



Variable frequency drive

Vector V800

User manual

Version 5.4



Contents

Chapter 1	1
Safety instructions	1
1.0 Description of name plate	2
1.1 Technical parameters	3
1.2 Instructions for selecting an inverter	6
1.3 Selected performance parameters of the V800	7
1.4 Table of suitable braking resistors	8
1.5 Dimensional specifications of frame sizes A2S and A4T 0.4 kW - 2.2 kW	9
1.6 Dimensional specifications of frame sizes B2S and B4T 2.2 kW - 7.5 kW	10
1.7 Dimensional specifications of C frame sizes 11 kW and 15 kW	11
1.8 Dimensional specifications of frame sizes D 18.5 kW - 30 kW	12
1.9 Dimensional specifications of E frame sizes 37 kW and 45 kW	13
1.10 Dimensional specifications of frame sizes F 55 kW to 160 kW	14
1.11 Dimensional specifications of frame sizes G 200 kW	15
1.12 Openings for mounting the external control panel	16
Chapter 2 Installation and wiring	17
2.1 Environment and installation requirements	17
2.2 Connection of inverter V 800 to power grid.....	17
2.2.1 Description of peripheral devices	17
2.2.2 Measures for connecting the main circuit	18
2.3.1 Conditions for connecting the inverter and cabling	19
2.3.2 Basic wiring diagram V 800 – 2S and 4T, equipment type R	20
Control terminal block for equipment type R models	22
2.3.3 Basic wiring diagram V 800 – 2S, equipment type S	24
Control terminal block for equipment type S models	26
2.3.4 Basic wiring diagram V 800 – 4T. equipment type T	28
Control terminal block for equipment type T models	30
2.3.5 Basic wiring diagram V 800 – 4T, equipment type U	32
Control terminal block for equipment type US models	34

2.3.6 Basic wiring diagram V 800 – 4T, equipment type V	36
Control terminal block for equipment type V models	38
2.3.7 Power terminal blocks V 800 and their description	39
Chapter 3 Operation	41
3.1 Description of the single-line digital panel	41
3.1.1 Picture of the panel for models 0.4 kW - 30 kW	41
3.1.2 The descriptions of the button's function	41
3.1.3 The descriptions of the light indicator	42
3.2 Description of the two-line digital panel	43
3.2.1 Picture of the panel for models 37 kW - 200 kW	43
3.3 Operation	45
3.3.1 Parameter setting	45
3.3.2 RESET errors	46
3.4 First start	46
3.4.1 First start for a V/F driven drive	46
3.4.2 First boot for the drive controlled by the SFVC method	47
3.5 Inverter operation	47
3.5.1 Initialization during power-on	47
3.5.2 Standby status of the inverter	48
3.5.3 Inverter operation	48
3.5.4 Fault messages	48
3.5.5 Setting PTC and TK of motor thermal protection	48
3.6 Quick start-up	49
Example 1: first start in V/F control mode	50
Example 2: first start in SFVC control mode	51
Chapter 4: List of function parameters – abbreviated	52
Group P0: Basic parameters	52
Group P1: Start / Stop control	55
Group P2: Motor parameters	57
Group P3: Vector control parameters	58


Group P4: V/F control parameters	60
Group P5: Input terminals X	62
Group P6: Output terminals	67
Group P7: Control panel and display	69
Group P8: Auxiliary functions	72
Group P9: Faults and protection	75
Group PA: PID process control functions	81
Group PB: Variable frequency, fixed length and count	84
Group PC: Multiple functions and simple PLC function	85
Group PD: Communication parameters	89
Group PF: Reserved for service purposes	89
Group PP: Restoring the factory setting and blocking the change of parameters	90
Group C0: Torque control and parameter limitation	90
Group C5: Control optimization parameters	91
Group C6: FI curve setting (FI is FIV or FIC)	91
Group C9: Special function PID	92
Group CC: Correction of FI/FO values	93
Group D0: Monitoring parameters.....	94
Example No. 1 Parameterizations of inverse control 10 V to 0 V	96
Example No. 2 Parameterization of braking resistance	96
Example No. 3 Parameterizations for the control of the el. motor of the crane	97
Example No. 4 Application PID	98
Example No. 5 High-speed spindle operation parameters	98
Chapter 5: Detailed description of parameters	99
Group P0: Basic parameters	99
Group P1: Start / Stop control	110
Group P2: Motor parameters	116
Group P3: Vector control parameters	118
Group P4: V/F control parameters	121
Group P5: Input terminals	127


Group P6: Output terminals	139
Group P7: Control panel and display	144
Group P8: Auxiliary functions	149
Group P9: Faults and protection	161
Group PA: PID process control functions	169
Group PB: Variable frequency, fixed length and count	176
Group PC: Multiple functions and simple PLC function	178
Group PD: Communication parameters	185
Group PP: Restoring the factory setting and blocking the change of parameters	185
Group C0: Torque control and parameter limitation	186
Group C5: Control optimization parameters	187
Group C6: FI curve setting (FI is FIV or FIC)	189
Group C9: Special function PID	191
Group CC: Correction of FI/FO values	191
Group D0: Monitoring parameters	193
Chapter 6 Fault checking and elimination	195
6.1 Fault display and elimination	195
6.2 Common faults and their solution	200
Chapter 7 Maintenance	202
7.1 Inspection.....	202
7.2 Periodic maintenance	203
7.3 Replacement of wearing parts	203
7.4 V 800 Inverter warranty.....	204
7.4.1 Inverter tests	204
7.4.2 Warranty period	204
7.4.3 Warranty terms	204
7.4.4 The warranty does not apply to defects caused	204
Declaration of Conformity	205
Annex A Communication protocol	206
Directory of MODBUS communication parameters	211

Chapter 1:

Safety instructions

Follow this instruction manual before installation, operation, maintenance or inspection. In this manual, safety precautions are marked with the text "WARNING" or "CAUTION".

 **WARNING** Indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury. Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and damage to the equipment. This symbol is also used to warn of any security operations.

 **CAUTION** Using the actuator outside the specification range specified in the technical specifications may cause malfunction or damage to the actuator components. In exceptional cases, there is a risk of overheating, risk of ignition, damage to property and health, or loss of life.

* **NOTE** indicates a necessary operation to ensure proper operation of the device.

Warning signs are located on the front cover of the inverter. Follow these instructions when using the frequency inverter.



WARNING

- Only persons authorized to do so by law may install this device
- Follow the instructions in the manual before installation or operation.
- Disconnect all power cords before opening the front cover of the unit.
- Wait at least 10 minutes for the DC bus capacitors to discharge.
- Use proper grounding
- Never connect AC current to the output U VW terminals of the inverter

Safety conditions and protection for IEC applications

* Safety and protection must be ensured according to IEC 60364 and according to other local standards and regulations for electrical installation.


The machine equipment manufacturer shall ensure (applies to stationary equipment and their modules) that overcurrent protections on the network side interrupt the circuit within 5 seconds.

Static discharges on surfaces or interfaces that are not generally accessible (eg end pins or connector pins) can cause malfunctions. Therefore, it is necessary to observe ESD protective measures when working with drives or drive components.

General safety principles


Frequency converters also use dangerous voltage for their operation and control rotating mechanical parts that can be dangerous. Protection of direct contact with PANV (for voltage up to 60V according to EN61800-5-1) is allowed only in connected spaces and in dry indoor spaces.

If these conditions are not met, other protective measures against electric shock must be taken, such as protective insulation. In principle, every frequency converter must be grounded. Since the leakage current of the inverter can be greater than 30mA AC, good grounding is necessary. The minimum size of the protective conductor must comply with the local safety conditions for equipment with high leakage currents.

 **WARNING** Applications with anti-interference filters can only be connected to power supplies with a neutral point.

Therefore, mount the frequency converter on a metal mounting plate. The mounting plate must not be painted and must have good electrical conductivity. It is strictly forbidden to disconnect from the network from the motor side if the inverter is running and the output current is not equal to zero.

They must also comply with the general and regional provisions on installation and safety for work on equipment with dangerous voltage (EN61800-5-1), as well as the relevant provisions regarding the correct use of tools and personal protective equipment (PPE).

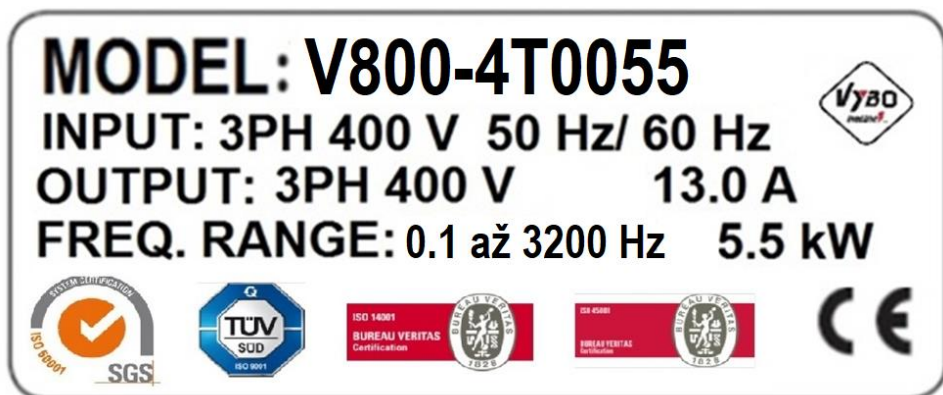
 **WARNING** In all operating modes of the control devices, the emergency stop device in accordance with EN 60204, IEC 204 (VDE 0113) must be functional. The failure of the emergency shutdown device must not lead to an uncontrolled or indefinite restart of the device. The use of radio devices (e.g. radios or mobile phones) in the immediate vicinity of the device may disrupt the function of the safety devices.

Operating and installation instructions for the V 800 series low-voltage frequency converter

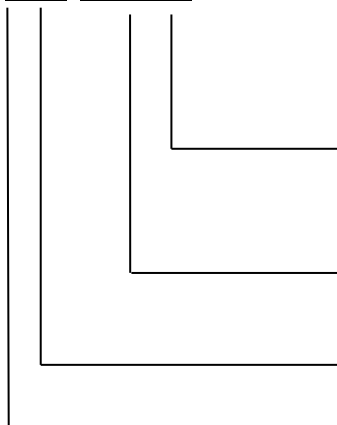
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1.0 Description of name plate



MODEL: V 800 -4T 0055



0055:5.5 kW

G: constant torque

P: variable torque

2S: 1 PH AC 230 V

4T: 3 PH AC 400 V

6T: 3 PH AC 690 V

800 Inverter series 800

V : VECTOR

1.1 Technical parameters

Parameter		VECTOR V 800
Power supply	Supply voltage	Input voltage range: 1 x 230 V AC \pm 10% 3 x 400 V AC \pm 10%
	Power supply frequency	Power supply frequency range 47 - 63 Hz
Standard functions	Control mode	V/F scalar control SFVC vector control with open circuit
	Maximum frequency	SFVC vector control: 0-320 Hz V/F scalar control: 0-3200Hz
	Carrier frequency	1 – 16 kHz The carrier frequency is automatically adjusted based on the load characteristic.
	Input frequency resolution	Digital setting 0.01 Hz Analogy setting: maximum frequency x 0.025%
	Initial torque	G type: 0.5 Hz/150% (SFVC) P type: 0.5 Hz/100%
	Speed range	1:100 (SFVC)
	Stability of speed	\pm 0.5% (SFVC)
	Torque control accuracy	\pm 5% (SFVC)
	Overload size	G type: 60s for 150% rated current, 3s for 180% rated current P type: 60s for 120% rated current, 3s for 150% rated current
	Increase of torque	Auto-boost or user manual boost 0.1% to 30.0%
	V/F curve	Integrated with "C1" designation of class C1. Without marking C2.
	V/F separation	Linear V/F curve Multi-point V/F curve N-voltage V/F curve (multiple of 1.2-voltage, 1.4- voltage, 1.6- voltage, 1.8- voltage, modified)
	Ramp modes	Two types: complete separation; half separation
Overload size	Linear curve The ramp of S-curve type Four sets of acceleration / deceleration in ranges of 0.0 - 6500.0 sec	

Parameter	VECTOR V 800
DC braking	Braking frequency: 0.3 Hz to maximum frequency Braking time: 0.0-100.0 s Braking current: 0.0% -100.0%
Control in JOG mode (stepping)	JOG frequency range: 0.00-50.00 Hz JOG acceleration / deceleration time: 0.0-6500.0 s
Preset fixed speeds	Implemented up to 16 speeds using a simple PLC function or combinations of end states X.
Built-in PID controller	Facilitates a process-driven closed-loop control system.
Automatic voltage control AVR	When changing the supply voltage, it can automatically maintain a constant output voltage.
Overvoltage and overcurrent control	Current and voltage are automatically limited during operation to prevent frequent tripping due to overvoltage and over current.
Torque limitation and control	It can automatically limit the torque and prevent frequent over current during run.
STO safety function	"Emergency stop" system: In emergency situations, the inverter stops immediately after activating STO.
Speed limitation of current	It helps to prevent frequent errors due to over current of the AC motor
High power	AC motor control is realized by high power vector current control technology.
Time management	Time range: 0.0-6500.0 minutes
Communication protocol	RS485 MODBUS RTU
Channel of trigger commands	According to the panel, control terminals, the serial communication port can be switched in many ways.
Frequency source	10 kinds of frequency, given by digital analog voltage, analog current, pulse, serial port, can be switched in many ways
Auxiliary source of frequency	10 kinds of frequencies, micro adjustment can be easily realized, frequency synthesizer

Standard functions

Input and output	Input terminals	6 digital inputs 2 analog inputs, one of which supports 0-10V input and the other supports 0-10V or 4-20mA input.
	Output terminals	1 digital output, 1 relay output, 1 analog output terminal, with 0-20 mA /0-10 V output
	PTC	Input for PTC protection of the electric motor
	LED display	Displays the parameters
	Key lock and function selection	It can block the buttons partially or completely and define the function range of some buttons to prevent incorrect function.
	Protective mode	Motor short circuit detection at power on, output phase loss protection, over current protection, over voltage protection, under voltage protection, over temperature protection and overload protection.
	EMC (Compatibility)	IEC 61000-4-6; IEC 61000-4-4; IEC 61000-4-11; IEC 61000-4-5
	Standards	EN/IEC 61800-3: 2017; C1, which is suitable for the 1st environment; EN/IEC 61800-3: 2017; C2, which is suitable for the 1st environment;
	Installation in the environment	Indoors, avoid direct sunlight, salt, dust, corrosive or flammable gas, smoke, steam. Resistance to chemical contamination class 3C3 EN/IEC 60721-3-3. Resistance to dust contamination 3S3EN/IEC 60721-3-3.
	Height above sea level	Below 1000 meters above sea level (reduce the load level when using above 1000 meters above sea level)
	Ambient temperature	-10 °C ~ 40 °C (reduce the power level if the ambient temperature is between 40 °C and 50 °C)
	Humidity	Less than 95% relative humidity, non-condensing IEC 60068-2-3
	Vibrations	Less than 5.9 m/s ² (0.6 g) IEC 60068-2-6
Storage temperature	-20°C až + 60°C	

1.2 Instructions for selecting an inverter V800

Type of model	Size	Rated output power (kW)	Maximum input current (A)	Rated output current (A)	Engine power (kW)
1PH / 3PH AC 230 V ±15%					
V 800-2S0004	A2S	0.4	5.4	2.4	0.4
V 800-2S0007	A2S	0.75	7.2	4.5	0.75
V 800-2S0015	A2S	1.5	10	7.0	1.5
V 800-2S0022	B2S	2.2	16	10.0	2.2
V 800-2S0030	B2S	3.0	23	16.0	3.0
3PH / 3PH AC 400 V ±15%					
V 800-4T0007	A4T	0.75	3.8	2.5	0.75
V800-4T0011	A4T	1.1	4.5	3.0	1.1
V 800-4T0015	A4T	1.5	5	3.7	1.5
V800-4T0022	A4T	2.2	5.8	5.0	2.2
V 800-4T0030	B4T	3.0	8.0	7.5	3.0
V 800-4T0040	B4T	4.0	10.0	9.0	4.0
V 800-4T0055	B4T	5.5	15.0	13.0	5.5
V 800-4T0075	B4T	7.5	19.0	17.5	7.5
V 800-4T0110	C	11	26.0	25.0	11
V 800-4T0150	C	15	35.0	32.0	15
V 800-4T0185	D	18.5	38.0	37.0	18.5
V 800-4T0220	D	22	46.0	45.0	22
V 800-4T0300	D	30	62.0	60.0	30
V 800-4T0370	E	37	76.0	75.0	37
V 800-4T0450	E	45	92.0	90.0	45
V 800-4T0550	F	55	112.0	110.0	55
V 800-4T0750	F	75	155.0	150.0	75
V 800-4T0900	F	90	180.0	176.0	90
V 800-4T1100	F	110	215.0	210.0	110
V 800-4T1320	F	132	260.0	253.0	132
V 800-4T1600	F	160	310.0	300.0	160
V 800-4T2000	G	200	390.0	380.0	200

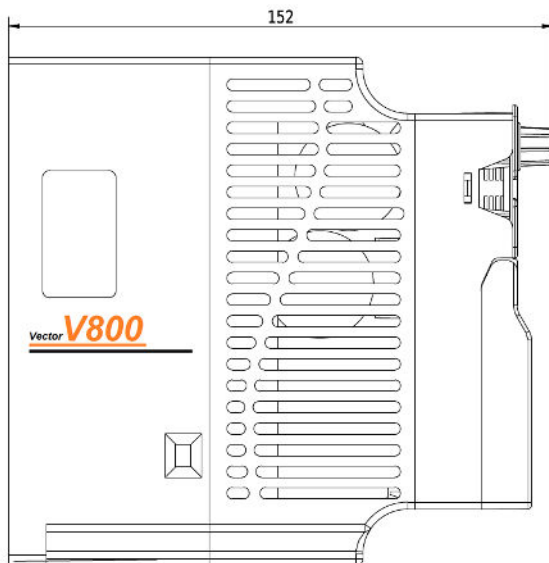
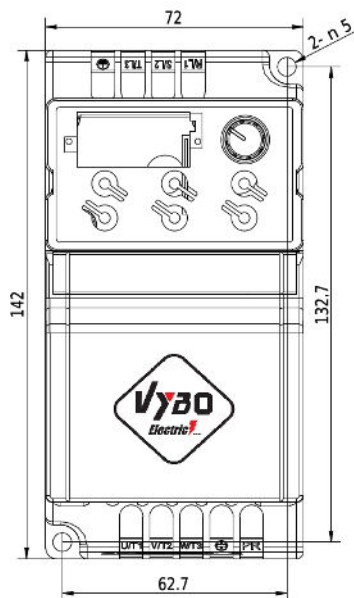
1.3 Selected performance parameters of the V800

Type of converter used	Input voltage 50/60 Hz	Engine power (kW)	Power wire cross-section (mm ²) *recommended	Recommended fuses IEC 60269 gG (A)
V 800-2S0004	1 phase 230 V	0.4	1.5	10
V 800-2S0007		0.75	1.5	16
V 800-2S0015		1.5	2.5	25
V 800-2S0022		2.2	4.0	32
V 800-2S0030		3.0	4.0	40
V 800-4T0004	3 phases 400 V	0.4	1.5	6
V 800-4T0007		0.75	1.5	6
V800-4T0011		1.1	1.5	10
V 800-4T0015		1.5	1.5	10
V 800-4T0022		2.2	1.5	10
V 800-4T0030		3.0	2.5	16
V 800-4T0040		4.0	2.5	16
V 800-4T0055		5.5	2.5	20
V 800-4T0075		7.5	4	32
V 800-4T0110		11	4	32
V 800-4T0150		15	6	40
V 800-4T0185		18.5	10	50
V 800-4T0220		22	10	50
V 800-4T0300		30	16	63
V 800-4T0370		37	25	100
V 800-4T0450		45	25	100
V 800-4T0550		55	35	125
V 800-4T0750		75	50	160
V 800-4T0900		90	70	225
V 800-4T1100		110	95	250
V 800-4T1320		132	120	315
V 800-4T1600		160	120	350
V 800-4T2000		200	185	500

1.4 Table of suitable braking resistors

Type of converter used		Braking resistors		Motor power (kW)
		Power (kW)	Resistance value (Ω) (\geq)	
V 800-2S0004	Built-in BU	0,08	200	0.40
V 800-2S0007	Built-in BU	0,08	150	0.75
V 800-2S0015	Built-in BU	0,10	100	1.5
V 800-2S0022	Built-in BU	0,10	70	2.2
V 800-2S0030	Built-in BU	0,25	65	3.0
V 800-4T0004	Built-in BU	0,15	300	0.4
V 800-4T0007	Built-in BU	0,15	300	0.75
V800-4T0011	Built-in BU	0,15	220	1.1
V 800-4T0015	Built-in BU	0,15	220	1.5
V 800-4T0022	Built-in BU	0,25	200	2.2
V 800-4T0030	Built-in BU	0,30	130	3.0
V 800-4T0040	Built-in BU	0,30	130	4.0
V 800-4T0055	Built-in BU	0,40	90	5.5
V 800-4T0075	Built-in BU	0,50	65	7.5
V 800-4T0110	Built-in BU	0,50	65	11
V 800-4T0150	Built-in BU	0,80	43	15
V 800-4T0185	Built-in BU	1,00	32	18.5
V 800-4T0220	Built-in BU	1,30	25	22
V 800-4T0300	Built-in BU	1,50	22	30
V 800-4T0370	Built-in BU	2,50	16	37
V 800-4T0450	Built-in BU	3.70	12.6	45
V 800-4T0550	External BU	4.50	9.4	55
V 800-4T0750	External BU	5.50	9.4	75
V 800-4T0900	External BU	7.50	6.3	90
V 800-4T1100	External BU	4.5 x 2	9.4x2	110
V 800-4T1320	External BU	5.5 x 2	9.4x2	132
V 800-4T1600	External BU	6.5 x 2	6.3x2	160
V 800-4T2000	External BU	6.5 x 3	6.3x3	200

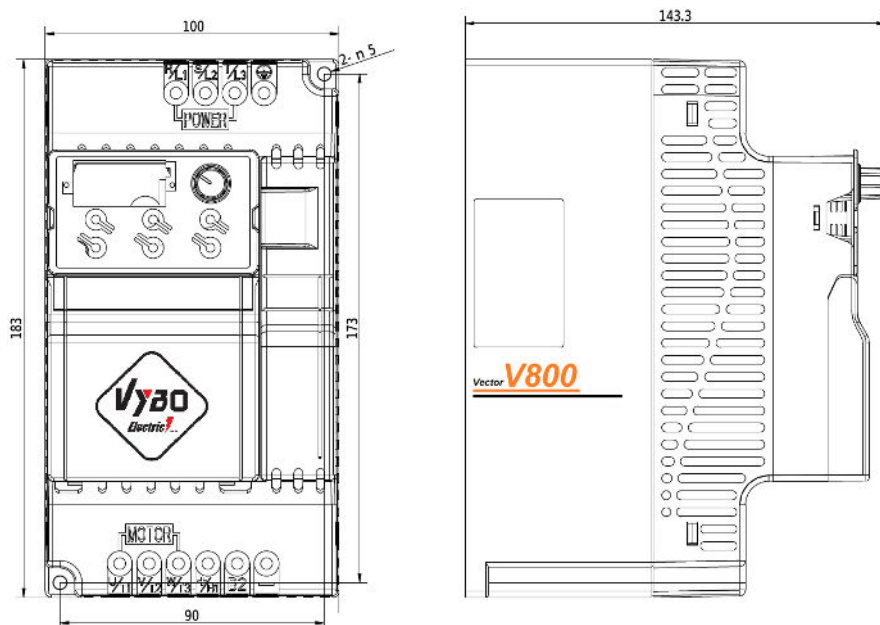
1.5 Dimensional specifications of frame sizes A2S and A4T



Model	External dimensions (mm)				Installation dimensions (mm)		
	W	H	H1	D	A	B	Ø d
V 800-2S0004 to 2S0015	72	142	-	152	62.7	132.7	5
V 800-4T0004 to 4T0022	72	142	-	152	62.7	132.7	5



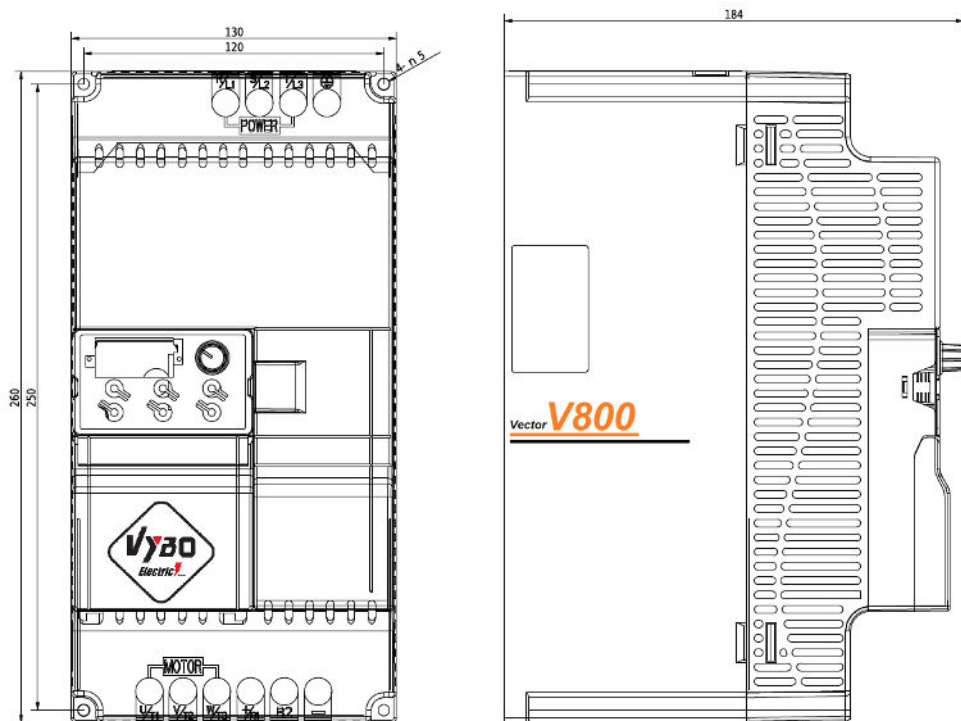
1.6 Dimensional specifications of frame sizes B2S and B4T



Model	External dimensions (mm)				Installation dimensions (mm)		
	W	H	H1	D	A	B	Ø d
V 800-2S0022 ; 2S0030	100	183	-	143	90	173	5
V 800-4T0030; 4T0040;4T0055;4T0075	100	183	-	143	90	173	5



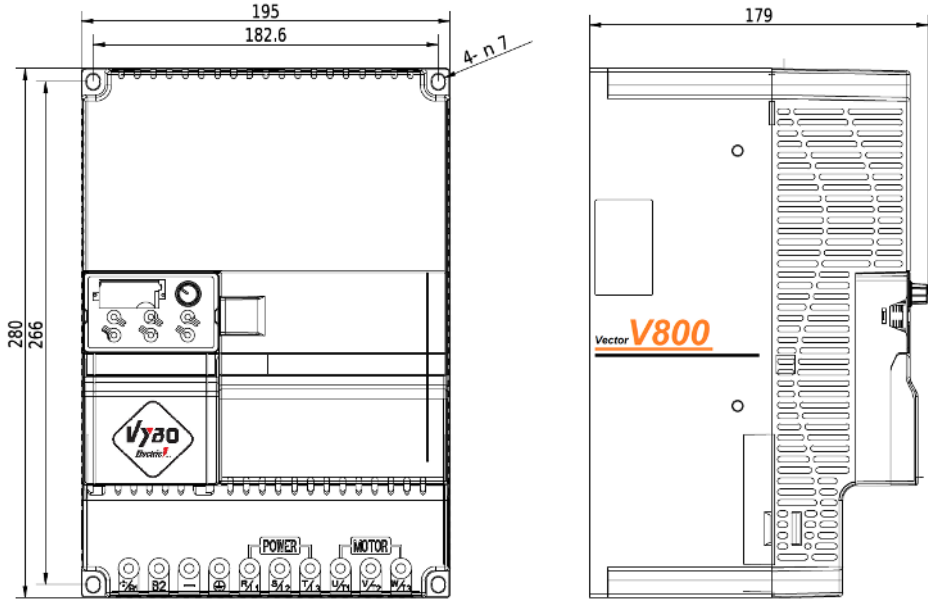
1.7 Dimensional specifications of frame sizes C 11 kW and 15 kW



Model	External dimensions (mm)				Installation dimensions (mm)		
	W	H	H1	D	A	B	Ø d
V 800-4T0110 V 800-4T0150	130	260	-	184	120	250	5



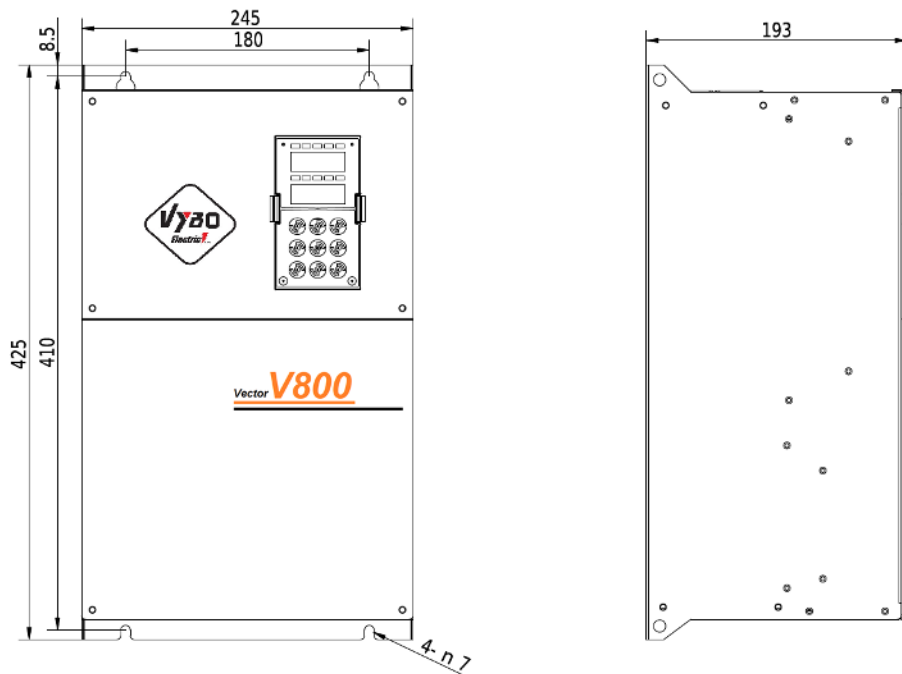
1.8 Dimensional specifications of frame sizes D from 18.5 kW to 30 kW



Model	External dimensions (mm)				Installation dimensions (mm)		
	W	H	H1	D	A	B	Ø d
V 800-4T0185	195	280	-	179	182.5	266	7
V 800-4T0220							
V 800-4T0300							



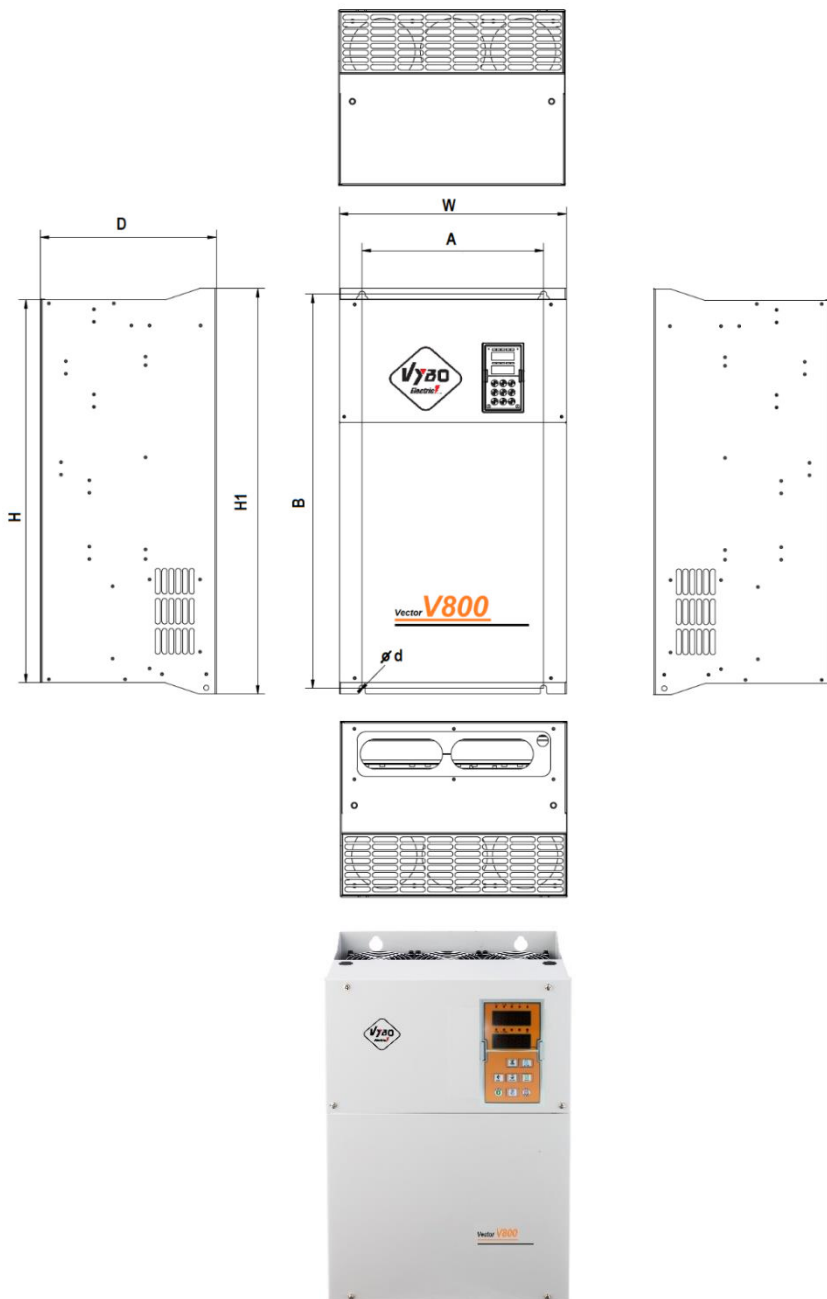
1.9 Dimensional specifications of frame sizes E 37 kW and 45 kW



Model	External dimensions (mm)				Installation dimensions (mm)		
	W	H	H1	D	A	B	Ø d
V 800-4T0370 V 800-4T0450	245	390	425	193	180	410	7

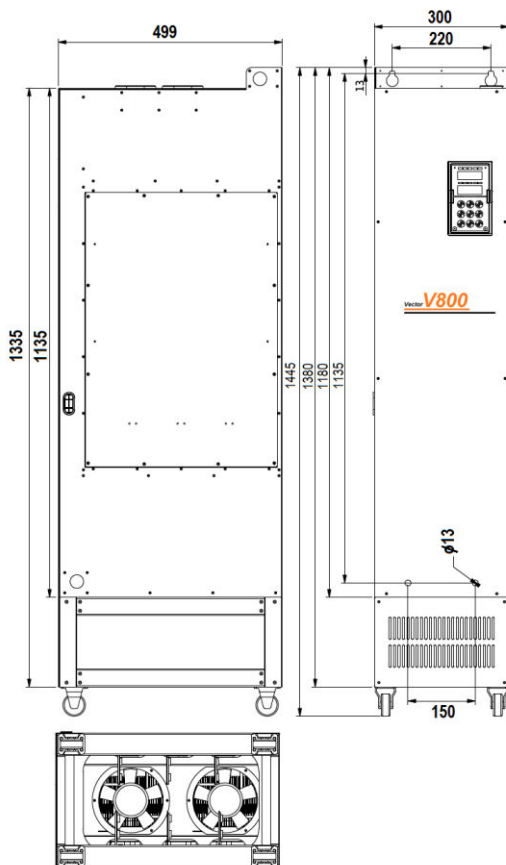


1.10 Dimensional specifications of frame sizes F from 55 kW to 160 kW



Model	External dimensions (mm)				Installation dimensions (mm)		
	W	H	H1	D	A	B	Ø d
V 800-4T0550 ; 4T0750	300	500	540	252	200	522	9
V 800-4T0900	338	546	576	256.5	270	560	9
V 800-4T1100 ; 4T1320	338	550	580	300	270	564	9
V 800-4T1600	400	675	715	310	320	695	11

1.11 Dimensional specifications of frame sizes G 200 kW

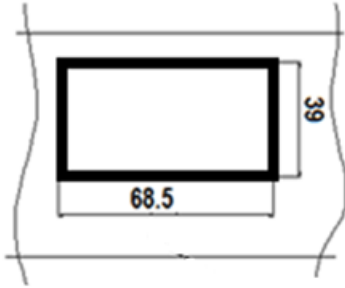


Model	External dimensions (mm)				Installation dimensions (mm)		
	W	H	H1	D	A	B	Ø d
V 800-4T2000	300	1380	1445	499	220	1135	13

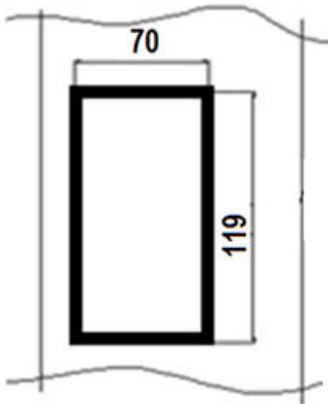
1.12 Openings for mounting the external control panel

For models ..0004 to 0300 (i.e. 0.4kW - 30 kW) 68,5 x 39 mm

For models..0370 and bigger (i.e. 37 kW and more) 70 x 119 mm



Opening for the keyboard (single-line display)



Opening for the keyboard (two-line display)

Chapter 2 Installation and wiring

2.1 Environment and installation requirements

- 3 The installation environment affects the life of the inverter and has a direct effect on the normal function, failure to comply with the environmental specifications could lead to a fault in the inverter.
- 4 For the VECTOR V 800 series inverter, use the vertical installation to ensure the best possible air flow and heat dissipation effect.
- 5 Ensure that you can meet the inverter's installation environment:
- 6
 - (1) - 10 ° C to + 40 ° C ambient temperature
 - (2) Ambient humidity 0 ~ 95%, no condensation
 - (3) Avoid direct sunlight
 - (4) The surrounding environment does not contain corrosive gas and liquid
 - (5) Dust-free environments, flying fibres, cotton and metallic particles
 - (6) Without radioactive material and fuel
 - (7) Distance from an electromagnetic interference source (such as an electric welding machine, a large powering machine)
 - (8) Install on a flat, vibration-free surface, if you cannot avoid vibrations, add anti-vibration pad to reduce vibration
 - (9) Install the inverter in a well-ventilated place, easily accessible for maintenance and for solid non-flammable material outside the heater (e.g. braking resistor, etc.)
- 7 (10) Installing the inverter requires plenty of space, especially in case more inverter installations, be careful with the location of the frequency inverter and place the cooling fans so that the ambient temperature is below 45 ° C.
- 8 (11) The rated output of the inverter applies to installations with an altitude of less than 1000 m. At an altitude above 1000 m the inverter performance decreases.

2.2 Connection of inverter V 800 to power grid

2.2.1 The descriptions of peripheral devices

(1) AC power supply

Use within the permissible power supply specifications of the inverter.

(2) Breaker

If the power supply voltage is low or the input terminal is short, the circuit breaker provides the option of disconnecting the inverter from the power supply during inspection, maintenance, or if the inverter does not work. Maximum disconnection times are according to STN 33 2000-4-41. To protect the input of the inverter, fuses with gR and gG characteristics

(semiconductor fuse) must be used. Fast fuses type: gG protects only short circuit, gR protect short circuit + overload.

(3) Electromagnetic contactor: (MC)

In order to ensure safety, the contactor allows the inverter to power on and off.

4) AC input reactor

Suppresses the higher harmonics to protect the inverter.

(5) Braking resistor

When braking the motor, the resistance can prevent the high voltage of the DC bus of the inverter and improve the braking capability of the internal braking unit.

2.2.2 Measures for main circuit wiring

(1) When connecting circuits, follow the requirements of electrical brands and standards.

(2) Using the supply voltage at the output terminals (U, V, W) of the inverter leads to its destruction.

(3) Use the insulated conductors and insulated protective tubes (if possible) to connect the power supply and ground them.

(4) The inverter and the welding unit, high performance motor and the like cannot use a common grounding cable.

(5) Earthing terminal E and earthing impedance are less than 10 ohms.

(6) Use the shortest earthing cable.

(7) Be careful not to create earthing loops when grounding multiple inverters.

8) Power cables and control cables must be separated, secure the distance of the power cables from parallel control cables to more than 10 cm, or when the cables and control cables are crossed. Parallel storage of power and control cables will cause interference.

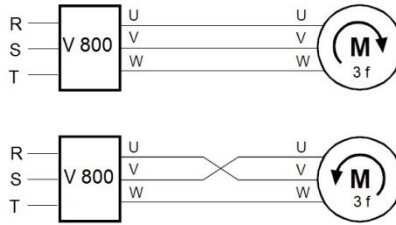
(9) Normally, the distance between the inverters and the motors is less than 30 m, the current generated by the parasitic capacitance can cause overshoot maximum current, incorrect operation, inverter failure and equipment failure. The maximum distance is 100 meters. If the distance is greater, put the reactor on the output side and lower the carrier frequency.

(10) Do not install an absorption capacitor or other capacitance resistive absorption devices!

(11) Make sure the terminals are fully tightened, the cables are well connected to the terminals, are not loose, do not cause sparks and short circuit. To minimize interference in 1st environment, it is recommended (if not installed in a particular inverter type)

- Install the EMC category C1 filter on the input side of the inverter;
- Protect the interference of other devices by means of a choke or an RFI filter.

(12) Changing the direction of rotation of the electric motor shaft: the direction of rotation can be changed by changing the two output lines at the output of the frequency converter or at the terminal block of the electric motor.



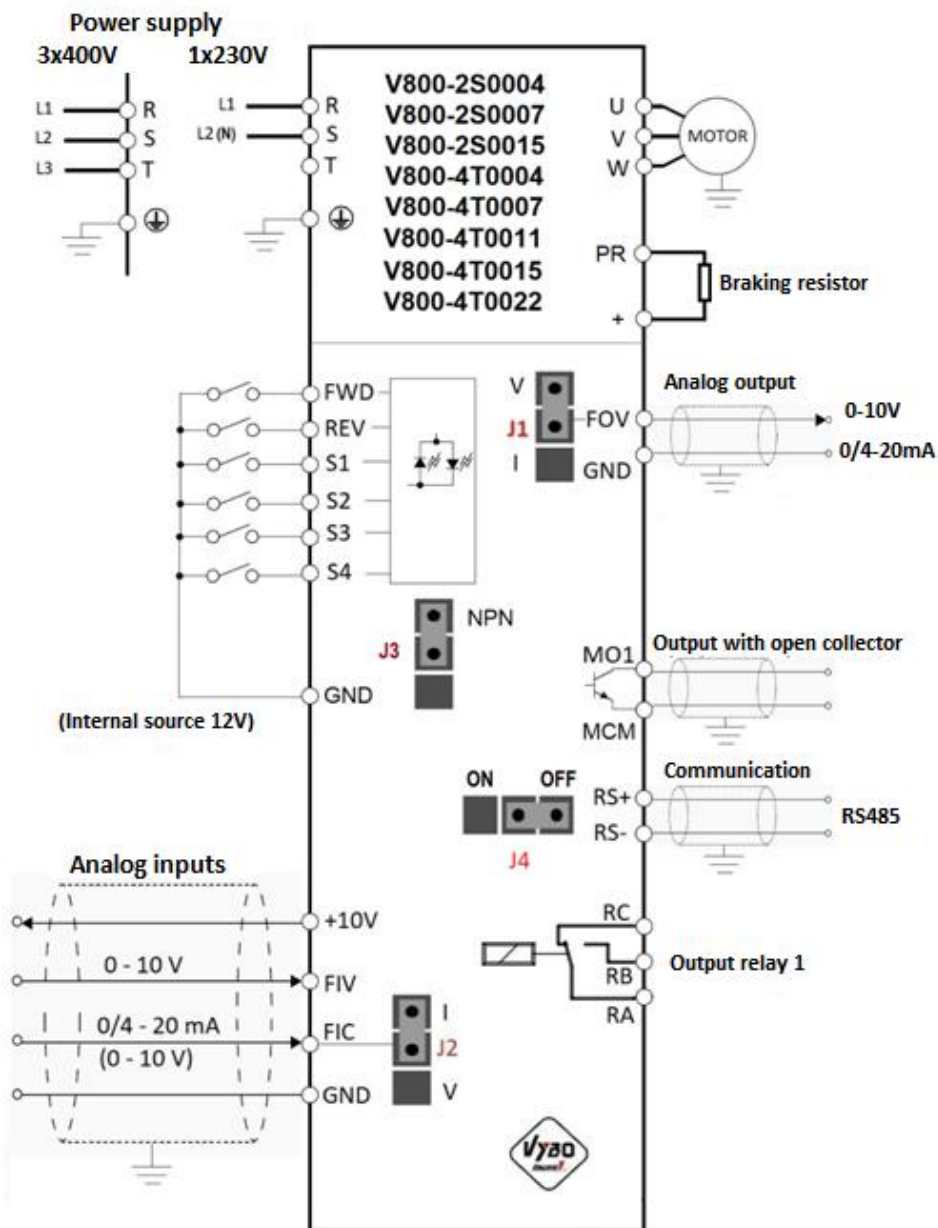
2.3.1 Inverter connection and cabling conditions

- (1) Place the control signal cables and the mains and other power lines apart.
- (2) Use a twisted pair or two-wire shielded conduit with a cross section of 0.5 to 2 mm² to avoid interference.
- (3) Ensure that the terminals used are suitable for maximum voltage and current load.
- (4) Use the correct earthing terminal E, the earthing resistance must be less than 10 ohms, according to STN EN 62305-3.

