Quick Start Guide

Refer to VXG Manual for full data. Available to download from www.imopc.com.

IMO Jaguar VXG

⚠CAUTION

Thank you for purchasing our Jaguar VXG series of inverters.

- This product is designed to drive a three-phase induction motor. Read through this quick reference guide and be familiar with the handling procedure for correct use.
- Improper handling might result in incorrect operation, a short life, or even a failure of this product as well as the motor.
- Deliver this manual to the end user of this product. Keep this manual in a safe place until this product is discarded.
- For how to use an optional device, refer to the instruction and installation manuals for that optional device.

IMO Precision Controls Ltd. **VXG-QSG10/1**

Preface

Thank you for purchasing our JAGUAR VXG series of inverters.

This product is designed to drive a three-phase induction motor. Read through this instruction manual and be familiar with proper handling and operation of this product.

Improper handling might result in incorrect operation, a short life, or even a failure of this product as well as the motor.

This instruction manual has been prepared for the inverter versions to be destined for the EU.

Have this manual delivered to the end user of this product. Keep this manual in a safe place until this product is discarded.

Listed below are the other materials related to the use of the JAGUAR VXG. Read them in conjunction with this manual as necessary.

- JAGUAR VXG User's Manual
- RS-485 Communication User's Manual

These materials are subject to change without notice. Be sure to obtain the latest editions for use.

■ Safety precautions

Read this manual thoroughly before proceeding with installation, connections (wiring), operation, or maintenance and inspection. Ensure you have sound knowledge of the device and familiarize yourself with all safety information and precautions before proceeding to operate the inverter.

Safety precautions are classified into the following two categories in this manual.

⚠WARNING	Failure to heed the information indicated by this symbol may lead to dangerous conditions, possibly resulting in death or serious bodily injuries.
⚠CAUTION	Failure to heed the information indicated by this symbol may lead to dangerous conditions, possibly resulting in minor or light bodily injuries and/or substantial property damage.

Failure to heed the information contained under the CAUTION title can also result in serious consequences. These safety precautions are of utmost importance and must be observed at all times.

Application

⚠WARNING

- The JAGUAR VXG is designed to drive a three-phase induction motor. Do not use it for single-phase motors or for other purposes.

  Fire or an accident could occur.

- The JAGUAR VXG may not be used for a life-support system or other purposes directly related to the human safety.
- Though the JAGUAR VXG is manufactured under strict quality control, install safety devices for applications where serious accidents or property damages are foreseen in relation to the failure of it.

  An accident could occur.

Installation

⚠WARNING

- Install the inverter on a base made of metal or other non-flammable material.

  Otherwise, a fire could occur.

- Do not place flammable object nearby.

  Doing so could cause fire.

- Inverters with a capacity of 30 kW or above, whose protective structure is IP00, involve a possibility that a human body may touch the live conductors of the main circuit terminal block. Inverters to which an optional DC reactor is connected also involve the same. Install such inverters in an inaccessible place.

  Otherwise, electric shock or injuries could occur.

⚠CAUTION

- Do not support the inverter by its front cover during transportation.

  Doing so could cause a drop of the inverter and injuries.

- Prevent lint, paper fibers, sawdust, dust, metallic chips, or other foreign materials from getting into the inverter or from accumulating on the heat sink.
- When changing the positions of the top and bottom mounting bases, use only the specified screws.

  Otherwise, a fire or an accident might result.

- Do not install or operate an inverter that is damaged or lacking parts.

  Doing so could cause fire, an accident or injuries.

Wiring

⚠WARNING

- If no zero-phase current (earth leakage current) detective device such as a ground-fault relay is installed in the upstream power supply line in order to avoid the entire power supply system's shutdown undesirable to factory operation, install a residual-current-operated protective device (RCD)/earth leakage circuit breaker (ELCB) individually to inverters to break the individual inverter power supply lines only.

  Otherwise, a fire could occur.

- When wiring the inverter to the power source, insert a recommended molded case circuit breaker (MCCB) or residual-current-operated protective device (RCD)/earth leakage circuit breaker (ELCB) (with overcurrent protection) in the path of each pair of power lines to inverters. Use the recommended devices within the recommended current capacity.
- Use wires in the specified size.
- Tighten terminals with specified torque.

  Otherwise, a fire could occur.

- When there is more than one combination of an inverter and motor, do not use a multicore cable for the purpose of handling their wirings together.
- Do not connect a surge killer to the inverter's output (secondary) circuit.

  Doing so could cause a fire.

- Be sure to connect an optional DC reactor (DCR) when the capacity of the power supply transformer exceeds 500 kVA and is 10 times or more the inverter rated capacity.

  Otherwise, a fire could occur.

- Ground the inverter in compliance with the national or local electric code.
- Be sure to ground the inverter's grounding terminals ⏚G.

  Otherwise, an electric shock or a fire could occur.

- Qualified electricians should carry out wiring.
- Be sure to perform wiring after turning the power OFF.

  Otherwise, an electric shock could occur.

- Be sure to perform wiring after installing the inverter unit.

  Otherwise, an electric shock or injuries could occur.

- Ensure that the number of input phases and the rated voltage of the product match the number of phases and the voltage of the AC power supply to which the product is to be connected.

  Otherwise, a fire or an accident could occur.

- Do not connect the power supply wires to output terminals (U, V, and W).
- When connecting a DC braking resistor (DBR), never connect it to terminals other than terminals P(+) and DB.

  Doing so could cause fire or an accident.

- In general, sheaths of the control signal wires are not specifically designed to withstand a high voltage (i.e., reinforced insulation is not applied). Therefore, if a control signal wire comes into direct contact with a live conductor of the main circuit, the insulation of the sheath might break down, which would expose the signal wire to a high voltage of the main circuit. Make sure that the control signal wires will not come into contact with live conductors of the main circuit.

  Doing so could cause an accident or an electric shock.

⚠WARNING⚠

- Before changing the switches or touching the control circuit terminal symbol plate, **turn OFF the power and wait at least five minutes for inverters with a capacity of 22 kW or below, or at least ten minutes for inverters with a capacity of 30 kW or above**. Make sure that the LED monitor and charging lamp are turned OFF. Further, make sure, using a multimeter or a similar instrument, that the DC link bus voltage between the terminals P(+) and N(-) has dropped to the safe level (+25 VDC or below).

  Otherwise, an electric shock could occur.

⚠CAUTION

- The inverter, motor and wiring generate electric noise. Be careful about malfunction of the nearby sensors and devices. To prevent them from malfunctioning, implement noise control measures.

  Otherwise an accident could occur.

- The leakage current of the EMC filter built-in type of inverters is comparatively large. Be sure to perform protective grounding.

  Otherwise, an electric shock could occur.

Operation

⚠WARNING

- Be sure to mount the front cover before turning the power ON. Do not remove the cover when the inverter power is ON.
  Otherwise, an electric shock could occur.
- Do not operate switches with wet hands.
  Doing so could cause electric shock.
- If the auto-reset function has been selected, the inverter may automatically restart and drive the motor depending on the cause of tripping. Design the machinery or equipment so that human safety is ensured at the time of restarting.
  Otherwise, an accident could occur.
- If the stall prevention function (current limiter), automatic deceleration (anti-regenerative control), or overload prevention control has been selected, the inverter may operate with acceleration/deceleration or frequency different from the commanded ones. Design the machine so that safety is ensured even in such cases.
- The STOP key on the keypad is effective only when the keypad operation is enabled with function code F02 (= 0, 2 or 3). When the keypad operation is disabled, prepare an emergency stop switch separately for safe operations.
  Switching the run command source from keypad (local) to external equipment (remote) by turning ON the "Enable communications link" command ***LE*** disables the STOP key. To enable the STOP key for an emergency stop, select the STOP key priority with function code H96 (= 1 or 3).
- If any of the protective functions have been activated, first remove the cause. Then, after checking that the all run commands are set to OFF, release the alarm. If the alarm is released while any run commands are set to ON, the inverter may supply the power to the motor, running the motor.
  Otherwise, an accident could occur.
- If you enable the "Restart mode after momentary power failure" (Function code F14 = 3 to 5), then the inverter automatically restarts running the motor when the power is recovered.
  Design the machinery or equipment so that human safety is ensured after restarting.
- If the user configures the function codes wrongly without completely understanding this Instruction Manual and the JAGUAR VXG User's Manual, the motor may rotate with a torque or at a speed not permitted for the machine.
  An accident or injuries could occur.
- Even if the inverter has interrupted power to the motor, if the voltage is applied to the main circuit input terminals L1/R, L2/S and L3/T, voltage may be output to inverter output terminals U, V, and W.
- Even if the run command is set to OFF, voltage is output to inverter output terminals U, V, and W if the servo-lock command is ON.
- Even if the motor is stopped due to DC braking or preliminary excitation, voltage is output to inverter output terminals U, V, and W.
  An electric shock may occur.
- The inverter can easily accept high-speed operation. When changing the speed setting, carefully check the specifications of motors or equipment beforehand.
  Otherwise, injuries could occur.

⚠CAUTION

- Do not touch the heat sink and braking resistor because they become very hot.
  Doing so could cause burns.
- The DC brake function of the inverter does not provide any holding mechanism.
  Injuries could occur.
- Ensure safety before modifying the function code settings.
  Run commands (e.g., "Run forward" ***FWD***), stop commands (e.g., "Coast to a stop" ***BX***), and frequency change commands can be assigned to digital input terminals. Depending upon the assignment states of those terminals, modifying the function code setting may cause a sudden motor start or an abrupt change in speed.
- When the inverter is controlled with the digital input signals, switching run or frequency command sources with the related terminal commands (e.g., ***SS1***, ***SS2***, ***SS4***, ***SS8***, ***Hz2/Hz1***, ***Hz/PID***, ***IVS***, and ***LE***) may cause a sudden motor start or an abrupt change in speed.
- Ensure safety before modifying customizable logic related function code settings (U codes and related function codes) or turning ON the "Cancel customizable logic" terminal command ***CLC***. Depending upon the settings, such modification or cancellation of the customizable logic may change the operation sequence to cause a sudden motor start or an unexpected motor operation.
  An accident or injuries could occur.

Maintenance and inspection, and parts replacement

⚠WARNING⚠

- Before proceeding to the maintenance/inspection jobs, **turn OFF the power and wait at least five minutes for inverters with a capacity of 22 kW or below, or at least ten minutes for inverters with a capacity of 30 kW or above**. Make sure that the LED monitor and charging lamp are turned OFF. Further, make sure, using a multimeter or a similar instrument, that the DC link bus voltage between the terminals P(+) and N(-) has dropped to the safe level (+25 VDC or below).

  Otherwise, an electric shock could occur.

- Maintenance, inspection, and parts replacement should be made only by qualified persons.
- Take off the watch, rings and other metallic objects before starting work.
- Use insulated tools.

  Otherwise, an electric shock or injuries could occur.

- Never modify the inverter.

  Doing so could cause an electric shock or injuries.

Disposal

⚠CAUTION

- Treat the inverter as an industrial waste when disposing of it.

  Otherwise injuries could occur.

GENERAL PRECAUTIONS

Drawings in this manual may be illustrated without covers or safety shields for explanation of detail parts. Restore the covers and shields in the original state and observe the description in the manual before starting operation.

Icons

The following icons are used throughout this manual.

Note This icon indicates information which, if not heeded, can result in the inverter not operating to full efficiency, as well as information concerning incorrect operations and settings which can result in accidents.

Tip This icon indicates information that can prove handy when performing certain settings or operations.

This icon indicates a reference to more detailed information.

BEFORE USING THE INVERTER

Acceptance Inspection

Unpack the package and check the following:

(1) An inverter and instruction manual (this book) are contained in the package.

Note
- The inverter is not equipped with a keypad when it is shipped. Mount a separately ordered keypad on the inverter. This manual describes the inverter with a remote keypad. For inverters with a multi-function keypad, read the Multi-function Keypad Instruction Manual in conjunction with this manual.
- Inverters with a capacity of 55 kW in VT mode and inverters with 75 kW or above require a DC reactor (DCR) to be connected. Be sure to connect a separately ordered DCR to those inverters.

(2) The inverter has not been damaged during transportation—there should be no dents or parts missing.

(3) The inverter is the type you ordered. You can check the type and specifications on the main nameplate. (Main and sub nameplates are attached to the inverter and are located as shown on the next page.) For inverters with a capacity of 30 kW or above, the mass is printed on the main nameplate.

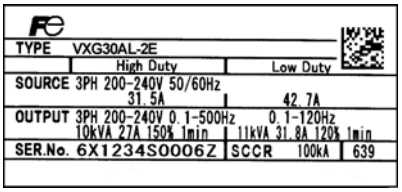
Jaguar **VXG** **60AL** - **4** **E**

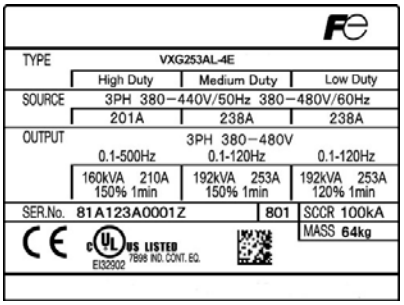
CT rating	VT rating	60AL
0.4kW	-	1A5
0.75kW	-	2A5
1.5kW	-	4A
2.2kW	-	5.5A
4.0kW	-	9A
5.5kW	7.5kW	16A5L
7.5kW	11kW	23AL
11kW	15kW	30A5L
15kW	18.5kW	37AL
18.5kW	22kW	45AL
22kW	30kW	60AL
30kW	37kW	75AL
37kW	45kW	91AL
45kW	55kW	112AL
55kW	75kW	150AL
75kW	90kW	176AL
90kW	110kW	210AL
110kW	132kW	253AL
132kW	160kW	304AL
160kW	200kW	377AL
200kW	220kW	415AL
220kW	280kW	520AL
280kW	315kW	650AL
315kW	355kW	740AL
355kW	400kW	840AL
400kW	500kW	960AL
500kW	630kW	1170AL
630W	710kW	1370AL

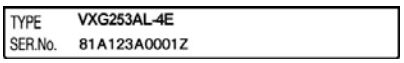
E Integrated EMC filter

2 Input voltage 200v/3ph

4 Input voltage 400v/3ph







Note In tables given in this manual, inverter types are denoted as "VXG"

The JAGUAR VXG is available in two or three drive modes depending upon the inverter capacity: Constant Torque (CT) and Variable Torque (VT) modes or Constant Torque (CT), Medium Torque (MT) and Variable Torque (VT) modes. One of these modes should be selected to match the load property of your system. Specifications in each mode are printed on the main nameplate. For details, see Chapter 8 "SPECIFICATIONS."

Constant Torque: CT mode designed for heavy duty load applications. Overload capability: 150% for 1 min, 200% for 3 s. Continuous ratings = Inverter ratings

Medium Torque: MT mode designed for medium duty load applications. Overload capability: 150% for 1 min. Continuous ratings = One rank higher capacity of inverters

Variable Torque: VT mode designed for light duty load applications. Overload capability: 120% for 1 min. Continuous ratings = One rank or two ranks higher capacity of inverters

SOURCE: Number of input phases (three-phase: 3PH), input voltage, input frequency, input current (each for CT, MT and VT modes)

OUTPUT: Number of output phases, rated output voltage, output frequency range, rated output capacity, rated output current, overload capability (each for CT, MT and VT modes)

SCCR: Short-circuit capacity

MASS: Mass of the inverter in kilogram (30 kW or above)

SER. No.: Product number

8 1 A 1 2 3 A 0 0 0 1 Z

- Serial number of production lot
- Production month
  1 to 9: January to September
  X, Y, or Z: October, November, or December
- Production year: Last digit of year

If you suspect the product is not working properly or if you have any questions about your product, contact your IMO representative.

SPECIFICATIONS

Standard Model (EMC Filter Built-in Type)

Three-phase 200 V class series

CT (High Duty)-mode inverters for heavy load

Item		Specifications																
Type (VXG*****-2)		3A	5A	8A	11A	18A	30AL	46AL	59AL	74AL	88AL	115AL	146AL	180AL	215AL	283AL	350AL	400AL
Nominal applied motor (kW) *1 (Output rating)		0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
Output ratings	Rated capacity (kVA) *2	1.1	1.9	3.0	4.2	6.8	10	14	18	24	28	34	45	55	68	81	107	131
	Rated voltage (V) *3	Three-phase 200 to 240 V (with AVR function)											Three-phase 200 to 230 V (with AVR function)					
	Rated current (A) *4	3	5	8	11	18	27	37	49	63	76	90	119	146	180	215	283	346
	Overload capability	150%-1 min, 200%-3.0 s																
Input power	Voltage, frequency	200 to 240 V, 50/60 Hz											200 to 220 V, 50 Hz, 200 to 230 V, 60 Hz					
	Allowable voltage/frequency	Voltage: +10 to -15% (Interphase voltage unbalance: 2% or less) *5, Frequency: +5 to -5%																
	Required capacity (with DCR) (kVA) *6	0.6	1.2	2.2	3.1	5.2	7.4	10	15	20	25	30	40	48	58	71	98	116
Braking	Torque (%) *7	150%		100%					20%				10 to 15%					
	Braking transistor	Built-in											–					
	Built-in braking resistor	5 s							–									
	Braking time (s)																	
	Duty cycle (%ED)	5	3	5	3	2	3	2	–									
EMC filter		Compliant with EMC Directives, Emission and Immunity: Category C3 (2nd Env.) (EN61800-3:2004)																
DC reactor (DCR) *8		Option																
Applicable safety standards		UL508C, C22.2No.14, EN61800-5-1:2003, EN954-1 Cat.3																
Enclosure (IEC60529)		IP20, UL open type											IP00, UL open type					
Cooling method		Natural cooling			Fan cooling													
Weight / Mass (kg)		1.8	2.1	3.0	3.1	3.2	6.7	7.0	6.4	10.9	10.9	11.0	25	32	42	43	62	105

VT (Low Duty)-mode inverters for light load

Item		Specifications																
Type (VXG*****-2)		3A	5A	8A	11A	18A	30AL	46AL	59AL	74AL	88AL	115AL	146AL	180AL	215AL	283AL	350AL	400AL
Nominal applied motor (kW) *1 (Output rating)		–					7.5	11	15	18.5	22	30	37	45	55	75	90	110
Output ratings	Rated capacity (kVA) *2	–					11	16	20	25	30	43	55	68	81	107	131	158
	Rated voltage (V) *3	–					Three-phase 200 to 240 V (with AVR function)						Three-phase 200 to 230 V (with AVR function)					
	Rated current (A) *4	–					31.8 (29)	46.2 (42)	59.4 (55)	74.8 (68)	88 (80)	115 (107)	146	180	215	283	346	415
	Overload capability	–					120%-1 min											
Input power	Voltage, frequency	–					200 to 240 V, 50/60 Hz						200 to 220 V, 50 Hz, 200 to 230 V, 60 Hz					
	Allowable voltage/frequency	–					Voltage: +10 to -15% (Interphase voltage unbalance: 2% or less) *5, Frequency: +5 to -5%											
	Required capacity (with DCR) (kVA) *6	–					10	15	20	25	30	40	48	58	71	98	116	143
Braking	Torque (%) *7	–					70%		15%				7 to 12%					
	Braking transistor	–					Built-in						–					
	Built-in braking resistor	–					3.7 s	3.4 s	–									
	Braking time (s)																	
	Duty cycle (%ED)	–					2.2	1.4	–									
EMC filter		Compliant with EMC Directives, Emission and Immunity: Category C3 (2nd Env.) (EN61800-3:2004)																
DC reactor (DCR) *8		–					Option											
Applicable safety standards		–					UL508C, C22.2No.14, EN61800-5-1:2003, EN954-1 Cat.3											
Enclosure (IEC60529)		–					IP20, UL open type						IP00, UL open type					
Cooling method		–					Fan cooling											
Weight / Mass (kg)		–					6.7	7.0	6.4	10.9	10.9	11.0	25	32	42	43	62	105

*1 4-pole standard motor

*2 Rated capacity is calculated assuming the rated output voltage as 220 V for 200 V class series and 440 V for 400 V class series.

*3 Output voltage cannot exceed the power supply voltage.

*4 To use the inverter with the carrier frequency of 3 kHz or more at the surrounding temperature of 40°C or higher, manage the load so that the current comes to be within the rated ones enclosed in parentheses ( ) in continuous running.

*5 $\text{Voltage unbalance (\%)} = \dfrac{\text{Max. voltage (V)} - \text{Min. voltage (V)}}{\text{Three-phase average voltage (V)}} \times 67 \text{ (IEC 61800-3)}$

If this value is 2 to 3%, use an optional AC reactor (ACR).

*6 Required when a DC reactor (DCR) is used.

*7 Average braking torque for the motor running alone. (It varies with the efficiency of the motor.)

*8 A DC reactor (DCR) is optionally provided. Note that inverters with a capacity of 55 kW in VT mode and inverters with 75 kW or above in all modes require a DCR to be connected. Be sure to connect it to those inverters.

Three-phase 400 V class series

CT (High Duty)-mode inverters for heavy load (0.4 to 75 kW)

Item		Specifications															
Type (VXG*****-4E)		1A5	2A5	4A	5.5A	9A	16A5L	23AL	30A5L	37AL	45AL	60AL	75AL	91AL	112AL	150AL	176AL
Nominal applied motor (kW) *2 (Output rating)		0.4	0.75	1.5	2.2	3.7 (4.0)*1	5.5	7.5	11	15	18.5	22	30	37	45	55	75
Output ratings	Rated capacity (kVA) *3	1.1	1.9	2.8	4.1	6.8	10	14	18	24	29	34	45	57	69	85	114
	Rated voltage (V) *4	Three-phase 380 to 480 V (with AVR function)															
	Rated current (A)	1.5	2.5	4.0	5.5	9.0	13.5	18.5	24.5	32	39	45	60	75	91	112	150
	Overload capability	150%-1 min, 200%-3.0 s															
Input power	Voltage, frequency	380 to 480 V, 50/60 Hz															*5
	Allowable voltage/frequency	Voltage: +10 to -15% (Interphase voltage unbalance: 2% or less) *6, Frequency: +5 to -5%															
	Required capacity (with DCR) (kVA) *7	0.6	1.2	2.1	3.2	5.2	7.4	10	15	20	25	30	40	48	58	71	96
Braking	Torque (%) *8	150%			100%				20%				10 to 15%				
	Braking transistor	Built-in											–				
	Built-in braking resistor	5 s							–								
	Braking time (s)																
	Duty cycle (%ED)	5	3	5	3	2	3	2	–								
EMC filter		Compliant with EMC Directives, Emission and Immunity: Category C3 (2nd Env.) (EN61800-3:2004)															
DC reactor (DCR) *9		Option															
Applicable safety standards		UL508C, C22.2No.14, EN61800-5-1:2003, EN954-1 Cat.3															
Enclosure (IEC60529)		IP20, UL open type											IP00, UL open type				
Cooling method		Natural cooling			Fan cooling												
Weight / Mass (kg)		1.8	2.1	2.7	2.9	3.2	6.8	6.9	6.2	10.5	10.5	11.2	26	27	32	33	42

(90 to 630 kW)

Item		Specifications															
Type (VXG*****-4E)		210AL	253AL	304AL	377AL	415AL	520AL	650AL	740AL	840AL	960AL	1170AL	1370AL				
Nominal applied motor (kW) *2 (Output rating)		90	110	132	160	200	220	280	315	355	400	500	630				
Output ratings	Rated capacity (kVA) *3	134	160	192	231	287	316	396	445	495	563	731	891				
	Rated voltage (V) *4	Three-phase 380 to 480 V (with AVR function)															
	Rated current (A)	176	210	253	304	377	415	520	585	650	740	960	1170				
	Overload capability	150%-1 min, 200%-3.0 s															
Input power	Voltage, frequency	380 to 440 V, 50 Hz 380 to 480 V, 60 Hz															
	Allowable voltage/frequency	Voltage: +10 to -15% (Interphase voltage unbalance: 2% or less) *6, Frequency: +5 to -5%															
	Required capacity (with DCR) (kVA) *7	114	140	165	199	248	271	347	388	436	489	611	773				
Braking	Torque (%) *8	10 to 15%															
	Braking transistor	–															
	Built-in braking resistor	–															
	Braking time (s)																
	Duty cycle (%ED)	–															
EMC filter		Compliant with EMC Directives, Emission and Immunity: Category C3 (2nd Env.) (EN61800-3:2004)															
DC reactor (DCR) *9		Option															
Applicable safety standards		UL508C, C22.2No.14, EN61800-5-1:2003, EN954-1 Cat.3															
Enclosure (IEC60529)		IP00, UL open type															
Cooling method		Fan cooling															
Weight / Mass (kg)		62	64	94	98	129	140	245	245	330	330	530	530				

*2 4-pole standard motor

*3 Rated capacity is calculated assuming the rated output voltage as 220 V for 200 V class series and 440 V for 400 V class series.

*4 Output voltage cannot exceed the power supply voltage.

*5 380 to 440 V, 50 Hz; 380 to 480 V, 60 Hz

*6 $\text{Voltage unbalance (\%)} = \dfrac{\text{Max. voltage (V) - Min. voltage (V)}}{\text{Three-phase average voltage (V)}} \times 67$ (IEC 61800-3)

If this value is 2 to 3%, use an optional AC reactor (ACR).

*7 Required when a DC reactor (DCR) is used.

*8 Average braking torque for the motor running alone. (It varies with the efficiency of the motor.)

*9 A DC reactor (DCR) is optionally provided. Note that inverters with a capacity of 55 kW in VT mode and inverters with 75 kW or above in all modes require a DCR to be connected. Be sure to connect it to those inverters.

VT (Low Duty)-mode inverters for light load (5.5 to 75 kW)

Item		Specifications															
Type (VXG*****-4E)		1A5	2A5	4A	5.5A	9A	16A5L	23AL	30A5L	37AL	45AL	60AL	75AL	91AL	112AL	150AL	176AL
Nominal applied motor (kW) (Output rating) *1		–					7.5	11	15	18.5	22	30	37	45	55	75	90
Output ratings	Rated capacity (kVA) *2	–					12	17	22	28	33	45	57	69	85	114	134
	Rated voltage (V) *3	–					Three-phase 380 to 480 V (with AVR function)										
	Rated current (A)	–					16.5	23	30.5	37	45	60	75	91	112	150	176
	Overload capability	–					120%-1 min										
Input power	Voltage, frequency	–					380 to 480 V, 50/60 Hz										*4
	Allowable voltage/frequency	–					Voltage: +10 to -15% (Interphase voltage unbalance: 2% or less) *5, Frequency: +5 to -5%										
	Required capacity (with DCR) (kVA)] *6	–					10	15	20	25	30	40	48	58	71	96	114
Braking	Torque (%) *7	–					70%		15%				7 to 12%				
	Braking transistor	–					Built-in						–				
	Built-in braking resistor	–					3.7 s	3.4 s	–								
	Braking time (s)																
	Duty cycle (%ED)	–					2.2	1.4	–								
EMC filter		–					Compliant with EMC Directives, Emission and Immunity: Category C3 (2nd Env.) (EN61800-3:2004)										
DC reactor (DCR) *8		–					Option										
Applicable safety standards		–					UL508C, C22.2No.14, EN61800-5-1:2003, EN954-1 Cat.3										
Enclosure (IEC60529)		–					IP20, UL open type						IP00, UL open type				
Cooling method		–					Fan cooling										
Weight / Mass (kg)		–					6.8	6.9	6.2	10.5	10.5	11.2	26	27	32	33	42

(90 to 630 kW)

Item		Specifications															
Type (VXG*****-4E)		210AL	253AL	304AL	377AL	415AL	520AL	650AL	740AL	840AL	960AL	1170AL	1370AL				
Nominal applied motor (kW) (Output rating) *1		110	132	160	200	220	280	355	400	450	500	630	710				
Output ratings	Rated capacity (kVA) *2	160	192	231	287	316	396	495	563	640	731	891	1044				
	Rated voltage (V) *3	Three-phase 380 to 480 V (with AVR function)															
	Rated current (A)	210	253	304	377	415	520	650	740	840	960	1170	1370				
	Overload capability	120%-1 min															
Input power	Voltage, frequency	380 to 440 V, 50 Hz 380 to 480 V, 60 Hz															
	Allowable voltage/frequency	Voltage: +10 to -15% (Interphase voltage unbalance: 2% or less) *5, Frequency: +5 to -5%															
	Required capacity (with DCR) (kVA) *6	140	165	199	248	271	347	436	489	547	611	773	871				
Braking	Torque (%) *7	7 to 12%															
	Braking transistor	–															
	Built-in braking resistor	–															
	Braking time (s)																
	Duty cycle (%ED)	–															
EMC filter		Compliant with EMC Directives, Emission and Immunity: Category C3 (2nd Env.) (EN61800-3:2004)															
DC reactor (DCR) *8		Option															
Applicable safety standards		UL508C, C22.2No.14, EN61800-5-1:2003, EN954-1 Cat.3															
Enclosure (IEC60529)		IP00, UL open type															
Cooling method		Fan cooling															
Weight / Mass (kg)		62	64	94	98	129	140	245	245	330	330	530	530				

*1 4-pole standard motor

*2 Rated capacity is calculated assuming the rated output voltage as 220 V for 200 V class series and 440 V for 400 V class series.

*3 Output voltage cannot exceed the power supply voltage.

*4 380 to 440 V, 50 Hz; 380 to 480 V, 60 Hz

*5 $\text{Voltage unbalance (\%)} = \frac{\text{Max. voltage (V) - Min. voltage (V)}}{\text{Three-phase average voltage (V)}} \times 67$ (IEC 61800-3)

If this value is 2 to 3%, use an optional AC reactor (ACR).

*6 Required when a DC reactor (DCR) is used.

*7 Average braking torque for the motor running alone. (It varies with the efficiency of the motor.)

*8 A DC reactor (DCR) is optionally provided. Note that inverters with a capacity of 55 kW in VT mode and inverters with 75 kW or above in all modes require a DCR to be connected. Be sure to connect it to those inverters.

