SJ300 Inverter Specifications

Tables for 200V class inverters

Note that "General Specifications" on page 1–9 covers all SJ300 inverters, followed by footnotes for all specifications tables. The 200V models in the upper table below (1/2 to 15 hp) include internal dynamic braking units (see "Dynamic Braking" on page 5–6).

Item		200V Class Specifications							
SJ300 inverters, 200V models, UL version		004LFU	007LFU	015LFU	022LFU	037LFU	055LFU	075LFU	110LFU
Applicable motor size, 4-pole *2	**HP**	**1/2**	**1**	**2**	**3**	**5**	**7.5**	**10**	**15**
	kW	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11
Rated capacity (200/240V) kVA		1.0 / 1.2	1.7 / 2.0	2.5 / 3.1	3.6 / 4.3	5.7 / 6.8	8.3 / 9.9	11 / 13.3	15.9/ 19.1
Rated input voltage		3-phase: 200 to 240V ±10%, 50/60 Hz ±5%							
Rated input current (A)		3.8	5.5	8.3	12	18	26	35	51
Rated output voltage *3		3-phase (3-wire) 200 to 240V (corresponding to input voltage)							
Rated output current (A)		3.0	5.0	7.5	10.5	16.5	24	32	46
Efficiency at 100% rated output, %		85.1	89.5	92.3	93.2	94.0	94.4	94.6	94.8
Watt loss, approximate (W)	at 70% output	64	76	102	127	179	242	312	435
	at 100% output	70	88	125	160	235	325	425	600
Starting torque *6		200% at 0.5 Hz (SLV), 150% at around 0 Hz (SLV, 0 Hz domain, with motor one frame size down), 100% at 0 Hz (with feedback board)							
Dynamic braking approx. % torque, short time stop *7	internal res. only	50%			20%				10%
	with external res.	200%			160%	100%	80%		70%
DC braking		Variable operating frequency, time, and braking force							
Weight	kg / lb	3.5 / 7.7	3.5 / 7.7	3.5 / 7.7	3.5 / 7.7	3.5 / 7.7	3.5 / 7.7	5 / 11	5 / 11

Item		200V Class Specifications, continued						
SJ300 inverters, 200V models, UL version		150LFU	185LFU	220LFU	300LFU	370LFU	450LFU	550LFU
Applicable motor size *2	**HP**	**20**	**25**	**30**	**40**	**50**	**60**	**75**
	kW	15	18.5	22	30	37	45	55
Rated capacity (200/240V) kVA		22.1 / 26.6	26.3 / 31.5	32.9 / 39.4	41.9 / 50.2	50.2/60.2	63 / 75.6	76.2/91.4
Rated input voltage		3-phase: 200 to 240V ±10%, 50/60 Hz ±5%						
Rated input current (A)		70	84	105	133	160	200	242
Rated output voltage *3		3-phase (3-wire) 200 to 240V (corresponding to input voltage)						
Rated output current (A)		64	76	95	121	145	182	220
Efficiency at 100% rated output, %		94.9	95.0	95.0	95.1	95.1	95.1	95.1
Watt loss, approximate (W)	at 70% output	575	698	820	1100	1345	1625	1975
	at 100% output	800	975	1150	1550	1900	2300	2800
Starting torque *6		200% at 0.5 Hz (SLV), 150% at around 0 Hz (SLV, 0 Hz domain, with motor one frame size down), 100% at 0 Hz (with feedback board)						
Dynamic braking approx. % torque, short time stop *7	w/o braking unit	10%						
	with braking unit	30–200%	25–170%	25–150%	55–110%	45–90%	35–75%	30–60%
DC braking		Variable operating frequency, time, and braking force						
Weight	kg / lb	12 / 26.4	12 / 26.4	12 / 26.4	20 / 44	30 / 66	30 / 66	50 / 110

Tables for 400V class inverters

Note that "General Specifications" on page 1–9 covers all SJ300 inverters, followed by footnotes for all specifications tables. The 400V models in the upper table below (1 to 15 hp) include internal dynamic braking units (see "Dynamic Braking" on page 5–6).

