Z1000 Family of Drives

YASKAWA

HVAC Building Automation Catalog

A Single Drive for all Your Building Automation Needs

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.

Pushing Expectations

Yaskawa America, Inc. has been building packages for the HVAC industry since 1988. Over that time, we have worked rigorously to evolve our products and exceed industry standards, while ensuring an exceptional customer experience.

Our latest offering for the HVAC industry, the Z1000 family of drives, pushes past the standard requirements to establish a new benchmark for expectations within the industry.

Yaskawa embraces the challenge of supplying an essential product into a growing and changing market. Customers of all types are demanding more flexibility, more control, more power, less downtime, and more packaging options. The Z1000 family of drives is able to address and exceed all of these expectations.

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Preface

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Z1000 Specifications: 200 to 240 V and 380 to 480 V

The Z1000 variable-speed drive is engineered for use in HVAC building automation applications requiring reliable motor control.

The Z1000 features HVAC application-specific software macros, a Hand-Off-Auto LCD keypad, and a real time clock for system accuracy. Popular building automation communication protocols BACnet, Siemens APOGEE, Johnson Controls Metasys, and MEMOBUS/Modbus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

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Performance Features

- VT Ratings:
  3 to 150 HP, 200 to 240 Vac
  3 to 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 to 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 K Ohm)
  4 to 20 mA DC (250 Ohm)
- 7 programmable multi-function input terminals (24 Vdc) 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 C rated 2 amps @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status
  - Contactor Control for External Bypass
  - Overtorque/undertorque detection

Service Conditions

- Input voltage:
  200 to 240 Vac, 380 to 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: 9.81 m/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 (3 to 100 HP @ 208V, 3 to 250 HP @ 480V)
- 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) (3 to 100 HP @ 208V, 3 to 250 HP @ 480V)
- 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 loss detection and selectable response strategy
- Feedback signal inverse and square root capability
- Feedback signal low pass filter
- 24 Vdc, 150 ma transmitter power supply
- Input and output terminal status indication
- Diagnostic fault indication
- VFD efficiency: 98% at full-speed; 96% at half-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 @ 250 Vac & 30 Vdc)
- 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 foldback 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

Z1000 Specifications: 500 to 600 V

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Popular building automation communication protocols BACnet, Siemens APOGEE, Johnson Controls Metasys, and MEMOBUS/Modbus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

Performance Features

- VT Ratings: 2 to 250 HP
- 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 K Ohm)
  4 to 20 mA DC (250 Ohm)
- Adjustable carrier frequency, from 1 kHz to 12.5 kHz
- 7 programmable multi-function input terminals (24 Vdc) 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 C rated 2 amps @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status
  - Contactor Control for External Bypass
  - Overtorque/undertorque detection

Service Conditions

- Input voltage:
  575 - 600 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: 9.81 m/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

- Displacement power factor of 0.98 throughout the motor speed range
- 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, 150 ma transmitter power supply
- Input and output terminal status indication
- Diagnostic fault indication
- VFD efficiency: 98% at full-speed; 96% at half-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 @ 250 Vac & 30 Vdc)
- 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
- Motor preheat function
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Standards

- UL 508C (Power Conversion)
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- IBC 2012

Options

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

Z1000 Model Selection 200 to 240 V

Z1000 Drives 3 to 150 HP, 200 to 240 V, 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 to 240 V 3-Phase	2A0011FAA	10.6	3	NEMA-1 / IP20
	2A0017FAA	16.7	5	
	2A0024FAA	24.2	7.5	
	2A0031FAA	30.8	10	
	2A0046FAA	46.2	15	
	2A0059FAA	59.4	20	
	2A0075FAA	74.8	25	
	2A0088FAA	88	30	
	2A0114FAA	114	40	
	2A0143FAA	143	50	
	2A0169FAA	169	60	
	2A0211FAA	211	75	
	2A0273FAA	273	100	
	2A0343AAA	343	125	Open-Type / IP00
	2A0396AAA	396	150	

*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 volts.

Z1000 Model Selection 380 to 480 V

Z1000 Drives 3 to 500 HP, 480 V, 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
380-480 V 3-Phase	4A0005FAA	4.8	3	NEMA-1 / IP20
	4A0008FAA	7.6	5	
	4A0011FAA	11	7.5	
	4A0014FAA	14	10	
	4A0021FAA	21	15	
	4A0027FAA	27	20	
	4A0034FAA	34	25	
	4A0040FAA	40	30	
	4A0052FAB	52	40	
	4A0052FAA	52	40	
	4A0065FAA	65	50	
	4A0077FAA	77	60	
	4A0096FAA	96	75	
	4A0124FAA	124	100	
	4A0156FAA	156	125	
	4A0180FAA	180	150	
	4A0240FAA	240	200	
	4A0302FAA	302	250	
	4A0361AAA	361	300	Open-Type / IP00
	4A0414AAA	414	350	
	4A0480AAA	480	400	
	4A0590AAA	590	500	

*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 480 volts.

Z1000 Model Selection 500 to 600 V

Z1000 Drives 1 to 250 HP, 600 V, 3-phase input, NEMA-1/IP20 enclosed or Protected Chassis/IP00.

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *3	Standard Enclosure *1 *2
			Drive Model Number CIMR-ZU
500 to 600 V 3-Phase	2.7	1 & 2	5A0003FAA
	3.9	3	5A0004FAA
	6.1	5	5A0006FAA
	9	7.5	5A0009FAA
	11	10	5A0011FAA
	17.5	15	5A0017FAA
	22	20	5A0022FAA
	27	25	5A0027FAA
	32	30	5A0032FAA
	41	40	5A0041FAA
	52	50	5A0052FAA
	62	60	5A0062FAA
	77	75	5A0077FAA
	99	100	5A0099FAA
	125	125	5A0125AAA
	145	150	5A0145AAA
	192	200	5A0192AAA
	242	250	5A0242AAA

*1. Standard Enclosure can be conventionally mounted or heat sink external (kit required for models CIMR-ZU5A0032FAA and smaller).

*2. Only models ending in FAA (CIMR-ZU5A0099FAA and smaller) come standard with NEMA 1 End Cap Kits. Separately sold kits are available for larger models.

*3. 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. Also, listed power ratings assume three-phase input.

Z1000 Options

End Cap Kits NEMA 1

This option consists of a top and bottom cover to convert a protected IP00/Open Type drive to a IP20/NEMA Type 1 enclosed unit. This option DOES NOT provide additional space for mounting auxiliary components (i.e., circuit breaker, input fuses, reactor, etc.).

Rated Input Voltage	Drive Model Number CIMR-ZU2A□□□□	Part Number
200 to 240 V 3-Phase	0343	EZZ021136E
	0396	
Rated Input Voltage	**Drive Model Number CIMR-ZU4A□□□□**	**Part Number**
380 to 480 V 3-Phase	0361	EZZ021136E
	0414	UUX000662
	0480	UUX000663
	0590	
Rated Input Voltage	**Drive Model Number CIMR-ZU5A□□□□**	**Part Number**
500 to 600 V 3-Phase	0041 *1	EZZ021136G
	0052 *1	
	0062 *1	EZZ021136C
	0165 *1	
	0099 *1	
	0125	EZZ021136D
	0145	
	0192	EZZ021136E
	0242	

*1. These ratings are already available as NEMA 1 (FAA) drives; the End Cap Kits for these ratings are shown here only for replacement purposes.

24 Vdc Control Power Unit

This option provides board-level component voltages for the Z1000 drive when provided with 24 Vdc from an external, customer-supplied source. It is used to maintain both drive control power and network communications (when utilized). Option kits for customer mounting:

Rated Input Voltage	Nominal HP	Drive Model Number CIMR-ZU	Control Power Unit Part Number
200 to 240 V 3-Phase	3 through 150	2A0011 through 2A0396	PS-A10LB
380 to 480 V 3-Phase	3 through 500	4A0005 through 4A0590	PS-A10HB
500 to 600 V 3-Phase	2 through 250	5A0003 through 5A0242	PS-A10H

External Heatsink Kits

External Heatsink Kit: Allow drives to be mounted with the drive's heat sink external to the enclosure. Option kit for customer mounting. Available in either NEMA 1 or NEMA 12.

External Heatsink Kits NEMA 1 for 200 to 240 V Models

Rated Input Voltage	Drive Model Number CIMR-ZU2A□□□□	Part Number
200 to 240 V 3-Phase	0011	EZZ021811A
	0017	
	0024	EZZ021811B
	0031	
	0046	EZZ021811C
	0059	
	0075	EZZ021811D
	0088	
	0114	
	0143	N/A
	0169	
	0211	
	0273	

External Heatsink Kits NEMA 1 for 380 to 480 V Models

Rated Input Voltage	Drive Model Number CIMR-ZU4A□□□□	Part Number
380 to 480 V 3-Phase	0005	EZZ021811A
	0008	
	0011	
	0014	EZZ021811B
	0021	
	0027	
	0034	EZZ021811C
	0040	
	0052 *1	EZZ021811D
	0065	
	0077	
	0096	
	0124	N/A
	0156	
	0180	
	0240	
	0302	

*1. Use EZZ021811C when using model CIMR-ZU4A0052FAB.

External Heatsink Kits NEMA 12

Rated Input Voltage	Drive Model Number CIMR-ZU2A□□□□	Part Number
200 to 240 V 3-Phase	0011	EZZ021642A
	0017	
	0024	EZZ021642B
	0031	
	0046	EZZ021642C
	0059	
	0075	EZZ021642D
	0088	
	0114	
	0143	EZZ021642F
	0169	
	0211	
	0273	
Rated Input Voltage	**Drive Model Number CIMR-ZU4A□□□□**	**Part Number**
380 to 480 V 3-Phase	0005	EZZ021642A
	0008	
	0011	
	0014	EZZ021642B
	0021	
	0027	
	0034	EZZ021642C
	0040	
	0052 *1	EZZ021642D
	0065	
	0077	
	0096	
	0124	EZZ021642E
	0156	EZZ021642F
	0180	
	0240	
	0302	EZZ021642G

*1. Use EZZ021642C when using model CIMR-ZU4A0052FAB.

External Heatsink Kits for 500 to 600 V

Rated Input Voltage	Drive Model Number CIMR-ZU5A□□□□	Part Number
500 to 600 V 3-Phase	0003	EZZ020800A
	0004	
	0006	EZZ020800B
	0009	
	0011	
	0017	EZZ020800C
	0022	
	0027	EZZ020800D
	0032	

Control and Communication Options

These cards, cables, and devices add control functionality to the standard drive. Items are shipped loose, unmounted.

Digital Operator and Software

Model No.	Option Name	Description
UOP000016 (JVOP-183)	Digital Operator (LCD)	This option is the standard digital operator found on the drive. This option is only required if the original digital operator is lost or damaged. If used as a remote operator, the standard digital operator may be used, but then requires Installation Set A (EZZ020642A) for panel or door mounting and Remote Operator Cable (UWR0051 or UWR0052), each sold separately. Features include: • LCD keypad display, 5 lines x 16 characters, backlit • 7 languages • Copy function • Mounts to RJ-45 keypad port
EZZ020642A	LCD/LED Keypad Installation Set A (Remote Operator Mounting Bracket Kit)	This is a bracket to which the LCD Digital Remote Operator (JVOP-183) attaches, and has (4) threaded holes and screws to attach to the cover of an enclosure. The kit contains (2) screws to mount the Operator to the bracket and (4) screws to attach the bracket to the enclosure.
EZZ020642B	LCD/LED Keypad Installation Set B (Remote Operator Mounting Bracket Kit)	Contains a similar bracket that the keypad attaches to and has non-threaded holes for mounting to an enclosure that has the screws attached to the enclosure already. The kit contains (2) screws to mount the keypad to the bracket and (4) nuts to attach the bracket to the customer supplied screws attached to the enclosure.
UUX000922	Keypad Adapter Kit	This kit can be used when a “new” Z1000 keypad is replacing an “old style” key pad used with E7-based Z1000 drives. This kit will allow enclosure door mounted key pad to be upgraded from E7 style to the Z1000 style digital key pad.
UWR0051	Operator Cable, Remote (1 meter)	These cables are used to connect the Remote Digital Operator (JVOP-18□). They are available in one (1) or three (3) meter lengths.
UWR0052	Operator Cable, Remote (3 meter)	
UUX000526 (Blank Membrane)	Operator Kits, NEMA Type 3R/4X	This option is used to extend an LCD or LED Digital Remote Operator to the wall of a separately specified, oversized UL Type 3R, 4, 4X, or 12 enclosure (IPX6 environment). Item includes a faceplate bezel with digital operator brackets and membrane to cover the operator cutout in the enclosure door, a 3-foot cable, a 10-foot cable, and a 1:1 template for cutting the necessary cutouts in the enclosure. Keypad can be removed after kit installation. Designed for use with **1000 series Digital Remote Operators (sold separately)**. Connects to RJ-45 port and mounts to enclosure wall.
UUX000527 (Yaskawa Logo Membrane)		
UNP00233-3 (Yaskawa Logo)	Overlay, Keypad, Self-adhesive	This membrane is used to cover the operator cutout in the enclosure door to which the keypad has been remotely mounted.
UNP00233-5 (Blank)		
UOP000017 (Yaskawa Logo Faceplate Membrane)	UL Rated Remote Outdoor Operator/ Mounting Kit	UL Rated Remote Outdoor Operator / Mounting Kit. This option provides all you will need to remotely mount the drive's Digital Operator to the door/wall of a separately specified, oversized UL Type 1, 3R, 4, 4X, or 12 enclosure (IPX6 environment). This kit includes: One JVOP-183R Digital Operator providing RTC, HOA, and outdoor rated LCD display, a faceplate bezel with digital operator brackets and membrane to cover the operator cutout in the enclosure door, a 3-foot cable, a 10-foot cable, and a 1:1 template for cutting the necessary cutouts in the enclosure. Mounting hardware is included. Keypad can be removed after kit installation. Connects to RJ-45 port and mounts to enclosure wall.
UOP000019 (Blank Faceplate Membrane)		
SW.DW.40	DriveWizard® HVAC Software	This optional software package allows upload and download of parameters via PC for data storage and for programming multiple drives. The software also includes graphing and monitoring tools. It is a Windows-based program designed to make startup, commissioning, and troubleshooting the drive as simple as possible. Refer to our website at **www.yaskawa.com** to download the software, and for more information, including minimum system requirements and cable information to interface a PC to the drive.
UWR-0638	USB Interface Cable	This 10-foot male USB-A to male USB-B cable provides a USB-to-USB connection from PC to the drive.
UWR-01076-1	Flash Write Cable	This 6-foot cable connects a PC’s 9-pin serial port to the drive’s keypad port for updating the drive’s firmware, flashing with custom firmware, or updating a network communication option board. It is used with the Flash Tool feature of the DriveWizard® HVAC software.
UWR00468-2	PC Interface Cable	This 6-foot cable interconnects the drive keypad port to the 9-pin communication port on a PC. This cable is used in conjunction with DriveWizard® HVAC software.

Support Tools

Model No.	Option Name	Description
JVOP-181	USB Copy Unit (Y-Stick)	This option allows the drive to connect to the USB port on a PC. It can read, copy and verify drive parameter settings from one drive to another like drive. The unit plugs into the RJ-45 port on the front of the digital operator. Refer to our website at www.yaskawa.com to download the software.
No Model Number	CopyUnitManager Software for USB Copy Unit (Y-Stick)	This option allows the user to transfer and save parameter files from the Copy Unit (JVOP-181), sold separately, to a PC and vice versa. Refer to our website at www.yaskawa.com to download the software.

Network Communications

Model No.	Option Name	Description
SI-W3	LonWorks	This option is compatible with the LonMark Interoperability Association and complies with the Functional Profile for a Variable Frequency Motor Drive. Network connectivity is facilitated by either a Phoenix-style screw termination or RJ-45 connector. Mounts at option connector CN5-A.
SI-EN3	EtherNet/IP	This option complies with the EtherNet/IP protocol specification, and allows for communication over 10/100 Mbps Ethernet networks. This option has the ability to configure the IP Address from a user specified IP address, from a DHCP host, or from a BootP host. The IP address can be set from the drive keypad or from the network. All parameters, diagnostics, and operational commands are accessible via EtherNet/IP. The web interface allows management of diagnostic information through a standard web browser. The embedded web pages include the main page, drive status page, network monitor page, and documentation page. Mounts at option connector CN5-A.
SI-EM3	Modbus TCP/IP	This option complies with the Modbus TCP/IP protocol specification. This allows for Modbus communication over 10/100 Mbps Ethernet networks. This option has the ability to configure the IP Address from a user-specified IP address, from a DHCP host, or from a BootP host. All parameters, diagnostics, and operational commands are accessible via Modbus TCP/IP. This option supports up to 10 simultaneous PLC/PC connections. Mounts at option connector CN5-A.
SI-EN3D	EtherNet/IP with device level ring (DLR)	This option complies with the EtherNet/IP protocol specification. This allows for communication over 10/100 Mbps Ethernet networks. The dual port hardware provides the user the choice of wiring in a star, line or ring configuration. For a ring configuration, device level ring (DLR) is available on this option card. This option has the ability to configure the IP Address from a user specified IP address, from a DHCP host, or from a BootP host. All parameters, diagnostics and operational commands are accessible via EtherNet/IP. Auto-tuning the motor is also possible through this option using the DriveWizard PC program. Mounts at option connector CN5-A.
SI-EM3D	Modbus TCP/IP – Dual Port	This option complies with the Modbus TCP/IP protocol specification. This allows for Modbus communication over 10/100 Mbps Ethernet networks. The dual port hardware provides the user the choice of wiring in a star, line or ring configuration. For a ring configuration, rapid spanning tree protocol (RSTP) is available on this option card. This option has the ability to configure the IP Address from a user specified IP address, from a DHCP host, or from a BootP host. All parameters, diagnostics and operational commands are accessible via Modbus TCP/IP. Auto-tuning the motor is also possible through this option using the DriveWizard PC program. This option supports up to 10 simultaneous PLC/PC connections. Mounts at option connector CN5-A.

Z1000 Dimensions and Data

200 to 240 V

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 to 240 V 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 to 480 V

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
380 to 480 V 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				487.0		4130	1964	6094

500 to 600 V

Rated Input Voltage	Drive Model Number CIMR-ZU	Nominal HP	Physical Dimensions (in)			Weight (lb) *1	Drawing Number *2	Heat Loss (Watts)		
			H	W	D			Heatsink	Internal	Total
500 to 600 V 3-Phase	5A0003FAA	2	11.81	5.51	5.79	7.5	DD.Z1K6.FR1.N1	23.3	21.5	44.8
	5A0004FAA	3						33.6	27.5	61.1
	5A0006FAA	5	11.81	5.51	6.46	8.2	DD.Z1K6.FR2.N1	43.7	28.1	71.8
	5A0009FAA	7.5						68.9	43.4	112.3
	5A0011FAA	10	11.81	5.51	6.57	9.0	DD.Z1K6.FR3.N1	88	56.1	144.0
	5A0017FAA	15	13.39	7.09	7.36	13.2	DD.Z1K6.FR5.N1	146.7	96.6	243.2
	5A0022FAA	20						178.3	99.4	277.7
	5A0027FAA	25	15.75	8.66	7.76	19.2	DD.Z1K6.FR6.N1	227.2	132.1	359.3
	5A0032FAA	30						279.9	141.6	421.5
	5A0041FAA	40	20.28	10.98	10.16	59.5	DD.Z1K6.FR8B.N1	330.8	136.2	467.0
	5A0052FAA	50						427.8	166.2	594.0
	5A0062FAA	60	28.74	12.95	11.14	99.2	DD.Z1K6.FR10.N1	791.2	279.0	1070.2
	5A0077FAA	75						959.1	329.4	1288.5
	5A0099FAA	100						1253.2	411.7	1664.9
	5A0125AAA *3	125	27.76	17.72	12.99	174.2	DD.Z1K6.FR11.IP00	1641	537	2178
			37.80	17.95	12.99	191.8	DD.Z1K6.FR11.N1			
	5A0145AAA *3	150	27.76	17.72	12.99	174.2	DD.Z1K6.FR11.IP00	1860	603	2463
			37.80	17.95	12.99	191.8	DD.Z1K6.FR11.N1 *3			
	5A0192AAA *3	200	31.50	19.69	13.78	235.9	DD.Z1K6.FR12.IP00	2420	769	3180
			45.98	19.84	13.78	257.9	DD.Z1K6.FR12A.N1 *3			
	5A0242AAA *3	250	31.50	19.69	13.78	235.9	DD.Z1K6.FR12.IP00	3100	1131	4231
			45.98	19.84	13.78	257.9	DD.Z1K6.FR12A.N1 *3			

*1. This data represents the average drive weight only, not shipping weight.

*2. The drawings are available in .pdf and .dwg formats. For additional formats, click on the Mechanical Drawings link available on the Z1000 Product Details page at www.yaskawa.com.

*3. Protected chassis models can be converted to NEMA Type 1 by adding top and bottom covers. Add-on kit is required. Consult factory for add-on kit.

Bypass Drive NEMA Type 1 (Z1B1)

Specifications: 208 and 480 V NEMA Type 1 (Z1B1)

The Z1000 Bypass is engineered for use in HVAC building automation applications that require reliable motor control. The package provides a Z1000 drive in a NEMA 1 (UL Type 1) enclosure with a 2-contactor style bypass to allow motor operation from the drive or across the line.

The bypass features HVAC application-specific software macros, a Hand-Off-Auto LCD keypad, and a real time clock for system accuracy. Popular building automation communication protocols BACnet, Siemens APOGEE, Johnson Controls Metasys, and MEMOBUS/Modbus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

Performance Features

- VT Ratings:
  1 to150 HP, 208 Vac
  1 to 500 HP, 480 Vac
- Overload capacity: 110% for 60 seconds (150% Peak)
- DC Injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Adjustable accel/decel: 0.1 to 6000 seconds
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Auto restart after power loss or resettable fault, selectable, programmable
- Up/down floating point control capability
- 140% starting torque capability, available from 3 Hz to 60 Hz
- Remote speed reference (speed command) signal:
  0 to 10 VDC (20 K Ohm)
  4 to 20 mA DC (250 Ohm)
- 7 programmable multi-function input terminals (24 Vdc) providing 60+ programmable features, including:
  - Customer Safeties
  - BAS / Damper Interlock
  - Emergency Override
  - Preset Speed
  - PI control enable / disable
- 4 programmable multi-function output relays (Form C rated 2 amps @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status
  - Contactor Control for External Bypass
  - Overtorque/undertorque

Bypass Features

- Bypass and Drive output contactors
- Lockable Main Input disconnect switch
- Thermal motor overload relay, class 20
- 115 Vac control transformer, fused
- Drive H/O/A keypad used for bypass control
- Damper control circuit with end of travel feedback with two adjustable wait time functions
- Selectable energy savings and harmonic reduction mode
- No load detection (loss of load) fully monitored in drive and bypass modes

Service Conditions

- Input voltage:
  208 Vac, 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

Design Features

- Built in 5% line impedance (1 - 100 HP @ 208 V, 1 - 250 HP @ 480 V)
- 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 - 100 HP @ 208 V, 1 - 250 HP @ 480 V)
- 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
- Drive internal PI closed loop control with selectable engineering units
- Independent PI control for use with external device
- Differential PI feedback feature
- Direct or reverse acting speed signal
- Sleep function in both closed loop and open loop control
- Feedback signal loss detection and selectable response strategy
- Feedback signal inverse and square root capability
- 24 Vdc, 150 ma transmitter power supply
- Input and output terminal status indication
- Diagnostic fault indication
- Cooling fan operating hours recorded
- VFD efficiency: 98% at full-speed; 96% at half-speed
- “S-curve” soft start / soft stop capability
- Serial communication loss detection and selectable response strategy
- Serial communication status
- 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
- Flash upgradeable firmware
- Customizable monitor display
- Heat sink over temperature speed foldback 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 508A (Industrial Control Panels)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- 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
- BTL certified

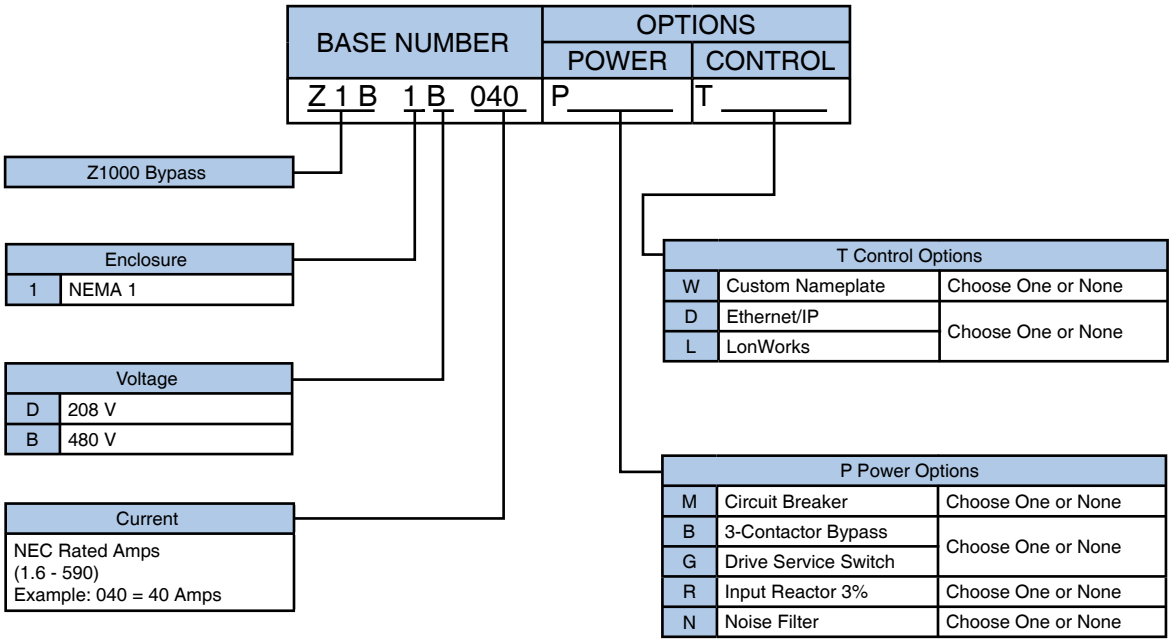
Options

- Circuit Breaker (100 kAIC, additional fuses not required)
- 3-Contactor Bypass
- Drive Service Switch
- Input Reactor
- Noise Filter
- Custom Nameplate
- EtherNet/IP
- LonWorks
- Modbus TCP/IP

Model Number Configuration (Z1B1)

Step 1. Complete the Base Number for the voltage and current rating.

