Catalog

1 Overview

1.1 Safety Precaution

Use this product only after fully understanding the safety precautions in this manual to protect both people and equipment.

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	Incorrect operation will result in death or major safety incidents.
ALARM	Incorrect operation may result in death or major safety incidents.
CAUTION	Incorrect operation may result in minor injuries.
Note	Incorrect operation may result in damage to the product and the associated system.

Operator

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

Safety Guide

Safety rules and warning signs detailed herein are designed to prevent injuries and product/system damage. Please read this manual carefully before use and strictly follow the safety guidelines and warning signs in this manual. They cover general guidance, transportation and storage guidance, installation and wiring guidance, operation guidance, maintenance guidance, and disassembly and disposal guidance.

General

⚠ Alarm	● This product is equipped with hazardous voltage to control potentially dangerous motion mechanisms. Non-compliance with regulations or failure to operate in accordance with this manual may lead to damage to the product and associated systems or even personal injury and death. ● This product is exclusively for use by trained professionals who must thoroughly understand all safety precautions and operational procedures outlined in the manual prior to use. Proper operation and maintenance are essential for safe operation and stable performance of the product. ● Do not work on wiring while power is on, as it poses a risk of fatal electric shock. Prior to any wiring, inspection, or maintenance work, ensure that the

	power supply to all associated equipment is disconnected, and confirm that the DC voltage in the main circuit has dropped to a safe level. Wait for 15 minutes before commencing the work.
⚠ Caution	Keep children and unauthorized persons away from the product. ● This product is intended for use in accordance with the manufacturer's specified purpose. Unauthorized use for special fields such as emergency, rescue, marine, medical, aviation, nuclear facility-related settings is prohibited. ● Unauthorized modifications or using of spare parts not sold or recommended by the manufacturer of this product may cause malfunctions.
Note	● Ensure this manual is provided directly to the actual user, who must read it thoroughly prior to use. ● Ensure that you have thoroughly read and comprehended the associated safety guidelines and warning notices before installing and adjusting the AC drive.

Transport and storage

⚠ Alarm	● Correct transportation, storage, installation, as well as careful operation and maintenance, for the safe operation of the AC drive is essential.
⚠ Caution	● Ensure that the drive is not subjected to shocks and vibrations during transportation and storage, and also ensure that it is stored in place that is dry, free of corrosive gases and conductive dust, and its ambient temperature is lower than 60℃.

Installation and wiring

⚠ Alarm	● Only professionals with relevant training can carry out operation on this product. ● 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. ● Before opening the integrated drive panel, 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 15 minutes. ● 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 factor improvement or varistors for lightning protection installed on the output side, 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 drive (if a switching device must be connected to the output side, the output current of the drive must be guaranteed to be zero when it is switched on).

Running

⚠ Alarm	● Pay attention to personal safety as the drive functions under high voltage, posing inherent dangers of electric shock in certain components. ● Control product failures can cause severe incidents or even personal injury, so please take extra precautions and consider installing supplementary separate devices like current limiters and mechanical safeguards. ● Check if the drive's motor parameters match the product's output specifications for proper overload protection.

Maintenance

⚠ Alarm	● Product maintenance should be performed exclusively by the Service Department of Suzhou VEICHI Electric Co., Ltd., its authorized service centers, or their trained and authorized professionals familiar with the safety warnings and operating instructions in this manual. ● Any defective devices must be replaced in a timely manner. ● Before performing maintenance, 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 15 minutes.

Disassembly and disposal

⚠ Caution	● Retain the integrated drive's packaging for reuse or return it to the manufacturer. ● Disassembled metal components are recyclable. ● Properly dispose of environmentally sensitive components like electrolytic capacitors as required by environmental regulations.

1.2 Technical Specifications

Item		Specification
Power Input	Voltage/Frequency	Three-phase 380V, 50Hz/60Hz Three-phase 660V, 50Hz/60Hz Three-phase 1140V, 50Hz/60Hz
	Allowable fluctuation	Voltage: 320V~440V Voltage imbalance rate: <3% Frequency: ±5% Distortion rate: meets IEC61800-2

	Closing surge current	< Rated current
	Power factor	≥0.94 (with DC reactor)
	Drive efficiency	≥96%
Output	Voltage	Under rated conditions: 3-phase, 0~input voltage, error<2%; overmodulation possible
	Frequency	0Hz~320Hz (above 320Hz available by factory order)
	Frequency accuracy	Error≤0.01Hz (via keypad) or ≤0.2% of maximum frequency (via AI)
	Overload capacity	150% of rated current for 1min; 180% of rated current for 10s; 200% of rated current for 0.5s
Main Control Performance	Control mode	AM: SVC, FVC, V/F PM: SVC, FVC
	Modulation	SVPWM, automatic switch between continuous and discontinuous modulation; overmodulation available to increase output voltage
	Carrier modulation	0.6kHz~15.0kHz; random carrier modulation supported
	Speed control range	FVC (AM/PM): 1:1000 SVC (AM): 1:100 SVC (PM): 1:50
	Speed stabilizing accuracy	SVC (AM/PM): ≤1% of rated synchronous speed FVC (AM/PM): ≤0.02% of rated synchronous speed
	Starting torque	SVC (AM): 180% of rated torque at 0.5Hz SVC (PM): 100% of rated torque at 2Hz FVC (AM/PM): 200% of rated torque at 0Hz
	Torque response	SVC (AM/PM):≤ 20ms FVC (AM/PM):≤ 10ms
	Frequency accuracy	SVC (AM/PM):≤ 20ms FVC (AM/PM):≤ 10ms
	Frequency resolution	Digit setting: 0.01Hz; analog setting: Max. frequency ×0.05 %
Product Basic Functions	DC brake	Starting frequency: 0.00Hz~50.00Hz Braking time: 0.0s~60.0s Braking current: 0.0%~150.0% of rated current
	DC brake	Auto torque boost: 0.0%~100.0% Manual torque boost: 0.0%~30.0%
	V/F curve	Linear V/F curve, user-defined multi-point VF curve, square V/F curve; arbitrary power VF with exponent 1.1~1.9
	ACC/DEC curve	2 patterns: Linear and S-curve acceleration/deceleration; Four sets of acceleration and deceleration time; the time unit is 0.01s, with the longest 650.00s; selectable reference
	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 during the grid voltage fluctuation
	Auto ECO mode	Output voltage is automatically optimized according to the load to save energy
	Auto current limit	Auto current limit works during operation to prevent frequent tripping due to over-current fault
	Instantaneous power-down mode	Uninterrupted operation is realized through bus voltage control in case of instantaneous power loss
	Standard	Frequency-source master/slave summation, operation-command bundling, start-frequency start, vector pre-excitation start, start/stop DC braking, speed tracking and restart after power loss, reverse-prohibit and forward/reverse dead-time settings, zero-speed torque hold, jog operation, frequency jump, independent emergency-stop time setting, FDT detection, timers, torque control, Flux braking and dynamic (energy-dissipative) braking, automatic fault recovery, last three fault records, process PID controller, multi-frequency and PLC program control, RS-485 communication interface
	Frequency source	Keypad, keypad potentiometer, analog voltage terminal VS, analog voltage/current terminal AI, analog current terminal AS, communication and terminals, and source combination
	Feedback input source	Voltage terminal VS1, voltage/current terminal AI, current terminal AS, communication, and PUL terminal
	Command source	Operation panel, external 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
	External output signal	2×RO, 1×OC 0V~10V output, 4mA~20mA/0mA~20mA output Pulse frequency output
Protection		DC-bus overvoltage, mains undervoltage, drive overcurrent, module error, drive overload, motor overload, current-detection zero-drift error, Hall sensor error, EEPROM error, motor-to-earth short-circuit, input phase loss, output phase loss, drive overheat, communication error, PG card error, PG disconnection, motor-parameter auto-tuning error
Special Functions	Control mode	Two vector modes: one for high-performance speed control, the other for lower performance with simpler tuning
	Parameter auto-tuning	Static and dynamic parameter tuning for asynchronous motors and permanent magnet synchronous motors; static parameter auto-tuning for asynchronous motors; FVC encoder auto-tuning
	Encoder support/setting	Frequency and voltage can be independently set and adjusted; supports multi-channel setting methods

	VF split	Frequency and voltage can be independently set and adjusted; supports multi-channel setting methods	
	Terminals/analog	Provides 4×virtual X terminals and 4×virtual Y terminals; supports edge-delay adjustment on terminals; can extend three X terminals via analog inputs; provides two multi-point analog curves for analog correction	
	Motor-to-earth short detection	Detects motor-to-earth short; automatic detection at power-up	
	Servo control	Supports synchronous and asynchronous servo control; pulse tracking, zero-servo, indexing; quadrature pulse input	
	Communication networking	Supports RS-485/Modbus, CANopen, Profibus-DP; Modbus free protocol and custom CAN protocol; enables networking and coordinated control among VEICHI AC drives	
	Remote & monitoring	Supports remote firmware upgrade, remote monitoring, remote lock; compatible with VEICHI 3G module; supports virtual oscilloscope for monitoring/debugging	
Keypad Display	LED display	Single-line 4-digit digital tube	To monitor the status of 1 AC drive
		Dual-line 5-digit digital tube	To monitor the status of 2 AC drives
	Parameter copy	Uploads and downloads the function code information of the AC drive to realize fast parameter copying.	
	Status monitoring	Output frequency, given frequency, output current, I/O voltage, motor speed, PID feedback, PID setting, module temperature, and I/O terminal status	
Surroundings	Installation place	Indoor, altitude ≤1000m, no corrosive gases, no direct sunlight	
	Temperature, humidity	-10℃~+40℃ 20%~95%RH (non-condensing)	
	Vibration	<0.5g below 20Hz	
	Storage temperature	-25℃~+60℃	
	Installation method	Wall-mounted, cabinet	
	Protection rating	IP20	
	Cooling method	Forced air-cooling	

2 Model Description and Installation Dimension

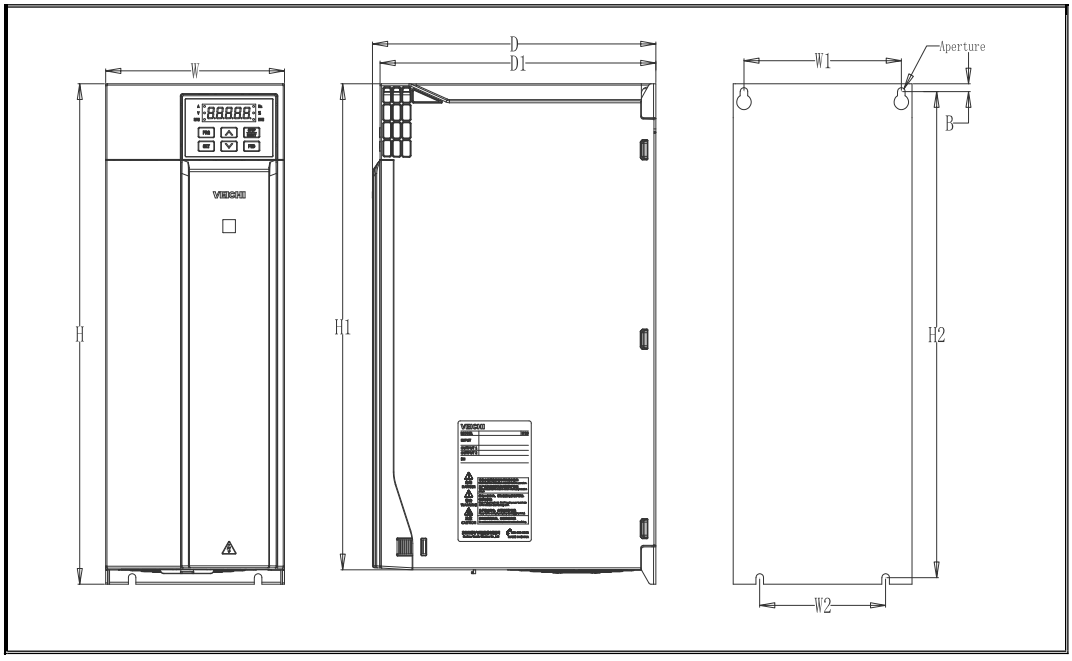
2.1 Naming Rules

The method of checking the model of AC drive is shown in the figure below:

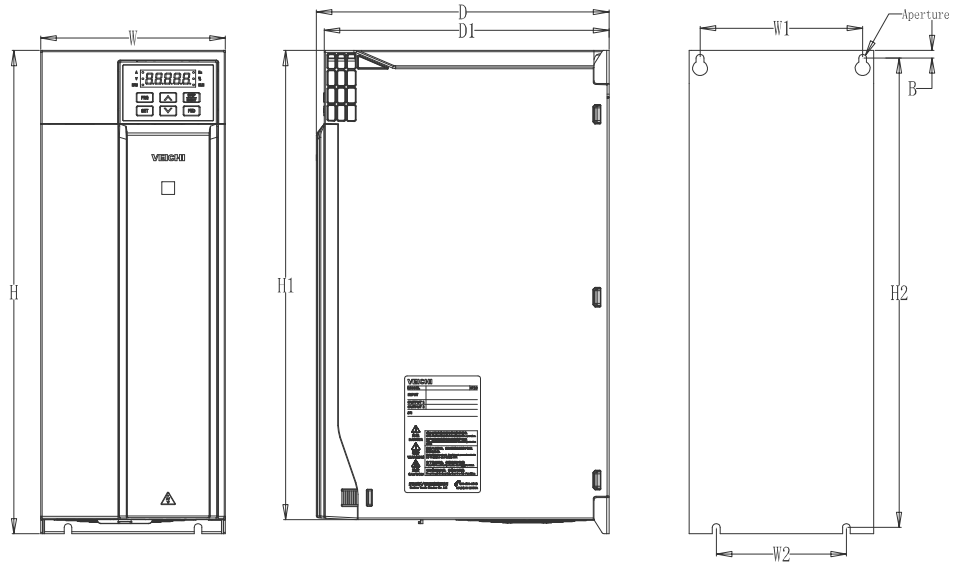
AC310-T 3-011G/015J-B
① ②③ ④ ⑤ ⑥

No.	Name
①	Product series
②	Voltage type T: Three-phase
③	Voltage level 3: 380V 6: 660V
④	Motor power (kW) 7R5G：7.5 011G：11 132G：132
⑤	Specialized drive J: Oil well pump
⑥	Accessory type B: Brake unit

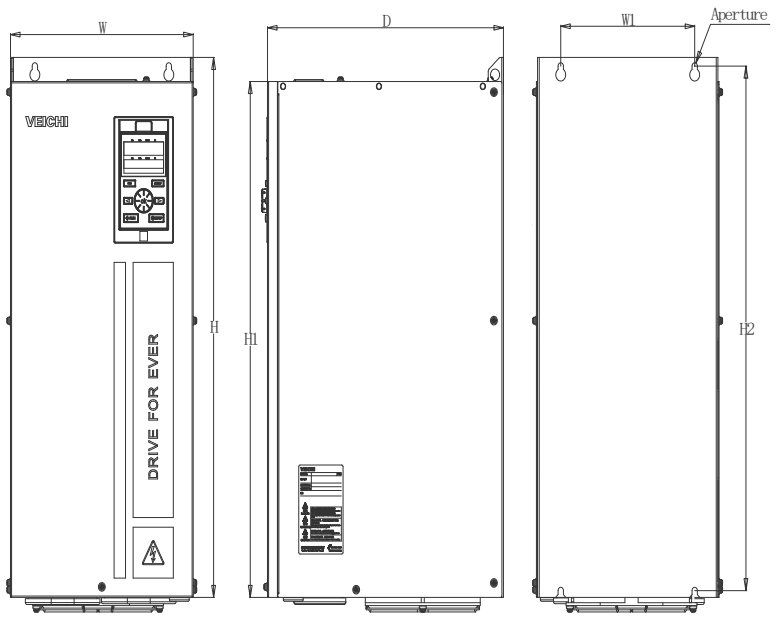
2.2 Installation Dimension



Model	Outer Dimension (mm)					Installation Dimension (mm)					Aperture
	W	H	H1	D	D1	W1	W2	H2	A	B	
AC310-T3-7R5G/011J-B	116	320	307.5	175	169	98	100	307.5	9	6	3-M5
AC310-T3-011G/015J-B											



Model	Outer Dimension (mm)					Installation Dimension (mm)				Aperture
	W	H	H1	D	D1	W1	W2	H2	B	
AC310-T3-015G/018J-B	142	383	372	225	219	125	100	372	6	4-M5
AC310-T3-018G/022J-B										
AC310-T3-022G/030J-B										
AC310-T3-030G/037J-B	172	430	-	225	219	150	150	416.5	7.5	4-M5
AC310-T3-037G/045J-B										



Model	Outer Dimension (mm)				Hole Position (mm)		Aperture
	W	H	H1	D	W1	H2	
AC310-T3-045G/055J-B	240	560	520	310	176	544	4-M6
AC310-T3-055G/075J-B							
AC310-T3-075G/090J-B							
AC310-T6-022G/030J-B							
AC310-T6-030G/037J-B							
AC310-T6-037G/045J-B							
AC310-T6-045G/055J-B							
AC310-T6-055G/075J-B							
AC310-T6-075G/090J-B							
AC310-T3-090G/110J-B	270	638	580	350	195	615	4-M8
AC310-T3-110G/132J-B							
AC310-T6-090G/110J-B							
AC310-T6-110G/132J-B							
AC310-T3-132G/160P-L	350	738	680	405	220	715	4-M8
AC310-T6-132G/160P-L							

3 Terms and Functions

3.1 Term Definitions

The definitions below apply only to beam pumps.

3.1.1 Stroke Rate

Stroke rate is defined as the number of rotations the oil well pump makes in one minute. Stroke rate reflects the pumping speed; combined with stroke, pump diameter, pump efficiency, and operating time, it can be used to indirectly estimate daily oil production.

Stroke rate = 60s/rotation period (s)×100, with unit 0.01 strokes/min.

3.1.2 Upstroke

The upward movement of the pumping rod is called the upstroke; it corresponds to the crank rotating from the upper position to the lower (toward-the-ground) position.

3.1.3 Downstroke

The downward movement of the pumping rod is called the downstroke; it corresponds to the crank rotating from the lower (toward-the-ground) position to the upper position.

3.1.4 Stroke, Top/Bottom Dead Center

Stroke: The distance moved during the upstroke or downstroke of the pumping rod.

Bottom dead center: The position at which the pumping rod is at its lowest point, corresponding to the horse head at its lowest position.

Top dead center: The position at which the polished rod string is at its highest point, corresponding to the horse head at its highest position.

3.1.5 Strokes Range Tuning

The strokes range tuning is the process of determining the upper and lower limits of stroke rate based on the system's maximum and minimum operating frequencies. The procedure is: First run at the default tuning frequency F16.33; use the time difference between two output signals of the position switch to determine the time required for one full crank rotation; then divide 60s (one minute) by this time to calculate the number of crank rotations per minute at that frequency, which is the current stroke rate for that frequency. Next, linearly calculate the stroke rate corresponding to the system's maximum and minimum operating frequencies to obtain the upper and lower limits. The tuning process requires a position switch to be installed (mounted where the crank is vertical to the ground) and functioning properly.

If the position switch cannot be installed, the strokes range can be determined manually.

Step 1: Set the system running frequency equal to the motor rated frequency; on the cycles interface, set parameters F01.02=0, F01.09=motor rated frequency.

Step 2: When the output frequency reaches the motor rated frequency, record the time for one full crank rotation and calculate the stroke rate at this speed.

Step 3: Enter the stroke rate calculated in Step 2 into F16.30 and set F16.31=1 to complete the determination of the strokes range.

The factory default values for the system's maximum and minimum operating frequencies are 60Hz and 20Hz. The default maximum of 60Hz is based on practical experience: when the operating frequency exceeds 60Hz, the entire mechanical system exhibits significant vibration. To ensure mechanical safety, 60Hz is defined as the maximum safe operating speed; however, this is not fixed and should be determined according to the maximum allowable speed for the specific oil well pump. The default minimum of 20Hz is also based on practical experience: 20Hz is the lower-limit frequency that allows an asynchronous motor to continue rotating under load without overheating and burning out. Since most asynchronous motors rely on an attached fan for cooling, the motor speed must not be too low to ensure adequate cooling; however, if an independent cooling system is provided, the lower-limit frequency can be reduced and is not limited to 20Hz.

System lower-limit stroke rate:

F16.37 = current stroke rate * lower frequency / current running frequency, with unit 0.01 strokes/min.

System upper-limit stroke rate:

F16.38 = current stroke rate * upper frequency / current running frequency, with unit 0.01 strokes/min.

3.1.6 Pump-off

Pump-off refers to alternating between "continuous operation" and a "recovery zone" (swing operation, well shut-in, or low-speed operation). As a well ages, its downhole oil supply capacity gradually declines. Long-term high-speed continuous operation cannot increase production but consumes substantial energy. Therefore, the well can run continuously for a period and then enter

a recovery zone to restore oil supply capacity before restarting continuous pumping. This approach can maintain production, improve pumping efficiency, and reduce energy consumption.

After a period of continuous operation, small-amplitude swing operation or well shut-in may be chosen to restore downhole oil supply. In winter, low temperatures can cause the wellhead to freeze and make restart difficult, so shut-in in the recovery zone is not recommended; in summer, when the wellhead will not freeze, shut-in may be chosen. For scenarios with strict production monitoring, low-speed operation may be selected in the recovery zone.

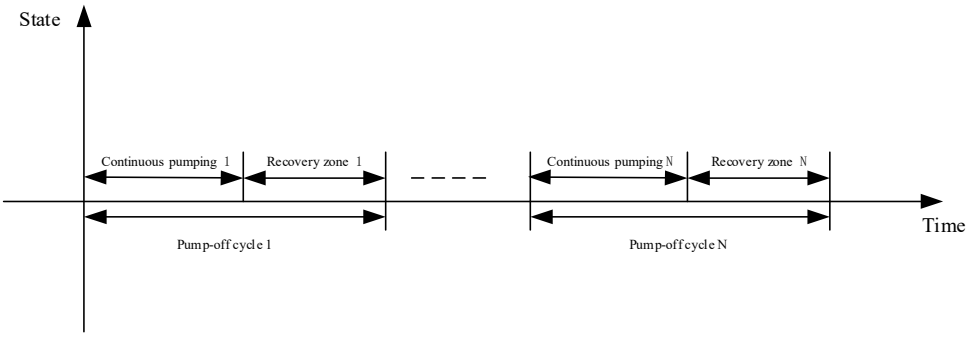
The "recovery zone" operation mode can be set by F15.03:

0: Swing operation

1: Well shut-in

2: Positioning-free swing operation

3: Low-speed operation



3.1.7 Positioned Swing Operation

Swing operation is defined with reference to the crank position. Using the position switch installation point as the origin, positioned swing is a low-frequency (low-speed), small-amplitude reciprocating forward-and-reverse rotation mode. Parameters related to the swing process, such as operating frequency and swing angle, can be set. The swing mode is used to prevent wax formation or freezing at the wellhead in winter, which would make restarting difficult.

The position switch is typically installed where the pump jack crank is vertical to the ground, a location that is easy to access.

3.1.8 Well Shut-in (Recovery Zone)

The recovery-zone shut-in mode means the pump does not swing during the period it would otherwise swing; instead, the drive’s U, V, W phases stop output, making the pump jack remain in a stopped-like state to maximize energy savings. However, the pump is not fully powered down—the drive run indicator remains ON—and it will automatically restart when the recovery-zone timer expires. Therefore this mode should be chosen with safety considerations in mind. The recovery-zone shut-in mode is suitable for seasons with higher temperatures when wellhead freezing will not occur.

3.1.9 Positioning-free Swing

Positioning-free swing is similar to positioned swing, but the swing is not referenced to the position switch installation point. Its swing-angle parameters differ from those of positioned swing and can be configured independently. Because positioning-free swing does not use the position switch as the reference origin, it can be used on wells without a position switch installed or when the position switch is damaged.

3.1.10 Operating Condition Diagnosis

Operating condition diagnosis is the process of monitoring the pump's operating parameters and using data analysis to assess its working condition, promptly detect potential faults, and issue warnings for handling. Its purpose is to improve equipment operating efficiency, reduce downtime due to faults, extend equipment service life, and ensure stable and safe oil production.

It can be viewed by monitoring parameter C04.50:

0: Stopped

1: Normal operation

2: Belt break (belt drive failure)

3: Wax deposition

4: Rod break (sucker rod fracture)

5: Plunger dislodged from the working barrel

6: Pump impact (collision on upstroke or downstroke)

Note:

The diagnosis here is not based on direct instrument detection but on empirical analysis derived from electrical parameters during operation (power, current). Each condition corresponds to characteristic electrical parameters, so the diagnosis may not be completely accurate. The results are provided for reference only; further verification with detection instruments or manual inspection is required to confirm the actual condition.

3.1.11 Automatic Pump-off

Automatic pump-off is an intelligent control mode for pumps. Unlike traditional pump-off mode, it can acquire and analyze the pump's fluid level or power changes in real time to dynamically determine the well's current fluid-supply condition, and automatically adjust the unit's continuous running time and recovery time accordingly. This adaptive control of pump-off is achieved through analysis and calculation without manual intervention, intelligently controlling pump-off to optimize efficiency and reduce energy consumption, especially suitable for low-production or unattended remote wells.

Automatic pump-off has two main recognition modes (set via F20.00):

Fluid level recognition:

Adjust continuous and recovery times dynamically based on changes in fluid level.

Power change-rate recognition:

Adjust continuous and recovery times dynamically based on changes in power.

3.1.12 Automatic Parameter Tuning

Automatic parameter tuning is an intelligent control technique for pumps that continuously monitors a well's oil supply capacity and the pump's operating status, and automatically adjusts the operating speed (stroke rate) to match actual production conditions. This optimizes pumping efficiency, reduces energy consumption, and can increase production. It is particularly suitable for wells with limited oil supply that can be pumped continuously for long periods; such wells cannot tolerate prolonged high-speed pumping and therefore require ongoing speed adjustments to maintain balanced supply and production and keep the well operating near optimal conditions.

Automatic parameter tuning has three main recognition modes (set via F21.00):

Fluid level recognition mode: Monitors pump fluid level via electrical-parameter analysis and automatically adjusts the pump's speed to keep the pump near optimal fill, avoiding pump-off (dry pumping) due to insufficient fluid level.

High-efficiency recognition mode: Analyzes production and energy consumption to adjust operating parameters so the pump achieves the highest pumping efficiency at the lowest energy cost.

High-production recognition mode: Optimizes operating parameters to maximize production while respecting the well's oil supply capacity.

3.2 Function Description

3.2.1 Start into Run/Start into Recovery Zone

Working process: Two parameters are set separately: continuous run time and recovery-zone execution time. If the "Start into Run" function is active at startup, the operation after startup is [continuous run: recovery action: continuous run: recovery action: …], where the run and recovery times are F15.07 [Continuous Runtime] and F15.08 [Recovery Execution Time], respectively. If the "Start into Recovery Zone" function is active at startup, the operation after startup is [recovery action: continuous run: recovery action: continuous run: …], where the swing and run times are F15.07 [Continuous Runtime] and F15.08 [Recovery Execution Time], respectively. These two functions are opposites in execution.

Design purpose/Reason/Problems solved: This is the most basic pump-off function. It is simple and quick to set up and yields significant energy savings, but it has a single control mode and is easily affected by stops. If the unit stops and restarts, the run and pump-off timers are reset to zero and do not continue counting from before the stop.

Related parameters:

F15.07: Continuous run time

F15.08: Recovery-zone execution time

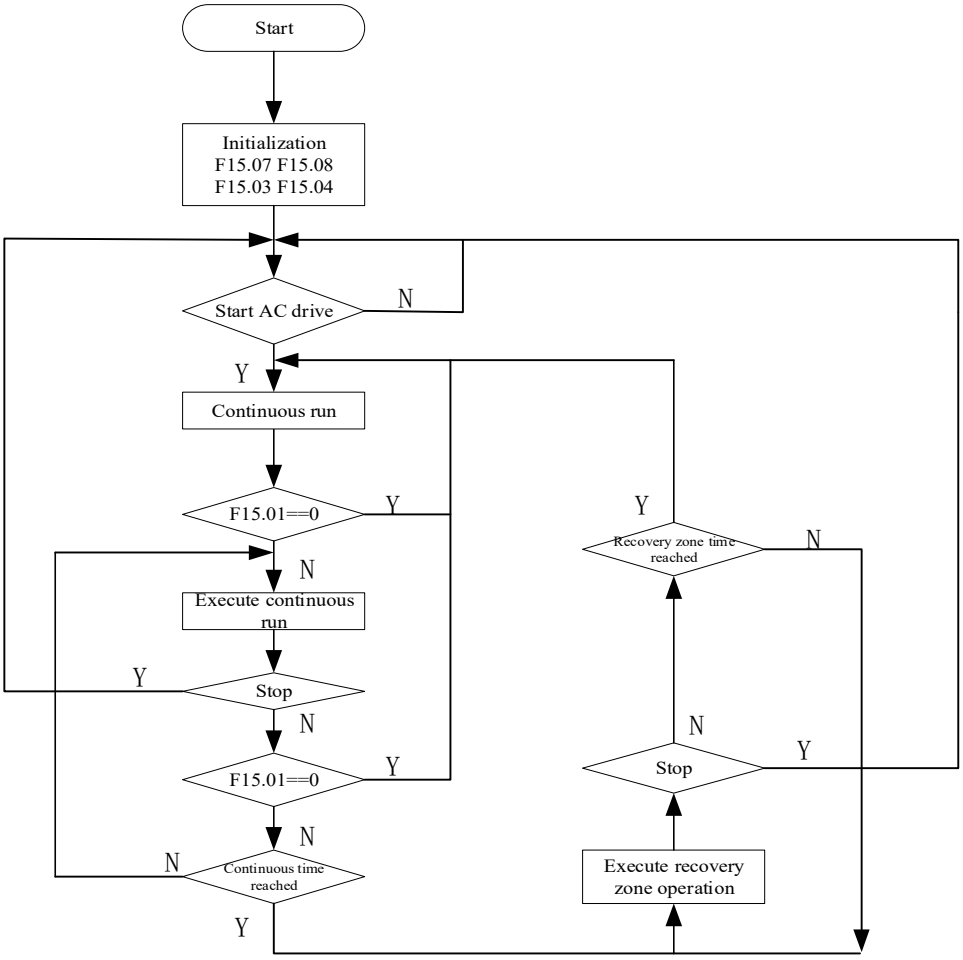
F15.03: Recovery-zone action for pump-off

F15.04: Pump-off type

If F15.04 = 0, then "start into run" is active; if F15.04 = 1, then "start into recovery zone" is active.

