YASKAWA

FP605 Selection Guide

INDUSTRIAL FAN AND PUMP DRIVE

IT'S PERSONAL

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Preface

Intended Audience

This selection guide may describe trademarked products. These trademarks are the property of the registered owner companies and may include the following:

DeviceNet™, trademark of ODVA

Modbus®, trademark of Schneider Automation, Inc.

Ethernet/IP, trademark of ODVA

PROFIBUS®, trademark of PROFIBUS International.

PROFINET®, trademark of PROFIBUS International.

Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc.

Unless otherwise noted, throughout this document, the term “Type” (when related to enclosure solutions) refers not only to NEMA Type, but also represents UL Listing for the specific Type(s).

Other documents and manuals are available to support special use or installation of products. These documents may be provided with the product or upon request. Contact Yaskawa America, Inc. or visit www.yaskawa.com.

Additional Resources

The Yaskawa.com website has the most current information for all Yaskawa products. When researching product specifications or features the Yaskawa website is the best resource to use. Some useful links for the FP605 drive product are listed here and throughout this guide:

Resource Links	
FP605 Drives	Brochure
FP605 Bypass Packages	Product Order Page
FP605 Configured Packages	Selection Guide
FP605 Manuals	

FP605 Drives

The FP605 was built on three aspects; Flexibility, Sustainability, and Ease of Use. The FP605 is flexible by providing a drive solution for every environment, the ability to run any motor type, hardware and network control solutions, and a simple to install design. The FP605 is sustainable through its integrated functional safety capability, environmentally friendly materials, and as always Yaskawa's durable and long lasting quality and design. The FP605 is easy through its use of in-box media. Its simple installation and startup is achieved using its intuitive keypad and software tools.

Yaskawa is committed to providing you with the highest quality, easiest to use industrial fan and pump drives.

Drives for Every Environment
IP20/UL Type 1
IP55/UL Type 12
IP55/Type 12 with Switch
IP20/Protected Chassis
Flange (IP55/UL Type 12 Backside)

Advanced Pump Control
Fast and easy pump setup
Easy to understand pump terminology
Application presets for faster setup
Advanced pump protection features
Contactor multiplexing for pump systems

Sustainable
10-year maintenance-free operation
Compliance with global certifications and standards
Built-in (5% split or 3% positive bus DC link choke) line impedance for harmonic reduction
Conformal coating for circuit board protection
Embedded STo functional safety maximizes production uptime

Flexible Solutions
-10 °C to +60 °C ambient[1]
Side-by-side mounting[1]
Type 1 End cap kits for IP20/Protected Chassis drives[1]
External heatsink flange mounting (Type 1 or Type 12)
Compatible with all major network communication protocols

Simple Operation
High visibility status ring
32-character keypad with LCD display and tactile buttons
Optional Bluetooth keypad provides a wireless experience with your mobile device

Quick and Easy Set-Up
Simple steps for efficient commissioning
Convenient programming without main three-phase power
Operates induction, permanent magnet, and synchronous reluctance motors
DriveWizard Mobile app for drive management on smart mobile devices
PC tools for drive management, harmonic estimation, energy savings calculations, and programming simulations

1. Refer to *Drive Derating* for environmental ratings.

Drive Selection

Figure 1: Catalog Code

FP65 U 4 005 A F A

Model Series
FP605 Series

Region Code	
U	Americas

Voltage Class	
2	240 VAC Three-phase
4	480 VAC Three-phase

Rated Output Current
See Ratings Table

Environmental Specifications	
A	Standard

Enclosure Type	
F	IP20/UL Type 1
B	IP20/Protected Chassis
W	Flange (Type 12 Backside)
V	IP55/UL Type 12
T	IP55/UL Type 12 with Switch

EMC Filter	
A	No built-in EMC filter for C2

Standard (IP20) drives are intended for clean environments and can be mounted three different ways as follows:

1) In a separate enclosure with heatsink internal. Extra mounting brackets are not required.
2) In a separate enclosure with heatsink external. Refer to Enclosure Adapters and Kits for drives requiring extra mounting brackets.
3) Mounted without an enclosure. Type 1 Adapters must be used when mounting the drive without an enclosure.

IP55/UL Type 12 drives are intended for limited dust ingress environments and can be mounted without an enclosure.

Additional Information
FP605 Product Page
Selection Guide

Table 1: Three-Phase 240 V Drives - 3 to 150 HP

Rated Output[1]		Frame	Standard IP20/UL Type 1 No EMC Filter[2]	Standard IP20/Protected Chassis No EMC Filter[2]	IP55/UL Type 12 No EMC Filter[3]	IP55/UL Type 12 w/ Switch No EMC Filter[3]	Flange UL Type 12 Backside[4]
Power Output (HP)	Output Amps		Catalog Code FP65U...	Catalog Code FP65U...	Catalog Code FP65U...	Catalog Code FP65U...	Catalog Code FP65U...
3	10.6	1	2011AFA	-	2011AVA	2011ATA	-
5	16.7	1	2017AFA	-	2017AVA	2017ATA	-
7.5	24.2	2	2024AFA	-	2024AVA	2024ATA	-
10	30.8	2	2031AFA	-	2031AVA	2031ATA	-
15	46.2	3	2046AFA	-	2046AVA	2046ATA	-
20	59.4	3	2059AFA	-	2059AVA	2059ATA	-
25	74.8	4	2075AFA	-	2075AVA	2075ATA	-
30	88	4	2088AFA	-	2088AVA	2088ATA	-
40	114	4	2114AFA	-	2114AVA	2114ATA	-
50	143	6	2143AFA	-	2143AVA	2413ATA	-
60	169	6	2169AFA	-	2169AVA	2169ATA	-
75	211	9	-	2211ABA	-	-	2211AWA
100	273	9	-	2273ABA	-	-	2273AWA
125	343	10	-	2343ABA	-	-	2343AWA
150	396	10	-	2396ABA	-	-	2396AWA

1. Output capacities are for conditions of three-phase input and DC input. Refer to *Drive Derating* for single-phase capabilities.
2. Standard (IP20) Drives are intended for clean conditions, and can be mounted three different ways as follows:
   A) In a separate enclosure with heatsink internal. No extra mounting brackets required.
   B) In a separate enclosure with heatsink external. Refer to Enclosure Adapters and Kits for sizes requiring extra mounting brackets.
   C) Without a separate enclosure, all sizes require Type 1 Adapters. Refer to *Enclosure Adapters and Kits*.
3. IP55 drives are intended for limited dust ingress environments and can be mounted without an enclosure.
4. Flange Drives are intended for mounting inside separate Type 12 enclosures with heatsink external, when the external environment is dirty or dusty (Type 12 Backside). No additional adapters required. Refer to *Enclosure Adapters and Kits* for models ending in AFA that require IP55 backside mounting into a Type 12 enclosure.

Table 2: Three-Phase 480 V Drives - 3 to 600 HP

Rated Output[1]		Frame	Standard IP20/UL Type 1 No EMC Filter[2]	Standard IP20/Protected Chassis No EMC Filter[2]	Standard IP55/UL Type 12 No EMC Filter[3]	IP55/UL Type 12 w/ Switch No EMC Filter[3]	Flange UL Type 12 Backside[4]
Power Output (HP)	Output Amps		Catalog Code FP65U...	Catalog Code FP65U...	Catalog Code FP65U...	Catalog Code FP65U...	Catalog Code FP65U...
3	4.8	1	4005AFA	-	4005AVA	4005ATA	-
5	7.6	1	4008AFA	-	-	-	-
7.5	11	1	4011AFA	-	4011AVA	4011ATA	-
10	14	1	4014AFA	-	4014AVA	4014ATA	-
15	21	2	4021AFA	-	4021AVA	4021ATA	-
20	27	2	4027AFA	-	4027AVA	4027ATA	-
25	34	2	4034AFA	-	4034AVA	4034ATA	-
30	40	3	4040AFA	-	4040AVA	4040ATA	-
40	52	3	4052AFA	-	4052AVA	4052ATA	-
50	65	3	4065AFA	-	4065AVA	4065ATA	-
60	77	4	4077AFA	-	4077AVA	4077ATA	-
75	96	4	4096AFA	-	4096AVA	4096ATA	-
100	124	4	4124AFA	-	4124AVA	4124ATA	-
125	156	6	4156AFA	-	4156AVA	4156ATA	-
150	180	9	-	4180ABA	-	-	4180AWA
200	240	9	-	4240ABA	-	-	4240AWA
250	302	9	-	4302ABA	-	-	4302AWA
300	361	10	-	4361ABA	-	-	4361AWA
350	414	10	-	4414ABA	-	-	4414AWA
400	477	11	-	4477ABA	-	-	4477AWA
450	515	11	-	4515ABA	-	-	4515AWA
500	590	11	-	4590ABA	-	-	4590AWA
600	720	11	-	4720ABA	-	-	4720AWA

1. Output capacities are for conditions of 3 phase input and DC input. Refer to *Drive Derating* for single-phase capabilities.
2. Standard (IP20) Drives are intended for clean conditions, and can be mounted three different ways as follows:
   A) In a separate enclosure with heatsink internal (no extra mounting brackets required)
   B) In a separate enclosure with heatsink external. Refer to Enclosure Adapters and Kits for sizes requiring extra mounting brackets.
   C) Without a separate enclosure, all sizes require Type 1 Adapters (Refer to *Enclosure Adapters and Kits*)
3. IP55 drives are intended for limited dust ingress environments and can be mounted without an enclosure.
4. Flange Drives are intended for mounting inside separate Type 12 enclosures with heatsink external, when the external environment is dirty or dusty (Type 12 Backside). No additional adapters required. Refer to *Enclosure Adapters and Kits* for models ending in AFA that require IP55 backside mounting into a Type 12 enclosure.

Dimensions

Table 3: IP20 Drive Approximate Dimensions

IP20/UL Type 1 (AFA)				
Frame	**Height (in)**	**Width (in)**	**Depth (in)**	**Link to Dimension Drawing**
1	14.1	4.9	8.6	Models 2011, 2017; 4005 - 4014
2	17.6	4.9	9.2	Models 2024, 2031; 4021 - 4034
3	20.1	7.9	9.3	Models 2046, 2059; 4040 - 4065
4	21.3	10	10.4	Models 2075 - 2114; 4077 - 4124
6	30.5	12.3	15.7	Models 2143, 2169; 4156

IP20/Protected Chassis (ABA)				
Frame	**Height (in)**	**Width (in)**	**Depth (in)**	**Link to Dimension Drawing**
9	27.6	12.3	16.5	Models 2211, 2273; 4180 - 4302
10	31.5	17.3	18.6	Models 2343, 2396; 4361, 4414
11	44.9	20.1	18.9	Models 4477 - 4720

Table 4: IP55 Drive Approximate Dimensions

IP55/UL Type 12 (AVA)				
Frame	**Height (in)**	**Width (in)**	**Depth (in)**	**Link to Dimension Drawing**
1	14.1	4.9	9.0	Models 2011, 2017; 4005 - 4014
2	17.6	4.9	9.6	Models 2024, 2031; 4021 - 4034
3	20.1	7.9	9.7	Models 2046, 2059; 4040 - 4065
4	21.3	10	10.7	Models 2075 - 2114; 4077 - 4124
6	30.14	14.26	16.14	Models 2143-2169; 4156

IP55/UL Type 12 with Switch (ATA)				
Frame	**Height (in)**	**Width (in)**	**Depth (in)**	**Link to Dimension Drawing**
1	20.4	4.9	9.0	Models 2011, 2017; 4005 - 4014
2	24.5	4.9	9.6	Models 2024, 2031; 4021 - 4034
3	28.9	7.9	9.7	Models 2046, 2059; 4040 - 4065
4A	37.4	10	10.7	Models 2075 - 2114; 4077 - 4096
4B	37.85	13.95	13.82	Model 4124
6	39.89	14.26	16.14	Models 2143-2169; 4156

Table 5: FP605 Flange UL Type 12 Backside Models

Flange - Type 12 Backside (AFA), (AWA)				
Frame	**Height (in)**	**Width (in)**	**Depth (in)**	**Link to Dimension Drawing**
1 (AFA)	14.1	4.9	8.6	Models 2011, 2017; 4005 - 4014
2 (AFA)	17.6	4.9	9.2	Models 2024, 2031; 4021 - 4034
3 (AFA)	20.1	7.9	9.3	Models 2046, 2059; 4040 - 4065
4 (AFA)	21.3	10	10.4	Models 2075 - 2114; 4077 - 4124
6 (AFA)	30.5	12.3	15.7	Models 2143 - 2169; 4156
9 (AWA)	27.6	13.8	16.5	Models 2211 - 2273; 4180 - 4302
10 (AWA)	31.5	18.8	18.6	Models 2343 - 2396; 4361 - 4414
11 (AWA)	44.9	21.6	18.9	Models 4477 - 4720

Drive Specifications

Item	Specification
Input Voltage	Three-phase 200 to 240 VAC, 380 to 480 VAC, +10%/-15%, 50/60 Hz +/-5%
Ambient Operating Temperature	-10 to +50 °C (IP20 and flange types)
	-10 to +40 °C (with Type 1kit)
	Up to +60 °C (with derating)
Ambient Storage	-20 °C to +70 °C (-4 °F to +158 °F)
Overload Capacity	110% for 60 s 140% for 2 s 175% instantaneous
Output Frequency	0 to 400 Hz
Control Methods	Open Loop V/f
	Open Loop Vector (PM motors only)
	EZ Open Loop Vector
Motor Types	Induction
	Permanent Magnet
	Synchronous Reluctance
Environmental	1,000 meters altitude, up to 4,000 meters with derating
	Class 3C2 and 3S2 operation for IP20/Type 1 & IP20/Protected Chassis
	95% humidity, non-condensing
	IP20/UL Type 1 plenum rated
Harmonics	5% split choke built in both positive and negative DC bus leg as standard (3% DC link on positive BUS for IP20/Protective Chassis designs)
Protective Design Types	IP20/Type 1
	IP20/Protected Chassis
	IP55/UL Type 12
Global Certifications	UL, cUL, CE, RoHS 2, WEEE, TUV SUD
Functional Safety	Safe Torque Off, SIL3 according to IEC 62061, PLe according to ISO 13849-1
Interface	LCD keypad and Status Ring, Bluetooth is optional
Standard I/O	(8) Multi-function digital inputs (24 VDC)
	(3) Multi-function analog inputs (0 +/- 10 VDC, 4-20 mA)
	(1) Multi-function pulse inputs
	(2) Safe Torque Off inputs
	(2) Fault relay output (form C)
	(2) Multi-function relay outputs (form A)
	(2) Multi-function analog output (0 +/- 10 VDC, 4-20 mA)
24 VDC Power	External supply input to maintain communications without main power
	150 mA output for customer use

Item	Specification
I/O Expansion	(3) Analog Inputs -10 to +10V, 13 bit plus sign, 4 to 20 mA
	(16) Digital Inputs
	(2) Analog Outputs (-10 to +10V, 11 bit magnitude)
	(8) Digital Outputs (6 transistor, 2 relay)
Network Communication	Standard: Modbus RTU, RS-485, 115 kbps
	Optional: EtherNet/IP, DeviceNet, Modbus TCP/IP, PROFINET, PROFIBUS-DP
Software Support Tools	DriveWizard Industrial
	DriveWizard Mobile
	Programming Simulator
	Energy Savings Predictor
	Harmonics Estimator

Control Options

Control Option cards add control functionality to the standard drive. Items are shipped loose and unmounted.

