

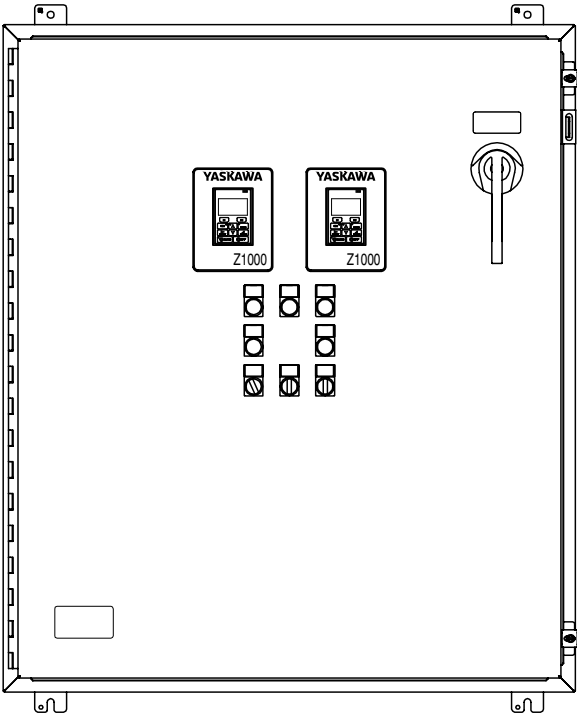
YASKAWA AC Drive Z1000

Redundant AC Drive for HVAC Fan and Pump

Primary Test Operation

Type: Z1R1B
Models: 480 V: 3 to 250 HP

To properly use the product, read this manual thoroughly and retain for easy reference, inspection, and maintenance. Ensure the end user receives this manual.



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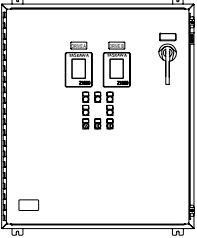
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1 Preface and Safety

Yaskawa manufactures products used as components in a wide variety of industrial systems and equipment. The selection and application of Yaskawa products remain the responsibility of the equipment manufacturer or end user. Yaskawa accepts no responsibility for the way its products are incorporated into the final system design. Under no circumstances should any Yaskawa product be incorporated into any product or design as the exclusive or sole safety control. Without exception, all controls should be designed to detect faults dynamically and fail safely under all circumstances. All systems or equipment designed to incorporate a product manufactured by Yaskawa must be supplied to the end user with appropriate warnings and instructions as to the safe use and operation of that part. Any warnings provided by Yaskawa must be promptly provided to the end user. Yaskawa offers an express warranty only as to the quality of its products in conforming to standards and specifications published in the Yaskawa manual. **NO OTHER WARRANTY, EXPRESS OR IMPLIED, IS OFFERED.** Yaskawa assumes no liability for any personal injury, property damage, losses, or claims arising from misapplication of its products.

2 Applicable Documentation

These documents are packaged together with the Z1000 Bypass (Redundant) Drive. Read and understand these documents before installing, operating, or servicing this system. The system must be installed according to this document and local codes.

	Yaskawa AC Drive Z1000 Bypass (Redundant) Drive Primary Test Operation (TOEPYAIZ1R01)
	This document is packaged together with the product and contains a procedure to test the redundant system and ensure proper operation after customer installation and wiring.
	Z1000 Bypass (Redundant) Schematic Diagram (DS.Z1R1.01 or 02)
	This document is packaged together with the product. A schematic diagram containing customer connections, ladder diagram, wiring information and drive parameter settings.
	Yaskawa AC Drive Z1000 User Manual for HVAC Fan and Pump (TOEPC71061645)
	This document is packaged together with the product and contains basic information required to install and wire the drive. It also gives detailed information on fault diagnostics, parameter settings, and BACnet specifications. The purpose of this document is to prepare the drive for a trial run with an application and for basic operation. This document is available for download on our documentation website, www.yaskawa.com . Additional documents are available at: https://www.yaskawa.com/products/drives/hvac-drives/drives/z1000-redundant

◆ Terms

Note: Indicates supplemental information that is not related to safety messages.