Common Specifications

Item			Explanation
Output frequency	Setting range	Maximum frequency	25 to 500 Hz (120 Hz for inverters in MT/VT mode) (120 Hz under vector control without speed sensor) (200 Hz under V/f control with speed sensor or vector control with speed sensor)
		Base frequency	25 to 500 Hz (in conjunction with the maximum frequency)
		Starting frequency	0.1 to 60.0 Hz (0.0 Hz under vector control with/without speed sensor)
		Carrier frequency	• 0.75 to 16 kHz (CT mode: 0.4 to 55 kW, VT mode: 5.5 to 18.5 kW) • 0.75 to 10 kHz (CT mode: 75 to 400 kW, VT mode: 22 to 55 kW) • 0.75 to 6 kHz (CT mode: 500 and 630 kW, VT mode: 75 to 500 kW) • 0.75 to 4 kHz (VT mode: 630 kW) • 0.75 to 2 kHz (MT mode: 90 to 400 kW) **Note:** The carrier frequency may automatically drop depending upon the surrounding temperature or output current to protect the inverter. (The automatic drop function can be disabled.)
	Accuracy (Stability)		• Analog setting: ±0.2% of maximum frequency (at 25 ±10°C) • Keypad setting: ±0.01% of maximum frequency (at -10 to +50°C)
	Setting resolution		• Analog setting: 1/3000 of maximum frequency (1/1500 for V2 input) • Keypad setting: 0.01 Hz (99.99 Hz or less), 0.1 Hz (100.0 to 500.0 Hz) • Link operation setting: Selectable from the following two types - 1/20000 of maximum frequency - 0.01 Hz (fixed)
	Under V/f control with speed sensor	Speed control range	• 1 : 100 (Minimum speed: Base speed, 4P, 15 to 1500 r/min) • 1 : 2 (Constant torque range: Constant output range)
	Under dynamic torque vector control with speed sensor	Speed control accuracy	• Analog setting: ±0.2% of maximum frequency (at 25 ±10°C) • Digital setting: ±0.01% of maximum frequency (at -10 to +50°C)
	Under vector control without speed sensor	Speed control range	• 1 : 200 (Minimum speed: Base speed, 4P, 7.5 to 1500 r/min) • 1 : 2 (Constant torque range: Constant output range)
		Speed control accuracy	• Analog setting: ±0.5% of base speed (at 25 ±10°C) • Digital setting: ±0.5% of base speed (at -10 to +50°C)
	Under vector control with speed sensor	Speed control range	• 1 : 1500 (Minimum speed: Base speed, 4P, 1 to 1500 r/min, 1024 p/r) • 1 : 4 (Constant torque range: Constant output range)
		Speed control accuracy	• Analog setting: ±0.2% of maximum frequency (at 25 ±10°C) • Digital setting: ±0.01% of maximum frequency (at -10 to +50°C)
Control	Control method		• V/f control • Dynamic torque vector control • V/f control with speed sensor or dynamic torque vector control with speed sensor • Vector control without speed sensor (Not available for MT-mode inverters) • Vector control with speed sensor (with an optional PG interface card mounted)
	V/f characteristics		• Possible to set output voltage at base frequency and at maximum frequency • AVR control ON/OFF selectable. Non-linear V/f pattern with three arbitrary points.
	Torque boost		• Auto torque boost (for constant torque load) • Manual torque boost: Desired torque boost (0.0 to 20.0%) can be set. • Select application load with function code F37. (Variable torque load or constant torque load)
	Starting torque		22 kW or below: 200% or over, 30 kW or above: 180% or over Reference frequency: 0.3 Hz with slip compensation and auto torque boost
	Start/stop operation		• Keypad (RUN and STOP keys), external signals (run forward (run reverse) command, etc.), Communications link (RS-485/fieldbus (option)) • Remote/local operation
	Enable input (Safety stop function)		Opening the circuit between terminals [EN] and [PLC] stops the inverter's output transistor (coast-to-stop). (Compliant with EN954-1 Cat.3)
	Frequency command		• Keypad: ∧ and ∨ keys • Analog input (Analog input can be set with external voltage/current input): 0 to ± 10 VDC/0 to ± 100% (terminals [12], [V2]) +4 to +20 mA DC/0 to 100% (terminal [C1]) • UP/DOWN operation: Multi-frequency (16 steps), 16-bit parallel • Pulse train input (standard): Pulse input = [X7] terminal, Rotational direction = One of the digital input terminals except [X7] • Link operation: Various buses (option) • Reference frequency switching, Remote/local mode switching, Auxiliary frequency setting, Proportional operation setting, and Inverse operation
	Acceleration/ deceleration time		0.00 to 6000 s Linear/S-curve/curvilinear, Acceleration/deceleration time settings 1 to 4 switchable

Item	Explanation

Control	Stop control	• Running continued at the stop frequency, coast-to-stop, or force to stop. • DC braking: Braking starting frequency (up to 60 Hz), time (up to 30.0 s), and operation level (up to 100%) • Zero speed control (under vector control with speed sensor.)
	Auto-restart after momentary power failure	• Trip immediately, trip after recovery from power failure, trip after deceleration to stop • Continue to run, restart at the frequency at which the power failure occurred, restart at the starting frequency, restart after searching for idling motor speed
	Hardware current limiter	• Current limiter operation level (20 to 200%) • Overcurrent limiting by hardware (This can be canceled.)
	Torque limiter	• Torque limit value (±300%) • Torque limiter 1/2, torque limiter enabled/disabled, analog torque limit value
	Control functions	• Analog input adjustment (gain/offset/filter time constant), frequency limiter (high and low), bias frequency, jump frequency, jogging operation, pre-excitation, switch to commercial power, commercial power switching sequence, cooling fan ON/OFF control, select motor 2 to 4, protect motor from dew condensation, universal DI, universal DO, universal AO, rotational direction limitation • Overload prevention control, auto search, slip compensation, automatic deceleration (anti-regenerative control), droop control, PID process control, PID dancer control, Deceleration characteristics (improving braking capability), auto energy saving function • Auto-tuning (offline) • Life early warning, cumulative inverter run time, cumulative motor run time • Light alarm, retry, command loss detection
	Digital input	Run forward command, run reverse command, select multi-frequency, select ACC/DEC time, enable 3-wire operation, coast to a stop, reset alarm, enable external alarm trip, ready for jogging, select frequency command 2/1, select motor 1 to 4, enable DC braking, select torque limiter level, switch to commercial power, UP (increase output frequency), DOWN (decrease output frequency), enable data change with keypad, cancel PID control, switch normal/inverse operation, interlock, cancel torque control, enable communications link via RS-485 or fieldbus (option), universal DI, enable auto search for idling motor speed at starting, force to stop, pre-excitation, reset PID integral and differential components, hold PID integral component, select local (keypad) operation, protect the motor from dew condensation, enable internal sequence to commercial lines, pulse train input, pulse train sign, cancel constant peripheral speed control, hold the constant peripheral speed control frequency in the memory, switch to commercial power operation, select droop control, servo-lock command, cancel PG alarm, cancel customizable logic, clear all customizable logic timers
	Transistor output	Inverter running, frequency arrival signal 1/3, frequency detected (3 points), undervoltage detected (inverter stopped), torque polarity detected, inverter output limiting, auto-restarting after momentary power failure, motor overload early warning, keypad operation, inverter ready to run, switch motor power between commercial line and inverter output (inverter input/output/commercial power), select the AX terminal function (primary side MC), inverter output limiting with delay, cooling fan in operation, auto-resetting, universal DO, heat sink overheat early warning, service lifetime alarm, reference loss detected, inverter output on, overload prevention control, current detected (3 points), low level current detected, PID alarm, under PID control, PID control stopped due to slow flowrate, low output torque detected, torque detected (2 points), switched to motor 1 to 4, run forward signal, run reverse signal, inverter in remote operation, PTC status detection enabled, brake signal, analog frequency reference loss on the terminal [C1], inverter keeping speed output, speed arrived, PG error detected, maintenance timer, light alarm, alarm relay contact output (for any fault), braking resistor broken, positioning completion signal, enable circuit failure detected, customizable logic output signal
	Analog output	Terminals [FM1] and [FM2]: Output a selected signal with analog DC voltage (0 to +10 V) or analog DC current (4 to 20 mA) Selectable output signals: Output frequency (before slip compensation, after slip compensation), output current, output voltage, output torque, load factor, input power, PID feedback amount, speed (PG feedback value), DC link bus voltage, universal AO, motor output, calibration, PID command (SV), PID output (MV)
Indication	Running/stopping	Speed monitor (reference frequency (Hz), output frequency, motor speed, load shaft speed, line speed, speed in %) Output current, output voltage, torque calculation value, input power, PID command value, PID feedback amount, PID output, load factor, motor output, torque current, flux command, analog signal input monitor, input watt-hour Life early warning, cumulative inverter run time, cumulative motor run time, input watt-hour, number of startups I/O checking, energy-saving monitor (input power, input power x coefficient (charges for input power))
	Trip mode	Trip history: Saves and displays the last 4 trip factors and their detailed description.
Other features	Communications	RS-485 COM port 1 (for keypad connection), RS-485 COM port 2 (on terminal block), and USB port (on the keypad face)
	Protection against momentary power failure	Upon detection of a momentary power failure lasting more than 15 ms, this function stops the inverter output. If restart after momentary power failure is selected, this function invokes a restart process if power is restored within a predetermined period (allowable momentary power failure time).

MOUNTING AND WIRING THE INVERTER

Operating Environment

Install the inverter in an environment that satisfies the requirements listed in Table 2.1.

Environmental Requirements

Item	Specifications	
Site location	Indoors	
Surrounding/ambient temperature	-10 to +50°C (Note 1)	
Relative humidity	5 to 95% (No condensation)	
Atmosphere	The inverter must not be exposed to dust, direct sunlight, corrosive gases, flammable gases, oil mist, vapor or water drops. Pollution degree 2 (IEC60664-1) (Note 2) The atmosphere can contain a small amount of salt. (0.01 mg/cm2 or less per year) The inverter must not be subjected to sudden changes in temperature that will cause condensation to form.	
Altitude	1,000 m max. (Note 3)	
Atmospheric pressure	86 to 106 kPa	
Vibration	55 kW or below (200 V class series) 75 kW or below (400 V class series)	75 kW or above (200 V class series) 90 kW or above (400 V class series)
	3 mm (Max. amplitude) 2 to less than 9 Hz 9.8 m/s2 9 to less than 20 Hz 2 m/s2 20 to less than 55 Hz 1 m/s2 55 to less than 200 Hz	3 mm (Max. amplitude) 2 to less than 9 Hz 2 m/s2 9 to less than 55 Hz 1 m/s2 55 to less than 200 Hz

Output Current Derating Factor in Relation to Altitude

Altitude	Output current derating factor
1000 m or lower	1.00
1000 to 1500 m	0.97
1500 to 2000 m	0.95
2000 to 2500 m	0.91
2500 to 3000 m	0.88

(Note 1) When inverters are mounted side-by-side without any clearance between them (22 kW or below), the surrounding temperature should be within the range from -10 to +40°C.

(Note 2) Do not install the inverter in an environment where it may be exposed to lint, cotton waste or moist dust or dirt which will clog the heat sink of the inverter. If the inverter is to be used in such an environment, install it in a dustproof panel of your system.

(Note 3) If you use the inverter in an altitude above 1000 m, you should apply an output current derating factor as listed in Table 2.2.

Installing the Inverter

(1) Mounting base

Install the inverter on a base made of metal or other non-flammable material. Do not mount the inverter upside down or horizontally.

⚠WARNING

Install the inverter on a base made of metal or other non-flammable material.
Otherwise, a fire could occur.

(2) Clearances

Ensure that the minimum clearances indicated in the below table and image are maintained at all times. When mounting the inverter in the panel of your system, take extra care with ventilation inside the panel as the surrounding temperature easily rises. Do not install the inverter in a small panel with poor ventilation.

■ When mounting two or more inverters

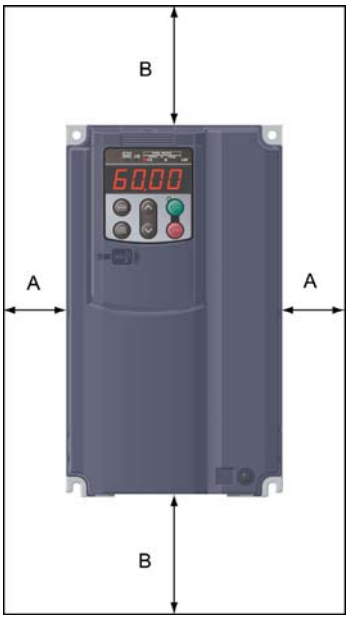
When mounting two or more inverters in the same unit or panel, basically lay them out side by side. When mounting them necessarily one above the other, be sure to separate them with a partition plate or the like so that any heat radiating from an inverter will not affect the one/s above.

As long as the surrounding temperature is 40°C or lower, inverters with a capacity of 22 kW or below can be mounted side by side without any clearance between them.

Clearances (mm)

Inverter capacity	A	B	C
0.4 to 1.5 kW	50	100	0
2.2 to 22 kW	10		
30 to 220 kW	50		100
280 to 630 kW		150	150

C: Space required in front of the inverter unit



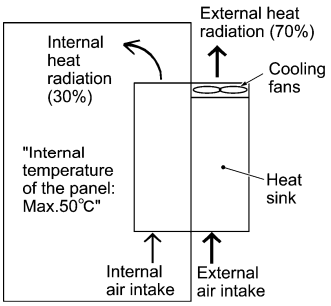
Mounting Direction and Required Clearances

■ When employing external cooling

In external cooling, the heat sink, which dissipates about 70% of the total heat (total loss) generated into air, is situated outside the equipment or the panel. The external cooling, therefore, significantly reduces heat radiating inside the equipment or panel.

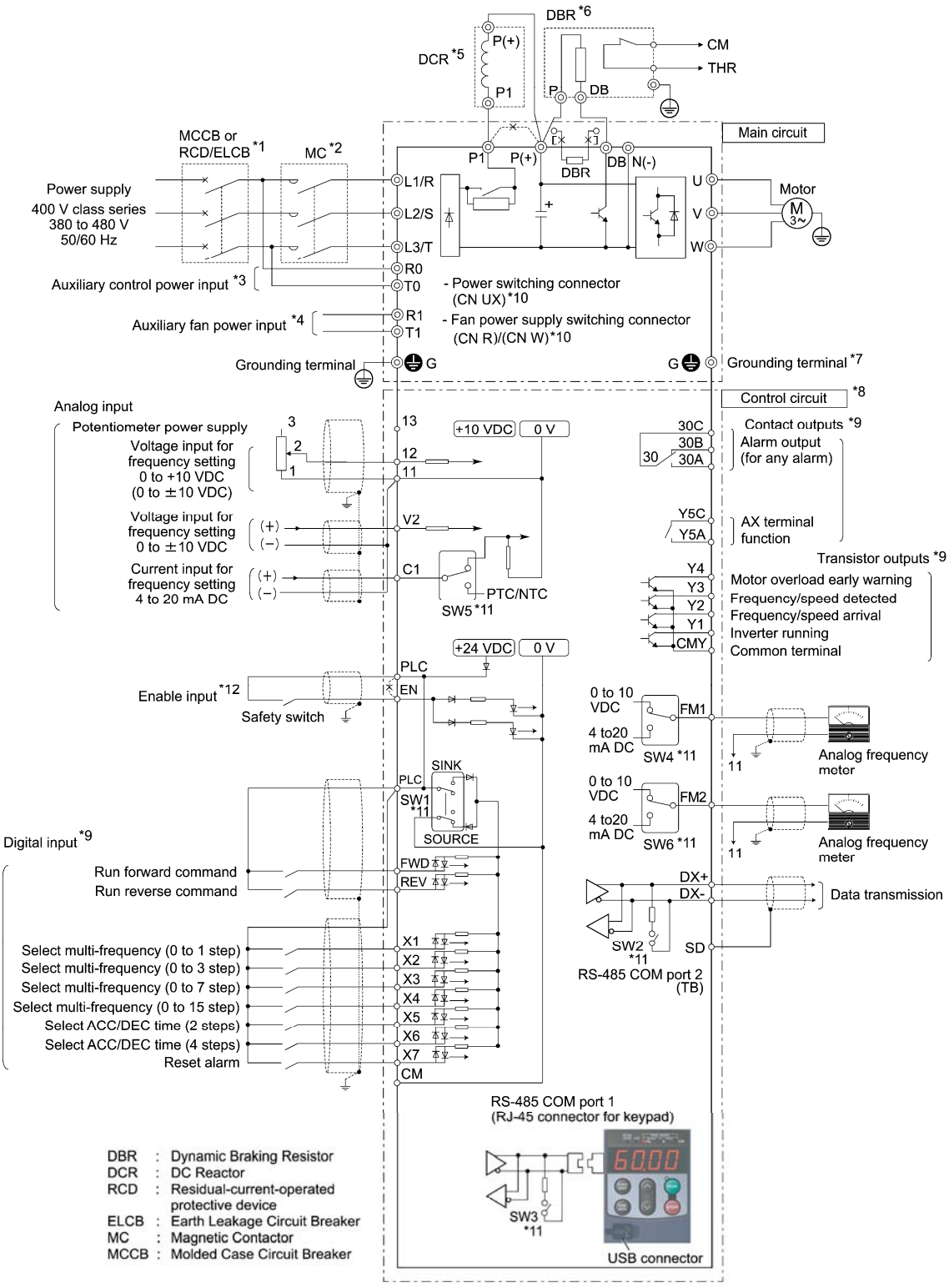
To employ external cooling for inverters with a capacity of 22 kW or below, use the external cooling attachment option; for those with a capacity of 30 kW or above, simply change the positions of the mounting bases.

⚠CAUTION
Prevent lint, paper fibers, sawdust, dust, metallic chips, or other foreign materials from getting into the inverter or from accumulating on the heat sink. **Otherwise, a fire or accident could occur.**



External Cooling

(2) VXGxxx-4E are set with SOURCE mode input by factory default



*1 Install a recommended molded case circuit breaker (MCCB) or residual-current-operated protective device (RCD)/earth leakage circuit breaker (ELCB) (with overcurrent protection function) in the primary circuit of the inverter to protect wiring. Ensure that the circuit breaker capacity is equivalent to or lower than the recommended capacity.

*2 Install a magnetic contactor (MC) for each inverter to separate the inverter from the power supply, apart from the MCCB or RCD/ELCB, when necessary.
Connect a surge absorber in parallel when installing a coil such as the MC or solenoid near the inverter.

*3 The R0 and T0 terminals are provided for inverters with a capacity of 1.5 kW or above.
To retain an alarm output signal ***ALM*** issued on inverter's programmable output terminals by the protective function or to keep the keypad alive even if the main power has shut down, connect these terminals to the power supply lines. Without power supply to these terminals, the inverter can run.

*4 Normally no need to be connected. Use these terminals when the inverter is equipped with a high power-factor, regenerative PWM converter (RHC series).

*5 When connecting an optional DC reactor (DCR), remove the jumper bar from the terminals P1 and P(+).
Inverters with a capacity of 55 kW in LD mode and inverters with 75 kW or above require a DCR to be connected. Be sure to connect it to those inverters.

Use a DCR when the capacity of the power supply transformer exceeds 500 kVA and is 10 times or more the inverter rated capacity, or when there are thyristor-driven loads in the same power supply line.

*6 Inverters with a capacity of 7.5 kW or below have a built-in braking resistor (DBR) between the terminals P(+) and DB.

When connecting an external braking resistor (DBR), be sure to disconnect the built-in one.

*7 A grounding terminal for a motor. Use this terminal if needed.

*8 For control signal wires, use twisted or shielded-twisted wires. When using shielded-twisted wires, connect the shield of them to the common terminals of the control circuit. To prevent malfunction due to noise, keep the control circuit wiring away from the main circuit wiring as far as possible (recommended: 10 cm or more). Never install them in the same wire duct. When crossing the control circuit wiring with the main circuit wiring, set them at right angles.

*9 The connection diagram shows factory default functions assigned to digital input terminals [X1] to [X7], [FWD] and [REV], transistor output terminals [Y1] to [Y4], and relay contact output terminals [Y5A/C] and [30A/B/C].

*10 Switching connectors in the main circuits. For details, refer to "⑥ Switching connectors" later in this section.

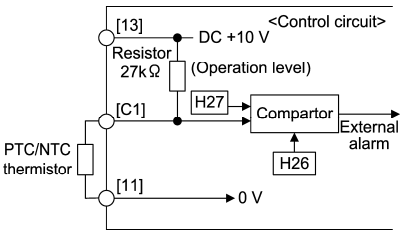
*11 Slide switches on the control printed circuit board (control PCB). Use these switches to customize the inverter operations. For details, refer to Section 2.3.6 "Setting up the slide switches."

*12 When using the Enable input function, be sure to remove the jumper wire from terminals [EN] and [PLC]. For opening and closing the hardware circuit between terminals [EN] and [PLC], use safety components such as safety relays and safety switches that comply with EN954-1, Category 3 or higher. Be sure to use shielded wires exclusive to terminals [EN] and [PLC]. (Do not put them together with any other control signal wire in the same shielded core.) Ground the shielding layer. For details, refer to Chapter 9, Section 9.6 "Compliance with EN954-1, Category 3."

When not using the Enable input function, keep the terminals between [EN] and [PLC] short-circuited with the jumper wire (factory default).

The table below lists the symbols, names and functions of the control circuit terminals. The wiring to the control circuit terminals differs depending upon the setting of the function codes, which reflects the use of the inverter. Route wires properly to reduce the influence of noise.

Symbols, Names and Functions of the Control Circuit Terminals

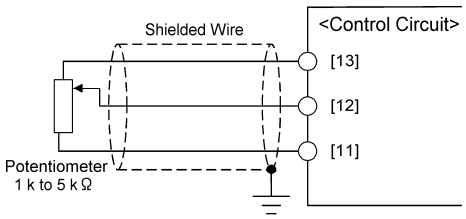
Classification	Symbol	Name	Functions
Analog input	[13]	Power supply for the potentiometer	Power supply (+10 VDC) for an external frequency command potentiometer (Variable resistor: 1 to 5kΩ) The potentiometer of 1/2 W rating or more should be connected.
	[12]	Analog setting voltage input	(1) The frequency is commanded according to the external voltage input. • 0 to ±10 VDC/0 to ±100% (Normal operation) • +10 to 0 VDC/0 to 100% (Inverse operation) (2) In addition to frequency setting, PID command, PID feedback signal, auxiliary frequency command setting, ratio setting, torque limiter level setting, or analog input monitor can be assigned to this terminal. (3) Hardware specifications • Input impedance: 22kΩ • The maximum input is ±15 VDC, however, the voltage higher than ±10 VDC is handled as ±10 VDC. • Inputting a bipolar analog voltage (0 to ±10 VDC) to terminal [12] requires setting function code C35 to "0."
	[C1]	Analog setting current input	(1) The frequency is commanded according to the external current input. • 4 to 20 mA DC/0 to 100% (Normal operation) • 20 to 4 mA DC/0 to 100 % (Inverse operation) (2) In addition to frequency setting, PID command, PID feedback signal, auxiliary frequency command setting, ratio setting, torque limiter level setting, or analog input monitor can be assigned to this terminal. (3) Hardware specifications • Input impedance: 250Ω • The maximum input is +30 mA DC, however, the current larger than +20 mA DC is handled as +20 mA DC.
		PTC/NTC thermistor input	(1) Connects PTC (Positive Temperature Coefficient)/NTC (Negative Temperature Coefficient) thermistor for motor protection. Ensure that the slide switch SW5 on the control PCB is turned to the PTC/NTC position The figure shown at the right illustrates the internal circuit diagram where SW5 (switching the input of terminal [C1] between C1 and PTC/NTC) is turned to the PTC/NTC position. In this case, you must change data of the function code H26.  Internal Circuit Diagram (SW5 Selecting PTC/NTC)
	[V2]	Analog setting voltage input	(1) The frequency is commanded according to the external voltage input. • 0 to ±10 VDC/0 to ±100 % (Normal operation) • +10 to 0 VDC/0 to 100% (Inverse operation) (2) In addition to frequency setting, PID command, PID feedback signal, auxiliary frequency command setting, ratio setting, torque limiter level setting, or analog input monitor can be assigned to this terminal. (3) Hardware specifications • Input impedance: 22kΩ • The maximum input is ±15 VDC, however, the voltage higher than ±10 VDC is handled as ±10 VDC. • Inputting a bipolar analog voltage (0 to ±10 VDC) to terminal [V2] requires setting function code C45 to "0."
	[11]	Analog common	Common for analog input/output signals ([13], [12], [C1], [V2], [FM1] and [FM2]). Isolated from terminals [CM] and [CMY].

Symbols, Names and Functions of the Control Circuit Terminals (Continued)

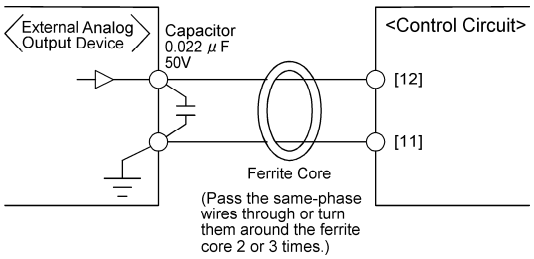
Classification	Symbol	Name	Functions

Note

- Since low level analog signals are handled, these signals are especially susceptible to the external noise effects. Route the wiring as short as possible (within 20 m) and use shielded wires. In principle, ground the shielded sheath of wires; if effects of external inductive noises are considerable, connection to terminal [11] may be effective. As shown in the below diagram, be sure to ground the single end of the shield to enhance the shield effect.
- Use a twin-contact relay for low level signals if the relay is used in the control circuit. Do not connect the relay's contact to terminal [11].
- When the inverter is connected to an external device outputting the analog signal, the external device may malfunction due to electric noise generated by the inverter. If this happens, according to the circumstances, connect a ferrite core (a toroidal core or equivalent) to the device outputting the analog signal or connect a capacitor having the good cut-off characteristics for high frequency between control signal wires as shown below.
- Do not apply a voltage of +7.5 VDC or higher to terminal [C1]. Doing so could damage the internal control circuit.



Connection of Shielded Wire



Example of Electric Noise Reduction

Digital input

Symbol	Name
[X1]	Digital input 1
[X2]	Digital input 2
[X3]	Digital input 3
[X4]	Digital input 4
[X5]	Digital input 5
[X6]	Digital input 6
[X7]	Digital input 7
[FWD]	Run forward command
[REV]	Run reverse command

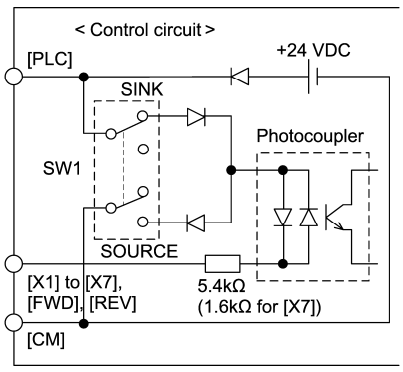
(1) Various signals such as "Coast to a stop," "Enable external alarm trip," and "Select multi-frequency" can be assigned to terminals [X1] to [X7], [FWD] and [REV] by setting function codes E01 to E07, E98, and E99.
(2) Input mode, i.e. SINK/SOURCE, is changeable by using the slide switch SW1. factory default for VXGxxx-2E is SINK, and for VXGxxx-4E, SOURCE.
(3) Switches the logic value (1/0) for ON/OFF of the terminals [X1] to [X7], [FWD], or [REV]. If the logic value for ON of the terminal [X1] is 1 in the normal logic system, for example, OFF is 1 in the negative logic system and vice versa.
(4) Digital input terminal [X7] can be defined as a pulse train input terminal with the function codes.

Maximum wiring length 20 m
Maximum input pulse 30 kHz: When connected to a pulse generator with open collector transistor output

100 kHz: When connected to a pulse generator with complementary transistor output

For the settings of the function codes, refer to JAGUAR VXG User's Manual, Chapter 5 "FUNCTION CODES."

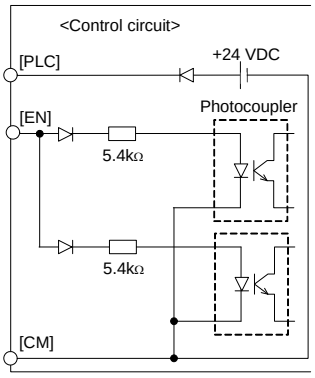
(Digital input circuit specifications)



Digital Input Circuit

Item		Min.	Max.
Operating voltage (SINK)	ON level	0 V	2 V
	OFF level	22 V	27 V
Operating voltage (SOURCE)	ON level	22 V	27 V
	OFF level	0 V	2 V
Operating current at ON (Input voltage is at 0 V)		2.5 mA	5 mA
(For [X7])		(9.7 mA)	(16 mA)
Allowable leakage current at OFF		–	0.5 mA

Symbols, Names and Functions of the Control Circuit Terminals (Continued)

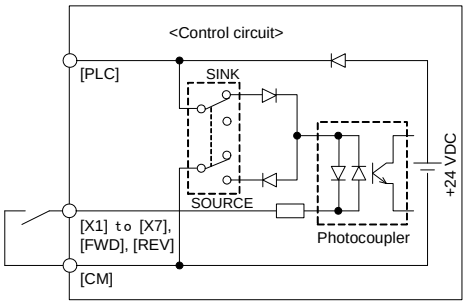
Classification	Symbol	Name	Functions
Digital input	[EN]	Enable input	(1) Safety stop function that is compliant with EN954-1, Category 3. This terminal allows the hardware circuit to stop the inserter's output transistor and coast the motor to a stop. (2) This terminal is exclusively used for the source mode input. When it is short-circuited with terminal [PLC], the Enable input is ON (ready for inverter run); when it is opened, the inverter coasts the motor to a stop. (This terminal is not interlocked with the slide switch SW1.) (3) By factory default, terminals [EN] and [PLC] are short-circuited with each other using a jumper wire, disabling this function. To enable it, be sure to remove the jumper wire. <Terminal [EN] circuit specification>  <table><tr><td colspan="2">Item</td><td>Min.</td><td>Max.</td></tr><tr><td rowspan="2">Operating voltage (SOURCE)</td><td>ON level</td><td>22 V</td><td>27 V</td></tr><tr><td>OFF level</td><td>0 V</td><td>2 V</td></tr><tr><td colspan="2">Operating current at ON (Input voltage is at 24 V)</td><td>5 mA</td><td>10 mA</td></tr><tr><td colspan="2">Allowable leakage current at OFF</td><td>–</td><td>0.5 mA</td></tr></table>
	[PLC]	PLC signal power	(1) Connects to PLC output signal power supply. Rated voltage: +24 VDC (Allowable range: +22 to +27 VDC), Maximum 100 mA DC (2) This terminal also supplies a power to the load connected to the transistor output terminals. Refer to "Transistor output" described later in this table for more.
	[CM]	Digital input common	Two common terminals for digital input signals These terminals are electrically isolated from the terminals [11]s and [CMY].

Tip

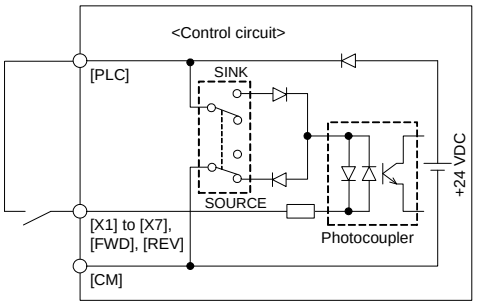
■ Using a relay contact to turn [X1] to [X7], [FWD], or [REV] ON or OFF

Below shows two examples of a circuit that uses a relay contact to turn control signal input [X1] to [X7], [FWD], or [REV] ON or OFF. In circuit (a), the slide switch SW1 has been turned to SINK, whereas in circuit (b) it has been turned to SOURCE.

