Basic functions

Each “setup item” that determines the control characteristics of the inverter is called a “parameter.”
For example, to change the acceleration time, you choose the acceleration time parameter (titled “ ACC ”).

Quick mode (EASY)

To enter the Quick mode, press the EASY key on the panel. In this mode, you can set eight of the basic parameters.

Standard mode

In this mode, you can set all parameters.
For details of parameters, refer to the Instruction Manual.

Title	Function
AU4	Parameter setting macro function
Pt	V/f control mode selection
FH	Maximum frequency
ACC	Acceleration time 1
dEC	Deceleration time 1
tHr	Motor overload protection level 1
FM	FM terminal meter adjustment
PSEL	Parameter display selection

Basic parameters

Title	Function	Adjustment Range	Default
FC	Frequency of operation panel	LL - UL Hz	0

Title	Function	Adjustment Range	Default
AUH	History function		-
AU1	Automatic acceleration/deceleration	0:Disabled 1:Automatic setting 2:Automatic setting (during acceleration only)	0
AU2	Automatic torque boost	0:Disabled 1:Automatic torque boost + auto-tuning 1 2: Sensorless vector control 1+ auto-tuning 1	0
AU4	Automatic function setting	0:Disabled 1:Frequency setting by means of voltage 2:Frequency setting by means of current 3:Voltage/current switching from external terminal 4:Frequency setting on operation panel and operation by means of terminals 5: Frequency setting and operation on operation panel	0
CMOd	Command mode selection	0:Terminal input enabled 1:Operation panel input enabled (including LED/LCD option input) 2:Operation panel RS485 (2-wire) communication input 3:Internal RS485 (4-wire) communication input 4:Communication option input	0
FMOd	Frequency setting mode selection 1	1:VI/II (voltage/current input) 2:RR/S4 (potentiometer/voltage input) 3:RX (voltage input) 4:Operation panel input enabled (including LED/LCD option input) 5:Operation panel RS485 (2-wire) communication input 6:Internal RS485 (4-wire) communication input 7:Communication option input 8:Optional AI1 (differential current input) 9:Optional AI2 (voltage/current input) 10:UP/DOWN frequency 11:RP pulse input 12:High-speed pulse input 13:Binary/BCD input	2
Pt	V/f control mode selection	0:Constant torque characteristics 1:Voltage decrease curve 2:Automatic torque boost 3:Sensorless vector control (speed) 4:- 5:V/f 5-point setting 6:PM control 7:PG feedback vector control (speed) 8:- 9:Energy-saving 10:Advanced energy-saving	0
ub	Manual torque boost 1	0.0~30.0%	Depends on the capacity
uL	Base frequency 1	25.0~500.0Hz	WN:60, WP:50.0
uLu	Base frequency voltage 1	200V class:50~330V 400V class:50~660V	Depends on the capacity
FH	Maximum frequency	30.0~500.0Hz	80.0
UL	Upper limit frequency	0.0~FH Hz	WN:60.0, WP:50.0
LL	Lower limit frequency	0.0~UL Hz	0.0
ACC	Acceleration time 1	0.1~6000 sec.	Depends on the capacity