Additional Information	
Network Communications	I/O Adapters

I/O Adapters

Part Number	Option	Purpose
AI-A3	Analog Input (provides 3 additional inputs)	Provides 3 high resolution (13-bit signed) analog inputs. These inputs are configurable for 0 - 10 VDC, -10 VDC to +10 VDC, or 4 - 20 mA, and can be combined with the standard analog inputs of the drive.
DI-A3	Digital Input (provides 16 additional inputs)	Provides an additional 16 digital inputs that can be programmed individually (multi-function) or used as a binary-coded decimal (BCD) speed reference, configurable as 2, 3, or 4 digit BCD.
AO-A3	Analog Output (provides 2 additional outputs)	Provides 2 signals for remote metering of any two of the drive's "U1" monitors. Additive to the two standard analog outputs. Signal level: 0 to +/- 10 VDC (20 kOhm).
DO-A3	Digital Output (provides 8 additional outputs)	Provides 8 additional digital outputs for use in monitoring the status outputs of the drive. Signal levels: 6 channels PHC (48 VDC, 50 mA maximum) and 2 channels of Form A (250 Vac at 1 A or less, 30 VDC at 1 A or less). Shared Common.

Network Communication Options

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

Part Number	Option	Purpose
JOHB-SMP3-MA	Multi-Protocol Ethernet	Multi-protocol dual port Ethernet card to connect to EtherNet/IP, Modbus TCP/IP, PROFINET, or EtherCAT networks.
SI-P3	PROFIBUS-DP	PI compliant option cards to connect to a PROFIBUS-DP network.
SI-N3	DeviceNet	ODVA compliant option cards to connect to a DeviceNet network.
SI-W3	LonWorks	LonWorks provides building automation communication capabilities.
SI-B3	BACnet MSTP	BACnet is a data communications protocol for building automation and control networks.
SI-J3	APOGEE/Metasys	APOGEE/Metasys is a multi-protocol card that provides communications between different systems and devices.
SI-S3	CANopen	CANopen is a CAN-based communication system.

Keypads, Accessories, and Cables

Additional Information
Keypads and Cables

Table 6: Keypads

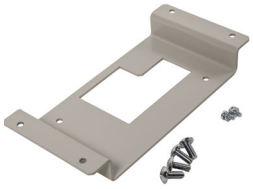
Part Number	Description
JVOP-KPLCA04MEB	Standard LCD Local/Remote Keypad (standard with FP605)
JVOP-KPLCC04MBB	LCD Keypad with Bluetooth for use with DriveWizard Mobile

Standard LCD Keypad

LCD Keypad with Bluetooth

Table 7: Remote Mount Adapters

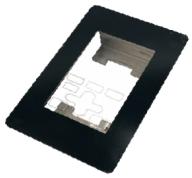
Part Number	Description
900-192-933-001	Type 1 Keypad Panel Mount Kit A (brackets have tapped holes for use with screws)
900-192-933-002	Type 1 Keypad Panel Mount Kit B (brackets have untapped holes for use with panel studs)
900-239-230-001	Type 12/3R Keypad Panel Mount (with embedded studs)
UUX001955	Type 4X Keypad Panel Mount Kit



-001 Type 1 Screw Mount

-002 Type 1 Stud Mount

Type 12/3R Mount (with embedded studs)



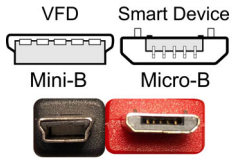
Type 4X Panel Mount

Table 8: Cables

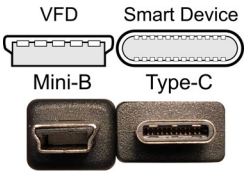
Part Number	Description
UWR0051	Keypad Remote Mount Cable - 1 Meter
UWR0052	Keypad Remote Mount Cable - 3 Meter
UWR01258	USB Cable for PC to Drive Communication - 3 Meter

Table 9: DriveWizard Mobile Interface Cables (for connecting an Android device to the USB port on drive)

Part Number	Description
UWR01516-B	USB Mini-B to USB Micro-B. On-The-Go (OTG) compatible, 2-meter length.
UWR01516-C	USB Mini-B to USB Type-C. On-The-Go (OTG) compatible, 2-meter length.



Part Number: UWR01516-B - USB Mini-B to USB Micro-B



Part Number: UWR01516-C - USB Mini-B to USB Type-C

Enclosure Adapters and Kits

These adapters are for mounting the standard IP20 drives directly to a wall, a machine in a clean environment (Type 1), or inside a Type 1 enclosure with external heatsink. The Type 1 Adapters convert a Protected Chassis Drive (IP20) to an enclosed wall-mounted drive (Type 1). The external heatsink adapters (flange kits) allow IP20/UL Type 1 drives (FP65UxxxxxFA) to be mounted with the drive's heatsink external (UL Type 1 or UL Type 12 backside) to an enclosure.

Type 1 Adapter

External Heatsink Adapter

Additional Information
Type 1 Adapter Manual
IP20/UL Type 1 Heatsink External Mounting Manual
IP55/UL Type 12 Heatsink External Mounting Manual

Table 10: 240 V Drive Mounting Adapters

Catalog Code FP65U . .[1]	UL Type 1 Adapters	Internal Fuses (Bussmann FWH Series) for UL Type 1 Adapters [2]	UL Type 1 External Heatsink Adapter	IP55/UL Type 12 External Heatsink Adapter
	Part Number	Part Number	Part Number	Part Number
2011	-	-	ZPSA-600-EH1-FR1	ZPSD-600-EH12-FR1
2017	-	-		
2024	-	-	ZPSA-600-EH1-FR2	ZPSD-600-EH12-FR2
2031	-	-		
2046	-	-	ZPSA-600-EH1-FR3	ZPSD-600-EH12-FR3
2059	-	-		
2075	-	-	ZPSA-600-EH1-FR4	ZPSD-600-EH12-FR4
2088	-	-		
2114	-	-		
2143	-	-	Included as standard (See instructions)	ZPSD-600-EH12-FR6
2169	-	-		
2211	900-192-121-009	-		Available as standard IP55/UL Type 12 backside models. Refer to *Table 1*. Drive catalog code ending in -AWA
2273		-		
2343	900-192-121-010	-		
2396		-		

1. Mounting adapter options applicable to FP65UxxxxAFA and FP65UxxxxABA models.
2. Fuses sold individually. Quantity 3 required per drive.

Table 11: 480 V Drive Mounting Adapters

Catalog Code FP65U . .[1]	UL Type 1 Adapters[2]	Internal Fuses (Bussmann FWH Series) for UL Type 1 Adapters[2, 3]	UL Type 1 External Heatsink Adapter	IP55/UL Type 12 External Heatsink Adapter
	Part Number	Part Number	Part Number	Part Number
4005AFA	-	-	ZPSA-600-EH1-FR1	ZPSD-600-EH12-FR1
4008AFA	-	-		
4011AFA	-	-		
4014AFA	-	-		
4021AFA	-	-	ZPSA-600-EH1-FR2	ZPSD-600-EH12-FR2
4027AFA	-	-		
4034AFA	-	-		
4040AFA	-	-	ZPSA-600-EH1-FR3	ZPSD-600-EH12-FR3
4052AFA	-	-		
4065AFA	-	-		
4077AFA	-	-	ZPSA-600-EH1-FR4	ZPSD-600-EH12-FR4
4096AFA	-	-		
4124AFA	-	-		
4156AFA	-	-	Included as standard (See instructions)	ZPSD-600-EH12-FR6
4180ABA	900-192-121-009	-		Available as standard IP55/UL Type 12 backside models. Refer to *Table 2*. Drive catalog code ending in -AWA
4240ABA		-		
4302ABA		-		
4361ABA	UUX001700	UFU000047		
4414ABA				
4477ABA	UUX001701	UFU000048		
4515ABA				
4590ABA		UFU000049		
4720ABA				

1. Mounting adapter options applicable to FP65UxxxxAFA and FP65UxxxxABA models.
2. Type 1 Adapters for models 4361 and larger are input fuse ready. UL requires Bussmann FWH-series semiconductor fuses to be installed inside the Type 1 Adapter on these models.
3. Fuses sold individually. Quantity 3 required per drive.

Power Options

Power options are add-on devices that can be used to help increase power factor, improve harmonics, and accommodate single-phase input power.

Name	Purpose
AC Reactor	• Improves the drive input power factor • Prevents damage to the drive when the power supply capacity is large. Use this option when the power supply capacity is more than 600 kVA. • Decreases harmonic current • Improves the power supply total power factor
Single Phase Converter	The Single Phase Converter is used in single-phase to three-phase conversion applications to eliminate drive derating. The Single Phase Converter significantly reduces stresses on the power grid with near unity power factor and less than 10% iTHD.

Additional Information
FP605 Power Options

AC Input Reactors

1.5% and 3% impedance reactors may be used on the input to reduce the effects of line side transients on the drive. The reactors listed are available loose or in a separate UL Type 1 enclosure.

Table 12: 200 - 240 V AC Input Reactors

HP	Catalog Code FP65U . .	1.5% Input Reactor		3% Input Reactor	
		Open Type	Enclosed Type 1	Open Type	Enclosed Type 1
		Part Number	Part Number	Part Number	Part Number
3	2011...	URX000315	URX000418	URX000307	URX000413
5	2017...	URX000319	URX000420	URX000311	URX000415
7.5	2024...	URX000326	URX000424	URX000315	URX000418
10	2031...	URX000332	URX000426	URX000319	URX000420
15	2046...	URX000338	URX000428	URX000329	URX000501
20	2059...	URX000341	URX000429	URX000332	URX000426
25	2075...	URX000341	URX000429	URX000335	URX000427
30	2088...	URX000344	URX000430	URX000338	URX000428
40	2114...	URX000350	URX000432	URX000341	URX000429
50	2143...	URX000353	URX000433	URX000344	URX000430
60	2169...	URX000356	URX000434	URX000347	URX000431
75	2211...	Not Applicable		URX000347	URX000431
100	2273...			URX000350	URX000432
125	2343...			URX000356	URX000434
150	2396...			URX000356	URX000434

Table 13: 480 V AC Input Reactors

HP	Catalog Code FP65U . .	1.5% Input Reactor		3% Input Reactor	
		Open Type	Enclosed Type 1	Open Type	Enclosed Type 1
		Part Number	Part Number	Part Number	Part Number
3	4005...	URX000299	URX000410	URX000300	URX000503
5	4008...	URX000303	URX000411	URX000304	URX000504
7.5	4011...	URX000307	URX000413	URX000308	URX000414
10	4014...	URX000311	URX000415	URX000312	URX000416
15	4021...	URX000315	URX000418	URX000316	URX000419
20	4027...	URX000319	URX000420	URX000320	URX000421
25	4034...	URX000319	URX000420	URX000320	URX000421
30	4040...	URX000323	URX000422	URX000324	URX000423
40	4052...	URX000326	URX000424	URX000327	URX000425
50	4065...	URX000332	URX000426	URX000333	URX000554
60	4077...	URX000335	URX000427	URX000336	URX000555
75	4096...	URX000335	URX000427	URX000336	URX000555
100	4124...	URX000341	URX000429	URX000342	URX000557
125	4156...	URX000344	URX000430	URX000345	URX000558
150	4180...	Not Applicable		URX000348	URX000559
200	4240...			URX000351	URX000560
250	4302...			URX000354	URX000561
300	4361...			URX000357	URX000562
350	4414...			URX000360	URX000563
400	4477...			URX000360	URX000563
450	4515...			URX000363	URX000564
500	4590...			URX000363	URX000564
600	4720...			URX000366	URX000565

AC Output Reactors

3% impedance reactors may be used on the output to reduce the effects of load side transients on the motor. The reactors listed are available loose or in a separate UL Type 1 enclosure.

Table 14: 240 V AC Output Reactors

HP	Catalog Code FP65U...	3% Output Reactor	
		Open Type Part Number	Enclosed Type 1 Part Number
3	2011...	05P00620-0134	05P00620-0032
5	2017...	05P00620-0136	05P00620-0036
7.5	2024...	URX000083	05P00620-0041
10	2031...	05P00620-0044	05P00620-0046
15	2046...	05P00620-0141	05P00620-0054
20	2059...	05P00620-0143	05P00620-0058
25	2075...	URX000085	URX000204
30	2088...	URX000085	URX000204
40	2114...	05P00620-0064	05P00620-0066
50	2143...	05P00620-0069	URX000206
60	2169...	URX000175	URX000248
75	2211...	URX000175	URX000248
100	2273...	URX000178	URX000249
125	2343...	URX000181	URX000250
150	2396...	URX000181	URX000250

Table 15: 480 V AC Output Reactors

HP	Catalog Code FP65U...	3% Output Reactor	
		Open Type Part Number	Enclosed Type 1 Part Number
3	4005...	05P00620-0025	05P00620-0029
5	4008...	05P00620-0133	05P00620-0028
7.5	4011...	05P00620-0135	05P00620-0033
10	4014...	05P00620-0137	05P00620-0037
15	4021...	05P00620-0138	05P00620-0042
20	4027...	05P00620-0139	05P00620-0047
25	4034...	05P00620-0139	05P00620-0047
30	4040...	05P00620-0049	05P00620-0051
40	4052...	05P00620-0142	05P00620-0055
50	4065...	05P00620-0144	05P00620-0059
60	4077...	05P00620-0144	05P00620-0059
75	4096...	05P00620-0145	05P00620-0062
100	4124...	05P00620-0013	05P00620-0067
125	4156...	05P00620-0070	05P00620-0073
150	4180...	URX000586	05P00620-0078
200	4240...	URX000175	05P00620-0083
250	4302...	URX000179	05P00620-0088
300	4361...	URX000182	05P00620-0092
350	4414...	05P00620-0094	05P00620-0096
400	4477...	05P00620-0094	05P00620-0096
450	4515...	05P00620-0098	05P00620-0100
500	4590...	05P00620-0098	05P00620-0100
600	4720...	05P00620-0102	05P00620-0104

Single Phase Converter

Yaskawa's industry leading Single Phase Converter (SPC) cleanly converts single-phase AC power to DC power for Yaskawa variable frequency drives. The SPC combines Yaskawa reliability and drive technology with motor control solutions for businesses in remote areas. The SPC eliminates the need to oversize variable frequency drives for single-phase applications while reducing distortion to less than 10% iTHD. With lower input harmonics and near unity power factor, the SPC also eliminates the need to significantly oversize transformers in single-phase applications, reducing overall installation costs. The Single Phase Converter addresses these common issues with AC motors powered from single-phase input:

- Limited single-phase motor options
- Inefficient use of power due to choppy current harmonics
- Increased maintenance of rotating parts and tuned circuits

Item	Specification
Power Range	230 VAC: 20 - 60 HP
	460 VAC: 30 - 125 HP
Input Voltage Tolerance	230-240 VAC, Single-Phase
	460-480 VAC, Single-Phase
	Tolerance -5/+10% [1]
Power Factor	0.99
Ambient Operating Temperature	-10 to +50 °C (14 to 122 °F) Open Chassis
Global Certifications	UL, RoHS
User Interface	4 LED indicators: Power, Ready, Run, Fault

1. -10 % Minimum input voltage for 60 seconds at rated power.

