

Instruction Manual

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Micro Motion[®] Net Oil Computer Software and NOC system

Installation Manual



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Chapter 1

Before You Begin

1.1 Overview

This chapter provides an orientation to the Micro Motion® Net Oil Computer Software and the installation process.

1.2 Responsibilities of the purchaser, designer, systems integrator, and installer

The Net Oil Computer Software is one component in a net oil measurement system (NOC system). The purchaser, designer, systems integrator, and installer are responsible for ensuring that the complete system and installation meet all applicable environmental and safety requirements and regulations.

1.3 Safety

Safety messages are provided throughout this manual to protect personnel and equipment. Read each safety message carefully before proceeding to the next step. Note that only safety messages applicable to Micro Motion components and procedures are included in this manual. It is the user's responsibility to comply with safety requirements for other components and procedures.



Improper installation in a hazardous area can cause an explosion. When installing in a hazardous area, refer to Micro Motion approvals instructions, shipped with the product or available from the Micro Motion web site.



Improper installation can cause measurement error or system failure. Follow all instructions to ensure that the system will operate correctly.

1.4 About the Net Oil Computer Software

The Net Oil Computer Software is a user program designed to run on the ROC809 Remote Operations Controller from Remote Automation Solutions. The Net Oil Computer Software performs net oil measurements and calculations and provides a variety of real-time, average, summary, and historical net oil data.

The Net Oil Computer Software requires input from at least one Micro Motion sensor, and may optionally accept input from up to three Micro Motion sensors used for oil or water measurement, and other devices used for gas measurement, pressure data, or temperature data.

Before You Begin

1.5 Installation components and resources

Before beginning installation, ensure that you have all components and resources required for your specific installation, as listed in Table 1-1.

Table 1-1 Components and resources

Vendor	Item	Comments
Micro Motion	Micro Motion sensor(s)	One or more required
	MVD™ Direct Connect™ I.S. barrier(s)	One required for each Micro Motion sensor
	Sensor installation manual	Shipped with sensor Available on Micro Motion web site
	Approvals documentation	Shipped with sensor Available on Micro Motion web site
	Net Oil Computer Software	Required Shipped with NOC order
	License key with NOC license	Required Shipped with NOC order
	ROCLINK™ 800 software from Micro Motion ⁽¹⁾	Required Shipped with NOC order
	NOCStartup_CONTINUOUS.800 NOCStartup_WELLTEST.800	Startup configuration files Required Shipped with NOC order
	LOI cable	Required Shipped with NOC order
	<i>Micro Motion Net Oil Computer Software and NOC System: Configuration and Use Manual</i>	Required Shipped with NOC order
	ProLink™ II software, manual, and installation kit	Required Shipped with NOC order
	Xycom display drivers for Emerson and sample program for Xycom display panel	Optional Shipped with NOC order
	Example parts list	Optional Shipped with NOC order
Remote Automation Solutions	ROC809 Remote Operations Controller	Required
	RS-485 communications module	Required for communication with Micro Motion sensor
	Other modules	As required for specific installation
	License key with AGA license	Required for gas measurement
	<i>ROC809 Remote Operations Controller: Instruction Manual</i>	ROC809 installation instructions
	<i>ROCLINK 800 Configuration Software: User Manual</i>	Information on configuring, using, and maintaining the ROC809 using ROCLINK 800
Third-party	External measurement devices	As required for specific installation

⁽¹⁾ The ROCLINK 800 software shipped with the Net Oil Computer Software has been developed specifically for use with the Net Oil Computer Software and the Model 3711 Gas Flow Computer from Micro Motion. Although you can use the standard version of ROCLINK 800, Micro Motion recommends using the version supplied here.

1.6 Installation procedure

Adapt the following installation procedure for your specific installation and requirements.

1. Review Chapter 2 to determine the components to be installed, component locations, and applicable installation requirements.
2. For all components supplied by other vendors, review the installation instructions and ensure that installation plans will meet all applicable requirements.
3. According to instructions from Remote Automation Solutions, as provided in the manual entitled *ROC809 Remote Operations Controller: Instruction Manual*:
 - Install the ROC809 controller.
 - Install the RS-485 module in Slot 1 (see Figure 2-4).
 - Install the license key containing the AGA license (if present).
 - Install power wiring.
4. Follow the instructions in Chapter 3 to:
 - Install the Micro Motion sensor(s)
 - Mount the I.S. barrier(s)
 - Install wiring between the sensor(s) and the ROC809 platform
5. Follow the instructions in Chapter 4 to:
 - Install ProLink II on the PC that will be used for communication with the core processor(s)
 - Install ROCLINK 800 on the PC that will be used for communication with the ROC809
 - Install the license key containing the NOC license
 - Download the Net Oil Computer Software to the ROC809
 - Download the appropriate startup configuration file to the ROC809
6. Follow the instructions in Chapter 5 to verify core processor configuration and perform sensor zero procedures.
7. According to vendor instructions, install all optional measurement devices, such as pressure sensors, temperature sensors, or water cut probes. For wiring between the device and the ROC809 platform, refer to the I/O wiring instructions provided in the manual entitled *ROC809 Remote Operations Controller: Instruction Manual*.
8. (Optional) Calibrate analog and/or RTD inputs. Instructions are provided in the manual entitled *ROCLINK 800 Configuration Software: User Manual*.

Before You Begin

1.7 Customer service

The best source for customer service on your NOC system is the overall system supplier. Please contact your system supplier first to ensure the fastest resolution. To contact Micro Motion for direct support on the flowmeter components, phone the support center nearest you:

- In the U.S.A., phone **800-522-MASS** (800-522-6277) (toll-free)
- In Canada and Latin America, phone +1 303-527-5200
- In Asia:
 - In Japan, phone 3 5769-6803
 - In other locations, phone +65 6777-8211 (Singapore)
- In Europe:
 - In the U.K., phone 0870 240 1978 (toll-free)
 - In other locations, phone +31 (0) 318 495 555 (The Netherlands)

Customers outside the U.S.A. can also email Micro Motion customer service at *International.MMISupport@EmersonProcess.com*.

Chapter 2

NOC System Options and Installation Considerations

2.1 Overview

This chapter provides information on a variety of topics that affect installation. The following topics are discussed:

- NOC system design options – see Section 2.2
- Interface to the Micro Motion sensor – see Section 2.3
- Cable types – see Section 2.4
- ROC809 modules – see Section 2.5
- Component location – see Section 2.7
- Hazardous area classifications – see Section 2.8
- I.S. requirements – see Section 2.9
- Environmental requirements – see Section 2.10
- Power requirements – see Section 2.6
- Grounding requirements – see Section 2.11

Review the information in this chapter before beginning installation.

