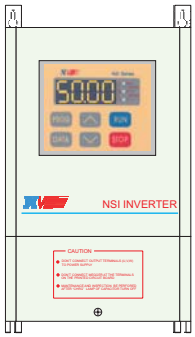
FREQUENCY INVERTER

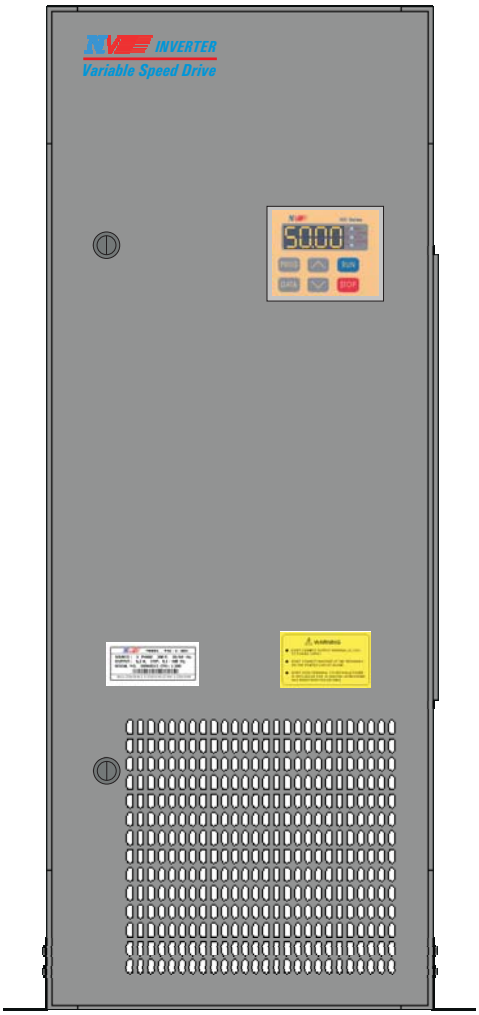
NSI Series

High - performance, Low - noise inverter
220 V 0.5 - 30 HP
380 V 0.5 - 430 HP



0.5 to 5.5 HP

50 to 125 HP



150 to 220 HP

NSI Advantages

- More than 150 percent starting torque (200 percent starting current)
- Carrier Frequency selectable from 1-10 kHz (resolution 0.1 kHz)
- Intellligent Terminal used for control circuit
- Increase/Decrease frequency terminal (UP/DOWN Control)
- 3 skip resonant frequencies (for reduce noise)
- 2 motor characteristices selectable
- Flying Start
- 8 Speed steps selectable
- Automation function
- 4 Fault Memories (for the 4 laster)
- Program check Sum
- Life Time (Unit : Hour)

