

TOSHIBA

Leading Innovation >>>



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**

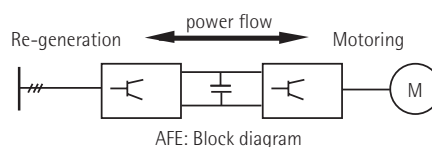
The EV-8 series Variable Speed Drives are designed specially to control 415V or 690V large KW motors up to 1500kW. Available in 6-pulse and Active Front End (AFE) versions, these high performance drives are suitable for industrial environments because they are supplied in IP54 enclosures complete with 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.

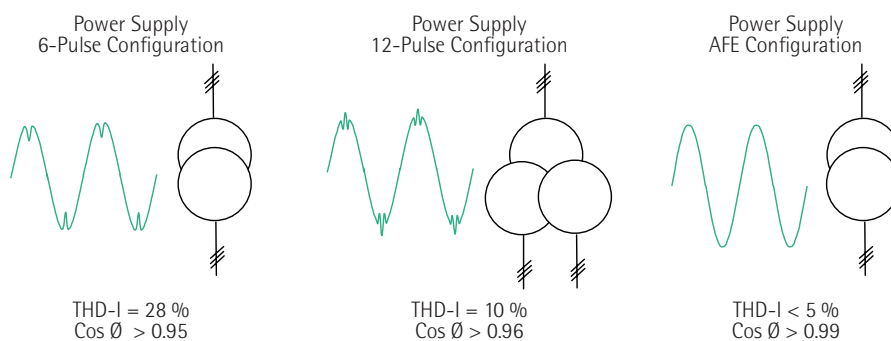
POWER FLOW IN AFE



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

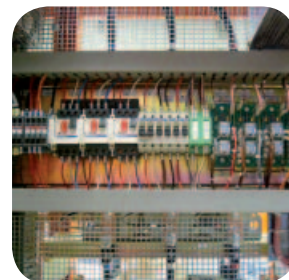
- CAN (Controller Area Network)
- DeviceNet (optional)
- PROFIBUS DP (optional)

MECHANICAL STRUCTURE

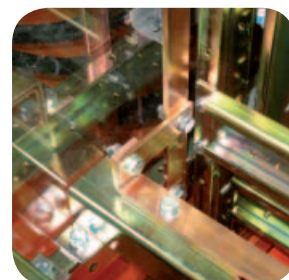
- Panel Construction: IP 54 (standard)
- Panel Material: Doors = 2 mm;
Structure = 3 mm MS
- Accessibility: Front /Rear (Rear access only for passive components such as reactors)
- Panel Colour: RAL 2008 (Electric Orange)



Key-pad on the main door



Internal protection circuitry



Extensive Earth bus-bar arrangements for structural supports

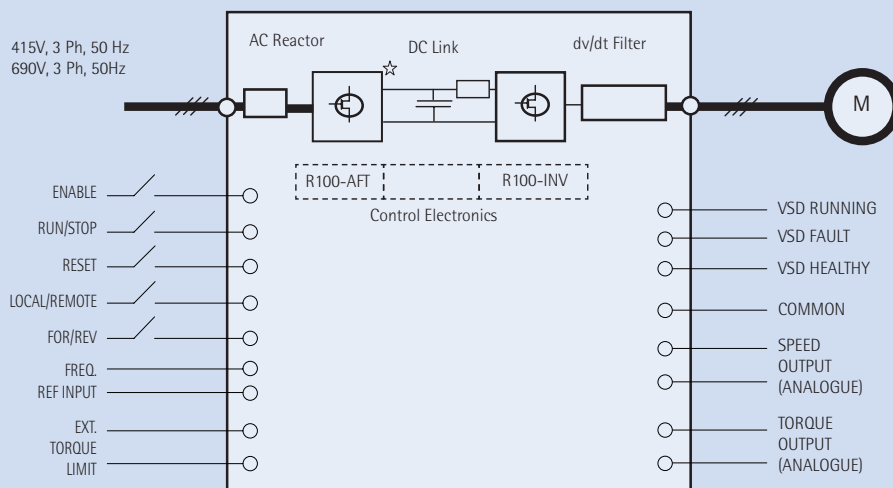


Dedicated panel over-temperature protection



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.



Toshiba's excellent service support

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-rating 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.

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