Step 2. Add the Option Code letter for each required option. If an option is not wanted, no character is inserted in that position.



Options (Z1B1)

Enclosure Options

NEMA 1	(1)	The drive and Configured options are provided in a NEMA Type 1 ventilated enclosure, large enough to accommodate any or all of the Configured package options.

Bypass Drive NEMA Type 1 (Z1B1)

Power Options

Circuit Breaker	(M)	The standard configuration provides an input disconnect switch with a padlockable operator mechanism. This disconnect switch DOES NOT provide motor short circuit protection. If motor short circuit protection is desired in the bypass enclosure, select option (M), which provides a circuit breaker (100 kAIC) with a padlockable operator mechanism.
Drive Input Circuit	(B, G)	The standard configuration does not include any protection or disconnecting means specifically for the drive. For a 3-contactor bypass that removes power from the drive, select option (B). For an input disconnect switch that removes power from the drive, select option (G).
Input Reactor	(R)	The standard configuration does not provide any additional AC line impedance. Option (R) can be selected to add a 3% AC line input reactor, (For 300 to 500 HP @ 480 volts and 125 to150 HP @ 208 volts only.)
Input Filter	(N)	The standard configuration for 125 to 150 HP @ 208V and for 300 to 500 HP @ 480V does not include a RFI filter. The cap filter, option (N), is a passive delta-wye capacitive network.

Control Options

Ethernet/IP SI-EN3	(D)	EtherNet/IP, option (D), requires the addition of an optional board.
LonWorks SI-W3	(L)	LonWorks, option (L), requires the addition of an optional board.
Custom Nameplates	(W)	Custom engraved nameplates with white lettering on black lamicoid are available with option (W), for special tagging purposes (Example: “AHU #1”). Note that this option requires the text to be specified by the customer.

Model and Power Option Selection (Z1B1)

208 V Models and Power Options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 1 Bypass	Typical Lead Time	Legend: A = Available N/A = Not available or not applicable				
					Circuit Breaker (100 kAIC)	Contactor Bypass	Drive Input Service Switch	Input Reactor	Cap Filter
			Z1B1 □□□□		M	B	G	R	N
208 V 3-Phase	2.4	0.5	D002	10 Working Days	A	A	A	N/A	N/A
	3.5	0.75	D003						
	4.6	1	D004						
	7.5	2	D007						
	10.6	3	D010						
	16.7	5	D016						
	24.2	7.5	D024						
	30.8	10	D030						
	46.2	15	D046						
	59.4	20	D059						
	74.8	25	D074						
	88	30	D088				N/A		
	114	40	D114						
	143	50	D143						
	169	60	D169						
	211	75	D211	-					
	273	100	D273						
	343	125	D343					A	A
	396	150	D396						

*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 volts.

Bypass Drive NEMA Type 1 (Z1B1)

480 V Models and Power Options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 1 Bypass	Typical Lead Time	Legend: A = Available N/A = Not available or not applicable				
					Circuit Breaker (100 kAIC)	Contactor Bypass	Drive Input Service Switch	Input Reactor	Cap Filter
			Z1B1 □□□□		M	B	G	R	N
480 V 3-Phase	1.6	0.5 & 0.75	B001	10 Working Days	A	A	A	N/A	N/A
	2.1	1	B002						
	3.2	2	B003						
	4.8	3	B004						
	7.6	5	B007						
	11	7.5	B011						
	14	10	B014						
	21	15	B021						
	27	20	B027						
	34	25	B034						
	40	30	B040						
	52	40	B52L						
	52	40	B052						
	65	50	B065						
	77	60	B077						
	96	75	B096				N/A		
	124	100	B124						
	156	125	B156						
	180	150	B180						
	240	200	B240	-					
	302	250	B302						
	361	300	B361					A	A
	414	350	B414						
	477	400	B477						
	590	500	B590						

*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 480 volts.

Dimensions and Data (Z1B1)

208 V NEMA Type 1

Rated Input Voltage	Z1B Bypass Base No. Z1B1 □□□□	Rated Output Current (Amps)	Nominal HP	Bypass Box No.	Submittal Documents (Outline Drawing) (Schematic) (Submittal Guide)	Drive Part No CIMR-ZU	Enclosed, NEMA 1 Bypass Data			
							Overall Dimensions (in)			Weight (lb)
							H	W	D	
208 V 3-Phase	D002	2.4	0.5	W1	DD.Z1B1.W1.01 DS.Z1B1.01 SG.Z1B1.10	2A0011FAA	41.60	6.77	12.92	70
	D003	3.5	0.75			2A0011FAA				
	D004	4.6	1			2A0011FAA				
	D007	7.5	2			2A0011FAA				
	D010	10.6	3			2A0011FAA				
	D016	16.7	5			2A0017FAA				
	D024	24.2	7.5	W2	DD.Z1B1.W2.01 DS.Z1B1.01 SG.Z1B1.10	2A0024FAA	45.10			80
	D030	30.8	10			2A0031FAA				
	D046	46.2	15	W3	DD.Z1B1.W3.01 DS.Z1B1.01 SG.Z1B1.10	2A0046FAA	48.20	10.18	13.19	90
	D059	59.4	20			2A0059FAA				
	D074	74.8	25	W4	DD.Z1B1.W4.01 DS.Z1B1.01 SG.Z1B1.10	2A0075FAA	52.80	12.68	14.20	160
	D088	88	30	W5	DD.Z1B1.W5.01 DS.Z1B1.01 SG.Z1B1.10	2A0088FAA	42.79	25.80	16.06	280
	D114	114	40			2A0114FAA				
	D143	143	50	W6	DD.Z1B1.W6.01 DS.Z1B1.01 SG.Z1B1.10	2A0143FAA	49.09	28.41	20.87	380
	D169	169	60			2A0169FAA				
	D211	211	75	F1	DD.Z1.1.F1.02 DS.Z1B1.01 SG.Z1B1.10	2A0211FAA	84.16	41.26	33.94	950
	D273	273	100			2A0273FAA				1250
	D343	343	125	F1	DD.Z1.1.F1.01 DS.Z1B1.02 SG.Z1B1.10	2A0343AAA				1650
	D396	396	150			2A0396AAA				1700

Bypass Drive NEMA Type 1 (Z1B1)

480 V NEMA Type 1

Rated Input Voltage	Z1B Bypass Base No. Z1B1 □□□□	Rated Output Current (Amps)	Nominal HP	Bypass Box No.	Submittal Documents (Outline Drawing) (Schematic) (Submittal Guide)	Drive Part No CIMR-ZU	Enclosed, NEMA 1 Bypass Data			
							Overall Dimensions (in)			Weight (lb)
							H	W	D	
480 V 3-Phase	B001	1.6	0.75	W1	DD.Z1B1.W1.01 DS.Z1B1.01 SG.Z1B1.10	4A0005FAA	41.60	6.77	12.92	70
	B002	2.1	1			4A0005FAA				
	B003	3.4	2			4A0005FAA				
	B004	4.8	3			4A0005FAA				
	B007	7.6	5			4A0008FAA				
	B011	11	7.5			4A0011FAA				
	B014	14	10	W2	DD.Z1B1.W2.01 DS.Z1B1.01 SG.Z1B1.10	4A0014FAA	45.10			80
	B021	21	15			4A0021FAA				
	B027	27	20			4A0027FAA				
	B034	34	25	W3	DD.Z1B1.W3.01 DS.Z1B1.01 SG.Z1B1.10	4A0034FAA	48.20	10.18	13.19	90
	B040	40	30			4A0040FAA				
	B52L	52	40	W3	DD.Z1B1.W3.01 DS.Z1B1.01 SG.Z1B1.10	4A0052FAB				
	B052	52	40	W4	DD.Z1B1.W4.01 DS.Z1B1.01 SG.Z1B1.10	4A0052FAA	52.80	12.68	14.20	160
	B065	65	50			4A0065FAA				
	B077	77	60			4A0077FAA				
	B096	96	75	W5	DD.Z1B1.W5.01 DS.Z1B1.01 SG.Z1B1.10	4A0096FAA	42.79	25.80	16.06	280
	B124	124	100			4A0124FAA				
	B156	156	125	W6	DD.Z1B1.W6.01 DS.Z1B1.01 SG.Z1B1.10	4A0156FAA	49.09	28.41	20.87	380
	B180	180	150			4A0180FAA				
	B240	240	200	F1	DD.Z1.1.F1.02 DS.Z1B1.01 SG.Z1B1.10	4A0240FAA	84.16	41.26	33.94	1,250
	B302	302	250	F1	DD.Z1.1.F1.01 DS.Z1B1.01 SG.Z1B1.10	4A0302FAA				1,600
	B361	361	300			4A0361AAA				1,700
	B414	414	350			4A0414AAA				1,800
	B477	477	400	F2	DD.Z1.1.F2.01 DS.Z1B1.02 SG.Z1B1.10	4A0477AAA		69.76	30.50	2,100
	B590	590	500			4A0590AAA				2,200

Z1000 Bypass Drive NEMA Type 12 (Z1BB)

Specifications: 208 and 480 V NEMA Type 12 (Z1BB)

The Z1000 Bypass is engineered for use in HVAC building automation applications that require reliable motor control. The package provides a Z1000 drive in a NEMA 12 (UL Type 12) enclosure with a 2-contactor style bypass to allow motor operation from the drive or across the line.

The bypass features HVAC application-specific software macros, a Hand-Off-Auto LCD keypad, and a real time clock for system accuracy.

Popular building automation communication protocols BACnet, Siemens APOGEE, Johnson Controls Metasys, and MEMOBUS/Modbus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

Performance Features

- VT Ratings:
  1 to150 HP, 208 Vac
  1 to 500 HP, 480 Vac
- Overload capacity: 110% for 60 seconds (150% Peak)
- DC Injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Adjustable accel/decel: 0.1 to 6000 seconds
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Auto restart after power loss or resettable fault, selectable, programmable
- Up/down floating point control capability
- 140% starting torque capability, available from 3 Hz to 60 Hz
- Remote speed reference (speed command) signal:
  0 to 10 VDC (20 K Ohm)
  4 to 20 mA DC (250 Ohm)
- 7 programmable multi-function input terminals (24 Vdc) providing 60+ programmable features, including:
  - Customer Safeties
  - BAS / Damper Interlock
  - Emergency Override
  - Preset Speed
  - PI control enable / disable
- 4 programmable multi-function output relays (Form C rated 2 amps @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status
  - Contactor Control for External Bypass
  - Overtorque/undertorque

Bypass Features

- Bypass and Drive output contactors
- Lockable Main Input disconnect switch
- Thermal motor overload relay, class 20
- 115 Vac control transformer, fused
- Drive H/O/A keypad used for bypass control
- Damper control circuit with end of travel feedback with two adjustable wait time functions
- Selectable energy savings and harmonic reduction mode
- No load detection (loss of load) fully monitored in drive and bypass modes

Service Conditions

- Input voltage:
  208 Vac, 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

Design Features

- Built in 5% line impedance (1 - 100 HP @ 208 V, 1 - 250 HP @ 480 V)
- 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 - 100 HP @ 208 V, 1 - 250 HP @ 480 V)
- 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
- Drive internal PI closed loop control with selectable engineering units
- Independent PI control for use with external device
- Differential PI feedback feature
- Direct or reverse acting speed signal
- Sleep function in both closed loop and open loop control
- Feedback signal loss detection and selectable response strategy
- Feedback signal inverse and square root capability
- 24 Vdc, 150 ma transmitter power supply
- Input and output terminal status indication
- Diagnostic fault indication
- Cooling fan operating hours recorded
- VFD efficiency: 98% at full-speed; 96% at half-speed
- “S-curve” soft start / soft stop capability
- Serial communication loss detection and selectable response strategy
- Serial communication status
- 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
- Flash upgradeable firmware
- Customizable monitor display
- Heat sink over temperature speed foldback 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 508A (Industrial Control Panels)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- 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
- BTL certified

Options

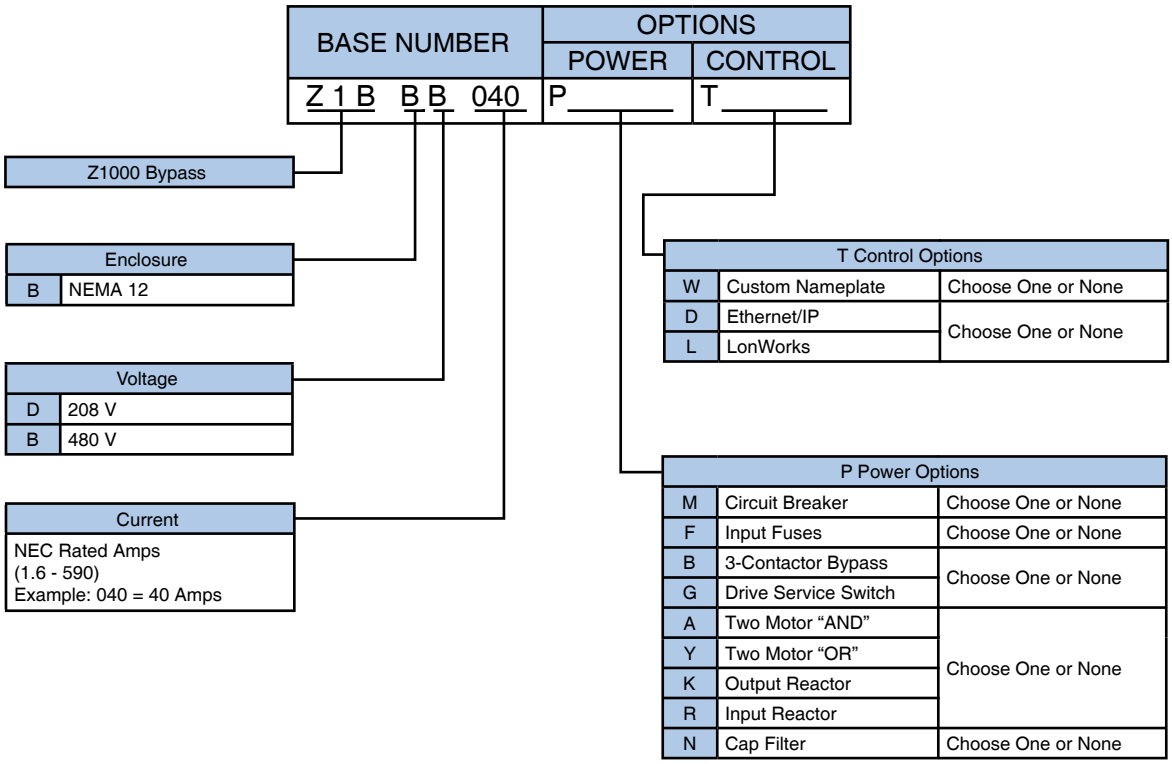
- Circuit Breaker (100 kAIC, additional fuses not required)
- Input Fuses
- 3-Contactor Bypass
- Drive Service Switch
- Two Motor “AND”
- Two Motor “OR”
- Output Reactor
- Input Reactor
- Noise Filter
- Custom Nameplate
- EtherNet/IP
- LonWorks
- Modbus TCP/IP

Z1000 Bypass Drive NEMA Type 12 (Z1BB)

Model Number Configuration (Z1BB)

Step 1. Complete the Base Number for the voltage and current rating.

Step 2. Add the Option Code letter for each required option. If an option is not wanted, no character is inserted in that position.



Options (Z1BB)

Enclosure Options

NEMA 12	(B)	The drive and Configured options are provided in a NEMA Type 12 (1) ventilated enclosure, large enough to accommodate any or all of the Configured package options.

Power Options

Motor Control	(A, Y)	Simultaneous control of two identical motors is possible with the 'AND' configuration, option (A). Either one of two motors can be controlled with the 'OR' configuration, option (Y).
Circuit Breaker	(M)	The standard configuration provides an input disconnect switch with a padlockable operator mechanism. This disconnect switch DOES NOT provide motor short circuit protection. If motor short circuit protection is desired in the bypass enclosure, select option (M), which provides a circuit breaker (100 kAIC) with a padlockable operator mechanism.

Input Fuses	(F)	Option (F) provides drive input fuses for increased drive input over current protection.
Drive Input Circuit	(B, G)	The standard configuration does not include any protection or disconnecting means specifically for the drive. For a 3-contactor bypass that removes power from the drive, select option (B). For an input disconnect switch that removes power from the drive, select option (G).
Input Reactor	(R)	The standard configuration does not provide any additional AC line impedance. Option (R) can be selected to add a 3% AC line input reactor.
Input Filter	(N)	The standard configuration for 125 to 150 HP @ 208V and for 300 to 500 HP @ 480V does not include a RFI filter. The cap filter, option (N), is a passive delta-wye capacitive network.
Output Reactor	(K)	No form of output impedance is normally required. A 5% load reactor, option (K), is available if additional output impedance is desired (usually for long lead-lengths or noise reduction).

Control Options

Ethernet/IP SI-EN3	(D)	EtherNet/IP, option (D), requires the addition of an optional board.
LonWorks SI-W3	(L)	LonWorks, option (L), requires the addition of an optional board.
Custom Nameplates	(W)	Custom engraved nameplates with white lettering on black lamicoid are available with option (W), for special tagging purposes (Example: “AHU #1”). Note that this option requires the text to be specified by the customer.

Model and Power Option Selection (Z1BB)

208 V Models and Power Options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 12 Bypass	Legend: A = Available N/A = Not available or not applicable								
				Circuit Breaker (100 kAIC)	Input Fuses	3-Contactor Bypass	Drive Input Service Switch	Two Motor "AND"	Two Motor "OR"	Output Reactor	Input Reactor	Cap Filter
			Z1BB □□□□	M	F	B	G	A	Y	K	R	N
208 V 3-Phase	2.4	0.5	D002	A	A	A	A	A	A	A	A	N/A
	3.5	0.75	D003									
	4.6	1	D004									
	7.5	2	D007									
	10.6	3	D010									
	16.7	5	D016									
	24.2	7.5	D024									
	30.8	10	D030									
	46.2	15	D046									
	59.4	20	D059									
	74.8	25	D074									
	88	30	D088				N/A					
	114	40	D114									
	143	50	D143									
	169	60	D169									
	211	75	D211									
	273	100	D273									
	343	125	D343									A
	396	150	D396									

*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 volts.

480 V Models and Power Options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 12 Bypass	Legend: A = Available N/A = Not available or not applicable								
				Circuit Breaker (100 kAIC)	Input Fuses	3-Contactor Bypass	Drive Input Service Switch	Two Motor "AND"	Two Motor "OR"	Output Reactor	Input Reactor	Cap Filter
			Z1BB □□□□	M	F	B	G	A	Y	K	R	N
480 V 3-Phase	1.6	0.5 & 0.75	B001	A	A	A	A	A	A	A	A	N/A
	2.1	1	B002									
	3.2	2	B003									
	4.8	3	B004									
	7.6	5	B007									
	11	7.5	B011									
	14	10	B014									
	21	15	B021									
	27	20	B027									
	34	25	B034									
	40	30	B040									
	52	40	B52L									
	52	40	B052									
	65	50	B065									
	77	60	B077									
	96	75	B096				N/A					
	124	100	B124									
	156	125	B156									
	180	150	B180									
	240	200	B240									
	302	250	B302									
	361	300	B361									A
	414	350	B414									
	477	400	B477									
	590	500	B590									

*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 480 volts.

Dimensions and Data (Z1BB)

208 V NEMA Type 12

Rated Input Voltage	Z1B Bypass Base No. Z1BB□□□□	Rated Output Current (Amps)	Nominal HP	Bypass Box No.	Submittal Documents (Outline Drawing) (Schematic) (Submittal Guide)	Drive Part No CIMR-ZU	Enclosed, NEMA 12 Bypass Data			
							Overall Dimensions (in)			Weight (lb)
							H	W	D	
208 V 3-Phase	D002	2.4	0.5	W1	DD.Z1BB.12.W1.01 DS.Z1B2.01 *2 SG.Z1B2.10	2A0011FAA	28.8	17.9	17.9	150
	D003	3.5	0.75			2A0011FAA				
	D004	4.6	1			2A0011FAA				
	D007	7.5	2			2A0011FAA				
	D010	10.6	3			2A0011FAA				
	D016	16.7	5			2A0017FAA				
	D024	24.2	7.5	W2	DD.Z1BB.12.W2.01 DS.Z1B2.01 *2 SG.Z1B2.10	2A0024FAA	34.8	20.5	17.9	210
	D030	30.8	10			2A0031FAA				
	D046	46.2	15	W3	DD.Z1BB.12.W3.01 DS.Z1B2.01 *2 SG.Z1B2.10	2A0046FAA	39.8	25.5	17.3	275
	D059	59.4	20			2A0059FAA				
	D074	74.8	25			2A0075FAA				
	D088	88	30	W4	DD.Z1BB.12.W4.01 DS.Z1B2.01 *2 SG.Z1B2.10	2A0088FAA	51.2	32.7	22.8	420
	D114	114	40			2A0114FAA				490
	D143	143	50	F1 *1	DD.Z1.12.F1.01 *1 DS.Z1B2.01 *2 SG.Z1B2.10	2A0143FAA	84.2	41.3 *1	32.0 *1	850
	D169	169	60			2A0169FAA				945
	D211	211	75			2A0211FAA				945
	D273	273	100			2A0273FAA				1,215
	D343	343	125			2A0343UAA				1,300
	D396	396	150			2A0396UAA				1,350

*1. Drive models D343, D396, B361, and B414 that have the “OR” or “AND” option refer to DD.Z1.12.F2.01

*2. Drives that have “OR” option refer to DS.Z1B2.02; drives that have “AND” option refer to DS.Z1B2.03

480 V NEMA Type 12

Rated Input Voltage	Z1B Bypass Base No. Z1BB□□□□	Rated Output Current (Amps)	Nominal HP	Bypass Box No.	Submittal Documents (Outline Drawing) (Schematic) (Submittal Guide)	Drive Part No CIMR-ZU	Enclosed, NEMA 12 Bypass Data			
							Overall Dimensions (in)			Weight (lb)
							H	W	D	
480 V 3-Phase	B001	1.6	0.75	W1	DD.Z1BB.12.W1.01 DS.Z1B2.01 *2 SG.Z1B2.10	4A0005FAA	28.8	17.9	17.9	150
	B002	2.1	1			4A0005FAA				
	B003	3.4	2			4A0005FAA				
	B004	4.8	3			4A0005FAA				
	B007	7.6	5			4A0008FAA				
	B011	11	7.5			4A0011FAA				
	B014	14	10	W2	DD.Z1BB.12.W2.01 DS.Z1B2.01 *2 SG.Z1B2.10	4A0014FAA	34.8	20.5	17.9	210
	B021	21	15			4A0021FAA				
	B027	27	20			4A0027FAA				
	B034	34	25	W3	DD.Z1BB.12.W3.01 DS.Z1B2.01 *2 SG.Z1B2.10	4A0034FAA	39.8	25.5	17.3	275
	B040	40	30			4A0040FAA				
	B52L	52	40			4A0052FAB				
	B052	52	40			4A0052FAA				
	B065	65	50	W4	DD.Z1BB.12.W4.01 DS.Z1B2.01 *2 SG.Z1B2.10	4A0065FAA	51.2	32.7	22.8	410
	B077	77	60			4A0077FAA				475
	B096	96	75			4A0096FAA				500
	B124	124	100			4A0124FAA				550
	B156	156	125	F1 *1	DD.Z1.12.F1.01 *1 DS.Z1B2.01 *2 SG.Z1B2.10	4A0156FAA	84.2	41.3 *1	32.0 *1	850
	B180	180	150			4A0180FAA				950
	B240	240	200			4A0240FAA				950
	B302	302	250			4A0302FAA				1,200
	B361	361	300			4A0361UAA				1,300
	B414	414	350			4A0414UAA				1,315
	B477	477	400	F2	DD.Z1.12.F2.01 DS.Z1B2.01 *2 SG.Z1B2.10	4A0477UAA	84.2	69.8	30.5	1,900
	B590	590	500			4A0590UAA				2,100

*1. Drive models B361, and B414 that have the “OR” or “AND” option refer to DD.Z1.12.F2.01

*2. Drives that have “OR” option refer to DS.Z1B2.02; drives that have “AND” option refer to DS.Z1B2.03

Bypass Drive NEMA Type 3R (Z1B3)

Specifications: 208 and 480 V NEMA Type 3R (Z1B3)

The Z1000 Bypass is engineered for use in HVAC building automation applications that require reliable motor control.

The bypass package provides a Z1000 drive in a NEMA 3R (UL Type 3R) enclosure and lockable main input circuit breaker with a 3-contactor style bypass to allow motor operation from the drive or across the line.

The bypass features HVAC application-specific software macros, a Hand-Off-Auto LCD keypad, and a real time clock for system accuracy.

Popular building automation communication protocols BACnet, Siemens APOGEE, Johnson Controls Metasys, and MEMOBUS/Modbus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

Performance Features

- VT Ratings:
  1 to150 HP, 208 Vac
  1 to 500 HP, 480 Vac
- Overload capacity: 110% for 60 seconds (150% Peak)
- DC Injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Adjustable accel/decel: 0.1 to 6000 seconds
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Auto restart after power loss or resettable fault, selectable, programmable
- Up/down floating point control capability
- 140% starting torque capability, available from 3 Hz to 60 Hz
- Remote speed reference (speed command) signal:
  0 to 10 VDC (20 K Ohm)
  4 to 20 mA DC (250 Ohm)
- 7 programmable multi-function input terminals (24 Vdc) providing 60+ programmable features, including:
  - Customer Safeties
  - BAS / Damper Interlock
  - Emergency Override
  - Preset Speed
  - PI control enable / disable
- 4 programmable multi-function output relays (Form C rated 2 amps @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status
  - Contactor Control for External Bypass
  - Overtorque/undertorque

Bypass Features

- Bypass and Drive output contactors
- 3-Contactor Bypass
- Thermal motor overload relay, class 20
- 115 Vac control transformer, fused
- Drive H/O/A keypad used for bypass control
- Damper control circuit with end of travel feedback with two adjustable wait time functions
- Selectable energy savings and harmonic reduction mode
- No load detection (loss of load) fully monitored in drive and bypass modes

Service Conditions

- Input voltage:
  208 Vac, 480 Vac, -15/+10%
- Input frequency:
  50/60 Hz ±5%
- Ambient service temperature: NEMA 3R (IP14): -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

Design Features

- Built in 5% line impedance (1 - 100 HP @ 208 V, 1 - 250 HP @ 480 V)
- 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 - 100 HP @ 208 V, 1 - 250 HP @ 480 V)
- 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
- Drive internal PI closed loop control with selectable engineering units
- Independent PI control for use with external device
- Differential PI feedback feature
- Direct or reverse acting speed signal
- Sleep function in both closed loop and open loop control
- Feedback signal loss detection and selectable response strategy
- Feedback signal inverse and square root capability
- 24 Vdc, 150 ma transmitter power supply
- Input and output terminal status indication
- Diagnostic fault indication
- Cooling fan operating hours recorded
- VFD efficiency: 98% at full-speed; 96% at half-speed
- “S-curve” soft start / soft stop capability
- Serial communication loss detection and selectable response strategy
- Serial communication status
- 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
- Flash upgradeable firmware
- Customizable monitor display
- Heat sink over temperature speed foldback 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 508A (Industrial Control Panels)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- 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
- BTL certified

Options

- Input Fuses
- Two Motor “AND”
- Two Motor “OR”
- Output Reactor
- Input Reactor
- Input Filter
- Surge Suppressor
- Space Heater
- Custom Nameplate
- EtherNet/IP
- LonWorks
- Keypad Viewing Window

Model Number Configuration (Z1B3)

Step 1. Complete the Base Number for the voltage and current rating.