Item			400V Class Specifications						
SJ300 inverters, 400V models	UL version		007HFU	015HFU	022HFU	040HFU	055HFU	075HFU	110HFU
	CE version		007HFE	015HFE	022HFE	040HFE	055HFE	075HFE	110HFE
Applicable motor size *2		**HP**	**1**	**2**	**3**	**5**	**7.5**	**10**	**15**
		kW	0.75	1.5	2.2	4.0	5.5	7.5	11
Rated capacity (400 / 480V) kVA			1.7 / 2.0	2.6 / 3.1	3.6 / 4.4	5.9 / 7.1	8.3 / 9.9	11 / 13.3	15.9/19.1
Rated input voltage			3-phase (3-wire) 380 to 480V ±10%, 50/60 Hz ±5%						
Rated input current (A)			2.8	4.2	5.8	9.5	13	18	25
Rated output voltage *3			3-phase (3-wire): 380 to 480V (corresponding to input voltage)						
Rated output current (A)			2.5	3.8	5.3	8.6	12	16	23
Efficiency at 100% rated output, %			89.5	92.3	93.2	94.0	94.4	94.6	94.8
Watt loss, approximate (W)	at 70% output		76	102	127	179	242	312	435
	at 100% output		88	125	160	235	325	425	600
Starting torque *6			200% at 0.5 Hz (SLV), 150% at around 0 Hz (SLV, 0 Hz domain, with motor one frame size down), 100% at 0 Hz (with feedback board)						
Dynamic braking approx. % torque, short time stop *7	internal res. only		50%		20%				10%
	with external res.		200%			140%	100%		70%
DC braking			Variable operating frequency, time, and braking force						
Weight	kg / lb		3.5 / 7.7	3.5 / 7.7	3.5 / 7.7	3.5 / 7.7	3.5 / 7.7	55 / 121	55 / 121

Item			400V Class Specifications						
SJ300 inverters, 400V models	UL version		150HFU	185HFU	220HFU	300HFU	370HFU	450HFU	550HFU
	CE version		150HFE	185HFE	220HFE	300HFE	370HFE	450HFE	550HFE
Applicable motor size *2		**HP**	**20**	**25**	**30**	**40**	**50**	**60**	**75**
		kW	15	18.5	22	30	37	45	55
Rated capacity (400 / 480V) kVA			22.1 / 26.6	26.3 / 31.5	33.2 / 39.9	40.1 / 48.2	51.9 / 62.3	62.3 / 74.8	76.2/91.4
Rated input voltage			3-phase (3-wire) 380 to 480V ±10%, 50/60 Hz ±5%						
Rated input current (A)			35	42	53	64	83	99	121
Rated output voltage *3			3-phase (3-wire): 380 to 480V (corresponding to input voltage)						
Rated output current (A)			32	38	48	58	75	90	110
Efficiency at 100% rated output, %			94.9	95.0	95.0	95.1	95.1	95.1	95.1
Watt loss, approximate (W)	at 70% output		575	698	820	1100	1345	1625	1975
	at 100% output		800	975	1150	1550	1900	2300	2800
Starting torque *6			200% at 0.5 Hz (SLV), 150% at around 0 Hz (SLV, 0 Hz domain, with motor one frame size down), 100% at 0 Hz (with feedback board)						
Dynamic braking approx. % torque, short time stop *7	w/o braking unit		10%						
	with braking unit		40–200%	40–200%	35–200%	110–170%	90–150%	70–120%	60–100%
DC braking			Variable operating frequency, time, and braking force						
Weight	kg / lb		12 / 26.4	12 / 26.4	12 / 26.4	20 / 44	30 / 66	30 / 66	50 / 110

Tables for 400V class inverters, continued...

Item			400V Class Specifications				
SJ300 inverters, 400V models	UL version		750HFU	900HFU	1100HFU	—	1500HFU
	CE version		750HFE	900HFE	1100HFE	1320HFE	—
Applicable motor size *2		**HP**	**100**	**125**	**150**	**175**	**200**
		kW	75	90	110	132	150
Rated capacity (400 / 480V) kVA			103.2 / 123.8	121.9 / 146.3	150.3 / 180.4	180.1 / 216.1	180.1 / 216.1
Rated input voltage			3-phase (3-wire) 380 to 480V ±10%, 50/60 Hz ±5%				
Rated input current (A)			164	194	239	286	286
Rated output voltage *3			3-phase (3-wire): 380 to 480V (corresponding to input voltage)				
Rated output current (A)			149	176	217	260	260
Efficiency at 100% rated output, %			95.2	95.2	95.2	95.2	95.2
Watt loss, approximate (W)	at 70% output		2675	3375	3900	4670	4670
	at 100% output		3800	4800	5550	6650	6650
Starting torque *6			180% at 0.5 Hz (SLV), 130% at around 0 Hz (SLV, 0 Hz domain, with motor one frame size down), 100% at 0 Hz (with feedback board)				
Dynamic braking approx. % torque, short time stop *7	w/o braking unit		10%				
	with braking unit		45–70%	40–60%	30–50%	25–40%	20–35%
DC braking			Variable operating frequency, time, and braking force				
Weight	kg / lb		60 / 132	60 / 132	80 / 176	80 / 176	80 / 176

Footnotes for the preceding tables and the table that follows:

Note 1: The protection method conforms to JEM 1030.