Additional Information	
Single Phase Converter	Manual
Specifications	Drawings

Table 16: 240 V Single Phase Converters

System Kit Number [1]	System Capacity			Component Name	Component Part Number
	Maximum Total Motor Load HP (kW)	Maximum Continuous			
	Rated Power HP [2]	Input Current (Amps)	Output DC Current (Amps)		
SPBC-240-20HP	20 (15)	79	57	Single Phase Converter	SPBC-2015AAA
				DC Link Choke	URX000530
SPBC-240-30HP	30 (22)	116	84	Single Phase Converter	SPBC-2022AAA
				DC Link Choke	URX000531
SPBC-240-40HP	40 (37)	154	112	Single Phase Converter	SPBC-2030AAA
				DC Link Choke	URX000532
SPBC-240-50HP	50 (37)	191	139	Single Phase Converter	SPBC-2037AAA
				DC Link Choke	URX000520
SPBC-240-60HP	60 (45)	228	166	Single Phase Converter	SPBC-2045AAA
				DC Link Choke	URX000521

1. The kit includes open type/protected chassis Single Phase Converter and DC link choke.
2. The larger power Single Phase Converter unit may be used on lower power motors.

Table 17: 480 V Single Phase Converters

System Kit Number [1]	System Capacity			Component Name	Component Part Number
	Maximum Total Motor Load HP (kW)	Maximum Continuous			
	Rated Power HP [2]	Input Current (Amps)	Output DC Current (Amps)		
SPBC-480-30HP	30 (22)	58	42	Single Phase Converter	SPBC-4022AAA
				DC Link Choke	URX000534
SPBC-480-40HP	40 (30)	77	56	Single Phase Converter	SPBC-4030AAA
				DC Link Choke	URX000535
SPBC-480-50HP	50 (37)	96	69	Single Phase Converter	SPBC-4037AAA
				DC Link Choke	URX000536
SPBC-480-60HP	60 (45)	114	83	Single Phase Converter	SPBC-4045AAA
				DC Link Choke	URX000537
SPBC-480-75HP	75 (56)	142	103	Single Phase Converter	SPBC-4056AAA
				DC Link Choke	URX000527
SPBC-480-125HP	125 (93)	234	170	Single Phase Converter	SPBC-4093AAA
				DC Link Choke	URX000529

1. The kit includes open type/protected chassis Single Phase Converter and DC link choke.
2. The larger power Single Phase Converter unit may be used on lower power motors.

Table 18: 480 V UL Type 1 Adapters for Single Phase Converters

Converter Model	Link Choke Part Number	Converter Type 1 Kit Adapter	Link Choke Type 1 Kit Adapter
		Part Number	Part Number
SPBC-2015AAA	URX000530	UUX001686	UUX001688
SPBC-2022AAA	URX000531		
SPBC-2030AAA	URX000532	UUX001687	
SPBC-2037AAA	URX000520	UUX001703	
SPBC-2045AAA	URX000521		
SPBC-4022AAA	URX000534	UUX001686	
SPBC-4030AAA	URX000535		
SPBC-4037AAA	URX000536	UUX001687	
SPBC-4045AAA	URX000537		
SPBC-4056AAA	URX000527	UUX001703	
SPBC-4093AAA	URX000529		

This option consists of a top and bottom cover to convert a protected chassis converter and/or DC link choke to a UL Type 1 enclosed unit. This option DOES NOT provide additional space for mounting auxiliary components (i.e., circuit breaker, input fuses, reactor, etc.).

Drive Derating

Single-Phase Derating

The FP605 can utilize single-phase input power. Use the tables below to select the correct model for the application. The tables below apply to the following FP605 drive versions: IP20/UL Type 1 (2011 to 2169 and 4005 to 4156), IP20/Protected Chassis (2211 to 2396 and 4180 to 4720), IP55/UL Type 12 (2011 to 2114 and 4005 to 4124), and IP55/UL Type 12 with Switch (2011 to 2114 and 4005 to 4096).

Notes:
The FP605 has a 5% split DC link choke built-in for models 2011 to 2169 and 4005 to 4156. Adding an external AC reactor is not recommended for these models.
The FP605 has a 3% DC link choke built-in for models 2211 to 2396 and 4180 to 4720. Single phase ratings for these models have been provided with and without additional AC reactors. External AC reactors are recommended to optimize the single phase ratings for these models.

Table 19: 240 V Single-Phase Input (0 to +10%) 208 V Three-Phase Motor (no reactor)

Catalog Code FP65U	Without Additional Impedance [1, 2]			
	Output Capacity		Single Phase Input	
	Motor Power (HP)	Motor FLA	Power (kVA)	Current (A)
2011	1.0	4.6	1.7	7.4
2017	2.0	7.5	3.2	14
2024	3.0	10.6	4.6	20
2031	3.0	10.6	4.6	20
2046	5.0	17.0	7.3	32
2059	7.5	24	10.3	45
2075	7.5	24	10.3	45
2088	10	31	14	60
2114	10	31	14	60
2143	10	31	14	60
2169	15	46	20	89
2211	30	92	38	166
2273	30	92	39	169
2343	40	120	51	222
2396	50	150	62	273

1. The FP605 has a 5% split DC link choke built-in for models 2011 to 2169. Adding an external AC reactor is not recommended for these models.
2. The FP605 has a 3% DC link choke built-in for models 2211 to 2396. See additional "with reactor" tables for single phase ratings of these drives when using an AC reactor.

Table 20: 240 V Single-Phase Input (0 to +10%) 208 V Three-Phase Motor (with reactor)

Catalog Code FP65U	No Reactor		With Additional Impedance [1]					
	Drive Output Capacity		Drive Output Capacity		Single Phase Input		AC Input Reactor	
							Open	Type 1 Enclosed
	Motor Power (HP)	Motor FLA	Motor Power (HP)	Motor FLA	Power (kVA)	Current (A)	Part Number	Part Number
2211	30	92	40	120	45	198	URX000351	URX000560
2273	30	92	50	150	56	247	URX000354	URX000561
2343	40	120	60	177	67	292	URX000357	URX000562
2396	50	150	75	221	82	361	URX000357	URX000562

1. The FP605 has a 3% DC link choke built-in for models 2211 to 2396. External AC reactors are recommended to optimize the single phase ratings for these models.

Table 21: 240 V Single-Phase Input (-5% to +10%) 230 V Three-Phase Motor (no reactor)

Catalog Code FP65U	Without Additional Impedance [1, 2]			
	Output Capacity		Single Phase Input	
	Motor Power (HP)	Motor FLA	Power (kVA)	Current (A)
2011	1.0	4.2	1.6	6.8
2017	2.0	6.8	2.8	12
2024	3.0	9.6	4.1	18
2031	3.0	9.6	4.1	18
2046	5.0	15.2	6.6	29
2059	7.5	22	9.3	41
2075	7.5	22	9.3	41
2088	10	28	13	55
2114	10	28	13	55
2143	10	28	13	55
2169	15	42	19	82
2211	30	80	38	166
2273	30	80	39	169
2343	40	104	51	222
2396	50	130	62	273

1. The FP605 has a 5% split DC link choke built-in for models 2011 to 2169. Adding an external AC reactor is not recommended for these models.
2. The FP605 has a 3% DC link choke built-in for models 2211 to 2396. See additional "with reactor" tables for single phase ratings of these drives when using an AC reactor.

Table 22: 240 V Single-Phase Input (-5% to +10%) 230 V Three-Phase Motor (with reactor)

Catalog Code FP65U	No Reactor		With Additional Impedance [1]					
	Drive Output Capacity		Drive Output Capacity		Single Phase Input		AC Input Reactor	
							Open	Type 1 Enclosed
	Motor Power (HP)	Motor FLA	Motor Power (HP)	Motor FLA	Power (kVA)	Current (A)	Part Number	Part Number
2211	30	80	Not Recommended					
2273	30	80	40	104	46	203	URX000353	URX000433
2343	40	104	50	130	57	250	URX000353	URX000433
2396	50	130	60	154	68	299	URX000356	URX000434

1. The FP605 has a 3% DC link choke built-in for models 2211 to 2396. External AC reactors are recommended to optimize the single phase ratings for these models.

Table 23: 480 V Single-Phase Input (-5% to +10%) 460 V Three-Phase Motor (no reactor)

Catalog Code FP65U	Without Additional Impedance [1, 2]			
	Output Capacity		Single Phase Input	
	Motor Power (HP)	Motor FLA	Power (kVA)	Current (A)
4005	1.0	2.1	1.5	3.4
4008	2.0	3.4	2.8	6.1
4011	3.0	4.8	4.1	9.0
4014	3.0	4.8	4.1	9.0
4021	3.0	4.8	4.1	9
4027	5.0	7.6	6.8	15
4034	5.0	7.6	6.8	15
4040	7.5	11.0	10	21
4052	10	14.0	13	28
4065	10	14	13	28
4077	15	21	19	41
4096	15	21	19	41
4124	25	34	31	67
4156	30	40	36	79
4180	50	65	62	136
4240	50	65	63	138
4302	50	65	64	140
4361	75	96	93	205
4414	100	124	122	267
4477	125	156	152	334
4515	125	156	153	335
4590	150	180	183	401
4720	150	180	183	401

1. The FP605 has a 5% split DC link choke built-in for models 4005 to 4156. Adding an external AC reactor is not recommended for these models.
2. The FP605 has a 3% DC link choke built-in for models 4180 to 4720. See additional "with reactor" tables for single phase ratings of these drives when using an AC reactor.

Table 24: 480 V Single-Phase Input (-5% to +10%) 460 V Three-Phase Motor (with reactor)

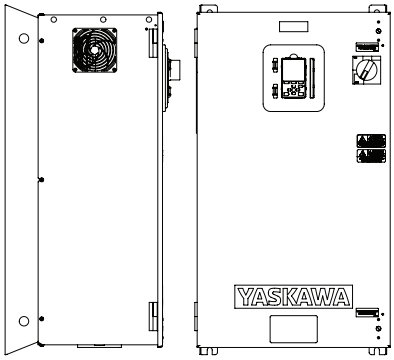
Catalog Code FP65U	No Reactor		With Additional Impedance [1]					
	Drive Output Capacity		Drive Output Capacity		Single Phase Input		AC Input Reactor	
							Open	Type 1 Enclosed
	Motor Power (HP)	Motor FLA	Motor Power (HP)	Motor FLA	Power (kVA)	Current (A)	Part Number	Part Number
4180	50	65	50	65	59	130	URX000347	URX000431
4240	50	65	50	65	60	132	URX000350	URX000432
4302	50	65	60	77	71	156	URX000353	URX000433
4361	75	96	75	96	89	196	URX000356	URX000434
4414	100	124	100	124	116	255	URX000356	URX000434
4477	125	156	150	180	171	375	URX000359	URX000566
4515	125	156	150	180	172	376	URX000359	URX000566
4590	150	180	200	240	227	497	URX000365	URX000581
4720	150	180	200	240	227	497	URX000365	URX000581

1. FP605 models 4180 to 4720 have 3% DC link choke built-in. External AC reactors are recommended to optimize the single phase ratings for these models.

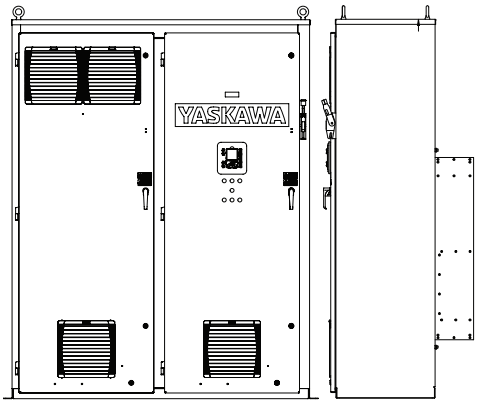
FP605 Configured Packages

UL Type 1, UL Type 12, & UL Type 3R FP605 Configured Packages

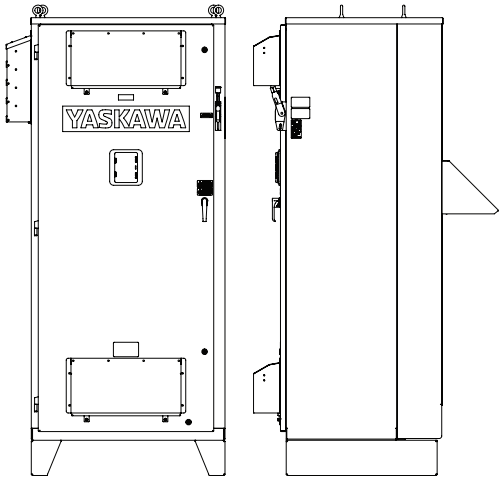
The FP605 configured package provides an FP605 drive in a Type 1, Type 12, or Type 3R enclosure, with space for several commonly used options, such as reactors, RFI filters, circuit breakers, etc. The FP605 configured has been designed for flexibility in providing commonly requested features and options.