Drive: Yaskawa Z1000-Series Redundant Drive Package

◆ Registered Trademarks

- All trademarks are the property of their respective owners.

◆ Supplemental Safety Information

■ General Safety

General Precautions

- The diagrams in this document may be indicated without covers or safety shields to show details. Replace the covers or shields before operating the drive and run the drive according to the instructions described in this document.
- Any illustrations, photographs, or examples used in this document are provided as examples only and may not apply to all products to which this document applies.
- The products and specifications described in this document or the content and presentation of the document may be changed without notice to improve the product and/or the document.
- When ordering a new copy of product instructions due to damage or loss, contact your Yaskawa representative or the nearest Yaskawa sales office and provide the document number shown on the front cover.
- If the nameplate becomes worn or damaged, order a replacement from your Yaskawa representative or the nearest Yaskawa sales office.

⚠ DANGER

Heed the safety messages in this document and refer to the Z1000 User Manual for additional safety information.

Failure to comply will result in death or serious injury.

The operating company is responsible for any injuries or equipment damage resulting from failure to heed the warnings in this document.

Electrical Shock Hazard

Arc Flash Hazard. It is possible that there is more than one source of power for equipment. Obey the requirements for Electrical Safety in the Workplace and local codes for safe work procedures and applicable personal protective equipment (PPE). Failure to obey can cause serious injury or death.

DANGER

Do not connect or disconnect wiring while the power is on.

Failure to comply will result in death or serious injury.

Before servicing, disconnect all power to the equipment. The internal capacitor remains charged even after the power supply is turned off. The charge indicator LED will extinguish when the DC bus voltage is below 50 Vdc. To prevent electric shock, wait for at least the time specified on the warning label once all indicators are OFF, and then measure the DC bus voltage level to confirm it has reached a safe level.

NOTICE

Observe proper electrostatic discharge procedures (ESD) when handling the drive and circuit boards.

Failure to comply may result in ESD damage to the drive circuitry.

Do not perform a withstand voltage test on any part of the drive.

Failure to comply could result in damage to the sensitive devices within the drive.

Do not operate damaged equipment.

Failure to comply could result in further damage to the equipment.

Do not connect or operate any equipment with visible damage or missing parts.

3 Product Overview

◆ About this Product

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

This document provides a procedure to test the operation of the Redundant Drive Package after wiring and programming of the drive is complete.

The redundant drive package contains two Z1000 drives that have HVAC application-specific software macros and real-time clocks in a NEMA 1 (UL Type 1) enclosure to make sure that a drive fault will not interrupt operation.

Feature highlights for the Redundant Drive Package include:

- Standard Lockable Main Input Disconnect Switch (Optional Circuit Breaker)
- 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

Popular building automation communication protocols BACnet, Siemens APOGEE, Johnson Controls Metasys and MEMOBUS/Modbus are embedded in the Drive. Interface cards for LonWorks, Ethernet/IP, EtherNet/IP (DLR), Modbus TCP/IP and Modbus TCP/IP (Dual Port) are offered separately.