2.2 NOC system design options

Using the Net Oil Computer Software and the ROC809 controller, many different NOC systems can be designed. The basic set of NOC system options is listed below:

- The NOC system may be used with a two-phase separator, including a variety of compact separators (e.g., Gas-Liquid Cylindrical Cyclone, or GLCC™) or a three-phase separator.
- A maximum of three Micro Motion sensors can be used for oil, water, or liquid (oil/water mixture) measurement.
- On any one leg, up to three sensors can be installed in parallel.
- Gas measurement is optional. If a gas measurement device is installed, it may be a Micro Motion sensor or a conventional device from another vendor. In either case, an AGA license is required on the ROC809 platform.
- Pressure and temperature sensors are optional:
 - If a pressure sensor is not installed, no pressure compensation or correction is applied to sensor data or NOC measurement. If a pressure sensor is installed, either pressure compensation, pressure correction, or both may be applied.
 - If a temperature sensor is not installed, temperature data from the RTD on the Micro Motion sensor will be used for temperature correction.
- Water cut probes (WCP) are optional. If a WCP is installed, it can be used for all water cut measurement on the line, or used within a user-specified range.
- The ROC809 platform may be used to monitor and control other devices, such as a level sensor. These functions are not managed by the Net Oil Computer Software. They must be set up and configured separately.

The following figures illustrate several of these options.

Note: Although these illustrations show the ELITE® sensor, other Micro Motion sensors can be used.

Figure 2-1 NOC systems with two-phase or GLCC separator

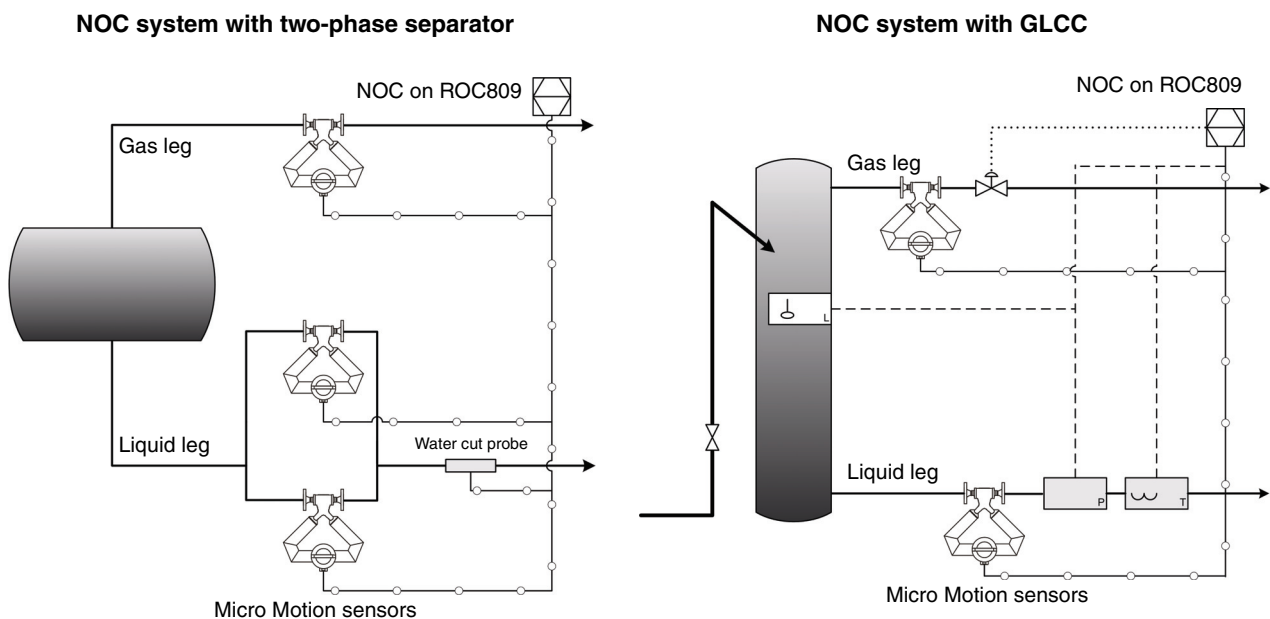
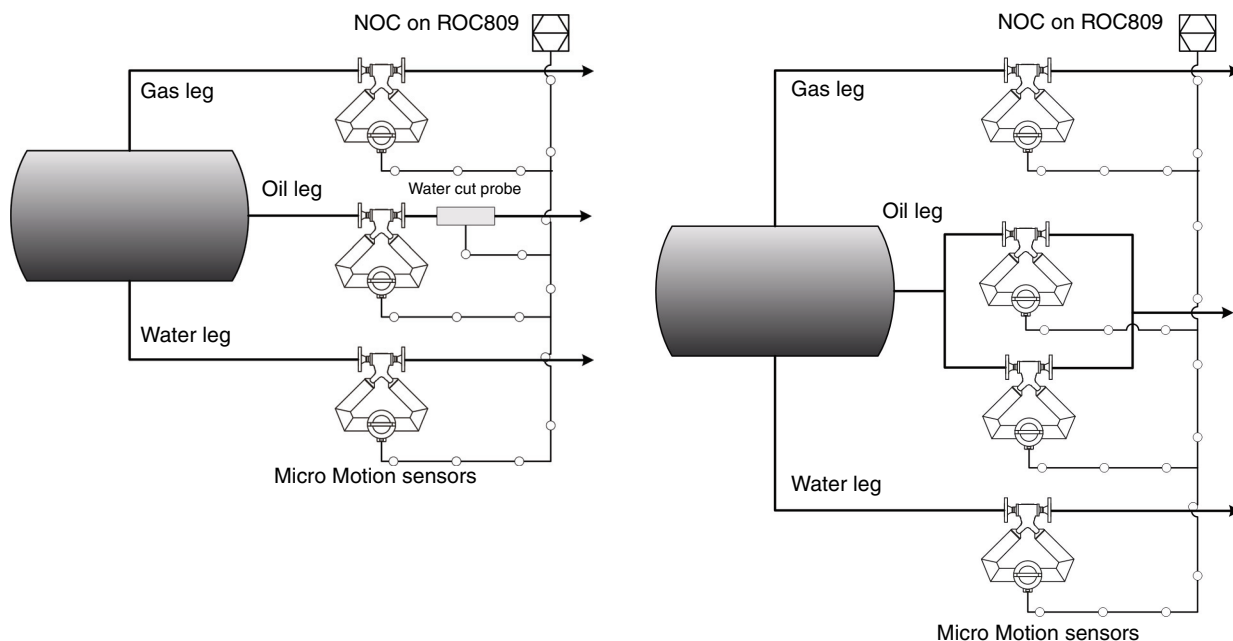


Figure 2-2 NOC systems with three-phase separators



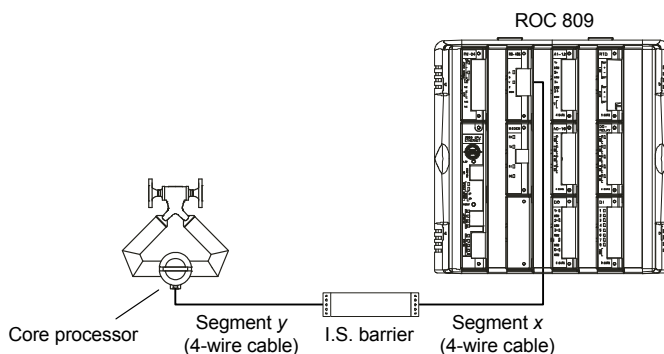
2.3 Micro Motion sensor interface

The NOC system installation instructions assume that the core processor is installed integrally with the sensor, as shown in Figure 2-3.

