Variable frequency drive

Vector V810

User manual

Version 4.1

Vybo Electric

Contents

Chapter 1: Introduction

1.0 Technical parameters

Parameter		VECTOR V 810
Standard functions	Control mode	**V/F** scalar control **SVC** vector control with open circuit **CLVC** vector control with close circuit
	Maximum frequency	SVC, CLVC vector control: 0 - 300 Hz V/F scalar control: 0 - 3200 Hz
	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) G type: 0.5 Hz / 180% (CLVC) P type: 0.5 Hz/100%
	Speed range	1:100 (SVC) 1:1000 (CLVC)
	Stability of speed	± 0.50 % (SVC) ± 0.02 % (CLVC)
	Torque control accuracy	± 5% (CLVC)
	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% až 30.0%
	V/F curve	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)
	V/F separation	Two types: complete separation; half separation
	Ramp modes	Linear curve The ramp of S-curve type Four sets of acceleration / deceleration in ranges of 0.0-6500.0 sec
Input and output	Input terminals	8 digital inputs, binary inputs ON / OFF, 1 terminal X5 can support high speed pulse input. All terminals have optional PNP or NPN. 2 analogue inputs, of which one FIV supports -10 V / +10 V; or a 0-10 V input and the second FIC supports a 0-10V or 0-20mA (4-20 mA) input.
Input and output	Output terminals	1 programmable open collector output: provides 1 output terminal (output of open collector or high speed pulse output) 2 relay outputs, 2 analogue outputs: FOV and FOC with optional 0-20 mA (4-20 mA) or 0-10 V output

PG	**PG** cards	The inverter is equipped with a port for PG cards (for encoder), or PG cards for use with a resolver, etc..
Standard functions	**DC** braking	Braking frequency: 0.00 Hz to maximum frequency Braking time: 0.0-36.0 s Braking current: 0.0% -100.0%
	Brake unit	Models up to 18.5 kW have a built-in brake unit as standard.
	Control in JOG mode (stepping)	JOG frequency range: 0.00-50.00 Hz JOG acceleration / deceleration time: 0.0-6500.0 s
	Implement multiple preset speeds PLC	Implemented up to 16 speeds using a simple PLC function or combinations of end states X.
	PTC	Input for PTC motor thermal protection.
	Built-in **PID** controller	Facilitates a process-controlled 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.
	EMS STOP safety function	"Emergency stop" system: In emergency situations, the inverter stops immediately after activating EMS STOP.
	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	MODBUS RTU, PROFIBUS-DP
	Channel of trigger commands	According to the panel, control terminals, the serial communication port can be switched in many ways.
	Frequency source	10 types of frequencies, given by digital analogue voltage, analogue current, pulse, serial port, X8, PID, can be switched in many ways.
	Auxiliary source of frequency	10 types of frequencies, it is easy to realize micro setup, frequency synthesizer.
	LED display	Displays the parameters.
	Lock keys and select functions	It can block the buttons partially or completely and define the range of functions of some buttons to prevent malfunctions.

	Protective mode	Motor short-circuit detection at power-on, output phase loss protection, over-current protection, over-voltage protection, under voltage protection, overheat 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	Inside, avoid direct sunlight, salt, dust, corrosive or flammable gas, smoke, steam. Resistance to chemical pollution Class 3C3 EN/IEC 60721-3-3. Resistance to pollution by dust 3S3EN/IEC 60721-3-3.
	Altitude	Under 1000 meters (reduce the power level when used 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, no condensation IEC 60068-2-3
	Vibration	Less than 5,9 m/s2 (0,6 g) IEC 60068-2-6
	Storage temperature	-20°C to +60°C

1.1 Description of inverter name plate

MODEL: V 810 -4T0040G/0055P

- 0040: 4.0 kW / 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
- 810: Inverter series 810
- V: VECTOR

1.2 Instructions for selecting a suitable inverter VECTOR V 810

Model / Type	Power 50/60 Hz	Motor power (kW)	Wire cross section (mm^2) *recommended	Breaker (A) *recommended	Input contactor (A) *recommended
V 810-2S0004	1 phase 230 V	0.4	1.5	10	9
V 810-2S0007		0.75	1.5	16	12
V 810-2S0015		1.5	2.5	25	18
V 810-2S0022		2.2	4.0	32	25
V 810-2S0030		3.0	6.0	40	32
V 810-4T0004	3 phases 400 V	0.4	1.5	6	9
V 810-4T0007		0.75	1.5	6	9
V 810-4T0015		1.5	1.5	10	9
V 810-4T0022		2.2	1.5	10	9
V 810-4T0040G/0055P		4.0/5.5	2.5	16	12
V 810-4T0055G		5.5	2.5	20	18
V 810-4T0075P		7.5	4	32	25
V 810-4T0075G/0110P		7.5/11	4	32	25
V 810-4T0110G/0150P		11/15	6	40	32
V 810-4T0150G/0185P		15/18.5	10	50	38
V 810-4T0185G/0220P		18.5/22	10	50	40
V 810-4T0220G/0300P		22/30	16	63	50
V 810-4T0300G/0370P		30/37	25	100	65
V 810-4T0370G/0450P		37/45	25	100	80
V 810-4T0450G/0550P		45/55	35	125	95
V 810-4T0550G/0750P		55/75	50	160	115
V 810-4T0750G/0900P		75/90	70	225	170
V 810-4T0900G/1100P		90/110	95	250	205
V 810-4T1100G/1320P		110/132	120	315	245
V 810-4T1320G/1600P		132/160	120	350	300
V 810-4T1600G/1850P		160/185	150	400	300
V 810-4T1850G/2000P		185/200	185	500	410
V 810-4T2000G/2200P		200/220	185	500	410
V 810-4T2200G/2500P		220/250	240	630	475
V 810-4T2500G/2800P		250/280	240	630	475
V 810-4T2800G/3150P		280/315	240	800	620
V 810-4T3150G/3500P		315/350	2x150	800	620
V 810-4T3500G/4000P		350/400	2x185	1000	800
V 810-4T4000G/4500P		400/450	2x240	1250	800
V 810-4T4500G/5000P		450/500	2x240	1250	1000

1. 3-phase, 400V AC ± 15%, 1-phase 230V AC ± 15%

Model	Rated output power (kW)	Rated input current (A)	Rated output current (A)	Motor power (kW)
1-phase/3-phase AC 230 V -15%~15%				
V810-2S0004	0.4	5.4	2.4	0.4
V810-2S0007	0.75	7.2	4.5	0.75
V810-2S0015	1.5	10	7	1.5
V810-2S0022	2.2	16	10	2.2
V810-2S0030	3.7	23	16	3.0
3-phase AC 400 V ±15%				
V810-4T0004	0.4	3.4	1.2	0.4
V810-4T0007	0.75	3.8	2.5	0.75
V810-4T0015	1.5	5	3.7	1.5
V810-4T0022	2.2	5.8	5.0	2.2
V810-4T0040G/0055P	3.7/5.5	10/15	9/13	3.7/5.5
V810-4T0055G/0075P	5.5/7.5	15/20	13/17	5.5/7.5
V810-4T0075G/0110P	7.5/11	20/26	17/25	7.5/11
V810-4T0110G/0150 P	11.0/15	26/35	25/32	11/15
V810-4T0150G/0185 P	15/18.5	35/38	32/37	15/18.5
V810-4T0185G/0220P	18.5/22	38/46	37/45	18.5/22
V810-4T0220G/0300P	22/30	46/62	45/60	22/30
V810-4T0300G/0370P	30/37	62/76	60/75	30/37
V810-4T0370G/0450P	37/45	76/90	75/90	37/45
V810-4T0450G/0550P	45/55	90/105	90/110	45/55
V810-4T0550G	55	105	110	55
V810-4T0750G	75	140	150	75
V810-4T0750G/0900P	75/90	140/160	150/176	75/90
V810-4T0900G/110OP	90/110	160/210	176/210	90/110
V810-4T1100G/1320P	110/132	210/240	210/253	110/132
V810-4T1320G/1600P	132/160	240/290	253/300	132/160
V810-4T1600G/1850P	160/185	290/330	300/340	160/185
V810-4T1850G/2000P	185/200	330/370	340/380	185/200
V810-4T2000G/2200P	200/220	370/410	380/420	200/220
V810-4T2200G/2500P	220/250	410/460	420/470	220/250
V810-4T2500G/2800P	250/280	460/500	470/520	250/280
V810-4T2800G/3150P	280/315	500/580	520/600	280/315
V810-4T3150G	315/350	580/620	600/640	315/350
V810-4T3500G	350/400	620/670	640/690	350/400

Model	Rated output power (kW)	Rated input current (A)	Rated output current (A)	Motor power (kW)
V810-4T4000G	400/450	670/790	690/790	400/450
V810-4T4500G	450/500	790/835	790/860	450/500
V810-4T5000G	500/560	835/920	860/950	500/560
V810-4T5600G	560/630	920/1050	950/1100	560/630
V810-4T6300G	630/710	1050/1126	1100/1280	630/710
V810-4T7100G	710/800	1126/1460	1280/1380	710/800
V810-4T8000G	800/900	1460/1640	1380/1640	800/900
V810-4T9000G	900/1000	1640/1800	1640/1720	900/1000
V810-4T10000G	1000	1800	1720	1000

2. 3-phase, 690 V AC ± 15%

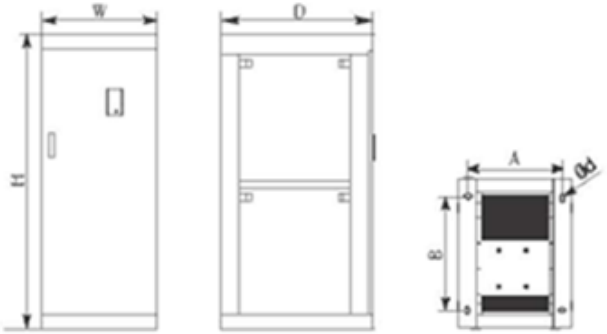
Model	Motor power (kW)	Rated input current (A)	External dimensions			Installation dimensions (mm)
			wide	height	depth	
V810-6T0110G/0150P	11	16	410	277	189	390*262*06.5
V810-6T0150G/0185P	15	20				
V810-6T0185G/0220P	18.5	25				
V810-6T0220G/0300P	22	28				
V810-6T0300G/0370P	30	35				
V810-6T0370G/0450P	37	45				
V810-6T0450G/0550P	45	52				
V810-6T0550G/0750P	55	63	595	300	236	573*200*09
V810-6T0750G/0900P	75	86				
V810-6T0900G/110OP	90	98				
V810-6T1100G/1320P	110	121	620	380	290	595*250*09
V810-6T1320G/1600P	132	150				
V810-6T1600G/1850P	160	175	880	380	358	840*250*013
V810-6T1850G/2000P	185	198				
V810-6T2000G/2200P	200	218				
V810-6T2200G/2500P	220	240				
V810-6T2500G/2800P	250	270				
V810-6T2800G/3150P	280	320	995	630	350	971*500*011
V810-6T3150G/3500P	315	350				
V810-6T3500G/4000P	350	380				

Model	Motor power (kW)	Rated input current (A)	External dimensions			Installation dimensions (mm)
			wide	height	depth	
V810-6T4000G/4500P	400	430	Wall mounting : 1040. Switchboard: 1515	680	400	Wall mounting: 1016*520*011 Switchboard: 550*300*013
V810-6T4500G/5000P	450	480				
V810-6T5000G/5600P	500	540				
V810-6T5600G/6300P	560	600	1800	650	920	550*800*017
V810-6T6300G/7100P	630	680				
V810-6T7100G/8000P	710	750	1800	750	920	650*800*017
V810-6T8000G/9000P	800	860				
V810-6T9000G/10000P	900	950	1800	900	920	800*800*017
V810-6T10000G	1000	1080				

1.3 Drawing of the external dimensions of the inverter

(1) wall mounting

(2) switchboard mounting
(freestanding switchboard)



Model	External dimensions				Installation dimensions A*B*Ø d	V mm	
	W	H	H1	D		Installation	Note
V810-2S0004	125	170	—	140	117*160*Ø5	Wall mounting	Of plastic
V810-2S0007							
V810-2S0015							
V810-2S0022							
V810-2S0030	120	225	—	143	105*208*Ø5		Partly of plastic
V810-4T0004	125	170	—	140	117*160*Ø5		Of plastic
V810-4T0007							
V810-4T0015							
V810-4T0022							
V810-4T0040G/0055P	120	225	—	143	105*208*Ø5	Wall mounting	Partly of plastic
V810-4T0055G/0075P	185	260	—	170	168*248*Ø6.5		Of plastic
V810-4T0075G/0110P							
V810-4T0110G/0150P	210	330	—	190	195*310*Ø6.5		Partly of plastic
V810-4T0150G/0185P							
V810-4T0185G/0220P	277	410	—	189	262*390*Ø6.5		Metal cabinet
V810-4T0220G/0300P							
V810-4T0300G/0370P							
V810-4T0370G							
V810-4T0370G/0450P	300	430	455	212	200*433*Ø9		
V810-0450G/0550P	300	535	560	236	200*538*Ø9		
V810-4T0550G							
V810-4T0750P							
V810-4T0750G/0900P	338	546	576	256.5	270*560*Ø9		New
V810-4T0900G/1100P	338	550	580	300	270*564*Ø9		
V810-4T1100G/1320P							

