

YASKAWA

Z1000U

HVAC MATRIX DRIVE

IT'S PERSONAL



Z1000U HVAC MATRIX DRIVE

A CLASS OF ITS OWN

Add significantly to your green initiative with the Z1000U HVAC Matrix Drive, the product that goes beyond conventional drive performance by combining excellent low harmonic levels, input power factor and energy saving capabilities.

**PROVEN
POWERFUL
RELIABLE**

INNOVATIVE MATRIX TECHNOLOGY



The Z1000U can be used for standard and low harmonic applications with the unique advantage of direct AC-to-AC power conversion. This unique design offers the best choice for induction motors (IM) and permanent magnet motors (PM). Benefits include low input current harmonics with near unity power factor allowing for increased energy efficiency. The bi-directional switching technology allows for continuous motoring or continuous regeneration. This means that fewer parts are required, leading to higher machine reliability. Moreover, the Z1000U can automatically switch into across-the-line operation through the drive, eliminating drive generated harmonics, drive losses, and motor noise.

COST SAVING



In addition to a reduction of energy consumption, the Z1000U provides cost-saving benefits through a simplified installation and smaller panel requirements. The Z1000U eliminates braking resistors that convert regenerative energy into heat which can be a safety concern in some application environments.

EMBEDDED BACnet



The Z1000U fully supports this popular building automation network via embedded BACnet.

CLEAN POWER



The sinusoidal input current, with a total harmonic distortion of less than 5%, and a true power factor of near unity, minimizes losses in grid components like generators and transformers. This, at the same time, greatly reduces the potential of disturbance of other devices and improves the reliability of your system.

TIME SAVING INSTALLATION



As no external components like harmonic filters or active front end units are required, connecting a Z1000U drive becomes a matter of minutes. 3 wires in, 3 wires out. It cannot be easier to build a low harmonic regenerative solution.

LOW HARMONIC SOLUTION



The Z1000U offers the best low harmonic solution in one unit. It does not need any external devices to facilitate IEEE 519 compliance. Its harmonic performance meets the most stringent requirement of IEEE 519 at the input of the drive, making it an all around green solution. Its input harmonics remain low, not just at rated power, but well below leading harmonic solutions throughout the speed/load range.

COMPACT SIZE



The Z1000U is an all-in-one compact solution for low harmonics. There is no smaller solution. Save as much as 80% space. Retrofit and upgrades are made easy, since it easily fits in nearly every existing 18-Pulse package.

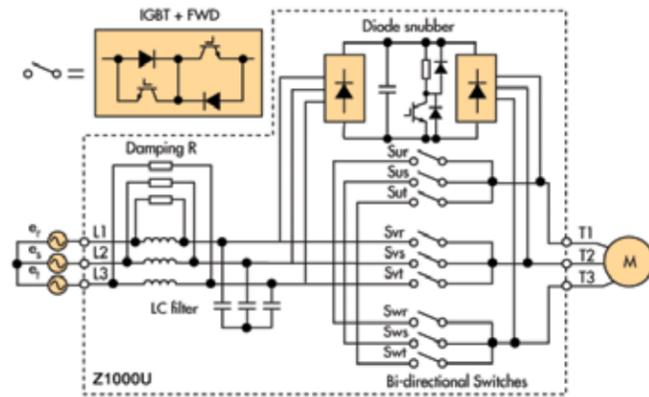


MATRIX DRIVE TECHNOLOGY

The evolution of variable speed drive technology stems from the need to boost motor control performance and to provide clean, efficient use of line power. To that end, recent advancements in drive technology have made way for a drive to use Matrix technology.

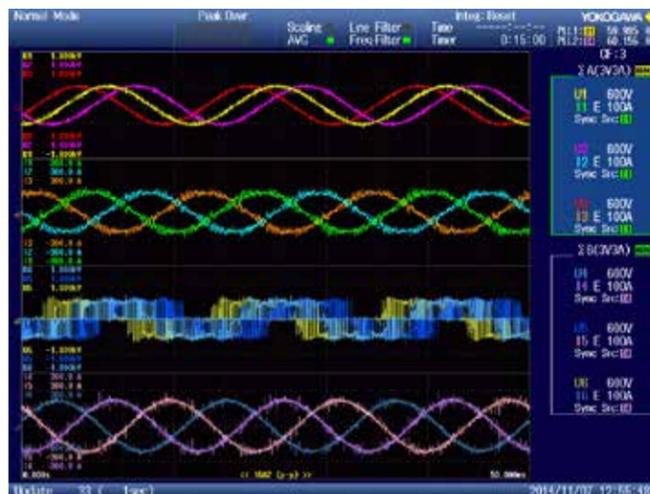
MATRIX DRIVE ARCHITECTURE

A drive using Matrix technology is different than conventional drives. The difference lies within the Matrix technology itself. Unlike conventional drives, Matrix Drives employs a system of nine bi-directional switches arranged in a Matrix to convert a three-phase AC input voltage directly into a three-phase AC output voltage. Matrix technology eliminates the need for a rectifying circuit and DC smoothing circuit found in conventional AC drive inverters. A Matrix drive incorporates a compact input PWM filter to mitigate the regenerative PWM waveform and provide a clean sine wave back onto the line.



OUTPUT WAVEFORM

The beauty of the way the matrix drive generates its output waveform is the resulting input current draw. Unlike other low input harmonic current solutions the matrix drive does not force current into the drive to reduce harmonics. The matrix drive draws current with low harmonics naturally. Each time the drive generates a pulse to the motor using the input voltage a corresponding current draw occurs. Current is drawn from the line during each and every step of the variable three level output. Generating a full PWM output voltage waveform to control the motor naturally results in an input current waveform that is sinusoidal with low harmonic currents. The matrix drive can operate at rated power with less than 5% iTHD at the input of the drive with near unit power factor (0.98 or better).



WINNER OF INTERNATIONAL AWARDS

The milestone product for harmonic suppression, regenerative energy savings and space savings.



**COMPACT
CREATIVE
INNOVATIVE**

CLEAN POWER

The Matrix Drive's unique direct AC-to-AC drive conversion process allows for a natural input current draw with IEEE 519 facilitating low input current harmonics. Enjoy low input harmonic performance at every speed/load operating condition.



