Variable frequency drive

X550 *IP65*

User manual

Version 5.4

VYBO Electric

CONTENSS

Safety instructions

Follow these instructions and operators before installation, operation, maintenance or inspection. In this manual, safety measures are marked with the text "HAZARD" or "WARNING".

HAZARD Indicates a potentially hazardous situation that, if unavoidable, could result in death or serious injury. Indicates a potentially hazardous situation that, if unavoidable, will cause minor or moderate injury and damage equipment. This symbol is also used to warn of any security and operations.

WARNING Use of propulsion outside the scope specified in the technical specifications are liable to cause a malfunction, or damage to drive components. In exceptional cases, there is a risk of overheating, ignition, damage to property and health, or loss of life.

* **NOTE** indicates the necessary operation to ensure correct operation of the device.

Warning signs are located on the front cover of the inverter. When using a frequency inverter, follow these instructions.

WARNING
• Only persons qualified to do so according to the law may install this device • Follow the instructions in the manual before installation or operation. • Unplug all power cords before opening the front cover of the unit. •Wait at least 10 minutes for the DC bus capacitors to discharge. •Use proper grounding • Never connect AC to the output UV W terminals of the converter

Safety conditions and protection for IEC applications

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

The machinery manufacturer shall ensure (applies to stationary equipment and its modules) that overcurrent protection on the mains side interrupts the circuit within 5 seconds.

Static discharges on surfaces or interfaces not generally accessible (e.g. end pins or connector pins) may cause malfunctions. Therefore, when working with drives or drive components, ESD protective measures must be observed.

General Safety Policy

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

If these conditions are not met, other protective measures against electric shock, such as protective insulation, must be implemented. In principle, each frequency converter must be grounded. Since the leakage current of the inverter can be more than 3.0 mA of alternating current, good grounding is required. The minimum size of the protective conductor must correspond to local safety conditions for devices with high leakage currents.

HAZARD Applications with interference suppression filters may only be connected to zero-point power supply networks.

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

In particular, general and regional installation and safety provisions for work on hazardous voltage equipment (EN61800-5-1) as well as relevant provisions concerning the correct use of tools and personal protective equipment (PPE) must also be observed.

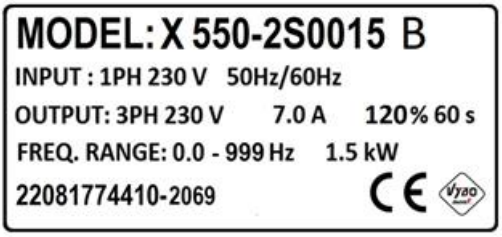
WARNING In all operating modes of control devices, the emergency stop device shall be operational in accordance with EN 60204, IEC 204 (VDE 0113). The inability of the emergency shutdown device must not lead to uncontrolled or indefinite restarting of the device. The use of radio equipment (e.g. walkie-talkies or mobile phones) in the immediate vicinity of the equipment may impair the operation of safety devices.

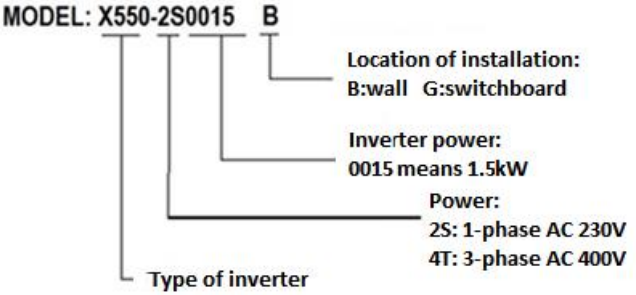
This device complies with the following standards:
EN 60947-4-2 (Semiconductor Controllers and AC Motor Starting)
EN 60204-1 (Work Machinery)
EN 50081-1 (EMC radiation)
EN 61000-6-2 (Resistance in industrial environments)

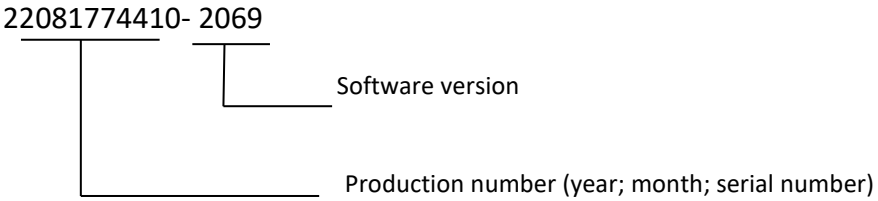
Version v.5.4
Date of revision: October 2023

Chapter 1: Description and parameters of the X 550

1. Description of the production plate







1.2 Parameters of the frequency inverter

Item			X 550
Supply voltage		Rated voltage / frequency	1-phase 1 x 230 V AC 50/60 Hz....Type 2S..... 3-phase 3 x 400 V AC 50/60Hz....Type 4T.....
		Voltage range	230 V: 170 V to 240V 400 V: 330 V to 440 V
Output		Voltage range	3 x 230V: 0 to 230V 3 x 400 V: 0 to 400 V
		Frequency range	0.10 to 999.9Hz
Control method			V/F control, scalar control
Display			Operating status / alarm definition / interactive guidance: e.g. frequency setting, output frequency/current, DC bus voltage, temperature, etc.
Control specification	Output frequency range		0.10Hz to 999.9Hz
	Frequency setting resolution		Digital input: 0.01 Hz, analog input: 0.1% of maximum output frequency
	Output frequency accuracy		0.01Hz
	V/F control		Setting the V/F curve to meet different practice requirements
	Torque control		Automatic increase: - automatic increase of the torque according to the load; - manual increase: allows to set 0.0 to 20.0% torque increase.
	Multifunctional input terminal block		Six multi-function input terminals that perform functions including fifteen-section speed control, running program, four-step acceleration / deceleration switch, UP / DOWN function and emergency stop and other functions.....
	Multifunctional output terminal block		2 multi-function output terminals to display running, zero speed, counter, external abnormalities, program operation and other information and alerts
	Setting the acceleration / deceleration time		The acceleration / deceleration time can be set individually in the range 0 to 999.9s

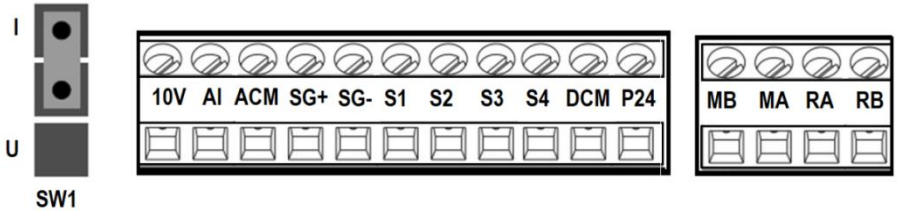
Item		X 550
Additional functions	PID control	Built-in PID control
	RS485	Standard communication function RS485 (MODBUS)
	Frequency setting	Analogue input: 0 – 10 V; 0-20mA, optional; Digital input: it is set via the rotary selector on the control panel or via RS485 or via UP/DOWN.
	Multi-stage speed	Six multi-function input terminals, 15 speed settings can be selected
	Automatic voltage regulation	AVR automatic voltage regulation function can be selected
	Counter	Built-in 2 groups of counters
Warning / protective functions	Overloading	120% / 60sec., (constant torque)
	Overvoltage	Overvoltage protection can be set
	Undervoltage	Low voltage protection can be set
	Other protections	Overheating; short circuit at the output; overcurrent; parameter blocking etc.
EMC	EMC compatibility	IEC 61000-4-6; IEC 61000-4-4; IEC 61000-4-11; IEC 61000-4-5
	Standards	EN/IEC 61800-3: 2017; C2, which is suitable for the 1st environment, EN 61800-3:2004+A1:2012; EN 618-5-1:2007+A1:2017
Environment	Ambient temperature	-10°C to 40°C (without icing)
	Ambient humidity	Max. 95% (without condensation); IEC 60068-2-3
	Height above sea level	Less than 1000m above sea level.
	Vibrations	Max. 0.5 g; IEC 60068-2-6
	Method of cooling	Cooling without forced air circulation through a cooler up to 4.0kW, forced air cooling for models above 5.5 kW
	Degree of coverage	IP 65
	Method of assembly	On the wall or in the switchboard (depending on design)
	Installation in the environment	Resistance to chemical pollution class 3C3 EN/IEC 60721-3-3. Resistance to dust pollution 3S3EN/IEC 60721-3-3.

1.3 Description of the power supply terminals for X 550-2S0007 to 2S0022

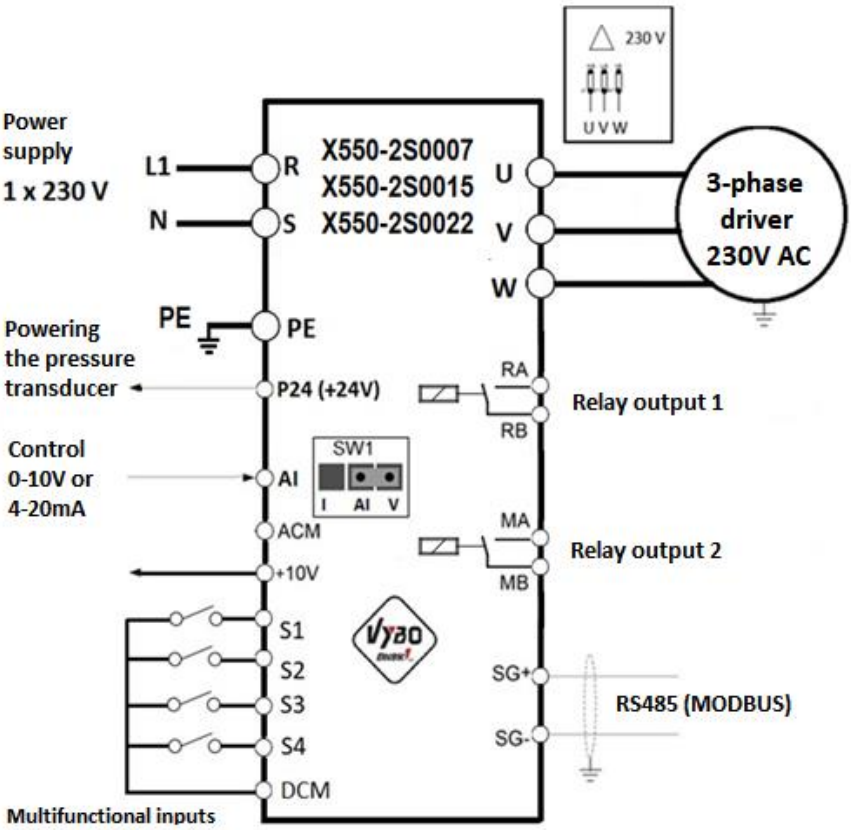
Type 2S: power supply 1 x 230 V

Power terminal block: frequency inverters of this series are supplied with the power supply installed cable and output cable.

Control terminal block for models of the power range 0.7 to 2.2 kW (power supply 1x230V**)**



Models X550-2S0007 to 2S0022

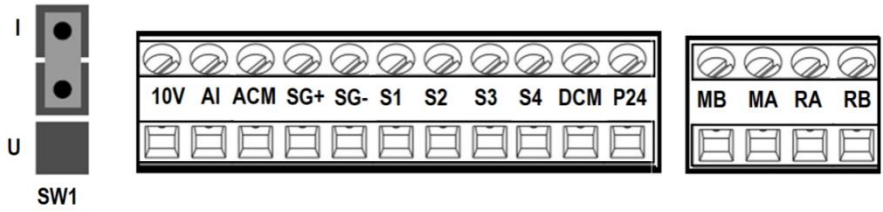


1.4 Description of the power supply terminals for X 550-4T0007 to X550-4T0055

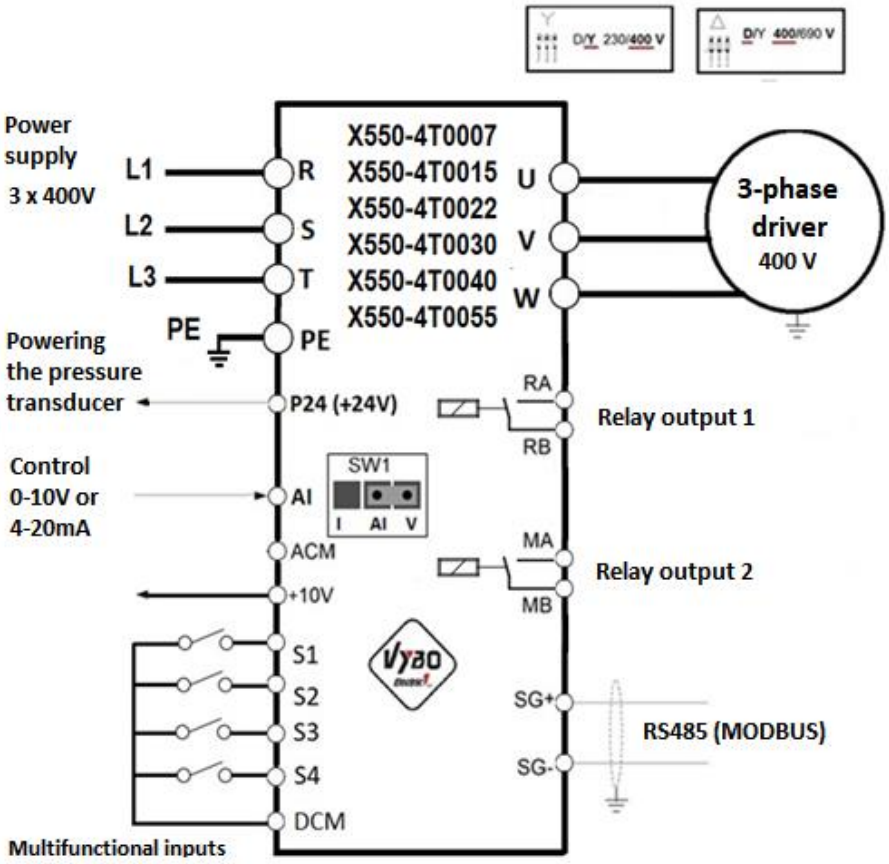
Type 4T: power supply 3 x 400 V

Power terminal block: frequency inverters of this series are supplied with the power supply installed cable and output cable.

Control terminal block for models of the power range 0.7 to 5.5kW

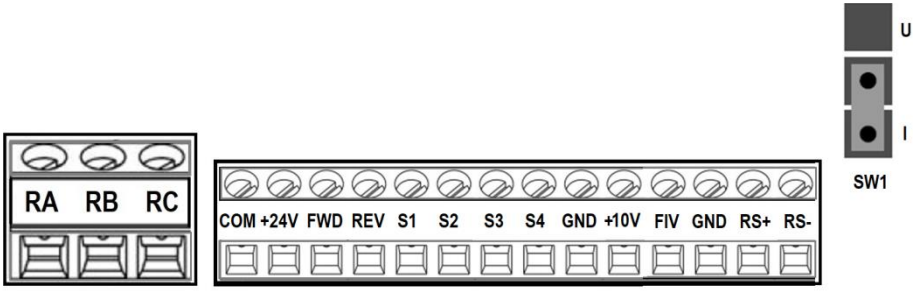


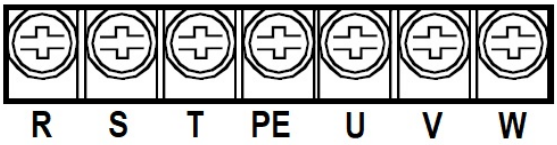
Models X550-4T0007 to 4T0055



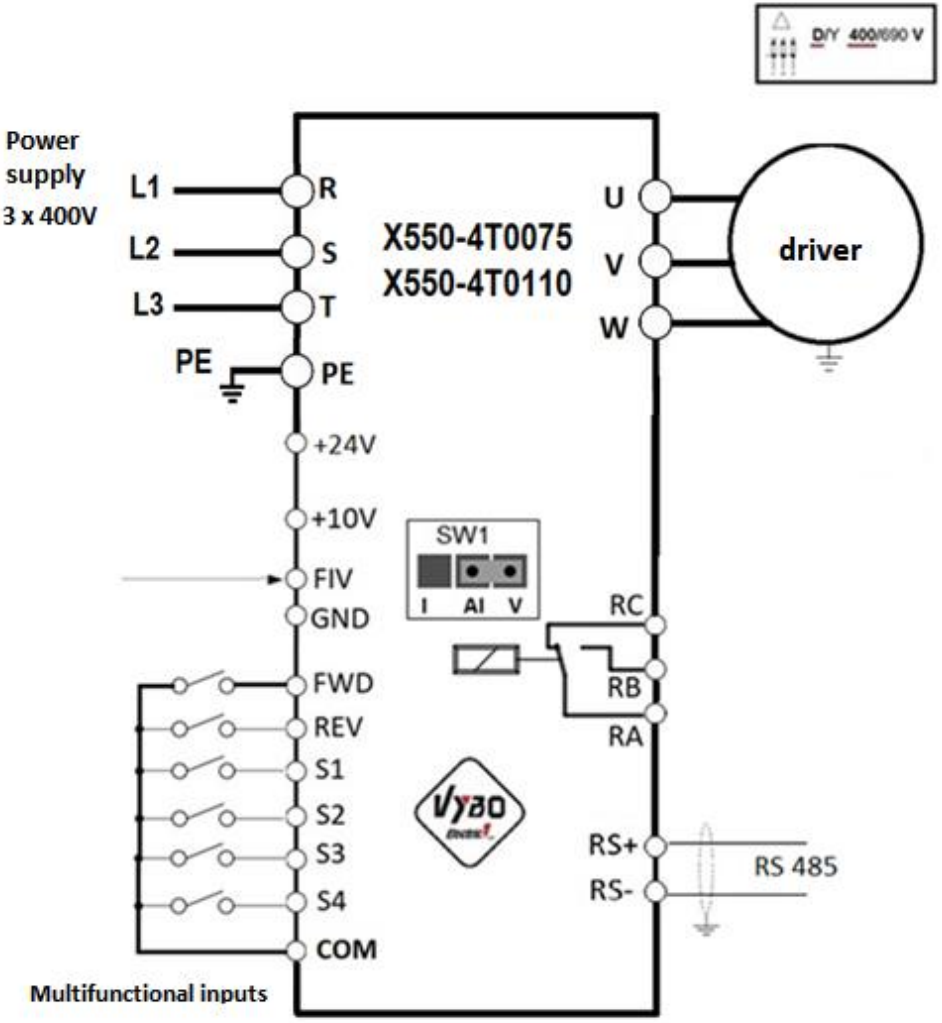
1.5 Description of the power supply terminals for X 550-4T0075 and X550-4T0110

Type 4T: power supply 3 x 400 V



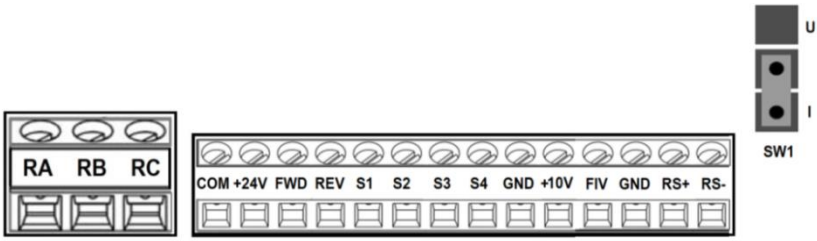


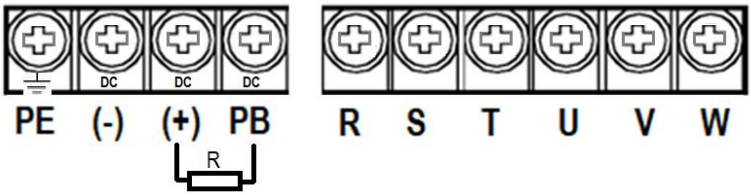
Models X550-4T0075 and X550-4T0110



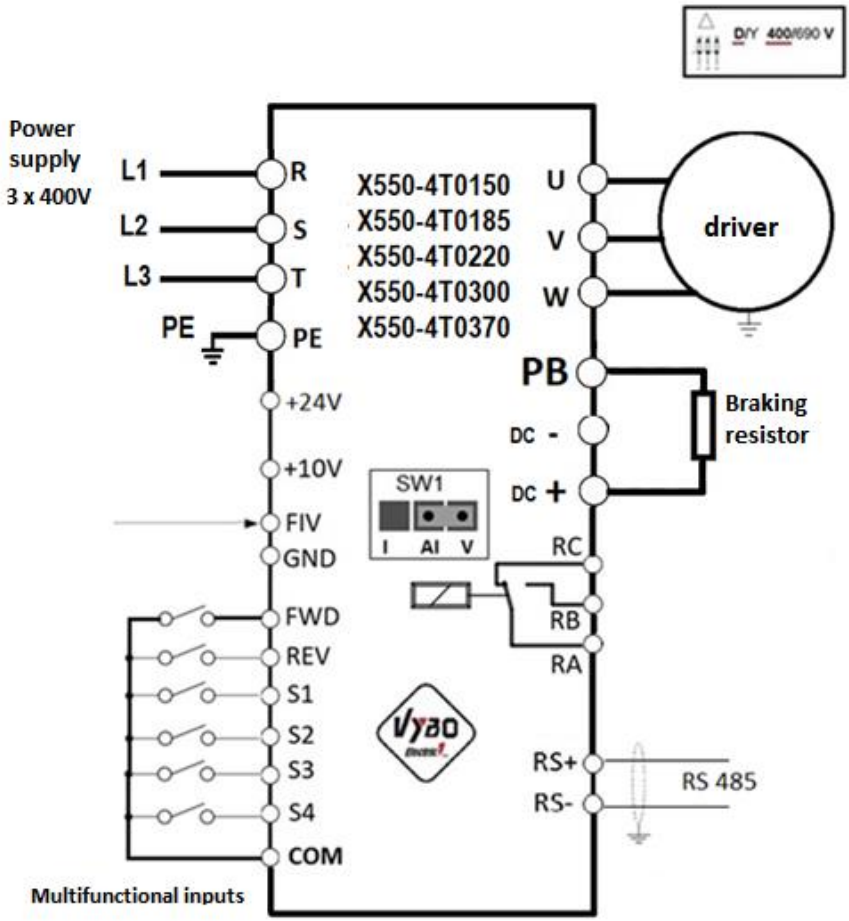
1.6 Description of the power supply terminals for X 550-4T0150 to X550-4T0370

Type 4T: power supply 3 x 400 V



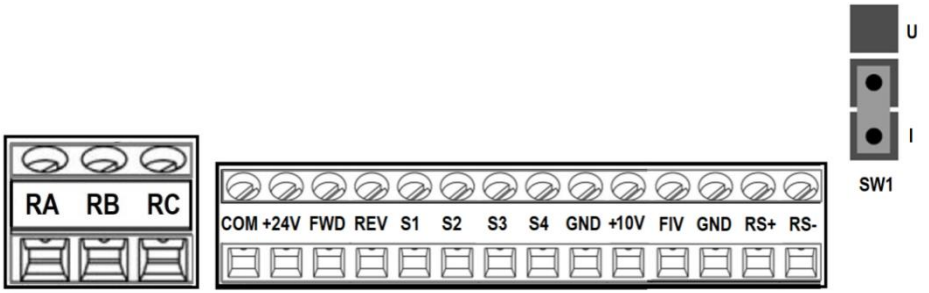


Models X550-4T0150 to X550-4T0370

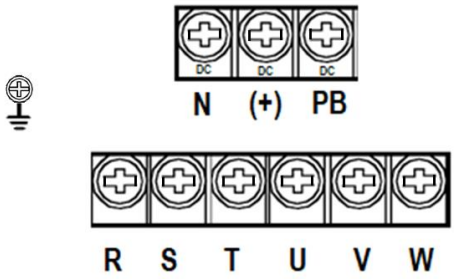


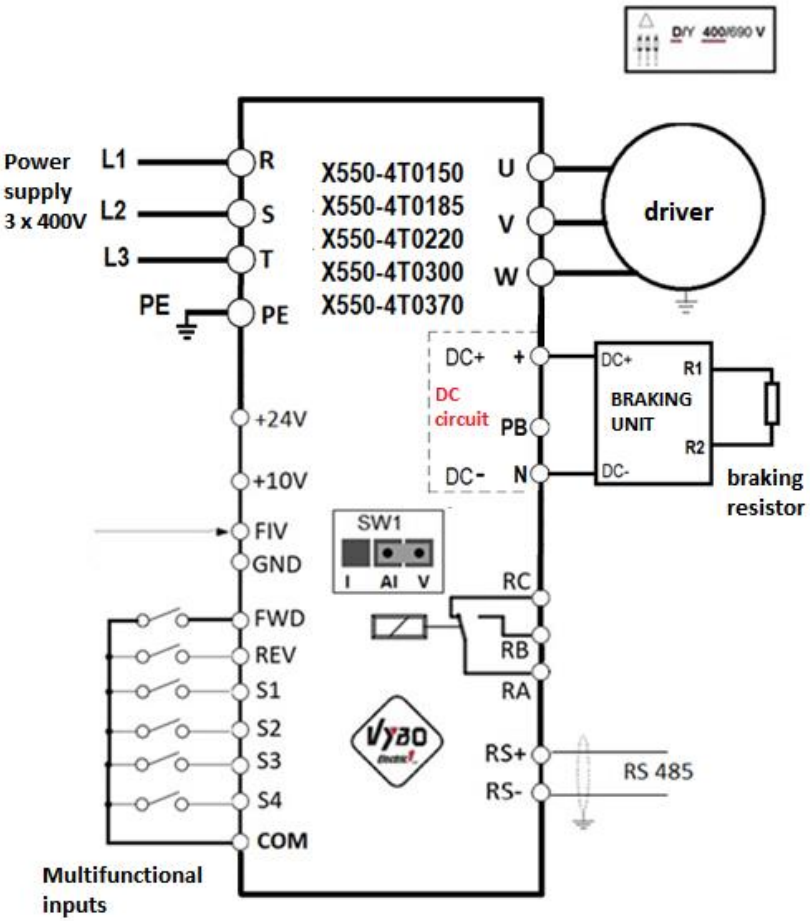
1.7 Description of the power supply terminals for X 550-4T0450 a X550-4T0550

Type 4T: power supply 3 x 400 V



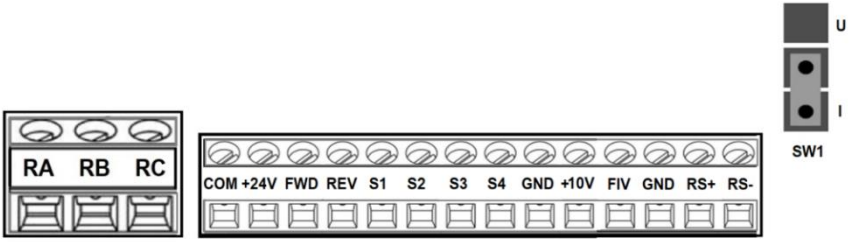
Models X550-4T0450 and X550-4T0550





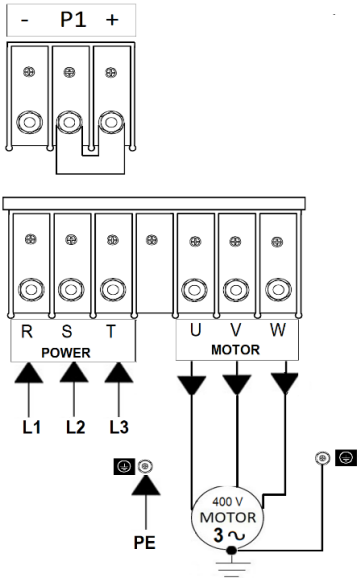
1.8 Description of the power supply terminals for X 550-4T0750; 4T0900; 4T1100

