QE for Motor V1.5.0

Release Note

Thank you very much for using the QE for Motor V1.5.0.

This release note covers product installation, restrictions, and so on. Please read this document before using the product.

Contents

1. About QE for Motor

1.1 Overview

QE for Motor is an assistance tool for applications that operates in the e^2 studio integrated development environment. For the development of embedded systems that include motor software and are based on the Renesas MCUs, this product offers the following features.

- Configuration of motor middleware and related drivers such as Flexible Software Package (FSP)
- Assistance in tuning and analysis in coordination with the Renesas Motor Workbench

1.2 Features

QE for Motor has the three features below for supporting the development of motor software.

1. Workflow View
   Following the workflow in the [Motor Workflow (QE)] view enables configuration of the middleware and related drivers for motors. Also, tuning and analysis can be implemented through coordination with the Renesas Motor Workbench.
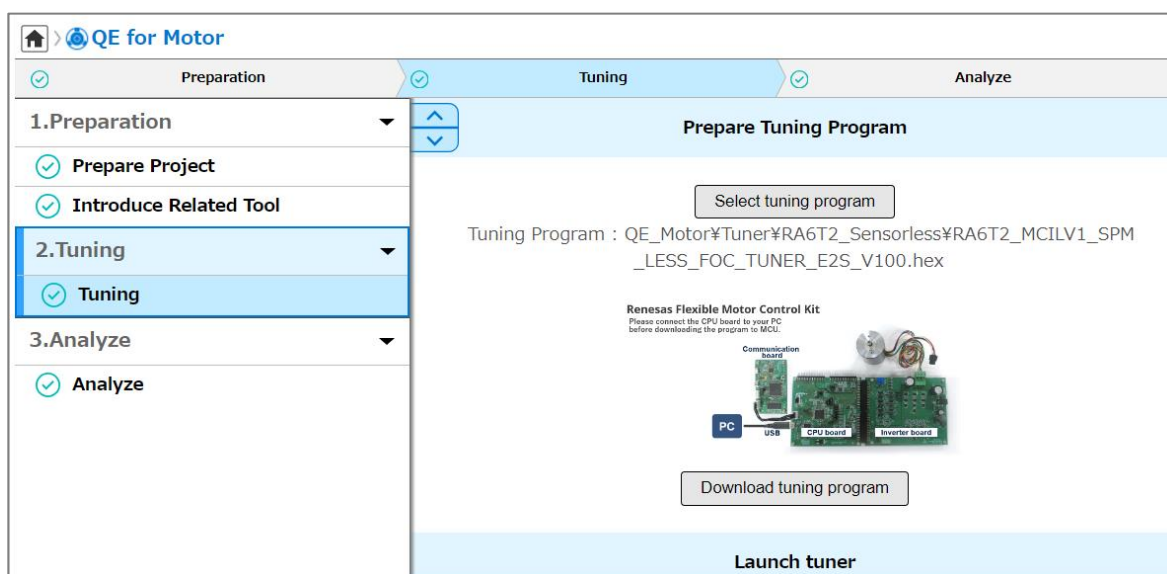
The workflow view can be opened from [Renesas Views] – [Renesas QE] – [Motor Workflow (QE)] Men. The display functions of the workflow view are as follows.

■ Display mode

2 display modes, guide style and simple style are supported. The display mode is automatically switched by the window size.

Guide style : Click each menu on the left to display the setting items. Steps are performed from top to bottom in the menu.
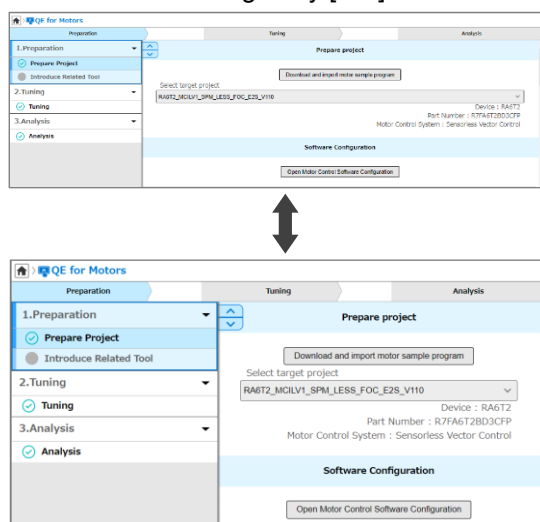
Simple style : All setting items are displayed. Steps are performed from top to bottom in the workflow.

