



## EV8 SERIES

HIGH PERFORMANCE  
VARIABLE SPEED DRIVES  
FOR LARGE KW MOTORS





# AND FINALLY! A DRIVE SOLUTION FOR LARGE POWER RATINGS IN LOW VOLTAGE! A DRIVE SOLUTION FOR UNDESIRABLE HARMONIC PROBLEMS!

## THE EV8 SERIES....

- **Wide Power Range up to 1500kW**
- **415V or 690 V option**
- **Controlled Input section: 6-pulse thyristor bridge OR an Active Front End (AFE) IGBT Bridge**
- **Built-in RFI filter**
- **Built-in DC Bus Reactor**
- **Built-in Output dv/dt Filter**
- **IP54 Enclosure**

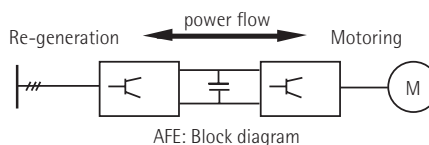
The EV-8 series Variable Speed Drives are designed specially to control 415V or 690V large KW motors up to 1500kW. Available in 6-pulse and Active Front End (AFE) versions, these high performance drives are suitable for industrial environments because they are supplied in IP54 enclosures complete with input and output filters as standard. It is a well-known fact that large drives can cause network voltage distortion - known as harmonics - especially, if connected to weak power supply. AFE technology, with its forced and controlled switching of input power devices, overcomes and almost eliminates such problems with harmonics.

## ACTIVE FRONT END (AFE) TECHNOLOGY

Most inverters are manufactured with the initial rectification stage consisting of simple diodes or thyristors. However, in both cases this leads to distortion of the current and voltage waveforms if power supply line has low short-circuit level. High current harmonic content results into consequent line losses and causes interference for the other consumers on connected to this supply. Toshiba International Corporation (TIC) offers an extremely compact inverter called the "AFE" (Active Front End) inverter, utilizing

an IGBT input bridge rectifier rather than the conventional bridges mentioned above. An IGBT bridge rectifier on the input side, not only mitigates the harmonic issues, but it also enables regenerated power from the load to be fed back to the mains through forced and controlled switching.

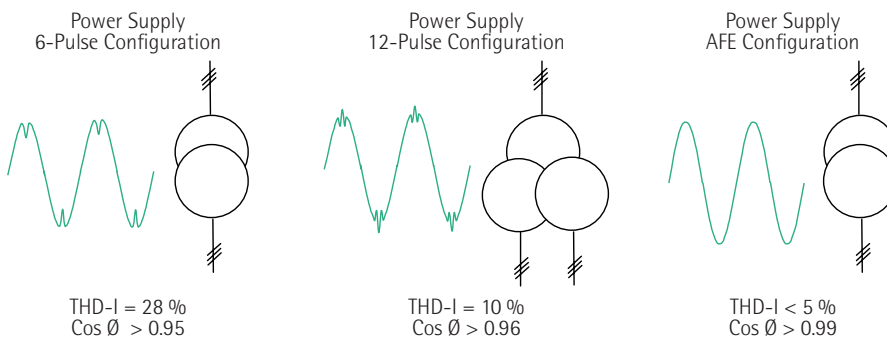
## POWER FLOW IN AFE



## BENEFITS OF AFE

- Reduces supply line harmonics
- Improves the Power Factor to near unity (p.f. > 0.99)
- Motor energy of high inertia loads is returned back to the power mains with the high dynamic performance
- Eliminates costly braking circuits and bulky resistance.

## HARMONICS AND POWER FACTOR



Note: THD-V figures will depend on power supply impedance/short circuit capacity at point-of-common coupling





# EV8 SERIES FEATURES

## POWER

The EV8 series is available in two voltage ratings:  
415V, 3 Ph (75kW – 900kW)  
690V, 3 Ph (75kW- 1500kW)

Standard Power Components in EV8 panel are:

- Incoming Switch/Fuse
- EMC Filter
- Over-voltage Suppressor
- Line contactor
- 6-pulse Thyristor Bridge or Input IGBT Bridge for AFE Drives
- DC Bus reactor
- Output IGBT Bridge
- Output dv/dt reactor

Control Transformers (415/400V and 110/24V)

## CONTROL

The EV8 series offers many possibilities of control – for example, Local and Remote operation with internally derived voltage or 24V DC external control supply. Control is also possible via serial communication.