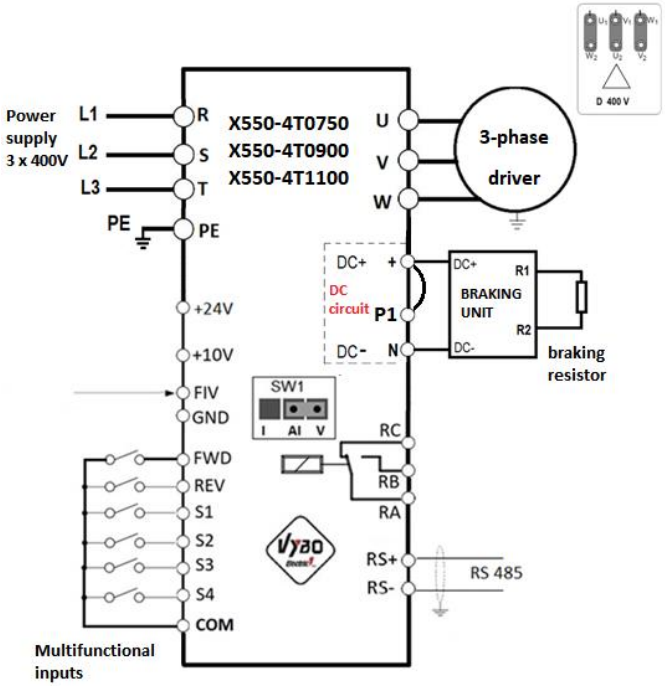
Type 4T: power supply 3x400 V



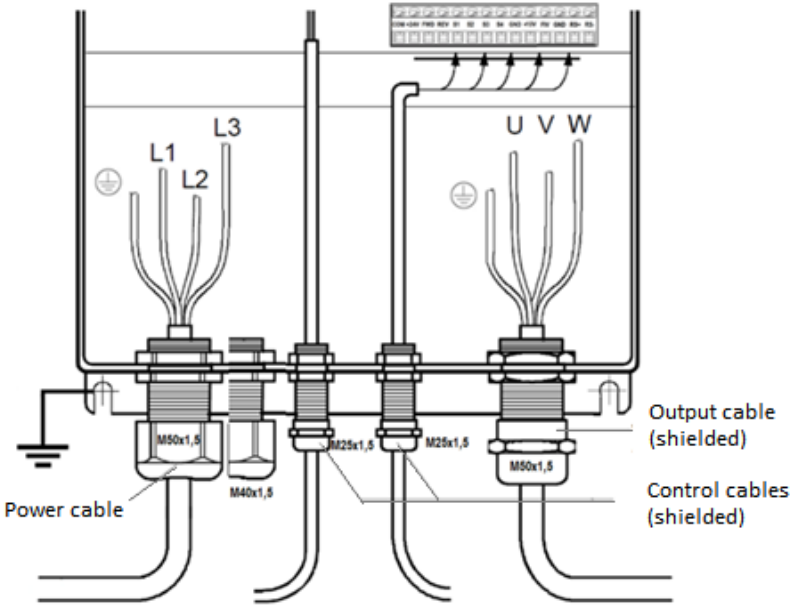
Models X550-4T0750; X550-4T0900 and X550-4T1100

Practical connection of the power terminal block of X550 frequency inverters with a power of 75 kW; 90 kW and 110 kW

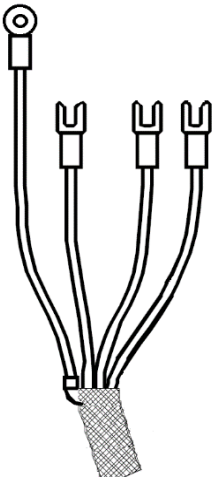


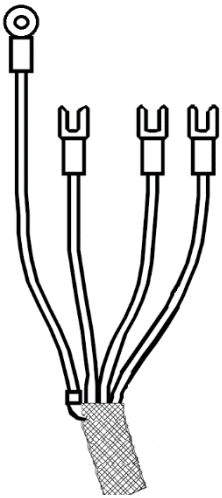


Connecting the cabling to the inverters X550-4T0750 to X550-4T1100

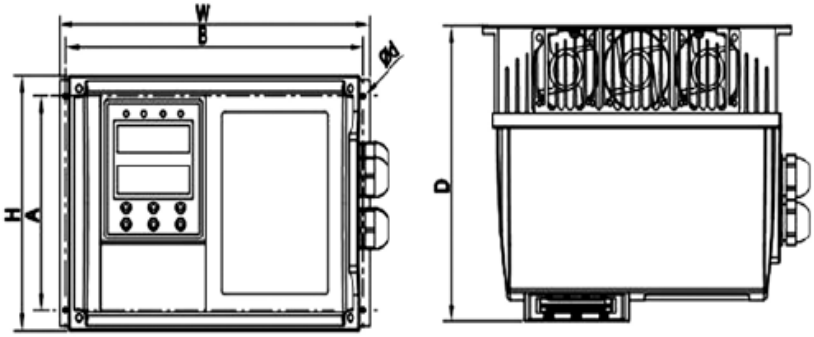


Proper cable termination with crimped cable lugs

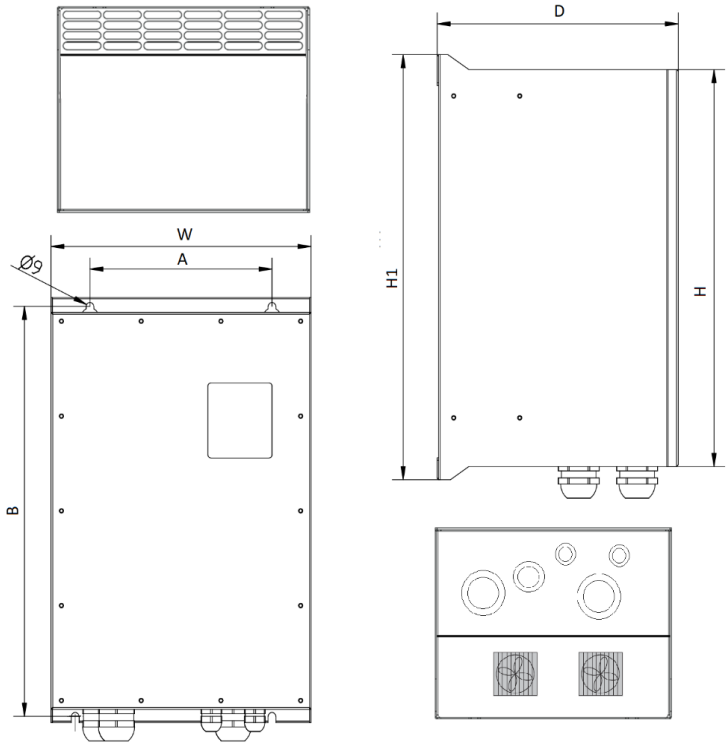




1.9 Drawing and description of X 550 for power 0.7 kW to 11 kW



1.10 Drawing and description of X 550 for power 15 kW to 110 kW



1.11 X550 frequency inverter dimension table

Model	Size	W	H	H1	D	A	B	d
X550-2S0007 B	A	188	122	-	134	105	178	4
X550-2S0015 B	A							
X550-2S0022 B	A							
X550-4T0007 B	A	188	122	-	134	105	178	4
X550-4T0015 B	A							
X550-4T0022 B	A							
X550-4T0030 B	B	235	154	-	179	129	225	4
X550-4T0040 B	B							
X550-4T0055 B	B							
X550-4T0075 B	B							
X550-4T0110 B	B							
X550-4T0150 B	C	192	280	-	178	200	180	5,5
X550-4T0185 B	D	236	300	-	204	250	225	7
X550-4T0220 B	D							
X550-4T0300 B	D							
X550-4T0370 B	D	236	400	-	231	225	175+175	7
X550-4T0450 B	D	300	450	482	278	210	465	9
X550-4T0550 B	D	300	450	482	278	210	465	9
X550-4T0750 B	E	400	520	560	280	300	535	9
X550-4T0900 B	E	400	520	560	280	300	535	9
X500-4T1100 B	E	400	520	560	280	300	535	9

1.12 Power table of X550 frequency inverters

Inverter type	Input voltage	Motor power (kW)	*Cross section of the power supply cable (mm^2)	Fuses (A)	Braking unit
X 550-2S0007 B	1-phase 230V 50/60Hz	0.75	3x2.5	16	OPTIONAL
X 550-2S0015 B		1.5	3x2.5	20	OPTIONAL
X 550-2S0022 B		2.2	3x4.0	25	OPTIONAL
X 550-4T0007 B	3-phases 400V 50/60 Hz	0.75	3x2.5	6	OPTIONAL
X 550-4T0015 B		1.5	3x2.5	10	OPTIONAL
X 550-4T0022 B		2.2	3x2.5	10	OPTIONAL
X 550-4T0030 B		3.0	3x2.5	16	OPTIONAL
X 550-4T0040 B		4.0	3x2.5	16	OPTIONAL
X 550-4T0055 B		5.5	3x2,5	20	OPTIONAL
X 550-4T0075 B		7.5	3x4.0	25	OPTIONAL
X 550-4T0110 B		11	3x4.0	32	OPTIONAL
X 550-4T0150 B		15	3x6.0	40	YES
X 550-4T0185 B		18.5	3x10	50	YES
X 550-4T0220 B		22	3x10	63	YES
X 550-4T0300 B		30	3x16	80	YES
X 550-4T0370 B		37	3x16	80	YES
X 550-4T0450 B		45	3x25	100	OPTIONAL
X 550-4T0550 B		55	3x35	125	OPTIONAL
X 550-4T0750 B		75	3x50	160	OPTIONAL
X 550-4T0900 B		90	3x70	225	OPTIONAL
X 550-4T1100 B		110	3x95	250	OPTIONAL

Inverter type	Nominal output power (kW)	Maximum input current (A)	Rated output current (A)	Recommended motor power (kW)
1PH / 3PH AC 230 V ±15% a 1 PH / 1PH AC 230 V ±15%				
X 550-2S0007B	0.75	7.2	4.5	0.75
X 550-2S0015B	1.5	10	7.0	1.5
X 550-2S0022B	2.2	16	10.0	2.2
3PH / 3PH AC 400 V ±15%				
X 550-4T0007 B	0.75	3.8	2.5	0.75
X 550-4T0015 B	1.5	5	3.7	1.5
X 550-4T0022 B	2.2	5.8	5	2.2
X 550-4T0030 B	3.0	8.4	6.8	3.0
X 550-4T0040 B	4.0	10	9	4.0
X 550-4T0055 B	5.5	15	13	5.5
X 550-4T0075 B	7.5	19	17.5	7.5
X 550-4T0110 B	11	26	25	11
X 550-4T0150 B	15	35	32	15
X 550-4T0185 B	18.5	38	37	18.5
X 550-4T0220 B	22	46	45	22
X 550-4T0300 B	30	62	60	30
X 550-4T0370 B	37	77	75	37
X 550-4T0450 B	45	92	90	45
X 550-4T0550 B	55	113	110	55
X 550-4T0750 B	75	154	150	75
X 550-4T0900 B	90	180	176	90
X 550-4T1100 B	110	214	210	110

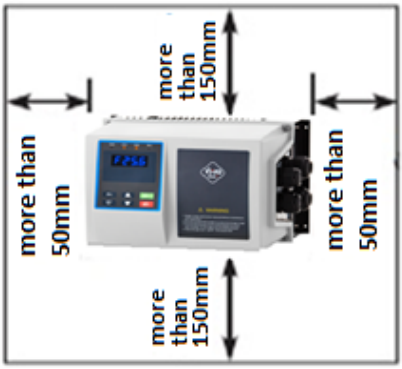
Chapter 2: Installation of frequency inverters X 550

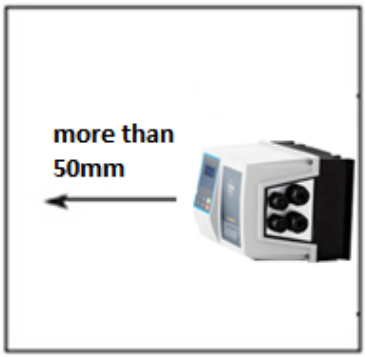
2.1 Environment and installation requirements

The installation environment has a direct impact on the lifetime of the inverter. If the inverter is used in an environment that does not comply with the permitted environment, it may lead to activation of the protection or failure of the inverter. Make sure that the installation environment of the inverter complies with the following conditions:

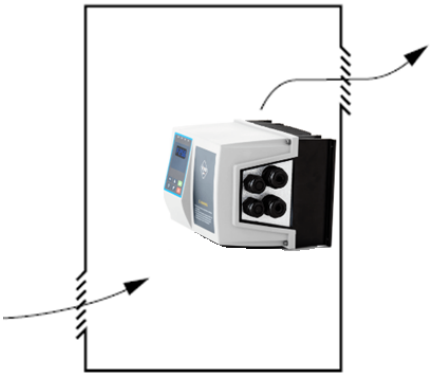
(1) Ambient temperature from -10 °C to + 40 °C.
(2) Ambient humidity 0 to 95%, non-condensing.
(3) Out of direct sunlight.
(4) The installation environment of the inverter does not contain corrosive gases and liquids.
(5) The environment does not contain dust, flying fibers and metal dust.
(6) Away from radioactive materials and flammable substances.
(7) Away from sources of electromagnetic interference (such as welding machines, high-performance machines).
(8) The installation surface must be solid. No vibration. If vibration is unavoidable, add anti-vibration pads to reduce vibration.
(9) Install the inverter in a place where there is adequate ventilation, access for inspection and maintenance; outside the heat source (such as a braking resistor).
(10) Provide enough space for the installation of the inverter, especially when installing multiple inverters, pay attention to the position of the inverter, and install an external cooling fan if the inverter will be installed in a switchboard to keep the ambient temperature below 40 °C.

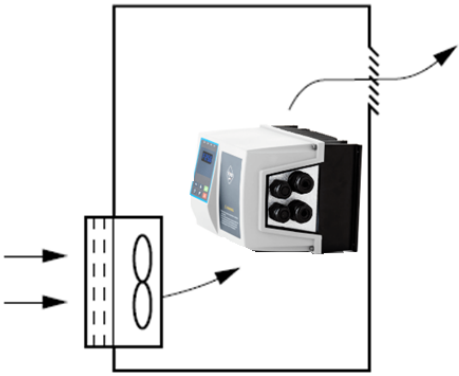
Installation of one X550 inverter in a cabinet:





* Be careful when installing several inverters, install them in parallel and with cooling





2.2 Connection of the inverter and requirements according to standards

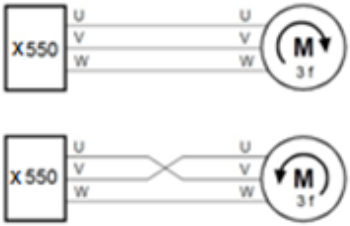
2.2.1 Description of peripheral devices

(1) AC power supply Use the power supply within the allowable specifications of the inverter. (2) Insurance If the power supply voltage is low or there is a short circuit at the input terminal, the fuse can provide protection during operation, or inspection, maintenance, malfunction, or can disconnect the inverter from the power supply. Maximum disconnection times are according to STN 33 2000-4-4. Fuses with gR characteristics must be used to protect the inverter input, and gG fuses for semiconductor protection. Fast fuses of the type: gG protect only short circuit, gR protect short circuit + overloading.
(3) AC choke
a: suppresses higher harmonic frequencies, thus protecting the inverter, b: increases energy efficiency.
(4) Braking resistor
When braking the motor, the resistor can prevent the high voltage of the DC bus of the inverter and improve the braking ability of the internal brake unit. Some models (on order) have built-in brake units with a power of 15kW or more. To select a braking resistor, please refer to Table 1.12: Power Table of X550 Series Inverters

2.2.2 Warning before connecting the main circuit

The X 550 VYBO Electric series inverters are highly reliable products, but the wrong way of connecting the peripheral circuits or the wrong way of operation / handling can shorten the life of the product or damage the product. Always recheck the following items before starting operation.
(1) Terminals with insulating sleeves for connecting the power supply and the motor.
(2) Connecting the supply voltage to the output terminals (U, V, W) of the inverter will damage the inverter!!! Never make such a connection.
(3) After connecting the inverter, no pieces of insulation and wires must be left in it. They can cause an alarm or malfunction. Always keep the inverter clean. When drilling holes in the housing, etc., do not allow chips and other foreign objects to enter the inverter.

(4) This inverter must be grounded. Grounding must meet the requirements of national and local safety codes and electrical codes.
(5) Use the prescribed cross-section of the grounding conductor. The cross-sections of protective conductors must be calculated or selected from the table (all according to STN 33 2000-5-54)
(6) The grounding 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:
(6.1) The grounding resistance of the source node should not be greater than 5Ω. In difficult soil conditions, a maximum of 15Ω is allowed.
(6.2) Total grounding resistance of PEN conductors (including conductors leaving the transformed and grounded point) for networks with e.g. 230V AC must not be greater than 2Ω.
(6.3) The PEN conductor in the TN-C network or the PE conductor in the TN-S network must be grounded by a separate grounding device or by connecting to the existing system. The individual groundings of the PEN and PE conductors should have a grounding resistance of no more than 15Ω. At the end of the lines and branches of the network at the neutral point, the grounding resistance should be no more than 5Ω.
(7) If possible, use an independent ground for the inverter. If independent grounding is impossible, use a grounding connection (I, II) where the inverter is connected to another device at the grounding point. The connection as shown in fig. (III), always according to STN.
(8) To avoid malfunction caused by interference, place the signal cables more than 10 cm away from the power cables.
(9) The total length of the line should be a maximum of 100 m. Especially when connected further away, the current limiting function may be reduced, or the device connected on the output side of the inverter may fail, or the charging current may be affected due to long electrical installation. Therefore, note the total length of the cable. 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.
(10) Do not install a power factor correction capacitor or RC interference / radio noise filter on the output side of the inverter.
(11) Before starting wiring or other work after the inverter is turned off, wait at least 10 minutes and check for residual voltage with a tester. The capacitor is charged to a high voltage and is dangerous for a certain time after being turned off.
(12) Electromagnetic interference. The input/output (main circuit) of the inverter contains high-frequency components that may interfere with communication equipment (such as FM/AM radios) used near the inverter. In this case, set a suitable EMC filter to minimize interference.
(13) Connect only the external braking resistor to the P/+ and PR terminals. Do not connect a mechanical brake.
(14) Changing the direction of rotation of the electric motor:



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

2.2.3 Instructions for connecting the control circuit

(1) Use shielded or twisted cables to connect to the control circuit terminals and place them away from the main and power circuits (including the 230V relay).

(2) Use two or more microswitches or double contacts in parallel to avoid malfunctions when switching contact inputs, because the input signals of the control circuit are controlled by other circuits.

(3) Do not apply any voltage to the contact input terminals FWD, REV, S1, S2, S3, S4 of the control and control circuit.

(4) Always connect the supply voltage to the output relay (RA, RB, MA, MB) according to the recommended values.

(5) For connection to the terminals of the control circuit, it is recommended to use cables with a cross-section of min. 0.75 mm2.

(6) The length of the cable for powering the control circuit should be a maximum of 30 m.

Note: models X550-2S0007 to 2S0022 and X550-4T0007 to 4T0055 come with cables already installed at the factory.

2.3 Detailed description of X550 terminal circuits

Terminal functions can be selected using parameters P315 to P329

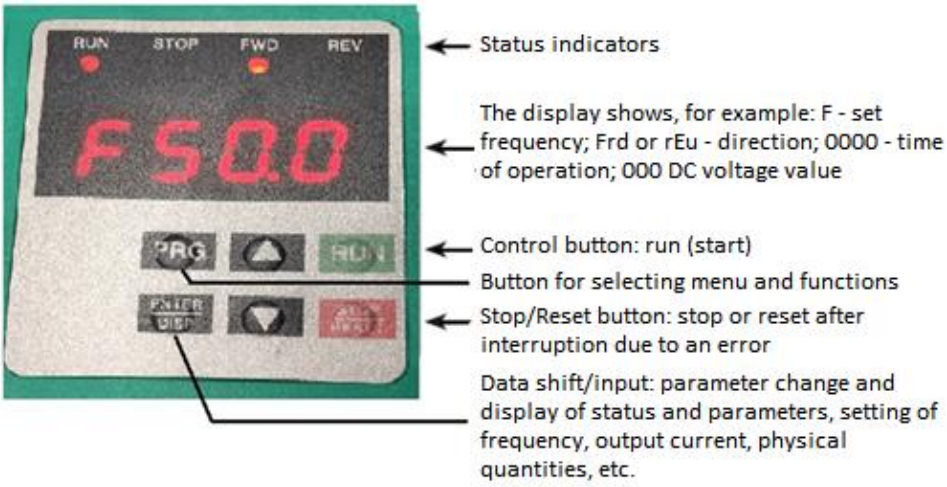
Terminal name	Meaning	Notes
FWD	Multifunctional input terminal	Models from 7.5 kW
REV	Multifunctional input terminal	Models from 7.5 kW
S1	Multifunctional input terminal	Multifunctional terminal FWD, REV, S1-S4 can be set according to P315-P318
S2	Multifunctional input terminal	
S3	Multifunctional input terminal	
S4	Multifunctional input terminal	
COM / DCM	Zero potential of the input terminal (digital)	According to performance class
P24 (sensor power supply)	+24V DC, max 100mA	
10V	Supply +10 V DC	
AI FIV	Analog input	0 to 10V, 0 –20mA / 4 - 20 mA
GND / ACM	Zero potential (analog input)	According to performance class
MA, MB	Output terminal of relay (NO)	250VAC/3A
RA, RB	Output terminal of relay (NO)	250VAC/3A
SG+ / SG-	RS485 for MODBUS communication (up to 5.5 kW))	MODBUS RTU
RS+ / RS-	RS485 for MODBUS communication (above 7.5 kW)	MODBUS RTU

Terminal designation	Terminal name	Description
R, S, T	Power input	Connection to the power supply network
U, V, W	Inverter output	Connection of a three-phase motor
PB, +	*Braking resistor	*Only some types Braking resistor connection
	Grounding	Inverter grounding

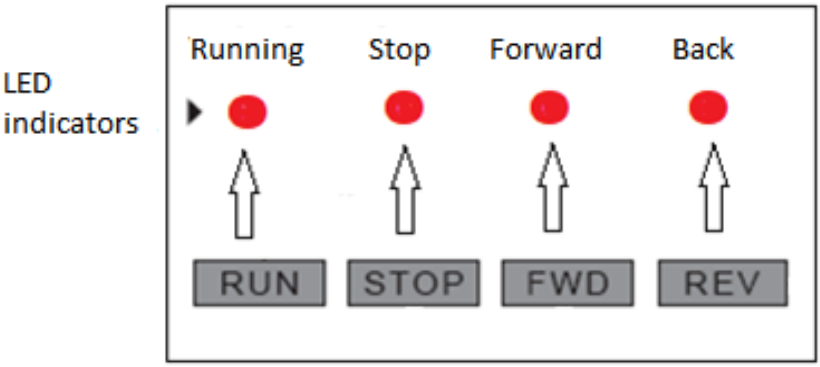
Chapter 3: Operation of frequency inverter X 550

The digital control panel is located in the middle of the inverter and is divided into two parts: the display part and the control part. The display part shows the settings of the parameters and the operation states of the inverter, and the control part creates a communication channel between the user and the inverter.

3.1 Control panel



3.1.1 Description of button function



Button	Description of the function
PRG	Menu and function selection button
▲ ▼	Buttons to change the function code and parameter
ENTER DISP	Move or enter data Go to the next digit or switch to another display with a short press, confirm the setting with a long press
RUN	RUN (start) command
STOP RESET	Stop command (applicable when controlling via the control panel) or Reset after a fault

3.1.2 Display description

	Displayed item	Description
1	**F00.0**	Frequency setting after power on
2	**H00.0**	Current operating frequency
3	**A00.0**	Motor current during operation
4	**Frd rEu**	Motor rotation direction
5	**0000**	Operation time
6	**338.5**	DC voltage value

* The listed display items can be switched by briefly pressing the ENTER button.

Display of the value of the required pressure and the actual pressure:

1. Set **P000=07**

3.1.3 Operating instructions for the control panel

(1) Parameter setting (example of changing parameter P104).

Progr.	Action	Button	Display	Description
1	Switch On		STOP FWD F00.0	①Displays the frequency setting. ② Inverter in STOP.
2	Push	PRG	STOP FWD P000	Set the parameter, the first character is flashing (it means a changeable item)
3	Push 4 times	▲ ▼	STOP FWD P004	Change from “0” to “4”.
4	Quick press 2 times (quick press is shift)	ENTER DISP	STOP FWD P004	Move 2 times to the left and the third digit will flash
5	Push	▲ ▼	STOP FWD P104	Change from “0” to “1”.
6	Push and hold	ENTER DISP	STOP FWD 0001	Enter the parameter setting interface.
7	Push	▲ ▼	STOP FWD 0000	Change from “1” to “0”.
8	Push and hold	ENTER DISP	STOP FWD P105	Confirmation of "P104" value change.
9	Push	PRG	STOP FWD F00.0	It will return to the initial view.

Notes:

1. Press the PRG button to cancel the modification and return to the main display interface.
2. After confirming the change, an Err error message may be displayed to indicate a failed parameter change.

(2) Status display and request

Parameter setting: The frequency of starting and switching off (P102 = 0) of the frequency inverter controlled via the panel is set by the potentiometer of the panel (P101 = 3).

Progr.	Action	Button	Display	Description
1	Switch On		STOP FWD F00.0	Display status when setting the frequency.
2	Push	RUN	RUN FWD F05.0	Frequency for going forward - start
3	Push	ENTER DISP	RUN FWD F05.0	Switch to the current frequency
4	Push	ENTER DISP	RUN FWD A00.0	Switch to current display when the output current is 0A.
5	Push	ENTER DISP	RUN FWD Frd	Switch to the setting interface (press to switch the direction of rotation)
6	Push	RUN	RUN FWD P000	Switch to parameter setting state.
7	Push	▲ ▼	RUN FWD P006	Select the P006 parameter code you want to edit.
8	Push 2 times	ENTER DISP	RUN FWD 022.8	Content of P006: the current temperature of the frequency inverter is 22.8 ° C (from 7.5 kW)
9	Push 2 times	PRG	RUN FWD F15.0	Go back to the main display, the set frequency is 15 Hz.
10	Push	STOP RESET	RUN FWD F15.0	During the interruption of the frequency inverter before stopping, the button will flash, and then the buttons will turn on, and the set frequency

Notice: The set frequency, operation frequency, output current and operation speed of the frequency inverter can be monitored by switching the buttons during operation, and the main display can be changed according to the setting of P000 according to the practical requirement. The relevant content can be monitored by the user through parameters P001-P018.

