Astraada DRV-240 Quick Start Guide

This guide briefly describes the external wiring, terminals, keypads, quick running, common function parameter settings, common faults and solutions, product dimensions, and energy efficiency data of DRV-240 series variable-frequency drive (VFD).
Visit www.astor.com.pl for more information and source download. For details, see the full version of corresponding product e-manual.

Scan the QR code to view the full version of series product e-manual.

Warning

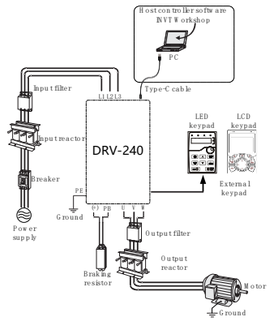
- This guide only provides the basic installation and commissioning information. Failure to comply with the safety instructions and installation and commissioning instructions in the relevant documentation may result in accidents such as equipment damage, personal injury, or even death.
- Only trained and qualified professionals are allowed to carry out related operations.

Danger

- Do not perform any operations including wiring, inspection, or component replacement when power supply is applied. Before performing these operations, ensure all the input power supplies have been disconnected, and wait for at least the time designated on the VFD.

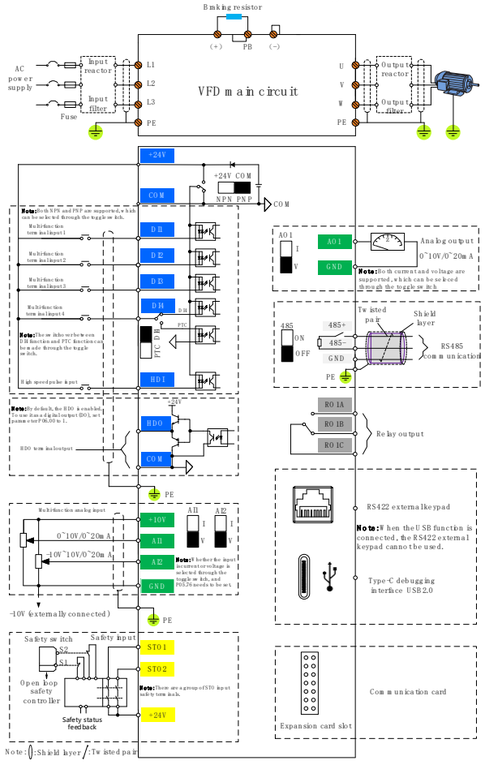
Minimum waiting time	VFD model
5 minutes	1PH 220V 0.2–4kW; 3PH 220V 0.2–15kW; 3PH 380V 0.4–22kW

1 External wiring



2 Electrical wiring

Figure 2-1 Typical VFD wiring

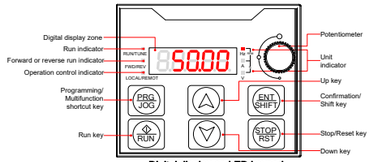


3 Function

Table 3-1 VFD terminal description

Terminal symbol	Function
Main circuit terminals	
L1, L2, L3 (L1, L2)	3PH (or 1PH) AC input terminals, connected to the grid.
U, V, W	3PH (or 1PH) AC output terminals, connected to the motor usually.
(+)	(+) and (-) connect to the shared DC bus terminals. PB and (+) connect to external braking resistor terminals.
(-)	
PB	
⏚	PE terminal. The PE terminals of each machine must be grounded reliably.
Control circuit terminals	
+10V	Locally provided +10V power supply. Max. output current: 50mA.
AI1	Input range: 0–10V/0–20mA Input resistance: 33kΩ for voltage input or 250Ω for current input Whether the input is current or voltage is selected through the toggle switch AI1 (I/V), and the function code P05.76 also needs to be set accordingly. Resolution: 1% accuracy across the full range
AI2	Input range: -10–10V/0–20mA Input resistance: 33kΩ for voltage input or 250Ω for current input Whether the input is current or voltage is selected through the toggle switch AI1 (I/V), and the function code P05.76 also needs to be set accordingly. Resolution: 1% accuracy across the full range
AO1	Output range: 0–10V/0–20mA Whether the output is current or voltage is selected through the toggle switch AO1 (I/V). Resolution: 1% accuracy across the full range
RO1A	Relay output. RO1A: NO; RO1B: NC; RO1C: common Contact capacity: 3A/AC 250V, 1A/DC 30V
RO1B	
RO1C	
GND	+10V power supply reference ground and analog signal reference ground.
HDO1	Switch capacity: 50mA/30V. Output frequency range: 0–50kHz It can be used as a standard DO terminal with push-pull output. You can set its function by setting P06.00.
485+	RS485 differential signal communication port. Use shielded twisted pairs for standard RS485 communication interfaces. You can determine whether to connect the 120Ω terminal matching resistor of RS485 communication through the toggle switch 485(ON/OFF).
485-	
USB	Type-C interface, which can be directly connected to a PC, using Modbus RTU as the communication protocol. When the VFD is not connected to the main power supply, it can be used to modify, save, import, and export parameters; when the VFD is connected to the main power supply, it can be used to control the VFD operation and monitor its running parameters.
+24V	User power supply provided by the VFD. Max. output current: 100mA It can be used as an external NPN mode power input for the DI terminal (the switch must be turned to the NPN position).
COM	+24V digital reference ground, which can be used as an external PNP mode input (the toggle switch must be set to the PNP position).
DI1–DI4 (PTC)	DI1–DI4 functions: Effective input high level range: 10–30V Effective input low level range: 0–5V Max. input frequency: 1kHz Programmable digital input terminals, the functions of which can be set through the related parameters Whether the NPN or PNP mode is used can be selected through the toggle switch, and the external power wiring is supported. PTC function: DI4 can be configured with PTC overtemperature protection, which can be enabled through P05.04=57 and toggle switch setting. Overtemperature resistance: 3.6kΩ. Recovery resistance: 1.5kΩ.
HDI1	It supports the switchover between NPN and PNP. It can act as a high frequency pulse input channel, in addition to a digital input channel. Max. input frequency: 50kHz Duty ratio: 30%–70%
STO1	Safe torque off (STO) inputs
STO2	STO redundant input, connected to the external NC contact. When the contact opens, STO acts and the VFD stops output. Safety input signal wires use shielded wires whose length is within 25m. The STO1 and STO2 terminals are short connected to +24V by default. Remove the jumper from the terminals before using the STO function.
Communication expansion card terminals	
+24E	An external 24V connection can be used for communication debugging.
COM	
EC IN	Five bus types are supported: PROFINET, EtherCAT, EtherNet IP, Modbus TCP, and EtherNet UDP EtherCAT can be only used in the IN port, while the other protocols do not distinguish the direction.
EC OUT	Five bus types are supported: PROFINET, EtherCAT, EtherNet IP, Modbus TCP, and EtherNet UDP EtherCAT can be only used in the OUT port, while the other protocols do not distinguish the direction.