dEC	Deceleration time 1	0.1~6000 sec.	Depends on the capacity
AuF2	RR/S4 input point 2 frequency	0.0~FH Hz	WN:60.0, WP:50.0
AIF2	VI/II input point 2 frequency	0.0~FH Hz	WN:60.0, WP:50.0
Sr1	Preset speed operation frequency 1	LL~UL Hz	0.0
Sr2	Preset speed operation frequency 2	LL~UL Hz	0.0
Sr3	Preset speed operation frequency 3	LL~UL Hz	0.0
Sr4	Preset speed operation frequency 4	LL~UL Hz	0.0
Sr5	Preset speed operation frequency 5	LL~UL Hz	0.0
Sr6	Preset speed operation frequency 6	LL~UL Hz	0.0
Sr7	Preset speed operation frequency 7	LL~UL Hz	0.0
Fr	Forward run/reverse run selection (operation panel operation)	0:Forward run 1:Forward run 2:Forward run (Forward/reverse switchable on operation panel) 3:Reverse run (Forward/reverse switchable on operation panel)	0
tHr	Motor overload protection level 1	10~100%	100
OLn	Motor overload protection characteristic selection	Setting / Motor type / Overload protection / OL stall	0
dSPU	Current/voltage unit selection	0:%, 1:A (ampere)/V (volt)	0
FMSL	FM terminal meter selection	0~64 (0:Output frequency, 1:Frequency command value, 2:Output current, 3:Input voltage, 4:Output voltage, etc.)	0
FM	FM terminal meter adjustment	-	-
AMSL	AM terminal meter selection	0~64 (0:Output frequency, 1:Frequency command value, 2:Output current, 3:Input voltage, 4:Output voltage, etc.)	2
AM	AM terminal meter adjustment	-	-
CF	PWM carrier frequency	1.0~16.0kHz (large capacity model 2.5~8.0kHz)	Depends on the capacity
uuS	Auto-restart control selection	0:Deselect 1:At auto-restart 2:ST ON/OFF switching 3:1+2 4:Starting	0
uuC	Regenerative power ride-through control	0:Deselect 1:Power ride-through 2:Deceleration stop during power failure 3:Synchronized deceleration/acceleration (synchronized acceleration/deceleration signal) 4:Synchronized deceleration/acceleration (synchronized acceleration/deceleration signal+power failure)	0
Pb	Dynamic braking selection	0:Deselect 1:Select (braking resistance overload detect) 2:Select (braking resistance overload not detect)	0
Pbr	Dynamic braking resistance	0.5~1000Ω	Depends on the capacity
PbCP	Allowable continuous braking resistance	0.01~600.0kW	Depends on the capacity
tyP	Factory default setting	0: - 1:50 Hz default setting 2:60 Hz default setting 3:Factory default setting 4:Trip cleared 5:Cumulative operation time cleared 6:Type information initialized 7:User-defined parameter recorded 8:Item 7 above reset 9:Cumulative fan operation time cleared 10:Acceleration/deceleration time setting 0.01 sec.~600.0 sec. 11:Acceleration/deceleration time setting 0.1 sec.~6000sec.	0
PSEL	Parameter display selection	0:Standard setting mode at time of activation of motor 1:Quick mode at time of activation of motor 2:Quick mode only	0
F1-- ~ F9--	Extended parameters	Set parameters in more detail.	-
Gr.U	Automatic edit function	-	-

