Intelligent Vortex Flowmeters

Kits for Converting to Vortex Model 84C – Installing Master Instruction

MI 019-226 Release date July 24, 2020



Legal Information

The Schneider Electric brand and any trademarks of Schneider Electric SE and its subsidiaries referred to in this guide are the property of Schneider Electric SE or its subsidiaries. All other brands may be trademarks of their respective owners.

This guide and its content are protected under applicable copyright laws and furnished for informational use only. No part of this guide may be reproduced or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise), for any purpose, without the prior written permission of Schneider Electric.

Schneider Electric does not grant any right or license for commercial use of the guide or its content, except for a non-exclusive and personal license to consult it on an "as is" basis. Schneider Electric products and equipment should be installed, operated, serviced, and maintained only by qualified personnel.

As standards, specifications, and designs change from time to time, information contained in this guide may be subject to change without notice.

To the extent permitted by applicable law, no responsibility or liability is assumed by Schneider Electric and its subsidiaries for any errors or omissions in the informational content of this material or consequences arising out of or resulting from the use of the information contained herein.

Important Information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of either symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that accompany this symbol to avoid possible injury or death.

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

Failure to follow these instructions will result in death or serious injury.

AWARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

Please Note

Electrical equipment should be installed, operated, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Table of Contents

Introduction	7
Qualification of Personnel	7
Required Tools and Documentation	7
Kit Contents	8
Summary of the Installation Process	9
Preparing for the Model 83 to 84C Conversion	11
Unpacking and Preparing for Conversion	
Managing Data Plates	11
Flowmeter Identification and Data Plate Management	12
Recording the Model 83 Configuration Database	15
Installing the Conversion Kit	16
Shutting Down the Process	16
Disassembling the Model 83 Flowmeter	16
Assembling the Model 84C Flowmeter	18
Finalizing the Model 83 to 84C Conversion	23
Performing a Pressure Text	23
Reconfiguring the Vortex Model 84C Flowmeter	24
Returning the Data Plates	24

Introduction

This document describes how to install the conversion kit to convert an integral or remotely mounted Model 83 flanged or wafer Vortex flowmeter (Model 83F or 83W) to an equivalent Model 84C flanged or wafer Vortex flowmeter (Model 84CF or 84CW). The resulting flowmeter will be a HART communication protocol version with 4-20 mA and pulse output capability.

Qualification of Personnel

ELECTRICAL HAZARD AND POSSIBLE IMPACT ON SITE'S SAFETY CERTIFICATIONS

- Personnel involved in maintenance of Vortex meters must be trained and qualified in the use of the equipment required and in the removal and replacement of meter components.
- Only authorized service providers, technical sales consultants, or other approved site leaders should perform this installation. Model 84C flowmeters must be installed to meet all applicable local installation regulations, such as hazardous location requirements, electrical wiring codes, and mechanical piping codes. Personnel involved in the installation must be trained in these code requirements.

Failure to follow these instructions can result in death or serious injury and can impact site safety certifications.

Required Tools and Documentation

The following tools are required for disassembly for the Model 83 flowmeter and installation of the Model 84C topworks:

- 3/8 inch driver torque wrench
- Precision torque wrench

NOTE: For best results, use the 2" bonnet bolt torque adapter (Part Number 0305557). This tool has been customized for Vortex bonnet bolts.

Figure 1 - Bonnet Bolt Torque Adapter



In addition to this instruction manual, it is recommended that you have the following documents available for reference:

- Intelligent Vortex Flowmeter Model 84C with HART Communication or Low Power (MI 019-222)
- Intelligent Vortex Flowmeter Model 84C Product Specification Sheet (PSS 1-8A8A)
- Intelligent Vortex Flowmeter Kits for Converting to Vortex Model 84C Ordering (MI 019-225)

Kit Contents

The conversion kit contents are shipped according to the model code of the conversion kit you order.

