display Unit

Code (Address)	Name	Content	Default (Range)	Property
F21.27 (0x551B)	Keypad Display Unit	**V/F SVC FVC PMVF PMSVC PMFVC** 0: %	0 (0~5)	RUN

		1: ℃ 2: MPa 3: Kpa 4: m^3/h 5: m^3/min		
F21.28 (0x551C)	PID control mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Constant pressure control mode 2: Constant pressure difference control mode (AI1-AI2) 3: Constant temperature control mode 4: Constant temperature difference control mode (AI1-AI2)	0 (0~4)	STOP

F21.30: Restart Interval

Code (Address)	Name	Content	Default (Range)	Property
F21.30 (0x551E)	Restart min interval time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the operation interval time between the two operation commands to avoid frequent startups.	0s (0s~ 60000s)	RUN

F21.31~F21.32: Overpressure Monitor

Code (Address)	Name	Content	Default (Range)	Property
F21.31 (0x551F)	Overpressure Monitor Enable	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: ON	0 (0~1)	RUN
F21.32 (0x5520)	Overpressure Alarm Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the overpressure alarm threshold. Its unit is up to the pressure feedback.	0.0 (0.0~ Upper limit)	RUN

F21.33~F21.36: Pressure Loss Compensation

Code (Address)	Name	Content	Default (Range)	Property
F21.33 (0x5521)	Setpoint 1 Enable	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: ON	0 (0~1)	RUN
F21.34 (0x5522)	Setpoint 1 Max Compensation	**V/F SVC FVC PMVF PMSVC PMFVC** Set the max compensation for the pressure loss Setpoint 1. Its unit is up to the pressure feedback.	0.0 (0.0~Upper limit)	RUN
F21.35 (0x5523)	Setpoint 2 Enable	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: ON	0 (0~1)	RUN
F21.36 (0x5524)	Setpoint 2 Max Compensation	**V/F SVC FVC PMVF PMSVC PMFVC** Set the max compensation for the pressure loss Setpoint 2. Its unit is up to the pressure feedback.	0.0 (0.0~ Upper limit)	RUN

F21.37~F21.42: PID Auto-tuning

Code (Address)	Name	Content	Default (Range)	Property
F21.37 (0x5525)	PID Auto-tuning Enable	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: ON	0 (0~1)	STOP
F21.38 (0x5526)	PID Auto-tuning Cycle	**V/F SVC FVC PMVF PMSVC PMFVC** Set PID Auto-tuning Cycle.	6 (1~1000)	RUN
F21.39 (0x5527)	PID Auto-tuning Frequency Hysteresis	**V/F SVC FVC PMVF PMSVC PMFVC** Take the max. frequency as reference.	10.0% (1.0%~50.0%)	RUN
F21.40 (0x5528)	PID Auto-tuning Error	**V/F SVC FVC PMVF PMSVC PMFVC** Take the PID target value as reference.	1.0% (0.0%~50.0%)	RUN
F21.41 (0x5529)	PID Property	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Quick 1: Normal 2: Slow	1 (0~2)	RUN

4.20 F22: Pump Control (Multi-pump)

Code (Address)	Name	Content	Default (Range)	Property
F22.00 (0x5600)	Multi-pump Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: 0: General drive mode 1: Single pump mode 2: Single-drive multi-pump mode 3: Cascade drive mode Tens-bit:: Main Pump Redundancy 0: No 1: Yes	0001 (0013)	STOP
F22.01 (0x5601)	Pump Plus Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Pump plus mode 1 2: Pump plus mode 2	1 (0~2)	RUN
F22.02 (0x5602)	Pump Plus Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency condition to decide if to add more pumps.	45.00Hz (0.00Hz~ Upper limit)	RUN
F22.03 (0x5603)	Pump Plus Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time delay to decide if to add more pumps.	10s (0s~1000s)	RUN
F22.04 (0x5604)	Pump Minus Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Pump minus mode 1	1 (0~1)	RUN
F22.05 (0x5605)	Pump Minus Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency to reduce the pumps.	25.00Hz (0.00Hz~ Upper limit)	RUN
F22.06 (0x5606)	Pump Minus Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time delay to decide if to reduce the pumps.	10s (0s~1000s)	RUN
F22.07 (0x5607)	Pump Shift Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Shift the pumps by the forward sequence 2: Shift the pumps by the reverse sequence 3: Shift the pumps by time (Only valid when ones-bit of F22.00 is set to cascade mode) 4: Shift the pumps after wakeup	3 (0~4)	RUN
F22.08 (0x5608)	Pump Shift Interval	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump shift interval time. Carry out a pump shift in sequence after the interval.	1440min (0min~ 30000min)	RUN
F22.09 (0x5609)	Maximum number of pumps	**V/F SVC FVC PMVF PMSVC PMFVC** Set the max pump No.	3 (0~10)	RUN
F22.10 (0x560A)	Operating Pump No.	**V/F SVC FVC PMVF PMSVC PMFVC** Set the maximum pumps to work at the same time (When F22.10 is lower than F22.09, the pump shift logic is based on F22.10.) F22.10 is automatically calculated when the F22.00 tens-bit setting is 1.	3 (0~10)	READ
F22.11 (0x560B)	Initial Pump Station	**V/F SVC FVC PMVF PMSVC PMFVC** Set the initial pump station number.	1 (0~10)	STOP
F22.12 (0x560C)	Pump Runtime Reset	**V/F SVC FVC PMVF PMSVC PMFVC** Set the reset station on the ones, tens and hundreds bit Thousands-bit to enable reset to zero.	0 (0000~ 1FFF)	STOP
F22.13 (0x560D)	Interlock Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the relay interlock time under power frequency-variable frequency switching. (Valid only when F22.00 ones-bit=2: Single-drive-multi-pump mode)	0.50s (0.0s~ 100.00s)	RUN

4.21 C0x: Monitoring

C00: Basic Monitoring

Code(Address)	Name	Code(Address)	Name
C00.00 (0x2100)	Target Frequency	C00.20 (0x2114)	Analog Output

C00.01 (0x2101)	Output Frequency	C00.21 (0x2115)	Expansion AO
C00.02(0x2102)	Output Current	C00.22 (0x2116)	Counter Record
C00.03 (0x2103)	Input Voltage	C00.23 (0x2117)	Current Runtime
C00.04 (0x2104)	Output Voltage	C00.24 (0x2118)	Cumulative Runtime
C00.05 (0x2105)	Mechanical Speed	C00.25 (0x2119)	Drive Power
C00.06 (0x2106)	Given Torque	C00.26 (0x211A)	Drive Rated Voltage
C00.07 (0x2107)	Output Torque	C00.27 (0x211B)	Drive Rated Current
C00.08 (0x2108)	PID Setting	C00.28 (0x211C)	Software Version
C00.09 (0x2109)	PID Feedback	C00.29 (0x211D)	PG Feedback Frequency
C00.10 (0x210A)	Output Power	C00.30 (0x211E)	Timer
C00.11 (0x210B)	Bus Voltage	C00.31 (0x211F)	PID Output
C00.12 (0x210C)	Module Temperature 1	C00.32 (0x2120)	Software Sub-Version
C00.13 (0x210D)	Module Temperature 2	C00.33(0x2121)	Encoder Feedback Angle
C00.14 (0x210E)	Input terminal X in the on-state	C00.34 (0x2122)	Accumulated Z-Pulse Error
C00.15 (0x210F)	Output terminal Y in the on-state	C00.35 (0x2123)	Z-Pulse Count
C00.16(0x2110)	AI1	C00.36 (0x2124)	Error Code
C00.17 (0x2111)	AI2	C00.37 (0x2125)	Total Power Consumption(Low)
C00.18 (0x2112)	AI3	C00.38 (0x2126)	Total Power Consumption(High)
C00.19 (0x2113)	PUL Input	C00.39 (0x2127)	Power Factor Angle

Note: For example, C00.14 is displayed as  , when terminals X1 and X2 are ON, and C00.15 is displayed as  , when terminal Y and relay are ON.

C01: Error Monitoring

Code(Address)	Name	Code(Address)	Name
C01.00 (0x2200)	Fault type	C01.18 (0x2212)	Previous 1 Fault Input Terminal Status
C01.01 (0x2201)	Fault Info	C01.19 (0x2213)	Previous 1 Fault Output Terminal Status
C01.02 (0x2202)	Fault Operation Frequency	C01.20 (0x2214)	Previous 2 Fault Type
C01.03 (0x2203)	Fault Output Voltage	C01.21 (0x2215)	Previous 2 Fault Info
C01.04 (0x2204)	Fault Output Current	C01.22 (0x2216)	Previous 3 Fault Type
C01.05 (0x2205)	Fault Bus Voltage	C01.23 (0x2217)	Previous 3 Fault Info
C01.06 (0x2206)	Fault Module Temperature	C01.24 (0x2218)	Previous 4 Fault Type
C01.07 (0x2207)	Fault Drive Status	C01.25 (0x2219)	Previous 4 Fault Info
C01.08 (0x2208)	Fault X Status	C01.26 (0x221A)	Previous 5 Fault Type
C01.09 (0x2209)	Fault Y Status	C01.27 (0x221B)	Previous 5 Fault Info
C01.10 (0x220A)	Previous 1 Fault Type	C01.28 (0x221C)	Previous 6 Fault Type
C01.11 (0x220B)	Previous 1 Fault Info	C01.29 (0x221D)	Previous 6 Fault Info
C01.12 (0x220C)	Previous 1 Fault Output	C01.30 (0x221E)	Previous 7 Fault Type
C01.13 (0x220D)	Previous 1 Fault Output Voltage	C01.31 (0x221F)	Previous 7 Fault Info
C01.14 (0x220E)	Previous 1 Fault Output Current	C01.32 (0x2220)	Previous 8 Fault Type
C01.15 (0x220F)	Previous 1 Fault Bus Voltage	C01.33 (0x2221)	Previous 8 Fault Info
C01.16(0x2210)	Previous 1 Fault Module	C01.34 (0x2222)	Previous 9 Fault Type
C01.17 (0x2211)	Previous 1 Fault Drive Status	C01.35 (0x2223)	Previous 9 Fault Info

Note: Drive fault status bit meaning:

Ones-bit: Operation direction, 0: Forward 1: Reverse

Tens-bit: Operation status 0: Stop 1: Constant speed 2: Accelerate 3: Decelerate

Hundreds-bit: Overvoltage/overcurrent 0: Normal 1: Overvoltage 2: Overcurrent 3: Overvoltage and overcurrent

Thousands-bit: Reserved

C02: App Monitoring

Code(Address)	Name	Code(Address)	Name
C02.00 (0x2300)	PID target	C02.17 (0x2311)~ C02.18 (0x2312)	Reserved
C02.01 (0x2301)	PID feedback	C02.19 (0x2313)	CBC No.
C02.02 (0x2302)	PID output	C02.20 (0x2314)~ C02.24 (0x2318)	Reserved
C02.03 (0x2303)	PID control status	C02.25 (0x2319)	IO Expansion AI 1
C02.05 (0x2305)	PLC stage	C02.26 (0x231A)	IO Expansion AI 2
C02.06 (0x2306)	PLC multi-frequency target	C02.27 (0x231B)	IO Expansion AI 3
C02.07 (0x2307)	PLC multi-frequency runtime	C02.28 (0x231C)	IO Expansion input terminal status
C02.08 (0x2308)	FWD/REV command	C02.29 (0x231D)	IO Expansion for motor temperature detection
C02.09 (0x2309)	Jogging command	C02.30 (0x231E)	IO Expansion PUL count low
C02.10 (0x230A)	Voltage/Current before AI1 correction	C02.31 (0x231F)	IO Expansion PUL count high
C02.11 (0x230B)	Voltage/Current before AI2 correction	C02.32 (0x2320)~ C02.47 (0x232F)	Power-down save parameter 1~16
C02.12 (0x230C)	Voltage/Current before AO correction	C02.48(0x2330)~ C02.49 (0x2331)	Reserved
C02.13 (0x230D)	Voltage/current before expansion AO correction	C02.50(0x2332)~ C02.59 (0x233B)	Cache register 0~9
C02.14 (0x230E)	Voltage/current before AI3 correction	C02.60 (0x233C)	Expansion A version
C02.15 (0x230F)	AC drive overload timing factor	C02.61 (0x233D)	Expansion B version
C02.16 (0x2310)	Motor overload timing factor	C02.62 (0x233E)	External keypad version

C03 : Maintenance and Tension Monitoring

Code(Address)	Name	Code(Address)	Name
C03.00 (0x2400)	Current runtime	C03.50 (0x2432)	Machine code 1
C03.01 (0x2401)	Cumulative runtime(hour)	C03.51 (0x2433)	Machine code 2
C03.02 (0x2402)	Cumulative runtime(hour)	C03.52 (0x2434)	Machine code 3
C03.03 (0x2403)	Total runtime(m)	C03.57 (0x2439)	AI1 feedback monitoring
C03.04 (0x2404)	Cooling fan runtime	C03.58 (0x243A)	AI2 feedback monitoring
C03.05 (0x2405)	Cooling fan maintenance	C03.59 (0x243B)	Pressure feedback from AI1/AI2
C03.07 (0x2407)	Main relay maintenance	-	-

C04: Industrial Application Monitoring

Code(Address)	Name	Code(Address)	Name
C04.00 (0x2500)	Pump 1 target frequency	C04.30(0x251E)	Pump 1 run time
C04.01 (0x2501)	Pump 2 target frequency	C04.31(0x251F)	Pump 2 run time
C04.02 (0x2502)	Pump 3 target frequency	C04.32(0x2520)	Pump 3 run time
C04.03 (0x2503)	Pump 4 target frequency	C04.33(0x2521)	Pump 4 run time
C04.04 (0x2504)	Pump 5 target frequency	C04.34(0x2522)	Pump 5 run time
C04.05 (0x2505)	Pump 6 target frequency	C04.35(0x2523)	Pump 6 run time
C04.06 (0x2506)	Pump 7 target frequency	C04.36(0x2524)	Pump 7 run time
C04.07 (0x2507)	Pump 8 target frequency	C04.37(0x2525)	Pump 8 run time
C04.08(0x2508)	Pump 9 target frequency	C04.38(0x2526)	Pump 9 run time
C04.09(0x2509)	Pump 10 target frequency	C04.39(0x2527)	Pump 10 run time
C04.10(0x250A)	Pump 1 feedback frequency	C04.40(0x2528)	Sleep flag