Note 2: The applicable motor refers to Hitachi standard 3-phase motor (4-pole). When using other motors, care must be taken to prevent the rated motor current (50/60 Hz) from exceeding the rated output current of the inverter.

Note 3: The output voltage decreases as the main supply voltage decreases (except when using the AVR function). In any case, the output voltage cannot exceed the input power supply voltage.

Note 4: To operate the motor beyond 50/60 Hz, consult the motor manufacturer for the maximum allowable rotation speed.

Note 5: When SLV is selected, please set the carrier frequency higher than 2.1 kHz.

Note 6: At the rated voltage when using a Hitachi standard 3-phase, 4-pole motor (when selecting sensorless vector control—SLV).

Note 7: The braking torque via capacitive feedback is the average deceleration torque at the shortest deceleration (stopping from 50/60 Hz as indicated). It is not continuous regenerative braking torque. The average decel torque varies with motor loss. This value decreases when operating beyond 50 Hz. If a large regenerative torque is required, the optional regenerative braking resistor should be used.

Note 8: The frequency command will equal the maximum frequency at 9.8V for input voltage 0 to 10 VDC, or at 19.6 mA for input current 4 to 20 mA. If this characteristic is not satisfactory for your application, contact your Hitachi sales representative.

Note 9: The storage temperature refers to the short-term temperature during transport.

Note 10: Conforms to the test method specified in JIS C0911 (1984). For the model types excluded in the standard specifications, contact your Hitachi sales representative.

Note 11: NEMA 1 applies up to 22kW. An optional wire-entry conduit box is required for 30kW to 55kW models to meet NEMA 1 rating.

General Specifications

The following table (continued on next page) applies to all SJ300 inverter models.

Item			General Specifications
Protective enclosure *1, *11			IP20 (NEMA 1)
Control method			Line-to-line sine wave pulse-width modulation (PWM) control
Output frequency range *4			0.1 to 400 Hz
Frequency accuracy			Digital command: ± 0.01% of the maximum frequency Analog command: ± 0.2% (25°C ± 10°C)
Frequency setting resolution			Digital: ± 0.01 Hz; Analog: (max. frequency)/4000, [O] terminal: 12-bit 0 to 10V; [OI] terminal: 12-bit, 4-20mA; [O2] terminal: 12-bit -10 to +10V
Volt./Freq. characteristic *5			V/F optionally variable (30 to 400Hz base frequency), V/F control (constant torque, reduced torque), sensorless vector control
Speed fluctuation			± 0.5% (sensorless vector control)
Overload capacity (output current)			150% for 60 seconds, 200% for 0.5 seconds
Acceleration/deceleration time			0.01 to 3600 sec., (linear curve profiles, accel./decel. selection), two-stage accel./decel.
Input signal	Freq. setting	Operator keypad	Up and Down keys / Value settings
		Potentiometer	Analog setting via potentiometer on operator keypad
		External signal *8	0 to 10 VDC (input impedance 10k Ohms), 4 to 20 mA (input impedance 100 Ohms), Potentiometer (1k to 2k Ohms, 2W)
		Serial port	RS485 interface
	FW/RV Run	Operator panel	Run key / Stop key (change FW/RV by function command)
		External signal	FW Run/Stop (NO contact), RV set by terminal assignment (NC/NO), 3-wire input available
	Intelligent Input terminals (assign eight functions to terminals)		RV (reverse run/stop), CF1~CF4 (multi-speed select), JG (jogging), DB (external DC braking), SET (set 2nd motor data), 2CH (2-stage accel./decel.), FRS (free-run stop), EXT (external trip), USP (unattended start protection), CS (commercial power source), SFT (software lock), AT (analog input voltage/current select), SET3 (set 3rd motor data), RS (reset inverter), STA (start, 3-wire interface), STP (stop, 3-wire interface), F/R (FW/RV 3-wire interface), PID (PID ON/OFF), PIDC (PID reset), CAS (control gain setting), UP (remote control Up function, motorized speed pot.), DWN (remote control Down function, motorized speed pot.), UDC (remote control data clearing), OPE (Operator control), SF1-SF7 (Multispeed bits 0-7), OLR (Overload limit change), TL (torque limit enable), TRQ1 (torque limit selection bit 1, LSB), TRQ2 (torque limit selection bit 2, MSB), PPI (Proportional / Proportional/Integral mode selection), BOK (Brake confirmation signal), ORT (Orientation – home search), LAC (LAC: LAD cancel), PCLR (Position deviation reset), STAT (pulse train position command input enable), NO (not selected)
	Thermistor input		One terminal (PTC characteristics)
Output signal	Intelligent Output terminals (assign six functions to five open collector outputs and one relay NO-NC contact)		RUN (run signal), FA1 (Frequency arrival type 1 – constant speed), FA2 (Frequency arrival type 2 – over-frequency), OL (overload advance notice signal 1), OD (Output deviation for PID control), AL (alarm signal), FA3 (Frequency arrival type 3 – at-frequency), OTQ (over-torque signal), IP (Instantaneous power failure signal), UV (Under-voltage signal), TRQ (In torque limit), RNT (Run time over), ONT (Power-ON time over), THM (thermal alarm), BRK (Brake release signal), BER (Brake error signal), ZS (Zero speed detect), DSE (speed deviation maximum), POK (Positioning completion), FA4 (Frequency arrival type 4 – over-frequency 2), FA5 (Frequency arrival type 5 – at-frequency 2), OL2 (Overload notice advance signal 2), Terminals 11-13 or 11-14 automatically configured as AC0-AC2 or AC0-AC3 per alarm code output selection)
	Intelligent monitor output terminals		Analog voltage monitor, analog current monitor (8-bit resolution), and PWM output, on terminals [AM], [AMI], [FM]
Display monitor			Output frequency, output current, motor torque, scaled value of output frequency, trip history, I/O terminal condition, input power, output voltage