Type 1, W2



Type 12, F2



Type 3R, F1

Ratings, Standards, Conditions, & Options

Ratings
1 to 150 HP @ 208 VAC
1 to 150 HP @ 240 VAC
1 to 600 HP @ 480 VAC
For drive performance features, see *Drive Specifications*

Service Conditions
Ambient Temperature: -10 to 40 °C (14 to 104 °F)
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 and Reliability
UL 508A (Industrial Control Panels)
UL, cUL Listed

Configured Options
Circuit Breaker
Disconnect Switch
Input Fuses
Input/Output Reactor
Space Heater
50 °C Ambient
Motor Output Terminal Block
Custom Nameplates
Network Communications
Digital & Analog Output Cards
Start & Stop Push Buttons
Door-mounted Pilot Lights
Door-mounted Hand/Off/Auto Switch
Door-mounted Speed Pot
Control Transformer +200 VA
Keypad Viewing Window
Bluetooth-enabled keypad for DriveWizard Mobile

Model Number Configuration

1 - 600 HP Type 1, Type 12, & Type 3R FP605 Configured

Type 1, Type 12, & Type 3R FP605 Configured

Step 1: Find the Base Number for the required enclosure type, voltage, and current rating.

Step 2: Add the option code letter for each required option. Power options must be preceded by (P), any Control & Communication option by (T), and any Special Option by (S).

Step 3: Check that complete model number does not exceed 18 characters.

Example: A Type 1 configured package (F6C1) with a 480, 40 A FP605 drive (B040), with standard AIC circuit breaker, a 3% input reactor (P followed by ER), and EtherNet/IP communications capability (T followed by D) would be F6C1B040PERTD

Figure 2: FP605 Configured Model Number Key

Base Number	Options		
	Power	Control	Special

F6C 1 A 040 P T S

Product Series

FP605 Configured

Enclosure

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

Voltage Class

D	208 V
A	240 V
B	480 V

Current

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

Power Options (P)

E	Lockable Circuit Breaker*4*5	Select one or none
C	Lockable Circuit Breaker *4*5 (65 kA SCCR panel rating)	
M	Lockable Circuit Breaker*4*5 (100 kA SCCR panel rating)	
D	Lockable Disconnect Switch	
F	Input Fuses*4*5	Select one or none
R	Input Reactor 3%*2	Select one or none
H	Output Reactor 3% *2*6	
3	Space Heater *1	Select one or none
4	50 °C Ambient *1	Select one or none
8	Motor Output Terminal Block*6	Select one or none

Special Options (S)

B	Bluetooth Keypad

Control & Communication Options (T)

W	Custom Nameplates	Select one or none
D	EtherNet/IP dual-port	Group 1 Select one or none*3
G	DeviceNet	
H	PROFIBUS	
J	BACnet	
L	LonWorks Serial Communications	
Q	Modbus TCP/IP dual-port	
E	Digital Output	Group 2 Select one or none *3
N	Analog Output	
6	Start & Stop Push Buttons	Select one or none
7	Run (Green) & Stop (Red) Pilot Lights	Select one or none
8	Fault Pilot Light (Red)	Select one or none
Y	Hand/Off/Auto Switch	Select one or none
Z	Speed Pot	
9	Speed Pot & HOA Switch	
K	Control Transformer +200 VA	Select one or none
M	Keypad Viewing Window*1	Select one or none

*1 Type 3R packages only.

*2 Option H may be substituted for option R for 208 V packages up to 150 HP, 240 V package up to 150 HP, and 480 V packages up to 600 HP.

*3 The FP605 supports two option cards. The output option cards will be installed on the drive control board. A package may consist of one network option selected from Group 1 and one control option selected from Group 2. If a network option is not selected, then both Group 2 options (N & E) may be selected.

*4 Power option E, C, M, or F is required for models: F6C1B361 - F6C1B720, F6C2B361 - F6C2B720.

*5 Option F is not allowed with options E,C, or M for the following package models because input fusing is automatically included: F6C1B180 - F6C1B720, F6C2B180 - F6C2B720.

*6 Option P8 is not allowed with Option PH, for the following package models because motor output terminal block is automatically included: F6C1D143 - F6C1D273, F6C1A130 - F6C1A248, F6C1B156 - F6C1B240.

Table 25: FP605 Configured Package SCCR (Short Circuit Current Rating) for Power Option Combinations

Option Type	SCCR (Short Circuit Current Rating) of Panel	
	With Input Fuse [1]	Without Input Fuse [1]
E - Standard Circuit Breaker	All 208 V: 25 kA All 240 V: 25 kA All 480 V: 18 kA	Same SCCR as with option F, but only when allowed as a selection. Refer to selection tables.
C - 65 kAIC Circuit Breaker	65 kA	65 kA when allowed as a selection
M - 100 kAIC Circuit Breaker	100 kA	100 kA when allowed as a selection
None of the options above	Varies by rating. Consult Factory	

1. Some package models with a circuit breaker automatically include input fuses. Refer to the Model Number Key.

Configured Package Option Descriptions

Configured Package - Enclosures	
Type 1	(1) The drive and Configured controls are provided in a Type 1 enclosure, large enough to accommodate any or all of the Configured package options.
Type 12	(2) The drive and Configured controls are provided in a Type 12 enclosure, large enough to accommodate any or all of the Configured package options.
Type 3R	(3) The drive and Configured controls are provided in a Type 3R enclosure, large enough to accommodate any or all of the Configured package options.

Note: The term “Type” (when related to enclosure solutions) refers not only to NEMA Type, but also represents UL Listing for the specific Type(s).

Configured Package - Power Options	
Standard Circuit Breaker	(E) This option provides a circuit breaker with operating handle. See *Table 25* for package SCCR.
65 kAIC Circuit Breaker	(C) This option provides a circuit breaker with operating handle and an Interrupting Capacity of 65 kA. See *Table 25* for package SCCR.
100 kAIC Circuit Breaker	(M) This option provides a circuit breaker with operating handle and an Interrupting Capacity of 100 kA. See *Table 25* for package SCCR.
Disconnect	(D) This option provides a non-fused disconnect with operating handle. See *Table 25* for package SCCR.
Input Fuses	(F) This option provides input fuses for drive short circuit protection. See *Table 25* for package SCCR.
Input Reactor	(R) No form of input impedance is normally required for the FP605 Configured. A 3% line reactor is available if additional impedance is desired, usually to reduce the effects of line-side transients and input current THD.
Output Reactor	(H) No form of output impedance is normally required for the FP605 Configured. A 3% load reactor is available if additional output impedance is desired, usually for long lead-lengths or noise reduction.
Space Heater	(3) This option maintains the internal cabinet temperature to reduce condensation. This option is only available for the Type 3R enclosure.
50 Degree C Ambient	(4) This option will allow the enclosure to be operated in an ambient temperature of 50 °C (122 °F). The standard basic design is rated for 40 °C ambient. This option is only available for the Type 3R enclosure.
Motor Output Terminal Block	(8) This option provides a dedicated motor output terminal block for customer use.

Configured Package - Control Options	
Custom Nameplates	(W) Custom engraved nameplates with white lettering on a black lamicoid are available with option (W), for special tagging purposes (Example: “FAN #1”). Note that this option requires the text to be specified by the customer.
EtherNet/IP dual-port SI-EN3D	(D) This option allows the drive to communicate on a EtherNet/IP network.
DeviceNet SI-N3	(G) This option allows the drive to communicate on a DeviceNet network.
PROFIBUS SI-P3	(H) This option allows the drive to communicate on a PROFIBUS network.
BACnet MSTP SI-B3	(J) This option allows the drive to communicate on a BACnet MSTP network.
LonWorks SI-W3	(L) This option allows the drive to communicate on a LonWorks network.
Modbus TCP/IP dual port SI-EM3D	(Q) This option allows the drive to communicate on a Modbus TCP/IP network.
Digital Output DO-A3	(E) This option provides 8 additional digital outputs for use in monitoring the status of the drive.
Analog Output AO-A3	(N) This option provides 2 additional isolated signal outputs (11 Bit + Sign) for remote monitoring of any two of the U1 parameters within the drive.
Start & Stop Push Buttons	(6) This option provides door-mounted start and stop push buttons.
Run (Green) & Stop (Red) Pilot Lights	(7) This option provides door-mounted pilot lights for run and stop indication.
Fault Pilot Light (Red)	(8) This option provides door-mounted pilot lights for fault indication.

Configured Package - Control Options	
Hand/Off/Auto HOA Switch	(Y) This option provides a door-mounted Hand/Off/Auto Selector Switch for determining start/stop and speed control.
Speed Potentiometer	(Z) This option provides a door-mounted Speed Pot with knob to control motor speed.
Speed Potentiometer & Hand/OFF/Auto (HOA) Switch	(9) This option provides a door-mounted Speed Pot with knob to control motor speed. and a door-mounted Hand/Off/Auto Selector Switch for determining start/stop and speed control.
Control Transformer +200 VA	(K) 200 VA Control Power Transformer (for customer use)
Keypad Viewing Window	(M) All FP605 standard drive packages include a door mounted keypad enclosed in a plastic bezel with a clear door that opens for access. Option M (for Type 3R only) provides a larger painted steel solution, including a key lock that protects the keypad and other door mounted controls.
Special Options	
Bluetooth Keypad	(B) This option equips the package with a Bluetooth enabled keypad for use with the DriveWizard Mobile application.

UL Type 1 Configured Packages

The FP605 configured packages provide a FP605 in a UL Type 1 enclosure, with space for several commonly used options, such as reactors and circuit breakers. The FP605 configured package is designed for tough industrial environments. It is rugged and reliable.

Refer to *Figure 2* - *FP605 Configured Model Number Key* for notes regarding compatibility with package options.

Table 26: UL Type 1 Configured

208 V		
Rated Output		Type 1 Configured Enclosure
Power Output (HP)	Output Current (Amps)	F6C1
1	4.6	D004
2	7.5	D007
3	10.6	D010
5	16.7	D016
7.5	24.2	D024
10	30.8	D030
15	46.2	D046
20	59.4	D059
25	74.8	D074
30	88	D088
40	114	D114
50	143	D143
60	169	D169
75	211	D211
100	273	D273
125	343	D343
150	396	D396

240 V		
Rated Output		Type 1 Configured Enclosure
Power Output (HP)	Output Current (Amps)	F6C1
1	4.2	A004
2	6.8	A006
3	9.6	A009
5	15.2	A015
7.5	22	A022
10	28	A028
15	42	A042
20	54	A054
25	68	A068
30	80	A080
40	104	A104
50	130	A130
60	154	A154
75	192	A192
100	248	A248
125	312	A312
150	360	A360

480 V		
Rated Output		Type 1 Configured Enclosure
Power Output (HP)	Output Current (Amps)	F6C1
1	2.1	B002
2	3.4	B003
3	4.8	B004
5	7.6	B007
7.5	11	B011
10	14	B014
15	21	B021
20	27	B027
25	34	B034
30	40	B040
40	52	B052
50	65	B065
60	77	B077
75	96	B096
100	124	B124
125	156	B156
150	180	B180
200	240	B240
250	302	B302
300	361	B361
350	414	B414
400	477	B477
450	515	B515
500	590	B590
600	720	B720

UL Type 12 Configured Packages

The FP605 configured packages provide a FP605 in a UL Type 12 enclosure, with space for several commonly used options, such as reactors and circuit breakers. The FP605 configured package is designed for tough industrial environments. It is rugged and reliable.

Refer to *Figure 2* - *FP605 Configured Model Number Key* for notes regarding compatibility with package options.

Table 27: UL Type 1 Configured

208 V		
Rated Output		Type 12 Configured Enclosure
Power Output (HP)	Output Current (Amps)	F6C2
1	4.6	D004
2	7.5	D007
3	10.6	D010
5	16.7	D016
7.5	24.2	D024
10	30.8	D030
15	46.2	D046
20	59.4	D059
25	74.8	D074
30	88	D088
40	114	D114
50	143	D143
60	169	D169
75	211	D211
100	273	D273
125	343	D343
150	396	D396

240 V		
Rated Output		Type 12 Configured Enclosure
Power Output (HP)	Output Current (Amps)	F6C2
1	4.6	A004
2	7.5	A007
3	10.6	A010
5	16.7	A016
7.5	24.2	A024
10	30.8	A030
15	46.2	A046
20	59.4	A059
25	74.8	A074
30	88	A088
40	114	A114
50	143	A143
60	169	A169
75	211	A211
100	273	A273
125	343	A343
150	396	A396

480 V		
Rated Output		Type 12 Configured Enclosure
Power Output (HP)	Output Current (Amps)	F6C2
1	2.1	B002
2	3.4	B003
3	4.8	B004
5	7.6	B007
7.5	11	B011
10	14	B014
15	21	B021
20	27	B027
25	34	B034
30	40	B040
40	52	B052
50	65	B065
60	77	B077
75	96	B096
100	124	B124
125	156	B156
150	180	B180
200	240	B240
250	302	B302
300	361	B361
350	414	B414
400	477	B477
450	515	B515
500	590	B590
600	720	B720

UL Type 3R Configured Packages

The FP605 configured packages provide a FP605 in a UL Type 3R enclosure, with space for several commonly used options, such as reactors and circuit breakers. The FP605 configured package is designed for tough industrial environments. It is rugged and reliable.

Refer to *Figure 2* - *FP605 Configured Model Number Key* for notes regarding compatibility with package options.

Table 28: UL Type 3R Configured

208 V		
Rated Output		Type 3R Configured Enclosure
Power Output (HP)	Output Current (Amps)	F6C3
5	16.7	D016
7.5	24.2	D024
10	30.8	D030
15	46.2	D046
20	59.4	D059
25	74.8	D074
30	88	D088
40	114	D114
50	143	D143
60	169	D169
75	211	D211
100	273	D273
125	343	D343
150	396	D396

240 V		
Rated Output		Type 3R Configured Enclosure
Power Output (HP)	Output Current (Amps)	F6C3
5	15.2	A015
7.5	22	A022
10	28	A028
15	42	A042
20	54	A054
25	68	A068
30	80	A080
40	104	A104
50	130	A130
60	154	A154
75	192	A192
100	248	A248
125	312	A312
150	360	A360

480 V		
Rated Output		Type 3R Configured Enclosure
Power Output (HP)	Output Current (Amps)	F6C3
5	7.6	B007
7.5	11	B011
10	14	B014
15	21	B021
20	27	B027
25	34	B034
30	40	B040
40	52	B052
50	65	B065
60	77	B077
75	96	B096
100	124	B124
125	156	B156
150	180	B180
200	240	B240
250	302	B302
300	361	B361
350	414	B414
400	477	B477
450	515	B515
500	590	B590
600	720	B720

Control and Communication Options

These cards and devices add control functionality to the standard configured package.