4 Keypad



Digital display on LED keypad

Display	Means	Display	Means	Display	Means	Display	Means
0	0	1	1	2	2	3	3
4	4	5	5	6	6	7	7
8	8	9	9	A	A	b	b
C	C	d	d	E	E	F	F
H	H	I	I	L	L	n	N
o	n	O	O	P	P	r	r
S	S	t	t	U	U	v	v
-	-	_	-				

Indicator	Status	Meaning
RUN/TUNE	Steady on	The VFD is running.
	Blinking	The VFD is in parameter autotuning.
	Steady off	The VFD is stopped.
FWD/REV	Steady on	The VFD runs reversely.
	Steady off	The VFD runs forward.
LOCAL/REMOT	Steady on	The VFD uses communication as the command running channel.
	Blinking	The VFD uses terminal as the command running channel.
	Steady off	The VFD uses keypad as the command running channel.
RUN/TUNE FWD/REV LOCAL/REMOT	All steady on, displaying the fault code	The VFD is in fault state.
	Blinking at the same time	The VFD is in pre-alarm state.
Unit indicator	A unit indicator that is on indicates the unit currently displayed on the keypad.	
	Hz	Frequency unit
	RPM	Rotation speed unit
	A	Current unit
	%	Percentage
	V	Voltage unit

Key		Function
PRG/JOG	Programming/ Multifunction shortcut key	Press it to enter or exit level-1 menus or delete a parameter. Press and hold it (at least 1s) to implement the function defined by the ones place of P07.02, which is jogging by default.
ENT/SHIFT	Confirmation/ Shifting key	Press it to enter menus in cascading mode or confirm the setting of a parameter. Press it to select display parameters in the interface for the VFD in stopped or running state. Press and hold it (at least 1s) or to select digits to change during parameter setting.
∧	Up key	Press it to increase data or move upward.
∨	Down key	Press it to decrease data or move downward.
RUN	Run key	Press it to run or perform autotuning under keypad operation mode.
STOP/RST	Stop/Reset key	P07.04 specifies the validity of the key function. Press it to stop running or autotuning in running state. Press it to reset in fault alarm state.

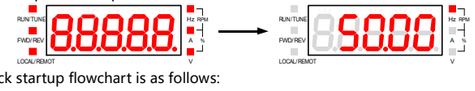
5 Quick running

5.1 Check before power-on

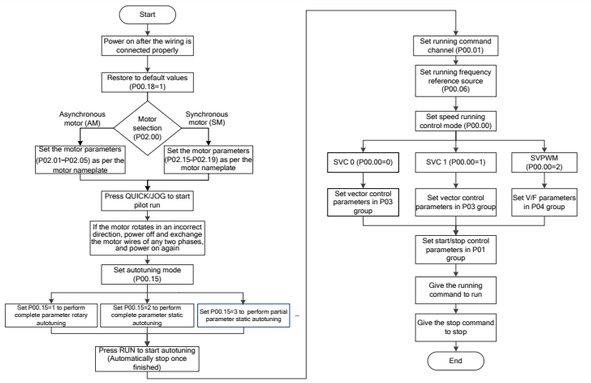
- Ensure that all terminals have been securely connected.
- Ensure that the motor power matches the VFD power.

5.2 Operating upon first power-on

After confirming the wiring and power are correct, close the air switch of the AC power at the VFD input side to power on the VFD.



The quick startup flowchart is as follows:



6 Common function parameter setup

The following briefly describes only some common function parameters and typical values.

"○" indicates that the value of the parameter can be modified when the VFD is in stopped or running state.

"◉" indicates that the value of the parameter cannot be modified when the VFD is in running state.

"●" indicates that the value of the parameter is detected and recorded, and cannot be modified.

(The VFD automatically checks and constrains the modification of parameters, which helps prevent incorrect modifications.)