* The setting items for both styles are the same as for the old workflow.

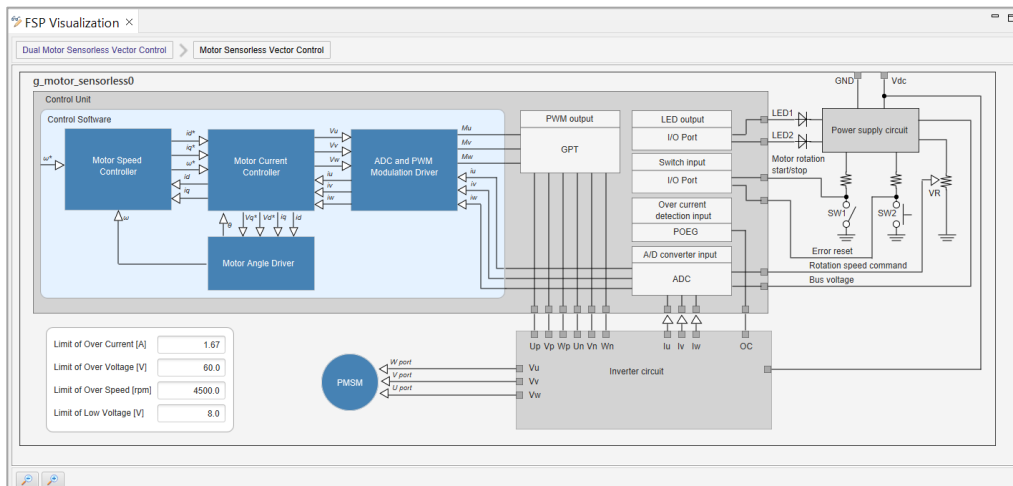| Guide Style	Simple Style
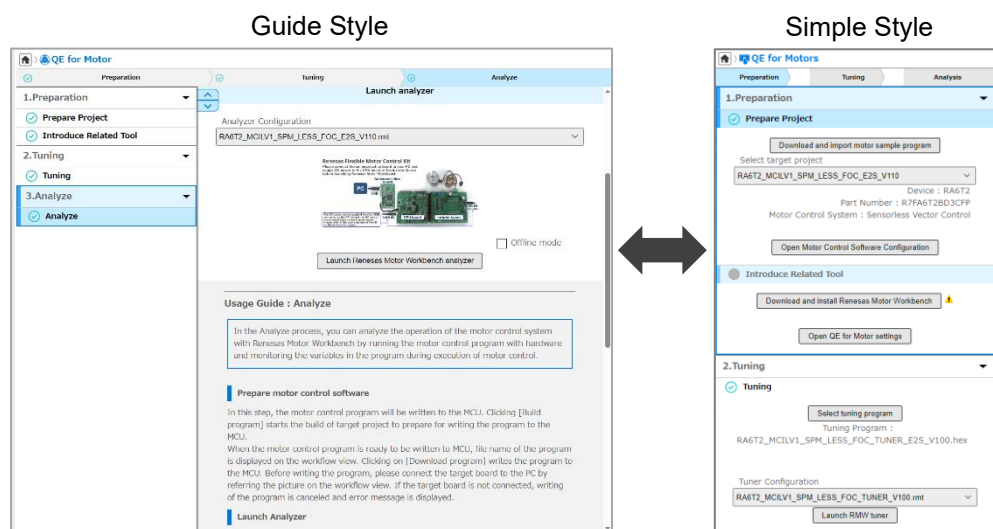
■ Display size

Display size of GUI items can be changed by [Ctrl] + mouse wheel.

2. Motor software configuration GUI

By changing the parameters of the motor control system in the GUI, you can configure the middleware and related drivers for motors. The hierarchical structures of the block diagram enable efficient operations.