C04.11(0x250B)	Pump 2 feedback frequency	C04.41(0x2529)	Sleep judge time
C04.12(0x250C)	Pump 3 feedback frequency	C04.42(0x252A)	Sleep boost time
C04.13(0x250D)	Pump 4 feedback frequency	C04.43(0x252B)	Final PID setpoint
C04.14(0x250E)	Pump 5 feedback frequency	C04.44(0x252C)	Low water consumption detection bias
C04.15(0x250F)	Pump 6 feedback frequency	C04.45(0x252D)	Low water bias ref
C04.16(0x2510)	Pump 7 feedback frequency	C04.46(0x252E)	High water consumption detection bias
C04.17(0x2511)	Pump 8 feedback frequency	C04.47(0x252F)	High water bias ref
C04.18(0x2512)	Pump 9 feedback frequency	C04.48(0x2530)	Pump clean flag
C04.19(0x2513)	Pump 10 feedback frequency	C04.49(0x2531)	Pump clean cycle cnt
C04.20(0x2514)	Pump 1 run sequence	C04.50(0x2532)	Pump clean run time
C04.21(0x2515)	Pump 2 run sequence	C04.51(0x2533)	Pump clean oc time
C04.22(0x2516)	Pump 3 run sequence	C04.52(0x2534)	Pump frost flag
C04.23(0x2517)	Pump 4 run sequence	C04.53(0x2535)	Pump frost temperature
C04.24(0x2518)	Pump 5 run sequence	C04.54(0x2536)	Pump dry flag
C04.25(0x2519)	Pump 6 run sequence	C04.55(0x2537)	Pump jockey flag
C04.26(0x251A)	Pump 7 run sequence	C04.56(0x2538)	Pump priming flag
C04.27(0x251B)	Pump 8 run sequence	C04.57(0x2539)	Pump priming time
C04.28(0x251C)	Pump 9 run sequence	C04.58(0x253A)	Pump extra relay status
C04.29(0x251D)	Pump 10 run sequence	C04.59(0x253B)	Pump press loss comp

4.22 Terminal I/O Functions

X	Description	X	Description	X	Description
0	OFF	21	PID control pause	43	Counter reset
1	FWD	22	PID characteristic switching	44	DC brake command
2	REV	23	PID parameter switching	45	Pre-excitation
3	Three-wire operation (Xi)	24	PID target shift 1	48	Command source to keypad
4	FWD jogging	25	PID target shift 2	49	Command source to terminal
5	REV jogging	26	PID target shift 3	50	Command source to communication
6	Free stop	27	PID feedback shift 1	52	Operation disable
7	Emergency stop	28	PID feedback shift 2	53	FWD operation disable
8	Fault reset	29	PID feedback shift 3	54	REV operation disable
9	External fault input	30	PLC pause	60	Speed/torque shift
10	Frequency up (UP)	31	Program(PLC) restart	62	Jogging frequency limit as torque mode frequency upper limit
11	Frequency down (DW)	32	ACC/DEC time 1	81	PID target source shift
12	Frequency reset (UP/DW	33	ACC/DEC time 2	88	Overflow protection
13	Source A to source B	34	ACC/DEC pause	89	Overflow alarm reset
14	Combined frequency	35	Wobble frequency operation	90	Pump sleep
15	Combined frequency	36	Wobble frequency pause	91	Dryout protection
16	Multi-frequency 1	37	Wobble frequency reset	92	Pump clean
17	Multi-frequency 2	38	Panel keys and display self-test	93	Anti-freezing and rusting
18	Multi-frequency 3	40	Timer	94	Motor 2 parameter
19	Multi-frequency 4	41	Timer reset	95	Main Pump Redundancy enable

20	PID control canceled	42	Counter	96	Main Pump Redundancy trigger
Y	**Description**	**Y**	**Description**	**Y**	**Description**
0	None	15	Program cycle completion	30	Control by communication address
1	Drive in operation	16	Program stage completion	31	Drive overheat alarm
2	Drive in reverse operation	17	PID feedback above upper limit	34	Jockey pump signal
3	Drive in forward operation	18	PID feedback below lower limit	35	Priming pump signal
4	Fault trip alarm 1 (alarm during fault reset)	19	PID Feedback Sensor Break	36	Motor out of phase (stop detection)
5	Fault trip alarm 2(no alarm during fault reset)	20	Reserved	37	Comparator 1 detection
6	Stop due to external faults	21	Timer arrival	38	Comparator 2 detection
7	AC drive undervoltage	22	Counter maximum value	40	Pump 1 Power Frequency Drive
8	AC drive ready for operation	23	Counter target arrival	41	Pump 1 Variable Frequency Drive
9	Frequency detection threshold 1 (FDT1)	24	Dynamic brake in progress	42	Pump 2 Power Frequency Drive
10	Frequency detection threshold 2 (FDT2)	25	Reserved	43	Pump 2 Variable Frequency Drive
11	Target frequency arrival	26	Emergency stop in progress	44	Pump 3 Power Frequency Drive
12	Zero-frequency in	27	Overload alarm 1	45	Pump 3 Variable Frequency Drive
13	Upper limit frequency	28	Underload warning 2	46	Pump 4 Power Frequency Drive
14	Lower limit frequency	29	Drive in alarm	47	Pump 4 Variable Frequency Drive

4.23 Error and Alarm Code List

Note: The numbers in brackets in the code column are error codes and warning codes. (Dec indicates decimal).

Display(Dec.)	Name	Type	Display(Dec.)	Name	Type
E. SC1 (1)	System error during acceleration	FAULT	E. LD2 (80)	Load protection 2	FAULT
E. SC2 (2)	System error during deceleration	FAULT	E. CPu (81)	CPU timeout	FAULT
E. SC3 (3)	System error during constant	FAULT	E. LoC (85)	Chip locked	FAULT
E. SC4（4）	System error during stop	FAULT	E. EEP (86)	Parameter storage error	FAULT
E. oC1(5)	Overcurrent in acceleration	FAULT	E. PLL(87)	PLL error	FAULT
E. oC2 (6)	Overcurrent during deceleration	FAULT	E. buS1 (91)	A expansion disconnection	FAULT
E. oC3 (7)	Overcurrent during constant	FAULT	E. buS2 (92)	B expansion disconnection	FAULT
E. ou1 (9)	Overvoltage during acceleration	FAULT	E. buS3 (93)	CAN expansion error	FAULT
E. ou2 (10)	Overvoltage during deceleration	FAULT	E. buS4 (94)	Other expansion error	FAULT
E. ou3 (11)	Overvoltage in constant running	FAULT	E. buS5 (95)	Other expansion error	FAULT
E. LoC (13)	Undervoltage during operation	FAULT	E. buS6 (96)	Others expansion	FAULT
E. oL1 (14)	Motor overload	FAULT	E. CP1 (97)	Monitor comparator	FAULT
E. oL2 (15)	AC drive overload 1	FAULT	E. CP2 (98)	Monitor comparator	FAULT
E. oL3 (16)	AC drive overload 2, CBC	FAULT	E. DAT (99)	Parameter setting error	FAULT
E. oL4 (17)	AC drive overload 3	FAULT	E. FA1 (110)	Reserved for expansion 1	FAULT
E. iLF (18)	Input phase loss	FAULT	E. FA2 (111)	Reserved for expansion 2	FAULT
E. oLF (19)	Three-phase output phase loss	FAULT	E. FA3 (112)	Reserved for expansion 3	FAULT
E. oLF1 (20)	U phase loss	FAULT	E.FA4 (113)	Reserved for expansion 4	FAULT
E. oLF2 (21)	V phase loss	FAULT	E.FA5 (114)	Reserved for expansion 5	FAULT
E. oLF3 (22)	W phase loss	FAULT	E.FA6 (115)	Reserved for expansion 6	FAULT
E. oH1 (30)	Rectifier module overheat	FAULT	E.FA7 (116)	Reserved for expansion 7	FAULT

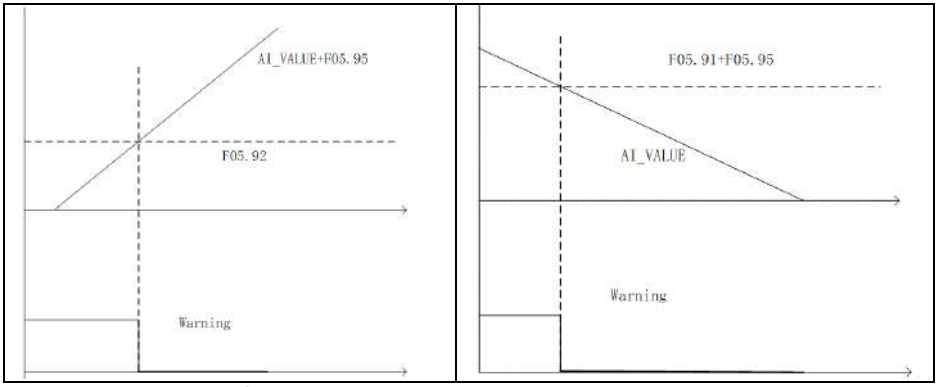
E. oH2 (31)	IGBT module overheat	FAULT	E.FA8 (117)	Reserved for expansion 8	FAULT
E. oH3 (32)	Motor overheat	FAULT	E. FrA(118)	Material fracture	FAULT
E. EF (33)	External fault	FAULT	E.DRY (120)	Dry out pump	FAULT
E. CE(34)	Modbus communication failure	FAULT	E.FUL (121)	Water full fault	FAULT
E. HAL1 (35)	Large U-phase zero drift	FAULT	**The following are the alarm codes**		
E. HAL2(36)	Large V-phase zero drift	FAULT			
E. HAL(37)	Non-0 current sum of three	FAULT	A. Lu1 (128)	Undervoltage during stop	ALARM
E. HAL3(38)	Large W-phase zero drift	FAULT	A. ou (129)	Overvoltage during stop	ALARM
E. SGxx(40)	Short circuit to ground	FAULT	A. iLF (130)	Input phase loss	ALARM
E. FSG(41)	Fan short circuit	FAULT	A. PiD (131)	PID feedback	ALARM
E. PiD(42)	PID feedback disconnection	FAULT	A. EEP (132)	Parameter storage failure	ALARM
E. CoP(43)	Parameter copy failure	FAULT	A. DEF (133)	Excessive speed deviation	ALARM
E. PG1(44)	Wrong PG parameter setting	FAULT	A. SPD (134)	Stall alarm	ALARM
E. PG2(44)	Encoder Z-pulse failure	FAULT	A. GPS1 (135)	GPS lockout	ALARM
E. PG3（44）	Resolver check failure	FAULT	A. GPS2 (136)	GPS disconnection	ALARM
E. PG4(44)	Resolver disconnection	FAULT	A. CE (137)	Modbus communication	ALARM
E. PG5(44)	ABZ encoder disconnection	FAULT	A. LD1 (138)	Load protection 1	ALARM
E. PG6(44)	Spindle encoder disconnection	FAULT	A. LD2 (139)	Load protection 2	ALARM
E. PG7(44)	Main shaft encoder Z-pulse	FAULT	A. buS (140)	Expansion disconnection	ALARM
E. PG8(44)	Encoder Z-pulse logic failure	FAULT	A. oH1 (141)	Module overheat	ALARM
E. PG9(44)	Main shaft encoder Z-pulse logic	FAULT	A. oH3 (142)	Motor overheat alarm	ALARM
E. PG10(44)	Encoder Z-pulse disconnection	FAULT	A. run1 (143)	Operation command	ALARM
E. PG11(44)	Spindle encoder Z-pulse	FAULT	A. run2 (158)	Jogging terminal startup	ALARM
E. PG12(44)	Encoder feedback failure	FAULT	A. run3 (159)	Terminal startup protection	ALARM
E. PG13(44)	Encoder hardware disconnection	FAULT	A. PA2 (144)	External keypad	ALARM
E.AI1 (45)	AI1 disconnection	FAULT	A. CoP(145)	Parameter copy failure	ALARM
E.AI1 (46)	AI2 disconnection	FAULT	A. CP1(146)	Monitor comparator 1	ALARM
E. bru(50)	Braking unit failure	FAULT	A. CP2 (147)	Monitor comparator 2	ALARM
E. TExx(52)	Motor parameter auto-tuning	FAULT	A. FA1 (150)	Reserved for expansion 1	ALARM
E. iAE1(71)	Motor angle tuning failure 1	FAULT	A. FA2 (151)	Reserved for expansion 2	ALARM
E. iAE2(72)	Motor angle tuning failure 2	FAULT	A. FA3 (152)	Reserved for expansion 3	ALARM
E. iAE3(73)	Motor angle tuning failure 3	FAULT	A. FA4 (153)	Reserved for expansion 4	ALARM
E. PST1(74)	PM step loss 1	FAULT	A. FA5 (154)	Reserved for expansion 5	ALARM
E. PST2(75)	PM step loss 2	FAULT	A. FA6(155)	Reserved for expansion 6	ALARM
E. PST3(76)	PM step loss 3	FAULT	A. FrA(157)	Material fracture	ALARM
E. DEF(77)	Excessive speed deviation	FAULT	A.161(161)	Fan expiration	ALARM
E. SPD(78)	Stall failure	FAULT	A.163 (163)	Main relay life alarm	ALARM
E. LD1 (79)	Load protection 1	FAULT	A.OPR (170)	Over pressure alarm	ALARM
-	-	-	A.DRY (175)	Dry out pump alarm	ALARM

Chapter 5 Pump Function Wizard

5.1 AI Error

Code (Address)	Name	Content	Default (Range)	Property
F05.90 (0x055A)	AI Disconnection Mode	V/F SVC FVC PMVF PMSVC PMFVC Ones-bit: AI1 disconnection Tens-bit: AI2 disconnection 0: Detection OFF 1: Report fault and free stop (E.Aix) 2: Report alarm and continue operation (A.AIx)	0000 (0000~0022)	RUN
F05.91 (0x055B)	AI1 Disconnection Upper Limit Percentage	V/F SVC FVC PMVF PMSVC PMFVC Set the percentage of the AI2 lower limit.	100% (0%~100%)	RUN
F05.92 (0x055C)	AI1 Disconnection Lower Limit Percentage	V/F SVC FVC PMVF PMSVC PMFVC Set the percentage of the AI2 lower limit.	0% (0%~100%)	RUN
F05.93 (0x055D)	AI2 Disconnection Upper Limit Percentage	V/F SVC FVC PMVF PMSVC PMFVC Set the percentage of the AI2 lower limit.	100% (0%~100%)	RUN
F05.94 (0x055E)	AI1 Disconnection Upper Limit Percentage	V/F SVC FVC PMVF PMSVC PMFVC Set the percentage of the AI2 lower limit.	0% (0%~100%)	RUN
F05.95 (0x055F)	AI1 Detection Bias	V/F SVC FVC PMVF PMSVC PMFVC Set the AI1 bias.	0% (0%~100%)	RUN
F05.96 (0x0560)	AI2 Detection Bias	V/F SVC FVC PMVF PMSVC PMFVC Set the AI2 bias.	0% (0%~100%)	RUN
F05.97 (0x0561)	AI1 Disconnection Detection Delay	V/F SVC FVC PMVF PMSVC PMFVC Set the disconnection detection time of AI1.	0.1s (0.0s~60.0s)	RUN
F05.98 (0x0562)	AI2 Disconnection Detection Delay	V/F SVC FVC PMVF PMSVC PMFVC Set the disconnection detection time of AI2.	0.1s (0.0s~60.0s)	RUN

1. AI disconnection detection logic: when AI_value + F05.95 < F05.92 or AI_value > F05.91 + F05.95, the software triggers AI disconnection at this time.



1.1. AI (AI1\AI2) disconnection function can be detected even during shutdown.

2. Example:

2.1. F05.90 ones-bit set to 1: Report fault (E.AI1) and free stop, F05.91 [AI1 Disconnection Upper Limit] is set to 80%, F05.92[AI1 Disconnection Lower Limit] is set to 20%, F05.95 [AI1 Detection Bias] is set to 5%, F05.97 [AI1 Disconnection Detection Delay] is set to 1s, AI1 voltage/current is set to 1.5V-8.5V/3mA-17mA, or AI1 voltage/current is set lower than 1.5V or higher than 8.5V, or lower than 3mA or higher than 17mA, the drive reports a fault (E.AI1) and stops freely.