## CONTROL TERMINALS

INPUTS:

- 0-10V and 4-20mA Freq. Reference Input
- External ENABLE / RUN / STOP / RESET Input signals
- 5 x Programmable Digital Inputs
- 2 x Programmable Analogue Inputs

OUTPUTS:

- VSD RUNNING / VSD HEALTHY / VSD FAULT Output signals
- 1 x 4-20mA Output for Current Monitoring
- 1 x 4-20mA Output for Speed Monitoring
- 4 x Digital Outputs
- 2 x Programmable Analogue Outputs
- 2 x Relay Outputs
- LCD Key-pad

## STANDARD PROTECTION FUNCTIONS

The EV8 series drive can be adjusted to the desired overload protection level. This protects the VSD and motor against overloads with its electronic thermal overload detection circuits. Following protections are available in EV8 series:

- Short circuit protection
- DC line over-voltage (hardware and software)
- Current Overload protection
- External protections ( Fan motor, thermal switch)
- Unbalance between reference and motor speed
- Unbalance between frequency and speed
- Auxiliary supply failure
- CAN transmission errors
- DC bus minimum Voltage
- IGBT protections
- Motor over-speed
- Motor over-temperature
- General software alarm

## COMMUNICATION

The Ev8 series is equipped with serial communication facility. RS485 serial communication with programming unit and external display – for example, a portable unit, video-keyboard, personal computer – allows the possibility of communication with host computer and remote port via a modem

## PROTOCOLS SUPPORTED

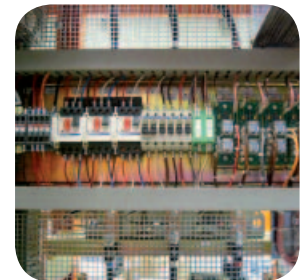
- CAN (Controller Area Network)
- DeviceNet (optional)
- PROFIBUS DP (optional)

## MECHANICAL STRUCTURE

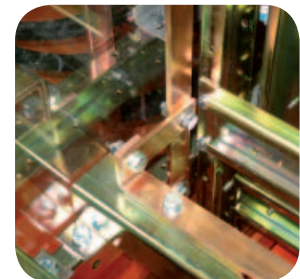
- Panel Construction: IP 54 (standard)
- Panel Material: Doors = 2 mm;  
Structure = 3 mm MS
- Accessibility: Front /Rear (Rear access only for passive components such as reactors)
- Panel Colour: RAL 2008 (Electric Orange)



Key-pad on the main door



Internal protection circuitry



Extensive Earth bus-bar arrangements for structural supports



Dedicated panel over-temperature protection



# SELECTION TABLES



415 V		6-PULSE VARIABLE SPEED DRIVES			
Type No.	VAR. TORQUE (110% O/L)		CONST. TORQUE (150% O/L)		Dimensions* (L xH** x D)mm
	KW	Output Current (A)	KW	Output Current (A)	
EV8-4090-G-Z	75	139	45	84	1000 x 2280 x 1000
EV8-4100-G-Z	90	167	75	139	1000 x 2280 x 1000
EV8-4120-G-Z	110	205	90	167	1000 x 2280 x 1000
EV8-4150-G-Z	132	245	110	205	1000 x 2280 x 1000
EV8-4180-G-Z	160	298	132	245	1000 x 2280 x 1000
EV8-4210-G-Z	200	372	160	298	1000 x 2280 x 1000
EV8-4260-G-Z	250	465	200	372	1000 x 2280 x 1000
EV8-4330-G-Z	315	586	250	465	2000 x 2280 x 1000
EV8-4415-G-Z	355	660	315	586	2000 x 2280 x 1000
EV8-4465-G-Z	400	744	355	660	2000 x 2280 x 1000
EV8-4525-G-Z	500	930	400	744	2000 x 2280 x 1000
EV8-4650-G-Z	560	1042	500	930	2000 x 2280 x 1000
EV8-4730-G-Z	630	1172	560	1042	3000 x 2280 x 1000
EV8-4820-G-Z	710	1321	630	1172	3000 x 2280 x 1000
EV8-4920-G-Z	800	1488	710	1321	3000 x 2280 x 1000
EV8-4105K-G-Z	900	1674	800	1488	3000 x 2280 x 1000