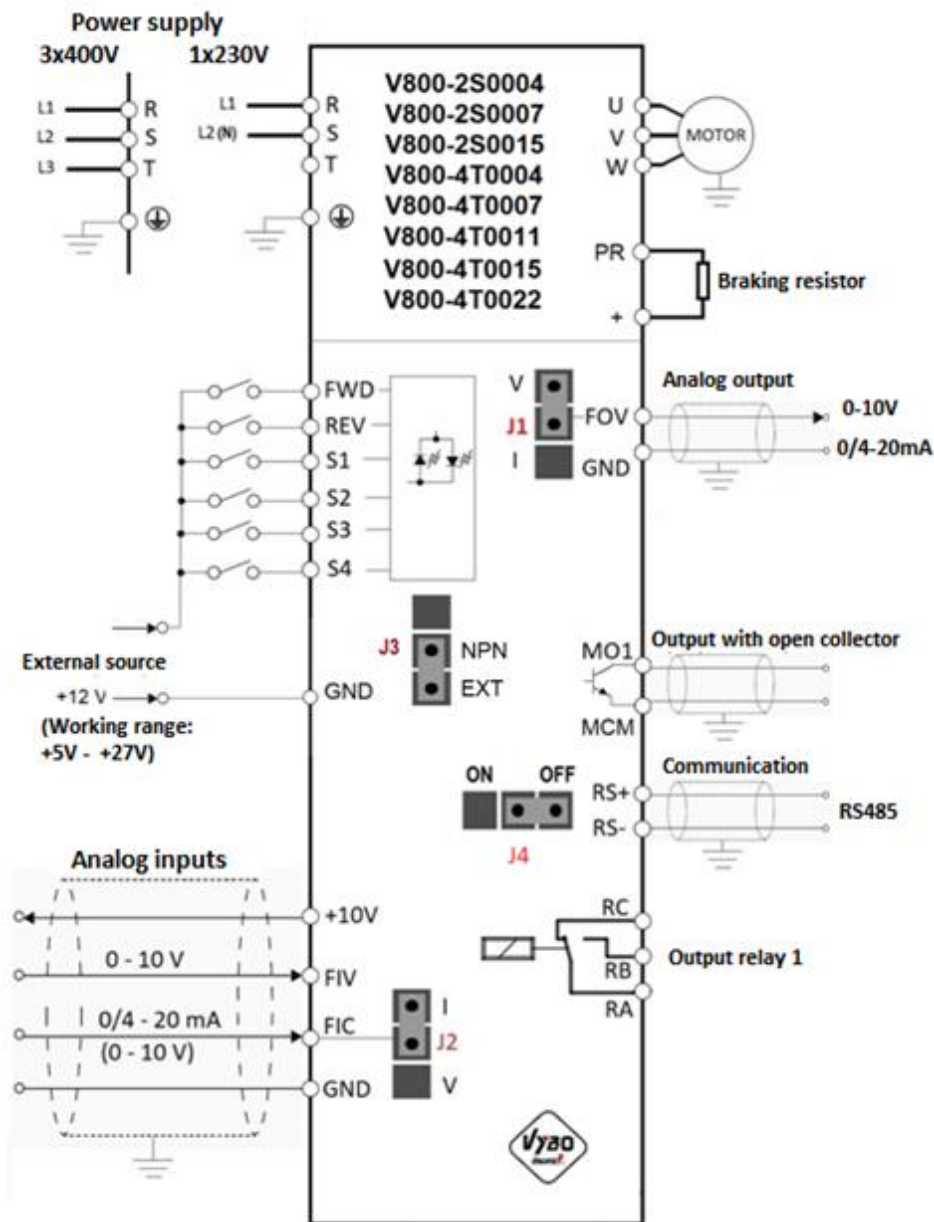
Use the prescribed cross section of the grounding wire. Protective wire cross sections must be calculated or determined according to the table (all according to STN 33 2000-5-54). The grounding point should be as close as possible to the inverter and the wire length should be as short as possible. In TN networks, the following requirements must be met:

- (4.1) The earthing resistance of the source node shall not be greater than 5 Ω. Under difficult soil conditions, a maximum of 15 Ω is allowed.
- (4.2) The total earthing resistance of PEN wires (including wires from the transformer and the ground point) for 230 V AC networks must not exceed 2 Ω.
- (4.3) The wire PEN in the TN-C network or the PE wire in the TN-S network must be grounded by a separate earthing device or connected to an existing system. The individual earthing of the PEN and PE wires should have a ground resistance of no more than 15Ω. At the end of the line and branch lines at the neutral point, the earthing resistance should be maximum 5 Ω.
- (5) Fulfil the requirements for the connection of each terminal, the right selection of accessories such as potentiometers, voltmeters, power supplies, cables, terminals, etc.
- (6) Power can be turned on after the connection is complete and checking that everything is properly connected.
- (7) The total length of the line should not exceed 100 m. Particularly in the remote connection, the current limiting function may be reduced, or the device or equipment connected to the inverter output side or the charging current may be malfunction due to a long electrical installation. Therefore, note the total lead length. It is recommended to use for outputs from inverter shielded cables, such as NYCY 3x cross section, NYCWY 3x cross section or ÖLFLEX® 4G, to minimize interference.

2.3.2 Basic wiring diagram of VECTOR V 800 – 2S and 4T. Equipment type R NPN Internal source

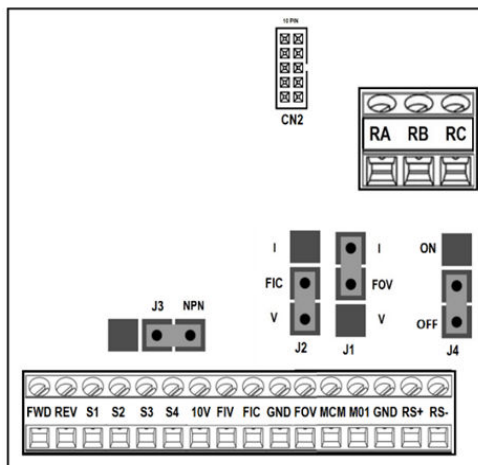


NPN External source

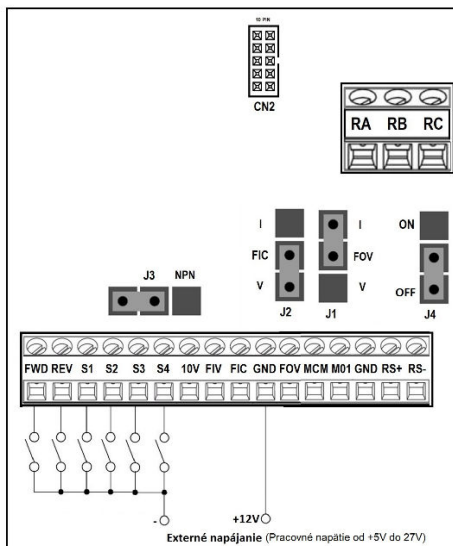


Control terminal block for equipment type R models

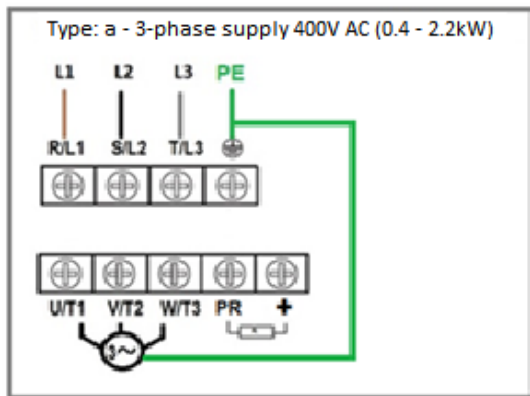
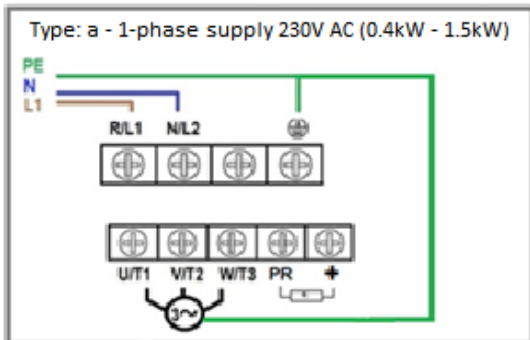
- Switch J2 determines whether the FIC is a voltage 0-10V or a current 4-20 mA input
 - Switch J1 determines whether the FOV is a voltage or current 4-20 mA output
 - Switch J3 determines whether the source of digital inputs is internal or external
 - Switch J4 determines the ON/OFF resistance of the communication line
 - CN2 is a 10PIN port for connecting a display or extension cable
- Type: NPN



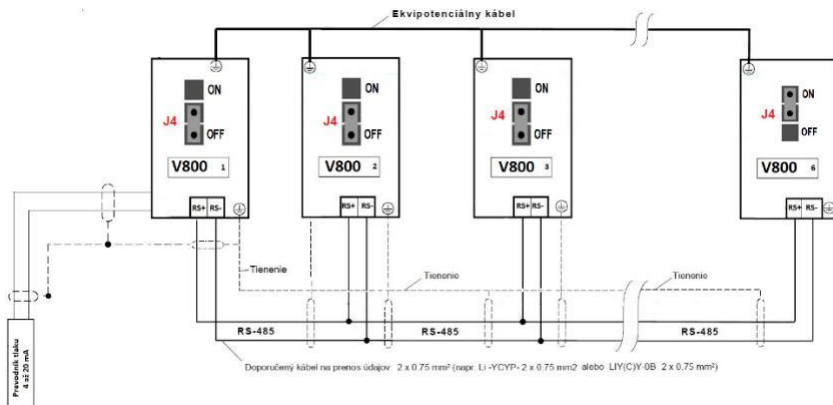
- Switch J2 determines whether the FIC is a voltage 0-10V or a current 4-20 mA input
 - Switch J1 determines whether the FOV is a voltage or current 4-20mA output
 - Switch J3 determines whether the digital input source is internal or external
 - Switch J4 determines the ON/OFF resistance of the communication line
 - CN2 is a 10PIN port for connecting a display or extension cable
- Type: NPN



Practical connection of the mentioned models

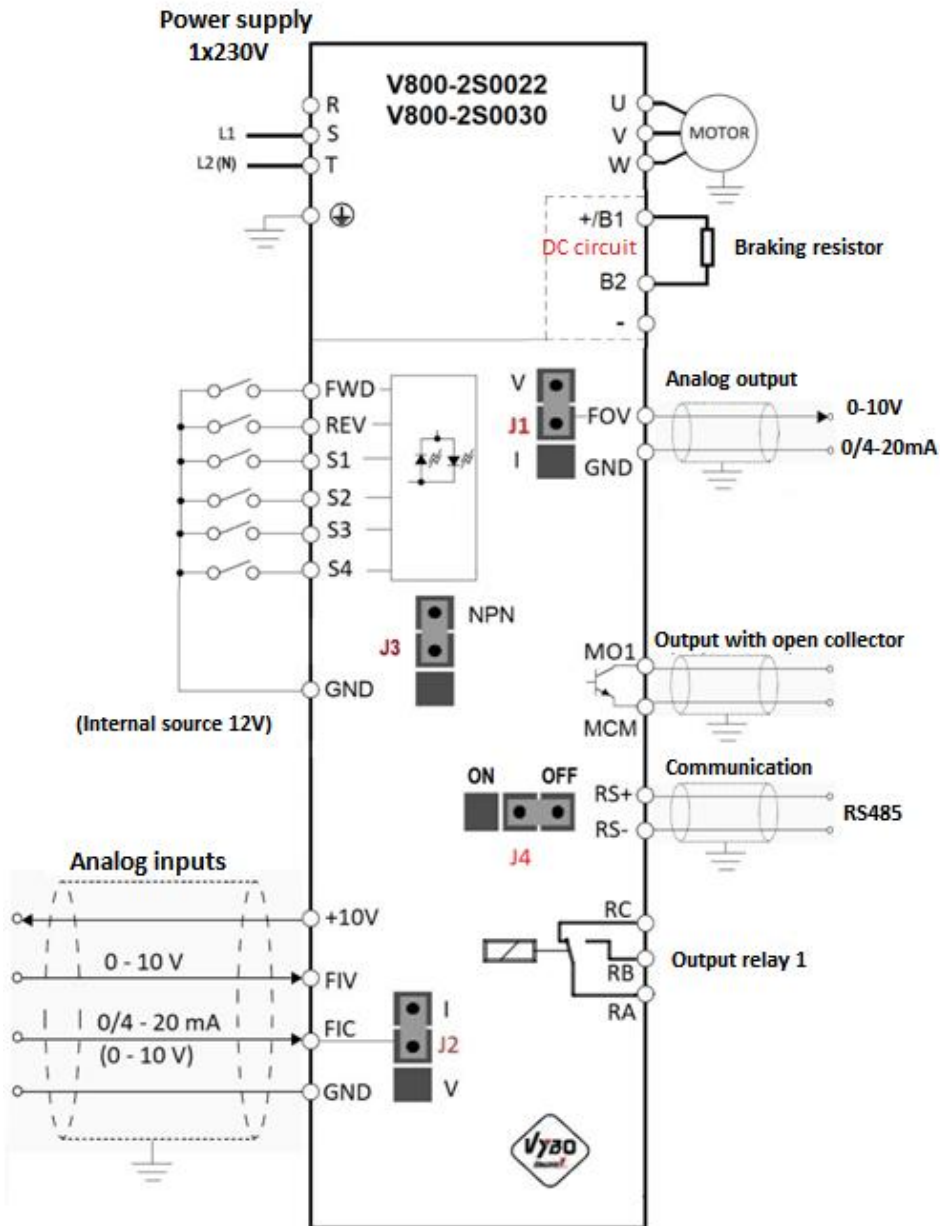


An example of connecting inverter control via RS485. For end FM, switch J4 to ON.

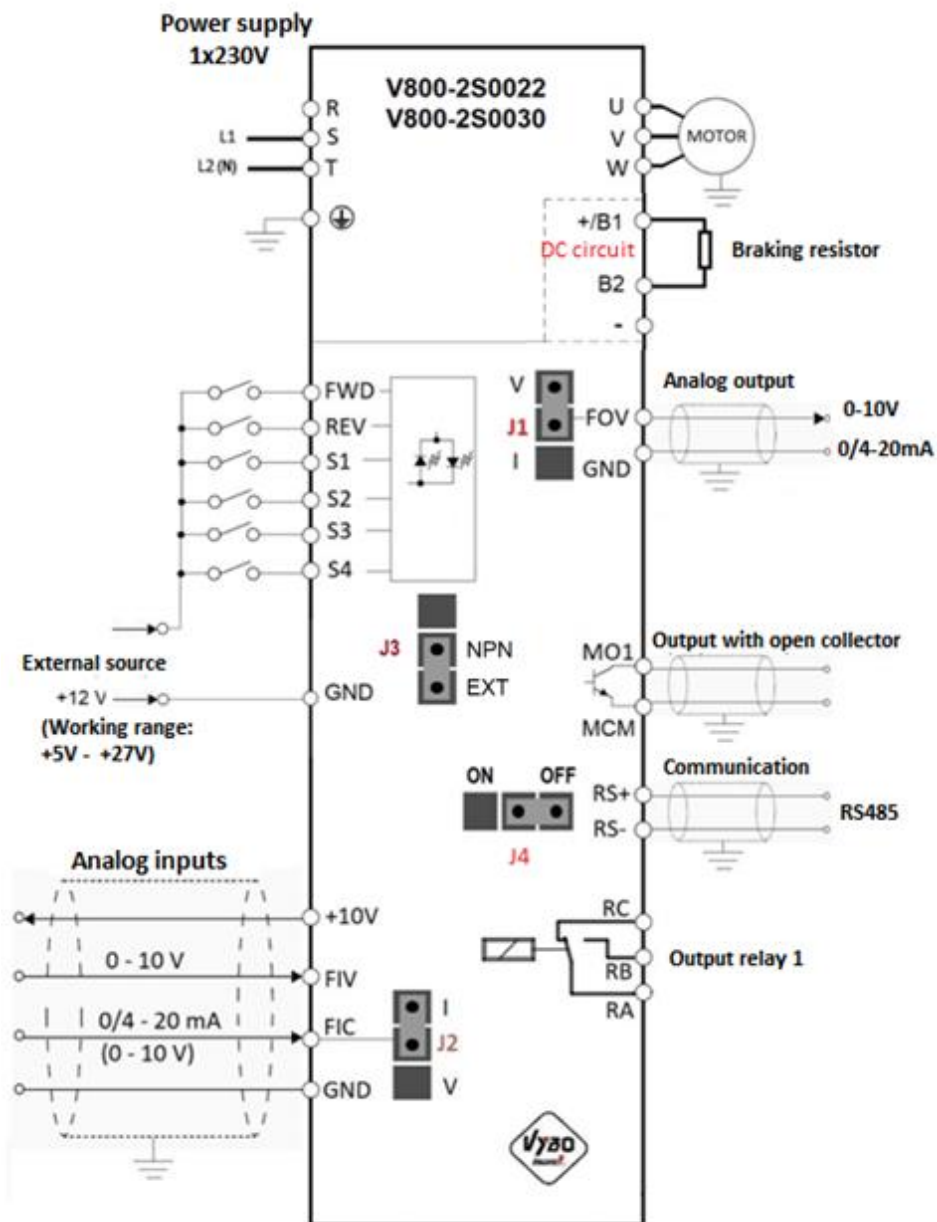


2.3.3. Basic wiring diagram VECTOR V 800 – 2S... equipment type S

NPN Internal source

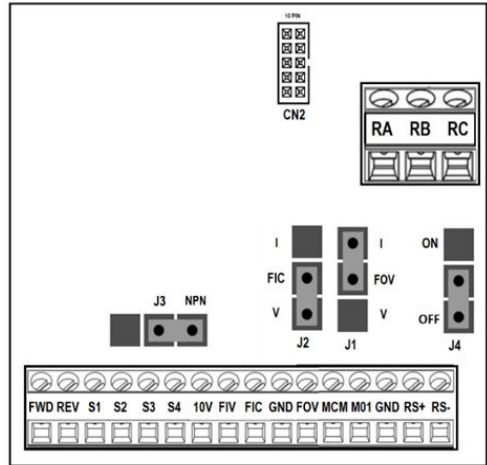


NPN Externý zdroj

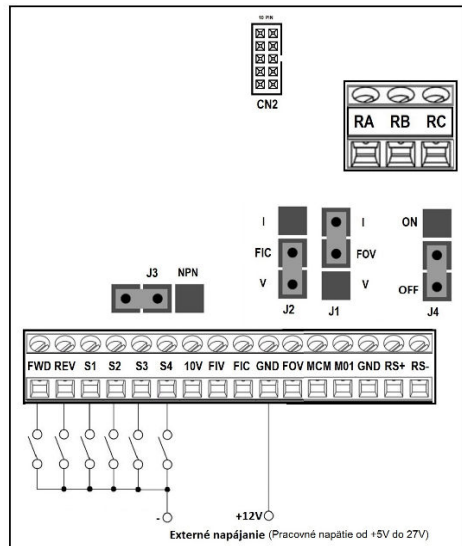


Control terminal block for equipment type S models

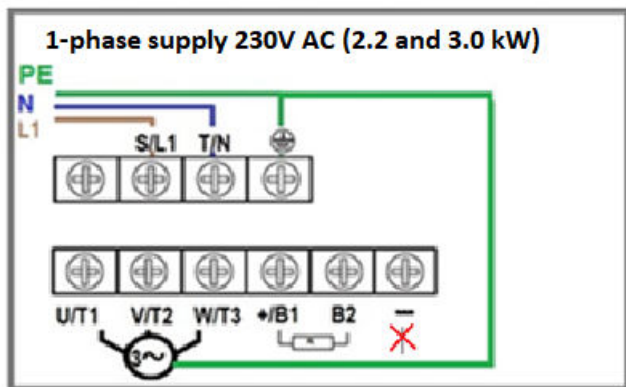
- Switch J2 determines whether the FIC is a voltage 0-10V or a current 4-20 mA input
 - Switch J1 determines whether the FOV is a voltage or current 4-20 mA output
 - Switch J3 determines whether the source of digital inputs is internal or external
 - Switch J4 determines the ON/OFF resistance of the communication line
 - CN2 is a 10PIN port for connecting a display or extension cable
- Type: NPN



- Switch J2 determines whether the FIC is a voltage 0-10V or a current 4-20 mA input
 - Switch J1 determines whether the FOV is a voltage or current 4-20 mA output
 - Switch J3 determines whether the source of digital inputs is internal or external
 - Switch J4 determines the ON/OFF resistance of the communication line
 - CN2 is a 10PIN port for connecting a display or extension cable
- Type: NPN

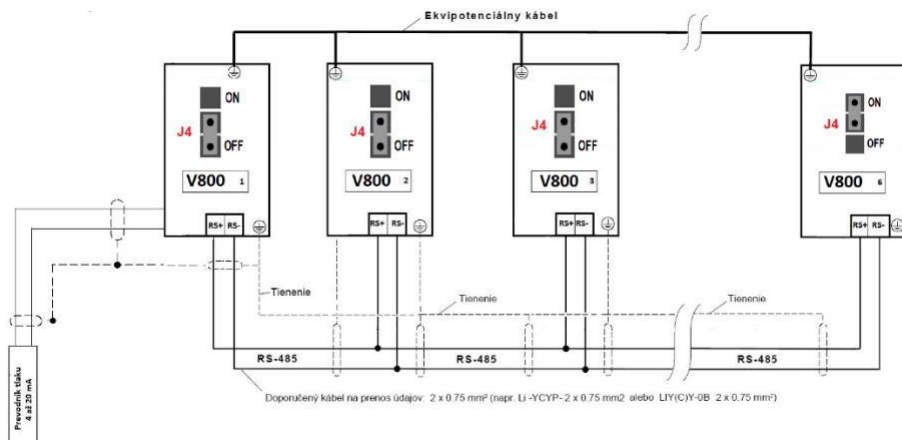


Practical connection of frequency converters V800-2S0022 and V800-2S0030...Type S



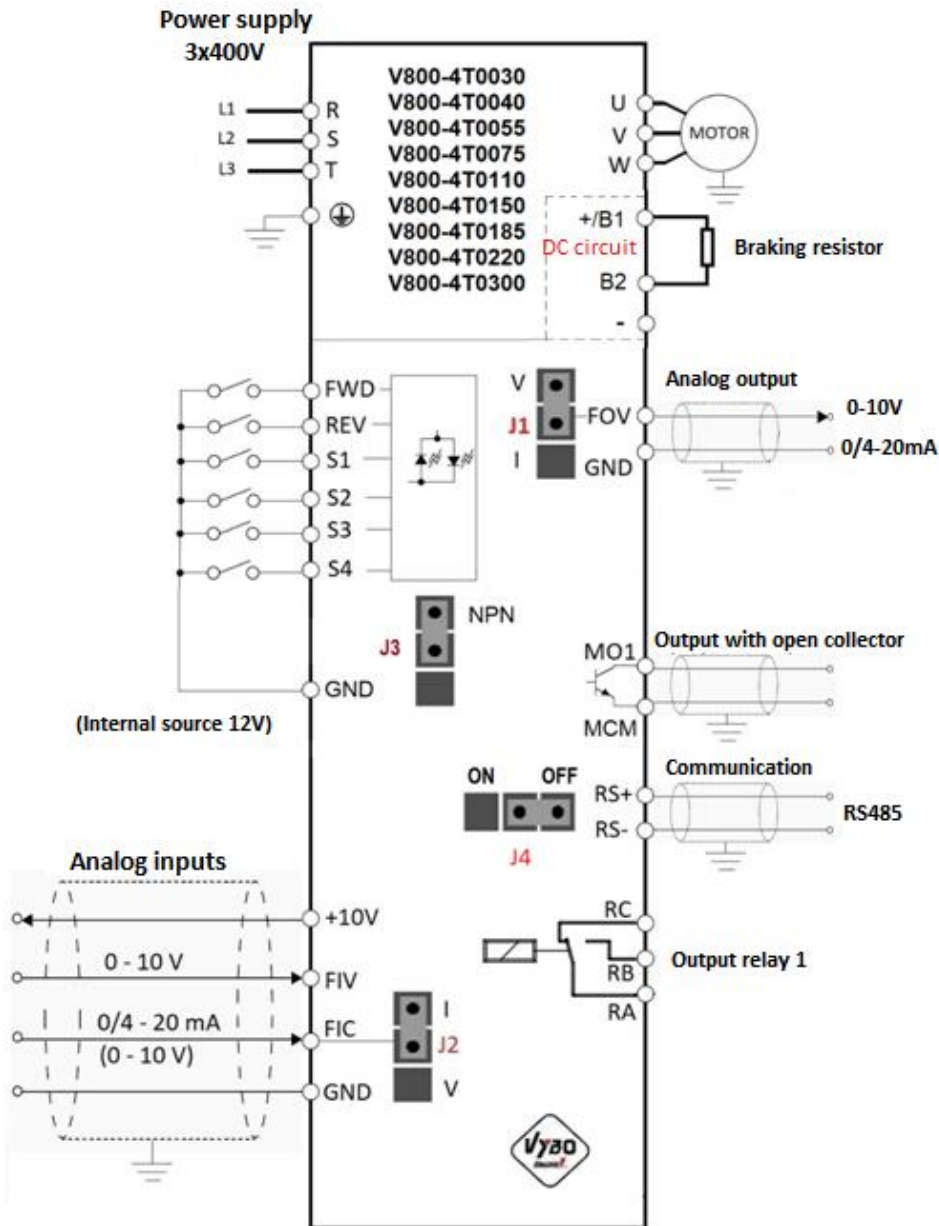
WARNING! Never connect the -DC intermediate circuit terminal to ground!

An example of connecting inverter control via RS485. For end FM, switch J4 to ON.

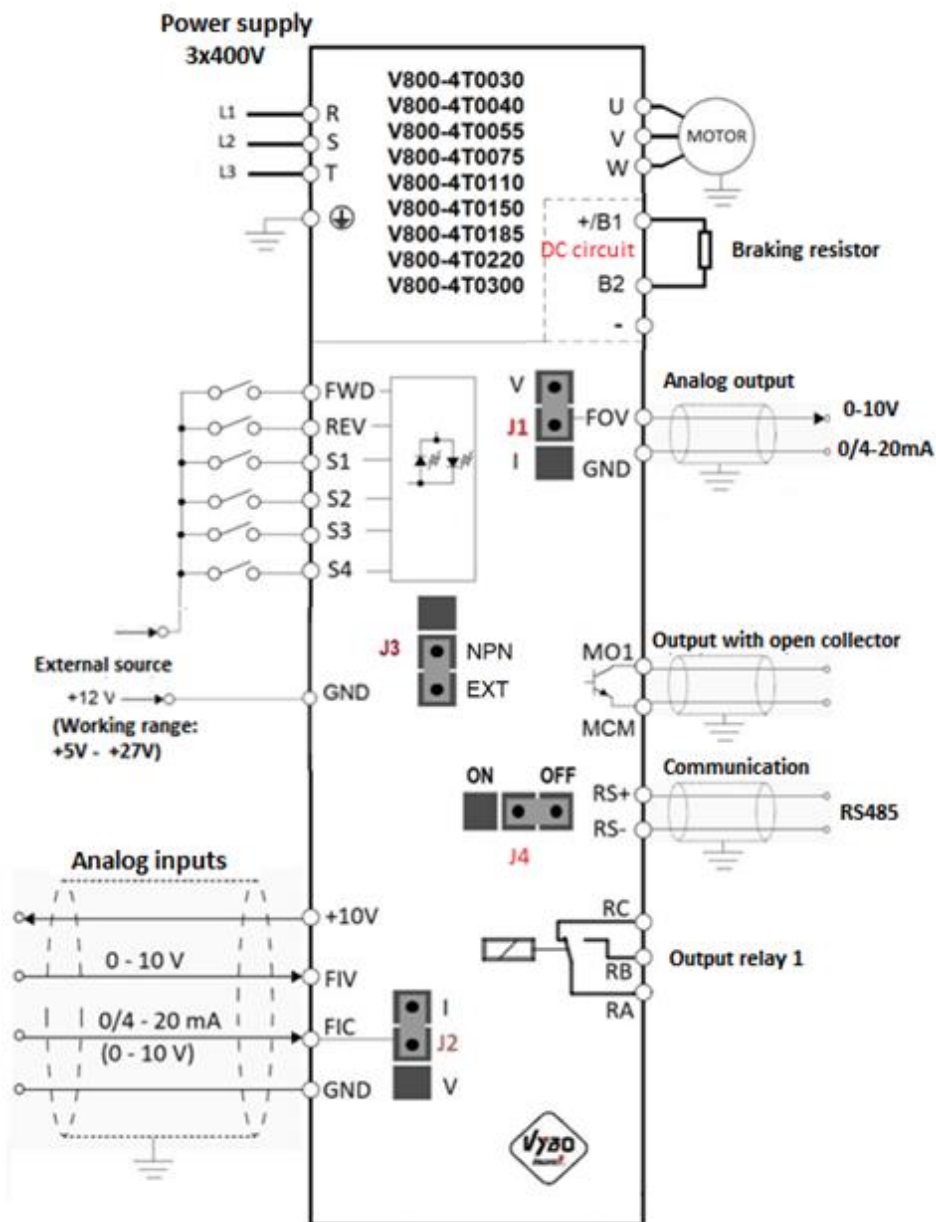


2.3.4. Basic wiring diagram VECTOR V 800 – 4T... equipment type T

NPN Internal source

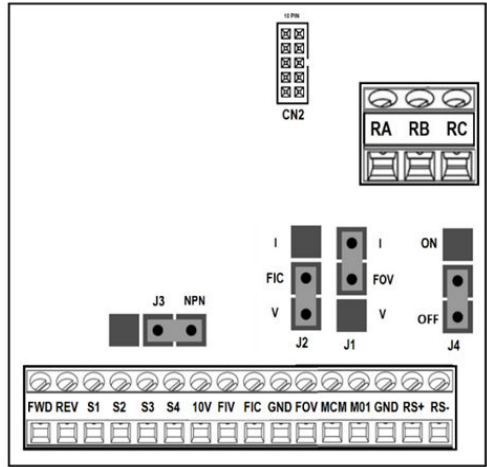


NPN Externý zdroj

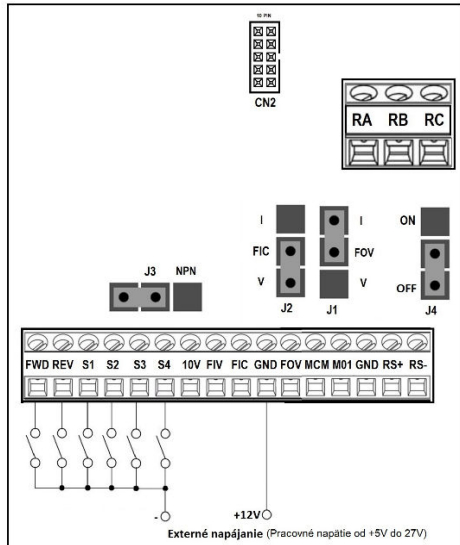


Control terminal block for equipment type T models

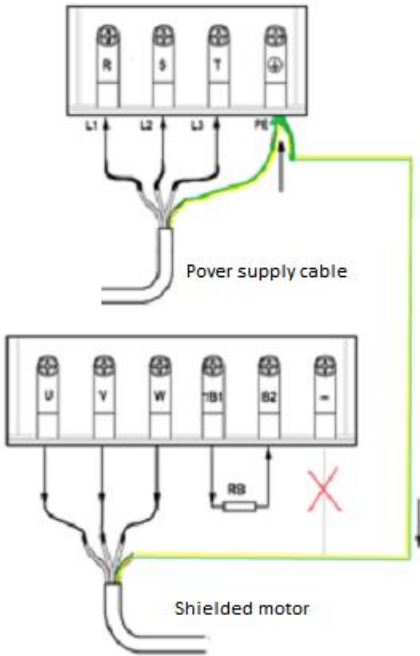
- Switch J2 determines whether the FIC is a voltage 0-10V or a current 4-20 mA input
 - Switch J1 determines whether the FOV is a voltage or current 4-20 mA output
 - Switch J3 determines whether the source of digital inputs is internal or external
 - Switch J4 determines the ON/OFF resistance of the communication line
 - CN2 is a 10PIN port for connecting a display or extension cable
- Type: NPN




- Switch J2 determines whether the FIC is a voltage 0-10V or a current 4-20 mA input
 - Switch J1 determines whether the FOV is a voltage or current 4-20 mA output
 - Switch J3 determines whether the source of digital inputs is internal or external
 - Switch J4 determines the ON/OFF resistance of the communication line
 - CN2 is a 10PIN port for connecting a display or extension cable
- Type: NPN



Connection of power part V800-4T0030 to 4T0150



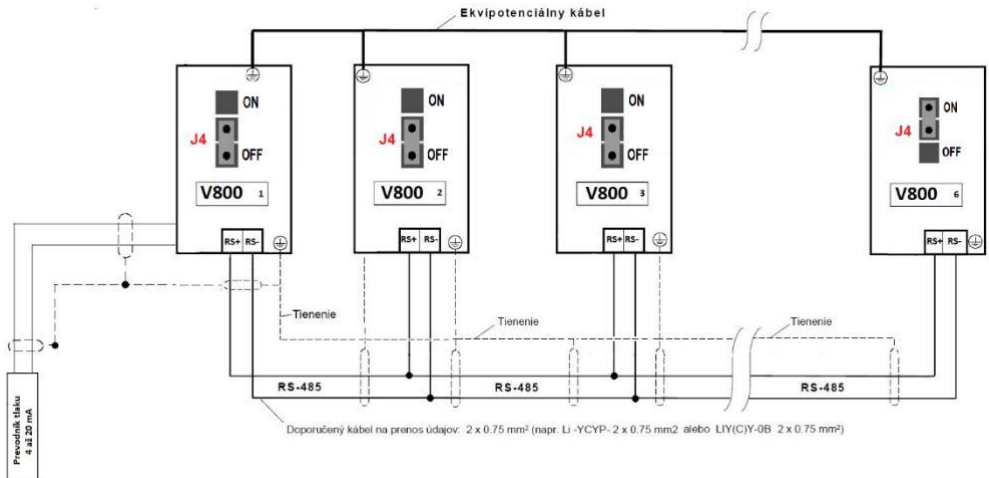
The R/S/T terminals are used to connect the power cable. The terminal  is common both for the supply and for the powered motor.

Terminals U/V/W are used to connect the electric motor, they are output terminals.

Terminals of the DC intermediate circuit +/B1 and B2 are used to connect the braking resistor (resistor).

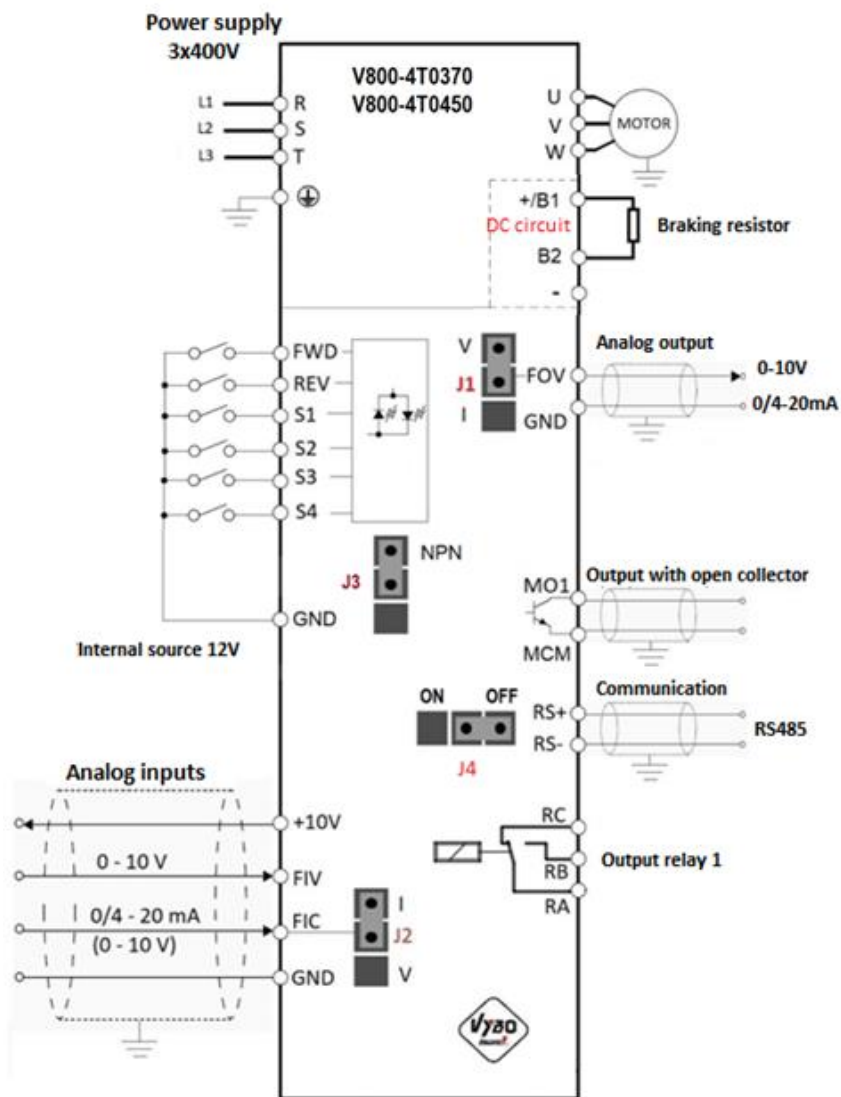
WARNING! Never connect the - DC intermediate circuit terminal to ground!

An example of connecting inverter control via RS485. For end FM, switch J4 to ON.

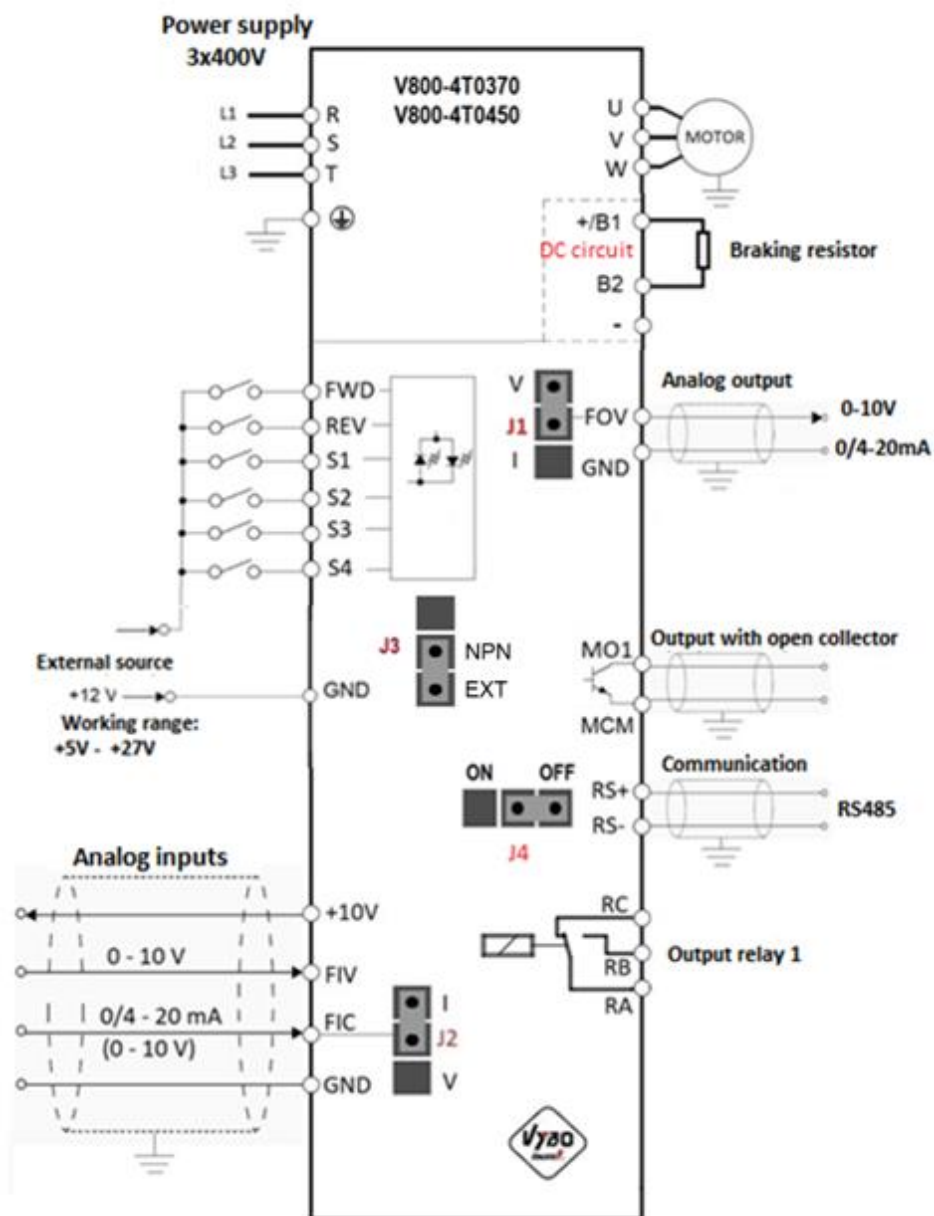


2.3.5. Basic wiring diagram VECTOR V 800 – 4T... equipment type U

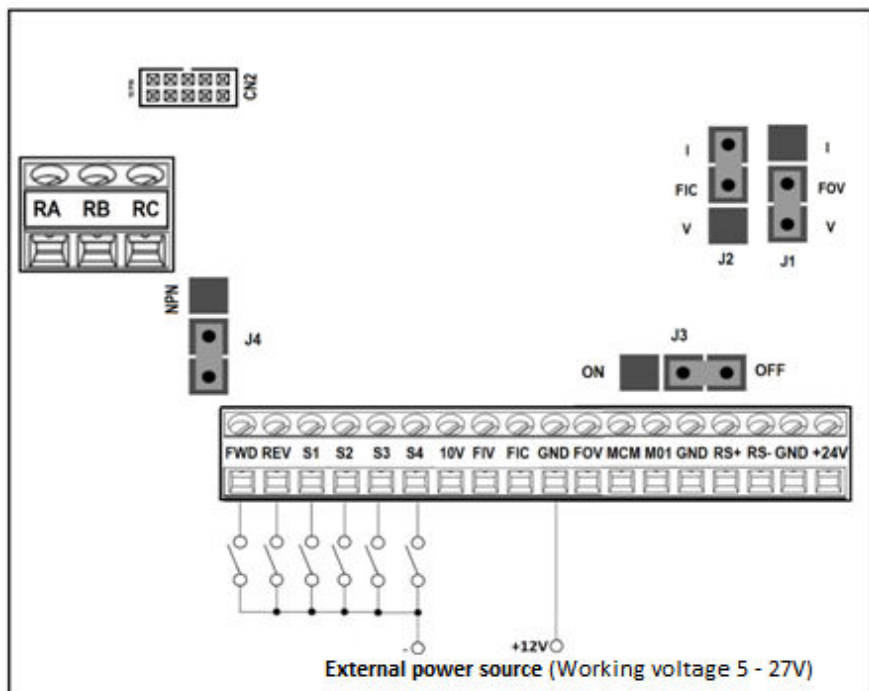
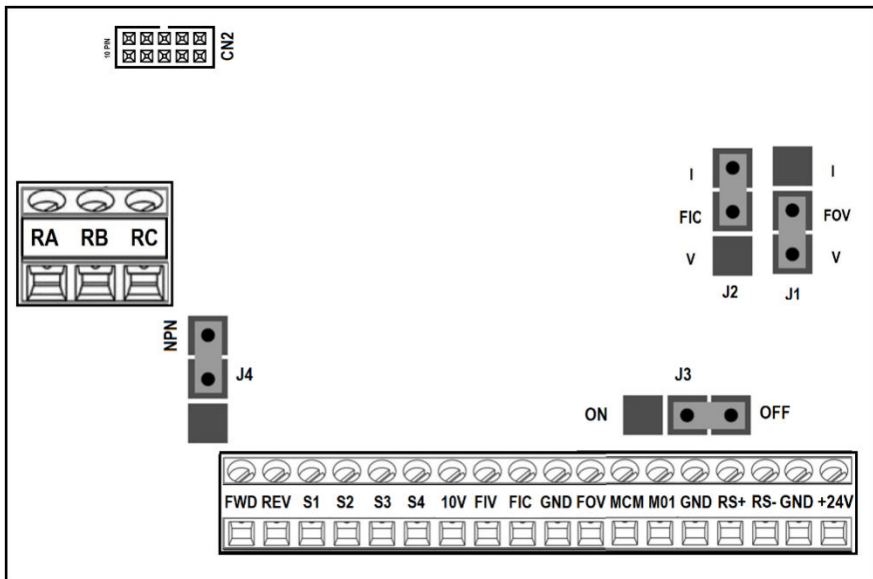
NPN Internal source



NPN Externý zdroj

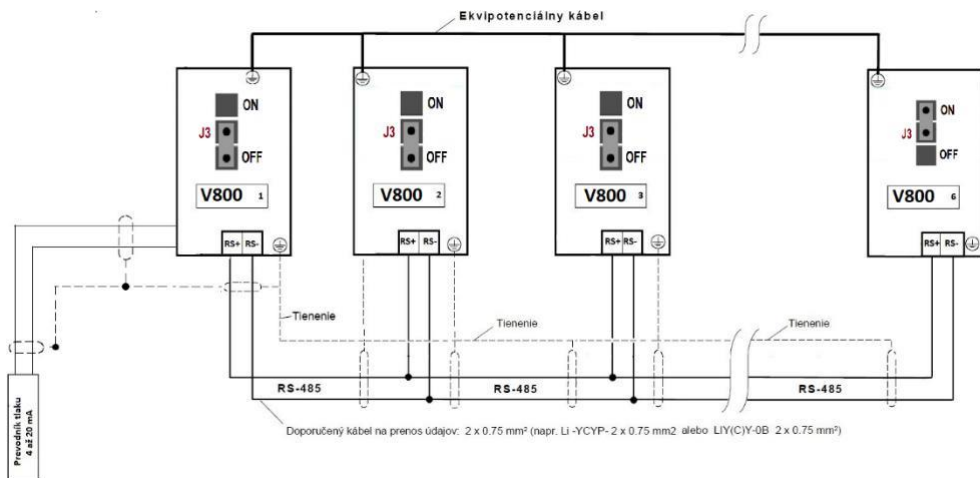


Control terminal block for equipment type U models



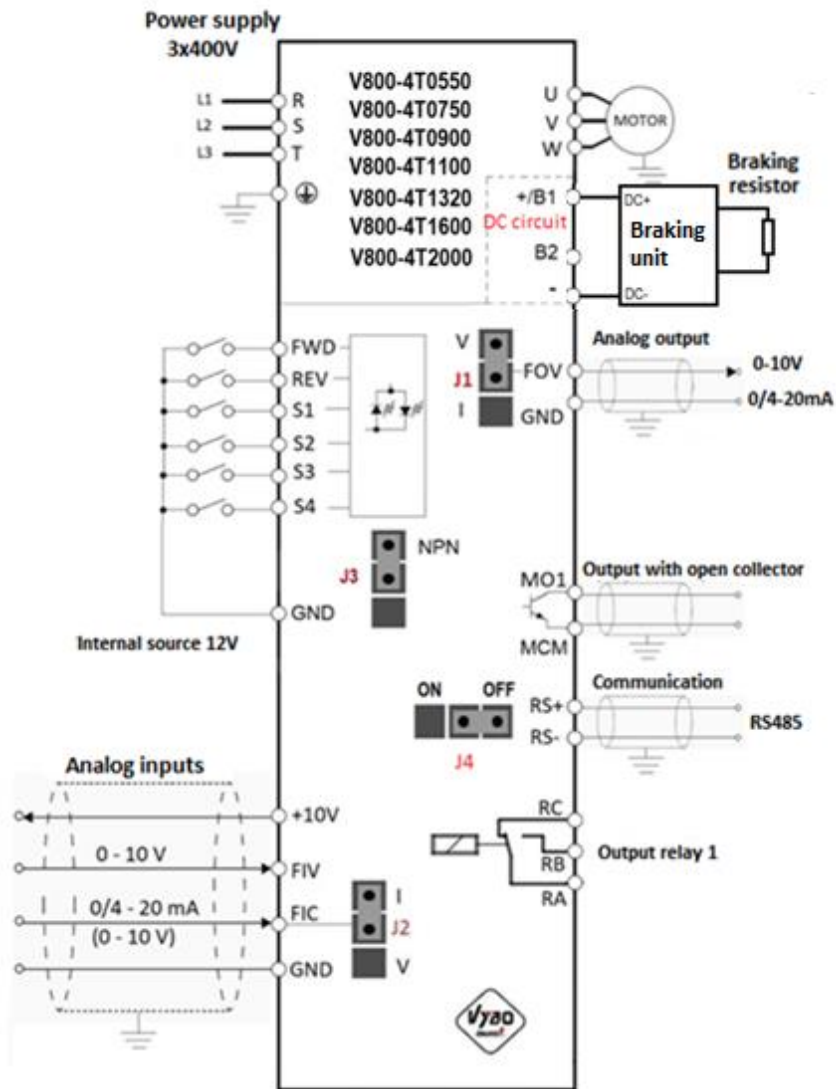
- Switch J2 determines whether the FIC is a voltage 0-10V or a current 4-20 mA input
- Switch J1 determines whether the FOV is a voltage or current 4-20 mA output
- Switch J3 determines whether the source of digital inputs is internal or external
- Switch J4 determines the ON/OFF resistance of the communication line
- CN2 is a 10PIN port for connecting a display or extension cable

An example of connecting inverter control via RS485. For end FM, switch J3 ON.