Table 1 - Model 83 to Model 84C Conversion Kit Contents (83V84CF or 83V84CW)

Description	Quantity ¹
Bonnet bolts	4
Sensor gasket	1
O-ring	1
Flow dam	1
Bonnet	1
Model 84C (topworks), with Vortex sensor attached. Includes: ² • Model 84C Electronics Module • Data Plate	1
Junction box with data plate (for remotely mounted flowmeters only)	1
Remote mounting hardware (for remotely mounted flowmeters only)	1

^{1.} Quantities are for single measurement. Quantities for all items except Instructions are doubled for dual measurement.

^{2.} All Model 83 to 84C conversion kits include a new sensor.



Figure 2 - Kit Contents for Model 83 to Model 84C Conversion Kits

Summary of the Installation Process

This section provides a summary of the steps to install the conversion kit. Details of each step are provided in this manual.

Summary of Steps to Install the Model 83 to Model 84C Conversion Kit

To install the Model 83 to Model 84C conversion kits:

- 1. Unpack the conversion kit and identify the contents.
- 2. Check the flowmeter to be converted and verify that the serial number and the K-Factor on the Model 83 topworks match the serial number and K-Factor on the data plate of the Model 84C topworks provided in the conversion kit. If you have a remotely mounted flowmeter, verify that the label on the original Model 83 junction box matches the label on the new Model 84C junction box.
- Remove the original Model 83 data plate from the topworks and set it aside to be retuned to Schneider Electric when the installation is complete. If you have a remotely mounted flowmeter, remove the label from the original Model 83 junction box.
- 4. Record the original configuration data from the existing Model 83 flowmeter's configuration database.
- 5. Shut down the process, depressurize the line, and bring the temperature down to ambient conditions.

- 6. Disassemble the Model 83 flowmeter.
- 7. Re-assemble the flowmeter using the components in the conversion kit.
- 8. Perform a pressure test.
- 9. Reconfigure the new Model 84C Vortex flowmeter with the configuration data retrieved from the original Model 83 process parameters. The conversion kit comes partially preconfigured with the new model code, serial number, and K-factor for the new Model 84C flowmeter.
- 10. When the installation is complete, return the Model 83 topworks label, and if you have a remotely mounted flowmeter, the Model 83 junction box label, to Schneider Electric using the RMA number.

Preparing for the Model 83 to 84C Conversion

Unpacking and Preparing for Conversion

SUPPLY VOLTAGE HAZARD

Please note that the Model 84C electronics module has a higher compliance voltage that the existing Model 83 electronics module. Make sure your site accommodates the voltage requirements of the Model 84C electronics module (see PSS 1-8A8A, *Model 84C Product Specification Sheet*).

Failure to follow these instructions can result in injury or equipment damage.

NOTICE

POTENTIAL EQUIPMENT DAMAGE

Components in your flowmeter are ESD-sensitive, and thus are susceptible to damage resulting from electrostatic discharge. When handling the components of the conversion kit or performing the kit installation, ground yourself with conductive wrist strap or stand on an ESD mat.

Failure to follow these instructions can result in equipment damage.

To unpack the conversion kit:

- Remove the contents of the kit from the shipping carton. Refer to Model 83 to Model 84C Conversion Kit Contents (83V84CF or 83V84CW), page 8 to verify that you have all required kit contents.
- 2. The Model 83 to Model 84C conversion kits come with a pre-installed sensor. When you are ready to begin the installation, remove the packing material around the sensor, taking care not to damage the sensor. Also take care not to damage the process sealing components: sensor gasket, o-ring, and flow dam.

Managing Data Plates

When converting a Model 83 to a Model 84C flowmeter in the field, it is critical that the correct data plate is installed on the equipment.

NOTICE

MAINTAINING EQUIPMENT TRACEABILITY AND AGENCY CERTIFICATIONS

To maintain equipment traceability and agency certifications, verify that the correct data plate(s) are installed on the topworks, the flowmeter body, and the junction box (if using remote electronics).

Failure to follow these instructions may impact your site's ability to maintain equipment traceability and agency certifications.

- 1. Check the existing Model 83 data labels to verify the information matches the data labels on the Model 84C flowmeter from the conversion kit.
 - Verify that the Serial Number (labeled REF NO, REF, or S/N) matches on the following:
 - The Model 83 data plate and the K-Factor label on the Model 83 (see Data Plates on Model 83 Flowmeter, page 13).