For RA family devices, the motor software configuration GUI is displayed in the [FSP Visualization] view of the e^2 studio. The [FSP Visualization] view is opened in the [FSP Configuration] perspective. The [FSP Visualization] view can also be opened from the main menu of the e^2 studio, by selecting [Renesas Views] -> [C/C++] -> [FSP Visualization]. The motor software configuration GUI is displayed when selecting the stack of the FSP module listed in **1.4 Supported Software of Motor Software Configuration GUI** on the [Stacks] tabbed page of the FSP configuration editor.
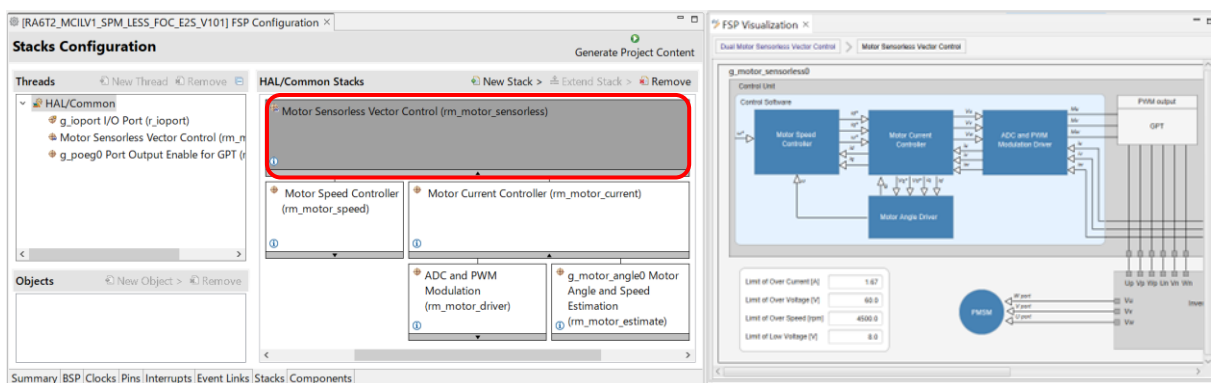
For RX family devices, the motor software configuration GUI is displayed in the [Motor Middleware Configurator (QE)] view of the e^2 studio. The [Motor Middleware Configurator (QE)] view is opened by selecting the sample project supporting this feature and clicking [Start Configuration] button on [Motor Main (QE)] view. For the sample projects supporting this feature, refer to **1.4 Supported Software of Motor Software Configuration GUI**.
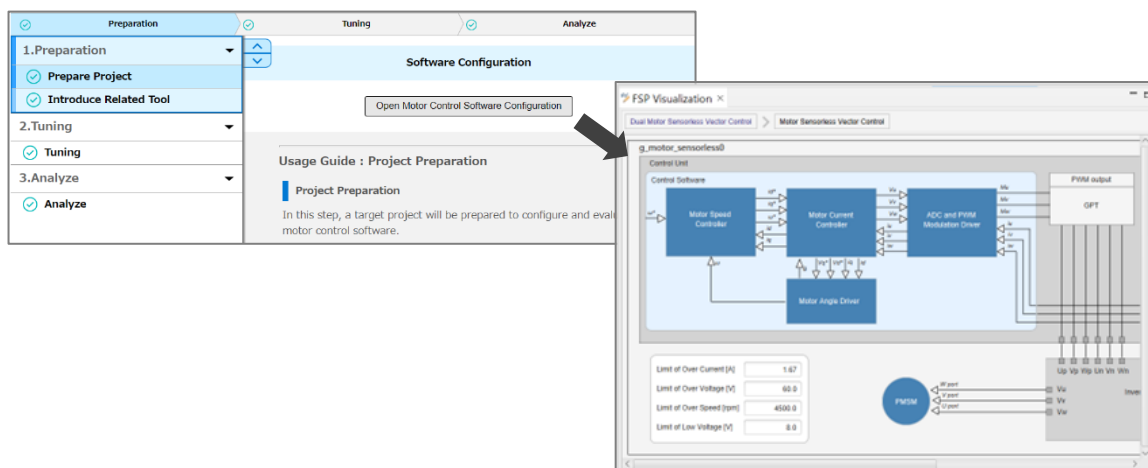
3. Coordination with the Renesas Motor Workbench