Table 29: Installed Control Options for Configured Packages

Installed Control Options (valid for all voltage and power ratings)		
Group	**Catalog Code**	**Description**
Group 1: Select none or one[1]	D	EtherNet/IP dual port (SI-EN3D)
	G	DeviceNet (SI-N3)
	H	PROFIBUS-DP (SI-P3)
	J	BACnet MSTP (SI-B3)
	L	LonWorks (SI-W3)
	Q	Modbus/TCP dual port (SI-EM3D)
Group 2: Select one or none[1]	E	Digital Output (provides 8 additional outputs) (DO-A3)
	N	Analog Monitor (provides 2 additional outputs) (AO-A3)
Group 3: Select none, any, or all	K	200 VA Control Power Transformer (for customer use)
	M[2]	Lockable Viewing Window (covers door mounted operator devices, only for NEMA 3R)
	W	Custom Nameplates
	6	Start & Stop Push Buttons
	7	Run (Green) & Stop (Red) Pilot Lights
	8	Fault Pilot Light (Red)
Group 4: Select none or one	Y	Hand/OFF/Auto (HOA) Switch
	Z	Speed Potentiometer
	9	Speed Potentiometer & Hand/OFF/Auto (HOA) Switch

1. The FP605 supports two option cards. The output option cards will be installed on the drive control board. A package may consist of one network option selected from Group 1 and one option selected from Group 2. If a network option is not selected, then both Group 2 options (N & E) may be selected.
2. Type 3R packages only.

Table 30: Installed Special Options for Configured Packages

Installed Special Options (valid for all voltage and power ratings)	
Special (S) Code	**Description**
B	Bluetooth Keypad Upgrade for use with DriveWizard Mobile. (provided with standard keypad if not selected)

Freestanding Leg Kit, NEMA 3R

Provides for floor mounting and ground clearance for NEMA 3R wall-mount enclosures. Floor-mount enclosures come standard with legs.

Table 31: Freestanding Leg Kits for Configured Type 3R Packages

Part Number	Description
UUX000923	12 inch height (for all NEMA 3R wall mount sizes)
UUX001656	18 inch height (for all NEMA 3R wall mount sizes)
UUX000924	30 inch height (for all NEMA 3R wall mount sizes)

UL Type 1 Configured Package Dimensions

Table 32: 208 V UL Type 1 Configured Models, Normal Duty

Type 1 Configured (ND) F6C1. .	Amps	Nominal HP	Physical Dimensions (in.) [2]			Weight (lb) [1]	Drawing Number
			H	W	D		
D004	4.6	1	25.9	15.7	15.6	90	DD.HWF.1.W0.01
D007	7.5	2					
D010	10.6	3				91	
D016	16.7	5				92	
D024	24.2	7.5	33.9	18.7	17.6	124	DD.HWF.1.W1.01
D030	30.8	10				133	
D046	46.2	15	37.1	20.8	18.5	166	DD.HWF.1.W2.01
D059	59.4	20				170	
D074	74.8	25	42.1	25.6	18.8	221	DD.HWF.1.W3.01
D088	88	30				228	
D114	114	40				240	
D143	143	50	53.1	33.7	20.5	422	DD.HWF.1.W4.01
D169	169	60				432	
D211	211	75				449	
D273	273	100				515	
D343	343	125	87.0	42.0	33.5	996	DD.HWF.1.F1.01
D396	396	150				1002	

1. This data represents the average drive package weight only, not shipping weight.
2. Dimensions listed are for reference only. Please refer to the corresponding dimensional drawing (DD) for exact dimensions.

Table 33: 240 V UL Type 1 Configured Models, Normal Duty

Type 1 Configured (ND) F6C1. .	Amps	Nominal HP	Physical Dimensions (in.) [2]			Weight (lb) [1]	Drawing Number
			H	W	D		
A004	4.2	1	25.9	15.7	15.6	91	DD.HWF.1.W0.01
A006	6.8	2					
A009	9.6	3					
A015	15.2	5				92	
A022	22	7.5	33.9	18.7	17.6	124	DD.HWF.1.W1.01
A028	28	10				128	
A042	42	15	37.1	20.8	18.5	161	DD.HWF.1.W2.01
A054	54	20				169	
A068	68	25	42.1	25.6	18.8	220	DD.HWF.1.W3.01
A080	80	30				225	
A104	104	40				236	
A130	130	50	53.1	33.7	20.5	412	DD.HWF.1.W4.01
A154	154	60				431	
A192	192	75				447	
A248	248	100				469	
A312	312	125	87.0	42.0	33.5	992	DD.HWF.1.F1.01
A360	360	150				999	

1. This data represents the average drive package weight only, not shipping weight.
2. Dimensions listed are for reference only. Please refer to the corresponding dimensional drawing (DD) for exact dimensions.

Table 34: 480 V UL Type 1 Configured Models, Normal Duty

Type 1 Configured (ND) F6C1. .	Amps	Nominal HP	Physical Dimensions (in.) [2]			Weight (lb) [1]	Drawing Number
			H	W	D		
B002	2.1	1	25.9	15.7	15.6	91	DD.HWF.1.W0.01
B003	3.4	2					
B004	4.8	3					
B007	7.6	5				92	
B011	11	7.5				93	
B014	14	10				99	
B021	21	15	33.9	18.7	17.6	131	DD.HWF.1.W1.01
B027	27	20				133	
B034	34	25				139	
B040	40	30	37.1	20.8	18.5	163	DD.HWF.1.W2.01
B052	52	40				175	
B065	65	50				183	
B077	77	60	42.1	25.6	18.8	237	DD.HWF.1.W3.01
B096	96	75				245	
B124	124	100				264	
B156	156	125	53.1	33.7	20.5	439	DD.HWF.1.W4.01
B180	180	150				463	
B240	240	200				490	
B302	302	250	87.0	42.0	33.5	980	DD.HWF.1.F1.01
B361	361	300				1010	
B414	414	350				1065	
B477	477	400	87.1	66.3	33.2	1511	DD.HWF.1.F2.01
B515	515	450				1566	
B590	590	500				1630	
B720	720	600					

1. This data represents the average drive package weight only, not shipping weight.
2. Dimensions listed are for reference only. Please refer to the corresponding dimensional drawing (DD) for exact dimensions.

UL Type 12 Configured Package Dimensions

Table 35: 208 V UL Type 12 Configured Models, Normal Duty

Type 12 Configured (ND) F6C2. .	Amps	Nominal HP	Physical Dimensions (in.) [2]			Weight (lb) [1]	Drawing Number
			H	W	D		
D004	4.6	1	27.1	18.3	18.8	96	DD.HWF.12.W0.01
D007	7.5	2					
D010	10.6	3				97	
D016	16.7	5				99	
D024	24.2	7.5	34.1	19.3	18.9	128	DD.HWF.12.W1.01
D030	30.8	10				137	
D046	46.2	15	37.3	24.5	19.0	184	DD.HWF.12.W2.01
D059	59.4	20				188	
D074	74.8	25	43.6	26.3	21.4	258	DD.HWF.12.W3.01
D088	88	30				261	
D114	114	40				273	
D143	143	50	55.0	33.3	26.3	475	DD.HWF.12.W4.01
D169	169	60				480	
D211	211	75				477	
D273	273	100				544	
D343	343	125	85.4	41.3	34.4	698	DD.HWF.12.F1.01
D396	396	150				800	

1. This data represents the average drive package weight only, not shipping weight.
2. Dimensions listed are for reference only. Please refer to the corresponding dimensional drawing (DD) for exact dimensions.

Table 36: 240 V UL Type 12 Configured Models, Normal Duty

Type 12 Configured (ND) F6C2. .	Amps	Nominal HP	Physical Dimensions (in.) [2]			Weight (lb) [1]	Drawing Number
			H	W	D		
A004	4.2	1	27.1	18.3	18.8	97	DD.HWF.12.W0.01
A006	6.8	2				99	
A009	9.6	3				98	
A015	15.2	5					
A022	22	7.5	34.1	19.3	18.9	125	DD.HWF.12.W1.01
A028	28	10				132	
A042	42	15	37.3	24.5	19.0	179	DD.HWF.12.W2.01
A054	54	20				187	
A068	68	25	43.6	26.3	21.4	256	DD.HWF.12.W3.01
A080	80	30				257	
A104	104	40				268	
A130	130	50	55.0	33.3	26.3	464	DD.HWF.12.W4.01
A154	154	60				479	
A192	192	75				476	
A248	248	100				500	
A312	312	125	85.4	41.3	34.4	698	DD.HWF.12.F1.01
A360	360	150				800	

1. This data represents the average drive package weight only, not shipping weight.
2. Dimensions listed are for reference only. Please refer to the corresponding dimensional drawing (DD) for exact dimensions.

Table 37: 480 V UL Type 12 Configured Models, Normal Duty

Type 12 Configured (ND) F6C2. .	Amps	Nominal HP	Physical Dimensions (in.) [2]			Weight (lb) [1]	Drawing Number
			H	W	D		
B002	2.1	1	27.1	18.3	18.8	100	DD.HWF.12.W0.01
B003	3.4	2					
B004	4.8	3					
B007	7.6	5					
B011	11	7.5					
B014	14	10				111	
B021	21	15	34.1	19.3	18.9	137	DD.HWF.12.W1.01
B027	27	20				138	
B034	34	25				145	
B040	40	30	37.3	24.5	19.0	181	DD.HWF.12.W2.01
B052	52	40				193	
B065	65	50				200	
B077	77	60	43.6	26.3	21.4	272	DD.HWF.12.W3.01
B096	96	75				276	
B124	124	100				295	
B156	156	125	55.0	33.3	26.3	490	DD.HWF.12.W4.01
B180	180	150				494	
B240	240	200				522	
B302	302	250	85.4	41.3	34.4	929	DD.HWF.12.F1.01
B361	361	300				873	
B414	414	350				932	
B477	477	400	87.1	66.3	33.2	1384	DD.HWF.12.F2.01
B515	515	450				1441	
B590	590	500				1494	
B720	720	600				1520	

1. This data represents the average drive package weight only, not shipping weight.
2. Dimensions listed are for reference only. Please refer to the corresponding dimensional drawing (DD) for exact dimensions.

UL Type 3R Configured Package Dimensions

Table 38: 208 V UL Type 3R Configured Models, Normal Duty

Type 3R Configured (ND) F6C3. .	Amps	Nominal HP	Physical Dimensions (in.) [2]			Weight (lb) [1]	Drawing Number
			H	W	D		
D016	16.7	5	39.2	18.6	18.2	152	DD.HWF.3R.W1.01
D024	24.2	7.5				156	
D030	30.8	10				164	
D046	46.2	15	44.2	20.6	20.2	188	DD.HWF.3R.W2.01
D059	59.4	20				194	
D074	74.8	25	49.2	26.6	22.2	287	DD.HWF.3R.W3.01
D088	88	30				293	
D114	114	40				305	DD.HWF.3R.W4.01
D143	143	50	61.2	38.6	25.2	548	
D169	169	60				557	
D211	211	75	93.5	43.6	48.6	1041	DD.HWF.3R.F1.01
D273	273	100				1092	
D343	343	125				1000	
D396	150	150				1100	

1. This data represents the average drive package weight only, not shipping weight.
2. Dimensions listed are for reference only. Please refer to the corresponding dimensional drawing (DD) for exact dimensions.

Table 39: 240 V UL Type 3R Configured Models, Normal Duty

Type 3R Configured (ND) F6C3. .	Amps	Nominal HP	Physical Dimensions (in.) [2]			Weight (lb) [1]	Drawing Number
			H	W	D		
A015	15.2	5	39.2	18.6	18.2	150	DD.HWF.3R.W1.01
A022	22	7.5				156	
A028	28	10				159	
A042	42	15	44.2	20.6	20.2	184	DD.HWF.3R.W2.01
A054	54	20				193	
A068	68	25	49.2	26.6	22.2	285	DD.HWF.3R.W3.01
A080	80	30				287	
A104	104	40				300	
A130	130	50	61.2	38.6	25.2	535	DD.HWF.3R.W4.01
A154	154	60				555	
A192	192	75	93.5	43.6	48.6	1014	DD.HWF.3R.F1.01
A248	248	100				1049	
A312	312	125				1000	
A360	360	150				1100	

1. This data represents the average drive package weight only, not shipping weight.
2. Dimensions listed are for reference only. Please refer to the corresponding dimensional drawing (DD) for exact dimensions.

Table 40: 480 V UL Type 3R Configured Models, Normal Duty

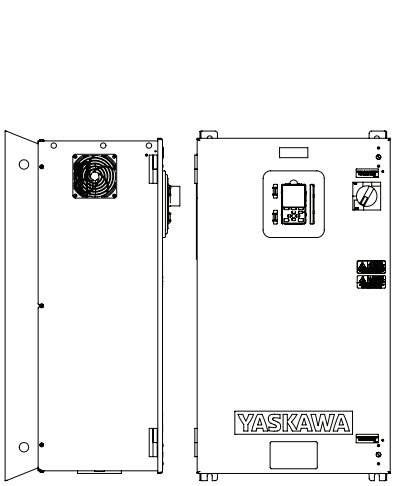
Type 3R Configured (ND) F6C3. .	Amps	Nominal HP	Physical Dimensions (in.) [2]			Weight (lb) [1]	Drawing Number
			H	W	D		
B007	7.6	5	39.2	18.6	18.2	155	DD.HWF.3R.W1.01
B011	11	7.5					
B014	14	10				159	
B021	21	15				163	
B027	27	20				165	
B034	34	25				171	
B040	40	30	44.2	20.6	20.2	185	DD.HWF.3R.W2.01
B052	52	40				198	
B065	65	50				205	
B077	77	60	49.2	26.6	22.2	300	DD.HWF.3R.W3.01
B096	96	75				308	
B124	124	100				334	
B156	156	125	61.2	38.6	25.2	566	DD.HWF.3R.W4.01
B180	180	150	93.5	43.6	48.6	1026	DD.HWF.3R.F1.01
B240	240	200				1070	
B302	302	250				1189	
B361	361	300				1150	
B414	414	350				1175	
B477	477	400				1400	
B515	515	450				1500	
B590	590	500				1550	
B720	720	600				1575	

1. This data represents the average drive package weight only, not shipping weight.
2. Dimensions listed are for reference only. Please refer to the corresponding dimensional drawing (DD) for exact dimensions.

