



***Catalog CA.F7.01  
F7 Drives for Industrial Automation***

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**YASKAWA**



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Other Documents and Manuals are available to support special use or installation of this product. These documents may be provided with the product or upon request. Contact Yaskawa Electric America, Inc. or visit [www.yaskawa.com](http://www.yaskawa.com), as required. Documents may include the following:

TM.F7.01... Drive User Manual included on CD ROM with product  
 TM.F7.02... Programming... Drive Programming Manual included on CD ROM with product  
 TM.F7.11... Parameter Access... Manual included on CD ROM with product  
 TM.AFD.12... ProfibusDP... Manual included on CD ROM with product  
 TM.AFD.13... DeviceNet... Manual included on CD ROM with product  
 TM.AFD.17... Modbus Plus... Manual included on CD ROM with product  
 TM.AFD.20... LonWorks... Manual included on CD ROM with product  
 TM.AFD.26... EtherNet/IP... Included on CD ROM with product  
 DriveWizard... Software and Manual...Included on CD ROM with product  
 Options Instructions... Included on CD ROM with product

## REVISIONS

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This AC drive is the Industrial Workhorse that can handle every conventional application found within the typical industrial plant from simple variable torque pumping to sophisticated networked material handling.

This drive is designed for tough industrial environments. It is rugged and reliable, with an MTBF of 28 years. A variety of enclosure options provide the right environmental protection. The dual ratings, Normal and Heavy duty, enable the most economical match of overload capacity for the application. Providing the right fit to power requirements is also easy with 208 to 230/240 and 480 volt ratings, built-in bus choke above 30 HP, provisions for 12-pulse rectification above 30 HP, common bus capability and regeneration options. Patented high slip braking can eliminate the need for dynamic braking resistors for high inertia loads. Other features include motor auto-tuning and a wide range of configurable options, such as breakers and fuses.

To provide the optimum control method, the F7 can operate in conventional V/f, V/f with encoder feedback, open loop vector, or closed loop vector mode. Drive performance can be further enhanced for a specific application with optional drive software.

The F7 supports the industry's open architecture, open connectivity demands with network communications choices such as DeviceNet, Profibus-DP, and others. Drive coordination with other equipment is simplified with inputs and outputs for digital pulse train, 4 to 20ma, -10 to +10V, and an assortment of programmable contacts.

### Performance Features

- Ratings: 0.5 to 150HP, 208 to 230/240 VAC  
0.75 to 500HP, 480 VAC
- Overload capacity:
- 150% for 1 min heavy duty, 110% for 1 min normal duty, 200% peak
- Starting torque, heavy duty: 150% at 0.5 Hz (open loop), at 0.3 Hz (closed loop)
- Starting torque, normal duty: 120% at 1.5 Hz (V/f)
- Output frequency: 0.01 to 300Hz for heavy duty, 400Hz for normal duty
- Controlled speed range: 40:1 (V/f), 50:1 (V/f with PG), 200:1 (open loop), 1000:1 (closed loop)
- Speed regulation: 2-3% (V/f), 0.5-1% (V/f with PG), 0.2% (open loop), 0.01% (closed loop)
- Speed/frequency resolution: 0.01% with digital reference, 0.1% with analog reference
- Electronic reversing
- Adjustable accel/decel: 0.1 to 6000 sec
- Stall prevention
- Drive efficiency: 96 to 98%
- Displacement power factor: 0.98
- Power loss ride-thru: 2 sec
- Inertial ride-thru
- Selectable auto restart after momentary power loss
- Programmable auto restart (0 to 10 attempts) on re-settable fault
- Critical frequency rejection: 3 selectable, adjustable bands

### Protective Features

- DC bus CHARGE indicator
- Optically-Isolated controls
- Phase-to-phase / phase-to-neutral short circuit protection
- Ground fault protection
- Electronic motor overload (UL, cUL, NEC)
- Current and torque limit
- Over-torque / under-torque detection
- Fault circuit: over-current, over-voltage, and over-temperature
- Input/output phase loss

### Service Conditions

- Ambient service temperatures: -10 to 40°C (104°F) NEMA-1, to 45°C (113°F) protected chassis
- Humidity: non-condensing 95%
- Altitude: to 3300 feet (1000 meter)
- Service Factor: 1.0
- Input voltage: +10% / -15%, 200 to 240VAC, 380 to 480VAC
- Enclosure: NEMA 1 or protected chassis (other options)
- Input frequency: 50/60Hz ± 5%
- 3-phase, 3-wire phase insensitive
- Vibration: 1G (10 to 20Hz), 0.2G, (20 to 50Hz)

### Design Features

- LCD keypad display, 5 lines x 16 characters, backlit, 7 languages, copy function
- Multi-speed settings: 17 available
- Setpoint (PID) trim control
- Signal follower: bias and gain
- Up / down / hold reference (digital M.O.P.)
- Timer function; on/off delay
- 32-bit microprocessor logic
- Easy access, quick start parameter groups
- Non-volatile memory/program retention
- Flash memory for update and custom applications
- 24VDC control logic
- DC injection braking, adjustable level
- Dynamic braking (25HP and below)
- Ramp to stop or coast to stop
- High-slip braking
- Dual motor parameter sets
- Synchronized start into rotating motor
- Motor auto-tuning, static and dynamic
- Common bus capability
- DC link choke: 30 to 150HP at 240VAC, 30 to 500HP at 480VAC
- Twelve-pulse rectification with optional input transformer: 30 to 150HP at 240V, 30 to 500HP at 480V
- Terminal strip, quick disconnect
- Split cover for ease of wiring
- Plug-in heat sink fan

### Inputs and Outputs

- Analog input: -10 to +10VDC (20K ohms) or 4 to 20 mA (250 ohm)
- Analog output: -10 to +10VDC or 4-20mA proportional to output parameters
- Digital pulse train input/output (32KHz max)
- Digital Inputs: 8 multi-function
- Programmable outputs: Three form A
- Fault contacts: one form C
- RS-485/422 communication terminals

### Additional Features for V/f

- Torque boost: full range, auto
- V/f ratio: 15 preset, one adjustable
- Slip compensation

### Standards & Reliability

- UL 508C (Power Conversion)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- UL, cUL listed; CE marked
- UL 1995 (Plenum)
- EN 50178 (LVD)
- EN 61800-3 (w/ External Filter)
- IEC 529, 146
- FCC CFR 47 Part 15 Subpart B (w/ External Filter)

### Options

- Remote display/keypad
- Various feedback cards
- DriveWizard™ software (upload / download)
- DeviceNet, Profibus-DP, others
- Custom drive software
- Input breaker, disconnect, fuses
- 115 VAC interface
- DB resistors and modules
- Input/output reactors
- EMC-compliant filters
- DC link choke (25HP and below)
- Isolation transformer
- Line regeneration (RC5 or DC5)
- Dynamic braking (25HP and above)
- Twelve-pulse transformer

# F7

## Standard Drives

**F7 Drives** - 1/2-500HP, 208-230/240 and 480V, 3-phase<sup>(1)</sup> input, NEMA 1 or protected chassis enclosure

Rated Input Voltage	Drive Model Number CIMR-F7U	Normal Duty <sup>(2)</sup>		Heavy Duty <sup>(2, 4)</sup>		Standard Enclosure	Drive List Price \$
		Rated Output Current (Amps)	Nominal HP <sup>(3)</sup>	Rated Output Current (Amps)	Nominal HP <sup>(3)</sup>		
208V	20P41	3.6	1/2 3/4	3.2	1/2	NEMA 1	
	20P71	4.6	1	4.2	3/4	NEMA 1	
	21P51	7.8	2	7.0	1	NEMA 1	
	22P21	10.8	3	9.6	2	NEMA 1	
	23P71	16.8	5	15.2	3	NEMA 1	
	25P51	23.0	N/A	23.0	5	NEMA 1	
	27P51	31.0	7.5 10	31.0	7.5 10	NEMA 1	
	20111	46.2	15	45.0	N/A	NEMA 1	
	20151	59.4	20	58.0	15	NEMA 1	
	20181	74.8	25	71.4	20	NEMA 1	
	20221	88	30	85	25	NEMA 1	
	20301	115	40	115	30 40	NEMA 1	
	20370	162	50	145	50	Protected Chassis	
	20450	192	60	180	60	Protected Chassis	
20550	215	75	215	75	Protected Chassis		
20750	312	100	283	100	Protected Chassis		
20900	360	125	346	125	Protected Chassis		
21100	415	150	360 <sup>(4)</sup>	150	Protected Chassis		
240V	20P41	3.6	1/2 3/4	3.2	1/2 3/4	NEMA 1	
	20P71	4.6	1	4.2	1	NEMA 1	
	21P51	7.8	2	7.0	2	NEMA 1	
	22P21	10.8	3	9.6	3	NEMA 1	
	23P71	16.8	5	15.2	5	NEMA 1	
	25P51	23.0	7.5	23.0	7.5	NEMA 1	
	27P51	31.0	10	31.0	10	NEMA 1	
	20111	46.2	15	45.0	15	NEMA 1	
	20151	59.4	20	58.0	20	NEMA 1	
20181	74.8	25	71.4	25	NEMA 1		
20221	88	30	85	30	NEMA 1		
20301	115	40	115	40	NEMA 1		
230V	20370	162	50 60	145	50	Protected Chassis	
	20450	192	75	180	60	Protected Chassis	
	20550	215	N/A	215	75	Protected Chassis	
	20750	312	100 125	283	100	Protected Chassis	
	20900	360	150	346	125	Protected Chassis	
	21100	415	N/A	360 <sup>(4)</sup>	150	Protected Chassis	

(1) For single-phase input applications, consult Yaskawa Drives Applications Engineering for proper sizing

(2) Normal Duty overload current rating is 110% of rated output current for 60 seconds; Heavy Duty overload current rating is 150% of rated output current for 60 seconds

(3) Horsepower rating is based on standard NEMA B 4-pole motor design as represented in NEC table 430.150 Full-Load Current, Three-Phase Alternating Current Motors

(4) O.L. 138% for 60 seconds



## F7 Drives (Continued)

Rated Input Voltage	Drive Model Number CIMR-F7U	Normal Duty <sup>(2)</sup>		Heavy Duty <sup>(2, 5)</sup>		Standard Enclosure	Drive List Price \$
		Rated Output Current (Amps)	Nominal HP <sup>(3)</sup>	Rated Output Current (Amps)	Nominal HP <sup>(3)</sup>		
480V	40P41	1.8	1/2 3/4	1.8	1/2 3/4	NEMA 1	
	40P71	2.1	1	2.1	1	NEMA 1	
	41P51	3.7	2	3.7	2	NEMA 1	
	42P21	5.3	3	5.3	3	NEMA 1	
	43P71	7.6	5	7.6	5	NEMA 1	
	45P51	12.5	7.5	12.5	7.5	NEMA 1	
	47P51	17.0	10	17.0	10	NEMA 1	
	40111	27.0	15 20	24.0	15 15	NEMA 1	
	40151	34.0	25	31.0	20	NEMA 1	
	40181	40.0	30	39.0	25	NEMA 1	
	40221	50.4	N/A	45.0	30	NEMA 1	
	40301	67.2	40 50	60.0	40	NEMA 1	
	40371	77	60	75	50	NEMA 1	
	40451	96	75	91	60	NEMA 1	
	40551	125	100	112	75	NEMA 1	
	40750	156	125	150	100	Protected Chassis	
	40900	180	150	180	125 150	Protected Chassis	
	41100	240	200	216	N/A	Protected Chassis	
	41320	260	N/A	260	200	Protected Chassis	
	41600	304	250	304	250	Protected Chassis	
41850	414	300 350	370	300	Protected Chassis		
42200	515	400 450	414 <sup>(5)</sup>	350	Protected Chassis		
43000	675	500	590 <sup>(5)</sup>	400 500	Protected Chassis		

- (1) For single-phase input applications, consult Yaskawa Drives Applications Engineering for proper sizing
- (2) Normal Duty overload current rating is 110% of rated output current for 60 seconds; Heavy Duty overload current rating is 150% of rated output current for 60 seconds
- (3) Horsepower rating is based on standard NEMA B 4-pole motor design as represented in NEC table 430.150 Full-Load Current, Three-Phase Alternating Current Motors
- (5) O.L. 150% for 45 seconds

# F7

## Dynamic Braking Options

### 10% Duty

**Dynamic Braking, 10% Duty Cycle** - Used to assist the drive to periodically decelerate a load without overvoltage trips. Ten percent dynamic braking is not typically used for "hold-back" type applications, such as unwinders, elevators, hoists, or downhill conveyors. Dynamic braking consists of at least one transistor and at least one resistor, and are sized for rated motor horsepower. The braking transistor may be included in the standard drive; this is indicated in the tables below. The resistors are sized for a 10% duty cycle (10 seconds maximum on-time of every 100 seconds), and will provide approximately 150% braking torque. Refer to the dynamic braking instruction sheet for more details; consult Yaskawa for information on higher duty cycles.