Note: To configure this kind of circuit, use a high quality relay.



(a) With the switch turned to SINK



(b) With the switch turned to SOURCE

Circuit Configuration Using a Relay Contact

Tip

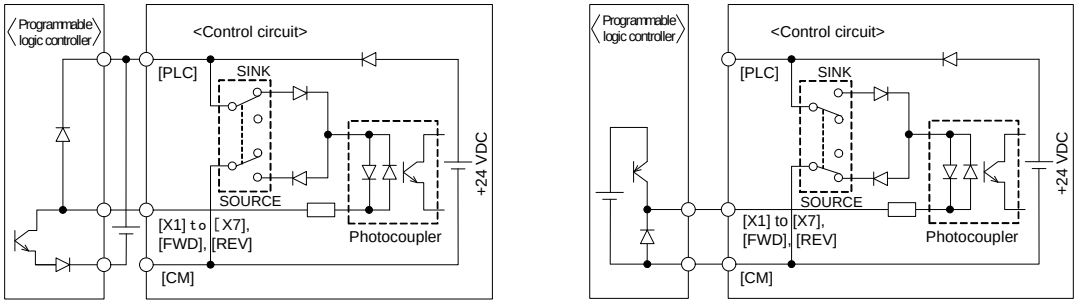
■ Using a programmable logic controller (PLC) to turn [X1] to [X7], [FWD], or [REV] ON or OFF

The next page shows two examples of a circuit that uses a programmable logic controller (PLC) to turn control signal input [X1] to [X7], [FWD], or [REV] ON or OFF. In circuit (a), the slide switch SW1 has been turned to SINK, whereas in circuit (b) it has been turned to SOURCE.

In circuit (a) below, short-circuiting or opening the transistor's open collector circuit in the PLC using an external power supply turns ON or OFF control signal [X1] to [X7], [FWD], or [REV]. When using this type of circuit, observe the following:

- Connect the + node of the external power supply (which should be isolated from the PLC's power) to terminal [PLC] of the inverter.
- Do not connect terminal [CM] of the inverter to the common terminal of the PLC.

Symbols, Names and Functions of the Control Circuit Terminals (Continued)

<table>
<tr><th>Classifi-cation</th><th>Symbol</th><th>Name</th><th>Functions</th></tr>
<tr><td>Digital input</td><td colspan="3">


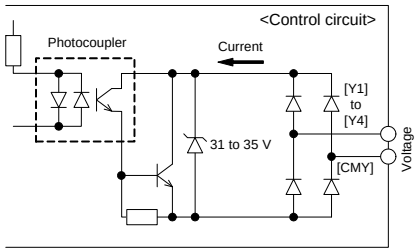
(a) With the switch turned to SINK (b) With the switch turned to SOURCE
Circuit Configuration Using a PLC

Note ■ For inputting a pulse train through the digital input terminal [X7]
• Inputting from a pulse generator with an open collector transistor output
Stray capacity on the wiring between the pulse generator and the inverter may disable transmission of the pulse train. As a countermeasure against this problem, insert a pull-up resistor between the open collector output signal (terminal [X7]) and the power source terminal (terminal [PLC]) if the switch selects the SINK mode input; insert a pull-down resistor between the output signal and the digital common terminal (terminal [CM]) if the switch selects the SOURCE mode input.
A recommended pull-up/down resistor is 1kΩ 2 W. Check if the pulse train is correctly transmitted because stray capacity is significantly affected by the wire types and wiring conditions.
</td></tr>
<tr><td rowspan="2">Analog output</td><td>[FM1]
[FM2]</td><td>Analog monitor</td><td>
Both terminals output monitor signals for analog DC voltage (0 to +10 V) or analog DC current (+4 to +20 mA). The output form (VO/IO) for each of [FM1] and [FM2] can be switched with the slide switches on the control PCB and the function codes, as listed below.
<table>
<tr><th rowspan="2">Terminal</th><th rowspan="2">Terminal function is specified by:</th><th colspan="2">Output form</th><th rowspan="2">Content is specified by:</th></tr>
<tr><th>Analog DC voltage</th><th>Analog DC current</th></tr>
<tr><td rowspan="2">[FM1]</td><td>Slide switch SW4</td><td>VO1</td><td>IO1</td><td rowspan="2">Function code F31</td></tr>
<tr><td>Function code F29</td><td>0</td><td>1</td></tr>
<tr><td rowspan="2">[FM2]</td><td>Slide switch SW6</td><td>VO2</td><td>IO2</td><td rowspan="2">Function code F35</td></tr>
<tr><td>Function code F32</td><td>0</td><td>1</td></tr>
</table>
The signal content can be selected from the following with function codes F31 and F35.
• Output frequency • Output current • Output voltage
• Output torque • Load factor • Input power
• PID feedback amount • Speed (PG feedback value) • DC link bus voltage
• Universal AO • Motor output • Calibration
• PID command • PID output

* Input impedance of the external device: Min. 5kΩ (at 0 to 10 VDC output)
(While the terminal is outputting 0 to 10 VDC, it is capable of driving up to two analog voltmeters with 10 kΩ impedance.)
* Input impedance of the external device: Max. 500Ω (at 4 to 20 mA DC output)
* Adjustable range of the gain: 0 to 300%
</td></tr>
<tr><td>[11]</td><td>Analog common</td><td>Two common terminals for analog input and output signals.
These terminals are electrically isolated from terminals [CM] and [CMY].</td></tr>
</table>

Symbols, Names and Functions of the Control Circuit Terminals (Continued)

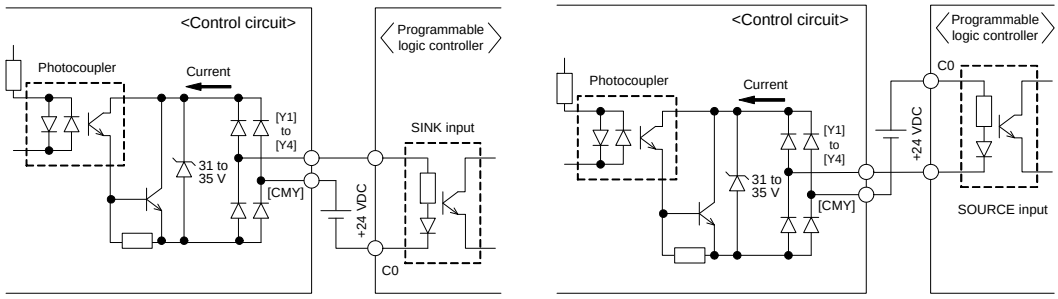
<table>
<tr><th>Classif-cation</th><th>Symbol</th><th>Name</th><th>Functions</th></tr>
<tr><td rowspan="4">Transistor output</td><td>[Y1]</td><td>Transistor output 1</td><td rowspan="3">(1) Various signals such as inverter running, speed/freq. arrival and overload early warning can be assigned to any terminals, [Y1] to [Y4] by setting function code E20 to E24.
(2) Switches the logic value (1/0) for ON/OFF of the terminals between [Y1] to [Y4], and [CMY]. If the logic value for ON between [Y1] to [Y4] and [CMY] is 1 in the normal logic system, for example, OFF is 1 in the negative logic system and vice versa.

(Transistor output circuit specification)
 

Transistor Output Circuit

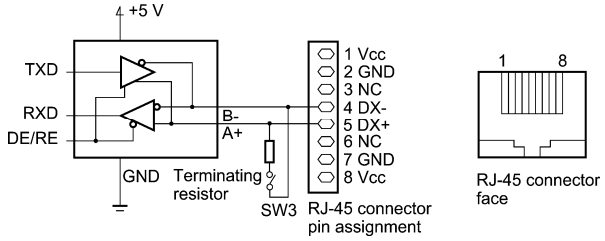
<table>
<tr><th colspan="2">Item</th><th>Max.</th></tr>
<tr><td rowspan="2">Operation voltage</td><td>ON level</td><td>2 V</td></tr>
<tr><td>OFF level</td><td>27 V</td></tr>
<tr><td colspan="2">Maximum current at ON</td><td>50 mA</td></tr>
<tr><td colspan="2">Leakage current at OFF</td><td>0.1 mA</td></tr>
</table>

Below shows examples of connection between the control circuit and a PLC.

Note - When a transistor output drives a control relay, connect a surge-absorbing diode across relay's coil terminals.
- When any equipment or device connected to the transistor output needs to be supplied with DC power, feed the power (+24 VDC: allowable range: +22 to +27 VDC, 100 mA max.) through the [PLC] terminal. Short-circuit between the terminals [CMY] and [CM] in this case.</td></tr>
<tr><td>[Y2]</td><td>Transistor output 2</td></tr>
<tr><td>[Y3]</td><td>Transistor output 3</td></tr>
<tr><td>[Y4]</td><td>Transistor output 4</td><td></td></tr>
<tr><td>[CMY]</td><td>Transistor output common</td><td>Common terminal for transistor output signals
This terminal is electrically isolated from terminals [CM] and [11]s.</td></tr>
<tr><td colspan="4">Tip ■ Connecting programmable logic controller (PLC) to terminal [Y1], [Y2], [Y3] or [Y4]
Below shows two examples of circuit connection between the transistor output of the inverter's control circuit and a PLC. In example (a), the input circuit of the PLC serves as a SINK for the control circuit output, whereas in example (b), it serves as a SOURCE for the output.
 

(a) PLC serving as SINK (b) PLC serving as SOURCE
Connecting PLC to Control Circuit</td></tr>
<tr><td rowspan="2">Relay output</td><td>[Y5A/C]</td><td>General purpose relay output</td><td>(1) A general-purpose relay contact output usable as well as the function of the transistor output terminal [Y1], [Y2], [Y3] or [Y4].
Contact rating: 250 VAC 0.3 A, cos ϕ = 0.3, 48 VDC, 0.5 A
(2) Switching of the normal/negative logic output is applicable to the following two contact output modes: "Active ON" (Terminals [Y5A] and [Y5C] are closed (excited) if the signal is active.) and "Active OFF" (Terminals [Y5A] and [Y5C] are opened (non-excited) if the signal is active while they are normally closed.).</td></tr>
<tr><td>[30A/B/C]</td><td>Alarm relay output (for any error)</td><td>(1) Outputs a contact signal (SPDT) when a protective function has been activated to stop the motor.
Contact rating: 250 VAC, 0.3A, cos ϕ = 0.3, 48 VDC, 0.5A
(2) Any one of output signals assigned to terminals [Y1] to [Y4] can also be assigned to this relay contact to use it for signal output.
(3) Switching of the normal/negative logic output is applicable to the following two contact output modes: "Active ON" (Terminals [30A] and [30C] are closed (excited) if the signal is active.) and "Active OFF" (Terminals [30A] and [30C] are opened (non-excited) if the signal is active while they are normally closed.).</td></tr>
</table>

Symbols, Names and Functions of the Control Circuit Terminals (Continued)

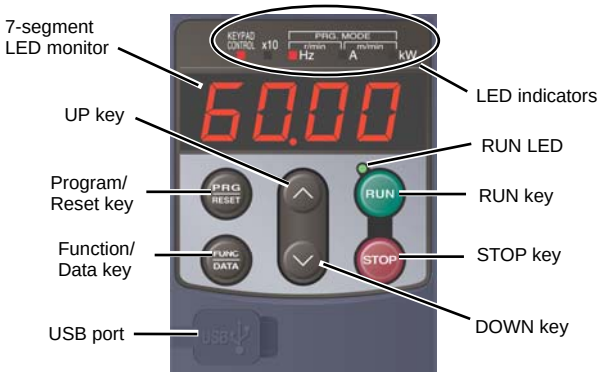
Classif-cation	Symbol	Name	Functions
Communication	[DX+]/ [DX-]/ [SD]	RS-485 communications port 2 (Terminals on control PCB)	A communications port transmits data through the RS-485 multipoint protocol between the inverter and a personal computer or other equipment such as a PLC. (For setting of the terminating resistor, refer to Section "Setting up the slide switches.")
	RJ-45 connector for the keypad	RS-485 communications port 1 (Standard RJ-45 connector)	(1) Used to connect the inverter with the keypad. The inverter supplies the power to the keypad through the pins specified below. The extension cable for remote operation also uses wires connected to these pins for supplying the keypad power. (2) Remove the keypad from the standard RJ-45 connector and connect the RS-485 communications cable to control the inverter through the PC or PLC (Programmable Logic Controller). For setting of the terminating resistor, refer to Section "Setting up the slide switches."  RJ-45 Connector and its Pin Assignment* * Pins 1, 2, 7, and 8 are exclusively assigned to power lines for the remote keypad and multi-function keypad, so do not use those pins for any other equipment.
	USB connector	USB port (On the keypad)	A USB port connector (mini B) that connects an inverter to a personal computer. JAGUAR Loader software running on the computer supports editing the function codes, transferring them to the inverter, verifying them, test-running an inverter and monitoring the inverter running status.

OPERATION USING THE KEYPAD (in the case of remote keypad)

LED Monitor, Keys and LED Indicators on the Keypad

As shown at the right, the keypad consists of a four-digit LED monitor, six keys, and five LED indicators.

The keypad allows you to run and stop the motor, monitor the running status, specify the function code data, and monitor I/O signal states, maintenance information, and alarm information.



Note When using a multi-function keypad instead of a remote keypad, read the Multi-function Keypad Instruction Manual.

Overview of Keypad Functions

Item	LED Monitor, Keys, and LED Indicators	Functions
LED Monitor	60.00	Four-digit, 7-segment LED monitor which displays the followings according to the operation modes. ■ In Running mode: Running status information (e.g., output frequency, current, and voltage) When a light alarm occurs, *l-al* is displayed. ■ In Programming mode: Menus, function codes and their data ■ In Alarm mode: Alarm code, which identifies the alarm factor when the protective function is activated.
Operation Keys	PRG RESET	Program/Reset key which switches the operation modes of the inverter. ■ In Running mode: Pressing this key switches the inverter to Programming mode. ■ In Programming mode: Pressing this key switches the inverter to Running mode. ■ In Alarm mode: Pressing this key after removing the alarm factor will switch the inverter to Running mode.
	FUNC DATA	Function/Data key which switches the operations you want to do in each mode as follows: ■ In Running mode: Pressing this key switches the information to be displayed concerning the status of the inverter (output frequency (Hz), output current (A), output voltage (V), etc.). When a light alarm is displayed, holding down this key resets the light alarm and switches back to Running mode. ■ In Programming mode: Pressing this key displays the function code or establishes the data entered with ∧ and ∨ keys. ■ In Alarm mode: Pressing this key displays the details of the problem indicated by the alarm code that has come up on the LED monitor.
	RUN	RUN key. Press this key to run the motor.
	STOP	STOP key. Press this key to stop the motor.
	∧/∨	UP and DOWN keys. Press these keys to select the setting items and change the function code data displayed on the LED monitor.
LED Indicators	RUN LED	Lights when running with a run command entered by the RUN key, by terminal command ***FWD*** or ***REV***, or through the communications link.
	KEYPAD CONTROL LED	Lights when the inverter is ready to run with a run command entered by the RUN key (F02 = 0, 2, or 3). In Programming and Alarm modes, however, pressing the RUN key cannot run the inverter even if this indicator lights.
	Unit LEDs (3 LEDs)	These three LED indicators identify the unit of numeral displayed on the LED monitor in Running mode by combination of lit and unlit states of them. Unit: Hz, A, kW, r/min and m/min Refer to Chapter 3, Section 3.3.1 "Monitoring the running status" for details. While the inverter is in Programming mode, the LEDs of Hz and kW light. ■ Hz □ A ■ kW
	x10 LED	Lights when the data to display exceeds 9999. When this LED lights, the "displayed value x 10" is the actual value. Example: If the LED monitor displays *1234* and the x10 LED lights, it means that the actual value is "1,234 × 10 = 12,340."

Overview of Keypad Functions (Continued)

Item	LED Monitor, Keys, and LED Indicators	Functions
USB port		The USB port with a mini B connector enables the inverter to connect with a PC with a USB cable.

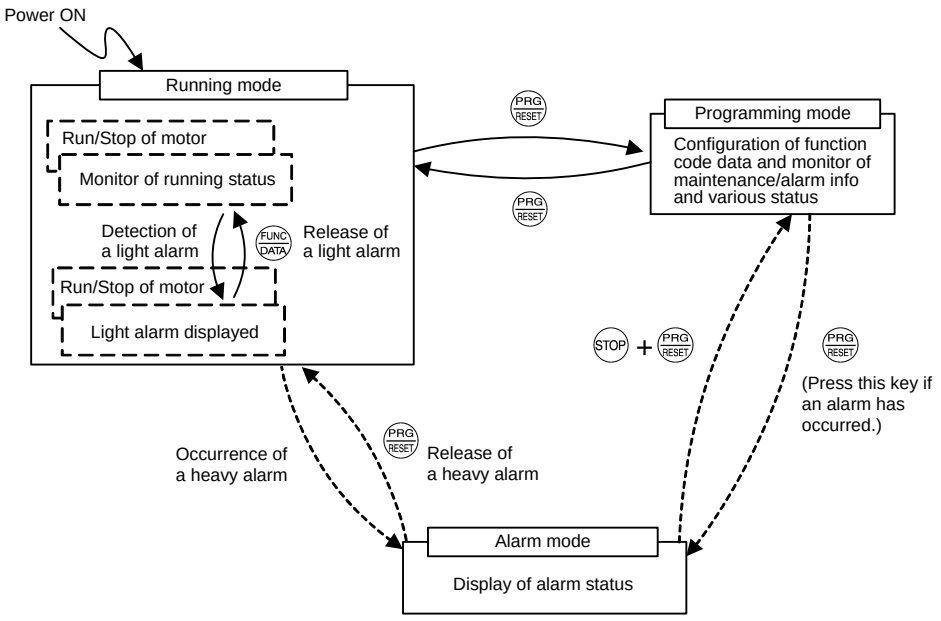
Overview of Operation Modes

JAGUAR VXG features the following three operation modes.

Operation Modes

Operation mode	Description
Running mode	After powered ON, the inverter automatically enters this mode. This mode allows you to specify the reference frequency, PID command value and etc., and run/stop the motor with the RUN / STOP keys. It is also possible to monitor the running status in real time. If a light alarm occurs, the *l-al* appears on the LED monitor.
Programming mode	This mode allows you to configure function code data and check a variety of information relating to the inverter status and maintenance.
Alarm mode	If an alarm condition arises, the inverter automatically enters Alarm mode in which you can view the corresponding alarm code* and its related information on the LED monitor. * Alarm code: Indicates the cause of the alarm condition. For details, first see "Abnormal States Detectable ("Heavy Alarm" and "Light Alarm" Objects)" "Protective Functions," and then read the troubleshooting of each alarm.

Below shows the status transition of the inverter between these three operation modes.



Status Transition between Operation Modes

Simultaneous keying

Simultaneous keying means pressing two keys at the same time. The simultaneous keying operation is expressed by a "+" letter between the keys throughout this manual.

For example, the expression "STOP + PRG RESET keys" stands for pressing the PRG RESET key with the STOP key held down.

For full parameter descriptions refer to VXG Manual

The following tables list the function codes available for the JAGUAR VXG series of inverters.

F codes: Fundamental Functions

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
F00	Data Protection	0: Disable both data protection and digital reference protection 1: Enable data protection and disable digital reference protection 2: Disable data protection and enable digital reference protection 3: Enable both data protection and digital reference protection	Y	Y	0	Y	Y	Y	Y	Y
F01	Frequency Command 1	0: ⌃ / ⌄ keys on keypad 1: Voltage input to terminal [12] (-10 to +10 VDC) 2: Current input to terminal [C1] (4 to 20 mA DC) 3: Sum of voltage and current inputs to terminals [12] and [C1] 5: Voltage input to terminal [V2] (0 to 10 VDC) 7: Terminal command ***UP/DOWN*** control 8: ⌃ / ⌄ keys on keypad (balanceless-bumpless switching available) 11: Digital input interface card (option) 12: Pulse train input	N	Y	0	Y	Y	Y	Y	N
F02	Operation Method	0: RUN/STOP keys on keypad (Motor rotational direction specified by terminal command ***FWD***/***REV***) 1: Terminal command ***FWD*** or ***REV*** 2: RUN/STOP keys on keypad (forward) 3: RUN/STOP keys on keypad (reverse)	N	Y	2	Y	Y	Y	Y	Y
F03	Maximum Frequency 1	25.0 to 500.0 Hz	N	Y	*1	Y	Y	Y	Y	Y
F04	Base Frequency 1	25.0 to 500.0 Hz	N	Y	50.0	Y	Y	Y	Y	Y
F05	Rated Voltage at Base Frequency 1	0: Output a voltage in proportion to input voltage 80 to 240 V: Output an AVR-controlled voltage (for 200 V class series) 160 to 500 V: Output an AVR-controlled voltage (for 400 V class series)	N	Y2	*1	Y	Y	Y	Y	Y
F06	Maximum Output Voltage 1	80 to 240 V: Output an AVR-controlled voltage (for 200 V class series) 160 to 500 V: Output an AVR-controlled voltage (for 400 V class series)	N	Y2	*1	Y	Y	N	N	Y
F07	Acceleration Time 1	0.00 to 6000 s	Y	Y	*2	Y	Y	Y	Y	N
F08	Deceleration Time 1	Note: Entering 0.00 cancels the acceleration time, requiring external soft-start.	Y	Y	*2	Y	Y	Y	Y	N
F09	Torque Boost 1	0.0% to 20.0% (percentage with respect to "Rated Voltage at Base Frequency 1")	Y	Y	*3	Y	Y	N	N	N
F10	Electronic Thermal Overload Protection for Motor 1 (Select motor characteristics)	1: For a general-purpose motor with shaft-driven cooling fan 2: For an inverter-driven motor, non-ventilated motor, or motor with separately powered cooling fan	Y	Y	1	Y	Y	Y	Y	Y
F11	(Overload detection level)	0.00: Disable 1% to 135% of the rated current (allowable continuous drive current) of the motor	Y	Y1 Y2	*4	Y	Y	Y	Y	Y
F12	(Thermal time constant)	0.5 to 75.0 min	Y	Y	*5	Y	Y	Y	Y	Y
F14	Restart Mode after Momentary Power Failure (Mode selection)	0: Trip immediately 1: Trip after a recovery from power failure 2: Trip after decelerate-to-stop 3: Continue to run, for heavy inertia or general loads 4: Restart at the frequency at which the power failure occurred, for general loads 5: Restart at the starting frequency	Y	Y	1	Y	Y	Y	Y	N
F15	Frequency Limiter (High)	0.0 to 500.0 Hz	Y	Y	70.0	Y	Y	Y	Y	N
F16	(Low)	0.0 to 500.0 Hz	Y	Y	0.0	Y	Y	Y	Y	N
F18	Bias (Frequency command 1)	-100.00% to 100.00%	Y*	Y	0.00	Y	Y	Y	Y	N
F20	DC Braking 1 (Braking starting frequency)	0.0 to 60.0 Hz	Y	Y	0.0	Y	Y	Y	Y	N
F21	(Braking level)	0% to 100% (CT mode), 0% to 80% (MT/VT mode)	Y	Y	0	Y	Y	Y	Y	N
F22	(Braking time)	0.00 (Disable); 0.01 to 30.00 s	Y	Y	0.00	Y	Y	Y	Y	N
F23	Starting Frequency 1	0.0 to 60.0 Hz	Y	Y	0.5	Y	Y	Y	Y	N
F24	(Holding time)	0.00 to 10.00 s	Y	Y	0.00	Y	Y	Y	Y	N
F25	Stop Frequency	0.0 to 60.0 Hz	Y	Y	0.2	Y	Y	Y	Y	N

The shaded function codes (▭) are applicable to the quick setup.

*1 The factory default differs depending upon the shipping destination. See Table A.

*2 6.00 s for inverters with a capacity of 22 kW or below; 20.00 s for those with 30 kW or above

*3 The factory default differs depending upon the inverter's capacity. See Table B.

*4 The motor rated current is automatically set. See Table C (function code P03).

*5 5.0 min for inverters with a capacity of 22 kW or below; 10.0 min for those with 30 kW or above

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
F26	Motor Sound (Carrier frequency)	0.75 to 16 kHz (CT-mode inverters with 55 kW or below and VT-mode ones with 18.5 kW or below) 0.75 to 10 kHz (CT-mode inverters with 75 to 400 kW and VT-mode ones with 22 to 55 kW) 0.75 to 6 kHz (CT-mode inverters with 500 and 630 kW and VT-mode ones with 75 to 500 kW) 0.75 to 4 kHz (VT-mode inverters with 630 kW) 0.75 to 2 kHz (MT-mode inverters with 90 to 400 kW)	Y	Y	2 (Asia) 15 (EU)	Y	Y	Y	Y	Y
F27	(Tone)	0: Level 0 (Inactive) 1: Level 1 2: Level 2 3: Level 3	Y	Y	0	Y	Y	N	N	Y
F29	Analog Output [FM1] (Mode selection)	0: Output in voltage (0 to 10 VDC) 1: Output in current (4 to 20 mA DC)	Y	Y	0	Y	Y	Y	Y	Y
F30	(Voltage adjustment)	0% to 300%	Y*	Y	100	Y	Y	Y	Y	Y
F31	(Function)	Select a function to be monitored from the followings. 0: Output frequency 1 (before slip compensation) 1: Output frequency 2 (after slip compensation) 2: Output current 3: Output voltage 4: Output torque 5: Load factor 6: Input power 7: PID feedback amount 8: PG feedback value 9: DC link bus voltage 10: Universal AO 13: Motor output 14: Calibration (+) 15: PID command (SV) 16: PID output (MV)	Y	Y	0	Y	Y	Y	Y	Y
F32	Analog Output [FM2] (Mode selection)	0: Output in voltage (0 to 10 VDC) 1: Output in current (4 to 20 mA DC)	Y	Y	0	Y	Y	Y	Y	Y
F34	(Voltage adjustment)	0% to 300%	Y*	Y	100	Y	Y	Y	Y	Y
F35	(Function)	Select a function to be monitored from the followings. 0: Output frequency 1 (before slip compensation) 1: Output frequency 2 (after slip compensation) 2: Output current 3: Output voltage 4: Output torque 5: Load factor 6: Input power 7: PID feedback amount 8: PG feedback value 9: DC link bus voltage 10: Universal AO 13: Motor output 14: Calibration 15: PID command (SV) 16: PID output (MV)	Y	Y	0	Y	Y	Y	Y	Y
F37	Load Selection/ Auto Torque Boost/ Auto Energy Saving Operation 1	0: Variable torque load 1: Constant torque load 2: Auto torque boost 3: Auto energy saving (Variable torque load during ACC/DEC) 4: Auto energy saving (Constant torque load during ACC/DEC) 5: Auto energy saving (Auto torque boost during ACC/DEC)	N	Y	1	Y	Y	N	Y	N
F38	Stop Frequency (Detection mode)	0: Detected speed 1: Reference speed	N	Y	0	N	N	N	Y	N
F39	(Holding Time)	0.00 to 10.00 s	Y	Y	0.00	Y	Y	Y	Y	N
F40	Torque Limiter 1-1	-300% to 300%; 999 (Disable)	Y	Y	999	Y	Y	Y	Y	Y
F41	1-2	-300% to 300%; 999 (Disable)	Y	Y	999	Y	Y	Y	Y	Y
F42	Drive Control Selection 1	0: V/f control with slip compensation inactive 1: Dynamic torque vector control 2: V/f control with slip compensation active 3: V/f control with speed sensor 4: Dynamic torque vector control with speed sensor 5: Vector control without speed sensor 6: Vector control with speed sensor	N	Y	0	Y	Y	Y	Y	Y
F43	Current Limiter (Mode selection)	0: Disable (No current limiter works.) 1: Enable at constant speed (Disable during ACC/DEC) 2: Enable during ACC/constant speed operation	Y	Y	2	Y	Y	N	N	N
F44	(Level)	20% to 200% (The data is interpreted as the rated output current of the inverter for 100%.)	Y	Y	160	Y	Y	N	N	N
F50	Electronic Thermal Overload Protection for Braking Resistor (Discharging capability)	0 (Braking resistor built-in type), 1 to 9000 kWs, OFF (Disable)	Y	Y1 Y2	*6	Y	Y	Y	Y	Y
F51	(Allowable average loss)	0.001 to 99.99 kW	Y	Y1 Y2	0.001	Y	Y	Y	Y	Y
F52	(Resistance)	0.01 to 999Ω	Y	Y1 Y2	0.01	Y	Y	Y	Y	Y
F80	Switching between CT, MT and VT drive modes	0: CT (Constant Torque) mode 1: VT (Variable Torque) mode 2: MT (Medium Torque) mode	N	Y	0	Y	Y	Y	Y	Y

The shaded function codes ( ) are applicable to the quick setup.