QE for Motor can operate in coordination with the Renesas Motor Workbench for the processes of tuning and analysis of the motor. Since QE for Motor automatically makes the necessary settings for starting the Renesas Motor Workbench, you can tune and analyze the motor by clicking on the buttons in the window of QE for Motor.
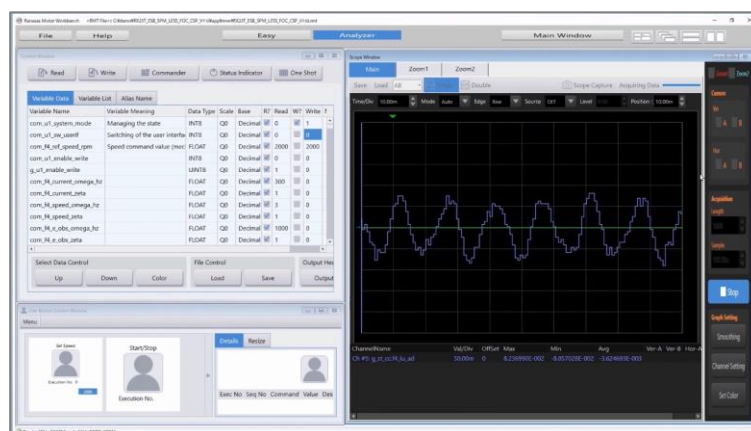
4. Supported MCUs

QE for Motor supports the following MCUs.
RL78/G1F, RL78/G24, RA4T1, RA6T2, RA6T3, RA8T1 and RX26T