Setting	Motor type	Overload protection	OL stall
0	Standard Motor	○ (protect)	× (not stall)
1		○ (protect)	○ (stall)
2		× (not protect)	× (not stall)
3		× (not protect)	○ (stall)
4	VF Motor	○ (protect)	× (not stall)
5		○ (protect)	○ (stall)
6		× (not protect)	× (not stall)
7		× (not protect)	○ (stall)

Extended parameters

About 400 extended parameters are available. For details on extended parameters, please visit our web site (http://www.inverter.co.jp/).

Standard specifications

Standard specifications (200 V class - 0.4 to 45 kW, 400 V class -0.75 to 75 kW model)

200 V class

Item		Specification													
Applicable Motor (kW)		0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45
Rating	Type	VFPS1–													
	Form	2004PL	2007PL	2015PL	2022PL	2037PL	2055PL	2075PL	2110PM	2150PM	2185PM	2220PM	2300PM	2370PM	2450PM
	Output Capacity (kVA) Note 1)	1.1	1.8	3.0	4.2	6.7	10	13	21	25	29	34	46	55	67
	Output Current (A) Note 2)	3.0 (3.0)	4.8 (4.5)	8.0 (8.0)	11 (10.5)	17.5 (16.6)	27.5 (25.0)	33 (33)	54 (49)	66 (64)	75 (66)	88 (75)	120 (88)	144 (120)	176 (140)
	Output Voltage	3-phase, 200 to 240 V (The maximum output voltage is the same as the input voltage.)													
	Overload Current Rating	120%–1 minute 135%–2 seconds													
Electric Braking	Dynamic Braking Circuit	Built-in													
	Dynamic Breaking Resistor	External options													
Power Supply	Voltage/frequency	3-phase, 200 to 240 V – 50/60 Hz													
	Allowable Fluctuation	Voltage +10% - 15% Note 3) Frequency ±5%													
Protective method		IP20 enclosed type (JEM1030)									IP00 enclosed type (JEM1030) Note 4)				
Cooling method		Forced air cooling													
Cooling fan noise (dBA)		43	43	43	55	55	56	58	60	60	60	60	64	64	64
Color		RAL7016													
Built-in Filter		EMI noise filter Note 5)									Basic noise filter Note 6)				
DC Reactor		External option									Built-in				

400 V class

Item		Specification													
Applicable Motor (kW)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
Rating	Type	VFPS1–														
	Form	4007PL	4015PL	4022PL	4037PL	4055PL	4075PL	4110PL	4150PL	4185PL	4220PL	4300PL	4370PL	4450PL	4550PL	4750PL
	Output Capacity (kVA) Note 1)	1.8	3.1	4.4	8.0	11	13	21	25	31	37	50	60	72	88	122
	Output Current (A) Note 2)	2.3 (2.3)	4.1 (4.0)	5.8 (5.3)	10.5 (8.6)	14.3 (13)	17.6 (17)	27.7 (25)	33 (32)	41 (37)	48 (38)	66 (53)	79 (60)	94 (75)	116 (93)	160 (120)
	Output Voltage	3-phase, 380 to 480 V (The maximum output voltage is the same as the input voltage.)														
	Overload Current Rating	120%–1 minute 135%–2 seconds														
Electric Braking	Dynamic Braking Circuit	Built-in														
	Dynamic Breaking Resistor	External options														
Power Supply	Voltage/frequency	3-phase, 380 to 480 V – 50/60 Hz														
	Allowable Fluctuation	Voltage +10% - 15% Note 3) Frequency ±5%														
Protective method		IP20 enclosed type (JEM1030)									IP00 enclosed type (JEM1030) Note 4)					
Cooling method		Forced air cooling														
Cooling fan noise (dBA)		43	43	43	55	56	56	58	60	60	60	64	64	64	64	64
Color		RAL7016														
Built-in Filter		EMI noise filter Note 5)														
DC Reactor		External option									Built-in					

Note 1) Capacity is calculated at 220V for the 200V models and at 440V for the 400V models.
Note 2) Rated output current when the PWM carrier frequency (parameter CF) is 4kHz or less.
The values in parentheses refer to rated output currents when set to 12kHz.
Note 3) ±10% when the inverter is used continuously (load of 100%)
Note 4) Inverters, 18.5kW or greater, do not have wiring port covers. They have large openings, but there is no space to bend the external cables inside the unit. If they are fitted external to the cabinet, please use an optional wiring port cover.
Note 5) Complies with the Europian EMC Directive
IEC/EN61800-3, 1st environment, category C2 or IEC/EN61800-3, 2nd environment, category C3
Note 6) Not complies with the European EMC Directive
Core and capacities with external filter (optional) : Complies with the Europien EMC Directive.