- The Model 84C data label on the new Model 84C topworks (see Data Plates on Model 84C Flowmeter, page 14).
- For remotely mounted flowmeters only, the label on the top of the Model 83 junction box (see Label on Junction Box for Remote Installation of Model 83, page 13).
- For remotely mounted flowmeters only, the label on the new Model 84C junction box (see Label on Junction Box for Remote Installation of Model 84C, page 14).
- Verify the K-Factor (labeled REF K-FACT or FACTOR (REF.)) matches on the following:
 - The Model 83 data plate and the K-Factor label on the Model 83 (see Data Plates on Model 83 Flowmeter, page 13.
 - The Model 84C data label on the new Model 84C topworks (see Data Plates on Model 84C Flowmeter, page 14.
- 2. If the labels do not match, contact Global Customer Support.
- 3. If all the labels match, carefully remove the existing label from the Model 83 flowmeter topworks, and for remotely mounted flowmeters, the label from the Model 83 junction box. These labels will be returned to Schneider Electric when the conversion kit is fully installed.

NOTE: DO NOT remove the K-Factor data plate from the existing Model 83 flowmeter body!

Flowmeter Identification and Data Plate Management

This section shows the data plates on the different flowmeters before and after the conversion kit is installed.

Model 83 Data Plates

Data Plates on Model 83 Flowmeter, page 13 shows the data plates on your existing Model 83 flowmeter. The Model 83 data plate is located on the topworks and the K-Factor plate is on the flowmeter body. During the installation process you will remove the data plate on the Model 83 topworks. It will be return it to Schneider Electric using the RMA after the installation is complete.

NOTE: DO NOT remove the K-Factor data plate from the existing Model 83 flowmeter body!

Figure 3 - Data Plates on Model 83 Flowmeter



Label on Junction Box for Remote Installation of Model 83, page 13 shows the label on the top of the junction box for a remotely mounted Model 83. After the new junction box is installed, you will remove this label and return it to Schneider Electric using the RMA.



Figure 4 - Label on Junction Box for Remote Installation of Model 83

Model 84C Data Plates

Data Plates on Model 84C Flowmeter, page 14 shows the data plates on your newly converted Model 84C flowmeter. The Model 84C data plate is located on the topworks and the K-Factor data plate is on the existing flowmeter body.





For remotely mounted flowmeters, you will receive a new junction box with the data plate installed (see Label on Junction Box for Remote Installation of Model 84C, page 14).



Figure 6 - Label on Junction Box for Remote Installation of Model 84C

Recording the Model 83 Configuration Database

Prior to installation of the conversion kit, record the configuration parameters of the current Model 83 flowmeter. For proper operation of the Model 84C flowmeter after installation, you must reconfigure the Model 84C with the correct settings.

- If you are using a HART Communicator, display and record the current database settings using the **Review** menu.
- If you are using the local configurator, display and record the current database settings using the **Display** menu.

Be sure to note the Model Code and K-Factor of your existing equipment.

Installing the Conversion Kit

Shutting Down the Process

In all cases, the pipeline must be shut down and emptied before loosening the bonnet bolts.

Disassembling the Model 83 Flowmeter

NOTICE

POTENTIAL EQUIPMENT DAMAGE

Components in your flowmeter are ESD-sensitive, and thus are susceptible to damage resulting from electrostatic discharge. When handling the components of the conversion kit or performing the kit installation, ground yourself with conductive wrist strap or stand on an ESD mat.

Failure to follow these instructions can result in equipment damage.

- For integrally mounted flowmeters, perform the steps in Removing the Model 83 Topworks and Sensor from an Integral Flowmeter, page 16.
- For remotely mounted flowmeters, perform the steps in Removing the Remotely Mounted Model 83 Electronics Module, Junction Box, and Sensor, page 18.