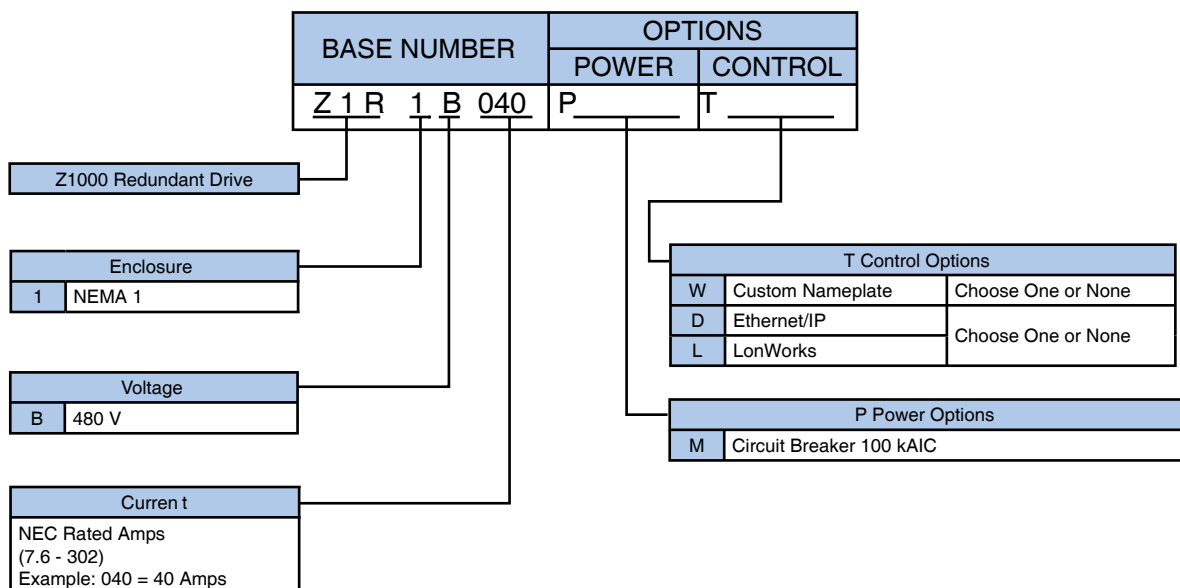
◆ Applicable Models

This document applies to the drive models in [Table 1](#).

Table 1 Applicable Models

Drive Series	Model Number
Z1000 Redundant Drive Package	Z1R□□□□□

■ Model Number Configuration (Z1R1)



3 Product Overview

■ Models (Z1R1)

Rated Input Voltage	Rated Output Current (Amps)	Redundant Drive Package Model No. Z1R1B□□□	Nominal HP <1>	Dimensions (in)			Approximate Weight (lb)
				H	W	D	
480 V 3-Phase	4.8	005	3	44.50	36.00	19.72	140
	7.6	008	5				140
	11	011	7.5				145
	14	014	10				150
	21	021	15				155
	27	027	20				160
	34	034	25				190
	40	040	30				280
	52	052	40	62.50			360
	65	065	50				430
	77	077	60				450
	96	096	75				470
	124	124	100	84.16	41.26	26.39	760
	156	156	125				910
	180	180	150				950
	240	240	200	85.70	69.76	23.70	Contact Yaskawa
302	302	250	Contact Yaskawa			—	

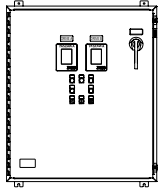
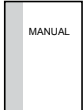
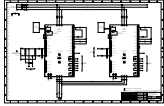
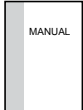
<1> Horsepower rating is based on standard NEMA B, 4-pole motor design as represented in NEC table 430.150 Full Load Current, Three-Phase Alternating Current Motors at 480 volts.

