

***Catalog CA.E7.01
E7 Drives and E7 Packages
for HVAC Building 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, as required. Documents may include the following:

- TM.E7.01 E7 Drive User Manual... included on CD ROM with product
- TM.E7.02 E7 Drive Programming Manual... included on CD ROM with product
- TM.E7B.01 E7 Drive/Bypass Technical Manual... included on CD ROM with product
- TM.E7L.01 E7 Drive/Bypass Technical Manual... included on CD ROM with product
- TM.E7.20 LonWorks Manual... included on CD ROM with product
- TM.E7.21 APOGEE Manual... included on CD ROM with product
- TM.E7.22 Metasys N2 Manual... included on CD ROM with product
- DriveWizard... Software and Manual... included on CD ROM with product
- Options Instructions... included on CD ROM with product
- TM.E7N.01 E7 Drive/Bypass Technical Manual... included on CD ROM with product

REVISIONS

Change	Page
Minor text changes; new information, weights and drawings	6, 9, 16, 36, 41-43, 47-48, 53, 58, 65, 67, 69, 76-78, 86-87, 103-105, 109-110
Changed revision date	All



The E7 Drive is a variable torque AC drive, designed specifically for HVAC applications in building automation. A new benchmark for size, cost, performance, benefits, and quality, the E7 includes numerous built-in features such as Network Communications, H/O/A, PI Control and Energy-Savings functions.

The E7 has embedded communications for the popular building automation protocols, Johnson Controls Metasys® N2 and Siemens APOGEE™ FLN, as well as Modbus®. An optional LonWorks® and EtherNet/IP interface card is also available.

The LCD keypad/operator is equipped with Hand/Off/Auto functions, copy feature, 7 language choices, and 5 lines of display, 16 characters per line. Optional software allows upload/download, as well as graphing and monitoring of drive parameters from a PC for ease of drive management. User parameter settings can be recovered at any time via "user initialization."

Built-in PI Control eliminates the need for closed loop output signals from a Building Automation System (BAS). It includes feedback display, inverse, square root and differential control functions, and maintains set point for closed loop control of fans and pumps for pressure, flow or temperature regulation.

Performance Features

- VT Ratings: 1/2-150 HP, 208 VAC
1/2-150 HP, 230/240 VAC
1/2- 500 HP, 480 VAC
- Overload capacity: 110% for 60 sec. (150% peak)
- Starting torque: 100% at 3 Hz
- DC injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Motor preheat function
- Adjustable accel/decel: 0.1 to 6000 sec.
- Controlled speed range: 40:1
- Critical frequency rejection: 3 selectable, adjustable bands
- Torque limiting: 30-180%
- Energy Saving control
- Torque boost: full range, auto
- Power loss ride-thru: 2 sec.
- Inertia ride-thru
- Auto restart after power loss or resettable fault, selectable, programmable
- Feedback signal loss detection
- Serial communications loss detection
- "Up/Down" floating point control capability
- Stationary motor auto-tuning
- Customizable monitor display
- Sleep function
- Run permissive input
- Ramp-to-stop or coast-to-stop selection
- Runtime changes in control and display
- Project-specific parameter initialization

Service Conditions

- Ambient Temperature:
-10°C to 40°C (14°F to 104°F) NEMA 1,
-10°C to 45°C (14°F to 113°F) protected chassis
- Humidity: 95% RH, non-condensing
- Altitude: 3300 ft; higher by derate
- Input voltage: +10%/-15%
- Input frequency: 50/60 Hz ± 5%
- 3-phase, 3-wire, phase sequence insensitive

Design Features

- 32-bit microprocessor logic
- Flash upgradeable firmware
- Non-volatile memory, program retention
- Surface-mount devices
- Displacement power factor: 0.98
- Output frequency: 0.1 to 120 Hz
- Frequency resolution: 0.06 Hz
- Frequency regulation: 0.1%
- Control Terminal Board: Quick disconnect, removable
- Carrier frequency: selectable to 15 kHz
- 3% DC bus reactor: 30-150 HP, 208 VAC; 30-150 HP, 240 VAC; 40-500 HP, 480 VAC; optional on lower ratings
- Keypad Operator: Hand/Off/Auto, built-in copy feature, 7 languages
- LCD display: 5 lines, 16 characters each
- 24 VDC control logic
- Transmitter/Option power supply
- Output contacts: One form C and two programmable form A
- Input/output terminal status
- Input terminals: 5 programmable multi-function input terminals
- Fault input: Programmable
- Diagnostic fault indication in selected language
- Timer function: Elapsed time, Delay on start, Delay on stop
- RS-422/485 port: Embedded Metasys N2, APOGEE FLN, and Modbus
- Volts/hertz ratio: Preset and programmable V/Hz patterns
- Multi-speed settings: 5 available
- Remote speed command: 0-10 VDC or 4-20 mA, direct or reverse-acting
- Setpoint (PI) control with inverse or square root input, differential control via two feedback capability
- Feedback signal: low pass filter
- Speed command: bias and gain
- Analog outputs: Programmable, two, 0-10 VDC
- Meter Functions: Volt, amp, kilowatt, elapsed run time, speed command
- Output Current Transformers, qty 3
- NEMA 1 or protected chassis
- MTBF: exceeds 28 years

Protective Features

- Current limited stall prevention
- Heat sink over-temperature, speed fold-back
- Cooling fan operating hours recorded
- Bi-directional start into rotating motor at synchronized speed
- DC bus charge indicator
- Current limiting DC bus fuse
- Optically-Isolated controls
- Short circuit protection: Phase-phase and phase-neutral
- Ground fault protection
- Short circuit withstand rating: 100K RMS
- Electronic motor overload: UL recognized
- Current and torque limit
- Fault display: last 10 faults
- Fault circuit: OC, OV, OT
- Over torque and under torque protection
- Program security code
- "Hunting" prevention logic
- Reverse operation prohibit selectability

Options

- Communication: LonWorks, BACnet and EtherNet/IP
- Analog outputs: 2 programmable, 4-20 mA
- Input and output reactor, enclosed
- DriveWizard™ upload/download and monitoring/graphing software
- Remote digital operator kit

Standards

- 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)

E7

Standard Drives

E7 Drives - 1/2-500HP, 208-230/240 and 480V, 3-phase⁽¹⁾ input, NEMA 1 or protected chassis enclosure

Rated Input Voltage	Drive Model Number CIMR-E7U	Rated Output Current (Amps)	Nominal HP ⁽²⁾	Standard Enclosure
208V	20P41 ⁽³⁾	3.6	1/2 3/4	NEMA 1
	20P71 ⁽³⁾	4.6	1	NEMA 1
	21P51 ⁽³⁾	7.8	2	NEMA 1
	22P21	10.8	3	NEMA 1
	23P71	16.8	5	NEMA 1
	27P51	31	7.5 10	NEMA 1
	20111	46.2	15	NEMA 1
	20151	59.4	20	NEMA 1
	20181	74.8	25	NEMA 1
	20221	88	30	
	20301	115	40	
	20370	162	50	Protected Chassis
	20450	192	60	
20550	215	75	Protected Chassis	
20750	312	100		
20900	360	125	Protected Chassis	
21100	415	150		
240V	20P41 ⁽³⁾	3.6	1/2 3/4	NEMA 1
	20P71 ⁽³⁾	4.6	1	NEMA 1
	21P51 ⁽³⁾	7.8	2	NEMA 1
	22P21	10.8	3	NEMA 1
	23P71	16.8	5	NEMA 1
	25P51	23	7.5	NEMA 1
	27P51	31	10	NEMA 1
	20111	46.2	15	NEMA 1
	20151	59.4	20	NEMA 1
	20181	74.8	25	NEMA 1
20221	88	30		
20301	115	40		
230V	20370	162	50 60	Protected Chassis
	20450	192	75	Protected Chassis
	20750	312	100 125	Protected Chassis
	20900	360	150	Protected Chassis

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

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

(3) These drives have a minimum 12 week lead-time. For faster delivery, use CIMR-E7U22P21.



E7 Drives (Continued)

Rated Input Voltage	Drive Model Number CIMR-E7U	Rated Output Current (Amps)	Nominal HP ⁽²⁾	Standard Enclosure
480V	40P41 ⁽³⁾	1.8	1/2 3/4	NEMA 1
	40P71 ⁽³⁾	2.1	1	NEMA 1
	41P51 ⁽³⁾	3.7	2	NEMA 1
	42P21	5.3	3	NEMA 1
	43P71	7.6	5	NEMA 1
	45P51	12.5	7.5	NEMA 1
	47P51	17.0	10	NEMA 1
	49P01	21.0	15	NEMA 1
	40111	27.0	20	NEMA 1
	40151	34.0	25	NEMA 1
	40181	40.0	30	NEMA 1
	40241	52.0	40	NEMA 1
	40301	67.2	50	NEMA 1
	40371	77.0	60	NEMA 1
	40451	96.0	75	NEMA 1
	40551	125	100	NEMA 1
40750	156	125	Protected Chassis	
40900	180	150	Protected Chassis	
41100	240	200	Protected Chassis	
41600	304	250	Protected Chassis	
41850	414	300 350	Protected Chassis	
42200	515	400 450	Protected Chassis	
43000	675	500	Protected Chassis	

- (1) For single-phase input applications, consult Yaskawa Drives Applications Engineering for proper sizing
- (2) Horsepower rating is based on standard NEMA B 4-pole motor design as represented in NEC table 430.150 Full-Load Current, Three-Phase Alternating Current Motors
- (3) These drives have a minimum 12 week lead-time. For faster delivery, use CIMR-E7U42P21.



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-E7U	Kit Model No. UDA00417-
208-230/240V	20P41 thru 25P51	D
	27P51	C
	20111	
	20151	B
	20181	
	20221	F
	20301	E
480V	20370 thru 21100	Not Available
	40P41 thru 45P51	D
	47P51	C
	40111	
	40151	B
	40181	
	40241	E
	40301	
40371 thru 40551	A	
40750 thru 43000	Not Available	

End Cap Kit Options

End Cap Kit
Leg Kit



End Cap Kits, 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 have additional space for mounting auxiliary components (i.e. circuit breaker, input fuses, reactor, etc.) If a drive with end caps installed is desired, please specify "installed end caps" on purchase order.

Rated Input Voltage	Drive Model Number CIMR-E7U	Kit Model No. UDA00365-	Overall Drive Dimensions		
			Height (in.)	Width (in.)	Depth (in.)
208-230/240V	20P41 thru 20301	Not Required			
	20370	C	32.24	15.55	11.81
	20450				12.99
	20550	E	40.83	18.43	13.78
	20750				
	20900	F	49.33	20.43	14.17
21100	Not Available				
480V	40P41 thru 40551	Not Required			
	40750	E	40.83	18.43	13.78
	40900				
	41100	F	49.33	20.43	14.17
	41600				
	41850	Not Available			
42200	Not Available				
43000	Not Available				

Freestanding Leg Kit, NEMA 3R - This option allows the NEMA 3R wall-mount enclosures to be mounted on legs so that the control can be freestanding and off the ground. Either kit can be used on any of the wall-mount enclosures. (All floor-mount enclosures come standard with freestanding legs.)

12" Leg Kit
Model No. UDA00548-1

30" Leg Kit
Model No. UDA00548-2



Control Options

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

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 Monitor, 4-20mA. The standard drive provides two programmable 0-10VDC outputs. This option will convert either, or both, of these outputs to 4-20mA output signals. It can be used for remote metering of any of the "U1" parameters, including: output frequency, output current, DC bus voltage, etc.

This option replaces and mounts in the same location as the drive's standard terminal PCB.

Model No. ETC618121

Digital Operator Options

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)

Model No. UUX000459 (Yaskawa Logo Membrane)

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)

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

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)

BACnet. This option complies with the BACnet protocol specification. This allows for communication over MS-TP (RS-485) BACnet networks. All parameters, diagnostics and operational commands are accessible via BACnet. BACnet is supported and maintained by ASHRAE Standing Standard Project Committee. The kit includes a 12-inch pigtail (UWR00567-1) for interface wiring of the drive Modbus terminals. 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.

Model No. CM049

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

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

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

NOTE: EtherNet/IP cannot be used on E7L or E7N.

Dimensions and Data

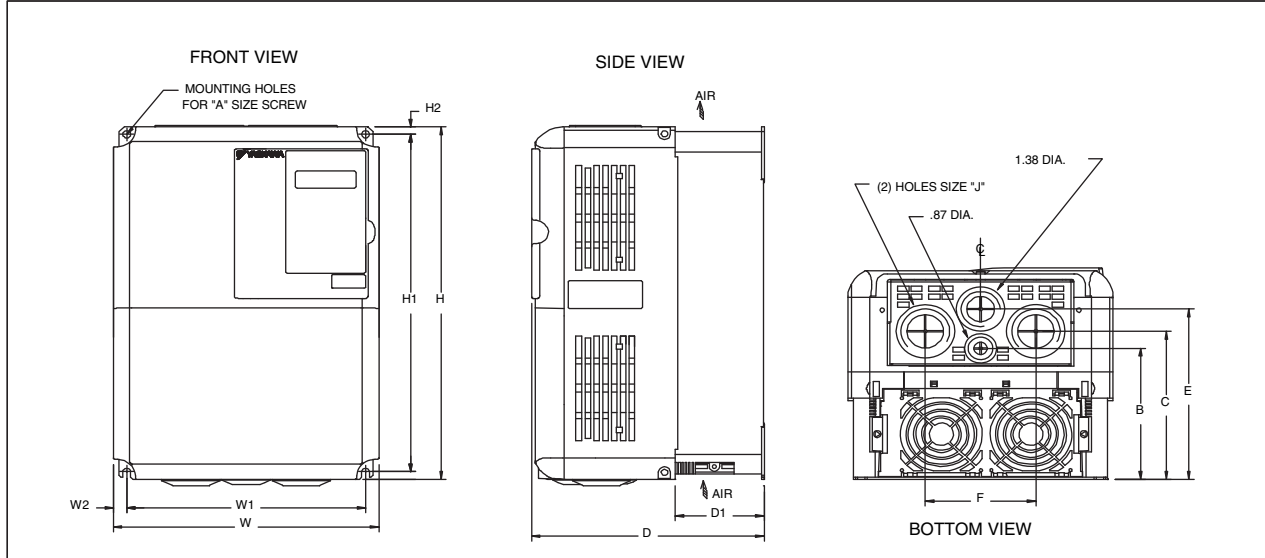
Rated Input Voltage	Drive Model Number CIMR-E7U	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Physical Dimensions (in.)			Weight (lbs.) ⁽²⁾	Standard Enclosure	Dimension Drawing Number ⁽³⁾	Heat Loss (watts) ⁽⁴⁾			
				H	W	D				Heatsink	Internal	Total	
208V	20P41	3.6	1/2 & 3/4	11.02	5.51	6.30	6.6	NEMA 1	S-5516	19	39	58	
	20P71	4.6	1							26	42	68	
	21P51	7.8	2							48	50	98	
	22P21	10.8	3							68	59	127	
	23P71	16.8	5	7.09	8.8	110	74	184					
	27P51	31.0	7.5 & 10			11.81	7.87	7.87	13.2	125	219	113	332
	20111	46.2	15	12.20	9.45	8.27	24.2	NEMA 1	S-5516	357	168	525	
	20151	59.4	20	13.78						416	182	598	
	20181	74.8	25	14.96						472	208	680	
	20221	88.0	30	21.06						583	252	835	
	20301	115	40	24.21	10.98	10.24	53	59	883	333	1216		
	20370	162	50	23.62	14.76	11.81	125	Protected Chassis	S-5518	1010	421	1431	
	20450	192	60							12.99	139	1228	499
	20550	215	75	28.54	17.72	13.78	189	191	1588	619	2207		
20750	312	100.0	34.84	22.64	14.96	330	238	1956	844	2800			
20900	360	125	33.46	19.69	14.17	238	238	2194	964	3158			
21100	415	150	34.84	22.64	14.96	330	238	2733	1234	3967			
240V	20P41	3.6	1/2 & 3/4	11.02	5.51	6.30	6.6	NEMA 1	S-5516	19	39	58	
	20P71	4.6	1							26	42	68	
	21P51	7.8	2							48	50	98	
	22P21	10.8	3							68	59	127	
	23P71	16.8	5	7.09	8.8	110	74	184					
	25P51	23.0	7.5			164	84	248					
	27P51	31.0	10	11.81	7.87	7.87	13.2	125	219	113	332		
	20111	46.2	15	12.20	9.45	8.27	24.2	NEMA 1	S-5516	357	168	525	
	20151	59.4	20	13.78						416	182	598	
	20181	74.8	25.0	14.96						472	208	680	
	20221	88.0	30	21.06						583	252	835	
	20301	115	40	24.21	10.98	10.24	53	59	883	333	1216		
	230V	20370	162	50 & 60	23.62	14.76	11.81	125	Protected Chassis	S-5518	1010	421	1431
		20450	192	75							12.99	139	1228
20750		312	100 & 125	28.54	17.72	13.78	191	191	1956	844	2800		
20900		360	150	33.46	19.69	14.17	238	238	2194	964	3158		
480V	40P41	1.8	1/2 & 3/4	11.02	5.51	6.30	6.6	NEMA 1	S-5516	14	39	53	
	40P71	2.1	1							17	41	58	
	41P51	3.7	2							36	48	84	
	42P21	5.3	3							59	56	115	
	43P71	7.6	5	7.09	8.8	80	68	148					
	45P51	12.5	7.5			127	81	208					
	47P51	17.0	10	11.81	7.87	7.87	13.2	NEMA 1	S-5516	193	114	307	
	49P01	21.0	15							232	158	390	
	40111	27.0	20							232	158	390	
	40151	34.0	25							296	169	465	
	40181	40.0	30	13.78	9.45	8.27	22	22	389	201	590		
	40241	52.0	40	21.06	10.98	10.24	53	NEMA 1	S-5516	691	297	988	
	40301	67.2	50							691	297	988	
	40371	77.0	60	25.00	12.95	11.22	88	NEMA 1	S-5517	801	332	1133	
	40451	96.0	75	28.15						901	386	1287	
	40551	125	100	28.15						1204	478	1682	
	40750	156	125	28.54						17.72	13.78	194	196
	40900	180	150	33.46	19.69	14.17	224	Protected Chassis	S-5518	1614	673	2287	
	41100	240	200							36.06	22.64	14.96	352
	41600	304	250	36.06	22.64	14.96	352	352	2636	1144	3780		
41850	414	300 & 350	51.38	27.95	16.34	572	Protected Chassis	S-5519	2791	1328	4119		
42200	515	400 & 450							3797	1712	5509		
43000	675	500	58.07	36.06	16.34	891	891	5838	2482	8320			

- (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 data represents the drive weight only, not shipping weight.
- (3) Please refer to Yaskawa's website at www.yaskawa.com for dimension drawings done to scale, including CAD format, and including layouts for panel mounting.
- (4) 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.



DIMENSIONS: E7 (NEMA 1) 208/240V (3.6-74.8 AMPS) 480V (1.8- 40.0 AMPS)

S - 5516



RATED INPUT	MODEL CIMR-E7U	RATED OUTPUT CURRENT (AMPS)	NOMINAL HP	DIMENSIONS IN INCHES														APPROX. WEIGHT (LBS.)
				MOUNTING		H	W	H2	W2	D	D1	A	B	C	E	F	J	
				H1	W1													
208V	20P41	3.6	1/2 3/4	10.47	4.96	11.02	5.51	.28	.28	6.30	1.54	#10	---	3.35	4.73	1.97	1.10	6.6
	20P71	4.6	1	10.47	4.96	11.02	5.51	.28	.28	6.30	1.54	#10	---	3.35	4.73	1.97	1.10	6.6
	21P51	7.8	2	10.47	4.96	11.02	5.51	.28	.28	6.30	1.54	#10	---	3.35	4.73	1.97	1.10	6.6
	22P21	10.8	3	10.47	4.96	11.02	5.51	.28	.28	6.30	1.54	#10	---	3.35	4.73	1.97	1.10	6.6
	23P71	16.8	5	10.47	4.96	11.02	5.51	.28	.28	7.09	2.32	#10	---	4.14	5.52	1.97	1.10	8.8
	27P51	31.0	7.5-10	11.22	7.32	11.81	7.87	.28	.28	7.87	2.58	1/4	4.63	5.11	6.21	3.07	1.38	13.2
	20111	46.2	15	11.22	7.32	12.20	7.87	.28	.28	7.87	2.58	1/4	4.63	5.11	6.21	3.07	1.38	15.4
	20151	59.4	20	13.19	8.50	13.78	9.45	.30	.47	8.27	3.07	1/4	5.12	5.79	6.65	3.94	1.73	24.2
20181	74.8	25	13.19	8.50	14.96	9.45	.30	.47	8.27	3.07	1/4	5.12	5.79	6.65	3.94	1.73	24.2	
240V	20P41	3.6	1/2 3/4	10.47	4.96	11.02	5.51	.28	.28	6.30	1.54	#10	---	3.35	4.73	1.97	1.10	6.6
	20P71	4.6	1	10.47	4.96	11.02	5.51	.28	.28	6.30	1.54	#10	---	3.35	4.73	1.97	1.10	6.6
	21P51	7.8	2	10.47	4.96	11.02	5.51	.28	.28	6.30	1.54	#10	---	3.35	4.73	1.97	1.10	6.6
	22P21	10.8	3	10.47	4.96	11.02	5.51	.28	.28	6.30	1.54	#10	---	3.35	4.73	1.97	1.10	6.6
	23P71	16.8	5	10.47	4.96	11.02	5.51	.28	.28	7.09	2.32	#10	---	4.14	5.52	1.97	1.10	8.8
	25P51	23.0	7.5	10.47	4.96	11.02	5.51	.28	.28	7.09	2.32	#10	---	4.14	5.52	1.97	1.10	8.8
	27P51	31.0	10	11.22	7.32	11.81	7.87	.28	.28	7.87	2.58	1/4	4.63	5.11	6.21	3.07	1.38	13.2
	20111	46.2	15	11.22	7.32	12.20	7.87	.28	.28	7.87	2.58	1/4	4.63	5.11	6.21	3.07	1.38	15.4
20151	59.4	20	13.19	8.50	13.78	9.45	.30	.47	8.27	3.07	1/4	5.12	5.79	6.65	3.94	1.73	24.2	
20181	74.8	25	13.19	8.50	14.96	9.45	.30	.47	8.27	3.07	1/4	5.12	5.79	6.65	3.94	1.73	24.2	
480V	40P41	1.8	1/2 3/4	10.47	4.96	11.02	5.51	.28	.28	6.30	1.54	#10	---	3.35	4.73	1.97	1.10	6.6
	40P71	2.1	1	10.47	4.96	11.02	5.51	.28	.28	6.30	1.54	#10	---	3.35	4.73	1.97	1.10	6.6
	41P51	3.7	2	10.47	4.96	11.02	5.51	.28	.28	6.30	1.54	#10	---	3.35	4.73	1.97	1.10	6.6
	42P21	5.3	3	10.47	4.96	11.02	5.51	.28	.28	7.09	2.32	#10	---	4.14	5.52	1.97	1.10	8.8
	43P71	7.6	5	10.47	4.96	11.02	5.51	.28	.28	7.09	2.32	#10	---	4.14	5.52	1.97	1.10	8.8
	45P51	12.5	7.5	10.47	4.96	11.02	5.51	.28	.28	7.09	2.32	#10	---	4.14	5.52	1.97	1.10	8.8
	47P51	17.0	10	11.22	7.32	11.81	7.87	.28	.28	7.87	2.58	1/4	4.63	5.11	6.21	3.07	1.38	13.2
	49P01	21.0	15	11.22	7.32	11.81	7.87	.28	.28	7.87	2.58	1/4	4.63	5.11	6.21	3.07	1.38	13.2
	40111	27.0	20	11.22	7.32	11.81	7.87	.28	.28	7.87	2.58	1/4	4.63	5.11	6.21	3.07	1.38	13.2
	40151	34.0	25	13.19	8.50	13.78	9.45	.30	.47	8.27	3.07	1/4	5.12	5.79	6.65	3.94	1.73	22
40181	40.0	30	13.19	8.50	13.78	9.45	.30	.47	8.27	3.07	1/4	5.12	5.79	6.65	3.94	1.73	22	

S - 5516

FOR REFERENCE ONLY UNLESS PROPERLY ENDORSED.

IN ORDER TO ACHIEVE ADEQUATE COOLING THE DRIVE MUST BE POSITIONED TO ALLOW A MINIMUM OF FREE AIR SPACE OF 1.2 INCHES ON SIDES AND 5 INCHES TOP AND BOTTOM



DR BY RIP 9.29.04
APPVL. TA 9.29.04

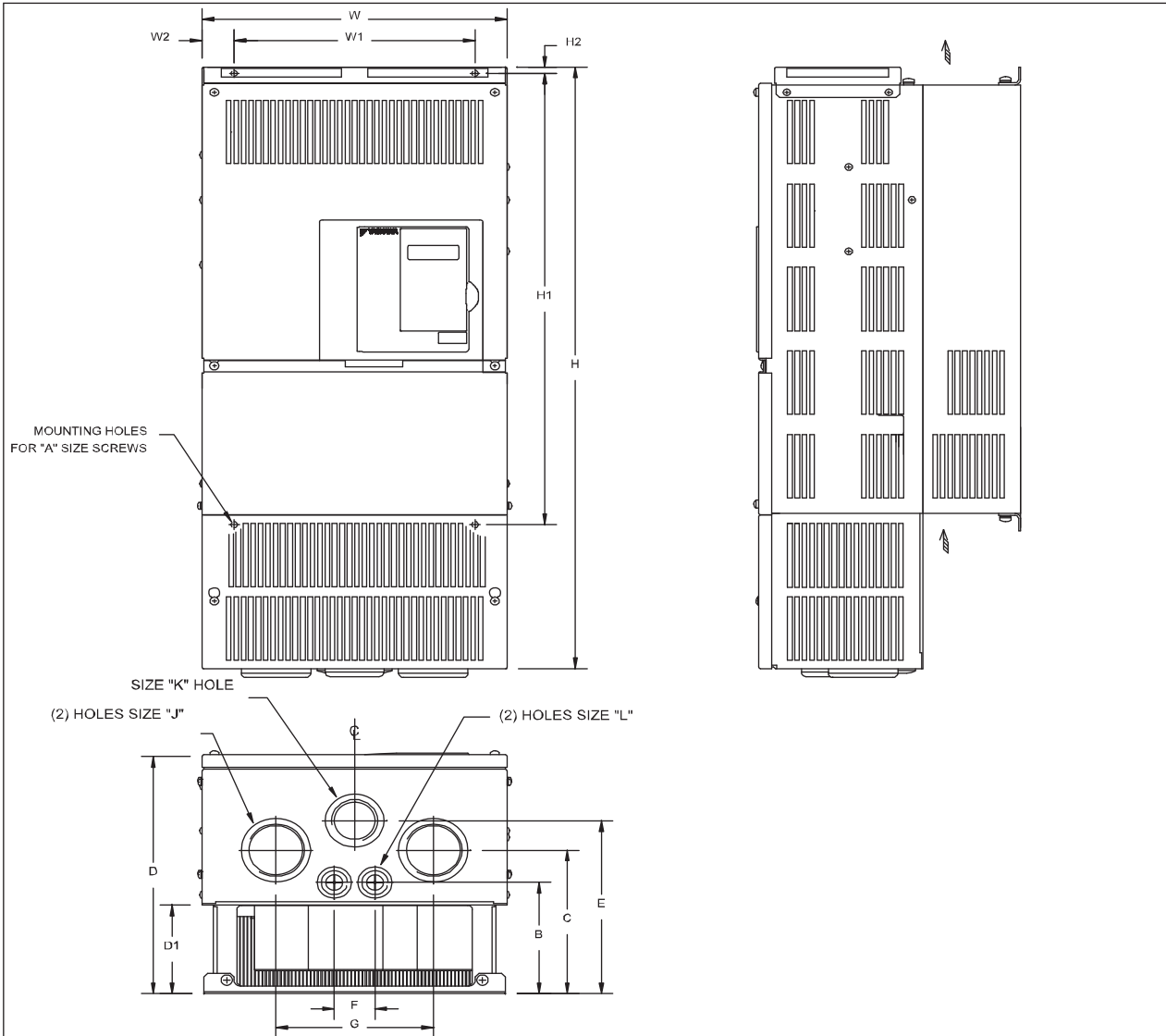


Dimension Drawing

DIMENSIONS: E7 (NEMA 1)

208/240V (88.0-115 AMPS) 480V (52.0-125 AMPS)

S - 5517



S - 5517

RATED INPUT	MODEL CIMR-E7U	RATED OUTPUT CURRENT (AMPS)	NOM. HP	DIMENSIONS IN INCHES																	APPROX. WEIGHT (LBS.)
				MOUNTING		H	W	H2	W2	D	D1	A	B	C	E	F	G	J	K	L	
				H1	W1																
208V	20221	88.0	30	15.16	7.68	21.06	10.00	.30	1.16	10.24	3.94	1/4	4.98	6.50	7.87	1.73	5.91	2.44	1.97	1.10	53
	20301	115	40	17.13	8.66	24.21	10.98	.30	1.16	10.24	3.94	1/4	4.98	6.50	7.87	1.73	5.91	2.44	1.97	1.10	59
240V	20221	88.0	30	15.16	7.68	21.06	10.00	.30	1.16	10.24	3.94	1/4	4.98	6.50	7.87	1.73	5.91	2.44	1.97	1.10	53
	20301	115	40	17.13	8.66	24.21	10.98	.30	1.16	10.24	3.94	1/4	4.98	6.50	7.87	1.73	5.91	2.44	1.97	1.10	59
480V	40241	52.0	40	17.13	8.66	21.06	10.98	.30	1.16	10.24	3.94	1/4	4.98	6.50	7.87	1.73	5.91	1.97	1.97	1.10	53
	40301	67.2	50	17.13	8.66	21.06	10.98	.30	1.16	10.24	3.94	1/4	4.98	6.50	7.87	1.73	5.91	1.97	1.97	1.10	53
	40371	77.0	60	21.06	10.24	25.00	12.95	.30	1.36	11.22	4.13	1/4	5.18	6.69	8.07	1.73	6.69	1.97	1.97	1.10	88
	40451	96.0	75	21.06	10.24	28.15	12.95	.30	1.36	11.22	4.13	1/4	5.18	6.69	8.07	1.73	6.69	2.44	1.97	1.10	88
	40551	125	100	21.06	10.24	28.15	12.95	.30	1.36	11.22	4.13	1/4	5.18	6.69	8.07	1.73	6.69	2.44	1.97	1.10	88

FOR REFERENCE ONLY UNLESS PROPERLY ENDORSED.

IN ORDER TO ACHIEVE ADEQUATE COOLING THE DRIVE MUST BE POSITIONED TO ALLOW A MINIMUM OF FREE AIR SPACE OF 1.2 INCHES ON SIDES AND 5 INCHES TOP AND BOTTOM



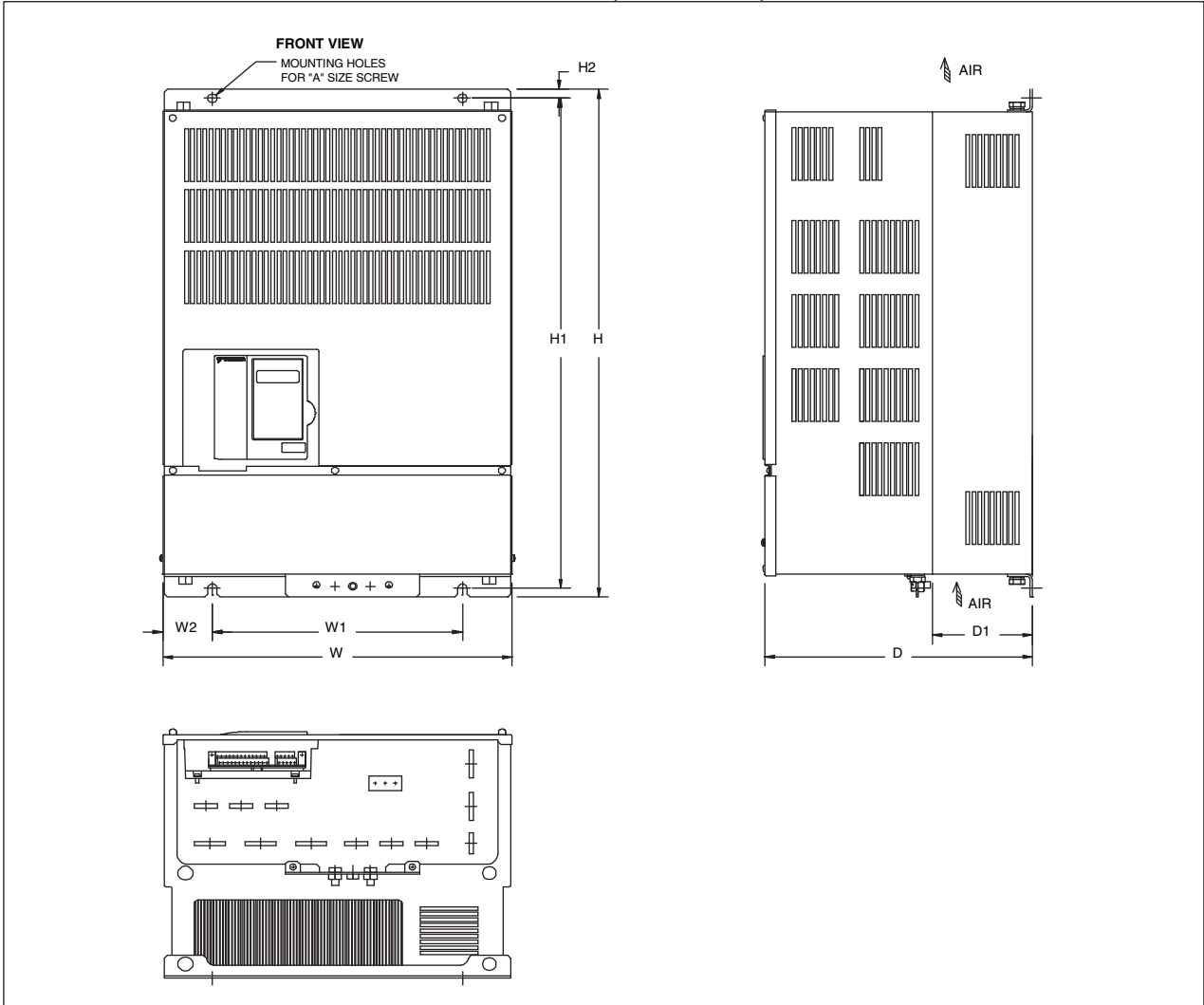
DR BY RIP 10.04
APPVL. TA 10.04



DIMENSIONS: E7 (PROTECTED CHASSIS)

**208-230V (162-415 AMPS)
480V (156-304 AMPS)**

S - 5518



S - 5518

RATED INPUT	MODEL CIMR-E7U	RATED OUTPUT CURRENT (AMPS)	NOM. HP	DIMENSIONS IN INCHES										APPROX. WEIGHT (LBS.)
				MOUNTING		H	W	H2	W2	D	D1	A		
				H1	W1									
208V	20370	162	50	22.64	9.84	23.62	14.76	.49	2.46	11.81	3.94	3/8	125	
	20450	192	60	22.64	9.84	23.62	14.76	.49	2.46	12.99	5.12	3/8	139	
	20550	215	75	27.56	12.80	28.54	17.72	.49	2.46	13.78	5.12	3/8	189	
	20750	312	100	27.56	12.80	28.54	17.72	.49	2.46	13.78	5.12	3/8	191	
	20900	360	125	32.28	14.57	33.46	19.69	.59	2.56	14.17	5.12	3/8	238	
230V	21100	415	150	33.66	17.52	34.84	22.64	.59	2.56	14.96	5.51	3/8	330	
	20370	162	50-60	22.64	9.84	23.62	14.76	.49	2.46	11.81	3.94	3/8	125	
	20450	192	75	22.64	9.84	23.62	14.76	.49	2.46	12.99	5.12	3/8	139	
	20750	312	100-125	27.56	12.80	28.54	17.72	.49	2.46	13.78	5.12	3/8	191	
	20900	360	150	32.28	14.57	33.46	19.69	.59	2.56	14.17	5.12	3/8	238	
480V	40750	156	125	27.56	12.80	28.54	17.72	.49	2.46	13.78	5.12	3/8	194	
	40900	180	150	27.56	12.80	28.54	17.72	.49	2.46	13.78	5.12	3/8	196	
	41100	240	200	32.28	14.57	33.46	19.69	.59	2.56	14.17	5.12	3/8	224	
	41600	304	250	33.66	17.52	36.06	22.64	.59	2.56	14.96	5.51	3/8	352	

FOR REFERENCE ONLY UNLESS PROPERLY ENDORSED.

