Description
3 - 500 HP

Z1000

The Z1000 variable-speed drive is designed for building automation applications such as fans, pumps, and cooling towers through 500 HP. The Z1000 features HVAC-specific application macros, an easy-to-read LCD keypad that provides Hand-Off-Auto interface, and a real time clock. These features make the Z1000 perfect for most building automation applications that require reliable motor control.

The Z1000 also features embedded communications for Modbus/Memobus, BACnet, Siemens APOGEE, and Johnson Controls Metasys. LonWorks and EtherNet/IP interface cards are also available, as separate options.

Performance Features

- VT Ratings: 3 - 150 HP, 208 VAC
  3 - 500 HP, 480 VAC
- Overload capacity: 110% for 60 seconds (150% Peak)
- DC Injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Motor preheat function
- Adjustable accel/decel: 0.1 to 6000 seconds
- Controlled speed range: 40:1
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Torque limiting: 30 - 180%
- Power loss ride through: 2 seconds
- Auto restart after power loss or resettable fault, selectable, programmable
- Serial communications loss detection
- Up/down floating point control capability
- Stationary motor auto-tuning
- 140% starting torque capability, available from 3 Hz to 60 Hz
- Remote speed reference (speed command) signal:
  0 to 10 VDC (20 KΩ)
  4 to 20 mA DC (250Ω)
- Adjustable carrier frequency, from 1 kHz to 12.5 kHz
- Programmable security code
- 7 programmable multi-function input terminals (24Vdc) providing 60+ programmable features, including:
  Customer Safeties
  BAS / Damper Interlock
  Emergency Override
  Preset Speed
  PI control enable / disable
- 3 programmable multi-function output relays (Form A rated 2 amps @ 250Vac & 30Vdc), providing 50+ functions, including:
  Damper control
  Hand / Auto Status
  Contactor Control for External Bypass
  Overtorque/undertorque detection

Service Conditions

- Input voltage:
  200 - 240 VAC, 380 - 480 VAC, -15/+10%
- Input frequency: 50/60 Hz ±5%
- Ambient service temperature:
  NEMA 1 (IP20): -10°C to 40°C (14°F to 104°F)
- Ambient storage temperature: -20°C to 70°C (-4°F to 158°F)
- Humidity: 0% to 95%, non-condensing
- Altitude: to 1000 meters (3300 feet); higher by derating
- Service factor: 1.0
- Vibration: 9.81m/s^2 (1 G) maximum at 10 to 20 Hz, 2.0 m/s^2 (0.2 G) at 20 Hz to 55 Hz
- Plenum mounting capable (IP20)
- RoHS Compliant

Design Features

- Built in 5% line impedance(1)
- Displacement power factor of 0.98 throughout the motor speed range
- NEC rated input / output amps
- Internal EMI/RFI filter complies with IEC 61800-3 restricted distribution for first environment (Category 2)(1)
- Built-In real time clock for time and date stamping events along with timer functions for starting, stopping and speed changes without the need for external controls
- Volt meter, ammeter, kilowatt meter elapsed run time meter and heat sink temperature monitoring functions
- Two internal (PI) Controls
- Drive internal PI closed loop control with selectable engineering units
- Independent PI control for use with external device
- Differential PI feedback feature
- Sleep function in both closed loop and open loop control
- Feedback signal low pass filter
- Feedback signal loss detection and selectable response strategy
- Feedback signal inverse and square root capability
- 24 Vdc, 150ma transmitter power supply
- Input and output terminal status indication
- Diagnostic fault indication
- VFD efficiency: 96% at half-speed; 98% at full-speed
- "S-curve" soft start / soft stop capability
- Serial communication loss detection and selectable response strategy
- Serial communication status
- No load detection (broken belt alert)
- One fixed "Fault" form C output relay (Rated 2 amps @ 250Vac & 30Vdc)
- 7 preset speeds
- Built-in BACnet protocol (BTL certified), Modbus/Memobus accessible via RS-422/485 communication, which is standard
- "Kinetic Energy Braking" (KEB) function stops the motor in up to half the time it would take without this function.
- LCD keypad: Hand/Off/Auto functions with a built-in copy feature
- Motor preheat function
- Flash upgradeable firmware
- Customizable monitor display
- Heat sink over temperature speed fold-back feature
- "Bumpless" transfer between Hand and Auto modes
- Emergency override can be used as "smoke purge" function
- Fan failure detection and selectable drive action

Standards

- UL 508C (Power Conversion)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- UL 1995 (Plenum)
- CE mark 2006/95/EC LVD
- CE mark 2004/108/EC
- IEC 61800-5-1 (LVD)
- EN 61800-3
- IEC 529
- IEEE C62.41
- UL, cUL listed; CE marked
- IBC 2012

Options

- LonWorks Interface
- EtherNet/IP
- Modbus TCP/IP

(1) 3 - 100 HP @ 208V, 3 - 250 HP @ 480V

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Data subject to change without notice
Yaskawa America, Inc.