The MVD Direct Connect™ I.S. barrier is required between the ROC809 platform and the core processor. All I.S. barriers required for Micro Motion sensors are shipped with the system.

If multiple Micro Motion sensors are used, there is no requirement that the sensors be the same type or same size.

Figure 2-3 Sensor interface to ROC809



NOC System Options and Installation Considerations

2.4 Cable types

Micro Motion offers two types of 4-wire cable: shielded and armored. Both types contain shield drain wires. The wires are color-coded as shown in Table 2-1.

Table 2-1 Micro Motion 4-wire cable

Wire color	Function	Wire size
Red	VDC +	18 AWG (0,75 mm ²)
Black	VDC –	
White	RS-485/A	22 AWG (0,35 mm ²)
Green	RS-485/B	

User-supplied 4-wire cable must meet the following requirements:

- Twisted pair construction
- The following gauge requirements:
 - RS-485 wires – 22 AWG (0,35 mm²) or larger
 - Power wires – 22–18 AWG (0,35–0,8 mm²)
- The applicable hazardous area requirements, if the sensor is installed in a hazardous area (see the approval documents shipped with the sensor or available on the Micro Motion web site)

2.5 ROC809 modules

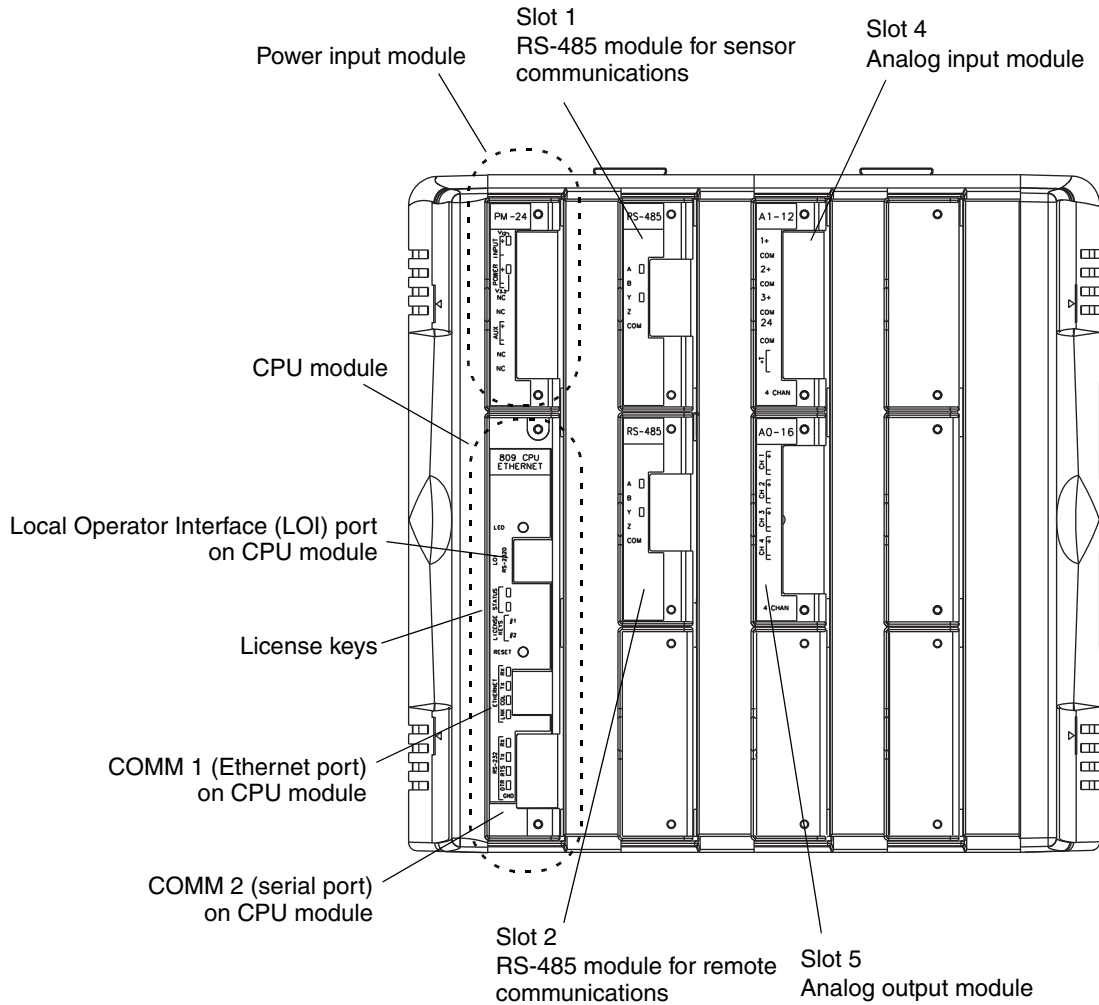
To support the NOC system, the ROC809 controller must be ordered with an RS-485 module that is used to communicate with the Micro Motion sensor(s). Other modules that may be part of the NOC system include:

- Analog output module – typically used for liquid control valve, gas control valve
- Analog input module – typically used for WCP, pressure sensor, level sensor, gas sensor
- Discrete output module – typically used for pump or device control, alarm control, Transient Bubble Remediation (TBR) implementation, frequency or pulse output simulation
- Discrete input module – typically used for external alarm indication
- RTD input module – typically used to provide external temperature data for temperature correction
- RS-485 or RS-232 communications module – used for communications with host

These modules must be installed in the ROC809 module rack, which contains slots for nine modules. The illustration in Figure 2-4 shows the required RS-485 sensor communications module in Slot 1, and three optional modules.

Note: A variety of other modules are available for the ROC809, but are not used with a typical NOC system.

Figure 2-4 ROC809 module rack, modules, and module slots



2.6 Power requirements

There are two sets of power requirements:

- Requirements for the ROC809 platform – Total power requirements for the ROC809 platform depend on the number and type of modules used, and the number of channels used per module. See the document entitled *ROC809 Remote Operations Controller: Instruction Manual* to calculate power requirements for your ROC809 platform.
- Requirements for the I.S. barrier(s) – Each I.S. barrier requires 24 VDC +/- 20% at the power terminals. The I.S. barrier powers the core processor and sensor.