*6 0 for inverters with a capacity of 7.5 kW or below; OFF for those with 11 kW or above

E codes: Extension Terminal Functions

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
		Selecting function code data assigns the corresponding function to terminals [X1] to [X7] as listed below.								
E01	Terminal [X1] Function	0 (1000): Select multi-frequency (0 to 1 steps) (***SS1***)	N	Y	0	Y	Y	Y	Y	N
E02	Terminal [X2] Function	1 (1001): Select multi-frequency (0 to 3 steps) (***SS2***)	N	Y	1	Y	Y	Y	Y	N
E03	Terminal [X3] Function	2 (1002): Select multi-frequency (0 to 7 steps) (***SS4***)	N	Y	2	Y	Y	Y	Y	N
E04	Terminal [X4] Function	3 (1003): Select multi-frequency (0 to 15 steps) (***SS8***)	N	Y	3	Y	Y	Y	Y	N
E05	Terminal [X5] Function	4 (1004): Select ACC/DEC time (2 steps) (***RT1***)	N	Y	4	Y	Y	Y	Y	N
E06	Terminal [X6] Function	5 (1005): Select ACC/DEC time (4 steps) (***RT2***)	N	Y	5	Y	Y	Y	Y	N
E07	Terminal [X7] Function	6 (1006): Enable 3-wire operation (***HLD***)	N	Y	8	Y	Y	Y	Y	Y
		7 (1007): Coast to a stop (***BX***)				Y	Y	Y	Y	Y
		8 (1008): Reset alarm (***RST***)				Y	Y	Y	Y	Y
		9 (1009): Enable external alarm trip (9 = Active OFF, 1009 = Active ON) (***THR***)				Y	Y	Y	Y	Y
		10 (1010): Ready for jogging (***JOG***)				Y	Y	Y	Y	N
		11 (1011): Select frequency command 2/1 (***Hz2/Hz1***)				Y	Y	Y	Y	N
		12 (1012): Select motor 2 (***M2***)				Y	Y	Y	Y	Y
		13: Enable DC braking (***DCBRK***)				Y	Y	Y	Y	N
		14 (1014): Select torque limiter level 2/1 (***TL2/TL1***)				Y	Y	Y	Y	Y
		15: Switch to commercial power (50 Hz) (***SW50***)				Y	Y	N	N	N
		16: Switch to commercial power (60 Hz) (***SW60***)				Y	Y	N	N	N
		17 (1017): UP (Increase output frequency) (***UP***)				Y	Y	Y	Y	N
		18 (1018): DOWN (Decrease output frequency) (***DOWN***)				Y	Y	Y	Y	N
		19 (1019): Enable data change with keypad (***WE-KP***)				Y	Y	Y	Y	Y
		20 (1020): Cancel PID control (***Hz/PID***)				Y	Y	Y	Y	N
		21 (1021): Switch normal/inverse operation (***IVS***)				Y	Y	Y	Y	N
		22 (1022): Interlock (***IL***)				Y	Y	Y	Y	Y
		23 (1023): Cancel torque control (***Hz/TRQ***)				N	N	N	N	Y
		24 (1024): Enable communications link via RS-485 or fieldbus (option) (***LE***)				Y	Y	Y	Y	Y
		25 (1025): Universal DI (***U-DI***)				Y	Y	Y	Y	Y
		26 (1026): Enable auto search for idling motor speed at starting (***STM***)				Y	Y	Y	N	Y
		30 (1030): Force to stop (***STOP***) ((30 = Active OFF, 1030 = Active ON)				Y	Y	Y	Y	Y
		32 (1032): Pre-excitation (***EXITE***)				N	N	Y	Y	N
		33 (1033): Reset PID integral and differential components (***PID-RST***)				Y	Y	Y	Y	N
		34 (1034): Hold PID integral component (***PID-HLD***)				Y	Y	Y	Y	N
		35 (1035): Select local (keypad) operation (***LOC***)				Y	Y	Y	Y	Y
		36 (1036): Select motor 3 (***M3***)				Y	Y	Y	Y	Y
		37 (1037): Select motor 4 (***M4***)				Y	Y	Y	Y	Y
		39: Protect motor from dew condensation (***DWP***)				Y	Y	Y	Y	Y
		40: Enable integrated sequence to switch to commercial power (50 Hz) (***ISW50***)				Y	Y	N	N	N
		41: Enable integrated sequence to switch to commercial power (60 Hz) (***ISW60***)				Y	Y	N	N	N
		47 (1047): Servo-lock command (***LOCK***)				N	N	N	Y	N
		48: Pulse train input (available only on terminal [X7] (E07)) (***PIN***)				Y	Y	Y	Y	Y
		49 (1049): Pulse train sign (available on terminals except [X7] (E01 to E06)) (***SIGN***)				Y	Y	Y	Y	Y
		70 (1070): Cancel constant peripheral speed control (***Hz/LSC***)				Y	Y	Y	Y	N
		71 (1071): Hold the constant peripheral speed control frequency in the memory (***LSC-HLD***)				Y	Y	Y	Y	N
		72 (1072): Count the run time of commercial power-driven motor 1 (***CRUN-M1***)				Y	Y	N	N	Y
		73 (1073): Count the run time of commercial power-driven motor 2 (***CRUN-M2***)				Y	Y	N	N	Y
		74 (1074): Count the run time of commercial power-driven motor 3 (***CRUN-M3***)				Y	Y	N	N	Y
		75 (1075): Count the run time of commercial power-driven motor 4 (***CRUN-M4***)				Y	Y	N	N	Y
		76 (1076): Select droop control (***DROOP***)				Y	Y	Y	Y	N
		77 (1077): Cancel PG alarm (***PG-CCL***)				N	Y	N	Y	Y
		80 (1080): Cancel customizable logic (***CLC***)				Y	Y	Y	Y	Y
		81 (1081): Clear all customizable logic timers (***CLTC***)				Y	Y	Y	Y	Y
		100: No function assigned (***NONE***)				Y	Y	Y	Y	Y
		Setting the value in parentheses ( ) shown above assigns a negative logic input to a terminal.								
E10	Acceleration Time 2	0.00 to 6000 s	Y	Y	*2	Y	Y	Y	Y	N
E11	Deceleration Time 2	Note: Entering 0.00 cancels the acceleration time, requiring external soft-start and -stop.	Y	Y	*2	Y	Y	Y	Y	N
E12	Acceleration Time 3		Y	Y	*2	Y	Y	Y	Y	N
E13	Deceleration Time 3		Y	Y	*2	Y	Y	Y	Y	N
E14	Acceleration Time 4		Y	Y	*2	Y	Y	Y	Y	N
E15	Deceleration Time 4		Y	Y	*2	Y	Y	Y	Y	N

*2 6.00 s for inverters with a capacity of 22 kW or below; 20.00 s for those with 30 kW or above

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
E16	Torque Limiter 2-1	-300% to 300%; 999 (Disable)	Y	Y	999	Y	Y	Y	Y	Y
E17	Torque Limiter 2-2	-300% to 300%; 999 (Disable)	Y	Y	999	Y	Y	Y	Y	Y
		Selecting function code data assigns the corresponding function to terminals [Y1] to [Y5A/C] and [30A/B/C] as listed below.								
E20	Terminal [Y1] Function	0 (1000): Inverter running (***RUN***)	N	Y	0	Y	Y	Y	Y	Y
E21	Terminal [Y2] Function	1 (1001): Frequency (speed) arrival signal (***FAR***)	N	Y	1	Y	Y	Y	Y	N
E22	Terminal [Y3] Function	2 (1002): Frequency (speed) detected (***FDT***)	N	Y	2	Y	Y	Y	Y	Y
E23	Terminal [Y4] Function	3 (1003): Undervoltage detected (Inverter stopped) (***LU***)	N	Y	7	Y	Y	Y	Y	Y
E24	Terminal [Y5A/C] Function	4 (1004): Torque polarity detected (***B/D***)	N	Y	15	Y	Y	Y	Y	Y
E27	Terminal [30A/B/C] Function (Relay output)	5 (1005): Inverter output limiting (***IOL***)	N	Y	99	Y	Y	Y	Y	Y
		6 (1006): Auto-restarting after momentary power failure (***IPF***)				Y	Y	Y	Y	Y
		7 (1007): Motor overload early warning (***OL***)				Y	Y	Y	Y	Y
		8 (1008): Keypad operation enabled (***KP***)				Y	Y	Y	Y	Y
		10 (1010): Inverter ready to run (***RDY***)				Y	Y	Y	Y	Y
		11: Switch motor drive source between commercial power and inverter output (For MC on commercial line) (***SW88***)				Y	Y	N	N	N
		12: Switch motor drive source between commercial power and inverter output (For secondary side) (***SW52-2***)				Y	Y	N	N	N
		13: Switch motor drive source between commercial power and inverter output (For primary side) (***SW52-1***)				Y	Y	N	N	N
		15 (1015): Select ***AX*** terminal function (For MC on primary side) (***AX***)				Y	Y	Y	Y	Y
		22 (1022): Inverter output limiting with delay (***IOL2***)				Y	Y	Y	Y	Y
		25 (1025): Cooling fan in operation (***FAN***)				Y	Y	Y	Y	Y
		26 (1026): Auto-resetting (***TRY***)				Y	Y	Y	Y	Y
		27 (1027): Universal DO (***U-DO***)				Y	Y	Y	Y	Y
		28 (1028): Heat sink overheat early warning (***OH***)				Y	Y	Y	Y	Y
		30 (1030): Lifetime alarm (***LIFE***)				Y	Y	Y	Y	Y
		31 (1031): Frequency (speed) detected 2 (***FDT2***)				Y	Y	Y	Y	Y
		33 (1033): Reference loss detected (***REF OFF***)				Y	Y	Y	Y	Y
		35 (1035): Inverter output on (***RUN2***)				Y	Y	Y	Y	Y
		36 (1036): Overload prevention control (***OLP***)				Y	Y	Y	Y	N
		37 (1037): Current detected (***ID***)				Y	Y	Y	Y	Y
		38 (1038): Current detected 2 (***ID2***)				Y	Y	Y	Y	Y
		39 (1039): Current detected 3 (***ID3***)				Y	Y	Y	Y	Y
		41 (1041): Low current detected (***IDL***)				Y	Y	Y	Y	Y
		42 (1042): PID alarm (***PID-ALM***)				Y	Y	Y	Y	N
		43 (1043): Under PID control (***PID-CTL***)				Y	Y	Y	Y	N
		44 (1044): Motor stopped due to slow flowrate under PID control (***PID-STP***)				Y	Y	Y	Y	N
		45 (1045): Low output torque detected (***U-TL***)				Y	Y	Y	Y	Y
		46 (1046): Torque detected 1 (***TD1***)				Y	Y	Y	Y	Y
		47 (1047): Torque detected 2 (***TD2***)				Y	Y	Y	Y	Y
		48 (1048): Motor 1 selected (***SWM1***)				Y	Y	Y	Y	Y
		49 (1049): Motor 2 selected (***SWM2***)				Y	Y	Y	Y	Y
		50 (1050): Motor 3 selected (***SWM3***)				Y	Y	Y	Y	Y
		51 (1051): Motor 4 selected (***SWM4***)				Y	Y	Y	Y	Y
		52 (1052): Running forward (***FRUN***)				Y	Y	Y	Y	Y
		53 (1053): Running reverse (***RRUN***)				Y	Y	Y	Y	Y
		54 (1054): In remote operation (***RMT***)				Y	Y	Y	Y	Y
		56 (1056): Motor overheat detected by thermistor (***THM***)				Y	Y	Y	Y	Y
		57 (1057): Brake signal (***BRKS***)				Y	Y	Y	Y	N
		58 (1058): Frequency (speed) detected 3 (***FDT3***)				Y	Y	Y	Y	Y
		59 (1059): Terminal [C1] wire break (***C1OFF***)				Y	Y	Y	Y	Y
		70 (1070): Speed valid (***DNZS***)				N	Y	Y	Y	Y
		71 (1071): Speed agreement (***DSAG***)				N	Y	Y	Y	N
		72 (1072): Frequency (speed) arrival signal 3 (***FAR3***)				Y	Y	Y	Y	N
		76 (1076): PG error detected (***PG-ERR***)				N	Y	Y	Y	N
		82 (1082): Positioning completion signal (***PSET***)				N	N	N	Y	N
		84 (1084): Maintenance timer (***MNT***)				Y	Y	Y	Y	Y
		98 (1098): Light alarm (***L-ALM***)				Y	Y	Y	Y	Y
		99 (1099): Alarm output (for any alarm) (***ALM***)				Y	Y	Y	Y	Y
		101 (1101): Enable circuit failure detected (***DECF***)				Y	Y	Y	Y	Y
		102 (1102): Enable input OFF (***EN OFF***)				Y	Y	Y	Y	Y
		105 (1105): Braking transistor broken (***DBAL***)				Y	Y	Y	Y	Y
		111 (1111): Customizable logic output signal 1 (***CLO1***)				Y	Y	Y	Y	Y
		112 (1112): Customizable logic output signal 2 (***CLO2***)				Y	Y	Y	Y	Y
		113 (1113): Customizable logic output signal 3 (***CLO3***)				Y	Y	Y	Y	Y
		114 (1114): Customizable logic output signal 4 (***CLO4***)				Y	Y	Y	Y	Y
		115 (1115): Customizable logic output signal 5 (***CLO5***)				Y	Y	Y	Y	Y
		Setting the value in parentheses ( ) shown above assigns a negative logic output to a terminal.								

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
E30	Frequency Arrival (Hysteresis width)	0.0 to 10.0 Hz	Y	Y	2.5	Y	Y	Y	Y	N
E31	Frequency Detection 1 (Level)	0.0 to 500.0 Hz	Y	Y	*1	Y	Y	Y	Y	N
E32	(Hysteresis width)	0.0 to 500.0 Hz	Y	Y	1.0	Y	Y	Y	Y	N
E34	Overload Early Warning/Current Detection (Level)	0.00 (Disable); Current value of 1% to 200% of the inverter rated current	Y	Y1 Y2	*4	Y	Y	Y	Y	Y
E35	(Timer)	0.01 to 600.00s	Y	Y	10.00	Y	Y	Y	Y	Y
E36	Frequency Detection 2 (Level)	0.0 to 500.0 Hz	Y	Y	*1	Y	Y	Y	Y	Y
E37	Current Detection 2/ Low Current Detection (Level)	0.00 (Disable); Current value of 1% to 200% of the inverter rated current	Y	Y1 Y2	*4	Y	Y	Y	Y	Y
E38	(Timer)	0.01 to 600.00 s	Y	Y	10.00	Y	Y	Y	Y	Y
E40	PID Display Coefficient A	-999 to 0.00 to 9990	Y	Y	100	Y	Y	Y	Y	N
E41	PID Display Coefficient B	-999 to 0.00 to 9990	Y	Y	0.00	Y	Y	Y	Y	N
E42	LED Display Filter	0.0 to 5.0 s	Y	Y	0.5	Y	Y	Y	Y	Y
E43	LED Monitor (Item selection)	0: Speed monitor (select by E48) 3: Output current 4: Output voltage 8: Calculated torque 9: Input power 10: PID command 12: PID feedback amount 14: PID output 15: Load factor 16: Motor output 17: Analog input 23: Torque current (%) 24: Magnetic flux command (%) 25: Input watt-hour	Y	Y	0	Y	Y	Y	Y	Y
E44	(Display when stopped)	0: Specified value 1: Output value	Y	Y	0	Y	Y	Y	Y	Y
E45	LCD Monitor (Item selection)	0: Running status, rotational direction and operation guide 1: Bar charts for output frequency, current and calculated torque	Y	Y	0	Y	Y	Y	Y	Y
E46	(Language selection)	Multi-function keypad (option) Type: OP-KP-LCD 0: Japanese 1: English 2: German 3: French 4: Spanish 5: Italian	Y	Y	1	Y	Y	Y	Y	Y
E47	(Contrast control)	0 (Low) to 10 (High)	Y	Y	5	Y	Y	Y	Y	Y
E48	LED Monitor (Speed monitor item)	0: Output frequency 1 (Before slip compensation) 1: Output frequency 2 (After slip compensation) 2: Reference frequency 3: Motor speed in r/min 4: Load shaft speed in r/min 5: Line speed in m/min 7: Display speed in %	Y	Y	0	Y	Y	Y	Y	Y
E50	Coefficient for Speed Indication	0.01 to 200.00	Y	Y	30.00	Y	Y	Y	Y	Y
E51	Display Coefficient for Input Watt-hour Data	0.000 (Cancel/reset), 0.001 to 9999	Y	Y	0.010	Y	Y	Y	Y	Y
E52	Keypad (Menu display mode)	0: Function code data editing mode (Menus #0, #1, and #7) 1: Function code data check mode (Menu #2 and #7) 2: Full-menu mode	Y	Y	0	Y	Y	Y	Y	Y
E54	Frequency Detection 3 (Level)	0.0 to 500.0 Hz	Y	Y	*1	Y	Y	Y	Y	Y
E55	Current Detection 3 (Level)	0.00 (Disable); Current value of 1% to 200% of the inverter rated current	Y	Y1 Y2	*4	Y	Y	Y	Y	Y
E56	(Timer)	0.01 to 600.00 s	Y	Y	10.00	Y	Y	Y	Y	Y
E61	Terminal [12] Extended Function	0: None 1: Auxiliary frequency command 1 2: Auxiliary frequency command 2 3: PID command 1 5: PID feedback amount 6: Ratio setting 7: Analog torque limit value A 8: Analog torque limit value B 10: Torque command 11: Torque current command 20: Analog input monitor	N	Y	0	Y	Y	Y	Y	Y
E62	Terminal [C1] Extended Function		N	Y	0	Y	Y	Y	Y	Y
E63	Terminal [V2] Extended Function		N	Y	0	Y	Y	Y	Y	Y
E64	Saving of Digital Reference Frequency	0: Automatic saving (when main power is turned OFF) 1: Saving by pressing (FUNC DATA) key	Y	Y	1	Y	Y	Y	Y	Y
E65	Reference Loss Detection	0: Decelerate to stop, 20% to 120%, 999: Disable	Y	Y	999	Y	Y	Y	Y	Y
E78	Torque Detection 1 (Level)	0% to 300%	Y	Y	100	Y	Y	Y	Y	Y
E79	(Timer)	0.01 to 600.00 s	Y	Y	10.00	Y	Y	Y	Y	Y
E80	Torque Detection 2/ Low Torque Detection (Level)	0% to 300%	Y	Y	20	Y	Y	Y	Y	Y
E81	(Timer)	0.01 to 600.00 s	Y	Y	20.00	Y	Y	Y	Y	Y

The shaded function codes (▭) are applicable to the quick setup.
*1 The factory default differs depending upon the shipping destination. See Table A.
*4 The motor rated current is automatically set. See Table C (function code P03).

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
		Selecting function code data assigns the corresponding function to terminals [FWD] and [REV] as listed below.								
E98	Terminal [FWD] Function	0 (1000): Select multi-frequency (0 to 1 steps) (***SS1***)	N	Y	98	Y	Y	Y	Y	N
E99	Terminal [REV] Function	1 (1001): Select multi-frequency (0 to 3 steps) (***SS2***)	N	Y	99	Y	Y	Y	Y	N
		2 (1002): Select multi-frequency (0 to 7 steps) (***SS4***)				Y	Y	Y	Y	N
		3 (1003): Select multi-frequency (0 to 15 steps) (***SS8***)				Y	Y	Y	Y	N
		4 (1004): Select ACC/DEC time (2 steps) (***RT1***)				Y	Y	Y	Y	N
		5 (1005): Select ACC/DEC time (4 steps) (***RT2***)				Y	Y	Y	Y	N
		6 (1006): Enable 3-wire operation (***HLD***)				Y	Y	Y	Y	Y
		7 (1007): Coast to a stop (***BX***)				Y	Y	Y	Y	Y
		8 (1008): Reset alarm (***RST***)				Y	Y	Y	Y	Y
		9 (1009): Enable external alarm trip (9 = Active OFF, 1009 = Active ON) (***THR***)				Y	Y	Y	Y	Y
		10 (1010): Ready for jogging (***JOG***)				Y	Y	Y	Y	N
		11 (1011): Select frequency command 2/1 (***Hz2/Hz1***)				Y	Y	Y	Y	N
		12 (1012): Select motor 2 (***M2***)				Y	Y	Y	Y	Y
		13: Enable DC braking (***DCBRK***)				Y	Y	Y	Y	N
		14 (1014): Select torque limiter level 2/1 (***TL2/TL1***)				Y	Y	Y	Y	Y
		15: Switch to commercial power (50 Hz) (***SW50***)				Y	Y	N	N	N
		16: Switch to commercial power (60 Hz) (***SW60***)				Y	Y	N	N	N
		17 (1017): UP (Increase output frequency) (***UP***)				Y	Y	Y	Y	N
		18 (1018): DOWN (Decrease output frequency) (***DOWN***)				Y	Y	Y	Y	N
		19 (1019): Enable data change with keypad (***WE-KP***)				Y	Y	Y	Y	Y
		20 (1020): Cancel PID control (***Hz/PID***)				Y	Y	Y	Y	N
		21 (1021): Switch normal/inverse operation (***IVS***)				Y	Y	Y	Y	N
		22 (1022): Interlock (***IL***)				Y	Y	Y	Y	Y
		23 (1023): Cancel torque control (***Hz/TRQ***)				N	N	N	N	Y
		24 (1024): Enable communications link via RS-485 or fieldbus (***LE***)				Y	Y	Y	Y	Y
		25 (1025): Universal DI (***U-DI***)				Y	Y	Y	Y	Y
		26 (1026): Enable auto search for idling motor speed at starting (***STM***)				Y	Y	Y	N	Y
		30 (1030): Force to stop ((30 = Active OFF, 1030 = Active ON) (***STOP***)				Y	Y	Y	Y	Y
		32 (1032): Pre-excitation (***EXITE***)				N	N	Y	Y	N
		33 (1033): Reset PID integral and differential components (***PID-RST***)				Y	Y	Y	Y	N
		34 (1034): Hold PID integral component (***PID-HLD***)				Y	Y	Y	Y	N
		35 (1035): Select local (keypad) operation (***LOC***)				Y	Y	Y	Y	Y
		36 (1036): Select motor 3 (***M3***)				Y	Y	Y	Y	Y
		37 (1037): Select motor 4 (***M4***)				Y	Y	Y	Y	Y
		39: Protect motor from dew condensation (***DWP***)				Y	Y	Y	Y	Y
		40: Enable integrated sequence to switch to commercial power (50 Hz) (***ISW50***)				Y	Y	N	N	N
		41: Enable integrated sequence to switch to commercial power (60 Hz) (***ISW60***)				Y	Y	N	N	N
		47 (1047): Servo-lock command (***LOCK***)				N	N	N	Y	N
		49 (1049): Pulse train sign (***SIGN***)				Y	Y	Y	Y	Y
		70 (1070): Cancel constant peripheral speed control (***Hz/LSC***)				Y	Y	Y	Y	N
		71 (1071): Hold the constant peripheral speed control frequency in the memory (***LSC-HLD***)				Y	Y	Y	Y	N
		72 (1072): Count the run time of commercial power-driven motor 1 (***CRUN-M1***)				Y	Y	N	N	Y
		73 (1073): Count the run time of commercial power-driven motor 2 (***CRUN-M2***)				Y	Y	N	N	Y
		74 (1074): Count the run time of commercial power-driven motor 3 (***CRUN-M3***)				Y	Y	N	N	Y
		75 (1075): Count the run time of commercial power-driven motor 4 (***CRUN-M4***)				Y	Y	N	N	Y
		76 (1076): Select droop control (***DROOP***)				Y	Y	Y	Y	N
		77 (1077): Cancel PG alarm (***PG-CCL***)				N	Y	N	Y	Y
		80 (1080): Cancel customizable logic (***CLC***)				Y	Y	Y	Y	Y
		81 (1081): Clear all customizable logic timers (***CLTC***)				Y	Y	Y	Y	Y
		98: Run forward (***FWD***)				Y	Y	Y	Y	Y
		99: Run reverse (***REV***)				Y	Y	Y	Y	Y
		100: No function assigned (***NONE***)				Y	Y	Y	Y	Y
		Setting the value in parentheses ( ) shown above assigns a negative logic input to a terminal.								

C codes: Control Functions of Frequency

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
C01	Jump Frequency 1	0.0 to 500.0 Hz	Y	Y	0.0	Y	Y	Y	Y	N
C02	2		Y	Y	0.0	Y	Y	Y	Y	N
C03	3		Y	Y	0.0	Y	Y	Y	Y	N
C04	(Hysteresis width)	0.0 to 30.0 Hz	Y	Y	3.0	Y	Y	Y	Y	N
C05	Multi-frequency 1	0.00 to 500.00 Hz	Y	Y	0.00	Y	Y	Y	Y	N
C06	2		Y	Y	0.00	Y	Y	Y	Y	N
C07	3		Y	Y	0.00	Y	Y	Y	Y	N
C08	4		Y	Y	0.00	Y	Y	Y	Y	N
C09	5		Y	Y	0.00	Y	Y	Y	Y	N
C10	6		Y	Y	0.00	Y	Y	Y	Y	N
C11	7		Y	Y	0.00	Y	Y	Y	Y	N
C12	8		Y	Y	0.00	Y	Y	Y	Y	N
C13	9		Y	Y	0.00	Y	Y	Y	Y	N
C14	10		Y	Y	0.00	Y	Y	Y	Y	N
C15	11		Y	Y	0.00	Y	Y	Y	Y	N
C16	12		Y	Y	0.00	Y	Y	Y	Y	N
C17	13		Y	Y	0.00	Y	Y	Y	Y	N
C18	14		Y	Y	0.00	Y	Y	Y	Y	N
C19	15		Y	Y	0.00	Y	Y	Y	Y	N
C20	Jogging Frequency	0.00 to 500.00 Hz	Y	Y	0.00	Y	Y	Y	Y	N
C30	Frequency Command 2	0: Enable ⌃ / ⌄ keys on the keypad 1: Voltage input to terminal [12] (-10 to +10 VDC) 2: Current input to terminal [C1] (4 to 20 mA DC) 3: Sum of voltage and current inputs to terminals [12] and [C1] 5: Voltage input to terminal [V2] (0 to 10 VDC) 7: Terminal command ***UP***/***DOWN*** control 8: Enable ⌃ / ⌄ keys on the keypad (balanceless-bumpless switching available) 11: Digital input interface card (option) 12: Pulse train input	N	Y	2	Y	Y	Y	Y	N
C31	Analog Input Adjustment for [12] (Offset)	-5.0% to 5.0%	Y*	Y	0.0	Y	Y	Y	Y	Y
C32	(Gain)	0.00% to 200.00%	Y*	Y	100.00	Y	Y	Y	Y	Y
C33	(Filter time constant)	0.00 to 5.00 s	Y	Y	0.05	Y	Y	Y	Y	Y
C34	(Gain base point)	0.00% to 100.00%	Y*	Y	100.00	Y	Y	Y	Y	Y
C35	(Polarity)	0: Bipolar 1: Unipolar	N	Y	1	Y	Y	Y	Y	Y
C36	Analog Input Adjustment for [C1] (Offset)	-5.0% to 5.0%	Y*	Y	0.0	Y	Y	Y	Y	Y
C37	(Gain)	0.00% to 200.00%	Y*	Y	100.00	Y	Y	Y	Y	Y
C38	(Filter time constant)	0.00 to 5.00s	Y	Y	0.05	Y	Y	Y	Y	Y
C39	(Gain base point)	0.00% to 100.00%	Y*	Y	100.00	Y	Y	Y	Y	Y
C41	Analog Input Adjustment for [V2] (Offset)	-5.0% to 5.0%	Y*	Y	0.0	Y	Y	Y	Y	Y
C42	(Gain)	0.00% to 200.00%	Y*	Y	100.00	Y	Y	Y	Y	Y
C43	(Filter time constant)	0.00 to 5.00 s	Y	Y	0.05	Y	Y	Y	Y	Y
C44	(Gain base point)	0.00% to 100.00%	Y*	Y	100.00	Y	Y	Y	Y	Y
C45	(Polarity)	0: Bipolar 1: Unipolar	N	Y	1	Y	Y	Y	Y	Y
C50	Bias (Frequency command 1) (Bias base point)	0.00% to 100.00%	Y*	Y	0.00	Y	Y	Y	Y	Y
C51	Bias (PID command 1) (Bias value)	-100.00% to 100.00%	Y*	Y	0.00	Y	Y	Y	Y	Y
C52	(Bias base point)	0.00% to 100.00%	Y*	Y	0.00	Y	Y	Y	Y	Y
C53	Selection of Normal/Inverse Operation (Frequency command 1)	0: Normal operation 1: Inverse operation	Y	Y	0	Y	Y	Y	Y	Y

P codes: Motor 1 Parameters

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
P01	Motor 1 (No. of poles)	2 to 22 poles	N	Y1 Y2	4	Y	Y	Y	Y	Y
P02	(Rated capacity)	0.01 to 1000 kW (when P99 = 0, 2, 3 or 4) 0.01 to 1000 HP (when P99 = 1)	N	Y1 Y2	*7	Y	Y	Y	Y	Y
P03	(Rated current)	0.00 to 2000 A	N	Y1 Y2	*7	Y	Y	Y	Y	Y
P04	(Auto-tuning)	0: Disable 1: Tune while the motor stops. (%R1, %X and rated slip frequency) 2: Tune while the motor is rotating under V/f control (%R1, %X, rated slip frequency, no-load current, magnetic saturation factors 1 to 5, and magnetic saturation extension factors "a" to "c") 3: Tune while the motor is rotating under vector control (%R1, %X, rated slip frequency, no-load current, magnetic saturation factors 1 to 5, and magnetic saturation extension factors "a" to "c." Available when the vector control is enabled.)	N	N	0	Y	Y	Y	Y	Y
P06	(No-load current)	0.00 to 2000 A	N	Y1 Y2	*7	Y	Y	Y	Y	Y
P07	(%R1)	0.00% to 50.00%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
P08	(%X)	0.00% to 50.00%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
P09	(Slip compensation gain for driving)	0.0% to 200.0%	Y*	Y	100.0	Y	Y	Y	Y	N
P10	(Slip compensation response time)	0.01 to 10.00 s	Y	Y1 Y2	0.12	Y	Y	N	N	N
P11	(Slip compensation gain for braking)	0.0% to 200.0%	Y*	Y	100.0	Y	Y	Y	Y	N
P12	(Rated slip frequency)	0.00 to 15.00 Hz	N	Y1 Y2	*7	Y	Y	Y	Y	N
P13	(Iron loss factor 1)	0.00% to 20.00%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
P14	(Iron loss factor 2)	0.00% to 20.00%	Y	Y1 Y2	0.00	Y	Y	Y	Y	Y
P15	(Iron loss factor 3)	0.00% to 20.00%	Y	Y1 Y2	0.00	Y	Y	Y	Y	Y
P16	(Magnetic saturation factor 1)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
P17	(Magnetic saturation factor 2)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
P18	(Magnetic saturation factor 3)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
P19	(Magnetic saturation factor 4)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
P20	(Magnetic saturation factor 5)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
P21	(Magnetic saturation extension factor "a")	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
P22	(Magnetic saturation extension factor "b")	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
P23	(Magnetic saturation extension factor "c")	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
P53	(%X correction factor 1)	0% to 300%	Y	Y1 Y2	100	Y	Y	Y	Y	Y
P54	(%X correction factor 2)	0% to 300%	Y	Y1 Y2	100	Y	Y	Y	Y	Y
P55	(Torque current under vector control)	0.00 to 2000 A	N	Y1 Y2	*7	N	N	Y	Y	Y
P56	(Induced voltage factor under vector control)	50% to 100%	N	Y1 Y2	85	N	N	Y	Y	Y
P57	Reserved *9	0.000 to 20.000 s	Y	Y1 Y2	*7	-	-	-	-	Y
P99	Motor 1 Selection	0: Motor characteristics 0 (standard motors) 1: Motor characteristics 1 (HP rating motors) 2: Motor characteristics 2 (Not used) 3: Motor characteristics 3 (Not used) 4: Other motors	N	Y1 Y2	0	Y	Y	Y	Y	Y

H codes: High Performance Functions

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control					Refer to page:
						V/f	PG V/f	w/o PG	w/ PG	Torque control	
H03	Data Initialization	0: Disable initialization 1: Initialize all function code data to the factory defaults 2: Initialize motor 1 parameters 3: Initialize motor 2 parameters 4: Initialize motor 3 parameters 5: Initialize motor 4 parameters	N	N	0	Y	Y	Y	Y	Y	5-99
H04	Auto-reset (Times)	0: Disable; 1 to 10	Y	Y	0	Y	Y	Y	Y	Y	
H05	(Reset interval)	0.5 to 20.0 s	Y	Y	5.0	Y	Y	Y	Y	Y	
H06	Cooling Fan ON/OFF Control	0: Disable (Always in operation) 1: Enable (ON/OFF controllable)	Y	Y	0	Y	Y	Y	Y	Y	5-100
H07	Acceleration/Deceleration Pattern	0: Linear 1: S-curve (Weak) 2: S-curve (Arbitrary, according to H57 to H60 data) 3: Curvilinear	Y	Y	0	Y	Y	Y	Y	N	5-38 5-101
H08	Rotational Direction Limitation	0: Disable 1: Enable (Reverse rotation inhibited) 2: Enable (Forward rotation inhibited)	N	Y	0	Y	Y	Y	Y	N	5-101

The shaded function codes ( ) are applicable to the quick setup.

