



Quick Start Guide

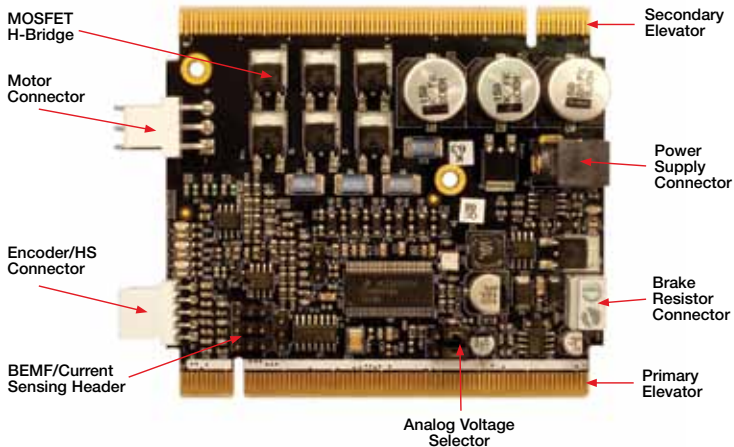
TWR-MC-LV3PH

Low-Voltage, Three-Phase
Motor Control Module



TOWER SYSTEM

Get to Know the TWR-MC-LV3PH



TWR-MC-LV3PH Freescale Tower System

The TWR-MC-LV3PH module is part of the Freescale Tower System, a modular development platform that enables rapid prototyping and tool re-use through reconfigurable hardware. Take your design to the next level and begin constructing your Tower System today.

TWR-MC-LV3PH Features

- Motor power and signal connectors
- 3-phase bridge inverter (six MOSFETs)
- 3-phase MOSFET gate driver with over current and under voltage protection
- 3-phase current sensing shunts
- 3-phase back-EMF voltage sensing circuitry for sensorless control
- Encoder/hall sensor sensing circuitry
- Power supply voltage input of 12–24V DC
- Output current up to 8 amps
- Power supply reverse polarity protection circuitry
- DC bus voltage and current sensing
- Low-voltage on-board power supplies
- User LED, power-on LED, six PWM LED diodes

Warning

This development-tool set operates in an environment that includes rotating machinery. Be aware:

- Wear safety glasses and use care to avoid contacting the motor or circuitry with clothing, ties or jewelry
- Power supply circuitry and the motor can reach temperatures hot enough to cause burns

Step-by-Step Installation Instructions

- 1** Assemble your Tower System, including a Tower System controller module and the TWR-MC-LV3PH module.
- 2** Attach the motor connector from the BLDC motor to J5 on the TWR-MC-LV3PH. Phase A, phase B, and phase C are labeled on the bottom of the board.
Note: For BLDC motors, it is important to put the wire color coded for phase A into the connector terminal labeled A. Repeat this for phase B and phase C.
- 3** Select analog power supply source by setting jumpers J2 and J3 appropriately. If your Tower controller module has terminated VDDA and VSSA signals to the primary elevator, select the elevator source (position 2-3). Otherwise, select internal source (position 1-2).
- 4** Connect an encoder or hall sensor connector from the motor assembly to the encoder/hall sensor interface J8 on the TWR-MC-LV3PH.
- 5** Connect a current-limited DC power supply to connector J1. The input voltage range is 12 to 24V DC. Current limit should be set for less than 8 amps. Power should not be applied to the TWR-ELEV or any other peripheral module.

When power is applied, the D7 power-on LED will illuminate. The TWR-MC-LV3PH board powers the Tower System with 5V and 3.3V on-board power supplies.

Warning

Input voltages higher than 24V may damage the Tower System module. The Tower System should only be powered by the TWR-MC-LV3PH module. Supplying power to the TWR-ELEV or other peripheral modules could result in damage.

TWR-MC-LV3PH Jumper Options

The following is a list of all jumper options. The default installed jumper settings are shown in white text within the black boxes.

Jumper	Option	Setting	Description
J2	VDDA Source Select	1-2	Internal on-board source of analog 3.3V
		2-3	Elevator source of analog 3.3V
J3	VSSA Source Select	1-2	Internal on-board source of analog GND
		2-3	Elevator source of analog GND
J10	AN6 Signal Select	1-2	Phase C current signal
		2-3	DC-bus current signal
J11	AN5 Signal Select	1-2	Phase A current signal
		2-3	DC-bus/2 voltage signal
J12	AN2 Signal Select	1-2	Phase C current signal
		2-3	Back EMF phase C
J13	AN1 Signal Select	1-2	Phase B current signal
		2-3	Back EMF phase B
J14	AN0 Signal Select	1-2	Phase A current signal
		2-3	Back EMF phase A

Visit **freescale.com/Tower** for information on the TWR-MC-LV3PH module, including:

- TWR-MC-LV3PH user's guide
- TWR-MC-LV3PH schematics
- Tower System fact sheet

For more information, visit freescale.com/Tower
Join the online Tower community at towergeeks.org

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