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CONTROL SPECFICATION

Output Ratings	
Frequency range	0 – 500Hz
Voltage range	0 – Input voltage
Continuous current	I_{CT} @ max 50°C ambient I_{VT} @ max 40°C ambient
Overload current	1.5 x I_{CT} for 1 min / 10 min. 2.5 x I_{CT} for 2 sec / 20 sec if output frequency < 30Hz and heat sink temperature < 60°C
Hardware Trip Limit	I_{TRIP} is 2.83 x I_{CT} after 10μs
Frequency Data	
Frequency resolution: Analog input Panel reference Comm reference	 Sign 12 bit, accuracy ±1% 0.01 Hz 0.01 Hz
Frequency accuracy	0.01 Hz
Efficiency	> 0.94
Default switching frequency	10 kHz <= 40 HP @ 230V, 400V, 500 V; 3.6 kHz > 40 HP @ 230V, 400V, 500 V; 1.5 kHz @ 600 V
Motor Performance	
Constant torque loads	Standard
Frequency (V/Hz) control: Speed regulation	 Motor slip dependant
Open loop vector control: Speed regulation Speed response time [Ref]	 <0.5 % full speed 10 ms
Closed loop vector control: Speed regulation Speed loop bandwidth Torque loop bandwidth Speed response time [Ref] Encoder PPR maximum Maximum drive PPS input	 0.01 % (encoder dependent) 8-16 Hz, function of inertia Up to 48 Hz 1 ms Application Dependent 115 kHz
Input Power	
Input voltage [–15% to +10%]	200 – 240, 380 – 440, 440 – 500, 525 – 690
Line voltage imbalance	< 3 %
Input frequency	45 – 66 Hz
Displacement power factor	0.96
Total power factor	0.93
Rated Interrupting Capacity	Up to 100, 000 A (100 kAIC)

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Design Type	
Converter	6 pulse diode
Inverter	IGBT
Waveform: V/Hz mode Torque mode	 Sine coded PWM PWM
Environment	
Operating temperature	-10°C (no frost) to +50°C. Derate I_{CT} by 7% / °C or 4% / °F above 50°C (122°F)
Storage temperature	-40°C to +60°C
Humidity	<95%, no condensation.
Altitude	3300 ft (1000m). Derate I_{CT} by 1% / 330 ft (100m) above 3300 ft (1000m).
Pollution level: Chemical vapors Mechanical particles	IEC 60721-3-3 (Air quality) Class 3C2 Class 3S2
Shock Operation Storage & Shipping	[IEC 68-2-27] Maximum 8 G, 11ms. Maximum 15 G, 11 ms, packaged
Vibration	[IEC 60721-3-3] Maximum displacement amplitude 3mm at 2 – 9 Hz. Maximum acceleration amplitude 0.5 G at 9 – 200 Hz.
Codes and Standards	
NEMA ICS 7 and 7.1	AFD construction and safety guidelines
IEC 61800-2 / NEMA ICS 29.200	Low voltage AFD rating specs
IEC 61800-3 / NEMA ICS 33.100	EMC – Immunity test
UL 508C	Yes
Enclosure Standard Optional	 Open and protected panel, NEMA 1, and NEMA 12 Oversized NEMA 1 and NEMA 12
Protective Features	
AC line transients	Standard 3% line reactor for all frames sizes except “M3 Frame”
Circuit disconnect	Optional. 2-7.5 HP : HMCP030H1C; 10-15 HP : HMCP050K2C; 20-25 HP : HMCP070M2C; 30-40 HP : HMCP100RC3; 50-60 HP : HMCP150T4C; 75 HP : HMCP150V4; 125-150 HP : HMCP400X5 250 HP : HMCP600L6W
AC line reactors	Standard
Ground fault protection	Standard electronic
Input line fuses	Optional 2-3 HP : JJS15; 5-7.5 HP : JJS30; 10-15 HP : JJS50; 20-25 HP : JJS60; 30-40 HP : JJS100 50-60 HP : JJS150; 75 HP : JJS200; 125 HP : JJS250; 150 HP : JJS350; 250 HP : JJS400
Standard Electronic Protection	Motor overload, underload, phase loss and stalled, Open short circuit, overcurrent, overtemperature, undervoltage, and Input phase loss.
Ride through (carryover)	Regenerative - Load dependent
Motor thermistor overtemperature	Optional
Motor dv/dt and peak voltage limiting	Optional
EMC input filter	Optional in most frame sizes