You can power the I.S. barriers separately or from the power input module on the ROC809 platform. If you choose the second option, be sure to include the I.S. barrier requirements when you calculate the ROC809 power requirements.

NOC System Options and Installation Considerations

2.7 Component location

When choosing locations for the NOC system components:

- Locate the Micro Motion sensor according to the guidelines in the sensor documentation. Be sure to consider hazardous area requirements.
- The I.S. barrier must be located in a safe area.
- The length of the RS-485 wire from the ROC809 platform to the last I.S. barrier in the daisy chain (see Figure 3-4) cannot exceed 4000 feet (1200 meters).
- Ensure that sufficient power can be provided to the ROC809 platform and to each barrier. Power supply is affected by cable size and cable length. For assistance in sizing the cable to the I.S. barriers, refer to Table 2-2 and use the equation below:

$$\text{MinimumSupplyVoltage} = 24\text{V} + (\text{CableResistance} \times \text{CableLength} \times 0.15\text{A})$$

- Locate all other components in accordance with vendor guidelines.

Table 2-2 Typical power cable resistances at 68 °F (20 °C)

Gauge	Resistance ⁽¹⁾
14 AWG	0.0050 Ω/foot
16 AWG	0.0080 Ω/foot
18 AWG	0.0128 Ω/foot
20 AWG	0.0204 Ω/foot
22 AWG	0.0328 Ω/foot
2,5 mm ²	0,0136 Ω/meter
1,5 mm ²	0,0228 Ω/meter
1 mm ²	0,0340 Ω/meter
0,75 mm ²	0,0460 Ω/meter
0,5 mm ²	0,0680 Ω/meter

(1) These values include the resistance of both high and low conductors in a cable.

2.8 Hazardous area classifications

For Micro Motion components:

- See the sensor specifications for information on sensor approvals.
- The I.S. barrier must be located in a safe area.

For components purchased from other vendors, see the vendor documentation for hazardous area and approvals information.

Note the following:

- Do not install any component or device in a hazardous area for which it is not approved.
- Ensure that all cables used in the NOC system installation meet the applicable hazardous area requirements.



When working on units located in a hazardous area (where explosive gases may be present), make sure the area is in a non-hazardous state before performing procedures. Performing procedures in a hazardous area could result in personal injury or property damage.

NOC System Options and Installation Considerations

2.9 I.S. requirements

The customer is responsible for ensuring that the installation and wiring of all components meet I.S. requirements.

2.10 Environmental requirements

For Micro Motion sensors, see the sensor specifications for environmental requirements.

For components purchased from other vendors, see the vendor documentation for environmental requirements.

2.11 Grounding requirements

Ground the Micro Motion sensor according to the installation instructions.

For other components, see the vendor documentation for grounding requirements.

Chapter 3

Micro Motion Hardware Installation

3.1 Overview

This chapter describes how to install the Micro Motion hardware components of the NOC system. The following tasks are discussed:

- Install the Micro Motion sensor(s) – see Section 3.2
- Mount the MVD Direct Connect I.S. barrier(s) – see Section 3.3
- Install wiring between the ROC809 platform and the Micro Motion sensor(s) – see Section 3.4
- Wire the MVD Direct Connect I.S. barrier(s) to a power supply (if required) – see Section 3.5

For other installation tasks (e.g., mounting the ROC809 controller, installing and wiring the power supply, or installing and wiring a third-party gas measurement sensor, a pressure sensor or a water cut probe), see the applicable vendor documentation.

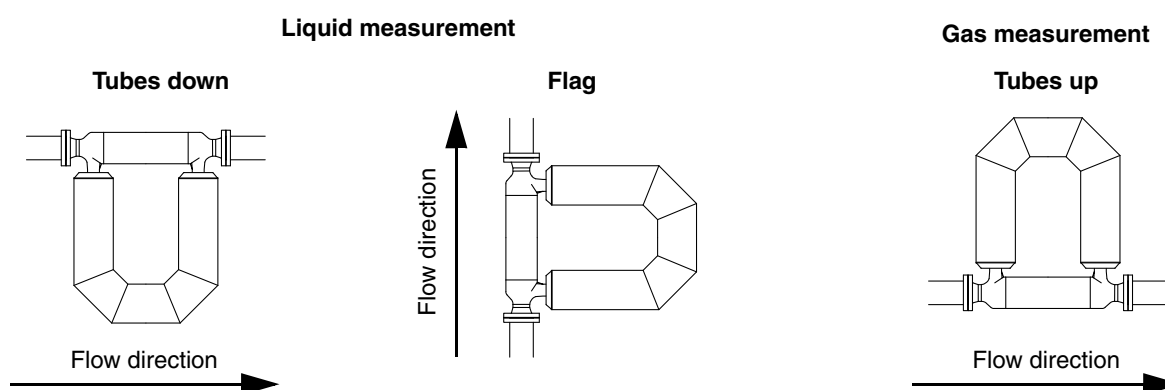
3.2 Installing the Micro Motion sensor

Instructions for installing a Micro Motion sensor are provided in the installation manual shipped with the sensor. Recommended sensor orientations are as follows (see Figure 3-1):

- For the sensors to be used for NOC measurement:
 - If possible, mount the sensor with its flow tubes downward in a horizontal pipe run.
 - If necessary to prevent sand or other solid particles from accumulating in the flow tubes, or to accommodate existing vertical piping, mount the sensor in flag position in a vertical pipe run. The fluid should flow upward through the pipeline.
- For the sensor to be used for gas measurement (optional), mount the sensor with its flow tubes up in a horizontal pipe run.

Note: The sensor measures accurately regardless of flow direction. The arrow on the sensor housing indicates the direction of normal forward flow.