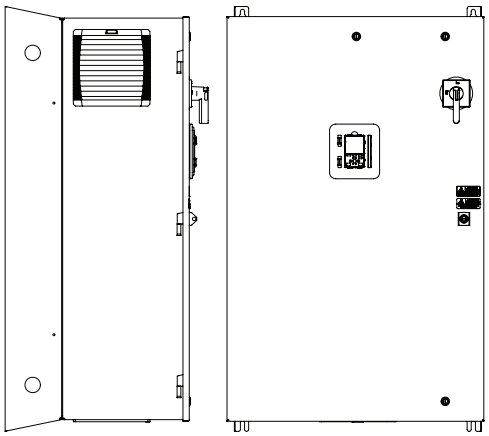
FP605 Bypass Packages

UL Type 1, UL Type 12, & UL Type 3R FP605 Bypass Packages

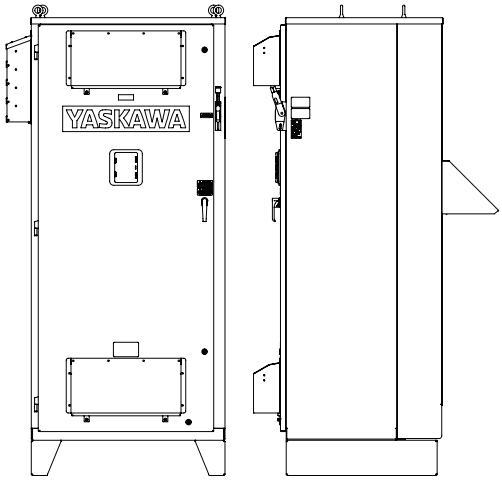
The FP605 bypass packages provide a FP605 with intelligent bypass in a UL Type 1, UL Type 12, or UL Type 3R enclosure. The FP605 bypass package is designed for tough industrial environments. It is rugged and reliable with space for several commonly used options, such as reactors and circuit breakers.



Type 1, W2



Type 12, W4



Type 3R, F1

Ratings, Standards, Conditions, & Options

Ratings
1 to 100 HP @ 208 VAC
1 to 100 HP @ 240 VAC
1 to 250 HP @ 480 VAC

Standards and Reliability
UL 508A (Industrial Control Panels)
UL, cUL Listed

Service Conditions
Ambient Temperature: -10 to 40 °C (14 to 104 °F)
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

Bypass Options
Input Circuit Breaker
Input Fuses
Drive Input Disconnect Switch
Three-Contactor Bypass
Space Heater
50 °C Ambient
Custom Nameplates
Network Communications
Digital & Analog Output Cards
Door-mounted Speed Pot
200 VA Control Power Transformer
Keypad Viewing Window
Bluetooth-enabled Keypad for DriveWizard Mobile

Model Number Configuration

1 - 250 HP Type 1, Type 12, and Type 3R FP605 Bypass

Step 1: Find the Base Number for the required enclosure type, voltage, and current rating.

Step 2: Add the option code letter for each required option. Power options must be preceded by (P), any Control & Communication option by (T), and any Special Option by (S).

Step 3: Check that complete model number does not exceed 18 characters.

Example: A Type 1 bypass package (F6B1) with a 480 V, 40 A FP605 drive (B040) with a standard AIC circuit breaker, and EtherNet/IP communications capability (T followed by D) would be F6B1B040PETD.

Figure 3: FP605 Bypass Model Number Key

Base Number	Options		
	Power	Control	Special

F6B 1 A 040 P T S

Product Series

FP605 Bypass	

Enclosure

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

Voltage Class

D	208 V
A	240 V
B	480 V

Current

Rated Amps (Ex: “040” = 40 A)

Power Options (P)

E	Lockable Circuit Breaker*3	Select one or none
C	Lockable Circuit Breaker*3 (65 kA SCCR panel rating)	
M	Lockable Circuit Breaker*3 (100 kA SCCR panel rating)	
F	Input Fuses*3	Select one or none
G	Drive Input Disconnect Switch*2	Select one or none
B	3-Contactor Bypass	
3	Space Heater *1	Select one or none
4	50 Degree C Ambient *1*2	Select one or none

Special Options (S)

B	Bluetooth Keypad

Control & Communication Options (T)

W	Custom Nameplates	Select one or none
D	EtherNet/IP dual-port	Select one or none
G	DeviceNet	
H	PROFIBUS	
L	LonWorks Serial Communications	
Q	Modbus TCP/IP dual-port	
E	Digital Output	Select one or none
N	Analog Output	
Z	Speed Pot	Select one or none
K	Control Transformer +200 VA	Select one or none
M	Keypad Viewing Window*1	Select one or none

*1 Type 3R Packages only.

*2 Power option 4 (50°C ambient) cannot be ordered with power option G (drive input disconnect switch).

*3 Option F is not allowed with options E,C, or M for the following package models because input fusing is automatically included: F6B1B180 - F6B1B302, F6B2B180 - F6B2B302.

Table 41: FP605 Bypass Package SCCR (Short Circuit Current Rating) for Power Option Combinations

Option Type	SCCR (Short Circuit Current Rating) of Panel	
	With Input Fuse [1]	Without Input Fuse [1]
E - Standard Circuit Breaker	All 208 V: 25 kA All 240 V: 25 kA All 480 V: 18 kA	Same SCCR as with option F, but only when allowed as a selection. Refer to selection tables.
C - 65 kAIC Circuit Breaker	65 kA	65 kA when allowed as a selection
M - 100 kAIC Circuit Breaker	100 kA	100 kA when allowed as a selection
None of the options above	Varies by rating. Consult Factory	

1. Some package models with a circuit breaker automatically include input fuses. Refer to the Model Number Key.

Bypass Package Option Descriptions

Bypass Package - Enclosures	
Type 1	(1) The drive and Bypass controls are provided in a Type 1 enclosure, large enough to accommodate any or all of the Bypass package options.
Type 12	(2) The drive and Bypass controls are provided in a Type 12 enclosure, large enough to accommodate any or all of the Bypass package options.
Type 3R	(3) The drive and Bypass controls are provided in a Type 3R enclosure, large enough to accommodate any or all of the Bypass package options.

Note: The term “Type” (when related to enclosure solutions) refers not only to NEMA Type, but also represents UL Listing for the specific Type(s).

Bypass Package - Power Options	
Standard Circuit Breaker	(E) This option provides a circuit breaker with operating handle. See *Table 41* for package SCCR.
65 kAIC Circuit Breaker	(C) This option provides a circuit breaker with operating handle and an Interrupting Capacity of 65 kA. See *Table 41* for package SCCR.
100 kAIC Circuit Breaker	(M) This option provides a circuit breaker with operating handle and an Interrupting Capacity of 100 kA. See *Table 41* for package SCCR.
Input Fuses	(F) This option provides input fuses for drive short circuit protection. See *Table 41* for package SCCR.
Drive Input Disconnect Switch	(G) This option provides a three phase contact before the drive to remove power from the drive.
3-Contactor Bypass	(B) This option changes the bypass configuration from a 2-contactor to a 3-contactor bypass by adding an additional electronically controlled three phase contact to the input of the drive.
Space Heater	(3) This option maintains the internal cabinet temperature to reduce condensation. This option is only available for the Type 3R enclosure.
50 Degree C Ambient	(4) This option will allow the enclosure to be operated in an ambient temperature of 50 °C (122 °F). The standard basic design is rated for 40 °C ambient. This option is only available for the Type 3R enclosure.

Bypass Package - Control Options	
Custom Nameplates	(W) Custom engraved nameplates with white lettering on a black lamicoid are available with option (W), for special tagging purposes (Example: “FAN #1”). Note that this option requires the text to be specified by the customer.
EtherNet/IP dual-port SI-EN3D	(D) This option allows the drive to communicate on an EtherNet/IP network.
DeviceNet SI-N3	(G) This option allows the drive to communicate on a DeviceNet network.
PROFIBUS SI-P3	(H) This option allows the drive to communicate on a PROFIBUS network.
LonWorks SI-W3	(L) This option allows the drive to communicate on a LonWorks network.
Modbus TCP/IP dual port SI-EM3D	(Q) This option allows the drive to communicate on a Modbus TCP/IP network.
Digital Output DO-A3	(E) This option provides 8 additional digital outputs for use in monitoring the status of the drive.
Analog Output AO-A3	(N) This option provides 2 additional isolated signal outputs (11 Bit + Sign) for remote monitoring of any two of the U1 parameters within the drive.
Speed Potentiometer	(Z) This option provides a door-mounted Speed Pot with knob to control motor speed.
Control Transformer +200 VA	(K) 200 VA Control Power Transformer (for customer use)
Keypad Viewing Window	(M) All FP605 standard drive packages include a door mounted keypad enclosed in a plastic bezel with a clear door that opens for access. Option M (for Type 3R only) provides a larger painted steel solution, including a key lock that protects the keypad and other door mounted controls.
Special Options	
Bluetooth Keypad	(B) This option equips the package with a Bluetooth enabled keypad for use with the DriveWizard Mobile application.

UL Type 1 Bypass Packages

The FP605 bypass packages provide a FP605 with intelligent bypass in a UL Type 1 enclosure. The FP605 bypass package is designed for tough industrial environments. It is rugged and reliable with space for several commonly used options, such as reactors and circuit breakers.

Refer to *Figure 3* - *FP605 Bypass Model Number Key* for notes regarding compatibility with package options.

Table 42: UL Type 1 Bypass

208 V		
Rated Output		Type 1 Bypass Enclosure
Power Output (HP)	Output Current (Amps)	F6B1
1	4.6	D004
2	7.5	D007
3	10.6	D010
5	16.7	D016
7.5	24.2	D024
10	30.8	D030
15	46.2	D046
20	59.4	D059
25	74.8	D074
30	88	D088
40	114	D114
50	143	D143
60	169	D169
75	211	D211
100	273	D273

240 V		
Rated Output		Type 1 Bypass Enclosure
Power Output (HP)	Output Current (Amps)	F6B1
1	4.2	A004
2	6.8	A006
3	9.6	A009
5	15.2	A015
7.5	22	A022
10	28	A028
15	42	A042
20	54	A054
25	68	A068
30	80	A080
40	104	A104
50	130	A130
60	154	A154
75	192	A192
100	248	A248

480 V		
Rated Output		Type 1 Bypass Enclosure
Power Output (HP)	Output Current (Amps)	F6B1
1	2.1	B002
2	3.4	B003
3	4.8	B004
5	7.6	B007
7.5	11	B011
10	14	B014
15	21	B021
20	27	B027
25	34	B034
30	40	B040
40	52	B052
50	65	B065
60	77	B077
75	96	B096
100	124	B124
125	156	B156
150	180	B180
200	240	B240
250	302	B302

UL Type 12 Bypass Packages

The FP605 bypass packages provide a FP605 with intelligent bypass in a UL Type 12 enclosure. The FP605 bypass package is designed for tough industrial environments. It is rugged and reliable with space for several commonly used options, such as reactors and circuit breakers.

Refer to *Figure 3* - *FP605 Bypass Model Number Key* for notes regarding compatibility with package options.

Table 43: UL Type 12 Bypass

208 V		
Rated Output		Type 12 Bypass Enclosure
Power Output (HP)	Output Current (Amps)	F6B2
1	4.6	D004
2	7.5	D007
3	10.6	D010
5	16.7	D016
7.5	24.2	D024
10	30.8	D030
15	46.2	D046
20	59.4	D059
25	74.8	D074
30	88	D088
40	114	D114
50	143	D143
60	169	D169
75	211	D211
100	273	D273

240 V		
Rated Output		Type 12 Bypass Enclosure
Power Output (HP)	Output Current (Amps)	F6B2
1	4.2	A004
2	6.8	A006
3	9.6	A009
5	15.2	A015
7.5	22	A022
10	28	A028
15	42	A042
20	54	A054
25	68	A068
30	80	A080
40	104	A104
50	130	A130
60	154	A154
75	192	A192
100	248	A248

480 V		
Rated Output		Type 12 Bypass Enclosure
Power Output (HP)	Output Current (Amps)	F6B2
1	2.1	B002
2	3.4	B003
3	4.8	B004
5	7.6	B007
7.5	11	B011
10	14	B014
15	21	B021
20	27	B027
25	34	B034
30	40	B040
40	52	B052
50	65	B065
60	77	B077
75	96	B096
100	124	B124
125	156	B156
150	180	B180
200	240	B240
250	302	B302

UL Type 3R Bypass Packages

The FP605 bypass packages provide a FP605 with intelligent bypass in a UL Type 3R enclosure. The FP605 bypass package is designed for tough industrial environments. It is rugged and reliable with space for several commonly used options, such as reactors and circuit breakers.

Refer to *Figure 3* - *FP605 Bypass Model Number Key* for notes regarding compatibility with package options.

Table 44: UL Type 3R Bypass

208 V		
Rated Output		Type 3R Bypass Enclosure
Power Output (HP)	Output Current (Amps)	F6B3
5	16.7	D016
7.5	24.2	D024
10	30.8	D030
15	46.2	D046
20	59.4	D059
25	74.8	D074
30	88	D088
40	114	D114
50	143	D143
60	169	D169
75	211	D211
100	273	D273

240 V		
Rated Output		Type 3R Bypass Enclosure
Power Output (HP)	Output Current (Amps)	F6B3
5	15.2	A015
7.5	22	A022
10	28	A028
15	42	A042
20	54	A054
25	68	A068
30	80	A080
40	104	A104
50	130	A130
60	154	A154
75	192	A192
100	248	A248

480 V		
Rated Output		Type 3R Bypass Enclosure
Power Output (HP)	Output Current (Amps)	F6B3
5	7.6	B007
7.5	11	B011
10	14	B014
15	21	B021
20	27	B027
25	34	B034
30	40	B040
40	52	B052
50	65	B065
60	77	B077
75	96	B096
100	124	B124
125	156	B156
150	180	B180
200	240	B240
250	302	B302

Control and Communication Options

These cards and devices add control functionality to the standard bypass.

Table 45: Installed Control Options for Bypass Packages

Installed Control Options (valid for all voltage and power ratings)		
Group	**Catalog Code**	**Description**
Group 1: Select none or one[1]	D	EtherNet/IP dual port (SI-EN3D)
	G	DeviceNet (SI-N3)
	H	PROFIBUS-DP (SI-P3)
	L	LonWorks (SI-W3)
	Q	Modbus/TCP dual port (SI-EM3D)
Group 2: Select none, any or all[2]	E	Digital Output (provides 8 additional outputs) (DO-A3)
	N	Analog Monitor (provides 2 additional outputs) (AO-A3)
	K	200 VA Control Power Transformer (for customer use)
	M	Lockable Viewing Window (covers door mounted operator devices, only for NEMA 3R)[3]
	W	Custom Nameplates
	Z	Speed Potentiometer

1. When selected, the network option card will be installed on the electronic bypass control board.
2. The FP605 bypass package simultaneously supports the digital and analog output option cards. The output option cards will be installed on the drive control board.
3. Type 3R Packages only.