IN ORDER TO ACHIEVE ADEQUATE COOLING THE DRIVE MUST BE POSITIONED TO ALLOW A MINIMUM OF FREE AIR SPACE OF 1.2 INCHES ON SIDES AND 5 INCHES TOP AND BOTTOM



DR BY RIP 9.29.04
APPVL. TA 9.29.04

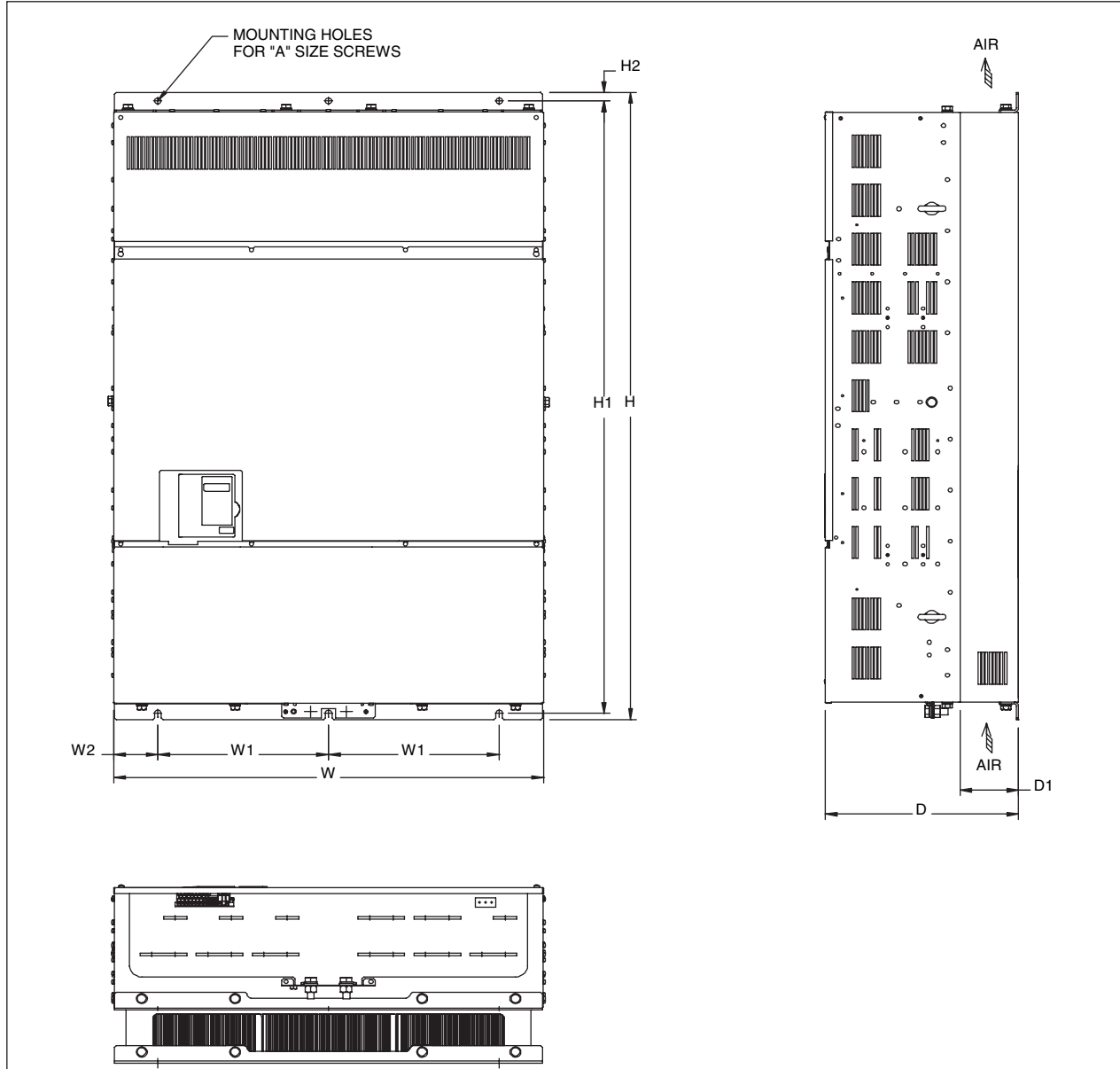
E7

Dimension Drawing

DIMENSIONS: E7 (PROTECTED CHASSIS)

480V (414-675 AMPS)

S - 5519



S - 5519

RATED INPUT	MODEL CIMR-E7U	RATED OUTPUT CURRENT (AMPS)	NOM. HP	DIMENSIONS IN INCHES										APPROX. WEIGHT (LBS.)
				MOUNTING		H	W	H2	W2	D	D1	A		
				H1	W1									
480V	41850	414	300-350	50.00	10.63	51.38	27.95	.79	3.35	16.34	4.94	3/8	572	
	42200	515	400-450	50.00	10.63	51.38	27.95	.79	3.35	16.34	4.94	3/8	616	
	43000	675	500	56.70	14.37	58.07	36.06	.79	3.66	16.34	4.94	3/8	891	

FOR REFERENCE ONLY UNLESS PROPERLY ENDORSED.

IN ORDER TO ACHIEVE ADEQUATE COOLING THE DRIVE MUST BE POSITIONED TO ALLOW A MINIMUM OF FREE AIR OF 1.2 INCHES ON SIDES AND 5 INCHES TOP AND BOTTOM



DR BY RIP 8-02
APPVL. TBS 9.5.02

Description

1/2-500HP E7/Configured NEMA 1/12 FVFF



The E7/Configured package provides an E7 in a NEMA 1 or NEMA 12 FVFF enclosure, with space for several commonly used options, such as reactors, RFI filters, circuit breakers, etc. The E7 and E7/Configured have been designed for flexibility in providing the features and options commonly specified by facility designers.

The E7 Drive is a variable torque AC drive, designed specifically for HVAC applications in building automation. A new benchmark for size, cost, performance, benefits, and quality, the E7 includes numerous built-in features such as Network Communications, H/O/A, PI control, and energy-savings functions.

The E7 has embedded communications for the popular building automation protocols, Johnson Controls Metasys N2 and Siemens APOGEE FLN, as well as Modbus. An optional LonWorks, EtherNet/IP or BACnet interface card is also available.

Performance Features

- VT Ratings: 1/2-150 HP, 208 VAC
1/2-150 HP, 230/240 VAC
1/2- 500 HP, 480 VAC
- Overload capacity: 110% for 60 sec. (150% peak)
- Starting torque: 100% at 3 Hz
- DC injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Motor preheat function
- Adjustable accel/decel: 0.1 to 6000 sec.
- Controlled speed range: 40:1
- Critical frequency rejection: 3 selectable, adjustable bands
- Torque limiting: 30-180%
- Energy Saving control
- Torque boost: full range, auto
- Power loss ride-thru: 2 sec.
- Inertia ride-thru
- Auto restart after power loss or resettable fault, selectable, programmable
- Feedback signal loss detection
- Serial communications loss detection
- "Up/Down" floating point control capability
- Stationary motor auto-tuning
- Customizable monitor display
- Sleep function
- Run permissive input
- Ramp-to-stop or coast-to-stop selection
- Runtime changes in control and display
- Project-specific parameter reinitialization

Service Conditions

- Ambient Temperature: -10°C to 40°C (14°F to 104°F) NEMA 1
- Humidity: 95% RH, non-condensing
- Altitude: 3300 ft; higher by derate
- Input voltage: +10%/-15%
- Input frequency: 50/60 Hz ± 5%
- 3-phase, 3-wire, phase sequence insensitive

Protective Features

- Current limited stall prevention
- Heat sink over-temperature, speed fold-back
- Cooling fan operating hours recorded
- Bi-directional start into rotating motor at synchronized speed
- DC bus charge indicator
- Current limiting DC bus fuse
- Optically-Isolated controls
- Short circuit protection: Phase-phase and phase-neutral
- Ground fault protection
- Electronic motor overload: UL
- Current and torque limit
- Fault display: last 10 faults
- Fault circuit: OC, OV, OT
- Over torque and under torque protection
- Program security code
- "Hunting" prevention logic
- Reverse prohibit selectability

Configured Options

- NEMA 12 FVFF enclosure
- Circuit breaker / Motor circuit protector
- RFI/EMI filter
- Input fuses
- Input impedance reactor
- Output (load) reactor
- Engraved nameplates
- Speed potentiometer
- Pressure/electrical transducer
- Analog outputs: 2 programmable, 4-20 mA
- 200VA Control Transformer (fused)
- Communication: LonWorks, EtherNet/IP and BACnet
- DriveWizard™ upload/download and monitoring/graphing software

Design Features

- 32-bit microprocessor logic
- Flash upgradeable firmware
- Non-volatile memory, program retention
- Surface-mount devices
- Displacement power factor: 0.98
- Output frequency: 0.1 to 120 Hz
- Frequency resolution: 0.06 Hz
- Frequency regulation: 0.1%
- Control Terminal Board: Quick disconnect, removable
- Carrier frequency: selectable to 15 kHz
- 3% DC bus reactor: 30-150 HP, 208 VAC; 30-150 HP, 240 VAC; 40-500 HP, 480 VAC; optional on lower ratings
- Keypad Operator: Hand/Off/Auto, built-in copy feature, 7 languages
- LCD display: 5 lines, 16 characters each
- 24 VDC control logic
- Transmitter/Option power supply
- Output contacts: One form C and two programmable form A
- Input/output terminal status
- Input terminals: 5 programmable multi-function input terminals
- Fault input: Programmable
- Diagnostic fault indication in selected language
- Timer function: Elapsed time, Delay on start, Delay on stop
- RS-422/485 port: Embedded Metasys N2, APOGEE FLN, and Modbus
- Volts/hertz ratio: Preset and programmable V/Hz patterns
- Multi-speed settings: 5 available
- Remote speed command: 0-10 VDC or 4-20 mA, direct or reverse-acting
- Setpoint (PI) control with inverse or square root input, differential control via two feedback capability
- Feedback signal: low pass filter
- Speed command: bias and gain
- Analog outputs: Programmable, two, 0-10 VDC
- Meter Functions: Volt, amp, kilowatt, elapsed run time, speed command
- Output Current Transformers, qty 3
- NEMA 1 or NEMA 12 FVFF enclosure
- UL, cUL listed; CE marked; IEC 146
- MTBF: exceeds 28 years



Description
1/2-500HP
E7/Configured
NEMA 1/12 FVFF

Model Number Configuration & Pricing:

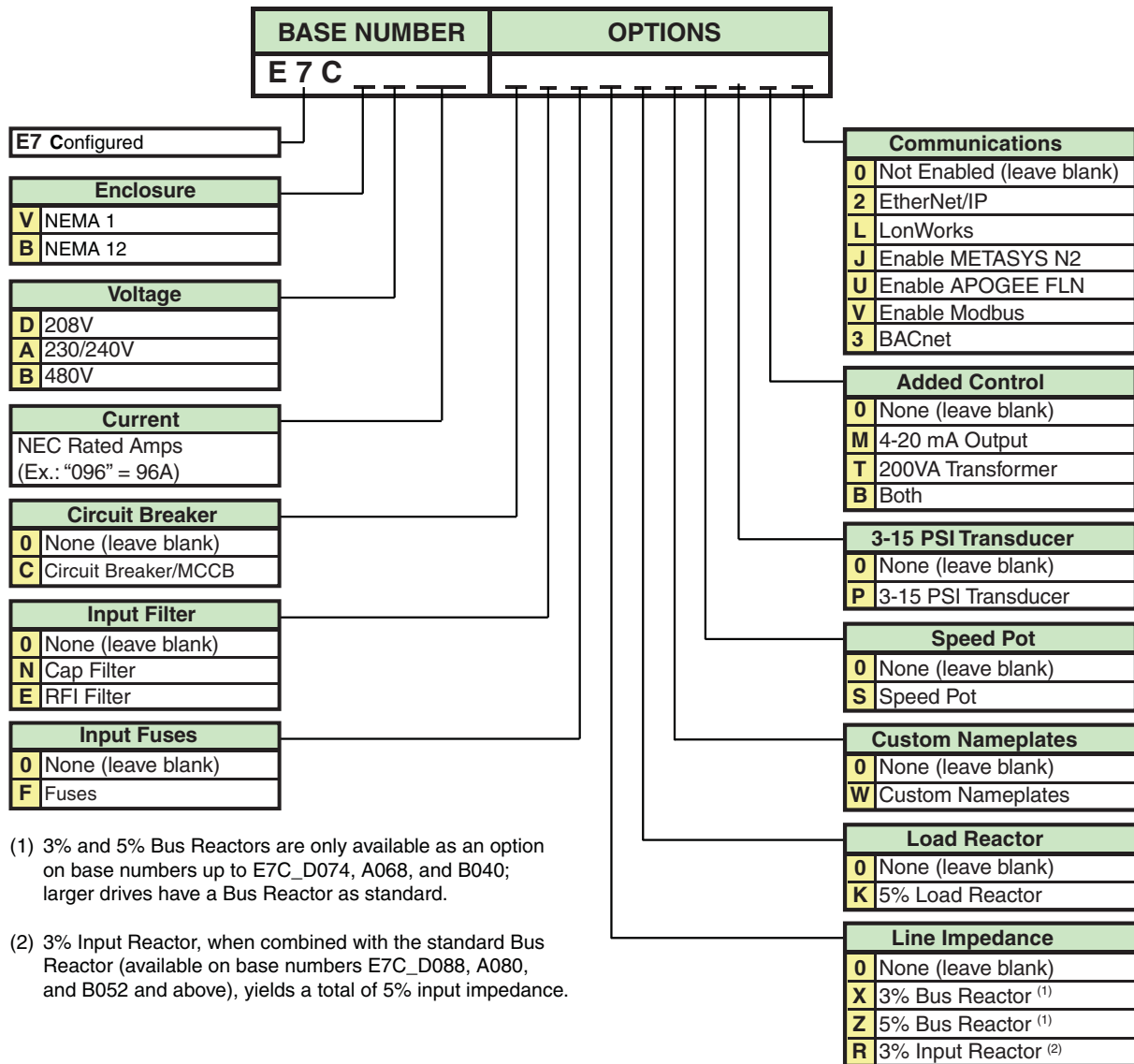
Step 1. First complete the Base Number for the required enclosure type, voltage and current rating.

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

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: E7 NEMA 1 Configured package (**E7CV**) with a 96 Amp, 480V drive (**B096**), with a 3% input reactor (**R**), door-mounted speed pot (**S**), and LonWorks communications capability (**L**), would be **E7CVB096RSL**.

E7CVB096RSL



Configured Option Descriptions:

- (V, B) Enclosure:** The drive and options are provided in either a NEMA Type 1 (V) ventilated or NEMA 12 FVFF (force ventilated fan filter) (B) enclosure, large enough to accommodate any or all of the package options. Enclosures for Base Numbers up to, and including, D114 (40HP, 208V), A104 (40HP, 240V), and B124 (100HP, 480V) are wall-mounted; larger drives are in floor-mount enclosures.
- (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.
- (N, E) Input Filter:** The standard configuration does not include a filter. The cap filter, option (N), is a delta-wye capacitive network, while the RFI filter (E) provides noise attenuation to help meet CE requirements. This option requires the addition of the add-on box - see Dimensions and Data.
- (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.
- (X, Z, R) Line Impedance:** Drives above Base Numbers D074 (25HP, 208V), A068 (25HP, 240V) and B040 (30HP, 480V) include a 3% DC bus reactor in the standard package and do not provide any additional impedance. Option (X), 3% impedance, and option (Z), 5% impedance, are not available for ratings larger than these. To achieve a 5% total input impedance, select option (R) - this 3% input reactor is available only for the HP ratings greater than the HP's listed above, and combines with the drive's standard DC bus reactor. If this option is combined with a drive that includes a bus reactor, the add-on box is required - see Dimensions and Data.
- (K) Load Reactor:** No form of output impedance is normally required. A 5% load reactor, option (K), is available if additional output impedance is desired (usually for long lead-lengths or noise reduction). This option may require the add-on box for wall-mount enclosures - see Dimensions and Data.
- (W) Custom Nameplates:** Custom engraved nameplates with white lettering on black lamicaid are available with option (W), for special tagging purposes (Example: "AHU #1"). Note that this option requires the text to be specified by the customer. Leave this field blank if no special nameplates are required.
- (S) Speed Pot:** The drive's digital operator is always brought out to the front of the panel, so it is available for speed control - this is the standard configuration. A door-mounted 2.5K ohm speed potentiometer is available for manual speed control with option (S). This also includes a 2.5K ohm trim pot and is suitable for NEMA 1 and NEMA 12 installations.
- (P) 3-15 PSI Transducer:** No transducer is provided with the standard configuration. To add an optional transducer that accepts a 3-15 PSI pneumatic signal and converts it to a 4-20mA signal that is sent to the drive, specify option (P).
- (M, T, B) Added Control:** The standard Configured package provides two programmable 0-10VDC outputs. To convert these outputs to 4-20mA output signals, specify option (M). Option (T) adds a 200VA control transformer, to provide more control circuit capacity. Option (B) can be selected if both options are desired.
- (2, L, J, U, 3, V) Communications:** All configurations provide the hardware and software required for Metasys N2, Siemens Apogee, and Modbus network communications, but these protocols are not enabled in the standard configuration. Options (J), (U), and (V) provide the programming and jumpers necessary to enable these protocols, at no additional cost. Lonworks option (L), BACnet option (3) and EtherNet/IP option (2) require the addition of an optional board.



Configured Drives and Options

NEMA 1

E7 Configured Drives - 1/2-500HP, 208-230/240 or 480V, 3-phase input, NEMA 1 enclosure, with factory-installed and wired options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	NEMA 1 Configured		Circuit Breaker	Input Filter		Input Fuses	Line Impedance			
					C=MCP	N=Cap	E=RFI	F=Fuses	X=3% Bus Reactor Z=5% Bus Reactor R=3% Input Reactor			
			E7CV	Base	C	N	E ⁽²⁾	F	X	Z	R ⁽²⁾	
208V	2.4	1/2	D002									N/A
	3.5	3/4	D003									
	4.6	1	D004									
	7.5	2	D007									
	10.6	3	D010									
	16.7	5	D016									
	24.2	7.5	D024									
	30.8	10	D030									
	46.2	15	D046									
	59.4	20	D059									
	74.8	25	D074									
	88	30	D088									
	114	40	D114									
	143	50	D143									
	169	60	D169									
211	75	D211										
273	100	D273										
343	125	D343										
396	150	D396										
240V	2.2	1/2	A002									N/A
	3.2	3/4	A003									
	4.0	1	A004									
	6.8	2	A006									
	9.6	3	A009									
	15.2	5	A015									
	22	7.5	A022									
	28	10	A028									
	42	15	A042									
	54	20	A054									
68	25	A068										
80	30	A080										
104	40	A104										
230V	130	50	A130									3% Bus Reactor is included as standard select option (0)
	154	60	A154									
	192	75	A192									
	248	100	A248									
	312	125	A312									
360	150	A360										

(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 price includes the add-on box, when required. If more than one of the following: RFI Filter, 3% Input Reactor, and 5% Load Reactor is selected, DEDUCT from all but one of these options



E7 Configured Drives (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nom. HP ⁽¹⁾	Load Reactor	Custom Name-plates	Speed Control	Trans-ducer	Added Control			Communications				Uses Drive Model Number CIMR-E7U		
			K=5%	W=NP	S=Pot	P=3-15 PSI	M=4-20mA T=200VA B=Both			2=EtherNet/IP, 3=BACnet L=LonWorks J=N2 U=APOGEE V=Modbus						
			K ⁽²⁾	W	S	P	M	T	B	2	3	L	J, U, V ⁽³⁾			
208V	2.4	1/2													22P21	
	3.5	3/4													22P21	
	4.6	1													22P21	
	7.5	2													22P21	
	10.6	3													22P21	
	16.7	5													23P71	
	24.2	7.5													27P51	
	30.8	10													27P51	
	46.2	15													20111	
	59.4	20													20151	
	74.8	25													20181	
	88	30													20221	
	114	40													20301	
	143	50													20370	
240V	169	60													20450	
	211	75													20550	
	273	100													20750	
	343	125													20900	
	396	150													21100	
	240V	2.2	1/2													22P21
		3.2	3/4													22P21
		4.0	1													22P21
		6.8	2													22P21
		9.6	3													22P21
		15.2	5													23P71
		22	7.5													25P51
		28	10													27P51
		42	15													20111
54		20													20151	
230V	68	25													20181	
	80	30													20221	
	104	40													20301	
	130	50													20370	
	154	60													20370	
	192	75													20450	
230V	248	100													20750	
	312	125													20750	
230V	360	150													20900	

- (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 price includes the add-on box, when required. If more than one of the following: RFI Filter, 3% Input Reactor, and 5% Load Reactor is selected, DEDUCT from all but one of these options
- (3) Included in the Base Price



Configured Drives and Options

NEMA 1

E7 Configured Drives (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	NEMA 1 Configured		Circuit Breaker	Input Filter		Input Fuses	Line Impedance			
					C=MCP	N=Cap E=RFI		F=Fuses	X=3% Bus Reactor Z=5% Bus Reactor R=3% Input Reactor			
			E7CV	Base	C	N	E ⁽²⁾	F	X	Z	R ⁽²⁾	
480V	1.6	1/2 3/4	B001									N/A
	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									3% Bus Reactor is included as standard select option (0)
240	200	B240										
302	250	B302										
380	300	B380										
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 price includes the add-on box, when required. If more than one of the following: RFI Filter, 3% Input Reactor, and 5% Load Reactor is selected, DEDUCT from all but one of these options



E7 Configured Drives (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nom. HP ⁽¹⁾	Load Reactor	Custom Name-plates	Speed Control	Transducer	Added Control			Communications				Uses Drive Model Number CIMR-E7U		
			K=5%	W=NP	S=Pot	0=None P=3-15 PSI	0=None M=4-20mA T=200VA B=Both			2=EtherNet/IP, 3=BACnet L=LonWorks J=N2 U=APOGEE V=Modbus						
			K ⁽²⁾	W	S	P	M	T	B	2	3	L	J, U, V ⁽³⁾			
480V	1.6	1/2 3/4														42P21
	2.1	1														42P21
	3.4	2														42P21
	4.8	3														42P21
	7.6	5														43P71
	11	7.5														45P51
	14	10														47P51
	21	15														40111
	27	20														40111
	34	25														40151
	40	30														40181
	52	40														40301
	65	50														40301
	77	60														40371
	96	75														40451
	124	100														40551
	156	125														40750
	180	150														40900
240	200														41100	
302	250														41600	
380	300														41850	
414	350														41850	
477	400														42200	
515	450														42200	
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) This price includes the add-on box, when required. If more than one of the following: RFI Filter, 3% Input Reactor, and 5% Load Reactor is selected, DEDUCT from all but one of these options
- (3) Included in the Base Price



Configured Drives and Options

NEMA 12 FVFF

E7 Configured Drives - 1/2-500HP, 208-230/240 or 480V, 3-phase input, NEMA 12 enclosure, with factory-installed and wired options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	NEMA 12 Configured		Circuit Breaker	Input Filter		Input Fuses	Line Impedance		
					C=MCP	N=Cap E=RFI	F=Fuses	X=3% Bus Reactor Z=5% Bus Reactor R=3% Input Reactor			
			E7CB	Base	C	N	E ⁽²⁾	F	X	Z	R ⁽²⁾
208V	2.4	1/2	D002								N/A
	3.5	3/4	D003								
	4.6	1	D004								
	7.5	2	D007								
	10.6	3	D010								
	16.7	5	D016								
	24.2	7.5	D024								
	30.8	10	D030								
	46.2	15	D046								
	59.4	20	D059								
	74.8	25	D074								
	88	30	D088								
	114	40	D114								
	143	50	D143								
169	60	D169									
211	75	D211									
273	100	D273									
343	125	D343									
396	150	D396									
240V	2.2	1/2	A002								N/A
	3.2	3/4	A003								
	4.0	1	A004								
	6.8	2	A006								
	9.6	3	A009								
	15.2	5	A015								
	22	7.5	A022								
	28	10	A028								
	42	15	A042								
	54	20	A054								
68	25	A068									
80	30	A080									
104	40	A104									
230V	130	50	A130								3% Bus Reactor is included as standard select option (0)
	154	60	A154								
	192	75	A192								
	248	100	A248								
	312	125	A312								
360	150	A360									

- (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 price includes the add-on box, when required. If more than one of the following: RFI Filter, 3% Input Reactor, and 5% Load Reactor is selected, DEDUCT from all but one of these options



E7 Configured Drives (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nom. HP ⁽¹⁾	Load Reactor	Custom Name-plates	Speed Control	Transducer	Added Control			Communications				Uses Drive Model Number CIMR-E7U	
			K=5%	W=NP	S=Pot	P=3-15 PSI	M=4-20mA T=200VA B=Both			2=EtherNet/IP, 3=BACnet L=LonWorks J=N2 U=APOGEE V=Modbus					
			K ⁽²⁾	W	S	P	M	T	B	2	3	L	J, U, V ⁽³⁾		
208V	2.4	1/2													22P21
	3.5	3/4													22P21
	4.6	1													22P21
	7.5	2													22P21
	10.6	3													22P21
	16.7	5													23P71
	24.2	7.5													27P51
	30.8	10													27P51
	46.2	15													20111
	59.4	20													20151
	74.8	25													20181
	88	30													20221
	114	40													20301
	143	50													20370
169	60													20450	
211	75													20550	
273	100													20750	
343	125													20900	
396	150													21100	
240V	2.2	1/2													22P21
	3.2	3/4													22P21
	4.0	1													22P21
	6.8	2													22P21
	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													20301	
230V	130	50													20370
	154	60													20370
	192	75													20450
	248	100													20750
	312	125													20750
360	150													20900	

- (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 price includes the add-on box, when required. If more than one of the following: RFI Filter, 3% Input Reactor, and 5% Load Reactor is selected, DEDUCT from all but one of these options
- (3) Included in the Base Price



Configured Drives and Options

NEMA 12 FVFF

E7 Configured Drives (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	NEMA 12 Configured		Circuit Breaker	Input Filter		Input Fuses	Line Impedance			
					C=MCP	N=Cap E=RFI		F=Fuses	X=3% Bus Reactor Z=5% Bus Reactor R=3% Input Reactor			
			E7CB	Base	C	N	E ⁽²⁾	F	X	Z	R ⁽²⁾	
480V	1.6	1/2 3/4	B001									N/A
	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									3% Bus Reactor is included as standard select option (0)
240	200	B240										
302	250	B302										
380	300	B380										
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 price includes the add-on box, when required. If more than one of the following: RFI Filter, 3% Input Reactor, and 5% Load Reactor is selected, DEDUCT from all but one of these options



E7 Configured Drives (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nom. HP ⁽¹⁾	Load Reactor	Custom Name-plates	Speed Control	Transducer	Added Control			Communications				Uses Drive Model Number CIMR-E7U		
			K=5%	W=NP	S=Pot	0=None P=3-15 PSI	0=None M=4-20mA T=200VA B=Both			2=EtherNet/IP, 3=BACnet L=LonWorks J=N2 U=APOGEE V=Modbus						
			K ⁽²⁾	W	S	P	M	T	B	2	3	L	J, U, V ⁽³⁾			
480V	1.6	1/2 3/4														42P21
	2.1	1														42P21
	3.4	2														42P21
	4.8	3														42P21
	7.6	5														43P71
	11	7.5														45P51
	14	10														47P51
	21	15														49P01
	27	20														40111
	34	25														40151
	40	30														40181
	52	40														40241
	65	50														40301
	77	60														40371
	96	75														40451
	124	100														40551
	156	125														40750
	180	150														40900
240	200														41100	
302	250														41600	
380	300														41850	
414	350														41850	
477	400														42200	
515	450														42200	
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) This price includes the add-on box, when required. If more than one of the following: RFI Filter, 3% Input Reactor, and 5% Load Reactor is selected, DEDUCT from all but one of these options
- (3) Included in the Base Price



Dimensions and Data

NEMA 1/12 FVFF

Rated Input Voltage	Configured E7CV or E7CB	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Physical Dimensions (in.)			Weight (lbs.) ⁽²⁾	Dimension Drawing Number ⁽⁵⁾	Drawing Number (w/ Add-on Box) ^{(3), (5)}
				H	W	D ⁽⁴⁾			
208V	D002	2.4	1/2	29.48	19.06	13.66	115	DD.AFD.087.01	DD.AFD.087.01.AO
	D003	3.5	3/4						
	D004	4.6	1						
	D007	7.5	2						
	D010	10.6	3						
	D016	16.7	5						
	D024	24.2	7.5	40.48	25.63	14.66	208	DD.AFD.088.01	DD.AFD.088.01.AO
	D030	30.8	10						
	D046	46.2	15						
	D059	59.4	20						
	D074	74.8	25						
	D088	88.0	30						
	D114	114	40						
	D143	143	50						
D169	169	60							
D211	211	75							
D273	273	100							
D343	343	125							
D396	396	150							
240V	A002	2.2	1/2	29.48	19.06	13.66	115	DD.AFD.087.01	DD.AFD.087.01.AO
	A003	3.2	3/4						
	A004	4.0	1						
	A006	6.8	2						
	A009	9.6	3						
	A015	15.2	5						
	A022	22.0	7.5	40.48	25.63	14.66	208	DD.AFD.088.01	DD.AFD.088.01.AO
	A028	28.0	10						
	A042	42.0	15						
	A054	54.0	20						
A068	68.0	25	84.00	37.75	26.00	221	DD.AFD.091.01	N/A	
A080	80.0	30							
A104	104	40							
A130	130	50							
230V	A154	154	60	84.00	37.75	26.00	847	DD.AFD.091.01	N/A
	A192	192	75						
	A248	248	100						
	A312	312	125						
	A360	360	150						

- (1) Horsepower rating is based on standard NEMA B 4-pole motor design as represented in NEC table 430.150 Full-Load Current, Three-Phase Alternating Current Motors
- (2) Data represents the total approx. weight of the drive with all possible standard options, not shipping weight.
- (3) Add-on box (required with specified options - see options description) adds up to 15" to 'H' dimension and 91 lbs. Max. to total drive weight.
- (4) Add 2.37" for circuit breaker handle to depth
- (5) Operator Drawing Number is DO.E7C.01 (See page 33)

Dimensions and Data

NEMA 1/12 FVFF



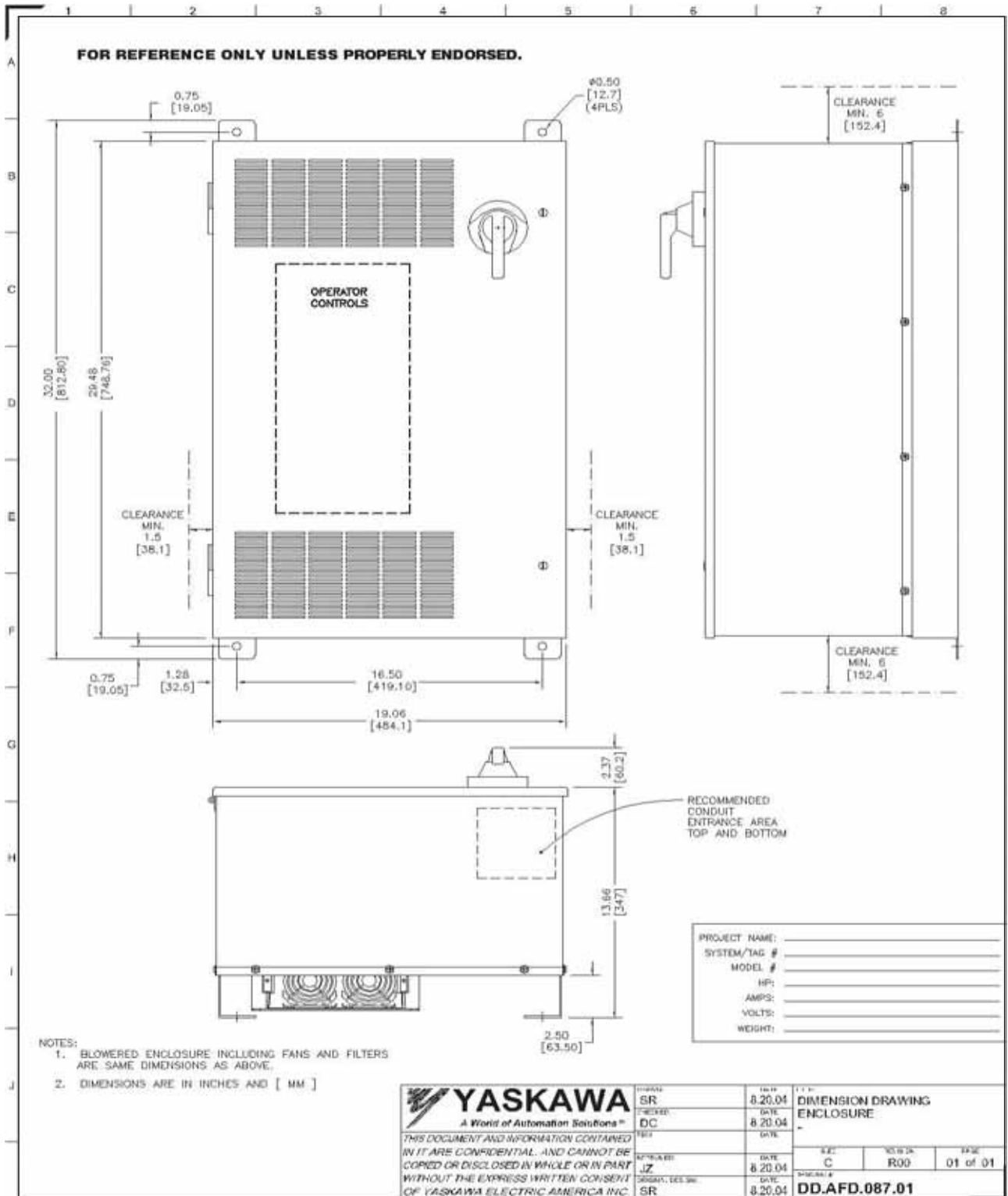
Rated Input Voltage	Configured E7CV or E7CB	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Physical Dimensions (in.)			Weight (lbs.) ⁽²⁾	Dimension Drawing Number ⁽⁵⁾	Drawing Number (w/ Add-on Box) ^{(3), (5)}
				H	W	D ⁽⁴⁾			
480V	B001	1.1 1.6	1/2 3/4	29.48	19.06	13.66	115	DD.AFD.087.01	DD.AFD.087.01.AO
	B002	2.1	1						
	B003	3.4	2						
	B004	4.8	3						
	B007	7.6	5						
	B011	11.0	7.5						
	B014	14.0	10						
	B021	21.0	15	127					
	B027	27.0	20	142					
	B034	34.0	25						
	B040	40.0	30						
	B052	52.0	40	40.48	25.63	14.66	203	DD.AFD.088.01	DD.AFD.088.01.AO
	B065	65.0	50				232		
	B077	77.0	60				241		
	B096	96.0	75						
	B124	124	100	84.00	37.75	26.00	943	DD.AFD.091.01	N/A
	B156	156	125				1240		
	B180	180	150				1352		
B240	240	200							
B302	302	250	84.00	73.25	26.00	1700	DD.AFD.093.01	TBD	
B361	361	300				1750			
B414	414	350	84.00	TBD	26.00	TBD	TBD	TBD	
B477	477	400				TBD			
B515	515	450				TBD			
B590	590.0	500				TBD			

- (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) Data represents the total approx. weight of the drive with all possible standard options, not shipping weight.
- (3) Add-on box (required with specified options - see options description) adds up to 15" to 'H' dimension and 91 lbs. Max. to total drive weight.
- (4) Add 2.37" for circuit breaker handle to depth
- (5) Operator Drawing Number is DO.E7C.01 (See page 33)

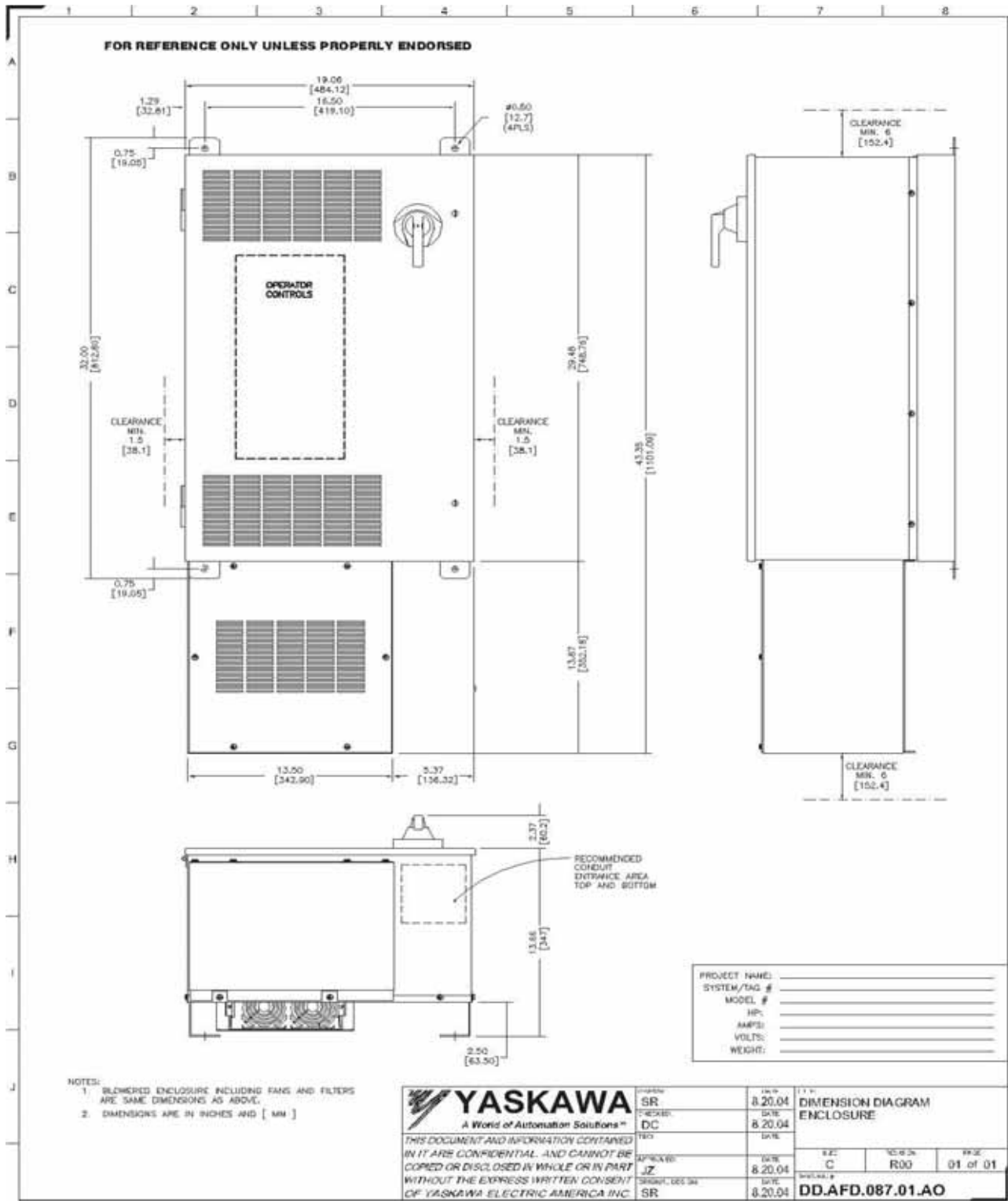
E7C

Dimension Drawing

DD.AFD.087.01
E7/Configured
NEMA 1/12 FVFF



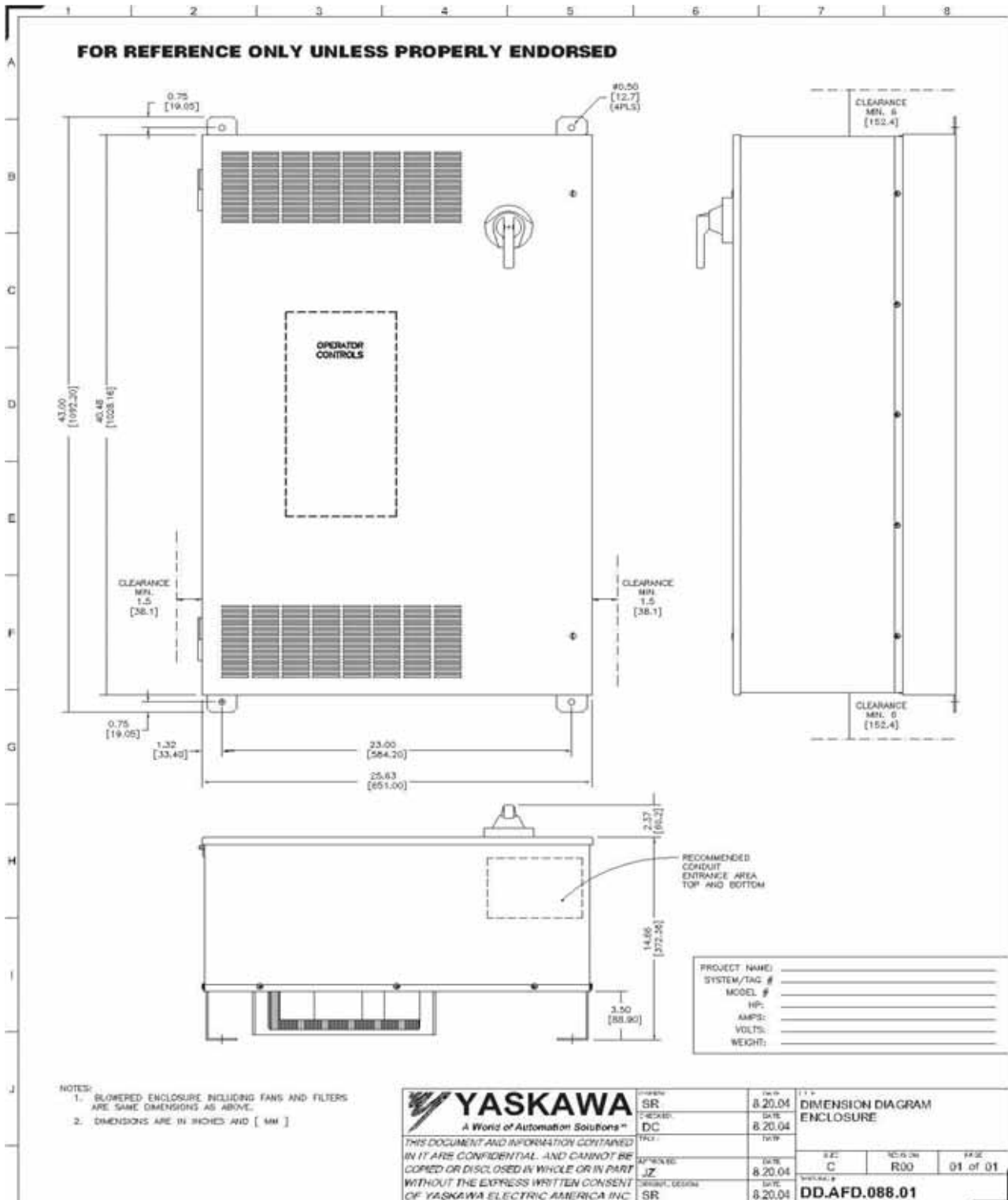
Dimension Drawing
DD.AFD.087.01.AO
E7/Configured With Add-On Box
NEMA 1/12 FVFF