VF-PS1

Standard specifications

Standard specifications (200 V class -55 to 75 kW, 400 V class -90 to 630 kW model)

200 V class

Item		Specification		
Applicable Motor (kW)		55	75	90
Rating	Type	VFPS1–		
	Form	2550P	2750P	2900P
	Output Capacity (kVA) Note 1)	84	109	137
	Output Current (A) Note 2)	221	285	359
	Output Voltage	3-phase, 200 to 240 V (The maximum output voltage is the same as the input voltage.)		
	Overload Current Rating	120%–1 minute 135%–2 seconds		
Electric Braking	Dynamic Braking Circuit	Built-in		
	Dynamic Breaking Resistor	External options		
Power Supply	Voltage/frequency	3-phase, 200 to 240 V – 50/60 Hz		
	Allowable Fluctuation	Voltage +10% – 15% Note 3) Frequency ±5%		
Protective method		IP20 enclosed type (JEM1030) Note 4)		
Cooling method		Forced air cooling		
Cooling fan noise (dBA)		61	61	70
Color		RAL7016		
Built-in Filter		External filter (optional)		
DC Reactor		Attached DC reactor Note 5)		

400 V class

Item		Specification										
Applicable Motor (kW)		90	110	132	160	220	250	280	315	400	500	630
Rating	Type	VFPS1–										
	Form	4900PC	4110KPC	4132KPC	4160KPC	4220KPC	4250KPC	4280KPC	4315KPC	4400KPC	4500KPC	4630KPC
	Output Capacity (kVA) Note 1)	136	164	197	239	325	367	419	469	578	717	905
	Output Current (A) Note 2)	179	215	259	314	427	481	550	616	759	941	1188
	Output Voltage	3-phase, 380 to 480 V (The maximum output voltage is the same as the input voltage.)										
	Overload Current Rating	120%–1 minute, 135%–2 seconds										
Electric Braking	Dynamic Braking Circuit	Built-in					External options					
	Dynamic Breaking Resistor	External options										
Power Supply	Voltage/frequency	Note 6)		3-phase, 380 to 440 V – 50 Hz 3-phase, 380 to 480 V – 60 Hz								
	Allowable Fluctuation	Voltage +10% – 15% Note 3) Frequency ±5%										
Protective method		IP20 enclosed type (JEM1030) Note 4)										
Cooling method		Forced air cooling										
Cooling fan noise (dBA)		61	61	72	73	73	76	76	76	76	76	78
Color		RAL7016										
Built-in Filter		EMI noise filter Note 7)										
DC Reactor		Attached DC reactor Note 5)										

Note 1) Capacity is calculated at 220V for the 200V models and at 440V for the 400V models.
Note 2) Indicates the value when the PWM carrier frequency (parameter ↗F) is 2.5 kHz or less.
When low noise (PWM carrier frequency 8 kHz) is required at 18.5 kW or more, use an inverter of capacity one rank higher than the motor capacity.
Note 3) ±10% when the inverter is used continuously (load of 100%)
Note 4) Inverters, 18.5kW or greater, do not have wiring port covers. They have large openings, but there is no space to bend the external cables inside the unit. If they are fitted external to the cabinet, please use an optional wiring port cover.
Note 5) For 200V-55kW, 400V-90kW or larger model, be sure to install DC reactor.
However, this is unnecessary for DC input specifications.
Note 6) Three-phase 380~480V-50/60Hz
Note 7) Complies with the European EMC Directive
IEC/EN61800-3, 2nd environment, category C3

