# SIEMENS

# SIMATIC

# FM 350-2
# Brief Instructions on commissioning

Getting Started

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## Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

| ⚠ DANGER |
| --- |
| indicates that death or severe personal injury **will** result if proper precautions are not taken. |

| ⚠ WARNING |
| --- |
| indicates that death or severe personal injury **may** result if proper precautions are not taken. |

| ⚠ CAUTION |
| --- |
| with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken. |

| CAUTION |
| --- |
| without a safety alert symbol, indicates that property damage can result if proper precautions are not taken. |

| NOTICE |
| --- |
| indicates that an unintended result or situation can occur if the corresponding information is not taken into account. |

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

## Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

## Prescribed Usage

Note the following:

| ⚠ WARNING |
| --- |
| This device may only be used for the applications described in the catalog or the technical description and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens. Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance. |

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## Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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# Brief Instructions on Commissioning

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## Introduction

This Getting Started is intended to lead you through the four steps in commissioning a fully functional application. Based on a practical example, it shows you how you can count contact switching cycles, introduces the basic functions of FM 350-2 hardware and software, and corresponding test features. The references to the manual should give you an initial overview of the information it contains.

It will take you between 1 and 2 hours to work your way through the example, depending on your prior experience.

## Requirements

Hardware and software requirements:

- An S7-300 station, consisting of a power supply module and a CPU.
- STEP 7 (≥V4.0.2.1) is correctly installed on your programming device.
- You have configured a project for the S7-300 station.
- The programming device is connected to the CPU.
- You must have an FM 350-2 module, the configuration package for the FM 350-2, and the necessary accessories such as an expansion bus, front connector, encoders or switches, and wiring material.

## Installing the configuration package on the programming device

The FM 350-2 configuration package contains a programming tool, the necessary functions (FC), the data structure (UDT1), and a sample program.

- Place the CD into the CD drive.
- In Windows, run the software setup dialog by double-clicking "Add/Remove Programs" in the "Control Panel."
- Click **Install...** , run the "Setup.exe" file from the setup folder on the CD, and follow the setup instructions.

### FM 350-2, installing and wiring

- Connect the bus connector included with FM 350-2 to the bus connector of the CPU. Place the FM 350-2 onto the mounting rail, then swivel it down, and screw-tighten it (for detailed instructions, refer to the manual).

- Wire the front connector as shown below (for the pin assignment of the front connector, refer to the manual):

Power supply module | CPU | FM 350-2 Front connector
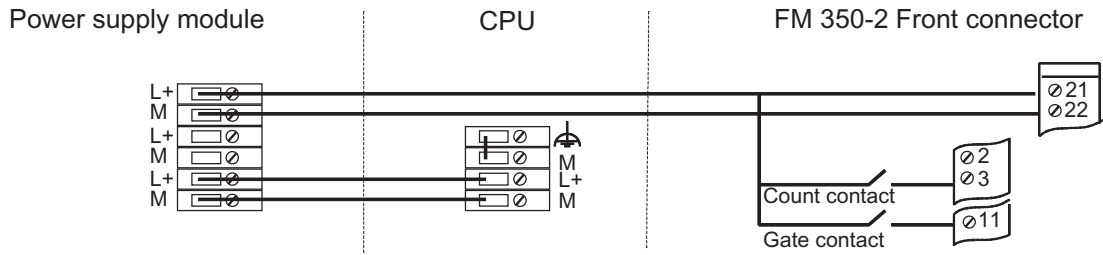
- Plug the front connector into the FM 350-2 and screw-tighten it.

### Test

Apply line voltage to the power supply module. The red SF LED lights up quickly and goes off after a successful internal module test. After you have switched on the power supply for the first time, the FM 350-2 is in the preset default state (see the manual for features of the default parameters).

### Generate counter DBs

- In SIMATIC Manager, select **File > Open... > Libraries** to open the "fm_cntli" library. Copy the the UDT 1 data structure from the "Blocks" container of the "fm_cntli" library into the "Blocks" container of your project.

- Select **Insert > S7 Block > Data Block** to insert DB 1 into the "Blocks" container.

- Open DB 1 and create DB 1 with the assigned user-defined UDT 1 data type.

- Save DB 1 by clicking **File > Save**.

## Programming FM 350-2

- Open your project in SIMATIC Manager.