Rated Input Voltage	Nominal HP <sup>(1)</sup>	Normal Duty Drive Model Number CIMR-F7U	Heavy Duty Drive Model Number CIMR-F7U	Transistor Module(s)			Resistor(s)				
				Part Number CDBR-	Qty	List Price (ea.) \$	Part Number URS000	Qty	List Price \$	Configuration <sup>(2)</sup>	Total List Price \$ <sup>(5)</sup>
208V	1/2	20P41	20P41	Included			034	1		Single <sup>(3)</sup>	
	3/4		20P71	Included			022	1		Single <sup>(3)</sup>	
	1	21P51	21P51	Included			022	1		Single <sup>(3)</sup>	
	2		22P21	Included			023	1		Single <sup>(3)</sup>	
	3	23P71	23P71	Included			024	1		Single <sup>(3)</sup>	
	5		25P51	Included			025	1		Single <sup>(3)</sup>	
	7.5	27P51	27P51	Included			026	1		Single <sup>(3)</sup>	
	10			Included			027	1		Single <sup>(3)</sup>	
	15	20111	20151	Included			140	1		Single <sup>(4)</sup>	
	20		20181	Included			136	1		Single <sup>(4)</sup>	
	25	20181	---	Included			136	1		Single <sup>(4)</sup>	
	25	---	20221	2022B	2		135	1		Single	
	30	20221	20301	2022B	2		135	1		Dual	
	40	20301	20301								
	50	20370	20370	2110B	1		100	1		Single	
	60	20450	20450								
75	20550	20550	2110B	1		096	1		Single		
100	20750	20750	2110B & 2022B	1	each	096 & 128	1	each	Single	Single	
125											20900
150	21100	21100	2110B	2		097	1		Dual		

- (1) Horsepower rating is based on standard NEMA B 4-pole motor design as represented in NEC table 430.150 Full-Load Current, Three-Phase Alternating Current Motors
- (2) Single = 1 resistor per package  
Dual = 2 resistors per package (requires 2 DB transistor modules, as indicated in table above)  
Triple = 3 resistors per package (requires 3 DB transistor modules, as indicated in table above)
- (3) This resistor package provides 120% braking torque
- (4) This resistor package provides 100% braking torque
- (5) Total List Price includes all resistors and transistor modules to provide the Dynamic Braking function





## Dynamic Braking, 10% Duty Cycle (continued for 230/240V)

Rated Input Voltage	Nominal HP <sup>(1)</sup>	Normal Duty Drive Model Number CIMR-F7U	Heavy Duty Drive Model Number CIMR-F7U	Transistor Module(s)			Resistor(s)				
				Part Number CDBR-	Qty	List Price (ea.) \$	Part Number URS000	Qty	List Price \$	Config-uration <sup>(2)</sup>	Total List Price \$ <sup>(5)</sup>
<b>230/ 240V</b>	1/2	<b>20P41</b>	<b>20P41</b>	Included			<b>034</b>	1		Single <sup>(3)</sup>	
	3/4		<b>20P71</b>				<b>022</b>	1		Single <sup>(3)</sup>	
	1	<b>20P71</b>	<b>21P51</b>	Included			<b>022</b>	1		Single <sup>(3)</sup>	
	2		<b>21P51</b>				<b>023</b>	1		Single <sup>(3)</sup>	
	3	<b>22P21</b>	<b>22P21</b>	Included			<b>024</b>	1		Single <sup>(3)</sup>	
	5		<b>23P71</b>				<b>025</b>	1		Single <sup>(3)</sup>	
	7.5	<b>25P51</b>	<b>25P51</b>	Included			<b>026</b>	1		Single <sup>(3)</sup>	
	10		<b>27P51</b>				<b>027</b>	1		Single <sup>(3)</sup>	
	15	<b>20111</b>	<b>20111</b>	Included			<b>140</b>	1		Single <sup>(4)</sup>	
	20		<b>20151</b>				<b>136</b>	1		Single <sup>(4)</sup>	
	25	<b>20181</b>	<b>20181</b>	Included			<b>136</b>	1		Single <sup>(4)</sup>	
	30	<b>20221</b>	<b>20221</b>	<b>2022B</b>	2		<b>135</b>	1		Dual	
	40	<b>20301</b>	<b>20301</b>				<b>129</b>	1		Dual	
	50	<b>20370</b>	<b>20370</b>	<b>2110B</b>	1		<b>100</b>	1		Single	
	60		<b>20450</b>				<b>096</b>	1		Single	
	75	<b>20450</b>	<b>20550</b>	<b>2110B</b>	1		<b>096</b>	1		Single	
100	<b>20750</b>	<b>20750</b>	<b>2110B &amp; 2022B</b>	1 each		<b>096 &amp; 128</b>	1 each		Single		
125		<b>20900</b>							<b>2110B &amp; 2022B</b>		1
150	<b>20900</b>	<b>21100</b>	<b>2110B</b>	2		<b>097</b>	1		Dual		

- (1) Horsepower rating is based on standard NEMA B 4-pole motor design as represented in NEC table 430.150 Full-Load Current, Three-Phase Alternating Current Motors
- (2) Single = 1 resistor per package  
Dual = 2 resistors per package (requires 2 DB transistor modules, as indicated in table above)  
Triple = 3 resistors per package (requires 3 DB transistor modules, as indicated in table above)
- (3) This resistor package provides 120% braking torque
- (4) This resistor package provides 100% braking torque
- (5) Total List Price includes all resistors and transistor modules to provide the Dynamic Braking function

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## Dynamic Braking Options

10% Duty

### Dynamic Braking, 10% Duty Cycle (continued for 480V)

Rated Input Voltage	Nominal HP <sup>(1)</sup>	Normal Duty Drive Model Number CIMR-F7U	Heavy Duty Drive Model Number CIMR-F7U	Transistor Module(s)			Resistor(s)				
				Part Number CDBR-	Qty	List Price (ea.) \$	Part Number URS000	Qty	List Price \$	Config-uration <sup>(2)</sup>	Total List Price \$ <sup>(5)</sup>
480V	1/2 3/4	40P41	40P41	Included			032	1		Single <sup>(3)</sup>	
	1 2	40P71 41P51	40P71 41P51	Included			032 033	1 1		Single <sup>(3)</sup> Single <sup>(3)</sup>	
	3 5	42P21 43P71	42P21 43P71	Included			034 035	1 1		Single <sup>(3)</sup> Single <sup>(3)</sup>	
	7.5 10	45P51 47P51	45P51 47P51	Included			036 037	1 1		Single <sup>(3)</sup> Single <sup>(3)</sup>	
	15 20	40111	40111 40151	Included			038 040	1 1		Single <sup>(3)</sup> Single <sup>(3)</sup>	
	25 30	40151 40181	40181 ---	Included			040 154	1 1		Single <sup>(3)</sup> Single <sup>(3)</sup>	
	30	---	40221	4045B	1		150	1		Single	
	40 50	40301	40301 40371	4045B 4045B	1 2		142 151	1 1		Single Dual	
	60 75	40371 40451	40451 40551	4045B	2		151 143	1 1		Dual Dual	
	100 125	40551 40750	40750 40900	4220B	1		119	1		Single	
	150	40900	40900	4220B	1		165	1		Single	
	200	41100	41320	4220B & 4045B	1 1		165 & 142	1 each		Single Single	
	250	41600	41600	4220B & 4045B	1 2		165 & 143	1 each		Single Dual	
	300 350	41850 41850	41850 42200	4220B	2		166	1		Dual	
	400	42200	43000	4220B	3		120 & 165	1		Dual Single	
	450 500	42200 43000	43000 43000	4220B	3		167	1		Triple	

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

(2) Single = 1 resistor per package  
 Dual = 2 resistors per package (requires 2 DB transistor modules, as indicated in table above)  
 Triple = 3 resistors per package (requires 3 DB transistor modules, as indicated in table above)

(3) This resistor package provides 120% braking torque

(4) This resistor package provides 100% braking torque

(5) Total List Price includes all resistors and transistor modules to provide the Dynamic Braking function

# Dynamic Braking Options

3% Duty

**F7**

**Dynamic Braking, 3% Duty Cycle** - Used to assist the drive to periodically decelerate a load without overvoltage trips. Three percent dynamic braking is not applicable for "hold-back" type applications, such as unwinders, elevators, hoists, or downhill conveyors. Dynamic braking consists of at least one transistor and at least one resistor, and are sized for rated motor horsepower. The braking transistor is included in the standard drive for these resistors. The resistors are sized for a 3% duty cycle (3 seconds maximum on-time of every 100 seconds), and will provide at least 100% braking torque. Refer to the dynamic braking instruction sheet for more details; consult Yaskawa for information on higher duty cycles. These resistors can be mounted directly to the heatsink on the back of the drive.

Rated Input Voltage	Drive Model Number CIMR-F7U	Nominal HP <sup>(1)</sup>	Resistor			
			Part Number	Qty	List Price \$	Braking Torque
208V	20P41	1/2	R7505	1		220
	20P71	1	R7505	1		125
	21P51	2	R7504	1		125
	22P21	3	R7503	1		120
	23P71	5	R7510	1		100
240V	20P41	1/2	R7505	1		220
	20P71	3/4	R7505	1		125
	21P51	1	R7504	1		125
	22P21	2	R7503	1		120
	23P71	3	R7510	1		100
480V	40P41	5	R7508	1		230
	40P71	3/4	R7508	1		130
	41P51	1	R7507	1		125
	42P21	2	R7506	1		115
	43P71	3	R7505	1		110

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

**F7****Ring Kit Options**

**Ring Kit** - These kits allow installation of the drive into a customer's enclosure with the heatsink mounted out the back to reduce overall enclosure size. Each kit includes all of the necessary components, including hardware and instructions.

