

# Description

## 5-500HP

### P7/Configured

### NEMA 3R



The P7/Configured package provides a P7 in a NEMA 3R enclosure, with space for several commonly used options, such as reactors, circuit breakers, etc. The P7 and P7/Configured have been designed for flexibility in providing the features and options commonly demanded by facility designers.

The P7 Drive is a variable torque AC drive, designed specifically for industrial applications. A new benchmark for size, cost, performance, benefits and quality, the P7 includes numerous built-in features such as Network Communications, PI control and energy-savings functions.

The P7 has embedded communications for Modbus. An optional interface card is also available for DeviceNet, Profibus, EtherNet, and LonWorks.

This P7 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 ± 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
- Input fuses
- Input reactor
- Output reactor
- Engraved nameplates
- Pressure/electrical transducer
- Analog outputs: 2 programmable, 4-20 mA
- HOA Selector Switch
- Communication Interface: DeviceNet, Profibus, EtherNet, LonWorks, Johnson Controls METASYS N2, and Siemens APOGEE FLN
- 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: built-in copy feature, 6 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: 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 Type 3R rating
- MTBF: exceeds 28 years
- Thermostatically controlled cabinet fans
- Lifting eyes
- Padlock hasp



**Description**  
**5-500HP**  
**P7/Configured**  
**NEMA 3R**

**Model Number Configuration & Pricing:**

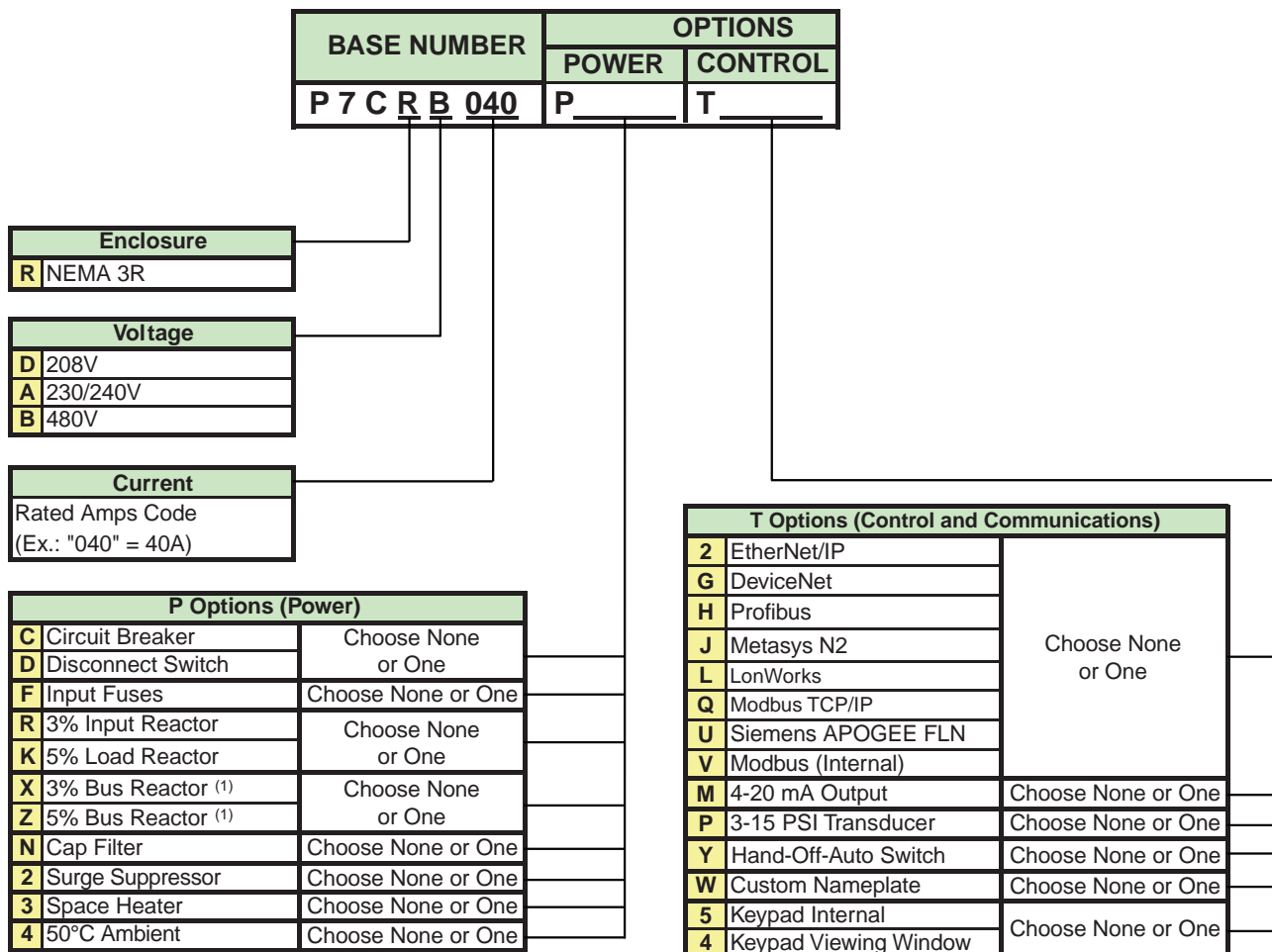
**Step 1.** To construct the complete Configured model number, first find the Base Number for the required enclosure type, voltage and current rating.