Step 2. Add the Option Code letter for each required option. If an option is not wanted, no character is inserted in that position.

BASE NUMBER	OPTIONS	
	POWER	CONTROL
Z 1 B 3 B 040	P	T

Z1000 Bypass

Enclosure

3	NEMA 3R

Voltage

D	208 V
B	480 V

Current

NEC Rated Amps
(1.6 - 590)
Example: 040 = 40 Amps

T Control Options

W	Custom Nameplate	Choose One or None
D	Ethernet/IP	Choose One or None
L	LonWorks	
M	Keypad Viewing Window	Choose One or None

P Power Options

F	Input Fuses	Choose One or None
A	Two Motor "AND"	Choose One or None
Y	Two Motor "OR"	
K	Output Reactor 3%	
R	Input Reactor	
N	Cap Filter	
2	Surge Suppressor	Choose None, Any, or All
3	Space Heater	

Options (Z1B3)

Enclosure Options

NEMA 3R	(3)	The drive and Configured options are provided in a NEMA Type 3R ventilated enclosure, large enough to accommodate any or all of the Configured package options.
Freestanding Leg Kit NEMA 3R	UUX000923	**12 in. Leg Kit:** This option allows the NEMA 3R wall-mount enclosures to be mounted on legs so that the control can be freestanding and off the ground. Either kit can be used on any of the wall-mount enclosures. Floor-mount enclosures come standard with freestanding legs.
	UUX000924	**30 in. Leg Kit:** This option allows the NEMA 3R wall-mount enclosures to be mounted on legs so that the control can be freestanding and off the ground. Either kit can be used on any of the wall-mount enclosures. Floor-mount enclosures come standard with freestanding legs.

Bypass Drive NEMA Type 3R (Z1B3)

Power Options

Motor Control	(A, Y)	Simultaneous control of two identical motors is possible with the 'AND' configuration, option (A). Either one of two motors can be controlled with the 'OR' configuration, option (Y).
Input Fuses	(F)	Option (F) provides drive input fuses for increased drive input over current protection.
Output Reactor	(K)	No form of output impedance is normally required. A 5% load reactor, option (K), is available if additional output impedance is desired (usually for long lead-lengths or noise reduction).
Input Reactor	(R)	The standard configuration does not provide any additional AC line impedance. Option (R) can be selected to add a 3% AC line input reactor.
Input Filter	(N)	The standard configuration for 125 to 150 HP @ 208V and for 300 to 500 HP @ 480V does not include a RFI filter. The cap filter, option (N), is a passive delta-wye capacitive network.
Surge Suppressor	(2)	This option provides a degree of protection from transient surges coming through the power line cables. Lightning strikes are the most common source of surges.
Space Heater	(3)	This option helps reduce condensation.

Control Options

Ethernet/IP SI-EN3	(D)	EtherNet/IP, option (D), requires the addition of an optional board.
LonWorks SI-W3	(L)	LonWorks, option (L), requires the addition of an optional board.
Keypad Viewing Window	(M)	The digital drive keypad is mounted on the outside of the NEMA 3R enclosure door. This option provides a viewing window that is hinged and lockable.
Custom Nameplates	(W)	Custom engraved nameplates with white lettering on black lamicoid are available with option (W), for special tagging purposes (Example: “AHU #1”). Note that this option requires the text to be specified by the customer.

Model and Power Option Selection (Z1B3)

208 V Models and Power Options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 3R Bypass	Legend: A = Available N/A = Not available or not applicable							
				Input Fuses	Two Motor "AND"	Two Motor "OR"	Output Reactor	Input Reactor	Cap Filter	Surge Suppressor	Space Heater
			Z1B3 □□□□	F	A	Y	K	R	N	2	3
208 V 3-Phase	2.4	0.5	D002	A	A	A	A	A	N/A	A	A
	3.5	0.75	D003								
	4.6	1	D004								
	7.5	2	D007								
	10.6	3	D010								
	16.7	5	D016								
	24.2	7.5	D024								
	30.8	10	D030								
	46.2	15	D046								
	59.4	20	D059								
	74.8	25	D074								
	88	30	D088								
	114	40	D114								
	143	50	D143								
	169	60	D169								
	211	75	D211								
	273	100	D273								
	343	125	D343						A		
	396	150	D396								

*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 volts.

Bypass Drive NEMA Type 3R (Z1B3)

480 V Models and Power Options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 3R Bypass	Legend: A = Available N/A = Not available or not applicable							
				Input Fuses	Two Motor "AND"	Two Motor "OR"	Output Reactor	Input Reactor	Cap Filter	Surge Suppressor	Space Heater
			Z1B3 □□□□	F	A	Y	K	R	N	2	3
480 V 3-Phase	1.6	0.5 & 0.75	B001	A	A	A	A	A	N/A	A	A
	2.1	1	B002								
	3.2	2	B003								
	4.8	3	B004								
	7.6	5	B007								
	11	7.5	B011								
	14	10	B014								
	21	15	B021								
	27	20	B027								
	34	25	B034								
	40	30	B040								
	52	40	B52L								
	52	40	B052								
	65	50	B065								
	77	60	B077								
	96	75	B096								
	124	100	B124								
	156	125	B156								
	180	150	B180								
	240	200	B240								
	302	250	B302								
	361	300	B361						A		
	414	350	B414								
	477	400	B477								
	590	500	B590								

*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 480 volts.

Dimensions and Data (Z1B3)

208 V NEMA Type 3R

Rated Input Voltage	Z1B Bypass Base No. Z1B3 □□□□	Rated Output Current (Amps)	Nominal HP	Bypass Box No.	Submittal Documents (Outline Drawing) (Schematic) (Submittal Guide)	Drive Part No CIMR-ZU	Enclosed, NEMA 3R Bypass Data			
							Overall Dimensions (in)			Weight (lb)
							H	W	D	
208 V 3-Phase	D002	2.4	0.5	W1	DD.Z1.3R.W1.01 DS.Z1B3.01 *2 SG.Z1B3.10	2A0011FAA	29.1	21.2	21.4	150
	D003	3.5	0.75			2A0011FAA				
	D004	4.6	1			2A0011FAA				
	D007	7.5	2			2A0011FAA				
	D010	10.6	3			2A0011FAA				
	D016	16.7	5			2A0017FAA				
	D024	24.2	7.5	W2	DD.Z1.3R.W2.01 DS.Z1B3.01 *2 SG.Z1B3.10	2A0024FAA	34.8	23.7	21.4	210
	D030	30.8	10			2A0031FAA				
	D046	46.2	15	W3	DD.Z1.3R.W3.01 DS.Z1B3.01 *2 SG.Z1B3.10	2A0046FAA	40.1	28.7	21.4	275
	D059	59.4	20			2A0059FAA				
	D074	74.8	25			2A0075FAA				
	D088	88	30	W4	DD.Z1.3R.W4.01 DS.Z1B3.02 *2 SG.Z1B3.10	2A0088FAA	51.1	39.0	21.4	420
	D114	114	40			2A0114FAA				490
	D143	143	50	F1 *1	DD.Z1.3R.F1.01 DS.Z1B3.02 *2 SG.Z1B3.10	2A0143AAA	91.1	41.3	50.7	850
	D169	169	60			2A0169AAA				945
	D211	211	75			2A0211AAA				945
	D273	273	100			2A0273AAA				1,215
	D343	343	125		DD.Z1.3R.F1.03 *1 DS.Z1B3.02 *2 SG.Z1B3.10	2A0343AAA		41.3 *1	46.6 *1	1,300
	D396	396	150			2A0396AAA				1,350

*1. Drive models D343 and D396 that have the "OR" or "AND" option refer to DD.Z1.3R.F2.01

*2. Drives that have "OR" option refer to DS.Z1B3.09/10/12, drives that have "AND" option refer to DS.Z1B3.05/06/08

Bypass Drive NEMA Type 3R (Z1B3)

480 V NEMA Type 3R

Rated Input Voltage	Z1B Bypass Base No. Z1B3 □□□□	Rated Output Current (Amps)	Nominal HP	Bypass Box No.	Submittal Documents (Outline Drawing) (Schematic) (Submittal Guide)	Drive Part No CIMR-ZU	Enclosed, NEMA 3R Bypass Data			
							Overall Dimensions (in)			Weight (lb)
							H	W	D	
480 V 3-Phase	B001	1.6	0.75	W1	DD.Z1.3R.W1.01 DS.Z1B3.01 *2 SG.Z1B3.10	4A0005FAA	29.1	21.2	21.4	150
	B002	2.1	1			4A0005FAA				
	B003	3.4	2			4A0005FAA				
	B004	4.8	3			4A0005FAA				
	B007	7.6	5			4A0008FAA				
	B011	11	7.5			4A0011FAA				
	B014	14	10	W2	DD.Z1.3R.W2.01 DS.Z1B3.01 *2 SG.Z1B3.10	4A0014FAA	34.8	23.7	21.4	210
	B021	21	15			4A0021FAA				
	B027	27	20			4A0027FAA				
	B034	34	25	W3	DD.Z1.3R.W3.01 DS.Z1B3.01 *2 SG.Z1B3.10	4A0034FAA	40.1	28.7	21.4	275
	B040	40	30			4A0040FAA				
	B52L	52	40			4A0052FAB				
	B052	52	40			4A0052FAA				
	B065	65	50	W4	DD.Z1.3R.W4.01 DS.Z1B3.02 *2 SG.Z1B3.10	4A0065FAA	51.1	39.0	21.4	410
	B077	77	60			4A0077FAA				475
	B096	96	75			4A0096FAA				500
	B124	124	100			4A0124AAA				550
	B156	156	125	F1 *1	DD.Z1.3R.F1.01 DS.Z1B3.02 *2 SG.Z1B3.10	4A0156AAA	91.1	41.3	50.7	850
	B180	180	150			4A0180AAA				950
	B240	240	200			4A0240AAA				950
	B302	302	250			4A0302AAA				1,200
	B361	361	300		DD.Z1.3R.F1.03 *1 DS.Z1B3.02 *2 SG.Z1B3.10	4A0361AAA		41.3 *1	46.6 *1	1,300
	B414	414	350		DD.Z1.3R.F1.03 *1 DS.Z1B3.03 *2 SG.Z1B3.10	4A0414AAA				1,315
	B477	477	400	F2	DD.Z1.3R.F2.01 DS.Z1B3.04 *2 SG.Z1B3.10	4A0480AAA	91.1	66.3	43.5	1,900
	B590	590	500			4A0590AAA				2,100

*1. Drive models B361 and B414 that have the "OR" or "AND" option refer to DD.Z1.3R.F2.01

*2. Drives that have "OR" option refer to DS.Z1B3.09/10/12, drives that have "AND" option refer to DS.Z1B3.05/06/08

Z1000 Configured Drive NEMA Type 1 (Z1C1)

Specifications: 208 and 480 V NEMA Type 1 (Z1C1)

The Z1000 Configured package provides a Z1000 in a NEMA 1 enclosure, with input disconnect switch and space for several commonly used option, such as reactors, fuses, circuit breakers, etc. The Z1000 Configured has been designed for flexibility in providing the features and options commonly specified by facility designers.

The Z1000 Drive is a variable torque AC drive, designed specifically for HVAC applications in building automation. A new benchmark for size, cost, performance, benefits, and quality, the Z1000 includes numerous built-in features such as Network Communications, H/O/A, PI control, and energy-savings functions.
The Z1000 has embedded communications for the popular building automation protocols BACnet, Modbus, Siemens APOGEE, and Johnson Controls Metasys. Optional LonWorks or EtherNet/IP interface cards are also available.

Performance Features

- VT Ratings:
  1 to 150 HP, 208 Vac
  1 to 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
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Controlled speed range 40:1
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Power loss ride through: 2 seconds
- Torque limiting: 30 to 180%
- 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 K Ohm)
  4 to 20 mA DC (250 Ohm)
- Adjustable carrier frequency, from 1 kHz to 12.5 kHz
- 7 programmable multi-function input terminals (24 Vdc) 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 C rated 2 amps @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status
  - Contactor Control for External Bypass
  - Overtorque/undertorque detection

Service Conditions

- Input voltage:
  208 Vac, 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

Design Features

- Lockable main input disconnect switch
- Built in 5% line impedance (1 to 100 HP @ 208V, 3 to 250 HP @ 480V)
- 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 to 100 HP @ 208V, 3 to 250 HP @ 480V)
- 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, 150 ma transmitter power supply
- Input and output terminal status indication
- VFD efficiency: 98% at full-speed; 96% at half-speed
- Diagnostic fault indication
- “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 @ 250 Vac & 30 Vdc)
- 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 foldback 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 508A (Industrial Control Panels)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- 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
- BTL listed
- IBC 2012

Options

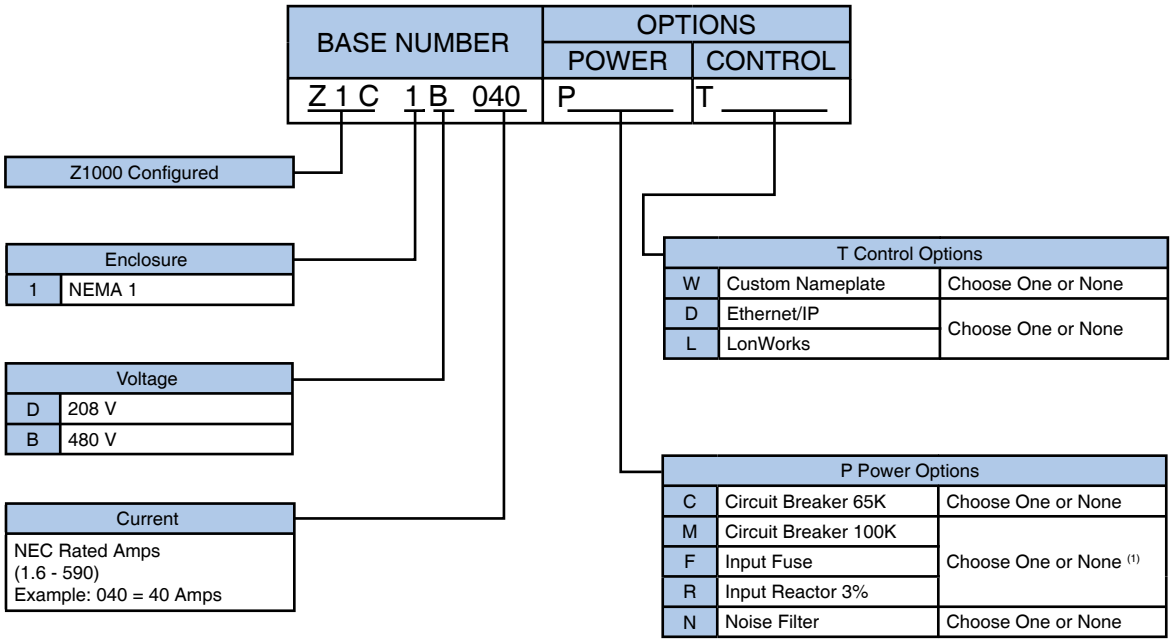
- Circuit Breaker (65 kAIC or 100 kAIC)
- Input Fuses
- Input Reactor
- Input Filter
- Custom Nameplate
- EtherNet/IP
- LonWorks

Z1000 Configured Drive NEMA Type 1 (Z1C1)

Model Number Configuration (Z1C1)

Step 1. Complete the Base Number for the voltage and current rating.

Step 2. Add the Option Code letter for each required option. If an option is not wanted, no character is inserted in that position.



Options (Z1C1)

Enclosure Options

NEMA 1	(1)	The drive and Configured options are provided in a NEMA Type 1 ventilated enclosure, large enough to accommodate any or all of the Configured package options.

Power Options

Circuit Breaker	(C, M)	The standard configuration provides a line input disconnect switch but no branch short circuit protection. Circuit breaker options are available. Option (C) is a 65 kAIC rated circuit breaker and option (M) is a 100 kAIC rated circuit breaker. When option (C) is specified, the configured drive package will be rated at 65 kAIC. When option (M) is specified, the configured drive package will be rated at 100 kAIC.
Input Fuses	(F)	Option (F) provides drive input fuses for increased drive input over current protection.
Input Reactor	(R)	The standard configuration does not provide any additional AC line impedance. Option (R) can be selected to add a 3% AC line input reactor. **Note:** Consult factory for availability on certain models. Certain capacities will not accommodate the R option.
Input Filter	(N)	The standard configuration for 125 to 150 HP @ 208V and for 300 to 500 HP @ 480V does not include a RFI filter. The cap filter, option (N), is a passive delta-wye capacitive network.

Control Options

EtherNet/IP SI-EN3	(D)	EtherNet/IP, option (D), requires the addition of an optional board.
LonWorks SI-W3	(L)	LonWorks, option (L), requires the addition of an optional board.
Custom Nameplates	(W)	Custom engraved nameplates with white lettering on black lamicoid are available with option (W), for special tagging purposes (Example: “AHU #1”). Note that this option requires the text to be specified by the customer.

Model and Power Option Selection (Z1C1)

208 V Models and Power Options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 1 Configured	Typical Lead Time	Legend: A = Available N/A = Not available or not applicable				
					Circuit Breaker (65 kAIC)	Circuit Breaker (100 kAIC)	Input Fuse	Input Reactor 3%	Noise Filter
			Z1C1 □□□□		C	M	F	R	N
208 V 3-Phase	2.4	0.5	D002	10 Working Days	A	A	A	A	N/A
	3.5	0.75	D003						
	4.6	1	D004						
	7.5	2	D007						
	10.6	3	D010						
	16.7	5	D016						
	24.2	7.5	D024						
	30.8	10	D030						
	46.2	15	D046						
	59.4	20	D059						
	74.8	25	D074					N/A	
	88	30	D088						
	114	40	D114						
	143	50	D143					A	
	169	60	D169						
	211	75	D211	–					
	273	100	D273						
	343	125	D343						A
	396	150	D396						

*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 volts.

480 V Models and Power Options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 1 Configured	Typical Lead Time	Legend: A = Available N/A = Not available or not applicable				
					Circuit Breaker (65 kAIC)	Circuit Breaker (100 kAIC)	Input Fuse	Input Reactor 3%	Noise Filter
			Z1C1 □□□□		C	M	F	R	N
480 V 3-Phase	1.6	0.5 & 0.75	B001	10 Working Days	A	A	A	A	N/A
	2.1	1	B002						
	3.2	2	B003						
	4.8	3	B004						
	7.6	5	B007						
	11	7.5	B011						
	14	10	B014						
	21	15	B021						
	27	20	B027						
	34	25	B034						
	40	30	B040						
	52	40	B52L						
	52	40	B052						
	65	50	B065						
	77	60	B077						
	96	75	B096						
	124	100	B124						
	156	125	B156						
	180	150	B180						
	240	200	B240	-					A
	302	250	B302						
	361	300	B361						
	414	350	B414						
	477	400	B477						
	590	500	B590						

*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 480 volts.

Dimensions and Data (Z1C1)

208 V NEMA Type 1

Rated Input Voltage	Z1C Configured Base No. Z1C1 □□□□	Rated Output Current (Amps)	Nominal HP	Configured Box No.	Submittal Documents (Outline Drawing) (Schematic) (Submittal Guide)	Drive Part No. CIMR-ZU	Enclosed, NEMA 1			
							Overall Dimensions (in)			Weight (lb)
							H	W	D	
208 V 3-Phase	D002	2.4	0.5	W1	DD.Z1C1.W1.01 DS.Z1C1.01 SG.Z1C1.10	2A0011FAA	41.60	6.77	12.92	65
	D003	3.5	0.75			2A0011FAA	41.60	6.77	12.92	65
	D004	4.6	1			2A0011FAA	41.60	6.77	12.92	65
	D007	7.5	2			2A0011FAA	41.60	6.77	12.92	65
	D010	10.6	3			2A0011FAA	41.60	6.77	12.92	65
	D016	16.7	5			2A0017FAA	41.60	6.77	12.92	65
	D024	24.2	7.5	W2	DD.Z1C1.W2.01 DS.Z1C1.01 SG.Z1C1.10	2A0024FAA	45.10	6.77	12.92	75
	D030	30.8	10			2A0031FAA	45.10	6.77	12.92	75
	D046	46.2	15	W3	DD.Z1C1.W3.01 DS.Z1C1.01 SG.Z1C1.10	2A0046FAA	48.20	10.18	13.19	85
	D059	59.4	20			2A0059FAA	48.20	10.18	13.19	85
	D074	74.8	25	W4	DD.Z1C1.W4.01 DS.Z1C1.01 SG.Z1C1.10	2A0075FAA	52.80	12.68	14.20	150
	D088	88	30			2A0088FAA	52.80	12.68	14.20	155
	D114	114	40			2A0114FAA	52.80	12.68	14.20	160
	D143	143	50	W6	DD.Z1C1.W6.01 DS.Z1C1.01 SG.Z1C1.10	2A0143FAA	49.09	28.41	20.87	360
	D169	169	60			2A0169FAA	49.09	28.41	20.87	370
	D211	211	75			2A0211FAA	49.09	28.41	20.87	385
	D273	273	100			2A0273FAA	49.09	28.41	20.87	450
	D343	343	125	F1	DD.Z1.1.F1.02 DS.Z1C1.02 SG.Z1C1.10	2A0343AAA	84.00	41.50	34.00	1,150
	D396	396	150			2A0396AAA				1,300

480 V NEMA Type 1

Rated Input Voltage	Z1C Configured Base No. Z1C1 □□□□	Rated Output Current (Amps)	Nominal HP	Configured Box No.	Submittal Documents (Outline Drawing) (Schematic) (Submittal Guide)	Drive Part No. CIMR-ZU	Enclosed, NEMA 1			
							Overall Dimensions (in)			Weight (lb)
							H	W	D	
480 V 3-Phase	B001	1.1	0.5	W1	DD.Z1C1.W1.01 DS.Z1C1.01 SG.Z1C1.10	4A0005FAA	41.60	6.77	12.92	65
		1.6	0.75			4A0005FAA	41.60	6.77	12.92	65
	B002	2.1	1			4A0005FAA	41.60	6.77	12.92	65
	B003	3.4	2			4A0005FAA	41.60	6.77	12.92	65
	B004	4.8	3			4A0005FAA	41.60	6.77	12.92	65
	B007	7.6	5			4A0008FAA	41.60	6.77	12.92	65
	B011	11	7.5			4A0011FAA	41.60	6.77	12.92	65
	B014	14	10	W2	DD.Z1C1.W2.01 DS.Z1C1.01 SG.Z1C1.10	4A0014FAA	45.10	6.77	12.92	75
	B021	21	15			4A0021FAA	45.10	6.77	12.92	75
	B027	27	20			4A0027FAA	45.10	6.77	12.92	75
	B034	34	25	W3	DD.Z1C1.W3.01 DS.Z1C1.01 SG.Z1C1.10	4A0034FAA	48.20	10.18	13.19	85
	B040	40	30			4A0040FAA	48.20	10.18	13.19	85
	B52L	52	40			4A0052FAB	48.20	10.18	13.19	85
	B052	52	40	W4	DD.Z1C1.W4.01 DS.Z1C1.01 SG.Z1C1.10	4A0052FAA	52.80	12.68	14.20	150
	B065	65	50			4A0065FAA	52.80	12.68	14.20	155
	B077	77	60			4A0077FAA	52.80	12.68	14.20	160
	B096	96	75			4A0096FAA	52.80	12.68	14.20	180
	B124	124	100	W5	DD.Z1C1.W5.01 DS.Z1C1.01 SG.Z1C1.10	4A0124FAA	42.79	25.80	16.06	240
	B156	156	125	W6	DD.Z1C1.W6.01 DS.Z1C1.01 SG.Z1C1.10	4A0156FAA	49.09	28.41	20.87	355
	B180	180	150			4A0180FAA	49.09	28.41	20.87	385
	B240	240	200			4A0240FAA	49.09	28.41	20.87	450
	B302	320	250	F1	DD.Z1.1.F1.01 DS.Z1C1.02 SG.Z1C1.10	4A0302FAA	84.00	42.00	34.00	1,150
	B361	361	300			4A0361AAA				1,300
	B414	414	350			4A0414AAA				1,400
	B477	477	400	F1T	DD.Z1.1.F1.04 DS.Z1C1.02 SG.Z1C1.10	4A0477AAA	92.00	41.50	32.00	1,500
	B590	590	500			4A0590AAA				1,600

Configured Drive NEMA Type 12 (Z1CB)

Specifications: 208 and 480 V NEMA Type 12 (Z1CB)

The Z1000 NEMA 12 Configured drive is engineered to allow flexibility when providing the features and options commonly specified by facility designers.

The configured package provides a Z1000 drive containing HVAC application-specific software macros, a real time clock, and Hand-Off-Auto LCD keypad with an input disconnect switch and space for several power options inside a NEMA 12 (UL Type 12) enclosure.