*7 The motor parameters are automatically set, depending upon the inverter's capacity and shipping destination. See Table C.

*9 These function codes are reserved for particular manufacturers. Unless otherwise specified, do not access these function codes.

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
H09	Starting Mode (Auto search)	0: Disable 1: Enable (At restart after momentary power failure) 2: Enable (At restart after momentary power failure and at normal start)	N	Y	0	Y	Y	N	N	N
H11	Deceleration Mode	0: Normal deceleration 1: Coast-to-stop	Y	Y	0	Y	Y	Y	Y	N
H12	Instantaneous Overcurrent Limiting (Mode selection)	0: Disable 1: Enable	Y	Y	1	Y	Y	N	N	N
H13	Restart Mode after Momentary Power Failure (Restart time)	0.1 to 10.0 s	Y	Y1 Y2	*3	Y	Y	Y	Y	N
H14	(Frequency fall rate)	0.00: Deceleration time selected by F08, 0.01 to 100.00 Hz/s, 999: Follow the current limit command	Y	Y	999	Y	Y	Y	N	N
H15	(Continuous running level)	200 to 300 V for 200 V class series 400 to 600 V for 400 V class series	Y	Y2	235 470	Y	Y	Y	Y	N
H16	(Allowable momentary power failure time)	0.0 to 30.0 s 999: Automatically determined by inverter	Y	Y	999	Y	Y	Y	Y	N
H18	Torque Limiter (Mode selection)	0: Disable (Speed control) 2: Enable (Torque current command) 3: Enable (Torque command)	N	Y	0	N	N	Y	Y	Y
H26	Thermistor (for motor) (Mode selection)	0: Disable 1: PTC (The inverter immediately trips with *0h4* displayed.) 2: PTC (The inverter issues output signal ***THM*** and continues to run.) 3: NTC (When connected)	Y	Y	0	Y	Y	Y	Y	Y
H27	(Level)	0.00 to 5.00 V	Y	Y	0.35	Y	Y	Y	Y	Y
H28	Droop Control	-60.0 to 0.0 Hz	Y	Y	0.0	Y	Y	Y	Y	N
H30	Communications Link Function (Mode selection)	Frequency command / Run command 0: F01/C30 / F02 1: RS-485 (Port 1) / F02 2: F01/C30 / RS-485 (Port 1) 3: RS-485 (Port 1) / RS-485 (Port 1) 4: RS-485 (Port 2) / F02 5: RS-485 (Port 2) / RS-485 (Port 1) 6: F01/C30 / RS-485 (Port 2) 7: RS-485 (Port 1) / RS-485 (Port 2) 8: RS-485 (Port 2) / RS-485 (Port 2)	Y	Y	0	Y	Y	Y	Y	Y
H42	Capacitance of DC Link Bus Capacitor	Indication for replacement of DC link bus capacitor 0000 to FFFF (hex.)	Y	N	-	Y	Y	Y	Y	Y
H43	Cumulative Run Time of Cooling Fan	Indication for replacement of cooling fan (in units of 10 hours)	Y	N	-	Y	Y	Y	Y	Y
H44	Startup Counter for Motor 1	Indication of cumulative startup count 0000 to FFFF (hex.)	Y	N	-	Y	Y	Y	Y	Y
H45	Mock Alarm	0: Disable 1: Enable (Once a mock alarm occurs, the data automatically returns to 0.)	Y	N	0	Y	Y	Y	Y	Y
H46	Starting Mode (Auto search delay time 2)	0.1 to 10.0 s	Y	Y1 Y2	*7	Y	Y	Y	N	Y
H47	Initial Capacitance of DC Link Bus Capacitor	Indication for replacement of DC link bus capacitor 0000 to FFFF (hex.)	Y	N	-	Y	Y	Y	Y	Y
H48	Cumulative Run Time of Capacitors on Printed Circuit Boards	Indication for replacement of capacitors (The cumulative run time can be modified or reset in units of 10 hours.)	Y	N	-	Y	Y	Y	Y	Y
H49	Starting Mode (Auto search delay time 1)	0.0 to 10.0 s	Y	Y	0.0	Y	Y	Y	Y	Y
H50	Non-linear V/f Pattern 1 (Frequency)	0.0: Cancel, 0.1 to 500.0 Hz	N	Y	*8	Y	Y	N	N	N
H51	(Voltage)	0 to 240: Output an AVR-controlled voltage (for 200 V class series) 0 to 500: Output an AVR-controlled voltage (for 400 V class series)	N	Y2	*8	Y	Y	N	N	N
H52	Non-linear V/f Pattern 2 (Frequency)	0.0: Cancel, 0.1 to 500.0 Hz	N	Y	0.0	Y	Y	N	N	N
H53	(Voltage)	0 to 240: Output an AVR-controlled voltage (for 200 V class series) 0 to 500: Output an AVR-controlled voltage (for 400 V class series)	N	Y2	0	Y	Y	N	N	N
H54	Acceleration Time (Jogging)	0.00 to 6000 s	Y	Y	*2	Y	Y	Y	Y	N
H55	Deceleration Time (Jogging)	0.00 to 6000 s	Y	Y	*2	Y	Y	Y	Y	N
H56	Deceleration Time for Forced Stop	0.00 to 6000 s	Y	Y	*2	Y	Y	Y	Y	N
H57	1st S-curve acceleration range (Leading edge)	0% to 100%	Y	Y	10	Y	Y	Y	Y	N
H58	2nd S-curve acceleration range (Trailing edge)	0% to 100%	Y	Y	10	Y	Y	Y	Y	N
H59	1st S-curve deceleration range (Leading edge)	0% to 100%	Y	Y	10	Y	Y	Y	Y	N
H60	2nd S-curve deceleration range (Trailing edge)	0% to 100%	Y	Y	10	Y	Y	Y	Y	N

*2 6.00 s for inverters with a capacity of 22 kW or below; 20.00 s for those with 30 kW or above

*3 The factory default differs depending upon the inverter's capacity. See Table B.

*7 The motor parameters are automatically set, depending upon the inverter's capacity and shipping destination. See Table C.

*8 The factory default differs depending upon the inverter's capacity. See the table under "■ Non-linear V/f Patterns 1, 2 and 3 for Voltage" in the description of F04.

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
H61	UP/DOWN Control (Initial frequency setting)	0: 0.00 Hz 1: Last ***UP***/***DOWN*** command value on releasing the run command	N	Y	1	Y	Y	Y	Y	N
H63	Low Limiter (Mode selection)	0: Limit by F16 (Frequency limiter: Low) and continue to run 1: If the output frequency lowers below the one limited by F16 (Frequency limiter: Low), decelerate to stop the motor.	Y	Y	0	Y	Y	Y	Y	N
H64	(Lower limiting frequency)	0.0: Depends on F16 (Frequency limiter, Low) 0.1 to 60.0 Hz	Y	Y	1.6	Y	Y	N	N	N
H65	Non-linear V/f Pattern 3 (Frequency)	0.0: Cancel, 0.1 to 500.0 Hz	N	Y	0.0	Y	Y	N	N	N
H66	(Voltage)	0 to 240: Output an AVR-controlled voltage (for 200 V class series) 0 to 500: Output an AVR-controlled voltage (for 400 V class series)	N	Y2	0	Y	Y	N	N	N
H67	Auto Energy Saving Operation (Mode selection)	0: Enable during running at constant speed 1: Enable in all modes	Y	Y	0	Y	Y	N	Y	N
H68	Slip Compensation 1 (Operating conditions)	0: Enable during ACC/DEC and at base frequency or above 1: Disable during ACC/DEC and enable at base frequency or above 2: Enable during ACC/DEC and disable at base frequency or above 3: Disable during ACC/DEC and at base frequency or above	N	Y	0	Y	Y	N	N	N
H69	Automatic Deceleration (Mode selection)	0: Disable 2: Torque limit control with Force-to-stop if actual deceleration time exceeds three times the specified one 3: DC link bus voltage control with Force-to-stop if actual deceleration time exceeds three times the specified one 4: Torque limit control with Force-to-stop disabled 5: DC link bus voltage control with Force-to-stop disabled	Y	Y	0	Y	Y	Y	Y	N
H70	Overload Prevention Control	0.00: Follow the deceleration time selected 0.01 to 100.0 Hz/s 999: Cancel	Y	Y	999	Y	Y	Y	Y	N
H71	Deceleration Characteristics	0: Disable 1: Enable	Y	Y	0	Y	Y	N	N	N
H72	Main Power Down Detection (Mode selection)	0: Disable 1: Enable	Y	Y	1	Y	Y	Y	Y	Y
H73	Torque Limiter (Operating conditions)	0: Enable during ACC/DEC and running at constant speed 1: Disable during ACC/DEC and enable during running at constant speed 2: Enable during ACC/DEC and disable during running at constant speed	N	Y	0	Y	Y	Y	Y	Y
H74	(Control target)	0: Motor-generating torque limit 1: Torque current limit 2: Output power limit	N	Y	1	N	N	Y	Y	Y
H75	(Target quadrants)	0: Drive/brake 1: Same for all four quadrants 2: Upper/lower limits	N	Y	0	N	N	Y	Y	Y
H76	(Frequency increment limit for braking)	0.0 to 500.0 Hz	Y	Y	5.0	Y	Y	N	N	N
H77	Service Life of DC Link Bus Capacitor (Remaining time)	0 to 8760 (in units of 10 hours)	Y	N	-	Y	Y	Y	Y	Y
H78	Maintenance Interval (M1)	0: Disable; 1 to 9999 (in units of 10 hours)	Y	N	8760	Y	Y	Y	Y	Y
H79	Preset Startup Count for Maintenance (M1)	0000: Disable; 0001 to FFFF (hex.)	Y	N	0	Y	Y	Y	Y	Y
H80	Output Current Fluctuation Damping Gain for Motor 1	0.00 to 0.40	Y	Y	0.20 *10	Y	Y	N	N	Y
H81	Light Alarm Selection 1	0000 to FFFF (hex.)	Y	Y	0	Y	Y	Y	Y	Y
H82	Light Alarm Selection 2	0000 to FFFF (hex.)	Y	Y	0	Y	Y	Y	Y	Y
H84	Pre-excitation (Initial level)	100% to 400%	Y	Y	100	N	N	Y	Y	Y
H85	(Time)	0.00: Disable; 0.01 to 30.00 s	Y	Y	0.00	N	N	Y	Y	Y
H86	Reserved *9	0 to 2	Y	Y1Y2	0 *11	-	-	-	-	-
H87	Reserved *9	25.0 to 500.0 Hz	Y	Y	25.0	-	-	-	-	-
H88	Reserved *9	0 to 3; 999	Y	N	0	-	-	-	-	-
H89	Reserved *9	0, 1	Y	Y	0	-	-	-	-	-
H90	Reserved *9	0, 1	Y	Y	0	-	-	-	-	-
H91	PID Feedback Wire Break Detection	0.0: Disable alarm detection 0.1 to 60.0 s	Y	Y	0.0	Y	Y	Y	Y	N
H92	Continuity of Running (P)	0.000 to 10.000 times; 999	Y	Y1Y2	999	Y	Y	Y	Y	N
H93	(I)	0.010 to 10.000 s; 999	Y	Y1Y2	999	Y	Y	Y	Y	N
H94	Cumulative Motor Run Time 1	0 to 9999 (The cumulative run time can be modified or reset in units of 10 hours.)	N	N	-	Y	Y	Y	Y	Y
H95	DC Braking (Braking response mode)	0: Slow 1: Quick	Y	Y	1	Y	Y	N	N	N
H96	STOP Key Priority/ Start Check Function	Data STOP key priority Start check function 0: Disable Disable 1: Enable Disable 2: Disable Enable 3: Enable Enable	Y	Y	0	Y	Y	Y	Y	Y

*9 These function codes are reserved for particular manufacturers. Unless otherwise specified, do not access these function codes.

*10 0.10 for 200 V class series of inverters with a capacity of 37 kW or above.

*11 2 for 200 V class series of inverters with a capacity of 37 kW or above.

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
H97	Clear Alarm Data	0: Disable 1: Enable (Setting "1" clears alarm data and then returns to "0.")	Y	N	0	Y	Y	Y	Y	Y
H98	Protection/Maintenance Function (Mode selection)	0 to 255: Display data in decimal format Bit 0: Lower the carrier frequency automatically (0: Disabled; 1: Enabled) Bit 1: Detect input phase loss (0: Disabled; 1: Enabled) Bit 2: Detect output phase loss (0: Disabled; 1: Enabled) Bit 3: Select life judgment threshold of DC link bus capacitor (0: Factory default level; 1: User setup level) Bit 4: Judge the life of DC link bus capacitor (0: Disabled; 1: Enabled) Bit 5: Detect DC fan lock (0: Enabled; 1: Disabled) Bit 6: Detect braking transistor error (for 22 kW or below) (0: Disabled; 1: Enabled) Bit 7: Switch IP20/IP40 enclosure (0: IP20; 1: IP40)	Y	Y	83	Y	Y	Y	Y	Y

A codes: Motor 2 Parameters

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
A01	Maximum Frequency 2	25.0 to 500.0 Hz	N	Y	*1	Y	Y	Y	Y	Y
A02	Base Frequency 2	25.0 to 500.0 Hz	N	Y	50.0	Y	Y	Y	Y	Y
A03	Rated Voltage at Base Frequency 2	0: Output a voltage in proportion to input voltage 80 to 240: Output an AVR-controlled voltage (for 200 V class series) 160 to 500: Output an AVR-controlled voltage (for 400 V class series)	N	Y2	*1	Y	Y	Y	Y	Y
A04	Maximum Output Voltage 2	80 to 240: Output an AVR-controlled voltage (for 200 V class series) 160 to 500: Output an AVR-controlled voltage (for 400 V class series)	N	Y2	*1	Y	Y	N	N	Y
A05	Torque Boost 2	0.0% to 20.0% (percentage with respect to "A03: Rated Voltage at Base Frequency 2")	Y	Y	*3	Y	Y	N	N	N
A06	Electronic Thermal Overload Protection for Motor 2 (Select motor characteristics)	1: For a general-purpose motor with shaft-driven cooling fan 2: For an inverter-driven motor, non-ventilated motor, or motor with separately powered cooling fan	Y	Y	1	Y	Y	Y	Y	Y
A07	(Overload detection level)	0.00: Disable 1% to 135% of the rated current (allowable continuous drive current) of the motor	Y	Y1 Y2	*4	Y	Y	Y	Y	Y
A08	(Thermal time constant)	0.5 to 75.0 min	Y	Y	*5	Y	Y	Y	Y	Y
A09	DC Braking 2 (Braking starting frequency)	0.0 to 60.0 Hz	Y	Y	0.0	Y	Y	Y	Y	N
A10	(Braking level)	0% to 100% (CT mode), 0% to 80% (MT/VT mode)	Y	Y	0	Y	Y	Y	Y	N
A11	(Braking time)	0.00: Disable; 0.01 to 30.00 s	Y	Y	0.00	Y	Y	Y	Y	N
A12	Starting Frequency 2	0.0 to 60.0 Hz	Y	Y	0.5	Y	Y	Y	Y	N
A13	Load Selection/ Auto Torque Boost Auto Energy Saving Operation 2	0: Variable torque load 1: Constant torque load 2: Auto-torque boost 3: Auto-energy saving operation (Variable torque load during ACC/DEC) 4: Auto-energy saving operation (Constant torque load during ACC/DEC) 5: Auto-energy saving operation (Auto-torque boost during ACC/DEC)	N	Y	1	Y	Y	N	Y	N
A14	Drive Control Selection 2	0: V/f control with slip compensation inactive 1: Dynamic torque vector control 2: V/f control with slip compensation active 3: V/f control with speed sensor 4: Dynamic torque vector control with speed sensor 5: Vector control without speed sensor 6: Vector control with speed sensor	N	Y	0	Y	Y	Y	Y	Y
A15	Motor 2 (No. of poles)	2 to 22 poles	N	Y1 Y2	4	Y	Y	Y	Y	Y
A16	(Rated capacity)	0.01 to 1000 kW (when A39 = 0, 2. 3 or 4) 0.01 to 1000 HP (when A39 = 1)	N	Y1 Y2	*7	Y	Y	Y	Y	Y
A17	(Rated current)	0.00 to 2000 A	N	Y1 Y2	*7	Y	Y	Y	Y	Y

*1 The factory default differs depending upon the shipping destination. See Table A.
*3 The factory default differs depending upon the inverter's capacity. See Table B.
*4 The motor rated current is automatically set. See Table C (function code P03).
*5 5.0 min for inverters with a capacity of 22 kW or below; 10.0 min for those with 30 kW or above
*7 The motor parameters are automatically set, depending upon the inverter's capacity and shipping destination. See Table C.

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
A18	Motor 2 (Auto-tuning)	0: Disable 1: Tune while the motor stops. (%R1, %X and rated slip frequency) 2: Tune while the motor is rotating under V/f control (%R1, %X, rated slip frequency, no-load current, magnetic saturation factors 1 to 5, and magnetic saturation extension factors "a" to "c") 3: Tune while the motor is rotating under vector control (%R1, %X, rated slip frequency, no-load current, magnetic saturation factors 1 to 5, and magnetic saturation extension factors "a" to "c." Available when the vector control is enabled.	N	N	0	Y	Y	Y	Y	Y
A20	(No-load current)	0.00 to 2000 A	N	Y1 Y2	*7	Y	Y	Y	Y	Y
A21	(%R1)	0.00% to 50.00%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
A22	(%X)	0.00% to 50.00%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
A23	(Slip compensation gain for driving)	0.0% to 200.0%	Y*	Y	100.0	Y	Y	Y	Y	N
A24	(Slip compensation response time)	0.01 to 10.00s	Y	Y1 Y2	0.12	Y	Y	N	N	N
A25	(Slip compensation gain for braking)	0.0% to 200.0%	Y*	Y	100.0	Y	Y	Y	Y	N
A26	(Rated slip frequency)	0.00 to 15.00 Hz	N	Y1 Y2	*7	Y	Y	Y	Y	N
A27	(Iron loss factor 1)	0.00% to 20.00%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
A28	(Iron loss factor 2)	0.00% to 20.00%	Y	Y1 Y2	0.00	Y	Y	Y	Y	Y
A29	(Iron loss factor 3)	0.00% to 20.00%	Y	Y1 Y2	0.00	Y	Y	Y	Y	Y
A30	(Magnetic saturation factor 1)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
A31	(Magnetic saturation factor 2)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
A32	(Magnetic saturation factor 3)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
A33	(Magnetic saturation factor 4)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
A34	(Magnetic saturation factor 5)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
A35	(Magnetic saturation extension factor "a")	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
A36	(Magnetic saturation extension factor "b")	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
A37	(Magnetic saturation extension factor "c")	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
A39	Motor 2 Selection	0: Motor characteristics 0 (Standard motors) 1: Motor characteristics 1 (HP rating motors) 2: Motor characteristics 2 (Not used) 3: Motor characteristics 3 (Not used) 4: Other motors	N	Y1 Y2	0	Y	Y	Y	Y	Y
A40	Slip Compensation 2 (Operating conditions)	0: Enable during ACC/DEC and at base frequency or above 1: Disable during ACC/DEC and enable at base frequency or above 2: Enable during ACC/DEC and disable at base frequency or above 3: Disable during ACC/DEC and at base frequency or above	N	Y	0	Y	Y	N	N	N
A41	Output Current Fluctuation Damping Gain for Motor 2	0.00 to 0.40	Y	Y	0.20	Y	Y	N	N	N
A42	Motor/Parameter Switching 2 (Mode selection)	0: Motor (Switch to the 2nd motor) 1: Parameter (Switch to particular A codes)	N	Y	0	Y	Y	Y	Y	Y
A43	Speed Control 2 (Speed command filter)	0.000 to 5.000 s	Y	Y	0.020	N	Y	Y	Y	N
A44	(Speed detection filter)	0.000 to 0.100 s	Y*	Y	0.005	N	Y	Y	Y	N
A45	P (Gain)	0.1 to 200.0 times	Y*	Y	10.0	N	Y	Y	Y	N
A46	I (Integral time)	0.001 to 9.999 s	Y*	Y	0.100	N	Y	Y	Y	N
A48	(Output filter)	0.000 to 0.100 s	Y	Y	0.002	N	Y	Y	Y	N
A49	(Notch filter resonance frequency)	1 to 200 Hz	Y	Y	200	N	N	N	Y	N
A50	(Notch filter attenuation level)	0 to 20 dB	Y	Y	0	N	N	N	Y	N
A51	Cumulative Motor Run Time 2	0 to 9999 (The cumulative run time can be modified or reset in units of 10 hours.)	N	N	-	Y	Y	Y	Y	Y
A52	Startup Counter for Motor 2	Indication of cumulative startup count 0000 to FFFF (hex.)	Y	N	-	Y	Y	Y	Y	Y
A53	Motor 2 (%X correction factor 1)	0% to 300%	Y	Y1 Y2	100	Y	Y	Y	Y	Y
A54	(%X correction factor 2)	0% to 300%	Y	Y1 Y2	100	Y	Y	Y	Y	Y
A55	(Torque current under vector control)	0.00 to 2000 A	N	Y1 Y2	*7	N	N	Y	Y	Y
A56	(Induced voltage factor under vector control)	50 to 100	N	Y1 Y2	85	N	N	Y	Y	Y
A57	Reserved *9	0.000 to 20.000 s	Y	Y1 Y2	*7	-	-	-	-	-

*7 The motor parameters are automatically set, depending upon the inverter's capacity and shipping destination. See Table C.

*9 These function codes are reserved for particular manufacturers. Unless otherwise specified, do not access these function codes.

b codes: Motor 3 Parameters

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
b01	Maximum Frequency 3	25.0 to 500.0 Hz	N	Y	*1	Y	Y	Y	Y	Y
b02	Base Frequency 3	25.0 to 500.0 Hz	N	Y	50.0	Y	Y	Y	Y	Y
b03	Rated Voltage at Base Frequency 3	0: Output a voltage in proportion to input voltage 80 to 240: Output an AVR-controlled voltage (for 200 V class series) 160 to 500: Output an AVR-controlled voltage (for 400 V class series)	N	Y2	*1	Y	Y	Y	Y	Y
b04	Maximum Output Voltage 3	80 to 240: Output an AVR-controlled voltage (for 200 V class series) 160 to 500: Output an AVR-controlled voltage (for 400 V class series)	N	Y2	*1	Y	Y	N	N	Y
b05	Torque Boost 3	0.0% to 20.0% (percentage with respect to "b03: Rated Voltage at Base Frequency 3")	Y	Y	*3	Y	Y	N	N	N
b06	Electric Thermal Overload Protection for Motor 3 (Select motor characteristics)	1: For a general-purpose motor with shaft-driven cooling fan 2: For an inverter-driven motor, non-ventilated motor, or motor with separately powered cooling fan	Y	Y	1	Y	Y	Y	Y	Y
b07	(Overload detection level)	0.00: Disable 1% to 135% of the rated current (allowable continuous drive current) of the motor	Y	Y1 Y2	*4	Y	Y	Y	Y	Y
b08	(Thermal time constant)	0.5 to 75.0 min	Y	Y	*5	Y	Y	Y	Y	Y
b09	DC Braking 3 (Braking starting frequency)	0.0 to 60.0 Hz	Y	Y	0.0	Y	Y	Y	Y	N
b10	(Braking level)	0% to 100% (CT mode), 0% to 80% (MT/VT mode)	Y	Y	0	Y	Y	Y	Y	N
b11	(Braking time)	0.00: Disable; 0.01 to 30.00 s	Y	Y	0.00	Y	Y	Y	Y	N
b12	Starting Frequency 3	0.0 to 60.0 Hz	Y	Y	0.5	Y	Y	Y	Y	N
b13	Load Selection/ Auto Torque Boost/ Auto Energy Saving Operation 3	0: Variable torque load 1: Constant torque load 2: Auto-torque boost 3: Auto-energy saving operation (Variable torque load during ACC/DEC) 4: Auto-energy saving operation (Constant torque load during ACC/DEC) 5: Auto-energy saving operation (Auto-torque boost during ACC/DEC)	N	Y	1	Y	Y	N	Y	N
b14	Drive Control Selection 3	0: V/f control with slip compensation inactive 1: Dynamic torque vector control 2: V/f control with slip compensation active 3: V/f control with speed sensor 4: Dynamic torque vector control with speed sensor 5: Vector control without speed sensor 6: Vector control with speed sensor	N	Y	0	Y	Y	Y	Y	Y
b15	Motor 3 (No. of poles)	2 to 22 poles	N	Y1 Y2	4	Y	Y	Y	Y	Y
b16	(Rated capacity)	0.01 to 1000 kW (when b39 = 0, 2, 3 or 4) 0.01 to 1000 HP (when b39 = 1)	N	Y1 Y2	*7	Y	Y	Y	Y	Y
b17	(Rated current)	0.00 to 2000 A	N	Y1 Y2	*7	Y	Y	Y	Y	Y
b18	(Auto-tuning)	0: Disable 1: Tune while the motor stops. (%R1, %X and rated slip frequency) 2: Tune while the motor is rotating under V/f control (%R1, %X, rated slip frequency, no-load current, magnetic saturation factors 1 to 5, and magnetic saturation extension factors "a" to "c") 3: Tune while the motor is rotating under vector control (%R1, %X, rated slip frequency, no-load current, magnetic saturation factors 1 to 5, and magnetic saturation extension factors "a" to "c." Available when the vector control is enabled.)	N	N	0	Y	Y	Y	Y	Y
b20	(No-load current)	0.00 to 2000 A	N	Y1 Y2	*7	Y	Y	Y	Y	Y
b21	(%R1)	0.00% to 50.00%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
b22	(%X)	0.00% to 50.00%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
b23	(Slip compensation gain for driving)	0.0% to 200.0%	Y*	Y	100.0	Y	Y	Y	Y	N
b24	(Slip compensation response time)	0.01 to 10.00 s	Y	Y1 Y2	0.12	Y	Y	N	N	N
b25	(Slip compensation gain for braking)	0.0% to 200.0%	Y*	Y	100.0	Y	Y	Y	Y	N
b26	(Rated slip frequency)	0.00 to 15.00 Hz	N	Y1 Y2	*7	Y	Y	Y	Y	N
b27	(Iron loss factor 1)	0.00% to 20.00%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
b28	(Iron loss factor 2)	0.00% to 20.00%	Y	Y1 Y2	0.00	Y	Y	Y	Y	Y
b29	(Iron loss factor 3)	0.00% to 20.00%	Y	Y1 Y2	0.00	Y	Y	Y	Y	Y
b30	(Magnetic saturation factor 1)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
b31	(Magnetic saturation factor 2)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
b32	(Magnetic saturation factor 3)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
b33	(Magnetic saturation factor 4)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
b34	(Magnetic saturation factor 5)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y

*1 The factory default differs depending upon the shipping destination. See Table A.
*3 The factory default differs depending upon the inverter's capacity. See Table B.
*4 The motor rated current is automatically set. See Table C (function code P03).
*5 5.0 min for inverters with a capacity of 22 kW or below; 10.0 min for those with 30 kW or above
*7 The motor parameters are automatically set, depending upon the inverter's capacity and shipping destination. See Table C.

	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
b35	Motor 3 (Magnetic saturation extension factor "a")	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
b36	(Magnetic saturation extension factor "b")	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
b37	(Magnetic saturation extension factor "c")	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
b39	Motor 3 Selection	0: Motor characteristics 0 (Standard motors) 1: Motor characteristics 1 (HP rating motors) 2: Motor characteristics 2 (Not used) 3: Motor characteristics 3 (Not used) 4: Other motors	N	Y1 Y2	0	Y	Y	Y	Y	Y
b40	Slip Compensation 3 (Operating conditions)	0: Enable during ACC/DEC and at base frequency or above 1: Disable during ACC/DEC and enable at base frequency or above 2: Enable during ACC/DEC and disable at base frequency or above 3: Disable during ACC/DEC and at base frequency or above	N	Y	0	Y	Y	N	N	N
b41	Output Current Fluctuation Damping Gain for Motor 3	0.00 to 0.40	Y	Y	0.20	Y	Y	N	N	N
b42	Motor/Parameter Switching 3 (Mode selection)	0: Motor (Switch to the 3rd motor) 1: Parameter (Switch to particular b codes)	N	Y	0	Y	Y	Y	Y	Y
b43	Speed Control 3 (Speed command filter)	0.000 to 5.000 s	Y	Y	0.020	N	Y	Y	Y	N
b44	(Speed detection filter)	0.000 to 0.100 s	Y*	Y	0.005	N	Y	Y	Y	N
b45	P (Gain)	0.1 to 200.0 times	Y*	Y	10.0	N	Y	Y	Y	N
b46	I (Integral time)	0.001 to 9.999 s	Y*	Y	0.100	N	Y	Y	Y	N
b48	(Output filter)	0.000 to 0.100 s	Y	Y	0.002	N	Y	Y	Y	N
b49	(Notch filter resonance frequency)	1 to 200 Hz	Y	Y	200	N	N	N	Y	N
b50	(Notch filter attenuation level)	0 to 20 dB	Y	Y	0	N	N	N	Y	N
b51	Cumulative Motor Run Time 3	0 to 9999 (The cumulative run time can be modified or reset in units of 10 hours.)	N	N	-	Y	Y	Y	Y	Y
b52	Startup Counter for Motor 3	Indication of cumulative startup count 0000 to FFFF (hex.)	Y	N	-	Y	Y	Y	Y	Y
b53	Motor 3 (%X correction factor 1)	0% to 300%	Y	Y1 Y2	100	Y	Y	Y	Y	Y
b54	(%X correction factor 2)	0% to 300%	Y	Y1 Y2	100	Y	Y	Y	Y	Y
b55	(Torque current under vector control)	0.00 to 2000 A	N	Y1 Y2	*7	N	N	Y	Y	Y
b56	(Induced voltage factor under vector control)	50 to 100	N	Y1 Y2	85	N	N	Y	Y	Y
b57	Reserved *9	0.000 to 20.000 s	Y	Y1 Y2	*7	-	-	-	-	-

r codes: Motor 4 Parameters

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
r01	Maximum Frequency 4	25.0 to 500.0 Hz	N	Y	*1	Y	Y	Y	Y	Y
r02	Base Frequency 4	25.0 to 500.0 Hz	N	Y	50.0	Y	Y	Y	Y	Y
r03	Rated Voltage at Base Frequency 4	0: Output a voltage in proportion to input voltage 80 to 240: Output an AVR-controlled voltage (for 200 V class series) 160 to 500: Output an AVR-controlled voltage (for 400 V class series)	N	Y2	*1	Y	Y	Y	Y	Y
r04	Maximum Output Voltage 4	80 to 240: Output an AVR-controlled voltage (for 200 V class series) 160 to 500: Output an AVR-controlled voltage (for 400 V class series)	N	Y2	*1	Y	Y	N	N	Y
r05	Torque Boost 4	0.0% to 20.0% (percentage with respect to "r03: Rated Voltage at Base Frequency 4")	Y	Y	*3	Y	Y	N	N	N
r06	Electronic Thermal Overload Protection for Motor 4 (Select motor characteristics)	1: For a general-purpose motor with shaft-driven cooling fan 2: For an inverter-driven motor, non-ventilate*d motor, or motor with separately powered cooling fan	Y	Y	1	Y	Y	Y	Y	Y
r07	(Overload detection level)	0.00: Disable 1% to 135% of the rated current (allowable continuous drive current) of the motor	Y	Y1 Y2	*4	Y	Y	Y	Y	Y
r08	(Thermal time constant)	0.5 to 75.0 min	Y	Y	*5	Y	Y	Y	Y	Y

*1 The factory default differs depending upon the shipping destination. See Table A.
*3 The factory default differs depending upon the inverter's capacity. See Table B.
*4 The motor rated current is automatically set. See Table C (function code P03).
*5 5.0 min for inverters with a capacity of 22 kW or below; 10.0 min for those with 30 kW or above
*7 The motor parameters are automatically set, depending upon the inverter's capacity and shipping destination. See Table C.
*9 These function codes are reserved for particular manufacturers. Unless otherwise specified, do not access these function codes.