Execution flow:

When F15.04=0:



Continuous run time is determined by F15.07, recovery-zone run time is determined by F15.08. F15.03 sets which recovery-zone action is executed. During pump-off, if F15.01=0 the system exits pump-off mode and switches to continuous operation.

F15.03	Recovery-zone action for pump-off	Setting range: 0~3 0: Swing operation 1: Well shut-in 2: Positioning free swing operation 3: Low-speed operation	Default: 3

3.2.2 Specified-stage Run/Specified-stage Recovery Zone

Working process: Up to 8 stages can be set. If the specified-stage run function is active, the unit performs continuous running when the time falls within any configured stage, and performs recovery-zone actions when the time falls outside those stages. If the specified-stage recovery-zone function is active, the unit performs recovery-zone actions when the time falls within any configured stage, and performs continuous running when the time falls outside those stages.

Design purpose/Reason/Problems solved: This function allows more flexible control of well operation or pump-off schedules, enabling the well to run continuously or execute recovery actions during specified time stages as required.

Related parameters:

F15.03: Recovery-zone action for pump-off

F15.04: Pump-off type; F15.04=2 enables the specified-stage recovery-zone function, F15.04=3 enables the specified-stage run function.

F19.42~F19.57: Start and end times for the 8 configurable stages

Example:

If stages are set as follows:

No.	Start Time	End Time
1	09: 00	12: 00
2	15: 00	18: 00
3	00: 00	00: 00
4	00: 00	00: 00
5	00: 00	00: 00
6	00: 00	00: 00
7	00: 00	00: 00
8	00: 00	00: 00

Then:

1） If specified-stage recovery-zone is selected, the unit executes recovery-zone actions at 09:00~12:00 and 15:00~18:00, and executes continuous running outside those periods. If more stages are set, the unit will execute recovery-zone actions during all specified stages and continuous running outside them.

2） If specified-stage run is selected, the unit executes continuous running at 09:00~12:00 and 15:00~18:00, and executes recovery-zone actions outside those periods. If more stages are set, the unit will execute continuous running during all specified stages and recovery actions outside them.

Note: This function requires a real-time clock and the well-specific extension card AC310YTIO.

3.2.3 Peak/Off-peak/Shoulder Pump-off

Working process: Divide the 24 hours of a day into peak, off-peak, and shoulder periods. Different periods have different recovery-zone times and continuous run times. Generally: peak run time < shoulder run time < off-peak run time, and peak recovery time > shoulder recovery time > off-peak recovery time.

Design purpose/Reason/Problems solved: This function is a form of pump-off that schedules continuous and recovery times according to electricity pricing or demand peaks. During high-tariff or high-demand periods, allocate more time to recovery actions to allow the well to restore oil supply; conversely, during low-tariff or low-demand periods, allocate more continuous running time to ensure daily oil production. This preserves production while reducing electricity costs.

Related parameters:

F19.00~F19.04: Peak/Off-peak/Shoulder Pump-off Time Settings

F19.06~F19.14: Peak/Off-peak/Shoulder Divisions

F15.03: Recovery-zone action for pump-off

F15.04: Pump-off type; F15.04=4 enables the peak/off-peak/shoulder pump-off.

Example:

If the peak/off-peak/shoulder periods are divided as shown below, then:

1） If the current time is 08:30, it falls into the second shoulder period; if F19.00 (shoulder run time)=11 and F19.01 (shoulder recovery time)=19, then continuous run time = 11 minutes and recovery time = 19 minutes; therefore during 08:00~09:00 the mode will be [continuous 11 min: recovery 19 min: continuous 11 min: recovery 19 min …].

2） If the current time is 13:00, it falls into the first off-peak period; if F19.04 (off-peak run time)=20 and F19.05 (off-peak recovery time)=10, then continuous run time = 20 minutes and recovery time = 10 minutes; therefore during 12:00~14:00 the mode will be [continuous 20 min: recovery 10 min: continuous 20 min: recovery 10 min …].

	Shoulder		**Peak**		**Off-peak**	
Period	Start Time	End Time	Start Time	End Time	Start Time	End Time
1	05: 30	07: 00	07: 00	8: 00	12: 00	14: 00
2	08: 00	09: 00	09: 00	11: 30	23: 30	05: 30
3	11: 30	12: 00	15: 30	20: 00	00: 00	00: 00
4	14: 00	15: 30	00: 00	00: 00	00: 00	00: 00
5	20: 00	23: 30	00: 00	00: 00	00: 00	00: 00
6	00: 00	00: 00	00: 00	00: 00	00: 00	00: 00

Note: This function requires a real-time clock and the well-specific extension card AC310YTIO.

3.2.4 Time-based Multi-speed

Working process: Up to 8 time periods can be set. During each configured period the unit runs at a specified speed; outside the configured periods it continues running at the original speed.
Design purpose/Reason/Problems solved: Allows convenient use of different speeds in different time periods.
Related parameters:

F19.58: Time-based multi-speed mode

F19.59~F19.74: Start/End times for specific time periods

F19.75~F19.82: Speeds corresponding to the 8 time periods

Example:

If the time periods and speeds are set as in the table below:

No.	Start time	End time	Speed
1	08: 00	09: 00	90.0%
2	09: 00	10: 00	70.0%
3	00: 00	00: 00	50.0%
4	00: 00	00: 00	50.0%
5	00: 00	00: 00	50.0%
6	00: 00	00: 00	50.0%
7	00: 00	00: 00	50.0%
8	00: 00	00: 00	50.0%

Then:

1） When the time is 08:00~09:00, stroke rate is automatically set to 90.0% of the system upper-limit.

2） When the time is 09:00~10:00, stroke rate is automatically set to 70.0% of the system upper-limit.

3） At other times, the stroke rate remains unchanged and runs at the previously set value.

Note: This function requires a real-time clock and the well-specific extension card AC310YTIO. 100.0% corresponds to F16.38 [Stroke Upper Limit].

3.2.5 Constant-speed (Variable-speed) Mode and Operating Modes 0~6

Working process: The stroke rates for the upstroke and downstroke are configured separately. During the upstroke, the unit runs at the rate set for the upstroke; during the downstroke, it runs at the rate set for the downstroke.

Design purpose / Reason / Problems solved: The upstroke and downstroke can be set to the same value (constant-speed mode) or to different values (variable-speed mode). If the upstroke rate is greater than the downstroke rate, the unit implements a “fast up, slow down” behavior: a

faster upstroke reduces losses while a slower downstroke increases pump fill, improving pumping efficiency. Operating mode 0 has identical upstroke and downstroke settings and is a special case of constant-speed mode. Mode 0 strokes are taken from the [Frequency Source] set in F01 group; the frequency given by selected source is automatically converted into strokes. Operating modes 1~6 are variable-speed modes with independent upstroke and downstroke settings; the corresponding values can be configured via function codes F16.03–F16.14. Entering or exiting constant/variable-speed mode requires the LCD keypad: long-press the left key on the appropriate screen. Detailed steps are provided in the keypad-specific interface instructions under the upstroke interface. Whether constant/variable mode and operating modes 0~6 are shown on the keypad is controlled by the parameter F22.41.

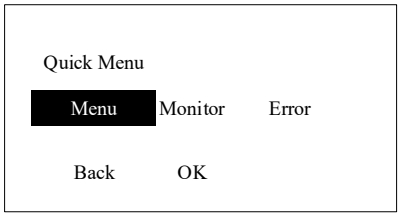
Related parameters: F20.25~F20.38, F22.41

Operating Mode	Upstroke	Downstroke
0	4.00	
1	5.50	4.50
2	5.00	4.00
3	4.50	3.50
4	4.00	3.00
5	3.50	2.50
6	6.00	5.00

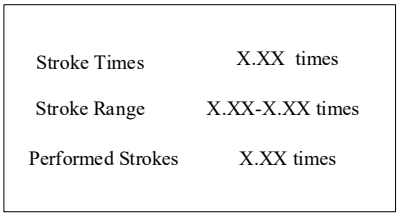
4 Keypad Operation Instruction

4.1 Types of Special Interfaces

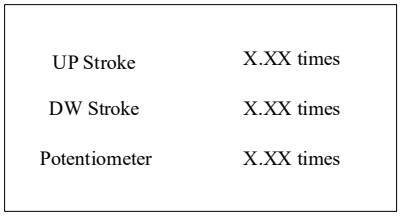
The AC310-J oil pump has several special interfaces: Quick Menu, Set Strokes, Upstroke, Constant-speed (Variable-speed) Mode, Operating Modes 0~6, and Monitoring. In these interfaces, the availability and effect of the keypad keys and knob differ. The main keys and knob are: PRG key, OK key, Left key, Right key, knob rotated clockwise, knob rotated counterclockwise. Special interfaces are named after the content shown on the first line of each screen. Below are sketches of the special interfaces.



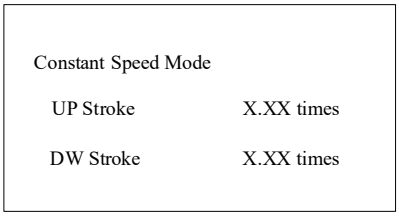
Quick Menu Interface



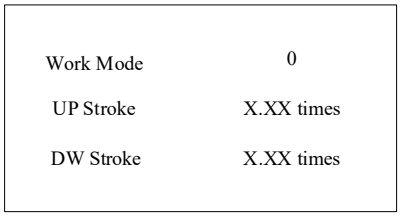
Set Strokes Interface



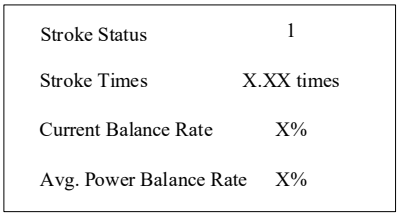
Upstroke Interface



Constant-speed (Variable-speed) Mode



Operating Modes 0~6 Interface



Monitoring Interface

Note: The only difference between constant-speed mode and variable-speed mode is whether the upstroke and downstroke are equal.

4.2 Special Interfaces Switching

Which special interfaces can be displayed depends on the value of F22.41 [Operation Mode Display]:

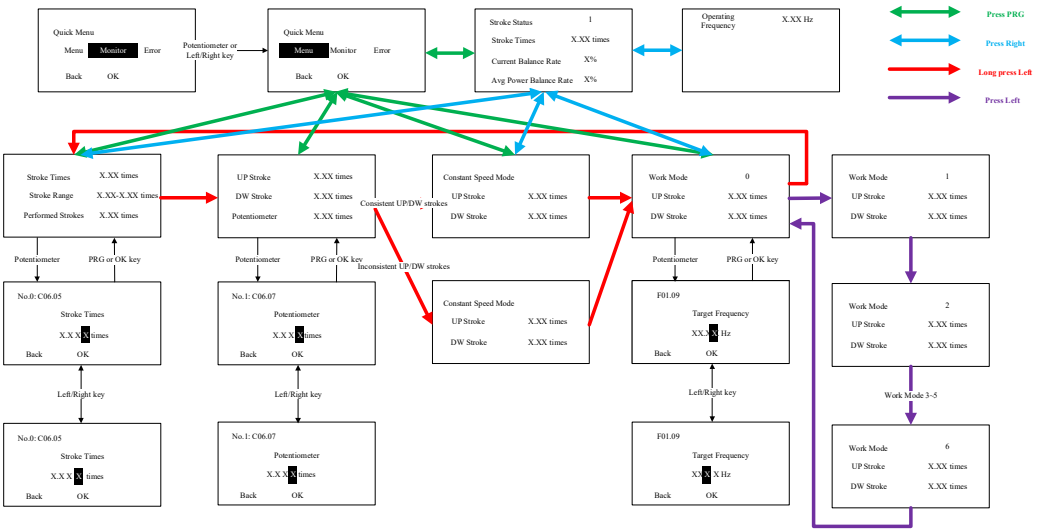
When F22.41=0, only the Stroke interface and Mode 0 interface can be displayed.

When F22.41=1, the Stroke interface and variable-speed–related interfaces can be displayed. Here "variable-speed–related interfaces" include the Upstroke interface, because the

Constant-speed (Variable-speed) Mode interface only indicates whether the upstroke and downstroke are equal after modification on the Upstroke screen. In other words, when F22.41=1, the visible interfaces are Set Stroke, Upstroke, and Constant-speed (Variable-speed) Mode.

When F22.41=2, the Stroke interface and Operating Modes 0~6 interface can be displayed.

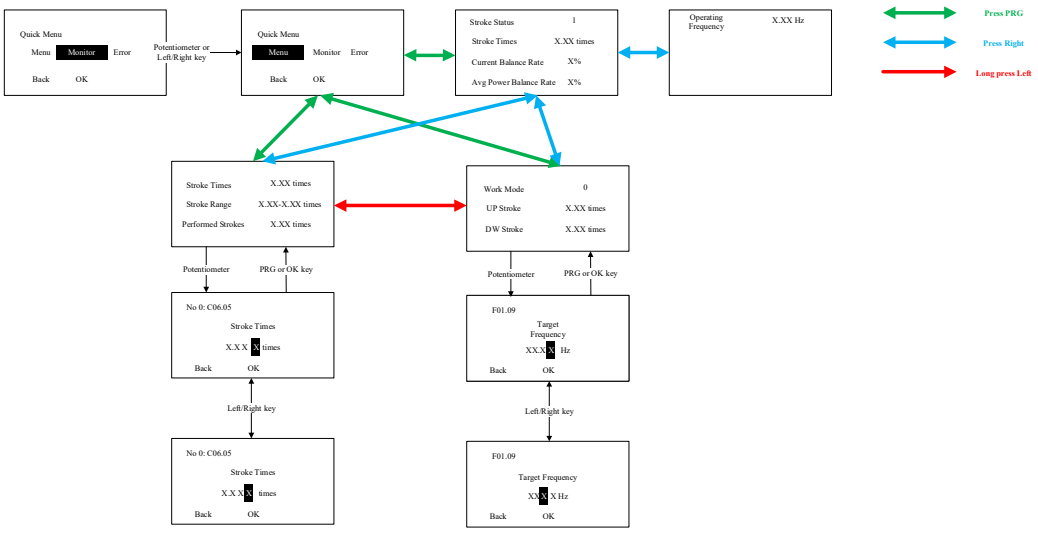
When F22.41=3, all special interfaces can be displayed. The following explanation uses F22.41=3 as an example.



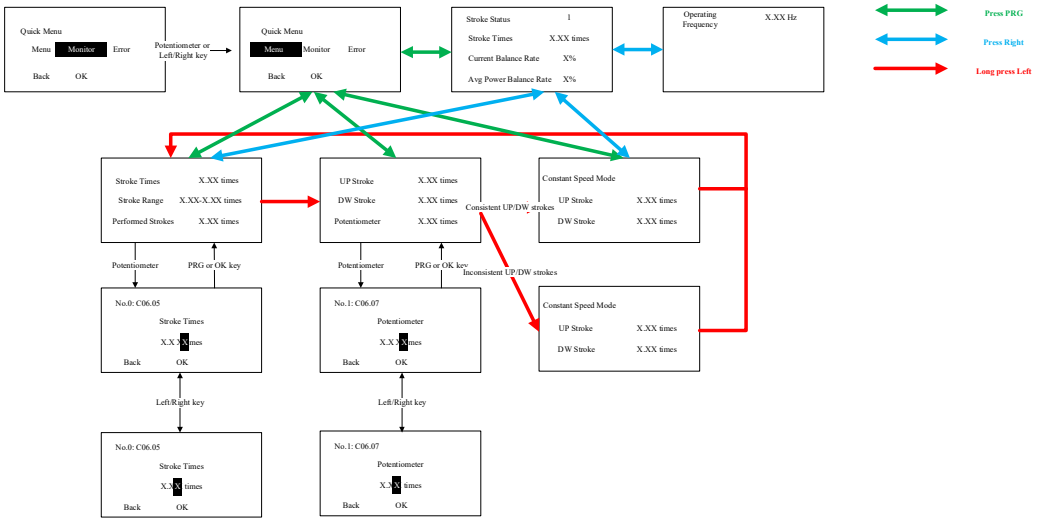
F22.41=3

From the above diagram:

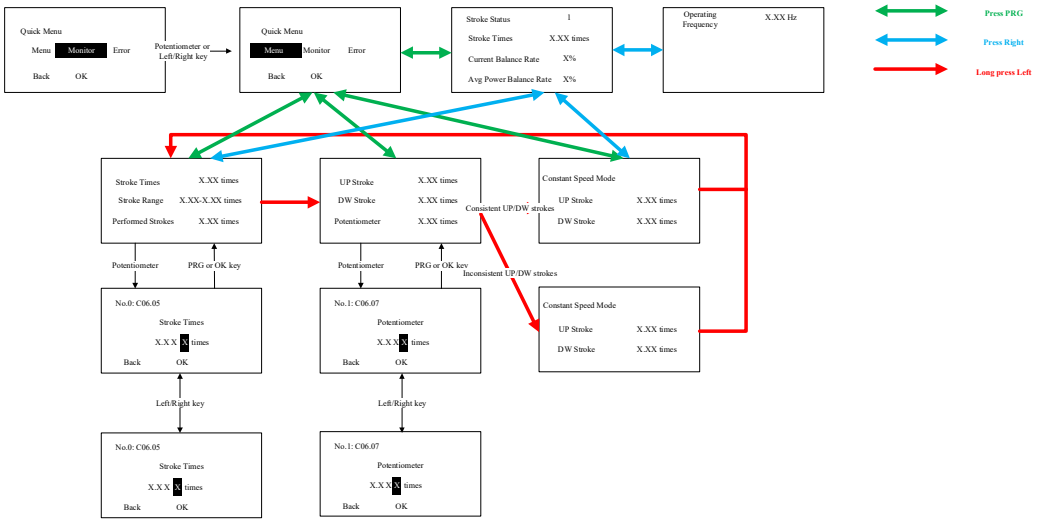
1. The Set Stroke, Upstroke, Constant-speed (Variable-speed) Mode, and Operating Modes 0~6 interfaces are cycled through by long-pressing the Left key. Even from the Monitoring interface, a long press of the Left key will jump to the next specific interface. For example, if you press the Right key on the Set Stroke interface to go to the Monitoring interface, then long-pressing the Left key will jump to the Upstroke interface.
2. All special interfaces can switch to and from the Quick Menu interface by pressing the PRG key.
3. Except for the Upstroke interface, the other three interfaces can jump to the Monitoring interface by pressing the Right key. On the Upstroke interface the Right key's function is to copy the rotation-setting value into the Downstroke.
4. The Set Stroke, Upstroke, and Operating Mode 0 interfaces allow quick parameter editing by rotating the knob. After entering a parameter-edit screen, the Left and Right keys become digit selectors to quickly change the value; at that time the PRG and OK keys both confirm and save the value and return to the corresponding interface.
5. The Operating Modes 0~6 interfaces are cycled through by short-pressing the Left key.
6. The operation methods for F22.41 values 0~2 are similar to those for value 3. The three diagrams below illustrate the operation methods when F22.41 is 0~2, respectively.



F22.41=0



F22.41=1



F22.41=2

4.3 Overview and Detailed Operations

4.3.1 Quick Menu Interface

The Quick Menu interface is a commonly used screen. It is the screen reached by pressing the PRG key from the Set Stroke interface, Upstroke interface, Constant-speed (Variable-speed) Mode interface, Operating Modes 0~6 interface, or Monitoring interface. If the keypad is not operated for an extended period, the display will switch to one of the other five interfaces.

1. PRG key is active: Switches the display between the Quick Menu and any one of the other five interfaces; the default is the Set Stroke interface, but if changed after power-up, it will remain as the modified interface.
2. Left key is active: Moves the selection left through the options until the leftmost option.
3. Right key is active: Moves the selection right through the options until the rightmost option.
4. Knob rotated clockwise is active: Moves the selection right through the options until the rightmost option. Knob rotated counterclockwise is active: Moves the selection left through the options until the leftmost option.
5. OK key is active: Confirms the selected option and enters the corresponding secondary menu.

4.3.2 Set Stroke Interface

The Set Stroke interface is the default target screen when pressing the PRG key from the Quick Menu. It can be displayed when F22.41 is 0~3. Pressing the Right key toggles between the Set Stroke interface and the Monitoring interface.

1. PRG key is active: Switches between this interface and the Quick Menu interface;
2. Left key short press is inactive: Long press performs special-interface switching;
3. Right key has no short/long distinction: Toggles between this interface and the Monitoring

interface;

4. Knob rotated clockwise increases the set strokes; knob rotated counterclockwise decreases it. The display switches to the set stroke value editing screen; in that screen the Left and Right keys select digits. The digit positions cycle from the hundreds place to the hundredths place. After setting the stroke value, press OK or PRG to save and return to the Set Stroke interface;
5. OK key is inactive.

4.3.3 Upstroke Interface

The Upstroke interface is visible only when F22.41=1 or F22.41=3. On this interface the Right key cannot jump to the Monitoring interface because the Right key's function here is to copy the rotation-setting value into the Downstroke.

1. PRG key is active: Switches between this interface and the Quick Menu interface;
2. Left key is active: Short press copies the rotation-setting value into the Upstroke; long press switches to the Constant-speed (Variable-speed) Mode interface. If the upstroke and downstroke are equal, the switched screen is the Constant-speed Mode interface; otherwise it is the Variable-speed Mode interface.
3. Right key is active: Copies the rotation-setting value into the Downstroke.
4. Rotating the knob clockwise increases the rotation-setting value; rotating it counterclockwise decreases the rotation-setting value. The display switches to the rotation-setting editing screen; in that screen the Left and Right keys select digits, cycling from the hundreds place to the hundredths place. After setting the rotation value, press OK or PRG to save it.
5. OK key is inactive.

4.3.4 Constant-speed (Variable-speed) Mode Interface

Since the Constant-speed (Variable-speed) Mode interface only indicates whether the upstroke and downstroke are equal after modification on the Upstroke interface, it is visible only when F22.41=1 or F22.41=3, and is always the target screen reached by long-pressing the Left key on the Upstroke interface. Only one of the Constant-speed Mode or Variable-speed Mode screens is shown: if the upstroke and downstroke are equal, the switched screen is the Constant-speed Mode interface; otherwise it is the Variable-speed Mode interface. Pressing the Right key toggles between this interface and the Monitoring interface.

1. PRG key is active: Switches between this interface and the Quick Menu interface;
2. Left key short press is inactive; long press switches to the Operating Modes 0~6 interface;
3. Right key has no short/long distinction: Toggles between this interface and the Monitoring interface;
4. Knob rotation clockwise or counterclockwise is inactive;
5. OK key is inactive.

4.3.5 Operating Modes 0~6 Interface

When F22.41=0, only Mode 0 can be displayed and Modes 1~6 cannot. When F22.41=2 or

F22.41=3, Modes 0~6 can all be displayed; they are cycled by short-pressing the Left key. Pressing the Right key toggles between this interface and the Monitoring interface.

1. PRG key is active: Switches between this interface and the Quick Menu interface;
2. Left key short press: Cycles the display through Operating Modes 0~6. The upstroke and downstroke for Modes 1~6 are set by F16.03~F16.14, while Mode 0's upstroke and downstroke are determined by the F01.09, which is changed via the knob on the Mode 0 screen. Left key long press: switches to the Set Stroke interface;
3. Right key has no short/long distinction: Toggles between this interface and the Monitoring interface;
4. Knob rotation clockwise/counterclockwise: inactive in Modes 1–6; active in Mode 0 to modify the F01.09 value (clockwise increases, counterclockwise decreases). In the F01.09 editing screen, the Left and Right keys select digits. After editing, press PRG or OK to confirm the F01.09 value and the upstroke/downstroke;
5. OK key is inactive.

4.3.6 Monitoring Interface

The Monitoring interface displays nine monitoring parameters F22.09~F22.17. Each selected ones, tens, hundreds, and thousands bit corresponds to a monitoring parameter, yielding values for 36 monitoring parameters in total. You can set whether each monitoring parameter is shown to change the number of displayed items. One page of the Monitoring interface can show four monitoring parameters; if more than four parameters are selected, press the Right key on the Monitoring interface to page.

1. PRG key is active: Switches between this interface and the Quick Menu interface.
2. Left key short press is inactive; long press continues the cycle through the Set Stroke, Upstroke, Constant-speed (Variable-speed) Mode, and Operating Modes 0~6 interfaces.
3. Right key has no short/long distinction: Pages the display and toggles between this interface and the Set Stroke interface or the Constant-speed (Variable-speed) Mode interface or the Operating Modes 0~6 interface.
4. Knob rotation clockwise or counterclockwise is inactive.
5. OK key is inactive.

