

# Plus Pack ASD Specifications

The Plus Pack outdoor adjustable speed drive revolutionized the industry by combining Toshiba's robust Plus Pack technology and Toshiba's proprietary, ground-breaking Virtual Linear Pump (VLP) Technology®. VLP Technology allows the Plus Pack to directly, precisely, and linearly control pressure, temperature, level, or flow using single or multiple devices while balancing the load between them. This innovative drive is designed to withstand even the harshest of conditions and is engineered to provide tight speed control, while offering the industry's most user-friendly operator interface.

## Product Scope

380 to 460 V

6-Pulse: 60 to 1500 HP

12-Pulse: 60 to 1500 HP

18-Pulse: 60 to 800 HP



## Highlights

- Proprietary VLP Technology®
- No Flow/Low NPSH Cut-Off
- Maximized Energy Savings on Variable Torque Loads
- Time-Based Alternation
- Regenerative Power Ride Through
- 18-Pulse Diode Front-End (Option)
- Non Air-to-Air Heat Exchangers
- 100% Continuous Overload Rating, 120% for 60 Seconds
- Eight Programmable Discrete Inputs with Selectable Sync or Source Logic
- Three Programmable Discrete Output Contacts: Two Form-A Contacts & One Form-C Contact
- Three Programmable Analog Inputs: One 0 to 20 mA or 0 to 10 VDC, One 0 to 10 VDC, & One ±10 VDC
- Two Programmable Analog Outputs: One 4 to 20 mA or 0 to 10 VDC & One 4 to 20 mA Isolated Output
- Half/Full Duplex RS485/RS232 & TTL Communication Ports
- Auto-Restart Operation/Catch a Spinning Motor

## Standard Features

- NEMA 1 or NEMA 3R Enclosure
- 18-Pulse Auto Phase-Shifting Transformer (Optional)
- Built-In, Real-Time Clock
- Two Protective Function Activation Relay Contact Outputs
- Past Trip Monitoring: Stores the Last Four Faults in Succession, Along with Cumulative At-Trip Times
- EOI: Four-Digit/Seven-Digit LED Display
- Save, Restore, & Clone Multiple Drive Settings
- Ambient Temperature: 14° to 122°F (-10° to 50°C)
- Altitude: Up to 1500 Meters without Derate
- Humidity: 95% Non-Condensing
- Standards/Compliances: IEEE, UL Listed in US & Canada, NEMA, NEC, & American Recovery & Reinvestment Act Compliant (ARRA)



# Plus Pack ASD

## Part Numbering Convention



The Plus Pack is a special configuration, larger horsepower, 7-series ASD. The NEMA 3R version is specifically designed for outdoor applications including white paint (indoor units are painted ANSI 61 grey). The Plus Pack has a 1.0 service factor. In addition, this drive includes input fuses, input disconnect, locking cabinet, and grounding lug.

Use the following part numbering system when ordering a Plus Pack.

Example Part Number:	HX7+D	4	##0/##K/##L	CB
<b>Series:</b> HX7+D — HX7 Plus Pack Rev. D				
<b>Voltage:</b> 4 — 460				
<b>Model Number:</b> 660 — 60 HP      60K — 600 HP 830 — 75 HP      70K — 700 HP 11K — 100 HP     81K — 800 HP 16K — 150 HP     93K — 900 HP 20K — 200 HP     10L — 1000 HP 26K — 250 HP     12L — 1200 HP 39K — 350 HP     14L40 — 1400 HP 45K — 400 HP     15L40 — 1500 HP 51K40 — 500 HP				
<b>Style:</b> CB — NEMA 3R, Includes Input Circuit Breaker CB1 — NEMA 1, Includes Input Circuit Breaker CC — NEMA 3R, Includes 12-pulse Input Circuit Breaker CC1 — NEMA 1, Includes 12-pulse Input Circuit Breaker CD — NEMA 3R, Includes 18-pulse Input Circuit Breaker				

### Notes:

- Plus Pack units do not include dynamic braking transistors as standard.
- Factory authorized startup is required on all ASDs 400 HP and larger.
- 12-pulse drives require a 12-pulse phase-shifting transformer (not included).
- Height dimensions listed include removable eyebolts and base.
- Width dimensions listed include heat exchanger.
- Depth dimensions listed include door devices.
- 500, 1400, and 1500 HP Plus Packs are rated 40°C maximum.
- NEMA 3R, includes 18-pulse, phase-shifting auto-transformer.