Function code	Name	Description	Default	Modify
P00.00	Speed control mode	0: SVC mode 0 1: SVC mode 1 2: Space voltage vector control mode	2	◉
P00.01	Channel of running commands	0: Keypad 1: Terminal 2: Communication	0	○
P00.02	Communication mode of running commands	0: Modbus/Modbus TCP 2: Ethernet 3: EtherCAT/PROFINET/EtherNet IP	0	○
P00.03	Max. output frequency	Max(P00.04)–599.00Hz	50.00Hz	◉
P00.04	Upper limit of running frequency	P00.05–P00.03	50.00Hz	◉
P00.05	Lower limit of running frequency	0.00Hz–P00.04	0.00Hz	◉
P00.06	Setting channel of A frequency command	0: P00.10 1: AI1 2: AI2 3: AI3 5: High-speed pulse HDI1 7: Simple PLC program 8: Multi-step speed running 9: PID control 10: Modbus communication 12: Ethernet communication 14: EtherCAT/PROFINET/ EtherNet IP communication	0	○
P00.07	Setting channel of B frequency command		1	○
P00.10	Set frequency via keypad	0.00Hz–P00.03	50.00Hz	○
P00.11	ACC time 1	0.0–3600.0s	Model depended	○
P00.12	DEC time 1		Model depended	○
P00.13	Running direction	0: Run at the default direction. 1: Run at the opposite direction. 2: Disable reverse running.	0	○
P00.15	Motor parameter autotuning	0: No operation 1: Complete parameter rotary autotuning 2: Complete parameter static autotuning 3: Partial parameter static autotuning	0	◉
P00.17	VFD type	2: Heavy duty 3: Light duty	2	◉
P00.18	Function parameter restoration	0: No operation 1: Restore default values (excluding motor parameters) 2: Clear fault records 3: Lock keypad parameters	0	◉
P01.00	Running mode of start	0: Direct start 1: Start after DC braking 4: Start after speed tracking (software)	0	◉
P01.08	Stop mode	0: Decelerate to stop 1: Coast to stop	0	○
P01.09	Starting frequency of braking for stop	0.00Hz–P00.03	0.00Hz	○
P01.11	DC braking current for stop	0.0–100.0%	0.0%	○
P01.12	DC braking time for stop	0.00–50.00s	0.00s	○

Function code	Name	Description	Default	Modify
P01.18	Terminal-based running command protection at power-on	0: Invalid at power-on 1: Valid at power-on	0	◉
P02.00	Type of motor 1	0: Asynchronous motor (AM) 1: Permanent magnet synchronous motor	0	◉
P02.01	Rated power of AM 1	0.1–3000.0kW	Model depended	◉
P02.02	Rated frequency of AM 1	0.01Hz–P00.03	50.00Hz	◉
P02.03	Rated speed of AM 1	1–60000rpm	Model depended	◉
P02.04	Rated voltage of AM 1	0–1200V	Model depended	◉
P02.05	Rated current of AM 1	0.08–600.00A	Model depended	◉
P02.15	Rated power of SM 1	0.1–3000.0kW	Model depended	◉
P02.16	Rated frequency of SM 1	0.01–P00.03Hz	50.00Hz	◉
P02.17	Number of pole pairs of SM 1	1–128	2	◉
P02.18	Rated voltage of SM 1	0–1200V	Model depended	◉
P02.19	Rated current of SM 1	0.08–600.00A	Model depended	◉
P02.23	Counter-emf of SM 1	0–10000	300	○
P03.00	Speed-loop proportional gain 1	0.0–200.0	20.0	○
P03.01	Speed-loop integral time 1	0.000–10.000s	0.200s	○
P03.03	Speed-loop proportional gain 2	0.0–200.0	20.0	○
P03.04	Speed-loop integral time 2	0.000–10.000s	0.200s	○
P03.11	Torque setting method selection of motor 1	0: P03.12 1: AI1 2: AI2 3: AI3 5: High-speed pulse HDI1 8: Multi-step speed running 10: Modbus/Modbus TCP communication 12: Ethernet communication 14: EtherCAT/PROFINET/ EtherNet IP communication	0	○
P03.32	Enabling torque control of motor 1	0: Disable 1: Enable	0	○
P03.54	Current-loop band width of motor 1	0–2000	400	○
P04.01	Torque boost of motor 1	0.0–10.0%	0.0%	○
P04.09	V/F slip compensation gain of motor 1	0.0–200.0%	100.0%	○
P04.10	Low-frequency oscillation control factor of motor 1	0–100	10	○
P04.11	High-frequency oscillation control factor of motor 1	0–100	10	○
P05.00	HDI input type	0: HDI1 is high-speed pulse input 1: HDI1 is digital input	0	◉
P05.01	Function of DI1	0: No function 1: Run forward 2: Run reversely 3: Three-wire running control 4: Jog forward 5: Jog reversely 6: Coast to stop 7: Reset faults 8: Pause running 9: External fault input 10: Increase frequency setting (UP) 11: Decrease frequency setting (DOWN) 57: Motor overtemperature fault input (supported only by DI4)	1	◉
P05.02	Function of DI2		4	◉
P05.03	Function of DI3		7	◉
P05.04	Function of DI4		0	◉
P05.11	Function of HDI1		0	◉
P05.42	AI1 lower limit	0.00V–P05.44	0.00V	○
P05.43	Corresponding setting of AI lower limit	-300.0%–300.0%	0.0%	○
P05.44	AI1 upper limit	P05.42–10.00V	10.00V	○
P05.45	Corresponding setting of AI1 upper limit	-300.0%–300.0%	100.0%	○
P05.47	AI2 lower limit	-10.00V–P05.49	-10.00V	○
P05.48	Corresponding setting of AI2 lower limit	-300.0%–300.0%	-100.0%	○
P05.49	AI2 middle value 1	P05.47–P05.51(V)	0.00V	○
P05.50	Corresponding setting of AI2 middle value 1	-300.0%–300.0%	0.0%	○
P05.51	AI2 middle value 2	P05.49–P05.53(V)	0.00V	○
P05.52–	Corresponding setting of AI2 middle value 2	-300.0%–300.0%	0.0%	○
P05.56	AI3 lower limit	0.00V–P05.58	0.00V	○

