TOSHIBA

Leading Innovation

2013 Industrial Catalog

DRIVES, MOTOR CONTROLS, & PLCs

TOSHIBA

Leading Innovation »»

1 CALL SOLUTION

G9®
Low Voltage Drive

EQP Global
Low Voltage Motor

ONE CALL. ONE SOLUTION.

Toshiba International Corporation is proud to be a single-source solution for your application demands, offering a complete product lineup of electric motors, adjustable speed drives, and motor starters. From R&D to after-market service, our full range of in-house services give our customers easy and efficient access to some of the best services in the world. These are just a few reasons why our customers prefer Toshiba. One Call. One Solution.

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Our Company

Toshiba International Corporation (TIC) is a Toshiba America Inc. (TAI) Group Company, a wholly owned subsidiary of Toshiba Corporation. TIC's Industrial Division is headquartered in Houston, Texas and employs approximately 1,400 people. With an extensive product offering ranging from electric motors and adjustable speed drives to uninterruptible power systems and super-charge ion batteries, TIC provides application solutions to a wide range of industries.

One Call, One Solution

Most products are manufactured at our one million square foot state-of-the-art manufacturing facility, in Houston, Texas. We are proud to be a single-source solution for our customers. Our comprehensive product offering and large installed base demonstrates our customer's confidence in choosing Toshiba. Since most of our products are manufactured under one roof, we can offer customized solutions to meet your application needs. We also have the capability to test our products together, as a complete system, before it goes out into the field—ensuring the highest level of quality, performance, and reliability.

Our Products

Toshiba is a leading manufacturer of low and medium voltage adjustable speed drives, low and medium voltage motor controls, and industrial automation for countless industries and applications. Our low and medium voltage drives range from ½ to 10,000 HP and 230 to 6,600 V and our low and medium voltage motor controls range from 3 to 6000 HP and 208 to 6600 V. Our products are built to deliver superior performance in virtually any application, setting new standards in extreme duty. Even if your project requires a customized product or integrated system, we can deliver a solution to not only meet but exceed your expectations.

This catalog contains all our standard product offerings. For more information on custom projects, please contact the factory directly at (800) 231-1412.

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Low Voltage Drives
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Specifications

The H9 adjustable speed drive is the most advanced low voltage, heavy duty drive offered by Toshiba. Designed with the end-user in mind, this powerful drive combines a rugged, proven power platform with the latest power devices and an advanced 32-bit micro-processor to provide users with a smarter, stronger, more reliable drive with flexible application control.

Product Scope

200 to 240 V at 0.75 HP to 125 HP
380 to 460 V at 1 HP to 400 HP

Highlights

- 100% Continuous Overload Rating, 120% for 60 Seconds
- Eight Programmable Discrete Inputs with Selectable Sink or Source Logic
- Three Programmable Discrete Output Contacts: Two Form-A Contacts & One Form-C Contact
- Three Programmable Analog Inputs: One 4 to 20 mA or 0 to 10 VDC Input, One 0 to 10 VDC Input, & One ±10 VDC Input
- Two Programmable Analog Outputs: One 4 to 20 mA or 0 to 10 VDC Output & One 4 to 40 mA Output
- Regenerative Power Ride Through
- DC-Link Reactors on Most HP Ratings
- Two-Wire/Four-Wire RS485
- Auto-Restart Operation/Catch a Spinning Motor

Standard Features

- NEMA 1 Enclosure
- NEC 2005 Motor Overload Retention (No External Motor Overloads Required)
- Built-In Real-Time Clock
- Past Trip Monitoring: Stores the Last 4 Faults in Succession, Along with Cumulative At-Trip Times
- EOI: Backlit Plain-English LCD & Four-Digit/Seven-Digit LED Display
- Save, Restore, & Clone Multiple Drive Settings
- Ambient Temperature: 14° to 104°F (-10° to 40°C)
- Humidity: 95% Non-Condensing
- Altitude: Up to 1000 Meters without Derate
- Standards/Compliance: UL Listed in US & Canada

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H9® ASD
H9 Power Unit Pricing & Dimensions

H9® 230 V ASD

VAC	HP	FLA	Model Number	List Price	Frame	Dimensions (in.)			Shipping Weight (lbs.)
						H	W	D	
230	0.75	3.2	VT130H9U2010	$1,550	2	11.2	5.2	6.1	8.0
	1	4.2	VT130H9U2015	$1,550					
	2	6.8	VT130H9U2025	$1,550					
	3	9.6	VT130H9U2035	$1,550	3	12.4	6.1	6.6	12.0
	5	15.2	VT130H9U2055	$1,600					
	7.5	22	VT130H9U2080	$1,900	4	15.0	6.9	6.6	17.0
	10	28	VT130H9U2110	$2,400					
	15	42	VT130H9U2160	$3,000	5B	19.3	9.1	7.6	38.0
	20	54	VT130H9U2220	$3,650					
	25	68	VT130H9U2270	$4,500					
	30	80	VT130H9U2330	$5,197	6	25.9	11.1	13.2	98.0
	40	104	VT130H9U2400	$7,087	7B	33.1	14.3	15.0	165
	50	130	VT130H9U2500	$11,000					
	60	154	VT130H9U2600	$13,500					
	75	192	VT130H9U2750	$15,400					
	100	248	VT130H9U210K	$18,600	9	51.7	14.6	17.6	321
	125	312	VT130H9U212K	$23,000	10	53.2	15.7	17.6	362

H9® ASD
H9 Power Unit Pricing & Dimensions

H9® 460 V ASD

VAC	HP	FLA	Model Number	List Price	Frame	Dimensions (in.)			Shipping Weight (lbs.)
						H	W	D	
460	1	2.1	VT130H9U4015	$1,550	2	11.2	5.2	6.1	9
	2	3.4	VT130H9U4025	$1,600					
	3	4.8	VT130H9U4035	$1,700					
	5	7.6	VT130H9U4055	$1,750	3	12.4	6.1	6.6	13.0
	7.5	11	VT130H9U4080	$2,000					
	10	14	VT130H9U4110	$2,635	4	15.0	6.9	6.6	14.0
	15	21	VT130H9U4160	$3,100	5A	15.1	8.3	7.6	14.0
	20	27	VT130H9U4220	$3,750					
	25	34	VT130H9U4270	$4,200	5B	19.3	9.1	7.6	36.0
	30	40	VT130H9U4330	$4,400					
	40	52	VT130H9U4400	$5,200	6	25.9	11.1	13.2	98.0
	50	65	VT130H9U4500	$6,700	7A	30.8	11.1	14.3	124
	60	77	VT130H9U4600	$7,900					
	75	96	VT130H9U4750	$8,800	8	36.1	14.3	15.3	185
	100	124	VT130H9U410K	$11,000					
	125	156	VT130H9U412K	$13,500					
	150	180	VT130H9U415K	$15,400	9	51.7	14.6	17.6	321
	200	240	VT130H9U420K	$18,600	10	53.2	15.7	17.6	362
	250	302	VT130H9U425K	$23,000	11	63.1	15.0	17.6	405
	300	361	VT130H9U430K	$27,000	12	68.5	18.9	17.6	594
	350	414	VT130H9U435K	$30,400					
	400	477	VT130H9U440K	$35,000	13	70.0	25.6	17.6	874

H9® ASD
Assembly Unit Part Numbering Convention

The H9 assembly unit combines the H9 power unit with commonly used options such as manual bypass & input disconnects in an easy-to-install turn-key package. H9 assembly units include a ground lug & door-mounted electronic operator interface.

Bypass units include an ASD/bypass selector switch, a bypass-start lighted push-button (red), & a bypass-stop lighted push-button (green). They are used for system control & are all located on the enclosure door.

Ordering Information: Use the following part numbering convention to configure the H9 assembly unit package when placing your order.

Example Part Number:	H9	4	###/###K	AA	##

Series:
H9 — H9 ASD

Voltage:
2 — 230
3 — 380
4 — 460
A — 208
B — 415
C — 440

Model Number:

010 — 0.75 HP	500 — 50 HP
015 — 1 HP	600 — 60 HP
025 — 2 HP	750 — 75 HP
035 — 3 HP	10K — 100 HP
055 — 5 HP	12K — 125 HP
080 — 7.5 HP	15K — 150 HP
110 — 10 HP	20K — 200 HP
160 — 15 HP	25K — 250 HP
220 — 20 HP	30K — 300 HP
270 — 25 HP	35K — 350 HP
330 — 30 HP	40K — 400 HP
400 — 40 HP	

Style:
AA — Includes motor circuit protector
AE — Includes motor circuit protector, three-contactor bypass, & overload protection

H9® ASD
H9 Assembly Unit Pricing & Dimensions

H9® 230 V ASD

VAC	HP	FLA	Model Number	List Price		Dimensions (in.)		
				AA	AE	H	W	D
230	0.75	9.6	H92010	$4,625	$5,683	36.0	24.0	10.0
	1	9.6	H92015	$4,625	$5,683			
	2	9.6	H92025	$4,625	$5,683			
	3	9.6	H92035	$4,783	$6,106			
	5	15.2	H92055	$4,933	$6,256			
	7.5	22	H92080	$5,233	$6,556	48.0		12.0
	10	28	H92110	$5,733	$7,056		36.0	20.0
	15	42	H92160	$6,492	$8,079			
	20	54	H92220	$7,142	$8,729			
	25	68	H92270	$8,627	$10,214			
	30	80	H92330	$8,994	$10,581	60.0		
	40	104	H92400	$12,351	$13,939			
	50	130	H92500	$17,667	$19,254	90.0		24.0
	60	154	H92600	$19,167	$22,341			
	75	192	H92750	$20,942	$24,116			
	100	248	H9210K	$24,234	$30,054		48.0	30.0
	125	312	H9212K	$28,702	$37,696			
Delivery: Five weeks for a basic assembly unit.								

H9® ASD
H9 Assembly Unit Pricing & Dimensions

H9® 460 V ASD

VAC	HP	FLA	Model Number	List Price		Dimensions (in.)		
				AA	AE	H	W	D
460	1	7.6	H94015	$3,175	$4,233	36.0	24.0	10.0
	2	7.6	H94025	$3,175	$4,233			
	3	7.6	H94035	$3,175	$4,233			
	5	7.6	H94055	$4,925	$6,512			
	7.5	11	H94080	$5,333	$6,656			
	10	14	H94110	$5,968	$7,291	48.0		12.0
	15	21	H94160	$6,433	$7,756		36.0	20.0
	20	27	H94220	$7,083	$8,935			
	25	34	H94270	$7,692	$9,279			
	30	40	H94330	$7,892	$9,479			
	40	52	H94400	$8,692	$10,279			
	50	65	H94500	$9,667	$11,254			
	60	77	H94600	$12,027	$13,085	60.0		
	75	96	H94750	$14,514	$16,102			
	100	124	H9410K	$17,667	$19,254	90.0		24.0
	125	156	H9412K	$19,167	$22,341			
	150	180	H9415K	$20,942	$24,116			
	200	240	H9420K	$24,234	$30,054		48.0	30.0
	250	302	H9425K	$28,702	$37,696			
	300	361	H9430K	$32,937	$48,810			
	350	414	H9435K	$37,039	$51,325			
	400	477	H9440K	$43,491	$58,491			

Delivery: Five weeks for a basic assembly unit.

G9® ASD
Specifications

The G9 adjustable speed drive is the most advanced low voltage, severe duty drive ever offered by Toshiba. Designed with the end-user in mind, this drive combines a rugged, proven power platform with the latest in power devices and an advanced micro-processor to provide users with a smarter, stronger, more reliable drive with flexible application control.

Product Scope

200 to 240 V at 0.75 HP to 100 HP
380 to 480 V at 1 HP to 350 HP

Highlights

- 115% Continuous Overload Rating, 150% for Two Minutes[1]
- Eight Programmable Discrete Inputs
- Three Programmable Discrete Output Contacts: One Form-C & Two Form-A
- Three Programmable Inputs: One 0 to 20 mA or 0 to 10 VDC Input, One 0 to 10 VDC Input, & One ±10 VDC Input
- Two Programmable Analog Output: FM Terminal from 0 to 20 mA or 0 to 10 VDC & AM Terminal from 0 to 20 mA
- Regenerative Power Ride Through
- DC-Link Reactors on Most HP Ratings
- Two-Wire/Four-Wire RS485
- Auto-Restart Operation/Catch a Spinning Motor

Standard Features

- UL Type-1 & NEMA 1 Enclosure
- Built-In Dynamic Braking Circuit
- 100 KAIC or 200 KAIC
- Built-In Real-Time Clock
- EOI: Backlit Plain-English LCD & Four-Digit/Seven-Digit LED Display
- Save, Restore, & Clone Multiple Drive Settings
- Ambient Temperature: 14° to 104°F (-10° to 40°C)
- Altitude: Up to 1000 Meters without Derate
- Humidity: 95% Non-Condensing
- Standards/Compliance: UL Listed in US & Canada, & American Recovery & Reinvestment Act Compliant (ARRA)

[1] *110% Continuous, 150% for One Minute (≥ 60 HP, 230 V; 100 HP, 480 V)*

G9® ASD
G9 Power Unit Pricing & Dimensions

G9® 230 V ASD

VAC	HP	FLA	Model Number	List Price	Frame	Dimensions (in.)			Shipping Weight (lbs.)
						H	W	D	
230	DEMO	DEMO	VT130G9U2015DEMO	$500	2	11.2	5.2	6.1	12
	0.75	3.5	VT130G9U2010	$1,550	2	11.2	5.2	6.1	8.0
	1	4.2	VT130G9U2015	$1,550					
	2	6.9	VT130G9U2025	$1,550					
	3	10.0	VT130G9U2035	$1,650	3	12.4	6.1	6.6	12.0
	5	15.2	VT130G9U2055	$1,700					
	7.5	23.8	VT130G9U2080	$2,160	4	15.0	6.9	6.6	17.0
	10	28.6	VT130G9U2110	$2,565	5A	15.1	8.3	7.6	21.0
	15	46.8	VT130G9U2160	$3,285	5B	19.3	9.1	7.6	38.0
	20	57.2	VT130G9U2220	$4,050					
	25	76	VT130G9U2270	$5,400	6	25.9	11.1	13.2	97.0
	30	90	VT130G9U2330	$6,237	7B	33.1	14.3	15.0	165
	40	104	VT130G9U2400	$13,050					
	50	152	VT130G9U2500	$15,300					
	60	176	VT130G9U2600	$18,900					
	75	221	VT130G9U2750	$21,263	9	51.7	14.6	17.6	321
	100	285	VT130G9U210K	$25,515	10	53.1	14.8	17.6	362

Notes:

- *Demo includes ASD-TB1-S1M9 demo terminal strip and 120 V input.*

G9® ASD
G9 Power Unit Pricing & Dimensions

G9® 460 V ASD

VAC	HP	FLA	Model Number	List Price	Frame	Dimensions (in.)			Shipping Weight (lbs.)
						H	W	D	
460	1	2.7	VT130G9U4015	$1,550	2	11.2	5.2	6.1	9
	2	3.6	VT130G9U4025	$1,600					
	3	5.0	VT130G9U4035	$1,700					
	5	9.1	VT130G9U4055	$2,050	3	12.4	6.1	6.6	12
	7.5	12.4	VT130G9U4080	$2,250	4	15.0	6.9	6.6	17
	10	15.3	VT130G9U4110	$2,790					
	15	24.0	VT130G9U4160	$3,600	5A	15.1	8.3	7.6	22
	20	28.6	VT130G9U4220	$4,500	5B	19.3	9.1	7.6	38
	25	35.7	VT130G9U4270	$5,580					
	30	42.0	VT130G9U4330	$6,660	6	25.9	11.1	13.2	96
	40	57.2	VT130G9U4400	$8,145	7A	30.8	11.1	14.3	124
	50	68.5	VT130G9U4500	$9,923					
	60	81.5	VT130G9U4600	$11,228	8	36.1	14.3	15.3	183
	75	100.8	VT130G9U4750	$13,050					
	100	138.7	VT130G9U410K	$15,300					
	125	179	VT130G9U412K	$18,900	9	51.7	14.6	17.6	321
	150	215	VT130G9U415K	$21,263	10	53.2	15.7	17.6	362
	200	259	VT130G9U420K	$25,515	11	63.1	15.0	17.6	405
	250	314	VT130G9U425K	$30,240	12	68.5	18.9	17.6	596
	300	387	VT130G9U430K	$37,800	13	70.0	25.6	17.6	860
	350	427	VT130G9U435K	$42,525					

G9® ASD
Assembly Unit Part Numbering Convention

The G9 assembly unit combines the G9 power unit with commonly used options such as manual bypass & input disconnects in an easy-to-install turn-key package. G9 assembly units include a ground lug & door-mounted electronic operator interface.

Bypass units include an ASD/bypass selector switch, a bypass-start lighted push-button (red), & a bypass-stop lighted push-button (green). They are used for system control & are all located on the enclosure door.

Ordering Information: Use the following part numbering convention to configure the G9 assembly unit package when placing your order.

Example Part Number:	G9	4	###/###K	AA	##

Series:
G9 — G9 ASD

Voltage:
2 — 230
3 — 380
4 — 460
A — 208
B — 415
C — 440

Model Number:

010 — 0.75 HP	500 — 50 HP
015 — 1 HP	600 — 60 HP
025 — 2 HP	750 — 75 HP
035 — 3 HP	10K — 100 HP
055 — 5 HP	12K — 125 HP
080 — 7.5 HP	15K — 150 HP
110 — 10 HP	20K — 200 HP
160 — 15 HP	25K — 250 HP
220 — 20 HP	30K — 300 HP
270 — 25 HP	35K — 350 HP
330 — 30 HP	40K — 400 HP
400 — 40 HP	

Style:
AA — Includes motor circuit protector
AE — Includes motor circuit protector, three-contactor bypass, & overload protection

G9® ASD
G9 Assembly Unit Pricing & Dimensions

G9® 230 V ASD

VAC	HP	FLA	Model Number	List Price		Dimensions (in.)		
				AA	AE	H	W	D
230	0.75	3.5	G92010	$4,374	$5,432	36.0	24.0	10.0
	1	4.2	G92015	$4,425	$5,483			
	2	6.9	G92025	$4,575	$5,633			
	3	10.0	G92035	$4,883	$6,206			
	5	15.2	G92055	$5,033	$6,356			
	7.5	23.8	G92080	$5,493	$6,816	48.0		12.0
	10	28.6	G92110	$6,183	$7,506		36.0	20.0
	15	46.8	G92160	$7,142	$8,729			
	20	57.2	G92220	$7,992	$9,579			
	25	76	G92270	$10,127	$11,714			
	30	90	G92330	$10,727	$12,314	60.0		
	40	104	G92400	$20,214	$21,802			
	50	152	G92500	$23,667	$25,254	90.0		24.0
	60	176	G92600	$26,667	$29,841			
	75	221	G92750	$29,167	$32,341			
	100	285	G9210K	$33,984	$39,804		48.0	30.0

Delivery: Five weeks for a basic assembly unit.

G9® ASD
G9 Assembly Unit Pricing & Dimensions

G9® 460 V ASD

VAC	HP	FLA	Model Number	List Price		Dimensions (in.)		
				AA	AE	H	W	D
460	1	2.7	G94015	$4,630	$5,688	36.0	24.0	10.0
	2	3.6	G94025	$4,750	$5,808			
	3	5.0	G94035	$4,875	$5,933			
	5	9.1	G94055	$5,225	$6,812			
	7.5	12.4	G94080	$5,833	$7,156			
	10	15.3	G94110	$6,433	$7,756	48.0		12.0
	15	24.0	G94160	$7,333	$8,656		36.0	20.0
	20	28.6	G94220	$8,333	$10,185			
	25	35.7	G94270	$9,692	$11,279			
	30	42.0	G94330	$10,892	$12,479			
	40	57.2	G94400	$12,542	$14,129			
	50	68.5	G94500	$13,992	$15,579			
	60	81.5	G94600	$16,602	$17,660	60.0		
	75	101	G94750	$20,214	$21,802			
	100	139	G9410K	$23,667	$25,254	90.0		24.0
	125	179	G9412K	$26,667	$29,841			
	150	215	G9415K	$29,167	$32,341			
	200	259	G9420K	$33,984	$39,804		48.0	30.0
	250	314	G9425K	$39,302	$48,296			
	300	387	G9430K	$47,937	$63,810			
	350	427	G9435K	$53,889	$68,175			
Delivery: Five weeks for a basic assembly unit.								

H9®/G9® ASD
Assembly Unit Option Information & Pricing

H9®/G9® 230 V

Part Number	Description	Price
NF	• 1 to 50 HP fan & filtered dust-inhibiting enclosure	$1,000
	• 30 to 100 HP fan & filtered dust-inhibiting enclosure	$1,500
	• 125 HP fan & filtered dust-inhibiting enclosure	$2,500
N3	• 1 to 50 HP fan & filtered enclosure for outdoor use	$2,000
	• 30 to 100 HP fan & filtered enclosure for outdoor use	$3,000
	• 125 HP fan & filtered enclosure for outdoor use	$5,000
Delivery: Add two weeks to basic assembly unit lead time.		
NC	• 0.75 to 7.5 HP NEMA 12 adder	$2,000
	• 10 to 15 HP NEMA 12 adder	$4,000
	• 20 to 50 HP NEMA 12 adder	$8,000
	• 60 to 100 HP NEMA 12 adder	$12,000
	• 125 HP NEMA 12 adder	$15,000
N4	• 0.75 to 7.5 HP NEMA 4 adder	$3,000
	• 10 to 25 HP NEMA 4 adder	$11,500
	• 30 to 50 HP NEMA 4 adder	$18,000
	• 60 to 100 HP NEMA 4 adder	$26,000
	• 125 HP NEMA 4 adder	$32,000
Delivery: Add five weeks to basic assembly unit lead time.		

H9®/G9® ASD
H9/G9 Assembly Unit Option Information & Pricing

H9®/G9® 460 V

Part Number	Description	Price
NF	• 1 to 50 HP fan & filtered dust-inhibiting enclosure	$1,000
	• 60 to 200 HP fan & filtered dust-inhibiting enclosure	$1,500
	• 250 to 400 HP fan & filtered dust-inhibiting enclosure	$2,500
N3	• 1 to 50 HP fan & filtered enclosure for outdoor use	$2,000
	• 60 to 200 HP fan & filtered enclosure for outdoor use	$3,000
	• 250 to 400 HP fan & filtered enclosure for outdoor use	$5,000
Delivery: Add two weeks to basic assembly unit lead time.		
NC	• 1 to 15 HP NEMA 12 adder	$2,000
	• 20 to 30 HP NEMA 12 adder	$4,000
	• 40 to 100 HP NEMA 12 adder	$8,000
	• 125 to 200 HP NEMA 12 adder	$12,000
	• 250 to 400 HP NEMA 12 adder	$15,000
N4	• 1 to 15 HP NEMA 4 adder	$3,000
	• 20 to 30 HP NEMA 4 adder	$11,500
	• 40 to 100 HP NEMA 4 adder	$18,000
	• 125 to 200 HP NEMA 4 adder	$26,000
	• 250 to 400 HP NEMA 4 adder	$32,000
Delivery: Add five weeks to basic assembly unit lead time.		

P9 ASD
Specifications

The P9 adjustable speed drive is a revolution in pump control. By incorporating Toshiba's proprietary, ground-breaking Virtual Linear Pump (VLP™) Technology, the P9 directly, precisely, and linearly controls pressure, temperature, level, or flow. The P9 eliminates many obstacles users thought were an integral part of pump control and sets a new standard in ingenuity, performance, and ease-of-use for the pump industry.

Product Scope

200 to 240 V at 0.75 HP to 125 HP
380 to 480 V at 1 HP to 400 HP

Highlights

- Proprietary VLP™ Technology
- Maximized Energy Savings on Variable Torque Loads
- Time Based Alternation
- Booster Pump Control Across-the-Line
- Sensorless Operation
- Automatic Sleep Timer
- Sealing Water Control Interlocks
- No Flow/Low NPSH Cut-Off
- Thrust Bearing Protection
- 100% Continuous Overload Rating, 120% for 60 Seconds
- Eight Programmable Discrete Inputs with Selectable Sink or Source Logic
- Three Programmable Discrete Output Contacts: Two Form-A & One Form-C
- Three Programmable Analog Inputs: One 0 to 20 mA or 0 to 10 VDC Isolated Input, One 0 to 10 VDC Input, & One ±10 VDC Input
- Two Programmable Analog Outputs: One 4 to 20 mA or 0 to 10 VDC & One 4 to 20 mA Output
- Two-Wire/Four-Wire Duplex RS485; MODBUS RTU or Toshiba TSB Built-In Communications
- Auto-Restart Operation/Catch a Spinning Motor

Standard Features

- NEMA 1 Enclosure
- Built-in Dynamic Braking Drive Circuit Up to 250 HP[1]
- Built-In EMC Filter (Complies with the European EMC Directive)[2]
- Regenerative Power Ride Through
- Past Trip Monitoring: Stores the Last 4 Faults in Succession, Along with Cumulative At-Trip Times
- EOI: Backlit Plain-English LCD & Four-Digit/Seven-Segment LED Display
- Save, Restore, & Clone Multiple Drive Settings
- Ambient Temperature: 14° to 104°F (-10° to 40°C)
- Altitude: Up to 1000 Meters without Derate
- Humidity: 20 to 93% Non-Condensing
- Standards/Compliances: UL Listed in US & Canada, & American Recovery & Reinvestment Act Compliant (ARRA)

(1) Up to 150 HP on 600 V Units
(2) Optional on 200 V Above 15 HP

P9 ASD
Power Unit Pricing & Dimensions

P9 230 V ASD

VAC	HP	FLA	Model Number	List Price	Frame	Dimensions (in.)			Shipping Weight (lbs.)
						H	W	D	
230	0.75	3.2	VT130P9U2010	$1,705	2	11.2	5.2	6.1	8.0
	1	4.2	VT130P9U2015	$1,705					
	2	6.8	VT130P9U2025	$1,705					
	3	9.6	VT130P9U2035	$1,705	3	12.4	6.1	6.6	12.0
	5	15.2	VT130P9U2055	$1,760					
	7.5	22	VT130P9U2080	$2,090	4	15.0	6.9	6.6	17.0
	10	28	VT130P9U2110	$2,640					
	15	42	VT130P9U2160	$3,300	5B	19.3	9.1	7.6	38.0
	20	54	VT130P9U2220	$4,015					
	25	68	VT130P9U2270	$4,950					
	30	80	VT130P9U2330	$5,717	6	25.9	11.1	13.2	98.0
	40	104	VT130P9U2400	$7,796	7B	33.1	14.3	15.0	165
	50	130	VT130P9U2500	$12,000					
	60	154	VT130P9U2600	$14,850					
	75	192	VT130P9U2750	$16,940					
	100	248	VT130P9U210K	$20,460	9	51.7	14.6	17.6	321
	125	312	VT130P9U212K	$25,300	10	53.2	15.7	17.6	362

P9 ASD
Power Unit Pricing & Dimensions

P9 460 V ASD

VAC	HP	FLA	Model Number	List Price	Frame	Dimensions (in.)			Shipping Weight (lbs.)
						H	W	D	
460	1	2.1	VT130P9U4015	$1,600	2	11.2	5.2	6.1	9
	2	3.4	VT130P9U4025	$1,735					
	3	4.8	VT130P9U4035	$1,870					
	5	7.6	VT130P9U4055	$1,925	3	12.4	6.1	6.6	13.0
	7.5	11	VT130P9U4080	$2,200					
	10	14	VT130P9U4110	$2,899	4	15.0	6.9	6.6	14.0
	15	21	VT130P9U4160	$3,410	5A	15.1	8.3	7.6	14.0
	20	27	VT130P9U4220	$4,125					
	25	34	VT130P9U4270	$4,620	5B	19.3	9.1	7.6	36.0
	30	40	VT130P9U4330	$4,840					
	40	52	VT130P9U4400	$5,720	6	25.9	11.1	13.2	98.0
	50	65	VT130P9U4500	$7,370	7A	30.8	11.1	14.3	124
	60	77	VT130P9U4600	$8,690					
	75	96	VT130P9U4750	$9,680	8	36.1	14.3	15.3	185
	100	124	VT130P9U410K	$12,100					
	125	156	VT130P9U412K	$14,850					
	150	180	VT130P9U415K	$16,940	9	51.7	14.6	17.6	321
	200	240	VT130P9U420K	$20,460	10	53.2	15.7	17.6	362
	250	302	VT130P9U425K	$25,300	11	63.1	15.0	17.6	405
	300	361	VT130P9U430K	$29,700	12	68.5	18.9	17.6	594
	350	414	VT130P9U435K	$33,440					
	400	477	VT130P9U440K	$38,500	13	70.0	25.6	17.6	874

P9 ASD
Assembly Unit Part Numbering Convention

The P9 assembly unit combines the P9 power unit with commonly used options such as manual bypass and input disconnects in an easy-to-install turn-key package. P9 assembly units include a ground lug and door-mounted electronic operator interface.

Bypass units include an ASD/Bypass selector switch, a Bypass-Start lighted push-button (red), and a Bypass-Stop lighted push-button (green). They are used for system control and are all located on the enclosure door.

Ordering Information: Use the following part numbering convention to configure the P9 assembly unit package when placing your order.

Example Part Number:	P9	4	###/###K	AA	BA

Series:
P9 — P9 ASD

Voltage:
2 — 230
3 — 380
4 — 460

Model Number:

010 — 0.75 HP	500 — 50 HP
015 — 1 HP	600 — 60 HP
025 — 2 HP	750 — 75 HP
035 — 3 HP	10K — 100 HP
055 — 5 HP	12K — 125 HP
080 — 7.5 HP	15K — 150 HP
110 — 10 HP	20K — 200 HP
160 — 15 HP	25K — 250 HP
220 — 20 HP	30K — 300 HP
270 — 25 HP	35K — 350 HP
330 — 30 HP	40K — 400 HP
400 — 40 HP	

Style:
AA — Includes motor circuit protector
AE — Includes motor circuit protector, three-contactor bypass, and overload protection

P9 ASD
Assembly Unit Pricing & Dimensions

P9 230 V ASD

VAC	HP	FLA	Model Number	List Price		Dimensions (in.)		
				AA	AE	H	W	D
230	0.75	9.6	P92015	$5,088	$6,251	36.0	24.0	10.0
	1	9.6	P92015	$5,088	$6,251			
	2	9.6	P92025	$5,088	$6,251			
	3	9.6	P92035	$5,261	$6,717			
	5	15.2	P92055	$5,426	$6,882			
	7.5	22	P92080	$5,756	$7,212	48.0		12.0
	10	28	P92110	$6,306	$7,762		36.0	20.0
	15	42	P92160	$7,141	$8,887			
	20	54	P92220	$7,856	$9,602			
	25	68	P92270	$9,490	$11,235			
	30	80	P92330	$9,893	$11,639	60.0		
	40	104	P92400	$13,586	$15,333			
	50	130	P92500	$21,377	$21,179	90.0		24.0
	60	154	P92600	$21,084	$24,575			
	75	192	P92750	$23,036	$26,528			
	100	248	P9210K	$26,657	$33,059		48.0	30.0
	125	312	P9212K	$31,572	$41,466			
Delivery: Five weeks for basic unit assembly.								

P9 ASD
Assembly Unit Pricing & Dimensions

P9 400 V ASD

VAC	HP	FLA	Model Number	List Price		Dimensions (in.)		
				AA	AE	H	W	D
460	1	7.6	P94015	$3,493	$4,656	36.0	24.0	10.0
	2	7.6	P94025	$3,493	$4,656			
	3	7.6	P94035	$3,493	$4,656			
	5	7.6	P94055	$5,418	$7,163			
	7.5	11	P94080	$5,866	$7,322			
	10	14	P94110	$6,565	$8,020	48.0		12.0
	15	21	P94160	$7,076	$8,532		36.0	20.0
	20	27	P94220	$7,791	$9,829			
	25	34	P94270	$8,461	$10,207			
	30	40	P94330	$8,681	$10,427			
	40	52	P94400	$9,561	$11,307			
	50	65	P94500	$10,634	$12,379			
	60	77	P94600	$13,230	$14,394	60.0		
	75	96	P94750	$15,965	$17,712			
	100	124	P9410K	$19,434	$21,179	90.0		24.0
	125	156	P9412K	$21,084	$24,575			
	150	180	P9415K	$23,036	$26,528			
	200	240	P9420K	$26,657	$33,059		48.0	30.0
	250	302	P9425K	$31,572	$41,466			
	300	361	P9430K	$36,231	$53,691			
	350	414	P9435K	$40,743	$56,458			
	400	477	P9440K	$47,840	$64,340			

Delivery: Five weeks for basic assembly unit.

P9 ASD
Assembly Unit Option Information & Pricing

P9 230 V

Part Number	Description	Price
NF	• 1 to 50 HP fan & filtered dust-inhibiting enclosure	$1,000
	• 30 to 100 HP fan & filtered dust-inhibiting enclosure	$1,500
	• 125 HP fan & filtered dust-inhibiting enclosure	$2,500
N3	• 1 to 50 HP fan & filtered enclosure for outdoor use	$2,000
	• 30 to 100 HP fan & filtered enclosure for outdoor use	$3,000
	• 125 HP fan & filtered enclosure for outdoor use	$5,000
Delivery: Add two weeks to basic assembly unit lead time.		
NC	• 0.75 to 7.5 HP NEMA 12 adder	$2,000
	• 10 to 15 HP NEMA 12 adder	$4,000
	• 20 to 50 HP NEMA 12 adder	$8,000
	• 60 to 100 HP NEMA 12 adder	$12,000
	• 125 HP NEMA 12 adder	$15,000
N4	• 0.75 to 7.5 HP NEMA 4 adder	$3,000
	• 10 to 25 HP NEMA 4 adder	$11,500
	• 30 to 50 HP NEMA 4 adder	$18,000
	• 60 to 100 HP NEMA 4 adder	$26,000
	• 125 HP NEMA 4 adder	$32,000
Delivery: Add five weeks to basic assembly unit lead time.		

P9 ASD
Assembly Unit Option Information & Pricing

P9 460 V

Part Number	Description	Price
NF	• 1 to 50 HP fan & filtered dust-inhibiting enclosure	$1,000
	• 60 to 200 HP fan & filtered dust-inhibiting enclosure	$1,500
	• 250 to 400 HP fan & filtered dust-inhibiting enclosure	$2,500
N3	• 1 to 50 HP fan & filtered enclosure for outdoor use	$2,000
	• 60 to 200 HP fan & filtered enclosure for outdoor use	$3,000
	• 250 to 400 HP fan & filtered enclosure for outdoor use	$5,000
Delivery: Add two weeks to basic assembly unit lead time.		
NC	• 1 to 15 HP NEMA 12 adder	$2,000
	• 20 to 30 HP NEMA 12 adder	$4,000
	• 40 to 100 HP NEMA 12 adder	$8,000
	• 125 to 200 HP NEMA 12 adder	$12,000
	• 250 to 400 HP NEMA 12 adder	$15,000
N4	• 1 to 15 HP NEMA 4 adder	$3,000
	• 20 to 30 HP NEMA 4 adder	$11,500
	• 40 to 100 HP NEMA 4 adder	$18,000
	• 125 to 200 HP NEMA 4 adder	$26,000
	• 250 to 400 HP NEMA 4 adder	$32,000
Delivery: Add five weeks to basic assembly unit lead time.		

AS1 ASD
Specifications

The AS1 adjustable speed drive builds on Toshiba's history of supplying powerful, reliable, and versatile drives. Designed with the end-user in mind, the AS1 combines a rugged, proven power platform with the latest technologies to provide users with a smarter, stronger, more reliable drive with flexible aplication control.

Product Scope

200 to 240 V at 1 HP to 100 HP
380 to 460 V at 1 HP to 700 HP
500 to 690 V at 2 HP to 700 HP

Highlights

- 100% Continuous Overload Rating, 150% for 60 Seconds
- Eight Programmable Discrete Inputs with Selectable Sink or Source Logic
- Three Programmable Discrete Outputs: One Form-C Contact & Two Open Collector Outputs
- Three Programmable Analog Inputs: One 4 to 20 mA, One 0 to 10 VDC Input, & One ±10 VDC Input
- Two Programmable Analog Outputs: One 4 to 20 mA or 0 to 10 VDC & One 0 to 1 mA Output or 0 to 7.5 VDC
- Two-Wire/Four-Wire RS485
- Auto-Restart Operation/Catch a Spinning Motor
- Improved PID Algorithms
- Built-In EMC Filter (Complies with the European EMC Directive)[1]

Standard Features

- NEMA 1 Enclosure with Additional Conduit Adapter
- Built-In Dynamic Breaking Drive Circuit Up to 250 HP[2]
- Past Trip Monitoring: Stores the Last 4 Faults in Succession, Along with Cumulative At-Trip Times
- EOI: Integral 7 Segment LED Keypad
- Save, Restore, & Clone Multiple Drive Settings
- Ambient Temperature: 14° to 122°F (-10° to 50°C)
- Altitude: Up to 1000 Meters without Derate
- Humidity: 95% Non-Condensing
- Standards/Compliance: IEEE, UL Listed in US & Canada, CSA, NEMA, NEC, CE, NOM-117, C-TICK, & GOST

[1] Optional on 200 V Above 15 HP
[2] Up to 150 HP on 600 V Units

AS1 ASD
Unit Pricing & Dimensions

AS1 230 V ASD

VAC	HP	FLA	Model Number	List Price	Frame	Dimensions (in.)			Shipping Weight (lbs.)
						H	W	D	
230	1	4.8	VFAS1-2007PL-HN	$750	2	10.0	5.5	6.0	10.0
	2	8.0	VFAS1-2015PL-HN	$840					
	3	11.0	VFAS1-2022PL-HN	$990	3	11.1	6.1	6.5	14.3
	5	17.5	VFAS1-2037PL-HN	$1,020					
	7.5	27.5	VFAS1-2055PL-HN	$1,396	4	12.6	6.9	6.5	18.0
	10	33.0	VFAS1-2075PL-HN	$1,710	5A	12.6	8.3	7.5	26.5
	15	54.0	VFAS1-2110PL-HN	$2,390	5B	15.7	9.1	7.5	53.0
	20	66.0	VFAS1-2150PL-HN	$2,700					
	25	75.0	VFAS1-2185PL-HN	$3,600	6	16.5	9.4	8.3	66.0
	30	88.0	VFAS1-2220PL-HN	$4,158					
	40	120	VFAS1-2300PL-HN	$6,570	7B	21.7	12.6	9.5	126
	50	144	VFAS1-2370PL-HN	$10,200					
	60	176	VFAS1-2450PL-HN	$12,600					
	75	221	VFAS1-2550P-HN	$15,505	9	36.2	12.2	14.6	220
	100	285	VFAS1-2750P-HN	$18,550	10	40.2	13.8	14.6	269

VAC	HP	FLA	Model Number	List Price	Frame	Dimensions (in.)			Shipping Weight (lbs.)
						H	W	D	
230	75	221	VFAS1-2550P-H1	$14,175	9	26.8	12.2	14.6	167
	100	285	VFAS1-2750P-H1	$17,010	10	30.8	13.8	14.6	200

Notes:
- *Units with H1 at the end of the model number will require an AC line reactor. DC link reactor not included.*

AS1 ASD
Unit Pricing & Dimensions

AS1 460 V ASD

VAC	HP	FLA	Model Number	List Price	Frame	Dimensions (in.)			Shipping Weight (lbs.)
						H	W	D	
460	1	2.3	VFAS1-4007PL-HN	$873	2	10.0	5.5	6.0	10.0
	2	4.1	VFAS1-4015PL-HN	$945					
	3	5.8	VFAS1-4022PL-HN	$1,020					
	5	10.5	VFAS1-4037PL-HN	$1,230	3	11.1	6.1	6.5	14.3
	7.5	14.3	VFAS1-4055PL-HN	$1,500	4	12.6	6.9	6.5	18.0
	10	17.6	VFAS1-4075PL-HN	$1,860					
	15	27.7	VFAS1-4110PL-HN	$2,400	5A	12.6	8.3	7.5	26.5
	20	33.0	VFAS1-4150PL-HN	$3,000	5B	15.7	9.1	7.5	53.0
	25	41.0	VFAS1-4185PL-HN	$3,720					
	30	48.0	VFAS1-4220PL-HN	$3,900	6	16.5	9.4	8.3	66.0
	40	66.0	VFAS1-4300PL-HN	$4,705	7A	21.7	9.4	9.5	95.0
	50	79.0	VFAS1-4370PL-HN	$6,200					
	60	94.0	VFAS1-4450PL-HN	$7,485	8	24.8	12.6	11.4	143
	75	116	VFAS1-4550PL-HN	$8,300					
	100	160	VFAS1-4750PL-HN	$10,200					
	125	179	VFAS1-4900PC-HN	$13,044	9	36.2	12.2	14.6	220
	150	215	VFAS1-4110KPC-HN	$14,796	10	40.2	13.8	14.6	269
	200	259	VFAS1-4132KPC-HN	$17,870	11	46.9	13.0	14.6	296
	250	314	VFAS1-4160KPC-HN	$21,835	12	46.9	16.9	14.6	405
	300	387	VFAS1-4200KPC-HN	$25,438	13	46.9	23.0	14.6	507
	350	427	VFAS1-4220KPC-HN	$28,849					
	450	550	VFAS1-4280KPC-HN	$39,765					

Notes:
- *Factory-authorized startup is required on all ASDs 400 HP and larger.*
- *Frame 13 and higher units do not include dynamic braking circuit. This is available as an option kit.*

AS1 ASD
Unit Pricing & Dimensions

AS1 460 V ASD

VAC	HP	FLA	Model Number	List Price	Frame	Dimensions (in.)			Shipping Weight (lbs.)
						H	W	D	
460	125	179	VFAS1-4900PC-H1	$11,844	9	26.8	12.2	14.6	167
	150	215	VFAS1-4110KPC-H1	$13,466	10	30.8	13.8	14.6	200
	200	259	VFAS1-4132KPC-H1	$16,330	11	37.4	13.0	14.6	216
	250	314	VFAS1-4160KPC-H1	$20,160	12	37.4	16.9	14.6	243
	300	387	VFAS1-4200KPC-H1	$23,688	13	37.4	23.0	14.6	360
	350	427	VFAS1-4220KPC-H1	$26,649					
	450	550	VFAS1-4280KPC-H1	$35,850					
	550	671	VFAS1-4355KPC-H1	$51,040	14	45.3	34.6	14.6	640
	600	759	VFAS1-4400KPC-H1	$58,800					
	700	941	VFAS1-4500KPC-H1	$74,700	15	45.3	43.6	14.6	750

Notes:
- *Frame 13 and higher units do not include dynamic braking circuit. This is available as an option kit.*
- *Factory-authorized startup is required on all ASDs 400 HP and larger.*
- *Units with H1 at the end of the model number will require an AC line reactor. DC link reactor not included.*

AS1 ASD
Unit Pricing & Dimensions

AS1 575/600/690 V ASD

VAC	HP	FLA	Model Number	List Price	Frame	Dimensions (in.)			Shipping Weight (lbs.)
						H	W	D	
575	2	2.7	VFAS1-5015PM-HN	$1,932	5A	12.6	8.3	7.5	26.5
	3	3.9	VFAS1-5022PM-HN	$1,932					
	5	6.1	VFAS1-5040PM-HN	$2,040					
	7.5	9.0	VFAS1-5055PM-HN	$2,220					
	10	11.0	VFAS1-5075PM-HN	$2,364					
600/690	2	4.0	VFAS1-6022PL-HN	$4,140	6	16.5	9.4	8.3	66.0
	3	4.5	VFAS1-6030PL-HN	$4,212					
	5	7.5	VFAS1-6055PL-HN	$4,284					
	7.5	10.0	VFAS1-6075PL-HN	$4,344					
	10	13.5	VFAS1-6110PL-HN	$4,416					
	15	17.0	VFAS1-6150PL-HN	$4,476					
	20	22.0	VFAS1-6185PL-HN	$4,548					
	25	27.0	VFAS1-6220PL-HN	$4,608					
	30	32.0	VFAS1-6300PL-HN	$4,680					
	40	41.0	VFAS1-6370PL-HN	$6,408	8	24.8	12.6	11.4	143
	50	52.0	VFAS1-6450PL-HN	$6,948					
	60	62.0	VFAS1-6550PL-HN	$7,476					
	75	77.0	VFAS1-6750PL-HN	$8,016					
	100	99.0	VFAS1-6900PL-HN	$10,140					

Notes:
- *For models 6022 to 6110, HP and FLA ratings are valid only at 690 V.*
- *For all others, HP and FLA ratings are valid only at 600 V.*
- *For models 6150 to 6900, HP and FLA ratings at 690 V are available in the manual.*

AS1 ASD
Unit Pricing & Dimensions

AS1 600/690 V

VAC	HP	FLA	Model Number	List Price	Frame	Dimensions (in.)			Shipping Weight (lbs.)
						H	W	D	
600/690	125	125	VFAS1-6110KPC-H1	$14,940	11	46.9	13.0	14.6	370
	150	144	VFAS1-6132KPC-H1	$16,008					
	200	192	VFAS1-6200KPC-H1	$22,680	13	46.9	23.0	14.6	470
	250	242	VFAS1-6250KPC-H1	$24,012					
	350	336	VFAS1-6315KPC-H1	$24,540					
	450	412	VFAS1-6400KPC-H1	$57,360	15	54.7	43.6	14.6	510
	550	528	VFAS1-6500KPC-H1	$63,360					
	700	672	VFAS1-6630KPC-H1	$65,760					

Notes:
- *Units with H1 at the end of the model number will require an AC line reactor. DC link reactor not included.*
- *Frame 13 and higher units do not include dynamic braking circuit. This is available as an option kit.*
- *Factory-authorized startup is required on all ASDs 400 HP and larger.*
- *Current and HP ratings in this table are applicable only at 600 V; HP and FLA ratings at 690 V are available in the manual.*

AS1 ASD
Option Information & Pricing

Conduit Adapters

Model Number	Frame	List Price	Height Increase (in.)	Stand Alone AS1 IP Rating
NEM1101Z	2	$140	1.2	IP20
NEM1102Z	3	$140		
NEM1103Z	4	$150		
NEM1104Z	5A	$150	1.4	
NEM1105Z	5B	$155	1.5	
NEM1106Z	6	$155	2.4	
NEM1107Z	7A	$160	2.0	
NEM1117Z	7B	$350	1.9	
NEM1108Z	8	$185	5.4	
NEM1109Z	9	$850	9.8	IP00
NEM1110Z	10	$1,000	13.4	
NEM1111Z	11	$1,300		
NEM1112Z	12	$1,300	15.7	
NEM1113Z	13	$1,300		
NEM1115Z	14	$3,400	18.6	
NEM1116Z	15	$4,760		

Notes:
- *AS1 units rated IP20 include a bottom cover, but will not accept conduit connections at the drive enclosure.*
- *AS1 units rated IP00 do not include a bottom cover.*
- *The optional conduit adapters listed above are NEMA 1 compliant. Stand alone AS1 power units are not NEMA 1 compliant.*

AS1 ASD
Option Information & Pricing

Flange-Mount Kits

Model Number	Frame	List Price
FOT001Z	2	$275
FOT002Z	3	$300
FOT003Z	4	$350
FOT004Z	5A	$400
FOT005Z	5B	$450
FOT006Z	6	$450
FOT007Z	7A	$500
FOT008Z	7B	$500
FOT009Z	8	$525
FOT010Z	9	$550
FOT011Z	10	$600
FOT012Z	11	$750
FOT013Z	12	$1,050
FOT014Z	13	$1,100
FOT015Z	13 + PB7	$1,300

Notes:
- *Flange-mount kits are only available for Frame 13 and below.*
- *The flange-mount kit allows the AS1 to be mounted in an enclosure with the heatsink out-the-back to reduce cooling needs and enclosure dimensions.*

AS1 ASD
Option Information & Pricing

Communication Cards, Closed-Loop Cards, Keypads, Cables & Cooling

Model Number	Description	List Price
RKP002Z	• Remote-mountable LED keypad has 20 mm LEDs, the largest in its class, to ensure outstanding visibility • Designed to fit into panels for use as an extension panel or display • Can be used as a parameter copy, capable of storing parameters for up to three models • One CAB001x-0A cable is necessary • Remote-mounting kit not necessary for door-mounting • Hardware included 	$225
RKP004Z	• Remote-mountable LCD keypad contains 23-character, eight-line display • Can be used for simple setup monitoring using jog dial • Snaps to front of drive or can be remote-mounted • Display language selectable between English & Japanese (German, Italian, Spanish, & Chinese will be available soon) • Remote-mounting requires SBP006Z remote-mounting kit, CNT001Z adapter (hand-held only), and CAB001x-0A cable 	$300
CNT001Z	• RJ45 female/RJ45 adaptor • Connects RKP004Z keypad to AS1 front port via CAB001x-0A cables	$40
CAB0011-0A	• 1-meter cable for remote-mounting RKP00xZ keypads	$40
CAB0012-0A	• 2-meter cable for remote-mounting RKP00xZ keypads	$50
CAB0015-0A	• 5-meter cable for remote-mounting RKP00xZ keypads	$60
SBP006Z	• Mounting kit for RKP004Z LCD keypad maintains IP54 rating for IP54 LCD remote keypad • Can be used with SBP007Z for IP65 installations 	$60
SBP007Z	• IP65 door attaches to SBP006Z mounting kit for RKP004Z keypad 	$30
FAN003Z	• Control fan kit allows for 60°C operation with derate for Frame 6	$120
FAN004Z	• Control fan kit allows for 60°C operation with derate for Frame 7A	$125
FAN005Z	• Control fan kit allows for 60°C operation with derate for Frame 7B	$130
FAN006Z	• Control fan kit allows for 60°C operation with derate for Frame 8	$140

AS1 ASD
Option Information & Pricing

Dynamic Braking Transistor

Model Number	Description	List Price
PB7-4200K	• Braking unit for VFAS1-4200KPC-Hx, VFAS1-4220KPC-Hx, VFAS1-4280KPC-Hx 	$5,500
PB7-4400K	• Braking unit for VFAS1-4355KPC-Hx, VFAS1-4400KPC-Hx, VFAS1-4500KPC-Hx 	$18,500
PB7-6300K	• Braking unit for VFAS1-6200KPC-Hx, VFAS1-6250KPC-Hx, VFAS1-6315KPC-Hx 	$19,225
PB7-6400K	• Braking unit for VFAS1-6400KPC-Hx, VFAS1-6500KPC-Hx, VFAS1-6630KPC-Hx 	$20,700

AS1 IP54 Unit Part Numbering Convention

The AS1 IP54 unit is rated with the European Ingress Protection (IP) system for classifying the degrees of protection provided for electrical equipment. These standards are designed to numerically rate an electrical product based on the level of protection that is available. By assigning number codes, the level of protection in the product can be easily and quickly identified. In the code IP54, IP identifies the standard, the 5 describes the level of protection from solid objects, and the 4 describes the level of protection from liquids.