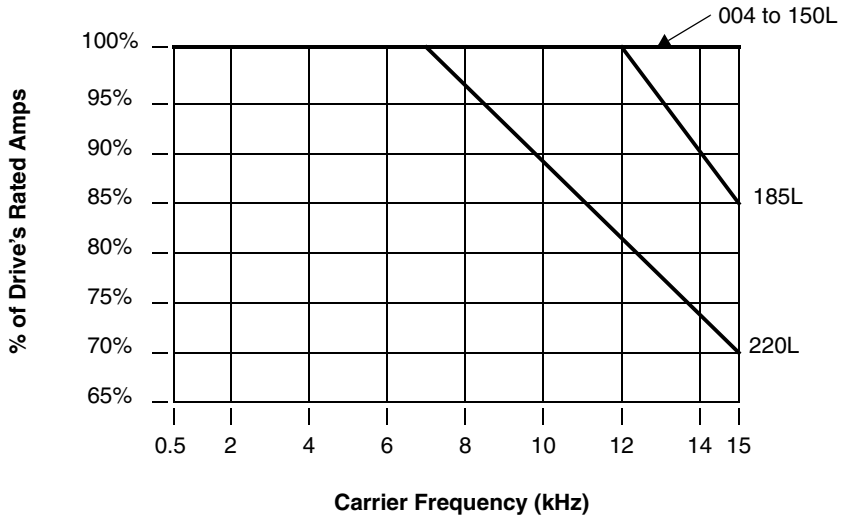
Item		General Specifications
Other user-settable parameters		V/F free-setting (up to 7 points), frequency upper/lower limit, frequency jump, accel/decel curve selection, manual torque boost value and frequency adjustment, analog meter tuning, start frequency, carrier frequency, electronic thermal protection level, external frequency output zero/span reference, external frequency input bias start/end, analog input selection, retry after trip, restart after instantaneous power failure, various signal outputs, reduced voltage start, overload restriction, default value setting (US, Europe, Japan), deceleration and stop after power failure, AVR function, fuzzy accel/decel, auto-tuning (on-line/off-line), high-torque multi-operation, automatic energy-saving operation
Carrier frequency range		0.5 to 15 kHz
Protective functions		Over-current, overload, braking resistor overload, over voltage, EEPROM error, under-voltage error, CT (current transformer) error, CPU error, external trip, USP error, ground fault, input over voltage, instantaneous power failure, expansion card 1 error, expansion card 2 error, inverter thermal trip, phase failure detection, IGBT error, thermistor error
Environ-ment	Temperature (*9)	Operating (ambient): -10 to 50°C / Storage: -20 to 65°C
	Humidity	20 to 90% humidity (non-condensing)
	Vibration *10	Models SJ300–004xxx to 220xxx: 5.9 m/s^2 (0.6G), 10 to 55 Hz Models SJ00–300xx to 1500xxx: 2.94 m/s^2 (0.3G), 10 to 55 Hz
	Location	Altitude 1,000 m or less, indoors (no corrosive gasses or dust)
Coating color		Gray
Accessories	Feedback PCB	SJ-FB (vector control loop speed sensor)
	Digital input PCB	SJ-DG (4-digit BCD / 16-bit binary)
	Others	EMI filters, input/output reactors, DC reactors, radio noise filters, braking resistors, braking units, LCR filter, communication cables, factory I/O network interface cards
Operator input devices		OPE–SRE (4-digit LED with potentiometer) / OPE–S (4-digit LED w/o potentiometer), Optional: OPE-SR (4-digit LED with potentiometer, Japanese/English overlay), SRW–0EX Multilingual operator with copy function (English, French, German, Italian, Spanish, and Portuguese)