**GREEN
EFFICIENT
ENERGY SAVING**

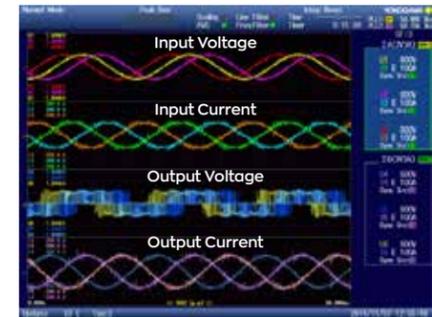
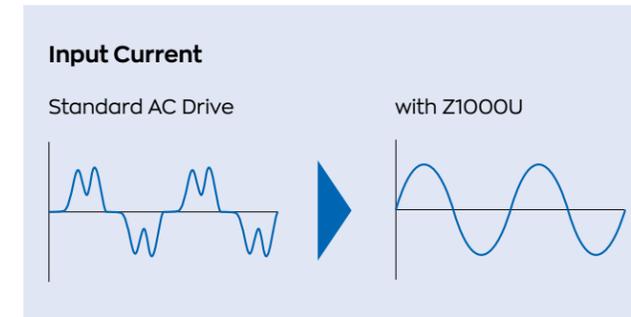
CLEAN CURRENTS

Facilitates IEEE 519 compliance at the input of the drive.

CLEAN POWER

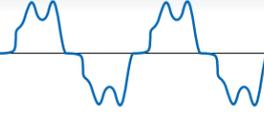
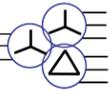
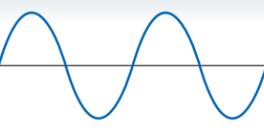
Z1000U is the answer to power quality, energy savings, and system efficiency improvement. The advanced technology of the Yaskawa matrix drive combines all application key features in a single space-saving drive design reducing iTHD to 5% without the need for external transformers or heavy filtering.

- Facilitates IEEE 519 Compliance
- No oversizing of transformers, generators or cables
- Sinusoidal input current and power factor at ~0.98
- Compact installation - 3 wire in, 3 wire in
- Reduced lifecycle cost
- Reliable operation



Matrix Drive Rated Power Operation

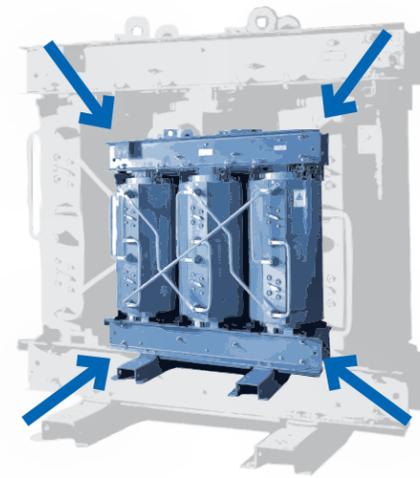
THE IDEAL ENERGY-SAVING CLEAN POWER FOR YOUR APPLICATION

		(Data shown below taken at rated power)		
	Standard AC drive		88% Current distortion	0.75 Power factor
	Standard AC drive with DC reactor		33% Current distortion	0.9 Power factor
	12-pulse system with Standard AC drive		7 - 12% Current distortion	0.95 Power factor
	Z1000U Industrial Matrix Drive		3 - 5% Current distortion	0.98 Power factor

EASY MODERNIZATION

SYSTEM EFFICIENCY

The AC-to-AC design of the matrix drive creates a sinusoidal input current. It means the Z1000U provides a power factor close to 1. This near unity power factor makes it possible to reduce losses in generators, transformers, and cables. When installing the Z1000U you can even design a smaller grid capacity for new installations or add more drives to existing power lines without additional stress to the power transformers.



Significantly lower your system size when modernizing

MODERNIZATION

Yaskawa Matrix Technology has been successfully proven in the field of low harmonic, space saving and HVAC applications. Reduce transformer burden or sizing requirements, retrofit aging equipment using existing panels, and reduce existing operational costs using the more efficient direct AC-to-AC Matrix drive design.

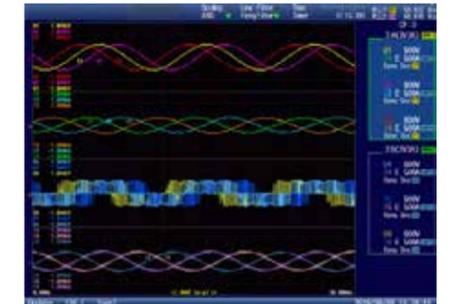
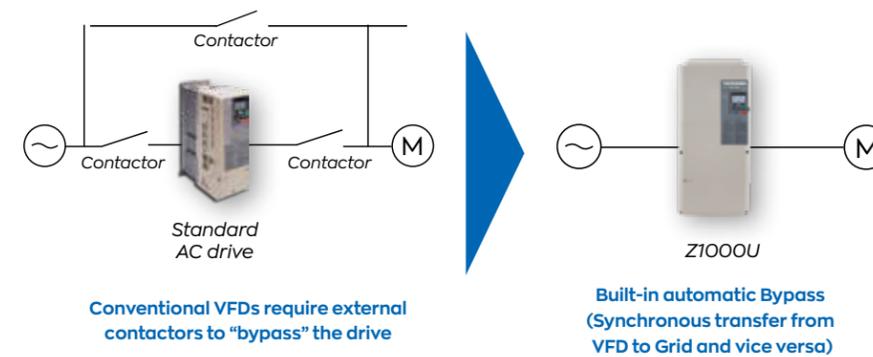
- Low harmonic (facilitate IEEE 519 Compliance)
- Significant reduction in panel cooling requirements
- Easy conversion from an existing to a new system
- Designed for 10 years of maintenance-free use

COMPACT EFFICIENCY

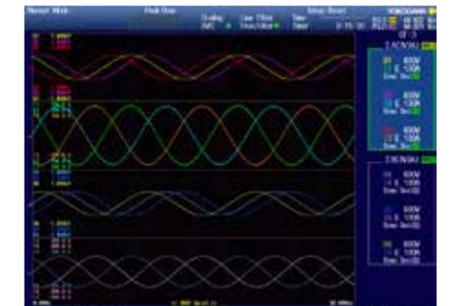
ECO-MODE - BUILT-IN ACROSS-THE-LINE (BYPASS) FUNCTION

The Z1000U has a built-in bypass function. Whenever an application is matching the grid frequency, the Z1000U can synchronize the motor to grid frequency. This built-in bypass function eliminates switching losses and any drive generated current harmonics and electrical motor noise.

- Eliminates all drive generated harmonics
- Eliminates drive noise (EMC/RF)
- Prolonged drive motor lifetime
- Drive fault detection monitoring still active
- Eliminates audible motor noise



Matrix Operation:
Rated Speed, Rated Torque



Eco-Mode Operation:
Rated Speed, Rated Torque

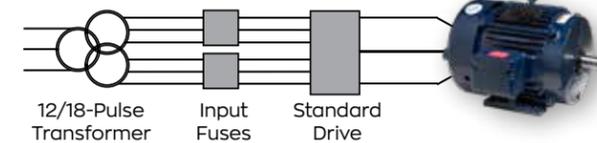
COMPACT AND EASY

The Z1000U design advantages, compared to conventional dynamic braking solutions, continues in saving installation space (up to 50%), reduced weight and 100% save of wasted energy. All you need to connect is 3 wires in and 3 wires out.