The AS1 IP54 unit combines the AS1 power unit with commonly-used options such as Manual Bypass and Input Disconnects in an easy-to-install turn-key package. AS1 IP54 units include a ground lug, door-mounted electronic operator interface, and heatsink out-the-back. Bypass units include an ASD/bypass selector switch, a bypass-start lighted push-button (red), and a bypass-stop lighted push-button (green). They are used for system control and are all located on the enclosure door.

Ordering Information: Use the following part numbering convention to configure the AS1 IP54 unit package when placing your order.

Example Part Number:	AS1	4	###/###K	AA

Series:
AS1 — AS1 ASD

Voltage:
2 — 230
3 — 380
4 — 460
6 — 600
E — 690

Model Number	for 230/460 V:	Model Number	for 600/690 V:
007 — 1 HP	370 — 50 HP	007 — 1 HP	370 — 40 HP
015 — 2 HP	450 — 60 HP	015 — 2 HP	450 — 50 HP
022 — 3 HP	550 — 75 HP	022 — 3 HP	550 — 60 HP
037 — 5 HP	750 — 100 HP	055 — 5 HP	750 — 70 HP
055 — 7.5 HP	900 — 125 HP	075 — 7.5 HP	900 — 100 HP
075 — 10 HP	110K — 150 HP	110 — 10 HP	110K — 125 HP
110 — 15 HP	132K — 200 HP	150 — 15 HP	132K — 150 HP
150 — 20 HP	160K — 250 HP	185 — 20 HP	200K — 200 HP
185 — 25 HP	200K — 300 HP	220 — 25 HP	250K — 250 HP
220 — 30 HP	220K — 350 HP	300 — 30 HP	315K — 350 HP
300 — 40 HP	280K — 400 HP		

Style:
AA — Includes motor circuit protector
AE — Includes motor circuit protector, three-contactor bypass, and overload protection

AS1 ASD
AS1 IP54 Unit Pricing & Dimensions

AS1 IP54 230 V

VAC	HP	FLA	Model Number	List Price		Dimensions (in.)				
				AA	AE	H		W		D
						AA	AE	AA	AE	
230	1	4.8	AS12007	$6,200	$7,258	26.0	36.0	24.0		8.0
	2	8.0	AS12015	$6,450	$7,508					
	3	11.0	AS12022	$6,700	$8,023					
	5	17.5	AS12037	$6,900	$8,223					
	7.5	27.5	AS12055	$7,200	$8,523					
	10	33.0	AS12075	$9,100	$10,423					
	15	54.0	AS12110	$10,100	$11,687	38.0	48.0	30.0		10.0
	20	66.0	AS12150	$10,700	$12,287					
	25	75.0	AS12185	$12,200	$13,787					
	30	88.0	AS12220	$13,600	$15,187					
	40	120	AS12300	$16,900	$18,488	40.0	60.0	36.0		16.0
	50	144	AS12370	$19,500	$21,087					
	60	176	AS12450	$22,500	$25,674					
	75	221	AS12550	$27,000	$30,174	90.0		36.0		24.0
	100	285	AS12750	$33,000	$38,820					
Delivery: Five weeks for basic assembly unit.										

AS1 ASD
AS1 IP54 Unit Pricing & Dimensions

AS1 IP54 460 V

VAC	HP	FLA	Model Number	List Price		Dimensions (in.)				
				AA	AE	H		W		D
						AA	AE	AA	AE	
460	1	2.3	AS14007	$4,700	$5,758	26.0	36.0	24.0		8.0
	2	4.1	AS14015	$4,850	$5,908					
	3	5.8	AS14022	$4,900	$5,958					
	5	10.5	AS14037	$6,700	$8,287					
	7.5	14.3	AS14055	$7,200	$8,523					
	10	17.6	AS14075	$8,250	$9,573					
	15	27.7	AS14110	$8,625	$9,948					
	20	33.0	AS14150	$9,290	$11,142	38.0	48.0	30.0		10.0
	25	41.0	AS14185	$9,890	$11,477					
	30	48.0	AS14220	$10,700	$12,287					
	40	66.0	AS14300	$11,585	$13,172					
	50	79.0	AS14370	$12,665	$14,252					
	60	94.0	AS14450	$15,080	$16,138	40.0	60.0	36.0		16.0
	75	116	AS14550	$17,650	$19,238					
	100	160	AS14750	$18,890	$20,477					
	125	179	AS14900	$22,000	$25,174	90.0		36.0		24.0
	150	215	AS14110K	$27,500	$30,674					
	200	259	AS14132K	$32,000	$37,820					
	250	314	AS14160K	$38,000	$46,994					
	300	387	AS14200K	$43,000	$58,873			48.0	48.0	
	350	427	AS14220K	$44,000	$58,286					
	400	550	AS14280K	$51,000	$66,000				60.0	

Delivery: Five weeks for basic assembly unit.

AS1 ASD
AS1 IP54 Unit Pricing & Dimensions

AS1 IP54 600/690 V

VAC	HP	FLA	Model Number	List Price		Dimensions (in.)				
				AA	AE	H		W		D
						AA	AE	AA	AE	
600/690	1	4.0	AS16007	$8,250	$9,308	CF		CF		CF
	2	4.0	AS16015	$8,250	$9,308					
	3	4.5	AS16022	$8,310	$9,368					
	5	7.5	AS16055	$9,550	$11,137					
	7.5	10.0	AS16075	$9,900	$11,223					
	10	13.5	AS16110	$10,900	$12,223					
	15	17.0	AS16150	$11,450	$12,773					
	20	22.0	AS16185	$11,600	$13,452					
	25	27.0	AS16220	$11,900	$13,487					
	30	32.0	AS16300	$12,100	$13,687					
	40	41.0	AS16370	$14,500	$16,087					
	50	52.0	AS16450	$15,400	$16,987					
	60	62.0	AS16550	$16,900	$17,958					
	75	77.0	AS16750	$20,200	$21,788					
	100	99.0	AS16900	$24,000	$25,587					
	125	125	AS16110K	$30,350	$33,524					
	150	144	AS16132K	$36,000	$39,174					
	200	192	AS16200K	$43,500	$49,319					
	250	242	AS16250K	$45,000	$53,994					
	350	336	AS16315K	$47,000	$56,916					
Delivery: Seven weeks for basic assembly unit.										

CF: Consult Factory.

S15/S11 ASD
S15 ASD
Specifications

The S15 adjustable speed drive is a compact and high performance drive designed for controlling a wide range of variable and constant torque applications for multiple industries. This micro-drive is capable of working with permanent magnet (PM) motors, which allows a much greater flexibility in selecting a motor for an application. In addition, expanded PID control allows a greater level of precise control and operation of difficult level control applications. No other micro-drive delivers such reliable performance and extensive capabilities at such a competitive cost.

Product Scope

200 to 240 V at .5 HP to 20 HP
380 to 460 V at .5 HP to 20 HP

Single Phase

200 to 240 V at .25 HP to 3 HP

Highlights

- 110% Continuous Overload Rating, 150% for 60 Seconds
- Three Programmable Discrete Outputs: 1 Form-A, 1 Form-C, & 1 Open Collector
- Six Programmable Discrete Inputs
- One Programmable Analog Outputs: 4 to 20 mA or 0 to 10 VDC
- Three Programmable Analog Inputs: One 4 to 20 mA Input, One 0 to 10 VDC Input, & One ±10 VDC Input
- NetPac Wireless Connection
- Ten Year Life-Long Design
- Compact Design
- Capable of Working with Permanent Magnet (PM) Motors (Premium Model)
- Safe Torque Off (STO) Compliant (Premium Model)
- Auto-Restart Operation/Catch a Spinning Motor

Standard Features

- IP20 Enclosure; Wall-Mount
- Past Trip Monitoring: Stores the Last 8 Faults in Succession, Along with At-Trip Operation Data
- Rotary Encoder
- EOI: Four-Digit/Seven-Segment LED Display
- Ambient Temperature: 14° to 122°F (-10° to 50°C)
- Humidity: 95% Non-Condensing
- Altitude: Up to 1000 Meters without Derate
- Two-Wire RS485 Communication Port
- Compliances: UL Listed in US & Canada, CSA, & CE

S15 ASD
S15 Power Unit
Pricing & Dimensions

VAC	HP	FLA	Model Number	List Price	Frame	Dimensions (in.)			Shipping Weight (lbs.)
						H	W	D	
120	DEMO	DEMO	VFS15S-2004DEMO	$429	1C2	5.12	2.83	4.72	5.0
230 Single-Phase	0.25	1.5	VFS15S-2002PL-W	$410	1C2	5.12	2.83	3.98	2.9
	0.5	3.3	VFS15S-2004PL-W	$429	1C2	5.12	2.83	4.72	3.1
	1	4.8	VFS15S-2007PL-W	$454	1C2	5.12	2.83	5.31	3.5
	2	8	VFS15S-2015PL-W	$543	2C2	5.12	4.13	5.91	4.4
	3	11	VFS15S-2022PL-W	$635	2C2	5.12	4.13	5.91	4.4
230	0.5	3.3	VFS15-2004PM-W	$402	1C3	5.12	2.83	4.72	2.9
	1	4.8	VFS15-2007PM-W	$441	1C3	5.12	2.83	5.12	3.1
	2	8	VFS15-2015PM-W	$571	2F3	5.12	4.13	5.12	4.0
	3	11	VFS15-2022PM-W	$648	2F3	5.12	4.13	5.12	4.2
	5	17.5	VFS15-2037PM-W	$883	3F3	6.69	5.51	5.91	6.0
	7.5	27.5	VFS15-2055PM-W	$1,256	4C3	8.66	5.91	6.69	10.8
	10	33	VFS15-2075PM-W	$1,376	4C3	8.66	5.91	6.69	11.0
	15	54	VFS15-2110PM-W	$1,838	5C3	12.20	7.09	7.48	19.4
	20	66	VFS15-2150PM-W	$2,334	5C3	12.20	7.09	7.48	19.8
460	0.5	1.5	VFS15-4004PL-W	$540	2C4	5.12	4.21	6.02	4.0
	1	2.3	VFS15-4007PL-W	$570	2C4	5.12	4.21	6.02	4.2
	2	4.1	VFS15-4015PL-W	$676	2C4	5.12	4.21	6.02	4.4
	3	5.5	VFS15-4022PL-W	$776	3C4	6.69	5.51	6.30	6.6
	5	9.5	VFS15-4037PL-W	$935	3C4	6.69	5.51	6.30	7.3
	7.5	14.3	VFS15-4055PL-W	$1,373	4C4	8.66	5.91	6.69	11.7
	10	17	VFS15-4075PL-W	$1,424	4C4	8.66	5.91	6.69	11.9
	15	27.7	VFS15-4110PL-W	$1,966	5C4	12.20	7.09	7.48	19.2
	20	33	VFS15-4150PL-W	$2,328	5C4	12.20	7.09	7.48	19.4

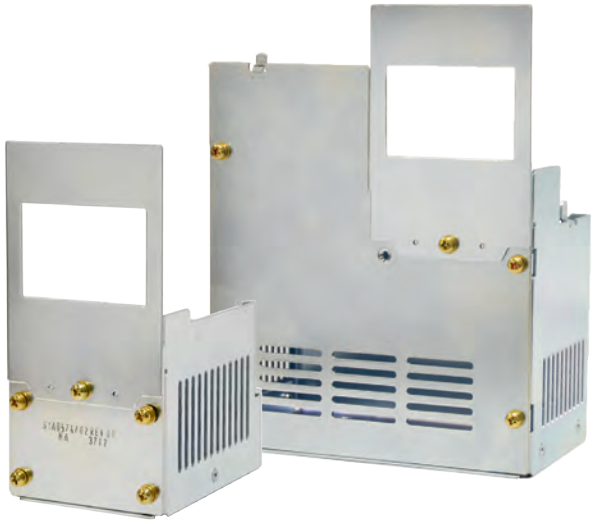
S15 ASD
S15 Premium Power Unit
Pricing & Dimensions

VAC	HP	FLA	Model Number	List Price	Frame	Dimensions (in.)			Shipping Weight (lbs.)
						H	W	D	
230 Single-Phase	0.25	1.5	VFS15S-2002PL-W1	$440	1C2	5.12	2.83	3.98	2.9
	0.5	3.3	VFS15S-2004PL-W1	$460	1C2	5.12	2.83	4.72	3.1
	1	4.8	VFS15S-2007PL-W1	$490	1C2	5.12	2.83	5.31	3.5
	2	8	VFS15S-2015PL-W1	$585	2C2	5.12	4.13	5.91	4.4
	3	11	VFS15S-2022PL-W1	$685	2C2	5.12	4.13	5.91	4.4
230	0.5	3.3	VFS15-2004PM-W1	$435	1C3	5.12	2.83	4.72	2.9
	1	4.8	VFS15-2007PM-W1	$475	1C3	5.12	2.83	5.12	3.1
	2	8	VFS15-2015PM-W1	$615	2F3	5.12	4.13	5.12	4.0
	3	11	VFS15-2022PM-W1	$700	2F3	5.12	4.13	5.12	4.2
	5	17.5	VFS15-2037PM-W1	$955	3F3	6.69	5.51	5.91	6.0
	7.5	27.5	VFS15-2055PM-W1	$1,355	4C3	8.66	5.91	6.69	10.8
	10	33	VFS15-2075PM-W1	$1,485	4C3	8.66	5.91	6.69	11.0
	15	54	VFS15-2110PM-W1	$1,985	5C3	12.20	7.09	7.48	19.4
	20	66	VFS15-2150PM-W1	$2,520	5C3	12.20	7.09	7.48	19.8
460	0.5	1.5	VFS15-4004PL-W1	$585	2C4	5.12	4.21	6.02	4.0
	1	2.3	VFS15-4007PL-W1	$615	2C4	5.12	4.21	6.02	4.2
	2	4.1	VFS15-4015PL-W1	$730	2C4	5.12	4.21	6.02	4.4
	3	5.5	VFS15-4022PL-W1	$840	3C4	6.69	5.51	6.30	6.6
	5	9.5	VFS15-4037PL-W1	$1,010	3C4	6.69	5.51	6.30	7.3
	7.5	14.3	VFS15-4055PL-W1	$1,485	4C4	8.66	5.91	6.69	11.7
	10	17	VFS15-4075PL-W1	$1,540	4C4	8.66	5.91	6.69	11.9
	15	27.7	VFS15-4110PL-W1	$2,125	5C4	12.20	7.09	7.48	19.2
	20	33	VFS15-4150PL-W1	$2,515	5C4	12.20	7.09	7.48	19.4

Delivery: Up to sixteen weeks. Consult factory for availability.

Notes:
- *Premium model includes STO power removal terminal, My Function, and PM Motor capability.*

S15 ASD
S15 Option Information & Pricing



S15 Conduit Adapters

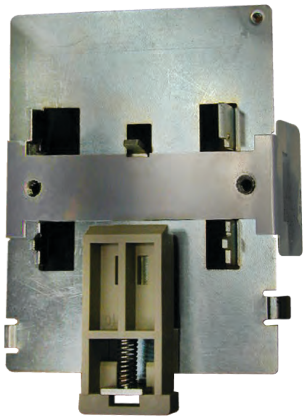
230 V Drive Model Numbers	460 V Drive Model Numbers	Model Numbers	List Price	Height Increase (in.)
VFS15-2004 VFS15-2007 VFS15S-2002 VFS15S-2004 VFS15S-2007	N/A	NEM201Z	$80	2.57
VFS15-2015 VFS15-2022	N/A	NEM202Z	$80	2.58
VFS15S-2015 VFS15S-2022	N/A	NEM203Z	$80	2.58
N/A	VFS15-4004 VFS15-4007 VFS15-4015	NEM204Z	$80	2.58
VFS15-2037	N/A	NEM205Z	$85	2.62
N/A	VFS15-4022 VFS15-4037	NEM206Z	$85	2.56
VFS15-2055 VFS15-2075	VFS15-4055 VFS15-4075	NEM207Z	$85	3.70
VFS15-2110 VFS15-2150	VFS15-4110 VFS15-4150	NEM208Z	$100	3.88

Notes:

- *Conduit adapters are mounted below the power terminal strips and replace the plastic plate provided with the drive.*
- *Conduit adapters provide mechanical strength and a location for a conduit connector.This allows wall-mounting of the S15 where NEMA 1 standards must be met.*
- *The height of the S15 will increase with the addition of the conduit adapter.*

S15 ASD
S15 Option
Information & Pricing

DIN005Z front



DIN005Z back

DIN Rail Mounting Kits

230 V Drive Model Numbers	460 V Drive Model Numbers	Model Numbers	List Price
VFS15S-2002 VFS15S-2004 VFS15S-2007 VFS15-2004 VFS15-2007	N/A	DIN003Z	$75
VFS15S-2015 VFS15S-2022 VFS15-2015 VFS15-2022	VFS15-4004 VFS15-4007 VFS15-4015	DIN005Z	$100

S15 EMC Grounding Plates

230 V Drive Model Numbers	460 V Drive Model Numbers	Model Numbers	List Price
VFS15S-2002 VFS15S-2004 VFS15S-2007 VFS15-2004 VFS15-2007	N/A	EMP007Z	$35
VFS15S-2015 VFS15S-2022 VFS15-2015 VFS15-2022	VFS15-4004 VFS15-4007 VFS15-4015 VFS15-4022 VFS15-4037	EMP008Z	$35
VFS15-2037	N/A	EMP009Z	$35
VFS15-2055 VFS15-2075	VFS15-4055 VFS15-4075	EMP010Z	$35
VFS15-2110 VFS15-2150	VFS15-4110 VFS15-4150	EMP011Z	$35

S15 ASD
S15 Option Information & Pricing

Communication Cards, Keypads, & Cables

Model Number	Description	List Price
RKP002Z	• Remote mount keypad and Parameter Writer • Remote-mountable LED keypad has 20 mm LEDs, the largest in its class, to ensure outstanding visibility • Designed to fit into panels for use as an extension panel or display • Can be used as a parameter copy, capable of storing parameters for up to three models • One CAB001x-0A cable is necessary • Remote-mounting kit not necessary for door-mounting • Hardware included 	$225
CAB0011-0A	• 1-meter communication cable	$40
CAB0012-0A	• 2-meter communication cable	$50
CAB0015-0A	• 5-meter communication cable	$60
PWU003Z	• Parameter writer stores S15 parameter sets • Writes program sets to drive with or without incoming power to the drive 	$1,050
TOS-SN-10B	• Remote-mount touch-pad includes 1.5 -meter connection cable • M3 mounting hardware not included 	$225
PDP003Z	• Profibus communication option card for S15 • SBP009Z required 	$450
DEV003Z	• Devicenet communication option card for S15 drive • SBP009Z required 	$550
IPE002Z	• Ethernet IP - Modbus TCP communication option card for S15 drive • SBP009Z required 	$600

S15 ASD
S15 Option
Information & Pricing

Model Number	Description	List Price
IPE003Z	• Ethercat communication option card for S15 • SBP009Z required 	$600
SBP009Z	• S15 communication option adapter 	$70
USB001Z	• USB-to-serial conversion unit • Allows users to use a USB port on computers as a COMport for connecting it to an inverter for data communications • USB input and RS485 or TTL output for use on S15 • CAB001x-0A required 	$200

Notes:
- *All of the options listed above are not installed and ship separately.*

S11 ASD
Specifications

The S11 adjustable speed drive provides maximum torque with precise speed control and features an easy-to-use, quiet, and compact design. A removable terminal board, larger terminals, bidirectional speed search, and PID control allow this drive to deliver reliable performance and extensive capabilities.

Product Scope

200 to 240 V at .5 HP to 20 HP
380 to 500 V at 1 HP to 20 HP
525 to 600 V at 2 HP to 20 HP

Single Phase

200 to 240 V at .5 HP to 3 HP

Highlights

- 100% Continuous Overload Rating, 150% for 60 Seconds
- Eight Programmable Discrete Inputs with Selectable Sink or Source Logic
- Two Programmable Discrete Outputs: One Open Collector & One Relay Contact
- Two Programmable Analog Inputs: One 4 to 20 mA or 0 to 10 VDC Input & One 0 to 10 VDC Input
- Reduced Dimension Compact Design Allowing For Small Footprint & Side-by-Side Mounting Capabilities
- Regenerative Power Ride Through
- Modbus RTU Communication Protocol
- Built-In EMI Noise Filter
- Auto-Restart Operation/Catch a Spinning Motor

Standard Features

- NEMA 1/IP20 Enclosure
- Save, Restore, & Clone Multiple Drive Settings
- EOI: Backlit Plain-English LCD & Four-Digit/Seven-Digit LED Display
- Ambient Temperature: 14 to 122°F (-10° to 50°C)
- Humidity: 93% Non-Condensing
- Altitude: Up to 1000 Meters without Derate
- Compliances: UL Listed in US & Canada, CSA, & CE

S11 ASD
S11 Power Unit Pricing & Dimensions

VAC	HP	FLA	Model Number	List Price	Frame	Dimensions (in.)			Shipping Weight (lbs.)
						H	W	D	
120	DEMO	DEMO	VFS11S-2004DEMO	$429	A	5.7	2.8	5.1	3.0
230 Single-Phase	0.5	3.3	VFS11S-2004PL-WN	$429	A	5.7	2.8	5.1	2.2
	1	4.8	VFS11S-2007PL-WN	$454				5.5	2.6
	2	7.8	VFS11S-2015PL-WN	$543	B	5.6	4.1	5.9	3.1
	3	11	VFS11S-2022PL-WN	$635	C	7.2	5.5		4.8
230	0.5	3.3	VFS11-2004PM-WN	$402	A	5.7	2.8	4.7	2.0
	1	4.8	VFS11-2007PM-WN	$441				5.1	2.4
	2	7.8	VFS11-2015PM-WN	$571	B	5.6	4.1		2.6
	3	11	VFS11-2022PM-WN	$648				5.9	2.9
	5	17.5	VFS11-2037PM-WN	$883	C	7.2	5.5		4.8
	7.5	27.5	VFS11-2055PM-WN	$1,256	D	9.1	7.1	6.7	10.6
	10	33	VFS11-2075PM-WN	$1,376					10.8
	15	54	VFS11-2110PM-WN	$1,838	E	13.0	9.6	7.5	20.5
	20	66	VFS11-2150PM-WN	$2,334					21.1
460	1	2.3	VFS11-4007PL-WN	$570	B	5.6	4.1	5.9	3.3
	2	4.1	VFS11-4015PL-WN	$676					
	3	5.5	VFS11-4022PL-WN	$776	C	7.2	5.5		5.1
	5	9.5	VFS11-4037PL-WN	$935					5.5
	7.5	14.3	VFS11-4055PL-WN	$1,373	D	9.1	7.1	6.7	11.0
	10	17	VFS11-4075PL-WN	$1,424					11.2
	15	27.7	VFS11-4110PL-WN	$1,966	E	13.0	9.6	7.5	21.1
	20	33	VFS11-4150PL-WN	$2,328					
600	2	2.7	VFS11-6015P-WN	$747	B	5.6	4.1	5.9	2.9
	3	3.9	VFS11-6022P-WN	$834	C	7.2	5.5		4.6
	5	6.1	VFS11-6037P-WN	$974					4.8
	7.5	9	VFS11-6055P-WN	$1,792	D	9.1	7.1	6.7	10.3
	10	11	VFS11-6075P-WN	$1,994					
	15	17	VFS11-6110P-WN	$2,554	E	13.0	9.6	7.5	19.4
	20	22	VFS11-6150P-WN	$2,762					

S11 ASD
S11 Power Unit Pricing & Dimensions

S11 ASD IP54 With Disconnect

VAC	HP	FLA	Model Number	List Price	Frame	Dimensions (in.)			Shipping Weight (lbs.)
						H	W	D	
230 Single - Phase	1	4.8	VFS11S-2007PLE-WN	$1,224	1	9.4	8.3	7.0	8.8
	2	7.8	VFS11S-2015PLE-WN	$1,355	2	11.7	8.5	8.1	13.3
	3	11	VFS11S-2022PLE-WN	$1,525	3	13.4	9.1	8.7	13.5
230	1	4.8	VFS11-2007PME-WN	$1,211	1	9.4	8.3	7.0	8.8
	3	11	VFS11-2022PME-WN	$1,393	2	11.7	8.5	8.1	13.0
	5	17.5	VFS11-2037PME-WN	$1,772	3	13.4	9.1	8.7	16.8
460	2	4.1	VFS11-4015PLE-WN	$1,428	2	11.7	8.5	8.1	13.5
	3	5.5	VFS11-4022PLE-WN	$1,580	3	13.4	9.1	8.7	17.2
	5	9.5	VFS11-4037PLE-WN	$1,933					17.7

S11 ASD
S11 Option Information & Pricing

Conduit Adapters

230 V Drive Model Numbers	460 V Drive Model Numbers	600 V Drive Model Numbers	Model Number	List Price	Height Increase (in.)
VFS11-2004PM-WN VFS11-2007PM-WN	N/A		NEM110Z	$70	2.7
VFS11S-2004PL-WN VFS11S-2007PL-WN			NEM111Z		
VFS11-2015PM-WN			NEM120Z		
VFS11S-2015PL-WN VFS11-2022PM-WN	VFS11-4007PL-WN VFS11-4015PL-WN	VFS11-6015P-WN	NEM121Z		
VFS11S-2022PL-WN VFS11-2037PM-WN	VFS11-4022PL-WN VFS11-4037PL-WN	VFS11-6022P-WN VFS11-6037P-WN	NEM130Z		
VFS11-2055PM-WN VFS11-2075PM-WN	VFS11-4055PL-WN VFS11-4075PL-WN	VFS11-6055P-WN VFS11-6075P-WN	NEM140Z		3.8
VFS11-2110PM-WN VFS11-2150PM-WN	VFS11-4110PL-WN VFS11-4150PL-WN	VFS11-6110P-WN VFS11-6150P-WN	NEM150Z		3.9

Notes:
- *Conduit adapters provide mechanical strength and a location for a conduit connector. This allows wall-mounting of the S11 where NEMA 1 standards must be met.*
- *The height of the S11 will increase with the addition of the conduit adapter.*
- *Conduit adapters are mounted below the power terminal strips and replace the plastic plate provided with the drive.*

S11 ASD
S11 Option Information & Pricing

Communication Cards, Closed-Loop Cards, Keypads, Cables & Cooling

Model Number	Description	List Price
RS4003Z	• RS485 communications card replaces standard terminal strip • Provides reduced I/O connections compared with standard terminal strip 	$125
DEV001Z	• DeviceNet communications card replaces standard terminal strip • Provides reduced I/O connections compared with standard terminal strip 	$450
TOS-SN-1	• Remote-mount touch-pad includes 2-meter connection cable • M3 mounting hardware not included 	$225
RKP005Z	• Remote-mountable LED keypad with 20mm LEDs to ensure outstanding visibility • Designed to be fit into panels for use as an extension panel or display • Can be used to copy drive parameters from one drive to another • Capable of storing parameters for up to three drives • Requires one CAB00xx-0A cable • Remote-mount kit not necessary for door-mounting • Hardware included 	$225
S-OISA	• Remote-mount LCD touch-pad parameter writer (includes 2-meter connection cable) • Remote-mounting kit not necessary for door-mounting • Hardware included 	$250
ASD-CAB-PC	• RS232 to TTL cable for PC-to-ASD communications connects to standard terminal strip 	$65

Notes:
- *All of the options listed above are not installed and ship separately.*

S11 ASD
Extender Box Part Numbering Convention

The S11 extender box combines the S11 power unit with commonly used options such as manual bypass, input circuit breakers, and fused disconnect switches in an easy-to-install turn-key package. S11 extender box style configurations include:

EA — Input Motor Circuit Protector
EB — Input Fused Disconnect Switch
EC — Input Motor Circuit Protector, Manual Two-Contactor Bypass, Overload Protection
ED — Input Fused Disconnect Switch, Manual Two-Contactor Bypass, Overload Protection
EE — Input Motor Circuit Protector, Isolated, Manual Three-Contactor Bypass, Overload Protection
EF — Input Fused Disconnect Switch, Isolated, Manual Three-Contactor Bypass, Overload Protection
EG — Manual Two-Contactor Bypass, Overload Protection
EH — Isolated Manual Three-Contactor Bypass, Overload Protection

In addition, the S11 extender box includes a *LOC/REM* selector switch, round lug, and customer terminal block.

Isolated three-contactor bypass units include *TEST OFF/ON* switch and *ASD/OFF/BYPASS* selector switch on the enclosure door for control.

Ordering Information: Use the following part numbering convention to configure the S11 extender box package when placing your order.

Example Part Number:	S11	4	###/S##	AA	##

Series:
S11 — S11 ASD

Voltage:
2 — 230
4 — 460
6 — 600

Model Number:
004 — 0.5 HP
007 — 1 HP
015 — 2 HP
022 — 3 HP
037 — 5 HP
055 — 7.5 HP
075 — 10 HP
110 — 15 HP
150 — 20 HP

Single-Phase Model Number:
S04 — 0.5 HP
S07 — 1 HP
S15 — 2 HP
S22 — 3 HP

Style:
EA — Includes motor circuit protector
EB — Includes fused disconnect switch
EC — Includes EA, EG features
ED — Includes EB, EG features
EE — Includes EA features, isolation, EH features
EF — Includes EB features, isolation, EH features
EG — Includes manual two-contactor bypass, overload protection
EH — Includes manual three-contactor bypass, overload protection

S11 ASD
Extender Box Unit Pricing & Dimensions

VAC	HP	FLA	Model Number	List Price				Dimensions (in.)			
				EA/EB	EC/ED/EH	EE/EF	EG	H		W	D
								EA/EB	EC/ED/EE/EF/EG/EH		
230 Single-Phase	0.5	3.3	S112S04	$1,736	-	-	-	CF	-	-	-
	1	4.8	S112S07	$1,792	-	-	-	CF	-	-	-
	2	7.8	S112S15	$1,848	-	-	-	CF	-	-	-
	3	11	S112S22	$1,904	-	-	-	CF	-	-	-
230	0.5	3.3	S112004	$1,932	$2,300	$2,484	$2,208	33.3	43.3	12.0	12.0
	1	4.8	S112007	$1,988	$2,356	$2,540	$2,264				
	2	7.8	S112015	$2,033	$2,401	$2,585	$2,308				
	3	11	S112022	$2,348	$2,809	$3,039	$2,694				
	5	17.5	S112037	$2,479	$2,940	$3,170	$2,825				
	7.5	27.5	S112055	$2,828	$3,289	$3,519	$3,174				
	10	33	S112075	$3,083	$3,545	$3,774	$3,429				
	15	54	S112110	$4,039	$4,592	$4,869	$4,454	38.3	48.3	18.0	16.0
	20	66	S112150	$4,683	$5,236	$5,513	$5,098				
460	1	2.3	S114007	$2,078	$2,446	$2,630	$2,353	33.3	43.3	12.0	12.0
	2	4.1	S114015	$2,156	$2,524	$2,708	$2,432				
	3	5.5	S114022	$2,223	$2,592	$2,775	$2,499				
	5	9.5	S114037	$2,503	$3,055	$3,332	$2,918				
	7.5	14.3	S114055	$2,962	$3,424	$3,653	$3,308				
	10	17	S114075	$3,228	$3,689	$3,919	$3,574				
	15	27.7	S114110	$3,696	$4,157	$4,387	$4,042	38.3	48.3	18.0	16.0
	20	33	S114150	$4,163	$4,808	$5,131	$4,647				
600	2	2.7	S116015	$2,380	$2,748	$2,932	$2,656	33.3	43.3	12.0	12.0
	3	3.9	S116022	$2,447	$2,816	$2,999	$2,723				
	5	6.1	S116037	$2,727	$3,279	$3,556	$3,142				
	7.5	9	S116055	$3,186	$3,648	$3,877	$3,532				
	10	11	S116075	$3,508	$3,969	$4,199	$3,854				
	15	17	S116110	$3,920	$4,381	$4,611	$4,266	38.3	48.3	18.0	16.0
	20	22	S116150	$4,499	$5,144	$5,467	$4,983				
Delivery: Five weeks.											

CF: Consult Factory.

GX7 ASD
Specifications

The GX7 adjustable speed drive is a severe duty drive built to handle all conventional applications in the industry. The GX7 Series offers flux-vector technology with or without encoder feedback. This drive maintains astoundingly tight control over both torque and speed with the industry's most user-friendly operator interface.

Product Scope

600 V at 500 HP to 1200 HP

Highlights

- 110% Continuous Overload Rating, 130% for 120 Seconds
- Eight Programmable Discrete Inputs with Selectable Sink or Source Logic
- Three Programmable Discrete Form C Output Contacts
- Heatsink Out-the-Back
- RS232/RS485 & TTL Communication Ports
- Built-In Proportional/Integral/Derivative (PID) Control Loop
- Auto-Restart Operation/Catch a Spinning Motor

Standard Features

- NEMA 1, IP20 Gasketed & Filtered Enclosure
- Past Trip Monitoring: Stores the Last 4 Faults in Succession, Along with Cumulative At-Trip Times
- EOI: Backlit Plain-English LCD Display
- Ambient Temperature: -14° to 104°F (-10° to 40°C)
- Humidity: 95% Non-Condensing
- Altitude: Up to 1000 Meters without Derate
- Standards/Compliances: NEC, ANSI, & IEEE 519

c UL us

GX7 ASD
Part Numbering Convention

The GX7 ASD comes standard with an input circuit breaker in an easy to install turn-key package.

AA - Input Disconnect

GX7 ASDs include input fuses, ground lug, customer terminal block, door-mounted electronic operator interface, and a dynamic braking transistor.

Ordering Information: Use the following part numbering convention to configure the GX7 series package when placing your order.

Example Part Number:	GX7	4	##K/##L	AA	BA
Series: GX7 — GX7 ASD HX7E — HX7E ASD					
Voltage: 4 — 460 6 — 600 E — 690					
Model Number: 50K — 500 HP 60K — 600 HP 70K — 700 HP 80K — 800 HP 90K — 900 HP 10L — 1000 HP 12L — 1200 HP 14L — 1400 HP 15L — 1500 HP					
Style: AA — Includes input disconnect					

GX7 ASD
Unit Pricing & Dimensions

VAC	HP	FLA	Model Number	List Price	Dimensions (in.)			Shipping Weight (lbs.)
					H	W	D	
600	500	481	GX7650KAA	$79,500	95.0	32.0	30.5	1500
	600	601	GX7660KAA	$89,500				
	700	698	GX7670KAA	$95,500				
	800	770	GX7680KAA	$110,000				
	900	866	GX7690KAA	$128,700	95.0	48.0	30.5	3200
	1000	962	GX7610LAA	$143,000				
	1200	1155	GX7612LAA	$170,500	95.0	59.5	30.5	3500
690	500	387	GX7E50KAA	$91,500	95.0	32.0	30.5	1500
	600	442	GX7E60KAA	$103,000				
	700	515	GX7E70KAA	$110,000				
	800	589	GX7E80KAA	$126,500				
	900	663	GX7E90KAA	$148,000	95.0	48.0	30.5	3200
	1000	736	GX7E10LAA	$164,500				
	1200	884	GX7E12LAA	$196,000				
690	500	387	HX7E50KAA	$84,000	95.0	32.0	30.5	1500
	600	442	HX7E60KAA	$95,000				
	700	515	HX7E70KAA	$101,000				
	800	589	HX7E80KAA	$116,500				
	900	663	HX7E90KAA	$136,000				
	1000	736	HX7E10LAA	$151,000				
	1200	884	HX7E12LAA	$180,000	95.0	48.0	30.5	3200
	1400	1031	HX7E14LAA	$210,000				
	1500	1104	HX7E15LAA	$225,000				
Delivery: Ten to twelve weeks.								

Notes:
- *Factory-authorized startup is required on all ASDs 400 HP and larger.*
- *HX7E is rated 100% continuous, 110% for 300 seconds.*

GX7 ASD
Option Information & Pricing

Replacement Aluminum-Mesh Air Filter

Part Number	Description	Price
PC67808P089	• Top-door, aluminum-mesh filter mounting bracket • Requires two, 8 to 32 x 1/2 self-tapping mounting screws	$50
PC50060G032	• Top-door, aluminum-mesh filter 6.75 x 15.75 x 0.25	$25
PC67801P312	• Bottom-door, aluminum-mesh filter • Mounting bracket • Requires five, 8 to 32 x 1/2 self-tapping mounting screws	$60
PC50060G037	• Bottom-door, aluminum-mesh filter 15.75 x 23.75 x 0.25	$30
PC67801P313	• Below-door, aluminum-mesh filter mounting bracket • Requires four, 8 to 32 x 1/2 self-tapping mounting screws	$55
PC50060G036	• Below-door aluminum-mesh filter 5.75 x 28.75 x 0.25	$30

Notes:
- *Spare parts discount applies to these filters.*
- *These aluminum-mesh filters come standard on the GX7 drives.*

W7 ASD
Specifications

The W7 adjustable speed drive offers the latest technology and proven reliability, making this AC drive one of the most advanced drives on the market. Our patented 18-pulse copper-wound auto transformer design masters the needs of customer's applications by providing a reliable and efficient adjustable speed drive that eliminates significant harmonic content to the power grid.

Product Scope

18-Pulse: 460 V at 60 HP to 800 HP
18-Pulse: 600 to 690 V at 75 HP to 900 HP

Highlights

- Patented 18-Pulse Copper-Wound Auto-Transformer Design
- Up to 60% Reduction in Transformer Losses
- Small Footprint with Uniform 24" Depth on All Models
- Meets IEEE 519-1992 Guidelines without Added Filters
- 100% Continuous Overload Rating, 120% for 60 Seconds
- Eight Programmable Discrete Inputs with Selectable Sink 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
- Analog Isolator: Two Isolated Outputs & One Isolated Input
- Half/Full Duplex RS232/RS485 & TTL Communication Ports

Standard Features

- NEMA 1, IP20, Gasket & Filter Enclosure
- Input Fuses
- Ground Lug
- 65,000 AIC Breaker
- Customer Terminal Block
- Built-In Real-Time Clock
- EOI: Door-Mounted, Backlit Plain-English LCD Display
- Ambient Temperature: 14° to 104°F (-10° to 40°C)
- Humidity: 95% Non-Condensing
- Altitude: Up to 1000 Meters without Derate
- Standards/Compliance: UL Listed in US & Canada

c UL us

W7 18 Pulse ASD
Part Numbering Convention

The W7 series ASD is available with commonly used options such as manual bypass and input circuit breakers in an easy-to-install package.

The W7 ASD includes an auto-transformer, input fuses, ground lug, customer terminal block, door-mounted electronic operator interface, power-on pilot light (white), run pilot light (red), fault pilot light (amber), hand/off/auto selector switch, emergency stop push button, real-time clock, and analog isolator (two isolated outputs and one isolated input).

Isolated three-contactor bypass units include an ASD/Off/Bypass selector switch, ASD Test On/Off selector switch, bypass mode pilot light (red), and ASD mode pilot light (red). They are used for system control and are all located on the enclosure door.

Isolated Solid State Starter bypass units include a door-mounted solid state starter keypad, ASD/Off/Bypass selector switch, ASD Test On/Off selector switch, solid state starter mode pilot light (red), and ASD mode pilot light (red). They are used for system control and are all located on the enclosure door.

Ordering Information: Use the following part numbering convention to configure the W7 when placing your order.

This example is for a 100 HP, 460 V "AA" style integrated 18-pulse assembly with a circuit breaker.

Example Part Number:	W7	4	##K	AA	DW	

Series:
W7 ASD
W7B ASD

Voltage:
4 — 460
6 — 600
E — 690

Model Number:

220 — 20 HP	10K — 100 HP	35K — 350 HP
270 — 25 HP	12K — 125 HP	40K — 400 HP
330 — 30 HP	15K — 150 HP	50K — 500 HP
400 — 40 HP	17K — 175 HP	60K — 600 HP
500 — 50 HP	20K — 200 HP	70K — 700 HP
600 — 60 HP	25K — 250 HP	80K — 800 HP
750 — 75 HP	30K — 300 HP	

Style:
AA — Includes circuit breaker
AE — Includes circuit breaker, isolated three-contactor bypass, overload protection
AS — Includes circuit breaker, isolated solid-state bypass, overload protection

18-Pulse Transformer:
DW — Auto-transformer

Enclosure/Other Options:
Blank — NEMA 1 enclosure
NC — NEMA 12 enclosure

Notes:
- *Factory-authorized startup is required on all ASDs 400 HP and larger.*

W7 ASD
Unit Pricing & Dimensions

W7 460 V ASD with NEMA 1 Enclosure

VAC	HP[1]	FLA	Model Number	List Price			Dimensions (in.)						
							H			W			D
				AADW	AEDW	ASDW	AA	AE	AS	AA	AE	AS	
460	20	27	W7B4220	$32,900	$34,900	$40,000	84	84	84	30	54	54	24
	25	34	W7B4270	$33,400	$35,400	$40,500							
	30	42	W7B4330	$34,000	$37,000	$42,100							
	40	52	W7B4400	$34,540	$37,540	$43,070							
	50	65	W7B4500	$35,000	$39,000	$44,530							
	60	77	W7B4600	$37,000	$42,000	$48,400							
	75	96	W7B4750	$39,000	$44,000	$51,250	100	100	100				
	100	124	W7B410K	$42,000	$47,000	$55,400						60	
	125	156	W7B412K	$46,000	$52,000	$60,830							
	150	190	W7B415K	$49,000	$55,000	$64,250							
	200	240	W7B420K	$57,000	$64,000	$74,960							
	250	302	W7B425K	$64,000	$74,000	$86,000				42	66	72	
	300	370	W7B430K	$70,000	$86,000	$98,700						84	
	350	450	W7B435K	$80,000	$96,000	$111,300							
	400	480	W7B440K	$85,000	$103,000	$118,900							
	500	628	W7B450K	$110,000	$128,000	$146,300					72	114	
	600	740	W7460K	$127,500	$151,000	$173,700	105	CF	CF	76	CF	CF	
	700	900	W7470K	$147,000	$175,000	$199,500							
	800	960	W7480K	$168,000	$198,000	$232,900							

Notes:
- *Factory-authorized startup is required on all ASDs 400 HP and larger.*

CF: Consult Factory.

W7 ASD
Unit Pricing & Dimensions

W7 600/690 V with NEMA 1 Enclosure

VAC	HP	FLA	Model Number	List Price	Dimensions (in.)		
					H	W	D
600/690	75	77	W7B6750AADW	$55,200	100	30	24
	100	99	W7B610KAADW	$64,975			
	125	125	W7B612KAADW	$69,000			
	150	150	W7B615KAADW	$72,450			
	175	177	W7B617KAADW	$79,350			
	200	200	W7B620KAADW	$86,250			
	250	250	W7B625KAADW	$103,500		42	
	300	300	W7B630KAADW	$115,000			
	400	425	W7B640KAADW	$140,300			

Notes:
- *HP rating is based on 600 V.*
- *Factory-authorized startup is required on all ASDs 400 HP and larger.*

W7 ASD
Unit Pricing & Dimensions

W7 460 V with NEMA 12 Enclosure

VAC	HP	FLA	Model Number	List Price			Dimensions (in.)						
							H			W			D
				AADWNC	AEDWNC	ASDWNC	AA	AE	AS	AA	AE	AS	
460	75	96	W7B4750	$44,850	$50,600	$57,800	90	90	90	38	62	76	24
	100	124	W7B410K	$48,300	$54,050	$61,950							
	125	156	W7B412K	$52,900	$59,800	$68,740							
	150	190	W7B415K	$56,350	$63,250	$73,550				40	64	78	
	200	240	W7B420K	$65,550	$73,600	$84,300							
	250	302	W7B425K	$73,600	$85,100	$98,100				64	88	90	
	300	370	W7B430K	$80,500	$98,900	$112,700							
	400	480	W7B440K	$97,750	$118,450	$138,350							
	500	628	W7B450K	$126,500	$147,200	$167,700	94	94	94		94	136	

Notes:
- *Factory-authorized startup is required on all ASDs 400 HP and larger.*

W7 ASD
Option Information & Pricing

General Options

Model Number	Description	List Price	
		NEMA 1	NEMA 12
RCABINET18	• Right-mounting 18” wide enclosure with blank door	$2,800	CF
PC80150P018	• Subpanel for 18” cabinet	$500	$500
RCABINET24	• Right-mounting 24” wide enclosure with blank door	$3,200	CF
PC80150P017	• Subpanel for 24” cabinet	$600	$600
RCABINET36	• Right-mounting 36” wide enclosure with blank door	$3,600	CF
PC80150P019	• Subpanel for 36” cabinet	$700	$700
LCABINET18	• Left-mounting 18” wide enclosure with blank door	$2,800	CF
PC80150P018	• Subpanel for 18” Cabinet	$500	$500
LCABINET24	• Left-mounting 24” wide enclosure with blank door	$3,200	CF
PC80150P017	• Subpanel for 24” cabinet	$600	$600
LCABINET36	• Left-mounting 36” wide enclosure with blank door	$3,600	CF
PC80150P019	• Subpanel for 36 “ cabinet	$700	$700

Additional Options

Option Code	Description	List Price
RI	• Control relay — IEC, 120 V, 2 A contacts	$100
M1	• Door-mounted volt amp meter package — IEC	$350
MA	• Door-mounted output amp meter	$200
MF	• Door-mounted output frequency meter	$200
MV	• Door-mounted output volt meter	$200
MX	• Door-mounted miscellaneous meter (order by description)	CF
PX	• Miscellaneous pilot light — IEC (specify function and indicator color)	$75
RT	• Door-mounted TIC-TPR6-14 relay — IEC (RTD monitor)	$4,400

Miscellaneous Options

Option Code	Description	List Price
BN	• Push-button — NEMA, 30mm, heavy duty, oil tight	$300
LN	• Pilot light — NEMA, 30mm, heavy duty, oil tight, P-T-T, 120V LED with transformer 6 V bulb (order by function indicator color)	$300
PN	• Speed-control potentiometer — NEMA, machine tool duty, 120 V, A600, 10 A contacts	$450
RN	• Control relay — NEMA, machine tool duty, 120 V, A600, 10 A contacts	$450
SN	• Selector switch — NEMA, 30 mm, heavy duty, oil tight, two or three position	$450

CF: Consult Factory.

Plus Pack ASD
Specifications

The Plus Pack outdoor adjustable speed drive is revolutionizing 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 480 V
6-Pulse: 60 HP to 1500 HP
12-Pulse: 60 HP to 1500 HP
18-Pulse: 60 HP 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 Sink 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 4 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)

c UL us

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	BA
Series: HX7+D — HX7 Plus Pack Rev. D					
Voltage: 4 — 460					
Model Number: 660 — 60 HP 830 — 75 HP 11K — 100 HP 16K — 150 HP 20K — 200 HP 26K — 250 HP 39K — 350 HP 45K — 400 HP 51K40 — 500 HP	60K — 600 HP 70K — 700 HP 81K — 800 HP 93K — 900 HP 10L — 1000 HP 12L — 1200 HP 14L40 — 1400 HP 15L40 — 1500 HP				
Style: 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, 1500 HP Plus Packs are rated 40°C maximum.*

Plus Pack ASD
Unit Pricing & Dimensions

6-Pulse & 12-Pulse NEMA 1

VAC	HP	FLA	Model Number	List Price		Dimensions (in.)			Shipping Weight (lbs.)
				CB1	CC1	H	W	D	
460	250	313	HX7+D426K	$40,000	$43,000	81.5	37.0	40.0	1200
	350	469	HX7+D439K	$46,400	$50,200				
	400	546	HX7+D445K	$53,000	$57,000				
	500	623	HX7+D451K40	$60,000	$64,000				1500
	600	722	HX7+D460K	$78,200	$84,200		72.0	46.0	2000
	700	842	HX7+D470K	$88,100	$95,350				
	800	980	HX7+D481K	$106,800	$114,300				
	900	1121	HX7+D493K	$116,500	$124,500				
	1000	1203	HX7+D410L	$125,000	$135,000				
	1200	1443	HX7+D412L	$145,000	$157,000	82.5	84.0		3500
	1400	1684	HX7+D414L40	$165,000	$177,000				
	1500	1804	HX7+D415L40	$185,000	$197,000				

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, 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
Unit Pricing & Dimensions

6-Pulse & 12-Pulse NEMA 3R

VAC	HP	FLA	Model Number	List Price		Dimensions (in.)			Shipping Weight (lbs.)
				CB	CC	H	W	D	
460	60[2]	79	HX7+D4660	$17,777	$19,277	81.5	25.0	35.0	1000
	75	100	HX7+D4830	$19,800	$21,400				
	100	133	HX7+D411K	$22,000	$23,750				
	150	196	HX7+D416K	$28,600	$30,600		31.5		
	200	241	HX7+D420K	$33,000	$35,750				
	250	313	HX7+D426K	$44,000	$47,000		46.0	42.0	1200
	350	469	HX7+D439K	$53,900	$57,700				
	400	546	HX7+D445K	$60,500	$64,500				
	500	623	HX7+D451K40	$69,000	$73,000		61.0		1500
	600	722	HX7+D460K	$84,700	$90,700		90.0	48.0	2000
	700	842	HX7+D470K	$94,600	$101,850				
	800	980	HX7+D481K	$113,300	$120,800				
	900	1121	HX7+D493K	$123,000	$131,000				
	1000	1203	HX7+D410L	$150,700	$160,700				
	1200	1443	HX7+D412L	$172,700	$184,700	82.5	110.0		3500
	1400	1684	HX7+D414L40	$185,000	$197,000				
	1500	1804	HX7+D415L40	$200,000	$212,000				

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
Unit Pricing & Dimensions

18-Pulse NEMA 3R (Phase-Shifting Auto-Transformer Included)

VAC	HP	FLA	Model Number	List Price	Dimensions (in.)			Shipping Weight (lbs.)
					H	W	D	
460	60	79	HX7+D4660CD	$42,000	81.5	70.0	35.0	2550
	75	100	HX7+D4830CD	$46,000				
	100	133	HX7+D411KCD	$54,650				
	150	196	HX7+D416KCD	$62,000				
	200	241	HX7+D420KCD	$71,800				
	250	313	HX7+D426KCD	$98,900		93.5	44.0	3425
	350	469	HX7+D439KCD	$114,500				3650
	400	546	HX7+D445KCD	$128,000				3900
	500	623	HX7+D451K40CD	$158,000				
	600	722	HX7+D460KCD	$188,000		130.0	46.5	5700
	700	842	HX7+D470KCD	$210,560				5775
	800	980	HX7+D481KCD	$240,000				

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	List Price
AE	• 66 kVA isolated three-contactor bypass	$11,020
	• 83 kVA isolated three-contactor bypass	$11,950
	• 111 kVA isolated three-contactor bypass	$12,840
	• 163 kVA isolated three-contactor bypass	$14,570
	• 200 kVA isolated three-contactor bypass	$15,020
	• 260 kVA isolated three-contactor bypass	$27,240
	• 390 kVA isolated three-contactor bypass	$27,570
	• 454 kVA isolated three-contactor bypass	$29,910
	• 500 kVA isolated three-contactor bypass	$37,550
	• 600 kVA isolated three-contactor bypass	$37,770
	• 700 kVA isolated three-contactor bypass	$37,770
	• 815 kVA isolated three-contactor bypass	$37,770
Delivery: Add four weeks to basic Plus Pack lead time.		