Derating Curves

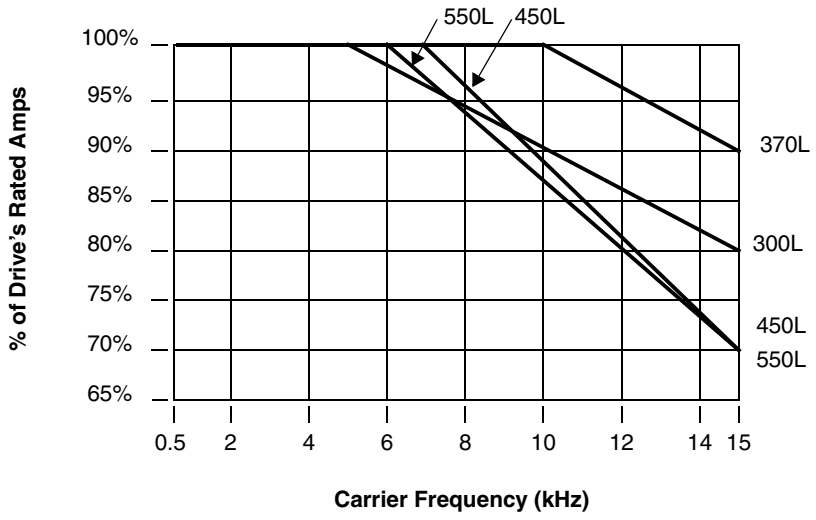
The maximum available inverter current output is limited by the carrier frequency and ambient temperature. The carrier frequency is the inverter's internal power switching frequency, settable from 0.5 kHz to 12 kHz. Choosing a higher carrier frequency tends to decrease audible noise, but it also increases the internal heating of the inverter, thus decreasing (derating) the maximum current output capability. Ambient temperature is the temperature just outside the inverter housing—such as inside the control cabinet where the inverter is mounted. A higher ambient temperature decreases (derates) the inverter's maximum current output capacity.

Use the following derating curves to help determine the optimal carrier frequency setting for your inverter, and to find the output current derating. Be sure to use the proper curve for your particular SJ300 inverter model number.

SJ300 1.5 to 22 kW at 50 deg. C ambient

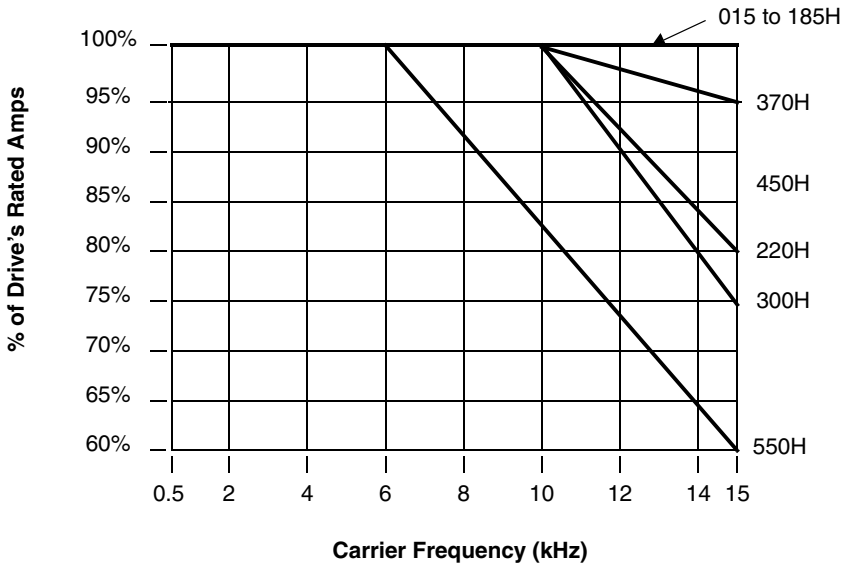


SJ300 30 to 55 kW at 50 deg. C ambient



Derating curves, continued...

SJ300 30 to 55 kW at 50 deg. C ambient, continued



SJ300 75 to 150 kW at 50 deg. C ambient