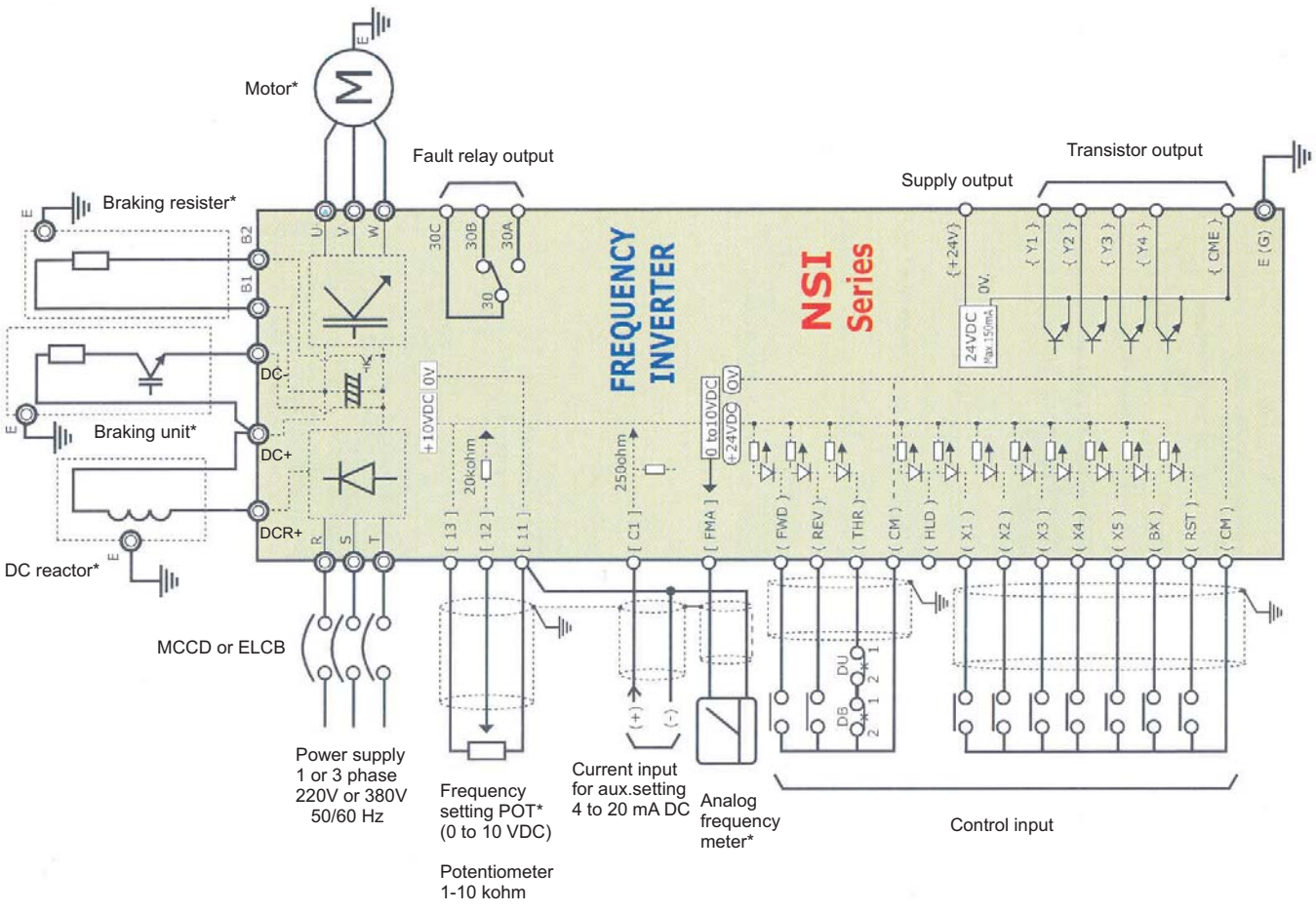
NSI Series Selection Guide

APPLICABLE MOTOR		380V		BRAKING UNIT	220V		BRAKING UNIT	COOLING METHOD
HP	KW	OUTPUT (A)	INVERTER TYPE		OUTPUT (A)	INVERTER TYPE		
0.5	0.4	1	NSI-4-0A5	Built-in	2	NSI-2-0A5	Built-in	Self-cooling
1	0.75	3.5	NSI-4-001		5.3	NSI-2-001		
2	1.5	4.8	NSI-4-002		8	NSI-2-002		
3	2.2	6.2	NSI-4-003		11	NSI-2-003		Forced air-cooled
5.5	4	11	NSI-4-5A5		17.5	NSI-2-5A5		
7.5	5.5	15	NSI-4-7A5		26	NSI-2-7A5		
10	7.5	18	NSI-4-010		34	NSI-2-010		
15	11	27	NSI-4-015		49	NSI-2-015		
20	15	34	NSI-4-020		64	NSI-2-020	Not include	
25	18.5	44	NSI-4-025	Not include	75	NSI-2-025		
30	22	50	NSI-4-030		87	NSI-2-030		
40	30	65	NSI-4-040					
50	37	80	NSI-4-050					
60	45	96	NSI-4-060					
75	55	128	NSI-4-075					
100	75	165	NSI-4-100					
125	90	186	NSI-4-125					
150	110	224	NSI-4-150					
175	132	245	NSI-4-175					
220	160	304	NSI-4-220					
250	185	340	NSI-4-250					
270	200	370	NSI-4-270					
340	250	510	NSI-4-340					
430	315	590	NSI-4-430					