Notes:
- *Bypasses are only available for 6-pulse drives. Consult factory for 932 kVA and larger size drives on option availability.*
- *Dimensions will be significantly affected with bypass adders.*

Installed Dynamic Braking Transistors

Option Code	Description	List Price
DB	• 66 to 111 kVA IGBT7	$1,200
	• 163 to 200 kVA IGBT7	$1,500
	• 260 kVA IGBT7	$1,600
	• 390 to 518 kVA IGBT7	$2,000
	• 600 to 1500 kVA IGBT7	$3,000
Delivery: Add two weeks to basic Plus Pack lead time.		

Notes:
- *600 kVA and larger size drives use the same size IGBT7.*
- *Larger units have limited braking capacity.*

Plus Pack ASD
Option Information & Pricing

Installed Junction Boxes

Option Code	Description	List Price
JB	• 66 to 111 kVA junction box	$1,350
	• 163 to 518 kVA junction box (standard on 518 kVA CB CC)	$2,225
	• 600 to 815 kVA junction box	$3,900
	• 932 to 1500 kVA junction box	$4,450

Notes:
- *Junction Box included on 18-pulse units.*

Installed DC Link Reactors

Option Code	Description	List Price
RD	• 163 kVA installed DC link reactor	$2,000
	• 200 kVA installed DC link reactor	$2,475
	• 260 kVA installed DC link reactor	$2,750
	• 390 kVA installed DC link reactor	$3,300
	• 454 kVA installed DC link reactor	$3,575
	• 518 kVA installed DC link reactor	$5,000
	• 600 kVA installed DC link reactor	$6,000
	• 700 kVA installed DC link reactor	$7,250
	• 815 kVA installed DC link reactor	$7,500
	• 932 kVA installed DC link reactor	$10,000
	• 1000 kVA installed DC link reactor	$11,000
	• 1200 kVA installed DC link reactor	$12,000
	• 1400 kVA installed DC link reactor	$14,000
	• 1500 kVA installed DC link reactor	$16,000
Delivery: Add two weeks to basic Plus Pack lead time.		

Notes:
- *66 to 111 kVA Plus Pack power units do not have DC link reactor option connection points.*
- *DC Link Reactors included on 18-pulse units.*

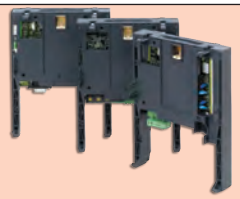
Installed Raycap Surge Suppressors

Option Code	Description	List Price
SS	• Installed Raycap surge suppressors for CB & CD units	$3,000
	• Installed Raycap surge suppressors for CC units	$6,000
Delivery: Add two weeks to basic Plus Pack lead time.		

Low Voltage ASD Options

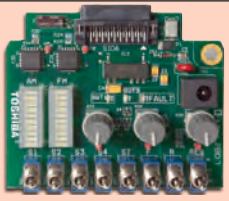
H9, G9, P9, AS1 ASD Options

Communication Cards, Closed-Loop Cards, Keypads, Cables, Cooling

Part Number	Description	Price
DEV002Z	• DeviceNet communications option module snaps directly onto drive • Mounts behind drive keypad control panel 	$255
PDP002Z	• Profibus DP communications option module snaps directly onto drive • Mounts behind drive keypad control panel 	$300
MBP001Z	• ModBus Plus communications option module snaps directly onto drive • Mounts behind drive keypad control panel 	$400
MBE001Z	• ModBus TCP communications option module snaps directly onto drive • Mounts behind drive keypad control panel 	$600
ASD-G9ETH	• Ethernet IP communications option module snaps directly onto the drive • Mounts behind drive keypad control panel • Supports: - Ethernet IP - Modbus/TCP - Bacnet - Profinet IO 	$900
IPE001Z	• Ethernet IP communications option module snaps directly onto drive • Mounts behind drive keypad control panel 	$550
ETB003Z	• I/O terminal block can be added to enhance your system for extra compatibility with wide range of systems: - Four Discrete Inputs - One Open-Collector Outputs - One Thermal-Trip Input - Form-C Output (One Circuit) • Only one ETB003Z card can be used per drive 	$175

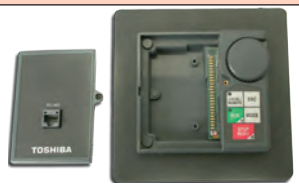
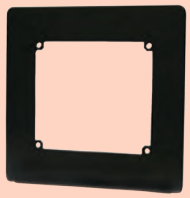
Low Voltage ASD Options
H9, G9, P9, AS1 ASD Options

Communication Cards, Closed-Loop Cards & Communication Cables

Part Number	Description	Price
ETB004Z	• I/O terminal block can be added to enhance your system for extra compatibility with a wide range of systems: - Four Discrete Inputs - One Open-Collector Outputs - One Thermal-Trip Input - Form-C Output (One Circuit) - Two Analog Inputs - Two Analog Outputs • Only one ETB004Z card can be used per drive 	$300
ETB006Z	• 120V Logic Input Adapter wires into drive terminal block • Contains seven 120 VAC inputs that control discrete inputs • Compatible with H9/G9/P9 drives frames 6 and above, as well as all AS1 drives	$145
ASD-CAB-USB	• RS485 to USB cable for PC to ASD communication • Can communicate with G9, P9, Q9, G7, H7, Q7, AS1, GX7, W7 	$150
VEC004Z	• Type-2 • Push pull/open collector 12V printed circuit board connects/mounts internally to drive, behind drive keypad control panel 	$150
VEC005Z	• Type-2 • Push pull/open collector 15V printed circuit board connects/mounts internally to drive, behind drive keypad control panel 	$150
VEC006Z	• Type-2 • Push pull/open collector 24V printed circuit board connects/mount internally to drive, behind drive keypad control panel 	$150
VEC007Z	• Type-1 • RS422 (line driver) 5V encoder card printed circuit board connects/mounts internally to drive, behind drive keypad control panel 	$150
ASD-TB1-SIM9	• Input simulator replaces standard terminal strip on any G9/H9 drive • Emulates input output control signals of drive using switches, potentiometers, indicators 	$300

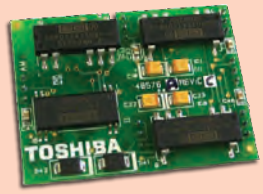
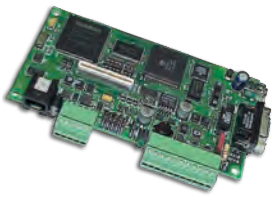
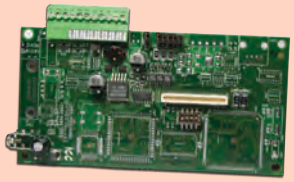
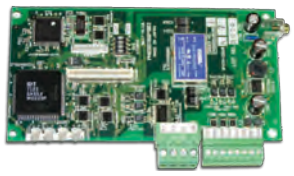
Low Voltage ASD Options
H9, G9, P9, AS1 ASD Options

Remote Keypads and Cables

Part Number	Description	Price
ASD-EOI-N4-G9	• G9/H9 • NEMA 4 keypad • Keypad should not be exposed to direct sunlight 	$750
ASD-EOI-N4-P9	• P9 • NEMA 4 keypad • Keypad should not be exposed to direct sunlight 	$750
ASD-MTG-KIT9	• Remote-mount kit for G9/H9 EOI Frame 2 to 5 • EOI extender cable ASD-CABxF is required (not included with drive) 	$300
ASD-MTG-KIT	• Remote-mount kit for G9/H9/P9 EOI Frame 6 to 13 • EOI extender cable ASD-CABxF may be required if keypad is remote-mounted beyond reach of EOI cable provided with drive 	$100
ASD-MTG-KITP9	• Remote-mount kit for P9 EOI Frame 2 to 5 • EOI extender cable ASD-CABxF is required (not included with drive) 	$300
ASD-BPC	• EOI panel cover provides dust protection when G9/H9/P9 keypad has been remotely mounted or removed on Frame 6 to 13 	$85
ASD-CAB7F	• 7-foot EOI extender cable with ferrite cores	$45
ASD-CAB10F	• 10-foot EOI extender cable with ferrite cores	$65
ASD-CAB15F	• 15-foot EOI extender cable with ferrite cores	$75

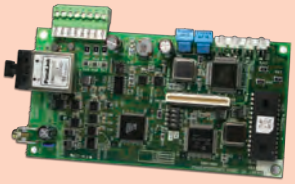
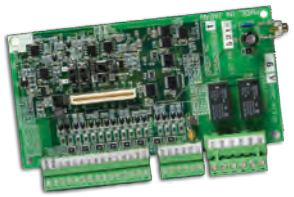
Low Voltage ASD Options
GX7, W7, Plus Pack ASD Options

Internal Communication/Multi-Function Cards

Part Number	Description	Price
ASD-CAB-USB	• RS485 to USB cable for PC to the W7/W7B • Used with G9, H9, P9, Q9, AS1, Plus Pack, W7, GX7	$150
ASD-TB1-ACI	• 120 V Logic Input Board • Replaces terminal strip supplies dry contact closures to control W7/W7B 	$450
ASD-RTC	• Real-time clock option adds time and date stamp on start, run, fault events • Stores up to 100 previous faults with operation data at time of fault 	$80
ASD-ISO-1	• Terminal strip signal isolator daughter board mounts onto factory terminal strip provides isolation of control board output circuit from AM/FM output from II input 	$300
ASD-MULTICOM-A	• Vector feedback card supports line driver, open-collector encoders, multiple network communication protocols, including: - Profibus - Modbus RTU - DeviceNet 	$1,520
ASD-MULTICOM-B	• Vector feedback, line driver, open-collector, pulse-speed command, process PID control 	$950
ASD-MULTICOM-F	• Tosline F10 communication board allows the drive to communicate with Toshiba T1, T2, T3 PLCs over twisted-pair cabling of Tosline F10 network 	$950

Low Voltage ASD Options
GX7, W7, Plus Pack ASD Options

Internal Communication/Multi-Function Cards

Part Number	Description	Price
ASD-MULTICOM-J	• Vector feedback, pulse-input speed command, position-control command, RX2 input, multi-function output terminal, alarm-code output terminal 	$950
ASD-MULTICOM-S	• Toshiba S20 communication board allows drive to communicate with Toshiba T2 & T3 PLCs over fiber-optic Tosline S20 network 	$1,350
ASD-MULTICOM-X	• Extended terminal board provides: - Eight additional programmable digital inputs - Two analog outputs - Two programmable form-C contacts - 16-bit BCD control function 	$900
ASD-NANOCOM	• Multi-protocol communication interface provides RS485-based network connectivity (currently supports Modbus RTU Metasys N2) • Chip plugs directly into B-version of 7-series ASDs • Not compatible with HX7+D Plus Pack 	$350
ASD-MULTICARD	• Option card spacer necessary when installing more than one option card in drive 	$270

Low Voltage ASD Options
External Gateway Options

External Communication Options

Part Number	Description	Price
XLTR-200	• Multi-protocol network gateway supports: - Modbus RTU - Metasys N2 - Siemens FLN • One unit connects up to three drives • Requires one CAB00xx-0A cable per drive 	$800
ETH-200	• Multi-protocol network gateway supports: • Ethernet IP • Modbus TCP • Modbus RTU • One unit connects up to three drives • Requires one CAB00xx-0A cable per drive 	$1,100
EXT-PROFIBUS	• Network gateway supports ProfibusDP • One unit connects up to two drives • Requires one CAB00xx-0A cable per drive 	$1,150
EXT-MODBUS+	• Network gateway supports Modbus+ • One unit connects up to three drives • Requires one CAB00xx-0A cable per drive 	$1,450
DNET-100	• Network gateway supports DeviceNet • One unit connects up to three drives • Requires one CAB00xx-0A cable per drive 	$1,050
10456	• Standard plug 120 VAC: 9 VDC power supply • Compatible with ICC gateways listed above	$95

Notes:
- *Options are available for 7-Series and S11 ASDs.*

Low Voltage ASD Options
External Gateway Options

Millennium Series Communication Options

Part Number	Description	Price
DNET-1000	• Network gateway that supports the following protocols: - DeviceNet - Modbus RTU - BACnet MS/TP - Metasys N2 	$1,350
ECAT-1000	• Network gateway that supports the following protocols: - EtherCAT - Modbus RTU - BACnet MS/TP - Metasys N2 	$1,350
ETH-1000	• Network gateway that supports the following protocols: - AB CSP (PCCC) - EtherNet/IP - BACnet/IP - BACnet MS/TP - Modbus/TCP - Modbus RTU - Profinet IO - Metasys N2 	$1,250
PBDP-1000	• Network gateway that supports the following protocols: - Profibus DP - Modbus RTU - BACnet MS/TP - Metasys N2 	$1,350
XLTR-1000	• Network gateway that supports the following protocols: - Modbus RTU - BACnet MS/TP - Metasys N2 	$800

Notes:
- *Options are available for 7-Series and 9-Series ASDs. Consult factory for installation/setup.*

Low Voltage ASD Options
H9, G9, P9, AS1 ASD
Installed Options

Installed Communication Cables & Closed-Loop Cards

Part Number	Description	Price
CD	• DEV002Z DeviceNet communications option module snaps directly onto drive • Mounts behind drive keypad control panel 	$755
CF	• PDP002Z Profibus DP communications option module snaps directly onto drive • Mounts behind drive keypad control panel 	$800
CH	• MBP001Z ModBus Plus communications option module snaps directly onto drive • Mounts behind drive keypad control panel 	$900
CP	• MBE001Z ModBus TCP communications option module snaps directly onto drive • Mounts behind drive keypad control panel 	$1,100
CQ	• ASD-G9ETH Ethernet IP communications option module snaps directly onto drive • Mounts behind drive keypad control panel • Supports: - Ethernet IP - Modbus/TCP - Bacnet - Profinet IO 	$1,400
CQ	• IPE001Z Ethernet IP communications option module snaps directly onto drive • Mounts behind drive keypad control panel • Supports Ethernet IP 	$1,050

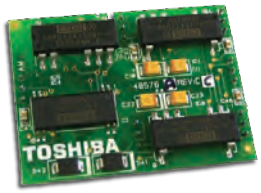
Low Voltage ASD Options
H9, G9, P9, AS1 ASD
Installed Options

Installed Communication Cables & Closed-Loop Cards

Part Number	Description	Price
CE	• ETB003Z I/O terminal block can be added to enhance your system for extra compatibility with a wide range of systems: - Four Discrete Inputs - One Open-Collector Outputs - One Thermal-Trip Input - Form-C Output (One Circuit) • Only one ETB003Z card can be used per drive 	$675
CT	• ETB004Z I/O terminal block can be added to enhance your system for extra compatibility with a wide range of systems: - Four Discrete Inputs - One Open-Collector Outputs - One Thermal-Trip Input - Form-C Output (One Circuit) - Two Analog Inputs - Two Analog Outputs • Only one ETB004Z card can be used per drive 	$800
CN	• ETB006Z 120 V Logic Input Adapter wires into drive terminal block and has seven 120 VAC inputs that control discrete inputs (compatible with H9/G9/P9 drives frames 6 and above and all AS1 drives)	$645
CV	• VEC004Z Type-2 • Push pull/open collector 12 V printed circuit board connects/mount internally to drive, behind drive keypad control panel 	$650
CV	• VEC005Z Type-2 • Push pull/open collector 15 V printed circuit board connects/mount internally to drive, behind drive keypad control panel 	$650
CV	• VEC006Z Type-2 • Push pull/open collector 24 V printed circuit board connects/mount internally to drive, behind drive keypad control panel 	$650
CU	• VEC007Z Type-1 • RS422 (line driver) 5 V encoder card printed circuit board connects/mounts internally to drive, behind drive keypad control panel 	$650
Delivery: Add two weeks to basic assembly unit lead time.		

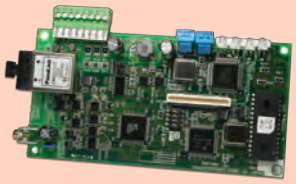
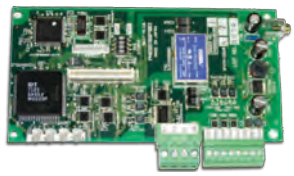
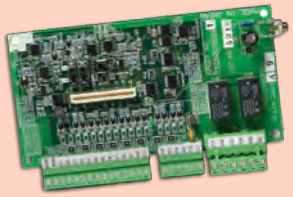
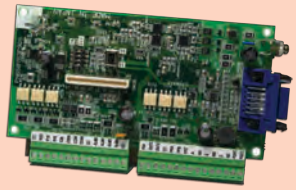
Notes:
- *Please consult factory when selecting options CV or CU.*

Low Voltage ASD Options
GX7, W7, Plus Pack ASD
Installed Options

Part Number	Description	Price
CN	• 120 V Logic Input Board • Replaces terminal strip supplies dry contact closures to control W7/W7B 	$950
CR	• Real-time clock option adds a time and date stamp on start, run, fault events • Stores up to 100 previous faults with operation data at time of fault • Standard in W7 ASD 	$580
X7	• Terminal strip signal isolator daughter board mounts onto factory terminal strip and provides isolation of control board output circuit from AM/FM output from the II input • Standard in W7 ASD 	$800

Low Voltage ASD Options
GX7, W7, Plus Pack ASD

Installed Communication Cards, Closed-Loop Cards

Part Number	Description	Price
C1	• Installed (ASD-MULTICOM-A) vector feedback multi-protocol communications card supports line driver, open-collector encoders, multiple network communication protocols including: - Profibus - Modbus RTU - DeviceNet 	$2,020
C5	• Installed (ASD-MULTICOM-S) Toshiba S20 communication board allows drive to communicate with Toshiba T2, T3 PLCs over fiber-optic Tosline S20 network 	$1,850
C6	• Installed (ASD-MULTICOM-F) Tosline F10 communication board allows drive to communicate with Toshiba T1, T2, T3 PLCs over twisted-pair cabling of Tosline F10 network 	$1,450
CE	• Installed extended terminal board (ASD-MULTICOM-X) provides: - Eight additional programmable digital inputs - Two analog outputs - Two programmable form-C contacts - 16-bit BCD control function 	$1,400
CU	• Installed (ASD-MULTICOM-B) vector feedback, line driver, open-collector, pulse-speed command, process PID control 	$1,450
CV	• Installed (ASD-MULTICOM-J) vector feedback, pulse-input speed command, position-control command, RX2 input, multi-function output terminal, alarm-code output terminal 	$1,450

Low Voltage ASD Options
NetPac™

Part Number	Description	Price
NETPAC-USB	• Toshiba NetPac Wireless connector for computer USB port 	$250
NETPAC-2-2C	• Toshiba NetPac Wireless connector for 2-wire RS-48S, includes 2 centimeter long cable 	$250
NETPAC-2-2F	• Toshiba NetPac Wireless connector for 2-wire RS-48S, includes 2 foot long cable 	$250
NETPAC-2-2M	• Toshiba NetPac Wireless connector for 2-wire RS-48S, includes 2 meter long cable 	$250
NETPAC-4-2C	• Toshiba NetPac Wireless connector for 4-wire RS-48S, includes 2 centimeter long cable 	$250
NETPAC-4-2F	• Toshiba NetPac Wireless connector for 4-wire RS-48S, includes 2 foot long cable 	$250
NETPAC-4-2M	• Toshiba NetPac Wireless connector for 4-wire RS-48S, includes 2 meter long cable 	$250

NetPac™ Compatibility Chart

Part Number	S11	S15	G9	H9	P9	AS1	Plus Pack	W7	GX7
NETPAC-2-2C	N/A	REC	OK	OK	OK	OK	N/A	N/A	N/A
NETPAC-2-2F	N/A	REC	OK	OK	OK	OK	N/A	N/A	N/A
NETPAC-2-2M	N/A	REC	OK	OK	OK	OK	N/A	N/A	N/A
NETPAC-4-2C	N/A	N/A	REC	REC	REC	OK	REC*	REC	REC
NETPAC-4-2F	N/A	N/A	REC	REC	REC	OK	REC*	REC	REC
NETPAC-4-2M	N/A	N/A	REC	REC	REC	OK	REC*	REC	REC

Notes:
- *REC: Recommended for this particular model.*
- *REC*: Requires the 9-series keypad on HX7+D model to be removed.*
- *N/A: May not be applied.*
- *OK: May be applied to this model, a different model may be better for the application.*

Low Voltage ASD Options
Installed Gateway Options

Installed External Communication Options

Part Number	Description	Price
CG	• Multi-protocol network gateway supports Modbus RTU, Metasys N2, Siemens FLN • One unit connects up to three drives • Includes option connection cable (CAB0011-0A) 	$1,300
CQ	• Multi-protocol network gateway supports: - Ethernet IP - Modbus TCP - Modbus RTU • One unit connects up to three drives • Includes option connection cable (CAB0011-0A) 	$1,600
CF	• Network gateway supports ProfibusDP • One unit connects up to two drives • Includes option connection cable (CAB0011-0A) 	$1,650
CH	• Network gateway supports Modbus Plus • One unit connects up to three drives • Includes option connection cable (CAB0011-0A) 	$1,950
CD	• Network gateway supports DeviceNet • One unit connects up to three drives • Includes option connection cable (CAB0011-0A) 	$1,550

Notes:
- *See compatibility chart on page 74.*
- *Options are available for 7-Series and S11 ASDs.*

Low Voltage ASD Options
Common Installed ASD Options

Installed Buttons

Part Number	Description	Price
BA	• Automatic bypass upon ASD fault for units with bypass	$600
B1	• Non-illuminated push-button • Black button for stop • Red button for start • Controls ASD only	$600
BJ	• Jog push-button	$300
BX	• Miscellaneous push-button	$300

Notes:
- *For NEMA-rated add $150 to list price.*

Installed Space Heaters

Part Number	Description	Price
HM	• Motor space heater	$400
HS	• Cabinet anti-condensation space heater powered by incoming power • Activated when ASD is not running	$500
HT	• Cabinet space heater powered by incoming power • Thermostat controlled	$600
T2	• 200 VA 120 V CPT for motor space heater power	$300
Delivery: Add two weeks to basic assembly unit lead time.		

Notes:
- *Voltage and wattage ratings required when specifying HM option.*
- *Motor space heater will be remotely powered by customer's power supply unless T2 option is also specified.*
- *Some motors may require CPT larger than 200 VA.*

Low Voltage ASD Options
Common Installed ASD Options

Installed Thermal-Overload Relays

Part Number	Description	Price
LA	• 0.25 HP overload relay	$150
LB	• 0.33 HP overload relay	$150
LC	• 0.5 HP overload relay	$150
LD	• 0.75 HP overload relay	$150
LE	• 1 HP overload relay	$150
LF	• 1.5 HP overload relay	$150
LG	• 2 HP overload relay	$150
LH	• 3 HP overload relay	$150
L J	• 5 HP overload relay	$150
LK	• 7.5 HP overload relay	$200
LL	• 10 HP overload relay	$200
LM	• 15 HP overload relay	$200
LN	• 20 HP overload relay	$200
LP	• 25 HP overload relay	$200
LQ	• 30 HP overload relay	$250
LR	• 40 HP overload relay	$250
LS	• 50 HP overload relay	$250
LT	• 60 HP overload relay	$450
LU	• 75 HP overload relay	$450
LW	• 100 HP overload relay	$450
LY	• 125 HP overload relay	$450
LZ	• 150 HP overload relay	$450
L1	• 200 HP overload relay	$500
L2	• 250 HP overload relay	$500
L3	• 300 HP overload relay	$500
L4	• 350 HP overload relay	$500
L5	• 400 HP overload relay	$550
Delivery: Add two weeks to basic assembly unit lead time.		

Low Voltage ASD Option
Common Installed ASD Options

Installed Meters

Part Number	Description	Price
M1	• Output voltage current meter package	$350
MA	• Output current meter	$200
ME	• Elapsed time meter	$200
MF	• Output frequency meter	$200
MV	• Output voltage meter	$200
MX	• Miscellaneous meter • Order by description	CF
RT	• RTD monitor/relay • 12 RTD inputs (Accepts Pt100, Ni100, Ni120, and Cu10 RTDs) • Door-mount display	$4,400
Delivery: Add two weeks to basic assembly unit lead time.		

Notes:
- *AM and FM analog outputs are used for meter display.*
- *Please consult factory for availability and pricing if more than 2 meters are needed, as additional transformers may be required.*
- *CF: Consult Factory.*

Low Voltage ASD Options
Common Installed ASD Options

Part number	Description	Price
PA	• Pilot light for ASD mode indicator	$300
PB	• Pilot light for bypass mode indicator	$300
PF	• Pilot light for fault indicator (amber)	$300
PG	• Pilot light for stop indicator (green)	$300
PP	• Pilot light for power on indicator (white)	$300
PR	• Pilot light for run indicator (red)	$300
PX	• Pilot light for miscellaneous indicator • Specify at time of order	CF
Delivery: Add two weeks to basic assembly unit lead time.		

Notes:
- *For NEMA-rated devices, consult factory for pricing.*
- *The discrete outputs OUT1, OUT2, and FLA/B/C are used to activate the pilot lights.*
- *For more than three active indicators, consult factory for pricing and availability of additional required hardware.*
- *CF: Consult Factory.*

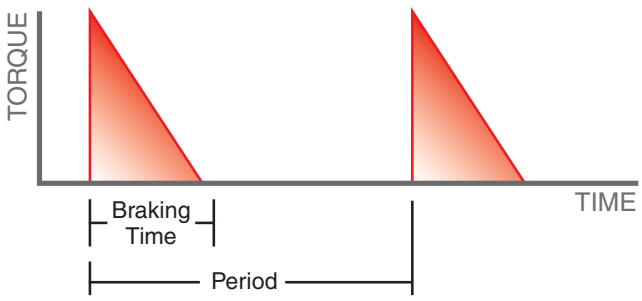
Miscellaneous Options

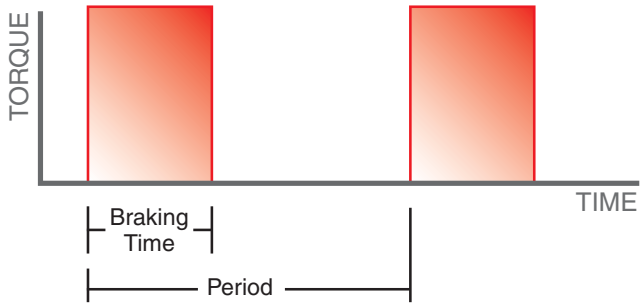
Part Number	Description	Price
X2	• Isolated 4 to 20 mA transducer connected to AM terminal	$550
X3	• Isolated 4 to 20 mA transducer connected to FM terminal	$550
X5	• Isolated 3 to 15 PSI transducer connected to VI terminal	$680
Delivery: Add two weeks to basic assembly unit lead time.		

Low Voltage ASD Options
Dynamic Braking Resistors

Dynamic braking resistors, also abbreviated as DBRs or PBRs (for power braking resistors), are typically designed to remove excess energy from a system in the form of heat. DBRs are normally connected in series with a chopper transistor labeled "IGBT7" across the DC bus which allows the resistor to bleed off excess voltage. Typical applications involving excess regeneration include decelerating high inertia loads and overhauling loads causing regenerative power.

Heavy duty resistors are rated at 125% braking torque and a maximum of 50% overhauling duty cycle or 100% decel rate on a 2 minute period (ie. 1 minute on, 1 minute off for 50% overhauling cycle). Standard duty resistors are rated at 125% braking torque and a maximum of 20% overhauling duty cycle or 40% decel rate.





DBRs must only be used in conjunction with thermal protection properly rated for the resistor's capacity and an input contactor to open the input 3-phase power to the ASD in the event that a DBR over-temperature condition occurs.

Notes:
- *Larger HP units have limited braking capacity.*
- *Dynamic braking parameters must be set correctly in order for DBRs to be used, failure to do so may result in damage to the drive or resistor. Parameter settings are typeform and application specific, please see each ASD's respective Installation and Operations Manual for more information.*
- *Dynamic braking transistors are not standard with all ASDs.*
- *Dynamic braking options listed are not necessarily the same as the options listed in the AS1, S11, or S15 Installation and Operations Manual.*
- *All dynamic braking resistors come in a NEMA 1 enclosure.*

Low Voltage ASD Options
Dynamic Braking Resistors

230 V Power Rating - Heavy Duty Dynamic Braking Resistors

HP	Model Number	Dimensions (in.)			List Price
		H	W	D	
0.75	BR-2000-3000	5	12	5	$190
1	BR-1500-3250	5	12	5	$195
2	BR-0760-6500	5	12	7	$300
3	BR-0510-120K	5	12	10	$400
5	BR-0300-160K	5	12	13	$485
7.5	BR-0198-240K	5	19	10	$660
10	BR-0155-349K	5	19	10	$725
15	BR-0099-524K	5	26.5	10	$900
20	BR-0073-612K	5	26.5	13	$1,150
25	BR-0065-842K	5	26.5	16	$1,450
30	BR-0055-112L	10	28	10	$1,700
40	BR-0040-144L	10	28	13	$1,940
50	BR-0033-168L	10	28	16	$2,550
60	BR-0027-195L	10	28	16	$3,050
75	BR-0022-250L	24	30	18	$4,085
100	BR-0017-316L	24	30	18	$4,520
125	BR-0013-384L	32	30	18	$6,200

Notes:
- *Dynamic braking resistors come with a normally-closed thermal switch and terminal block.*

230 V Power Rating - Standard Duty Dynamic Braking Resistors

HP	Model Number	Dimensions (in.)			List Price
		H	W	D	
0.75	BR-6100-2500	5	12	5	$190
1	BR-4500-2500	5	12	5	$195
2	BR-2300-2500	5	12	5	$200
3	BR-1520-3250	5	12	5	$205
5	BR-0900-3500	5	12	5	$210
7.5	BR-0600-8000	5	12	7	$300
10	BR-0460-8000	5	12	7	$320
15	BR-0300-120K	5	12	10	$400
20	BR-0228-140K	5	12	13	$475
25	BR-0184-160K	5	12	13	$500
30	BR-0150-200K	5	12	16	$575
40	BR-0112-280K	5	19	13	$800
50	BR-0093-372K	5	19	10	$850
60	BR-0078-527K	5	26.5	10	$900
75	BR-0064-655K	5	26.5	13	$1,100
100	BR-0048-622K	5	26.5	13	$1,200
125	BR-0037-745K	5	26.5	13	$1,250

Notes:
- *Dynamic braking resistors come with a normally-closed thermal switch and terminal block.*

Low Voltage ASD Options
Dynamic Braking Resistors

460 V Power Rating - Heavy Duty Dynamic Braking Resistors

HP	Model Number	Dimensions (in.)			List Price
		H	W	D	
1	BR-6000-3500	5	12	5	$195
2	BR-3000-6500	5	12	7	$300
3	BR-2010-9750	5	12	10	$400
5	BR-1200-160K	5	12	13	$485
7.5	BR-0810-240K	5	19	10	$660
10	BR-0600-320K	5	19	13	$800
15	BR-0408-480K	5	26.5	13	$1,100
20	BR-0292-656K	5	26.5	13	$1,150
25	BR-0245-794K	5	26.5	16	$1,350
30	BR-0198-105L	10	28	10	$1,550
40	BR-0164-138L	10	28	16	$2,150
50	BR-0130-168L	10	28	16	$2,550
60	BR-0104-211L	16	30	18	$3,110
75	BR-0080-288L	24	30	18	$3,900
100	BR-0060-310L	32	30	18	$4,900
125	BR-0049-395L	32	30	18	$5,600
150	BR-0040-465L	40	30	18	$6,800
200	BR-0030-676L	48	30	18	$8,500
250	BR-0024-778L	48	30	18	$9,500
300	BR-0020-873L	48	30	18	$11,000
350	BR-0019-109M	2x40	2x30	2x18	$13,000
400	BR-0015-116M	2x40	2x30	2x18	$15,000
450	BR-0013-154M	2x56	2x30	2x18	$20,000
550	BR-0011-176M	2x56	2x30	2x18	$22,800
600	BR-0011-184M	2x56	2x30	2x18	$23,500
700	BR-0009-222M	3x56	3x30	3x18	$29,000

Notes:

- *Dynamic braking resistors come with a normally-closed thermal switch and terminal block.*
- *Plus Packs 250 HP & above must use the 250 HP heavy duty dynamic braking resistor.*
- *Units 350 HP & above come as two separate components.*

Dynamic Braking Resistors

460 V Power Rating - Standard Duty Dynamic Braking Resistors

HP	Model Number	Dimensions (in.)			List Price
		H	W	D	
1	BR-180K-2500	5	12	5	$195
2	BR-9250-2500	5	12	5	$200
3	BR-6100-2500	5	12	5	$205
5	BR-3600-3500	5	12	5	$210
7.5	BR-2400-8000	5	12	7	$300
10	BR-1800-7000	5	12	7	$320
15	BR-1200-105K	5	12	10	$400
20	BR-0920-160K	5	12	13	$475
25	BR-0720-160K	5	12	13	$500
30	BR-0600-200K	5	12	16	$575
40	BR-0455-280K	5	19	13	$700
50	BR-0368-320K	5	19	13	$800
60	BR-0310-400K	5	19	16	$950
75	BR-0240-480K	5	26.5	13	$1,100
100	BR-0196-635K	5	26.5	13	$1,150
125	BR-0153-807K	5	26.5	16	$1,300
150	BR-0127-107L	10	28	13	$1,775
200	BR-0091-118L	10	28	13	$1,950
250	BR-0074-149L	10	28	13	$2,250
300	BR-0064-230L	16	30	18	$2,950
350	BR-0051-262L	24	30	18	$4,000
400	BR-0046-291L	32	30	18	$4,650
450	BR-0042-302L	24	30	18	$4,850
550	BR-0034-336L	24	30	18	$5,300
600	BR-0032-461L	32	30	18	$5,900
700	BR-0026-517L	32	30	18	$6,500

Notes:

- *Dynamic braking resistors come with a normally-closed thermal switch and terminal block.*

Low Voltage ASD Options
Dynamic Braking Resistors

600/690 V Power Rating - Heavy Duty Dynamic Braking Resistors

HP	Model Price	Dimensions (in.)			List Price
		H	W	D	
2	BR-6500-7000	5	12	7	$300
3	BR-4350-9750	5	12	10	$400
5	BR-2600-160K	5	12	13	$485
7.5	BR-1740-240K	5	19	10	$660
10	BR-1280-320K	5	19	13	$800
15	BR-0864-480K	5	26.5	13	$1,000
20	BR-0656-640K	10	28	10	$1,300
25	BR-0520-800K	10	28	13	$1,600
30	BR-0437-984K	10	28	10	$1,800
40	BR-0344-138L	10	28	13	$2,000
50	BR-0260-176L	10	28	16	$2,300
60	BR-0206-174L	16	30	18	$2,800
75	BR-0166-215L	16	30	18	$3,400
100	BR-0133-332L	24	30	18	$4,800
125	BR-0102-417L	32	30	18	$5,900
150	BR-0087-453L	40	30	18	$6,800
200	BR-0064-640L	40	30	18	$8,500
250	BR-0052-749L	56	30	18	$9,500
300	BR-0043-956L	72	30	18	$13,000
350	BR-0037-107M	2x40	2x30	2x18	$15,500
400	BR-0032-128M	2x40	2x30	2x18	$17,000
450	BR-0029-126M	2x40	2x30	2x18	$19,000
550	BR-0024-188M	2x64	2x30	2x18	$22,500
700	BR-0018-233M	3x56	3x30	3x18	$26,500

Notes:
- *Dynamic braking resistors come with a normally-closed thermal switch and terminal block.*
- *GX7/Plus Packs must use the 300 HP heavy duty dynamic braking resistor.*
- *Units 350 HP & above come as two separate components.*

Low Voltage ASD Options
Dynamic Braking Resistors

600/690 V Power Rating - Standard Duty Dynamic Braking Resistors

HP	Model Number	Dimensions (in.)			List Price
		H	W	D	
2	BR-200K-2500	5	12	5	$200
3	BR-130K-2500	5	12	5	$205
5	BR-8000-3500	5	12	5	$210
7.5	BR-5200-5000	5	12	7	$300
10	BR-4000-7000	5	12	7	$320
15	BR-2700-105K	5	12	10	$400
20	BR-2000-140K	5	12	13	$475
25	BR-1600-160K	5	12	13	$500
30	BR-1300-200K	5	12	16	$575
40	BR-0980-280K	5	19	13	$750
50	BR-0784-320K	5	19	13	$800
60	BR-0650-400K	5	19	16	$950
75	BR-0528-480K	5	26.5	13	$1,100
100	BR-0400-640K	10	28	10	$1,440
125	BR-0310-794K	5	26.5	16	$1,300
150	BR-0264-140L	10	28	13	$1,800
200	BR-0208-141L	10	28	13	$2,000
250	BR-0160-164L	10	28	16	$2,500
300	BR-0126-202L	16	30	18	$3,200
350	BR-0117-237L	16	30	18	$3,600
400	BR-0102-255L	24	30	18	$4,000
450	BR-0088-317L	24	30	18	$4,250
550	BR-0073-356L	24	30	18	$4,900
700	BR-0055-448L	32	30	18	$6,000

Notes:
- *Dynamic braking resistors come with a normally-closed thermal switch and terminal block.*

Reactors & Filters
Line Reactors

Line reactors, also referred to as chokes, are passive-power conditioning devices. Reactors are most often applied to correct or prevent power-line problems inherent in ASD applications. When applied to the input of a drive, the line reactor is intended to protect the input of the drive from power-line problems or vice versa.

Applying line reactors is simple. There are two factors to consider when selecting the amperage and percent impedance for an application. For amperage, the line reactor must meet or exceed the current flow requirements of the application. The percent impedance indicates the expected voltage drop across the reactor at full load. For instance, if the input voltage is 480 VAC a 5% impedance line reactor is applied, a 13.86 volt drop [(480 x .05)/1.73] will occur with a resultant 466 VAC output.

Typical Applications

Input

- Reducing reflected harmonics to the power-line
- High ratios between point of common coupling (PCC) ASD's power capacity
- Example: A pad-mounted transformer has a capacity of 1000 kVA, the ASD has a capacity of 11 kVA (10 HP) for a ratio of 90:1 (stiff line). Toshiba suggests that a line reactor be used where the ratio is greater than 20:1

Nuisance trips due to line voltage spikes can be minimized, as the line reactor will reduce the magnitude duration of the transients.

Output

- Adding inductance to a low impedance motor
- Excessively long motor lead-lengths must be addressed with a long lead-length filter

Reactors & Fillers
Line Reactors

230 V, 3% Impedance in NEMA 1 Enclosure

Amps	HP	Model Number	Dimensions (in.)			Weight (lbs.)	List Price
			H	W	D		
4	0.75	101063	6.5	8.0	6.0	3	$265
6	1	101064	6.5	8.0	6.0	3	$280
8	2	101065	6.5	8.0	6.0	3	$285
12	3	101066	6.5	8.0	6.0	3	$300
16	5	101067	6.5	8.0	6.0	7	$375
25	7.5	101070	7.5	10.0	7.0	8	$420
35	10	101072	7.5	10.0	7.0	8	$460
55	15	101074	7.5	10.0	7.0	11	$510
80	20	101075	9.0	12.0	8.0	22	$680
110	40	101076	15.5	15.0	13.0	26	$880
130	50	101077	15.5	15.0	13.0	33	$1,090
160	60	101078	15.5	15.0	13.0	47	$1,265

230 V, 6% Impedance in NEMA 1 Enclosure

Amps	HP	Model Number	Dimensions (in.)			Weight (lbs.)	List Price
			H	W	D		
3	0.75	PC34093P001	6.5	8.0	6.0	3	$265
6	1	PC34093P003	6.5	8.0	6.0	3	$300
8	2	PC34093P005	6.5	8.0	6.0	3	$300
12	3	PC34093P007	6.5	8.0	6.0	6	$310
16	5	PC34093P010	6.5	8.0	6.0	7	$365
25	7.5	PC34093P015	7.5	10.0	7.0	11	$465
35	10	PC34093P025	7.5	10.0	7.0	14	$495
55	15	PC34093P040	9.0	12.0	8.0	22	$660
80	20	PC34093P060	15.5	15.0	13.0	26	$880
110	40	PC34093P075	15.5	15.0	13.0	33	$1,100
130	50	PC34093P100	15.5	15.0	13.0	47	$1,180
160	60	PC34093P125	15.5	15.0	13.0	50	$1,375
Delivery: Three to five weeks.							

Reactors & Filters
Line Reactors

230 V, 3% Impedance Open Style

Amps	HP	Model Number	Dimensions (in.)			Weight (lbs.)	List Price
			H	W	D		
4	0.75	PC34094P000	4.0	5.0	4.0	3	$160
6	1	PC34094P001	4.0	5.0	4.0	3	$165
8	2	PC34094P002	4.0	5.0	4.0	3	$175
12	3	PC34094P003	4.0	5.0	4.0	3	$195
16	5	PC34094P005	5.0	6.0	4.0	7	$275
25	7.5	PC34094P007	6.0	7.0	4.0	8	$290
35	10	PC34094P010	6.0	7.0	4.0	8	$300
55	15	PC34094P020	5.8	8.0	5.0	11	$350
80	20	PC34094P030	7.0	9.0	6.0	22	$465
110	40	PC34094P040	7.0	10.0	7.0	26	$655
130	50	PC34094P050	9.0	11.0	7.0	33	$725
160	60	PC34094P060	9.0	11.0	7.0	47	$905

230 V, 6% Impedance Open Style

Amps	HP	Model Number	Dimensions (in.)			Weight (lbs.)	List Price
			H	W	D		
3	0.75	PC34095P001	4.0	4.3	3.0	3	$220
6	1	PC34095P003	4.0	4.3	3.0	3	$260
8	2	PC34095P005	4.0	5.0	4.0	3	$260
12	3	PC34095P007	5.0	7.0	5.0	6	$280
16	5	PC34095P010	5.0	6.0	4.0	7	$310
25	7.5	PC34095P015	5.8	8.0	5.0	11	$325
35	10	PC34095P025	5.8	8.0	5.0	14	$350
55	15	PC34095P040	7.0	9.0	6.0	22	$500
80	20	PC34095P060	9.0	11.0	6.0	31	$600
110	40	PC34095P075	9.0	11.0	7.0	39	$800
130	50	PC34095P100	9.0	11.0	8.0	48	$900
160	60	PC34095P125	9.0	11.0	8.0	50	$1,100

Delivery: Three to five weeks.

Reactors & Filters
Line Reactors

460 V, 3% Impedance in A NEMA 1 Enclosure

Amps	HP	Model Number	Dimensions (in.)			Weight (lbs.)	List Price
			H	W	D		
3	1	PC34093P001	6.5	8.0	6.0	3	$265
4	2	PC34093P002	6.5	8.0	6.0	3	$265
6	3	PC34093P003	6.5	8.0	6.0	3	$300
12	7.5	PC34093P007	6.5	8.0	6.0	6	$310
16	10	PC34093P010	6.5	8.0	6.0	7	$365
18	10	101051	7.5	10.0	7.0	11	$420
25	15	PC34093P015	7.5	10.0	7.0	11	$465
35	20 to 25	PC34093P025	7.5	10.0	7.0	14	$495
45	30	PC34093P030	7.5	10.0	7.0	14	$550
55	40	PC34093P040	9.0	12.0	8.0	22	$660
80	50	PC34093P060	15.5	15.0	13.0	31	$880
110	60	PC34093P075	15.5	15.0	13.0	39	$1,100
130	75	PC34093P100	15.5	15.0	13.0	48	$1,180
160	100	PC34093P125	15.5	15.0	13.0	50	$1,375
200	125	PC34093P150	18.5	20.0	16.0	86	$1,585
250	150	PC34093P200	18.5	20.0	16.0	91	$1,905
300	200	101054	18.5	20.0	16.0	101	$2,090
360	250	PC34093P250	18.5	20.0	16.0	90	$2,200
420	300	PC34093P300	18.5	20.0	16.0	100	$2,365
480	350	PC34093P400	18.5	20.0	16.0	115	$2,575
600	400	PC34093P500	18.5	20.0	16.0	151	$3,080
750	500	101055	36.0	28.5	30.3	283	$4,840
850	700	101056	36.0	28.5	30.3	290	$5,280
950	800	101057	36.0	28.5	30.3	295	$5,830

Delivery: Three to five weeks.

Reactors & Filters
Line Reactors

460 V, 3% Impedance Open Style

Amps	HP	Model Number	Dimensions (in.)			Weight (lbs.)	List Price
			H	W	D		
3	1	PC34095P001	4.0	4.3	3.0	3	$220
4	2	PC34095P002	4.0	4.3	3.0	3	$220
6	3	PC34095P003	4.0	4.3	3.0	3	$260
8	5	PC34095P005	4.0	5.0	4.0	3	$260
12	7.5	PC34095P007	5.0	7.0	5.0	6	$280
16	10	PC34095P010	5.8	6.0	4.0	7	$310
25	15	PC34095P015	5.8	8.0	5.0	11	$325
35	20 to 25	PC34095P025	5.8	8.0	5.0	14	$350
45	30	PC34095P030	5.8	8.0	5.0	14	$450
55	40	PC34095P040	7.0	9.0	6.0	22	$500
80	50	PC34095P060	9.0	11.0	6.0	31	$600
110	60	PC34095P075	9.0	11.0	7.0	39	$800
130	75	PC34095P100	9.0	11.0	8.0	48	$900
160	100	PC34095P125	9.0	11.0	8.0	50	$1,100
200	125	PC34095P150	11.4	14.0	8.0	86	$1,200
250	150	PC34095P200	11.4	14.0	8.0	91	$1,600
300	200	PC34095P240	11.4	14.0	8.0	101	$1,800
360	250	PC34095P250	11.4	14.0	8.0	98	$1,900
420	300	PC34095P300	11.4	14.0	8.0	100	$2,000
480	350	PC34095P400	11.4	15.0	11.0	115	$2,300
600	400	PC34095P500	11.4	15.0	13.0	151	$2,750
750	500	CF	17.3	16.9	10.3	283	$4,200
850	700	CF	17.3	16.9	10.3	290	$4,700
950	800	CF	17.3	16.9	10.3	295	$5,300
Delivery: Three to five weeks.							

CF: Consult Factory.

Reactors & Filters
Line Reactors

460 V, 5% Impedance in NEMA 1 Enclosure

Amps	HP	Model Number	Dimensions (in.)			Weight (lbs.)	List Price
			H	W	D		
3	1	PC34096P001A	6.5	8.0	6.0	3	$270
4	2	PC34096P002	6.5	8.0	6.0	3	$270
6	3	PC34096P003	6.5	8.0	6.0	6	$330
12	7.5	PC34096P008	6.5	8.0	6.0	6	$375
16	10	PC34096P010	7.5	10.0	7.0	12	$495
18	10	101058	7.5	10.0	7.0	12	$505
25	15	PC34096P015	7.5	10.0	7.0	14	$515
35	20 to 25	PC34096P025	9.0	12.0	8.0	22	$685
45	30	PC34096P030	9.0	12.0	8.0	24	$750
55	40	PC34096P040	15.5	15.0	13.0	48	$1,130
80	50	PC34096P050	15.5	15.0	13.0	48	$1,130
110	60	PC34096P075	15.5	15.0	13.0	50	$1,265
130	75	PC34096P100	18.5	20.0	16.0	81	$1,485
160	100	PC34096P125	18.5	20.0	16.0	84	$1,650
200	125	PC34096P150	18.5	20.0	16.0	110	$1,870
250	150	PC34096P200	18.5	20.0	16.0	91	$2,380
300	200	PC34096P250	18.5	20.0	16.0	122	$2,555
360	250	PC34096P300	18.5	20.0	16.0	156	$2,750
420	300	101144	18.5	20.0	16.0	160	$3,080
480	350	PC34096P400	18.5	20.0	16.0	175	$3,740
600	400	101048	36.0	28.5	30.3	275	$4,425
750	500	PR00098P22	36.0	28.5	30.3	295	$5,325
850	700	101049	36.0	28.5	30.3	300	$5,900
950	800	101145	36.0	28.5	30.3	300	$6,700

Delivery: Three to five weeks.

Line Reactors

460 V, 5% Impedance Open Style

Amps	HP	Model Number	Dimensions (in.)			Weight (lbs.)	List Price
			H	W	D		
3	1	PC34097P001A	4.0	5.0	4.0	3	$240
4	2	PC34097P002	4.0	5.0	4.0	4	$240
6	3	PC34097P003	5.0	7.0	5.0	6	$290
8	5	PC34097P005	5.0	7.0	5.0	6	$290
12	7.5	PC34097P008	5.0	7.0	5.0	6	$330
16	10	PC34097P010	5.8	8.0	5.0	12	$375
25	15	PC34097P015	5.8	8.0	5.0	14	$385
35	20 to 25	PC34097P025	7.0	9.0	6.0	22	$520
45	30	PC34097P030	7.0	9.0	6.0	24	$590
55	40	PC34097P040	9.0	11.0	6.0	32	$625
80	50	PC34097P060	9.0	11.0	7.0	48	$850
110	60	PC34097P075	11.4	15.0	8.0	50	$1,000
130	75	PC34097P100	11.4	15.0	8.0	81	$1,200
160	100	PC34097P125	11.4	15.0	8.0	84	$1,350
200	125	PC34097P150	11.4	15.0	8.0	110	$1,650
250	150	PC34097P200	11.4	15.0	10.0	115	$2,200
300	200	PC34097P250	11.4	15.0	11.0	122	$2,350
360	250	PC34097P300	11.4	15.0	11.0	156	$2,500
420	300	CF	11.4	15.0	13.0	160	$2,700
480	350	PC34097P400	11.4	15.0	13.0	175	$3,500
600	400	PC34097P450	17,3	16.9	10.3	275	$3,750
750	500	PC34097P500	17,3	16.9	10.3	295	$4,300
850	700	PC3497P700	17,3	16.9	10.3	300	$5,325
950	800	CF	17,3	16.9	10.3	305	$6,000
Delivery: Three to five weeks.							

CF: Consult Factory.