2.2. F05.90 ones-bit set to 2: Report alarm (A.AI1) and continue operation, AI1 voltage/current is set to 1.5V-8.5V/3mA-17mA,

or AI1 voltage g/current is set to lower than 1.5V or higher than 8.5V, or lower than 3mA or higher than 17mA, the drive

reports an alarm (A.AI1).

5.2 Motor Detection before Stop

Code (Address)	Name	Content	Default (Range)	Property
F07.20 (0x0714)	Start Braking Current	**V/F SVC FVC PMVF PMSVC PMFVC** Set the output current during DC brake.	60.0% (0.0%~150.0%)	STOP
F09.60 (0x093C)	Motor Detection Current Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** 100% of the motor rated current, and the drive will report faults when output current is lower than this setting.	15.0% (0.0%~100.0%)	RUN
F10.30 (0x0A1E)	Stop Phase Detection	**V/F SVC FVC PMVF PMSVC PMFVC** Set the output phase loss detection when the drive is shut down to detect the motor status in advance so as to overhaul in advance. Detect one by the set time on F10.31. 0: OFF 1: Report E.iLF at phase loss, free stop 2: Report A.iLF at phase loss, continue operation	0 (0~2)	RUN
F10.31 (0x0A1F)	Motor Detection Interval	**V/F SVC FVC PMVF PMSVC PMFVC** Set the interval for motor detection.	3.0s (0.0s~6000.0s)	RUN

1. Motor detection refers to output out-of-phase detection when the drive is shut down, the drive will detect the motor status in advance so as to overhaul it in advance. (Detect every time for the time set on F10.31 and every 3s with the DC brake detection), 0.5s for each detection (150ms until the current is stable, filtering 250ms). U phase in and V / W-phase out, so it will detect the V / W-phase current. The stop mode can be set on F10.30, and motor detection interval time can be set on F10.31.
2. Start commands from any sources will interrupt the detection progress.
3. When F07.20[] is lower than F09.60[Motor Detection Current Threshold], the motor phase loss detection is triggered(min current among U/V/W), and the drive reports phase loss E.OLF.

5.3 Pipe Filing

In water supply systems, water hammer can occur if pipes are filled too quickly. Therefore, it is advisable to limit the water speed. This mode eliminates water hammer caused by rapid venting by filling the pipes at a lower rate,
and it is available for horizontal, vertical and mixed piping systems. As pressure in a horizontal piping system does not rise during shutdown, users need to set the shutdown speed for the of the horizontal piping system so that it will stop before the set time or the set pressure.

Code (Address)	Name	Content	Default (Range)	Property
F09.63 (0x093F)	Pipe Filling Enable	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: ON	0 (0~1)	STOP
F09.64 (0x0940)	PID Enable	**V/F SVC FVC PMVF PMSVC PMFVC** Used to select whether or not to automatically enter PID mode after the end of pipe filling 0: OFF 1: ON	1 (0~1)	STOP
F09.65 (0x0941)	First Constant stage Freq	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency for pipe filling.	30.00Hz (0.00Hz~F01.12)	RUN
F09.66 (0x0942)	First Constant Freq Stage Hold Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency holding time during pipe filling.	10.0s (1.0s~3600.0s)	RUN
F09.67 (0x0943)	Initial Stage End frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the minimum speed of the motor for switching acceleration and deceleration. When the operating frequency is less than the minimum frequency, take F9.68 for the acceleration time, otherwise, take F1.22.	0.00Hz (0.00Hz~F01.12)	RUN
F09.68 (0x0944)	Initial ACC Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the acceleration time of the motor running from 0Hz to the minimum frequency.	10.00s (0.00s~650.00s)	RUN
F09.70 (0x0946)	Second ACC stage Time	**V/F SVC FVC PMVF PMSVC PMFVC** It is valid under FVC. When F09.66 is reached, and the AI feedback does not reach the set point on F09.75, i.e., the drive continues to accelerate according to this setting.	10.00s (0.00s~650.00s)	RUN

This value is not modifiable and it depends on other parameters (F09.74, F09.75, F09.77).

F09.70 = (F09.75- F09.74)/F09.77

F09.72 (0x0948)	PID ACC Time	**V/F SVC FVC PMVF PMSVC PMFVC** It is the acceleration time when the frequency source is set to PID, valid under FVC.	10.00s (0.00s~650.00s)	RUN

This time value indicates the motor speed from 0Hz to the maximum speed (F1.10), Valid under FVC.

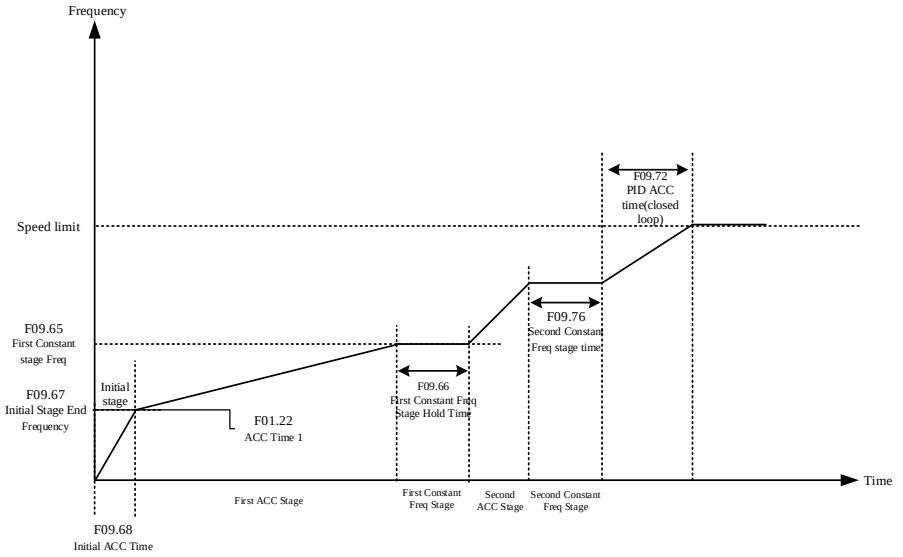
When the pressure reaches the setpoint, the motor control mode switches to regular PID mode and the value takes effect.

F09.74 (0x094A)	Per-unit Min. Speed Pressure	**V/F SVC FVC PMVF PMSVC PMFVC** It indicates the percentage of the water pressure detected by the sensor connected to AI at the min. speed (or 0Hz).	0.00% (0.00%~100.00%)	RUN
F09.75 (0x094B)	Per-unit Target Pressure	**V/F SVC FVC PMVF PMSVC PMFVC** It indicates the percentage of the water pressure target detected by the sensor connected to AI.	45.00% (0.00%~100.00%)	RUN

The water pressure at minimum speed (or 0Hz), and the set water pressure, are converted to a percentage by a pressure transducer connected to the analog input.

F09.76 (0x094C)	Second Constant Freq stage time	**V/F SVC FVC PMVF PMSVC PMFVC** When the AI feedback reaches the set target, it switches to PID operation control after the delay time.	1.0s (0.1s~10.0s)	RUN
F09.77 (0x094D)	Second ACC stage Rate	**V/F SVC FVC PMVF PMSVC PMFVC** Set the ramp rate during pipe filling. Calculate the ACC time together with F9.74 and F9.75.	5.00% (0.00%~100.00%)	RUN
F09.78 (0x094E)	Pressure Input Source	**V/F SVC FVC PMVF PMSVC PMFVC** Set the AI source of pressure sensor: 0: AI1 1: AI2 2: AI3	0 (0~2)	STOP

The stages of pipe filling are shown below:



Note: ACC time refers to the acceleration time of the motor running speed from 0Hz-minimum frequency.

5.4 PID Sleep

Code (Address)	Name	Content	Default (Range)	Property
F13.29 (0x0D1D)	Sleep Enable	V/F SVC FVC PMVF PMSVC PMFVC Set sleep function on or off. 0: OFF 1: General mode 2: Constant pressure mode	0 (0~2)	RUN
When F13.29 is selected to 1: General mode, the following parameters are valid:				
F13.30 (0x0D1E)	Sleep Frequency	V/F SVC FVC PMVF PMSVC PMFVC Set the sleep frequency.	25.00Hz (0.00Hz~ Max.freq)	RUN
F13.31 (0x0D1F)	Sleep Delay	V/F SVC FVC PMVF PMSVC PMFVC Set the sleep delay time.	10.0s (0.0s~ 3600.0s)	RUN
F13.32 (0x0D20)	Wakeup Deviation	V/F SVC FVC PMVF PMSVC PMFVC Set the upper limit pressure for analog input.	5.0% (0.0%~ 50.0%)	RUN
F13.33 (0x0D21)	Wakeup Delay	V/F SVC FVC PMVF PMSVC PMFVC Set the wakeup delay time.	1.0s (0.0s~60.0s)	RUN
When F13.29 is selected to 2: Constant-pressure mode, the following parameters are valid:				
F13.31 (0x0D1F)	Sleep Delay	V/F SVC FVC PMVF PMSVC PMFVC Set the sleep delay time.	10.0s (0.0s~ 3600.0s)	RUN
F13.34 (0x0D23)	Sleep Bias	V/F SVC FVC PMVF PMSVC PMFVC This is up to the set target PID values.	2.0% (0.0%~ 100.0%)	RUN

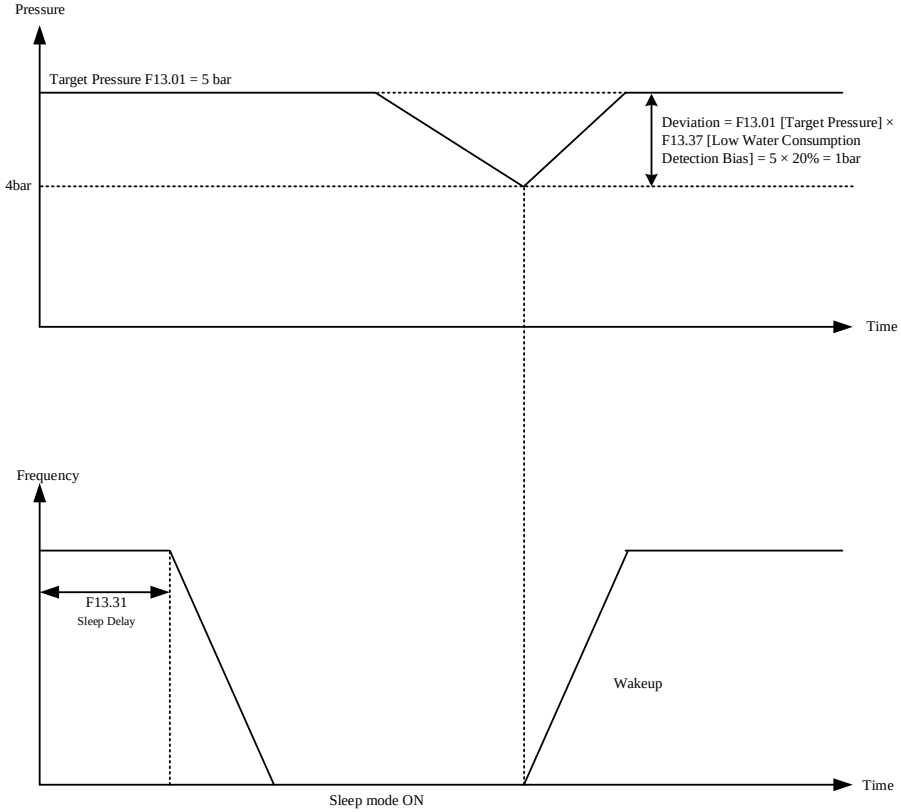
When the constant pressure feedback bias remains within the range of F13.34 and the duration exceeds F13.31, the drive will decelerate to stop to enter the sleep standby.

After entering the standby state, when the system pressure meets the condition of high or low water consumption conditions, the drive will resume operation to provide system pressurization. Refer to F13.37~F13.39 for conditions of high or low water consumption.

F13.37 (0x0D25)	Low Water Consumption Detection Bias	V/F SVC FVC PMVF PMSVC PMFVC If the pressure change is greater than this value, it is judged to be a small amount of water use.	10.0% (0.0%~ 100.0%)	RUN
F13.38 (0x0D26)	High Water Consumption Detection Bias	V/F SVC FVC PMVF PMSVC PMFVC If the amount of pressure change during the F13.39 time is greater than this value, it is determined to be a small amount of water use.	0.0% (0.0%~ 100.0%)	RUN
F13.39 (0x0D27)	High Water Consumption Detection Time	V/F SVC FVC PMVF PMSVC PMFVC See F13.38 for details.	0.500s (0.000s~ 2.000s)	RUN

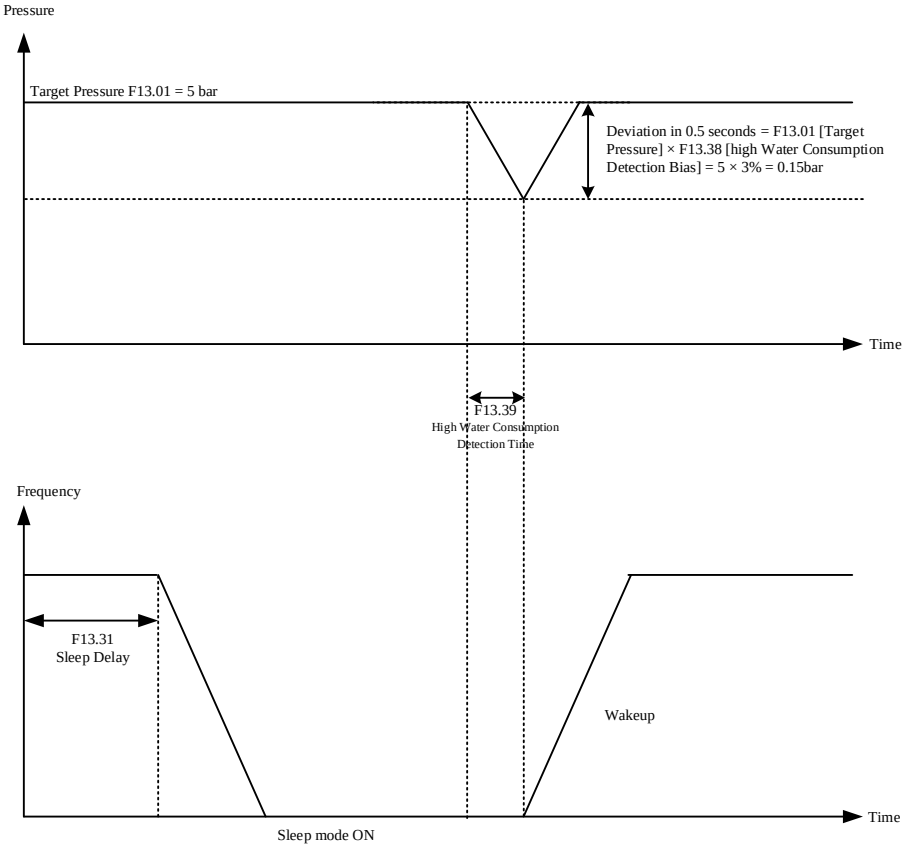
Example:

When the target value of constant pressure of water pump is 5 bar, F13.34 is 2%, F13.31 is 15 seconds, F13.37 is 20%, F13.38 is 3%, F13.39 is 0.5 seconds, which means that the deviation from the target value is 0.1 bar (5 bar × 2% = 0.1 bar).
That is, when the value of the feedback value is greater than or equal to 4.9 bar and the time exceeds 15 seconds, the drive will start to decelerate into the sleep standby.
Scenario 1: Low water consumption restart detection.
After the constant pressure is met to enter the sleep mode, the PID pressure feedback drops to a deviation from the target value equal to or greater than 1 bar (5 bar × 20% = 1 bar),
i.e. the drive wakes up and resumes operation when the feedback value is lower than 4 bar.