Removing the Model 83 Topworks and Sensor from an Integral Flowmeter

Model 83 Flowmeter, page 16 shows the flowmeter. You will remove the topworks and the sensor assembly from the Model 83 flowmeter body in preparation to install the Model 84C topworks and sensor assembly from the conversion kit. All Model 83 to Model 84C conversion kits include the new topworks and a new sensor assembly.

Figure 7 - Model 83 Flowmeter



Removing the Sensor Assembly from an Integrally Mounted Model 83 Flowmeter, page 17 shows an exploded view of the flowmeter with the sensor assembly and related parts.



Figure 8 - Removing the Sensor Assembly from an Integrally Mounted Model 83 Flowmeter

To remove the Model 83 topworks and the existing sensor assembly from an integrally mounted Model 83 flowmeter:

NOTE: These steps apply to both the flanged (Model 83F) and wafer (Model 83W) body styles.

- 1. Turn off power to the flowmeter.
- If the flowmeter is equipped with an isolation valve, make sure it is in the Off position.
- 3. Remove the bonnet bolts and lift off the electronics housing, bonnet, and sensor assembly as a unit of the flowmeter body.
- 4. Slide the sensor assembly out of the bonnet.
- 5. If the flow dam and gasket remain in the flowmeter body, remove them as they will be replaced when you install the conversion kit. Clear the groove of any remaining fragments of the old o-ring.
- 6. Repeat the procedure for dual measurement configurations.

Removing the Remotely Mounted Model 83 Electronics Module, Junction Box, and Sensor

You will remove the remotely mounted Model 83 Electronics Housing from its remote mount, the Model 83 junction box, and the existing sensor assembly in preparation to install the remotely mounted Model 83 to 84C conversion kit.

NOTE: All Model 83 to Model 84C conversion kits for remote installations include a new Electronics Housing, junction box, and sensor assembly The cable that connects the Electronics Housing to the junction box will be pre-installed in the kit.

To remote the remotely mounted Model 83 flowmeter:

NOTE: These steps apply to both the flanged (Model 83F) and wafer (Model 83W) body styles.

- 1. Turn off power to the flowmeter.
- 2. Remove the remotely mounted Electronics Module from its remote mount by loosening and removing the U-bolt or screws and lifting the Electronics Module and its mounting bracket off of the mount.
- 3. To remove the junction box from the flowmeter body, remove the four bonnet bolts from below the Model 83 junction box.
- 4. Lift the junction box, bonnet, and sensor assembly as a unit off of the flowmeter body.
- 5. Slide the sensor assembly out of the bonnet.
- 6. If the flow dam and gasket remain in the flowmeter body, remove them as they will be replaced when you install the conversion kit. Clear the groove of any remaining fragments of the old o-ring.

Assembling the Model 84C Flowmeter

All Model 83 to Model 84C conversion kits (for both flanged and wafer) come with a new, pre-installed sensor.

NOTICE

POTENTIAL EQUIPMENT DAMAGE

Components in your flowmeter are ESD-sensitive, and thus are susceptible to damage resulting from electrostatic discharge. When handling the components of the conversion kit or performing the kit installation, ground yourself with conductive wrist strap or stand on an ESD mat.

Failure to follow these instructions can result in equipment damage.

- For integrally mounted flowmeters, perform the steps in Installing the Model 84C Topworks and Sensor to a Integral Flowmeter, page 18 to install the conversion kit.
- For remotely mounted flowmeters, perform the steps in Installing the Model 84C Electronics Module, Junction Box, and Sensor to a Remote Flowmeter, page 20 to install the conversion kit.

Installing the Model 84C Topworks and Sensor to a Integral Flowmeter

To connect the Model 84C topworks to the flowmeter body in an integral installation (see the diagram for reference):

Figure 9 - Installing the Model 84C Topworks and Sensor



- 1. Turn off power to the flowmeter.
- 2. If you have not already done so during unpacking procedures, remove the protective packaging from the sensor assembly.
- 3. Verify that the flow dam, gasket, and o-ring have been removed from the flowmeter body. Clear the groove of any remaining fragments of the old o-ring.
- 4. Slide the new o-ring over the sensor wires and onto the neck of the sensor.
- 5. Place the new flat gasket over the sensor, in contact with the serrated sealing surface. Center the gasket.
- 6. Slide the new flow dam into the groove of the sensor.
- 7. Insert the sensor with the bonnet into the flowmeter body.
- 8. Secure the bonnet with the four new bonnet bolts, finger-tight.

