

# Foreword

First of all, thank you for purchasing the AF300/AE300 series Variable Frequency Drive (VFD).

The AF300/AE300 series Variable Frequency Drive adopts high performance vector control technology, which has excellent control performance such as large torque at low frequency, high stable speed accuracy, and strong overload capacity; and it has the advantages of compact structure, easy installation, high reliability, etc., suitable for driving AC induction and PM motors in different applications, especially suitable for applications with high economic, limited installation space, such as assembly lines, textile printing and dyeing machinery, packaging machinery, woodworking machinery, etc.

This user manual is used for the model selection, installation, parameters setting, commissioning and fault diagnosis of the Variable Frequency Drive.

To guarantee safe operation of the equipment, please read this manual carefully before connecting power to VFD. Keep this manual at hand and distribute it to all users for reference.

Note that this manual should be delivered to the end users. If you have any questions, please consult our technical support personnel or distributors for help.

Due to continuous improvement of products, the information provided by our company is subject to change without notice.

## Safety Precautions



**DANGER: Dangerous warning** warns of high voltage which can cause physical injury and/or damage to the equipment, even could be lethal. Extreme care is necessary at all times when working with or adjacent to the VFD.



**WARNING: General warning** warns about conditions, other than those caused by electricity, which can result in physical injury and/or damage to the product.

### ■ USE



#### DANGER

- This series of VFD is used to control the operation of three-phase AC motor. It cannot be used to control single-phase motor, DC motor or for other purpose, otherwise it may cause VFD fault or fire.
- This series of VFD cannot be easily applied to applications such as medical device that are directly related to personal safety.
- This series of VFD is manufactured under strict quality management system. If an VFD fault occurs, it may cause a major accident or loss, require safety measures such as redundancy or bypass, just in case.

### ■ Arrival Inspection



#### WARNING

- The VFD cannot be installed if the VFD is damaged or missing parts, otherwise an accident may occur.

### ■ Installation



#### WARNING

- When handling and installing, please hold the bottom of the VFD. Do not hold the enclosure only, otherwise, your feet may be injured and/or the VFD may be damaged.
- The VFD should be mounted on the fire-retardant surface such as metal, and keep away from flammable objects and heat producer.
- Do not drop drilling residue into the VFD during installation work. Otherwise, the VFD may be damaged and/or trip on a fault.
- When the VFD is installed in an electrical control cabinet, the electrical control cabinet shall be equipped with a fan and ventilation port. In addition, air-cooling duct shall be designed in the cabinet to facilitate heat dissipation.

## ■ Wiring



### DANGER

- Wiring must be performed by a qualified electrical engineer, otherwise there is a risk of electric shock or damage to the VFD.
- Must cut off the power before wiring; otherwise, there is a risk of electric shock or fire.
- The grounding terminal PE must be grounded reliably, otherwise, the VFD enclosure may become live.
- Do not touch the main circuit terminals. The main circuit terminals wiring of the VFD must not be contacted to the enclosure, otherwise, risk of electric shock may occur.
- The connection terminals of the brake resistor are “BR+” and “BR-”. Do not connect to other terminals; otherwise, risk of fire may occur.
- The leakage current of the VFD is higher than 3.5mA, and the specific value is determined by the actual conditions. For safety, the VFD and the motor must be firmly grounded.

 **WARNING**

- The three-phase power supply cannot be connected to the output terminals U, V, W; otherwise, the VFD will be damaged.
- It is absolutely prohibited to connect a capacitor or phase lead LC/RC noise filter to the output terminal of the VFD, otherwise the VFD will be damaged.
- Please confirm the number of power supply phases and rated input voltage match the nameplate, otherwise the VFD may be damaged.
- The withstand voltage test cannot be performed to the VFD; otherwise, the VFD may be damaged.
- The main circuit terminal wiring and control circuit terminal wiring of the VFD should be arranged separately or vertically, otherwise the control signal will be interfered.
- Please use cable lug with insulating sleeve for the cable to main circuit terminals.
- The sectional area of input and output cables selection should according to the VFD rated current.
- When the cable length between the VFD and the motor exceeds 100 meters, please use an output reactor to avoid over-current fault caused by excessive distributed capacitance.
- The terminal connection of the main circuit must be reliable; otherwise, it may cause fire and/or short circuit.
- It is strictly prohibited to connect control terminals to AC 220V/380V voltage except TA, TB and TC terminals, otherwise there is a risk of damaging the equipment.

## ■ Operation

 **DANGER**

- Do not operate the VFD with damp hands, otherwise there is a risk of electric shock.
- Only after the VFD wiring is completed and covered well, the VFD can be powered up. It is forbidden to remove the cover when the power is on; otherwise, there is a risk of electric shock.
- Before running, confirm that the mechanical installation is reliable; otherwise, it may cause physical injury and/or damage to the equipment.
- Before running, must confirm all personnel are in safe position, otherwise, it may cause physical injury and/or damage to the equipment.
- If automatic fault reset or automatic start after powered up function is active, safety isolation measures must be taken for mechanical equipment, otherwise, it may cause physical injury and/or damage to the equipment.
- After the VFD is powered, even if it is in the stop status, the terminals of the VFD are still live. It is forbidden to touch the terminals, otherwise it may cause electric shock.
- Before reset the VFD, confirm the run command has been switch off, otherwise it may cause physical injury and/or damage to the equipment.

 **WARNING**

- Do not start or stop the VFD by turning the power supply on or off; otherwise, the VFD may be damaged.
- Before start, please confirm whether the motor and machinery are within the allowable range of use, otherwise the equipment may be damaged.
- Before start, please set the motor parameters correctly and start motor parameters auto-tune, otherwise, if the default parameter values are not match the motor will cause over-current fault or motor vibration, even damage to the equipment.
- Do not touch heat sink and brake resistor, otherwise there is a danger of burns and/or electric shock.
- When the VFD is used for lifting machine, such as crane, escalator, elevator, please also configure a mechanical brake.
- Do not change the VFD parameters at will. Most of the parameters' default value can meet the operation requirements. Just need to change some necessary parameters, and arbitrarily modify the parameters may cause damage to the mechanical equipment. Only some necessary parameters need to be set. Modify the parameters at will may result in damage to the mechanical equipment.

## ■ Maintenance and Inspection



- Do not touch the terminals of the VFD while the power is on, otherwise there is a danger of electric shock.
- Make sure cut off the power supply before remove the cover.
- Wait at least 10 minutes after cut off the power, or confirm that the charging CHARGE indicator is off before performing maintenance and inspection to prevent the residual voltage of the main circuit capacitor from injuring people.
- Please designate qualified electrical engineers to do the maintenance, inspection and replace parts for the VFD.
- For VFDs stored for more than 2 years, the voltage should be gradually increased by a voltage regulator when powered on, otherwise there is a risk of electric shock or explosion.



- There are CMOS large-scale integrated circuits on the circuit board. Do not touch the PCB with your hands to prevent static electricity from damaging the circuit board.

## ■ Others



- It is forbidden to modify the VFD's hardware; otherwise, it will cause personal injury.
- The power of interphone used when close to the VFD shall not exceed 8W.
- It is forbidden to use the screws not provided by the manufacturer or specified by the manufacturer, otherwise the structural parts of the VFD or the circuit will be damaged due to factors such as too long or too large screws.

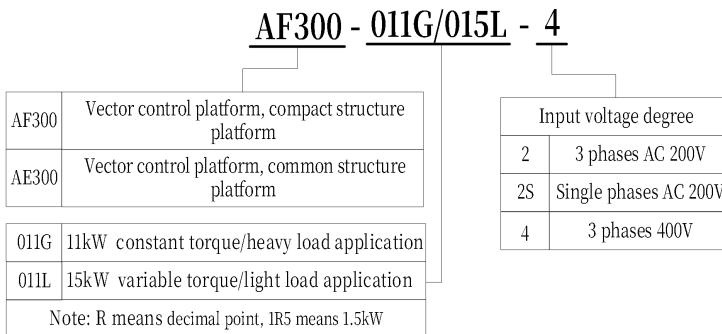
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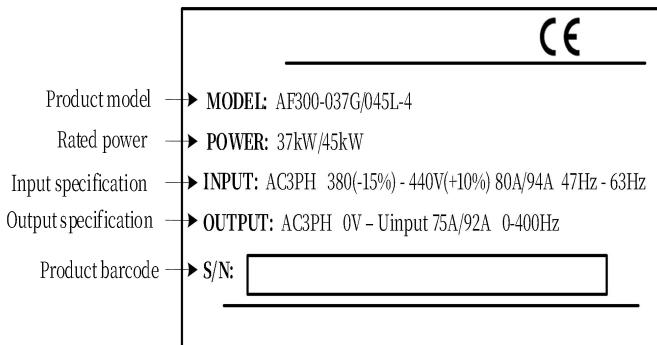
# Chapter 1 AF300/AE300 Introduction

## 1.1 Model Description

The model field on the VFD nameplate uses numbers and letters to indicate information such as product series, input voltage, power, software version and hardware version.



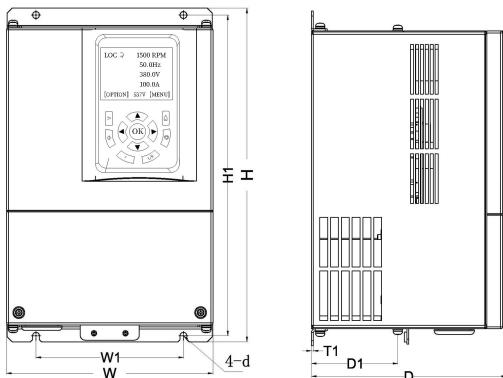
## 1.2 Nameplate Description



## 1.3 Product Series

| VFD model         | Constant torque   |                    |                   | Variable torque   |                    |                   |
|-------------------|-------------------|--------------------|-------------------|-------------------|--------------------|-------------------|
|                   | Output power (kW) | Output current (A) | Input current (A) | Output power (kW) | Output current (A) | Input current (A) |
| AF300-0R7G-4      | 0.75              | 2.5                | 3.4               | /                 | /                  | /                 |
| AF300-1R5G-4      | 1.5               | 3.7                | 5.0               | /                 | /                  | /                 |
| AF300-2R2G-4      | 2.2               | 5                  | 5.8               | /                 | /                  | /                 |
| AF300-3R7G/5R5L-4 | 3.7               | 9.5                | 13.5              | 5.5               | 14                 | 19.5              |
| AF300-5R5G/7R5L-4 | 5.5               | 14                 | 19.5              | 7.5               | 18.5               | 25                |
| AF300-7R5G/011L-4 | 7.5               | 18.5               | 7.5               | 25                | 25                 | 32                |
| AF300-011G/015L-4 | 11                | 25                 | 11                | 32                | 32                 | 40                |
| AF300-015G/018L-4 | 15                | 32                 | 15                | 40                | 38                 | 47                |
| AF300-018G/022L-4 | 18.5              | 38                 | 18.5              | 47                | 45                 | 56                |
| AF300-022G/030L-4 | 22                | 45                 | 22                | 56                | 60                 | 70                |
| AF300-030G/037L-4 | 30                | 60                 | 30                | 70                | 75                 | 80                |
| AF300-037G/045L-4 | 37                | 75                 | 37                | 80                | 92                 | 94                |
| AF300-045G/055L-4 | 45                | 92                 | 45                | 94                | 115                | 128               |
| AF300-055G/075L-4 | 55                | 115                | 55                | 128               | 150                | 160               |
| AF300-075G/090L-4 | 75                | 150                | 75                | 160               | 180                | 190               |
| AF300-090G/110L-4 | 90                | 180                | 90                | 190               | 215                | 225               |
| AF300-110G/132L-4 | 110               | 215                | 110               | 225               | 260                | 265               |
| AF300-132G/160L-4 | 132               | 260                | 132               | 265               | 305                | 310               |
| AF300-160G/185L-4 | 160               | 305                | 160               | 310               | 340                | 345               |
| AF300-185G/200L-4 | 185               | 340                | 185               | 345               | 380                | 385               |
| AF300-200G/220L-4 | 200               | 380                | 200               | 385               | 425                | 430               |
| AF300-220G/250L-4 | 220               | 425                | 220               | 430               | 480                | 485               |
| AF300-250G/280L-4 | 250               | 480                | 250               | 485               | 530                | 545               |
| AF300-280G/315L-4 | 280               | 530                | 280               | 545               | 600                | 610               |
| AF300-315G/355L-4 | 315               | 600                | 315               | 610               | 650                | 625               |
| AF300-355G/400L-4 | 355               | 650                | 355               | 625               | 720                | 715               |
| AF300-400G-4      | 400               | 720                | 400               | 715               | /                  | /                 |
| AF300-450G-4      | 450               | 820                | 450               | 840               | /                  | /                 |
| AF300-500G-4      | 500               | 860                | 500               | 890               | /                  | /                 |

## 1.4 Mounting Dimensions



AF300 series product mounting dimensions

| Model             | Outline and mounting dimensions (mm) |     |     |     |    |                   |
|-------------------|--------------------------------------|-----|-----|-----|----|-------------------|
|                   | H                                    | W   | D   | H1  | W1 | Installation hole |
| AF300-0R7G/1R5L-4 | 230                                  | 80  | 165 | 215 | 52 | M5                |
| AF300-1R5G/2R2L-4 |                                      |     |     |     |    |                   |
| AF300-2R2G/3R7L-4 |                                      |     |     |     |    |                   |
| AF300-3R7G/5R5L-4 |                                      |     |     |     |    |                   |
| AF300-5R5G/7R5L-4 | 255                                  | 90  | 165 | 245 | 50 | M5                |
| AF300-7R5G/011L-4 |                                      |     |     |     |    |                   |
| AF300-011G/015L-4 | 300                                  | 100 | 205 | 290 | 70 | M6                |
| AF300-015G/018L-4 |                                      |     |     |     |    |                   |
| AF300-018G/022L-4 | 350                                  | 120 | 230 | 340 | 70 | M6                |
| AF300-022G/030L-4 |                                      |     |     |     |    |                   |
| AF300-030G/037L-4 | 465                                  | 150 | 250 | 455 | 90 | M6                |
| AF300-037G/045L-4 |                                      |     |     |     |    |                   |

## AE300 series product mounting dimensions

| Model             | Outline and mounting dimensions (mm) |     |     |     |     |                   |
|-------------------|--------------------------------------|-----|-----|-----|-----|-------------------|
|                   | H                                    | W   | D   | H1  | W1  | Installation hole |
| AE300-0R7G-4      | 165                                  | 90  | 125 | 155 | 75  | M5                |
| AE300-1R5G-4      |                                      |     |     |     |     |                   |
| AE300-2R2G-4      |                                      |     |     |     |     |                   |
| AE300-3R7G/5R5L-4 | 185                                  | 95  | 135 | 175 | 85  | M5                |
| AE300-5R5G/7R5L-4 |                                      |     |     |     |     |                   |
| AE300-7R5G/011L-4 | 255                                  | 145 | 190 | 240 | 130 | M5                |
| AE300-011G/015L-4 |                                      |     |     |     |     |                   |
| AE300-015G/018L-4 | 320                                  | 170 | 205 | 305 | 150 | M5                |
| AE300-018G/022L-4 |                                      |     |     |     |     |                   |
| AE300-022G/030L-4 | 360                                  | 220 | 210 | 340 | 130 | M7                |
| AE300-030G/037L-4 |                                      |     |     |     |     |                   |
| AE300-037G/045L-4 | 415                                  | 270 | 250 | 400 | 215 | M7                |
| AE300-045G/055L-4 |                                      |     |     |     |     |                   |
| AE300-055G/075L-4 | 610                                  | 260 | 300 | 590 | 175 | M7                |
| AE300-075G/090L-4 |                                      |     |     |     |     |                   |
| AE300-090G/110L-4 | 640                                  | 290 | 330 | 620 | 190 | M7                |
| AE300-110G/132L-4 |                                      |     |     |     |     |                   |
| AE300-132G/160L-4 | 720                                  | 310 | 405 | 700 | 205 | M8                |
| AE300-160G/185L-4 |                                      |     |     |     |     |                   |
| AE300-185G/200L-4 |                                      |     |     |     |     |                   |
| AE300-200G/220L-4 | 930                                  | 310 | 405 | 875 | 205 | M9                |
| AE300-220G/250L-4 |                                      |     |     |     |     |                   |
| AE300-250G/280L-4 |                                      |     |     |     |     |                   |
| AE300-280G/315L-4 | 1000                                 | 460 | 480 | 940 | 380 | M10               |
| AE300-315G/355L-4 |                                      |     |     |     |     |                   |
| AE300-355G/400L-4 |                                      |     |     |     |     |                   |
| AE300-400G-4      |                                      |     |     |     |     |                   |
| AE300-450G-4      | 1060                                 | 650 | 350 | 960 | 450 | M10               |
| AE300-500G-4      |                                      |     |     |     |     |                   |

## Chapter 2 Mechanical Installation

### 2.1 Environment

- Install the Variable Frequency Drive in an area without dust, metal powder, oil, water, or other unwanted materials.
- Install the Variable Frequency Drive in an area without oil mist, corrosive gas, or flammable gas, explosive gas.
- Install the Variable Frequency Drive in an area without radioactive or flammable materials; keep wood and other flammable materials away from the Variable Frequency Drive.
- Install the Variable Frequency Drive in an area without harmful gas or fluids.
- Install the Variable Frequency Drive in an area without salt.
- Install the Variable Frequency Drive in an area without direct sunlight.
- Do not leave drilling residues inside the Variable Frequency Drive when installation.
- Install the Variable Frequency Drive vertically for sufficient airflow to cool the Variable Frequency Drive in the electric control cabinet, use a cooling fan or air conditioner to keep the internal air temperature in the permitted range.
- It is recommended to install the heat sink outside the cabinet for harsh installation environments.

### 2.2 Direction and Clearances

As shown in the following figure, please install the Variable Frequency Drive vertically to obtain sufficient airflow for cooling. Ensure there is sufficient space for wiring and airflow to cool the Variable Frequency Drive.

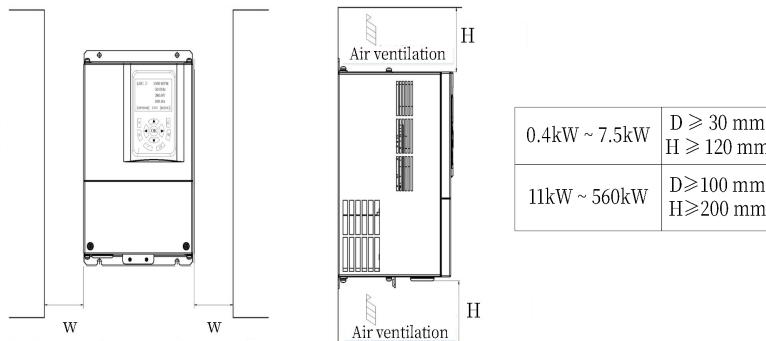


Figure2-1 Space for wiring and airflow

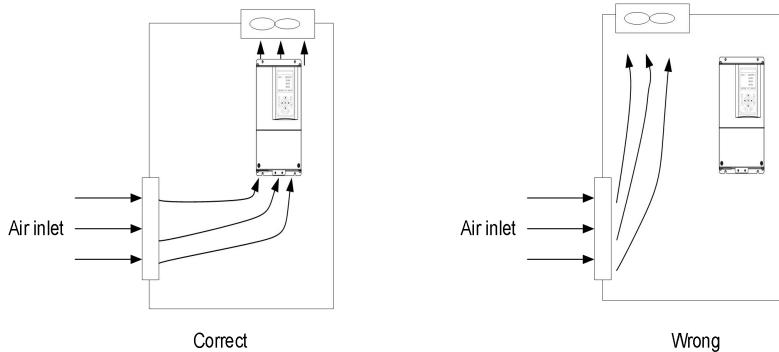


Figure 2-2 Vertical installation

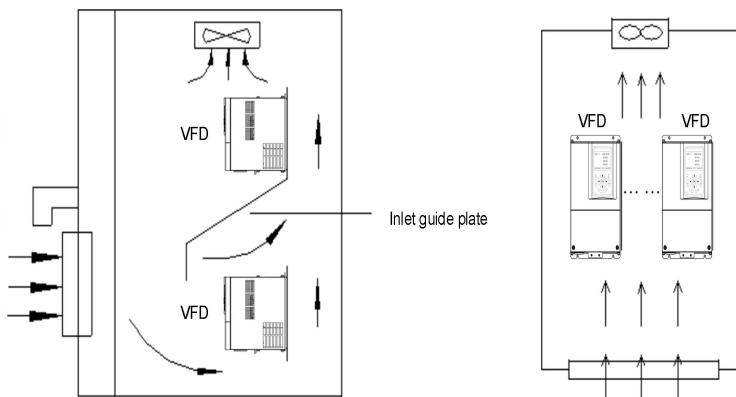
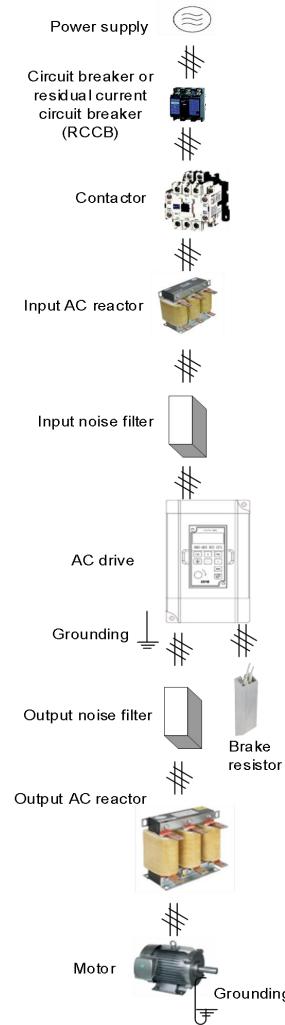


Figure 2-3 Parallel installation

## Chapter 3 Electrical Installation

### 3.1 Peripheral Devices Connection



**Figure 3-1** Connection diagram of the product and peripheral devices

### 3.2 Peripheral Devices Description

| Device                   | Model selection reference   |
|--------------------------|---|
| Circuit breaker          | The circuit breaker capacity should be 1.5 to 2 times of the VFD rated current. The time characteristics of the circuit breaker must fully consider the time characteristics of the VFD overload protection.  |
| RCCB                     | Residual current circuit breaker. The VFD output is high-frequency pulse so as generates leakage current to ground. When a RCCB is installed at the input end, please use a specialized RCCB. It is suggested to choose type B RCCB and set the leakage current higher than 300mA.  |
| Contactor                | Frequent contactor action will cause VFD failure, the maximum frequency for the open and close the contactor shall not exceed 10 times/min.<br>When using brake resistor and/or external brake chopper, a protective function should be installed to protect the brake resistor and/or chopper. Once a fault occurs, the power contactor should be disconnected.  |
| Input AC reactor         | When there are the following requirements, an AC reactor should be installed on the input side of the VFD. <ol style="list-style-type: none"> <li>1. The supply capacity is more than 600kVA or 10 times of the VFD capacity.</li> <li>2. If there is switch type reactive power compensation capacitors or thyristor phase-controlled load on the same power node. There will be a large peak current flowing into the VFD, which will cause damage to the rectifier.</li> <li>3. When the voltage imbalance of VFD's three-phase power supply exceeds 3%, it may cause interference to the system or cause damage to the rectifier.</li> <li>4. The input power factor of the VFD is required higher than 90%, and the input AC reactor can improve the power factor of the input side.</li> <li>5. Improve the input side of the high-order harmonic; prevent distortion of voltage waveform from causing damage to other equipment.</li> <li>6. Improve the impact of high order harmonics on the input side of the VFD and reduce external conducted and radiated interference.</li> </ol> |
| Input noise filter       | It can reduce the interference from power supply to the VFD and improve the anti-interference ability of the VFD.<br>It can reduce the external conduction and radiation interference of the VFD.   |
| Thermal protection relay | Although the VFD has its own motor overload protection function, when an VFD drives two or more motors or drives a multi-poles motor, a thermal protection relay shall be installed between the VFD and each motor.   |
| Output noise filter      | It can reduce the external conduction and radiation interference of the VFD.  |
| Output AC reactor        | When the cable from the VFD to the motor exceeds 100 meters, an AC output reactor should be installed to suppress high-frequency oscillation, avoid motor insulation damage, prevent excessive leakage current and VFD protection.  |

### 3.3 Main Circuit Terminal

| Symbol  | Description                         |
|---|-------------------------------------|
| R, S, T   | Power supply AC input terminals     |
| PB, P+  | Brake resistor connecting terminals |
| P+, —   | DC bus                              |
| U, V, W   | Three-phase AC output terminals     |
|  | Grounding terminal PE               |

**Figure 3-2 Main circuit terminals**

### 3.4 Attention for Main Circuit Wiring

#### 3.4.1 Power Supply Wiring

- ◆ Do not connect the power supply to VFD output terminal; otherwise, the VFD will be damaged.
- ◆ For input side over-current protection and maintenance conveniently, the VFD should be connected to the power supply through a breaker or RCCB and contactor.
- ◆ Please confirm the power supply phases and rated voltage are consistent with the nameplate of the VFD, otherwise the VFD may be damaged.

#### 3.4.2 Motor Wiring

- ◆ Do not connect output terminals to the GND or short to earth. the VFD will be damaged or serious injury or death.
- ◆ Avoid output cables (U/V/W) short circuit or short circuit to enclosure, otherwise there is a risk of electric shock.
- ◆ It is strictly prohibited to connect a capacitor or phase lead LC/RC noise filter to the output of the VFD, otherwise the VFD will be damaged.
- ◆ When a contactor is installed between the VFD and the motor, the contactor cannot switch ON or OFF when the Variable Frequency Drive running, otherwise may occur over-current fault, even damage to the Variable Frequency Drive.
- ◆ When the cable between the VFD and the motor is too long, the high-order harmonic leakage current at the output will adversely affect the VFD and peripheral devices. It is recommended to install an output AC reactor when the motor cable exceeds 100 meters, and contact the manufacturer to inquire whether require change the carrier frequency.

|                                    |        |        |         |
|------------------------------------|--------|--------|---------|
| Cable length between VFD and motor | < 50 m | <100 m | > 100 m |
| PWM frequency                      | <15kHz | <10kHz | <5kHz   |

### 3.4.3 Ground wiring

- The VFD generates leakage current, and the higher the carrier frequency, the more the leakage current. The leakage current of the VFD is higher than 3.5mA. The leakage current is determined by the conditions of use. To ensure safety, the VFD and motor must be grounded.
- The grounding resistance should less than  $10\Omega$ . For the wire diameter requirements of the grounding cable.
- Do not share the grounding wire with welding machines and other power equipment.
- When using two or more VFDs, the grounding wire should not form a loop.

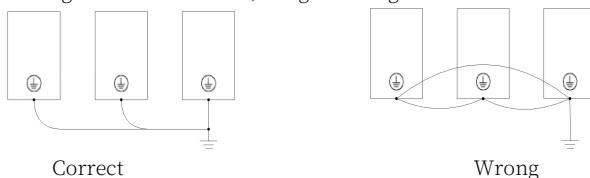


Figure 3-3 Grounding wiring

### 3.4.4 Countermeasures for Conduction and Radiation Interference

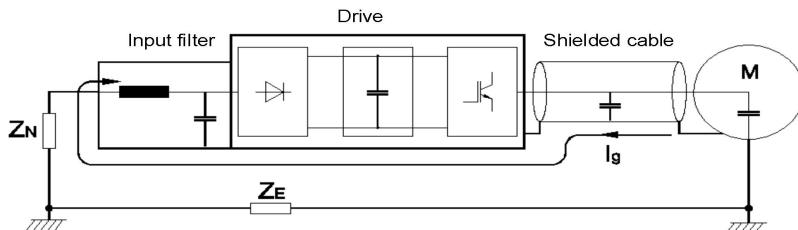


Figure 3-4 Noise current illustration

- If an input noise filter is installed, the wiring from the filter to the input power supply of the VFD should be as short as possible.
- The outer casing of the filter and the mounting cabinet should be reliably connected over a large area to reduce the return impedance of the noise current  $I_g$ .
- The cable distance between the VFD and the motor should be as short as possible, and the motor cable should use 4-core cable. One end of the ground cable is grounded to the VFD side, the other end is connected to the motor enclosure, and the motor cable is inserted into a metal tube.
- The input power cable and output motor cable should be as far away as possible.
- The susceptible equipment and signal cables should be installed as far away as possible from the VFD.

- ◆ Critical signal cables should use shielded cables. It is recommended that the shield layer be grounded by a 360-degree grounding method and inserted into the metal tube. Keep away from the input power cable and output motor cable. If a signal cable must cross the input power cable or the output motor cable, they should be orthogonal.
- ◆ When the frequency reference source is analog input (voltage or current signal), use a double-stranded shielded cable and connect the shield layer to the grounding terminal PE of the VFD. The signal cable length must less than 50 meters.
- ◆ The wiring of the control circuit relay output signal (TA/TB/TC) and other control circuit signal should be separate.
- ◆ It is strictly forbidden to short-circuit the shield layer with other signal cables and equipment.
- ◆ When the VFD is connected to an inductive load device (magnetic contactor, relay, solenoid valve, etc.), be sure to use a surge suppressor on the load device coil as shown below.

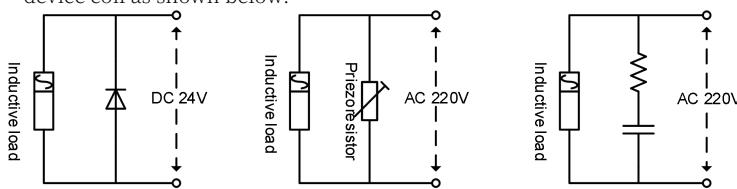


Figure 3-5 Application of inductive load surge suppressor

### 3.5 Terminal Wiring

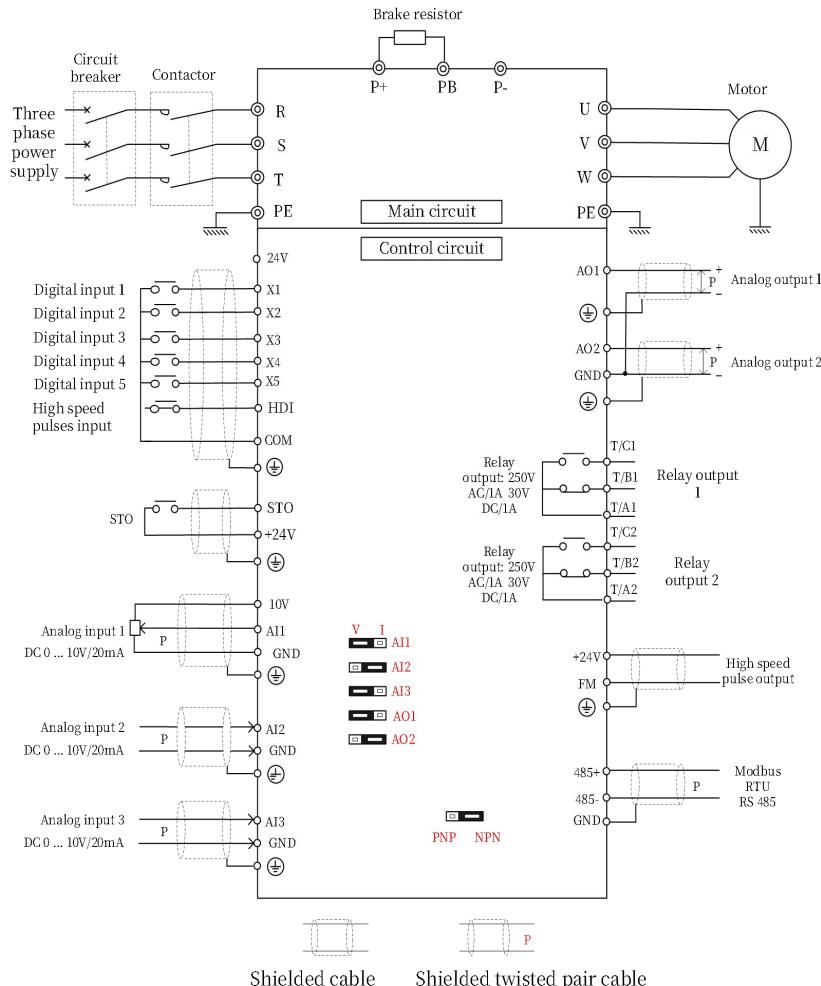


Figure3-6 AF300 Terminal wiring diagram

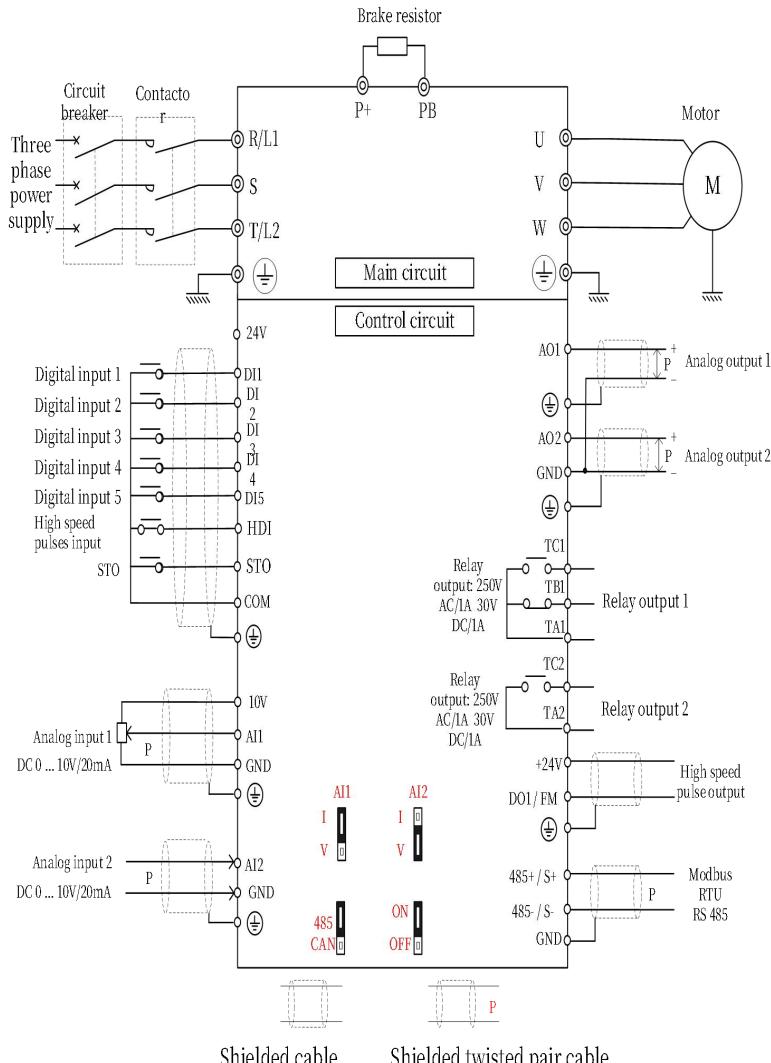


Figure3-7 AE300 series product terminal wiring diagram

### 3.6 Control Circuit Description

| Terminal                 | Symbol      | Function description                   | Technical specifications                                     |
|--------------------------|-------------|--|--|
| AI & AO                  | 10V         | +10V power supply                      | Maximum output current: 10mA                                 |
|                          | GND         | GND                                    | GND of 10V and analog  |
|                          | AI1         | Analog input 1                         | 0V ... 10V/20mA, selected by jumper                          |
|                          | AI2         | Analog input 2                         | 0V ... 10V/20mA, selected by jumper                          |
|                          | AO1         | Analog output 1                        | 0 ... 10V  |
|                          | AO2         | Analog output 2                        | 0 ... 20mA   |
| DI & DO                  | 24V         | +24V power supply                      | Maximum output current: 50mA                                 |
|                          | COM         | COM                                    | 24V GND  |
|                          | DI1 ... DI5 | Digital inputs 1 ... 5                 |  |
|                          | HDI         | High-speed pulse input                 | High speed pulse input: 0.10~50.00 KHz                       |
|                          | STO         | Safe torque off                        |  |
| Relay outputs            | TA1         | Programmable relay output              | Capacity: 250VAC/1A, 30VDC/1A, resistive load                |
|                          | TB1         |  |  |
|                          | TC1         |  |  |
|                          | TA2         | Programmable relay output              | Capacity: 250VAC/1A, 30VDC/1A, resistive load                |
|                          | TC2         |  |  |
| High speed pulses output | DO1 / FM    | Programmable high speed digital output | Pulses output: 0.1kHz ... 50kHz<br>Voltage range: 24V ± 20%. |
| RS485                    | S+ / 485+   | RS485 positive end                     | ● Modbus RTU format  |
|                          | S- / 485-   | RS485 negative end                     | ● Baud rate: 4800, 9600, 1920 ~ 921600bps                    |

1. The arrangement sequence of the control circuit terminals is as follows:



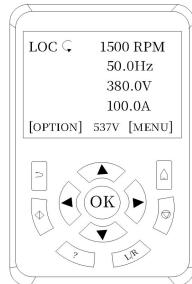
2. Control Circuit Peripheral Devices

| Terminal number   | Terminal screw | Tightening torque (N·m) | Cable mm <sup>2</sup> | Cable type                  |
|---|----------------|-------------------------|-----------------------|-----------------------------|
| 10V, AI1, AI2, 485+, 485-, AO1, GND                                       | M3             | 0.5 ... 0.6             | 0.75                  | Shielded twisted pair cable |
| +24V, COM, DI1, DI2, DI3, DI4, DI5, STO, HDI, FM, TA1, TB1, TC1, TA2, TC2 | M3             | 0.5 ... 0.6             | 0.75                  | Shielded cable              |

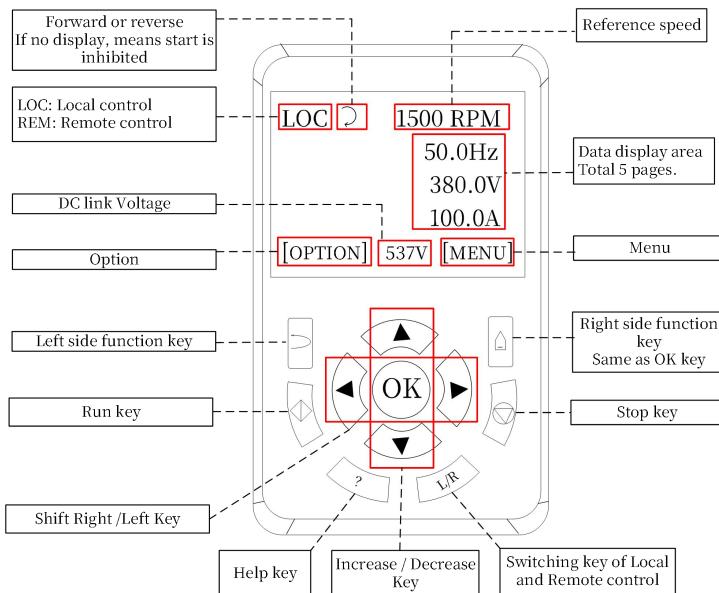
## Chapter 4 Control Panel

### 4.1 Control Panel Description

This chapter describes the displays, keys and operations of the control panel. The control panel can be used to control drives, read status data, and set the parameters.