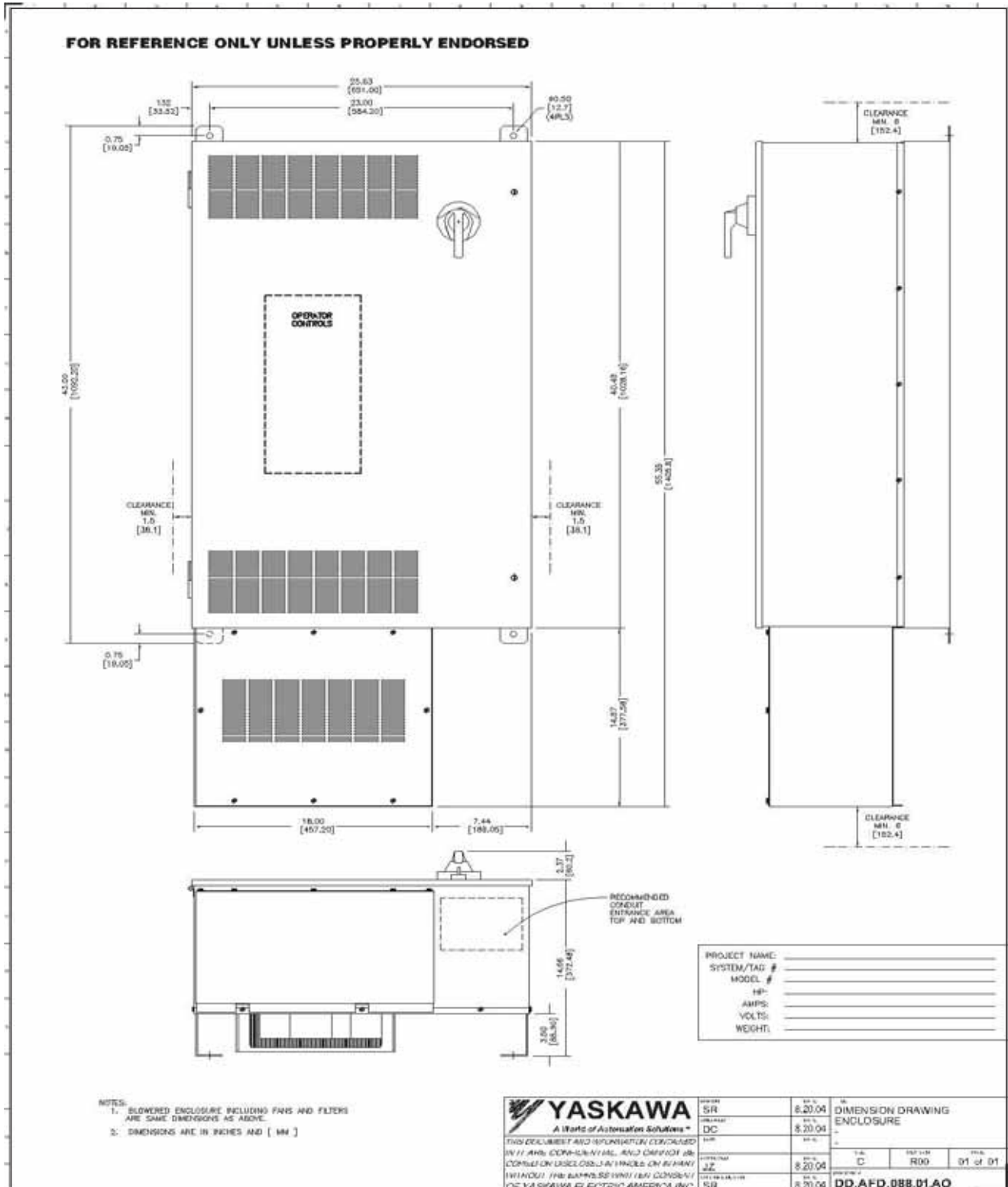
E7C

Dimension Drawing

DD.AFD.088.01
E7/Configured
NEMA 1/12 FVFF

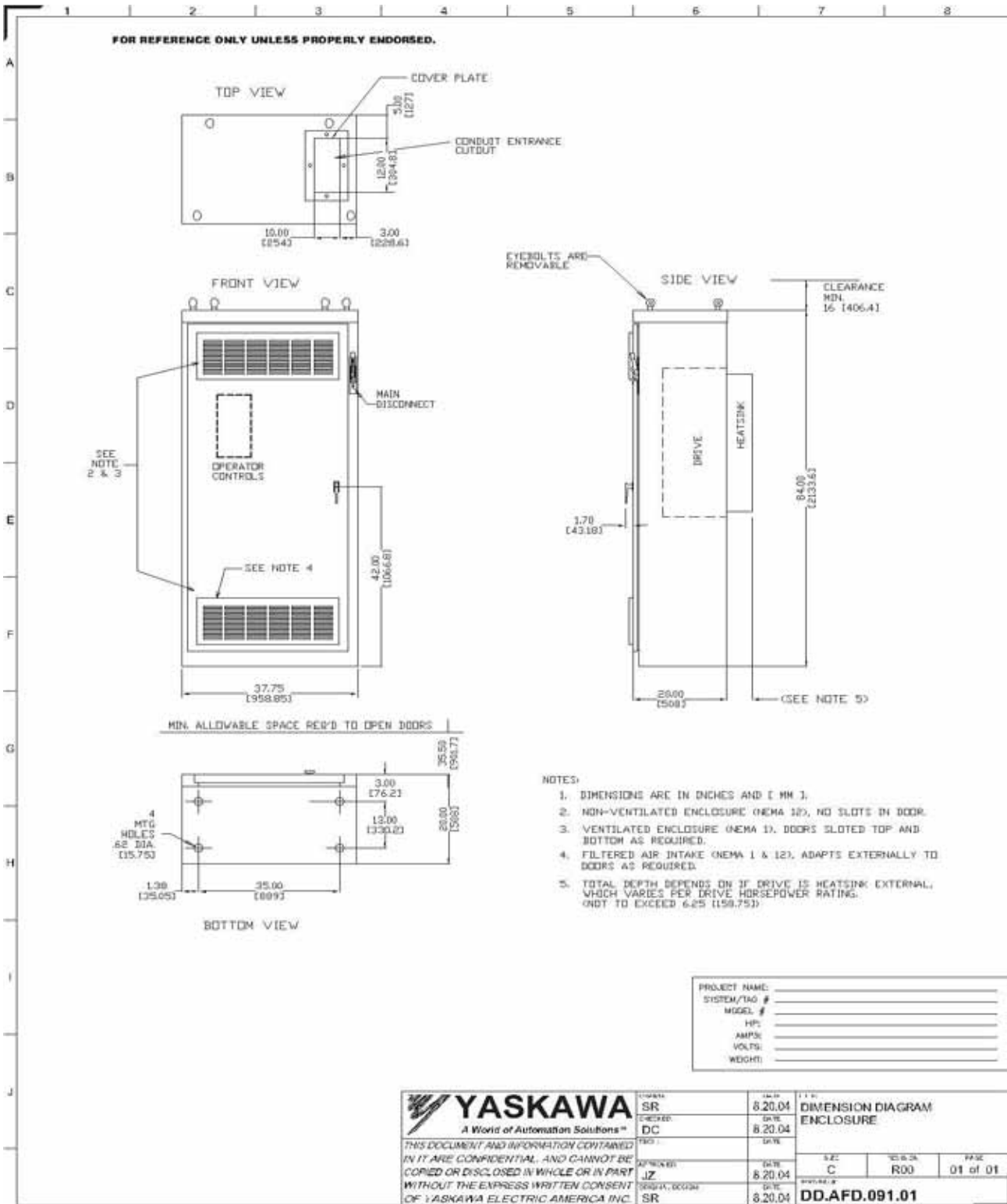


Dimension Drawing
DD.AFD.088.01.AO
E7/Configured With Add-On Box
NEMA 1/12 FVFF



E7C

Dimension Drawing
DD.AFD.091.01
E7/Configured Floor Mount
NEMA 1/12 FVFF





1	2	3	4	5	6	7	8
A							
B							
C							
D							
E							
F							
G							
H							
I							
J							

WARNING

⚠ Risk of electric shock.
 Wait 5 minutes for capacitor discharge after disconnecting power supply.

E7

PROJECT NAME: _____

SYSTEM/TAG # _____

MODEL # _____

HP: _____

AMPS: _____

VOLTS: _____

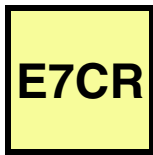
WEIGHT: _____

	DRAWN	SR	DATE	8.24.04	OPERATOR DRAWING	E7C	
	DESIGNED	DC	DATE	8.24.04			
THIS DOCUMENT AND INFORMATION CONTAINED IN IT ARE CONFIDENTIAL AND CANNOT BE COPIED OR DISCLOSED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN CONSENT OF YASKAWA ELECTRIC AMERICA INC.					REV. A	REV. R00	PAGE 01 of 01
APPROVED	DATE	8.24.04	DATE	8.24.04	DRAWING #		
ORIGINAL DESIGNED	DATE	8.24.04	DATE	8.24.04	DO.E7C.01		

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Description

5-500HP E7/Configured NEMA 3R



The E7/Configured package provides an E7 in a NEMA 3R enclosure, with space for several commonly used options, such as reactors, circuit breakers, etc. The E7 and E7/Configured have been designed for flexibility in providing the features and options commonly specified by facility designers.

The E7 Drive is a variable torque AC drive, designed specifically for HVAC applications in building automation. A new benchmark for size, cost, performance, benefits, and quality, the E7 includes numerous built-in features such as Network Communications, H/O/A, PI control, and energy-savings functions.

The E7 has embedded communications for the popular building automation protocols, Johnson Controls Metasys N2 and Siemens APOGEE FLN, as well as Modbus. An optional LonWorks, EtherNet/IP or BACnet interface card is also available.

This E7 package has a UL-type 3R rating.

Performance Features

- VT Ratings: 5-150 HP, 208 VAC
5-150 HP, 230/240 VAC
5- 500 HP, 480 VAC
- Overload capacity: 110% for 60 sec. (150% peak)
- Starting torque: 100% at 3 Hz
- DC injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Motor preheat function
- Adjustable accel/decel: 0.1 to 6000 sec.
- Controlled speed range: 40:1
- Critical frequency rejection: 3 selectable, adjustable bands
- Torque limiting: 30-180%
- Energy Saving control
- Torque boost: full range, auto
- Power loss ride-thru: 2 sec.
- Inertia ride-thru
- Auto restart after power loss or resettable fault, selectable, programmable
- Feedback signal loss detection
- Serial communications loss detection
- "Up/Down" floating point control capability
- Stationary motor auto-tuning
- Customizable monitor display
- Sleep function
- Run permissive input
- Ramp-to-stop or coast-to-stop selection
- Runtime changes in control and display
- Project-specific parameter reinitialization

Service Conditions

- Ambient Temperature: -10°C to 40°C (14°F to 104°F)
- Humidity: 95% RH, non-condensing
- Altitude: 3300 ft; higher by derate
- Input voltage: +10%/-15%
- Input frequency: 50/60 Hz \pm 5%
- 3-phase, 3-wire, phase sequence insensitive

Protective Features

- Current limited stall prevention
- Heat sink over-temperature, speed fold-back
- Cooling fan operating hours recorded
- Bi-directional start into rotating motor at synchronized speed
- DC bus charge indicator
- Current limiting DC bus fuse
- Optically-Isolated controls
- Short circuit protection: Phase-phase and phase-neutral
- Ground fault protection
- Electronic motor overload: UL
- Current and torque limit
- Fault display: last 10 faults
- Fault circuit: OC, OV, OT
- Over torque and under torque protection
- Program security code
- "Hunting" prevention logic
- Reverse prohibit selectability

Configured Options

- Circuit breaker / Motor circuit protector
- Input fuses
- Input impedance reactor
- Output (load) reactor
- Engraved nameplates
- Pressure/electrical transducer
- Analog outputs: 2 programmable, 4-20 mA
- Communication: LonWorks, EtherNet/IP and BACnet
- DriveWizard™ upload/download and monitoring/graphing software
- Surge suppressor
- Space heater
- Keypad viewing window
- 50°C ambient
- Leg kits (shipped loose)

Design Features

- 32-bit microprocessor logic
- Flash upgradeable firmware
- Non-volatile memory, program retention
- Surface-mount devices
- Displacement power factor: 0.98
- Output frequency: 0.1 to 120 Hz
- Frequency resolution: 0.06 Hz
- Frequency regulation: 0.1%
- Control Terminal Board: Quick disconnect, removable
- Carrier frequency: selectable to 15 kHz
- 3% DC bus reactor: 30-150 HP, 208 VAC; 30-150 HP, 240 VAC; 40-500 HP, 480 VAC; optional on lower ratings
- Keypad Operator: Hand/Off/Auto, built-in copy feature, 7 languages
- LCD display: 5 lines, 16 characters each
- 24 VDC control logic
- Transmitter/Option power supply
- Output contacts: One form C and two programmable form A
- Input/output terminal status
- Input terminals: 5 programmable multi-function input terminals
- Fault input: Programmable
- Diagnostic fault indication in selected language
- Timer function: Elapsed time, Delay on start, Delay on stop
- RS-422/485 port: Embedded Metasys N2, APOGEE FLN, and Modbus
- Volts/hertz ratio: Preset and programmable V/Hz patterns
- Multi-speed settings: 5 available
- Remote speed command: 0-10 VDC or 4-20 mA, direct or reverse-acting
- Setpoint (PI) control with inverse or square root input, differential control via two feedback capability
- Feedback signal: low pass filter
- Speed command: bias and gain
- Analog outputs: Programmable, two, 0-10 VDC
- Meter Functions: Volt, amp, kilowatt, elapsed run time, speed command
- Output Current Transformers, qty 3
- UL, cUL listed; CE marked; IEC 146
- MTBF: exceeds 28 years
- Thermostatically controlled cabinet fans
- Lifting eyes
- Padlock HASP



Description

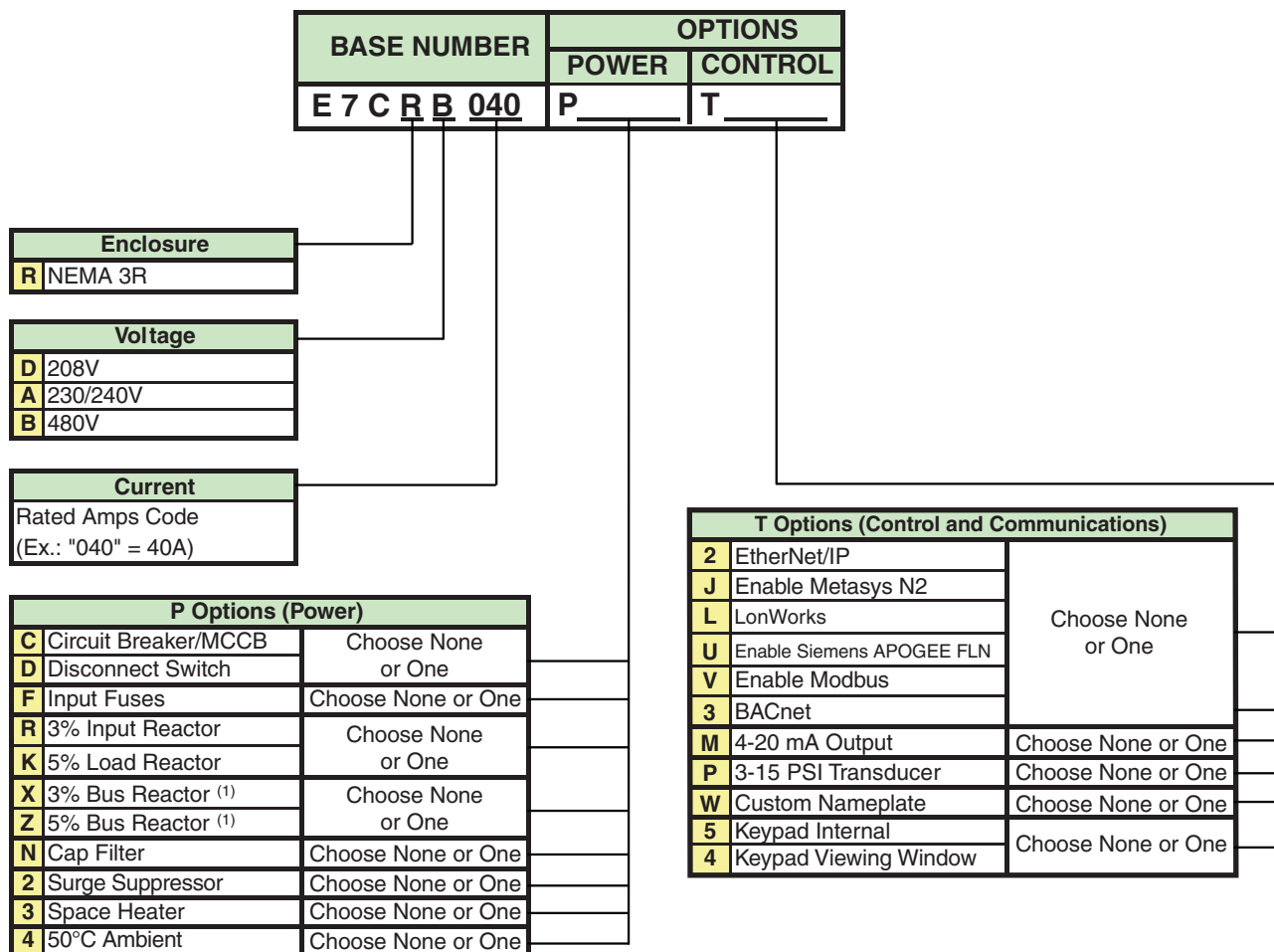
**5-500HP
E7/Configured
NEMA 3R**

Model Number Configuration & Pricing:

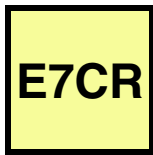
- Step 1.** To construct the complete Configured model number, first find the Base Number for the required enclosure type, voltage and current rating.
- Step 2.** Add the Option code letter for each required option. Any Power option must be preceded by **(P)**; any Control & Communications option by **(T)**. No more than eight options may be selected. The letters **P** and **T** must be deleted if no options of that type are selected.
- Step 3.** Find the corresponding list price for the Base Number selected from the following pages. Add the list price of each selected option to this base price.

Example: E7 NEMA 3R Configured package (**E7CR**) with a 480V, 40 Amp E7 drive (**B040**), with Circuit Breaker and a 3% Bus reactor (**P** followed by **CX**), Ethernet/IP communications capability (T followed by **2**). Model number is:

E7CRB040PCXT2



(1) 3% and 5% Bus Reactors are only available as an option on base numbers up to and including E7CR_D074, A068 and B040; larger drives have a Bus Reactor as standard.



Configured Option Descriptions:

- (R) **Enclosure:** The drive and options are provided in a NEMA Type 3R ventilated enclosure, large enough to accommodate any or all of the package options. Enclosures for Base Numbers up to, and including, D114 (40HP, 208V), A104 (40HP, 240V), and B124 (100HP, 480V) are wall-mounted; larger drives are in floor-mount enclosures.

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.
- (N) **Input Filter:** The standard configuration does not include a filter. The cap filter, option (N), is a delta-wye capacitive network.
- (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.
- (X, Z, R) **Line Impedance:** Drives above Base Numbers D074 (25HP, 208V), A068 (25HP, 240V) and B040 (30HP, 480V) include a 3% DC bus reactor in the standard package and do not provide any additional impedance. Option (X), 3% impedance, and option (Z), 5% impedance, are not available for ratings larger than these. To achieve a 5% total input impedance, select option (R) - this 3% input reactor is available only for the HP ratings greater than the HP's listed above, and combines with the drive's standard DC bus reactor.
- (K) **Load Reactor:** No form of output impedance is normally required. A 5% load reactor, option (K), is available if additional output impedance is desired (usually for long lead-lengths or noise reduction).
- (2) **Surge Suppressor:** This option will offer some degree of protection from transient surges coming through the power line cables. Lightning strikes are the most common source of surges.
- (3) **Space Heater:** This option maintains the internal cabinet temperature to reduce condensation.
- (4) **50°C Ambient:** This option will allow the enclosure to be operated in an ambient temperature of 50°C (122°F). The standard basic design is rated for 40°C ambient.

T Options (Control and Communications)

- (W) **Custom Nameplates:** Custom engraved nameplates with white lettering on black lamicaid are available with option (W), for special tagging purposes (Example: "AHU #1"). Note that this option requires the text to be specified by the customer. Leave this field blank if no special nameplates are required.
- (P) **3-15 PSI Transducer:** No transducer is provided with the standard configuration. To add an optional transducer that accepts a 3-15 PSI pneumatic signal and converts it to a 4-20mA signal that is sent to the drive, specify option (P).
- (M) **4-20mA Output:** The standard Configured package provides two programmable 0-10VDC outputs. To convert these outputs to 4-20mA output signals, specify option (M).
- (2, L, J, U, 3, V) **Communications:** All configurations provide the hardware and software required for Metasys N2, Siemens Apogee, and Modbus network communications, but these protocols are not enabled in the standard configuration. Options (J), (U), and (V) provide the programming and jumpers necessary to enable these protocols, at no additional cost. Lonworks option (L), BACnet option (3) and EtherNet/IP option (2) require the addition of an optional board.
- (5) **Drive Keypad Internal:** The digital drive keypad will be mounted inside the NEMA 3R enclosure, on the drive.
- (4) **Keypad Viewing Window:** The digital drive keypad is mounted on the outside of the NEMA 3R enclosure door. This option provides a viewing window which is hinged and lockable.



Configured Drives and Options

NEMA 3R

E7 Configured Drives - 5-500HP, 208-230/240 and 480V, 3-phase input, NEMA 3R enclosure, with factory-installed and wired options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	NEMA 3R Configured		Circuit Breaker		Input Filter	Input Fuses	Line Impedance			Load Reactor
					C=CB D=Disconnect		N=Cap	F=Fuses	X=3% Bus Reactor Z=5% Bus Reactor R=3% Input Reactor			K=5%
					E7CR	Base	C	D	N	F	X	Z
208V	16.7	5	D016									
	24.2	7.5	D024								N/A	
	30.8	10	D030									
	46.2	15	D046									
	59.4	20	D059									
	74.8	25	D074									
	88	30	D088									
	114	40	D114									
	143	50	D143									
	169	60	D169							3% DC Bus Reactor is included as standard		
	211	75	D211									
273	100	D273										
343	125	D343										
396	150	D396										
240V	15.2	5	A015									
	22	7.5	A022								N/A	
	28	10	A028									
	42	15	A042									
	54	20	A054									
	68	25	A068									
230V	80	30	A080									
	104	40	A104									
	130	50	A130									
	154	60	A154								3% DC Bus Reactor is included as standard	
	192	75	A192									
248	100	A248										
312	125	A312										
360	150	A360										

(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



E7 Configured Drives (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nom. HP ⁽¹⁾	Other			Name-plates	Transducer	4-20mA Output	Communications						Keypad		Uses Drive Model Number CIMR-E7U
			2=Surge Suppressor 3=Space Heater 4=50°C Ambient			W=NP	P=3-15 PSI	M=4-20 mA	V=Modbus, L=LonWorks, 3=BACnet 2=EtherNet/IP, J=METASYS N2 U=APOGEE FLN						3=Keypad Internal 4=Viewing Window		
			2	3	4	W	P	M	V ⁽³⁾	L	2	3	J	U	3	4	
208V	16.7	5															23P71A
	24.2	7.5															27P51A
	30.8	10															27P51A
	46.2	15															20111A
	59.4	20															20151A
	74.8	25															20181A
	88	30															20221A
	114	40															20301A
	143	50															20370A
	169	60															20450A
211	75															20550A	
273	100															20750A	
343	125															20900A	
396	150															21100A	
240V	15.2	5															23P71A
	22	7.5															25P51A
	28	10															27P51A
	42	15															20111A
	54	20															20151A
	68	25															20181A
	80	30															20221A
104	40															20301A	
230V	130	50															20370A
	154	60															20370A
	192	75															20450A
	248	100															20750A
	312	125															20750A
360	150															20900A	

- (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) N/A = Consult Factory
- (3) Included in the Base Price



Configured Drives and Options

NEMA 3R

E7 Configured Drives (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	NEMA 3R Configured		Circuit Breaker		Input Filter	Input Fuses	Line Impedance			Load Reactor
					C=CB D=Disconnect		N=Cap	F=Fuses	X=3% Bus Reactor Z=5% Bus Reactor R=3% Input Reactor			K=5%
					E7CR	Base	C	D	N	F	X	Z
480V	7.6	5	B007									
	11	7.5	B011								N/A	
	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							3% DC Bus Reactor is included as standard		
	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



E7 Configured Drives (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nom. HP ⁽¹⁾	Other			Name-plates	Trans-ducer	4-20mA Output	Communications						Keypad		Uses Drive Model Number CIMR-E7U
			2=Surge Suppressor 3=Space Heater 4=50°C Ambient			W=NP	P=3-15 PSI	M=4-20mA	V=Modbus, L=LonWorks, 3=BACnet, 2=EtherNet/IP, J=METASYS N2 U=APOGEE FLN						3=Keypad Internal 4=Viewing Window		
			2	3	4	W	P	M	V ⁽³⁾	L	2	3	J	U	3	4	
480V	7.6	5															43P71
	11	7.5															45P51
	14	10															47P51
	21	15															40111
	27	20															40151
	34	25															40181
	40	30															40301
	52	40															40371
	65	50															40451
	77	60															40551
	96	75															40750
	124	100															40900
	156	125															41100
	180	150															41600
	240	200															41850
	302	250															41850
361	300															42200	
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) N/A = Consult Factory

(3) Included in the Base Price

Freestanding Leg Kit, NEMA 3R - This option allows the NEMA 3R wall-mount enclosures to be mounted on legs so that the control can be freestanding and off the ground. Either kit can be used on any of the wall-mount enclosures. (All floor-mount enclosures come standard with freestanding legs.)

12" Leg Kit

Model No. UDA00548-1

30" Leg Kit

Model No. UDA00548-2



Dimensions and Data

NEMA 3R

Rated Input Voltage	Configured E7CR	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Physical Dimensions (in.)			Weight (lbs.) ⁽²⁾	Dimension Drawing Number ⁽³⁾
				H	W	D		
208V	D016	16.7	5	32	24	17.5	230	DD.AFD.198.01
	D024	24.2	7.5					
	D030	30.8	10					
	D046	46.2	15	40	32	17.5	365	DD.AFD.199.01
	D059	59.4	20					
	D074	74.8	25	46	42	17.5	430	DD.AFD.200.01
	D088	88	30					
	D114	114	40					
	D143	143	50	91	37	36	775	DD.AFD.189.01
	D169	169	60				850	
D211	211	75	975					
D273	273	100	91	74	36	1100	DD.AFD.190.01	
D343	343	125				1150		
D396	396	150						
240V	A015	15.2	5	32	24	17.5	230	DD.AFD.198.01
	A022	22	7.5					
	A028	28	10					
	A042	42	15	40	32	17.5	365	DD.AFD.199.01
	A054	54	20					
	A068	68	25	46	42	17.5	430	DD.AFD.200.01
A080	80	30						
A104	104	40						
230V	A130	130	50	91	37	36	775	DD.AFD.189.01
	A154	154	60				875	
	A192	192	75				1000	
	A248	248	100	91	74	36	1200	DD.AFD.190.01
	A312	312	125					
A360	360	150						

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



Rated Input Voltage	Configured E7CR	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Physical Dimensions (in.)			Weight (lbs.) ⁽²⁾	Dimension Drawing Number ⁽³⁾
				H	W	D		
480V	B007	7.6	5	32	24	17.5	230	DD.AFD.198.01
	B011	11	7.5					
	B014	14	10					
	B021	21	15					
	B027	27	20	40	32	17.5	365	DD.AFD.199.01
	B034	34	25					
	B040	40	30					
	B052	52	40					
	B065	65	50	46	42	17.5	430	DD.AFD.200.01
	B077	77	60					
	B096	96	75					
	B124	124	100					
	B156	156	125	91	37	36	775	DD.AFD.189.01
	B180	180	150					
	B240	240	200				875	
	B302	302	250					
B361	361	300	91	74	36	1500	DD.AFD.190.01	
B414	414	350						
B477	477	400						
B515	515	450						
B590	590	500						
						1900		

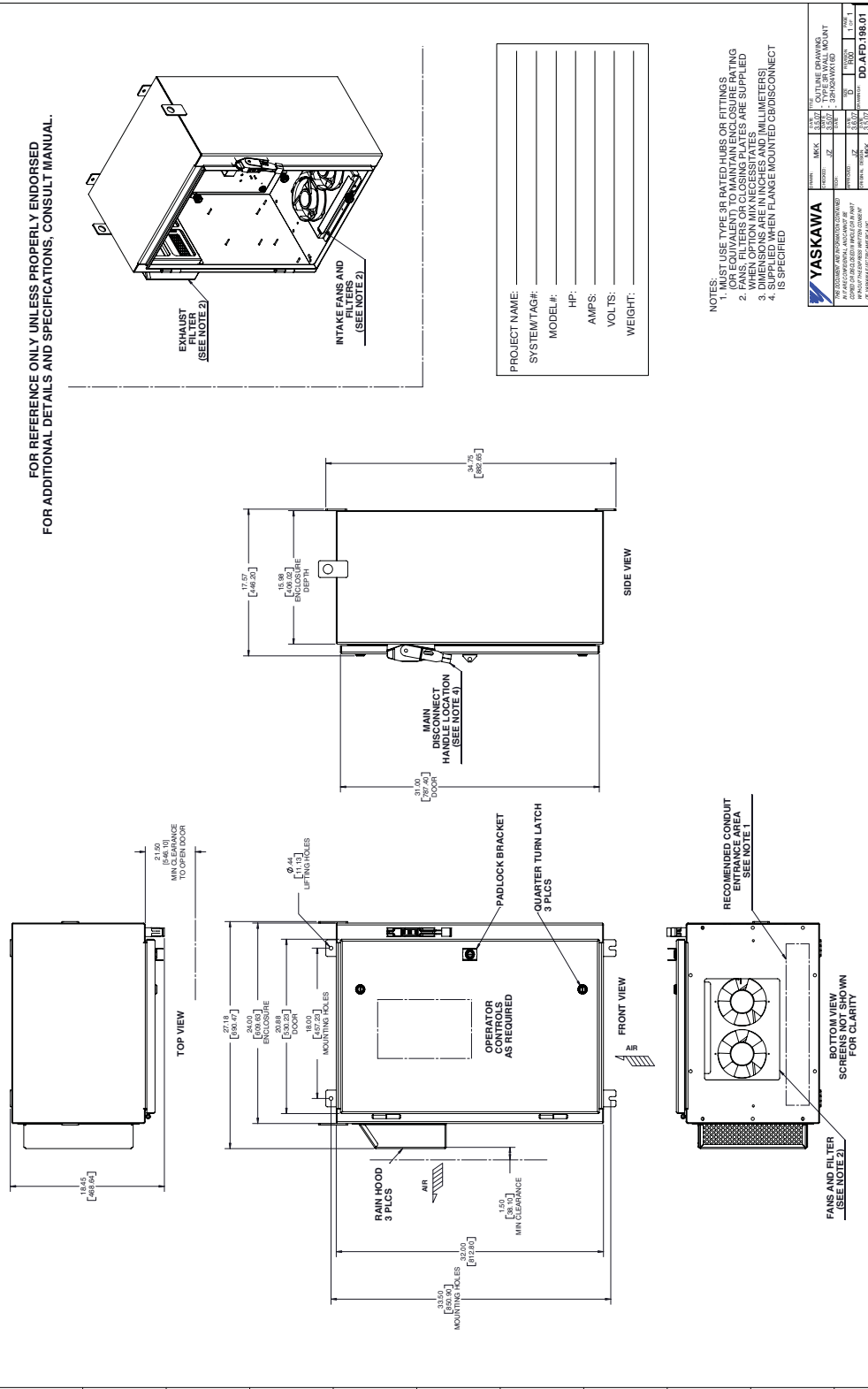
- (1) Horsepower rating is based on standard NEMA B 4-pole motor design as represented in NEC table 430.150 Full-Load Current, Three-Phase Alternating Current Motors
- (2) Data represents the total approx. weight of the drive with all possible standard options, not shipping weight.
- (3) Please refer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

E7CR

Dimension Drawing

DD.AFD.198.01
E7 Configured
NEMA 3R

FOR REFERENCE ONLY UNLESS PROPERLY ENDORSED
FOR ADDITIONAL DETAILS AND SPECIFICATIONS, CONSULT MANUAL.



Dimension Drawing

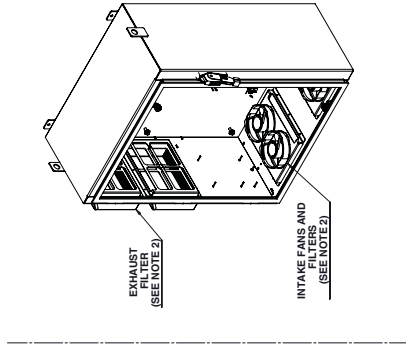
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E7 Configured

NEMA 3R



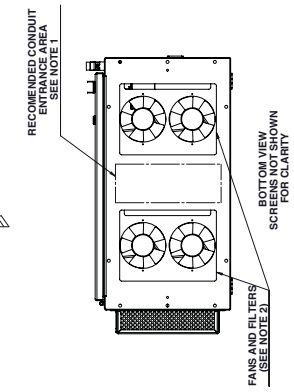
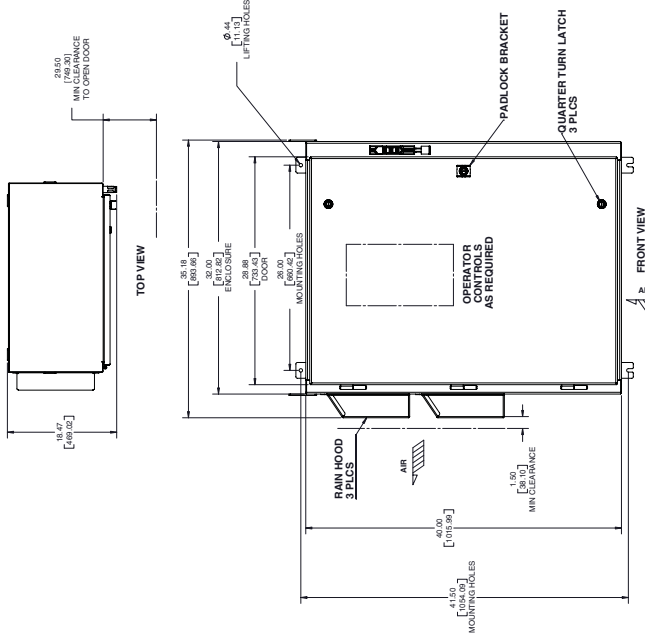
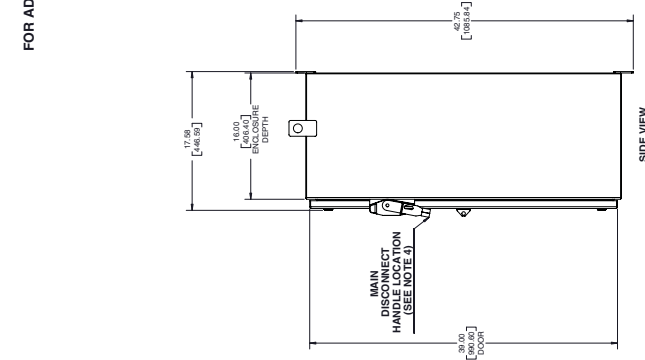
FOR REFERENCE ONLY UNLESS PROPERLY ENDORSED
FOR ADDITIONAL DETAILS AND SPECIFICATIONS, CONSULT MANUAL.