Common Specifications

Item			Specification
Control specifications	Control system		Sinusoidal PWM control
	Output voltage adjustment		Main circuit voltage feedback control. (Switchable between automatic adjustment/fix/control off)
	Output frequency range		Setting between 0.01 to 500Hz. Default max. frequency is set to 0.01 to 60Hz. Maximum frequency adjustment (30 to 500Hz)
	Minimum setting steps of frequency		0.01Hz: operation panel input (60Hz base), 0.02Hz: analog input (60Hz base, 11 bit/0 to 10Vdc)
	Frequency accuracy		Within ±0.2% (25°C±10°C): analog input ±0.01% (25°C±10°C): digital input
	Voltage/frequency characteristics		V/f constant, square reduction torque control, automatic torque boost, vector calculation control, base frequency adjustment 1 and 2 (25 to 500Hz), V/F 5-point arbitrary setting, torque boost adjustment (0 to 30%), start frequency adjustment (0 to 10Hz), stop frequency adjustment (0 to 30Hz)
	Frequency setting signal		3kΩ potentiometer (possible to connect to 1 to 10kΩ-rated potentiometer) 0 to 10Vdc (input impedance Zin: 30kΩ) 0 to ±10Vdc (Zin: 22kΩ) 4 to 20mAdc (Zin:242Ω)
	Terminal board base frequency		The characteristic can be set arbitrarily by two-point setting. Compliant with 6 types of input; analog input (RR, VI/II, RX, RX2), pulse input and binary/BCD input (*RX2, binary/BCD input: optional)
	Frequency jump		3 places. Setting of jump frequency and width.
	Upper and lower limit frequencies		Upper limit frequency: 0 to max. frequency, lower limit frequency: 0 to upper limit frequency
	PWM carrier frequency		200V-45kW or less, adjustable between 1.0 to 16kHz for 400V-75kW or less200V-55kW or less, adjustable between 2.5 to 8kHz for 400V-90kW or more
	PID control		Adjustment of proportional gain, integral time, differential time and delay filter
Operation specifications	Acceleration/deceleration time		0.01 to 6000 sec. Selectable from among acceleration/deceleration. times 1 and 2. Automatic acceleration/deceleration function. S-pattern acceleration/deceleration 1 and 2 pattern adjustable.
	DC braking		Adjustment of braking start frequency (0 to 120Hz), braking (0 to 100%) and braking time (0 to 10 sec.). With emergency stop braking function and motor shaft fix control function.
	Forward run/reverse run Note 1)		With F-CC closed to forward run, with R-CC closed to reverse run, with both closed to reverse run. With ST-CC opened to coast stop. Emergency stop by panel operation or terminal board.
	Jog run Note 1)		Jog mode, if selected, allows jog operation from the operation panel Jog run operation by terminal board is possible by setting the parameters.
	Preset speed operation Note 1)		By changing the combination of open/close between S1, S2, S3, RR/S4-CC, set frequency + 15-speed operation. Selectable between acceleration/deceleration time, torque limit and V/f by set frequency.
	Retry		Capable of restarting after a check of the main circuit elements in case the protective function is activated. Max. 10 times selectable arbitrarily. Waiting time adjustment (0 to 10 sec.)
	Soft stall		Automatic load reduction control at overloading. (Default: OFF)
	Cooling fan ON/OFF		The cooling fan will be stopped automatically to assure long life when unnecessary.
	Operation panel key operation ON/OFF control		Key prohibition selectable between Stop key only, Mode key only, etc. All key operations can be prohibited.
	Regenerative power ride-through control		Possible to keep the motor running using its regenerative energy in case of a momentary power failure. (Default: OFF)
	Auto-restart operation		Possible to restart the motor in coasting in accordance with its speed and direction. (Default: OFF)
	Commercial inverter switching		Possible to switch operation by commercial power source or inverter
	Drooping function		When two or more inverters are used to operate a single load, this function prevents load from concentrating on one inverter due to unbalance.
	Override function		External input signal adjustment is possible to the operation frequency command value.
Protective function	Protective function		Stall prevention, current limit, overcurrent, overvoltage, short circuit on the load side, ground fault on the load side (Note 5), undervoltage, momentary power failure (15ms or more), non-stop control at momentary power failure, overload protection, arm overload at starting, overcurrent on the load side at starting, overcurrent and overload at dynamic braking resistance, fin overheat, emergency stop