### 4.2 Display and Keys



### 4.3 Control Panel Operation

#### Basic operation of the drive

| Task                                     | Actions   |
|--|---|
| Set the language                         |  <p>In home view, press  key</p>  <p>In menu view, press  key move to 8, and press  key</p><br> <p>In SETTING view, press  key move to 1 and press  key</p>  <p>1= English<br/>2=Chinese</p> |
| Switch between local and remote control. | Press the  key. Remote-control mode will show the words REM on the left side of status bar and Local control mode will show the words LOC on the left side of status bar.  |
| Start and stop the drive.                | <p>In local control, press  key to start the drive and  key to stop the drive.</p> <p>Note: this function is locked when the drive is running. Using the parameter <i>1600 Local lock</i> to disable the drive to enter the local control mode.</p>   |
| Set the reference in the home view.      | <p>In local control:</p> <ol style="list-style-type: none"> <li>① Press  key and  to change the speed directly.</li> <li>② Go to OPTION → Reference, set the reference with the arrow keys.</li> </ol>  |
| Change the direction of motor rotation.  | <p>In local control:</p> <ol style="list-style-type: none"> <li>① Press  key or  key to change the speed direction directly.</li> <li>② Go to OPTION &gt; Direction, set the direction via  key or .</li> </ol>   |
| Add parameters to home view              | Go to OPTION → Edit home view   |
| View/edit parameters                     | Go to MENU → Parameters to view parameters.   |
| Restore to default value.                | Go to MENU → Settings → Reset to defaults   |
| View the modified parameters             | Go to Menu → Parameters → Changed params.   |

Initially, the control keyboard is in the main interface. The upper right corner of the LCD shows the current given value. The LCD shows up to 3 signals in one page for real time monitoring to the drive. 3 signals constitute one monitoring page. Up to 8 pages, totally 24 signals can show. Each signal can be flexibly indicated to any of the parameters of the drive.

When a fault or warning occurs, the information of fault or warning pop-up, as shown in the figure, Press the left function key to reset the fault. Then the right function key loses its effect. Press the navigation keys (up and down for four direction keys), you can hide faults or warning messages. If it lasts 3 seconds (fault) or 30 seconds (alarm) and no keys act, the fault or warning message will pop up again. Meanwhile, the warning messages will disappear automatically after the warning disappears.

In the main interface, press the **right function key**  to enter the main menu. There are 8 submenus in the main menu including: parameters, modified parameters, fault logs, parameters change log, assistant, parameter backup, system information and settings.

In the main interface, press the **left function key**  to enter the options menu. There is a total of 3 submenus in the option menu: interface. Thereinto, the local given is used to modify the local given value, motor rotation direction for switching the motor steering; edit main interface for selecting the monitoring signal of the main interface.

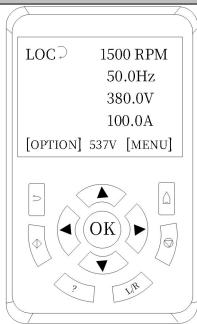
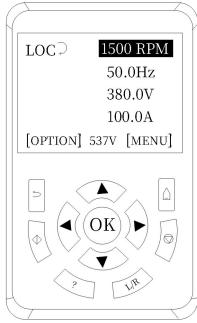
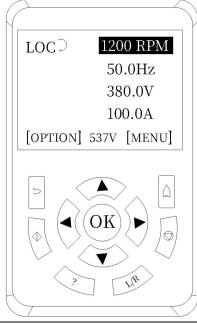
| LOC          | MESSAGE  |
|--------------|----------|
| FAULT        | 02       |
| Over current |          |
| 1.0A         |          |
| [RESET]      | 537V [ ] |

| LOC ↴             | MAIN MENU 1    |
|-------------------|----------------|
| Parameters        |                |
| Changed params    |                |
| Fault logs        |                |
| Param change logs |                |
| [ EXIT ]          | 537V [ ENTER ] |

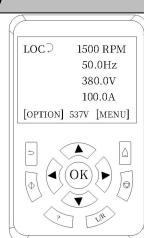
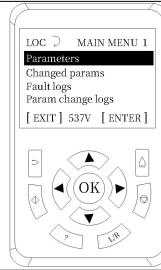
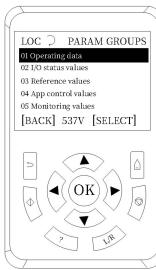
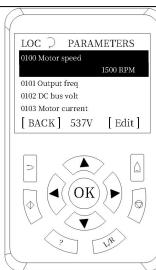
| LOC ↴          | OPTIONS 1      |
|----------------|----------------|
| Reference      |                |
| Direction      |                |
| Edit home view |                |
| [ EXIT ]       | 537V [ ENTER ] |

## Main Interface Mode

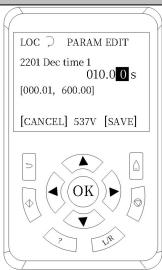
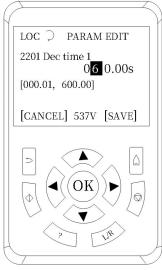
### How to modify the speed, frequency or torque given value

| Step | Action  | Display  |
|------|---|--|
| 1    | If it is not in the main interface, press the left functional key again till the return to the main interface.  |   |
| 2    | If the given value is not in the highlighted status, it indicates that the given value cannot be modified. At this point, you can switch to the local control mode or modify the given source to keypad.  |   |
| 3    | Press the up arrow to increase the given value, press the down arrow to reduce the given value. Press one of the two and keep not to loose, the settings will change quickly and the modified value will take effect immediately. The given value will be saved to the permanent memory of the drive, and will automatically recover after the power is turned off. |  |

## How to select a parameter and views its value

| Step | Action  | Display   |
|------|---|---|
| 1    | If in the options menu, press or hold down the left function keys to return to the main interface.  |    |
| 2    | If in the main interface, press the right function button to enter the main menu, otherwise press the left function key repeatedly until the return to the main menu. Use the navigation keys (up and down or so four direction keys) and select the parameter list, press the right function key or the OK key to enter the submenu of the parameters.   |    |
| 3    | The first two-digit numbers of each line that displayed in the central part of the LCD are the parameters set number. Initially, the first set of parameters is selected (highlighted). Using the navigation keys (up and down or so four direction keys) to select the specified parameter group of parameters, then press the right function key or the OK bottom to enter the parameter view mode. |   |
| 4    | The first four-digit numbers of each line that displayed in the central part of the LCD are the parameters address. Initially, the first parameter is selected, and the current value of this parameter is displayed next (highlighted). Use the navigation keys (up and down or so four direction keys) to select the appropriate parameters to view its values.                                     |  |

## How to modify values of numeric type parameters

| Step | Action   | Display   |
|------|--|---|
| 1    | Select a numeric type parameter and then press the right function key or the OK button to enter the parameters edit mode. For this type of parameter, the first line of the central LCD shows its address and name, the second line shows its current value and unit, while the third line shows its range.  |  |
| 2    | Use the up and down arrow keys to modify the value of the selected parameter, while pressing the two keys can restore its default value. The initial cursor is located in the unit position of the parameter value (highlighted), press the left and right arrow keys to move the cursor. Press the up and down arrow keys, the parameter values change quickly. |  |
| 3    | To save the modification to make the new value valid, press the right function key or the OK button. To discard the modification and keep the original value, press the left function key.   |   |

## Chapter 5 Parameters list

Description of each meaning in the parameters list

| Item          | Explanation  |             |              |             |              |       |               |             |             |              |       |           |
|---------------|--|-------------|--------------|-------------|--------------|-------|---------------|-------------|-------------|--------------|-------|-----------|
| No.           | Indicates the number of the parameter, such as 0100.   |             |              |             |              |       |               |             |             |              |       |           |
| Name/Value    | The name of parameter, which explains the parameter's meanings.  |             |              |             |              |       |               |             |             |              |       |           |
| Value         | Allowable setting range.<br>Value type:<br><ul style="list-style-type: none"> <li>● 16 bits signed integer, the value range of [-32768, 32767].</li> <li>● 216bits unsigned integer, the value range of [0, 65535].</li> <li>● Enumeration, a list of several options.</li> <li>● Bits, a collection of up to 16 Boolean variables.</li> <li>● Value pointer: Pointer to another parameter, taking the value of another parameter as its own value.               <table border="1" style="margin-top: 5px;"> <tr> <td>Bit15 … bit8</td> <td>Bit7 … bit0</td> </tr> <tr> <td>Group number</td> <td>Index</td> </tr> </table> <br/>               For example, if we want the pointer to point to parameter 0302, please set the pointer to P.03.02.             </li> <li>● Bit pointer: A pointer to one binary bit of another parameter, which takes the value of one binary bit of another parameter as its own value.               <table border="1" style="margin-top: 5px;"> <tr> <td>Bit15 … bit10</td> <td>Bit9 … bit4</td> <td>Bit3 … bit0</td> </tr> <tr> <td>Group number</td> <td>Index</td> <td>Bit field</td> </tr> </table> <br/>               For example, if we want the pointer to point to bit6 of parameter 0600, please set the pointer to P.06.00.06             </li> </ul> |             | Bit15 … bit8 | Bit7 … bit0 | Group number | Index | Bit15 … bit10 | Bit9 … bit4 | Bit3 … bit0 | Group number | Index | Bit field |
| Bit15 … bit8  | Bit7 … bit0  |             |              |             |              |       |               |             |             |              |       |           |
| Group number  | Index  |             |              |             |              |       |               |             |             |              |       |           |
| Bit15 … bit10 | Bit9 … bit4  | Bit3 … bit0 |              |             |              |       |               |             |             |              |       |           |
| Group number  | Index  | Bit field   |              |             |              |       |               |             |             |              |       |           |
| Description   | Describe the parameters and values.  |             |              |             |              |       |               |             |             |              |       |           |
| Default       | The parameter value after reset the default value  |             |              |             |              |       |               |             |             |              |       |           |

## 01 Operating Data

| No.  | Name                      | Description   | Unit    |
|------|---------------------------|---|---------|
| 0100 | <b>Motor speed</b>        | The filtered motor speed                                | 0.1RPM  |
| 0101 | <b>Output freq</b>        | Actual output frequency                                 | 0.1Hz   |
| 0102 | <b>DC bus volt</b>        | DC link voltage   | 0.1V    |
| 0103 | <b>Motor current</b>      | Actual motor current                                    | 0.1A    |
| 0104 | <b>Mot current %</b>      | Motor current, 100.0% = motor rated current             | 0.1%    |
| 0105 | <b>Heat sink temp.</b>    | Heat sink temperature                                   | 0.1°C   |
| 0106 | <b>Rectifier temp.</b>    | Rectifier temperature.                                  | 0.1°C   |
| 0107 | <b>CPU temperature</b>    | reserved  | 0.1°C   |
| 0108 | <b>IGBT Tjc est</b>       | reserved  | 0.1°C   |
| 0109 | <b>IGBT Tj</b>            | IGBT chip temperature                                   | 0.1°C   |
| 0110 | <b>IGBT power loss</b>    | IGBT loss power   | 0.001kW |
| 0111 | <b>CPU usage</b>          | CPU usage   | 0.1%    |
| 0112 | <b>Motor slip est</b>     | Motor slip frequency                                    | 0.01Hz  |
| 0113 | <b>Motor flux est</b>     | Estimated value of motor magnetic flux                  | 0.1%    |
| 0114 | <b>Encoder counter</b>    |   | /       |
| 0115 | <b>Pulse counter</b>      |   | /       |
| 0116 | <b>Z mark latch</b>       |   | /       |
| 0117 | <b>Pos ref raw</b>        |   | /       |
| 0118 | <b>Actual position</b>    |   | /       |
| 0119 | <b>PLL freq</b>           | Measured back EMF frequency of PM motor                 | 0.01Hz  |
| 0120 | <b>PLL volt</b>           | Measured back EMF voltage of PM motor                   | 0.1V    |
| 0121 | <b>Output volt</b>        | Actual output voltage                                   | 0.1V    |
| 0122 | <b>Motor torque</b>       | 100.0 % = motor rated torque                            | 0.1%    |
| 0123 | <b>Motor temperature</b>  | Motor temperature                                       | 0.1°C   |
| 0124 | <b>Encoder speed</b>      | Actual motor speed measured by encoder                  | 0.1RPM  |
| 0125 | <b>Udc ripple</b>         |   | 1V      |
| 0126 | <b>Spd refl gain</b>      | Gain of the speed reference 1 used only in the PID mode | /       |
| 0127 | <b>Power factor</b>       |   | 0.001   |
| 0128 | <b>Output power</b>       |   | 0.1kW   |
| 0129 | <b>Temp chg rate</b>      | Temperature change rate                                 | 0.1°C   |
| 0130 | <b>Modulation depth</b>   |   | 0.1%    |
| 0131 | <b>LOS cnt</b>            |   | /       |
| 0132 | <b>DOS cnt</b>            |   | /       |
| 0133 | <b>LOT cnt</b>            |   | /       |
| 0134 | <b>PM elect angle err</b> |   | 0.1deg  |

| No.  | Name                   | Description | Unit  |
|------|------------------------|-------------|-------|
| 0135 | <b>Ambient temp</b>    |             | 0.1°C |
| 0136 | <b>IGBT pla temp</b>   | Reserved    | 0.1°C |
| 0137 | <b>Encoder turns</b>   | Reserved    | /     |
| 0138 | <b>New added param</b> | reserved    | /     |
| 0139 | <b>New added param</b> | reserved    | /     |
| 0140 | <b>New added param</b> | reserved    | /     |
| 0141 | <b>New added param</b> | reserved    | 0.1   |
| 0142 | <b>New added param</b> | reserved    | /     |
| 0143 | <b>New added param</b> | reserved    | 0.1   |

## 02 DI &amp; DO &amp; AI &amp; AO

| No.  | Name                      | Description                            | Unit             |
|------|---------------------------|--|------------------|
| 0200 | <b>DI status</b>          | BIT6 ~ BIT0: DI7 ~DI1                  | /                |
| 0201 | <b>DO status</b>          | BIT3 ~ BIT0: RO2, RO1, DO2, DO1        | /                |
| 0202 | <b>AI1 actual</b>         |  | 0.001V           |
| 0203 | <b>AI1 scaled</b>         |  | /                |
| 0204 | <b>AI2 actual</b>         |  | 0.001V / 0.001mA |
| 0205 | <b>AI2 scaled</b>         |  | /                |
| 0206 | <b>AI2 actual</b>         |  | 0.001V / 0.001mA |
| 0207 | <b>AI2 scaled</b>         |  | /                |
| 0208 | <b>AO1 actual</b>         |  | 0.001V / 0.001mA |
| 0209 | <b>AO2 actual</b>         |  | 0.001V / 0.001mA |
| 0210 | <b>HDI actual</b>         |  | Hz               |
| 0211 | <b>HDI scaled</b>         | CPU usage                              | -                |
| 0212 | <b>HDO actual</b>         | Motor slip frequency                   | 1Hz              |
| 0213 | <b>Control panel ref1</b> | Estimated value of motor magnetic flux | 0.1%             |
| 0214 | <b>Control panel ref2</b> |  | 1RPM             |
| 0215 | <b>Fieldbus ref1</b>      |  | 1RPM             |
| 0215 | <b>Fieldbus ref2</b>      |  | 0.1%             |
| 0217 | <b>Speed ffwd</b>         |  | 1RPM             |

## 03 Reference Value

| No.  | Name                     | Description  | Unit |
|------|--------------------------|--|------|
| 0300 | <b>Speed ref output</b>  | The output value of speed given module.  | 1rpm |
| 0301 | <b>Motor potent out</b>  | The speed given value of the digital potentiometer, can be achieved by the terminal for the addition and subtraction of the speed given. | 1rpm |
| 0302 | <b>Const speed out</b>   | The output given value for the multi segment speed function module.  | 1rpm |
| 0303 | <b>Speed ref unramp</b>  | Use the speed given value before the ramp and the forming speed.   | 1rpm |
| 0304 | <b>Speed ref ramped</b>  | Ramp and forming speed given.  | 1rpm |
| 0305 | <b>Control mode used</b> | Actually implemented control mode.   | -    |
| 0306 | <b>Torque ref unramp</b> | The value of the torque given before the ramp input is the percentage of the relative maximum torque.                                    | 0.1% |
| 0307 | <b>Torque ref ramped</b> | Ramp torque given value, As percentage.  | 0.1% |

## 04 App Values

| No.  | Name                   | Description  | Unit      |
|------|------------------------|--|-----------|
| 0400 | <b>Process act1</b>    | Process feedback1 of the process PID controller.   | -         |
| 0401 | <b>Process act2</b>    | Process feedback2 of the process PID controller.   | -         |
| 0402 | <b>Process act</b>     | Final process feedback for process feedback selection and modification.                                | -         |
| 0403 | <b>Process PID err</b> | Process PID deviation value, that is, the difference value between the PID set point and the feedback. | -         |
| 0404 | <b>Process PID out</b> | Output of the process PID controller.  | -         |
| 0405 | <b>Line spd act</b>    | Actual value of the winding control line speed.  | 0. 1m/min |
| 0406 | <b>Trq out Nm</b>      | Torque control volume of the winding control. Unit is Nm.  | 0. 1Nm    |
| 0407 | <b>Trq out percent</b> | The torque control quantity of the winding control. Unit is %.   | 0.1%      |
| 0408 | <b>Tense ref</b>       | Tension given value of the winding control.  | 0. 1N     |
| 0409 | <b>Tense ref taped</b> | Tension given value of the corrected tension taper.  | 0. 1N     |
| 0410 | <b>Roll dia est</b>    | Roller diameter estimated value of the winding control.  | 1mm       |
| 0411 | <b>Pulse counter</b>   | The external circles of signal count value used for measuring the roller diameter .                    | 1         |

## 05 Timer &amp; Counter

| No.  | Name                     | Description  | Unit |
|------|--------------------------|--|------|
| 0500 | <b>Run time: sec</b>     | Less than one hour at current running time, the parameter will return to zero automatically when accumulated to 3600.                    | 1s   |
| 0501 | <b>Run time: hour</b>    | One or more than one hour at current running time. When the parameter 0500 accumulated to 3600, it will be incremented by 1.             | 1h   |
| 0502 | <b>Power on time: s</b>  | Less than one hour at current power on time. This parameter will return to zero automatically when accumulated to 3600.                  | 1s   |
| 0503 | <b>Power on time: h</b>  | One or more than one hour at current power on time, when the parameter 0502 accumulated to 3600, it will be incremented by 1.            | 1h   |
| 0504 | <b>Total run time: s</b> | Less than one hour for the cumulative running time, this parameter will return to zero automatically when accumulated to 3600.           | 1s   |
| 0505 | <b>Total run time: h</b> | One or more than one hour for the cumulative running time, when the parameter 0504 accumulated to 3600, it will be incremented by 1.     | 1h   |
| 0506 | <b>Total power on: s</b> | Less than one hour for the cumulative power on time, this parameter will return to zero automatically when accumulated to 3600.          | 1s   |
| 0507 | <b>Total power on: h</b> | One or more than one hour for the cumulative power on time, when parameter 0506 accumulated to 3600, it will be incremented by 1.        | 1h   |
| 0508 | <b>Fan on time: s</b>    | Less than one hour for the cumulative fan running time, this parameter will return to zero automatically when accumulated to 3600.       | 1s   |
| 0509 | <b>Fan on time: h</b>    | One or more than one hour for the cumulative fan running time, when the parameter 0508 accumulated to 3600, it will be incremented by 1. | 1h   |

| No.  | Name                     | Description   | Unit    |
|------|--------------------------|---|---------|
| 0510 | <b>EEP ROM wr tick</b>   | Less than one thousand times for the total number of writing the EEPROM memory. This parameter will return to zero automatically when accumulated to 1000.            | -       |
| 0511 | <b>EEP ROM wr tick k</b> | Reaching or exceeding one thousand times for the total number of writing the EEPROM memory. When the parameter 0510 accumulated to 1000, it will be incremented by 1. | -       |
| 0512 | <b>Max udc</b>           | The highest recorded value of the bus voltage.  | 0.1V    |
| 0513 | <b>Max Imag</b>          | The highest recorded value of the output current.   | 0.1A    |
| 0514 | <b>Max Tj</b>            | The highest recorded value of the IGBT chip temperature.  | 0.1 °C  |
| 0515 | <b>Max T_heat sink</b>   | The highest recorded value of the radiator temperature.   | 0.1 °C  |
| 0516 | <b>Max T_cpu</b>         | The highest recorded value of the CPU temperature.  | 0.1 °C  |
| 0517 | <b>IGBT usage hour</b>   | IGBT equivalent use time.   | 1h      |
| 0518 | <b>IGBT usage sec</b>    | IGBT equivalent use time.   | 1s      |
| 0519 | <b>P_Mot_kWh</b>         | Electric power of the built-in electric energy meter, the kWh part.   | 0.1 kWh |
| 0520 | <b>P_Mot_MWh</b>         | Electric power of the built-in electric energy meter, the MWh part.   | 1 MWh   |
| 0521 | <b>P_Reg_kWh</b>         | Power generation of the built-in electric energy meter, the kWh part.   | 0.1 kWh |
| 0522 | <b>P_Reg_MWh</b>         | Power generation of the built-in electric energy meter, the MWh part.   | 1 MWh   |

## 06 Drive Status

| No.  | Name          | Description           |                |  |
|------|---------------|-----------------------|----------------|--|
| 0600 | Status word 1 | Drive status word 1 . |                |  |
|      |               | Bit                   | Name           | Information  |
|      |               | 0                     | Ready          | 1=Drive ready to receive start command.<br>0=Drive not ready.  |
|      |               | 1                     | Fault          | 1=Drive fault.<br>0=Drive no fault.  |
|      |               | 2                     | Alarm          | 1=Drive warning.<br>0=Drive no warning.  |
|      |               | 3                     | Limiting       | 1=Drive limited.<br>0= Drive unlimited.  |
|      |               | 4                     | Running        | 1= Drive running.<br>0=Drive not running.  |
|      |               | 5                     | Rev req        | 1=Drive starting reversal.<br>0=Drive starting forward.  |
|      |               | 6                     | Start req      | 1=Driver received Start request.<br>0=Drive not received Start request.                                |
|      |               | 7                     | Stop req       | 1=Drive received shutdown request<br>0=Drive not received shutdown request.                            |
|      |               | 8                     | JOG active     | 1=Drive jog operation.<br>0=Drive jog function not activated.  |
|      |               | 9                     | Int stop req   | 1=Drive internal forced shutdown activated.<br>0=Drive forced shutdown function not activated.         |
|      |               | 10                    | Ext run enable | 1=Drive external operation enabled.<br>0=Drive external operation not enabled.                         |
|      |               | 11                    | JOG2           | 1=Drive JOG2 activated.<br>0= Drive JOG1 activated.  |
|      |               | 12                    | DC charged     | 1=DC high voltage capacitor charging completed.<br>0=DC high voltage capacitor charging not completed. |
|      |               | 13                    | Chg rly closed | 1=Soft start relay ON.<br>0=Soft start relay OFF.  |
|      |               | 14                    | Ext2           | 1=Control place2 activated.<br>0=Control place1activated.  |
|      |               | 15                    | Loc ctrl       | 1=Drive operates in remote control mode.<br>0=Drive operates in the local control mode.                |

| No.  | Name          | Description        |               |   |
|------|---------------|--------------------|---------------|---|
| 0601 | Status word 2 | Drive status word2 |               |   |
|      |               | Bit                | Name          |   |
|      |               |                    | Information   |   |
|      |               | 0                  | Data log      | 1 = OSC cache has been updated.<br>0 = OSC cache has not been updated.  |
|      |               | 1                  | OFF1          | 1 = OFF1 (Deceleration stop) activated.<br>0 = OFF1 (Deceleration stop) not activated.                            |
|      |               | 2                  | OFF2          | 1 = OFF2 (EMS coast stop) activated.<br>0 = OFF2 (EMS coast stop) not activated.                                  |
|      |               | 3                  | OFF3          | 1 = OFF3 (EMS DEC stop) activated.<br>0 = OFF3 (EMS DEC stop) not activated.                                      |
|      |               | 4                  | Motor Brk     | 1 = activated.<br>0 = not activated.  |
|      |               | 5                  | Ramp in zero  | 1 = Ramp input forced to zero.<br>0 = Normal operation.   |
|      |               | 6                  | Ramp out zero | 1 = Ramp output forced to zero.<br>0 = Normal operation.  |
|      |               | 7                  | Ramp hold     | 1 = Ramp input forced to keep.<br>0 = Normal operation.   |
|      |               | 8                  | Modulating    | 1 = Modulating, IGBT being controlled.<br>0 = No modulating.  |
|      |               | 9                  | Modbus        | 1 = Built-in MODBUS activated.<br>0 = Built-in MODBUS not activated.  |
|      |               | 10                 | CANopen       | 1 = Built-in CAN activated.<br>0 = Built-in CAN not activated.  |
|      |               | 11                 | Profi-DP      | 1 = PROFIBUS-DP activated.<br>0 = PROFIBUS-DP not activated.  |
|      |               | 12                 | Fan on        | 1 = Drive cooling fan is on.<br>0 = Drive cooling fan is off.   |
|      |               | 13                 | Start block   | 1 = Start command not executed.<br>0 = Normal operation.  |
|      |               | 14                 | ID run        | 1 = motor ID RUN is activated.<br>0 = None.   |
|      |               | 15                 | Main power on | 1 = The main power is on.<br>0 = The main power supply is not powered on properly or the voltage is insufficient. |

| No.  | Name          | Description         |                           |
|------|---------------|---------------------|---------------------------|
| 0602 | Status word 3 | Drive status word 3 |                           |
|      |               | Bit                 | Name                      |
|      |               | 0                   | AC src active             |
|      |               |                     | 1=AC power mode activated |
|      |               |                     | 0=DC power mode activated |
|      |               | 1                   | DC src active             |
|      |               |                     | 1=DC power mode activated |
|      |               |                     | 0=DC power mode activated |
|      |               | 2                   | Start inhibit             |
|      |               |                     | 1 = Start inhibit         |
|      |               |                     | 0 = normal                |
|      |               | 3                   | Spd ref limit             |
|      |               | 4                   | Trqref limit              |
|      |               | 5                   | Rem in local              |
|      |               | 6                   | Imax limit                |
|      |               | 7                   | Volt limit                |
|      |               | 8                   | PM sync loss              |
|      |               | 9                   | PM flux boost             |
|      |               | 10                  | Zero freq                 |
|      |               | 11                  | Flux build                |
|      |               | 12                  | Mech brake open           |
|      |               | 13                  | Brake opened              |
|      |               | 14                  | Brake checking            |
|      |               | 15                  | Crane active              |

| No.  | Name             | Description                |                    |  |
|------|------------------|----------------------------|--------------------|--|
| 0603 | Speed ctrl stat  | Speed control status word. |                    |  |
|      |                  | Bit                        | Name               | Information  |
|      |                  | 0                          | Zero speed         | 1 = Actual speed has reached zero speed limit and zero speed delay.<br>0 = Not enter the zero speed state. |
|      |                  | 1                          | Reverse            | 1 = Reverse running<br>0 = Forward running   |
|      |                  | 2                          | Ramp up            | 1 = Ramp up, Speed absolute value increases.<br>0 = No acceleration.                                       |
|      |                  | 3                          | Ramp down          | 1 = Ramp down, speed absolute value decreases<br>0 = No deceleration.                                      |
|      |                  | 4                          | At set point       | 1 = Deviation of actual speed and ramp input in the speed window.  |
|      |                  | 5                          | Reserved VF        | 1 = VF scalar control activated.<br>0 = Vector control activated.  |
|      |                  | 6                          | Regen active       | 1 = Power generation operation.<br>0 = Jog operation.  |
|      |                  | 7                          | Reserved Open loop | 1 = Open loop vector control activated.<br>0 = Open loop vector control not activated.                     |
|      |                  | 8                          | Pos ctrl           | 1 = Position control activated.  |
|      |                  | 9                          | ACIM               | 1 = Asynchronous motor activated.  |
|      |                  | 10                         | PMSM               | 1 = Synchronous motor activated.   |
|      |                  | 11                         | SynRM              | 1 = Synchronous reluctance motor activated.  |
|      |                  | 12                         | ID run             | 1 = Motor parameter ID run activated.  |
|      |                  | 13                         | Torque limit       | 1 = Torque limiting  |
|      |                  | 14                         | Speed limit        | 1 = Speed limiting   |
|      |                  | 15                         | Exc active         | 1 = Pre-excitation of induction motor  |
| 0604 | Infeed ctrl word | reserved                   |                    |  |

| No.  | Name               | Description  |                |
|------|--------------------|--|----------------|
| 0605 | <b>Fieldbus CW</b> | Field bus control word   |                |
|      |                    | Bit  | Name           |
|      |                    | 0  | Stop           |
|      |                    | 1=Drive stop.<br>0=Maintain current status.                          |                |
|      |                    | 1  | Start          |
|      |                    | 1=Drive start.<br>0= Maintain current status.                        |                |
|      |                    | 2  | StopMode OFF2  |
|      |                    | 1 = EMS stop mode.   |                |
|      |                    | 3  | StopMode OFF3  |
|      |                    | 1 = EMS coast stop mode.   |                |
|      |                    | 4  | Local ctrl     |
|      |                    | 1 = Request for local control.                                       |                |
|      |                    | 5  | StopMode ramp  |
|      |                    | 1 = Deceleration stop mode.  |                |
|      |                    | 6  | StopMode coast |
|      |                    | 1 = Coast stop mode.   |                |
|      |                    | 7  | Run enable     |
|      |                    | 1 = Run enable.<br>0 = Run inhibit.                                  |                |
|      |                    | 8  | Reset          |
|      |                    | 0->1 = Reset drive fault.  |                |
|      |                    | 9  | Jog1           |
|      |                    | 1 = Jog 1 start.   |                |
|      |                    | 10   | Jog2           |
|      |                    | 1 = Jog 2 start.   |                |
|      |                    | 11   | Remote         |
|      |                    | 1 = Request for remote control.                                      |                |
|      |                    | 12   | Ramp in 0      |
|      |                    | 1 = Force the input of reference ramp generator as 0.                |                |
|      |                    | 13   | Ramp hold      |
|      |                    | 1 = Force the output of reference ramp generator to remain constant. |                |
|      |                    | 14   | Ramp out 0     |
|      |                    | 1 = Force the output of reference ramp generator as 0.               |                |
|      |                    | 15   | Ext2 sel       |
|      |                    | 1 = Select external control location 2 (EXT2).                       |                |

| No.  | Name       | Description                  |             |   |
|------|------------|------------------------------|-------------|---|
| 0606 | Encoder SW | Encoder status word          |             |   |
|      |            | Bit                          | Name        | Information   |
|      |            | 0                            | DOS         | 1 = DOS fault.<br>0 = Normal.                                     |
|      |            |                              | LOT         | 1 = LOT fault.<br>0 = Normal.                                     |
|      |            | 2                            | LOS         | 1 = LOS fault.<br>0 = Normal.                                     |
|      |            | 3:15                         | Reserved    |   |
| 0607 | PosCtrl SW | Position control status word |             |   |
|      |            | Bit                          | Designation | Information   |
|      |            | 0                            | Pos sync    | 1 = Position synchronized.<br>0 = Position not synchronized.      |
|      |            |                              | Pos end     | 1 = Position completed.<br>0 = Position not completed.            |
|      |            | 1                            | Mark rdy    | 1 = Reference signal ready.<br>0 = Reference signal not detected. |
|      |            | 2                            | Mark load   | 1 = Loaded.<br>0 = Not loaded.                                    |
|      |            | 3:15                         | Reserved    |   |