Function code	Name	Description	Default	Modify
P05.57	Corresponding setting of AI3 lower limit	-300.0%–300.0%	0.0%	○
P05.58	AI3 upper limit	P05.56–10.00V	10.00V	○
P05.59	Corresponding setting of AI3 upper limit	-300.0%–300.0%	100.0%	○
P05.66	HDI1 lower limit frequency	0.000kHz–P05.68	0.000kHz	○
P05.67	Corresponding setting of HDI1 lower limit frequency	-300.0%–300.0%	0.0%	○
P05.68	HDI1 upper limit frequency	P05.66–50.000kHz	50.000 kHz	○
P05.69	Corresponding setting of HDI1 upper limit frequency	-300.0%–300.0%	100.0%	○
P05.76	AI input signal type selection	Bit0: AI1 input signal type selection 0: Voltage 1: Current Bit1: AI2 input signal type selection 0: Voltage 1: Current	0x0–0xF	◉
P06.00	HDO1 output type	0: High-speed pulse output 1: Digital output	0	◉
P06.04	HDO1 output	0: Invalid 1: Running 2: Running forward 3: Running reversely 4: Jogging 5: VFD in fault 6: Frequency level detection FDT1 7: Frequency level detection FDT2 8: Frequency reached	0	○
P06.05	RO1 output		1	○
P06.09	Output terminal polarity selection	0x00–0x1F Bit0–bit2: Reserved Bit3: HDO1 Bit4: RO1	0x00	○
P06.26	AO1 output	0: Running frequency 1: Set frequency 2: Ramp reference frequency 3: Rotational speed 4: Output current 5: Output current 6: Output voltage 7: Output power	0	○
P06.28	HDO1 high-speed pulse output		0	○
P06.29	AO1 output lower limit	-300.0%–P06.31	0.0%	○
P06.30	AO1 output corresponding to lower limit	0.00–10.00V	0.00V	○
P06.31	AO1 output upper limit	P06.29–300.0%	100.0%	○
P06.32	AO1 output corresponding to upper limit	0.00–10.00V	10.00V	○
P06.21	AO1 output filter time	0.000s–10.000s	0.000s	○
P06.41	HDO1 output lower limit	-300.0%–P06.43	0.0%	○
P06.42	HDO1 output corresponding to lower limit	0.00–50.00kHz	0.00kHz	○
P06.43	HDO1 output upper limit	P06.41–300.0%	100.0%	○
P06.44	HDO1 output corresponding to upper limit	0.00–50.00kHz	50.00kHz	○
P07.00	User password	0–65535	0	○
P07.27	Present fault type	-	-	●
P07.28	Last fault type	-	-	●
P07.29	2nd-last fault type	-	-	●
P07.30	3rd-last fault type	-	-	●
P07.31	4th-last fault type	-	-	●
P07.32	5th-last fault type	-	-	●
P08.28	Auto fault reset count	0–10	0	○
P08.29	Auto fault reset interval	0.1–3600.0s	1.0s	○
P08.41	Cooling-fan running mode	Setting range: 0x00–0x12 Ones place: Run mode 0: Normal mode 1: Permanent running after power-on 2: Run mode 2 Tens place: Speed regulation mode 0: Disable speed regulation 1: Speed regulation mode 1	0x10	○
P11.00	Protection against phase loss	Setting range: 0x000–0x011 Ones place: 0: Disable software input phase loss protection. 1: Enable software input phase loss protection. Tens place: 0: Disable output phase loss protection. 1: Enable output phase loss	0x011	○

Function code	Name	Description	Default	Modify
		protection. Hundreds place: Reserved		
P14.00	Local communication address	1–247 **Note:** The communication address of a slave cannot be to 0.	1	○
P14.01	Communication baud rate	0: 1200 bps 1: 2400 bps 2: 4800 bps 3: 9600 bps 4: 19200 bps 5: 38400 bps 6: 57600 bps 7: 115200 bps	4	○
P14.02	Data bit check	0: No check (N, 8, 1) for RTU 1: Even check (E, 8, 1) for RTU 2: Odd check (O, 8, 1) for RTU 3: No check (N, 8, 2) for RTU 4: Even check (E, 8, 2) for RTU 5: Odd check (O, 8, 2) for RTU	1	○
P23.02	Received PZD2	0: Invalid 1: Set frequency 2: PID reference 3: PID feedback 4: Torque setting 5: FWD rotation upper-limit frequency setting 6: REV rotation upper-limit frequency setting 7: Electromotive torque upper limit 8: Braking torque upper limit 9: Virtual input terminal command 10: Virtual output terminal command 11: V/F separation voltage setting 12: AO1 setting 1	0	○
P23.03	Received PZD3		0	○
P23.04	Received PZD4		0	○
P23.05	Received PZD5		0	○
P23.06	Received PZD6		0	○
P23.07	Received PZD7		0	○
P23.08	Received PZD8		0	○
P23.09	Received PZD9		0	○
P23.10	Received PZD10		0	○
P23.11	Received PZD11		0	○
P23.12	Received PZD12		0	○
P23.13	Sent PZD2	0: Invalid 1: Running frequency 2: Set frequency 3: Bus voltage 4: Output voltage 5: Output current 6: Actual output torque 7: Actual output power 8: Rotational speed 9: Linear speed 10: Ramp reference frequency 11: Fault code 27: VFD status word 2	0	○
P23.14	Sent PZD3		0	○
P23.15	Sent PZD4		0	○
P23.16	Sent PZD5		0	○
P23.17	Sent PZD6		0	○
P23.18	Sent PZD7		0	○
P23.19	Sent PZD8		0	○
P23.20	Sent PZD9		0	○
P23.21	Sent PZD10		0	○
P23.22	Sent PZD11		0	○
P23.23	Sent PZD12		0	○
P24.00	Expansion card protocol selection	0: PROFINET 1: EtherCAT 3: EtherNet IP 4: Modbus TCP 5: EtherNet UDP 6: PROFINET + EtherNet UDP 7: EtherCAT + EtherNet UDP 15: No communication expansion card	15	◉
P29.00	Expansion card type	0: No card 36: All-in-one expansion card—PROFINET communication card 41: All-in-one expansion card—EtherCAT communication card 43: All-in-one expansion card—EtherNet IP communication card 44: All-in-one expansion card—Modbus TCP communication card 45: All-in-one expansion card—Ethernet communication card 46: All-in-one expansion card—PROFINET + EtherNet communication card 47: All-in-one expansion card—EtherCAT + EtherNet communication card	0	•