	Electronic thermal characteristic		Switchable between standard motor/constant torque VF motor, adjustment of overload protection and stall prevention level.
	Reset		Reset by 1a contact closed (or 1b contact opened), or by operation panel. Or power source OFF/ON. This function is also used to save and clear trip records.
Display functions	4-digit and 7-segment LED	Alarms	Stall prevention during operation, overload limit, overload, undervoltage on power source side, DC circuit undervoltage, setting error, in retry, upper limit, lower limit.
		Causes of failures	Overcurrent, overvoltage, fin overheat, short circuit on the load side, ground fault on the load side, inverter overload, arm overcurrent at starting, overcurrent on the load side at starting, EEPROM error, RAM error, ROM error, transmission error, (dynamic braking resistor overcurrent/overload), (emergency stop), (undervoltage), (low current), (overtorque), (motor overload), (output phase failure) The items in the parentheses are selectable.
		Monitoring function	Operation frequency, operation frequency command, forward run/reverse run, output current, DC voltage, output voltage, compensated frequency, terminal board input/output information, CPU version, control EEPROM version, past trip history, cumulative operation time, speed feedback, torque, torque command, torque current, exiting current, PID feedback value, motor overload factor, inverter overload factor, PBR overload factor, PVBR load factor, input power, output power, peak output current, peak DC voltage, Motor counter pseudo PG, position pulse, RR input, VI/II input, RX input, RX2 input, FM output, AM output, meter adjustment fix output, flash memory version, main circuit EEPROM version, types of connection option, previous default setting, previous automatic control (AU2)
		Free unit display	Display of optional units other than output frequency (motor speed, line speed, etc), current ampere/% switch, voltage volt/% switch
		Automatic edit function	Searches automatically parameters that are different from the standard default setting parameters. Easy to find changed parameters.
		User default setting	User parameter settings can be saved as default settings. Allows to reset the parameters to the user-defined parameter settings.
	LED	Charge display	Displays main circuit capacitor charging.
Power Removal safety, function			Built-in Power Removal safety function which complies with EN954-1 category 3 and IEC/EN61508-1 SIL2.
Input/output terminal input function			Possible to select positive logic or negative logic with programmable input/output terminal function menu. Note 1: Note 2: (Default setting: positive logic)
Sink/source switching			Possible to switch between minus common (CC) and plus common (P24) for control terminal. (Default setting: minus common (CC))
Output signal	Failure detection signal		1c contact output (250Vac-2A-cosØ=1, 250Vac-1A-cosØ=0.4, 30Vdc-1A)
	Low speed/speed reach signal output Note 2)		Open collector output (24Vdc, max. 50mA, output impedance: 33Ω)
	Upper/lower limit frequency signal output Note 2)		Open collector output (24Vdc, max. 50mA, output impedance: 33Ω)
	Output for frequency meter/output for ammeter Note 3)		Analog output. 1mAdc full-scale DC ammeter or 7.7Vdc-1mA voltmeter
	Pulse train frequency output		Open collector output (24Vdc, max. 50mA)
Communication function			RS-485 standard 2-channel equipped (connector: modular 8P)
Environments	Operating environments		Indoor use. Altitude: 3000m or less (current reduction necessary if 1000m or more.) Place not exposed to direct sunlight and free of corrosive and explosive gases.
	Ambient temperature		-10 to +60°C (Remove the upper cover if 40°C or more, max. 60°C) Note 4:
	Storage temperature		-25 to +70°C
	Relative humidity		20 to 93% (free from condensation)
	Vibration		5.9m/s²{0.6G} or less (10 to 55Hz) (Compliant with JIS C0040)

Note 1: 16 contact input terminals (of which 8 are options) are programmable contact input terminals, and they make it possible to arbitrarily select from 80 types of signals.
Note 2: Programmable ON/OFF output terminals make it possible to arbitrarily select from 180 types of signals.
Note 3: Programmable analog output terminals make it possible to arbitrarily select from 50 types of signals.
Note 4: When using inverters where the ambient temperature will rise above 50°C or 45°C, remove the upper cover and operate each inverter at a current lower than the rated one.
Note 5: This function protects inverters from overcurrent due to output circuit ground fault.