RISK OF GASKET LEAKAGE

The gasket must contact the surfaces uniformly to provide a good seal. The next step helps assure a uniform seal.

Failure to follow these instructions can result in injury or equipment damage.

9. Tighten all bonnet bolts in steps of 1.4 N-m (1 lb-ft) up to 2.8 N-m (2 lb-ft), using the sequence shown in the diagram.

Figure 10 - Bonnet Bolt Torquing Sequence



- a. Using the same sequence, tighten the bolts to 7 N-m (5 lb-ft).
- b. Continue to tighten the bolts in steps of 7 N-m (5 lb-ft) in the same sequence. The maximum torque needed for normal operation is 41 N-m (25 lb-ft).

Installing the Model 84C Electronics Module, Junction Box, and Sensor to a Remote Flowmeter

There are two parts to installing a remotely mounted Model 84C flowmeter from the conversion kit:

- Install the Electronics Module on the remote mount.
- Install the junction box and sensor to the Model 83 flowmeter body.

NOTICE

POTENTIAL EQUIPMENT DAMAGE

Be aware that the 84C Electronics Module and the 84C junction box provided in the conversion kit are connected with a pre-installed cable. Keep these two components in close proximity to one another during the installation to avoid damaging the cable.

Failure to follow these instructions can result in equipment damage.

To install the Electronics Module on the remote mount (see the diagram and "Mounting the Remote Electronics Housing" in MI 019-222 for reference):

Figure 11 - Installing the Remote Model 84C Electronics Module



NOTE: WHEN THE BRACKET IS USED FOR WALL MOUNTING, REPLACE THE U-BOLT WITH TWO OR FOUR 0.375 in BOLTS LONG ENOUGH TO PASS THROUGH THE BRACKET AND SURFACE.

- 1. Turn off the flowmeter.
- 2. Position the new Model 84C Electronics Module and the mounting bracket on the remote mount (a pipe or the wall).
- 3. Secure the mounting bracket to the pipe with the U-bolt or to the wall with screws.

To connect the Model 84C junction box and sensor assembly to the flowmeter body in a remote installation (see the diagram for reference):

Figure 12 - Installing the Model 84C Junction Box and Sensor Assembly to the Flowmeter Body



- 1. Turn off power to the flowmeter.
- 2. If you have not already done so during unpacking procedures, remove the protective packaging from the sensor assembly that is attached to the new junction box.
- 3. Verify that the flow dam, gasket, and o-ring have been removed from the flowmeter body. Clear the groove of any remaining fragments of the old o-ring.
- 4. Slide the new o-ring over the sensor wires and onto the neck of the sensor.
- 5. Place the new flat gasket over the sensor, in contact with the serrated sealing surface. Center the gasket.
- 6. Slide the new flow dam into the groove of the sensor.
- 7. Insert the sensor with the bonnet and the junction box into the flowmeter body.
- 8. Secure the bonnet with the four new bonnet bolts, finger-tight.

RISK OF GASKET LEAKAGE

The gasket must contact the surfaces uniformly to provide a good seal. The next step helps assure a uniform seal.

Failure to follow these instructions can result in injury or equipment damage.

- 9. Tighten all bonnet bolts in steps of 1.4 N-m (1 lb-ft) up to 2.8 N-m (2 lb-ft), using the sequence shown in Bonnet Bolt Torquing Sequence, page 20.
 - a. Using the same sequence, tighten the bolts to 7 N-m (5 lb-ft).
 - b. Continue to tighten the bolts in steps of 7 N-m (5 lb-ft) in the same sequence. The maximum torque needed for normal operation is 41 N-m (25 lb-ft).