<table>
<tr><th rowspan="2">Model</th><th colspan="4">External dimensions</th><th rowspan="2">Installation dimensions
A*B*Ø d
W</th><th colspan="2">V mm</th></tr>
<tr><th>W</th><th>H</th><th>H1</th><th>D</th><th>H</th><th>H1</th></tr>
<tr><td>V810-4T1320G/1600P</td><td rowspan="2">420</td><td rowspan="2">Wall: 730
Cabinet: 1130</td><td rowspan="2">Wall: 790
Cabinet: 1165</td><td rowspan="2">330</td><td rowspan="2">Wall:
300*765*Ø11
Switchboard:
250*350Ø12</td><td rowspan="6">Wall mounting / into the switchboard</td><td rowspan="9">Metal cabinet</td></tr>
<tr><td>V810-4T1600G/1850P</td></tr>
<tr><td>V810-4T1850G/2000P</td><td rowspan="3">530</td><td rowspan="3">Wall: 800
Cabinet: 1300</td><td rowspan="3">Wall: 860
Cabinet: 1335</td><td rowspan="3">335</td><td rowspan="3">Wall:
400*835*Ø11
Switchboard:
250*450Ø12</td></tr>
<tr><td>V810-4T2000G/2200P</td></tr>
<tr><td>V810-4T2200G/2500P</td></tr>
<tr><td>V810-4T12500G/2800P</td><td rowspan="3">700</td><td rowspan="3">Wall: 880
Cabinet: 1380</td><td rowspan="3">Wall: 940
Cabinet: 1415</td><td rowspan="3">350</td><td rowspan="3">Wall:
600*915*Ø11
Switchboard:
250*620Ø12</td></tr>
<tr><td>V810-4T2800G/3150P</td></tr>
<tr><td>V810-4T3150G</td></tr>
<tr><td>V810-4T3500G</td><td rowspan="3">600</td><td rowspan="3">1600</td><td rowspan="3">—</td><td rowspan="3">800</td><td rowspan="3">550*700* Ø13</td><td rowspan="9">Into the switchboard</td><td rowspan="9">Metal cabinet</td></tr>
<tr><td>V810-4T4000G</td></tr>
<tr><td>V810-4T4500G</td></tr>
<tr><td>V810-4T5000G</td><td rowspan="3">650</td><td rowspan="3">1600</td><td rowspan="3">—</td><td rowspan="3">800</td><td rowspan="3">600*700* Ø13</td></tr>
<tr><td>V810-4T5600G</td></tr>
<tr><td>V810-4T6300G</td></tr>
<tr><td>V810-4T7100G</td><td rowspan="4">700</td><td rowspan="4">2200</td><td rowspan="4">—</td><td rowspan="4">1000</td><td rowspan="4">690*900* Ø13</td></tr>
<tr><td>V810-4T8000G</td></tr>
<tr><td>V810-4T9000G</td></tr>
<tr><td>V810-4T10000G</td></tr>
</table>

Control panel size for inverter over 5.5 kW: 141.5 mm * 79.5 mm
Control panel size for inverter under 4.0 kW: 99.5mm * 56mm

1.4 Inspection

CAUTION

- Do not install or use a inverter that is damaged or contains damaged parts, as it may cause injury.

After unpacking the inverter, check the following items:
1. Inspect the entire outer surface of the inverter for any scratches or other damage caused by shipping.
2. Make sure that the operating instructions and warranty card are included in the package.
3. Check the nameplate to make sure you have received the inverter you ordered.
4. Make sure the optional parts are the ones you need.

If the inverter or optional parts are damaged, contact your local sales representative.

WARNING

• A person without proper training handling the device or a device in the event of a "WARNING" indication can cause serious injury or property damage.
Only a person who has received training in the design, installation, commissioning and operation of the equipment and has obtained a certificate is entitled to operate this equipment.
• The power wire must be securely connected and the device must be securely grounded.
• Even though the inverter does not work, there is still dangerous voltage at the following terminals: - power terminals: R, S, T - motor connection terminals: U, V, W.
• After turning off the power, you should not operate the inverter for 5 minutes to ensure that the device is completely discharged.
• The cross-sectional size of the ground wire must not be smaller than the power wire.

CAUTION

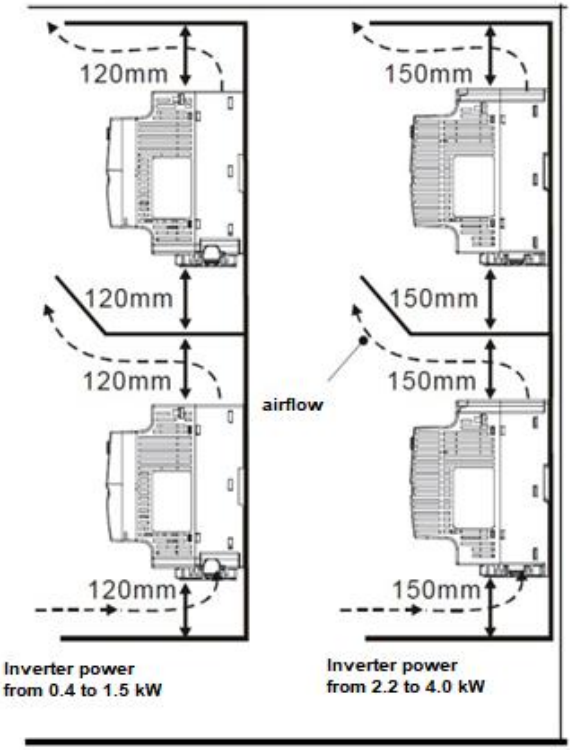
• When moving the inverter, hold it by the base and do not lift it by the panel, as the main unit may fall, which may result in personal injury.
• To prevent fire, install the inverter on a fireproof surface (eg metal).
• When installing two or more inverters in one cabinet, a cooling fan should be available to ensure that the air temperature in the cabinet is below 45 ° C. Failure to do so could result in fire or damage to the equipment.

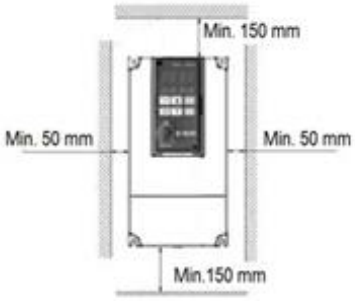
Chapter 2: Installation and wiring

2.1 Environment and installation requirements

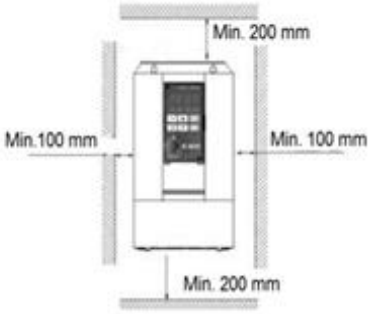
The installation environment affects the life of the inverter and has a direct effect on the normal function, failure to comply with the environmental specifications could lead to a fault in the inverter.
For the VECTOR V 810 series inverter, use the vertical installation to ensure the best possible air flow and heat dissipation effect.
Ensure that you can meet the inverter's installation environment:
(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 (e. g. 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 heat source (e.g. braking resistor, etc.).
(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.
(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 Installation space





Power from 5.5 to 7.5 kW



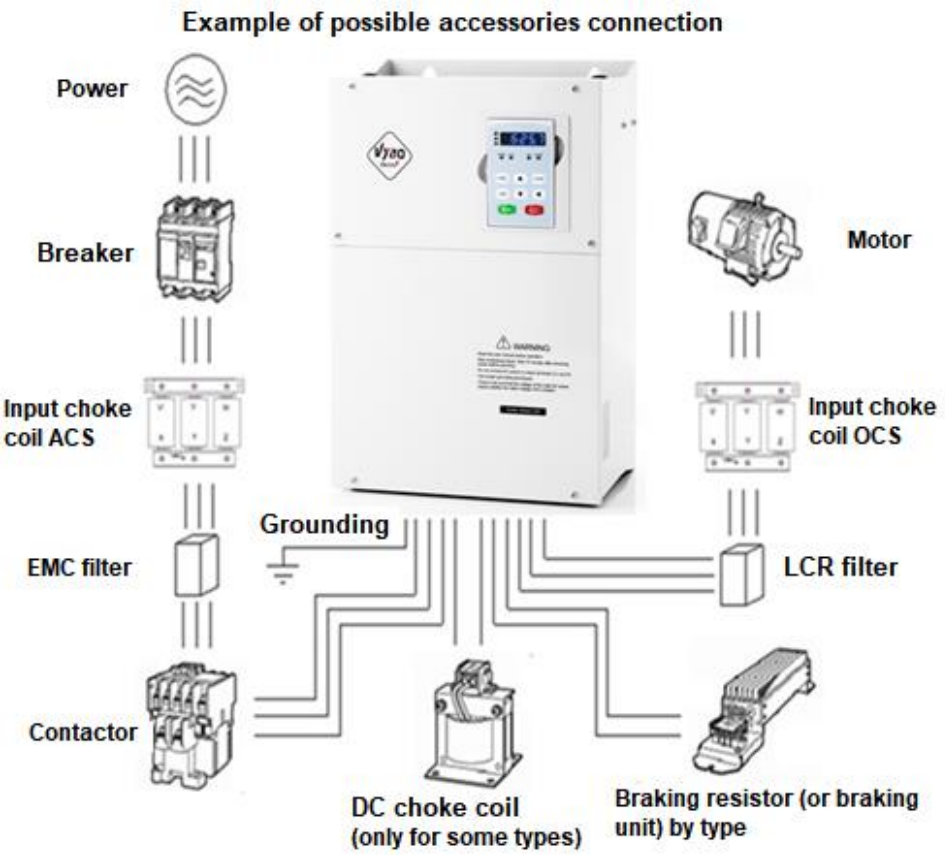
Power from 11 to 15 kW

Installing multiple inverters.

Note: When using a installation one above the other, add an air spoiler.

2.3 Connection of inverter V 810 to power grid

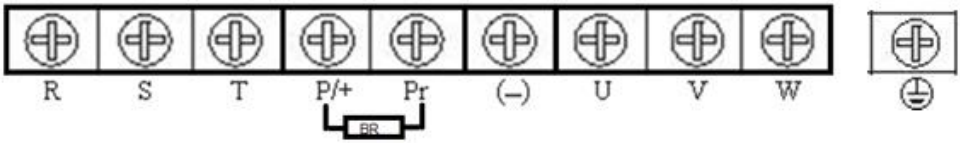
2.3.1 Connection the main power part of the inverter



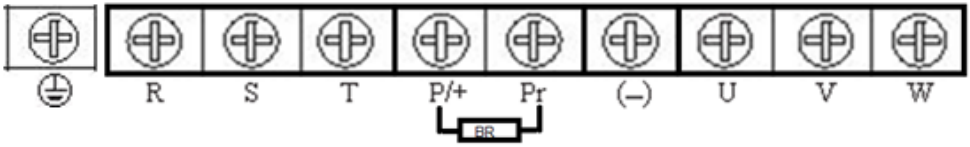
2.4 Terminal block configuration

2.4.1 Main circuit terminal block

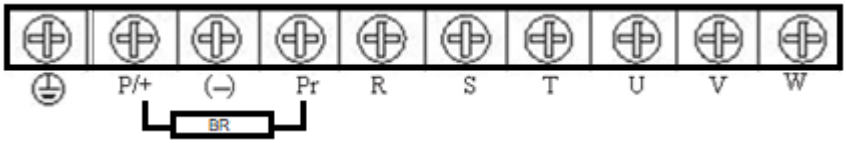
a./ Main terminal block for types powered by 3 x 400 V (690 V), 0.75 to 4 kW with BR



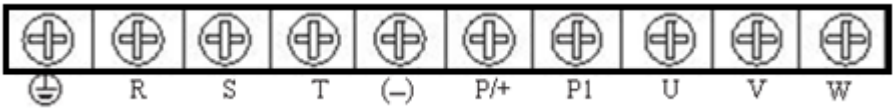
b./ Main terminal block for types powered by 3 x 400 V (690 V), 5.5 to 7.5 kW with BR



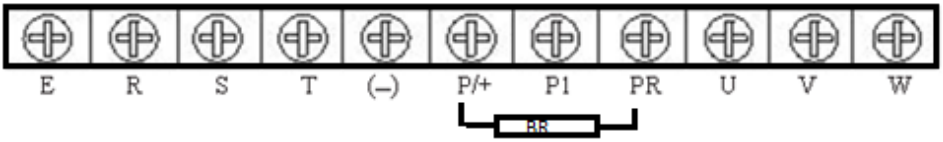
c./ Main terminal block for types powered by 3 x 400 V (690 V), 11 to 15kW with BR.



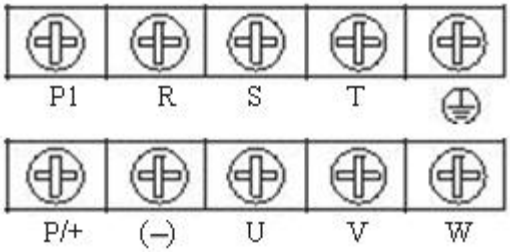
d./ Main terminal block for types powered by 3 x 400 V (690 V), 18.5 to 110kW without BR



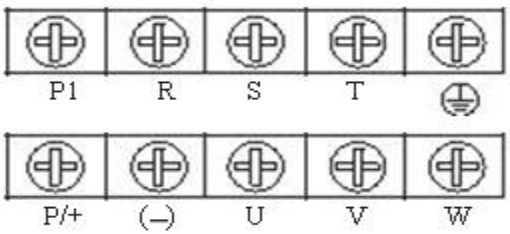
e./ Main terminal block for types powered by 3 x 400 V (690 V),18.5 to 30 kW with BR



f./ Main terminal block for types powered by 3 x 400 V (690 V), 132 to 315kW



g./ Main terminal block for types powered by 3 x 400 V (690 V), 350kW and more.



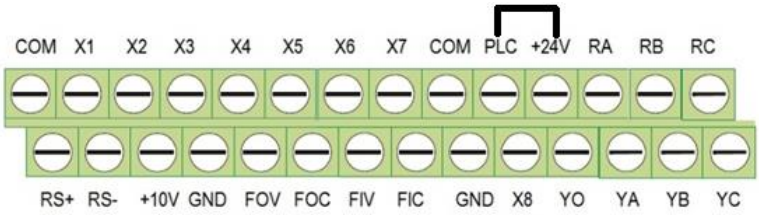
NOTE: “710-1000 kW inverters, top row, front port connection; second row, connection via rear hole ".

The functions of the main circuit are summarized according to the symbols on the terminal board in the following table. Connect the terminal block correctly for the required purpose.