Figure 3-1 Recommended orientations for Micro Motion sensors



Micro Motion Hardware Installation

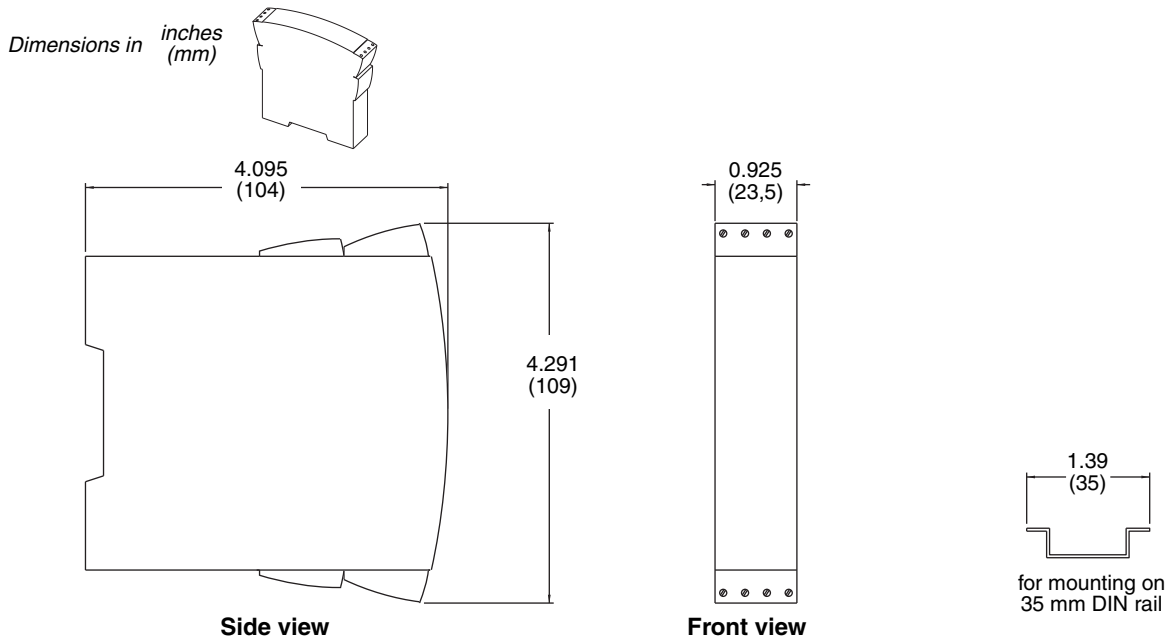
3.3 Mounting the MVD Direct Connect I.S. barrier(s)

The MVD Direct Connect I.S. barrier is designed to snap onto a 35 mm DIN rail. Dimensions are shown in Figure 3-2.

You may need to mount up to four I.S. barriers, depending on the number of Micro Motion sensors you are installing.

If you need to remove the I.S. barrier from the rail, lift the bottom lock.

Figure 3-2 Barrier dimensions



3.4 Installing sensor wiring

Refer to Sections 2.3 and 2.4 to assist with sensor wiring. There are two subtasks in this task:

- Subtask 1 – Wiring the ROC809 platform to the I.S. barrier (Segment x)
- Subtask 2 – Wiring the I.S. barrier to the core processor (Segment y)



When installing units in a hazardous area, make sure that all installation components selected are labeled for use in such areas. Installation and maintenance must be performed only when the area is known to be non-hazardous. Installation in a hazardous area could result in personal injury or property damage.



Do not install sensor wiring when the system is powered. First remove power from the system, then install sensor wiring.

Subtask 1 Wiring Segment x

To wire the ROC809 platform to the I.S. barrier:

1. Ensure that the wire and wire routing meet all applicable I.S. and hazardous area requirements.
2. Cut a 4-wire cable to the required length.
3. Follow the instructions in the ROC809 installation manual to access the RS-485 sensor communications module and the power input module (see Figure 2-4).
4. (Optional) At the ROC809 platform, connect the VDC+ and VDC– wires in the 4-wire cable to the terminals labeled Power on the power input module. (You may also power the I.S. barriers independently. If you choose this option, see Section 3.5 for power wiring instructions.)

Note: If you are using Micro Motion 4-wire cable, these are the red and black wires.

5. Connect the RS-485/A and RS-485/B wires to the A and B terminals on the RS-485 sensor communications module. See Figure 3-3.

Note: If you are using Micro Motion 4-wire cable, these are the white and green wires.

6. Replace the covers on the ROC809 platform.
7. At the I.S. barrier, connect the wires in the 4-wire cable to the non-I.S. terminals on the barrier, stripping the wires as required and matching by function. See Figure 3-4.
8. If you are installing more than one I.S. barrier:
 - The non-I.S. RS-485 terminals must be daisy-chained, as shown in Figure 3-4.
 - The non-I.S. power supply terminals may be daisy-chained or wired separately to an external power source, as desired.

Figure 3-3 Terminals on RS-485 sensor communications module

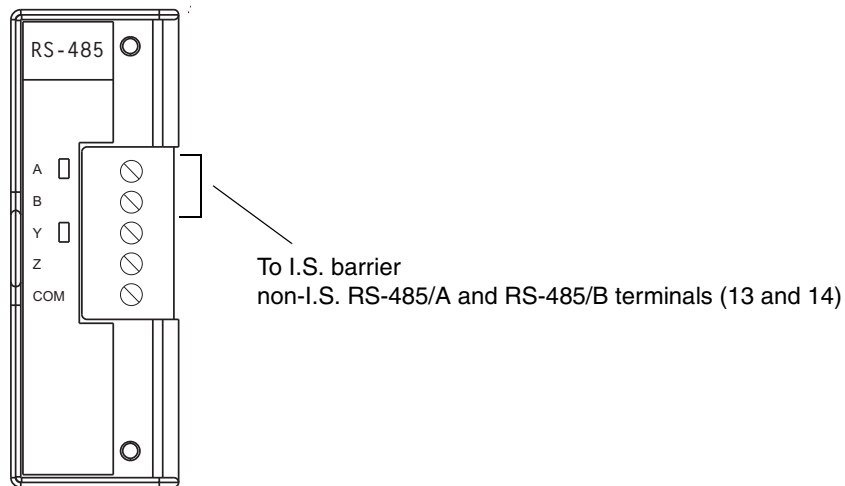
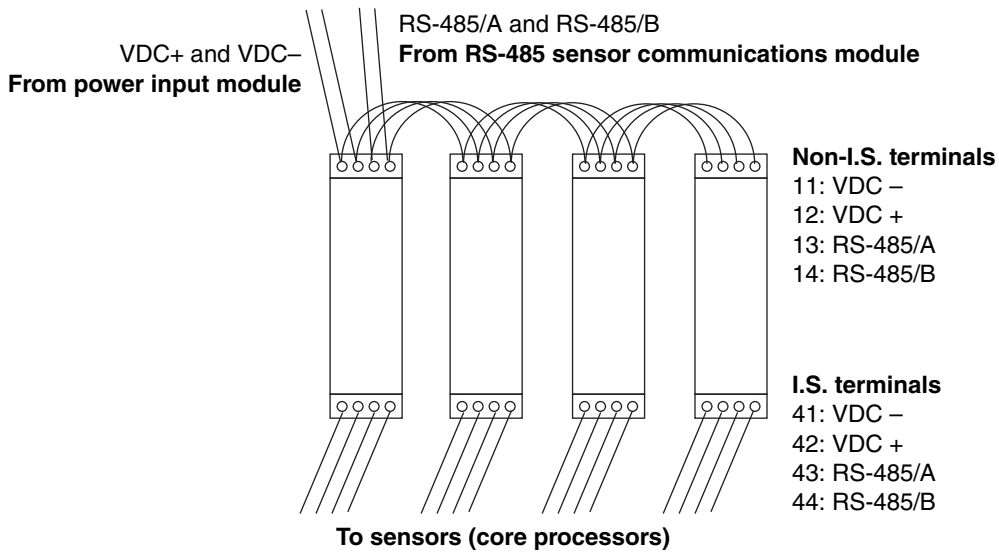