Chapter 4: Model X550 features parameter table

Param.	Name	Range of setting	Factory setting
P000	Selection of displayed data on the panel with the option of "clicking through" with the "ENTER" button even during operation	00: Set frequency (F) 01: Output frequency (H) 02: Output current (A) 03: Direction of rotation (Frd or rEu) 04: Output speed 05: DC link voltage 06: X550 inverter module temperature (models from 7.5 kW) 07: PID feedback signal value 08: Operation time	01
P001	Displays the set frequency	Continuously displays the value of the set frequency	---
P002	Displays the output frequency	Continuously displays the value of the output frequency	---
P003	Displays the output current	Continuously displays the value of the output current	---
P004	Displays engine speed	Displays the current speed	---
P005	Displays the DC bus voltage value	Displays the continuous value of the bus voltage	---
P006	Displays the temperature of the inverter	Displays the continuous temperature value of the inverter	---
P007	Displays the PID value of the link	Read only	---
P008	Displays the operating time	Read only	---
P009	Output voltage	Displays the set value of the output voltage	
P010	Fault record 1	Read only	---
P011	Fault record 2	Read only	---
P012	Fault record 3	Read only	---
P013	Fault record 4	Read only	---

P014	Set frequency during the last alarm	Read only	---
P015	Output frequency during the last alarm	Read only	---
P016	Output current in the last alarm	Read only	---
P017	Output voltage in the last alarm	Read only	---
P018	DC bus voltage in the last alarm.	Read only	---
P050	Software version	2.069 Standard: control of 1 pump 2.226 Multi-pump: control of up to 6 pumps in cascade	---
P100	**Digital frequency adjustment with buttons**	**0.00 to a maximum frequency of 999.9 Hz "↑" or "↓"**	0.00
P101	**Selecting the frequency setting source**	0: Digital frequency setting (P100) If P812=0, it keeps the set value in memory even after switching off 1: AI/FIV (0 to 10 V / 4 to 20 mA) switch SW1 2: Reserve 3: Setting via external control panel 4: Setting via external UP/DOWN 5: Setting via RS485	0
P102	**Choice of management method**	0: Control panel (FWD/REV/STOP) 1: I/O terminal 2: Communication via RS485	1
P103	Blocking the “STOP” button	0: Button blocking disabled 1: Button blocking enabled	1
P104	Choice of reverse protection	0: Reverse disabled 1: Reverse enabled	1
P105	**Maximum frequency**	0.01 to 999.9 Hz	50.00
P106	Minimum frequency	0.00 to maximum frequency	0.00
P107	**Acceleration time 1**	0 - 999.9s	by the model
P108	**Deceleration time 1**	0 - 999.9s	
P109	V/F maximum voltage	V/F medium voltage up to 500.0 V	400.0

P110	V/F basic frequency	V/F medium frequency up to max. frequency	50.00
P111	V/F medium voltage	V/F min. voltage up to V/F max. voltage	various
P112	V/F medium frequency	V/F minimum frequency to V/F base frequency	2.50
P113	V/F minimum voltage	0 to V/F medium voltage	15.0
P114	V/F minimum frequency	0 to V/F medium frequency	1.25
P115	Carrier frequency	1.0 kHz - 15.0 kHz	by the model
P116	Automatic adjustment of the carrier frequency	Reserved	0
P117	**Return to factory settings X550 parameters**	**8: Return to factory settings**	**0**
P118	Parameters locking	0: Unlocking parameters 1: Locking parameters	0
P200	Selection of the start mode	0: Normal start 1: Restart with frequency tracking	0
P201	**Stop mode selection**	**0: Decelerate to a stop after a curve** **1: Idle stop**	1
P202	Frequency at start	0.10 - 10.00 Hz	0.5
P203	Track frequency	0.10 - 10.00 Hz	0.5
P204	DC brake operating current (start)	0 - 150% rated motor current	100%
P205	DC brake operating time (start)	0 - 25.0 s	0
P206	DC brake operating current (stop)	0 - 150% rated motor current	100%
P207	DC brake operating time (stop)	0 - 25.0 s	0
P208	**Torque boost**	**0 - 20.0 %**	**5%**

P209	**Rated motor voltage**	**10 - 500.0 V according to the nameplate**	by the model
P210	**Rated motor current**	**0 to ……. A according to the nameplate**	by the model
P211	Motor no-load current (no load)	0 – 100 %	40 %
P212	Rated motor speed	0 - 6000 rpm	1420 rpm
P213	Number of motor poles	0 - 20	4
P214	Rated motor slip	0 - 10.00 Hz	2.50
P215	Rated motor frequency	0 - 999.9 Hz	50.00
P216	Stator resistance	0 – 100 Ω	0
P217	Rotor resistance	0 – 100 Ω	0
P218	Self-induction of the rotor	0 -1.000 H	0
P219	Mutual induction of the rotor	0 -1.000 H	0
P300	**FIV minimum input voltage/current**	**0-10 V = 0,0 ; 4-20 mA = 1,0**	0
P301	**FIV maximum input voltage/current**	**0-10 V = 10,0 ; 4-20 mA = 5,0**	10.0
P302	AI/FIV input filter time	0 - 25.0 s	1.0 s
P303 - P309	Reserved		0
P310	Frequency at min. analog input	0 - 600.00 Hz	0.00
P311	Direction at min. analog input	0/1	0
P312	Frequency at max. analog input	0 - 600.00 Hz	50.00

Param.	Name		Range of setting	Factory setting	
P313	Direction at max. analogue input		0: Forward direction 1: Reverse direction	0	
P314	Selection of analogue input for reverse		0: Maintains signal polarity 1: Negates signal polarity	0	
	Input terminals				
	0.7 kW to 5.5 kW	7.5 kW to 55 kW (B)		(A)	(B)
P315	**S1**	**FWD**	0: Invalid 1: Jogging (JOG) 2: JOG forward 3: JOG backward 4: Forward / Reverse 5: RUN 6: Forward (FWD) 7: Backward (REV) 8: STOP 9: Fixed speed 1 10: Fixed speed 2 11: Fixed speed 3 12: Fixed speed 4 13: Acceleration / Deceleration terminal 1 14: Acceleration/ Deceleration terminal 2 15: Frequency increase (UP) 16: Frequency reduction (DOWN) 17: Safety STOP EMS 18: RESET of the inverter 19: PID in operation 20: PLC in operation 21: Start for timer 1 22: Start for timer 2 23: Counter input 24: RESET counter 25: Erasing the memory 26: Start of winding 27 to 31: Reserve 32: PTC/PTO/TK thermal motor protection	6	6
P316	**S2**	**REV**		7	7
P317	**S3**	**S1**		1	1
P318	**S4**	**S2**		18	18
P319	Reserved	**S3**		00	15
P320	Reserved	**S4**		00	16
P321 (0 - 32)	Reserved for S5			8	
P322 (0 - 32)	Reserved for S6			9	

P323	Reserved	0: Invalid 1: Inverter in operation 2: Frequency reached 3: Alarm (ALARM) 4: Zero speed 5: Frequency 1 reached 6: Frequency 2 reached 7: Acceleration 8: Slowdown 9: Low voltage signalling 10: Timer 1 reached 11: Timer 2 reached 12: End of program section 13: Signalling the end of the complete operation 14: PID maximum 15: PID minimum 16: Disconnecting the 4-20mA circuit 17: Engine overload 18: Inverter overload 19 to 26: Reserve 27: End of timer operation 28: Medium setting value reached 29: Liquid supply by constant voltage *T on / 0” off 30: Inverter ready 31 and 32: Reserved	01
P324	Output terminal - relay MA / MB For models up to 5.5 kW		02
P325	Output terminal - relay RA / RB for models up to 5.5 kW RA/RB/RC for models from 7.5 kW		03
P326 P327	Reserved		0
P400	**Frequency setting for JOG mode**	**0.00 - maximum frequency**	**5.00**
P401	Acceleration time 2	0 - 999.9s	10.0
P402	Deceleration time 2	0 - 999.9s	10.0
P403	Acceleration time 3	0 - 999.9s	20.0
P404	Deceleration time 3	0 - 999.9s	20.0
P405	Acceleration time 4 /Jog acceleration time	0 - 999.9s	2.0

P406	Deceleration time 4/Jog deceleration time	0 - 999.9s	2.0
P407	Required counter value	0 - 999.9	100
P408	Average counter value	0 - 999.9	50
P409	Torque acceleration limitation	0 - 200%	150%
P410	Constant speed torque limitation	0 - 200%	00
P411	Overvoltage protection during deceleration	0: Overvoltage protection off 1: Overvoltage protection on	1
P412	Automatic voltage regulation	0: AVR off 1: AVR on 2: AVR disabled when decelerating	1
P413	Automatic energy saving	0 – 100 %	00
P414	Initiation of dynamic braking via braking resistor at DC voltage	4T models: 700.0 V DC (560 – 800 V DC) 2S models: 370.0 V DC (360 – 400 V DC)	700.0 V 370.0 V
P415	Braking range (brake power)	40 – 100 %	50 %
P416	Braking range (brake power)	0: Enable restart disabled 1: Enable restart enabled	0
P417	Allowable power interruption time	0 – 10 s	5.0 s
P418	Flying restart current limiting	0 – 200 %	150%
P419	Flying restart time	0 – 10 s	50
P420	Restart times after failure	0 – 5 s	5
P421	Restart delay after failure	0 – 100 s	10 s

P422	Operation after inverter overload	0: Continues-detects at a constant speed after exceeding 1: Stops-detects at constant speed after exceeding 2: Continues after exceeding - always detects (all speeds) 3: Stops after exceeding - always detects (all speeds)	0
P423	Inverter overload level	0 – 200 %	00
P424	Inverter overload detection time	0 - 20.0 s	00
P425	Frequency reached 1	0.00 - maximum frequency	100
P426	Frequency reached 2	0.00 - maximum frequency	5.0
P427	Timer 1 setting	0 - 999.9 s	0
P428	Timer 2 setting	0 - 999.9 s	0
P429	Torque limitation time at const. speed	0 - 999.9 s	various
P430	Frequency bandwidth of the hysteresis loop	0.00 - 2.00	0.50
P431	Jump frequency 1	0.00 – maximum frequency	0
P432	Jump frequency 2	0.00 - maximum frequency	0
P433	The bandwidth of the jump frequency of the hysteresis loop	0.00 - 2.00	0.50
P434	UP/DOWN, frequency step	0 - 10.00 Hz	0.1
P435	UP/DOWN, frequency memory	0: Stored in memory 1: Not stored in memory	0
P500	**PLC memory mode**	**0: Off** **1: On**	**0**

P501	PLC initial mode	0: Off 1: On	0
P502	PLC run mode	0: PLC stops after one cycle 1: PLC stop mode, stops after one cycle 2: PLC normal running 3: PLC stop mode, normal running mode 4: PLC works at the last frequency after starting one cycle.	0
P503	Frequency for speed 1	0.00 - maximum frequency	10.00
P504	Frequency for speed 2	0.00 - maximum frequency	15.00
P505	Frequency for speed 3	0.00 - maximum frequency	20.00
P506	Frequency for speed 4	0.00 - maximum frequency	25.00
P507	Multiple speed 5	0.00 - maximum frequency	30.00
P508	Multiple speed 6	0.00 - maximum frequency	35.00
P509	Multiple speed 7	0.00 - maximum frequency	40.00
P510	Multiple speed 8	0.00 - maximum frequency	45.00
P511	Multiple speed 9	0.00 - maximum frequency	50.00
P512	Multiple speed 10	0.00 - maximum frequency	10.00
P513	Multiple speed 11	0.00 - maximum frequency	10.00
P514	Multiple speed 12	0.00 - maximum frequency	10.00
P515	Multiple speed 13	0.00 - maximum frequency	10.00
P516	Multiple speed 14	0.00 - maximum frequency	10.00
P517	Multiple speed 15	0.00 - maximum frequency	10.00
P518	PLC operating time 1	0 - 999.9 s	100

P519	PLC operating time 2	0 - 999.9 s	100
P520	PLC operating time 3	0 - 999.9 s	100
P521	PLC operating time 4	0 - 999.9 s	100
P522	PLC operating time 5	0 - 999.9s	100
P523	PLC operating time 6	0 - 999.9s	0
P524	PLC operating time 7	0 - 999.9s	0
P525	PLC operating time 8	0 - 999.9s	0
P526	PLC operating time 9	0 - 999.9s	0
P527	PLC operating time 10	0 - 999.9s	0
P528	PLC operating time 11	0 - 999.9s	0
P529	PLC operating time 12	0 - 999.9s	0
P530	PLC operating time 13	0 - 999.9s	0
P531	PLC operating time 14	0 - 999.9s	0
P532	PLC operating time 15	0 - 999.9s	0
P533	PLC direction of operation	0 - 9999	0
P600	Initial PID mode	0: PID disabled 1: PID start 2: PID external start	**0**
P601	Selection of PID operation mode	0: Negative feedback mode 1: Positive feedback mode	0
P602	PID set point selection	0: Mode number (P604) 1: AI/FIV 2: FIC (reserved)	0
P603	PID feedback option	0: AI (analog input can be 0-10V; 4-20mA) (if FIV is 0-10 V, set P300=0 and P301=10) (if FIC is 4 to 20 mA, set P300=1 and P301=5) 1: FIC 2: FIV-FIC 3: FIC-FIV	0
P604	PID setting of the target pressure value	0.00 to 10.00 bar	5.0 bar
P605	PID upper alarm limit When exceeded, **hP** declares	0.00 to 100.0 %	100 %

P606	When the PID reaches the lower limit of the alarm, the **LP** will be declared	0.00 - 100.0 %	0.00 %
P607	PID proportional band setting **P**	0.0 - 500.0 %	300%
P608	PID integration constant **I**	0.0 - 200.0 s; 0.0 means closed	2.0 s
P609	PID derivative constant **D**	0.00.0 – 200.0 s; 0.0 means closed	0.0s
P610	Setting the PID process step	0.00 - 10.00 Hz	0.50 Hz
P611	PID frequency in **SLP** sleep mode	0.00 - 50.0Hz (0.00Hz) 0.00Hz means the sleep function is off	25.00Hz
P612	PID time until the inverter goes into **SLP** sleep mode	0 – 200 s	10s
P613	PID value when waking from sleep mode	0 – 100 %	0.0 %
P614	Pressure transducer range (corresponding display value)	0.00 to 10.00	10
P615	PID number of display digits	0 - 4	4
P616	PID number of display digits after the decimal point	0 - 4	2
P617	PID upper frequency limit	0 - maximum frequency	48.00
P618	PID lower frequency limit	0 - maximum frequency	20.00
P619	PID working mode	0: Always working (PID function open) 1: When the feedback reaches the upper limit (P605), will work on min. frequency. When the feedback reaches the lower limit (P606), the PID starts working. Responds to P606.	0
P620	PID deviation limit	0 to 100.0 %	1.0
P621	Signal disconnection alarm from the pressure transducer	0: Off 1: The alarm will appear on the display as "20" (change won't stop) 2: The inverter stops (STOP) and "20" is displayed	0

P622	Reserved		
P623	Reserved		
P624	**LP** low pressure warning time (dry run) It reacts only if P619=1	Range: 0 to 600 s - if the pressure is lower than P606 and the duration is longer than P624, it will report a low pressure error and CHOD will stop, the error code is "LP" (when the pressure returns to normal, the P631 (or P632) delay will automatically reset the fault) - if you set P624 = 0, the low pressure fault is not detected	100 s
P625 to P629	Reserved		
P630	High pressure **hP** detection time	0.0 to 500.0 s	0.5 s
P631	Restart time after **hP** alarm	Interval: 0 to 6500.0 s	30.0 s
P632	After 10 times low pressure is recorded, the recovery time interval is set	Interval time = P632 x P634 min. e.g.: 2 x 60 = 120 min. (restarts operation after 120 min.) The range of the interval is 1 to 60000	2
P633	Reserved		
P634	Time unit of parameter P632	1 to 200 min.	60 min.
P635	Sleep assessment If the stable frequency is 0.1 to 500.0 Hz	Sleep assessment - After reaching the pressure, the working frequency is less than the sleep frequency of P611 and the duration time is greater than the sleep time of P612. When the frequency drops to 0, it will go into sleep mode and display “SLP”. -If the working frequency is higher than the sleep frequency of P611 and the frequency is kept stable, the frequency change value is less than P635 and the working frequency is less than P639 and the duration is greater than P612, the inverter will start to reduce the output frequency of P637 and judge whether the pressure will drop by more than the set pressure P636, if so, then terminates the sleep mode assessment. If not, the frequency will continue to decrease P637 after a 1s drop, and then judge whether the pressure has dropped more than the set pressure P636, etc.	0.3 Hz
P636	Sleep assessment If the pressure currency is 0.1% to 100.0%		0.6 %
P637	Sleep assessment If the sleep frequency decreases by 0.3 Hz/s		0.3 Hz
P638	Number of repetitions of descent frequency changes 1 - 100	If the cumulative number of repetitions reaches P638, it goes into sleep mode and displays SLP.	10 times

P639	Above this frequency P639, the sleep mode cannot be activated 0.0 – 50.0 Hz	If the frequency is higher than P639, the sleep mode is not evaluated.	42.0 Hz
P640	Interval time against freezing of water in the system	0 to 999.9 s	650.0s
P641	Time of operation of the pump against freezing of water in the system	0 to 999.9 s	30.0 s
P642	Initialization of the anti-freeze system	0: Off 1: On	1
P643	Internal service parameter	00 to 20	02
P700	**Communication speed**	0: 4800bps **1: 9600 bps** 2: 19200 bps 3: 38400 bps	**1**
P701	Communication mode	0: 8N1 for ASC 1: 8E1 for ASC 2: 8O1 for ASC 3: 8N1 for RTU 4: 8E1 for RTU 5: 8O1 for RTU	0
P702	Communication address	0 - 240	0
P800	**Lock application parameters**	**0: Locked** **1: Unlocked**	**1**
P801	Setting the input frequency to 50Hz or 60Hz	0: 50Hz 1: 60Hz	0
P802	Constant torque or variable torque	0: Constant torque 1: Variable torque	0
P803	Setting the surge protection	400 V DC for models 2S 810 V DC for models 4T	by the model
P804	Setting the undervoltage protection	150 V DC for models 2S 310 V DC for models 4T	by the model
P805	Setting the protection against overheating	40 – 120°C	85/95°C

P806	Current view filtering time	0 - 10.0	2.0
P807	0 - 10V calibration coefficient for low analog output	0 - 65535	-
P808	0 - 10V calibration coefficient for high analog output	0 - 65535	-
P809	0 - 20mA calibration coefficient for low analog output	0 - 65535	-
P810	0-20 mA calibration coefficient for high analog output	0 - 65535	-
P811	Frequency compensation point during run dead time	0.00 - maximum frequency	0.00
P812	Memorizing the frequency during UP/DOWN	0: Stored in memory 1: Not stored in memory	0

Chapter 5: Detailed explanations of X550 functional parameters

5.0 Monitoring parameters P0

Param.	Name	Range of setting	Description
P000	Selection of main display data (allows you to switch even while running)	00	Displays the set frequency
		01	Displays the output frequency of the inverter
		02	Displays the output current of the inverter
		03	Displays FWD or REV direction of rotation
		04	Displays the engine speed
		05	Displays the DC bus voltage
		06	Reserve
		07	Displays the value of the PID feedback signal
		08	Displays the PID value

The user can set the initial display of the inverter through parameter P000.
For example, if you want to monitor the speed through the control panel, the user can set the parameter P000 = 04.
The initial value of P000 is "00", so if it is not changed, the X 550 inverter will display the set frequency.

P001	Displays the set frequency.
	Displays the set frequency of the inverter.

With this parameter you can monitor the set frequency of the inverter.

P002	Displays the output frequency
	Displays the output frequency of the inverter.

You can monitor the current output frequency of the inverter using parameter P002.

P003	Displays the output current
	Displays the output current of the inverter

You can monitor the current output current using parameter P003.

P004	Displays the engine speed.
	It shows the actual engine rotation speed.

You can monitor the actual motor rotation speed using parameter P004.

P005	Displays the DC bus voltage.
	It shows the DC bus voltage in the main circuit of the inverter.

You can monitor the actual voltage of the DC bus with parameter P005.

P006	Displays the temperature of the inverter
	Displays the current temperature of the inverter.

You can monitor the current temperature of the inverter using parameter P006, which will help you assess the operating status of the inverter.

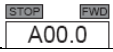
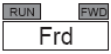
P010	Fault record 1
P011	Fault record 2
P012	Fault record 3
P013	Fault record 4

You can check the conditions for the last four faults by examining P010 to P013. These four parameters can help the user to judge the operation status of the inverter and find the cause of the malfunction and eliminate the hidden problems.

P014	Shows the recently set frequency of the inverter when a fault occurs
P015	It shows the recent output frequency of the inverter when the fault occurred
P016	It shows the recent output current of the inverter when the fault occurred
P017	It shows the recent inverter output voltage when the fault occurred
P018	It shows the recent DC bus voltage of the inverter when the fault occurred
	The parameters show the detailed status when the last error occurred. You can check the current frequency setting, the current output frequency, the actual output voltage and the DC voltage of the main circuit in the inverter.

You can check the details of the condition when the last error occurred by examining the contents of P014 - P018. You can examine the frequency setting, actual output frequency and actual output current, actual output voltage, main circuit DC bus voltage. According to the above data, you can analyze the cause of the failure and quickly find a solution to help the maintenance staff to make repairs.

You can track the data by pressing the button as shown in the following table:

Proc.	Aktion	Button	Display	Description
1	Turn on the power			①The inverter is in standby mode. ②The display shows the frequency setting. the FREE light is on, which means the keyboard is showing the frequency setting.
2	Press once			Inverter start ①The inverter is in operation and the RUN indicator light is on. ②The picture shows the frequency setting. The Forward light is on; the inverter is in Forward state.
3	Press once			Display switching; not if the actual output frequency is displayed. The inverter is in Forward state. ①The actual output frequency is 50 Hz.
4	Press once			Display switching; not if the actual output current is displayed. ①Actual output current is 0A.
5	Press once			Shows the startup status

5.1 Basic parameters P1

P100	Digital frequency setting (total value: 0.00Hz)			
	Range of setting	0.00-Max. frequency 999.9	Unit	0.01

When P101 is set to 0, the drive operates in digital frequency setting mode. The frequency value is set using P100.

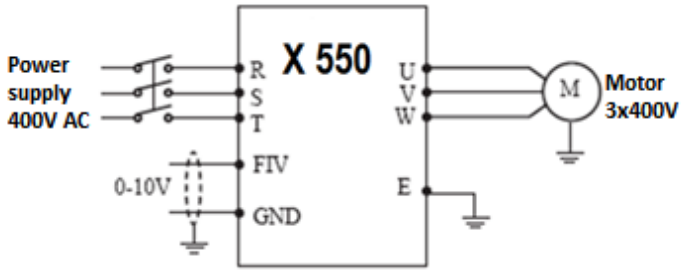
During operation, you can change the frequency by editing the contents of parameter P100 or by pressing the "↑" or "↓" button to change the frequency. If you change the frequency by modifying P100 when the drive is stationary or when it is turned off, the modified content may be remembered.
If you change the frequency by pressing the "↑" or "↓" button when the inverter is stopped or turned off, the modified content will not be remembered; the original content of P100 will be remembered. After the inverter is started, it will work at the original value of P100.

P101	Choice of frequency setting		Initial value: 0	
	Range of setting	0-5	Unit	1
	Explanation	0: Digital frequency setting (P100) If P812=0, it keeps the set value in memory even after switching off 1: AI/FIV (0 to 10 V DC) or (4 to 20 mA) switch SW1 2: Reserve 3: Setting via the control panel 4: Setting the frequency via UP/DOWN 5: Frequency setting via RS485		

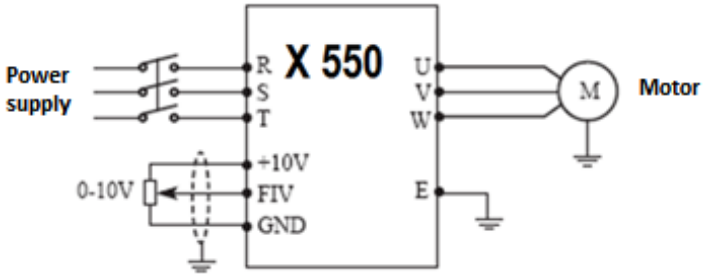
The frequency setting option can be used to determine the output frequency of the inverter.

0: Digital frequency setting
The output frequency of the inverter is controlled by parameter P100. In general, you can change the output frequency by pressing the "↑" or "↓" key on the keyboard. See P100 for more information.

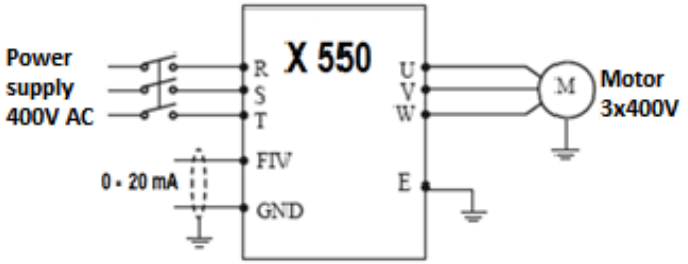
1: Analog voltage (0—10VDC or 4-20mA current)
The output frequency of the inverter is controlled by an external voltage signal (0-10 V or an external current signal 4-20 mA), which is fed to the inverter through the AI (Analog Input)/ FIV terminal.
There are two modes of external voltage signal: one is to adjust the signal in the range of 0 to 10V; the second is the potentiometer setting. See the following connection diagram.



Explanation: the output frequency is controlled via the AI / FIV terminal (0-10V).



Explanation: the control output frequency of the inverter is controlled by the AI / FIV voltage signal from the external POT (10 kΩ).

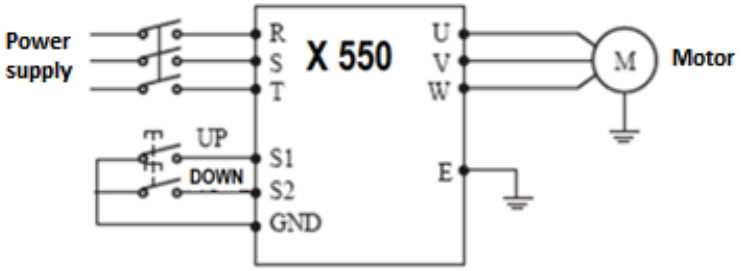


Explanation: the control output frequency of the inverter is controlled by the AI / FIV current signal 0 to 20 mA, or 4 to 20 mA.

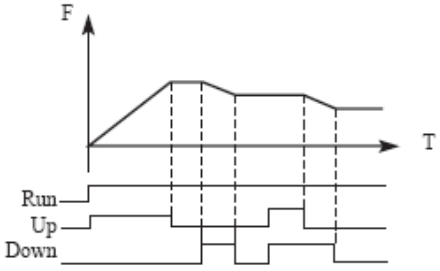
2: Reserve for models of a higher power class above 30 kW (0—20 mA DC)
The output frequency of the inverter is controlled by an external current signal (0-20 mA), which is fed to the inverter through the FIC terminal.

3: Setting through the control panel - external (option).
You can control the X 550 series inverter using the POT rotary knob on the external panel.

4: Setting the frequency via UP/DOWN
The output frequency of the inverter is controlled by external terminals UP / DOWN. External terminals can be selected via P315 to P322, one of the external terminals is selected as UP / DOWN. When UP is active, the frequency will increase. If DOWN is active, the frequency will decrease. When both UP and DOWN inputs are active, the frequency remains the same.



Parameter: P317 = 15, terminal S1 will be set in UP mode
P318 = 16, terminal S2 will be set in DOWN mode.



Explanation: if UP is active (UP is closed), the frequency will increase. If DOWN is active (DOWN is closed), the frequency will decrease.

P102	Choice of start method		Initial value : 0	
	Range of setting	0-2	Unit	1
	Explanation	0: Through the control panel with the FWD/REW/STOP buttons 1: I/O terminals 2: Communication via RS485		

Start signal selection is used to set the signal source.

0: Control panel (FWD / REV / STOP)

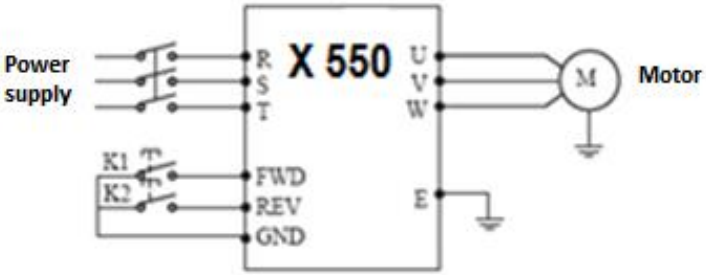
A running signal is displayed on the control panel. The control of the inverter can be controlled by the [RUN] (reverse forward) button on the control panel. Press the [STOP|RESET] button to stop the inverter operation.

1: I/O terminal

In the initial setup, the forward and reverse rotation signals are used as the start and stop signals. Turn on either of the forward and reverse rotation directions to start the motor in the appropriate direction. If both are off (or on) during operation, the inverter decelerates to a stop (or maintains the original operating state). You can use the two-wire or three-wire control mode using the I/O terminal.