# Plus Pack ASD

## 6-Pulse & 12 Pulse Unit (NEMA 1 Enclosure) Pricing & Dimensions



VAC	HP	FLA	Model Number		H	W	D	Shipping Weight (lbs.)
					Dimensions (in.)			
<b>6-Pulse Unit</b>								
460	250	313	HX7+D426KCB1		81.5	37.0	40.0	1200
460	350	469	HX7+D439KCB1		81.5	37.0	40.0	1200
460	400	546	HX7+D445KCB1		81.5	37.0	40.0	1200
460	500	623	HX7+D451K40CB1		81.5	37.0	40.0	1500
460	600	722	HX7+D460KCB1		81.5	72.0	46.0	2000
460	700	842	HX7+D470KCB1		81.5	72.0	46.0	2000
460	800	980	HX7+D481KCB1		81.5	72.0	46.0	2000
460	900	1121	HX7+D493KCB1		81.5	72.0	46.0	2000
460	1000	1203	HX7+D410LCB1		82.5	84.0	46.0	3500
460	1200	1443	HX7+D412LCB1		82.5	84.0	46.0	3500
460	1400	1684	HX7+D414L40CB1		82.5	84.0	46.0	3500
460	1500	1804	HX7+D415L40CB1		82.5	84.0	46.0	3500

VAC	HP	FLA	Model Number		H	W	D	Shipping Weight (lbs.)
					Dimensions (in.)			
<b>12-Pulse Unit</b>								
460	250	313	HX7+D426KCC1		81.5	37.0	40.0	1200
460	350	469	HX7+D439KCC1		81.5	37.0	40.0	1200
460	400	546	HX7+D445KCC1		81.5	37.0	40.0	1200
460	500	623	HX7+D451K40CC1		81.5	37.0	40.0	1500
460	600	722	HX7+D460KCC1		81.5	72.0	46.0	2000
460	700	842	HX7+D470KCC1		81.5	72.0	46.0	2000
460	800	980	HX7+D481KCC1		81.5	72.0	46.0	2000
460	900	1121	HX7+D493KCC1		81.5	72.0	46.0	2000
460	1000	1203	HX7+D410LCC1		82.5	84.0	46.0	3500
460	1200	1443	HX7+D412LCC1		82.5	84.0	46.0	3500
460	1400	1684	HX7+D414L40CC1		82.5	84.0	46.0	3500
460	1500	1804	HX7+D415L40CC1		82.5	84.0	46.0	3500

**Notes:**

- Dimensions and weights are for estimation purposes only — height dimensions listed include removable eyebolts and base; width dimensions listed include heat exchanger; depth dimensions listed include door devices.
- Factory authorized startup is required on all ASDs 400 HP and larger.
- 500, 1400, and 1500 HP Plus Packs are rated 40°C maximum.
- Plus Pack units do not include dynamic braking transistors as standard.
- 12-pulse drives require a 12-pulse phase-shifting transformer (not included).