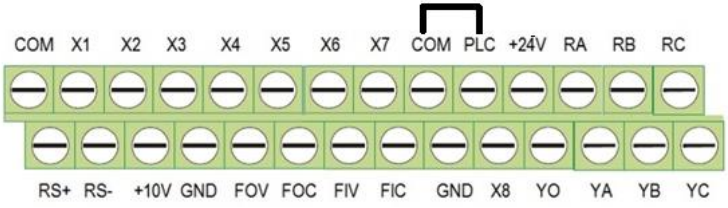
Name of terminal	Description
R, S, T	Terminals for connecting three-phase power supply
P, (-)	External brake unit connection terminals
P, Pr	External braking resistor connection terminals
P1, P/+	DC choke coil terminals (some models)
(-)	DC bus negative terminal
U, V, W	Terminals for connecting a three-phase output
⏚	Grounding terminal

2.4.2 NPN and PNP control circuit terminal block

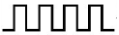
NPN mode



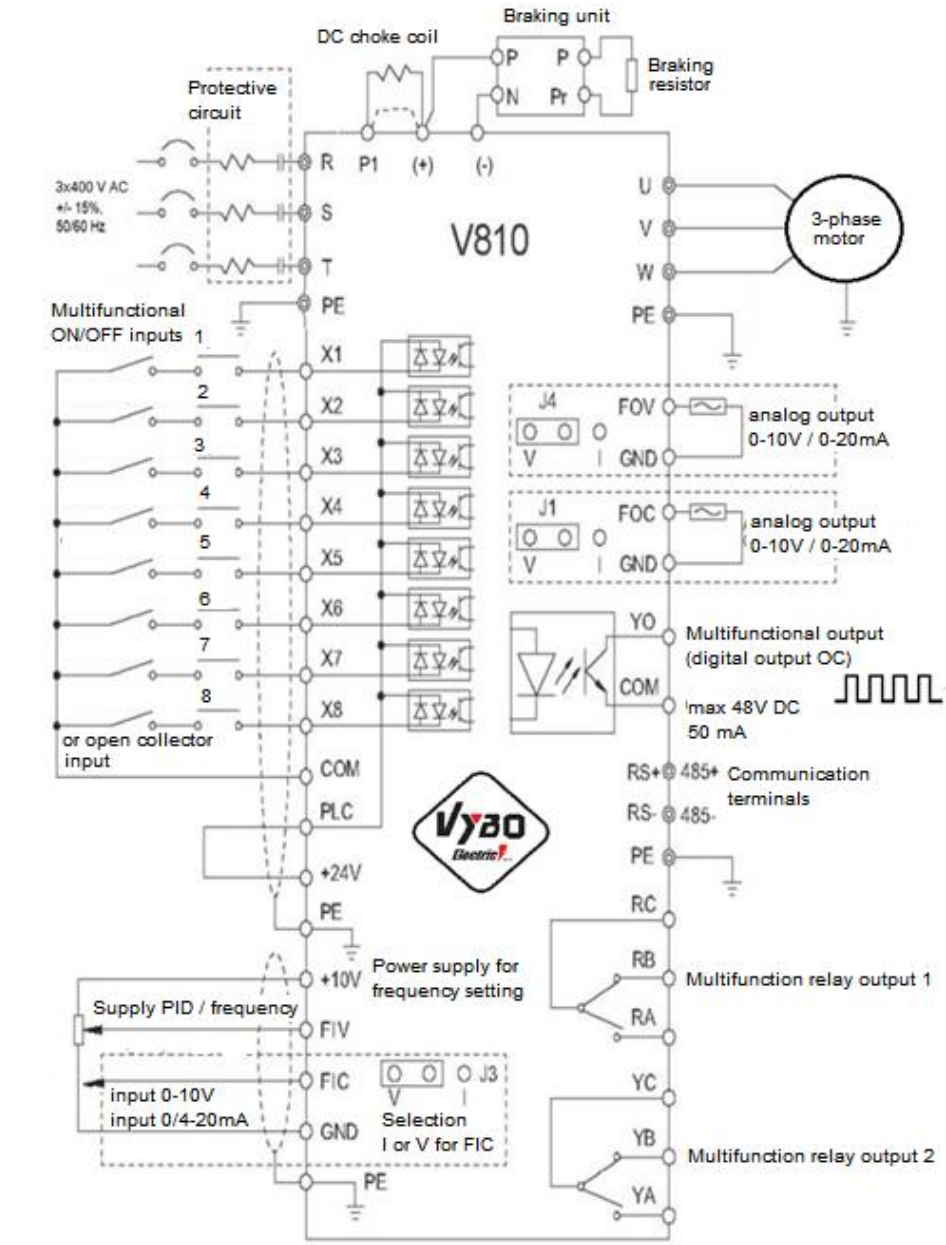
PNP mode



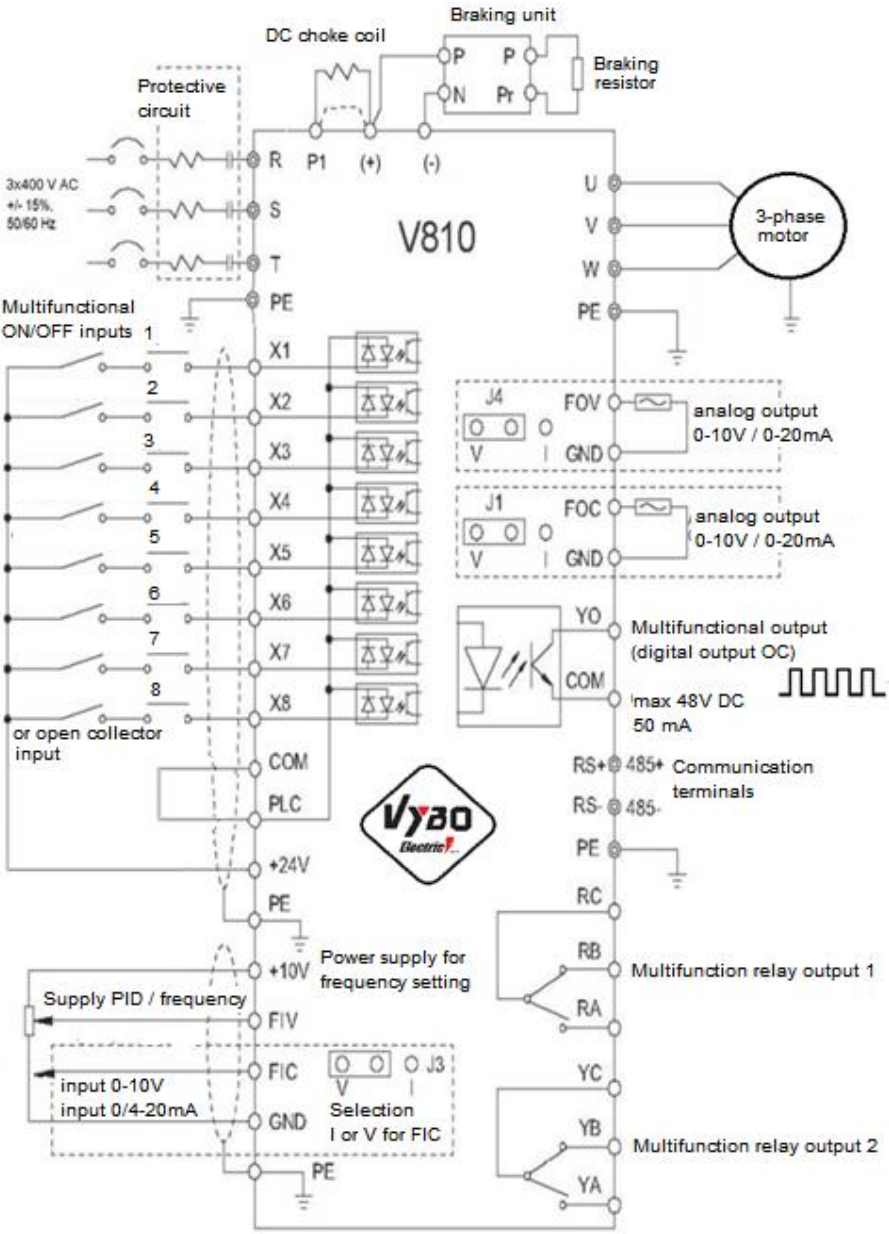
Terminal	Description
X1-X8	ON-OFF signal input, optical PLC and COM connection. Input voltage range: 9-30V. Input impedance: 3.3kΩ
X5	High-speed pulse or ON-OFF input signal, optical PLC and COM connection. Pulse input frequency range: 0 to 100kHz. Input voltage range: 9-30 V. Input impedance: 100 kΩ.
PLC	External power supply. The +24 V terminal is connected to the PLC terminal as the default setting. If the user needs external power, disconnect the +24 V terminal from the PLC terminal (go to PNP method).

Terminal	Description
+24V	It provides an output voltage of +24 V. The maximum output current is 150 mA.
FIV	Analogue input -10V / +10 V. Input impedance: 20 kΩ
FIC	Analogue input 0-10 V / 0-20mA, switches via J3. Input impedance: 10kΩ (for input voltage) / 250 Ω (for input current)
GND	Common ground terminal of analogue signal and + 10V. The GND terminal must be isolated from COM.
+10V	Power supply + 10V for inverter. High speed pulse output terminal. The corresponding common ground terminal is COM.
YO	Output frequency range: 0 to 100 kHz. 
COM	Common (zero potential) terminal for digital signal and +24 V (or external power supply).
FOV/FOC	It provides a voltage or current output that can be switched using J4 and J1. Output range: 0 - 10V / 0 - 20mA (4-20 mA).
RA/RB/RC	Relay output: RC - common, RB = NC, RA = NO. Contact rating: AC 250V / 3A; DC 30V / 1 A.
YA/YB/YC	Relay output: YC - common, YB = NC, YA = NO. Contact rating: AC 250V / 3A; DC 30V / 1 A.
RS+ / RS-	RS485 communication port. RS485 differential signal, +, -.

2.5 Wiring diagram of the V 810 inverter in the NPN mode



2.5.1 Wiring diagram of the V 810 inverter in the PNP mode



2.6 Main circuit connection

2.6.1 Connection of the main circuit on the input side

- Circuit protection

It is necessary to connect a circuit breaker that is compatible with the power of the inverter between the 3-phase power supply and the input terminals (R, S, T). The tripping current of the circuit breaker is 1.5 to 2 times higher than the rated current of the inverter. See "Circuit Breaker, Cable, and Contactor Specifications" for details.

- Contactor

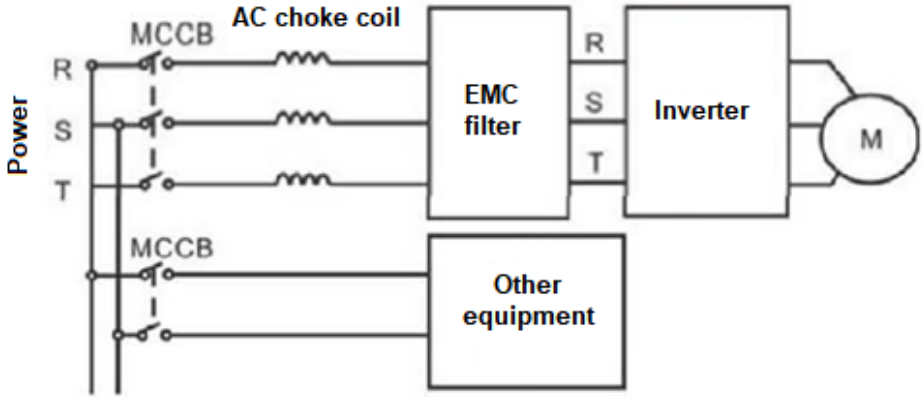
In order to effectively disconnect the input power supply when an error occurs in the system, a contactor should be installed on the input side to control the on / off of the main power circuit.

- AC choke coil

To prevent damage to the rectifier due to high current, an input choke must be installed on the input side. It can also protect the rectifier from sudden changes in supply voltage or from the effects of higher harmonics generated by the phase load.

- Input EMC filter

Interference with surrounding equipment may occur during drive operation. An EMC filter can minimize this interference. As in the following picture.



Connection on the input side

2.6.2 Main circuit connection on the inverter side

- DC choke coil

Inverters over 250 kW have a built-in DC choke, which can improve the power factor.

- Brake unit and braking resistor

• Inverters with an output of 15 kW or less have a built-in brake unit. To consume energy generated by dynamic braking, the braking resistor should be installed at the "+" and "PR" terminals. The cable for connecting the braking resistor should be shorter than 5 m.

• An inverter with an output of 18.5 kW and more needs to connect an external brake unit, which should be installed at the (+) and (-) terminals. The cable between the inverter and the brake unit should be shorter than 5 m. The cable between the brake unit and the braking resistor should be shorter than 10 m.

• The braking resistor temperature increases as the regenerative energy is converted into heat. Protection against contact (hot parts) and good ventilation and cooling of the resistor are recommended.

Note: Make sure the electrical polarity of the (+) and (-) terminals is correct; it is not allowed to connect (+) and (-) directly, otherwise the inverter will be damaged or a fire will occur.

2.6.3 Main circuit connection on the motor side

- Output choke coil (motor)

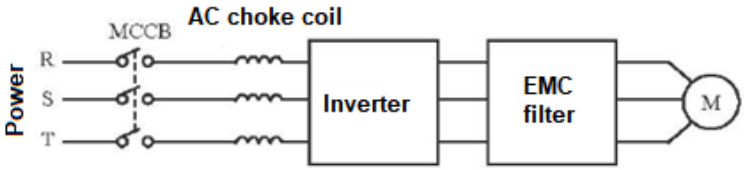
The output choke coil must be installed in the following conditions:

a./ If the distance between the inverter and the motor is greater than 50 meters, the frequency inverter can often exceed the over current protection due to the large leakage current caused by the parasitic capacitance to ground.

b./ On order to prevent damage to the motor insulation, an output choke should be installed

- Output EMC filter

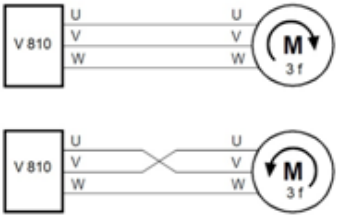
The EMC filter should be installed to minimize leakage current caused by the cable and to minimize electromagnetic noise caused by the cables between the drive and the motor. See the following image. An additional EMC filter must be installed if the frequency converter is located in environment 1.