Reactors & Filters
Line Reactors

575 V, 3% Impedance in NEMA 1 Enclosure

Amps	HP	Model Number	Dimensions (in.)			Weight (lbs.)	List Price
			H	W	D		
8	5	101115	6.5	8.0	6.0	7	$265
12	10	101116	6.5	8.0	6.0	7	$290
18	15	101118	7.5	10.0	7.0	12	$410
25	20	101120	7.5	10.0	7.0	12	$420
27	25	101121	7.5	10.0	7.0	12	$440
35	30	101122	7.5	10.0	7.0	16	$465
45	40	101123	9.0	12.0	8.0	26	$530
55	50	101124	9.0	12.0	8.0	24	$565
80	60	101125	15.5	15.0	13.0	49	$825
80	75	101125	15.5	15.0	13.0	49	$825
110	100	101126	15.5	15.0	13.0	49	$1,102
130	125	101127	15.5	15.0	13.0	47	$1,190
160	150	101128	15.5	15.0	13.0	47	$1,265
200	200	101129	18.5	20.0	16.0	86	$1,375
250	250	101130	18.5	20.0	16.0	91	$1,510

Line Reactors

575 V, 5% Impedance in NEMA 1 Enclosure

Amps	HP	Model Number	Dimensions (in.)			Weight (lbs.)	List Price
			H	W	D		
8	5	101094	6.5	8.0	6.0	7	$345
12	10	101095	7.5	10.0	7.0	8	$375
18	15	101097	7.5	10.0	7.0	12	$495
25	20	101099	9.0	12.0	8.0	17	$510
27	25	101100	9.0	12.0	8.0	17	$540
35	30	101101	9.0	12.0	8.0	23	$620
45	40	101102	15.5	15.0	13.0	26	$690
55	50	101103	15.5	15.0	13.0	33	$915
80	60	101104	15.5	15.0	13.0	49	$1,130
80	75	101104	15.5	15.0	13.0	49	$1,130
110	100	101105	18.5	20.0	16.0	53	$1,265
130	125	101106	18.5	20.0	16.0	88	$1,485
160	150	101107	18.5	20.0	16.0	95	$1,620
200	200	101108	18.5	20.0	16.0	110	$1,870
250	250	101109	18.5	20.0	16.0	115	$2,380
300	300	101110	18.5	20.0	16.0		$2,560
Delivery: Three to five weeks.							

Reactors & Filters
Line Reactors

575 V, 3% Impedance Open Style

Amps	HP	Model Number	Dimensions (in.)			Weight (lbs.)	List Price
			H	W	D		
8	5	Consult Factory					$265
12	10						$290
18	15						$410
25	20						$420
27	25						$440
35	30						$465
45	40						$530
55	50						$565
80	60						$825
80	75						$825
110	100						$1,102
130	125						$1,090
160	150						$1,265
200	200						$1,375
250	250						$1,510

575 V, 5% Impedance Open Style

Amps	HP	Model Number	Dimensions (in.)			Weight (lbs.)	List Price
			H	W	D		
8	5	Consult Factory					$345
12	10						$375
18	15						$495
25	20						$510
27	25						$540
35	30						$620
45	40						$690
55	50						$915
80	60						$1,130
80	75						$1,130
110	100						$1,265
130	125						$1,485
160	150						$1,620
200	200						$1,870
250	250						$2,380

Delivery: Three to five weeks.

Reactors & Filters
Line Reactors

Installed AC Line Reactors

Option Code	230 V Power Rating	460 V Power Rating	3% Impedance List Price	5% Impedance List Price
R3/R5	-	1 HP	$360	$385
	0.75-1 HP	2 HP	$385	$440
	-	3 HP	$415	$495
	2 HP	5 HP	$440	$550
	3 HP	7.5 HP	$550	$660
	5 HP	10 HP	$605	$715
	7.5 HP	15 HP	$660	$825
	10 HP	20 HP	$715	$935
	-	25 HP	$770	$990
	15 HP	30 HP	$825	$1,045
	20 HP	40 HP	$880	$1,250
	25 HP	50 HP	$1,100	$1,320
	30 HP	60 HP	$1,375	$1,650
	40 HP	75 HP	$1,485	$1,760
	50 HP	100 HP	$1,650	$1,925
	60 HP	125 HP	$1,925	$2,200
	75 HP	150 HP	$2,200	$2,750
	100 HP	200 HP	$2,750	$3,025
	125 HP	250 HP	$3,000	$3,575
	-	300 HP	$3,300	$3,850
	-	350 HP	$3,800	$4,950
	-	400 HP	$4,000	$5,500
	-	500 HP	$6,000	$6,500
	-	600 HP	$7,000	$7,500
	-	700 HP	$8,000	$9,000
	-	800 HP	$9,000	$10,000
	-	900 HP	$12,000	$13,500
	-	1000 HP	$13,200	$14,500
	-	1200 HP	$14,400	$16,000
	-	1400 HP	$16,800	$18,500
	-	1500 HP	$19,200	$21,500

Delivery: Add two weeks to basic assembly unit lead time.

Reactors & Filters
Long Lead Filters

Long lead filters are designed for applications with long motor leads between IGBT-switched adjustable speed drives. Typical installations include deep wells, process lines, conveyor systems. Refer to the Operating Maintenance Manual for guidelines.

Long lead filters are current-rated devices. Therefore, know the total motor load on the ASD for proper application. They are to be wired directly to the drive installed adjacent to the output terminals. Installing the filters anywhere else in the circuit will negatively affect performance.

For 230 V applications, refer to the FLA rating or double the HP for proper sizing. For instance, a 20 HP/230 V application would require a 40 HP/460 V long lead filter. Refer to your operation manual for instructions on how to change the carrier frequency and carrier frequency limitations.

460 V for Motor Lead-Lengths Up To 3000 ft. 8 kHz Maximum Carrier Frequency In a NEMA 1 Enclosure

FLA	HP	Model Number	Dimensions (in.)			Weight (lbs.)	List Price
			H	W	D		
4	1 to 2	PR00100P22	6.5	8.0	6.0	8	$730
6	3	PR00101P22	6.5	8.0	6.0	8	$750
8	5	PR00102P22	6.5	8.0	6.0	8	$775
12	7.5	PR00103P22	6.5	8.0	6.0	8	$795
16	10	PR00104P22	6.5	8.0	6.0	11	$805
25	15	PR00105P22	7.5	10.0	7.0	16	$870
35	20 to 25	PR00106P22	7.5	10.0	7.0	17	$895
45	30	PR00107P22	7.5	10.0	7.0	17	$915
55	40	PR00108P22	9.0	12.0	8.0	18	$1,005
80	50 to 60	PR00109P22	9.0	12.0	8.0	31	$1,290
110	75	PR00110P22	16	15.0	13.0	58	$1,760
130	100	PR00111P22	16	15.0	13.0	58	$1,925
160	125	PR00112P22	16	15.0	13.0	70	$2,145
200	150	PR00113P22	16	15.0	13.0	74	$2,230
250	200	PR00114P22	16	15.0	13.0	82	$2,255
300	250	PR00115P22	19	20.0	16.0	106	$2,420
360	300	PR00116P22	19	20.0	16.0	117	$2,695
480	350 to 400	PR00117P22	19	20.0	16.0	142	$3,850
600	450	PR00118P22	19	20.0	16.0	148	$4,400
750	500	CF	13	15	15	325	$10,500
Delivery: Three to five weeks.							

Notes:
- *Consult factory for installed pricing.*

CF: Consult Factory.

Long Lead Filters

Miscellaneous Options

Model Number	Description	List Price
PC25100P201	• 0 to 1 mA Input to 4 to 20 mA output isolation transducer • Mounts externally to ASD	$510
PC25100P203	• 3 to 15 PSI Input to 4 to 20 mA output transducer • Mounts externally to ASD	$580
PC25100P204	• 4 to 20 mA Input to 4 to 20 mA output isolation transducer • Mounts externally to ASD	$510
PC25100P205	• 0 to 3, 8, 10 VDC input to 4 to 20 mA output transducer • Mounts externally to ASD	$550
PC41270P001	• Speed pot, 10-Turn, 2.0 kW, 2 Watt	$220
101211	• Signal isolator module	$320
PC20011P805	• Socket base for signal isolator module	$8
Delivery: Stock to three weeks.		

Notes:
- *Consult factory for installed pricing.*

Medium Voltage Drives
T300MVi® ASD
Specifications

The T300MVi® medium voltage adjustable speed drive is the most advanced drive in the industry. No other drive in the market features the latest multi-level Pulse Width Modulation (PWM) with Neutral-Point Clamping (NPC) technology. This advanced technology allows for a smaller footprint, a reduced component count, and ultimately, a lower cost. In addition, it incorporates the latest safety technology, making it one of the safest designs on the market.

Product Scope

2400 V at 300 HP to 3000 HP
4160 V at 300 HP to 10,000 HP
6600 V at 300 HP to 7000 HP

Highlights

- Three Cables In, Three Cables Out
- 24-Pulse Harmonic Cancellation Complies with IEEE-519 1992
- Higher True Factor (0.96) than Running Motors Across-the-Line
- Small Footprint Through Compact Power Modules, Standard Copper-Wound Isolation Transformer, & Air-Cooling System
- Robust, High-Quality Medium Voltage IGBT Technology, Transistors, & Control Components
- Advanced Electronics to Reduce Component Count
- Additive Multi-Level PWM Output Voltage with No Neutral Shift
- Ten-Year Mean Time Between Failures

Standard Features

- 100% Continuous Overload Rating, 115% for 60 Seconds
- NEMA 1 Ventilated & IP20 Gasket & Filter Enclosure
- Eight Discrete Digital Input Terminals with Programmable Functions
- Six Available Digital Programmable Outputs
- Two Selectable Currents (0/4 to 20 mA) or Voltage (0 to 10 VDC) Input Signals
- Eight Selectable Currents (0/4 to 20 mA) or Voltage (0 to 10 VDC) Output Signals with Programmable Functions
- Medium Voltage IGBT Technology
- EOI: Plain-English LCD Display
- Ambient Temperature: 32° to 104° F (0° to 40°C)
- Altitude: Up to 1000 Meters without Derate
- Humidity: 95% Non-Condensing
- Standards & Compliances: NEC, NEMA, UL Listed in US & Canada, ANSI, & American Recovery & Reinvestment Act (ARRA) Compliant

Notes:
- *1000, 2000, & 6000 HP at 4160 V, Overload is 100%.*
- *Not UL Listed: >6000 HP at 4160 V; 300 to 3000 HP & 4500 to 7000 HP at 6600 V.*
- *36-Pulse: ≥7000 HP at 4160 V and ≥5000 HP at 6600 V.*

T300MVi® ASD - NEMA 1
Part Numbering Convention

The T300MVi® can be configured with commonly-used options for an easy-to-install, turn-key package. See the chart below for available configurations. Custom packages are available upon request. The T300MVi includes a ground lug and customer terminal block. Drawings supplied by Toshiba's MV Drives Department. The example, M32A44050SAA-HS, shows a standard duty second generation T300MVi, 500 HP, 4160 V input, 4160 V output with input disconnect, cooling fan power, and motor heater control.

Example Part Number:	M3 M32	A	X	4	4	050	S	AA/AE	HS

Series:
M3 — 1st Generation
M32 — 2nd Generation

Input Frequency:
A — 60 Hz
B — 50 Hz

Type:
BLANK — For 2400 V, 3300 V, & 4160 V drives under Frame 4
P — For G4P & H4P
S — For 6600 V drives
R — For Regen Module Drives

Input Voltage:
2 — 2400
3 — 3300
4 — 4160
A — 4800
6 — 6600
C — 6900
D — 8320
E — 12000
F — 12470
G — 13200
H — 13800
Z — OTHER

Output Voltage:
2 — 2400
3 — 3300
4 — 4160
6 — 6600
X — OTHER

Output Rated Capacity

030 — 300 HP	150 — 1500 HP	500 — 5000 HP
040 — 400 HP	175 — 1750 HP	550 — 5500 HP
050 — 500 HP	200 — 2000 HP	600 — 6000 HP
060 — 600 HP	225 — 2250 HP	700 — 7000 HP
070 — 700 HP	250 — 2500 HP	800 — 8000 HP
080 — 800 HP	300 — 3000 HP	900 — 9000 HP
090 — 900 HP	350 — 3500 HP	10K — 10000 HP
10E — 1000 HP	400 — 4000 HP	11K — 11000 HP
125 — 1250 HP	450 — 4500 HP	

Duty Rating:
S — Standard (115% OL Rating)

Configuration:	ID:	CP:	BYP:
AA —	X	X	
AB —	X		
AC —		X	
AD —			
AE —	X	X	X
AF —	X		X
AG —		X	X
AH —			X

ID — Input Disconnect
CP — Cooling Fan Power
BYP — Isolated Across-the-Line Starter

Additional Functions: Options should be entered in alphabetical order. If smart part number is longer than two options, replace all options with a "-1." List all options with descriptions for ease of understanding.

Notes:
- *1000 HP, 2000 HP, & 6000 HP has 110% OL rating.*

T300MVi® ASD
Pricing & Dimensions

T300MVi® — 2400 VAC Output

HP	FLA	Model Number	Frame	List Price		Dimensions (in.)				Weight (lbs.)	
						H	W		D		
				AA	AE		AA	AE		AA	AE
300	64	M32A22030S	A2	$223,000	$268,000	103.7	48	78	48	6,700	8,700
350	75	M32A22035S	A2	$230,000	$274,000	103.7	48	78	48	6,700	8,700
400	86	M32A22040S	A2	$231,000	$276,000	103.7	48	78	48	6,700	8,700
450	97	M32A22045S	A2	$234,000	$279,000	103.7	48	78	48	6,700	8,700
500	107	M32A22050S	A2	$227,000	$272,000	103.7	48	78	48	6,700	8,700
600	129	M32A22060S	B2	$262,000	$307,000	103.7	74	104	43.4	8,300	10,300
700	150	M32A22070S	B2	$263,000	$308,000	103.7	74	104	43.4	8,300	10,300
800	172	M32A22080S	B2	$271,000	$315,000	103.7	74	104	43.4	8,300	10,300
900	193	M32A22090S	B2	$276,000	$321,000	103.7	74	104	43.4	8,300	10,300
1000	215	M32A22100S	B2	$290,000	$334,000	103.7	74	104	43.4	8,300	10,300
1250	269	M32A22125S	D2	$363,000	$411,000	103.7	122	152	43.4	17,500	19,500
1500	322	M32A22150S	D2	$374,000	$422,000	103.7	122	152	43.4	17,500	19,500
1750	376	M32A22175S	D2	$399,000	$458,000	103.7	122	156	43.4	17,500	20,500
2000	430	M32A22200S	D2	$440,000	$499,000	103.7	122	156	43.4	17,500	20,500
2250	504	M3A22225S	4	$631,000	$700,000	103.7	222	258	49.5	33,000	36,000
2500	537	M3A22250S	4	$639,000	$709,000	103.7	222	258	49.5	33,000	36,000
3000	635	M3A22300S	4	$652,000	$721,000	103.7	222	258	49.5	33,000	36,000

Notes:
- *HP ratings above are for typical 4-pole motors.*
- *Dimensions do not include space required for clearance for airflow, door operation, etc.*
- *Bypass Starter pricing is based on fixed contactors (non draw-out type).*
- *Frames A2, B2, and D2 drives with redundant fan option will increase in height by 7”over the standard model.*
- *Weights and dimensions are subject to change.*

T300MVi® ASD
Pricing & Dimensions

T300MVi® — 3300 VAC Output

HP	FLA	Model Number	Frame	List Price		Dimensions (in.)					Weight (lbs.)	
						H	W		D			
				AA	AE		AA	AE	AA	AE	AA	AE
300	47	M32A33030S	A4µ	$295,000	$340,000	103.7	48	78	48	48	8,300	9,400
400	63	M32A33040S	A4µ	$300,000	$345,000	103.7	48	78	48	48	8,300	9,400
500	78	M32A33050S	A4	$303,000	$348,000	103.7	60	90	48	48	8,300	9,400
600	94	M32A33060S	A4	$304,000	$348,000	103.7	60	90	48	48	8,300	9,400
700	109	M32A33070S	A4	$323,000	$367,000	103.7	60	90	48	48	8,300	9,400
800	125	M3A33080S	1	$362,000	$410,000	103.7	122	152	43.4	43.4	12,500	13,600
900	141	M3A33090S	1	$362,000	$410,000	103.7	122	152	43.4	43.4	12,500	13,600
1000	156	M3A3310ES	1	$411,000	$459,000	103.7	122	152	43.4	43.4	12,500	13,600
1250	195	M3A33125S	1	$414,000	$462,000	103.7	122	152	43.4	43.4	12,500	13,600
1500	234	M3A33150S	1	$423,000	$471,000	103.7	122	152	43.4	43.4	12,500	13,600
1750	273	M3A33175S	2	$566,000	$614,000	103.7	164	194	49.5	49.5	16,500	17,600
2000	310	M3A33200S	2	$574,000	$622,000	103.7	164	194	49.5	49.5	16,500	17,600
2250	352	M3A33225S	3	$707,000	$766,000	103.7	174	210	49.5	49.5	22,500	25,300
2500	391	M3A33250S	3	$717,000	$776,000	103.7	174	210	49.5	49.5	22,500	25,300
3000	469	M3A33300S	4	$880,000	$949,000	103.7	222	258	49.5	49.5	30,000	32,800
3500	547	M3A33350S	4	$895,000	$964,000	103.7	222	258	49.5	49.5	30,000	32,800
4000	625	M3A33400S	4	$927,000	$996,000	103.7	222	258	49.5	49.5	30,000	32,800
4500	703	M3A33450S	4	$948,000	$1,020,000	103.7	222	273	49.5	49.5	30,000	32,800
5000	780	M3A33500S	G4P	$1,320,000	$1,590,000	103.7	307.5	379.5	60	84	44,500	56,500
5500	858	M3A33550S	G4P	$1,320,000	$1,590,000	103.7	307.5	379.5	60	84	44,500	56,500
6000	936	M3A33600S	H4P	$1,860,000	$2,130,000	103.7	402.5	474.5	60	84	69,500	81,500
7000	1092	M3AP33700S	H4P	$1,890,000	$2,170,000	103.7	402.5	474.5	60	84	69,500	81,500
8000	1240	M3AP33800S	H4P	$1,930,000	$2,200,000	103.7	402.5	474.5	60	84	69,500	81,500

Notes:
- *HP ratings above are for typical 4-pole motors.*
- *Dimensions do not include space required or clearance for airflow, door operation, etc.*
- *Bypass Starter pricing is based on fixed contactors (not rack-out type).*
- *Frame 1 drives with redundant fan option will increase in height by 7" over the standard model.*
- *Weights and dimensions are subject to change.*
- *Frame G4P — consult factory for update on UL status.*
- *Frame H4P — consult factory for update on UL status.*

T300MVi® ASD
Pricing & Dimensions

T300MVi® — 4160 VAC Output

HP	FLA	Model Number	Frame	List Price		Dimensions (in.)					Weight (lbs.)	
						H	W		D			
				AA	AE		AA	AE	AA	AE	AA	AE
300	37	M32A44030S	A4µ	$274,000	$318,000	103.7	48	78	48	48	8,300	9,400
400	50	M32A44040S	A4µ	$295,000	$340,000	103.7	48	78	48	48	8,300	9,400
500	62	M32A44050S	A4µ	$300,000	$345,000	103.7	48	78	48	48	8,300	9,400
600	74	M32A44060S	A4µ	$300,000	$345,000	103.7	48	78	48	48	8,300	9,400
700	87	M32A44070S	A4	$303,000	$348,000	103.7	60	90	48	48	8,300	9,400
800	99	M32A44080S	A4	$304,000	$349,000	103.7	60	90	48	48	8,300	9,400
900	112	M32A44090S	A4	$323,000	$367,000	103.7	60	90	48	48	8,300	9,400
1000	124	M32A4410ES	A4	$328,000	$372,000	103.7	60	90	48	48	8,300	9,400
1250	155	M3A44125S	1	$362,000	$410,000	103.7	122	152	43.4	43.4	12,500	13,600
1500	186	M3A44150S	1	$411,000	$459,000	103.7	122	152	43.4	43.4	12,500	13,600
1750	217	M3A44175S	1	$414,000	$462,000	103.7	122	152	43.4	43.4	12,500	13,600
2000	248	M3A44200S	1	$423,000	$471,000	103.7	122	152	43.4	43.4	12,500	13,600
2250	279	M3A44225S	2	$566,000	$614,000	103.7	164	194	49.5	49.5	16,500	17,600
2500	310	M3A44250S	2	$574,000	$622,000	103.7	164	194	49.5	49.5	16,500	17,600
3000	372	M3A44300S	3	$707,000	$766,000	103.7	174	210	49.5	49.5	22,500	25,300
3500	434	M3A44350S	3	$717,000	$776,000	103.7	174	210	49.5	49.5	22,500	25,300
4000	496	M3A44400S	4	$880,000	$949,000	103.7	222	258	49.5	49.5	30,000	32,800
4500	558	M3A44450S	4	$895,000	$964,000	103.7	222	258	49.5	49.5	30,000	32,800
5000	620	M3A44500S	4	$912,000	$981,000	103.7	222	258	49.5	49.5	30,000	32,800
5500	682	M3A44550S	4	$927,000	$996,000	103.7	222	258	49.5	49.5	30,000	32,800
6000	744	M3A44600S	4	$948,000	$1,020,000	103.7	222	258	49.5	49.5	30,000	32,800
7000	868	M3AP44700S	G4P	$1,320,000	$1,590,000	103.7	307.5	379.5	60	84	44,500	56,500
8000	992	M3AP44800S	H4P	$1,860,000	$2,130,000	103.7	402.5	474.5	60	84	69,500	81,500
9000	1,110	M3AP44900S	H4P	$1,890,000	$2,170,000	103.7	402.5	474.5	60	84	69,500	81,500
10,000	1,240	M3AP4410KS	H4P	$1,930,000	$2,200,000	103.7	402.5	474.5	60	84	69,500	81,500
11,000	1,364	M3AP4411KS	H4P	$1,970,000	$2,350,000	103.7	402.5	504.5	60	84	69,500	85,500

Notes:
- *HP ratings above are for typical 4-pole motors.*
- *Dimensions do not include space required or clearance for airflow, door operation, etc.*
- *Bypass Starter pricing is based on fixed contactors (not rack-out type).*
- *Frame 1 drives with redundant fan option will increase in height by 7”over the standard model.*
- *Weights and dimensions are subject to change.*
- *Frame G4P — consult factory for update on UL status.*
- *Frame H4P — consult factory for update on UL status.*
- *Bypass 7000 to 11,000 HP are breakers.*

T300MVi® ASD
Pricing & Dimensions

T300MVi® — 6600 VAC Output

HP	FLA	Model Number	Frame	List Price		Dimensions (in.)					Weight (lbs.)	
						H	W		D			
				AA	AE		AA	AE	AA	AE	AA	AE
300	23	M3AS66030S	A6Sμ	$383,600	$446,000	103.7	108	CF	48	CF	CF	CF
350	27	M3AS66035S	A6Sμ	$402,780	$465,780	103.7	108	CF	48	CF	CF	CF
400	31	M3AS66040S	A6Sμ	$413,000	$476,000	103.7	108	CF	48	CF	CF	CF
450	35	M3AS66045S	A6Sμ	$417,130	$480,130	103.7	108	CF	48	CF	CF	CF
500	39	M3AS66050S	A6Sμ	$420,000	$482,000	103.7	108	CF	48	CF	CF	CF
600	47	M3AS66060S	A6Sμ	$422,100	$483,000	103.7	108	CF	48	CF	CF	CF
700	55	M3AS66070S	A6Sμ	$424,200	$487,000	103.7	108	CF	48	CF	CF	CF
800	63	M3AS66080S	A6Sμ	$425,600	$488,000	103.7	108	CF	48	CF	CF	CF
900	70	M3AS66090S	A6S	$452,200	$514,000	103.7	138	CF	48	CF	CF	CF
1000	78	M3AS6601ES	A6S	$459,200	$521,000	103.7	138	CF	48	CF	CF	CF
1250	98	M3AS66125S	A6S	$506,800	$574,000	103.7	138	CF	48	CF	CF	CF
1500	117	M3AS66150S	A6S	$575,400	$643,000	103.7	138	CF	48	CF	CF	CF
1750	137	M3AS66175S	B6S	$579,600	$646,000	103.7	176	CF	48	CF	CF	CF
2000	156	M3AS66200S	B6S	$592,200	$659,000	103.7	176	CF	48	CF	CF	CF
2250	176	M3AS66225S	B6S	$792,400	$859,000	103.7	176	CF	48	CF	CF	CF
2500	195	M3AS66250S	B6S	$803,600	$870,000	103.7	176	CF	48	CF	CF	CF
3000	234	M3AS66300S	B6S	$989,800	$1,080,000	103.7	176	CF	48	CF	CF	CF
3500	273	M3AS66350S	C6S	$1,003,800	$1,090,000	103.7	234	CF	60	CF	CF	CF
4000	313	M3AS66400S	C6S	$1,232,000	$1,330,000	103.7	234	CF	60	CF	CF	CF
4500	352	M3AS66450S	D6S	$1,253,000	$1,350,000	103.7	265	CF	60	CF	CF	CF
5000	391	M3AS66500S	D6S	$1,276,800	$1,380,000	103.7	265	CF	60	CF	CF	CF
5500	430	M3AS66550S	F6S	$1,297,800	$1,400,000	103.7	304.5	CF	60	CF	CF	CF
6000	469	M3AS66600S	F6S	$1,327,200	$1,430,000	103.7	304.5	CF	60	CF	CF	CF
7000	547	M3AS66700S	F6S	$1,848,000	CF	103.7	304.5	CF	60	CF	CF	CF
9000	547	M3AS66900S	F6S+	$2,646,000	CF	103.7	378.5	CF	60	CF	CF	CF

Notes:
- *HP ratings above are for typical 4-pole motors.*
- *Dimensions do not include space required for clearance for airflow, door operation, etc.*
- *Weights and dimensions are subject to change.*
- *3500 and 4000 HP units are UL listed. For all other units, consult factory for updated UL status.*
- *CF: Consult Factory.*

50 Hz

For 50 Hz, add 15% to the list price. Consult factory for updates on UL status.

Example 1:
60 Hz: 4160 V Input and 4160 V Output: M32A44050S; 500 HP — list price: $300,000.
50 Hz: 4160 V Input and 4160 V Output: M32B44050S; 500 HP — list price: $300,000 plus 15% = $345,000.

6.9 kV to 13.8 kV Input

The HV input option gives users the ability to input 6.9 to 13.8 kV primary voltages directly to the drive transformer. In this option the short circuit rating is 40 kA. This option pricing is available only as a price adder to the -AA and -AB style units. Published standard dimensions will increase 74" or 26" on width based on the selection of HV equipment.

- 74" section includes fused input disconnect switch, input contactor, soft charge circuit and PTs. This arrangement mimics the standard -AA drive but with HV input.
- 26" section is comprised of a soft charge circuit without PTs. Input disconnects and fusing is supplied by the user. This arrangement mimics the -AD drive but with HV input. In this configuration, the customer is to provide 2 PTs in open delta configuration (120-0-120 V) for input voltage monitoring at ASD (100 VA) and also external power 120 V, single-phase, 60 Hz - rated at 1 kVA (Non UL listed; Short circuit is based on feeder and coordination by others).

Notes:
- *For Frames A2 and B2 on 2400 V and Frame A4μ and A4 on 3300 V and 4160 V: maximum allowed input voltage is 6600 V.*
- *No bypass is available with this feature.*
- *The price of the drive will increase by 10% to accommodate the HV windings.*
- *In case of HV Input: Frame A4μ and A4 ASD will be in Frame 1 ASD; Frame A2 or B2 ASD will be in Frame D2 ASD enclosure due to the increase in size of the transformer.*
- *For above mentioned frames, select ASD as below:*

MV Frame	MV Input Frame	Price
Frame A2	Frame D2	Use 1250 HP (Frame D2) price + selected HV input price
Frame B2	Frame D2	Use 1250 HP (Frame D2) price + selected HV input price
Frame A4μ & A4	Frame 1	Use 1250 HP (Frame 1) price + selected HV input price
Frame 1 to 4	No Change	Drive price x 110% + selected HV option price
Frame D2	No Change	Drive price x 110% + selected HV option price

T300MVi® ASD
Option Information & Pricing

Option Code	Frame Size	Description	Price
D through Z (see matrix)	Frames 1 to 4, B2, & D2	• Up to 15 kV input — includes fused input disconnect, input breaker, soft charge circuit, and PT (add 74" to width)	$85,700
	Frames G4P & H4P	• Up to 15 kV input — includes fused input disconnect, input breaker, soft charge circuit, and PTs (add 74" to width)	$97,800
	Frames 1 to 4, B2, & D2	• Up to 15 kV input without disconnect, load break switch or PTs (add 26" to width)	$26,800

Example 1: 500 HP, 13.8 kV input with 4160 V output. This is a Frame A4µ rating but will be housed in a Frame 1 (122") enclosure. Use the 1250 HP price of $362,000 and add the 74" section at $85,700. Total list price equals $447,700. Overall dimension will be 196" (122" + 74"). Part number will be M3AH125SAA.

Example 2: 2500 HP, 12.4 kV input with 4160 V output, load break switch is customer-supplied. This is a Frame 2 drive at 164". The 26" section has no PT, so control power is supplied from a separate power supply. The T300MVi® price is $574,000 plus 10%, which equals $631,400. The 26" section is $26,800, for a total list price of $658,200. Part number will be M3AF4205SAB.

Sync-Xfer

Sync-Xfer is an exciting technological feature of the T300MVi®. With Sync-Xfer, the T300MVi determines the utility line characteristics and transfers the motor supply power from variable speed to utility power via contactors. Additionally, it can pick up a motor from utility power and return it to variable speed.

Sync-Xfer can have a significant impact in lowering a system's cost in applications where multiple motors are controlled by one T300MVi and/or used for soft-starting duty only. Contact Toshiba's MV Drive Department for more details.

To price a Sync-Xfer option, you only need to add one output reactor per T300MVi and one contactor section for each motor. For 7000 to 10,000 HP, consult the factory.

Add one reactor per drive and one contactor section frame per motor.

Notes:
- *In case of Sync-Xfer line-up, only Sync-Xfer line-up shall be ordered as a separate line item.*

T300MVi® ASD
Option Information & Pricing

Option Code	Description	Price
SX	• Output reactor frame A4µ/A4/A2 • One per drive	$11,550
	• Contactor section frame A4µ/A4/A2 • Add 30” per section • One section per motor - Add one 15” cable pull section $15,000	$44,550
	• Output reactor frame 1/B2 • One per drive	$13,475
	• Contactor section frame 1/B2 • Add 30” per section • One section per motor - Add one 15” cable pull section $15,000	$48,000
	• Output reactor frame 2/D2 (1250-1500 HP)	$16,170
	• Contactor frame 2/D2 (1250-1500 HP) • Add 30” per motor • For multiple motors, select the required additional section from below	$48,000
	• For multiple sections (total bus current up to 1200 A) • Add 54” for power cable pull section (15”) + ASD feed LBS (24”) + ASD output pull section (15”)	$30,000
	• For multiple sections (total bus current > 1200 A, up to 3000 A) • Add 69” for power cable pull section (30”) + ASD feed LBS (24”) + ASD output pull section (15”)	$42,000
	• Output reactor frame 3/D2 (1750-2000HP)	$18,480
	• Contactor frame 3/D2 (1750-2000HP) • Add 36” per motor • For multiple motors, select the required additional section from below	$59,000
	• For multiple sections (total bus current up to 1200A) • Add 66” for power cable pull section (15”) + ASD feed LBS (36”) + ASD output pull section (15”)	$30,000
	• For multiple sections (total bus current > 1200 A, up to 3000 A) • Add 81” for power cable pull section (30”) + ASD feed LBS (36”) + ASD output pull section (15”)	$42,000
	• Output reactor frame 4 • Maximum output current allowed is 720 A	$23,100
	• Contactor frame 4 • Add 36” per motor • For multiple motors, select the required additional section from below	$69,220
	• For multiple sections (total bus current up to 1200 A) • Add 66” for power cable pull section (15”) + ASD feed LBS (36”) + ASD output pull section (15”)	$30,000

T300MVi® ASD
Option Information & Pricing

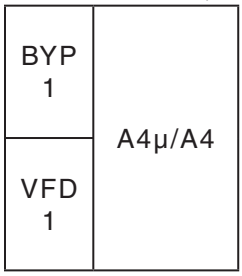
Option Code	Description	Price
SX	• For multiple sections (total bus current >1200 A, up to 3000 A) • Add 88” for power cable pull section (30”) + ASD feed LBS (36”) + ASD output pull section (15”)	$42,000
	• Output reactor frame G4P	CF
	• Bypass section for motors	CF
	• Output reactor frame H4P	CF
	• Bypass section for motors	CF
6600 V	• CF	CF

Notes:
- *In Sync-Xfer application, maximum bus current capacity is 3000 A.*
- *Sync-Xfer lineups can be configured differently to meet site requirements; please consult factory.*
- *Above details are given as a primary guideline, not for construction. If the dimensions are critical, please consult factory.*
- *Standard bus 1200 A; When bus rating is changed to 2000 A, input section changes from 15”to 36” wide with a price adder of $5,000 for input section. When bus rating is changed to 3000 A, line depth changes from 36”to 44” and input section changes from 15”to 36” wide with a price adder of $5,000 for input section.*
- *CF: Consult Factory.*

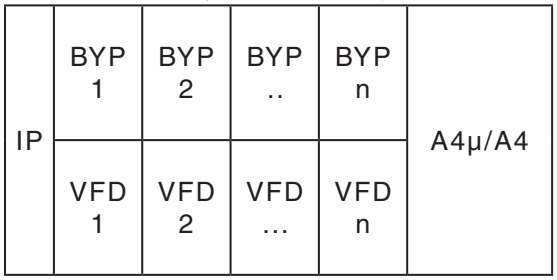
T300MVi® ASD
Option Information & Pricing

Typical Layout for Sync-Xfer

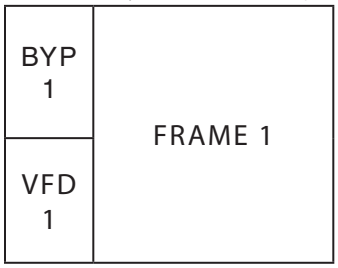
Frame A4μ/A4: Sync-Xfer arrangement for Single Motor



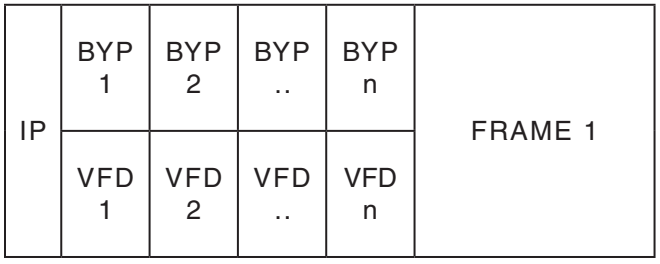
Frame A4μ/A4: Sync-Xfer arrangement for Multiple Motors (max. 3000 Amps)



Frame 1: Sync-Xfer arrangement for Single Motor



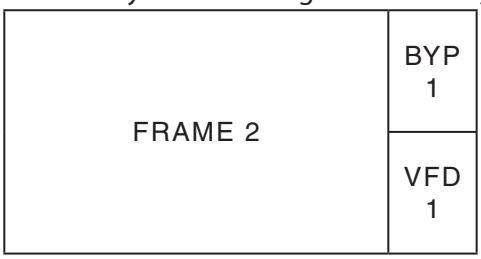
Frame 1: Sync-Xfer arrangement for Multiple Motors (max. 3000 Amps)



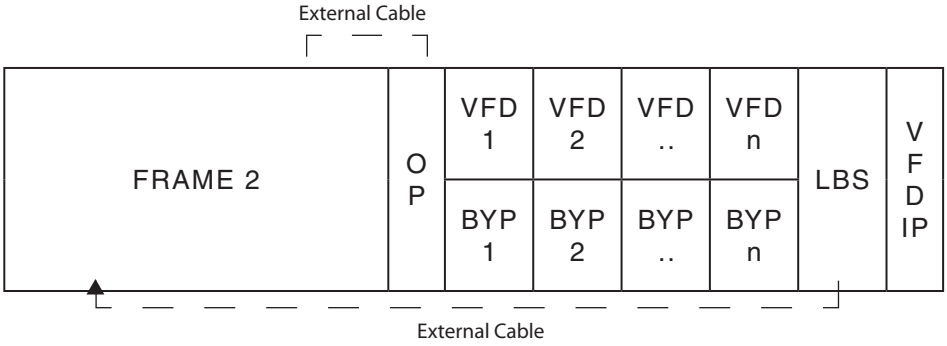
Notes:

- *Standard bus 1200 A; When bus rating is changed to 2000 A, input section changes from 15"to 36" wide with a price adder of $5,000 for input section. When bus rating is changed to 3000 A, line depth changes from 36"to 44" and input section changes from 15"to 36" wide with a price adder of $5,000 for input section.*

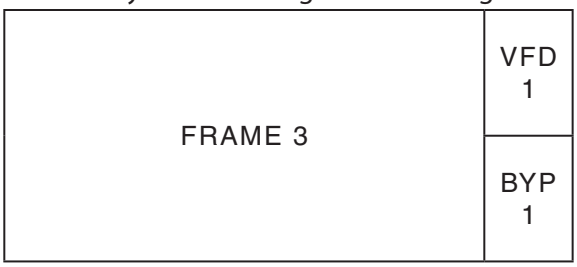
Frame 2: Sync-Xfer arrangement for Single Motor



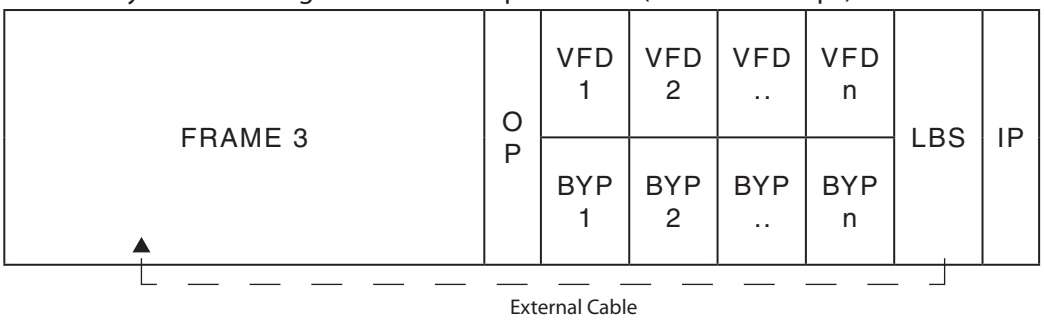
Frame 2: Sync-Xfer arrangement for Multiple Motors (max. 3000 Amps)



Frame 3: Sync-Xfer arrangement for Single Motor



Frame 3: Sync-Xfer arrangement for Multiple Motors (max 3000 Amps)



Notes:

- *Additional 15"cabinet may be needed for Frame 2; Consult factory before ordering.*
- *External cable by others.*
- *Standard bus 1200 A; When bus rating is changed to 2000 A, input section changes from 15"to 36" wide with a price adder of $5,000 for input section. When bus rating is changed to 3000 A, line depth changes from 36"to 44" and input section changes from 15"to 36" wide with a price adder of $5,000 for input section.*

T300MVi® ASD
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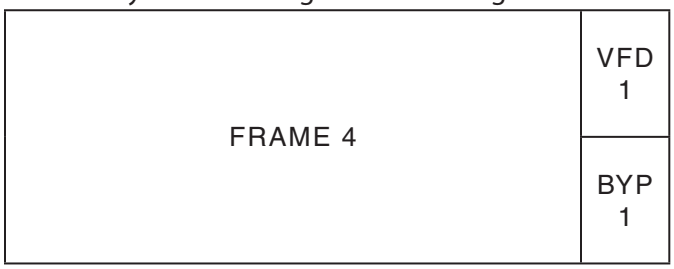
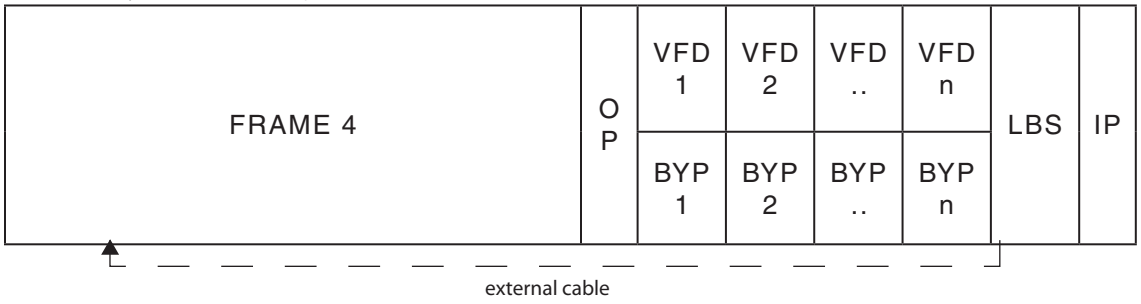
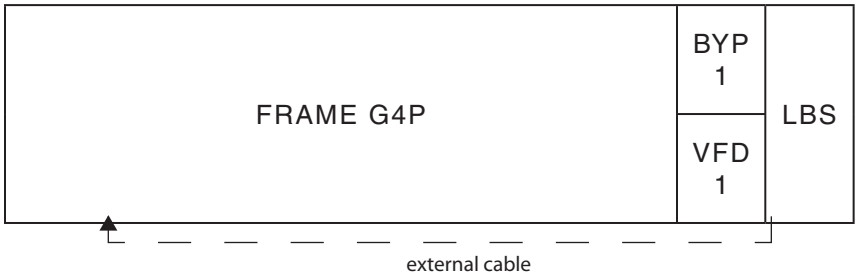
Frame 4: Sync-Xfer arrangements for Single Motor



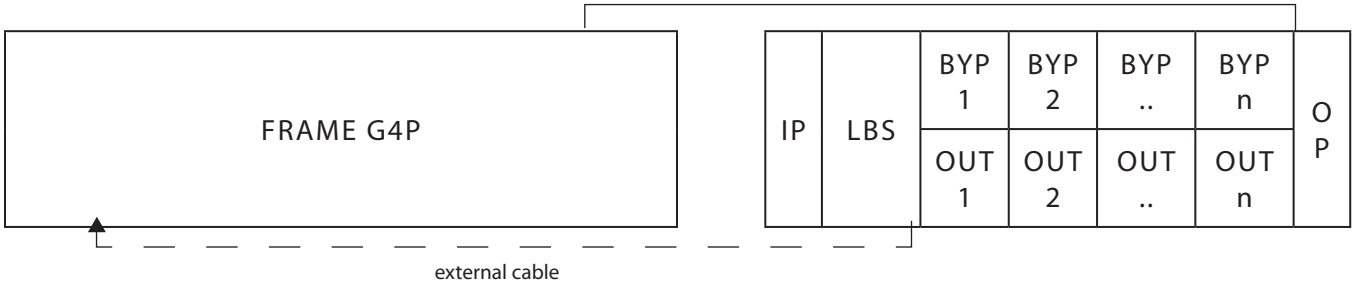
Frame 4: Sync-Xfer arrangement for Multiple Motors (max. 3000 Amps)



Frame G4P: Sync-Xfer arrangement for Single Motor



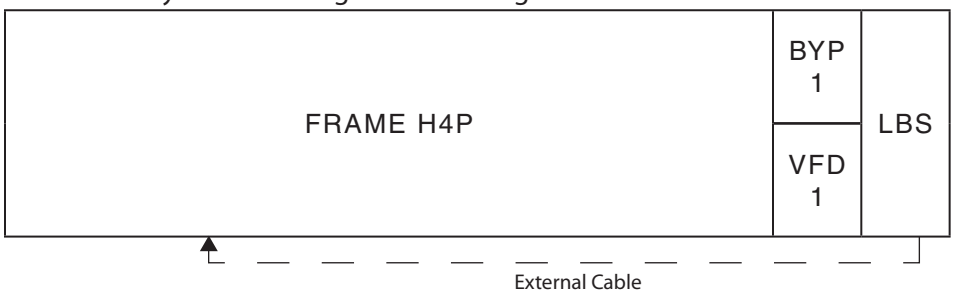
Frame G4P: Sync-Xfer arrangement for Multiple Motors (max. 3000 Amps)



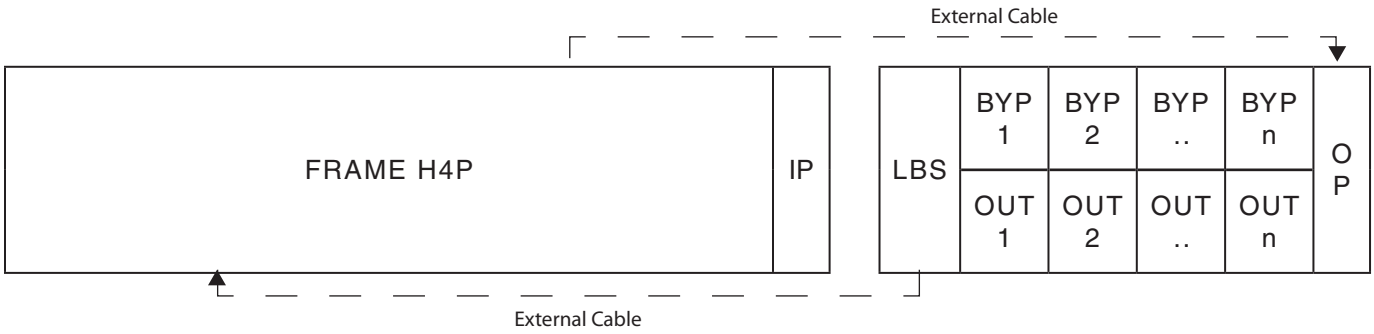
Notes:

- *External cable by others.*
- *Standard bus 1200 A; When bus rating is changed to 2000 A, input section changes from 15”to 36” wide with a price adder of $5,000 for input section. When bus rating is changed to 3000 A, line depth changes from 36”to 44” and input section changes from 15”to 36” wide with a price adder of $5,000 for input section.*

Frame H4P: Sync-Xfer arrangement for Single Motor



Frame H4P: Sync-Xfer arrangement for Multiple Motors (max. 3000 Amps)



Notes:

- *External cable by others.*
- *Standard bus 1200 A; When bus rating is changed to 2000 A, input section changes from 15”to 36” wide with a price adder of $5,000 for input section. When bus rating is changed to 3000 A, line depth changes from 36”to 44” and input section changes from 15”to 36” wide with a price adder of $5,000 for input section.*

T300MVi® ASD
Option Information & Pricing

Solid State Starter Bypass

The Toshiba JKSSS Plus Series digital, reduced-voltage, solid state starter is designed to be a superior method of providing soft-start control and protection for AC motors while in Bypass. Advantages include solid state construction, advanced motor protection, step-less acceleration, reduced inrush current, minimal maintenance, and high-duty cycle capability. Published dimensions will increase based on the size of additional equipment.

Option Code	Rating	Description	Price
BS	2400 V		
	300 to 450 HP	SSS Bypass — Adds 75" to Base Dimensions	$86,900
	500 to 900 HP		$96,200
	1000 to 1500 HP		$105,800
	1750 HP	SSS Bypass — Adds 123" to Base Dimensions	$129,200
	2000 to 2500 HP		$146,800
	3300 V		
	500 to 700 HP	SSS Bypass —Adds 75" to Base Dimensions	$91,000
	800 to 1500 HP		$97,500
	1750 to 2250 HP		$99,000
	2500 to 3500 HP	SSS Bypass —Adds 123" to Base Dimensions	$155,800
	4000 to 4500 HP		$163,600
	4160 V		
	500 to 900 HP	SSS Bypass — Adds 75" to Base Dimensions	$91,000
	1000 to 1750 HP		$97,500
	2000 to 2500 HP		$99,000
	3000 to 3500 HP	SSS Bypass — Adds 123" to Base Dimensions	$155,800
	4000 to 4500 HP		$163,600
	5000 to 6000 HP (max. 720 Amps)		$183,300

Notes:

- *In case of solid state starter bypass, only solid state starter shall be ordered as a separate line item.*

T300MVi® ASD
Option Information & Pricing

Reduced Voltage Auto-Transformer Bypass

The reduced voltage auto-transformer (RVAT) bypass provides the owner with a means of limiting the inrush current by reducing initial voltage supplied to the motor during starting, resulting in a mechanical soft-start. This option pricing is available only as a price adder to the AE style units. Published dimensions will increase based on the size of additional equipment.

Option Code	Rating	Description	Price
BT	300 to 800 HP, 2400 V 500 to 1750 HP, 4160 V	RVAT Bypass — Adds 72" to Base Dimensions	CF
	900 to 1750 HP, 2400 V 2000 to 3000 HP, 4160 V		CF
	2000 to 2500 HP, 2400 V 4000 to 5000 HP, 4160 V	RVAT Bypass — Adds 108" to Base Dimensions	CF

Notes:
- *Reduced voltage auto-transformer bypass shall be ordered as a separate line item.*
- *CF: Consult Factory.*

Output DV/DT Filters

An Output DV/DT Filter is recommended for lead-lengths of 1000 to 2000 ft.

Option Code	Size	Description	Price
DV	2400 V		
	Frame A2	Output DV/DT Filter	$10,500
	Frame B2		$11,500
	Frame D2 (1250 to 1500 HP)		$12,500
	Frame D2 (1750 to 2000 HP)		$14,000
	Frame 4		$18,000
	3300 V		
	Frame A4µ/A4	Output DV/DT Filter	$10,500
	Frame 1		$11,500
	Frame 2		$12,500
	Frame 3		$14,000
	Frame 4		$18,000
	4160 V		
	Frame A4µ/A4	Output DV/DT Filter	$10,500
	Frame 1		$11,500
	Frame 2		$12,500
	Frame 3		$14,000
	Frame 4		$18,000
	Frame G4P		$28,000
	Frame H4P		$36,000

T300MVi® ASD
Option Information & Pricing

Sinewave Output Filters

A sinewave output filter is recommended for lead-lengths of 2000 ft. to 6 miles. Sinewave output filters are recommended in applications where a step-up transformer is used on the output of the drive.

Option Code	Size	Description	Price
SW	3300 V		
	Frame A4µ/A4	Sinewave output filter	$15,000
	Frame 1		$29,000
	Frame 2		$57,000
	Frame 3		$83,000
	Frame 4		$109,000
	4160 V		
	Frame A4µ/A4	Sinewave output filter	$15,000
	Frame 1		$29,000
	Frame 2		$57,000
	Frame 3		$83,000
	Frame 4		$109,000
	Frame G4P		$127,000
	Frame H4P		$182,000

Notes:
- *The footprint of Frame A2 drive increases by 30".*
- *The footprint of Frame 2 drive increases by 42".*
- *The footprint of Frame 3 drive increases by 42".*
- *The footprint of Frame 4 drive increases by 60".*
- *The footprints of Frames G4P and H4P increase by 48" and 60" wide.*

Redundant Fans

The redundant fan option includes a Toshiba PLC for cycling fans at a set interval. A manual switch-over is possible via a door-mounted illuminated switch. Fans will cycle automatically upon fan failure without stopping the drive. A fan fault will be annunciated on the keypad.