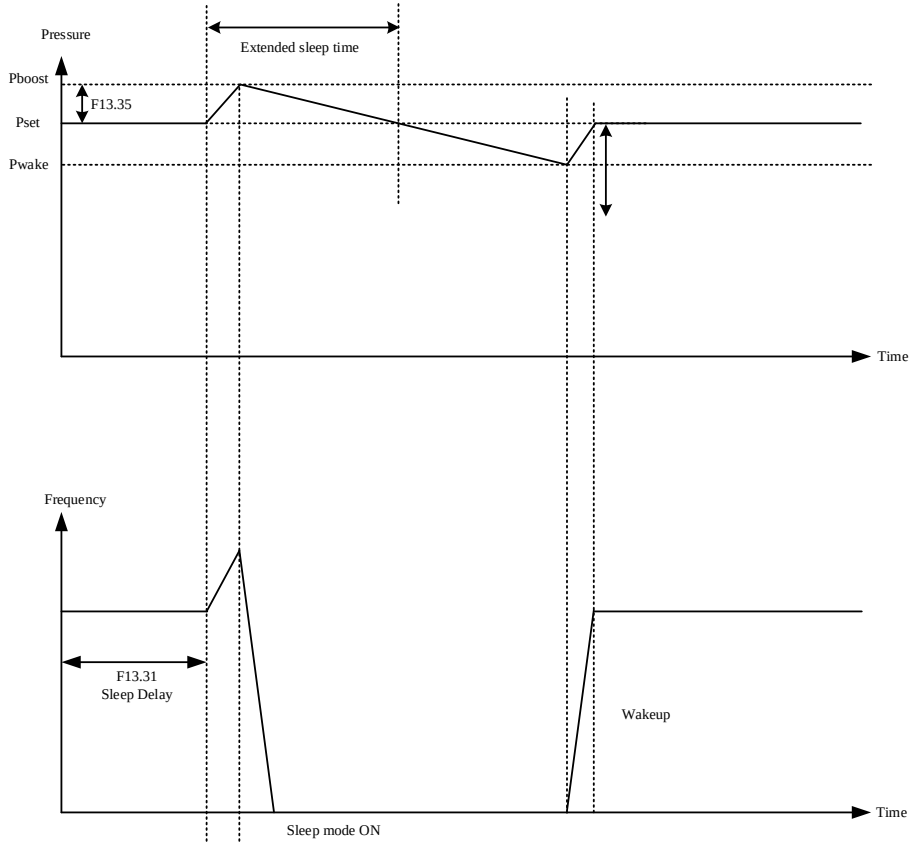
Scenario 2: High water consumption restart detection

After the constant pressure is met to enter the sleep mode, and the feedback pressure change within the time set in F13.39 is greater than the pressure bias set in F13.38, i.e. the change in 0.5 seconds is greater than or equal to 0.15 bar (5 bar × 3% = 0.15 bar), or the drive wakes up and resumes operation when the feedback pressure decreases below 4.85 bar in 0.5 seconds.

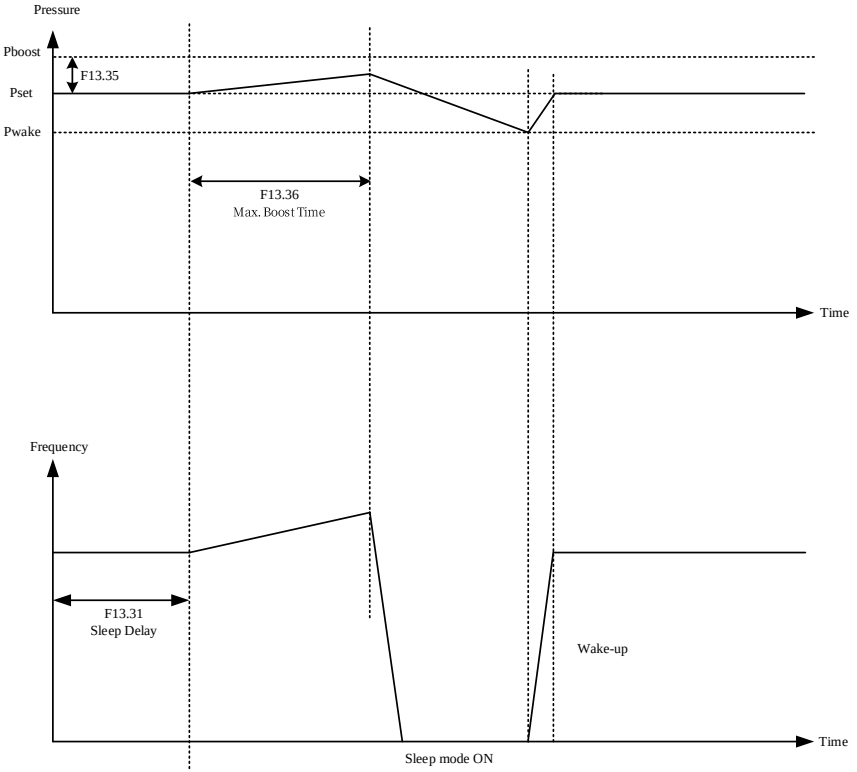


F13.35 (0x0D23)	Pre-sleep Boost	**V/F SVC FVC PMVF PMSVC PMFVC** This is up to the set target PID values.	0.0% (0.0%~100.0%)	RUN
F13.36 (0x0D24)	Max. Boost Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the maximum time for pressure boost before entering sleep, And once the time window is reached,The drive will enter sleep automatically regardless Of the pressure state.	20s (0s~1000s)	RUN

Scenario 1: To enter the constant pressure mode, increase F13.35 to reach the target pressure value, and then enter the sleep state to extend the sleep time.



Scenario 2: After the time set on F13.36, [Pre-sleep Boost] target is still not reached.



5.5 AI1/AI2 Combination

Code (Address)	Name	Content	Default (Range)	Property
F13.44 (0x0D2C)	AI Combination Method	V/F SVC FVC PMVF PMSVC PMFVC 0: AI1+ AI2 1: AI1-AI2 2: Avg.(AI2 AI1) 3: Max (AI1, AI2) 4: Min (AI1, AI2)	0 (0~4)	RUN
F13.45 (0x0D2D)	AI1 Feedback Gain	**V/F SVC FVC PMVF PMSVC PMFVC** It is valid when F13.03=10.	1.00 (0.00~10.00)	RUN
F13.46 (0x0D2E)	AI2 Feedback Gain	**V/F SVC FVC PMVF PMSVC PMFVC** It is valid when F13.03=10.	1.00 (0.00~10.00)	RUN
F13.47 (0x0D2F)	AI Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the upper limit pressure for analog input.	100.0% (100.0%~ 6000.0%)	RUN
F13.50 (0x0D32)	PID Target 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set X terminal to 81 to shift between F13.01 and F13.50.	80.0% (0.0%~100.0%)	RUN

C03.57: AI1 feedback monitoring
C03.58: AI2 feedback monitoring
C03.59: AI combination feedback monitoring

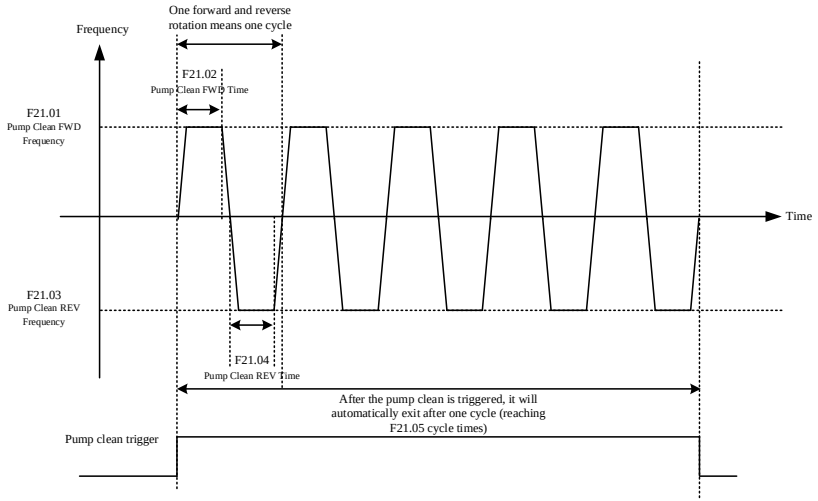
5.6 Pump Clean

Code (Address)	Name	Content	Default (Range)	Property
F21.00 (0x5500)	Pump Clean Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: 0: OFF 1: ON (Manual trigger by X terminal) 2: ON (Auto trigger when current exceeds the limit) 3: ON (Auto trigger by timer) Tens-bit: Timer unit under clean timer mode 0: Time reset 1: s 2: min 3: hour	0000 (0000~0033)	STOP

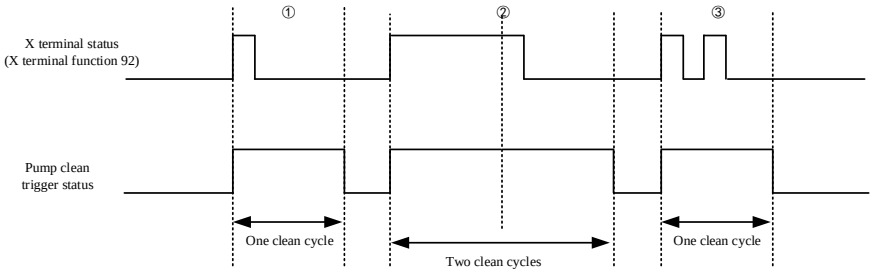
Pump cleaning function is used to remove the debris, or sediment on the impellers.
It will make the pump to carry out forward and reverse rotation. Some pumps only support one-way operation rather than forward and reverse operation, so please turn off this function to avoid damage to the pump.

F21.01 (0x5501)	Pump Clean FWD Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump cleaning forward frequency.	30.00Hz (0.00Hz~Upper limit)	RUN
F21.02 (0x5502)	Pump Clean FWD Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump cleaning forward time.	60s (0s~1000s)	RUN
F21.03 (0x5503)	Pump Clean REV Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump cleaning reverse frequency.	30.00Hz (0.00Hz~Upper limit)	RUN
F21.04 (0x5504)	Pump Clean REV Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump cleaning reverse time.	60s (0s~1000s)	RUN
F21.05 (0x5505)	Pump Clean Cycle	**V/F SVC FVC PMVF PMSVC PMFVC** Set the cycle count to trigger the anti-freezing/rust mode.	5 (0~1000)	RUN
F21.06 (0x5506)	Pump Clean Current Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump clean current threshold.	120.0% (0.0%~300.0%)	RUN
F21.07 (0x5507)	Pump Clean Current Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time for pump clean current judgement.	30.0s (0.0s~1000.0s)	RUN
F21.08 (0x5508)	Regular Pump Clean Cycle	**V/F SVC FVC PMVF PMSVC PMFVC** Set the regular pump clean cycle.	24h (0h~2000h)	RUN

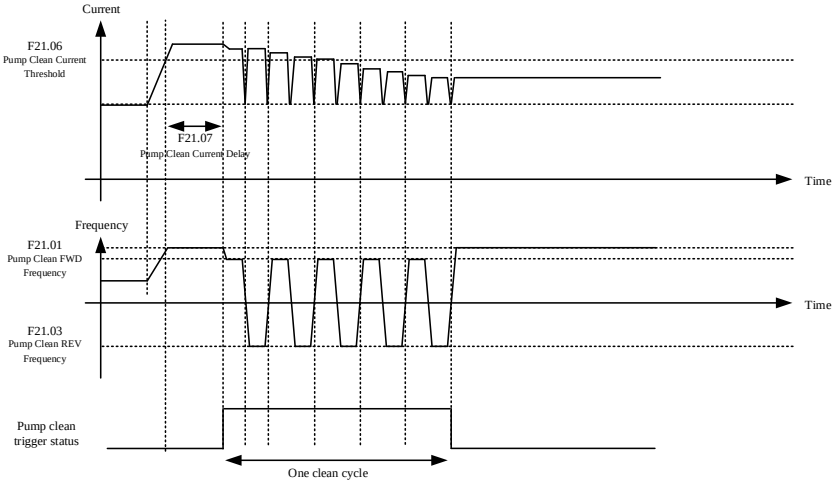
According to F21.01~F21.05, after the pump cleaning is triggered, it will automatically exit after a cycle of cleaning, and the pump cleaning process is shown below:



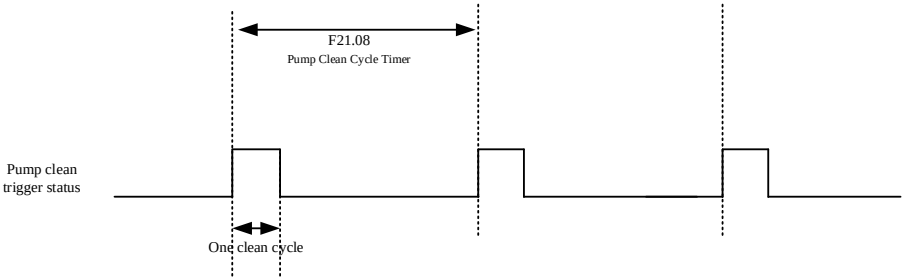
There are three ways to trigger pump cleaning:
F21.00=1 (X terminal to 92: Manual trigger), the relationship between terminal status and pump cleaning is as follows:



F21.00=2 (Current exceeds the current limit, auto trigger), the relationship between output current and pump cleaning is as follows:



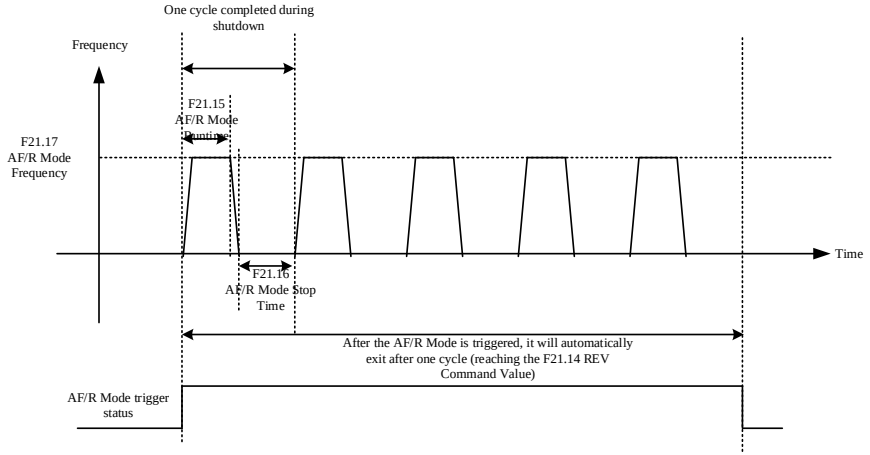
F21.00=3 (X terminal to 92: Auto trigger), the relationship between terminal status and pump cleaning is as follows:



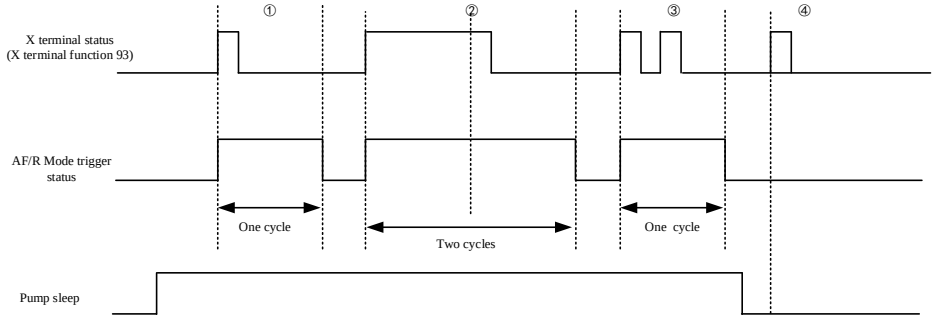
5.7 AF/R Mode

Code (Address)	Name	Content	Default (Range)	Property
F21.09 (0x5509)	AF/R Mode Enable	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit 0: OFF 1: ON (Manual trigger by X terminal selected to 93) 2: ON (Auto trigger by low-temperature control) Tens-bit 0: OFF 1: AI1 2: AI2 3: AI3	0000 (0000~0033)	STOP

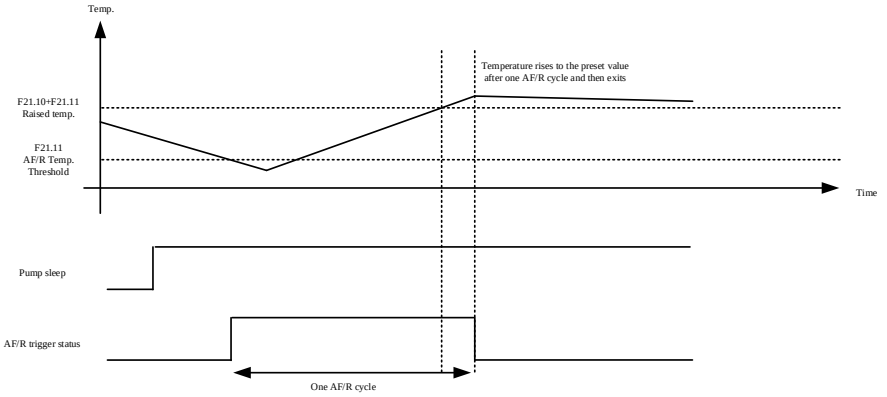
This function is used to avoid the impeller corrosion caused by the liquid in the pipeline does not flow for a long time, or the temperature is lower than the critical value of the freezing, resulting in the damage of the pump.
And it is valid only under sleep, during which the liquid in the pipeline will flow by means of intermittent operation or.
Set F21.14~F21.17 for this function, and it will exit after one cycle. The process is as follows:

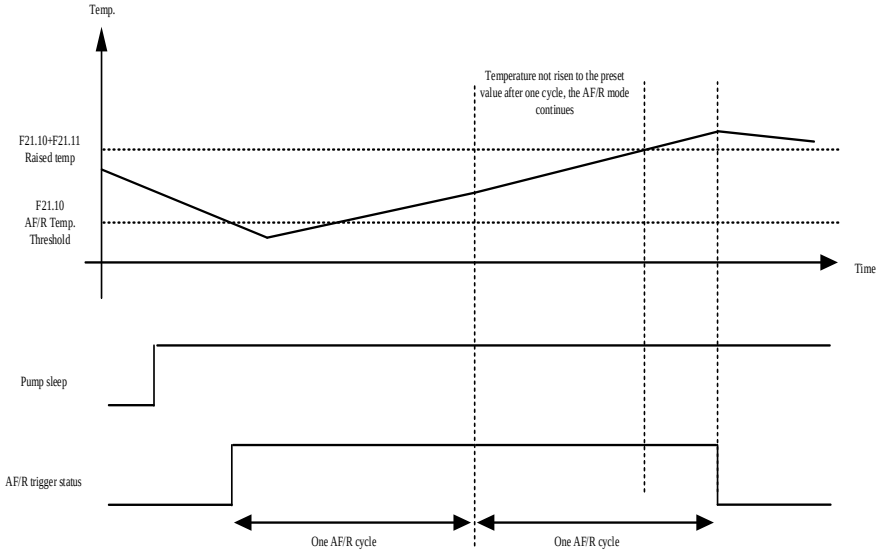


There are two ways to trigger this function:
Ones-bit of F21.09=1 (X terminal to 93: Manual trigger), the relationship between terminal status and AF/R is as follows:



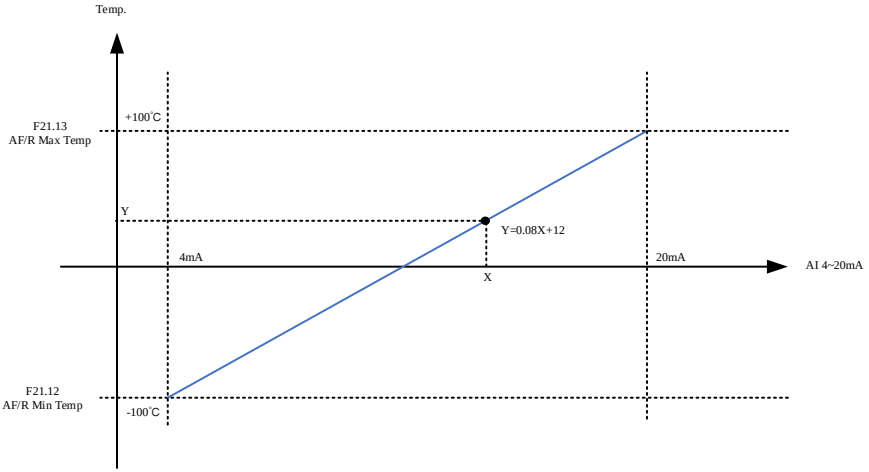
Ones-bit of F21.09=2 (Auto trigger by low-temperature control), the relationship between terminal status and AF/R is as follows:





F21.10 (0x550A)	Temp. Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the temp. threshold enter the anti-freezing/rust mode.	5.0°C (-100°C~+100°C)	RUN
F21.11 (0x550B)	Temp. Recovery Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Exit Antifreeze Rust Mode Temperature Return Value.	5.0°C (-100°C~+100°C)	RUN
F21.12 (0x550C)	Min. Temp.	**V/F SVC FVC PMVF PMSVC PMFVC** Set the minimum temperature under the anti-freezing/rust mode.	-100.0°C (-100°C~+100°C)	RUN
F21.13 (0x550D)	Max. Temp.	**V/F SVC FVC PMVF PMSVC PMFVC** Set the maximum temperature under the anti-freezing/rust mode.	100.0°C (-100°C~+100°C)	RUN

Set the linear relationship between temperature and AI on F21.12~F21.13, and take the default parameters as an example, the correspondence is as follows:



F21.14 (0x550E)	AF/R Mode Cycle	**V/F SVC FVC PMVF PMSVC PMFVC** Set the cycle count to trigger the anti-freezing/rust mode.	5 (0~60000)	RUN
F21.15 (0x550F)	AF/R Mode Runtime	**V/F SVC FVC PMVF PMSVC PMFVC** Set the runtime for the anti-freezing/rust mode.	5min (0min~10000min)	RUN
F21.16 (0x5510)	AF/R Mode Stop Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stop time of the anti-freezing/rust mode.	5min (0min~10000min)	RUN
F21.17 (0x5511)	AF/R Mode Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency of the anti-freezing/rust mode.	25.00Hz (0.00Hz~Upper limit)	RUN

5.8 Dry-out Protection

Code (Address)	Name	Content	Default (Range)	Property
F21.18 (0x5512)	Dryout Protection Detection Mode	**V/F SVC FVC PMVF PMSVC PMFVC** **Ones-bit: Detection enable** 0: OFF 1: Terminal detection ON(sensor) 2: Current detection ON 3: Terminal and current detection ON **Tens-bit: Alarm mode**	0000 (0000~0033)	RUN

		0: OFF 1: Report alarm A.175 [A.dry], continue operation 2: Report alarm A.175 [A.dry], stop and auto restart 3: Report error E.120[E.dry], stop and manual restart		
F21.19 (0x5513)	Dryout Protection Current	**V/F SVC FVC PMVF PMSVC PMFVC** Set the current for the dry pump protection.	5.0A (0.0A~3000.0A)	RUN
F21.20 (0x5514)	Dryout Protection Detection Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the detection time to trigger the dry pump protection.	10s (0s~1000s)	RUN
F21.21 (0x5515)	Dryout Protection Interval	**V/F SVC FVC PMVF PMSVC PMFVC** Set the interval time to trigger the dry pump protection.	30min (0s~1000min)	RUN

Dryout protection is used to detect whether there is sufficient liquid in the pipeline, water tank or water well, to avoid long time pump idling. The fan blade will be in direct contact with the pump in the absence of water in-between, which is easy to cause damage to the pump.

There are three detection methods for dry pump protection, which can be set with ones-bit of F21.18:

When it is set to 1: Terminal detection (sensor), customers' needs to connect the low-level sensor inside the tank to the X terminal, and when the level inside the tank is too low, the sensor will trigger the X terminal for dry pump protection, X terminal function is 91.

When it is set to 2, no level sensor is required for current detection, only output current is detected, and dry pump protection is triggered when the output current is lower than F21.19 and duration is greater than F21.20 when the drive is running to the maximum speed.

The dry pump protection is triggered and processed according to the method selected in the F21.18 tens-bit:

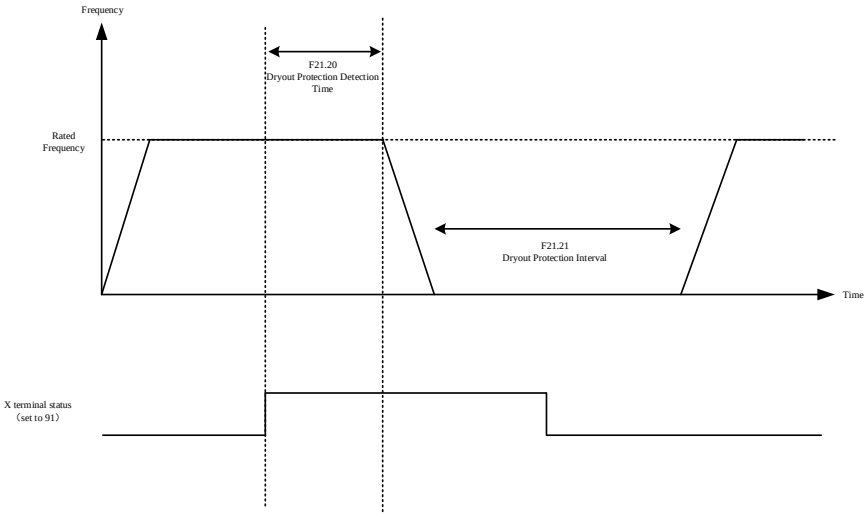
0: OFF

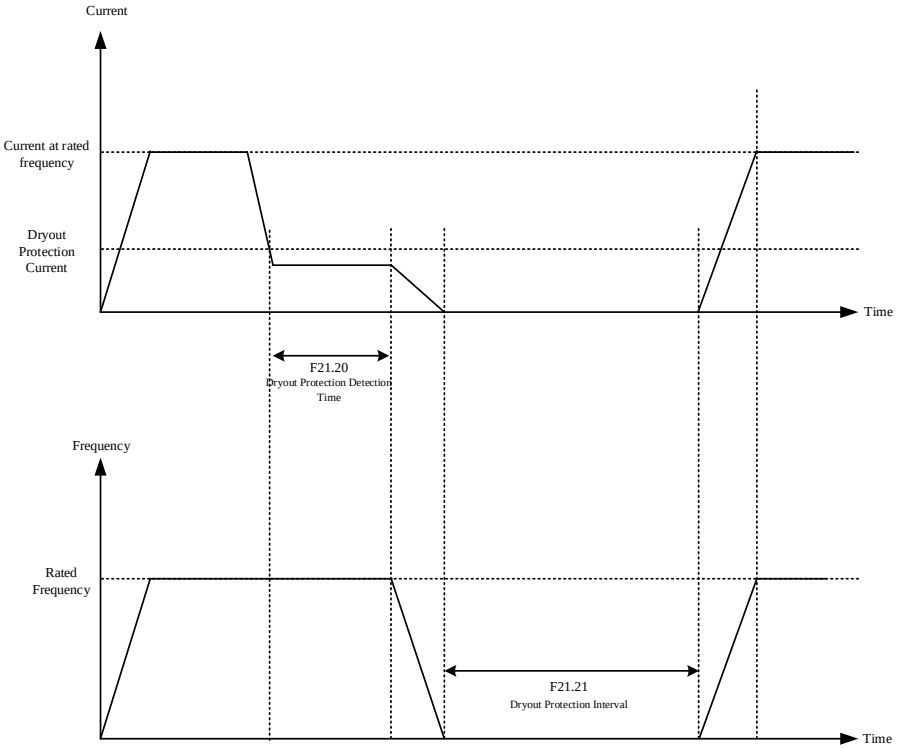
1: Report alarm and continue operation

2: Report alarm and lower the speed to 0, auto restart when conditions are met

3: Report fault, and free stop. Manual reset to restart.

Dry pump protection interval can be set to leave some time for the water well to storage some water, so as to avoid frequent triggering of dry pump protection.




Current
Current at rated frequency
Dryout Protection Current
Time
F21.20
Dryout Protection Detection Time
Frequency
Rated Frequency
F21.21
Dryout Protection Interval
Time

5.9 Jockey Pump

Code (Address)	Name	Content	Default (Range)	Property
F21.22 (0x5516)	Jockey Pump Enable	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: The main pump enters the sleep state after the Jockey pump starts; after the main pump wakes up, the Jockey pump stops (Y terminal to 34: Jockey pump ON) 2: The main pump enters the sleep state and PID feedback is lower than F21.23, the Jockey pump works; after the main pump wakes up and PID feedback is higher than F21.24, the Jockey pump stops (Y terminal to 34: Jockey pump ON)	0 (0~2)	RUN
F21.23 (0x5517)	Jockey Pump Start Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the max compensation for the pressure loss threshold 1. Its unit is up to the pressure feedback.	0.0 (0.0~Upper limit)	RUN
F21.24 (0x5518)	Jockey Pump Stop Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the max compensation for the pressure loss threshold 1. Its unit is up to the pressure feedback.	0.0 (0.0~Upper limit)	RUN

This function is used when there is one big and one small pump, the smaller one will be used as the Jockey pump. When the main pump is in sleep, the Jockey pump is responsible for the pressure preservation to avoid that the main pump might be running at low frequencies for a long time or wake up frequently when low amount of water is used.

Industrial frequency power supply is used for the Jockey pump, and the power is controlled by the external contactor of the output terminal of the drive.