## 08 Fault&amp;Alarm Log

| No.  | Name       | Description        | Unit |
|------|------------|--------------------|------|
| 0800 | Alarm Code | Latest Alarm Code. | -    |
| 0801 | Fault Code | Latest Fault Code. | -    |

## 09 System Info

| No.  | Name                    | Description   | Unit |
|------|-------------------------|---|------|
| 0900 | <b>Driver ID</b>        | Drive hardware code.  | -    |
| 0901 | <b>Drive type</b>       | Drive type .  | -    |
| 0902 | <b>Firmware version</b> | Drive firmware version.   | -    |
| 0903 | <b>Encoder type</b>     | The encoder type identified by the expansion card slot SLOT1.   | -    |
| 0904 | <b>PWM freq</b>         | The actual applied carrier frequency of the system.   | -    |
| 0905 | <b>App macro active</b> | The actual applied macro of the system.   | -    |
| 0906 | <b>PM phase CM</b>      | The angle accuracy is sufficient to use when the common mode signal strength identified by the synchronous motor rotor initial angle reach to 150. It is used to instruct the user to adjust the parameter <i>6011</i> of the injection current size to achieve the best search.              | -    |
| 0907 | <b>PM phase DIF</b>     | The angle accuracy is sufficient to use when the differential-mode mode signal strength identified by the synchronous motor rotor initial angle reach to 150. It will cause too loud noise if inject too much current; while the insufficient current signal strength may cause search error. | -    |

## 10 Start/Stop/Dir

| No.                        | Name                       | Description  | Default                    |                            |                            |         |        |      |   |               |               |   |   |               |   |   |      |      |   |   |   |            |  |
|----------------------------|----------------------------|--|----------------------------|----------------------------|----------------------------|---------|--------|------|---|---------------|---------------|---|---|---------------|---|---|------|------|---|---|---|------------|--|
| 1000                       | <b>Ext 1 start func</b>    | Selects the source of start, stop and direction commands for external control location 1 (EXT1). See also parameters 1001, 1002 and 1003.  | In1FWD;<br>In2 REV<br>=[2] |                            |                            |         |        |      |   |               |               |   |   |               |   |   |      |      |   |   |   |            |  |
|                            | Not selected               | The start function of EXT1 is not selected.  | 0                          |                            |                            |         |        |      |   |               |               |   |   |               |   |   |      |      |   |   |   |            |  |
|                            | In1 RUN;<br>In2 DIR        | The start/stop source is selected by the parameter <i>1001 Ext1 start in1</i> (0= Stop, 1= Start).<br>The direction source is selected by the parameter <i>1002 Ext1 start in2</i> (0=forward, 1=Reverse).   | 1                          |                            |                            |         |        |      |   |               |               |   |   |               |   |   |      |      |   |   |   |            |  |
|                            | In1 FWD;<br>In2 REV        | The forward start signal is selected by the parameter <i>1001 Ext1 start in1</i> .<br>The reverse start signal is selected by the parameter <i>1002 Ext1 start in2</i> .<br>The state transition of the signal source bits is interpreted as follows:  | 2                          |                            |                            |         |        |      |   |               |               |   |   |               |   |   |      |      |   |   |   |            |  |
|                            |                            | <table border="1"> <thead> <tr> <th>State of input 1<br/>(1001)</th> <th>State of input 2<br/>(1002)</th> <th>Command</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Stop</td> </tr> <tr> <td>1</td> <td>0</td> <td>Forward start</td> </tr> <tr> <td>0</td> <td>1</td> <td>Reverse start</td> </tr> <tr> <td>1</td> <td>1</td> <td>Stop</td> </tr> </tbody> </table>  | State of input 1<br>(1001) | State of input 2<br>(1002) | Command                    | 0       | 0      | Stop | 1 | 0             | Forward start | 0 | 1 | Reverse start | 1 | 1 | Stop |      |   |   |   |            |  |
| State of input 1<br>(1001) | State of input 2<br>(1002) | Command  |                            |                            |                            |         |        |      |   |               |               |   |   |               |   |   |      |      |   |   |   |            |  |
| 0                          | 0                          | Stop   |                            |                            |                            |         |        |      |   |               |               |   |   |               |   |   |      |      |   |   |   |            |  |
| 1                          | 0                          | Forward start  |                            |                            |                            |         |        |      |   |               |               |   |   |               |   |   |      |      |   |   |   |            |  |
| 0                          | 1                          | Reverse start  |                            |                            |                            |         |        |      |   |               |               |   |   |               |   |   |      |      |   |   |   |            |  |
| 1                          | 1                          | Stop   |                            |                            |                            |         |        |      |   |               |               |   |   |               |   |   |      |      |   |   |   |            |  |
|                            | RUN/STOP/DIR               | The start signal is selected by the parameter <i>1001 Ext1 start in1</i> .<br>The stop signal is selected by the parameter <i>1002 Ext1 start in2</i> .<br>The direction signal is selected by the parameter <i>1003 Ext1 start in3</i><br>The state transition of the signal source bits are interpreted as follows:  | 3                          |                            |                            |         |        |      |   |               |               |   |   |               |   |   |      |      |   |   |   |            |  |
|                            |                            | <table border="1"> <thead> <tr> <th>State of input 1<br/>(1001)</th> <th>State of input 2<br/>(1002)</th> <th>State of input 3<br/>(1003)</th> <th>Command</th> </tr> </thead> <tbody> <tr> <td>0 -&gt; 1</td> <td>0</td> <td>0</td> <td>Forward start</td> </tr> <tr> <td>0 -&gt; 1</td> <td>0</td> <td>1</td> <td>Reverse start</td> </tr> <tr> <td>-</td> <td>1</td> <td>-</td> <td>Stop</td> </tr> <tr> <td>0</td> <td>0</td> <td>-</td> <td>Change Dir</td> </tr> </tbody> </table> | State of input 1<br>(1001) | State of input 2<br>(1002) | State of input 3<br>(1003) | Command | 0 -> 1 | 0    | 0 | Forward start | 0 -> 1        | 0 | 1 | Reverse start | - | 1 | -    | Stop | 0 | 0 | - | Change Dir |  |
| State of input 1<br>(1001) | State of input 2<br>(1002) | State of input 3<br>(1003)   | Command                    |                            |                            |         |        |      |   |               |               |   |   |               |   |   |      |      |   |   |   |            |  |
| 0 -> 1                     | 0                          | 0  | Forward start              |                            |                            |         |        |      |   |               |               |   |   |               |   |   |      |      |   |   |   |            |  |
| 0 -> 1                     | 0                          | 1  | Reverse start              |                            |                            |         |        |      |   |               |               |   |   |               |   |   |      |      |   |   |   |            |  |
| -                          | 1                          | -  | Stop                       |                            |                            |         |        |      |   |               |               |   |   |               |   |   |      |      |   |   |   |            |  |
| 0                          | 0                          | -  | Change Dir                 |                            |                            |         |        |      |   |               |               |   |   |               |   |   |      |      |   |   |   |            |  |

| No.                     | Name                    | Description   | Default                    |                         |                         |         |        |   |   |               |   |       |   |               |   |   |   |      |   |   |   |      |   |
|-------------------------|-------------------------|---|----------------------------|-------------------------|-------------------------|---------|--------|---|---|---------------|---|-------|---|---------------|---|---|---|------|---|---|---|------|---|
| 1000                    | <b>Ext 1 start func</b> | Selects the source of start, stop and direction commands for external control location 1 (EXT1). See also parameters 1001, 1002 and 1003.   | In1FWD;<br>In2 REV<br>=[2] |                         |                         |         |        |   |   |               |   |       |   |               |   |   |   |      |   |   |   |      |   |
|                         | FWD/REV/STOP            | <p>The forward start signal is selected by the parameter <i>1001 Ext1 start in1</i>.</p> <p>The reverse start signal is selected by the parameter <i>1002 Ext1 start in2</i>.</p> <p>The stop signal is selected by the parameter <i>1003 Ext1 start in3</i>.</p> <p>The state transition of the signal source bits are interpreted as follows:</p> <table border="1"> <thead> <tr> <th>State of input 1 (1001)</th> <th>State of input 2 (1002)</th> <th>State of input 3 (1003)</th> <th>Command</th> </tr> </thead> <tbody> <tr> <td>0 -&gt; 1</td> <td>0</td> <td>0</td> <td>Forward start</td> </tr> <tr> <td>0</td> <td>0-&gt; 1</td> <td>0</td> <td>Reverse start</td> </tr> <tr> <td>-</td> <td>-</td> <td>1</td> <td>Stop</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>Stop</td> </tr> </tbody> </table> | State of input 1 (1001)    | State of input 2 (1002) | State of input 3 (1003) | Command | 0 -> 1 | 0 | 0 | Forward start | 0 | 0-> 1 | 0 | Reverse start | - | - | 1 | Stop | 1 | 1 | 0 | Stop | 4 |
| State of input 1 (1001) | State of input 2 (1002) | State of input 3 (1003)   | Command                    |                         |                         |         |        |   |   |               |   |       |   |               |   |   |   |      |   |   |   |      |   |
| 0 -> 1                  | 0                       | 0   | Forward start              |                         |                         |         |        |   |   |               |   |       |   |               |   |   |   |      |   |   |   |      |   |
| 0                       | 0-> 1                   | 0   | Reverse start              |                         |                         |         |        |   |   |               |   |       |   |               |   |   |   |      |   |   |   |      |   |
| -                       | -                       | 1   | Stop                       |                         |                         |         |        |   |   |               |   |       |   |               |   |   |   |      |   |   |   |      |   |
| 1                       | 1                       | 0   | Stop                       |                         |                         |         |        |   |   |               |   |       |   |               |   |   |   |      |   |   |   |      |   |
|                         | Field bus               | Start/stop and direction is controlled by field bus communication control word.   | 5                          |                         |                         |         |        |   |   |               |   |       |   |               |   |   |   |      |   |   |   |      |   |
|                         | Panel                   | Start/stop and direction is controlled by control panel.  | 6                          |                         |                         |         |        |   |   |               |   |       |   |               |   |   |   |      |   |   |   |      |   |

| No.  | Name                        | Description   | Default           |
|------|-----------------------------|---|-------------------|
| 1001 | <b>Ext 1 start In1</b>      | Select the input source 1 of EXT1.<br><i>Refer to parameter 1000 Ext1 start func.</i>   | DI1 = [2048]      |
|      | P.01.00.00<br>(Bit pointer) | User defined pointer.<br>01.00.00 from left to right take two digits as a set, indicates the parameter group number, index number in the group and the bit number.<br>The actual value is determined by the current value of the parameter. |                   |
|      | CONST.FALSE                 | 0 (always OFF).   | 0                 |
|      | CONST.TRUE                  | 1 (always ON).  | 1                 |
|      | DI1                         | Digital input DI1 ( <i>parameter 0200, DI state, bit 0</i> )  | 2048              |
|      | DI2                         | Digital input DI2   | 2049              |
|      | DI3                         | Digital input DI3   | 2050              |
|      | DI4                         | Digital input DI4   | 2051              |
|      | DI5                         | Digital input DI5   | 2052              |
|      | DI6                         | Digital input DI6   | 2053              |
|      | DI7                         | Digital input DI7   | 2054              |
| 1002 | <b>Ext 1 start In2</b>      | Select the input source 2 of EXT1.<br>For the available selections, see parameter 1001 <i>Ext1 start In1</i> .  | DI2 = [2049]      |
| 1003 | <b>Ext 1 start In3</b>      | Select the input source 3 of EXT1.<br>For the available selections, see parameter 1001 <i>Ext1 start In1</i> .  | CONST.FALSE = [0] |
| 1004 | <b>Ext2 start func</b>      | Selects the source of start, stop and direction commands for external control location 2 (EXT2).<br>For the available selections, see parameter 1001 <i>Ext1 start In1</i> .  | Not selected      |
| 1005 | <b>Ext2 start In1</b>       | Select the input source1 of EXT2.<br>For the available selections, see parameter 1001 <i>Ext1 start In1</i> .   | CONST.FALSE = [0] |
| 1006 | <b>Ext2 start In2</b>       | Select the input source 2 of EXT2.<br>For the available selections, see parameter 1001 <i>Ext1 start In1</i> .  | CONST.FALSE = [0] |
| 1007 | <b>Ext2 start In3</b>       | Select the input source 3 of EXT2.<br>For the available selections, see parameter 1001 <i>Ext1 start In1</i> .  | CONST.FALSE = [0] |

| No.  | Name                   | Description   | Default           |
|------|------------------------|---|-------------------|
| 1008 | <b>JOG1 start</b>      | Select the start signal source of Jogging 1.<br>1 = Jogging 1 active. For the available selections, see parameter <i>1001 Ext1 start In1</i> .                          | CONST.FALSE = [0] |
| 1009 | <b>JOG2 start</b>      | Select the start signal source of Jogging 2.<br>1 = Jogging 2 active. For the available selections, see parameter <i>1001 Ext1 start In1</i> .                          | CONST.FALSE = [0] |
| 1010 | <b>JOG enable</b>      | Selects the source for a jog enable signal.<br>1 = Jogging is enabled. For the available selections, see parameter <i>1001 Ext1 start In1</i> .                         | CONST.FALSE = [0] |
| 1011 | <b>Fault reset sel</b> | Select the source of the fault reset signal .<br>0 -> 1 = Reset .For the available selections, see parameter <i>1001 Ext1 start In1</i> .                               | CONST.FALSE = [0] |
| 1012 | <b>Run enable</b>      | Select the source of enable signal for operation.<br>1 = Running enable signal is ON. For the available selections, see parameter <i>1001 Ext1 start In1</i> .          | CONST.TRUE = [1]  |
| 1013 | <b>Emergency stop</b>  | Select the source of the emergency stop signal.<br>0 = Emergency stop. For the available selections, see parameter <i>1001 Ext1 start In1</i> .<br>1 = No action.       | CONST.TRUE = [1]  |
| 1014 | <b>EM stop mode</b>    | Selection of emergency stop mode.   | OFF2 = [1]        |
|      | OFF1                   | Deceleration stop according the acceleration and deceleration time1.  | 0                 |
|      | OFF2                   | Coast stop  | 1                 |
|      | OFF3                   | Deceleration stop according emergency stop time.  | 2                 |
| 1015 | <b>Start enable</b>    | Select the source of start enable signal.<br>1 = Start enable signal is ON. For the available selections, see parameter <i>1001 Ext1 start In1</i> .                    | CONST.TRUE = [1]  |
| 1016 | <b>Upper limit</b>     | Select the signal source of the upper limit,<br>0: Limit activated, For the available selections, see parameter <i>1001 Ext1 start In1</i> .<br>1: Limit not activated. | CONST.TRUE = [1]  |
| 1017 | <b>Lower limit</b>     | Select the signal source of the lower limit.<br>0: Limit activated, For the available selections, see parameter <i>1001 Ext1 start In1</i> .<br>1: Limit not activated. | CONST.TRUE = [1]  |

## 11 Start/Stop Mode

| No.  | Name/Value             | Start Stop Mode Settings  | Def   |
|------|------------------------|---|---|
| 1100 | <b>Stop mode</b>       | Stop mode.  | RAMP= [0]   |
|      | RAMP                   | Stop along the active deceleration ramp.  | 0   |
|      | COAST                  | Stop by switching off the output semiconductors of the drive. The motor coasts to a stop.             | 1   |
| 1101 | <b>Ext 1/Ext2 sel</b>  | Selects the source for external control location<br>EXT1/EXT2 selection.<br><br>0 = EXT1<br>1 = EXT2  | CONST.FALSE =[0]                                  |
|      |                        | P.01.00.00  | User defined pointer (parameter bit pointer)      |
|      |                        | CONST.FALSE   | EXT1 (permanently selected).                      |
|      |                        | CONST.TRUE  | EXT2 (permanently selected).                      |
|      |                        | DI1   | Digital input DI1 ( <i>0200 DI state, bit 0</i> ) |
|      |                        | DI2   | 2048  |
|      |                        | DI3   | 2049  |
|      |                        | DI4   | 2050  |
|      |                        | DI5   | 2051  |
|      |                        | DI6   | 2052  |
|      |                        | DI7   | 2053  |
|      |                        |   | 2054  |
| 1102 | <b>Ext 1 ctrl mode</b> | Motor control mode of EXT1.   | Speed = [0]                                       |
|      | Speed                  | Speed mode  | 0   |
|      | Torque                 | Torque mode   | 1   |
|      | Min                    | Speed and torque mode, take the minimum value of speed loop output or the torque reference.           | 2   |
|      | Max                    | Speed and torque mode, take the maximum value of speed loop output or the torque reference.           | 3   |
|      | Add                    | Speed and torque mode, take the sum of the speed loop output and the torque reference.                | 4   |
|      | Position               | Point to point position control mode.   | 5   |
|      | Homing                 | Position control mode with origin regression.   | 6   |
|      | Profvel                | Position control mode with trajectory planning.   | 7   |
| 1103 | <b>Ext2 ctrl mode</b>  | Motor control mode of EXT2. For the available selections, see parameter <i>1102 Ext 1 ctrl mode</i> . | Speed = [0]                                       |

| No.  | Name/Value             | Start Stop Mode Settings   | Def          |
|------|------------------------|--|--------------|
| 1104 | <b>Local ctrl mode</b> | Selects the operating mode for local control.  | Speed = [0]  |
|      | Speed                  | Speed mode. Speed reference is defined by parameter <i>0213 Control panel ref 1</i> .                              | 0            |
|      | Torque                 | Torque mode. Torque reference is defined by parameter <i>0214 Control panel ref 2</i> .                            | 1            |
| 1105 | <b>Ext 1 trig type</b> | Select the trigger mode for control1.  | Level = [ 1] |
|      | Edge                   | Edge trigger   | 0            |
|      | Level                  | Level trigger  | 1            |
| 1106 | <b>Ext2 trig type</b>  | Select the trigger mode for control2.<br>For the available selections, see parameter <i>1105 Ext 1 trig type</i> . | Level = [ 1] |

## 13 Analog &amp; pulse input

| No.  | Name / Value           | Description  | Default         |
|------|------------------------|--|-----------------|
| 1300 | <b>AI1 input max</b>   | Maximum value of analog input AI1 .<br>[0.000V, 10.000V]   | 10.000V<br>-    |
| 1301 | <b>AI1 input min</b>   | Minimum value of analog input AI1.<br>[0.000V, 10.000V]  | 0.000V<br>-     |
| 1302 | <b>AI1 superv act</b>  | Action performed when AI1 exceeds the maximum or minimum range.  | No action = [0] |
|      | No action              | No action .  | 0               |
|      | Fault                  | Report Fault.  | 1               |
|      | Alarm                  | Report Alarm.  | 2               |
| 1303 | <b>AI1 superv sel</b>  | Select the monitoring content of AI1 .   | 00b             |
|      | BIT0: AI min sup       | 1 = Activate monitoring whether the AI1 input is less than the value defined by parameter 1301.  | 0               |
|      | BIT1: AI max sup       | 1 = Activate monitoring whether the AI1 input is greater than the value defined by parameter 1300.   | 0               |
| 1304 | <b>AI1 calibration</b> | AI1 correct selection.   | No action = [0] |
|      | No action              | No action, or the action has been completed.   | 0               |
|      | AI_MIN_TUNE            | 1=Minimum value correction.<br>2=Maximum value correction.   | 1               |
|      | AI_MAX_TUNE            | Before start tuning, please ensure the current analog input value is the minimum/maximum value.  | 2               |
| 1305 | <b>AI1 max scale</b>   | Maximum value of the converted analog AI1.   | 1500            |
|      | [-32768, 32767]        | The maximum value of AI1 after scaled.   | -               |
| 1306 | <b>AI1 min scale</b>   | The minimum value of the converted analog AI1 .  | 0               |
|      | [-32768, 32767]        | The minimum value of AI1 after scaled.   | -               |
| 1307 | <b>AI1 sim enable</b>  | A forced value parameter (1308 AI1 sim data) is provided for the AI1, and its value is applied whenever the parameter 1307 AI1 sim enable is set to "Enable" . | Disable = [0]   |
|      | Disable                | The converted output of AI1 depends on the AI1 input.  | 0               |
|      | Enable                 | The converted output of AI1 depends on the parameter 1308 AI1 sim data .   | 1               |
| 1308 | <b>AI1 sim data</b>    | Simulation data of analog AI1.   | 0               |
|      | [-32768, 32767]        | Set the converted output of AI1 when parameter 1307 AI1 sim Enable is set to Enable.   | -               |
| 1309 | <b>AI1 filter time</b> | Define the filtering time constant of analog AI1 .   | 0.10s           |
|      | [0.01s, 10.00s]        | Filter time constant.  | -               |

| No.  | Name / Value           | Description   | Default             |
|------|------------------------|---|---------------------|
| 1310 | <b>AI2 input max</b>   | Maximum value of analog input AI2.<br>[0.000mA, 20.000mA] Range and unit are defined by parameter <i>1317 AI2 input type</i> ( <i>AI2 Input type</i> ).<br>[0.000V, 10.000V]  | 10.000V<br>20.000mA |
|      |                        |   |                     |
|      |                        |   |                     |
| 1311 | <b>AI2 input min</b>   | Minimum value of analog input AI2.<br>[0.000mA, 20.000mA] Range and unit are defined by parameter <i>1317 AI2 input type</i> .<br>[0.000V, 10.000V]   | 0.000 V<br>0.000mA  |
|      |                        |   |                     |
|      |                        |   |                     |
| 1312 | <b>AI2 superv act</b>  | The performed action when AI2 exceeds the maximum or minimum range.<br>For the available selections, see parameter <i>1302 AI1 superv act</i> .   | No action = [0]     |
| 1313 | <b>AI2 superv sel</b>  | Select the contents of AI2 monitoring.<br>For the available selections, see parameter <i>1303 AI1 superv sel</i> .  | 00b                 |
| 1314 | <b>AI2 calibration</b> | AI2 calibration selection.<br>For the available selections, see parameter <i>1304 AI1 calibration</i> .   | No action = [0]     |
| 1315 | <b>AI2 max scale</b>   | Maximum value of the converted analog AI2.  | 1500                |
|      | [ -32768, 32767 ]      | The maximum value of AI2 after scaled.  | -                   |
| 1316 | <b>AI2 min scale</b>   | Minimum value of the converted analog AI2.  | 0                   |
|      | [ -32768, 32767 ]      | The minimum value of AI2 after scaled.  | -                   |
| 1317 | <b>AI2 input type</b>  | Select the input type of analog AI2.<br>Notes: <ul style="list-style-type: none"><li>● Must check the DIP is in V side or I side.</li><li>● When AI2 input is 4~20mA current , please set the parameter <i>1311 (AI2 input min)</i> to 4.000mA.</li></ul> | Voltage = [0]       |
|      | Voltage                | Please move the AI2 jumper to “V” side  | 0                   |
|      | Current                | Please move the AI2 jumper to “I” side  | 1                   |
|      |                        |   |                     |
| 1318 | <b>AI2 sim enable</b>  | Simulation enable of analog AI2.<br>Refer to the parameter <i>1307 AI1 sim enable</i> .   | Disable = [0]       |
| 1319 | <b>AI2 sim data</b>    | Simulation data of analog AI2.<br>Refer to the parameter <i>1308 AI1 sim data</i> .   | 0                   |
| 1320 | <b>AI2 filter time</b> | Define the filter time constant of analog AI2.  | 0.10s               |
|      | [ 0.01s, 10.00s ]      | Filter time constant.   | -                   |

| No.  | Name / Value           | Description   | Default                  |
|------|------------------------|---|--------------------------|
| 1321 | <b>AI3 input max</b>   | Maximum value of analog input AI3.<br>[0.000mA, 20.000mA]<br>[0.000V, 10.000V]  | 10.000V<br>20.000mA<br>- |
|      |                        | Range and unit are defined by parameter <i>1328 AI3 input type</i> .  | -                        |
| 1322 | <b>AI3 input min</b>   | Minimum value of analog input AI3.<br>[0.000mA, 20.000mA]<br>[0.000V, 10.000V]  | 0.000V<br>0.000mA<br>-   |
|      |                        | Range and unit are defined by parameter <i>1328 AI3 input type</i> .  | -                        |
| 1323 | <b>AI3 superv act</b>  | The performed action when AI3 exceeds the maximum or minimum range.<br>For the available selections, see parameter <i>1302 AI1 superv act</i> .   | No action = [0]          |
| 1324 | <b>AI3 superv sel</b>  | Select the contents of the AI3 monitor.<br>For the available selections, see parameter <i>1303 AI1 superv sel</i> .   | 00b                      |
| 1325 | <b>AI3 calibration</b> | AI3 calibration selection. For the available selections, see parameter <i>1304 AI1 calibration</i> .  | None = [0]               |
| 1326 | <b>AI3 max scale</b>   | Maximum value of the converted analog AI3.  | 1500                     |
|      | [ -32768, 32767 ]      | The maximum value of AI3 after scaled.  | -                        |
| 1327 | <b>AI3 min scale</b>   | Minimum value of the converted analog AI3.  | 0                        |
|      | [ -32768, 32767 ]      | The minimum value of AI3 after scaled.  | -                        |
| 1328 | <b>AI3 input type</b>  | Select the input type of analog AI3.<br>Notes: <ul style="list-style-type: none"><li>● Must check the DIP is in V side or I side.</li><li>● When input is 4~20mA current input, please set the Parameter <i>1322 (AI3 input min) to 4.000mA</i>.</li></ul> For the available selections, see parameter <i>1317 AI2 input type</i> . | Voltage = [0]            |
| 1329 | <b>AI3 sim enable</b>  | Simulation enable of analog AI3.<br>Refer to the parameter <i>1307 AI1 sim enable</i> .   | Disable = [0]            |
| 1330 | <b>AI3 sim data</b>    | Simulation data of analog AI3.<br>Refer to the parameter <i>1308 AI1 sim data</i> .   | 0                        |
| 1331 | <b>AI3 filter time</b> | Define the filter time constant of analog AI3.  | 0.10s                    |
|      | [ 0.01s, 10.00s ]      | Filter time constant.   | -                        |

| No.  | Name / Value               | Description  | Default       |
|------|----------------------------|--|---------------|
| 1332 | <b>Freq input max</b>      | Maximum frequency of high speed pulse input.<br>[0Hz, 60000Hz]                                       | 10000Hz<br>-  |
|      |                            |  |               |
| 1333 | <b>Freq input min</b>      | Minimum frequency of high speed pulse input.<br>[0Hz, 60000Hz]                                       | 0Hz<br>-      |
|      |                            |  |               |
| 1334 | <b>Freq in max scale</b>   | The converted maximum output value of the frequency input.   | 1500          |
|      | [ -32768, 32767 ]          | The maximum value of the frequency input after scaled.   | -             |
| 1335 | <b>Freq in min scale</b>   | The converted minimum output value of the frequency input.   | 0             |
|      | [ -32768, 32767 ]          | The minimum value of the frequency input after scaled.   | -             |
| 1336 | <b>Freq in sim enable</b>  | Simulation enable of analog frequency input.<br>Refer to the parameter 1307 AI1 sim enable.          | Disable = [0] |
|      | Disable                    | The frequency input conversion output depends on the actual high speed pulse input.                  | 0             |
|      | Enable                     | The frequency input conversion output depends on the parameter 1337 Freq in sim data.                | 1             |
| 1337 | <b>Freq in sim data</b>    | Simulation data of the frequency input.  | 0             |
|      | [ -32768, 32767 ]          | Set the converted output of frequency input when parameter 1336 Freq in sim enable is set to Enable. | -             |
| 1338 | <b>Freq in filter time</b> | Define the filter time constant of the frequency input.  | 0.10s         |
|      | [ 0.01s, 10.00s ]          | Filter time constant.  | -             |