Motor side connection

- Changing the direction of rotation of the electric motor shaft: the direction of rotation can be changed by exchanging the two output lines at the output of the frequency converter or at the terminal board of the electric motor.

The direction of rotation of the motor can be changed by swapping the two output lines on the inverter or on the motor.



2.6.4 Connection of the regeneration unit

The regeneration unit is used to supply the electricity produced by braking the motor to the grid. Compared to a traditional 3-phase inverse parallel bridge rectifier, the regeneration unit uses IGBTs so that the total harmonic distortion (THD) is less than 4%. The regeneration unit is often used in conjunction with centrifugal and lifting devices.

2.6.5 Common DC bus connection

The common DC bus method is widely used in the paper and fibber industries, which need to coordinate multiple motors. In these applications, some motors are running, while others are in regenerative braking (electricity generation). The regenerated energy is automatically balanced via a common DC bus, which means that it can be supplied to the motor in the running state. Therefore, the power consumption of the whole system will be lower compared to the traditional method (one inverter drives one motor).

Let two motors run at the same time (eg winding / unwinding application), one is running and the other is in regenerative mode. In this case, the DC buses of the two converters can be connected in parallel so that the regenerated energy can be fed to the motor in the running state whenever necessary. The detailed connection is shown in the following figure ……

Note: When connected to a common DC bus, both inverters must be the same. Make sure they are turned on at the same time.

2.6.6 Earth connection (PE)

To ensure safety and to prevent electric shock and fire, the PE terminal must be earthed. The ground wire should be large and short and it is better to use copper wire (> 4.0 mm^2). If more than one drive is required, do not connect the ground wire to a closed loop.

2.7 EMC compliant installation instructions

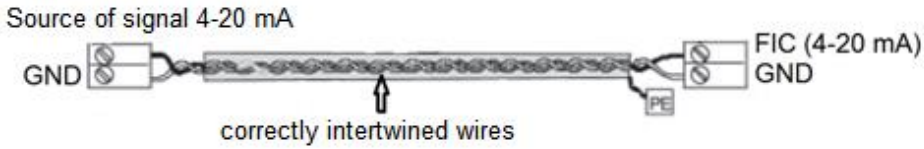
2.7.1 General EMC information

EMC stands for electromagnetic compatibility, which means that a device or system has the ability to operate normally in an electromagnetic environment and will not generate excessive electromagnetic interference from other devices.

EMC covers two areas: electromagnetic interference and electromagnetic perturbance. Depending on the method of transmission, electromagnetic interference can be divided into two categories: line interference and radiated interference. Line interference is interference transmitted by the driver. Therefore, any wires (such as cables, transmission lines, inductor, capacitor, etc.) are considered interference transmission channels.

Conversely, radiated interference is interference transmitted by electromagnetic waves and energy is inversely proportional to the square of the distance.

Three necessary conditions must be met for electromagnetic interference: the source of the interference, the transmission channel and the sensitive receiver. For customers, the solution to the EMC problem is mainly in the transmission channel, because the attribute of the interference source and receiver device cannot be changed.



2.7.2 EMC properties of the converter

Like other electrical or electronic devices, the inverter is not only a source of electromagnetic interference, but also an electromagnetic receiver. The principle of operation of the converter determines that it can produce some electromagnetic interference.

At the same time, the inverter should be designed with some interference immunity to ensure trouble-free operation in a certain electromagnetic environment. The EMC functions of the inverter are as follows:

1. / The input current is without sine wave. The input current contains a large number of higher harmonic frequencies, which can cause electromagnetic interference, reduce the power factor and increase line losses.

2./ The output voltage is a high frequency PMW wave that can cause the motor temperature to rise and shorten its life. It will also increase the leakage current, which can lead to equipment failure and create strong electromagnetic interference affecting the reliability of other electrical equipment.

3./ As an electromagnetic receiver, too much interference will damage the inverter and affect its normal operation. EMS and EMI inverters coexist in the system. Reducing the EMI of the drive can increase its EMS capability.

2.7.3 EMC installation instructions

To ensure the smooth operation of all electrical equipment in the same system, this section, based on the EMC characteristics of the inverter, outlines the EMC installation procedure in several aspects of the application (noise control, wiring, grounding, leakage current and power filter). The good effectiveness of EMC will depend on the effect of all five aspects.

1./ Noise reduction

All cables connected to the control terminals must be shielded. The conductor shield must be grounded near the inverter input conductor. The grounding method is by means of a 360 ° stepped ring cable clamp. It is strictly forbidden to connect the twisted shielding layer to the ground of the inverter, which significantly reduces or suppresses the shielding effect.

Connect the inverter and motor using a shielded wire or a separate cable route. One side of the shield or metal cover of the cable route should be connected to ground and the other side should be connected to the motor cover. Electromagnetic noise can be significantly reduced by installing an EMC filter.

2./ Electrical installation

Power supply: the power supply should be separated by an electrical transformer. The cable should consist of 5 conductors, three of which are phase conductors, one is the neutral conductor and one of them is ground. It is strictly forbidden to use the same conductor as the neutral and at the same time the earth conductor.

3./ Equipment categorization

In one distribution box, there are various electrical devices, such as inverter, filter, PLC, etc., that have a different ability to radiate and resist electromagnetic interference. It is therefore necessary to classify these devices in a category with a high degree of radiation and interference sensitivity. The same types of equipment should be located in the same area. The distance between devices of different categories should be greater than 20 cm.

4./ Arrangement of conductors inside the switchboard

In one switchboard there are signal cables (low current) and power cables (high current). In terms of the inverter, the power cables are divided into input and output cable. Signal cables can be easily disturbed by power cables. Therefore, cables, both signal and power, should be laid separately. It is strictly forbidden to arrange them in parallel or to cross them at a distance of less than 20 cm or to tie them. If the signal wires must pass through the power cables, they should cross at a 90° angle. Input and output cables should not be arranged next to each other or connected to each other, especially when installing an EMC filter. Otherwise, the distributed capacities of the input and output power cables are interconnected, causing the EMC filter to malfunction.

5./ Grounding

The inverter must be safely grounded during operation. Grounding takes precedence in all EMC methods because it not only ensures the safety of equipment and people, but is also the simplest, most efficient and cheapest solution for solving EMC problems. Grounding has three categories: special grounding, common grounding, and series grounding. Different control systems should use a separate ground, different devices in the same control system should use a common ground, and different devices connected to the same power cord should use a serial ground.

6./ Leakage current

The leakage current includes the leakage current between the conductors and the leakage current to ground. Its value depends on the distributed capacity and the carrier inverter. The earth leakage current, which is the current flowing through the common ground conductor, can flow not only into the inverter system but also into other devices. It can

also cause a fault in the power circuit, relays or other devices. The value of the leakage current in the line, which means the leakage current passing through the distributed capacities of the input and output conductor, depends on the carrier frequency of the inverter, on the length and cross section of the motor cables. The higher the carrier frequency of the inverter, the longer the motor cable and / or the larger the cross-section of the cables, the higher the leakage current.

Countermeasures:

Decreasing the carrier frequency can effectively reduce the leakage current. In the case of a motor cable that is relatively long (longer than 50 meters), an AC or sine wave reactor must be installed on the output side, and when the line is even longer, one reactor must be mounted at a certain distance.

7./ EMC filter

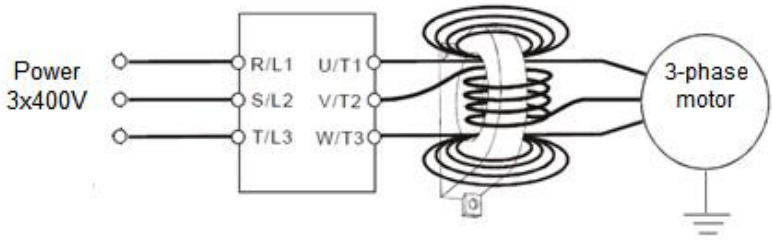
The EMC filter has a great influence on electromagnetic interference, so it is more advantageous for the customer to install it.

From the point of view of the inverter, the installation of a noise filter has the following options:

• Noise filter installed on the input side of the inverter;

• Install a noise filter for other devices using an isolation transformer or voltage filter.

Example of interference suppression on the output side of the inverter using a ferrite ring:



NOTES wire check:

(1) Place control signal cables and mains and other power lines separately.

(2) To prevent interference caused by interference, use a twisted pair or two-wire shielded cable with a cross section of 0.5 to 2 mm2.

(3) Make sure that the terminals used are suitable in terms of voltage and maximum current load.

(4) Use the correct earth terminal E, the earth resistance must be less than <10 ohms, STN EN 62305-3. Use the prescribed cross-section of the earth conductor. The cross-sections of

the protective conductors must be calculated or selected from the table (all according to STN 33 2000-5-54). The ground point should be as close as possible to the inverter and the wire length should be as short as possible. The following requirements must be met in TN networks:

(5) The source resistance of the source node shall not be greater than 5 Ω. A maximum of 15 Ω is permitted in difficult soil conditions.

(6) The total ground resistance of PEN conductors (including conductors leaving the transformed and grounded point) for networks with a voltage of 230 V AC shall not exceed 2 Ω.

(7) The PEN conductor in the TN-C network or the PE conductor in the TN-S network must be earthed by a separate earthing switch or by connection to an existing system. The individual groundings of the PEN and PE conductors should have a ground resistance of no more than 15Ω. The earth resistance at the neutral point at the neutral point at the neutral point should not exceed 5 Ω.

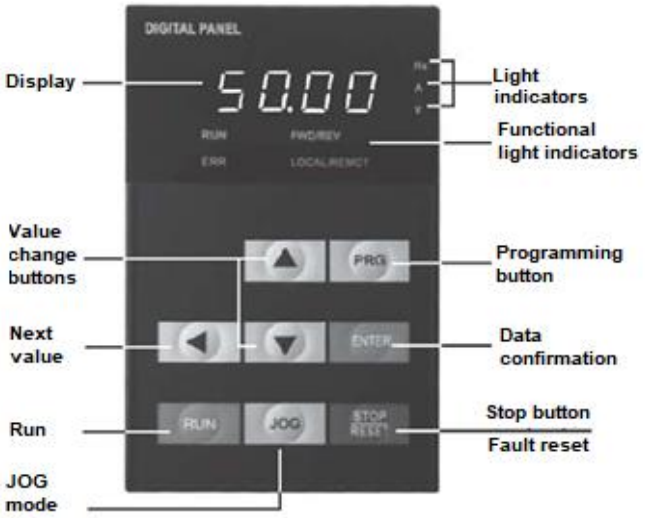
(8) Meet the wiring requirements of each terminal, the correct choice of accessories such as potentiometers, voltmeters, power supplies, cables, terminals, etc.

(9) After completing the connection and checking that everything is connected correctly, the power can be turned on.

(10) The total length of the line should be a maximum of 100 m. Especially with a more remote connection, the current limiting function may be reduced or the device or equipment connected on the output side of the inverter may malfunction or the charging current may be affected due to the long electrical installation. Therefore, note the total cable length. When dimensioning the output cables to the motor, it is recommended to use shielded cables of the type e.g. NYCY 3 x cross section, NYCWY 3 x cross section, or ÖLFLEX® 4G, to minimize radio frequency interference.

Chapter 3: Operation

3.1 Keyboard description



3.2 The descriptions of the button's function

Button	Name	Description
PRG	Program key	Enter or returns from the first level menu
ENTER	ENTER	Stepwise scrolls through menus and confirming parameters
▲	Increase value	Gradually increases data or functional codes

Button	Name	Description
	Decrease value	Gradually decreases data or functional codes
	Shift left	In parameter setting mode, press this button to select the figure you want to edit. In other modes, it displays the parameters by scrolling to the right
	Start	Start of the inverter in keypad control mode.
	Stop / Reset after error	In the mode RUN, it can be used to stop the inverter. In case of a fault, it is possible to reset the inverter without restrictions.
	JOG mode	Determined by function code P7.01 0: Status switching display 1: JOG operation 2: Switch between Forward and Backward. 3: Clears the UP / DOWN settings. 4: Quick tuning mode
	Key combination	You can freely stop the inverter by pressing the RUN and STOP / RESET buttons

3.3 The descriptions of the light indicator

1) Description of light indicator functions

Name of light indicator	Description of light indicator
FWD/REV	OFF: forward operation ON: backward operation
LOCAL/REMOT	OFF : control by keyboard Flashing: control by terminal ON: control via communication

2) Description of the displayed value of the indicator light

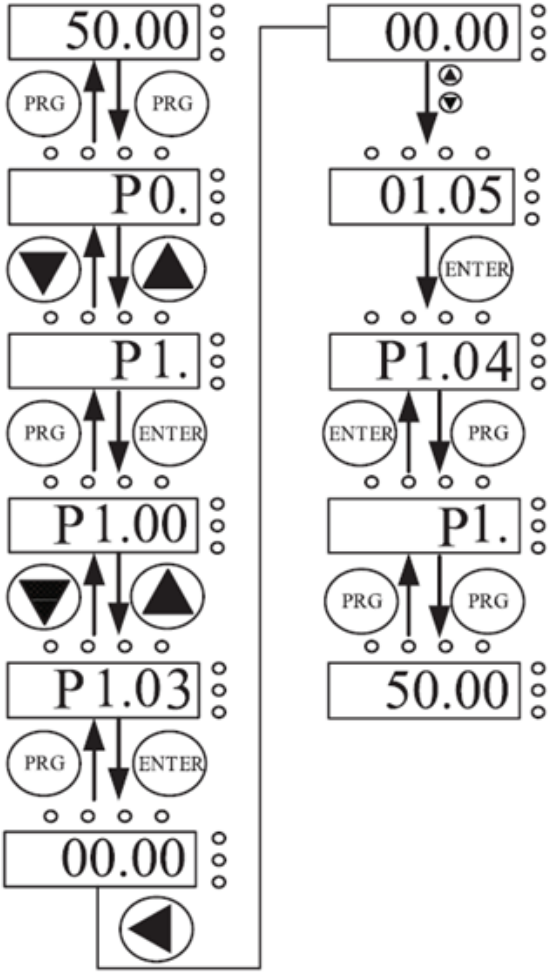
Symbol	Description
Hz	Frequency
A	Current
V	Voltage

3) Digital display

5-digit LED display that can display all types of monitored data and alert codes, such as reference frequency, output frequency, etc.