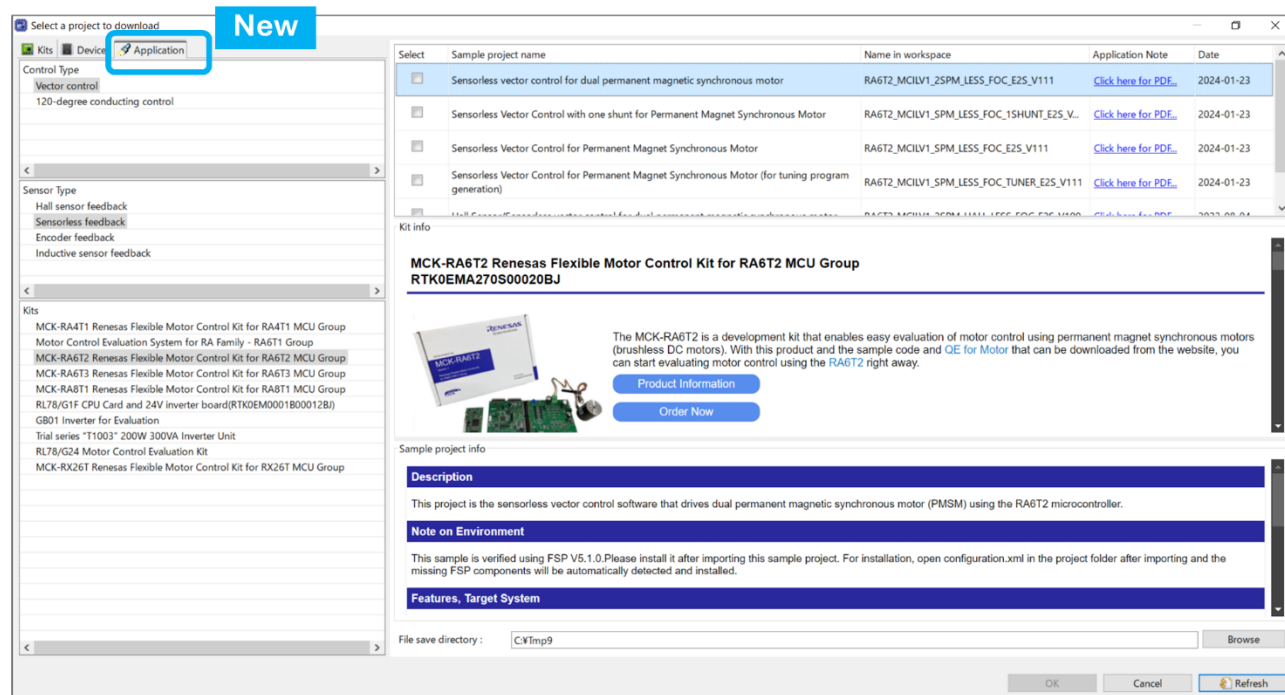## 1.3   Changes in V1.5.0

1.3.1 Addition of Supported Devices

The following group is now supported.
RA Family: RA2T1 Group

1.3.2 Addition of [Application] Tab to the Sample Program Import Function

An [Application] tab was added to the sample program import window to enable searching for sample programs by motor control method.

1.4 Supported Software of Motor Software Configuration GUI

- RA Flexible Software Package (FSP)
  - Motor Sensorless Vector Control: rm_motor_sensorless
  - Motor Encoder Vector Control: rm_motor_encoder
  - 120-degree control: rm_motor_120_degree
  - Motor Vector Control with hall sensors: rm_motor_hall
  - Motor Vector Control with induction sensor: rm_motor_induction
- RX26T sample projects
  - Sensorless Vector Control of a Permanent Magnet Synchronous Motor For MCK-RX26T
  - Vector Control for Permanent Magnet Synchronous Motor with Encoder For MCK-RX26T

2. Installation, Uninstallation and Updating the Product

Refer to https://www.renesas.com/software-tool/qe-support

3. Functional Restrictions

3.1 Writing the Tuning Program for RA6T1 or RA6T2 Evaluation Board

When using the evaluation board for RA6T1 or RA6T2 with the control method described below, the tuning program for the RA6T1 or RA6T2 evaluation board obtained via the [Select Tuning Program] button cannot be written to the MCU using the [Download Tuning Program] button in the initial state.

Control Method
・Sensorless vector control for permanent magnetic synchronous motor*
・Vector control for permanent magnetic synchronous motor with encoder*
* When using RA6T2 with e²studio 2025-07 or later

Please update the .sbd file associated with the tuning program using the steps below.
1. Obtain the file from http://tool-support.renesas.com/e2studio/qe/tools/Qem_ra6t1_ra6t2_sbd_202507.zip state. and unzip it to any desired folder.
2. Overwrite the Qem folder in the Renesas Motor Workbench installation directory with the Qem folder from the extracted files.
   You can check the Renesas Motor Workbench installation directory by clicking the [Open QE for Motor settings] button on the [Introduce Related Tool] page.