## 14 Digital I/O

| No.  | Name / Value         | Description   | Default |
|------|----------------------|---|---------|
| 1400 | <b>DI1 on delay</b>  | Defines the activation delay for digital input DI1.<br>[0, 65535 ms]<br>Activation delay for DI1.     | 2ms     |
| 1401 | <b>DI1 off delay</b> | Defines the deactivation delay for digital input DI1.<br>[0, 65535 ms]<br>Deactivation delay for DI1. | 2ms     |
| 1402 | <b>DI2 on delay</b>  | Defines the activation delay for digital input DI2.<br>See parameter <i>1400 DI1 on delay</i> .       | 2ms     |
| 1403 | <b>DI2 off delay</b> | Defines the deactivation delay for digital input DI2.<br>See parameter <i>1401 DI1 off delay</i> .    | 2ms     |
| 1404 | <b>DI3 on delay</b>  | Defines the activation delay for digital input DI3.<br>See parameter <i>1400 DI1 on delay</i> .       | 2ms     |
| 1405 | <b>DI3 off delay</b> | Defines the deactivation delay for digital input DI3.<br>See parameter <i>1401 DI1 off delay</i> .    | 2ms     |
| 1406 | <b>DI4 on delay</b>  | Defines the activation delay for digital input DI4.<br>See parameter <i>1400 DI1 on delay</i> .       | 2ms     |
| 1407 | <b>DI4 off delay</b> | Defines the deactivation delay for digital input DI4.<br>See parameter <i>1401 DI1 off delay</i> .    | 2ms     |
| 1408 | <b>DI5 on delay</b>  | Defines the activation delay for digital input DI5.<br>See parameter <i>1400 DI1 on delay</i> .       | 2ms     |
| 1409 | <b>DI5 off delay</b> | Defines the deactivation delay for digital input DI5.<br>See parameter <i>1401 DI1 off delay</i> .    | 2ms     |
| 1410 | <b>DI6 on delay</b>  | Defines the activation delay for digital input DI6.<br>See parameter <i>1400 DI1 on delay</i> .       | 2ms     |
| 1411 | <b>DI6 off delay</b> | Defines the deactivation delay for digital input DI6.<br>See parameter <i>1401 DI1 off delay</i> .    | 2ms     |
| 1412 | <b>DI7 on delay</b>  | Defines the activation delay for digital input DI7.<br>See parameter <i>1400 DI1 on delay</i> .       | 2ms     |
| 1413 | <b>DI7 off delay</b> | Defines the deactivation delay for digital input DI7.<br>See parameter <i>1401 DI1 off delay</i> .    | 2ms     |

| No.  | Name / Value             | Description   | Default  |
|------|--------------------------|---|----------|
| 1414 | <b>DO1 on delay</b>      | Defines the activation delay for relay output 1   | 0 ms     |
|      | [0, 65535 ms]            | Activation delay for relay output 1.  |          |
| 1415 | <b>DO1 off delay</b>     | Defines the deactivation delay for relay output 1   | 0 ms     |
|      | [0, 65535 ms]            | Deactivation delay for relay output 1.  |          |
| 1416 | <b>RO2 on delay</b>      | Defines the activation delay for relay output 2.<br><i>See parameter 1414 DO1 on delay.</i>   | 0 ms     |
|      |                          |   |          |
| 1417 | <b>DO2 off delay</b>     | Defines the deactivation delay for relay output 2.<br><i>See parameter 1415 DO1 off delay.</i>  | 0 ms     |
|      |                          |   |          |
| 1418 | <b>RO1 on delay</b>      | Reserved  | 0 ms     |
| 1419 | <b>RO1 off delay</b>     | Reserved  | 0 ms     |
| 1420 | <b>RO2 on delay</b>      | Reserved  | 0 ms     |
| 1421 | <b>RO2 off delay</b>     | Reserved  | 0 ms     |
| 1422 | <b>DI logic</b>          | The parameter is used to activate the inversion of digital inputs.<br>Bits 0 ~ 6 reflect the status of DI1 ~ DI7.<br>0=No inversion<br>1= Inversion active  | 0000000b |
|      |                          |   |          |
| 1423 | <b>DI sim enable</b>     | Simulation enable of the digital input.<br>0=Simulation is disabled<br>1=Simulation is enabled  | 0000000b |
|      | BIT0: DI1                | 1 = Force DI1 to value of bit 0 of parameter 1424   | 0        |
|      | BIT1: DI2                | 1 = Force DI2 to value of bit 0 of parameter 1424   | 0        |
|      | BIT2: DI3                | 1 = Force DI3 to value of bit 0 of parameter 1424   | 0        |
|      | BIT3: DI4                | 1 = Force DI4 to value of bit 0 of parameter 1424   | 0        |
|      | BIT4: DI5                | 1 = Force DI5 to value of bit 0 of parameter 1424   | 0        |
|      | BIT5: DI6                | 1 = Force DI6 to value of bit 0 of parameter 1424   | 0        |
|      | BIT6: DI7                | 1 = Force DI7 to value of bit 0 of parameter 1424   | 0        |
| 1424 | <b>DI sim data</b>       | Contains the values that the digital inputs are forced to when selected by parameter 1423 DI sim enable.<br><i>See parameter 1423 DI sim enable.</i>  | 0000000b |
|      |                          |   |          |
| 1425 | <b>DI status undelay</b> | Displays the electrical status of digital inputs before the delay. The activation/deactivation delays of the inputs (if any are specified) are ignored.<br>Bits 0 ~ 6 reflect the status of DI1~DI7 | -        |

| No.  | Name / Value         | Description   | Default            |
|------|----------------------|---|--------------------|
| 1426 | <b>DO logic</b>      | The parameter is used to activate the inversion of digital outputs.   | 0000b              |
|      | BIT0: DO1            | Relay 1 logic   | 0                  |
|      | BIT1: DO2            | Relay 2 logic   | 0                  |
|      | BIT2:                | Reserved  | 0                  |
|      | BIT3:                | Reserved  | 0                  |
| 1427 | <b>DO sim enable</b> | Digital output simulation enable.<br>0=Simulation is disabled<br>1=Simulation is enabled.   | 0000b              |
|      | BIT0: DO1            | DO1 simulation enable or data   | 0                  |
|      | BIT1: DO2            | DO2 simulation enable or data   | 0                  |
|      | BIT2: RO1            | RO1 simulation enable or data   | 0                  |
|      | BIT3: RO2            | RO2 simulation enable or data   | 0                  |
| 1428 | <b>DO sim data</b>   | Contains the values that the digital outputs are forced to when selected by parameter 1427 DO sim enable. See parameter 1427 DO sim enable. | 0000b              |
| 1429 | <b>DO1 source</b>    | Selects a drive signal to be connected to DO1.  | Running<br>=[6148] |
|      | P.01.00.00           | User defined pointer (parameter bit pointer).   | -                  |
|      | CONST.FALSE          | Output is not energized.  | 0                  |
|      | CONST.TRUE           | Output is energized.  | 1                  |
|      | Ready                | Ready (0600 Status word 1, bit 0)   | 6144               |
|      | Running              | Drive running (0600 Status word 1, bit 4)   | 6148               |
|      | Fault                | Driver fault (0600 Status word 1, bit 1)  | 6145               |
|      | Alarm                | Drive alarm (0600 Status word 1, bit 2)   | 6146               |
|      | Start req            | Drive received start request (0600 Status word 1, bit 6)  | 6150               |
|      | Ext2                 | Current controlled is EXT2 (0600 Status word 1, bit 14)   | 6158               |
|      | Loc ctrl             | Drive in local control (0600 Status word 1, bit 15)   | 6159               |
|      | Zero speed           | Drive output is 0 (0603 Speed control status word, bit 0)   | 6192               |
|      | Reverse              | Reverse running (0603 Speed control status word, bit 1)   | 6193               |
|      | At setpoint          | Actual speed has reached reference (0603 Speed control status word, bit 4)  | 6196               |
|      | Torq limit           | Running in torque limit state (0603 Speed control status word, bit 13)  | 6205               |
|      | Speed limit          | Running in speed limit state (0603 Speed control status word, bit 14)   | 6206               |

| No.               | Name / Value           | Digital input and output  | Def              |
|-------------------|------------------------|---|------------------|
| 1430              | <b>DO2 source</b>      | Set the signal source of DO1. For the available selections, see parameter <i>1429 DO1 source</i> .  | Fault = [6145]   |
| 1431              | <b>RO1 source</b>      | Reserved  | Running = [6148] |
| 1432              | <b>RO2 source</b>      | Reserved  | Fault = [6145]   |
| 1433              | <b>DO1 level type</b>  | Set DO1 signal type.  | Level = [ 1 ]    |
|                   | Edge                   | Output is edge pulse mode.  | 0                |
|                   | Level                  | Output is level mode.   | 1                |
| 1434              | <b>DO1 edge type</b>   | Set DO1 signal type.  | Rising = [0]     |
|                   | Rising                 | Trigger the DO pulse output by rising edge.   | 0                |
|                   | Falling                | Trigger the DO pulse output by falling edge.  | 1                |
|                   | Both                   | Trigger the DO pulse output by rising and falling edge.   | 2                |
| 1435              | <b>DO1 pulse width</b> | Set the pulse output width of DO1.  | 500ms            |
|                   | [0, 65535ms]           |   | 1ms              |
| 1436              | <b>DO2 level type</b>  | Set DO2 signal type.  | Level = [ 1 ]    |
|                   | Edge                   | Output is edge pulse mode.  | 0                |
|                   | Level                  | Output is level mode.   | 1                |
| 1437              | <b>DO2 edge type</b>   | Set DO2 signal type.  | Rising = [0]     |
|                   | Rising                 | Trigger the DO pulse output by rising edge.   | 0                |
|                   | Falling                | Trigger the DO pulse output by falling edge.  | 1                |
|                   | Both                   | Trigger the DO pulse output by rising and falling edge.   | 2                |
| 1438              | <b>DO2 pulse width</b> | Set the pulse output width of DO2.  | 500ms            |
|                   | [0, 65535ms]           |   | 1ms              |
| 1439<br>~<br>1444 |                        | Reserved  |                  |
| 1445              | <b>DO JOG mask</b>     | The parameter is used to disable the DO output function during jogging operation.<br>For the available selections, see parameter <i>1426 DO logic</i> . | 0                |

## 15 Analog &amp; pulse out

| No.  | Name / Value                             | Digital input and output  | Def                   |
|------|--|---|-----------------------|
| 1500 | <b>AO1 source</b>                        | Select a signal to be connected to analog output AO1.   | Motor speed<br>=[256] |
|      | P.01.00                                  | User defined pointer (parameter pointer).   | -                     |
|      | Zero                                     | Always be 0.  | 0                     |
|      | Motor speed                              | Refer to parameter <i>0100 Motor speed</i> .  | 256                   |
|      | Output frequency                         | Refer to parameter <i>0101 Output frequency</i> .   | 257                   |
|      | DC bus voltage                           | Refer to parameter <i>0102 DC bus voltage</i> .   | 258                   |
|      | Motor current                            | Refer to parameter <i>0103 Motor current</i> .  | 259                   |
|      | Motor current %                          | Refer to parameter <i>0104 Motor current %</i> .  | 260                   |
|      | Motor slip est                           | Refer to parameter <i>0112 Motor slip est.</i>  | 268                   |
|      | Output voltage                           | Refer to parameter <i>0121 Output voltage</i> .   | 277                   |
|      | Motor torque                             | Refer to parameter <i>0122 Motor torque</i> .   | 278                   |
|      | Motor temperature                        | Refer to parameter <i>0123 Motor temperature</i> .  | 279                   |
|      | Output power                             | Refer to parameter <i>0128 Output power</i> .   | 284                   |
| 1501 | <b>AO1 output max</b>                    | Define the maximum AO1 output.  | 10.000V               |
|      | [0.000mA, 20.000mA]<br>[0.000V, 10.000V] | The value range and the unit are determined by the parameter <i>1508 AO1 output type</i> .  | -                     |
| 1502 | <b>AO1 output min</b>                    | Define the minimum AO1 output.  | 0.000V                |
|      | [0.000mA, 20.000mA]<br>[0.000V, 10.000V] | The value range and the unit are determined by the parameter <i>1508 AO1 output type</i> .  | -                     |
| 1503 | <b>AO1 source max</b>                    | Define the maximum value of the signal selected via the parameter <i>1500 AO1 source</i> . See parameter <i>1507 AO1 output mode</i> for corresponding output value of AO1. | 15000                 |
|      | [-32768, 32767]                          |   | -                     |
| 1504 | <b>AO1 source min</b>                    | Define the minimum value of the signal selected via the parameter <i>1500 AO1 source</i> . See parameter <i>1507 AO1 output mode</i> for corresponding output value of AO1. | 0                     |
|      | [-32768, 32767]                          |   | -                     |

| No.  | Name / Value           | Analog output and pulse output   | Default       |
|------|------------------------|--|---------------|
| 1505 | <b>AO1 sim data</b>    | Set the output voltage or current of AO1 when simulation enabled.<br>[0mA, 20.000mA]<br>[0V, 10.000V]  | 10.000V       |
|      |                        |  | -             |
| 1506 | <b>AO1 sim enable</b>  | The value of the analog output can be overridden for eg. testing purposes. A forced value parameter (1505 AO1 sim data) is provided for the analog output, and its value is applied whenever the corresponding value this parameter is "Enable". | Disable = [0] |
|      | Disable                | The output voltage or current of AO1 depends on the actual value of the signal source.   | 0             |
|      | Enable                 | Force AO1 to value of parameter <i>1505 AO1 sim data</i> .   | 1             |
| 1507 | <b>AO1 output mode</b> | The output mode determines the correspondence between the maximum and minimum values of the AO1 signal source and the AO1 output.  | Normal = [0]  |
|      | Normal                 | Keep the symbol bit of the signal source.<br>● AO1 maximum output corresponds to the maximum value of the signal source.<br>● AO1 minimum output corresponds to the minimum value of the signal source.  | 0             |
|      | Absolute               | Take the absolute value of the signal source.<br>● AO1 maximum output corresponds to the maximum absolute value of the maximum value and the minimum value.<br>● AO1 minimum output corresponds to 0.  | 1             |
| 1508 | <b>AO1 output type</b> | AO1 output type, must be consistent with the jumper of the control board.<br><b>Note:</b> To achieve 4~20mA output, please set the parameter <i>1502 AO1 output min</i> to 4.000mA.  | Voltage = [0] |
|      | Voltage                | Move the jumper to "V" side.   | 0             |
|      | Current                | Move the jumper to "I" side.   | 1             |
| 1509 | <b>AO1 filter time</b> | Define the filter time constant of AO1.  | 0.1s          |
|      | [0.01s, 10.00s]        | Filter time constant.  | -             |

| No.  | Name / Value  | Analog output and pulse output   | Default                 |
|------|---|--|-------------------------|
| 1510 | <b>AO2 source</b>   | Select a signal to be connected to AO2.<br>For the available selections, see parameter <i>1500 AO1 source</i> .  | Motor current % = [260] |
| 1511 | <b>AO2 output max</b><br>[0.000mA, 20.000mA]<br>[0.000V, 10.000V] | Define the maximum value of the AO2 output.<br>The range value and the unit determined by the parameter <i>1518 AO2 output type</i> .  | 10.000V<br>-            |
| 1512 | <b>AO2 output min</b><br>[0.000mA, 20.000mA]<br>[0.000V, 10.000V] | Define the minimum value of the AO2 output.<br>The range value and the unit determined by the parameter <i>1518 AO2 output type</i> .  | 0.000V<br>-             |
| 1513 | <b>AO2 source max</b><br>[-32768, 32767]                          | Define the maximum value of the signal selected by the parameter <i>1510 AO2 source</i> .<br>See parameter <i>1517 AO2 output mode</i> for corresponding AO2 output value.   | 15000<br>-              |
| 1514 | <b>AO2 source min</b><br>[-32768, 32767]                          | Define the minimum value of the signal selected by the parameter <i>1510 AO2 source</i> . See parameter <i>1517 AO2 output mode</i> for corresponding AO2 output value.  | 0<br>-                  |
| 1515 | <b>AO2 sim data</b>   | Simulation data of analog AO2.<br>See parameter <i>1505 AO1 sim data</i> .   | 10.000V                 |
| 1516 | <b>AO2 sim enable</b>   | Simulation enable of analog AO2.<br>See parameter <i>1506 AO1 sim enable</i> .   | Disable = [0]           |
| 1517 | <b>AO2 output mode</b>  | The output mode determines the correspondence between the maximum and minimum values of the AO2 signal source and the AO2 output.<br>For the selections, see parameter <i>1507 AO1 output mode</i> .   | Normal = [0]            |
| 1518 | <b>AO2 output type</b>  | AO2 output type, must be consistent with the jumper of the control board.<br><b>Note:</b> To achieve 4~20mA output, please set the parameter <i>1512 AO2 output min</i> to 4.000mA.<br>For the available selections, see parameter <i>1508 AO1 output type</i> . | Voltage = [0]           |
| 1519 | <b>AO2 filter time</b><br>[0.01s, 10.00s]                         | Define the filter time constant of AO2.<br>Filter time constant.   | 0.1s<br>-               |

| No.  | Name / Value                | Description  | Default       |
|------|-----------------------------|--|---------------|
| 1520 | <b>Freq out source</b>      | Select a signal to be connected to pulse output.<br>For the available selections, see parameter 1500 <i>A01 source</i> .<br><b>Note:</b> to use the frequency output function, user need to set the parameter 1528 <i>Freq out enable</i>                                  | 0             |
| 1521 | <b>Freq out max</b>         | Maximum frequency of high-speed pulse output.  | 10000Hz       |
|      | [0Hz, 60000Hz]              |  | -             |
| 1522 | <b>Freq out min</b>         | Minimum frequency of high-speed pulse output.  | 0 Hz          |
|      | [0Hz, 60000Hz]              |  | -             |
| 1523 | <b>Freq out src max</b>     | The actual signal value corresponding to the maximum frequency output value.   | 15000         |
|      | [-32768, 32767]             |  | -             |
| 1524 | <b>Freq out src min</b>     | The actual signal value corresponding to the minimum frequency output value.   | 0             |
|      | [-32768, 32767]             |  | -             |
| 1525 | <b>Freq out sim enable</b>  | In debugging or other applications occasion, user can enable the simulation function of the frequency output via this parameter.<br><b>Note:</b> to use this function, user need to enable the high-speed pulse output function by parameter 1528 <i>Freq out enable</i> . | Disable = [0] |
|      | Disable                     | The output frequency depends on the actual signal value.   | 0             |
|      | Enable                      | The output frequency depends on the set value of the parameter 1526 <i>Freq out sim data</i> .   | 1             |
| 1526 | <b>Freq out sim data</b>    | When the frequency output simulation is enabled, set its output frequency.   | 10000 Hz      |
|      | [0Hz, 60000Hz]              |  | -             |
| 1527 | <b>Freq out filter time</b> | Define the filter time constant of the frequency output.   | 0.1s          |
|      | [0.01s, 10.00s]             | Filter time constant.  | -             |
| 1528 | <b>Freq out enable</b>      | User can enable the frequency output via this parameter.   | Disable = [0] |
|      | Disable                     | Frequency output function disabled.  | 0             |
|      | Enable                      | Frequency output function enabled.   | 1             |

## 16 System

| No.  | Name / Value          | Description   | Default              |
|------|-----------------------|---|----------------------|
| 1600 | <b>Local lock</b>     | Select the signal source of inhibiting local control (LOC/REM button on the control panel). 0: local control permitted, 1: local control inhibited.                               | CONST.FALSE<br>= [0] |
|      | P.01.00.00            | User defined pointer (parameter bit pointer).   | -                    |
|      | CONST.FALSE           | Always be 0   | 0                    |
|      | CONST.TRUE            | Always be 1   | 1                    |
|      | DI1                   | Digital input DI1 ( <i>0200 DI state, bit 0</i> )   | 2048                 |
|      | DI2                   | Digital input DI2   | 2049                 |
|      | DI3                   | Digital input DI3   | 2050                 |
|      | DI4                   | Digital input DI4   | 2051                 |
|      | DI5                   | Digital input DI5   | 2052                 |
|      | DI6                   | Digital input DI6   | 2053                 |
|      | DI7                   | Digital input DI7   | 2054                 |
| 1601 | <b>Parameter lock</b> | Select the status of the parameter lock. The parameter lock prevents the parameter from being modified.   | Open=<br>[0]         |
|      | Open                  | Parameter lock open. Parameter values can be modified.  | 0                    |
|      | Locked                | Locked. The parameter values cannot be modified from the control keyboard.  | 1                    |
|      | Not saved             | Parameters lock open. User can modify the parameter values, but changes will not be saved if the power is cut off.  | 2                    |
| 1602 | <b>Pass code</b>      | Enter different passwords to obtain different parameters access rights.   | 0                    |
|      | [0, 65535]            |   | -                    |
| 1603 | <b>Param restore</b>  | Restore the default value of the parameters. This parameter is automatically restored to 0 only after the operation is complete. Affects only the currently active parameter set. | Done=<br>[0]         |
|      | Done                  | No action or parameter restore completed.   | 0                    |
|      | Default               | Restore to custom defaults, excluding motor and encoder related parameters.   | 1                    |
|      | Clear all             | Restore all parameters to the custom defaults.  | 2                    |
|      | Factory               | Reserved for manufacturers.   | 3                    |

| No.                          | Name / Value  | Description   | Default                      |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |
|------------------------------|---|---|------------------------------|------------------------------|-----------------------------|---|---|-------------------------|---|---|-------------------------|---|---|-------------------------|---|---|-------------------------|
| 1604                         | <b>Param save manual</b>                                  | Save the parameters manually. This parameter is automatically restored to 0 after the operation is complete.<br>Affects only the currently active parameter set.  | Done=[0]                     |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |
|                              | Done  | No action or parameter save completed.  | 0                            |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |
|                              | Save  | Request to save the parameters to the memory, next time will be automatically restored when power on.   | 1                            |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |
| 1605                         | <b>Param set sel</b>                                      | Load the specified parameter set to the current active parameter set, or save the current active parameter set to the specified parameter set. This parameter is automatically restored to 0 when the operation is completed.   | No request=[0]               |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |
|                              | No request  | No request or operation completed.  | 0                            |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |
|                              | Load by I/O   | The parameter set 1~4 is selected by a combination of parameter <i>1608 Para set in1</i> (Parameter set switch input 1) and <i>1609 Para set in2</i> (Parameter set switch input 2)<br>Combined selection parameter set 1~4:<br><table border="1"> <tr> <th>Parameter set input 1 status</th> <th>Parameter set input 2 status</th> <th>Selected user parameter set</th> </tr> <tr> <td>0</td> <td>0</td> <td>Load the parameter set1</td> </tr> <tr> <td>1</td> <td>0</td> <td>Load the parameter set2</td> </tr> <tr> <td>0</td> <td>1</td> <td>Load the parameter set3</td> </tr> <tr> <td>1</td> <td>1</td> <td>Load the parameter set4</td> </tr> </table> | Parameter set input 1 status | Parameter set input 2 status | Selected user parameter set | 0 | 0 | Load the parameter set1 | 1 | 0 | Load the parameter set2 | 0 | 1 | Load the parameter set3 | 1 | 1 | Load the parameter set4 |
| Parameter set input 1 status | Parameter set input 2 status                              | Selected user parameter set   |                              |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |
| 0                            | 0   | Load the parameter set1   |                              |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |
| 1                            | 0   | Load the parameter set2   |                              |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |
| 0                            | 1   | Load the parameter set3   |                              |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |
| 1                            | 1   | Load the parameter set4   |                              |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |
| Load set 1                   | Load parameter set 1 to the current active parameter set. | 2   |                              |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |
| Load set2                    | Load parameter set 2 to the current active parameter set. | 3   |                              |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |
| Load set3                    | Load parameter set 3 to the current active parameter set. | 4   |                              |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |
| Load set4                    | Load parameter set 4 to the current active parameter set. | 5   |                              |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |
| Save to set 1                | Save current active parameter set to parameter set1.      | 6   |                              |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |
| Save to set2                 | Save current active parameter set to parameter set2.      | 7   |                              |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |
| Save to set3                 | Save current active parameter set to parameter set3.      | 8   |                              |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |
| Save to set4                 | Save current active parameter set to parameter set4.      | 9   |                              |                              |                             |   |   |                         |   |   |                         |   |   |                         |   |   |                         |

| No.  | Name / Value          | Description  | Default            |
|------|-----------------------|--|--------------------|
| 1608 | <b>Param set in1</b>  | This parameter is valid only when the parameter <i>1605 Param set sel</i> is set to 1 (Load by IO).  | CONST. FALSE = [0] |
|      | P.01.00.00            | User defined pointer (parameter bit pointer).  | -                  |
|      | CONST.FALSE           | Always be 0  | 0                  |
|      | CONST.TRUE            | Always be 1  | 1                  |
|      | DI1                   | Digital input DI1 ( <i>parameter 0200 DI status, bit 0</i> )   | 2048               |
|      | DI2                   | Digital input DI2  | 2049               |
|      | DI3                   | Digital input DI3  | 2050               |
|      | DI4                   | Digital input DI4  | 2051               |
|      | DI5                   | Digital input DI5  | 2052               |
|      | DI6                   | Digital input DI6  | 2053               |
|      | DI7                   | Digital input DI7  | 2054               |
| 1609 | <b>Param set in2</b>  | This parameter is valid only when the parameter <i>1605 Param set sel</i> is set to 1 (Load by IO). for available selections, see parameter <i>1608 Param set in1</i> .                  | CONST. FALSE = [0] |
| 1610 | <b>Set as default</b> | Set the current value of all parameters to default value. This parameter will automatically restore to 0 when the operation is completed. <i>Refer to parameter 1603 Param restore</i> . | Done = [0]         |
|      | Done                  | No request or operation completed.   | 0                  |
|      | Save as default       | Request to save the current value of all parameters as custom default value.   | 1                  |

| No.  | Name / Value           | Description  | Default         |
|------|------------------------|--|-----------------|
| 1611 | <b>Fan on temp</b>     | Temperature value at cooling fan is turned on.<br>[0.0, 150.0°C]   | 40.0°C          |
|      |                        |  |                 |
| 1612 | <b>Fan off temp</b>    | Temperature value at cooling fan is turned off.<br>[0.0, 150.0°C]  | 30.0°C          |
|      |                        |  |                 |
| 1613 | <b>Fan off delay</b>   | Delay time of fan off after shutdown when using the operating signal to control the fan.<br>[0.0, 6553.5s]   | 30.0s           |
|      |                        |  |                 |
| 1614 | <b>Fan ctrl mode</b>   | Control mode of the cooling fan.   | Auto = [0]      |
|      | Auto                   | The fan operates automatically according to the temperature of the radiator.                                 | 0               |
|      | On while run           | The fan runs, when drive running. When the drive stops, fan stops after delay.                               | 1               |
|      | Always on              | Fan always runs.   | 2               |
|      | Always off             | Fan always stops. Be careful: select this mode may cause overheating.  | 3               |
| 1615 | <b>System reboot</b>   | System manual reset request. This parameter is automatically restored to 0 after the operation is completed. | No Request =0   |
|      | No request             | No request or reset completed.   | 0               |
|      | Reboot request         | Request reset.   | 1               |
| 1616 | <b>System language</b> | System language setting.   | Chinese = [ 1 ] |
|      | English                | Choose English as system language.   | 0               |
|      | Chinese                | Choose Chinese as system language.   | 1               |

## 17 Data logger

| No.  | Name / Value            | Description  | Default        |
|------|-------------------------|--|----------------|
| 1700 | <b>Data log enables</b> | Enable of the function of the software oscilloscope.   | Enable = [ 1 ] |
|      | Disable                 | Turn off the oscilloscope can save CPU resources.  | 0              |
|      | Enable                  | Enable oscilloscope  | 1              |
| 1701 | <b>Acquire mode</b>     | The data acquisition mode of the oscilloscope is consistent with the usage method of the physical  | Normal = [ 1 ] |
|      | Auto                    | No need to trigger the signal, the oscilloscope has been taking sample.  | 0              |
|      | Normal                  | Normal trigger mode. Collection will start each time the trigger condition is satisfied, until the entire screen updated.  | 1              |
|      | Single                  | Single trigger mode. Collection will start when the trigger condition is satisfied and will stop automatically when the collection is completed, waiting for the waveform to read.   | 2              |
| 1702 | <b>Sample rate</b>      | Data sampling rate, i.e. the number of points collected in 1 second. If 1000 represents a collection of 1000 points per second, that is one data per 1ms for collection. If the parameter exceeds the carrier frequency by 2 times, then the actual sampling rate will drop to 2 times of the carrier frequency. | 1000Hz         |
|      | [ 10Hz, 24000Hz]        | Sampling rate.   |                |
| 1703 | <b>CH1 source</b>       | Selection of the signal source for oscilloscope channel 1  | Iu             |
| 1704 | <b>CH2 source</b>       | Selection of the signal source for oscilloscope channel 2.   | Iv             |
| 1705 | <b>CH3 source</b>       | Selection of the signal source for oscilloscope channel 3.   |                |
| 1706 | <b>CH4 source</b>       | Selection of the signal source for oscilloscope channel 4.   |                |
| 1707 | <b>CH5 source</b>       | Selection of the signal source for oscilloscope channel 5.   |                |
| 1708 | CH6 source              | Selection of the signal source for oscilloscope channel 6.   |                |
| 1709 | CH7 source              | Selection of the signal source for oscilloscope channel 7.   |                |
| 1710 | CH8 source              | Selection of the signal source for oscilloscope channel 8.   |                |

| No.  | Name / Value             | Description  | Default             |
|------|--------------------------|--|---------------------|
| 1711 | <b>Trigger source</b>    | Selection of the signal source for oscilloscope trigger channel.   |                     |
| 1712 | <b>Force trig</b>        | Forced trigger request.  | Done = [0]          |
|      | Done                     | Completed.   | 0                   |
|      | Force trig               | Forced trigger request.  | 1                   |
| 1713 | <b>Trig level</b>        | Set the trigger level. This parameter does not work in auto-trigger mode.  | 0                   |
|      | [-32768, 32767]          | Set trigger level.   | -                   |
| 1714 | <b>Event trig source</b> | Select the event triggered signal source. 0: No trigger, 1: trigger.   | CONST.FALSE E = [0] |
|      | P.01.00.00               | User defined pointer (parameter bit pointer).  | -                   |
|      | CONST.FALSE              | Always be 0  | 0                   |
|      | CONST.TRUE               | Always be 1  | 1                   |
| 1715 | <b>Trig edge sel</b>     | The trigger edge setting, which is used for the signal source of the trigger, is specified by the parameter <i>1711 Trigger source</i> .   | Rising = [0]        |
|      | Rising                   | Rising edge trigger acquisition.   | 0                   |
|      | Falling                  | Falling edge trigger acquisition.  | 1                   |
|      | Both                     | Rising and falling edge trigger acquisition.   | 2                   |
| 1716 | <b>Event edge sel</b>    | The event edge setting used for trigger is specified by the parameter <i>1714 Event trig source</i> . Refer to the parameter <i>1715 Trig edge sel</i> for relevant available options.                       | Rising = [0]        |
| 1717 | <b>Channel num</b>       | Setting for the number of channels of the oscilloscope.<br>When the number of channels is less than 8, the part of the parameters from <i>1703</i> ... <i>1710</i> does not work, by the front is preferred. | 6                   |
|      | [ 1, 8 ]                 | Channel number setting.  | -                   |
| 1718 | <b>Channel size</b>      | Data length of each channel. System automatically calculates, for PC use. Read only.   | -                   |

## 18 Fault log

| No.  | Name / Value              | Description   | Default |
|------|---------------------------|---|---------|
| 1800 | <b>Read index</b>         | The serial number of the fault record to be read. If you want to read the latest fault record, please set this parameter to 1. If you want to read the 10 <sup>th</sup> fault record, please set this parameter to 10.<br>[0, 99] | 0       |
| 1801 | <b>Fault record num</b>   | Indicates the total number of fault records.  | -       |
| 1802 | <b>Fault record clear</b> | Set this parameter to 1 and clear all fault records. This parameter is automatically restored to 0 when the operation is completed.   |         |
| 1803 | <b>Fault code</b>         | The fault record index read from <i>parameter 1800</i> will be stored in <i>parameter from 1803 to 1820</i> , which including the fault code, the length, the address and the content of fault information.                       |         |
| 1804 | <b>Fault info len</b>     |   |         |
| 1805 | <b>Fault info1 addr</b>   |   |         |
| 1806 | <b>Fault info1 data</b>   |   |         |
| 1807 | <b>Fault info2 addr</b>   |   |         |
| 1808 | <b>Fault info2 data</b>   |   |         |
| 1809 | <b>Fault info3 addr</b>   |   |         |
| 1810 | <b>Fault info3 data</b>   |   |         |
| 1811 | <b>Fault info4 addr</b>   |   |         |
| 1812 | <b>Fault info4 data</b>   |   |         |
| 1813 | <b>Fault info5 addr</b>   |   |         |
| 1814 | <b>Fault info5 data</b>   |   |         |
| 1815 | <b>Fault info6 addr</b>   |   |         |
| 1816 | <b>Fault info6 data</b>   |   |         |
| 1817 | <b>Fault info7 addr</b>   |   |         |
| 1818 | <b>Fault info7 data</b>   |   |         |
| 1819 | <b>Fault info8 addr</b>   |   |         |
| 1820 | <b>Fault info8 data</b>   |   |         |
| 1821 | <b>Fault code 1</b>       | The 1 <sup>st</sup> fault code (the latest first fault code).   |         |
| 1822 | <b>Fault code 2</b>       | The 2 <sup>nd</sup> latest fault code.  |         |
| 1823 | <b>Fault code 3</b>       | The 3 <sup>rd</sup> latest fault code.  |         |
| 1824 | <b>Fault code 4</b>       | The 4 <sup>th</sup> latest fault code.  |         |
| 1825 | <b>Fault code 5</b>       | The 5 <sup>th</sup> latest fault code.  |         |
| 1826 | <b>Fault code 6</b>       | The 6 <sup>th</sup> latest fault code.  |         |
| 1827 | <b>Fault code 7</b>       | The 7 <sup>th</sup> latest fault code.  |         |
| 1828 | <b>Fault code 8</b>       | The 8 <sup>th</sup> latest fault code.  |         |

## 19 Speed Calculation

| No.  | Name / Value             | Description  | Default |
|------|--------------------------|--|---------|
| 1900 | <b>Speed scaling</b>     | Define the final speed value for acceleration, as well as the initial speed value in deceleration. Similar to the maximum frequency of drives. | 1500rpm |
|      | [ 150rpm, 30000rpm]      |  |         |
| 1901 | <b>Speed filter time</b> | Define the filtering time of the speed feedback.   | 2.0ms   |
|      | [0.0ms, 10.0ms]          |  |         |
| 1902 | <b>Zero speed delay</b>  | Define the zero-speed holding time for acceleration stop.  | 0.5s    |
|      | [0.0s, 6000.0s]          |  |         |
| 1903 | <b>Zero speed level</b>  | Define the initial speed value of zero speed holding.  | 30rpm   |
|      | [0 rpm, 1500rpm]         |  |         |
| 1904 | <b>Speed window</b>      | Define the speed window range of the speed to reach.   | 30rpm   |
|      | [0rpm, 1500rpm]          |  |         |

## 20 Limits

| No.  | Name / Value            | Description  | Default              |
|------|-------------------------|--|----------------------|
| 2000 | <b>Maximum speed</b>    | Define the maximum allowed speed.  | 1500rpm              |
|      | [-30000rpm, 30000rpm]   | Maximum speed.   |                      |
| 2001 | <b>Minimum speed</b>    | Define the minimum allowed speed.  | -1500rpm             |
|      | [-30000rpm, 30000rpm]   | Minimum speed.   |                      |
| 2002 | <b>Pos speed enable</b> | Select the signal source of the corotation (speed given value is positive) to enable the command.<br>0: No positive rotation; 1: Allow positive rotation.  | CONST.TRUE<br>=[ 1 ] |
|      | P.01.00.00              | User defined pointer (parameter bit pointer)   | -                    |
|      | CONST.FALSE             | Always be 0  | 0                    |
|      | CONST.TRUE              | Always be 1  | 1                    |
|      | DI1                     | Digital input DI1( <i>0200 DI State, bit 0</i> )   | 2048                 |
|      | DI2                     | Digital input DI2  | 2049                 |
|      | DI3                     | Digital input DI3  | 2050                 |
|      | DI4                     | Digital input DI4  | 2051                 |
|      | DI5                     | Digital input DI5  | 2052                 |
|      | DI6                     | Digital input DI6  | 2053                 |
|      | DI7                     | Digital input DI7  | 2054                 |
| 2003 | <b>Neg speed enable</b> | Select the signal source of reverse (the speed given value is negative) enable command. 0: reverse inhibited 1: reverse allow. <i>Refer to parameter 2002 Pos speed enable for relevant available options.</i> | CONST.TRUE<br>=[ 1 ] |
| 2004 | <b>Torque ref max</b>   | Maximum value of the torque given. Relative to the rated torque of motor.  | 150.0%               |
|      | [0%, 300.0%]            |  |                      |
| 2005 | <b>Torque ref min</b>   | Minimum value of the torque given. Relative to the rated torque of motor.  | -150.0%              |
|      | [-300.0%, 0%]           |  |                      |
| 2006 | <b>Max motor torque</b> | The permitted maximum motor torque. Relative to the rated torque of motor.   | 150.0%               |
|      | [0.0%, 300.0%]          |  |                      |
| 2007 | <b>Max regen torque</b> | The permitted maximum generator torque. Relative to the rated torque of motor.   | 150.0%               |
|      | [0.0%, 300.0%]          |  |                      |