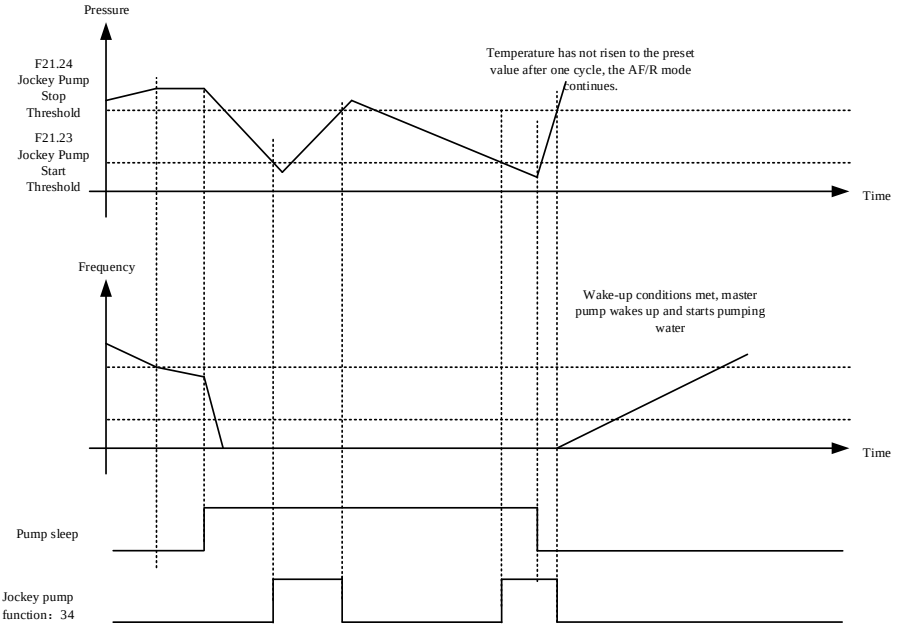
There are two working modes for the Jockey pump function. When F21.22 is deleted to 1, the Jockey pump is synchronized with the main pump sleep. Once the man pump enters sleep, the Jockey pump starts. While when main pump wakes up, the Jockey pump stops.

When F21.22 is deleted to 2, the Jockey pump operation is decided by sleep and feedback pressure at the same time.

When the main pump starts sleep and the PID feedback is lower than F21.23, the Jockey pump starts.

When the main pump wakes up and the PID feedback is higher than F21.24, the Jockey pump stops.

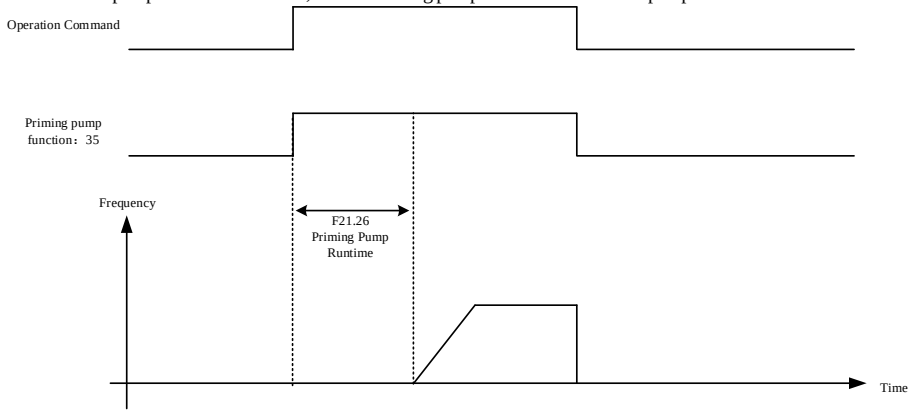
When F21.22 is selected to 2, the relationship between Jockey pump, the feedback pressure and sleep is shown below:



5.10 Priming Pump

Code (Address)	Name	Content	Default (Range)	Property
F21.25 (0x5518)	Priming Pump	V/F SVC FVC PMVF PMSVC PMFVC 0: OFF 1: ON (Y terminal to 35: Priming pump)	0 (0~1)	RUN
F21.26 (0x5519)	Priming Pump Runtime	V/F SVC FVC PMVF PMSVC PMFVC Set Priming Pump Runtime.	300s (0s~60000s)	RUN

This function is used when there is one big and one small pump, and the bigger one is directly controlled by the drive and the smaller one is used for the preset operation. Industrial frequency power supply is used for the preset operation, and the power is controlled by the external contactor of the output terminal of the drive.
This is to increase the inlet pressure of the main pump before the main pump runs to avoid cavitation.
Configure the terminal output function, and set the Priming running time, and enable this work mode.
After the actual operation command, the Priming pump terminal will be enabled first, so that the small pump will run first before the main pump after the set runtime, and the Priming pump can run with the main pump afterwards.



5.11 Restart Interval

Code (Address)	Name	Content	Default (Range)	Property
F21.30 (0x551E)	Restart Delay	V/F SVC FVC PMVF PMSVC PMFVC Set the operation interval time between the two operation commands to avoid frequent startups.	0s (0s~60000s)	RUN

Frequent start and stop is not allowed in some cases, so a minimum time interval between starts is required.

5.12 Overpressure Monitor

Code (Address)	Name	Content	Default (Range)	Property
F21.31 (0x551F)	Overpressure Monitor Enable	V/F SVC FVC PMVF PMSVC PMFVC 0: OFF 1: ON	0 (0~1)	RUN
F21.32 (0x5520)	Overpressure Alarm Threshold	V/F SVC FVC PMVF PMSVC PMFVC Set the max compensation for the pressure loss threshold 1. Its unit is up to the pressure feedback.	0.0 (0.0~Upper limit)	RUN

The overpressure detection function is applied to the multi-pump scenario. When multiple pumps work at the same time. But if the valve is closed due to external emergency, and it results to a sharp rise in water pressure in the pipeline, this function can quickly cut off the other pumps quickly except the main pump to reduce the impact on the water pipe.

5.13 Pressure Loss Compensation

Code (Address)	Name	Content	Default (Range)	Property
F21.33 (0x5521)	Setpoint 1 Enable	V/F SVC FVC PMVF PMSVC PMFVC 0: OFF 1: ON	0 (0~1)	RUN
F21.34 (0x5522)	Setpoint 1 Max Compensation	V/F SVC FVC PMVF PMSVC PMFVC Set the max compensation for the pressure loss Setpoint 1. Its unit is up to the pressure feedback.	0.0 (0.0~Upper limit)	RUN
F21.35 (0x5523)	Setpoint 2 Enable	V/F SVC FVC PMVF PMSVC PMFVC 0: OFF 1: ON	0 (0~1)	RUN
F21.36 (0x5524)	Setpoint 2 Max Compensation	V/F SVC FVC PMVF PMSVC PMFVC Set the max compensation for the pressure loss Setpoint 1. Its unit is up to the pressure feedback.	0.0 (0.0~Upper limit)	RUN

Pressure loss compensation is used for long-distance pipeline transmission, and when boost the pressure to several long pipelines, the optimal location for the sensor is the middle of the pipeline, or place them behind the pumps. This gives the right pressure directly behind the pump, but further down the pipe the pressure decreases as the flow rate increases. Therefore, compensation is required for the given pressure.

Pressure loss compensation works by adjusting the setpoints according to the output frequency.
F21.33~F21.36 are two sets of pressure compensation setpoints reserved for different location compensation. (Not enabled at the same time).

Taking F21.33 and F21.34 as an example, the pressure loss compensation is calculated as follows:
Compensation pressure = F21.34 * (Output frequency - Min. frequency)/(Max. frequency - Min. frequency).
Actual PID target pressure = Original target pressure + compensation pressure.

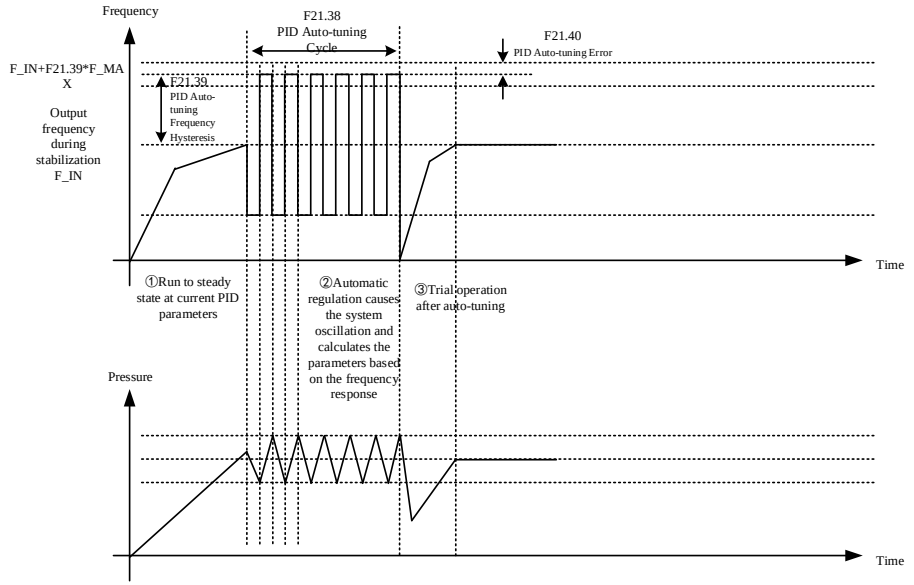
5.14 Motor 2 Parameters

1) The motor parameters are concluded in the F2 group.
2) Set X terminal to 94: Motor parameter switching to select the desired the motor parameter group for operation.
3) There are group A and group B of motor parameters. When the terminal function is invalid, group A is selected by default, and the default value in group F2 is the default values of group A. At this time, the motor parameters modified or set in F2 can be saved in group A. After it is switched to group B and then switched to group A, the set value of group F2 will be automatically switched to modified values in group A. The same goes for group B.

5.15 PID Auto-tuning

Code (Address)	Name	Content	Default (Range)	Property
F21.37 (0x5525)	PID Auto-tuning Enable	V/F SVC FVC PMVF PMSVC PMFVC 0: OFF 1: ON	0 (0~1)	STOP
F21.38 (0x5526)	PID Auto-tuning Cycle	V/F SVC FVC PMVF PMSVC PMFVC Set PID Auto-tuning Cycle.	6 (1~1000)	RUN
F21.39 (0x5527)	PID Auto-tuning Frequency Hysteresis	V/F SVC FVC PMVF PMSVC PMFVC Take the max. frequency as reference.	10.0% (1.0%~50.0%)	RUN
F21.40 (0x5528)	PID Auto-tuning Error	V/F SVC FVC PMVF PMSVC PMFVC Take the PID target value as reference.	1.0% (0.0%~50.0%)	RUN
F21.41 (0x5529)	PID Property	V/F SVC FVC PMVF PMSVC PMFVC 0: Quick 1: Normal 2: Slow	1 (0~2)	RUN

The PID auto-tuning function is used for auto calculation of F13.11[Proportional Gain P1], F13.12[Integral Time I1] and F13.13[Differential Time D1].
The PID auto-tuning function, based on the frequency response of the system,
It calculates the PID parameters by testing the open-loop frequency response of the system to obtain the critical gain and critical period.
And the valves should be to closed completely, otherwise pressure change will be too slow to be useful for PID auto-tuning.

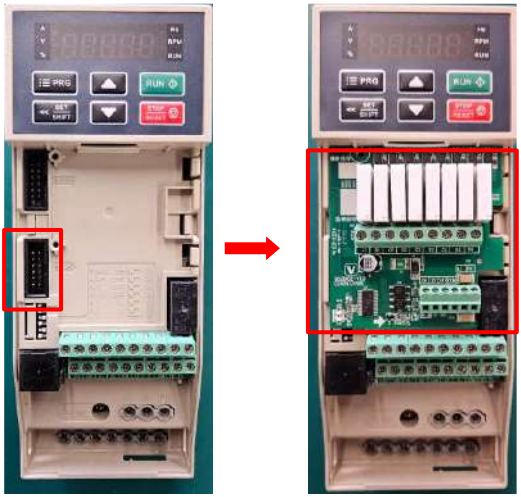


5.16 Pump Control(Single-Drive-Multi-Pump Mode)

Code (Address)	Name	Content	Default (Range)	Property
F22.00 (0x5600)	Multi-pump Mode	V/F SVC FVC PMVF PMSVC PMFVC Ones-bit: 0: General drive mode 1: Single pump mode 2: Single-drive-multi-pump mode 3: Cascade drive mode Tens-bit: 0: OFF 1: Master pump fixed	0001 (0000~0013)	STOP
F17.01 (0x5101)	Expansion RO 1 Function	V/F SVC FVC PMVF PMSVC PMFVC Set the function of the expansion relay 1.	0 (0~63)	RUN
F17.02 (0x5102)	Expansion RO 2 Function	V/F SVC FVC PMVF PMSVC PMFVC Set the function of the expansion relay 2.	0 (0~63)	RUN
F17.03 (0x5103)	Expansion RO 3 Function	V/F SVC FVC PMVF PMSVC PMFVC Set the function of the expansion relay 3.	0 (0~63)	RUN
F17.04 (0x5104)	Expansion RO 4 Function	V/F SVC FVC PMVF PMSVC PMFVC Set the function of the expansion relay 4.	0 (0~63)	RUN
F17.14 (0x510E)	Expansion RO 5 Function	V/F SVC FVC PMVF PMSVC PMFVC Set the function of the expansion relay 5.	0 (0~63)	RUN
F17.15 (0x510F)	Expansion RO 6 Function	V/F SVC FVC PMVF PMSVC PMFVC Set the function of the expansion relay 6.	0 (0~63)	RUN
F17.16 (0x5110)	Expansion RO 7 Function	V/F SVC FVC PMVF PMSVC PMFVC Set the function of the expansion relay 7.	0 (0~63)	RUN
F17.17 (0x5111)	Expansion RO 8 Function	V/F SVC FVC PMVF PMSVC PMFVC Set the function of the expansion relay 8.	0 (0~63)	RUN

There are two control modes for multi-pump control, when F22.00 ones-bit = 2: Single-drive-multi-pump mode,

Connect the CN1 port of GS20-R8-E, the relay expansion to the EX-B as shown in the figure below:



F22.01 (0x5601)	Pump Plus Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Pump plus mode 1 2: Pump plus mode 2 (F22.00 ones-bit = 2: Single-drive-multi-pump mode)	1 (0~2)	RUN
F22.02 (0x5602)	Pump Plus Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency condition to decide if to add more pumps.	50.00Hz (0.00Hz~Upper limit)	RUN
F22.03 (0x5603)	Pump Plus Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time delay to decide if to add more pumps.	10s (0s~1000s)	RUN
F22.04 (0x5604)	Pump Minus Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Pump minus mode 1	1 (0~1)	RUN
F22.05 (0x5605)	Pump Minus Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency to reduce the pumps.	0.00Hz (0.00Hz~Upper limit)	RUN
F22.06 (0x5606)	Pump Minus Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time delay to decide if to reduce the pumps.	10s (0s~1000s)	RUN
F22.09 (0x5609)	Pump No.	**V/F SVC FVC PMVF PMSVC PMFVC** Set the max pump No.	3 (0~10)	RUN

Up to 4 pumps can be operated simultaneously in single-drive-multi-pump mode (the number of pumps is set by the F22.09). At startup, the controller is used to run pump 1 at variable frequency. If the output frequency reaches F22.02 [Pump Plus Frequency] and the feedback pressure is lower than the target value, the power supply is connected to pump 1 and the output is connected from pump 1 to pump 2. At this time, the pump 1 runs with the industrial frequency and pump 2 with variable frequency; if the output frequency again reaches F22.02, and the feedback pressure is lower than the target value, then the power supply is connected to the pump 2, the pump 3 is added to output. At this time, the pump 1, the pump 2 are running with industrial frequency, the pump 3 with variable operation, and so on. The logic of pump minus process is opposite.