3.4 Operation - parameter setting

Parameter setting



Parameter setting diagram

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 these two manners is next: 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.

In three-level state, if the parameter is not flashing, it means that 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.

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 by terminal function reset the fault (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.

Adaptive motor parameters setting
1: Automatically setting the dynamic parameters
When selecting vector control mode PG, the motor nameplate data must be exactly entered, the inverter will be set according to the nameplate parameters that correspond to the standard motor. In order to get better control performance, motor parameter auto-tuning is suggested and auto-tuning steps are as follows:
First, the command channel selection (P2.00) for the key commands is started. Then enter the actual parameters according to the engine, as follows: P2.00: engine type;
P2.01: the motor rated power;
P2.02: the motor rated voltage;
P2.03: the motor rated current;
P2.04: the motor rated frequency;
P2.05: the motor rated speed.
In the automatic setup process, "Study" appears on the display, when the display shows "END" the automatic parameter setting of the motor is terminated.
NOTE: In an automatic tuning process, the motor should be unloaded, otherwise the motor parameters obtained from the automatic tuning may not be correct.

2: Automatically setting the static parameters
During auto-tuning of the static engine parameters, the motor may not be without load, the input parameters (P2.01 - P2.05) must be corrected according to the motor

nameplate because automatic adjustment detects stator resistance, rotor resistance and mutual inductance. If the mutual inductance of the motor and no-load current will not be able to measure, the user can input the corresponding values according to the motor nameplates.

3.5 Running converter and PTC protection settings

- Power-on initialization

When the drive is turned on, the system initializes first. When initialization is complete, the drive is in standby mode.

- Stand-by mode of inverter

Various status parameters can be displayed when the drive is stopped or running. By Function Code P7.03 (operating parameters), P7.05 (stop parameter), various definitions can refer to P7.03 and P7.05 function code.

- Adaptive motor parameters setting

Please refer to the detailed description of P2.37 the function code.

- Inverter operation

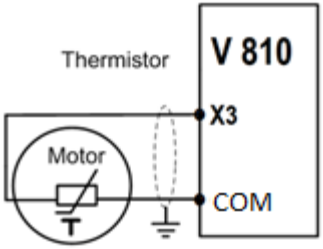
In the operating state, you can select how a total of sixteen operating parameters are to be displayed: operating frequency, set frequency, bus voltage, output voltage, output current, operating speed, output power, output torque, PID setting, analog input PID, FIV voltage, analogue input voltage FIC, number of multi-speed segments, required torque. The bit code selection of function F7.06 (binary converter) can decide what is or should not be displayed. What to display is decided by selecting bit P7.03 and P7.04. Press the ENTER button to switch the display order of the selected parameters, press the ENTER + JOG button to scroll through the parameters in the left order.

- Failure reports

The V810 inverter series offers a variety of fault information. Please read Chapter 5 on V810 inverter errors and troubleshooting them.

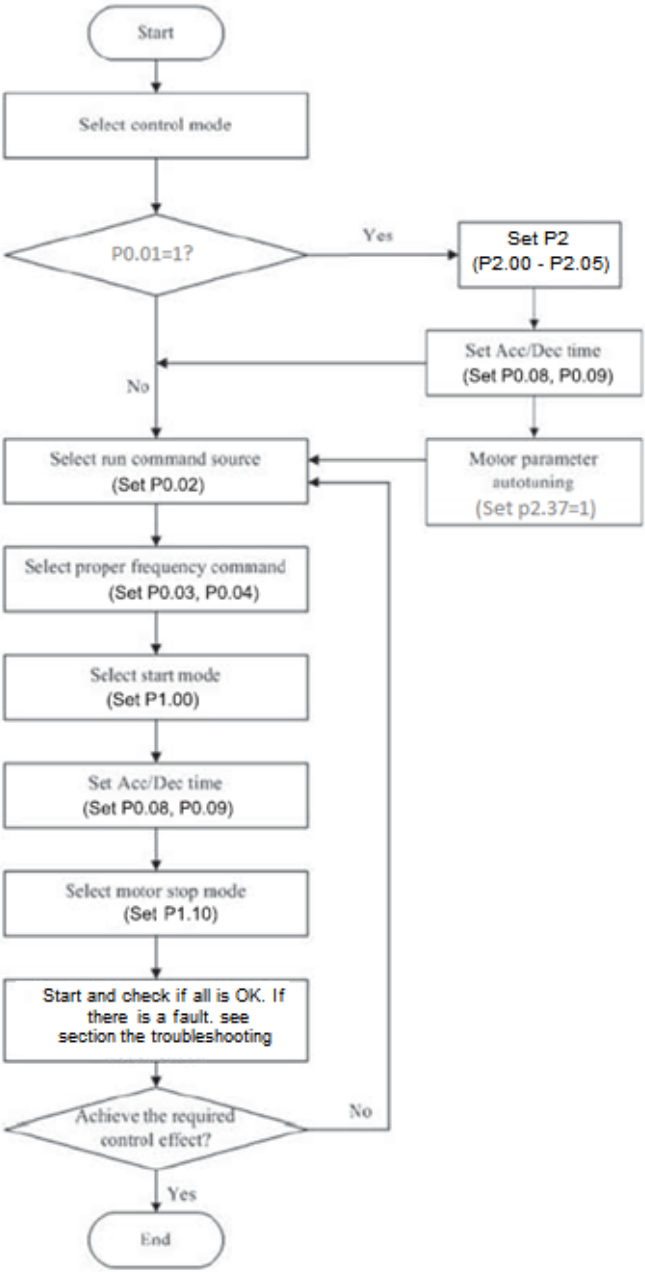
- Setting the PTC motor protection

Connect the PTC thermistor or TK thermal contact of the electric motor according to the picture:



The parameter setting is as follows: P5.02 = 33

3.6 Quick setup - diagram



Chapter 4: Description of functions (abbreviated)

If parameter PP.00 is set to a non-zero number, parameter protection is enabled. You must enter the correct user password to enter the menu. To cancel the password protection function, enter the password and set PP.00 to 0. Parameter menus that the user customizes are not password protected. Group P and B are the basic parameters of functions, group D is for monitoring functional parameters.

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

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

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

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

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

Group P0: Parameters of basic functions

Function code	Parameter name	Setting range	Default setting	Property
P0.00	G/P type*	1: G type (constant torque load) 2: P type (variable torque, e.g. fan, compressor, pump, etc.)	* By the model	★
P0.01	Selecting the control mode	0: Voltage / frequency control (V/F) 1: Non-feedback vector control (SFVC) 2: Vector feedback control (CLVC)	0	★

Function code	Parameter name	Setting range	Default setting	Property
P0.02	Select command channel	0: Control via the operation panel (LED OFF) 1: Control via input terminals (LED ON) 2: Control via comunication (LED FLASHING)	0	☆
P0.03	Frequency source	**.X**: 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 a Y operation) 0: X+Y 1: X-Y 2: Maximum X a Y 3: Minimum X a Y	00	☆
P0.04	Select the main frequency source X	0: Digital setting (P0.10 preset frequency, can change over UP / DOWN; clears the set frequency when the power is turned off) 1: Digital setting (P0.10 preset frequency, can change over UP / DOWN; saves the set frequency when the power is turned off) 2: FIV 3: FIC 4: The rotary knob on the panel 5: Impulse setting (S3) 6: Multiple instructions 7: Simple PLC 8: PID 9: Communication interface	0	★
P0.05	Select the auxiliary frequency source Y	The same as P0.04 (X main source selection)	0	★
P0.06	Select the range of auxiliary frequency source Y	0: Considering to the max. frequency 1: Considering to the max. frequency of X	0	☆

Function code	Parameter name	Setting range	Default setting	Property
P0.07	Extension of the auxiliary power 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 freq (P0.12)	50.00Hz	☆
P0.11	Direction of rotation	0: The same direction 1: Opposite direction	0	☆
P0.12	Maximum frequency	50.00 Hz - 3200.00 Hz	50.00Hz	★
P0.13	The upper limit of the frequency	0: Setting 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	0.5 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	0:1s 1:0.1s 2: 0.01s	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 in memory 1: In memory	0	☆
P0.24	Basis frequency for acceleration / deceleration	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	Command binding to frequency source	**...X**: Binding of the control panel command to the frequency source 0: No binding 1: Frequency source by digital setting 2: FIV 3: FIC 4: FIA (PG card) 5: Impulse setting (X5) 6: Multi-reference 7: PLC 8: PID 9: Communication interface **..X.:** Binding of the terminal command to the frequency source (0-9, same as units) **.X..:** Binding of the communication interface command to the frequency source (0-9, same as units)	000	☆
P0.27	Communication expansion card type	0: MODBUS communication card 1: PROFIBUS-DP communication card 2: CAN OPEN communication card	0	☆

Group P1: Start / Stop Control				
Function code	**Parameter name**	**Setting range**	**Default setting**	**Property**
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 time/Pre- excited time	0%-100%	0%	★
P1.06	Startup DC braking current / Pre-excited current	0.0s -100.0s	0.0s	★
P1.07	Acceleration/ Deceleration mode	0: Linear acceleration / deceleration 1: S-curve acceleration / deceleration A 2: S-curve acceleration / deceleration B	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 according to the curve 1: Idle deceleration	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 to 100.0s	0.0s	☆
P1.13	Braking DC current at stop	0% to 100%	0%	☆
P1.14	DC braking time	0.0s to 100.0s	0.0s	☆
P1.15	Braking rate	0 – 100 %	100 %	☆
Group P2: Motor parameters				
P2.00	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: Synchronous motor with permanent magnets	0	★
P2.01	Rated motor power	0.1kW to 1000.0kW	By the model	★
P2.02	Rated motor voltage	1V to 2000V	By the model	★
P2.03	Rated motor current	0.01 A to 6553.5A	By the model	★
P2.04	Rated motor frequency	0.01 Hz – Maximum frequency	By the model	★
P2.05	Rated motor speed	1 rpm to 65535 rpm	By the model	★
P2.06	Stator resistance (asynchronous motor)	0.01- 65.535 Ω	By the model	★

P2.07	Rotor resistance (asynchronous motor)	0.0001 Ω - 65.535 Ω	By the model	★
P2.08	Leakage inductive reactance (asynchronous motor)	0.01 mH to 655.35mH	By the model	★
P2.09	Mutual induction (asynchronous motor)	0.1mH to 655.35mH	By the model	★
P2.10	Motor current without load (asynchronous motor)	0.01A - P2.03	By the model	★
P2.16	Stator resistance (synchronous motor)	0.0001 Ω - 65.535 Ω	By the model	★
P2.17	Inductance on the side D (synchronous motor)	0.01 mH to 655.35 mH	By the model	★
P2.18	Inductance on the side Q (synchronous motor)	0.01 mH to 655.35 mH	By the model	★
P2.20	Reverse EMF (synchronous motor)	0.1 V to 6553.5 V	By the model	★
P2.27	Setting the number of encoder pulses	1 to 65535	1024	★
P2.28	Type of encoder	0：ABY incremental encoder 1：UVW incremental encoder 2：Resolver 3：SIN/COS encoder 4：Wire-saving UVW encoder	2	★

P2.30	ABZ phase sequence	0: FORWARD 1: BACKWARD	0	★
P2.31	Encoder installation angle	0.0 až 359.9°	0.0°	★
P2.32	UVW phase sequences (UVW encoder)	0: FORWARD 1: BACKWARD	0	★
P2.33	UVW encoder angle offset	0.0 to 359.9°	0.0°	★
P2.34	Number of resolver pole pairs	1 to 65535	1	★
P2.36	Encoder break time detection time	0.0：OFF 0.1s to 10.0s	0.0	★
P2.37	Auto tuning selection	0: Auto tuning disabled 1: Asynchronous motor - static automatic tuning 2: Asynchronous motor - complete automatic tuning 3: Synchronous motor tuning complete 4: Synchronous motor tuning static	0	★

Group P3: Vector control parameters				
P3.00	Linear constant 1	1-100	30	☆
P3.01	Integration constant 1	0.01 s to 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 to 10.00s	1.00s	☆
P3.05	Frequency of switching 2	P3.02 – maximum output frequency	10.00Hz	☆
P3.06	Vector control slip	50% to 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: Set via P3.10 1: FIV 2: FIC 3: Reserved 4: Impulse setting (X5) 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% to 200.0%	150.0%	☆

P3.13	Adjusting the linear excitation constant	0-60000	2000	☆
P3.14	Adjusting the integration constant of excitation	0-60000	1300	☆
P3.15	Adjusting the linear constant of torque	0-60000	2000	☆

Function code	Parameter name	Setting range	Default setting	Property
P3.16	Adjusting the integration constant of torque	0-60000	1300	☆
P3.17	Speed of integration loo	0: Disabled 1: Enabled	0	☆
P3.18	Synchronous motor field weakening mode	0: No field weakening 1: Direct calculation 2: Automatic adjustment	1	☆
P3.19	The field weakening force of the synchronous motor	50% to 500%	100%	☆
P3.20	Maximum field weakening current	1% to 300%	50%	☆
P3.21	Weakening of the automatic gain setting	10% to 500%	100%	☆
P3.22	Integral multiple weakening field	2 to 10	2	☆

Group P4: V/F Control Parameters				
Function code	**Parameter name**	**Setting range**	**Default setting**	**Property**
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 separation	0	★
P4.01	Increase of torque	0.0%: (Auto increase) 0.1% to 30.0%	By the model	☆
P4.02	Torque limitation	0.00 Hz – maximum output frequency	50.00Hz	★
P4.03	Multi-point V/F frequency curve 1	0.00 Hz - P4.05	0.00Hz	★
P4.04	Multipoint V/F voltage curve 1	0.0% to 100.0%	0.0%	★
P4.05	Multi-point V/F frequency curve 2 (F2)	P4.03 to P4.07	0.00Hz	★
P4.06	Multipoint V/F voltage curve 2 (V2)	0.0% to 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% to 100.0%	0.0%	★