5 Parameter List

5.1 Terms and Marks

◆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	Valid parameters under closed-loop vector control for asynchronous motors (AM)
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	The parameter can be modified during operation
STOP	The parameter cannot be modified during operation
READ	The parameter can only be read, not modified (Displays 5 "-" during modification)

5.2 Parameter List

5.2.1 General Parameter Groups

Parameter Group	Name	Parameter Group	Name
F00.0x	Environment	F06.6x~F06.7x	Virtual I/O Terminals
F00.1x	Common Parameters	F07.0x	Start Control
F01.0x	Basic Commands	F07.1x	Stop Control
F01.1x	Frequency Commands	F07.2x	DC Brake and Fly Track
F01.2x	ACC/DEC Time	F07.3x	Jog
F01.4x	PWM Control	F07.4x	Hold and Jump Frequency during Start/Stop
F02.0x	Basic Motor Parameters and Auto-tuning	F08.0x	Counting and Timing
F02.1x	AM Advanced Parameters	F08.3x	Wobble Frequency
F02.2x	PM Advanced Parameters	F09.0x	Maintenance
F02.3x~F02.4x	Encoder Parameters	F10.0x	Current Protection
F02.5x	Motor Application	F10.1x	Voltage Protection

F03.0x	ASR Control	F10.2x	Auxiliary Protection
F03.1x	ACR and Torque Limit	F10.3x	Load Protection
F03.2x	Torque Optimization	F10.4x	Stall Protection
F03.3x	Flux Optimization	F10.5x	Fault Recovery and Motor Overload Protection
F03.4x~F03.5x	Torque Control	F11.0x	Key Operation
F03.6x	PM HF Injection	F11.1x	Cyclic Monitoring of Status Interface
F03.7x	Position Compensation	F11.2x	Monitoring Parameters
F03.8x	Extensions	F11.3x	Special Keypad Functions
F04.0x	V/F Control	F12.0x	Modbus Slave Parameters
F04.1x	User-defined V/F Curves	F12.1x	Modbus Master Parameters
F04.2x	VF-SPLIT Control	F12.2x	Special Modbus Functions
F04.3x	V/F ECO Control	F12.3x	PROFIBUS-DP Parameters
F05.0x	DI Terminal	F12.4x	CANopen Parameters
F05.1x	X1-X5 Detection Delay	F12.5x~F12.6x	EX_A, EX_B Extension Communication
F05.2x	DI Terminal Mode	F13.00-F13.06	PID Setting and Feedback
F05.3x	PUL Terminal	F13.07~F13.24	PID Setting
F05.4x	AI Parameters	F13.25~F13.28	PID Feedback Disconnection
F05.5x	AI Linear Parameters	F13.29~F13.33	Sleep
F05.6x	AI Curve 1	F14.00~F14.14	Multi-frequency Setting
F05.7x	AI Curve 2	F14.15	PLC Operation Mode
F05.8x	AI as DI Terminal	F14.16~F14.30	PLC Runtime
F06.0x	AO	F14.31~F14.45	PLC Direction and ACC/DEC Time
F06.1x	AO Extension	C00.xx	Basic Monitoring
F06.2x~F06.3x	DO/RO	C01.xx	Error Monitoring
F06.4x	Frequency Detection	C02.xx	App Monitoring
F06.5x	Monitoring Comparator	-	-

5.2.2 Oilfield-specific Parameter Groups

Parameter Group		Name
F15 Basic Pump-Off (30)	F15.00	Pump Type
	F15.01~F15.04	Pump-Off Functions
	F15.05~F15.06	Pump-Off Speed
	F15.07~F15.10	Pump-Off Time
	F15.11~F15.16	Calibration Time
	F15.17~F15.29	Reserved
F16 Beam Pumps (50)	F16.00	Position Switch
	F16.01	Operating Mode
	F16.02	Position Switch Failure Speed
	F16.03~F16.14	Operating Mode Speed
	F16.15	Upstroke/Downstroke ACC/DEC Time
	F16.16~F16.22	Swing Parameters
	F16.24~F16.26	Position Switch Setting
	F16.27~F16.33	Stroke Parameters
	F16.34~F16.36	Pump Parameters
	F16.37~F16.38	Stroke Upper/Lower Limit
	F16.39	Pump Setting Depth
	F16.40~F16.41	Stroke Correction
	F16.41~F16.49	Reserved
F17 Progressive Cavity Pumps (45 Reserved)	Reserved	
F18 Electric Submersible Pumps (45 Reserved)	Reserved	
F19 Peak/Off-peak/Shoulder, Specified Time Pump-Off, Time-Division Variable Speed (85)	F19.00~F19.05	Peak/Off-peak/Shoulder Pump-Off and Swing Time
	F19.06~F19.17	Shoulder Time 1~6
	F19.18~F19.29	Peak Time 1~6
	F19.30~F19.41	Off-peak Time 1~6
	F19.42~F19.57	Specified Start/End Time 1~8
	F19.58	Time-Division Variable Speed Mode

	F19.59~F19.74	Time-Division Start/End Time 1~8
	F19.75~F19.82	Time-Division Speed 1~8
	F19.83~F19.84	Reserved
F20 Automatic Pump-Off Parameters (40)	F20.00	Automatic Pump-Off Recognition Mode
	F20.01~F20.08	Fluid Level Recognition Parameters
	F20.09~F20.13	Power Recognition Parameters
	F20.14~F20.21	Pump-Off Speed, Time Settings
	F20.22~F20.39	Reserved
F21 Automatic Parameter Tuning (40)	F21.00	Automatic Tuning Recognition Mode
	F21.01	Automatic Tuning Speed
	F21.02~F21.05	Fluid Level Recognition Parameters
	F21.06~F21.13	Automatic Tuning Search Speed, Time Settings
	F21.14~F21.39	Reserved
F22 Pump Comprehensive Parameters (60)	F22.00	Pump-Off and Auto-Tuning
	F22.01~F22.05	Voice Broadcast Settings
	F22.06~F22.08	Power Monitoring Settings
	F22.09	Operating Condition Diagnosis
	F22.18~F22.21	Power Parameter Filter Time
	F22.22~F22.24	High Bus Voltage Parameters
	F22.26~F22.27	Fluid Level/Dynamic Fluid Level Source
	F22.28	Output Delay
	F22.29	Special Parameter Modification Password
	F22.30~F22.42	Special Parameter Settings
	F22.43~F22.53	Reserved
	F22.54~F22.55	Extension RS485 Communication Parameters
	F22.56~F22.59	Reserved

5.2.3 General Parameter List

F00: Environment

F00.0x: Environment Setting

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.yyy) 1: Common parameters (F00.00, Pxx.yyy) 2: Monitoring parameters (F00.00, Cxx.yyy) 3: Modified parameters (F00.00, Hxx.yy)	0 (0~3)	RUN
F00.01 (0x0001)	Purpose	**V/F SVC FVC PMVF PMSVC PMFVC** AC drives can be set 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 initialization mode for the drive. 0: Not initialized 11: Set parameters initialized according to actual needs (motor parameters excl.) 22: All parameters initialized 33: Clear error records	0 (0~33)	STOP
F00.04 (0x0004)	Keypad Parameter Copy	**V/F SVC FVC PMVF PMSVC PMFVC** 0: None 11: Upload parameters to keypad 22: Download parameters to drive	0 (0~30)	STOP
F00.05 (0x0005)	Reserved	Reserved	Reserved	Reserved
F00.06 (0x0006)	Reserved	Reserved	Reserved	Reserved

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 Parameter 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 00~31 to xx in Fxx.yy	Up to F00.01 (0000~2999)	RUN

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** Se the control mode for Motor 1. AM control modes: 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 conversion **Note:** This function only supports 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** Select the method to send run/stop commands and the direction of operation to the drive. 0: Keypad (external keypad first) 1: Terminal 2: RS485 3: Extension	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: Keypad 1: Potentiometer 2: AI1 3: AI2 4: Reserved 5: PUL 6: RS485 7: UP/DW terminal 8: PID 9: PLC 10: Extension 11: Multi-frequency setting 12: Special RS485 setting	0 (0~12)	RUN
F01.03 (0x0103)	Frequency Source A Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the gain of frequency giving 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 frequency giving 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 for frequency giving source B. 0: Max. output frequency 1: Frequency set by source A	0 (0~1)	RUN

F01.07 (0x0107)	Frequency Source Combination	**V/F SVC FVC PMVF PMSVC PMFVC** Select the combination method of source A and source 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** Bind the frequency source to each command source when this parameter is valid. Ones-bit: Bind keypad commands Tens-bit: Bind terminal commands Hundreds-bit: Bind communication commands Thousands-bit: Bind extension commands 0: None 1: Keypad 2: Potentiometer 3: AI1 4: AI2 5: Reserved 6: PUL 7: RS5485 8: UP/DW terminal 9: PID A: PLC B: Extension C: Multi-frequency setting D: Reserved	0000 (0000~DDDD)	RUN
F01.09 (0x0109)	Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set and modify the frequency via the keypad.	50.00Hz (0.00Hz~Upper limit frequency)	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 (1.00Hz~ 500.00Hz)	STOP
F01.11 (0x010B)	Upper Limit Frequency Source	**V/F SVC FVC PMVF PMSVC PMFVC** Set the upper limit frequency source. 0: Keypad 1: Potentiometer 2: AI1 3: AI2 4: Reserved 5: PUL 6: RS485 7: Extension	0 (0~7)	RUN
F01.12 (0x010C)	Upper Limit Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** The upper limit frequency is given from the keypad when F01.11 is set to 0.	50.00Hz (Lower limit~Max. frequency)	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 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/deceleration time. 0: Max. frequency 1: 50Hz 2: Set frequency	0 (0~2)	STOP
F01.21 (0x0115)	ACC/DEC Time Unit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the unit for the acceleration and deceleration time. 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 to accelerate the output frequency 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 to decelerate the output frequency 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 to accelerate the output frequency 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 to decelerate the output frequency 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 to accelerate the output frequency 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 to decelerate the output frequency 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 to accelerate the output frequency 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 to decelerate the output frequency 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 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 S-curve acceleration start time.	0.20s (0.00s~10.00s)	STOP
F01.32 (0x0120)	ACC S-Curve End Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the S-curve acceleration stop time.	0.20s (0.00s~10.00s)	STOP
F01.33 (0x0121)	DEC S-Curve Start Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the S-curve deceleration start time.	0.20s (0.00s~10.00s)	STOP
F01.34 (0x0122)	DEC S-Curve End Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the S-curve deceleration stop time.	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 switching frequency of ACC. time 1 and ACC. time 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 switching frequency of the drive's IGBT module	Up to model (1.0kHz~ 16.0kHz)	RUN
F01.41 (0x0129)	PWM Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Carrier-temperature relationship 0: Irrelevant 1: Relevant Tens-bit: Carrier-output frequency relationship 0: Irrelevant 1: Relevant Hundreds-bit: Random PWM enable 0: OFF 1: Valid in V/F control mode 2: Valid in vector control Thousands-bit: PWM mode 0: Three-phase only 1: Automatic shift between two-phase and three-phase	1111 (0000~1211)	RUN
F01.43 (0x012B)	Deadtime Compensation Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the deadtime compensation gain.	306 (0~512)	RUN
F01.46 (0x012E)	Random PWM Depth	**V/F SVC FVC PMVF PMSVC PMFVC** The higher the set point, the greater the carrier fluctuation when random PWM is enabled.	0 (0~20)	RUN

F02: Motor 1 Parameters

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

Code (Address)	Name	Content	Default (Range)	Property
F02.00 (0x0200)	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)	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)	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)	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)	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)	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 Type	**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 of the asynchronous motor.	Up to model (0.1A~ 3000.0A)	STOP
F02.11 (0x020B)	Stator Resistance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stator resistance of the asynchronous motor.	Up to model (0.01mΩ~ 60000mΩ)	STOP
F02.12 (0x020C)	Rotor Resistance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the rotor resistance of the asynchronous motor.	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 of the asynchronous motor.	Up to model (0.001mH~ 6553.5mH)	STOP
F02.14 (0x020E)	Stator Inductance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stator inductance of the asynchronous motor.	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 value of the stator resistance for the asynchronous motor.	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 value of the rotor resistance for the asynchronous motor.	Up to model (0.01%~ 50.00%)	READ
F02.17 (0x0211)	Per-unit Stator Leakage Inductance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the per-unit value of the stator leakage inductance for the asynchronous motor.	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 value of the stator inductance.	Up to model (0.1%~ 999.0%)	READ
F02.19 (0x0213)	F02.11~ F02.14 Decimal Point	**V/F SVC FVC PMVF PMSVC PMFVC** Set the decimal point of the four parameters from F02.11 to F02.14.	0x0000 (0x0000~ 0x2222)	STOP

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 motor.	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 motor.	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 motor.	Up to model (0.001mH~ 6553.5mH)	STOP
F02.23 (0x0217)	Back Emf	**V/F SVC FVC PMVF PMSVC PMFVC** Set the back emf of the permanent magnet synchronous motor. Only recognized in dynamic auto-tuning.	Up to model (0V~1500V)	STOP
F02.24 (0x0218)	Encoder Angle	**V/F SVC FVC PMVF PMSVC PMFVC** Set the encoder installation angle of the permanent magnet synchronous motor.	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 value of stator resistance for the permanent magnet synchronous motor.	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 value of d-axis inductance for the permanent magnet synchronous motor.	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 value of q-axis inductance for the permanent magnet synchronous motor.	Up to model (Monitored values)	READ
F02.28 (0x021C)	Pulse Width Coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pulse width coefficient of the permanent magnet synchronous motor.	Up to model (00.00~99.99)	STOP
F02.29 (0x021D)	F02.20~F02.22 Decimal Point	**V/F SVC FVC PMVF PMSVC PMFVC** Set the decimal point of the three parameters from F02.20to F02.22.	0x0000 (0x0000~0x2222)	STOP

F02.3x~F02.4x: Encoder Parameters

Code (Address)	Name	Content	Default (Range)	Property
F02.30 (0x021E)	Speed Encoder Type	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Common ABZ encoder (to extension port EX_B) 1: Resolver (to extension port 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 rotary transformer.	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)	Speed Detection 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 Tolerance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the Z pulse allowable tolerance.	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 Parameters

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 Coefficient 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 Coefficient 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 Coefficient 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stator resistance tuning coefficient 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: FVC 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

F03: Vector Control

F03.0x: ASR

Code (Address)	Name	Content	Default (Range)	Property
F03.00 (0x0300)	Rigidity Class	**V/F SVC FVC PMVF PMSVC PMFVC** Set the rigidity class of the speed loop. The higher the class, the better the speed rigidity.	32 (0~128)	RUN
F03.01 (0x0301)	Rigidity Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set the rigidity mode of the speed loop.	0x0000 (0x0000~ 0xFFFF)	RUN

F03.02 (0x0302)	HF Proportional Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the proportional gain for high-frequency operation of the speed loop.	10.00 (0.01~100.00)	RUN
F03.03 (0x0303)	HF Integral Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the integral time for high-frequency operation of the speed loop.	0.100s (0.000s~ 6.000s)	RUN
F03.04 (0x0304)	HF Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the filter time for high-speed operation of the speed loop.	0.0ms (0.0ms~ 100.0ms)	RUN
F03.05 (0x0305)	HF Shift Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the switching frequency for high-frequency operation of the speed loop.	0.00Hz (0.00Hz~ Max. frequency)	RUN
F03.06 (0x0306)	LF Proportional Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the proportional gain for low-frequency operation of the speed loop.	10.00 (0.01~100.00)	RUN
F03.07 (0x0307)	LF Integral Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the integral time for low-speed operation of the speed loop.	0.100S (0.000s~ 6.000s)	RUN
F03.08 (0x0308)	LF Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the filter time for low-frequency operation of the speed loop.	0.0ms (0.0ms~ 100.0ms)	RUN
F03.09 (0x0309)	LF Shift Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the switching frequency for low-frequency operation of the speed loop.	0.00Hz (0.00Hz~ F03.05)	RUN

F03.1x: ACR 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 integral gain of 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 integral gain of 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 during motoring.	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 speed.	0.0% (0.0%~ 400.0%)	RUN
F03.18 (0x0312)	Regenerative Torque Limit Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the operation frequency limited by torque at low speed.	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: Keypad 1: Potentiometer (on external single-row keypad) 2: AI1 3: AI2 4: Reserved 5: PUL 6: RS485 (0x3014) 7: Extension Tens-bit: Torque limit source during generating 0: Keypad 1: Potentiometer (on external single-row keypad) 2: AI1 3: AI2 4: Reserved 5: PUL 6: RS485 (0x3015) 7: Extension Hundreds-bit: 0: C00.06 displays the torque limit value during motoring 1: C00.06 displays 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 Pull-in Current	**V/F SVC FVC PMVF PMSVC PMFVC** When the SVC mode of the PM is on, the larger the pull-in current, the larger the torque output.	20.0% (0.0%~50.0%)	RUN
F03.21 (0x0315)	PM HF Pull-in Current	**V/F SVC FVC PMVF PMSVC PMFVC** When the SVC mode of the PM is on, the larger the pull-in current, the larger the torque output.	10.0% (0.0%~50.0%)	RUN

F03.22 (0x0316)	PM Pull-in 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)	Vector Slip Compensation	**V/F SVC FVC PMVF PMSVC PMFVC** Set the slip compensation under AM vector control.	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 feedforward coefficient under field weakening control.	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 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 axis 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 Range	**V/F SVC FVC PMVF PMSVC PMFVC** Set the over-excitation brake range.	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)	Min. ECO Excitation	**V/F SVC FVC PMVF PMSVC PMFVC** Set the min. excitation during auto energy-saving operation.	50.0% (0.0%~80.0%)	RUN
F03.39 (0x0327)	ECO 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 Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Torque limit under 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: Keypad 1: Potentiometer (on external single-row keypad) 2: AI1 3: AI2 4: Reserved 5: PUL 6: RS485 7: Extension 8: Reserved 9: Tension 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)	Torque	**V/F SVC FVC PMVF PMSVC PMFVC** Set the torque via keypad.	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 Lower Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the corresponding percentage to the torque lower limit.	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 Upper Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the corresponding percentage to the torque upper limit.	100.00% (-250.00%~ 300.00%)	RUN
F03.47 (0x032F)	Torque Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the operation frequency limited by torque at low speed.	0.100S (0.000s~ 6.000s)	RUN
F03.49 (0x0331)	Torque ACC Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the acceleration time when the given torque increases, with a reference of 100%. This parameter is only valid during torque control, and invalid during stop.	0.00s (0.00s~ 650.00s)	RUN
F03.50 (0x0332)	Torque DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the deceleration time when the given torque decreases, with a reference of 100%. This parameter is only valid during torque control, and invalid during stop.	0.00s (0.00s~ 650.00s)	RUN
F03.52 (0x0334)	Torque Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the output torque upper limit in torque control.	150.0% (0.0%~ 300.0%)	RUN
F03.53 (0x0335)	Torque Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the output torque lower limit in torque control.	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 (on 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: Extension×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 (on external single-row keypad)×F03.57 2: AI1× F03.57 3: AI2× F03.57 4: Reserved 5: PUL× F03.57 6: RS485 × F03.57 7: Extension×F03.57 8: Reserved	0 (0~8)	RUN
F03.56 (0x0338)	Max. FWD Speed	**V/F SVC FVC PMVF PMSVC PMFVC** Set the max. forward running speed under torque control.	100.0% (0.0%~ 100.0%)	RUN
F03.57 (0x0339)	Max. REV Speed	**V/F SVC FVC PMVF PMSVC PMFVC** Set the max. reverse running speed 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 given torque gain switching frequency.	1.00Hz (0.00Hz~Max. frequency)	RUN
F03.59 (0x033B)	Torque Gain	**V/F SVC FVC PMSVC PMFVC** Set the given torque gain.	100.0% (0.0%~ 500.0%)	RUN

F03.6x: PM HF Injection

Code (Address)	Name	Content	Default (Range)	Property
F03.60 (0x033C)	HF Injection	**V/F SVC FVC PMVF PMSVC PMFVC** Valid in PMSVC mode. 0: Disable 1~5: Enable, the greater the value, the higher the injection frequency.	0 (0~5)	STOP
F03.61 (0x033D)	HF Injection Voltage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the injection voltage range (relative to 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 OFF Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set 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)	Position Compensation Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the position compensation gain.	0.0 (0.0~100.0)	RUN
F03.72 (0x0348)	Position Compensation Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the position compensation limit.	0.0% (0.0%~100.0%)	STOP
F03.73 (0x0349)	Compensation Range	**V/F SVC FVC PMVF PMSVC PMFVC** Set the position compensation range.	10.0% (0.0%~100.0%)	STOP

F03.8x: Extension Control

Code (Address)	Name	Content	Default (Range)	Property
F03.80 (0x0350)	PM MTPA Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the MTPA gain of the permanent magnet synchronous motor.	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 of the permanent magnet synchronous motor.	1.0ms (0.0ms~100.0ms)	RUN

F04: V/F Control

F04.0x: V/F Control

Code (Address)	Name	Content	Default (Range)	Property
F04.00 (0x0400)	V/F Curve	**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 torque boost 0.1%~30.0%: Manual torque boost	Up to model (0.0%~30.0%)	RUN
F04.02 (0x0402)	Torque Boost OFF Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the range of the torque boost function. The torque boost function will be cut off 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 Range	**V/F SVC FVC PMVF PMSVC PMFVC** Set the slip compensation range.	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 oscillation suppression filter time.	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 Curves

Code (Address)	Name	Content	Default (Range)	Property
F04.10 (0x040A)	User-Defined Voltage 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the user-defined voltage 1.	3.0% (0.0%~ 100.0%)	STOP
F04.11 (0x040B)	User-Defined Frequency 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the user-defined frequency 1.	1.00Hz (0.00Hz~ Max. frequency)	STOP
F04.12 (0x040C)	User-Defined Voltage 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the user-defined voltage 2.	28.0% (0.0%~ 100.0%)	STOP
F04.13 (0x040D)	User-Defined Frequency 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the user-defined frequency 2.	10.00Hz (0.00Hz~ Max. frequency)	STOP
F04.14 (0x040E)	User-Defined Voltage 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the user-defined voltage 3.	55.0% (0.0%~ 100.0%)	STOP

F04.15 (0x040F)	User-Defined Frequency 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the user-defined frequency 3.	25.00Hz (0.00Hz~ Max. frequency)	STOP
F04.16 (0x0410)	User-Defined Voltage 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the user-defined voltage 4.	78.0% (0.0%~ 100.0%)	STOP
F04.17 (0x0411)	User-Defined Frequency 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the user-defined frequency 4.	37.50Hz (0.00Hz~ Max. frequency)	STOP
F04.18 (0x0412)	User-Defined Voltage 5	**V/F SVC FVC PMVF PMSVC PMFVC** Set the user-defined voltage 5.	100.0% (0.0%~100.0 %)	STOP
F04.19 (0x0413)	User-Defined Frequency 5	**V/F SVC FVC PMVF PMSVC PMFVC** Set the user-defined frequency 5.	50.00Hz (0.00Hz~ Max. frequency)	STOP

F04.2x: VF-SPLIT Control

Code (Address)	Name	Content	Default (Range)	Property
F04.20 (0x0414)	V/F-Split Voltage Source	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Source A Tens-bit: Source B 0: Voltage percentage 1: Potentiometer (on the external single-row keypad) 2: AI1 3: AI2 4: Reserved 5: PUL 6: PID 7: RS485 8: Extension 9: Voltage value Hundreds-bit: Combination method 0: Source A 1: Source B 2: A+B 3: A-B 4: MIN(A, B) 5: MAX(A, B)	0x0000 (0x0000~ 0x0599)	RUN

F04.21 (0x0415)	V/F-Split Voltage Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the output voltage percentage under V/F separation control.. 100.0% of it corresponds to the motor rated voltage.	0.00% (0.00%~ 110.00%)	RUN
F04.22 (0x0416)	V/F-Split Voltage ACC Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the voltage acceleration time under V/F separation control.	10.00s (0.00s~ 100.00s)	RUN
F04.23 (0x0417)	V/F-Split Voltage DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the voltage deceleration time under V/F separation control.	10.00s (0.00s~ 100.00s)	RUN
F04.24 (0x0418)	V/F-Split Stop Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stop mode under V/F separation control. 0: ACC./DEC. of output voltage and that of output frequency do not affect each other 1: Output frequency drops after the output voltage drops to 0V	0 (0~1)	RUN
F04.25 (0x0419)	V/F-Split Voltage Value	**V/F SVC FVC PMVF PMSVC PMFVC** Set the voltage value under V/F separation control.	0.00V (0.00V~ 600.00V)	RUN

F04.3x: V/F ECO Control

Code (Address)	Name	Content	Default (Range)	Property
F04.30 (0x041E)	V/F ECO Function	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: ON	0 (0~1)	STOP
F04.31 (0x041F)	V/F ECO Min. Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the minimum frequency of the V/F ECO mode.	15.0Hz (0.0Hz~ 50.0Hz)	STOP
F04.32 (0x0420)	V/F ECO Min. Voltage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the minimum voltage of the V/F ECO mode.	50.0% (20.0%~ 100.0%)	STOP

F04.33 (0x0421)	V/F ECO Voltage DEC Rate	**V/F SVC FVC PMVF PMSVC PMFVC** Set the voltage deceleration rate under the V/F ECO mode.	0.010V/ms (0.010V/ms~ 0.200V/ms)	RUN
F04.34 (0x0422)	V/F ECO Voltage ACC Rate	**V/F SVC FVC PMVF PMSVC PMFVC** Set the voltage acceleration rate under the V/F ECO mode.	0.200V/ms (0.000V/ms~ 2.000V/ms)	RUN
F04.35 (0x0423)	Over-excitation Coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** It is valid when F10.11 tens-bit is not set to zero. The output voltage increases with increasing bus voltage at the same output.	64 (0~200)	RUN

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 (0~95)	STOP
F05.01 (0x0501)	X2 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	2 (0~95)	STOP
F05.02 (0x0502)	X3 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	4 (0~95)	STOP
F05.03 (0x0503)	X4 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	5 (0~95)	STOP
F05.04 (0x0504)	X5 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	6 (0~95)	STOP
F05.05 (0x0505)	X6 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~95)	STOP
F05.06 (0x0506)	X7 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~95)	STOP

F05.07 (0x0507)	X8 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~95)	STOP
F05.08 (0x0508)	X9 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~95)	STOP
F05.09 (0x0509)	X10 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~95)	STOP

F05.1x: DI Terminal 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 terminal X1 from OFF to ON.	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 terminal X1 from ON to OFF.	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 terminal X2 from OFF to ON.	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 terminal X2 from ON to OFF.	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 terminal X3 from OFF to ON.	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 terminal X3 from ON to OFF.	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 terminal X4 from OFF to ON.	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 terminal X4 from ON to OFF.	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.	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.	0.010s (0.000s~6.000s)	RUN

F05.2x: DI Terminal Mode

Code (Address)	Name	Content	Default (Range)	Property
F05.20 (0x0514)	Terminal Control Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Two-line 1 1: Two-line 2 2: Three-line 1 3: Three-line 2 **Note:** See Appendix II for terminal wiring.	0 (0~3)	STOP
F05.22 (0x0516)	X1~X4 Terminal 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 Terminal 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 Terminal Characteristics	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Valid when closed 1: Valid when open Ones-bit: X9 Tens-bit: X10	0000 (0000~1111)	RUN

F05.25 (0x0519)	UP/DW Frequency Adjustment	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Power-down save on 1: Power-down save off 2: Adjustable during operation, clear after stop	0 (0~2)	STOP
F05.26 (0x051A)	UP/DW Frequency ACC/DEC Rate	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency acceleration/deceleration rate via the UP/DW terminal.	0.50Hz/s (0.01Hz/s~50.00Hz/s)	RUN
F05.27 (0x051B)	E-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)	Input Signal	**V/F SVC FVC PMVF PMSVC PMFVC** 0: X5 (5.00kHz) 1: Extension X10 (Max. 100.00kHz) 2: X5 (Max. 100.00kHz)	0 (0~2)	STOP
F05.31 (0x051F)	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)	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)	Max. Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set 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 max. 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 OFF Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Frequencies below this parameter are no longer recognized by the drive. Process as 0Hz	0.010kHz (0.000kHz~ 1.000kHz)	RUN

F05.4x: AI Parameters

Code (Address)	Name	Content	Default (Range)	Property
F05.41 (0x0529)	AI1 Type	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Voltage 0.00V~10.00V 1: Current 0.00mA~20.00mA	0 (0~1)	RUN
F05.42 (0x052A)	AI2 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)	AI Curve	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: AI1 Tens-bit: AI2 0: Line (default) 1: Curve 1 2: Curve 2	0000 (0000~0022)	RUN

F05.5x: AI Linear Parameters

Code (Address)	Name	Content	Default (Range)	Property
F05.50 (0x0532)	AI1 Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Define the signal lower limit received at the AI1 terminal. The voltage signal below this value is processed as this setting.	0.0% (-100.0%~ 100.0%)	RUN

F05.51 (0x0533)	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
F05.52 (0x0534)	AI1 Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Define the signal upper limit received at the AI1 terminal. The voltage signal higher than this value is processed as this setting.	100.0% (-100.0%~ 100.0%)	RUN
F05.53 (0x0535)	AI1 Upper Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the AI1 upper limit.	100.00% (-100.00%~ 100.00%)	RUN
F05.54 (0x0536)	AI1 Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the size of the filtering applied to the AI1 signal to remove interference signals.	0.100s (0.000s~ 6.000s)	RUN
F05.55 (0x0537)	AI2 Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Define the signal lower limit received at the AI2 terminal. The voltage signal below this value is processed as this setting.	0.0% (-100.0%~ 100.0%)	RUN
F05.56 (0x0538)	AI2 Lower Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the AI2 lower limit.	0.00% (-100.00%~ 100.00%)	RUN
F05.57 (0x0539)	AI2 Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Define the signal upper limit received at the AI2 terminal. The voltage signal higher than this value is processed as this setting.	100.0% (-100.0%~ 100.0%)	RUN
F05.58 (0x053A)	AI2 Upper Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the AI2 upper limit.	100.00% (-100.00%~ 100.00%)	RUN
F05.59 (0x053B)	AI2 Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the size of the filtering applied to the AI2 signal to remove interference 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)	Curve 1 Lower Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of curve 1 lower limit.	0.00% (-100.00%~ 100.00%)	RUN
F05.62 (0x053E)	Curve 1 Inflection Point 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the input voltage at 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 voltage percentage at curve 1 inflection point 1.	30.00% (-100.00%~ 100.00%)	RUN
F05.64 (0x0540)	Curve 1 Inflection Point 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the input voltage at 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 voltage percentage at curve 1 inflection point 2.	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)	Curve 1 Upper Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of curve 1 upper limit.	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)	Curve 2 Lower Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of curve 2 lower limit.	0.00% (-100.00%~ 100.00%)	RUN
F05.72 (0x0548)	Curve 2 Inflection Point 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the input voltage at curve 2 inflection point 1.	30.0% (0.0%~ 100.0%)	RUN
F05.73 (0x0549)	Inflection Point 1 Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the voltage percentage at curve 2 inflection point 1.	30.00% (-100.00%~ 100.00%)	RUN
F05.74 (0x054A)	Curve 2 Inflection Point 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the input voltage at 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 voltage percentage at curve 2 inflection point 2.	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)	Curve 2 Upper Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of curve 2 upper limit.	100.00% (-100.00%~ 100.00%)	RUN

F05.8x: AI as DI Terminal

Code (Address)	Name	Content	Default (Range)	Property
F05.80 (0x0550)	AI as DI Logic	**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)	AI1 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~95)	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** Any value below this setting is considered as low level.	30.00% (0.00%~ 100.00%)	RUN
F05.84 (0x0554)	AI2 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~95)	STOP
F05.85 (0x0555)	AI2 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
F05.86 (0x0556)	AI2 Low Level	**V/F SVC FVC PMVF PMSVC PMFVC** Any value below this setting is considered as low level.	30.00% (0.00%~ 100.00%)	RUN

F06: Output Terminal

F06.0x: AO (Analog Output)

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 setting 9: PID feedback 10: Output power 11: Bus voltage 12: AI1 value 13: AI2 value 14: Reserved 15: PUL 16: Module temp. 1 17: Module temp. 2 18: 485 communication 19: vY1 function	0 (0~19)	RUN
F06.02 (0x0602)	AO Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the analog output from the terminals.	100.0% (0.0%~ 300.0%)	RUN
F06.03 (0x0603)	AO Bias	**V/F SVC FVC PMVF PMSVC PMFVC** Set the AO bias to adjust the zero point of the terminal output.	0.0% (-10.0%~ 10.0%)	RUN
F06.04 (0x0604)	AO Filter	**V/F SVC FVC PMVF PMSVC PMFVC** Set 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 analog output as the lower limit of frequency.	0.20kHz (0.00kHz~ 100.00kHz)	RUN
F06.06 (0x0606)	AO as FM Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set analog output as the upper limit of frequency.	50.00kHz (0.00kHz~ 100.00kHz)	RUN