PROJECT NAME: _____
SYSTEM/TAG#: _____
MODEL#: _____
HP: _____
AMPS: _____
VOLTS: _____
WEIGHT: _____

- NOTES:
1. MUST USE TYPE 3R RATED HUBS OR FITTINGS (OR EQUIVALENT) TO MAINTAIN ENCLOSURE RATING
2. FANS, FILTERS OR CLOSING PLATES ARE SUPPLIED
3. DIMENSIONS ARE IN INCHES AND (MILLIMETERS)
4. SUPPLIED WHEN FLANGE MOUNTED CB DISCONNECT IS SPECIFIED

YASKAWA		FORM	MMK	3.532	OUTLINE DRAWING
CONSTRUCTION/REVISIONS	DATE	BY	CHKD	APP'D	APPROVAL
REV	DATE	BY	CHKD	APP'D	APPROVAL
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JOB: 199-01-000000					
OFFICE: P-199-01-000000					
JOB: 199-01-000000					
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OFFICE: P-199-01-000000					



E7CR

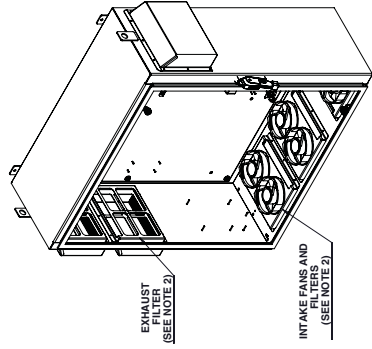
Dimension Drawing

DD.AFD.200.01

E7 Configured

NEMA 3R

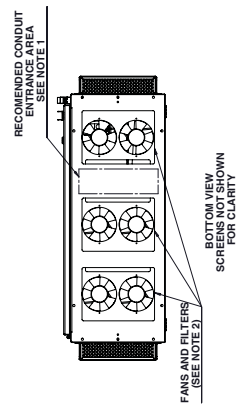
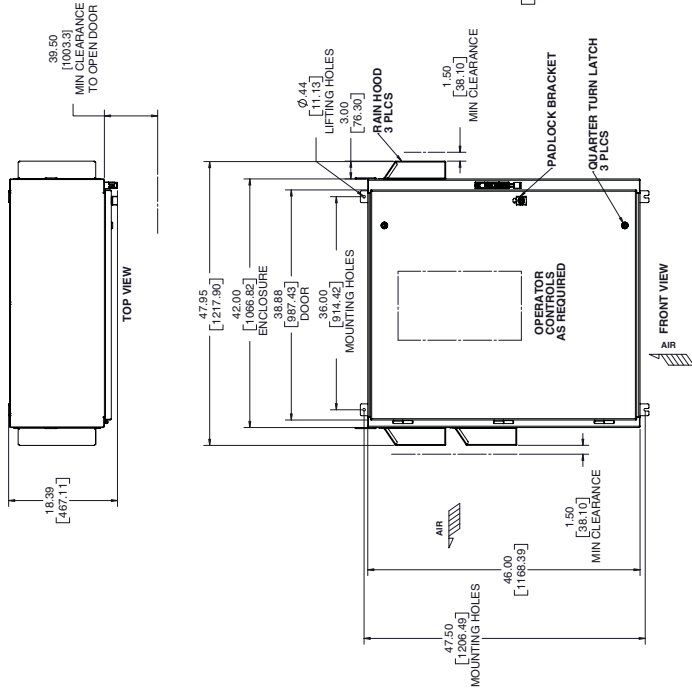
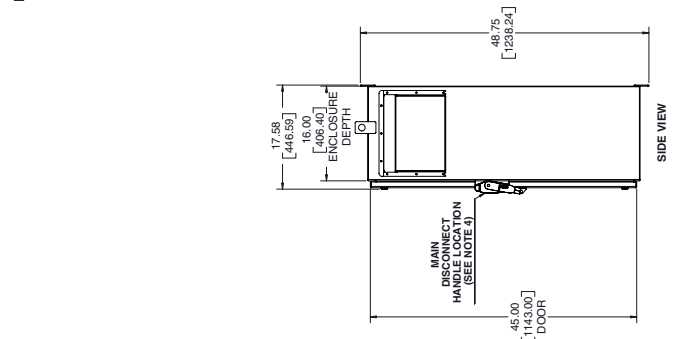
FOR REFERENCE ONLY UNLESS PROPERLY ENDORSED
FOR ADDITIONAL DETAILS AND SPECIFICATIONS, CONSULT MANUAL.



PROJECT NAME: _____
 SYSTEM TAG#: _____
 MODEL #: _____
 HP: _____
 AMPS: _____
 VOLTS: _____
 WEIGHT: _____

- NOTES:
- MUST USE TYPE 3R RATED HUBS OR FITTINGS FOR ALL ELECTRICAL CONNECTIONS.
 - FANS, FILTERS OR CLOSING PLATES ARE SUPPLIED WHEN OPTION MIX NECESSITATES.
 - OPTIONAL PART NUMBERS AND DIMENSIONS IS SPECIFIED.
 - SUPPLEMENT FLANGE MOUNTED DISCONNECT IS SPECIFIED.

YASKAWA		DATE	SCALE	SIZE	TYPE OF DRAWING
PROJECT	DD.AFD.200.01	REV	AS SHOWN	12" X 18"	3R WALL MOUNT
PROJECT	DD.AFD.200.01	REV	AS SHOWN	12" X 18"	3R WALL MOUNT
PROJECT	DD.AFD.200.01	REV	AS SHOWN	12" X 18"	3R WALL MOUNT
PROJECT	DD.AFD.200.01	REV	AS SHOWN	12" X 18"	3R WALL MOUNT
PROJECT	DD.AFD.200.01	REV	AS SHOWN	12" X 18"	3R WALL MOUNT



Dimension Drawing

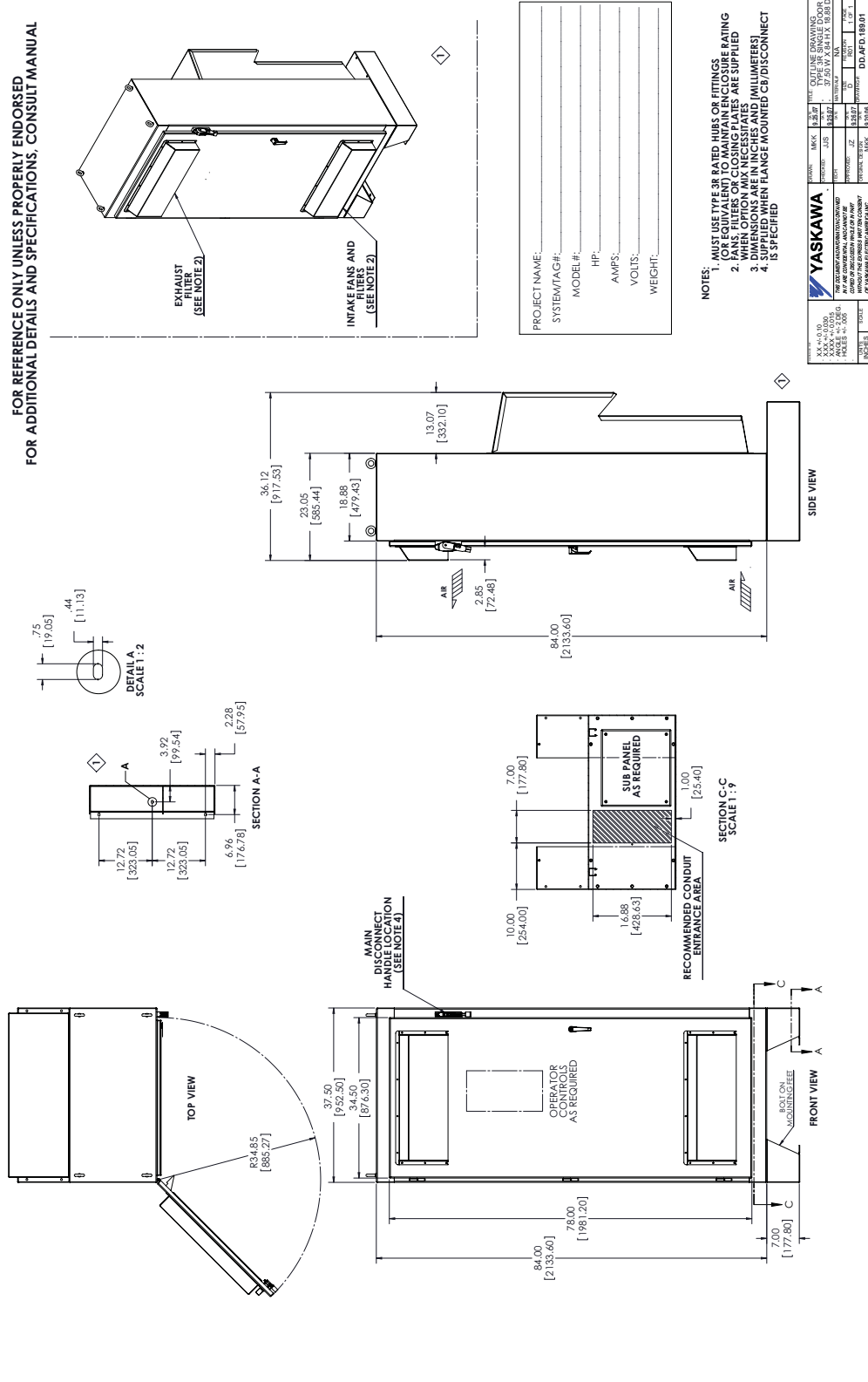
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E7 Configured

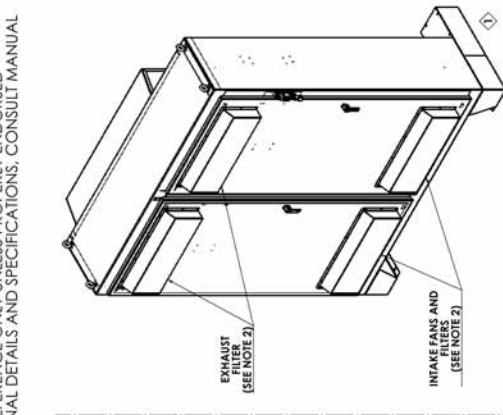
NEMA 3R

E7CR

FOR REFERENCE ONLY UNLESS PROPERLY ENDORSED
FOR ADDITIONAL DETAILS AND SPECIFICATIONS, CONSULT MANUAL



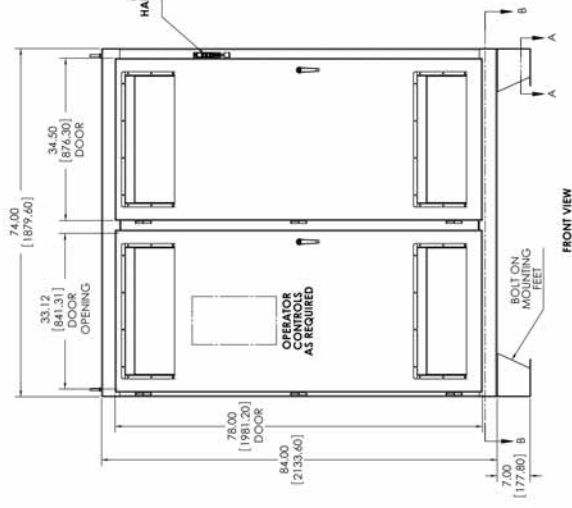
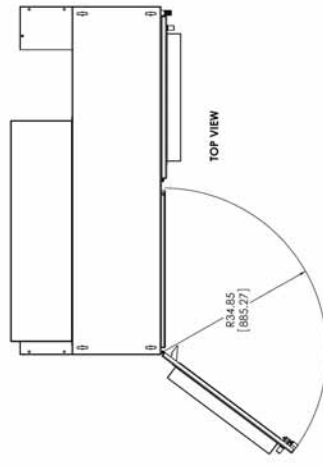
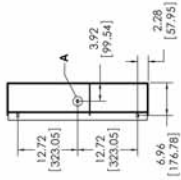
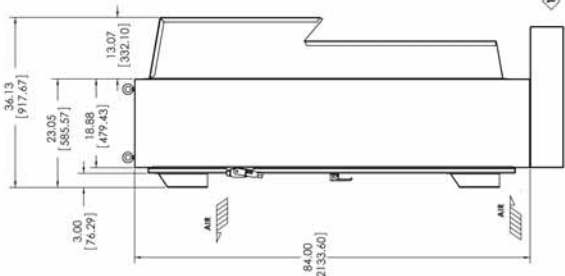
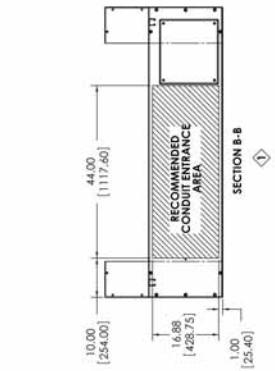
FOR REFERENCE ONLY UNLESS PROPERLY ENDORSED
FOR ADDITIONAL DETAILS AND SPECIFICATIONS, CONSULT MANUAL



PROJECT NAME: _____
 SYSTEM/TAG#: _____
 MODEL#: _____
 HP: _____
 AMPS: _____
 VOLTS: _____
 WEIGHT: _____

- NOTES:**
1. MUST USE TYPE 3R RATED HUBS OR FITTINGS (OR EQUIVALENT) TO MAINTAIN ENCLOSURE RATING
 2. WHEN OPTION 1 OR 2 IS SPECIFIED, HUBS ARE SUPPLIED
 3. DIMENSIONS ARE IN INCHES AND (MILLIMETERS)
 4. IS SPECIFIED WHEN FLANGE MOUNTED C/P/DISCONNECT IS SPECIFIED

YASKAWA		DATE: 03/21/18	
PROJECT: DD.AFD.190.01	DC	REV: 1	BY: JZ
APPROVED: [Signature]		CHECKED: [Signature]	
PROJECT: DD.AFD.190.01		DATE: 03/21/18	
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1 2 3 4 5 6 7 8

A

B

C

D

E


F

G

H

I


J



WARNING

⚠ Risk of electric shock.
Wait 5 minutes for capacitor discharge after disconnecting power supply.

FWD REV SEG REF ALARM
AUTO



E7

PROJECT NAME: _____

SYSTEM/TAG # _____


MODEL # _____

HP: _____

AMPS: _____

VOLTS: _____

WEIGHT: _____

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	A	R00	01 of 01								
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APPROVED	JZ	DATE	8.24.04								
DESIGNED BY	SR	DATE	8.24.04								

DO.E7C.01

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Description

1/2-20HP

E7 Narrow Bypass

E7N



The E7N Bypass package is a 2-contactor style bypass with HOA touchpad control, allowing motor operation from either the drive or across the line. This allows continued operation even if the E7 drive is disabled, by fault or intention. Drive maintenance must be delayed until line power can be removed. The E7 and E7N Bypass have been designed for flexibility in providing the features and options commonly specified by facility designers.

The E7 Drive is a variable torque AC drive, designed specifically for HVAC applications in building automation. A new benchmark for size, cost, performance, benefits, and quality, the E7 includes numerous built-in features such as Network Communications, PI control and energy savings functions.

The E7 has embedded communications for the popular building automation protocols, Johnson Controls Metasys N2 and Siemens APOGEE, as well as Modbus. An optional LonWorks or BACnet interface card is available.

Performance Features

- VT Ratings: 1/2-10 HP, 208 VAC
1/2-20 HP, 480 VAC
- Overload capacity: 110% for 60 sec (150% peak)
- Starting torque: 100% at 3 Hz
- DC injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Motor preheat function
- Adjustable accel/decel: 0.1 to 6000 sec.
- Controlled speed range: 40:1
- Critical frequency rejection: 3 selectable, adjustable bands
- Current limiting: 30-180%
- Energy Saving control
- Torque boost: full range, automatic
- Power loss ride-thru: 2 seconds
- Inertia ride-thru
- Auto restart after power loss or resettable fault, selectable, programmable
- Feedback signal loss detection
- Serial communication loss detection
- "Up/Down" floating point control capability
- Stationary motor auto-tuning
- Customizable monitor display
- Sleep function
- Run permissive input
- Ramp-to-stop or coast-to-stop selection
- Runtime changes in control and display
- Project-specific parameter reinitialization
- Copy keypad

Protective Features

- Current limited stall prevention
- Heat sink over-temperature, speed fold-back
- Cooling fan operating hours recorded
- Bi-directional start into rotating motor at synchronized speed
- DC bus charge indicator
- Current limiting DC bus fuse
- Optically-Isolated controls
- Short circuit protection: Phase-phase and phase-neutral
- Ground fault protection
- Electronic motor overload: UL
- Current and torque limit
- Fault display: last 10 faults
- Fault trace capabilities
- Over torque and under torque protection
- Program security code
- "Hunting" prevention logic
- Input source protection (MOVs)
- Input/output phase loss protection

Design Features

- 32-bit microprocessor logic
- Flash upgradeable firmware
- Non-volatile memory, program retention
- Surface-mount devices
- Displacement power factor: 0.98
- Output frequency: 0.1 to 120 Hz
- Frequency resolution: 0.06 Hz
- Frequency regulation: 0.1%
- Carrier frequency: selectable to 15 kHz
- 3% DC bus reactor: 40-60 HP, 480 VAC (optional on lower ratings)
- LED display
- 24 VDC control logic
- Transmitter/Option power supply
- Input/output terminal status
- Timer function: Elapsed time, Delay on start, Delay on stop
- Embedded Metasys N2, APOGEE FLN, and Modbus
- Volts/hertz ratio: Preset and programmable V/Hz patterns
- Remote speed command: 0-10 VDC or 4-20 mA, direct or reverse-acting
- Setpoint (PI) control with inverse or square root input, differential control via two feedback capability
- Feedback signal: low pass filter
- Speed command: bias and gain
- Meter Functions: Volt, amp, kilowatt, elapsed run time, speed command
- Output Current Transformers: qty 3
- UL, cUL listed and CE marked; IEC 146;
- MTBF: exceeds 28 years

Service Conditions

- Ambient Temperature: -10°C to 40°C (14° F to 104° F)
- Humidity: 95% RH, non-condensing
- Altitude: 3300 ft; higher by derate
- Input voltage: +10%/-15%
- Input frequency: 50/60 Hz ± 5%
- 3-phase, 3-wire, phase sequence insensitive

Options

- Circuit breaker (MCP) disconnect
- Main disconnect
- Semi-conductor fast acting fuses
- Drive input fused disconnect
- RFI cap network
- 3% or 5% line impedance
- LCD "Alpha" drive keypad
- Pneumatic pressure transducer : 3-15 psi
- LonWorks communication and BACnet
- Engraved nameplate
- 3 Contactor Bypass

Bypass Features

- Bypass and Drive are factory assembled, utilizing 2 contactors with Electronic Control System
- NEMA 1 metal enclosure standard
- Input disconnect switch with a lockable, through-the-door operating mechanism
- Sealed Bypass Control Keypad mounted on front door
- Integrated Drive touchpad control
- Drive Output and Bypass contactors
- Bi-metallic thermal overload relay, provides motor protection in both the "drive" and "bypass" modes
- 120 VAC control power transformer
- Control and safety circuit terminal strip (Selectable for 120 VAC or 24 VDC input)
- Indicator LED's for Control Power, Drive Ready, Drive Run, Drive Selected, Drive Fault, Drive Test, Bypass Selected, Bypass Run, Motor OL, Safety Open, Damper/BAS, Auto Run, Auto/Rem Transfer, Smoke Purge, Hand Mode, Off Mode, and Auto Mode
- 3 programmable Form C contacts (250 VAC, 1 Amp) for: Motor Run, Damper/BAS, Drive Run, Hand Mode, Auto Mode, Bypass Run, Fault or 1 selectable from the drive menu
- Remote Run/Stop via contact closure or serial communication
- Input speed command via 0-10 VDC, 4-20 mA or serial communication
- 2 Programmable analog outputs (0-10 VDC or 4-20 mA)
- Damper control circuit
- Programmable auto transfer to bypass on drive fault
- Remote transfer to bypass via contact closure
- Smoke purge function via contact closure
- Safety (freezestat, firestat, duct pressure, etc.) interlock
- Building Automation System (BAS) interlock

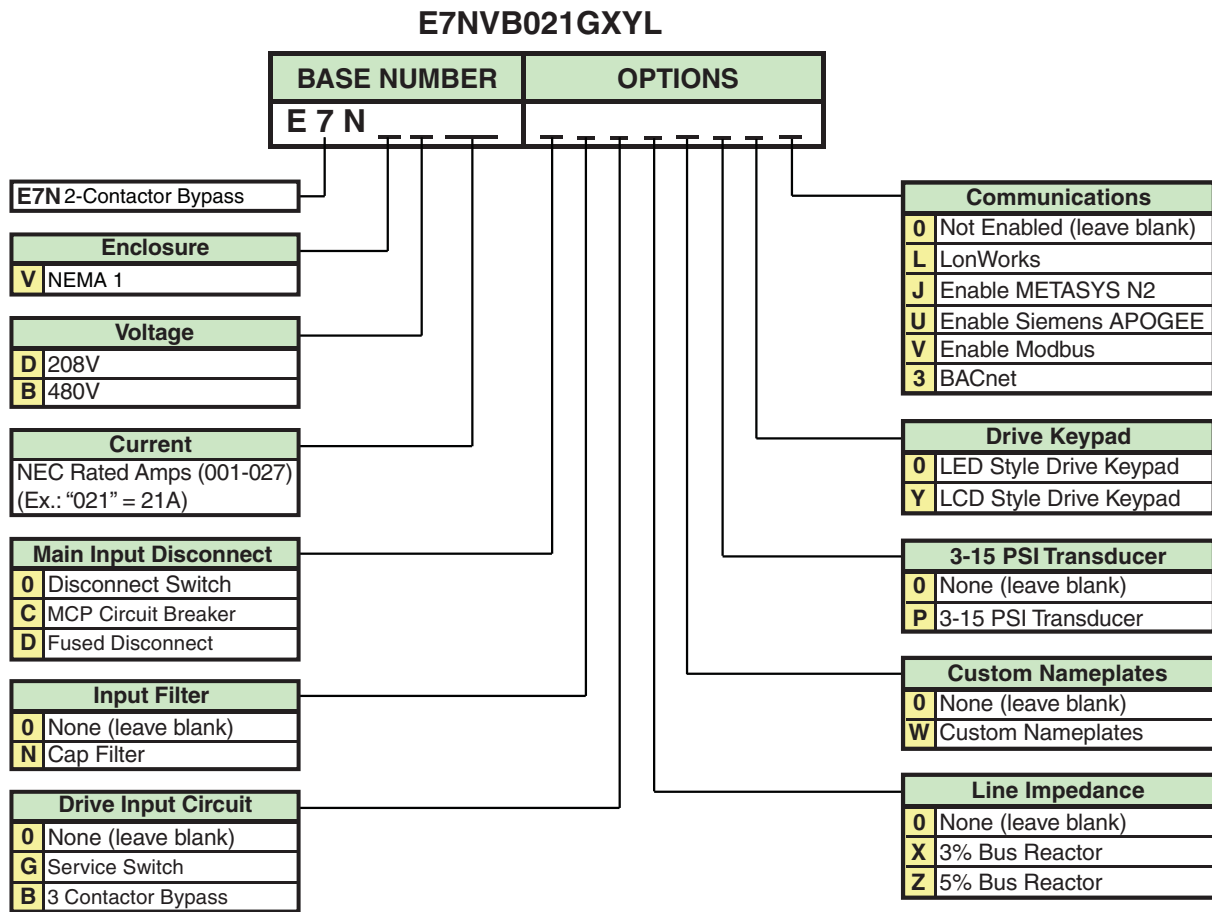


Description
1/2-20HP
E7 Narrow Bypass

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. If an option is not wanted, no character is inserted.
- 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: E7 NEMA 1 Bypass package (**E7NV**) with a 21 Amp, 480V drive (**B021**), with a Drive Input disconnect switch (**G**), a 3% bus reactor (**X**), LCD Style Keypad (**Y**), and LonWorks communications capability (**L**), would be **E7NVB021GXLYL**.



Bypass Option Descriptions:

- (V, B) Enclosure:** The drive and Bypass options are provided in a NEMA Type 1 (V) enclosure, large enough to accommodate any or all of the Bypass package options. E7N Bypass enclosures are all wall-mounted.
- (C, D)* Main Input Disconnect:** The standard configuration, option (0), provides an input disconnect switch with a through-the-door padlockable operator mechanism. This disconnect switch **DOES NOT** provide motor short circuit protection. If motor short circuit protection is desired in the E7N bypass enclosure, select option (C) which provides a circuit breaker MCP with a through-the-door padlockable operator mechanism. A fused disconnect switch (D), which will allow for a 100K AIC package rating, is also available. (Customer-supplied line impedance may be needed to achieve this rating.)
- (N) Input Filter:** The standard configuration, option (0), does not include a filter. The cap filter, option (N), is a delta-wye capacitive network.
- (G, B)* Drive Input Circuit:** The standard configuration, option (0), does not include any protection or disconnecting means specifically for the drive. For an input disconnect switch that will remove power from the drive, select option (G). For a 3 contactor bypass that will remove power from the drive, select option (B).
- (X, Z) Line Impedance:** The E7N Bypass package, option (0), does not provide any additional impedance. Option (X), 3% impedance, and option (Z), 5% impedance, can be used to add line impedance.
- (W) Custom Nameplates:** Custom engraved nameplates with white lettering on black lamicaid are available with option (W), for special tagging purposes (Example: "AHU #1"). Note that this option requires the text to be specified by the customer. Leave this field blank if no special nameplates are required.
- (P) 3-15 PSI Transducer:** No transducer is provided with the standard configuration. To add an optional transducer that accepts a 3-15 PSI pneumatic signal and converts it to a 4-20mA signal that is sent to the drive, specify option (P).
- (0, Y) Drive Keypad:** The standard E7N package uses the JVOP 161 LED drive operator keypad, option (0). To use the 5 line LCD keypad, select option (Y).
- (L, J, U, V, 3) Communications:** All bypass configurations provide the hardware and software required for Metasys N2, Siemens Apogee, and Modbus network communications, but these protocols are not enabled in the standard configuration. Options (J), (U), and (V) provide the programming and jumpers necessary to enable these protocols, at no additional cost. Lonworks option (L) and BACnet option (3) require the addition of an optional board.

* If option **D** is requested, you cannot request option **G**.



Bypass Drives and Options

NEMA 1

E7 Narrow Bypass - 1/2-20HP, 208 and 480V, 3-phase input, NEMA 1 enclosure, with factory-installed and wired options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	NEMA 1 Bypass		Main Input Disconnect		Input Filter	Drive Input Circuit		Impedance	
					0=Disc. Switch C=MCP Ckt Bkr D=Fused Disconnect		N=Cap	G=Disc. Switch B=3 Contactor Bypass		X=3% Bus Reactor Z=5% Bus Reactor	
			E7NV	Base	C	D	N	G	B	X	Z
208V	2.4	1/2	D002								
	3.5	3/4	D003								
	4.6	1	D004								
	7.5	2	D007								
	10.6	3	D010								
	16.7	5	D016								
	24.2	7.5	D024								
	30.8	10	D030								

(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



E7 Narrow Bypass (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Custom Nameplates	Drive Keypad	3-15 PSI Transducer	Communications			Uses Drive Model Number CIMR-E7U
			W=NP	0=LED Y=LCD	P=3-15 PSI	3=BACnet L=LonWorks J=N2 U=APOGEE V=Modbus			
			W	Y	P	3	L	J, U, V ⁽²⁾	
208V	2.4	1/2							22P21
	3.5	3/4							22P21
	4.6	1							22P21
	7.5	2							22P21
	10.6	3							22P21
	16.7	5							23P71
	24.2	7.5							27P51
30.8	10							27P51	

(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) Included in Base Price



Bypass Drives and Options

NEMA 1

E7 Narrow Bypass (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	NEMA 1 Bypass		Main Input Disconnect		Input Filter	Drive Input Circuit		Impedance	
					0=Disc. Switch C=MCP Ckt Bkr D=Fused Disconnect		N=Cap	G=Disc. Switch B=3 Contactor Bypass		X=3% Bus Reactor Z=5% Bus Reactor	
			E7NV	Base	C	D	N	G	B	X	Z
480V	1.6	1/2 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								

(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



E7 Narrow Bypass (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Custom Nameplates	Drive Keypad	3-15 PSI Transducer	Communications			Uses Drive Model Number CIMR-E7U
			W=NP	0=LED Y=LCD	P=3-15 PSI	3=BACnet L=LonWorks J=N2 U=APOGEE V=Modbus			
			W	Y	P	3	L	J, U, V ⁽²⁾	
480V	1.6	1/2 3/4							42P21
	2.1	1							42P21
	3.4	2							42P21
	4.8	3							42P21
	7.6	5							43P71
	11	7.5							45P51
	14	10							47P51
	21	15							40091
27	20							40111	

(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

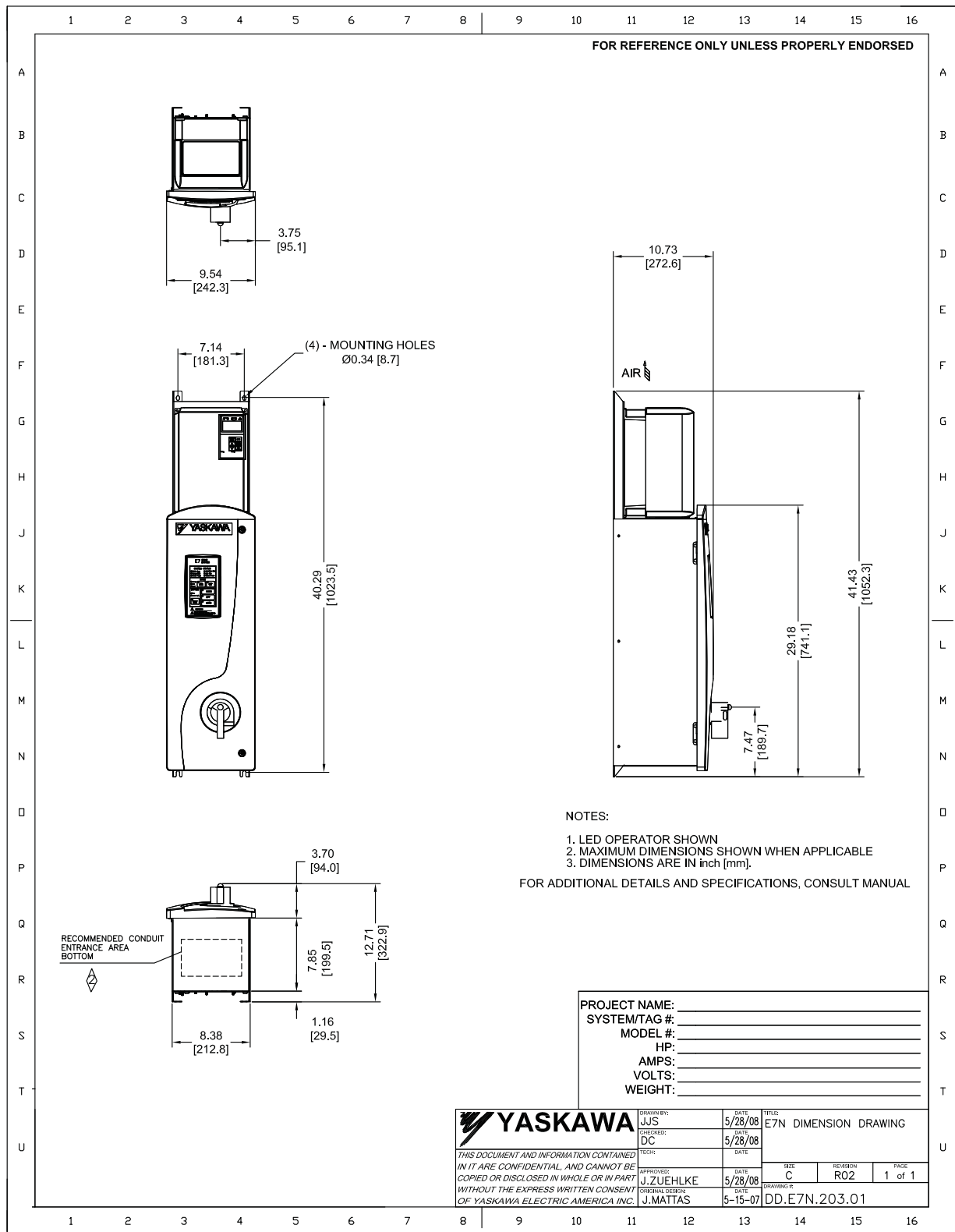
(2) Included in Base Price



Dimension Drawing

DD.E7N.203.01

E7 Narrow Bypass



FOR REFERENCE ONLY UNLESS PROPERLY ENDORSED

- NOTES:
1. LED OPERATOR SHOWN
 2. MAXIMUM DIMENSIONS SHOWN WHEN APPLICABLE
 3. DIMENSIONS ARE IN inch [mm].

FOR ADDITIONAL DETAILS AND SPECIFICATIONS, CONSULT MANUAL

PROJECT NAME: _____
 SYSTEM/TAG #: _____
 MODEL #: _____
 HP: _____
 AMPS: _____
 VOLTS: _____
 WEIGHT: _____

YASKAWA	DRAWN BY: JJS	DATE: 5/28/08	TITLE: E7N DIMENSION DRAWING	
	CHECKED: DC	DATE: 5/28/08	SIZE: C	REVISION: R02
APPROVED: J.ZUEHLKE		DATE: 5/28/08	PAGE: 1 of 1	
ORIGINAL DESIGN: J.MATTAS		DATE: 5-15-07	DRAWING #: DD.E7N.203.01	

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Description

1/2-60HP

E7/2-Contactor Bypass

E7L



The E7L Bypass package is a 2-contactor style bypass with HOA touchpad control, allowing motor operation from either the drive or across the line. This allows continued operation even if the E7 drive is disabled, by fault or intention. Drive maintenance must be delayed until line power can be removed. The E7 and E7L Bypass have been designed for flexibility in providing the features and options commonly specified by facility designers.

The E7 Drive is a variable torque AC drive, designed specifically for HVAC applications in building automation. A new benchmark for size, cost, performance, benefits, and quality, the E7 includes numerous built-in features such as Network Communications, PI control and energy savings functions.

The E7 has embedded communications for the popular building automation protocols, Johnson Controls Metasys N2 and Siemens APOGEE, as well as Modbus. An optional LonWorks or BACnet interface card is available.