4 Receiving and System Components

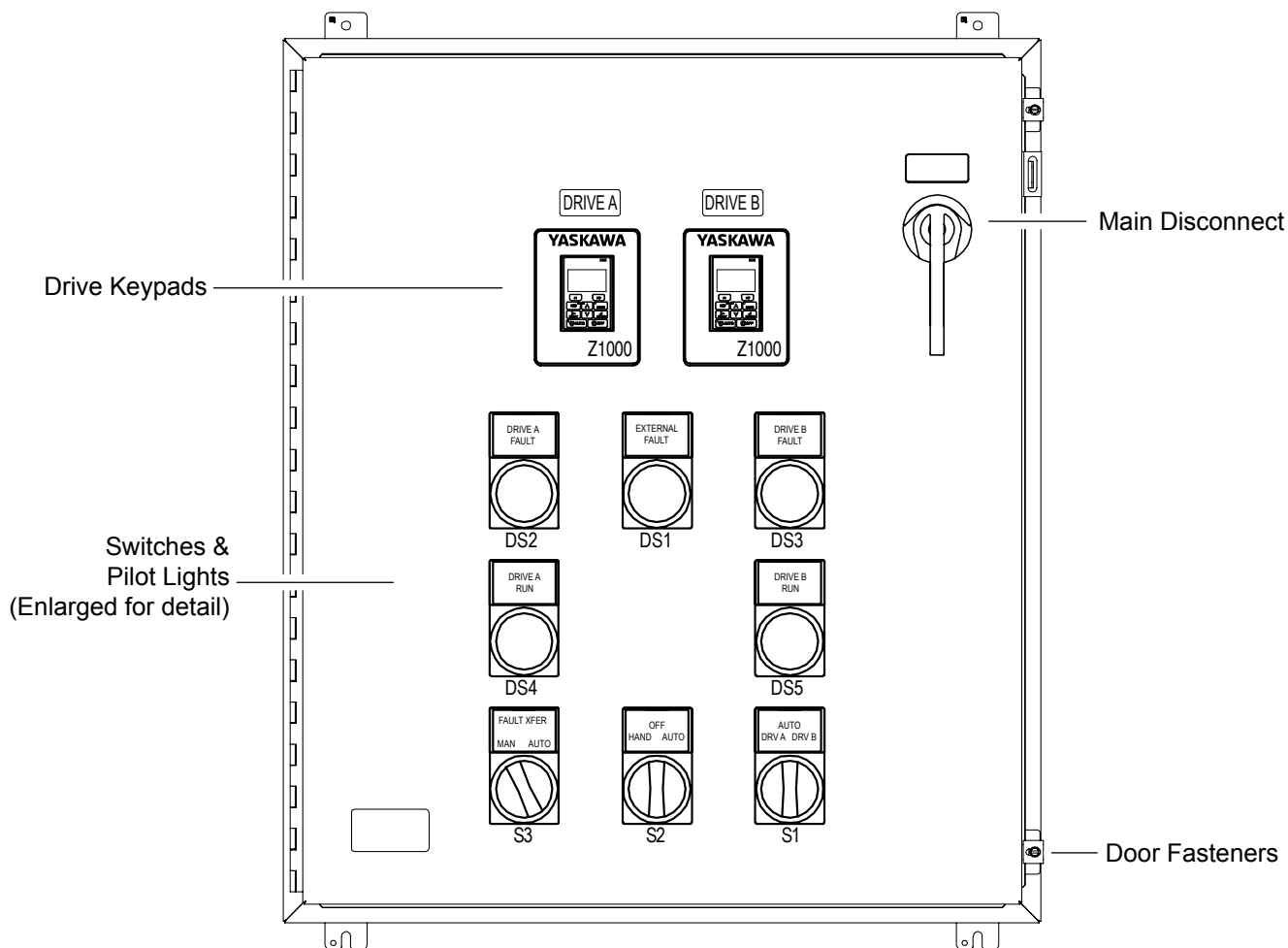
Perform the following tasks upon receipt of the Redundant Drive Package:

- Inspect the package for damage. Contact the shipper immediately if the package appears damaged upon receipt.
- Verify receipt of the correct model by checking the model number printed on the nameplate of the package.
- Contact your supplier if you have received the wrong model or the package does not function properly.

◆ Package Contents

Description	Drive Package	Primary Test Operation	Schematic Diagram Z1000 Bypass (Redundant)	Z1000 User Manual
-				
Quantity	1	1	1	1

◆ System Components



5 Primary Operation Test

Perform the Primary Operation Test procedure in [Table 2](#) on Drive A and the procedure in [Table 3](#) for Drive B. Make sure that you program both drives with the same settings.