F06.1x: AO Extension

Code (Address)	Name	Content	Default (Range)	Property
F06.10 (0x060A)	AO Extension 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
F06.11 (0x060B)	AO Extension Content	**V/F SVC FVC PMVF PMSVC PMFVC** The same as F06.01.	1 (0~19)	RUN
F06.12 (0x060C)	AO Extension Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the analog output from the terminals.	100.0% (0.0%~ 300.0%)	RUN
F06.13 (0x060D)	AO Extension Bias	**V/F SVC FVC PMVF PMSVC PMFVC** Set the bias to adjust the zero point of the terminal output.	0.0% (-10.0%~ 10.0%)	RUN
F06.14 (0x060E)	AO Extension Filter	**V/F SVC FVC PMVF PMSVC PMFVC** Set the filter applied to the 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)	Polarity	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Y terminal Tens-bit: Relay terminal Hundreds-bit: Y extension terminal Thousands-bit: Relay extension terminal 0: Positive 1: Negative	0000 (0000~1111)	RUN
F06.21 (0x0615)	Y Terminal Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal Y.	1 (0~63)	RUN
F06.22 (0x0616)	Relay Terminal Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal Y.	4 (0~63)	RUN

F06.23 (0x0617)	Y Extension Function	**V/F SVC FVC PMVF PMSVC PMFVC** Set the function of extended Y terminal.	0 (0~63)	RUN
F06.24 (0x0618)	Relay Extension Function	**V/F SVC FVC PMVF PMSVC PMFVC** Set the function of extended relay 2.	0 (0~63)	RUN
F06.25 (0x0619)	Y Terminal ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time when Y terminal is switched on.	0.010s (0.000s~ 60.000s)	RUN
F06.26 (0x061A)	Relay Terminal ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time when the relay terminal is switched on.	0.010s (0.000s~ 60.000s)	RUN
F06.27 (0x061B)	Y Extension ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time when Y extension terminal is switched on.	0.010s (0.000s~ 60.000s)	RUN
F06.28 (0x061C)	Relay Extension ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time when relay extension terminal is switched on.	0.010s (0.000s~ 60.000s)	RUN
F06.29 (0x061D)	Y Terminal OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time when Y terminal is switched off.	0.010s (0.000s~ 60.000s)	RUN
F06.30 (0x061E)	Relay Terminal OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time when relay terminal is switched off.	0.010s (0.000s~ 60.000s)	RUN
F06.31 (0x061F)	Y Extension OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time when Y extension terminal is switched off.	0.010s (0.000s~ 60.000s)	RUN
F06.32 (0x0620)	Relay Extension OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time when relay extension terminal is switched off.	0.010s (0.000s~ 60.000s)	RUN

F06.4x: Frequency Detection

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

F06.5x: Monitoring Comparator Output 1

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 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)	Comparator 1 Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Continue operation (DO terminal only) 1: Report alarm and free stop 2: Report warning 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 00~63 to yy in monitor parameter Cxx.yy. Hundreds and thousands-bit: Set 00~07 to xx in monitor parameter 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)	Comparator 2 Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Continue operation (DO terminal only) 1: Report alarm and free stop 2: Report warning 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 (0~95)	RUN
F06.61 (0x063D)	vX2 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~95)	RUN
F06.62 (0x063E)	vX3 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~95)	RUN

F06.63 (0x063F)	vX4 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal X.	0 (0~95)	RUN
F06.64 (0x0640)	vX ON Source	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Internal connection with vYn terminal 1: Connection with Xn terminal 2: Funcode Ones-bit: vX1 Tens-bit: vX2 Hundreds-bit: vX3 Thousands-bit: vX4	0000 (0000~2222)	RUN
F06.65 (0x0641)	vX ON via Funcode	**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 the functions of terminal Y.	0 (0~63)	RUN
F06.67 (0x0643)	vY2 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal Y.	0 (0~63)	RUN
F06.68 (0x0644)	vY3 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal Y.	0 (0~63)	RUN
F06.69 (0x0645)	vY4 Function	**V/F SVC FVC PMVF PMSVC PMFVC** See the functions of terminal Y.	0 (0~63)	RUN
F06.70 (0x0646)	vY1 ON Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the delay time when vY1 terminal is switched 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 when vY2 terminal is switched 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 when vY3 terminal is switched 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 when vY4 terminal is switched 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 when vY1 is switched 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 when vY2 is switched 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 when vY3 is switched 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 when vY4 is switched off.	0.010s (0.000s~ 60.000s)	RUN

F06.7x: Monitor Comparator 2 Output

Code (Address)	Name	Content	Default (Range)	Property
F06.80 (0x0650)	Comparator 3 Item	**V/F SVC FVC PMVF PMSVC PMFVC** Ones- and tens-bit: Set 00~63 to yy in monitor parameter Cxx.yy. Hundreds and thousands-bit: Set 00~07 to xx in monitor parameter Cxx.yy.	0003 (0000~0763)	RUN
F06.81 (0x0651)	Comparator 3 Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the comparator 3 upper limit.	(Up to F06.80)	RUN
F06.82 (0x0652)	Comparator 3 Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the comparator 3 lower limit.	(Up to F06.80)	RUN
F06.83 (0x0653)	Comparator 3 Bias	**V/F SVC FVC PMVF PMSVC PMFVC** Set the comparator 3 bias value.	(Up to F06.80)	RUN

F06.84 (0x0654)	Comparator 3 Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Continue operation (DO terminal only) 1: Report alarm and free stop 2: Report warning and continue operation 3: Force stop	0 (0~3)	RUN
F06.85 (0x0655)	Comparator 4 Item	**V/F SVC FVC PMVF PMSVC PMFVC** Ones- and tens-bit: Set 00~63 to yy in monitor parameter Cxx.yy. Hundreds and thousands-bit: Set 00~07 to xx in monitor parameter Cxx.yy.	0004 (0000~0763)	RUN
F06.86 (0x0656)	Comparator 4 Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the comparator 4 upper limit.	(Up to F06.85)	RUN
F06.87 (0x0657)	Comparator 4 Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the comparator 4 lower limit.	(Up to F06.85)	RUN
F06.88 (0x0658)	Comparator 4 Bias	**V/F SVC FVC PMVF PMSVC PMFVC** Set the comparator 4 bias value.	(Up to F06.85)	RUN
F06.89 (0x0659)	Comparator 4 Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Continue operation (DO terminal only) 1: Report alarm and free stop 2: Report warning and continue operation 3: Forced stop	0 (0~3)	RUN
F06.90 (0x065A)	Comparator ON Delay	Set the delay time when comparator 1~4 is turned on for output.	0.010 (0.000s~ 60.000s)	RUN
F06.91 (0x065B)	Comparator OFF Delay	Set the delay time when comparator 1~4 is turned off.	0.010 (0.000s~ 60.000s)	RUN

F07: Operation Control

F07.0x: Connection

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)	Start Pre-Excitation Time	**V/F SVC FVC PMVF PMSVC PMFVC** Only asynchronous motors in SVC support pre-excitation.	0.00s (0.00s~ 60.00s)	STOP
F07.02 (0x0702)	Start Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Drive will not start but stay in standby when the given frequency is lower than this value.	0.00Hz (0.00Hz~Upper limit frequency)	STOP
F07.03 (0x0703)	Start 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 are valid, report A. runx alarm when protection is triggered.	0111 (0000~1111)	STOP

F07.05 (0x0705)	Operation Direction	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Reverse operation 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 Hundreds-bit: Frequency controlled direction 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.	0000 (0000~1121)	STOP
F07.06 (0x0706)	Power-Down Restart Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Start from fly track 2: Start as startup mode setting	0 (0~2)	STOP
F07.07 (0x0707)	Power-Down Restart Interval	**V/F SVC FVC PMVF PMSVC PMFVC** Set the waiting interval to restart after power down.	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)	Stop 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~Upper limit frequency)	RUN
F07.12 (0x070C)	Pause-Restart Interval	**V/F SVC FVC PMVF PMSVC PMFVC** Set waiting time to restart after operation pause.	0.00s (0.00s~ 60.00s)	STOP

F07.15 (0x070F)	Under-Lower Limit Frequency Mode	**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 frequency	2 (0~3)	RUN
F07.16 (0x0710)	Zero Frequency Torque Coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** Set the torque current during zero-frequency operation, 100.0% of the rated drive current.	60.0% (0.0%~ 150.0%)	RUN
F07.17 (0x0711)	Zero Frequency Torque 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 DC Braking Current	**V/F SVC FVC PMVF PMSVC PMFVC** The reference is the rated current of the motor, and it's limited by the rated drive current.	60.0% (0.0%~ 150.0%)	STOP
F07.21 (0x0715)	Start DC Braking Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the DC braking duration during start.	0.0s (0.0s~60.0s)	STOP
F07.22 (0x0716)	Stop DC Braking Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the DC braking working frequency to stop.	1.00Hz (0.00Hz~ 50.00Hz)	STOP
F07.23 (0x0717)	Stop DC Braking Current	**V/F SVC FVC PMVF PMSVC PMFVC** The reference is the rated current of the motor, and it's limited by the rated drive current.	60.0% (0.0%~ 150.0%)	STOP

F07.24 (0x0718)	Stop DC Braking Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the duration of DC braking 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 Tens-bit: Reverse search 0: OFF 1: ON Hundreds-bit: Search source 0: Software 1: Hardware	0000 (0000~1111)	STOP
F07.26 (0x071A)	Fly Track Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the fly track time.	0.50s (0.00s~ 60.00s)	STOP
F07.27 (0x071B)	Fly Track Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the fly track stop delay.	1.00s (0.00s~ 60.00s)	STOP
F07.28 (0x071C)	Fly Track Current	**V/F SVC FVC PMVF PMSVC PMFVC** Set the fly track current.	120.0% (0.0%~ 400.0%)	STOP

F07.3x: Jogging

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. frequency)	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)	S-curve Jog	**V/F SVC FVC PMVF PMSVC PMFVC** Set the S-curve for jogging. 0: OFF 1: ON	1 (0~1)	RUN

F07.34 (0x0722)	Jog Stop Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stop mode for jogging. 0: By F7.10 setting 1: Deceleration stop only	0 (0~1)	STOP

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

Code (Address)	Name	Content	Default (Range)	Property
F07.40 (0x0728)	Start 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~ Upper limit frequency)	STOP
F07.41 (0x0729)	Start Hold Frequency Time	**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)	Stop Hold Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the holding frequency during stop.	0.50Hz (0.00Hz~ Upper limit frequency)	STOP
F07.43 (0x072B)	Stop Hold Frequency Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency holding 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. frequency)	RUN
F07.45 (0x072D)	Jump Frequency 1 Range	**V/F SVC FVC PMVF PMSVC PMFVC** Set the range for jump frequency 1.	0.00Hz (0.00Hz~ Max. frequency)	RUN
F07.46 (0x072E)	Jump Frequency 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the jump frequency 2.	0.00Hz (0.00Hz~ Max. frequency)	RUN
F07.47 (0x072F)	Jump Frequency 2 Range	**V/F SVC FVC PMVF PMSVC PMFVC** Set the range for jump frequency 2.	0.00Hz (0.00Hz~ Max. frequency)	RUN

F08: Auxiliary Control

F08.0x: Counting and Timing

Code (Address)	Name	Content	Default (Range)	Property
F08.00 (0x0800)	Counter Source	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Common X terminal 1: PUL terminal 2~5: Reserved	0 (0~5)	RUN
F08.01	Counter	**V/F SVC FVC PMVF PMSVC**	0	RUN
F08.02 (0x0802)	Max. Counting	**V/F SVC FVC PMVF PMSVC PMFVC** Set the max. value for the counting circuit.	1000 (0~65000)	RUN
F08.03 (0x0803)	Counter Setting	**V/F SVC FVC PMVF PMSVC PMFVC** Set the value for the counting circuit.	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** Increase the length to output, while reset when one terminal length is reached.	1000m (0m~65535m)	STOP
F08.06 (0x0806)	Actual Length	**V/F SVC FVC PMVF PMSVC PMFVC**	0m (0m~65535m)	STOP
F08.07 (0x0807)	Timer Unit	**V/F SVC FVC PMVF PMSVC PMFVC**	0 (0~2)	STOP
F08.08 (0x0808)	Timer	**V/F SVC FVC PMVF PMSVC PMFVC** Set the value for timing.	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 Frequency Range	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Start method 0: Auto 1: Manual via terminal Tens-bit: Wobble frequency range 0: Center frequency-based 1: Max. frequency-based Hundreds-bit: Preset frequency 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. frequency)	STOP
F08.33 (0x0821)	Wobble Frequency Preset 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)	Wobble Frequency Jump Range	**V/F SVC FVC PMVF PMSVC PMFVC** Set the wobble frequency jump range.	10.0% (0.0%~ 50.0%)	STOP
F08.36 (0x0824)	Wobble ACC Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the triangular wave rise time.	5.00s (0.00s~ 650.00s)	STOP
F08.37 (0x0825)	Wobble DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the triangular wave drop time.	5.00s (0.00s~ 650.00s)	STOP
F08.41 (0x0829)	Monitoring 1 Ratio	**V/F SVC FVC PMVF PMSVC PMFVC** Thousands-bit: Decimal digit setting Hundreds-bit: C0x setting Tens-, ones-bit: Set yy in C0x.yy	2000 (0000~3763)	RUN

F08.42 (0x082A)	Monitoring 1 Proportional Coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** Set the proportional coefficient for monitoring value 1, and the calculated monitoring value is C02.23.	1.00 (0.00~ 600.00)	RUN
F08.43 (0x082B)	Monitoring 2 Ratio	**V/F SVC FVC PMVF PMSVC PMFVC** Thousands-bit: Decimal digit setting Hundreds-bit: C0x setting Tens-, ones-bit: Set yy in C0x.yy	2001 (0000~3763)	RUN
F08.44 (0x082C)	Monitoring 2 Proportional Coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** Set the proportional coefficient for monitoring value 2, and the calculated monitoring value is C02.24.	1.00 (0.00~ 600.00)	RUN

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** Set it to 0.0% when replacing the main relay.	0.0% (0.0%~ 150.0%)	STOP

F10: Protection Parameters

F10.0x: Current Protection

Code (Address)	Name	Content	Default (Range)	Property
F10.00 (0x0A00)	Anti-OC	**V/F SVC FVC PMVF PMSVC PMFVC** Auto limit the output current below the set overcurrent suppression point to prevent overcurrent error triggered. 0: Always ON 1: ON during ACC/DEC and OFF at constant speed	0 (0~1)	RUN
F10.01 (0x0A01)	Anti-OC Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the load current limit level, 100% of the drive rated current	160.0% (0.0%~ 300.0%)	RUN
F10.02 (0x0A02)	Anti-OC Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the response effect of overcurrent suppression.	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-interference for OC protection 0: Normal 1: Level 1 2: Level 2 Hundreds-bit: Anti-interference for SC protection 0: Normal 1: Level 1 2: Level 2 Thousand bits: SC, OC, OU, error reset delay 0: OFF 1: ON	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 detection, report E. oLF4. 0: OFF 1: ON	0001 (0000~ 0011)	STOP
F10.05 (0x0A05)	Current Imbalance Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** The ratio of the largest to the smallest phase of the three-phase current. This is used to judge current imbalance error by comparing it with the set value.	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
F10.10 (0x0A0A)	Operation Pause Delay	**V/F SVC FVC PMVF PMSVC PMFVC** When the set value is zero, trigger the UV error as usual. While if the set value is non-zero, trigger the UV alarm, the output will be suppressed, and the system will pause. If the UV still exists after the delay, report error, and if the voltage recovers during delay, operation is immediately resumed.	0.0s (0.0s~10.0s)	STOP

F10.11 (0x0A0B)	Anti-OU	**V/F SVC FVC PMVF PMSVC PMFVC** If the bus voltage is higher than the overvoltage suppression point, acceleration and deceleration will be slowed down or stopped to prevent overvoltage faults. Ones-bit: Anti-OU function 0: OFF 1: ON Tens-bit: Over-excitation 0: OFF 1: ON during deceleration 2: ON during operation	0011 (0000~0021)	STOP
F10.12 (0x0A0C)	Anti-OU Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the bus voltage value to trigger the anti-overvoltage function.	T3: 750V S2: 370V (0V~OU limit) T3 OU point: 820V S2 OU point: 400V	STOP
F10.13 (0x0A0D)	Anti-OU Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the response effect of overvoltage suppression.	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-OV 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~OU limit) T3 OU point: 820V S2 OU point: 400V	RUN

F10.16 (0x0A10)	Anti-LU	**V/F SVC FVC PMVF PMSVC PMFVC** Auto adjust the operation frequency when the bus voltage is lower than the under-voltage suppression point to prevent under-voltage faults. 0: OFF 1: ON	0 (0~1)	STOP
F10.17 (0x0A11)	Anti-LU Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the bus voltage value to trigger the low-voltage suppression function.	T3: 430V S2: 240V (0V~OU limit) T3 OU point: 820V S2 OU point: 400V	STOP
F10.18 (0x0A12)	Anti-LU 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)	Bus LU Protection Voltage	**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~OU limit) 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	**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 when input phase loss is detected, continue operation 2: ON, report E.iLF when input phase loss is detected, free stop Hundreds-bit: Reserved Thousands-bit: Reserved	0021 (000~1121)	STOP

F10.21 (0x0A15)	Input Phase Loss Level	**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)	Short Ground 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 Hundreds-bit: 24V power supply short circuit protection 0: OFF 1: ON	0111 (0000~0112)	STOP
F10.23 (0x0A17)	Fan Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set the drive fan operation mode. 0: Fan runs after the drive is powered up 1: Fan runs according to temperature, and runs with the drive 2: Fan runs for the set time of F10.24 and stops. It relates to temperature.	1 (0~2)	RUN
F10.24 (0x0A18)	Fan OFF Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time from operation command release to fan stopping.	30.00s (0.00s~ 600.00s)	STOP
F10.25 (0x0A19)	Drive oH1 Warning Level	**V/F SVC FVC PMVF PMSVC PMFVC** Set the value for overheat detection, report alarm when it is above this value.	80.0℃ (0.0℃~ 100.0℃)	RUN

F10.26 (0x0A1A)	Motor OT and Module Temperature Sensor	**V/F SVC FVC PMVF PMSVC PMFVC** Set the function related to motor over-temperature protection with the IO extension. Ones-bit: Motor temperature sensor type 0: PT1000 1: KTY84 IO extension dip switches to KTY, and F10.26 is valid. IO extension dip switches to PT100, and PT100 sensor is valid. Tens-bit: Motor temperature detection duration 0: 2s 1: Fault identification off 2: 5s 3: 30s 4: 60s 5: 120s 6: 300s (5min) - default 7: 600s 8: 1200s 9: 1800s (30min) Note: When the output current is lower than 1/2 of the rated current of the motor, the time is twice the set value. Hundreds-bit: Internal module temperature sensor disconnection detection 0: ON, this function is not related to the extension 1: OFF Thousands-bit: Motor temperature disconnection mode 0: OFF 1: Report alarm and free stop 2: Report warning and continue operation	0061 (0000~0091)	RUN
F10.27 (0x0A1B)	Motor Overheat Alarm (Extension)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the motor overheat limit, report alarm when it is above this value.	110.0℃ (0.0℃~ 200.0℃)	RUN
F10.28 (0x0A1C)	Motor Overheat Warning (Extension)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the value for over-temperature, report warning when it is above this value.	90.0℃ (0.0℃~ F10.27)	RUN

F10.3x: Load Protection

Code (Address)	Name	Content	Default (Range)	Property
F10.31 (0x0A1F)	Load Alarm Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the load alarm threshold under vector control. Ones-bit: Load alarm reference 0: Output torque 1: Output current	0000 (0000~ 0001)	STOP
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 at constant speed only 3: Detect underload 4: Detect underload at constant speed only Tens-bit: Load detection 1 alarm mode 0: Continue to run, report A. LD1 1: Free stop, report E. LD1 Hundreds-bit: Load detection mode 2 0: OFF 1: Detect overload 2: Detect overload at constant speed only 3: Detect underload 4: Detect underload at constant speed only Thousands-bit: Load detection 2 alarm mode 0: Continue to run, report A. LD1 1: Free stop, report E. LD1	0000 (0000~ 1414)	STOP
F10.33 (0x0A21)	Load Alarm Level 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. 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 Level 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. 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: Overspeed Protection

Code (Address)	Name	Content	Default (Range)	Property
F10.40 (0x0A28)	Excessive Speed Deviation Protection	**V/F SVC FVC PMVF PMSVC PMFVC** Set the detection mode and alarm mode of excessive deviation between the motor's given speed and the feedback speed. Ones-bit: Detection mode 0: OFF 1: Detect only at constant speed 2: ON Tens-bit: Alarm mode 0: Free stop and report error 1: Report alarm and continue operation	0000 (0000~ 0012)	STOP
F10.41 (0x0A29)	Excessive Speed Deviation Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the detection value for excessive speed deviation, 100% of F01.10 [Max. Frequency].	10.0% (0.0%~ 60.0%)	STOP

F10.42 (0x0A2A)	Excessive Speed Deviation Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time for excessive speed deviation detection. If the deviation between the given speed and the feedback speed is greater than F10.41 for this time, report excessive speed deviation alarm.	2.0s (0.0s~ 60.0s)	STOP
F10.43 (0x0A2B)	Overspeed Protection	**V/F SVC FVC PMVF PMSVC PMFVC** Set the detection mode and alarm mode of overspeed. Ones-bit: Detection mode 0: OFF 1: Detect only at constant speed 2: ON Tens-bit: Alarm mode 0: Free stop and report error 1: Report alarm and continue operation	0002 (0000~ 0012)	STOP
F10.44 (0x0A2C)	Overspeed Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the value of the overspeed warning for detection, 100% of F01.10 [Max. Frequency].	110.0% (0.0%~ 150.0%)	STOP
F10.45 (0x0A2D)	Overspeed Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the duration of overspeed detection, if the feedback speed is higher than F10.44 and lasts for the set time here, report warning.	0.100S (0.000s~ 2.000s)	STOP

F10.5x: Error Reset Protection and Motor Overload

Code (Address)	Name	Content	Default (Range)	Property
F10.50 (0x0A32)	Auto Reset No.	**V/F SVC FVC PMVF PMSVC PMFVC** Set the number of times allowed to perform error auto reset. Note: 0 indicates that the auto reset function is disabled; otherwise, it is enabled.	0 (0~10)	STOP

F10.51 (0x0A33)	Auto Reset Interval	**V/F SVC FVC PMVF PMSVC PMFVC** Set the waiting time after an error occurs until reset.	1.0s (0.0s~ 100.0s)	STOP
F10.52 (0x0A34)	Performed Auto Reset	**V/F SVC FVC PMVF PMSVC PMFVC** Indicate the times of already performed auto error reset, read-only.	0	READ
F10.53 (0x0A35)	OV Auto-recovery No.	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Reserved Tens-bit: Overvoltage auto-recovery times 0: OFF 1~F: ON	0000 (0000~ 00F0)	STOP
F10.54 (0x0A36)	Operation Pause No.	**V/F SVC FVC PMVF PMSVC PMFVC** Record the times when operation set on F10.10 is paused, it is a read-only parameter, and will be cleared by re-power-up.	0 (0~10)	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)	Insulation Grade	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Grade A 1: Grade E 2: Grade B 3: Grade F 4: Grade H 5: Special grade S	3 (0~5)	STOP
F10.57 (0x0A39)	Work Mode	**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 OL Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the motor overload threshold. Record the overload quantity when actual current is greater than the value here.	105.0% (0.0%~ 130.0%)	STOP
F10.59 (0x0A3B)	Motor OL Coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** Motor overload current = actual current * motor overload current coefficient	100.0% (0.0%~ 250.0%)	STOP

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: Lock parameters modified via keypad 2: Lock functional parameters and non-start/stop key 3: Lock all the functional parameters and keys	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: Invalid 1: REV 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 invalid 1: Non-keypad stop works according to F07.10 2: Non-keypad stop works according to the free stop mode	0 (0~2)	STOP
F11.04 (0x0B04)	UP/DW (Knob) Key Function	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: UP/DW key for modification 0: OFF 1: ON to modify F01.09 [Frequency] 2: ON to modify F13.01 [PID Setting/Feedback] 3: ON to modify the function code Tens-bit: Power-down save 0: OFF 1: ON Hundreds-bit: Modification condition 0: Modifiable during operation and stop 1: Modifiable during operation, kept during stop 2: Adjustable during operation, clear after stop	0011 (0000~0213)	STOP
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 parameter code Fxx.yy Hundreds- and thousands-bit: set 00~15 to xx in parameter code Fxx.yy	0109 (0000~2999)	RUN

F11.06 (0x0B06)	Command Key	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bits: Internal/external command keys (RUN, STOP/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)	L/R Shift Key	**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 are invalid, the monitor display value is shown as parameter 1 after re-powering up.	0011 (0000~0011)	STOP
F11.11 (0x0B0B)	Parameter 1 for 1st Row Cyclic Display	**V/F SVC FVC PMVF PMSVC PMFVC** Ones- and tens-bit: Set 00~63 to yy in monitor parameter Cxx.yy. Hundreds and thousands-bit: Set 00~07 to xx in monitor parameter Cxx.yy.	0000 (0000~0763)	RUN
F11.12 (0x0B0C)	Parameter 2 for 1st Row Cyclic Display	**V/F SVC FVC PMVF PMSVC PMFVC** The same as above.	0001 (0000~0763)	RUN

F11.13 (0x0B0D)	Parameter 3 for 1st Row Cyclic Display	**V/F SVC FVC PMVF PMSVC PMFVC** The same as above.	0002 (0000~0763)	RUN
F11.14 (0x0B0E)	Parameter 4 for 1st Row Cyclic Display	**V/F SVC FVC PMVF PMSVC PMFVC** The same as above.	0011 (0000~0763)	RUN
F11.15 (0x0B0F)	Parameter 1 for 2nd Row Cyclic Display	**V/F SVC FVC PMVF PMSVC PMFVC** The same as above.	0002 (0000~0763)	RUN
F11.16 (0x0B10)	Parameter 2 for 2nd Row Cyclic Display	**V/F SVC FVC PMVF PMSVC PMFVC** The same as above.	0004 (0000~0763)	RUN
F11.17 (0x0B11)	Parameter 3 for 2nd Row Cyclic Display	**V/F SVC FVC PMVF PMSVC PMFVC** The same as above.	0010 (0000~0763)	RUN
F11.18 (0x0B12)	Parameter 4 for 2nd Row Cyclic Display	**V/F SVC FVC PMVF PMSVC PMFVC** The same as above.	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 error code switching 0: OFF 1: ON, error code is the same as AC300 during 485 communication 2: ON, error code is 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)	Error Auto-Reset Display	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Error display 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 Giving Voltage Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the lower limit voltage via the keypad potentiometer (valid on the external single-row keypad).	0.50V (0.00V~ 3.00V)	RUN

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

F12: Communication Parameters

F12.0x: Modbus Slave Parameters

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 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: 9600bps 4: 19200bps 5: 38400bps 6: 57600bps	3 (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	**V/F SVC FVC PMVF PMSVC PMFVC** 0: ON to white operation 1: OFF to write operation	0 (0~1)	RUN
F12.05 (0x0C05)	Response Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the interval between the completion of receiving data and replying to the master with answer data.	0ms (0ms~ 5000ms)	RUN
F12.06 (0x0C06)	Communicatio n Timeout	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time between two communications to detect a communication disconnection.	1.0s (0.1s~ 100.0s)	RUN
F12.07 (0x0C07)	Communicatio n Disconnection	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Report error 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 value for the communication giving frequency (100.00 corresponds to 100.00Hz).	0.00 (-100.00~ 100.00)	RUN
F12.09 (0x0C09)	Data Gain (0x3000)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the gain for the communication	100.0% (0.0%~ 500.0%)	RUN

		giving frequency. Given frequency = actual communication giving value x gain + bias		