Table 46: Installed Special Options for Bypass Packages

Installed Special Options (valid for all voltage and power ratings)	
Special (S) Code	**Description**
B	Bluetooth keypad upgrade for use with DriveWizard Mobile. (provided with standard keypad if not selected)

Freestanding Leg Kit, NEMA 3R

Provides for floor mounting and ground clearance for NEMA 3R wall-mount enclosures. Floor-mount enclosures come standard with legs.

Table 47: Freestanding Leg Kits for Bypass Type 3R Packages

Part Number	Description
UUX000923	12 inch height (for all NEMA 3R wall mount sizes)
UUX001656	18 inch height (for all NEMA 3R wall mount sizes)
UUX000924	30 inch height (for all NEMA 3R wall mount sizes)

UL Type 1 Bypass Package Dimensions

Table 48: 208 V UL Type 1 Bypass Models, Normal Duty

Type 1 Bypass (ND) F6B1. .	Amps	Nominal HP	Physical Dimensions (in.) [2]			Weight (lb) [1]	Drawing Number
			H	W	D		
D004	4.6	1	25.9	15.7	15.6	93	DD.HWF.1.W0.01
D007	7.5	2					
D010	10.6	3					
D016	16.7	5					
D024	24.2	7.5	33.9	18.7	17.6	125	DD.HWF.1.W1.01
D030	30.8	10				128	
D046	46.2	15	37.1	20.7	18.5	159	DD.HWF.1.W2.01
D059	59.4	20				163	
D074	74.8	25	42.1	25.6	18.8	224	DD.HWF.1.W3.01
D088	88	30				233	
D114	114	40				248	DD.HWF.1.W3.01
D143	143	50	53.1	33.7	20.5	419	
D169	169	60				434	
D211	211	75	87.0	42.0	33.5	832	DD.HWF.1.W3.01
D273	273	100				859	

1. This data represents the average drive package weight only, not shipping weight.
2. Dimensions listed are for reference only. Please refer to the corresponding dimensional drawing (DD) for exact dimensions.

Table 49: 240 V UL Type 1 Bypass Models, Normal Duty

Type 1 Bypass (ND) F6B1. .	Amps	Nominal HP	Physical Dimensions (in.) [2]			Weight (lb) [1]	Drawing Number
			H	W	D		
A004	4.2	1	25.9	15.7	15.6	93	DD.HWF.1.W0.01
A006	6.8	2					
A009	9.6	3					
A015	15.2	5					
A022	22	7.5	33.9	18.7	17.6	125	DD.HWF.1.W1.01
A028	28	10				128	
A042	42	15	37.1	20.7	18.5	159	DD.HWF.1.W2.01
A054	54	20				163	
A068	68	25	42.1	25.6	18.8	224	DD.HWF.1.W3.01
A080	80	30				228	
A104	104	40				243	
A130	130	50	53.1	33.7	20.5	414	DD.HWF.1.W4.01
A154	154	60				430	
A192	192	75	87.0	42.0	33.5	803	DD.HWF.1.F1.01
A248	248	100				859	

1. This data represents the average drive package weight only, not shipping weight.
2. Dimensions listed are for reference only. Please refer to the corresponding dimensional drawing (DD) for exact dimensions.

Table 50: 480 V UL Type 1 Bypass Models, Normal Duty

Type 1 Bypass (ND) F6B1. .	Amps	Nominal HP	Physical Dimensions (in.) [2]			Weight (lb) [1]	Drawing Number
			H	W	D		
B002	2.1	1	25.9	15.7	15.6	93	DD.HWF.1.W0.01
B003	3.4	2					
B004	4.8	3					
B007	7.6	5				94	
B011	11	7.5					
B014	14	10					
B021	21	15	33.9	18.7	17.6	125	DD.HWF.1.W1.01
B027	27	20				129	
B034	34	25				137	
B040	40	30	37.1	20.7	18.5	162	DD.HWF.1.W2.01
B052	52	40				168	
B065	65	50				179	
B077	77	60	42.1	25.6	18.8	233	DD.HWF.1.W3.01
B096	96	75				247	
B124	124	100				263	
B156	156	125	53.1	33.7	20.5	431	DD.HWF.1.W4.01
B180	180	150	87.0	42.0	33.5	803	DD.HWF.1.F1.01
B240	240	200				857	
B302	302	250				964	

1. This data represents the average drive package weight only, not shipping weight.
2. Dimensions listed are for reference only. Please refer to the corresponding dimensional drawing (DD) for exact dimensions.

UL Type 12 Bypass Package Dimensions

Table 51: 208 V UL Type 12 Bypass Models, Normal Duty

Type 12 Bypass (ND) F6B2. .	Amps	Nominal HP	Physical Dimensions (in.) [2]			Weight (lb) [1]	Drawing Number
			H	W	D		
D004	4.6	1	27.1	18.3	18.8	104	DD.HWF.12.W0.01
D007	7.5	2					
D010	10.6	3					
D016	16.7	5					
D024	24.2	7.5	34.1	19.3	18.9	137	DD.HWF.12.W1.01
D030	30.8	10				140	
D046	46.2	15	37.3	24.5	19.0	186	DD.HWF.12.W2.01
D059	59.4	20				190	
D074	74.8	25	43.6	26.3	21.4	265	DD.HWF.12.W3.01
D088	88	30				270	
D114	114	40				288	DD.HWF.12.W4.01
D143	143	50	55.0	33.3	26.3	480	
D169	169	60				490	
D211	211	75	85.4	41.3	34.4	832	DD.HWF.12.F1.01
D273	273	100				851	

1. This data represents the average drive package weight only, not shipping weight.
2. Dimensions listed are for reference only. Please refer to the corresponding dimensional drawing (DD) for exact dimensions.

Table 52: 240 V UL Type 12 Bypass Models, Normal Duty

Type 12 Bypass (ND) F6B2. .	Amps	Nominal HP	Physical Dimensions (in.) [2]			Weight (lb) [1]	Drawing Number
			H	W	D		
A004	4.2	1	27.1	18.3	18.8	104	DD.HWF.12.W0.01
A006	6.8	2					
A009	9.6	3					
A015	15.2	5					
A022	22	7.5	34.1	19.3	18.9	131	DD.HWF.12.W1.01
A028	28	10				134	
A042	42	15	37.3	24.5	19.0	180	DD.HWF.12.W2.01
A054	54	20				185	
A068	68	25	43.6	26.3	21.4	258	DD.HWF.12.W3.01
A080	80	30					
A104	104	40				275	
A130	130	50	55.0	33.3	26.3	481	DD.HWF.12.W4.01
A154	154	60				485	
A192	192	75	85.4	41.3	34.4	804	DD.HWF.12.F1.01
A248	248	100				851	

1. This data represents the average drive package weight only, not shipping weight.
2. Dimensions listed are for reference only. Please refer to the corresponding dimensional drawing (DD) for exact dimensions.

Table 53: 480 V UL Type 12 Bypass Models, Normal Duty

Type 12 Bypass (ND) F6B2. .	Amps	Nominal HP	Physical Dimensions (in.) [2]			Weight (lb) [1]	Drawing Number
			H	W	D		
B002	2.1	1	27.1	18.3	18.8	106	DD.HWF.12.W0.01
B003	3.4	2					
B004	4.8	3					
B007	7.6	5				113	
B011	11	7.5					
B014	14	10					
B021	21	15	34.1	19.3	18.9	139	DD.HWF.12.W1.01
B027	27	20				142	
B034	34	25				150	
B040	40	30	37.3	24.5	19.0	187	DD.HWF.12.W2.01
B052	52	40				195	
B065	65	50				204	
B077	77	60	43.6	26.3	21.4	339	DD.HWF.12.W3.01
B096	96	75				355	
B124	124	100				372	
B156	156	125	55.0	33.3	26.3	491	DD.HWF.12.W4.01
B180	180	150	85.4	41.3	34.4	807	DD.HWF.12.F1.01
B240	240	200				849	
B302	302	250				936	

1. This data represents the average drive package weight only, not shipping weight.
2. Dimensions listed are for reference only. Please refer to the corresponding dimensional drawing (DD) for exact dimensions.

UL Type 3R Bypass Package Dimensions

Table 54: 208 V UL Type 3R Bypass Models, Normal Duty

Type 3R Bypass (ND) F6B3. .	Amps	Nominal HP	Physical Dimensions (in.) [2]			Weight (lb) [1]	Drawing Number
			H	W	D		
D016	16.7	5	39.2	18.6	18.2	150	DD.HWF.3R.W1.01
D024	24.2	7.5				155	
D030	30.8	10				157	
D046	46.2	15	44.2	20.6	20.2	176	DD.HWF.3R.W2.01
D059	59.4	20				182	
D074	74.8	25	49.2	26.6	22.2	284	DD.HWF.3R.W3.01
D088	88	30				289	
D114	114	40				300	DD.HWF.3R.W4.01
D143	143	50	61.2	38.6	25.2	554	
D169	169	60				567	
D211	211	75	93.5	43.6	48.6	1039	DD.HWF.3R.F1.01
D273	273	100				1054	

1. This data represents the average drive package weight only, not shipping weight.
2. Dimensions listed are for reference only. Please refer to the corresponding dimensional drawing (DD) for exact dimensions.

Table 55: 240 V UL Type 3R Bypass Models, Normal Duty

Type 3R Bypass (ND) F6B3. .	Amps	Nominal HP	Physical Dimensions (in.) [2]			Weight (lb) [1]	Drawing Number
			H	W	D		
A015	15.2	5	39.2	18.6	18.2	150	DD.HWF.3R.W1.01
A022	22	7.5				154	
A028	28	10				156	
A042	42	15	44.2	20.6	20.2	176	DD.HWF.3R.W2.01
A054	54	20				181	
A068	68	25	49.2	26.6	22.2	285	DD.HWF.3R.W3.01
A080	80	30					
A104	104	40				304	
A130	130	50	61.2	38.6	25.2	545	DD.HWF.3R.W4.01
A154	154	60				563	
A192	192	75	93.5	43.6	48.6	1019	DD.HWF.3R.F1.01
A248	248	100				1055	

1. This data represents the average drive package weight only, not shipping weight.
2. Dimensions listed are for reference only. Please refer to the corresponding dimensional drawing (DD) for exact dimensions.

Table 56: 480 V UL Type 3R Bypass Models, Normal Duty

Type 3R Bypass (ND) F6B3. .	Amps	Nominal HP	Physical Dimensions (in.) [2]			Weight (lb) [1]	Drawing Number
			H	W	D		
B007	7.6	5	39.2	18.6	18.2	152	DD.HWF.3R.W1.01
B011	11	7.5					
B014	14	10					
B021	21	15				155	
B027	27	20				158	
B034	34	25				164	
B040	40	30	44.2	20.6	20.2	178	DD.HWF.3R.W2.01
B052	52	40				185	
B065	65	50				200	
B077	77	60	49.2	26.6	22.2	290	DD.HWF.3R.W3.01
B096	96	75				307	
B124	124	100				320	
B156	156	125	61.2	38.6	25.2	567	DD.HWF.3R.W4.01
B180	180	150	93.5	43.6	48.6	1014	DD.HWF.3R.F1.01
B240	240	200				1057	
B302	302	250				1163	

1. This data represents the average drive package weight only, not shipping weight.
2. Dimensions listed are for reference only. Please refer to the corresponding dimensional drawing (DD) for exact dimensions.

Drive Watt Loss

Table 57: Watt Loss for 240 V Models without Switch

Catalog Code FP65U . .	Rated Output Current A	Carrier Frequency kHz	Interior Unit Loss W	Cooling Fin Loss W	Total Loss W
2011	10.6	5.0	45	86	131
2017	16.7	5.0	56	140	196
2024	24.2	5.0	75	184	259
2031	30.8	5.0	89	244	333
2046	46.2	5.0	116	314	430
2059	59.4	5.0	148	418	566
2075	74.8	5.0	175	538	713
2088	88	5.0	201	615	816
2114	114	5.0	246	780	1026
2143	143	5.0	244	937	1180
2169	169	5.0	279	1132	1411
2211	211	2.0	339	1417	1756
2273	273	2.0	437	1972	2409
2343	343	2.0	517	2004	2522
2396	396	2.0	585	2245	2830

Table 58: Watt Loss for 240 V Models with Switch

Catalog Code FP65U . .	Rated Output Current A	Carrier Frequency kHz	Interior Unit Loss W	Cooling Fin Loss W	Total Loss W
2011	10.6	5.0	45	86	131
2017	16.7	5.0	57	140	196
2024	24.2	5.0	76	184	260
2031	30.8	5.0	91	244	335
2046	46.2	5.0	118	314	432
2059	59.4	5.0	151	418	569
2075	74.8	5.0	177	538	715
2088	88	5.0	203	615	818
2114	114	5.0	251	780	1031

Table 59: Watt Loss for 480 V Models without Switch

Catalog Code FP65U . .	Rated Output Current A	Carrier Frequency kHz	Interior Unit Loss W	Cooling Fin Loss W	Total Loss W
4005	4.8	5.0	31	44	75
4008	7.6	5.0	38	70	108
4011	11	5.0	56	142	198
4014	14	5.0	66	196	262
4021	21	5.0	89	212	301
4027	27	5.0	111	285	397
4034	34	5.0	128	327	455
4040	40	5.0	145	373	518
4052	52	5.0	178	470	648
4065	65	5.0	224	600	824
4077	77	5.0	271	819	1090
4096	96	5.0	323	973	1295
4124	124	5.0	423	1294	1717
4156	156	5.0	332	1448	1780
4180	180	2.0	402	1859	2260
4240	240	2.0	426	2106	2532
4302	302	2.0	852	2645	3496
4361	361	2.0	933	2936	3869
4414	414	2.0	901	2825	3727
4477	477	2.0	1172	3814	4986
4515	515	2.0	1242	4236	5479
4590	590	2.0	1325	4632	5957
4720	720	2.0	1597	6235	7831

Table 60: Watt Loss for 480 V Models with Switch

Catalog Code FP65U . .	Rated Output Current A	Carrier Frequency kHz	Interior Unit Loss W	Cooling Fin Loss W	Total Loss W
4005	4.8	5.0	31	44	75
4011	11	5.0	56	142	198
4014	14	5.0	67	196	263
4021	21	5.0	90	212	301
4027	27	5.0	113	285	398
4034	34	5.0	130	327	457
4040	40	5.0	146	373	519
4052	52	5.0	181	470	651
4065	65	5.0	228	600	827
4077	77	5.0	273	819	1093
4096	96	5.0	326	973	1298