Popular building automation communication protocols BACnet, Siemens APOGEE, Johnson Controls Metasys, and MEMOBUS/Modbus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

Performance Features

- VT Ratings:
  1 to 150 HP, 208 Vac
  1 to 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
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Controlled speed range 40:1
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Power loss ride through: 2 seconds
- Torque limiting: 30 to 180%
- Auto restart after power loss or resettable fault, selectable, programmable
- Serial communications loss detection
- Up/down floating point control capability
- Stationary motor auto-tuning

Design Features

- Lockable main input disconnect switch
- Built in 5% line impedance (1 to 100 HP @ 208V, 1 to 250 HP @ 480V)
- 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 to 100 HP @ 208V, 3 to 250 HP @ 480V)
- 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, 150 ma transmitter power supply
- Input and output terminal status indication
- 140% starting torque capability, available from 3 Hz to 60 Hz
- Remote speed reference (speed command) signal:
  0 to 10 Vdc (20 K Ohm)
  4 to 20 mA DC (250 Ohm)
- Adjustable carrier frequency, from 1 kHz to 12.5 kHz
- 7 programmable multi-function input terminals (24 Vdc) 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 C rated 2 amps @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status
  - Contactor Control for External Bypass
  - Overtorque/undertorque detection
- VFD efficiency: 98% at full-speed; 96% at half-speed
- Diagnostic fault indication
- “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 @ 250 Vac & 30 Vdc)
- 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 foldback feature
- “Bumpless” transfer between Hand and Auto modes
- Emergency override can be used as “smoke purge” function
- Fan failure detection and selectable drive action

Service Conditions

- Input voltage:
  208 Vac, 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

Standards

- UL 508A (Industrial Control Panels)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- 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
- BTL listed
- IBC-2012

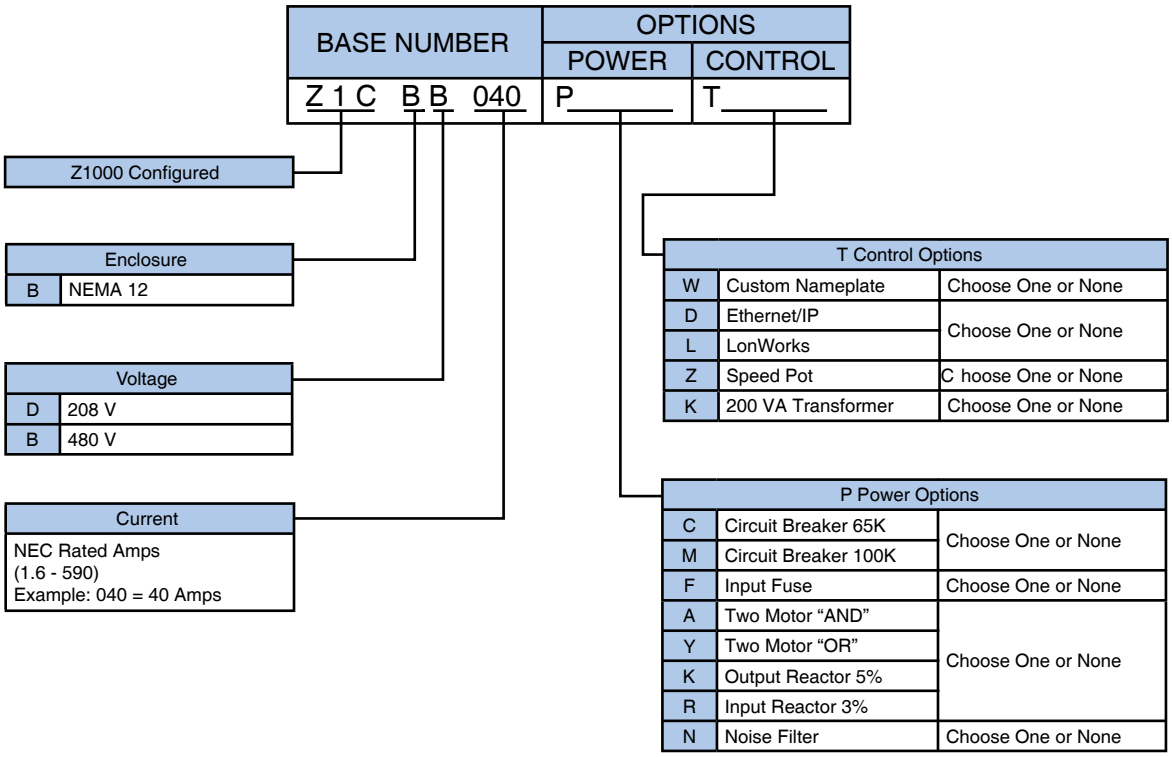
Options

- Circuit Breaker (65 kAIC or 100 kAIC)
- Input Fuses
- Two Motor “AND”
- Two Motor “OR”
- Output Reactor
- Input Reactor
- Input Filter
- Custom Nameplate
- EtherNet/IP
- LonWorks

Model Number Configuration (Z1CB)

Step 1. Complete the Base Number for the voltage and current rating.

Step 2. Add the Option Code letter for each required option. If an option is not wanted, no character is inserted in that position.



Options (Z1CB)

Enclosure Options

NEMA 12	(B)	The drive and Configured options are provided in a NEMA Type 12 (1) ventilated enclosure, large enough to accommodate any or all of the Configured package options.

Configured Drive NEMA Type 12 (Z1CB)

Power Options

Motor Control	(A, Y)	Simultaneous control of two identical motors is possible with the 'AND' configuration, option (A). Either one of two motors can be controlled with the 'OR' configuration, option (Y).
Circuit Breaker	(C, M)	The standard configuration provides a line input disconnect switch but no branch short circuit protection. Circuit breaker options are available. Option (C) is a 65 kAIC rated circuit breaker and option (M) is a 100 kAIC rated circuit breaker. When option (C) is specified, the configured drive package will be rated at 65 kAIC. When option (M) is specified, the configured drive package will be rated at 100 kAIC.
Input Fuses	(F)	Option (F) provides drive input fuses for increased drive input over current protection.
Output Reactor	(K)	No form of output impedance is normally required. A 5% load reactor, option (K), is available if additional output impedance is desired (usually for long lead-lengths or noise reduction).
Input Reactor	(R)	The standard configuration does not provide any additional AC line impedance. Option (R) can be selected to add a 3% AC line input reactor.
Input Filter	(N)	The standard configuration for 125 to 150 HP @ 208V and for 300 to 500 HP @ 480V does not include a RFI filter. The cap filter, option (N), is a passive delta-wye capacitive network.

Control Options

EtherNet/IP SI-EN3	(D)	EtherNet/IP, option (D), requires the addition of an optional board.
LonWorks SI-W3	(L)	LonWorks, option (L), requires the addition of an optional board.
200 VA Transformer (CPT)	(K)	200 VA Control Power Transformer (for customer use).
Speed pot	(Z)	Door mounted.
Custom Nameplates	(W)	Custom engraved nameplates with white lettering on black lamicoid are available with option (W), for special tagging purposes (Example: “AHU #1”). Note that this option requires the text to be specified by the customer.

Model and Power Option Selection (Z1CB)

208 V Models and Power Options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 12 Configured	Legend: A = Available N/A = Not available or not applicable							
				Circuit Breaker (65 kAIC)	Circuit Breaker (100 kAIC)	Input Fuse	Two Motor "AND"	Two Motor "OR"	Load Reactor	Input Reactor	Noise Filter
			Z1CB □□□□	C	M	F	A	Y	K	R	N
208 V 3-Phase	2.4	0.5	D002	A	A	A	A	A	A	A	N/A
	3.5	0.75	D003								
	4.6	1	D004								
	7.5	2	D007								
	10.6	3	D010								
	16.7	5	D016								
	24.2	7.5	D024								
	30.8	10	D030								
	46.2	15	D046								
	59.4	20	D059								
	74.8	25	D074								
	88	30	D088								
	114	40	D114								
	143	50	D143								
	169	60	D169								
	211	75	D211								
	273	100	D273								
	343	125	D343								A
	396	150	D396								

*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 volts.

Configured Drive NEMA Type 12 (Z1CB)

480 V Models and Power Options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 12 Configured	Legend: A = Available N/A = Not available or not applicable							
				Circuit Breaker (65 kAIC)	Circuit Breaker (100 kAIC)	Input Fuse	Two Motor "AND"	Two Motor "OR"	Load Reactor	Input Reactor	Noise Filter
			Z1CB □□□□	C	M	F	A	Y	K	R	N
480 V 3-Phase	1.6	0.5 & 0.75	B001	A	A	A	A	A	A	A	N/A
	2.1	1	B002								
	3.2	2	B003								
	4.8	3	B004								
	7.6	5	B007								
	11	7.5	B011								
	14	10	B014								
	21	15	B021								
	27	20	B027								
	34	25	B034								
	40	30	B040								
	52	40	B52L								
	52	40	B052								
	65	50	B065								
	77	60	B077								
	96	75	B096								
	124	100	B124								
	156	125	B156								
	180	150	B180								
	240	200	B240								
	302	250	B302								
	361	300	B361								A
	414	350	B414								
	477	400	B477								
	590	500	B590								

*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 480 volts.

Dimensions and Data (Z1CB)

208 V NEMA Type 12

Rated Input Voltage	Z1C Configured Base No. Z1CB□□□□	Rated Output Current (Amps)	Nominal HP	Configured Box No.	Submittal Documents (Outline Drawing) (Schematic)	Drive Part No. CIMR-ZU	Enclosed, NEMA 12			
							Overall Dimensions (in)			Weight (lb)
							H	W	D	
208 V 3-Phase	D002	2.4	0.5	W1	DD.Z1CB.12.W1.01 DS.Z1C2.01	2A0011FAA	29.00	18.00	18.00	140
	D003	3.5	0.75			2A0011FAA				
	D004	4.6	1			2A0011FAA				
	D007	7.5	2			2A0011FAA				
	D010	10.6	3			2A0011FAA				
	D016	16.7	5			2A0017FAA				
	D024	24.2	7.5	W2	DD.Z1CB.12.W2.01 DS.Z1C2.01	2A0024FAA	35.00	20.50	18.00	200
	D030	30.8	10			2A0031FAA				
	D046	46.2	15	W3	DD.Z1CB.12.W3.01 DS.Z1C2.01	2A0046FAA	40.00	25.50	17.50	260
	D059	59.4	20			2A0059FAA				
	D074	74.8	25			2A0075FAA				
	D088	88	30	W4	DD.Z1CB.12.W4.01 DS.Z1C2.01	2A0088FAA	51.00	33.00	23.00	395
	D114	114	40			2A0114FAA				465
	D143	143	50	F1	DD.Z1.12.F1.01 DS.Z1C2.01	2A0143FAA	84.00	41.50	34.00	800
	D169	169	60			2A0169FAA				910
	D211	211	75			2A0211FAA				910
	D273	273	100			2A0273FAA				1,150
	D343	343	125			2A0343AAA				1,200
	D396	396	150			2A0396AAA				1,250

Configured Drive NEMA Type 12 (Z1CB)

480 V NEMA Type 12

Rated Input Voltage	Z1C Configured Base No. Z1CB□□□□	Rated Output Current (Amps)	Nominal HP	Configured Box No.	Submittal Documents (Outline Drawing) (Schematic)	Drive Part No. CIMR-ZU	Enclosed, NEMA 12			
							Overall Dimensions (in)			Weight (lb)
							H	W	D	
480 V 3-Phase	B001	1.1	0.5	W1	DD.Z1CB.12.W1.01 DS.Z1C2.01	4A0005FAA	29.00	18.00	18.00	140
		1.6	0.75			4A0005FAA				
	B002	2.1	1			4A0005FAA				
	B003	3.4	2			4A0005FAA				
	B004	4.8	3			4A0005FAA				
	B007	7.6	5			4A0008FAA				
	B011	11	7.5			4A0011FAA				
	B014	14	10	W2	DD.Z1CB.12.W2.01 DS.Z1C2.01	4A0014FAA	35.00	20.50	18.00	200
	B021	21	15			4A0021FAA				
	B027	27	20			4A0027FAA				
	B034	34	25	W3	DD.Z1CB.12.W3.01 DS.Z1C2.01	4A0034FAA	40.00	25.50	17.50	260
	B040	40	30			4A0040FAA				
	B52L	52	40			4A0052FAB				
	B052	52	40			4A0052FAA				
	B065	65	50			4A0065FAA				
	B077	77	60	W4	DD.Z1CB.12.W4.01 DS.Z1C2.01	4A0077FAA	51.00	33.00	23.00	435
	B096	96	75			4A0096FAA				465
	B124	124	100			4A0124FAA				505
	B156	156	125	F1	DD.Z1.12.F1.01 DS.Z1C2.01	4A0156FAA	84.00	41.50	32.50	795
	B180	180	150			4A0180FAA				895
	B240	240	200			4A0240FAA				895
	B302	302	250			4A0302FAA				1,100
	B361	361	300			4A0361AAA				1,200
	B414	414	350			4A0414AAA				1,250
	B477	477	400	F1T	DD.Z1.12.F1.02 DS.Z1C2.01	4A0477AAA	92.00	41.50	32.00	1,500
	B590	590	500			4A0590AAA				1,600

Configured Drive NEMA Type 3R (Z1C3)

Specifications: 208 and 480 V NEMA Type 3R (Z1C3)

The Z1000 NEMA 3R Configured drive is engineered to allow flexibility when providing the features and options commonly specified by facility designers.

The configured package provides a Z1000 drive containing HVAC application-specific software macros, a real time clock, and Hand-Off-Auto LCD keypad with an input disconnect switch and space for several power options inside a NEMA 3R (UL Type 3R) enclosure.

Popular building automation communication protocols BACnet, Siemens APOGEE, Johnson Controls Metasys, and MEMOBUS/Modbus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

Performance Features

- VT Ratings:
  1 to 150 HP, 208 Vac
  1 to 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
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Controlled speed range 40:1
- Power loss ride through: 2 seconds
- Torque limiting: 30 to 180%
- Auto restart after power loss or resettable fault, selectable, programmable
- Serial communications loss detection
- Up/down floating point control capability
- Stationary motor auto-tuning

Design Features

- Lockable main input disconnect switch
- Built in 5% line impedance (1 to 100 HP @ 208V, 1 to 250 HP @ 480V)
- 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 to 100 HP @ 208V, 1- 250 HP @ 480V)
- 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, 150 ma transmitter power supply
- 140% starting torque capability, available from 3 Hz to 60 Hz
- Remote speed reference (speed command) signal:
  0 to 10 Vdc (20 K Ohm)
  4 to 20 mA DC (250 Ohm)
- Adjustable carrier frequency, from 1 kHz to 12.5 kHz
- Programmable security code
- 7 programmable multi-function input terminals (24 Vdc) 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 C rated 2 amps @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status
  - Contactor Control for External Bypass
  - Overtorque/undertorque detection
- Input and output terminal status indication
- VFD efficiency: 98% at full-speed; 96% at half-speed
- Diagnostic fault indication
- “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 @ 250 Vac & 30 Vdc)
- 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 foldback feature
- “Bumpless” transfer between Hand and Auto modes
- Emergency override can be used as “smoke purge” function
- Fan failure detection and selectable drive action

Service Conditions

- Input voltage:
  208 Vac, 480 Vac, -15/+10%
- Input frequency:
  50/60 Hz ±5%
- Ambient service temperature: NEMA 3R: -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

Standards

- UL 508A (Industrial Control Panels)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- 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
- BTL listed

Options

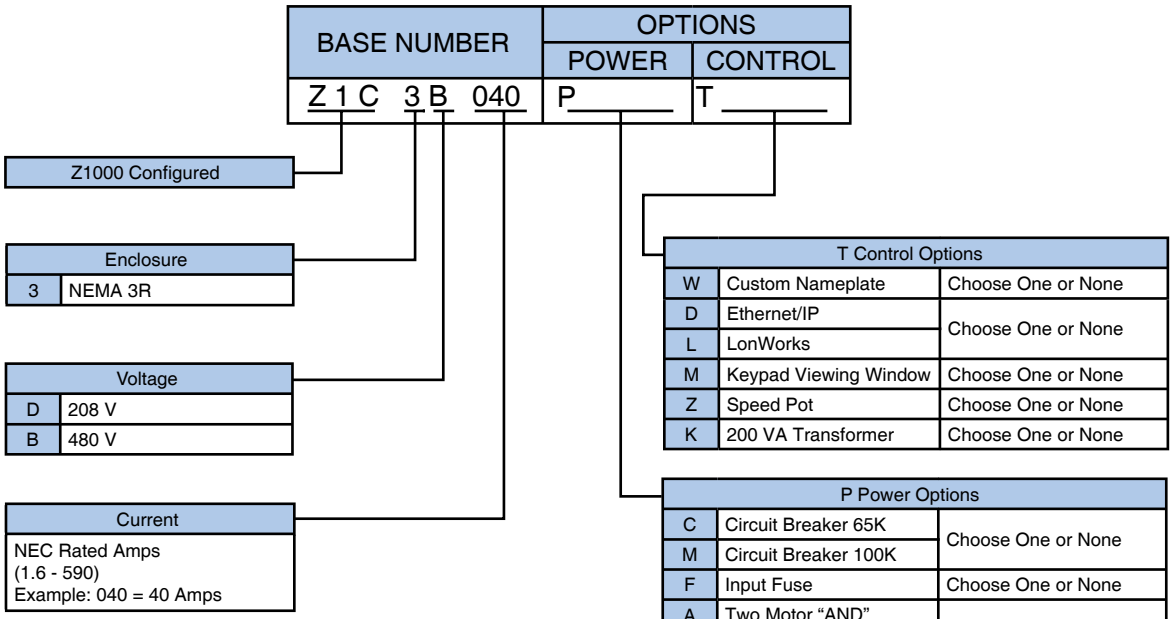
- Circuit Breaker (65 kAIC or 100 kAIC)
- Input Fuses
- Two Motor “AND”
- Two Motor “OR”
- Output Reactor
- Input Reactor
- Input Filter
- Surge Suppressor
- Space Heater
- Custom Nameplate
- EtherNet/IP
- LonWorks
- Keypad Viewing Window

Configured Drive NEMA Type 3R (Z1C3)

Model Number Configuration (Z1C3)

Step 1. Complete the Base Number for the voltage and current rating.

Step 2. Add the Option Code letter for each required option. If an option is not wanted, no character is inserted in that position.



T Control Options		
W	Custom Nameplate	Choose One or None
D	Ethernet/IP	Choose One or None
L	LonWorks	
M	Keypad Viewing Window	Choose One or None
Z	Speed Pot	Choose One or None
K	200 VA Transformer	Choose One or None

P Power Options		
C	Circuit Breaker 65K	Choose One or None
M	Circuit Breaker 100K	
F	Input Fuse	Choose One or None
A	Two Motor “AND”	Choose One or None
Y	Two Motor “OR”	
K	Output Reactor 5%	
R	Input Reactor 3%	
N	Noise Filter	Choose One or None
2	Surge Suppressor	Choose None, Any, or All
3	Space Heater	

Options (Z1C3)

Enclosure Options

NEMA 3R	(3)	The drive and Configured options are provided in a NEMA Type 3R ventilated enclosure, large enough to accommodate any or all of the Configured package options.
Freestanding Leg Kit NEMA 3R	UUX000923	**12 in. Leg Kit:** This option allows the NEMA 3R wall-mount enclosures to be mounted on legs so that the control can be freestanding and off the ground. Either kit can be used on any of the wall-mount enclosures. Floor-mount enclosures come standard with freestanding legs.
	UUX000924	**30 in. Leg Kit:** This option allows the NEMA 3R wall-mount enclosures to be mounted on legs so that the control can be freestanding and off the ground. Either kit can be used on any of the wall-mount enclosures. Floor-mount enclosures come standard with freestanding legs.

Power Options

Motor Control	(A, Y)	Simultaneous control of two identical motors is possible with the 'AND' configuration, option (A). Either one of two motors can be controlled with the 'OR' configuration, option (Y).
Circuit Breaker	(C, M)	The standard configuration provides a line input disconnect switch but no branch short circuit protection. Circuit breaker options are available. Option (C) is a 65 kAIC rated circuit breaker and option (M) is a 100 kAIC rated circuit breaker. When option (C) is specified, the configured drive package will be rated at 65 kAIC. When option (M) is specified, the configured drive package will be rated at 100 kAIC.
Input Fuses	(F)	Option (F) provides drive input fuses for increased drive input over current protection.
Output Reactor	(K)	No form of output impedance is normally required. A 5% load reactor, option (K), is available if additional output impedance is desired (usually for long lead-lengths or noise reduction).
Input Reactor	(R)	The standard configuration does not provide any additional AC line impedance. Option (R) can be selected to add a 3% AC line input reactor.

Configured Drive NEMA Type 3R (Z1C3)

Input Filter	(N)	The standard configuration for 125 to 150 HP @ 208V and for 300 to 500 HP @ 480V does not include a RFI filter. The cap filter, option (N), is a passive delta-wye capacitive network.
Surge Suppressor	(2)	This option provides a degree of protection from transient surges coming through the power line cables. Lightning strikes are the most common source of surges.
Space Heater	(3)	This option helps reduce condensation.

Control Options

EtherNet/IP SI-EN3	(D)	EtherNet/IP, option (D), requires the addition of an optional board.
LonWorks SI-W3	(L)	LonWorks, option (L), requires the addition of an optional board.
Keypad Viewing Window	(M)	The digital drive keypad is mounted on the outside of the NEMA 3R enclosure door. This option provides a viewing window that is hinged and lockable.
200 VA Transformer (CPT)	(K)	200 VA Control Power Transformer (for customer use).
Speed pot	(Z)	Door mounted.
Custom Nameplates	(W)	Custom engraved nameplates with white lettering on black lamicoid are available with option (W), for special tagging purposes (Example: “AHU #1”). Note that this option requires the text to be specified by the customer.

Model and Power Option Selection (Z1C3)

208 V Models and Power Options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 3R Configured	Legend: A = Available N/A = Not available or not applicable									
				Circuit Breaker (65 kAIC)	Circuit Breaker (100 kAIC)	Input Fuse	Two Motor "AND"	Two Motor "OR"	Load Reactor	Input Reactor	Noise Filter	Surge Suppressor	Space Heater
			Z1C3 □□□□	C	M	F	A	Y	K	R	N	2	3
208 V 3-Phase	2.4	0.5	D002	A	A	A	A	A	A	A	N/A	A	A
	3.5	0.75	D003										
	4.6	1	D004										
	7.5	2	D007										
	10.6	3	D010										
	16.7	5	D016										
	24.2	7.5	D024										
	30.8	10	D030										
	46.2	15	D046										
	59.4	20	D059										
	74.8	25	D074										
	88	30	D088										
	114	40	D114										
	143	50	D143										
	169	60	D169										
	211	75	D211										
	273	100	D273										
	343	125	D343								A		
	396	150	D396										

*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 volts.

Configured Drive NEMA Type 3R (Z1C3)

480 V Models and Power Options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 3R Configured	Legend: A = Available N/A = Not available or not applicable									
				Circuit Breaker (65 kAIC)	Circuit Breaker (100 kAIC)	Input Fuse	Two Motor "AND"	Two Motor "OR"	Load Reactor	Input Reactor	Noise Filter	Surge Suppressor	Space Heater
			Z1C3 □□□□	C	M	F	A	Y	K	R	N	2	3
480 V 3-Phase	1.6	0.5 & 0.75	B001	A	A	A	A	A	A	A	N/A	A	A
	2.1	1	B002										
	3.2	2	B003										
	4.8	3	B004										
	7.6	5	B007										
	11	7.5	B011										
	14	10	B014										
	21	15	B021										
	27	20	B027										
	34	25	B034										
	40	30	B040										
	52	40	B52L										
	52	40	B052										
	65	50	B065										
	77	60	B077										
	96	75	B096										
	124	100	B124										
	156	125	B156										
	180	150	B180										
	240	200	B240										
	302	250	B302										
	361	300	B361								A		
	414	350	B414										
	477	400	B477										
	590	500	B590										

*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 480 volts.

Dimensions and Data (Z1C3)

208 V NEMA Type 3R

Rated Input Voltage	Z1C Configured Base No. Z1C3□□□□	Rated Output Current (Amps)	Nominal HP	Configured Box No.	Submittal Documents (Outline Drawing) (Schematic)	Drive Part No. CIMR-ZU	Enclosed, NEMA 3R			
							Overall Dimensions (in)			Weight (lb)
							H	W	D	
208 V 3-Phase	D002	2.4	0.5	W1	DD.Z1.3R.W1.01 DS.Z1C3.01 *1	2A0011FAA	29.00	18.00	21.50	140
	D003	3.5	0.75			2A0011FAA				
	D004	4.6	1			2A0011FAA				
	D007	7.5	2			2A0011FAA				
	D010	10.6	3			2A0011FAA				
	D016	16.7	5			2A0017FAA				
	D024	24.2	7.5	W2	DD.Z1.3R.W2.01 DS.Z1C3.01 *1	2A0024FAA	35.00	20.50	21.50	200
	D030	30.8	10			2A0031FAA				
	D046	46.2	15	W3	DD.Z1.3R.W3.01 DS.Z1C3.01 *1	2A0046FAA	40.00	25.50	21.50	260
	D059	59.4	20			2A0059FAA				
	D074	74.8	25			2A0075FAA				
	D088	88	30	W4	DD.Z1.3R.W4.01 DS.Z1C3.02 *1	2A0088FAA	51.00	39.00	21.50	395
	D114	114	40			2A0114FAA				465
	D143	143	50	F1	DD.Z1.3R.F1.01 DS.Z1C3.02 *1	2A0143FAA	91.00	41.50	50.50	800
	D169	169	60			2A0169FAA				910
	D211	211	75			2A0211FAA				910
	D273	273	100			2A0273FAA				1,150
	D343	343	125			2A0343AAA				1,200
	D396	396	150			2A0396AAA				1,250

*1. Drives that have “OR” option refer to DS.Z1C3.09, DS.Z1C3.10, DS.Z1C3.11, DS.Z1C3.12; drives that have “AND” option refer to DS.Z1C3.05, DS.Z1C3.06, DS.Z1C3.07, DS.Z1C3.08

Configured Drive NEMA Type 3R (Z1C3)

480 V NEMA Type 3R

Rated Input Voltage	Z1C Configured Base No. Z1C3□□□□	Rated Output Current (Amps)	Nominal HP	Configured Box No.	Submittal Documents (Outline Drawing) (Schematic)	Drive Part No. CIMR-ZU	Enclosed, NEMA 3R			
							Overall Dimensions (in)			Weight (lb)
							H	W	D	
480 V 3-Phase	B001	1.1	0.5	W1	DD.Z1.3R.W1.01 DS.Z1C3.01 *1	4A0005FAA	29.00	18.00	21.50	140
		1.6	0.75			4A0005FAA				
	B002	2.1	1			4A0005FAA				
	B003	3.4	2			4A0005FAA				
	B004	4.8	3			4A0005FAA				
	B007	7.6	5			4A0008FAA				
	B011	11	7.5			4A0011FAA				
	B014	14	10	W2	DD.Z1.3R.W2.01 DS.Z1C3.01 *1	4A0014FAA	35.00	20.50	21.50	200
	B021	21	15			4A0021FAA				
	B027	27	20			4A0027FAA				
	B034	34	25	W3	DD.Z1.3R.W3.01 DS.Z1C3.01 *1	4A0034FAA	40.00	25.50	21.50	260
	B040	40	30			4A0040FAA				
	B52L	52	40			4A0052FAB				
	B052	52	40			4A0052FAA				
	B065	65	50	W4	DD.Z1.3R.W4.01 DS.Z1C3.02 *1	4A0065FAA	51.00	39.00	21.50	375
	B077	77	60			4A0077FAA				435
	B096	96	75			4A0096FAA				465
	B124	124	100			4A0124FAA				505
	B156	156	125	F1	DD.Z1.3R.F1.01 DS.Z1C3.02 *1	4A0156FAA	91.00	41.50	50.50	795
	B180	180	150			4A0180FAA				895
	B240	240	200			4A0240FAA				895
	B302	302	250			4A0302FAA				1,100
	B361	361	300		DD.Z1.3R.F1.03 DS.Z1C3.02 *1	4A0361AAA	91.00	41.50	46.50	1,200
	B414	414	350		DD.Z1.3R.F1.03 DS.Z1C3.03 *1	4A0414AAA				1,250
	B477	477	400	F2	DD.Z1.3R.F2.01 DS.Z1C3.04 *1	4A0477AAA	91.00	66.50	43.50	1,700
	B590	590	500			4A0590AAA				1,900

*1. Drives that have “OR” option refer to DS.Z1C3.09, DS.Z1C3.10, DS.Z1C3.11, DS.Z1C3.12; drives that have “AND” option refer to DS.Z1C3.05, DS.Z1C3.06, DS.Z1C3.07, DS.Z1C3.08

Specifications: 480 V NEMA Type 1 (Z1R1)

The Z1000 Redundant Drive Package is engineered for use in critical HVAC building automation applications that require continuous reliable motor control.

