HVP-KV10Z32
Quick Start Guide

Freescale Controller Card

High–Voltage
Development
Platform

Get to Know the HVP-KV10Z32
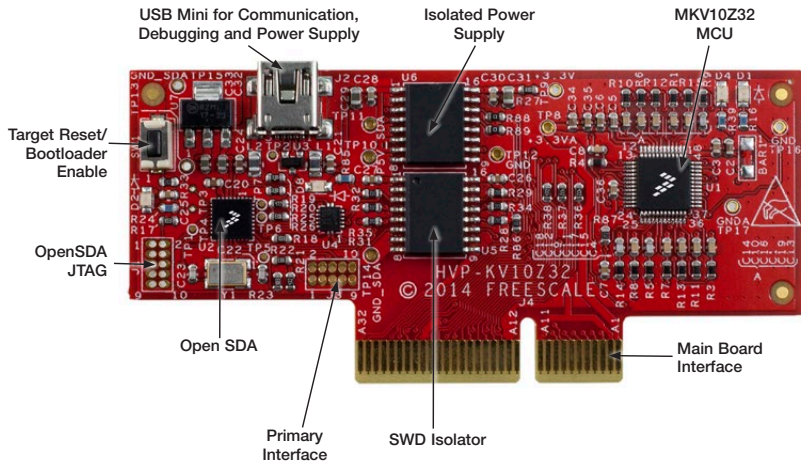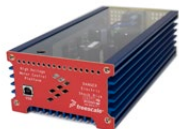

USB Mini for Communication, Debugging and Power Supply

Isolated Power Supply

MKV10Z32 MCU

Target Reset/ Bootloader Enable

OpenSDA JTAG

Open SDA

Main Board Interface

Primary Interface

SWD Isolator

Figure 1: HVP-KV10Z32

HVP-KV10Z32
High-Voltage Development Platform

The Freescale High-Voltage Development Platform is a set of software and hardware tools for evaluation and development of high-voltage motor control and power conversion algorithms. It is ideal for rapid prototyping of high-voltage microcontroller-based applications.

Introduction to HVP-KV10Z32 High-Voltage Development Platform

The HVP-KV10Z32 controller card is a development board for the Kinetis KV1x family which in combination with one of HVP-MC3PH High-Voltage Development Platform provides ready-made software and hardware development for high-voltage motor control and power conversion applications.

This Quick Start Guide will teach you to:

- Easily program precompiled examples for the KV1x MCU.
- Learn about HVP-MC3PH high voltage motor control development platform.
- Spin the 3-phase PMSM motor of the HVP-MC3PH module while monitoring the motor with the FreeMASTER tool

HVP-KV10Z32 Controller Card Features

- Accommodates Target MKV10Z32VLF7 MCU (ARM® Cortex®-M0+ 75 MHz, 32 KB flash, 2x12-bit ADCs, 3x FlexTimer, 48 LQFP)
- SWD isolation up to 5KV
- Programmable OpenSDA[1] debug interface with Micro USB connector and virtual serial port
- Galvanic isolation
- Design optimized for low noise
- On-board isolated power supply, allowing safe debugging
- Controller card allows stand-alone operation

Tools Required

- IAR Embedded Workbench V7.20.5.7624 or higher
- Freescale FreeMASTER for real-time debug monitoring and data visualization

[1] Refer to the OpenSDA User Guide available at freescale.com

Step-by-Step Installation Instructions

1 Download Software and Tools

Download installation software and documentation under **"Jump Start Your Design"** at **freescale.com/HVP**.

2 Install the Software and Tools

- Download and install the IDE toolchain IAR Embedded Workbench® for ARM® v 7.20.5 or later, 30-day free evaluation license, at iar.com/Freescale.

- Download and install the PEMicro Windows® USB Drivers at pemicro.com/OpenSDA.

- Download and install the free debug monitoring and data visualization tool Freescale FreeMASTER, v1.4 or later, at **freescale.com/FreeMASTER**.

3 Program a Precompiled Example Using the OpenSDA MSD Application

1) Plug the USB mini cable into HVP-KV10Z32. Windows will detect a new HVP-KV10Z32 drive and automatically install the required drivers.