F12.1x: Modbus Master Parameters

Code (Address)	Name	Content	Default (Range)	Property
F12.10 (0x0C0A)	Master Cycle Parameters	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-, tens-, hundreds-, and thousands-bit: 0: OFF 1: Operation command 2: Given frequency 3: Output frequency 4: Upper limit frequency 5: Given torque 6: Output torque 7: Reserved 8: Reserved 9: PID setting 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 the address to give the frequency.	0x0000 (0x0000~ 0xFFFF)	RUN
F12.12 (0x0C0C)	User-defined Command Address	**V/F SVC FVC PMVF PMSVC PMFVC** Set the address to give the command.	0x0000 (0x0000~ 0xFFFF)	RUN
F12.13 (0x0C0D)	FWD Command Value	**V/F SVC FVC PMVF PMSVC PMFVC** Set the command value for forward running.	0x0001 (0x0000~ 0xFFFF)	RUN
F12.14 (0x0C0E)	REV Command Value	**V/F SVC FVC PMVF PMSVC PMFVC** Set the 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 Sending Command	**V/F SVC FVC PMVF PMSVC PMFVC** Select the type of master sending command. 0: Operation command 1: Operation 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 communication.	0 (0~3)	STOP
F12.21 (0x0C15)	RJ45 Communication Address	**V/F SVC FVC PMVF PMSVC PMFVC** Set the slave addresses when RJ45 port is 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 for Modbus communication. 0: 1200bps 1: 2400bps 2: 4800bps 3: 9600bps 4: 19200bps 5: 38400bps	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 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	0 (0~5)	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		
F12.24 (0x0C18)	RJ45 Response Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set the transmission response when RJ45 port is for Modbus communication. 0: ON to white operation 1: OFF 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 for Modbus communication.	0ms (0ms~5000ms)	RUN
F12.26 (0x0C1A)	RJ45 Communication Timeout	**V/F SVC FVC PMVF PMSVC PMFVC** Set the timeout value when RJ45 port is for Modbus communication.	1.0s (0.1s~100.0s)	RUN
F12.27 (0x0C1B)	RJ45 Disconnection	**V/F SVC FVC PMVF PMSVC PMFVC** Set the mode when RJ45 interface for Modbus communication is disconnected. 0: OFF 1: Report error 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 Error Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set the DP master-slave communication error mode. 0: OFF 1: Report alarm and free stop	0 (0~2)	STOP

		2: Report warning and continue operation		

Note: Extensions 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 (1~65535)	RUN
F12.42 (0x0C2A)	CAN 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 Error Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set the CAN master-slave communication error mode. 0: OFF 1: Report alarm and free stop 2: Report warning and continue operation	0 (0~2)	RUN

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

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

Code (Address)	Name	Content	Default (Range)	Property
F12.50 (0x0C32)	Extension Disconnection Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: EX_A port disconnection mode 0: OFF 1: Report alarm and free stop 2: Report warning and continue operation Tens-bit: EX_B port disconnection mode 0: OFF 1: Report alarm and free stop 2: Report warning and continue operation	0000 (0000~0022)	RUN

F12.51 (0x0C33)	EX_A Setting Update	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Initial values updated after power on 2: EX_A parameters restored to initial values	0 (0~2)	RUN
F12.52 (0x0C34)	EX_B Setting Update	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Initial values updated after power on 2: EX_B parameters restored 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: Lower 8 bits within 00~63 Hundreds-bit and thousands-bit: Higher 8 bits within 00~07	0001 (0000~ 0763)	RUN
F12.54 (0x0C36)	EX_A Monitor Frame Address 2	**V/F SVC FVC PMVF PMSVC PMFVC** The same as above.	0002 (0000~ 0763)	RUN
F12.55 (0x0C37)	EX_A Monitor Frame Address 3	**V/F SVC FVC PMVF PMSVC PMFVC** The same as above.	0007 (0000~0763)	RUN
F12.56 (0x0C38)	EX_A Monitor Frame Address 4	**V/F SVC FVC PMVF PMSVC PMFVC** The same as above.	0011 (0000~0763)	RUN
F12.57 (0x0C39)	EX_B Monitor Frame Address 1	**V/F SVC FVC PMVF PMSVC PMFVC** The same as above.	0001 (0000~0763)	RUN
F12.58 (0x0C3A)	EX_B Monitor Frame Address 2	**V/F SVC FVC PMVF PMSVC PMFVC** The same as above.	0002 (0000~0763)	RUN
F12.59 (0x0C3B)	EX_B Monitor Frame Address 3	**V/F SVC FVC PMVF PMSVC PMFVC** The same as above.	0007 (0000~0763)	RUN
F12.60 (0x0C3C)	EX_B Monitor Frame Address 4	**V/F SVC FVC PMVF PMSVC PMFVC** The same as above.	0011 (0000~0763)	RUN

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

F13: PID Control

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

Code (Address)	Name	Content	Default (Range)	Property
F13.00 (0x0D00)	PID Setting Source	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Keypad 1: Potentiometer 2: AI1 3: AI2 4: Reserved 5: PUL 6: RS485 7: Extension 8: Terminal 9: Active current given via communication	0 (0~9)	RUN
F13.01 (0x0D01)	PID Setting/Feedback	**V/F SVC FVC PMVF PMSVC PMFVC** This parameter is valid when F13.00 or F13.03 is set to [PID Setting] and [PID Feedback] via the keypad.	50.0% (0.0%~ 100.0%)	RUN
F13.02 (0x0D02)	PID Setting Change Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time required when PID increases from 0.0% to 100.0%.	1.00s (0.00s~ 60.00s)	RUN
F13.03 (0x0D03)	PID Feedback Source	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Keypad 1: Potentiometer 2: AI1 3: AI2 4: Reserved 5: PUL 6: RS485 7: Extension 8: Terminals 9: Local active current	2 (0~9)	RUN
F13.04 (0x0D04)	Feedback Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** The longer the filter time, the greater the anti-interference effect, but the response becomes slower.	0.010s (0.000s~ 6.000s)	RUN
F13.05 (0x0D05)	Feedback Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set for linear proportional regulation of the feedback input signal.	1.00 (0.00~10.00)	RUN
F13.06 (0x0D06)	Feedback Range	**V/F SVC FVC PMVF PMSVC PMFVC** The PID feedback signal range is dimensionless units which are used to regulate PID feedback and display.	100.0 (0.0~100.0)	RUN

F13.07~F13.24: PID Control

Code (Address)	Name	Content	Default (Range)	Property
F13.07 (0x0D07)	PID Characteristic	**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)	PID Preset Output	**V/F SVC FVC PMVF PMSVC PMFVC** When PID operation is initiated, output as the pre-settings.	100.0% (0.0%~ 100.0%)	RUN
F13.09 (0x0D09)	PID Preset Runtime	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time for the PID preset output, and performs as the normal PID setting after it is finished.	0.0s (0.0s~ 6500.0s)	RUN
F13.10 (0x0D0A)	PID Deviation Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the maximum deviation of PID feedback from PID setting.	0.0% (0.0%~ 100.0%)	RUN
F13.11 (0x0D0B)	Proportional Gain P1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the proportional gain of PID parameter group 1.	0.100 (0.000~ 4.000)	RUN
F13.12 (0x0D0C)	Integral Time I1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the integral time of PID parameter group 1.	1.0s (0.0s~ 600.0s)	RUN
F13.13 (0x0D0D)	Differential Time D1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the differential time of PID	0.000s (0.000s~ 6.000s)	RUN
F13.14 (0x0D0E)	Proportional Gain P2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the proportional gain of PID	0.100 (0.000~ 4.000)	RUN
F13.15 (0x0D0F)	Integral Time I2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the integral time of PID parameter group 2.	1.0s (0.0s~ 600.0s)	RUN

F13.16 (0x0D10)	Differential Time D2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the differential time of PID parameter group 2.	0.000s (0.000s~ 6.000s)	RUN
F13.17 (0x0D11)	PID Shift Condition	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: Shift via DI terminals 2: Shift according to deviation	0 (0~2)	RUN
F13.18 (0x0D12)	Shift Deviation Low	**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 Deviation High	**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 Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the differential range.	5.0% (0.0%~ 100.0%)	RUN
F13.22 (0x0D16)	PID Max. Output	**V/F SVC FVC PMVF PMSVC PMFVC** Set the maximum PID output.	100.0% (0.0%~ 100.0%)	RUN
F13.23 (0x0D17)	PID Min. Output	**V/F SVC FVC PMVF PMSVC PMFVC** Set the minimum PID output.	0.0% (-100.0%~ F13.22)	RUN
F13.24 (0x0D18)	PID Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the PID output 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: Continue PID operation without reporting error 1: Stop and report error 2: Continue PID operation, and report alarm 3: Run at current frequency, and report alarm	0 (0~3)	STOP
F13.26 (0x0D1A)	Feedback Disconnection Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the PID feedback disconnection detection duration.	1.0s (0.0s~ 120.0s)	RUN
F13.27 (0x0D1B)	Feedback Disconnection Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** If the feedback signal exceeds this value and continues for F13.26, the sensor is considered disconnected.	100.0% (0.0%~ 100.0%)	RUN
F13.28 (0x0D1C)	Feedback Disconnection Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** If the feedback signal exceeds this value and continues for F13.26, the sensor is considered disconnected.	0.0% (0.0%~ 100.0%)	RUN

F13.29~F13.33: PID Sleep

Code (Address)	Name	Content	Default (Range)	Property
F13.29 (0x0D1D)	Sleep	**V/F SVC FVC PMVF PMSVC PMFVC** Set the sleep function on or off. 0: OFF 1: ON	0 (0~1)	RUN
F13.30 (0x0D1E)	Sleep Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** When the sleep function is valid, the PID output frequency is lower than [F13.30] and continues for F13.31 [Sleep Delay], then sleep function works.	10.00Hz (0.00Hz~ Max. frequency)	RUN

F13.31 (0x0D1F)	Sleep Delay	**V/F SVC FVC PMVF PMSVC PMFVC** When the sleep function is valid, the PID output frequency is lower than [F13.30] and continues for F13.31 [Sleep Delay], then sleep function works.	60.0s (0.0s~ 3600.0s)	RUN
F13.32 (0x0D20)	Wakeup Deviation	**V/F SVC FVC PMVF PMSVC PMFVC** When PID feedback is smaller/greater than (positive characteristic/negative characteristic) PID setting minus/plus (positive characteristic/negative characteristic) F13.32 [Wakeup Deviation] and continues for F13.33 [Wakeup Delay], the drive exits from sleep status and start the normal operation.	5.0% (0.0%~ 50.0%)	RUN
F13.33 (0x0D21)	Wakeup Delay	**V/F SVC FVC PMVF PMSVC PMFVC** When PID feedback is smaller/greater than (positive characteristic/negative characteristic) PID setting minus/plus (positive characteristic/negative characteristic) F13.32 [Wakeup Deviation] and continues for F13.33 [Wakeup Delay], the drive exits from sleep status and start the normal operation.	1.0s (0.0s~60.0s)	RUN

F14: Simulated PLC for Multi-frequency

F14.00~F14.14: Multi-frequency Setting

Code (Address)	Name	Content	Default (Range)	Property
F14.00 (0x0E00)	PLC Multi-frequency 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 1 with PLC.	10.00Hz (0.00Hz~ Max. frequency)	RUN

F14.01 (0x0E01)	PLC Multi-frequency 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 2 with PLC.	20.00Hz (0.00Hz~ Max. frequency)	RUN
F14.02 (0x0E02)	PLC Multi-frequency 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 3 with PLC.	30.00Hz (0.00Hz~ Max. frequency)	RUN
F14.03 (0x0E03)	PLC Multi-frequency 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 4 with PLC.	40.00Hz (0.00Hz~ Max. frequency)	RUN
F14.04 (0x0E04)	PLC Multi-frequency 5	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 5 with PLC.	50.00Hz (0.00Hz~ Max. frequency)	RUN
F14.05 (0x0E05)	PLC Multi-frequency 6	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 6 with PLC.	40.00Hz (0.00Hz~ Max. frequency)	RUN
F14.06 (0x0E06)	PLC Multi-frequency 7	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 7 with PLC.	30.00Hz (0.00Hz~ Max. frequency)	RUN
F14.07 (0x0E07)	PLC Multi-frequency 8	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 8 with PLC.	20.00Hz (0.00Hz~ Max. frequency)	RUN
F14.08 (0x0E08)	PLC Multi-frequency 9	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 9 with PLC.	10.00Hz (0.00Hz~ Max. frequency)	RUN
F14.09 (0x0E09)	PLC Multi-frequency 10	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 10 with PLC.	20.00Hz (0.00Hz~ Max. frequency)	RUN
F14.10 (0x0E0A)	PLC Multi-frequency 11	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 11 with PLC.	30.00Hz (0.00Hz~ Max. frequency)	RUN
F14.11 (0x0E0B)	PLC Multi-frequency 12	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 12 with PLC.	40.00Hz (0.00Hz~ Max. frequency)	RUN

F14.12 (0x0E0C)	PLC Multi-frequency 13	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 13 with PLC.	50.00Hz (0.00Hz~ Max. frequency)	RUN
F14.13 (0x0E0D)	PLC Multi-frequency 14	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 14 with PLC.	40.00Hz (0.00Hz~ Max. frequency)	RUN
F14.14 (0x0E0E)	PLC Multi-frequency 15	**V/F SVC FVC PMVF PMSVC PMFVC** Set the multi-frequency 15 with PLC.	30.00Hz (0.00Hz~ Max. frequency)	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) Hundreds-bit: Power-down save 0: OFF 1: ON Thousands-bit: Start mode 0: Restart from the first stage 1: Restart from the stage upon stop last time 2: Continue operation for the remaining of the stop stage	0000 (0000~2122)	RUN

F14.16~F14.30: PLC Runtime

Code (Address)	Name	Content	Default (Range)	Property
F14.16 (0x0E10)	Multi-frequency 1 Runtime	**V/F SVC FVC PMVF PMSVC PMFVC** Set the runtime of multi-frequency 1 of the PLC simulation function.	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 runtime of multi-frequency 2 of the PLC simulation function.	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 runtime of multi-frequency 3 of the PLC simulation function.	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 runtime of multi-frequency 4 of the PLC simulation function.	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 runtime of multi-frequency 5 of the PLC simulation function.	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 runtime of multi-frequency 6 of the PLC simulation function.	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 runtime of multi-frequency 7 of the PLC simulation function.	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 runtime of multi-frequency 8 of the PLC simulation function.	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 runtime of multi-frequency 9 of the PLC simulation function.	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 runtime of multi-frequency 10 of the PLC simulation function.	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 runtime of multi-frequency 11 of the PLC simulation function.	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 runtime of multi-frequency 12 of the PLC simulation function.	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 runtime of multi-frequency 13 of the PLC simulation function.	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 runtime of multi-frequency 14 of the PLC simulation function.	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 runtime of multi-frequency 15 of the PLC simulation function.	10.0(s/m/h) (0.0(s/m/h)~ 6500.0(s/m/h))	RUN

F14.31~F14.45: PLC Operation 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 1: Opposite Tens-bit: ACC/DEC time of the current stage 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

5.2.4 Oilfield-specific Parameters

ACC/DEC Time

Code (Address)	Name	Content	Default (Range)	Property
F01.22 (0x0116)	ACC Time 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time required to accelerate the output frequency 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 to decelerate the output frequency from the reference frequency to 0.00Hz.	Up to model (0.01s~ 650.00s)	RUN

F15: Basic Pump-Off

F15.00: Pump Type

Code (Address)	Name	Content	Default (Range)	Property
F15.00 (0x0F00[RAM]/0x1F00[EEPROM])	Pump Type	**V/F SVC FVC PMVF PMSVC PMFVC** Select the oil pump type. 0: Beam pump 1: Progressive cavity pump 2: Electric submersible pump	0 (0~2)	STOP

F15.01~F15.04: Pump-Off Functions

Code (Address)	Name	Content	Default (Range)	Property
F15.01 (0x0F01)	Pump-off Enable	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump-off function on/off. 0: OFF 1: ON 2: ON/OFF by terminal	0 (0~2)	RUN

F15.02 (0x0F02)	Continuous Run Speed Source	**V/F SVC FVC PMVF PMSVC PMFVC** Set the speed reference source for continuous operation of the pump-off function. 0: None 1: F15.05	0 (0~1)	RUN
F15.03 (0x0F03)	Pump-off Recovery Zone Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set the action when entering the recovery zone during pump-off. 0: Swing operation 1: Well shut-in 2: Positioning-free swing operation 3: Low-speed operation	3 (0~3)	RUN
F15.04 (0x0F04)	Pump-off Type	**V/F SVC FVC PMVF PMSVC PMFVC** Select the pump-off type. 0: Enter run on start 1: Enter recovery zone on start 2: Run at specified stage 3: Recovery zone at specified stage 4: Peak/Off-peak/Shoulder pump-off 5: Automatic pump-off	0 (0~5)	RUN

F15.05~F15.06: Pump-Off Speed

Code (Address)	Name	Content	Default (Range)	Property
F15.05 (0x0F05)	Continuous Run Speed	**V/F SVC FVC PMVF PMSVC PMFVC** Set the speed for continuous operation of the pump-off function.	60.0% (F15.06~100.0%)	RUN
F15.06 (0x0F06)	Low-speed Run Speed	**V/F SVC FVC PMVF PMSVC PMFVC** Set the speed for recovery-zone in low-speed operation.	30.0% (0.0%~F15.05)	RUN

F15.07~F15.10: Pump-Off Time

Code (Address)	Name	Content	Default (Range)	Property

F15.07 (0x0F07)	Continuous Runtime	**V/F SVC FVC PMVF PMSVC PMFVC** Set the continuous runtime for pump-off.	10min 1min~6000min	RUN
F15.08 (0x0F08)	Recovery Execution Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the recovery zone execution time for pump-off.	20min 2min~6000min	RUN
F15.09 (0x0F09)	Pump-off Clock Source	**V/F SVC FVC PMVF PMSVC PMFVC** Select the pump-off clock source. 0: Internal timing 1: External clock	0 (0~2)	RUN
F15.10 (0x0F0A)	Operating Time Before Shut-in	**V/F SVC FVC PMVF PMSVC PMFVC** Set the runtime before well shut-in in recovery-zone.	120s (0s~3600s)	RUN

F15.11~F15.16: Calibration Time

Code (Address)	Name	Content	Default (Range)	Property
F15.11 (0x0F0B)	Calibration Time (Year)	**V/F SVC FVC PMVF PMSVC PMFVC** Calibrate the well-specific extension card time (Year).	2020 (2020~2099)	RUN
F15.12 (0x0F0C)	Calibration Time (Month)	**V/F SVC FVC PMVF PMSVC PMFVC** Calibrate the well-specific extension card time (Month).	1 (1~12)	RUN
F15.13 (0x0F0D)	Calibration Time (Day)	**V/F SVC FVC PMVF PMSVC PMFVC** Calibrate the well-specific extension card time (Day).	1 (1~31)	RUN
F15.14 (0x0F0E)	Calibration Time (Hour)	**V/F SVC FVC PMVF PMSVC PMFVC** Calibrate the well-specific extension card time (Hour).	0 (0~23)	RUN
F15.15 (0x0F02F)	Calibration Time (Minute)	**V/F SVC FVC PMVF PMSVC PMFVC** Calibrate the well-specific extension card time (Minute).	0 (0~59)	RUN

F15.16 (0x0F10)	Calibration Time (Second)	**V/F SVC FVC PMVF PMSVC PMFVC** Calibrate the well-specific extension card time (Second).	0 (0~59)	RUN

F16: Beam Pumps

F16.00: Position Switch

Code (Address)	Name	Content	Default (Range)	Property
F16.00 (0x5000[RAM]/0xD000[EEPROM])	Position Switch	**V/F SVC FVC PMVF PMSVC PMFVC** Set whether the beam pump has a position switch. 0: Equipped 1: Not equipped	0 (0~1)	STOP

F16.01: Operating Mode

Code (Address)	Name	Content	Default (Range)	Property
F16.01 (0x5001)	Operating Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Select the operating mode (0~6). 0: Mode 0 1: Mode 1 2: Mode 2 3: Mode 3 4: Mode 4 5: Mode 5 6: Mode 6 7: Stroke interface	0 (0~6)	RUN

F16.02: Position Switch Failure Speed

Code (Address)	Name	Content	Default (Range)	Property
F16.02 (0x5002)	Switch Failure Speed	**V/F SVC FVC PMVF PMSVC PMFVC** Set the speed reference used when the position switch fails. 0: Set frequency 1: Average stroke 2: Minimum stroke 3: Maximum stroke	0 (0~3)	RUN

F16.03~F16.14: Operating Mode Speed

Code (Address)	Name	Content	Default (Range)	Property
F16.03 (0x5003)	Mode 1 Upstroke	**V/F SVC FVC PMVF PMSVC PMFVC** Set the mode 1 upstroke.	5.50 strokes/min (F16.37~F16.38)	RUN
F16.04 (0x5004)	Mode 1 Downstroke	**V/F SVC FVC PMVF PMSVC PMFVC** Set the mode 1 downstroke.	4.50 strokes/min (F16.37~F16.38)	RUN
F16.05 (0x5005)	Mode 2 Upstroke	**V/F SVC FVC PMVF PMSVC PMFVC** Set the mode 2 upstroke.	5.00 strokes/min (F16.37~F16.38)	RUN
F16.06 (0x5006)	Mode 2 Downstroke	**V/F SVC FVC PMVF PMSVC PMFVC** Set the mode 2 downstroke.	4.00 strokes/min (F16.37~F16.38)	RUN
F16.07 (0x5007)	Mode 3 Upstroke	**V/F SVC FVC PMVF PMSVC PMFVC** Set the mode 3 upstroke.	4.50 strokes/min (F16.37~F16.38)	RUN
F16.08 (0x5008)	Mode 3 Downstroke	**V/F SVC FVC PMVF PMSVC PMFVC** Set the mode 3 downstroke.	3.50 strokes/min (F16.37~F16.38)	RUN
F16.09 (0x5009)	Mode 4 Upstroke	**V/F SVC FVC PMVF PMSVC PMFVC** Set the mode 4 upstroke.	4.00 strokes/min (F16.37~F16.38)	RUN
F16.10 (0x500A)	Mode 4 Downstroke	**V/F SVC FVC PMVF PMSVC PMFVC** Set the mode 4 downstroke.	3.00 strokes/min (F16.37~F16.38)	RUN
F16.11 (0x500B)	Mode 5 Upstroke	**V/F SVC FVC PMVF PMSVC PMFVC** Set the mode 5 upstroke.	3.50 strokes/min (F16.37~F16.38)	RUN
F16.12 (0x500C)	Mode 5 Downstroke	**V/F SVC FVC PMVF PMSVC PMFVC** Set the mode 5 downstroke.	2.50 strokes/min (F16.37~F16.38)	RUN
F16.13 (0x500D)	Mode 6 Upstroke	**V/F SVC FVC PMVF PMSVC PMFVC** Set the mode 6 upstroke.	6.00 strokes/min (F16.37~F16.38)	RUN
F16.14 (0x500E)	Mode 6 Downstroke	**V/F SVC FVC PMVF PMSVC PMFVC** Set the mode 6 downstroke.	5.00 strokes/min (F16.37~F16.38)	RUN

F16.15: Upstroke/Downstroke ACC/DEC Time

Code (Address)	Name	Content	Default (Range)	Property

F16.15 (0x500F)	Upstroke/Downstroke ACC/DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the acceleration/deceleration time between upstroke and downstroke when switching modes.	10.00s (2.00~650.00s)	RUN

F16.16~F16.22: Swing Parameters

Code (Address)	Name	Content	Default (Range)	Property
F16.16 (0x5010)	Swing ACC/DEC Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the acceleration/deceleration time when entering swing operation.	10.00s (5.00s~650.00s)	RUN
F16.17 (0x5011)	Reserved	-	-	-
F16.18 (0x5012)	Swing Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the swing operation frequency.	10.0% (5.0%~50.0%)	RUN
F16.19 (0x5013)	Pre-swing Position Search Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency used to search for the position switch when entering swing operation.	30.0% (10.0%~100.0%)	RUN
F16.20 (0x5014)	Swing Angle	**V/F SVC FVC PMVF PMSVC PMFVC** Set the swing angle for positioned swing operation.	20º (5º~90º)	RUN
F16.21 (0x5015)	Positioning-free Swing Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time determining the swing angle when positioning-free swing is used.	5.0s (1.0s~30.0s)	RUN
F16.22 (0x5016)	Well Shut-In Start Execution Time	**V/F SVC FVC PMVF PMSVC PMFVC** Determine whether a start executes (non-zero) or remain shut-in (0) during well shut-in.	120s (0~3600s)	RUN

F16.24~F16.26: Position Switch Setting

Code (Address)	Name	Content	Default (Range)	Property
F16.24 (0x5018)	Position Switch Failure Swing Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Operation mode selection after center position switch open-circuit 0: Run at set frequency 1: Positioning-free swing operation 2: Low-speed run speed (F15.06) 3: Alarm shutdown (position switch signal lost)	2 (0~3)	RUN
F16.25 (0x5019)	Position Switch Failure Detection Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time for validating position-switch feedback signal during continuous running.	100s (30s~600s)	RUN
F16.26 (0x501A)	Position Switch Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the filter time for the position switch.	3.0s (0.0s~30.0s)	RUN

F16.27~F16.33: Upstroke/Downstroke Start Angle

Code (Address)	Name	Content	Default (Range)	Property
F16.27 (0x501B)	Upstroke Start Angle	**V/F SVC FVC PMVF PMSVC PMFVC** Set the upstroke start angle.	10º (0º~359º)	RUN
F16.28 (0x501C)	Downstroke Start Angle	**V/F SVC FVC PMVF PMSVC PMFVC** Set the downstroke start angle.	190º (0º~359º)	RUN
F16.29 (0x501D)	Automatic Stroke Setting	**V/F SVC FVC PMVF PMSVC PMFVC** Set the Strokes per Minute using flywheel rotation in the Stroke interface.	3.00 strokes/min (F16.37~F16.38)	RUN
F16.30 (0x501E)	Rated Strokes	**V/F SVC FVC PMVF PMSVC PMFVC** Set the Strokes per Minute corresponding to asynchronous motor running at 50.00Hz or at the motor rated frequency; auto-set after tuning.	5.00 strokes/min (0.50~15.00 strokes/min)	RUN

F16.31 (0x501F)	Stroke Range Tuning	**V/F SVC FVC PMVF PMSVC PMFVC** Set the auto-tuning status: 0 = Re-tuning, 1 = Tuning completed. 0: Re-tuning 1: Tuning completed	0 (0~1)	RUN
F16.33 (0x5021)	Tuning Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency used during stroke auto-tuning; 100.0% corresponds to the motor rated frequency.	60.0% (10.0%~100.0%)	RUN

F16.34~F16.36: Pump Parameters

Code (Address)	Name	Content	Default (Range)	Property
F16.34 (0x5022)	Pump Efficiency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump efficiency; 0.0% uses an internal estimate, nonzero uses an externally obtained efficiency for production estimation.	0.0% (0.0%~100.0%)	RUN
F16.35 (0x5023)	Stroke Length	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump stroke.	4.20m (1.00m~12.00m)	RUN
F16.36 (0x5024)	Pump Diameter	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump diameter.	57mm (10mm~200mm)	RUN

F16.34~F16.36: Pump Parameters

Code (Address)	Name	Content	Default (Range)	Property
F16.37 (0x5025)	Stroke Lower Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Automatically updates after auto-tuning; based on the AC drive frequency limits.	2.00 strokes/min	READ
F16.38 (0x5026)	Stroke Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Automatically updates after auto-tuning; based on the AC drive frequency limits.	6.00 strokes/min	READ

F16.39: Pump Setting Depth

Code (Address)	Name	Content	Default (Range)	Property
F16.39 (0x5027)	Pump Setting Depth	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump setting depth.	1000.0m (10.0m~4000.0m)	RUN

F16.40~F16.41: Stroke Correction

Code (Address)	Name	Content	Default (Range)	Property
F16.40 (0x5028)	Stroke Fine-tune Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set a frequency fine-tuning to bring actual stroke closer to the set stroke.	0.50Hz (0.00Hz~20.00Hz)	RUN
F16.41 (0x5029)	Operational Stroke Deviation	**V/F SVC FVC PMVF PMSVC PMFVC** Set the deviation threshold: If actual stroke differs from set stroke by less than this value, automatic frequency fine-tuning is inhibited to stabilize stroke.	0.02 strokes/min (0.00~0.50 strokes)	RUN

F17 Progressive Cavity Pumps

Code (Address)	Name	Content	Default (Range)	Property
F17.00~F17.44 (0x5100~0x512C)	Reserved			

F18 Electric Submersible Pumps

Code (Address)	Name	Content	Default (Range)	Property
F18.00~F18.44 (0x5200~0x522C)	Reserved			

F19: Peak/Off-peak/Shoulder, Specified Time Pump-Off, Time-Division Variable Speed

F19.00~F19.05: Peak/Off-peak/Shoulder Pump-Off and Swing Time

Code (Address)	Name	Content	Default (Range)	Property
F19.00 (0x5300[RAM] 0xD300[EEROM])	Shoulder Run Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the shoulder period continuous run time.	15 (0~1440)	RUN
F19.01 (0x5301)	Shoulder Recovery Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the shoulder period recovery time.	30 (0~1440)	RUN
F19.02 (0x5301)	Peak Run Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the peak period continuous run time.	15 (0~1440)	RUN
F19.03 (0x5301)	Peak Recovery Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the peak period recovery time.	30 (0~1440)	RUN
F19.04 (0x5301)	Off-peak Run Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the off-peak period continuous run time.	15 (0~1440)	RUN
F19.05 (0x5301)	Off-peak Recovery Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the off-peak period recovery time.	30 (0~1440)	RUN

F19.06~F19.17: Shoulder Time 1~6

Code (Address)	Name	Content	Default (Range)	Property
F19.06 (0x5306)	Shoulder Start 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for shoulder period 1.	530 (0000~2359)	RUN
F19.07 (0x5307)	Shoulder End 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for shoulder period 1.	700 (0000~2359)	RUN