Rated Input Voltage	Drive Model Number CIMR-F7U	Kit Model No. UDA00417-	Kit List Price \$
208-230/240V	20P41 thru 25P51	D	
	27P51 20111	C	
	20151 20181	B	
	20221	F	
	20301	E	
	20370 thru 21100	Not Available	
	40P41 thru 45P51	D	
480V	47P51 40111	C	
	40151 40181	B	
	40221 40301	E	
	40371 thru 40551	A	
	40750 thru 43000	Not Available	

# End Cap Kit Options



**End Cap Kit, NEMA 1** - This option consists of a top and bottom cover to convert a protected chassis drive to a NEMA 1 enclosed unit. This option DOES NOT provide additional space for mounting auxilliary components (i.e. circuit breaker, input fuses, reactor, etc.).

Rated Input Voltage	Drive Model Number CIMR-F7U	Kit Model No. UDA00365-	Overall Drive Dimensions			Kit List Price \$
			Height (in.)	Width (in.)	Depth (in.)	
208-230/240V	20P41 thru 20301		Not Required			
	20370	C	32.24	15.55	No Change	
	20450					
	20550	E	40.83	18.43	No Change	
	20750					
	20900	F	49.33	20.43	No Change	
480V	21100		Not Available			
	40P41 thru 40551		Not Required			
	40750	E	40.83	18.43	No Change	
	40900					
	41100	F	49.33	20.43	No Change	
	41320					
	41600	P	52.52	23.39	No Change	
	41850	Q	70.00	27.95	No Change	
42200						
	43000	R	76.00	36.06	No Change	

# F7

## Reactor Options

**Reactor, 3% and 5% Impedance** - May be used on either the input or output of a drive to reduce the effect of load or line side transients on the drive. The three-phase reactors are provided in a separate NEMA 1 enclosure.

Rated Input Voltage	Drive Model Number CIMR-F7U	3% Enclosed Reactor					5% Enclosed Reactor				
		Part Number 05P00620-	List Price \$	Dimensions (in.)			Part Number 05P00620-	List Price \$	Dimensions (in.)		
				H	L	W			H	L	W
208V	20P41	0020		8.0	8.0	6.0	TBD		8.0	8.0	6.0
	20P71	0027		8.0	8.0	6.0	0020		8.0	8.0	6.0
	21P51	0027					0028				
	22P21	0036		8.0	8.0	6.0	0032		8.0	8.0	6.0
	23P71	0041		13.0	13.0	13.0	0036				
	25P51	0041		13.0	13.0	13.0	0047		13.0	13.0	13.0
	27P51	0046					0051				
	20111	0054		13.0	13.0	13.0	0055		13.0	13.0	13.0
	20151	0058					0059				
	20181	TBD		13.0	13.0	13.0	0058		13.0	13.0	13.0
	20221						0067				
	20301	0066		13.0	13.0	13.0	0067		13.0	13.0	13.0
	20370	0072					0073				
	20450	0077		13.0	13.0	13.0	0078		13.0	13.0	13.0
	20550	0082					0083		24.0	17.0	17.0
20750	0087		24.0	17.0	17.0	0088		24.0	17.0	17.0	
20900	TBD		TBD			0092		24.0	17.0	17.0	
21100						0096					
230/ 240V	20P41	TBD		8.0	8.0	6.0	0015		8.0	8.0	6.0
		0020					0021				
	20P71	0020		8.0	8.0	6.0	0021		8.0	8.0	6.0
	21P51	0027					0028				
	22P21	0032		8.0	8.0	6.0	0033		8.0	8.0	6.0
	23P71	0036					0037				
	25P51	0041		13.0	13.0	13.0	0042		13.0	13.0	13.0
	27P51	0046					0047				
	20111	0050		13.0	13.0	13.0	0055		13.0	13.0	13.0
	20151	0054					0055				
	20181	0058		13.0	13.0	13.0	0059		13.0	13.0	13.0
	20221	TBD					0058				
	20301	0066		13.0	13.0	13.0	0067		13.0	13.0	13.0
	20370	0066 URX000206 <sup>(1)</sup>		13.0	13.0	13.0	0067 0073		13.0	13.0	13.0
	20450	0077		13.0	13.0	13.0	0078		13.0	13.0	13.0
20750	0082		13.0	13.0	13.0	0083		24.0	17.0	17.0	
	0087		24.0	17.0	17.0	0088					
20900	TBD		TBD			0092		24.0	17.0	17.0	

(1) This is an independent part number and does not use the prefix 05P00620



Reactor, 3% and 5% Impedance (continued for 480V)

Rated Input Voltage	Drive Model Number CIMR-F7U	3% Enclosed Reactor					5% Enclosed Reactor				
		Part Number 05P00620-	List Price \$	Dimensions (in.)			Part Number 05P00620-	List Price \$	Dimensions (in.)		
				H	L	W			H	L	W
480V	40P41	TBD 0015		8.0	8.0	6.0	TBD 0016		8.0	8.0	6.0
	40P71	0015		8.0	8.0	6.0	0016		8.0	8.0	6.0
	41P51	0021		8.0	8.0	6.0	0023		8.0	8.0	6.0
	42P21	0028		8.0	8.0	6.0	0029		8.0	8.0	6.0
	43P71	0033		8.0	8.0	6.0	0034		8.0	8.0	6.0
	45P51	0037		8.0	8.0	6.0	0038		13.0	13.0	13.0
	47P51	0037		8.0	8.0	6.0	0038		13.0	13.0	13.0
	40111	0042 0047		13.0	13.0	13.0	0043 0048		13.0	13.0	13.0
	40151	0047		13.0	13.0	13.0	0048		13.0	13.0	13.0
	40181	0051		13.0	13.0	13.0	0052		13.0	13.0	13.0
	40221	0055		13.0	13.0	13.0	0056		13.0	13.0	13.0
	40301	0055 0059		13.0	13.0	13.0	0056 0060		13.0	13.0	13.0
	40371	0062		13.0	13.0	13.0	0063		13.0	13.0	13.0
	40451	0062		13.0	13.0	13.0	0063		13.0	13.0	13.0
	40551	0067		13.0	13.0	13.0	0068		13.0	13.0	13.0
	40750	0073		13.0	13.0	13.0	0074		13.0	13.0	13.0
	40900	0078		13.0	13.0	13.0	0079		13.0	13.0	13.0
	41100	0083		24.0	17.0	17.0	0084		24.0	17.0	17.0
41320	0088		24.0	17.0	17.0	0089		24.0	17.0	17.0	
41600	0088		24.0	17.0	17.0	0089		24.0	17.0	17.0	
41850	0092		24.0	17.0	17.0	0093		24.0	17.0	17.0	
42200	0100		24.0	17.0	17.0	URX000205 <sup>(1)</sup>		24.0	17.0	17.0	
43000	0104		30.0	24.0	24.0	0105		30.0	24.0	24.0	

(1) This is an independent part number and does not use the prefix 05P00620

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**Control Options** - These cards, cables and devices add control functionality to the standard drive. Items are shipped loose, unmounted. See Configured Section for factory mounted and wired control.

## Analog Input Options

**Analog Input (14 Bit).** This option provides for the interface of 2 high resolution analog inputs to the drive.

Signal levels (fixed):

- 1 channel, 0 to 10VDC (20kOhm)
- 1 channel, 4 to 20mADC (250Ohm)

*Mounts at option connector 2CN*

**Model No. AI-14U..... List \$**

**Analog Input (13 Bit + Sign).** This option provides for the interface of 3 high resolution analog inputs to the drive.

Signal levels (individually selectable):

- 0 to ±10VDC (20kOhm),
- 4 to 20mADC (250Ohm)

*Mounts at option connector 2CN*

**Model No. AI-14B..... List \$**

**Analog Input, Isolated (13 Bit + Sign).** This option provides for the interface of 3 isolated, high resolution analog inputs to the drive.

Signal levels (individually selectable):

- 0 to ±10VDC (20kOhm),
- 0 to 20mADC (250Ohm),
- 4 to 20mADC (250Ohm)

*Mounts at option connector 2CN*

**Model No. AI-040 (formerly AI-14B2) .....List \$**

**Trim Potentiometer.** This option provides a 5kOhm potentiometer for use as a dropping resistor for maximum or minimum analog input trim.

*Mounts to control terminal strip*

**Model No. AI-001**

**3-15PSI Transducer.** This option provides for the interface of a 3 to 15PSI pneumatic signal, and provides a 4 to 20mA output signal proportional to the input signal to the drive.

*Mounts to control terminal strip*

**Model No. AI-010**

## Analog Output Options

**Analog Output (8 Bit).** This option provides 2 signals for remote metering of any two of the drive's "U1" monitors. These are in addition to the two standard analog outputs.

Signal levels (fixed):

- 0 to 10VDC (20kOhm)

*Mounts at option connector 3CN*

**Model No. AO-08 ..... List \$**

**Analog Output (11 Bit + Sign).** This option provides 2 signals for remote metering of any two of the drive's "U1" monitors. These are in addition to the two standard analog outputs.

Signal levels (individually selectable):

- 0 to ±10VDC (20kOhm)

*Mounts at option connector 3CN*

**Model No. AO-12 ..... List \$**

**Analog Output, Isolated (11 Bit + Sign).** This option provides 2 isolated signals for remote metering of any two of the drive's "U1" parameters. These are in addition to the two standard analog outputs.

Signal levels (individually selectable):

- 0 to ±10VDC (20kOhm),
- 0 to 20mADC (500Ohm max),
- 4 to 20mADC (500Ohm max)

*Mounts at option connector 3CN*

**Model No. AO-001 (formerly AO-12B2) ....List \$**

## Digital Input Options

**Digital Input (8 Bit).** This option provides for the interface of an 8 bit digital input (binary or BCD) to the drive.

*Mounts at option connector 2CN*

**Model No. DI-08..... List \$**

**Digital Input (12 or 16 Bit).** This option provides for the interface of a 12 or 16 bit digital input (binary or BCD) to the drive.

*Mounts at option connector 2CN*

**Model No. DI-16H2 ..... List \$**

**120VAC Logic Interface (8-Input).** This option provides for the interface of 120VAC control logic circuits to the drive. This option is used for digital inputs S1 to S8.

*Mounts to control terminal strip*

**Model No. DI-001 ..... List \$**



# Control Options

## Control Options (continued)

### Digital Output Options

**Digital Output (2 Channel).** This option provides 2 additional digital outputs for use in monitoring the status outputs of the drive. Signal levels:

2 channels, Form C, 250VAC, 30VDC, 1A  
Mounts at option connector 3CN  
**Model No. DO-02C.....List \$**

**Digital Output (8 Channel).** This option provides 8 additional digital outputs for use in monitoring the status outputs of the drive. Signal levels:

2 channels, Form A, 250VAC, 30VDC, 1A  
6 channels, PHC, 48VDC, 50mA, Shared Common  
Mounts at option connector 3CN  
**Model No. DO-08 .....List \$**

### Encoder Feedback Options

**Single Encoder (PG) Feedback - Line Driver.** This option provides velocity and direction feedback from an encoder. This is primarily used for motor speed feedback in closed loop flux vector control. A 5VDC buffered output is also included.

Signal levels:  
5 or 12VDC differential line driver with compliments  
Maximum input frequency: 300kHz  
Phases A and B (Z required with some custom software)  
Mounts at option connector 4CN  
**Model No. PG-X2 .....List \$**

**Single Encoder (PG) Feedback - Open Collector.** This option provides velocity and direction feedback from an encoder. This is primarily used for motor speed feedback in closed loop flux vector control. A 24DC buffered output (open collector) is also included.