- In your project, open the "HW Config" configuration table.

- From the hardware catalog, select the FM 350-2 with the correct order number, then drag it to the required slot (in our example: slot 5).

### Calling up the object properties:

- Right-click to open the context menu. Click the object properties menu point (until STEP 7 V5.3 also by: double-clicking on the order number).

- Select the following settings in the object properties settings of FM 350-2:

  – Retain all settings, however, on the Addresses tab.

  – Change to the basic parameters tab. You will be asked for a channel DB in a dialog box. Using **Select Data Block**, select DB 1.

  – Fill out the "Basic parameters" as follows:
    **Interrupt generation:** NO
    **Interrupt selection:** none
    **Reaction to CPU STOP:** Cancel

As of STEP 7 V5.3, calling up the dialog box to select the channel DB occurs by clicking on the Mod. Addr. buttons.

### Calling up the parameter assignment dialog box:

Until STEP 7 V5.3 by clicking on the parameter button in the object properties.

As of STEP 7 V5.3, open the programming interfaces by double-clicking FM 350-2. Close the dialog which prompts you to save the configuration by clicking **OK**.

- In the parameter assignment dialog boxes, click on the buttons to make the following settings (please leave other settings unchanged because they are not initially required for commissioning): Confirm the settings by clicking on the **OK** command button.

| | | |
|---|---|---|
| Specify channels: | ⊙ Channel 0...7 as single counter | |
| **The following settings are valid for channel 0.** | | |
| Operating modes: | ⊙ Continous counting | ☑ Use hardware gate |
| Encoders: | ⊙ Pulse and direction | ⊙ Main count direction up |
| Interrupt enable: | not possible, because deselected in basic parameters | |
| Outputs: | ⊙ no comparison | |

- Enter the FM 350-2 parameter assignments in your configuration using the menu command **File > Save** and close the parameter assignment window. Until STEP 7 V5.3: Close the "Properties - FM 350-2 Counter" by clicking **OK**. Save your project configuration data by selecting **Station > Save and Compile**.

- Download the configuration to the CPU in STOP mode using the menu command **PLC > Download**. The parameters are now downloaded directly to the CPU, and transferred to FM 350-2. Provided you backup configuration data on the CPU, the CPU always transfers these data to FM 350-2 at each STOP to RUN transition.

## Test

You can now run simple tests without a program:

Open the commissioning dialog box via **Debug > Commissioning**.
Here, you can use SW_GATE to open and close the SW gate. If you generate count pulses with the switch connected to the module when the software gate is open, you can observe the change in the count reading in this dialog box. Note that a mechanical count contact can bounce.

## Integration in the user program

- In SIMATIC Manager, select **File > Open... > Libraries** to open the "fm_cntli" library. Copy the FC 2 function from the "Blocks" container of the "fm_cntli" library into the "Blocks" container of your project.
- Open OB1 in your project.
- Call FC2 in OB 1, then transfer the parameters to FC2 (see the manual) and set SW_GATE in DB 1.

```
ON DB 1
CALL FC 2
       DB_NO := W#16#1
SET
= DBX 23.0
```

- Save OB1 using the menu command **File > Save**.
- Select all the blocks in your project (exclude VAT and UDT).
- Download the program to the CPU by clicking **PLC → Download**.

## Test

Use the "Monitoring and modifying variables" functions to monitor, for example, the count value and the gate:

- Select the "Blocks" container of your project. Insert tag table VAT1 by clicking **Insert > S7 Block > Variable Table**, and confirm your entries with **OK**.

- Open variable table VAT1, then enter the following variables in the "Address" column:

  - **db1.dbd44**(actual count value)

  - **db1.dbx43.0**(status of internal gate)

- Save tag table VAT1 by clicking **Table > Save**.

- Go online by selecting **PLC > Connect > configured CPU**.

- Set monitoring mode by selecting **Variable > Monitor**.

- Switch the CPU to RUN-P.

- Generate pulses with the help of your counting contact, and monitor the count value based on the state of the gate contact.

## Diagnostics

Errors can occur as a result of incorrect operation, incorrect wiring, or contradictory parameter assignments which the FM 350-2 displays with the group error LED SF. The manual describes how to analyze such errors and messages.

## Example

In project ZXX34_01_FM350-2, you can find an additional example that you can orient yourself to and adjust your settings to.