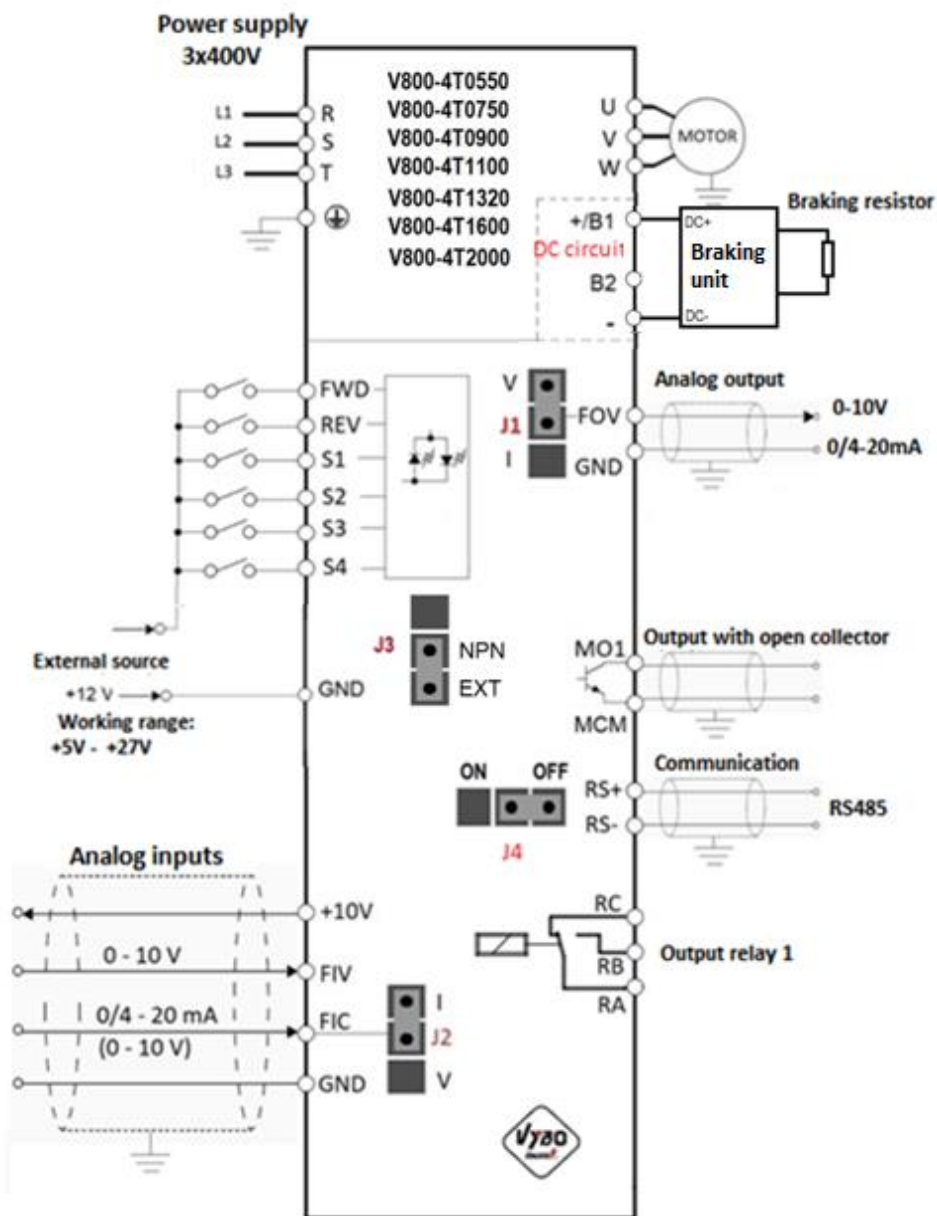


2.3.6. Basic wiring diagram VECTOR V 800 – 4T... equipment type V

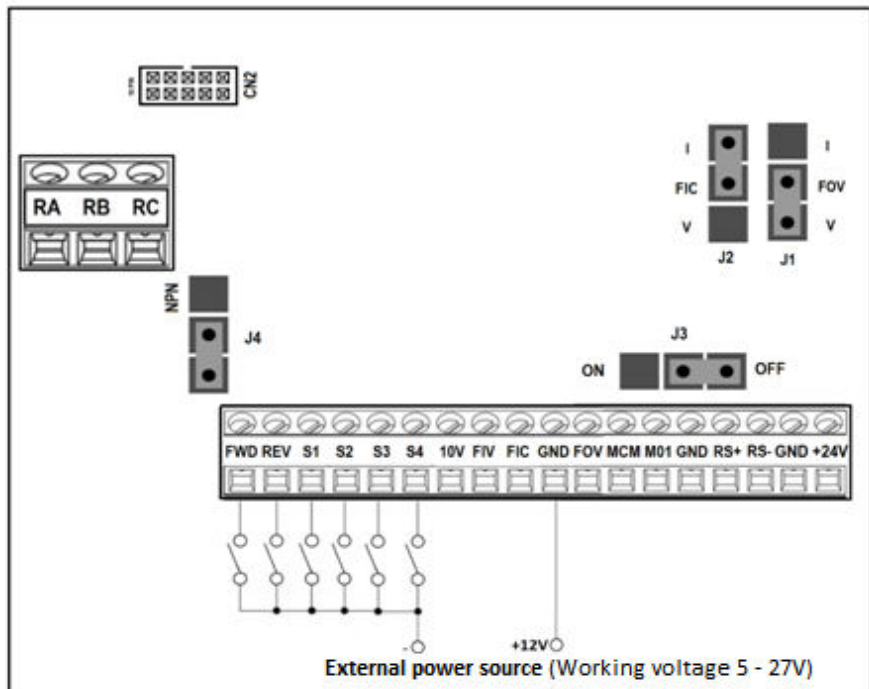
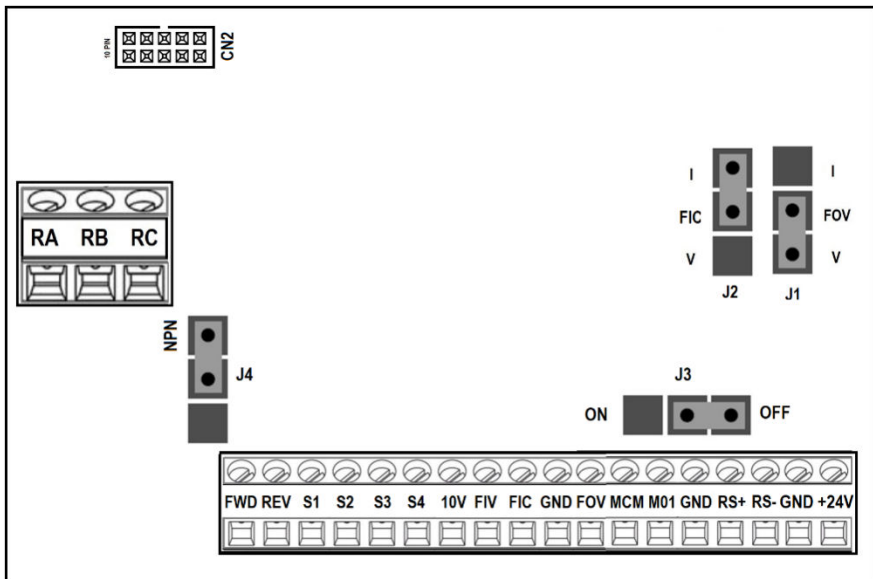
NPN Internal source



NPN External source




Control terminal block for equipment type V models



- Switch J2 determines whether the FIC is a voltage 0-10V or a current 4-20 mA input
- Switch J1 determines whether the FOV is a voltage or current 4-20 mA output
- Switch J4 determines whether the source of digital inputs is internal or external
- Switch J3 determines the ON/OFF resistance of the communication line
- CN2 is a 10 PIN port for connecting the display or extension cable to the display

2.3.7 Power terminal blocks and control terminal blocks V 800 and their description

The arrangement of the terminals of the V 800 power terminal block is as follows:

Terminal designation	Description
R/L1, S/L2, T/L3	Supply voltage (input terminals)
U/T1, U/T2, U/T3	Inverter output terminals for connecting a three-phase electric motor.
+/B1, -	DC circuit output. WARNING!!! Only the brake unit can be connected here!
+/B1, B2	Braking resistor connection
+, PR	Braking resistor connection (Equipment type A)
	Earthing (PE)

Description of switches on the control panel

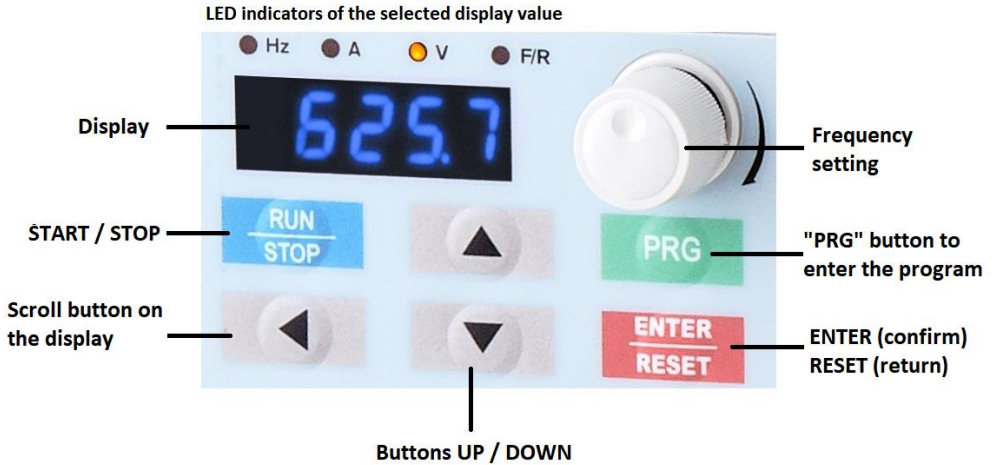
Switch name	Description of the switch
J2	FIC analogue input: voltage (0-10 V) input switch to V FIC analogue input: current (0 - 20 mA) input switch to I
J1	FOC analogue output: voltage (0-10 V) output switch to V FOC analogue output: current (0 - 20 mA) output switch to I
J3 (0,4 - 30 kW)	Switch J3 determines whether the power source for the digital terminals is internal or external (Working range from +5V to 27V).
J4 (0,4 - 30 kW)	Switch J3 determines the value of the terminal resistance of the communication line. Switched ON or switched OFF.
J3 (37 - 200 kW)	Switch J3 determines the value of the terminal resistance of the communication line. Switched ON or switched OFF.
J4 (37 - 200 kW)	Switch J4 determines whether the power source for the digital terminals is internal or external (Working range from +5V to +27V).
CN2	10 PIN port for connecting the display or extension cable to the display

Terminal name	Description of the function	Notes
FWD	Command RUN FORWARD / STOP command	Multi-function input terminals S1 to S4, FWD, REV according to reference number or specific settings and GND. Internal power supply 12 V DC. External power supply 5V to 27 V DC. Input impedance 3.3 k Ω .
REV	Command RUN REVERSE / STOP command	
S1	Multifunction input terminal	
S2	Multifunction input terminal	
S3	High speed pulse input terminal	
S4	Multifunction input terminal	
FOV	Analogue output terminal	0-10 V / 0-20 mA
10V	Source +10 V for frequency control	Potentiometer 10 k Ω
FIV	Input analogue voltage terminal	0-10 V (Impedance: 20 k Ω)
FIC	Input analogue current terminal	0 – 20 mA / 0 – 10 V (Impedance 250 Ω for current input / 10 k Ω for voltage)
GND	Zero potential for digital inputs	
MCM	Zero potential for OC	
MO1	Multifunction optical output	Output load capacity max. 48V DC/50mA
RS+	RS 485 plus	RS485 communication
RS-	RS 485 minus	
+24V	Source +24 V (max. 150 mA)	Only models from 37 kW
RA	Relay output contacts (NO)	Load capacity of contacts: AC 250V / 3A; DC 30V / 1 A.
RB	Relay output contacts (NC)	Load capacity of contacts: AC 250V / 3A; DC 30V / 1 A.
RC	Relay output contacts RA, RB common terminal	Load capacity of contacts: AC 250V / 3A; DC 30V / 1 A.






Chapter 3: Operation

3.1 Description of the single-line digital panel

3.1.1 Image of the panel for models 0.4 kW to 30 kW



3.1.2 Description of button functions



Key	Name	Description
	Program key	Enter or returns from the first level menu
	ENTER/RESET	Step by step through the menu and confirm the parameters, or return back
	Increase value	Gradually increases data or functional codes.
	Decrease value	Gradually decreases data or functional codes.
	Rotary knob/Button	Turn the knob to control the frequency / Press the knob to switch the display

Briefly "push and release" the rotary knob and the display will gradually show other quantities after each push:

- operating frequency in Hz
- set frequency Hz
- the value of the current DC voltage
- output current A
- output power

* It depends on the setting of bits in P7.03



Key	Name	Description
	Shift left	In parameter setting mode, press this button to select the bit you want to edit. In other modes, it displays the parameters by scrolling to the right
	START/STOP	Start and Stop of the inverter in keypad control mode.

3.1.3 Description of the light indicator





The name of the light indicator	Description of the light indicator
Hz	Frequency
A	Current
V	Voltage
FWD/REV	Off (light off): forward. On (light on): reverse operation.

3.2 Description of the two-line digital panel

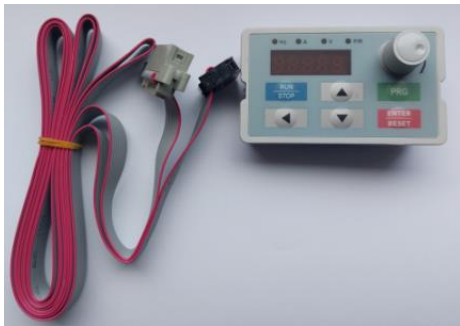
3.2.1 Panel image for 37 kW to 200 kW models

LED indicators of the selected display value		1 st line of display
LED showing functions		2 nd line of display
Shift UP		Program entry button
Shift Left / Shift Down		Confirmation
START		STOP / RESET
	JOG / Multifunctions button	

Key	Name	Description
	Program key	Enter or returns from the first level menu
	ENTER/RESET	Postupné prechádzanie cez menu a potvrdzovanie parametrov, alebo návrat späť.
	Increase value	Gradually increases data or functional codes.
	Decrease value	Gradually decreases data or functional codes.

Key	Name	Description
	Shift left	In parameter setting mode, press this button to select the bit you want to edit. In other modes, it displays the parameters by scrolling to the right
	START	Press the button to start the inverter
	STOP / RESET	Press the button to stop the inverter, or in the event of a malfunction, reset the error
	JOG	Multifunctional button JOG, (slow motion), adjustable in P7.01

Accessories: It is possible to purchase an extension cable and an external display for the inverter. The cable is custom-made according to the request in a length of 2 to 30 m.



Extension cable and external display suitable for V800 power series inverters from 0.4 kW to 30 kW Type: DP6E2



Extension cable and external display suitable for V800 power series inverters from 37 kW to 200 kW Type: DP6G3

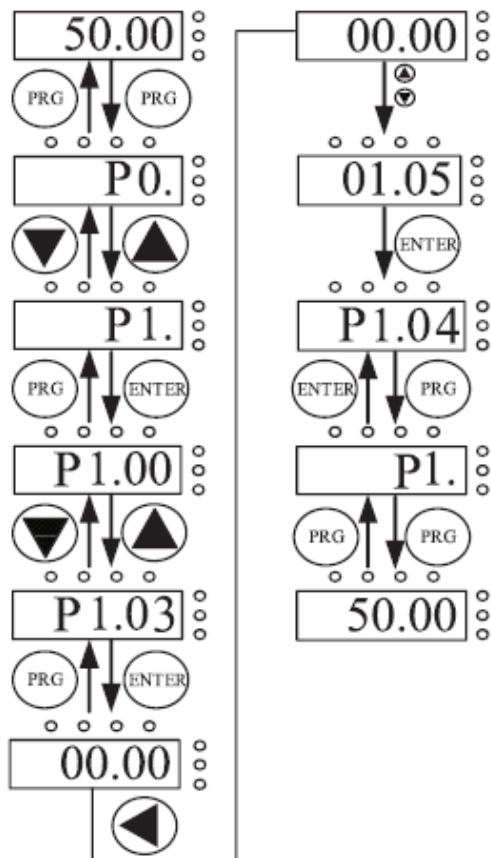
3.3 Operation

3.3.1 Parameter setting

Three-level menu:

- 1.The function code group (first menu);
2. Function code (second menu);
3. Function code set value (third menu).

Explanation: the three-level menu operation can press PRG or ENTTER to return to the secondary menu. The difference between the two is: press ENTER to set parameters in control panel, and then return to the secondary menu, and automatically move to the next function code; Press PRG directly to return to the secondary menu, don't store parameters, and keep staying in the current function code. Example: change the function code P1.03 from 00.00 Hz change the sample set to 50.00 Hz.



Flow chart of parameter setting.

In three-level state, if the parameter is not flashing, said the function code cannot be modified, possible reasons are:

- 1) The function code parameters cannot be modified. Such as the actual testing parameters, operation records, etc.;
- 2) The function code in the running state cannot be modified.

3.3.2 Fault RESET

After the failure of the inverter, the inverter will be prompted to related fault information. User can press STOP key on the keyboard or terminal function to conduct the fault reset (P5), after fault reset the inverter is in the standby mode. If the inverter is in fault state, the user does not carry on the fault reset, the inverter is in the running to protect state and can't run.

3.4 First start

3.4.1 First start for V/F drive (suitable for fans, pumps, etc.)

A simplified example:

After you have correctly connected the V800 frequency converter according to chapter 1 and 2 and you have correctly connected the appropriate electric motor:

Set V800 parameters

P0.00=2

P0.01=0

P0.08= select the start-up time according to the load

P0.09= select the deceleration time according to the load

P1.10= 0 if you are stopping small inertias

P1.10= 1 if you are stopping large inertias, e.g. large fan

P2.01= power of the driven electric motor according to its nameplate

P2.02= nominal supply voltage of the electric motor according to its nameplate

P2.03= rated current of the electric motor according to its nameplate

P2.04= nominal frequency of the electric motor according to its nameplate

P2.05= rated speed of the electric motor according to its nameplate

P4.01= increase in torque (use for harder start-up (preferably 0.0 = automatic))

3.4.2 First start for SFVC drive (suitable for crushers, conveyors, etc.)

In the SFVC vector control process, it is necessary to tune the inverter to the driven electric motor!

A simplified example:

After you have correctly connected the V800 frequency converter according to chapter 1 and 2 and you have correctly connected the appropriate electric motor:

Set V800 parameters

P0.00=1

P0.01=1

P0.08= select the start-up time according to the load

P0.09= select the deceleration time according to the load

P2.01= power of the driven electric motor according to its nameplate

P2.02= nominal supply voltage of the electric motor according to its nameplate

P2.03= rated current of the electric motor according to its nameplate

P2.04= nominal frequency of the electric motor according to its nameplate

P2.05= rated speed of the electric motor according to its nameplate

Then set automatic tuning (if you have the drive decoupled - no load), enter dynamic tuning P2.37=2 and press START. "Study" lights up on the display and the drive starts. After the end of the tuning process (autotuning), the set frequency appears on the display, e.g.: 50.00

If you already have the drive connected to the load, the direction of rotation of the electric motor rotor is correctly set, but for certain reasons it is safer not to rotate the drive, enter static tuning:

P2.37=1 and press START. "Study" lights up on the display, but the drive does not start. The electric motor shaft will only "twitch" slightly and there may be an intermittent "buzz" from the motor (this is a natural tuning effect). After the end of the tuning process (autotuning), the set frequency appears on the display, e.g.: 50.00.

3.5 Inverter operation


3.5.1 Power-on initialization

When the inverter is switched on, the system first initializes, the LED display shows "2000". When the initialization is complete, the inverter is in the standby mode.

3.5.2 Stand-by mode of inverter

In the stopping or running status can the display shows a various of state parameters. By Function Code P7.03 (operating parameters), P7.05 (stop parameter), various definitions can refer to P7.03 and P7.05 function code.

3.5.3 Inverter operation

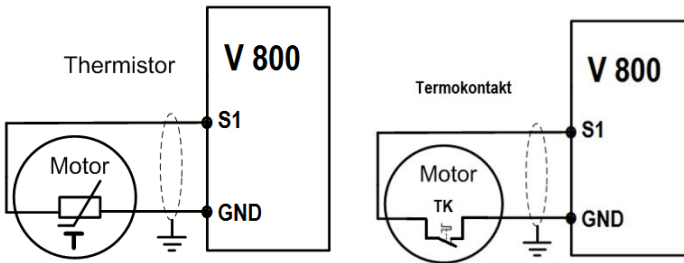
In the operating state, it is possible to choose whether a total of sixteen operating parameters should be displayed: operating frequency, set frequency, bus voltage, output voltage, output current, operating speed, output power, output torque, PID setting, analog input PID FIV voltage, FIC analog input voltage, number of multi-turn segments, torque set point; whether to display the function code is decided by the selection of bit P7.03 and P7.04, press the button to switch the display order of the selected parameters, press the left button  to switch the display of the selected parameters.

3.5.4 Failure reports

The V 800 series offers a variety of fault information. Please read Chapter 5 on V 800 inverter errors and troubleshooting them.

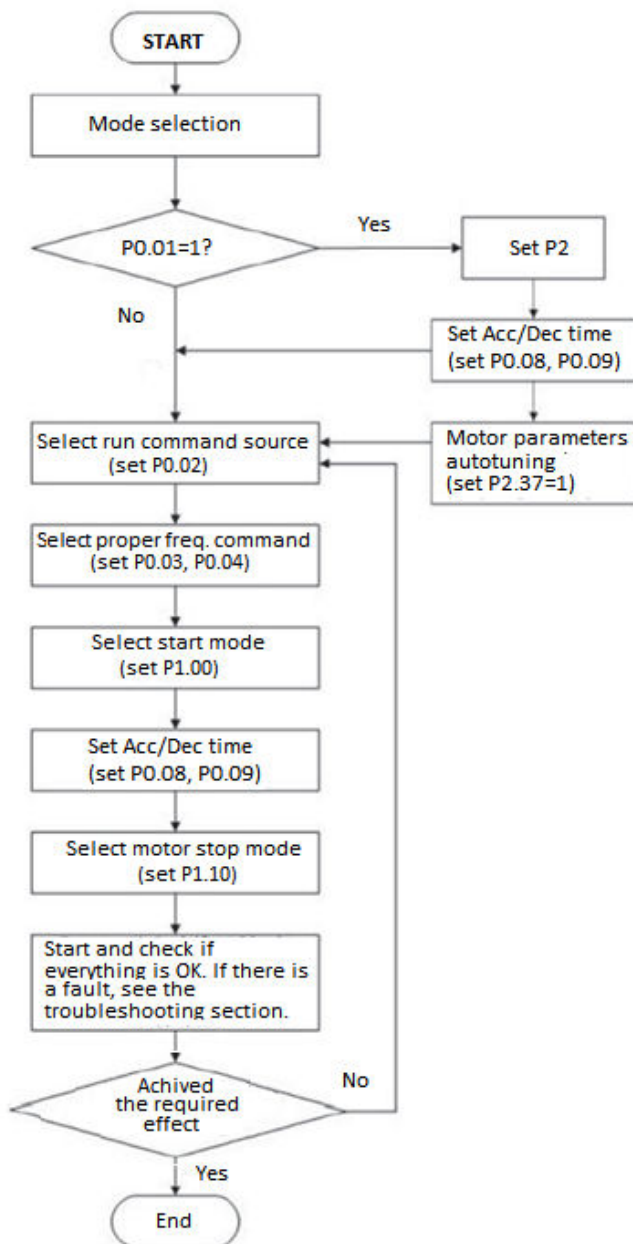
3.5.5 Setting of PTC and TK thermal protection of the motor

Connect the PTC thermistor and the TK electric motor according to the picture:

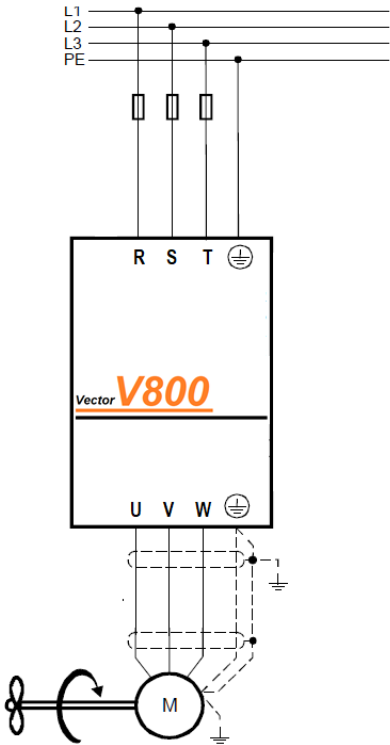


For example, the parameter setting is as follows: **P5.02 = 33**

3.6 Quick Start-up



Example 1: first start in V/F control mode



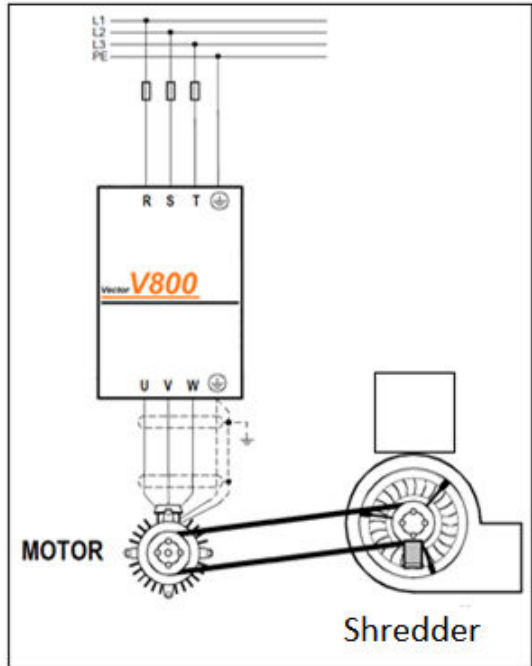
- P0.00= 2
 - P0.01= 0
 - P0.08= 120 sec
 - P0.09= 120 sec
 - P1.10= 1
 - P2.01= 7,5 kW
 - P2.02= 400 V
 - P2.03= 13,5 A
 - P2.04= 50 Hz
 - P2.05= 2930 rpm
 - P4.01= 5,0 %
 - P9.00= 1
 - P9.01= 10
 - P9.03= 50
 - P9.12= 11
 - P9.13= 1
- START

Example 2: first boot in SFVC control mode

P0.00=1
P0.01=1
P0.08=30 sec
P0.09=30 sec
P2.01=7,5 kW
P2.02=400 V
P2.03=14,2 A
P2.04=50 Hz
P2.05=2910 rpm
P9.00= 1
P9.01= 1.0
P9.03= 30
P9.12= 11
P9.13= 1

P2.37=1 (autotuning)

START



Chapter 4: The list of function parameters - shortened

If parameter PP.00 is set to a nonzero number, parameter protection is enabled. To enter the menu, you must enter the correct user password. To disable password protection, enter your password and set PP.00 to 0.

The parameter menu customized by the user is not password protected. Group P is the basic parameters of the functions, group D is for monitoring of functional parameters.

The meaning of the symbols in the function code table is as follows:

„☆“The parameter can be changed when the inverter is in a stopped or running state.

„★“The parameter cannot be changed when the inverter is in a running state.

„●“The parameter is actually a measured value and cannot be changed.

„*“This parameter is a factory parameter and can only be set by the manufacturer.

Function code	Parameter name	Setting range	Default setting	Attribute
Group P0: Parameters of standard functions				
P0.00	G/P type*	1: G type (constant torque load) 2: P type (variable torque, eg fan, compressor, pump, etc.)	*by the model	★
P0.01	Selecting the control mode	0: Voltage / frequency control (V/F) 1: Flow vector control without sensor (SFVC)	0	★

Function code	Parameter name	Setting range	Default setting	Attribute
P0.02	Select command channel	0: Control via the operation panel 1: Control via input terminals 2: Control via PC	0	☆
P0.03	Frequency source	.X (frequency source) 0: Main source of frequency 1: X and Y operations (operating mode specified by dozens) 2: Switch between X and Y 3: Switch between X and "X and Y" 4: Switching between Y and "X and Y" X. (X and Y operations) 0: X + Y 1: X-Y 2: Maximum X and Y 3: Minimum X and Y	00	☆
P0.04	Select the main frequency source X	0: Digital setting (P0.10 preset frequency, can change over UP / DOWN) 1: Digital setting (P0.10 preset frequency, can change over UP / DOWN) 2: FIV 3: FIC 4: By the rotary knob on the panel 5: Impulse setting (S3), option 6: Step speeds 7: Simple PLC 8: PID 9: Communication interface	0	★
P0.05	Select the auxiliary frequency source Y	The same like P0.04 (selection of the main X source) 0 - 9	0	★
P0.06	Select the range of auxiliary frequency source Y	0: Considering to the maximum frequency 1: Considering to the maximum frequency of X source	0	☆
P0.07	Extension of auxiliary frequency source Y	0% - 150 %	100%	☆

P0.08	Acceleration time 1	0.00s – 65000 s	by the model	☆
P0.09	Deceleration time 1	0.00s – 65000 s	by the model	☆
P0.10	Default frequency	0.00 - maximum frequency (P0.12)	50.00Hz	☆
P0.11	Direction of rotation	0: The same direction 1: Reverse direction	0	☆
P0.12	Maximum frequency	50.00 Hz - 3200.00 Hz	50.00Hz	★
P0.13	The upper limit of the frequency source	0: P0.12 1: FIV 2: FIC 3: Reserved 4: Impulse setting 5: Setting via the communication input	0	★
P0.14	The upper limit of the frequency	Bottom frequency limit P0.16 - maximum frequency P0.12	50.00Hz	☆
P0.15	The upper limit of the frequency - shift	0.00 Hz- maximum frequency P0.12	0.00Hz	☆
P0.16	Bottom frequency limit	0.00 Hz - Upper frequency limit P0.14	0.00Hz	☆
P0.17	Carrier frequency	1 kHz-16.0 kHz	by the model	☆
P0.18	The influence of temperature on the carrier frequency	0: No 1: Yes	1	☆
P0.19	Time increment for acceleration / deceleration	0: 1 s 1: 0.1 s 2: 0.01 s	1	★
P0.21	Frequency shift of auxiliary frequency source for X and Y operation	0.00 Hz – maximum frequency P0.12	0.00Hz	☆

P0.22	Frequency reference	1: 0.1 Hz 2: 0.01 Hz	2	★
P0.23	Permanent digital frequency setting on power-on	0: No memory 1: Memory	0	☆
P0.24	Acceleration/Deceleration time base frequency	0: Maximum frequency (P0.12) 1: Set frequency 2: 100Hz	0	★
P0.25	Base frequency for UP/DOWN modification during running	0: Running frequency 1: Set frequency	0	★
P0.26	Binding command source to frequency source	<p>..X: Binding operation panel command to frequency source</p> <p>0: No binding</p> <p>1: Frequency source by digital setting</p> <p>2: FIV</p> <p>3: FIC</p> <p>4: Reserved</p> <p>5: Pulse setting (S3)</p> <p>6: Multi-reference</p> <p>7: PLC</p> <p>8: PID</p> <p>9: Communication setting</p> <p>.X.: Binding operation panel command to frequency source (0-9, the same as units)</p> <p>X...: Binding operation panel command to frequency source (0-9, the same as units)</p>	000	☆
P0.27	Communication expansion card type	0: MODBUS communication card	0	☆
P0.28	Reserved			

Group P1: Start / Stop Control				
Function code	Parameter name	Setting range	Default setting	Attribute
P1.00	Start mode	0: Direct start 1: Re-start with speed tracking 2: Pre-excitation (asynchronous motor)	0	☆
P1.01	Speed tracking mode	0: From stop frequency 1: From zero speed 2: From the maximum frequency	0	★
P1.02	Rotation tracking speed	1-100	20	☆
P1.03	Starting frequency	0.00Hz -10.00Hz	0.00 Hz	☆
P1.04	Startup frequency holding time	0.0s -100.0s	0.0s	★
P1.05	Startup DC braking current / Pre-excited current	0% - 100%	0%	★
P1.06	Startup DC braking time/Pre- excited time	0.0s - 100.0s	0.0s	★
P1.07	Acceleration/ Deceleration mode	0: Linear acceleration / deceleration 1: S-curve A acceleration / deceleration 2: S-curve B acceleration / deceleration	0	★
P1.08	Time portion of the S-curve start phase	0.0% - (100.0%-P1.09)	30.0%	★
P1.09	Time portion of the S-curve end phase	0.0% - (100.0%-P1.08)	30.0%	★
P1.10	STOP mode	0: Deceleration to stop acc. to curve 1: Coast to stop	0	☆
P1.11	Initial frequency of stop DC braking	0.00 Hz – Maximum frequency	0.00Hz	☆
P1.12	Waiting time of stop DC braking	0.0s - 100.0s	0.0s	☆

P1.13	Braking DC current at stop	0% - 100%	0%	☆
P1.14	DC braking time	0.0s - 100.0s	0.0s	☆
P1.15	Braking rate	0 – 100 %	100 %	☆

Group P2: Motor parameters

Function code	Parameter name	Setting range	Default setting	Attribute
P2.00	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor	0	★
P2.01	Rated motor power	0.1kW - 500.0kW	by the model	★
P2.02	Rated motor voltage	1V - 2000V	by the model	★
P2.03	Rated motor current	0.01A - 655.35A	by the model	★
P2.04	Rated motor frequency	0.01 Hz – maximum frequency	by the model	★
P2.05	Rated motor speed	1 rpm - 65535 rpm	by the model	★
P2.06	Stator resistance (asynchronous motor)	0.001 Ω - 65.535 Ω	by the model	★
P2.07	Rotor resistance (asynchronous motor)	0.001 Ω - 65.535 Ω	by the model	★
P2.08	Leakage inductive reactance (asynchronous motor)	0.01 mH - 655.35 mH	by the model	★
P2.09	Mutual induction (asynchronous motor)	0.1 mH - 6553.5 mH	by the model	★

P2.10	Motor current without load (asynchronous motor)	0.01A - P2.03	by the model	★
P2.11- P2.36 Reserved				
P2.37	Auto-tuning selection	0: Auto-tuning disabled 1: Asynchronous motor - static auto-tuning 2: Asynchronous motor - complete auto-tuning (dynamic parameters)	0	★

Group P3: Vector control parameters

Function code	Parameter name	Setting range	Default setting	Attribute
P3.00	Linear constant 1	1 - 100	30	☆
P3.01	Integration constant 1	0.01 s - 10.00s	0.50s	☆
P3.02	Frequency of switching 1	0.00 - P3.05	5.00Hz	☆
P3.03	Linear constant 2	1 - 100	20	☆
P3.04	Integration constant 2	0.01 s - 10.00s	1.00s	☆
P3.05	Frequency of switching 2	P3.02 – maximum output frequency	10.00Hz	☆
P3.06	Vector control slip gain	0% - 200%	100%	☆
P3.07	Time constant of filter of the loop speed	0.000s - 0.100s	0.000s	☆
P3.08	Over excitation gain	0 - 200	64	☆

P3.09	Torque upper limit source in speed control mode	0: P3.10 1: FIV 2: FIC 3: Reserved 4: Impulse setting 5: Communication setting via RS 485 6: MIN(FIV,FIC) 7: MAX(FIV,FIC)	0	☆
P3.10	Digital setting of torque upper limit in speed control mode	0.0% - 200.0%	150.0%	☆
P3.11	Reserved			
P3.12	Reserved			
P3.13	Adjusting the linear excitation constant	0 - 60000	2000	☆
P3.14	Adjusting the integration excitation constant	0 - 60000	1300	☆
P3.15	Adjusting the linear torque constant	0 - 60000	2000	☆
P3.16	Adjustment of the integration constant of torque	0 - 60000	1300	☆
P3.17	The speed of the integration loop	0: Disabled 1: Enabled	0	☆
P3.18	Reserved			
P3.19	Reserved			
P3.20	Reserved			
P3.21	Reserved			
P3.22	Reserved			

Group P4: V/F Control Parameters				
Function code	Parameter name	Setting range	Default setting	Attribute
P4.00	Setting the V/F curve	0: Linear V/F curve 1: Multipoint V/F curve 2: Square V/F curve 3: 1.2-fold V/F curve 4: 1.4-fold V/F curve 6: 1.6-fold V/F curve 8: 1.8-fold V/F curve 9: Reserved 10: V/F complete separation 11: V/F half-section	0	★
P4.01	Increase of torque	0.0%: Automatic increasing 0.1% - 30.0%: Manual increasing	by the model	☆
P4.02	Torque limitation	0.00 Hz – maximum output frequency	50.00 Hz	★
P4.03	Multi-point V/F frequency curve 1	0.00 Hz - P4.05	0.00 Hz	★
P4.04	Multipoint V/F voltage curve 1	0.0% - 100.0%	0.0 %	★
P4.05	Multi-point V/F frequency curve 2 (F2)	P4.03 - P4.07	0.00 Hz	★
P4.06	Multipoint V/F voltage curve 2 (V2)	0.0% - 100.0%	0.0%	★
P4.07	Multi-point V/F frequency curve 3 (F3)	P4.05 - rated motor frequency (P2.04)	0.00Hz	★
P4.08	Multipoint V/F voltage curve 3 (V3)	0.0% - 100.0%	0.0%	★
P4.09	Constant slope compensation V/F	0.0% - 200.0%	0.0%	☆

P4.10	V/F over excitation	0 - 200	64	☆
P4.11	V/F suppression of oscillation	0-100	by the model	☆
P4.13	Voltage source for V/F separation	0: Digital setting (P4.14) 1: FIV 2: FIC 3: Reserved 4: Impulse setting (S3), option 5: Step speed 6: Simple PLC 7: PID 8: The communication interface, 100% corresponds to the rated motor voltage (P2.02)	0	☆
P4.14	Digital voltage setting for V/F separation	0V - rated motor voltage	0V	☆
P4.15	Voltage rise time of V/F separation	0.0s-1000.0s, gives the time it takes to increase the output voltage from 0 V to the rated motor voltage	0.0s	☆
P4.16	Voltage drop time during V/F separation	0.0s-1000.0s, gives the time it takes for the output voltage to drop from the nominal motor voltage to 0 V	0.0s	☆

Group P5: Input terminals				
Function code	Parameter name	Setting range	Default setting	Attribute
P5.00	Function selection FWD	0: No function 1: RUN forward (FWD) 2: Reverse RUN (REV) 3: Three-wire control 4: RUN forward JOG (FJOG) 5: Reverse RUN (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Gradual stop 9: RESET of the fault (RESET) 10: Pause during RUN 11: Normally open (NO) external error input 12: Multiple terminal 1 13: Multiple terminal 2 14: Multiple terminal 3 15: Multiple terminal 4 16: Terminal 1 for selecting acceleration / deceleration time 17: Terminal 2 for selecting acceleration / deceleration time 18: Switching frequency source 19: Reset via UP and DOWN (terminal, control panel) 20: Command source switchover terminal 21: Acceleration / deceleration disabled 22: Pause of PID 23: Recovering the PLC status 24: Swing pause 25: Counter input 26: Reset the counter 27: Length count input 28: Resetting the length 29: Torque control disabled 30: Pulse input (S3 only), option 31: Reserved 32: Immediate DC braking 33: Normal close (NC) input of external fault (via S1 suitable for PTC)	1	★
P5.01	Select of funct. REV		4	★
P5.02	Select of function S1		9	★
P5.03	Select of function S2		12	★

P5.04	Select of function S3		13	★
P5.05	Select of function S4	<p>34: Changing the frequency is disabled</p> <p>35: Reverse direction of PID</p> <p>36: Terminal 1 for external STOP</p> <p>37: Terminal 2 for command source switch</p> <p>38: Pause the PID integration</p> <p>39: Switching between the main X source and the preset frequency</p> <p>40: Switching between the Y source and the preset frequency</p> <p>41: Motor selection terminal 1</p> <p>42: Motor selection terminal 2</p> <p>43: Switching PID parameters</p> <p>44: Reserved</p> <p>45: Reserved</p> <p>46: Switching - speed control / torque control</p> <p>47: Emergency Stop</p> <p>48: Terminal 2 for external STOP</p> <p>49: DC braking with delay</p> <p>50: Reset the current operating time</p> <p>51-59: Reserved</p>	0	★
P5.10	Filter time	0.000s - 1.000s	0.010 s	☆
P5.11	Command mode via terminal block	<p>0: Two-wire mode 1</p> <p>1: Two-wire mode 2</p> <p>2: Three-wire mode 1</p> <p>3: Three-wire mode 2</p>	0	★
P5.12	Change value by terminals UP/DOWN	0.001 Hz/s - 65.535Hz/s	1.00Hz/s	☆
P5.13	Fl curve 1 min. input	0.00V - P5.15	0.00V	☆

Function code	Parameter name	Setting range	Default setting	Attribute
P5.14	Corresponding setting of FI curve 1 min. input	-100.0% - +100.0%	0.0%	☆
P5.15	FI curve 1 max. input	P5.13 - +10.00V	10.00V	☆
P5.16	Corresponding setting of FI curve 1 max. input	-100.0% - +100.0%	100.0%	☆
P5.17	FI filter curve time 1	0.00s - 10.00 s	0.10s	☆
P5.18	FI curve 2 min. input	0.00V - P5.20	0.00V	☆
P5.19	Corresponding setting of FI curve 2 min. input	-100.0% - +100.0%	0.0%	☆
P5.20	FI curve 2 max. input	P5.18 - +10.00V	10.00V	☆
P5.21	Corresponding setting of FI curve 2 max. input	-100.0% - +100.0%	100.0%	☆
P5.22	FI filter curve time 2	0.00s - 10.00 s	0.10s	☆
P5.23	FI curve 3 min. input	-10.00V - P5.25	-10.00V	☆
P5.24	Corresponding setting of FI curve 3 min. input	-100.0% - +100.0%	-100.0%	☆
P5.25	FI curve 3 max. input	P5.23 - +10.00V	10.00V	☆
P5.26	Corresponding setting of FI curve 3 min. input	-100.0% - +100.0%	100.0%	☆
P5.27	FI filter curve time 3	0.00s - 10.00s	0.10s	☆

Function code	Parameter name	Setting range	Default setting	Attribute
P5.28	IMPULS minimum input	0.00kHz - P5.30	0.00kHz	☆
P5.29	Corresponding minimum input impulse setting	-100.0% - 100.0%	0.0%	☆
P5.30	IMPULS maximum input	P5.28 - 100.00kHz	50.00kHz	☆
P5.31	Corresponding maximum input impulse setting	-100.0% - 100.0%	100.0%	☆
P5.32	Filter time of impulse curve	0.00s - 10.00s	0.10s	☆
P5.33	Selection of FI curve	Units: Selection of FIV curve 1: Curve 1 (2-point, see P5.13-P5.16) 2: Curve 2 (2-point, see P5.18-P5.21) 3: Curve 3 (2-point, see P5.23-P5.26) 4: Curve 4 (4-point, see C6.00 - C6.07) 5: Curve 5 (4-point, see C6.08 - C6.15) Tens: Selection of FIC curve (1-5, the same as FIV) Hundreds: reserved	321	☆
P5.34	Set the FI to less than the minimum input	Units: Set the FIV to less than the minimum input 0: Minimum value 1: 0.0% Tens: Set the FIC to less than the minimum input (0-1, the same as FIV) Hundreds: reserved	000	☆
P5.35	FWD delay time	0.0s - 3600.0s	0.0s	★
P5.36	REV delay time	0.0s - 3600.0s	0.0s	★

P5.37	S1 delay time	0.0s - 3600.0s	0.0s	★
P5.38	Selecting the allowed S-mode 1	Units: FWD allowed mode 0: High level allowed 1: Low level enabled Tens: REV Hundreds: S1 Thousands: S2 Tens of thousands: S3	00000	★
P5.39	Selecting the allowed S-mode 2	Units: S4 0: High level allowed 1: Low level enabled	0	★

Group P6: Output terminals				
Function code	Parameter name	Setting range	Default setting	Attribute
P6.00	M01 output mode	1: Turn on the output signal (M01)	1	☆
P6.01	Functions M01 (0 – 40)	0: No output 1: Inverter in RUN mode 2: Output error (stop) 3: Detection of the FDT1 frequency level 4: Frequency achieved 5: Run at zero speed 6: Pre-warning of overloading the motor 7: Pre-warning of overloading the inverter 8: Set counter value reached 9: Required value of counter reached 10: Length reached 11: The entire PLC cycle completed 12: The cumulative operating time reached 13: Limited frequency 14: Limited torque 15: The inverter is ready to RUN 16: FIV>FIC 17: The upper frequency limit reached 18: The lower frequency limit reached 19: Under voltage 20: Communication setting 21: Reserved 22: Reserved 23: Run at zero speed 24: Total time Under voltage reached 25: Detection of the FDT2 frequency level 26: Frequency reached 1 27: Frequency reached 2 28: Current reached 1 29: Current reached 2 30: Time reached 31: FIV entry limit exceeded 32: Zero load 33: Reverse RUN 34: Zero current 35: Module temperature reached 36: Exceeded output current limit 37: Frequency lower limit reached 38: Output alarm (continues to run) 39: Reserved 40: Current running time reached	0	☆