The redundant drive package provides two Z1000 drives containing HVAC application-specific software macros and a real time clocks in a NEMA 1 (UL Type 1) enclosure to ensure uninterrupted operation in the event of drive fault.

The redundant drive package features a main input disconnect switch, semiconductor fuses for each drive, single input/output wiring points, a single control wiring point, two door-mounted keypads, a selectable Manual or Auto Transfer switch, an H/O/A switch, and an integral damper control circuit.

Popular building automation communication protocols BACnet, Siemens APOGEE, Johnson Controls Metasys, and MEMOBUS/Modbus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

Performance Features

- VT Ratings: 5 - 250 HP, 480 Vac
- Overload capacity: 110% for 60 seconds (150% Peak)
- DC Injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Adjustable accel/decel: 0.1 to 6000 seconds
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Auto restart after power loss or resettable fault, selectable, programmable
- Up/down floating point control capability
- 140% starting torque capability, available from 3 Hz to 60 Hz
- Remote speed reference (speed command) signal:
  0 to 10 VDC (20 K Ohm)
  4 to 20 mA DC (250 Ohm)
- 7 programmable multi-function input terminals (24 Vdc) 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 C rated 2 amps @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Overtorque/undertorque detection

Redundant Package Features

- Standard Lockable Main Input Disconnect Switch
- 115 Vac control transformer, fused
- Semiconductor Fuses for each VFD
- Damper control circuit with end of travel feedback with two adjustable wait time functions
- Selectable Manual or Auto Transfer
- Drive A-Auto-Drive B switch
- Hand-Off-Auto switch
- Single input/output wiring points
- Single control wiring point
- Two door mounted keypads

Service Conditions

- Input voltage:
  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

Design Features

- 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)
- 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
- Drive internal PI closed loop control with selectable engineering units
- Independent PI control for use with external device
- Differential PI feedback feature
- Direct or reverse acting speed signal
- Sleep function in both closed loop and open loop control
- Feedback signal loss detection and selectable response strategy
- Feedback signal inverse and square root capability
- 24 Vdc, 150 ma transmitter power supply
- Input and output terminal status indication
- Diagnostic fault indication
- Cooling fan operating hours recorded
- VFD efficiency: 98% at full-speed; 96% at half-speed
- “S-curve” soft start / soft stop capability
- Serial communication loss detection and selectable response strategy
- Serial communication status
- 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
- Flash upgradeable firmware
- Customizable monitor display
- Heat sink over temperature speed foldback feature
- “Bumpless” transfer between Hand and Auto modes
- Emergency override can be used as “smoke purge” function
- Fan failure detection and selectable drive action
- Selectable energy savings mode

Standards

- UL 508A (Industrial Control Panels)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- 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
- BTL certified

Embedded Serial Communication Protocols

- BACnet MSTP
- Modbus/Memobus
- Siemens Apogee
- Johnson Controls Metasys

Communication Options

- EtherNet/IP
- LonWorks Interface

Power Options

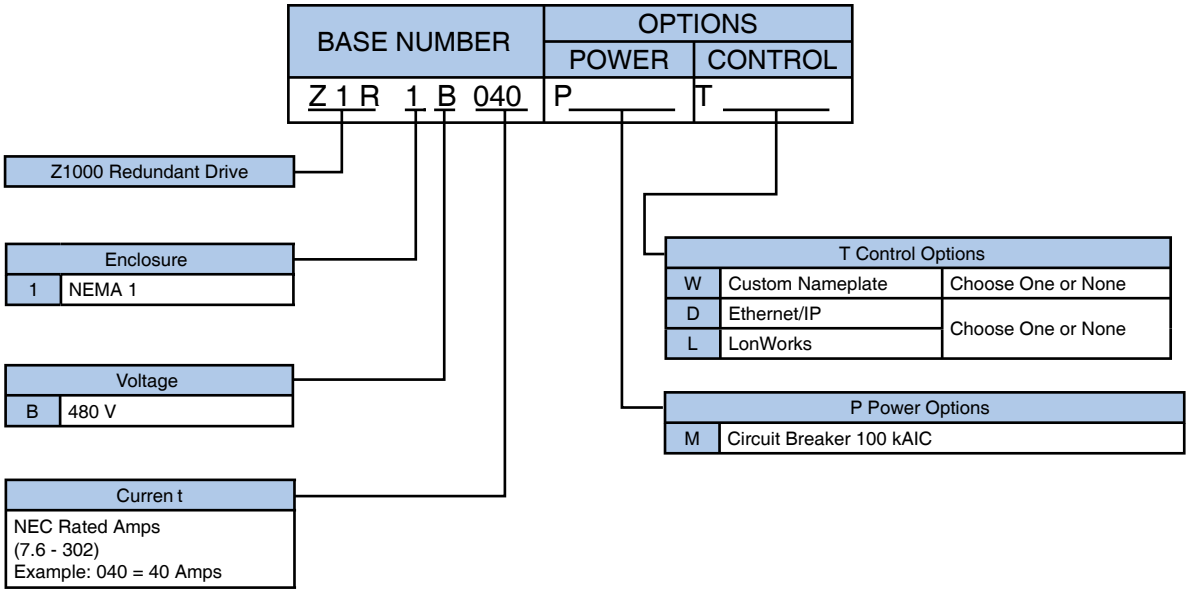
- Optional Lockable Main Input Circuit Breaker with 100 kAIC panel rating

Redundant Drive Package NEMA Type 1 (Z1R1)

Model Number Configuration (Z1R1)

Step 1. Complete the Base Number for the voltage and current rating.

Step 2. Add the Option Code letter for each required option. If an option is not wanted, no character is inserted in that position.



Options (Z1R1)

Enclosure Options

NEMA 1	(1)	The drive and Configured options are provided in a NEMA Type 1 ventilated enclosure, large enough to accommodate any or all of the Configured package options.

Power Options

Circuit Breaker	(M)	The standard configuration provides a line input disconnect switch but no branch short circuit protection. Circuit breaker options are available. Option (M) is a 100 kAIC rated circuit breaker. When option (M) is specified, the drive package will be rated at 100 kAIC.

Control Options

Ethernet/IP SI-EN3	(D)	EtherNet/IP, option (D), requires the addition of an optional board. *1
LonWorks SI-W3	(L)	LonWorks, option (L), requires the addition of an optional board. *1
Custom Nameplates	(W)	Custom engraved nameplates with white lettering on black lamicoid are available with option (W), for special tagging purposes (Example: “AHU #1”). Note that this option requires the text to be specified by the customer.

*1. Two (2) network control options, one option installed on each of the two drives within the redundant drive package.

Model Selection (Z1R1)

Rated Input Voltage	Rated Output Current (Amps)	Redundant Drive Package Model No. Z1R1B□□□	Nominal HP *2	Circuit Breaker (100 kAIC)	Dimensions (in)			Approximate Weight (lb)
				M	H	W	D	
480 V 3-Phase	4.8	005	3	Available	44.50	36.00	19.72	110
	7.6	008	5					115
	11	011	7.5					120
	14	014	10					125
	21	021	15					130
	27	027	20					135
	34	034	25		62.50			165
	40	040	30					175
	52	052	40					420
	65	065	50					425
	77	077	60					500
	96	096	75					675
	124	124	100		84.16	41.26	31.57	680
	156	156	125					950
	180	180	150					1,100
	240	240	200		85.70	66.25	23.70	1,500
	302	302	250		Contact Yaskawa			

*2. 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 480 volts.

12-Pulse Bypass Drive NEMA Type 1 (Z1B1J)

Specifications: 480 V NEMA Type 1 (Z1B1J)

The 12-Pulse Z1000 Bypass is engineered for use in HVAC building automation applications that require reliable motor control and reduced harmonic distortion.

The bypass package provides a Z1000 drive containing HVAC application-specific software macros, a real time clock, and Hand-Off-Auto keypad inside a NEMA 1 (UL Type 1) enclosure and a 3-contactor style bypass to allow motor operation from the drive or across the line.

The design also matches an isolation transformer with a tuned input reactor to provide a phase shift that reduces harmonic distortion for cleaner power.

Popular building automation communication protocols BACnet, Siemens APOGEE, Johnson Controls Metasys, and MEMOBUS/Modbus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

Performance Features

- VT Ratings: 7.5 to 250 HP, 480 Vac
- Overload capacity: 110% for 60 seconds (150% Peak)
- DC Injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Adjustable accel/decel: 0.1 to 6000 seconds
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Auto restart after power loss or resettable fault, selectable, programmable
- Up/down floating point control capability
- 140% starting torque capability, available from 3 Hz to 60 Hz
- Remote speed reference (speed command) signal:
  0 to 10 VDC (20 K Ohm)
  4 to 20 mA DC (250 Ohm)
- 7 programmable multi-function input terminals (24 Vdc) providing 60+ programmable features, including:
  - Customer Safeties
  - BAS / Damper Interlock
  - Emergency Override
  - Preset Speed
  - PI control enable / disable
- 4 programmable multi-function output relays (Form C rated 2 amps @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status
  - Contactor Control for External Bypass
  - Overtorque/undertorque detection

Bypass Features

- Input, Output and Bypass Contactors
- Lockable Main Input Circuit Breaker with 100 kAIC panel rating
- Thermal motor overload relay, class 20
- 115 Vac control transformer, fused
- Drive H/O/A keypad used for bypass control
- Damper control circuit with end of travel feedback with two adjustable wait time functions
- Selectable energy savings mode
- No load detection (loss of load) fully monitored in drive and bypass modes

Service Conditions

- Input voltage:
  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

Design Features

- Integral 12-Pulse Design
- 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)
- 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
- Independent PI control for use with external device
- Differential PI feedback feature
- Direct or reverse acting speed signal
- Sleep function in both closed loop and open loop control
- Feedback signal loss detection and selectable response strategy
- Feedback signal inverse and square root capability
- 24 Vdc, 150 ma transmitter power supply
- Input and output terminal status indication
- Diagnostic fault indication
- Cooling fan operating hours recorded
- VFD efficiency: 98% at full-speed; 96% at half-speed
- “S-curve” soft start / soft stop capability
- Serial communication loss detection and selectable response strategy
- Serial communication status
- 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
- Flash upgradeable firmware
- Customizable monitor display
- Heat sink over temperature speed foldback 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 508A (Industrial Control Panels)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- 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
- BTL certified

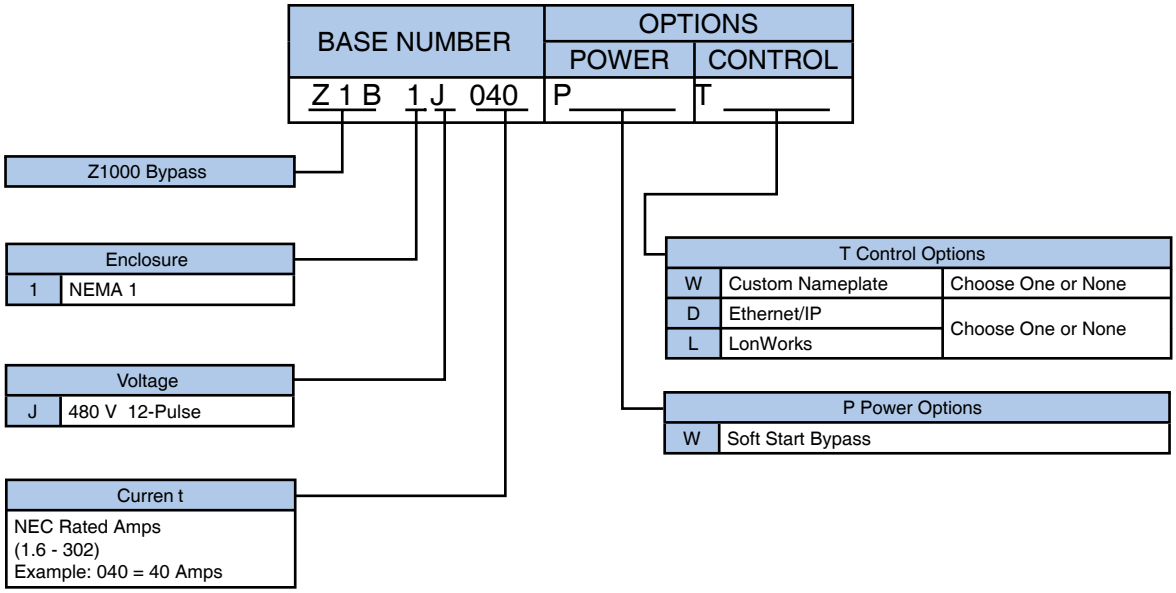
Options

- Soft Start Bypass
- EtherNet/IP
- LonWorks

Model Number Configuration (Z1B1J)

Step 1. Complete the Base Number for the voltage and current rating.

Step 2. Add the Option Code letter for each required option. If an option is not wanted, no character is inserted in that position.



Options (Z1B1J)

Enclosure Options

NEMA 1	(1)	The drive and Configured options are provided in a NEMA Type 1 ventilated enclosure, large enough to accommodate any or all of the Configured package options.

Power Options

Soft Start Bypass	(W)	Provides a solid-state adjustable soft starter for use when switching to bypass mode. Option (W) provides a solid-state soft-starter with adjustable ramp to reduce mechanical system stress typically associated with across-the-line bypass motor starts. Select option (W) if the application cannot tolerate the mechanical load stress caused by across-the-line bypass motor starts.

Control Options

Ethernet/IP SI-EN3	(D)	EtherNet/IP, option (D), requires the addition of an optional board.
LonWorks SI-W3	(L)	LonWorks, option (L), requires the addition of an optional board.

Custom Nameplates	(W)	Custom engraved nameplates with white lettering on black lamicoid are available with option (W), for special tagging purposes (Example: “AHU #1”). Note that this option requires the text to be specified by the customer.

Model and Power Option Selection (Z1B1J)

480 V Models and Power Options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 1 12-Pulse Bypass	Soft Start Bypass
			Z1B1□□□□	W
480 V 3-Phase	11	7.5	J011	Available
	14	10	J014	
	21	15	J021	
	27	20	J027	
	34	25	J034	
	40	30	J040	
	52	40	J052	
	65	50	J065	
	77	60	J077	
	96	75	J096	
	124	100	J124	
	156	125	J156	
	180	150	J180	
	240	200	J240	
	302	250	J302	

*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 480 volts.

Note: Consult factory for outline drawings and schematics.

12-Pulse Bypass Drive NEMA Type 3R (Z1B3J)

Specifications: 480 V NEMA Type 3R (Z1B3J)

The 12-Pulse Z1000 Bypass is engineered for use in HVAC building automation applications that require reliable motor control and reduced harmonic distortion.

The bypass package provides a Z1000 drive containing HVAC application-specific software macros, a real time clock, and Hand-Off-Auto keypad inside a NEMA 3R (UL Type 3R) enclosure and lockable main input circuit breaker with a 3-contactor style bypass to allow motor operation from the drive or across the line.

The design also matches an isolation transformer with a tuned input reactor to provide a phase shift that reduces harmonic distortion for cleaner power.

Popular building automation communication protocols BACnet, Siemens APOGEE, Johnson Controls Metasys, and MEMOBUS/Modbus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

Performance Features

- VT Ratings: 7.5 to 250 HP, 480 volt only.
- Overload capacity: 110% for 60 seconds (150% Peak)
- DC Injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Adjustable accel/decel: 0.1 to 6000 seconds
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Auto restart after power loss or resettable fault, selectable, programmable
- Up/down floating point control capability
- 140% starting torque capability, available from 3 Hz to 60 Hz
- Remote speed reference (speed command) signal:
  0 to 10 VDC (20 K Ohm)
  4 to 20 mA DC (250 Ohm)
- 7 programmable multi-function input terminals (24 Vdc) providing 60+ programmable features, including:
  - Customer Safeties
  - BAS / Damper Interlock
  - Emergency Override
  - Preset Speed
  - PI control enable / disable
- 4 programmable multi-function output relays (Form C rated 2 amps @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status Contactor
  - Control for External Bypass
  - Overtorque/undertorque detection

Bypass Features

- Input, Output and Bypass Contactors
- Lockable Main Input Circuit Breaker with 100 kAIC panel rating
- Thermal motor overload relay, class 20
- 115 Vac control transformer, fused
- Drive H/O/A keypad used for bypass control
- Damper control circuit with end of travel feedback with two adjustable wait time functions
- Selectable energy savings mode
- No load detection (loss of load) fully monitored in drive and bypass modes

Service Conditions

- Input voltage:
  480 Vac, -15/+10%
- Input frequency:
  50/60 Hz ±5%
- Ambient service temperature: NEMA 3R: -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

Design Features

- Integral 12-Pulse Design
- 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)
- 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
- Drive internal PI closed loop control with selectable engineering units
- Independent PI control for use with external device
- Differential PI feedback feature
- Direct or reverse acting speed signal
- Sleep function in both closed loop and open loop control
- Feedback signal loss detection and selectable response strategy
- Feedback signal inverse and square root capability
- 24 Vdc, 150 ma transmitter power supply
- Input and output terminal status indication
- Diagnostic fault indication
- Cooling fan operating hours recorded
- VFD efficiency: 98% at full-speed; 96% at half-speed
- "S-curve" soft start / soft stop capability
- Serial communication loss detection and selectable response strategy
- Serial communication status
- 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
- Flash upgradeable firmware
- Customizable monitor display
- Heat sink over temperature speed foldback 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 508A (Industrial Control Panels)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- 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
- BTL certified

Options

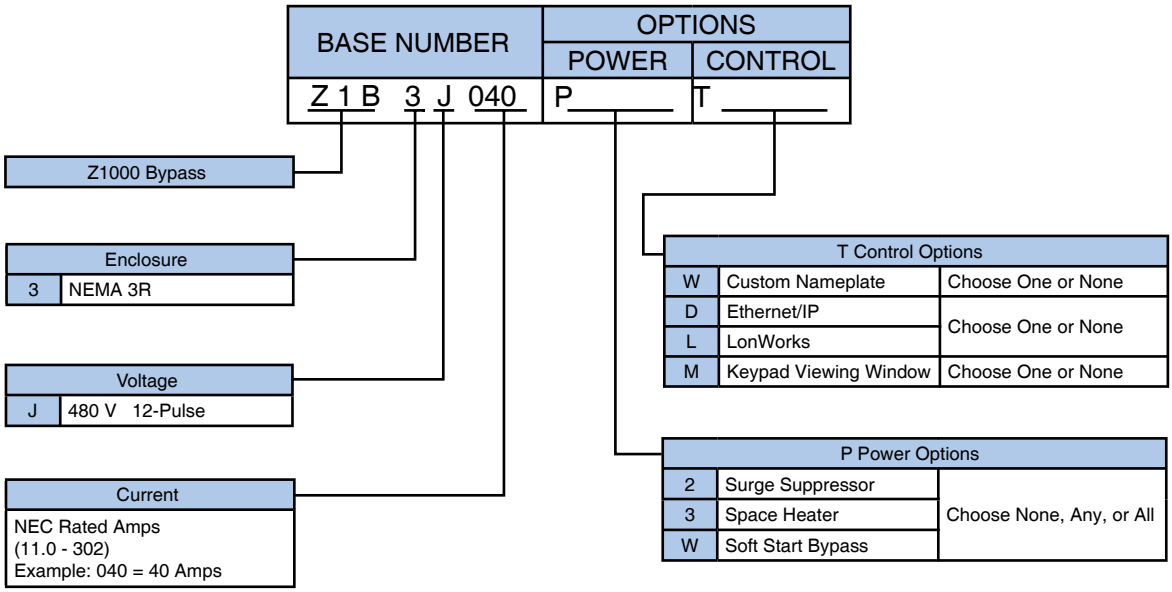
- Soft Start Bypass
- Surge Suppressorr
- Space Heater
- Custom Nameplate
- Keypad Viewing Window
- EtherNet/IP
- LonWorks

12-Pulse Bypass Drive NEMA Type 3R (Z1B3J)

Model Number Configuration (Z1B3J)

Step 1. Complete the Base Number for the voltage and current rating.

Step 2. Add the Option Code letter for each required option. If an option is not wanted, no character is inserted in that position.



Options (Z1B3J)

Enclosure Options

NEMA 3R	(3)	The drive and Configured options are provided in a NEMA Type 3R ventilated enclosure, large enough to accommodate any or all of the Configured package options.

Power Options

Surge Suppressor	(2)	This option provides a degree of protection from transient surges coming through the power line cables. Lightning strikes are the most common source of surges.
Space Heater	(3)	This option helps reduce condensation.
Soft Start Bypass	(W)	Provides a solid-state adjustable soft starter for use when switching to bypass mode. Option (W) provides a solid-state soft-starter with adjustable ramp to reduce mechanical system stress typically associated with across-the-line bypass motor starts. Select option (W) if the application cannot tolerate the mechanical load stress caused by across-the-line bypass motor starts.

Control Options

Ethernet/IP SI-EN3	(D)	EtherNet/IP, option (D), requires the addition of an optional board.
LonWorks SI-W3	(L)	LonWorks, option (L), requires the addition of an optional board.
Keypad Viewing Window	(M)	The digital drive keypad is mounted on the outside of the NEMA 3R enclosure door. This option provides a viewing window that is hinged and lockable.
Custom Nameplates	(W)	Custom engraved nameplates with white lettering on black lamicoid are available with option (W), for special tagging purposes (Example: “AHU #1”). Note that this option requires the text to be specified by the customer.

12-Pulse Bypass Drive NEMA Type 3R (Z1B3J)

Model and Power Option Selection (Z1B3J)

480 V Models and Power Options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 3R 12-Pulse Bypass	Soft Start Bypass	Surge Suppressor	Space Heater
			Z1B3□□□□	W	2	3
480 V 3-Phase	11	7.5	J011	Available	Available	Available
	14	10	J014			
	21	15	J021			
	27	20	J027			
	34	25	J034			
	40	30	J040			
	52	40	J052			
	65	50	J065			
	77	60	J077			
	96	75	J096			
	124	100	J124			
	156	125	J156			
	180	150	J180			
	240	200	J240			
	302	250	J302			

*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 480 volts.

Note: Consult factory for outline drawings and schematics.

12-Pulse Configured Drive NEMA Type 1 (Z1C1J)

Specifications: 480 V NEMA Type 1 (Z1C1J)

The 12-Pulse Z1000 Configured drive is engineered to allow flexibility when providing the features and options commonly specified by facility designers.

The configured package provides a Z1000 drive containing HVAC application-specific software macros, a real time clock, and Hand-Off-Auto LCD keypad with an input circuit breaker and space for several power options inside a NEMA 1 (UL Type 1) enclosure.

The design also matches an isolation transformer with a tuned input reactor to provide a phase shift that reduces harmonic distortion for cleaner power.