Option Code	HP Range	Description	Price
FR	Frame A2 & B2	Redundant fans	$7,675
	Frame D2		$21,950
	Frame A4µ, A4 & 1		$7,675
	Frame 2 & 3		$21,950
	Frame 4		$32,775
	Frame G4P & H4P		$45,665
FRI	Manual Switch	Door-mounted illuminated switch	$1,000

Drive & Motor Space Heater

Option Code	HP Range	Description	Price
DH	Frame A2	Drive space heater internal 120 VAC power used	$2,200
	Frame B2		$3,200
	Frame D2		$4,400
	Frame A4µ, A4 & 1		$2,200
	Frame 2		$3,200
	Frame 3		$4,400
	Frame 4		$5,400
	Frame G4P & H4P		$8,500
HM	Power provided separately	Motor space heater control circuit — specify voltage; external power source @ 120 VAC	$900
HI	Power provided internally	Motor space heater control circuit — internal power source (500 W) maximum @ 120 VAC	$4,400
HIM	Power provided internally	Drive space heater + motor space heater	$12,000

Push-Buttons

Option Code	Description	Price
B1	IEC STYLE: Push-buttons/pilot lights	$300
BX	Miscellaneous push-button	CF

Notes:
- *Mounted on drive enclosure.*
- *CF: Consult Factory.*

T300MVi® ASD
Option Information & Pricing

Communication Interface

Option Code	Description	Price
C5	TOSLINE-S20LP communication card with FC connector (Tosline-S20 with F07 connector included on control board)	$2,533
CD	DeviceNet communication card — PC61910P080	$3,833
CF	Profibus communication card — 100066	$4,255
CR	Modbus RTU/Ethernet Communication Card — PC61910P079	$3,200

Keyed Door Interlocks

Keyed door interlocks (kirk-key style) provide a mechanical interlock between contactors, disconnects and doors for personnel, and/or equipment safety. One key is provided for each interlock function. Keyed door interlocks are automatically provided on Frames 2, 3, 4, G4P, and H4P drives between the fused input disconnect switch and the transformer door. This prevents opening the transformer door without removing power from the input.

Keyed door interlocks can have other functions. All T300MVi ASDs can have an interlock between the drive's power-modules and the input disconnect. Frames A2, B2, D2, 0, and 1 require two locks, while the others require three locks. Other examples of interlocks would be for a redundant drive system where there is an output contactor for each drive with a tie contactor in between. A three-lock arrangement with two keys is appropriate when manually isolating one drive.

Toshiba archives and documents all keys for installed locks and registers keys with the lock manufacturer, allowing for broken or bent keys to be replaced quickly. The end-user address is required.

Option Code	Rating	Description	Price
KK	One-lock	Keyed door interlocks	$1,400
	Three-lock		$2,800
	Four-lock		$4,400
	Five-lock		$5,400

T300MVi® ASD
Option Information & Pricing

Door-Mounted Equipment

Meters

Option Code	Description	Price
M1	• Output volt and amp meter package	$5,000
M3	• Multilin 369, 12-channel RTD monitor & OL • Includes CTs, PTs, & Grount CT	$22,000
M4	• Multilin 469, 12-channel RTD monitor & OL • Includes CTs, PTs, & Ground CT	$22,000
MA	• Output Amp Meter • Using drive analog output	$400
ME	• Elapsed time meter	$400
MF	• Output frequency meter • Using drive analog output	$400
MV	• Output volt meter • Using drive analog output	$1,000
MX	• Miscellaneous meter • Specify function	CF
MQ	• Multilin PQM (Power Quality Meter) measures the following: kW, kVA, Power Factor, MWHr, kW Demand, kVA Demand, kVAR Demand, Amps Demand	$17,800
RT	• Door-mounted TIC-TPR6-14 relay — IEC (RTD monitor)	$4,400

Pilot Lights

Option Code	Description	Price
PA	IEC STYLE: Pilot Light for ASD Mode Indication	$300
PB	IEC STYLE: Pilot Light for Bypass Mode Indication	$300
PF	IEC STYLE: Pilot Light for Fault Indication (Amber)	$300
PG	IEC STYLE: Pilot Light for Stop Indication (Green)	$300
PP	IEC STYLE: Pilot Light for Power On Indication (White)	$300
PR	IEC STYLE: Pilot Light for Run Indication (Red)	$300
PX	Miscellaneous Pilot Light — Specify Function	CF

Speed Potentiometer & Switches

Option Code	Description	Price
S1	Speed Control Potentiometer	$450
S2	Speed Control Potentiometer with Local/Remote Switch	$650

CF: Consult Factory.

T300MVi® ASD
Option Information & Pricing

Software

Option Code	Description	Price
CF	MVI-Tool — Windows-Based Programming and Diagnostics Software — includes Cable	$6,070

Miscellaneous Options

Option Code	Description	Price
RX	Relay Outputs 115V, 2A, Form-C	$450
SP	24 VDC Power Supply 1-Amp Output Maximum	$780
X1	4 to 20 mA Isolation Transducer (Two Analog Inputs and Two Analog Outputs Available)	$1,440
CN	120 V Control Isolation (Eight Inputs Available)	$1,200

T300MVi® ASD
Spare Parts Kits

Toshiba recommends a separate line item on the purchase order for spare parts on the drives purchase order. Spare Parts Kits provide an easy and practical way to acquire the proper spare parts to handle most emergencies. Spare Parts Kits contain one of each circuit board, one low voltage power supply, rectifier fuses, diodes, one set of control power fuses, four potential transformer fuses, three input fuses, and truck (Frame 2, 3, 4, G4P, H4P) when required.

Spare Parts Kits can be ordered with or without a power module. To order a Spare Parts Kits, please use the following numbering convention:

Example Part Number:	M3 M32	A	4	4	050	-1
Series: M3 — 1st Generation M32 — 2nd Generation						
Input Frequency: A — 60 Hz B — 50 Hz						
Input Voltage: 2 — 2400 3 — 3300 4 — 4160 A — 4800 6 — 6600						
Output Voltage: 2 — 2400 3 — 3300 4 — 4160						
4160V Output: 030 — 300 HP 040 — 400 HP 050 — 500 HP 060 — 600 HP 070 — 700 HP 080 — 800 HP 090 — 900 HP 100 — 1000 HP 10E — 1000 HP 125 — 1250 HP 150 — 1500 HP 175 — 1750 HP 200 — 2000 HP 225 — 2250 HP 250 — 2500 HP 300 — 3000 HP 350 — 3500 HP 400 — 4000 HP 450 — 4500 HP 500 — 5000 HP 550 — 5500 HP 600 — 6000 HP 700 — 7000 HP 800 — 8000 HP 900 — 9000 HP 10K — 10000 HP						
Power Module: -1 (Included)						

T300MVi® ASD
Spare Part Kits

Input fuses will change as HP changes. Spare Parts Kits contain:

Item	2400 V Qty.	4160 V Qty.	Description	Part Number
1	1	1	GSD Board	HP-Specific
2	1	1	Control Board	PC61910P081M
3	1	1	XIO Board	PC61910P082C
4	1	1	Keypad	PC61910P116
5	1	1	I/F Board	PC61910P114A
6	1	1	Power Supply	GCI6720G282
7	1	1	GDI Board	PC61910P085A
8	1	1	PDM Board	PC61910P107A
9	1	1	Fan	PC50050P302
10	4	4	CPT Fuse	PC16109P902
11	3	3	Input Fuse	HP-Specific
12	6	18	Rectifier Fuse	HP-Specific
13	4	12	Diode Pack	HP-Specific
14	1	1	PM Lifting Mechanism	PM Lifting Mech (Frame 0 and 1)
15	1	1	PM Ramp	PM Ramp (Frames 2 to 4)
16	1	1	PM Truck	PM Truck (Frames 2 to 4)
17	1	1	PW, Tex Board	PC61910P123A
1	1	1	Power Module	HP-Specific

Notes:
- *Power Tex Board part of 7000 to 10,000 HP Spare Parts Kit Only.*
- *CPT Fuse up to 6000 HP Spare Parts Kit Only.*

T300MVi® ASD
Spare Parts Kits Pricing

Part Number	Price	Part Number	Price
M32A22030 to M3A22050	$18,499	M3A22030-1 to M3A22050-1	$30,901
M32A22060 to M3A22100	$20,142	M3A22060-1 to M3A22100-1	$36,315
M32A22125 to M3A22175	$23,049	M3A22125-1 to M3A22175-1	$46,431
M3A22225 to M3A22300	$28,926	M3A22200-1 to M3A22300-1	$109,075
M32A44030 to M32A44060	$21,046	M32A44030-1 to M32A44060-1	$52,848
M32A44070 to M32A4410E	$21,046	M32A44070-1 to M32A4410E-1	$53,848
M3A44125 to M3A44200	$24,394	M3A44125-1 to M3A44200-1	$70,764
M3A44225 to M3A44250	$30,946	M3A44225-1 to M3A44250-1	$98,095
M3A44300 to M3A44350	$32,526	M3A44300-1 to M3A44350-1	$125,275
M3A44400 to M3A44600	$36,495	M3A44400-1 to M3A44600-1	$154,296
M3AP44700	$31,662	M3AP44700-1	$217,161
M3AP44800 to M3AP4410K	$36,355	M3AP44800-1 to M3AP4410M-1	$271,957
M3AS66175 to M3AS66300	$31,491	M3AS66175-1 to M3AS66300-1	$100,921
M3AS66350 to M3AS66400	$79,825	M3AS66350-1 to M3AS66400-1	$179,716
M3AS66450 to M3AS66500	$80,892	M3AS66450-1 to M3AS66500-1	$223,776
M3AS66550 to M3AS66700	$92,542	M3AS66550-1 to M3AS66700-1	$269,491
M3AS66800 to M3AS66900	$92,542	M3AS66800-1 to M3AS66900-1	$269,491
M3B33030 to M3B33070	$21,937	M3B33030-1 to M3B33070-1	$53,136
M3B33080 to M3B33150	$24,327	M3B33080-1 to M3B33150-1	$70,677
M3B33175 to M3B33200	$30,946	M3B33175-1 to M3B33200-1	$98,095
M3B33225 to M3B33250	$31,473	M3B33225-1 to M3B33250-1	$124,222
M3B33300 to M3B33450	$36,819	M3B33300-1 to M3B33450-1	$154,620

Notes:
- *Prices valid when ordered along with drive.*
- *Parallel configuration contains two power modules in the kit (M3APXXX).*

T300MVi® ASD
Heat Loss Data (Standard Duty Drive)

The T300MVi medium voltage drive utilizes IGBT technology to create a synthetic AC waveform to power standard 2400 and 4160 V motors. This waveform has inherent losses associated with it that must be accommodated. In the T300MVi, you can reasonably expect to see a 2% heat rejection to atmosphere @ 2400 V, and 3.5% heat rejection to atmosphere @ 4160 V. See the table below for typical heat losses in the T300MVi at full load. Expect losses to be linear with load.

Voltage	Basic Model	Motor HP	Motor kW	Output kVA	Losses	
					kW	BTU
2400	M32A22030S	300	233	268	8.1	27,551
	M32A22035S	350	272	313	9.4	31,919
	M32A22040S	400	311	357	10.7	36,623
	M32A22045S	450	350	402	12.1	41,327
	M32A22050S	500	389	447	13.4	45,695
	,M32A22060S	600	466	536	16.1	54,767
	M32A22070S	700	544	625	18.7	63,838
	M32A22080S	800	622	715	21.5	73,246
	M32A22090S	900	699	804	24.1	82,318
	M32A22100S	1000	777	893	26.8	91,390
	M32A22125S	1250	971	1116	33.5	114,237
	M32A22150S	1500	1166	1340	40.2	137,085
	M32A22175S	1750	1360	1563	46.9	159,932
	M32A22200S	2000	1554	1786	53.6	182,780
	M32A22225S	2250	1748	2010	60.3	205,627
	M32A22250S	2500	1943	2233	67.0	228,475
	M32A22300S	3000	2331	2680	80.4	274,169

T300MVi® ASD
Heat Loss Data
(Standard Duty Drive)

Voltage	Basic Model	Motor HP	Motor kW	Output kVA	Losses	
					kW	BTU
4160	M32A44030S	300	233	268	8.2	27,849
	M32A44035S	350	272	313	9.5	32,511
	M32A44040S	400	311	357	10.9	37,172
	M32A44045S	450	350	402	12.3	41,834
	M32A44050S	500	389	447	13.6	46,495
	M32A44060S	600	466	536	16.3	55,699
	M3A44070S	700	544	625	19.0	65,022
	M3A44080S	800	622	715	21.8	74,345
	M3A44090S	900	699	804	24.5	83,548
	M3A44100S	1000	777	893	27.2	92,871
	M3A44125S	1250	971	1116	34.0	116,059
	M3A44150S	1500	1166	1340	40.8	139,366
	M3A44175S	1750	1360	1563	47.6	162,554
	M3A44200S	2000	1554	1786	54.4	185,742
	M3A44225S	2250	1748	2010	61.2	208,930
	M3A44250S	2500	1943	2233	68.0	232,237
	M3A44300S	3000	2331	2680	81.6	278,613
	M3A44350S	3500	2720	3126	95.2	325,108
	M3A44400S	4000	3108	3573	108.8	371,484
	M3A44450S	4500	3497	4019	122.4	417,979
	M3A44500S	5000	3885	4466	136.0	464,355
	M3A44550S	5500	4274	4913	149.6	510,850
	M3A444600S	6000	4662	5359	163.2	557,226
	M3AP44700S	7000	5439	6252	190.4	650,096
	M3AP44800S	8000	6216	7145	217.6	742,967
	M3AP44900S	9000	6993	8038	244.8	835,838
	M3AP4410KS	10000	7770	8931	272.0	928,709

Regen ASD
Specifications

The Regen medium voltage adjustable speed drive is a 100% regenerative drive that can be configured with commonly-used options for an easy-to-install, turn-key package. The standard T300MVi® adjustable speed drive is only capable of two quadrant operation. When the T300MVi is configured with the Regen module, it is equipped with an active front end. Consult the factory for technical details.

Please note: Existing T300MVi drives cannot be retrofitted to add the regenerative capability.

Product Scope

4160 V at 300 HP to 6000 HP
6600 V at 300 HP to 7000 HP

Highlights

- 100% Regeneration
- Three Cables In, Three Cables Out
- Isolation Transformer
- Multi-Level PWM Output
- Five-Cycle Ride Through
- Auto-Restart
- Higher True Factor (0.96) than Running Motors Across-the-Line
- Small Footprint Through Compact Power Modules, Standard Copper-Wound Isolation Transformer, & Air-Cooling System
- Advanced Electronics to Reduce Component Count
- Ten-Year Mean Time Between Failures

Standard Features

- 100% Continuous Overload Rating, 15% for 60 Seconds
- NEMA 1 Ventilated & IP20 Gasket & Filter Enclosure
- Eight 24 VDC Digital Inputs
- Six 24 VDC Digital Outputs
- EOI: Plain-English LCD Display
- Standards & Compliances: American Recovery & Reinvestment Act (ARRA), IEC, NEMA, & ANSI

ARRA COMPLIANT

Regen ASD
Part Numbering Convention

The Regen can be configured with commonly-used options for an easy-to-install, turn-key package. See the chart below for available configurations. Custom packages are available upon request. The Regen includes a ground lug and customer terminal block. Drawings supplied by Toshiba's MV Drive Department. The example, M3AR44050SAAHS, shows a standard duty Regen, 500 HP, 4160 V input, 4160 V output with Input disconnect, cooling fan power, and motor heater control.

Example Part Number:	M32AR	A	X	4	4	050	S	AA/AE	HS

Series:
M32AR — Regeneration

Input Frequency:
A — 60 Hz
B — 50 Hz

Type:
BLANK — for 2400 V, 3300 V, and 4160 V drives under Frame 4
P — for G4P and H4P
S — for 6600 V drives
R — for Regen module drives

Input Voltage:

2 —	6 — 6600	F — 12470
3 — 3300	C — 6900	G — 13200
4 — 4160	D — 8320	H — 13800
A — 4800	E — 12000	Z — OTHER

Output Voltage:

3 — 3300	4 — 4160	X — OTHER
	6 — 6600	

Output Rated Capacity

030 — 300 HP	10E — 1000 HP	300 — 3000 HP
040 — 400 HP	125 — 1250 HP	350 — 3500 HP
050 — 500 HP	150 — 1500 HP	400 — 4000 HP
060 — 600 HP	175 — 1750 HP	450 — 4500 HP
070 — 700 HP	200 — 2000 HP	500 — 5000 HP
080 — 800 HP	225 — 2250 HP	550 — 5500 HP
090 — 900 HP	250 — 2500 HP	600 — 6000 HP

Duty Rating:
S — Standard (115% OL rating)

Configuration:	ID:	CP:	BYP:
AA —	X	X	
AB —	X		
AC —		X	
AD —			
AE —		X	X
AF —	X		X
AG —	X	X	X
AH —			X

ID — Input disconnect
CP — Cooling fan power
BYP — Isolated across-the-line starter

Additional Function:
- Options should be entered in alphabetical order.
- If the smart part number is longer than two options, replace all options with a "-1."
- List all options with descriptions for ease of understanding.

Notes:
- *1000 HP, 2000 HP, and 6000 HP has 110% OL rating.*

Regen ASD
Pricing & Dimensions

3300 VAC Output

HP	FLA	Model Number	Frame	List Price		Dimensions (in.)				Weight (lbs.)	
						H	W		D		
				AA	AE		AA	AE		AA	AE
300	47	M32AR33030	A4R	$413,000	$476,000	103.7	96	126	43.4	11,500	12,600
400	63	M32AR33040	A4R	$420,000	$483,000	103.7	96	126	43.4	11,500	12,600
500	78	M32AR33050	A4R	$424,000	$487,000	103.7	96	126	43.4	11,500	12,600
600	94	M32AR33060	A4R	$425,000	$487,000	103.7	96	126	43.4	11,500	12,600
700	109	M32AR33070	A4R	$452,000	$514,000	103.7	96	126	43.4	11,500	12,600
800	125	M32AR33080	CF	$506,000	$574,000	CF	CF	CF	CF	17,000	18,100
900	141	M32AR33090	CF	$506,000	$574,000	CF	CF	CF	CF	17,000	18,100
1000	156	M32AR3310E	CF	$576,000	$643,000	CF	CF	CF	CF	17,000	18,100
1250	195	M32AR33125	CF	$579,000	$646,000	CF	CF	CF	CF	17,000	18,100
1500	234	M32AR33150	CF	$592,000	$659,000	CF	CF	CF	CF	17,000	18,100
1750	273	M32AR33175	CF	$792,000	$859,000	CF	CF	CF	CF	24,000	25,100
2000	310	M32AR33200	CF	$803,000	$870,000	CF	CF	CF	CF	24,000	25,100
2250	352	M32AR33225	CF	$989,000	$1,080,000	CF	CF	CF	CF	30,000	32,800
2500	391	M32AR33250	CF	$1,010,000	$1,090,000	CF	CF	CF	CF	30,000	32,800
3000	469	M32AR33300	CF	$1,240,000	$1,330,000	CF	CF	CF	CF	44,000	46,800
3500	547	M32AR33350	CF	$1,260,000	$1,350,000	CF	CF	CF	CF	44,000	46,800
4000	625	M32AR33400	CF	$1,300,000	$1,400,000	CF	CF	CF	CF	44,000	46,800
4500	703	M32AR33450	CF	$1,330,000	$1,430,000	CF	CF	CF	CF	44,000	46,800

Notes:
- *Consult factory for update on UL status.*
- *Frame A2, B2, D2, 0, and 1 drives with redundant fan option will increase in height by 7" over the standard model.*
- *CF: Consult Factory.*
- *HP rating is based on typical 4-pole motor. Always use motor FLA rating to size drives. Consult factory for pricing.*
- *Bypass Starter pricing is based on fixed contactors (not rack-out type).*
- *Dimensions are estimate only, please consult factory.*

Regen ASD
Pricing & Dimensions

4160 VAC Output

HP	FLA	Model Number	Frame	List Price		Dimensions (in.)				Weight (lbs.)	
						H	W		D		
				AA	AE		AA	AE		AA	AE
300	37	M32AR44030	A4R	$383,000	$446,000	103.7	96	126	48	11,500	12,600
400	50	M32AR44040	A4R	$413,000	$476,000	103.7	96	126	48	11,500	12,600
500	62	M32AR44050	A4R	$420,000	$482,000	103.7	96	126	48	11,500	12,600
600	74	M32AR44060	A4R	$420,000	$483,000	103.7	96	126	48	11,500	12,600
700	87	M32AR44070	A4R	$424,000	$487,000	103.7	96	126	48	11,500	12,600
800	99	M32AR44080	A4R	$425,000	$488,000	103.7	96	126	48	11,500	12,600
900	112	M32AR44090	A4R	$452,000	$514,000	103.7	96	126	48	11,500	12,600
1000	124	M32AR4410E	A4R	$459,000	$521,000	103.7	96	126	48	11,500	12,600
1250	155	M32AR44125	CF	$506,000	$574,000	103.7	176	CF	CF	17,000	18,100
1500	186	M32AR44150	CF	$576,000	$643,000	103.7	176	CF	CF	17,000	18,100
1750	217	M32AR44175	CF	$579,000	$646,000	103.7	176	CF	CF	17,000	18,100
2000	248	M32AR44200	CF	$592,000	$659,000	103.7	176	CF	CF	17,000	18,100
2250	279	M32AR44225	CF	$792,000	$859,000	103.7	234	CF	CF	24,000	25,100
2500	310	M32AR44250	CF	$803,000	$870,000	103.7	234	CF	CF	24,000	25,100
3000	372	M32AR44300	CF	$989,000	$1,080,000	103.7	265	CF	CF	30,000	32,800
3500	434	M32AR44350	CF	$1,010,000	$1,090,000	103.7	265	CF	CF	30,000	32,800
4000	496	M32AR44400	CF	$1,240,000	$1,330,000	103.7	304.5	CF	CF	44,000	46,800
4500	558	M32AR44450	CF	$1,260,000	$1,350,000	103.7	304.5	CF	CF	44,000	46,800
5000	620	M32AR44500	CF	$1,280,000	$1,380,000	103.7	304.5	CF	CF	44,000	46,800
5500	682	M32AR44550	CF	$1,300,000	$1,400,000	103.7	304.5	CF	CF	44,000	46,800
6000	744	M32AR44600	CF	$1,330,000	$1,430,000	103.7	304.5	CF	CF	44,000	46,800

Notes:
- *Consult factory for update on UL status.*
- *Frame A2, B2, D2, 0, and 1 drives with redundant fan option will increase in height by 7" over the standard model.*
- *HP rating is based on typical 4-pole motor. Always use motor FLA rating to size drives. Consult factory for pricing.*
- *Bypass Starter pricing is based on fixed contactors (not rack-out type).*
- *Dimensions are estimates only, please consult factory.*
- *1000 HP, 2000 HP, and 6000 HP has 110% OL rating.*
- *CF: Consult Factory.*

MTX® NEMA 3R ASD
Specifications

The MTX® NEMA 3R outdoor medium voltage adjustable speed drive is one of the most innovative adjustable speed drive offerings to date. Featuring an advanced enclosure design and power section topology, the MTX is the world's first and only drive specifically designed for outdoor mounting in remote applications or applications where a building does not exist. From the jungle to the desert, the MTX can be mounted virtually anywhere, eliminating the need to find suitable indoor floor space.

Product Scope

4160 V at 500 HP to 3000 HP

Highlights

- Outdoor Enclosure Design
- Three Cables In, Three Cables Out
- Distribution-Quality Lightening Arrestors as Standard
- 36-Pulse Harmonic Cancellation Complies with IEEE-519 1992
- Higher True Factor (0.96) than Running Motors Across-the-Line
- Provides Easy Monitoring & Maintenance through Advanced User Interface Design
- UL-Rated Rainproof (NEMA 3R) Enclosure
- Lowers Cost of Ownership from Rated Full-Load Operation at -25°C to 50°C
- Allows for Standard Motors to be Used in Conjunction with Drive Without Special Motor Insulation

Standard Features

- 100% Continuous Overload Rating, 115% for 60 Seconds
- NEMA 3R Enclosure
- Eight Discrete Digital Input Terminals with Programmable Functions
- Six Available Digital Programmable Outputs
- Two Selectable Currents (0/4 to 20 mA) or Voltage (0 to 10 VDC) Input Signals
- Eight Selectable Currents (0/4 to 20 mA) or Voltage (0 to 10 VDC) Output Signals with Programmable Functions
- Medium Voltage IGBT Technology
- EOI: Plain-English LCD Display
- Ambient Temperature: -13° to 122°F (-25° to 50°C)
- Altitude: Up to 1000 Meters without Derate (4500 Meter Option Available)
- Humidity: 95% Non-Condensing
- Standards & Compliances: NEC, NEMA, UL Listed in US & Canada, ANSI, & American Recovery & Reinvestment Act (ARRA) Compliant

MTX® NEMA 3R ASD
Part Numbering Convention

The MTX can be configured with commonly-used options for an easy-to-install, turn-key package. See the chart below for available configurations. Custom packages are available upon request. The MTX includes ground lug and customer terminal block. Drawings supplied by Toshiba's MV Drives Department.

The example below, MTX44050SAAHS, shows a standard duty MTX, 500 HP, 4160 V input, 4160 V output with input disconnect, cooling fan power, and motor heat control.

Example Part Number:	MTX	A	4	4	050	S	AA	HS
Series: MTX®								
Input Frequency: A — 60 Hz B — 50 Hz								
Input Voltage: 2 — 2400 3 — 3300 4 — 4160 A — 4800 6 — 6600 C — 6900	D — 8320 E — 12000 F — 12470 G — 13200 H — 13800 Z — OTHER							
Output Voltage: 3 — 3300 4 — 4160								
4160V Output: 050 — 500 HP 100 — 1000 HP 150 — 1500 HP 200 — 2000 HP 250 — 2500 HP 300 — 3000 HP								
Duty Rating: S — Standard (115% OL rating)								
Configuration: AA — AE —	ID: X X	CP: X X	BYP: X	ID — Input disconnect CP — Low voltage control power BYP — Isolated across-the-line starter				
Additional Function: • See Options section. • Options should be entered in alphabetical order. • If the smart part number is longer than two options, replace all options with a "-1". • List all options with descriptions for all equipment.								

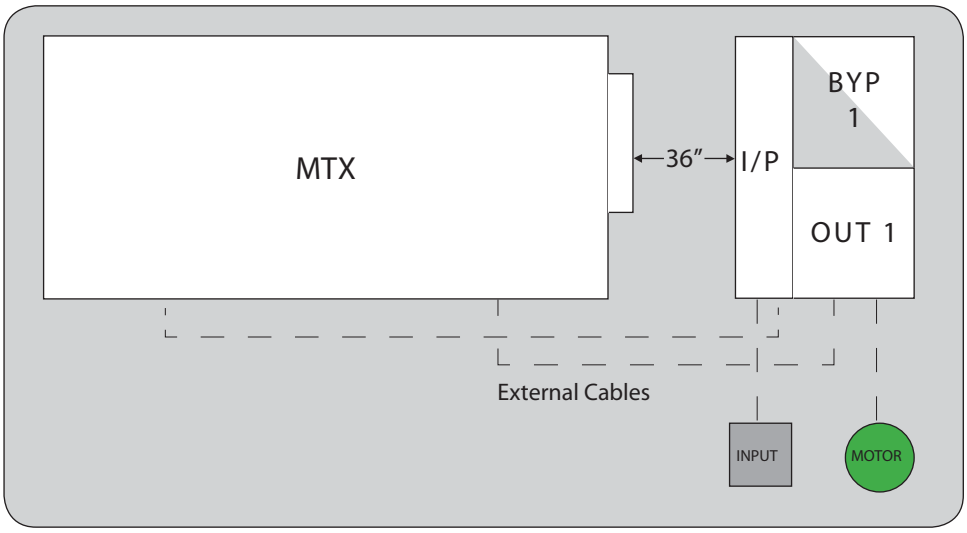
MTX® NEMA 3R ASD
Pricing & Dimensions

MTX® 41600 VAC Output

HP	FLA	Model Number	List Price		Dimensions (in.)						Weight (lbs.)	
					H		W		D			
			AA	AE	AA	AE	AA	AE	AA	AE	AA	AE
500	62	MTXA44050S	$466,000	$524,000	107	107	168	225	63	63	15,000	21,000
1000	124	MTXA44100S	$495,000	$553,000	107	107	168	225	63	63	15,000	21,000
1500	186	MTXA44150S	$574,000	$632,000	107	107	168	225	63	63	15,000	21,000
2000	248	MTXA44200S	$986,000	CF	110.75	CF	237.5	CF	70	CF	24,500	CF
2500	310	MTXA44250S	$1,020,000	CF	110.75	CF	237.5	CF	70	CF	24,500	CF
3000	372	MTXA44300S	$1,060,000	CF	110.75	CF	237.5	CF	70	CF	24,500	CF

Notes:
- *External cable not included for bypass.*
- *HP rating is based on a typical 4-pole motor.*
- *Always use motor FLA rating to size drives.*
- *Bypass Starter pricing is based on fixed contactors (not rack-out type).*
- *CF: Consult Factory.*

General Arrangement For Bypass



Notes:
- *Clearance is needed to the right for side-mounted heat exchanger.*
- *No clearance is needed when mounted on the left hand side.*
- *External cables interconnecting two sections are not included and need to be provided by others.*

MTX® NEMA3R ASD
Option Information & Pricing

Sync-Xfer

Sync-Xfer is an exciting technological feature of the MTX. With Sync-Xfer, the MTX determines the utility line characteristics and transfers the motor supply power from variable speed to utility power via contactors. Additionally, it can pick up a motor from utility power and return it to variable speed.

Sync-Xfer can have a significant impact in lowering a system's cost in applications where multiple motors are controlled with MV ASD, or where the ASD is used for soft-starting duty only. Contact Toshiba's MV Drive Department or your local distributor for more details.

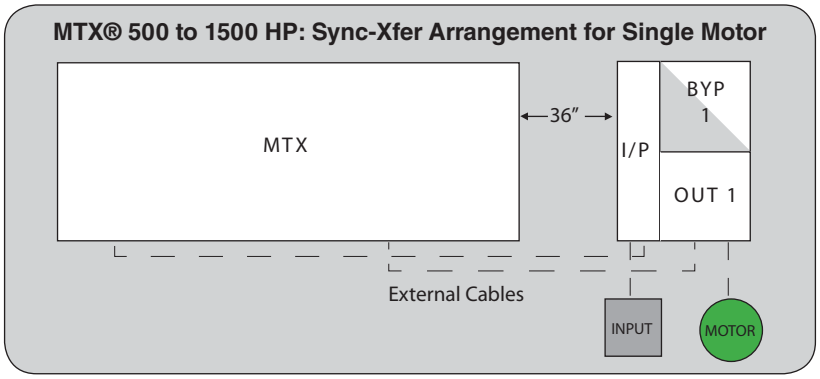
To price a Sync-Xfer option, you only need to add one output reactor per MTX and one contactor section for each motor.

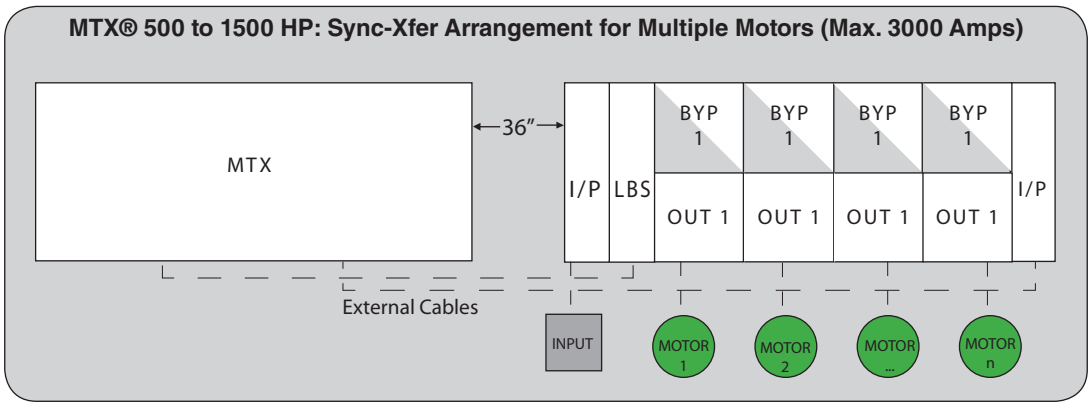
Option Code	Description	Price
SX	• Output reactor frame (500 to 1500 HP) • One per drive	$13,475
	• Must add first section (84") for input, LBS, output sections	$56,000
	• Contactor section (500 to 1500 HP) • Add 36" per section, one section per motor	$57,865
	• Output reactor frame (2000 to 3000 HP) • One per drive	$18,480
	• Must add first section (84") for input, LBS, output sections	$65,000
	• Contactor section (2000 to 3000 HP) • Add 42" per section, one section per motor	CF

Notes:
- *Field interconnecting cable not included for bypass.*
- *CF: Consult Factory.*

MTX® NEMA 3R ASD
Option Information & Pricing

Typical Layout For Sync-Xfer





Notes:
- *Consult factory for lineup details on MTX 3000 frame.*

6.9 To 13.8 kV Input

The HV Input option gives users the ability to input 6.9 to 13.8 kV primary voltages directly to the drive transformer. This option pricing is available only as a price adder to the -AA style unit. Published standard dimensions will increase 74″ on width based on the selection of HV equipment.

- 74″ section includes fused input disconnect switch, input contactor, soft charge circuit and PTs. This arrangement mimics the standard -AA drive but with HV input.
- Option price = drive price x 110% + $97,800
- Add 74″ to the drive dimension.

Notes:
- *UL/cUL in progress.*
- *No bypass is available with this feature.*
- *The price of the drive will increase by 10% to accommodate the HV windings.*

Option Code	HP	Description	Price
D through Z (see matrix)	500 to 3000	• Up to 15 kV input • Includes: Fused input disconnect, Input breaker, Soft charge circuit, PTs (add 74″ to width)	$97,800

Example 1: 500 HP, 13.8 kV input with 4160 V output. Use the 500 HP price of $512,600 and add the 74″ section at $97,800. Total list price equals $610,400. Overall dimension will be 242″ (168″ + 74″). Part number will be MTXAH44050SAA.

MTX® NEMA 3R ASD
Option Information & Pricing

Output DV/DT Filters

An output DV/DT filter is recommended for lead-lengths of 1000 to 2000 ft.

Option Code	Rating	Description	Price
DV	500 HP	Output DV/DT filter	$11,500
	1000 HP		$11,500
	1500 HP		$11,500
	2000 HP		$14,000
	2500 HP		$14,000
	3000 HP		$14,000

Sinewave Output Filters

A sinewave output filter is recommended for lead-lengths of 2000 ft. to 6 miles. Sinewave output filters are recommended in applications where a step-up transformer is used on the output of the drive.

Option Code	Size	Description	Price
SW	500 HP	Sinewave output filter	$21,035
	1000 HP		$24,165
	1500 HP		$29,000

CF: Consult Factory.

Drive Motor Space Heater

Option Code	Heater	Description	Price
HS	Drive space heater	• Internal power supply	$4,400
HM	Motor space heater control circuit	• Power provided separately • Specify voltage capacity @ 120 VAC	$900
HI	Motor space heater control circuit	• Power provided internally • Internal power source (500 W) maximum @ 120 VAC	$4,400

MTX® NEMA 3R ASD
Option Information & Pricing

Push-Buttons

Option Code	Description	Price
B1	• IEC Style: push-buttons/pilot lights	$300
BX	• Miscellaneous push-button	CF

Communication Interface

Option Code	Description	Price
C5	• Tosline-S20LP communication card with FC connector • Tosline-S20 with F07 connector included on control board	$2,533
CD	• DeviceNet communication card — PC61910P080	$3,833
CF	• Profibus communication card — 100066	$4,255
CR	• Modbus RTU/Ethernet communication card — PC61910P079	$3,200

MTX® NEMA 3R ASD
Spare Parts Kits

Toshiba recommends a separate line item on the purchase order for spare parts on the drives purchase order. Spare parts are handled by the spare parts group. Spare Parts Kits provide an easy and practical way to acquire the proper spare parts to handle most emergencies. Spare Parts Kits contain one of each circuit board, one low voltage power supply, rectifier fuses, diodes, one set of control power fuses.

Spare Parts Kits can be ordered with or without a power module. To order a Spare Parts Kits, please use the following numbering convention:

Example Part Number:	MTX	A	4	4	050

Series:
MTX®

Input Frequency:
A — 60 Hz
B — 50 Hz

Input Voltage:
2 — 2400
3 — 3300
4 — 4160

Output Voltage:
3 — 3300
4 — 4160

4160V Output:
050 — 500 HP
100 — 1000 HP
150 — 1500 HP
200 — 2000 HP
250 — 2500 HP
300 — 3000 HP

MTX® NEMA 3R ASD
Spare Parts Kits

Item	4160 V Qty.	Description	Part Number
1	8	• IGBT, 3300 V, 400 A	PC40233P406
2	2	• Diode, 3300 V, 400 A	PC40333P402
3	6	• Rectifier	HP-Specific
4	4	• PWB - RGM T300MV	PC61910P106A
5	1	• PWB - CHG, DET, T300MV	PC61910P110A
6	2	• PWB - IGBT Driver, Type G	PC41910P075G
7	2	• PWB - IGBT Driver, Type H	PC61910P075H
8	1	• Power Supply Assembly	GCI6720G282
9	1	• PWB - GSD	HP-Specific
10	1	• PWB - CTR, I Series, Type M	PC61910P081M
11	1	• PWB - XIO, Wi Series	PC61910P082C
12	1	• PWB - GDI, Wi Series, HCT	PC61910P085A
13	1	• PWB - PDM	PC61910P116
14	1	• PWB - Interface	PC61910P114A
15	2	• CT Hall	HP-Specific
16	6	• Rectifier Fuse	HP-Specific
17	3	• Input Fuse	HP-Specific
18	2	• CPT Fuse, E/2E 4.8 kV	PC16109P902
19	1	• Fan	HP-Specific

MTX® Spare Parts Kits Pricing

Part Number	List Price
MTXA44050-1	$63,670
MTXA44100-1	$64,237
MTXA44150-1	$65,605
MTXA44200-1	$78,160
MTXA44250-1	$82,732
MTXA44300-1	$82,732

Notes:
- *Prices valid when ordered along with drive.*

Medium Voltage Drives
Related Services
Startup

Toshiba recommends a separate line item on the purchase order for services along with the drives purchase order. Startup is handled by Toshiba's Field Service Department. The typical medium voltage drive requires four days of startup service by a factory-qualified/approved startup engineer/technician. Startup requires a three-week notice and an Onsite Service Request form (available online at www.toshiba.com/ind/fieldservice) to be submitted. Please consult the factory to determine the readiness requirements onsite for the service. If the service is extended beyond the pre-arranged time frame due to reasons out of Toshiba's control, additional charges may apply. For additional information, contact Field Service at 800-231-1412 ext. 3449.

The following table lists the net price for the continental U.S. and Canada. All startup services performed outside these countries will be billed per the standard field service rate schedule.

Part Number	Description	List Price
MVSTARTUP1	• Single day adder for Monday through Saturday - Excludes Sundays and holidays - 7 a.m. to 5 p.m. - Living expenses included • Must be in conjunction with MVSTARTUP4 • Multiple drives, same site, same size, same application = two additional days per drive • Multiple drives, same site, different sizes, different applications = four additional days per drive	$1,795/day
MVSTARTUP2	• Single day adder for Sundays and holidays - 7 a.m. to 5 p.m. - Living expenses included • Must be in conjunction with MVSTARTUP4	$3,250/day
MVSTARTUP3	• Stand-by day/holidays and Sundays	$950/$1900
MVSTARTUP4	• Standard package up to four days onsite - Travel on Sunday and/or holidays not included - Includes travel expenses Monday through Saturday - 7 a.m. to 5 p.m. - Based on 10 hours per day • Package for one drive only	$12,000
MVTRAINING3	• Standard training package up to three days onsite - Includes technical operational overview - Monday through Friday - 7 a.m. to 5 p.m.	$10,000

Notes:
- *Prices are subject to change.*
- *Services and packages are only available in the continental U.S. and Canada.*
- *For Sync-Xfer, please add one additional day for each additional motor line-up.*

Medium Voltage Drives
Related Services
Statement of Conformance

STATEMENT OF CONFORMANCE IEEE-519, 1992

Toshiba guarantees that the T300MVi® and MTX® medium voltage adjustable speed drive product lines will meet or exceed IEEE-519 per table 10.3 standards as advertised at the input to the drive to reduce harmonic distortion associated with AC adjustable frequency drives and other nonlinear loads that employ the use of three-phase, six-pulse diode bridge rectifiers. During testing, the technologically advanced designs of the T300MVi and MTX have been proven to:

- Reduce current total harmonic distortion, as measured at the input terminals, to less than 5% at full load operation. This also substantially minimizes the total voltage distortion to less than 5% total and less than 3% for individual harmonics per IEEE-519 table 10.3.
- Not become overloaded by upstream harmonic sources.
- Not resonate with other power system components due to its specially designed input topology.
- Present no compatibility problems with engine generator sets.

MEDIUM VOLTAGE WORKSHEET

Specification for Procurement 2400/3300/4160/6600 VAC Adjustable Speed Drive

PROJECT REFERENCE:		R.F.Q. REFERENCE	
SPEC. REFERENCE		DATE	

MOTOR DATA

HP/KW	
NEW/ EXISTING	
VOLTAGE (VOTLS)	
FLA (AMPS)	
SPEED (RPM)	
MOTOR LEAD LENGTH(FT)	
SERVICE FACTOR	
SPACE HEATER (VOLT/WATTS)	
RTD (MAKE/ QTY)	
INVERTER-DUTY	☐Yes ☐No
ENCODER	
CABLE DISTANCE FROM MOTOR TO ASD	

LOAD TYPE

VARIABLE TORQUE	☐
CONSTANT TORQUE	☐
REGENERATION	☐
FAN / PUMP	
OTHER	
SPEED RANGE	__Hz to__ Hz

BREAKAWAY TORQUE

0 to 100%	☐
101 to 150%	☐
% Overload Rating for 1 minute	

ENVIRONMENT

SITE LOCATION	
CONTROL ROOM MAX AMBIENT	°C
CONTROL ROOM MIN AMBIENT	°C
ELEVATION	Meters ASL
HUMIDITY NON-CONDENSING	%
DRIVE CABINET SPACE HEATER	☐Yes ☐No
SPACE HEATER TEST CIRCUIT	☐Yes ☐No
MOTOR SPACE HEATER CIRCUIT(EXTERNALLY POWERED)	☐Yes ☐No

DESIGN STANDARDS

UL	☐
cUL	☐
IEEE 519	☐
OTHER	____

SPEED REGULATION

0.5%, WITHOUT TACHO	☐
0.1% WITH TACHOMETER	☐
OTHER	____
MOTORING	☐
REGENERATION	☐
VOLTS / HZ SPEED CONTROL	☐
SENSORLESS VECTOR	☐
CLOSED LOOP VECTOR CONTROL	☐
MASTER FOLLOWER	☐
Speed Regulation without Encoder/ Resolver	____
Speed Regulation with Encoder/Resolver	____

SUPPLY SYSTEM VOLTAGE (± 10%)

2400 V	☐
3300 V	☐
4160 V	☐
6600 V	☐
Other _____ V	☐
LINE FREQUENCY	☐60Hz ☐50Hz

ENCLOSURE

NEMA 1	☐
NEMA 3R	☐
ELECTRICAL HOUSE	☐

Medium Voltage Drive Related Services
Medium Voltage Worksheet

Cable

POWER CABLE ENTRY	☐ TOP	☐BOTTOM
POWER CABLE EXIT	☐TOP	☐ BOTTOM
CONTROL CABLE ENTRY	☐ TOP	☐BOTTOM
CONTROL CABLE EXIT	☐TOP	☐ BOTTOM

Options

Kirk Key Interlocks	☐
Relay Outputs 115 V, 2 A, Form-C	☐
24 VDC Power Supply	☐
4 to 20 mA Isolated Analog Outputs ☐ Speed ☐ Current ☐ Voltage ☐ Load Other ____	☐
Control Power Backup 1 KVA,120V,TIC UPS	☐
Auxiliary Pilot Lights	☐
Auxiliary Pilot Lights Type	____
Auxiliary Push Buttons	☐
Auxiliary Push Buttons Type	____
Redundant Fan (3∅, 460V)	☐
Additional Controls (please attach control schematic)	

Auxiliary Equipment

BYPASS STARTER	
ACROSS THE LINE	☐
RVAT	☐
SOLID STATE STARTER	☐
SYNCHRONOUS TRANSFER	
NUMBER OF MOTORS	____
INDOOR RATED SYNC.TRANSFER (GEAR)	
OUTDOOR RATED SYNC. TRANSFER (GEAR)	
GEAR SUPPLIED BY OTHERS	

Communication Options

TOSLINE S20	☐
DEVICENET	☐
PROFIBUS	☐
ETHERNET	☐
MODBUS RTU/PLUS	☐
OTHER	____

Motor Protection

RTD-TR6 RELAY	☐
MULTILIN 369	☐
MULTILIN 469	☐
RTD TYPE	_____

Services

STARTUP (INCLUDED IN PRICE OF UNIT)	☐
ONSITE FACTORY TRAINING TESTING	☐
FACTORY TRAINING HOUSTON	☐

Spares

SPARE PARTS KIT	☐Yes	☐No
SPARE POWER MODULE	☐Yes	☐No

Software

PC INTERFACE SOFTWARE	☐Yes	☐No

Testing

WITNESS TEST – QC RUNBACK	☐
WITNESS TEST DYNAMOMETER (UPTO 1250 HP)	☐
DRIVE/MOTOR COMBINED TEST AT MOTOR VENDOR'S FACILITY	☐

Additional Requirements

Power Apparatus Components
Medium Voltage Controllers
JK Series Starters

Toshiba's medium voltage JK Series motor controller is manufactured under ISO 9001 standards in the same Houston, Texas facility as motors and drives. The components of this series are arranged to produce a streamlined space-saving unit, using no internal power cables in the full-voltage type starters for ease of maintenance and enhanced safety features. These state-of-the-art medium voltage controllers are available in full-voltage or reduced-voltage models for the control of induction, wound rotor or synchronous motors, transformers, and capacitors.