690 V		6-PULSE VARIABLE SPEED DRIVES			
Type No.	VAR. TORQUE (110% O/L)		CONST. TORQUE (150% O/L)		Dimensions* (L xH** x D) mm
	KW	Output Current (A)	KW	Output Current (A)	
EV8-6100-G-Z	90	95	75	82	1000 x 2280 x 1000
EV8-6120-G-Z	110	115	90	95	1000 x 2280 x 1000
EV8-6150-G-Z	132	140	110	115	1000 x 2280 x 1000
EV8-6170-G-Z	160	170	132	140	1000 x 2280 x 1000
EV8-6200-G-Z	200	215	160	170	1000 x 2280 x 1000
EV8-6260-G-Z	250	270	200	215	1000 x 2280 x 1000
EV8-6330-G-Z	315	340	250	270	2000 x 2280 x 1000
EV8-6390-G-Z	355	385	315	340	2000 x 2280 x 1000
EV8-6440-G-Z	400	435	355	385	2000 x 2280 x 1000
EV8-6500-G-Z	500	545	400	435	2000 x 2280 x 1000
EV8-6620-G-Z	560	610	500	545	2000 x 2280 x 1000
EV8-6690-G-Z	630	685	560	610	3000 x 2280 x 1000
EV8-6780-G-Z	710	760	630	685	3000 x 2280 x 1000
EV8-6870-G-Z	800	870	710	760	3000 x 2280 x 1000
EV8-6990-G-Z	900	980	800	870	3000 x 2280 x 1000
EV8-6110K-G-Z	1000	1090	900	980	3000 x 2280 x 1000
EV8-6122K-G-Z	1200	1250	1000	1090	4000 x 2280 x 1000
EV8-6150K-G-Z	1500	1550	1200	1250	4000 x 2280 x 1000
EV8-6185K-G-Z	-	-	1500	1550	4000 x 2280 x 1000

(\*) Dimensions subject to change as per engineering requirement (\*\*) Allow additional 300mm for fan hood



# SELECTION TABLES



415 V		ACTIVE FRONT END (AFE) VARIABLE SPEED DRIVES			
Type No.	VAR. TORQUE (110% O/L)		CONST. TORQUE (150% O/L)		Dimensions* (L xH** x D) mm
	KW	Output Current (A)	KW	Output Current (A)	
EV8-4100-A-Z	75	139	45	84	1000 x 2280 x 1000
EV8-4120-A-Z	90	167	75	139	1000 x 2280 x 1000
EV8-4150-A-Z	110	205	90	167	1000 x 2280 x 1000
EV8-4180-A-Z	132	245	110	205	1000 x 2280 x 1000
EV8-4210-A-Z	160	298	132	245	1000 x 2280 x 1000
EV8-4260-A-Z	200	372	160	298	2000 x 2280 x 1000
EV8-4330-A-Z	250	465	200	372	2000 x 2280 x 1000
EV8-4415-A-Z	315	586	250	465	2000 x 2280 x 1000
EV8-4465-A-Z	355	660	315	586	2000 x 2280 x 1000
EV8-4525-A-Z	400	744	355	660	2200 x 2280 x 1000
EV8-4650-A-Z	500	930	400	744	2200 x 2280 x 1000
EV8-4730-A-Z	560	1042	500	930	2200 x 2280 x 1000
EV8-4820-A-Z	630	1172	560	1042	3200 x 2280 x 1000
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EV8-4105K-A-Z	800	1488	710	1321	4000 x 2280 x 1000