F19.08 (0x5308)	Shoulder Start 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for shoulder period 2.	800 (0000~2359)	RUN
F19.09 (0x5309)	Shoulder End 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for shoulder period 2.	900 (0000~2359)	RUN
F19.10 (0x530A)	Shoulder Start 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for shoulder period 3.	1130 (0000~2359)	RUN
F19.11 (0x530B)	Shoulder End 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for shoulder period 3.	1200 (0000~2359)	RUN
F19.12 (0x530C)	Shoulder Start 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for shoulder period 4.	1400 (0000~2359)	RUN
F19.13 (0x530D)	Shoulder End 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for shoulder period 4.	1530 (0000~2359)	RUN
F19.14 (0x530E)	Shoulder Start 5	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for shoulder period 5.	2000 (0000~2359)	RUN
F19.15 (0x530F)	Shoulder End 5	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for shoulder period 5.	2330 (0000~2359)	RUN
F19.16 (0x5310)	Shoulder Start 6	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for shoulder period 6.	0 (0000~2359)	RUN
F19.17 (0x5311)	Shoulder End 6	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for shoulder period 6.	0 (0000~2359)	RUN

F19.18~F19.29: Peak Time 1~6

Code (Address)	Name	Content	Default (Range)	Property
F19.18 (0x5312)	Peak Start 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for peak period 1.	700 (0000~2359)	RUN
F19.19 (0x5313)	Peak End 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for peak period 1.	800 (0000~2359)	RUN
F19.20 (0x5314)	Peak Start 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for peak period 2.	900 (0000~2359)	RUN
F19.21 (0x5315)	Peak End 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for peak period 2.	1130 (0000~2359)	RUN
F19.22 (0x5316)	Peak Start 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for peak period 3.	1530 (0000~2359)	RUN
F19.23 (0x5317)	Peak End 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for peak period 3.	2000 (0000~2359)	RUN
F19.24 (0x5318)	Peak Start 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for peak period 4.	0 (0000~2359)	RUN
F19.25 (0x5319)	Peak End 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for peak period 4.	0 (0000~2359)	RUN
F19.26 (0x531A)	Peak Start 5	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for peak period 5.	0 (0000~2359)	RUN
F19.27 (0x531B)	Peak End 5	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for peak period 5.	0 (0000~2359)	RUN
F19.28 (0x531C)	Peak Start 6	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for peak period 6.	0 (0000~2359)	RUN
F19.29 (0x531D)	Peak End 6	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for peak period 6.	0 (0000~2359)	RUN

F19.30~F19.41: Off-peak Time 1~6

Code (Address)	Name	Content	Default (Range)	Property
F19.30 (0x531E)	Off-peak Start 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for off-peak period 1.	1200 (0000~2359)	RUN
F19.31 (0x531F)	Off-peak End 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for off-peak period 1.	1400 (0000~2359)	RUN
F19.32 (0x5320)	Off-peak Start 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for off-peak period 2.	2330 (0000~2359)	RUN
F19.33 (0x5321)	Off-peak End 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for off-peak period 2.	530 (0000~2359)	RUN
F19.34 (0x5322)	Off-peak Start 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for off-peak period 3.	0 (0000~2359)	RUN
F19.35 (0x5323)	Off-peak End 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for off-peak period 3.	0 (0000~2359)	RUN
F19.36 (0x5324)	Off-peak Start 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for off-peak period 4.	0 (0000~2359)	RUN
F19.37 (0x5325)	Off-peak End 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for off-peak period 4.	0 (0000~2359)	RUN
F19.38 (0x5326)	Off-peak Start 5	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for off-peak period 5.	0 (0000~2359)	RUN

F19.39 (0x5327)	Off-peak End 5	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for off-peak period 5.	0 (0000~2359)	RUN
F19.40 (0x5328)	Off-peak Start 6	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for off-peak period 6.	0 (0000~2359)	RUN
F19.41 (0x5329)	Off-peak End 6	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for off-peak period 6.	0 (0000~2359)	RUN

F19.42~F19.57: Specified Pump-off/Runtime 1~8

Code (Address)	Name	Content	Default (Range)	Property
F19.42 (0x532A)	Specified Start Time 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for specified-stage 1.	0000 (0000~2359)	RUN
F19.43 (0x532B)	Specified End Time 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for specified-stage 1.	0000 (0000~2359)	RUN
F19.44 (0x532C)	Specified Start Time 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for specified-stage 2.	0000 (0000~2359)	RUN
F19.45 (0x532D)	Specified End Time 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for specified-stage 2.	0000 (0000~2359)	RUN
F19.46 (0x532E)	Specified Start Time 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for specified-stage 3.	0000 (0000~2359)	RUN
F19.47 (0x532F)	Specified End Time 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for specified-stage 3.	0000 (0000~2359)	RUN

F19.48 (0x5330)	Specified Start Time 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for specified-stage 4.	0000 (0000~2359)	RUN
F19.49 (0x5331)	Specified End Time 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for specified-stage 4.	0000 (0000~2359)	RUN
F19.50 (0x5332)	Specified Start Time 5	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for specified-stage 5.	0000 (0000~2359)	RUN
F19.51 (0x5333)	Specified End Time 5	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for specified-stage 5.	0000 (0000~2359)	RUN
F19.52 (0x5334)	Specified Start Time 6	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for specified-stage 6.	0000 (0000~2359)	RUN
F19.53 (0x5335)	Specified End Time 6	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for specified-stage 6.	0000 (0000~2359)	RUN
F19.54 (0x5336)	Specified Start Time 7	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for specified-stage 7.	0000 (0000~2359)	RUN
F19.55 (0x5337)	Specified End Time 7	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for specified-stage 7.	0000 (0000~2359)	RUN
F19.56 (0x5338)	Specified Start Time 8	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for specified-stage 8.	0000 (0000~2359)	RUN
F19.57 (0x5339)	Specified End Time 8	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for specified-stage 8.	0000 (0000~2359)	RUN

F19.58~F19.74: Time-Division Start/End Time 1~8

Code (Address)	Name	Content	Default (Range)	Property
F19.58 (0x533A)	Time-Division Variable Speed Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Enables or disables time-based multi-speed operation. 0: OFF 1: ON	0 (0~1)	RUN
F19.59 (0x533B)	Time-Division Start Time 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for time-division period 1.	0000 (0000~2359)	RUN
F19.60 (0x533C)	Time-Division End Time 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for time-division period 1.	0000 (0000~2359)	RUN
F19.61 (0x533D)	Time-Division Start Time 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for time-division period 2.	0000 (0000~2359)	RUN
F19.62 (0x533E)	Time-Division End Time 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for time-division period 2.	0000 (0000~2359)	RUN
F19.63 (0x533F)	Time-Division Start Time 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for time-division period 3.	0000 (0000~2359)	RUN
F19.64 (0x5340)	Time-Division End Time 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for time-division period 3.	0000 (0000~2359)	RUN
F19.65 (0x5341)	Time-Division Start Time 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for time-division period 4.	0000 (0000~2359)	RUN
F19.66 (0x5342)	Time-Division End Time 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for time-division period 4.	0000 (0000~2359)	RUN

F19.67 (0x5343)	Time-Division Start Time 5	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for time-division period 5.	0000 (0000~2359)	RUN
F19.68 (0x5344)	Time-Division End Time 5	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for time-division period 5.	0000 (0000~2359)	RUN
F19.69 (0x5345)	Time-Division Start Time 6	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for time-division period 6.	0000 (0000~2359)	RUN
F19.70 (0x5346)	Time-Division End Time 6	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for time-division period 6.	0000 (0000~2359)	RUN
F19.71 (0x5347)	Time-Division Start Time 7	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for time-division period 7.	0000 (0000~2359)	RUN
F19.72 (0x5348)	Time-Division End Time 7	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for time-division period 7.	0000 (0000~2359)	RUN
F19.73 (0x5349)	Time-Division Start Time 8	**V/F SVC FVC PMVF PMSVC PMFVC** Set the start time for time-division period 8.	0000 (0000~2359)	RUN
F19.74 (0x534A)	Time-Division End Time 8	**V/F SVC FVC PMVF PMSVC PMFVC** Set the end time for time-division period 8.	0000 (0000~2359)	RUN

F19.75~F19.82: Time-Division Speed 1~8

Code (Address)	Name	Content	Default (Range)	Property
F19.75 (0x534B)	Time-Division Speed 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the speed for time-division period 1.	50.0% (0.0%~100.0%)	RUN

F19.76 (0x534C)	Time-Division Speed 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the speed for time-division period 2.	50.0% (0.0%~100.0%)	RUN
F19.77 (0x534D)	Time-Division Speed 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the speed for time-division period 3.	50.0% (0.0%~100.0%)	RUN
F19.78 (0x534E)	Time-Division Speed 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the speed for time-division period 4.	50.0% (0.0%~100.0%)	RUN
F19.79 (0x534F)	Time-Division Speed 5	**V/F SVC FVC PMVF PMSVC PMFVC** Set the speed for time-division period 5.	50.0% (0.0%~100.0%)	RUN
F19.80 (0x5350)	Time-Division Speed 6	**V/F SVC FVC PMVF PMSVC PMFVC** Set the speed for time-division period 6.	50.0% (0.0%~100.0%)	RUN
F19.81 (0x5351)	Time-Division Speed 7	**V/F SVC FVC PMVF PMSVC PMFVC** Set the speed for time-division period 7.	50.0% (0.0%~100.0%)	RUN
F19.82 (0x5352)	Time-Division Speed 8	**V/F SVC FVC PMVF PMSVC PMFVC** Set the speed for time-division period 8.	50.0% (0.0%~100.0%)	RUN

F20: Automatic Pump-Off Parameters

F20.00: Automatic Pump-Off Recognition Mode

Code (Address)	Name	Content	Default (Range)	Property
F20.00 (0x5400[RAM]/0xD400[EEPROM])	Automatic Pump-Off Recognition Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Select the automatic pump-off recognition mode. 0: Fluid level 1: Power variation rate	0 (0~1)	RUN

F20.01~F20.08: Fluid Level Recognition Parameters

Code (Address)	Name	Content	Default (Range)	Property
F20.01 (0x5401)	Pump-Off Target Fluid Level	**V/F SVC FVC PMVF PMSVC PMFVC** Set the target fluid level for pump-off.	70.0% (0.0%~100.0%)	RUN
F20.03 (0x5403)	Pump-Off Stable Run Time (ESP/PCP)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stable running time for ESP/PCP pump-off.	5min (1min~30min)	RUN
F20.04 (0x5404)	Pump-Off Stable Run Cycles (Beam Pump)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stable running cycle count for pump-off.	5 (5~100 cycles)	RUN
F20.05 (0x5405)	Low Target Fluid Level Detection Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the detection time for being below the target fluid level.	5min (1min~30min)	RUN
F20.06 (0x5406)	Target Continuous Run Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the target continuous run time.	10min (1min~60min)	RUN
F20.07 (0x5407)	Min. Recovery Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the minimum recovery time.	20min (1min~60min)	RUN
F20.08 (0x5408)	Max. Recovery Time	**V/F SVC FVC PMVF PMSVC PMFVC** Sets the maximum recovery time.	60min (F20.07~240min)	RUN

F20.09~F20.13: Power Recognition Parameters

Code (Address)	Name	Content	Default (Range)	Property
F20.09 (0x5409)	Avg Power Continuous Decline Rate	**V/F SVC FVC PMVF PMSVC PMFVC** Set the average continuous power decline rate for power-based recognition.	16.0% (0.0%~100.0%)	RUN
F20.10 (0x540A)	Avg Power Sudden Decline Rate	**V/F SVC FVC PMVF PMSVC PMFVC** Set the average sudden power drop rate for power-based recognition.	8.0% (0.0%~50.0%)	RUN
F20.11 (0x5401B)	Avg Power Detection Time (ESP/PCP)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the average power detection time for ESP and PCP.	1min (1min~30min)	RUN
F20.12 (0x540C)	Power Decline Detection Time (ESP/PCP)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the detection time for power decline rate of ESP and PCP.	4min (1min~30min)	RUN
F20.13 (0x540D)	Power Decline Detection Cycles (Beam Pump)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the detection cycle count for power decline rate of beam pump.	10 (1~100 cycles)	RUN

F20.14~F20.21: Pump-Off Speed, Time Settings

Code (Address)	Name	Content	Default (Range)	Property
F20.14 (0x540E)	Continuous Run Time Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the limit for continuous run time.	60min (1min~180min)	RUN
F20.15 (0x540F)	Speed Adjustment	**V/F SVC FVC PMVF PMSVC PMFVC** Enables or disables the speed adjustment function. 0: OFF 1: ON	0 (0~1)	RUN

F20.16 (0x5410)	Continuous Runtime Variation Rate	**V/F SVC FVC PMVF PMSVC PMFVC** Set the variation rate for continuous run time.	15.0% (0.0%~100.0%)	RUN
F20.17 (0x5411)	Forced Speed Adjustment Runtime	**V/F SVC FVC PMVF PMSVC PMFVC** Set the run time used during forced speed adjustment.	30min (1min~90min)	RUN
F20.18 (0x5412)	Forced Speed Adjustment	**V/F SVC FVC PMVF PMSVC PMFVC** Enables or disables forced speed adjustment.	0 (0~1)	RUN
F20.19 (0x5413)	Pump-Off Speed Variation Range	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pump-off speed variation range.	5.0% (0.0%~50.0%)	RUN
F20.20 (0x5414)	Pump-Off Upper Speed Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the upper speed limit for pump-off operation.	100.0% (0.0%~100.0%)	RUN
F20.21 (0x5415)	Pump-Off Lower Speed Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the lower speed limit for pump-off operation.	30.0% (0.0%~100.0%)	RUN

F21: Automatic Parameter Tuning

F21.00: Automatic Tuning Recognition Mode

Code (Address)	Name	Content	Default (Range)	Property
F21.00 (0x5500[RAM]/0xD500[EEPROM]	Automatic Tuning Recognition Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Select the automatic parameter-tuning recognition mode. 0: OFF 1: Fluid level 2: High efficiency 3: High production	0 (0~3)	RUN

F21.01: Automatic Tuning Speed

Code (Address)	Name	Content	Default (Range)	Property
F21.01 (0x5501)	Automatic Tuning Speed	**V/F SVC FVC PMVF PMSVC PMFVC** Set the speed for automatic parameter tuning.	60.0% (20.0%~100.0%)	RUN

F21.02~F21.05: Fluid Level Recognition Parameters

Code (Address)	Name	Content	Default (Range)	Property
F21.02 (0x5502)	Tuning Target Fluid Level	**V/F SVC FVC PMVF PMSVC PMFVC** Set the target fluid level for parameter tuning.	80.0% (0.0%~100.0%)	RUN
F21.03 (0x5503)	Tuning Fluid Level Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the fluid level threshold for parameter tuning.	8.0% (0.0%~50.0%)	RUN
F21.04 (0x5504)	Tuning Stable Runtime (ESP/PCP)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stable running time for parameter tuning of ESP and PCP.	5min (1min~60min)	RUN
F21.05 (0x5505)	Tuning Stable Run Cycles (Beam Pump)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stable running cycle count for parameter tuning.	20 (1~200 cycles)	RUN

F21.06~F21.13: Automatic Tuning Search Speed, Time Settings

Code (Address)	Name	Content	Default (Range)	Property
F21.06 (0x5506)	Search Speed Variation Range	**V/F SVC FVC PMVF PMSVC PMFVC** Set the speed variation range used during search.	4.0% (0.0%~20.0%)	RUN
F21.07 (0x5507)	Search Time (ESP/PCP)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the search time for ESP and PCP.	2min (1min~30min)	RUN
F21.08 (0x5508)	Search Cycles (Beam Pump)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the search cycles for beam pump.	5 (1~200 cycles)	RUN

F21.09 (0x5509)	Search Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Select the search mode. 0: Specified by F13.09 1: Full range	0 (0~1)	RUN
F21.10 (0x550A)	Manual Search Range	**V/F SVC FVC PMVF PMSVC PMFVC** Set the manual search range.	25.0% (0.0%~100.0%)	RUN
F21.11 (0x550B)	Re-search Relative Variation Rate	**V/F SVC FVC PMVF PMSVC PMFVC** Set the re-search relative change rate.	20.0% (0.0%~100.0%)	RUN
F21.12 (0x550C)	Tuning Upper Speed Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the upper speed limit for parameter tuning.	100.0% (0.0%~100.0%)	RUN
F21.13 (0x550D)	Tuning Lower Speed Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the lower speed limit for parameter tuning.	30.0% (0.0%~100.0%)	RUN

F22: Pump Comprehensive Parameters

F22.00: Pump-Off and Auto-Tuning

Code (Address)	Name	Content	Default (Range)	Property
F22.00 (0x5600[RAM] 0xD600[EEROM])	Pump-Off and Auto-Tuning	**V/F SVC FVC PMVF PMSVC PMFVC** Select between pump-off and automatic parameter tuning. 0: Pump-off 1: Auto-tuning	0 (0~1)	RUN

F22.01~F22.05: Voice Broadcast Settings

Code (Address)	Name	Content	Default (Range)	Property
F22.01 (0x5601)	Voice Broadcast First Half Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the first-half duration for voice broadcast.	6s (0s~60s)	RUN

F22.02 (0x5602)	Voice Broadcast Second Half Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the second-half duration for voice broadcast.	16s (0s~60s)	RUN
F22.03 (0x5603)	Voice Broadcast Switch	**V/F SVC FVC PMVF PMSVC PMFVC** Enables or disables voice broadcast. 0: OFF 1: ON	1 (0~1)	RUN
F22.04 (0x5604)	Voice Prompt Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the voice prompt time.	22s (0s~120s)	RUN
F22.05 (0x5605)	Actual Voice Prompt Time	**V/F SVC FVC PMVF PMSVC PMFVC** Display the actual voice prompt time.	23s	READ

F22.06~F22.08: Power Monitoring Settings

Code (Address)	Name	Content	Default (Range)	Property
F22.06 (0x5606)	Power and Production Reset	**V/F SVC FVC PMVF PMSVC PMFVC** Set the method to clear power and production counters. 0: OFF 11: Clear runtime and run power 22: Clear daily power 33: Clear cumulative power 55: Clear stage power 66: Clear today's production 88: Clear cumulative production	0 (0~88)	RUN
F22.07 (0x5607)	Stage Power Monitoring	**V/F SVC FVC PMVF PMSVC PMFVC** Enables or disables stage power monitoring. 0: OFF 1: ON	0 (0~1)	RUN
F22.08 (0x5608)	Negative Power Calculation	**V/F SVC FVC PMVF PMSVC PMFVC** Set whether negative power is included in calculations. 0: Excluded 1: Included	1 (0~1)	RUN

F22.09 (0x5609)	Operating Condition Diagnosis	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 1: ON	1 (0~1)	RUN

F22.18~F22.21: Power Parameter Filter Time

Code (Address)	Name	Content	Default (Range)	Property
F22.18 (0x5612)	Active Power Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the filter time for active power.	0.10s (0.00s~10.00s)	RUN
F22.19 (0x5613)	Apparent Power Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the filter time for apparent power.	0.10s (0.00s~10.00s)	RUN
F22.20 (0x5614)	Reactive Power Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the filter time for reactive power.	0.10s (0.00s~10.00s)	RUN
F22.21 (0x5615)	Power Factor Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the filter time for power factor.	0.10s (0.00s~10.00s)	RUN

F22.22~F22.24: High Bus Voltage Parameters

Code (Address)	Name	Content	Default (Range)	Property
F22.22 (0x5616)	Bus Overvoltage Detection Switch	**V/F SVC FVC PMVF PMSVC PMFVC** Enables or disables bus overvoltage detection. 0: OFF 1: ON	1 (0~1)	RUN
F22.23 (0x5617)	Bus Overvoltage Detection Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the detection time for bus overvoltage.	120s (0s~3600s)	RUN
F22.24 (0x5618)	Bus Overvoltage Setting	**V/F SVC FVC PMVF PMSVC PMFVC** Set the bus overvoltage threshold. T3: 600V T6: 1030V	600V (0V~2000V)	RUN

F22.26~F22.27: Fluid Level/Dynamic Fluid Level Source

Code (Address)	Name	Content	Default (Range)	Property
F22.26 (0x561A)	Fluid Level Source	**V/F SVC FVC PMVF PMSVC PMFVC** Select the fluid level source. 0: Internal calculation 1: Communication input	0 (0~1)	RUN
F22.27 (0x561B)	Dynamic Fluid Level Source	**V/F SVC FVC PMVF PMSVC PMFVC** Select the dynamic fluid level source. 0: Internal calculation 1: Communication input	0 (0~1)	RUN

F22.28: Output Delay

Code (Address)	Name	Content	Default (Range)	Property
F22.28 (0x561C)	Output Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the output delay time.	0.5s (0.0s~10.0s)	RUN

F22.29 Special Parameter Modification Password

Code (Address)	Name	Content	Default (Range)	Property
F22.29 (0x561D)	Special Parameter Modification Password	**V/F SVC FVC PMVF PMSVC PMFVC** Set the password required to modify special parameters.	0 (0~65535)	RUN

F22.30~F22.42: Special Parameter Settings

Code (Address)	Name	Content	Default (Range)	Property
F22.30 (0x561E)	Frequency Range Modification Setting	**V/F SVC FVC PMVF PMSVC PMFVC** Set whether frequency range modification is restricted or unrestricted. 0: Restricted 1: Unrestricted	0 (0~1)	RUN
F22.31 (0x561F)	Target Lower Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the target lower-limit frequency.	20.00Hz (0.00~F22.32)	RUN

F22.32 (0x5620)	Target Maximum Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the target maximum frequency.	60.00Hz (F22.31~320.00Hz)	RUN
F22.33 (0x5621)	Log Reset	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF 11: Reset daily SPM 22: Reset cumulative SPM 33: Reset daily auto pump-off 44: Reset cumulative auto pump-off 55: Clear condition records	0 (0~55)	RUN
F22.34 (0x5622)	Stroke Correction	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stroke correction value.	0.0 (-1.00~1.00)	RUN
F22.35 (0x5623)	Current Balance Ratio Correction	**V/F SVC FVC PMVF PMSVC PMFVC** Set the current-balance correction percentage.	0% (-100%~100%)	RUN
F22.36 (0x5624)	Max Power Balance Ratio Correction	**V/F SVC FVC PMVF PMSVC PMFVC** Set the maximum power balance correction percentage.	0% (-100%~100%)	RUN
F22.37 (0x5625)	Power Balance Ratio Correction	**V/F SVC FVC PMVF PMSVC PMFVC** Set the power balance correction percentage.	0% (-100%~100%)	RUN
F22.41 (0x5629)	Operation Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Operation Mode 0: Stroke + Mode 0 1: Stroke + Variable speed mode 2: Stroke + 6+1 3: Full display	2 (0~3)	RUN
F22.42 (0x562A)	Left/Right Key Stroke Adjustment	**V/F SVC FVC PMVF PMSVC PMFVC** Enable or disable using Left/Right keys to change the stroke. 0: OFF 1: ON	0 (0~1)	RUN

F22.54~F22.55 Extension RS485 Communication Parameters

Code (Address)	Name	Content	Default (Range)	Property
F22.54 (0x5636)	Extension 485 Address	**V/F SVC FVC PMVF PMSVC PMFVC** Set the RS485 address for the extension.	1 (1~127)	STOP
F22.55 (0x5637)	Extension 485 Baud Rate/Format	**V/F SVC FVC PMVF PMSVC PMFVC** Set the RS485 baud rate and format. LED Ones-bit: Baud rate 0: 1200bps 1: 2400bps 2: 4800bps 3: 9600bps 4: 19200bps 5: 38400bps LED Tens-bit: Format 0: (N,8,1) No parity 1: (E,8,1) Even parity 2: (O,8,1) Odd parity 3: (N,8,2) No parity 4: (E,8,2) Even parity 5: (O,8,2) Odd parity LED Hundreds-bit: Reserved LED Thousands-bit: Reserved	0x0003 (0x0000~ 0x0055)	STOP

6 Oilfield-specific Parameter Details

6.1 F01: Operating ACC/DEC Settings

F01 group parameters are used to set the acceleration and deceleration times for different well operating modes controlled by the AC drive.

F01.22~F01.23: ACC/DEC Time [1]

Note: The system-wide acceleration and deceleration times for any operating mode are determined by F01.22~F01.23; selection of other parameter groups is not supported.

Funcode	Name	Range	Default
F01.22	ACC Time 1	Range: 0.00s~650.00s	For AC drives with rated power ≤37kW, the time is 12s; for 45kW~55kW, it is 18s; for 75kW, it is 24s.
F01.23	DEC Time 1	Range: 0.00s~650.00s	For AC drives with rated power ≤37kW, the time is 12s; for 45kW~55kW, it is 18s; for 75kW, it is 24s.

6.2 F15: Basic Pump-Off

F15.00: Pump Type

F15.00	Pump Type	Range: 0~2 0: Beam pump 1: Progressive cavity pump 2: Electric submersible pump	Default: 0

Note: Options 1 and 2 are reserved for future development; currently only 0 is supported.

F15.01~F15.04: Pump-Off Functions

F15.01	Pump-off Enable	Range: 0~2 0: OFF 1: ON 2: ON/OFF by terminal	Default: 0

Note: When set to 2, pump-off mode is activated upon valid external terminal input. Select function 81 for AC drive terminals X [1~8] and ensure the input signal is valid.

F15.02	Continuous Run Speed Source	Range: 0~1 0: None 1: F15.05	Default: 0

Note: If set to 0, the current frequency is determined by the AC drive's selected frequency source, time-division variable speed mode, or 6+1 mode. If set to 1, F15.05 is forced as the source, ignoring time-division variable speed mode and 6+1 mode.

F15.03	Pump-off Recovery Zone Mode	Range: 0~3 0: Swing operation 1: Well shut-in 2: Positioning-free swing operation 3: Low-speed operation	Default: 3

Note: Only beam pump can select 0~3; for other pump types selecting 0 or 2 will be treated as 3.

Caution: Well shut-in is not the same as shutdown. Shut-in places the system in a paused running state and it will resume when the recovery period ends.

Caution

Use the shut-in option with care to avoid mistaking it for a shutdown and causing safety incidents.

F15.04	Pump-off Type	Range: 0~5 0: Enter run on start 1: Enter recovery zone on start 2: Run at specified stage 3: Recovery zone at specified stage 4: Peak/Off-peak/Shoulder pump-off 5: Automatic pump-off	Default: 0

Note:

1. Options 0 and 1 are set by F15.07/F15.08; the two options are opposite in execution.

2. Options 2 and 3 use the specified-stage settings; the two options are opposite in execution.

0: Enter run on start

When pump-off mode is active, the pump runs according to F15.07 [Continuous Runtime] and F15.08 [Recovery Execution Time]. The operation pattern is: [continuous run time: recovery execution time: continuous run time: …].

1: Enter recovery zone on start

When pump-off mode is active, the pump runs according to F15.07 [Continuous Runtime] and F15.08 [Recovery Execution Time]. The operation pattern is: [recovery execution time: continuous run time: recovery execution time: …].

2: Run at specified stage

When pump-off mode is active, the pump runs continuously when the current time is between F19.42 [Specified Start Time 1] and F19.57 [Specified End Time 8]; otherwise it enters the recovery zone.

3: Recovery zone at specified stage

When pump-off mode is active, the pump runs continuously when the current time is between F19.42 [Specified Start Time 1] and F19.57 [Specified End Time 8]; otherwise it enters the recovery zone.

4: Peak/Off-peak/Shoulder pump-off

Divides 24 hours of a day into peak, off-peak, and shoulder periods; different periods have different continuous-run and recovery execution times.

5: Automatic pump-off

Combines with the F20 Automatic Pump-Off Parameters to automatically adjust continuous-run time and recovery execution time based on the selected recognition method.

Note: When F15.04 is set to 0~4, the selected type is considered a standard pump-off mode, which requires explicit “continuous run time” and “recovery time.” Automatic pump-off (5) adjusts those times automatically according to the well’s current fluid-supply capacity.

F15.05~F15.06: Pump-Off Speed

F15.05	Continuous Run Speed	Range: F15. 06~100.0%	Default: 60.0%
F15.06	Low-speed Run Speed	Range: 0.0%~F15. 05	Default: 30.0%

Note:Continuous operating speed corresponds to the upper limit frequency, while low-speed operation corresponds to the motor's rated frequency.

Caution: During pump-off low-speed operation, the speed setting takes priority and must not be lower than F1.13 [Lower Limit Frequency]; if lower, it will be limited to F1.13.

F15.07~F15.10: Pump-Off Time

F15.07	Continuous Runtime	Range: 1min~6000min	Default: 10min
F15.08	Recovery Execution Time	Range: 2min~6000min	Default: 20min

Note: When F15.04 is set to 0 or 1, these two parameters determine the time setting.

F15.09	Pump-off Clock Source	Range: 0~1 0: Internal timing 1: External clock	Default: 0

Note: The external clock source is provided by the clock extension card. Only standard/automatic pump-off modes support clock-source selection; specified-stage and peak/off-peak/shoulder modes are fixed to use the external clock.

F15.10	Operating Time Before Shut-in	Range: 0s~3600s	Default: 120s

Note: When F15.04 is set to 1 or 3 and F15.03 is set to 1, on restart from shut-in the unit will first execute a run for the duration set by this parameter. This prevents mistaken interpretation of a start with no response as a fault.