Highlights

- JK400 & JK700 Series
- Reduced Footprint
- Rigid 11-Gauge Steel Frame
- Visible, Bolted Pressure, Isolation Switch
  - Less Resistance
  - Less Wear
  - No Insertion Pressure
  - Mechanical Interlocking System
- Reduced Voltage Auto-Transformer (RVAT) Controllers
  - Three Vacuum Contactors
  - Three Winding Copper-Wound Auto-Transformer with 50%, 65% & 80% Voltage Taps
  - Adjustable Solid State Transition Timer & Incomplete Sequence Timer

Standard Features

- UL Listed in US & Canada
- Meet NEMA Class E2 Requirements
- Front-Accessible Main Bus
- Current Transformers
- Mechanical & Electrical Interlocks
- Single-Phase Ammeter
- Power-Control Transformer with Primary/Secondary Fuses
- Single- & Three-Phase Overload Protection
- Start/Stop Push Buttons
- Run/Off Pilot Lights
- LED Trip Indicator
- Manual or Remote Reset (Auto-Reset Optional)

c UL us

Medium Voltage Controllers
JK400 Series Starters

Product Scope

2300 to 6600 V
360 A Maximum
Up to 5000 HP

Standard Features

- 30 Inch Wide Footprint*
- Two-High Design Option
- Available Configurations:
  - Full-Voltage
  - Non-Reversing
  - Reversing

** Dimensions are based on NEMA Type 1, 12 enclosure ratings. For NEMA Type 3R, add 6" to width.*

JK400 Series Starters Current Rating

Enclosure Type	Maximum Continuous Amps 46" & 60" One-High Controller		Maximum Continuous Amps 90" One-High Controller or Lower Controller in a Two-High Stacked Arrangement		Maximum Continuous Amps Upper Controller in a Two-High Stacked Arrangement
	Fixed Type	Drawout Type	Fixed Type	Drawout Type	Fixed Drawout Type
Type 1 Ventilated	360 A	360 A	360 A	360 A	320 A
Type 1 Non-Ventilated	320 A	360 A	320 A	360 A	280 A
Type 12 & 3R	310 A	310 A	310 A	310 A	280 A

Notes:
- *Actual limits based on your specific application parameters. All specifications subject to change without notice.*

JK400 Series Short Circuit Withstand Capability

Interrupting Capacity (Symmetrical Amps)	Interrupting Capacity (Symmetrical MVA)	Short Time Capability 30 Seconds (Amps)	Short Time Capability 1 Second (Amps)	Dielectric Withst 1 Minute (KVAC)	Impulse Voltage Withst (KV)
50,000 @ 2.3 to 6.6 KV	200 @ 2.3 KV 350 @ 4.0 KV 400 @ 4.6 KV 570 @ 6.6 KV	2400 A	6000 A	18.2	60 KV

JK400 Series Application Table

Enclosed Max. Continuous Current (Amps)	Maximum Horsepower at Utilization Voltage								
	2300 V			4200 V			6600 V		
	Synchronous Motors		Induction Motors	Synchronous Motors		Induction Motors	Synchronous Motors		Induction Motors
	0.8 PF	1.0 PF		0.8 PF	1.0 PF		0.8 PF	1.0 PF	
360	1500	1750	1500	2500	3000	2500	4000	5000	4000
320	1250	1500	1250	2250	2500	2250	3500	4500	3500
310	1250	1500	1250	2000	2500	2000	3500	4000	3500
280	1000	1250	1000	1750	2250	1750	3000	3500	3000

Notes:
- *For transformer and capacitor load-switching applications, consult factory.*
- *Maximum rating depends on enclosure rating.*

Medium Voltage Controllers
JK700 Series Starters

Product Scope

2300 to 4800 V
720 A Maximum
Up to 6000 HP

Standard Features

- 36 Inch Wide Footprint*
- One-High Enclosure Design
- Available Configuration:
  - Full-Voltage
  - Non-Reversing
  - Reversing

** Dimensions are based on NEMA Type 1, 12 enclosure ratings. For NEMA Type 3R, add 6"to width.*

JK700 Series Starters Current Rating

Enclosure Type	Max. Continuous Amps
Type 1 Ventilated	720 A
Type 1 Non-Ventilated	650 A
Type 12 & 3R	600 A

Notes:
- *Actual limits are based on your specific application parameters. All specifications subject to change without notice.*

JK700 Series Short Circuit Withstand Capability

Interrupting Capacity (Symmetrical Amps)	Interrupting Capacity (Symmetrical MVA)	Short Time Capability 30 Seconds (Amps)	Short Time Capability 1 Second (Amps)	Dielectric Withst 1 Minute (KVAC)	Impulse Voltage Withst (KV)
50,000 @ 2.3 to 4.6 KV	200 @ 2.3 KV 350 @ 4.0 KV 400 @ 4.6 KV	4320 A	8000 A	AC 13.25 DC 19	60 KV

JK700 Series Application Table

Enclosed Max. Continuous Current (Amps)	Maximum Horsepower at Utilization Voltage					
	2300 V			4200 V		
	Synchronous Motors		Induction Motors	Synchronous Motors		Induction Motors
	0.8 PF	1.0 PF		0.8 PF	1.0 PF	
720	3000	3500	3000	5500	6000	5500
650	2750	3000	2750	5000	5500	5000
600	2500	2750	2500	4500	5000	4500

Notes:
- *Maximum rating depends on enclosure rating.*

Medium Voltage Controllers
JK400 & JK700 Series Pricing

JK Full Voltage Non-Reversing (NEMA 1) Controller Pricing

Nominal System Voltage	HP	Contactor Type	Model Number	Dimensions (in.)			List Price
				H	W	D	
2300	75 to 800	400 A Fixed	FK400B2_	46	30	36	$23,900
	900 to 1500	400 A Fixed	FK400B2_	46	30	36	$24,900
	75 to 800	400 A Drawout	JK400B2_	46	30	36	$27,600
	900 to 1500	400 A Drawout	JK400B2_	46	30	36	$28,600
	1250 to 2250	720 A Fixed	JK700B2_	90	36	36	$42,600
	2500	720 A Fixed	JK700B2_	90	36	36	$44,600
4160	200 to 1500	400 A Fixed	FK400B4_	46	30	36	$23,900
	1750 to 3000	400 A Fixed	FK400B4_	46	30	36	$24,900
	200 to 1500	400 A Drawout	JK400B4_	46	30	36	$27,600
	1750 to 3000	400 A Drawout	JK400B4_	46	30	36	$28,600
	3000 to 4000	720 A Fixed	JK700B4_	90	36	36	$42,600
	4500 to 5000	720 A Fixed	JK700B4_	90	36	36	$44,600
6600	200 to 700	400 A Fixed	FK400BB_	46	30	36	$24,900
	750 to 2250	400 A Fixed	FK400BB_	46	30	36	$27,100
	2500 to 4500	400 A Fixed	FK400BB_	46	30	36	$27,300
	200 to 700	400 A Drawout	JK400BB_	46	30	36	$28,600
	75 to 2250	400 A Drawout	JK400BB_	46	30	36	$30,800
	2500 to 4500	400 A Drawout	JK400BB_	46	30	36	$31,000

Notes:
- *For other system voltages (i.e. 3300 V), consult factory.*
- *HP rating is based on a typical 4-pole motor. Always use motor FLA rating. Refer to application tables (i.e. ampere rating in the appropriate enclosure*
- *rating) to size starters.*
- *46-inch tall one-high units can be supplied as a 60" tall enclosure with a larger low voltage compartment. Consult factory for price adder.*

Medium Voltage Controller
JK400 & JK700 Series Pricing

JK Reduced Voltage Autotransformer Type (NEMA 1) Controller Pricing

Nominal System Voltage	HP	Contactor Type	Model Number	Dimensions (in.)			List Price
				H	W	D	
2300	100 to 350	400 A Drawout	JK420B2_	90	36	36	$38,200
	400	400 A Drawout	JK420B2040	90	36	36	$38,900
	500	400 A Drawout	JK420B2050	90	36	36	$40,500
	600	400 A Drawout	JK420B2060	90	36	36	$43,600
	700	400 A Drawout	JK420B2070	90	36	36	$43,900
	800	400 A Drawout	JK420B2080	90	36	36	$44,400
	900	400 A Drawout	JK420B2090	90	36	36	$45,200
	1000	400 A Drawout	JK420B2100	90	36	36	$47,800
	1250	400 A Drawout	JK420B2125	90	36	36	$48,400
	1500	400 A Drawout	JK420B2150	90	42	36	$56,900
	1750 to 2250	720 A Fixed	JK720B2_	90	72	36	$144,200
	2500	720 A Fixed	JK720B250	90	84	36	$174,300
4160	200	400 A Drawout	JK420B4020	90	36	36	$33,600
	300 to 400	400 A Drawout	JK420B4_	90	36	36	$34,600
	500	400 A Drawout	JK420B4050	90	36	36	$34,900
	600 to 700	400 A Drawout	JK420B4_	90	36	36	$37,700
	800 to 900	400 A Drawout	JK420B4_	90	36	36	$39,100
	1000	400 A Drawout	JK420B4100	90	36	36	$40,500
	1250	400 A Drawout	JK420B4125	90	36	36	$43,600
	1500	400 A Drawout	JK420B4150	90	42	36	$44,700
	2000	400 A Drawout	JK420B4200	90	42	36	$48,000
	2250	400 A Drawout	JK420B4225	90	42	36	$48,300
	2500	400 A Drawout	JK420B4250	90	42	36	$48,700
	3000	400 A Drawout	JK420B4300	90	42	36	$58,000
	3500 to 4000	720 A Fixed	JK720BB_	90	72	36	$144,200
	4500	720 A Fixed	JK720BB450	90	72	36	$149,600
	5000 to 5500	720 A Fixed	JK720BB_	90	84	36	$174,300

Notes:
- *For other system voltages (i.e. 3300 V), consult factory.*
- *HP rating is based on a typical 4-pole motor. Always use motor FLA rating. Refer to application tables (i.e. ampere rating in the appropriate enclosure rating) to size starters.*

Medium Voltage Controllers

JK Solid State Starters Series

Toshiba's JKSSS medium voltage motor starter series is designed to softly start and stop AC motors in any fixed speed application regardless of power condition, load condition, and the extremity of its environment. Rated at 500% for 60 seconds, the JKSSS motor starter series is one of the highest rated power devices in current-carrying capacity. The JKSSS line provides maximum protection with "true thermal modeling," while allowing smooth, stepless control of acceleration and deceleration.

Highlights

- JKSSS4 & JKSSS7 Series
- Soft Start
- 125% Continuous Duty
- Reduced Footprint
- Rigid 11-Gauge Steel Frame
- Programmable Via Keypad or Computer
- Fiber Optically Isolated Low Voltage Compartment
- Built-In 120 V Control Power Transformer; Voltage and Current Metering
- Fully-Rated Bypass Contactor for Increased Thermal Capacity and Optional Across-the-Line Start
- Line Isolation Vacuum Contactor
- Heavy Duty SCR Stack Assemblies with Ring Transformer Isolation
- Visible Grounding Bar
- Coordinated Motor Fuses with Blown Fuse Indicators
- Ground Fault Protection

Standard Features

- UL Listed in US & Canada
- NEMA Type 1 Enclosure
- Meet NEMA Class E2 Requirements
- Front-Accessible Main Bus
- Top or Bottom Entry and Exit
- Removable Entry Plates for Easy Connection
- RTD Input for Precision Thermal Management
- LCD Display with Programmable Key Pad
- Built-In Real-Time Clock
- Current Transformers
- Non-Load-Break Disconnect Switch with Door Safety Interlocking
- Single- & Three-Phase Overload Protection
- LED Trip Indicator
- Manual or Remote Reset (Auto-Reset Optional)

Medium Voltage Controllers
JKSSS4 Solid State Starters

Product Scope

2300 to 4800 V
720 A Maximum
Up to 6000 HP

JKSSS4 Series Current Ratings

Enclosure Type	Max. Continuous Amps 90" One-High Controller
Type 1 Ventilated	360 A
Type12 & 3R	300 A

Notes:
- *Actual limits based on your specific application. All specifications subject to change without notice.*

JKSSS4 Series Short Circuit Withstand Capability

Interrupting Capacity (Symmetrical Amps)	Interrupting Capacity (Symmetrical MVA)	Short Time Capability 30 Seconds (Amps)	Short Time Capability 1 Second (Amps)	Dielectric Withst 1 Minute (KVAC)	Impulse Voltage Withst (KV)
50,000 @ 2.3 to 4.2 KV	200 @ 2.3 KV 350 @ 4.0 KV	2400 A	6000 A	18.2	60 KV

JKSSS4 Series Application Table

Enclosed Max. Continuous Current (Amps)	Maximum Horsepower at Utilization Voltage					
	2300 V			4200 V		
	Synchronous Motors		Induction Motors	Synchronous Motors		Induction Motors
	0.8 PF	1.0 PF		0.8 PF	1.0 PF	
360	1500	1750	1500	2500	3000	2500
310	1250	1500	1250	2000	2500	2000
300	1000	1250	1000	1750	2250	1750

Notes:
- *Line reactors and MOVs are not required with Toshiba solid state starters.*
- *The starter is not affected by line capacitance, power source rating (MVA), multiple starters on the supply bus, or cable length.*
- *Maximum rating depends on enclosure rating.*

Medium Voltage Controllers
JKSSS7 Solid State Starters

Product Scope

2300 to 4200 V
720 A Maximum
Up to 6000 HP

JKSSS7 Series Current Ratings

Enclosure Type	Max. Continuous Amps 90" One-High Controller
Type 1 Ventilated	720 A
Type 1 Non-Ventilated	650 A
Type 12 & 3R	600 A

Notes:
- *All specifications subject to change without notice.*
- *Actual limits based on your specific application.*

JKSSS7 Series Short Circuit Withstand Capability

Interrupting Capacity (Symmetrical Amps)	Interrupting Capacity (Symmetrical MVA)	Short Time Capability 30 Seconds (Amps)	Short Time Capability 1 Second (Amps)	Dielectric Withst 1 minute (KV)	Impulse Voltage Withst (KV)
50,000 @ 2.3 to 4.2 KV	200 @ 2.3 KV 350 @ 4.0 KV	4320 A	8000 A	AC 13.25 DC 19	60 KV

JKSSS7 Series Application Table

Enclosed Max. Continuous Current (Amps)	Maximum Horsepower at Utilization Voltage					
	2300 V			4200 V		
	Synchronous Motors		Induction Motors	Synchronous Motors		Induction Motors
	0.8 PF	1.0 PF		0.8 PF	1.0 PF	
720	3000	3500	3000	5500	6000	5500
650	2750	3000	2750	5000	5500	5000
600	2500	2750	2500	4500	5000	4500

Notes:
- *Line reactors and MOVs are not required with Toshiba solid state starters.*
- *The starter is not affected by line capacitance, power source rating (MVA), multiple starters on the supply bus, or motor cable length.*
- *Maximum rating depends on enclosure rating.*

Medium Voltage Controllers
JK Solid State Starter Series Pricing

JK Reduced Voltage Solid State Starter (NEMA 1) Pricing

Nominal System Voltage	HP	Contactor Type	Model Number	Dimensions (in.)			List Price
				H	W	D	
2300	100 to 250	400 A Fixed	JKSSS4-B2_	90	30	36	$51,200
	300 to 350	400 A Fixed	JKSSS4-B2_	90	30	36	$51,400
	400 to 500	400 A Fixed	JKSSS4-B2_	90	30	36	$51,700
	600 to 800	400 A Fixed	JKSSS4-B2_	90	30	36	$54,000
	900	400 A Fixed	JKSSS4-B2090	90	30	36	$59,600
	1000	400 A Fixed	JKSSS4-B2100	90	30	36	$62,900
	1250	400 A Fixed	JKSSS4-B2125	90	30	36	$63,200
	1500	400 A Fixed	JKSSS4-B2150	90	30	36	$70,200
	1750	720 A Fixed	JKSSS7-B2175	90	72	36	$95,000
	2000 to 2250	720 A Fixed	JKSSS7-B2_	90	72	36	$114,000
4160	200 to 400	400 A Fixed	JKSSS4-B4_	90	30	36	$51,200
	300 to 400	400 A Fixed	JKSSS4-B4_	90	30	36	$51,200
	500 to 700	400 A Fixed	JKSSS4-B4_	90	30	36	$53,300
	800 to 1000	400 A Fixed	JKSSS4-B4_	90	30	36	$55,900
	1250	400 A Fixed	JKSSS4-B4125	90	30	36	$58,400
	1500	400 A Fixed	JKSSS4-B4150	90	30	36	$59,900
	1750 to 2000	400 A Fixed	JKSSS4-B4_	90	30	36	$61,000
	2250 to 2500	400 A Fixed	JKSSS4-B4_	90	30	36	$62,700
	3000	400 A Fixed	JKSSS4-B4300	90	30	36	$66,800
	3500	720 A Fixed	JKSSS7-B4350	90	72	36	$124,300
	4000 to 4500	720 A Fixed	JKSSS7-B4_	90	72	36	$132,900
	5000 to 5500	720 A Fixed	JKSSS7-B4_	90	72	36	$154,500
	6000	720 A Fixed	JKSSS7-B4600	90	72	36	$157,900

Notes:
- *For other system voltages (i.e. 3300 V), contact the factory.*
- *HP rating is based on a typical 4-pole motor. Always use motor FLA rating. Refer to application tables (i.e. ampere rating in the appropriate enclosure rating) to size starters.*
- *For Type 1 enclosure only. If Type12 or 3R, use 3500 HP price (720A). Confirm motor FLA with factory.*

Medium Voltage Controllers
JK Series Part Numbering Convention

The JK series combines a fixed isolation switch with either a drawout or fixed contactor/main fuse assembly.

AVAILABLE OPTIONS

- **JK** – Withdrawable 400 A or Fixed 720A Contactor/ Main Power Fuse Assembly
- **FK** – Fixed Type 400 A Contactor Power Fuses
- **JKSSS** – Reduced Voltage Solid-State Type with Fixed 400 A or 720 A Isolation Contactor
- **JKSSD** – Reduced Voltage Solid-State Type with Drawout 400 A Isolation Contactor

AVAILABLE CONTROLLER TYPES

- **FVNR** – Full Voltage Non-Reversing Type
- **FDR** – Transformer Feeder (As Standard Uses Latched-Type Contactor)
- **FVR** – Full-Voltage Reversing Type
- **RVAT** – Reduced-Voltage Autotransformer Type
- **SSS** – Reduced-Voltage Solid-State Type

Consult factory for other controller types that are available (i.e. reversing SSS, synchronous RVAT).

Ordering Information: Use the following part numbering convention to configure the JK Starter when placing your order. For transformer feeder application, select "ZZZ" under Motor Rating specify transformer KVA separately.

Example Part Number:	JK/FK/JKSSS	4	00	B	4	025	SH
Series							
Contactor Rating: 4 — 400 A 7 — 720 A							
Controller Type: 00 — FVNR 01 — FDR 10 — FVR 20 — RVAT N/A — SSS							
Enclosure Rating: B — 1 (indoor) K — 12 (outdoor) E — 3R (outdoor) A — 1 Gasketed (indoor) Z — OTHER							
Line Voltage: 2 — 2400 3 — 3300 4 — 4160	A — 4800 B — 6600 Z — OTHER						
Motor Rating: 010 — 100 HP 012 — 125 HP 015 — 150 HP 020 — 200 HP 025 — 250 HP 030 — 300 HP 035 — 350 HP 040 — 400 HP	045 — 450 HP 050 — 500 HP 060 — 600 HP 070 — 700 HP 080 — 800 HP 090 — 900 HP 100 — 1000 HP 125 — 1250 HP	150 — 1500 HP 175 — 1750 HP 200 — 2000 HP 225 — 2250 HP 250 — 2500 HP 300 — 3000 HP 350 — 3500 HP 400 — 4000 HP	450 — 4500 HP 500 — 5000 HP 550 — 5500 HP 600 — 6000 HP ZZZ — OTHER				

Additional Functions:

- See options section.
- Options should be entered in alphabetical order.
- If the smart part number is longer than two options, replace all options with a "-1."
- List all options with descriptions for all equipment.

Medium Voltage Controllers
JK Series Factory-Installed Modifications

Medium Voltage Starter Options

Pilot Devices

Part Number	Description	Price
B1	• Push-buttons: Start/stop standard on FVNR and RVAT, opt. on JKSSS	$400
BE	• Push-button: Emergency stop, mushroom head (red)	$250
BR	• Push-button: “Reset” overload relay	$200
BX	• Push-button: Specify function	CF
PB	• Pilot light: Bypass Mode indication (white) for JKSSS	$300
PF	• Pilot light: Fault indication (amber); protection relay trip indication	$300
PG	• Pilot light: Stop indication (green); standard on FVNR and RVAT	$300
PP	• Pilot light: Power On indication (white)	$300
PR	• Pilot light: Run indication (red); standard on FVNR and RVAT	$300
PX	• Pilot light: Miscellaneous; specify function	CF
SO	• Selector switch: Off/On	$300
SH	• Selector switch: Hand/Off/Auto	$300
SL	• Selector switch: Local/Remote	$300
SX2	• Selector switch: Two-position/specify function	CF
SX3	• Selector switch: Three-position/specify function	CF

Protective Relays

Part Number	Description	Price
-	• Solid-state protection relay (overload/phase failure) - 2E Relay Standard with drawout contactor IEEE device no. 46/51. For JKSSS, see “Emergency Full Voltage Starting” option	STD
M2	• Solid-state protection relay (overload/phase failure) - 2E relay for fixed contactor IEEE device no. 46/51. For JKSSS, see “Emergency Full Voltage Starting” option	$800
MG	• 2E relay option: zero-sequence ground fault (RC81A module) IEEE device no. 50G	$1,000
MR	• 2E option: substitute auto-reset relay IEEE device no. 46/51	$100
BR	• 2E option: manual-reset push-button on door	$200
MX	• Multi-function motor protection relay	CF
MZ	• Ground Fault: zero-sequence ground fault, for JKSSS only IEEE device no. 50G	$2,100
RT	• RTD monitor/relay, door-mounted, 12 RTD Inputs, Pt100, Ni100, Ni120, Cu10, IEEE device no. 49. JKSSS Includes 12 RTD Inputs standard	$4,400
V1	• Undervoltage relay (standard on JKSSS) IEEE device no. 27	$400
V2	• Overvoltage relay (standard on JKSSS) IEEE device no. 59	$400
V3	• Under, overvoltage relay (standard on JKSSS) IEEE device no. 27/59	$800
-	• Incomplete sequence protection standard on applicable controllers IEEE device no. 48	STD

Medium Voltage Controllers
JK Series Factory-Installed Modifications

Control Relays

Part Number	Description	Price
R22	• 4-pole: contact arrangement 2NO, 2NC	$360
R40	• 4-pole: contact arrangement 4NO	$360
R44	• 8-pole: contact arrangement 4NO, 4NC	$600
R62	• 8-pole: contact arrangement 6NO, 2NC	$600
R80	• 8-pole: contact arrangement 8NO	$600
TX	• Timing relay, solid state (specify time-range and function)	$500

Miscellaneous

Part Number	Description	Price
HS	• Cubicle space heater (standard on type 3R enclosures)	$400
HT	• Thermostat (for cubicle space heater)	$400
D8	• Lighting arrestor - three-phase, station class (15" inc. sec. may be required)	$3,600
D9	• Surge capacitor (three-phase)	CF
T4	• Add 2nd PT/CPT, 100/300 to 500VA (standard on SSS)	$1,000
T8	• Additional CPT capacity (VA)	CF
-	• Device markers	STD
KK	• Key interlock	$1,400
L1	• Latched contactor (specify close trip voltages) includes AC/DC rectifier	$1,500
L2	• Capacitor trip device (for use on latched-type contactors)	$850
L3	• Blown-fuse trip mechanism (UL not available if required)	$1,200

Notes:
- *Blown-fuse trip mechanism for 360/400 A only.*

Metering

Part Number	Description	Price
MA	• Ammeter, AC, single-phase monitoring (standard on full voltage and RVAT)	$400
MT	• Ammeter switch (three-phase monitoring)	$500
MV	• Voltmeter (AC single-phase monitoring)	$1,000
MY	• Voltmeter (AC Single three-phase monitoring, includes: meter, three-phase switch, additional PT)	$2,400
ME	• Elapsed time meter	$400
W1	• Wattmeter	$3,000
W2	• Kilowatt hour meter (no demand meter)	$3,400
W3	• Watts transducer (specify output)	$2,000

Medium Voltage Controllers
JK Series Factory-Installed Modifications

Enclosure

Part Number	Description	Price
-	• Type-1 general purpose (indoor)	STD
K	• Type-12 dust-tight (indoor), one-high (46"-60" H) controller	$500
	• Type-12 dust-tight (indoor), all 90" H cubicles (two-high controller, RVAT, SSS)	$1,000
KD	• Drip shield (for Type 1 or 12 enclosure)	$500
E	• Type-3R rainproof, sleet-resistant (outdoor), one-high (46"-60" H) controller	$4,300
	• Type-3R rainproof, sleet-resistant (outdoor), all 90" H cubicles (two-high controller, RVAT, SSS)	$6,800
-	• Incoming section	CF

Special Options For Solid State Starters

Part Number	Description	Price
F2	• Emergency Full Voltage Starting: • Includes: - SSS/Bypass Selector Switch - Current Transformers - Class 20 Bi-Metallic Overload Relay	$1,250
F3	• Emergency Full Voltage Starting • Includes: - SSS/Bypass Selector Switch - Current Transformers - Solid State Overload (2E Relay with Adjustable Trip Curves, Class 3 to 40)	$1,700
MZ	• Ground Fault : zero sequence, includes GF board sensor (ZCT), IEEE device no. 50G	$2,100
D4	• Input Isolation contactor/power fuses change from fixed to drawout	$3,300
-	• Contactor for power correction capacitor switching	CF

Notes:
- *When ordering, add the color code.*
- *Controllers with fixed-type main contactor comes standard with thermal bi-metallic overload relay 250VA CPT (Exception: JKSSS).*
- *Full-voltage and RVAT-type controllers come with standard pilot lights (see individual controller description). This option is for additional lights on these controllers.*
- *Price is per 90"H cubicle (i.e. for one two-high structure, two starters in one 90" structure, add this price once to the combined price of the controllers. Price also includes cubicle space heater.*
- *This option is not available if option H9 (which includes the second PT) is selected.*
- *Must include additional PT; see option T4.*
- *Price includes cubicle space heater. If a thermostat is required, add option HT.*
- *JKSSS includes many metering features. See JKSSS section for further details.*
- *Option M2 (2E relay) is required if it is not supplied as standard on the starter.*

Medium Voltage Controllers
JK Series Accessories

Color Pb Caps	Color Pl Lens	Color Code
Green	Green	G
Black	-	Bw
Red	Red	R
White	White	W
Yellow	Yellow	Y
Blue	Blue	B

JK Series Accessories

Catalog Number	Item	Description	List Price
LCV5010H20G01	JK Yoke	Carriage lifting attachment	$300
SSS TOOL	Software	For JKSSS series	$650

Notes:
- *JK lifting yoke is recommended for two-high FVNR RVAT-type controllers.*
- *Software for programming, commissioning and monitoring includes CD and USB to RS485 converter.*

Vacuum Contactors

Medium Voltage JK OEM Power Cells

Toshiba's JK OEM power cells are UL listed. This compact, front-accessible design can be used in either motor or distribution applications (2300 V to 6600 V, 7200 V maximum).

OEM power cells are designed to replace existing air contactors or old vacuum contactor applications when used for motors or small distribution feeders. This kit provides you with state-of-the-art Toshiba vacuum technology, a patented bolt-pressure isolation switch.

Customers can use their existing standard cubicles, wiring methods, and components with these power cells allowing for valuable real-estate and labor dollars to be saved.

Standard Features

- Toshiba Medium Voltage Vacuum Contactor, 400 A
- Draw-out or Fixed-Type
- Patented, Bolted Pressure-Isolation Switch
- Less than 24" Wide, 29.3" High, Less than 33" Deep
- Available with or without Main Power Fuse-Clips (Single or Double-Barrel)
- Front-Accessible
- Electrically Held or Latched-Type Versions

Visible, Bolted Pressure, Isolation Switch Features

- Less Resistance
- Less Wear
- No Insertion Pressure
- Mechanical Interlocking System

JK OEM Cell Application Table

System Voltage	0.8 PF Ind./Syn. Motor	1 PF Syn. Motor	Three-Phase Transformer	Three-Phase Capacitor
2.2 to 2.5 KV	1750 HP	2000 HP	1500 KVA	1500 KVAR
3 to 3.3 KV	2250 HP	2500 HP	2000 KVA	2000 KVAR
4 to 5 KV	3000 HP	3500 HP	3000 KVA	2000 KVAR
6 to 6.6 KV	4500 HP	5000 HP	4000 KVA	2000 KVAR

Notes:
- *The above table is based on general-load data standard application.*
- *Lower limitations may apply on specific applications (i.e. applications above 1000 masl).*

Vacuum Contactors
JK OEM Power Cell Pricing

Model Number	Description	Application	List Price
GCV5084L03G01	Fixed-type with single-barrel fuse clips	Motor HP rating up to 1500 HP	$7,200
GCV5084L03G02	Fixed-type with double-barrel fuse clips	Motor HP rating up to 3000 HP	$7,500
GCV5084L03G03	Fixed-type for CPT/PT/CB	Includes bolted pressure - isolation switch for disconnecting CPT/PTs, provision to fix-mount 1 or 2 CPT/PTs with mounting provision for secondary low voltage circuit breaker	$5,200
GCV5084L03G04	Fixed-type for CPT/PT/LS	Includes bolted-pressure isolation switch for disconnecting CPT/PTs, provision to fix-mount 1 or 2 CPT/PTs with limit switch	$5,200
GCV5084L04G00	Drawout-type without fuse clips	Used when upstream protection is provided	$9,800
GCV5084L04G01	Drawout-type with single-barrel fuse clips	Motor HP rating up to 1500 HP	$9,600
GCV5084L04G02	Drawout-type with double-barrel fuse clips	Motor HP rating up to 3000 HP	$9,900
GCV5084L05G00	Fixed-latched-type without fuse clips	Used when upstream protection is provided	$8,400
GCV5084L05G01	Fixed-latched-type with single-barrel fuse clips	For distribution loads (400A maximum), transformer, or capacitor switching	$8,200
GCV5084L05G02	Fixed-latched-type with double-barrel fuse clips	For distribution loads (400A maximum), transformer, or capacitor switching	$8,500
GCV5084L06G00	Drawout-latched-type without fuse clips	Used when upstream protection is provided	$10,600
GCV5084L06G01	Drawout-latched-type with single-barrel fuse clips	For distribution loads (400A Maximum), transformer, or capacitor switching	$10,600
GCV5084L06G02	Drawout-latched-type with double-barrel fuse clips	For distribution loads (400A maximum), transformer, or capacitor switching	$10,900

Vacuum Contactors
Low & Medium Voltage Vacuum Contactors

Toshiba is a leading manufacturer of vacuum contactors with over 40 years experience developing the latest technologies availalbe in the market. Our vacuum contactors use an electronics-controlled circuit with a compact design to ensure reliability, ease-of-use, & safety. They are suitable for motor starters, transformer feeders, and capacitor-switching.

Standard Features

- **Environment-Resistant:** Ideal for Use in High Dust Areas; Switching Arc is Contained within Vacuum Bottle, Shielding Main Contacts
- **Reduced Maintenance:** Vacuum Bottle Contacts Have Long Life with Virtually No Maintenance
- **No External Surge Protection:** Special Main Contact Materials Minimize Chopping Current; No Surge Suppressor/Arrester Required Except for Special Applications
- **Designed for Safety:** High & Low Voltage Parts are totally Separated by Insulated Barrier (Non-Flammable Molded Frame)
- **Conformity Industrial Standards:** Conforms to Latest International Standards Such as UL, CSA, AS, BS, NEMA, IEC60470 (2000); Consult Factory On Each Series
- **Electronic-Control Drive Unit:** All Contactors Include Electronic Control of Operating Coil Which Offers Wide Control Voltage of 100 to 240 VAC & 100 to 250 VDC, Anti-Chopping Feature Reduce Power Consumption
- Electrically Held or Latched-Type Versions (Medium Voltage Models)

CV-10H (13.8/15 KV) Contactor

- **New CV-10H (13.8/15 KV) Contactor:** Contactor is now rated 400 Inductive & 450 Thermal Amps, available in Latched-Type Version; CV-10HA model is for Inductive Load-Switching (i.e. Motors & Transformer Loads), CV-10HB Model has Specially Designed Interrupters for Capacitor Switching

CV-10HA (15 KV, 400A)

Higher Interrupting-Performance: Afford a Wide Margin of Protective Coordination with Any Type of Power Fuse Resulting in Increased Electrical Safety & Reliability

Vertical Magnetic Arc Dispersion System

- **Designed for Longer Wear**: Unique Vertical Magnetic Arc Dispersion System, USA patent (HCV-1KAU, HCV-6KAU, HCV-6KALU)

Axial Magnetic Field Interrupter - Arc Dispersion

Vacuum Contactors
Low Voltage Vacuum Contactor Specifications

Low Voltage Technical Data

Model	HCV-1JBU	HCV-1KAU
Voltage	208 to 1500 V	
Operational Current	600 A	720 A
Rated Thermal Current	600 A	720 A
Interrupting Current	42,000 A	
Peak Withstand Current	-	85 KA
Short-Circuit Making/Breaking Current IEC 60470 (2000)	6000 A (100 times)	7200 A (100 times)
	6000 A (25 Times)	7200 A (25 Times)
Withstand Overload Current	3600 A for 30 seconds	4320 A for 30 seconds
	6000A for 2 seconds	7200A for 2 seconds
	9000A for 1 seconds	10,800A for 1 seconds
	30,000 A for 0.05 seconds	36,000 A for 0.05 seconds
Coordination with Current-Limiting Fuses	50 KA	45 KA
Switching Frequency	1200/hour	
Mechanical Life	2.5 million	
Electrical Life	500,000	
Impulse Withstand	15 KV	
Dielectric Strength	5.5 KV for 1 minute	
Closing Time (@ 120 VAC)	60 to 80ms	
Opening Time (@ 120 VAC)	50 to 65ms	
Arcing Time	10ms or less	
Pick-up Voltage	85% hot to 70% cold AC or DC	
Drop-out Voltage	20% or more of rated control voltage (cold)	

Notes:
- *Maximum required test; actual life under normal conditions is greater.*

Vacuum Contactors
Low Voltage Vacuum Contactor Specifications

Low Voltage Technical Data

Model		HCV-1JBU	HCV-1KAU
Control Voltage	Standard	100 to 240 VAC/DC	
Control Circuit Burden	Closing	1080 VA	
	Holding	50 VA	
Auxiliary Contact Ratings	Arrangement	3NO-3NC	
	Current	10 A (A600)	
	Voltage	600 V maximum, 48 V minimum	
	VAC	720 VA (P.F. 0.35)	
	VDC	60W (L/R 150ms)	
Application Conditions	Altitude without derating	Lower than 3300 ft. (1000m)	
	Ambient	-5 to 40°C	
	Relative humidity	45 to 85%	
	Vibration	Maximum 20 Hz to 1G	
	Shock	Maximum 30G	
Weight in lbs. (kg)		59.5 (27)	61.7 (28)

Vacuum Contactors
Low Voltage Vacuum Contactor Specifications

Low Voltage Application Table

Model	System Voltage	Induction Motor	Three-Phase Transformer	Three-Phase Capacitor
	208 V	200 HP	100 KVA	-
	230 V	250 HP	200 KVA	200 KVAR
	380 V	300 HP	350 KVA	-
	460 V	500 HP	400 KVA	400 KVAR
	575/600 V	600 HP	560 KVA	500 KVAR
	762/796 V	800 HP	720 KVA	-
	1500 V	1600 HP	1400 KVA	1400 KVAR
	230 V	300 HP	240 KVA	250 KVAR
	380 V	450 HP	400 KVA	-
	460 V	600 HP	480 KVA	500 KVAR
	575/600 V	700 HP	600 KVA	600 KVAR
	762/796 V	900 HP	800 KVA	-
	1500 V	2000 HP	1500 KVA	1500 KVAR

Notes:
- *The above table is based on general load data and standard application.*
- *Lower limitations may apply on specific application (i.e. applications above 3000 meter elevations).*

Accessories

- **Capacitor Trip Device:** Used for Latched Contactor when DC Power is Not Available; Charges from AC Power, Supplies DC Power to Trip Coil
- **Control Power Rectifier:** Converts AC to DC Control Power for Trip Coil on Latched-Type Contactors
- **Surge Suppressor:** Three-Phase-Type NV60K304T1 for 3.6 to 7.2 KV, NVK95K304T1 for 12 to 15 KV; Surge Suppressor composed of Capacitor and Series Resistor for an Excellent Protection Device; Features Suppression, Decreased Surge Generation; Suitable for Protecting Motors and Transformers Requiring Frequent Operations
- **Mechanical Interlock:** Used in a Reversing Starter to Mechanically Prevent Forward/ Reverse Contactors from Closing Simultaneously (Not Available for CV-10 Series)

Reversing Contactor Assembly

- Low Voltage Vacuum Contactors, HCV-1JBU (600 A, 208 to 1500 V) and HCV-1KAU (720 A, 208 to 1500 V) available in Assembly for Reversing Motor Applications; Assembly Consists of two Contactors on Common Base-plate with Mechanical Interlock; Line-Side Bus Jumpers with Incoming Mechanical Lugs, Load-Side Cable Jumpers, Output Mechanical Lugs also Included.

Vacuum Contactors
Medium Voltage Vacuum Contactor Specifications

Medium Voltage Technical Data

Model	HCV-5HA	HCV-5HAL	HCV-6KAU	HCV-6KALU	CV-10HA(L)	CV-10HB(L)
Voltage	2.4 to 6.6 KV (7.2 KV maximum)				12 to 15 KV	12 to 13.8 KV
Operational Current	400 A		720 A		400 A	
Rated Thermal Current	450 A		800 A		450 A	
Interrupting Current	7000 A (4.5 KA @ 7.2 KV)		7200 A		5 KA/4 KA	5 KA
Peak Withstand Current	15.8 KA		20 KA		12.5 KA	
Short-Circuit Making/ Breaking Current IEC 60470 (2000)	6.3 KA		8.0 KA		5 KA/4 KA	5 KA
	Open for 3 minutes, closed/open for 3 minutes, closed/open					
Class E1 MVA	25/50 (36/60)		30/60/85		120	
Class E2 MVA	200/400/570		200/400/600		1200	
Withstand Overload Current	2400 A for 30 seconds		4320 A for 30 seconds		1920 A for 30 seconds	
	4000 A for 12 seconds		-		-	
	6300 A for 2 seconds		10,800 A for 1 second		8000 A for 1 second	
Overcurrent Strength w/ Current Limiting Fuses (Peak Value)	85 KA (peak)				See coordination below	
Coordination W/Current Limiting Fuses	-		-		Prospective short-circuit current 50 KA, Cut-off current 36 KA peak	
Switching Frequency	1200/Hr.	300/Hr.	600/Hr.	300/Hr.	300/Hr.	120/Hr.
Mechanical Life	2.5 Million	250 Thousand	1 Million	200 Thousand	250 Thousand	
Electrical Life	250 Thousand		200 Thousand		100 Thousand	
Impulse Withstand	60 KV				75 KV	
Dielectric Strength	22 KV, 1 minute				28 KV, 1 minute (42 KV)	
Closing time (@ 120 VAC)	75 to 100 ms		80 to 100 ms		120 to 145 ms	
Opening time (@ 120 VAC)	20 to 30 ms		40 to 55 ms		30 to 40 ms	
Arcing Time	10 ms or less					
Pick-up Voltage	85% hot to 70% cold AC or DC					
Drop-out Voltage	50% hot to 40% cold AC or DC					
Tripping Voltage	60% or less of coil rating DC (Cold)					

Notes:
- *Special withstand voltage (42 KV for 1 minute) available by request.*
- *Maximum required test. Actual life under normal conditions is greater.*

Vacuum Contactors
Medium Voltage Vacuum Contactor Specifications

Model		HCV-5HA	HCV-5HAL	HCV-6KAU	HCV-6KALU	CV-10HA(L)	CV-10HB(L)
Control Voltage	Standard	120 VAC, 50/60 Hz		115 to 240 VAC/ 125 to 250 VDC		100 to 240 VAC/ 125 to 250 VDC	
	Optional	240 VAC/ 125 VDC/ 250 VDC		-		-	
	Tripping	-	24, 32, 48, 125, 250 VDC	-	24, 32, 48, 125, 250 VDC	-	125 VDC
Control Circuit Burden	Closing	5.4 A peak @ 120 VAC 670 VA (AC), 700W (DC)		6 to 7.0 A @ 120 VAC 840 VA (AC), 875W (DC)		7.2 A peak @ 120 VAC 864 VA (AC) - 900W (DC)	
	Holding	0.12 A Avg. @ 120 VAC 85 VA (AC), 85W (DC)		0.8 to 1 A @ 120 VAC 48 VA		0.16 A Avg. @ 120 VAC 80 VA (AC), 90W (DC)	
	Tripping[1]	4.8 A peak @125 VDC					
Auxiliary Contact Ratings	Arrangement	3NO-3NC	2NO-2NC	3NO-3NC	2NO-2NC	4NO-2NC	2NO-1NC
	Current	10 A (A600)					
	Voltage	600 V maximum, 48 V minimum					
	AC	720 VA (P.F. 0.35)					
	DC	60W (L/R 150 ms)					
Application Conditions	Altitude w/o Derating	Lower than 3300 ft (1000 m)					
	Ambient	-5° to 40°C					
	Relative Humidity	45 to 85%					
	Vibration	Maximum 20 Hz to 1 G					
	Shock	Maximum 30 G					
Weight in lbs. (kg)		43 (19.5)	44 (20.0)	60 (27)	62 (28)	88 (40)	91 (41)

Notes:
- *Latched type for HCV-5HAL.*

Vacuum Contactors
Medium Voltage Vacuum Contactor Specifications

Medium Voltage Application Table

Model	System Voltage	0.8 PF Ind./ Syn. Motor	1.0 PF Syn. Motor	Three-Phase Transformer	Three-Phase Capacitor
HCV-5HA(L) (400 A)	2.2 to 2.5 KV	1750 HP	2000 HP	1500 KVA	1500 KVAR
	3 to 3.3 KV	2250 HP	2500 HP	2000 KVA	2000 KVAR
	4 to 5 KV	3000 HP	3500 HP	3000 KVA	2000 KVAR
	6 to 6.6 KV	4500 HP	5000 HP	4000 KVA	2000 KVAR
HCV-6KA(L)U (720 A)	2.2 to 2.5 KV	2500 HP	3000 HP	2500 KVA	2000 KVAR
	3 to 3.3 KV	3000 HP	3500 HP	3500 KVA	2000 KVAR
	4 to 5 KV	4500 HP	5000 HP	4500 KVA	2000 KVAR
	6 to 6.6 KV	6000 HP	7000 HP	7000 KVA	2000 KVAR
CV-10HA(L) (320 A)	6.9 to 7.2 KV	3500 HP	4000 HP	3000 KVA	N/A
	10 to 12 KV	5500 HP	6000 HP	5500 KVA	
	13.8 KV	7000 HP	7500 HP	6500 KVA	
CV-10HB(L) (320 A Continuous, 230 A Breaking)	2.2 to 2.5 KV	N/A	N/A	N/A	1500 KVAR
	3 to 3.3 KV				2000 KVAR
	4 to 5 KV				2000 KVAR
	6 to 6.6 KV				3000 KVAR
	6.9 to 7.2 KV				3000 KVAR
	10 to 13.8 KV				5000 KVAR

Notes:
- *The above table is based on general load data and standard application.*
- *Lower limitations may apply on specific applications (i.e applications above 3000 meter elevations).*

Vacuum Contactors
Low & Medium Voltage
Vacuum Contactor Pricing

Model	Description	Application	List Price
HCV-5HA	400 A, 2.3 to 7.2 KV Non-Latched Type	Motors, distribution loads, transformer/capacitor switching	$4,000
HCV-5HAL-xx	400 A, 2.3 to 7.2 KV Latched Type	Motors, distribution loads, transformer/capacitor switching	$4,800
HCV-6KAU	720 A, 2.3 to 7.2 KV Non-Latched Type	Motors, distribution loads, transformer/capacitor switching	$12,000
HCV-6KALU-xx	720 A, 2.3 to 7.2 KV Latched Type	Motors, distribution loads, transformer/capacitor switching	$12,900
CV-10HA	400 A, 10 to 15 KV Non-Latched Type	Motors, distribution loads, transformer	$11,700
CV-10HAL	400 A, 10 to 15 KV Latched Type	Distribution loads, transformer switching	$13,000
CV-10HB	400 A, 10 to 13.8 KV Non-Latched Type	Capacitor switching	$11,700
CV-10HBL	400 A, 10 to 13.8 KV Latched Type	Capacitor switching	$13,000
HCV-1JBU	600 A, 208 to 1500 V Non-Latched Type	Motors, distribution loads, transformer/capacitor switching	$6,000
HCV-1KAU	720 A, 208 to 1500 V Non-Latched Type	Motors, distribution loads, transformer/capacitor switching	$9,400
HCVR-1JBU	Reversing Contactor Assembly, 600 A, 208 to 1500 V Non-Latched Type	Reversing motors	$14,700
HCVR-1KAU	Reversing Contactor Assembly, 720 A, 208 to 1500 V Non-Latched Type	Reversing motors	$21,400

Latched Contactor Voltage Codes

Close Voltage	Code	Trip-Coil Voltage	Code
1	120 VAC	1	125 VDC
2	240 VAC	2	250 VDC
3	125 VDC	3	24 VDC
4	250 VDC	4	32 VDC
		5	48 VDC

Notes:
- *For HCV-5HAL and HCV-6KALU, replace "xx" in model number with close and trip voltage codes. First "x" is closing voltage, and second "x" is trip-coil voltage.*
- *For 24 VDC, 32 VDC, and 48 VDC trip, add $800 to list price shown in table. Adder includes auxiliary contact arc killer.*

Vacuum Contactors
Low & Medium Voltage
Vacuum Contactor Accessories

Model Number	Description	List Price
CIT-10QA	Capacitor trip device used for latched-type vacuum contactor or vacuum circuit breaker when DC power is not available. Charges from AC power and supplies DC power to trip coil 	$1,500
4Z9G0334G001	AC/DC control power rectifier converts 120/240 VAC Input to 125/520 VDC to power trip coil on latched-type vacuum contactor or control power for a vacuum circuit breaker 	$300
NV60K304T1	Surge suppressor: Three-phase CR surge suppressor for 3.3 to 7.2 KV system 	$2,500
NV95K304T1	Surge suppressor: Three-phase CR surge suppressor for 10 to 15 KV system	$5,900
2C9G0059G002	Mechanical interlock for HCV-5HA(L)	$640
2C9G0068G001	Mechanical interlock for HCV-6KA(L)U	$1,000
3Z9G0119G001	Latched-contactor modification kit for HCV-5HA & HCV-6KAU; 125 VDC trip-coil	$700
3Z9G0119G002	Latched-contactor modification kit for HCV-5HA & HCV-6KAU; 250 VDC trip-coil	$700
3Z9G0119G003	Latched-contactor modification kit for HCV-5HA & HCV-6KAU; 24 VDC trip-coil	$1,150
3Z9G0119G004	Latched-contactor modification kit for HCV-5HA & HCV-6KAU; 30/32 VDC trip-coil	$1,150
3Z9G0119G005	Latched-contactor modification kit for HCV-5HA & HCV-6KAU; 48 VDC trip-coil	$1,150
PC18330P671	Latched-contactor auxiliary contact arc killer for HCV-5HAL & HCV-6KAUL; Used with 24/32/48 VDC trip-coil models	$280
5P9A2593P001	B9 lubricating grease (30 g tube)	CF

Low Voltage Solid State Starters
TE Series

Toshiba's low voltage TE Series is a high-end, digitally programmable, reduced voltage solid state starter. This heavy-duty starter provides stepless soft starting of three-phase AC induction motors, which protects mechanical components from excessive torque stress as well as electrical systems from the effects of high motor inrush currents. Toshiba's TE Series solid state starter sets a new standard in control and protection for critical motors and loads.

Product Scope

18 to 1250 A
200 to 600 V

Highlights

- Advanced Motor Protection
- Narrow Width for Motor Control Center (MCC) Mounting
- Remote Keypad Mounting
- Pull-Apart Control Terminals for Easy Assembly & Wiring
- Smooth, Stepless Soft Start
  - Voltage Ramp Start: 1 to 120 Seconds
  - Initial Voltage: 0 to 100%
- Soft Stop
  - Stop Voltage: 0 to 100%
- Deceleration/Pump Control
- Current Limit: 200 to 600%
- Overload Capacity: 500% for 60 Seconds
- Undercurrent
- Overcurrent
- Jog Mode
- Three Programmable Output Relays
- Two-Wire/Four-Wire
- 120 V Control Voltage

STANDARD FEATURES

- UL Listed in US & Canada
- Four-Digit EOI Display
- Start & Run Protection
- Residual Ground Fault
- Retentive Thermal Memory
- Overload Reset: Manual or Automatic
- Phase Loss (Single-Phase)/Imbalance (5 to 30%)
- Electronic Overload
- Shorted SCR
- Shorted Load
- Over-Temperature

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Low Voltage Solid State Starters
TE Series Pricing

TE Solid State Starter Pricing — Open Chassis Type

Model Number	Max. Amps	Nominal Motor Rating 50/60Hz								List Price
		208 V/HP		230 V/HP		460 V/HP		575 V/HP		
		Shunt Bypass	Start Bypass	Shunt Bypass	Start Bypass	Shunt Bypass	Start Bypass	Shunt Bypass	Start Bypass	
TE-18-BP	18	5	3	5	5	10	10	15	10	$1,570
TE-28-BP	28	7.5	7.5	7.5	7.5	20	15	25	20	$1,600
TE-39-BP	39	10	10	10	10	25	25	30	30	$1,650
TE-48-BP	48	15	10	15	15	30	30	40	30	$1,700
TE-62-BP	62	20	15	20	20	40	40	60	50	$1,720
TE-78-BP	78	25	20	25	25	60	50	75	60	$1,750
TE-92-BP	92	30	25	30	30	60	60	75	75	$2,100
TE-112-BP	112	30	30	40	30	75	75	100	75	$2,500
TE-150-BP	150	40	40	50	50	100	100	125	-	$3,200
TE-160-BP	160	50	40	60	50	125	100	150	-	$3,600
TE-210-BP	210	60	60	75	60	150	150	200	150	$4,600
TE-275-BP	275	75	60	100	75	200	150	200	150	$5,500
TE-361-BP	361	125	75	125	125	300	250	350	300	$5,900
TE-450-BP	450	150	125	150	150	350	300	450	300	$6,620
TE-550-BP	550	150	150	200	200	450	400	500	500	$8,350
TE-600-BP	600	200	200	200	200	500	500	600	600	$8,500
TE-862-BP	862	250	250	300	300	600	500	700	600	$12,250
TE-900-BP	900	300	250	350	300	700	600	900	600	$14,250
TE-1006-BP	1006	350	300	400	400	800	800	1000	900	$24,000
TE-1250-BP	1250	450	350	500	450	1000	900	1200	1000	$29,500

Notes:
- *Data is based on NEC Table 430-150, full-load current three-phase motors.*
- *Size soft starter based on actual motor nameplate FLA.*

Low Voltage Solid State Starters
TE-H Series

There is no need to compromise on performance or features. The TE-H Series incorporates Toshiba's TE Series SSS into a heavy-duty enclosure that is ready to work right out-of-the-box. Expect the full benefits of reliable soft starting, unsurpassed motor/load protection, and control flexibility -- all in one complete package that is readily stocked in many ratings.

Product Scope

21 to 1080 A
200 to 600 V

Highlights

- Type 12/4 Enclosure (21 to 600 A)
- Type 12 Enclosure (690 to 1080 A)
- Circuit Breaker with Door Operator
- Fusible Disconnect Switch with Fuses
- Built-In Full Line Start Bypass Contactor
- Soft Start or Across-the-Line Switch

STANDARD FEATURES

- Includes TE Series SSS
- UL Listed in US & Canada
- Four-Digit EOI Display
- 120 V Control Voltage (CPT Included)
- Smart Door
  - Door Mounted Keypad
  - Emergency Stop Button
  - Local/Off/Remote Switch
  - Start/Stop Button

TE-H Smart Door

Low Voltage Solid State Starters
TE-H Series Pricing

TE-H Heavy Duty Combination Type

Model Number	Max. Amp Rating	Nominal Motor HP Rating				Maximum KW Rating			List Price	Enclosure Frame Size
		200 V/HP	230 V/HP	460 V/HP	575 V/HP	220 V/KW	380 V/KW	415 V/KW		
TE-H-21-CB-*	21	7.5	7.5	10-15	15-20	5.5	11	11	$5,100	1
TE-H-27-CB-*	27	10	10	20-25	25-30	7.5	15	15	$4,100	1
TE-H-40-CB-*	40	10	15	30	30	11	18.5	18.5	$3,900	1
TE-H-45-CB-*	45	15	20	40	40-50	15	30	30	$4,000	1
TE-H-55-CB-*	55	20	25	50	60	18.5	37	30	$4,200	1
TE-H-68-CB-*	68	25	30	60	-	22	45	37	$4,500	1
TE-H-96-CB-*	96	30	30	75	75	30	55	60	$5,400	1
TE-H-125-CB-*	125	40	40-50	100	-	45	75	75	$6,000	1
TE-H-156-CB-*	156	50-60	60	125-150	100-150	55	90	90	$7,000	2
TE-H-220-CB-*	220	60	75	150	150	55	110	132	$8,200	2
TE-H-248-CB-*	248	75-100	100-125	200-250	200-300	75	132	132	$9,600	2
TE-H-312-CB-*	312	125	150	300	300	110	160	160	$10,800	2
TE-H-400-CB-*	400	125	150	300	300	-	200	250	$11,500	2
TE-H-480-CB-*	480	150	200	400	350-500	-	-	-	$15,000	2
TE-H-600-CB-*#	600	150	250	500	600	-	-	-	$20,500	2
TE-H-690-CB-*	690	250	250	500	600	-	355	400	$20,750	3
TE-H-800-CB-*	800	250	300	600	600	-	450	500	$21,000	3
TE-H-960-CB-*	960	300	350-400	700-800	700-900	-	475	500	$33,000	3
TE-H-1080-CB-*	1080	350	450	900	1000	-	565	600	$38,000	3

Notes:
 # - TE-H-600 is 1.0 S.F. rated. Use 690 model if 1.15 S.F. is required.
** - Replace with Line and Control Voltage code listed below:*
1 = 208 V, 120 V Ctrl, 50/60 Hz
2 = 230 V, 120 V Ctrl, 50/60 Hz
3 = 380 V, 220 V Ctrl, 50/60 Hz
4 = 460 V, 120 V Ctrl, 50/60 Hz
5 = 575 V, 120 V Ctrl, 50/60 Hz
6 = 415 V, 220 V Ctrl, 50/60 Hz
7 = 220 V, 220 V Ctrl, 50/60 Hz

Low Voltage Solid State Starters
TE & TE-H Series Dimensions & Weights

TE Series — Open Chassis Type

Model	Open-Chassis Type			
	Dimensions Inches (mm)			Approx. Weight lbs. (kg)
	H	W	D	
TE-18-BP to TE-48-BP	8.75 (216)	8.00 (203)	6.66 (169)	13 (5.9)
TE-62-BP to TE-112-BP	14.00 (355.6)	8.00 (203)	6.68 (170)	23 (10.4)
TE-150-BP to TE-160-BP	19.21 (487.9)	8.00 (203)	6.68 (170)	33 (15)
TE-210-BP	28.50 (712.4)	12.50 (317.5)	9.04 (223)	130 (59)
TE-275-BP				140 (63.5)
TE-361-BP to TE-450-BP				145 (65.8)
TE-550-BP to TE-600-BP	28.50 (712.4)	12.50 (317.5)	9.04 (223)	165 (74.8)
TE-862-BP to TE-900-BP	44.13 (1120)	25.5 (647.7)	11.86 (301)	315 (143)
TE-1006-BP	46.56 (1182)	28.2 (716)	13.00 (330)	550 (250)
TE-1250-BP	46.56 (1182)	28.2 (716)	13.00 (330)	750 (340)

TE-H Series — Combination Type

Frame Size	Enclosure	Dimensions (in.)			Rating
		H	W	D	
1	Wall Mount	37	15	17	N4/12
2	Wall Mount	48	33	16	N4/12
3	Floor Standing	92	36	30	N12 only

Low Voltage Solid State Starters
TD Series

Toshiba's low voltage TD Series is a high-end, digitally programmable, reduced voltage solid state starter. This heavy-duty microprocessor controlled solid state starter offers a new standard of motor and load protection for critical motor loads. Digital microprocessor control makes sophisticated programmable protective features possible, yet keeps the complex algorithms transparent to the user. Programmable protection, flexible response, system protection, and historical recordings make the TD Series an ideal choice for your applications.