NSI - 4 - 030

NSI Series	Voltage	Motor capacity
	2 : 220 4 : 380	030 : 30 HP 7A5 : 7.5 HP

Basic Schematic Diagrams



Notes : Each common terminal of circuit, [11], (CM) and {CME} are insulated.
* Option

Standard Specifications

Models		AC 220V Three-Phase and Single Phase Series	AC 380V Three-Phase Series
Applied motor output		0.4 to 22 kw	0.4 to 315 kw
Rated output voltage		3-phase, AC 200 TO 240V	3-phase, AC 380 to 460V
Overload capacity		150% of rated output current for 1 minute	
Input Power Supply	Number of phase, voltage, frequency	Three phase, 200 to 240V ; 50/60Hz	Three phase, 380 to 460V ; 50/60Hz
	Voltage variations	+10, -15% of rated AC input voltage	
	Frequency variations	+/-5% of rated input frequency	
	Instantaneous voltage drop resistance	Continuous operation at 152V or more, or at less than 152V for 15 ms.	Continuous operation at 304V or more, or at less than 304V for 15 ms.

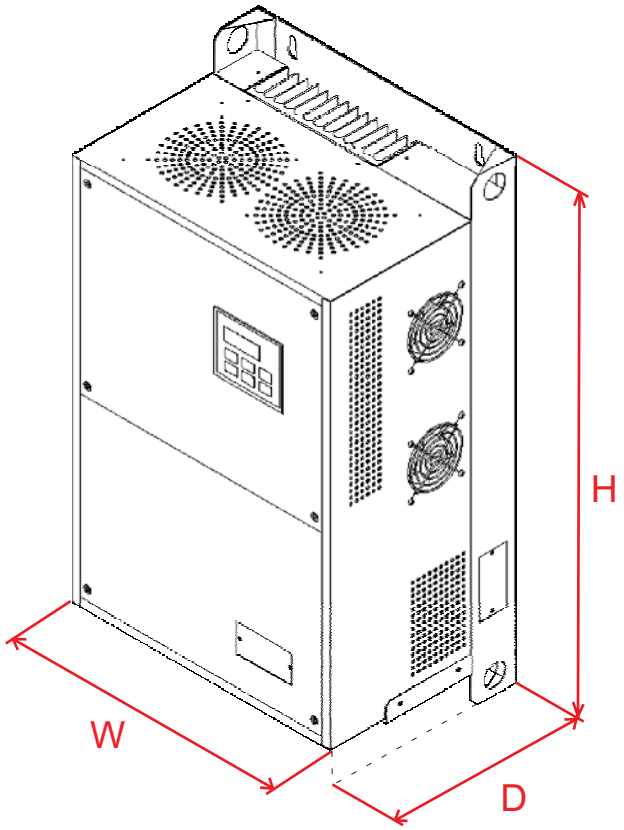
Common Specifications

Control	Output frequency	0 to 400 Hz
	Digital display	Process m/min, RPM, output frequency, current, voltage
	Output frequency accuracy	+/-0.5%b of selected maximum output frequency (25+/-10°C) for analog setting
	Frequency setting resolution	Digital setting ; 0.01 Hz (under 100 Hz) Analog setting ; 1/1023 of maximum frequency
	Inverter control	High carrier frequency sinusoidal PWM control
	Carrier frequency	Variable from 1 to 10 kHz (rated output current must be derated with carrier frequency)
	Operation method	KEY operation : Run or Stop key Input signal : Forward/Reverse command, Coast-to-stop command, Trip command (external fault), Alarm reset, 3 Wire control, Multistep speed selection, Acc./Dec. Time selection, 2nd V/F selection
	Frequency setting	KEY operation : Up or Down key Potentiometer : 1 to 10 kohm (1/2w) Analog input : 0 to 10 Vdc, 4 to 20 mAdc UP/DOWN control : Output frequency increases during X1 : ON and decreases during X2 : ON Multistep frequency : 8 different frequencies ca be selected terminal X1, X2, and X3
	Status output signal	Open collector output : RUN, FAR, FDT, OL, LU and etc. (12 kinds selectable) Analog output : Output frequency, Output current
