INVERTERS

What is an inverter?

An inverter is a motor control that adjusts the speed of an AC induction motor. It does this by varying the frequency of the AC power to the motor. An inverter also adjusts the voltage to the motor.

This process takes place by using some intricate electronic circuitry that controls six separate power devices. They switch on and off to produce a simulated three phase AC voltage. This switching process is also called inverting DC bus voltage and current into the AC waveforms that are applied to the motor. This led to the name “inverter”. For the rest of this discussion, the term “inverter” will be used in place of adjustable speed drive.

How does an inverter work?

Most inverters are of the variable voltage, variable frequency design. They consist of a converter section, a bus capacitor section and an inverting section. The converter section uses semiconductor devices to rectify (convert) the incoming fixed voltage, fixed frequency 3-phase AC power to DC voltage which is stored in the bus capacitor bank. There it becomes a steady source of current for the power devices which are located in what is known as the inverting section. The inverting section absorbs power from the DC bus cap bank, inverts it back to simulated 3-Phase AC sinewaves of varying voltage and varying frequency that are typically used to vary the speed of a 3-phase induction motor.
Inverter Block Diagram

-six-step-inverter-

Baldor

Six Step Inverter
Diode Bridge Rectification

3Ø AC Power

+ 

L1 L2 L3

M

DC Ripple

- 360Hz 3Ø Input Power
- 120 Hz 1Ø Input Power

60 Hz

Diode Capacitor Input
PWM Output

OUTPUT VOLTAGE

OUTPUT CURRENT
Line Regen Drive

Line Reactor
3 PHASE INPUT
8kH Harmonic Filter
AC POWER INPUT
L1, L2, L3
DC Bus Voltage
Convert Section
Inverter Section
Control Board
Feedback
User Commands
Encoder on Vector Only
Motor
Enc

Converter Section
INVERTER BASICS

Line Regen Control Block Diagram

AC POWER INPUT
L1, L2, L3
INPUT REACTOR
3 PHASE CURRENT FEEDBACK
ZERO CROSSING DETECTION
CONVERTER CONTROL BOARD
TARGET BUS VOLTAGE
EXTERNAL USER COMMANDS
FEED FORWARD
CONVERTER SECTION
INVERTER SECTION
3 PHASE POWER INPUT CIRCUIT
3 PHASE POWER OUTPUT CIRCUIT
DC BUS VOLTAGE
DRIVER CIRCUIT
FEEDBACK
POSITION FEEDBACK
INVERTER CONTROL BOARD
AC MOTOR
CURRENT FEEDBACK
3 PHASE POWER OUTPUT CIRCUIT
Baldor

Baldor