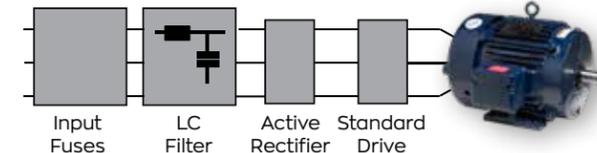
- Smaller panels
- Very compact footprint
- Simple installation in shortest time
- Perfectly fits in existing installations - easy retrofit

COMPLEX

12/18-PULSE SYSTEM



ACTIVE COMPONENT SYSTEM



SIMPLE



3 WIRES IN, 3 WIRES OUT

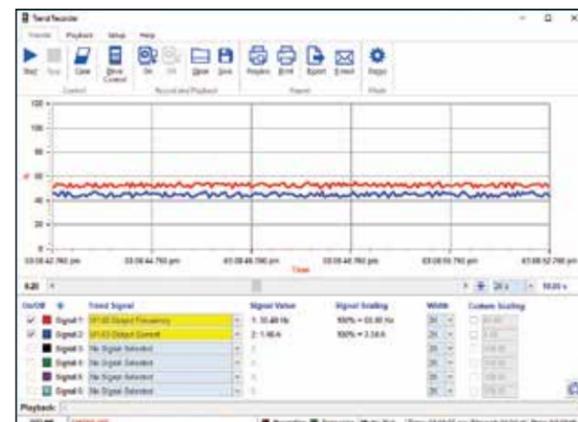
- Fewer components
- Less Space
- Faster Setup
- Higher Efficiency

CONTROL MADE EASY

Unleash all that the Z1000U has to offer with Yaskawa's intuitive and flexible PC-based interface tools. Enjoy DriveWizard® HVAC for configuring, advanced monitoring, trending, and file storage.

DRIVEWIZARD HVAC

- Complete online/offline parameter management PC support tool.
- Connect via USB and interface with the Z1000U.
- Create configurations offline, then later connect and download them to Z1000U.
- Monitor a dashboard of dynamic variables and discrete information.
- Chart your process with up to 6 channels of recorded data.
- Create reports for exporting and emailing.



DriveWizard® and DriveWorksEZ® are registered trademarks of Yaskawa.



HARMONICS ESTIMATOR

Estimates total harmonic distortion when using Yaskawa HVAC drives and references IEEE 519 to determine if the defined system meets the required standard. The results can be viewed in graphical and text format with built-in functions to generate an energy prediction report especially designed for consultants.

ENERGY SAVINGS PREDICTOR

Predicts energy savings achieved when using Yaskawa HVAC drives instead of conventional control methods in HVAC applications. The results can be viewed in graphical and text format with built-in functions to generate an energy prediction report, especially designed for consultants.



PROGRAMMING SIMULATORS

Provide a realistic simulation of the programming and operation of an Z1000U or Z1000U Electronic Bypass package. All major functions of the drives are simulated by these PC tools with the addition of I/O, trending, diagnostic operations. The software has an integrated automatic update function that allows for updating the actual program - when connected to the internet.

HVAC MATRIX DRIVE

TECHNICAL DATA



Increase your green space with the Yaskawa Z1000U HVAC Matrix Drive, the product that goes beyond conventional drives by combining excellent harmonic mitigation, input power factor control and energy saving capabilities.

The Z1000U HVAC Matrix drive provides extremely low harmonic distortion in a space-saving design, along with the same HVAC-specific features as the standard HV600. This single-component solution achieves excellent low distortion levels without the need for harmonics mitigation, such as passive filters or multi-pulse arrangements. Unlike conventional drives, Yaskawa's Matrix technology creates a variable output by switching directly from the AC input power, thus eliminating the DC bus. The Matrix drive's outstanding harmonic performance helps system designers achieve harmonics performance levels well within the recommended practice of IEEE 519.



APPLICATIONS

- Supply & return fans
- Cooling tower fans
- Chilled water pumps
- Chiller compressors

POWER RANGE

- 10-100 HP, 208 V
- 7.5-350 HP, 480 V

AVAILABLE PACKAGES

- Electronic Bypass
- Configured

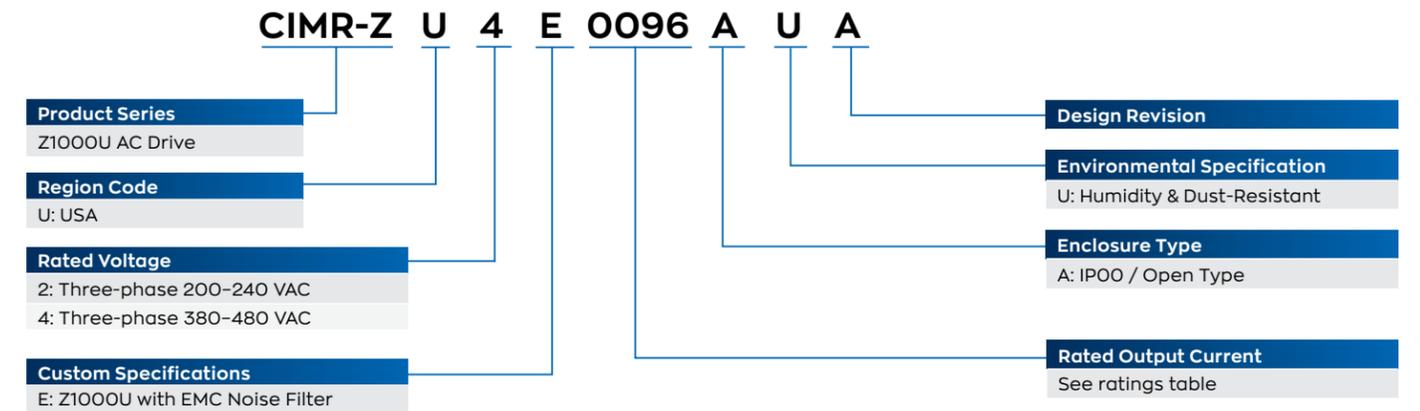
ENCLOSURES

- Open Type (IPO0)
- UL Type 1 Kit

PRIMARY FEATURES AND BENEFITS

- Facilitates IEEE 519 Compliance
- Low input distortion across a wide load and speed range
- < 5% THD
- Eco-mode to achieve near across-the-line THD
- High efficiency design provides extra energy savings as compared to other low harmonic solutions
- Near unity True Power Factor at full load
- Integrated Input Fusing provides 100kA SCCR
- Integrated C2 EMC filter
- Compact design
- High reliability with an MTBF of 28 years
- Embedded BACnet Communications (BTL Certified)
- Embedded Real Time Clock for event stamping
- High Carrier Frequency (Low Motor Noise) capability
- 0-400 Hz output frequency
- 120% overload for 60 seconds
- Motor auto-tuning
- Multi-language LCD display, with Hand/Off/Auto and copy function
- DriveWizard® HVAC software
- Embedded Timer functions for starting, stopping and speed changes
- Start into spinning load (speed search)
- Both Induction and Permanent Magnet motor control
- Available I/O
 - (8) Multi-function digital inputs
 - (3) Multi-function analog inputs
 - (3) Multi-function relay outputs
 - (2) Multi-function 0-10 VDC or 4-20 mA analog outputs
 - (1) Fault relay