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
r09	DC Braking 4 (Braking starting frequency)	0.0 to 60.0 Hz	Y	Y	0.0	Y	Y	Y	Y	N
r10	(Braking level)	0% to 100% (CT mode), 0% to 80% (MT/VT mode)	Y	Y	0	Y	Y	Y	Y	N
r11	(Braking time)	0.00: Disable; 0.01 to 30.00 s	Y	Y	0.00	Y	Y	Y	Y	N
r12	Starting Frequency 4	0.0 to 60.0 Hz	Y	Y	0.5	Y	Y	Y	Y	N
r13	Load Selection/ Auto Torque Boost/ Auto Energy Saving Operation 4	0: Variable torque load 1: Constant torque load 2: Auto-torque boost 3: Auto-energy saving operation (Variable torque load during ACC/DEC) 4: Auto-energy saving operation (Constant torque load during ACC/DEC) 5: Auto-energy saving operation (Auto-torque boost during ACC/DEC)	N	Y	1	Y	Y	N	Y	N
r14	Drive Control Selection 4	0: V/f control with slip compensation inactive 1: Dynamic torque vector control 2: V/f control with slip compensation active 3: V/f control with speed sensor 4: Dynamic torque vector control with speed sensor 5: Vector control without speed sensor 6: Vector control with speed sensor	N	Y	0	Y	Y	Y	Y	Y
r15	Motor 4 (No. of poles)	2 to 22 poles	N	Y1 Y2	4	Y	Y	Y	Y	Y
r16	(Rated capacity)	0.01 to 1000 kW (when r39 = 0, 2, 3 or 4) 0.01 to 1000 HP (when r39 = 1)	N	Y1 Y2	*7	Y	Y	Y	Y	Y
r17	(Rated current)	0.00 to 2000 A	N	Y1 Y2	*7	Y	Y	Y	Y	Y
r18	(Auto-tuning)	0: Disable 1: Tune while the motor stops. (%R1, %X and rated slip frequency) 2: Tune while the motor is rotating under V/f control (%R1, %X, rated slip frequency, no-load current, magnetic saturation factors 1 to 5, and magnetic saturation extension factors "a" to "c") 3: Tune while the motor is rotating under vector control (%R1, %X, rated slip frequency, no-load current, magnetic saturation factors 1 to 5, and magnetic saturation extension factors "a" to "c." Available when the vector control is enabled.)	N	N	0	Y	Y	Y	Y	Y
r20	(No-load current)	0.00 to 2000 A	N	Y1 Y2	*7	Y	Y	Y	Y	Y
r21	(%R1)	0.00% to 50.00%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
r22	(%X)	0.00% to 50.00%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
r23	(Slip compensation gain for driving)	0.0% to 200.0%	Y*	Y	100.0	Y	Y	Y	Y	N
r24	(Slip compensation response time)	0.01 to 10.00 s	Y	Y1 Y2	0.12	Y	Y	N	N	N
r25	(Slip compensation gain for braking)	0.0% to 200.0%	Y*	Y	100.0	Y	Y	Y	Y	N
r26	(Rated slip frequency)	0.00 to 15.00 Hz	N	Y1 Y2	*7	Y	Y	Y	Y	N
r27	(Iron loss factor 1)	0.00% to 20.00%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
r28	(Iron loss factor 2)	0.00% to 20.00%	Y	Y1 Y2	0.00	Y	Y	Y	Y	Y
r29	(Iron loss factor 3)	0.00% to 20.00%	Y	Y1 Y2	0.00	Y	Y	Y	Y	Y
r30	(Magnetic saturation factor 1)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
r31	(Magnetic saturation factor 2)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
r32	(Magnetic saturation factor 3)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
r33	(Magnetic saturation factor 4)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
r34	(Magnetic saturation factor 5)	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
r35	(Magnetic saturation extension factor "a")	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
r36	(Magnetic saturation extension factor "b")	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
r37	(Magnetic saturation extension factor "c")	0.0% to 300.0%	Y	Y1 Y2	*7	Y	Y	Y	Y	Y
r39	Motor 4 Selection	0: Motor characteristics 0 (Standard motors) 1: Motor characteristics 1 (HP rating motors) 2: Motor characteristics 2 (Not used) 3: Motor characteristics 3 (Not used) 4: Other motors	N	Y1 Y2	0	Y	Y	Y	Y	Y
r40	Slip Compensation 4 (Operating conditions)	0: Enable during ACC/DEC and at base frequency or above 1: Disable during ACC/DEC and enable at base frequency or above 2: Enable during ACC/DEC and disable at base frequency or above 3: Disable during ACC/DEC and at base frequency or above	N	Y	0	Y	Y	N	N	N
r41	Output Current Fluctuation Damping Gain for Motor 4	0.00 to 0.40	Y	Y	0.20	Y	Y	N	N	N
r42	Motor/Parameter Switching 4 (Mode selection)	0: Motor (Switch to the 4th motor) 1: Parameter (Switch to particular r codes)	N	Y	0	Y	Y	Y	Y	Y

*7 The motor parameters are automatically set, depending upon the inverter's capacity and shipping destination. See Table C.

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
r43	Speed Control 4 (Speed command filter)	0.000 to 5.000 s	Y	Y	0.020	N	Y	Y	Y	N
r44	(Speed detection filter)	0.000 to 0.100 s	Y*	Y	0.005	N	Y	Y	Y	N
r45	P (Gain)	0.1 to 200.0 times	Y*	Y	10.0	N	Y	Y	Y	N
r46	I (Integral time)	0.001 to 9.999 s	Y*	Y	0.100	N	Y	Y	Y	N
r48	(Output filter)	0.000 to 0.100 s	Y	Y	0.002	N	Y	Y	Y	N
r49	(Notch filter resonance frequency)	1 to 200 Hz	Y	Y	200	N	N	N	Y	N
r50	(Notch filter attenuation level)	0 to 20 dB	Y	Y	0	N	N	N	Y	N
r51	Cumulative Motor Run Time 4	0 to 9999 (The cumulative run time can be modified or reset in units of 10 hours.)	N	N	-	Y	Y	Y	Y	Y
r52	Startup Counter for Motor 4	Indication of cumulative startup count 0000 to FFFF (hex.)	Y	N	-	Y	Y	Y	Y	Y
r53	Motor 4 (%X correction factor 1)	0% to 300%	Y	Y1 Y2	100	Y	Y	Y	Y	Y
r54	(%X correction factor 2)	0% to 300%	Y	Y1 Y2	100	Y	Y	Y	Y	Y
r55	(Torque current under vector control)	0.00 to 2000 A	N	Y1 Y2	*7	N	N	Y	Y	Y
r56	(Induced voltage factor under vector control)	50 to 100	N	Y1 Y2	85	N	N	Y	Y	Y
r57	Reserved *9	0.000 to 20.000 s	Y	Y1 Y2	*7	-	-	-	-	-

J codes: Application Functions 1

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
J01	PID Control (Mode selection)	0: Disable 1: Enable (Process control, normal operation) 2: Enable (Process control, inverse operation) 3: Enable (Dancer control)	N	Y	0	Y	Y	Y	Y	N
J02	(Remote command SV)	0: ⌃ / ⌄ keys on keypad 1: PID command 1 (Analog input terminals [12], [C1], and [V2]) 3: UP/DOWN 4: Command via communications link	N	Y	0	Y	Y	Y	Y	N
J03	P (Gain)	0.000 to 30.000 times	Y	Y	0.100	Y	Y	Y	Y	N
J04	I (Integral time)	0.0 to 3600.0 s	Y	Y	0.0	Y	Y	Y	Y	N
J05	D (Differential time)	0.00 to 600.00 s	Y	Y	0.00	Y	Y	Y	Y	N
J06	(Feedback filter)	0.0 to 900.0 s	Y	Y	0.5	Y	Y	Y	Y	N
J08	(Pressurization starting frequency)	0.0 to 500.0 Hz	Y	Y	0.0	Y	Y	Y	Y	N
J09	(Pressurizing time)	0 to 60 s	Y	Y	0	Y	Y	Y	Y	N
J10	(Anti reset windup)	0% to 200%	Y	Y	200	Y	Y	Y	Y	N
J11	(Select alarm output)	0: Absolute-value alarm 1: Absolute-value alarm (with Hold) 2: Absolute-value alarm (with Latch) 3: Absolute-value alarm (with Hold and Latch) 4: Deviation alarm 5: Deviation alarm (with Hold) 6: Deviation alarm (with Latch) 7: Deviation alarm (with Hold and Latch)	Y	Y	0	Y	Y	Y	Y	N
J12	(Upper level alarm (AH))	-100% to 100%	Y	Y	100	Y	Y	Y	Y	N
J13	(Lower level alarm (AL))	-100% to 100%	Y	Y	0	Y	Y	Y	Y	N
J15	(Stop frequency for slow flowrate)	0.0: Disable; 1.0 to 500.0 Hz	Y	Y	0.0	Y	Y	Y	Y	N
J16	(Slow flowrate level stop latency)	0 to 60 s	Y	Y	30	Y	Y	Y	Y	N
J17	(Starting frequency)	0.0 to 500.0 Hz	Y	Y	0.0	Y	Y	Y	Y	N
J18	(Upper limit of PID process output)	-150% to 150%; 999: Depends on setting of F15	Y	Y	999	Y	Y	Y	Y	N
J19	(Lower limit of PID process output)	-150% to 150%; 999: Depends on setting of F16	Y	Y	999	Y	Y	Y	Y	N
J21	Dew Condensation Prevention (Duty)	1% to 50%	Y	Y	1	Y	Y	Y	Y	Y
J22	Commercial Power Switching Sequence	0: Keep inverter operation (Stop due to alarm) 1: Automatically switch to commercial-power operation	N	Y	0	Y	Y	N	N	Y
J56	PID Control (Speed command filter)	0.00 to 5.00 s	Y	Y	0.10	Y	Y	Y	Y	N
J57	(Dancer reference position)	-100% to 0% to 100%	Y	Y	0	Y	Y	Y	Y	N
J58	(Detection width of dancer position deviation)	0: Disable switching PID constant 1% to 100% (Manually set value)	Y	Y	0	Y	Y	Y	Y	N
J59	P (Gain) 2	0.000 to 30.000 times	Y	Y	0.100	Y	Y	Y	Y	N
J60	I (Integral time) 2	0.0 to 3600.0 s	Y	Y	0.0	Y	Y	Y	Y	N
J61	D (Differential time) 3	0.00 to 600.00 s	Y	Y	0.00	Y	Y	Y	Y	N
J62	(PID control block selection)	0 to 3 bit 0: PID output polarity 0: Plus (add), 1: Minus (subtract) bit 1: Select compensation factor for PID output 0 = Ratio (relative to the main setting) 1 = Speed command (relative to maximum frequency)	N	Y	0	Y	Y	Y	Y	N

*7 The motor parameters are automatically set, depending upon the inverter's capacity and shipping destination. See Table C.
*9 These function codes are reserved for particular manufacturers. Unless otherwise specified, do not access these function codes.

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
J68	Brake Signal (Brake-OFF current)	0% to 300%	Y	Y	100	Y	Y	Y	Y	N
J69	(Brake-OFF frequency/speed)	0.0 to 25.0 Hz	Y	Y	1.0	Y	Y	N	N	N
J70	(Brake-OFF timer)	0.0 to 5.0 s	Y	Y	1.0	Y	Y	Y	Y	N
J71	(Brake-ON frequency/speed)	0.0 to 25.0 Hz	Y	Y	1.0	Y	Y	N	N	N
J72	(Brake-ON timer)	0.0 to 5.0 s	Y	Y	1.0	Y	Y	Y	Y	N
J95	(Brake-OFF torque)	0% to 300%	Y	Y	100	N	N	Y	Y	N
J96	(Speed selection)	0: Detected speed 1: Reference speed	Y	Y	0	N	N	Y	Y	N
J97	Servo-lock (Gain)	0.00 to 10.00 times	Y*	Y	0.10	N	N	N	Y	N
J98	(Completion timer)	0.000 to 1.000 s	Y	Y	0.100	N	N	N	Y	N
J99	(Completion range)	0 to 9999 pulses	Y	Y	10	N	N	N	Y	N

d codes: Application Functions 2

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
d01	Speed Control 1 (Speed command filter)	0.000 to 5.000 s	Y	Y	0.020	N	Y	Y	Y	N
d02	(Speed detection filter)	0.000 to 0.100 s	Y*	Y	0.005	N	Y	Y	Y	N
d03	P (Gain)	0.1 to 200.0 times	Y*	Y	10.0	N	Y	Y	Y	N
d04	I (Integral time)	0.001 to 9.999 s	Y*	Y	0.100	N	Y	Y	Y	N
d06	(Output filter)	0.000 to 0.100 s	Y	Y	0.002	N	Y	Y	Y	N
d07	(Notch filter resonance frequency)	1 to 200 Hz	Y	Y	200	N	N	N	Y	N
d08	(Notch filter attenuation level)	0 to 20 dB	Y	Y	0	N	N	N	Y	N
d09	Speed Control (Jogging) (Speed command filter)	0.000 to 5.000 s	Y	Y	0.020	N	Y	Y	Y	N
d10	(Speed detection filter)	0.000 to 0.100 s	Y*	Y	0.005	N	Y	Y	Y	N
d11	P (Gain)	0.1 to 200.0 times	Y*	Y	10.0	N	Y	Y	Y	N
d12	I (Integral time)	0.001 to 9.999 s	Y*	Y	0.100	N	Y	Y	Y	N
d13	(Output filter)	0.000 to 0.100 s	Y	Y	0.002	N	Y	Y	Y	N
d14	Feedback Input (Pulse input format)	0: Pulse train sign/Pulse train input 1: Forward rotation pulse/Reverse rotation pulse 2: A/B phase with 90 degree phase shift	N	Y	2	N	Y	N	Y	Y
d15	(Encoder pulse resolution)	0014 to EA60 (hex.) (20 to 60000 pulses)	N	Y	0400 (1024)	N	Y	N	Y	Y
d16	(Pulse count factor 1)	1 to 9999	N	Y	1	N	Y	N	Y	Y
d17	(Pulse count factor 2)	1 to 9999	N	Y	1	N	Y	N	Y	Y
d21	Speed Agreement/PG Error (Hysteresis width)	0.0% to 50.0%	Y	Y	10.0	N	Y	Y	Y	N
d22	(Detection timer)	0.00 to 10.00 s	Y	Y	0.50	N	Y	Y	Y	N
d23	PG Error Processing	0: Continue to run 1: Stop running with alarm 1 2: Stop running with alarm 2	N	Y	2	N	Y	Y	Y	Y
d24	Zero Speed Control	0: Not permit at startup 1: Permit at startup	N	Y	0	N	N	Y	Y	N
d25	ASR Switching Time	0.000 to 1.000 s	Y	Y	0.000	N	Y	Y	Y	Y
d32	Torque Control (Speed limit 1)	0 to 110 %	Y	Y	100	N	N	Y	Y	Y
d33	(Speed limit 2)	0 to 110 %	Y	Y	100	N	N	Y	Y	Y
d41	Application-defined Control	0: Disable (Ordinary control) 1: Enable（Constant peripheral speed control）	N	Y	0	N	Y	N	N	N
d51	Reserved *9	0 to 500	N	Y	*12	-	-	-	-	-
d52	Reserved *9	0 to 500	N	Y	*12	-	-	-	-	-
d53	Reserved *9	0 to 500	N	Y	*12	-	-	-	-	-
d54	Reserved *9	0 to 500	N	Y	*12	-	-	-	-	-
d55	Reserved *9	0, 1	N	Y	0	-	-	-	-	-
d59	Command (Pulse Rate Input) (Pulse input format)	0: Pulse train sign/Pulse train input 1: Forward rotation pulse/Reverse rotation pulse 2: A/B phase with 90 degree phase shift	N	Y	0	Y	Y	Y	Y	Y
d61	(Filter time constant)	0.000 to 5.000 s	Y	Y	0.005	Y	Y	Y	Y	Y
d62	(Pulse count factor 1)	1 to 9999	N	Y	1	Y	Y	Y	Y	Y
d63	(Pulse count factor 2)	1 to 9999	N	Y	1	Y	Y	Y	Y	Y
d67	Starting Mode (Auto search)	0: Disable 1: Enable (At restart after momentary power failure) 2: Enable (At restart after momentary power failure and at normal start)	N	Y	2	N	N	Y	N	Y
d68	Reserved *9	0.0 to 10.0 Hz	N	Y	40	-	-	-	-	-
d69	Reserved *9	30.0 to 100.0 Hz	Y	Y	30.0	-	-	-	-	-
d70	Speed Control Limiter	0.00 to 100.00%	Y	Y	100.00	N	Y	N	N	N
d99	Reserved *9	0 to 3	Y	Y	0	-	-	-	-	-

*9 These function codes are reserved for particular manufacturers. Unless otherwise specified, do not access these function codes.
*12 The factory default differs depending upon the inverter's capacity.
5 for inverters with a capacity of 4.0 kW or below; 10 for those with 5.5 kW to 22 kW; 20 for those with 30 kW or above

U codes: Application Functions 3

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
U00	Customizable Logic (Mode selection)	0: Disable 1: Enable (Customizable logic operation)	N	Y	0	Y	Y	Y	Y	Y
U01	Customizable Logic: (Input 1)	0 (1000): Inverter running (***RUN***)	N	Y	0	Y	Y	Y	Y	Y
U02	Step 1 (Input 2)	1 (1001): Frequency (speed) arrival signal (***FAR***)	N	Y	0	Y	Y	Y	Y	N
		2 (1002): Frequency (speed) detected (***FDT***)				Y	Y	Y	Y	Y
		3 (1003): Undervoltage detected (Inverter stopped) (***LU***)				Y	Y	Y	Y	Y
		4 (1004): Torque polarity detected (***B/D***)				Y	Y	Y	Y	Y
		5 (1005): Inverter output limiting (***IOL***)				Y	Y	Y	Y	Y
		6 (1006): Auto-restarting after momentary power failure (***IPF***)				Y	Y	Y	Y	Y
		7 (1007): Motor overload early warning (***OL***)				Y	Y	Y	Y	Y
		8 (1008): Keypad operation enabled (***KP***)				Y	Y	Y	Y	Y
		10 (1010): Inverter ready to run (***RDY***)				Y	Y	Y	Y	Y
		11: Switch motor drive source between commercial power and inverter output (For MC on commercial line) (***SW88***)				Y	Y	N	N	N
		12: Switch motor drive source between commercial power and inverter output (For secondary side) (***SW52-2***)				Y	Y	N	N	N
		13: Switch motor drive source between commercial power and inverter output (For primary side) (***SW52-1***)				Y	Y	N	N	N
		15 (1015): Select ***AX*** terminal function (For MC on primary side) (***AX***)				Y	Y	Y	Y	Y
		22 (1022): Inverter output limiting with delay (***IOL2***)				Y	Y	Y	Y	Y
		25 (1025): Cooling fan in operation (***FAN***)				Y	Y	Y	Y	Y
		26 (1026): Auto-resetting (***TRY***)				Y	Y	Y	Y	Y
		28 (1028): Heat sink overheat early warning (***OH***)				Y	Y	Y	Y	Y
		30 (1030): Lifetime alarm (***LIFE***)				Y	Y	Y	Y	Y
		31 (1031): Frequency (speed) detected 2 (***FDT2***)				Y	Y	Y	Y	Y
		33 (1033): Reference loss detected (***REF OFF***)				Y	Y	Y	Y	Y
		35 (1035): Inverter output on (***RUN2***)				Y	Y	Y	Y	Y
		36 (1036): Overload prevention control (***OLP***)				Y	Y	Y	Y	N
		37 (1037): Current detected (***ID***)				Y	Y	Y	Y	Y
		38 (1038): Current detected 2 (***ID2***)				Y	Y	Y	Y	Y
		39 (1039): Current detected 3 (***ID3***)				Y	Y	Y	Y	Y
		41 (1041): Low current detected (***IDL***)				Y	Y	Y	Y	Y
		42 (1042): PID alarm (***PID-ALM***)				Y	Y	Y	Y	N
		43 (1043): Under PID control (***PID-CTL***)				Y	Y	Y	Y	N
		44 (1044): Motor stopped due to slow flowrate under PID control (***PID-STP***)				Y	Y	Y	Y	N
		45 (1045): Low output torque detected (***U-TL***)				Y	Y	Y	Y	Y
		46 (1046): Torque detected 1 (***TD1***)				Y	Y	Y	Y	Y
		47 (1047): Torque detected 2 (***TD2***)				Y	Y	Y	Y	Y
		48 (1048): Motor 1 selected (***SWM1***)				Y	Y	Y	Y	Y
		49 (1049): Motor 2 selected (***SWM2***)				Y	Y	Y	Y	Y
		50 (1050): Motor 3 selected (***SWM3***)				Y	Y	Y	Y	Y
		51 (1051): Motor 4 selected (***SWM4***)				Y	Y	Y	Y	Y
		52 (1052): Running forward (***FRUN***)				Y	Y	Y	Y	Y
		53 (1053): Running reverse (***RRUN***)				Y	Y	Y	Y	Y
		54 (1054): In remote operation (***RMT***)				Y	Y	Y	Y	Y
		56 (1056): Motor overheat detected by thermistor (***THM***)				Y	Y	Y	Y	Y
		57 (1057): Brake signal (***BRKS***)				Y	Y	Y	Y	N
		58 (1058): Frequency (speed) detected 3 (***FDT3***)				Y	Y	Y	Y	Y
		59 (1059): Terminal [C1] wire break (***C1OFF***)				Y	Y	Y	Y	Y
		70 (1070): Speed valid (***DNZS***)				N	Y	Y	Y	Y
		71 (1071): Speed agreement (***DSAG***)				N	Y	Y	Y	N
		72 (1072): Frequency (speed) arrival signal 3 (***FAR3***)				Y	Y	Y	Y	N
		76 (1076): PG error detected (***PG-ERR***)				N	Y	Y	Y	N
		82 (1082): Positioning completion signal (***PSET***)				N	N	N	Y	N
		84 (1084): Maintenance timer (***MNT***)				Y	Y	Y	Y	Y
		98 (1098): Light alarm (***L-ALM***)				Y	Y	Y	Y	Y
		99 (1099): Alarm output (for any alarm) (***ALM***)				Y	Y	Y	Y	Y
		101 (1101): Enable circuit failure detected (***DECF***)				Y	Y	Y	Y	Y
		102 (1102): Enable input OFF (***EN OFF***)				Y	Y	Y	Y	Y
		105 (1105): Braking transistor broken (***DBAL***)				Y	Y	Y	Y	Y
		2001 (3001): Output of step 1 (***SO01***)				Y	Y	Y	Y	Y
		2002 (3002): Output of step 2 (***SO02***)				Y	Y	Y	Y	Y
		2003 (3003): Output of step 3 (***SO03***)				Y	Y	Y	Y	Y
		2004 (3004): Output of step 4 (***SO04***)				Y	Y	Y	Y	Y
		2005 (3005): Output of step 5 (***SO05***)				Y	Y	Y	Y	Y
		2006 (3006): Output of step 6 (***SO06***)				Y	Y	Y	Y	Y
		2007 (3007): Output of step 7 (***SO07***)				Y	Y	Y	Y	Y

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
		2008 (3008): Output of step 8 (***SO08***)				Y	Y	Y	Y	Y
		2009 (3009): Output of step 9 (***SO09***)				Y	Y	Y	Y	Y
		2010 (3010): Output of step 10 (***SO10***)				Y	Y	Y	Y	Y
		4001 (5001): Terminal [X1] input signal (***X1***)				Y	Y	Y	Y	Y
		4002 (5002): Terminal [X2] input signal (***X2***)				Y	Y	Y	Y	Y
		4003 (5003): Terminal [X3] input signal (***X3***)				Y	Y	Y	Y	Y
		4004 (5004): Terminal [X4] input signal (***X4***)				Y	Y	Y	Y	Y
		4005 (5005): Terminal [X5] input signal (***X5***)				Y	Y	Y	Y	Y
		4006 (5006): Terminal [X6] input signal (***X6***)				Y	Y	Y	Y	Y
		4007 (5007): Terminal [X7] input signal (***X7***)				Y	Y	Y	Y	Y
		4010 (5010): Terminal [FWD] input signal (***FWD***)				Y	Y	Y	Y	Y
		4011 (5011): Terminal [REV] input signal (***REV***)				Y	Y	Y	Y	Y
		6000 (7000): Final run command (***FL_RUN***)				Y	Y	Y	Y	Y
		6001 (7001): Final FWD run command (***FL_FWD***)				Y	Y	Y	Y	Y
		6002 (7002): Final REV run command (***FL_REV***)				Y	Y	Y	Y	Y
		6003 (7003): During acceleration (***DACC***)				Y	Y	Y	Y	Y
		6004 (7004): During deceleration (***DDEC***)				Y	Y	Y	Y	Y
		6005 (7005): Under anti-regenerative control (***REGA***)				Y	Y	Y	Y	Y
		6006 (7006): Within dancer reference position (***DR_REF***)				Y	Y	Y	Y	Y
		6007 (7007): Alarm factor presence (***ALM_ACT***)				Y	Y	Y	Y	Y
		Setting the value in parentheses ( ) shown above assigns a negative logic output to a terminal. (True if OFF.)								
U03	(Logic circuit)	0: No function assigned 1: Through output + General-purpose timer 2: ANDing + General-purpose timer 3: ORing + General-purpose timer 4: XORing + General-purpose timer 5: Set priority flip-flop + General-purpose timer 6: Reset priority flip-flop + General-purpose timer 7: Rising edge detector + General-purpose timer 8: Failing edge detector + General-purpose timer 9: Rising and failing edge detector + General-purpose timer 10: Input hold + General-purpose timer 11: Increment counter 12: Decrement counter 13: Timer with reset input	N	Y	0	Y	Y	Y	Y	Y
U04	(Type of timer)	0: No timer 1: On-delay timer 2: Off-delay timer 3: Pulses 4: Retriggerable timer 5: Pulse train output	N	Y	0	Y	Y	Y	Y	Y
U05	(Timer)	0.00 to 600.00	N	Y	0.00	Y	Y	Y	Y	Y
U06	Customizable Logic: (Input 1)	See U01.	N	Y	0	See U01.				
U07	Step 2 (Input 2)	See U02.	N	Y	0	See U02.				
U08	(Logic circuit)	See U03.	N	Y	0	Y	Y	Y	Y	Y
U09	(Type of timer)	See U04.	N	Y	0	Y	Y	Y	Y	Y
U10	(Timer)	See U05.	N	Y	0.00	Y	Y	Y	Y	Y
U11	Customizable Logic: (Input 1)	See U01.	N	Y	0	See U01.				
U12	Step 3 (Input 2)	See U02.	N	Y	0	See U02.				
U13	(Logic circuit)	See U03.	N	Y	0	Y	Y	Y	Y	Y
U14	(Type of timer)	See U04.	N	Y	0	Y	Y	Y	Y	Y
U15	(Timer)	See U05.	N	Y	0.00	Y	Y	Y	Y	Y
U16	Customizable Logic: (Input 1)	See U01.	N	Y	0	See U01.				
U17	Step 4 (Input 2)	See U02.	N	Y	0	See U02.				
U18	(Logic circuit)	See U03.	N	Y	0	Y	Y	Y	Y	Y
U19	(Type of timer)	See U04.	N	Y	0	Y	Y	Y	Y	Y
U20	(Timer)	See U05.	N	Y	0.00	Y	Y	Y	Y	Y
U21	Customizable Logic: (Input 1)	See U01.	N	Y	0	See U01.				
U22	Step 5 (Input 2)	See U02.	N	Y	0	See U02.				
U23	(Logic circuit)	See U03.	N	Y	0	Y	Y	Y	Y	Y
U24	(Type of timer)	See U04.	N	Y	0	Y	Y	Y	Y	Y
U25	(Timer)	See U05.	N	Y	0.00	Y	Y	Y	Y	Y