Table 2 Primary Operation Test (Drive A)

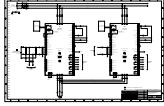








Check	Step	Step Details	Figure
<input type="checkbox"/>	1	Verify Drive A and Drive B parameters are set to Yaskawa factory defaults before proceeding. Refer to Yaskawa schematic DS.Z1R1.0X, Table 1. Factory Set Z1000 Bypass (Redundant Drive) Parameters for default settings. Use the Z1000 keypad to correct any settings that differ from Table 1.	
<input type="checkbox"/>	2	Set the Hand-Off-Auto switch to “Off”.	
<input type="checkbox"/>	3	Set the Auto/Manual Fault Transfer switch to “Manual”.	
<input type="checkbox"/>	4	Set the Drive A-Auto-Drive B switch to “Drive A”.	
<input type="checkbox"/>	5	Set the Hand-Off-Auto switch to “Hand” to start the drive and control drive operation. Adjust manual speed reference using the keypad. Do the normal startup procedure (check rotation direction, check damper position if used, set min/max speeds and accel/decel times, etc.).	
<input type="checkbox"/>	6	When commissioning is complete, set the Hand-Off-Auto switch to “Off” to stop the drive.	

Table 3 Primary Operation Test (Drive B)

Check	Step	Step Details	Figure
<input type="checkbox"/>	7	Make sure that the Hand-Off-Auto switch is set to “Off”.	
<input type="checkbox"/>	8	Make sure that the Auto/Manual Fault Transfer switch is set to “Manual”.	
<input type="checkbox"/>	9	Set the Drive A-Auto-Drive B switch to “Drive B”.	



Check	Step	Step Details	Figure
<input type="checkbox"/>	10	Set the Hand-Off-Auto switch to “Hand” to start the drive and control drive operation. Adjust manual speed reference using the keypad. Do the normal startup procedure (check rotation direction, check damper position if used, set min/max speeds and accel/decel times, etc.).	 S2
<input type="checkbox"/>	11	When commissioning is complete, set the Hand-Off-Auto switch to “Off” to stop the drive.	 S2

Table 4 Expanded Function Test








Check	Step	Step Details	Figure
<input type="checkbox"/>	12	Check Auto control for correct operation. Set the Hand-Off-Auto switch to “Auto”.	 S2
<input type="checkbox"/>	13	When you will use the Building Automation System (BAS) to select Drive A or Drive B, set the Drive A-Auto-Drive B switch to “Auto”. When you will NOT use the BAS to select Drive A or Drive B, set the Drive A-Auto-Drive B switch to “Drive A” or “Drive B” to manually select each drive.	 OR  OR  S1
<input type="checkbox"/>	14	Confirm that you can use the BAS to start and stop Drive A and Drive B in Auto.	—
<input type="checkbox"/>	15	Confirm that you can use the BAS to change the speed reference for Drive A and Drive B.	—

Table 5 Confirm Auto-Transfer Function

Check	Step	Step Details	Figure
<input type="checkbox"/>	16	Set the Auto/Manual Fault Transfer switch to “Auto”.	 S3
<input type="checkbox"/>	17	Set the Drive A-Auto-Drive B switch to “Auto”.	 S1
<input type="checkbox"/>	18	Set the Hand-Off-Auto switch to “Hand” to start Drive A.	 S2
<input type="checkbox"/>	19	Confirm that you can use the BAS to change the speed reference for Drive A and Drive B.	—

5 Primary Operation Test

Check	Step	Step Details	Figure
□	20	<p>If needed, remove the front cover from Drive A to access the TB1 terminal block below the control board.</p> <p>While Drive A is running, momentarily jumper terminal TB1 SN to S3 (external fault normally open) to trigger a fault in Drive A.</p> <p>Note: When you jumper terminal SN to S3, Drive A will fault on an EF3 fault code. Drive B will then attempt to start immediately. Confirm that the corresponding drive fault relay output is in a faulted state.</p> <p>Confirm Drive B starts operating.</p>	
—	—	END	—


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Revision History

The revision dates and the numbers of revised documents appear on the bottom of the back cover.

Example:

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└─ Date of publication └─ Date of original publication └─ Revision number

Date of Publication	Revision Number	Section	Revised Content
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March 2018	-	-	First Edition

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YASKAWA AC Drive Z1000

Redundant AC Drive for HVAC Fan and Pump

Primary Test Operation

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