7 Common faults and solutions

Fault code	Fault type	Possible cause	Solution
E4	Overcurrent during ACC	● ACC time too short. ● Load too large or sudden change of load. ● Start during motor rotating. ● 3PH output current imbalance. ● When sensorless vector control is used for motor control, parameter autotuning is not performed. ● When V/F control is used for motor control, V/F curve setting is abnormal. ● There are strong external interference sources (contactor switchover or improper grounding). ● Grid voltage too low. ● Hardware fault.	● Increase the ACC time, or reduce the software current limit point through P11.06; if the process requires rapid ACC, increase the VFD capacity. ● Increase the VFD capacity to ensure that the motor does not experience stalling, and that the load equipment functions without any exception. ● Start after the motor stops, or select speed tracking start through P01.00. ● Check the VFD output voltage and motor resistance to ensure three-phase balance. ● Set the rated parameters according to the motor nameplate, and perform parameter autotuning through P00.15. ● Adjust the frequency and voltage relationship set by the V/F curve, and reduce the voltage corresponding to the frequency. ● To avoid strong interference, keep the motor cables away from contactors and ensure

Fault code	Fault type	Possible cause	Solution
			reliable grounding of the system. ● Improve the power quality, or increase the VFD capacity. ● Replace the VFD.
E5	Overcurrent during DEC	● DEC time too short. ● Software current limit point setting too high. ● Load too large or sudden change of load. ● 3PH output current imbalance. ● When sensorless vector control is used for motor control, parameter autotuning is not performed. ● When V/F control is used for motor control, V/F curve setting is abnormal. ● There are strong external interference sources (contactor switchover or improper grounding). ● Hardware fault.	● Increase the DEC time, or reduce the software current limit point through P11.06; if the process requires rapid DEC, increase the VFD capacity. ● Reduce the software current limit point through P11.06. ● Increase the VFD capacity to ensure that the motor does not experience stalling, and that the load equipment functions without any exception. ● Check the VFD output voltage and motor resistance to ensure three-phase balance. ● Set the rated parameters according to the motor nameplate, and perform parameter autotuning through P00.15. ● Adjust the frequency and voltage relationship set by the V/F curve, and reduce the voltage corresponding to the frequency. ● To avoid strong interference, keep the motor cables away from contactors and ensure reliable grounding of the system. ● Replace the VFD.
E6	Overcurrent during constant speed running	● Load too large or sudden change of load. ● Software current limit point setting too high. ● 3PH output current imbalance. ● When sensorless vector control is used for motor control, parameter autotuning is not performed. ● When V/F control is used for motor control, V/F curve setting is abnormal. ● There are strong external interference sources (contactor switchover or improper grounding). ● Grid voltage too low. ● Hardware fault.	● Increase the VFD capacity to ensure that the motor does not experience stalling, and that the load equipment functions without any exception. ● Reduce the software current limit point through P11.06. ● Check the VFD output voltage and motor resistance to ensure three-phase balance. ● Set the rated parameters according to the motor nameplate, and perform parameter autotuning through P00.15. ● Adjust the frequency and voltage relationship set by the V/F curve, and reduce the voltage corresponding to the frequency. ● To avoid strong interference, keep the motor cables away from contactors and ensure reliable grounding of the system. ● Improve the power quality, or increase the VFD capacity. ● Replace the VFD.
E7	Overvoltage during ACC	● ACC time too short. ● Grid voltage too high. ● Start during motor rotating. ● The load has a significant energy feedback. ● Improper setting of overvoltage stall protection.	● Increase the ACC time or enable overvoltage stall protection. ● Improve the power quality to comply with the VFD input voltage specifications (refer to product specifications). ● Start after the motor stops, or select speed tracking start through P01.00. ● Install a braking unit and energy feedback unit, or remove external factors that cause the load to generate power. ● Enable overvoltage stall protection through P11.03, and lower the overvoltage stall protection voltage value of P11.04.
E8	Overvoltage during DEC	● Deceleration time too short. ● Grid voltage too high. ● The load has a significant energy feedback. ● Improper setting of overvoltage stall protection.	● Increase the DEC time; if the process requires rapid DEC, braking units, energy feedback units can be added, or the magnetic flux braking function can be used. ● Improve the power quality to comply with the VFD input voltage specifications (refer to product specifications). ● Install a braking unit and energy feedback unit, or remove external factors that cause the load to generate power. ● Enable overvoltage stall protection through P11.03, and lower the overvoltage stall protection voltage value of P11.04.
E9	Overvoltage during constant speed running	● Grid voltage too high. ● The load has a significant energy feedback.	● Improve the power quality to comply with the VFD input voltage specifications (refer to