Signal levels:  
12VDC differential open collector with compliments  
Maximum input frequency: 32kHz  
Phases A and B (No marker pulse capability)  
Mounts at option connector 4CN  
**Model No. PG-B2 .....List \$**

**Dual Encoder (PG) Feedback - Line Driver.** This option provides velocity and direction feedback from 2 encoders. This card is used for 2-motor operation with standard software and for some custom software titles. A 5VDC buffered output is also included.

Signal levels:  
5 or 12VDC differential line driver with compliments  
Maximum input frequency: 300kHz  
Phases A and B (Z required with some custom software)  
Mounts at option connector 4CN  
**Model No. PG-W2 .....List \$**

### Digital Operator Options

**Digital Operator (LCD).** This option is the standard digital operator found on the drive. This option is only needed if the original keypad is lost or damaged.

Features include:  
LCD keypad display, 5 lines x 16 characters, backlight  
7 languages  
Copy function  
Mounts to keypad port  
**Model No. 300-016-999 .....List \$**

**Remote Operator Cables (3 or 10 feet).** These cables allow for tethering the keypad for easier viewing.

Mounts to keypad port  
**Model No. UWR0051 (3 feet) ..... List \$**  
**Model No. UWR0052 (10 feet) ..... List \$**

**UL Rated Remote Operator Kits.** This option is used to extend the existing Digital Operator to the wall of a separately priced, oversized UL Type 1, 3R, 4, 4X, or 12 enclosure (IPX6 environment). Price includes a faceplate bezel with digital operator carrier and membrane to cover the operator cutout in the enclosure door, a 3-foot cable, a 10-foot cable, and a 1:1 template for cutting the necessary cutouts in the enclosure. Keypad can be removed after kit installation.

Mounts to keypad port and enclosure wall.  
**Model No. UUX000458 (Blank Membrane)..... List \$**  
**Model No. UUX000459 (Yaskawa Logo Membrane) ..... List \$**

**Remote Operator Kit.** This option is used to extend the existing Digital Operator to the wall of a separately priced, oversized NEMA 1 enclosure (No UL rating). Price includes a faceplate membrane to cover the operator cutout in the enclosure door, a 3-foot cable, a 10-foot cable, a remote digital operator carrier, and a 1:1 template for cutting the necessary cutouts in the enclosure.

**Note: Keypad cannot be removed after initial installation.**  
Mounts to keypad port and enclosure wall.  
**Model No. UUX000444 (Yaskawa Logo Membrane) ..... List \$**



## Communications Options - These communications options are provided loose, unmounted. Network communications are available for most popular protocols.

**DeviceNet™ With ADR.** Each DeviceNet network supports up to 63 drives. Controllers are available from many PLC and/or PC suppliers. The DeviceNet network communications option board is designed to comply with all pertinent aspects of the ODVA (Open DeviceNet Vendor Association) specification and AC drive profile. All parameters, diagnostics, and operational commands are accessible via DeviceNet. Automatic Device Replacement (ADR) is supported in this DeviceNet option, including the functions of Auto Baud Rate sensing and Faulted Node Recovery (using Group 4 messaging). The DeviceNet satellite board mounts integrally in the drive and provides a DeviceNet standard open tap connector. Electronic Data Sheets may be downloaded from [www.yaskawa.com](http://www.yaskawa.com) to assist with network configuration and drive setup.

*Mounts at option connector 2CN.*

**Model No. CM012 .....List \$**

**Other DeviceNet Options.** For DeviceNet option kits CM056 and CM059, please follow the guidelines listed below. Please download the application note AN.AFD.14 from [www.yaskawa.com](http://www.yaskawa.com), which details the exact differences between all the DeviceNet option kits.

### New Installations

New installations without any requirements of backwards compatibility should use CM012 kit. The CM012 incorporates all the functionality of the CM056 and CM059 as well as ADR and many other new features.

### Existing Installations

When replacing a failed card in the field or adding an additional drive to an existing network, it is generally recommended to use the existing kit (CM056 or CM059) found in the installation. This will ease in the support of the network.

*Note: Each DeviceNet kit has unique EDS (electronic data sheets) files for each model of every drive series. These can be found on [www.yaskawa.com](http://www.yaskawa.com). If you choose to replace an existing kit with a different kit, you must use the new EDS file as well.*

**Profibus DP.** This option complies with the Profibus DP protocol specification. All parameters, diagnostics and operational commands are accessible via Profibus. The option board provides convenient Phoenix-type terminations for landing the shielded, twisted-pair wiring. Each Profibus network supports up to 99 drives. This option supports all of the Profibus data rates from 9.6 Kbps to 12 Mbps. Up to 32 bytes of input data and 32 bytes of output data are provided per message transaction. GSD files may be downloaded from [www.yaskawa.com](http://www.yaskawa.com) to assist with network configuration and drive setup.

*Mounts at option connector 2CN.*

**Model No. CM061**

**LonWorks.** This option is compatible with the Lon Mark Interoperability Association and complies with the Functional Profile for a Variable Frequency Motor Drive. The option board features the FFT-10A Free Topology Twisted-Pair Transceiver. Network connectivity is facilitated by either a Phoenix-style screw termination or RJ-45 connector. The kit includes a 12-inch pigtail (UWR00567-1) for interface wiring of the phoenix terminal block. Optional longer pigtail assemblies are available for use when drive is mounted within another enclosure. The 20-inch cable is for wall mount enclosures. The 78-inch cable may be used with any enclosure and may be cut to any length required.

*Mounts at option connector 2CN. Covers 3CN. Blocks 4CN.*

**Model No. CM048**

**Model No. UWR00567-2 (20-inch cable)**

**Model No. UWR00567-3 (78-inch cable)**

**Modbus Plus.** This option complies with Modicon's ModConnect Partners program and provides a seamless interface to Quantum, 984 and Compact PLCs. All parameters, diagnostics and operational commands are accessible via Modbus Plus. The option board provides a 9-pin D-shell connector for easy wiring and communicates via a 1 Mbps, twisted-pair, Local Area Network. Each Modbus Plus network supports up to 63 drives.

*Mounts at option connector 2CN. Covers 3CN.*

**Model No. CM071**

**Modbus TCP/IP.** This option complies with the Modbus TCP/IP protocol specification. This allows for communication over 10/100 Mbps Ethernet networks. This option has the ability to configure the IP Address from a user specified IP address, from a DHCP host or from a BootP host. All parameters, diagnostics and operational commands are accessible via Modbus TCP/IP. Auto-tuning the motor is also possible through this option using the DriveWizard PC program. This option supports up to 10 simultaneous PLC/PC connections.

*Mounts at option connector 2CN.*

**Model No. CM090**

**EtherNet/IP.** This option complies with the EtherNet/IP protocol specification. This allows for communication over 10/100 Mbps Ethernet networks. This option has the ability to configure the IP Address from a user specified IP address, from a DHCP host or from a BootP host. All parameters, diagnostics and operational commands are accessible via EtherNet/IP. Auto-tuning the motor is also possible through this option using the DriveWizard PC program.

*Mounts at option connector 2CN.*

**Model No. CM092**

Rated Input Voltage	Drive Model Number CIMR-F7U	Physical Dimensions (in.)			Weight (lbs) <sup>(1)</sup>	Standard Enclosure	Dimension Drawing Number <sup>(2)</sup>	Heat Loss (watts) <sup>(3)</sup>			
		H	W	D				Heatsink	Internal	Total	
208V/ 240V/ 230V	20P41	11.02	5.51	6.30	6.6	NEMA 1	DD.F7.FR1.N1.01	19	39	58	
	20P71							26	42	68	
	21P51			48	50			98			
	22P21			68	59			127			
	23P71			110	74			184			
	25P51	164	84	248							
	27P51	11.81	7.87	7.87	13.2	NEMA 1	DD.F7.FR3A.N1.01	219	113	332	
	20111	12.20						357	168	525	
	20151	13.78	9.45	8.27	24.2			DD.F7.FR4A.N1.01	416	182	598
	20181	14.96							472	208	680
	20221	21.06	10.00	10.24	53			DD.F7.FR5.N1.01	583	252	835
	20301	24.21	10.98			59	883		333	1216	
	20370	23.62	14.76	11.81	125	Protected Chassis	DD.F7.FR7.IP00.01	1010	421	1431	
	20450			12.99	139			1228	499	1727	
	20550	28.54	17.72	13.78	189			DD.F7.FR10.IP00.01	1588	619	2207
	20750								191	1956	844
20900	33.46	19.69	14.17	238	DD.F7.FR11.IP00.01			2194	964	3158	
21100	34.84	22.64	14.96	330	DD.F7.FR12.IP00.01	2733	1234	3967			
480V	40P41	11.02	5.51	6.30	6.6	NEMA 1	DD.F7.FR1.N1.01	14	39	53	
	40P71							17	41	58	
	41P51			36	48			84			
	42P21			59	56			115			
	43P71			80	68			148			
	45P51	127	81	208							
	47P51	11.81	7.87	7.87	13.2	NEMA 1	DD.F7.FR3A.N1.01	193	114	307	
	40111							232	158	390	
	40151	13.78	9.45	8.27	22		DD.F7.FR4B.N1.01	296	169	465	
	40181							389	201	590	
	40221	21.06	10.98	10.24	53		DD.F7.FR6B.N1.01	420	233	653	
	40301					691		298	989		
	40371	25.00	12.95	11.22	88	DD.F7.FR9A.N1.01	801	332	1133		
	40451	28.15					901	386	1287		
	40551	28.15					1204	478	1682		
	40750	28.54	17.72	13.78	194	Protected Chassis	DD.F7.FR10.IP00.01	1285	562	1847	
	40900							196	1614	673	2287
	41100	33.46	19.69	14.17	224		DD.F7.FR11.IP00.01	1889	847	2736	
41320	33.46	19.69	14.17	265	2388		1005	3393			
41600	36.06	22.64	14.96	352	DD.F7.FR13.IP00.01		2791	1144	3935		
41850	51.38	27.95	16.34	572	Protected Chassis	DD.F7.FR14.IP00.01	2636	1328	3964		
42200							616	3797	1712	5509	
43000	58.07	36.06	16.34	891		DD.F7.FR15.IP00.01	5838	2482	8320		

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

(2) Please refer to Yaskawa's website at [www.yaskawa.com](http://www.yaskawa.com) for dimension drawings.

(3) Total Heat Loss is the amount of heat dissipated by the drive at full load. This data is separated into "Heatsink" and "Internal" values. The value in the "Heatsink" column is the amount of heat dissipated by the heatsink, and would not need to be considered when calculating the enclosure size for applications that may require mounting the heatsink out the back of the enclosure using the Ring Kit option.

# Description

## 3/4-500HP

### F7/Configured

# F7C



The F7/Configured package provides an F7 in a NEMA 12 FVFF or NEMA type12 enclosure, with space for several commonly used options, such as reactors, RFI filters, circuit breakers, etc. The F7/Configured has been designed for flexibility in providing the features and options commonly demanded by industrial control designers.

This drive is designed for tough industrial environments. It is rugged and reliable, with an MTBF of 28 years. A variety of enclosure options provide the right environmental protection. Patented high slip braking can eliminate the need for dynamic braking resistors for high inertia loads.

To provide the optimum control method, the F7 can operate in conventional V/f, V/f with encoder feedback, open loop vector, or closed loop vector mode. Drive performance can be further enhanced for a specific application with optional drive software.

The F7 supports a variety of communications protocols and input/output control cards.