① Two-wire mode

A two-wire connection is shown below:



Parameter: P102 = 1; P315 = 6; P316 = 7

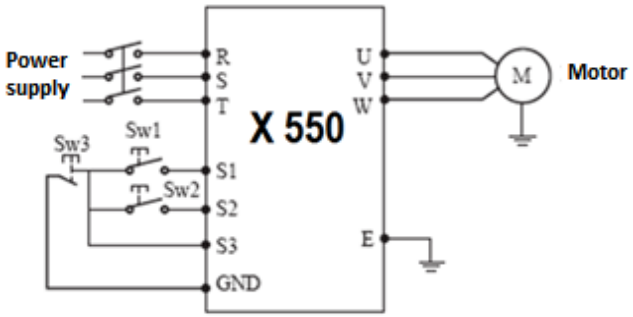
Explanation of controls:

Input choice		Inverter status
K1	K2	
ON	OFF	Forward
OFF	OFF	Stop
OFF	ON	Back
ON	ON	It will retain its original operating condition

② Three-wire mode

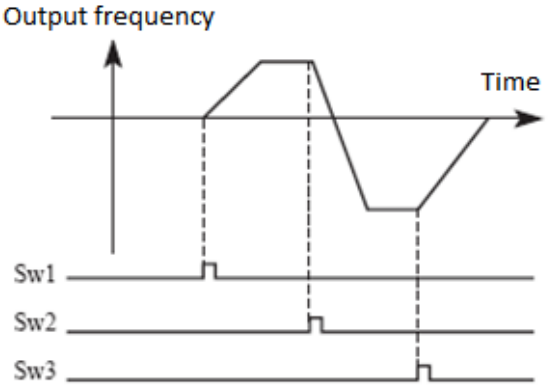
The three-wire connection is shown below.

After turning on the STOP signal, automatic start selection occurs. In this case, the forward/reverse rotation signal only works as a start signal.
If the start signal (S1 / S2) is on and then off, the start signal is held and the inverter starts.
When changing the direction of rotation, turn S1 (S2) on once and then turn off.
To stop the inverter, turn off the STOP signal, the inverter will slow down to a stop.



Use S1, S2 or S3 as input terminal for external signal

Parameter: P317 = 6, S1 is FORWARD
P318 = 7, S2 is REVERSE
P319 = 9, S3 is in stop mode
P102 = 1, external terminal input

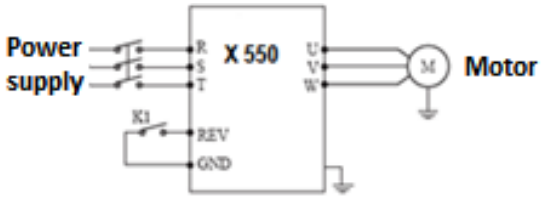


2: RS485 mode

The inverter can receive control commands and data from the computer via MODBUS RTU serial communication.

P103	Blocking the “STOP” button Initial value : 1			
	Range of setting	0-1	Unit	1
	Explanation	0: Button blocking disabled 1: Button blocking enabled		

The "STOP" button on the control panel can be blocked to prevent accidental stopping. Set "0" in P103 and then press "ENTER" for 2s to block the function of "STOP" button and the "STOP" button cannot stop the inverter operation. Set "1" in P103 and then press "ENTER" so that the "STOP" button is active and can stop the drive operation.



Process	Input	Explanation
1	K1 ON	Reverse operation of the inverter starts
2	(K1 OFF) press the Stop button	The inverter stops
3	K1 OFF	The run stops
4	K1 ON	Reverse will start

P104	Choice of reverse protection		Initial value : 1	
	Range of setting	0-1	Unit	1
	Explanation	0: Reverse disabled 1: Reverse enabled		

Many devices only allow rotation in one direction. In this case, you can set this parameter in unidirectional rotation only mode.

0: Reverse disabled
Reversing the engine is prohibited. If P104 is set to "Reverse is disabled", switching between Forward and Reverse is ineffective.
1: Reverse enabled
Engine reverse is enabled, switching between forward and reverse is active.

P105	Maximum frequency	Initial value: 50.00
	Range of setting	minimum output frequency - 999.9 Hz

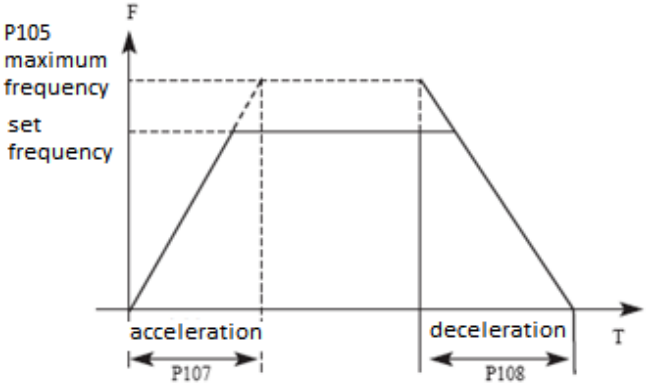
The output frequency range of the inverter is 0.1 - 999.9 Hz. Therefore, the inverter can drive motors above 50 / 60Hz.
This parameter is to limit the output frequency of the inverter to prevent the motor from running at a higher speed.

P106	Minimum frequency	Initial value: 0.00
	Range of setting	0.0 Hz - Maximum frequency

This parameter sets the minimum output frequency of the inverter. If the set frequency is lower than the Minimum frequency of the inverter, it will run at min. frequency. In some applications, this feature could prevent the motor from overheating due to low speed operation.

P107	Acceleration time	Initial value: .....
P108	Deceleration time	Initial value: .....
	Range of setting	0.1 – 999.9 s

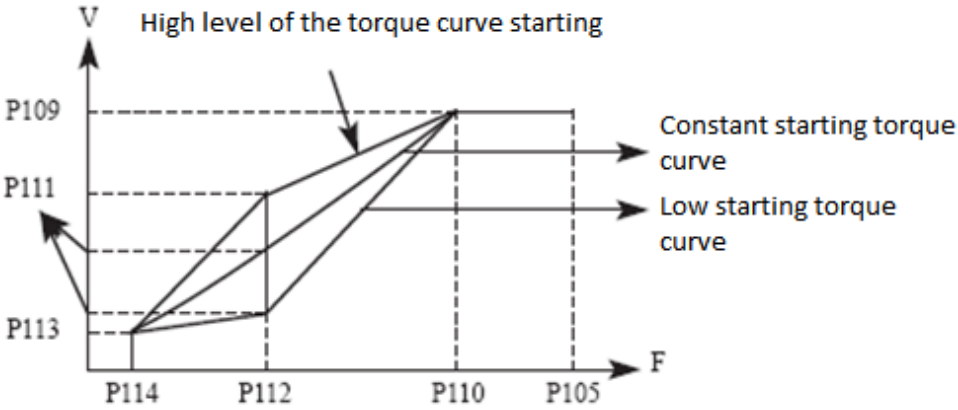
The acceleration time means the time when the inverter should reach the Maximum frequency from 0.00 Hz. The deceleration time refers to the time when the frequency of the inverter decreases to 0.00 Hz from the maximum frequency.



The default deceleration/acceleration value is primary time. A different deceleration / acceleration time can be selected via an external terminal.

P109	V/F maximum voltage		Initial value: 380	
	Range of setting	V/F midle voltage - 500.0 V	Unit	0.01
P110	V/F basic frequency		Initial value: 50	
	Range of setting	V/F basic frequency - max. frequency	Unit	0.01
P111	V/F middle voltage		Initial value: change	
	Range of setting	V/F min. voltage - V/F max. voltage	Unit	0.1
P112	V/F middle frequency		Initial value: 2.5	
	Range of setting	V/F Minimum frequency - V/F basic frequency	Unit	0.01
P113	V/F minimum voltage		Initial value: 15	
	Range of setting	0 - V/F middle voltage	Unit	0.1
P114	V/F minimum frequency		Initial value: 1.25	
	Range of setting	0 - V/F middle frequency	Unit	0.01

Parameters from P109 to P114 determine the V/F curve of the inverter. Set the corresponding V/F curves according to different loads.
Constant torque curve: application for constant torque load, output voltage and output frequency are in a linear relationship.
Lower (variable) torque curve: application for variable torque loads such as fan and pump. The load will increase as the RPM increases.



High level of the starting of the torque curve: application for heavy loads and loads that require a high starting torque.

P109: The maximum
V/F voltage is set according to the connected motor. It is generally set to the rated voltage of the motor. When the motor is close to the inverter, usually within 30 meters, it should be set to a higher value.

P110: base frequency
V/F Set the base V/F frequency to the frequency of motor operation. In general, do not change the V/F base frequency as it is very likely to damage the motor.

P111: V/F medium voltage
Set the medium V/F voltage according to the specific load. Improper adjustment can cause motor overcurrent or undertorque or even trigger inverter protection. Increasing the value of P111 can increase the output torque and output current. Monitor the output current when the value of P111 changes. When changing the value of P111, slowly adjust the value until the required output torque is reached. Too high a setting may trigger protection or inverter failure.

P112: V/F medium frequency
The V/F center frequency determines the midpoint of the V/F curve. Improper adjustment may cause insufficient torque or over-protection of the inverter. In general, do not change the setting of this parameter during use.

P113: V/F minimum voltage
The V/F minimum voltage setting is somewhat relevant to torque initiation. Correctly increasing the value of this parameter can increase the starting torque, it can also cause excessive current. In general, it is not necessary to change the value of P113.

P114: V/F Minimum frequency Minimum frequency V/F determines the starting point of the V/F curve, it is the minimum value in the V/F curve.

See the following table for each model's specific default setting:

Parameter / Model	P107	P108	P111	P115
X 550-2S0007	8	8	14	10
X 550-2S0015	9	9	14	9
X 550-4T0007	8	8	27	5
X 550-4T0015	9	9	26	5
X 550-4T0022	10	10	25	5

P115	Carrier frequency		Factory setting
	Range of setting	1-15 kHz	Unit: 1

The carrier frequency determines the switching frequency of the internal power module. The factory setting of inverters with different capacity is different because it affects motor noise, motor heating and breakdowns.

carrier frequency P115	engine noise	engine heating	faults
Small -> Large	Large -> Small	Small -> Large	Small -> Large

Therefore, when the environment requires noise-free operation, increase the value of P115, the maximum load of the inverter will be reduced. If the motor is located far from the inverter, reduce the value of P115 to reduce the leakage current between the wires and the ground conductor. If the ambient temperature or motor load is high, reduce the value of P115 to reduce the heating of the inverter. See the table in P114 for the factory setting of P115.

P117	Parameters resetting		Initial value : 0	
	Range of setting	0-8	Unit	1
	Explanation	8: Return to factory settings		

If the parameter setting is not correct, or when the wrong operation leads to the wrong setting of the parameter, you can set P117 to 08 to restore all the parameters to the factory setting, and then you can set them again according to the current need.

Warning: When the parameters are lock, that is, P118 = 1, you cannot initialize the parameters and change them. First change P118 and then set these parameters.

P118	Parameters locking		Initial value : 0	
	Range of setting	0-1	Unit	1
	Explanation	0: Parameters unlocking 1: Parameters locking		

1: Parameters locking

You can lock the parameter using function P118 to prevent the inverter setting from changing unexpectedly.

When P118 is set, no other parameters except P100 (main frequency setting) can be changed.

5.2 Basic application parameters P2

P200	Selection of the start mode		Initial value : 0	
	Range of setting	0-1	Unit	1
	Explanation	0: Normal start 1: Restart with frequency tracking		

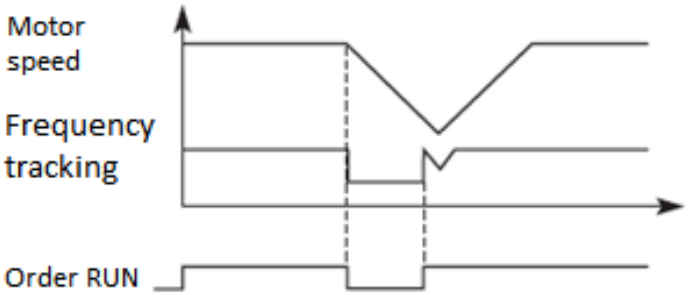
There are two startup modes for the X550 series inverter. You can choose from two settings for parameter P200 and machine status.

0: Normal start

Most types of load do not have special requirements at the start. The output of the inverter is the starting frequency.

1: Restart with frequency tracking

The inverter starts after a fault reset or in the event of a sudden power failure. With this function, the inverter can automatically recognize the rotation speed and rotation direction of the motor, corresponding to the output frequency and voltage.

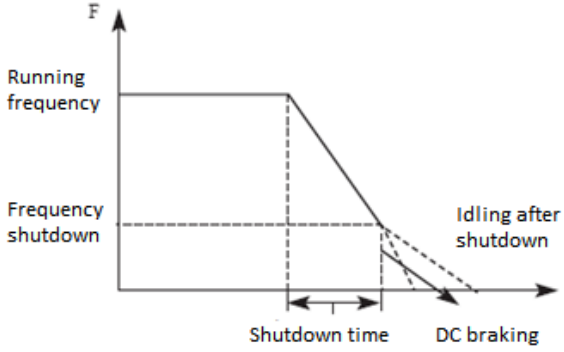


Warning: When the drive starts in the start tracking mode, the drive will track the speed in order from high to low frequency.
There will likely be a large current at the beginning. Therefore, you must have the current overload limit set (setting 4.09). The specific value depends on the load.
In addition, when the value of 4.09 is too low, it can lead to a long startup time. In case of overcurrent during speed monitoring, the inverter stops speed monitoring.

P201	Stop mode selection		Initial value : 0	
	Range of setting	0-1	Unit	1
	Explanation	0: Decelerate to a stop along a curve 1: Idle to stop		

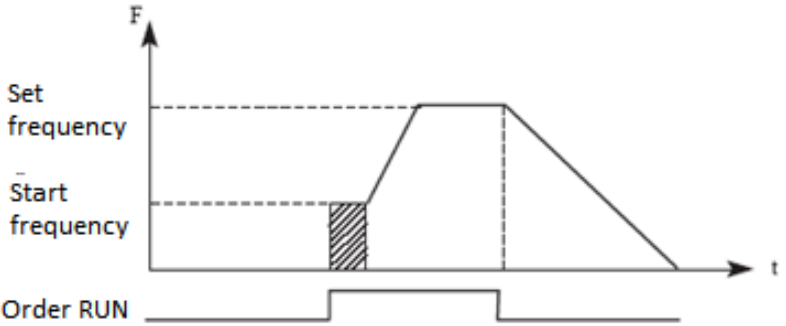
You can choose the appropriate stop mode according to the actual load.

0: Decelerate to a stop along a curve
After receiving the stop command, the inverter will reduce the output frequency according to the deceleration time.



As for the stop mode after reaching the stop frequency, you can choose DC brake and other options. If you do not select DC braking, the motor will automatically stop in coasting mode.
1: Idle to stop
When the inverter receives a stop command, it stops the frequency output and the motor stops automatically.

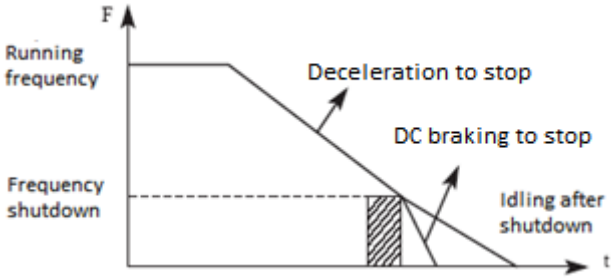
P202	Frequency at start		Initial value : 0.5	
	Range of setting	0.10 - 10.00 Hz	Unit	0.01



The starting frequency is the initial frequency at the start of the inverter. For equipment with heavy load or fast fast torque, it increases the starting frequency. However, if the trigger frequency is too high, it may cause the over-protection to activate.

P203	Frequency at stop		Initial value : 0.5	
	Range of setting	0.10 - 10.00 Hz	Unit	0.01 Hz

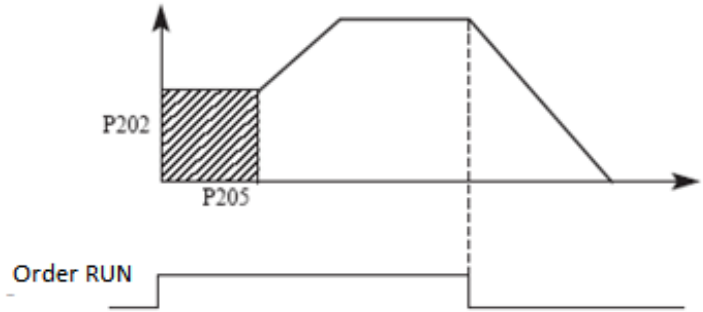
If the inverter receives a stop command, it will reduce the output frequency to the stop frequency, then start the self-stop z mode or stop by DC braking, according to the setting.



P204	DC brake operating current (start)		Initial value : 100	
	Range of setting	0 – 150 %	Unit	1
P205	DC brake operating current (start)		Initial value : 0	
	Range of setting	0 – 250 %	Unit	1

DC braking at start is a suitable application for the fan in stop mode and variable load.

Because the motor is in the idling mode before the inverter starts, and the direction of rotation is unknown, it is easy to cause overload protection at the start. Therefore, you should use the DC brake in advance to stop the motor before starting.
The DC braking current at start-up is a proportional part of the rated current of the inverter. Setting P204 can have different braking torques. When setting the parameter value, you can set the value from low to high until sufficient braking torque is achieved according to the current load.
DC braking time is the duration of DC braking. If the setting is 0, the DC brake is inactive.

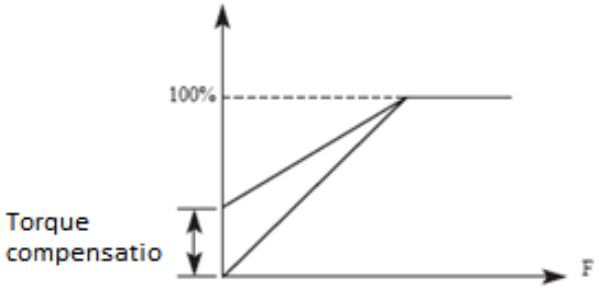


P206	Pracovný prúd DC brzdy (stop)		Initial value : 100	
	Range of setting	0 – 150 %	Unit	1
P207	Doba prevádzky DC brzdy (STOP)		Initial value : 0	
	Range of setting	0 – 250 %	Unit	1

DC braking in the track is suitable for loads that have a braking requirement. The DC braking current in the trace is a proportional part of the rated current of the inverter. Setting this parameter can produce different braking torques.
DC braking time in stop is the duration of DC braking mode. If the setting is 0, the DC brake is inactive.
See explanations P203, P204 and P205 for detailed information.

P208	Increasing torque		Initial value : 5%	
	Range of setting	0.1 – 20%	Unit	0.1

Setting parameter P208 can increase voltage and achieve higher torque.
Warning: Too high a value can cause the motor to overheat. Increase the setting step by step until the desired starting torque is reached.



P209	Rated motor voltage		Initial value : 380 V	
	Range of setting	0 - 500.00 V According to the nameplate	Unit	0.01
P210	Rated motor current		Initial value :	
	Range of setting	According to the nameplate	Unit	0.1
P211	Rated current of the motor without load		Initial value : 40 %	
	Range of setting	0 - 100 %	Unit	1
P212	Rated motor speed		Initial value : 1420	
	Range of setting	0 - 6000 ot./min	Unit	1
P213	Number of motor poles		Initial value : 4	
	Range of setting	0-10	Unit	1
P214	Rated motor slip		Initial value : 2.5	
	Range of setting	0-100	Unit	0.1

Set the above parameters according to the motor nameplate.

P209 Motor rated voltage
Set the rated voltage of the motor according to the voltage value on the motor nameplate.
P210 Motor rated current Set the rated current of the motor according to the current value on the nameplate. If the current exceeds the rated current, the inverter will shut down to protect the motor.
P211 Motor rated current without load The rated current of the motor can affect the slip compensation. The rated motor no-load current is a percentage of the motor current.
P212 Rated engine speed
The value of parameter P112 is the rotation speed at 50 Hz. Refers to the speed shown. It is generally set according to the nameplate value. If you want to display the actual rotation speed of the motor, you can set parameter P212 to the actual rotation speed at 50 Hz.
P213 Number of motor poles
Set the number of paired motor poles by setting this parameter according to the nameplate value.
P214 Nominal motor slip
If we increase the load while controlling the motor with an inverter, the motor may slip. Setting P214 can compensate for the slip and the motor speed will be closer to the desired speed.

P215	Rated motor frequency		Initial value : 50Hz	
	Range of setting	0.00 – 999.9 Hz According to the nameplate	Unit	0.01
P216	Stator resistance		Initial value : 0	
	Range of setting	0-100.00	Unit	0.01
P217	Rotor resistance		Initial value : 0	
	Range of setting	0-100.00	Unit	0.01
P218	Self induction of the rotor		Initial value : 0	
	Range of setting	0-1.000	Unit	0.001
P219	Mutual induction of the rotor		Initial value : 0	
	Range of setting	0-1.000	Unit	0.001

The above parameters are motor parameters.
P215 Rated motor frequency Set the rated motor frequency according to the motor nameplate.
P216 Stator resistance
P217 Rotor resistance
P218 Rotor self-induction
P219 Rotor mutual induction Adjust the above parameters according to the current engine condition.

5.3 Parameters P3 for input and output applications

P300	AI/FIV minimálne napätie/prúd vstupu		Initial value : 0 V	
	Range of setting	0 V - maximum voltage 10 V 0 mA - maximum current 20 mA	Unit	0.1
P301	AI/FIV maximálne napätie/prúd vstupu		Initial value : 10 V	
	Range of setting	minimum voltage 0.0 V - 10 V minimum current 0.0 mA - 20 mA	Unit	0.1
P302	AI/FIV input filter time		Initial value : 1 s	
	Range of setting	0-25.0 s	Unit	1

P300: AI/FIV minimum input voltage
The input value of the FIV minimum voltage is related to the equivalent frequency of the analog inputs. A command with a voltage below this value is considered an invalid command.

P301: AI/FIV maximum input voltage
The input value of the FIV maximum voltage is related to the analog input frequency. At a voltage higher than this value, the device will still only operate at this value.
The P300 value and the P301 value determine the input voltage range.

P302: AI/FIV input filter time
The value of the input filter time determines the response speed of the inverter to an analog change.
As the value of P302 increases, the inverter will react more slowly to the analog change.

P303 to P309: Reserved

P310	Frequency at min. analog input		Initial value : 0.00	
	Range of setting	0 - 600.00 Hz	Unit	0.01
P311	Direction at min. analog input		Initial value : 0	
	Range of setting	0/1	Unit	1
	Explanation	0: Positive direction 1: Negative direction		
P312	Frequency at max. analog input		Initial value : 50	
	Range of setting	0 - 600.00 Hz	Unit	0.01
P313	Direction at max. analog input		Initial value : 0	
	Range of setting	0/1	Unit	1
	Explanation	0: Positive direction 1: Negative direction		
P314	Direction at min. analog input		Initial value : 0	
	Range of setting	0 - 1	Unit	1
	Explanation	0: Reverse operation is disabled at negative voltage 1: Reverse operation is enabled at negative voltage		

The parameter group P310-P314 controls the analog signals, including the output frequency and direction. According to the current needs of the user, they can create different control curves.

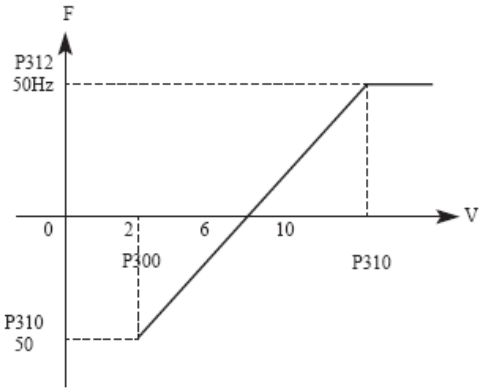
P310 Frequency at min. analog input
The smallest analog frequency determines the output frequency of the smallest analog input corresponding to the analog minimum voltage (current) input. P311 Direction at min. analog input The direction of the smaller analog determines the operating condition at low frequency, whether it is forward or reverse.

P312 Frekvencia pri max. analógovom vstupe
Analógová vysoká frekvencia určuje vyššiu výstupnú frekvenciu a zodpovedá vstupu analógového maximálneho napätia (prúdu).

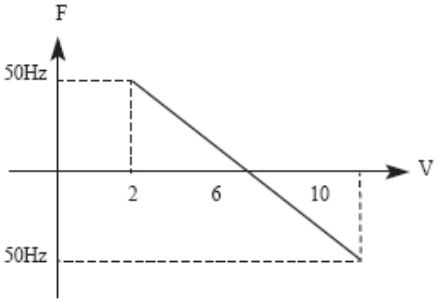
P313 Direction at max. analog input
The analog direction determines whether the higher frequency state is forward or backward.

P314 Direction at min. analog input

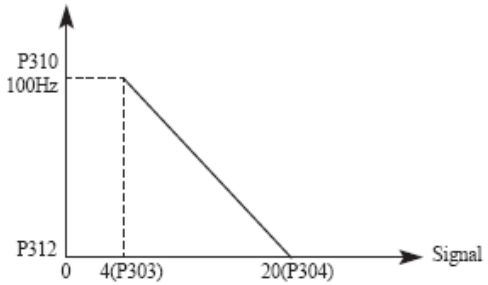
Analog reverse selection determines the operating state of the analog negative voltage. Using the above parameter, a curve can be created that meets the customer's needs.
Example 1: PC top output 2-10 V signal to control the inverter, 50 Hz reverse to 50 Hz forward.



P300 = 2, minimum voltage input FIV: 2V (the inverter considers signals below 2V as invalid signals);
P301 = 10, FIV maximum voltage input: 10V (signals above 10V are considered 10V);
P310 = 50, analog lower frequency: 50 Hz;
P311 = 1, low level analog direction: 1 (reverse);
P312 = 50, analog high frequency: 50 Hz;
P313 = 0, high level analog direction: 0 (forward);
P314 = 1, direction selection: 1 (negative voltage can be reversed).
Note: In different curves, the forward and reverse switching commands will remain effective if the curve is reversed when switching forward and backward, and the curve diagram is as follows:



Example 2, the output from the control PC is 4 - 20 mA and the inverter has the "Output frequency" parameter set: 100 Hz - 0 Hz



Parameters:
P303 = 4, FIC minimum input current
P304 = 20, FIC maximum input current
P310 = 100.00, frequency at min. analog input
P311 = 0, direction at min. analog input
P312 = 0, frequency at max. analog input
P314 = 0, selection of reverse analog input
A special reverse curve can be created using P310-P314.
Warning: an input signal below 4mA is considered an invalid signal by the inverter.

P315	Multifunctional input terminal —FWD/S1 terminal	Preset 6
P316	Multifunctional input terminal—REV/S2 terminal	Preset 7
P317	Multifunctional input terminal—S1/S3 terminal	Preset 1
P318	Multifunctional input terminal—S2/S4 terminal	Preset 18
P319	Multifunctional input terminal—S3 terminal	Preset 15
P320	Multifunctional input terminal—S4 terminal	Preset 16
P321	Multifunctional input terminal—S5 terminal	Preset 8
P322	Multifunctional input terminal—S6 terminal	Preset 9
	Range of setting 0-32	Unit 1

	Setting	0: Invalid 1: Jogging (JOG) 2: JOG forward 3:JOG backwards 4: Forward / Reverse 5: RUN 6: Forward (FWD) 7: Backward (REV) 8: STOP 9: Fixed speed 1 10: Fixed speed 2 11: Fixed speed 3 12: Fixed speed 4 13: Acceleration / Deceleration terminal 1 14: Acceleration/ Deceleration terminal 2 15: Frequency increase (UP) 16: Frequency reduction (DOWN) 17: Safety STOP EMS 18: RESET of the inverter 19: PID in operation 20: PLC in operation 21: Start for timer 1 22: Start for timer 2 23: Counter input 24: RESET counter 25: Erasing the memory 26: Start of winding 27 to 31: Reserved 32: PTC motor protection

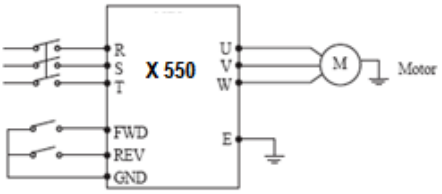
0: Invalid. As an unoccupied terminal, no function

1: Jogging (JOG). Sets the JOG, usually used for rehearsals. operation, the jump is 5 Hz

2: JOG forward. Sets the JOG forward.