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OPERATOR INTERFACE

Setup and Adjustments	
Acceleration and deceleration [linear]	0.1 – 3000 seconds.
Acceleration and deceleration [s curve]	0 – 10 seconds for the s part.
Current limit	0.1 to 2.5 times I_{CT}
V/Hz	Linear, squared, programmable, automatic torque boost.
Maximum frequency	Min freq. – 120/500 Hz.
Minimum frequency	0 – max freq.
Frequency reference source selection	Panel, voltage or current terminals, joystick input, or communication port.
Preset speeds	Up to 7
Multiple speed reference source	Up to 2 plus keypad and fixed speeds.
Motorized potentiometer	Electronic digital speed control.
Jog speed reference	Min to max frequency
PI controller	Gain and time
Start/stop source selection	Panel, I/O terminals, or communication port.
Parameter setup	To customize drive, motor, and/or load characteristics.
Switching frequency	1kHz to 16kHz, horsepower dependent.
Motor nameplate voltage	180 – 690 V.
Motor nameplate frequency	30 – 500 Hz.
Motor nameplate speed	1 – 20000 RPM.
Motor nameplate current	Up to 2.5 times I_{CT} .
Motor rotation selection	Forward or reverse.
Line voltage	208 – 240, 380 – 440, 380 – 500, 525 – 690.
DC injection braking: Magnitude Duration	 0.15 to 1.5 times I_{CT} 0 to 250 seconds
Display: 3 line [Multi-line] Graphical	 Standard Optional
Metering [Display Parameters]	Output frequency, motor speed, motor current, motor torque, motor power, motor voltage, DC link voltage, heat sink temperature, operating days, megawatt hours, analog input voltage, analog input current, percent motor temperature rise, unit Hp rating, and control software.
Status	Digital inputs, digital outputs, run, stop, fault
Control program	System Software Version Number
Fault indication	Overcurrent, overvoltage, ground fault, inverter fault, charging fault, undervoltage, input phase loss, output phase loss, dynamic brake fault, undertemperature, overtemperature, motor stalled, motor overtemperature, motor underload, analog input hardware fault, option board fault, 10V reference, 24V supply, EEPROM checksum, microprocessor watchdog, panel communication error, thermistor protection, analog current input below 4mA, and external fault
Warning indication	Motor stalled, motor overtemperature, motor underload, fault or status counters changed, application selection not successful, unbalance current, drive overtemperature, analog current input below 4mA, and external switch opened(or closed)

Interface	
Keypad	Speed, start/stop, digital outputs, parameter adjustment, and Fault reset.
Terminal block	Speed, start/stop, digital inputs, digital outputs, and Analog output.
RS232	Program, monitor and control via a Windows based SVDrive software.
Fieldbus communication	Modbus RTU, Profibus DP, Interbus S, LonWorks, and DeviceNet.
Analog input: Voltage / Current / Isolation	 0 – 10 Vdc, R_L = 200 kohms / 0 (4) – 20mAdc, R_L = 250 ohms / Differential isolation standard. Galvanic isolation optional.
Analog output: Current / Isolation	 0 (4) – 20mAdc, R_L < 500 ohms, resolution 10 bits, accuracy ± 3% / Differential isolation standard.
Digital input	Referenced to +24Vdc or common ; "0" <= 10V, "1">= 18V; R_i = 5 kΩ.
Digital outputs: Open collector Relay (2) [Non Inductive Load]	 Max 50mA/48Vdc referenced to ground Max switching volt: 300vdc, 250vac; Max switching load: 8A/24V, 0.4A/250Vdc, 2kVA/250Vac Max continuous: 2A rms