#### Performance Features

- Ratings: 0.5 to 150HP, 208 to 230/240 VAC  
0.75 to 500HP, 480 VAC
- Overload capacity:
- 150% for 1 min heavy duty, 110% for  
1 min normal duty, 200% peak
- Starting torque, heavy duty:  
150% at 0.5 Hz (open loop), at 0.3 Hz  
(closed loop)
- Starting torque, normal duty:  
120% at 1.5 Hz (V/f)
- Output frequency: 0.01 to 300Hz for heavy  
duty, 400Hz for normal duty
- Controlled speed range:  
40:1 (V/f), 50:1 (V/f with PG), 200:1 (open  
loop), 1000:1 (closed loop)
- Speed regulation:  
2-3% (V/f), 0.5-1% (V/f with PG), 0.2%  
(open loop), 0.01% (closed loop)
- Speed/frequency resolution: 0.01% with dig-  
ital reference, 0.1% with analog reference
- Electronic reversing
- Adjustable accel/decel: 0.1 to 6000 sec
- Stall prevention
- Drive efficiency: 96 to 98%
- Displacement power factor: 0.98
- Power loss ride-thru: 2 sec
- Inertial ride-thru
- Selectable auto restart after momentary  
power loss
- Programmable auto restart  
(0 to 10 attempts) on re-settable fault
- Critical frequency rejection: 3 selectable,  
adjustable bands

#### Protective Features

- DC bus CHARGE indicator
- Optically-Isolated controls
- Phase-to-phase / phase-to-neutral short  
circuit protection
- Ground fault protection
- Electronic motor overload (UL, cUL, NEC)
- Current and torque limit
- Over-torque / under-torque detection
- Fault circuit: over-current, over-voltage,  
and over-temperature
- Input/output phase loss

#### Service Conditions

- Ambient service temperatures:  
-10 to 40°C (104°F) NEMA-1, to 45°C  
(113°F) protected chassis
- Humidity: non-condensing 95%
- Altitude: to 3300 feet (1000 meter)
- Service Factor: 1.0
- Input voltage: +10% / -15%, 200 to  
240VAC, 380 to 480VAC
- Enclosure: NEMA 1 or protected chassis  
(other options)
- Input frequency: 50/60Hz ± 5%
- 3-phase, 3-wire phase insensitive
- Vibration: 1G (10 to 20Hz), 0.2G, (20 to  
50Hz)

#### Design Features

- LCD keypad display, 5 lines x 16 charac-  
ters, backlit, 7 languages, copy function
- Multi-speed settings: 17 available
- Setpoint (PID) trim control
- Signal follower: bias and gain
- Up / down / hold reference (digital M.O.P.)
- Timer function; on/off delay
- 32-bit microprocessor logic
- Easy access, quick start parameter groups
- Non-volatile memory/program retention
- Flash memory for update and custom  
applications
- 24VDC control logic
- DC injection braking, adjustable level
- Dynamic braking (25HP and below)
- Ramp to stop or coast to stop
- High-slip braking
- Dual motor parameter sets
- Synchronized start into rotating motor
- Motor auto-tuning, static and dynamic
- Common bus capability
- DC link choke: 30 to 150HP at 240VAC, 30  
to 500HP at 480VAC
- Twelve-pulse rectification with optional  
input transformer: 30 to 150HP at 240V, 30  
to 500HP at 480V
- Terminal strip, quick disconnect
- Split cover for ease of wiring
- Plug-in heat sink fan

#### Inputs and Outputs

- Analog input: -10 to +10VDC (20K ohms)  
or 4 to 20 mA (250 ohm)
- Analog output: -10 to +10VDC or 4-20mA  
proportional to output parameters
- Digital pulse train input/output (32KHz  
max)
- Digital Inputs: 8 multi-function
- Programmable outputs: Three form A
- Fault contact: one form C
- RS-485/422 communication terminals

#### Additional Features for V/f

- Torque boost: full range, auto
- V/f ratio: 15 preset, one adjustable
- Slip compensation

#### Standards & Reliability

- UL 508C (Power Conversion)
- CSA 22.2 No. 14-95  
(Industrial Control Equipment)
- UL, cUL listed; CE marked
- UL 1995 (Plenum)
- EN 50178 (LVD)
- EN 61800-3 (w/ External Filter)
- IEC 529, 146
- FCC CFR 47 Part 15 Subpart B  
(w/ External Filter)

#### Configured Options

- Various feedback cards
- Various output cards
- DriveWizard™ software (upload / down-  
load)
- DeviceNet, Profibus-DP, and other proto-  
cols
- Custom drive software
- Input breaker
- Input disconnect
- Input fuses
- 115 VAC interface
- Trim pot
- Input/output reactors
- Input filters
- DC link choke (25HP and below)
- Dynamic braking



# Description

**3/4-500HP  
F7/Configured**

## Model Number Configuration & Pricing:

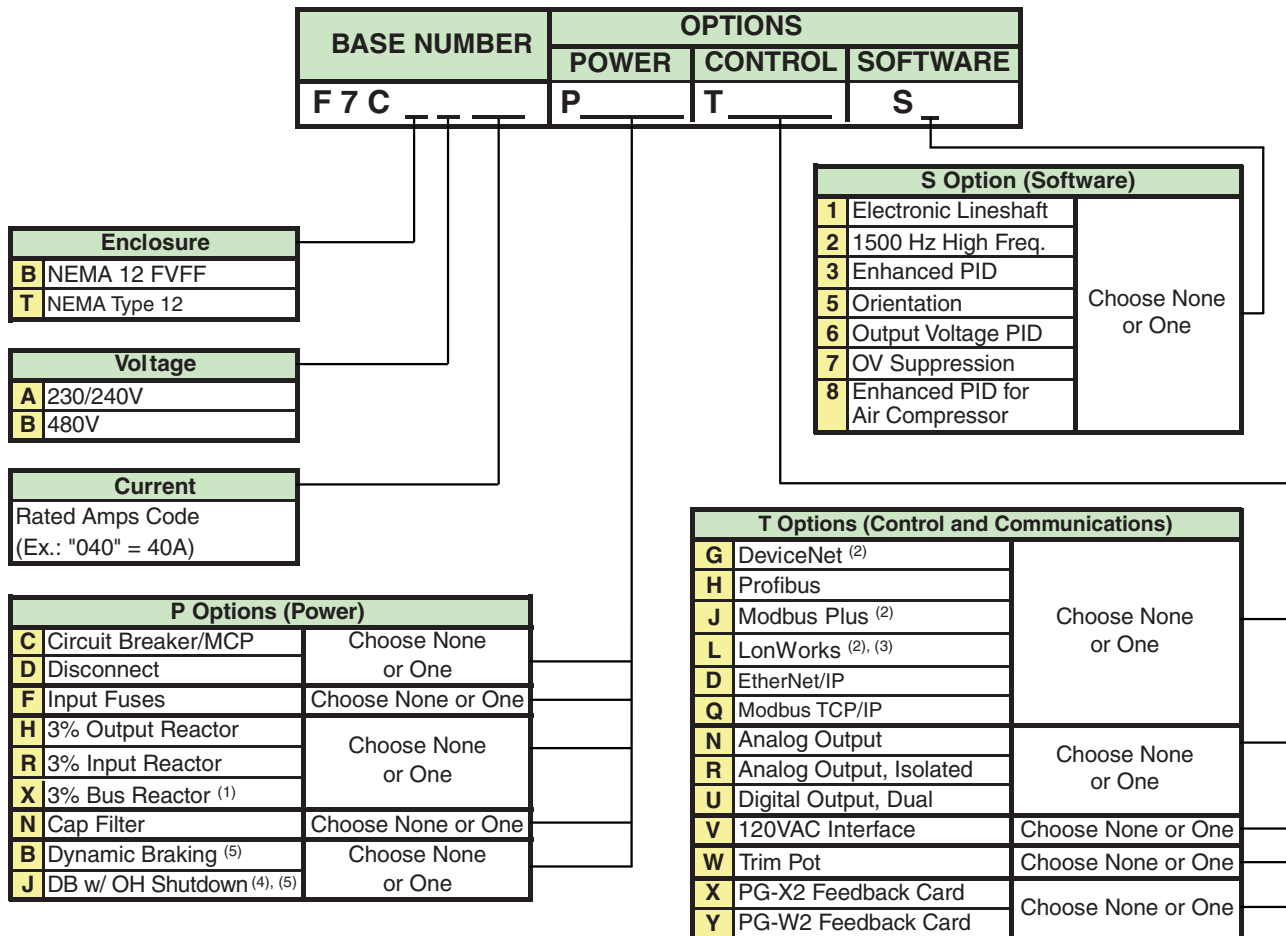
**Step 1.** First complete the Base Number for the required enclosure type, voltage and current rating.

**Step 2.** Add the Option code letter for each required option. Any Power option must be preceded by (P); any Control Option by (T), and Software Option by (S). No more than seven options may be selected. The letters P, T or S must be deleted if no options of that type are selected.

**Step 3.** Find the list price for the Base Number selected from the following pages. Add the list price of each selected option to this base price.

**Example:** F7 Configured package (**F7CB**) with a 480V, 40 Amp (**B040**), with Circuit Breaker and 3% Bus reactor (**P** followed by **CX**), Profibus-DP network communications capability (**T** followed by **H**) and no software option (delete the **S**). Model number is:

**F7CBB040PCXTH**



(1) 3% Bus Reactors are only available as an option on base numbers up to and including F7C\_A068 and B034; larger drives have a Bus Reactor as standard

(2) When this option is selected, port 3CN "Control Output" options **N** and **U** cannot be used

(3) When this option is selected, port 4CN "Feedback" options **X** and **Y** cannot be used

(4) When this option is selected, Power options **C** and **D** are not available

(5) Resistors for Dynamic Braking are NOT included, NOT factory-mounted. Price from DB section.

## Configured Option Descriptions:

### Enclosure Options

- (B) **NEMA 12 FVFF:** The drive and configured controls are provided in a NEMA 12 (IP22, UL Type 1) force-ventilated fan-filtered enclosure, large enough to accommodate any or all of the configured package options.
- (T) **NEMA 12:** The drive and configured controls are provided in a NEMA 12 (IP54, UL Type 12) enclosure, large enough to accommodate any or all of the Configured package options.

### P Options (Power)

- (C) **Circuit Breaker:** The standard configuration provides no branch short circuit protection or input disconnecting means. This option provides a thermal-magnetic circuit breaker that meets NEC branch circuit protection requirements, with a flange-mounted operating handle.
- (D) **Disconnect:** The standard configuration provides no input disconnecting means. This option provides a non-fused disconnect with a flange-mounted operating handle.
- (F) **Input Fuses:** The standard configuration does not include Drive Input Fuses. This option provides high-speed semi-conductor drive input fuses, rated for 200,000 amp RMS symmetrical interrupting capacity, that provides both drive input I2T protection and NEC approved branch circuit and short circuit protection.
- (R) **Input Reactor:** No form of input impedance is normally required for the Configured Drive. A 3% line reactor is available if additional impedance is desired (usually to reduce the effects of line-side transients and input THD).
- (X) **DC Bus Reactor:** No form of bus impedance is normally required for the Configured Drive. A 3% bus reactor is available if additional impedance is desired (usually to reduce the effects of line-side transients and input THD).
- (H) **Output Reactor:** No form of output impedance is normally required for the Configured Drive. A 3% load reactor is available if additional output impedance is desired (usually for long lead-lengths or noise reduction).
- (N) **Input Filter:** The standard configuration does not include a filter. The cap filter is a delta-wye capacitive network.
- (B) **Dynamic Braking:** This option is used to enhance the drive's ability to brake/stop the motor. The braking transistor module is included in the Configured package, and is sized for standard duty (10-15%). This option does NOT include DB resistors or any other DB resistor overtemp protection. See Dynamic Braking Section to select DB resistor.
- (J) **Dynamic Braking with Overtemp Shutdown:** This option is used to enhance the drive's ability to brake/stop the motor. The braking transistor module is included in the Configured package along with a shunt trip MCP and power circuitry to disconnect the input power from the drive, should the DB resistor overtemperature switch activate. The braking transistor is sized for standard duty (10-15%). This option does NOT include DB resistors, and cannot be ordered with Power Options (C) or (D). See Dynamic Braking Section to select DB resistor.