# Plus Pack ASD

## 6-Pulse & 12 Pulse Unit (NEMA 3R Enclosure) Pricing & Dimensions



VAC	HP	FLA	Model Number		H	W	D	Shipping Weight (lbs.)
					Dimensions (in.)			
<b>6-Pulse Unit</b>								
460	60	79	HX7+D4660CB		81.5	25.0	35.0	1000
460	75	100	HX7+D4830CB		81.5	25.0	35.0	1000
460	100	133	HX7+D411KCB		81.5	25.0	35.0	1000
460	150	196	HX7+D416KCB		81.5	31.5	35.0	1000
460	200	241	HX7+D420KCB		81.5	31.5	35.0	1000
460	250	313	HX7+D426KCB		81.5	46.0	42.0	1200
460	350	469	HX7+D439KCB		81.5	46.0	42.0	1200
460	400	546	HX7+D445KCB		81.5	46.0	42.0	1200
460	500	623	HX7+D451K40CB		81.5	61.0	42.0	1500
460	600	722	HX7+D460KCB		81.5	90.0	48.0	2000
460	700	842	HX7+D470KCB		81.5	90.0	48.0	2000
460	800	980	HX7+D481KCB		81.5	90.0	48.0	2000
460	900	1121	HX7+D493KCB		81.5	90.0	48.0	2000
460	1000	1203	HX7+D410LCB		82.5	110.0	48.0	3500
460	1200	1443	HX7+D412LCB		82.5	110.0	48.0	3500
460	1400	1684	HX7+D414L40CB		82.5	110.0	48.0	3500
460	1500	1804	HX7+D415L40CB		82.5	110.0	48.0	3500

VAC	HP	FLA	Model Number		H	W	D	Shipping Weight (lbs.)
					Dimensions (in.)			
<b>12-Pulse Unit</b>								
460	60	79	HX7+D4660CC		81.5	25.0	35.0	1000
460	75	100	HX7+D4830CC		81.5	25.0	35.0	1000
460	100	133	HX7+D411KCC		81.5	25.0	35.0	1000
460	150	196	HX7+D416KCC		81.5	31.5	35.0	1000
460	200	241	HX7+D420KCC		81.5	31.5	35.0	1000
460	250	313	HX7+D426KCC		81.5	46.0	42.0	1200
460	350	469	HX7+D439KCC		81.5	46.0	42.0	1200
460	400	546	HX7+D445KCC		81.5	46.0	42.0	1200
460	500	623	HX7+D451K40CC		81.5	61.0	42.0	1500
460	600	722	HX7+D460KCC		81.5	90.0	48.0	2000
460	700	842	HX7+D470KCC		81.5	90.0	48.0	2000
460	800	980	HX7+D481KCC		81.5	90.0	48.0	2000
460	900	1121	HX7+D493KCC		81.5	90.0	48.0	2000
460	1000	1203	HX7+D410LCC		82.5	110.0	48.0	3500
460	1200	1443	HX7+D412LCC		82.5	110.0	48.0	3500
460	1400	1684	HX7+D414L40CC		82.5	110.0	48.0	3500
460	1500	1804	HX7+D415L40CC		82.5	110.0	48.0	3500

### Notes:

- Dimensions and weights are for estimation purposes only — height dimensions listed include removable eyebolts and base; width dimensions listed include heat exchanger; depth dimensions listed include door devices.
- 60 to 100 HP do not utilize heat exchanger.
- 500, 1400, and 1500 HP Plus Packs are rated 40°C maximum.
- Factory authorized startup is required on all ASDs 400 HP and larger.
- Plus Pack units do not include dynamic braking transistors as standard.
- 12-pulse drives require a 12-pulse phase-shifting transformer (not included).