## 21 Speed Ref

| No.  | Name / Value           | Description  | Default              |
|------|------------------------|--|----------------------|
| 2100 | <b>Speed ref1 src</b>  | Select the signal source for the speed setpoint 1.<br>Also, can refer to parameter <i>2102 Speedref1 func.</i>   | AI1scaled<br>= [515] |
|      | P.01.00                | User-defined pointer (parameter pointer)   | -                    |
|      | Zero                   | Always zero  | 0                    |
|      | AI1 scaled             | Refer to parameter <i>0203 AI1 scaled.</i>   | 515                  |
|      | AI2 scaled             | Refer to parameter <i>0205 AI2 scaled.</i>   | 517                  |
|      | AI3 scaled             | Refer to parameter <i>0207 AI3 scaled.</i>   | 519                  |
|      | Freq in scaled         | Refer to parameter <i>0211 Freq in scaled.</i>   | 523                  |
|      | Control panel ref1     | Refer to parameter <i>0213 Control panel ref1.</i>   | 525                  |
|      | Control panel ref2     | Refer to parameter <i>0214 Control panel ref2.</i>   | 526                  |
|      | Fieldbus ref1          | Refer to parameter <i>0215 Fieldbus ref1.</i>  | 527                  |
|      | Fieldbus ref2          | Refer to parameter <i>0216 Fieldbus ref2.</i>  | 528                  |
|      | Motor potent out       | Refer to parameter <i>0301 Motor potent out.</i>   | 769                  |
|      | Const speed out        | Refer to parameter <i>0302 Const speed out.</i>  | 770                  |
|      | Process PID out        | Refer to parameter <i>0404 Process PID out.</i>  | 1028                 |
| 2101 | <b>Speed ref2 src</b>  | Select the signal source for the speed setpoint 2.<br>Refer to parameter <i>2100 Speed ref1 src</i> for relevant available options.  | AI2 scaled = [517]   |
| 2102 | <b>Speed ref1 func</b> | Define the mathematical function of the two reference signal synthesis speed setpoint2 which are selected by the parameter <i>2100 Speed ref1 src</i> and <i>2101 Speed ref2 src</i> . | Ref1 = [0]           |
|      | Ref1                   | The signal selected by the parameter <i>2100 Speed ref1 src</i> is used as the speed given value1.   | 0                    |
|      | Add<br>(Ref1 + Ref2)   | The sum of the two reference signals is used as the speed given1.  | 1                    |
|      | Sub<br>(Ref1-Ref2)     | The difference of the two reference signals is used as the speed given2 .  | 2                    |
|      | Mul<br>(Ref1xRef2)     | The product of the two reference signals is used as the speed given3.  | 3                    |
|      | Min                    | The small one of the two reference signals is used as the speed given4.  | 4                    |
|      | Max                    | The big one of the two reference signals is used as the speed given5.  | 5                    |
|      | Abs                    | Select the absolute value of Ref6.   | 6                    |

| No.  | Name / Value           | Description   | Default          |
|------|------------------------|---|------------------|
| 2103 | <b>Speed ref2 sel</b>  | Select the signal source switching between the speed reference 1 and speed reference 2.<br>0: Select the speed reference 1 defined by the parameter <i>2102 Speed ref func.</i><br>1: Select the speed reference 2 defined by the parameter <i>2101 Speed ref2 src.</i> | CONST.FALSE= [0] |
|      | P.01.00.00             | User-defined pointer (parameter bit pointer)  | -                |
|      | CONST.FALSE            | Always be 0   | 0                |
|      | CONST.TRUE             | Always be 1   | 1                |
|      | DI1                    | Digital input DI1 ( <i>0200 DI status, bit 0</i> )  | 2048             |
|      | DI2                    | Digital input DI2   | 2049             |
|      | DI3                    | Digital input DI3   | 2050             |
|      | DI4                    | Digital input DI4   | 2051             |
|      | DI5                    | Digital input DI5   | 2052             |
|      | DI6                    | Digital input DI6   | 2053             |
|      | DI7                    | Digital input DI7   | 2054             |
| 2104 | <b>Speed ref share</b> | The conversion factor for the speed reference.  | 1.000            |
|      | [-10.000, 10.000]      | Speed given conversion factor.  |                  |
| 2105 | <b>Speed ref JOG1</b>  | The speed reference of jogging 1.   | 150rpm           |
|      | [-30000rpm, 30000rpm]  |   |                  |
| 2106 | <b>Speed ref JOG2</b>  | The speed reference of jogging 2.   | 300rpm           |
|      | [-30000rpm, 30000rpm]  |   |                  |

| No.  | Name / Value             | Description   | Default              |
|------|--------------------------|---|----------------------|
| 2107 | <b>Pot save mode</b>     | Select whether to retain the value of the potentiometer when the drive is powered off.  |                      |
|      | Reset                    | The value of the potentiometer will be reset when the drive is powered off.   | 0                    |
|      | Store                    | The value of the potentiometer will be retained after the drive is powered off.   | 1                    |
| 2108 | <b>Pot up source</b>     | Select the incremental instruction signal source of the electric potentiometer.<br>0 : No incremental instruction;<br>1: Has incremental instruction. Refer to parameter <i>2103 Speed ref2 sel</i> for relevant available options. | CONST.FALSE<br>= [0] |
| 2109 | <b>Pot down source</b>   | Select the descending instruction signal source of the electric potentiometer. 0 : No descending instruction; 1: Has descending instruction. Refer to parameter <i>2103 Speed ref2 sel</i> for relevant available options.          | CONST.FALSE<br>= [0] |
| 2110 | <b>Pot output max</b>    | The maximum output of the electric potentiometer.   | 1500rpm              |
|      | [0, 30000rpm]            |   |                      |
| 2111 | <b>Pot output min</b>    | The minimum output of the electric potentiometer.   | -1500rpm             |
|      | [-30000rpm, 0rpm]        |   |                      |
| 2112 | <b>Pot ramp time</b>     | The acceleration and deceleration time from the parameter 2110 to 2111 for the output of the electric potentiometer.  | 10.0s                |
|      | [0.1s, 100.0s]           |   |                      |
| 2113 | <b>Pot output</b>        | The real-time output of the electric potentiometer. Read-only.  |                      |
| 2114 | <b>Slow down spd ref</b> | Up or down speed limits value.  | 301rpm               |
|      | [0, 30000]               |   |                      |
| 2115 | <b>Up slow rqst</b>      | Signal source selection of the up-direction deceleration request.   | CONST TRUE           |
| 2116 | <b>Down slow rqst</b>    | Signal source selection of the down direction deceleration request.   | CONST TRUE           |

## 22 Speed Ref Ramp

| No.  | Name / Value           | Description   | Default         |
|------|------------------------|---|-----------------|
| 2200 | <b>Acc time1</b>       | Defines acceleration time 1 as the time required for the speed to change from zero to the speed defined by parameter <i>1900 Speed scaling</i> defined speed. | Model dependent |
|      |                        | [0.01s, 655.35s]  |                 |
| 2201 | <b>Dec time1</b>       | Defines deceleration time 1 as the time required for the speed to change from the speed defined by parameter <i>1900 Speed scaling</i> to zero.               | Model dependent |
|      |                        | [0.01s, 655.35s]  |                 |
| 2202 | <b>Acc time2</b>       | Acceleration time2  | Model dependent |
|      |                        | [0.01s, 655.35s]  |                 |
| 2203 | <b>Dec time2</b>       | Deceleration time2  | Model dependent |
|      |                        | [0.01s, 655.35s]  |                 |
| 2204 | <b>EM stop time</b>    | Emergency stop time   | 1.00s           |
|      |                        | [0.01s, 655.35s]  |                 |
| 2205 | <b>Jog acc time</b>    | Jog acceleration time   | 5.00s           |
|      |                        | [0.01s, 655.35s]  |                 |
| 2206 | <b>Jog dec time</b>    | Jog deceleration time   | 5.00s           |
|      |                        | [0.01s, 655.35s]  |                 |
| 2207 | <b>Shape acc time1</b> | S Curve acceleration time 1   | 0.20s           |
|      |                        | [0.01s, 655.35s]  |                 |
| 2208 | <b>Shape acc time2</b> | S Curve acceleration time 2   | 0.20s           |
|      |                        | [0.01s, 655.35s]  |                 |
| 2209 | <b>Shape dec time1</b> | S Curve deceleration time1  | 0.20s           |
|      |                        | [0.01s, 655.35s]  |                 |
| 2210 | <b>Shape dec time2</b> | S Curve deceleration time2  | 0.20s           |
|      |                        | [0.01s, 655.35s]  |                 |
| 2211 | <b>Speed scaling</b>   | The same parameter <i>1900 Speed scaling</i> .  | 1500rpm         |

| No.  | Name / Value  | Description  | Default           |
|------|---------------|--|-------------------|
| 2212 | Ramp time sel | Selects the source that switches between the two sets of acceleration/deceleration ramp times defined by parameters 2200… 2203.<br>0 = Acceleration time 1 and deceleration time 1 are active<br>1 = Acceleration time 2 and deceleration time 2 are active. | CONST.FALSE = [0] |
|      | P.01.00.00    | User-defined pointer (parameter bit pointer)   | -                 |
|      | CONST.FALSE   | 0, always acceleration time 1 and deceleration time 1 are active.  | 0                 |
|      | CONST.TRUE    | 1, always acceleration time 2 and deceleration time 2 are active.  | 1                 |
|      | DI1           | Digital input DI1 ( <i>0200 DI State, bit 0</i> )  | 2048              |
|      | DI2           | Digital input DI2  | 2049              |
|      | DI3           | Digital input DI3  | 2050              |
|      | DI4           | Digital input DI4  | 2051              |
|      | DI5           | Digital input DI5  | 2052              |
|      | DI6           | Digital input DI6  | 2053              |
|      | DI7           | Digital input DI7  | 2054              |

## 23 Speed Control

| No.  | Name / Value      | Description   | Default |
|------|-------------------|---|---------|
| 2300 | <b>Speed Kp</b>   | Speed regulator Kp should be adjust according to rotating inertia of machines connecting with motor. For machines with large rotating inertia, please increase Kp value; for machines with small rotating inertia, please decrease Kp value. When Kp is greater than inertia, although the control response become quickly, but may cause speed oscillation. Reversely, if Kp setting is smaller than inertia, the control response will get slower and the time taken to adjust the speed to the stable value will longer. | 1.00    |
|      | [0.00, 30.00]     |   |         |
| 2301 | <b>Speed Ti</b>   | Speed regulator Ti defines the rate at which the speed controller output changes. The shorter the Ti setting, the faster the system responses. Too short Ti value may cause the system unstable.  | 60ms    |
|      | [0, 3000ms]       |   |         |
| 2302 | <b>Torque Kp</b>  | Defines the current regulator Kp. Vector control will control the motor output current and keep track the current.  | 1.00    |
|      | [0.00, 30.00]     |   |         |
| 2303 | <b>Droop rate</b> | Speed droop control rate used for speed droop control only. The function is used to keep the motor speed constant if load fluctuation or under heavy load.<br>100% means full slip gain;<br>0% means no slip gain.  | 0.0%    |
|      | [0.0, 1000.0%]    |   |         |

## 24 Torque Reference

| No.  | Name / Value           | Description   | Default               |
|------|------------------------|---|-----------------------|
| 2400 | <b>Torque ref1 src</b> | Select the signal source of torque reference 1.   | AI1 scaled<br>= [515] |
|      | P.01.00                | User-defined pointer (parameter pointer)  | -                     |
|      | Zero                   | Always zero   | 0                     |
|      | AI1 scaled             | See parameter <i>0203 AI1 scaled</i> .  | 515                   |
|      | AI2 scaled             | See parameter <i>0205 AI2 scaled</i> .  | 517                   |
|      | AI3 scaled             | See parameter <i>0207 AI3 scaled</i> .  | 519                   |
|      | Freq in scaled         | See parameter <i>0211 Freq in scaled</i> .  | 523                   |
|      | Control panel ref1     | See parameter <i>0213 Control panel ref1</i> .  | 525                   |
|      | Control panel ref2     | See parameter <i>0214 Control panel ref2</i> .  | 526                   |
|      | Fieldbus ref1          | See parameter <i>0215 Fieldbus ref1</i> .   | 527                   |
|      | Fieldbus ref2          | See parameter <i>0216 Fieldbus ref2</i> .   | 528                   |
|      | Const speed out        | See parameter <i>0302 Const speed out</i> .   | 770                   |
| 2401 | <b>Torque ref2 src</b> | Select the signal source of torque reference 2.<br>For available selections, see parameter <i>2400 Torque ref1 src</i> .  | AI2scaled = [517]     |
|      | <b>Torque ref func</b> | Define the calculation of the torque reference 1 ( <i>2400 Torque ref1 src</i> ) and torque reference 2 ( <i>2401 Torque ref2 src</i> ), the result is given as the final torque reference 1. | Ref1 = [0]            |
| 2402 | Ref1                   | The signal selected by <i>2400 Torque ref1 src</i> is used as the torque reference 1.   | 0                     |
|      | Add<br>(Ref1 + Ref2)   | The sum of the two reference signals is used as the torque reference 1.   | 1                     |
|      | Sub<br>(Ref1 - Ref2)   | The difference of the two reference signals is used as the torque reference 1.  | 2                     |
|      | Mul<br>(Ref1 * Ref2)   | The product of the two reference signals is used as the torque reference 1.   | 3                     |
|      | Min                    | The small one of the two reference signals is used as the torque reference 1.   | 4                     |
|      | Max                    | The big one of the two reference signals is used as the torque reference 1.   | 5                     |

| No.  | Name / Value              | Description   | Default              |
|------|---------------------------|---|----------------------|
| 2403 | <b>Torque ref2 sel</b>    | This parameter is used to select the torque reference 1 or the torque reference 2 as torque reference.<br>0: Select torque reference defined by parameter <i>2402 Torque ref func.</i><br>1: Select the torque reference defined by the parameter <i>2401 Torquer ref2 src.</i> | CONST.FALSE<br>= [0] |
|      | P.01.00.00                | User-defined pointer (parameter bit pointer)  | -                    |
|      | CONST.FALSE               | 0, the torque reference defined by parameter <i>2402 Torque ref func.</i>   | 0                    |
|      | CONST.TRUE                | 1, the torque reference defined by parameter <i>2401 Torquer ref2 src.</i>  | 1                    |
|      | DI1                       | Digital input DI1 ( <i>0200 DI Status, bit 0</i> )  | 2048                 |
|      | DI2                       | Digital input DI2   | 2049                 |
|      | DI3                       | Digital input DI3   | 2050                 |
|      | DI4                       | Digital input DI4   | 2051                 |
|      | DI5                       | Digital input DI5   | 2052                 |
|      | DI6                       | Digital input DI6   | 2053                 |
|      | DI7                       | Digital input DI7   | 2054                 |
| 2404 | <b>Torque load share</b>  | The torque reference distribution coefficient.  | 1.000                |
|      | [0.000, 10.000]           |   |                      |
| 2405 | <b>Torque acc time</b>    | The torque reference acceleration time.   | 0.10s                |
|      | [0.00, 655.35s]           |   |                      |
| 2406 | <b>Torque dec time</b>    | The torque reference deceleration time.   | 0.10s                |
|      | [0.00, 655.35s]           |   |                      |
| 2407 | <b>Torque filter time</b> | The torque reference filtering time.  | 1ms                  |
|      | [0, 10000ms]              |   |                      |
| 2408 | <b>Fric Trqstatic</b>     | The static friction compensation coefficient, relative to the motor rated torque.   | 0.0%                 |
|      | [0, 100.0%]               |   | 0.1%                 |
| 2409 | <b>Fric Trqslide</b>      | The sliding friction compensation coefficient, relative to the motor rated torque.  | 0.0%                 |
|      | [0, 100.0%]               |   | 0.1%                 |
| 2410 | <b>Inertial trq</b>       | The moment of the inertia compensation coefficient, relative to the motor rated torque.   | 0.0%                 |
|      | [0, 100.0%]               |   | 0.1%                 |

## 25 Critical Speed

| No.  | Name / Value           | Description  | Default      |
|------|------------------------|--|--------------|
| 2500 | <b>Crit speed 1 lo</b> | Defines the low limit for critical speed range 1.<br><b>Note:</b> this value must be less than or equal to the value of 2501 <i>Crit speed 1 hi</i> .    | 0            |
|      | [0, 30000rpm]          | Low limit for critical speed 1.  |              |
| 2501 | <b>Crits peed 1 hi</b> | Define the high limit for critical speed range 1.<br><b>Note:</b> this value must be greater than or equal to the value of 2500 <i>Crit speed 1 lo</i> . | 0            |
|      | [0, 30000rpm]          | High limit for critical speed 1.   |              |
| 2502 | <b>Crit speed 2 lo</b> | Defines the low limit for critical speed range 2.<br><b>Note:</b> this value must be less than or equal to the value of 2503 <i>Crit speed 2 hi</i> .    | 0            |
|      | [0, 30000rpm]          | Low limit for critical speed 2.  |              |
| 2503 | <b>Crit speed 2 hi</b> | Define the high limit for critical speed range 2.<br><b>Note:</b> this value must be greater than or equal to the value of 2502 <i>Crit speed 2 lo</i> . | 0            |
|      | [0, 30000rpm]          | High limit for critical speed 2.   |              |
| 2504 | <b>Crit speed 3 lo</b> | Defines the low limit for critical speed range 3.<br><b>Note:</b> this value must be less than or equal to the value of 2505 <i>Crit speed 3 hi</i> .    | 0            |
|      | [0, 30000rpm]          | Low limit for critical speed 3.  |              |
| 2505 | <b>Crit speed3 hi</b>  | Define the high limit for critical speed range 3.<br><b>Note:</b> this value must be greater than or equal to the value of 2504 <i>Crit speed 3 lo</i> . | 0            |
|      | [0, 30000rpm]          | High limit for critical speed 3  |              |
| 2506 | <b>Crits peed sel</b>  | Critical speed control   | Disable= [0] |
|      | Disable                | Critical speeds is disabled.   | 0            |
|      | Enable                 | Critical speeds is enabled.  | 1            |

## 26 Constant Speeds

| No.  | Name / Value   | Description   | Default  |
|------|----------------|---|----------|
| 2600 | Const speed 0  | When <i>2100 spd ref1 src</i> is set to [-30000rpm,30000rpm]  | 750 rpm  |
|      |                | P.03.02 Const speed out, it is possible to predefine 15 constant speeds in parameters 2600 … 2615. Constant speeds are selected through parameters 2618 … 2621. |          |
| 2601 | Const speed 1  |   | 1500 rpm |
| 2602 | Const speed 2  |   | 1500 rpm |
| 2603 | Const speed 3  |   | 1500 rpm |
| 2604 | Const speed 4  |   | 1500 rpm |
| 2605 | Const speed 5  |   | 0 rpm    |
| 2606 | Const speed 6  | The setting range and unit of parameters 2600 … 2615 are the same as parameter 2600.  | 0 rpm    |
| 2607 | Const speed 7  |   | 0 rpm    |
| 2608 | Const speed 8  |   | 0 rpm    |
| 2609 | Const speed 9  |   | 0 rpm    |
| 2610 | Const speed 10 |   | 0 rpm    |
| 2611 | Const speed 11 |   | 0 rpm    |
| 2612 | Const speed 12 |   | 0 rpm    |
| 2613 | Const speed 13 |   | 0 rpm    |
| 2614 | Const speed 14 |   | 0 rpm    |
| 2615 | Const speed 15 |   | 0 rpm    |

| No.  | Name / Value            | Description  | Default   |                        |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
|------|-------------------------|--|-----------|------------------------|------|------|------------------------|---|---|---|---|------------------|---|---|---|---|------------------|---|---|---|---|------------------|---|---|---|---|------------------|---|---|---|---|------------------|---|---|---|---|------------------|---|---|---|---|------------------|---|---|---|---|------------------|---|---|---|---|------------------|---|---|---|---|------------------|---|---|---|---|-------------------|---|---|---|---|-------------------|---|---|---|---|-------------------|---|---|---|---|-------------------|---|---|---|---|-------------------|---|---|---|---|-------------------|---|
| 2616 | <b>Const speed mode</b> | Define the multi-step speed mode.<br>Packed = [0]  |           |                        |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
|      | Packed                  | Four digital signals generate a total of 16 combinations, corresponding to multi step speeds of 0 … 15. The specific combination is as follows:<br><table border="1"> <thead> <tr> <th>Sel4</th><th>Sel3</th><th>Sel2</th><th>Sel1</th><th>Reference active</th></tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>Constant speed 0</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>1</td><td>Constant speed 1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>0</td><td>Constant speed 1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td><td>Constant speed 3</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>0</td><td>Constant speed 4</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>1</td><td>Constant speed 5</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>0</td><td>Constant speed 6</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>1</td><td>Constant speed 7</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>0</td><td>Constant speed 8</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td><td>Constant speed 9</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>0</td><td>Constant speed 10</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>1</td><td>Constant speed 11</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>0</td><td>Constant speed 12</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>1</td><td>Constant speed 13</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>0</td><td>Constant speed 14</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td><td>Constant speed 15</td></tr> </tbody> </table> | Sel4      | Sel3                   | Sel2 | Sel1 | Reference active       | 0 | 0 | 0 | 0 | Constant speed 0 | 0 | 0 | 0 | 1 | Constant speed 1 | 0 | 0 | 1 | 0 | Constant speed 1 | 0 | 0 | 1 | 1 | Constant speed 3 | 0 | 1 | 0 | 0 | Constant speed 4 | 0 | 1 | 0 | 1 | Constant speed 5 | 0 | 1 | 1 | 0 | Constant speed 6 | 0 | 1 | 1 | 1 | Constant speed 7 | 1 | 0 | 0 | 0 | Constant speed 8 | 1 | 0 | 0 | 1 | Constant speed 9 | 1 | 0 | 1 | 0 | Constant speed 10 | 1 | 0 | 1 | 1 | Constant speed 11 | 1 | 1 | 0 | 0 | Constant speed 12 | 1 | 1 | 0 | 1 | Constant speed 13 | 1 | 1 | 1 | 0 | Constant speed 14 | 1 | 1 | 1 | 1 | Constant speed 15 | 0 |
| Sel4 | Sel3                    | Sel2   | Sel1      | Reference active       |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 0    | 0                       | 0  | 0         | Constant speed 0       |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 0    | 0                       | 0  | 1         | Constant speed 1       |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 0    | 0                       | 1  | 0         | Constant speed 1       |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 0    | 0                       | 1  | 1         | Constant speed 3       |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 0    | 1                       | 0  | 0         | Constant speed 4       |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 0    | 1                       | 0  | 1         | Constant speed 5       |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 0    | 1                       | 1  | 0         | Constant speed 6       |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 0    | 1                       | 1  | 1         | Constant speed 7       |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 1    | 0                       | 0  | 0         | Constant speed 8       |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 1    | 0                       | 0  | 1         | Constant speed 9       |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 1    | 0                       | 1  | 0         | Constant speed 10      |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 1    | 0                       | 1  | 1         | Constant speed 11      |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 1    | 1                       | 0  | 0         | Constant speed 12      |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 1    | 1                       | 0  | 1         | Constant speed 13      |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 1    | 1                       | 1  | 0         | Constant speed 14      |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 1    | 1                       | 1  | 1         | Constant speed 15      |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
|      | Separate                | The specific combination of “Separate” is as follows:<br><table border="1"> <thead> <tr> <th>Sel4</th><th>Sel3</th><th>Sel2</th><th>Sel1</th><th>Speed reference active</th></tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>Constant speed 0</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>1</td><td>Constant speed 1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>-</td><td>Constant speed 1</td></tr> <tr><td>0</td><td>1</td><td>-</td><td>-</td><td>Constant speed 3</td></tr> <tr><td>1</td><td>-</td><td>-</td><td>-</td><td>Constant speed 4</td></tr> </tbody> </table>  | Sel4      | Sel3                   | Sel2 | Sel1 | Speed reference active | 0 | 0 | 0 | 0 | Constant speed 0 | 0 | 0 | 0 | 1 | Constant speed 1 | 0 | 0 | 1 | - | Constant speed 1 | 0 | 1 | - | - | Constant speed 3 | 1 | - | - | - | Constant speed 4 | 1 |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| Sel4 | Sel3                    | Sel2   | Sel1      | Speed reference active |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 0    | 0                       | 0  | 0         | Constant speed 0       |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 0    | 0                       | 0  | 1         | Constant speed 1       |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 0    | 0                       | 1  | -         | Constant speed 1       |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 0    | 1                       | -  | -         | Constant speed 3       |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 1    | -                       | -  | -         | Constant speed 4       |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
| 2617 | <b>Const speed out</b>  | Output of the multi segment speed.   | 0 rpm     |                        |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |
|      | [-30000rpm, 30000rpm]   | Actual output of the multi speed.  | Read-only |                        |      |      |                        |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                  |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |   |   |   |                   |   |

| No.  | Name / Value            | Description   | Default              |
|------|-------------------------|---|----------------------|
| 2618 | <b>Const speed sel1</b> | Signal source of the multi-step speed selection 1.<br>See parameter 2616 <i>Const speed mode</i> for details.               | CONST.FA<br>LSE= [0] |
|      | P.01.00.00              | User-defined pointer (parameter bit pointer)  | -                    |
|      | CONST.FALSE             | 0   | 0                    |
|      | CONST.TRUE              | 1   | 1                    |
|      | DI1                     | Digital input DI1 ( <i>0200 DI Status, bit 0</i> )  | 2048                 |
|      | DI2                     | Digital input DI2   | 2049                 |
|      | DI3                     | Digital input DI3   | 2050                 |
|      | DI4                     | Digital input DI4   | 2051                 |
|      | DI5                     | Digital input DI5   | 2052                 |
|      | DI6                     | Digital input DI6   | 2053                 |
|      | DI7                     | Digital input DI7   | 2054                 |
| 2619 | <b>Const speed sel2</b> | Signal source of the multi-step speed selection 2.<br>For available selections see parameter 2618 <i>Const speed sel1</i> . | CONST.FA<br>LSE= [0] |
| 2620 | <b>Const speed sel3</b> | Signal source of the multi-step speed selection 3.<br>For available selections see parameter 2618 <i>Const speed sel1</i> . | CONST.FA<br>LSE= [0] |
| 2621 | <b>Const speed sel4</b> | Signal source of the multi-step speed selection 4.<br>For available selections see parameter 2618 <i>Const speed sel1</i> . | CONST.FA<br>LSE= [0] |

## 27 Process PID

| No.  | Name / Value             | Description   | Default               |
|------|--------------------------|---|-----------------------|
| 2700 | <b>PID activate</b>      | Active the control of the process control PID.  | Disable = [0]         |
|      | Disable                  | Process control disabled.   | 0                     |
|      | Enable                   | Process control activated.  | 1                     |
| 2701 | <b>Reference source</b>  | Select a given signal source.   | P.27.02<br>= [6914]   |
|      | P.01.00                  | User-defined pointer (parameter pointer)  | -                     |
|      | Zero                     | Always zero   | 0                     |
|      | AI1 scaled               | Refer to parameter 0203 <i>AI1 scaled</i> .   | 515                   |
|      | AI2 scaled               | Refer to parameter 0205 <i>AI2 scaled</i> .   | 517                   |
|      | AI3 scaled               | Refer to parameter 0207 <i>AI3 scaled</i> .   | 519                   |
|      | Freq in scaled           | Refer to parameter 0211 <i>Freq in scaled</i> .   | 523                   |
|      | Control panel ref1       | Refer to parameter 0213 <i>Control panel ref1</i> .   | 525                   |
|      | Control panel ref2       | Refer to parameter 0214 <i>Control panel ref2</i> .   | 526                   |
|      | Fieldbus ref1            | Refer to parameter 0215 <i>Fieldbus ref1</i> .  | 527                   |
|      | Fieldbus ref2            | Refer to parameter 0216 <i>Fieldbus ref2</i> .  | 528                   |
| 2702 | <b>Ref internal</b>      | Internal digital reference for process control.   | 0                     |
|      | [ -32768, 32767 ]        |   |                       |
| 2703 | <b>Ref filter time</b>   | Reference filter time constant.   | 0.1s                  |
|      | [ 0.01s, 3.00s ]         |   | -                     |
| 2704 | <b>Reference actual</b>  | Actual reference value. Read-only.  |                       |
| 2705 | <b>Feedback func</b>     | Select the calculation of feedback signal source 1 and feedback signal source 2.  | Fbk1 = [0]            |
|      | Fbk1                     | Actual feedback = feedback 1.   | 0                     |
|      | Add                      | Actual feedback = feedback 1 + feedback 2.  | 1                     |
|      | Sub                      | Actual feedback = feedback 1 - feedback 2.  | 2                     |
|      | Min                      | Actual feedback = min (feedback 1, feedback 2).   | 3                     |
|      | Max                      | Actual feedback = max (feedback 1, feedback 2).   | 4                     |
| 2706 | <b>Feedback 1 source</b> | Select the source of feedback 1. Refer to parameter 2701 <i>Reference source</i> for relevant available options.        | AI1 scaled<br>= [515] |
| 2707 | <b>Feedback 2 source</b> | Select the signal source of feedback 2. Refer to parameter 2701 <i>Reference source</i> for relevant available options. | AI2 scaled<br>= [517] |

| No.  | Name / Value             | Description   | Default                     |
|------|--------------------------|---|-----------------------------|
| 2708 | <b>Feedback1 max</b>     | Set the maximum allowable value of feedback 1.<br>[-32768, 32767]   | 32767                       |
| 2709 | <b>Feedback1 min</b>     | Set the minimum allowable value of feedback 1.<br>[-32768, 32767]   | -32768                      |
| 2710 | <b>Feedback2 max</b>     | Set the maximum allowable value of feedback 2.<br>[-32768, 32767]   | 32767                       |
| 2711 | <b>Feedback2 min</b>     | Set the minimum allowable value of feedback 2.<br>[-32768, 32767]   | -32768                      |
| 2712 | <b>Feedback gain</b>     | Feedback gain factor.<br>[0.10, 10.00]  | 1.00                        |
| 2713 | <b>Fbk filter time</b>   | Filter time constant of the feedback.<br>[0.01s, 2.00s]   | 0.01s                       |
| 2714 | <b>Feedback actual</b>   | Actual value of the feedback. Read-only.  |                             |
| 2715 | <b>PID Kp</b>            | Proportional gain of PID<br>[0.01, 100.00]  | 1.00                        |
| 2716 | <b>PID Ti</b>            | PID integration time.<br>[0.10s, 20.00s]  | 1.00s                       |
| 2717 | <b>PID Td</b>            | PID differential time.<br>[0.00s, 20.00s]   | 0.00s                       |
| 2718 | <b>Deriv filter time</b> | Filtering time of differential quantity.<br>[0.01s, 20.00s]   | 1.00s                       |
| 2719 | <b>Error invert sel</b>  | Error is selected by the reverse mode.<br>Disable<br>Positive polarity, when the PID feedback is higher than the PID reference, decrease the PID output.<br>Enable<br>Negative polarity, when the PID feedback is higher than the PID reference, increase the PID output. | Disable = [0]<br>0<br>1     |
| 2720 | <b>Output trim mode</b>  | Format the output.<br>Direct<br>The output is not converted.<br>Speed<br>The output is converted to the speed.<br>Torque<br>The output is converted to torque.  | Direct = [1]<br>0<br>1<br>2 |
| 2721 | <b>Out max</b>           | The maximum allowable value of PID output.<br>[-32768, 32767]   | 1500                        |
| 2722 | <b>Out min</b>           | The minimum allowable value of PID output.<br>[-32768, 32767]   | -1500                       |

| No.  | Name / Value            | Description   | Default               |
|------|-------------------------|---|-----------------------|
| 2723 | <b>Bal enable sel</b>   | Balanced control enable signal.   | Disable = [0]         |
|      | Disable                 | Balance control is disabled.  | 0                     |
|      | Enable                  | Balance control is enabled.   | 1                     |
| 2724 | <b>Bal ref</b>          | Reference of balance control.   | 0                     |
|      | [-32768, 32767]         |   |                       |
| 2725 | <b>Sleep mode</b>       | Sleep mode.   | No sleep= [0]         |
|      | No sleep                | Sleep function disabled.  | 0                     |
|      | Sleep internal          | The sleep function is activated by process control.   | 1                     |
|      | Sleep external          | The sleep function is activated by external signal, and will be triggered when the actual speed is less than the value of parameter 2726 <i>Sleep level</i> . | 2                     |
|      | Sleep by error          | The sleep function is activated when the PID error is less than the value of parameter 2728 <i>wakeup level</i> .   | 3                     |
| 2726 | <b>Sleep level</b>      | The motor speed at which sleep begins.  | 900                   |
|      | [-32768, 32767]         |   |                       |
| 2727 | <b>Sleep delay</b>      | Delay time of sleep.  | 60.0s                 |
|      | [0.0, 6553.5s]          |   |                       |
| 2728 | <b>Wakeup level</b>     | The error level of wake up. Wake up when the PID error is greater than this value.  | 1000                  |
|      | [-32768, 32767]         |   |                       |
| 2729 | <b>Wakeup delay</b>     | Wake up delay time after sleep.   | 1.0s                  |
|      | [0.0, 6553.5s]          |   |                       |
| 2730 | <b>Sleep enable sel</b> | Defines a source that is used to activate the PID sleep function when parameter 2725 <i>Sleep mode</i> is set to "Sleep external".                            | CONST.FALSE<br>E= [0] |
|      | P.01.00.00              | User-defined pointer (parameter bit pointer)  | -                     |
|      | CONST.FALSE             | Always be 0.  | 0                     |
|      | CONST.TRUE              | Always be 1.  | 1                     |
|      | DI1                     | Digital input DI1 ( <i>0200 DI Status, bit 0</i> )  | 2048                  |
|      | DI2                     | Digital input DI2   | 2049                  |
|      | DI3                     | Digital input DI3   | 2050                  |
|      | DI4                     | Digital input DI4   | 2051                  |
|      | DI5                     | Digital input DI5   | 2052                  |
|      | DI6                     | Digital input DI6   | 2053                  |
|      | DI7                     | Digital input DI7   | 2054                  |

| No.  | Name / Value              | Description   | Default             |
|------|---------------------------|---|---------------------|
| 2731 | <b>Calc enable sel</b>    | Select the signal source of PID operation enable.<br>Selects a source that enables/disables process PID control.<br>0 = Process PID control disabled<br>1 = Process PID control enabled | Running<br>= [6148] |
|      | P.01.00.00                | User-defined pointer (parameter bit pointer)  | -                   |
|      | CONST.FALSE               | Always be 0   | 0                   |
|      | CONST.TRUE                | Always be 1   | 1                   |
|      | <b>Feedback loss mode</b> | Detection mode of PID feedback disconnection.   | Internal = [2]      |
| 2732 | Disable                   | No detection.   | 0                   |
|      | External                  | Detection by external terminal input.   | 1                   |
|      | Internal                  | Detection by judging the PID error.   | 2                   |
| 2733 | <b>Fbk loss min speed</b> | The minimum speed of the PID feedback disconnection detection.  | 30.0 rpm            |
|      | [0, 3000.0rpm]            |   |                     |
| 2734 | <b>Fbk loss src</b>       | Select the input terminal for the external feedback missing signal.<br>For available selections, see parameter 2730<br><i>Sleep enable sel</i> .  | False               |
| 2735 | <b>Fbk loss level</b>     | The error judgment level of PID feedback disconnection.   | 3000                |
|      | [0, 30000]                |   | -                   |
| 2736 | <b>Fbk loss delay</b>     | PID feedback disconnection fault delay.   | 2.0s                |
|      | [0, 60.0s]                |   |                     |