F15.11~F15.16: Pump-Off Time

F15.11	Calibration Time (Year)	Range: 2000~2099	Default: 2020
F15.12	Calibration Time (Month)	Range: 1~12	Default: 1
F15.13	Calibration Time (Day)	Range: 1~31	Default: 1
F15.14	Calibration Time (Hour)	Range: 0~23	Default: 0
F15.15	Calibration Time (Minute)	Range: 0~59	Default: 0
F15.16	Calibration Time (Second)	Range: 0~59	Default: 0

Clock calibration procedure: Set Year, Month, Day, Hour, Minute, and finally Second. F15.11~F15.16 do not advance automatically with real time; they are for correcting the real-time clock only. Use C04.21~C04.26 to monitor the current Year, Month, Day, Hour, Minute, and Second for verification.

6.3 F16: Beam Pumps

F16.00: Position Switch

F16.00	Position Switch	Range: 0~1 0: Equipped 1: Not equipped	Default: 0

Note: Selecting 0 requires a physical position switch. If the switch fails the system will automatically switch to the 1.

F16.01: Operating Mode

F16.01	Operating Mode	Range: 0~6 0: Mode 0 1: Mode 1 2: Mode 2 3: Mode 3 4: Mode 4 5: Mode 5 6: Mode 6 7: Stroke interface	Default: 0

Note: This parameter is effective only when changed after power-up; changing it selects the corresponding operating mode. Mode 0 stroke is determined by the frequency source set in F1; the frequency may come from source A or B. The system automatically converts the frequency to the corresponding strokes and displays it in Mode 0.

Only beam pump has defined operating modes; progressing cavity pumps and submersible pumps do not. For normal operation, keep the position-switch signal input valid.

Caution: F22.41 must be set to 2 or 3 for the above operating modes to be displayed.

F16.02: Switch Failure Mode Speed

F16.02	Switch Failure Speed	Range: 0~3 0: Set frequency 1: Average stroke 2: Minimum stroke 3: Maximum stroke	Default: 0

Note: When the position switch is invalid in Modes 1~6, this parameter determines the stroke settings. “0” means the strokes are determined by the system frequency source (A or B).

F16.03~F16.14: Operating Mode Speed

F16.03	Mode 1 Upstroke	Range: F16.37~F16.38	Default: 5.50 strokes
F16.04	Mode 1 Downstroke	Range: F16.37~F16.38	Default: 4.50 strokes
F16.05	Mode 2 Upstroke	Range: F16.37~F16.38	Default: 5.00 strokes
F16.06	Mode 2 Downstroke	Range: F16.37~F16.38	Default: 4.00 strokes
F16.07	Mode 3 Upstroke	Range: F16.37~F16.38	Default: 4.50 strokes
F16.08	Mode 3 Downstroke	Range: F16.37~F16.38	Default: 3.50 strokes
F16.09	Mode 4 Upstroke	Range: F16.37~F16.38	Default: 4.00 strokes
F16.10	Mode 4 Downstroke	Range: F16.37~F16.38	Default: 3.00 strokes
F16.11	Mode 5 Upstroke	Range: F16.37~F16.38	Default: 3.50 strokes

F16.12	Mode 5 Downstroke	Range: F16.37~F16.38	Default: 2.50 strokes
F16.13	Mode 6 Upstroke	Range: F16.37~F16.38	Default: 6.00 strokes
F16.14	Mode 6 Downstroke	Range: F16.37~F16.38	Default: 5.00 strokes

Note:

These parameters set the upstroke and downstroke for Modes 1~6. Each upstroke/downstroke value must lie within the range defined by F16.37~F16.38.

F16.15: Upstroke/Downstroke ACC/DEC Time

F16.15	Upstroke/Downstroke ACC/DEC Time	Range: 2.00s~650.00s	Default: 10.00s

Note: Set the acceleration/deceleration time between upstroke and downstroke when switching modes.

F16.16~F16.23: Swing Parameters

F16.16	Swing ACC/DEC Time	Range: 5.00s~650.00s	Default: 10.00s

Set the acceleration/deceleration time when entering swing operation.

F16.18	Swing Frequency	Range: 5.0%~50.0%	Default: 10.0%

Note: 100.0% corresponds to the motor rated frequency. During pump-off the swing frequency setting takes priority.

F16.19	Pre-swing Position Search Frequency	Range: 10.0%~100.0%	Default: 30.0%

Note: 100.0% corresponds to the motor rated frequency. When searching for the center position before swinging, the search frequency setting takes priority.

F16.20	Swing Angle	Range: 5º~90º	Default: 20º

Note: Set the positioned-swing angle; when F15.03=0, this adjusts the swing angle used during pump-off operation.

F16.21	Positioning-free Swing Time	Range: 1.0s~30.0s	Default: 5.0s

Note: For non-positioning swing, the angle is not available and the swing amplitude is determined by time.

F16.22	Well Shut-In Start Execution Time	Range: 0s~3600s	Default: 120s

Note: During shut-in, this value determines whether a start will first execute (non-zero) or remain shut-in (0). This prevents mistaking a non-responsive start during the shut-in period for a system fault and causing a safety incident.

F16.24~F16.26: Position Switch Setting

F16.24	Position Switch Failure Swing Mode	Range: 0~3 0: Set frequency 1: Positioning-free swing operation 2: Low-speed run speed (F15.06) 3: Alarm shutdown (position switch signal lost)	Default: 2

Note: When pump-off operation is enabled and the recovery action is positioned swing, loss of position-switch feedback causes execution according to this setting. 0 means the selected system frequency source determines the running frequency.

F16.25	Position Switch Failure Detection Time	Range: 30s~600s	Default: 100s

Note: Time to validate position-switch feedback during continuous running. 100s corresponds to 0.6 strokes/min; increase the detection time if lower stroke rates are required.

F16.26	Position Switch Filter Time	Range: 0.0s~30.0s	Default: 3.0s

Note: Prevent multiple false triggers caused by crank surface irregularities.

F16.27~F16.28: Upstroke/Downstroke Start Angle

F16.27	Upstroke Start Angle	Range: 0º~359º	Default: 10º
F16.28	Downstroke Start Angle	Range: 0º~359º	Default: 190º

Note: Defined for beam pump: crank angle 10°~190° is upstroke; 190°~360° (0°)~10° is downstroke.

Caution: These parameters are effective only when a functioning position switch is installed.

F16.29~F16.30: Automatic Stroke/Rated Stroke

F16.29	Automatic Stroke Setting	Range: F16.37~F16.38	Default: 3.00 strokes

Note: Set the Strokes per Minute using flywheel rotation in the Stroke interface.

F16.30	Rated Strokes	Range: 0.50~15.00 strokes/min	Default: 5.00 strokes

Note: Set the Strokes per Minute corresponding to asynchronous motor running at 50.00Hz or at the motor rated frequency; auto-set after tuning.

F16.31~F16.33: Stroke Auto-tuning Parameters

F16.31	Stroke Range Tuning	0: Re-tuning 1: Tuning completed	Default: 0

Note: Default is 0. On power-up, if stroke-range tuning is not completed, the system runs at the tuning frequency F16.33 and performs automatic tuning; the parameter is set to 1 on

completion. Manually clearing (setting to 0) re-enables self-tuning. Manual tuning is also possible—see the “Terminology” section, “Pump tuning stroke range,” for details.

F16.33	Tuning Frequency	Range: 10.0%~100.0%	Default: 60.0%

Note: 100.0% corresponds to the motor rated frequency.

F16.34~F16.36: Pump Parameters

F16.34	Pump Efficiency	Range: 0.0%~100.0%	Default: 0.0%
F16.35	Stroke Length	Range: 1.00m~12.00m	Default: 4.20m
F16.36	Pump Diameter	Range: 10mm~200mm	Default: 57mm

Note:

- Pump efficiency: 0.0% uses an internal estimate; a nonzero value uses an externally obtained efficiency for production estimation.
- Stroke: The default corresponds to the CYJY10-4.2-53HB model.
- Pump diameter: Common sizes include 38mm, 44mm, 57mm, 70mm, 83mm.

These three parameters affect production estimation; if production is not of concern, they need not be set.

F16.37~F16.38: Stroke Upper/Lower Limit

F16.37	Stroke Lower Limit	Read-only	Default: 2.00 strokes/min
F16.38	Stroke Upper Limit	Read-only	Default: 6.00 strokes/min

Note: These values are automatically updated after auto-tuning and are determined by the AC drive frequency limits.

F16.39: Pump Setting Depth

F16.39	Pump Setting Depth	Range: 10.0m~4000.0m	Default: 1000.0m

Note: Depth of pump submergence; this value affects dynamic liquid-level estimation and can be left unset if not required.

F16.40~F16.41: Stroke Correction

F16.40	Stroke Fine-tune Frequency	0.00kHz~20.00Hz	Default: 0.50Hz

Note:

If the actual measured cycles deviate from the set cycles by more than F16.41, the output frequency is adjusted incrementally to bring actual cycles closer to the set cycles. The adjustment step size is determined by F16.40.

F16.41	Operational Stroke Deviation	Range: 0.00~0.50 strokes Set the deviation threshold: If actual stroke differs from set stroke by less than this value, automatic frequency fine-tuning is inhibited to stabilize stroke.	Default: 0.01 strokes

Note:

When the actual cycles differ from the set cycles by less than this deviation, automatic frequency fine-tuning is inhibited to stabilize stroke. Otherwise, the output frequency is adjusted (step size = F16.40) until the actual cycles stay within the F16.41 tolerance.

6.4 F17: Progressive Cavity Pumps (Reserved)

6.5 F18: Electric Submersible Pumps (Reserved)

6.6 F19: Peak/Off-peak/Shoulder, Specified Time Pump-Off, Time-Division Variable Speed

The "Peak/Off-peak/Shoulder" function is a form of pump-off designed for low-permeability wells to save power. It divides the day into three periods—Shoulder, Peak, and Off-peak—based on industrial/residential load patterns or electricity price variations. "Shoulder" is defined as moderate demand, "Off-peak" as the lowest demand period, and "Peak" as the highest demand period when the grid load is greatest. The function schedules different run and recovery times for these periods by configuring the period definitions (Peak/Off-peak/Shoulder) and the execution times (run time, recovery time). The Peak/Off-peak/Shoulder parameter group is effective only when pump-off mode is set to Peak/Off-peak/Shoulder (F15.04 = 4).

F19.00~F19.05: Peak/Off-peak/Shoulder Run and Recovery Time

F19.00	Shoulder Run Time	Range: 1min~1440min	Default: 30
F19.01	Shoulder Recovery Time	Range: 1min~1440min	Default: 30
F19.02	Peak Run Time	Range: 1min~1440min	Default: 30
F19.03	Peak Recovery Time	Range: 1min~1440min	Default: 30
F19.04	Off-peak Run Time	Range: 1min~1440min	Default: 30
F19.05	Off-peak Recovery Time	Range: 1min~1440min	Default: 30

Description:

These parameters set the run and recovery durations for each period. For example, if all times are 30min, the system automatically matches the current time to the appropriate period (Peak/Off-peak/Shoulder) and applies the configured run and recovery times.

Note:

- If either the run time or the recovery time for a period is set to 0, that segment is skipped; if both are 0, the system performs continuous running. This allows keeping continuous running during a period or forcing only recovery without alternating.
- When entering a new period, the system begins the new period's configured run/recovery cycle. Example: If current time is within Shoulder Period 1 [05:30~07:00] and Shoulder [run, recovery] = [30min, 10min], the total period length is 90min (1.5×60) and each cycle is 40min; at the third cycle when the run timer reaches its 10th minute (current time 07:00), the system will enter Peak Period 1 [07:00–08:00], where Peak [run, recovery] = [20 min, 30 min]; the unit will continue running until the 20th minute, then switch to recovery.

Set start and end times separately for Shoulder, Peak, and Off-peak periods to enable flexible scheduling of pump-off operation. Example settings:

	Shoulder		Peak		Off-peak	
Period	Start Time	End Time	Start Time	End Time	Start Time	End Time
1	05: 30	07: 00	07: 00	8: 00	12: 00	14: 00
2	08: 00	09: 00	09: 00	11: 30	23: 30	05: 30
3	11: 30	12: 00	15: 30	20: 00	00: 00	00: 00
4	14: 00	15: 30	00: 00	00: 00	00: 00	00: 00
5	20: 00	23: 30	00: 00	00: 00	00: 00	00: 00
6	00: 00	00: 00	00: 00	00: 00	00: 00	00: 00

Note:

- Period continuity and evaluation order Keep periods continuous where possible; gaps between periods are treated as "not in any period," in which case the system executes continuous running.
- Correctness of start/end times:
  - If the current time does not fall within any configured period, the system executes continuous running (e.g., if current time is 04:00~05:00 and no period covers that interval).
  - Ensure end time is later than start time to guarantee valid settings.
  - Initial execution may have up to a 1-minute timing error because timing is counted in whole minutes. If the current seconds value is 30s, the first "minute" may be recorded after only 30s; subsequent timing proceeds normally, so the initial error depends on the system clock's current seconds.

F19.06~F19.17: Shoulder Time 1~6

F19.06	Shoulder Start 1	Range: 0000~2359	Default: 530
F19.07	Shoulder End 1	Range: 0000~2359	Default: 700

F19.08	Shoulder Start 2	Range: 0000~2359	Default: 800
F19.09	Shoulder End 2	Range: 0000~2359	Default: 900
F19.10	Shoulder Start 3	Range: 0000~2359	Default: 1130
F19.11	Shoulder End 3	Range: 0000~2359	Default: 1200
F19.12	Shoulder Start 4	Range: 0000~2359	Default: 1400
F19.13	Shoulder End 4	Range: 0000~2359	Default: 1530
F19.14	Shoulder Start 5	Range: 0000~2359	Default: 0
F19.15	Shoulder End 5	Range: 0000~2359	Default: 0
F19.16	Shoulder Start 6	Range: 0000~2359	Default: 0
F19.17	Shoulder End 6	Range: 0000~2359	Default: 0

Note:

These parameters are used together with the run/recovery times (F19.00~F19.05) and define the start/end times for Shoulder periods. When the system time falls within a configured Shoulder period, the corresponding pump-off settings are applied.

F19.18~F19.29: Peak Time 1~6

F19.18	Peak Start 1	Range: 0000~2359	Default: 700
F19.19	Peak End 1	Range: 0000~2359	Default: 800
F19.20	Peak Start 2	Range: 0000~2359	Default: 900
F19.21	Peak End 2	Range: 0000~2359	Default: 1130
F19.22	Peak Start 3	Range: 0000~2359	Default: 1530
F19.23	Peak End 3	Range: 0000~2359	Default: 2000
F19.24	Peak Start 4	Range: 0000~2359	Default: 0
F19.25	Peak End 4	Range: 0000~2359	Default: 0
F19.26	Peak Start 5	Range: 0000~2359	Default: 0
F19.27	Peak End 5	Range: 0000~2359	Default: 0
F19.28	Peak Start 6	Range: 0000~2359	Default: 0
F19.29	Peak End 6	Range: 0000~2359	Default: 0

Note:

These parameters are used together with the run/recovery times (F19.02~F19.03) and define the start/end times for Peak periods. When the system time falls within a configured Peak period, the corresponding pump-off settings are applied.

F19.30~F19.41: Off-peak Time 1~6

F19.30	Off-peak Start 1	Range: 0000~2359	Default: 1200
F19.31	Off-peak End 1	Range: 0000~2359	Default: 1400

F19.32	Off-peak Start 2	Range: 0000~2359	Default: 2330
F19.33	Off-peak End 2	Range: 0000~2359	Default: 530
F19.34	Off-peak Start 3	Range: 0000~2359	Default: 0
F19.35	Off-peak End 3	Range: 0000~2359	Default: 0
F19.36	Off-peak Start 4	Range: 0000~2359	Default: 0
F19.37	Off-peak End 4	Range: 0000~2359	Default: 0
F19.38	Off-peak Start 5	Range: 0000~2359	Default: 0
F19.39	Off-peak End 5	Range: 0000~2359	Default: 0
F19.40	Off-peak Start 6	Range: 0000~2359	Default: 0
F19.41	Off-peak End 6	Range: 0000~2359	Default: 0

Note:

These parameters are used together with the run/recovery times (F19.04~F19.05) and define the start/end times for Off-peak periods. When the system time falls within a configured Off-peak period, the corresponding pump-off settings are applied.

F19.42~F19.57: Specified Start/End Time 1~8

F19.42	Specified Start Time 1	Range: 0000~2359	Default: 0000
F19.43	Specified End Time 1	Range: 0000~2359	Default: 0000
F19.44	Specified Start Time 2	Range: 0000~2359	Default: 0000
F19.45	Specified End Time 2	Range: 0000~2359	Default: 0000
F19.46	Specified Start Time 3	Range: 0000~2359	Default: 0000
F19.47	Specified End Time 3	Range: 0000~2359	Default: 0000
F19.48	Specified Start Time 4	Range: 0000~2359	Default: 0000
F19.49	Specified End Time 4	Range: 0000~2359	Default: 0000
F19.50	Specified Start Time 5	Range: 0000~2359	Default: 0000
F19.51	Specified End Time 5	Range: 0000~2359	Default: 0000
F19.52	Specified Start Time 6	Range: 0000~2359	Default: 0000
F19.53	Specified End Time 6	Range: 0000~2359	Default: 0000
F19.54	Specified Start Time 7	Range: 0000~2359	Default: 0000
F19.55	Specified End Time 7	Range: 0000~2359	Default: 0000
F19.56	Specified Start Time 8	Range: 0000~2359	Default: 0000
F19.57	Specified End Time 8	Range: 0000~2359	Default: 0000

F19.58: Time-Division Variable Speed Mode

F19.58	Time-Division Variable Speed Mode	0: OFF 1: ON	Default: 0

Note:

Enables the time-division variable speed mode. When enabled, the unit runs according to the time-division start/end time x and time-division speed x. Use of this function requires installation of a clock card.

x: [1~8].

F19.59~F19.74: Time-Division Start/End Time 1~8

F19.59	Time-Division Start Time 1	Range: 0000~2359	Default: 0000
F19.60	Time-Division End Time 1	Range: 0000~2359	Default: 0000
F19.61	Time-Division Start Time 2	Range: 0000~2359	Default: 0000
F19.62	Time-Division End Time 2	Range: 0000~2359	Default: 0000
F19.63	Time-Division Start Time 3	Range: 0000~2359	Default: 0000
F19.64	Time-Division End Time 3	Range: 0000~2359	Default: 0000
F19.65	Time-Division Start Time 4	Range: 0000~2359	Default: 0000
F19.66	Time-Division End Time 4	Range: 0000~2359	Default: 0000
F19.67	Time-Division Start Time 5	Range: 0000~2359	Default: 0000
F19.68	Time-Division End Time 5	Range: 0000~2359	Default: 0000
F19.69	Time-Division Start Time 6	Range: 0000~2359	Default: 0000
F19.70	Time-Division End Time 6	Range: 0000~2359	Default: 0000
F19.71	Time-Division Start Time 7	Range: 0000~2359	Default: 0000
F19.72	Time-Division End Time 7	Range: 0000~2359	Default: 0000
F19.73	Time-Division Start Time 8	Range: 0000~2359	Default: 0000
F19.74	Time-Division End Time 8	Range: 0000~2359	Default: 0000

Note:

- Time-Division Start Time x and Time-Division End Time x are effective only when set on the Stroke interface.
- If F19.58=1 (enabled), when the current time is within [start time x, end time x] the unit runs at the Time-Division Speed x defined in F19.75~F19.82; otherwise the unit runs at the stroke it was using before multi-speed was enabled (previous running cycles are restored).

x: [1~8].

F19.75~F19.82: Time-Division Speed 1~8

F19.75	Time-Division Speed 1	Range: 0.0%~100.0%	Default: 50.0%
F19.76	Time-Division Speed 2	Range: 0.0%~100.0%	Default: 50.0%
F19.77	Time-Division Speed 3	Range: 0.0%~100.0%	Default: 50.0%

F19.78	Time-Division Speed 4	Range: 0.0%~100.0%	Default: 50.0%
F19.79	Time-Division Speed 5	Range: 0.0%~100.0%	Default: 50.0%
F19.80	Time-Division Speed 6	Range: 0.0%~100.0%	Default: 50.0%
F19.81	Time-Division Speed 7	Range: 0.0%~100.0%	Default: 50.0%
F19.82	Time-Division Speed 8	Range: 0.0%~100.0%	Default: 50.0%

Note:

Time-Division Speed x assigns different speeds to different time periods; when time falls within the interval defined by F19.59~F19.74, the corresponding F19.75~F19.82 speed is used. 100.0% corresponds to F16.38 [Stroke Upper Limit].

When F19.58 = 1, this setting is invalid.

6.7 F20: Automatic Pump-Off Parameters

Automatic pump-off differs from standard pump-off modes by analyzing real-time output power data to determine the well's current fluid level and fluid-supply condition: poorer supply increases recovery time, better supply shortens recovery time, and the system continuously adjusts accordingly.

The length of the continuous run is determined by the recognition mode selected in F20.00. In the "Fluid level" recognition mode, the computed fluid level is compared with the F20.01 [Pump-Off Target Fluid Level]; if the fluid level is below F20.01, the unit enters the recovery zone and ends the continuous run. In the "Power change rate" recognition mode, the decision to enter the recovery zone is based on power-change behavior.

Studies and extensive field tests have shown both modes are effective: they enable adaptive pump-off control of wells to improve efficiency and reduce energy consumption without manual adjustment of continuous-run and recovery times.

F20.00: Automatic Pump-Off Recognition Mode

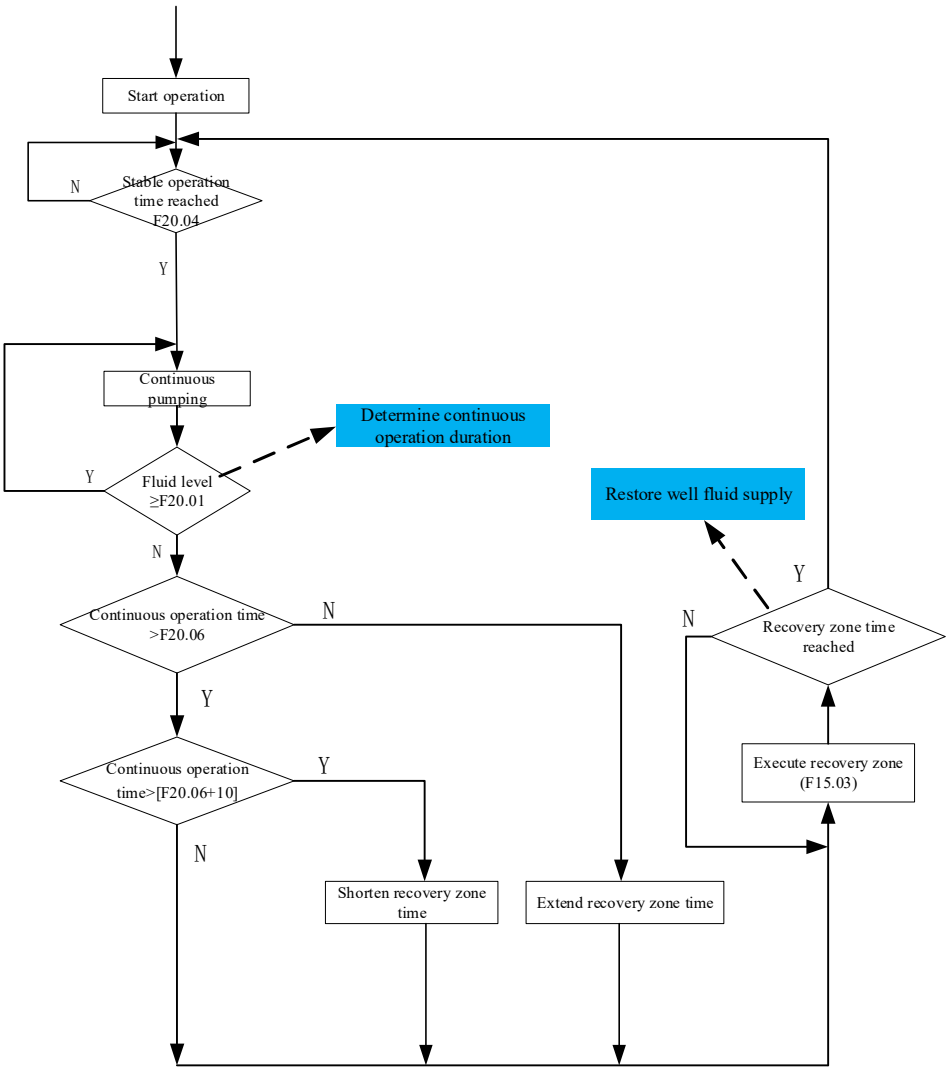
F20.00	Automatic Pump-Off Recognition Mode	Range: 0~1 0: Fluid level 1: Power variation rate	Default: 0

Note: This feature is effective only when F22.00=0 and F15.05=5. The two options use different observation and recognition methods.

F20.01~F20.08: Fluid Level Recognition Parameters

Fluid-level recognition is a commonly used automatic pump-off method intended to keep the pump operating at a specified fluid level (F20.01) while ensuring a minimum continuous run time (F20.06).

Example flow of the automatic pump-off — fluid-level recognition scheme:



F20.01	Pump-Off Target Fluid Level	Range: 0.0%~100.0%	Default: 70.0%

Note: If the analyzed well fluid level falls below this set value, the unit will enter the pump-off recovery zone; this is the desired fluid level when each pumping start occurs.

F20.03	Pump-Off Stable Run Time (ESP/PCP)	Range: 1min~30 min	Default: 5

Note: After returning from the recovery zone to continuous running, the continuous run time must meet this setting before the next automatic pump-off cycle can begin.

F20.04	Pump-Off Stable Run Cycles (Beam Pump)	Range: 5~100 Cycles	Default: 5

Note: Same meaning as F20.03 but expressed in cycles for beam pumps.

F20.05	Low Target Fluid Level Detection Time	Range: 1min~30 min	Default: 5

Note: Continuous detection time that the fluid level remains below F20.01; when this time is

reached, the unit enters the recovery zone.

F20.06	Target Continuous Run Time	Range: 1min~60 min	Default: 10

Note: Desired minimum continuous pumping time for each start, i.e., the run duration should exceed the time the F20.01 can be sustained.

F20.07	Min. Recovery Time	Range: 1min~60 min	Default: 20min

Note: Recovery time is dynamically adjusted but shall not be shorter than this value. On startup from shut-in, the first recovery time uses this value to ensure orderly execution of subsequent pump-off cycles.

F20.08	Max. Recovery Time	Range: F20.07~240min	Default: 60min

Note: Recovery time is dynamically adjusted but shall not exceed this value.

F20.09~F20.13: Power Recognition Parameters

Any electromechanical system's real work and load changes can be inferred by analyzing its electrical power consumption. Well operation follows the same rule: by analyzing power consumption changes, the downhole fluid supply and operating condition changes can be detected. **The "power recognition" scheme translates experienced reservoir engineers' condition-assessment and adjustment rules into an automated control strategy.**

F20.09	Avg Power Continuous Decline Rate	Range: 0.0%~100.0%	Default: 16.0%

Note: Compare the current-cycle average power with the power recorded after completing the stable-running period (F20.03/F20.04). If the decline rate exceeds this setting and the condition is sustained for the detection duration specified by F20.12 (ESP&PCP) or F20.13 (beam pump), the unit enters the pump-off recovery zone.

F20.10	Avg Power Sudden Decline Rate	Range: 0.0%~50.0%	Default: 8.0%

Note: Compare the current-cycle average power with any of the four previously retained cycle average powers. If the drop rate compared to any retained value exceeds this setting, and subsequent cycles each show a decline greater than this setting sustained for the detection duration specified by F20.12 (ESP&PCP) or F20.13 (beam pump), the unit enters the pump-off recovery zone.

F20.11	Avg Power Detection Time (ESP/PCP)	Range: 1min~30 min	Default: 1

Note: ESP and PCP lack a periodic position switch, so a specific detection time is required.

F20.12	Power Decline Detection Time (ESP/PCP)	Range: 1min~30 min	Default: 4

Note: Detection duration for power-relative change for ESP and PCP.

F20.13	Power Decline Detection Cycles (Beam Pump)	Range: 1~50 Cycles	Default: 10

Note: Detection duration for beam pumps is expressed in cycles.

F20.14~F20.21: Pump-Off Speed, Time Settings

F20.14	Continuous Run Time Limit	Range: 0min~180min	Default: 60 min

Note: If continuous run reaches this limit, it will be forced into the recovery zone. This protects against indefinitely long continuous runs; the next recovery time will be at least the minimum recovery time (F20.07).

F20.15	Speed Adjustment	Range: 0~1 0: OFF 1: ON	Default: 0

Note: When set to 1, speed adjustment is applied each cycle according to F20.16~F20.19.

F20.16	Continuous Runtime Variation Rate	Range: 0.0%~100.0%	Default: 15.0%

Note: Calculated when a cycle's continuous-run time > F20.06 and < F20.14.

Case 1: If current-run > F20.06 and previous-run > F20.06, variation rate = [(current-run − previous-run) * 1000 / previous-run] (unit = 0.1%), can be positive or negative.

Case 2: If current-run ≤ F20.06 or previous-run ≤ F20.06, variation rate = 0.0%.