Model Number Designation



Models and Ratings

208 V MODELS

CIMR-ZU2E □□□□ AUA	0028	0042	0054	0068	0081	0104	0130	0154	0192	0248
Rated Output Current (A)	28	42	54	68	81	104	130	154	192	248
Nominal HP 240V (208V)	10 (7.5)	15 (10)	20 (15)	25 (20)	30 (25)	40 (30)	50 (40)	60 (50)	75 (60)	100 (75)
Dim (in)	Height	19	26	26	26	26	32	32	39	45
	Width	10	10	10	10	10	10	10	16	19
	Depth	14	17	17	17	17	18	18	16	18
Heat Loss (W)	Weight (lb)	46	73	73	79	79	139	139	254	399
	Heatsink	659	854	1037	1295	1420	1696	2157	2441	3785
	Internal	103	168	195	225	238	282	341	366	578
	Total	762	1022	1232	1520	1658	1978	2498	2807	4363

480 V MODELS

CIMR-ZU4E □□□□ AUA	0011	0014	0021	0027	0034	0040	0052	0065	0077
Rated Output Current (A)	11	14	21	27	34	40	52	65	77
Nominal HP	7.5	10	15	20	25	30	40	50	60
Dim (in)	Height	19	19	19	19	19	26	26	26
	Width	10	10	10	10	10	10	10	10
	Depth	14	14	14	14	14	17	17	17
Heat Loss (W)	Weight (lb)	46	46	46	46	46	73	73	79
	Heatsink	452	459	641	675	798	877	1109	1369
	Internal	80	79	105	106	124	174	209	240
	Total	532	538	746	781	922	1051	1318	1730

CIMR-ZU4E □□□□ AUA	0096	0124	0156	0180	0216	0240	0302	0361	0414
Rated Output Current (A)	96	124	156	180	216	240	302	361	414
Nominal HP	75	100	125	150	175	200	250	300	350
Dim (in)	Height	32	32	39	39	45	45	45	45
	Width	10	10	16	16	19	19	27	27
	Depth	18	18	16	16	18	18	18	18
Heat Loss (W)	Weight (lb)	139	139	254	254	399	399	589	589
	Heatsink	1715	2256	2857	3316	3720	3897	5202	5434
	Internal	290	362	421	482	587	600	857	863
	Total	2005	2618	3278	3798	4307	4497	6059	6297

Note: Data subject to change.

DRIVE FUNCTIONS

CONTROL FUNCTIONS

Item	Specification
Control methods	V/f Control (V/f), V/f Control with PG (V/f w/PG), Open Loop Vector Control for PM (OLV/PM)
Frequency control range	0.01 to 400Hz
Frequency accuracy (Temperature fluctuation)	Digital input: within $\pm 0.01\%$ of the max. output frequency (-10°C to $+40^{\circ}\text{C}$) Analog input: within $\pm 0.1\%$ of the max. output frequency ($25^{\circ}\text{C} \pm 10^{\circ}\text{C}$)
Frequency setting resolution	Digital input: 0.01 Hz Analog input: 1/2048 of the maximum output speed setting (11 bit plus sign)
Output speed resolution	0.001Hz
Frequency setting signal	Main speed frequency reference: DC -10 to +10 V (20 k Ω), DC 0 to +10 V (20 k Ω), 4 to 20 mA (250 Ω), 0 to 20mA (250 Ω) Main speed reference: Pulse train input (max. 32 kHz)
Speed control range	1:40 (V/f, V/f w/PG), 1:20 (OLV/PM)
Speed control accuracy	V/f: ± 0.2 to 3% ($25^{\circ}\text{C} \pm 10^{\circ}\text{C}$)* ² OLV/PM: $\pm 0.2\%$ ($25^{\circ}\text{C} \pm 10^{\circ}\text{C}$)* ²
Speed response	OLV/PM: 10 Hz ($25^{\circ}\text{C} \pm 10^{\circ}\text{C}$) ($77^{\circ}\text{F} \pm 50^{\circ}\text{F}$)
Accel/Decel time	0.0 to 6000.0s (4 selectable combinations of independent acceleration and deceleration settings)
Braking torque	Same value as overload tolerance
Main control functions	Momentary Power Loss Ride-Thru, Speed Search, Overtorque/Undertorque Detection, 4 Step Speed (max), Accel/Decel Switch, S-curve Accel/decel, 3-Wire Sequence, Auto-Tuning (Stationary for Line-to-Line Resistance, Rotational for V/f Control), Cooling Fan on/off Switch, Slip Compensation, Torque Compensation, Frequency Jump, Upper/lower Limits for Frequency Reference, DC Injection Braking at Start and Stop, Overexcitation Braking, PID Control (with sleep function), Energy Saving Control, APOGEE FLN Comm. (RS-422/RS-485 4.8 kbps), BACnet Comm. (RS-485 max. 76.8 kbps), MEMOBUS/Modbus Comm. (RS-422/RS-485 max. 115.2 kbps), Metasys N2 Comm. (RS-422/RS-485 9.6 kbps), Fault Restart, Application Presets, Overexcitation Deceleration, Sequence Timer Operation, Secondary PI Control, Bypass Operation, HOA Keypad, Dynamic Noise Control

PROTECTION FUNCTIONS

Item	Specification
Power supply regeneration	Available
Motor protection	Electronic thermal overload relay
Momentary overcurrent protection	Drive stops when output current reaches about 200% of the rated current
Overload protection	Drive stops after 60 s at 120% of rated heavy duty output current* ³
Overvoltage protection	200V class: Stops when input voltage exceeds approx. 315 V 400V class: Stops when input voltage exceeds approx. 630 V
Undervoltage protection	200V class: Stops when input voltage falls below approx. 150 V 400V class: Stops when input voltage falls below approx. 300 V
Momentary power loss ride-thru	Immediately stop after 2 ms or longer power loss* ⁴ Continuous operation during power loss up to 2 s (standard)* ⁵
Ground protection	Electronic circuit protection* ⁶

OPERATING ENVIRONMENT

Item	Specification
Area of use	Indoors
Ambient temperature	-10 $^{\circ}\text{C}$ to +50 $^{\circ}\text{C}$ (IP00 enclosure) -10 $^{\circ}\text{C}$ to +40 $^{\circ}\text{C}$ (IP20/UL Type 1 enclosure)
Humidity	95 RH% or less (non-condensing)
Storage temperature	-20 $^{\circ}\text{C}$ to +60 $^{\circ}\text{C}$ (short-term temperature during transportation)
Altitude	Max. 1,000m (max. 3,000m with output current and voltage derating)
Standards	UL508C, IEC/EN 61800-3, IEC/EN 61800-5-1

*1 Current derating is required. Select control modes in accordance with the drive capacity.