P4.09	Constant slope compensation V/F	0.0% to 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 (X5) 5: Multiple function 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, indicates the time required to increase the output voltage from 0 V to the rated motor voltage	0.0s	☆
P4.16	Voltage decline time of V/F separation	0.0s-1000.0s, indicates the time required for the output voltage to drop from the rated motor voltage to 0 V	0.0s	☆

Group P5: Input terminals				
P5.00	Function selection X1	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) input of an external error 12: Fixed speed 1 13: Fixed speed 2 14: Fixed speed 3 15: Fixed speed 4 16: Terminal 1 for selecting acceleration / deceleration time 17: Terminal 2 for selecting acceleration / deceleration time 18: Switching frequency source X/Y 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 Value: Function 24: Swing break 25: Counter input 26: Reset the counter 27: Length count input 28: Resetting the length 29: Torque control disabled 30: 30: Pulse input (S3 only) 31: Reserved 32: Immediate DC braking 33: Normally closed (NC) external error input (via X suitable for PTC) 34: Changing the frequency is disabled 35: Reverse direction of PID 36: Terminal for external STOP 1	1	★
P5.01	Function selection X2		4	★
P5.02	Function selection X3		9	★
P5.03	Function selection X4		12	★
P5.04	Function selection X5		13	★
P5.05	Function selection X6		0	★
P5.06	Function selection X7		0	★

P5.07	Function selection X8	37: Terminal for command source switch 2 38: Pause the PID integration 39: Switching between the main X source and the preset frequency 40: Switching between the auxiliary Y source and the preset frequency 41: Engine selection terminal 1 42: Engine selection terminal 2 43: Switching PID parameters 44: Reserved 45: Reserved 46: Switching - speed control / torque control 47: Emergency Stop 48: Terminal for external STOP 2 49: DC braking with delay 50: Reset the current operating time 51-59: Reserved	0	★
P5.08	Rezerva		0	★
P5.09	Rezerva		0	★
P5.10	Filter time	0.000s to 1.000s	0.010 s	☆
P5.11	Command mode via terminal	0: Two-wire mode 1 1: Two-wire mode 2 2: Three-wire mode 1 3: Three-wire mode 2	0	★
P5.12	Change value by terminals UP/DOWN	0.001 Hz/s to 65.535Hz/s	1.00Hz/s	☆
P5.13	FI curve 1 minimum input	0.00V - P5.15	0.00V	☆

P5.14	Corresponding setting of FI curve 1 minimum input	-100.0% to +100.0%	0.0%	☆
P5.15	FI curve 1 maximum input	P5.13 - +10.00V	10.00V	☆
P5.16	Corresponding setting of FI curve 1 maximum input	-100.0% to +100.0%	100.0%	☆
P5.17	FI filter curve time 1	0.00s to 10.00 s	0.10s	☆
P5.18	FI curve 2 minimum input	0.00V - P5.20	0.00V	☆
P5.19	Corresponding setting of FI curve 2 min. input	-100.0% to +100.0%	0.0%	☆
P5.20	FI curve 2 maximum input	P5.18 - +10.00V	10.00V	☆
P5.21	Corresponding setting of FI curve 2 max. input	-100.0% to +100.0%	100.0%	☆
P5.22	FI filter curve time 2	0.00s to 10.00 s	0.10s	☆
P5.23	FI curve 3 minimum input	-10.00V to P5.25	-10.00V	☆
P5.24	Corresponding setting of FI curve 3 min. input	-100.0% to +100.0%	-100.0%	☆
P5.25	FI curve 3 maximum input	P5.23 - +10.00V	10.00V	☆
P5.26	Corresponding setting of FI curve 3 max. input	-100.0% to +100.0%	100.0%	☆
P5.27	FI filter curve time 3	0.00S - 10.00s	0.10s	☆

P5.28	IMPULS minimum input	0.00kHz to P5.30	0.00kHz	☆
P5.29	Corresponding minimum input impulse setting	-100.0% to 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: FIV curve selection 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: Choice of FIC curves (1-5, same as FIV) Hundreds: Choice of FIA curves (1 - 5, same as FIV)	321	☆
P5.34	Set the FI to less than the minimum input up	Units: Setting the FIV to a value less than min. entrance 0: Minimum value 1: 0.0% Tens: Setting the FIC to a value less than min. input (0 - 1, same as FIV) Hundreds: Setting the FIC to a value less than min. input (0 - 1, same as FI)	000	☆

P5.35	X1 delay time	0.0s - 3600.0s	0.0s	★
P5.36	X2 delay time	0.0s -~ 3600.0s	0.0s	★
P5.37	X3 delay time	0.0s - 3600.0s	0.0s	★
P5.38	Selecting the allowed X-mode 1	0: High level 1: Low level _ _ _ _ X : X1 allowed mode _ _ _ X _ : X2 _ _ X _ _ : X3 _ X _ _ _ : X4 X _ _ _ _ : X5	00000	★
P5.39	Selecting the allowed X-mode 2	0: High level 1: Low level _ _ _ _ X : X6 allowed mode _ _ _ X _ : X7 _ _ X _ _ : X8 _ X _ _ _ : X9 X _ _ _ _ : X10	00000	★

Group P6: Output terminals

Function code	Parameter name	Setting range	Default setting	Property
P6.00	YO terminal output mode	0: Pulse output signal (YO-P) 1: On / Off output signal (YO-R)	0	☆

P6.01	Function YO-R (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: Counter set value reached 10: Length reached 11: The entire PLC cycle completed 12: The cumulative operating time reached	0	
P6.02	Relay output function YA-YB-YC (0-40)	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	2	
P6.03	Relay output function RA-RB-RC (0 – 40)	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 current limit 37: Frequency lower limit reached 38: Alarm 39: Reserved 40: Actual running time reached	0	☆
P6.04	Reserved		0	
P6.05	Reserved		0	

Function code	Parameter name	Setting range	Default setting	Property
P6.06	Output function selection YOP (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% is 100.0kHz) 7: FIV 8: FIC 9: FIA (for PG card) 10: Length 11: Calculated value 12: Communication settings 13: Engine speed 14: Output current (100.0% is 1000.0 A) 15: Output voltage (100.0% is 1000.0 V) 16: Reserved	0	☆
P6.07	Output function selection FOV (0 – 16)		0	☆
P6.08	Output function selection FOC (0 – 16)		1	
P6.09	Maximum output frequency YOP	0.01 kHz až 100.00 kHz	50.00 kHz	☆
P6.10	FOV zero displacement coefficient	-100.0% - +100.0%	0.0%	☆
P6.11	FOV gain	-10.00 - +10.00	1.00	☆
P6.12	FOC zero displacement coefficient	-100.0% - +100.0%	0.0%	☆

P6.13	FOC gain	-10.00 - +10.00	1.00	☆
P6.14 - P6.16	Reserved			
P6.17	YO-R output delay time	0.0s - 3600.0s	0.0s	☆
P6.18	YA-YB-YC output delay time	0.0s - 3600.0s	0.0s	☆
P6.19	RA-RB-RC output delay time	0.0s - 3600.0s	0.0s	☆
P6.20	YO delay time	0.0s - 3600.0 s	0.0 s	
P6.21	Reserved			
P6.22	Output terminal mode selection	. . X: YO-R mode 0: Positive logic 1: Negative logic . X: RA-RB-RC mode 0: Positive logic 1: Negative logic X. .: YA-YB-YC mode 0: Positive logic 1: Negative logic	0000	☆

Group P7: Control panel and display

Function code	Parameter name	Setting range	Default setting	Property
P7.00	Correction power factor	0.0 - 200.0	100.0	☆

P7.01	Select the function of the JOG key	0: The JOG button is off 1: Switches between panel control and external control (terminal command channel or communication channel): 2: Switching between FORWARD and REVERSE 3: FORWARD JOG 4: BACK JOG		
P7.02	STOP/RESET key	0: STOP/RESET key enabled only in operation panel control 1: STOP/RESET key enabled in any operation mode	1	☆
P7.03	Parameters 1, LED display during RUN	0000-FFFF Bit00: Run frequency 1 (Hz) Bit01: Set frequency (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit07: Input status S 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: Pulse frequency setting (kHz) Bit03: Run frequency 2 (Hz) Bit04: Remaining run time Bit05: FIV voltage before correction (V) Bit06: FIC voltage before correction (V) Bit07: Reserved Bit08: Linear speed Bit09: Current time under voltage Bit10: Current run time (Min) Bit11: Pulse frequency setting (kHz) Bit12: Communication setting value Bit13: Reserved Bit14: Display of main frequency X (Hz) Bit15: Auxiliary frequency Y (Hz) display	0	☆
P7.05	LED display during STOP	0000-FFFF Bit00: Set frequency (Hz) Bit01: Bus voltage (V) Bit02: Input status S Bit03: Output status M01 Bit04: FIV voltage (V) Bit05: FIC voltage (V) Bit06: Reserved Bit07: Counter value Bit08: Length value Bit09: PLC status Bit10: Display load speed Bit11: PID setting Bit12: Pulse frequency setting (kHz)	33	☆
P7.06	Load speed display coefficient	0.0001- 6.5000	1.0000	☆

Function code	Parameter name	Setting range	Default setting	Property
P7.07	Actual inverter module temperature	0.0°C to 150.0°C	-	•
P7.08	Actual inverter heatsink temperature	0.0 to 150.0°C	-	•
P7.09	Total running time	0h to 65535hod.	-	•
P7.10	Reserved	-	-	•
P7.11	Software version	-	-	•
P7.12	The number of decimal places to display the load rate	0: 0 decimal places 1: 1 decimal places 2: 2 decimal places 3: 3 decimal places	1	☆
P7.13	Total time under voltage	0h to 65535h	-	•
P7.14	Total electricity consumption	0kWh to 65535kWh	-	•
Group P8: Auxiliary functions				
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 2	0.0s - 6500.0s	By the model	☆
P8.05	Acceleration time 3	0.0s - 6500.0s	By the model	☆
P8.06	Deceleration 3	0.0s - 6500.0s	By the model	☆
P8.07	Acceleration time 4	0.0s - 6500.0s	By the model	☆

P8.08	Deceleration 4	0.0s - 6500.0s	By the model	☆
P8.09	Jump frequency 1	0.00Hz – maximum frequency	0.00Hz	☆

Function code	Parameter name	Setting range	Default setting	Property
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: Enabled 1: Disabled	0	☆
P8.14	Mode of operation when the set frequency is lower than the lower limit of frequency	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 - 65000h	Oh	☆
P8.17	Total time of operation the inverter	0h - 65000h	Oh	☆
P8.18	The protection at the start	0: NO 1: YES	0	☆
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	Jumping frequency during acceleration / deceleration	0: Enabled 1: Disabled	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: Enabled 1: Disabled	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%	☆
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 % - Not detected 0.1 % - 300.0 % (rated motor current)	200.0%	☆
P8.37	Delay time when exceeding the output current limit	0.00s - 600.00s	0.00s	☆

P8.38	Current reaching the value 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 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: Enabled 1: Disabled	0	☆
P8.43	Timing source selection	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	Thermal protection switch-off 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	0.0Min - 6500.0Min	0.0 min	★

Group P9: Faults and protection				
P9.00	Selection of overload protection	0: OFF 1: Enabled (ON)	1	☆
P9.01	Increasing motor overload protection	0.20 to 10.00	1.00	☆
P9.02	Motor overload warning coefficient	50% to 100%	80%	☆
P9.03	Increasing overload of DC overvoltage	0 to 100 0 = no overvoltage (set 0 to when dynamic braking is activate**)**	10	☆
P9.04	Overvoltage stall protective voltage	120% to 150%	130%	☆
P9.05	Overcurrent increasing	0 to 100	20	☆
P9.06	Overcurrent protection	100% to 200%	150%	☆
P9.07	To test short to ground after switching on	0: Disabled 1: Enabled	1	☆
P9.09	Automatic recovery time after fault	0 to 20	0	☆
P9.10	Output state YO during auto-recovery after malfunction	0: No activity 1: Activity	0	☆
P9.11	Auto-recovery interval after malfunction	0.1s - 100.0s	1.0s	☆
P9.12	Turn on protection when the input phase fails	0: Protection disabled (Off) 1: Protection allowed	1	☆
P9.13	Turn on protection when the output phase fails	0: Protection disabled (Off) 1: Protection allowed	1	☆

P9.14	The first type of fault	0: No error 1: Reserved 2: Overcurrent at acceleration 3: Overcurrent during deceleration 4: Overcurrent at constant speed. 5: Overvoltage during acceleration 6: Overvoltage during deceleration 7: Overvoltage at constant speed 8: Brake unit overload 9: Undervoltage 10: Inverter overload 11: Motor overload 12: Power phase loss 13: Loss of output phase 14: Module overheating 15: External device error 16: Communication error 17: Contactor fault 18: Current detection fault 19: Automatic engine tuning error 20: Encoder / PG card error 21: Error reading and writing EEPROM 22: Drive hardware error 23: Short circuit to ground 24: Reserved 25: Reserved 26: Accumulation run time has been reached 27: User - defined fault 1 28: User - defined fault 2 29: Accumulation time has been reached 30: Load is 0 (zero) 31: Runtime PID feedback 40: Current limit error 41: Engine failure during operation 42: Speed deviation too large 43: Rotor speed exceeded 45: Engine overheating 51: Initial position fault	-	•
P9.15	The second type of disorder		-	•
P9.16	The third (last) type of fault		-	•
P9.17	Frequency at the 3rd fault	Frequency recording at last error	-	•