### T Options (Control and Communications)

- (G) **DeviceNet:** This option complies with the ODVA (Open DeviceNet Vendor Association) specification and AC drive profile. All parameter, diagnostics, and operational commands are accessible via DeviceNet. The option board provides a DeviceNet standard open tap connector. Each DeviceNet network supports up to 63 drives. Controllers are available from many PLC and/or PC suppliers. Electronic Data Sheets may be downloaded from [www.yaskawa.com](http://www.yaskawa.com) to assist with network configuration and drive setup. (CM056)
- (H) **Profibus-DP:** This option complies with the Profibus DP protocol specification. All parameters, diagnostics and operational commands are accessible via Profibus. The option board provides convenient Phoenix-type terminations for landing the shielded, twisted-pair wiring. Each Profibus network supports up to 99 drives. This option supports all of the Profibus data rates from 9.6 Kbps to 12 Mbps. Up to 32 bytes of input data and 32 bytes of output data are provided per message transaction. GSD files may be downloaded from [www.yaskawa.com](http://www.yaskawa.com) to assist with network configuration and drive setup.(CM061)



## Description

3/4-500HP  
F7/Configured

### Configured Option Descriptions (continued):

#### T Options (Control and Communications) (continued)

- (J) Modbus Plus:** This option complies with Modicon's ModConnect Partners program and provides a seamless interface to Quantum, 984 and Compact PLCs. All parameters, diagnostics and operational commands are accessible via Modbus Plus. The option board provides a 9-pin D-shell connector for easy wiring and communicates via a 1 Mbps, twisted-pair, Local Area Network. Each Modbus Plus network supports up to 63 drives. (CM071)
- (L) LonWorks:** This option is compatible with the Lon Mark Interoperability Association and complies with the Functional Profile for a Variable Frequency Motor Drive. The option board features the FFT-10A Free Topology Twisted-Pair Transceiver. Network connectivity is facilitated by either a Phoenix-style screw termination or RJ-45 connector. (CM048)
- (D) EtherNet/IP:** This option complies with the EtherNet/IP protocol specification. This allows for communication over 10/100 Mbps Ethernet networks. This option has the ability to configure the IP Address from a user specified IP address, from a DHCP host, or from a BootP host. All parameters, diagnostics and operational commands are accessible via EtherNet/IP. Auto-tuning the motor is also possible through this option using the DriveWizard PC program. (CM092)
- (Q) Modbus TCP/IP:** This option complies with the Modbus TCP/IP protocol specification. This allows for communication over 10/100 Mbps Ethernet networks. This option has the ability to configure the IP Address from a user specified IP address, from a DHCP host, or from a BootP host. All parameters, diagnostics and operational commands are accessible via Modbus TCP/IP. Auto-tuning the motor is also possible through this option using the DriveWizard PC program. This option supports up to 10 simultaneous PLC/PC connections. (CM090)
- (N) Analog Output, Bi-polar, 12 Bit:** This option provides 2 signals for remote metering of any two of the drive's "U1" monitors. These are in addition to the two standard analog outputs.  
Signal levels (individually selectable):  $\pm 10\text{VDC}$  (20kOhm), 11 bit + sign (AO-12)
- (R) Analog Output, Isolated, Bi-polar, 12 Bit:** This option provides 2 isolated signals for remote metering of any two of the drive's "U1" parameters. These are in addition to the two standard analog outputs.  
Signal levels (individually selectable): 0 to  $\pm 10\text{VDC}$  (20kOhm), 0/4 to 20mADC (500Ohm max), 11 bit + sign (AO-001)
- (U) Digital Output, Dual Relay:** This option provides 2 additional digital outputs for use in monitoring the status outputs of the drive. These are in addition to the 5 standard digital outputs.  
Signal levels: 2 channels, Form C, 250VAC, 30VDC, 1A (DO-02C)
- (V) 120VAC Input:** This option attaches directly to the control board terminal strip to all of the digital input (24VDC) terminals (S1 thru S8). External 120VAC control inputs can now be used with the drive. (DI-001)
- (W) Analog Input Trim Pot:** This option provides a 5kOhm potentiometer for use as a dropping resistor for maximum or minimum analog input trim. This voltage in turn can be used to supply a remote speed pot. (AI-001)
- (X) Single Encoder Feedback:** This option provides velocity and direction feedback from an encoder. This is primarily used for motor speed feedback in closed loop flux vector control. A 5VDC buffered output is also included. Signal levels: 5 or 12VDC differential line driver with compliments, maximum input frequency of 300kHz, phases A and B (Z required with some custom software). (PG-X2)
- (Y) Dual Encoder Feedback:** This option provides velocity and direction feedback from 2 encoders. This card is used for 2-motor operation with standard software and for some custom software titles. A 5VDC buffered output is also included. Signal levels: 5 or 12VDC differential line driver with compliments, maximum input frequency of 300kHz, phases A and B (Z required with some custom software). (PG-W2)



## Configured Option Descriptions (continued):

### S Options (Software)

- (1) **Electronic Lineshaft ELS (064):** This software option allows the Drive to act as a follower, controlling its motor's velocity and phase with respect to a master encoder signal. This software provides error (drift) free tracking of the master signal. Features include Advance, Retard, Lineshaft Disable, Registration Control, Alignment Control, and multiple preset gear ratios. The phase loop can be disabled thus making the drive a digital velocity follower. A PG-W2 Dual Encoder Feedback Card is required. The encoder must output a quadrature, line driver signal.
- (2) **1500 Hz High Frequency (056):** This software option allows the Drive to operate at an output frequency of up to 1500 Hz for high-speed spindle applications. It is available in V/Hz control mode only, and uses different drive current ratings and overload settings as compared to standard software. Therefore, the software manual (TM.F7SW.056.1500HzHighFrequency) must be consulted to properly size the drive for the application.
- (3) **Enhanced PID (058):** This software option allows the Drive to trim the speed reference with a PID feedback control loop. The feedback device, such as a dancer, is monitored with regard to its setpoint. Any error is sent to the PID and then the output of the PID is added to the frequency reference. Other features include PID feedback alarms, Accel/Decel control, and differential control.
- (5) **Orientation (063):** This software option allows the Drive to stop (or orientate) a machine to the same position every time the machine is stopped. This feature is designed for machine tools and punch/stamping presses where the machine must always stop at the same position to allow for automatic tool changing. An encoder feedback option card is always required. The machine configuration will determine which card, the PG-X2 or the PG-W2, is required.
- (6) **Output Voltage PID (061):** This software option allows the Drive to regulate its output voltage using a PID feedback loop. This function is useful for applications like uninterruptible power supplies (UPS) and vibratory welders. An external voltage-measuring device is required to provide the voltage feedback signal. This software is available in V/Hz control mode only.
- (7) **OV Suppression (062):** This software option allows the Drive to prevent overvoltage fault trips in cyclic applications like punch presses, shaker tables, and pump jacks (beam pumps) without the need for a dynamic braking resistor. This feature only works at constant speed and is not applicable for stopping the machine.
- (8) **Enhanced PID for Air Compressors (096):** This software option allows the Drive to provide optimum control of non-reciprocating rotary screw air compressors. The Drive will regulate the air pressure in an air compressor using a PID control loop. The pressure feedback device is monitored with regard to its setpoint and any error is corrected. Other features include PID feedback alarms, "blowdown valve" control, improved, scalable monitors with selectable display units, and an improved sleep function.

# F7C

## Configured Drives and Options

**F7 Configured Drives** - 3/4-500HP, 208-230/240 and 480V, 3-phase input, NEMA 12 enclosure, with factory-installed and wired options

Rated Input Voltage	Rated Output Current (Amps) <sup>(2)</sup>	Nom. HP <sup>(1)</sup>	Base Number				P Options (Power)										
			Configured Enclosure				Circuit Breaker		Input Fuses	Line Impedance			Input Filter	Dynamic Braking <sup>(3)</sup>			
			B=NEMA 12 FVFF T=NEMA Type 12				C= MCP	D= Disconnect	F= Fuses	H=3% Output Reactor R=3% Input Reactor X=3% Bus Reactor			N= Cap Filter	B=Standard Duty J=Standard Duty w/ Overtemp Shutdown			
			F7CB	Base List \$	F7CT	Base List \$	C List \$	D List \$	F List \$	H List \$	R List \$	X List \$	N List \$	B List \$	J List \$		
240V	3.2	3/4	---		A003												
	4.2	1	---		A004												
	6.8	2	---		A006												
	9.6	3	---		A009												
	15.2	5	---		A015												
	22	7.5	---		A022												
	28	10	---		A028												
	42	15	---		A042												
230V	54	20	---		A054												
	68	25	---		A068												
	80	30	---		A080												
	104	40	---		A104												
	130	50	A130		---												
	154	60	A154		---												
480V	192	75	A192		---												
	248	100	A248		---												
	312	125	A312		---												
	360	150	A360		---												
	1.6	3/4	---		B001												
	2.1	1	---		B002												
	3.4	2	---		B003												
	4.8	3	---		B004												
	7.6	5	---		B007												
	11	7.5	---		B011												
	14	10	---		B014												
	21	15	---		B021												
	27	20	---		B027												
	34	25	---		B034												
	40	30	---		B040												
	52	40	---		B052												
	65	50	---		B065												
	77	60	---		B077												
96	75	---		B096													
124	100	B124		---													
156	125	B156		---													
180	150	B180		---													
240	200	B240		---													
302	250	B302		---													
361	300	B361		---													
414	350	B414		---													
477	400	B477		---													
515	450	B515		---													
590	500	B590		---													

(1) Horsepower rating is based on standard NEMA B 4-pole motor design as represented in NEC table 430.150 Full-Load Current, Three-Phase Alternating Current Motors  
 (2) This is the maximum rated output for the configured drive package, not the drive's output current rating.  
 (3) See Dynamic Braking Section to select DB resistors.