3: JOG backward. Sets JOG backward.

4: Forward / Reverse. Sets forward/backward switching, if the terminal is defined as active, the running direction is backward.



Parameters: P102 = 1, P315 = 6, P316 = 4

Terminal status		Conditions of operation
FWD	REV	
ON	OFF	Forward
ON	ON	Backward
OFF	OFF	Stop

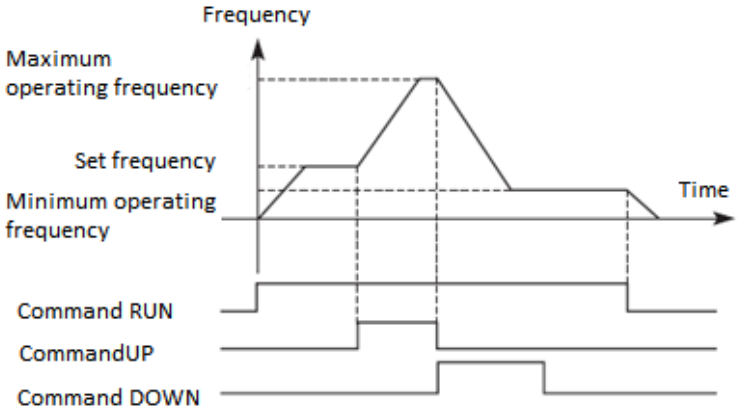
5: In operation (RUN). Sets the terminal as a signal for operation.
6: Forward. If the terminal is active, the motor runs forward.
7: Back. If the terminal is active, the operation is reverse.
8: Stop. If the terminal is active, the motor stops.
9: Step fixed speed 1
10: Step fixed speed 2
11: Step fixed speed 3
12: Step fixed speed 4
The software allows you to select 15 speeds using multi-speed terminals 1, 2, 3 and 4 according to the table below:

Multifunctional terminal block				Status - Explanation
fixed speed 1	fixed speed 2	fixed speed 3	fixed speed 4	
0	0	0	0	Primary frequency. The primary frequency is given by P100 or a potentiometer
1	0	0	0	Fixed speed 1 (P503)
0	1	0	0	Fixed speed 2 (P504)
0	0	1	0	Fixed speed 3(P505)
0	0	0	1	Fixed speed 4 (P506)
1	1	0	0	Multi-speed 5 (P507)
1	0	1	0	Multi-speed 6 (P508)
1	0	0	1	Multi-speed 7 (P509)
0	1	1	0	Multi-speed 8 (P510)
0	1	0	1	Multi-speed 9 (P511)
0	0	1	1	Multi-speed 10 (P512)
1	1	1	0	Multi-speed 11 (P513)
1	1	0	1	Multi-speed 12 (P514)
1	0	1	1	Multi-speed 13 (P515)
0	1	1	1	Multi-speed 14 (P516)
1	1	1	1	Multi-speed 15 (P517)

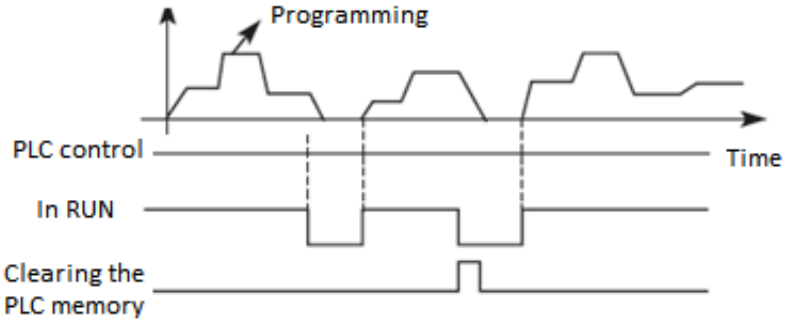
Notes: 0: terminal invalid
1: terminal valid
13: selection of acceleration / deceleration 1
14: selection of acceleration / deceleration 2
4 types of acceleration/deceleration times can be selected for terminals 1 and 2.

Multifunctional terminal		Status and result of deceleration/acceleration
Selection of acceleration / deceleration 1	Selection of acceleration / deceleration 2	
0	0	Acceleration / deceleration time 1 (P107, P108)
1	0	Acceleration / deceleration time 2 (P401, P402)
0	1	Acceleration / deceleration time 3 (P403, P404)
1	1	Acceleration / deceleration time 4 (P405, P406)

15: Signal increasing the frequency UP (ascending signal)
When this clamp is valid, the frequency increases at a constant rate until the operating frequency is not the highest.
16: Signal reducing the frequency DOWN (falling signal)
When this terminal is active, the frequency is reduced at a constant rate while it is lowest operating frequency reached.
Warning: the inverter will not remember the frequency setting changed by "UP" and "DOWN" signal. After the power is turned off and reset again, the inverter still remembers the parameter P100.

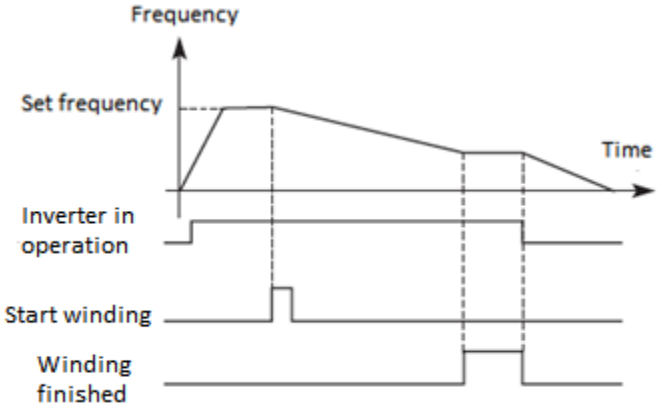


17: Safety STOP EMS
When the terminal is active, the inverter stops the drive.
18: Fault reset
In the event of an alarm, the inverter resets, this function of the terminal is the same as the function RESET button on the panel.
19: Enabling the PID function into operation
When this contact closes, the PID function is activated. When parameter P601 set to 2, PID is inactive.
20: Enabling the PLC function
When this contact closes, the PLC function starts.
21: Timer 1 starts
22: Timer 2 starts
When this contact closes, the timer starts and starts counting the time when the timer reaches set value, the corresponding action of the multi-function output is performed.
23: Pulse counter input
This terminal can receive impulse signals with a maximum frequency of 250 Hz.
24: Reset the counter
The counter will be reset.
25: The PLC memory is cleared



During the running of the PLC program, due to a fault or stop, the frequency inverter will automatically record the program status, after removing the fault and turning on the inverter again, the frequency inverter will continue to operate according to the program. If memory clearing is enabled, the program will be reset and the drive will start from the beginning.

26: Start of winding operation
If this signal is active, the winding function is on.



Introduction:

(1) The winding function is activated and winding begins;

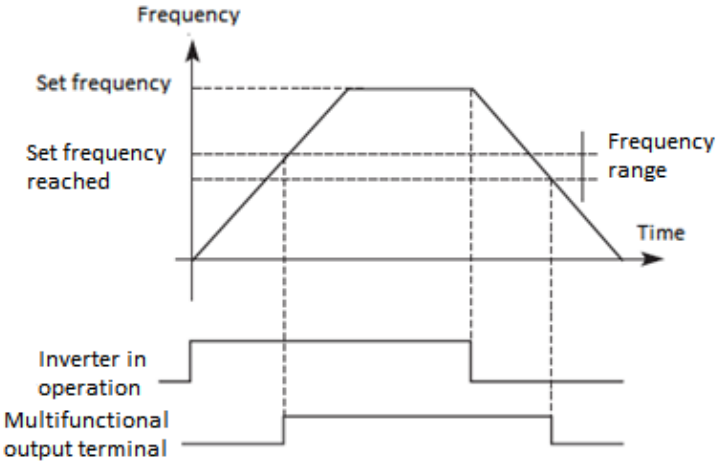
(2) Termination of winding. The multi-function terminal has a winding completion signal output;

(3) The inverter stops, the winding signal is completely reset.

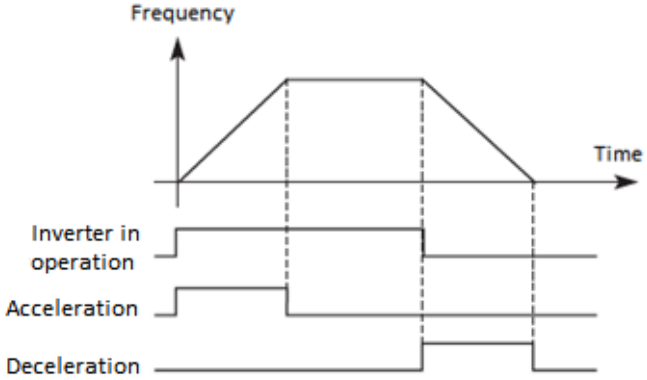
P323	Reserved		Initial value 01	
P324	Output terminal MA/MB For models up to 5.5 kW		Initial value 02	
P325	RA/RB output terminals for models up to 5.5 kW Output terminals RA/RB/RC for models from 7.5 kW		Initial value 03	
	Range of setting	0-32	Unit	1

	Setting	0: Invalid 1: Inverter in operation 2: Frequency reached 3: Alarm (ALARM) 4: Zero speed 5: Frequency 1 reached 6: Frequency 2 reached 7: Acceleration 8: Slowdown 9: Low voltage signaling 10: Timer 1 reached 11: Timer 2 reached 12: Signaling of all phases 13: Signaling complete operation 14: PID maximum 15: PID minimum 16: Disconnecting the 4-20 mA circuit 17: Engine overload 18: Inverter overload 19 to 26: Reserve 27: Termination of timer operation 28: Medium setting value reached 29: Liquid supply by constant voltage *T on / 0" off 30: Inverter ready 31 and 32: PTC/TK thermal motor protection

0: Invalid
As an unoccupied terminal, no function
1: In operation (RUN)
Sets the terminal as a signal for operation. The output is ON.
2: Reached frequency
When the frequency reaches the set value, this contact turns ON.
3: In fault (ALARM)
When the inverter detects an abnormal condition, this contact turns ON.
4: Zero speed
If the output frequency of the inverter is lower than the start frequency, this contact is switched ON.
5: Frequency 1 reached
6: Frequency 2 reached
When the frequency reaches the set value, this contact turns ON.



7: Acceleration
If the inverter is in the acceleration state, this contact is ON.
8: Deceleration
If the inverter is in deceleration state, this contact is ON.



9: Low voltage - alarm
When the inverter detects that the DC bus voltage is lower than the set value, this contact is turned on and an alarm is activated. The low voltage limit and alarm can be changed using the extended group of application parameters.
10: Timer 1 value reached
11: Timer 2 value reached
When the inverter reaches the set value, this contact turns ON, when the timer trigger signal turns OFF, this contact turns OFF.
12: End of program section In PLC operating mode, the drive will generate this pulse signal when the drive has completed a part of the program.

13: Indication of the end of the process
In PLC operation mode, the inverter will generate this pulse signal when the inverter has finished the whole program.
14: Upper PID limit
If the PID feedback value exceeds the set upper limit value, the contact turns ON.
15: Lower PID limit
If the PID feedback value is less than the set value, the contact turns ON.
16: The 4-20 mA loop (circuit) is broken
When the FIC input signal is disconnected, this contact is ON and the alarm is active.
17: Engine overload
If the inverter detects motor overload, this contact is ON.
18: Inverter overload
If the inverter is overloaded, this contact is closed.
19 to 26: Reserved
27: Termination of timer operation
When the timer function is finished, this contact is switched ON. When the inverter stops, this contact opens.
28: Counter value reached
When the inverter implements an external counter and if the value reaches the set value (P425), this contact is switched ON.
29: Liquid supply by constant voltage
*T on / 0" off
30: The inverter is ready for operation
31 and 32: PTC/PTO thermal motor protection

5.4 Secondary group of applications P4

P400			Initial value 5.00	
	Range of setting	0.00 - Maximum frequency	Unit	0.01

Jog frequency setting (JOG) is usually applied during a trial run. This function can only be called via an external terminal.
When the JOG function is reached, other commands are ignored. When the JOG signal is active, the inverter decelerates to a stop, the JOG acceleration/deceleration time is set in the 4th acceleration/deceleration parameter.

Management level priority:
JOG -> external multi-turn -> PLC operation means -> PID means -> triangle wave (transient function) -> winding -> frequency conversion setting means.

P401	Acceleration time 2		Initial value 10.0	
P402	Deceleration time 2		Initial value 10.0	
P403	Acceleration time 3		Initial value 20.0	
P404	Deceleration time 3		Initial value 20.0	
P405	Acceleration time 4		Initial value 2.0	
P406	Deceleration time 4		Initial value 2.0	
	Range of setting	0-999.9s	Unit	0.1

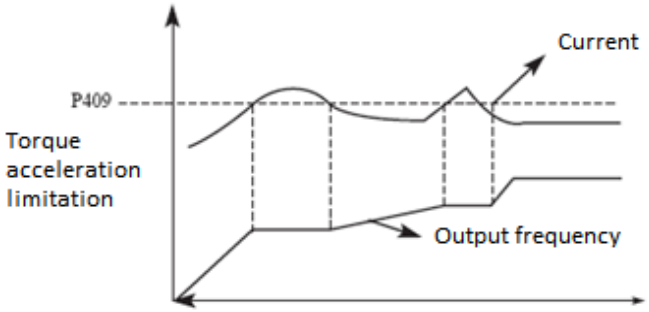
The X550 inverter series provides the possibility to set 4 acceleration / deceleration times. For normal operation, the default value is 1. For JOG operation, the default acceleration/deceleration time is 4.

P407	Required counter value		Initial value 100	
P408	Average counter value		Initial value 50	
	Range of setting	0-999.9	Unit	1

The X550 series inverter has 2 groups of counters. A pulse signal with a frequency of up to 250 Hz can be received via a multifunction terminal. If the counter value reaches the set value, the corresponding multi-function output terminal is turned on, the counter input terminal resets the signal through the counter, resets the counter and starts counting again.

P409	Torque acceleration limitation		Initial value 150 %	
	Range of setting	0-200 %	Unit	1

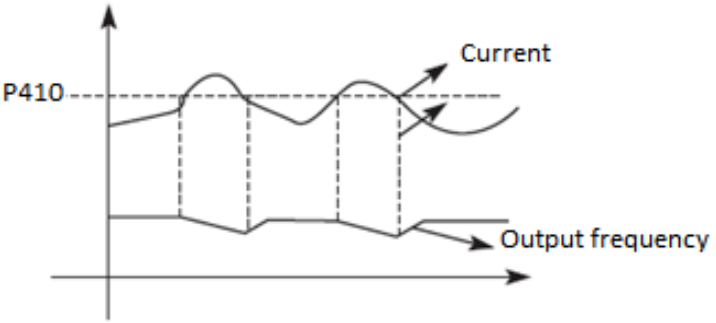
Parameter P409 is the torque limit value during acceleration. When the output current reaches the set value, the inverter stops, if the current is below the set value, the inverter continues to accelerate.



100% prúdu je menovitý prúd meniča; ak je P409 nastavené na hodnotu 0, potom je obmedzenie krútiaceho momentu neaktívne a nemá ochrannú funkciu.

P410	Constant speed torque limitation		Initial value 00 %	
	Range of setting	0-200 %	Unit	1

Parameter P410 is Torque limitation at constant speed. When the output current reaches the setting value, the inverter will automatically reduce the output frequency to reduce the load. When the output current drops, the inverter increases the output frequency to the setting value (100% current is the rated current of the inverter). When P410 is set to 0, the constant speed torque level is ignored and cannot protect the drive.



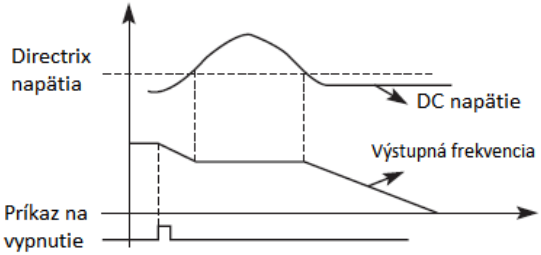
P411	Overvoltage protection during deceleration		Initial value 1	
	Range of setting	0-1	Unit	
	Setting	0: Protection OFF 1: Protection ON		

0: Protection OFF

When decelerating, the DC bus voltage may increase, if the overvoltage protection selection is inactive, the inverter may go into a fault due to excessive DC voltage.

1: Protection ON

During deceleration, when the DC bus voltage reaches the set value, the inverter stops the deceleration process. When the DC bus voltage returns to an acceptable value, the inverter resumes deceleration.



P412	Automatic voltage regulation		Initial value 1	
	Range of setting	0-2	Unit	1
	Setting	0: Regulation OFF 1: Regulation ON 2: Off when decelerating		

If the input voltage is not stable, the temperature of the machines will rise, the insulation may be damaged, and the output torque will be unstable.

0: Voltage regulation OFF

With this setting, the output voltage of the inverter will be unstable.

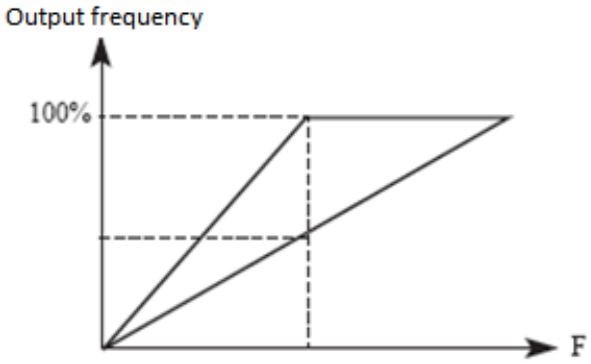
1: Automatic voltage regulation is ON.

If the automatic voltage regulation function is selected and the input voltage source is unstable, the inverter automatically stabilizes the output voltage.

2: Disabled when decelerating - blocked when decelerating When this function is selected, the braking function of the inverter is strengthened.

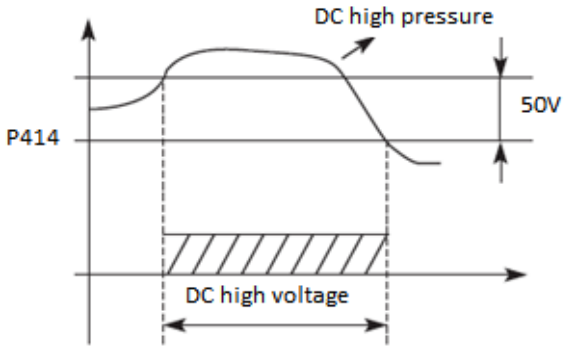
P413	Automatic energy saving		Initial value 0	
	Range of setting	0-100	Unit	1
P414	DC braking voltage		Initial value X 550-4T...: 700 V DC X 550-2S...: 370 V DC	
	Range of setting	Series 4T...: 650–800V Series 2S....:360-400V	Unit	1
P415	Braking performance		Initial value 50 %	
	Range of setting	40-100 %	Unit	1

P413 Automatic energy saving In the constant speed automatic energy saving mode, the highest voltage value can be calculated according to the load conditions and the load can be set to achieve the best energy saving.
Note: if the load changes frequently or the motor is almost always at full load, this function is not suitable for this situation.



Parameters P414 and P415 are only suitable for inverters with built-in braking units and are invalid for inverters with external braking units.
The internal DC braking voltage level and braking ratio of the inverter are set by two parameters.

P414 DC braking voltage
If the DC voltage of the inverter is high and is higher than the set value of P414, the built-in brake unit will turn on. Energy is released through braking resistance. Then the DC voltage is reduced back to a certain value, at which the built-in brake unit is switched off.

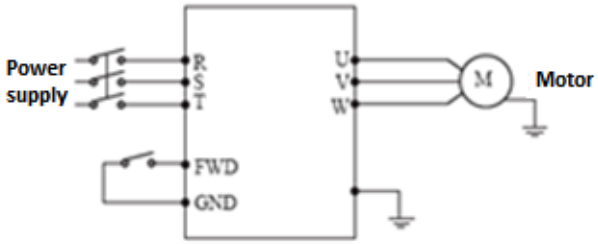


If the value of P414 is too high, the DC voltage may be too high and cause the drive protection to trip. If the value of P414 is too low, the brake resistor may be too hot.

P415 Brake performance
This parameter determines the working function of the brake resistor. Higher operation requires high braking resistor power.

P416	Restart after sudden power failure (OPTION)		Initial value 0	
	Range of setting	0-1	Unit	1
	Setting	0: Disabled restart after immediate power failure 1: Restart enabled after power failure		

0: Restart disabled
The inverter clears the running command after a power failure. After power is restored, the inverter does not start automatically.
1: Restart enabled When there is a short-term power failure, the inverter keeps the running command effective. When the power is restored in a short time, the inverter will monitor the motor speed and restart.
Warning: if the immediate restart after a power failure is activated, the inverter can start the motor automatically. Be safe when using this function!



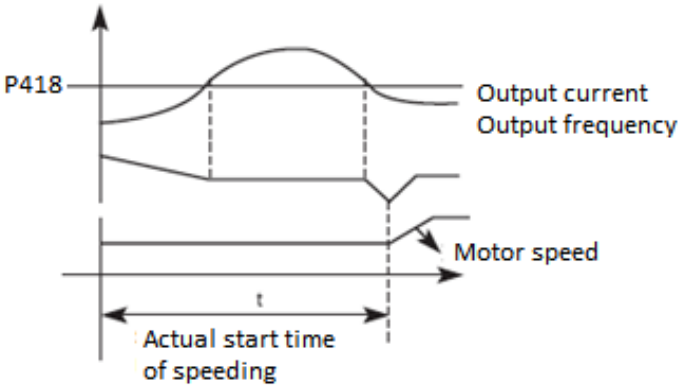
Example:
Use K1 (FWD), drive control.
If K1 is connected, frequency conversion is performed, when K1 is disconnected, the inverter stops. When the power is off and K1 remains connected and the power is on, the inverter will suddenly start up, which can be very dangerous. Use other control methods, such as three-wire method of connection to the system.

P417	Allowable power interruption time		Initial value 5 s	
	Range of setting	0-10.0 s	Unit	0.1

P417 nastavuje prípustný čas výpadku prúdu. Ak čas výpadku napájania prekročí nastavenú hodnotu, reštart po poruche napájania nenastane.

P418	Flying restart current limiting		Initial value 150%	
	Range of setting	0-200%	Unit	1

When the drive starts a fly-by restart, it tracks frequencies down from the highest speed setting, the drive output current increases relatively quickly and may exceed the protection setting, at which point the drive stops tracking and the inverter output current drops to normal. The setting value of 100% of this parameter is the rated current of the inverter and the protection of the frequency inverter can be set via P418.



P419	Flying restart time		Initial value 5 s	
	Range of setting	0-10 s	Unit	1

When the drive activated the restart function, the inverter tracked the motor speed down for a set time. If the activity is not finished within the set time, the inverter activates the protection.
In the above example, if the value of t> the value of P419, the inverter activates the protection.

P420	Restart time after failure		Initial value 0 s	
	Range of setting	0-5 s	Unit	1
P421	Restart delay after failure		Initial value 2 s	
	Range of setting	0-100 s	Unit	1

After the occurrence of an alarm (e.g. for current, overvoltage, etc.), after the time interval set by parameter P421, the inverter will automatically start (in the case of a non-zero value set according to P420) according to the set start parameters (P200).
After startup, if there is no alarm within 60 seconds, the inverter will automatically reset the P420.
If the alarm occurs again within 60 seconds, the inverter will record the number of alarms, and when the number of alarms reaches the set value of P420, the inverter will stop outputting.
Warning: If P420 = 0, the restart after a fault is ineffective.
When the restart after failure function is active, the engine may start suddenly, so be careful when using this function.

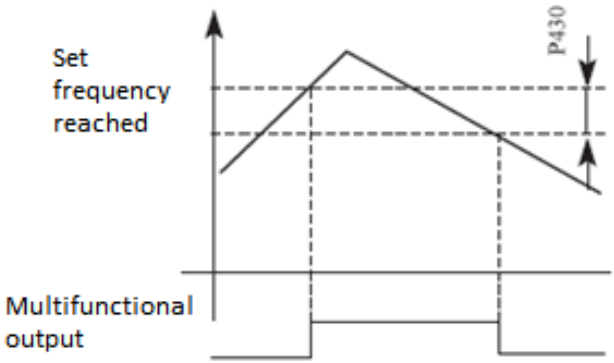
P422	Inverter overload detection		Initial value 0	
	Range of setting	0-3	Unit	1
	Setting	0: The inverter starts detecting only when running at constant speed, the drive continues to run when the overload is exceeded 1: The inverter will start detecting only when operating at a constant speed, the inverter will stop when the overload level is exceeded 2: The inverter always detects overload, continues to operate during overload 3: Inverter always detects overload, stops when overload level is exceeded		

P423	Frequency inverter overload detection level		Initial value 0 %	
	Range of setting	0 – 200 %	Unit	1
P424	Inverter overload detection time		Initial value 2 s	
	Range of setting	0 - 20 s	Unit	1

If the output current of the inverter exceeds the set value of P423, the inverter starts counting the overload time. If the duration exceeds half of the set value of P424, the inverter pre-alarm output signal is activated. The inverter continues to operate until the time set in P424 is exceeded. Then the inverter activates protection and triggers an alarm.
If P423 = 0, the inverter overload detection is inactive and the inverter current is 100% of the rated value.

P425	Frequency reached 1		Initial value 100	
	Range of setting	0-Maximum frequency	Unit	0.1
P426	Frequency reached 2		Initial value 5	
	Range of setting	0-Maximum frequency	Unit	0.1

The X550 series uses two groups of frequencies. If the output frequency reaches the set values of P425 and P426, the corresponding multifunctional output terminal is switched on. The frequency width is the width of the hysteresis loop, which is set by parameter P430.



P427	Timer 1 setting		Initial value 0 s	
	Range of setting	0.0-999.9 s	Unit	0.1
P428	Timer 2 setting		Initial value 0 s	
	Range of setting	0.0-999.9 s	Unit	0.1

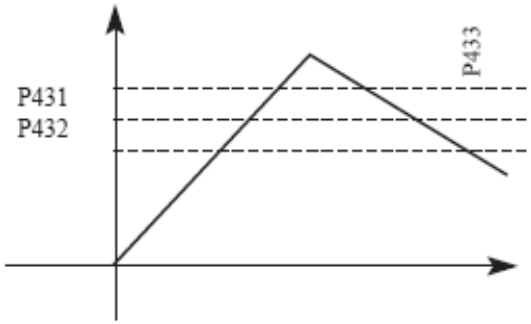
The X550 series has two timers. When the timer reaches the set value (set by P427 and P428), the corresponding multifunction terminal is turned on.
The timer start is controlled by an external multi-function input terminal. Some simple programs can be executed using these two timers.

P429	Torque limitation time at constant speed Range of setting 0.0-999.9 s		Initial value 0.50 s	
	Range of setting	0.0-999.9 s	Unit	0.1
P430	Frequency bandwidth of the hysteresis loop		Initial value 0.50	
	Range of setting	0.00-2.00	Unit	0.01

This parameter sets the width of the achieved frequency, see the introductory sections P425-F426 for details.