Performance Features

- VT Ratings: 1/2-25 HP, 208 VAC
1/2-30 HP, 230 / 240 VAC
1/2-60 HP, 480 VAC
- Overload capacity: 110% for 60 sec. (150% peak)
- Starting torque: 100% at 3 Hz
- DC injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Motor preheat function
- Adjustable accel/decel: 0.1 to 6000 sec.
- Controlled speed range: 40:1
- Critical frequency rejection: 3 selectable, adjustable bands
- Current limiting: 30-180%
- Energy Saving control
- Torque boost: full range, automatic
- Power loss ride-thru: 2 sec.
- Inertia ride-thru
- Auto restart after power loss or resettable fault, selectable, programmable
- Feedback signal loss detection
- Serial communication loss detection
- "Up/Down" floating point control capability
- Stationary motor auto-tuning
- Customizable monitor display
- Sleep function
- Run permissive input
- Ramp-to-stop or coast-to-stop selection
- Runtime changes in control and display
- Project-specific parameter reinitialization
- Copy keypad

Protective Features

- Current limited stall prevention
- Heat sink over-temperature, speed fold-back
- Cooling fan operating hours recorded
- Bi-directional start into rotating motor at synchronized speed
- DC bus charge indicator
- Current limiting DC bus fuse
- Optically-Isolated controls
- Short circuit protection: Phase-phase and phase-neutral
- Ground fault protection
- Electronic motor overload: UL
- Current and torque limit
- Fault display: last 10 faults
- Fault trace capabilities
- Over torque and under torque protection
- Program security code
- "Hunting" prevention logic
- Input source protection (MOVs)
- Input/output phase loss protection

Design Features

- 32-bit microprocessor logic
- Flash upgradeable firmware
- Non-volatile memory, program retention
- Surface-mount devices
- Displacement power factor: 0.98
- Output frequency: 0.1 to 120 Hz
- Frequency resolution: 0.06 Hz
- Frequency regulation: 0.1%
- Carrier frequency: selectable to 15 kHz
- 3% DC bus reactor: 40-60 HP, 480 VAC (optional on lower ratings)
- LED display
- 24 VDC control logic
- Transmitter/Option power supply
- Input/output terminal status
- Timer function: Elapsed time, Delay on start, Delay on stop
- Embedded Metasys N2, APOGEE FLN, and Modbus
- Volts/hertz ratio: Preset and programmable V/Hz patterns
- Remote speed command: 0-10 VDC or 4-20 mA, direct or reverse-acting
- Setpoint (PI) control with inverse or square root input, differential control via two feedback capability
- Feedback signal: low pass filter
- Speed command: bias and gain
- Meter Functions: Volt, amp, kilowatt, elapsed run time, speed command
- Output Current Transformers: qty 3
- UL, cUL listed and CE marked; IEC 146;
- MTBF: exceeds 28 years

Service Conditions

- Ambient Temperature: -10°C to 40°C (14° F to 104° F)
- Humidity: 95% RH, non-condensing
- Altitude: 3300 ft; higher by derate
- Input voltage: +10%/-15%
- Input frequency: 50/60 Hz ± 5%
- 3-phase, 3-wire, phase sequence insensitive
- Plenum rated (UL 1995)

Options

- NEMA 12 FVFF metal enclosure
- Circuit breaker (MCP) disconnect
- Semi-conductor fast acting fuse:
- Drive input disconnect (internal test switch)
- RFI cap network
- 3% or 5% line impedance
- LCD "Alpha" drive keypad
- Pneumatic pressure transducer : 3-15 psi
- LonWorks and BACnet communication
- Engraved nameplate

Design Features

- Bypass and Drive are factory assembled, utilizing 2 contactors with Electronic Control System
- NEMA 1 metal enclosure standard
- Input disconnect switch with a lockable, through-the-door operating mechanism
- Sealed Bypass Control Keypad mounted on front door with integrated Drive touchpad control
- Drive Output and Bypass contactors
- Bi-metallic thermal overload relay, provides motor protection in both the "drive" and "bypass" modes
- 120 VAC control power transformer
- Control and safety circuit terminal strip (Selectable for 120 VAC or 24 VDC input)
- Indicator LED's for Control Power, Drive Ready, Drive Run, Drive Selected, Drive Fault, Drive Test, Bypass Selected, Bypass Run, Motor OL, Safety Open, Damper/BAS, Auto Run, Auto/Rem Transfer, Smoke Purge, Hand Mode, Off Mode, and Auto Mode
- 3 programmable Form C contacts (250 VAC, 1 Amp) for: Motor Run, Damper/BAS, Drive Run, Hand Mode, Auto Mode, Bypass Run, Fault or 1 selectable from the drive menu
- Remote Run/Stop via contact closure or serial communication
- Input speed command via 0-10 VDC, 4-20 mA or serial communication
- 2 Programmable analog outputs (0-10 VDC or 4-20 mA)
- Damper control circuit
- Programmable auto transfer to bypass on drive fault
- Remote transfer to bypass via contact closure
- Smoke purge function via contact closure
- Safety (freezestat, firestat, duct pressure, etc.) interlock
- Building Automation System (BAS) interlock



Description

1/2-60HP E7/2-Contactor Bypass

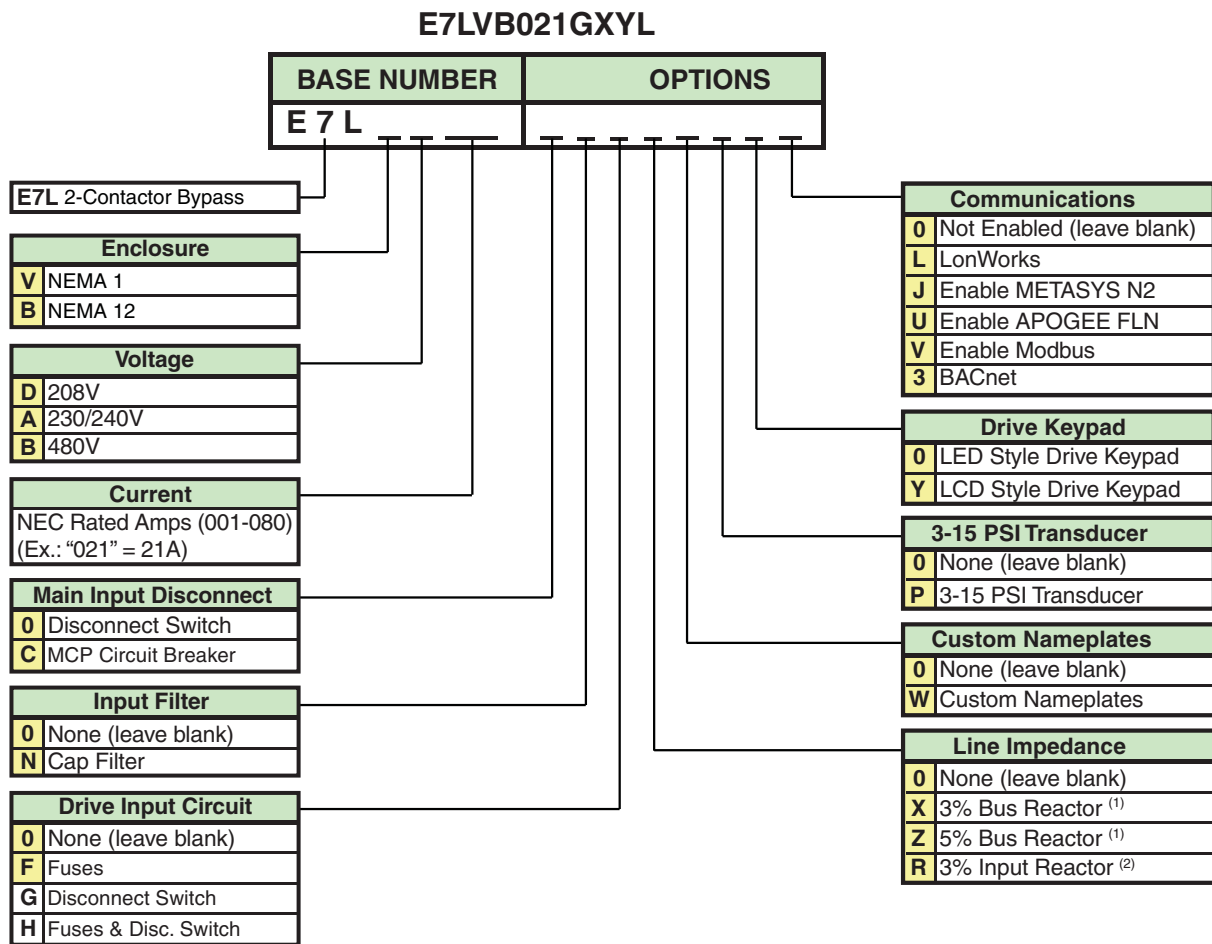
Model Number Configuration & Pricing:

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. If an option is not wanted, no character is inserted.

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: E7 NEMA 1 Bypass package (**E7LV**) with a 21 Amp, 480V drive (**B021**), with a Drive Input disconnect switch (**G**), a 3% bus reactor (**X**), LCD Style Keypad (**Y**), and LonWorks communications capability (**L**), would be **E7LVB021GXYL**.



(1) 3% and 5% Bus Reactors are only available as an option on base numbers up to E7LVA068 and E7LVB040; larger drives have a Bus Reactor as standard.

(2) 3% Input Reactor, when combined with the standard Bus Reactor (available on base numbers E7LVA080 and E7LVB052 and above), yields a total of 5% input impedance.



Bypass Option Descriptions:

- (V, B) Enclosure:** The drive and Bypass options are provided in either a NEMA Type 1 (V) or NEMA 12 FVFF (UL Type 1) (B) ventilated enclosure, large enough to accommodate any or all of the Bypass package options. E7L Bypass enclosures are all wall-mounted.
- (C) Main Input Disconnect:** The standard configuration, option (0), provides an input disconnect switch with a through-the-door padlockable operator mechanism. This disconnect switch **DOES NOT** provide motor short circuit protection. If motor short circuit protection is desired in the E7L bypass enclosure, select option (C) which provides a circuit breaker MCP with a through-the-door padlockable operator mechanism.
- (N) Input Filter:** The standard configuration, option (0), does not include a filter. The cap filter, option (N), is a delta-wye capacitive network.
- (F, G, H) Drive Input Circuit:** The standard configuration, option (0), does not include any protection or disconnecting means specifically for the drive. For an input disconnect switch that will remove power from the drive, select option (G). Option (F) provides high-speed semi-conductor drive input fuses, rated for 200,000 amp RMS symmetrical interrupting capacity. For the combination of options (F) and (G) which will provide an input fused disconnect switch for the drive, select option (H).
- (X, Z, R) Line Impedance:** Drives above Base Numbers D074 (25HP, 208V), A068 (25HP, 240V) and B040 (30HP, 480V) include a 3% DC bus reactor in the standard package and do not provide any additional impedance. Option (X), 3% impedance, and option (Z), 5% impedance, are not available for ratings larger than these. To achieve a 5% total input impedance, select option (R) - this 3% input reactor is available only for the HP ratings greater than the HP's listed above, and combines with the drive's standard DC bus reactor. If this option is combined with a drive that includes a bus reactor, the add-on box is required - see Dimensions and Data.
- (W) Custom Nameplates:** Custom engraved nameplates with white lettering on black lamincoid are available with option (W), for special tagging purposes (Example: "AHU #1"). Note that this option requires the text to be specified by the customer. Leave this field blank if no special nameplates are required.
- (P) 3-15 PSI Transducer:** No transducer is provided with the standard configuration. To add an optional transducer that accepts a 3-15 PSI pneumatic signal and converts it to a 4-20mA signal that is sent to the drive, specify option (P).
- (0, Y) Drive Keypad:** The standard E7L package uses the JVOP 161 LED drive operator keypad, option (0). To use the 5 line LCD keypad, select option (Y).
- (L, J, U, V, 3) Communications:** All configurations provide the hardware and software required for Metasys N2, Siemens Apogee, and Modbus network communications, but these protocols are not enabled in the standard configuration. Options (J), (U), and (V) provide the programming and jumpers necessary to enable these protocols, at no additional cost. Lonworks option (L) and BACnet option (3) require the addition of an optional board.



Bypass Drives and Options

NEMA 1

E7/2-Contactor Bypass - 1/2-60HP, 208-230/240 and 480V, 3-phase input, NEMA 1 enclosure, with factory-installed and wired options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	NEMA 1 Bypass		Main Input Disconnect	Input Filter	Drive Input Circuit			Impedance		
					0=Disc. Switch C=MCP Ckt Bkr	N=Cap	F=Fuses G=Disc. Switch H=Both			X=3% Bus Reactor Z=5% Bus Reactor R=3% Input Reactor		
			E7LV	Base	C	N	F	G	H	X	Z	R
208V	2.4	1/2	D002									
	3.5	3/4	D003									
	4.6	1	D004									
	7.5	2	D007									
	10.6	3	D010									
	16.7	5	D016									
	24.2	7.5	D024									
	30.8	10	D030									
	46.2	15	D046									
59.4	20	D059										
74.8	25	D074										
240V	2.2	1/2	A002									
	3.2	3/4	A003									
	4.0	1	A004									
	6.8	2	A006									
	9.6	3	A009									
	15.2	5	A015									
	22	7.5	A022									
	28	10	A028									
	42	15	A042									
	54	20	A054									
68	25	A068										
80	30	A080									3% Bus Reactor is included as standard - select option (0)	

(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



E7/2-Contactor Bypass (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Custom Nameplates	Drive Keypad	3-15 PSI Transducer	Communications			Uses Drive Model Number CIMR-E7U
			W=NP	0=LED Y=LCD	P=3-15 PSI	3=BACnet L=LonWorks J=N2 U=APOGEE V=Modbus			
			W	Y	P	3	L	J, U, V ⁽²⁾	
208V	2.4	1/2							22P21
	3.5	3/4							22P21
	4.6	1							22P21
	7.5	2							22P21
	10.6	3							22P21
	16.7	5							23P71
	24.2	7.5							27P51
	30.8	10							27P51
	46.2	15							20111
59.4	20							20151	
74.8	25							20181	
240V	2.2	1/2							22P21
	3.2	3/4							22P21
	4.0	1							22P21
	6.8	2							22P21
	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	

(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) Included in Base Price



Bypass Drives and Options

NEMA 1

E7/2-Contactor Bypass (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	NEMA 1 Bypass		Main Input Disconnect	Input Filter	Drive Input Circuit			Impedance			
					0=Disc. Switch C=MCP Ckt Bkr	N=Cap	F=Fuses G=Disc. Switch H=Both			X=3% Bus Reactor Z=5% Bus Reactor R=3% Input Reactor			
			E7LV	Base	C	N	F	G	H	X	Z	R	
480V	1.6	1/2 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										

(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



E7/2-Contactor Bypass (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Custom Nameplates	Drive Keypad	3-15 PSI Transducer	Communications			Uses Drive Model Number CIMR-E7U
			W=NP	0=LED Y=LCD	P=3-15 PSI	3=BACnet L=LonWorks J=N2 U=APOGEE V=Modbus			
			W	Y	P	3	L	J, U, V ⁽²⁾	
480V	1.6	1/2 3/4							42P21
	2.1	1							42P21
	3.4	2							42P21
	4.8	3							42P21
	7.6	5							43P71
	11	7.5							45P51
	14	10							47P51
	21	15							40111
	27	20							40111
	34	25							40151
	40	30							40181
	52	40							40301
65	50							40301	
77	60							40371	

(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) Included in Base Price



Bypass Drives and Options

NEMA 12 FVFF

E7/2-Contactor Bypass - 1/2-60HP, 208-230/240 and 480V, 3-phase input, NEMA 12 enclosure, with factory-installed and wired options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	NEMA 12 Bypass		Main Input Disconnect	Input Filter	Drive Input Circuit			Impedance			
					0=Disc. Switch C=MCP Ckt Bkr	N=Cap	F=Fuses G=Disc. Switch H=Both			X=3% Bus Reactor Z=5% Bus Reactor R=3% Input Reactor			
			E7LB	Base	C	N	F	G	H	X	Z	R	
208V	2.4	1/2	D002										
	3.5	3/4	D003										
	4.6	1	D004										
	7.5	2	D007										
	10.6	3	D010										
	16.7	5	D016										
	24.2	7.5	D024										
	30.8	10	D030										
	46.2	15	D046										
59.4	20	D059											
74.8	25	D074											
240V	2.2	1/2	A002										
	3.2	3/4	A003										
	4.0	1	A004										
	6.8	2	A006										
	9.6	3	A009										
	15.2	5	A015										
	22	7.5	A022										
	28	10	A028										
	42	15	A042										
	54	20	A054										
68	25	A068											
80	30	A080									3% Bus Reactor is included as standard - select option (0)		

(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



E7/2-Contactor Bypass (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Custom Nameplates	Drive Keypad	3-15 PSI Transducer	Communications			Uses Drive Model Number CIMR-E7U
			W=NP	0=LED Y=LCD	P=3-15 PSI	3=BACnet L=LonWorks J=N2 U=APOGEE V=Modbus			
			W	Y	P	3	L	J, U, V ⁽²⁾	
208V	2.4	1/2							22P21
	3.5	3/4							22P21
	4.6	1							22P21
	7.5	2							22P21
	10.6	3							22P21
	16.7	5							23P71
	24.2	7.5							27P51
	30.8	10							27P51
240V	46.2	15							20111
	59.4	20							20151
	74.8	25							20181
	2.2	1/2							22P21
	3.2	3/4							22P21
	4.0	1							22P21
	6.8	2							22P21
	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	

(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) Included in Base Price



Bypass Drives and Options

NEMA 12 FVFF

E7/2-Contactor Bypass (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	NEMA 12 Bypass		Main Input Disconnect	Input Filter	Drive Input Circuit			Impedance			
					0=Disc. Switch C=MCP Ckt Bkr	N=Cap	F=Fuses G=Disc. Switch H=Both			X=3% Bus Reactor Z=5% Bus Reactor R=3% Input Reactor			
			E7LB	Base	C	N	F	G	H	X	Z	R	
480V	1.6	1/2 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											
3% Bus Reactor is included as standard - select option (0)													

(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



E7/2-Contactor Bypass (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Custom Nameplates	Drive Keypad	3-15 PSI Transducer	Communications			Uses Drive Model Number CIMR-E7U
			W=NP	0=LED Y=LCD	P=3-15 PSI	3=BACnet L=LonWorks J=N2 U=APOGEE V=Modbus			
			W	Y	P	3	L	J, U, V ⁽²⁾	
480V	1.6	1/2 3/4							42P21
	2.1	1							42P21
	3.4	2							42P21
	4.8	3							42P21
	7.6	5							43P71
	11	7.5							45P51
	14	10							47P51
	21	15							40111
	27	20							40111
	34	25							40151
	40	30							40181
	52	40							40301
65	50							40301	
77	60							40371	

(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) Included in Base Price

E7L

Dimensions and Data

Rated Input Voltage	Bypass E7LV or E7LB	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Physical Dimensions (in.)			Weight (lbs.) ⁽²⁾	Dimension Drawing Number ^{(4), (5)}	
				H	W	D			
208V	D002	2.4	1/2	29.48	19.06	13.66	115	DD.AFD.087.01 or DD.AFD.087.02	
	D003	3.5	3/4						
	D004	4.6	1						
	D007	7.5	2						
	D010	10.6	3	40.48	25.63	14.66	208		
	D016	16.7	5						
	D024	24.2	7.5						
	D030	30.8	10						
D046	46.2	15	40.48	25.63	14.66	208	DD.AFD.088.01 or DD.AFD.088.02		
D059	59.4	20							
D074	74.8	25							
240V	A002	2.2	1/2	29.48	19.06	13.66	115	DD.AFD.087.01 or DD.AFD.087.02	
	A003	3.2	3/4						
	A004	4.0	1						
	A006	6.8	2						
	A009	9.6	3	40.48	25.63	14.66	208		
	A015	15.2	5						
	A022	22.0	7.5						
	A028	28.0	10						
A042	42.0	15	40.48	25.63	14.66	208	DD.AFD.088.01 or DD.AFD.088.02		
A054	54.0	20							
A068	68.0	25							
A080	80.0	30							
480V	B001	1.1	1/2	29.48	19.06	13.66	115	DD.AFD.087.01 or DD.AFD.087.02	
	B001	1.6	3/4						
	B002	2.1	1						
	B003	3.4	2						
	B004	4.8	3	40.48	25.63	14.66	203		
	B007	7.6	5						
	B011	11.0	7.5						
	B014	14.0	10						
	B021	21.0	15	40.48	25.63	14.66	232		DD.AFD.088.01 or DD.AFD.088.02
	B027	27.0	20						
	B034	34.0	25						
	B040	40.0	30						
	B052	52.0	40						
B065	65.0	50							
B077	77.0	60							

(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

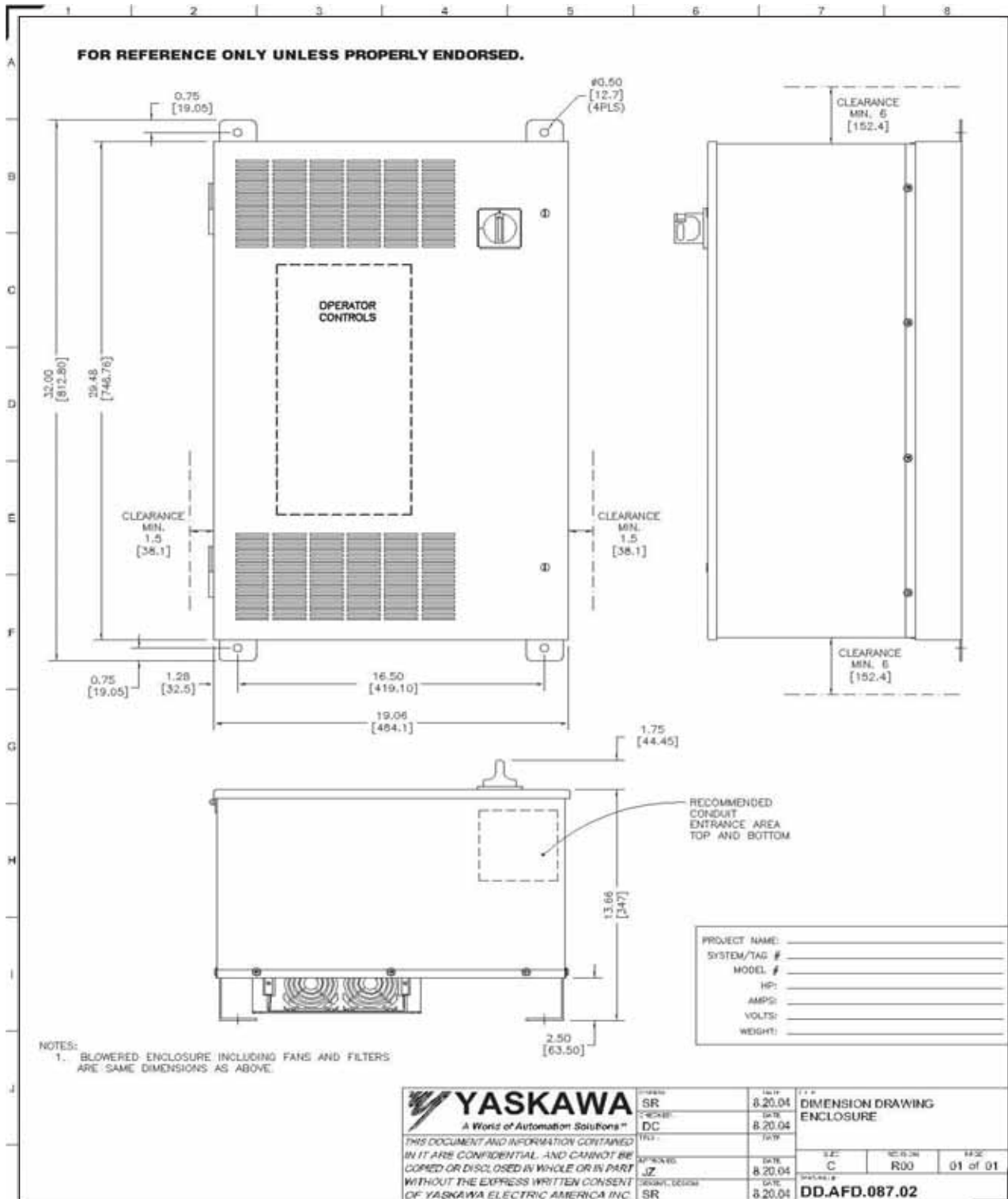
(2) Data represents the total approx. weight of the drive with all possible standard options, not shipping weight.

(3) Add 2.37" for circuit breaker handle to depth for Main Input Disconnect Option C
 Add 1.75" for disconnect switch handle to depth for Main Input Disconnect Option 0 (DD.AFD.087.02)
 Add 2.46" for disconnect switch handle to depth for Main Input Disconnect Option 0 (DD.AFD.088.02)

(4) Use DD.AFD.08x.01 for Main Input Disconnect Option C
 Use DD.AFD.08x.02 for Main Input Disconnect Option 0

(5) Operator Drawing Number - Keypad Option 0: DO.E7L.01
 Operator Drawing Number - Keypad Option Y: DO.E7L.02

Dimension Drawing
DD.AFD.087.02
E7/2-Contactor Bypass Package

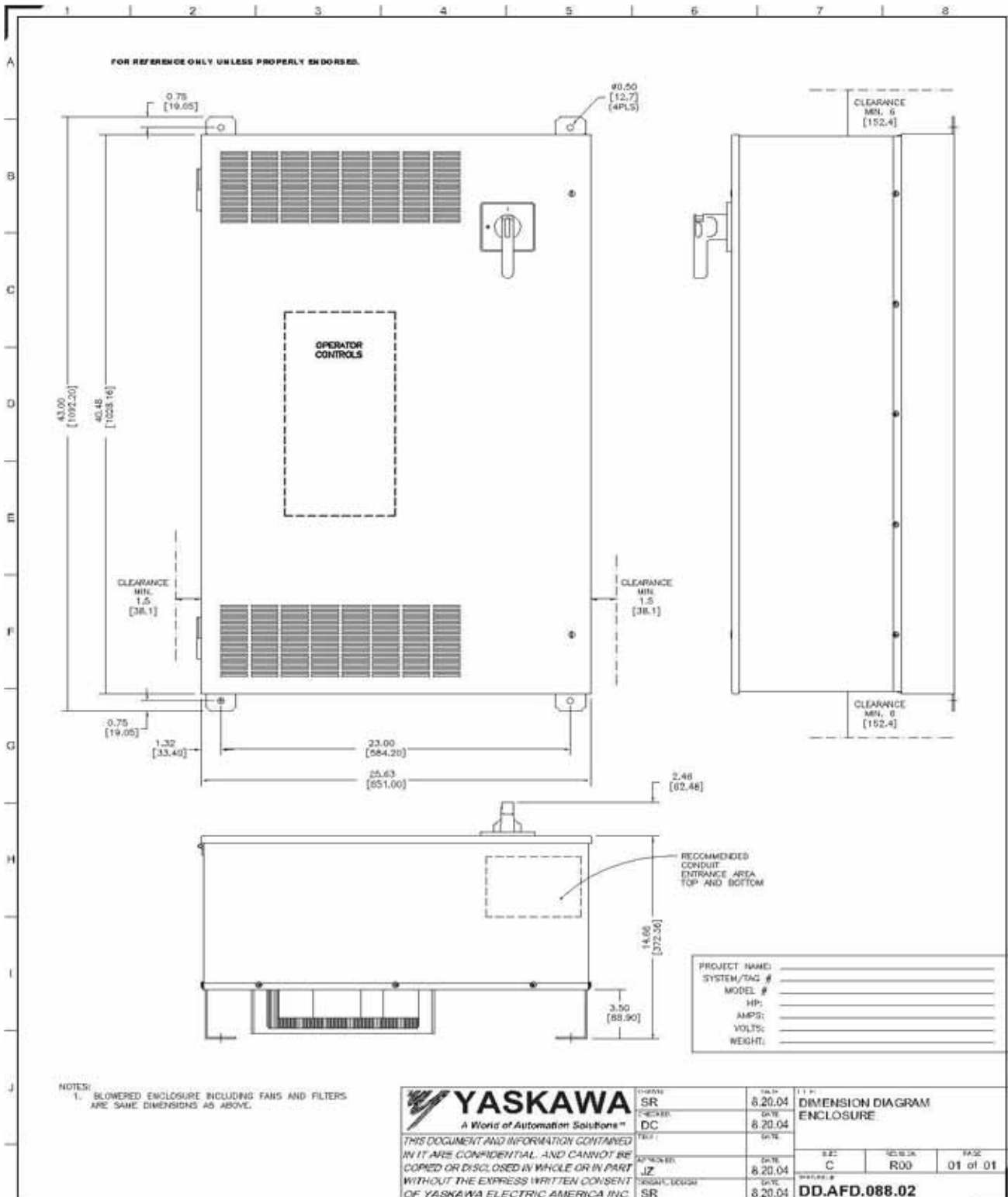


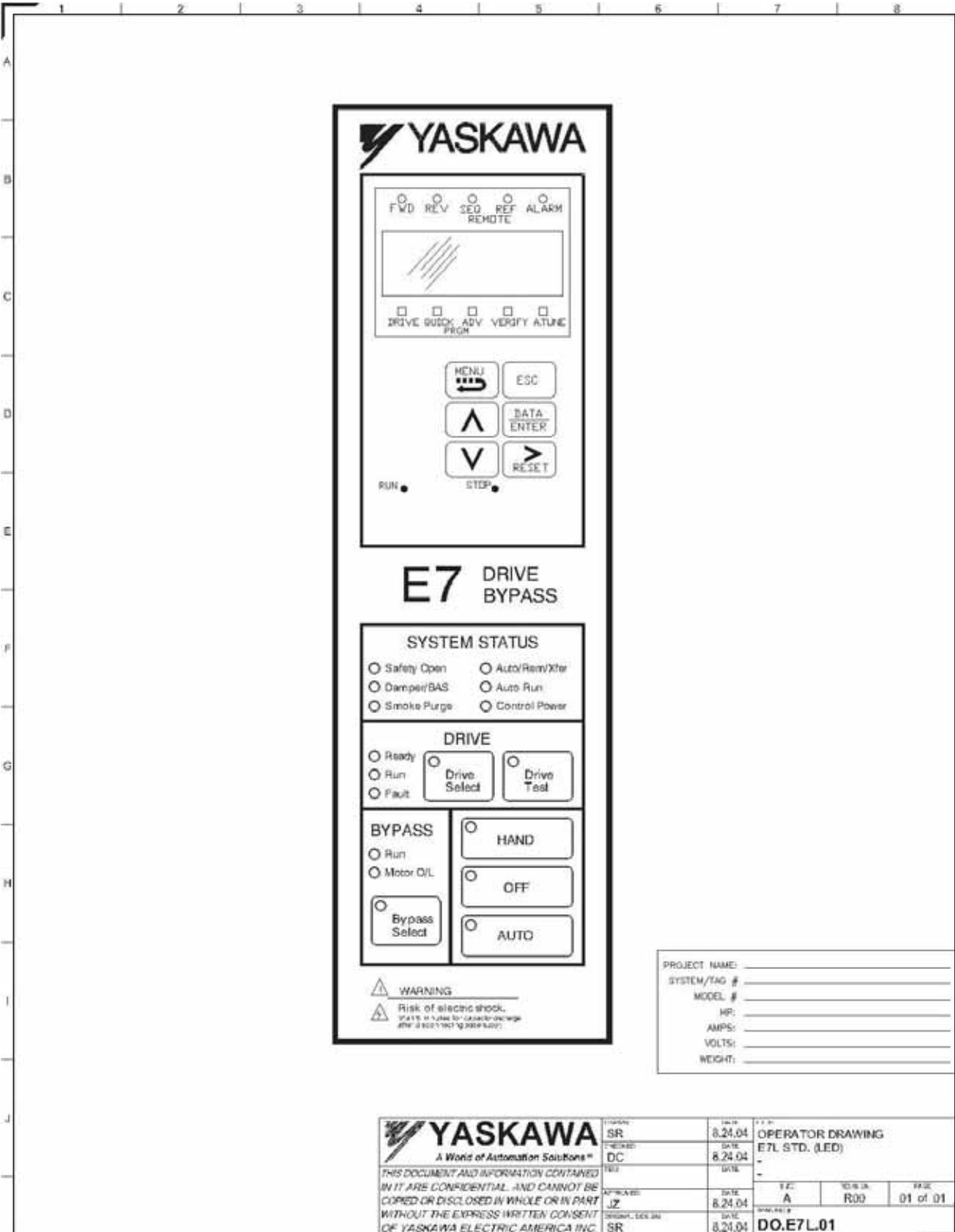


Dimension Drawing

DD.AFD.088.02

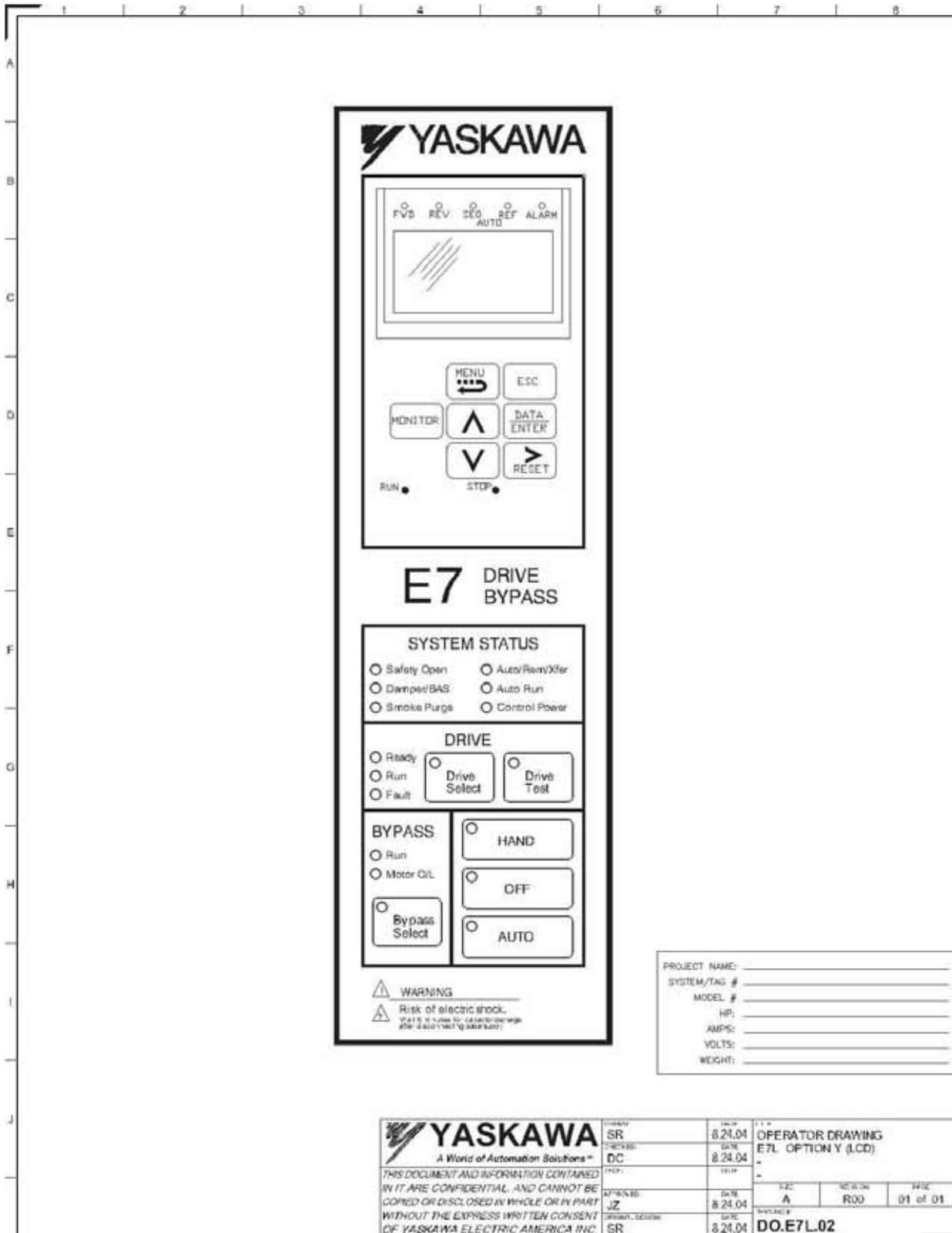
E7/2-Contactor Bypass Package







Drawing
DO.E7L.02
E7/2-Contactor Bypass Operator



Description

1/2-500HP

E7/3-Contactor Bypass

NEMA 1/12 FVFF



The E7/Bypass package is a 3-contactor style bypass, allowing motor operation from either the drive or across the line. This facilitates drive maintenance while the motor continues to operate. The E7 and E7/Bypass have been designed for flexibility in providing the features and options commonly specified by facility designers.

The E7 Drive is a variable torque AC drive, designed specifically for HVAC applications in building automation. A new benchmark for size, cost, performance, benefits, and quality, the E7 includes numerous built-in features such as Network Communications, H/O/A, PI control and energy savings functions.

The E7 has embedded communications for the popular building automation protocols, Johnson Controls Metasys N2 and Siemens APOGEE FLN, as well as Modbus. An optional LonWorks, EtherNet/IP or BACnet interface card is available.

Image Displayed with Motor Control Option (0), 22 mm LEDs and Switches

Bypass Features

- Input, output, and bypass contactors
- Circuit breaker disconnect (MCP), with interlocked, through-the-door operating mechanism
- Thermal motor overload relay, class 20
- 115 VAC control transformer, fused
- Drive/Bypass selector
- Hand/Off/Auto selector
- Normal/Test selector
- LED's, for Control: Power, Drive Run, Drive Fault, Bypass Run, Motor OL/Safety Fault and Smoke Purge
- Selectable auto transfer to bypass on drive fault
- Selectable remote transfer to bypass via contact closure
- Selectable smoke purge function
- Run mode and Fault contacts
- Control and safety circuit terminal strip
- Damper circuit safety interlock

Bypass Options

- NEMA 12 FVFF enclosure
- 22mm LEDs & switches
- Twelve-pulse rectification with input transformer: 25 -150 HP, 208 VAC; 30-150 HP, 230/240 VAC; 40-500 HP, 480 VAC
- LCD display: 5 lines, 16 characters each
- Communication: LonWorks, BACnet and EtherNet/IP
- RFI/EMI filter
- Pressure/electrical transducer
- Multiple motor operation logic: 2 Motor "OR" 2 Motor "AND"
- Speed potentiometer
- Engraved nameplates
- DriveWizard upload/download and monitoring/graphing software
- Drive input fusing
- 4-20mA output, 2 programmable
- Output impedance
- Input impedance

Service Conditions

- Ambient Temperature: -10°C to 40°C (14°F to 104°F) NEMA 1
- Humidity: 95% RH, non-condensing
- Altitude: 3300 ft; higher by derate
- Input voltage: +10%/-15%
- Input frequency: 50/60 Hz ± 5%
- 3-phase, 3-wire, phase sequence insensitive

Performance Features

- VT Ratings: 1/2-150 HP, 208 VAC
1/2-150 HP, 230/240 VAC
1/2- 500 HP, 480 VAC
- Overload capacity: 110% for 60 sec. (150% peak)
- Starting torque: 100% at 3 Hz
- DC injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Motor preheat function
- Adjustable accel/decel: 0.1 to 6000 sec.
- Controlled speed range: 40:1
- Critical frequency rejection: 3 selectable, adjustable bands
- Torque limiting: 30-180%
- Energy Saving control
- Torque boost: full range, auto
- Power loss ride-thru: 2 sec.
- Inertia ride-thru
- Auto restart after power loss or resettable fault, selectable, programmable
- Feedback signal loss detection
- Serial communications loss detection
- "Up/Down" floating point control capability
- Stationary motor auto-tuning
- Customizable monitor display
- Sleep function
- Run permissive input
- Ramp-to-stop or coast-to-stop selection
- Runtime changes in control and display
- Project-specific parameter reinitialization

Protective Features

- Current limited stall prevention
- Heat sink over-temperature, speed fold-back
- Cooling fan operating hours recorded
- Bi-directional start into rotating motor at synchronized speed
- DC bus charge indicator
- Current limiting DC bus fuse
- Optically-Isolated controls
- Short circuit protection: Phase-phase and phase-neutral
- Ground fault protection
- Electronic motor overload: UL
- Current and torque limit
- Fault display: last 10 faults
- Fault circuit: OC, OV, OT
- Over torque and under torque protection
- Program security code
- "Hunting" prevention logic
- Reverse prohibit selectability

Design Features

- 32-bit microprocessor logic
- Flash upgradeable firmware
- Non-volatile memory, program retention
- Surface-mount devices
- Displacement power factor: 0.98
- Output frequency: 0.1 to 120 Hz
- Frequency resolution: 0.06 Hz
- Frequency regulation: 0.1%
- Control Terminal Board: Quick disconnect, removable
- Carrier frequency: selectable to 15 kHz
- 3% DC bus reactor: 30-150 HP, 208 VAC; 30-150 HP, 240 VAC; 40-500 HP, 480 VAC; optional on lower ratings
- Keypad Operator: Hand/Off/Auto, built-in copy feature, 7 languages
- 24 VDC control logic
- Transmitter/Option power supply
- Output contacts: One form C and two programmable form A
- Input/output terminal status
- Input terminals: 5 programmable multi-function input terminals
- Fault input: Programmable
- Diagnostic fault indication in selected language
- Timer function: Elapsed time, Delay on start, Delay on stop
- RS-422/485 port: Embedded Metasys N2, APOGEE FLN, and Modbus
- Volts/hertz ratio: Preset and programmable V/Hz patterns
- Multi-speed settings: 5 available
- Remote speed command: 0-10 VDC or 4-20 mA, direct or reverse-acting
- Setpoint (PI) control with inverse or square root input, differential control via two feedback capability
- Feedback signal: low pass filter
- Speed command: bias and gain
- Analog outputs: Programmable, two, 0-10 VDC
- Meter Functions: Volt, amp, kilowatt, elapsed run time, speed command
- Output Current Transformers, qty 3
- NEMA 1 or NEMA 12 enclosure
- UL, cUL listed; CE marked; IEC 146
- MTBF: exceeds 28 years



Description
1/2-500HP
E7/3-Contactor Bypass
NEMA 1/12 FVFF

Model Number Configuration & Pricing:

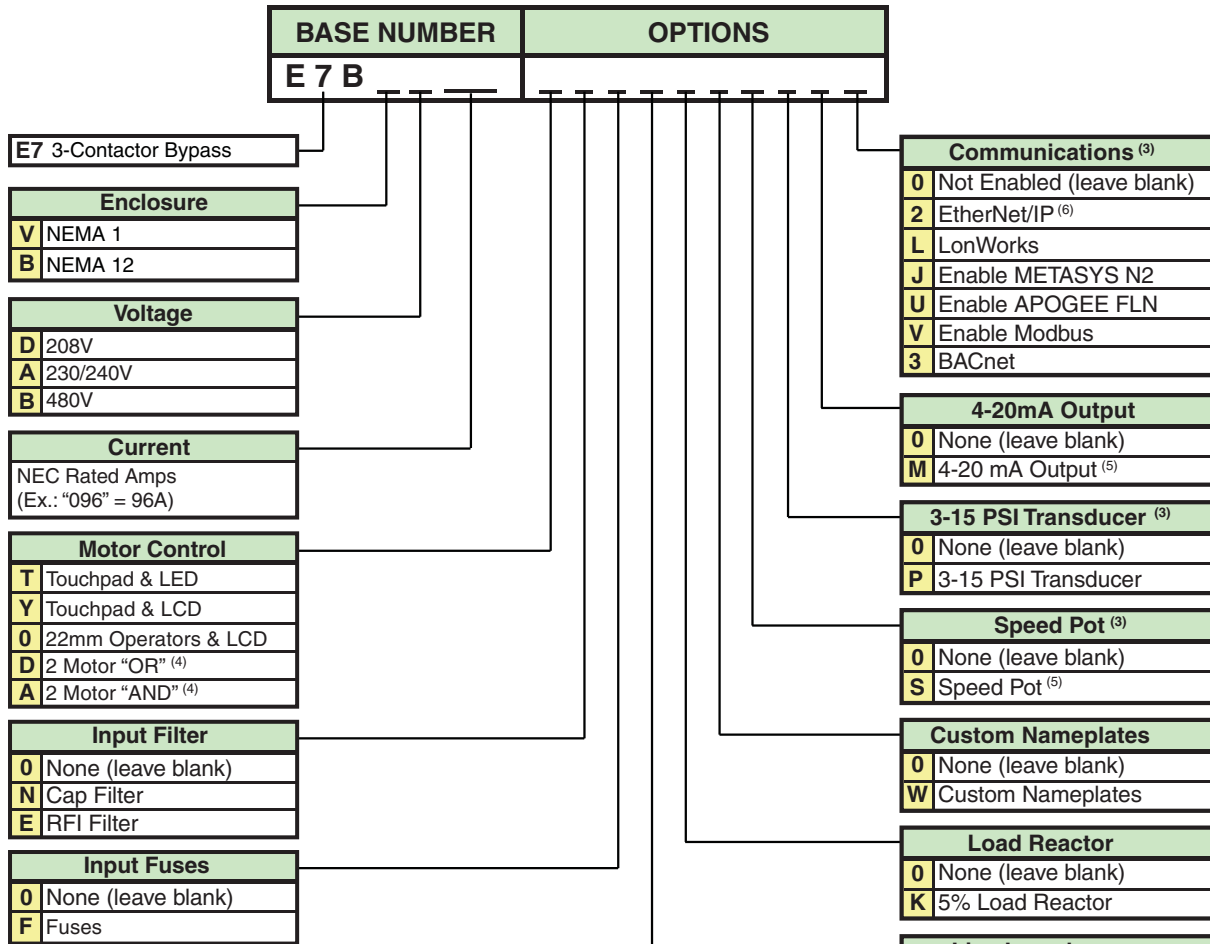
Step 1. First complete the Base Number for the required enclosure type, voltage and current rating.