See table below for details:Pressure	#1 pump	#2 pump	#3 pump	#4 pump
Feedback lower than target values	Variable frequency	OFF	OFF	OFF
Feedback lower than target values	Industrial frequency	Variable frequency	OFF	OFF
Feedback lower than target values	Industrial frequency	Industrial frequency	Variable frequency	OFF
Feedback lower than target values	Industrial frequency	Industrial frequency	Industrial frequency	Variable frequency
Feedback higher than target values	Industrial frequency	Industrial frequency	Industrial frequency	Variable frequency
Feedback higher than target values	Industrial	Industrial frequency	Variable	OFF

	frequency		frequency	
Feedback higher than target values	Industrial frequency	Variable frequency	OFF	OFF
Feedback higher than target values	Variable frequency	OFF	OFF	OFF
STOP, Error, Overpressure Monitor	Variable frequency	OFF	OFF	OFF

F22.07 (0x5607)	Pump Shift Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Shift the pumps by the forward sequence 2: Shift the pumps by the reverse sequence 3: Shift the pumps by time 4: Shift the pumps after wakeup When under Single-drive multi-pump mode, only 1 and 4 shift mode are valid.	3 (0~4)	RUN
F22.08 (0x5608)	Pump Shift Interval	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump shift interval time. Carry out a pump shift in sequence after the interval.	1440min (0min ~30000min)	RUN

In the single-drive-multi-pump mode, pump shift can be carried out by fixed sequence (F22.07=1) and by wake-up(F22.07=4).

1. When F22.07=1, the initial sequence is (1# Pump, 2# Pump, 3# Pump, 4# Pump) after the normal operation of the frequency converter, the wheel pump time begins to time, wheel pump running cycle (F22.08) arrived, automatically change the running order for (2# Pump, 3# Pump, 4# Pump, 1# Pump), and so on;

2. When F22.07=4, the initial sequence for the (1# Pump, 2# Pump, 3# Pump, 4# Pump), and the drive works until the sleep mode works. And after wake-up automatically change the running order for the (2# Pump, 3# Pump, 4# Pump, 1# Pump), and so on;

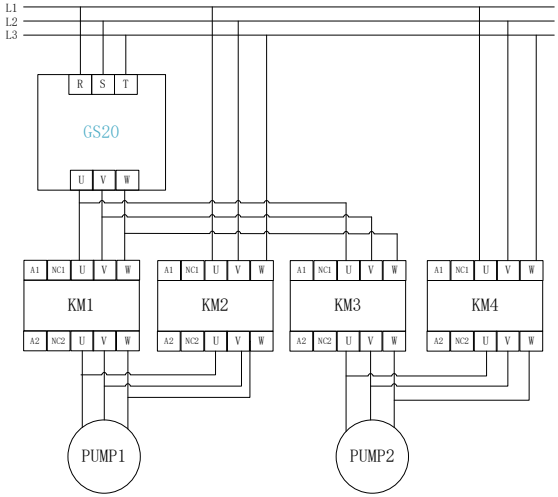
Take one-drive-two-pump as an example, the wiring is as follows:

The industrial frequency and the variable frequency need to be interlocked for one single pump, so that there is only one way to connect to avoid direct connection between the industrial frequency and drive output.

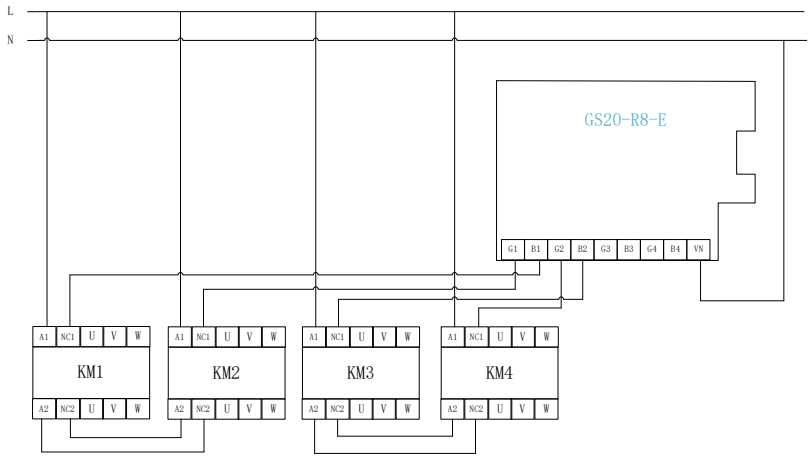
At the same time, on the drive side, the need for industrial frequency switching delay time should be set on F22.13 to avoid the existence of adhesion and false conduction during industrial/variable frequency switching.

F22.13 (0x560D)	Interlock Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the relay interlock time under power frequency-variable frequency switching. (Valid only when F22.00 ones-bit=2: Single-drive-multi-pump mode)	0.50s (0.50s~100.00s)	RUN

Main circuit wiring:



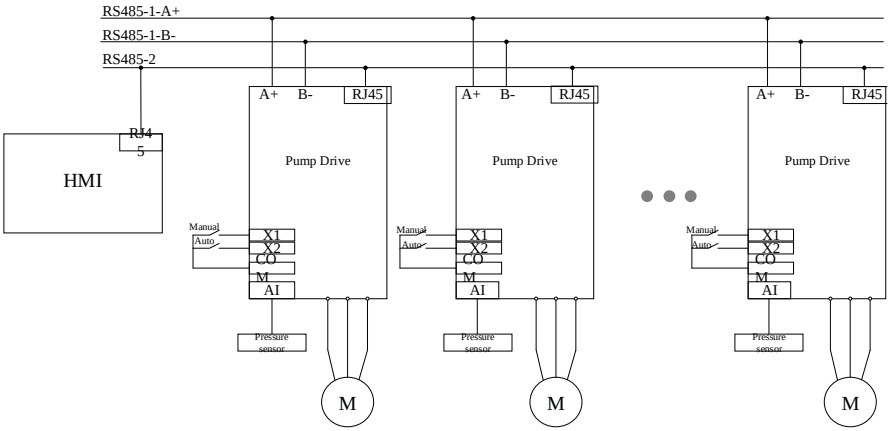
Control circuit wiring:



5.17 Pump Control(Cascade mode)

F22.00 (0x5600)	Multi-pump Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: 0: General drive mode 1: Single pump mode 2: Single-drive multi-pump mode 3: Cascade drive mode Tens-bit:: Main Pump Redundancy 0: No 1: Yes	0001 (0000~0013)	STOP
F22.11 (0x560B)	Initial Pump Station	**V/F SVC FVC PMVF PMSVC PMFVC** Set the initial pump station number.	1 (0~10)	STOP

F22.00 ones-bit is set to 3: Cascade drive mode



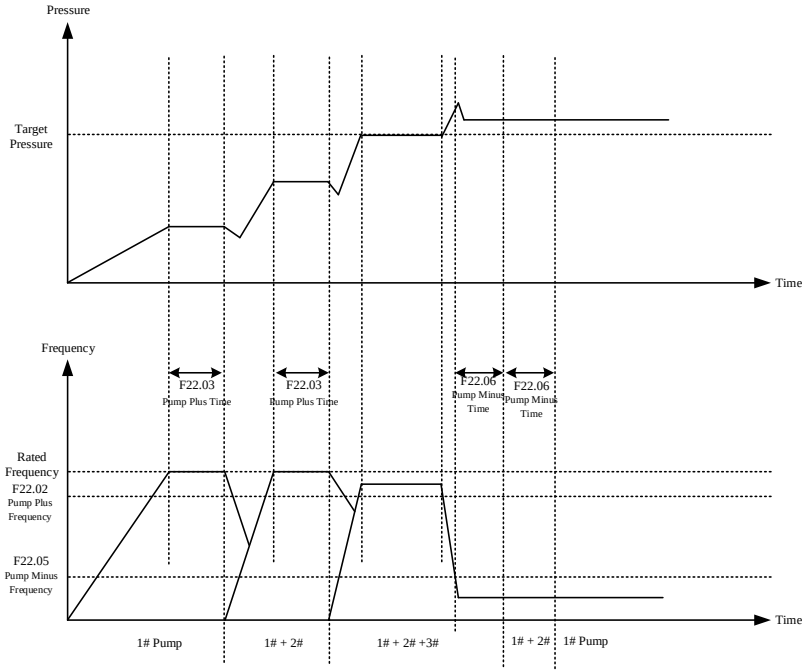
F22.01 (0x5601)	Pump Plus Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Pump plus mode 1 2: Pump plus mode 2	1 (0~2)	RUN
F22.02 (0x5602)	Pump Plus Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency condition to decide if to add more pumps.	45.00Hz (0.00Hz~Upper limit)	RUN
F22.03 (0x5603)	Pump Plus Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time delay to decide if to add more pumps.	10s (0s~1000s)	RUN
F22.04 (0x5604)	Pump Minus Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Pump minus mode 1	1 (0~1)	RUN
F22.05 (0x5605)	Pump Minus Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency to reduce the pumps.	25.00Hz (0.00Hz~Upper limit)	RUN
F22.06 (0x5606)	Pump Minus Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time delay to decide if to reduce the pumps.	10s (0s~1000s)	RUN

Add pumps:

1. If F22.01 is selected to mode 1, when the feedback pressure continues to be lower than the target pressure, the drive automatically increase the frequency until it is higher than pump plus frequency for the time set on F22.03, it tell that it's time to add a pump, and automatically starts the next pump and decelerate the current one. When the two pumps are running at the same frequency, and the main pump will adjust the frequency.
2. If F22.01 is selected to mode 2, when the feedback pressure continues to be lower than the target pressure, the drive automatically increase the frequency until it is higher than pump plus frequency for the time set on F22.03, it tell that it's time to add a pump, and automatically starts the next pump and the main pump will adjust the frequency. The difference with Mode 1 is that there is no process of waiting for the pumps to run at the same frequency.

Reduce pumps:

When the feedback pressure continues to be higher than the target pressure, the drive automatically decrease the frequency until it is lower than pump minus frequency for the time set on F22.06, it tell that it's time to reduce a pump, and automatically stops one pump.



F22.07 (0x5607)	Pump Shift Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Shift the pumps by the forward sequence 2: Shift the pumps by the reverse sequence 3: Shift the pumps by time (Only valid when ones-bit of F22.00 is set to cascade mode) 4: Shift the pumps after wakeup	3 (0~4)	RUN
F22.08 (0x5608)	Pump Shift Interval	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump shift interval time. Carry out a pump shift in sequence after the interval.	1440min (0min~30000min)	RUN
F22.12 (0x560C)	Pump Runtime Reset	**V/F SVC FVC PMVF PMSVC PMFVC** Set the reset station on the ones, tens and hundreds bit. Thousands-bit to enable reset to zero.	0 (0000~1FFF)	STOP

In the cascade drive mode, pump shift can be carried out by fixed sequence (F22.07=1, **F22.07=2),** by time (F22.07=3) and by wake-up (F22.07=4).

1、 When F22.07=1, the initial sequence is (1# Pump, 2# Pump, 3# Pump, 4# Pump), after the normal drive operation, the pump shift starts to count until the cycle set on F22.08 arrives, and the sequence automatically changes to (2# Pump, 3# Pump, 4# Pump, 1# Pump), and so on;

2、 When F22.07=2, the initial sequence is (1# Pump, 2# Pump, 3# Pump, 4# Pump), after the normal drive operation, the pump shift starts to count until the cycle set on F22.08 arrives, and the sequence automatically changes (2# Pump, 3# Pump, 4# Pump, 1# Pump), and so on;

3、 When F22.07=3, the initial sequence is (1# Pump, 2# Pump, 3# Pump, 4# Pump), after the normal drive operation, the pump shift starts to count until the cycle set on F22.08 arrives, the sequence changes according to the actual runtime.
For example, if the running time of each pump is (1# Pump: 40 minutes, 2# Pump: 20 minutes, 3# Pump: 50 minutes, 1# Pump: 10 minutes), the sequence will be (4# Pump, 2# Pump, 1# Pump, 3# Pump).
The pump runtime can be cleared to zero by setting F22.12 and each pump can only clear its own runtime;

4、 When F22.07=4, the initial sequence is (1# Pump, 2# Pump, 3# Pump, 4# Pump), and the drive works until the sleep mode works.And after wake-up automatically change the running order for the (2# Pump, 3# Pump, 4# Pump, 1# Pump), and so on.

F22.09 (0x5609)	Pump No.	**V/F SVC FVC PMVF PMSVC PMFVC** Set the max pump No.	3 (0~10)	RUN
F22.10 (0x560A)	Operating Pump No.	**V/F SVC FVC PMVF PMSVC PMFVC** Set the maximum pumps to work at the same time (When F22.10 is lower than F22.09, the pump shift logic is based on F22.10.)	3 (0~10)	READ

In cascade drive mode, set F22.09 to limit the max pump in the system, so that when there is a pump failure, the standby pumps will automatically be enabled to make up for it, ensuring that the actual running pumps number in the system remains unchanged;

F22.10 is the actual number of operating pumps, and it is calculated automatically.

F22.00 (0x5600)	Multi-pump Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: 0: General drive mode 1: Single pump mode 2: Single-drive multi-pump mode 3: Cascade drive mode Tens-bit:: Main Pump Redundancy 0: No 1: Yes	0001 (0000~0013)	STOP

In the cascade drive mode, when F22.00 tens-bit is set to 1 or terminal to 95 is valid, main pump redundancy us valid.

The main pump redundancy function is used when the main pump fails or needs maintenance, the slave pump takes over as the new main pump responsible for the system scheduling to avoid system shutdown.

There are two methods to trigger the main pump redundancy: Manual terminal triggering (terminal function to 96) and automatic triggering in the event of a fault.

Here is an example:

1、 Initial configuration, 1# Pump (station number 1, main), 2# pump 2 (station number 2 slave), 3# pump (station number 3 slave).

2、 Set F22.00=0013 in all of the drives, the main drive is reserved and set X terminal function to 96 to ensure that all the pumps can communicate normally, and the pump addition and reduction can be conducted.

3、 And the configuration will be changed automatically to 1# Pump (station number 2, slave), 2# Pump (station number 1 master), 3# Pump (station number 3 slave)

Chapter 6 Inspection, Maintenance and Warranty

6.1 Inspection

The drives consist of semiconductor devices, passive electronic devices, and motion devices, all of which have a service life, and even under normal operating conditions, some of the devices may change in characteristics or fail if their service life is exceeded. To prevent malfunction, preventive inspections and maintenance such as daily inspections, periodic inspections, and device replacement must be performed. It is recommended that inspections be performed every 3 to 4 months after the machine is installed.

Daily inspection: To avoid damage to the drive and shortening of its service life, check the following items on a daily basis.