How to Check the Renesas Motor Workbench Installation Directory
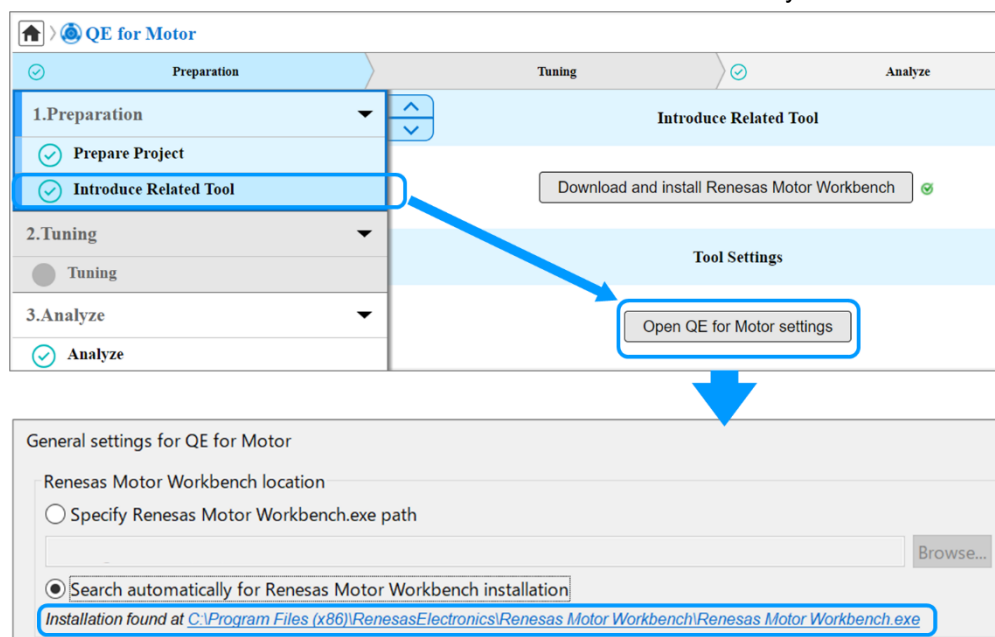
3. Obtain the tuning program using the [Select tuning program] button.
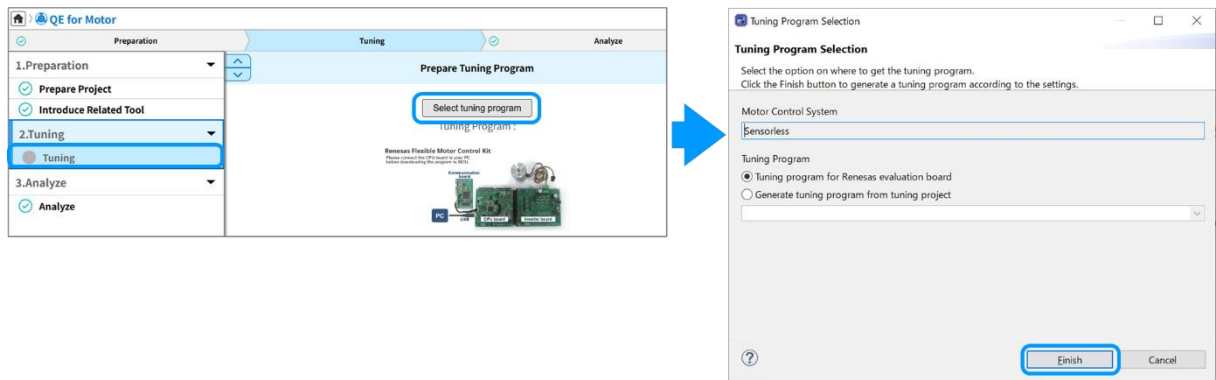
4. When using RA6T1, copy the following files from Qem/mot_rmt folder in the Renesas Motor Workbench installation directory to the target project.

Sensorless vector control for permanent magnetic synchronous motor

Source file	Destination location
RA6T1_MRSSK2_SPM_LESS_FOC_TUNER_RV200/ RA6T1_MRSSK2_SPM_LESS_FOC_TUNER_RV200.sbd	<Project Folder>/QE_Motor/ Tuner/RA6T1_Sensorless

Vector control for permanent magnetic synchronous motor with encoder

Source file	Destination location
RA6T1_MRSSK2_SPM_ENCD_FOC_TUNER_RV200/ RA6T1_MRSSK2_SPM_ENCD_FOC_TUNER_RV200.sbd	<Project Folder>/QE_Motor/ Tuner/RA6T1_Encoder

After completing the above steps to update the files, you will be able to write the control program using the [Download tuning program] button.