Figure 3-4 I.S. barrier wiring and daisy chain



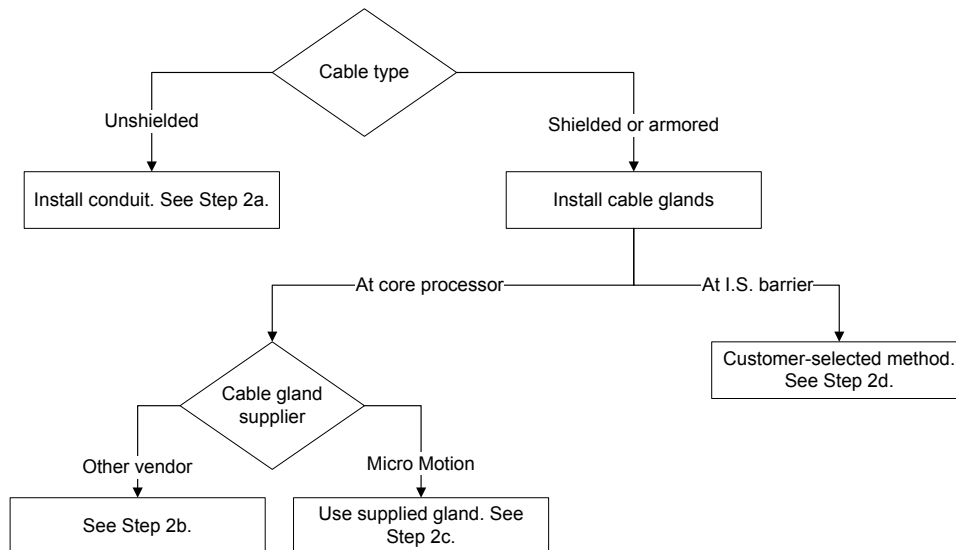
Note: You may also power the I.S. barriers independently.

Subtask 2 Wiring Segment y

To wire the I.S. barrier to the core processor:

1. The wiring from the I.S. barrier to the core processor must be shielded. The flowchart in Figure 3-5 illustrates the shielding options. Identify the options that apply to you, then refer to the substeps below for detailed information.

Figure 3-5 Shielding options

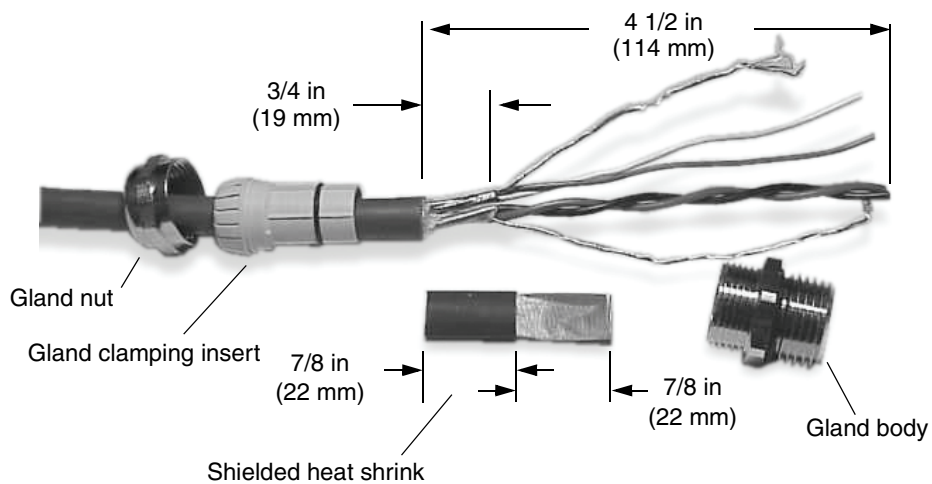


- a. Install continuous metallic conduit that provides 360° termination shielding for the enclosed wiring. Go to Step 6.

Micro Motion Hardware Installation

- b. Terminate both the armored braid (if present) and the shield drain wires in the cable gland at the core processor. Go to Step 6.
 - c. Use the gland supplied with the sensor. Installation requirements depend on your cable type:
 - With shielded cable, prepare the cable and apply shielded heat shrink to the cable (see Figure 3-6), as described in Step 4. The shielded heat shrink provides a shield termination suitable for use in the gland when using cable whose shield consists of foil and not a braid. Go to Step 2.
 - With armored cable, prepare the cable as described in Step 4, but do not apply heat shrink – omit Steps 4d, 4e, 4f, and 4g. Go to Step 2.
 - d. At the I.S. barrier, it is your responsibility to ensure that the installation meets all applicable I.S. and hazardous area requirements. Go to Step 6.
2. Remove the cover from the core processor.
 3. Slide the gland nut and the clamping insert over the cable.

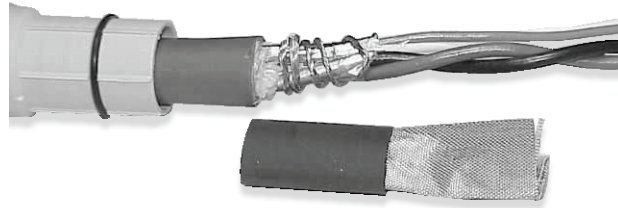
Figure 3-6 Micro Motion cable gland and heat shrink



4. For connection at the core processor housing, prepare shielded cable as follows (for armored cable, omit Steps 4d, 4e, 4f, and 4g):
 - a. Strip 4 1/2 inches (114 mm) of cable jacket.
 - b. Remove the clear wrap that is inside the cable jacket, and remove the filler material between the wires.
 - c. Remove the foil shield that is around the insulated wires, leaving 3/4 inch (19 mm) of foil or braid and drain wires exposed, and separate the wires.
 - d. Wrap the shield drain wire(s) around the exposed foil twice. Cut off the excess wire. See Figure 3-7.

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Figure 3-7 Wrapping the shield drain wires



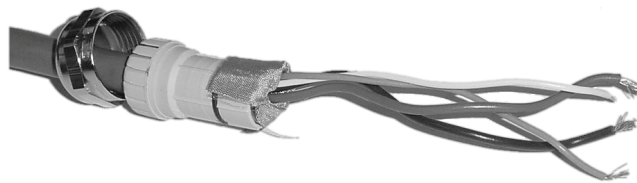
- e. Place the shielded heat shrink over the exposed shield drain wire(s). The tubing should completely cover the drain wires. See Figure 3-8.
- f. Without burning the cable, apply heat (250 °F or 120 °C) to shrink the tubing.