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

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: E7 NEMA 1 Bypass package (**E7BV**) with a 96 Amp, 480V drive (**B096**), with 22mm LEDs & switches (**0**), a 3% input reactor (**R**), door-mounted speed pot (**S**), and LonWorks communications capability (**L**), would be **E7BVB096RSL**.

E7BVB096RSL



- (1) 3% and 5% Bus Reactors are only available as an option on base numbers up to E7B_D074, A068, and B040; larger drives have a Bus Reactor as standard.
- (2) 3% Input Reactor, when combined with the standard Bus Reactor (available on base numbers E7B_D088, A080, and B052 and above), yields a total of 5% input impedance.
- (3) Serial Comm options (J), (L), (U) or (V) cannot be ordered if both (S) and (P) are combined.
- (4) 2 Motor "OR" and 2 Motor "AND" options (D) and (A) are only available with 22mm operators option (0).
- (5) Options (M) and (S) are not available with options (T) or (Y) - 4-20mA output is standard with options (T) or (Y).
- (6) Not available with options (T) or (Y).

Description
1/2-500HP
E7/3-Contactor Bypass
NEMA 1/12 FVFF

E7B

Bypass Option Descriptions:

- (V, B) Enclosure:** The drive and options are provided in either a NEMA Type 1 (V) ventilated or NEMA 12 FVFF (force ventilated fan filter) (B) enclosure, large enough to accommodate any or all of the package options. Enclosures for Base Numbers up to, and including, D114 (40HP, 208V), A104 (40HP, 240V), and B124 (100HP, 480V) are wall-mounted; larger drives are in floor-mount enclosures.
- (T, Y, 0, D, A) Motor Control:** The best-priced configuration, option (T) is for single motor operation with H/O/A Touchpad Control and an LED Drive Keypad. The (Y) option replaces the LED Drive Keypad with a backlit 5-line LCD Keypad Display. Option (0) provides 22mm LEDs & Switches and the LCD Drive Keypad Display. **For purposes of continuity with previous sales - if no Motor Control option is indicated, the standard configuration option (0) will be provided.** Either one of two motors can be controlled with the 'OR' configuration, option (D). Simultaneous control of two identical motors is possible with the 'AND' configuration, option (A). Both options (A) & (D) are only available with the 22mm LEDs & Switches.
- (N, E) Input Filter:** The standard configuration does not include a filter. The cap filter, option (N), is a delta-wye capacitive network, while the RFI filter (E) provides noise attenuation to help meet CE requirements. This option requires the addition of the add-on box - see Dimensions and Data.
- (F) Input Fuses:** The standard configuration, option (0), includes a circuit breaker disconnect with a door-interlocked operating mechanism. Option (F) provides high-speed semi-conductor drive input fuses, rated for 200,000 amp RMS symmetrical interrupting capacity.
- (X, Z, R) Line Impedance:** Drives above Base Numbers D074 (25HP, 208V), A068 (25HP, 240V) and B040 (30HP, 480V) include a 3% DC bus reactor in the standard package and do not provide any additional impedance. Option (X), 3% impedance, and option (Z), 5% impedance, are not available for ratings larger than these. To achieve a 5% total input impedance, select option (R) - this 3% input reactor is available only for the HP ratings greater than the HP's listed above, and combines with the drive's standard DC bus reactor. If this option is combined with a drive that includes a bus reactor, the add-on box is required - see Dimensions and Data.
- (K) Load Reactor:** No form of output impedance is normally required. A 5% load reactor, option (K), is available if additional output impedance is desired (usually for long lead-lengths or noise reduction). This option may require the add-on box for wall-mount enclosures - see Dimensions and Data.
- (W) Custom Nameplates:** Custom engraved nameplates with white lettering on black lamicaid are available with option (W), for special tagging purposes (Example: "AHU #1"). Note that this option requires the text to be specified by the customer. Leave this field blank if no special nameplates are required.
- (S) Speed Pot:** The drive's digital operator is always brought out to the front of the panel, so it is available for speed control - this is the standard configuration. A door-mounted 2.5K ohm speed potentiometer is available for manual speed control with option (S). This also includes a 2.5K ohm trim pot and is suitable for NEMA 1 and NEMA 12 installations.
- (P) 3-15 PSI Transducer:** No transducer is provided with the standard configuration. To add an optional transducer that accepts a 3-15 PSI pneumatic signal and converts it to a 4-20mA signal that is sent to the drive, specify option (P).
- (M) 4-20mA Output:** The standard Configured package provides two programmable 0-10VDC outputs. To convert these outputs to 4-20mA output signals, specify option (M).
- (2, L, J, U, 3, V) Communications:** All configurations provide the hardware and software required for Metasys N2, Siemens Apogee, and Modbus network communications, but these protocols are not enabled in the standard configuration. Options (J), (U), and (V) provide the programming and jumpers necessary to enable these protocols, at no additional cost. Lonworks option (L), BACnet option (3) and EtherNet/IP option (2) require the addition of an optional board.



Bypass Drives and Options

NEMA 1

E7/3-Contactor Bypass - 1/2-500HP, 208-230/240 and 480V, 3-phase input, NEMA 1 enclosure, with factory-installed and wired options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	NEMA 1 Bypass		Motor Control					Input Filter		Input Fuses	Line Impedance			
					T="Touchpad & LED" Y="Touchpad & LCD" 0="22mm Operators & LCD" D=2 Motor "OR" A=2 Motor "AND"					N=Cap E=RFI	F=Fuses	X=3% Bus Reactor Z=5% Bus Reactor R=3% Input Reactor				
			E7BV	Base	T	Y	0	D ⁽³⁾	A ⁽³⁾	N	E ⁽²⁾	F	X	Z	R ⁽²⁾	
208V	2.4	1/2	D002													N/A
	3.5	3/4	D003													
	4.6	1	D004													
	7.5	2	D007													
	10.6	3	D010													
	16.7	5	D016													
	24.2	7.5	D024													
	30.8	10	D030													
	46.2	15	D046													
	59.4	20	D059													
	74.8	25	D074													
	88	30	D088													
	114	40	D114													
	143	50	D143													
169	60	D169														
211	75	D211														
273	100	D273														
343	125	D343														
396	150	D396														
240V	2.2	1/2	A002													N/A
	3.2	3/4	A003													
	4.0	1	A004													
	6.8	2	A006													
	9.6	3	A009													
	15.2	5	A015													
	22	7.5	A022													
	28	10	A028													
	42	15	A042													
	54	20	A054													
68	25	A068														
80	30	A080														
104	40	A104														
230V	130	50	A130													3% Bus Reactor is included as standard - select option (0)
	154	60	A154													
	192	75	A192													
	248	100	A248													
	312	125	A312													
	360	150	A360													

- (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 price includes the add-on box, when required. If more than one of the following: RFI Filter, 3% Input Reactor, and 5% Load Reactor is selected, DEDUCT from all but one of these options
- (3) When option D or A is selected, do not add for option 0.



E7/3-Contactor Bypass (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Load Reactor	Custom Name-plates	Speed Pot	3-15 PSI Transducer	4-20mA Output	Communications				Uses Drive Model Number CIMR-E7U	
			K=5%	W=NP	S=Pot	P=3-15 PSI	M=4-20mA	2=EtherNet/IP, 3=BACnet L=LonWorks J=N2 U=APOGEE V=Modbus					
			K ⁽²⁾	W	S	P	M	2	3	L	J, V, U ⁽³⁾		
208V	2.4	1/2											22P21
	3.5	3/4											22P21
	4.6	1											22P21
	7.5	2											22P21
	10.6	3											22P21
	16.7	5											23P71
	24.2	7.5											27P51
	30.8	10											27P51
	46.2	15											20111
	59.4	20											20151
	74.8	25											20181
	88	30											20221
	114	40											20301
	143	50											20370
240V	2.2	1/2											22P21
	3.2	3/4											22P21
	4.0	1											22P21
	6.8	2											22P21
	9.6	3											22P21
	15.2	5											23P71
	22	7.5											25P51
	28	10											27P51
	42	15											20111
	54	20											20151
230V	68	25											20181
	80	30											20221
	104	40											20301
	130	50											20370
	154	60											20370
	192	75											20450
230V	248	100											20750
	312	125											20750
230V	360	150											20900

- (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 price includes the add-on box, when required. If more than one of the following: RFI Filter, 3% Input Reactor, and 5% Load Reactor is selected, DEDUCT from all but one of these options
- (3) Included in Base Price



Bypass Drives and Options

NEMA 1

E7/3-Contactor Bypass (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	NEMA 1 Bypass		Motor Control					Input Filter		Input Fuses	Line Impedance			
					T="Touchpad & LED" Y="Touchpad & LCD" 0="22mm Operators & LCD" D=2 Motor "OR" A=2 Motor "AND"					N=Cap E=RFI	F=Fuses	X=3% Bus Reactor Z=5% Bus Reactor R=3% Input Reactor				
			E7BV	Base	T	Y	0	D	A	N	E ⁽²⁾	F	X	Z	R ⁽²⁾	
480V	1.6	1/2 3/4	B001													N/A
	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													
380	300	B380														
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 price includes the add-on box, when required. If more than one of the following: RFI Filter, 3% Input Reactor, and 5% Load Reactor is selected, DEDUCT from all but one of these options

E7/3-Contactor Bypass (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Load Reactor	Custom Name-plates	Speed Pot	3-15 PSI Transducer	4-20mA Output	Communications				Uses Drive Model Number CIMR-E7U		
			K=5%	W=NP	S=Pot	P=3-15 PSI	M=4-20mA	2=EtherNet/IP, 3=BACnet L=LonWorks J=N2 U=APOGEE V=Modbus						
			K ⁽²⁾	W	S	P	M	2	3	L	J, V, U ⁽³⁾			
480V	1.6	1/2 3/4												42P21
	2.1	1												42P21
	3.4	2												42P21
	4.8	3												42P21
	7.6	5												43P71
	11	7.5												45P51
	14	10												47P51
	21	15												40111
	27	20												40111
	34	25												40151
	40	30												40181
	52	40												40301
	65	50												40301
	77	60												40371
	96	75												40451
	124	100												40551
	156	125												40750
	180	150												40900
240	200												41100	
302	250												41600	
380	300												41850	
414	350												41850	
477	400												42200	
515	450												42200	
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) This price includes the add-on box, when required. If more than one of the following: RFI Filter, 3% Input Reactor, and 5% Load Reactor is selected, DEDUCT from all but one of these options
- (3) Included in Base Price



Bypass Drives and Options

NEMA 12 FVFF

E7/3-Contactor Bypass - 1/2-500HP, 208-230/460V, 3-phase input, NEMA 12 FVFF enclosure, with factory-installed and wired options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	NEMA 12 Bypass		Motor Control					Input Filter		Input Fuses	Line Impedance			
					T="Touchpad & LED" Y="Touchpad & LCD" 0="22mm Operators & LCD" D=2 Motor "OR" A=2 Motor "AND"					N=Cap E=RFI	F=Fuses	X=3% Bus Reactor Z=5% Bus Reactor R=3% Input Reactor				
					E7BB	Base	T	Y	0	D	A	N	E ⁽²⁾	F	X	Z
208V	2.4	1/2	D002													N/A
	3.5	3/4	D003													
	4.6	1	D004													
	7.5	2	D007													
	10.6	3	D010													
	16.7	5	D016													
	24.2	7.5	D024													
	30.8	10	D030													
	46.2	15	D046													
	59.4	20	D059													
	74.8	25	D074													
	88	30	D088													
	114	40	D114													
	143	50	D143													
169	60	D169														
211	75	D211														
273	100	D273														
343	125	D343														
396	150	D396														
240V	2.2	1/2	A002													N/A
	3.2	3/4	A003													
	4.0	1	A004													
	6.8	2	A006													
	9.6	3	A009													
	15.2	5	A015													
	22	7.5	A022													
	28	10	A028													
	42	15	A042													
	54	20	A054													
68	25	A068														
80	30	A080														
104	40	A104														
230V	130	50	A130													3% Bus Reactor is included as standard - select option (0)
	154	60	A154													
	192	75	A192													
	248	100	A248													
	312	125	A312													
	360	150	A360													

(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 price includes the add-on box, when required. If more than one of the following: RFI Filter, 3% Input Reactor, and 5% Load Reactor is selected, DEDUCT from all but one of these options



E7/3-Contactor Bypass (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Load Reactor	Custom Name-plates	Speed Pot	3-15 PSI Transducer	4-20mA Output	Communications				Uses Drive Model Number CIMR-E7U	
			K=5%	W=NP	S=Pot	P=3-15 PSI	M=4-20mA	2=EtherNet/IP, 3=BACnet L=LonWorks J=N2 U=APOGEE V=Modbus					
			K ⁽²⁾	W	S	P	M	2	3	L	J, V, U ⁽³⁾		
208V	2.4	1/2											22P21
	3.5	3/4											22P21
	4.6	1											22P21
	7.5	2											22P21
	10.6	3											22P21
	16.7	5											23P71
	24.2	7.5											27P51
	30.8	10											27P51
	46.2	15											20111
	59.4	20											20151
	74.8	25											20181
	88	30											20221
	114	40											20301
	143	50											20370
240V	2.2	1/2											22P21
	3.2	3/4											22P21
	4.0	1											22P21
	6.8	2											22P21
	9.6	3											22P21
	15.2	5											23P71
	22	7.5											25P51
	28	10											27P51
	42	15											20111
	54	20											20151
230V	68	25											20181
	80	30											20221
	104	40											20301
	130	50											20370
	154	60											20370
	192	75											20450
230V	248	100											20750
	312	125											20750
230V	360	150											20900

- (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 price includes the add-on box, when required. If more than one of the following: RFI Filter, 3% Input Reactor, and 5% Load Reactor is selected, DEDUCT from all but one of these options
- (3) Included in Base Price



Bypass Drives and Options

NEMA 12 FVFF

E7/3-Contactor Bypass (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	NEMA 12 Bypass		Motor Control					Input Filter		Input Fuses	Line Impedance				
					T="Touchpad & LED" Y="Touchpad & LCD" 0="22mm Operators & LCD" D=2 Motor "OR" A=2 Motor "AND"					N=Cap E=RFI	F=Fuses	X=3% Bus Reactor Z=5% Bus Reactor R=3% Input Reactor					
			E7BB	Base	T	Y	0	D	A	N	E ⁽²⁾	F	X	Z	R ⁽²⁾		
480V	1.6	1/2 3/4	B001														N/A
	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															
380	300	B380															
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 price includes the add-on box, when required. If more than one of the following: RFI Filter, 3% Input Reactor, and 5% Load Reactor is selected, DEDUCT from all but one of these options



E7/3-Contactor Bypass (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Load Reactor	Custom Name-plates	Speed Pot	3-15 PSI Transducer	4-20mA Output	Communications				Uses Drive Model Number CIMR-E7U		
			K=5%	W=NP	S=Pot	P=3-15 PSI	M=4-20mA	2=EtherNet/IP, 3=BACnet L=LonWorks J=N2 U=APOGEE V=Modbus						
			K ⁽²⁾	W	S	P	M	2	3	L	J, V, U ⁽³⁾			
480V	1.6	1/2 3/4												42P21
	2.1	1												42P21
	3.4	2												42P21
	4.8	3												42P21
	7.6	5												43P71
	11	7.5												45P51
	14	10												47P51
	21	15												40111
	27	20												40111
	34	25												40151
	40	30												40181
	52	40												40301
	65	50												40301
	77	60												40371
	96	75												40451
	124	100												40551
	156	125												40750
	180	150												40900
240	200												41100	
302	250												41600	
380	300												41850	
414	350												41850	
477	400												42200	
515	450												42200	
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) This price includes the add-on box, when required. If more than one of the following: RFI Filter, 3% Input Reactor, and 5% Load Reactor is selected, DEDUCT from all but one of these options
- (3) Included in Base Price

E7B

Dimensions and Data NEMA 1/12 FVFF

Rated Input Voltage	Bypass E7BV or E7BB	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Physical Dimensions (in.) ⁽⁵⁾			Weight (lbs.) ⁽²⁾	Dimension Drawing Number ⁽⁶⁾	Dimension Drawing Number (w/ Add-on Box) ^{(3), (6)}
				H	W	D ⁽⁴⁾			
208V	D002	2.4	1/2	29.48 ⁽³⁾	19.06	13.66	115	DD.AFD.087.01	DD.AFD.087.01.AO
	D003	3.5	3/4						
	D004	4.6	1						
	D007	7.5	2						
	D010	10.6	3						
	D016	16.7	5	40.48 ⁽³⁾	25.63	14.66	208	DD.AFD.088.01	DD.AFD.088.01.AO
	D024	24.2	7.5						
	D030	30.8	10						
	D046	46.2	15	84.00	37.75 ⁽⁵⁾	26.00	847	DD.AFD.091.01	N/A
	D059	59.4	20						
	D074	74.8	25						
	D088	88.0	30						
	D114	114	40						
D143	143	50	84.00	73.25	26.00	1330 1423	DD.AFD.093.01	N/A	
D169	169	60							
D211	211	75							
D273	273	100	29.48 ⁽³⁾	19.06	13.66	115	DD.AFD.087.01	DD.AFD.087.01.AO	
D343	343	125							
D396	396	150							
A002	2.2	1/2							
A003	3.2	3/4							
A004	4.0	1							
A006	6.8	2							
A009	9.6	3							
A015	15.2	5							
A022	22.0	7.5							
A028	28.0	10	40.48 ⁽³⁾	25.63	14.66	208	DD.AFD.088.01	DD.AFD.088.01.AO	
A042	42.0	15							
A054	54.0	20							
A068	68.0	25	84.00	37.75 ⁽⁵⁾	26.00	847	DD.AFD.091.01	N/A	
A080	80.0	30							
A104	104	40							
A130	130	50							
A154	154	60	84.00	73.25	26.00	1330 1376	DD.AFD.093.01	N/A	
A192	192	75							
A248	248	100							
A312	312	125	84.00	73.25	26.00	1330 1376	DD.AFD.093.01	N/A	
A360	360	150							

- (1) Horsepower rating is based on standard NEMA B 4-pole motor design as represented in NEC table 430.150 Full-Load Current, Three-Phase Alternating Current Motors
- (2) Data represents the total approx. weight of the drive with all possible standard options, not shipping weight.
- (3) Add-on box (required with specified options - see options description) adds up to 15" to 'H' dimension and 91 lbs. Max. to total drive weight.
- (4) Add 2.37" for circuit breaker handle to depth.
- (5) Some option combinations require the next size enclosure. Consult factory before providing mechanical submittal data.
- (6) Operator Drawing Number, Options 0, D, A: DO.E7B.01
Operator Drawing Number, Option T: DO.E7B.02
Operator Drawing Number, Option Y: DO.E7B.03

Dimensions and Data

NEMA 1/12 FVFF



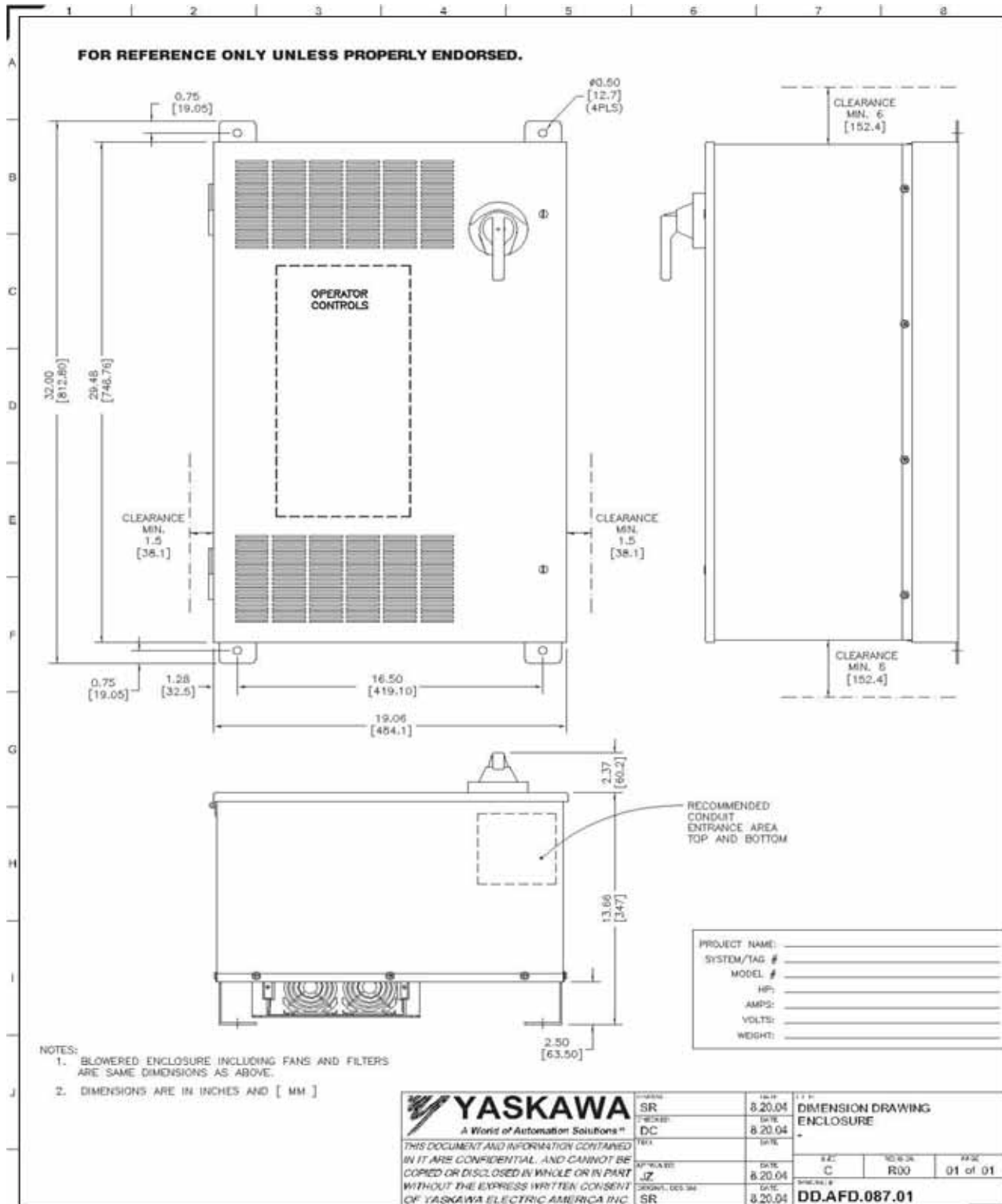
Rated Input Voltage	Bypass E7BV or E7BB	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Physical Dimensions (in.) ^{(5), (7)}			Weight (lbs.) ⁽²⁾	Dimension Drawing Number ⁽⁶⁾	Dimension Drawing Number (w/ Add-on Box) ^{(3), (6)}
				H	W	D ⁽⁴⁾			
480V	B001	1.1 1.6	1/2 3/4	29.48 ⁽³⁾	19.06	13.66	115	DD.AFD.087.01	DD.AFD.087.01.AO
	B002	2.1	1						
	B003	3.4	2						
	B004	4.8	3						
	B007	7.6	5						
	B011	11.0	7.5						
	B014	14.0	10						
	B021	21.0	15						
	B027	27.0	20	40.48 ⁽³⁾	25.63	14.66	127	DD.AFD.088.01	DD.AFD.088.01.AO
	B034	34.0	25						
	B040	40.0	30						
	B052	52.0	40				203		
	B065	65.0	50	84.00	37.75 ⁽⁵⁾	26.00	232	DD.AFD.091.01	N/A
	B077	77.0	60						
	B096	96.0	75				241		
	B124	124	100	84.00	73.25	26.00	943	DD.AFD.093.01	N/A
	B156	156	125						
	B180	180	150						
	B240	240	200				1240		
	B302	302	250	84.00	109.00	26.00	1352	TBD	N/A
B380	380	300							
B414	414	350							
B477	477	400	84.00	109.00	26.00	1740	TBD	N/A	
B515	515	450				1800			
B590	590	500	1854	1900	2150	TBD	N/A		

- (1) Horsepower rating is based on standard NEMA B 4-pole motor design as represented in NEC table 430.150 Full-Load Current, Three-Phase Alternating Current Motors
- (2) Data represents the total approx. weight of the drive with all possible standard options, not shipping weight.
- (3) Add-on box (required with specified options - see options description) adds up to 15" to 'H' dimension and 91 lbs. Max. to total drive weight.
- (4) Add 2.37" for circuit breaker handle to depth.
- (5) Some option combinations require the next size enclosure. Consult factory before providing mechanical submittal data.
- (6) Operator Drawing Number, Options 0, D, A: DO.E7B.01
Operator Drawing Number, Option T: DO.E7B.02
Operator Drawing Number, Option Y: DO.E7B.03
- (7) If option D (2 motor "OR") or option A (2 motor "AND") is selected, consult factory for dimensions.

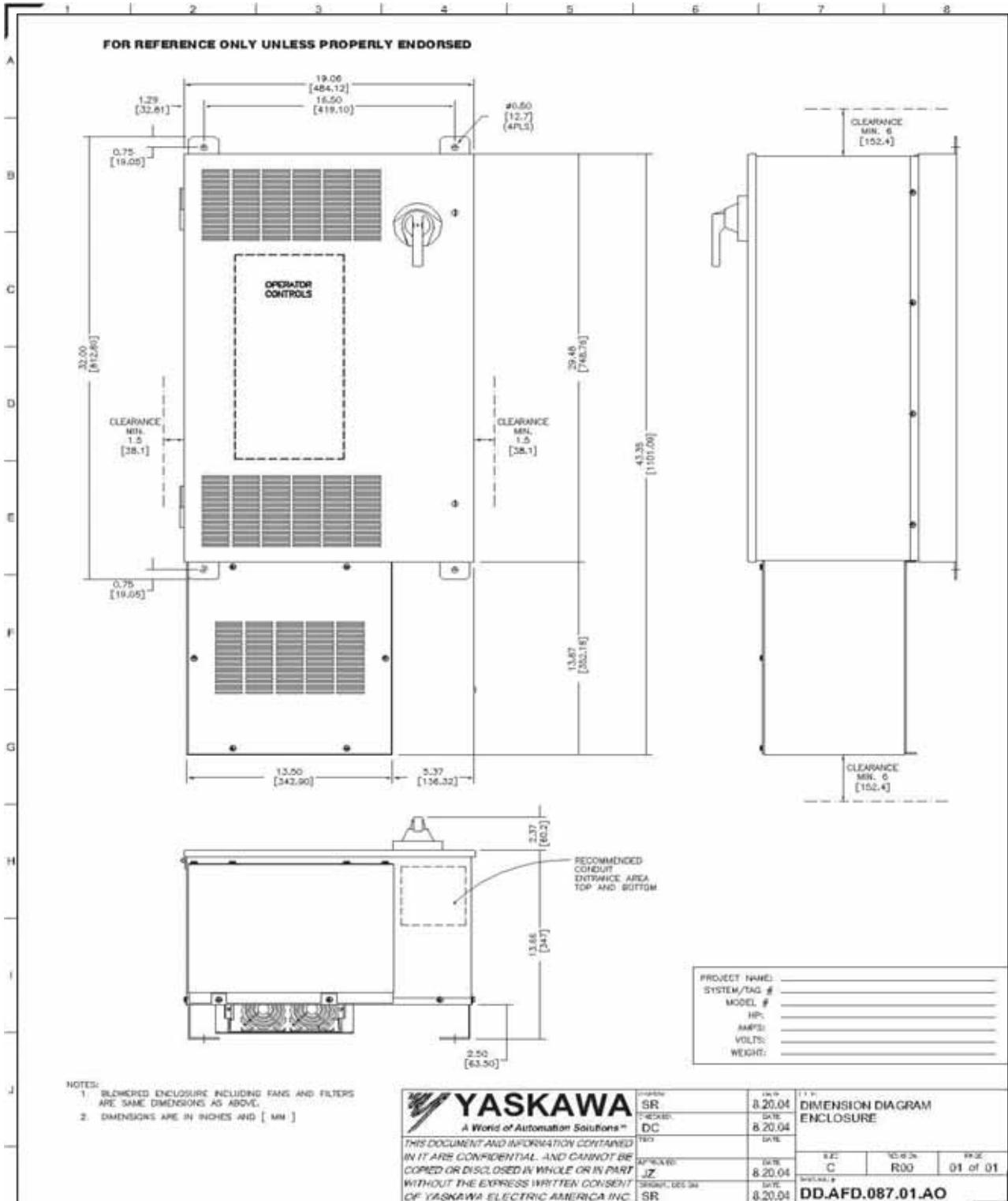
E7B

Dimension Drawing

DD.AFD.087.01
 E7/Bypass
 NEMA 1/12 FVFF



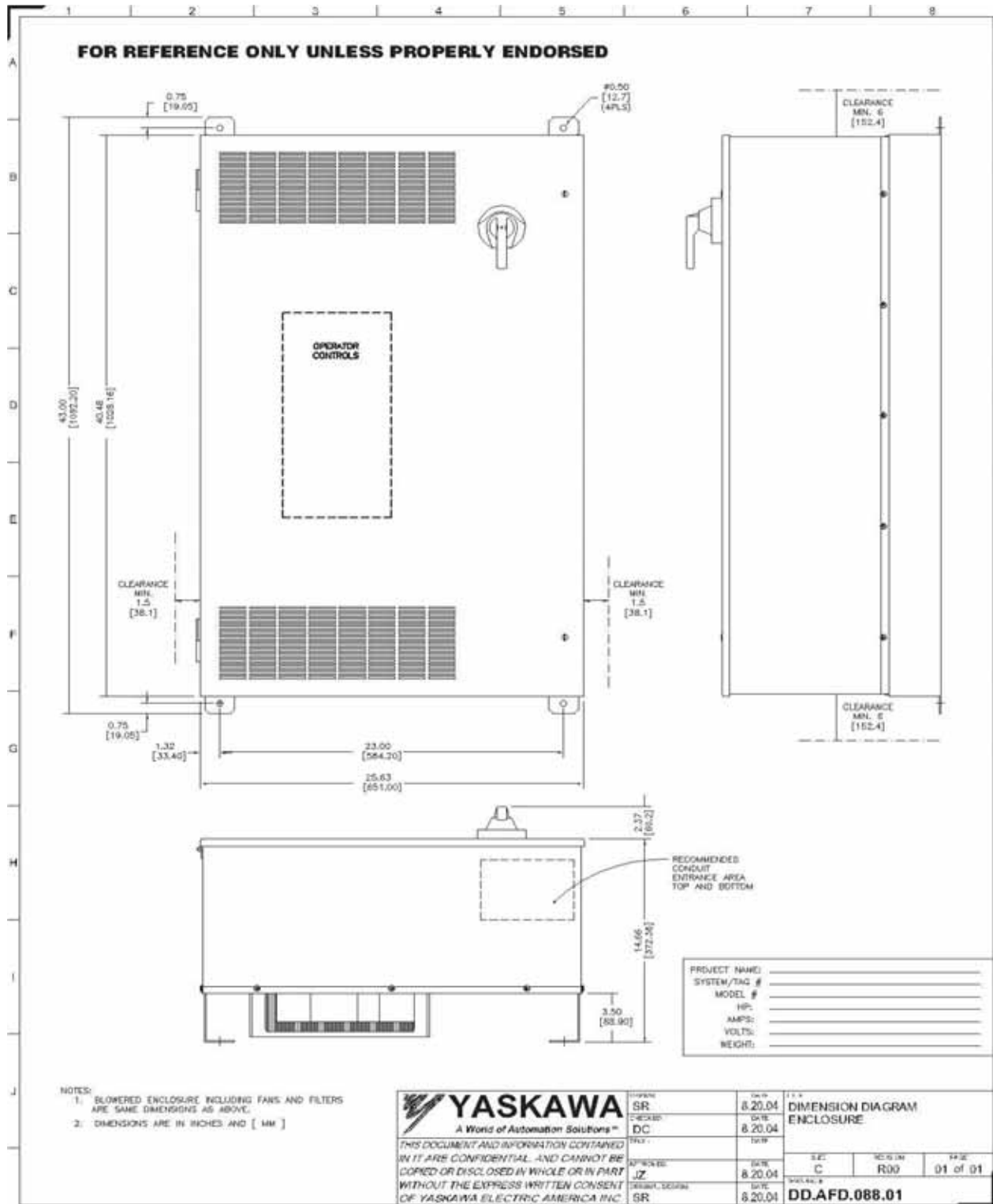
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DD.AFD.087.01.AO
E7/Bypass With Add-On Box
NEMA 1/12 FVFF