## 29 Timer Function

| No.  | Name / Value         | Description   | Default          |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
|------|----------------------|---|------------------|------|-------------|---|-----------------|-------------------------|---|-----------------|-------------------------|---|----------------|-------------------------|---|----------------|-----------------------|---|----------------|-----------------------|---|----------------|-----------------------|--|
| 2900 | <b>Timer enable</b>  | Activation the timer.   | Disable<br>= [0] |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
|      | Disable              | Timer not activated.  | 0                |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
|      | Enable               | Timer is activated.   | 1                |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
| 2901 | <b>Timer status</b>  | The state word of the timer.<br><br>The timer function can be configured by pointing to this parameter with a pointer.  |                  |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
|      |                      | <table border="1"> <thead> <tr> <th>bit</th><th>Name</th><th>Description</th></tr> </thead> <tbody> <tr> <td>0</td><td>Timer 1 compare</td><td>Timer 1 compare trigger</td></tr> <tr> <td>1</td><td>Timer 2 compare</td><td>Timer 2 compare trigger</td></tr> <tr> <td>2</td><td>Timer3 compare</td><td>Timer 3 compare trigger</td></tr> <tr> <td>3</td><td>Timer 1 period</td><td>Timer 1 cycle trigger</td></tr> <tr> <td>4</td><td>Timer 2 period</td><td>Timer 2 cycle trigger</td></tr> <tr> <td>5</td><td>Timer 3 period</td><td>Timer 3 cycle trigger</td></tr> </tbody> </table> | bit              | Name | Description | 0 | Timer 1 compare | Timer 1 compare trigger | 1 | Timer 2 compare | Timer 2 compare trigger | 2 | Timer3 compare | Timer 3 compare trigger | 3 | Timer 1 period | Timer 1 cycle trigger | 4 | Timer 2 period | Timer 2 cycle trigger | 5 | Timer 3 period | Timer 3 cycle trigger |  |
| bit  | Name                 | Description   |                  |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
| 0    | Timer 1 compare      | Timer 1 compare trigger   |                  |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
| 1    | Timer 2 compare      | Timer 2 compare trigger   |                  |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
| 2    | Timer3 compare       | Timer 3 compare trigger   |                  |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
| 3    | Timer 1 period       | Timer 1 cycle trigger   |                  |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
| 4    | Timer 2 period       | Timer 2 cycle trigger   |                  |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
| 5    | Timer 3 period       | Timer 3 cycle trigger   |                  |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
| 2902 | <b>Timer1 period</b> | The cycle of Timer 1, unit in minute.   | 1.0min           |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
|      | [0. 1min, 6553.5min] |   |                  |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
| 2903 | <b>Timer1 duty</b>   | Duty cycle of the Timer 1, unit is percentage.  | 50.0%            |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
|      | [0.0%, 100.0%]       |   |                  |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
| 2904 | <b>Timer2 period</b> | Cycle of the Timer 2, unit is minute.   | 1.0min           |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
|      | [0. 1min, 6553.5min] |   |                  |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
| 2905 | <b>Timer2 duty</b>   | Duty cycle of the Timer 2, unit is percentage.  | 50.0%            |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
|      | [0.0%, 100.0%]       |   |                  |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
| 2906 | <b>Timer3 period</b> | Cycle of the Timer 3, unit is minute.   | 1.0min           |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
|      | [0. 1min, 6553.5min] |   |                  |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
| 2907 | <b>Timer3 duty</b>   | Duty cycle of the Timer 3, unit is percentage.  | 50.0%            |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
|      | [0.0%, 100.0%]       |   |                  |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
| 2908 | <b>Long period</b>   | For long cycle mode, the unit of the timer cycle is minute; for short cycle mode, the unit of the timer cycle is second.  | Disable          |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
|      | Disable              | Short cycle mode, second.   | 0                |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |
|      | Enable               | Long cycle mode, minute.  | 1                |      |             |   |                 |                         |   |                 |                         |   |                |                         |   |                |                       |   |                |                       |   |                |                       |  |

## 30 Fault function

| No.  | Name / Value            | Description   | Default             |
|------|-------------------------|---|---------------------|
| 3000 | <b>Ext fault 1 src</b>  | Select the signal source for the external fault 1.<br>0: No external fault input<br>1: External fault input                 | CONST.FALSE<br>=[0] |
|      | P.01.00.00              | User-defined pointer (parameter bit pointer)  | -                   |
|      | CONST.FALSE             | Always be 0   | 0                   |
|      | CONST.TRUE              | Always be 1   | 1                   |
|      | DI1                     | Digital input DI1 ( <i>0200 DI Status, bit 0</i> )  | 2048                |
|      | DI2                     | Digital input DI2   | 2049                |
|      | DI3                     | Digital input DI3   | 2050                |
|      | DI4                     | Digital input DI4   | 2051                |
|      | DI5                     | Digital input DI5   | 2052                |
|      | DI6                     | Digital input DI6   | 2053                |
|      | DI7                     | Digital input DI7   | 2054                |
| 3001 | <b>Ext fault 2 src</b>  | Select the signal source for the external fault 2.<br>For available selections, see parameter 3000 <i>Ext fault 1 src</i> . | CONST.FALSE<br>=[0] |
| 3002 | <b>Groud fault act</b>  | Selects the action taken when a ground fault is detected.   | Fault = [ 1 ]       |
|      | No action               | No action.  | 0                   |
|      | Fault                   | Report fault.   | 1                   |
|      | Alarm                   | Report alarm.   | 2                   |
| 3003 | <b>Input phase loss</b> | Selects the action taken when an input phase fault is detected.   | Fault = [ 1 ]       |
|      | No action               | No action.  | 0                   |
|      | Fault                   | Report fault.   | 1                   |
|      | Alarm                   | Report alarm.   | 2                   |
| 3004 | <b>Motor phase loss</b> | Selects the action taken when motor phase loss is detected.   | Fault = [ 1 ]       |
|      | No action               | No action.  | 0                   |
|      | Fault                   | Report fault.   | 1                   |
|      | Alarm                   | Report alarm.   | 2                   |
| 3005 | <b>STO action</b>       | Activate or deactivate the STO function.  | Enable = [ 1 ]      |
|      | Disable                 | Disable the STO function.   | 0                   |
|      | Enable                  | Enable the STO function.  | 1                   |

| No.  | Name / Value            | Description   | Default       |
|------|-------------------------|---|---------------|
| 3006 | <b>OH alarm level</b>   | Setting the IGBT radiator overheating warning point.<br>When the set overheating warning point exceeds the allowable temperature of the drive, this value will be ignored and automatically warning at 5 degrees ahead of the over temperature value. | 90.0°C        |
|      | [40.0°C, 120.0°C]       | Overheat warning temperature point.   |               |
| 3007 | <b>Fault auto reset</b> | Activate or disable the fault automatic reset function by this parameter.   | Disable = [0] |
|      | Disable                 | Disable the fault automatic reset function.   | 0             |
|      | Enable                  | Enable the fault automatic reset function.  | 1             |
| 3008 | <b>Fault trial num</b>  | Number of times a fault reset trying is allowed.  | 5             |
|      | [1, 20]                 |   | -             |
| 3009 | <b>Fault trial wait</b> | Interval time of fault reset.   | 1.00s         |
|      | [0.01s, 150.00s]        |   |               |
| 3010 | <b>Trial cnt reset</b>  | Time interval for fault reset trying to clear the counter.  | 60.00s        |
|      | [0.01s, 150.00s]        |   |               |

| No.  | Name / Value               | Description   | Default |
|------|----------------------------|---|---------|
| 3011 | <b>Chop IGBT fault act</b> | Selects the action taken when brake IGBT fails.                             | Fault   |
|      | None                       | No action.  | 0       |
|      | Fault                      | Fault output.   | 1       |
|      | Alarm                      | Alarm output.   | 2       |
| 3012 | <b>Rb est</b>              | Estimated resistance value of the braking resistor, read-only.              | -       |
| 3013 | <b>Br thermal enable</b>   | Braking resistor thermal protection enable.                                 | Disable |
|      | Disable                    | Turn off.   | 0       |
|      | Enable                     | Enable braking resistor thermal protection.                                 | 1       |
| 3014 | <b>Br temp est</b>         | Estimated value of the temperature rise of the braking resistor. Read-only. | -       |
| 3015 | <b>Br max power</b>        | Set the rated power of the braking resistor.                                | 2.0kW   |
|      | [0, 3000.0kW]              |   | 0.1kW   |
| 3016 | <b>Br time constant</b>    | Set the thermal time constant of the braking resistor.                      | 60.0 s  |
|      | [0. 1s, 3000.0s]           |   | 0.1s    |
| 3017 | <b>Br temp rise</b>        | Set the rated temperature rise of the braking resistor.                     | 60.0°C  |
|      | [0.0s, 300.0s]             |   | 0.1 °C  |
| 3018 | <b>Br fault level</b>      | Set the overheat fault point of the braking resistor.                       | 150.0°C |
|      | [0.0, 300.0°C]             |   | 0.1 °C  |
| 3019 | <b>Br alarm level</b>      | Set the overheat alarm point of the braking resistor.                       | 120.0°C |
|      | [0.0, 300.0°C]             |   | 0.1 °C  |

## 31 Motor Therm Prot

| No.  | Name / Value    | Description   | Default         |
|------|-----------------|---|-----------------|
| 3100 | Protect action  | Selects the action taken when motor over temperature is detected.   | Fault = [ 1]    |
|      | No              | Motor thermal protection is not activated.  | 0               |
|      | Fault           | When the temperature is above the alarm / fault level defined by the parameters <i>3102 Alarm limit</i> / <i>3103 Fault limit</i> (whichever is lower), the drive will generate a MOTOR OH alarm or a MOTOR OH fault trip.  | 1               |
|      | Alarm           | When the motor temperature exceeds the alarm limit defined by the parameter <i>3102 Alarm limit</i> , the drive generates a MOTOR OH warning.   | 2               |
| 3101 | Temperature src | Select the temperature measurement method for the motor thermal protection. When the overheating is detected; the drive will react in accordance with the method defined by the parameter <i>3100 Protect action</i> .  | Estimated = [0] |
|      | Estimated       | Estimated motor temperature.<br>This model uses motor thermal time constant (parameter <i>3109 Therm time const</i> ) and motor load curve (parameters <i>3104...3108</i> ).<br>The motor temperature increases if it operates in the region above the load curve, and decreases if it operates in the region below the load curve.<br><b>WARNING!</b> The model cannot protect the motor if the motor does not cool properly because of dust, dirt, etc. | 0               |
|      | KTY84           | The motor temperature sensor is KTY84.  | 1               |
|      | PTC             | The motor temperature sensor is PTC.  | 2               |
|      | PT100_X1        | The motor temperature sensor is a PT100.  | 3               |
|      | PT100_X2        | The motor temperature sensor is two PT100s.   | 4               |
|      | PT100_X3        | The motor temperature sensor is three PT100s.   | 5               |

| No.  | Name / Value               | Description  | Default |
|------|----------------------------|--|---------|
| 3102 | <b>Alarm limit</b>         | Set the motor temperature warning point.<br>[0.0°C, 200.0°C]   | 120.0°C |
| 3103 | <b>Fault limit</b>         | Set motor temperature fault point.<br>[0.0°C, 200.0°C]   | 130.0°C |
| 3104 | <b>Ambient temp</b>        | Set the actual operating ambient temperature of the motor.<br>[0.0°C, 90.0°C]  | 40.0°C  |
| 3105 | <b>Motor nom load</b>      | Maximum load of the motor load curve.<br>[50.0%, 200.0%]   | 110.0%  |
| 3106 | <b>Zero speed load</b>     | Define the maximum motor load at zero speed on the load curve. If the motor is equipped with an external fan to enhance ventilation and cooling, a greater value may be set. Refer to the motor manufacturer's recommendations.<br>[50.0%, 100.0%]   | 70.0%   |
| 3107 | <b>Motor nom speed</b>     | Defines the break point speed of the load curve i.e. the point at which the motor load curve begins to decrease from the value of parameter 3105 <i>Nominal load</i> towards the value of 3106 <i>Zero speed load</i> .<br>[ 150rpm, 30000rpm]   | 1500rpm |
| 3108 | <b>Motor nom temp rise</b> | When the load of the motor reaches the rated current, define the temperature rise of the motor. When the parameter 3101 <i>Temperature src</i> is set as <i>Estimated</i> , the heating model of the motor will use the load curve.<br>Refer to the motor manufacturer's recommendations.<br>[ 10.0°C , 200.0°C] | 60.0°C  |
| 3109 | <b>Therm time const</b>    | Defining the thermal time constant of the motor thermal protection model (i.e. the time that the temperature rise to the 63% of the rated temperature rise).<br>Refer to the recommendations of the motor manufacturer.<br>[ 10.0s, 1800.0s]   | 1800.0s |

| No.  | Name / Value      | Description   | Default                |
|------|-------------------|---|------------------------|
| 3110 | External cool fan | For the variable frequency asynchronous motor or the synchronous motor, the cooling fan is independent, then the load capacity of zero speed is the same as that of the rated speed.<br>For the non-variable frequency motor, the motor comes with the fan and coaxial with the rotor, then need to be set to Auto cool. The correct setting is the premise of accurate temperature estimation. | External cool<br>= [0] |
|      | Auto cool         | Non variable frequency motor. The load capacity of zero speed is lower than that of the rated speed.  | 0                      |
|      | External fan      | External independent fan. The load capacity of zero speed is the same as that of the rated speed.   | 1                      |
| 3111 | Sensor input sel  | The signal input channel of the temperature sensor.<br>Be sure to change the corresponding analog input jump to voltage type input side.  | AI1 = [0]              |
|      | AI1               | The temperature sensor is connected to the analog input AI1.  | 0                      |
|      | AI2               | The temperature sensor is connected to the analog input AI2.  | 1                      |
|      | AI3               | The temperature sensor is connected to the analog input AI3.  | 2                      |
| 3112 | Sensor bias out   | The selection of bias current source for the temperature sensor. Be sure to change the corresponding analog output jumper to current type output side.  | AO1 = [0]              |
|      | AO1               | The temperature sensor is connected to the analog output AO1.   | 0                      |
|      | AO2               | The temperature sensor is connected to the analog output AO2.   | 1                      |

## 32 Factory Setting

| No.  | Name / Value        | Description   | Default           |
|------|---------------------|---|-------------------|
| 3204 | <b>Kp_vdc_max</b>   | Gain of the overvoltage controller, Q12.<br>[2048, 16384]                   | 4096<br>1         |
|      |                     |   |                   |
| 3205 | <b>Ki_vdc_max</b>   | Integral gain of the overvoltage stall controller, Q16.<br>[419, 16384]     | 1638<br>1         |
|      |                     |   |                   |
| 3206 | <b>Kp_vdc_max_f</b> | Gain of the overvoltage frequency controller, Q12.<br>[2048, 16384]         | 4096<br>1         |
|      |                     |   |                   |
| 3207 | <b>Ki_vdc_max_f</b> | Integral gain of the overvoltage frequency controller, Q16.<br>[419, 16384] | 1638<br>1         |
|      |                     |   |                   |
| 3208 | <b>Kp_fctrl</b>     | Gain of the open loop frequency controller, Q12.<br>[819, 16384]            | 2048<br>1         |
|      |                     |   |                   |
| 3209 | <b>Kp_vctrl</b>     | Gain of the open loop voltage controller, Q12.<br>[819, 16384]              | 2048<br>1         |
|      |                     |   |                   |
| 3210 | <b>AI1 gain</b>     | Analog input AI1 correction gain, Q12<br>[2048, 8192]                       | 4096<br>1         |
|      |                     |   |                   |
| 3211 | <b>AI1 offset</b>   | Analog input AI1 corrected offset, 1mV or 1mA<br>[-200, 200]                | 0<br>1mV / 1mA    |
|      |                     |   |                   |
| 3212 | <b>AI2 gain</b>     | Analog input AI2 correction gain, Q12<br>[2048, 8192]                       | 4096<br>1         |
|      |                     |   |                   |
| 3213 | <b>AI2 offset</b>   | Analog input AI2 corrected offset, 1mV or 1mA<br>[-200, 200]                | 0<br>1mV / 1mA    |
|      |                     |   |                   |
| 3214 | <b>AI3 gain</b>     | Analog input AI3 correction gain, Q12<br>[2048, 8192]                       | 4096<br>1         |
|      |                     |   |                   |
| 3215 | <b>AI3 offset</b>   | Analog input AI3 corrected offset, 1mV or 1mA<br>[-200, 200]                | 0<br>1mV / 1mA    |
|      |                     |   |                   |
| 3216 | <b>AO1 gain</b>     | Analog output AO1 correction gain, Q12<br>[2048, 8192]                      | 3805<br>1         |
|      |                     |   |                   |
| 3217 | <b>AO1 offset</b>   | Analog output AO1 corrected offset, 1mV or 1mA<br>[-200, 200]               | 45mV<br>1mV / 1mA |
|      |                     |   |                   |
| 3218 | <b>AO2 gain</b>     | Analog output AO2 correction gain, Q12<br>[2048, 8192]                      | 3805<br>1         |
|      |                     |   |                   |
| 3219 | <b>AO2 offset</b>   | Analog output AO2 corrected offset, 1mV or 1mA<br>[-200, 200]               | 45mV<br>1mV / 1mA |
|      |                     |   |                   |

## 33 Signal Generator

| No.  | Name / Value            | Description  | Default          |
|------|-------------------------|--|------------------|
| 3300 | <b>Signal generator</b> | Enable or disable signal generator function.   | Enable = [ 1 ]   |
|      | Disable                 | When this function is not required, please deactivate it to reduce CPU load.   | 0                |
|      | Enable                  | Enable.  | 1                |
| 3301 | <b>Signal waveform</b>  | Select the output signal waveform.   | Sinusoid = [ 0 ] |
|      | Sinusoid                | Output sine wave of the signal generator.  | 0                |
|      | Trapezoid               | Output trapezoidal wave of the signal generator.   | 1                |
| 3302 | <b>Signal output</b>    | Display the current output value of the monitoring signal, read only.<br>This parameter can be connected by a pointer. | 0                |
|      | [ -32768,32767 ]        |  | -                |
|      |                         |  |                  |
| 3303 | <b>Max output</b>       | Set the maximum output value of the signal.  | 1500             |
|      | [ -32768,32767 ]        |  | -                |
| 3304 | <b>Min output</b>       | Set the minimum output value of the signal.  | -1500            |
|      | [ -32768,32767 ]        |  | -                |
| 3305 | <b>Sinusoid period</b>  | Set the signal cycle of the sine wave.   | 3000 ms          |
|      | [ 8,30000 ]             |  | -                |
| 3306 | <b>Trape rise time</b>  | Set the rising time of the trapezoidal wave from low level to high level.  | 6000 ms          |
|      | [ 1,60000 ]             |  | -                |
| 3307 | <b>Trape fall time</b>  | Set the falling time of the trapezoidal wave from high level to low level.   | 6000 ms          |
|      | [ 1,60000 ]             |  | -                |
| 3308 | <b>Trape high time</b>  | Set the duration of the trapezoidal wave high level.   | 1.00 s           |
|      | [ 0.01,600.00 ]         |  | -                |
| 3309 | <b>Trape low time</b>   | duration of the trapezoidal wave low level.  | 1.00 s           |
|      | [ 0.01,600.00 ]         |  | -                |

## 34 Logic Function

| No.   | Name / Value            | Description   | Default              |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
|-------|-------------------------|---|----------------------|------|-------------|---|-------|-----------------------|---|-------|-----------------------|---|-------|-----------------------|---|-------|---------------------|---|-------|---------------------|---|-------|---------------------|---|--------|----------------|---|--------|----------------|---|--------|----------------|---|---------|----------------|----|---------|----------------|----|---------|----------------|-------|----------|----------|--|
| 3400  | <b>Logic status</b>     | Can be connected to any bit of the status word by a bit pointer.<br><table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Bit</th><th>Name</th><th>Description</th></tr> </thead> <tbody> <tr><td>0</td><td>Edge1</td><td>Edge counter 1 output</td></tr> <tr><td>1</td><td>Edge2</td><td>Edge counter 2 output</td></tr> <tr><td>2</td><td>Edge3</td><td>Edge counter 3 output</td></tr> <tr><td>3</td><td>Comp1</td><td>Comparator 1 output</td></tr> <tr><td>4</td><td>Comp2</td><td>Comparator 2 output</td></tr> <tr><td>5</td><td>Comp3</td><td>Comparator 3 output</td></tr> <tr><td>6</td><td>Logic1</td><td>Logic 1 output</td></tr> <tr><td>7</td><td>Logic2</td><td>Logic 2 output</td></tr> <tr><td>8</td><td>Logic3</td><td>Logic 3 output</td></tr> <tr><td>9</td><td>Ontime1</td><td>Timer 1 output</td></tr> <tr><td>10</td><td>Ontime2</td><td>Timer 2 output</td></tr> <tr><td>11</td><td>Ontime3</td><td>Timer 3 output</td></tr> <tr><td>12~15</td><td>Reserved</td><td>Reserved</td></tr> </tbody> </table> | Bit                  | Name | Description | 0 | Edge1 | Edge counter 1 output | 1 | Edge2 | Edge counter 2 output | 2 | Edge3 | Edge counter 3 output | 3 | Comp1 | Comparator 1 output | 4 | Comp2 | Comparator 2 output | 5 | Comp3 | Comparator 3 output | 6 | Logic1 | Logic 1 output | 7 | Logic2 | Logic 2 output | 8 | Logic3 | Logic 3 output | 9 | Ontime1 | Timer 1 output | 10 | Ontime2 | Timer 2 output | 11 | Ontime3 | Timer 3 output | 12~15 | Reserved | Reserved |  |
| Bit   | Name                    | Description   |                      |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
| 0     | Edge1                   | Edge counter 1 output   |                      |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
| 1     | Edge2                   | Edge counter 2 output   |                      |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
| 2     | Edge3                   | Edge counter 3 output   |                      |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
| 3     | Comp1                   | Comparator 1 output   |                      |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
| 4     | Comp2                   | Comparator 2 output   |                      |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
| 5     | Comp3                   | Comparator 3 output   |                      |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
| 6     | Logic1                  | Logic 1 output  |                      |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
| 7     | Logic2                  | Logic 2 output  |                      |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
| 8     | Logic3                  | Logic 3 output  |                      |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
| 9     | Ontime1                 | Timer 1 output  |                      |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
| 10    | Ontime2                 | Timer 2 output  |                      |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
| 11    | Ontime3                 | Timer 3 output  |                      |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
| 12~15 | Reserved                | Reserved  |                      |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
| 3401  | <b>Edge cnt 1 val</b>   | Display the count value of edge counter 1, read-only.   | 0                    |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
|       | [0, 65535]              |   | -                    |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
| 3402  | <b>Edge cnt 1 src</b>   | Selects the signal to be monitored by edge counter 1.   | CONST.FALSE<br>= [0] |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
|       | P.01.00.00              | User-defined pointer (parameter bit pointer)  | -                    |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
|       | CONST.FALSE             | Always be 0   | 0                    |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
|       | CONST.TRUE              | Always be 1   | 1                    |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
|       | DI1                     | Digital input DI1 ( <i>0200 DI Status, Position 0</i> )   | 2048                 |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
|       | DI2                     | Digital input DI2   | 2049                 |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
|       | DI3                     | Digital input DI3   | 2050                 |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
|       | DI4                     | Digital input DI4   | 2051                 |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
|       | DI5                     | Digital input DI5   | 2052                 |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
|       | DI6                     | Digital input DI6   | 2053                 |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
|       | DI7                     | Digital input DI7   | 2054                 |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
| 3403  | <b>Edge cnt 1 reset</b> | Select the reset signal of the edge counter 1. The value will be reset to 0 after reset. For available selections, see parameter 3402 Edge cnt1 src.  | CONST.FALSE<br>= [0] |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
| 3404  | <b>Edge cnt 1 edge</b>  | Select the count edge of the edge counter 1.  | Rising = [0]         |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
|       | Rising                  | Only rising edges are counted.  | 0                    |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
|       | Falling                 | Only falling edges are counted.   | 1                    |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |
|       | Both                    | Both rising edges and falling edges are counted.  | 2                    |      |             |   |       |                       |   |       |                       |   |       |                       |   |       |                     |   |       |                     |   |       |                     |   |        |                |   |        |                |   |        |                |   |         |                |    |         |                |    |         |                |       |          |          |  |

| No.  | Name / Value             | Description   | Default               |
|------|--------------------------|---|-----------------------|
| 3405 | <b>Edge cnt 1 duty</b>   | Set the duty cycle of the edge counter 1. The output of the edge counter 1 is display by the bit0 of parameter <i>3400 Logic status</i> . When the count value is less than the duty cycle, the output is 0; otherwise, the output is 1.<br>[0,65535] | 100<br>-              |
| 3406 | <b>Edge cnt 1 period</b> | Set the count cycle for the edge counter 1.<br><b>Note:</b> The period of the edge counter should not be less than its duty cycle.<br>[0,65535]   | 120<br>-              |
| 3407 | <b>Edge cnt 1 clear</b>  | Set the clear mode of the edge counter 1 .  | Disable = [0]         |
|      | Disable                  | Clear when the count value exceeds the value of 65535.  | 0                     |
|      | Enable                   | Clear when the count value reaches the cycle value.   | 1                     |
| ...  | ...                      | ...   | ...                   |
| 3415 | <b>Edge cnt3 val</b>     | Display the count value of edge counter 3, read-only. The value range and units and other descriptions see parameter <i>3401 Edge cnt1 val</i> .  | 0                     |
| 3416 | <b>Edge cnt3 src</b>     | Select the count signal source of the edge counter 3. For available selections, see parameter <i>3402 Edge cnt1 src</i> .   | CONST.FALS E<br>= [0] |
| 3417 | <b>Edge cnt3 reset</b>   | Select the reset signal source of edge counter 3. For available selections, see parameter <i>3402 Edge cnt1 src</i> .   | CONST.FALS E<br>= [0] |
| 3418 | <b>Edge cnt3 edge</b>    | Select the count value of the edge counter 3. For available selections, see parameter <i>3404 Edge cnt1 edge</i> .  | Rising = [0]          |
| 3419 | <b>Edge cnt3 duty</b>    | Set the duty cycle of the edge counter 3. The value range and units and other descriptions see parameter <i>3405 Edge cnt1 duty</i> .   | 100                   |
| 3420 | <b>Edge cnt3 period</b>  | Set the cycle of the edge counter 3. The value range and units and other descriptions see parameter <i>3406 Edge cnt1 period</i> .  | 120                   |
| 3421 | <b>Edge cnt3clear</b>    | Set the clear mode of the edge counter 3. For available selections, see parameter <i>3407 Edge cnt1</i>   |                       |

| No.  | Name / Value          | Description   | Default       |
|------|-----------------------|---|---------------|
| 3422 | <b>Comp 1 output</b>  | The output of the comparator 1, read only.<br>The output of the comparator 1 is also displayed in the bit3 of parameter <i>3400 Logic status</i> .  | 0             |
|      | [0, 1]                | The comparator using the hysteresis comparison mode by default. The hysteresis size $\Delta$ is determined by the parameter <i>3425 Comp1 range</i> . Initially, the comparator output is 0;<br>When the input A decreased to less than or equal to $B - \Delta$ , the output is reversed to 0;<br>When the input A increased to greater than or equal to the input $B + \Delta$ , the output is reversed to 1.<br>Enable the window comparison mode by the parameter <i>3428 Comp1 win</i> , the window size $\Delta$ is also determined by the parameter <i>3425 Comp1 range</i> .<br>When the input A is not less than $B - \Delta$ and no greater than the input $B + \Delta$ , the output is 1, otherwise the output is 0. | -             |
| 3423 | <b>Comp 1 A src</b>   | Select the input A signal source of comparator 1.   | Zero= [0]     |
|      | P.01.00               | User-defined pointer (parameter bit pointer)  | -             |
|      | Zero                  | Always zero.  | 0             |
| 3424 | <b>Comp 1 B val</b>   | Set the input B value of comparator 1.  | 120           |
|      | [-32767,32767]        |   | -             |
| 3425 | <b>Comp 1 range</b>   | Set the comparison range of comparator 1.   | 20            |
|      | [-32767,32767]        |   |               |
| 3426 | <b>Comp 1 in abs</b>  | Enable or disable the absolute value of the input A of comparator 1.  | Disable = [0] |
|      | Disable               | Disable   | 0             |
|      | Enable                | Enable  | 1             |
| 3427 | <b>Comp 1 out inv</b> | Enable or disable the inversion of comparator 1.<br>For available selections, see parameter <i>3426 Comp 1 in abs</i> .   | Disable = [0] |
| 3428 | <b>Comp 1 win</b>     | Enable or disable the window comparison mode of comparator 1. For available selections, see parameter <i>3426 Comp 1 in abs</i> .   | Disable = [0] |
| ...  | ...                   | ...   | ...           |

| No.  | Name / Value          | Description  | Default       |
|------|-----------------------|--|---------------|
| 3436 | <b>Comp 3 output</b>  | The output of the comparator 3, read only.<br>The output of the comparator 3 is also displayed in the bit5 of parameter <i>3400 Logic status</i> .<br>The value range and unit and other instructions see parameter <i>3422 Comp1 output</i> . | 0             |
| 3437 | <b>Comp 3 A src</b>   | Select the input A signal source of comparator 3.<br>For available selections, see parameter <i>3423 Comp1A src</i> .  | Zero= [0]     |
| 3438 | <b>Comp 3 B val</b>   | Set the input B value of comparator 3.<br>The value range and unit and other instructions see parameter <i>3424 Comp1B val</i> .   | 100           |
| 3439 | <b>Comp 3 range</b>   | Set the comparison range of comparator 3.<br>The value range and unit and other instructions see parameter <i>3425 Comp1 range</i> .   | 20            |
| 3440 | <b>Comp 3 in abs</b>  | Enable or disable the absolute value of the input A of comparator 3.<br>For available selections, see parameter <i>3426 Comp1 in abs</i> .   | Disable = [0] |
| 3441 | <b>Comp 3 out inv</b> | Enable or disable the inversion of comparator 3.<br>For available selections, see parameter <i>3426 Comp1 in abs</i> .   | Disable = [0] |
| 3442 | <b>Comp 3 win</b>     | Enable or disable the window comparison mode of comparator 3.<br>For available selections, see parameter <i>3426 Comp1 in abs</i> .  | Disable = [0] |

| No.  | Name / Value         | Description   | Default              |
|------|----------------------|---|----------------------|
| 3443 | <b>Logic 1 A src</b> | Select the input A signal source of logic 1.  | CONST.FALSE<br>= [0] |
|      | P.01.00.00           | User-defined pointer (parameter bit pointer.)   | -                    |
|      | CONST.FALSE          | Always be 0   | 0                    |
|      | CONST.TRUE           | Always be 1   | 1                    |
|      | DI1                  | Digital input DI1 ( <i>0200 DI State, bit 0</i> )   | 2048                 |
|      | DI2                  | Digital input DI2   | 2049                 |
|      | DI3                  | Digital input DI3   | 2050                 |
|      | DI4                  | Digital input DI4   | 2051                 |
|      | DI5                  | Digital input DI5   | 2052                 |
|      | DI6                  | Digital input DI6   | 2053                 |
|      | DI7                  | Digital input DI7   | 2054                 |
| 3444 | <b>Logic 1 B src</b> | Select the input B signal source of logic 1. For available selections, see parameter 3443 Logic1 A src.       | CONST.FALSE<br>= [0] |
| 3445 | <b>Logic 1 C src</b> | Select the input C signal source of logic 1. For available selections, see parameter 3443 Logic1 A src.       | CONST.FALSE<br>= [0] |
| 3446 | <b>Logic 1 func</b>  | Selection the function of logic 1. The Logic 1 output is displayed in bit6 of parameter 3400 Logic status.    | AND = [0]            |
|      | AND                  | Logic and   | 0                    |
|      | OR                   | Logic or  | 1                    |
|      | NOT                  | Logic non   | 2                    |
|      | XOR                  | Logic exclusive or  | 3                    |
|      | Toggle               | Logic reverse   | 4                    |
|      | NAND                 | Logic and non   | 5                    |
|      | ...                  | ...   | ...                  |
| 3451 | <b>Logic 3 A src</b> | Set the input A signal source of logic 3. For available selections, see parameter 3443 Logic1 A src.          | CONST.FALSE<br>= [0] |
| 3452 | <b>Logic 3 B src</b> | Set the input B signal source of logic 3. For available selections, see parameter 3443 Logic1 A src.          | CONST.FALSE<br>= [0] |
| 3453 | <b>Logic 3 C src</b> | Set the input C signal source of logic 3. For available selections, see parameter 3443 Logic1 A src.          | CONST.FALSE<br>= [0] |
| 3454 | <b>Logic 3 func</b>  | Selection the function of logic 3.<br>The Logic 3 output is displayed in bit8 of parameter 3400 Logic status. | AND = [0]            |

| No.  | Name / Value           | Description  | Default     |
|------|------------------------|--|-------------|
| 3455 | <b>Ontime 1 enable</b> | Select the enable signal source of the timer 1.  | CONST.FALSE |
|      | <b>src</b>             | When the enable signal is equal to 0, timer stops;<br>When the enable signal is equal to 1 , timer starts.   | = [0]       |
|      | P.01.00.00             | User-defined pointer (parameter bit pointer).  | -           |
|      | CONST.FALSE            | Always be 0  | 0           |
|      | CONST.TRUE             | Always be 1  | 1           |
|      | DI1                    | Digital input DI1 ( <i>0200 DI state, bit 0</i> )  | 2048        |
|      | DI2                    | Digital input DI2  | 2049        |
|      | DI3                    | Digital input DI3  | 2050        |
|      | DI4                    | Digital input DI4  | 2051        |
|      | DI5                    | Digital input DI5  | 2052        |
| 3456 | <b>Ontime1 comp</b>    | Set the comparison value of timer 1, units is 0.1s.  | 6553.5 s    |
|      | <b>val</b>             | Timer 1 output is displayed in bit 9 of parameter 3400 <i>Logic status</i> .<br>When the timer value is less than the comparison value, the output is 0, otherwise, the output is 1. |             |
| 3457 | <b>Ontime 1 cnt</b>    | Display the timer 1 count value, read – only.  | 0           |
|      | [0, 65535]             |  | -           |
|      | ...                    | ...  | ...         |
| 3461 | <b>Ontime3 enable</b>  | Select the enable signal source of timer 3.  | CONST.FALSE |
|      | <b>src</b>             | For available selections, see parameter 3455 <i>Ontime1 enable src</i> .   | = [0]       |
| 3462 | <b>Ontime3 comp</b>    | Set the comparison value of timer 3.   | 6553.5 s    |
|      | <b>val</b>             | The value range and unit and other instructions see parameter 3456 <i>Ontime1comp val</i> .  |             |
| 3463 | <b>Ontime 3 cnt</b>    | Display the timer 3 count value, read – only.  | 0           |
|      |                        | The value range and unit and other instructions see parameter 3457 <i>Ontime 1 cnt</i> .   |             |