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I/O EXPANDER AND FIELDBUS BOARDS

FieldBus Board	
MODBUS RTU, LONWORKS, INTERBUS S	
Digital Inputs	Reference to +24Vdc; "0" <= 10V, "1">= 18V; R_i = 5 kΩ.
Digital Outputs	Open Collector; Max 50mA/48Vdc referenced to ground.
Encoder Inputs Voltage Rating Maximum PPR / Maximum drive PPS input	 24V: "0" <= 10V, "1">= 18V, R_i = 3.3 kΩ ; 5V: "0" <= 2V, "1">= 3V, R_i = 300 Ω. Application dependent / 115 kHz
Thermistor Input	R_{trip} = 4.7 kΩ.
PROFIBUS DP	
Digital Inputs	Reference to +24Vdc; "0" <= 10V, "1">= 18V; R_i = 5 kΩ.
Digital Outputs Open Collector Relay (1)	 Max 50mA/48Vdc referenced to ground. Max switching volt: 300Vdc, 250Vac; Max switching load: 8A/24V, 0.4A/3000Vdc, 2kVA/250Vac Max continuous: 2A rms
Encoder Inputs Voltage Rating Maximum PPR / Maximum drive PPS input	 24V: "0" <= 10V, "1">= 18V, R_i = 3.3 kΩ; 5V: "0" <= 2V, "1">= 3V, R_i = 300 Ω. Application dependent / 115 kHz
Thermistor Input	R_{trip} = 4.7 kΩ.
Encoder Board	
SLOW ENCODER BOARD [SV9IOC100]	
Max Encoder Freq Input	115 kHz
Quadrature Tolerance	Encoder specs dependent
Jitter Tolerance	Encoder specs dependent
Harmonic Distortion	
Voltage	24V: "0" <= 10V, "1">= 18V, R_i = 3.3 kΩ; 5V: "0" <= 2V, "1">= 3V, R_i = 300 Ω.
FAST ENCODER BOARD [SV9IOC104]	
Max Encoder Freq Input	115 kHz
Quadrature Tolerance	Encoder specs dependent
Jitter Tolerance	Encoder specs dependent
Voltage	24V: "0" <= 10V, "1">= 18V, R_i = 3.3 kΩ; 5V: "0" <= 2V, "1">= 3V, R_i = 300 Ω.
Encoder Output Open Collector	 Max 50mA/48Vdc referenced to ground
I/O Expander Board [SV9IOC101-3]	
Digital Inputs	Reference to +24Vdc; "0" <= 10V, "1">= 18V; R_i > 5 kΩ.
Analog input: Voltage / Current / Isolation	 0 – 10 Vdc, R_L = 200 kΩ / 0 (4) – 20mAdc, R_L = 250 Ω / Differential isolation standard. Galvanic isolation optional.
Analog output: Current / Voltage Isolation	 0 (4) – 20mAdc, R_L < 500 ohms, resolution 10 bits, accuracy ± 2% / 0 – 10Vdc, R_L >= 1 kΩ, resolution 10 bits, accuracy ± 2% Differential isolation standard.
Relay Outputs	Max switching volt: 300vdc, 250vac; Max switching load: 8A/24V, 0.4A/250Vdc, 2kVA/250Vac; Max continuous: 2A rms
Thermistor Input	R_{trip} = 4.7 kΩ.
Encoder Inputs Voltage Rating Maximum PPR / Maximum drive PPS input	 24V: "0" <= 10V, "1">= 18V, R_i = 2.2 kΩ; 5V: "0" <= 2V, "1">= 3V, R_i = 300 Ω. Application dependent / 115 kHz

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