	Acceleration time Deceleration time	0.1 to 3600s (Independently adjustable acceleration and deceleration) Mode select : Linear, S-curve
	Frequency limitter	High limitter : 0 to 400 Hz
	Bias frequency	0 to 400 Hz adjustable
	Gain for frequency setting	0.1 to 200% adjustable
	Frequency jump control	The jumping frequency (3 point)
	Flying start	The motor can be start without stopping the motor
	Auto-restart after Momentary power failure	Automatic restart is available after a momentary power failure
	Switching operation	Control terminals are provided for smooth switching from commercial power line to inverter inverter to power supply
	2nd V/F setting	This function uses 2 motor switching operation. 2nd motor's base frequency and rated voltage can be preset
Indication	Running or stopping mode	Output frequency, Output current, Output voltage, Motor synchronous speed, Line speed
	Setting mode	Function No. And data
	Trip mode	Indication of trip cause code (ex OC1, OC2, OC3, OU1, OU2, OU3, OH1, OH2, OL, LU)
Protection	Overload	Electronic thermal overload relay
	Overvoltage	Overvoltage detection from DC link circuit
	Surge input	Inverter protection from input power supply voltage surge
	Undervoltage	Undervoltage detection from DC link circuit
	Overheating	Inverter overheating protection by temperature detection
	Protective structure	IP 20
Condition	Installation location	Do not install in a dusty location or expose to corrosive gasses, oil splashes or direct sunlight or outdoor
	Ambient temperature	-10°C to +40°C
	Ambient humidity	20 to 90% RH (non-condensing)
	Stored temperature	-20°C to +65°C

External Dimensions

1/3 Phase 220V			
HP	W	H	D
0.5	172	290	166
1			
2			
3	172	290	186
3 Phase 220V			
5.5	172	290	186
7.5	215	374	190
10	215	404	190
15			
20	320	522	228
25	365	650	264
30			

[Unit : mm.]



Drawing 50 to 125 HP

3 Phase 380V			
HP	W	H	D
0.5	172	290	166
1			
2			
3	172	290	186
5.5			
7.5	215	374	190
10			
15	215	404	190
20			
25	320	522	228
30			
40			
50	365	650	264
60			
75			
100	420	800	299
125			
150	564	1203	395
175			
220			
270	780	1425	550
340			
430			