Function code	Parameter name	Setting range	Default setting	Attribute
P6.02	Relay output function (RA-RB-RC)	The same as M01	2	☆
P6.03 – P6.05 Reserved				
P6.07	FOV selection the function of output (0 – 16)	0: Frequency during RUN 1: Set frequency 2: Output current 3: Output torque 4: Output power 5: Output voltage 6: Pulse input (100.0% means 100.0kHz) 7: FIV 8: FIC 9: Reserved 10: Length 11: Numbered value of counter 12: Communication setup 13: Speed of engine rotation 14: Output current (100.0% means 1000A) 15: Output Voltage (100.0% means 1000V) 16: Reserved	0	☆
P6.08	Reserved			
P6.09	Reserved			☆
P6.10	FOV zero offset coefficient	-100.0%~+100.0%	0.0%	☆
P6.11	FOV gain	-10.00~+10.00	1.00	☆
P6.12	Reserved			☆
P6.13	Reserved			☆
P6.14	Reserved			
P6.15	Reserved			
P6.16	Reserved			
P6.17	M01 time delay	0.0s - 3600.0 s	0.0s	☆
P6.18	RA-RB-RC time delay	0.0s - 3600.0 s	0.0s	☆
P6.19	Reserved			
P6.20	Reserved			
P6.21	Reserved			

P6.22	Selection of output terminal mode	<p>....X: M01 mode 0: Positive logic 1: Negative Logic ...X.: RA-RB-RC mode 0: Positive logic 1: Negative Logic ..X.: Reserved .X...: Reserved X....: Reserved</p>	00000	☆
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Group P7: Control panel a display

Function code	Parameter name	Setting range	Default setting	Attribute
P7.00	Correction power factor	0.0 - 200.0	100.0	☆
P7.01	Selection of the function of the JOG key Only valid for models V800-4T0370 to 4T2000 with two-line display	<p>0: JOG button is disabled on DP6-G-3 panels 1: Switching between panel control and external control (terminal command channel or communication channel) 2: Switching between FORWARD and REVERSE 3: Activation of FORWARD JOG 4: BACKWARD JOG activation 5: Activation of the STOP button on DP6-E-2 panels</p>	0	
P7.02	STOP/RESET button	<p>0: STOP/RESET key enabled only in operation panel control 1: STOP/RESET key enabled in any operation mode</p>	1	☆

Function code	Parameter name	Setting range	Default setting	Attribute
P7.03	Parameters 1, LED display during RUN	0000 - FFFF Bit00: Frequency of RUN 1 (Hz) Bit01: Setting of frequency (Hz) Bit02: Bus voltage (V) Bit03: Output Voltage (V) Bit04: Output Current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit07: Input S status Bit08: Output status M01 Bit09: FIV voltage (V) Bit10: FIC voltage (V) Bit11: Reserved Bit12: Counter value Bit13: Length value Bit14: Display Load Speed Bit15: PID setting	1F	☆
P7.04	Parameters 2, LED display during RUN	0000-FFFF Bit00: PID Feedback Bit01: PLC status Bit02: Setting of frequency (kHz) Bit03: Frequency 2 of operation (Hz) Bit04: Remaining time of RUN mode Bit05: FIV voltage before correction (V) Bit06: FIC voltage before correction (V) Bit07: Reserved Bit08: Linear speed Bit09: Current time under voltage Bit10: Current time of Run mode (Min) Bit11: Impulse setting of frequency (kHz) Bit12: The value of communication setting Bit13: Reserved Bit14: Display of the main frequency X (Hz) Bit15: Display of the auxiliary frequency Y (Hz)	0	☆

Function code	Parameter name	Setting range	Default setting	Attribute
P7.05	LED display during STOP	0000-FFFF Bit00: Set frequency (Hz) Bit01: Bus voltage (V) Bit02: Status of input S Bit03: Status of output M01 Bit04: FIV voltage (V) Bit05: FIC voltage (V) Bit06: Reserved Bit07: Counter value Bit08: Length value Bit09: PLC status Bit10: Speed of load display Bit11: PID setting Bit12: Impulse setting of frequency (kHz) Bit13: PID feedback value	33	☆
P7.06	Load speed display coefficient	0.0001-6.5000	1.0000	☆
P7.07	Inverter cooler temperature	0.0°C - 150.0°C	-	•
P7.08	Real temperature of the module	0.0°C - 150.0 °C	-	•
P7.09	Total running time	0 h - 65535 h	-	•
P7.10	Reserved	-	-	•
P7.11	Version of the software	e.g. 132.09	-	•
P7.12	Number of decimal places to display load speed	0: 0 decimal places 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places	1	☆
P7.13	Total time under voltage	0 h - 65535 hours	-	•
P7.14	Total electricity consumption	0 kWh - 65535 kWh	-	•

Group P8: Auxiliary functions				
Function code	Parameter name	Setting range	Default setting	Attribute
P8.00	Jog (JOG) frequency	0.00 Hz – maximum frequency	2.00Hz	☆
P8.01	Jog acceleration (JOG)	0.0s - 6500.0s	20.0s	☆
P8.02	Jog deceleration (JOG)	0.0s - 6500.0s	20.0s	☆
P8.03	Acceleration time 2	0.0s - 6500.0s	by the model	☆
P8.04	Deceleration time 2	0.0s - 6500.0s	by the model	☆
P8.05	Acceleration time 3	0.0s - 6500.0s	by the model	☆
P8.06	Deceleration time 3	0.0s - 6500.0s	by the model	☆
P8.07	Acceleration time 4	0.0s - 6500.0s	by the model	☆
P8.08	Deceleration time 4	0.0s - 6500.0s	by the model	☆
P8.09	Jump frequency 1	0.00Hz – maximum frequency	0.00Hz	☆
P8.10	Jump frequency 2	0.00Hz – maximum frequency	0.00 Hz	☆
P8.11	Amplitude of the jump frequency	0.00Hz – maximum frequency	0.01Hz	☆
P8.12	Dead zone time when changing rotation	0.0s - 3000.0s	0.0s	☆
P8.13	Control of reverse run	0: disabled 1: enabled	0	☆
P8.14	Mode of operation when the set frequency is lower than the lower limit	0: RUN at the lower frequency limit 1: Stop 2: RUN at zero speed	0	☆
P8.15	Balance control	0.00Hz - 10.00Hz	0.00Hz	☆
P8.16	Limit of total turn-on time	0h – 65000 hours	0h	☆
P8.17	Total time of operation the inverter	0h – 65000 hours	0h	☆
P8.18	The protection at start	0: disabled 1: enabled	0	☆

Function code	Parameter name	Setting range	Default setting	Attribute
P8.19	Frequency detection value (FDT1)	0.00Hz – maximum frequency	50.00Hz	☆
P8.20	Hysteresis detection value (FDH)	0.0% - 100.0% (FDT1)	5.0%	☆
P8.21	Achieved range of frequency detection	0.00Hz – 100% (maximum frequency)	0.0%	☆
P8.22	Jump frequency during acceleration / deceleration	0: disabled 1: enabled	0	☆
P8.25	Frequency switching point between acceleration time 1 and acceleration time 2	0.00Hz – maximum frequency	0.00Hz	☆
P8.26	Frequency switching point between deceleration time 1 and deceleration time 2	0.00Hz – maximum frequency	0.00Hz	☆
P8.27	Terminal JOG preferred	0: disabled 1: enabled	0	☆
P8.28	Frequency detection value (FDT2)	0.00Hz – maximum frequency	50.00Hz	☆
P8.29	Hysteresis detection value (FDT2)	0.0% - 100.0% (FDT2 level)	5.0%	☆
P8.30	Frequency reaching the detected value 1	0.00Hz – maximum frequency	50.00Hz	☆
P8.31	Frequency reaching the amplitude value 1	0.0% - 100.0% (maximum frequency)	0.0%	☆
P8.32	Frequency reaching the detected value 2	0.00Hz – maximum frequency	50.00Hz	☆
P8.33	Frequency reaching the amplitude value 2	0.0% - 100.0% (maximum frequency)	0.0%	☆

Function code	Parameter name	Setting range	Default setting	Attribute
P8.34	Level of zero current detection	0.0% - 300.0% 100.0% of rated motor current	5.0%	☆
P8.35	The delay time of zero current detection	0.01s - 600.00s	0.10s	☆
P8.36	Exceeding the output current limit	0.0 % - no detection 0.1 % - 300.0 % (rated motor current)	200.0%	☆
P8.37	Delay time when crossing the limit	0.00s - 600.00s	0.00s	☆
P8.38	Current reaching the value of detection 1	0.0 – 300.0 % (rated motor current)	100.0%	☆
P8.39	Current reaching the value of amplitude 1	0.0 – 300.0 % (rated motor current)	0.0%	☆
P8.40	Current reaching the value of detection 2	0.0 – 300.0 % (rated motor current)	100.0%	☆
P8.41	Current reaching the value of amplitude 2	0.0 – 300.0 % (rated motor current)	0.0%	☆
P8.42	Selection of timing function	0: disabled 1: enabled	0	☆
P8.43	Selection of source the timing	0: P8.44 1: FIV 2: FIC 3: Reserved 100% of the analog input corresponds to P8.44	0	☆
P8.44	Time of duration	0.0 min - 6500.0 min	0.0 min	☆
P8.45	Lower limit of input voltage FIV	0.00V - P8.46	3.10V	☆
P8.46	Upper limit of input voltage FIV	P8.45 - 10.00V	6.80V	☆

P8.47	Inverter temperature	0°C - 150°C	100°C	☆
P8.48	Fan control	0: The fan works only during operation 1: The fan works continuously	0	☆
P8.49	Frequency at wake-up	Frequency during sleep (P8.51) – maximum frequency (P0.12)	0.00Hz	☆
P8.50	Delay of wake-up	0.0s - 6500.0s	0.0s	☆
P8.51	Frequency during sleep	0.00 Hz - frequency at wake-up (P8.49)	0.00Hz	☆
P8.52	Delay of sleep	0.0s - 6500.0s	0.0s	☆
P8.53	Running time reached	0.0 min - 6500.0 min	0.0 min	★

Group P9: Faults and protection

Function code	Parameter name	Setting range	Default setting	Attribute
P9.00	Selection of overload protection	0: protection disabled 1: protection enabled	1	☆
P9.01	Increasing motor overload protection	0.20 - 10.00	1.00	☆
P9.02	Motor overload warning coefficient	50% - 100%	80%	☆
P9.03	Increasing overload of DC overvoltage	0 - 100 (when activate the dynamic braking, set 0)	10	☆
P9.04	Overvoltage stall protective voltage	120% - 150%	130%	☆
P9.05	Over current increasing	0 - 100	20	☆
P9.06	Over current protection	100% - 200%	150%	☆

Function code	Parameter name	Setting range	Default setting	Attribute
P9.07	To test short to ground after switching on	1: test 0: do not test	1	☆
P9.09	Auto restoration times after malfunction	0 - 20	0	☆
P9.10	Output state M01 during auto-recovery after malfunction	0: no activity; 1: activity	0	☆
P9.11	Auto-recovery interval after malfunction	0.1s-100.0s	1.0 s	☆
P9.12	Reserved			☆
P9.13	Turn on protection when the output phase fails	0: disabled 1: enabled	1	☆
P9.14	The first type of malfunction	0: No fault 1: Inverter fault 2: Over current during acceleration 3: Over current during deceleration 4: Over current at constant speed 5: Overvoltage during acceleration 6: Overvoltage during deceleration 7: Overvoltage at constant speed 8: Braking resistance overload 9: Low Voltage 10: Overloaded inverter 11: Overloaded motor 12: Reserved 13: Power phase failure 14: Overheating of the inverter 15: External device error 16: Communication error 17: Contactor Error 18: Error of current detection 19: Error of automatic tuning 20: Reserved 21: EPROM memory error 22: Hardware error of the inverter	-	•

Function code	Parameter name	Setting range	Default setting	Attribute
P9.15	The second type of malfunction	23: Short to ground 24: Reserved 25: Reserved 26: Total operating time reached 27: Reserved 28: Reserved 29: Total time under voltage (operating time)	-	•
P9.16	The third (last) type of malfunction	30: Zero load 31: Loss of feedback from the PID controller 40: Current limit failure 41 -43: Reserved 51: Reserved	-	•
P9.17	Frequency at the 3rd error	-	-	•
P9.18	Current at the 3rd error	-	-	•
P9.19	Bus voltage at the 3rd error	-	-	•
P9.20	State of input terminals at the 3rd error	-	-	•
P9.21	State of output terminals at the 3rd error	-	-	•
P9.22	Inverter status at 3rd error	-	-	•
P9.23	Duration of turn on at 3rd error	-	-	•
P9.24	Duration of run mode at 3rd error	-	-	•
P9.25	Reserved	-	-	•
P9.26	Reserved	-	-	•

Function code	Parameter name	Setting range	Default setting	Attribute
P9.27	Frequency at the 2nd error	-	-	•
P9.28	Current at the 2nd error	-	-	•
P9.29	Bus voltage at the 2nd error	-	-	•
P9.30	State of input terminals at the 2nd error	-	-	•
P9.31	State of output terminals at the 2nd error	-	-	•
P9.32	Inverter status at 2nd error	-	-	•
P9.33	Duration of turn on at 2nd error	-	-	•
P9.34	Duration of run mode at 2nd error	-	-	•
P9.35	Reserved	-	-	•
P9.36	Reserved	-	-	•
P9.37	Frequency at the 1st error	-	-	•
P9.38	Current at the 1st error	-	-	•
P9.39	Bus voltage at the 1st error	-	-	•
P9.40	State of input terminals at the 1st error	-	-	•
P9.41	State of output terminals at the 1st error			
P9.42	Inverter status at 1st error			
P9.43	Duration of turn on at 1st error			
P9.44	Duration of run mode at 1st error			
P9.45	Reserved			
P9.46	Reserved			

Function code	Parameter name	Setting range	Default setting	Attribute
P9.47	Selection of failure protection action 1 X: Motor overload (OL1) 0: Deceleration to stop 1: STOP by stop mode 2: Continues in run ... X.: Reserved ..X.: Phase loss (LO) .X...: External device error (EF) X....: Communication error (CE)	00000	☆
P9.48	Selection of failure protection action 2X: Reserved 0: Deceleration to stopX.: EEPROM error (EEP) 0: Deceleration to stop 1: STOP by stop mode ..X.: Reserved .X...: Reserved X....: Total time was reached (END1)	00000	☆
P9.49	Selection of failure protection action 3X: 0: Deceleration to stop 1: STOP by stop mode 2: Continues in run ...X: 0: Deceleration to stop 1: STOP by stop mode 2: Continues in run ..X.: The total time of power on was reached (END2) 0: Deceleration to stop 1: STOP by stop mode 2: Continues in run .X...: Zero load 0: Deceleration to stop 1: STOP by stop mode 2: Continues to operate at 7% of the rated motor frequency and recovers the set frequency if the load resumes X....: Loss of PID feedback 0: Deceleration to stop 1: STOP by stop mode 2: Continues in run	00000	☆

Function code	Parameter name	Setting range	Default setting	Attribute
P9.50	Reserved			
P9.51	Reserved			
P9.52	Selection of displaying the quantity on the 2nd line of the display	0: Running frequency 1: Set frequency 2: DC bus voltage 3: Output voltage 4: Output current 5: Output power 6: Output torque 7: Status of terminal S 8: Status of terminal M01		
P9.54	Frequency selection for continuing to run	0: Actual running frequency 1: Set frequency 2: The upper frequency limit 3: The lower frequency limit 4: Backup frequency for error	0	☆
P9.55	Backup frequency at error	60.0% - 100.0%	100.0%	☆
P9.56	Reserved			☆
P9.57	Reserved			☆
P9.58	Reserved			☆
P9.59	Selection of activity in case of a sudden power outage	0: Invalid 1: Deceleration 2: Deceleration to stop	0	☆
P9.60	The action will suspend the voltage monitoring during a sudden power outage	0.0% - 100.0%	100.0%	☆
P9.61	Power monitoring time in case of a sudden power outage	0.00s - 100.00s	0.50s	☆

Function code	Parameter name	Setting range	Default setting	Attribute
P9.62	Voltage during power failure	60.0 % - 100.0 % (bus voltage)	80.0%	☆
P9.63	Protection at zero load	0: disabled 1: enabled	0	☆
P9.64	Level of zero load detection	0.0-100.0%	10.0%	☆
P9.65	The zero load detection time	0.0-60.0s	1.0s	☆
P9.67	Reserved			
P9.68	Reserved			
P9.69	Reserved			
P9.70	Reserved			

Group PA: PID process control functions

Function code	Parameter name	Setting range	Default setting	Attribute
PA.00	Setting of source the required value of PID	0: PA.01 1: FIV 2: FIC 3: Reserved 4: IMPULSE setting (S3), option 5: Communication setting 6: Multiple meaning	0	☆
PA.01	Digital setting of PID	0.0% - 100.0%	50.0%	☆
PA.02	Setting of source the feedback of PID	0: FIV 1: FIC 2: Reserved 3: FIV-FIC 4: IMPULSE setting (S3), option 5: Communication setting 6: FIV+FIC MULTI REFERENCE 7: MAX(FIV , FIC) 8: MIN(FIV , FIC)	0	☆

Function code	Parameter name	Setting range	Default setting	Attribute
PA.03	Direction of action the PID	0: Action forward 1: Action backward	0	☆
PA.04	Setting range of PID feedback	0 - 65535	1000	☆
PA.05	Linear constant Kp1	0.0 - 100.0	20.0	☆
PA.06	Integration constant Ti1	0.01 s - 10.00s	2.00s	☆
PA.07	Derivation constant Td1	0.000 - 10.000s	0.000s	☆
PA.08	Disconnection frequency PID of reverse rotation	0.0 – maximum frequency	2.00Hz	☆
PA.09	Limit of PID deviation	0.0% - 100.0%	0.0%	☆
PA.10	PID differential limit	0.00% - 100.00%	0.10%	☆
PA. 11	Setting the PID change time	0.00 - 650.00s	0.00s	☆
PA.12	The time of filtering PID feedback	0.00 - 60.00s	0.00s	☆
PA.13	The time of filtering PID output	0.00 - 60.00s	0.00s	☆
PA. 14	Reserved			☆
PA.15	Linear constant Kp2	0.0 - 100.0	20.0	☆
PA.16	Integration constant Ti2	0.01s - 10.00s	2.00s	☆

Function code	Parameter name	Setting range	Default setting	Attribute
PA.17	Derivation constant Td2	0.000s - 10.000s	0.000s	☆
PA.18	Switching condition of PID parameters	0: No switching 1: Switching over S 2: Automatic switching based on deviation	0	☆
PA.19	Parameter switching deviation PID 1	0.0% - PA.20	20.0%	☆
PA.20	Parameter switching deviation PID 2	PA.19 - 100.0%	80.0%	☆
PA.21	Initial value of PID	0.0% - 100.0%	0.0%	☆
PA.22	Initial value of delaying PID	0.00-650.00s	0.00s	☆
PA.23	Maximum deviation between two PID outputs in the forward direction	0.00% - 100.00%	1.00%	☆
PA.24	Maximum deviation between two PID outputs in the backward direction	0.00%-100.00%	1.00%	☆
PA.25	Properties of PID integration	.X: Separated integration 0: disabled 1: enabled X.: Stop the integration when the output reaches the required limit 0: Continuing of integration 1: Stop of integration	00	☆
PA.26	Detection of PID controller feedback loss	0.0%= loss of feedback is not detected 0.1: 100.0%	0.0%	☆

PA.27	Detection time when PID controller feedback is lost	0.0s - 20.0s	0.0s	☆
PA.28	Behaviour of PID in case of loss of feedback	0: No action of PID and STOP 1: PID action and STOP	0	☆

Group Pb: Variable frequency, fixed length and count

Function code	Parameter name	Setting range	Default setting	Attribute
Pb.00	Set the swing frequency mode	0: Relative to the mean value of the frequency 1: Relative to the maximum value of the frequency	0	☆
Pb.01	Amplitude of swing frequency	0.0% - 100.0%	0.0%	☆
Pb.02	Amplitude of the jump frequency	0.0% - 50.0%	0.0%	☆
Pb.03	Frequency swing cycle	0.1s - 3000.0s	10.0s	☆
Pb.04	Time coefficient of triangle wave rise	0.1 % - 100.0%	50.0%	☆
Pb.05	Set length	0m - 65535m	1000m	☆
Pb.06	Actual length	0m - 65535m	0m	☆
Pb.07	Number of pulses per meter	0.1 - 6553.5	100.0	☆
Pb.08	Set counter value	1 - 65535	1000	☆
Pb.09	Determined counter value	1 - 65535	1000	☆

Group PC: Multiple functions and simple PLC function				
Function code	Parameter name	Setting range	Default setting	Attribute
PC.00	Multifunction 0	-100.0% - 100.0%	0.0%	☆
PC.01	Multifunction 1	-100.0% - 100.0%	0.0%	☆
PC.02	Multifunction 2	-100.0% - 100.0%	0.0%	☆
PC.03	Multifunction 3	-100.0% - 100.0%	0.0%	☆
PC.04	Multifunction 4	-100.0% - 100.0%	0.0%	☆
PC.05	Multifunction 5	-100.0% - 100.0%	0.0%	☆
PC.06	Multifunction 6	-100.0% - 100.0%	0.0%	☆
PC.07	Multifunction 7	-100.0% - 100.0%	0.0%	☆
PC.08	Multifunction 8	-100.0% - 100.0%	0.0%	☆
PC.09	Multifunction 9	-100.0% - 100.0%	0.0%	☆
PC.10	Multifunction 10	-100.0% - 100.0%	0.0%	☆
PC.11	Multifunction 11	-100.0% - 100.0%	0.0%	☆
PC.12	Multifunction 12	-100.0% - 100.0%	0.0%	☆
PC.13	Multifunction 13	-100.0% - 100.0%	0.0%	☆
PC.14	Multifunction 14	-100.0% - 100.0%	0.0%	☆
PC.15	Multifunction 15	-100.0% - 100.0%	0.0%	☆
PC. 16	Run mode of the simple PLC	0: Stop after performing of one cycle of the inverter 1: Holds the last values after the inverter performs one cycle 2: Repeat after performing of one cycle of the inverter	0	☆
PC. 17	Setting the memory for selecting a simple PLC	.X: Storage after power failure 0:No 1:Yes X.: Storage after the STOP command 0:No 1:Yes	00	☆
PC. 18	Duration of run mode the single PLC command 0	0.0s(h) - 6553.5s(h)	0.0s(h)	
PC. 19	The acceleration / deceleration time of the simple PLC command 0	0-3	0	

Function code	Parameter name	Setting range	Default setting	Attribute
PC.20	Duration of run mode the single PLC command 1	0.0s(h) - 6553.5s(h)	0.0s(h)	☆
PC.21	The acceleration / deceleration time of the simple PLC command 1	0-3	0	☆
PC.22	Duration of run mode the single PLC command 2	0.0s(h) - 6553.5s(h)	0.0s(h)	☆
PC.23	The acceleration / deceleration time of the simple PLC command 2	0-3	0	☆
PC.24	Duration of run mode the single PLC command 3	0.0s(h) - 6553.5s(h)	0.0s(h)	☆
PC.25	The acceleration / deceleration time of the simple PLC command 3	0-3	0	☆
PC.26	Duration of run mode the single PLC command 4	0.0s(h) - 6553.5s(h)	0.0s(h)	☆
PC.27	The acceleration / deceleration time of the simple PLC command 4	0-3	0	☆
PC.28	Duration of run mode the single PLC command 5	0.0s(h) - 6553.5s(h)	0.0s(h)	☆
PC.29	The acceleration / deceleration time of the simple PLC command 5	0-3	0	☆
PC.30	Duration of run mode the single PLC command 6	0.0s(h) - 6553.5s(h)	0.0s(h)	☆

Function code	Parameter name	Setting range	Default setting	Attribute
PC.31	The acceleration / deceleration time of the simple PLC command 6	0-3	0	☆
PC.32	Duration of run mode the single PLC command 7	0.0s(h) - 6553.5s(h)	0.0s(h)	☆
PC.33	The acceleration / deceleration time of the simple PLC command 7	0-3	0	☆
PC.34	Duration of run mode the single PLC command 8	0.0s(h) - 6553.5s(h)	0.0s(h)	☆
PC.35	The acceleration / deceleration time of the simple PLC command 8	0-3	0	☆
PC.36	Duration of run mode the single PLC command 9	0.0s(h) - 6553.5s(h)	0.0s(h)	☆
PC.37	The acceleration / deceleration time of the simple PLC command 9	0-3	0	☆
PC.38	Duration of run mode the single PLC command 10	0.0s(h) - 6553.5s(h)	0.0s(h)	☆
PC.39	The acceleration / deceleration time of the simple PLC command 10	0-3	0	☆
PC.40	Duration of run mode the single PLC command 11	0.0s(h) - 6500.0s(h)	0.0s(h)	☆
PC.41	The acceleration / deceleration time of the simple PLC command 11	0-3	0	☆

Function code	Parameter name	Setting range	Default setting	Attribute
PC.42	Duration of run mode the single PLC command 12	0.0s (h) - 6500.0s (h)	0.0s (h)	☆
PC.43	The acceleration / deceleration time of the simple PLC command 12	0-3	0	☆
PC.44	Duration of run mode the single PLC command 13	0.0s (h) - 6500.0s (h)	0.0s (h)	☆
PC.45	The acceleration / deceleration time of the simple PLC command 13	0-3	0	☆
PC.46	Duration of run mode the single PLC command 14	0.0s (h) - 6500.0s (h)	0.0s(h)	☆
PC.47	The acceleration / deceleration time of the simple PLC command 14	0-3	0	☆
PC.48	Duration of run mode the single PLC command 15	0.0s (h) - 6500.0s (h)	0.0s (h)	☆
PC.49	The acceleration / deceleration time of the simple PLC command 15	0-3	0	☆
PC.50	Time unit of a simple PLC	0: S (seconds) 1: H (hours)	0	☆
PC.51	Source 0	0: Set from PC.00 1: FIV 2: FIC 3: Reserved 4: IMPULSE setting 5: PID 6: Set according to the preset frequency (P0.10), modified by UP / DOWN keys	0	☆

Group PD: Communication parameters				
Function code	Parameter name	Setting range	Default setting	Attribute
PD.00	Transfer speed	Units: MODBUS 0: 300 BPS 1: 600 BPS 2: 1200 BPS 3: 2400 BPS 4: 4800 BPS 5: 9600 BPS 6: 19200 BPS 7: 38400 BPS 8: 57600 BPS 9: 115200 BPS Tens: Reserved Hundreds: Reserved Thousands: Reserved	0005	☆
PD.01	Data format	0: No parity, data format <8, N,2> 1: Even parity, data format <8, E,1> 2: Odd parity, data format <8,0,1> 3: No parity, data format <8, N,1> Valid to MODBUS	3	☆
PD.02	Local address	1 - 247 : Broadcast address	1	☆
PD.03	Delay of reply	0ms - 20ms	2	☆
PD.04	Communication timeout	0.0 (invalid) 0.1s - 60.0s	0.0	☆
PD.05	Selection of the MODBUS transmission protocol	.X: MODBUS protocol 0: Non-standard MODBUS protocol 1: Standard MODBUS protocol X.: Reserved	1	☆
PD.06	Current communication resolution	0: 0.01A 1: 0.10A	0	☆

Group PF: Reserved for service

Group PP: Restoring the factory settings and blocking the change of parameters				
Function code	Parameter name	Setting range	Default setting	Attribute
PP.00	User Password	0 - 65535	0	☆
PP.01	Restore factory settings	0: No activity 01: Restore factory setting except motor parameters 02: Delete records 11: High frequency control activated	0	★
PP.04	Blocking of parameter changes	0: Parameter change allowed 1: Parameter change is blocked		

Group C0: Torque control and parameter limitation				
C0.00	Selection of control the speed / torque	0: Speed control 1: Torque control	0	★
C0.01	Torque control source settings	0: Digital setting (C0.03) 1: FIV 2: FIC 3: Reserved 4: IMPULSE setting, option 5: Communication setting 6: MIN (FIV,FIC) 7: MAX (FIV,FIC)	0	★
C0.03	Digital setting of torque control	-200.0% - 200.0%	150.0%	☆
C0.05	Maximum frequency forward at torque control	0.0 Hz – maximum frequency	50.00Hz	☆
C0.06	Maximum frequency backward at torque control	0.0 Hz – maximum frequency	50.00Hz	☆
C0.07	The acceleration time for torque control	0.00s - 650.00s	0.00s	★
C0.08	The deceleration time for torque control	0.00s - 650.00s	0.00s	☆

Groups C1-C4: Reserved

Group C5: Control optimization parameters				
Function code	Parameter name	Setting range	Default setting	Attribute
C5.00	Upper limit of PWM frequency switching	0.0 Hz – 15 Hz	12.00Hz	☆
C5.01	PWM modulation mode	0: Asynchronous modulation 1: Synchronous modulation	0	☆
C5.02	Compensation method	0: No compensation 1: Compensation mode 1 2: Compensation mode 2	1	☆
C5.03	Random dimension of PWM	0: Disabled 1-10: Random dimension of carrier frequency PWM	0	☆
C5.04	Open limitation of current	0: Disabled 1: Enabled	1	☆
C5.05	Detection of current compensation	0 - 100	5	☆
C5.06	Setting the undervoltage	60.0% - 140.0%	100.0%	☆
C5.07	Selection SFVC optimization mode	0: No optimization 1: Optimization mode 1 2: Optimization mode 2	1	☆

Group C6: FI curve setting(FI means FIV or FIC)				
Function code	Parameter name	Setting range	Default setting	Attribute
C6.00	The minimum of FI curve 4	-10.00V - C6.02	0.00V	☆
C6.01	Corresponding FI 4 curve setting, minimum	-100.0% - +100.0%	0.0%	☆
C6.02	FI curve 4 inflexion 1	C6.00 - C6.04	3.00V	☆
C6.03	Corresponding curve setting FI 4 inflexion 1	-100.0% - +100.0%	30.0%	☆
C6.04	FI curve 4 inflexion 2	C6.02 - C6.06	6.00V	☆
C6.05	Corresponding curve setting FI 4 inflexion 2	-100.0% - +100.0%	60.0%	☆

Function code	Parameter name	Setting range	Default setting	Attribute
C6.06	FI curve 4 maximum	C6.06 - +10.00V	10.00V	☆
C6.07	Corresponding FI 4 curve setting, maximum	-100.0% - +100.0%	100.0%	☆
C6.08	The minimum of FI curve 5	-10.00V - C6.10	0.00V	☆
C6.09	Corresponding FI 5 curve setting, minimum	-100.0% - +100.0%	-100.0%	☆
C6.10	FI curve 5 inflexion 1	C6.08 - C6.12	3.00V	☆
C6.11	Corresponding curve setting FI 5 inflexion 1	-100.0% - +100.0%	-30.0%	☆
C6.12	FI curve 5 inflexion 2	C6.10 - C6.14	6.00V	☆
C6.13	Corresponding curve setting FI 5 inflexion 2	-100.0% - +100.0%	30.0%	☆
C6.14	FI curve 5 maximum	C6.12 - +10.00V	10.00V	☆
C6.15	Corresponding FI 5 curve setting, maximum	-100.0% - +100.0%	100.0%	☆
C6.16	FIV jump point	-100.0% - 100.0%	0.0%	☆
C6.17	Amplitude of the FIV jump	0.0% - 100.0%	0.5%	☆
C6.18	FIC jump point	-100.0% - 100.0%	0.0%	☆
C6.19	Amplitude of the FIC jump	0.0% - 100.0%	0.5%	☆

Group C9: Special function PID

Function code	Parameter name	Setting range	Default setting	Attribute
C9.00	PID sleep frequency	0 - P0.12	0.00 Hz	0.00 Hz
C9.01	PID sleep time	0 - 5000.0 s	10.0 s	0.0 s
C9.02	PID wake-up value	0 - 100 %	60.0 %	0.0 %

Group CC: Correction of FI / FO values				
Function code	Parameter name	Setting range	Default setting	Attribute
CC.00	Measured voltage FIV 1	Default	Factory adjusted	☆
	Setting range	0.500V-4.000V		
CC.01	Displayed voltage FIV 1	Default	Factory adjusted	☆
	Setting range	0.500V-4.000V		
CC.02	Measured voltage FIV 2	Default	Factory adjusted	☆
	Setting range	6.000V-9.999V		
CC.03	Displayed voltage FIV 2	Default	Factory adjusted	☆
	Setting range	6.000V-9.999V		
CC.04	Measured voltage FIC 1	Default	Factory adjusted	☆
	Setting range	0.500V - 4.000V		
CC.05	Displayed voltage FIC 1	Default	Factory adjusted	☆
	Setting range	0.500V-4.000V		
CC.06	Measured voltage FIC 2	Default	Factory adjusted	☆
	Setting range	6.000V-9.999V		
CC.07	Displayed voltage FIC 2	Default	Factory adjusted	☆
	Setting range	6.000V-9.999V		
CC.08	Reserved			
CC.09	Reserved			
CC.10	Reserved			
CC.11	Reserved			

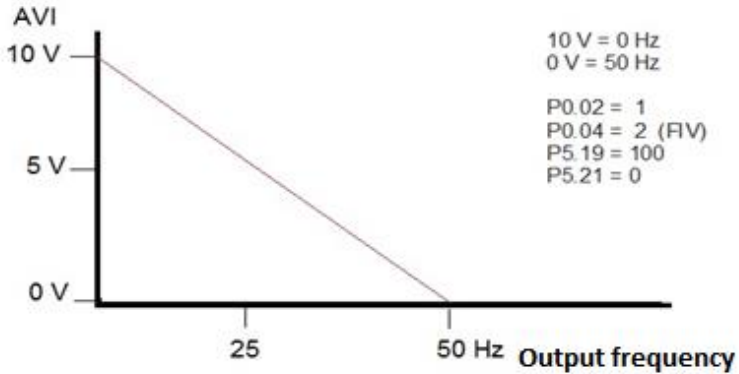
Function code	Parameter name	Setting range	Default setting	Attribute
CC.12	FOV target voltage 1	Default	Factory adjusted	☆
	Setting range	0.500V-4.000V		
CC.13	FOV measured voltage 1	Default	Factory adjusted	☆
	Setting range	0.500V-4.000V		
CC.14	FOV target voltage 2	Default	Factory adjusted	☆
	Setting range	6.000V-9.999V		
CC.15	FOV measured voltage 2	Default	Factory adjusted	☆
	Setting range	6.000V-9.999V		
CC.16	Reserved			
CC.17	Reserved			
CC.18	Reserved			
CC.19	Reserved			

Group D0 Monitoring parameters

Function	Parameter name	Unit
D0.00	Run Frequency (Hz)	0.01Hz
D0.01	Set frequency (Hz)	0.01Hz
D0.02	Bus voltage (V)	0.1V
D0.03	Output Voltage (V)	1V
D0.04	Output current (A)	0.01A
D0.05	Output power (kW)	0.1 kW
D0.06	Output torque (%)	0.1%
D0.07	Input state of S-terminal	1
D0.08	Output state of M01-terminal	1
D0.09	Reserved	
D0.10	FIC voltage (V)	0.01 V
D0.11	Reserved	

Function	Parameter name	Unit
D0.12	Counter value	1
D0.13	Length value	1
D0.14	Load Speed	1
D0.15	PID setting	1
D0.16	PID Feedback	1
D0.17	PLC status	1
D0.18	Input pulse frequency	0.01 kHz
D0.19	Reserved	
D0.20	The remaining running time	0.1 min
D0.21	FIV voltage before correction	0.001V
D0.22	FIC voltage before correction	0.001V
D0.23	Reserved	
D0.24	Linear speed	1 m/min
D0.25	Total time under voltage	1 min
D0.26	Total running time	0.1 min
D0.27	Input frequency of pulse	1 Hz
D0.28	Setting of communications	0.01 %
D0.29	Reserved	
D0.30	Main frequency X	0.01 Hz
D0.31	Auxiliary frequency Y	0.01 Hz
D0.32	Displaying any memory address value	
D0.33	Reserved	
D0.34	Reserved	
D0.35	Required torque	0.1 %
D0.36	Reserved	
D0.37	Angle of the effective	0.1
D0.38	Reserved	
D0.39	Target voltage for V/F separation	1 V
D0.40	Output voltage for V/F separation	1 V
D0.41	Reserved	
D0.42	Reserved	
D0.43	Reserved	
D0.44	Reserved	
D0.45	The current fault code	0

Example No. 1: Parameterisation of inverse control with a frequency voltage of 10 V to 0 V:



Example No. 2: Parametrization of the brake resistor



P9.03=0 (activates the brake resistor)

Example No. 3: Parameterisation for the control of the electric motor of the crane

Installation procedure:

- 1./ connect the inverter, protections, connect the braking resistor, etc.
- 2./ connect the motor to the inverter (preferably without the clutch engaged - idle)
- 3./ set the motor parameters P0.00=0; P0.01=1 and P2.01;P2.02;P2.03;P2.04
- 4./ turn on automatic engine tuning P2.37=1
- 5./ the converter displays "Study" and we press START
- 6./ the converter is "paired" to the motor
- 7./ after the end of the autotuning, the inverter displays e.g. 50.0 Hz (set frequency)

Only then will we adjust the parameters according to the table below and connect the control!

P0.00	G constant load		1
P0.01	SFVC control		1
P0.02	Select command channel	Through the input terminals	1
P0.04	Select the main frequency source X		06
P2.01	Rated motor power	Electric motor power 37 kW	37
P2.02	Rated motor voltage	Voltage V from nameplate	400
P2.03	Rated motor current	Current A from nameplate	
P2.04	Rated motor frequency	Frequency Hz from the nameplate	50
P2.37	Automatic tuning		1
P5.00	FWD function selection	RUN right at speed 1	1
P5.01	REV function selection	RUN left at speed 1	2
P5.02	S1 function selection	Not connected	9
P5.03	S2 function selection	Speed 2	12
P5.04	S3 function selection	Not connected	13
PC.00	Multiple function 0	Frequency in % for speed 1	20
PC.01	Multiple function 1	Frequency in % for speed 2	100
P6.02	RA-RB-RC relay output function (It is needed to release the external brake)	Frequency reached	4
P8.21	The range of detection of the frequency reached	About 3 Hz, but we indicate it in %	12
P9.03	Activation of the integrated brake unit		0

If you turn on FWD/GND, the inverter will start to the right at speed 1

If you turn on REV/GND, the inverter will run to the left at speed 1

If you turn on both FWD/GND and S2/GND at the same time, the inverter will run clockwise at speed 2

If you turn on both REV/GND and S2/GND at the same time, the inverter will run to the left at speed 2

Example No. 4: PID application

The basic PID setting is as follows:

P0.02=1

P0.04=8

PA.00=0

PA.01= target pressure value

PA.02=1 (FIC)

PA.21= PID initialization value

C9.00 : PID sleep frequency

C9.01 : PID sleep time

C9.02 : PID wake-up value

P8.49 : Wake-up frequency

P8.50 : Wake-up delay

P8.51 : Frequency during sleep

P8.52 : Sleep delay

Example No. 5: High-speed spindle operation parameters

High frequency control			
PP.01	11	P5.03	12
P0.02	1	P5.04	13
P0.04	6	P5.05	14
P0.10	400.0 Hz	PC.01	25.0 %
P0.12	400.0 Hz	PC.02	37.5 %
P0.14	400.0 Hz	PC.03	50.0 %
P0.22	1	PC.04	62.5 %
P4.11	0	PC.05	75.0 %
P5.13	0.50 V	PC.06	87.5 %
P2.04	400.0 Hz	PC.07	100.0 %
P2.05	24000 rpm	PC.51	0
P0.08	10.0 s	C5.01	1
P0.09	10.0 s		

Chapter 5: Detailed description of parameters

Group P0 : Basic parameters

P0.00	G/P typ *		Default	*Depends on the model
	Setting value	1	1: G type (constant torque load CT)	
	2	2: P type (variable torque, eg fan, compressor, pump, etc.)		

This parameter is used to display the supplied model and cannot be modified.

1: Applies to constant torque load with specified rated parameters .

2: Applies to variable torque load (fan and pump) with rated parameters.

P0.01	Selecting the control mode		Default	0
	Setting value	0	Voltage / frequency control (V/F)	
	1	Flow vector control without sensor (SFVC)		

0: Voltage / frequency control (V/F)

It is used in applications with simple requirements or applications where one AC drive works with multiple motors, such as a fan and a pump.

1: Sensor-free flux vector control (SFVC).

It is an open-loop vector control and is applicable to high-performance control applications such as machine tools, centrifuges, wire drawing machines and injection molding machines. One AC unit can only control one motor.

NOTE: If vector control is used, automatic parameter tuning must be performed, as the benefits of vector control can only be realized after obtaining the correct motor parameters. Greater performance can be achieved by adjusting the engine parameters.

P0.02	Select command channel		Default	0
	Setting value	0	0: Control via the operation panel (LED does not light)	
	1	1: Control via input terminals (LED lights up)		
	2	2: Control via PC (LED flashes)		

It is used to specify the input channel of AC control commands such as run, stop, forward, reverse and jog (JOG). You can enter commands in the following three channels:

0: Control via the operation panel

Commands are entered by pressing the RUN and STOP / RESET buttons on the control panel.

1: Control via input terminals

Commands are entered through multi-function input terminals with functions such as FWD, REV, JOGF and JOGR.

2: Control via communication (MODBUS RTU)

Commands are entered from the host computer.

	Frequency source	Default	00
P0.03	Setting value	.X :(frequency source)	
		0	Main source of frequency X
		1	X and Y operations (operating mode specified by dozens)
		2	Switch between X and Y
		3	Switch between X and "X and Y"
		4	4: Switching between Y and "X and Y"
		X. : (X and Y operation)	
		0	X+Y
		1	X-Y
		2	Maximum X and Y
	3	Minimum X and Y	

It is used to select the channel for setting the frequency. Through the main source of frequency X and the source of auxiliary frequency Y, it reaches the desired frequency. Digit in units position (frequency source).

0: Main frequency X

Main frequency X as target frequency.

1: Specifies the relationship between frequency X and auxiliary frequency Y.

It is specified by the digit in the tens place in the function code.

2: Switching between the main frequency source X and the auxiliary frequency source Y.

When the multi-function input terminal 18 (frequency switch) is disabled, the main frequency X is the target frequency. When the multi-function input terminal 18 is enabled, the auxiliary frequency Y is the target frequency.

3: Switching frequencies between X and "X and Y".

When the multi-function input terminal 18 (frequency switch) is disabled, the main frequency X is the target frequency. When the multi-function input terminal 18 is enabled, the resulting frequency is calculated using the auxiliary frequency.

4: Switching frequencies between Y and "X and Y"

When the multi-function input terminal 18 (frequency switch) is disabled, the auxiliary frequency Y is the target frequency. When the multi-function input terminal 18 is enabled, the resulting frequency is calculated using the auxiliary / main frequency.

Tens digit (frequency source)

0: The sum of the main and auxiliary frequencies ($X+Y$) determines the target frequency.

1: The difference between main and auxiliary frequency ($X-Y$) determines the target frequency.

2: MAX (main frequency source X, auxiliary frequency source Y), the target frequency is the frequency whose absolute value is larger.

3: MIN (main frequency source X, auxiliary frequency source Y), the target frequency is the frequency whose absolute value is smaller. In addition, when the selection of the frequency source is determined by the complementary calculation, the offset frequency can be set according to P0.21.

P0.04	Select the main frequency source X		Default	00	
	Setting value	0	Digital setting - after power loss without saving (P0.10 preset frequency, can be changed via UP/DOWN)		
		1	Digital setting - after power loss with value storage (P0.10 preset frequency, can be changed via UP/DOWN)		
		2	FIV		
		3	FIC		
		4	The rotary knob on the panel		
		5	Impulse adjustment (S3), option		
		6	Step fixed speeds		
		7	PLC		
		8	PID		
9		Communication interface			

Select the main input channel of the given frequency inverter.

A total of 9 frequency channels are given:

0: digital setting (does not remember setting after power loss)

Set the initial value of frequency P0.10 (frequency preset). You can use the \uparrow and \downarrow buttons (or the UP and DOWN multi-function input terminal) to change the set frequency of the inverter. The inverter resets the frequency values to P0.10 (digital frequency preset) after the power is turned off and the power is turned on again.

1: digital setting (does not remember setting after power loss)

Set the initial frequency value of P010 (frequency setting). They can be set with the keys \uparrow , \downarrow (or the multifunctional input terminal UP and DOWN). After the power is turned off and the power is turned on again, the inverter will set the frequency according to the last

setting, you can make a correction through the ↑ and ↓ keys or through the UP and DOWN terminal.

It is necessary to remind that P0.23 sets the "digital frequency memory selection", P0.23 is used to select the inverter when the inverter stops, P0.23 is used to select whether the inverter remembers the frequency or is reset during the stop, P0.23 it is related to the stop, not related to the memory leak, please pay attention to it in the application.

2: FIV

3: FIC

The V 800 panel provides two analog input terminals (FIV, FIC). Of them, FIV is a voltage input from 0V to 10V, FIC is a voltage input from 0V to 10V, and can also be used for 4-20mA current input, FIV, FIC input voltage values, the corresponding relationship with the target frequency, users they are free to choose. The V 800 inverter provides 5 sets of correlation curves, three groups of curves for linear relationship (2-point correlation), three groups of curves for linear relationship (4-point correlation), the user can set the values in P4 and C6 group of function codes.

The function code P4.33 is used to set the bidirectional analog input FIV - FIC, respectively to select one of the five groups of curves, see the descriptions of the function codes of groups P4, C6.

4: By the rotary knob on panel

5: The given pulse frequency (S3) is connected through the terminal pulse input. Impulse signal with specifications: voltage range 9V - 30V and frequency range from 0 kHz to 100 kHz. The input pulse can only be entered from the multi-function input terminals S3.

Terminal S3 and the corresponding parameter setting are P5.28 - P5.31. The linear relationship between the corresponding setting of 100% input pulses, refers to the relative maximum frequency of P0.12 percent.

6: More instructions for selection and other instructions of operation mode: by different combination, select the speed through digital input X, V 800 allows to set 4 multi-speed instruction terminals and select 16 states of these terminals. Through the function code of the PC group, select the code corresponding to any 16-fold instruction. The multiple instruction refers to the percentage of the maximum frequency P0.12.

The selection of the function of the input terminal S as well as the selection of the terminal must be made in group P5.

7: Simple PLC

If the frequency source is simple PLC mode, the inverter frequency source can run between any frequency source from 1 to 16, the delay time is from 1 to 16 frequency instructions, and their respective acceleration/deceleration times can also be set by the user. Specific content may relate to a PC group.

8: PID

Select the PID output control process as the operating frequency.