Z1000 Drives - 3 to 150 HP, 208 Volt and 3 to 500 HP, 480 Volt, 3-phase input, NEMA-1/IP20 enclosed or Protected Chassis/IP00

Rated Input Voltage	Drive Model Number CIMR-ZU	Rated Output Current (Amps)	Nominal HP(1)	Standard Enclosure
200-240V 3-Phase	**2A0011FAA**	10.6	3	NEMA-1 / IP20
	2A0017FAA	16.7	5	NEMA-1 / IP20
	2A0024FAA	24.2	7.5	NEMA-1 / IP20
	2A0031FAA	30.8	10	NEMA-1 / IP20
	2A0046FAA	46.2	15	NEMA-1 / IP20
	2A0059FAA	59.4	20	NEMA-1 / IP20
	2A0075FAA	74.8	25	NEMA-1 / IP20
	2A0088FAA	88.0	30	NEMA-1 / IP20
	2A0114FAA	114	40	NEMA-1 / IP20
	2A0143FAA	143	50	NEMA-1 / IP20
	2A0169FAA	169	60	NEMA-1 / IP20
	2A0211FAA	211	75	NEMA-1 / IP20
	2A0273FAA	273	100	NEMA-1 / IP20
	2A0343AAA	343	125	Open-Type / IP00
	2A0396AAA	396	150	Open-Type / IP00
380-480V 3-Phase	**4A0005FAA**	4.8	3	NEMA-1 / IP20
	4A0008FAA	7.6	5	NEMA-1 / IP20
	4A0011FAA	11.0	7.5	NEMA-1 / IP20
	4A0014FAA	14.0	10	NEMA-1 / IP20
	4A0021FAA	21.0	15	NEMA-1 / IP20
	4A0027FAA	27.0	20	NEMA-1 / IP20
	4A0034FAA	34.0	25	NEMA-1 / IP20
	4A0040FAA	40.0	30	NEMA-1 / IP20
	4A0052FAB	52.0	40	NEMA-1 / IP20
	4A0052FAA	52.0	40	NEMA-1 / IP20
	4A0065FAA	65.0	50	NEMA-1 / IP20
	4A0077FAA	77.0	60	NEMA-1 / IP20
	4A0096FAA	96.0	75	NEMA-1 / IP20
	4A0124FAA	124	100	NEMA-1 / IP20
	4A0156FAA	156	125	NEMA-1 / IP20
	4A0180FAA	180	150	NEMA-1 / IP20
	4A0240FAA	240	200	NEMA-1 / IP20
	4A0302FAA	302	250	NEMA-1 / IP20
	4A0361AAA	361	300	Open-Type / IP00
	4A0414AAA	414	350	Open-Type / IP00
	4A0480AAA	480	400	Open-Type / IP00
	4A0590AAA	590	500	Open-Type / IP00

(1) Horsepower rating is based on standard NEMA B, 4-pole motor design as represented in NEC table 430.150 Full-Load Current, Three-Phase Alternating Current Motors at 208 or 480 volts.

Rated Input Voltage	Drive Model Number CIMR-ZU	Nominal HP	Physical Dimensions (in.)			Weight (lb)	Drawing Number	Heat Loss (Watts)		
			H	W	D			Heatsink	Internal	Total
200-240V 3-Phase	2A0011FAA	3	14.06	4.88	8.58	12.3	DD.Z1K.FR1.N1	121	28	148
	2A0017FAA	5				13.0		176	37	214
	2A0024FAA	7.5	17.60		9.17	16.3	DD.Z1K.FR2.N1	280	55	335
	2A0031FAA	10				17.2		378	73	451
	2A0046FAA	15	20.08	7.87	9.35	26.5	DD.Z1K.FR3.N1	396	86	482
	2A0059FAA	20				28.7		542	116	658
	2A0075FAA	25	21.33	10.04	10.37	59.5	DD.Z1K.FR4.N1	557	132	688
	2A0088FAA	30				61.7		670	157	827
	2A0114FAA	40				63.9		864	200	1064
	2A0143FAA	50	30.47	13.39	15.75	143.3	DD.Z1K.FR6.N1	1191	307	1499
	2A0169FAA	60				149.9		1447	365	1811
	2A0211FAA	75				154.3		1753	471	2224
	2A0273FAA	100				160.9		2378	625	3003
	2A0343AAA	125	31.5	19.69	13.78	216.0	DD.Z1K.FR8.IP00	1964	655	2620
	2A0396AAA	150				218.0		2435	829	3264
380-480V 3-Phase	4A0005FAA	3	14.06	4.88	8.58	11.9	DD.Z1K.FR1.N1	93	24	117
	4A0008FAA	5				12.6		143	33	178
	4A0011FAA	7.5				13.4		184	38	222
	4A0014FAA	10	17.60		9.17	16.1	DD.Z1K.FR2.N1	231	52	283
	4A0021FAA	15				16.8		306	69	375
	4A0027FAA	20				18.5		390	85	475
	4A0034FAA	25	20.08	7.87	9.35	28.7	DD.Z1K.FR3.N1	457	105	562
	4A0040FAA	30						558	118	677
	4A0052FAB	40						584	151	734
	4A0052FAA	40	21.33	10.04	10.37	59.5	DD.Z1K.FR4.N1	463	130	594
	4A0065FAA	50				63.9		576	161	737
	4A0077FAA	60				68.3		891	225	1116
	4A0096FAA	75				70.5		1131	288	1419
	4A0124FAA	100	27.56	10.87	11.38	101.4	DD.Z1K.FR5.N1	1581	398	1979
	4A0156FAA	125	30.47	13.39	15.75	160.9	DD.Z1K.FR6.N1	1929	535	2464
	4A0180FAA	150				167.6		2342	621	2963
	4A0240FAA	200				174.2		2863	790	3653
	4A0302FAA	250	41.14	17.91	18.90	286.6	DD.Z1K.FR7.N1	3278	929	4207
	4A0361AAA	300	31.50	19.70	13.78	236.0	DD.Z1K.FR8.IP00	3009	1157	4166
	4A0414AAA	350	37.40	19.70	14.57	275.0	DD.Z1K.FR9.IP00	3206	1633	4840
	4A0480AAA	400	44.88	26.38	14.57	476.0	DD.Z1K.FR10.IP00	3881	2011	5893
	4A0590AAA	500	44.88	26.38	14.57	487.0		4130	1964	6094