P431	Jump frequency 1		Initial value 0	
	Range of setting	0.0 - upper frequency limit	Unit	0.01
P432	Jump frequency kvencia 2		Initial value 0	
	Range of setting	0.0 - upper frequency limit	Unit	0.01
P433	The bandwidth of the jump frequency of the hysteresis loop		Initial value 0.5	
	Range of setting	0.00-2.00	Unit	0.01

If the machine has resonated at a certain frequency, we can use the jump frequency function **to skip the resonance point**.
X550 supports 2 jump frequencies according to parameters P431 and P432. The width of the jump hysteresis loop can be adjusted using P433 as shown below:



P434	UP/DOWN frequency step	0 - 10.00 Hz	0.1
P435	UP/DOWN, frequency memory	0: Stored in memory 1: Not stored in memory	0

5.5 Special operation (PLC control) P5

P500	PLC memory mode		Initial value 0	
	Range of setting	0-1	Unit	1
	Setting	0: No memorization 1: Remembering		

0: No memorization If the device stops due to an error or other reasons, the inverter does not remember the state in which it was stopped. After restarting, it will start running from the initial state.
1: Remembering If the device stops due to an error or other reasons, the inverter remembers the state before the stop. After restarting, the inverter will continue to operate according to the program.

Warning: the power must not be disconnected. If you stop the device and disconnect the power, the inverter will not remember the state before the power failure. After restarting, the inverter starts according to the initial program.

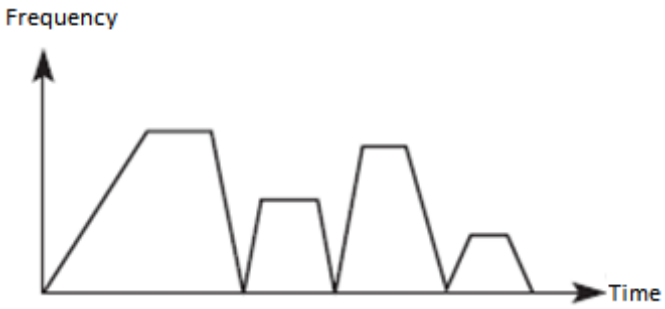
P501	PLC X550 initial mode		Initial value 0	
	Range of setting	0-1	Unit	1
	Setting	0: Invalid (PLC does not start) 1: Valid (PLC start)		

P501 determines the start mode of the PLC inverter.
P501 = 0 means that the PLC is blocked. The inverter is controlled by the normal mode.
When P501 = 1, the PLC is working. The inverter selects a PLC program to run. In the PLC start-up stage, with various operating commands and programs, the inverter will be controlled according to the priority level.

Level of priority	Priority level	Item
High -> Low	1	JOG
	2	External multiple speed
	3	Internal multiple speed
	4	PID
High -> Low	5	Triangular wave
	6	Winding up
	7	Inverter setting mode

P502	PLC operation mode		Initial value 0	
	Range of setting	0-4	Unit	1
	Setting	0: PLC stops after one cycle 1: PLC stop mode, stops after one cycle 2: PLC normal running 3: PLC stop mode, normal running mode 4: The PLC works at the last frequency after starting one cycle.)		

The PLC operation mode determines the start state of the internal multiple speed, either one cycle is started or the cycle continues. P502 is only valid when the PLC is started.
PLC pause mode means that when each speed phase is completed, the speed will decrease, stop and accelerate to the next speed. An image for clarification is given below:



Users can choose the right mode of operation according to the current conditions.

P503	Fixed speed 1	Initial value: 10.0		
P504	Fixed speed 2	Initial value: 15.0		
P505	Fixed speed 3	Initial value: 20.0		
P506	Fixed speed 4	Initial value: 25.0		
P507	Multiple speed 5	Initial value: 30.0		
P508	Multiple speed 6	Initial value: 35.0		
P509	Multiple speed 7	Initial value: 40.0		
P510	Multiple speed 8	Initial value: 45.0		
P511	Multiple speed 9	Initial value: 50.0		
P512	Multiple speed 10	Initial value: 10.0		
P513	Multiple speed 11	Initial value: 10.0		
P514	Multiple speed 12	Initial value: 10.0		
P515	Multiple speed 13	Initial value: 10.0		
P516	Multiple speed 14	Initial value: 10.0		
P517	Multiple speed 15	Initial value: 10.0		
	Range of setting	0.0 - Maximum frequency	Unit	1

Nominal speeds are set in P503 - P517. For the relationships between multiple revolutions and the external terminal, please refer to instructions 1, 2, 3, 4 of the multi-function terminal.

P518	PLC operating time 1		Initial value: 100	
P519	PLC operating time 2		Initial value: 100	
P520	PLC operating time 3		Initial value: 100	
P521	PLC operating time 4		Initial value: 100	
P522	PLC operating time 5		Initial value: 100	
P523	PLC operating time 6		Initial value: 0	
P524	PLC operating time 7		Initial value: 0	
P525	PLC operating time 8		Initial value: 0	
P526	PLC operating time 9		Initial value: 0	
P527	PLC operating time 10		Initial value: 0	
P528	PLC operating time 11		Initial value: 0	
P529	PLC operating time 12		Initial value: 0	
P530	PLC operating time 13		Initial value: 0	
P531	PLC operating time 14		Initial value: 0	
P532	PLC operating time 15		Initial value: 0	
	Range of setting	0.0 – 999.9 s	Unit	1

The operating time of the PLC determines the internal control changing the nominal operating time for each segment.

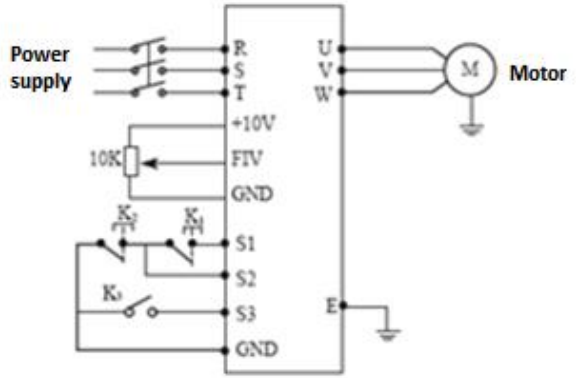
P533	PLC direction of operation		Initial value 0	
	Range of setting	0-9999	Unit	1

P533 sets the direction of operation in each segment "Mode of setting the direction of operation":

Operation direction setting method: using 16-bit binary system and then converting to decimal system; each bit specifies the corresponding direction of traffic: 0 is forward and 1 is backward. This parameter is only valid when the PLC is powered onFor example: if we have a five-segment program, the cycle setting will be as follows:

Item	Output frequency	Direction of operation	Operation time
Main frequency	The potentiometer is adjustable	Forward	
Segment 1	20.0	Back	20
Segment 2	60.0	Forward	25
Segment 3	40.0	Back	30
Segment 4	15.0	Forward	20

Two buttons, one is for running, the other is for stopping; the main frequency requires an adjustable potentiometer.



X 550

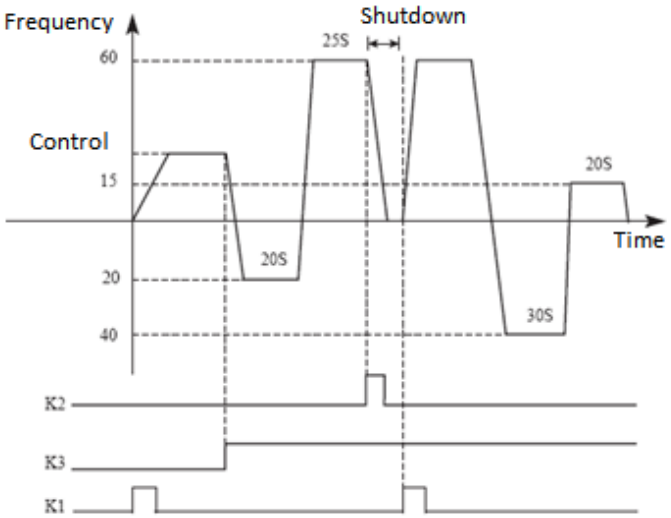
(1) Connection picture

(2) Parameter setting

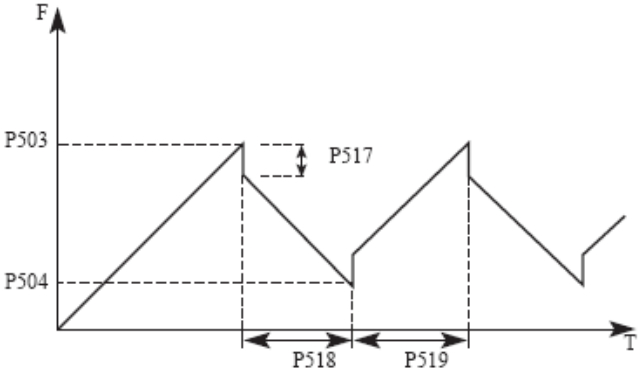
PLC operation direction setting: setting P533)

segment 1	segment 2	segment 3	segment 4	Main frequency	
4	3	2	1	0	-->position (bit)
0	1	0	1	0	-->running direction<0 forward, 1 backward
0*24	1*23	0*22	1*21	0*20	--> conversion to decimal units

The binary number 01010 is converted to decimal as follows:
1 * 21 + 1 * 23 + 8 = 10
Define: P533 = 10
We define the parameters as follows:
P101 = 3 (Potentiometer setting mode from the panel: the dominant frequency is controlled by the potentiometer)
P102 = 2 (Start method selection: multi-function end input)
P105 = 60 (Maximum frequency is 60 Hz)
P107 = 10
P108 = 10 (acceleration / deceleration time 10S)
P314 = 6 (end of S1, run forward)
P318 = 8 (end of S2, stops)
P319 = 20, end of S3, PLC is started
P500 = 1, PLC programming memory
P501 = 1, PLC is on
P502 = 0, PLC stops after one cycle
P503 = 1, segment 1, set to 20 Hz
P504 = 60, Segment 1, set to 60 Hz
P505 = 40, Segment 1, set to 40 Hz
P506 = 15, Segment 1, set to 15 Hz
P518 = 10, The set duration of segment 1 is 10 seconds
P519 = 20, The set duration of segment 1 is 20 seconds
P520 = 25, The set duration of segment 1 is 25 seconds
P521 = 30, The set duration of segment 1 is 30 seconds



Instructions: ①To start the inverter, press the K1 button and set the output frequency with the potentiometer.
②Press the K3 key, the PLC will start program segment 1 PLC, which will execute one circle and then stop
③If the program is running, press K3, or if a fault occurs and the inverter stops. When the fault is cleared, press K1 and the inverter will continue forward as programmed.
④If P500=1 and the program is not in memory, the program starts from the very beginning.



5.6 Special operation (PID controller) P6

Menič môže byť použitý na ovládanie procesu, napr. riadi prietok, objem vzduchu alebo tlak.Vstupné svorky FIV/FIC alebo nastavenie parametra sa použije ako nastavená hodnota a vstupný signál terminálu FIV/FIC sa tiež môže použiť ako hodnota spätnej väzby na vytvorenie systému spätnej väzby pre riadenie PID.

P600	PID X550 initial mode		Initial value 0	
	Range of setting	0-1	Unit	1
	Setting	0: PID is disabled 1: PID start 2: PID external start		

0: PID is disabled, the PID controller cannot be used.
1: PID start The PID controller works despite the input external signal and is enabled even without an external input.
2: PID will start under certain conditions; The PID is triggered when a certain external input is on.

P601	Selection of PID operation mode		Initial value 0	
	Range of setting	0-1	Unit	1
	Setting	0: Negative feedback mode 1: Positive feedback mode		

0: Negative feedback mode
If the feedback value (P603) > the set value (P602), the inverter will reduce the output frequency.
If the feedback value (P603) < the set value (P602), the inverter increases the output frequency.
1: Positive feedback mode
If the feedback value (P603) > the set value (P602), the inverter will reduce the output frequency.
If the feedback value (P603) < the setting value (P602), the inverter increases the output frequency.

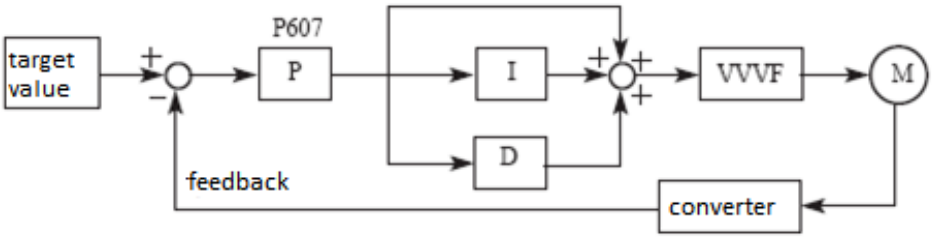
P602	PID set point selection		Initial value 0	
	Range of setting	0-2	Unit	1
	Setting	0: mode number (P604) 1: AI/FIV 2: FICReserve		

0: Select the mode number as the desired value (P604)
Set the value (P604) from the control panel or parameter unit.
1: AI/FIV
The FIV terminal input is the set value (0-10 DC V) or (0-20 mA).
2: FIC.
Reserve for high performance models

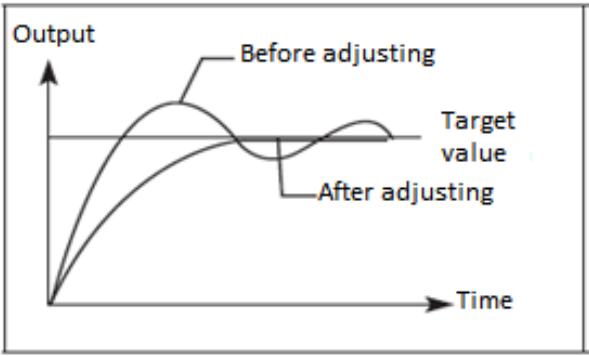
P603	PID feedback option		Initial value 0	
	Range of setting	0-3	Unit	1
	Setting	0: AI (if FIV is 0-10 V set P300=0 and P301=10) (if FIC is 4 to 20 mA, set P300=1 and P301=5) 1: FIC ...Reserved 2: FIV-FIC...Reserved 3: FOC-FIV....Reserved		

P604	Setting the PID target value		Initial value 5.00 bar	
	Range of setting	0.00 - 10.00 bar	Unit	0.01
	Setting	Select AI value as feedback		

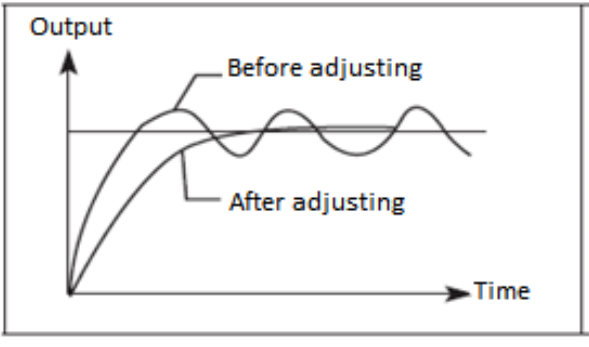
The set value of 10.00 bar corresponds to an analog voltage of 10 V or a current of 20 mA. Closed-loop PID control is often used to control processes such as pressure and temperature. The feedback signal is conducted from a temperature sensor or a pressure sensor. In the case of PID control, the feedback signal input channel is an analog signal (4 - 20 mA or 0 - 10 V). There are two channels for setting.
Block diagram of PID control:



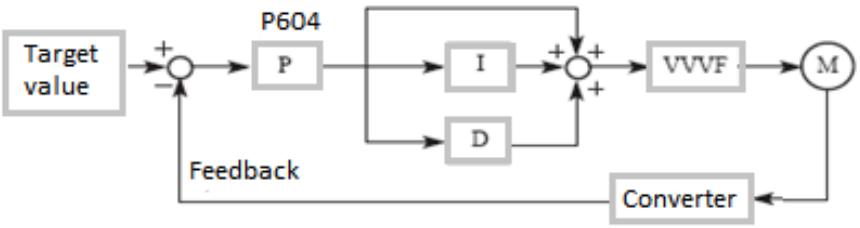
General control method for PID control:
(1) Select the correct sensor/transducer for which the standard 4-20mA or 0-10V signal is selected as the output specification.
(2) Set the correct PID action value.
(3) Increase the value of the proportional constant (P) in the case non-oscillating output.
(4) Reduce integration constant (Ti) in case of non-oscillating output.



Limiting the output of the system when a specific value is exceeded
a: reduction of differential time (D value)
b: increase in integration time (I value)



Limitation of the system outlet during oscillation
a: decrease the differential time (D value) or set to 0
b: decrease the proportional constant (P)



P605	PID upper alarm limit (High pressure hP)		Initial value 100.0 %	
	Range of setting	0.00 -100.0 %	Unit	0.01

Set the upper limit value. If the feedback value exceeds the set value, the "hP" alarm will be triggered. The maximum input (20 mA / 10 V) of the measured value at terminal AI corresponds to 100.0%.

P606	PID lower alarm limit (Low pressure LP)		Initial value 0.00%	
	Range of setting	0.00 – 100.0%	Unit	0.1

Set the lower limit value. If the feedback value falls below the Range of setting, the "LP" alarm signal is issued. The maximum input (20 mA / 10 V) of the measured value corresponds to 100%.

P607	PID P proportional band setting		Initial value 300%	
	Range of setting	0 -500 %	Unit	0.1

If the proportional band is narrow (the parameterization is small), the controlled variable will change significantly for a small change in the measured value. Therefore, as the proportional band narrows, the response sensitivity (gain) improves, but the stability deteriorates, e.g. oscillation occurs.

P608	PID integration constant I		Initial value 2.00 s	
	Range of setting	0.00 -200.0 s	Unit	0.01

For the deviation step input, the time (Ti) is only needed for integrating (I) and controlling the variable as for the proportional setting (P). As the integral time decreases, the desired value is reached earlier, but oscillation occurs. If P608=0.00 the function is closed.

P609	PID derivative constant D		Initial value 0.00 s	
	Range of setting	0.00 -200.0 s	Unit	0.01

For input bias, time (Td) is only needed to control the variable for proportional (P) action. As the differential time increases, the response is a larger change in deviation.
If P609=0.00, the function is closed.

P610	Setting the PID process step		Initial value 0.50	
	Range of setting	0.00-10.0 Hz	Unit	0.01

PID evaluates values once every 10 ms. The frequency increment (△f Hz) is determined each time. If the frequency increment is greater than the P610 maximum frequency increment value, the P610 function will be active.

P611	PID frequency in sleep mode "SLP"		Initial value 25.00 Hz	
	Range of setting	0.00-50.0 Hz	Unit	0.01
P612	PID time in until the inverter goes to sleep "SLP"		Initial value 10.0 s	
	Range of setting	0.00-200.0 s	Unit	0. 1
P613	PID values when waking from sleep mode		Initial value 0.0%	
	Range of setting	0.0-100 %	Unit	

P611 PID frequency in standby mode

If P611=0.00, the function is disabled. P611 must reach the minimum frequency in PID standby mode. When the frequency in operation is less than the value of P610, the sleep time starts to count.

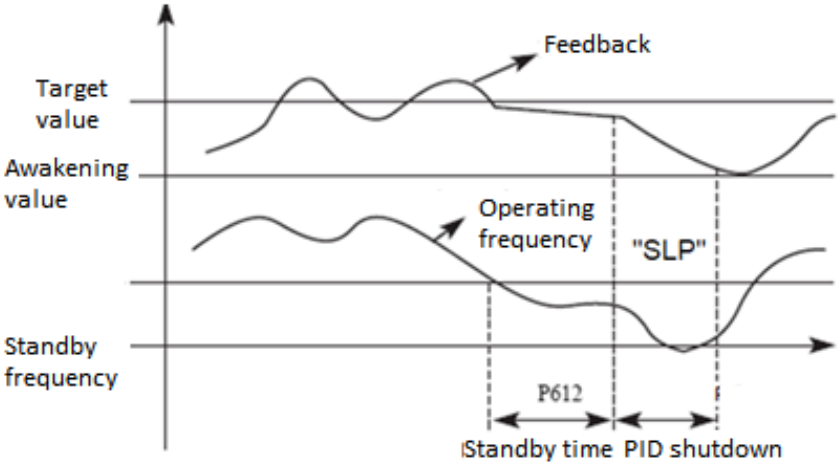
P612 PID standby time

If the operating time of the inverter is longer than the standby time of P612, the inverter will go into standby mode. It then stops the output and disconnects from the PID, but monitor the PID feedback - parameter

P613: PID values on wake-up.

Value 100% = value of required pressure P604.

E.g.: The value of the required pressure is 5.0 bar and we want it to "wake up" when the pressure drops to 4.5 bar, then we set P613=90. When the drive detects that the feedback value is lower than the wake-up value (P613), the PID function is activated and the drive starts operation.



P614	Pressure transducer range - Scale		Initial value 10	
	Range of setting	0 - 10	Unit	1
P615	PID number of display digits		Initial value 4	
	Range of setting	0 - 4	Unit	1
P616	PID number of decimal digits of the display		Initial value 2	
	Range of setting	0 - 4	Unit	1

P617	PID upper frequency limit	0 - Maximum frequency	48.00
P618	PID lower frequency limit	0 - Maximum frequency	20.00
P619	PID working mode	0: Always working (PID function open) 1: When the feedback reaches the upper limit (P605), it will work at min. frequency. When the feedback reaches the lower limit (P606), the PID starts working. Activates on P606	0
P620	PID deviation limit	0 až 100.0 %	1.0
P621	Signal disconnection alarm from the pressure transducer	0: Off 1: The alarm will appear on the display as "20" (the inverter will not stop) 2: The inverter stops (STOP) and "20" is displayed	0
P622	Reserved		
P623	Reserved		
P624	**LP** low pressure warning time (dry run) It reacts only if P619=1	Range: 0 to 600 s - If the pressure is lower than P606 and the duration is longer than P624, it will report a low pressure error and CHOD will stop, the error code is "LP" (When the pressure returns to normal, the P631 (or P632) delay will automatically reset the fault) - If you set P624 = 0, the low pressure fault is not detected	100 s
P625 to P629	Reserved		

P630	High pressure hP detection time	0.0 - 500.0 s	0.5 s
P631	Restart time after **hP** alarm	Interval: 0 - 6500.0 s	30.0 s
P632	After 10 times low pressure is recorded, the recovery time interval is set	Interval time = P632 x P634 min. E.g.: 2 x 60 = 120 min. (restarts operation after 120 min.) The range of the interval is 1 to 60000	2
P633	Reserved		
P634	Time unit of parameter P632	1 - 200 min.	60 min
P635	Sleep assessment If the stable frequency is 0.1 to 500.0 Hz	Sleep assessment - After reaching the pressure, the working frequency is less than the sleep frequency of P611 and the duration time is greater than the sleep time of P612. When the frequency drops to 0, it will go into sleep mode and display “SLP”. - If the working frequency is higher than the sleep frequency P611 and the frequency is kept stable, the frequency change value is less than P635 and the working frequency is less than P639 and the duration is greater than P612, the inverter will start to decrease the output frequency P637 and will judge if the pressure does not drop more than the set pressure P636, if it does, then terminate the sleep mode judgement. - If not, the frequency will continue to decrease P637 after a decrease of 1s, and then judge whether the pressure has decreased more than the set pressure P636, etc. - If the cumulative number of repetitions reaches P638, it will switch to sleep mode and display SLP. - If the frequency is higher than P639, the sleep mode is not evaluated. - If the frequency is higher than P639, the sleep mode is not evaluated.	0.3 Hz
P636	Sleep assessment If the pressure currency is 0.1% to 100.0%		0.6 %
P637	Sleep assessment If the sleep frequency decreases by 0.3 Hz/s		0.3 Hz
P638	The number of repetitions of the descent frequency		10 krát.
P639	Above this frequency P639, the sleep mode cannot be activated 0.0 – 50.0 Hz		42.0 Hz

P640	Interval time against freezing of water in the system	0 - 999.9 s	900.0s
P641	Time of operation of the pump against freezing of water in the	0 - 999.9 s	30.0 s
P642	Initialization of the anti-freeze system	0: Off 1: On	1
P643	Internal service parameter	00 - 20	02

5.7 Initial settings and specifications of RS-485 communication P7

It is used to make the required settings for communication between the inverter and the computer.

P700	Communication speed		Initial value 1	
	Range of setting	0-3	Unit	1
	Setting	0: 4800 bps **1: 9600 bps** 2: 19200 bps 3: 38400 bps		

For example, when the value is set to "1", the communication speed is 9600 bps.

P701	Communication mode		Initial value 0	
	Range of setting	0-5	Unit	1
	Setting	0: 8N1 pre ASC 3: 8N1 pre RTU 1: 8E1 pre ASC 4: 8E1 pre RTU 2: 8O1 pre ASC 5: 8O1 pre RTU		

Set the communication data format in P701. Detailed information can be found in the corresponding description of the communication.

P702	RS-485 communication address		Initial value 0	
	Range of setting	0-240	Unit	1

Each inverter must have its own station number, which will be defined through P702. The communication interface of the inverter can connect with 240 others.

5.7.1 MODBUS X 550 communication protocol X550

The MODBUS communication protocol of the X 550 inverter series uses the ASCII code (American standard code for information interchange)

Each byte consists of 2 ASCII characters, e. g. the representation of a numerical value of 54 Hex ASCII means that "54" consists of "5" (35 Hex) and 4 (34 Hex).

1. Definition of coding

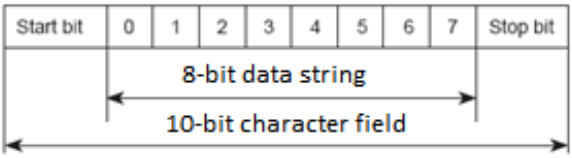
The communication protocol belongs to the hexadecimal system, in which each character represents the following information.

SIGN	“0”	“1”	“2”	“3”	“4”	“5”	“6”	“7”
ASCII CODE	30H	31H	32H	33H	34H	35H	36H	37H
SIGN	“8”	“9”	“A”	“B”	“C”	“D”	“E”	“F”
ASCII CODE	38H	39H	41H	42H	43H	44H	45H	46H

2. Character structure

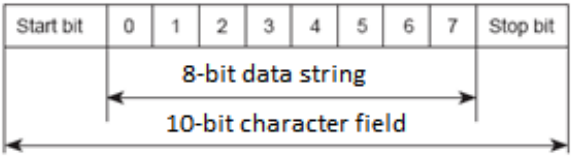
10-bit character field (for ASCII)

Data template: 8N1 for ASCII

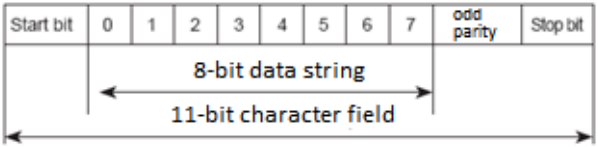


10-bit character field (for RTU)

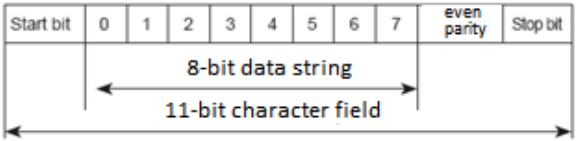
Data template: 8N1 for RTU



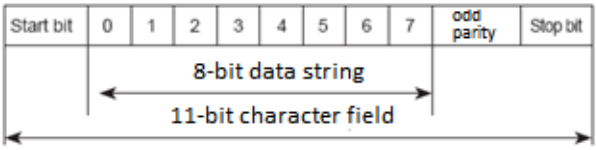
Data template: 8O1 for ASCII



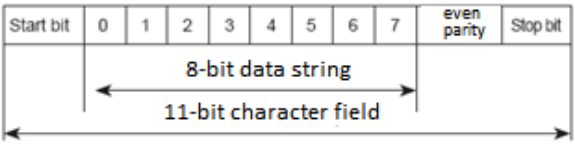
Data template: 8E1 pre ASCII



Data template: 8O1 pre RTU



Data template: 8E1 pre RTU



3. Structure of communication data

Data field format

ASCII mode:

STX	Starting symbol = ':'(3AH)
The upper byte of the data address	Communication address:
The lower byte of the data address	An 8-bit address consists of 2 ASCII codes
Data upper byte	Function code:
Data lower byte	The 8-bit function code consists of 2 ASCII codes
DATA (n-1)	Data characters:
	The n x 8-bit data content consists of 2n ASCII codes
DATA 0	n < 16, maximum 32 ASCII codes

LRC CHK Hi	LRC check:
LRC CHK Lo	The 8-bit LRC check consists of 2 ASCII codes
END upper part	End character:
END lower part	END Hi = CR (0DH), END Lo = LF (0AH)

RTU mode

START	Zero input signal longer than or equal to 10 ms
Address	Communication address: 8-bit binary address
Function	Function code: 8-bit binary address
DATA (n-1)	Data characters: n x 8-bit data, n = 16
DATA 0	
CRC CHK	CRC check:
CRC CHK	A 16-bit CRC check consists of 2 8-bit characters
END	Zero input signal longer than or equal to 10 ms

Communication address
00H: All converters transmit
01H: For inverter with 1st address
0FH: For inverter with 15th address
10H: For the inverter with the 16th address, by analogy, it can reach a maximum of 240.