In practice, closed-loop control technology, such as constant pressure control, closed-loop constant voltage control, etc., is more commonly used. To use the PID as a frequency source, you must set the PID-related parameters in the PA group.

9: Communication The main source of frequency is given by the equipment for communication. The V 800 supports these communication methods via RS 485.

Select the auxiliary frequency source Y		Default	00
P0.05	Setting value	0	Digital setting (P0.10 preset frequency, can change over UP / DOWN)
		1	Digital setting (P0.10 preset frequency, can change over UP / DOWN)
		2	FIV
		3	FIC
		4	Reserved
		5	Impulse adjustment (S3), option
		6	Multiple instructions
		7	PLC
		8	PID
		9	Communication interface

The auxiliary frequency source with the frequency for a given channel as independent (e.g. X and Y switching frequency source selection), its use and the main frequency source with X and the methods used can be found in the P0.03 related instructions.

When the auxiliary frequency source is used as the superposition of a given source (i.e. selecting the source frequency with $X + Y$, X to $X + Y$ or Y to $X + Y$), attention should be paid to the following:

- 1) If the auxiliary frequency source is for digital timing and the preset frequency (P0 ... 10) is disabled, the user can adjust the setting using the \uparrow , \downarrow (or UP and DOWN multifunctional input terminals) directly based on that frequency adjustment.
- 2) If the auxiliary power source is for a given analog input (FIV, FIC) or a given input pulse, 100% of the input setting corresponding to the auxiliary frequency source range can be set using P0.06 and P0.07.

3) If the frequency source is a pulse input similar to the analogue. Tip: The selection of the auxiliary frequency source and the main source of frequency X, Y cannot be set to the same channel, namely P0.04 and P0.05 cannot be set to the same value, otherwise it will confuse.

P0.06	Select the range of auxiliary frequency source Y		Default	00
	Setting value	0	Considering to the maximum frequency	
		1	Considering to the maximum frequency of X source	
P0.07	Extension of the auxiliary power source Y		Default	00
	Setting value		0 % - 150 %	

When selecting the Frequency supply frequency source (P0.03 set to 1, 3 or 4), these two parameters are used to determine the range of the auxiliary power source setting. P0.05 is used to determine the range of the auxiliary frequency source of object, the choice with respect to the maximum frequency may also be relative to the frequency of the source X. If the selection is based on the main source of frequency, the range of the secondary frequency source will change as the main frequency X.

P0.08	Acceleration time 1	Default	Depends on the model
	Setting range	0.00s – 65000 s	
P0.09	Deceleration time 1	Default	Depends on the model
	Setting range	0.00s – 65000 s	

The acceleration time refers to the zero-speed inverter, the deceleration time required for the reference frequency (setting P0.24).

The deceleration time refers to the inverter at the reference frequency (setting P0.24), the deceleration to the required zero frequency.

P0.10	Default frequency	Default	50.00 Hz
	Setting range	0.00 - maximum frequency (P0.12)	

If the "digital" or "UP / DOWN" terminal is set to the frequency source selection, the function code value is the frequency of the initial digital inverter setting value.

P0.11	Direction of rotation		Default	00
	Setting range	0	The same direction	
		1	Opposite direction	

When changing the function code, you do not need to change the electrical connection of the motor to change the direction of rotation, its effect is equivalent to the setting of the electrical device (U, V, W) of any two wires for the direction of rotation of the motor.

Tip: after initialization, the original motor parameters for the rotation direction are restored. Pay attention to the tuning system, which is forbidden to change the direction of the engine.

P0.12	Maximum frequency	Default	50.00 Hz
	Setting range		50.00 Hz - 3200.00 Hz

In analogue and pulse input (S3), command time, etc., as a source of frequency 100.0% relative to the P0.10 calibration.

The maximum frequency output can reach 3200 Hz, the frequency resolution instructions and the input frequency range refer to the standard, they can be set via P0.22.

When P0.22 is set to **value 1**, the frequency resolution is 0.1 Hz, the setting range P0.10 is 50.0 Hz - 320.0 Hz;

When P0.22 is set to **value 2**, a frequency resolution of 0.01 Hz, the setting range P0.10 is 50.00 Hz - 3200.00 Hz;

P0.13	The upper limit of the frequency source		Default	0
	Setting range	0	Setting P0.12	
		1	FIV	
		2	FIC	
		3	Reserved	
		4	Impulse setting	
		5	Setting via the communication input	

Defines the upper limit of the frequency source, which may be the upper limit frequency according to the setting (P0.12), as well as the analogue setting. When was limited by the

analog input frequency , the corresponding analog input corresponds to 100% of the P012 setting.

For example, in the case of control the winding in order to avoid tearing of the material when the phenomenon "ride" occurs, an analog frequency limiting may be used when the inverter is running at the upper limit frequency.

P0.14	The upper limit of the frequency	Default	50.00 Hz
	Setting range	Bottom frequency limit P0.16 - maximum frequency P0.12	
P0.15	The upper limit of the frequency - shift	Default	0.00 Hz
	Setting range	0.00 Hz- maximum frequency P0.12	

When the upper limit for the analog or IMPULSE frequency setting is set, P0.13 is the shift of set value, overrides the offset frequency and sets the upper limit values of the P012 frequency, it is the final limit value.

P0.16	Bottom frequency limit	Default	0.00 Hz
	Setting range	0.00 Hz - Upper frequency limit P0.14	

The instruction for frequency in P0.16 sets the lower limit of the frequency, the inverter can stop and run at a lower frequency or set a zero speed, its operating mode can be set in P8.14 (the set frequency is lower than the lower frequency limit in the operating mode).

P0.17	Carrier frequency	Default	According to the model
	Setting range	1 kHz - 16.0 kHz	

This function sets the carrier frequency of the inverter. By adjusting the carrier frequency you can reduce electrical noise, avoid the resonance point of the mechanical system and reduce the interference caused by the inverter.

When the carrier frequency is low, the output current of the higher harmonic component increases, the loss and temperature of the motor increases.

If the carrier frequency is higher, the motor loss decreases, the motor temperature decreases, but the inverter's loss rises, the inverter temperature increases, the interference increases.

Setting the carrier frequency will affect the performance of the following:

Carrier frequency	low -> high
Motor noise	high -> low
Output current	bad -> good
Motor temperature	high --> low
Inverter temperature	low --> high
Electrical leak	low -> high
The rate of foreign interference	low -> high

For other power to the inverter, the factory setting of the carrier frequency is different. Although the user may adjust it as necessary, attention must be paid to the following: if the carrier frequency is set to a higher value than the factory setting, it will increase the inverter temperature, the user needs to reduce the frequency of the inverter, otherwise there is a risk of overheating.

PO.18	The influence of temperature on the carrier frequency	Default	0
	Setting range	0: No 1: Yes	

The temperature influences the setting of the carrier frequency, that is, the inverter detects a high temperature, reduces the carrier frequency automatically, and thus reduces the temperature increase of the inverter. When the temperature of heat sink is low, the carrier frequency returns to the set value. This feature can prevent malfunctions due to overheating of the inverter.

PO.19	Time increment for acceleration / deceleration		Default	1
	Setting range	0	1s	
		1	0.1s	
		2	0.01s	

To meet the needs of all kinds of requirements, V 800 offers three increments of time units: 1 second, 0.1 second and 0.01 seconds.

Warning: modifying the function parameters, four groups of decimal numbers, will change the deceleration time corresponding to the change in time. Pay special attention to settings during the application.

P0.21	Frequency shift of auxiliary frequency source for X and Y operation	Default	0.00 Hz
	Setting range	0.00 Hz – maximum frequency P0.12	

This function code is valid only at the time of selection of the frequency source by supplemental calculation.

If the source of frequency in the complementary calculation P0.21 is the shifted frequency, the result of the complementary calculation is a composite frequency which is considered to be the target frequency.

P0.22	Frequency reference	Default	2
	Setting range	1	0.1Hz
		2	0.01Hz

All parameters are used to determine the resolution of the function code assigned to the frequency.

With a frequency resolution of 0.1 Hz, the maximum output frequency V 800 can reach 320 Hz and at a frequency resolution of 0.01 Hz, the maximum output frequency is 3200.00 Hz.

Warning: If you modify the parameter P0.22, everything related to the frequency parameters will change, i.e., the corresponding frequency values change, pay special attention to applications.

P0.23	Permanent digital frequency setting on power-on	Default	0
	Setting range	0	No memory
		1	Memory

The function of source frequency for the digital signal is effective only when it is set.

"No memory" refers to the inverter after a pause, the digital frequency values return to the value of parameter P0.10 (preset frequency), press the ▲, ▼ or the signal at UP and DOWN to adjust the frequency setting.

"Memory" refers to the inverter after a pause, the frequency setting will remain as before the pause, with ▲, ▼ or the signal at UP and DOWN to adjust the frequency setting.

P0.24	Basic frequency during acceleration / deceleration	Default	0
	Setting range	0	Maximum frequency (P0.12)
		1	Set frequency
		2	100Hz

The acceleration / deceleration time refers to the frequency from zero to the value set by parameter P0.24.

When P024 is set to 1, the deceleration time is associated with the set frequency, if the frequency setting often changes, the motor acceleration is variable, pay attention to the application.

P0.25	Base frequency changed via UP/DOWN while running		Default	0
	Setting range	0	Running frequency	
		1	Set frequency	

This parameter is only valid if the frequency source is set digitally.

Use the ▲, ▼ or signal buttons on UP and DOWN to select how the frequency correction is set, the target frequency is based on the operating frequency, increasing or decreasing, or the basic setting. Two sets of differences are used for inverters in the deceleration process, namely, if the inverter is running and the frequency is not set at the same time, the difference selection parameter is very large.

P0.26	Command binding to frequency source		Default	000
	Setting range	..X:	Binding operation panel command to frequency source	
		0	No binding	
		1	Frequency source by digital setting	
		2	FIV	
		3	FIC	
		4	Reserved	
		5	Impulse setting (S3), option	
		6	Multiple instruction	
		7	PLC	
		8	PID	
		9	Communication setting	
		.X.:	Binding operation panel command to frequency source (0-9, the same as units)	
	X..:	Binding operation panel command to frequency source (0-9, the same as units)		

It is used to link three running command sources with nine frequency sources, making it easier to implement sync switching.

For detailed information about the frequency sources, see P0.03 (selection of the main frequency source X). Different sources of running commands can be tied to the same frequency source.

If the master source has a linked frequency source and when the frequency source process is active, the command source set in P003 to P007 is no longer effective.

P0.27	Communication expansion card type	Default	0
	Setting range	MODBUS communication card	

Group P1: Start / Stop Control

P1.00	Start mode		Default	0
	Setting range	0	Direct start	
		1	Re-start with speed tracking	
		2	Pre-excitation (asynchronous motor)	

0: Direct start

If the DC braking time is set to 0, the AC motor starts running at the startup frequency. If the DC braking time is not 0, the AC unit performs DC-braking first and then starts running at the startup frequency. It is used in applications with low inertia when the motor is likely to rotate at startup.

1: Re-start with speed tracking

The drive of the AC unit first evaluates the speed and direction of rotation and then starts at the detected frequency. Such a smooth start does not affect the rotating engine. Applies to a re-start with a short power outage at high inertia load. To ensure restarting with speed-tracking, set the motor parameters in P2 correctly.

2: Pre-excitation (asynchronous motor)

Applies only to asynchronous motors and is used for motors with built-in magnetic fields. For these motors, see the current and time setting in parameters P1.05 and P1.06. If the pre-excitation time is set to 0 seconds, the unit will cancel the pre-excitation and start at the startup frequency. If the pre-excitations not set to 0 seconds, the AC motor will be pre-excited before starting to improve the dynamic response of the engine.

P1.01	Speed tracking mode		Default	0
	Setting range	0	From stop frequency	
		1	From zero speed	
		2	From the maximum frequency	

To complete the speed tracking process in the shortest possible time, select the correct mode in which the AC drive monitors the motor speed.

0: From stop frequency.

This is the common selected mode.

1: From zero speed.

It is used to re-start after a long power failure.

2: From the maximum frequency.

It is used to control power generators.

P1.02	Rotation tracking speed	Default	20
	Setting range	1-100	

In the restart speed tracking mode, select the speed of the rotation tracking. The higher the value, the more frequent the tracking is. However, a too large setting value can cause unreliable tracking.

P1.03	Starting frequency	Default	0.00 Hz
	Setting range	0.00 Hz-10.00 Hz	
P1.04	Startup frequency holding time	Default	0.0 s
	Setting range	0.0 s-100.0 s	

To ensure the torque of AC unit at startup, set the correct starting frequency. In addition, to use excitation when starting the engine, the trigger frequency must be maintained for some time. The trigger frequency (P1.03) is not limited by the lower frequency limit. If the set target frequency is lower than the trigger frequency, the AC drive will not start and will remain in standby mode.

During switching between forward and reverse, the retention time of the start frequency is blocked. The retention time is not included in the acceleration time but is included in the runtime of the single PLC.

Example 1:

P0.04 = 0. The source of the frequency is a digital setting.

P0.10 = 2.00 Hz. The digitally set frequency is 2.00 Hz.

P1.03 = 5.00 Hz. The starting frequency is 5.00 Hz.

P1.04 = 2.0 s. The hold time of frequency is 2.0s.

In this example, the AC drive is in standby mode and the output frequency is 0.00 Hz.

Example 2:

P0.04 = 0. The source of the frequency is a digital setting.

P0.10 = 10.00 Hz. The digitally set frequency is 10.00 Hz.

P1.03 = 5.00 Hz. The starting frequency is 5.00 Hz.

P1.04 = 2.0 s. The hold time of frequency is 2.0s.

In this example, the AC drive accelerates to 5.00 Hz and then accelerates to a set frequency of 10.00 Hz for 2 seconds.

P1.05	Startup DC braking time/Pre- excited time	Default	0%
	Setting range	0% - 100%	
P1.06	Startup DC braking current / Pre- excited current	Default	0.0 s
	Setting range	0.0 s - 100.0 s	

The start of DC brakes is generally used during re-start of AC drive after motor stop. The pre-excitation is used to create a magnetic field for the asynchronous motor before starting to improve its sensitivity.

Starting DC braking is only possible for direct start. In this case, the AC unit performs DC-braking with the starting brake DC current set. After the DC brake time has elapsed, the AC drive will start. If the initial DC braking time is set to 0, the AC motor will start immediately without DC braking. The greater the DC braking current, the greater the braking force.

If the pre-excitation is triggered before starting, the AC motor generates a magnetic field based on the set excited current. After the pre-excitation time has elapsed, the AC drive will start. If the pre-excitation time is set to 0, the AC motor will start immediately without pre-excitation. The start brake DC current or pre-excitation current is a percentage relative to the base value.

If the rated motor current is less than or equal to 80% of the rated current of the inverter, the rated value is the rated motor current. If the rated motor current is greater than 80% of the rated current of the inverter, the base value is 80% of the rated current of the inverter.

P1.07	Acceleration/ Deceleration mode	Default	0
	Setting range	0	Linear acceleration / deceleration
		1	S-curve acceleration / deceleration A
	2	S-curve acceleration / deceleration B	

Used to set the frequency change mode during the frequency inverter startup and stop process.

0: Linear acceleration / deceleration

The output frequency increases or decreases linearly. The V 800 provides four sets of acceleration / deceleration times, which can be selected using P5.00 to P5.08.

1: S-curve acceleration / deceleration A

The output frequency increases or decreases according to curve S. The S-curve provides a soft start or stop in applications such as lifts, conveyor belts etc. Function codes P1.08 and P1.09 determine the ratio of acceleration time and deceleration of the start and end phases of the S-curve.

2: S-curve acceleration / deceleration B

In this curve, the rated motor frequency is always the point of inflection. This mode is commonly used in applications where acceleration / deceleration is required at a speed higher than the rated frequency.

If the set frequency is higher than the rated frequency, the acceleration / deceleration time is:

$$t = \left\{ \frac{4f}{9f_b} + \frac{5}{9} \right\} * T$$

In the formula "f" is the set frequency, "f_b" is the rated motor frequency, and "T" is the acceleration time from 0 Hz to the nominal frequency "f_b".

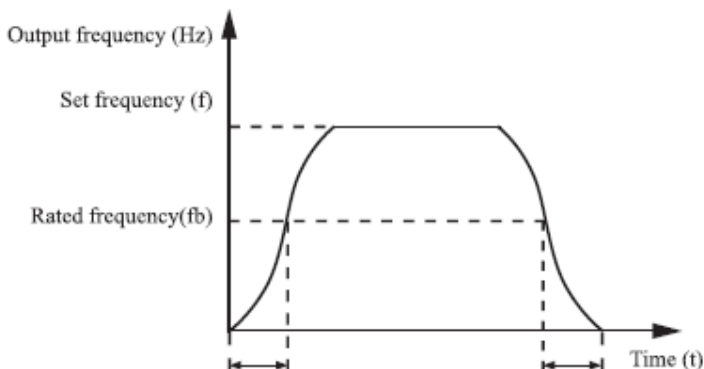


Figure 4-1 S-curve acceleration / deceleration B

P1.08	Time portion of the S-curve start phase	Default	30.0%
	Setting range	0.0% - (100.0% - P1.09)	
P1.09	Time portion of the S-curve end phase	Default	30.0%
	Setting range	0.0% - (100.0% - P1.08)	

These two parameters define the start and end times of the acceleration / deceleration of the S-curve type A. They must meet this requirement: $P1.08 + P1.09 \leq 100.0\%$.

In Figure 4-2, t_1 is the time defined in P1.08, in which the output frequency slope gradually increases. t_2 is the time defined in parameters P1.09, in which the output frequency slope gradually decreases to 0. Between time t_1 and t_2 , the slope of the change of the output frequency remains unchanged, so the acceleration / deceleration is linear.

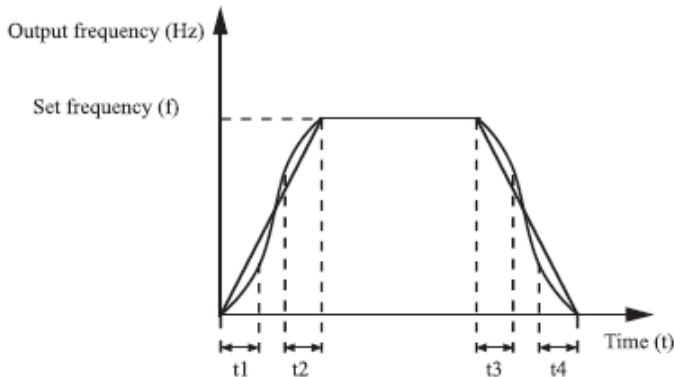


Figure 4-2 S-curve acceleration / deceleration A

P1.10	STOP mode		Default	0
	Setting range	0	Decelerate to stop	
		1	Coast to stop	

0: Decelerate to stop

After the stop command is issued, the AC unit reduces the output frequency to the deceleration time and stops the motor when the frequency drops to zero.

1: Stop

After the stop command is issued, the AC unit immediately stops the motor. The motor rotates inertia and gradually stops.

P1.11	Initial frequency of stop DC braking	Default	0.00 Hz
	Setting range	0.00 Hz – Maximum frequency	
P1.12	Waiting time of stop DC braking	Default	0.0 s
	Setting range	0.0 s - 36.0 s	
P1.13	Braking DC current at stop	Default	0 %
	Setting range	0 % ~ 100 %	
P1.14	DC braking time	Default	0.00 s
	Setting range	0.0 s ~ 36.0 s	

P1.11 (Initial frequency of stop DC braking)

During the deceleration until the stop, the AC unit starts DC braking when the running frequency is lower than the set value P1.11.

P1.12 (Waiting time of stop DC braking)

When the running frequency decreases to the initial stopping frequency of the DC braking, the AC unit stops the output for a certain period of time and then starts DC braking. This prevents errors such as an excessive current caused by high-speed DC braking.

P1.13 (Braking DC current at stop)

This parameter specifies the output current for DC braking and is given as a percentage of the base value. If the rated motor current is less than or equal to 80% of the rated current of the AC unit, the rated value is the rated motor current. If the rated motor current is greater than 80% of the rated current of the AC unit, the base value is 80% of the rated current of the AC inverter.

P1.14 (DC braking time)

This parameter specifies the duration of braking with DC current. If set to 0, the DC braking will be disabled. The DC braking procedure is illustrated in the following figure.

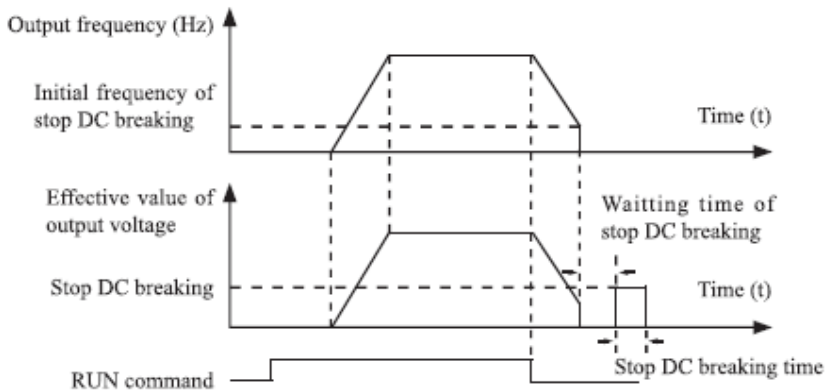


Figure 4-3: DC braking procedure

P1.15	Braking rate	Default	100 %
	Setting range	0 – 100 %	

Applies only to an AC motor with an internal brake unit and is used to adjust the braking unit performance ratio. The greater the value of this parameter, the better the braking result. However, too much value causes a large AC voltage fluctuation during the braking process.

Group P2: Motor parameters

P2.00	Motor type selection	Default	0
	Setting range	0: Common asynchronous motor 1: Variable frequency asynchronous motor	
P2.01	Rated motor power	Default	Depends on the model
	Setting range	0.1 kW to 500.0 kW	
P2.02	Rated motor voltage	Default	Depends on the model
	Setting range	1 V – 2000 V	
P2.03	Rated motor current	Default	Depends on the model
	Setting range	0.01 A - 855.35 A	
P2.04	Rated motor frequency	Default	Depends on the model
	Setting range	0.01 Hz – Maximum frequency	
P2.05	Rated motor speed	Default	Depends on the model
	Setting range	1 rpm ~ 65535 rpm	

P2.06	Stator resistance (asynchronous motor)	Default	Depends on the model
	Setting range	0.001 Ω -30.000 Ω	
P2.07	Rotor resistance (asynchronous motor)	Default	Depends on the model
	Setting range	0.001 Ω - 65.535 Ω	
P2.08	Leakage inductive reactance (asynchronous motor)	Default	Depends on the model
	Setting range	0.01 mH ~ 655.35 mH	
P2.09	Mutual induction (asynchronous motor)	Default	Depends on the model
	Setting range	0.1 mH ~ 6553.5 mH	
P2.10	Motor current without load (asynchronous motor)	Default	Depends on the model
	Setting range	0.01 A - P2.03	

Set the parameters according to the motor nameplate, regardless of whether the V/F control or vector control is selected. To achieve better V/F power or vector control, auto tuning is required. The accuracy of automatic tuning of the motor depends on the correct setting of parameters according to the engine label.

Parameters P2.06 to P2.10 are for asynchronous motor.

P2.06 - P2.10 parameters are ordinary unavailable on the motor's nameplate and are obtained by means of inverter's auto-tuning. Asynchronous motor's stationary auto-tuning can obtain only three parameters, from P2.06 to P2.08. Asynchronous motor's dynamic auto-tuning can obtain besides all the parameters in P2.06 to P2.10, and can also obtain encoder phase sequence and current loop PI.

Each time "Rated motor power" (P2.01) or "Rated motor voltage" (P2.02) is changed, the AC drive automatically restores values of P2.06 to P2.10 to the parameter setting for the common standard Y series asynchronous motor.

If it is impossible to perform asynchronous motor's stationary autotuning manually input the values of these parameters according to data provided by the motor manufacturer.

P2.11-P2.36 – reserved.

P2.37	Auto-tuning selection		Default	0
	Setting range	0	No auto-tuning	
		1	Asynchronous motor - static auto-tuning	
		2	Asynchronous motor - complete auto-tuning	

0: Automatic tuning is disabled.

1: Asynchronous motor - static auto-tuning

Applies to situations where complete automatic tuning cannot be performed because the asynchronous motor cannot easily be disconnected from the load.

Before performing static automatic tuning, first set the motor type and motor nameplate parameters correctly in parameters P2.00 - P2.05. The AC unit detects static auto-tuning three parameters P2.06 to P2.08. Activity description: set this parameter to 1 and press RUN. Then the AC drive starts static auto-tuning.

2: Asynchronous motor - complete auto-tuning

To perform this type of automatic tuning, make sure the motor is disconnected from the load. During the full automatic adjustment process, the static automatic tuning is first performed by the AC inverter and then accelerated to 80% of the rated motor frequency within the acceleration time set in P0.08. The motor runs for some time and then deceleration to stop according to the deceleration time set in P0.09. Set this parameter to 2 and press RUN. Then the inverter starts full automatic tuning.

NOTE: auto-tuning of the motor can only be done in the control panel mode.

Group P3: Vector Control Parameters

P3 group code function applies only to vector control, V/F control is blocked.

P3.00	Linear constant 1	Default	30
	Setting range	1-100	
P3.01	Integration constant 1	Default	0.50 s
	Setting range	0.01 s - 10.00 s	
P3.02	Frequency of switching 1	Default	5.00 Hz
	Setting range	0.0 - P3.05	
P3.03	Linear constant 2	Default	20
	Setting range	0 - 100	
P3.04	Integration constant 2	Default	11.00 s
	Setting range	0.01 s - 10.00 s	

P3.05	Frequency of switching 2	Default	110.00 Hz
	Setting range	P3.02 – Maximum output frequency	

The response rate with PI parameters varies depending on the frequency of the AC inverter.

If the running frequency is less or equal to "Switch Frequency 1" (P3.02), the PI loop parameters are P3.00 and P3.01.

If the running frequency is equal to or greater than "Switching Frequency 2" (P3.05), the PI loop parameters are P3.03 and P3.04.

If the running frequency is between P3.02 and P3.05, the PI loop parameters are obtained from the linear switching between the two PI parameter groups as shown in Figure 4-4.

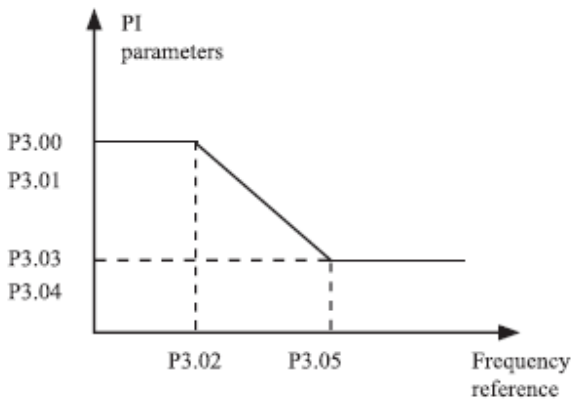


Figure 4-4: The relationship between running frequency and PI parameters

Characteristics of speed dynamic response in vector control can be set by linear amplification and integration time of the speed controller.

To get a faster system response, increase the linear constant (gain) and reduce the integration time. Remember, this can lead to system oscillation.

The recommended editing procedure is as follows:

If the factory setting does not meet your requirements, make the correct settings. First, increase the linear constant to ensure that the system does not oscillate and reduce the integration time to ensure that the system has a fast response and a small overrun.

Note: Incorrect setting of the PI parameter can cause too much over-speeding and overvoltage can occur.

P3.06	Vector control slip gain	Default	100 %
	Setting range	50 % – 200 %	

For SFVC, it is used to adjust speed stability accuracy of the motor. When the motor with load runs at a very low speed, increase the value of this parameter; when the motor with load runs at a very large speed, decrease the value of this parameter.

P3.07	Time constant of filter of the loop	Default	0.000s
	Setting range		0.000 s - 0.100 s

In vector control mode, the output of the control loop is related to the torque current. This parameter is used for torque filtering. In general, it does not have to be set and the value can be increased in case of large speed fluctuations. In case of motor oscillation, decrease the value of this parameter correctly. If the value of this parameter is small, the output torque of the AC inverter may fluctuate considerably, but the response is fast.

P3.08	Zisk prebudenia	Štandardne	64
	Rozsah nastavenia	0-200	

During AC motor deceleration, excessive pre-excitation may prevent the bus voltage from increasing in order to avoid overvoltage. The greater the increase in pre-excitation, the better the limiting effect. If there is an overvoltage error during deceleration, increase the gain of pre-excitation. However, too much increase in excess pre-excitation may lead to an increase in output current. Therefore, in real applications, set this parameter to the correct value. Set the pre-excitation increment to 0 in low-inertia applications (bus voltage does not increase during deceleration) or where braking resistor is used.

P3.09	Torque upper limit source in speed control mode		Default	0
	Setting range	0	P3.10	
		1	FIV	
		2	FIC	
		3	Reserved	
		4	Pulse setting	
5	Communication setting via RS 485			
P3.10	Digital setting of torque upper limit in speed control mode		Default	150.0%
	Setting range		0.0 - 200.0%	

In speed control mode, the maximum output torque of the inverter is limited by P3.09. If the upper torque limit is analog, pulse or set via the communication interface, 100% of the setting corresponds to P3.10 and 100% of the P3.10 corresponds to the rated torque of the inverter.

P3.13	Adjusting the linear excitation constant	Default	2000
	Setting range	0-20000	
P3.14	Adjusting the integration constant of excitation	Default	1300
	Setting range	0-20000	
P3.15	Adjusting the linear constant of torque	Default	2000
	Setting range	0-20000	
P3.16	Adjusting the integration constant of torque	Default	1300
	Setting range	0-20000	
P3.17	Speed of integration loop	Default	0
	Setting range	0: disabled	
		1: enabled	

These are parameters of the PI current loop for vector control. These parameters are obtained by "automatic complete tuning of the asynchronous motor", and do not need to be changed.

Note that too much PI increase of the current loop can lead to oscillation of the entire control loop. Therefore, if the current oscillations or torque fluctuations are large, manually reduce the linear or integration constant.

P3.18-P3.22 – reserved.

Group P4: V/F Control Parameters

The V/F control mode is applicable for low-load applications (fan or pump) or applications where one inverter operates with multiple motors, or there is a large difference between inverter power and motor power.

P4.00	Setting the V/F curve	Default	0
	Setting range	0	Linear V/F curve
		1	Multipoint V/F curve
		2	Square V/F curve
		3	1.2-fold V/F curve
		4	1.4-fold V/F curve
		6	1.6-fold V/F curve
		8	1.8-fold V/F curve
		9	Reserved
		10	V/F complete separation
		11	V/F half-section

0: Linear V/F curve

It is applicable to common constant torque load..

1: Multipoint V/F curve

It is applicable to special load such as dehydrator and centrifuge. Any such V/F curve can be obtained by setting parameters of P4.03 to P4.08

2: Square V/F curve

It is applicable to centrifugal loads such as fan and pump.

3 - 8: V/F curve between linear V/F and square V/F**10: V/F complete separation mode**

In this mode, the output frequency and output voltage of the AC drive are independent.

The output frequency is determined by the frequency source, and the output voltage is determined by "Voltage source for V/F separation" (P4.13).

It is applicable to induction heating, inverse power supply and torque motor control.

11: V/F half-section mode

In this mode, V and F are linear and linear relationships can be set by parameter P4.13. The relationship between V and F is also related to the rated motor voltage and the rated motor frequency set in the P2 group.

Assume that the voltage source input is X (0 to 100%), the relationship between V and F is:

$$V/F = 2 * X * (\text{Rated motor voltage}) / (\text{Rated motor frequency})$$

P4.01	Increase of torque	Default	Depends on the model
	Setting range	0.0%- 30 %	
P4.02	Torque limitation	Default	50.00 Hz
	Setting range	0.00 Hz – maximum output frequency	

To compensate for the low V/F torque frequency, you can increase the output voltage of the inverter at low frequency by adjusting the parameter P4.01. If the torque boost is set to too high, the motor may overheat and the inverter may suffer overcurrent. If the load is large and the motor torque is inadequate, increase the value of P4.01. If the load is small, lower the P4.01 value. If the parameter is set to 0.0, the inverter will automatically increase the torque. In this case, the inverter automatically calculates the torque boost value based on motor parameters including the stator resistance. P4.02 specifies the frequency that limits the torque increase. Increasing the torque after exceeding this frequency is not possible, as shown in the following figure.

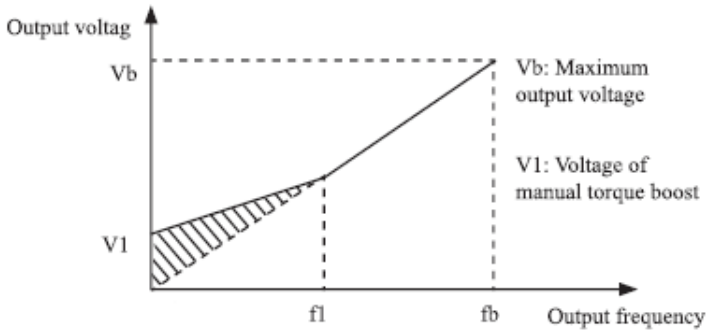


Figure 4-5: Manual increasing of torque

f1: limitation of the frequency of manual torque increase, fb: rated value of frequency during motor running

P4.03	Multi-point V/F frequency curve 1 (F1)	Default	0.00 Hz
	Setting range	0.00 HZ-P4.05	
P4.04	Multipoint V/F voltage curve 1 (V1)	Default	0.0%
	Setting range	0.0%~100.0%	
P4.05	Multi-point V/F frequency curve 2 (F2)	Default	0.00Hz
	Setting range	P4.03-P4.07	
P4.06	Multipoint V/F voltage curve 2 (V2)	Default	0
	Setting range	0.0%~100.0%	
P4.07	Multi-point V/F frequency curve 3 (F3)	Default	0
	Setting range	P4.05 - rated motor frequency (P2.04)	
P4.08	Multipoint V/F voltage curve 3 (V3)	Default	0.0%
	Setting range	0.0%~100.0%	

These six parameters are used to define the multi-point V/F curve. The multi-point V/F curve is set based on the motor's load characteristic. The relationship between voltages and frequencies must meet: $V1 < V2 < V3$, $F1 < F2 < F3$. At low frequency, higher voltage may cause overheat or even burnt out of the motor and overcurrent stall or overcurrent protection of the inverter. Multipoint V/F curve setting is described in Figure 4-6.

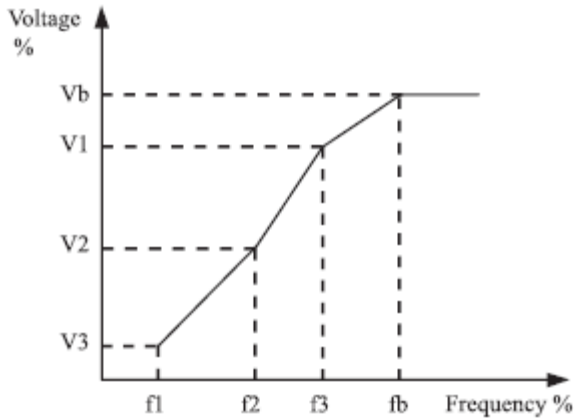


Figure 4-6 V1-V3: 1st, 2nd and 3rd voltage; F1-F3: 1st, 2nd and 3rd frequencies in percent; Vb: rated motor voltage; Fb: rated motor frequency

P4.09	Constant slope compensation V/F	Default	0.0%
	Setting range	0%~200.0%	

This parameter is valid for asynchronous motor only.

It can compensate the slope of speed the asynchronous motor rotation while increasing the load of the motor, stabilize the motor speed in the event of a change of load.

If this parameter is set to 100%, it means that the compensation when the motor is in nominal load is the nominal slip of the motor. The nominal slip of the motor is automatically obtained by calculating the inverter based on the rated motor frequency and the nominal motor rotation in the F1 group.

When adjust the V/F slip compensation gain, generally, at rated load, if the motor rotational speed is different from the target speed, slightly adjust this parameter.

P4.10	V/F overexcitation	Default	64
	Setting range	0-200	

When slowing down the frequency converter, excessive excitement may prevent increased bus voltage to prevent overvoltage. The greater the excitement, the better the result of the limitation.

Increase the pre-excitation if the inverter gets into overcurrent during deceleration. However, too much incrementing may result in an increase in output current. Set the value P4.09 to the correct value in the current applications.

Set the pre-excitation increment to 0 in applications where there is little inertia and the bus voltage does not increase during motor deceleration or where there is a braking resistor.

P4.11	V/F suppression of oscillation	Default	Depends on the model
	Setting range		0-100

Set this parameter to a value as small as possible in the prerequisite of efficient oscillation suppression to avoid influence on V/F control.

Set this parameter to 0 if the motor has no oscillation. Increase the value properly only when the motor has obvious oscillation. The larger the value is the more obvious the oscillation suppression result will be. If the oscillation suppression function is activated, the correct motor current and idle current must be set. Otherwise, the V/F oscillation suppression effect will be inadequate.

P4.13	Voltage source for V/F separation		Default	0
	Rozsah nastavenia	0	Digital setting (P4.14)	
		1	FIV	
		2	FIC	
		3	Reserved	
		4	Impulse setting (S3), option	
		5	Step - fixed speeds	
		6	Simple PLC	
		7	PID	
		8	The communication interface	
100% corresponds to the rated motor voltage (P2.02)				
P4.14	Voltage rise time of V/F separation		Setting range	0V
	Setting range		0V - rated motor voltage	

The separation of V/F is universally usable in applications such as induction heating, inverse power supply and torque control of the engine.

If V/F separated control is enabled, the output voltage can be set by function code P4.14 or by means of analog, multi-reference, simple PLC, PID or communication. If you set the output voltage by means of non-digital setting, 100% of the setting corresponds to the rated motor voltage. If a negative percentage is set, its absolute value is used as the effective value.

0: Digital setting (P4.14)

The output voltage is set directly by P4.14.

1: FIV, 2: FIC

The output voltage is set by AI terminals.

3: Reserved**4: Impulse setting (S3)**

The output voltage is set by pulses of the terminal S3.

Pulse specification: voltage range 9-30 V, frequency range 0-100 kHz.

5: Multiple source

If a multiple voltage source is used, the parameters in the P4 and PC groups must be set to determine the correlation between the set signal and the set voltage.

100.0% setting of multiple references in the FC group corresponds to the rated motor voltage.

6: Simple PLC

If the voltage source is a simple PLC mode to set the output voltage, the parameters in the FC group must be set.

7: PID

The output voltage is generated based on the closed loop PID. See the PID description in the PA group for details.

8: The communication interface

The output voltage is set by the host computer using the communication means.

The voltage source for the separate V/F is set in the same way as the frequency source.

100.0% of the settings in each mode corresponds to the rated motor voltage. If the value is negative, the absolute value is used.

P4.15	Voltage rise time of V/F separation	Default	0.0s
	Setting range	0.0s-1000.0s	
P4.16	Voltage decline time of V/F separation	Default	0.0s
	Setting range	0.0s-1000.0s	

P4.15 gives the time it takes to increase the output voltage from 0 V to the rated motor voltage, shown as time t1 in the following figure.

P4.16 gives the time it takes for the output voltage to drop from the nominal motor voltage to 0 V, displayed as time t2.

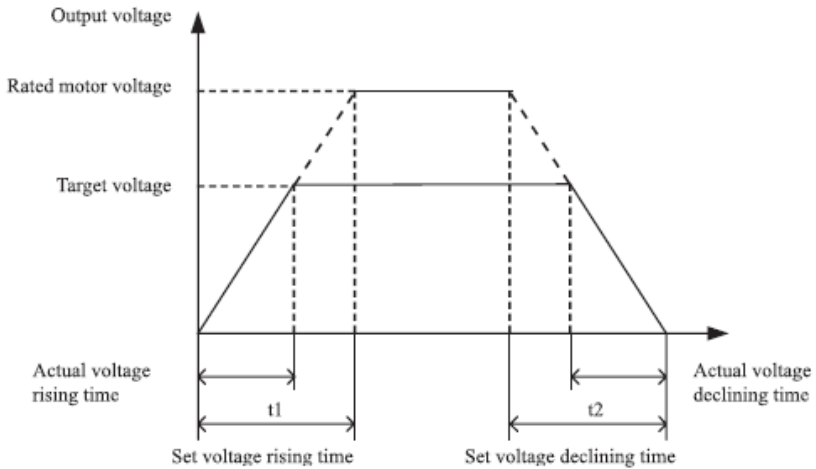


Figure 4-7: Voltage course at V/F separation

Skupina P5: Vstupné terminály

The V 800 series has 6 multifunctional digital inputs (S3 can be used as a high-speed pulse input terminal) and two analog input terminals.

P5.00	FWD function selection	Default	1 RUN forward (FWD)
P5.01	REV function selection	Default	2 Reverse RUN (REV)
P5.02	S1 function selection	Default	9 (RESET of the fault)
P5.03	S2 function selection	Default	12 (multiple terminal 1)
P5.04	S3 function selection	Default	13 (multiple terminal 2)
P5.05	S4 function selection	Default	14 (multiple terminal 3)

The following table lists the features available for multifunctional input terminals. You can choose the following features:

Val.	Function	Description
0	No function	Set 0 for reserved terminals to avoid malfunction.
1	RUN forward (FWD)	The terminal is used to control forward or reverse RUN of the AC drive.
2	Reverse RUN (REV)	
3	Three-wire control	The terminal determines three-line control of the AC drive. For details, see the description of P5.11.
4	RUN forward JOG (FJOG)	FJOG indicates forward JOG running, while RJOG indicates reverse JOG running. The JOG frequency, acceleration time and deceleration time are described respectively in P8.00, P8.01 and P8.02.
5	Reverse RUN (RJOG)	
6	Terminal UP	If the frequency is determined by external terminals, the terminals with the two functions are used as increment and decrement commands for frequency modification. When the frequency source is digital setting, they are used to adjust the frequency.
7	Terminal DOWN	
8	Gradual stop	The inverter blocks the output, the motor stops and is not controlled by the inverter. It is the same as the gradual stop described in P1.10
9	RESET of the fault (RESET)	The terminal is used for fault reset function, the same as the function of RESET key on the operation panel. Remote fault reset can be implemented by this function.
10	Pause during RUN	The inverter decelerates until it stops, but all parameters of PLC, PID, frequency are memorized. After cancelling this function, the inverter returns to the previously status.
11	Open input contact (NO) for protection control	If this input is on, the inverter will announce the E15 and will perform the fault protection action. For more information, see P9.47.
12	Fixed speed 1	The setting of 16 speeds or 16 other references can be implemented by combining 16 states of these four terminals. For more details, see table no.1.
13	Fixed speed 2	
14	Fixed speed 3	
15	Fixed speed 4	

16	Terminal 1 for selecting acceleration / deceleration time	By combining the two states of these two terminals, a total of four group of acceleration / deceleration times can be set.
17	Terminal 2 for selecting acceleration / deceleration time	
18	Switching frequency source	The terminal is used to switch and selection different frequency sources. Select the function code P0.03 by frequency source. If two types of frequency source switching are set as the frequency source, the terminal is used to switch between the two frequency sources.
19	Reset via UP and DOWN (terminal, control panel)	If the frequency source is a digital setting, the terminal is used to reset the modification using the UP / DOWN function or the increment / decrease key on the control panel and returns the set frequency to P0.10.
20	Command source switchover terminal	If the source of the command is set to terminal control (P0.02 = 1), this terminal is used to switch between terminal control and control via the control panel. If the command source is set to control over the communication interface (P0.02 = 1), this terminal is used to switch between the communication interface and the control panel.
21	Acceleration / deceleration disabled	Allows the inverter to keeps the current output frequency without being affected by external signals (except for the STOP command).
22	Pause of PID	PID is temporarily disabled. The inverter keeps the current frequency output without supporting the PID source setting.
23	Recovering the PLC status	The terminal is used to restore the PLC's original state when the PLC is restarted after stopping.
24	Swing pause	The inverter sends the central frequency and the frequency transfer function is paused.
25	Counter input	This terminal is used to count impulses.
26	Reset the counter	This terminal is used to reset the counter.
27	Length count input	This terminal is used to count the length.
28	Resetting the length	This terminal is used to reset the length

29	Torque control disabled	Torque control is disabled, speed is controlled.
30	Pulse input (allowed only for S3)	S3 is used for pulse input (option)
31	Reserved	Reserved
32	Immediate DC braking	After switching on this terminal, the inverter switches directly to the braking DC state.
33	Normal close (NC) input of external fault (via S1	After activating the input, the inverter reports an E15 fault and stops the motor.
34	Changing the frequency is disabled	After the input is activated, the inverter will not respond to any frequency change request.
35	Reverse direction of PID	After activating the input, the PID rotation direction is set according to PA.03.
36	Terminal for external STOP 1	In the control panel mode, this terminal can be used to stop the drive, which corresponds to the STOP button on the control panel.
37	Terminal for command source switch 2	It is used to switch between terminal control and control through the communication interface. If the source of command is the control via terminal, the system switches to control over the communication
38	Pause the PID integration	When the input is activated, the integration function is paused. Linear and differential control functions are allowed.
39	Switching between the main X source and the preset frequency	After activating the input, the frequency source X is replaced by the default frequency set in P010.
40	Switching between the Y source and the preset frequency	When this terminal is active, the frequency source Y is replaced by the preset frequency set in P010.
43	Switching PID parameters	If the PID parameters switchover performed by means of X terminal (PA.18 = 1), the PID parameters are PA.05 to PA.07 when the terminal becomes invalid; the PID parameters PA.15 to PA.17 are used when this terminal becomes effective.
44	Reserved	
45	Reserved	

46	Switching - speed control / torque control	This input allows switching between speed control and torque control. When active, the inverter switches to another control mode. Otherwise, the inverter is in the mode set in C0.00.
47	STO	If the input is active, the inverter will stop in the shortest possible time. During the stop process, the current remains at the current upper limit. This function serves to meet the requirement to stop the drive in an emergency state.
48	Terminal for external STOP 2	Any control mode (control panel, terminal or communication) can be used to stop the inverter. In this case, the deceleration time is 4.
49	DC braking with delay	If the input is active, the inverter decelerates to the initial DC stopping frequency by braking and then switches to the braking DC state.
50	Reset the current operating time	If the input is active, the actual runtime of the inverter is erased. This feature must be supported by P8.42 and P8.53.

Supplementary Table 1: Description of Multipurpose Terminals.

The four multi-purpose terminals have 16 combinations of states corresponding to 16 values listed in the following table.