Fault code	Fault type	Possible cause	Solution
		● Improper setting of overvoltage stall protection.	product specifications). ● Install a braking unit and energy feedback unit, or remove external factors that cause the load to generate power. ● Enable overvoltage stall protection through P11.03, and lower the overvoltage stall protection voltage value of P11.04.
E10	DC bus undervoltage	● Grid voltage too low. ● Abnormal bus voltage display. ● Abnormal precharge contactor closing. ● Running under heavy load in the event of input phase loss.	● Increase grid input voltage. ● Contact us. ● Contact us. ● Check for abnormal input power and loose input cables.
E11	Motor overload	● Grid voltage is too low. ● Motor rated current is set incorrectly. ● Motor stall or load jumps violently.	● Increase grid input voltage. ● Reset the motor rated current in the motor parameter group. ● Check the load and adjust torque boost.
E12	VFD overload	● ACC is too fast. ● The motor is restarted during rotating. ● Grid voltage is too low. ● Load is too heavy. ● VFD power is too small.	● Increase ACC time. ● Avoid restart after stop. ● Increase grid input voltage. ● Select a VFD with larger power.
E13	Input side phase loss	● Phase loss or significant fluctuations in input L1, L2, or L3. ● Input-side screws are loose.	● Check for abnormal input power and loose input cables. ● Set P11.00 to screen out the fault.
E14	Output side phase loss	● Output cables are broken or short connected to the ground. ● UVW phase loss (or the three phases of load are seriously asymmetrical). **Note:** The output phase loss detection time requires at least 2.5s. After phase loss, instability may occur, potentially leading to overcurrent, overvoltage, overload, or speed deviation fault being reported first.	● Check for loose or broken output cables. ● Check for sharp load fluctuation and motor 3PH resistance imbalance.
E16	Inverter module overheat	● Air duct is blocked or fan is damaged. ● Ambient temperature is too high. ● Long-time overload running.	● Ventilate the air duct or replace the fan. ● Keep good ventilation to lower ambient temperature. ● Select a VFD with larger power.
E17	External fault	● DI terminal external fault input signal acted.	● Check whether external device input is normal.
E18	Modbus/Modbus TCP communication fault	● Incorrect baud rate ● Communication line fault. ● Incorrect communication address. ● Communication suffers from strong interference.	● Set a proper baud rate. ● Check the communication port wiring. ● Set the communication address correctly. ● You are recommended to use shielded cables to improve anti-interference.
E19	Current detection fault	● Abnormal motor cable or motor insulation.	● Remove motor cables to check. ● Contact us.
E20	Motor autotuning fault	● Motor capacity does not match with the VFD capacity. This fault may occur if the capacity difference exceeds five power classes. ● Incorrect motor parameter setting. ● The parameters gained from autotuning deviate sharply from the standard parameters. ● Autotuning timeout. ● Pulse current setting is too large.	● Change the VFD model, or adopt V/F mode for control ● Check motor wiring, motor type, and parameter settings. ● Empty the motor load and re-perform autotuning. ● Check whether the upper limit frequency is larger than 2/3 of the rated frequency. ● Decrease the pulse current setting properly.
E21	EEPROM operation fault	● Error in reading or writing control parameters ● EEPROM damaged.	● Press STOP/RST to reset. ● Replace the control board.
E22	PID feedback offline.	● PID feedback offline. ● PID feedback source disappears.	● Check PID feedback signal wires. ● Check PID feedback source.
E23	Braking unit fault	● Braking circuit fault or braking pipe damage. ● External braking resistor with small resistance.	● Check the braking unit, and replace with new braking pipe ● Increase the braking resistance.
E24	Running time reached	● Actual VFD running time longer than internally set running time.	● Contact us.
E25	Electronic overload	● The VFD reports overload pre-alarm according to the setting.	● Check whether the overload pre-alarm point is set properly.
E27	Parameter upload error	● Keypad cable connected improperly or disconnected. ● Keypad cable too long, causing strong interference. ● Keypad or mainboard	● Check the keypad cable and re-plug to determine whether a fault occurs. ● Check the surroundings to rule out interference source ● Replace the hardware and seek maintenance services.

Fault code	Fault type	Possible cause	Solution
		communication circuit error	
E28	Parameter download error	● Keypad cable connected improperly or disconnected. ● Keypad cable too long, causing strong interference. ● Keypad data storage error	● Check the surroundings to rule out interference source ● Replace the hardware and seek maintenance services. ● Check whether the version of the control board software of keypad backup parameter copy is the same as the version of the control board software of the VFD.
E30	Ethernet communication fault	● No data transmission between the communication card and the host controller (or PLC).	● Check whether the communication card wiring is loose or disconnected.
E32	To-ground short-circuit fault	● The output of the VFD is short circuited to the ground. ● Current detection circuit fault.	● Check whether the motor is short circuited to the ground and wiring is normal. ● Check whether the motor wiring is normal. ● Replace the main control board.
E34	Speed deviation fault	● Load too heavy or stalled.	● Check for overload, increase speed deviation detection time, or prolong ACC/DEC time. ● Check motor parameter settings and re-perform motor parameter autotuning. ● Check speed loop control parameter settings.
E35	Mal-adjustment fault	● Load exception. ● Incorrect SM parameter settings. ● Autotuned motor parameters are inaccurate. ● The VFD is not connected to the motor. ● Flux weakening application.	● Check for overload or stalling. ● Check motor parameter and counter EMF settings. ● Re-perform motor parameter autotuning. ● Increase the maladjustment detection time. ● Adjust flux weakening coefficient and current loop parameters.
E36	Underload fault	● The VFD reports underload pre-alarm according to the setting.	● Check the load and overload pre-alarm threshold.
E40	Safe torque off	● Safe torque off function is enabled by external forces.	-
E41	Safety circuit exception of STO channel 1	● The wiring of STO is improper ● Fault occurred to external switch of STO. ● Channel safety circuit hardware fault.	● Check whether terminal wiring of STO is proper and firm enough. ● Check whether the external switch of STO can work properly ● Replace the control board. **Note:** Re-power on is required to clear the fault.
E42	Safety circuit exception of STO channel 2		
E43	Exception to both STO channel 1 and channel 2	● Hardware fault occurred to STO circuit.	● Replace the drive board.
E44	STO safety code FLASH CRC check fault	● Drive board fault.	● Replace the drive board.
E57	PROFINET communication timeout	● No data transmission between the communication card and the host controller (or PLC).	● Check whether the communication card wiring is loose or disconnected.
E59	Motor overtemperature fault	● Equipment or ambient temperature too high. ● AI/AO detected temperature inaccurate. ● DI4 input motor overtemperature signal.	● Lower the equipment or ambient temperature. ● Replace the temperature measuring resistor. ● Check the external temperature measuring terminal signal.
E60	Communication card identifying failure	● There is data transmission in communication card interface, but the card type cannot be identified.	● Check whether the expansion card in the slot is supported. ● Stabilize the expansion card interface after power-off, and check whether the fault persists at next power-on. ● Check whether the insertion port or card slot is damaged. If yes, replace the insertion port or card slot after power-off.
E63	Communication card communication timeout fault	● No data transmission in the communication card interface.	
E66	EtherCAT communication timeout	● No data transmission between the communication card and the host controller (or PLC).	● Check whether the communication card wiring is loose or disconnected.
E92	AI1 disconnection	● AI1 input too low. ● AI1 wiring disconnected.	● Connect a 5V or 10mA power source to check whether the input is normal. ● Check the wiring or replace the cable.
E93	AI2 disconnection	● AI2 input too low. ● AI2 wiring disconnected.	
E94	AI3 disconnection	● AI3 input too low. ● AI3 wiring disconnected.	
E95	EtherNet IP communication timeout fault	● No data transmission between the communication card and the host controller (or PLC).	● Check whether the communication card wiring is loose or disconnected.
E96	No upgrade bootloader	● Upgrade bootloader missing.	● Contact us.
E587	Dual CPU communication fault 1	● Dual CPU communication fault.	● Contact us.