P9.18	Current at the 3rd fault	-	-	•
P9.19	Bus voltage at the 3rd fault	-	-	•
P9.20	Status of input terminals at the 3rd fault	-	-	•
P9.21	Status of output terminals at the 3rd fault	-	-	•
P9.22	Inverter status at the 3rd fault	-	-	•
P9.23	On time at the 3rd fault	-	-	•
P9.24	Runtime after the 3rd	-	-	•
P9.25	Reserved			
P9.26	Reserved			
P9.27	Frequency at the 2nd fault	-	-	•
P9.28	Current at the 2nd fault	-	-	•
P9.29	Bus voltage at the 2nd fault	-	-	•
P9.30	Status of input terminals at the 2nd fault	-	-	•
P9.31	Status of output terminals at the 2nd fault	-	-	•
P9.32	Inverter status at the 2nd fault	-	-	•
P9.33	On time at the 2nd fault	-	-	•
P9.34	Runtime after the 2nd fault	-	-	•
P9.35	Reserved			
P9.36	Reserved			
P9.37	Frequency at the 1st fault	-	-	•
P9.38	Current at the 1st fault	-	-	•
P9.39	Bus voltage at the 1st fault	-	-	•
P9.40	Status of input terminals at the 1st fault	-	-	•
P9.41	Status of output terminals at the 1st fault	-	-	•
P9.42	Inverter status at the 1st fault	-	-	•

P9.43	On time at the 1st fault	-	-	•
P9.44	Runtime after the 1st fault	-	-	•
P9.45	Reserved			
P9.46	Reserved			
P9.47	Selection of failure protection action 1	**.... X**: Motor overload (OL1) 0: Deceleration to a stop 1: STOP according to stop mode 2: Continuing operation **... X.**: Lost of input phase LI **..X ..**: Output phase loss (LO) **.X ...**: External device error (EF) **X ....**: Communication error (CE)	00000	☆
P9.48	Selection of failure protection action 2	**.... X**: PG encoder error 0: Deceleration to a stop 1: Switch to V / F, STOP control according to stop mode 2: Switch to V / F control, motor RUN continues **... X.**: EEPROM memory error (EEP) 0: Deceleration to a stop 1: STOP according to stop mode **..X ..**: Reserved **.X ...**: Engine overheating **X ....**: Total time reached (END1)	00000	☆

Function code	Parameter name	Setting range	Default setting	Property
P9.49	Selection of failure protection action 3	**....X:** User defined 1 0: Deceleration to a STOP 1: STOP according to stop mode 2: Continuing in RUN **...X.:** User defined 2 0: Deceleration to a STOP 1: STOP according to stop mode 2: Continuing in RUN **..X..:** Total time under voltage (END2) reached 0: Deceleration to a STOP 1: STOP according to stop mode 2: Continuing in RUN **.X...:** Zero load 0: Deceleration to a STOP 1: STOP according to stop mode 2: Continues to operate at 7% of the rated motor frequency and restores the set frequency when the load is restored **X....:** Loss of PID feedback 0: Deceleration to a STOP 1: STOP according to stop mode 2: Continuing in RUN	00000	☆
P9.50	Selection of failure protection action 4	Units: Excessive Speed Deviation (ESP) 0: Deceleration to a stop 1: STOP according to stop mode 2: Continue running Tens: Speeding (OSP) Hundreds: Initial Position Fault (INI)	00000	☆
P9.51	Reserved			☆
P9.52	Reserved			☆
P9.53	Reserved			☆

P9.54	Frequency selection to continue running	0: Current running frequency 1: Set frequency 2: Upper frequency limit 3: Lower frequency limit 4: Backup frequency on fault	0	☆
P9.55	Backup frequency on fault	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	P9.62 -100.0%	100.0%	☆
P9.61	Power monitoring time in case of a sudden power outage	0.00s -100.00s	0.50s	☆
P9.62	Voltage during power failure	60.0 % - 100.0 % (bus voltage)	80.0%	☆
P9.63	Protection at zero load	0: Enabled 1: Disabled	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	Overspeed detection value	0.0% to 50.0% maximum frequency	20.0 %	☆
P9.68	Overspeed time detection value	0.0 s to 60.0 s	1.0 s	☆
P9.69	Detection value deviation is too fast	0.0 % to 50.0 % maximum frequency	20.0 %	☆
P9.70	Detection time deviation too high	0.0 s to 60.0 s	1.0 s	☆

Group PA: PID process control functions				
Function code	**Parameter name**	**Setting range**	**Default setting**	**Property**
PA.00	Setting of source the required value of PID	0:PA.01 1:FIV 2:FIC 3:Reserved 4: PULSE setting (X5) 5: Communication settings 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: PULSE setting (X5) 5: Communication settings 6:FIV+FIC 7:MAX(|FIV|, |FIC|) 8:MIN(|FIV|, |FIC|)	0	☆
PA.03	Direction of action the PID	0: Action forward 1: Action backward (reverse)	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	0.01 s - 10.00s	2.00s	☆
PA.17	Derivation constant Td2	0.000S - 10.000s	0.000s	☆
PA.18	Switching condition of PID parameters	0: No switching 1: Switching via X 2: Automatic switching based on deviation	0	☆
PA.19	Deviation of the parameter switching PID 1	0.0% - PA.20	20.0%	☆
PA.20	Deviation of the parameter switching PID 2	PA.19 - 100.0%	80.0%	☆
PA.21	Initial value of PID (required value)	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	0.00%-100.00%	1.00%	☆

PA.25	PID integration features	**.X:** Separated integration 0: Enabled 1: Disabled **X.:** Stop integration when the output reaches the required limit 0: Continuation of integration 1: Stop 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 PID action 1: PID action according to setting	0	☆

Group Pb: Variable frequency, fixed length and count

Function code	Parameter name	Setting range	Default setting	Property
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				
PC.00	Fixed speed 0	-100.0% - 100.0%	0.0%	☆
PC.01	Fixed speed 1	-100.0% - 100.0%	0.0%	☆
PC.02	Fixed speed 2	-100.0% - 100.0%	0.0%	☆
PC.03	Fixed speed 3	-100.0% - 100.0%	0.0%	☆
PC.04	Fixed speed 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: Keeps 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	
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)	☆
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	☆
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: FIA 4: PULSE setting (X5) 5: PID 6: Set according to the preset frequency (P0.10), modified with ter. UP / DOWN	0	☆
Group PD: Communication parameters				
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	6005	☆
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> Applies to MODBUS	3	☆
PD.02	Local address	1 – 247; 0: Transmitting address	1	☆

PD.03	Response delay	0ms - 20ms	2	☆
PD.04	Time communication limit	0.0 (invalid) 0.1s - 60.0s	0.0	☆
PD.05	MODBUS transmission protocol selection	**_ 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 PE: Reserved				
Group PP: Function codes defined by user				
PP.00	User password	0 - 65535	0	☆
PP.01	**Restore factory settings**	00: No activity **01: Restore factory setting except motor parameters** 02: Delete records 04 ： Restores stored user parameters 501Backs up current user parameters	0	★
Group C0: Torque control and parameter limitation				
Function code	**Parameter name**	**Setting range**	**Default setting**	**Property**
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 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	☆
Group C1 – C4: Reserved				
Group C5: Control optimization parameters				
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 P	0: Forbidden 1-10: Random PWM carrier frequency	0	☆
C5.04	Open limitation of current	0: Enabled 1: Disabled	1	☆

C5.05	Detection of current compensation	0-100	5	☆
C5.06	Setting the under voltage	60.0% - 140.0%	100.0%	☆
C5.07	Selection SFVC optimization mode	0: No optimization 1: Optimization mode 1 2: Optimization mode 2	1	☆
C5.08	Dead band time adjustment	100 % to 200 %	150 %	☆
Group C6: FI curve setting (FI is FIV or FIC)				
C6.00	FI curve 4 minimum	-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 inflexia 1	C6.00 - C6.04	3.00V	☆
C6.03	Corresponding FI curve 4 setting inflexia 1	-100.0% - +100.0%	30.0%	☆
C6.04	FI curve 4 inflexia 2	C6.02 - C6.06	6.00V	☆
C6.05	Corresponding FI curve 4 setting inflexia 2	-100.0% - +100.0%	60.0%	☆
C6.06	FI curve 4 maximum	C6.06-+10.00V	10.00V	☆
C6.07	Corresponding FI curve 5 setting max.	-100.0% - +100.0%	100.0%	☆
C6.08	FI curve 5 minimum	-10.00V - C6.10	0.00V	☆
C6.09	Corresponding FI curve 5 setting minimum	-100.0% - +100.0%	-100.%	☆

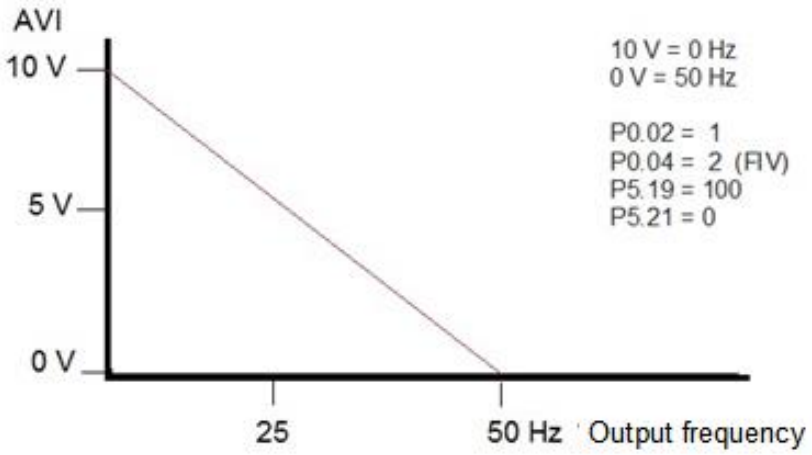
C6.10	FI curve 5 inflexia 1	C6.08 - C6.12	3.00V	☆
C6.11	Corresponding FI curve 5 setting inflexia 1	-100.0% - +100.0%	-30.0%	☆
C6.12	FI curve 5 inflexia 2	C6.10 - C6.14	6.00V	☆
C6.13	Corresponding FI curve 5 setting inflexia 2	-100.0% - +100.0%	30.0%	☆
C6.14	FI curve 5 maximum	C6.12-+10.00V	10.00V	☆
C6.15	Corresponding FI curve 5 setting maximum	-100.0% - +100.0%	100.0%	☆
C6.16	setting of jump point of the FIV	-100.0% - 100.0%	0.0%	☆
C6.17	Jump amplitude FIV	0.0% - 100.0%	0.5%	☆
C6.18	setting of jump point of the FIC	-100.0% - 100.0%	0.0%	☆
C6.19	Jump amplitude FIC	0.0% - 100.0%	0.5%	☆
Group C9: Special functions PID				
C9.00	PID sleep frequency	0 to P0.12	0.00 Hz	
C9.01	PID sleep time	0 to 5000.0 s	10.0 s	
C9.02	PID wake-up value	0 to 100.0 %	60.0 %	
Group CC: Correction of FI / FO values				
CC.00	Measured voltage FIV 1	0.500V - 4.000V	Factory setting	☆

CC.01	Displayed voltage FIV 1	0.500V-4.000V	Factory setting	☆
CC.02	Measured voltage FIV 2	6.000V-9.999V	Factory setting	☆
CC.03	Displayed voltage FIV 2	6.000V-9.999V	Factory setting	☆
CC.04	Measured voltage FIC 1	0.500V-4.000V	Factory setting	☆
CC.05	Displayed voltage FIC 1	0.500V-4.000V	Factory setting	☆
CC.06	Measured voltage FIC 2	6.000V-9.999V	Factory setting	☆
CC.07	Displayed voltage FIC 2	6.000V-9.999V	Factory setting	☆
CC.08	Reserved		Factory	☆
CC.09	Reserved		Factory	☆
CC.10	Reserved		Factory	☆
CC.11	Reserved		Factory	☆
CC.12	FOV target voltage 1	0.500V-4.000V	Factory setting	☆
CC.13	FOV measured voltage 1	0.500V-4.000V	Factory setting	☆
CC.14	FOV target voltage 2	6.000V-9.999V	Factory setting	☆
CC.15	FOV measured voltage 2	6.000V-9.999V	Factory setting	☆
CC.16 To CC.19	Reserved		Factory setting	☆

Parameters of group D0:		
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 X-terminal	1
D0.08	Output state of YO-terminal	1
D0.09	FIV analog input - voltage (V)	0.01 V
D0.10	FIC analog input - 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	Feedback speed	0.1 Hz
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	Encoder feedback rate	0.01 Hz
D0.30	Main frequency X	0.01 Hz
D0.31	Auxiliary frequency Y	0.01 Hz
D0.32	Displaying any memory address value	1
D0.33	Synchronous motor rotor position	0.0°
D0.34	Engine temperature	1°C
D0.35	Required torque	0.1 %
D0.36	Resolver position	1
D0.37	Angle of the effective	0.1

D0.38	ABZ position	0.0
D0.39	Target voltage for V/F separation	1 V
D0.40	Output voltage for V/F separation	1 V
D0.41	X status visual display	1
D0.42	Y status visual display	1
D0.43	Function display X display 1	1
D0.44	Function display X display 2	1
D0.59	Set frequency (0.01%)	0
D0.60	Running frequency	.....Hz
D0.61	Inverter condition	

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



Example No.2 Parameterization of braking resistor:

P9.03=0 (activates the braking resistor)

Chapter 5 Checking and removing errors

5.1 Displaying and removing errors

The V 810 has a total of 24 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 analyse 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.

Error name	Display	Possible cause	Solution
Inverter 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.

Error name	Display	Possible cause	Solution
Overcurrent during acceleration	OC2	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.	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	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.	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	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.	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.