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
U26	Customizable Logic: (Input 1)	See U01.	N	Y	0	See U01.				
U27	Step 6 (Input 2)	See U02.	N	Y	0	See U02.				
U28	(Logic circuit)	See U03.	N	Y	0	Y	Y	Y	Y	Y
U29	(Type of timer)	See U04.	N	Y	0	Y	Y	Y	Y	Y
U30	(Timer)	See U05.	N	Y	0.00	Y	Y	Y	Y	Y
U31	Customizable Logic: (Input 1)	See U01.	N	Y	0	See U01.				
U32	Step 7 (Input 2)	See U02.	N	Y	0	See U02.				
U33	(Logic circuit)	See U03.	N	Y	0	Y	Y	Y	Y	Y
U34	(Type of timer)	See U04.	N	Y	0	Y	Y	Y	Y	Y
U35	(Timer)	See U05.	N	Y	0.00	Y	Y	Y	Y	Y
U36	Customizable Logic: (Input 1)	See U01.	N	Y	0	See U01.				
U37	Step 8 (Input 2)	See U02.	N	Y	0	See U02.				
U38	(Logic circuit)	See U03.	N	Y	0	Y	Y	Y	Y	Y
U39	(Type of timer)	See U04.	N	Y	0	Y	Y	Y	Y	Y
U40	(Timer)	See U05.	N	Y	0.00	Y	Y	Y	Y	Y
U41	Customizable Logic: (Input 1)	See U01.	N	Y	0	See U01.				
U42	Step 9 (Input 2)	See U02.	N	Y	0	See U02.				
U43	(Logic circuit)	See U03.	N	Y	0	Y	Y	Y	Y	Y
U44	(Type of timer)	See U04.	N	Y	0	Y	Y	Y	Y	Y
U45	(Timer)	See U05.	N	Y	0.00	Y	Y	Y	Y	Y
U46	Customizable Logic: (Input 1)	See U01.	N	Y	0	See U01.				
U47	Step 10 (Input 2)	See U02.	N	Y	0	See U02.				
U48	(Logic circuit)	See U03.	N	Y	0	Y	Y	Y	Y	Y
U49	(Type of timer)	See U04.	N	Y	0	Y	Y	Y	Y	Y
U50	(Timer)	See U05.	N	Y	0.00	Y	Y	Y	Y	Y
U71	Customizable Logic Output Signal 1 (Output selection)	0: Disable 1: Step 1 output (***SO01***)	N	Y	0	Y	Y	Y	Y	Y
U72	Customizable Logic Output Signal 2	2: Step 2 output (***SO02***)	N	Y	0	Y	Y	Y	Y	Y
U73	Customizable Logic Output Signal 3	3: Step 3 output (***SO03***)	N	Y	0	Y	Y	Y	Y	Y
U74	Customizable Logic Output Signal 4	4: Step 4 output (***SO04***)	N	Y	0	Y	Y	Y	Y	Y
U75	Customizable Logic Output Signal 5	5: Step 5 output (***SO05***) 6: Step 6 output (***SO06***) 7: Step 7 output (***SO07***) 8: Step 8 output (***SO08***) 9: Step 1 output (***SO09***) 10: Step 10 output (***SO10***)	N	Y	0	Y	Y	Y	Y	Y
U81	Customizable Logic Output Signal 1 (Function selection)	0 (1000): Select multi-frequency (0 to 1 steps) (***SS1***)	N	Y	100	Y	Y	Y	Y	N
		1 (1001): Select multi-frequency (0 to 3 steps) (***SS2***)				Y	Y	Y	Y	N
U82	Customizable Logic Output Signal 2	2 (1002): Select multi-frequency (0 to 7 steps) (***SS4***)	N	Y	100	Y	Y	Y	Y	N
U83	Customizable Logic Output Signal 3	3 (1003): Select multi-frequency (0 to 15 steps) (***SS8***)	N	Y	100	Y	Y	Y	Y	N
U84	Customizable Logic Output Signal 4	4 (1004): Select ACC/DEC time (2 steps) (***RT1***)	N	Y	100	Y	Y	Y	Y	N
U85	Customizable Logic Output Signal 5	5 (1005): Select ACC/DEC time (4 steps) (***RT2***)	N	Y	100	Y	Y	Y	Y	N
		6 (1006): Enable 3-wire operation (***HLD***)				Y	Y	Y	Y	Y
		7 (1007): Coast to a stop (***BX***)				Y	Y	Y	Y	Y
		8 (1008): Reset alarm (***RST***)				Y	Y	Y	Y	Y
		9 (1009): Enable external alarm trip (***THR***) (9 = Active OFF, 1009 = Active ON)				Y	Y	Y	Y	Y
		10 (1010): Ready for jogging (***JOG***)				Y	Y	Y	Y	N
		11 (1011): Select frequency command 2/1 (***Hz2/Hz1***)				Y	Y	Y	Y	N
		12 (1012): Select motor 2 (***M2***)				Y	Y	Y	Y	Y
		13: Enable DC braking (***DCBRK***)				Y	Y	Y	Y	N
		14 (1014): Select torque limiter level 2/1 (***TL2/TL1***)				Y	Y	Y	Y	Y
		15: Switch to commercial power (50 Hz) (***SW50***)				Y	Y	N	N	N
		16: Switch to commercial power (60 Hz) (***SW60***)				Y	Y	N	N	N
		17 (1017): UP (Increase output frequency) (***UP***)				Y	Y	Y	Y	N
		18 (1018): DOWN (Decrease output frequency) (***DOWN***)				Y	Y	Y	Y	N
		20 (1020): Cancel PID control (***Hz/PID***)				Y	Y	Y	Y	N
		21 (1021): Switch normal/inverse operation (***IVS***)				Y	Y	Y	Y	N
		22 (1022): Interlock (***IL***)				Y	Y	Y	Y	Y
		23 (1023): Cancel torque control (***Hz/TRQ***)				N	N	N	N	Y
		24 (1024): Enable communications link via RS-485 or fieldbus (***LE***)				Y	Y	Y	Y	Y
		25 (1025): Universal DI (***U-DI***)				Y	Y	Y	Y	Y
		26 (1026): Enable auto search for idling motor speed at starting (***STM***)				Y	Y	Y	N	Y
		30 (1030): Force to stop (***STOP***) (30 = Active OFF, 1030 = Active ON)				Y	Y	Y	Y	Y

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque
		32 (1032): Pre-excitation (***EXITE***)				N	N	Y	Y	N
		33 (1033): Reset PID integral and differential components (***PID-RST***)				Y	Y	Y	Y	N
		34 (1034): Hold PID integral component (***PID-HLD***)				Y	Y	Y	Y	N
		35 (1035): Select local (keypad) operation (***LOC***)				Y	Y	Y	Y	Y
		36 (1036): Select motor 3 (***M3***)				Y	Y	Y	Y	Y
		37 (1037): Select motor 4 (***M4***)				Y	Y	Y	Y	Y
		39: Protect motor from dew condensation (***DWP***)				Y	Y	Y	Y	Y
		40: Enable integrated sequence to switch to commercial power (50 Hz) (***ISW50***)				Y	Y	N	N	N
		41: Enable integrated sequence to switch to commercial power (60 Hz) (***ISW60***)				Y	Y	N	N	N
		47 (1047): Servo-lock command (***LOCK***)				N	N	N	Y	N
		49 (1049): Pulse train sign (***SIGN***)				Y	Y	Y	Y	Y
		70 (1070): Cancel constant peripheral speed control (***Hz/LSC***)				Y	Y	Y	Y	N
		71 (1071): Hold the constant peripheral speed control frequency in the memory (***LSC-HLD***)				Y	Y	Y	Y	N
		72 (1072): Count the run time of commercial power-driven motor 1 (***CRUN-M1***)				Y	Y	N	N	Y
		73 (1073): Count the run time of commercial power-driven motor 2 (***CRUN-M2***)				Y	Y	N	N	Y
		74 (1074): Count the run time of commercial power-driven motor 3 (***CRUN-M3***)				Y	Y	N	N	Y
		75 (1075): Count the run time of commercial power-driven motor 4 (***CRUN-M4***)				Y	Y	N	N	Y
		76 (1076): Select droop control (***DROOP***)				Y	Y	Y	Y	N
		77 (1077): Cancel PG alarm (***PG-CCL***)				N	Y	N	Y	Y
		81 (1081): Clear all customizable logic timers (***CLTC***)				Y	Y	Y	Y	Y
		98: Run forward (***FWD***)				Y	Y	Y	Y	Y
		99: Run reverse (***REV***)				Y	Y	Y	Y	Y
		100: No function assigned (***NONE***)				Y	Y	Y	Y	Y
		Setting the value of 1000s in parentheses ( ) shown above assigns a negative logic input to a terminal.								
U91	Customizable Logic Timer Monitor (Step selection)	1: Step 1 2: Step 2 3: Step 3 4: Step 4 5: Step 5 6: Step 6 7: Step 7 8: Step 8 9: Step 9 10: Step 10	N	Y	1	Y	Y	Y	Y	Y

y codes: LINK Functions

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
y01	RS-485 Communication 1 (Station address)	1 to 255	N	Y	1	Y	Y	Y	Y	Y
y02	(Communications error processing)	0: Immediately trip with alarm *er8* 1: Trip with alarm *er8* after running for the period specified by timer y03 2: Retry during the period specified by timer y03. If the retry fails, trip with alarm *er8*. If it succeeds, continue to run. 3: Continue to run	Y	Y	0	Y	Y	Y	Y	Y
y03	(Timer)	0.0 to 60.0 s	Y	Y	2.0	Y	Y	Y	Y	Y
y04	(Baud rate)	0: 2400 bps 1: 4800 bps 2: 9600 bps 3: 19200 bps 4: 38400 bps	Y	Y	3	Y	Y	Y	Y	Y
y05	(Data length)	0: 8 bits 1: 7 bits	Y	Y	0	Y	Y	Y	Y	Y
y06	(Parity check)	0: None (2 stop bits) 1: Even parity (1 stop bit) 2: Odd parity (1 stop bit) 3: None (1 stop bit)	Y	Y	0	Y	Y	Y	Y	Y
y07	(Stop bits)	0: 2 bits 1: 1 bit	Y	Y	0	Y	Y	Y	Y	Y

Code	Name	Data setting range	Change when running	Data copying	Default setting	Drive control				
						V/f	PG V/f	w/o PG	w/ PG	Torque control
y08	RS-485 Communication 1 (No-response error detection time)	0: No detection; 1 to 60 s	Y	Y	0	Y	Y	Y	Y	Y
y09	(Response interval)	0.00 to 1.00 s	Y	Y	0.01	Y	Y	Y	Y	Y
y10	(Protocol selection)	0: Modbus RTU protocol 1: JAGUAR Loader protocol 2: General-purpose inverter protocol	Y	Y	1	Y	Y	Y	Y	Y
y11	RS-485 Communication 2 (Station address)	1 to 255	N	Y	1	Y	Y	Y	Y	Y
y12	(Communications error processing)	0: Immediately trip with alarm *erp* 1: Trip with alarm *erp* after running for the period specified by timer y13 2: Retry during the period specified by timer y13. If the retry fails, trip with alarm *erp*. If it succeeds, continue to run. 3: Continue to run	Y	Y	0	Y	Y	Y	Y	Y
y13	(Timer)	0.0 to 60.0 s	Y	Y	2.0	Y	Y	Y	Y	Y
y14	(Baud rate)	0: 2400 bps 1: 4800 bps 2: 9600 bps 3: 19200 bps 4: 38400 bps	Y	Y	3	Y	Y	Y	Y	Y
y15	(Data length)	0: 8 bits 1: 7 bits	Y	Y	0	Y	Y	Y	Y	Y
y16	(Parity check)	0: None (2 stop bits) 1: Even parity (1 stop bit) 2: Odd parity (1 stop bit) 3: None (1 stop bit)	Y	Y	0	Y	Y	Y	Y	Y
y17	(Stop bits)	0: 2 bits 1: 1 bit	Y	Y	0	Y	Y	Y	Y	Y
y18	(No-response error detection time)	0: No detection; 1 to 60 s	Y	Y	0	Y	Y	Y	Y	Y
y19	(Response interval)	0.00 to 1.00 s	Y	Y	0.01	Y	Y	Y	Y	Y
y20	(Protocol selection)	0: Modbus RTU protocol 2: IMO general-purpose inverter protocol	Y	Y	0	Y	Y	Y	Y	Y
y97	Communication Data Storage Selection	0: Save into nonvolatile storage (Rewritable times limited) 1: Write into temporary storage (Rewritable times unlimited) 2: Save all data from temporary storage to nonvolatile one (After saving data, the y97 data automatically returns to "1.")	Y	Y	0	Y	Y	Y	Y	Y
y98	Bus Link Function (Mode selection)	Frequency command / Run command 0: Follow H30 data / Follow H30 data 1: Via fieldbus option / Follow H30 data 2: Follow H30 data / Via fieldbus option 3: Via fieldbus option / Via fieldbus option	Y	Y	0	Y	Y	Y	Y	Y
y99	Loader Link Function (Mode selection)	Frequency command / Run command 0: Follow H30 and y98 data / Follow H30 and y98 data 1: Via RS-485 link (JAGUAR Loader) / Follow H30 and y98 data 2: Follow H30 and y98 data / Via RS-485 link (JAGUAR Loader) 3: Via RS-485 link (JAGUAR Loader) / Via RS-485 link (JAGUAR Loader)	Y	N	0	Y	Y	Y	Y	Y

TROUBLESHOOTING

⚠WARNING

If any of the protective functions has been activated, first remove the cause. Then, after checking that the all run commands are set to OFF, release the alarm. If the alarm is released while any run commands are set to ON, the inverter may supply the power to the motor, running the motor.

Injury may occur.

- Even though the inverter has interrupted power to the motor, if the voltage is applied to the main circuit input terminals L1/R, L2/S and L3/T, voltage may be output to inverter output terminals U, V, and W.
- Turn OFF the power and wait at least five minutes for inverters with a capacity of 22 kW or below, or at least ten minutes for inverters with a capacity of 30 kW or above. Make sure that the LED monitor and charging lamp are turned OFF. Further, make sure, using a multimeter or a similar instrument, that the DC link bus voltage between the terminals P (+) and N (-) has dropped to the safe level (+25 VDC or below).

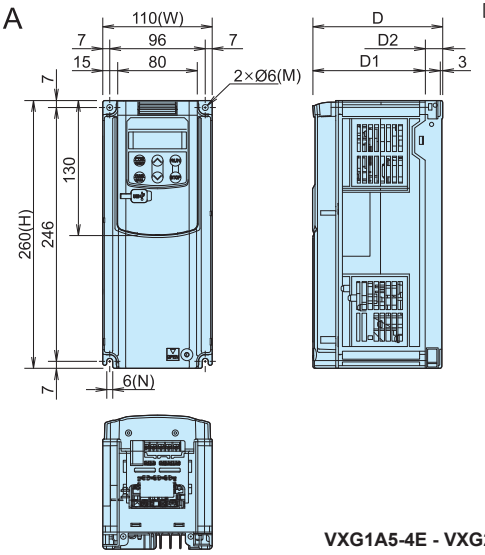
Electric shock may occur.

Description of major protective functions

Alarm code	Alarm name	Alarm description
Oc1	Overcurrent protection during acceleration	Excessive output current due to: - Excessive motor load. - Acceleration (deceleration) too fast. - Short circuit in the output circuit. - Ground fault (this protection is effective only during start up).
Oc2	Overcurrent protection during deceleration	
Oc3	Overcurrent protection at constant speed	
Ou1	Overvoltage protection during acceleration	Voltage in the DC link too high (400 V for 200 V class inverters; 800 V for 400 V class inverters) due to: - Deceleration too fast. - The motor is regenerating energy and there is no braking resistor connected to the inverter. This protection may not protect the case where the supply voltage is excessive
Ou2	Overvoltage protection during deceleration	
Ou3	Overvoltage protection at constant speed	
Lu	Undervoltage protection	Voltage in the DC link too low (200 V for 200 V class inverters; 400 V for 400 V class inverters). In the case F14=4 or 5, then this alarm does not go off when the voltage in the DC link is low.
Lin	Input phase loss protection	Input phase loss. If the inverter load is low or a DC reactor is installed the event of an input phase loss may be not detected.
Opl	Output phase lost protection	An output phase of the inverter is in open circuit.
Oh1	Overheat protection	Excessive heat sink temperature due to: - Inverter fan is not working. - The inverter is overloaded.
Dbh	External braking resistor overheat	Overheating of the external braking resistor
Olu	Overload protection	IGBT internal temperature calculated from the output current and from the temperature inside the inverter is over the preset value.
Oh2	External alarm input	A digital input is programmed with the function THR (9) and has been deactivated.
Ol1	Electronic thermal overload motor 1	The inverter is protecting the motor in accordance with the electronic thermal overload protection setting: - F10 (A06, b06, r06) =1 is for general purpose motors. - F10 (A06, b06, r06) =2 is for inverter motors. - F11 (A07, b07, r07) defines the operation level (current level). - F12 (A08, b08, r08) defines the thermal time constant. F functions are for motor 1, A functions are for motor 2, b functions are for motor 3 and r functions are for motor 4.
Ol2	Electronic thermal overload motor 2	
Oh4	PTC thermistor	The thermistor input has stopped the inverter to protect the motor. The thermistor has to be connected between terminals [C1] and [11]. Also the slide switch has to be set to the correct position and functions H26 (enable) and H27 (level) have to be set.
Er1	Memory error detection	Memory error has been detected during power up.
Er2	Keypad communications error detection	The inverter has detected a communications error with the keypad (standard keypad or multifunction keypad).
Er3	CPU error detection	Inverter has detected a CPU error or LSI error caused by noise or some other factors.
Er4	Option communications error detection	Inverter has detected a communications error with the option card.
Er5	Option error detection	The option card has detected an error.

Fig.A

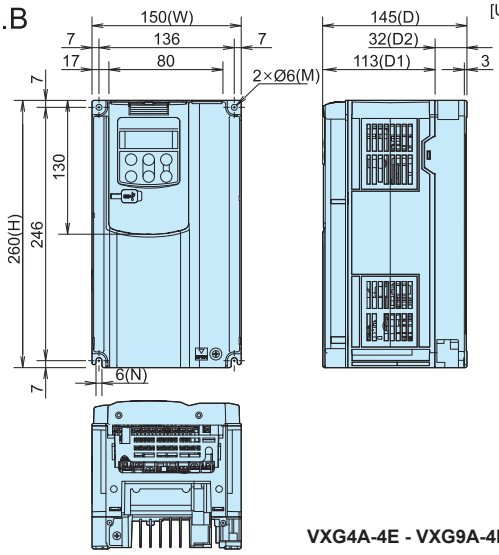
[Unit : mm]



VXG1A5-4E - VXG2A5-4E

Fig.B

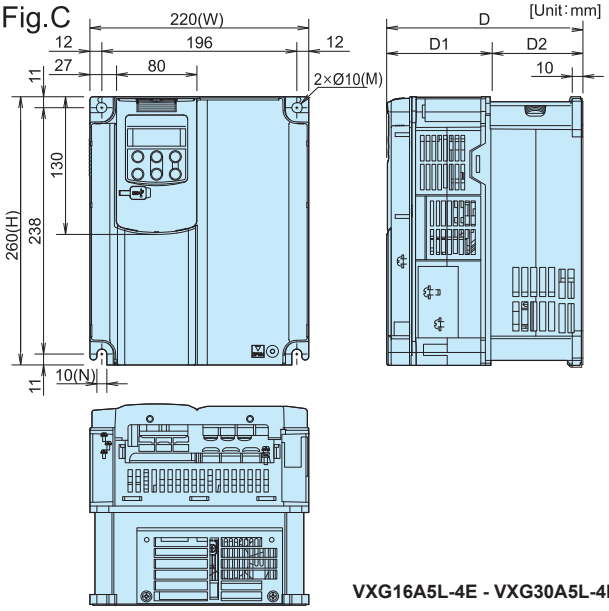
[Unit : mm]



VXG4A-4E - VXG9A-4E

Fig.C

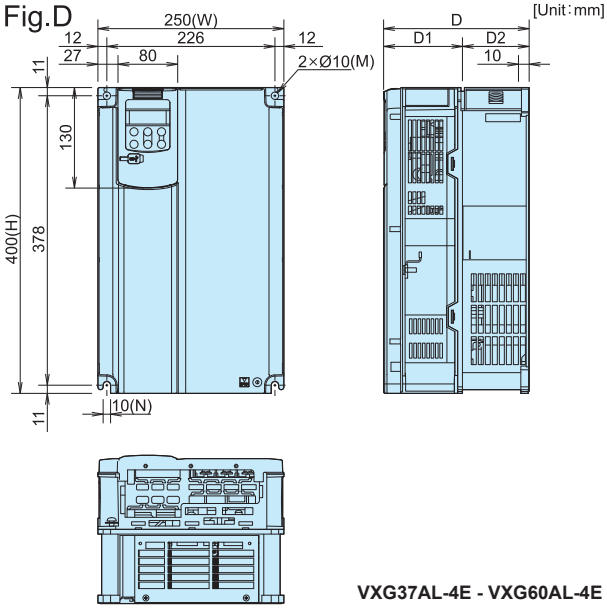
[Unit : mm]



VXG16A5L-4E - VXG30A5L-4E

Fig.D

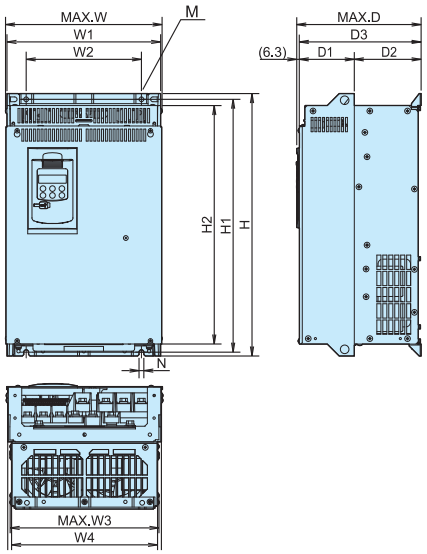
[Unit : mm]

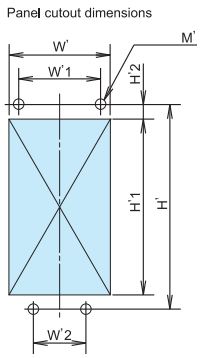


VXG37AL-4E - VXG60AL-4E

Fig.E

[Unit : mm]





VXG75AL-4E - VXG1370AL-4E

Dimensions

Power supply voltage	Motor Rating (KW)	Inverter type	Fig	Main body external dimensions (mm)														Panel cut-out dimensions (mm)						
				W	W1	W2	W3	W4	H	H1	H2	D	D1	D2	D3	M	N	W'	W'1	W'2	H'	H'1	H'2	M'
Three Phase 400V	0.4	VXG1A5-4E	A	110	-	-	-	-	260	-	-	130	113	17	41.5	2XØ6	6	-	-	-	-	-	-	-
	0.75	VXG2A5-4E													56.5									
	1.5	VXG4A-4E	B	150								145		32	-									
	2.2	VXG5.5A-4E																						
	4	VXG9A-4E																						
	5.5	VXG16A5L-4E	C	220								195	105	90	139	2XØ10	10							
	7.5	VXG23AL-4E																						
	11	VXG30A5L-4E																						
	15	VXG37AL-4E	D	250					400						137									
	18.5	VXG45AL-4E																						
	22	VXG60AL-4E																						
	30	VXG75AL-4E	E	326	320	240	310	304	550	530	500	261	115	140	255	2XØ10	10	312	288	240	530	512	9	4XM8
	37	VXG91AL-4E																						
	45	VXG112AL-4E		361	355	275	345	339	615	595	565	276		155	270			347	323	275	595	577		
	55	VXG150AL-4E							675	655	625										655	637		
	75	VXG176AL-4E							740	720	690								275	-	720	702		
	90	VXG210AL-4E		536	530	430	506	501		710	679	321	135	180	315	2XØ15	15.5	510	430	430	710	685	12.5	4XM12
	110	VXG253AL-4E																						
	132	VXG304AL-4E		536				500	1000	970	940	366	180		360						970	945		
	160	VXG377AL-4E																						
	200	VXG415AL-4E		686	680	580	656	651								3XØ15		660	580	580				6XM12
	220	VXG520AL-4E																						
	280	VXG650AL-4E					-	-			-							Consult IMO						
	315	VXG740AL-4E							1400	1370		440	260		434									
	355	VXG840AL-4E		880	874	520																		
	400	VXG960AL-4E																						
	500	VXG1170AL-4E		1000	994	600			1550	1520		500	313	187	494									
	630	VXG1370AL-4E																						

Inverter Heat loss ratings

Power Supply Voltage	Inverter Type	Inverter heat loss (Watts)			
		CT mode		VT mode	
		low carrier frequency	high carrier frequency	low carrier frequency	high carrier frequency
Three Phase 400V	VXG1A5-4E	35	45	-	-
	VXG2A5-4E	45	60	-	-
	VXG4A-4E	60	110	-	-
	VXG5.5A-4E	80	140	-	-
	VXG9A-4E	130	230	-	-
	VXG16A5L-4E	170	300	210	370
	VXG23AL-4E	230	400	300	520
	VXG30A5L-4E	300	520	360	610
	VXG37AL-4E	360	610	460	770
	VXG45AL-4E	440	770	510	870
	VXG60AL-4E	510	900	710	1310
	VXG75AL-4E	800	1150	1000	1250
	VXG91AL-4E	1000	1450	1250	1550
	VXG112AL-4E	1100	1600	1350	1700
	VXG150AL-4E	1350	1950	1950	2400
	VXG176AL-4E	1600	2150	2000	2250
	VXG210AL-4E	1900	2600	2250	2550
	VXG253AL-4E	2300	3050	2700	3050
	VXG304AL-4E	2500	3300	3050	3400
	VXG377AL-4E	3100	4000	3900	4350
	VXG415AL-4E	3850	5000	4250	4750
	VXG520AL-4E	4350	5600	5600	6200
	VXG650AL-4E	Consult IMO			
	VXG740AL-4E				
	VXG840AL-4E				
	VXG960AL-4E				
	VXG1170AL-4E				
	VXG1370AL-4E				

Inverter Filter Specifications

Power supply voltage	Motor Rating (KW)	Inverter type	Fig	Filter	Category	Mounting	Length [L]	Width [W]	Height [H]	L1	W1	Rated Current [A]	Leakage [mA] 440Vac	Weight [Kg]
Three Phase 400V	0.4	VXG1A5-4E	A	RF2A5-4B	C1	Footprint	320	116	42	293	90	5	0.5	0.75
	0.75	VXG2A5-4E												
	1.5	VXG4A-4E		RF10A-4B			320	155	42	293	105	13	0.5	1.45
	2.2	VXG5.5A-4E												
	4	VXG9A-4E												
	5.5	VXG16A5L-4E		RF23A-4B			341	255	48	311	167	35	0.5	2.5
	7.5	VXG23AL-4E												
	11	VXG30A5L-4E		RF30A5-4B								44	0.5	5
	15	VXG37AL-4E		RF60A-4B			500	250	70	449	185	78	0.5	5
	18.5	VXG45AL-4E												
	22	VXG60AL-4E												
	30	VXG75AL-4E		RF75A-4B	C2							95	0.5	5
	37	VXG91AL-4E	B	RF176A-4B		Free Standing	429	110	240	414	80	180	0.5	8.5
	45	VXG112AL-4E												
	55	VXG150AL-4E												
	75	VXG176AL-4E												
	90	VXG210AL-4E		RF304A-4B	C3		300	260	135	120	235	320	1.3	13.2
	110	VXG253AL-4E												
	132	VXG304AL-4E												
	160	VXG377AL-4E		RF520A-4B								600	1.3	13.6
	200	VXG415AL-4E												
	220	VXG520AL-4E												
	280	VXG650AL-4E		RF840A-4B			350	280	150	145	255	850	10	23.7
	315	VXG740AL-4E												
	355	VXG840AL-4E												
	400	VXG960AL-4E		RF960A-4B								1000	10	24
	500	VXG1170AL-4E		RF1370A-4B			400	300	160	170	275	1600	10	34
	630	VXG1370AL-4E												

All dimensions in mm

Fig A

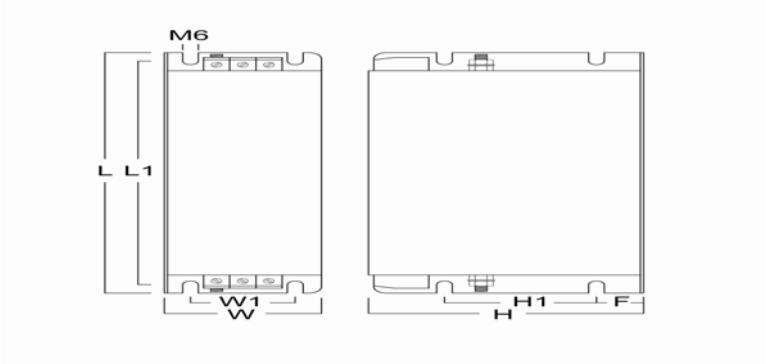
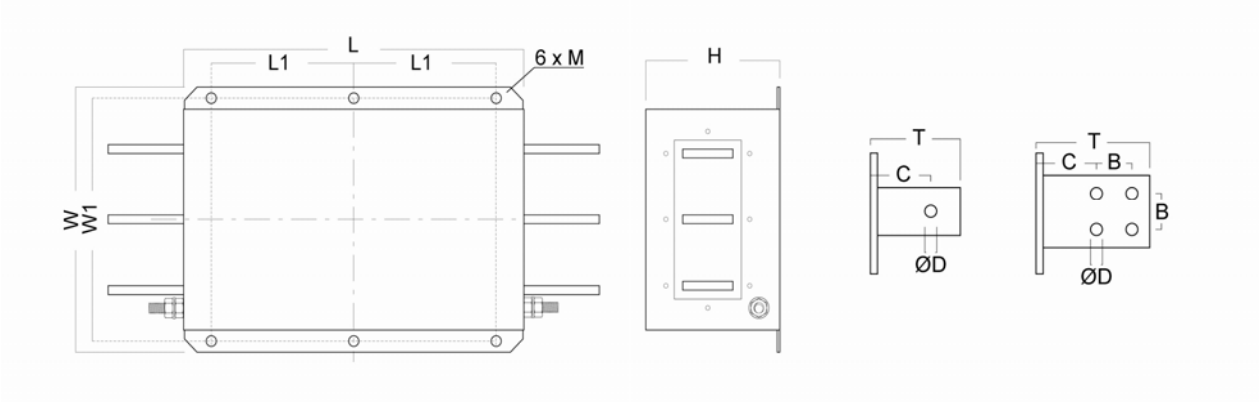