*2 The accuracy of these values depends on motor characteristics, ambient conditions, and drive settings. Specifications may vary with different motors and with changing motor temperature. Contact Yaskawa for consultation.

*3 Overload protection may be triggered when operating with 150% of the rated output current if the output frequency is less than 6 Hz.

*4 May be shorter due to load conditions and motor speed.

*5 A separate Momentary Power Loss Ride-Thru Unit is required for the drives if the application needs to continue running during a momentary power loss up to 2 s.

*6 Ground protection cannot be provided when the impedance of the ground fault path is too low, or when the drive is powered up while a ground fault is present at the output.

DRIVE DIMENSIONS

OPEN CHASSIS (IP00)

240 V Class			Dimensions (inches)				Weight (lb) ¹
Model: CIMR-ZU2E□	Amps	HP	Fig. No.	H	W	D	
0028AUA	28	10	1	18.89	9.84	14.17	44
0042AUA	42	15		25.60	10.39	16.53	71
0054AUA	54	20		25.60	10.39	16.53	77
0068AUA	68	25		25.60	10.39	16.53	77
0081AUA	81	30	2	32.12	10.39	17.71	132
0104AUA	104	40		32.12	10.39	17.71	132
0130AUA	130	50		32.12	10.39	17.71	132
0154AUA	154	60	3	38.97	16.33	15.86	245
0192AUA	192	75		38.97	16.33	15.86	245
0248AUA	248	100		38.97	16.33	15.86	245
0248AUA	248	100		44.56	19.29	17.71	388

480 V Class			Dimensions (inches)				Weight (lb) ¹
Model: CIMR-ZU4E□	Amps	HP	Fig. No.	H	W	D	
0011AUA	11	7.5	1	18.89	9.84	14.17	44
0014AUA	14	10					
0021AUA	21	15					
0027AUA	27	20		25.60	10.39	16.53	71
0034AUA	34	25					
0040AUA	40	30					
0052AUA	52	40	2	32.12	10.39	17.71	132
0065AUA	65	50					
0077AUA	77	60					
0096AUA	96	75					
0124AUA	124	100	3	38.97	16.33	15.86	245
0156AUA	156	125					
0180AUA	180	150					
0216AUA	216	175		44.56	19.29	17.71	388
0240AUA	240	200					
0302AUA	302	250					
0361AUA	361	300	44.56	27.36	17.71	571	
0414AUA	414	350					
0477AUB	477	400					
0590AUB	590	500					Contact Yaskawa
0720AUB ²	720	600					
0930AUB ³	930	800	72.24	47.64	1389		

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

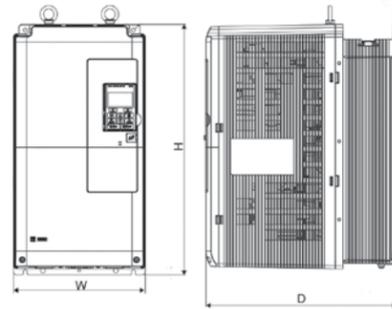


Figure 1

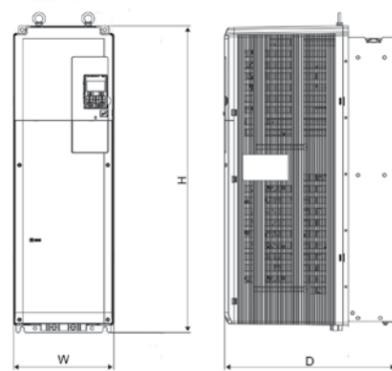


Figure 2

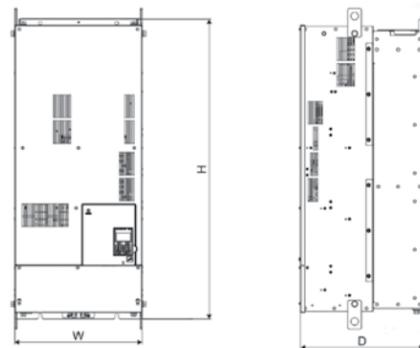


Figure 3



HVAC MATRIX INNOVATION

Improved Energy Efficiency with Direct Conversion from AC to AC

DRIVE OPTIONS

COMMUNICATION OPTIONS

Communication option cards connect a drive to a network. Using this option unit, a master device can:

- Operate the drive
- Monitor the drive operation status
- Read or modify drive parameters

Part Number	Network Communications Option
SI-EN3	EtherNet IP
SI-EN3D	Dual Port EtherNet IP
SI-EM3	Modbus TCP
SI-EM3D	Dual Port Modbus TCP
SI-W3	LonWorks

NEMA 1 KIT

Part Number	Description
EZZ022745A	for 480 V: 11 A, 14 A, 21 A, 27 A, 34 A for 240 V: 28 A
EZZ022745B	for 480 V: 40 A, 52 A, 65 A, 77 A for 240 V: 42 A, 54 A, 68 A, 81 A
EZZ022745C	for 480 V: 96 A, 124 A for 240 V: 104 A, 130 A
EZZ022745D	for 480 V: 156 A, 180 A for 240 V: 154 A, 192 A
EZZ022745E	for 480 V: 216 A, 240 A for 240 V: 248 A
EZZ022745F	for 480 V: 302 A, 361 A, 414 A

24 V POWER CONTROL SUPPLY

The 24 VDC control power option is used to maintain drive control power during a prolonged three-phase power loss (greater than 2 seconds). An external 24 VDC customer power supply is required.