## 35 Math function

| No.  | Name / Value         | Description  | Default       |
|------|----------------------|--|---------------|
| 3500 | <b>Linear1x src</b>  | Select the signal source for proportional conversion 1 input X.  | Zero = [0]    |
|      | P.01.00              | User-defined pointer (parameter pointer).  | -             |
|      | Zero                 | Always zero  | 0             |
| 3501 | <b>Linear1y</b>      | The output value of proportional conversion 1 output Y.<br>User can connect to the parameter by a parameter pointer. | 0             |
|      | [ -32767, 32767 ]    |  | -             |
|      |                      |  |               |
| 3502 | <b>Linear1x max</b>  | The maximum value of the proportional conversion 1 input X.  | 32767         |
|      | [ -32767, 32767 ]    |  | -             |
| 3503 | <b>Linear1x min</b>  | The minimum value of the proportional conversion 1 input X.  | 0             |
|      | [ -32767, 32767 ]    |  | -             |
| 3504 | <b>Linear1y max</b>  | The maximum output value of proportional conversion 1 output Y.  | 32767         |
|      | [ -32767, 32767 ]    |  | -             |
| 3505 | <b>Linear1y min</b>  | The minimum output value of proportional conversion 1 output Y.  | 0             |
|      | [ -32767, 32767 ]    |  | -             |
| 3506 | <b>Linear1x abs</b>  | Enable or disable the absolute value of the proportional conversion 1 input X.                                       | Disable = [0] |
|      | Disable              | Disable  | 0             |
|      | Enable               | Enable   | 1             |
| 3507 | <b>Linear1y dec</b>  | Set the decimal digits of the proportional conversion output Y.  | 0             |
|      | [ 0, 7 ]             |  | -             |
| 3508 | <b>Linear1y unit</b> | Select the unit of the proportional conversion 1 output Y.   | 0             |
|      | [ 0, 63 ]            |  | -             |
| ...  | ...                  | ...  | ...           |

| No.  | Name / Value          | Description   | Default       |
|------|-----------------------|---|---------------|
| 3518 | <b>Linear3 x src</b>  | Select the signal source of the proportional conversion 3 input X.<br>For available selections see parameter <i>3500 Linear1x src</i> . | Zero = [0]    |
| 3519 | <b>Linear3 y</b>      | Value of the proportional conversion 3 output Y.<br>For setting range and unit see parameter <i>3501 Linear1 output</i> .               | 0             |
| 3520 | <b>Linear3 x max</b>  | Set the maximum value the proportional conversion 3 input X.<br>For setting range and unit see parameter <i>3502 Linear1 x max</i> .    | 32767         |
| 3521 | <b>Linear3 x min</b>  | Set the minimum value the proportional conversion 3 input X.<br>For setting range and unit see parameter <i>3503 Linear1 x min</i> .    | 0             |
| 3522 | <b>Linear3 y max</b>  | Set the maximum value the proportional conversion 3 output Y.<br>For setting range and unit see parameter <i>3504 Linear1 y max</i> .   | 32767         |
| 3523 | <b>Linear3 y min</b>  | Set the minimum value the proportional conversion 3 output Y.<br>For setting range and unit see parameter <i>3505 Linear1 y min</i> .   | 0             |
| 3524 | <b>Linear3 x abs</b>  | Enable or disable the absolute value of the proportional conversion 3 input X.  | Disable = [0] |
| 3525 | <b>Linear3 y dec</b>  | Set the decimal digits of the proportional conversion 3 output Y.   | 0             |
| 3526 | <b>Linear3 y unit</b> | Select the unit of the proportional conversion 3 output Y.  | 0             |

| No.  | Name / Value         | Description  | Default    |
|------|----------------------|--|------------|
| 3527 | <b>Math1 x src</b>   | Select the signal source of math 1 input X.  | Zero = [0] |
|      | P.01.00              | User-defined pointer (parameter pointer).  | -          |
|      | Zero                 | Always zero  | 0          |
| 3528 | <b>Math1 y src</b>   | Select the signal source of math 1 input Y.<br>For available selections, see parameter 3527 Math1 x src. | Zero = [0] |
| 3529 | <b>Math1 func</b>    | Select the calculation function of math 1.   | Add = [0]  |
|      | Add                  | x + y  | 0          |
|      | Sub                  | x - y  | 1          |
|      | Min                  | Min (X, Y)   | 2          |
|      | Max                  | Max (X, Y)   | 3          |
|      | Abs                  | ABS (X)  | 4          |
|      | Mul                  | x * y / k (k is a scaling factor)  | 5          |
|      | Div                  | X * k / y (k is a scaling factor)  | 6          |
| 3530 | <b>Math 1 factor</b> | When the parameter 3529 Math1 func select "Mul" or "Div" operator, set the scaling factor k of math 1.   | 0          |
|      | [-32768,32767]       |  | -          |
| 3531 | <b>Math1 output</b>  | The output of math 1, read – only.<br>It can be connected to the parameter by a pointer.                 | 0          |
|      | [-32768,32767]       |  | -          |
| ...  | ...                  | ...  | ...        |
| 3537 | <b>Math 3 x src</b>  | Select the signal source of math 3 input X.<br>For available selections, see parameter 3527 Math1 x src. | Zero = [0] |
| 3538 | <b>Math3 y src</b>   | Select the signal source of math 3 input Y.<br>For available selections, see parameter 3527 Math1 x src. | Zero = [0] |
| 3539 | <b>Math 3 func</b>   | Select the calculation function of math 3.<br>For available selections, see parameter 3529 Math1 func.   | Add = [0]  |
|      | Math3 factor         | When the parameter 3539 Math3 func select "Mul" or "Div" operator, set the scaling factor k of math 3.   | 0          |
| 3541 | <b>Math 3 output</b> | The output of math 3, read – only.<br>It can be connected to the parameter by a pointer.                 | 0          |

| No.   | Name / Value               | Description   | Default    |
|-------|----------------------------|---|------------|
| 3542  | <b>Integrator1src</b>      | Select the signal source of integrator1 input.<br>For available selections, see parameter <i>3527 Math1 x src.</i>  | Zero = [0] |
| 3543  | <b>Integrator 1 output</b> | The output of integrator1 1, read – only.<br>It can be connected to the parameter by a pointer.   | 0          |
|       | [0, 65535]                 |   | -          |
| 3544  | <b>Integrator1scaling</b>  |   | 0          |
|       | [0, 65535]                 |   | -          |
| ..... | ....                       | ...   | ...        |
| 3548  | <b>Integrator3src</b>      | Select the signal source of integrator3 input.<br>For available selections, see parameter <i>3542 Integrator 1 src.</i>   |            |
| 3549  | <b>Integrator3output</b>   | The output of integrator1 3, read – only.<br>It can be connected to the parameter by a pointer.   |            |
| 3550  | <b>Integrator3scaling</b>  |   |            |
| 3551  | <b>Filter 1 input</b>      | Select the signal source of a low pass filter 1 input.  | Zero = [0] |
|       | P.01.00                    | User-defined pointer (parameter pointer).   | -          |
|       | Zero                       | Always zero   | 0          |
| 3552  | <b>Filter 1 output</b>     | The output of filter 1, read – only.<br>It can be connected to the parameter by a pointer.  | 0          |
|       | [0, 65535]                 |   | -          |
| 3553  | <b>Filter 1 time const</b> | Set the filter time constant of low pass filter 1. Unit is 0.01s.   | 1.00 s     |
|       | [0.00, 655.35]             |   | -          |
| ..... | ....                       | ...   | ...        |
| 3557  | <b>Filter 3 input src</b>  | Select the signal source of a low pass filter 3 input..<br>For available selections, see parameter <i>3551 Filter 1 input.</i>  | Zero = [0] |
| 3558  | <b>Filter 3 output</b>     | The output of filter 3, read – only.<br>It can be connected to the parameter by a pointer.<br>More information about the range and unit, see parameter <i>3552 Filter 1 output.</i> | 0          |
| 3559  | <b>Filter 3 time const</b> | Set the filter time constant of low pass filter 3. Unit is 0.01s.   | 1.00 s     |

## 40 Pos control

| No.  | Name / Value           | Description   | Default      |
|------|------------------------|---|--------------|
| 4000 | <b>Pos ctrl mode</b>   | Position control mode   | Disable      |
|      | POS CTRL               | Positioning control, including the trajectory planning. Support for fixed length and fixed angle control. | 0            |
|      | SERVO CTRL             | servo control supports for conventional servo function.   | 1            |
|      | ZERO SERVO             | Zero servo control.   | 2            |
| 4001 | <b>Pos ctrl enable</b> | Activate/deactivate position control.   | CONST.FALSE  |
| 4002 | <b>Pos mark type</b>   | Position reference signal type.   | Z mark = [0] |
|      | Z mark                 | Take Z pulse as position reference signal   | 0            |
|      | DI                     | Take the external signal as position reference signal defined by the parameter 4003.                      | 1            |
| 4003 | <b>Pos mark src</b>    | Selection of external reference signal source.  | CONST.FALSE  |
| 4004 | <b>Orient dir</b>      | Direction of spindle orientation.   | 0            |
|      | AUTO                   | Automatic   | 0            |
|      | FWD                    | Positive  | 1            |
|      | REV                    | Reverse   | 2            |
| 4005 | <b>Pos spd set</b>     | Orientation speed   | 300 rpm      |
|      | [0, 30000]             |   |              |
| 4006 | <b>Pos refsrc</b>      | Select the position reference source  | PULSE = [0]  |
|      | PULSE                  | The position reference source is given by the pulse train   | 0            |
|      | FIELDBUS               | The position reference source is given by the Fieldbus  | 1            |
| 4007 | <b>Pos ctrl gain</b>   | Position loop gain  | 40Hz         |
|      | [ 1, 100]              |   |              |
| 4008 | <b>Pos ffwd filter</b> | Filtering time of position feedforward  | 2.0ms        |
|      | [0.0, 50.0]            |   |              |
| 4009 | <b>Pos sel in1</b>     | Multi-step position selection source 1  | CONST.FALSE  |
| 4010 | <b>Pos sel in2</b>     | Multi-step position selection source 2  | CONST.FALSE  |
| 4011 | <b>Inc pos sel in1</b> | Incremental position selection source 1   | CONST.FALSE  |
| 4012 | <b>Inc pos sel in2</b> | Incremental position selection source 2   | CONST.FALSE  |
| 4013 | <b>Inc pos sel in3</b> | Incremental position selection source 3   | CONST.FALSE  |
| 4014 | <b>Feed fwd rqst</b>   | Forward feed request signal source  | CONST.FALSE  |
| 4015 | <b>Feed rev rqst</b>   | Reverse feed request signal source  | CONST.FALSE  |
| 4016 | <b>Pos rpt rqst</b>    | Repeat positioning request signal source  | CONST.FALSE  |

| No.  | Name / Value                              | Description   | Default     |
|------|---|---|-------------|
| 4017 | <b>Pos err lim</b><br>[ 10, 1000]         | The allowable position error of the positioning         | 100         |
| 4018 | <b>Pos preset1_rev</b><br>[-32768, 32767] | The revolutions of multi-step position 1.               | 0           |
| 4019 | <b>Pos preset1_pul</b><br>[-32768, 32767] | The pulses of multi-step position 1.                    | 0           |
| 4020 | <b>Pos preset2_rev</b><br>[-32768, 32767] | The revolutions of multi-step position 2.               | 0           |
| 4021 | <b>Pos preset2_pul</b><br>[-32768, 32767] | The pulses of multi-step position 2.                    | 0           |
| 4022 | <b>Pos preset3_rev</b><br>[-32768, 32767] | The revolutions of multi-step position 3.               | 0           |
| 4023 | <b>Pos preset3_pul</b><br>[-32768, 32767] | The pulses of multi-step position 3.                    | 0           |
| 4024 | <b>Pos preset4_rev</b><br>[-32768, 32767] | The revolutions of multi-step position 4.               | 0           |
| 4025 | <b>Pos preset4_pul</b><br>[-32768, 32767] | The pulses of multi-step position 4.                    | 0           |
| 4026 | <b>Inc pos preset1_rev</b>                | The revolutions of incremental position 1.              | 0           |
| 4027 | <b>Inc pos preset1_pul</b>                | The pulses of incremental position 1.                   | 0           |
| 4028 | <b>Inc pos preset2_rev</b>                | The revolutions of incremental position 2.              | 0           |
| 4029 | <b>Inc pos preset2_pul</b>                | The pulses of incremental position 2.                   | 0           |
| 4030 | <b>Inc pos preset3_rev</b>                | The revolutions of incremental position 3.              | 0           |
| 4031 | <b>Inc pos preset3_pul</b>                | The pulses of incremental position 3.                   | 0           |
| 4032 | <b>Inc pos preset4_rev</b>                | The revolutions of incremental position 4.              | 0           |
| 4033 | <b>Inc pos preset4_pul</b>                | The pulses of incremental position 4.                   | 0           |
| 4034 | <b>Inc pos preset5_rev</b>                | The revolutions of incremental position 5.              | 0           |
| 4035 | <b>Inc pos preset5_pul</b>                | The pulses of incremental position 5.                   | 0           |
| 4036 | <b>Inc pos preset6_rev</b>                | The revolutions of incremental position 6.              | 0           |
| 4037 | <b>Inc pos preset6_pul</b>                | The pulses of incremental position 6.                   | 0           |
| 4038 | <b>Inc pos preset7_rev</b>                | The revolutions of incremental position 7.              | 0           |
| 4039 | <b>Inc pos preset7_pul</b>                | The pulses of incremental position 7.                   | 0           |
| 4040 | <b>Inc pos preset8_rev</b>                | The revolutions of incremental position 8.              | 0           |
| 4041 | <b>Inc pos preset8_pul</b>                | The pulses of incremental position 8.                   | 0           |
| 4042 | <b>Force home rqst</b>                    | Signal source of force return to zero position request. | CONST.FALSE |

## 42 Mech brake

| No.  | Name / Value             | Description  | Default |
|------|--------------------------|--|---------|
| 4200 | <b>Mech brake enable</b> | Enable the mechanical brake control logic.   | Disable |
|      | Disable                  | Not enabled. Brake output signal is always OFF.  | 0       |
|      | Enable                   | Enabled. No brake response signal.   | 1       |
|      | Enable with ack          | Enabled, has brake response signal send the drive. When the response signal is abnormal, system will produce a protective fault.   | 2       |
| 4201 | <b>Mech ack src</b>      | The mechanical brake response signal source, only effective when the parameter <i>4200 Mech brake enable</i> is Enable with ack.   | False   |
|      | P.01.00.00               | User-defined pointer (parameter bit pointer).  | -       |
|      | CONST.FALSE              | Always be 0  | 0       |
|      | CONST.TRUE               | Always be 1  | 1       |
|      | DI1                      | Digital input DI1( <i>0200 DI state, bit 0</i> )   | 2048    |
|      | DI2                      | Digital input DI2  | 2049    |
|      | DI3                      | Digital input DI3  | 2050    |
|      | DI4                      | Digital input DI4  | 2051    |
|      | DI5                      | Digital input DI5  | 2052    |
|      | DI6                      | Digital input DI6  | 2053    |
|      | DI7                      | Digital input DI7  | 2054    |
| 4202 | <b>Brake open delay</b>  | The time required from issuing the mechanical brake release command to fully releasing the mechanical brake.<br><br>Please set according to the specifications of the mechanical brake. Unreasonable settings can cause damage to the brake due to friction. | 800ms   |
|      | [200ms, 2000ms]          |  |         |
| 4203 | <b>Brake close delay</b> | The time required from issuing the mechanical brake close command to fully close the mechanical brake. Please set according to the specifications of the brake. Unreasonable settings will cause "slide hook" accident.                                      | 800ms   |
|      | [200ms, 2000ms]          |  |         |
| 4204 | <b>Brake open torque</b> | The setting of the torque output before sending the mechanical brake release command during startup.   | 100.0%  |
|      | [50.0%, 200.0%]          |  | 0.1%    |

| No.  | Name / Value                | Description   | Default |
|------|-----------------------------|---|---------|
| 4205 | <b>Brake check rqst src</b> | Request signal source of the mechanical brake check. The drive checks this signal before sending run command.<br><br>When effective drive runs the brake check function. When invalid, drive runs the normal operation of the crane control function. | False   |
|      | P.01.00.00                  | User-defined pointer (parameter bit pointer).   | -       |
|      | CONST.FALSE                 | Always be 0   | 0       |
|      | CONST.TRUE                  | Always be 1   | 1       |
|      | DI1                         | Digital input DI1( <i>0200 DI state, bit 0</i> )  | 2048    |
|      | DI2                         | Digital input DI2   | 2049    |
|      | DI3                         | Digital input DI3   | 2050    |
|      | DI4                         | Digital input DI4   | 2051    |
|      | DI5                         | Digital input DI5   | 2052    |
|      | DI6                         | Digital input DI6   | 2053    |
|      | DI7                         | Digital input DI7   | 2054    |
| 4206 | <b>Brake check torque</b>   | Torque setting for mechanical brake check function.<br><br>When the mechanical brake check function is activated, if the drive detects the motor in slip state, the drive will produce a fault prompt.  | 100.0%  |
|      | [50.0%, 200.0%]             |   | 0.1%    |
| 4207 | <b>Brake check time</b>     | The drive torque retention time when the mechanical brake check function is activated.  | 2.0s    |
|      | [0.5s, 10.0s]               |   |         |
| 4208 | <b>Brake slip limit</b>     | When the mechanical brake check function is activated, this parameter is used to determine whether the speed level slips or not during mechanical brake checking function.  | 30rpm   |
|      | [ 15rpm, 60rpm]             |   |         |
| 4209 | <b>Brake open trq mem</b>   | The motor torque measured by the drive after the brake is completely released, used for diagnosis, read-only.   | 0.1%    |
| 4210 | <b>Brake close trq mem</b>  | The motor torque measured by the drive when the brake is about to close, used for diagnosis, read-only.   | 0.1%    |



## 43 Winder

| No.  | Name / Value              | Description   | Default               |
|------|---------------------------|---|-----------------------|
| 4300 | <b>Winder mode</b>        | Winding mode  | Winder = [0]          |
|      | Winder                    |   | 0                     |
|      | Unwinder                  |   | 1                     |
| 4301 | <b>Gear ratio</b>         | Mechanical transmission ratio   | 1.000                 |
|      | [0.001, 30.000]           |   |                       |
| 4302 | <b>Thickness</b>          | Material thickness  | 0.100mm               |
|      | [0.001, 30.000]           |   |                       |
| 4303 | <b>Web width</b>          | Strip material width  | 1000mm                |
|      | [1, 30000]                |   |                       |
| 4304 | <b>Density</b>            | Material density  | 1000kg/m <sup>3</sup> |
|      | [1, 30000]                |   |                       |
| 4305 | <b>Line spd max</b>       | Maximum linear speed  | 300.0m/min            |
|      | [0.1, 3000.0]             |   |                       |
| 4306 | <b>Line spd src</b>       | Line speed input signal source selection  | AI1 scaled            |
| 4307 | <b>Dia calc mode</b>      | Roll diameter calculation mode  | LINESPEED             |
|      | LINE SPEED                |   | 0                     |
|      | ENCODER                   |   | 1                     |
|      | ROLL_PULSE                |   | 2                     |
|      | EXT_FBK                   | Calculated by parameter 4308 Roll dia src   | 3                     |
| 4308 | <b>Roll dia src</b>       | Signal source selection for external roll diameter calculation.                     | AI1 scaled            |
| 4309 | <b>Roll pulse src</b>     | Roll pulse signal source selection.   | CONST.FALSE           |
| 4310 | <b>Roll pulse scaling</b> | Roll pulse rate, i.e. The number of pulses generated by one revolution of the drum. | 1                     |
| 4311 | <b>Core diameter</b>      | Empty roll diameter   | 100mm                 |
| 4312 | <b>Full roll dia</b>      | Full roll diameter  | 1                     |
| 4313 | <b>Dia reset rqst</b>     | Roll diameter reset request signal source   | CONST.FALSE           |
| 4314 | <b>Dia preset rqst</b>    | Roll diameter preset request signal source  | CONST.FALSE           |
| 4315 | <b>Dia preset data</b>    | Roll diameter preset value  | 100mm                 |
| 4316 | <b>Min spd dia calc</b>   | Maximum speed for roll diameter calculation   | 30rpm                 |
| 4317 | <b>Tense src</b>          | Tension reference source selection  | AI2 scaled            |
| 4318 | <b>Tmax</b>               | Maximum tension setting   | 30.0N                 |
| 4319 | <b>Tape mode</b>          | Tension taper mode selection  | 0                     |
| 4320 | <b>Max tape</b>           | Maximum gain of tension taper   | 0.0%                  |
|      | [0, 100.0]                |   |                       |

## 47 Simple PLC function

| No.  | Name / Value          | Description  | Default    |
|------|-----------------------|--|------------|
| 4700 | <b>Speed out</b>      | Speed reference Simple PLC module speed output, read-only.<br>When select speed reference source (parameter 2100 or 2101) by parameter pointer and set to P.47.00, then simple PLC output is connected to the speed reference. | -          |
| 4701 | <b>Run enable src</b> | Parameter Bit pointer. The default enable source is RUN signal.  | P.06.00.04 |
| 4702 | <b>Mode</b>           | Select the simple PLC operation mode.  | 0          |
|      | Single                | Keep the final speed after one process operation.  | 0          |
|      | Repeat                | Circulation operation.   | 1          |
|      | Single & stop         | Stop after one process operation. Before the next startup, it is necessary to issue a stop command first.  | 2          |
| 4703 | <b>Save mode</b>      | Whether save running data after stop or power off.   | 0          |
|      | Disable               | Not save.  | 0          |
|      | Enable                | Save running data to memory.   | 1          |
| 4704 | <b>Stage</b>          | Current running step, user can edit this parameter as the starting step.   | 0          |
|      | [0, 15]               |  |            |
| 4705 | <b>Timer</b>          | The current step running time, users can edit this parameter as starting time.   | 0          |
|      | [0.0, 6553.5]         |  | 0. 1min    |
| 4706 | <b>Time Set 0</b>     | Defines the 1 <sup>st</sup> step run time. 0 = Ignore this step.   | 0          |
|      | [0.0, 6553.5]         |  | 0. 1min    |
| ...  | ...                   | ...  | 0          |
| 4721 | <b>Time Set 15</b>    | Defines the 16 <sup>th</sup> step run time. 0 = Ignore this step.  | 0          |
|      | [0.0, 6553.5]         |  | 0. 1min    |
| 4722 | <b>Speed Set 0</b>    | Defines the 1 <sup>st</sup> step speed reference.  | 0          |
|      | [0, 65535]            |  | 1rpm       |
| ...  | ...                   | ...  |            |
| 4737 | <b>Speed Set 15</b>   | Defines the 16 <sup>th</sup> step speed reference.   | 0          |
|      | [0, 65535]            |  | 1rpm       |

## 48 Switch Sync

| No.    | Name / Value         | Description  | Default       |      |             |   |          |   |        |          |  |   |
|--------|----------------------|--|---------------|------|-------------|---|----------|---|--------|----------|--|---|
| 4800   | <b>Status</b>        | Status word for synchronous switching controller.<br><table border="1" style="margin-left: 20px;"> <tr> <th>Bit</th><th>Name</th><th>Information</th></tr> <tr> <td>0</td><td>Sync out</td><td>1=Switching action.<br/>0=Switching no action.</td></tr> <tr> <td>15 … 1</td><td>Reserved</td><td></td></tr> </table> | Bit           | Name | Information | 0 | Sync out | 1=Switching action.<br>0=Switching no action. | 15 … 1 | Reserved |  | 0 |
| Bit    | Name                 | Information  |               |      |             |   |          |   |        |          |  |   |
| 0      | Sync out             | 1=Switching action.<br>0=Switching no action.  |               |      |             |   |          |   |        |          |  |   |
| 15 … 1 | Reserved             |  |               |      |             |   |          |   |        |          |  |   |
| 4801   | <b>Phase err</b>     | The phase error value of the motor and the power grid, read-only.  | -             |      |             |   |          |   |        |          |  |   |
| 4802   | <b>Switch enable</b> | Enable the synchronous switching   | Disable = [0] |      |             |   |          |   |        |          |  |   |
| 4803   | <b>Phase comp</b>    | The phase compensation size for synchronous switching control is used to compensate for the phase lag caused by the contactor delay and the load.  | 6deg          |      |             |   |          |   |        |          |  |   |
| 4804   | <b>Speed comp</b>    | The phase of the motor needs to be modified to synchronize with the grid before the synchronous switching. When enable the synchronous switching, the speed compensation is automatically added to the given speed. Read-only.   | 0             |      |             |   |          |   |        |          |  |   |

## 49 Data storage

| No.  | Name / Value         | Description               | Default |
|------|----------------------|---------------------------|---------|
| 4900 | <b>Data storage1</b> | Data storage parameter 1. | 0       |
|      | [-32768,32767]       | 16 bits data.             | -       |
| 4901 | <b>Data storage2</b> | Data storage parameter 2. | 0       |
|      | [-32768,32767]       | 16 bits data.             | -       |
| 4902 | <b>Data storage3</b> | Data storage parameter 3. | 0       |
|      | [-32768,32767]       | 16 bits data.             | -       |
| 4903 | <b>Data storage4</b> | Data storage parameter 4. | 0       |
|      | [-32768,32767]       | 16 bits data.             | -       |
| 4904 | <b>Data storage5</b> | Data storage parameter 5. | 0       |
|      | [-32768,32767]       | 16 bits data.             | -       |
| 4905 | <b>Data storage6</b> | Data storage parameter 6. | 0       |
|      | [-32768,32767]       | 16 bits data.             | -       |
| 4906 | <b>Data storage7</b> | Data storage parameter 7. | 0       |
|      | [-32768,32767]       | 16 bits data.             | -       |
| 4907 | <b>Data storage8</b> | Data storage parameter 8. | 0       |
|      | [-32768,32767]       | 16 bits data.             | -       |

## 50 Fieldbus

| No.  | Name / Value           | Description   | Default                |
|------|------------------------|---|------------------------|
| 5000 | <b>Fieldbus enable</b> | Disable or enable the fieldbus function.  | Disable = [0]          |
|      | Disable                | Disable   | 0                      |
|      | Enable                 | Enable  | 1                      |
| 5001 | <b>Comm loss func</b>  | Select the action to be performed when the field bus communication is lost.     | No action = [0]        |
|      | No action              | No action   | 0                      |
|      | Fault                  | Report failure  | 1                      |
|      | Alarm                  | Report alarm  | 2                      |
| 5002 | <b>Comm loss time</b>  | Set the detection time of the loss of the fieldbus communication, Unit is 0.1s. | 2.0 s                  |
|      | [0.0, 60.0]            | -   | -                      |
| 5003 | <b>Act1 src</b>        |   |                        |
| 5004 | <b>Act2 src</b>        |   |                        |
| 5005 | <b>Data in1</b>        | Select the data 1 transferred from the drive to the fieldbus module.            | Status word = [ 1536]  |
|      | P.01.00                | User-defined pointer (parameter pointer).                                       | -                      |
|      | Zero                   | Always zero   | 0                      |
|      | Status word            | Refer to parameter <i>0600 Status word 1</i> .                                  | 1536                   |
|      | Act 1                  |   |                        |
|      | Act2                   |   |                        |
|      | ...                    | ...   | ...                    |
| 5016 | <b>Data in12</b>       | Select the data 12 transferred from the drive to the fieldbus module.           | -                      |
| 5017 | <b>Data out 1</b>      | Select the data 1 transferred from the field bus module to the drive.           | Control word = [ 1541] |
|      | P.01.00                | User-defined pointer (parameter pointer).                                       | -                      |
|      | Zero                   | Always zero   | 0                      |
|      | Fieldbus ref1          | See parameter <i>0215 Fieldbus ref1</i> .                                       | 527                    |
|      | Fieldbus ref2          | See parameter <i>0216 Fieldbus ref2</i> .                                       | 528                    |
|      | Control word           | See parameter <i>0605 Control word</i> .  | 1541                   |
|      | ...                    | ...   | ...                    |
| 5028 | <b>Data out 12</b>     | Select the data 12 transferred from the field bus module to the drive.          | Zero = [0]             |

## 51 Embedded Modbus

| No.  | Name / Value         | Description   | Default        |
|------|----------------------|---|----------------|
| 5100 | <b>Modbus enable</b> | Disable or enable the Modbus communication function. When this function is not needed, it can be disabled to reduce CPU load. | Enable = [ 1 ] |
|      | Disable              | Disable   | 0              |
|      | Enable               | Enable  | 1              |
| 5101 | <b>Node address</b>  | Defines the Modbus address. Two units with the same address are not allowed on-line.<br>0 = broadcast address.                | 1              |
|      | [0, 247]             |   | -              |
| 5102 | <b>Baud rate</b>     | Selects the Modbus baud rate.   | 9600 = [ 1 ]   |
|      | 4800                 |   | 0              |
|      | 9600                 |   | 1              |
|      | 19200                |   | 2              |
|      | 38400                |   | 3              |
|      | 57600                |   | 4              |
|      | 115200               |   | 5              |
|      | 230400               |   | 6              |
|      | 460800               |   | 7              |
|      | 921600               |   | 8              |
| 5103 | <b>Format</b>        | Sets the Modbus-RTU data format.  | 8, N, 1= [ 0 ] |
|      | 8, N, 1              | 8 data bits, no parity bit, 1 stop bit  | 0              |
|      | 8, N, 2              | 8 data bits, no parity bit, 2 stop bits   | 1              |
|      | 8, E, 1              | 8 data bits, even parity bit, 1 stop bit  | 2              |
|      | 8, O, 1              | 8 data bits, odd parity bit, 1 stop bit   | 3              |

| No.  | Name / Value       | Description  | Default      |
|------|--------------------|--|--------------|
| 5104 | <b>Master mode</b> | Set Modbus to master mode. Note: The master mode only supports 0x06 function code. | Disable= [0] |
|      | Disable            | Disable  | 0            |
|      | Enable             | Enable   | 1            |
| 5105 | <b>Reg data</b>    | When working on the master mode, set the data source of the target register.       | Zero = [0]   |
|      | P.01.00            | User-defined pointer (parameter pointer).  | -            |
|      | Zero               | Always zero  | 0            |
| 5106 | <b>Reg addr</b>    | When working on the master mode, set the address of the target register.           | 2            |
|      | [0, 65535]         |  |              |
| 5107 | <b>Comm cycle</b>  | When working on the master mode, set the communication cycle. Unit is 1ms.         | 100 ms       |
|      | [0, 65535]         | -  | -            |
| 5108 | <b>Slave addr</b>  | When working on the master mode, set the destination node address.                 | 0            |
|      | [0, 247]           |  |              |

| No.  | Name / Value             | Description   | Default |
|------|--------------------------|---|---------|
| 5109 | <b>Diagnostics</b>       | Diagnostic information for Modbus Communications.   | 0       |
| 5110 | <b>Packet recv count</b> | Count the message frames for this node received from the Modbus bus. Note: this counter counts only the message frames sent to this node (Broadcast frame included)         |         |
|      | [0, 65535]               |   |         |
| 5111 | <b>Packet send count</b> | Count the message frames for this node sent to the Modbus bus.  |         |
|      | [0, 65535]               |   |         |
| 5112 | <b>Bus message count</b> | Count all the message frames detected by this node from the Modbus bus.   |         |
|      | [0, 65535]               |   |         |
| 5113 | <b>UART error count</b>  | Count the number of serial port errors when the node receives the message frame from the Modbus   |         |
|      | [0, 65535]               | Normally the baud rate, frame format error, will therefore increase the error.  |         |
| 5114 | <b>CRC error count</b>   | Count the number of CRC verification errors for this node to receive messages from Modbus bus.  |         |
|      | [0, 65535]               | CRC is normally prone to errors when communication is disturbed or protocol is inconsistent. Make sure that the master-slave communication GND has been connected together. |         |
| 5115 | <b>Frame error count</b> | Count other errors that occur when the node receives the message frame from the Modbus bus, such as frame length error, frame timeout, etc.                                 |         |
|      | [0, 65535]               | Check communication agreement.  |         |