Product Scope

48 to 1250 A
200 to 600 V

Highlights

- Smooth, Stepless Soft Start
  - Voltage Ramp Start: 1 to 120 Seconds
  - Initial Voltage: 0 to 100%
- Soft Stop
  - Stop Voltage: 0 to 100%
- Deceleration/Pump Control
- Current Limit: 200 to 600%
- Overload Capacity: 500% for 60 Seconds; 600% for 30 Seconds
- Undercurrent
- Overcurrent
- Three Programmable Output Relays
- Two-Wire/Four-Wire
- Modbus RTU RS485 (Adapter Kit Required)
- 120 V Control Voltage

TD Display

STANDARD FEATURES

- UL Listed in US & Canada
- Built-In Real-Time Clock
- Four-Digit Display
- Phase Reversal
- Phase Currents (A,B,C)
- Remaining Thermal Capacity of Motor
- Elapsed Time (ETM)
- Run Cycle Counter
- Past Trip Monitoring: Stores Last 3 Faults
- Lockout Time Remaining
- Overload Reset: Manual or Automatic
- Phase Loss (Single-Phase)/Imbalance (5 to 30%)
- Electronic Overload
- Shorted SCR
- Shorted Load

Low Voltage Solid State Starters
TD Series Pricing

TD Series—Non-Combination Type

Model Number	Chassis Max. Amps	Maximum HP				List Price			
						Open Chassis	Enclosure Type		
		208V	230 V	460 V	575 V		1	12/3R	4
TD005	48	10	15	30	40	$1,800	-	$2,800	$2,970
TD006	78	15	20	40	50	$1,900	-	$2,900	$3,070
TD006	78	20	25	50	60	$1,900	-	$2,900	$3,070
TD007	120	25	30	60	75	$2,300	-	$4,100	$4,750
TD007	120	30	40	75	100	$2,300	-	$5,080	$5,700
TD008	180	40	50	100	125	$3,000	$5,080	$6,350	$6,800
TD008	180	50	60	125	150	$3,000	$5,080	$6,900	$7,300
TD009	220	60	75	150	200	$3,600	$5,800	$8,200	$8,670
TD010	288	75	100	200	250	$4,000	$6,560	$8,670	$9,500
TD011	414	100	125	250	300	$4,600	$7,400	$10,150	$11,100
TD011	414	125	150	300	350	$4,600	$7,400	$10,900	$11,950
TD012	476	-	-	350	400	$5,500	$9,200	$12,900	$14,380
TD013	550	150	200	400	500	$5,800	$9,610	$13,500	$14,700
TD014	718	200	250	500	600	$7,500	$12,900	$19,900	$21,700
TD015	1006	250	300	600	700	$9,000	$15,700	$21,200	$23,950
TD015	1006	300	350	700	800	$9,000	$15,700	$21,200	$23,950
TD016	1150	350	400	800	900	$15,000	$23,800	$44,600	$48,000
TD017	1250	400	450	900	1000	$19,000	$31,800	$52,900	CF
TD017	1250	450	500	1000	1250	$19,000	CF		

Notes:
- *For TD007 to TD017, the NEMA 12, 3R, and 4 price includes automatic bypass (air) contactor, full HP rated.*
- *Minimum motor FLA (chassis) setting is programmable down to 18A.*
- *Unit has an integrated NEMA 1 chassis, but can also be used as a panel mount.*
- *All units require 120 VAC control power. See option for control power transformer if desired.*
- *Options and accessories may affect overall dimensions. Consult factory for exact dimensions.*
- *CF: Consult Factory.*

Low Voltage Solid State Starters
TD Series Pricing

TD Series— Combination Circuit Breaker Type

Model Number	Chassis Max. Amps	Maximum HP				List Price		
						Enclosure Type		
		208 V	230 V	460 V	575 V	1	12/3R	4
TD105	48	10	15	30	40	$4,100	$4,530	$5,070
TD106	78	15	20	40	50	$4,230	$4,700	$5,180
TD106	78	20	25	50	60	$4,230	$4,700	$5,180
TD107	120	25	30	60	75	$5,180	$5,980	$6,560
TD107	120	30	40	75	100	$6,090	$6,870	$7,500
TD108	180	40	50	100	125	$7,400	$7,950	$8,780
TD108	180	50	60	125	150	$7,840	$8,460	$9,300
TD109	220	60	75	150	200	$8,350	$9,600	$10,500
TD110	288	75	100	200	250	$10,270	$12,500	$13,800
TD111	414	100	125	250	300	$11,300	$13,500	$14,700
TD111	414	125	150	300	350	$12,960	$13,950	$15,300
TD112	476	-	-	350	400	$14,900	$20,200	$22,100
TD113	550	150	200	400	500	$15,700	$20,500	$22,400
TD114	718	200	250	500	600	$18,300	$25,800	$28,700
TD115	1006	250	300	600	700	$22,900	$29,900	$32,800
TD115	1006	300	350	700	800	$25,800	$33,800	$35,800
TD116	1150	350	400	800	900	$36,200	$48,800	$51,500
TD117	1250	400	450	900	1000	$42,200	$65,000	CF
TD117	1250	450	500	1000	1250	$54,300	$65,600	

Notes:
- *For TD107 to TD117, the NEMA 12, 3R, and 4 price includes automatic bypass (air) contactor, full HP rated.*
- *Minimum motor FLA (chassis) setting is programmable down to 18 A.*
- *All units require 120 VAC control power. See option for control power transformer if desired.*
- *Options and accessories may affect overall dimensions. Consult factory for exact dimensions.*
- *Circuit breakers come standard with shunt-trip coil (120 VAC).*
- *CF: Consult Factory.*

Low Voltage Solid State Starters
TX Series

Toshiba's low voltage TX Series is a high-end, digitally programmable, reduced voltage solid state starter. This heavy-duty microprocessor controlled solid state starter offers a new standard of motor and load protection for critical motor loads. Digital microprocessor control makes sophisticated programmable protective features possible, yet keeps the complex algorithms transparent to the user. Programmable protection, flexible response, system protection, and historical recordings make the TX Series an ideal choice for your applications.

Product Scope

48 to 1250 A
200 to 600 V

Highlights

- Smooth, Stepless Soft Start
  - Voltage Ramp Start: 1 to 120 Seconds
  - Initial Voltage: 0 to 100%
- Soft Stop
  - Stop Voltage: 0 to 100%
- Deceleration/Pump Control
- Current Limit: 200 to 600%
- Overload Capacity: 500% for 60 Seconds; 600% for 30 Seconds
- Undercurrent
- Overcurrent
- Four Programmable Output Relays
- Two-Wire/Four-Wire
- 120 V Control Voltage

TX Display

STANDARD FEATURES

- UL Listed in US & Canada
- Built-In Real-Time Clock
- Residual Ground Fault
- Phase Reversal
- Motor Thermal Model
- Retentive Thermal Memory
- Dynamic Reset Response
- Overload Reset: Manual or Automatic
- Phase Loss (Single-Phase)/Imbalance (5 to 30%)
- Electronic Overload
- Shorted SCR
- Shorted Load
- Over-Temperature

Low Voltage Solid State Starters
TX Series Pricing

TX Series—Non-Combination Type

Model Number	Chassis Max. Amps	Maximum HP				List Price			
						Open Chassis	Enclosure Type		
		208 V	230 V	460 V	575 V		1	12/3R	4
TX005	48	10	15	30	40	$3,400	-	$3,990	$4,230
TX006	78	15	20	40	50	$3,600	-	$4,700	$4,970
TX006	78	20	25	50	60	$3,600	-	$4,700	$4,970
TX007	120	25	30	60	75	$3,900	-	$5,980	$6,450
TX007	120	30	40	75	100	$3,900	-	$6,950	$7,500
TX008	180	40	50	100	125	$4,600	$6,880	$8,250	$8,700
TX008	180	50	60	125	150	$4,600	$6,900	$8,700	$9,300
TX009	220	60	75	150	200	$5,200	$7,600	$10,200	$10,500
TX010	288	75	100	200	250	$5,600	$8,400	$10,600	$11,300
TX011	414	100	125	250	300	$6,200	$9,300	$11,900	$12,800
TX011	414	125	150	300	350	$6,200	$9,300	$12,800	$13,900
TX012	476	-	-	350	400	$7,100	$10,900	$14,740	$14,200
TX013	550	150	200	400	500	$7,400	$11,300	$15,300	$16,500
TX014	718	200	250	500	600	$9,100	$14,800	$21,600	$23,600
TX015	1006	250	300	600	700	$10,600	$17,500	$22,900	$25,000
TX015	1006	300	350	700	800	$10,600	$17,500	$22,900	$25,000
TX016	1150	350	400	800	900	$16,600	$25,700	$47,400	$49,800
TX017	1250	400	450	900	1000	$20,600	$33,700	$54,600	CF
TX017	1250	450	500	1000	1250	$20,600	CF		

Notes:
- *For TX007 to TX017, the NEMA 12, 3R, and 4 price includes automatic bypass (air) contactor, full HP rated.*
- *Minimum motor FLA (chassis) setting is programmable down to 18 A.*
- *Unit has an integrated NEMA 1 chassis, but can also be used as a panel mount.*
- *All units require 120 VAC control power. See option for control power transformer, if desired*
- *Options and accessories may affect overall dimensions. Consult factory for exact dimensions.*
- *CF: Consult Factory.*

Low Voltage Solid State Starters
TX Series Pricing

TX Series—Combination Circuit Breaker Type

Model Number	Chassis Max. Amps	Maximum HP				List Price		
						Enclosure Type		
		208 V	230 V	460 V	575 V	1	12/3R	4
TX105	48	10	15	30	40	$5,700	$6,100	$6,900
TX106	78	15	20	40	50	$6,090	$6,560	$7,100
TX106	78	20	25	50	60	$6,090	$6,560	$7,100
TX107	120	25	30	60	75	$7,100	$7,920	$8,500
TX107	120	30	40	75	100	$7,980	$8,700	$9,500
TX108	180	40	50	100	125	$9,240	$9,840	$10,680
TX108	180	50	60	125	150	$9,720	$11,300	$12,400
TX109	220	60	75	150	200	$10,250	$11,800	$12,800
TX110	288	75	100	200	250	$12,060	$14,300	$15,700
TX111	414	100	125	250	300	$13,200	$15,200	$16,500
TX111	414	125	150	300	350	$13,980	$15,840	$17,300
TX112	476	-	-	350	400	$16,900	$21,900	$24,000
TX113	550	150	200	400	500	$17,900	$22,500	$24,700
TX114	718	200	250	500	600	$20,300	$31,300	$34,700
TX115	1006	250	300	600	700	$25,000	$31,800	$35,800
TX115	1006	300	350	700	800	$27,000	$35,800	$37,700
TX116	1150	350	400	800	900	$38,400	$50,900	$53,200
TX117	1250	400	450	900	1000	$43,900	$67,700	CF
TX117	1250	450	500	1000	1250	$56,900	$68,300	

Notes:
- *For TX107 to TX117, the NEMA 12, 3R, and 4 price includes automatic bypass (air) contactor, full HP rated.*
- *Minimum motor FLA (chassis) setting is programmable down to 18 A.*
- *All units require 120 VAC control power. See option for control power transformer, if desired.*
- *Options and accessories may affect overall dimension. Consult factory for exact dimensions.*
- *Circuit breakers come standard with shunt-trip coil (120 VAC).*
- *CF: Consult Factory.*

Low Voltage Solid State Starters
TD & TX Series Dimensions

Max HP At 460 V	Model	Combination Type (Circuit Breaker) N-1 (With CPT, No Bypass)			Combination Type (Circuit Breaker) N-12/3R (With CPT, Air Bypass)		
		Dimensions (in.)			Dimensions (in.)		
		H	W	D	H	W	D
30	TD/TX105	30	24	13	30	24	16
50	TD/TX106	30	24	13	30	24	16
60	TD/TX107	30	24	13	30	24	16
75	TD/TX107	30	24	13	30	24	16
100	TD/TX108	42	30	13	48	36	16
125	TD/TX108	42	30	13	48	36	16
150	TD/TX109	42	30	13	60	36	16
200	TD/TX110	48	36	16	60	36	16
250	TD/TX111	48	36	16	60	36	16
300	TD/TX111	48	36	16	60	36	16
350	TD/TX112	48	36	16	60	36	16
400	TD/TX113	48	36	16	72	48	16
500	TD/TX114	72	60	20	90	48	24
600	TD/TX115	72	60	20	90	48	24
800	TD/TX116	90	72	24	90	72	24
1000	TD/TX117	Consult Factory			90	72	24

Notes:
- *TD/TX005 and TD/TX006 as standard do not come with or need an automatic bypass contactor.*
- *Includes floor-stand kit as standard. Add 12"for total height (i.e. 84"tall).*

Max HP At 460 V	Model	Combination Type (Circuit Breaker) N-12/3R (With CPT, Vacuum Bypass)		
		Dimensions (in.)		
		H	W	D
100	TD/TX108	48	36	16
125	TD/TX108	48	36	16
150	TD/TX109	60	36	16
200	TD/TX110	60	36	16
250	TD/TX111	60	36	16
300	TD/TX111	72	48	16
350	TD/TX112	72	48	16
400	TD/TX113	72	48	16
500	TD/TX114	90	48	24
600	TD/TX115	90	48	24
800	TD/TX116	Not Available		
1000	TD/TX117			

Notes:
- *Includes floor-stand kit as standard. Add 12"for total height (i.e 84"tall).*

Low Voltage Solid State Starters
TD & TX Series Dimensions & Weights

Max HP At 460 V	Model	Open-Chassis Type				Non-Combination Type N-1 (With CPT, No Bypass)		
		Dimensions (in.)			Weight (lbs.)	Dimensions (in.)		
		H	W	D		H	W	D
30	TD/TX005	16	10	10	31.4	30	24	13
50	TD/TX006	16	10	10	34.8	30	24	13
60	TD/TX007	16	10	10	35	30	24	13
75	TD/TX007	16	10	10	35	30	24	13
100	TD/TX008	20	20.12	12	85	30	24	13
125	TD/TX008	20	20.12	12	85	30	24	13
150	TD/TX009	27	20.12	11.2	85	42	30	13
200	TD/TX010	27	20.12	11.2	97	42	30	13
250	TD/TX011	29.5	20.12	11.5	120	42	30	13
300	TD/TX011	29.5	20.12	11.5	120	42	30	13
350	TD/TX012	29.5	20.12	11.5	120	42	30	13
400	TD/TX013	29.5	20.12	11.5	120	42	30	13
500	TD/TX014	45	33	12.75	410	48	36	16
600	TD/TX015	45	33	12.75	410	48	36	16
800	TD/TX016	33	33	15.2	893	90	48	24
1000	TD/TX017	33	33	15.2	893	90	48	24

Max HP At 460 V	Model	Non-Combination Type N-1/12/3R (With CPT, Air Bypass)			Non-Communication Type N-1/12/3R (With CPT, VAC Bypass)		
		Dimensions (in.)			Dimensions (in.)		
		H	W	D	H	W	D
30	TD/TX005	30	24	16	-	-	-
50	TD/TX006	30	24	16	-	-	-
60	TD/TX007	30	24	16	-	-	-
75	TD/TX007	30	24	16	-	-	-
100	TD/TX008	48	36	16	48	36	16
125	TD/TX008	48	36	16	48	36	16
150	TD/TX009	60	36	16	60	36	16
200	TD/TX010	60	36	16	60	36	16
250	TD/TX011	60	36	16	60	36	16
300	TD/TX011	60	36	16	72	48	16
350	TD/TX012	60	36	16	72	48	16
400	TD/TX013	60	36	16	72	48	16
500	TD/TX014	90	48	24	90	48	24
600	TD/TX015	90	48	24	90	48	24
800	TD/TX016	90	48	24	Not Available		
1000	TD/TX017	90	48	24			

Notes:
- *TD/TX005, TD/TX006 as standard do not come with or need an automatic bypass contactor.*
- *Includes floor-stand kit as standard. Add 12" for total height (i.e. 84" tall).*

Low Voltage Solid State Starters
TD & TX Series Part Numbering Convention

Ordering Information: Use the following part numbering convention to configure the solid state starter when placing your order. For additional factory installed options, add the appropriate option code on the end as in the example below. Example is a TD unit with a circuit breaker, 100 HP, 460 V, in a NEMA 12 enclosure.

Example Part Number:	TD/TX	1	08	K	C	Y	1
Series							
Non-Comb. or w/CB: 0 — Non-comb.		1 — Circuit breaker					
Chassis rating: 04 — 32A 05 — 48A 06 — 78A 07 — 120A 08 — 180A 09 — 220A 10 — 288A		11 — 414A 12 — 475A 13 — 550A 14 — 718A 15 — 1006A 16 — 1150A 17 — 1250A					
Enclosure Rating: A — None (Open) B — 1 C — 1A K — 12		E — 3R G — 4 W — 4X					
Line Voltage @ 60 Hz B — 230 to 240 C — 460 to 480 D — 575 to 600 F — 208 H — 400	**Line Voltage @ 50 Hz** N — 200 to 220 P — 400 to 440 R — 380		**Line Voltage w/open chassis no factory mod.** N — 200 to 220 C — 208 to 480 D — 575 to 600				
Motor rating: K — 7.5 HP L — 10 HP M — 15 HP N — 20 HP P — 25 HP Q — 30 HP R — 40 HP	S — 50 HP T — 60 HP V — 75 HP W — 100 HP Y — 125 HP Z — 150 HP A — 200 HP		B — 250 HP C — 300 HP D — 350 HP E — 400 HP F — 450 HP G — 500 HP H — 600 HP		J — 700 HP K — 800 HP L — 900 HP M — 1000 HP N — 1250 HP X — OTHER		
Bypass/Input ISO: 0 — NONE 1 — Auto byp - Air Ctt 2 — Man byp - VAC Ctt/2E OL 3 — Man byp - Air Ctt/2E OL			4 — Auto byp - VAC Ctt 5 — ISO - Air Ctt 6 — ISO - VAC Ctt 7 — Man byp - air Ctt/bi-metal OL				

Notes:

- *Enclosure Ratings:*
  - *1 — Type 1, Indoor, General Purpose*
  - *1A — Indoor, Gasketed, Dust-Protected with Fans & Filters*
  - *12 — Type 12, Indoor, Dust-Tight, Drip-Tight*
  - *3R — Type 3R, Outdoor, Rain-Tight, Sleet-Resistant*
  - *4 — Type 4, Indoor/Outdoor, Water-Tight, Dust-Tight*
  - *4X — Type 4X, Indoor/Outdoor, Water-Tight, Dust-Tight, Corrosion-Resistant*
- *For no modifications or bypass, 120 VAC separate control, use open chassis enclosure code "A" in the part number, line voltage code "C" or "D" for TD, "D" for TX, no other codes.*

Low Voltage Solid State Starters
Factory Installed Modifications

Modification Ordering Information: Use the following part numbering convention to configure the solid state starters when placing your order.

For additional factory installed options, add the appropriate option code to the end of the part number as shown in the example.

For a TD rated 100 HP, 460 V, type 12 enclosure, which comes standard with an automatic bypass contactor, include a control power transformer (460 V:120 V), H/Off/Auto selector switch, Run/Off pilot lights.

TD108KCY1	D		0		K		6			
Starter Base Part No.	Control Circuit		Pilot Device PB		Pilot Device SS		Pilot Device PL		Protective Device/ Relay/Etc.	
	Code	Type	Code	Type	Code	Type	Code	Type	Code	Type
TD for a 100 HP, 460 V motor, with circuit breaker in N-12 enclosure	D	Std. capacity CPT	0	No push-button	K	H/O/A Switch	6	Run/Off pilot lights	Blank	No additional options

TE Series Factory Installed Modifications

Option	Modification Description	List Price
RX	Emergency Bypass - Door mounted SS/ATL switch with solid state overload relay	$1,000
XVS	Ethernet Communications (Includes VS1 Converter)	$2,900
SHIELD-1	For 21-125A only, outdoor, direct sunlight, sun shield kit is recommended (installed by customer, shipped loose)	$800
SHIELD-2	For 156-600A only, outdoor, direct sunlight, sun shield kit is recommended (installed by customer, shipped loose)	$800
H	Heater with Thermostat	$800
RTD	TE-RTD12 RTD Monitor/Relay- Includes door mounted keypad/display	$4,400

Low Voltage Solid State Starters
TD & TX Factory Installed Modifications

Modification Description			Model	Code	List Price
No bypass or input isolation contactor			All	0	-
• Bypass option (bypass contactor is full-HP rated for across-the-line starting)	• Manual bypass • Allows emergency full voltage starting without SSS • No pilot devices supplied as standard • If door or internally-mounted device is required, add appropriate option (i.e. selector switch mod. code "E" or "M", $300 adder)	• Bypass - air contactor & bimetallic overload	TD/TX_05	7	$450
			TD/TX_06		$600
			TD/TX_07		For N-1 enclosure, use N-12 price code, add $250 On N-12/3R/4/4X, add $250
			TD/TX_08		
			TD/TX_09		
			TD/TX_10		
			TD/TX_11		
			TD/TX_12		
			TD/TX_13		
			TD/TX_14		
			TD/TX_15		
			TD/TX_16		Consult Factory
			TD/TX_17		
		• Bypass - vacuum contactor & 2E solid state overload for Type 1 enclosure, use Type 12 list price enclosure code, add modification list price • For Type 12, 3R, 4, and 4X, use appropriate enclosure code, add modification list price shown	TD/TX_13	2	$5,000
			TD/TX_14		$5,400
			TD/TX_15 (720A max. FLA)		$5,400
• Bypass option (bypass contactor is full-HP rated for across-the-line starting)	• Manual bypass • Allows emergency full voltage starting without SSS • No pilot devices supplied as standard • If door or internally-mounted device is required, add appropriate option (i.e. selector switch mod. code "E" or "M", $100 adder	• Bypass - air contactor and 2E solid state overload	TD/TX_05	3	$1,100
			TD/TX_06		$1,100
			TD/TX_07		For N-1 enclosure, use N-12 price code, add $720 On N-12/3R/4/4X, add $720
			TD/TX_08		
			TD/TX_09		
			TD/TX_10		
			TD/TX_11		
			TD/TX_12		
			TD/TX_13		
			TD/TX_14		
			TD/TX_15		
			TD/TX_16		Consult Factory
			TD/TX_17		

Low Voltage Solid State Starters
TD & TX Factory Installed Modifications

Modification Description			Model	Code	List Price
• Bypass option (bypass contactor is full-HP rated for across-the-line starting)	• Automatic bypass (uses SSS chassis internal solid state overload)	• Bypass - air contactor	TD/TX_05	0	Not Required
			TD/TX_06		
			TD/TX_07	1	For N-1 enclosure, use N-12 price code Standard on N-12/3R/4/4X
			TD/TX_08		
			TD/TX_09		
			TD/TX_10		
			TD/TX_11		
			TD/TX_12		
			TD/TX_13		
			TD/TX_14		
			TD/TX_15		
			TD/TX_16		
			TD/TX_17		
• Bypass option (bypass contactor is full-HP rated for across-the-line starting)	• Automatic bypass (uses SSS chassis internal solid state overload)	• Bypass - vacuum contactor • For NEMA 1 enclosure, use NEMA 12 list price enclosure code, add modification list price • For NEMA 12, 3R, 4, 4X, use appropriate enclosure code add modification list price shown	TD/TX_12	4	$3,250
			TD/TX_13		$4,400
			TD/TX_14		$4,700
			TD/TX_15 (720A max. FLA)		$4,700

Low Voltage Solid State Starters
TD & TX Factory Installed Modifications

Modification Description		Model	Code	List Price
• Input isolation-contactor	• Input air-contactor	TD/TX_05	5	$350
		TD/TX_06		$400
		TD/TX_07		$500
		TD/TX_08		$700
		TD/TX_09		$900
		TD/TX_10		$1,000
		TD/TX_11		$1,900
		TD/TX_12		$2,000
		TD/TX_13		$3,300
		TD/TX_14		$5,800
		TD/TX_15		$5,800
		TD/TX_16		$6,900
		TD/TX_17		CF
	• Input vacuum-contactor	TD/TX_11	6	$5,400
		TD/TX_12		$5,400
		TD/TX_13		$5,400
		TD/TX_14		$5,400
		TD/TX_15 (720A Max. FLA)		CF

Notes:
- *Standard starter dimensions may be changed due to these modifications.*

Low Voltage Solid State Starters
TD & TX Factory Installed Modifications

Modification Description			Code	List Price
• Control circuit	• Separate control	120 VAC	A	NC
		230 VAC	B	
• Control power transformer • (120 VAC secondary with one secondary and two primary fuses)	• Standard capacity		D	$250
	• With 100 VA extra capacity		F	$350
	• With 200 VA extra capacity		H	$450
	• With 300 VA extra capacity		J	$600
	• With 400 VA extra capacity		L	$650
	• With 500 VA extra capacity		M	$750
	• With 1000 VA extra capacity		V	$1,000

Notes:
- *Standard starter dimensions may be changed due to these modifications.*
- *If other control voltage is required, consult factory.*
- *NC: No Charge.*

Modification Descriptions				Code	List Price
	Quantity	Color	Legend		
Pilot devices - PB (Push-button)	1	Black	Start	A	$200
			Stop	B	
			On	C	
			Off	D	
			Open	E	
			Close	F	
			Reset	G	
			Jog	H	
			Bypass	I	
		Red	Stop	K	
			Off	M	
	2	Black/red	Start/Stop	T	$400
			On/Off	U	
	3	Black/black/red	For/Rev/Stop	X	$600
				Y	
	None			0	

Notes:
- *Legend plates are standard black with white lettering.*

Low Voltage Solid State Starters
TD & TX Factory Installed Modifications

Modification Description				Code	List Price
	Position	Color	Legend		
Pilot devices - SS (selector switch)	2	Black	Local/Remote	A	$300
			Hand/Auto	B	
			For/Rev	C	
			Slow/Fast	D	
			SSS/Bypass	E	
			Man/Auto	F	
			Start/Stop	G	
			Off/On	H	
	3	Black	For/Off/Rev	I	
			Hi/Off/Lo	J	
			H/Off/Auto	K	
			SSS/Off/Bypass	M	
	None			0	

Modification Description				Code	List Price
	Quantity	Color	Legend		
Pilot devices - PL (pilot light)	1	Red	Run	A	$300
			On	B	
			Off	C	
			Stop	D	
			Trip	E	
			Open	F	
			Close	G	
			Jog	H	
			Power On	J	
			SSS	K	
			Bypass	L	
			Fault	M	
	None			0	

Notes:
- *Legend plates are standard black with white lettering.*

Low Voltage Solid State Starters
TD & TX Factory Installed Modifications

Modification Description				Code	List Price
	Quantity	Color	Legend		
Pilot devices - PL (pilot light)	1	Green	Run	N	$300
			On	P	
			Off	Q	
			Stop	R	
			Open	T	
			Close	U	
			Jog	V	
		Amber	Fault	X	
			Reset	Y	
			Power On	Z	
			Trip	1	
		White	Reset	3	
			Power On	4	
	2	Red/green	Run/Off	6	$600
			On/Off	7	
		Green/red	Run/Off	8	
			On/Off	9	
		Red/red	For/Rev	#	
			Slow/Fast	%	
			SSS/Bypass	$	
	3	Red/red/green	For/Rev/Off	@	$900
			Hi/Lo/Off	&	
	None			0	

Notes:
- *Legend plates are standard black with white lettering.*

Low Voltage Solid State Starters
TD & TX Factory Installed Modifications

Modification Description				Code	Enclosure Type	List Price
• Protective devices • Control timing relays • Enclosure modifications	• For multi-motor control or manual bypass:					
	- Thermal bimetallic OLR - add OLR			A	ALL	$160
	- Solid state overload relay (2E). For manual bypass, see bypass option			C	ALL	$720
	• 2E option: manual reset on door			H	ALL	$200
	• Door-mount keypad/display panel	TD & TX		M	1	$480
					12, 3R, 4	$600
	• RTD monitor/relay -12 RTD inputs, door-mount display	For TD or man. byp.		R	1, 12	$4,400
	• RTD monitor/relay - maximum 12 RTD inputs	TX only		N	ALL	$2,000
	• Undervoltage relay	Std. on TX		S	ALL	$400
	• Overvoltage relay	Std. on TX		T	ALL	$400
	• Under/overvoltage relay	Std. on TX		U	ALL	$800
	• Control relay, 4-pole, specify function	NO	NC			
	• Contact configuration	2	2	Y	ALL	$360
		3	1	Z		
		4	0	1		
	• Control relay, 8-pole, Specify function	NO	NC			
	• Contact configuration	4	4	2	ALL	$600
		6	2	3		
		8	0	4		
	• Timing relay; Specify time range function			5	ALL	$500
	• Programmable 24-hour, 7 day clock			9	ALL	$600
	• Lighting arrestor, Three-phase			#	ALL	$300
	• Surge capacitor			%	ALL	$240
	• Floor-mount stand where applicable			$	ALL	$400
	• Cubicle space heater			@	ALL	$400
	• Cubicle space heater with thermostat			&	ALL	$600
	• None			Leave blank		

Low Voltage Solid State Starters
TE & TD Series Accessories

TE Series Accessories

Part Number	Description	Model	List Price
TE-KP12-KIT2-1	• Remote display kit - Type 1, 12, & 4X with 1-meter cable	TE-18 to TE-48	$220
TE-KP12-KIT2-2	• Remote display kit - Type 1, 12, & 4X with 2-meter cable		$250
TE-KP12-KIT2-3	• Remote display kit - Type 1, 12, & 4X with 3-meter cable		$270
TE-KP12-KIT-1	• Remote display kit - Type 1, 12, & 4X with 1-meter cable	TE-62 above	$240
TE-KP12-KIT-2	• Remote display kit - Type 1, 12, & 4X with 2-meter cable		$280
TE-KP12-KIT-3	• Remote display kit - Type 1, 12, & 4X with 3-meter cable		$290
SSS TOOL	• Software for programming, commissioning, monitoring includes CD and USB to RS485 converter	All	$650

Notes:
- *Remote display cable assembly includes connectors on each end.*
- *Starters do not come with lugs. Soft starters up to 60A rating are provided with terminal bus tabs as standard.*

TD Series Accessories

Part Number	Description	List Price
TD-KPN1-1	• Remote display kit - Type 1 with 1-meter cable	$160
TD-KPN1-2	• Remote display kit - Type 1 with 2-meter cable	$180
TD-KPN1-3	• Remote display kit - Type 1 with 3-meter cable	$200
TD-KP12-1	• Remote display kit - Type 12/4 with 1-meter cable	$280
TD-KP12-2	• Remote display kit - Type 12/4 with 2-meter cable	$300
TD-KP12-3	• Remote display kit - Type 12/4 with 3-meter cable	$320
TD-RS485-KIT-1	• RS485 communication kit for TD series only. Kit includes 12-inch long cable	$400

Low Voltage Solid State Starters
TD & TX Series Spare Parts

Part Number	Chassis Model	Description	List Price (ea.)
101232	TD005-17 (120 VAC Control)	• Main power/CPU circuit board kit includes both main power board and CPU board assembled together	$1,750
101285	TX005-17	• Main power/CPU circuit board kit includes both main power board and CPU boards assembled together	$4,400
101183	TD or TX005	• Thyristor (SCR) for 48A unit, three required per starter	$260
101184	TD or TX006	• Thyristor (SCR) for 78A unit, three required per starter	$370
101185	TD or TX007	• Thyristor (SCR) for 120A unit, three required per starter	$375
101186	TD or TX008	• Thyristor (SCR) for 180A unit, six required per starter	$380
101187	TD or TX009-10	• Thyristor (SCR) for 220 - 288A units, six required per starter	$385
101188	TD or TX011-15	• Thyristor (SCR) for 414 - 718A units, six required per starter	$930
101190	TD or TX016-17	• Thyristor (SCR) for 1150 - 1250A units, six required per starter	$1,720
101235	TD005-17	• Keypad/display panel	$240
101262	TX005-17	• Keypad communications board, Circuit board only	$2,100

Notes:
- *Does not include keypad membrane. For membrane, consult factory.*
- *Use spare parts discount.*

Vacuum Circuit Breakers
VK/HVK Series

The VK and HVK Series circuit breakers combine Toshiba's quality and state-of-the-art vacuum technology to provide full range of voltages and interrupting ratings with the highest reliability and service for worldwide applications.

Product Scope

5 to 15 KV
1200, 2000, & 3000 A
250 to 1000 MVA

Highlights

- VK & HVK Series
- Compact & Lightweight
- Available In:
  - Fixed Style
  - Drawout Style
  - Manual Operated
  - Motor Operated
- Designed for Safety with Electrical & Mechanical Interlocks
- Excellent Breaking Performance
- Minimized Maintenance & Inspection
- Front-Mounted with Circuit Control Components on Printed Circuit Board

Standard Features

- Meets or Exceeds ANSI Standard
- NEMA Enclosure
- Rugged & Simple Primary Disconnects
- Heavy Duty Auxiliary Contacts
- High-Tech Control Circuit Board
- Rugged Steel Frame
- Heavy Duty & Glass Polyester High-Performance Insulation Barrier

Vacuum Circuit Breakers
VK/HVK Series
Specifications

Rating & Specifications with Voltage Range Factor K=1.0
(Symmetrical Current Rating Basis, ANSI C37.06-1997)

Identification				Insulation Level		Current		
Model Number	Nominal RMS Voltage Class (KV)	Max. RMS Volts	Nominal Three-Phase Class MVA	Rated Low Freq. Withstand (KV, RMS)	Rated Impulse Withstand Voltage (KV, CREST)	Cont. Current Rating (A, RMS)	RMS Short Circuit Current (KA, RMS)	Close & Latch Capability (KA, PEAK)
HVK-6M32A	4.16	4.76	250	19	60	1200	29	58
HVK-6P32A	4.16	4.76	250	19	60	2000	29	58
HVK-6M40A	4.16	4.76	350	19	60	1200	41	66
HVK-6P40A	4.16	4.76	350	19	60	2000	41	66
VK-6M50	4.16	4.76	350	19	60	1200	41	78
VK-6P50	4.16	4.76	350	19	60	2000	41	78
VK-6Q50	4.16	4.76	350	19	60	3000	41	78
HVK-8M40A	7.2	8.25	500	36	95	1200	33	66
HVK-8P40A	7.2	8.25	500	36	95	2000	33	66
VK-8Q40	7.2	8.25	500	36	95	3000	33	66
HVK-10M25A2	13.8	15	500	36	95	1200	18	37
HVK-10P25A2	13.8	15	500	36	95	2000	18	37
HVK-10M40A	13.8	15	750	36	95	1200	28	58
HVK-10P40A	13.8	15	750	36	95	2000	28	58
VK-10Q40	13.8	15	750	36	95	3000	28	58
HVK-10M40A	13.8	15	1000	36	95	1200	37	59
HVK-10P40A	13.8	15	1000	36	95	2000	37	59
VK-10Q40	13.8	15	1000	36	95	3000	37	59
VK-10M50	13.8	15	1000	36	95	1200	37	77
VK-10P50	13.8	15	1000	36	95	2000	37	77
VK-10Q50	13.8	15	1000	36	95	3000	37	77

Notes:
- *Maximum voltage for which the breaker is designed and the upper limit of operation are based on ANSI C84.1.*
- *Rated interrupting time: three cycles (all above breakers).*
- *Rated permissible tripping delay time: two seconds (all above breakers).*

Vacuum Circuit Breakers
VK/HVK Series Part Numbering Convention

Ordering Information: Use the following part numbering convention to configure the breaker when placing your order. For additional factory installed options, add the appropriate option code on the end as in the example below.

Example is a HVK series breaker rated 4.16 KV, 1200 A, 29 KA, Fixed-Type, with 125 VDC Close/Charge/Trip and 120 VAC undervoltage release.

Example Part Number:	HVK-	6	M	32	F	V	V	-UV

Series

Voltage Class:
- 6 — 4.2 KV
- 8 — 7.2 KV
- 10 — 15 KV

Continuous Amps:
- M — 1200 A
- P — 2000 A
- Q — 3000 A

Interrupting Capability:
- 25 — 18 KA
- 32 — 29 KA
- 40 — 28 to 41 KA
- 50 — 37 to 41 KA

Breaker Configuration:
- - — Drawout
- F — Fixed

Closing/Charging Voltage:
- V — 125 VDC

Tripping Voltage:
- V — 125 VDC

Factory Modification:
- N/A — None
- UV — Undervoltage

Vacuum Circuit Breakers

VK/HVK Series Breaker Pricing & Factory Modifications

Model Number	Nominal RMS Voltage Class (KV)	Cont. Current Rating (A, RMS)	Three-Phase Class MVA	RMS Short Circuit Current (KA, RMS)	Drawout-Type Breaker List Price	Fixed-Type Breaker List Price
HVK-6M32A	4.16	1200	250	29	$25,000	$26,000
HVK-6P32A	4.16	2000	250	29	$33,700	$34,700
HVK-6M40A	4.16	1200	350	41	$25,700	$26,700
HVK-6P40A	4.16	2000	350	41	$33,700	$34,700
VK-6M50	4.16	1200	350	41	$74,000	CF
VK-6P50	4.16	2000	350	41	$84,000	CF
VK-6Q50	4.16	3000	350	41	$94,000	CF
HVK-8M40A	7.2	1200	500	33	$25,700	$26,700
HVK-8P40A	7.2	2000	500	33	$33,700	$34,700
VK-8Q40	7.2	3000	500	33	$94,000	CF
HVK-10M25A2	13.8	1200	500	18	$25,700	$26,700
HVK-10P25A2	13.8	2000	500	18	$33,700	$34,700
HVK-10M40A	13.8	1200	750/1000	28	$25,700	$26,700
HVK-10P40A	13.8	2000	750/1000	28	$33,700	$34,700
VK-10Q40	13.8	3000	750/1000	28	$94,000	CF
VK-10M50	13.8	1200	1000	37	$74,000	CF
VK-10P50	13.8	2000	1000	37	$84,000	CF
VK-10Q50	13.8	3000	1000	37	$94,000	CF

Notes:
- *Breakers sold without cells are not for use in applications involving breaker retrofits.*
- *Racking and charging handles are not included with breaker or cell and must be ordered separately. See breaker accessories.*
- *CF: Consult Factory.*

VK/HVK Series Breaker Factory Modifications

Modification	Breaker Series	Code	List Price
Under Voltage Release (120 VAC)	VK & HVK	UV	$1,000

Vacuum Circuit Breakers
VZ Series

The VZ Series circuit breakers combines vacuum arc-control technology (SADE) and a compact design to ensure reliability, ease of handling, and safety, making these breakers suitable for various applications.

Product Scope

24 KV
630 to 2000 A
16 & 25 KA

Highlights

- VZ Series
- Compact & Lightweight
- Available In:
  - Fixed Style
  - Drawout Style
  - Manual Operated
  - Motor Operated
- Designed for Safety with Electrical & Mechanical Interlocks
- Excellent Breaking Performance
- Minimized Maintenance & Inspection

Standard Features

- SADE Technology
- Two Models for Different Configurations of Switchgear Designs
- Conforms to the Latest International Standards of BS 5311 & IEC 60056
- Electrical & Mechanical Interlocks Provided on Drawout Version
- Dead Front Design & Front Access

Vacuum Circuit Breakers
VZ Series Part Numbering Convention

Ordering Information: Use the following part numbering convention to configure the breaker when placing your order. For additional factory installed options, add the appropriate option code on the end as in the example below.

Example is a VZ 24 KV, 1250 A, 25 KA, drawout-type with 125 VDC close/charge/trip.

Example Part Number:	VZ-	20	M	25	-	V	V
Series							
Voltage Class: 20 — 24 KV							
Continuous Amps: J — 630 A M — 1250 A P — 2000 A							
Interrupting Capability: 16 — 16 KA 25 — 25 KA							
Breaker Configuration: N/A — Drawout F — Fixed							
Closing/Charging Voltage: V — 125 VDC							
Tripping Voltage: V — 125 VDC							

Vacuum Circuit Breakers
VZ Series Specifications & Pricing

Specifications		VZ-20J16	VZ-20M16	VZ-20J25	VZ-20M25	VZ-20P25
Maximum Continuous Current Rating		630 A	1250 A	630 A	1250 A	2000 A
Rated Voltage		24 KV				
Interrupting Current		16 KA		25 KA		
Making Current		40 KA		63 KA		
Short-Time Current		16 KA for 3 seconds		25 KA for 3 seconds		
Interrupting Time		Less than three cycles				
Out-of-Phase Breaking Current		25% of rated interrupting current				
Insulation Level	Impulse	125 KV				
	Power Frequency	50 KV				
Operation Duty	Standard Duty	Open for 3 minutes, closed/open for 3 minutes, closed/open				
	Rapid Duty	Open for 0.3 seconds, closed/open for 3 minutes, closed/open				
Mechanical Life		10-thousand operations				
Load Switching Life		10-thousand operations				
Auxiliary Contacts	Form	4NO-NC				
	Cont. Current	20 A				
	Voltage	220 V maximum; 48 V minimum				
	Interrupting	AC: make 20/break 10 A (110 V) at PF 0.35				
		DC:10 A (48 V), 5 A (110 V), 2.5 A (220 V) at L/R 40ms				
Altitude (Above derate by ANSI C37.04)		3300 ft (100m)				
Ambient Temperature		-5° to 40°				
Opening Time		30ms (Typical)				
No-Load Closing Time		40ms (Typical)				
Operating	Voltage/Current	Standard 125 VDC, 5 A (Starting)/0.5 A, Optional: 100 VDC/110 VDC and 200/220 VDC, 5 A (starting)/ 0.6A (Charging Time 0.01 Seconds (Starting)/7 Seconds)				
Closing	Voltage/Current	Standard 125 VDC, 3.2 A; Optional: 48/50 VDC, 6.0/6.3 A, 100 VDC/ 110 VDC, 3.6/4 A, 200/220 VDC, 1.6/ 1.7 A				
Tripping	Voltage/Current	Standard 125 VDC, 3.2 A; Optional: 48/50 VDC, 6.0/6.3 A, 100 VDC/110 VDC, 3.6/4 A, 200/220 VDC, 1.6/1.7 A				
Weight in lbs. (kg)		298 (135)				320 (145)
List Price	Fixed-Type	$28,600	$32,400	$30,900	$34,600	$41,500
	Drawout-Type	$27,600	$31,400	$29,900	$33,600	$40,500

Vacuum Circuit Breakers
HV6 Series

Toshiba's HV6 series circuit breakers are designed specifically for medium voltage, low-capacity power receiving and transforming facilities. The HV6 series low surge features and compact size make it ideal for a wide variety of applications including mobile power centers and portable substations.

Product Scope

600 A
2300 to 7200 V
12.5 kA

Highlights

- Compact & Lightweight
- Available In:
  - Fixed Style
  - Drawout Style
  - Manual Operated
  - Motor Operated
- Designed for Safety with Electrical & Mechanical Interlocks
- Excellent Breaking Performance
- Minimized Maintenance & Inspection
- Made in Houston, Texas

Standard Features

- Front-Mounted Operation Counter
- Conforms to JIS C 4603 & JEC-2300
- Low Surge Interrupters
- Low Chopping-Current
- Multiple Main Terminal Configurations
- Power Terminals Available in Two Directions
  - U-Vertical
  - L-Horizontal

Vacuum Circuit Breakers
HV6 Series Part Numbering Convention

Ordering Information: Use the following part numbering convention to configure the breaker when placing your order. For additional factory installed options, add the appropriate option code on the end as in the example below.

Example is an HV6, fixed-type, motor-operated, with power stabs horizontal, with 125 VDC close/charge/trip.

HV6CS-	ML		-V		V			
Model	Type		Closing-Coil Volts		Trip-Coil Volts		Factory Modification	
Version	Code	Configuration/ Operation	Code	Volts	Code	Volts	Code	Mod.
HV6CS	U	Fixed/Manual Operation	A	None (manually operated)	S	24/32 VDC	-R	Replaces V16 series fixed-mount version (same faceplate dimensions)
	L	Fixed/Manual Operation			V	125 VDC		
HV6CS	MU	Fixed/Motor Operation	V	125 VDC	S	24/32 VDC	-R	Replaces V16 Series fixed-mount version (same faceplate dimensions)
	ML	Fixed/Motor Operation						
	MLD	Drawout/Motor Operation			V	125 VDC	Not applicable on drawout version	

Notes:

- *Factory modification "-R" includes a special mounting faceplate on the HV6 so it can replace a V16 without enclosure modification. The front-facing of the HV6 is smaller than the V16. This modification is applicable for the fixed-type models only, if the face plate was used for mounting or if the face was protruding though the enclosure. This is a no cost adder.*

Vacuum Circuit Breakers
HV6 Series Specifications & Pricing

Model Number		HV6CS-U	HV6CS-L	HV6CS-MU	HV6CS-ML	HV6CS-MLD
Maximum Continuous Current Rating		600 A				
Rated Voltage		2.4 to 7.2 KV				
Interrupting Current (0.15 P.F.)		12.5 KA (Sym.)				
Rated Frequency		50/60 Hz				
Transient Recovery Voltage		0.32 KV/Microsecond at 4.2 KV & Above, Below 0.16 KV/Microsecond				
Making Current		31.5 KA (Peak)				
Short-time Current		12.5 KA for 2 Seconds				
Interrupting Time		Less than 3 Cycles				
Insulation Level (Basic Impulse Level)		60 KV				
AC Withstand Voltage		22 KV for 1 Minute				
Operation Duty		Open 1 Minute; Closed/Open 3 minutes; Closed/Open				
Mechanical Life		10,000 Operations				
Load-Switching Life		10,000 Operations				
Auxiliary Contacts	Form	2NO-2NC				
	Cont. Current	10 A				
	Voltage	300 V Maximum; 48 V Minimum				
	Interrupting	AC: 700 VA at PF 0.35/DC: 60 W at L/R 150 ms				
Altitude (Above Derate by ANSI C37.04)		3300 ft (1000 m)				
Ambient Temperature		-5° to 40 C°				
Installation		Fixed				Drawout
Operation		Manual Closing		Motor Spring Closing		
Opening Time		30 ms (Typical)				
No-Load Closing Time		-		30 ms		
Charging	Voltage/Current	-		125 VDC/2.5 A Peak (0.9 A Average)		
Closing	Voltage/Current	-		125 VDC/1.1 A		
Tripping	Voltage/Current	125 VDC/3.0 A		125 VDC/4.6 A		
Under Voltage Release		0.4 A at 120 VAC (Trip Voltage 24 to 72 VAC)				
Weight in lbs. (kg)		66 (30)		73 (33)		99 (45)
List Price		$5,900		$8,700		$9,800

Vacuum Circuit Breakers
VJB Series

Toshiba's VJB series circuit breakers are designed for frequent switching applications, such as arc furnaces. The expected life of the breaker is 150,000 operations, which is 15 times longer than standard vacuum breakers, making the VJB series a reliable and ideal choice for multiple applications.

Product Scope

1250 & 2000 A
24 & 36 kV

Highlights

- Compact & Lightweight
- Available in Fixed-Mount Design
- Designed for Safety with Electrical & Mechanical Interlocks
- Excellent Breaking Performance
- Minimized Maintenance & Inspection
- Dust-Proof Cubical Option
- Front & Back Panel Access
- Optional Control Panel

Standard Features

- Extended Service Life
- 150,000 Operations
- Easy Inspection with Simplified Structure
- Easy Replacement of Conventional-type Breaker Series
- Conforms to IEC 56 & JEC-2300
- Seven Normally-Open Auxiliary Contacts
- Six Normally-Closed Auxiliary Contacts

Note: Consult factory for pricing information.

Vacuum Circuit Breakers
OEM Cell Pricing

OEM Cell Model Number	Used for Breaker	Cell Weight	List Price
HKA-10MS-K-X (Provision for kirk-key interlock & shutter padlock)	HVK-6M32A HVK-6M40A HVK-8M40A HVK-10M25A2 HVK-10M40A	130 kg. 190 lb.	$11,400
HKA-10PS-K-X (Provision for kirk-key interlock & shutter padlock)	HVK-6P32A HVK-6P40A HVK-8P40A HVK-10P25A2 HVK-10P40A	150 kg. 330 lb.	$14,200
HKA-10MS1	VK-6M50 VK-10M50	150 kg. 330 lb.	$11,400
HKA-10PS1	VK-6P50 VK-10P50	170 kg. 380 lb	$14,200
HKA-6QS	VK-6Q50 VK-8Q40 VK-10Q40 VK-10Q50	290 kg. 640 lb	$23,000
UZP-20JM	VZ-20J16 VZ-20J25	145 kg. 320 lb	$13,400
UZP-20PM	VZ-20M16 VZ-20M25 VZ-20P25	150 kg. 330 lb.	$14,600
H6A-HLS	HV6CS-MLD	20 kg. 44 lb	$3,900

Notes:
- *For adding a kirk-key interlock, the key interlock kit (in breaker accessories) is required. The actual kirk-key is not included with the cell or the interlock kit and must be purchased separately.*

Vacuum Circuit Breakers
Accessories

Model Number	Description	List Price
CIT-10QA	• Capacitor-trip device used for latched-type vacuum contactor or vacuum circuit breaker when DC power not available. Device charges from AC power & supplies DC power to trip-coil 	$1,500
4Z9G0334G001	• AC/DC Control Power Rectifier converts 120/240 VAC input to 125/250 VDC to power trip-coil on latched-type vacuum contactor or control power for vacuum circuit breaker 	$300
NV60K304T1	• Surge suppressor; Three-phase CR surge suppressor for 3.3 to 7.2 KV system 	$2,500
NV95K304T1	• Surge suppressor; Three-phase CR surge suppressor for 10 to 15 KV system	$5,900
4D9A2365G001	• Charging handle for VK & HVK series	$680
4D9A2177G002	• Racking handle for VK & HVK series	$620
4D9A2283G002	• Key interlock kit without key for HKA-10MS/PS cells	$750
4D9A2283G003	• Key Interlock Kit without key for HKA-10MS1/PS1 cells	$750
4D9A2177G008	• Mechanism operating contacts (MOC 6a-6b) kit for VK & HVK breakers	$1,350
4D9A2177G012	• Truck operating contacts (TOC 6a-6b) kit for HKA cells (VK & HVK breakers)	$1,100
L-21CBS	• Portable lifter for standard VK & HVK series breakers	$5,000
5P1B0404P013	• Portable lifter for VK 50 Series & 3000 A Breakers	$9,700
5P9A2593P001	• B9 lubricating grease (30 g tube)	CF

Solid State Relays
RC820 Motor Protection Relay

Toshiba's RC820 motor protection relay is ideal for end-users whose motor protection needs are not elaborate. This relay combines reliable protection against overloads and single phasing with a simple, easily adjustable design. The RC820, which is also knowns as the "2E Relay," is adjustable from Class 3 through Class 40 to provide ultimate protection and to accommodate reduced voltage starting and high inertia loads.