Fault code	Fault type	Possible cause	Solution
E588	Dual CPU communication fault 2		

8 Product dimensions

Figure 8-1 Dimensions and hole positions for VFDs in frames A and B

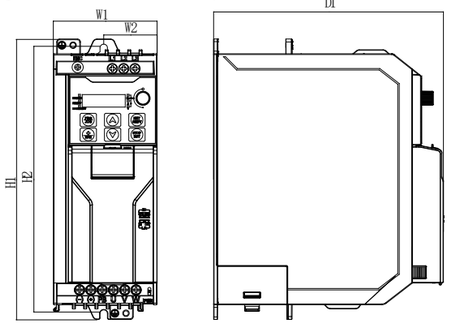


Table 8-1 Dimensions and hole positions for VFDs in frames A and B

Product model	Frame	Outline dimensions (mm)			Mounting hole distance (mm)		Mounting hole diameter (mm)
		W1	H1	D1	W2	H2	
AS240DRV20C2	A	60	190	155	36	180	Ø5
AS240DRV20C4		60	190	155	36	180	Ø5
AS240DRV20C7		60	190	155	36	180	Ø5
AS240DRV40C4		60	190	155	36	180	Ø5
AS240DRV40C7		60	190	155	36	180	Ø5
AS240DRV41C1		60	190	155	36	180	Ø5
AS240DRV21C1	B	70	190	155	36	180	Ø5
AS240DRV21C5		70	190	155	36	180	Ø5
AS240DRV22C2		70	190	155	36	180	Ø5
AS240DRV41C5		70	190	155	36	180	Ø5
AS240DRV42C2		70	190	155	36	180	Ø5
AS240DRV43C0		70	190	155	36	180	Ø5
AS240DRV44C0		70	190	155	36	180	Ø5

Figure 8-2 Dimensions and hole positions for VFDs in frame C

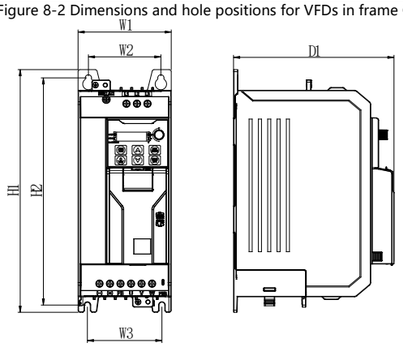


Table 8-2 Dimensions and hole positions for VFDs in frame C

Product model	Frame	Outline dimensions (mm)			Mounting hole distance (mm)			Mounting hole diameter (mm)
		W1	H1	D1	W2	W3	H2	
AS240DRV24C0	C	90	235	155	70	72	220	Ø6
AS240DRV45C5	C	90	235	155	70	72	220	Ø6
AS240DRV47C5	C	90	235	155	70	72	220	Ø6

Figure 8-3 Dimensions and hole positions for VFDs in frame D

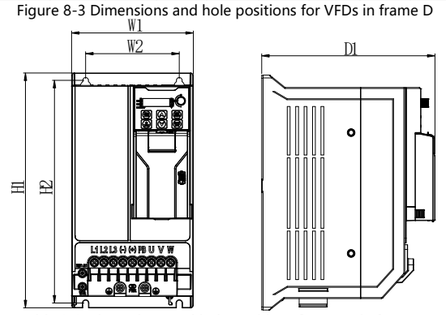


Table 8-3 Dimensions and hole positions for VFDs in frame D

Product model	Frame	Outline dimensions (mm)			Mounting hole distance (mm)		Mounting hole diameter (mm)
		W1	H1	D1	W2	H2	
AS240DRV4011	D	130	250	185	100	237	Ø6
AS240DRV4015		130	250	185	100	237	Ø6