Function code and data characters
03H: Read the contents of the temporary memory
06H: Write the Word into the temporary memory;

Function code 03H: Read the contents of the temporary memory.
For example: Inverter address 01H, reads data from two consecutive temporary memory addresses: Starting memory address 2102H

Function code 06H: Writes the Word into the temporary memory.

Format of the Call character string

STX	■:’
Address	‘1’
	‘0’
Function	‘0’
	‘3’
Initial address	‘2’
	‘1’
	‘0’
	‘2’
Data size (number in bytes)	‘0’
	‘0’
	‘0’
	‘2’
LRC check	‘D’
	‘7’
END	CR
	LF

STX	‘:’
Address	‘0’
	‘1’
Function	‘0’
	‘3’
Data size (number in bytes)	‘0’
	‘4’
Data content at address 2102H	‘1’
	‘7’
	‘7’
	‘0’
Contents of address 2103 H	‘0’
	‘0’
	‘0’
	‘0’
LRC check	‘7’
	‘1’
END	CR
	LF

ASCII mode:
RTU mode:
Call format

Address	01H
Function	03H
Initial address	21H
	02H
Data size (number in bytes)	00H
	02H
CRC CHK lower part	6FH
CRC CHK upper part	F7H

Response format

Address	01H
Function	03H
Data size (number in bytes)	04H
Data content at address 8102H	17H
	70H
Data content of addresses 8103H	00H
	00H
CRC CHK lower part	FEH
CRC CHK upper part	5CH

For example: the inverter addresses 01H, writes 6000 (1770H) to the internal setting parameter 0100H of the inverter.

LRC ASCII mode check
ASCII mode
Call format

STX	':'
Address	'0'
	'1'
Function	'0'
	'6'
Data address	'0'
	'1'
	'0'
	'0'
Data content	'1'
	'7'
	'7'
	'0'
LRC kontrola	'7'
	'1'
END	CR
	LF

Response format

STX	':'
Address	'0'
	'1'
Function	'0'
	'6'
Data address	'0'
	'1'
	'0'
	'0'
Data content	'1'
	'7'
	'7'
	'0'
LRC kontrola	'7'
	'1'
END	CR
	LF

RTU mod:
Call format

Address	01H
Function	06H
Data address	01H
	00H
Data content	17H
	70H
CRC CHK lower part	86H
CRC CHK upper part	22H

Response format

Address	01H
Function	06H
Data address	01H
	00H
Data content	17H
	70H
CRC CHK lower part	86H
CRC CHK upper part	22H

The LRC check is the value added from the address to the data content. For example, the LRC check of the above prompt 3.3.1 is as follows: 01H + 03H + 21H + 02H + 00H + 02H = 29H, then 2 (D7H) is added.
CRC check in RTU mode

The CRC check is from the address to the data content and the rule of operation is as follows:
Step 1: Write 16-bit word to temporary memory (CRC temporary storage) = FFFFH.
Step 2: XOR the first 8-bit byte of the message command with the lower byte of the 16-bit CRC register, putting the result into the CRC register.
Step 3: Examine the LSB of the CRC register.
Step 4: If the LSB of the CRC register is 0, shift the CRC register one bit right with the MSB zero padded, then repeat step 3. If the LSB of the CRC register is 1, shift the CRC register one bit right with the MSB zero padded, calculate the XOR of the CRC register with polynomial value A001H, then repeat step 3.
Step 5: Repeat steps 3 and 4 until eight shifts have been made. When this happens, the result is a complete 8-bit byte.
Step 6: Repeat steps 2 through 5 for the next 8-bit command message byte. Keep doing this until all bytes have been processed. The final content of the CRC register is the CRC value. When transmitting the CRC in the message, the upper and lower bytes of the CRC value must be exchanged, i.e. j. the lower byte will be transmitted first.

The following is an example of a C calculation program written in C:

```
unsignedintcrc_cal_value(unsignedchar *data_value,unsignedchardata_length)
{
int i;
unsignedintcrc_value=Oxffff;
while(data_length--)
{
crc_value^ =*data_value++;
for(i=0;i<8;i++)
{
If(crc_value&0x0001) crc_value=(crc_value»1 )^0xa001;
else
crc_value=crc_value»1;
}
}
Retum(crc_value);
}
```

Data address	Bit address	Contents	Read / write	Address
2000H (P102=2)	**BIT1~BIT0**	00B：no action 01B：stop 10B：start 11B：JOG start	write	**2000H**
	BIT2~BIT3	00B：no action 01B：reverse 10B：forward 11B：change direction		
	BIT4	0B：no action 1B：alarm reset		
	BIT5~BIT15	reserved		
2001H (P101=5)	**BIT0~BIT15**	Desired frequency 0000-4000 1 digit after decimal comma, unit: Hz	write	**2001H**
P027	Alarm codes		just reading	**001BH**
	BIT0	1：UC; 0：no alarm		
	BIT1	1：OC 0：no alarm		
	BIT2	1：NF communication error 0：no alarm		
	BIT3	1：loss of LO output phase 0：no alarm		
	BIT4	1：OU 0：no alarm		
	BIT5	reserved		
	BIT6	1:LU 0：no alarm		
	BIT7	1: overloaded OL motor 0：no alarm		

Data address	Bit address	Contents	Read / write	Address
P027	**BIT8**	1：exceeded permissible OT torque 0：no alarm	just reading	**001BH**
	BIT9	1：overheating of OH； 0：no alarm		
	BIT10	1：no 4-20mA signal； 0：no alarm		
	BIT11~BIT14	reserved		
	BIT15	1: alarm 0: no alarm		
P028	**BIT 0**	0: forward 1: backward	just reading	**001CH**
	BIT1	0: stop 1: run		

Parameters directory

Function	Parameter	Name	Command address
Monitoring functions	**P001**	Displays the set frequency	**0001H**
	P002	Displays the output frequency	**0002H**
	P003	Displays the output current	**0003H**
	P004	Displays engine speed	**0004H**
	P005	Displays the DC bus voltage value	**0005H**
	P006	Displays the temperature of the inverter	**0006H**
	P007	Displays the PID	**0007H**
	P009	Displays the output voltage	**0009H**
	P010	Alarm record 1	**000AH**
	P011	Alarm record 2	**000BH**
	P012	Alarm record 3	**000CH**
	P013	Alarm record 4	**000DH**
	P014	Frequency setting for the last alarm	**000EH**
	P015	Output frequency at the last alarm	**000FH**
	P016	Output current at the last alarm	**0010H**
	P017	Output voltage at the last alarm	**0011H**
	P018	DC bus output voltage at the last alarm	**0012H**
	P020	Output power	**0014H**

Function	Parameter	Name	Command address
Basic functions	P100	Digital frequency setting	0064H
	P101	Selecting a frequency setting	0065H
	P102	Selection of the start signal	0066H
	P103	Select "stop" button lock operation.	0067H
	P104	Selection of reverse rotation protection	0068H
	P105	Maximum frequency	0069H
	P106	Minimum frequency	006AH
	P107	Acceleration time 1	006BH
	P108	Deceleration time 1	006CH
	P109	Maximum voltage V/F	006DH
	P110	V/F basic frequency	006EH
	P111	Middle voltage V/F	006FH
	P112	V/F middle frequency	0070H
	P113	Minimum voltage V/F	0071H
	P114	Minimum frequency V/F	0072H
	P115	Carrier frequency	0073H
Function	**Parameter**	**Name**	**Command address**
Basic functions	P116	Automatic setting of parameters	0074H
	P117	Initialization of parameters	0075H
	P118	Locking parameters	0076H
	P200	Start mode selection	00C8H
	P201	Stop mode selection	00C9H
	P202	Frequency at start	00CAH
	P203	Frequency at stop	00CBH
	P204	DC brake operating current (start)	00CCH
	P205	DC brake operating time (start)	00CDH
	P206	DC brake operating current (stop)	00CEH
	P207	DC brake operating time (stop)	00CFH
	P208	Increase in torque	00D0H
	P209	Rated motor voltage	00D1H
	P210	Rated motor current	00D2H
	P211	No-load motor current	00D3H
	P212	Rated motor speed	00D4H
	P213	Number of motor poles	00D5H
	P214	Rated motor slip	00D6H
	P215	Rated motor frequency	00D7H
	P216	Stator resistance	00D8H
	P217	Rotor resistance	00D9H
	P218	Self-inductance of the rotor	00DAH
	P219	Mutual inductance of the rotor	00DBH

Function	Parameter	Name	Command address
Input / output functions	**P300**	AVI minimum voltage input	**012CH**
	P301	Maximum voltage input AVI	**012DH**
	P302	AVI input filter time	**012EH**
	P303	Reserved	**012FH**
	P304	Reserved	**0130H**
	P305	Reserved	**0131H**
	P306	Reserved	**0132H**
	P307	Reserved	**0133H**
	P310	Low analog signal frequency	**0136H**
	P311	Low analog signal direction	**0137H**
	P312	High analog signal frequency	**0138H**
	P313	High analog signal direction	**0139H**
	P314	Reverse analog input selection	**013AH**
	P315	FWD input terminal (0-32)	**013BH**
	P316	REV input terminal (0-32)	**013CH**
	P317	Input terminal S1 (0-32)	**013DH**
	P318	Input terminal S1 (0-32)	**013EH**
	P319	Reserved	**013FH**
	P320	Reserved	**0140H**
	P321	Reserved	**0141H**
	P322	Reserved	**0142H**
	P323	Reserved	**0143H**
	P324	Reserved	**0144H**
	P325	Alarm output terminal RA, RB, RC (0-32)	**0145H**
	P326	Reserved	**0146H**
	P327	Reserved	**0147H**

Function	Parameter	Name	Command address
Secondary functions	**P400**	Setting the frequency during JOG	**0190H**
	P401	Acceleration time 2	**0191H**
	P402	Deceleration time 2	**0192H**
	P403	Acceleration time 3	**0193H**
	P404	Deceleration time 3	**0194H**
	P405	Deceleration time 4 / Deceleration time for JOG	**0195H**
	P406	Deceleration time 4 / Deceleration time for JOG	**0196H**
	P407	Counter set value	**0197H**
	P408	Intermediate counter value	**0198H**
	P409	Torque acceleration limitation	**0199H**
	P410	Torque limitation at constant speed	**019AH**
	P411	Choice of overvoltage protection during deceleration	**019BH**
	P412	Automatic selection of voltage regulation	**019CH**

	P413	Automatic energy saving option	**019DH**
	P414	DC braking voltage	**019EH**
	P415	Load during braking	**019FH**
	P416	Restart after immediate shutdown (OPTION)	**01A0H**
	P417	Allowed power failure time	**01A1H**
	P418	Current limiting level on restart	**01A2H**
	P419	Edge restart time	**01A3H**
	P420	Restart time in case of failure	**01A4H**
	P421	Restart delay time after failure	**01A5H**

Function	Parameter	Name	Command address
Druhotné funkcie	**P422**	Torque too high	**01A6H**
	P423	Overtorque detection level	**01A7H**
	P424	Overtorque detection time	**01A8H**
	P425	Reached frequency 1	**01A9H**
	P426	Reached frequency 2	**01AAH**
	P427	Timer 1 setting	**01ABH**
	P428	Timer 2 setting	**01ACH**
	P429	Torque limitation time at constant speed	**01ADH**
	P430	Frequency width in the hysteresis loop	**01AEH**
	P431	Jump frequency 1	**01AFH**
	P432	Jump frequency 2	**01B0H**
	P433	The width of the jump frequency hysteresis loop	**01B1H**
	P434	Frequency step UP/DOWN	**01B2H**
	P435	UP/DOWN frequency memory selection	**01B3H**

Function	Parameter	Name	Command address
Operating of PLC	**P500**	PLC memory mode	**01F4H**
	P501	PLC startup mode	**01F5H**
	P502	PLC operation mode	**01F6H**
	P503	Multi-speed 1	**01F7H**
	P504	Multi-speed 2	**01F8H**
	P505	Multi-speed 3	**01F9H**
	P506	Multi-speed 4	**01FAH**
	P507	Multi-speed 5	**01FBH**
	P508	Multi-speed 6	**01FCH**
	P509	Multi-speed 7	**01FDH**
	P510	Multi-speed 8	**01FEH**
	P511	Multi-speed 9	**01FFH**
	P512	Multi-speed 10	**0200H**
	P513	Multi-speed 11	**0201H**
	P514	Multi-speed 12	**0202H**

	P515	Multi-speed 13	**0203H**
	P516	Multi-speed 14	**0204H**
	P517	Multi-speed 15	**0205H**
	P518	Operating time PLC 1	**0206H**
	P519	Operating time PLC 2	**0207H**
	P520	Operating time PLC 3	**0208H**

Function	Parameter	Name	Command address
Operating of PLC	**P521**	Operating time PLC 4	**0209H**
	P522	Operating time PLC 5	**020AH**
	P523	Operating time PLC 6	**020BH**
	P524	Operating time PLC 7	**020CH**
	P525	Operating time PLC 8	**020DH**
	P526	Operating time PLC 9	**020EH**
	P527	Operating time PLC 10	**020FH**
	P528	Operating time PLC 11	**0210H**
	P529	Operating time PLC 12	**0211H**
	P530	Operating time PLC 13	**0212H**
	P531	Operating time PLC 14	**0213H**
	P532	Operating time PLC 15	**0214H**
	P533	PLC operation direction	**0215H**

Function	Parameter	Name	Command address
Operating of PID	**P600**	PID start mode	**0258H**
	P601	PID operating mode selection	**0259H**
	P602	Setting the PID action point	**025AH**
	P603	Choice of PID feedback value	**025BH**
	P604	Setting the PID target value	**025CH**
	P605	PID upper limit alarm value	**025DH**
	P606	PID lower limit alarm value	**025EH**
	P607	PID band of proportionality	**025FH**
	P608	Integral time of PID	**0260H**
	P609	Differential time PID	**0261H**
	P610	PID step size	**0262H**
	P611	PID stand-by frequency	**0263H**
	P612	PID standby mode duration	**0264H**
	P613	PID wake-up value	**0265H**
	P614	PID corresponding display value	**0266H**
	P615	PID number of display digits	**0267H**
	P616	PID number of decimal digits of the display	**0268H**
	P617	PID upper limit frequency	**0269H**
	P618	PID lower limit frequency	**026AH**
	P619	PID working mode	**026BH**

Function	Parameter	Name	Command address
Advanced applications	**P800**	Advanced locking of application parameters	**0320H**
	P801	Setting 50Hz / 60Hz	**0321H**
	P802	Constant or variable torque	**0322H**
	P803	Overvoltage protection setting	**0323H**
	P804	Low voltage protection setting	**0324H**
	P805	Overheating protection setting	**0325H**
	P806	Current view filtering time	**0326H**
	P807	0-10V analog output for low value calibration	**0327H**
	P808	0-10V analog output for high value calibration	**0328H**
	P809	0-20mA analog output for low value calibration	**0329H**
	P810	0-20mA analog output for high value calibration	**032AH**
	P811	Frequency compensation point during inactivity	**032BH**
	P811	UP/DOWN choice of memorizing frequencies	**032CH**

Register numbers for reading the instantaneous values of the following quantities, e.g.:
current frequency: 0002H
required frequency: 0001H
current current, power: 0003H

Numbers of registers (holding or input) for recording the values of the following quantities:
required frequency: 2001H

Alternatively, START / STOP control, enter the direction 2000H
type 000AH FWD 0006H REV 0001H STOP）

5.8 Advanced application parameters P8

P800	Uzamknutie parametrov aplikácie		Initial value 1	
	Range of setting	0-1	Unit	1
	Setting	0: Locked 1: Unlocked		

If parameter P800 is set to "0", you cannot use extended parameters.

P801	Input frequency setting 50 Hz/ 60 Hz		Initial value 0	
	Range of setting	0-1	Unit	1
	Setting	0 : 50Hz 1 : 60Hz		

The input frequency of 50 Hz or 60 Hz can be set using a parameter according to the conditions of the power network.

P802	Constant torque or variable torque		Initial value 0	
	Range of setting	0-1	Unit	1
	Setting	0: Constant torque 1: Variable torque		

Variable torque is suitable for fan or pump control, when it can bring energy savings.

P803	Overvoltage protection setting		Initial value	
	Range of setting	400 V DC for models 2S 810 V DC for models 4T	Unit	1

P803 sets the DC bus overvoltage protection level. This feature can prevent polarity reversal during deceleration.

P804	Setting the undervoltage protection		Initial value	
	Range of setting	150 V DC for models 2S 310 V DC for models 4T	Unit	1

P804 sets the voltage protection level.
If the input voltage is low, the inverter is easily tripped by undervoltage. This function should be used to avoid undervoltage of the inverter protection.

P805	Setting the protection against overheating		Initial value 85/95°C	
	Range of setting	40 - 120°C	Unit	1

P805 sets the level of protection against overheating of the inverter. In the high temperature environment, the protection level could be suitably improved to ensure the normal operation of the inverter. However, setting it too high will damage the IGBT, so the only solution is to improve the cooling.

P806	The current display filtering time		Initial value 2.0s	
	Range of setting	0-100 s	Unit	1

This parameter setting is relevant for the stabilization of the current display and generally does not change. If the setting is too small, the display will fluctuate.

P807	0 - 10V calibration coefficient for low analog output		Initial value *	
	Range of setting	0-65535	Unit	1
P808	0 - 10V calibration coefficient for high analog output		Initial value *	
	Range of setting	0-65535	Unit	1
P809	0 - 20mA calibration coefficient for low analog output		Initial value *	
	Range of setting	0-65535	Unit	1
P810	0 - calibration coefficient for high analog output		Initial value *	
	Range of setting	0-65535	Unit	1

The above parameters are preset by the manufacturer, normally they do not need to be adjusted, otherwise they may cause abnormal operation.

P811	Frequency compensation point during run dead time	0.00 - maximum frequency	0.00
P812	Memorizing the frequency during UP/DOWN	0: Stored in memory 1: Not stored in memory	0

Chapter 6 Measures for maintenance and inspection

An inverter is an electronic device consisting primarily of semiconductor devices. In order to prevent any malfunction due to the adverse effects of operating conditions, a daily check must be carried out. Service life is affected by: temperature, humidity, dust, dirt and vibration.

Measures for maintenance and control:

A high voltage remains in the capacitor for a short time after the power is turned off. When opening the inverter for inspection, wait at least 10 minutes after turning off the power supply, and then make sure that the voltage between the terminals of the main circuit P / + - N / - of the inverter is not greater than 30 V DC.

6.1 Inspection X550

6.1.1 Daily inspection - preventive

Check the following possible faults during operation.

(1) Engine malfunction

(2) Incorrect installation environment
(3) Cooling system failure
(4) Unusual vibration and noise
(5) Abnormal overheating and discoloration During operation, check the input voltage of the inverter with a meter.

6.1.2 Periodic inspection

During the inspection, check for places that are inaccessible and require regular inspection. If necessary, contact us regarding a regular check.
(1) Check the operation of the cooling system, clean the air filter, etc.
(2) Check (only with the device turned off) and tighten the screws. Screws can become loose due to vibration, temperature changes, etc.
(3) Check conductors and insulating materials for corrosion and possible damage.
(4) Measure the insulation resistance (of prescribed components).
(5) Check and clean the cooling fan.

6.1.3 Daily and periodic inspection

Controlled item	Description	Corrective action when an alarm occurs
Surrounding environment	Check the ambient temperature, humidity, dirt, corrosive gas, oil mist, etc.	Improve the operating environment
Total unit	Check for unusual vibrations and noise	Check the warnings and tighten the connections
Supply voltage	Check that the main circuit voltages and control voltages are normal.	Check the power supply
Generally	1. Check the ground (across the main circuit terminals and the ground terminal). 2. Check for loose bolts and nuts. 3. Check for overheating. 4. Check the device for contamination.	Tighten the screws Clean the cooling
Electrolytic capacitor	1. Check for liquid leakage in the condenser and deformation 2. Visual inspection and assessment of capacitor life.	Consult the manufacturer when replacing capacitors
Cooling system	Air filter, fan, etc.	Clean up
Driver	Check for vibrations and unusual increases in noise	Stop the device and contact the manufacturer

6.2 Replacement of parts

An inverter consists of many electronic parts, such as semiconductor devices.
The following parts may become damaged over time due to their structure or physical properties, resulting in reduced performance or inverter failure. For preventive maintenance, it is necessary to replace some parts regularly.

N Also use the instructions for replacing parts to check the service life.

Part name	Standard replacement interval	Description
Fan	3-5 years	Replace (if necessary)
Capacitor	Approximately 5 years	Replace (if necessary)
Fuses (for 18.5kW or larger inverter)	10 years	Replace (if necessary)
Relay	-------	Replace (if necessary)

6.3 Troubleshooting of X550 inverters

If an alarm (major fault) occurs in the inverter, the protection function is activated, which stops the inverter and the control panel automatically switches to one of the following error indications (alarm).
If your error does not correspond to any of the following errors or if you have a different problem, please contact your device supplier.

• If the protection function is activated, the display will automatically switch to the above display.

• The reset method stops the inverter output after the protection function is activated. Therefore, the inverter cannot be restarted
.
• When the protection function is activated, take appropriate corrective action, then reset the inverter and continue operation. Failure to do so may cause malfunction and damage to the inverter.

6.3.1 Zoznam zobrazovaných poruchových hlásení

Display	Fault name	Possible cause	Solution
OC0/UC0	IGBT failure	1: IGBT damage	1:Kontaktujte svojho predajcu
OC1/UC1	Overcurrent during acceleration	1: Acceleration time is too short 2: The V/F curve is incorrectly set 3: The electric motor connection has a short circuit to ground 4: The torque increase is set fast 5: Supply voltage is too low. 6: Direct start of running motor. 7: The inverter setting is incorrect	1: Increase acceleration time 2: Adjust the V/F curve. 3: Check the insulation resistance of the motor and line 4: Reduce the torque boost value. 5: Check the power supply 6: Check the load 7: Set the inverter correctly
OC2/UC2	Overcurrent during deceleration	1: Doba spomalenia je príliš krátka 2: Nesprávne nastavený výkon meniča 3: Preverte, či sa nevyskytuje rušenie v napájacej sieti	1: Increase deceleration time 2: Choose a higher power class inverter 3: Eliminate network interference
OC3/UC3	Overcurrent at constant speed	1: The insulation condition of the motor or line is unsatisfactory. 2: Load fluctuation 3: Fluctuation of input voltage 4: Incorrectly selected inverter power 5: Determine if another large motor is running causing the input voltage to drop 6: Check that there is no interference in the power supply network	1: Check the insulation resistance of the motor and line 2: Check the load condition and mechanical functionality of the drive 3: Check the power supply 4: Use a higher power class inverter 5: Increase the capacity of the power supply 6: Eliminate network interference

Display	Fault name	Possible cause	Solution
OU0	Overvoltage during the track	1: Deceleration time is too short 2: Incorrectly selected inverter power 3: Interference (electromagnetic)	1: Set the deceleration time 2: Use a higher power inverter 3: Eliminate interference
OU1	Overvoltage during acceleration	1: The power supply is abnormal 2: Peripheral circuits are incorrectly set	1: Check the power supply 2: Do not use the power switch to start or turn off the inverter
OU2	Overvoltage during deceleration	1: The power supply is abnormal 2: Energy feedback is too high 3: Braking resistor is incorrectly set	1: Check the power supply 2: Install the brake unit and or resistor 3: Install the braking resistor of the correct value
OU3	Overvoltage at constant speed	1: Deceleration time is too short 2: The power supply is abnormal 3: Inverter overload 4: Braking resistor is incorrectly set 5: The braking parameter is incorrectly set	1: Increase deceleration time 2: Check the power supply 3: Check the brake unit and resistance 4: Set the braking parameters again 5: Adjust the braking parameters
LU0	Low voltage during stop	1: The power supply is abnormal 2: Missing phase	1: Check the power supply 2: Check power supply and completeness of phases
LU1	Low voltage during acceleration	1: The power supply is abnormal 2: Missing phase 3: There is a large voltage drop at the input at start-up ("soft voltage source")	1: Check the power supply 2: Check the power supply 3: Use an independent power supply ("harder voltage source")
LU2	LOW voltage during deceleration		
LU3	Low voltage during constant speed		

Display	Fault name	Possible cause	Solution
FB0 **FB1** **FB2** **FB3**	The fuse is blown in the circuit of the device	1: Malfunction in the inverter circuits	1: Contact your device dealer
OL0 during stop **OL1** during acceleration **OL2** during deceleration **OL3** at constant speed	Inverter overload	1: Overload 2: Acceleration time is too short 3: The torque increase is set too fast 4: The V/F curve is incorrectly set 5: Input voltage is low 6: Even before the engine stops, the inverter starts RUNNING 7: Load fluctuations or drive blocking under load	1: Reduce the load or use a higher inverter performance class. 2: Increase acceleration time 3: Reduce the torque boost value. 4: Adjust the V/F curve. 5: Check the power supply, use a higher power class inverter 6: Set the RPM tracking start mode 7: Check the load condition
OT0 during stop **OT1** during acceleration **OT2** during deceleration **OT3** at constant speed	Motor overload	1: The motor used has a small power 2: Acceleration time is too short 3: The motor protection setting is too small 4: The V/F curve is incorrectly set 5: The torque increase is set too fast 6: Bad insulation of the electric motor 7: The connected electric motor has low power	1: Reduce the load 2: Increase acceleration time 3: Increase the motor protection value by setting the parameter 4: Adjust the V/F curve. 5: Reduce the rate of torque increase 6: Check the insulation resistance of the motor or replace the motor. 7: Use a bigger motor

Display	Fault name	Possible cause	Solution
OH0 during stop **OH1** during acceleration **OH2** during deceleration **OH3** at constant speed	Iverheating of inverter	1: The cooling fan is broken 2: Small cooling capacity 3: The ambient temperature is high	1: Replace the cooling fan. 2: Clean the radiator 3: Keep the ambient temperature within specifications.
ES	Emergency stop	1: The inverter is in an emergency stop state	1: Perform a normal power-on after releasing the emergency stop button
CO	Communication error	1: The communication line connection has a fault 2: The communication parameter is set incorrectly 3: The transmission format is incorrect	1: Make the correct connection of RS-485 terminals 2: Set the parameter again 3: Check the data transfer format
20	The 4-20mA current loop is interrupted	1: Free terminal; 2: The signal line is incorrectly connected	1, 2: Make the correct wiring of the 4-20mA terminals.
PR	Error writing parameters	The parameter setting is incorrect	After finishing the operation, set the parameters.
ERR	Invalid parameter group	The parameter does not exist or is factory set	Omit this parameter
LP	Low pressure	The pressure has dropped below the set value	
hP	High pressure	The pressure has risen above the set value	
SLP	Sleep mode	Sleep mode has been reached	

6.4 First check whether a fault has occurred

If the causes of the failure are still unknown after repeated checking, it is recommended to initialize the parameters (initial value), then restore the required parameter values and check again.