Figure 3-8 Applying the heat shrink



- g. Position gland clamping insert so the interior end is flush with the heat shrink.
- h. Fold the cloth shield or braid and drain wires over the clamping insert and approximately 1/8 inch (3 mm) past the O-ring. See Figure 3-9.

Figure 3-9 Folding the cloth shield



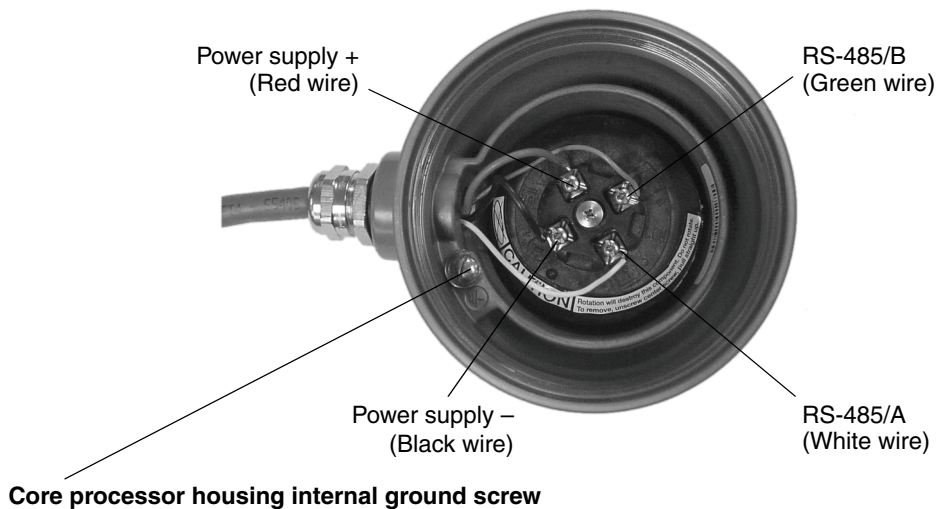
- i. Install the gland body into the (4-wire) conduit opening at the core processor. See Figure 3-10.

Figure 3-10 Gland body and core processor housing



5. Insert the wires through the gland body and assemble the gland.
6. Identify the wires in the 4-wire cable. The 4-wire cable supplied by Micro Motion consists of one pair of 18 AWG (0,75 mm²) wires (red and black), which should be used for the VDC connection, and one pair of 22 AWG (0,35 mm²) wires (green and white), which should be used for the RS-485 connection.
7. If necessary, remove the core processor cover. Connect the four wires to the numbered slots on the core processor as shown in Figure 3-11.
 - If you are installing a cable gland supplied by Micro Motion, do not terminate the shields or braid in the cable gland.
 - If you are installing a cable gland supplied by another vendor, terminate the shields and braid (if present) in the cable gland.

Figure 3-11 Connecting the wires at the core processor



Core processor housing internal ground screw

- For connections to earth ground (if core processor cannot be grounded via sensor piping and local codes require ground connections to be made internally)
- Do not connect shield drain wires to this terminal

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8. Reattach the core processor cover. **CAUTION! Twisting the core processor will damage the equipment. Do not twist the core processor.**
9. At the I.S. barrier:
 - a. Ensure that the cable is shielded, using an appropriate method.
 - b. Connect the wires from the core processor to the I.S. terminals at the barrier, matching by function (see Figure 3-4). If you are using Micro Motion 4-wire cable, you can identify the wires by color (see Table 2-1).

3.5 Installing power wiring to the I.S. barrier(s)

If you chose not to power the I.S. barrier(s) from the ROC809 platform, follow these instructions to supply power to the I.S. barrier(s):

1. Connect power wires to non-I.S. terminals 11 and 12 on the I.S. barrier (see Figure 3-4).
2. If you are daisy-chaining the I.S. barriers:
 - a. Connect terminals 11 and 12 on the first barrier to terminals 11 and 12 on the second barrier. Be sure to connect terminal 11 to terminal 11 and terminal 12 to terminal 12.
 - b. Repeat as required for all I.S. barriers.
3. Connect power wires to the VDC+ and VDC– terminals on the power supply. Be sure to connect positive to positive and negative to negative.

Chapter 4

Software Installation and Setup

4.1 Overview

This chapter provides instructions and information for the following tasks:

- Installing and using ProLink II – see Section 4.2
- Installing and using ROCLINK 800 – see Section 4.3
- Installing the license key with the NOC license – see Section 4.4
- Installing the Net Oil Computer Software – see Section 4.5
- Downloading the startup configuration file – see Section 4.6

To complete the tasks described in this chapter, you must be able to power up the ROC809 platform.

4.2 Installing and using ProLink II

ProLink II is a Windows-based software tool provided by Micro Motion. In the NOC system, ProLink II should be installed on a PC that can be connected to the core processor or the I.S. barrier.

Typical uses of ProLink II in an NOC system include the following:

- Verifying core processor configuration
- Changing core processor configuration, e.g.:
 - Changing meter factors
 - Changing slug flow parameters
- Zeroing the sensor
- Performing a density calibration
- Resetting core processor totalizers
- Troubleshooting

The ProLink II manual is installed with the ProLink II software. Refer to the manual for instructions on using ProLink II.

Software Installation and Setup

4.2.1 PC requirements

To install and run ProLink II, your PC must meet or exceed the following requirements:

- 200 MHz Pentium processor
- One of the following:
 - Windows 98 (initial release or second edition) with 32 megabytes (MB) RAM
 - Windows ME with 64 MB RAM
 - Windows NT 4.0 with Service Pack 6a and 64 MB RAM
 - Windows 2000 with Service Pack 3 and 128 MB RAM
 - Windows XP with Service Pack 1 and 128 MB RAM
- 24 MB of available hard disk space
- Video with support for 256 or more colors
- An available serial port or USB port

Note: Windows NT does not support the USB port.

4.2.2 Installation kits

ProLink II installation kits for RS-485 connections (serial port or USB) were shipped with the Net Oil Computer Software. Kit contents are listed in Table 4-1. If you need a ProLink II installation kit, contact Micro Motion.

Table 4-1 ProLink II installation kits

Physical layer	Connection	Kit contents
RS-485	Serial port	<ul style="list-style-type: none">• Black Box Async RS-232 <-> 2-wire RS-485 Interface Converter (Code IC521A-F)• DB9-DB25 adapter• DB9-DB9 tester• Cable
	USB	<ul style="list-style-type: none">• Black Box Async RS-232 <-> 2-wire RS-485 Interface Converter (Code IC521A-F)• USB-to-serial (RS-232) converter• DB9-DB25 adapter• DB9-DB9 tester• Cable

Note: If you use a different RS-232 to RS-485 signal converter, it is your responsibility to ensure that your equipment provides equivalent functionality. See the ReadMe.txt file in the ProLink II installation directory, or contact Micro Motion customer support for assistance or additional information.