Figure 8-4 Dimensions and hole positions for VFDs in frame E

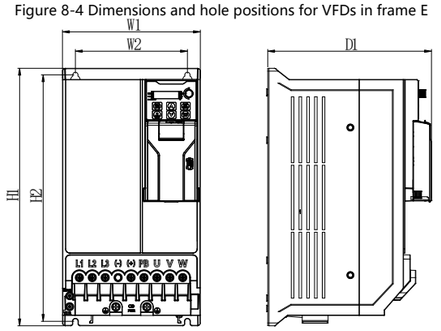


Table 8-4 Dimensions and hole positions for VFDs in frame E

Product model	Frame	Outline dimensions (mm)			Mounting hole distance (mm)		Mounting hole diameter (mm)
		W1	H1	D1	W2	H2	
AS240DRV4018	E	160	300	190	130	287	Ø6
AS240DRV4022		160	300	190	130	287	Ø6

Appendix A Energy efficiency data

Table A-1 Power loss and IE class

Product model	Relative loss (%)								Standby loss (W)	IE class
	(0;25)	(0;50)	(0;100)	(50;25)	(50;50)	(50;100)	(90;50)	(90;100)		
AS240DRV20C2	2.45	2.78	2.98	2.8	3.01	3.26	3.08	3.29	7	IE2
AS240DRV20C4	1.96	2.24	2.54	2.05	2.4	2.65	2.52	2.81	7	IE2
AS240DRV20C7	1.48	1.68	1.84	1.54	1.84	2.54	1.93	2.71	7	IE2
AS240DRV21C1	1.39	1.61	2.21	1.68	1.9	2.55	2.03	2.71	7	IE2
AS240DRV21C5	1.41	1.44	1.91	1.69	1.91	2.35	1.92	2.59	7	IE2
AS240DRV22C2	1.2	1.42	2.02	1.38	1.68	2.41	1.75	2.95	7	IE2
AS240DRV24C0	1.33	1.65	2.34	1.47	1.84	2.74	2.04	3.09	11	IE2
AS240DRV40C4	2.13	2.28	2.59	2.2	2.54	2.81	2.54	2.94	9	IE2
AS240DRV40C7	1.41	1.64	2.11	1.67	1.86	2.29	1.92	2.43	9	IE2
AS240DRV41C1	1.45	1.61	1.83	1.64	1.94	2.16	2.03	2.29	9	IE2
AS240DRV41C5	1.25	1.34	1.52	1.41	1.63	2.01	1.62	2.15	9	IE2
AS240DRV42C2	1.27	1.29	1.61	1.56	1.77	2.12	1.61	2.23	9	IE2
AS240DRV43C0	1.19	1.27	1.55	1.48	1.65	2.01	1.59	2.11	9	IE2
AS240DRV44C0	1.11	1.21	1.46	1.34	1.62	1.83	1.54	2.35	9	IE2
AS240DRV45C5	1.22	1.37	1.56	1.46	1.77	2.12	1.77	2.26	11	IE2
AS240DRV47C5	0.76	0.96	1.54	0.98	1.17	1.91	1.22	2.04	11	IE2
AS240DRV4011	0.79	0.89	1.79	0.78	0.9	1.77	0.93	1.8	20	IE2
AS240DRV4015	0.7	1.01	1.98	0.74	1.02	1.87	1.17	2.23	20	IE2
AS240DRV4018	0.53	0.76	1.23	0.56	0.86	1.73	0.86	2.01	20	IE2
AS240DRV4022	0.63	0.71	1.38	0.6	0.9	1.73	1.02	1.95	20	IE2

Table A-2 Rated specifications (in heavy/light load)

Product model	Heavy load				Light load				Rated power Frequency (Hz)	Rated power voltage (V)
	Apparent power (kVA)	Motor power (kW)	Output current (A)	Max. working temperature (°C)	Apparent power (kVA)	Motor power (kW)	Output current (A)	Max. working temperature (°C)		
AS240DRV20C2	0.7	0.2	1.5	50°C	0.94	0.4	2	40°C	50Hz or 60Hz, Allowed range: 47–63Hz	AC 1PH 220V–240V
AS240DRV20C4	1.15	0.4	2.5	50°C	1.52	0.75	3.3	40°C		
AS240DRV20C7	1.88	0.75	4.2	50°C	2.26	1.1	5.1	40°C		
AS240DRV21C1	2.28	1.1	6.5	50°C	2.85	1.5	7.5	40°C		
AS240DRV21C5	3.35	1.5	7.5	50°C	4.37	2.2	9.8	40°C		
AS240DRV22C2	4.35	2.2	10	50°C	5.44	4	12.5	40°C		
AS240DRV24C0	6	4	16	50°C	-	-	-	40°C		
AS240DRV40C4	1.26	0.4	1.5	50°C	1.66	0.75	2	40°C		AC 3PH 380–480V
AS240DRV40C7	2.1	0.75	2.5	50°C	2.73	1.1	3.3	40°C		
AS240DRV41C1	2.41	1.1	3	50°C	2.94	1.5	3.7	40°C		
AS240DRV41C5	3.56	1.5	4.2	50°C	4.66	2.2	5.5	40°C		
AS240DRV42C2	4.53	2.2	5.5	50°C	5.76	3	7	40°C		
AS240DRV43C0	6.17	3	7.5	50°C	7.82	4	9.5	40°C		
AS240DRV44C0	7.67	4	9.5	50°C	9.28	5.5	11.5	40°C		
AS240DRV45C5	9.21	5.5	14	50°C	11.84	7.5	18	40°C		
AS240DRV47C5	12.96	7.5	18.5	50°C	13.49	11	21	40°C		
AS240DRV4011	19.97	11	25	50°C	25.56	15	32	40°C		
AS240DRV4015	29.15	15	32	50°C	34.6	18	38	40°C		
AS240DRV4018	25.2	18	38	50°C	29.6	22	45	40°C		
AS240DRV4022	25	22	45	50°C	38.17	30	58	40°C		