Finalizing the Model 83 to 84C Conversion

Now that the 84C flowmeter has been installed, perform the following tasks to complete the conversion:

- Perform a Pressure Test
- Reconfigure the Vortex Model 84C Flowmeter
- Return the Data Plates

Performing a Pressure Text

RISK OF NONCOMPLIANCE WITH AGENCY CERTIFICATIONS

In order to maintain agency certification of this product and to prove the integrity of the parts and workmanship in containing process pressure, a hydrostatic pressure test must be performed. The flowmeter must hold the pressure listed in Maximum Test Pressure (Model 84CF), page 23 or Maximum Test Pressure (Model 84CW), page 23 for 10 minutes with no visible leaks.

Failure to follow these instructions can result in death or serious injury.

Table 2 - Maximum Test Pressure (Model 84CF)

	304 SS
End Connection	Test Pressure
ANSI Class 150	452.2 psig
ANSI Class 300	1184.4 psig
ANSI Class 600	2368.8 psig
ANSI Class 900	3553.2 psig
ANSI Class 1500	5922.0 psig
DIN Flanges PN 16	26.3 barg
DIN Flanges PN 25	41.1barg
DIN Flanges PN 40	65.8 barg
DIN Flanges PN 63	103.6 barg
DIN Flanges PN 100	164.5barg
DIN Flanges PN 160	263.2 barg ³

Table 3 - Maximum Test Pressure (Model 84CW)

	316 SS	Nickel alloy ⁴
End Connection	Test Pressure	Test Pressure
ANSI Class 150	433.1 psig	433.1 psig
ANSI Class 300	1134.0 psig	1134.0 psig
ANSI Class 600	2268.0 psig	2268.0 psig

3. 263.2 barg = 3817 psig

^{4.} Equivalent to Hastelloy® C-4C.

	316 SS	Nickel alloy⁵
End Connection	Test Pressure	Test Pressure
DIN Flanges PN 16	25.2 barg	25.2 barg
DIN Flanges PN 40	63.0 barg	63.0 barg
DIN Flanges PN 63	99.2 barg	99.2 barg
DIN Flanges PN 100	157.5 barg ⁶	157.5 barg ⁶

Table 3 - Maximum Test Pressure (Model 84CW) (Continued)

Reconfiguring the Vortex Model 84C Flowmeter

NOTE: When you receive your conversion kit and prepare to install it, be sure to make note of the original Model 83 flowmeter's configuration and settings. When the conversion kit arrives, begin by confirming the new Model 84C model number and Reference K-Factor located on the new Model 84C data plate are entered into the Model 84C electronics. Then, continue with configuring the application data and range.

For proper operation of the Model 84C flowmeter after installation, you must reconfigure the Model 84C flowmeter with the settings you previously recorded from the Model 83 flowmeter.

Using the HART Communicator, the PC50 configurator, or the local configurator, make sure the process parameters are set appropriately for your application.

The following process parameters are preconfigured in the Model 84C flowmeter's database when shipped from the factory:

- 1. Model Code
- 2. Serial Number
- 3. Reference K-Factor

As a final check, make sure the serial numbers and K-Factor values match on all data plates and in the flowmeter database.

For more information on configuring Model 84C flowmeters, see MI 019-222.

Returning the Data Plates

The data plates that were removed from the Model 83 flowmeter topworks, and from the Model 83 junction box (for remotely mounted flowmeters only) must be returned to Schneider Electric after the installation is complete (see Flowmeter Identification and Data Plate Management, page 12) for the location of the data plates

Use the RMA numbers obtained when you ordered the conversion kit to return the label.

Contact Global Customer Support for help if you do not have your RMA number available.

^{5.} Equivalent to Hastelloy® C-4C.

^{6. 157.5} barg = 2284 psig

Schneider Electric Systems USA, Inc. 38 Neponset Avenue Foxboro, MA 02035 United States of America

1-866-746-6477 inside the U.S. 1-508-549-2424 outside the U.S.

pasupport.schneider-electric.com

As standards, specifications, and design change from time to time, please ask for confirmation of the information given in this publication.

© 2020 – Schneider Electric Systems USA, Inc. All rights reserved.

MI 019-226