3.2 Combo box display in the software configuration window

When using multiple monitors, the options in a combo box on the motor software configuration window may appear in a different position than the combo box itself.
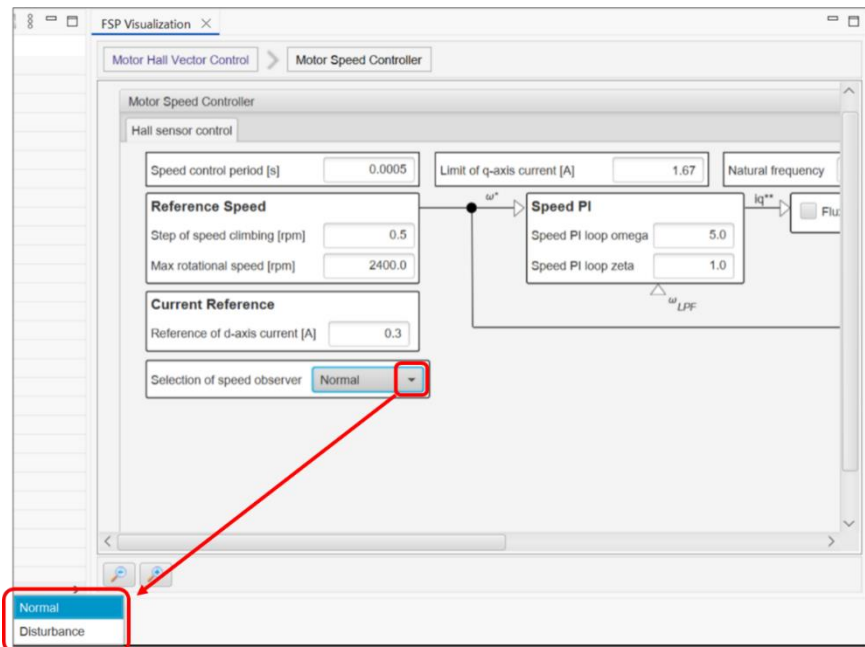
4. Operating Environment

System: x64 based processor

Windows® 11

Windows® 10 (64-bit versions)

Supported Tools

e² studio 2024-10 or later

Renesas Motor Workbench 3.0 or later

Revision History

		Description	
Rev.	**Date**	**Page**	**Summary**
1.00	Jul.09.25	-	First edition issued.
1.10	Jul.22.25	6	3.1 Writing the Tuning Program for RA6T1 or RA6T2 Evaluation Board : added

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

1. Precaution against Electrostatic Discharge (ESD)

    A strong electrical field, when exposed to a CMOS device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop the generation of static electricity as much as possible, and quickly dissipate it when it occurs. Environmental control must be adequate. When it is dry, a humidifier should be used. This is recommended to avoid using insulators that can easily build up static electricity. Semiconductor devices must be stored and transported in an anti-static container, static shielding bag or conductive material. All test and measurement tools including work benches and floors must be grounded. The operator must also be grounded using a wrist strap. Semiconductor devices must not be touched with bare hands. Similar precautions must be taken for printed circuit boards with mounted semiconductor devices.

2. Processing at power-on

    The state of the product is undefined at the time when power is supplied. The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the time when power is supplied. In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the time when power is supplied until the reset process is completed. In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the time when power is supplied until the power reaches the level at which resetting is specified.

3. Input of signal during power-off state

    Do not input signals or an I/O pull-up power supply while the device is powered off. The current injection that results from input of such a signal or I/O pull-up power supply may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements. Follow the guideline for input signal during power-off state as described in your product documentation.

4. Handling of unused pins

    Handle unused pins in accordance with the directions given under handling of unused pins in the manual. The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of the LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible.

5. Clock signals

    After applying a reset, only release the reset line after the operating clock signal becomes stable. When switching the clock signal during program execution, wait until the target clock signal is stabilized. When the clock signal is generated with an external resonator or from an external oscillator during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Additionally, when switching to a clock signal produced with an external resonator or by an external oscillator while program execution is in progress, wait until the target clock signal is stable.

6. Voltage application waveform at input pin

    Waveform distortion due to input noise or a reflected wave may cause malfunction. If the input of the CMOS device stays in the area between V_{IL} (Max.) and V_{IH} (Min.) due to noise, for example, the device may malfunction. Take care to prevent chattering noise from entering the device when the input level is fixed, and also in the transition period when the input level passes through the area between V_{IL} (Max.) and V_{IH} (Min.).

7. Prohibition of access to reserved addresses

    Access to reserved addresses is prohibited. The reserved addresses are provided for possible future expansion of functions. Do not access these addresses as the correct operation of the LSI is not guaranteed.

8. Differences between products

    Before changing from one product to another, for example to a product with a different part number, confirm that the change will not lead to problems. The characteristics of a microprocessing unit or microcontroller unit products in the same group but having a different part number might differ in terms of internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

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