Error name	Display	Possible cause	Solution
Overvoltage during deceleration	OU2	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 installed.	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	1: The input voltage is too high. 2: An external force drives the motor during deceleration.	1: Adjust the voltage to normal range. 2: Cancel the external force or install the braking resistor.
Control 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	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 defective.	1: Reset the fault. 2: Adjust the voltage to normal range. 3, 4, 5, 6: Find technical support.
Inverter overload	OL2	1: The load is too high or another motor is connected to 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

Motor overload	OL1	1: P9.01 is set improperly. 2: The load is too high or another motor is connected to the motor. 3: The AC inverter model is of too small power class.	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.
Loss of input phase	LI	1: The three-phase power supply is faulty 2: The inverter motherboard is faulty. 3: The inverter's optical board is defective. 4: The control panel main board is faulty.	1: Troubleshoot the power supply 2: Look for technical support 3: Look for technical support 4: Look for technical support
Loss of output phase	LO	1: The cable connecting the AC drive and the motor is faulty. 2: The AC inverter's three-phase output is unbalanced when the motor is running. 3: The inverter board is faulty. 4: The module is faulty.	1: Eliminate external faults. 2: Check whether the motor three-phase winding is normal. 3: Find technical support 4. Find technical support
Inverter overheat	OH	1: The ambient temperature is too high. 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.	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	1: External fault signal is input via X. 2: External fault signal is input via virtual I/O.	1: Reset the operation. 2: Reset the operation.
Communi-cation fault	CE	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.	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	1: The drive board and power supply are defective. 2: The contactor is defective.	1: Replace the defective drive board or power supply board. 2: Replace the defective contactor.
Current detection fault	IE	1: The HALL device is defective. 2: The drive board is defective.	1: Replace the defective HALL device. 2: Replace the defective drive board.
Motor auto-tuning error	TE	1: The motor parameters are not set according to the nameplate. 2: The motor auto-tuning times out.	1: Set the motor parameters according to the nameplate properly. 2: Check the cable connecting the inverter and the motor.
PG card error	PG	1: The set encoder type is incorrect. 2: The cable connection to the encoder is incorrect. 3: The encoder is damaged. 4: The PG card is faulty	1: Set the correct encoder type 2: Eliminate external faults. 3: Replace the damaged encoder. 4: Replace the faulty PG card.
EEPROM read / write fault	EEP	The EEPROM chip is defective.	Replace the main control board.

Inverter hardware fault	OUOC	1: Overvoltage exists. 2: Overcurrent exists.	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.
Pulse-by-pulse 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 over speed fault	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 sensor parameters correctly. 2: Perform automatic engine tuning. 3: Set the engine speed detection parameters correctly based on the current situation.
Initial position fault	ini	The motor parameters have too many deviations from the actual values.	Check again that the motor parameters are set correctly and make sure that the rated motor current setting is not too small.

5.2 Common errors and their solutions

You may encounter the following errors while using the drive. See the following table for easy fault analysis.

Table 5-1: Troubleshooting Common Drive Faults

SN	Error	Possible cause	Solution
1	When the power is turned on, no indication appears on the display	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 operation panel breaks.	1: Check the power supply. 2: Check the bus voltage. 3: Find technical support

2	When the power is turned on, "8000" is displayed.	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	When the power is turned on, "GND" is displayed.	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 display is normal when the power is turned on. But when started, "8000" is displayed 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.
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.
7	The S-terminals are blocked	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 indicated when the power or inverter is turned on.	The contactor of soft starter is not excitated.	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. 4: Find technical support

Chapter 6: Maintenance

⚠ WARNING
• 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.

6.1 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.

6.2 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
PCB	Dust and dirt	Vacuum clean.
Fan	Abnormal noise, abnormal vibration, whether it has used up 20 000 hours	Clean from dirt or replace the fan
Electrolytic capacitor	Whether the colour is changed and the smell is abnormal	Replace the electrolytic capacitor
Heatsink	Dust and dirt	Vacuum clean.
Power components	Dust and dirt	Vacuum clean.

6.3 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 30 000 to 40 000 hours.

6.4 V 810 Inverter warranty

6.4.1 Inverter tests

The frequency converter was thoroughly tested and pre-programmed by the manufacturer before shipment. The properties of the V 810 product 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	Corresponding standard
Insulation resistance		> 1MΩ	GB 12668
Insulation strength		2.5kV AC; 60s leakage current < 1 mA	GB 12668
ESD	Constant discharge	+/- 4 kV	EN 61000-4-2
	Air discharge	+/- 8 kV	
	Discharge at the joints	+/- 4 kV	
EFT	RST	+/- 4 kV	EN 61000-4-4
	UVW	+/- 2 kV	
	Signaling paths	+/- 2.5 kV	
Line overvoltage	Interphase	+/- 2 kV	EN 61000-4-5
	Opposite	+/- 4 kV	
CS test (Frequency range 150 kHz to 80 MHz		10 V (e.m.f)	EN 61000-4-6

6.4.2 Warranty period

The warranty period is 24 months from the date of sale of the product.

6.4.3 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

6.4.4 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 over voltages 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.

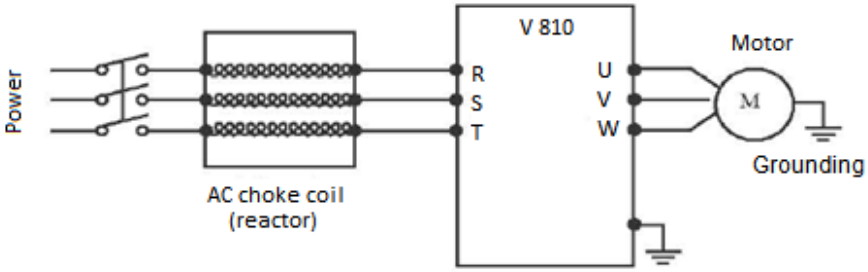
Chapter 7: Peripheral devices selection

Check the performance of the purchased inverter. Appropriate peripherals must be selected according to performance. Look at the following list and select the appropriate peripherals:

7.1 Peripheral devices description

Device name	Description
Circuit breaker and leakage breaker	The circuit breaker must be carefully selected according to the power and tripping time
Electromagnetic contactor (MC)	Install the contactor to ensure operator safety. Do not use the contactor to start and stop the inverter. Otherwise, its service life will be shortened.
AC/DC choke coil (reactor)	The reactor (optional) is used to measure harmonic power, improve the power factor or if the inverter is installed near a large power supply system (1000 kVA or more). If you do not use the reactors, the inverter may be damaged. Select the reactor according to the model. At 160 KW or less, remove the jumpers via the P / + - <-> terminals to connect to the DC reactor. At 250 KW or more, a unidirectional reactor is supplied. Always install it.
Interference filter	Install an interference filter to reduce the electromagnetic noise generated from the drive. It is effective in the range of about 1 MHz to 10 MHz. A better result can be achieved by crossing several conductors.
Brake resistor and brake unit	Improves braking ability when decelerating.
Ferrite ring	Reduces drive-generated interference.

7.2 AC choke coil (reactor) specification



Inverter type	Motor power (kW)	AC reactor selection	
		Rated current (A)	Inductance (mH)
V810-2S0004	0.4	2	7
V810-2S0007	0.75	2	7
V810-2S0015	1.5	5	3.8
V810-2S0022	2.2	7.5	2.5
V810-2S0030	3.0	20	0.75
V810-4T0004	0.4	5	3.8
V810-4T0007	0.75	5	3.8
V810-4T0015	1.5	5	3.8
V810-4T0022	2.2	7	2.5
V810-4T0040G/0055P	3.7/5.5	10	1.5
V810-4T0055G/0075P	5.5/7.5	15	1
V810-4T0075G/0110P	7.5/11	20	0.75
V810-4T0110G/0150P	11.0/15	30	0.6

Inverter type	Motor power (kW)	AC reactor selection	
		Rated current (A)	Inductance (mH)
V810-4T0150G/0185P	15/18.5	40	0.42
V810-4T0185G/0220P	18.5/22	50	0.35
V810-4T0220G/0300P	22/30	60	0.28
V810-4T0300G/0370P	30/37	80	0.19
V810-4T0370G/0450P	37/45	90	0.16
V810-4T0450G/0550P	45/55	120	0.13
V810-4T0550G/0750P	55/75	150	0.1
V810-4T0750G/0900P	75/90	200	0.12
V810-4T0900G/110OP	90/110	250	0.06
V810-4T1100G/1320P	110/132	250	0.06
V810-4T1320G/1600P	132/160	290	0.04
V810-4T1600G/1850P	160/185	330	0.04
V810-4T1850G/2000P	185/200	400	0.04
V810-4T2000G/2200P	200/220	490	0.03
V810-4T2200G/2500P	220/250	490	0.03
V810-4T2500G/2800P	250/280	530	0.03
V810-4T2800G/3150P	280/315	600	0.02
V810-4T3150G	315	660	0.02
V810-4T3500G	350	800	0.0175
V810-4T4000G	400	800	0.0175
V810-4T4500G	450	1000	0.014
V810-4T5000G	500	1200	0.011
V810-4T5600G	560	1200	0.011
V810-4T6300G	630	1200	0.011
V810-4T7100G	710	1800	0.008
V810-4T8000G	800	1800	0.008
V810-4T9000G	900	1800	0.008
V810-4T10000G	1000	1800	0.008

7.3 Braking resistor specification

Inverter type	Braking resistor		Braking unit CDBR	Braking torque (10% ED)	Motor power (kW)
	Power (W)	Resistance value (Ω)			
V810-2S0004	80	200	built-in	125	0.4
V810-2S0007	80	150		125	0.75
V810-2S0015	100	100		125	1.5
V810-2S0022	100	70		125	2.2
V810-2S0030	250	65		125	3.0
V810-4T0004	150	300		125	0.4
V810-4T0007	150	300		125	0.75
V810-4T0015	150	220		125	1.5
V810-4T0022	250	200		125	2.2
V810-4T0040G/0055P	300	130		125	3.7/5.5
V810-4T0055G/0075P	400	90		125	5.5/7.5
V810-4T0075G/0110P	500	65		125	7.5/11
V810-4T0110G/0150P	800	43		125	11.0/15
V810-4T0150G/0185P	1000	32		125	15/18.5
V810-4T0185G/0220P	1300	25	optional (built-in)	125	18.5/22
V810-4T0220G/0300P	1500	22		125	22/30
V810-4T0300G/0370P	2500	16		125	30/37
V810-4T0370G/0450P	3700	12.6		125	37/45
V810-4T0450G/0550P	4500	9.4	external	125	45/55
V810-4T0550G/0750P	5500	9.4		125	55/75
V810-4T0750G/0900P	7500	6.3		125	75/90
V810-4T0900G/110OP	4500*2	9.4*2		125	90/110

Inverter type	Braking resistor		Braking unit CDBR	Braking torque (10% ED)	Motor power (kW)
	Power (W)	Resistance value (Ω)			
V810-4T1100G/1320P	5500*2	9.4*2	external	125	110/132
V810-4T1320G/1600P	6500*2	6.3*2		125	132/160
V810-4T1600G/1850P	16000	2.5		125	160/185
V810-4T1850G/2000P	6500*3	6.3*3		125	185/200
V810-4T2000G/2200P	20000	2.5		125	200/220
V810-4T2200G/2500P	22000	2.5		125	220/250
V810-4T2500G/2800P	12500*	2.5*2		125	250/280
V810-4T2800G/3150P	14000*	2.5*2		125	280/315
V810-4T3150G	16000*	2.5*2		125	315
V810-4T3500G	17000*	2.5*2		125	350
V810-4T4000G	14000*	2.5*3		125	400
V810-4T4500G	15000*	2.5*3		125	450
V810-4T5000G	17000*	2.5*3		125	500
V810-4T5600G	20000*	2.5*3		125	560
V810-4T6300G	22000*	2.5*3		125	630
V810-4T7100G	20000*	2.5*4		125	710
V810-4T8000G	20000*	2.5*4		125	800
V810-4T9000G	22000*	2.5*4		125	900
V810-4T10000G	20000*	2.5*5		125	1000

Calculation of braking resistor value:

The braking resistor value is related to the DC current when the inverter is braking. At 400 V power supply, the DC voltage is 800 V to 820 V and for the 230 V system the DC voltage is 400 V.

In addition, the braking resistance value refers to the braking torque Mbr%. The formula for calculating the braking resistor value is as follows:

$$\boldsymbol{R = \frac{U_{dc}^2 * 100}{P_{Motor} * M_{br}\% * \eta_{Inverter} * \eta_{Motor}}}$$

where is:

U_{dc} braking voltage DC

P_{Motor} power of motor

Mbr braking torque

η_{Motor} efficiency of the motor

$\eta_{Inverter}$ efficiency of the inverter

Braking power is related to braking torque and braking frequency, the previous figure shows a braking torque of 125% and a frequency of 10%, for different loads the values are different.

Vyhlásenie o zhode ES

VYBO Electric a.s.
Radlinského 18
052 01 Spišská Nová Ves, Slovenská republika

na vlastnú zodpovednosť potvrdzuje zhodu nasledujúcich výrobkov

Meniče frekvencie konštrukčného radu A 550; E 550; X 550; V 350; V560; V800 a V810

podľa

smernice o strojových zariadeniach	**2006/42/ES**
smernice o nízkonapäťových zariadeniach	**2006/95/ES**
smernice o EMC	**2004/108/ES**
použité harmonizované normy:	**EN 13849-1:2008** **EN 61800-5-1:2007** **EN 61800-3:2007**

Meniče frekvencie typového radu uvedené hore sú určené pre riadenie otáčok asynchrónnych elektromotorov s kotvou na krátko a synchrónnych elektromotorov, zmenou frekvencie a amplitúdy ich svorkového napätia.
Meniče frekvencie uvedené hore boli vyrobené, posudzované a skúšané podľa hore uvedených harmonizovaných noriem a spĺňajú nariadenia vlády SR č.308/2004 Z.y.; č.318/2007 Z.z.
Výrobok sa musí používať len na účely na ktoré bol navrhnutý a vyrobený a musí byť nainštalovaný v súlade s poskytnutou technickou dokumentáciou.

Všetky bezpečnostno-technické časti dokumentácie týkajúcej sa výrobku (prevádzkový návod, príručka atď.), sa musia dodržiavať počas celého životného cyklu výrobku.

Spišská Nová Ves, 27.02.2017

Meniče frekvencie typového radu V350;V560;E550 sú určené pre riadenie otáčok asynchrónnych elektromotorov s kotvou na krátko a synchrónnych elektromotorov zmenou frekvencie a amlitúdy ich svorkového napätia.
Meniče frekvencie V350;V560;E550boli vyrobené, posudzované a skúšané podľa hore uvedených harmonizovaných noriem a spĺňajú podmienky podľa nariadenia vlády SR č.308/2004 Z.z.; č.318/2007 Z.z.

Ing. Babeta Výbošťoková
podpredseda predstavenstva

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VYBO Electric a.s.

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