K4	K3	K2	K1	Designation	Related parameter
OFF	OFF	OFF	OFF	Reference 0	PC.00
OFF	OFF	OFF	ON	Reference 1	PC.01
OFF	OFF	ON	OFF	Reference 2	PC.02
OFF	OFF	ON	ON	Reference 3	PC.03
OFF	ON	OFF	OFF	Reference 4	PC.04
OFF	ON	OFF	ON	Reference 5	PC.05
OFF	ON	ON	OFF	Reference 6	PC.06
OFF	ON	ON	ON	Reference 7	PC.07
ON	OFF	OFF	OFF	Reference 8	PC.08
ON	OFF	OFF	ON	Reference 9	PC.09
ON	OFF	ON	OFF	Reference 10	PC.10
ON	OFF	ON	ON	Reference 11	PC.11
ON	ON	OFF	OFF	Reference 12	PC.12
ON	ON	OFF	ON	Reference 13	PC.13
ON	ON	ON	OFF	Reference 14	PC.14
ON	ON	ON	ON	Reference 15	PC.15

If the frequency source is a multiple reference, the value of 100% of parameters PC.00 to PC.15 corresponds to the maximum frequency P012.

In addition to multi-speed operation, the multiple reference may be used as a source of PID setting or voltage source for V/F separation, which meets the requirements for switching the various set values.

Doplnková tabuľka 2: opis funkcií terminálu pri voľbe času zrýchlenia / spomalenia

Terminal 2	Terminal 1	Choice of acceleration/deceleration time	Related parameters
OFF	OFF	acceleration / deceleration time 1	P0.08; P0.09
OFF	ON	acceleration / deceleration time 2	P8.03; P8.04
ON	OFF	acceleration / deceleration time 3	P8.05; P8.06
ON	ON	acceleration / deceleration time 4	P8.07; P8.08

P5.10	Filtering time X	Default	0.010 s
	Setting range	0.000 s – 1.000 s	

Used to set the S-terminal software filtering time. If the S-terminals are subject to interference and can cause a fault, increase the value of this parameter to increase the interference prevention capability.

P5.11	Command mode via terminal	Default	0
	Setting range	0	Two-wire mode 1
		1	Two-wire mode 2
		2	Three-wire mode 1
		3	Three-wire mode 2

This parameter defines an external terminal, controls four different inverter modes.

0: Two-wire mode 1

1: this is the most commonly used mode. The positive and reverse operation of the motor is controlled by the Xx, Yy terminals. The setting parameters are listed below:

Terminal	Set value	Description
Sx	1	RUN forward (FWD)
Sy	2	RUN reverse (REV)

In that Sx, Sy, terminals S1 through S4, FWD, REV are multi-function input terminals, level controlled. Note: COM = GND

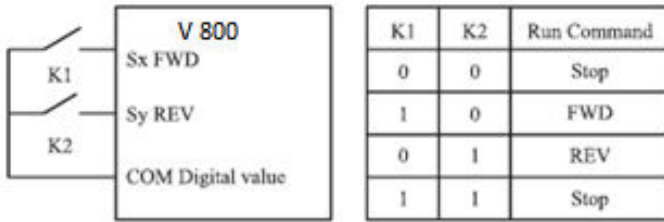


Figure 4-8: Setting the two-wire mode 1

1: Two-wire mode 2 - use this setting when the Sx terminal specifies the operation and the Sy terminal is set to run.

Terminal	Set value	Description
Sx	1	RUN forward (FWD)
Sy	2	RUN reverse (REV)

In that Sx, Sy, terminals S1 through S4, FWD, REV are multi-function input terminals, level controlled.

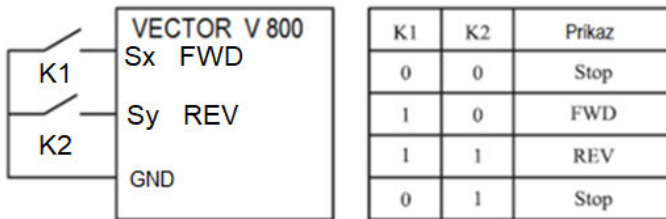


Figure 4-9: Setting the two-wire mode 1

2: Three-wire mode 1:

In this mode, the Sn terminal allows RUN and direction is set by Sx and Sy terminals.

The settings parameters are below:

Terminal	Set value	Description
Sx	1	CHOD vpred (FWD)
Sy	2	CHOD vzad (REV)
Sn	3	Trojvodičové riadenie

To enable the forward and reverse engine control system via the Sx or Sy inputs, the Sn terminal must be on.

When stopping is required, the Sn signal must be disconnected. In that Sx, Sy and Sn are terminals S1 to S4, FWD, REV are multi-function input terminals, Sx, Sy are pulse controlled. Sn is level controlled.

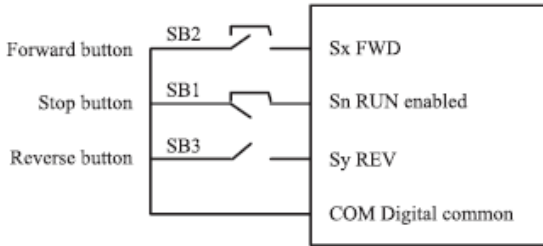


Figure 4-10-1 Setting the three-wire mode 1

In Figure 4-10-1 means: SB1: stop button
SB2: Button Forward
SB3: Reverse button

3: Three-wire mode 2:

In this mode, Sn allows execution of the command. The run command is given by the Sx signal and the direction specifies the Sy signal. The settings parameters are below:

Terminal	Set value	Description
Sx	1	RUN forward (FWD)
Sy	2	RUN reverse (REV)
Sn	3	Three-wire mode

Sn input must be on. The Sx signal triggers the motor and the Sy signal controls the direction of rotation of the motor. To stop the engine, Sn must be disconnected. In that Sx, Sy and Sn the terminals S1 to S4, FWD, REV are multifunctional input terminals, Sx is impulse controlled. Sy, Sn are level-controlled.

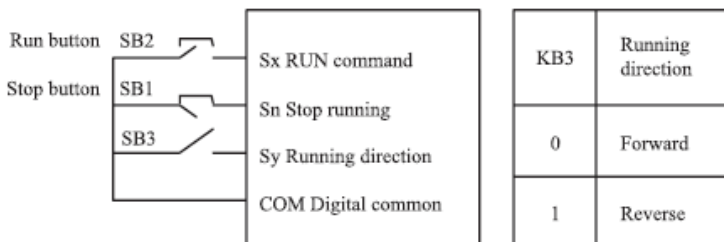


Figure 4-10-2: Setting the three-wire mode 2

P5.12	Change value by terminals UP/DOWN	Default	1.00 Hz/s
	Setting range	0.01 Hz/s – 65 535 Hz/s	

It is used to set the terminal UP / DOWN for setting the frequency. Frequency changes are in Hz/second. If P0.22 (Frequency reference resolution) is 2, the setting range is 0.001 to 65535 Hz/s. If P0.22 is 1, the setting range is 0.01-655.35 Hz/s.

P5.13	FI curve 1 minimum input	Default	0.00V
	Setting range	0.00V-P5.15	
P5.14	Corresponding setting of FI curve 1 minimum input	Default	0.0%
	Setting range	-100.00%~100.0%	
P5.15	FI curve 1 maximum input	Default	10V
	Setting range	P5.13-10.00V	
P5.16	Corresponding setting of FI curve 1 maximum input	Default	100%
	Setting range	-100.00%~100.0%	
P5.17	FI filter curve time 1	Default	0.10s
	Setting range	0.00s~10.00s	

These parameters are used to define the relationship between the analog input voltage and the corresponding setting. When the analog input voltage exceeds the maximum value (P5.15), the maximum value of the analog voltage is calculated according to the "maximum input". If the analog input voltage is less than the set minimum input (P5.13), the value set in P5.34 (setting for FI is less than the minimum input) is calculated according to the minimum input value or is 0.0%.

When the analog input is a current input, the 20 mA current corresponds to a voltage of 5 V. The 4 mA current corresponds to a voltage of 1 V.

The FI input filtering time is used to set the FI software filtering time.

If the analog input is interrupted, increase the filtering time to stabilize the detected analog input.

However, increasing FI filtering time of curve 1 slows the analog detection response. Set this parameter correctly based on actual conditions.

In different applications, 100% of the analog input corresponds to different nominal values. For details, see the application descriptions.

The following figure shows two typical examples of settings.

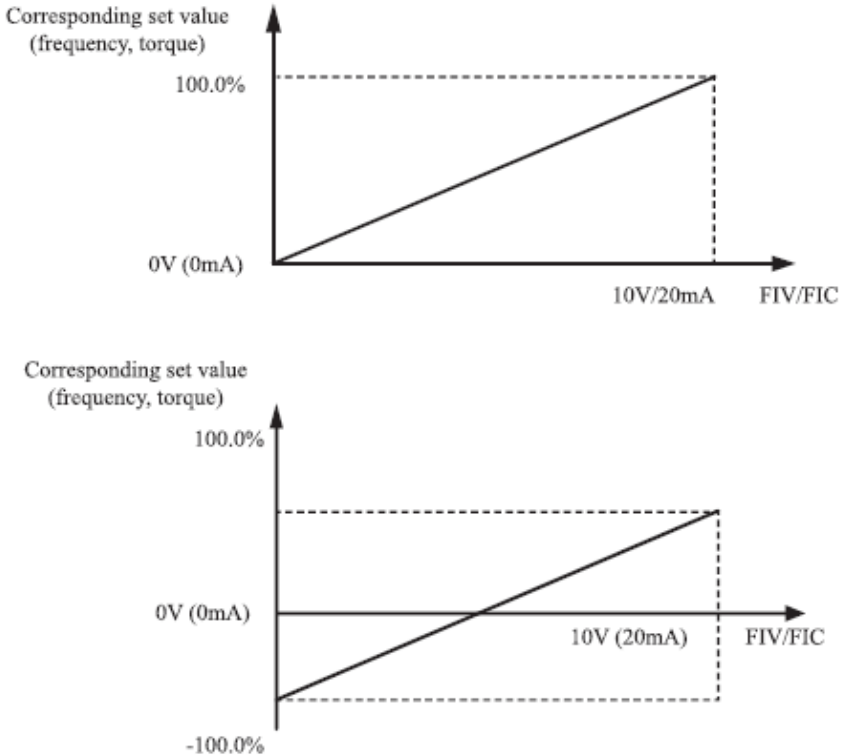


Figure 4-11: The relationship between analog inputs and set values

P5.18	FI curve 2 minimum input		Default	0.00 V
	Setting range	0.00V-P5.20		
P5.19	Corresponding setting of FI curve 2 min. input		Default	0.0 %
	Setting range	-100.00%~100.0%		
P5.20	FI curve 2 maximum input		Default	10.00 V
	Setting range	P5.18~10.00V		

P5.21	Corresponding setting of FI curve 2 max. input	Default	100.0 %
	Setting range	-100.00%~100.0%	
P5.22	FI filter curve time 2	Default	0.10 s
	Setting range	0.00S-10.00s	
P5.23	FI curve 3 minimum input	Default	-10.00 V
	Setting range	-10.00V~P5.25	
P5.24	Corresponding setting of FI curve 3 minimum input	Default	-100.0 %
	Setting range	-100.00%~100.0%	
P5.25	FI curve 3 maximum input	Default	10.00 V
	Setting range	P5.18~10.00V	
P5.26	Corresponding setting of FI curve 3 min. input	Default	100.0 %
	Setting range	-100.00%~100.0%	
P5.27	FI filter curve time 3	Default	0.10 s
	Setting range	0.00s~10.00s	

The FI 3 curve setting method and functions are similar to setting the FI 1 curve function.

P5.28	IMPULS minimum input	Default	0.00 kHz
	Setting range	0.00kHz~P5.30	
P5.29	Corresponding minimum input impulse setting	Default	0.0 %
	Setting range	-100.00%~100.0%	
P5.30	IMPULS maximum input	Default	50.00 kHz
	Setting range	P5.28~50.00kHz	
P5.31	Corresponding maximum input impulse setting	Default	100.0 %
	Setting range	-100.00%~100.0%	
P5.32	Filter time of impulse curve	Default	0.10 s
	Setting range	0.00 s - 10.00 s	

These parameters are used to set the relationship between pulse input S3 and the corresponding settings. Pulses can be input only with S3. The setting method of this function is similar to setting the FI 1 curve function. Refer to FI 1 curve description.

P5.33	Selection of FI curve		Default	321
	Setting range	..X	Selection of FIV curve	
		1	Curve 1 (2-point, see P5.13-P5.16)	
		2	Curve 2 (2-point, see P5.18-P5.21)	
		3	Curve 3 (2-point, see P5.23-P5.26)	
		4	Curve 4 (4-point, see C6.00~C6.07)	
		5	Curve 5 (4-point, see C6.08~C6.15)	
		.X.	Selection of FIC curve (1-5, the same as FIV)	
X..	Reserved			

The digits at the position of the units, tens and hundreds of this parameter are used to select the appropriate FIV/FIC curve. Each of the five curves can be selected for 2 analog inputs. Curve 1, Curve 2, and Curve 3 are 2-point curves to set in P5. Curve 4 and Curve 5 are both 4-point curves set in group C6.

The inverter VECTOR V800 provides two FI terminals as standard.

P5.34	Set the FI to less than the minimum input		Default	000
	Setting range	..X	Set the FIV to less than the minimum input	
		0	Minimum value	
		1	0.0%	
		.X.	Set the FIC to less than the minimum input (0-1, the same as FIV)	
X..	Reserved			

This function code is used to determine the corresponding setting when the analog input voltage is less than the minimum value. Units, tens and hundreds of this function code corresponds the settings for FIV and FIC.

If the value of a certain digit is set to 0 and the analog input voltage is less than the minimum input, the corresponding minimum input setting (P5.14, P5.19, P5.24) is used.

If the value of a certain digit is set to 1 and the analog input voltage is less than the minimum input, the corresponding value of this analog input is 0.0%.

P5.35	X1 delay time		Default	0.0 s
	Setting range	0.0 s - 3600.0 s		
P5.36	X2 delay time		Default	0.0 s
	Setting range	0.0 s - 3600.0 s		

P5.37	X3 delay time		Default	0.0 s
	Setting range	0.0 s - 3600.0 s		

These parameters are used to set the delay time of the inverter when the terminal status is changed.

At present only FWD, REV and S1 support the delay function.

P5.38	Selecting the allowed S-mode 1		Default	00000
	Setting rangeX	FWD allowed mode	
		0	Positive logic	
		1	Negative logic	
		...X.	REV allowed mode (0-1, the same as FWD)	
		..X..	S1 allowed mode (0-1, the same as FWD)	
		.X...	S2 allowed mode (0-1, the same as FWD)	
X....	S3 allowed mode (0-1, the same as FWD)			
P5.39	Selecting the allowed S-mode 2		Default	Default
	Setting range	.X	S4 valid mode	
		0	Positive logic	
		1	Negative logic	

These parameters are used to set the digital input terminal mode. Terminal S is enabled when connected to GND and blocked when disconnected from GND.

Group P6: Output Terminals

V 800 includes 1 standard multifunction analogue output connector FOV, 1 multifunction output relay output and M01 terminal (used for high-speed pulse output or open collector output).

P6.00	M01 output mode		Default	1
	Setting range	0 - 1	1: Switch/break output	
P6.01	M01 Functions (output - open collector OC)			Default 0
P6.02	Relay output function (RA-RB-RC)			Default 2

These two parameters are used to select the functions of the five digital output terminals. RA-RB-RC are the relevant relay on the control board and on the add-on card. The output terminal functions are described in the following table.

Table 4-5 Output terminal functions.

Value	Function	Description
0	No output	The terminal has no assigned function
1	Inverter in RUN mode	When the inverter is running and has an output frequency (may be zero), the output is ON
2	Fault (stop)	If the inverter has stopped due to an error, the output is ON
3	Detection of the FDT1 frequency level	See description P8.19 and P8.20.
4	Frequency achieved	See description P8.21.
5	Run at zero speed	If the inverter operates at output frequency 0, the output is ON. If the inverter is stopped, the output is OFF.
6	Pre-warning of overloading the motor	The inverter decides whether the motor load exceeds the level of the pre-overload warning before activation of the protection. If the warning level is exceeded, the terminal output is ON. For motor overload parameters, see descriptions P9.00 to P9.02.
7	Pre-warning of overloading the inverter	The outputs are switched on for 10 seconds before the inverter overload protection action is performed.
8	Set counter value reached	The output is ON when the counter value reaches the value set in Pb.08.
9	Required value of counter reached	The output is ON when the counter value reaches the value set in Pb.09.
10	Length reached	The output is ON when the actual length exceeds the value set in Pb.05.
11	The entire PLC cycle completed	When the PLC completes one cycle, the terminal outputs a 250 ms pulse signal

12	The cumulative operating time reached	If the cumulative runtime exceeds the time set in P8.17, the output is ON.
13	Limited frequency	If the set frequency exceeds the upper or lower frequency limit and the output frequency of the inverter reaches the upper or lower limit, the output is ON.
14	Limited torque	In torque control mode, if the output torque reaches the torque limit, the inverter enters the protection state and the output switches ON.
15	The inverter is ready to RUN	If the main circuit and the control circuit are stable and the inverter detects no fault and is ready for RUN, the output will be ON.
16	FIV > FIC	When the FIV input is greater than the FIC input, the output
17	The upper frequency limit reached	If the frequency of RUN mode reaches the upper limit, the output is ON.
18	The lower frequency limit reached	If the frequency of RUN mode reaches the lower limit, the output will turn ON. In the event of a stop, the output will switch off.
19	Under voltage	If the inverter is under voltage, the output will turn ON.
20	Communication setting	See the communication protocol.
21	Reserved	Reserved
22	Reserved	Reserved
23	Run at zero speed 2	If the output frequency of the inverter is 0, the output is ON. In the event of a stop, the output is still on.
24	Total time under voltage reached	If the cumulative turn on time of the inverter (P7.13) exceeds the value set in P8.16, the output is ON.
25	Detection of the FDT2 frequency level	See description P8.28 and P8.29.
26	Frequency 1 reached	See description P8.30 and P8.31.
27	Frequency 2 reached	See description P8.32 and P8.33.

28	Current 1 reached	See description P8.38 and P8.39.
29	Current 2 reached	See description P8.40 and P8.41.
30	Time reached	If the timing function (P8.42) is enabled, the output is ON when the actual running time of the inverter reaches the set time.
31	FIV entry limit exceeded	If the FIV input is greater than P9.46 (upper limit of the input voltage FIV) or lower than the value P9.45 (lower limit of the input voltage FIV), the output is ON.
32	Zero load	Load 0, output turns ON.
33	Reverse RUN	If the inverter is in REVERSE mode, the output will be
34	Zero current	See description P8.28 and P8.29.
35	Module temperature	If the heat sink temperature (P7.07) reaches the set module threshold (P8.47), the output is ON.
36	Exceeded current limit	See description P8.36 and P8.37.
37	Frequency lower limit reached	If the RUN frequency reaches the lower limit, the output is ON. During the stop, the output is still on.
38	Alarm	If a fault occurs in the inverter and the inverter will not continue, an alarm signal will switch on.
39	Reserved	Reserved
40	Actual running time reached	If the actual runtime exceeds P8.53, the output is ON.

P6.03 - P6.06 RESERVED

P6.07	FOV selection the function of output	Default	0
P6.08	Reserved		

The FOV output range is 0-10 V or 0-20 mA. The relationship between the ranges of pulse and analogue outputs and the corresponding functions is shown in the following table.

Table 4-6 Relationship between pulse and analog output ranges and corresponding functions.

Value	Function	Range (corresponding to the range of pulses or analog outputs 0.0%-100.0%)
0	Frequency during RUN	0 - maximum output frequency
1	Set frequency	0 - maximum output frequency
2	Output current	0 - 2-multiple the rated value of current the motor
3	Output torque	0 - 2-multiple the rated value of torque the motor
4	Output power	0 – 2-multiple of the rated value of supply voltage
5	Output voltage	0 – 1.2-multiple of the rated value of voltage the inverter
6	Impulse input	0.01 kHz-100.00 kHz
7	FIV	0 V - 10 V
8	FIC	0 V - 10 V (or 0 – 20 mA)
9	Reserved	
10	Length	0 – maximum length set
11	Numbered value of counter	0 - maximum set value of the counter
12	Communication setup	0.0 % - 100.0%
13	Speed of engine rotation	0- the rotational speed corresponding to the maximum output frequency
14	Output current	0.0 A - 1000.0 A
15	Output Voltage	0.0 V - 1000.0 V

P6.10	FOV zero offset coefficient	Default	0.0 %
	Setting range	100.0%~+100.0%	
P6.11	FOV gain	Default	1.00
	Setting range	-10.00 - +10.00	
P6.12	Reserved		
P6.13 to P6.16	Reserved		

These function codes are used to correct the shift of the zero of the analogue output and the output amplitude deviation. They can also be used to define the desired FOV curve.

If "b" represents a zero shift, "k" represents the gain, "Y" represents the actual output and "X" represents the standard output, the actual output value is: $Y = kX + b$.

The zero displacement coefficient of 100% FOV corresponds to 10V (or 20 mA). The standard output refers to a value corresponding to an analogue output of 0 to 10 V (or 0 to 20 mA) without setting a zero shift or gain.

For example, if the analogue output is used as frequency of RUN and the output is expected to be 8V at a maximum frequency of 3V, the gain is set to -0.50 and the zero offset is set to 80%.

P6.17	M01 time of delay	Default	0.0 s
	Setting range	0.0 s – 3600.0 s	
P6.18	RA-RB-RC time of delay	Default	0.0 s
	Setting range	0.0 s – 3600.0 s	

These parameters are used to set the delay of M01 output terminals, relay 1 from time of change to actual output.

P6.19 to P6.21: Reserved

P6.22	Selection of output terminal mode		Default	00000
	Setting range	Units	M01 mode	
		0	Positive logic	
		1	Negative Logic	
		Tens	RA-RB-RC mode (0-1, the same as N101)	

Used to define logic of M01, RA, RB, RC output terminals.

0: Positive logic

The output terminal is active when it is connected to the GND, and is inactive when disconnected from the GND.

1: Negative Logic

The output terminal is inactive when it is connected to the GND, and is active when disconnected from the GND.

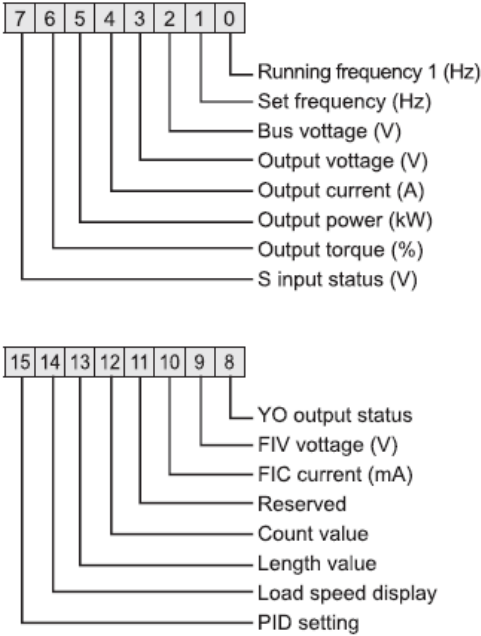
Group P7: Control panel and display

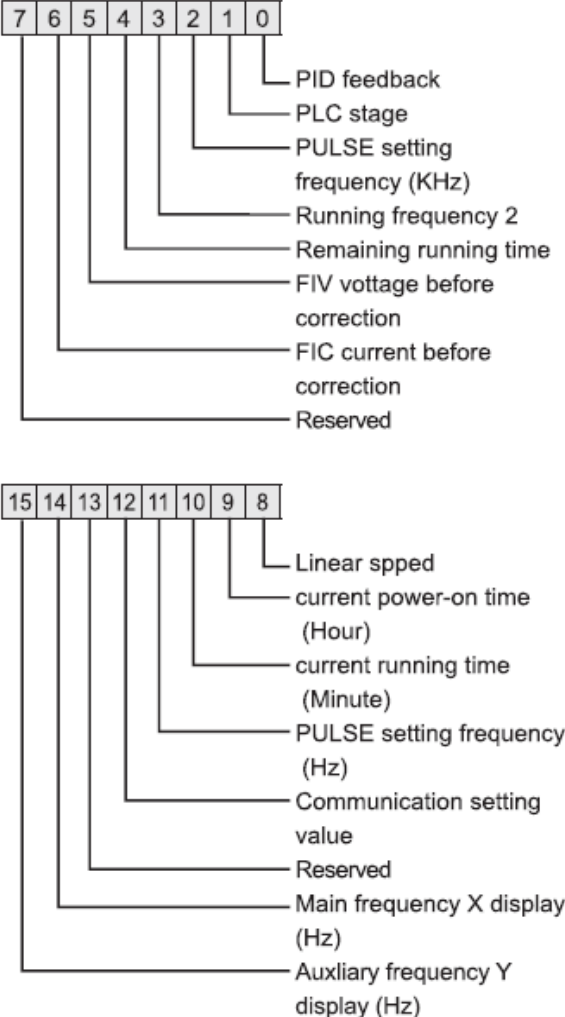
P7.00	Correction power factor		Default	100.0
	Setting range	0	0.0 - 200.0	

It can adjust the output power by changing parameter P7.00, (output power can be displayed helping with parameter D0.05)

P7.01	Selection of the function of the JOG key Only valid for V800-4T0370 to 4T1600 models with two-row panel	0:JOG button is disabled on DP6-G-3 panels 1: Switching between panel control and external control (terminal command channel or communication channel) 2: Switching between FORWARD and REVERSE 3: Activation of FORWARD JOG 4: BACKWARD JOG activation 5: Activation of the STOP button on DP6-E-2 panels
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P7.02	STOP/RESET button	Default	1
	Setting range	0	STOP/RESET key enabled only in operation panel control
		1	STOP/RESET key enabled in any operation mode

P7.03	Parameters 1, LED display during RUN	Default	31
	Setting range	0000 -FFFF	 <p>If we need to display parameters during run, set the corresponding bit to 1 and set the hexadecimal equivalent of this binary number in P7.03.</p>

	Parameter 2, LED display during RUN	Default	0
P7.04	Setting range		 <p data-bbox="420 199 985 1220"> Bit 7: PID feedback Bit 6: PLC stage Bit 5: PULSE setting frequency (KHz) Bit 4: Running frequency 2 Bit 3: Remaining running time Bit 2: FIV voltage before correction Bit 1: FIC current before correction Bit 0: Reserved Bit 15: Linear speed Bit 14: current power-on time (Hour) Bit 13: current running time (Minute) Bit 12: PULSE setting frequency (Hz) Bit 11: Communication setting value Bit 10: Reserved Bit 9: Main frequency X display (Hz) Bit 8: Auxiliary frequency Y display (Hz) </p> <p data-bbox="348 1236 983 1332">If we need to display parameters during run, set the corresponding bit to 1 and set the hexadecimal equivalent of this binary number in P7.04.</p>
P7.04	Setting range		0000 -FFFF

Once parameters are enabled, the parameters that can be displayed are visible to any state of the inverter.

	LED display during STOP	Default	33
P7.05	Setting range	0000 -FFFF	<p>7 6 5 4 3 2 1 0</p> <ul style="list-style-type: none"> — Set frequency (Hz) — Bus voltage (V) — X input status — YO output status — FIV voltage (V) — FIC current (mA) — Reserved — Count value <p>15 14 13 12 11 10 9 8</p> <ul style="list-style-type: none"> — Length value — PLC stage — Load speed — PID setting — PULSE setting frequency (kHz) — Reserved — Reserved — Reserved <p>If we need to display parameters during run, set the corresponding bit to 1 and set the hexadecimal equivalent of this binary number in P7.0.</p>

P7.06	Load speed display coefficient	Default	1.0000
	Setting range		0,0001 – 6.5000

This parameter serves to set the relation between the inverter output frequency and the load speed. For details, see P7.12.

P7.07	Teplota chladiča meniča	Štandardne	Len pre čítanie
	Rozsah nastavenia		0.0°C až 150.0°C

It is used to display of the input bipolar transistor (IGBT) temperature of the inverter and IGBT protection against overheating depending on the model.

P7.08	Temporary version of the software	Default	Read only
	Setting range		0.0°C – 150.0°C

It displays the temporary version of the control panel software.

P7.09	Total running time	Default	0 hours
	Setting range		0 hours – 65 635 hours

It shows the total running time of the inverter. If this value reaches the value set in P8.17, digital output (ON) will be switched on.

P7.10	Reserved		Default	
P7.11	Version of the software		Default	
	Setting range		control board software version	
P7.12	Number of decimal places to display load speed		Default	0
	Setting range	0	0 decimal places	
		1	1 decimal place	
		2	2 decimal places	
		3	3 decimal places	

P7.12 is used to set the number of decimal places to display the loading speed. The following example explains how to calculate the loading speed:

Let's assume that P7.06 (coefficient of loading speed the display) is 2,000 and P7.12 is 2 (2 decimal places). If the drive frequency is 40.00 Hz, the load speed is $40.00 \times 2000 = 80.00$ (display of 2 decimal places).

If the inverter is in the STOP state, the loading speed is the speed corresponding to the set frequency, namely "set loading speed". If the frequency is set to 50.00 Hz, the loading speed in STOP state is $50.00 \times 2.000 = 100.00$ (2 decimal places).

P7.13	Total time under voltage	Default	-----
	Setting range		0 hours – 65 635 hours

It is used to display the cumulative turn on time of the inverter. If the time reaches the set on time (P8.17), the digital output 24 will switch ON.

P7.14	Total electricity consumption	Default	---
	Setting range	0 – 65 635 kWh	

It is used to display the cumulative power consumption of the inverter.

Group P8: Auxiliary functions

P8.00	Jog (JOG) frequency	Default	2.00 Hz
	Setting range	0.00 Hz – maximum frequency	
P8.01	Jog acceleration (JOG)	Default	20.0 s
	Setting range	0.0 s - 6500.0 s	
P8.02	Jog deceleration (JOG)	Default	20.0 s
	Setting range	0.0 s - 6500.0 s	

These parameters are used to define the set frequency and acceleration / deceleration time of the motor in JOG mode. The startup mode is "Direct start" (P1.00 = 0) and the stop mode is "Deceleration to stop" (P1.10 = 0).

P8.03	Acceleration time 2	Default	According to the model
	Setting range	0.0 s - 6500.0 s	
P8.04	Deceleration time 2	Default	According to the model
	Setting range	0.0 s - 6500.0 s	
P8.05	Acceleration time 3	Default	According to the model
	Setting range	0.0 s - 6500.0 s	
P8.06	Deceleration time 3	Default	According to the model
	Setting range	0.0 s - 6500.0 s	
P8.07	Acceleration time 4	Default	According to the model
	Setting range	0.0 s - 6500.0 s	
P8.08	Deceleration time 4	Default	According to the model
	Setting range	0.0 s - 6500.0 s	

The 800 provides a total of four sets of acceleration / deceleration times, that is, the previous three groups and the group defined in P0.08 and P0.09. The definitions of the

four groups are exactly the same. You can switch between these four acceleration / deceleration time groups by means of different combinations of S-terminal states. For more details, see P5.01 to P5.05.

P8.09	Jump frequency 1	Default	0.00Hz
	Setting range	0.00Hz – maximum frequency	
P8.10	Jump frequency 2	Default	0.00Hz
	Setting range	0.00Hz – maximum frequency	
P8.11	Amplitude of the jump frequency	Default	0.00Hz
	Setting range	0.00Hz – maximum frequency	

If the frequency in the frequency jump range is set, the current frequency is the jump frequency close to the set frequency. Setting the jump frequency helps avoid mechanical load resonance.

The V 800 provides two jumper frequencies. If both are set to 0, the frequency jump function is off. The principle of jump frequencies and jump amplitude is illustrated in the following figure.

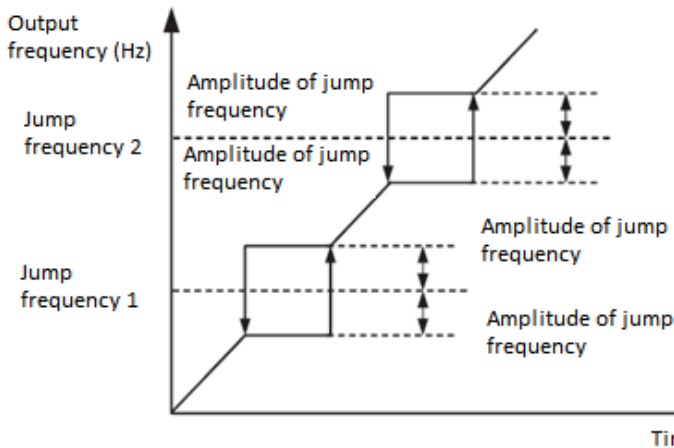


Figure 4-12: The principle of jump frequencies and amplitude

P8.12	Dead zone time when changing rotation	Default	0.0 s
	Setting range	0.00 s – 3000.0 s	

It is used to set the time when the output is 0 Hz when changing the motor as shown in the following figure.

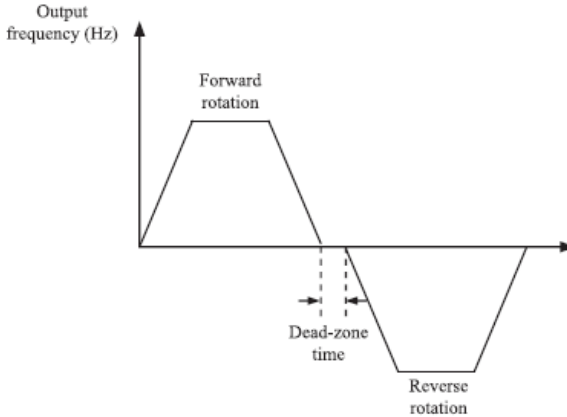


Figure 4-13: Forward / Reverse rotation

P8.13	Control of reverse		Default	0
	Setting range	0	disabled	
		1	enabled	

Used to set whether the inverter allows reversing. For applications where reverse flow is disabled, set this parameter to 0.

P8.14	Mode of operation when the set frequency is lower than the lower limit		Default	0
	Setting range	0	RUN at the lower frequency limit	
		1	Stop	
		2	RUN at zero speed	

It is used to set the AC inverter mode when the set frequency is lower than the lower frequency limit. The inverter provides three operating modes to meet the requirements of various applications.

P8.15	Balance control		Default	0.00 Hz
	Setting range	0.00 Hz – 10.00 Hz		

This function is used to balance the work load distribution when multiple motors are used to drive the same load. The output frequency of the inverters decreases as the load is increased. You can reduce the working load of the motor under load by reducing the

output frequency for this motor and implement the load balancing between several motors.

P8.16	Limit of total turn-on time	Default	0 hours
	Setting range	0 – 65 000 hod	

If the total turn on time (P7.13) reaches the value set in parameter P8.16, the corresponding M01 terminal outputs are ON, (P6.01 = 24).

P8.17	Total time of operation the inverter	Default	0 hours
	Setting range	0 – 65 000 hours	

It is used to set the limit for the total running time of the inverter. If the total operating time (P7.09) reaches the value set in this parameter, the corresponding output terminals M01 are ON, (P6.01 = 40).

P8.18	The protection at start	Default	0
	Setting range	0	disabled
		1	enabled

This parameter is used to set whether to enable security protection

If set to 1, the inverter does not respond to the command triggered when switching on the inverter (for example, the input terminal is on before the voltage is connected). The inverter responds only after the startup command has been cancelled and re-started.

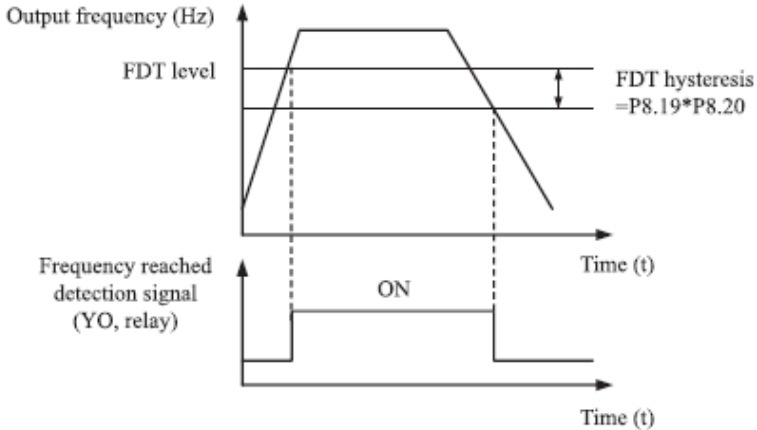
In addition, the inverter does not respond to the issued command, which is valid after resetting errors in the inverter. Running protection can only be deactivated after cancelling the starting command.

In this way, this parameter is set to 1, the motor can be protected from responding to the commands issued after the power is turned on or when an unexpected error is reset.

P8.19	Frequency detection value (FDT1)	Default	50 Hz
	Setting range	0.00Hz – maximum frequency	
P8.20	Hysteresis detection value (FDH)	Default	5.0 %
	Setting range	0.0% - 100.0% (FDT1)	

If the operating frequency is higher than the frequency detection value, the corresponding M01 terminal is ON. If the running frequency is lower than P8.19, the output on the M01 terminals is cancelled.

These two parameters are used to set the output frequency detection value and hysteresis value when the output is cancelled. The value P8.20 is the percentage of hysteresis frequency from the frequency value (P8.19). The FDT function is shown in the following figure.



Obrázok 4-14: FDT úrovne

P8.21	Achieved range of frequency detection	Default	0.0 %
	Setting range	0.00Hz – 100% (maximum frequency)	

If the frequency of the inverter is running within a certain frequency range, the corresponding YO terminal is ON.

This parameter serves to set the range at which the output frequency is detected to achieve the set frequency. The value of this parameter is a percentage with respect to the maximum frequency. The reached range of detection is shown in the following figure.

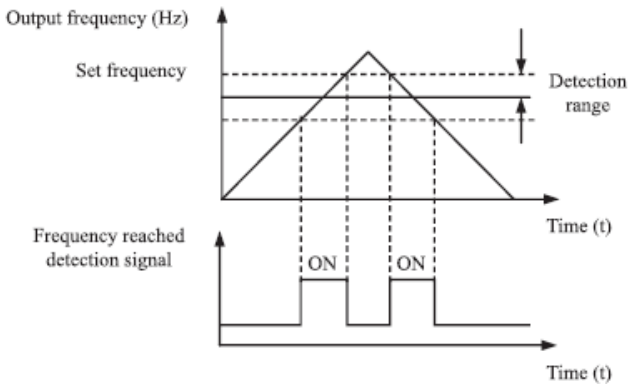


Figure 4-15 Frequency detection range

P8.22	Jumping frequency during acceleration / deceleration		Default	1
	Setting range	0: disabled 1: enabled		

Used to determine if the jumping frequency is enabled during the acceleration / deceleration process.

If the jumping frequency during acceleration / deceleration is enabled and the running frequency is within the jumping frequency range, the actual running frequency exceeds the amplitude of the set jumping frequency (it increases directly from the lowest to the highest jumping frequency). The following figure shows a diagram when the jumping frequency is enabled during acceleration / deceleration.

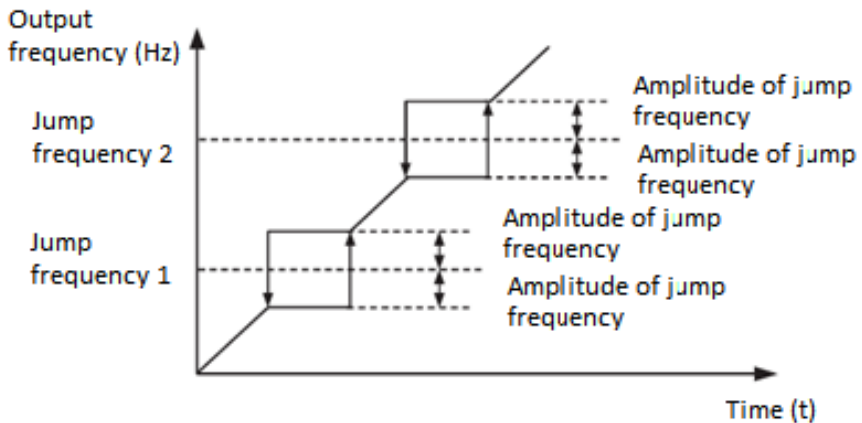


Figure 4-16: Diagram when the jumping frequency is enabled during the acceleration / deceleration process

P8.25	Frequency switching point between acceleration time 1 and acceleration time 2	Default	0.00 Hz
	Setting range	0.00Hz – maximum frequency	
P8.26	Frequency switching point between deceleration time 1 and deceleration time 2	Default	0.00 Hz
	Setting range	0.00Hz – maximum frequency	

This function is enabled when the inverter selects an acceleration / deceleration time that is not enabled by switching the X terminal. It is used to select different acceleration / deceleration time groups based on the operating frequency range rather than the X terminal during the inverter running.

During acceleration, if the running frequency is less than P8.25, acceleration time is selected 2. If the running frequency is greater than P8.25, acceleration time 1 is selected. During deceleration, if the running frequency is less than P8.25, the deceleration time is 2. If the running frequency is greater than P8.25, the deceleration time is 1.

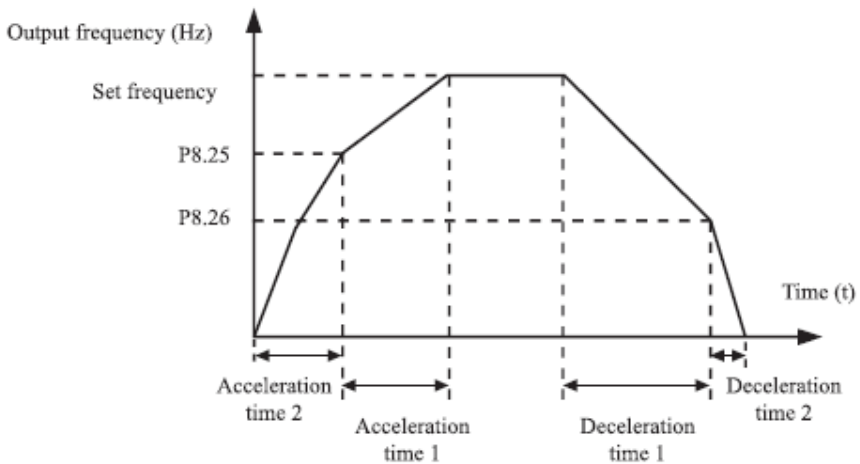


Figure 4-17: Toggle acceleration / deceleration time

P8.27	Terminal JOG preferred	Default	0
	Setting range	0: disabled 1: enabled	

It serves to set whether the JOG terminal has the highest priority. If the JOG terminal is preferred, the inverter switches to JOG.

P8.28	Frequency detection value (FDT2)		Default	50 Hz
	Setting range	0.00Hz – maximum frequency		
P8.29	Hysteresis detection value (FDT2)		Default	5.0 %
	Setting range	0.0% - 100.0% (FDT2 level)		

The frequency detection function is the same as the FDT1 function. For details, see P8.19 and P8.20.

P8.30	Frequency reaching the detected value 1		Default	50 Hz
	Setting range	0.00Hz – maximum frequency		
P8.31	Frequency reaching the amplitude value 1		Default	0.0 %
	Setting range	0.0% - 100.0% (maximum frequency)		
P8.32	Frequency reaching the detected value 2		Default	50 Hz
	Setting range	0.00Hz – maximum frequency		
P8.33	Frequency reaching the amplitude value 2		Default	0.0 %
	Setting range	0.0% - 100.0% (maximum frequency)		

If the output frequency of the inverter in the positive and negative frequency amplitudes reaches the detection value, the corresponding M01 outputs are ON, (P6.01 = 26/27). The V 800 provides two groups with any frequency reaching detection parameters, including the detection frequency and amplitude detection as shown in the following figure.

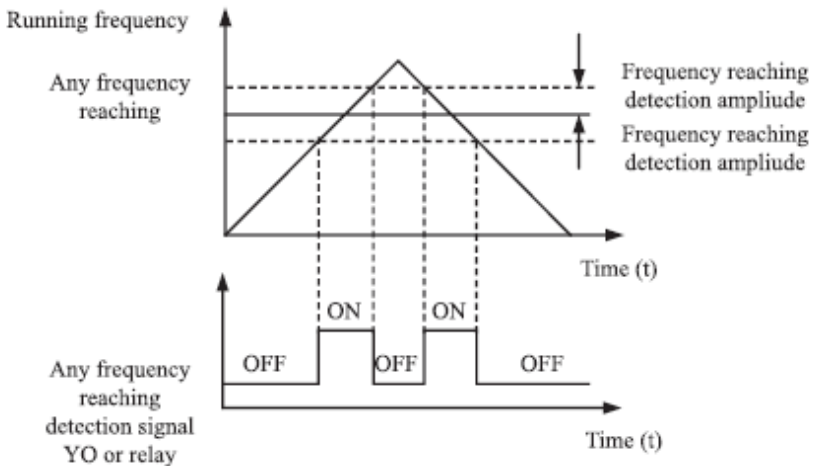


Figure 4-18: Detection of any frequency

P8.34	Level of zero current detection	Default	50 Hz
	Setting range	0.0% - 300.0% (of rated motor current)	
P8.35	The delay time of zero current detection	Default	0.0 %
	Setting range	0.01 s – 600.00 s	

If the output current of the inverter is equal to or less than the level of zero current detection, and the duration exceeds the delay time of zero current detection, the corresponding M01 terminal is ON. Detection the zero current is shown in the following figure.

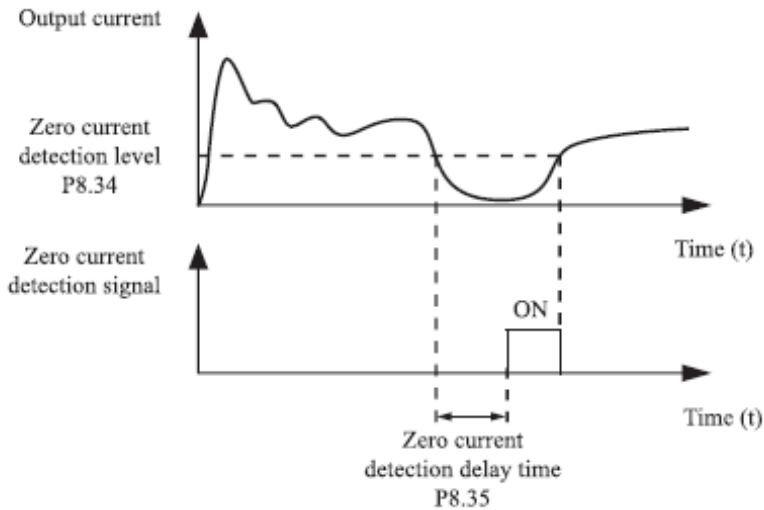


Figure 4-19: Zero current detection

P8.36	Exceeding the output current limit	Default	200 %
	Setting range	0.0 % - no detection 0.1 % - 300.0 % (rated motor current)	
P8.37	Delay time when exceeding the output current limit	Default	0.00 s
	Setting range	0.01 s – 600.00 s	

If the output current of the inverter is equal to or higher than the set limit and the duration exceeds the detection delay time, the corresponding output YO will be switched on. The function of output of overcurrent detection is shown in the following figure.