**Step 2.** Add the Option code letter for each required option. Choose options, in order, starting at the top of the option table and working toward the bottom. Any Power option must be preceded by **(P)**; any Control & Communications option by **(T)**. No more than eight options may be 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:** P7 NEMA 3R Configured package (**P7CR**) with a 480V, 40 Amp P7 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:

**P7CRB040PCXT2**



(1) 3% and 5% Bus Reactors are only available as an option on base numbers up to and including P7CR\_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 I<sup>2</sup>T 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.
- (Y) **Hand/Off/Auto:** The drive's digital operator is always brought out to the front of the Configured panel, so it is available for speed control - this is the standard configuration. A door-mounted Hand/Off/Auto Switch is available when option (Y) is specified.
- (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).
- (G, H, L, Q, 2, V, J, U) **Communications:** All configurations provide the hardware and software required for network communications, but these are not enabled in the standard configuration. Option (V) provides the programming and jumpers necessary to enable Modbus communications at no additional cost. DeviceNet option (G), Profibus option (H), Lonworks option (L), Modbus TCP/IP option (Q), and EtherNet/IP option (2) all require the addition of an optional board. Option (J) Johnson Controls METASYS N2 and option (U) Siemens APOGEE FLN require a software change, but no hardware change.
- (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

**P7 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 <sup>(1)</sup>	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%
					P7CR	Base List \$	C List \$	D List \$	N List \$	F List \$	X List \$	Z List \$
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





# Configured Drives and Options

## NEMA 3R

### P7 Configured Drives (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nominal HP <sup>(1)</sup>	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%
					P7CR	Base List \$	C List \$	D List \$	N List \$	F List \$	X List \$	Z List \$
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									
	260	200	B260									
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

# Configured Drives and Options

## NEMA 3R



### P7 Configured Drives (Continued)

Rated Input Voltage	Rated Output Current (Amps)	Nom. HP <sup>(1)</sup>	Other			Name-plates	HOA Switch	Transducer	4-20mA Output	Communications								Keypad		Uses Drive Model Number CIMR-P7U		
			2=Surge Suppressor 3=Space Heater 4=50°C Ambient							W=NP	Y=HOA Switch	P=3-15 PSI	M=4-20mA	G=DeviceNet, H=Profibus V=Modbus, L=LonWorks Q=Modbus TCP/IP, 2=EtherNet/IP, J=METASYS N2 U=APOGEE FLN								5=Keypad Internal 4=Viewing Window
			2 List \$	3 List \$	4 List \$	W List \$	Y List \$	P List \$	M List \$					G List \$	H List \$	V <sup>(3)</sup> List \$	L List \$	Q List \$	2 List \$		J List \$	U List \$
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
	260	200																				41320
	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



# Dimensions and Data

## NEMA 3R

Rated Input Voltage	Configured P7CR	Rated Output Current (Amps)	Nominal HP <sup>(1)</sup>	Physical Dimensions (in.)			Weight (lbs.) <sup>(2)</sup>	Dimension Drawing Number <sup>(3)</sup>
				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	429	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	429	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](http://www.yaskawa.com) for dimension drawings.

**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** ..... List \$

**30" Leg Kit**  
**Model No. UDA00548-2** ..... List \$

# Dimensions and Data

## NEMA 3R



Rated Input Voltage	Configured P7CR	Rated Output Current (Amps)	Nominal HP <sup>(1)</sup>	Physical Dimensions (in.)			Weight (lbs.) <sup>(2)</sup>	Dimension Drawing Number <sup>(3)</sup>
				H	W	D		
<b>480V</b>	B007	7.6	5	32	27	17.5	230	DD.AFD.198.01
	B011	11	7.5					
	B014	14	10					
	B021	21	15					
	B027	27	20					
	B034	34	25	40	35	17.5	365	DD.AFD.199.01
	B040	40	30					
	B052	52	40					
	B065	65	50					
	B077	77	60	46	48	17.5	429	DD.AFD.200.01
	B096	96	75					
	B124	124	100					
	B156	156	125	91	37	36	775	DD.AFD.189.01
	B180	180	150					
	B240	240	200					
	B260	260	200					
	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						
						1500		
						1700		
						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](http://www.yaskawa.com) for dimension drawings.

**NEMA 3R Filters** - Replacement filters for enclosure fans.

**Wall Mount Enclosures**

Model No. UFL00002-9..... List \$

**Floor Mount Enclosures (40 and 50°C)**

Model No. UFL00002-20..... List \$

**Floor Mount Enclosures (50°C)**

Model No. UFL00002-21..... List \$