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Function Table

Basic Function		
NO.	**Name**	**Setting range**
F100	Frequency command	00 : KEYPAD operation (Up or Down key) 01 : Voltage input (Terminals 12 and 11) 02 : Current input (Terminals C1 and 11)
F101	Operation Method**	00 : KEYPAD operation (Run or Stop key) 01 : FWD or REV commond Signal operation
F102	Maximum Frequency	50.00 - 400.0
F103	Base Frequency 1	50.00 - 400.0
F104	Rated Voltage 1	110-220 (200V class) 220-380 (400V class)
F105	Acceleration Time 1	0.1 - 3600
F106	Deceleration Time 1	0.1 - 3600
F107	Torque Boost 1	0 - 20
F108	Frequency Limit (Upper)	Lower Limit - Maximum Frequency
F109	Frequency Limit (Lower)	0.0 - Frequency Limit (Upper)
F110	Bias Frequency	0.0 - 400.0
F111	Gain Frequency	0.01 - 200.0
F112	DC Brake (Start Freq.)	0.0 - 60.00
F113	DC Brake (Brake Level)	0.0 - 100.00
F114	DC Brake (Brake Time)	0.1 - 30.0 (0.0 = DC Brake inactive)
F115	Number of Motor Poles	2 - 14
F116	Motor Direction	00 : Forward 01 : Reverse
F117	Multistep Frequency 1	0.0 - Maximum Frequency
F118	Multistep Frequency 2	0.0 - Maximum Frequency
F119	Multistep Frequency 3	0.0 - Maximum Frequency
F120	Multistep Frequency 4	0.0 - Maximum Frequency
F121	Multistep Frequency 5	0.0 - Maximum Frequency
F122	Multistep Frequency 6	0.0 - Maximum Frequency
F123	Multistep Frequency 7	0.0 - Maximum Frequency
F124	Search Frequency	00 : Inactive 01 : Active
F125	Deceleration time search	0.1 - 20.0
Terminal Function		
F200	X1-X5 terminal function	0000 - 2222 **X1 and X2 terminal function** 0 # # # : Multistep speed selection (4 step) 1 # # # : UP/DOWN (Initail Freq. = 0.0Hz) 2 # # # : UP/DOWN (Initail Freq. = Last Freq.) **X3 terminal function** # 0 # # : Multistep speed selection (8 steps using X1, X2 and X3) # 1 # # : Switching operation from Line to inverter (for 50 Hz line)

Terminal Function		
NO.	**Name**	**Setting range**
		# 2 # # : Switching operation from line to inverter (for 60Hz line) **X4 terminal function** # # 0 # : ACC/DEC time selection (2 steps) # # 1 # : Current input signal selection # # 2 # : DC brake commamd **X5 terminal function** # # # 0 : ACC/DEC time selection (4 steps using X4 and X5) # # # 1 : 2nd V/F selection # # # 2 : Enabing signal for change of
F201	FMA terminal function	00 : Output frequency 01 : Output current
F202	FMA Voltage Adjust	65 - 200
F203	Y1-Y4 terminal function	0000 - DDDD 0 : Inverter running (RUN) 1 : Frequency equivalence signal (FAR) 2 : Frequency level detection signal (FDT) 3 : Overload early warning signal (OL) 4 : Undervoltage detection signal (LU) 5 : KEYPAD operation mode 6 : Stall current 7 : Inverter stopping 8 : Auto-restarting 9 : Auto-resetting A : Accel B : Decel C : Lower frequency D : Upper frequency
F204	FAR function (Hysteresis)	0.0 - 10.00
F205	FDT function (Level)	0.0 - 400.0
F206	FDT function (Hysterresis)	0.0 - 30.00
F207	OL function (Level)	Approx.20 to 105% of rated current
Protection Function		
F300	Thermal Overload Relay	00 : Inactive 01 : Active (for 4-pole standard motor)
F301	Thermal Overload Level	Approx.20 to 105% of rated current
F302	Restart after momentary power failure recovers	00 : Inactive (Immediate LU Trip) 01 : Inactive (LU Trip after Recovery) 02 : Active (Smooth recovery) 03 : Active (Restarting at frequency at time of Power failure) 04 : Active (Restarting at starting frequency)
F303	Auto-restart (Restart time)	0.0 - 5.0
F304	Frequency fall rate	0.0 - 3600
F305	Auto-reset times	0 - 7
F306	Auto-reset interval	2 - 20
F307	Jump Frequency 1	0.0 - 400.0
F308	Jump Frequency 2	0.0 - 400.0