(1) It is not possible to write parameters. Causes and remedies:
a: Check the selection of P118 parameter entry.
b: Check the frequency setting P101 / P102 - "Operation mode selection".
c: Make sure the operation has not been performed. Stop the inverter and adjust it.

(2) Engine does not turn. Causes and remedies:
a: Check the correctness of the operation mode setting P102.
b: Check that the starting frequency setting is not greater than the operating frequency.
c: Check the main circuit and control circuit.
d: Check if the stop or reset output signal is on.
e: Check whether the reverse rotation protection option is not selected - parameter P104.
f: Check that the frequency setting for each individual frequency (eg Multi-speed operation) is not zero.
g: Check that the P105 maximum frequency setting is not zero.
h: Check that the P400 (JOG) frequency setting is not lower than the P202 start frequency setting.
i: Check that the load is not too large.

(3) Engine generates unusual heat. Causes and remedies:
a: Check that the load is not too large. Reduce the load.
b: Is the engine fan running? (check for deposited dust).
c: Check that the P208 torque boost setting is correct.
d: Has the engine type been set? Check engine settings P209 to P219.
e: If you use a motor from another manufacturer, perform automatic motor tuning (VECTOR type).

(4) Engine makes unusual noise. Causes and remedies:
a: Check that there are no vibrations of metal parts at the carrier frequency (metal sounds). Check the setting of P115 of the engine used.
b: Check the mechanical play of the joints, etc.
c: Contact the engine manufacturer.

(5) The motor rotates in the opposite direction. Causes and remedies:
a: Check that the phase sequence of the output terminals U, V and W is correct.
b: Check that the start signals (forward rotation, reverse rotation) are connected correctly.

(6) Speed does not increase. Causes and remedies:

a: Check if the maximum frequency setting (P105) is correct. (If you want to run the motor at 120 Hz or more, set the maximum frequency of P105 - Maximum speed.)
b: Check that the load is not too high (the load may be higher in winter).
c: Check if the braking resistor is connected correctly

(7) The inverter may interfere with other devices. Causes and remedies: The input/output (main circuit) of the inverter contains high-frequency components that may interfere with communication equipment used near the inverter. In this case, set a suitable EMC filter C1 to minimize interference.
a: Lower the carrier frequency (P115).
b: Install a noise filter on the output side of the inverter to reduce the electromagnetic noise generated from the inverter.
c: Install a noise filter, choke or class C1 EMC filter on the input side of the inverter.
d: To reduce the induced noise from the power supply line of the inverter, it is recommended to ground the cable by inserting it into the ground terminal of the inverter.
e: To avoid malfunction due to noise, place the signal cables more than 10 cm away from the power cables.
f: The control circuit cables should be shielded or the cables should be installed in a metal tube.

6.5 Interference generated by converters and ways of reduction

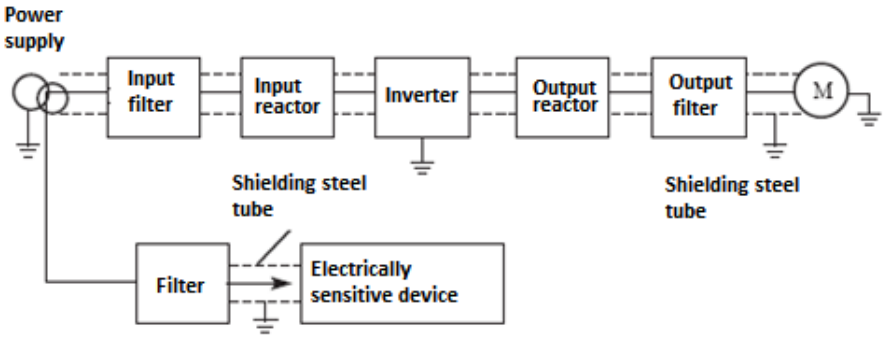
Interference emitted by the frequency inverter can damage peripheral devices. Although the inverter is designed to be immune to interference, it emits low-level signals, so it requires the following basic technique. Inverters emit interference at a high carrier frequency. If this interference causes peripheral equipment to malfunction, interference suppression measures should be taken. These methods of suppression differ slightly depending on the method of propagation of the interference.

①Basic techniques:
• Do not store power cables (I/O cables) and signal cables of the inverter parallel to each other and don't tie them up.
• Use coiled cables with twisted pairs to connect sensors and control cables signals and connect the cable shield to the SC terminal.
• Ground the inverter, motor, etc., at one point.

②Techniques to reduce the noise that enters the inverter and causes it to malfunction: If devices are installed that produce a lot of interference (e.g. electromagnetic contactors, electromagnetic brakes, many relays) and the inverter can be this damaged by interference, the following measures must be taken:

- Provide surge protection for devices that generate interference.
- Connect the filters to the data cables.
- Ground the shielding of cables from sensors and control signal cables.

③An example of noise reduction



Chapter 7: Selection of peripheral devices for X550 models

Check the capacity of the motor connected to the purchased inverter. Appropriate peripherals must be selected according to capacity. Refer to the following list and prepare the appropriate peripherals:

7.1 Description of peripheral devices

Peripheral device	Description
Electromagnetic circuit breaker (MCCB) or residual current device (ELB)	The circuit breaker must be selected precisely, because when the power is turned on, a large current flows through it and protects the frequency inverter from damage.
Electromagnetic contactor (MC) (Optional equipment)	Install MC to ensure security. Do not use MC to start and stop the inverter. Otherwise, the lifetime of the inverter will be shortened.
AC/DC Choke	A choke (optional) should be used if higher harmonics are measured, the power factor must be improved, or the inverter is installed near a large power system (1000 kVA or more). Failure to use chokes may damage the inverter. Select the choke according to the model.
Noise filter	Install a category C1 interference filter to reduce electromagnetic noise generated from the inverter. It is effective in the range from 1 MHz to 10 MHz. A more efficient result can be achieved when several conductors are passed.
Brake resistor and brake unit	Improves braking ability when decelerating.
Ferrite ring	Reduces interference generated by the inverter.

Chapter 8: Safety notices

8.1 Transport and safety during installation

WARNING

• When transporting heavy products, use a suitable lifting mechanism to avoid injury.
• Do not place the inverter boxes higher than the recommended height.
• Make sure the mounting location and material can support the weight of the inverter. Mount the inverter according to the information in the User Manual.
• Do not install or use the inverter if it is damaged or if any of its parts are missing.
• When carrying the inverter - do not hold it by the front cover or adjustment knobs. It may fall to the ground.
• Do not place any heavy objects on the product.
• Check whether the mounting position of the frequency inverter is correct.
• Prevent conductive objects such as screws and metal fragments or flammable substances such as oil from entering the inverter.
• Because the inverter is a precise and sensitive device, do not drop it or subject it to impact.
• Use the frequency inverter in the specified environment. Otherwise, it may be damaged.

Teplota okolia: -10 ℃ až 40 ℃.
Vlhkosť okolia: 95% RH alebo menej.
Okolité prostredia: vnútorné (bez korozívneho plynu, horľavého plynu, oleja, prachu a nečistôt, bez priameho slnečného žiarenia).
Vibrácie: max. 0,5g.

• Uistite sa, že skrutky sú pevne dotiahnuté v súlade s pokynmi návodu na použitie, aby ste zabránili pádu meniča.
• Ak sú v rozvádzači inštalované dva alebo viac meničov, nainštalujte ich podľa návodu na obsluhu a je potrebné, aby mali dostatok okolitého priestoru. Inštalujte ďalšie ventilátory na zabezpečenie núteného prúdenia vzduchu v skrini, udržanie teploty vo vnútri rozvádzača pod 40 ° C. Prehriatie môže spôsobiť poruchu meniča frekvencie, prípadne požiar alebo iné nehody.
• Menič frekvencie musí byť inštalovaný, testovaný a parametre nastavené vyškolenými odbornými pracovníkmi s príslušnou elektrotechnickou kvalifikáciou.

8.2 Safety when plugging in and connecting to the network

WARNING

• Do not damage the insulation of the conductors during assembly. If the wires are under weight or pinched, they can become damaged and cause an electric shock.
• Do not install a power factor correction capacitor or interference (radio noise) filter on the output side of the inverter.
• Do not install switching devices such as air switch and contactor on the output side of the X 550 frequency inverter.
• Improper wiring can cause damage to the inverter. Control/control signal lines must be placed completely outside the main supply to protect them from electrical interference.

DANGER

• Make sure the power is off before connecting the wires.
• Electrical installation work must be performed by qualified personnel. Assembly and assembly-related work with frequency converters may only be carried out by authorized persons with qualifications at least according to § 21 to § 24 of Decree 508/2009 Coll.
• Connect the cables according to the specifications given in the User Manual.
• Grounding must be done correctly and in accordance with the relevant regulations in the user manual, otherwise electric shock or fire may occur.
• Use an independent power supply for the frequency inverter, never use the same power supply with strong interference, such as electric welding machine.
• Do not touch the bottom plate of the X 550 inverter with a wet hand, as this may cause an electric shock.
• Do not touch the terminals, do not connect the input or output terminals of the inverter to the enclosure of the inverter under voltage, otherwise electric shock may occur.
• Make sure that the voltage of the power supply and the voltage of the inverter are the same - compatible, otherwise the inverter may malfunction or cause personal injury.
• The power supply cables must be connected to the R, S, T terminals. Never connect the power cable to the inverter terminals U, V, W. This will damage the inverter because they are output terminals.
• Do not perform a pressure test on the inverter, as this may cause internal damage to the inverter.
• Install accessories, such as brake units, brake resistors according to the instructions in the user manual, otherwise the inverter may malfunction or cause a fire.
• Check that the terminal screws are tight, otherwise the inverter may malfunction.

8.3 Switching on, testing, warranty

WARNING

• Do not open the front cover when the power is on or the inverter is in operation. Otherwise, electric shock may occur.
• Do not operate the inverter with the front cover removed. Otherwise, you may touch the live terminals or the charging part of the DC circuit and receive an electric shock.
• Confirm and set the parameters before starting operation. If you don't, some machines may make unexpected movements.
• It is recommended to carry out tests without load first.
• If the "stop" function is not available, install an emergency EMS switch.
• Do not use the input contactor of the inverter to start / stop the inverter, otherwise it may affect the service life of the inverter.

8.4 Inverter tests

The frequency inverter was thoroughly tested and pre-programmed by the manufacturer before shipping. The properties of the 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 user manual. The following tests were performed:

Tested circuit		Test result	The relevant standard
Insulation resistance		>1MΩ	GB12668
Insulation strength		2-5kV AC; 60s leakage current <1mA	GB12668
ESD	Contact discharge	+/- 4kV	EN61000-4-2
	Air discharge	+/- 8kV	
	Discharge on connections	+/- 4kV	
EFT	RST	+/- 4kV	EN61000-4-4
	UVW	+/- 2kV	
	Signal pathways	+/- 2.5kV	
Overvoltage in wiring	Interphase	+/- 2kV	EN61000-4-5
	Opposite direction	+/- 4kV	
CS test (frequency range 150 kHz – 80 MHz		10 V (e.m.f.)	EN61000-4-6

8.5 Warranty period

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

8.6 Warranty condition

The warranty applies only to malfunctions and defects caused by a manufacturing error or the materials used. The warranty is extended by the time during which the frequency inverter was under repair. The customer claims the warranty repair at the seller. The buyer will deliver the frequency inverter for repair to the seller at his own expense.

8.7 Exclusion from warranty

a. Due to the fault of the buyer - user, in the event of mechanical damage (e.g. during transport or falling), or during use in violation of the technical documentation, incorrect connection, or if the defect was caused by unprofessional intervention in the product.

b. When the device is damaged by external influences (dusting of the internal parts of the inverter, wetting of the internal circuits) and natural events (effects of high overvoltages due to lightning, fire, water flooding, etc.)

c. Improper storage, connection contrary to the recommended connection, damage caused by external influences, especially the effects of electrical quantities of an inadmissible size.

DANGER

• When the restart after failure function is set, do not touch the device because the device may restart automatically after restarting.
• Make sure the inverter specification and range match the system requirements. Exceeding the range of use can cause malfunction of the electric motor and the machine.
• Do not change the inverter parameter settings during operation.
• When the power is turned on and off after a certain time, do not touch the frequency converter because it is hot and you may burn yourself.
• Perform communication and button settings with dry hands to avoid electric shock.
• Please do not disconnect or remove the electric motors during the operation of the inverter, otherwise it may cause an error of the inverter or cause the inverter to malfunction.

8.8 Safety of inspection and maintenance

WARNING

• Make sure the power is turned off before inspection and maintenance. Otherwise, electric shock may occur.
• To prevent damage caused by static electricity, touch a metal object before touching the inverter to remove - discharge static electricity from the body.
• Do not perform an insulation resistance measurement test on the control circuits of the inverter.

DANGER

• Any person involved in the wiring or inspection of this equipment should be fully competent and trained to carry out this work.
• Carry out inspection, maintenance and replacement of components according to the specified methods in the instruction manual, do not make any modifications yourself. Doing so may result in electric shock and injury or damage to the inverter.

8.9 Emergency stop

DANGER

• Ensure the safety of the drive (e.g. conveyor) such as an emergency brake to prevent the machine and equipment from entering a dangerous state if the inverter is faulty.
• When there is a fault in the contactor at the input of the power supply to the inverter, before reconnecting, after replacing the damaged contactor, independently check the frequency inverter for damage.
• When the protection function is activated (X 550 "reports" a fault), take appropriate corrective measures, determine the cause of the fault, and only then reset the inverter and continue operation.

8.10 Disposal of the frequency inverter

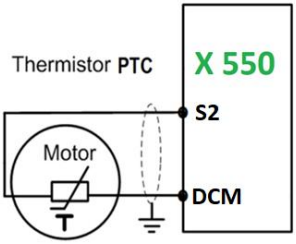
WARNING

Treat the worn-out frequency inverter as electronic industrial waste according to the applicable waste laws of the Slovak Republic.

We reserve the right to typographical errors in the text

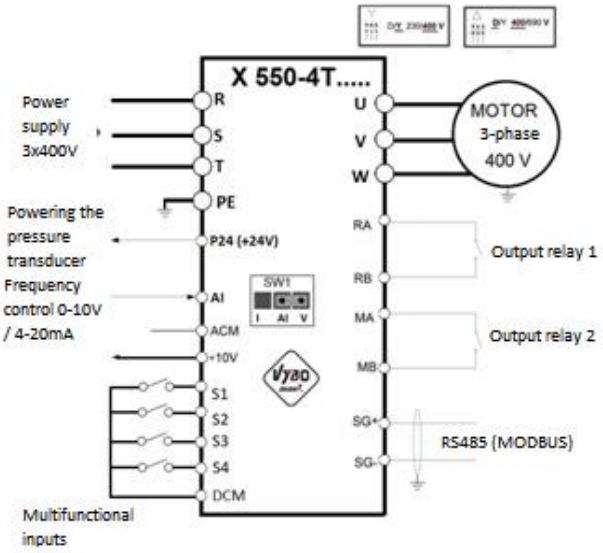
Attachment No 1: Connection of PTC / TK thermal protection of the electric motor

Set the parameter P316 = 32 (example)



Attachment No 2: Connection of frequency inverter X550 for external control UP/DOWN

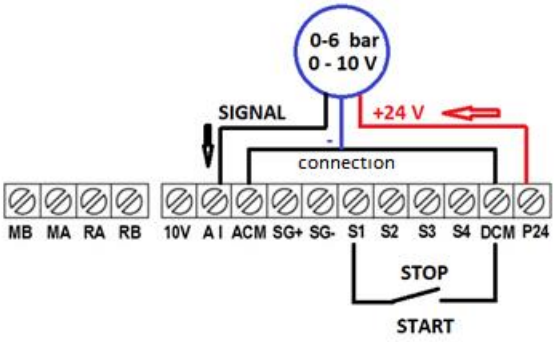
P101=4
P102=1
P315=6 FWD (S1/DCM)
P316=7 REV (S2/DCM)
P317=15 UP (S3/DCM) increasing frequency
P318=16 DOWN (S4/DCM) decreasing frequency
P812=1



Attachment No 3: Connection and parameterization of the X550 for constant pressure control

1./ Parameterization with prev. pressure with current output 4 – 20 mA (two-wire connection)

SW1	I	 4 - 20 mA control
P101	1	AI input frequency source selection
P102	1	Choice of I/O control method external terminal
P104	0	Choice of reverse protection
P106	0	Minimum working frequency (Hz)
P300	1	Minimum current analog. input (1 takes 4 mA)
P301	5	Maximum current analog. input (5 means 20 mA)
P600	1	PID start enabled
P601	0	Negative feedback mode
P602	0	PID set according to P604
P603	0	PID feedback selection via AI (analog input)
P604	4.0	Setting the target pressure value (e.g. 4.0 bar)
P605	095	PID upper alarm limit 95% = 5.70 bar “**hP**”
P606	035	PID lower alarm limit 35% = 2.10 bar “**LP**”
P611	20	Standby PID Frequency (Hz)
P612	10	PID standby time before SLP (seconds)
P613	90	PID values at wake-up (given in %) 90%=3.70 bar
P614	6	Scale - Pressure transducer range (0 to 6.0 bar)
P617	48	PID upper frequency limit
P618	20	PID lower frequency limit
P619	1	PID working mode
P624	100	Low pressure warning time “**LP**” (dry run)
P631	30.0	Restart time after high pressure alarm “**hP**”
P000	07	Display of set pressure/actual pressure



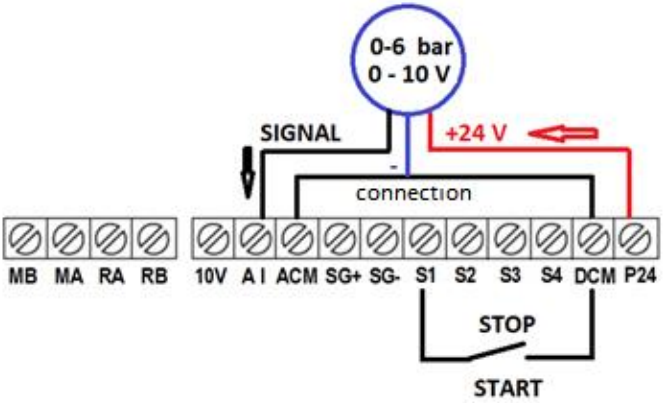
If you set P000=07, the display of the X550 inverter shows the PID setting
- the left double digit 3.0 means the value of the required pressure, i.e. 3.0 bar
- the right double digit 3.1 means the value of the achieved pressure, i.e. 3.1 bar

The display shows SLP (sleep), this means that the inverter has reached the required set pressure and if the pressure in the system does not decrease (e.g. there is no water intake), the inverter goes into "sleep" mode.

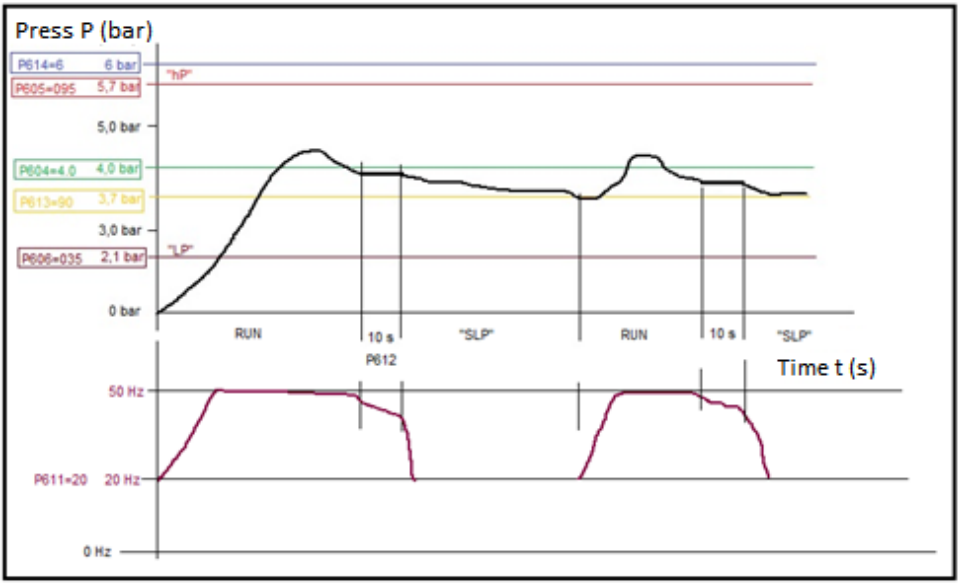
The "SLP" display has changed to "3.0 0.5" the inverter display shows the value of the required pressure 3.0 bar on the left and the pressure value in the system on the right, i.e. 0.5 bar. The inverter has been activated and the pump motor starts to reach the required pressure of 3.0 bar.

2./ Parameterization with pressure transducer with 0-10 V output

SW1	V	0-10 V voltage control
P101	1	AI input frequency source selection
P102	1	Choice of I/O control method external terminal
P104	0	Choice of reverse protection
P106	0	Minimum working frequency (Hz)
P300	0	Minimum analog input voltage (0 V)
P301	10	Maximum analog input voltage (10 V)
P600	1	PID start enabled
P601	0	Negative feedback mode
P602	0	PID set according to P604
P603	0	PID feedback selection via AI (analog input)
P604	3	Setting the target pressure value (e.g. 3 bar)
P605	100	PID upper alarm limit
P606	000	PID lower alarm limit
P611	25	Standby PID Frequency (Hz)
P612	10	PID standby time (seconds)
P613	30	PID values at wake-up (%)
P614	6	Range of the pressure transducer (e.g. 6 bar)
P617	48	PID upper frequency limit
P618	20	PID lower frequency limit
P000	07	Display of set pressure/actual pressure



Graphic representation of set values



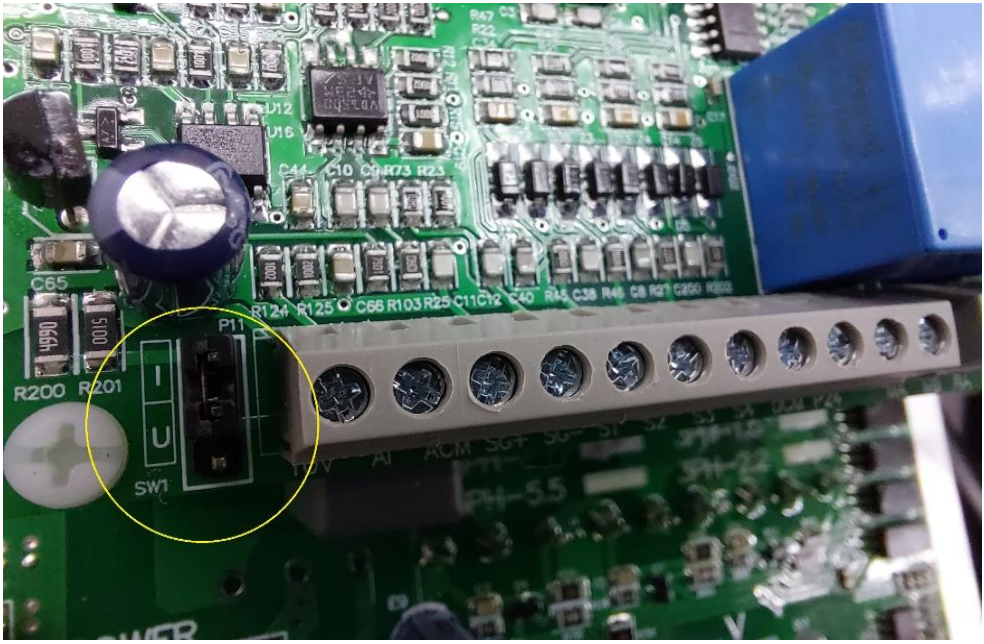
Attachment No 4: Parameterization of the high-speed spindle

Label data of the electric motor: Un=3x160 V; In=8,50 A; fn=300 Hz; rpm=18000

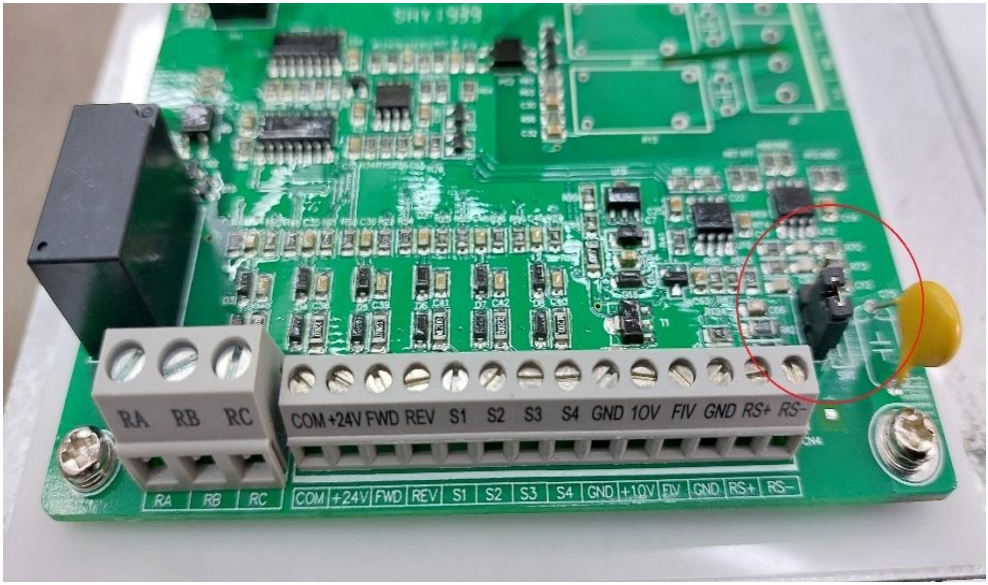
P105=300.0 Hz
P106=300.0 Hz

P107=20.0 s
P108=20.0 s
P109=165.0 V
P110=300.0 Hz
P111=40.00 Hz
P112=55.00 Hz
P113=6.0 V
P114=15.00 Hz
P201=1
P209=165 V
P210=8.5 A
P212=18000 rpm
P213=2
P215=300.0 Hz

Attachment No 5 Location of switch SW1 on models up to 5.5 kW



Attachment No 6 Location of switch SW1 on X550 models above 7.5 kW



DECLARATION OF CONFORMITY

Business name: **VYBO Electric a.s.**

Registered office: Radlinského 18
05201 Spisska Nova Ves
Slovak Republic IČO: 45537143

The declaration of conformity shall, on behalf of the manufacturer, issue and declare on his sole responsibility the conformity of the following products:

Frequency inverters A200-2S....; A550-2S....; A550-4T....; X550-2S....; X550-4T....;

The safety features of this product meet all relevant safety requirements for components in accordance with the Machine Directive 2006/42/EC on electrical machinery**.**

Furthermore, the following guidelines were used in the assessment:

Low voltage equipment directives 2014/35/EU
EMC Directive 2014/30/EU
Ecodesign Directives 2009/125/EC

Harmonized technical standards were also used in the conformity assessment:

EN 61800-5-1:2007+A1:2017
EN 61800-5-1:2007+A11:2021
EN 61800-3:2004+A1:2012

Spišská Nová Ves, 04.11.2022

.....
Ing. Babeta Výbošťoková
Vice-Chairman

This declaration is not a guarantee of the characteristics of products in terms of liability for damage caused by them. The safety instructions and appropriate uses provided in the product documentation must be followed.