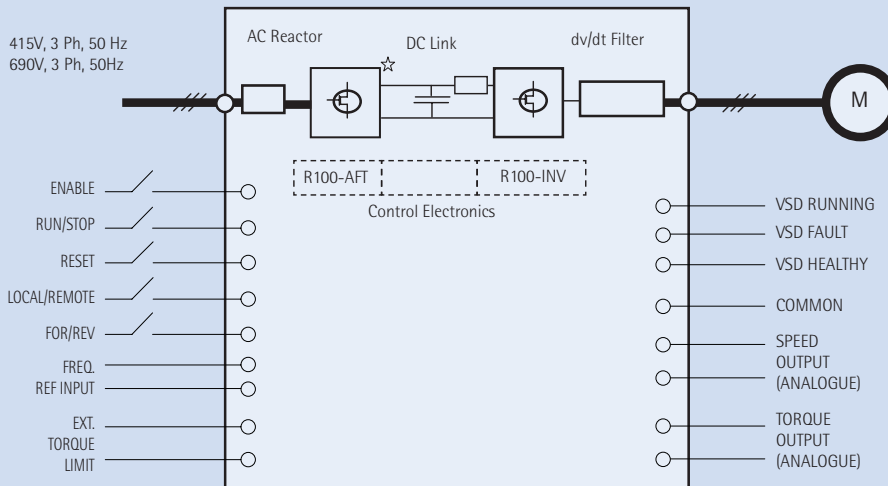
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Type No.	VAR. TORQUE (110% O/L)		CONST. TORQUE (150% O/L)		Dimensions* (L xH** x D) mm
	KW	Output Current (A)	KW	Output Current (A)	
EV8-6100-A-Z	75	84	45	50	1000 x 2280 x 1000
EV8-6120-A-Z	90	101	75	84	1000 x 2280 x 1000
EV8-6150-A-Z	110	123	90	101	1000 x 2280 x 1000
EV8-6180-A-Z	132	148	110	123	1000 x 2280 x 1000
EV8-6210-A-Z	160	179	132	148	1000 x 2280 x 1000
EV8-6260-A-Z	200	274	160	179	2000 x 2280 x 1000
EV8-6310-A-Z	250	280	200	274	2000 x 2280 x 1000
EV8-6390-A-Z	315	352	250	280	2000 x 2280 x 1000
EV8-6440-A-Z	355	397	315	352	2000 x 2280 x 1000
EV8-6500-A-Z	400	447	355	397	2000 x 2280 x 1000
EV8-6620-A-Z	500	559	400	447	2000 x 2280 x 1000
EV8-6690-A-Z	560	626	500	559	2000 x 2280 x 1000
EV8-6780-A-Z	630	705	560	626	3000 x 2280 x 1000
EV8-6870-A-Z	710	794	630	705	3000 x 2280 x 1000
EV8-6990-A-Z	800	895	710	794	3000 x 2280 x 1000
EV8-6110K-A-Z	900	984	800	895	3000 x 2280 x 1000
EV8-6122K-A-Z	1000	1094	900	984	3000 x 2280 x 1000
EV8-6150K-A-Z	1200	1284	1000	1094	4000 x 2280 x 1000
EV8-6185K-A-Z	1500	1605	1200	1284	4000 x 2280 x 1000

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# STANDARD TECHNICAL SPECIFICATIONS

## TYPICAL CONNECTION DIAGRAM\*\*



☆ 6-Pulse VSDs have SCR input bridge.

\*\* This being an engineered product, actual connections may differ from what is shown in the diagram.



## STANDARD TECHNICAL SPECIFICATIONS

*SUPPLY VOLTAGE:* 415V or 690 V +/- 10%

*SUPPLY FREQUENCY:* 50 or 60 Hz +/- 5%

*ALTITUDE:* < 1000m

*AMBIENT TEMPERATURE:* 40 Deg C +/- 5% (De-ration at higher temperatures)

*HUMIDITY:* 95% at 20 Deg C

*COOLING:* Forced Air Cooled

*OVERLOAD FACTOR:* Constant Torque: 150% for 1 Min.

Variable Torque: 110% for 1 Min.

Our excellent service support...

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