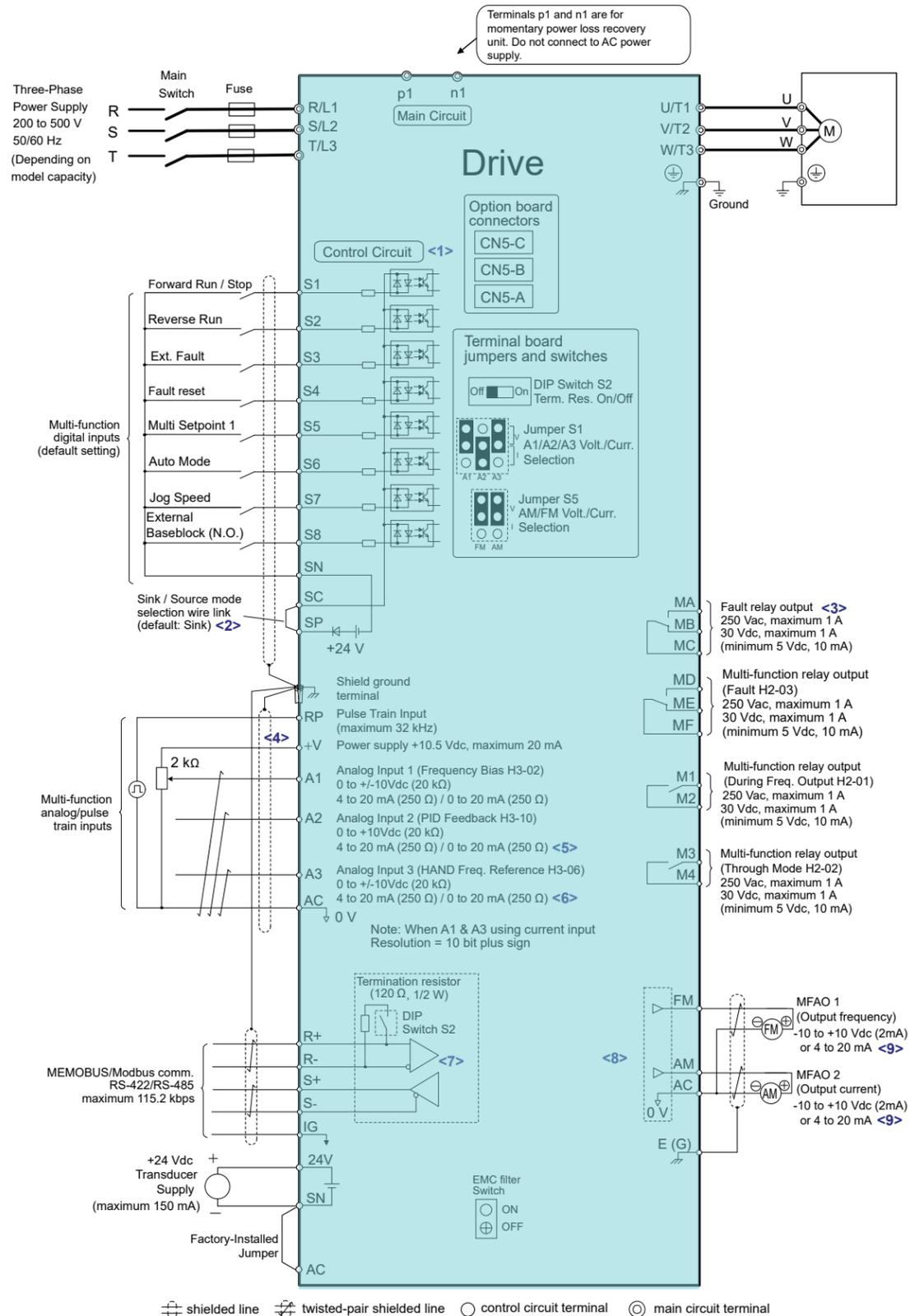
Part Number	Description
PS-U10L	24 V control power option board (240 V Drives)
PS-U10H	24 V control power option board (480 V Drives)

DIGITAL OPERATOR OPTION

- Practical keypad, usable for remote operation. Built-in parameter copy function.
- 5 digit, 8 segment LED operator JVOP-182: Good readability from distance and in dark environment

Model Code	Description
EZZ020642A	Operator attachment IP20 with screws
EZZ020642B	Operator attachment IP20 with nuts
UUX000527	Operator Kits, UL Type 3R/UL Type 4X
JVOP-181	Copy unit w\USB converter
UWR0051	1m extension cable for remote digital operator
UWR0052	3m extension cable for remote digital operator

DRIVE CONNECTION DIAGRAM



- <1> Supplying power to the control circuit separately from the main circuit requires 24 V power supply (option).
- <2> This figure illustrates an example of a sequence input to S1 through S8 using a non-powered relay or an NPN transistor. Install the wire link between terminals SC-SP for Sink mode, between SC-SN for Source mode, or leave the link out for external power supply. Never short terminals SP and SN, as it will damage the drive. Refer to Control I/O Connections on page 85 for details.
- <3> Wire the fault relay output separately from the main circuit power supply and other power lines.
- <4> The maximum output current capacity for the +V terminal on the control circuit is 20 mA. Never short terminals +V or AC, as it can cause erroneous operation or damage the drive.
- <5> Set jumper S1 to select between a voltage or current input signal to terminal A2. The default setting is for current input.
- <6> Set jumper S1 to select between a voltage or current input signal to terminal A1 and A3. The default setting is for current input.
- <7> Set DIP switch S2 to the ON position to enable the termination resistor in the last drive in a MEMOBUS/Modbus network.
- <8> Use jumper S5 to select between voltage or current output signals at terminals AM and FM. Set parameters H4-07 and H4-08 accordingly.
- <9> Monitor outputs work with devices such as analog frequency meters, ammeters, voltmeters, and wattmeters. They are not intended for use as a feedback-type signal.

Z1000U ENCLOSED ELECTRONIC BYPASS

Matrix VFD packages with electronic bypass for low harmonics and IEEE 519 compliance

HOW TO SELECT A Z1000U ENCLOSED ELECTRONIC BYPASS PACKAGE

To construct an Enclosed Electronic Bypass model number, find the base number for the required enclosure type, voltage, and current rating. Add the option code for each required option. Power options are preceded by 'PN', control options are preceded by 'T'.