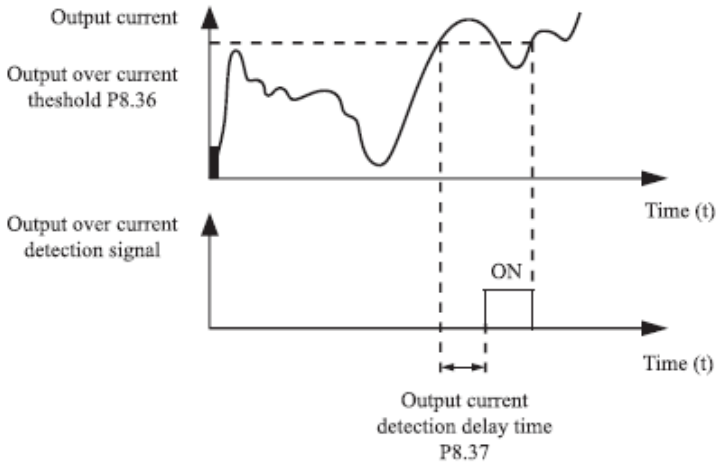


Figure 4-20 Current detection

P8.38	Current reaching the value of detection 1	Default	100.0 %
	Setting range	0.0 – 300.0 % (rated motor current)	
P8.39	Current reaching the value of amplitude 1	Default	0.0 %
	Setting range	0.0 – 300.0 % (rated motor current)	
P8.40	Current reaching the value of detection 2	Default	100.0 %
	Setting range	0.0 – 300.0 % (rated motor current)	
P8.41	Current reaching the value of amplitude 2	Default	0.0 %
	Setting range	0.0 – 300.0 % (rated motor current)	

If the output current of the inverter is in the positive and negative amplitudes of any current range, the corresponding output M01 is ON.

The V800 provides two groups with any current reaching detection parameters, including the current and amplitude detection values, as shown in the following figure.

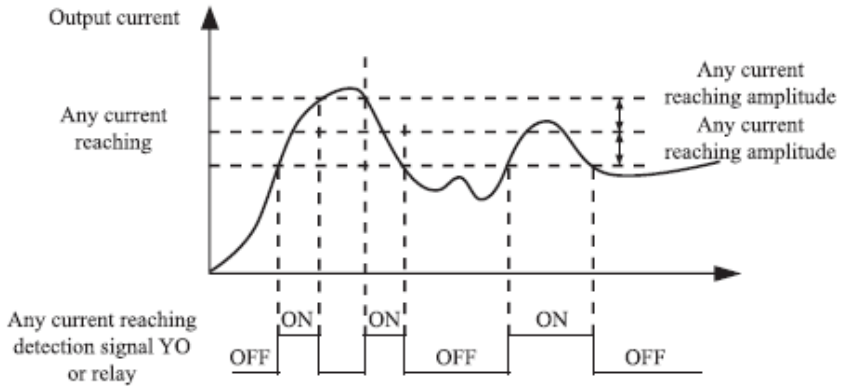


Figure 4-21 Detecting any current

P8.42	Selection of timing function		Default	0
	Setting range	0	Disabled	
1		Enabled		
P8.43	The selection of function the timing		Default	0
	Setting range	0	P8.44	
		1	FIV	
		2	FIC	
		3	Reserved	
100% of the analog input corresponds to P8.44				
P8.44	Time of duration		Default	0.0 min
	Setting range		0.0 min – 6500.0 min	

These parameters are used to set the timing function for the inverter.

If parameter P8.42 is set to 1, the inverter will start at startup. Once the set time has been reached, the inverter stops automatically and simultaneously switches on the corresponding M01 outputs.

The inverter starts the timing from 0 after each start and the remaining time can be detected via D0.20. Timing is set in parameters P8.43 and P8.44 in minutes.

P8.45	Lower limit of input voltage FIV		Default	3.10 V
	Setting range		0.00 V - P8.46	
P8.46	Upper limit of input voltage FIV		Default	6.80V
	Setting range		P8.45 – 10.00 V	

These two parameters are used to set the input voltage limits to ensure inverter protection. If the FIV input is greater than P8.46 or less than P8.45, the corresponding M01 output is switched on, meaning the FIV input exceeds the set limit.

P8.47	Inverter temperature	Default	100°C
	Setting range	0 – 150°C	

When the heat sink temperature of the inverter reaches the value of this parameter, the corresponding M01 becomes ON, indicating that the module temperature reaches the threshold.

P8.48	Fan control	Default	0
	Setting range	0: The fan works only during operation 1: The fan works continuously	

It is used to set the working mode of the cooling fan. If this parameter is set to 0, the fan works when the inverter is in running state. When the inverter stops, the cooling fan works if the heat sink temperature is higher than 40°C, and stops working if the heat sink temperature is lower than 40°C.

If this parameter is set to 1, the cooling fan works after power-on of inverter.

P8.49	Frequency at wake-up	Default	0.00 Hz
	Setting range	Frequency during sleep (P8.51) – maximum frequency (P0.12)	
P8.50	Delay of wake-up	Default	0.0 s
	Setting range	0.0 s – 6500 s	
P8.51	Frequency during sleep	Default	0.00 Hz
	Setting range	0.00 Hz - frequency at wake-up (P8.49)	
P8.52	Delay of sleep	Default	0.0 s
	Setting range	0.0 s – 6500 s	

These parameters are used to set sleep mode and wake-up functions in pump applications. If the inverter is in operation, it enters sleep mode and stops automatically after the set sleep time (P8.52), if the set frequency is lower or equal to the sleep frequency (P8.51).

When the inverter is in sleep mode and the current trigger command is active, after the wake-up time (P8.50), the inverter starts if the set frequency is higher or equal to the wake-up frequency (P8.49).

In general, set the wake-up frequency equal to or higher than the sleep frequency. If the wake-up and sleep frequency is set to 0, sleep and wake-up are off.

If the sleep function and the PID source are active, PID sleep mode is performed according to parameter PA.28. In this case, allow PID operation in the stop state (PA.28 = 1).

P8.53	Running time reached		Default	0.0 min
	Setting range	0.0 min – 6500 min		

If the current turn on time reaches the value set in this parameter, the corresponding M01 output is ON.

Group P9: Faults and protection

P9.00	Selection of overload protection		Default	1
	Setting range	0	Disabled	
		1	Enabled	
P9.01	Increasing motor overload protection		Default	1.00
	Setting range	0.20 – 10.00		

P9.00 = 0

Overload protection function is off. The motor is exposed to potential damage due to overheating. It is recommended to install a thermal relay between the inverter and the motor.

P9.00 = 1

The inverter evaluates whether the motor is overloaded according to the inverse time-lag curve of the motor overload protection

The inverse time delay of the overload protection of the motor is:

$220\% * P9.01 * \text{rated motor current}$ (if the load remains at that value for one minute, the inverter reports an overload motor error) or

$150\% * P9.01 * \text{rated motor current}$ (if the load remains at this value after 60 minutes, the inverter reports a motor overload error).

Set P9.01 based on actual overload. If the value of parameter P9.01 is set to too high, the motor may be damaged if the motor overheats but the inverter does not sound an alarm.

P9.02	Motor overload warning coefficient		Default	80 %
	Setting range	50 % - 100 %		

This function serves to provide a warning signal to the control system via the M01 output before motor overload protection. This parameter is used to determine the percentage at which a pre-warning is performed before the motor is overloaded. The larger the value, the shorter the pre-warning period.

If the total output current of the inverter is greater than the value of the inverse time curve of the overload multiplied by the value of P9.02, the multi-function digital output M01 (motor overload pre-warning) will turn ON.

P9.03	Increasing overload	Default	10
	Rozsah nastavenia	0 (no overvoltage) - 100 To activate the brake unit, set P9.03=0	
P9.04	Overvoltage stall protective voltage	Default	130 %
	Setting range	120 % - 150 % (3 phases)	

If the DC bus voltage exceeds P9.04 (overvoltage protection) during engine deceleration, the inverter will stop the deceleration and maintain the current running frequency. After lowering the bus voltage, the motor continues to decelerate. The parameter P9.03 (increasing overload of DC overvoltage) is used to set the protection of suppression the overvoltage in the inverter. The higher the value, the greater the protection.)

Assuming no overvoltage, set P9.03 to a small value.

For low loads, the value should be small. Otherwise, the system's dynamic response will be slow. With high inertial load, the value should be large. Otherwise, the suppression result will be weak and there may be a breakdown. If the overvoltage increase is set to 0, the overvoltage function is off.

P9.05	Overcurrent increasing	Default	20
	Setting range	0 - 100	
P9.06	Overcurrent protection	Default	150 %
	Setting range	100 % - 200 %	

If the output current exceeds the protective current during acceleration / deceleration of the AC motor, the inverter will stop the acceleration / deceleration and maintain the current running frequency.

P9.05 (Current increment) is used to set the overcurrent protection of the AC motor. The higher the value, the higher the overcurrent protection. Assuming no overcurrent, set P9.05 to a small value.

For low loads, the value should be small. Otherwise, the system's dynamic response will be slow. With high inertial load, the value should be large. Otherwise, the suppression result will be weak and a malfunction may occur. If the overload increment of current is set to 0, the overload function is off.

P9.07	Short to ground after switching on		Default	1
	Setting range	0	Disabled	
		1	Enabled	

It is used to determine if the motor should be shorted to ground when switching on the inverter. If this function is on, the U V W outputs of inverter will connect to the voltage after a certain test time.

P9.09	Auto restoration times after malfunction		Default	0
	Setting range	0 - 20		

Used to set automatic reset the times of faults when this function is used. After exceeding the value, the inverter will remain in a malfunction.

P9.10	Output state M01 during auto-recovery after malfunction		Default	1
	Setting range	0: no activity; 1: activity		

It is used when deciding whether M01 is activated when the fault is automatically reset.

P9.11	Auto-recovery interval after malfunction		Default	1.0 s
	Setting range	0.1 s – 100.0 s		

It is used to set the auto-reset delay after failure.

P9.12 Reserved

P9.13	Turn on protection when the output phase fails		Default	1
	Setting range	0: disabled 1: enabled		

Used to determine if protection is to be done when the output phase is lost.

P9.14	The first type of malfunction	0-99
P9.15	The second type of malfunction	
P9.16	The third (last) type of malfunction	

It is used to record the types of the last three faults of the inverter. The number 0 means no fault. Refer to Chapter 5 for possible causes and solutions for each failure.

P9.17	Frequency at the 3rd error	Shows the frequency at which the last error occurred.
P9.18	Current at the 3rd error	Displays the current state when the last fault occurred.

P9.19	Bus voltage at the 3rd error	Shows the bus voltage when the last error occurred.																				
P9.20	State of input terminals at the 3rd error	<p>Displays the status of all input terminals when the last error occurred.</p> <table border="1"> <thead> <tr> <th>BIT9</th><th>BIT8</th><th>BIT7</th><th>BIT6</th><th>BIT5</th><th>BIT4</th><th>BIT3</th><th>BIT2</th><th>BIT1</th><th>BIT0</th> </tr> </thead> <tbody> <tr> <td></td><td></td><td></td><td></td><td>S4</td><td>S3</td><td>S2</td><td>S1</td><td>REV</td><td>FWD</td> </tr> </tbody> </table> <p>The sequence is as follows: If the input terminal is ON, the setting is 1; setting 0 means OFF. The value is equivalent to the decimal figure, recalculated from state S.</p>	BIT9	BIT8	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0					S4	S3	S2	S1	REV	FWD
BIT9	BIT8	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0													
				S4	S3	S2	S1	REV	FWD													
P9.21	State of output terminals at the 3rd error	<p>Displays the status of all input terminals when the last error occurred.</p> <table border="1"> <thead> <tr> <th>BIT3</th><th>BIT2</th><th>BIT1</th><th>BIT0</th> </tr> </thead> <tbody> <tr> <td></td><td></td><td>RA, RB, RC</td><td>YO</td> </tr> </tbody> </table> <p>The sequence is as follows: If the input terminal is ON, the setting is 1; setting 0 means OFF. The value is equivalent to the decimal figure, recalculated from state S.</p>	BIT3	BIT2	BIT1	BIT0			RA, RB, RC	YO												
BIT3	BIT2	BIT1	BIT0																			
		RA, RB, RC	YO																			
P9.22	Inverter status at 3rd error	Reserved																				
P9.23	Duration of turn on at 3rd error	Displays the actual turn on period when the last fault occurred.																				
P9.24	Duration of run mode at 3rd error	Displays the current run time when the last error occurred.																				
P9.25	Reserved																					
P9.26	Reserved																					
P9.27	Bus voltage at the 2nd error	The same as P9.17 - P9.24																				
P9.28	State of input terminals at the 2nd error																					
P9.29	State of output terminals at the 2nd error																					
P9.30	Inverter status at 2nd error																					
P9.31	Duration of turn on at 2nd error																					
P9.32	Duration of run mode at 2nd error																					
P9.33	Inverter status at 3rd error																					
P9.34	Duration of turn on at 3rd error																					

P9.35	Reserved	
P9.36	Reserved	
P9.37	Frequency at the 1st error	The same as P9.17 - P9.24
P9.38	Current at the 1st error	
P9.39	Bus voltage at the 1st error	
P9.40	State of input terminals at the 1st error	
P9.41	State of output terminals at the 1st error	
P9.42	Inverter status at 1st error	
P9.43	Duration of turn on at 1st error	
P9.44	Duration of run mode at 1st error	
P9.45	Reserved	
P9.46	Reserved	

P9.47	Selection of failure protection action 1		Default	00000
	Setting range	Units	Motor overload (OL1)	
		0	Deceleration to stop	
		1	STOP by stop mode	
		2	Continuing in run	
		Tens	Reserved	
		Hundreds	Phase loss (LO) (same as the digit of units)	
		Thousands	External device error (EF) (same as the digit of units)	
Tens of thousands	Communication error (CE) (same as the digit of units)			

P9.48	Selection of failure protection action 2		Default	00000
	Setting range	Units	Reserved	
		0	Deceleration to stop	
		1	Switch to V/F control, STOP by stop mode	
		2	Switch to V/F control, the motor continues in run	
		Tens	Code of function of faulty reading (EEP)	
0	Deceleration to stop			

		1	STOP by stop mode			
		Hundreds	Reserved			
		Thousands	Reserved			
		Tens of thousands	Total time was reached (END1) (the same as the digit of units in P9.47)			
P9.49	Selection of failure protection action 3		Default	00000		
	Setting range	Units	Reserved			
		Tens	Reserved			
		Hundreds	The total time of power on was reached (END2) (the same as the digit of units in P9.47)			
		Thousands	Start of load (LOAD)			
		0	Deceleration to stop			
		1	STOP by stop mode			
		2	Continues to operate at 7% of the rated motor frequency and recovers the set frequency if the load resumes			
Tens of thousands	PID feedback in RUN (PIDE) (the same as the digit of units in P9.47)					
P9.50	Reserved					
P9.51	Reserved					
P9.52	Selection of displaying the value on the 2nd line of the display	0: Running frequency 1: Set frequency 2: DC bus voltage 3: Output voltage 4: Output current 5: Output power 6: Output torque 7: Status of terminal S 8: Status of terminal M01 9 to 40: According to D0 parameters				

If "Coast to stop" is selected, the AC drive displays error code and directly stops.

If "Stop according to the stop mode" is selected, the inverter displays alarm code and stops according to the stop mode. After stopping, the inverter displays error code.

If "Continue to run" is selected, the AC drive continues to run and displays alarm code. The running frequency is set in P9.54.

P9.54	Frequency selection for continuing to run		Default	0
	Setting range	0	Actual running frequency	
		1	Set frequency	
		2	The upper frequency limit	
		3	The lower frequency limit	
	4	Backup frequency for error		
P9.55	Backup frequency at error		Default	100.0%
	Setting range	60.0 % - 100.0 %		

If a fault occurs during the running of the inverter and the manner of solving the fault is set to "Continue to run", the inverter displays alarm code and continues to run at the frequency set in P9.54. The value in P9.55 is the percentage of the maximum frequency.

P9.56	Reserved			
P9.57	Reserved			
P9.58	Reserved			
P9.59	Selection of activity in case of a sudden power outage		Default	0
	Setting range	0	Invalid	
		1	Deceleration	
		2	Deceleration to stop	
P9.60	The action will suspend the voltage monitoring during a sudden power outage		Default	0.0 %
	Setting range		0.0 % - 100.0 %	
P9.61	Power monitoring time in case of a sudden power outage		Default	0.50 s
	Setting range		0.00 s - 100.00 s	
P9.62	Voltage during power failure		Default	80.0 %
	Setting range		60.0 % - 100.0 % (bus voltage)	

In case of a sudden power failure or a sudden drop in voltage, the DC bus voltage is reduced. This feature allows the inverter to compensate for decreasing the DC bus voltage by energy of feedback reducing the output frequency to maintain the continuous operation of the AC motor.

If P9.59 = 1 in case of a sudden power outage or a sudden drop in voltage, the inverter will decelerate.

After recovering the normal bus voltage, the inverter accelerate to the set frequency. If the bus voltage remains normal for a time exceeding the value set in P9.61, the bus voltage is normal.

If $P9.59 = 2$ in case of a sudden power outage or a sudden drop in voltage, the inverter will decelerate until it stops.

Figure 4-22 shows the inverter's actions after a sudden power outage.

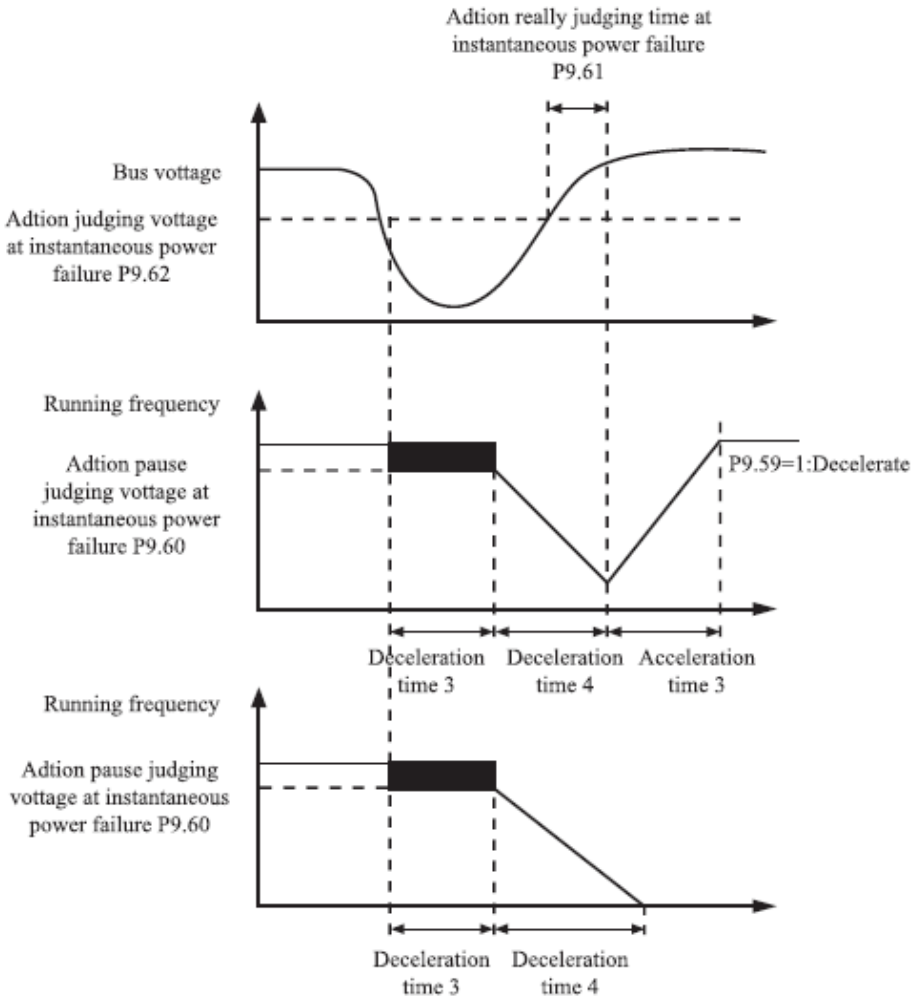


Figure 4-22: Operation of the inverter after a power failure

P9.63	Protection at zero load		Default	0
	Setting range	0		Disabled
		1		Enabled
P9.64	Level of zero load detection		Default	10.0 %
	Setting range	0.0 % - 100.0 % (rated motor current)		
P9.65	The zero load detection time		Default	1.0 s
	Setting range	0.0 s – 60.0 s		

If the zero load protection is activated and the output current of the inverter is lower than the detection level (P9.64) and the continuous time exceeds the detection time (P9.65), the inverter output frequency automatically drops to 7% of the nominal frequency. During protection the inverter automatically accelerates to the set frequency if the normal load is restored.

P9.67 - P9.70 Reserved

Group PA: PID process control functions

PID control is a general method of process control. By means of linear, integration and differential operations between the feedback signal and the target signal, the output frequency is adjusted and generates a feedback system to stabilize the controlled target value.

It is applied to process control, such as flow control, pressure and temperature control. The following figure shows the PID master block diagram.

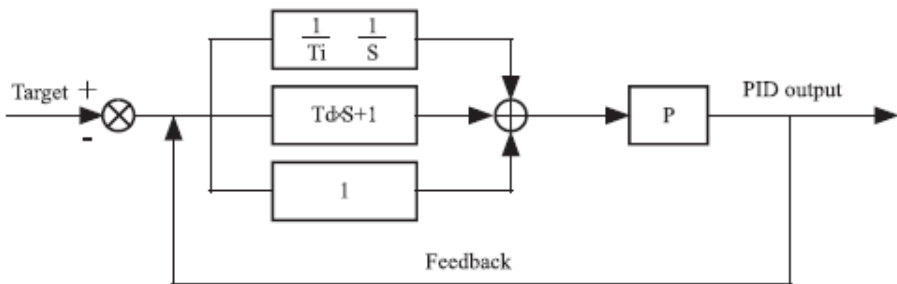


Figure 4-23: Block diagram of PID control

PA.00	Setting of source the required value of PID		Default	0
	Setting range	0	PA.01	
		1	FIV	
		2	FIC	
		3	Reserved	
		4	IMPULSE setting (S3), option	
		5	Communication setting	
6	Multiple meaning			
PA.01	Digital setting of PID		Default	150.0 %
	Setting range		0.0 – 100.0 %	

PA.00 is used to select the PID setting channel. The PID setting is a relative value ranging from 0.0% to 100.0%. PID feedback is also a relative value. The purpose of the PID control is the same PID and PID feedback setting.

PA.02	Setting of source the feedback of PID		Default	0
	Setting range	0	FIV	
		1	FIC	
		2	Reserved	
		3	FIV to FIC	
		4	IMPULSE setting (S3), option	
		5	Communication setting	
		6	FIV + FIC	
		7	MAX (FIV , FIC)	
8	MIN (FIV , FIC)			

This parameter serves to select the PID feedback signal channel.

PID feedback is a relative value ranging from 0.0% to 100.0%.

PA.03	Direction of action the PID		Default	0
	Setting range	0	Action forward	
		1	Action backward	

0: Action forward

If the feedback value is less than the PID setting, the inverter output frequency rises. For example, winding voltage control requires a PID action forward.

1: Action backward

If the feedback value is less than the PID, the output frequency of the inverter will be reduced. For example, unwinding tension control requires a reverse PID action. Note that

this function is affected by the inverting of the multifunctional PID terminal. In this application, pay attention.

PA.04	Setting range of PID feedback	Default	1000
	Setting range	0 – 65 535	

This parameter is a dimensionless value. It shows the PID setting (D0.15) and the PID feedback (D0.16).

The relative value of 100% of the PID feedback corresponds to PA.04. If PA.04 is set to 2000 and the PID setting is 100%, the PID setting (D0.15) is 2000.

PA.05	Linear constant Kp1	Default	20.0
	Setting range	0.0 – 100.0	
PA.06	Integration constant Ti1	Default	2.00 s
	Setting range	0.01 s – 10.00 s	
PA.07	Derivation constant Td1	Default	0.0 s
	Setting range	0.0 – 10.0	

PA.05 (Linear constant Kp1)

Specifies the intensity of PID control. The higher the Kp1, the greater the control intensity. The value of 100.0 indicates when the variance between the PID feedback and the PID setting is 100.0%. Setting the amplitude of the PID controller at the reference output frequency is the maximum frequency.

PA.06 (Integration constant Ti1)

It determines the intensity of integration. The shorter the integration time, the greater the control intensity. When the deviation between the PID feedback and the PID setting is 100.0%, the integral controller performs the continuous setting for the time set in PA.06. Then the amplitude of the setting reaches the maximum frequency.

PA.07 (Derivation constant Td1)

Specifies the intensity of differential PID control. The longer the derivation time, the greater the control intensity. Derivative time is the time at which the feedback change reaches 100.0% and then the amplitude of the setting reaches the maximum frequency.

PA.08	Disconnection frequency PID of reverse rotation	Default	2.0 Hz
	Setting range	0.0 – max. frequency	

In some situations, if the PID output frequency is a negative value (reverse engine rotation), the PID setting and the PID feedback may be the same. However, for some applications, the too high reverse rotation rate is disabled and PA.08 is used to determine the upper limit of the reverse rotation frequency.

PA.09	Limit of PID deviation	Default	0.0 %
	Setting range	0.0 – 100.0 %	

If the deviation between the PID feedback and the PID is less than the PA19 value, the PID control stops. A small deviation between the PID feedback and the PID setting causes the output frequency to be stable and unchangeable, which is particularly effective for some closed-loop control applications.

PA.10	PID differential limit	Default	0.10 %
	Setting range	0.0 – 100.0 %	

Used to set the PID differential output range. With PID control, differential operation can easily cause system oscillation. Differential control of PID is therefore limited to a small range. PA.10 is used to set the differential output PID range.

PA.11	Setting the PID change time	Default	0.00 s
	Setting range	0.00 – 650.0 s	

The changeover time of the PID indicates the time needed to change the PID setting from 0.0% to 100.0%. The PID setting changes linearly according to varying times, reducing the impact caused by the sudden change in setting in the system.

PA.12	The time of filtering PID feedback	Default	0.00 s
	Setting range	0.00 – 60.0 s	
PA.13	The time of filtering PID output	Default	0.00 s
	Setting range	0.00 – 60.0 s	

PA.12 is used to filter PID feedback, helping to reduce feedback interference, but slows down the system's response.

PA.13 is used to filter out the PID output frequency, what helps to suppress the sudden change of frequency the inverter, but slows down the system's response.

PA.15	Linear constant Kp2	Default	20.0
	Setting range	0.00 – 100.0	
PA.16	Integration constant Ti2	Default	2.00 s
	Setting range	0.01 s – 10.00 s	
PA.17	Derivation constant Td2	Default	0.00 s
	Setting range	0.0 – 10.0	

PA.18	Switching condition of PID parameters		Default	0
	Setting range	0	No switching	
		1	Switching over S	
		2	Automatic switching based on deviation	
PA.19	Deviation of the parameter switching PID 1		Default	20 %
	Setting range	0.0 % - PA.20		
PA.20	Deviation of the parameter switching PID 2		Default	80 %
	Setting range	PA.19 – 100 %		

In some applications, switching the PID parameters is required if one group of PID parameters fails to meet the requirement of the entire running process. These parameters are used to switch between two groups of PID parameters.

Controller parameters from PA.15 to PA.17 are set in a similar way to PA.05 to PA.07.

Switching can be done either via the S-terminal or automatically by the deviation.

If switching via input S is selected, function 43 must be assigned to input S ("Switching PID parameters"). If S is off, parameter group 1 (PA.05 to PA.07) is selected. If S is on, group 2 is selected (PA.15 to PA.17).

When the absolute value of the deviation between the PID feedback and the PID is less than PA.19 and the automatic switching is selected, the PID parameter selects group 1. When the absolute value of the deviation between the PID feedback and the PID is greater than the PA.20 value, the PID parameter selects group 2. When there is a variation between PA.19 and PA.20, PID parameters are linearly interpolated values of two groups of parameter values.

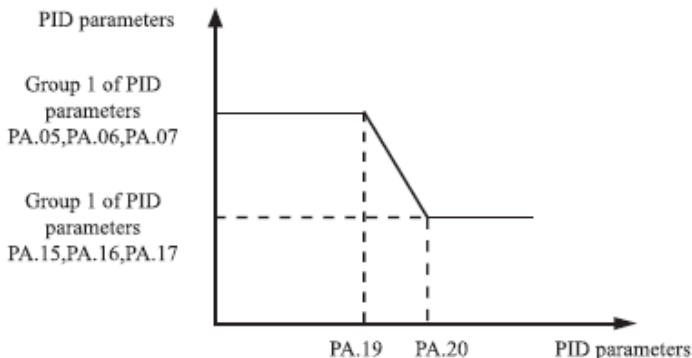


Figure 4-24 Switching PID parameters

PA.21	Initial value of PID	Default	0 %
	Setting range	0.0 % - 100.0 %	
PA.22	Initial value of delaying PID	Default	0.00 s
	Setting range	0.00 s – 650.00 s	

When the inverter starts, the PID will start the closed loop algorithm only after the PID output is stabilized to the PID value (PA.21) and this delay time is set in PA.22.

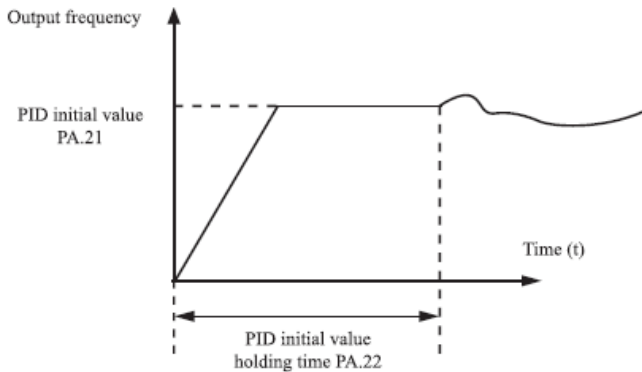


Figure 4-25 Functions of initial value the PID

PA.23	Maximum deviation between two PID outputs in the forward direction	Default	1.00 %
	Setting range	0.0 % - 100.0 %	
PA.24	Maximum deviation between two PID outputs in the backward direction	Default	1.00 %
	Setting range	0.0 % - 100.0 %	

This function serves to limit the variance between two PID outputs (2 ms to the PID output) which suppress the fast change of the PID output and stabilize the AC motor operation.

PA.23 and PA.24 correspond to the maximum absolute value of the output deviation in the forward and reverse directions.

PA.25	Properties of PID integration		Default	00
	Setting range	Units	Separated integration	
		0	Disabled	
		1	Enabled	
		Tens	Stop the integration when the output reaches the required limit	
		0	Continuing	
1	Stop			

Separate Integration

If separate Integration is enabled, the PID stops the operation when to X is assigned 38 "PID integration paused". In this case, only linear and differential operations are effective.

If separate integration is disabled, it does not matter whether or not the 38 "PID Integrated Suspended" function assigned to S is enabled.

Integration is a stop when the output reaches the required limit. If "stop integration" is selected, the PID integration operation stops, which can help reduce the PID parameter overrun.

PA.26	Detection of PID controller feedback loss		Default	0.00 %
	Setting range	0.0%: loss of feedback is not detected 0.1%: 100.0%		
PA.27	Detection time when PID controller feedback is lost		Default	0.0 s
	Setting range	0.0 s - 20.0 s		

These parameters are used to assess the loss of PID feedback.

If the PID feedback is less than PA.26 and the continuous time exceeds PA.27, the inverter reports Err31 and operates according to the selected failure protection action.

PA.28	Správanie sa PID pri strate spätnej väzby		Štandardne	0
	Rozsah nastavenia	0	Žiadna akcia PID a STOP	
		1	Akcia PID a STOP	

These parameters are used to assess the loss of PID feedback. If the PID feedback is less than PA.26 and the total time exceeds PA.27, the inverter reports PIDE and continues according to the selected failure protection action.

Group PB: Variable frequency, fixed length and count

The swing frequency function is applied to the textile and chemical fibre industry and to applications where winding functions are needed. The swing frequency function indicates that the inverter output frequency changes up and down around the set midrange frequency. The frequency course on the timeline is shown in the following figure.

The swing frequency amplitude is set in Pb.00 and PB.01. When Pb.01 is set to 0, the swing frequency amplitude is 0 and the swing frequency function is not used.

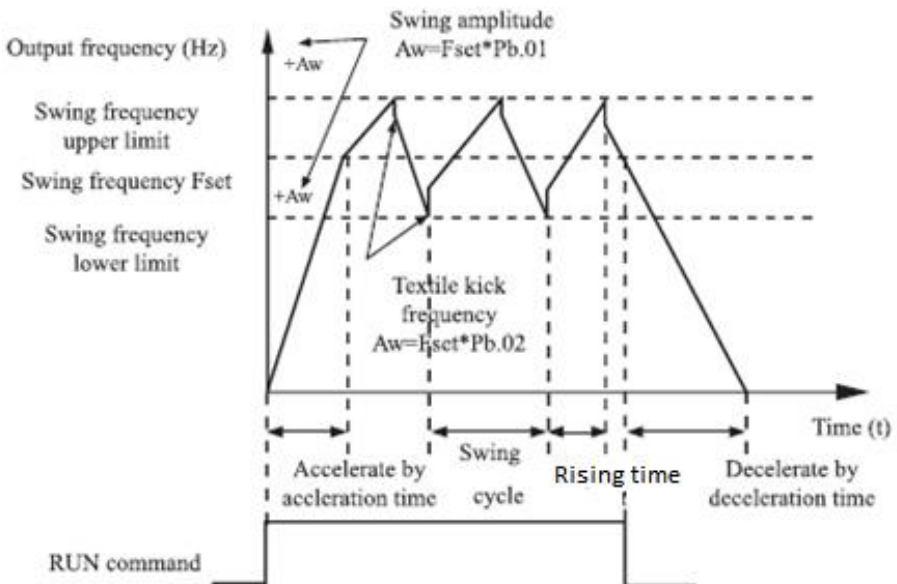


Figure 4-26: Frequency swing control

Pb.00	Set the swing frequency mode		Default	0
	Setting range	0	Relative to the mean value of the frequency	
	1	Relative to the maximum value of the frequency		

This parameter serves to select the base value of the swing amplitude. 0: With regard to medium frequency (P0.03 frequency source selection) it is a variable swing value. The amplitude varies according to the medium frequency (set frequency).

1: With regard to the maximum frequency (maximum output frequency P0.12) it's a fixed swing value. The amplitude does not change.

Pb.01	Amplitude of swing frequency	Default	0.00 %
	Setting range	0.0 % - 100.0 %	
Pb.02	Amplitude of the jump frequency	Default	0.00 %
	Setting range	0.0 % - 50.0 %	

This parameter is used to determine the amplitude of the swing frequency and the jump frequency.

The swing frequency is limited by the upper frequency limit and the lower frequency limit. Concerning the middle frequency (Pb.00 = 0), the actual AW amplitude of the swing is the result of the calculation the value of P0.03 (frequency source selection) multiplied by Pb.01. Compared to the maximum frequency (Pb.00 = 1), the actual AW amplitude of the swing is the result of P0.12 (maximum frequency) multiplied by Pb.01. Jump Frequency = Swing amplitude AW x Pb.02 (Jump frequency amplitude). With respect to the mean frequency (Pb.00 = 0), the jump frequency is a variable value. As for the maximum frequency (Pb.00 = 1), the jump frequency is a fixed value.

Frequency of the swing is limited by the upper and lower frequency limits.

Pb.03	Frequency swing cycle	Default	10.0 s
	Setting range	0.1 s – 3000.0 s	
Pb.04	Time coefficient of triangle wave rise	Default	50.00 %
	Setting range	0.1 % - 100.0 %	

Swing frequency cycle: the time of a complete swing frequency cycle.

Pb.04 specifies the time percentage of triangular wave rising time to Pb.03 (Swing frequency cycle).

Triangular wave rising time = Pb.03 (Swing frequency cycle) x Pb.04 (Triangular wave rising time coefficient, unit: s).

Triangular wave falling time = Pb.03 (Swing frequency cycle) x (1- Pb.04 Triangular wave rising time coefficient. unit: s).

Pb.05	Set length	Default	1000 m
	Setting range	0 m - 65535 m	
Pb.06	Actual length	Default	0
	Setting range	0 m - 65535 m	
Pb.07	Number of pulses per meter	Default	100
	Setting range	0.1 – 6553.5	

Previous parameters are used to control fixed lengths. Length information is gathered through multifunctional digital inputs. The actual length Pb.06 is calculated by dividing the number of pulses registered via input S by Pb.07 (pulse per meter).

When the actual length Pb.06 exceeds the set length in Pb.05, output M01 is assigned function 10 (reached length) turns ON.

During length measurement mode, length reset can be performed via terminal S with assigned function 28. See P5.00 to P5.09 for details.

Assign function 27 (length measurement input) to the appropriate S-terminal in the desired applications. If the pulse frequency is high, input S3 must be used.

Pb.08	Set counter value	Default	1000
	Setting range	1 - 65535	
Pb.09	Determined counter value	Default	1000
	Setting range	1 - 65535	

Input pulses are input from multi-function input terminals. Assign the function 25 (counter input) to the appropriate input terminal. If the pulse frequency is high, input S3 must be used.

When the counter value reaches the set value (Pb.08), the M01 clamp with assigned function 8 (achieved counter value reached) is ON. Then the counter stops.

When the counter value reaches the value (Pb.09), the M01 terminal with function 9 (setpoint value reached) turns ON (ON). The counter is then counted until the set value is reached. The value of Pb.09 should be equal to or less than Pb.08.

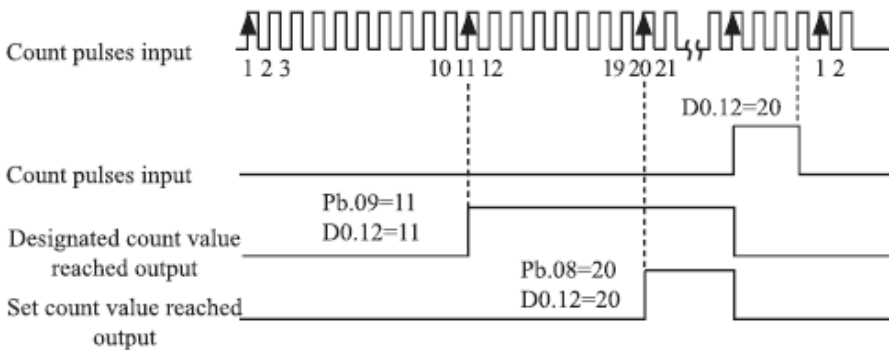


Figure 4-27: Reached set value of the counter

Group PC: Multiple functions and simple PLC function

The V800 has many more instructions than just a multiple speed. In addition to multiple speeds, they can be used as a separate V/F voltage source and PID controller source settings. The simple PLC function differs from the function of the V 800 programmable by user. The simple PLC can perform only a simple combination of multiple instructions, but

the user-programmable function is richer and more practical. See the PC group description for details.

PC.00	Multifunction 0		Default	10.0 %
	Setting range	from -100% to +100%		
PC.01	Multifunction 1		Default	10.0 %
	Setting range	from -100% to +100%		
PC.02	Multifunction 2		Default	10.0 %
	Setting range	from -100% to +100%		
PC.03	Multifunction 3		Default	10.0 %
	Setting range	from -100% to +100%		
PC.04	Multifunction 4		Default	10.0 %
	Setting range	from -100% to +100%		
PC.05	Multifunction 5		Default	10.0 %
	Setting range	from -100% to +100%		
PC.06	Multifunction 6		Default	10.0 %
	Setting range	from -100% to +100%		
PC.07	Multifunction 7		Default	10.0 %
	Setting range	from -100% to +100%		
PC.08	Multifunction 8		Default	10.0 %
	Setting range	from -100% to +100%		
PC.09	Multifunction 9		Default	10.0 %
	Setting range	from -100% to +100%		
PC. 10	Multifunction 10		Default	10.0 %
	Setting range	from -100% to +100%		
PC.11	Multifunction 11		Default	10.0 %
	Setting range	from -100% to +100%		
PC. 12	Multifunction 12		Default	10.0 %
	Setting range	from -100% to +100%		
PC. 13	Multifunction 13		Default	10.0 %
	Setting range	from -100% to +100%		
PC. 14	Multifunction 14		Default	10.0 %
	Setting range	from -100% to +100%		
PC. 15	Multifunction 15		Default	10.0 %
	Setting range	from -100% to +100%		

The multiple instruction can be used in three cases: as a frequency source, a V/F separate voltage source and the source of process setting PID controller. The multiple instruction is a relative value and in range from -100.0% to + 100.0%.

As a frequency source a percentage is set relative to the maximum frequency. As a separate V/F voltage source this is the percentage with respect to the rated motor voltage. As a source of PID process setup, it does not require conversion.

Multiple instructions can be switched based on different states of multifunctional digital S-terminals. See the P5 group description for details.

Run mode of the simple PLC		Default	0
PC.16	Setting range	0	Stop after performing of one cycle of the inverter
		1	Keeps the last values after the inverter performs one cycle
		2	Repeat after performing of one cycle of the inverter

0: Stop after performing of one cycle of the inverter

The inverter stops after one cycle and does not start until another command is received.

1: Keeps the last values after the inverter performs one cycle

The inverter keeps the final running frequency and direction after one cycle.

2: Repeat after performing of one cycle of the inverter

After one cycle the inverter will automatically start another cycle and continue until the stop command is received.

Simple PLC function has two functions: frequency source or V/F separated voltage source.

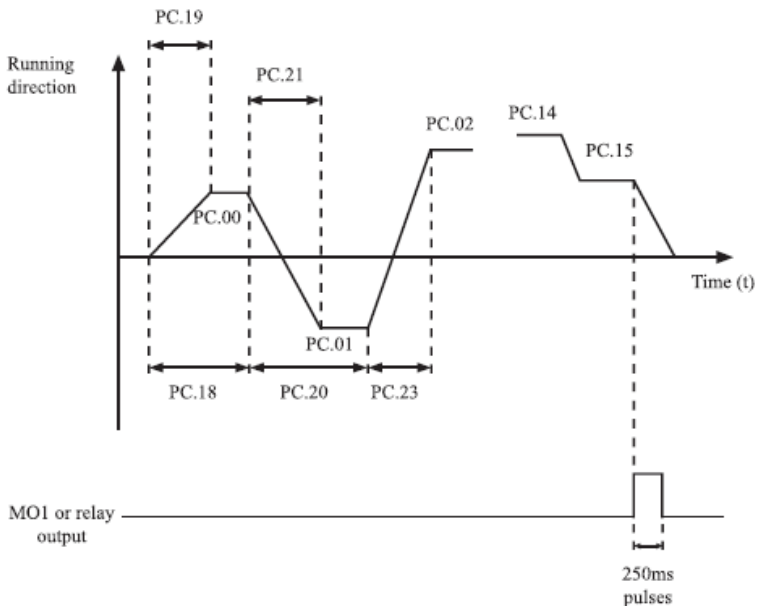


Figure 4-28 Simple PLC when used as a frequency source

When a simple PLC is used as the frequency source, the values of PC.00 to PC.15 are positive or negative and determine the direction of operation. If the parameter values are negative, it means the engine runs in the opposite direction.

As a source of frequency, the PLC has three modes of operation but as a separate V/F source, it does not have three modes, that is:

0: Stop after performing of one cycle of the inverter

The inverter stops after one cycle and does not start until another command is received.

1: Keeps the last values after the inverter performs one cycle

The inverter keeps the final running frequency and direction after one cycle.

2: Repeat after performing of one cycle of the inverter

After one cycle the inverter will automatically start another cycle and continue until the stop command is received.

Setting the memory for selecting a simple PLC		Default	00
PC.17	Setting range	Units	Storage after power failure
		0	No
		1	Yes
PC.17	Setting range	Tens	Storage after the STOP command
		0	No
		1	Yes

Setting the memory to select a simple PLC in the event of a power outage means that the inverter remembers the actual PLC status and the frequency before the power failure and will continue to run according to memorized data. If the unit number is 0, the inverter starts the PLC process after it is switched on again.

Setting the PLC to memorize the status after stop means that the inverter records the running parameters and the running frequency at the stopping moment and will continue to run from the recorded moment after its restart. If the decimal number is set to 0, the inverter will start the PLC process after the reboot.

PC.18	Duration of run mode the single PLC command 0	Default	0.0 s (hours)
	Setting range	0.0 s (hours) – 6553.5 s (hours)	
PC.19	The acceleration / deceleration time of the simple PLC command 0	Default	0
	Setting range	0 - 3	
PC.20	Duration of run mode the single PLC command 1	Default	0.0 s (hours)
	Setting range	0.0 s (hours) – 6553.5 s (hours)	
PC.21	The acceleration / deceleration time of the simple PLC command 1	Default	0
	Setting range	0 - 3	
PC.22	Duration of run mode the single PLC command 2	Default	0.0 s (hours)
	Setting range	-0.0 s (hours) – 6553.5 s (hours)	
PC.23	The acceleration / deceleration time of the simple PLC command 2	Default	0
	Setting range	0 - 3	
PC.24	Duration of run mode the single PLC command 3	Default	0.0 s (hours)
	Setting range	0.0 s (hours) – 6553.5 s (hours)	
PC.25	The acceleration / deceleration time of the simple PLC command 3	Default	0
	Setting range	0 - 3	
PC.26	Duration of run mode the single PLC command 4	Default	0.0 s (hours)
	Setting range	0.0 s (hours) – 6553.5 s (hours)	
PC.27	The acceleration / deceleration time of the simple PLC command 4	Default	0
	Setting range	0 - 3	
PC.28	Duration of run mode the single PLC command 5	Default	0.0 s (hours)
	Setting range	-0.0 s (hours) – 6553.5 s (hours)	
PC.29	The acceleration / deceleration time of the simple PLC command 5	Default	0
	Setting range	0 - 3	

PC.30	Duration of run mode the single PLC command 6	Default	0.0 s (hours)
	Setting range	0.0 s (hours) – 6553.5 s (hours)	
PC.31	The acceleration / deceleration time of the simple PLC command 6	Default	0
	Setting range	0 - 3	
PC.32	Duration of run mode the single PLC command 7	Default	0.0 s (hours)
	Setting range	0.0 s (hours) – 6553.5 s (hours)	
PC.33	The acceleration / deceleration time of the simple PLC command 7	Default	0
	Setting range	0 - 3	
PC.34	Duration of run mode the single PLC command 8	Default	0.0 s (hours)
	Setting range	-0.0 s (hours) – 6553.5 s (hours)	
PC.35	The acceleration / deceleration time of the simple PLC command 8	Default	0
	Setting range	0 - 3	
PC.36	Duration of run mode the single PLC command 9	Default	0.0 s (hours)
	Setting range	0.0 s (hours) – 6553.5 s (hours)	
PC.37	The acceleration / deceleration time of the simple PLC command 9	Default	0
	Setting range	0 - 3	
PC.38	Duration of run mode the single PLC command 10	Default	0.0 s (hours)
	Setting range	0.0 s (hours) – 6553.5 s (hours)	
PC.39	The acceleration / deceleration time of the simple PLC command 10	Default	0
	Setting range	0 - 3	
PC.40	Duration of run mode the single PLC command 11	Default	0.0 s (hours)
	Setting range	-0.0 s (hours) – 6553.5 s (hours)	
PC.41	The acceleration / deceleration time of the simple PLC command 11	Default	0
	Setting range	0 - 3	

PC.42	Duration of run mode the single PLC command 12		Default	0.0 s (hours)
	Setting range	0.0 s (hours) – 6553.5 s (hours)		
PC.43	The acceleration / deceleration time of the simple PLC command 12		Default	0
	Setting range	0 - 3		
PC.44	Duration of run mode the single PLC command 13		Default	0.0 s (hours)
	Setting range	0.0 s (hours) – 6553.5 s (hours)		
PC.45	The acceleration / deceleration time of the simple PLC command 13		Default	0
	Setting range	0 - 3		
PC.46	Duration of run mode the single PLC command 14		Default	0.0 s (hours)
	Setting range	-0.0 s (hours) – 6553.5 s (hours)		
PC.47	The acceleration / deceleration time of the simple PLC command 14		Default	0
	Setting range	0 - 3		
PC.48	Duration of run mode the single PLC command 15		Default	0.0 s (hours)
	Setting range	-0.0 s (hours) – 6553.5 s (hours)		
PC.49	The acceleration / deceleration time of the simple PLC command 15		Default	0
	Setting range	0 - 3		
PC.50	Time unit of a simple PLC		Default	0
	Setting range	0	S (seconds)	
		1	H (hours)	
PC.51	Source 0		Default	0
	Setting range	0	Set from PC.00	
		1	FIV	
		2	FIC	
		3	Reserved	
		4	IMPULSE setting	
		5	PID	
		6	Set according to the preset frequency (P0.10), modified by UP / DOWN keys	

Specifies setting parameters of the channel 0. You can make convenient switching between setting channels. When multiple-command or simple PLCs are used as the source of frequency, switching between two frequency sources can be easily implemented.