Popular building automation communication protocols BACnet, Siemens APOGEE, Johnson Controls Metasys, and MEMOBUS/Modbus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

Performance Features

- VT Ratings: 7.5 to 250 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
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Controlled speed range 40:1
- Power loss ride through: 2 seconds
- Torque limiting: 30 to 180%
- Auto restart after power loss or resettable fault, selectable, programmable
- Serial communications loss detection and selectable response strategy
- 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 K Ohm)
  4 to 20 mA DC (250 Ohm)
- Adjustable carrier frequency, from 1 kHz to 12.5 kHz
- 7 programmable multi-function input terminals (24 Vdc) 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 C rated 2 amps @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status
  - Contactor Control for External Bypass
  - Overtorque/undertorque detection

Service Conditions

- Input voltage:
  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

Design Features

- Integral 12-Pulse Design
- Input circuit breaker (100 kAIC)
- 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)
- 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
- Drive internal PI closed loop control with selectable engineering units
- Independent PI control for use with external device
- Differential PI feedback feature
- Direct or reverse acting speed signal
- Sleep function in both closed loop and open loop control
- Feedback signal loss detection and selectable response strategy
- Feedback signal inverse and square root capability
- 24 Vdc, 150 ma transmitter power supply
- Input and output terminal status indication
- Diagnostic fault indication
- Cooling fan operating hours recorded
- VFD efficiency: 98% at full-speed; 96% at half-speed
- “S-curve” soft start / soft stop capability
- 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
- Flash upgradeable firmware
- Customizable monitor display
- Heat sink over temperature speed foldback 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 508A (Industrial Control Panels)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- 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
- BTL certified

Options

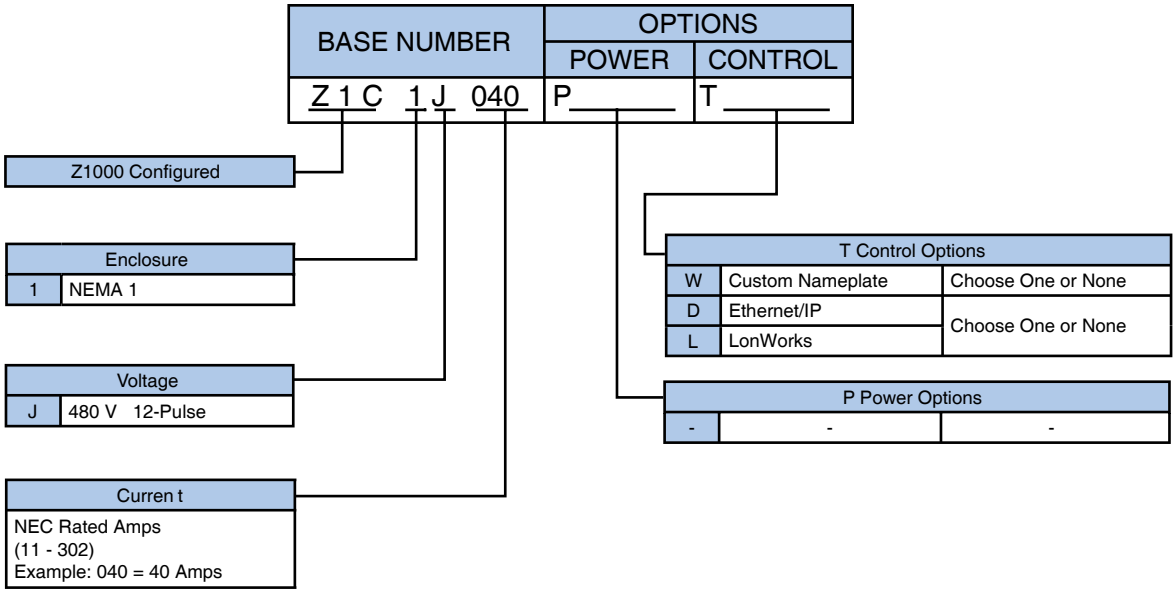
- EtherNet/IP
- LonWorks

12-Pulse Configured Drive NEMA Type 1 (Z1C1J)

Model Number Configuration (Z1C1J)

Step 1. Complete the Base Number for the voltage and current rating.

Step 2. Add the Option Code letter for each required option. If an option is not wanted, no character is inserted in that position.



Options (Z1C1J)

Enclosure Options

NEMA 1	(1)	The drive and Configured options are provided in a NEMA Type 1 ventilated enclosure, large enough to accommodate any or all of the Configured package options.

Control Options

EtherNet/IP SI-EN3	(D)	EtherNet/IP, option (D), requires the addition of an optional board.
LonWorks SI-W3	(L)	LonWorks, option (L), requires the addition of an optional board.
Custom Nameplates	(W)	Custom engraved nameplates with white lettering on black lamicoid are available with option (W), for special tagging purposes (Example: “AHU #1”). Note that this option requires the text to be specified by the customer.

Model Selection (Z1C1J)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 1 12-Pulse Configured Available Models
			Z1C1□□□□
480 V 3-Phase	11	7.5	J011
	14	10	J014
	21	15	J021
	27	20	J027
	34	25	J034
	40	30	J040
	52	40	J052
	65	50	J065
	77	60	J077
	96	75	J096
	124	100	J124
	156	125	J156
	180	150	J180
	240	200	J240
	302	250	J302

*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 480 volts.

Note: Consult factory for outline drawings and schematics.

12-Pulse Configured Drive NEMA Type 3R (Z1C3J)

Specifications: 480 V NEMA Type 3R (Z1C3J)

The 12-Pulse Z1000 Configured NEMA 3R drive is engineered to allow flexibility when providing the features and options commonly specified by facility designers.

The configured package provides a Z1000 drive containing HVAC application-specific software macros, a real time clock, and Hand-Off-Auto LCD keypad with an input circuit breaker and space for several power options inside a NEMA 3R (UL Type 3R) enclosure.

The design also matches an isolation transformer with a tuned input reactor to provide a phase shift that reduces harmonic distortion for cleaner power.

Popular building automation communication protocols BACnet, Siemens APOGEE, Johnson Controls Metasys, and MEMOBUS/Modbus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

Performance Features

- VT Ratings: 7.5 to 250 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
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Controlled speed range 40:1
- Power loss ride through: 2 seconds
- Torque limiting: 30 to 180%
- Auto restart after power loss or resettable fault, selectable, programmable
- Serial communications loss detection and selectable response strategy
- 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 K Ohm)
  4 to 20 mA DC (250 Ohm)
- Adjustable carrier frequency, from 1 kHz to 12.5 kHz
- Programmable security code
- 7 programmable multi-function input terminals (24 Vdc) 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 C rated 2 amps @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status
  - Contactor Control for External Bypass
  - Overtorque/undertorque detection

Service Conditions

- Input voltage:
  480 Vac, -15/+10%
- Input frequency:
  50/60 Hz ±5%
- Ambient service temperature:
  NEMA 3R (IP14: -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

Design Features

- Integral 12-Pulse Design
- Input circuit breaker (100 kAIC)
- 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)
- 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
- Drive internal PI closed loop control with selectable engineering units
- Independent PI control for use with external device
- Differential PI feedback feature
- Direct or reverse acting speed signal
- Sleep function in both closed loop and open loop control
- Feedback signal loss detection and selectable response strategy
- Feedback signal inverse and square root capability
- 24 Vdc, 150 ma transmitter power supply
- Input and output terminal status indication
- Diagnostic fault indication
- Cooling fan operating hours recorded
- VFD efficiency: 98% at full-speed; 96% at half-speed
- “S-curve” soft start / soft stop capability
- 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
- Flash upgradeable firmware
- Customizable monitor display
- Heat sink over temperature speed foldback 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 508A (Industrial Control Panels)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- 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
- BTL certified

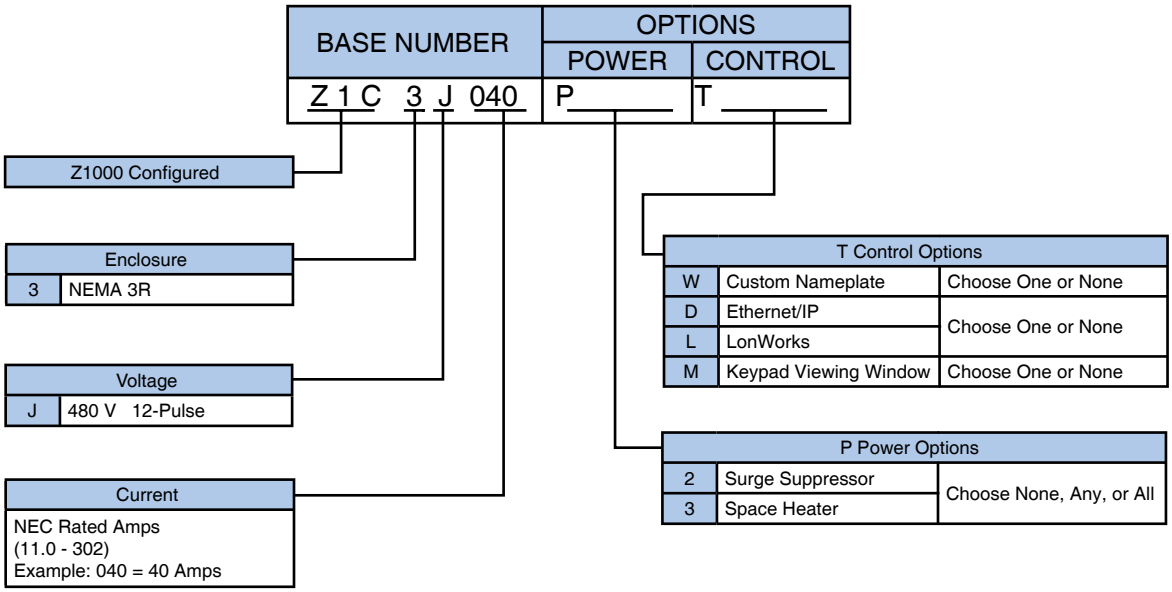
Options

- Surge Suppressor
- Space Heater
- Custom Nameplate
- Keypad Viewing Window
- EtherNet/IP
- LonWorks

Model Number Configuration (Z1C3J)

Step 1. Complete the Base Number for the voltage and current rating.

Step 2. Add the Option Code letter for each required option. If an option is not wanted, no character is inserted in that position.



Options (Z1C3J)

Enclosure Options

NEMA 3R	(3)	The drive and Configured options are provided in a NEMA Type 3R ventilated enclosure, large enough to accommodate any or all of the Configured package options.

Power Options

Surge Suppressor	(2)	This option provides a degree of protection from transient surges coming through the power line cables. Lightning strikes are the most common source of surges.
Space Heater	(3)	This option helps reduce condensation.

Control Options

EtherNet/IP SI-EN3	(D)	EtherNet/IP, option (D), requires the addition of an optional board.
LonWorks SI-W3	(L)	LonWorks, option (L), requires the addition of an optional board.

12-Pulse Configured Drive NEMA Type 3R (Z1C3J)

Keypad Viewing Window	(M)	The digital drive keypad is mounted on the outside of the NEMA 3R enclosure door. This option provides a viewing window that is hinged and lockable.
Custom Nameplates	(W)	Custom engraved nameplates with white lettering on black lamicoid are available with option (W), for special tagging purposes (Example: “AHU #1”). Note that this option requires the text to be specified by the customer.

Model and Power Option Selection (Z1C3J)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 3R 12-Pulse Configured	Surge Suppressor	Space Heater
			Z1C3□□□□	2	3
480 V 3-Phase	11	7.5	J011	Available	Available
	14	10	J014		
	21	15	J021		
	27	20	J027		
	34	25	J034		
	40	30	J040		
	52	40	J052		
	65	50	J065		
	77	60	J077		
	96	75	J096		
	124	100	J124		
	156	125	J156		
	180	150	J180		
	240	200	J240		
	302	250	J302		

*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 480 volts.

Note: Consult factory for outline drawings and schematics.

18-Pulse Bypass Drive NEMA Type 1 (Z1B1K)

Specifications: 480 V NEMA Type 1 (Z1B1K)

The 18-Pulse Z1000 Bypass is engineered for use in HVAC building automation applications that require reliable motor control and reduced harmonic distortion.

The bypass package provides a Z1000 drive containing HVAC application-specific software macros, a real time clock, and Hand-Off-Auto keypad inside a NEMA 1 (UL Type 1) enclosure and a 3-contactor style bypass to allow motor operation from the drive or across the line.

The design also matches an autotransformer with a tuned balance reactor to provide a phase shift that reduces harmonic distortion for cleaner power.

Popular building automation communication protocols BACnet, Siemens APOGEE, Johnson Controls Metasys, and MEMOBUS/Modbus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

Performance Features

- VT Ratings: Ratings: 5 to 250 HP, 480 Vac
- Overload capacity: 110% for 60 seconds (150% Peak)
- DC Injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Adjustable accel/decel: 0.1 to 6000 seconds
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Auto restart after power loss or resettable fault, selectable, programmable
- Up/down floating point control capability
- 140% starting torque capability, available from 3 Hz to 60 Hz
- Remote speed reference (speed command) signal:
  0 to 10 VDC (20 K Ohm)
  4 to 20 mA DC (250 Ohm)
- 7 programmable multi-function input terminals (24 Vdc) providing 60+ programmable features, including:
  - Customer Safeties
  - BAS / Damper Interlock
  - Emergency Override
  - Preset Speed
  - PI control enable / disable
- 4 programmable multi-function output relays (Form C rated 2 amps @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status Contactor
  - Control for External Bypass
  - Overtorque/undertorque detection

Bypass Features

- Input, Output and Bypass Contactors
- Lockable Main Input Circuit Breaker with 100 kAIC panel rating
- Thermal motor overload relay, class 20
- 115 Vac control transformer, fused
- Drive H/O/A keypad used for bypass control
- Damper control circuit with end of travel feedback with two adjustable wait time functions
- Selectable energy savings mode
- No load detection (loss of load) fully monitored in drive and bypass modes

Service Conditions

- Input voltage:
  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

Design Features

- Integral 18-Pulse Design
- 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)
- 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
- Independent PI control for use with external device
- Differential PI feedback feature
- Direct or reverse acting speed signal
- Sleep function in both closed loop and open loop control
- Feedback signal loss detection and selectable response strategy
- Feedback signal inverse and square root capability
- 24 Vdc, 150 ma transmitter power supply
- Input and output terminal status indication
- Diagnostic fault indication
- Cooling fan operating hours recorded
- VFD efficiency: 98% at full-speed; 96% at half-speed
- “S-curve” soft start / soft stop capability
- Serial communication loss detection and selectable response strategy
- Serial communication status
- 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
- Flash upgradeable firmware
- Customizable monitor display
- Heat sink over temperature speed foldback 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 508A (Industrial Control Panels)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- 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
- BTL certified

Options

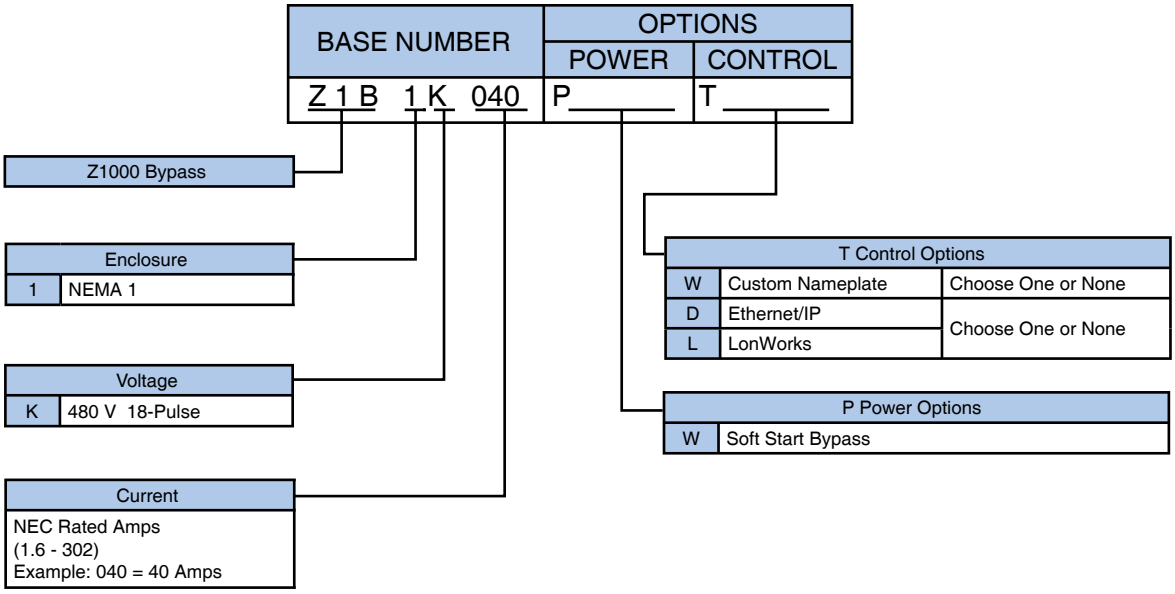
- Soft Start Bypass
- EtherNet/IP
- LonWorks

18-Pulse Bypass Drive NEMA Type 1 (Z1B1K)

Model Number Configuration (Z1B1K)

Step 1. Complete the Base Number for the voltage and current rating.

Step 2. Add the Option Code letter for each required option. If an option is not wanted, no character is inserted in that position.



Options (Z1B1K)

Enclosure Options

NEMA Type 1	(1)	The drive and Configured options are provided in a NEMA Type 1 ventilated enclosure, large enough to accommodate any or all of the Configured package options.

Power Options

Soft Start Bypass	(W)	Provides a solid-state adjustable soft starter for use when switching to bypass mode. Option (W) provides a solid-state soft-starter with adjustable ramp to reduce mechanical system stress typically associated with across-the-line bypass motor starts. Select option (W) if the application cannot tolerate the mechanical load stress caused by across-the-line bypass motor starts.

Control Options

Ethernet/IP SI-EN3	(D)	EtherNet/IP, option (D), requires the addition of an optional board.
LonWorks SI-W3	(L)	LonWorks, option (L), requires the addition of an optional board.

Custom Nameplates	(W)	Custom engraved nameplates with white lettering on black lamicoid are available with option (W), for special tagging purposes (Example: “AHU #1”). Note that this option requires the text to be specified by the customer.

Model and Power Option Selection (Z1B1K)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 1 18-Pulse Bypass	Soft Start Bypass
			Z1B1□□□□	W
480 V 3-Phase	7.6	5	K007	Available
	11	7.5	K011	
	14	10	K014	
	21	15	K021	
	27	20	K027	
	34	25	K034	
	40	30	K040	
	52	40	K052	
	65	50	K065	
	77	60	K077	
	96	75	K096	
	124	100	K124	
	156	125	K156	
	180	150	K180	
	240	200	K240	
	302	250	K302	

*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 480 volts.

Note: Consult factory for outline drawings and schematics.

18-Pulse Bypass Drive NEMA Type 3R (Z1B3K)

Specifications: 480 V NEMA Type 3R (Z1B3K)

The 18-Pulse Z1000 Bypass is engineered for use in HVAC building automation applications that require reliable motor control and reduced harmonic distortion.

The bypass package provides a Z1000 drive containing HVAC application-specific software macros, a real time clock, and Hand-Off-Auto keypad inside a NEMA 3R (UL Type 3R) enclosure and lockable main input circuit breaker with a 3-contact style bypass to allow motor operation from the drive or across the line.

The design also matches an autotransformer with a tuned balance reactor to provide a phase shift that reduces harmonic distortion for cleaner power.

Popular building automation communication protocols BACnet, Siemens APOGEE, Johnson Controls Metasys, and MEMOBUS/Modbus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

Performance Features

- VT Ratings: 5 to 250 HP, 480 Vac
- Overload capacity: 110% for 60 seconds (150% Peak)
- DC Injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Adjustable accel/decel: 0.1 to 6000 seconds
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Auto restart after power loss or resettable fault, selectable, programmable
- Up/down floating point control capability
- 140% starting torque capability, available from 3 Hz to 60 Hz
- Remote speed reference (speed command) signal:
  0 to 10 Vdc (20 K Ohm)
  4 to 20 mA DC (250 Ohm)
- 7 programmable multi-function input terminals (24 Vdc) providing 60+ programmable features, including:
  - Customer Safeties
  - BAS / Damper Interlock
  - Emergency Override
  - Preset Speed
  - PI control enable / disable
- 4 programmable multi-function output relays (Form C rated 2 amps @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status Contactor
  - Control for External Bypass
  - Overtorque/undertorque detection

Bypass Features

- Input, Output and Bypass Contactors
- Lockable Main Input Circuit Breaker with 100 kAIC panel rating
- Thermal motor overload relay, class 20
- 115 Vac control transformer, fused
- Drive H/O/A keypad used for bypass control
- Damper control circuit with end of travel feedback with two adjustable wait time functions
- Selectable energy savings mode
- No load detection (loss of load) fully monitored in drive and bypass modes

Service Conditions

- Input voltage:
  480 Vac, -15/+10%
- Input frequency:
  50/60 Hz ±5%
- Ambient service temperature: NEMA 3R (IP14): -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

Design Features

- Integral 18-Pulse Design
- 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)
- 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
- Drive internal PI closed loop control with selectable engineering units
- Independent PI control for use with external device
- Differential PI feedback feature
- Direct or reverse acting speed signal
- Sleep function in both closed loop and open loop control
- Feedback signal loss detection and selectable response strategy
- Feedback signal inverse and square root capability
- 24 Vdc, 150 ma transmitter power supply
- Input and output terminal status indication
- Diagnostic fault indication
- Cooling fan operating hours recorded
- VFD efficiency: 98% at full-speed; 96% at half-speed
- “S-curve” soft start / soft stop capability
- Serial communication loss detection and selectable response strategy
- Serial communication status
- 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
- Flash upgradeable firmware
- Customizable monitor display
- Heat sink over temperature speed foldback 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 508A (Industrial Control Panels)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- 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
- BTL certified

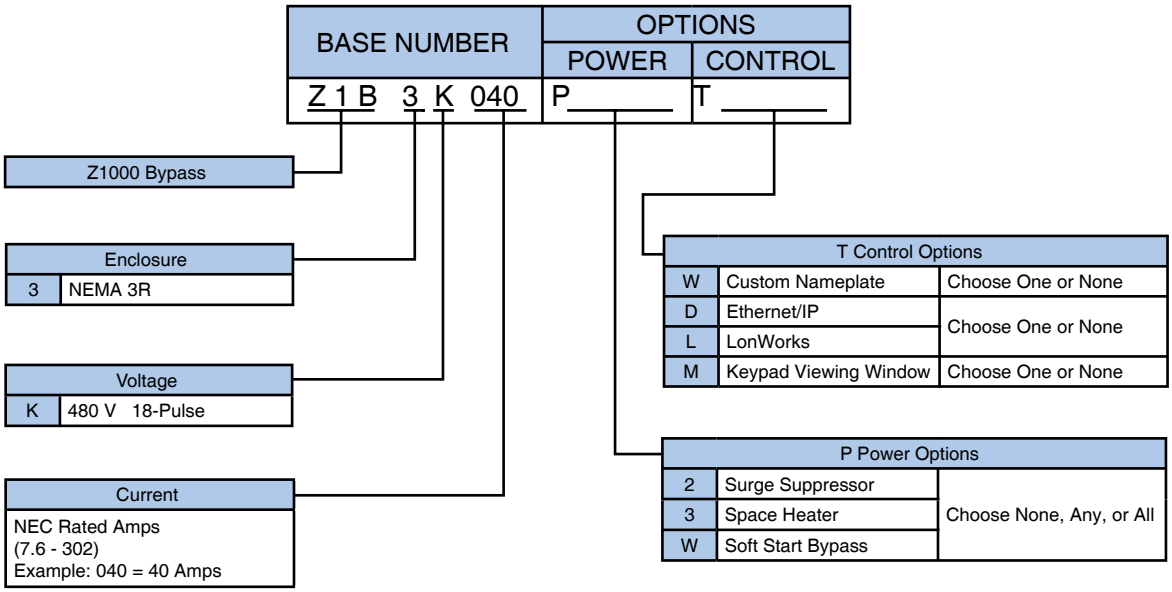
Options

- Soft Start Bypass
- Surge Suppressor
- Space Heater
- Custom Nameplate
- Keypad Viewing Window
- EtherNet/IP
- LonWorks

Model Number Configuration (Z1B3K)

Step 1. Complete the Base Number for the voltage and current rating.

Step 2. Add the Option Code letter for each required option. If an option is not wanted, no character is inserted in that position.



Options (Z1B3K)

Enclosure Options

NEMA 3R	(3)	The drive and Configured options are provided in a NEMA Type 3R ventilated enclosure, large enough to accommodate any or all of the Configured package options.

18-Pulse Bypass Drive NEMA Type 3R (Z1B3K)

Power Options

Surge Suppressor	(2)	This option provides a degree of protection from transient surges coming through the power line cables. Lightning strikes are the most common source of surges.
Space Heater	(3)	This option helps reduce condensation.
Soft Start Bypass	(W)	Provides a solid-state adjustable soft starter for use when switching to bypass mode. Option (W) provides a solid-state soft-starter with adjustable ramp to reduce mechanical system stress typically associated with across-the-line bypass motor starts. Select option (W) if the application cannot tolerate the mechanical load stress caused by across-the-line bypass motor starts.

Control Options

Ethernet/IP SI-EN3	(D)	EtherNet/IP, option (D), requires the addition of an optional board.
LonWorks SI-W3	(L)	LonWorks, option (L), requires the addition of an optional board.
Keypad Viewing Window	(M)	The digital drive keypad is mounted on the outside of the NEMA 3R enclosure door. This option provides a viewing window that is hinged and lockable.
Custom Nameplates	(W)	Custom engraved nameplates with white lettering on black lamicoid are available with option (W), for special tagging purposes (Example: “AHU #1”). Note that this option requires the text to be specified by the customer.

Model and Power Option Selection (Z1B3K)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 3R 18-Pulse Bypass	Soft Start Bypass	Surge Suppressor	Space Heater
			Z1B3□□□□	W	2	3
480 V 3-Phase	7.6	5	K007	Available	Available	Available
	11	7.5	K011			
	14	10	K014			
	21	15	K021			
	27	20	K027			
	34	25	K034			
	40	30	K040			
	52	40	K052			
	65	50	K065			
	77	60	K077			
	96	75	K096			
	124	100	K124			
	156	125	K156			
	180	150	K180			
	240	200	K240			
	302	250	K302			

*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 480 volts.

Note: Consult factory for outline drawings and schematics.

18-Pulse Configured Drive NEMA Type 1 (Z1C1K)

Specifications: 480 V NEMA Type 1 (Z1C1K)

The 18-Pulse Z1000 Configured NEMA 1 drive is engineered to allow flexibility when providing the features and options commonly specified by facility designers.

The configured package provides a Z1000 drive containing HVAC application-specific software macros, a real time clock, and Hand-Off-Auto LCD keypad with an input circuit breaker and space for several power options inside a NEMA 1 (UL Type 1) enclosure.

The design also matches an autotransformer with a tuned balance reactor to provide a phase shift that reduces harmonic distortion for cleaner power.