Fig B



DC Reactor Specifications

Power Supply Voltage	Motor rating (KW)	Inverter Type	Choke Type	Fig.	Height {H}	Width [W]	Depth [D]	Fixing slot	Impedance [mH]	Current [A]	Weight [Kg]
Three phase 400v	0.4	VXG1A5-4E	VXLC0.4	A	130	80	120	5x6	350	1.5	3
	0.75	VXG2A5-4E	VXLC0.75						30	2.5	
	1.5	VXG4A-4E	VXLC1.5						16	4	
	2.2	VXG5A5-4E	VXLC2.2						12	5.5	
	4	VXG9A-4E	VXLC4.0						7	9	
	5.5	VXG16A5L-4E	VXLC5.5						4	13	
	7.5	VXG23AL-4E	VXLC7.5		140			10x6	3.5	18	
	11	VXG30A5L-4E	VXLC11		150	100	95	15x5	2.2	25	
	15	VXG37AL-4E	VXLC15		165	125	115	12x7	1.8	34	5
	18.5	VXG45AL-4E	VXLC18				120		1.4	41	7
	22	VXG60AL-4E	VXLC22		175	137		22x6	1.2	49	
	30	VXG75AL-4E	VXLC30				145		0.86	80	10
	37	VXG91AL-4E	VXLC37		195	155	165	22x7	0.7	100	15
	45	VXG112AL-4E	VXLC45				180		0.58	120	
	55	VXG150AL-4E	VXLC55		230	200	165		0.47	146	17
	75	VXG176AL-4E	VXLC75	B	200	185	240	22x8	0.35	200	25
	90	VXG210AL-4E	VXLC90			185			0.29	238	27.5
	110	VXG253AL-4E	VXLC110			185			0.24	291	29
	132	VXG304AL-4E	VXLC132	C	240	250	270	Ø13	0.215	326	35
	160	VXG377AL-4E	VXLC160				270		0.177	395	45
	200	VXG415AL-4E	VXLC200				300		0.142	494	65
	220	VXG520AL-4E	VXLC220						0.126	557	75
	280	VXG650AL-4E	VXLC280						0.1	700	96
	315	VXG740AL-4E	VXLC315		Consult IMO						
	355	VXG840AL-4E	VXLC355								
	400	VXG960AL-4E	VXLC400								
	500	VXG1170AL-4E	VXLC500								
	630	VXG1370AL-4E	VXLC630								

FIG A

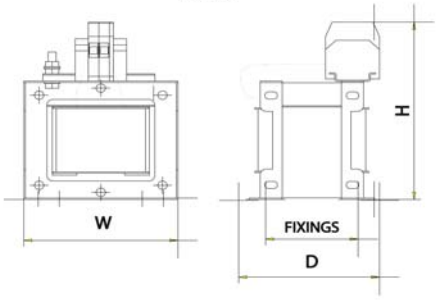


FIG B

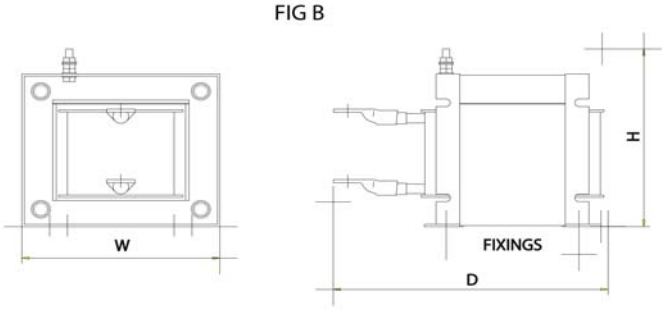
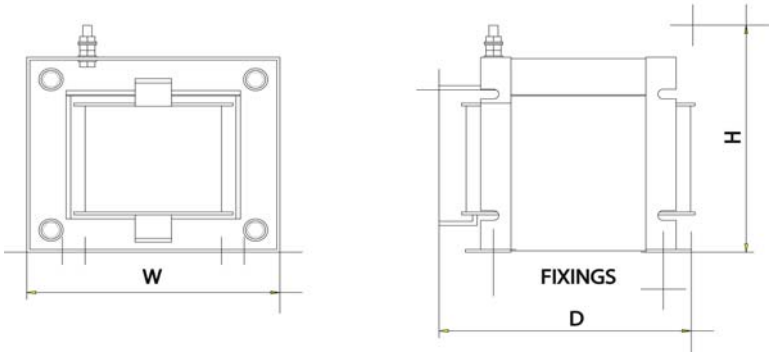


FIG C



Dynamic Braking Data

Power Supply Voltage	Motor rating (KW)	Inverter Type	Dynamic braking					
			Braking unit	Resistance [Ω]	Power [W]	Braking resistor	Dims [H x W x L]	Braking Torque %
Three phase 400v	0.4	VXG1A5-4E	N/A	200	0.2	DBR100R400W x 2	27x36x200	150
	0.75	VXG2A5-4E						
	1.5	VXG4A-4E		160	0.4	DBR160R400W	27x36x200	
	2.2	VXG5A5-4E						
	4	VXG9A-4E		130				
	5.5	VXG16A5L-4E		80	0.8	DBR160R400W x 2		
	7.5							
	11	VXG23AL-4E		60	0.9			
	15	VXG30A5L-4E		40	1.4	DBR160R400W x 4		
	18.5	VXG37AL-4E		34.4		DBR110R500W x 3	27x36x260	
	22	VXG45AL-4E		27	1.8	DBR110R500W x 4		
	30	VXG60AL-4E		22		DBR100R400W x 4	27x36x200	
	37	VXG75AL-4E	VXDBU30/37	15	3.6	Consult IMO	Consult IMO	100
	45	VXG91AL-4E		12	4.8			
	55	VXG112AL-4E	VXDBU45/55	10	6			
	75	VXG150AL-4E		7.5	7.2			
	90	VXG176AL-4E	VXDBU75/90	6.5	9.6			
	110	VXG210AL-4E	VXDBU110/132	4.7	12			
	132	VXG253AL-4E			14.4			
	160	VXG304AL-4E		3.9	18			
	200	VXG377AL-4E	VXDBU160/132	3.2	19.2			
	220	VXG415AL-4E		2.6	24			
	280	VXG520AL-4E		2.2	28.8			
	315	VXG650AL-4E	VXDBU160/132 (2 Units required)	Consult IMO	Consult IMO			
	355	VXG740AL-4E						
	400	VXG840AL-4E						
	500	VXG960AL-4E						
	630	VXG1170AL-4E						
		VXG1370AL-4E						

Inverter Wiring and Protection Data

Power Supply Voltage	Motor rating (KW)	Inverter Model	CT/VT mode	Circuit Protection							Recommended wire size (mm2)						
				IMO Contactor		IMO MCB		Moulded Case Circuit Breaker		Fuses	Main circuit power input (L1/R, L2/S, L3/T,)		Inverter output [U, V, W]	DCR [P1, P(+)]	Control Circuit	Auxilliary Control power input	Grounding
				With DCR	Without DCR	With DCR	Without DCR	With DCR	Without DCR	Fuse Rating (A)	w/ DCR	w/o DCR					
Three phase 400v	0.4	VXG1A5-4E	CT	MC14-S-10	MC14-S-10	C10B3006	C10B3006	5	5	3	1.0	1.0	1.0	1.0	0.75	2.0	2.0
	0.75	VXG2A5-4E								6							
	1.5	VXG4A-4E					C10B3010		10	10							
	2.2	VXG5.5A-4E				C10B3010	C10B3016		15	15							
	4	VXG9A-4E					C10B3020	10	20	20		1.5					
	5.5	VXG16A5L-4E	CT	MC22-S-10	MC22-S-10	C10B3016	C10B3032	15	30	80		2.5	1.5	1.5			
	7.5		VT			C10B3020	C10B3040	20	40		1.5	4.0	2.5	2.5			3.5
		VXG23AL-4E	CT	MC32-S-00	MC32-S-00												
	11		VT			C10B3032	C10B3050	30	50		4.0	6	4	4			
		VXG30A5L-4E	CT							125							
	15		VT			C10B3040	C10B3060	40	60		6	10	6	6			5.5
		VXG37AL-4E	CT	MC40-S-00	MC40-S-00												
	18.5		VT						75			16	10	10			
		VXG45AL-4E	CT	MC50-S-00	MC50-S-00					160							
	22		VT			Consult IMO		50	100		10			16.0			
		VXG60AL-4E	CT	MC62-S-00	MC62-S-00												
	30		VT					75	125		16	25	16	25			8.0
		VXG75A-4E	CT	MC90-S-00	MC90-S-00					250							
	37		VT					100			25	35	25				
		VXG91AL-4E	CT	MC115-S-00	MC115-S-00												
	45		VT						150	315		50	35	35			
		VXG112AL-4E	CT														
	55		VT					125	200		35	70	50	70			
		VXG150AL-4E	CT	MC151-S-00	MC151-S-00					400							
	75		VT					175		350	70		70	95			14.0
		VXG176AL-4E	CT	MC176-S-00	MC176-S-00												
	90		VT					200			95		95	120			
		VXG210AL-4E	CT	MC210-S-00	-												
	110		VT					250			50x2		70x2	150			22.0
		VXG253AL-4E	CT	MC260-S-00						400							
	132		VT					300			70x2			70x2			
		VXG304AL-4E	CT	MC316-S-00						450							
	160		VT					350			185		240	300			
		VXG377AL-4E	CT	MC450-S-00						500							
	200		VT					500			300		300	120x2			38.0
		VXG415AL-4E	CT							550							
	220		VT										150x2	150x2			
		VXG520AL-4E	CT					600	-	630							
	250			MC550-S-00							185x2		185x2	185x2			
	280		VT								240x2	-	240x2	240x2			
		VXG650AL-4E	CT							900							
	315			MC700-S-00	-			800			300x2		300x2	300x2			60.0
	355		VT								240x2		240x2	240x2			
	315	VXG740AL-4E	CT	MC860-S-00							300x2		300x2	300x2			
	355										240x3		240x3	300x3			
	400		VT					1200			300x2		300x2	300x2			
	355	VXG840AL-4E	CT					800		1250	240x3		240x3	300x3			
	400										300x3		300x3				
	450		VT					1200			240x3		240x3	300x3			
	400	VXG960AL-4E	CT								300x3		300x3	240x4			
	450			MC1000-S-12									240x4	300x4			100.0
			VT														
	500	VXG1170AL-4E	CT	MC1200-S-12						2000							
			VT					1400			300x4		300x4				
	630	VXG1370AL-4E	CT	-													
	710		VT					1600									

CONFORMITY WITH STANDARDS

Compliance with UL Standards and Canadian Standards (cUL certification)

General

Originally, the UL standards were established by Underwriters Laboratories, Inc. as private criteria for inspections/investigations pertaining to fire/accident insurance in the USA. Later, these standards were authorized as the official standards to protect operators, service personnel and the general populace from fires and other accidents in the USA.

cUL certification means that UL has given certification for products to clear CSA Standards. cUL certified products are equivalent to those compliant with CSA Standards.

Considerations when using JAGUAR VXG in systems to be certified by UL and cUL

If you want to use the IMO series of inverters as a part of UL Standards or CSA Standards (cUL certified) certified product, refer to the related guidelines described on pages ix to xii.

Compliance with European Standards

The CE marking on IMO products indicates that they comply with the essential requirements of the Electromagnetic Compatibility (EMC) Directive 2004/108/EC and Low Voltage Directive 2006/95/EC which are issued by the Council of the European Communities

The products comply with the following standards

	Basic type	EMC filter built-in type
EMC Directives	Depends upon a filter dedicated to IMO inverters*	EN61800-3 : 2004 Immunity : Second environment (Industrial) Emission : Category C3
Low Voltage Directive	EN61800-5-1: 2003	
Safety Standard	EN954-1: Category 3	

* If connected with an external EMC filter dedicated to IMO inverters, the basic type of inverters that bear a CE marking but have no built-in EMC filter becomes compliant with these EMC Directives.

CAUTION

The EMC filter built-in type of the IMO inverters is categorized as "Category C3" of the EN61800-3. It is not designed for use in a domestic environment. It may interfere with the operations of home appliances or office equipment due to noise emitted from it.

Compliance with EMC Standards

General

The CE marking on inverters does not ensure that the entire equipment including our CE-marked products is compliant with the EMC Directive. Therefore, CE marking for the equipment shall be the responsibility of the equipment manufacturer. For this reason, IMO's CE mark is indicated under the condition that the product shall be used within equipment meeting all requirements for the relevant Directives. Instrumentation of such equipment shall be the responsibility of the equipment manufacturer.

Generally, machinery or equipment includes not only our products but other devices as well. Manufacturers, therefore, shall design the whole system to be compliant with the relevant Directives.

In addition, to satisfy the requirements noted above, use the EMC filter built-in type of inverters or the combination of the basic type of inverters that have no built-in EMC filter and an external filter (option) dedicated to IMO inverters. In either case, mount inverters in accordance with the installation procedure given below. To ensure the compliance, it is recommended that inverters be mounted in a metal panel.

Tip Our EMC compliance test is performed under the following conditions.
Wiring length (of the shielded cable) between the inverter (EMC filter built-in type) and motor: 5m

Note To use IMO inverters in combination with a PWM converter, the basic type of inverters having no built-in EMC filter should be used. Use of an EMC filter built-in type may increase heat of capacitors in the inverter, resulting in a break. In addition, the effect of the EMC filter can no longer be expected.

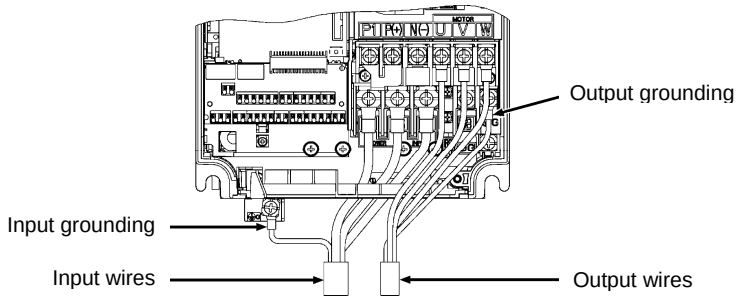
Recommended installation procedure

To make the machinery or equipment fully compliant with the EMC Directive, have certified technicians wire the motor and inverter in strict accordance with the procedure described below.

■ In the case of EMC filter built-in type of inverter

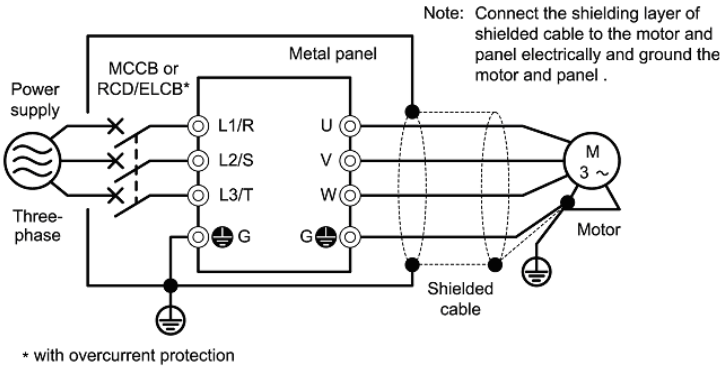
1) Mount the inverter on a grounded panel or metal plate. Use shielded wires for the motor cable and route the cable as short as possible. Firmly clamp the shield to the metal plate to ground it. Further, connect the shielding layer electrically to the grounding terminal of the motor. Separate the input and output wires as far as possible, using wiring guides.

   For inverters with a capacity of 5.5 to 11 kW, connect the input grounding wire to the grounding terminal at the front, left-hand side, and the output grounding wire to that on the main circuit terminal block. (Refer to below.)



For EMC Filter Built-in Type Inverters with a Capacity of 5.5 to 11 kW

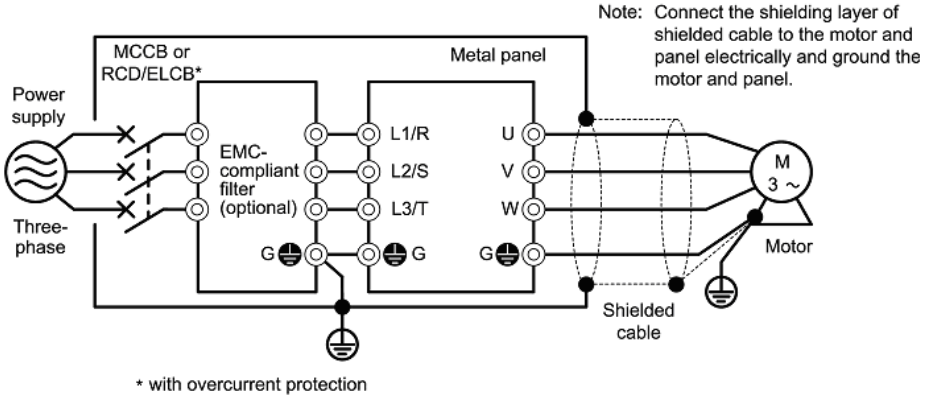
2) For connection to inverter's control terminals and for connection of the RS-485 communication signal cable, use shielded wires. As with the motor, clamp the shields firmly to a grounded panel.
3) If noise from the inverter exceeds the permissible level, enclose the inverter and its peripherals within a metal panel as shown below.



Mounting the Inverter in a Metal Panel

■ In case an EMC-compliant filter (optional) is externally used

1) Mount the inverter and the filter on a grounded panel or metal plate. Use shielded wires for the motor cable and route the cable as short as possible. Firmly clamp the shields to the metal plate to ground them. Further, connect the shielding layers electrically to the grounding terminal of the motor.
2) For connection to inverter's control terminals and for connection of the RS-485 communication signal cable, use shielded wires. As with the motor, clamp the shields firmly to a grounded panel.
3) If noise from the inverter exceeds the permissible level, enclose the inverter and its peripherals within a metal panel as shown below.



Mounting the Inverter with EMC-compliant Filter in a Metal Panel

Leakage current of EMC-filter built-in type of inverters

An EMC filter uses grounding capacitors for noise suppression which increase leakage current. When using an EMC-filter built-in type of inverters, therefore, check whether there is no problem with electrical systems.

⚠CAUTION

Three-Phase PDS (Power Drive System) with touch currents ≥ 3.5 mA AC or ≥ 10 mA DC

As the touch current (leakage current) of inverters with EMC-filter is relatively high, it is of essential importance to always assure a reliable connection to Protective Earth (PE).

In Table 9.1, for the inverter types whose leakage currents are equal to or exceed the critical value of 35 mA AC or 10 mA DC (IEC 61800-5-1), the minimum cross sectional area of the PE-conductor should be:

- 10 mm^2 (Cu-conductors)
- 16 mm^2 (Al-conductors)

An electric shock could occur.

Leakage Current of EMC Filter Built-in Type of Inverters

Input Power	Inverter type *1)	Leakage current (mA)
Three-phase 200 V *1)	VXG3A-2	2
	VXG5A-2	
	VXG8A-2	4
	VXG11A-2	
	VXG18A-2	
	VXG30AL-2	23
	VXG46AL-2	
	VXG59AL-2	
	VXG74AL-2	25
	VXG88AL-2	
	VXG115AL-2	
	VXG146AL-2	
	VXG180AL-2	
	VXG215AL-2	
	VXG283AL-2	
	VXG350AL-2	
	VXG400AL-2	

Input Power	Inverter type *1)	Leakage current (mA)
Three-phase 400 V *2)	VXG1A5-4E	3
	VXG2A5-4E	
	VXG4A-4E	2
	VXG5.5A-4E	
	VXG9A-4E	
	VXG16A5L-4E	4
	VXG23AL-4E	
	VXG30A5L-4E	
	VXG37AL-4E	
	VXG45AL-4E	
	VXG60AL-4E	
	VXG75AL-4E	11
	VXG91AL-4E	
	VXG112AL-4E	
	VXG150AL-4E	5
	VXG176AL-4E	
	VXG210AL-4E	
	VXG253AL-4E	
	VXG304AL-4E	
	VXG377AL-4E	
	VXG415AL-4E	
	VXG520AL-4E	
	VXG650AL-4E	
	VXG740AL-4E	
	VXG840AL-4E	
	VXG960AL-4E	
	VXG1170AL-4E	
	VXG1370AL-4E	

*1) Calculated based on these measuring conditions: 240 V, 60 Hz, grounding of a single wire in delta connection, interphase voltage unbalance ratio 2%.

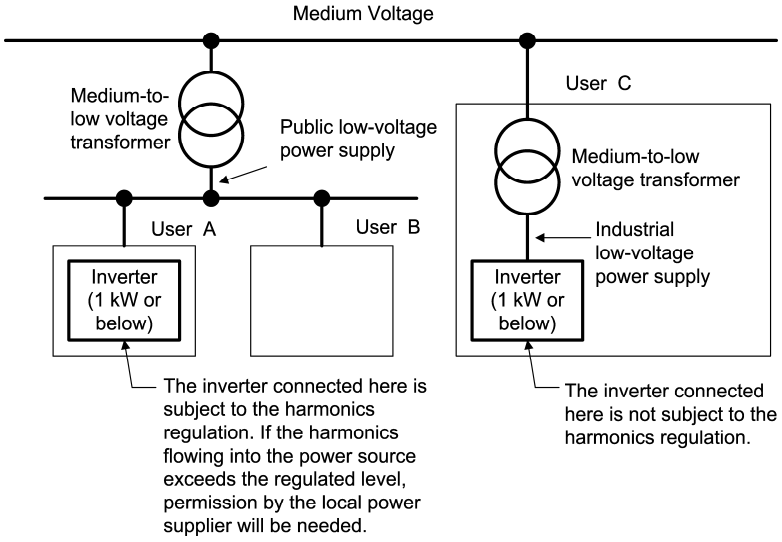
*2) Calculated based on these measuring conditions: 480 V, 60 Hz, neutral grounding in Y-connection, interphase voltage unbalance ratio 2%.

Harmonic Component Regulation in the EU

General comments

When you use general-purpose industrial inverters in the EU, the harmonics emitted from the inverter to power lines are strictly regulated as stated below.

If an inverter whose rated input is 1 kW or less is connected to public low-voltage power supply, it is regulated by the harmonics emission regulations from inverters to power lines (with the exception of industrial low-voltage power lines). Refer below for details.



Power Source and Regulation

9.1.1 Compliance with the harmonic component regulation

Compliance with Harmonic Component Regulation

Power supply voltage	Inverter type	w/o DC reactor	w/ DC reactor	Applicable DC reactor type
Three-phase 200 V	VXG3A-2	√ *	√ *	Consult IMO
	VXG5A-2	√ *	√ *	Consult IMO
Three-phase 400 V	VXG1A5-4E	—	√	VXLC0.4
	VXG2A5-4E	—	√	VXLC0.75

* When supplying three-phase 200 VAC power stepped down from a three-phase 400 VAC power line using a transformer, the level of harmonic flow from the 400 VAC line will be regulated.

Note 1) Inverter types marked with √ in the table above are compliant with the EN61000-3-2 (+A14), so they may be connected to public low-voltage power supply unconditionally.

Conditions apply when connecting models marked with "—". To connect them to public low-voltage power supply, you need to obtain permission from the local electric power supplier. In general, you will need to provide the supplier with the harmonics current data of the inverter. To obtain the data, contact your IMO representative.

Compliance with the Low Voltage Directive in the EU

General

General-purpose inverters are regulated by the Low Voltage Directive in the EU. IMO Precision Controls Ltd states that all our inverters with CE marking are compliant with the Low Voltage Directive.

Points fo r con sideration when u sing the IMO series in a sy stem to be certified b y th e L ow Voltage Directive in the EU

If you want to use the IMO series of inverters in systems/equipment in the EU, refer to the guidelines on pages v to viii.

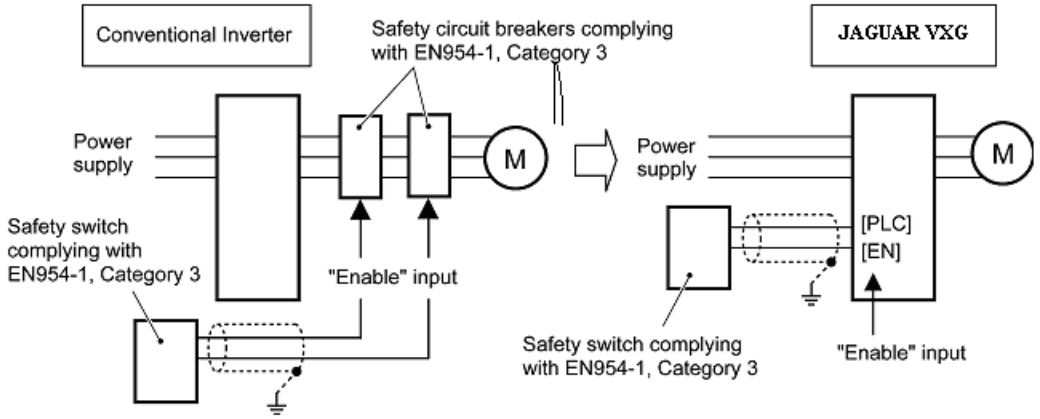
Compliance with EN954-1, Category 3

General

In IMO series of inverters, opening the hardware circuit between terminals [EN] and [PLC] stops the output transistor, coasting the motor to a stop. (EN: Enable input) This is the safety stop function prescribed in EN60204-1, Category 0 (Uncontrolled stop) and compliant with EN954-1, Category 3.

Note: Depending on applications, additional measures may be necessary (for end-user) to apply such as 'brake function' to prevent movement and motor terminal protection against possible electrical hazard(s).

Use of terminals [EN] and [PLC] eliminates the need of external safety circuit breakers while conventional inverters need those breakers to configure the EN954-1 Category 3 compliant safety system.



EN954-1

European Standard EN954-1 (Safety of machinery–Safety related parts of control systems) prescribes the basic safety requirements for machinery categorized according to the requirement level. Category 3 represents the requirements that the machinery shall be designed with redundancy so that a single fault does not lead to the loss of the safety function. Below shows an outline of the category levels and their safety requirements. (For detailed requirements refer to EN 954-1)

Category	Summary of requirements	System behavior
B	Safety related parts of control systems and/or their safety devices and their components shall be designed, constructed, selected, assembled and combined in accordance with the relevant standards so that they can withstand the expected influence.	The occurrence of a fault can lead to the loss of the safety function.
1	Requirements of Category B shall apply. Well-tried safety principles and well-tried components shall be used.	The occurrence of a fault can lead to the loss of the safety function, but the probability of occurrence is lower than for Category B.
2	Requirements of Category 1 shall apply. The safety function shall be checked at intervals suitable for the machinery.	The occurrence of a fault can lead to the loss of the safety function between the checks.
3	Requirements of Category 1 shall apply. Safety-related parts shall be designed, so that: - a single fault in any of these parts does not lead to the loss of the safety function, and - a single fault is detected whenever reasonably practicable.	When the single fault occurs, the safety function is still maintained. Accumulation of undetected faults can lead to the loss of the safety function.
4	Requirements of Category 1 shall apply. Safety-related parts shall be designed, so that a single fault is detected during or prior to the next demand on the safety function. If this is not possible, an accumulation of faults shall not lead to the loss of the safety function.	When faults occur, the safety function is still maintained.

Notes

(1) Wiring for terminal [EN]

- When using terminal [EN], be sure to remove the short-circuit wire from terminals [EN] and [PLC], which has been connected at the shipment.
- '[EN] & [PLC]' terminals are safety related wire connections and therefore careful installation practices shall be applied to ensure no 'short-circuit(s)' can occur to these connections.
- For opening and closing the hardware circuit between terminals [EN] and [PLC], use safety approved components such as safety switches and safety relays that comply with EN954-1, Category 3 or higher to ensure a complete shutoff.
- Be sure to use shielded wires for connecting terminals [EN] and [PLC] and ground the shielding layer. Do not connect/mix any other control signal wire within the same shielded core.
- It is the responsibility of the machinery manufacturer to guarantee that a short-circuiting or other fault does not occur in wiring of external safety components between terminals [EN] and [PLC].

  Fault examples:

  • Terminals [EN] and [PLC] are short-circuited due to the wiring being caught in the door of the control panel so that a current continues to flow in terminal [EN] although the safety component is OFF and therefore the safety function will/may NOT operate

  • The wiring is in contact with any other wire so that a current continues to flow in terminal [EN] and therefore the safety function will/may NOT operate

(2) Other notes

- When configuring the product safety system with this safety stop function, make a risk assessment of not only the external equipment and wiring connected to terminal [EN] but also the whole system including other equipment, devices and wiring against the product safety system required by the machinery manufacturer under the manufacturer's responsibility in order to confirm that the whole system conforms to the product safety system required by the machinery manufacturer.

  In addition, as preventive maintenance, the machinery manufacturer must perform periodical inspections to check that the product safety system properly functions.
- To make the inverter compliant with EN954-1, Category 3, it is necessary to install the inverter on a control panel with the enclosure rating of IP54 or above.

  This safety stop function coasts the motor to a stop. When a mechanical brake is used to stop or hold the motor for the sake of the product safety system of whole system, do not use the inverter's control signals such as output from terminal [Y]. (Using control signals does not satisfy the safety standards because of software intervention.) Use safety components complying with EN954-1, Category 3 or higher to activate mechanical brakes.
- The safety shutdown circuit between terminal [EN] input section and inverter's output shutdown section is dual-configured (redundant circuit) so that an occurrence of a single fault does not detract the safety stop function.

  If a single fault is detected in the safety shutdown circuit, the inverter coasts the motor to a stop even with the terminal [EN]-[PLC] state being ON, as well as outputting an alarm to external equipment. (Note that the alarm output function is not guaranteed to all of single faults.)
- This safety stop function may not completely shut off the power supply to the motor electrically. Before performing wiring or maintenance jobs, be sure to disconnect/isolate the input power to the inverter and wait at least 5 minutes for 22 kW or below of inverters, and at least 10 minutes for 30 kW or above.

IMO Inverter warranty statement.

Terms of IMO 5 year warranty.

- IMO Jaguar Inverters are covered by a 5 year warranty from date of despatch.
- In the event of failure due to faulty components or inferior workmanship, the Inverter will be replaced or repaired free of charge at IMO's discretion.
- Warranty replacements and repaired units will be despatched free of charge, all costs related to faulty units being returned to IMO for inspection/repair are the responsibility of the sender.
- In circumstances where it is viable for the Inverter to be repaired in situ due to size (>30kw), an Engineer from IMO or contracted to represent IMO can be supplied. Site visits are chargeable at IMO's current service rate, any warranty parts will be replaced free of charge.
- All Inverters require a Returns Authorisation reference to be supplied with the Inverter upon returning the drive to IMO, this reference can be obtained from our website www.imopconline.com by registering and following the returns instructions.
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Warranty restrictions.

- Incorrect, or unsafe installation.
- Poor condition due to abuse, neglect or improper maintenance.
- Modifications, repairs performed by anyone other than IMO or without prior written agreement.
- Inverter used in incorrect application or used for function other than for which it is designed.
- Any alterations, which may invalidate the Inverters CE declaration.
- Non IMO options or ancillary devices used.

Liability.

- Regardless whether a breakdown occurs during or after the warranty period, IMO shall not be liable for any loss of opportunity, loss of profits, penalty clauses or damages arising from any special circumstances, secondary damages, accident compensation to another company, damages to any equipment, or personal injury.

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