Base Number

Z1D 1 B 040

Product Series

Z1000U Electronic Bypass Package

Enclosure and Duty

1: UL Type 1
2: UL Type 12
3: UL Type 3R

Voltage Class

D: 208 V^{*3}
B: 480 V

Current

Rated Amps:
(Example: "040" = 40 A)

Power Options (P)

N	EMC Filter ^{*1}	Included
G	Drive Input Disconnect Switch ^{*4}	Choose None or One
B	3-Contactor Bypass ^{*3}	
K	Output Reactor 5% ^{*3}	Choose None or One
W	Soft Start Bypass ^{*3}	Choose None or One
7	Surge Suppressor ^{*2}	Choose None or One
3	Space Heater ^{*2}	Choose None or One

Control & Communication Options (T)

W	Custom Nameplates	Select None or One
D	EtherNet/IP (dual port)	
L	LonWorks	Choose None or One
Z	Speed Potentiometer	Choose None or One
K	200 VA Transformer (CPT)	Choose None or One
M	Keypad Viewing Window ^{*2}	Choose None or One

Control Options

T□□□□

Notes

*1. An EMC filter is internal to the Z1000U drive

*2. UL Type 3R only

*3. UL Type 1 and UL Type 3R only

*4. Power option G only available on models Z1D1B011PN - Z1D1B077PN and Z1D2B011PN - Z1D2B077PN



UL Type 3R, UL Type 12, and UL Type 1 Matrix Drive Packages

FEATURES

- Facilitates IEEE 519 compliance
- Electronic bypass
- 100 kAIC package rating
- Lockable circuit breaker
- Standard digital inputs
 - Run
 - Safety
 - BAS interlock
 - Auto transfer to bypass
 - Emergency override
- (3) Programmable digital inputs
- (4) Form C programmable relays
- Built-in communications
 - BACnet
 - APOGEE
 - Metasys
 - Modbus
- HOA Keypad
- Flash upgradeable firmware

OPTIONS

- Drive input service switch
- 3-contactor bypass
- Output reactor
- Soft start bypass
- Surge suppressor
- Space heater
- Custom nameplate
- LonWorks
- EtherNet/IP
- BACnet/IP
- Speed pot
- 200 VA transformer
- Keypad viewing window

Models and Ratings

208 VAC MODELS

Base No. : Z1D□□□□	024	030	046	059	074	088	114	143	169	211	
Rated Output Current (A)	28	42	54	68	81	104	130	154	192	248	
Nominal HP	7.5	10	15	20	25	30	40	50	60	75	
Physical Size	UL Type 1 Z1D1□□□□	Height	48.0	60.0	60.0	60.0	60.0	60.0	86.0	86.0	86.0
		Width	22.0	22.0	22.0	22.0	22.0	30.0	30.0	41.0	41.0
		Depth	18.0	22.0	22.0	22.0	22.0	20.0	20.0	32.0	32.0
		Weight	230	325	340	350	350	465	475	825	825
Physical Size	UL Type 3R Z1D3D□□□□	Height	38.0	44.9	44.9	44.9	44.9	54.2	54.2	92.0	92.0
		Width	28.5	31.3	31.3	31.3	31.3	35.0	35.0	41.3	41.3
		Depth	20.8	23.2	23.2	23.2	23.2	24.4	24.4	47.4	47.4
		Weight	201	260	269	277	290	435	452	948	943

Note: UL Type 3R package dimensions (Z1D3D) represent approximate dimensions for a package without power option K, W, 3 and control option K selected. For the dimensions of a specific Z1D3D configuration, reference PD.Z1000.01.

480 VAC MODELS

Base No. : Z1D□B□□□□	011	014	021	027	034	040	052	065	077	096	124	156	180	240	302	361	414	
Rated Output Current (A)	11	14	21	27	34	40	52	65	77	96	124	156	180	240	302	361	414	
Nominal HP	7.5	10	15	20	25	30	40	50	60	75	100	125	150	200	250	300	350	
Physical Size	UL Type 1 Z1D1B□□□□	Height	48.0	48.0	48.0	60.0	60.0	60.0	60.0	60.0	60.0	86.0	86.0	86.0	86.0	86.0	86.0	86.0
		Width	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	30.0	30.0	41.0	41.0	41.0	70.0	70.0	70.0
		Depth	18.0	18.0	18.0	22.0	22.0	22.0	22.0	22.0	20.0	20.0	32.0	32.0	32.0	31.0	31.0	31.0
		Weight	220	230	230	300	300	315	350	360	375	475	490	850	900	1100	1600	1750
Physical Size	UL Type 12 Z1D2B□□□□	Height	40.2	40.2	40.2	40.2	47.0	47.0	47.0	47.0	56.2	56.2	84.0	84.0	-	-	-	-
		Width	23.3	23.3	23.3	23.3	27.3	27.3	27.3	27.3	33.3	33.3	37.9	37.9	-	-	-	-
		Depth	19.1	19.1	19.1	19.1	21.6	21.6	21.6	21.6	21.6	27.0	27.0	26.9	26.9	-	-	-
		Weight	217	218	218	220	279	308	312	326	327	497	501	923	938	-	-	-
Physical Size	UL Type 3R Z1D3B□□□□	Height	38.0	38.0	38.0	38.0	38.0	44.9	44.9	44.9	54.2	54.2	92.0	92.0	92.0	93.5	93.5	93.5
		Width	28.5	28.5	28.5	28.5	28.5	31.3	31.3	31.3	35.0	35.0	41.3	41.3	41.3	66.3	66.3	66.3
		Depth	20.8	20.8	20.8	20.8	20.8	23.2	23.2	23.2	23.2	24.4	24.4	47.4	47.4	47.4	48.2	48.2
		Weight	199	200	203	203	209	268	269	289	290	438	453	954	951	1148	1656	1700

