

Description

5-500HP P7/Bypass NEMA 3R

P7BR



The P7/Bypass package in a NEMA 3R enclosure 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 P7 and P7/Bypass 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, H/O/A, 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

- Input, output, and bypass contactors
- Circuit breaker disconnect (MCP), with interlocked, flange-mount operating mechanism
- Thermal motor overload relay, class 20
- 115 VAC control transformer, fused
- Drive/Bypass selector switch
- Hand/Off/Auto selector switch
- Normal/Test selector switch
- Pilot lights, 22mm LED, for Control Power, Drive Run, Drive Fault, Bypass Run, Motor OL/Safety Fault and Smoke Purge
- Switch selectable auto transfer to bypass on drive fault
- Switch selectable remote transfer to bypass via contact closure
- Switch selectable smoke purge function
- Run mode and Fault contacts
- Control and safety circuit terminal strip
- Damper circuit safety interlock

Bypass Options

- Input reactor
- Communication Interface: DeviceNet, Profibus, EtherNet, LonWorks, Johnson Controls METASYS N2, and Siemens APOGEE FLN
- Pressure/electrical transducer
- Engraved nameplates
- DriveWizard upload/download and monitoring/graphing software
- Analog outputs: 2 programmable, 4-20 mA
- Surge suppressor
- Space heater
- 50°C ambient
- Keypad viewing window
- Leg kits (shipped loose)
- Input fuses

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

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
- Short circuit withstand rating: 65K RMS, 100K RMS with bus reactor
- 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: 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

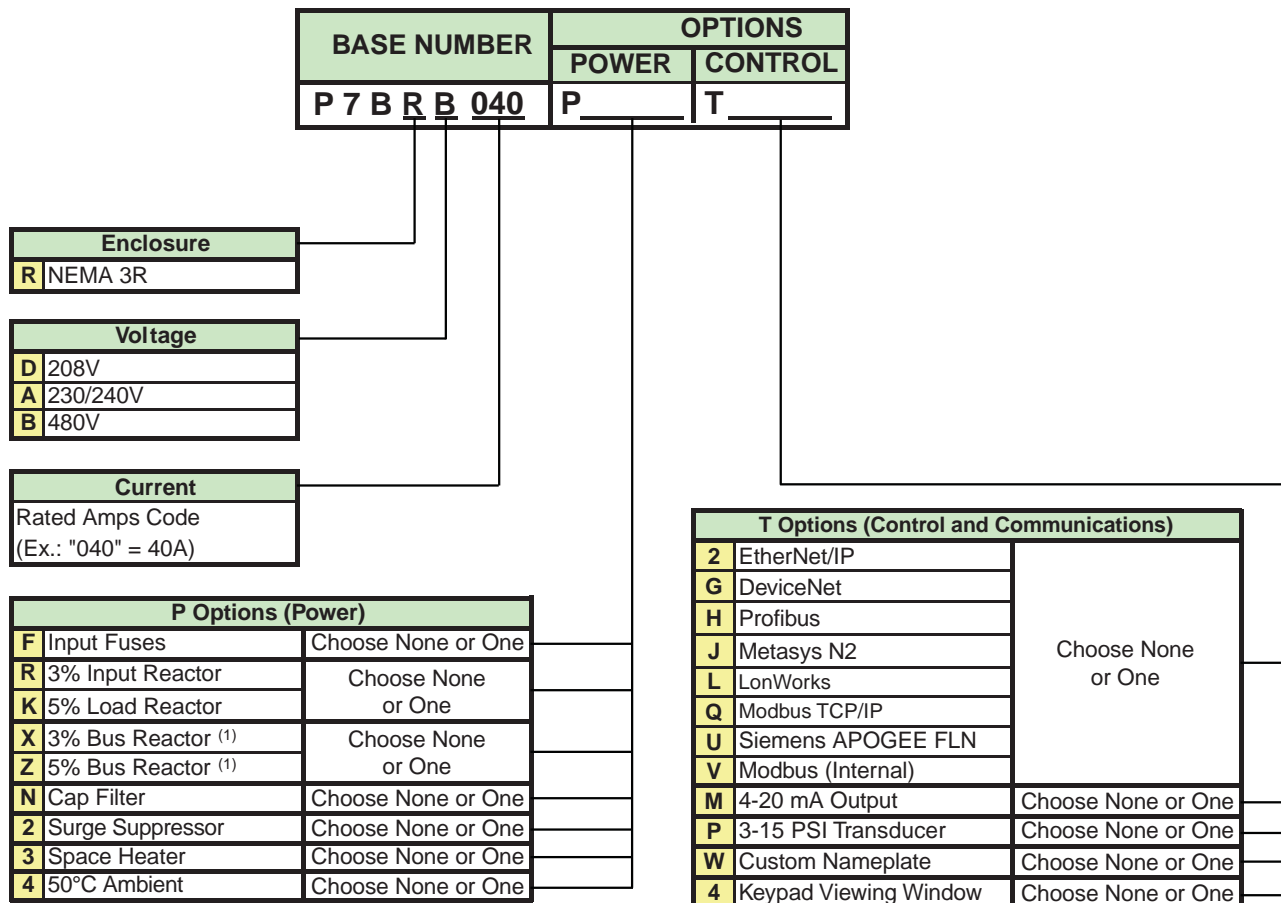
**5-500HP
P7/Bypass
NEMA 3R**

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. 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 Bypass package (**P7BR**) with a 480V, 40 Amp P7 drive (**B040**), with Input Fuses and a 3% Bus reactor (**P** followed by **FX**), LonWorks communications capability (**T** followed by **L**). Model number is:

P7BRB040PFXTL



(1) 3% and 5% Bus Reactors are only available as an option on base numbers up to and including P7BR_D074, A068 and B040; larger drives have a Bus Reactor as standard.

Description

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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-ye 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).
- (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.
- (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.



Bypass Drives and Options

NEMA 3R

P7 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		
			P7BR	Base List \$	N List \$	F List \$	X List \$	Z List \$	R List \$	K List \$	2 List \$	3 List \$	4 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						3% DC Bus Reactor is included as standard				
	143	50	D143										
	169	60	D169										
211	75	D211											
273	100	D273											
343	125	D343											
396	150	D396											
240V	15.2	5	A015						N/A				
	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% DC Bus Reactor is included as standard				
	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



P7 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-P7U	
			W=NP	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								4=Viewing Window		
			W List \$	P List \$	M List \$	G List \$	H List \$	V ⁽³⁾ List \$	L List \$	Q List \$	2 List \$	J List \$	U List \$	4 List \$		
208V	16.7	5														23P71
	24.2	7.5														27P51
	30.8	10														
	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	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														
	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) N/A = Consult Factory
- (3) Included in the Base Price



Bypass Drives and Options

NEMA 3R

P7 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						
			P7BR	Base List \$	N List \$	F List \$	X List \$	Z List \$	R List \$	K List \$	2 List \$	3 List \$	4 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							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



P7 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-P7U	
			W=NP	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								4=Viewing Window		
			W List \$	P List \$	M List \$	G List \$	H List \$	V ⁽³⁾ List \$	L List \$	Q List \$	2 List \$	J List \$	U List \$	4 List \$		
480V	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
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

Rated Input Voltage	Bypass P7BR	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	365	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	1400	DD.AFD.190.01	
D396	396	150						
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	365	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	1400	DD.AFD.190.01
	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	Bypass P7BR	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	365	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				110	
B515	515	450						
B590	590	500		1900	2100			

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- (3) Please refer to Yaskawa's website at www.yaskawa.com for dimension drawings.