Item	Content	Solutions
Power supply	Check that the supply voltage meets the requirements and that there is no phase loss in the supply.	Solve the problem in accordance with the requirements of the nameplate.
Surrounding	Check whether the installation environment meets the requirements.	Confirm the source and solve it properly.
Cooling system	Check whether there is abnormal heating and discoloration of the drive and motor, and the working condition of the fan.	Confirm whether there is overload, tighten the screws, whether the heat sink is dirty, and whether the fan is blocked.
Motor	Whether the motor has abnormal vibration or sound.	Tighten mechanical and electrical connections and lubricate mechanical parts.
Load	Check whether the output current of the drive is higher than the rated value of the motor and it runs for a certain period of time.	Confirm that overload has not occurred and that the drive model is correct.

● Periodic inspection: In general, it is appropriate to conduct periodic inspections every 3 to 4 months, however, please determine the actual inspection period for each machine based on its usage and working environment.

Item	Content	Solutions
Overall	Insulation resistance check; environment check.	Tighten and replace defective parts; clean and improve the operating environment.
Electrical connections	● The wires and connections are free of discoloration, broken insulation, cracks and signs of deterioration. ● Connection terminals are not worn, damaged, or loose. ● Grounding check.	● Replace damaged wires. ● Tighten loose terminals and replace damaged ones. ● Measure the grounding resistance and tighten the corresponding grounding terminals.
Mechanical connections	● Check for abnormal vibrations and noises, and for loose fixing.	● Tighten, lubricate, and replace defective parts.
Semiconductor devices	● Check for dirt and dust. ● Check for visible changes in appearance.	● Clean the environment and replace damaged parts.
Electrolytic capacitor	● Check for fluid leakage, discoloration, cracks, and exposed, expanded, ruptured, or leaked valves.	● Replace the damaged parts.
Peripherals protection	● Appearance and insulation inspection of peripheral equipment.	● Clean the environment and replace damaged parts.
Printed circuit board	● Check for odor, discoloration, and severe rust, and whether connectors are correct and reliable.	● Fasten connectors. ● Clean the printed circuit board. ● Replace the damaged printed circuit board.
Cooling system	● Check the cooling fan for damage and blockage. ● Check for dirt and dust on the heatsinks. ● Check that the air inlet and exhaust ports are not clogged or contaminated with foreign matter.	● Clean the operating environment. ● Replace damaged parts.
Keypad	● Check the cooling fan for damage and blockage.	● Replace damaged parts.
Motor	● Check whether the motor has abnormal vibration or sound.	● Tighten mechanical and electrical. connections and lubricate mechanical parts.

: carry out work with the power supply on, as there is a risk of electric shock and death. Before performing wiring, inspection, maintenance, etc., disconnect the power supply to all associated equipment and make sure that the DC voltage in the main circuit has dropped to a safe level for 5 minutes.

6.2 Maintenance

All equipment and components have a service life, proper maintenance can prolong the life, but it does not fix the damage of the equipment and devices, please replace the devices according to the requirements.

Name	Life	Name	Life	Name	Life
Fan	2~3 years	Electrolytic capacitor	4~5 years	Printed circuit board	8~10 years

Replacement of other devices requires maintenance techniques and product knowledge, and replaced parts must be strictly tested before actual use, so we do not recommend users to replace other internal devices. If replacement is indeed necessary, please contact the agent from whom you purchased the product or our sales department.

6.3 Warranty

1. If the product malfunctions during the warranty period, please see the warranty terms in the warranty card for coverage.

2. Primary troubleshooting will be carried out by your company, but the service can be provided by VEICHI or service network for a fee at your request. If the cause of malfunction is found to be on VEICHI, the service will be free of charge according to mutual negotiation.

3. Liability exemption, the inconvenience caused to your company or your customers due to the failure of our products and the damage caused to the non-company products, regardless of whether they are within the warranty period, do not belong to the scope of responsibility of our company.

Appendix I: Modbus Communication Protocol

● Communication frame structure

The communication data format is as follows:

Composition of bytes: Start bit, 8 data bits, parity bit and stop bit.

Start bit	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Bit8	Parity	Stop bit

The information of a frame must be transmitted in one continuous data stream , and if it is longer than 1.5 bytes of interval before the end of transmission of the entire frame, the receiving device will clear this incomplete information and incorrectly assume that the subsequent byte is the address field of the next new frame. Similarly, if the start of a new frame is shorter than 3.5 bytes interval from the previous frame, the receiving device will consider it to be the sequent part of the previous frame. The final CRC parity will be incorrect due to the misalignment of the frame, resulting in a communication error.

Standard structure of an RTU frame:

Frame header	Transmission time for 3.5 bytes
Slave address	Communication address: 0~247 in decimal (0 is the broadcast address)
Command code	03H: Read slave parameters 06H: Write slave parameters 08H: Circuit self-detection
Data area	Parameter address, number of parameters, parameter value, etc.
CRC CHK low	Check value: 16-bit CRC value
CRC CHK high	
End of the frame	Transmission time for 3.5 bytes

● Command code and communication data description

Take the read parameter command code as an example.

For example, if there is an AC drive with a slave address of 01H and a memory starting address of 2100H(C00.00 Monitoring Parameters), read three consecutive words, the frame is described as follows:

RTU master command		**RTU slave response (normal)**	
Slave address	01H	Slave address	01H
Command code	03H	Command code	03H
Starting address high	21H	Byte count low	06H
Starting address low	00H	Data address 2100H high	13H
Data count high	00H	Data address 2100H low	88H
Data count low	03H	Data address 2101H high	00H
CRC CHK low	0FH	Data address 2101H low	00H
CRC CHK high	F7H	Data address 2102H high	00H
-	-	Data address 2102H low	00H
-	-	CRC CHK low	C3H
-	-	CRC CHK high	C9H
-	-	RTU slave response(abnormal):	
-	-	Slave address	01H
-	-	Command code	83H
-	-	Fault code	04H

-	-	CRC CHK low	40H
-	-	CRC CHK high	F3H

● Communication control parameter group address description

Function	Address	Description			R/W
Communication set	0X3000 or 0x2000	0~50000 corresponds to 0.00Hz~500.00Hz			W/R
Communication set command	0X3000 or 0x2001	0x0000: None 0x0001: FWD 0x0002: REV 0x0003: FWD jogging 0x0004: REV jogging		0x0005: Deceleration stop 0x0006: free stop 0x0007: Error reset 0x0008: Operation disable 0x0009: Operation enable	W/R
Drive status	0x3002 or 0x2002	Bit0	0:Stopping	1:Operating	R
		Bit1	0:Non-accelerating	1:Accelerating	
		Bit2	0:Non-deceleration	1:Decelerating	
		Bit3	0:FWD	1:REV	
		Bit4	0:No error	1:Drive error	
		Bit5	0:GPRS unlocked	1:GPRS locked	
		Bit6	0:No alarm	1:Drive in alarm	
Drive fault code	0X3000 or 0x2003	Current error code(see error code table)			R
Communication giving upper limit frequency	0X3004 or 0x2004	0~32000 corresponds to 0.00Hz~320.00Hz			W/R
Target torque	0X3000 or 0x2005	0~1000 corresponds to 0.0%~100.0%			W/R
FWD upper frequency limit under torque control	0x3006 or 0x2006	0~1000 corresponds to 0.0%~100.0%			W/R
REV upper frequency limit under torque control	0x3007 or 0x2007	0~1000 corresponds to 0.0%~100.0%			W/R
Communication set PID target	0x3008 or 0x2008	0~1000 corresponds to 0.0%~100.0%			W/R
Communication giving PID feedback	0x3009 or 0x2009	0~1000 corresponds to 0.0%~100.0%			W/R
Error/Alarm code reading	0x3010 or 0x2010	0~127 are error codes, 128 and above are alarm codes			R
Output terminal status	0x3018 or 0x2018	Drive output terminals externally occupied, Bit0—Y Bit1—A1—TB1—TC1 Bit2—Y1 expansion (IO expansion needed) Bit3—Relay expansion (IO expansion needed)			W
AO	0x3019 or 0x2019	0~10000 corresponds to output 0V~10V, 0mA~20mA			W

Note: For other function code addresses, please see the "Address" column in the function code list.

When the write command(06H) is used to write the F00~F15 parameter group, if its high half byte of the address field is 0, it will be written into the RAM of drive only, and will not be stored during power down; if it is 1, then it will be written into EEPROM, that is to say, it will be stored during power down.

Take F00.xx as an example: 0x00xx (write RAM) , 0x10xx (store in EEPROM); F01.xx: 0x01xx (write RAM), 0x11xx (store in EEPROM), and so are the other parameters. When reading the parameters in Group F00~F15, the high half byte of the address can be 0, such as the read parameter F03.xx: 0x03xx.

When the write command(06H) is used to write the F16~F29 parameter group, if its high half byte of the address field is 5, it will be written into the RAM of drive only, and will not be stored during power down; if it is D, it will be written into EEPROM, that is to say, it will be stored during power down.

Take parameter F16.xx for example: 0x50xx(write to RAM) 0xD0xx(store in EEPROM); F17.xx: 0x51xx(write RAM) 0xD1xx(store in EEPROM), and so are the other parameters. When reading the parameters in Group F16~F29, the high half byte of the address can be 5, such as the read parameter F18.xx: 0x52xx.

● **Meaning of error codes of the abnormal response messages from slave**

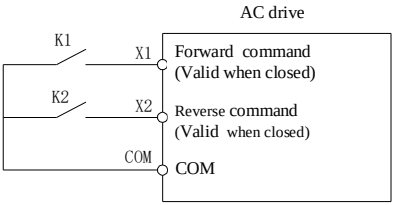
Fault code	Description	Fault code	Description	Fault code	Description
1	Command code error	3	CRC parity error	4	Illegal address
5	Illegal data	6	Parameters not for modification during operation	8	Drive busy (saving to EEPROM)
9	Parameter over range	10	Reserved parameters not for modification	11	Error in reading parameter bytes

Appendix II: Terminal Wiring Methods

0: Two-wire Control 1

Operation and direction are set at the same time. Two-wire mode is the most commonly mode. The factory default is that the X1(FWD operation) and X2(REV operation) terminal control the motor to run forward and reverse. This is shown in the figure below:

K1	K2	Command
0	0	STOP
1	0	Forward
1	1	Reverse
0	1	STOP

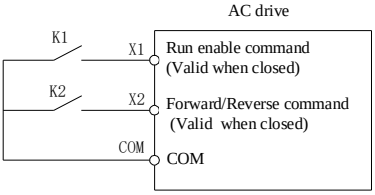


0: Schematic diagram of two-wire control 1

1: Two-wire Control 2

Operation and direction are separated. X1 (FWD operation) in this mode is used to enable motor operation. And the direction is defined by the status of the X2 terminal (REV operation). This is shown in the figure below:

K1	K2	Command
0	0	STOP
1	0	Forward
1	1	Reverse
0	1	STOP

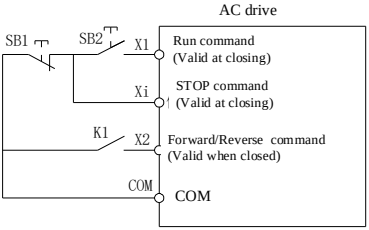


1: Schematic diagram of two-wire control 2

2: Three-wire control 1

The three-wire control terminal(Xi) of this mode is for stop and the operation command is generated by X1(FWD operation) and the direction is controlled by X2(REV operation). Input via the terminal(Xi) in the three-wire control mode is valid.

K1	Directional
0	Forward
1	Reverse

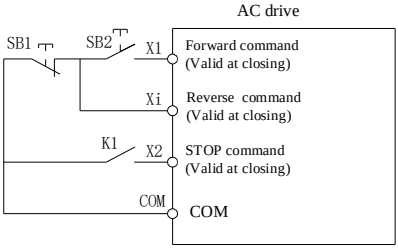


2: Schematic diagram of three-wire control 1

3: Three-wire control 2

The three-line control terminal(Xi) of this mode is for stop and the operation command is generated by X1(FWD operation) or X2(REV operation), and the two controls the direction simultaneously.

K1	Directional
0	Forward
1	Reverse



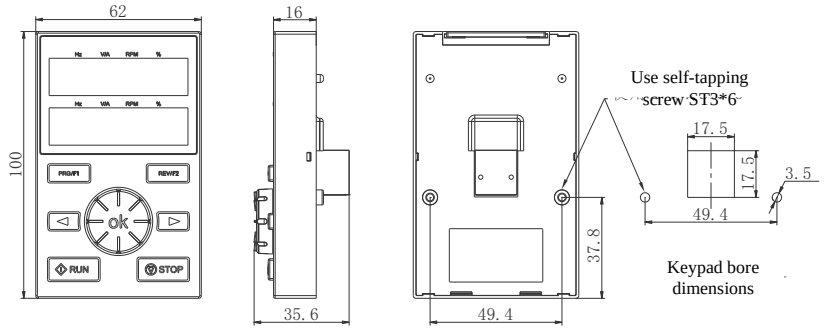
3: Schematic diagram of three-wire control 2

Note: SB1: Stop; SB2: FWD operation; SB3: REV operation; "Xi" is a multifunction input terminal set to "3" [3-line control(Xi)].

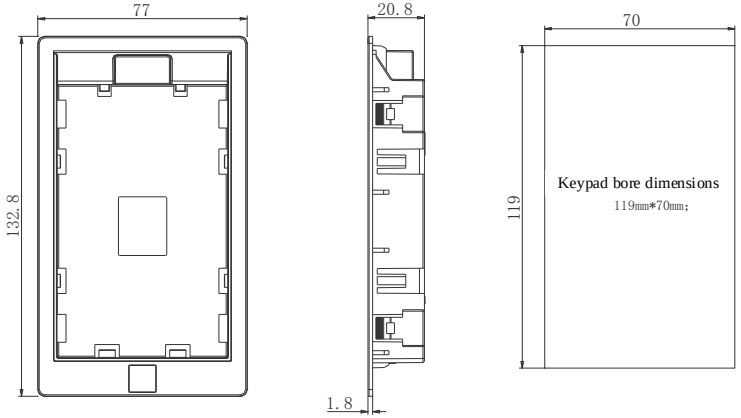
Appendix III: External Keypad Dimensions and Models

● **External dual-row keypad and opening dimensions**

Model: KBD300-25(Note: LCD and LED keypad external dimensions and opening dimensions are fully compatible (unit in the drawing: mm)).



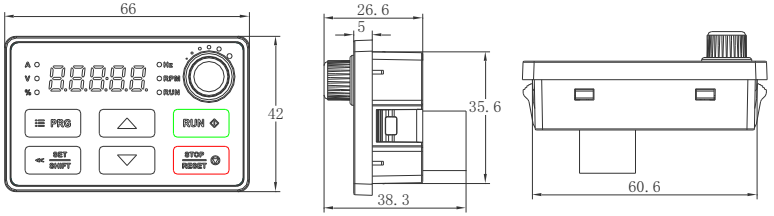
GS20 external dual-row keypad dimensions



GS20 external dual-row keypad pocket and opening dimensions

● **External single-row keypad and opening dimensions**

Model: KBD10-15(Note: Mounting plate opening size: 61mmx36mm (unit in the drawing: mm).



GS20 series external single-row keypad dimensions

Version Change Log

Date	Version	Content
2024.10	V1.0	First version issued