## F7 Configured (Continued)

Rated Input Voltage	Rated Output Current (Amps) <sup>(4)</sup>	Nom. HP <sup>(1)</sup>	T Options (Control and Communication)												S Options		Uses Drive Model Number CIMR-F7U	
			Network Communications						Control Outputs			Term. 1	Terminal 2	Encoder Feedback		Software		
			G=DeviceNet H=Profibus J=Modbus Plus <sup>(2)</sup> L=LonWorks <sup>(2) (3)</sup> Q=Modbus TCP/IP D=EtherNet/IP						N=Analog Output R=Analog Output, Isolated U=Digital Output			V=120 VAC Interface	W=Trim Pot	X=PG-X2 Y=PG-W2		1=ELS 2=1500Hz 3=PID, 5=ORI 6=OV PID 7=OV SUP 8=AIR PID		
			G List \$	H List \$	J List \$	L List \$	Q List \$	D List \$	N List \$	R List \$	U List \$	V List \$	W List \$	X List \$	Y List \$	1,5,7 List \$		2,3,6,8 List \$
<b>240V</b>	3.2	3/4																20P41
	4.2	1																20P71
	6.8	2																21P51
	9.6	3																22P21
	15.2	5																23P71
	22	7.5																25P51
	28	10																27P51
	42	15																20111
54	20																20151	
68	25																20181	
80	30																20221	
104	40																20300	
<b>230V</b>	130	50																20370
	154	60																20450
	192	75																20550
	248	100																20750
	312	125																20900
360	150																21100	
<b>480V</b>	1.6	3/4																40P41
	2.1	1																40P71
	3.4	2																41P51
	4.8	3																42P21
	7.6	5																43P71
	11	7.5																45P51
	14	10																47P51
	21	15																40111
	27	20																40151
	34	25																40181
	40	30																40221
	52	40																40301
	65	50																40371
	77	60																40451
	96	75																40551
	124	100																40751
	156	125																40900
	180	150																40900
240	200																41320	
302	250																41600	
361	300																41850	
414	350																42200	
477	400																43000	
515	450																43000	
590	500																43000	

- (1) Horsepower rating is based on standard NEMA B 4-pole motor design as represented in NEC table 430.150 Full-Load Current, Three-Phase Alternating Current Motors
- (2) When this option is selected, port 3CN "Control Output" options (N, U) cannot be used
- (3) When this option is selected, port 4CN "Encoder Feedback" options (X, Y) cannot be used
- (4) This is the maximum rated output for the configured drive package, not the drive's output current rating.

# F7C

## Heatsink Filter Kit Options

**Heatsink Filter Kit Option** (only for Configured product) - The filter kit is mounted to the back of the enclosure, providing additional protection to the exposed drive heatsink and fan assemblies. It has been designed for extremely dirty or dusty environments in which cooling fans and heatsink fins could easily become clogged. The kit contains a duct and a pair of filters, which can be removed and cleaned, increasing fan life and cooling efficiency.

Rated Input Voltage	Configured Package Model Number F7CT____	Heatsink Filter Kit		Replacement Filter	
		Heatsink Filter Kit	List Price \$	Model Number	List Price \$
208-230/240V	A003 thru A015	UFL00003-1		UFL00002-1	
	A022, A028	UFL00003-2		UFL00002-2	
	A042, A054	UFL00003-3		UFL00002-3	
480V	B001 thru B011	UFL00003-1		UFL00002-1	
	B014, B021	UFL00003-2		UFL00002-2	
	B027, B034	UFL00003-3		UFL00002-3	



Rated Input Voltage	Configured F7CB or F7CT	Rated Output Current (Amps) <sup>(2)</sup>	Nominal HP <sup>(1)</sup>	Physical Dimensions (in.)			Weight (lbs) <sup>(3)</sup>	Configured Enclosure	Dimension Drawing Number <sup>(4)</sup>
				H	W	D			
240V	A003	3.2	3/4	28.50	17.50	11.75	87	NEMA 12	DD.F7C.W1.N12.01
	A004	4.2	1				87		
	A006	6.8	2				90		
	A009	9.6	3				92		
	A015	15.2	5	102					
	A022	22	7.5	34.50	20.00	15.00	128	NEMA 12	DD.F7C.W2.N12.01
	A028	28	10	138					
	A042	42	15	39.50	25.00	15.50	192	NEMA 12	DD.F7C.W3.N12.01
	A054	54	20	225					
	A068	68	25	52.00	29.00	19.75	301	NEMA 12	DD.F7C.W4.N12.01
A080	80	30	346						
A104	104	40	335						
230V	A130	130	50	84.00	37.75	27.00	804	NEMA 12 FVFF	DD.F7C.F1.N1.01
	A154	154	60				820		
	A192	192	75				880		
	A248	248	100				880		
	A312	312	125	84.00	73.25	27.00	1340	NEMA 12 FVFF	DD.F7C.F2.N1.01
A360	360	150	1450						
480V	B001	1.6	3/4	28.50	17.50	11.75	87	NEMA 12	DD.F7C.W1.N12.01
	B002	2.1	1				87		
	B003	3.4	2				88		
	B004	4.8	3				96		
	B007	7.6	5	93					
	B011	11	7.5	101					
	B014	14	10	34.50	20.00	15.00	134	NEMA 12	DD.F7C.W2.N12.01
	B021	21	15	138					
	B027	27	20	39.50	25.00	15.50	178	NEMA 12	DD.F7C.W3.N12.01
	B034	34	25	196					
	B040	40	30	52.00	29.00	19.75	295	NEMA 12	DD.F7C.W4.N12.01
	B052	52	40				295		
	B065	65	50				366		
	B077	77	60				370		
	B096	96	75	387					
	B124	124	100	84.00	37.75	27.00	890	NEMA 12 FVFF	DD.F7C.F1.N1.01
	B156	156	125				890		
	B180	180	150				890		
	B240	240	200				925		
B302	302	250	1075						
B361	361	300	1740	84.00	73.25	27.00	1800	NEMA 12 FVFF	DD.F7C.F2.N1.01
B414	414	350	1800						
B477	477	400	1800						
B515	515	450	2125						
B590	590	500	2125						

- (1) Horsepower rating is based on standard NEMA B 4-pole motor design as represented in NEC table 430.150 Full-Load Current, Three-Phase Alternating Current Motors
- (2) This is the maximum rated output for the configured drive package, not the drive's output current rating.
- (3) Data represents the total approx. weight of the drive with all possible standard options, not shipping weight.
- (4) Please refer to Yaskawa's website at [www.yaskawa.com](http://www.yaskawa.com) for dimension drawings.

# Software, Drawings, Manuals

## Software

**DriveWizard Software Kit.** This software package allows uploading and downloading of parameters via a PC for data storage and for programming of a drive. The software includes graphing and monitoring tools. It is a Windows-based program designed to make startup, commissioning, and troubleshooting of Yaskawa drives as simple as possible. Refer to our website at [www.yaskawa.com](http://www.yaskawa.com) for more information, including minimum system requirements. This kit includes the DriveWizard program on CD and a PC interface cable.  
**Model No. DWST616-C2**

**DriveWizard Software.** Software CD only. The software can also be downloaded for free on our website [www.yaskawa.com](http://www.yaskawa.com).  
**Model No. CD.DW.01**

**PC Interface Cable.** This 6 foot cable interconnects the drive keypad port to the 9-pin communications port on a PC. This cable is used in conjunction with DriveWizard software.  
**Model No. UWR00468-2**

## Drawings

**Approval/Special Drawings.** Pricing for drives and options is based on standard documentation, which consists of one Technical Manual, standard Instruction Sheets, Wiring Diagrams and Outline Drawings. When approval or special drawings must be prepared and submitted to the customer, a Drawing Price Addition must be made for each different drive being offered. Material procurement and manufacture will not commence until written drawing approval is received by the factory.

## Manuals/CDs

**Technical Manuals.** One manual and CD-ROM is included with each drive at no charge when shipped from the factory.

**Additional copies of Manual or CD-ROM:**

<b>Part No. TM.F7.01</b> .....	\$
<b>Part No. CD4005</b> .....	\$

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 Electric America has three training facilities in the United States. The primary training facility is in Yaskawa Electric 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 Electric 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.

## **Training Classes Available**

### **F7 Sales/Web Class**

Short, information packed class designed to present ample specific product information in a short amount of time, typically 1-3 hours. Can be done live or over the web.

### **F7 Installation and Start-Up Workshop**

The F7 Installation and Start-Up class is designed for technicians and engineers that need to know how to install and start up a F7 Drive.

### **F7 Application Programming**

The F7 Application Programming class is designed for technicians and engineers that need to know how to incorporate a F7 Drive into an application.

### **Hands-On Troubleshooting for AC Drives**

The Hands-On Troubleshooting for AC Drives class is designed for technicians and engineers that need to know the basic theory of troubleshooting a Yaskawa variable-frequency drive (P7, F7, G7).

To enroll, contact Technical Training Services.  
Phone: 1-800-Yaskawa (1-800-927-5292), dial 4, then 1.  
Fax: 847-887-7185  
E-mail: [training@yaskawa.com](mailto:training@yaskawa.com)

Check out the latest class schedule and cut sheets at [www.yaskawa.com](http://www.yaskawa.com)

# Terms and Conditions

## YASKAWA AMERICA, INC. ("YAI"), DRIVES & MOTION DIVISION - TERMS AND CONDITIONS OF SALE

### 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 to evidence and perfect D&M's security interest. D&M reserves all rights and remedies available to it under the Uniform Commercial Code and other applicable law in the event of Buyer's default.

### 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.



# Terms and Conditions

## 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 sold by D&M 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 workmanlike manner. Buyer's sole remedy for a breach of this service warranty is limited to further service or a refund or credit of amounts paid by Buyer, at Seller's option.

(b) D&M's warranty obligation shall be conditioned upon receipt by D&M of written notice of any alleged defects within sixty (60) days after discovery. D&M will not be responsible for unauthorized repairs to any products, even if defective. D&M shall not be responsible for any products which have been altered, abused, misused, or improperly installed or repaired, or for any loss, damage, defect, claim or non-performance resulting from or attributable to Buyer's specifications. D&M does not guarantee production rates or the quality of goods made using D&M's products or services, nor shall any longer warranty periods apply, except as agreed in writing signed by an authorized D&M representative.

(c) Where Buyer orders non-stock products or parts manufactured by a third-party, D&M will, to the extent permitted, pass through to Buyer any warranty of the manufacturer. As to such items, Buyer's sole remedy for breach of warranty shall be the remedy offered by and available from the manufacturer, if any.

(d) **D&M'S WARRANTY HEREIN IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES OF D&M AND ANY PARENT OR AFFILIATED COMPANIES OF D&M. D&M DISCLAIMS ALL OTHER WARRANTIES, WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE OR USE.**

(e) **UNDER NO CIRCUMSTANCES SHALL D&M, OR ANY PARENT OR AFFILIATED COMPANY OF D&M, BE LIABLE TO BUYER OR ANY ENTITY FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER ARISING FROM BREACH OF CONTRACT, TORT, NEGLIGENCE, MISREPRESENTATION, STRICT LIABILITY OR OTHERWISE, INCLUDING FOR LOST PROFITS, IMPAIRMENT OF GOODS, WORK STOPPAGE OR OTHERWISE, IN ANY WAY ARISING OUT OF OR RELATED TO PRODUCTS OR SERVICES SUPPLIED BY D&M OR ANY TRANSACTION TO WHICH THESE STANDARD TERMS APPLY. THE MAXIMUM LIABILITY OF D&M, INCLUDING, BUT NOT LIMITED TO, WITH RESPECT TO THE DESIGN, MANUFACTURE, SALE, DELIVERY, RESALE, INSPECTION, ASSEMBLY, INSTALLATION, TESTING, REPAIR, REPLACEMENT, MAINTENANCE OR USE OF ANY PRODUCT OR THE PERFORMANCE OF ANY SERVICE, SHALL NOT EXCEED THE PURCHASE PRICE PAID TO D&M.**

## 9. INFRINGEMENT:

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:

These Terms and the relationship of the parties are governed by the internal laws of the State of Illinois, U.S.A., without regard to its choice of law rules. For all claims or disputes arising out of or relating to the sale of products or services by D&M and/or the relationship of the parties, Buyer shall file any and all lawsuits or claims exclusively in the state or federal courts located in Cook County, Illinois. Buyer hereby submits to the personal jurisdiction of said courts and waives any claim of improper or inconvenient venue. To the fullest extent permitted by law, Buyer hereby agrees to waive the right to trial by jury for all claims or disputes arising out of or relating to the sale of products or services by D&M and/or the relationship of Buyer and D&M. The parties agree that U.N. Convention of Contracts for the International Sale of Goods shall not apply to their relationship or the sale of products by D&M.