E7B

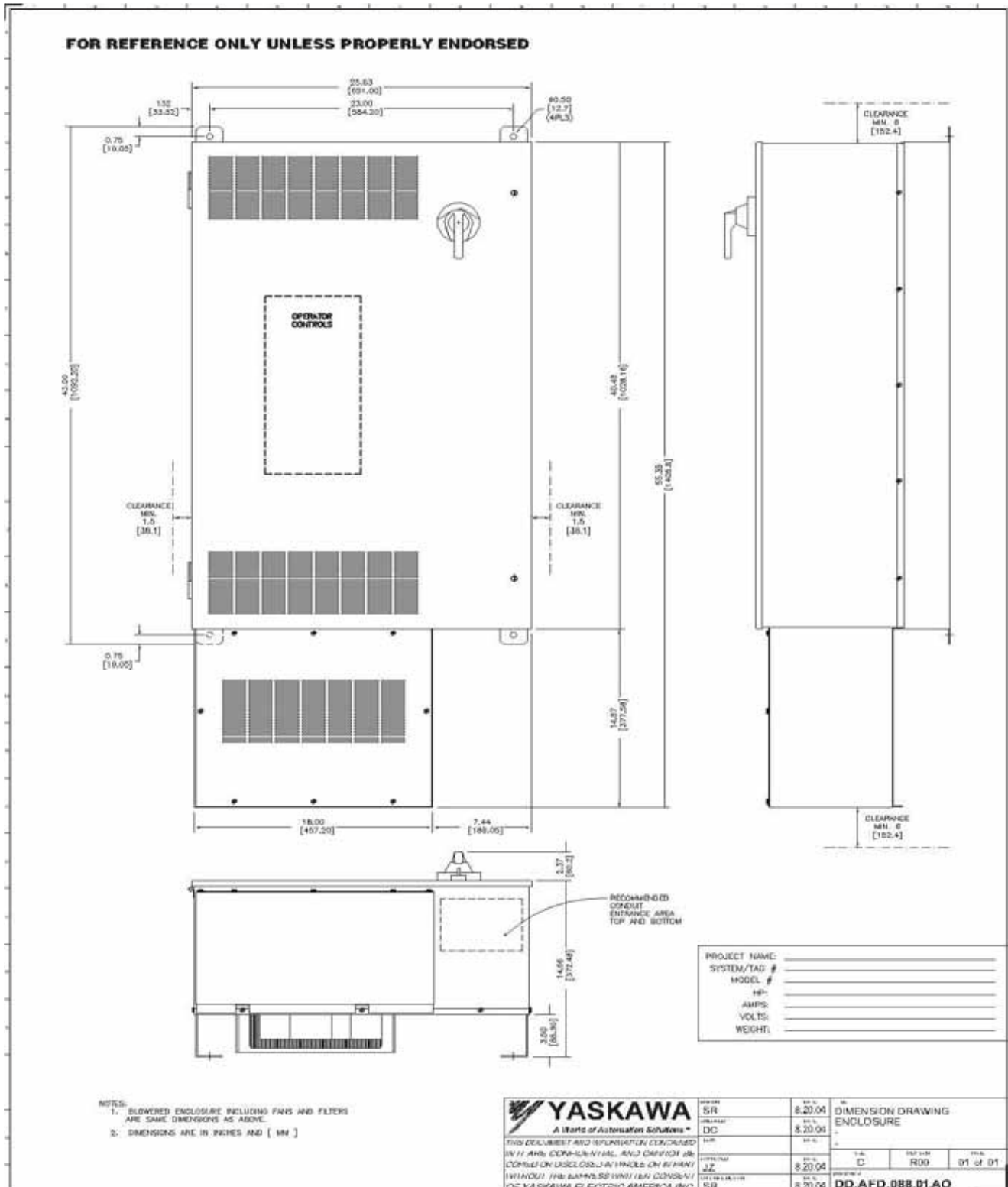
Dimension Drawing

DD.AFD.088.01
E7/Bypass
NEMA 1/12 FVFF



Dimension Drawing

DD.AFD.088.01.AO
E7/Bypass With Add-On Box
NEMA 1/12 FVFF



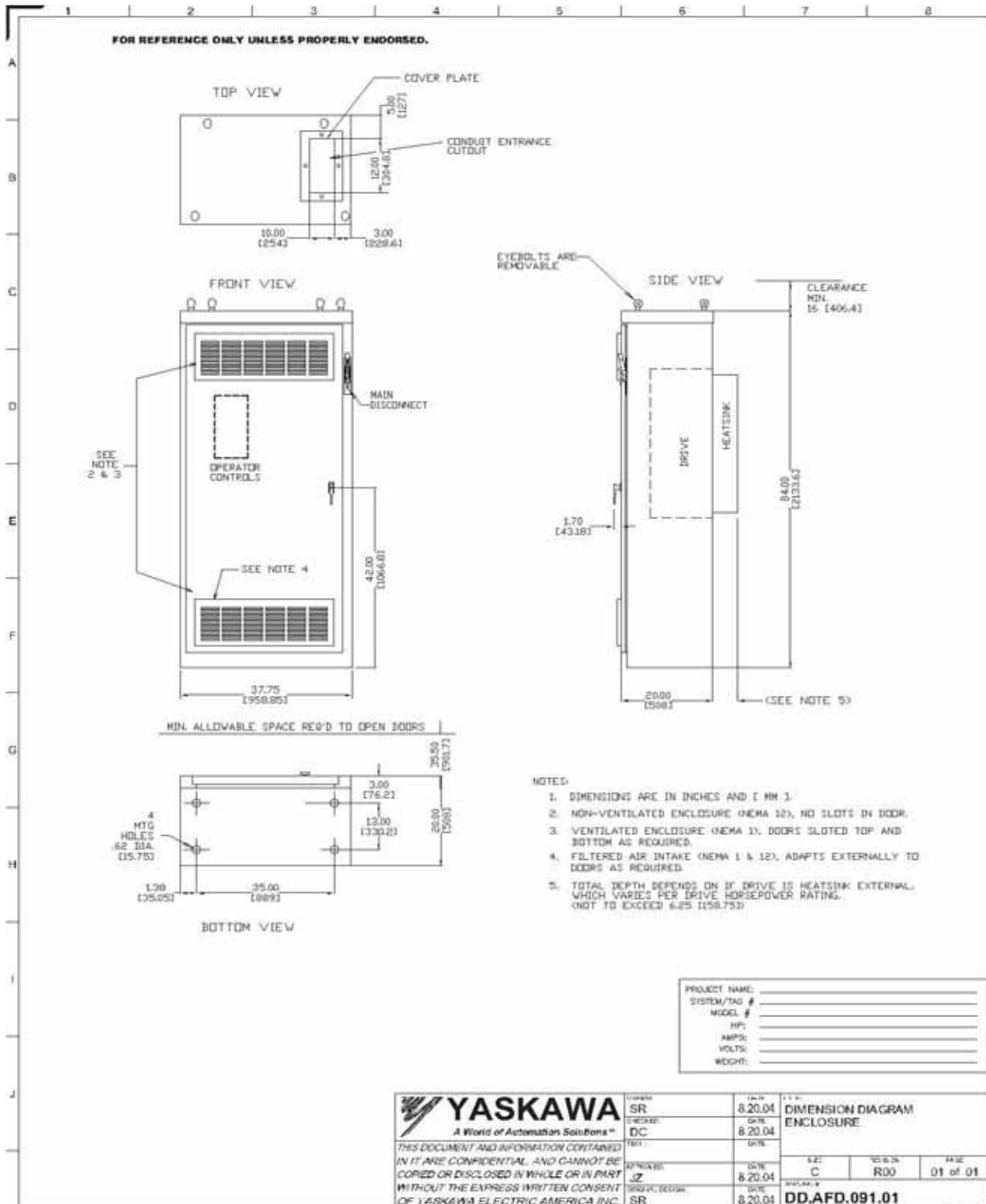
E7B

Dimension Drawing

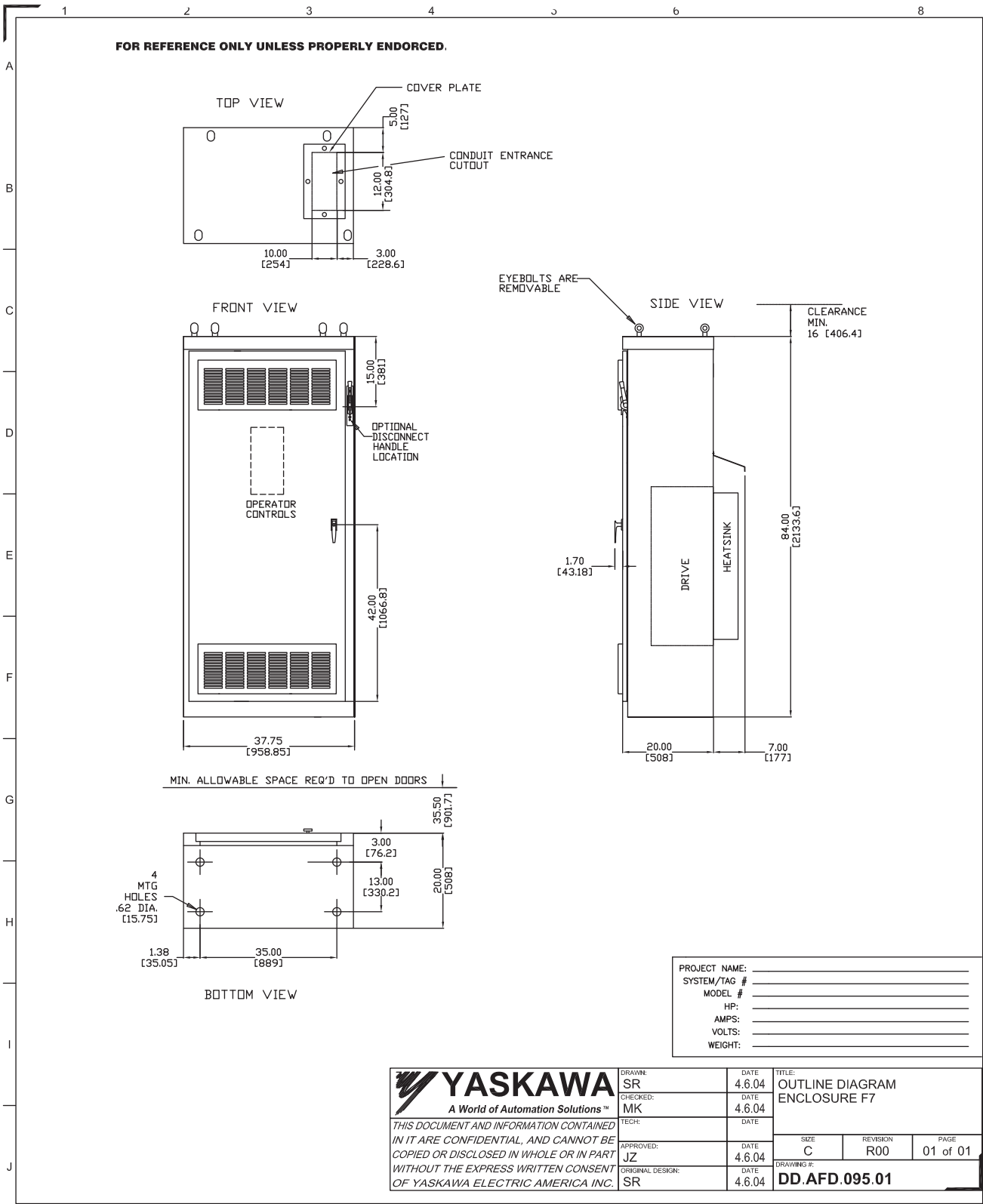
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E7/Bypass Floor Mount

NEMA 1/12 FVFF



Dimension Drawing
DD.AFD.095.01
E7/Bypass Floor Mount
NEMA 1/12 FVFF

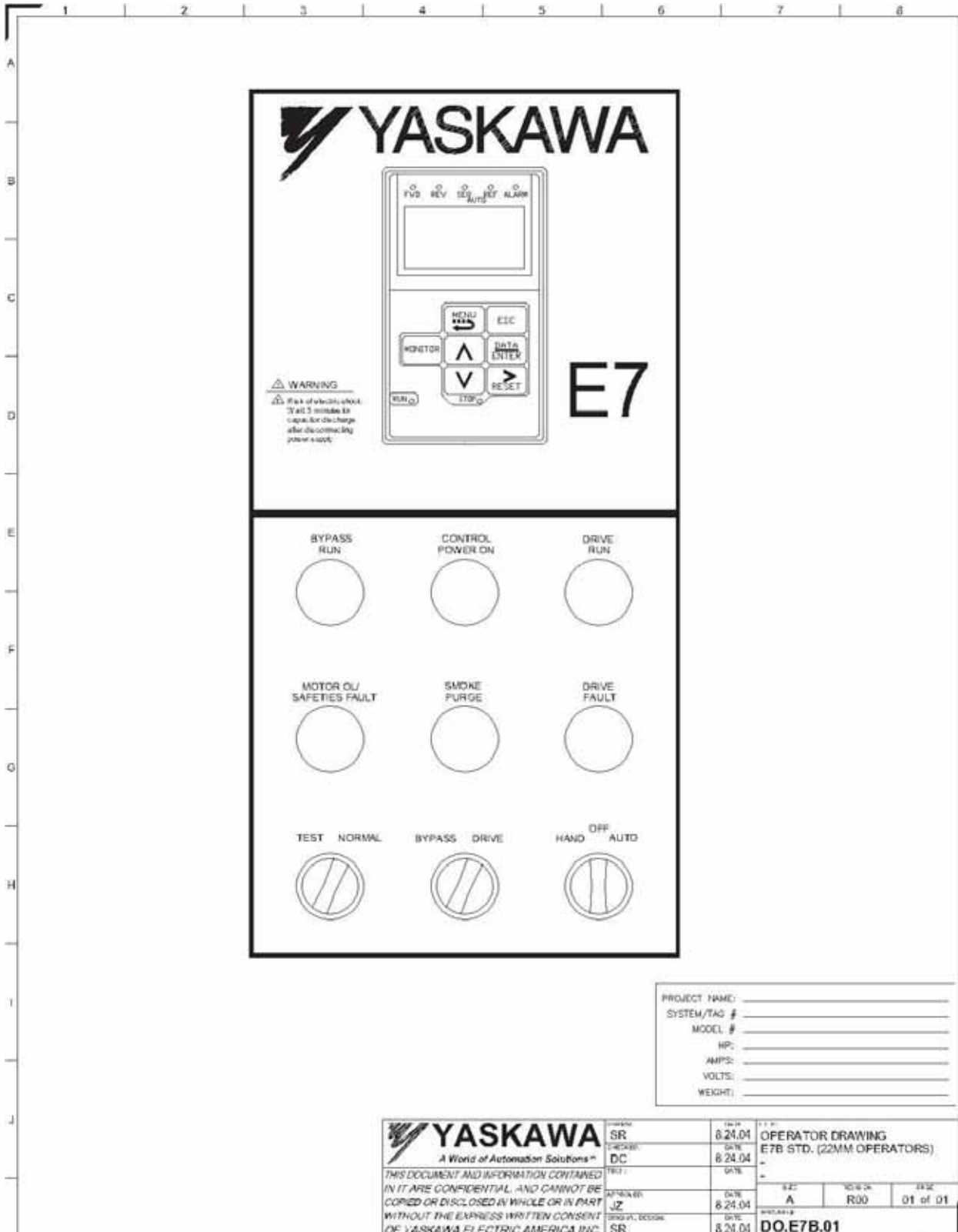


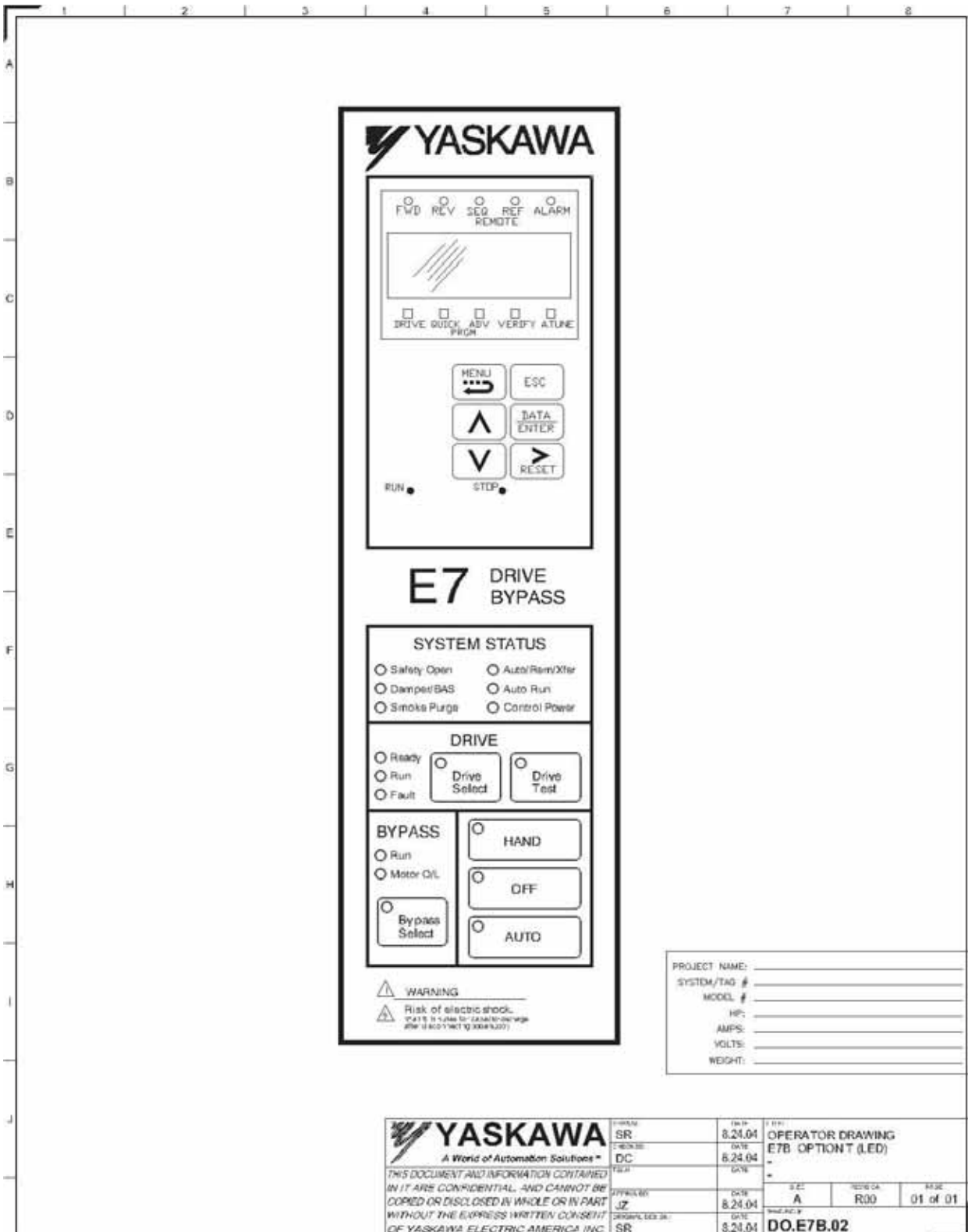
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 SYSTEM/TAG # _____
 MODEL # _____
 HP: _____
 AMPS: _____
 VOLTS: _____
 WEIGHT: _____

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E7B

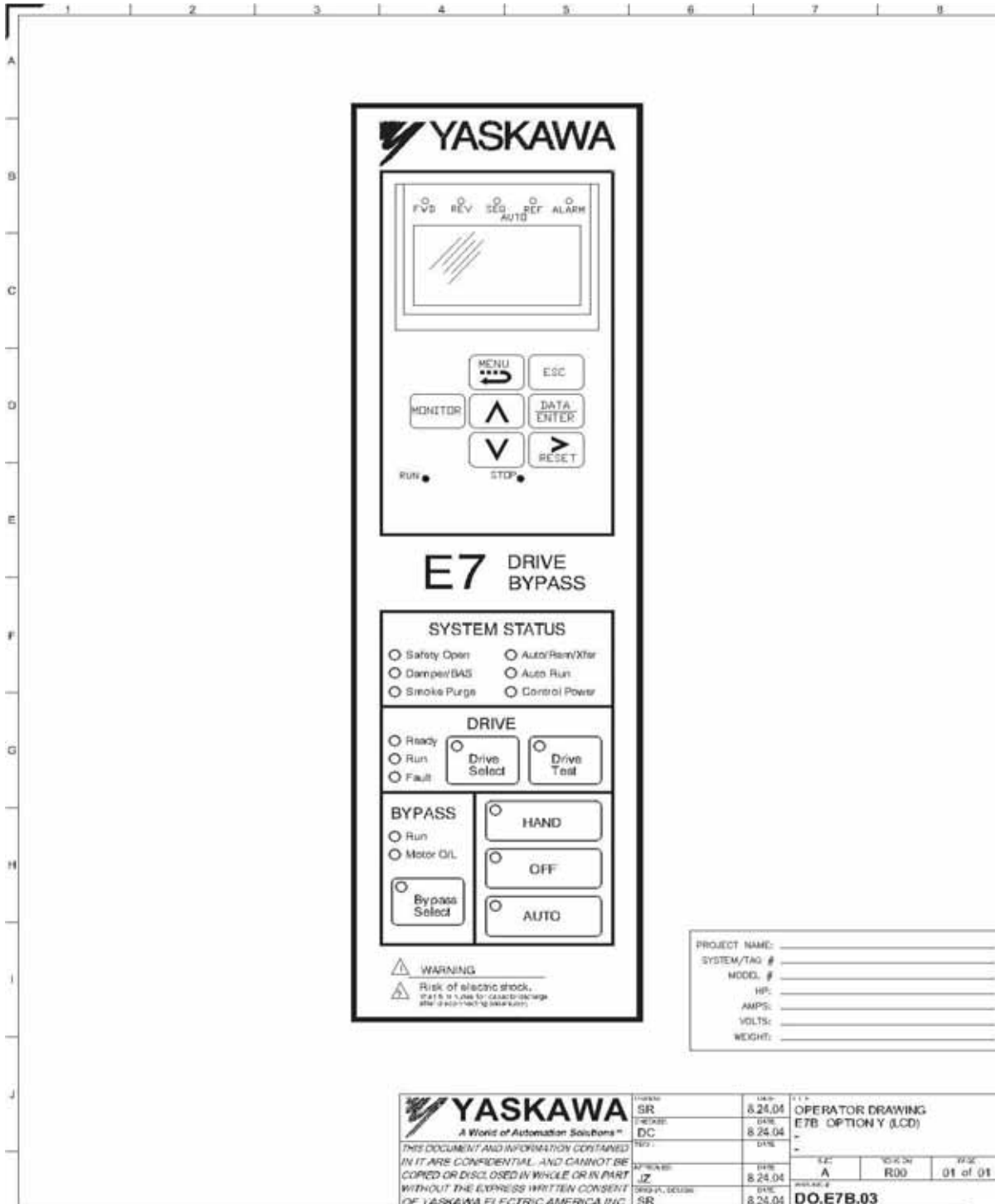
Drawing
DO.E7B.01
22mm Operator & LCD Keypad





E7B

Drawing DO.E7B.03 Touchpad Operator & LCD Keypad



Description

5-500HP
E7/Bypass
NEMA 3R

E7BR



The E7/Bypass package is a 3-contactor style bypass, allowing motor operation from either the drive or across the line. This facilitates drive maintenance while the motor continues to operate. The E7 and E7/Bypass have been designed for flexibility in providing the features and options commonly specified by facility designers.

The E7 Drive is a variable torque AC drive, designed specifically for HVAC applications in building automation. A new benchmark for size, cost, performance, benefits, and quality, the E7 includes numerous built-in features such as Network Communications, H/O/A, PI control and energy savings functions.

The E7 has embedded communications for the popular building automation protocols, Johnson Controls Metasys N2 and Siemens APOGEE FLN, as well as Modbus. An optional LonWorks, BACnet and EtherNet/IP interface card is available.

This E7 package has a UL type 3R rating.

Bypass Features

- Input, output, and bypass contactors
- Circuit breaker disconnect (MCP), with interlocked, through-the-door operating mechanism
- Thermal motor overload relay, class 20
- 115 VAC control transformer, fused
- Drive/Bypass selector
- Hand/Off/Auto selector
- Normal/Test selector
- LED's, for Control: Power, Drive Run, Drive Fault, Bypass Run, Motor OL/Safety Fault and Smoke Purge
- Selectable auto transfer to bypass on drive fault
- Selectable remote transfer to bypass via contact closure
- Selectable smoke purge function
- Run mode and Fault contacts
- Control and safety circuit terminal strip
- Damper circuit safety interlock

Bypass Options

- Communication: LonWorks, BACnet and EtherNet/IP
- Pressure/electrical transducer
- Engraved nameplates
- DriveWizard upload/download and monitoring/graphing software
- Drive input fusing
- 4-20mA output, 2 programmable
- Output impedance
- Input impedance

Service Conditions

- Ambient Temperature: -10°C to 40°C (14°F to 104°F)
- Humidity: 95% RH, non-condensing
- Altitude: 3300 ft; higher by derate
- Input voltage: +10%/-15%
- Input frequency: 50/60 Hz ± 5%
- 3-phase, 3-wire, phase sequence insensitive

Performance Features

- VT Ratings: 5-150 HP, 208 VAC
5-150 HP, 230/240 VAC
5- 500 HP, 480 VAC
- Overload capacity: 110% for 60 sec. (150% peak)
- Starting torque: 100% at 3 Hz
- DC injection braking: at start or stop, adjustable, current limited (anti-windmilling)
- Motor preheat function
- Adjustable accel/decel: 0.1 to 6000 sec.
- Controlled speed range: 40:1
- Critical frequency rejection: 3 selectable, adjustable bands
- Torque limiting: 30-180%
- Energy Saving control
- Torque boost: full range, auto
- Power loss ride-thru: 2 sec.
- Inertia ride-thru
- Auto restart after power loss or resettable fault, selectable, programmable
- Feedback signal loss detection
- Serial communications loss detection
- "Up/Down" floating point control capability
- Stationary motor auto-tuning
- Customizable monitor display
- Sleep function
- Run permissive input
- Ramp-to-stop or coast-to-stop selection
- Runtime changes in control and display
- Project-specific parameter reinitialization

Protective Features

- Current limited stall prevention
- Heat sink over-temperature, speed fold-back
- Cooling fan operating hours recorded
- Bi-directional start into rotating motor at synchronized speed
- DC bus charge indicator
- Current limiting DC bus fuse
- Optically-Isolated controls
- Short circuit protection: Phase-phase and phase-neutral
- Ground fault protection
- Electronic motor overload: UL
- Current and torque limit
- Fault display: last 10 faults
- Fault circuit: OC, OV, OT
- Over torque and under torque protection
- Program security code
- "Hunting" prevention logic
- Reverse prohibit selectability

Design Features

- 32-bit microprocessor logic
- Flash upgradeable firmware
- Non-volatile memory, program retention
- Surface-mount devices
- Displacement power factor: 0.98
- Output frequency: 0.1 to 120 Hz
- Frequency resolution: 0.06 Hz
- Frequency regulation: 0.1%
- Control Terminal Board: Quick disconnect, removable
- Carrier frequency: selectable to 15 kHz
- 3% DC bus reactor: 30-150 HP, 208 VAC; 30-150 HP, 240 VAC; 40-500 HP, 480 VAC; optional on lower ratings
- Keypad Operator: Hand/Off/Auto, built-in copy feature, 7 languages
- 24 VDC control logic
- Transmitter/Option power supply
- Output contacts: One form C and two programmable form A
- Input/output terminal status
- Input terminals: 5 programmable multi-function input terminals
- Fault input: Programmable
- Diagnostic fault indication in selected language
- Timer function: Elapsed time, Delay on start, Delay on stop
- RS-422/485 port: Embedded Metasys N2, APOGEE FLN, and Modbus
- Volts/hertz ratio: Preset and programmable V/Hz patterns
- Multi-speed settings: 5 available
- Remote speed command: 0-10 VDC or 4-20 mA, direct or reverse-acting
- Setpoint (PI) control with inverse or square root input, differential control via two feedback capability
- Feedback signal: low pass filter
- Speed command: bias and gain
- Analog outputs: Programmable, two, 0-10 VDC
- Meter Functions: Volt, amp, kilowatt, elapsed run time, speed command
- Output Current Transformers, qty 3
- MTBF: exceeds 28 years
- UL type 3R rated
- Thermostatically controlled cabinet fans
- Lifting eyes
- Padlock HASP



Description

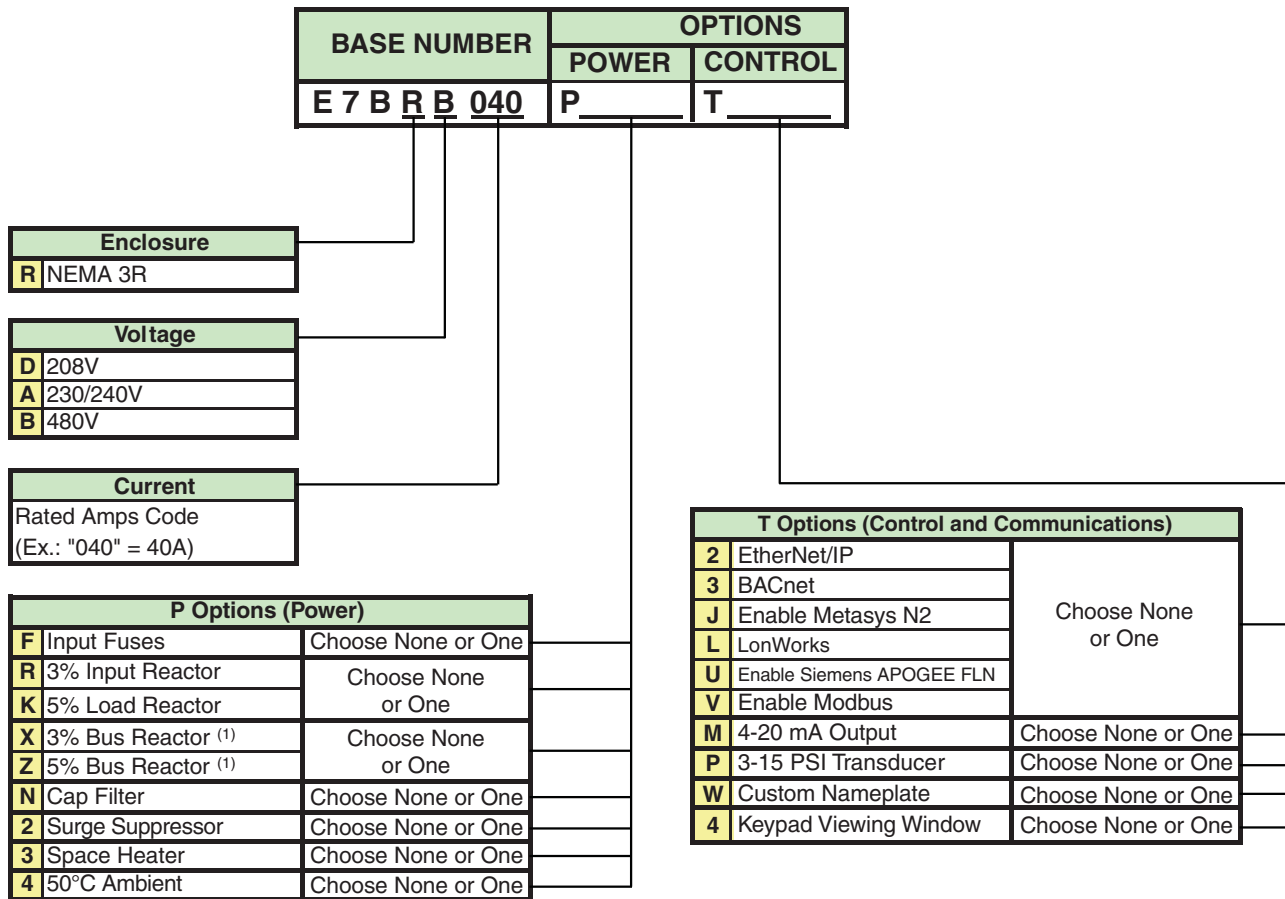
**5-500HP
E7/Bypass
NEMA 3R**

Model Number Configuration & Pricing:

- Step 1.** To construct the complete Configured model number, first find 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 & Communications option by **(T)**. No more than eight options may be selected. The letters **P** and **T** must be deleted if no options of that type are selected.
- Step 3.** Find the corresponding list price for the Base Number selected from the following pages. Add the list price of each selected option to this base price.

Example: E7 NEMA 3R Bypass package (**E7BR**) with a 480V, 40 Amp E7 drive (**B040**), with Input Fuses and a 3% Bus reactor (**P** followed by **FX**), LonWorks communications capability (**T** followed by **L**). Model number is:

E7BRB040PFXTL



(1) 3% and 5% Bus Reactors are only available as an option on base numbers up to and including E7BR_D074, A068 and B040; larger drives have a Bus Reactor as standard.

Description

5-500HP
E7/Bypass
NEMA 3R



Bypass Option Descriptions:

- (R) **Enclosure:** The drive and options are provided in a NEMA Type 3R ventilated enclosure, large enough to accommodate any or all of the package options. Enclosures for Base Numbers up to, and including, D114 (40HP, 208V), A104 (40HP, 240V), and B124 (100HP, 480V) are wall-mounted; larger drives are in floor-mount enclosures.

P Options (Power)

- (N) **Input Filter:** The standard configuration does not include a filter. The cap filter, option (N), is a delta-wye capacitive network.
- (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.
- (X, Z, R) **Line Impedance:** Drives above Base Numbers D074 (25HP, 208V), A068 (25HP, 240V) and B040 (30HP, 480V) include a 3% DC bus reactor in the standard package and do not provide any additional impedance. Option (X), 3% impedance, and option (Z), 5% impedance, are not available for ratings larger than these. To achieve a 5% total input impedance, select option (R) - this 3% input reactor is available only for the HP ratings greater than the HP's listed above, and combines with the drive's standard DC bus reactor.
- (K) **Load Reactor:** No form of output impedance is normally required. A 5% load reactor, option (K), is available if additional output impedance is desired (usually for long lead-lengths or noise reduction).
- (2) **Surge Suppressor:** This option will offer some degree of protection from transient surges coming through the power line cables. Lightning strikes are the most common source of surges.
- (3) **Space Heater:** This option maintains the internal cabinet temperature to reduce condensation.
- (4) **50°C Ambient:** This option will allow the enclosure to be operated in an ambient temperature of 50°C (122°F). The standard basic design is rated for 40°C ambient.

T Options (Control and Communications)

- (W) **Custom Nameplates:** Custom engraved nameplates with white lettering on black lamicoid are available with option (W), for special tagging purposes (Example: "AHU #1"). Note that this option requires the text to be specified by the customer. Leave this field blank if no special nameplates are required.
- (P) **3-15 PSI Transducer:** No transducer is provided with the standard configuration. To add an optional transducer that accepts a 3-15 PSI pneumatic signal and converts it to a 4-20mA signal that is sent to the drive, specify option (P).
- (M) **4-20mA Output:** The standard Configured package provides two programmable 0-10VDC outputs. To convert these outputs to 4-20mA output signals, specify option (M).
- (2, L, J, U, 3, V) **Communications:** All configurations provide the hardware and software required for Metasys N2, Siemens Apogee, and Modbus network communications, but these protocols are not enabled in the standard configuration. Options (J), (U), and (V) provide the programming and jumpers necessary to enable these protocols, at no additional cost. Lonworks option (L), BACnet option (3) and EtherNet/IP option (2) require the addition of an optional board.
- (4) **Keypad Viewing Window:** The digital drive keypad is mounted on the outside of the NEMA 3R enclosure door. This option provides a viewing window which is hinged and lockable.



Description

**5-500HP
E7/Bypass
NEMA 3R**

E7 Bypass Drives - 5-500HP, 208-230/240 and 480V, 3-phase input, NEMA 3R enclosure, with factory-installed and wired options

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	NEMA 3R Bypass		Input Filter	Input Fuses	Line Impedance			Load Reactor	Other								
					N=Cap	F=Fuses	X=3% Bus Reactor Z=5% Bus Reactor R=3% Input Reactor			K=5%	2=Surge Suppressor 3=Space Heater 4=50°C Ambient								
					E7BR	Base	N	F	X	Z	R	K	2	3	4				
208V	16.7	5	D016																
	24.2	7.5	D024							N/A									
	30.8	10	D030																
	46.2	15	D046																
	59.4	20	D059																
	74.8	25	D074																
	88	30	D088							3% DC Bus Reactor is included as standard									
	114	40	D114																
	143	50	D143																
	169	60	D169																
211	75	D211																	
273	100	D273																	
343	125	D343																	
396	150	D396																	
240V	15.2	5	A015																
	22	7.5	A022							N/A									
	28	10	A028																
	42	15	A042																
	54	20	A054																
	68	25	A068							3% DC Bus Reactor is included as standard									
	80	30	A080																
104	40	A104																	
130	50	A130																	
230V	154	60	A154																
	192	75	A192																
	248	100	A248																
	312	125	A312																
	360	150	A360																

(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



E7 Bypass Drives (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Custom Name-plates	Transducer	4-20mA Output	Communications						Keypad	Uses Drive Model Number CIMR-E7U
			W=NP	P=3-15 PSI	M=4-20mA	V=Modbus, L=LonWorks 2=EtherNet/IP, 3=BACnet J=METASYS N2 U=APOGEE FLN						4=Viewing Window	
			W	P	M	V ⁽³⁾	L	2	3	J	U	4	
208V	16.7	5											23P71
	24.2	7.5											27P51
	30.8	10											20111
	46.2	15											20151
	59.4	20											20181
	74.8	25											20221
	88	30											20301
	114	40											20370
	143	50											20450
	169	60											20550
240V	211	75											20750
	273	100											20900
	343	125											21100
	396	150											
	15.2	5											23P71
	22	7.5											25P51
	28	10											27P51
	42	15											20111
230V	54	20											20151
	68	25											20181
	80	30											20221
	104	40											20301
	130	50											20370
	154	60											20450
230V	192	75											20750
	248	100											20750
	312	125											20750
	360	150											20900

- (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) N/A = Consult Factory
- (3) Included in the Base Price



Bypass Drives and Options

NEMA 3R

E7 Bypass Drives (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	NEMA 3R Bypass		Input Filter	Input Fuses	Line Impedance			Load Reactor	Other							
					N=Cap	F=Fuses	X=3% Bus Reactor Z=5% Bus Reactor R=3% Input Reactor			K=5%	2=Surge Suppressor 3=Space Heater 4=50°C Ambient							
			E7BR	Base	N	F	X	Z	R	K	2	3	4					
480V	7.6	5	B007															
	11	7.5	B011							N/A								
	14	10	B014															
	21	15	B021															
	27	20	B027															
	34	25	B034															
	40	30	B040															
	52	40	B052							3% DC Bus Reactor is included as standard								
	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



E7 Bypass Drives (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Custom Name-plates	Transducer	4-20mA Output	Communications						Keypad	Uses Drive Model Number CIMR-E7U	
			W=NP	P=3-15 PSI	M=4-20mA	3=BACnet, V=Modbus, L=LonWorks 2=EtherNet/IP, J=METASYS N2 U=APOGEE FLN						4=Viewing Window		
			W	P	M	V ⁽³⁾	L	2	3	J	U	4		
480V	7.6	5												43P71
	11	7.5												45P51
	14	10												47P51
	21	15												40111
	27	20												
	34	25												40151
	40	30												40181
	52	40												40301
	65	50												
	77	60												40371
	96	75												40451
	124	100												40551
	156	125												40750
	180	150												40900
	240	200												41100
	302	250												41600
361	300												41850	
414	350												41850	
477	400												42200	
515	450												42200	
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) N/A = Consult Factory

(3) Included in the Base Price

Freestanding Leg Kit, NEMA 3R - This option allows the NEMA 3R wall-mount enclosures to be mounted on legs so that the control can be freestanding and off the ground. Either kit can be used on any of the wall-mount enclosures. (All floor-mount enclosures come standard with freestanding legs.)

12" Leg Kit

Model No. UDA00548-1

30" Leg Kit

Model No. UDA00548-2

E7BR

Dimensions and Data

Rated Input Voltage	Bypass E7BR	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Physical Dimensions (in.)			Weight (lbs.) ⁽²⁾	Dimension Drawing Number ⁽³⁾
				H	W	D		
208V	D016	16.7	5	32	24	17.5	250	DD.AFD.198.01
	D024	24.2	7.5					
	D030	30.8	10					
	D046	46.2	15	40	32	17.5	290	DD.AFD.199.01
	D059	59.4	20					
	D074	74.8	25	46	42	17.5	480	DD.AFD.200.01
	D088	88	30					
	D114	114	40					
	D143	143	50	91	37	36	850	DD.AFD.189.01
	D169	169	60				950	
D211	211	75	1100					
D273	273	100	1330					
D343	343	125	91	74	36	1330	DD.AFD.190.01	
D396	396	150				1400		
240V	A015	15.2	5	32	24	17.5	250	DD.AFD.198.01
	A022	22	7.5					
	A028	28	10					
	A042	42	15	40	32	17.5	290	DD.AFD.199.01
	A054	54	20					
	A068	68	25	46	42	17.5	480	DD.AFD.200.01
A080	80	30						
A104	104	40						
230V	A130	130	50	91	37	36	850	DD.AFD.189.01
	A154	154	60				950	
	A192	192	75				1100	
	A248	248	100				1330	
	A312	312	125	91	74	36	1330	DD.AFD.190.01
	A360	360	150				1400	

(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) Data represents the total approx. weight of the drive with all possible standard options, not shipping weight.
 (3) Please refer to Yaskawa's website at www.yaskawa.com for dimension drawings.