Function Table

Protection Function		
NO.	**Name**	**Setting range**
F309	Jump Frequency 3	0.0 - 400.0
F310	Jump Hysteresis	0.0 - 20.00
F311	Current Limit	00 : Disable 01 : Enable
F312	Current Limit Level	80.0 - 200.0
F313	Current Limit Decel	0.0 - 10
F314	REV Phase Sequence Lock	00 : Inactive 01 : Active
Special Function		
F400	LED Monitor	00 - 05 (6 kinds selectable)
F401	LED Monitor Display STOP mode	00 : Setting value 01 : Output value
F402	Coefficient for machine speed and line speed	0.01 - 200.0 (Multiplier to Hz value)
F403	Frequency Start	0.50 - 60.00
F404	Hold time frequency start	0.0 - 10.0
F405	Frequency Cutoff	0.0 - Frequency Start
F406	Sub V/F (Frequency)	0.0 - 400.0
F407	Sub V/F (Voltage)	0 - VoltMax
F408	V/F Pattern	00 : Linear 01 : Curve
F409	Carrier Frequency**	1.0 - 10.0
F410	ACC/DEC pattern (S-Curve Select Mode)	00 : Linear 01 : Short S-Curve (T x 2) 02 : Medium S-Curve (T x 2.4) 03 : Long S-Curve (T x 3)
F411	Acceleration time 2	0.1 - 3600
F412	Deceleration time 2	0.1 - 3600
F413	Acceleration time 3	0.1 - 3600
F414	Deceleration time 3	0.1 - 3600
F415	Acceleration time 4	0.1 - 3600
F416	Deceleration time 4	0.1 - 3600
F417	Base frequency 2	50.00 - 400.00
F418	Reted voltage 2	110-220 (200V class) 220-380 (400V class)
F419	Torque boost 2	0.0 - 20.0
F420	Stop Mode	00 : Deceleration (Decel. = 0 Free Run) 01 : DC Brake 02 : Free Run
Automation Function		
F500	Pattern (Mode select)	00 : Inactive 01 : Mono-cycle 02 : Continuous cycle 03 : Mono-cycle with continuous 7th speed

Automation Function		
NO.	**Name**	**Setting range**
F501	Stage Time 1	0.0 - 5400
F502	Stage Accel 1	01 - 04
F503	Stage Decel 1	01 - 04
F504	Stage Direction 1	00 : Forward 01 : Reverse
F505	Stage Time 2	0.0 - 5400
F506	Stage Accel 2	01 - 04
F507	Stage Decel 2	01 - 04
F508	Stage Direction 2	00 : Forward 01 : Reverse
F509	Stage Time 3	0.0 - 5400
F510	Stage Accel 3	01 - 04
F511	Stage Decel 3	01 - 04
F512	Stage Direction 3	00 : Forward 01 : Reverse
F513	Stage Time 4	0.0 - 5400
F514	Stage Accel 4	01 - 04
F515	Stage Decel 4	01 - 04
F516	Stage Direction 4	00 : Forward 01 : Reverse
F517	Stage Time 5	0.0 - 5400
F518	Stage Accel 5	01 - 04
F519	Stage Decel 5	01 - 04
F520	Stage Direction 5	00 : Forward 01 : Reverse
F521	Stage Time 6	0.0 - 5400
F522	Stage Accel 6	01 - 04
F523	Stage Decel 6	01 - 04
F524	Stage Direction 6	00 : Forward 01 : Reverse
F525	Stage Time 7	0.0 - 5400
F526	Stage Accel 7	01 - 04
F527	Stage Decel 7	01 - 04
F528	Stage Direction 7	00 : Forward 01 : Reverse
F529	Clear Cycle Pattern	00 : Active 01 : Inactive
Service Function		
F600	Data initializing**	00 : Manual set values 01 : Return to factory set values
F601	Function Lock	00 : Unlock 01 : Lock
F602	Password set	0000 - FFFF
F603	Fault Memory	00 : Last Fault 01 : 1st Last Fault 02 : 2nd Last Fault 03 : 3rd Last Fault
F604	Life Time	0-65535
F605	Clear Fault Immediate Run	00 : Active 01 : Inactive
F606	Factory Password	Enable group 0 (Factory Function)
F607	Program Check Sum	0000 - FFFF (Read Only)