Popular building automation communication protocols BACnet, Siemens APOGEE, Johnson Controls Metasys, and MEMOBUS/Modbus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

Performance Features

- VT Ratings: 5 to 250 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
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Controlled speed range 40:1
- Power loss ride through: 2 seconds
- Torque limiting: 30 to 180%
- Auto restart after power loss or resettable fault, selectable, programmable
- Serial communications loss detection and selectable response strategy
- 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 K Ohm)
  4 to 20 mA DC (250 Ohm)
- Adjustable carrier frequency, from 1 kHz to 12.5 kHz
- 7 programmable multi-function input terminals (24 Vdc) 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 C rated 2 amps @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status
  - Contactor Control for External Bypass
  - Overtorque/undertorque detection

Service Conditions

- Input voltage:
  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

Design Features

- Integral 18-Pulse Design
- Input circuit breaker (100 kAIC)
- 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)
- 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
- Drive internal PI closed loop control with selectable engineering units
- Independent PI control for use with external device
- Differential PI feedback feature
- Direct or reverse acting speed signal
- Sleep function in both closed loop and open loop control
- Feedback signal loss detection and selectable response strategy
- Feedback signal inverse and square root capability
- 24 Vdc, 150 ma transmitter power supply
- Input and output terminal status indication
- Diagnostic fault indication
- Cooling fan operating hours recorded
- VFD efficiency: 98% at full-speed; 96% at half-speed
- “S-curve” soft start / soft stop capability
- 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
- Flash upgradeable firmware
- Customizable monitor display
- Heat sink over temperature speed foldback 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 508A (Industrial Control Panels)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- 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
- BTL certified

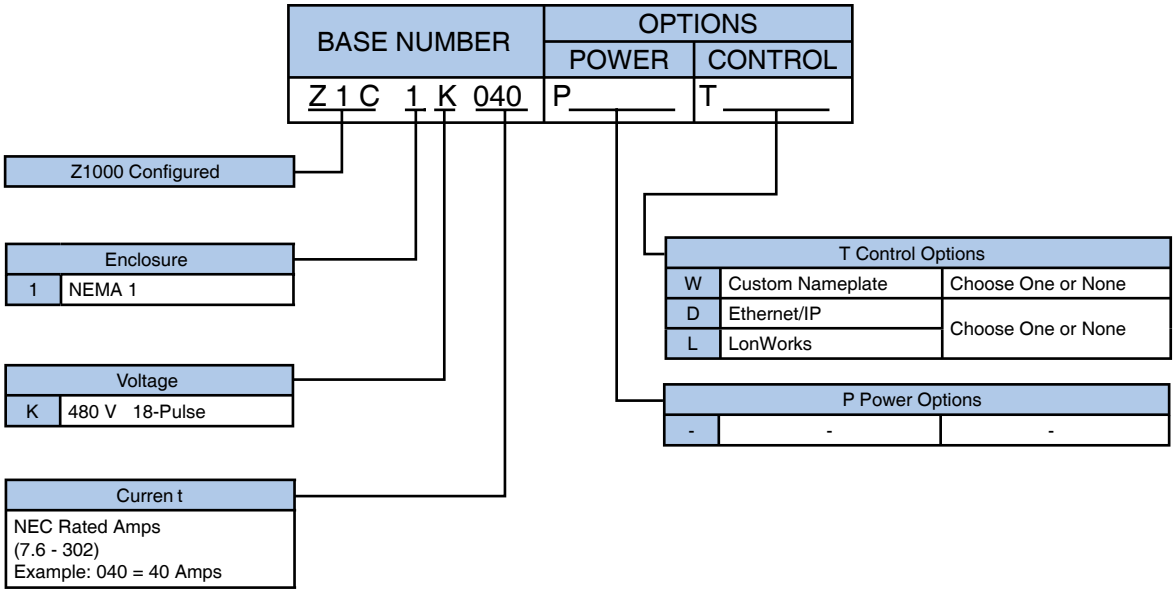
Options

- EtherNet/IP
- LonWorks

Model Number Configuration (Z1C1K)

Step 1. Complete the Base Number for the voltage and current rating.

Step 2. Add the Option Code letter for each required option. If an option is not wanted, no character is inserted in that position.



Options (Z1C1K)

Control Options

EtherNet/IP SI-EN3	(D)	EtherNet/IP, option (D), requires the addition of an optional board.
LonWorks SI-W3	(L)	LonWorks, option (L), requires the addition of an optional board.
Custom Nameplates	(W)	Custom engraved nameplates with white lettering on black lamicoid are available with option (W), for special tagging purposes (Example: “AHU #1”). Note that this option requires the text to be specified by the customer.

18-Pulse Configured Drive NEMA Type 1 (Z1C1K)

Model and Power Option Selection (Z1C1K)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 1 18-Pulse Configured
			Z1C1□□□□
480 V 3-Phase	7.6	5	K007
	11	7.5	K011
	14	10	K014
	21	15	K021
	27	20	K027
	34	25	K034
	40	30	K040
	52	40	K052
	65	50	K065
	77	60	K077
	96	75	K096
	124	100	K124
	156	125	K156
	180	150	K180
	240	200	K240
	302	250	K302

*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 480 volts.

Note: Consult factory for outline drawings and schematics.

18-Pulse Configured Drive NEMA Type 3R (Z1C3K)

Specifications: 480 V NEMA Type 3R (Z1C3K)

The 18-Pulse Z1000 Configured NEMA 3R drive is engineered to allow flexibility when providing the features and options commonly specified by facility designers.

The configured package provides a Z1000 drive containing HVAC application-specific software macros, a real time clock, and Hand-Off-Auto LCD keypad with an input circuit breaker and space for several power options inside a NEMA 3R (UL Type 3R enclosure. The design also matches an autotransformer with a tuned balance reactor to provide a phase shift that reduces harmonic distortion for cleaner power.

Popular building automation communication protocols BACnet, Siemens APOGEE, Johnson Controls Metasys, and MEMOBUS/Modbus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

Performance Features

- VT Ratings: 5 to 250 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
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Controlled speed range 40:1
- Power loss ride through: 2 seconds
- Torque limiting: 30 to 180%
- Auto restart after power loss or resettable fault, selectable, programmable
- Serial communications loss detection and selectable response strategy
- 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 K Ohm)
  4 to 20 mA DC (250 Ohm)
- Adjustable carrier frequency, from 1 kHz to 12.5 kHz
- Programmable security code
- 7 programmable multi-function input terminals (24 Vdc) 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 C rated 2 amps @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status
  - Contactor Control for External Bypass
  - Overtorque/undertorque detection

Service Conditions

- Input voltage:
  480 Vac, -15/+10%
- Input frequency:
  50/60 Hz ±5%
- Ambient service temperature: NEMA 3R (IP14):
  -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

Design Features

- Integral 18-Pulse Design
- Input circuit breaker (100 kAIC)
- 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)
- 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
- Drive internal PI closed loop control with selectable engineering units
- Independent PI control for use with external device
- Differential PI feedback feature
- Direct or reverse acting speed signal
- Sleep function in both closed loop and open loop control
- Feedback signal loss detection and selectable response strategy
- Feedback signal inverse and square root capability
- 24 Vdc, 150 ma transmitter power supply
- Input and output terminal status indication
- Diagnostic fault indication
- Cooling fan operating hours recorded
- VFD efficiency: 98% at full-speed; 96% at half-speed
- “S-curve” soft start / soft stop capability
- 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
- Flash upgradeable firmware
- Customizable monitor display
- Heat sink over temperature speed foldback 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 508A (Industrial Control Panels)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- 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
- BTL certified

Options

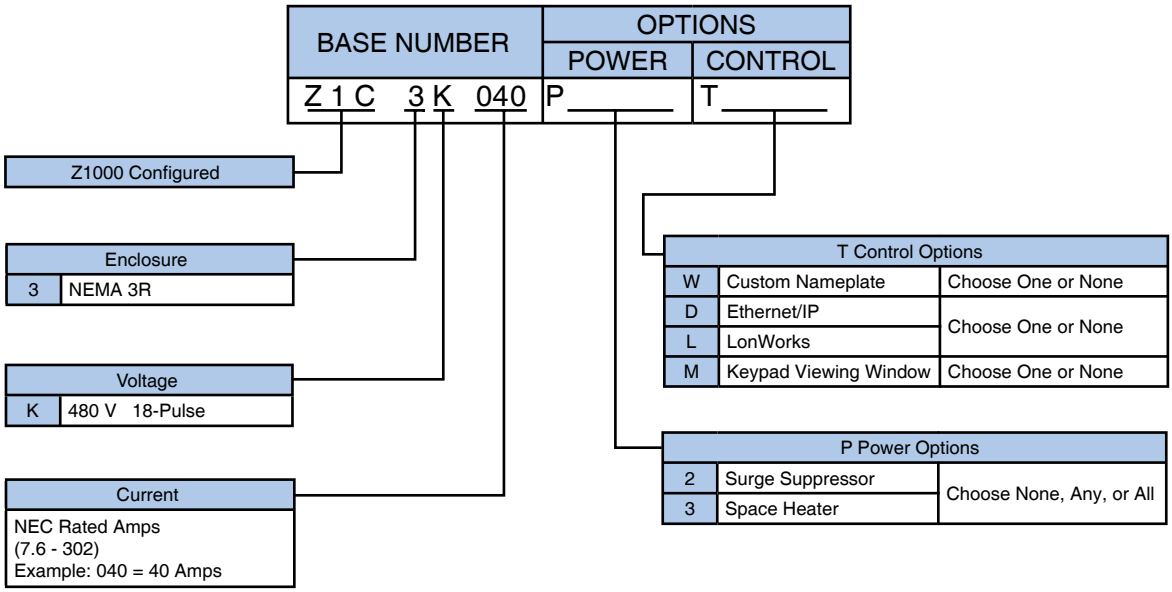
- Surge Suppressorr
- Space Heater
- Custom Nameplate
- Keypad Viewing Window
- EtherNet/IP
- LonWorks

18-Pulse Configured Drive NEMA Type 3R (Z1C3K)

Model Number Configuration (Z1C3K)

Step 1. Complete the Base Number for the voltage and current rating.

Step 2. Add the Option Code letter for each required option. If an option is not wanted, no character is inserted in that position.



Options (Z1C3K)

Enclosure Options

NEMA 3R	(3)	The drive and Configured options are provided in a NEMA Type 3R ventilated enclosure, large enough to accommodate any or all of the Configured package options.

Power Options

Surge Suppressor	(2)	This option provides a degree of protection from transient surges coming through the power line cables. Lightning strikes are the most common source of surges.
Space Heater	(3)	This option helps reduce condensation.

Control Options

EtherNet/IP SI-EN3	(D)	EtherNet/IP, option (D), requires the addition of an optional board.
LonWorks SI-W3	(L)	LonWorks, option (L), requires the addition of an optional board.

Keypad Viewing Window	(M)	The digital drive keypad is mounted on the outside of the NEMA 3R enclosure door. This option provides a viewing window that is hinged and lockable.
Custom Nameplates	(W)	Custom engraved nameplates with white lettering on black lamicoid are available with option (W), for special tagging purposes (Example: “AHU #1”). Note that this option requires the text to be specified by the customer.

Model and Power Option Selection (Z1C3K)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 3R 18-Pulse Configured	Surge Suppressor	Space Heater
			Z1C3□□□□	2	3
480 V 3-Phase	7.6	5	K007	Available	Available
	11	7.5	K011		
	14	10	K014		
	21	15	K021		
	27	20	K027		
	34	25	K034		
	40	30	K040		
	52	40	K052		
	65	50	K065		
	77	60	K077		
	96	75	K096		
	124	100	K124		
	156	125	K156		
	180	150	K180		
	240	200	K240		
	302	250	K302		

*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 480 volts.

Note: Consult factory for outline drawings and schematics.

Z1000U Specifications: 200 to 240 V and 380 to 480 V

The Z1000U HVAC MATRIX drive combines superior harmonic mitigation, input power factor control, and energy saving capabilities in a design specifically suited for use in building automation applications requiring reliable motor control.

The Z1000U HVAC MATRIX drive incorporates MATRIX technology to directly convert input AC voltage to output AC voltage. The Z1000U HVAC MATRIX drive offers real choices and benefits for green HVAC applications, and features HVAC application-specific software macros, a Hand-Off-Auto LCD keypad, and a real time clock for system accuracy.

Popular building automation communication protocols, BACnet (BTL certified) , Siemens APOGEE FLN, Johnson Controls Metasys N2, and MEMOBUS/Modbus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

Performance Features

- VT Ratings:

  200 to 240 V, 10 to 100 HP
  380 to 480 V, 7.5 to 350 HP
- V/f Control, Open Loop Vector Control for PM
- Overload capacity: 120% for 60 seconds
- 0-400 Hz Output Frequency
- DC Injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Adjustable accel/decel: 0.1 to 6000 seconds
- Controlled speed range: 40:1
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Torque limiting: 0 to 300%
- Auto restart after power loss or resettable fault, selectable, programmable
- Up/down floating point control capability
- Stationary motor auto-tuning
- 150% starting torque, available from 3 to 60 Hz
- Remote speed reference (speed command) signal:
  - 0 to 10 Vdc/–10 to 10 Vdc (20 K Ohms)
  - 4 to 20 mA/0 to 20 mAdc (250 Ohms)
- Adjustable carrier frequency, from 4 kHz to 10 kHz
- Programmable security code
- 8 programmable multi-function input terminals (24 Vdc) providing 60+ programmable features, including:
  - Customer Safeties
  - BAS / Damper Interlock
  - Emergency Override
  - Preset Speed
  - PI control enable / disable
- 2x Form A and 1x Form C programmable multi-function output relays (Rated 1 amp @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status
  - Contactor Control for External Bypass
  - Overtorque/undertorque detection

Service Conditions

- Input voltage: 200 to 240 Vac, 380 to 480 Vac, -15/+10%
- Input frequency: 50/60 Hz ±3% (Frequency fluctuation rate: 1 Hz/100 ms or less)
- Ambient service temperature: Open Type (IP00): -10 °C to 50 °C (14 °F to 122 °F)
- Ambient storage temperature: -20 °C to 60 °C (-4 °F to 140 °F)
- Humidity: 0% to 95%, non-condensing
- Altitude: to 1000 meters (3300 feet); higher by derating
- Service factor: 1.0
- 10 to 20 Hz: 9.8 m/s² 20 to 55 Hz: 5.9 m/s² (2□0028 to 2□0081 and 4□0011 to 4□0077), 2.0 m/s² (2□0104 to 2□0248 and 4□0096 to 4□0414)
- Plenum mounting capable (IP20)

Design Features

- Displacement power factor of 0.98 throughout the motor speed range
- Standard LCD Multi-lingual keypad, Full-text , Hand-Off-Auto with Copy (Read/Write) Function
- 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 (PID) Controls
- Drive internal PID closed loop control with selectable engineering units
- Independent PID control for use with external device
- Differential PID 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
- 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 1 amp @ 250 Vac & 30 Vdc)
- 6 preset speeds
- Built-in BACnet (BTL certified), Siemens APOGEE FLN, Johnson Controls Metasys N2, and Modbus/Memobus communication
- Eco-Mode to achive near across-the-line THD and quietest operation
- Energy Savings Monitor
- Motor preheat function
- Flash upgradeable firmware
- Customizable monitor display
- Heat sink over temperature speed foldback feature
- “Bumpless” transfer between Hand and Auto modes
- Emergency override can be used as “smoke purge” function
- Fan failure detection and selectable drive action
- Built-in EMC Filter
- Built-in line fuses, 100 kAIC
- Energy Savings – Low Power Loss Design
- Compact Package
- Unity Power Factor Control
- IEEE-519 Compliant (<5% TDD) Harmonic Characteristics
- Low Harmonics over Wide Speed Range
- DriveWizard® HVAC Software
- Removable Terminal Block with Memory
- High Reliability with an MTBF of 28 Years
- Short Circuit Withstand Rating: 100K RMS
- Optimal Speed Command Search

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
- ROHS Compliant
- IEC 61800-5-1 (LVD)
- EN 61800-3:2004
- IEC 529
- IEEE C62.41
- UL, cUL listed; CE marked
- IBC 2012
- BACnet (BTL) Certified

Options

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

Z1000U Model Selection 200 to 240 V

Rated Input Voltage	Rating		Standard Enclosure
	Rated Output Amps *1 *2	HP *3 240 V (208 V)	Model Number CIMR-ZU2E□□□□AUA With built-in EMC noise filter.
200 to 240 V 3-Phase	28	10 (7.5)	0028
	42	15 (10)	0042
	54	20 (15)	0054
	68	25 (20)	0068
	81	30 (25)	0081
	104	40 (30)	0104
	130	50 (40)	0130
	154	60 (50)	0154
	192	75 (60)	0192
	248	100 (75)	0248

*1. The rated output current of the drive should be equal to or greater than the motor rated current.

*2. Carrier frequency is set to 4 kHz. Current derating is required to raise the carrier frequency.

*3. 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 240 volts.

Z1000U Model Selection 380 to 480 V

Rated Input Voltage	Rating		Standard Enclosure
	Rated Output Amps *1 *2	Nominal HP *3	Model Number CIMR-ZU4E□□□□AUA With built-in EMC noise filter.
380 to 480 V 3-Phase	11	7.5	0011
	14	10	0014
	21	15	0021
	27	20	0027
	34	25	0034
	40	30	0040
	52	40	0052
	65	50	0065
	77	60	0077
	96	75	0096
	124	100	0124
	156	125	0156
	180	150	0180
	216	175	0216
	240	200	0240
	302	250	0302
	361	300	0361
	414	350	0414

*1. The rated output current of the drive should be equal to or greater than the motor rated current.

*2. Carrier frequency is set to 4 kHz. Current derating is required to raise the carrier frequency.

*3. 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 480 volts.

Z1000U Options

End Cap Kits NEMA 1

This option consists of a top and bottom cover to convert a protected IP00/Open Type drive to a IP20/NEMA Type 1 enclosed unit. This option DOES NOT provide additional space for mounting auxiliary components (i.e., circuit breaker, input fuses, reactor, etc.).

Rated Input Voltage	Drive Model Number CIMR-ZU2E□□□□AUA	Part Number
200 to 240 V 3-Phase	0028	EZZ022745A
	0042 0054 0068 0081	EZZ022745B
	0104 0130	EZZ022745C
	0154 0192	EZZ022745D
	0248	EZZ022745E
Rated Input Voltage	**Drive Model Number CIMR-ZU4E□□□□AUA**	**Part Number**
380 to 480 V 3-Phase	0011 0014 0021 0027 0034	EZZ022745A
	0040 0052 0065 0077	EZZ022745B
	0096 0124	EZZ022745C
	0156 0180	EZZ022745D
	0216 0240	EZZ022745E
	0302 0361 0414	EZZ022745F

External Heatsink Kits NEMA 1

External Heatsink Kit: Allows drives to be mounted with the drive's heatsink external (NEMA 1 backside) to the enclosure. Option kit for customer mounting. Larger standard drives include brackets.

Rated Input Voltage	Drive Model Number CIMR-ZU2E□□□□AUA	Part Number
200 to 240 V 3-Phase	0028	UUX001072
	0042 0054 0068 0081	UUX001073
	0104 0130	UUX001074
	0154 0192	UUX001075
	0248	*1
Rated Input Voltage	**Drive Model Number CIMR-ZU4E□□□□AUA**	**Part Number**
380 to 480 V 3-Phase	0011 0014 0021 0027 0034	UUX001072
	0040 0052 0065 0077	UUX001073
	0096 0124	UUX001074
	0156 0180	UUX001075
	0216 0240 0302 0361 0414	*1

*1 Required brackets are included with the drive.

Z1000U Control and Communication Options

These cards, cables, and devices add control functionality to the standard drive. Items are shipped loose, unmounted.

Digital Operator and Software

Model No.	Option Name	Description
UOP000016 (JVOP-183)	Digital Operator (LCD)	This option is the standard digital operator found on the drive. This option is only required if the original digital operator is lost or damaged. If used as a remote operator, the standard digital operator may be used, but then requires Installation Set A (EZZ020642A) for panel or door mounting and Remote Operator Cable (UWR0051 or UWR0052), each sold separately. Features include: • LCD keypad display, 5 lines x 16 characters, backlit • 7 languages • Copy function • Mounts to RJ-45 keypad port
EZZ020642A	LCD/LED Keypad Installation Set A (Remote Operator Mounting Bracket Kit)	This is a bracket to which the LCD Digital Remote Operator (JVOP-183) attaches, and has (4) threaded holes and screws to attach to the cover of an enclosure. The kit contains (2) screws to mount the Operator to the bracket and (4) screws to attach the bracket to the enclosure.
EZZ020642B	LCD/LED Keypad Installation Set B (Remote Operator Mounting Bracket Kit)	Contains a similar bracket that the keypad attaches to and has non-threaded holes for mounting to an enclosure that has the screws attached to the enclosure already. The kit contains (2) screws to mount the keypad to the bracket and (4) nuts to attach the bracket to the customer supplied screws attached to the enclosure.
UUX000922	Keypad Adapter Kit	This kit can be used when a “new” Z1000 keypad is replacing an “old style” key pad used with E7-based Z1000 drives. This kit will allow enclosure door mounted key pad to be upgraded from E7 style to the Z1000 style digital key pad.
UWR0051	Operator Cable, Remote (1 meter)	These cables are used to connect the Remote Digital Operator (JVOP-18☐). They are available in one (1) or three (3) meter lengths.
UWR0052	Operator Cable, Remote (3 meter)	
UUX000526 (Blank Membrane)	Operator Kits, NEMA Type 3R/4X	This option is used to extend an LCD or LED Digital Remote Operator to the wall of a separately specified, oversized UL Type 3R, 4, 4X, or 12 enclosure (IPX6 environment). Item includes a faceplate bezel with digital operator brackets and membrane to cover the operator cutout in the enclosure door, a 3-foot cable, a 10-foot cable, and a 1:1 template for cutting the necessary cutouts in the enclosure. Keypad can be removed after kit installation. Designed for use with **1000 series Digital Remote Operators (sold separately)**. Connects to RJ-45 port and mounts to enclosure wall.
UUX000527 (Yaskawa Logo Membrane)		
UNP00233-3 (Yaskawa Logo)	Overlay, Keypad, Self-adhesive	This membrane is used to cover the operator cutout in the enclosure door to which the keypad has been remotely mounted.
UNP00233-5 (Blank)		
UOP000017 (Yaskawa Logo Faceplate Membrane)	UL Rated Remote Outdoor Operator/ Mounting Kit	UL Rated Remote Outdoor Operator / Mounting Kit. This option provides all you will need to remotely mount the drive's Digital Operator to the door/wall of a separately specified, oversized UL Type 1, 3R, 4, 4X, or 12 enclosure (IPX6 environment). This kit includes: One JVOP-183R Digital Operator providing RTC, HOA, and outdoor rated LCD display, a faceplate bezel with digital operator brackets and membrane to cover the operator cutout in the enclosure door, a 3-foot cable, a 10-foot cable, and a 1:1 template for cutting the necessary cutouts in the enclosure. Mounting hardware is included. Keypad can be removed after kit installation. Connects to RJ-45 port and mounts to enclosure wall.
UOP000019 (Blank Faceplate Membrane)		
SW.DW.40	DriveWizard® HVAC Software	This optional software package allows upload and download of parameters via PC for data storage and for programming multiple drives. The software also includes graphing and monitoring tools. It is a Windows-based program designed to make startup, commissioning, and troubleshooting the drive as simple as possible. Refer to our website at **www.yaskawa.com** to download the software, and for more information, including minimum system requirements and cable information to interface a PC to the drive.
UWR-00638	USB Interface Cable	This 10-foot male USB-A to male USB-B cable provides a USB-to-USB connection from PC to the drive.
UWR-01076-1	Flash Write Cable	This 6-foot cable connects a PC’s 9-pin serial port to the drive’s keypad port for updating the drive’s firmware, flashing with custom firmware, or updating a network communication option board. It is used with the Flash Tool feature of the DriveWizard® HVAC software.
UWR00468-2	PC Interface Cable	This 6-foot cable interconnects the drive keypad port to the 9-pin communication port on a PC. This cable is used in conjunction with DriveWizard® HVAC software.

Support Tools

Model No.	Option Name	Description
JVOP-181	USB Copy Unit (Y-Stick)	This option allows the drive to connect to the USB port on a PC. It can read, copy and verify drive parameter settings from one drive to another like drive. The unit plugs into the RJ-45 port on the front of the digital operator. Refer to our website at www.yaskawa.com to download the software.
No Model Number	CopyUnitManager Software for USB Copy Unit (Y-Stick)	This option allows the user to transfer and save parameter files from the Copy Unit (JVOP-181), sold separately, to a PC and vice versa. Refer to our website at www.yaskawa.com to download the software.

Network Communications

Model No.	Option Name	Description
SI-W3	LonWorks	This option is compatible with the LonMark Interoperability Association and complies with the Functional Profile for a Variable Frequency Motor Drive. Network connectivity is facilitated by either a Phoenix-style screw termination or RJ-45 connector. Mounts at option connector CN5-A.
SI-EN3	EtherNet/IP	This option complies with the EtherNet/IP protocol specification, and allows for communication over 10/100 Mbps Ethernet networks. This option has the ability to configure the IP Address from a user specified IP address, from a DHCP host, or from a BootP host. The IP address can be set from the drive keypad or from the network. All parameters, diagnostics, and operational commands are accessible via EtherNet/IP. The web interface allows management of diagnostic information through a standard web browser. The embedded web pages include the main page, drive status page, network monitor page, and documentation page. Mounts at option connector CN5-A.
SI-EM3	Modbus TCP/IP	This option complies with the Modbus TCP/IP protocol specification. This allows for Modbus communication over 10/100 Mbps Ethernet networks. This option has the ability to configure the IP Address from a user-specified IP address, from a DHCP host, or from a BootP host. All parameters, diagnostics, and operational commands are accessible via Modbus TCP/IP. This option supports up to 10 simultaneous PLC/PC connections. Mounts at option connector CN5-A.
SI-EN3D	EtherNet/IP with device level ring (DLR)	This option complies with the EtherNet/IP protocol specification. This allows for communication over 10/100 Mbps Ethernet networks. The dual port hardware provides the user the choice of wiring in a star, line or ring configuration. For a ring configuration, device level ring (DLR) is available on this option card. This option has the ability to configure the IP Address from a user specified IP address, from a DHCP host, or from a BootP host. All parameters, diagnostics and operational commands are accessible via EtherNet/IP. Auto-tuning the motor is also possible through this option using the DriveWizard PC program. Mounts at option connector CN5-A.
SI-EM3D	Modbus TCP/IP – Dual Port	This option complies with the Modbus TCP/IP protocol specification. This allows for Modbus communication over 10/100 Mbps Ethernet networks. The dual port hardware provides the user the choice of wiring in a star, line or ring configuration. For a ring configuration, rapid spanning tree protocol (RSTP) is available on this option card. This option has the ability to configure the IP Address from a user specified IP address, from a DHCP host, or from a BootP host. All parameters, diagnostics and operational commands are accessible via Modbus TCP/IP. Auto-tuning the motor is also possible through this option using the DriveWizard PC program. This option supports up to 10 simultaneous PLC/PC connections. Mounts at option connector CN5-A.