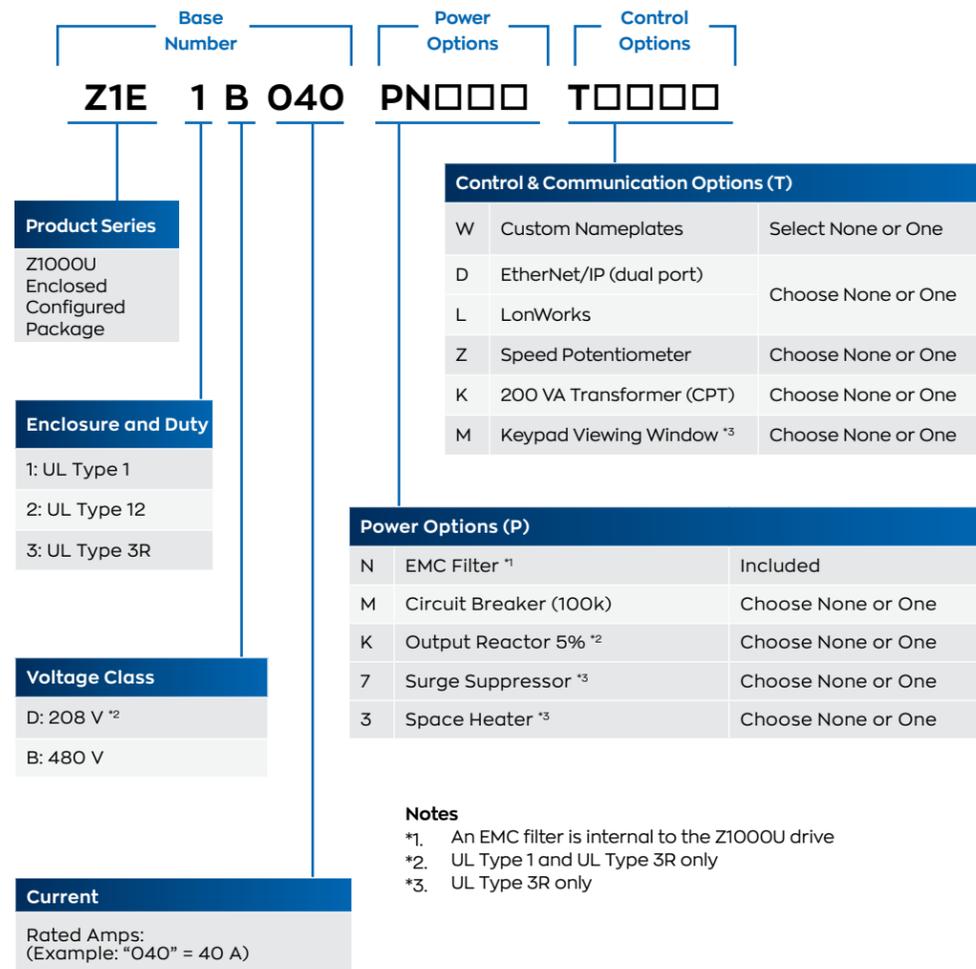
Note: UL Type 3R package dimensions (Z1D3B) represent approximate dimensions for a package without power option K, W, 3 and control option K selected. For the dimensions of a specific Z1D3B configuration, reference PD.Z1000.02.

Z1000U ENCLOSED CONFIGURED

Matrix VFD packages with features & options to achieve low harmonics and IEEE 519 compliance

HOW TO SELECT A Z1000U ENCLOSED CONFIGURED PACKAGE

To construct an Enclosed Configured model number, find the base number for the required enclosure type, voltage, and current rating. Add the option code for each required option. Power options are preceded by 'PN', control options are preceded by 'T'.



UL Type 3R, UL Type 12, and UL Type 1 Matrix Drive Packages

FEATURES

- Facilitates IEEE 519 compliance
- Lockable main input disconnect switch
- PID control with selectable engineering units
- Independent PID control for use with external device
- Differential PID feedback feature
- Sleep function
- 24 VDC, 150 mA power supply
- Input and output status indication
- Serial communication loss detection and selectable response
- Built-in communications
 - BACnet
 - APOGEE
 - Metasys
 - Modbus
- HOA Keypad
- Flash upgradeable firmware
- Bumpless transfer between Hand and Auto Modes

OPTIONS

- Lockable input circuit breaker
- Output reactor
- Surge suppressor
- Space heater
- Custom nameplate
- LonWorks
- EtherNet/IP
- BACnet/IP
- Speed pot
- 200 VA transformer
- Keypad viewing window

Models and Ratings

208 VAC MODELS

Base No. : Z1E□□□□	024	030	046	059	074	088	114	143	169	211	
Rated Output Current (A)	28	42	54	68	81	104	130	154	192	248	
Nominal HP	7.5	10	15	20	25	30	40	50	60	75	
Physical Size	UL Type 1 Z1E1D□□□	Height	48.0	60.0	60.0	60.0	60.0	60.0	86.0	86.0	86.0
		Width	22.0	22.0	22.0	22.0	22.0	30.0	30.0	41.0	41.0
		Depth	18.0	22.0	22.0	22.0	22.0	20.0	20.0	32.0	32.0
		Weight	210	300	305	315	315	420	430	745	745
Physical Size	UL Type 3R Z1E3D□□□	Height	38.0	44.9	44.9	44.9	44.9	54.2	54.2	92.0	92.0
		Width	28.5	31.3	31.3	31.3	31.3	35.0	35.0	41.3	41.3
		Depth	20.8	23.2	23.2	23.2	23.2	24.4	24.4	47.4	47.4
		Weight	194	253	257	265	272	410	428	900	906

Note: UL Type 3R package dimensions (Z1E3D) represent approximate dimensions for a package without power option K, 3 and control option K selected. For the dimensions of a specific Z1E3D configuration, reference PD.Z1000.05.

480 VAC MODELS

Base No. : Z1E□B□□□	011	014	021	027	034	040	052	065	077	096	124	156	180	240	302	361	414	
Rated Output Current (A)	11	14	21	27	34	40	52	65	77	96	124	156	180	240	302	361	414	
Nominal HP	7.5	10	15	20	25	30	40	50	60	75	100	125	150	200	250	300	350	
Physical Size	UL Type 1 Z1E1B□□□	Height	48.0	48.0	48.0	60.0	60.0	60.0	60.0	60.0	60.0	86.0	86.0	86.0	86	86	86	86
		Width	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	30.0	30.0	41.0	41.0	41	70	70	70
		Depth	18.0	18.0	18.0	22.0	22.0	22.0	22.0	22.0	20.0	20.0	32.0	32.0	32	31	31	31
		Weight	200	210	210	270	270	285	315	325	340	425	440	765	810	990	1440	1575
Physical Size	UL Type 12 Z1E2B□□□	Height	40.2	40.2	40.2	40.2	47.0	47.0	47.0	47.0	56.2	56.2	84.0	84.0	-	-	-	-
		Width	23.3	23.3	23.3	23.3	27.3	27.3	27.3	27.3	33.3	33.3	37.9	37.9	-	-	-	-
		Depth	19.1	19.1	19.1	19.1	21.6	21.6	21.6	21.6	27.0	27.0	26.9	26.9	-	-	-	-
		Weight	214	214	215	215	269	296	300	308	311	481	485	888	897	-	-	-
Physical Size	UL Type 3R Z1E3B□□□	Height	38.0	38.0	38.0	38.0	38.0	44.9	44.9	44.9	44.9	54.2	54.2	92.0	92.0	92	93.5	93.5
		Width	28.5	28.5	28.5	28.5	28.5	31.3	31.3	31.3	35.0	35.0	41.3	41.3	41.3	66.3	66.3	66.3
		Depth	20.8	20.8	20.8	20.8	20.8	23.2	23.2	23.2	24.4	24.4	47.4	47.4	47.4	48.2	48.2	48.2
		Weight	193	193	196	196	198	257	257	271	272	414	429	903	909	1069	1586	1604

Note: UL Type 3R package dimensions (Z1E3B) represent approximate dimensions for a package without power option K, 3 and control option K selected. For the dimensions of a specific Z1E3B configuration, reference PD.Z1000.06.

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