Rated Input Voltage	Bypass E7BR	Rated Output Current (Amps)	Nominal HP ⁽¹⁾	Physical Dimensions (in.)			Weight (lbs.) ⁽²⁾	Dimension Drawing Number ⁽³⁾
				H	W	D		
480V	B007	7.6	5	32	24	17.5	250	DD.AFD.198.01
	B011	11	7.5					
	B014	14	10					
	B021	21	15					
	B027	27	20					
	B034	34	25	40	32	17.5	290	DD.AFD.199.01
	B040	40	30					
	B052	52	40					
	B065	65	50					
	B077	77	60	46	42	17.5	480	DD.AFD.200.01
	B096	96	75					
	B124	124	100					
	B156	156	125	91	37	36	800	DD.AFD.189.01
	B180	180	150					
	B240	240	200				900	
	B302	302	250					
	B361	361	300	91	74	36	1500	DD.AFD.190.01
	B414	414	350					
B477	477	400	91				109	
B515	515	450						
B590	590	500		1900	2100			

- (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) Data represents the total approx. weight of the drive with all possible standard options, not shipping weight.
- (3) Please refer to Yaskawa's website at www.yaskawa.com for dimension drawings.



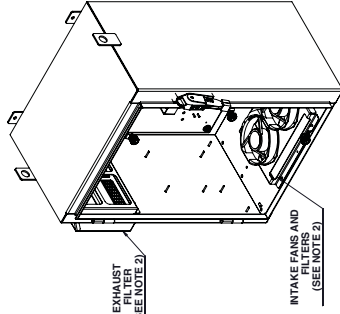
Dimension Drawing

DD.AFD.198.01

E7/Bypass

NEMA 3R

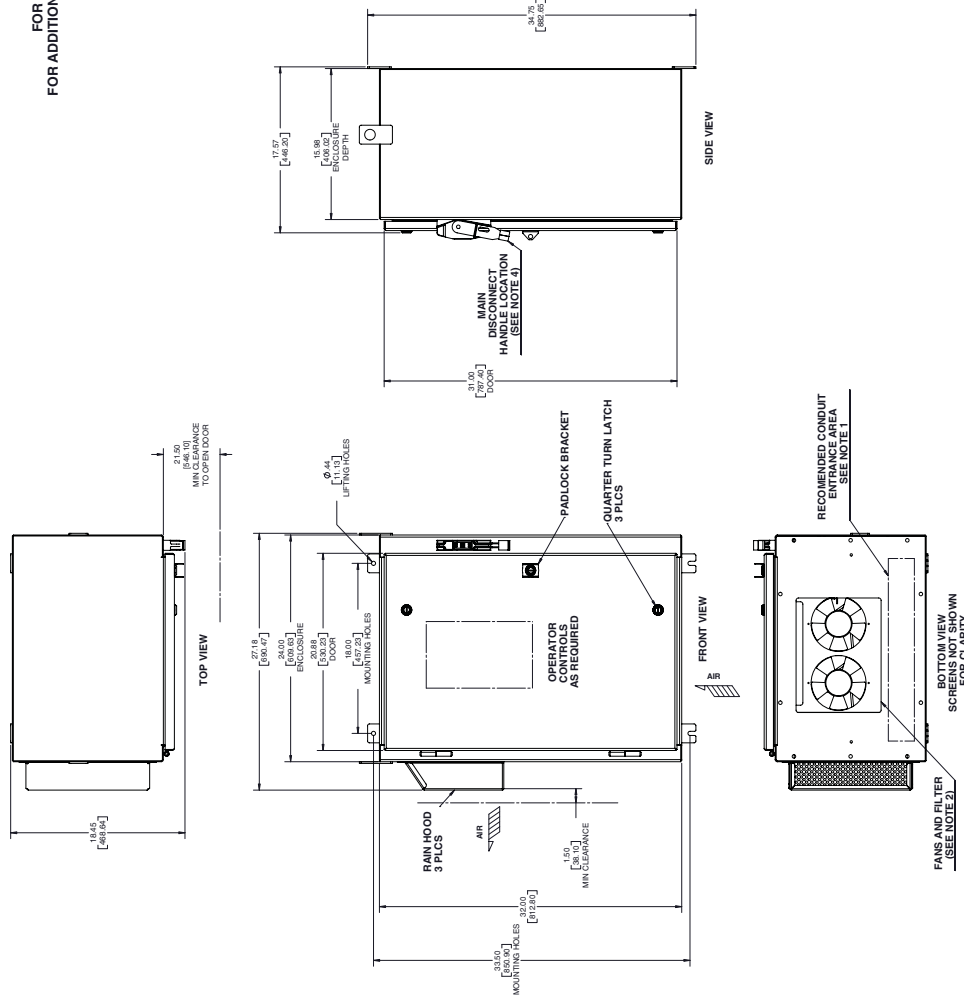
FOR REFERENCE ONLY UNLESS PROPERLY ENDORSED
FOR ADDITIONAL DETAILS AND SPECIFICATIONS, CONSULT MANUAL.



PROJECT NAME: _____
 SYSTEM/TAG#: _____
 MODEL#: _____
 HP: _____
 AMPS: _____
 VOLTS: _____
 WEIGHT: _____

- NOTES:
- MUST USE TYPE 3R RATED JUBS OR FITTINGS FOR ALL CONNECTIONS.
 - FANS, FILTERS OR CLOSING PLATES ARE SUPPLIED WHEN OPTION MIX NECESSITATES.
 - WHEN OPTION MIX NECESSITATES, ALL DIMENSIONS ARE IN METERS.
 - SUPPLIED WHEN FLANGE MOUNTED CB/MS/CONNECT IS SPECIFIED.

YASKAWA		TYPE 3R WALL MOUNT	
MODEL	SIZE	TYPE 3R WALL MOUNT	TYPE 3R WALL MOUNT
1000	1.000	1.000	1.000
1000	1.000	1.000	1.000
1000	1.000	1.000	1.000
1000	1.000	1.000	1.000
PROJECT NO. MKC		DD.AFD.198.01	



Dimension Drawing

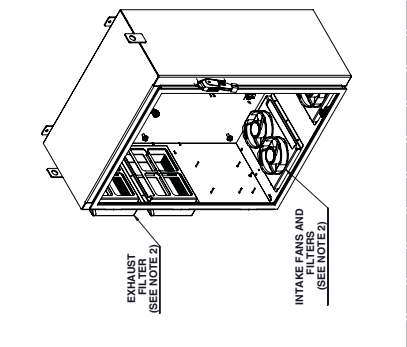
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E7/Bypass

NEMA 3R



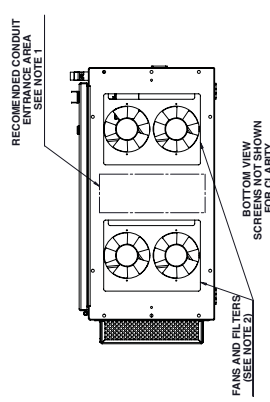
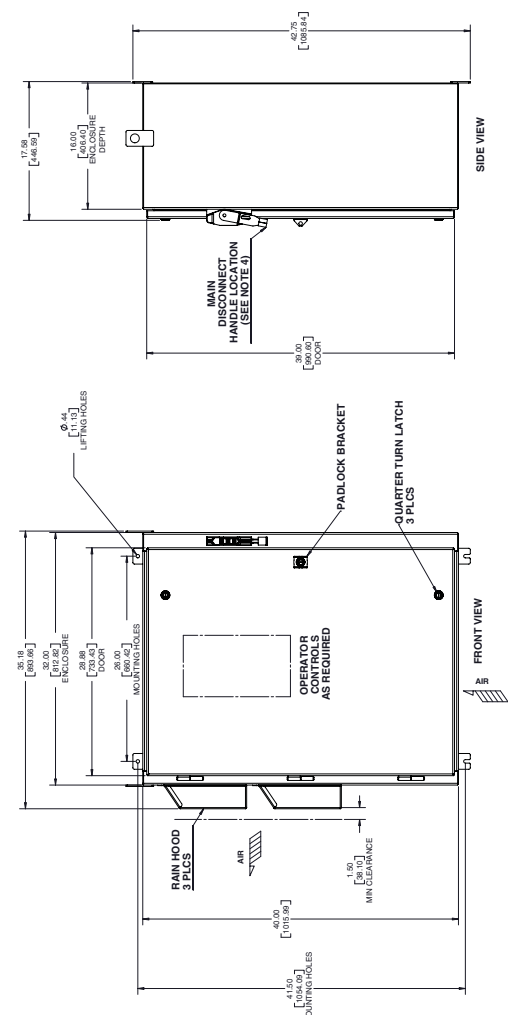
FOR REFERENCE ONLY UNLESS PROPERLY ENDORSED
FOR ADDITIONAL DETAILS AND SPECIFICATIONS, CONSULT MANUAL.



PROJECT NAME: _____
 SYSTEM/TAG#: _____
 MODEL#: _____
 HP: _____
 AMPS: _____
 VOLTS: _____
 WEIGHT: _____

- NOTES:
1. MUST USE TYPE 3R RATED HUBS OR FITTINGS (OR EQUIVALENT) TO MAINTAIN ENCLOSURE RATING
 2. FANS, FILTERS OR CLOSING PLATES ARE SUPPLIED
 3. DIMENSIONS ARE IN INCHES AND (MILLIMETERS)
 4. SUPPLIED WHEN FLANGE MOUNTED CB DISCONNECT IS SPECIFIED

YASKAWA		FORM	MMK	3.532	OUTLINE DRAWING
DESIGNATION	ENCLOSURE	TYPE	U7	3.532	FLANGE MOUNT
REV		DATE			DATE
1		08/11/08			08/11/08
DESIGNED BY	Y. TAKAHASHI	CHECKED BY	M. KAWANO	APPROVED BY	T. YAMAMOTO
PROJECT	DD.AFD.199.01	PROJECT	DD.AFD.199.01	PROJECT	DD.AFD.199.01
DATE	08/11/08	DATE	08/11/08	DATE	08/11/08



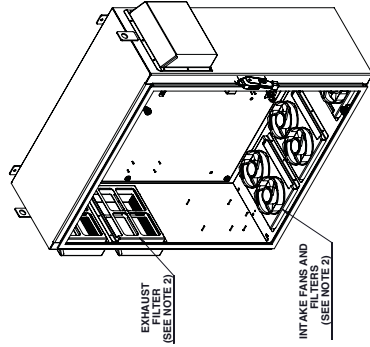
Dimension Drawing

DD.AFD.200.01

E7/Bypass

NEMA 3R

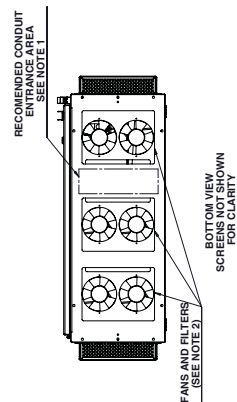
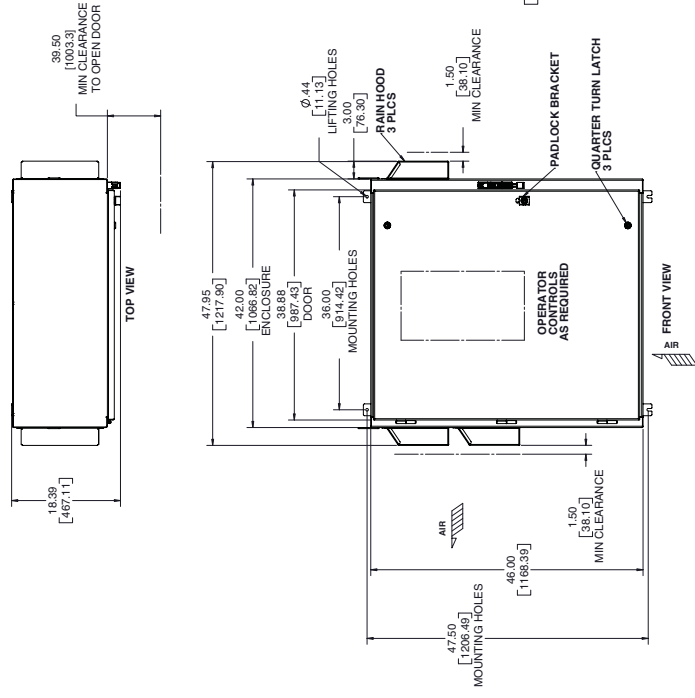
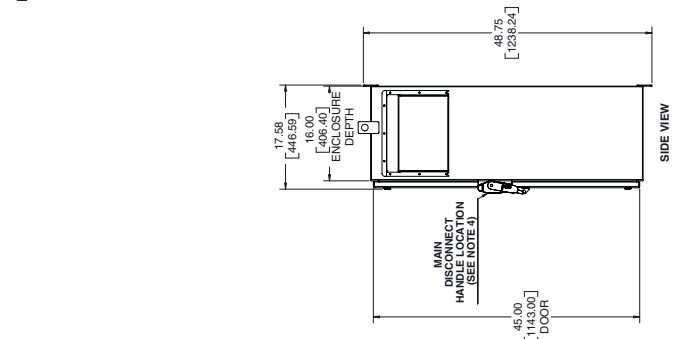
FOR REFERENCE ONLY UNLESS PROPERLY ENDORSED
FOR ADDITIONAL DETAILS AND SPECIFICATIONS, CONSULT MANUAL.



PROJECT NAME: _____
 SYSTEM TAG#: _____
 MODEL #: _____
 HP: _____
 AMPS: _____
 VOLTS: _____
 WEIGHT: _____

- NOTES:
- MUST USE TYPE 3R RATED HUBS OR FITTINGS FOR ALL CONNECTIONS.
 - FANS, FILTERS OR CLOSING PLATES ARE SUPPLIED WHEN OPTION MIX NECESSITATES.
 - CONNECTIONS MUST BE MADE TO THE MAIN DISCONNECT.
 - SUPPLEMENTAL LANGE MOUNTED DISCONNECT IS SPECIFIED

YASKAWA		DATE	REV	DESCRIPTION
PROJECT	DD.AFD.200.01	03/20/11	01	OR WALL MOUNT
DESIGN	DD.AFD.200.01	03/20/11	01	OR WALL MOUNT
ISSUED	DD.AFD.200.01	03/20/11	01	OR WALL MOUNT
PROJECT	DD.AFD.200.01	03/20/11	01	OR WALL MOUNT
DESIGN	DD.AFD.200.01	03/20/11	01	OR WALL MOUNT
ISSUED	DD.AFD.200.01	03/20/11	01	OR WALL MOUNT
PROJECT	DD.AFD.200.01	03/20/11	01	OR WALL MOUNT
DESIGN	DD.AFD.200.01	03/20/11	01	OR WALL MOUNT
ISSUED	DD.AFD.200.01	03/20/11	01	OR WALL MOUNT
PROJECT	DD.AFD.200.01	03/20/11	01	OR WALL MOUNT
DESIGN	DD.AFD.200.01	03/20/11	01	OR WALL MOUNT
ISSUED	DD.AFD.200.01	03/20/11	01	OR WALL MOUNT



Dimension Drawing

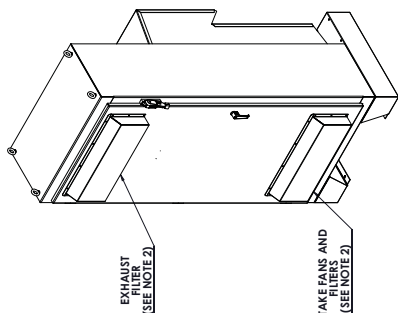
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E7/Bypass

NEMA 3R



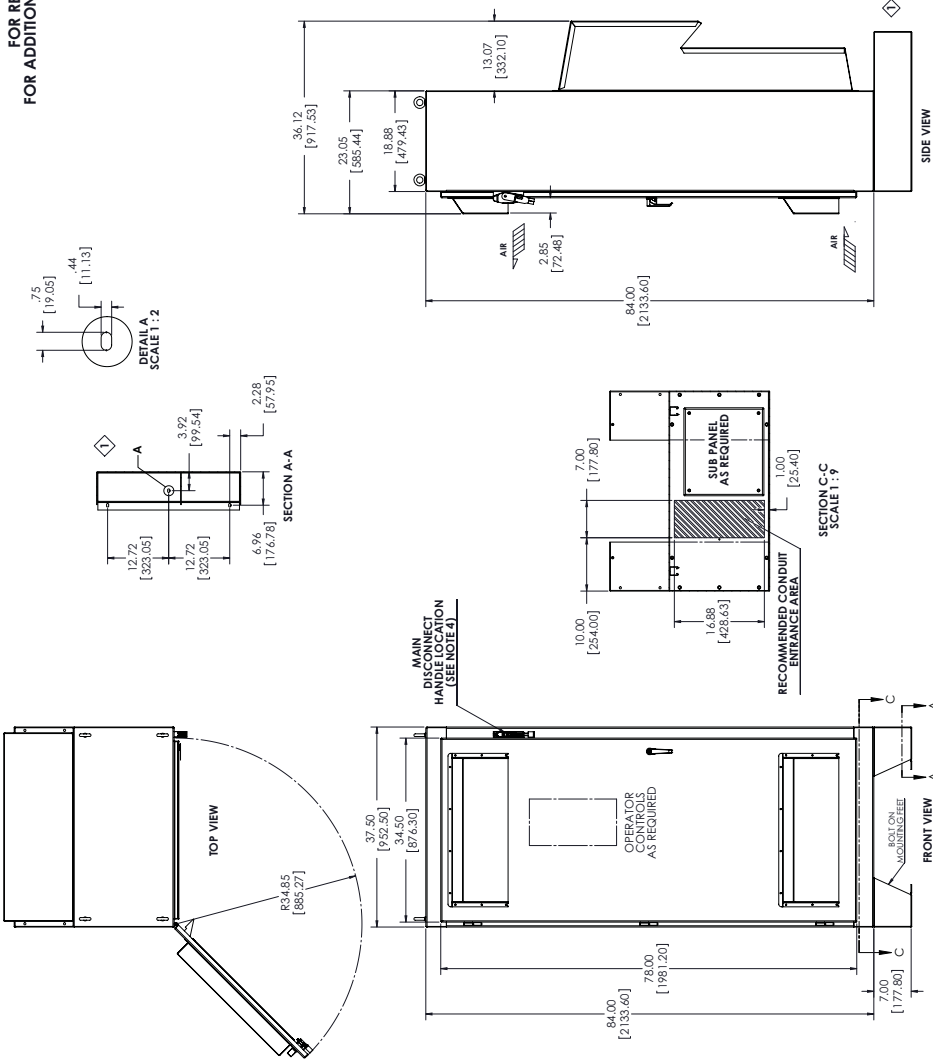
FOR REFERENCE ONLY UNLESS PROPERLY ENDORSED
FOR ADDITIONAL DETAILS AND SPECIFICATIONS, CONSULT MANUAL



PROJECT NAME: _____
 SYSTEM/TAG#: _____
 MODEL#: _____
 HP: _____
 AMPS: _____
 VOLTS: _____
 WEIGHT: _____

- NOTES:
- MUST USE TYPE 3R RATED HUBS OR FITTINGS (OR EQUIVALENT) TO MAINTAIN ENCLOSURE RATING
 - ALL ELECTRICAL CONNECTIONS ARE SUPPLIED WHEN OPTION 2X IS SPECIFIED
 - DIMENSIONS ARE IN INCHES AND (MILLIMETERS)
 - SUPPLIED WHEN FLANGE MOUNTED C/BYDISCONNECT IS SPECIFIED

YASKAWA		PROJECT: MKK	DATE: 12.31.07	TYPE: OUTLINE DRAWING
REV: 01	DATE: 01.11.08	PROJECT: JIS	DATE: 01.11.08	TYPE: 37.50 BY 84.00 D
REV: 02	DATE: 01.11.08	PROJECT: JIS	DATE: 01.11.08	TYPE: 37.50 BY 84.00 D
REV: 03	DATE: 01.11.08	PROJECT: JIS	DATE: 01.11.08	TYPE: 37.50 BY 84.00 D
REV: 04	DATE: 01.11.08	PROJECT: JIS	DATE: 01.11.08	TYPE: 37.50 BY 84.00 D
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E7BR

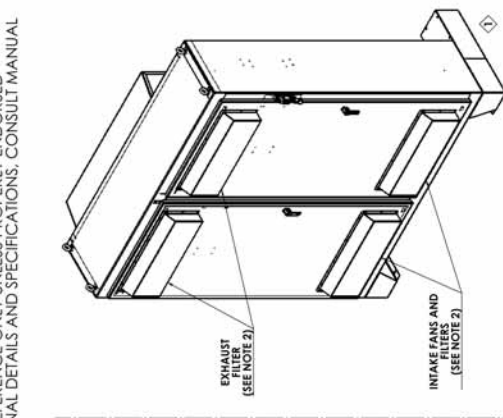
Dimension Drawing

DD.AFD.190.01

E7/Bypass

NEMA 3R

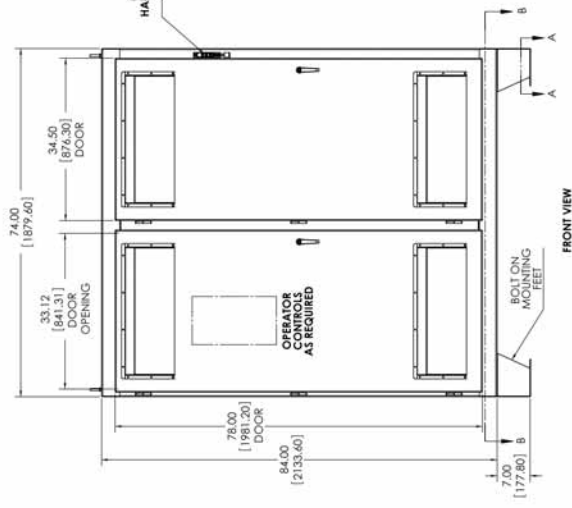
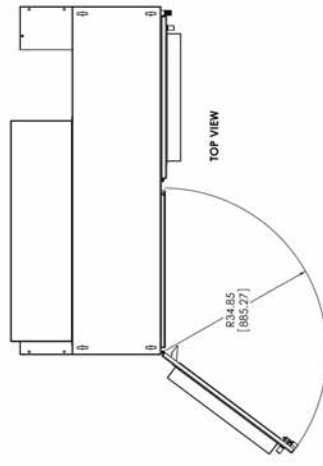
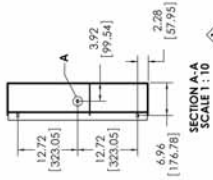
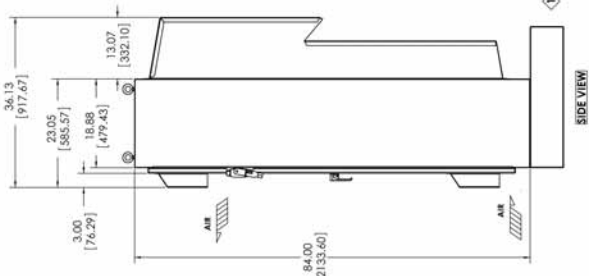
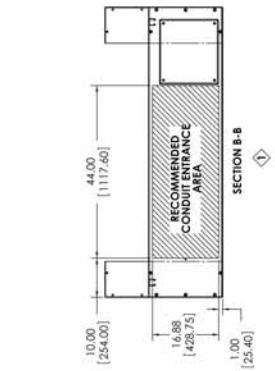
FOR REFERENCE ONLY UNLESS PROPERLY ENDORSED
FOR ADDITIONAL DETAILS AND SPECIFICATIONS, CONSULT MANUAL

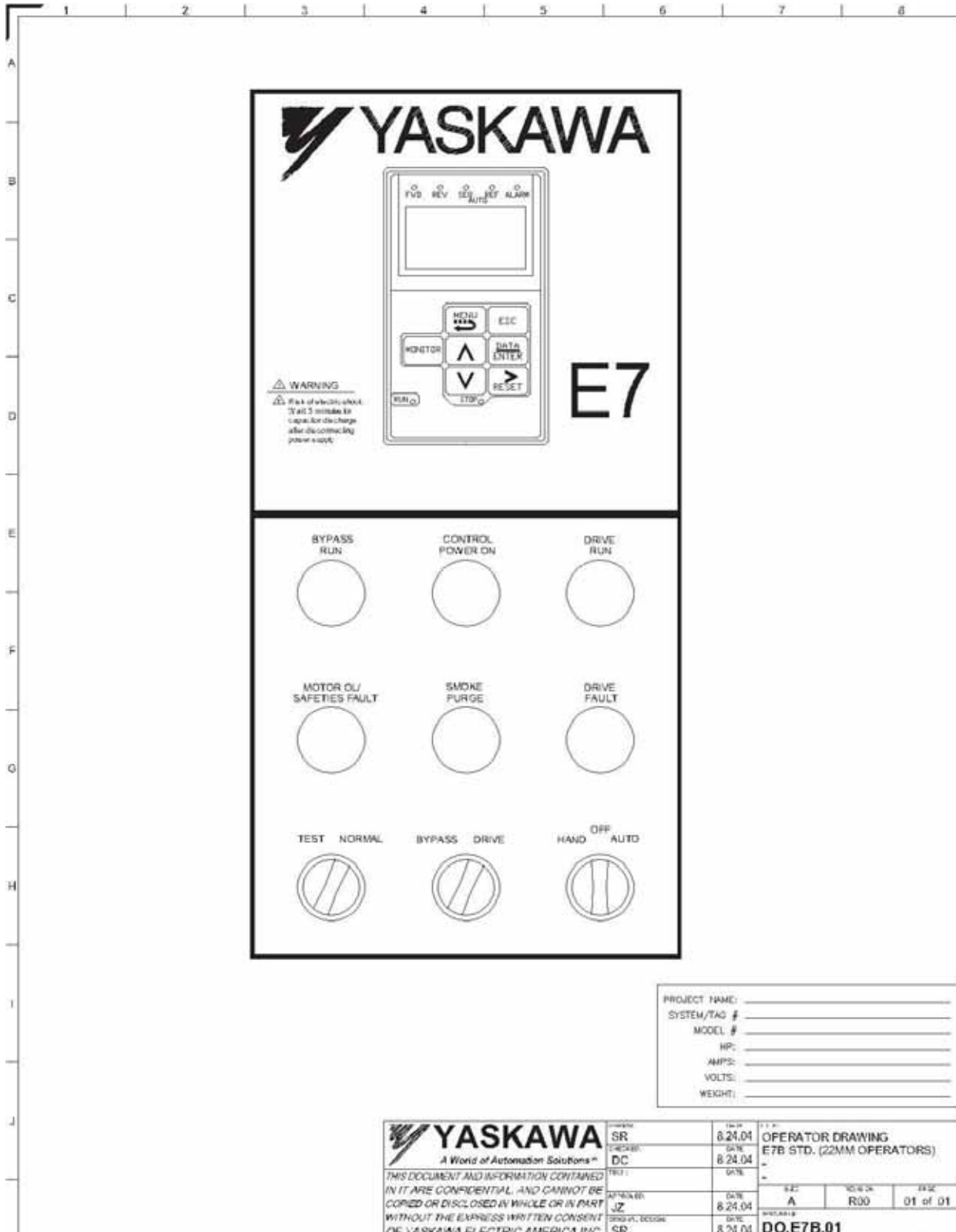


PROJECT NAME: _____
 SYSTEM/TAG#: _____
 MODEL#: _____
 HP: _____
 AMPS: _____
 VOLTS: _____
 WEIGHT: _____

- NOTES:**
1. MUST USE TYPE 3R RATED HUBS OR FITTINGS (OR EQUIVALENT) TO MAINTAIN ENCLOSURE RATING
 2. WHEN OPTION A OR B IS SPECIFIED, CONDUIT FITTINGS ARE SUPPLIED
 3. DIMENSIONS ARE IN INCHES AND (MILLIMETERS)
 4. IS SPECIFIED WHEN FLANGE MOUNTED CBI/DISCONNECT IS SPECIFIED

YASKAWA		DATE: 03/21/18	
DESIGNER: DC	DATE: 03/21/18	PROJECT: DD.AFD.190.01	SCALE: 1:1
CHECKED: JZ	DATE: 03/21/18	PROJECT: DD.AFD.190.01	SCALE: 1:1
<small>YASKAWA ELECTRIC AMERICA, INC. 10000 YASKAWA DRIVE, WEST VALLEY CITY, OHIO 44150-1099 © 2018 YASKAWA ELECTRIC AMERICA, INC. ALL RIGHTS RESERVED.</small>			





PROJECT NAME: _____
 SYSTEM/TAG # _____
 MODEL # _____
 HP: _____
 AMPS: _____
 VOLTS: _____
 WEIGHT: _____

<p>YASKAWA A World of Automation Solutions™</p> <p><small>THIS DOCUMENT AND INFORMATION CONTAINED IN IT ARE CONFIDENTIAL, AND CANNOT BE COPIED OR DISCLOSED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN CONSENT OF YASKAWA ELECTRIC AMERICA INC.</small></p>	REVISED	DATE	OPERATOR DRAWING E7B STD. (22MM OPERATORS)
	SR	8.24.04	
	DC	8.24.04	
	TEST	DATE	
APPROVED	DATE	S&C A R00 01 of 01	
JZ	8.24.04		
DESIGNED, CHECKED	DATE	PROJECT # DO.E7B.01	
SR	8.24.04		

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 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.
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:
Part No. TM.E7.01
Part No. CD.E7.01

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

E7 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.

E7 Installation and Start-Up

A hands on class specifically designed for Tradesmen, HVAC Service Mechanics, Building Automation Engineers, and end users. Physical and electrical installation, and start-up procedures are covered for both E7 and E7 Bypass in this 2-day class.

E7 Basic Class

An in-depth look at the functions and programming parameters of the product. Basic training is highly detailed and takes 2-3 days.

E7 Troubleshooting Class

This 1-day class is designed to provide a better understanding of how the products work, and is designed primarily for technicians. Topics covered include unit checks with and without power and fault code explanations.

To enroll, contact Technical Training Services.

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

Fax: 847-785-2724

E-mail: training@yaskawa.com

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

Terms and Conditions

YASKAWA ELECTRIC AMERICA, INC. - STANDARD TERMS AND CONDITIONS OF SALE

1. GENERAL:

- (a) Any sale of products or services by Yaskawa Electric America, Inc. ("YEA") is governed exclusively by these Standard Terms and Conditions of Sale ("Standard Terms") and shall supersede any inconsistent or additional terms on Buyer's purchase order or any other document. These Standard Terms constitute the final, complete and exclusive agreement between YEA and the Buyer as to the subject matter hereof. YEA hereby objects to any inconsistent or additional terms. This Agreement may be amended only in writing signed by an authorized representative of YEA.
- (b) Any order placed with YEA must be in the form of a written purchase order or letter from Buyer ("Order") and shall set forth all information necessary for YEA to fill the Order, if accepted. All proposals, quotations or similar communications from YEA will be considered invitations to Buyer to submit an Order. A binding sales contract will result only when YEA accepts Buyer's Order, at YEA's office in Waukegan, Illinois or such other place as designated by YEA. YEA reserves the right to bill any Order at a minimum of \$100, plus any additional charges provided for herein.
- (c) All products shall be packaged for domestic shipment in accordance with YEA'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.

2. WARRANTY:

- (a) YEA warrants that each new and unused product sold by YEA shall be free of defects in material workmanship 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. YEA warrants that its services shall be free of defects in workmanship for a period of ninety (90) days from the date they are first provided. Within the applicable warranty period, YEA will, at its sole discretion, either repair, replace or return the purchase price paid to YEA for any product, part or service found by YEA to be defective; provided that the subject product is used under normal conditions for which it was designed and installed, operated and maintained in accordance with YEA's instructions and (subject always to such instructions) in accordance with generally accepted industrial practices.
- (b) YEA's warranty obligation shall be conditioned upon receipt by YEA of written notice of any alleged defects within sixty (60) days after discovery. YEA will not be responsible or accept invoices for unauthorized repairs to any products, even if defective. YEA 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.
- (c) Where Buyer requests that YEA supply non-stock products or component parts manufactured by a third-party, YEA 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. YEA shall have no liability, whether in contract, tort or otherwise, for such products.
- (d) YEA does not guarantee production rates or the quality of goods made using YEA's products or services, nor shall any longer warranty periods apply, except as agreed in writing signed by an authorized YEA representative.
- (e) YEA's WARRANTY HEREIN IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES OF YEA AND ALL PARENT OR AFFILIATED COMPANIES OF YEA. 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, ARE HEREBY EXCLUDED.
- (f) UNDER NO CIRCUMSTANCES SHALL YEA, OR ANY PARENT OR AFFILIATED COMPANY OF YEA, 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 GOODS OR SERVICES SUPPLIED BY YEA OR ANY TRANSACTION TO WHICH THESE STANDARD TERMS APPLY. THE MAXIMUM LIABILITY OF YEA, 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 YEA FOR THE DEFECTIVE PRODUCT OR SERVICE.

3. DRAWINGS/MEASUREMENTS:

All drawings, tables, graphs and the like submitted by YEA or contained in YEA's publications shall be regarded as approximations only. Weights, measurements, capacities and all other particulars of products or services offered by YEA are approximations only. YEA is not responsible for such approximations, including, in particular, based on data supplied by Buyer.

4. INFRINGEMENT:

YEA's liability for infringement (and the liability of any parent or affiliated company of YEA) is limited to YEA's defense of any suit or proceeding brought against Buyer based on a claim that products sold hereunder, when employed in the manner intended by YEA, constitutes an infringement of any patent of the United States. If Buyer's use of the products in the manner intended by YEA is finally enjoined in such action, YEA 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). YEA 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 products or in the practice of any process, and if a claim, suit or action is brought against YEA or any parent or affiliate of YEA, Buyer shall defend, indemnify and save YEA (and its parent/affiliates) harmless from and against any and all claims, losses or damages arising therefrom.

5. SHIPMENT, FORCE MAJEURE, PRICES AND ERROR:

- (a) Shipment/delivery dates are approximations only. YEA shall not be liable to pay any penalty or damages, including consequential damages, for any delay in shipment.
- (b) In no event shall YEA 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 YEA'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, YEA's obligation shall be limited to the refund of any advance payment received from Buyer.
- (c) All claims for loss of or damage to products, whether concealed or obvious, must be made, in writing, to the carrier and to YEA 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. YEA will render reasonable assistance in providing information necessary for Buyer to process such damage claims with the carrier or any insurance company.

Terms and Conditions

(d) YEA's quoted prices are firm for thirty (30) days from the date of YEA's written proposal. Thereafter, the applicable prices are those in effect at the time Buyer's Order is placed with YEA. YEA will notify Buyer of any price changes for incorporation into a revised Order prior to acceptance by YEA. Pricing based on volume discounts is subject to adjustment by YEA 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 YEA.

(e) (1) 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, YEA reserves the right to charge Buyer for storage charges plus interest.

(f) (2) All shipments are F.O.B. YEA's (or its suppliers') manufacturing plant or warehouse. YEA will, at Buyer's expense, arrange for the transportation of the products from the manufacturing plant or warehouse designated by YEA. Buyer is responsible to timely procure all necessary export and import licenses and all permits required for the consummation of the transaction.

6. TERMS OF PAYMENT:

(a) All payments are due within thirty (30) days of YEA's invoice. YEA reserves the right to require payment in advance, or satisfactory security, for any shipment or sale. YEA may cancel any shipment or Order for any Buyer which has failed to make payment or comply with any other provision of these Standard Terms. YEA reserves the right to seek any other remedy available at law or equity. Payment shall be made at the agreed time, to the place specified, and in the currency indicated on YEA's invoice. Buyer's failure to pay at the agreed time and place constitutes a waiver of Buyer's right to demand YEA's performance under the contract.

(b) When an account 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 are accepted by YEA, Buyer's failure to pay any installment when due shall give YEA 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, YEA may then cancel the contract by written notice to Buyer. Upon cancellation of an installment contract, all items already delivered to and paid for in full by Buyer will be transferred to Buyer "AS IS, WHERE IS," without any warranty.

(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 YEA, such expenses may be recovered by YEA from Buyer, and Buyer shall indemnify YEA against claims for the same. Buyer is responsible for all taxes applicable or related to this transaction, including all sales, use and excise taxes.

7. RISK OF LOSS:

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 manufacturing plant or warehouse of YEA or its supplier. Buyer is responsible to obtain insurance coverage on all shipments of products supplied by YEA.

8. RETURNS/CANCELLATION CHARGES:

Buyer shall not return any product to YEA without the written consent of, and upon terms agreed to, by YEA. If Buyer refuses to accept delivery, or improperly revokes acceptance of product, Buyer shall be responsible for YEA's cancellation charges and expenses.

Before returning products, a Return Merchandise Authorization ("R.M.A.") number must be obtained from YEA. 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, YEA will only accept for return and credit new, unused, current stock items, in the original packaging and undamaged. Buyer shall be responsible for all freight charges, import/export charges, duties, tariffs, taxes, insurance and risk of loss/damage regarding return shipment to YEA.

9. SECURITY INTEREST:

To secure any indebtedness due and owing from Buyer from time to time, Buyer hereby grants to YEA, and YEA hereby reserves, a continuing purchase money security interest in all Yaskawa-brand and other products heretofore or hereafter sold and delivered to Buyer by YEA, 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 YEA herein. Buyer shall cooperate with YEA, and hereby appoints YEA as its attorney-in-fact, to execute and file, on Buyer's behalf, any documents necessary to evidence and perfect YEA's security interest.

10. GOVERNING LAW, FORUM AND JURY WAIVER:

These Standard Terms and the relationship of the parties hereto shall be 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 YEA and/or the relationship of Buyer and YEA, 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 YEA and/or the relationship of Buyer and YEA. 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 YEA.

11. MISCELLANEOUS:

(a) Failure on the part of YEA to enforce any of its rights derived from this contract shall never be construed as a waiver of any of YEA'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 YEA trademark must be approved by YEA in writing.

(d) Buyer may not delegate its performance or assign its rights under this Agreement except upon the express written consent of YEA. In any case, these Standard Terms shall be binding upon the successors and legal representatives of Buyer.

(e) Buyer shall comply with all applicable laws and regulations regarding the use, import and export of the products sold hereunder. The products and services to be sold hereunder are not intended for use in any nuclear, chemical or weapons production or environmental damage. If Buyer uses the products or services for such or other impermissible purposes, it shall indemnify, hold harmless and defend YEA, all parent and affiliated companies of YEA, from and against all related claims and damages.

(f) All rights and remedies available to YEA under the Uniform Commercial Code and other applicable law are reserved to YEA as remedies in the event of Buyer's default.

E7 Drives & E7 Packages Catalog

Data Subject to change without notice.



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DrivesHelpDesk@yaskawa.com - www.yaskawa.com

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