# Plus Pack ASD

## 18 Pulse Unit (NEMA 3R Enclosure)

### (Phase Shifting AutoTransformer Included)

#### Pricing & Dimensions



VAC	HP	FLA	Model Number		H	W	D	Shipping Weight (lbs.)
					Dimensions (in.)			
460	60	79	HX7+D4660CD		81.5	70.0	35.0	2550
460	75	100	HX7+D4830CD		81.5	70.0	35.0	2550
460	100	133	HX7+D411KCD		81.5	70.0	35.0	2550
460	150	196	HX7+D416KCD		81.5	70.0	35.0	2550
460	200	241	HX7+D420KCD		81.5	70.0	35.0	2550
460	250	313	HX7+D426KCD		81.5	93.5	44.0	3425
460	350	469	HX7+D439KCD		81.5	93.5	44.0	3650
460	400	546	HX7+D445KCD		81.5	93.5	44.0	3900
460	500	623	HX7+D451K40CD		81.5	93.5	44.0	3900
460	600	722	HX7+D460KCD		81.5	130.0	46.5	5700
460	700	842	HX7+D470KCD		81.5	130.0	46.5	5775
460	800	980	HX7+D481KCD		81.5	130.0	46.5	5775

#### Notes:

- Dimensions and weights are for estimation purposes only — height dimensions listed include removable eyebolts and base; width dimensions listed include heat exchanger; depth dimensions listed include door devices.
- 18-pulse drives have an integrated 18-pulse phase-shifting transformer.
- 500 HP 18-pulse Plus Pack is rated 40°C maximum.
- Factory authorized startup is required on all ASDs 400 HP and larger.
- Plus Pack units do not include dynamic braking transistors as standard.

# Plus Pack ASD

## Option Information & Pricing

### Installed Isolated Bypass

Option Code	Description
AE	60 HP Isolated Three-contactor Bypass
	75 HP Isolated Three-contactor Bypass
	100 HP Isolated Three-contactor Bypass
	150 HP Isolated Three-contactor Bypass
	200 HP Isolated Three-contactor Bypass
	250 HP Isolated Three-contactor Bypass
	350 HP Isolated Three-contactor Bypass
	400 HP Isolated Three-contactor Bypass
	500 HP Isolated Three-contactor Bypass
	600 HP Isolated Three-contactor Bypass
	700 HP Isolated Three-contactor Bypass
	800 HP Isolated Three-contactor Bypass

**Notes:**

- Bypasses are only available for 6-pulse drives. Consult factory for 900 HP and larger size drives on option availability.
- Dimensions will be significantly affected with bypass adders.

### Installed Dynamic Braking Transistors

Option Code	Description
DB	60 to 100 HP IGBT7
	150 to 200 HP IGBT7
	250 HP IGBT7
	350 to 500 HP IGBT7
	600 to 1500 HP IGBT7

**Notes:**

- Plus Packs 250 HP and above must use the 250 HP heavy duty dynamic braking resistor.
- Larger units have limited braking capacity.

# Plus Pack ASD

## Option Information & Pricing

### Installed Junction Boxes

Option Code	Description
JB	60 to 100 HP Junction Box
	150 to 500 HP Junction Box (Standard on 518 kVA CB CC)
	600 to 800 HP Junction Box
	900 to 1500 HP Junction Box

**Notes:**

- Junction box included on 18-pulse units.

### Installed DC Link Reactors

Option Code	Description
RD	150 HP-Installed DC Link Reactor
	200 HP-Installed DC Link Reactor
	250 HP-Installed DC Link Reactor
	350 HP-Installed DC Link Reactor
	400 HP-Installed DC Link Reactor
	500 HP-Installed DC Link Reactor
	600 HP-Installed DC Link Reactor
	700 HP-Installed DC Link Reactor
	800 HP-Installed DC Link Reactor
	900 HP-Installed DC Link Reactor
	1000 HP-Installed DC Link Reactor
	1200 HP-Installed DC Link Reactor
	1400 HP-Installed DC Link Reactor
	1500 HP-Installed DC Link Reactor

**Notes:**

- 60 to 100 HP Plus Pack power units do not have DC link reactor option connection points.
- DC link reactors included on 18-pulse units.

### Installed Raycap Surge Suppressors

Option Code	Description
SS	Installed Raycap Surge Suppressors for CB & CD Units
	Installed Raycap Surge Suppressors for CC Units