2) Program a Precompiled Example "LED_demo" for the KV10 In the HVP-KV10Z32 drive, copy **LED_demo.SREC** file from the Precompiled Examples folder of the Quick Start Package. Demo will start automatically when the download is complete. It is not necessary to disconnect the USB cable.

3) User LED on the controller card will blink.
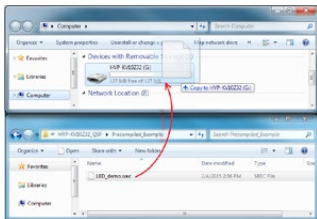
Step-by-Step Installation Instructions

**4** Debug Motor Control Project in IAR with HVP-MC3PH High-Voltage Development Platform

1) Configuring Hardware

- Plug the controller card HVP-KV10Z32 into 64-pin PCI connector located at HVP-MC3PH.

- Configure jumpers at HVP-MC3PH as is shown in the table below.

Option	Setting
J1	1–2, 2–3
J3	1–2, 2–3

- Close the lids.

- Connect the servo motor leads to output connector J13. (Applications are tuned for Servo motor type: Mige 60CST-M01330 or Maxsine 60MSLO1330FC).

- Connect mini USB cable between daughter card and your computer. Windows will detect a HVP-KV10Z32 debug port, mass storage device and CDC serial port.
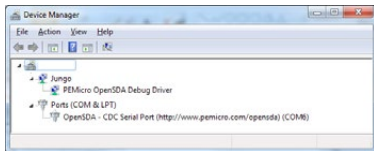
Step-by-Step Installation Instructions

5 Loading the PMSM Motor Demo Software

- Launch IAR EWARM v7.20.5 and Build the "**PMSM_sensorless_FOC. eww**". following the path build\iar\kv10\ PMSM_Sensorless_FOC\ in the Quick Start Package

Note: To warranty your project compatibility with the hardware tool, select the Options: Freescale MKV10Z32xxx7 as Target Device, KV10_32KB_ Pflash.icf as Linker configuration file, PE micro as Debug Driver, FlashKV1x32K.board as Flashloader configuration file and OpenSDA-USB as PE Micro Hardware Interface Type.

Clean the project before selecting the action Rebuild All.

**Note:** The compilation may return warning messages without consequence.

- Run IAR EWARM v7.20.5 Debug Mode and Download and Debug the "**PMSM_ sensorles_FOC**" project.

- Connect a line-isolated, current-limited 110 V DC or 90 V AC power supply to the power input module with the IEC connector. The power supply current limit should be set for less than 3 amps. The DC power supply's polarity does not matter. Regardless whether DC or AC power is used, the power is always applied to the input power connector located on the rear panel.

- Start the debug session by selecting the GO option from the toolbar. To spin motor and set motor speed, continue to following section.

Step-by-Step Installation Instructions

6 Monitor the Project with FreeMASTER

- Launch Freescale FreeMASTER v1.4 or later from the Windows Start menu.

- Open the FreeMASTER project file **PMSM_FOC_KV1x.pmp** following the path freemaster\PMSM_Sensorless_ FOC in the Quick Start Package. The PMSM Sensorless Application interface will appear in FreeMASTER to monitor and control the speed, the voltage and the current consumption of the motor.

- In the Project Options, set the COM port affected as the OpenSDA -CDC Serial Port (information available in Device Manager) and set the baud rate/speed to 19200 bps (check the option Do Not Open Port at Startup to avoid error messages at FreeMASTER startup).

- From the toolbar, select the action Start the Communication.

- Select in FreeMASTER speedometer; the requested speed and the motor will spin automatically.
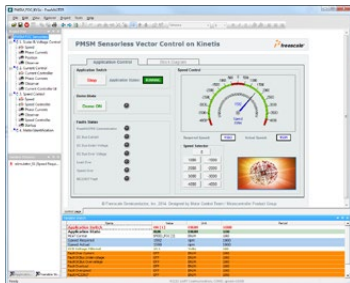
et Started

Download installation software and documentation under **"Jump Start Your Design"** at **freescale.com/HVP**.

Support

Visit **freescale.com/support** for a list of phone numbers within your region.

Warranty

Visit **freescale.com/warranty** for complete warranty information.

For more information, visit freescale.com/HVP, freescale.com/Kinetis, or freescale.com/Kinetis/VSeries