Z1000U Dimensions and Data

200 to 240 V

Units: mm (in)

Rated Input Voltage	Model Number CIMR-ZU2E□□□□AUA	Units: mm (in)			Wt. kg (lb)	Drawing Number	Heat Loss (Watts)		
		H	W	D			Heatsink	Internal	Total
200 to 240 V 3-Phase	0028	480 (18.89)	250 (9.84)	360 (14.17)	21 (46)	DD.Z1KU.FR1.IP00	659	103	762
	0042	650 (25.60)	264 (10.39)	420 (16.53)	33 (73)	DD.Z1KU.FR2.IP00	854	168	1022
	0054						1037	195	1232
	0068				36 (79)		1295	225	1520
	0081						1420	238	1658
	0104	816 (32.12)	264 (10.39)	450 (17.71)	63 (139)	DD.Z1KU.FR3.IP00	1696	282	1978
	0130						2157	341	2498
	0154	900 (38.97)	415 (16.33)	403 (15.86)	115 (254)	DD.Z1KU.FR4.IP00	2441	366	2807
	0192						3064	447	3511
	0248	1132 (44.56)	490 (19.29)	450 (17.71)	181 (399)	DD.Z1KU.FR4.5.IP00	3785	578	4363

380 to 480 V

Units: mm (in)

Rated Input Voltage	Model Number CIMR-ZU4E□□□□AUA	Units: mm (in)			Wt. kg (lb)	Drawing Number	Heat Loss (Watts)		
		H	W	D			Heatsink	Internal	Total
380 to 480 V 3-Phase	0011	480 (18.89)	250 (9.84)	360 (14.17)	21 (46)	DD.Z1KU.FR1.IP00	452	80	532
	0014						459	79	538
	0021						641	105	746
	0027						675	106	781
	0034						798	124	922
	0040	650 (25.60)	264 (10.39)	420 (16.53)	33 (73)	DD.Z1KU.FR2.IP00	877	174	1051
	0052						1109	209	1318
	0065				36 (79)		1369	240	1609
	0077						1479	251	1730
	0096	816 (32.12)	264 (10.39)	450 (17.71)	63 (139)	DD.Z1KU.FR3.IP00	1715	290	2005
	0124						2256	362	2618
	0156	990 (38.97)	415 (16.33)	403 (15.86)	115 (254)	DD.Z1KU.FR4.IP00	2857	421	3278
	0180						3316	482	3798
	0216	1132 (44.56)	490 (19.29)	450 (17.71)	181 (399)	DD.Z1KU.FR4.5.IP00	3720	587	4307
	0240						3897	600	4497
	0302	1132 (44.56)	695 (27.36)	450 (17.71)	267 (589)	DD.Z1KU.FR5.IP00	5202	857	6059
	0361						5434	863	6297
	0414						6444	1012	7456

Specifications: 208 and 480 V NEMA Type 1 (Z1D1)

The Z1000U MATRIX Bypass combines excellent harmonic mitigation, input power factor control, and energy saving capabilities in a design specifically suited for use in HVAC building automation applications that require reliable motor control.

The bypass package provides a Z1000U MATRIX drive in a NEMA 1 (UL Type 1) enclosure with input circuit breaker, and 2-contactor style bypass to allow motor operation from the drive or across the line. The Z1000U HVAC MATRIX drive incorporates MATRIX technology to directly convert input AC voltage to output AC voltage. The Z1000U HVAC MATRIX drive offers real choices and benefits for green HVAC applications.

The Z1000U features HVAC application-specific software macros, a Hand-Off-Auto LCD keypad, and a real time clock for system accuracy. Popular building automation communication protocols BACnet (BTL certified), Siemens APOGEE FLN, Johnson Controls Metasys N2, and MEMOBUS/Modbus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

Performance Features

- VT Ratings:
  208 V, 7.5 to 75 HP
  480 V, 7.5 to 350 HP
- V/f Control, Open Loop Vector Control for PM
- Overload capacity: 120% for 60 seconds
- 0-400 Hz Output Frequency
- DC Injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Adjustable accel/decel: 0.1 to 6000 seconds
- Controlled speed range: 40:1
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Torque limiting: 0 to 300%
- Power loss ride through: 2 seconds
- Auto restart after power loss or resettable fault, selectable, programmable
- Up/down floating point control capability
- Stationary motor auto-tuning
- 150% starting torque capability, available from 3 to 60 Hz
- Remote speed reference (speed command) signal:
  - 0 to 10 Vdc/–10 to 10 Vdc (20 K Ohms)
  - 4 to 20 mA/0 to 20 mAdc (250 Ohms)

Bypass Features

- Output and bypass contactors
- Lockable main input circuit breaker
- Thermal motor overload relay, class 20
- 115 Vac control transformer, fused
- Drive H/O/A keypad used for bypass control
- Damper control circuit with end of travel feedback and two adjustable wait time functions
- Selectable energy savings mode
- No load detection (loss of load) fully monitored in drive and bypass modes.

Design Features

- Displacement power factor of 0.98 throughout the motor speed range
- NEC rated input / output amps
- Standard LCD Multi-lingual keypad, Full-text , Hand-Off-Auto with Copy (Read/Write) Function
- 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 (PID) Controls
- Drive internal PID closed loop control with selectable engineering units
- Independent PID control for use with external device
- Differential PID 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
- 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
- Adjustable carrier frequency, 4 kHz to 10 kHz
- Programmable security code
- 8 programmable multi-function input terminals (24 Vdc) providing 60+ programmable features, including:
  - Customer Safeties
  - BAS / Damper Interlock
  - Emergency Override
  - Preset Speed
  - PI control enable / disable
- 2x Form A and 1x Form C programmable multi-function output relays (Rated 1 amp @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status
  - Contactor Control for External Bypass
  - Overtorque/undertorque detection
- One fixed “Fault” form C output relay (Rated 1 amp @ 250 Vac & 30 Vdc)
- 6 preset speeds
- Built-in BACnet (BTL certified), Siemens APOGEE FLN, Johnson Controls Metasys N2, and Modbus/Memobus communication
- Energy Savings Monitor
- Eco-Mode to achive near across-the-line THD and quietest operation
- Flash upgradeable firmware
- Customizable monitor display
- Heat sink over temperature speed foldback feature
- “Bumpless” transfer between Hand and Auto
- Emergency override can be used as “smoke purge”
- Fan failure detection and selectable drive action
- Built-in EMC Filter
- Built-in input fuses
- Input circuit breaker (100 kAIC)
- Energy Savings – Low Power Loss Design
- Compact Package
- Unity Power Factor Control
- IEEE-519 Compliant (<5% TDD) Harmonic Characteristics
- Low Harmonics over Wide Speed Range
- DriveWizard® HVAC Software
- Removable Terminal Block with Memory
- High Reliability with an MTBF of 28 Years
- Short Circuit Withstand Rating: 100K RMS
- Optimal Speed Command Search

Service Conditions

- Input voltage: 208 Vac, 480 Vac, -15/+10%
- Input frequency: 50/60 Hz ±3% (Frequency fluctuation rate: 1 Hz/100 ms or less)
- Ambient service temperature: NEMA 1 (IP20): -10 °C to 40 °C (14 °F to 104 °F)
- Maximum ambient storage temperature: -20 to 60 °C (-4 to 140 °F)
- Humidity: 0% to 95%, non-condensing
- Altitude: to 1000 meters (3300 feet); higher by derating

Standards

- UL 508A (Industrial Control Panels)

Options

- 3-Contactor Bypass
- Drive Service Switch
- 5% Output Reactor
- Soft-start Bypass
- Custom Nameplate
- Speed Pot (door mounted)
- 200 VA Control Power Transformer
- LonWorks Interface
- EtherNet/IP

Model Number Configuration (Z1D1)

Step 1. Complete the Base Number for the voltage and current rating.

Step 2. Add the Option Code letter for each required option. If an option is not wanted, no character is inserted in that position.

BASE NUMBER	OPTIONS	
	POWER	CONTROL
Z 1 D 1 B 040	PN	T

Z1000U Bypass

Enclosure	
1	NEMA 1

Voltage	
D	208 V
B	480 V

Current
NEC Rated Amps (1.6 - 302) Example: 040 = 40 Amps

T Control Options		
W	Custom Nameplate	Choose One or None
D	Ethernet/IP	Choose One or None
L	LonWorks	
Z	Speed Pot	Choose One or None
K	200 VA Transformer (CPT)	Choose One or None

P Power Options		
N	EMC Filter	Included*
G	Drive Service Switch	Choose One or None
B	3-Contactor Bypass	
K	Output Reactor 5%	Choose One or None
W	Soft Start Bypass	Choose One or None

* An EMC filter is internal to the Z1000U drive.

Options (Z1D1)

Enclosure Options

NEMA 1	(1)	The drive and Configured options are provided in a NEMA Type 1 ventilated enclosure, large enough to accommodate any or all of the Configured package options.

Power Options

Drive Input Circuit	(B, G)	For a 3-contactor bypass that removes power from the drive, select option (B). Drive service switch that removes power from the drive, select option (G).
Output Reactor	(K)	No form of output impedance is normally required. A 5% load reactor, option (K), is available if additional output impedance is desired (usually for long lead-lengths or noise reduction).
Soft Start Bypass	(W)*1	Provides a solid-state adjustable soft starter for use when switching to bypass mode. Option (W) provides a solid-state soft-starter with adjustable ramp to reduce mechanical system stress typically associated with across-the-line bypass motor starts. Select option (W) if the application cannot tolerate the mechanical load stress caused by across-the-line bypass motor starts. **Note *1:** The following Z1D1 models have a short circuit withstand rating of 65 kA RMS symmetrical when option W is specified: - Z1D1B011 to ZIDIB156 - Z1D1D024 to Z1D1D143 Other Z1D1 models have a short circuit withstand rating of 100 kA RMS symmetrical when option W is specified.

Control Options

EtherNet/IP SI-EN3	(D)	EtherNet/IP, option (D), requires the addition of an optional board.
LonWorks SI-W3	(L)	LonWorks, option (L), requires the addition of an optional board.
200 VA Transformer (CPT)	(K)	200 VA Control Power Transformer (for customer use).
Speed pot	(Z)	Door mounted.
Custom Nameplates	(W)	Custom engraved nameplates with white lettering on black lamicoid are available with option (W), for special tagging purposes (Example: “AHU #1”). Note that this option requires the text to be specified by the customer.

Model and Power Option Selection (Z1D1)

208 V Models and Power Options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 1 MATRIX Bypass Drive (With EMC filter) *2	Soft Start Bypass	3-Contactor Bypass	Drive Input Service Switch	Output Reactor	EMC Filter
			Z1D1□□□□□□	W	B	G	K	N *2
208 V 3-Phase	24.2	7.5	D024PN	Available	Available	Available	Available	Included
	30.8	10	D030PN					
	46.2	15	D046PN					
	59.4	20	D059PN					
	74.8	25	D074PN					
	88	30	D088PN					
	114	40	D114PN					
	143	50	D143PN					
	169	60	D169PN					
	211	75	D211PN					

*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 volts.

*2. An EMC filter is included, and is internal to the MATRIX drive.

480 V Models and Power Options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 1 MATRIX Bypass Drive (With EMC filter) *2	Legend: A = Available N/A = Not available or not applicable				
				Soft Start Bypass	3-Contactor Bypass	Drive Input Service Switch	Output Reactor	EMC Filter
			Z1D1□□□□□□	W	B	G	K	N *2
480 V 3-Phase	11	7.5	B011PN	A	A	A	A	Included
	14	10	B014PN					
	21	15	B021PN					
	27	20	B027PN					
	34	25	B034PN					
	40	30	B040PN					
	52	40	B052PN					
	65	50	B065PN					
	77	60	B077PN					
	96	75	B096PN			N/A		
	124	100	B124PN			N/A		
	156	125	B156PN			N/A		
	180	150	B180PN			N/A		
	240	200	B240PN			N/A		
	302	250	B302PN			N/A		
	361	300	B361PN			N/A		
	414	350	B414PN			N/A		

*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 480 volts.

*2. An EMC filter is included, and is internal to the MATRIX drive.

Dimensions and Data (Z1D1)

Rated Input Voltage	Matrix Bypass Base No. Z1D1□□□□	Rated Output Current (Amps)	Nominal HP *1	Bypass Box No.	Submittal Documents (Outline Drawing) (Schematic)	Enclosed, NEMA 1 Bypass Data			
						Overall Dimensions (in)			Weight (lb)
						H	W	D	
208 V 3-Phase	D024	24.2	7.5	W1	DD.Z1U.1.W1.01 DS.Z1D1.01	48	22	18	230
	D030	30.8	10	W2	DD.Z1U.1.W2.01 DS.Z1D1.01	60	22	18	325
	D046	46.2	15						340
	D059	59.4	20						350
	D074	74.8	25						350
	D088	88	30	W3	DD.Z1U.1.W3.01 DS.Z1D1.01	60	30	20	465
	D114	114	40						475
	D143	143	50	F1	DD.Z1U.1.F1.01 DS.Z1D1.01	86	41	32	825
	D169	169	60						825
	D211	211	75						1050
480 V 3-Phase	B011	11	7.5	W1	DD.Z1U.1.W1.01 DS.Z1D1.01	48	22	18	220
	B014	14	10						230
	B021	21	15						230
	B027	27	20	W2	DD.Z1U.1.W2.01 DS.Z1D1.01	60	22	18	300
	B034	34	25						300
	B040	40	30						315
	B052	52	40						350
	B065	65	50						360
	B077	77	60						375
	B096	96	75	W3	DD.Z1U.1.W3.01 DS.Z1D1.01	60	30	20	475
	B124	124	100						490
	B156	156	125	F1	DD.Z1U.1.F1.01 DS.Z1D1.01	86	41	32	850
	B180	180	150						900
	B240	240	200						1100
	B302	302	250	F2	DD.Z1U.1.F2.01 DS.Z1D1.01	86	70	31	1600
	B361	361	300						1750
	B414	414	350						1800

*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.

Z1000U MATRIX Configured Drive NEMA Type 1 (Z1E1)

Specifications: 208 and 480 V NEMA Type 1 (Z1E1)

The Z1000U Configured variable-speed MATRIX drive combines excellent harmonic mitigation, input power factor control, and energy saving capabilities in a design allowing flexibility when providing the features and options commonly specified by facility designers.

The configured package provides a Z1000U MATRIX drive containing HVAC application-specific software macros, a real time clock, and Hand-Off-Auto LCD keypad with an input disconnect switch and space for several power options inside a NEMA 1 (UL Type 1) enclosure.

The Z1000U HVAC MATRIX drive incorporates MATRIX technology to directly convert input AC voltage to output AC voltage. The Z1000U HVAC MATRIX drive offers real choices and benefits for green HVAC applications.

Popular building automation communication protocols,BACnet (BTL certified), Siemens APOGEE FLN, Johnson Controls Metasys N2, and Modbus/Memobus are embedded in the drive. Interface cards for LonWorks and EtherNet/IP communications are offered separately.

Performance Features

- VT Ratings:
  208 V, 7.5 to 75 HP
  480 V, 7.5 to 350 HP
- V/f Control, Open Loop Vector Control for PM
- Overload capacity: 120% for 60 seconds
- 0-400 Hz Output Frequency
- DC Injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Adjustable accel/decel: 0.1 to 6000 seconds
- Controlled speed range: 40:1
- Critical frequency rejection capability: 3 selectable, adjustable bands
- Torque limiting: 0 to 300%
- Power loss ride through: 2 seconds
- Auto restart after power loss or resettable fault, selectable, programmable
- Up/down floating point control capability
- Stationary motor auto-tuning

Design Features

- Displacement power factor of 0.98 throughout the motor speed range
- NEC rated input / output amps
- Standard LCD Multi-lingual keypad, Full-text , Hand-Off-Auto with Copy (Read/Write) Function
- 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 (PID) Controls
- Drive internal PID closed loop control with selectable engineering units
- Independent PID control for use with external device
- Differential PID 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
- 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
- 150% starting torque capability, available from 3 Hz
- Remote speed reference (speed command) signal:
  - 0 to 10 Vdc/–10 to 10 Vdc (20 K Ohms)
  - 4 to 20 mA/0 to 20 mAdc (250 Ohms)
- Adjustable carrier frequency, from 4 kHz to 10 kHz
- Programmable security code
- 8 programmable multi-function input terminals (24 Vdc) providing 60+ programmable features, including:
  - Customer Safeties
  - BAS / Damper Interlock
  - Emergency Override
  - Preset Speed
  - PI control enable / disable
- 2x Form A and 1x Form C programmable multi-function output relays (Rated 1 amp @ 250 Vac & 30 Vdc), providing 50+ functions, including:
  - Damper control
  - Hand/Auto Status
  - Contactor Control for External Bypass
  - Overtorque/undertorque detection
- Serial communication status
- No load detection (broken belt alert)
- One fixed “Fault” form C output relay (Rated 1 amp @ 250 Vac & 30 Vdc)
- 6 preset speeds
- Built-in BACnet (BTL certified), Siemens APOGEE FLN, Johnson Controls Metasys N2, and Modbus/Memobus communication
- Energy Savings Monitor
- Eco-Mode to achive near across-the-line THD and quietest operation
- Flash upgradeable firmware
- Customizable monitor display
- Heat sink over temperature speed foldback feature
- “Bumpless” transfer between Hand and Auto modes
- Emergency override can be used as “smoke purge” function
- Fan failure detection and selectable drive action
- Built-in EMC Filter
- Built-in input fuses
- Input disconnect switch
- Energy Savings – Low Power Loss Design
- Compact Package
- Unity Power Factor Control
- IEEE-519 Compliant (<5% TDD) Harmonic Characteristics
- Low Harmonics over Wide Speed Range
- DriveWizard® HVAC Software
- Removable Terminal Block with Memory
- High Reliability with an MTBF of 28 Years
- Short Circuit Withstand Rating: 100K RMS (with optional circuit breaker)
- Optimal Speed Command Search

Service Conditions

- Input voltage: 208 Vac, 480 Vac, -15/+10%
- Input frequency: 50/60 Hz ±3% (Frequency fluctuation rate: 1 Hz/100 ms or less)
- Maximum ambient service temperature NEMA 1: -10 to 40 °C (14 to 104 °F)
- Maximum ambient storage temperature: -20 to 60 °C (-4 to 140 °F)
- Humidity: 0% to 95%, non-condensing
- Altitude: to 1000 meters (3300 feet); higher by derating
- Service factor: 1.0

Standards

- UL 508A (Industrial Control Panels)

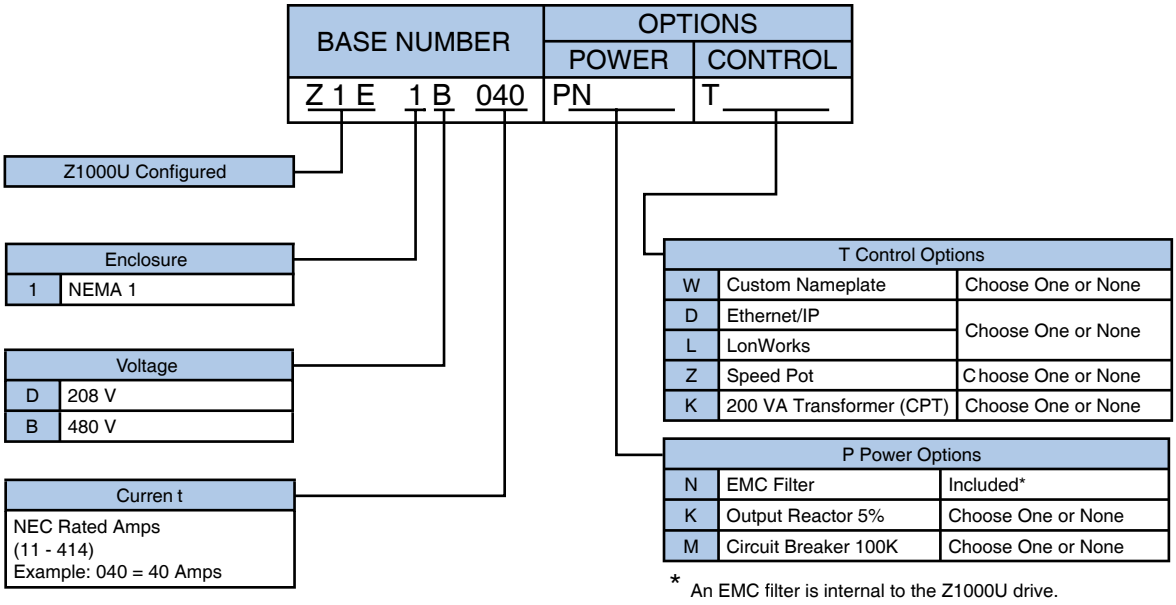
Options

- 5% Output Reactor
- Lockable input Circuit Breaker (100 kAIC)
- Custom Nameplate
- Speed Pot (door mounted)
- 200 VA Control Power Transformer
- LonWorks Interface
- EtherNet/IP

Model Number Configuration (Z1E1)

Step 1. Complete the Base Number for the voltage and current rating.

Step 2. Add the Option Code letter for each required option. If an option is not wanted, no character is inserted in that position.



Options (Z1E1)

Power Options

Output Reactor	(K)	No form of output impedance is normally required. A 5% load reactor, option (K), is available if additional output impedance is desired (usually for long lead-lengths or noise reduction).
Circuit Breaker 100 kAIC	(M)	Lockable input Circuit Breaker (100 kAIC panel rating).

Z1000U MATRIX Configured Drive NEMA Type 1 (Z1E1)

Control Options

EtherNet/IP SI-EN3	(D)	EtherNet/IP, option (D), requires the addition of an optional board.
LonWorks SI-W3	(L)	LonWorks, option (L), requires the addition of an optional board.
200 VA Transformer (CPT)	(K)	200 VA Control Power Transformer (for customer use).
Speed pot	(Z)	Door mounted.
Custom Nameplates	(W)	Custom engraved nameplates with white lettering on black lamicoid are available with option (W), for special tagging purposes (Example: “AHU #1”). Note that this option requires the text to be specified by the customer.

Model and Power Option Selection (Z1E1)

208 V Models and Power Options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 1 Configured Matrix (With EMC filter) *2	Circuit Breaker (100 kAIC)	Output Reactor	EMC Filter
			Z1E1□□□□□□	M	K	N *2
208 V 3-Phase	24.2	7.5	D024PN	Available	Available	Included
	30.8	10	D030PN			
	46.2	15	D046PN			
	59.4	20	D059PN			
	74.8	25	D074PN			
	88	30	D088PN			
	114	40	D114PN			
	143	50	D143PN			
	169	60	D169PN			
	211	75	D211PN			

*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 volts.

*2. An EMC filter is included, and is internal to the MATRIX drive.

480 V Models and Power Options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP *1	NEMA 1 Configured Matrix (With EMC filter) *2	Circuit Breaker (100 kAIC)	Output Reactor	EMC Filter
			Z1E1□□□□□□	M	K	N *2
480 V 3-Phase	11	7.5	B011PN	Available	Available	Included
	14	10	B014PN			
	21	15	B021PN			
	27	20	B027PN			
	34	25	B034PN			
	40	30	B040PN			
	52	40	B052PN			
	65	50	B065PN			
	77	60	B077PN			
	96	75	B096PN			
	124	100	B124PN			
	156	125	B156PN			
	180	150	B180PN			
	240	200	B240PN			
	302	250	B302PN			
	361	300	B361PN			
	414	350	B414PN			

*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 480 volts.

*2. An EMC filter is included, and is internal to the MATRIX drive.

Dimensions and Data (Z1E1)

Rated Input Voltage	Matrix Configured Base No. Z1E1□□□□	Rated Output Current (Amps)	Nominal HP *1	Bypass Box No.	Submittal Documents (Outline Drawing) (Schematic)	Enclosed, NEMA 1 Configured Data			
						Overall Dimensions (in)			Weight (lb)
						H	W	D	
208 V 3-Phase	D024	24.2	7.5	W1	DD.Z1U.1.W1.01 DS.Z1E1.01	48	22	18	210
	D030	30.8	10	W2	DD.Z1U.1.W2.01 DS.Z1E1.01	60	22	18	300
	D046	46.2	15						305
	D059	59.4	20						315
	D074	74.8	25						315
	D088	88	30	W3	DD.Z1U.1.W3.01 DS.Z1E1.01	60	30	20	420
	D114	114	40						430
	D143	143	50	F1	DD.Z1U.1.F1.01 DS.Z1E1.01	86	41	32	745
	D169	169	60						745
	D211	211	75						945
480 V 3-Phase	B011	11	7.5	W1	DD.Z1U.1.W1.01 DS.Z1E1.01	48	22	18	200
	B014	14	10						210
	B021	21	15						210
	B027	27	20	W2	DD.Z1U.1.W2.01 DS.Z1E1.01	60	22	18	270
	B034	34	25						270
	B040	40	30						285
	B052	52	40						315
	B065	65	50						325
	B077	77	60						340
	B096	96	75	W3	DD.Z1U.1.W3.01 DS.Z1E1.01	60	30	20	425
	B124	124	100						440
	B156	156	125	F1	DD.Z1U.1.F1.01 DS.Z1E1.01	86	41	32	765
	B180	180	150						810
	B240	240	200						990
	B302	302	250	F2	DD.Z1U.1.F2.01 DS.Z1E1.01	86	70	31	1440
	B361	361	300						1575
	B414	414	350						1620

*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.

Technical Training

In today's world of global competition, it is impossible for a company to survive without "state-of-the-art" technically trained associates and customers. Yaskawa Technical Training Services (TTS) is comprised of engineers who are specialists in their field.

Yaskawa America has three training facilities in the United States. The primary training facility is in Yaskawa America's North American Headquarters in Waukegan, Illinois (45 miles north of Chicago, 50 miles south of Milwaukee). This facility has six training rooms; two lecture halls, two training rooms and two training labs.

Besides the possibility of attending training classes in Waukegan and Los Angeles, Yaskawa America can also bring training to the customer. On-site classes are available in two varieties. The first is to duplicate the official training classes at the customer's location. Full functioning demo units, data projector, computer and documentation can be shipped to recreate the official class on-site. The second variety is road show training. Road show training is a one-day training class that is specifically tailored to the students' needs and questions. Only basic demos are used and the topics covered in class are generated by the students in attendance.

The Yaskawa Virtual Training Room is another training option. All you need is an Internet connection and a telephone. This is a live, interactive training class, which gives you the ability to talk to the instructor as well as other students. The Internet connection allows us to show slides and demonstrate software packages. The telephone is for the audio portion of the training class. Web classes can be found on the Yaskawa formal training schedule and can also be done on-demand, per the time and preference of the customer.

To enroll, contact Technical Training Services.

Phone: 1-800-YASKAWA (1-800-927-5292), then dial 2 for "Drives" and 4 for "Training"

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E-mail: **training@yaskawa.com**

Check out the latest class schedule and cut sheets at www.yaskawa.com

YASKAWA

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