## 11. EXPORT CONTROL:

Buyer acknowledges that the products and related software and technology may be subject to export controls of the U.S. Government, including the Export Administration Regulations of the U.S. Department of Commerce. Buyer shall comply with all applicable laws, regulations, treaties and agreements regarding the use, import, export or re-export of the products and shall be solely responsible for obtaining all required licenses or approvals. The products are not intended for use in any nuclear, chemical or weapons production or environmental damage or for export, re-export, or distribution to any restricted or embargoed country or to a person or entity whose privilege to participate in exports has been denied or restricted by the U.S. Government. Buyer shall indemnify, hold harmless and defend D&M, its parent and affiliated companies from any violation of this section by Buyer or its employees, consultants, agents and customers.

## 12. MISCELLANEOUS:

(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 YAI 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.

**F7****Options Matrix**

Model/ Part Number	Description	List Price \$	Old Model/Part Number
05P00620-0015	Reactor, 600V, 2A, Enclosed		
05P00620-0016	Reactor, 600V, 2A, Enclosed		
05P00620-0020	Reactor, 600V, 4A, Enclosed		
05P00620-0021	Reactor, 600V, 4A, Enclosed		
05P00620-0022	Reactor, 600V, 4A, Enclosed		
05P00620-0023	Reactor, 600V, 4A, Enclosed		
05P00620-0027	Reactor, 600V, 8A, Enclosed		
05P00620-0028	Reactor, 600V, 8A, Enclosed		
05P00620-0029	Reactor, 600V, 8A, Enclosed		
05P00620-0032	Reactor, 600V, 12A, Enclosed		
05P00620-0033	Reactor, 600V, 12A, Enclosed		
05P00620-0034	Reactor, 600V, 12A, Enclosed		
05P00620-0036	Reactor, 600V, 18A, Enclosed		
05P00620-0037	Reactor, 600V, 18A, Enclosed		
05P00620-0038	Reactor, 600V, 18A, Enclosed		
05P00620-0041	Reactor, 600V, 25A, Enclosed		
05P00620-0042	Reactor, 600V, 25A, Enclosed		
05P00620-0043	Reactor, 600V, 18A, Enclosed		
05P00620-0046	Reactor, 600V, 35A, Enclosed		
05P00620-0047	Reactor, 600V, 35A, Enclosed		
05P00620-0048	Reactor, 600V, 35A, Enclosed		
05P00620-0050	Reactor, 600V, 45A, Enclosed		
05P00620-0051	Reactor, 600V, 45A, Enclosed		
05P00620-0052	Reactor, 600V, 45A, Enclosed		
05P00620-0054	Reactor, 600V, 55A, Enclosed		
05P00620-0055	Reactor, 600V, 55A, Enclosed		
05P00620-0056	Reactor, 600V, 55A, Enclosed		
05P00620-0058	Reactor, 600V, 80A, Enclosed		
05P00620-0059	Reactor, 600V, 80A, Enclosed		
05P00620-0060	Reactor, 600V, 80A, Enclosed		
05P00620-0062	Reactor, 600V, 100A, Enclosed		
05P00620-0063	Reactor, 600V, 100A, Enclosed		
05P00620-0066	Reactor, 600V, 130A, Enclosed		
05P00620-0067	Reactor, 600V, 130A, Enclosed		
05P00620-0068	Reactor, 600V, 130A, Enclosed		
URX000206	Reactor, 600V, 160A, Enclosed		05P00620-0072
05P00620-0073	Reactor, 600V, 160A, Enclosed		
05P00620-0074	Reactor, 600V, 160A, Enclosed		
05P00620-0078	Reactor, 600V, 200A, Enclosed		
05P00620-0079	Reactor, 600V, 200A, Enclosed		
05P00620-0082	Reactor, 600V, 250A, Enclosed		
05P00620-0083	Reactor, 600V, 250A, Enclosed		
05P00620-0084	Reactor, 600V, 250A, Enclosed		
05P00620-0087	Reactor, 600V, 320A, Enclosed		

Model/ Part Number	Description	List Price \$	Old Model/Part Number
05P00620-0088	Reactor, 600V, 320A, Enclosed		
05P00620-0089	Reactor, 600V, 320A, Enclosed		
05P00620-0092	Reactor, 600V, 400A, Enclosed		
05P00620-0093	Reactor, 600V, 400A, Enclosed		
05P00620-0096	Reactor, 600V, 500A, Enclosed		
05P00620-0100	Reactor, 600V, 600A, Enclosed		
URX000205	Reactor, 600V, 600A, Enclosed		05P00620-0101
05P00620-0104	Reactor, 600V, 750A, Enclosed		
05P00620-0105	Reactor, 600V, 750A, Enclosed		
AI-001	Analog Input Trim Potentiometer Kit		UTC000043
AI-010	Analog Input 3-15 PSI Transducer Kit		USNN0001
AI-040	Analog Input Isolated (3 Inputs, 14 Bit)		AI-14B2
AI-14B	Analog Input Kit (3 Inputs, 12 Bit)		ICG352, DS387
AI-14U	Analog Input Kit (1 Input, 14 Bit)		ICG351, DS386
AO-001	Analog Output Isolated Kit, (2 Outputs, 11 Bit + Sign)		AO-12B2
AO-08	Analog Output Kit (2 Outputs, 8 Bit)		ICG355, DS390
AO-12	Analog Output Kit (2 Outputs, 11 Bit + Sign)		ICG356, DS391
CD.DW.01	DriveWizard Software CD		
CDBR-2022B	Dynamic Braking Transistor Module		46S03331-0020
CDBR-2110B	Dynamic Braking Transistor Module		
CDBR-4045B	Dynamic Braking Transistor Module		46S03331-0060
CDBR-4220B	Dynamic Braking Transistor Module		46S03331-0090
CM048	LonWorks Communication Kit		
CM056	DeviceNet Communication Kit, F7		46S03318-XXXX
CM059	DeviceNet Communication Kit (SI-N1 Board)		SI-N1
CM061	Profibus DP Communication Kit (Includes Profibus II)		SI-P1
CM071	Modbus Plus Communication Kit		
CM090	Ethernet Modbus TCP/IP Communication Kit		
CM092	EtherNet/IP Communication Kit		
DI-08	Digital Input Kit (8 Data Inputs, BCD or Binary)		ICG353, DS388
DI-16H2	Digital Input Kit (12/16 Data Inputs, BCD or Binary)		CDR001021, DS390
DO-02C	Digital Output Kit (2 Form C, 250VAC, 30VDC, 1A)		CDR001023, DS011
DO-08	Digital Output Kit (2 Form A and 6 PHC)		ICG367, DS383
DWST616-C2	DriveWizard Kit (Software and Cable)		
PG-W2	PG Feedback Kit, Dual		CDR001040, DS014
PG-B2	PG Feedback Kit		
PG-X2	PG Feedback Kit		CDR001015, DS003
R7503	DB Resistor, Heat Sink Mt, 3% Duty Cycle, 70 Ohm		50185432
R7504	DB Resistor, Heat Sink Mt, 3% Duty Cycle, 100 Ohm		50185431
R7505	DB Resistor, Heat Sink Mt, 3% Duty Cycle, 200 Ohm		50185430
R7506	DB Resistor, Heat Sink Mt, 3% Duty Cycle, 300 Ohm		50185532
R7507	DB Resistor, Heat Sink Mt, 3% Duty Cycle, 400 Ohm		50185531
R7508	DB Resistor, Heat Sink Mt, 3% Duty Cycle, 750 Ohm		50185530
R7510	DB Resistor, Heat Sink Mt, 3% Duty Cycle, 62 Ohm		50185433
UDA00365-C	End Cap Kit		
UDA00365-E	End Cap Kit		

**Options Matrix**

Model/ Part Number	Description	List Price \$	Old Model/Part Number
UDA00365-F	End Cap Kit		
UDA00365-P	End Cap Kit		
UDA00365-Q	End Cap Kit		
UDA00365-R	End Cap Kit		
UDA00417-A	Ring Kit		
UDA00417-B	Ring Kit		
UDA00417-C	Ring Kit		
UDA00417-D	Ring Kit		
UDA00417-E	Ring Kit		
UDA00417-F	Ring Kit		
UOP000008	LCD Digital Operator (Same as Supplied with Drive)		
UOPN0005	Remote Operator Kit (Cable, Carrier, and Membrane)		
URS000096	Dynamic Braking Resistor		
URS000097	Dynamic Braking Resistor		
URS000100	Dynamic Braking Resistor		
URS000119	Dynamic Braking Resistor		
URS000120	Dynamic Braking Resistor		
URS000128	Dynamic Braking Resistor		
URS000129	Dynamic Braking Resistor		
URS000135	Dynamic Braking Resistor		
URS000136	Dynamic Braking Resistor		
URS000140	Dynamic Braking Resistor		
URS000142	Dynamic Braking Resistor		
URS000143	Dynamic Braking Resistor		
URS000150	Dynamic Braking Resistor		
URS000151	Dynamic Braking Resistor		
URS000154	Dynamic Braking Resistor		
URS000165	Dynamic Braking Resistor		
URS000166	Dynamic Braking Resistor		
URS000167	Dynamic Braking Resistor		
USR000022	DB Resistor. 10% Duty Cycle, 200 Ohm, 250W		05P00041-0825
USR000023	DB Resistor. 10% Duty Cycle, 100 Ohm, 250W		05P00041-0826
USR000024	DB Resistor. 10% Duty Cycle, 70 Ohm, 250W		05P00041-0827
USR000025	DB Resistor. 10% Duty Cycle, 40 Ohm, 846W		05P00041-0828
USR000026	DB Resistor. 10% Duty Cycle, 30 Ohm, 824W		05P00041-0829
USR000027	DB Resistor. 10% Duty Cycle, 20 Ohm, 1260W		05P00041-0830
USR000032	DB Resistor. 10% Duty Cycle, 750 Ohm, 600W		05P00041-0835
USR000033	DB Resistor. 10% Duty Cycle, 400 Ohm, 500W		05P00041-0836
USR000034	DB Resistor. 10% Duty Cycle, 250 Ohm, 500W		05P00041-0837
USR000035	DB Resistor. 10% Duty Cycle, 150 Ohm, 500W		05P00041-0838
USR000036	DB Resistor. 10% Duty Cycle, 100 Ohm, 975W		05P00041-0839
USR000037	DB Resistor. 10% Duty Cycle, 75 Ohm, 1050W		05P00041-0840
USR000038	DB Resistor. 10% Duty Cycle, 50 Ohm, 1600W		05P00041-0841
USR000040	DB Resistor. 10% Duty Cycle, 32 Ohm, 2340W		05P00041-0843
UWR00468-2	Computer Interface Cable, 6 feet (2 meter)		
UWR0051	Remote Operator Cable, 3 feet (1 meter)		DS071
UWR0052	Remote Operator Cable, 10 feet (3 Meter)		DS073

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# F7 Drives Catalog

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Data Subject to change without notice.



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