F20.17	Forced Speed Adjustment Runtime	Range: 1min~90min	Default: 30

Note: When F20.18=1, if a cycle's continuous-run time exceeds this value, a forced speed increase is applied per F20.19.

Next-cycle continuous speed = current continuous speed + (current continuous speed * F20.19/1000).

F20.18	Forced Speed Adjustment	Range: 0~1 0: OFF 1: ON	Default: 0

Note: Effective only when F20.15=1.

F20.19	Pump-Off Speed Variation Range	Range: 0.0%~50.0%	Default: 5.0%

Note: The change amount relative to the current continuous speed. Whether the next-cycle speed changes is decided by F20.16 [Continuous Runtime Variation Rate].

Next-cycle speed calculation:

Case 1: variation rate (positive) > F20.16

Next-cycle speed = current speed + (current speed * F20.19 / 1000).

Case 2: variation rate (negative) < −F20.16

Next-cycle speed = current speed − (current speed * F20.19 / 1000).

Case 3: otherwise

Next-cycle speed unchanged.

F20.20	Pump-Off Upper Speed Limit	Range: 0.0%~100.0%	Default: 100.0%
F20.21	Pump-Off Lower Speed Limit	Range: 0.0%~100.0%	Default: 30.0%

Note: Continuous-run speed adjustments must remain within these limits. 100.0% corresponds to the system upper-limit frequency; the final continuous-run speed must lie within the system frequency upper and lower limits.

6.8 F21: Automatic Parameter Tuning

Automatic parameter tuning is suitable for wells with a certain fluid-supply capability. Compared with pump-off wells, these wells can run continuously for long periods but cannot sustain long-duration high-speed pumping. To keep supply and extraction balanced and to maximize efficiency, the running speed must be continuously adjusted to pursue a target fluid level, maximize pumping efficiency, or maximize production.

Three tuning modes are available and selected by F21.00: “Fluid-level,” “High-efficiency,” and “High-production.” These modes enable adaptive control of well operation without manual speed adjustments, improving efficiency and reducing energy consumption.

F21.00: Automatic Tuning Recognition Mode

F21.00	Automatic Tuning Recognition Mode	Range: 0~3 0: OFF 1: Fluid level 2: High efficiency 3: High production	Default: 0

0: OFF, automatic tuning is not performed.

1: Fluid level recognition — adjusts speed to keep the downhole fluid level close to the set target fluid level, achieving supply–extraction balance.

2: High-efficiency recognition — seeks to maximize production per unit energy (production/energy).

3: High-production recognition — seeks maximum production as the control objective.

Caution: Automatic tuning requires F22.00 = 1 to be set before operation.

F21.01: Automatic Tuning Speed

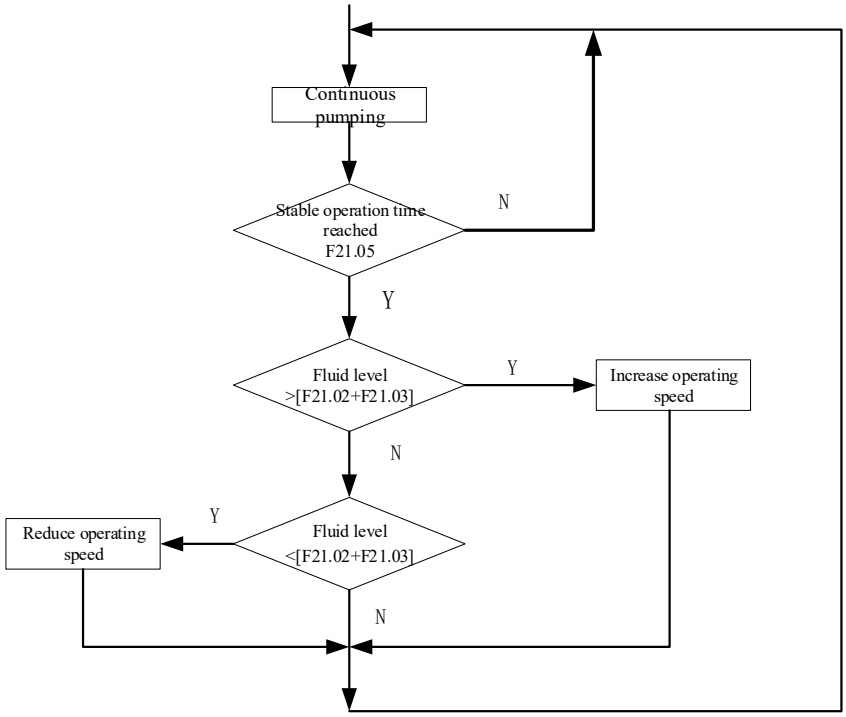
F21.01	Automatic Tuning Speed	Range: 20.0%~100.0%	Default: 60.0%

Note: During automatic tuning, this parameter is used for speed setting. 100.0% corresponds to the system upper-limit frequency.

F21.02~F21.03: Fluid Level Recognition Parameters

Fluid level recognition is a commonly used automatic-tuning method that aims to keep the well operating near a specified fluid level (F21.02), avoiding excessive energy consumption from high-speed pumping at low fluid levels.

Example flow of the automatic parameter tuning — fluid-level recognition scheme:



F21.02	Tuning Target Fluid Level	Range: 0.0%~100.0%	Default: 80.0%

Note: The controller adjusts speed to keep the downhole fluid level near this target; used when F21.00=1.

F21.03	Tuning Fluid Level Threshold	Range: 0.0%~50.0%	Default: 8.0%

Note: No speed adjustment occurs while the measured fluid level remains within ± this threshold around F21.02.

F21.04	Tuning Stable Runtime (ESP/PCP)	Range: 1min~60 min	Default: 5

Note: After each speed adjustment, the system must run this time before the next recognition/action.

F21.05	Tuning Stable Run Cycles (Beam Pump)	Range: 1~200 Cycles	Default: 20

Note: Same meaning as F21.04 but expressed in cycles for beam pumps.

F21.06~F21.13: Automatic Tuning Search Speed, Time Settings

F21.06	Search Speed Variation Range	Range: 0.0%~20.0%	Default: 4.0%

Description: Speed adjustment increment used during search. In fluid level recognition, it is used to step speed while searching for the target fluid level; in high-efficiency and high-production modes, it is used to search for the optimal speed.

Note: The actual adjustment is dynamic, not a fixed step.

F21.07	Search Time (ESP/PCP)	Range: 1min~30 min	Default: 2

Note: Search duration, applicable only to ESP and PCP.

F21.08	Search Cycles (Beam Pump)	Range: 0~200 cycles	Default: 5

Note: Search duration for beam pump is expressed in cycles.

F21.09	Search Method	Range: 0~1 0: Specified by F21.10 1: Full range	Default: 0

Note: Full-range searches across the entire upper/lower speed limits and requires longer time; each speed change during a search is determined by F21.06.

F21.10	Manual Search Range	Range: 0.0%~100.0%	Default: 25.0%

Note: Defines the ± range around F21.01 used for search; each speed change during a search is determined by F21.06.

Search upper/lower limit speed:

Search upper limit speed = F21.01 + F21.01 * F21.10 / 1000.

Search lower limit speed = F21.01 − F21.01 * F21.10 / 1000.

F21.11	Re-search Relative Variation Rate	Range: 0.0%~100.0%	Default: 20.0%

Note: After completing a search (per F21.09) and selecting an optimal speed for modes 2 or 3, the system maintains that speed. If subsequent operating changes cause energy/consumption to change and the relative change after a search time exceeds this value, a new search is triggered.

F21.12	Tuning Upper Speed Limit	Range: 0.0%~100.0%	100.0%
F21.13	Tuning Lower Speed Limit	Range: 0.0%~100.0%	30.0%

Note: Speed adjustments during tuning must remain within these limits; 100.0% corresponds to the upper-limit operating frequency.

6.9 F22: Pump Comprehensive Parameters

F22.00: Pump-Off and Auto-Tuning

F22.00	Pump-Off and Auto-Tuning	0: Pump-off 1: Auto-tuning	0

Note: Pump-off and automatic tuning cannot run simultaneously; only one mode may be selected at a time.

F22.01~F22.05: Voice Broadcast Settings

F22.01	Voice Broadcast First Half Time	Range: 0s~60s	Default: 6.0s
F22.02	Voice Broadcast Second Half Time	Range: 0s~60s	Default: 16.0s

Note:

The total broadcast is divided into two parts; the broadcast cycle is F22.01 + F22.02. If Y terminal / relay output / extension Y2 terminal / extension relay2 [F06.21–F06.24] = 40, terminal output is active during voice broadcast.

Voice content must be recorded separately for the first and second halves. The first half is typically looped (for example: first half “Pump starting — keep away), and the second half is a countdown (“Pump start countdown 10, 9, 8 … 1”). Both halves together must not exceed F22.04; F22.04 is adjusted around the minimum cycle of F22.01 + F22.02. If F22.04 = 28 s, playback order is [first-half, first-half, second-half] (first half repeated twice).

F22.03	Voice Broadcast Switch	Range: 0~1 0: OFF 1: ON	Default: 1

Note: Enables voice broadcast. If F22.03 = 1, F22.01 and F22.02 are effective; otherwise they are ignored.

F22.04	Voice Prompt Time	Range: 0s~120s When the unit transitions from standstill to swing or to continuous run, a voice prompt is issued.	Default: 22s

Note: This parameter is intended for safety. When transitioning from standstill (shut-in) to continuous run or swing, or from swing to continuous run, the voice prompt warns nearby personnel or animals. Use in conjunction with F22.01 and F22.02.

F22.05	Actual Voice Prompt Time	Read-only	Default: 23s

Note: When voice prompts are used, F22.05 is automatically adjusted to ensure complete

playback when F22.01~F22.02 are set. Recovery time must be greater than the actual voice prompt time.

F22.06~F22.08: Power Monitoring Settings

F22.06	Power and Production Reset	Range: 0~88 0: No operation 11: Clear runtime and run power 22: Clear daily power 33: Clear cumulative power 55: Clear stage power 66: Clear daily production 88: Clear cumulative production	Default: 0
F22.07	Stage Power Monitoring	Range: 0~1 0: OFF 1: ON	Default: 0

0: No operation

Do not clear run time or energy.

11: Clear runtime and run power

Clears run-time and run-energy counters that measure only during running; run-time and run-power reset automatically on stop; run power is monitored by C05.00, run time by C05.01.

22: Clear daily power

Clears daily power (monitored/displayed by C04.46).

33: Clear cumulative power

Clears cumulative run power; cumulative run power is stored to EEPROM on power loss and persists unless manually cleared (see C04.48 & C04.49).

55: Clear stage power

Clears stage run power; stage run power is stored to EEPROM on power loss and persists unless manually cleared; stage energy measurement requires F22.07=1.

66: Clear daily production

Clears daily production (monitored/displayed by C04.44).

88: Clear cumulative production

Clears cumulative production (monitored/displayed by C05.04 & C05.05).

Note:

After F22.06 action is executed, F22.06 will be set to 0; repeat the setting to clear again.

F22.08	Negative Power Calculation	Range: 0~1 0: Excluded 1: Included	Default: 1

0: Excluded

Ignore negative active power when summing up active power for upstroke/downstroke (i.e., when the pump is generating).

1: Included

Include negative active power in upstroke/downstroke active-power totals.

Note: Active-power accumulation for upstroke and downstroke is performed in 10ms increments.

F22.09	Operating Condition Diagnosis	Range: 0~1 0: OFF 1: ON	Default: 1

Note: If disabled, condition diagnosis is not performed and C04.50 will show only 0 and 1.

F22.18~F22.21: Power Parameter Filter Time

F22.18	Active Power Filter Time	Range: 0.00s~10.00s	Default: 0.10s
F22.19	Apparent Power Filter Time	Range: 0.00s~10.00s	Default: 0.10s
F22.20	Reactive Power Filter Time	Range: 0.00s~10.00s	Default: 0.10s
F22.21	Power Factor Filter Time	Range: 0.00s~10.00s	Default: 0.10s

Note: These parameters apply filtering to the respective power measurements to reduce interference. Longer filter times increase interference rejection but make displayed values change more slowly. **These filters affect the "Fluid level" calculation; keep default values unless tuning is required.**

F22.22~F22.24: High Bus Voltage Parameters

F22.22	Bus Overvoltage Detection Switch	Range: 0~1 0: OFF 1: ON	Default: 1

Note:

If F22.22=1, bus overvoltage detection is active; if 0, no overvoltage detection is performed.

F22.23	Bus Overvoltage Detection Time	Range: 0s~3600s	Default: 120s

Note:

Detection is triggered if the bus voltage remains above the F22.24 setting for longer than this time.

F22.24	Bus Overvoltage Setting	Range: 0V~2000V	Default: 600V T3: 600V T6: 1030V

Note:

When bus overvoltage detection is enabled, if the actual bus voltage exceeds the setting value and continues for the detection time, the configured response action is executed; otherwise no action is taken.

This function detects sustained high input voltage by monitoring the DC bus voltage and provides protection against prolonged overvoltage, especially when the grid voltage is abnormally high or unstable.

Based on field practice, set a Y-terminal output as the response. Configure F06.21 to select Y output condition 42 (bus overvoltage), wire the Y output to a trip coil on the main breaker, and arrange the trip coil so that when Y energizes, it trips the breaker and disconnects the supply. Disconnecting the supply on overvoltage prevents excessive harmonics and high voltages that damage motor insulation; prolonged exposure can cause motor burnout. If overvoltage occurs frequently, contact the power supplier to stabilize the supply.

F22.26~F22.27: Fluid Level/Dynamic Fluid Level Source

F22.26	Fluid Level Source	Range: 0~1 0: Internal calculation 1: Communication input	Default: 0

Description: Internal calculation is derived from the AC drive's analysis of electrical parameters. Communication input means the fluid level is provided by an external sensor via communication at address 0x201E or 0x301E.

F22.27	Dynamic Fluid Level Source	Range: 0~1 0: Internal calculation 1: Communication input	Default: 0

Description: Internal calculation is derived from the AC drive's analysis of electrical parameters. Communication input means the fluid level is provided by an external sensor via communication at address 0x201F or 0x301F.

F22.28: Output Delay

F22.28	Output Delay	Range: 0.0s~10.0s	Default: 0.5s

Note: Effective when driving synchronous motors; after receiving a run command, U/V/W outputs are enabled after this delay.

F22.29: Special Parameter Modification Password

F22.29	Special Parameter Modification Password	Range: 0~65536	Default: 0

Note:

Enter the password provided by the manufacturer to enable modification of F22.30~F22.42. After entering the password, parameter modification is allowed for 60s.

F22.30~F22.42: Special Parameter Settings

F22.30	Frequency Range Modification Setting	Range: 0~1 0: Restricted 1: Unrestricted	Default: 0

Note:

0: Restricted

F1.12 [Lower Limit Frequency] may not be set below F22.31, and F1.10 [Maximum Frequency] may not exceed F22.32.

1: Unrestricted

Frequency modifications are not constrained.

F22.31	Target Lower Frequency	Range: 0.00s~F22.32	Factory value: 20.00Hz
F22.32	Target Maximum Frequency	Range: F22.31~320.00Hz	Factory value: 60.00Hz

Note: When F22.30=0, F01.13 [Lower Limit Frequency] must not be set below F22.31, and F1.10 [Maximum Frequency] must not exceed F22.32.

F22.34	Stroke Correction	Range: -1.00~1.00	Default: 0.0

Note:

If the actual (manually measured, excluding measurement error) stroke differs significantly from the stroke shown by C04.00, adjust F22.34 to correct the error. If actual stroke > C04.00, set F22.34 to positive error value; if actual stroke < C04.00, set F22.34 to negative error value.

Stroke correction = (Actual stroke − Monitored stroke)

F22.35	Current Balance Ratio Correction	Range: -100%~100%	Default: 0%

Note:

Based on the measured peak currents of upstroke and downstroke, compute the actual current-balance ratio and correct relative to the monitored current-balance.

Current-balance correction = (Actual current-balance − Monitored current-balance)

F22.36	Max Power Balance Ratio Correction	Range: -100%~100%	Default: 0%
F22.37	Power Balance Ratio Correction	Range: -100%~100%	Default: 0%

Note: Use the same correction method as F22.35.

Balance Ratio

The balancing condition of a pump is determined by equal work done during the upstroke and downstroke, equal peak motor current, and equal peak crank shaft torque. The balance ratio is calculated based on the ratio of work or current between the upstroke and downstroke, providing a

reference to evaluate whether the system is balanced.

Current Balance Ratio:

Current balance ratio = (Downstroke max. current / Upstroke max. current) × 100 (unit: %).

Max Power Balance Ratio:

Maximum power balance ratio = (Downstroke max. power / Upstroke max. power) × 100 (unit: %).

Note: If downstroke max. power < 0, set maximum power balance ratio = 0.

Avg Power Balance Ratio:

Power balance ratio = (Downstroke average power / Upstroke average power) × 100 (unit: %).

Note: If downstroke average power < 0, set power balance ratio = 0.

F22.41	Operation Mode	Range: 0~3 0: Stroke + Mode 0 1: Stroke + Variable speed mode 2: Stroke + 6+1 3: Full display	2

Note:

0: Stroke + Mode 0

The LCD keypad can toggle between the Stroke interface and Mode 0 display, entering the corresponding operating state. Long-press the Left key for more than 3s to switch between the two modes.

1: Stroke + Variable speed mode

The LCD keypad can toggle between the Stroke interface and the variable-speed (or constant-speed) mode display, entering the corresponding operating state. (Variable-speed: up/down strokes differ; Constant-speed: up/down strokes equal.) Long-press the Left key for more than 3s to switch between the two modes.

2: Stroke + "6+1"

The LCD keypad can toggle between the Stroke interface and operating modes 1~6. Long-press the Left key for more than 3s to switch between the Stroke interface and modes 1~6; short-press the Right key to cycle among modes 1~6.

3: Full display

Supports displaying and entering all the above operating modes.

F22.42	Left/Right Key Stroke Adjustment	Range: 0~1 0: OFF 1: ON	Default: 0

Note:

0: OFF

In variable-speed mode, the Left and Right keys cannot modify the up/down stroke

values.

1: ON

In variable-speed mode, the Left and Right keys can quickly modify the up/down stroke values.

F22.54~F22.55: Extension RS485 Communication Parameters

F22.54	Extension 485 Address	Range: 1~127	Default: 1
F22.55	Extension 485 Baud Rate/Format	LED Ones-bit: Baud rate 0: 1200 bps 1: 2400 bps 2: 4800 bps 3: 9600 bps 4: 19200 bps 5: 38400 bps LED Tens-bit: Format 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 Hundreds-bit: Reserved Thousands-bit: Reserved	Default: 0x0003

Note: To ensure proper communication, the extension card address must be correctly matched with the baud rate. Otherwise, communication will fail.

6.10 Well-Specific Monitoring Parameters

Parameters in groups C04 and C05 are dedicated well-monitoring parameters.

C04 Monitoring Parameters 1

Code (Address)	Name	Min. Unit	Content
C04.00 (0x2500)	Running SPM	0.01 strokes/min	Actual strokes per minute. May have some deviation when no position switch is present.
C04.01 (0x2501)	Upstroke Setting	0.01 strokes/min	Upstroke display in Stroke interface, Mode 0, and Constant-speed mode. For Modes 1~6 and Variable-speed mode, the displayed upstroke/downstroke correspond to each mode.
C04.02 (0x2502)	Downstroke Setting	0.01 strokes/min	The same as C04.01.
C04.03 (0x2503)	Stroke Status	0~2	0: Stop 1: Upstroke 2: Downstroke
C04.04 (0x2504)	Pump-Off Status	0~3	0: Stop 1: Normal operation, pump-off not active 2: Pump-off continuous running 3: Pump-off recovery
C04.05 (0x2505)	Recovery Status	0~4	0: Stop 1: Swing operation 2: Well shut-in 3: Positioning-free swing operation 4: Low-speed operation
C04.06 (0x2506)	Crank Position Angle	1°	Crank vertical up (12 o'clock, corresponding to bottom-dead-center) = 0°.
C04.07 (0x2507)	Swing Angle	1°	Current swing angle during pump-off recovery and swinging (valid when position switch is installed and functioning).
C04.08 (0x2508)	Normal Pump-Off Runtime	1min	Continuous run timer when F15.04=0~4.
C04.09 (0x2509)	Normal Pump-Off Recovery Time	1min	Recovery phase timer when F15.04=0~4.
C04.10 (0x250A)	Max Upstroke Current	0.1A	Peak current observed during upstroke (requires position switch functioning).

C04.11 (0x250B)	Max Downstroke Current	0.1A	Peak current observed during downstroke (requires position switch functioning).
C04.12 (0x250C)	Current Balance Ratio	1%	Calculation: (Downstroke peak current * 100 / Upstroke peak current).
C04.13 (0x250D)	Max Upstroke Power	0.1kW	Peak power observed during upstroke (requires position switch functioning).
C04.14 (0x250E)	Max Downstroke Power	0.1kW	Peak power observed during downstroke (requires position switch functioning).
C04.15 (0x250F)	Max Power Balance Ratio	1%	Calculation: (Downstroke peak power * 100 / Upstroke peak power). Note: If downstroke max. power < 0, set maximum power balance ratio = 0.
C04.16 (0x2510)	Avg Upstroke Power	0.1kW	Average power for upstroke (requires position switch functioning).
C04.17 (0x2511)	Avg Downstroke Power	0.1kW	Average power for downstroke (requires position switch functioning).
C04.18 (0x2512)	Power Balance Ratio	1%	Calculation: (Downstroke average power * 100 / Upstroke average power). Note: If downstroke average power < 0, set power balance ratio = 0.
C04.19 (0x2513)	Position Switch Status	0~2	0: Normal 1: Fault after tuning 2: Fault due to incomplete tuning Note: if F16.00 = 1, this will always show 0 (no switch status check).
C04.20 (0x2514)	Reserved	-	Note: Only valid if the dedicated extension card is installed (C04.21~C04.26). C04.20 is reserved and must not be used.
C04.21 (0x2515)	Clock–Year	1	
C04.22 (0x2516)	Clock–Month	1	
C04.23 (0x2517)	Clock–Day	1	
C04.24 (0x2518)	Clock–Hour	1	

C04.25 (0x2519)	Clock–Minute	1	
C04.26 (0x251A)	Clock–Second	1	
C04.27 (0x251B)	Today Stroke Count	1 stroke	Cumulative strokes counted for the current day.
C04.28 (0x251C)	Yesterday Stroke Count	1 stroke	Cumulative strokes counted for the previous day.
C04.29 (0x251D)	Cumulative Stroke Count (Low)	1 stroke	Cumulative strokes = C04.30*65536 + C04.29.
C04.30 (0x251E)	Cumulative Stroke Count (High)	65536 strokes	
C04.31 (0x251F)	Today Auto Pump-Off Count	1 stroke	When F15.04=5, counts each completed automatic pump-off cycle for the day.
C04.32 (0x2520)	Yesterday Auto Pump-Off Count	1 stroke	Cumulative automatic pump-off cycles counted for the previous day.
C04.33 (0x2521)	Cumulative Auto Pump-Off Count (Low)	1 stroke	Cumulative = C04.34*65536 + C04.33.
C04.34 (0x2522)	Cumulative Auto Pump-Off Count (High)	65536 strokes	
C04.35 (0x2523)	Today Auto Pump-Off Continuous Runtime	1min	Accumulated continuous run time when F15.04=5.
C04.36 (0x2524)	Today Auto Pump-Off Recovery Time	1min	Accumulated recovery time when F15.04=5.
C04.37 (0x2525)	Yesterday Auto Pump-Off Continuous Runtime	1min	Cumulative automatic pump-off continuous run time counted for the previous day.

C04.38 (0x2526)	Yesterday Auto Pump-Off Recovery Time	1min	Cumulative automatic pump-off recovery time counted for the previous day.
C04.39~ C04.42 (0x2527~ 0x252A)	Reserved	-	-
C04.43 (0x252B)	Target Frequency	0.01Hz	Frequency provided by the selected frequency source.
C04.44 (0x252C)	Daily Production	0.01m³/day	Today's production. Can be cleared with F22.06 = 66.
C04.45 (0x252D)	Yesterday Production	0.01m³/day	Yesterday's production.
C04.46 (0x252E)	Daily Power Consumption	0.1kW/ h	Today's power consumption. Can be cleared with F22.06 = 22.
C04.47 (0x252F)	Yesterday Power Consumption	0.1kW/ h	Yesterday's power consumption.
C04.48 (0x2530)	Cumulative Power Consumption (Low)	0.1kW/ h	Cumulative power consumption = C04.49*6553.6+C04.48. Note: Can be cleared with F22.06 = 33; but only if it shares the same unit as C0.37 and C0.38; otherwise, it cannot be cleared.
C04.49 (0x2531)	Cumulative Power Consumption (High)	6553.6W/ h	

C04.50 (0x2532)	Operating Condition Diagnosis	0: Stop 1: Normal operation 2: Belt broken 3: Wax deposition 4: Rod broken 5: Plunger out of barrel 6: Pump impact (upstroke or downstroke)	Belt break: belt drive failure Rod break: sucker rod fracture Note: Items 2~6 are reference indications only; verify with instruments or manual inspection.
C04.51 (0x2533)	Recent Operating Condition	Same as C04.50.	Record the most recent operating condition (items 2~6 in C04.50).
C04.52 (0x2534)	Recent Condition Occurrence Time (Month/Day)	-	Record the month/day of the most recent operating condition occurrence (e.g., “829” = Aug 29).
C04.53 (0x2535)	Recent Condition Occurrence Time (Hour/Minute)	-	Record the hour/minute of the most recent operating condition occurrence (e.g., “2235” = 22:35).
C04.54 (0x2536)	Previous Operating Condition	Same as C04.50.	The same as C04.50.
C04.55 (0x2537)	Previous Condition Occurrence Time (Month/Day)	-	The same as C04.52.
C04.56 (0x2538)	Previous Condition Occurrence Time (Hour/Minute)	-	The same as C04.53.
C04.57 (0x2539)	Peak/Off-peak/Shoulder Runtime	1min	Continuous-run time during peak/off-peak/shoulder operation.

C04.58 (0x253A)	Peak/Off-peak/Shoulder Recovery Time	1min	Recovery time during peak/off-peak/shoulder operation.
C04.59 (0x253B)	Peak/Off-peak/Shoulder Time Indicator	0~3	0: Not in designated time interval, continuous operation 1: Shoulder 2: Peak 3: Off-peak
C04.60 (0x253C)	System Max Running SPM	0.01 strokes/min	Maximum strokes the system can run depends on the upper-limit frequency.
C04.61 (0x253D)	System Min Running SPM	0.01 strokes/min	Minimum strokes the system can run depends on the lower-limit frequency.
C04.62 (0x253E)	Fluid Level	0.1%	Estimated by model and empirical analysis; reflects downhole fluid level.
C04.63 (0x253F)	Pump Efficiency	0.1%	Estimated by model and empirical analysis; for accurate values, use instruments.

Note: Other C04.xx parameters not listed above are reserved.

C05 Monitoring Parameters 2

Code	Name	Min. Unit	Content
C05.00 (0x2600)	Start Run Power Consumption	0.1kWh	Power consumption accumulated from start of running; resets on stop. Note: Can be cleared with F22.06 = 11.
C05.01 (0x2601)	Start Runtime	min	Time accumulated from start of running; resets on stop. Note: Can be cleared with F22.06 = 11.
C05.02 (0x2602)	Stage Power Consumption (Low)	0.1kWh	Stage power consumption (low) = C05.03 * 6553.6 + C05.02. Note: Can be cleared with F22.06 = 55.
C05.03 (0x2603)	Stage Power Consumption (High)	6553.6kWh	
C05.04 (0x2604)	Cumulative Production (Low)	0.01M³	Cumulative production (low) = C05.05 * 655.36 + C05.04. Note: Can be cleared with F22.06 = 88.
C05.05 (0x2605)	Cumulative Production (High)	655.36M³	

C05.06 (0x2606)	Active Power	0.1kW	Filter time is set by F22.18; this value affects the “fluid level” calculation—use default filter unless adjustment is required.
C05.07 (0x2607)	Apparent Power	0.1kVA	Filter time is set by F22.19.
C05.08 (0x2608)	Reactive Power	0.1kVar	Filter time is set by F22.20.
C05.09 (0x2609)	Power factor	0.01	Filter time is set by F22.21.
C05.10 (0x260A)	Dynamic Fluid Level	0.1m	Estimated by model and empirical analysis; for accurate values, use instruments.

6.11 I/O Terminal Functions

A few terminal functions are reserved for oilfield-specific I/O.

AC drive X terminal function options:

Function Option	Description
80	Beam Pump Position Switch Signal Input
81	Pump-Off Operation

AC drive Y/relay terminal function options:

Function Option	Description
40	Pump-Off Voice Prompt
42	High Bus Voltage
43	Switch Error Output
44	Pump Status Output Closed: upstroke Open: stopped or downstroke

6.12 Oilfield-specific Errors

A specific error E.E83 indicates loss of the position switch signal during positioned swinging in pump-off execution.

Error	Name	Condition
E.E83	Swing signal lost	Detected during continuous running (not detected during swinging). Detection time set by F16.25, and requires F15.03 = 0 and F16.24 = 3. See F16.24 for details.

Version Change Log

Date	Version	Content
2025.10	V1.0	First version released