## 60 Motor control

| No.  | Name                   | Motor control   | Default       |
|------|------------------------|---|---------------|
| 6000 | <b>Carrier freq</b>    | Carrier frequency setting of the drive. Affected by the temperature of the drive and the frequency of the motor, the actual carrier frequency may be different, refer to parameter 0904.  | Type decision |
|      | [2kHz, 812kHz]         | Enhance the carrier can reduce motor noise. For long-distance transmission, if no reactor at the output side, it is necessary to reduce the carrier to reduce the reflected voltage of motor, to avoid motor insulation failure and burned. |               |
| 6001 | <b>Slip gain</b>       | Slip compensation gain of the asynchronous motor.   | 1.00          |
|      | [0.00, 1.00]           | In open loop control, it is used to modify the speed estimation value. Closed-loop control with encoder, it is used to correct the error of the rotor time constant, so that the motor is in the best state.                                |               |
| 6002 | <b>Torque boost</b>    | Manual boost capacity of the motor torque. Normally no need to set.   | 0.00          |
|      | [0.00, 1.00]           | Manual torque boost ratio, relative to the rated torque of the motor.   |               |
| 6003 | <b>SC brake time</b>   | Synchronous motor to start short circuit braking time.  | 0.0s          |
|      | [0.0s, 100.0s]         | Start short circuit braking time.   | -             |
| 6004 | <b>Res damp gain</b>   | Oscillation suppression gain.   | 0.50          |
|      | [0.00, 3.00]           | The open loop V/F control applicable for synchronous and asynchronous motors.   |               |
| 6005 | <b>Excitation time</b> | The pre-excitation time of vector control of the asynchronous motor.  | 0.0s          |
|      | [0.0s, 5.0s]           | Increasing the pre-excitation time can improve the starting torque.   |               |
| 6006 | <b>Fly restart</b>     | Speed tracking enable control can only be used in open loop V/F control mode of the asynchronous motor.   | Disable = [0] |
|      | Disable                | Speed tracking function disabled.   | 0             |
|      | Enable                 | Speed tracking function enabled.  | 1             |
| 6007 | <b>Vdc max control</b> | Activate or disable the over voltage stall function by this parameter.  | Enable = [1]  |
|      | Disable                | Disable over voltage stall function.  | 0             |
|      | Enable                 | Enable over voltage stall function.   | 1             |
|      | Enable at equal        | Activation of the over voltage stall, but is invalid in the deceleration. Used for periodic load equipment.   | 2             |

| No.  | Name                     | Motor control   | Default       |
|------|--------------------------|---|---------------|
| 6008 | Vdc min control          | Activate or disable the under-voltage stall function by this parameter.   | Disable = [0] |
|      | Disable                  | Disable under voltage stall function.   | 0             |
|      | Enable                   | Enable under voltage stall function.  | 1             |
| 6009 | Auto phase mode          | Search mode for initial phase of the synchronous motor.   | Auto = [0]    |
|      | Auto                     | Enable automatically. Normally performs after power up and coast stop.  | 0             |
|      | Always                   | Always enable the phase search function.  | 1             |
|      | Disable                  | Always disable the phase search function.   | 2             |
| 6010 | PM type                  | PM motor type   | [ 1 ]         |
|      | Type 1<br>(non-standard) | Special phase search method, suitable for partially IPM motors, such as squirrel cage motor.  | 0             |
|      | Type 2<br>(standard)     | Standard phase search method, suitable for SPM motors and most IPM motors   | 1             |
| 6011 | Cur inject               | Injected current for phase search of PM motors. For PM motor with squirrel cage, as well as big rating drive control small rating motor, needs to be slightly increased.  | 30%           |
|      | [0, 100]                 |   |               |
| 6012 | Phase comp               | The phase compensation value of the PM motor. For quick start application 90 ° is the best, while ordinary start 30 ° is the best. Normally set in the range of 0 to 90°. | 30deg         |
|      | [-180, 180]              |   |               |
| 6013 | Over modu gain           | Over modulation output gain.  | 15%           |
|      | [0, 15]                  |   |               |

| No.  | Name                   | Encoder configue  | Default   |
|------|------------------------|---|-----------|
| 6014 | <b>PWM mode</b>        | PWM modulation mode.  | THD = [0] |
|      | AUTO THD               | The PWM mode is automatically adjusted to minimize the output voltage harmonics.                              | 0         |
|      | AUTO SL                | The PWM mode is automatically adjusted to minimize the IGBT switching loss.                                   | 1         |
|      | SVPWM                  | SVPWM represents a continuous PWM mode, DPWM means intermittent PWM mode.                                     | 2         |
|      | DPWM MIN               | DPWM MIN mode, micro drive series driver does not support DPWM mode.  | 3         |
|      | DPWM MAX               | DPWM MAX mode   | 4         |
|      | DPWM3                  | DPWM3 mode  | 5         |
|      | DPWM2                  | DPWM2 mode  | 6         |
|      | DPWM1                  | DPWM1 mode  | 7         |
|      | DPWM0                  | DPWM0 mode  | 8         |
| 6015 | <b>Flux brake gain</b> | Magnetic flux braking control gain  | 0%        |
|      | [0, 100]               |   |           |
| 6016 | <b>Energy opt gain</b> | Energy-saving control gain of the asynchronous motor.   | 0%        |
|      | [0, 50]                |   |           |
| 6017 | <b>FOC spd max</b>     | Maximum allowable speed for closed loop control. If exceeds the maximum will switch to the open loop control. | 30000rpm  |
|      | [0, 32767]             |   |           |

## 61 Encoder config

| No.  | Name                    | Encoder configure  | Default             |
|------|-------------------------|--|---------------------|
| 6100 | <b>Pulse per rev</b>    | Define the PPR of the incremental encoder,   | 2048                |
|      | [ 100, 65535]           | Pulses/rev   | -                   |
| 6101 | <b>Electric offset</b>  | Define the offset angle of the encoder Z pulse, relative to the d-q axis system.   | 0                   |
|      | [0°, 360°]              | Only applicable to synchronous motor.  | 1                   |
| 6102 | <b>Encoder phase</b>    | Define the phase of the encoder signal.  | Normal<br>= [0]     |
|      | Normal                  | Normal phase.  | 0                   |
|      | Invert                  | Inverse phase.   | 1                   |
| 6103 | <b>Enc counter mode</b> | Define the encoder count mode.   | Quadrature<br>= [0] |
|      | Quadrature              | Quadrature encoder (with two channels, A and B)  | 0                   |
|      | Direction               | Single-track encoder (with one channel, A).  | 1                   |
| 6104 | <b>Pulse cnt mode</b>   | Define the count mode of the pulse inputs used for the location reference. For available selections see parameter <i>6103 Enc counter mode</i> . | Quadrature<br>= [0] |
| 6105 | <b>Gear den</b>         | The electronic gear denominator of the position pulse input.   | 1000                |
|      | [ 1, 65535]             | Pulse input used for the given position.   | -                   |
| 6106 | <b>Gear num</b>         | The electronic gear molecule of the position pulse input.  | 1000                |
|      | [ 1, 65535]             | Pulse input used for the given position.   | -                   |
| 6107 | <b>Encoder enable</b>   | The enable encoder module, can only be used for small micro series driver.   | Disable<br>= [0]    |
|      | Disable                 | Disable encoder function.  | 0                   |
|      | Enable                  | Enable encoder function.   | 1                   |

## 62 Motor parameter

| No.  | Name                    | Motor parameters   | Default                                 |
|------|-------------------------|--|---|
| 6200 | <b>Pole pairs</b>       | Defines the motor pole pairs. This is automatically calculated based on the rated speed and rated frequency of the motor, so it is essential to set the rated speed and rated frequency correctly. | Model dependent                         |
|      |                         | [1, 30]  | The pole pairs of the motor.            |
| 6201 | <b>No-load current</b>  | No-load current of the asynchronous motor.   | Model dependent                         |
|      |                         | [0A, 400.0A]   | The parameter is obtained after ID RUN. |
| 6202 | <b>Stator resist</b>    | Stator resistance of motor.  | Model dependent                         |
|      |                         | [0 Ω, 65.535 Ω]  | The parameter is obtained after ID RUN. |
| 6203 | <b>Rotor resist</b>     | Rotor phase resistance of asynchronous motor.  | Model dependent                         |
|      |                         | [0 Ω, 65.535 Ω]  | The parameter is obtained after ID RUN. |
| 6204 | <b>Stator induct</b>    | Stator phase inductance of motor.  | Model dependent                         |
|      |                         | [0mH, 3000.0mH]  | The parameter is obtained after ID RUN. |
| 6205 | <b>Leak induct coef</b> | Leakage inductance coefficient of asynchronous motor.  | Model dependent                         |
|      |                         | [0%, 20.0%]  | The parameter is obtained after ID RUN. |
| 6206 | <b>d-axis induct</b>    | D axis inductance of PM motor.   | Model dependent                         |
|      |                         | [0.00mH, 300.00mH]   | The parameter is obtained after ID RUN. |
| 6207 | <b>q-axis induct</b>    | q axis inductance of PM motor.   | Model dependent                         |
|      |                         | [0.00mH, 300.00mH]   | The parameter is obtained after ID RUN. |
| 6208 | <b>Back EMF coef</b>    | Back EMF coefficient of PM motor.  | Model dependent                         |
|      |                         | [0.0mV, 3000.0mV]  | The parameter is obtained after ID RUN. |
| 6209 | <b>Core sat coef</b>    | Iron core saturation coefficient of motor.   | 80%                                     |
|      |                         | [50, 100]  | The parameter is obtained after ID RUN. |
| 6210 | <b>PM with squirrel</b> | 1 = Synchronous motor with a squirrel cage.  | 0                                       |
|      |                         | [50, 100]  | The parameter is obtained after ID RUN. |

## 63 Startup Parameters

| No.  | Name                     | Startup Parameters   | Default         |
|------|--------------------------|--|-----------------|
| 6300 | <b>Motor nom power</b>   | Defines the motor rated power. This setting must match the value on the rating plate of the motor. If multiple motors are connected to the drive, enter the total power of the motors.<br><br>Note: This parameter cannot be changed while the drive is running. | Model dependent |
|      |                          | [0.00kW, 630.00 kW]  | -               |
| 6301 | <b>Motor nom volt</b>    | Defines the nominal motor voltage supplied to the motor. This setting must match the value on the rating plate of the motor.   | Model dependent |
|      |                          | [0 V, 1000 V]  |                 |
| 6302 | <b>Motor nom current</b> | Defines the motor rated current. This setting must match the value on the rating plate of the motor. If multiple motors are connected to the drive, enter the total current of the motors.   | Model dependent |
|      |                          | [0.0 A, 1200.0 A]  |                 |
| 6303 | <b>Motor nom speed</b>   | Defines the nominal motor speed. The setting must match the value on the rating plate of the motor.  | Model dependent |
|      |                          | [0 RPM, 30000 RPM]   |                 |
| 6304 | <b>Motor nom freq</b>    | Defines the nominal motor frequency. This setting must match the value on the rating plate of the motor.   | 50Hz            |
|      |                          | [0 Hz, 1000 Hz]  |                 |
| 6305 | <b>Motor type</b>        | Select the motor type.   | ACIM = [0]      |
|      | ACIM                     | Standard squirrel cage AC induction motor (asynchronous induction motor).  | 0               |
|      | PMSM                     | Permanent magnet motor. Three-phase AC synchronous motor with permanent magnet rotor and sinusoidal Back EMF voltage.  | 1               |
|      | SynRM                    | Synchronous reluctance motor. Three-phase AC synchronous motor with salient pole rotor without permanent magnets.  | 2               |

| No.  | Name           | Startup Parameters  | Default             |
|------|----------------|---|---------------------|
| 6306 | ID run request | <p>Selects the type of the motor identification routine (ID run) performed at the next start of the drive. During the ID run, the drive will identify the characteristics of the motor for optimum motor control.</p> <p>After completion of the ID run of motor, drive will stop.</p> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• The ID run can only be performed in local control mode.</li> <li>• Once the ID run is activated, it can be canceled by stopping the drive.</li> </ul>  | No request<br>= [0] |
|      | No request     | No motor ID run is requested.   | 0                   |
|      | Normal         | <p>Normal ID run. Guarantees good control accuracy for all cases.</p> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• In the following two cases to perform normal ID run. Must disconnect the mechanical connection between motor and driven equipment: If the load torque is higher than 20%; If the mechanical device driven by the motor is not able to withstand the rated speed transients during the normal auto tuning operation.</li> <li>• Before starting ID run, please check the motor direction. During ID run, motor will rotate in the forward direction.</li> <li>• The motor will run at up to approximately 50 ~ 100% of the nominal speed during the ID run. ENSURE THAT IT IS SAFE TO RUN THE MOTOR BEFORE PERFORMING THE ID RUN!</li> </ul> | 1                   |
|      | Standstill     | <p>Static ID run.</p> <p><b>Note:</b> A standstill ID run should be selected only if the Normal ID run is not possible due to the restrictions caused by the connected mechanics (eg. with lift or crane applications).</p>   | 2                   |
|      | Auto-phasing   | Only applicable to synchronous motor, used to identify initial Angle encoder under stationary state.  | 3                   |

| No.  | Name                   | Startup Parameters  | Default              |
|------|------------------------|---|----------------------|
| 6307 | <b>Drive mode</b>      | Select motor control mode.  | SVC = [0]            |
|      | Open loop vector       | Open loop vector control model is suitable for most applications.   | 0                    |
|      | Close loop vector      | Closed loop vector control.<br>This model is used for occasions with strict requirements for speed and torque accuracy and response speed. You must install the PG card plus encoder to obtain the speed feedback to a closed-loop control.   | 1                    |
| 6308 | <b>Phase inversion</b> | Switches the rotation direction of motor. This parameter can be used if the motor turns in the wrong direction (for example, because of the wrong phase order in the motor cable), and correcting the cabling is considered impractical.<br><br>Notes: <ul style="list-style-type: none"><li>● Changing this parameter does not affect speed reference polarities, so positive speed reference will rotate the motor forward. The phase order selection just ensures that “forward” is in fact the correct direction.</li><li>● After changing this parameter, the sign of encoder feedback (if any) must be checked and re-start motor ID RUN.</li></ul> | Normal, UVW<br>= [0] |
|      | Normal, UVW            | Motor phase sequence is normal.   | 0                    |
|      | Invert, UWV            | Motor phase inverting, V and W exchange.  | 1                    |
|      | <b>Macro sel</b>       | Select the drive application macro.   | Factory = [0]        |
| 6309 | Factory                | Default factory application macros.   | 0                    |
|      | Reserved               |   | 1                    |

## Chapter 6 Diagnostics

### 6.1 Fault Indications

This chapter lists all the faults messages including the possible causes and corrective actions. If the VFD faults, the VFD output is disabled so that the VFD stops controlling the motor, and the following fault code will be displayed on the keypad, the fault contact output operates too.

For details, refer to the following table to identify and correct the cause of the fault.

For damages on units or unsolvable questions, please contact with local distributors/agents, service centers or manufacturer for solutions.

| No. | Failure name             | Possible causes   | Terms of settlement  |
|-----|--------------------------|---|--|
| 01  | SC(Output short circuit) | Output phase to phase short circuit<br>Output to earth short circuit<br>output to the bus short circuit                           | Check whether the motor is short circuit.<br>Check wiring and cable short circuit.<br>Check whether there is a power factor compensation capacitor or surge absorber in the motor cable. |
| 02  | OC(Motor over current)   | Acceleration time is too short<br>The motor parameters incorrect setting<br>Load too heavy  | Prolong acceleration time<br>Adjust the motor parameter<br>Check the load  |
| 03  | OV(Bus overvoltage)      | Abnormal input voltage Deceleration time is too short<br>The motor is in power generating status                                  | Check power supply voltage<br>Prolong deceleration time<br>Connect a braking resistor  |
| 04  | OH(Drive over heat)      | Ambient over-temperature<br>Fan failure<br>Blockage of air duct<br>Output current too high.<br>Temperature detect circuit failure | Check ambient conditions<br>Check air flow and fan running<br>Clean the heat-sink<br>Check the load and parameter<br>Check the PWM frequency<br>Seek for technical support               |

| No. | Failure name                           | Possible causes  | Terms of settlement   |
|-----|--|--|---|
| 05  | GF(Earth leakage)                      | Output short to ground<br>Input and output short circuit<br>The sum of the output current is not zero, and greater than the allowable value. | Check wiring<br>Measure motor insulation<br>Check wiring is loose<br>Check whether the motor cable leakage.<br>Check the motor output line is too long and there is no additional output reactor. |
| 06  | ADC (ADC Fault)                        | Hardware problem<br>Motor current sensor fault<br>Analog to digital converter fault on the control board.                                    | Seek for technical support  |
| 07  | NTC LOSS<br>(Temperature sensor break) | Drive internal temperature sensor disconnection.   | Seek for technical support  |
| 08  | ENCINIT<br>Encoder initial fault       | The encoder is found to be faulty during initialization.   | Check the encoder wiring is correct   |
| 09  | ENCZMARK                               | The number of pulses between the two Z pulses captured by the encoder is different from that of the encoder.                                 | Check encoder resolution settings are correct. Check whether the encoder cable is disturbed.  |
| 10  | EEPROM<br>Memory fault                 | Hardware failure   | Seek for technical support  |
| 11  | CPU OVERLOAD                           | CPU load over 100%, Failure to complete real-time task. Or stack overflow.   | Seek for technical support  |
| 12  | PARA ERROR                             | The parameters of the motor are conflicting with each other.   | Check motor parameters are set correctly.   |

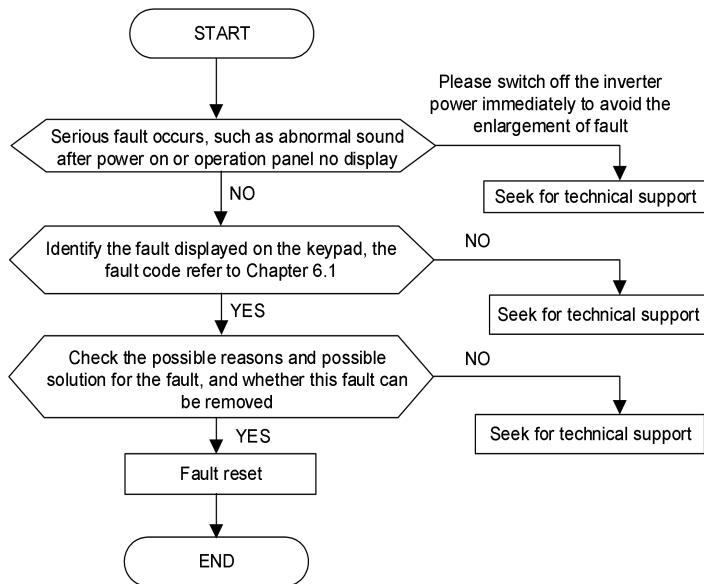
| No. | Failure name   | Possible causes  | Terms of settlement  |
|-----|----------------|--|--|
| 13  | MOTOR OH       | The temperature of the motor exceeds the set fault point.  | Check whether the motor is overloaded.<br>check motor overheating protection settings are correct.     |
| 14  | AI LOSS        | Analog input out of range.   | Check whether analog input is broken or short.   |
| 15  | EXT FAULT      | External user defined fault.   | Check external fault signal.   |
| 16  | SUPPLY LOSS    | Abnormal power supply. Input phase loss.<br>Unbalanced 3-AC input.<br>Insufficient capacity.         | Check whether the lack of phase.<br>Check whether the capacitance value is normal.                     |
| 17  | OUTPUT LOSS    | Output current abnormal<br>The output phase loss IGBT and peripheral anomalies cannot be controlled. | Check whether the motor is short of phase.<br>Check whether the motor vibration.                       |
| 18  | ID RUN         | Motor ID RUN fault.  | Check whether the motor has been connected.<br>Check the motor nameplate parameters are set correctly. |
| 19  | MODBUS FAULT   | MODBUS Communication failure.  | Check MODBUS communication.  |
| 20  | CANOPEN FAULT  | CAN Communication failure.   | Check CAN communication.   |
| 21  | PROFIBUS FAULT | PROFIBUS Communication failure.  | Check PROFIBUS communication.  |
| 22  | PAR SET ERR    | Backup parameter set error in memory.  | Parameter set not backup.  |

| No. | Failure name     | Possible causes   | Terms of settlement  |
|-----|------------------|---|--|
| 23  | UNDER VOLTAGE    | Power supply under voltage.                                   | Check whether the power supply is normal.<br>Check whether the soft start is normal.                                   |
| 24  | SPEED FEEDBACK   | Speed feedback fault.   | Feedback phase disconnection or positive feedback.   |
| 25  | OVER SPEED       | Overspeed.  | Check encoder settings are correct.<br>Check whether the feedback is positive feedback.                                |
| 26  | OPTCARD CHANGED  | Hot swap card options.  | Do not allow the hot swap option card, otherwise it may cause permanent damage to the driver.                          |
| 27  | RUNTIME LIMITTED | Run time is limited.  | Contact local agents.  |
| 28  | PID FBK LOSS     | Process PID feedback break.                                   | Check whether the PID disconnection detection is correct.<br>Check whether the external wire break.                    |
| 29  | BR ERR           | The brake resistance is less than allowable resistance drive. | Check the brake resistance is reasonable.  |
| 30  | BR OVERLOAD      | Regenerative braking resistor.                                | Check the brake resistor overload detection settings are correct ,Check whether the power of resistance is reasonable. |

| No. | Failure name     | Possible causes  | Terms of settlement   |
|-----|------------------|--|---|
| 31  | BRAKE SLIP       | The brake during the inspection, Motor slip.   | Check whether the need to replace the brake.<br>Check the brake check settings are correct. |
| 32  | BRAKE FLT        | Open the front brake, start moment cannot be reached.  | Check whether the normal brake.   |
| 33  | BRAKE SAFE CLOSE | Open loop control, The motor works in the low speed dangerous area, Brake force close.                 | Check whether speed given is too low.   |
| 34  | BRAKE OL         | After the brake open, Actual compliance exceeds the maximum allowable torque of the drive.             | Check whether the load is too high.<br>Check the brake control circuit is normal.           |
| 35  | BRAKE ACK FLT    | After the brake open, no response signal.  | Check the brake response signal is normal.  |
| 36  | BRAKE SYNC FLT   | Lifting control, motor speed and the given estimated deviation is too large.<br>Magnetic flux anomaly. | Check motor parameters are set correctly.   |
| 37  | PM SYNC LOSS     | Multiple step out of step in the starting process of synchronous motor.                                | Check whether the initial angle identification parameter is set correctly                   |

| No. | Failure name                          | Possible causes  | Terms of settlement   |
|-----|---------------------------------------|--|---|
| 38  | MOTOR STALL                           | Motor blocking fault, the rotor is almost impossible to rotate, The moment has reached the maximum torque. | Check if the machine is locked  |
| 39  | STO Fault (1.0 version)               | STO signal input   | The connector between STO and 24V terminals may loose or singal triggered         |
| 40  | STO Fault (1.1 version)               | STO signal input   | The connector between STO and 24V terminals may loose or singal triggered         |
| 41  | STO Terminal 1 trigered (1.1 version) | STO signal input   | The connector between STO 1 and 24V terminals may loose or STO 1 singal triggered |
| 42  | STO Terminal 2 trigered (1.1 version) | STO signal input   | The connector between STO 2 and 24V terminals may loose or STO 1 singal triggered |
| 43  | Drive overload                        | Output current of drive exceeds rated current for a while  | Use bigger rating drive   |

## 6.2 Troubleshooting Procedures



## Chapter 7 Maintenance

The application environment (such as temperature, humidity, dust and powder, wool, smoke and oscillation), burning and wearing of internal devices and other factors may reduce the service life. To reduce the fault and prolong the service life, it is necessary to perform daily inspections and periodic maintenance.



### Note

1. Only the professionals can dismantle and replace the VFD components.
2. Before inspection and maintenance, please make sure that the power supply has been switch off at least ten minutes, otherwise, electric shock may be happened.
3. Do not leave metal components and parts in the inner of VFD, otherwise, VFD will be damaged.

### 7.1 Daily Inspections

The VFD should be used under the allowable conditions as recommended in this manual and its daily inspections should be performed as the table.

| Item        | Inspection Contents       | Inspection Means                                | Criteria  |
|-------------|---------------------------|---|---|
| Environment | Temperature               | Thermometer                                     | -10 ~ +40°C. De-rated at 40 to 50°C, and the rated output current shall be decreased by 1% for every temperature rise of 1°C. |
|             | Humidity                  | hygrometer                                      | 5 ~ 95%, no condensing  |
|             | Dust, oil, water and drop | Visual check                                    | There are no dust, oil, water and drop  |
|             | Vibration                 | Special test instrument                         | 3.5m/s <sup>2</sup> , 2 ~ 9Hz<br>10m/s <sup>2</sup> , 9 ~ 200Hz<br>15m/s <sup>2</sup> , 200 ~ 500Hz                           |
|             | Gas                       | Special test instrument, smell and visual check | There are no abnormal smell and smoke   |
| VFD         | Heat dissipation effect   | Special test instrument                         | Exhaust normal  |
|             | Noise                     | Listen  | There is no abnormal noise  |
|             | Gas                       | Smell and visual check                          | There are no abnormal smell and smoke   |
|             | Physical appearance       | Visual check                                    | The physical appearance is kept intact  |
|             | Heat-sink and             | Visual check                                    | No dust blocking the air duct   |

| Item  | Inspection Contents     | Inspection Means                  | Criteria  |
|-------|-------------------------|-----------------------------------|---|
| Motor | cooling fan             |                                   |   |
|       | Input current           | Ampere-meter                      | Refer to the nameplate check allowable range                                |
|       | Input voltage           | Voltmeter                         | Refer to the nameplate check allowable range                                |
|       | Output current          | Ampere-meter                      | In the rated value range and can be overload for a short time               |
|       | Output voltage          | Voltmeter                         | In the rated value range  |
| Motor | Heat dissipation effect | Special test instrument and smell | The motor temperature is within the normal range, no abnormal burning smell |
|       | Noise                   | Listen                            | No abnormal noise   |
|       | Vibration               | Special test instrument           | No vibration  |

## 7.2 Periodic Maintenance

Please start periodic maintenance every three to six months according to the application environment and working conditions.

| Item  | Inspection Contents                                | Inspection Means      | Criteria   |
|-------|--|-----------------------|--|
| VFD   | Main circuit terminal                              | Screwdriver/sleeve    | The screws fixed strongly and no damaged to the cables |
|       | PE terminal  | Screwdriver/sleeve    | The screws fixed strongly and no damaged to the cables |
|       | Control circuit terminal                           | Screwdriver           | The screws fixed strongly and no damaged to the cables |
|       | Reliability of internal connections and connectors | Screwdriver and hands | Connection is firm and reliable                        |
|       | Expansion card connector                           | Screwdriver and hands | Connection is firm and reliable                        |
|       | Mounting screws                                    | Screwdriver/sleeve    | The screws are tightened                               |
|       | Cleaning the dusts and powders                     | Cleaner               | There are no dusts and wool                            |
|       | Internal foreign matter                            | Visual check          | There are no foreign matter                            |
| Motor | Insulation test                                    | 500VDC megger         | Normal   |

### 7.3 Component Replacement

Different types of components have different service lives. The service lives of the components are subject to the environment and application conditions.

Better working environment may prolong the service lives of the components. The cooling fan and electrolytic capacitor are vulnerable components and should be periodic maintenance. If any fault occurs, please replace the component.

| Vulnerable Component | Damage Causes   | Solutions | Items for Routine Inspection   |
|----------------------|---|-----------|--|
| Cooling fan          | Bearing worn, blade aging                               | Replace   | Service life: 30 000 ... 40 000 hours<br>The fan blade has no cracks and rotates normally. The screws are tightened.   |
| Capacitor            | High ambient temperature and electrolyte volatilization | Replace   | Service life: 40 000 ... 50 000 hours<br>There are no electrolyte leakage, color change, crack and shell inflation. The safety valve is normal.<br>Static capacity is equal to or higher than the initial value *0.85. |

When the VFD is stored for a long time, power-on test should be conducted once within two years and last at least five hours. You can use voltage regulator to gradually increase the voltage to the rated voltage after power-on.

## Appendix A Modbus Comm

### 1 Support Protocol

Support Modbus protocol, RTU format.

Broadcast address is 0, slave address is “1–247”, and “248–255” for reservation.

### 2 Interface Mode

RS485: Asynchronous, half duplex, LSB sending priority. Low byte is after the high byte.

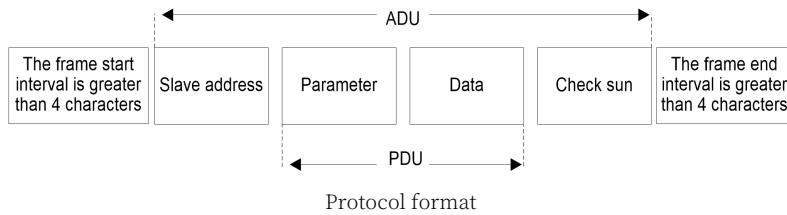
Communication terminals: RS485A, RS485B.

Default data format: 8-N-1.

Default baud rate: 9600bps.

Refer to the parameters group for more details.

### 3 Protocol Format



The ADU (Application Data Unit) check sum is the CRC16 checksum of the first three parts of the ADU obtained by exchanging the high and low bytes.

## 4 Field Bus Data Set

| Address   | Name  |
|-----------|---|
| 0001      | Fieldbus control word (corresponding to parameter 0605) |
| 0002      | Field bus given 1(corresponding to parameter 0215)      |
| 0003      | Field bus given 2(corresponding to parameter 0216)      |
| 0004      | Field bus status word                                   |
| 0005      | Field bus actual value1                                 |
| 0006      | Field bus actual value2                                 |
| 0007-0018 | Field bus module input1-12 (parameter 5005- 5016)       |
| 0019-0030 | Field bus module output1-12 (parameter 5017- 5028)      |

Field Bus Status Word

| No. | Name              | Meaning   |
|-----|-------------------|---|
| 0   | Ready             | 1 : Operational readiness   |
| 1   | Enabled           | 1 : Run enable  |
| 2   | Modulating        | 1 : PWM signal output   |
| 3   | Following ref     | 1:  |
| 4   | Em OFF2           | 1 : Free parking mode   |
| 5   | Em OFF3           | 1 : Emergency stop mode   |
| 6   | Start inhibit     | 1 : Start inhibit   |
| 7   | Alarm             | 1 : Alarm   |
| 8   | At setpoint       | 1 : The output is consistent with the set (speed arrival or torque arrival) |
| 9   | Torque limited    | 1 : Torque limited  |
| 10  | Speed limited     | 1 : Speed limited   |
| 11  | EXT2 active       | 1 : Control ground 2 effective  |
| 12  | Local ctrl        | 1 : Local ctrl  |
| 13  | Zero speed        | 1 : Zero speed  |
| 14  | Direction reverse | 1 : Direction reverse   |
| 15  | Fault             | 1 : Fault   |

## 5 Related Parameters

| Parameter address | Parameter name | Parameter values |
|-------------------|----------------|------------------|
| 5100              | Modbus enable  | Enable = [1]     |
| 5101              | Node address   | -                |
| 5102              | Baud rate      | -                |
| 5103              | Format         | -                |

## 6 Example

The following is an example of node address equal to 1, The last CRC check code is only applicable to this case, To change any data should be recalculated after CRC check code, Can use the software

automatically generated.

### 1 Read drive status

Request frame: 01 03 06 00 00 01 84 82, response frame: 01 03 02 B4 81 0F 24

### 2 Modify drive reference speed (First, set speed source is field bus)

Request frame: 01 06 00 02 03 E8 28 B4

### 3 Start drive (0x0882: start command, note that bit 7 and bit 11 must always 1)

(First, set the external start source is fieldbus communication)

Request frame: 01 06 00 01 08 82 5F AB

### 4 Stop driver (0x0881: stop command, note that bit 7 and bit 11 must always 1)

Request frame: 01 06 00 01 08 81 1F AA

### 6 Read parameter 2200 Acc timel attribute

Request: 01 42 0000 1600 77 A5, Response: 01 42 00 0008 AC 7E 78

### 7 Read parameter 2200 Acc timel default value

Request: 01 42 0001 1600 26 65, Response: 01 42 000101 F4 28 12

### 8 Read parameter 2201 Dec time minimum value

Request: 01 42 00 02 16 01 17 A5, Response: 01 42 00 02 00 01 19 C5

### 9 Read parameter 2201 Dec time maximum value

Request: 01 42 00 03 16 01 46 65, Response: 01 42 00 03 EA 60 C6 8D

### 10 Read the contained number of parameter group *01 Actual value*

Request: 01 42 00 04 16 01 F7 A4, Response: 01 42 00 04 00 0D F9 C1

## 7 Register Address

Parameter address is 16 bits, High 8 bit parameter group number, Low 8 bit is within the group index.

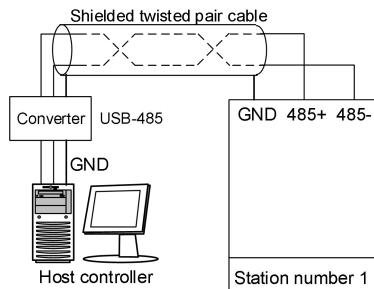
| GROUP                     | INDEX                              | Address     |             |
|---------------------------|------------------------------------|-------------|-------------|
|                           |                                    | Hexadecimal | Decimal     |
| 00:<br>Communication data | 01-30 Data set                     | 0001-001E   | 0001-0030   |
| 01:<br>Parameter group 01 | 00-255:<br>Parameter<br>0100-01255 | 0100-01FF   | 256-511     |
| 02:<br>Parameter group 02 | 00-255:<br>Parameter<br>0200-02255 | 0200-02FF   | 512-767     |
| ...                       | ...                                | ...         | ...         |
| 63:<br>Parameter group 63 | 00-255:<br>Parameter<br>6300-63255 | 3F00-3FFF   | 16128-16383 |

Notice:

1. For each actual parameter, please refer to this manual.
2. The use of PLC as the master station parameter address need to add 40000, if the communication address of parameter *0100* is 40256.

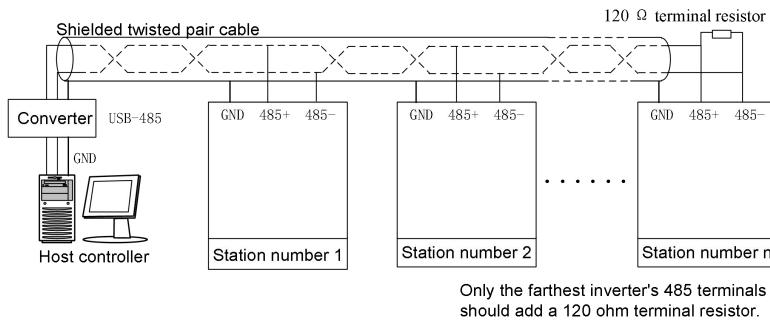
## 8 Network Construction

- The connection of one VFD and one host controller



The connection of one VFD and one host controller

- The connection of multiple VFDs and one host controller



The connection of multiple VFDs and one host controller