Group PD: Communication parameters

See the special appendix "Communication protocol V 800 and directories"

Group PP: Restoring the factory setting and blocking the change of parameters

PP.00	User Password	Default	0
	Setting range	0 - 65535	

If the parameter is set to any nonzero number, password protection is enabled. After setting up and executing a password, enter the correct password to enter the menu. If the entered password is incorrect, you cannot view or modify the parameters. If PP.00 is set to 00000, the previously set user password is cleared and password protection is off.

PP.01	Restore factory settings		Default	0
	Setting range	00	No activity	
		01	Restore factory setting except motor parameters	
		02	Delete records	
		11	High frequency controll	

1: Restore factory setting except motor parameters

If PP-01 is set to 1, most of the function codes are reset to the default setting, except for motor parameters, (P0.22) frequency range setting, fault logs, total running time (P7.09), total switch-on time (P7.13) and total energy consumption (P7.14).

2: Delete records

If PP.01 is set to 2, fault records, total run time (P7.09), total switch-on time (P7.13), and total power consumption (P7.14) are deleted.

11: High frequency control activated If you want to manage e.g. high frequency spindle (generally above 100 Hz) activate this parameter

PP.04	Blocking of parameter changes	Default	0
	Setting range	0: Parameter change allowed 1: Parameter change is blocked	

Group C0: Torque control and parameter limitation

C0.00	Selection of control the speed / torque		Default	0
	Setting range	0	Speed control	
		1	Torque control	

It is used to select the inverter control mode: speed control or torque control.

V 800 provides S-terminals with two torque-related functions, "Torque control is disabled" (function 29) and switching between "Speed control / torque control" (function 46). Both S-terminals must be used together with C0.00 to perform the speed / torque control switching. If function 46 (switching speed control / torque control) is assigned to the S-terminal, it is OFF, the control mode is determined by C0.00. If the S terminal allocated with function 46 is ON, the control mode is to reverse the value of C0-00.

However, if the torque control function is disabled, the inverter is fixed for operation in the speed control mode.

C0.01	Torque control source settings		Default	0
	Setting range	0	Digital setting (C0.03)	
		1	FIV	
		2	FIC	
		3	Reserved	
		4	IMPULSE setting, option	
		5	Communication setting	
		6	MIN (FIV, FIC)	
		7	MAX (FIV, FIC)	
C0.03	Digital setting of torque control		Default	150 %
	Setting range	-200% - +200%		

Parameter C0.01 is used for "Torque Control Source Settings". There are a total of 8 Torque Controllers. The torque setting is the relative value, the value of 100.0% corresponds to the nominal torque. The adjustment range is from -200.0% to 200.0%, which means that the maximum torque of the inverter is twice the nominal torque of the motor.

The torque setting uses 1-7, i.e.. communication interface, analog input and pulse input. The data format is -100.00% to 100.00%. 100% corresponds to C0.03.

C0.05	Maximum frequency forward at torque control	Default	50.00 Hz
	Setting range	0.0 Hz – maximum frequency	
C0.06	Maximum frequency backward at torque control	Default	50.00 Hz
	Setting range	0.0 Hz – maximum frequency	

These two parameters are used to set the maximum frequency for forward or reverse rotation in torque control mode.

For torque control, if the load torque is less than the output torque of the motor, the motor speed will increase steadily. To prevent failure of the mechanical system, the maximum motor speed must be limited in torque regulation. You can perform a smooth change of the maximum frequency in the torque control dynamics by controlling the upper frequency limit.

C0.07	The acceleration time for torque control	Default	0.00 s
	Setting range	0.00 s – 650.0 s	
C0.08	The deceleration time for torque control	Default	0.00 s
	Setting range	0.00 s – 650.0 s	

In torque control, the difference between the motor output torque and the load torque determines the rate of change of the motor speed and the load. The speed of rotation of the motor can change rapidly, causing noise or excessive mechanical stress. Setting the acceleration / deceleration time in the torque control smoothly changes the engine speed. In applications that require fast torque response, set the acceleration/deceleration time in torque control to 0.00s. For example, two inverters are connected to drive the same load. To balance the load distribution, set one inverter as master in speed control and the other as slave in torque control.

The slave inverter receives the output torque from the master inverter as a torque command and must respond quickly. In this case, the acceleration / deceleration time of the slave converter in the torque controller is set to 0.0s.

Group C5: Parameters of optimization the control

C5.00	Upper limit of PWM frequency switching	Default	12.00 Hz
	Setting range	0.0 Hz – 15 Hz	

This parameter is only used for V/F control.

Used to determine Wave Modulation Mode when controlling a V/F asynchronous motor. If the frequency is lower than the value of this parameter, the waveform is a 7-segment continuous modulation. If the frequency is higher than the value of this parameter, the waveform is a 5-segment intermittent modulation.

7-segment continuous modulation causes more loss but less current ripple. 5-segment intermittent modulation causes less loss but greater current ripple. This can lead to instability of the motor at high frequency. Do not change this parameter normally.

For instability of the V/F control, see parameter P4.11. When temperature increases, see parameter P0.17.

C5.01	PWM modulation mode		Default	0
	Setting range	0	0: Asynchronous modulation	
		1	1: Synchronous modulation	

V/F control is effective when asynchronous modulation is used and the output frequency is high (over 100HZ), resulting in output voltage quality.

C5.02	Compensation method		Default	1
	Setting range	0	No compensation	
		1	Compensation mode 1	
		2	Compensation mode 2	

In general, there is no need to modify it.

C5.03	Random dimension of PWM		Default	0
	Setting range	0	Disabled	
		1 - 10	Random dimension of carrier frequency PWM	

This parameter reduces motor noise, reduces electromagnetic interference.

C5.04	Open limitation of current		Default	10
	Setting range	0	Disabled	
		1	Enabled	

The parameter can limit the occurrence of a fault due to overcurrent, ensuring the normal operation of the inverter. Opening a current limit for a long time may cause overheating of the inverter, CBC failure is reported.

C5.05	Detection of current compensation		Default	5
	Setting range	0 - 100		

Used to set the current detection compensation, we do not recommend to change.

C5.06	Setting the under voltage	Default	100 %
	Setting range	60 % - 140 %	

It is used to set the LU voltage error for the low voltage of the inverter. The value of 100% of the different voltage levels of the inverter corresponds to different voltages, single-phase 220V or three-phase 220V: three-phase 380V: 350; three-phase 690V: 650V.

C5.07	Selection SFVC optimization mode		Default	1
	Setting range	0	No optimization	
		1	Optimization mode 1	
		2	Optimization mode 2	

1: Optimization mode 1

It is used when there is a high demand for linear torque regulation.

2: Optimization mode 2

Used in case requirement for speed stability.

Group C6: FI curve setting (FI is FIV or FIC)

C6.00	The minimum of FI curve 4		Default	0.0 V
	Setting range	-10.0 V – C6.02		
C6.01	Corresponding FI 4 curve setting, minimum		Default	0 %
	Setting range	-100 % - +100 %		
C6.02	FI curve 4 inflexion 1		Default	3.00 V
	Setting range	C6.00 – C6.04		
C6.03	Corresponding curve setting FI 4 inflexion 1		Default	30.0 %
	Setting range	-100 % - +100 %		
C6.04	FI curve 4 inflexion 2		Default	6.0 V
	Setting range	C6.02 – C6.06		
C6.05	Corresponding curve setting FI 4 inflexion 2		Default	60 %
	Setting range	-100 % - +100 %		
C6.06	FI curve 4 maximum		Default	10.00 V
	Setting range	C6.06 – 10.00 V		

C6.07	Corresponding FI 4 curve setting, maximum		Default	100 %
	Setting range	-100 % - +100 %		
C6.08	FI curve 5 minimum		Default	0.0 V
	Setting range	-10.0 V – C6.10		
C6.09	Corresponding FI 5 curve setting, minimum		Default	0 %
	Setting range	-100 % - +100 %		
C6.10	FI curve 5 inflexion 1		Default	3.00 V
	Setting range	C6.08 – C6.12		
C6.11	Corresponding curve setting FI 5 inflexion 1		Default	30.0 %
	Setting range	-100 % - +100 %		
C6.12	FI curve 5 inflexion 2		Default	6.0 V
	Setting range	C6.10 – C6104		
C6.13	Corresponding curve setting FI 5 inflexion 2		Default	60 %
	Setting range	-100 % - +100 %		
C6.14	FI curve 5 maximum		Default	10.00 V
	Setting range	C6.14 – 10.00 V		
C6.15	Corresponding FI 5 curve setting, maximum		Default	100 %
	Setting range	-100 % - +100 %		

The function of curves 4 and 5 is similar to curves 1 and 3, but curves 1 and 3 are continuous lines, and curves 4 and 5 are 4-point curves, resulting in a more flexible relationship. Curves 4 and 5 are illustrated in the following figure.

When setting the curves 4 and 5, note that the minimum input voltage, inflexion 1, inflexion 2, voltage 2, and maximum curve voltage must continue to increase in this order. P5.33 (FI curve selection) is used to determine how to select a curve for FIV to FIC from five curves.

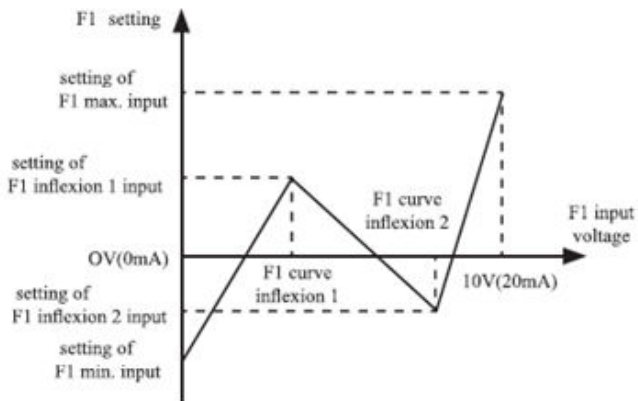


Figure 4-29 Diagram of curves 4 and 5

C6.16	Corresponding setting of jump point of the FIV input		Default	0.0 %
	Setting range	-100 % - +100 %		
C6.17	Corresponding setting of jump amplitude of the FIV input		Default	0.5 %
	Setting range	0 % - +100 %		
C6.18	Corresponding setting of jump point of the FIC input		Default	0.0 %
	Setting range	-100 % - +100 %		
C6.19	Corresponding setting of jump amplitude of the FIC input		Default	0.5 %
	Setting range	0 % - +100 %		

The analog input terminals (FIV to FIC) of the V 800 inverter support the appropriate jump setting function that fixes the corresponding analog input setting at the jump point when the associated analog input setting is within the jump range.

For example, the FIV input voltage jumps around 5.00 V and the jump range is 4.90-5.10V. The minimum FIV 0.00 V input corresponds to 0.0% and the maximum input 10.00 V corresponds to 100.0%. The detected corresponding FIV input setting is between 49.0% and 51.0%.

If you set the values of C6.16 to 50.0% and C6.17 to 1.0%, then after the jump function, the fixed input FIV is set to 50.0%, which eliminate the fluctuation effect.

Group C9: Special PID functions

C9.00	PID sleep frequency	0 - P0.12	0.00 Hz	0.00 Hz
C9.01	PID sleep time	0 - 5000.0 s	10.0 s	0.0 s
C9.02	PID wake-up value	0 - 100 %	60.0 %	0.0 %

Group CC: Correction of FI / FO values

CC.00	Measured voltage FIV 1		Default	Production correction
	Setting range	0.500V - 4.000V		
CC.01	Displayed voltage FIV 1		Default	Production correction
	Setting range	0.500V - 4.000V		
CC.02	Measured voltage FIV 2		Default	Production correction
	Setting range	6.000V – 9.999V		

CC.03	Displayed voltage FIV 2	Default	Production correction
	Setting range	6.000V – 9.999V	
CC.04	Measured voltage FIC 1	Default	Production correction
	Setting range	0.500V - 4.000V	
CC.05	Displayed voltage FIC 1	Default	Production correction
	Setting range	0.500V - 4.000V	
CC.06	Measured voltage FIC 2	Default	Production correction
	Setting range	6.000V – 9.999V	
CC.07	Displayed voltage FIC 2	Default	Production correction
	Setting range	-9.999V – 10.000V	

These parameters are used for FI correction to eliminate shift of zero.

The correction was made before delivery. Once the factory values are restored, these parameters are restored to factory settings. Generally, you do not need to correct these parameters.

The measured voltage indicates the actual output voltage measured by instruments such as the multimeter. The displayed voltage corresponds to the value that the inverter samples. For details, see D0.21, D0.22. For the correction, enter two voltage values for each FI terminal and store the measured and displayed values in the function codes CC.00 to CC.07. Then, the inverter will automatically perform a zero shift.

CC.12	Measured voltage FOV 1	Default	Production correction
	Setting range	0.500V - 4.000V	
CC.13	Displayed voltage FOV 1	Default	Production correction
	Setting range	0.500V - 4.000V	
CC.14	Measured voltage FOV 2	Default	Production correction
	Setting range	6.000V – 9.999V	
CC.15	Displayed voltage FOV 2	Default	Production correction
	Setting range	6.000V – 9.999V	
CC.16	Reserved		
CC.17	Reserved		
CC.18	Reserved		
CC.19	Reserved		

These parameters are used to correction of FOV.

The correction was made before delivery. Once the factory values are restored, these parameters are restored to factory settings. Generally, you do not need to correct these parameters.

The set voltage indicates the theoretical output voltage of the inverter. The measured voltage indicates the actual output voltage measured by the instruments, such as the multimeter.

Group D0: Monitoring parameters

The group of D0 parameters is used to monitor the condition of the inverter while it is running. You can view the parameter values using a control panel that is suitable for putting into operation or from a host computer via the communication interface.

Parameters D0.00 to D0.31 are monitoring parameters during run and stop defined by parameters P7.03 and P7.04.

See the table for more details.

Function code	Parameter Name	Unit
D0.00	Run Frequency (Hz)	0.01Hz
D0.01	Set frequency (Hz)	0.01Hz
D0.02	Bus voltage (V)	0.1V
D0.03	Output Voltage (V)	1V
D0.04	Output current (A)	0.01A
D0.05	Output power (kW)	0.1 kW
D0.06	Output torque (%)	0.1%
D0.07	Input state of S	1
D0.08	Output state of M01	1
D0.09	Reserved	
D0. 10	FIC voltage (V)	0.01 V
D0. 11	Reserved	
D0. 12	Counter value	1
D0. 13	Length value	1
D0.14	Load Speed	1
D0. 15	PID setting	1
D0. 16	PID Feedback	1
D0. 17	PLC status	1
D0. 18	Input pulse frequency	0.01 kHz
D0. 19	Speed of the electric motor	rpm
D0.20	The remaining running time	0.1 min
D0.21	FIV voltage before correction	0.001V
D0.22	FIC voltage before correction	0.001V
D0.23	Reserved	
D0.24	Linear speed	1 m/min

D0.25	Total time under voltage	1 min
D0.26	Total running time	0.1 min
D0.27	Input frequency of pulse	1 Hz
D0.28	Setting of communications	0.01 %
D0.29	Reserved	
D0.30	Main frequency X	0.01 Hz
D0.31	Auxiliary frequency Y	0.01 Hz
D0.32	Displaying any memory address value	
D0.33	Reserved	
D0.34	Reserved	
D0.35	Required torque	0.1 %
D0.36	Reserved	
D0.37	Angle of the effective	0.1
D0.38	Reserved	
D0.39	Target voltage for V/F separation	1 V
D0.40	Output voltage for V/F separation	1 V
D0.41	Reserved	
D0.42	Reserved	
D0.43	Reserved	
D0.44	Reserved	
D0.45	Fault information	0

Chapter 6: Fault checking and elimination

6.1 Displaying and removing fault

The V800 has a total of 28 warning and protective functions. Once a fault occurs, the protection function, the stop of the inverter output, the fault code of the inverter is displayed on the panel display. The user can analyze the cause of the problem himself, find a solution. If the failure is marked with a dotted frame, find a service or your supplier or contact our company directly.

In most cases, an OUOC alarm is caused by a hardware overvoltage.

Fault name	Display on panels	Possible causes	Solutions
Inverter unit protection	OC	1: The output circuit is grounded or short circuited. 2: The connecting cable of the motor is too long. 3: The module overheats. 4: The internal connections become loose. 5: The main control board is faulty. 6: The drive board is faulty. 7: The inverter module is faulty	1: Eliminate external faults. 2: Install an output filter. 3: Check the air filter and the cooling fan. 4: Connect all cables properly. 5,6,7: Find technical support
Overcurrent during acceleration	OC1	1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not Performed. 3: The acceleration time is too Short. 4: Manual torque boost or V/F curve is not appropriate. 5: The voltage is too low. 6: The startup operation is performed on the rotating motor. 7: A sudden load is added during acceleration. 8: The inverter model has a too low power class.	1: Eliminate external faults. 2: Perform the motor auto-tuning. 3: Increase the acceleration time. 4: Adjust the manual torque boost or V/F curve. 5: Adjust the voltage to normal range. 6: Select rotational speed tracking restart or start the motor after it stops. 7: Remove the added load. 8: Select an inverter of higher power class.

Overcurrent at constant speed	OC2	<ol style="list-style-type: none"> 1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The deceleration time is too short. 4: The voltage is too low. 5: A sudden load is added during deceleration. 6: The braking unit and braking resistor are not installed. 	<ol style="list-style-type: none"> 1: Eliminate external faults. 2: Perform the motor auto-tuning. 3: Increase the deceleration time. 4: Adjust the voltage to normal range. 5: Remove the added load. 6: Install the braking unit and braking resistor.
Overcurrent at constant speed	OC3	<ol style="list-style-type: none"> 1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The voltage is too low. 4: A sudden load is added during operation. 5: The inverter model has a too low power class. 	<ol style="list-style-type: none"> 1: Eliminate external faults. 2: Perform the motor auto-tuning. 3: Adjust the voltage to normal range. 4: Remove the added load. 5: Select an inverter of higher power class.
Overvoltage during acceleration	OU1	<ol style="list-style-type: none"> 1: The input voltage is too high. 2: An external force drives the motor during acceleration. 3: The acceleration time is too short. 4: The braking unit and braking resistor are not installed. 	<ol style="list-style-type: none"> 1: Adjust the voltage to normal range. 2: Cancel the external force or install a braking resistor. 3: Increase the acceleration time. 4: Install the braking unit and braking resistor.
Overvoltage during deceleration	OU2	<ol style="list-style-type: none"> 1: The input voltage is too high. 2: An external force drives the motor during deceleration. 3: The deceleration time is too short. 4: The braking unit and braking resistor are not 	<ol style="list-style-type: none"> 1: Adjust the voltage to normal range. 2: Cancel the external force or install the braking resistor. 4: Install the braking unit and braking resistor.

Overvoltage at constant speed	OU3	<ol style="list-style-type: none"> 1: The input voltage is too high. 2: An external force drives the motor during deceleration. 	<ol style="list-style-type: none"> 1: Adjust the voltage to normal range. 2: Cancel the external force or install the braking resistor.
Power supply fault	POFF	The input voltage is not within the allowable range.	Adjust the input voltage to the allowable range.
Lack of voltage	LU	<ol style="list-style-type: none"> 1: Instantaneous power failure occurs on the input power supply. 2: The inverter's input voltage is not within the allowable range. 3: The bus voltage is abnormal. 4: The rectifier bridge and buffer resistor are defective. 5: The drive board is defective 6: The main control board is 	<ol style="list-style-type: none"> 1: Reset the fault. 2: Adjust the voltage to normal range. 3, 4, 5, 6: Find technical support.
Inverter overload	OL2	<ol style="list-style-type: none"> 1: The load is too high or another motor is connected to the motor. 2: The inverter model has a too low power class. 	<ol style="list-style-type: none"> 1: Reduce the load and check the motor and mechanical condition. 2: Select an inverter of higher power class
Motor overload	OL1	<ol style="list-style-type: none"> 1: P9.01 is set improperly. 2: The load is too high or another motor is connected to the motor. 3: The AC drive model is of too small power class. 	<ol style="list-style-type: none"> 1: Set P9.01 correctly. 2: Reduce the load and check the motor and the mechanical condition. 3: Select an inverter of higher power class.
Power output phase loss (reserved)	Lo	<ol style="list-style-type: none"> 1: The cable connecting the AC drive and the motor is faulty. 2: The AC drive's three-phase output is unbalanced when the motor is running. 3: The drive board is faulty. 4: The module is faulty. 	<ol style="list-style-type: none"> 1: Eliminate external faults. 2: Check whether the motor three-phase winding is normal. 3, 4: Find technical support

Inverter overheated	OH	<ol style="list-style-type: none"> 1: The ambient temperature is too temperature. 2: The air filter is blocked. 3: The fan is damaged. 4: The thermally sensitive resistor of the module is defective. 5: The inverter module is defective. 	<ol style="list-style-type: none"> 1: Lower the ambient High. 2: Clean the air filter. 3: Replace the defective fen 4: Replace the defective thermally sensitive resistor. 5: Replace the inverter module.
External equipment fault	EF	<ol style="list-style-type: none"> 1: External fault signal is input via X. 2: External fault signal is input via virtual I/O. 	Reset the operation.
Communication fault	CE	<ol style="list-style-type: none"> 1: The host computer is in abnormal state. 2: The communication cable is faulty. 3: P028 is set improperly. 4: The communication parameters in group PD are set improperly. 	<ol style="list-style-type: none"> 1: Check the cabling of host computer. 2: Check the communication cabling. 3: Set P028 correctly. 4: Set the communication parameters properly.
Contactor fault	rAy	<ol style="list-style-type: none"> 1: The drive board and power supply are defective. 2: The contactor is defective. 	<ol style="list-style-type: none"> 1: Replace the defective drive board or power supply board. 2: Replace the defective contactor.
Current detection fault	IE	<ol style="list-style-type: none"> 1: The HALL device is defective. 2: The drive board is defective. 	<ol style="list-style-type: none"> 1: Replace the defective HALL device. 2: Replace the defective drive board.
Motor auto-tuning fault	TE	<ol style="list-style-type: none"> 1: The motor parameters are not set according to the nameplate. 2: The motor auto-tuning times out. 	<ol style="list-style-type: none"> 1: Set the motor parameters according to the nameplate properly. 2: Check the cable connecting the inverter and the motor.
EEPROM read / write fault	EEP	The EEPROM chip is defective.	Replace the main control board.
Inverter hardware fault	OUOC	<ol style="list-style-type: none"> 1: Overvoltage exists. 2: Overcurrent exists. 	<ol style="list-style-type: none"> 1: Remove the overvoltage. 2: Remove the overcurrent.

Short circuit to ground fault	GND	The motor is short circuited to the ground.	Replace the cable or motor.
Accumulative running time reached	END1	The accumulative running time reaches the setting value.	Clear the record through the parameter initialization function.
Accumulative power-on time reached	END2	The accumulative power-on time reaches the setting value.	Clear the record through the parameter initialization function.
Zero load	LOAD	The inverter operation current is lower than P9.64.	Check that the load is disconnected or the setting of P9.64 and P9.65 is correct.
PID feedback lost during running	PIDE	The PID feedback is lower than the setting of PA.26.	Check the PID feedback signal or set PA.26 to a proper value.
Impulse current limit fault	CBC	1: The load is too high or the rotor is blocked on the motor. 2: The inverter model has a too low power class.	1: Reduce the load and check the motor and mechanical condition. 2: Select an inverter of higher power class
Too large speed deviation fault	ESP	1: The encoder parameters are set incorrectly. 2: The motor auto-tuning is not performed. 3: Parameters of too large speed deviation P9.69 and P9.70 are set incorrectly.	1: Set the encoder parameters properly. 2: Perform the motor auto-tuning. 3: Set P9.69 and P9.70 correctly based on the actual situation.
Motor speed too high	OSP	1: The encoder parameters are set incorrectly. 2: The motor auto-tuning is not performed. 3: The P9.69 and P9.70 motor speed overrun detection parameters are incorrectly set.	1: Set the encoder parameters properly. 2: Perform the motor auto-tuning. 3: Set correctly the P9.69 and P9.70 motor speed overrun detection parameters according to actual situation

6.2 Common errors and their solutions

You may encounter the following errors while using the inverter. For a simple fault analysis, see the following table.

Table 5-1 Troubleshooting common inverter faults

SN	Fault	Possible cause	Solution
1	When the power is turned on, the display does not show any data.	1: There is no power supply to the inverter or the power input to the inverter is too low. 2: The power supply of the switch on the drive board of the inverter is faulty. 3: The rectifier bridge is damaged. 4: The control board or the operation panel is faulty. 5: The cable connecting the control board and the drive board and the	1: Check the power supply. 2: Check the bus voltage. 3, 4, 5: Find technical support
2	"2000" is displayed when the power is on.	1: The cable between the drive board and the control board is in poor contact. 2: Related components on the control board are damaged. 3: The motor or the motor cable is short circuited to the ground. 4: The HALL device is faulty. 5: The power input to the inverter is too low.	Find technical support
3	"GND" is displayed when the power is on	1: The motor or the motor output cable is short-circuited to the ground. 2: The AC drive is damaged.	1: Measure the insulation of the motor and the output cable. 2: Find technical support
4	The inverter's display is normal when the power is on. But "2000" is displayed after running and stops immediately.	1 The cooling fan is damaged or rotor is blocked. 2: The external control terminal cable is short circuited.	1: Replace the defective fan. 2: Eliminate external faults.

SN	Fault	Possible cause	Solution
5	OH (module overheat) fault is reported frequently.	1: The setting of carrier frequency is too high. 2: The cooling fan is damaged, or the air filter is blocked. 3: Components inside the inverter are damaged (thermal coupler or others).	1: Reduce the carrier frequency (P017). 2: Replace the fan and clean the air filter. 3: Find technical support
6	The motor does not rotate after the inverter runs.	1: Check the motor and the motor cables. 2: The inverter parameters are set improperly (motor parameters). 3: The cable between the drive board and the control board is in poor contact. 4: The drive board is faulty.	1: Ensure the cable between the inverter and the motor is normal. 2: Replace the motor or clear mechanical faults. 3: Check and re-set motor parameters. 4: Find technical support
7	The S-terminals are disabled.	1: The parameters are set incorrectly. 2: The external signal is incorrect 3: The jumper bar between OP and +24 V becomes loose. 4: The control board is faulty.	1: Check and reset the parameters in group P5. 2: Re-connect the external signal cables. 3: Check the jumper bar between OP and +24 V. 4: Find technical support
8	Reserved		
9	The inverter reports overcurrent and overvoltage frequently.	1: The motor parameters are set improperly. 2: The acceleration/deceleration time is improper. 3: The load fluctuates.	1: Again set the motor or auto-tuning parameters. 2: Set proper acceleration/deceleration time. 3: Find technical support
10	RAY is reported when the power is or the AC drive is running.	The contactor of soft starter is not excited.	1: Check whether the contactor cable is loose. 2: Check whether the contactor is faulty. 3: Check whether 24 V power supply of the contactor is faulty.

Chapter 7 Maintenance



- Maintenance must be performed according to specified maintenance methods.
- The maintenance, inspection and replacement of parts must only be carried out by a certified person.
- Wait 10 minutes before further maintenance or inspection after the main power circuit has been switched off.
- Do not touch the components or circuit boards directly. Otherwise, the drive may be damaged by electrostatic charge.
- After maintenance, all screws must be tightened.

7.1 Inspection

To avoid failure of the frequency inverter and to operate reliably with high power for a long period of time, the user must periodically check the inverter (at least once every five years). The following table lists the subject of the check.

Inspected parts	Scope of inspection
Temperature / humidity	Ambient temperature shall be lower than 40°C. Humidity shall meet the requirement of 20~90%.
Smoke and dust	No dust accumulation, no traces of water leakage and no condensate.
Inverter	Check the inverter to ensure it has no abnormal heat, abnormal vibration
Fan	Ensure the fan operation is normal, no debris stuck, etc.
Power	The supply voltage and frequency must be within the permissible range.
Motor	Inspect the engine for unusual vibrations, heat, noise or phase failure, etc.

7.2 Periodic maintenance

Users should check the drive at regular intervals. The subject of the inspection is as follows:

Inspected parts	Scope of inspection	Solution
The screws of terminals	Whether the screws of control terminals are loose	Tighten screws
Printed circuit boards	Dust and dirt	Clean the dust on PCBs and air ducts with a vacuum cleaner
Fan	Abnormal noise, abnormal vibration, whether it has used up 20,000 hours	Clear dirt and replace the fan
Electrolytic capacitor	Whether the colour is changed and the smell is abnormal	Change the electrolytic capacitor
Heatsink	Dust and dirt	Clean the dust with a vacuum cleaner.
Power components	Dust and dirt	Clean the dust with a vacuum cleaner..

7.3 Replacement of wearing parts

Fans and electrolytic capacitors are included, replace them regularly to ensure long-term, safe and trouble-free operation. The exchange periods are as follows:

- Fan: must be replaced every 20 000 hours;
- Electrolytic capacitor: replace it if it is running from 30000 to 40000 hours.

7.4 Warranty for the V 800 frequency inverter

7.4.1 Inverter tests

The manufacturer has thoroughly checked and pre-programmed the frequency converter before shipping. The product features of the V800 correspond to the technical documentation provided that it is installed and used in accordance with the instructions and recommendations given in the technical documentation and in the operating instructions.

Tested circuit		Test result	The relevant standard
Insulation resistance		>1M Ω	GB12668
Insulation strength		2-5kV AC; 60s leakage current <1mA	GB12668
ESD	Contact discharge	+/- 4kV	EN61000-4-2
	Air discharge	+/- 8kV	
	Discharge on connections	+/- 4kV	
EFT	RST	+/- 4kV	EN61000-4-4
	UVW	+/- 2kV	
	Signal pathways	+/- 2.5kV	
Overvoltage in wiring	Interphase	+/- 2kV	EN61000-4-5
	Opposite direction	+/- 4kV	
CS test (frequency range 150 kHz – 80 MHz)		10 V (e.m.f.)	EN61000-4-6

7.4.2 Warranty period

The warranty period is 24 months from the date of sale of the product.

7.4.3 Warranty terms

The warranty covers only defects and faults that have arisen from the manufacturing error or the materials used. The warranty is prolonged by the time the frequency inverter has been repaired.

The buyer applies warranty repairing at the manufacturer. The buyer will ship the inverter for repair to the seller at his own expense.

7.4.4 The warranty does not apply to defects caused

a./ Buyer-user's fault in the case of mechanical damage (for example, when transporting or falling) or when used in contravention of technical documentation, faulty connection or using incorrect breaker, if the fault has been caused by undue interference with the product.

b./ Damage to the device through external influences (dusting of internal parts of the inverter, humidification of internal circuits) and natural disasters (effects of high overvoltages e.g. due to lightning, fire, water flooding, etc.)

c/. Incorrect storage, improper connection, damage by external influences, especially the effects of electrical quantities of inadmissible size.



DECLARATION OF CONFORMITY

We: **VYBO Electric a.s.**

Radlinského 18
05201 Spišská Nová Ves
Slovak republic

IČO: 45537143

Hereby declare under our sole responsibility, that the products:

**Frequency inverters V800-2S....; V800-4T; V810-2S....; V810-4T....;
V900-2S....; V900-4T;**

Are in conformity with the requirements of the following directives and conformity was checked in accordance with the following standards.

Directives:

LV Directive 2014/35EU
EMC Directive 2014/30/EU
Eco design Directive 2006/42/EC
Machine Directive 2006/42/EC

Harmonized standards:

EN 61800-5-1:2007+A1:2017
EN 61800-5-1:2007+A11:2021
EN 61800-3:2004+A1:2012

Spišská Nová Ves, 04.11.2022

.....
Ing. Babeta Výbošťoková
Vice Chairman

Annex A

Communication protocol V 800

The V 800 series provides the RS232 / RS485 communication interface and supports the MODBUS communication protocol. The user can connect with a computer or centrally controlled PLC. Through the communication protocol, it can set the inverter, send commands, modify or read function parameters, read the status of the inverter, fault information, etc.

1. Content of the protocol

The serial communication protocol defines the serial communication transmission of information content and format. If an error occurred while receiving the information from device or don't meet the host's requirements, feedback will be sent to the user.

2. Application methods

Application mode with RS232 / RS485 with bus accessible from the main control network via PC / PLC.

3. Bus structure

- (1) Hardware interface RS232 / RS485
- (2) Asynchronous serial transmission mode, half-duplex transmission mode. At the same time, only the host can send data and the other party can only receive the data. Data in the serial asynchronous communication process, form of message, frame for sending.
- (3) The topological structure is based on one host system. Transmitter addresses are set to 1 - 247. The transmitter has address 0.
- (4) Each device address must be unique in the network.

4. Protocol description

The V 800 series has an asynchronous serial port for the MODBUS communication protocol on the master-slave principle. The network has only one device (host) that can send a "query / command". Another device can only provide answers to the question of the master device and perform the appropriate action. The host is in this case personal computer (PC), industrial control device or programmable logic controller (PLC), etc. The host can communicate with the device separately from the computer.

5. Communications data structure

The structure of the V 800 series communication data structure in the MODBUS communication format is as follows: In RTU mode, messages are sent in frames that begin and end with a 3.5 character spacing. The transmitting device is the first domain address.

The transmitted characters are in the hexadecimal system and use numbers 0-9 and letters A to F. Once the message is received, each device detects an address and checks if the message belongs to it. The last character is followed by a space of 3.5 characters. The new message starts after this pause.

The entire message framework must be a continuous flow of transmission. If the time frame to complete the transfer is more than 1.5 characters before of the space, the receiving device resumes an incomplete message and assumes that the next byte is a new message.

Also, if the new message has less than 3.5 characters, the receiving device assumes it is a continuation of the previous message.

The result will be an error because the CRC checksum field cannot be correct.

Rámcac RTU má formát:

Beginning of the message	3.5 of character
Recipient address	address 1 -247
The code of the desired CMD function	03: reading one 16-bit register; 06: writing one 16-bit register
Data section DATA (N-1)	Information content: function code parameter address, function code, parameter number, function code parameter values, etc..
Data section DATA (N-2)	
.....	
Data section DATA 0	
Checksum CRC CHK, higher byte	Checksum CRC CHK
Checksum CRC CHK, lower byte	
End of the message	3.5 of character

CMD (command) and DATA (description of data word) command code: 03H, read N words (you can read maximum 12 words). For example, from machine address 01 at F105, you can continuously read two consecutive values:

ADR	01H
CMD	03H
upper byte of address	F1H
bottom byte of address	05H
upper byte of register	00H
bottom byte of register of register	02H
checksum CRC CHK, higher byte	waits for CRC CHK calculation
checksum CRC CHK, lower byte	

As a reply from slave device.

Set PD.05 to 0:

ADR	01H
CMD	03H
upper byte	00H
bottom byte	04H
upper byte F002H	00H
bottom byte F002H	00H

Data upper byte F003H	00H	00H
Data lower byte F003H	01H	04H
Checksum CRC CHK, lower byte	Waits for CRC CHK calculation	00H
Checksum CRC CHK, higher byte		00H

Set PD.05 to 1:

ADR	01H
CMD	03H
upper byte	00H
bottom byte	04H
upper byte F002H	00H
bottom byte F002H	00H
Data upper byte F003H	00H
Data lower byte F003H	01H
Checksum CRC CHK, lower byte	Waits for CRC CHK calculation
Checksum CRC CHK, higher byte	

Command code: 06H writes the word. For example, write 000 (BB8H) to the slave device.

Address F00AH of inverter 05H.

Command:

ADR	05H
CMD	06H
The upper byte of the data address	0FH
The lower byte of the data address	0AH
Data upper byte	0BH
Data lower byte	B8H
Checksum CRC CHK, lower byte	Waits for CRC CHK calculation
Checksum CRC CHK, higher byte	

Response from slave device:

ADR	02H
CMD	06H
The upper byte of the data address	F0H
The lower byte of the data address	0AH
Data upper byte	13H
Data lower byte	88H
Checksum CRC CHK, lower byte	Waits for CRC CHK calculation
Checksum CRC CHK, higher byte	

CRC Check: RTU uses CRC control. The report contains a CRC-based error detection field. The CRC area tests the entire content of the message. The CRC consists of two bytes, respectively. 16 bits. The value is calculated by the transmitting device and added to the message. The receiving device also calculates it and compares it with the CRC value in the received message.

The Cyclic Redundancy Check (CRC) is calculated using the following steps:

Step 1: Fill a 16-bit register (called CRC) with FFFFH.

Step 2: Calculate the XOR with the first byte command with the lower byte of the 16-bit CRC Registry, store the result in the CRC register.

Step 3: Check the LSB of the CRC registry.

Step 4: If the LSB of the CRC is 0, move the CRC register one bit to the right and fill the MSB by zero, then repeat step 3. If the LSB of the CRC is 1, move the CRC register one bit to the right and fill the MSB by zero, calculate the XOR of the CRC register with the polynomial A001H, then repeat step 3.

Step 5: Repeat steps 3 and 4 until eight shifts are performed. After eight shifts, the result is a complete 8-bit byte.

Step 6: Repeat steps 2 through 5 for the next 8-bit command-byte. Continue until all bytes are processed. The final content of the CRC is CRC value. For CRC transmission in the report, the upper and lower bytes of the CRC values need to be changed, so the lower byte will be transmitted first.

The program for the CRC function is as follows:

```

unsignedintcrc_cal_value(unsignedchar *data_value,unsignedchardata_length)
{
int i;
unsignedintcrc_value=0xffff;
while(data_length--)
{
crc_value^=*data_value++;
for(i=0;i<8;i++)
{

```

```

If(crc_value&0x0001) crc_value=(crc_value»1)^0xa001;
else
crc_value=crc_value»1;
}
}
Return(crc_value);
}

```

Define the communication parameters address. This section is the communication content that is used to control the inverter, inverter status, and parameter setting. Reading and writing function code parameters (some code that cannot be changed is for manufacturers only or for monitoring). Rules for function code parameter addresses: higher byte F0-FF (P group), A0-AF (C group), 70-7F (D group), lower byte: 00-FF.

E.g. P3.12, the address is expressed as F30C; PF group: parameters do not change; D group: read-only, parameters cannot be changed.

If some of the inverter parameters are in operation, do not change them. Some inverter parameters in any state cannot be changed.

Additionally, because it is often written to EEPROM, its lifetime may be shortened, so if some of the function codes in the communication mode do not have to be stored, just change the RAM value. If a parameter group P is used, the corresponding function can be addressed from F to 0. If it is a C group of parameters, the corresponding function can be addressed from A to 4.

The corresponding function codes are as follows: higher byte: 00 to 0F (group P), 40 to 4F (group B), lower byte: 00 to FF.

Function code P3.12 is not stored in EEPROM, the address is expressed as 030C. Function code C0-05 is not stored in EEPROM, address is expressed as 4005. Interpreting an address can only write to RAM, it cannot read, it's an invalid address when it's read. For all parameters, you can also use the 7H command code to implement this feature.

Set the inverter to control via communication: P0.02=2 and P0.04=9

Directory of MODBUS communication parameters

Parameters for START / STOP

Parameter address	Parameter description	
1000	Desired frequency (-10000 to 10000) (decimal system)	Write/Read
1001	Operating frequency	Read
1002	Bus voltage	Read
1003	Output voltage	Read
1004	Current output	Read
1005	Output power	Read
1006	Output torque	Read
1007	Speed of running	Read
1008	S Input Flag	Read
1009	M01 output Flag	Read
100A	FIV voltage	Read
100B	FIC voltage	Read
100C	Reserved	Read
100D	Counter input	Read
100E	Length input	Read
100F	Speed of loading	Read
1010	PID setting	Read
1011	PID Feedback	Read
1012	PLC steps	Read
1013	Impulse input frequency, unit 0.01kHz	Read
1014	Reserved	Read
1015	The remaining running time	Read
1016	FIV before correction voltage	Read
1017	FIC before correction voltage	Read
1018	Reserved	Read
1019	Linear speed	Read
101A	Current period while power is on	Read
101B	Current run time	Read
101C	Pulse input frequency, unit 1Hz	Read
101D	Set up of communication	Read
101E	Reserved	Read
101F	Displaying the main X frequency	Read
1020	Displaying the auxiliary Y frequency	Read

Warning for 1000H:

The value of the required frequency is a relative percentage value, 10000 corresponds to 100.00%. The size of the frequency data is given as a percentage of the maximum frequency (P0.12); P2.10. For example, if this frequency is 50 Hz, and

you set the register 1000H to 5000, the inverter will control the motor with a frequency of 25 Hz (50%).

Reading the inverter registers is command #3 (Read holding register).

Writing to the inverter registers is command #6 (Pre-set holding register).

Inverter control commands (write only):

The address of command	Command function
2000	0001: run forward
	0002: reverse run
	0003: normal rotation
	0004: reverse motion
	0005: deceleration by inertia
	0006: slowdown
	0007: RESET errors

Reading inverter status (read only):

The address of command	Command function
3000	0001: run forward
	0002: reverse run
	0003: STOP

Password lock parameters (if 8888H returns, it means that the password was checked):

Password address	Content of input password
1F00	*****
The address of command	Content of command
2001	BIT 0: (reserved) BIT1: (default) BIT2: RA-RB-RC controlled output BIT3: reserved BIT4: M01 controlled output

FOV analogue output control (write only):

The address of command	Content of command
2002	0-7FFF correspond to 0%~100%

Analogue output control: (reserved):

The address of command	Content of command
2003	0-7FFF correspond to 0%~100%

Impulse output control (PULSE), (write only):

The address of command	Content of command
2004	0-7FFF correspond to 0%~100%

Inverter fault description:

Inverter fault address	Inverter fault information
	Parameter description (read only)
8000	0000: no error 0001: reserved 0002: overcurrent at acceleration 0003: overcurrent at deceleration 0004: overcurrent at constant speed 0005: overvoltage at acceleration 0006: overvoltage at deceleration 0007: overvoltage at constant speed 0008: fault brake resistance overload 0009: low voltage 000A: overloaded inverter 000B: overloaded motor 000C: reserved 000D: output phase 000E: overheated inverter 000F: external error 0010: communication error 0011: contactor error 0012: current detection error 0013: auto tuning error 0014: reserved 0015: parameter error, write and read 0016: hardware error of the inverter 0017: motor short circuit to ground 0018: reserved 0019: reserved 001A: reached running time 001B: reserved 001C: reserved 001D: reached time of power on 001E: zero load 001 F: loss of PID feedback while running 0028: current limitation error 0029: failure of switching the motor during running 002A: too high speed deviation 002B: too high motor speed 002D: overheated motor 005A: encoder error 005B: unconnected encoder 005C: Initial position error 005E: fault of the speed feedback

Inverter fault address	Inverter fault information
8001	0000: no error 0001: password error 0002: command code error 0003: CRC error 0004: invalid address 0005: invalid parameter 0006: correction parameter is invalid 0007: the system is locked 0008: blocked EPROM operation

Communication parameters of group PD

	Baud speed	Set value	0005
PD.00	Range of setting	units: MODBUS baud speed 0:300 BPS 1:600 BPS 2:1200 BPS 3:2400 BPS 4:4800 BPS 5:9600 BPS 6:19200 BPS 7:38400 BPS 8:57600 BPS 9:115200 BPS	

This parameter is used to set the baud rate between the inverter and the PC. Note that setting the baud rate between parent and slave devices must be the same. Otherwise, communication is not possible. Higher speed means greater data transfer.

	Data format	Set value	3
PD.01	Range of setting	0: No parity, data format <8, N, 2> 1: Even parity, data format <8, E, 1> 2: Odd parity, data format <8,0,1> 3: No parity, data format <8, N, 1>	

The PC and the data format set by the inverter must be the same, otherwise communication cannot be established.

	Data format	Set value	1
PD.02	Range of setting	1-247, 0 is the sending address	

When the device address is set to 0, it means that the device is transmitting. The device address is unique (with the exception of the broadcast address) and is intended to guarantee peer-to-peer communication between the machine and the inverter.

PD.03	Data format	Set value	2 ms
	Range of setting	0 – 20 ms	

Response delay: the time the device accepts the data you are sending. If the response delay is less than the system processing time, the delay of the response will be within the system processing time; if the response delay is longer than the data processing in the system, the system will prolong waiting for the response.

PD.04	Communication timeout	Set value	0
	Range of setting	0.0 s (invalid), 0.1-60.0s	

If the code is set to 0.0 s, the parameter is invalid.

If the function code is set to valid values and the communication and time interval of the next communication is greater than the communication time limit, the system will report a communication failure (CE) error. Typically, the set value is invalid. If time is set in the parameter, you can track the status of the communication.

PD.05	Selection the communication	Set value	1
	Range of setting	0: nonstandard protocol MODBUS 1: standard protocol MODBUS	

PD.05 = 1: standard MODBUS protocol selected

PD.05 =0: when reading the command, it returns the number of bytes from the device according to the MODBUS protocol, described in detail in this chapter.

PD.06	Resolution of reading the value current	Set value	1
	Range of setting	0: 0.01 A 1: 0.10 A	

Used to select communication when reading the output current, the actual value of the output units.

We reserve the right to typographical errors in the text