Drive Short Circuit Protection

Table 61: Approved Short Circuit Protection for 240 V Drives

Drive Catalog Code FP65U	Drive Mounted without Supplemental Enclosure (Using Type 1 Kit)		Drive Mounted in Supplemental Enclosure						
			Any Size Protected Enclosure (Ventilated or Non-Ventilated)		Restricted Size Protected Enclosure (Ventilated Only)				
	Semiconductor Fuse[1] Part Number (Permitted Only in Type 1 Kit) Manufacturer: Eaton/Bussmann	Class CC, J, or T Fuse [2] Maximum Amps	Semiconductor Fuse [1] Part Number Manufacturer: Eaton/Bussmann	Class CC, J, or T Fuse [2, 3] Maximum Amps	Class CC, J, or T Fuse [2, 3] Maximum Amps	MCCB [3] Maximum Amps	MCP [1] Part Number Manufacturer: Schneider	Enclosure Volume Minimum (in^3)	
								External Heatsink	Internal Heatsink
2011	Not allowed. Does not support internal fuses for these drive models.	17.5	FWH-40B	17.5	Enclosure volume not restricted. Refer to the values in the column to the left for fuses.	25	HLL36030M71	3056	3056
2017		25	FWH-45B	25		40	HLL36030M71	3056	3056
2024		40	FWH-80B	40		60	HLL36050M72	3056	3056
2031		50	FWH-125B	50		75	HLL36050M72	3056	3056
2046		80	FWH-125B	80		110	HLL36100M73	5520	5520
2059		100	FWH-175B	100		125	HLL36100M73	5520	5520
2075		125	FWH-200B	125		175	HLL36150M74	5520	5520
2088		150	FWH-225A	150		200	HLL36150M74	5520	5520
2114		200	FWH-225A	200		250	HLL36150M74	5520	5520
2143		250	FWH-250A	250		350	JLL36250M75	21582	14657
2169		250	FWH-275A	250		400	JLL36250M75	21582	14657
2211		350	FWH-600A	350		500	LAL3640036M or LLL36400M37X	52800	14657
2273		450	FWH-800A	450		600	LAL3640036M or LLL36400M37X	52800	14657
2343		600	FWH-1000A or FWH-1000B	600		700	PLL34060M68	52800	52800
2396		700	FWH-1000A or FWH-1000B	700		800	PLL34060M68	52800	52800

1. Protection device must be in same enclosure with drive.
2. Class T fuses are fast-acting (non-time-delay) only. Class CC and J can be either time-delay or non-time-delay.
3. Protection device and drive permitted in same or separate enclosure.

Table 62: Approved Short Circuit Protection for 480 V Drives

Drive Catalog Code FP65U	Drive Mounted without Supplemental Enclosure (Using Type 1 Kit)		Drive Mounted in Supplemental Enclosure						
			Any Size Protected Enclosure (Ventilated or Non-Ventilated)		Restricted Size Protected Enclosure (Ventilated Only)				
	Semiconductor Fuse[1] Part Number (Permitted Only in Type 1 Kit) Manufacturer: Eaton/Bussmann	Class CC, J, or T Fuse [2] Maximum Amps	Semiconductor Fuse[1] Part Number Manufacturer: Eaton/Bussmann	Class CC, J, or T Fuse [2, 3] Maximum Amps	Class CC, J, or T Fuse [2, 3] Maximum Amps	MCCB [3] Maximum Amps	MCP [1] Part Number Manufacturer: Schneider	Enclosure Volume Minimum (in^3)	
								External Heatsink	Internal Heatsink
4005	Not allowed. Does not support internal fuses for these drive models.	8	FWH-25A14F	8	Enclosure volume not restricted. Refer to the values in the column to the left for fuses.	15	HLL36030M71	3056	3056
4006		9	FWH-30A14F	9		15	HLL36030M71	3056	3056
4008		12	FWH-30A14F	12		15	HLL36030M71	3056	3056
4011		17.5	FWH-40B	17.5		25	HLL36030M71	3056	3056
4014		20	FWH-45B	20		35	HLL36030M71	3056	3056
4021		35	FWH-60B	35		50	HLL36030M71	3056	3056
4027		45	FWH-80B	45		60	HLL36050M72	3056	3056
4034		60	FWH-100B	60		80	HLL36050M72	3056	3056
4040		70	FWH-125B	70		100	HLL36100M73	5520	5520
4052		90	FWH-150B	90		125	HLL36100M73	5520	5520
4065		110	FWH-200B	110		150	HLL36100M73	5520	5520
4077		125	FWH-225A	125		175	HLL36100M73	5520	5520
4096		150	FWH-225A	150		225	HLL36150M74	5520	5520
4124		200	FWH-225A	200		300	JLL36250M75	5520	5520
4156		250	FWH-325A	250		350	JLL36250M75	21582	14657
4180		300	FWH-500A	300		450	JLL36250M75	52800 [4]	14657
4240		400	FWH-600A	400		600	LAL3640036M or LLL36400M37X	52800 [4]	14657
4302		500	FWH-700A	500		700	LAL3640036M or LLL36400M37X	52800 [4]	14657
4361	FWH-800A	Not allowed. Must use semiconductor fuses.	FWH-800A	Not allowed. Must use minimum enclosure volume requirements.	600	700	PLL34060M68	52800 [4]	52800
4414	FWH-800A or FWH-800B		FWH-800A or FWH-800B		700	800	PLL34060M68	52800 [4]	52800
4477	FWH-1000A or FWH-1000B		FWH-1000A or FWH-1000B		800	900	PLL34080M68	52800 [4]	52800
4515	FWH-1000A or FWH-1000B		FWH-1000A or FWH-1000B		900	1000	PLL34080M68	52800 [4]	52800
4590	FWH-1200A		FWH-1200A		1000	1200	PLL34080M68	52800 [4]	52800
4720	FWH-1200A		FWH-1200A		1200	1400	PLL34100M69	52800 [4]	52800

1. Protection device must be in same enclosure with drive.
2. Class T fuses are fast-acting (non-time-delay) only. Class CC and J can be either time-delay or non-time-delay.
3. Protection device and drive permitted in same or separate enclosure.
4. External heatsink installation on these models requires a heatsink shroud and filter.

Technical Training

Additional Information
Training Home Page

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"

Email: training@yaskawa.com

Terms and Conditions

YASKAWA AMERICA, INC. (“YAI”), DRIVES & MOTION TERMS AND CONDITIONS

1. GENERAL:

(a) All sales of products or services by Yaskawa America, Inc., Drives & Motion Division (hereinafter "D&M"), is governed exclusively by these Terms and Conditions of Sale ("Terms"), which supersede all inconsistent or additional terms on Buyer's purchase order or any other document. These Terms constitute the final, complete and exclusive agreement between the parties as to the subject matter hereof. These Terms may be amended only in writing signed by an authorized representative of D&M.
(b) Orders must be submitted in the form of a written purchase order or letter from Buyer, setting forth all information necessary for D&M to fill the Order, if accepted. All proposals, quotations or similar communications from D&M are considered invitations to submit an Order. A binding sales contract will result only when D&M accepts Buyer's Order, at D&M's office in Waukegan, Illinois or such other place as designated by D&M.

2. PRICES:

(a) D&M's quoted prices are firm for thirty (30) days from the date of D&M's written proposal. Thereafter, the applicable prices are those in effect at the time Buyer's Order is placed with D&M. D&M will notify Buyer of any price changes for incorporation into a revised Order prior to acceptance by D&M. Pricing based on volume discounts is subject to adjustment by D&M if actual shipping volumes do not meet minimum volume requirements of agreement. Clerical errors in any element of a proposal, purchase order, invoice or contract are subject to correction by D&M.

3. TERMS OF PAYMENT:

(a) All payments are due within thirty (30) days from date of D&M's invoice. Payment shall be made at the agreed time, to the place specified, and in the currency indicated on D&M's invoice. D&M reserves the right to require payment in advance, or satisfactory security, for any shipment or sale. D&M reserves the right to seek any other remedy available at law or equity and Buyer shall be liable for all expenses, including attorneys' fees, relating to the collection of past due amounts. Buyer's default constitutes a waiver of Buyer's right to demand D&M's performance under the contract.
(b) When an amount becomes past due according to its payment terms, Buyer shall pay interest on the balance due, at the greater of 1.50% per month (18% per annum) or the maximum permitted by law, until paid in full.
(c) If delivery and/or payment in installments is accepted by D&M, Buyer's failure to pay any installment when due shall give D&M the right to suspend work or delivery until such payment is made. In the event that any such default by Buyer continues for more than fifteen (15) days, D&M may then cancel the contract by written notice to Buyer.
(d) All duties, tariffs, fees, costs and other charges connected with shipment, insurance, exportation and importation of the products are the responsibility of Buyer, and, if paid by D&M, such expenses may be recovered by D&M from Buyer, and Buyer shall indemnify D&M against claims for the same. Buyer is responsible for all taxes applicable or related to this transaction, including all sales, use and excise taxes.

4. SECURITY INTEREST:
To secure any indebtedness due and owing from Buyer from time to time, Buyer hereby grants to D&M, and D&M hereby reserves, a continuing purchase money security interest in all Yaskawa-brand and other products heretofore or hereafter sold and delivered to Buyer by D&M, and all related parts, components and accessories therefor, and all proceeds arising from the sale or other disposition of the foregoing, including, but not limited to, cash, accounts, contract rights, accounts receivable, instruments and chattel paper. Buyer shall at no time grant any security interest that conflicts with that granted to D&M herein. Buyer shall cooperate with D&M, and hereby appoints D&M as its attorney-in-fact, to execute and file, on Buyer's behalf, any documents necessary

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5. SHIPMENT, FORCE MAJEURE, AND ERROR:
(a) Shipment/delivery dates are approximations only. D&M shall not be liable to pay any penalty or damages, including consequential damages, for any delay in shipment.
(b) All shipments are F.O.B. D&M's (or its suppliers') manufacturing plant or warehouse. D&M will, at Buyer's expense, arrange for the transportation of the products from the manufacturing plant or warehouse designated by D&M. All products shall be packaged for domestic shipment in accordance with D&M's standard specifications. If special packaging is required, it must be clearly requested on Buyer's Order. The price for any special packaging shall be billed to Buyer. Buyer is responsible to timely procure all necessary export and import licenses and all permits required for the consummation of the transaction and to obtain insurance coverage on all shipments of products supplied by D&M. Risk of loss and/or damage to the products shall pass to Buyer upon delivery thereof to Buyer or its representative, or to a carrier for shipment to Buyer or its designated customer, as the case may be, at the FOB point.
(c) D&M shall not be liable for any damages, including consequential damages, caused by delays or non-performance resulting from or related to force majeure or other causes beyond D&M's reasonable control, including, but not limited to, war, blockade, civil disturbances, strikes and lockouts, labor shortages, fire and other casualties, acts of nature, accidents and governmental acts (including regulations concerning export and import licensing and currency exchange). In case of non-delivery, D&M's obligation shall be limited to the refund of any advance payment received from Buyer.
(d) All claims for loss of or damage to products, whether concealed or obvious, must be made, in writing, to the carrier and to D&M by Buyer as soon as possible after receipt of shipment, and in no case beyond 30 days of shipment, or such claims shall be deemed waived. D&M will render reasonable assistance in providing information necessary for Buyer to process such damage claims with the carrier or any insurance company.
(e) Buyer agrees to accept delivery within fifteen (15) days following the anticipated date of delivery. If Buyer refuses to take delivery within the fifteen (15) day period, D&M reserves the right to charge Buyer for storage charges plus interest.

6. RETURNS/CANCELLATION CHARGES:
Buyer shall not return products to D&M without the written consent of, and upon terms agreed to, by D&M. If Buyer refuses to accept delivery, or improperly revokes acceptance of product, Buyer shall be responsible for D&M's cancellation charges and expenses. Before any returns, a Return Merchandise Authorization ("R.M.A.") number must be obtained from D&M. Products returned without an R.M.A. number clearly marked on the outside of the shipping carton will be refused. Except for approved warranty returns, D&M will only accept for return and credit new, unused, undamaged, current stock items, in the original packaging. Buyer shall be responsible for all freight charges, import/export charges, duties, tariffs, taxes, insurance and risk of loss/damage regarding return shipment to D&M.

7. DRAWINGS/MEASUREMENTS:
All ratings, drawings, tables, graphs and the like submitted by D&M or set forth in written materials or on the company's website are approximations only. Weights, measurements, capacities and all other particulars of products or services offered by D&M are approximations only. D&M is not responsible for such approximations, including, in particular, based on data supplied by Buyer.

8. LIMITED WARRANTY:
(a). At the time of shipment, new and unused product shall be free from defects in materials and workmanship. D&M warrants that for a period of one (1) year from the date the product is first used by Buyer, or 18 months from the date of shipment, whichever occurs first, if any product or part is found by D&M to be defective, D&M will, at its sole discretion and as Buyer's exclusive remedy, either repair, replace or return the purchase price paid to D&M; provided that the subject product is used under normal conditions for which it was designed and installed, operated and maintained in accordance with D&M's instructions and in accordance with generally accepted industrial practices. Products repaired or replaced during the warranty period shall be covered by the foregoing warranty for the remainder of the original warranty period or ninety (90) days from date of the repair or shipment of the replacement, whichever is longer. D&M warrants, for a period of ninety (90) days, that services shall be performed in a workman like manner. Buyer's sole remedy for a breach of this service warranty is limited to further service or a refund or credit

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The liability of D&M, any parent or affiliated company for patent infringement is limited to D&M's defense of proceeding brought against Buyer based on a claim that products, when employed in the manner intended by D&M, constitutes an infringement of any U.S. patent. If Buyer's use of the products in the manner intended by D&M is finally enjoined in such action, D&M shall, at its option, procure for Buyer the right to continue using the products, replace the same with non-infringing products, modify the products so that they become non-infringing equivalent products, or refund the purchase price (less allowance for use, damage or obsolescence). D&M makes no warranty against patent infringement resulting from portions of the products made to Buyer's specifications or the use of products in combination with any other goods or in the practice of any process, and if a claim is brought against D&M or any parent or affiliate of D&M, Buyer shall defend, indemnify and hold D&M (and its parent/affiliates) harmless from and against any and all claims, losses or damages arising therefrom.

10. GOVERNING LAW, FORUM AND JURY WAIVER:

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(a) Failure on the part of D&M to enforce any of its rights derived from these Terms shall never be construed as a waiver of any of D&M's rights.
(b) The invalidity of one or more of the clauses herein shall not affect the validity of the other clauses, which for this purpose are considered severable.
(c) Any use by Buyer of any AYAI trademark must be approved by YAI in writing.
(d) Buyer may not delegate its performance or assign its rights under these Terms except upon the express written consent of D&M. In any case, these Terms shall be binding upon the successors and legal representatives of Buyer.

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