Product Scope

7, 55, & 110 A

Highlights

- Two Model Options
- Manual/Remote Reset
- Automatic Reset
- Ground Fault & Phase Reversal Modules Available
- Solid State Provides High Reliability & Precise Operation
- Ground Fault Option
- Flush Door Mounting Kit Option

Standard Features

- UL Listed in US & Canada
- Wide Range of Current & Trip Time Settings
- Phase Loss Protection
- LED Trip Indicator
- Manual Test Feature
- Adjustable Range of 75 to 150%
- Wiring Capability Through the Three Current Transformer Windows

The RC820 is offered in six models:

Model	Trip Reset	Ampere-Turn Rating
RC820-HP1Y72	Manual/ Remote	7AT
RC820-HP3Y72		110AT
RC820-AP1Y	Automatic	7AT
RC820-AP2Y		55AT
RC820-AP3Y		110AT

Notes:
- *Selection of the suitable model may require some preliminary calculations. Model selection can also be influenced by wire size, limiting the number of turns that can be passed through the CT windows (0.75 x 0.75 in.).*

Solid State Relays
RC820 Relay Specification

RC820 Relay Technical Data

Model RC820-		H/AP1Y	AP2Y	H/AP3Y
Applicable Circuit		Three-phase, 50/60 Hz, 600 VAC max. Higher voltage with external CTs		
Operational Current	Rated Ampere-Turn	7AT	55AT	110AT
	Setting Range	75 to 150% of rated AT		
Overload Operating Characteristics	Ultimate Trip Current	105 to 125% of setting current		
	Operating Time Setting Range	3 to 40 seconds at 600% of setting current		
Single-Phase Operating Characteristics	Minimum Operating Current	85% of setting current flowing in conducting phase		
	Operating Time	Less than 4 seconds		
Control Voltage	Rating	100 to 120/200 to 240 VAC, single-phase, 50/60 Hz		
	Tolerance	85% to 110%		
Output Contact	Contact Arrangement	1NO/NC (Form C)		
	Contact Capacity NEMA B300	120 VAC — 5.0A (resistive load) 120 VAC — Make 30A/Break 3A 240 VAC — Make 15A/Break 1.5A 125 VDC — 0.2A (L/R = 7ms) 250 VDC — 0.1A (L/R = 7ms)		
Power Consumption	Control Power Circuit	2 VA		
	Detecting Circuit	0.3 VA/phase at rated current		
Application	Ambient Temperature	-10° to 60°C		
	Relative Humidity	45 to 85% at 20°C		
Dimensions	Height x Width x Depth	7.00 x 3.66 x 6.2 in. (180 x 76 x 157mm)		

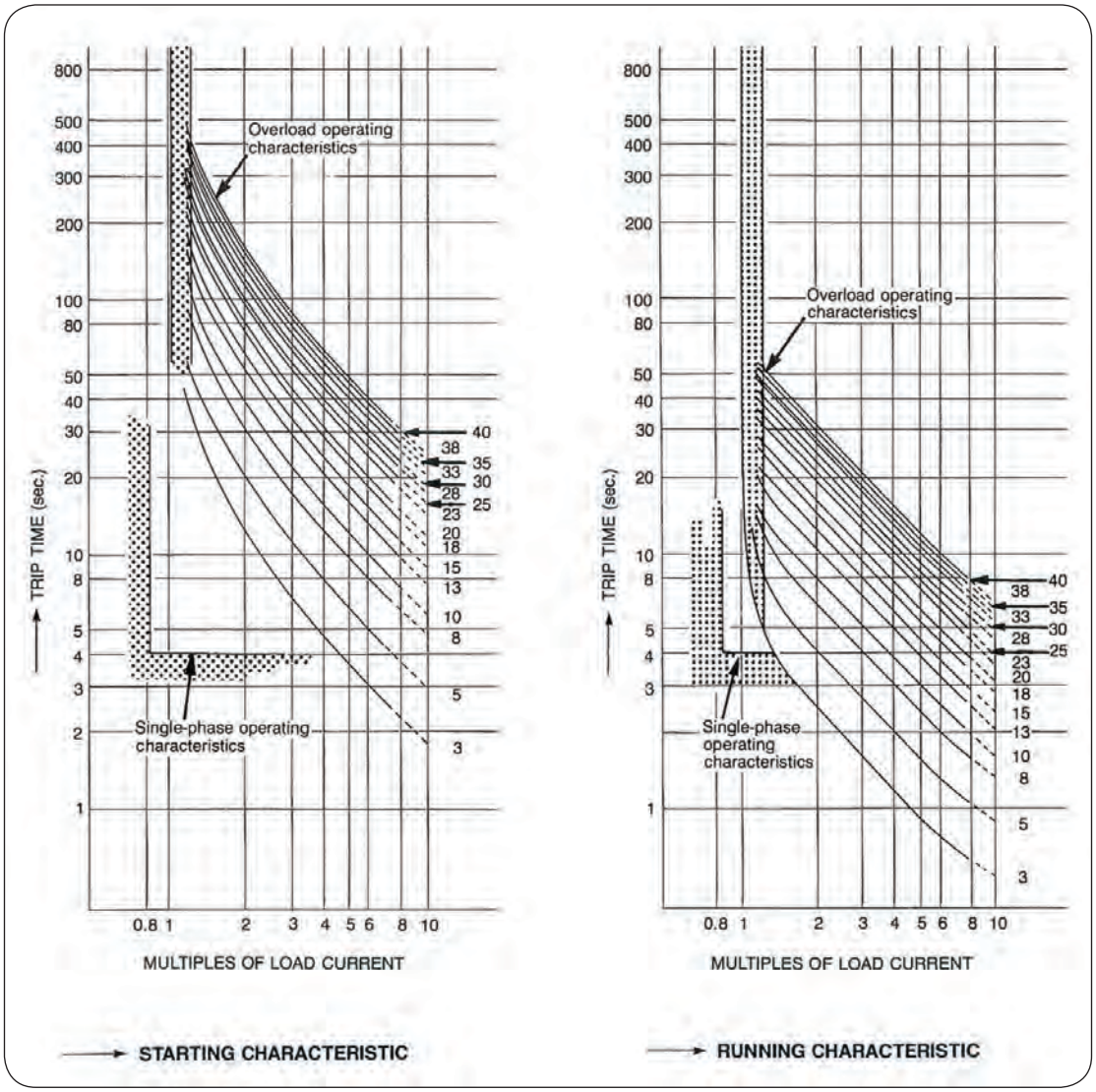
Additional Module Specifications

Phase Reversal & Ground Fault Technical Data

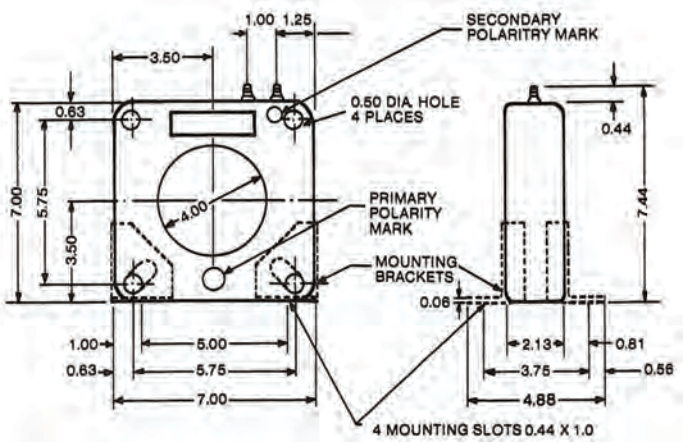
Model		RC-81A	RC-81B	RC-81C
Phase Reversal Characteristics	Operating Current	Not Applicable	90% of 2E relay setting current	
	Operating Time		Less than 0.5 seconds	
Ground Fault Characteristics	Ground Fault Current Setting	4 to 12A ZCT primary	Not Applicable	4 to 12A ZCT primary
	Max. Ground Fault Current	60 A		60 A
	Ground Fault Time Setting	0.1 to 1.0 sec.		0.1 to 1.0 sec.
Output Signal	-	Output contacts of basic 2E relay		
Trip Indication		LED (manual reset only)		

Notes:
- *RC-81A & RC-81C (Ground Fault) modules require model no. 810-ZCT-100 zero sequence current transformer.*

Solid State Relays
Overload Trip Curve



Zero Sequence Current Transformer No. 810-ZCT-100



2E with RC-81C Ground Fault/Phase Reversal Module

Solid State Relays
Relay & Module Pricing, Ordering & Installation Information

Model Number	Description	Setting Range	List Price
RC820-HP1Y72	7AT	5.25 to 10.5 A	$660
RC820-HP3Y72	110AT	82.5 to 165 A	$880
RC820-AP1Y	7AT	5.25 to 10.5 A	
RC820-AP2Y	55AT	41.25 to 85.5 A	$660
RC820-AP3Y	110AT	82.5 to 165 A	
RC-81A	Ground fault module	4 to 12 A	$560
RC-81B	Phase reversal module	-	$460
RC-81C	Ground fault/phase reversal module	4 to 12 A	$660

Selection & Ordering

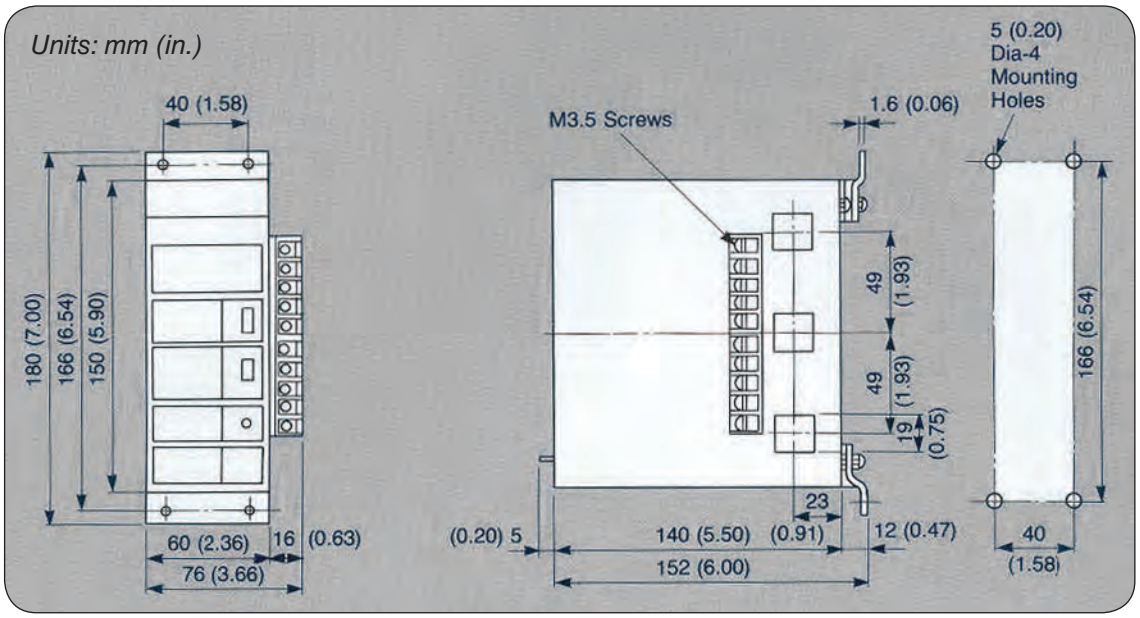
2E — For medium voltage applications and continuous load rating above 165 A, use external current transformers and select the RC820-HP1Y72 or -AP1Y.

Setting range is for rated load (continuous ampere load) and is not the trip value. See the relay trip curves for trip value.

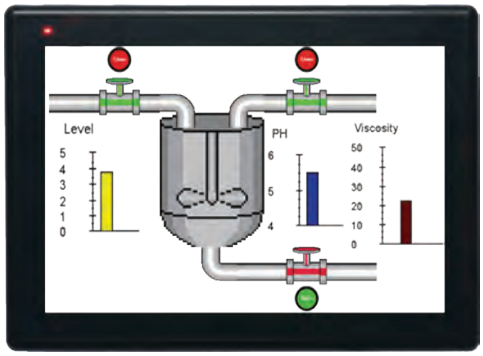
Modules — Setting range shown is the CT primary current, ground fault trip value.

Model (ordering) number and price for the RC-81A and RC-81C includes the ZCT (Zero Sequence Current Transformer). If the ZCT alone is required (i.e. replacement or spare part), consult factory for pricing on part number 810-ZCT-100.

Installation



Industrial Automation
Operator Interface Stations
OIS PLUS Series Pricing



Operator Interface Stations

Part Number	Description	Price
OIS10 PLUS	• 16x2 Text with Multicolor Backlit LCD • PLC Ladder Editor • 6 Function Keys with Built-In LEDs • Built-In 8 to 24 VDC Inputs • 6 Relay Outputs, 2 to 24 VDC NPN Transistor Outputs • Requires OIL-DS Setup Software	$270
OIS12	• 16x2 Text with Multicolor Backlit LCD • Same as OIS10 Plus but No I/O • Used for T/C Access, Message Display, Data Value Change for All Toshiba PLCs • Integrated Controllers & ASDs • Requires OIL-DS Setup Software	$130
OIS20 PLUS	• 3.1" Multicolor Backlit LCD • PLC Ladder Editor • 6 Function Keys • Built-In 12 to 24 VDC Inputs • 6 Relay Outputs, 2 to 24 VDC NPN Transistor Outputs • Requires OIL-DS Setup Software	$370
OIS40 PLUS	• 3" 128x64 Monochrome Blacklit LCD Tri-Color Touchscreen • 24 VDC PS • PLC Ladder Editor • Requires OIL-DS Setup Software	$225
OIS42 PLUS	• 3" 128x64 Monochrome Blacklit LCD Tri-Color Touchscreen • 8 to 24 VDC Inputs • 6 Relay Outputs, 2 Transistor Outputs, 2 Analog Inputs, 1 Analog Output • PLC Ladder Editor • Requires OIL-DS Setup Software	TBD
OIS55 PLUS	• 3.5" TFT Color Touchscreen • 6 Function Keys • Accepts 3 Clip-On I/O Modules • 24 VDC PS • PLC Ladder Editor • Requires OIL-DS Setup Software • Supports Web Page	$370

Industrial Automation
OIS PLUS Series Pricing

Part Number	Description	Price
OIS45E PLUS	• 4.3" TFT Color Touchscreen • Ethernet Port • Accepts 3 Clip-On I/O Modules • PLC Ladder Editor • 24 VDC PS • Requires OIL-DS Setup Software	$460
OIS60 PLUS	• 6" TFT Color Touchscreen • Accepts 5 Clip-On I/O Modules • PLC Ladder Editor • 24 VDC PS • Requires OIL-DS Setup Software	$610.00
OIS70E PLUS	• 7" TFT 800 x 480 Color Touchscreen • Ethernet Port • PLC Ladder Editor • Accepts 5 Clip-On I/O Modules • 24 VDC PS • Requires OIL-DS Setup Software • Supports Web Page	$700.00
OIS120A	• 12" TFT Color Touchscreen • Ethernet Port • No I/O, 24 VDC PS • Requires OIL-DS Setup Software • Supports Web Page	$2,000

Clip-On I/O — Digital

Part Number	Description	Price
TRPDIX1600	• 16 Inputs • 24 VDC (Sink/Source)	$80
TRPDIO0808P	• 8 Inputs • 24 VDC (Sink/Source) • 8 Outputs, Transistor, 24 VDC, PNP	$105
TRPDIO0808N	• 8 Inputs • 24 VDC (Sink/Source) • 8 Outputs, Transistor, 24 VDC, NPN	$100
TRPHIO0808P	• 8 Inputs (4 HS) • 24 VDC (Sink/Source) • 8 Outputs (2 PWM), Transistor, 24 VDC, PNP	$120
TRPHIO0808N	• 8 Inputs (4 HS) • 24 VDC (Sink/Source) • 8 Outputs (2 PWM), Transistor, 24 VDC, NPN	$120
TRPDOX0016N	• 16 Outputs, Transistor, 24 VDC, 0.5 A/each, NPN	$130
TRPDOX0016P	• 16 Outputs, Transistor, 24 VDC, 0.5 A/each, PNP	$130
TRPROX0012	• 12 Output Relays • 24 VDC - 240 VAC • 2 A Each, 5 A/Common	$110

Clip-On I/O — Analog

Part Number	Description	Price
TRPADT0400	• 4 Inputs • 4 to 20 mA, 0 to10 V, 12 Bits	$170
TRPRTX0402	• 4 Inputs, 0 to 10 V, 4 to 20 mA, RTD, TC • 2 Outputs, 0 to 10 V, 4 to 20 mA, 16 Bits Each	$280
TRPAIO0202L	• 2 Inputs, 0 to 10 V, 4 to 20 mA • 2 Outputs, 0 to 10 V, 4 to 20 mA, 12 Bits Each	$205

Industrial Automation
OIS Series Pricing

Legacy Operator Interface Stations

Part Number	Description	Price
OIS10	• 16x2 Character Backlit LCD • 6 Operator Keys • 2 LEDs • No Programming • Messages & Functions are Stored in PLC • Power from PLC • Comes with Cable for T1	$165
OIS15	• 16x4 Character Backlit LCD • 8 Operator Keys • 4 LEDs • No Programming • Messages & Functions are Stored in PLC • Power from PLC • Comes with Cable for T1	$210
OIS40	• 20x4 Character Backlit LCD • 8 Function Keys • 8 LEDs • 0 to 9 Number Keys • Connects to PLC Programming Port • Power from PLC • Order all Connection Cables Separately • Requires OISetup32 Software	$375
OIS40R	• 20x4 Character Backlit LCD • 8 Function Keys • 8 LEDs • 0 to 9 Number Keys • Connects to RS485 Port • Requires Separate 24 VDC PS • Order All Connection Cables Separately • Requires OISetup32 Software	$400

Notes:
- *Limited stock on legacy OIS. Check with customer service for availability.*

OIS PLUS Series Pricing

Cables

Part Number	Description	Price
EC-I-019A-00	• Connects OIS40 to T1 Programming Port, 2 m	$25
EC-I-019B-00	• Connects OIS40 to T2E/T2N/T3/S2E/S2T Programming Port, 2 m	$25
EC-P-046B-00	• Connects OIS40R/OIS PLUS/GWY to T2N/T3 RS485 Port (DB15 Connector), 2 m	$25
EC-P-046A-00	• Connects OIS40R/OIS PLUS/GWY to T1/T2E/T3/S2E/S2T RS485 Port, • Pigtail on PLC End, 2 m	$20
EC-P-019B-00	• Connects OIS40R/OISPLUS/GWY to T2/T3/S2E/S2T Programming Port, 2 m	$25
EC-P-019A-00	• Connects OIS40R/OISPLUS/GWY to T1 Programming Port, 2 m	$25
EC-P-009K-00	• Connects GWY to OIS PLUS, RS485, 2 m (Profibus, CAN Open, & DeviceNet)	$25
EC-P-108A-00	• Connects OIS PLUS to G9/P9/AS1 ASDs, RS485, 4W	$25
EC-P-108C-00	• Connects OIS PLUS to VF-nC3/FS1 ASDs, RS485, 2W	$25
EC-P-108-00	• Connects OIS PLUS to S9/S11//VF-nC1/VF-nC3 TTL Port, Smart Cable, 2 m	$30
RC-P-009I-00	• Connects OIS PLUS/GWY to V200 Series PLC, RS485, 2 m	$25
RC-P-019A-00	• Connects OIS55/55E to T1 Programming Port, 2 m	$25
RC-P-009H-00	• Connects OIS PLUS/GWY to V200 Series PLC, RS232, 2 m	$25
EC-Y-FP	• Special Port Splitter Cable for OIS40/42/45E PLUS	$60
RC-P-108A-00	• Connects V200 PLC to Toshiba G9/AS1 ASDs, RS485, 4W, 2 m	$25
IBM-H-005-00	• Programming Cable • For Download from Computer Serial Port to All OIS55/55E & V200 CPUs • Alternate, Use USB Printer Cable	$30
IBM-0909-1-00	• Programming Cable • For Download from Computer to All OIS/OIS PLUS • Use with OISeup32 & OIL-DS Setup Software	$25

Cables — OIS 10/15/20

Part Number	Description	Price
CAB-OIS-T1-X	• Connects OIS10/15/20/old40 to T1 PLC • Comes with OIS10/15	$35
CAB-OIS-T2-X	• Connects OIS10/15/20/old40/ to T2/T3 PLC • Order Separately	$35

Industrial Automation
Programmable Logic Controllers
V200 Series PLC Pricing

CPU Modules

Part Number	Description	Price
GPU288*3S	• V200 CPU • 8 Inputs, 24 VDC • 2 Outputs, 24 VDC Transistor, 6 Output Relays • Requires 24 VDC PS • Supports 8 I/O Expansion Modules	$220
GPU200*3S	• V200 CPU • RS232/485, USB, & Ethernet Ports • Requires 24 VDC PS • Supports 8 I/O Expansion Modules	$190
GPU230*3S	• V200 CPU • RS232/485, Ethernet & USB Ports • Remote Programming, Monitoring, & Embedded Webpage Capability • Requires 24 VDC PS • Supports 16 I/O Expansion Modules	$400

Digital I/O Modules

Part Number	Description	Price
GDI216**S	• 16 Inputs • 24 VDC, 8p/com • Sink/Source	$95
GDR288**S	• 8 Inputs • 24 VDC, 4p/com • 8 Output Relays, 4p/com	$125
GDD288P*S	• 8 Inputs • 24 VDC, 4p/com • 8 Outputs PNP, 4p/com	$125
GDD288N*S	• 8 Inputs • 24 VDC, 4p/com • 8 Outputs NPN, 4p/com	$125
GRO216**S	• 16 Output Relays, 8p/com	$150
GDO216P*S	• 16 Outputs • 24 VDC Transistor, 8p/com • PNP	$150
GDO216*S	• 16 Outputs • 24 VDC Transistor, 8p/com • NPN	$150

V200 Series PLC Pricing

Analog I/O Modules

Part Number	Description	Price
GAD208**S	• 8 Analog Inputs • 4 to 20 mA, 0 to 10 VDC (12 Bits)	$260
GAA242**S	• 4 Analog Selectable Inputs, 4 to 20 mA, 0 to 10 VDC • 0-50/100 mV, RTD, TC • 2 Analog Outputs, 4 to 20 mA, 0 to 10 VDC	$240
GDA204**S	• 4 Analog Outputs • 4 to 20 mA, 0 to 10 VDC	$270

Cables

Part Number	Description	Price
RC-P-009I-00	• Connects OIS PLUS/GWY to V200 Series PLC, RS485, 2 m	$25
RC-P-009H-00	• Connects OIS PLUS/GWY to V200 Series PLC, RS232, 2 m	$25
RC-P-108C-00	• Connects V200 PLC to Toshiba VF-nC3/FS1 ASDs, RS485, 2W, 2 m	$25
RC-P-108A-00	• Connects V200 PLC to Toshiba G9/AS1 ASDs, RS485, 4W, 2 m	$25
IBM-H-005-00	• Programming Cable • For Download from Computer Serial Port to All OIS55/55E & V200 CPUs • Alternate Cable, Use USB Cable	$30

Industrial Automation
V2000 Series PLC Pricing

V2000-Series Controller Modules

Part Number	Description	Price
GPU612E*S	• Sequence Control Module (S2E) • User Program Capacity 32 kSteps, T-Series Instruction Set • Uses T-PDS Programming Software	$990
GPU662T*S	• Sequence Control Module (S2T) • User Program Capacity 32 kSteps, T-Series Instruction Set • Uses T-PDS Programming Software	$2,000
GPU672T*S	• Sequence Control Module (S2T) • User Program Capacity 64 kSteps, T-Series Instruction Set • Uses T-PDS Programming Software	$3,350
HPUM11**S	• Sequence Control Module, Standard CPU • User Program Capacity 32 kSteps • Ports: USB, Ethernet, & SD Card Slot • Uses V-Tool Programming Software	$2,100
HPUM12**S	• Sequence Control Module, High Performance CPUI • User Program Capacity 64 kSteps • Ports: USB, Ethernet, & SD Card Slot • TC-Net I/O Loop, Optical Network • Uses V-Tool Programming Software	$4,200
HPUM14**S	• Sequence Control Module, Redundant CPU • User Program Capacity 128 kSteps • Ports: USB, Ethernet, & Tracking Cables • TC-Net I/O Loop, Optical Network • Uses V-Tool Programming Software	$7,400

Main/Expansion Racks

Part Number	Description	Price
GBU643D*S	• Base Rack for S2T/S2 • Four Station Bus Slots, No I/O Slots • Not for S2E	$395
GBU648E*S	• Base Rack for S2T/S2 • Four Slots (Up to 5 Station Bus Slots) • Not for S2E	$425
GBU664**S	• Base Rack for S2E • Three I/O Slots • Expansion Rack for S2T/S2, Four I/O Slots	$195
GBU666**S	• Base Rack for S2E • Five I/O Slots • Expansion Rack for S2T/S2, Six I/O Slots	$200
GBU668**S	• Base Rack for S2E • Seven I/O Slots • Expansion Rack for S2T/S2, Eight I/O Slots	$210
GIF661**S	• Interface Module for Connecting Expansion Racks	$130

Industrial Automation
V2000 Series PLC Pricing

Power Supplies

Part Number	Description	Price
GPS632**S	• 24 VDC Power Supply • For Main/Expansion Racks	$130
GPS652**S	• 100 to 110 VDC Power Supply • For Main/Expansion Racks	$600
GPS693**S	• 120/240 VAC Power Supply • For Main/Expansion Racks • 24 VDC Service PS	$240
GPS691**S	• 120/240 VAC Power Supply • For Main Rack with UPS Interface Connections	$480

Direct I/O Modules — Discrete

Part Number	Description	Price
GIN663**S	• AC Input Module • 16 Points • 200 to 240 VAC	$225
GIN653**S	• AC Input Module • 16 Points • 100 to 120 VAC	$225
GDI632D*S	• DC Input Module • 8 Points • 12 to 24 VDC • Isolated Between Points	$255
GDI633**S	• DC Input Module • 16 Points • 12 to 24 VDC	$140
GDI634**S	• DC Input Module • 32 Points • 24 VDC	$330
GDI635**S	• DC Input Module • 64 Points • 24 VDC	$475
GDI635H*S	• DC Input Module • High Speed • 64 Points • 24 VDC	$520
GDI653**S	• DC Input Module • 16 Points • 100 to 110 VDC • 0.1A/Point, Sink	$330
GCD633**S	• DC Input Module • Change Detect • 16 Points • 12 to 24 VDC	$580

Industrial Automation
V2000 Series PLC Pricing

Direct I/O Modules — Discrete

Part Number	Description	Price
GDO633*S	• DC Output Module • 16 Points • 5 to 24 VDC • 1A/Point • Sink (Source Load)	$160
GDO633P*S	• DC Output Module • 16 Points, 5 to 24 VDC, 1A/Point, Source	$185
GDO634**S	• DC Output Module • 32 Points • 5 to 24 VDC • 0.1A/Point • Sink	$390
GDO635**S	• DC Output Module • 64 Points • 5 to 24 VDC • 0.1A/Point • Sink	$540
GAC663A*S	• AC Output Module • 12 Points • 100 to 240 VAC • 1A/Point	$285
GRO662S*S	• Relay Output Module • Eight Points (Isolated) • 240 VAC/24 VDC (max) • 2A/Point	$190
GRO663**S	• Relay Output Module • 16 Points, 240 VAC/24 VDC (max), 2A/Point	$215

Direct I/O Modules — Analog

Part Number	Description	Price
GAD634L*S	• Analog Input Module • Four Channels • 0 to 10 V Input • 8-Bit	$320
GAD668**S	• Analog Input Module • Eight Channels • 0 to 5 V • 0 to 20 mA • ±10 V • 16-Bit	$880
GAD674**S	• Analog Input Module • Four Channels • ±10 V Input • 12-Bit	$530
GAD624**S	• Analog Input Module • Four Channels • 1 to 5 VDC/4 to 20 mA • 12-Bit	$530

Industrial Automation
V2000 Series PLC Pricing

Part Number	Description	Price
GAD638S*S	• Analog Input Module • Eight Channels (Isolated) • ±10 V Input • 12-Bit	$1,590
GAD624L*S	• Analog Input Module • Four Channels • 1 to 5 VDC/4 to 20 mA • 8-Bit	$320
GAD628S*S	• Analog Input Module • Eight Channels (Isolated) • 0 to 5 V/0 to 20 mA • 12-Bit	$1,590
GRT614**S	• RTD Input Module • Four Channels • Pt100 Input • 12-Bit	$1,145
GTC618**S	• Thermocouple Input Module • Eight Channels • E, J, K • 16-Bit	$900
GDA672**S	• Analog Output Module • Two Channels • ±10 V Output • 12-Bit	$650
GDA624S*S	• Analog Output Module • Four Channels (Isolated) • 0 to 20 mA • 16-Bit • Output Hold Option	$1,820
GDA622L*S	• Analog Output Module • Two Channels • 1 to 5 VDC/4 to 20 mA • 8-Bit	$350
GDA622**S	• Analog Output Module • Two Channels • 1 to 5 V/4 to 20 mA • 8-Bit	$650
GDA664**S	• Analog Output Module • Four Channels • 0 to 5 V/0 to 20 mA • ±10 V • 16-Bit	$840

Industrial Automation
V2000 Series PLC Pricing

Cables

Part Number	Description	Price
GCS6R3*CS	• Expansion Cable • 0.3 m Long	$90
GCS6R5*CS	• Expansion Cable • 0.5 m Long	$100
GC6R7*CS	• Expansion Cable • 0.7 m Long	$105
GCS6*1*CS	• Expansion Cable • 1.2 m Long	$120
TKS20-OPTIC	• TOSLINE-S20 Fiber Optic Cable • 2 m Long • For Test & Demo	$200
TKIO20	• Cable for Hi-Density PLC I/O Modules • 24 VDC • One End I/O Connector & Other End Pigtail • 1/32 pt Module • 2/64 Module • 2 m Long	$160

Intelligent I/O Modules

Part Number	Description	Price
GCF612**S	• Communications Module • Two Channels • RS232/RS485 • ASCII/Binary • S2T Only	$1,830
GCF611**S	• Communications Module • One Channel • RS232C • ASCII	$930
GPI632**S	• Pulse Input Module • Two Channels • Up to 50 kpps • 5/12/24 V Input • 24-Bit Counter	$785
GPI672**S	• Pulse Input Module • Two Channels • Up to 50 kpps • RS422 Input • 24-Bit Counter	$850

V2000 Series PLC Pricing

Network Modules

Part Number	Description	Price
GDN611A*S	• DeviceNet Scanner Module	$1,160
GPF611**S	• Profibus DP Master Module	$5,450
GUN611**S	• TOSLINE-F10 • Single Bus • Twisted Paired-Cable • Master Station	$1,170
GUN612**S	• TOSLINE-F10 • Single Bus • Twisted Paired-Cable • Slave Station	$1,170
GPF612**S	• Profibus DP Slave Module	$4,700
GFL612**S	• FL-Net Master Version 2.0	$1,730
GFL654**S	• FL-Net Remote I/O Station Version 2.0 • CPU Module not Required	$2,290
GEN651A*S	• Ethernet Module • Single Bus • 100 Base-TX	$1,690
GSN621**S	• TOSLINE-S20 • Single Bus • Coaxial Cable • S2E/S2 Systems Only	$1,570
GSN622**S	• TOSLINE-S20 • Single Bus • Optical Cable • S2E/S2 Systems Only	$1,980
GSN625**S	• TOSLINE-S20 • Single Bus • Coaxial Cable • S2T Only	$2,350
GSN626**S	• TOSLINE-S20 • Single Bus • Optical Cable • S2T Only	$2,970
GSN627**S	• TOSLINE-S20LP • Double-Loop Optical Cable • S2T/S2 Only	$3,070

Industrial Automation
V2000 Series PLC Pricing

Network Peripherals

Part Number	Description	Price
FRO663-K	• TOSLINE-F10 Block Output Relay • 16 Points, Four Points/Common	$650
FDO633-K	• TOSLINE-F10 Block Output Transistor • 16 Points	$650
FDI633-K	• TOSLINE-F10 Block Input • Dry Contact (for NPN Outputs) • 16 Points	$650
FRP611AK	• TOSLINE-F10 Repeater • Extends the Length of a TOSLINE-F10 System • Two per System Max. • 24 VDC PS	$2,520
FRP613AK	• TOSLINE-F10 Repeater • Extends the Length of a TOSLINE-F10 System • Fiber Optic Link Between Repeaters • Two per F10 Network • 24 VDC PS	$2,600
SSIF21-US	• TOSLINE-S20 SIF Station • RS232 & Coax • Provides a TOSLINE-S20 Station for a Host Computer	$4,770
SSIF22-US	• SIF Station • RS232 & Fiber Optic Connector	$7,760
SSASC22-US	• Tosline-S20 Fiber Optic Active Star Coupler • Connects 10 S20 Stations (PLCs, ASDs, etc.) in a Star Configuration	$7,760
SASC25-US	• TOSLINE-S20 Fiber Optic Active Star Coupler • Connects Two F01 & Eight F07 S20 Stations in a Star Configuration	$5,300
HGA922**S	• TC-Net I/O Adapter • Connects V2000 Racks to TC-Net I/O Loop • Allows Use of All V2000 I/O Modules	$2,400

Programming

Part Number	Description	Price
T-PDS	• T-Series Computer Programming Software; MS Windows® XP or Later • CD with User Manuals, Includes Brochures, etc. for Current & Older PLCs	$495
HET81E4SS	• V-Series Computer Programming Software; MS Windows® XP or Later • Programs All V2000 Series (Except S2E & S2T) & nV Controllers • IEC61131-3 Compliant • Single Station Stand Alone Version	$2,100
S-LS	• TOSLINE-S20 S-LS Windows® Programming Software • Includes 3.5” Disks, User Manual • Used to Set Up TOSLINE-S20 Modules & SIF Stations	$300
T-DNW	• T-Series DeviceNet Wizard Software; MS Windows® 95/98/NT • Requires DeviceNet Interface (AB 1770-KFC RS232 Module or SST DeviceNet PCMCIA Card)	$2,300
TKRS232	• Programming Cable, 2 Meters • Connects T2/T3 Programming Port to Computer RS232 Port • All T-Series, S2E & S2T Processors	$70
TCJ905-CS	• Programming Cable, 2 Meters • Connects T2/T3 Programming Port to HP911 Handy Programmer/Computer RS232 Port	$220

V2000 Series PLC Pricing

Parts & Peripherals

Part Number	Description	Price
GPT9R2*AS	• Spare Thermistor for TTC218/GTC618 Thermocouple Input Card	$15
GSP691**S	• Module • Blank with Cover for Custom I/O Card	$60
GSP600*AS	• Module • Blank	$40
GBT611*AS	• Battery • Spare for S2/L2 CPU Modules	$80

T-Series Manuals

Part Number	Description	Price
UM-TS03-E004	• T-Series • Instruction Set • Includes: - Ladder - Function Blocks - SFC	$30
UM-TS08-E045	• T-PDS Windows® Software Basic Operation Manual Version 2.0	$25
UM-TS03-E008	• T-Series Computer Link • Protocol & Memory Map	$30
6F8C0928	• S2T User Manual • Basic Programming • Internal Operation & Program Debugging	$40
6F8C0926	• S2T User Manual • Basic Hardware • Specifications • I/O Modules • Troubleshooting • For CPU662T*S/CPU672T*S	$40
6F8C1132	• S2E User Manual • Basic Programming • Specifications • I/O Modules • Troubleshooting • For CPU612E*S	$40
6F8C1094	• S2E User Manual • Basic Hardware • Specifications • I/O Modules • Troubleshooting • For CPU612E*S	$40
6F8C1147	• Profibus Module User Manual for S2E/S2T	$40
PRIMER-T Series	• T-Series PLC Primer for T1, T2, & V2000 PLC • Includes: - Basics on T-PDS Programming Software - Application Examples - Advanced Information	$45

Industrial Automation
V2000 Series PLC Pricing

V-Series Manuals

Part Number	Description	Price
6F8C0860	• I/O Manual • Intelligent Analog Modules • Same as UM-TS02-E026 for S2E/S2T	$40
6F8C0841	• I/O Manual • Pulse Input Module • Same as UM-TS02-E021 for S2E/S2T	$40
6F8C0843	• I/O Manual • ASCII Communications Module • Same as UM-TS02-E013 for S2E/S2T	$40
6F8C0979	• Network Manual • Ethernet Module for S2/S2T	$40
6F3B0356	• Network Manual • TOSLINE-S20LP for S2T	$40
6F3B0357	• Network Manual • TOSLINE-S20S-LS Software User Manual for S2E/S2T	$40
6F8C0840	• Network Manual • TOSLINE-S20 for S2/S2E/S2T	$40
6F3B0364	• Network Manual • DeviceNet Instruction Manual for S2E/S2T • Same as UM-TS02-E016	$40
6F8C0890	• Network Manual • TOSLINE-S20 User Manual for S2E/S2	$40
DeviceNetWizard1	• Network Manual • DeviceNet Wizard Configuration Manual for S2/S2E/S2T	$40
DeviceNetWizard2	• Network Manual • DeviceNet Wizard User Manual for S2/S2E/S2T	$40
6F8C0845	• Network Manual • DeviceNet Instruction Manual for S2	$40
6F8C1068	• Network Manual • FL-Net User Manual for S2E/S2T	$40

Industrial Automation
Special Items

Converters

Part Number	Description	Price
TCNV485-232C	• RS422/485 (2 Wire/4 Wire) to RS232/TTL, Requires 24 VDC External PS	$79
TCNV485-CMOS	• RS422/485 (2 Wire/4 Wire) to CMOS Converter, RJ45 Connector for Toshiba ASDs	$90

Communications

Part Number	Description	Price
GWY-00	• Gateway Protocol Converter • Modbus/Toshiba • Requires 24 VDC External PS • Order Cables Separately	$200
GWY-300	• Gateway Protocol Converter • CAN (J1939)/Toshiba • Requires 24 VDC External PS • Order Cables Separately	$230
GWY-610-B	• Gateway Protocol Converter • Modbus Ethernet TCP/IP to Toshiba PLC/ASD • Requires 24 VDC External PS • Order Cables Separately	$260
GWY-901-B	• Gateway GSM Modem Module • Send Text Messages from PLC • Requires 24 VDC External PS & Phone Company SIM Card	$370

Industrial Automation
Special Items

Cables

Part Number	Description	Price
EC-P-009K-00	• Connects GWY to OIS PLUS • RS485, 2 m (Profibus, CAN Open, DeviceNet)	$25
EC-P-046A-00	• Connects OIS40R/OIS PLUS/GWY to T1/T2E/T3/S2E/S2T • RS485 Port • Pigtail on PLC End • 2 m	$20
EC-P-019B-00	• Connects OIS40R/OISPLUS/GWY to T2/T3/S2E/S2T Programming Port • 2 m	$25
EC-P-019A-00	• Connects OIS40R/OISPLUS/GWY to T1 Programming Port • 2 m	$25
EC-P-108A-00	• Connects OIS PLUS to G9/P9/AS1 ASDs • RS485, 4W	$25
EC-P-108C-00	• Connects OIS PLUS to VF-nC3/FS1 ASDs • RS485, 2W	$25
RC-P-009I-00	• Connects OIS PLUS/GWY to V200 Series PLC • RS485, 2 m	$25
RC-P-009H-00	• Connects OIS PLUS/GWY to V200 Series PLC • RS232, 2 m	$25
IBM-0909-1-00	• Programming Cable • For Download from Computer to All OIS/OIS PLUS Use with OISeup32 & OIL-DS Setup Software	$25

Appendices

Appendix A
Pricing & Delivery

Pricing Information

- *List pricing is subject to change at any time.*
- *All dimensions and weights are approximate and subject to change without notice.*
- *Contact the appropriate department for "consult factory" items.*
- *Contact the appropriate department for multipliers, pricing on special features, or options not listed in this guide.*
- *Ensure that the product's amp rating is equal to or larger than the applied motor amp rating.*
- *All options may not work in conjunction with one another. Contact the appropriate department for compatibility.*
- *Unless otherwise specified, all ASDs are three-phase input, three-phase output.*
- *See each device's Part Numbering Convention section for the required ordering information.*
- *Please see Toshiba's Terms and Conditions at http://www.toshiba.com/ind/data/pages_files/TCofSale.pdf*

Delivery

Toshiba International Corporation makes some of the finest value-added adjustable speed drive products in the market today — the right product, at the right price, delivered at the right time.

We offer engineered product options that can be ordered in a variety of configurations. The combination compatibility between different options can further impact delivery lead times.

Included in this price book are delivery guidelines that can be used to assist in determining the typical delivery of a standard or engineered product. Any item in stock is subject to prior sale. Please check with customer service for availability delivery schedules.

Deliveries of installed options are noted in the Options categories. Please note that most delivery times run concurrently. For instance, ordering the NEMA 4 option for an assembly unit will add six weeks to the delivery. Therefore, it would not be necessary to add two weeks to add a heater, as the most limiting time would be the NEMA 4 enclosure.

Appendix B
Warranty Information

Extended Warranty

Toshiba's standard warranty is 18 months from the date of shipment or one year from date of startup — whichever occurs first. This is a full parts and labor warranty. Please refer to Toshiba's Standard Terms and Conditions of Sale available on our website at http://www.toshiba.com/ind/data/pages_files/TCofSale.pdf for more details.

Extended warranties are available on motor-drive packages. When a purchase order is submitted for a motor-drive package to Toshiba, the ASD warranty will be extended to match the motor warranty for up to three years on parts labor when the Motor-Drive Package Extended Warranty Request Form is included. This extended warranty includes the following ASD products: G9, P9, GX7, W7, and Plus Pack. For motor-drive packages shipped from distributor stock, the distributor must submit this request form to the ASD department.

Extended warranties are also available on Toshiba motor-starter packages. When a purchase order is submitted for a motor-starter package to Toshiba, the Solid State Starter warranty will be extended to match the motor warranty for up to three years on parts labor when the Motor-Starter Package Extended Warranty Request Form is included. This extended warranty includes the following PAC products: TE, TD, TX. For motor-starter packages shipped from distributor stock, the distributor must submit this request form to the Motor Control Marketing department.

Extended warranties are also available from Toshiba as adders. The extended warranty must be on the same purchase order with the covered equipment. The adders are listed below:

Two-Year Warranty		Three-Year Warranty		Four-Year Warranty	
Parts Only	1.5%	Parts Only	4.0%	Parts Only	7.5%
Parts & Labor	3.0%	Parts & Labor	8.0%	Parts & Labor	15.0%

Example: *If total equipment cost is $30,000 and a four-year parts labor warranty is required, multiply $30,000 by 0.15, which equals $4,500. Added to the original amount, the total order would equal $34,500.*

Appendix C
Drawing Requests

Drawing Requests

Approval Drawings

Please include a part number of DWG-APP to request approval drawings on any purchase order to Toshiba. For non-standard parts, a set of drawings will be provided for your approval four to six weeks after acceptance of the purchase order. Standard product drawings will be available immediately for approval. Not all products in this price book are standard.

We will expect a written request for the approval drawings with one of the three choices:

1. *Release for manufacture as submitted.*
2. *Revise and release as noted.*
3. *Revise and resubmit drawings for approval.*

Reference Drawings

Please include a part number of DWG-REF to request reference drawings on any purchase order to Toshiba. For non-standard parts, a set of drawings will be provided for your reference three to four weeks after receipt of the purchase order. Standard product drawings will be available immediately for reference. Not all products in this price book are standard.

Any changes made to reference drawings are considered a change request which are subject to change fees and scrap charges.

Appendix D
Field Service & Special Testing Rates

Field Service Rates

Definition	Continental U.S. & Canada	International
Services Provided Monday through Friday from 7 a.m. to 5 p.m.	$180/Hour	$190/Hour
	Travel Living Expenses at Cost	
Services Provided Monday through Friday in Excess of 8 Hours per Day, Before 7 a.m. or After 5 p.m.	$270/Hour	$285/Hour
	Travel Living Expenses at Cost	
Services Provided on Saturday	$270/Hour	$285/Hour
	Travel Living Expenses at Cost	
Services Provided on Sundays and/or Holidays	$360/Hour	$380/Hour
	Travel Living Expenses at Cost	
Travel Time Monday through Saturday	$110/Hour Maximum 8 Hours Per Day, Per Direction	$110/Hour Maximum 12 Hours Per Day, Per Direction
Travel Time Sunday and/or Holidays	$220/Hour Maximum 10 Hours Per Day, Per Direction	$220/Hour Maximum 12 Hours Per Day, Per Direction
Standby Time will be Billed at the Appropriate Rate on the Specific Day of the Week in Which it Occurs; A Minimum of 8 Hours will be Billed for Standby Days	Per Above Rates	
Minimum Billing per Service Request will be 4 Hours at the Rate for the Specific Day Requested	Per Above Rates	
Travel, Labor, and Living Expenses	At Cost 10%	

Notes:

- *Prices are subject to change.*
- *Standby time — an individual is requested to remain onsite when their ability to provide direct support activities is impeded by others. Access to areas of the equipment and/or machine are not made available for check-out/troubleshooting by the service engineer. An individual is requested to remain at the customer's facility or close by on an "on-call" basis to provide support onsite, if needed.*
- *Toshiba's Standard Terms and Conditions of Sale apply and shall take precedence over any other terms and conditions referenced or included in any purchase order; except that if the parties have reached an agreed terms in writing such as a Master Agreement or Field Service Agreement whose agreed terms shall take precedent over all other terms.*
- *International Travel: Customer to provide escort and ground transportation at all times.*

Special Testing

Control Logic Witness Testing

- Testing conducted under shop ambient conditions.
- ***Test has a minimum one week impact on shipping lead times.***

Standard Witness Testing for Low Voltage Drives

All Horsepowers	Net Price
Standard Witness Testing	$14,000

Standard Witness Testing for Medium Voltage Drives

Synch Transfer	Frames 0 & 1	Frames ≥ 2
YES	$45,000 List	$50,000 List
NO	$35,000 List	$45,000 List

Burn-In Testing (Unwitnessed)

- Burn-in Testing is performed in Toshiba's Control Plant with a reactor load. A shorted reactor at reduced voltage is used to demonstrate the current carrying capacity (Amps) of the ASD.
- Testing conducted under shop ambient conditions.
- Burn-in test capacitiy ≤900 Amps. max.

	8 Hr. Burn-In	16 Hr. Burn-In	24 Hr. Burn-In	40 Hr. Burn-In
MV-ASD Burn-In	$7,000 List	$10,000 List	$13,000 List	$22,000 List
LV-ASD Burn-In	$3,000 List	$5,000 List	$7,000 List	$13,000 List

Dynamometer Testing Prices (Witnessed or Unwitenessed)

- Testing conducted under shop ambient conditions.
- Test has a minimum one week impact on shipping lead times. Actual impact dependent upon scope of testing and shop loading at time of testing.
- Test motor will be provided by Toshiba where available. In some cases a test motor cannot be supplied by Toshiba. In this case customer will be expected to supply a motor to Toshiba for load.
- Motor drive string testing is subject to additional motor testing charges.
- Maximum load capability based upon using both 950 kW and 375 kW together.

Dynamometer Test Capacities (ASD Ratings)

6,600 V @ 150 Amps. max.
4,000 V @ 250 Amps. max.
2,300 V @ 400 Amps. max.
690 V @ 900 Amps. max.
600 V @ 1,250 Amps. max.
480 V @ 1,750 Amps. max.
230 V @ 1,000 Amps. max.

Dynamometer Testing for Low Voltage Drives

(Motor Test Lab - Dynamometer Testing NOT TO EXCEED 8 hrs.)

Small	Medium	Large
≤100 HP	125 HP to 450 HP	≥500 HP
$13,200 List	$22,000 List	$27,000 List

Dynamometer Testing for Medium Voltage Drives

(Motor Test Lab - Dynamometer Testing NOT TO EXCEED 8 hrs.)

Synch Transfer	Frames 0 & 1	Frames ≥ 2
YES	$45,000 List	$50,000 List
NO	$35,000 List	$45,000 List

Notes:

Toshiba International Corporation is committed to providing the utmost in quality products and services and strives to uphold Toshiba's worldwide commitment to innovative technology, superior quality, and unmatched reliability.

In House Services

- Applications Support
- Customer Service & Project Management
- Design & Engineering
- Field Service
- Logistics & Warehousing
- Manufacturing
- Product Application & Field Service Training
- Research & Development
- Sales & Marketing

Adjustable Speed Drives Customer Service

Email: asdcustomerservice@tic.toshiba.com
Toll Free: (855)-803-7088

Low Voltage Drive Applications Support

Email: asdmarketing@tic.toshiba.com
Toll Free: (855)-803-7089

Medium Voltage Drive Applications Support

Email: casdmarketing@tic.toshiba.com
Toll Free: (855) 803-7090

Motor Controls Support

Email: controls@tic.toshiba.com
Toll Free: (800) 231-1412 Extension: 3472

Industrial Automation Support

Email: plc@tic.toshiba.com
Toll Free: (800) 231-1412 Extension: 3619

Field Service Support

Please submit online field service requests at **www.toshiba.com/ind/fieldservice**. Toshiba's field service group has created critical item email addresses. Please visit the website or use the e-mail addresses below for correspondence pertaining to:

Rapid Responses: asd-rr@tic.toshiba.com

Return Authorizations: asd-ra@tic.toshiba.com

Requests for On-Site Services: asd-svc@tic.toshiba.com

Training: asd-training@tic.toshiba.com

Service Providers: asd-svcctr@tic.toshiba.com

Toll Free: (800) 231-1412 Extension: 3449

Thank you for choosing Toshiba products! This catalog contains all of our standard product offerings. For more information on custom projects, please contact the factory directly at (800) 231-1412. For the most current information regarding Toshiba's industrial products and services, please visit our website at **www.toshiba.com/ind**.

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