4.2.3 Installation and setup

To install and set up ProLink II, follow the steps below.

Step 1 Ensure required privileges

Installing and running ProLink II requires specific privileges. Install ProLink II using the required user account, and ensure that all persons who will run ProLink II have the required privileges. See Table 4-2.

Table 4-2 Required privileges

Operating system	To install ProLink II	To run ProLink II
Windows NT 4.0	Must be the built-in Admin account	<ul style="list-style-type: none"> • Read/write local hard drive • Read/write Windows registry
Windows 2000	Must be member of the Administrators group	<ul style="list-style-type: none"> • Read/write local hard drive • Read/write Windows registry
Windows XP	Must be member of the Administrators group	<ul style="list-style-type: none"> • Read/write local hard drive • Read/write Windows registry
Windows 98	Not applicable	Not applicable
Windows ME	Not applicable	Not applicable

During installation on a Windows NT, Windows 2000, or Windows XP system, if the installer is not in the Administrator group, the installation wizard may display a message warning that the installation may not be successful. If this occurs, the installation wizard will run to completion but the Windows registry may not be updated correctly. If you are subsequently unable to connect to a transmitter, reinstall the software using the required user account.

Step 2 Install ProLink II software

To install ProLink II software:

1. Insert the ProLink II CD-ROM into the PC's CD-ROM drive.
2. If the setup program does not start automatically, locate and run the SETUP.EXE file. The file is located in the root directory on the CD-ROM (e.g., D:\setup.exe, where "D" is your CD-ROM drive letter).
3. Follow the on-screen instructions to complete the installation. If you have a previous version of ProLink II installed on your PC, you may be prompted to remove it before installing the new version.

Note: The ProLink II site key is associated with a disk drive and specific folder on your PC. If you decide to move ProLink II after installation, you will have to transfer the license and reinstall ProLink II. To avoid this step, be sure to install ProLink II into a location that you can use permanently.

Step 3 Generate the temporary license

The first time ProLink II is run, you will be prompted to generate a temporary license. This license will allow you to run ProLink II with full functionality for seven days, starting from the current date and time. Follow the on-screen instructions to generate the temporary license.

Note: If you are running Windows 98 or Windows ME, you must temporarily disable any anti-virus software running on your PC before you can generate the temporary license. You can re-enable the anti-virus software immediately after the temporary license has been successfully generated.

Instructions for obtaining and configuring a site key are provided in the ProLink II manual, installed with the ProLink II software program.

Note: If you attempt to use ProLink II after the temporary license has expired, ProLink II will no longer allow you to connect to a transmitter.

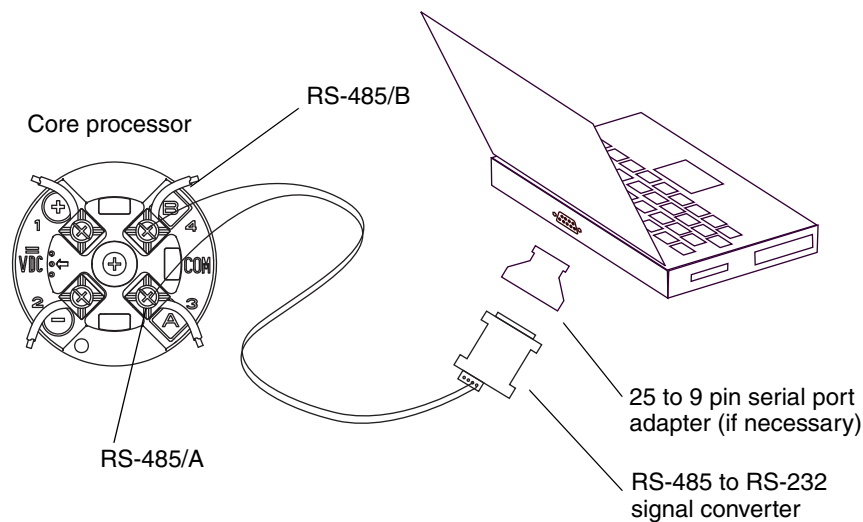
4.2.4 Connecting with ProLink II

To connect from ProLink II to the core processor:

1. Attach the signal converter to the COM port or USB port on your PC.
2. Complete the physical connection using one of the following methods:
 - Disconnect the RS-485 wires at the I.S. barrier and connect the signal converter leads to the non-I.S. RS-485 terminals (see Figure 3-4). This method is intrinsically safe.
 - Disconnect the RS-485 wires at the RS-485 sensor communications module on the ROC809 platform, and connect the signal converter leads to the wires (see Figure 3-3). This method is intrinsically safe.
 - Remove the core processor lid (see Figure 2-3), disconnect the RS-485 wires at the core processor, and connect the signal converter leads directly to the core processor terminals (see Figure 4-1). This method is not intrinsically safe. **WARNING! Before removing the core processor lid, make sure that the atmosphere is free from explosive gases. WARNING! Before connecting to the RS-485 terminals, make sure that the atmosphere is free from explosive gases.**

Note: Do not disconnect the power wires. The core processor must be powered for the ProLink II connection.

Figure 4-1 Modbus/RS-485 connection to RS-485 terminals on core processor



3. Start ProLink II. If the **Connect** dialog box is not displayed:
 - a. Open the **Connection** menu.
 - b. Click on the **Connect** option.

4. Set parameters as follows:
 - Protocol: Modbus RTU or Modbus ASCII
 - Baud rate: 1200–38,400
 - Parity: Any
 - Stop bits: 1 or 2
 - Port: As appropriate for your PC
 - Address: 1, 2, 3, or 4 as appropriate for your core processor

Note: If you do not know the core processor's Modbus address, use the Poll function.

5. Click **Connect**.
6. If the connection fails, switch the leads and retry the connection.

To return to normal operation:

1. In the ProLink **Connection** menu, click **Disconnect**.
2. Reconnect the original RS-485 wiring.
3. Close housings, reseal modules, etc., as required.

4.3 Installing and using ROCLINK 800

This section describes the PC requirements for ROCLINK 800, and the ROCLINK 800 installation procedure, and provides brief instructions for starting ROCLINK 800 and connecting to the ROC 800 platform.

For more detailed information, see the document entitled *ROCLINK 800 Configuration Software: User Manual*.

4.3.1 PC requirements for ROCLINK 800

To install and run ROCLINK 800 on a PC, the PC must meet the following minimum requirements:

- Pentium-class processor (233 MHz or greater recommended)
- CD-ROM drive
- Windows 98, ME, NT 4.0 (SP6), 2000 (SP2), or XP
- 64 MB of RAM
- SVGA color monitor, 800 by 600 pixels, small fonts
- 15-50 MB of available hard disk space depending on operating system and revision level
- EIA-232 (RS-232) serial port

4.3.2 Installing ROCLINK 800

Insert the ROCLINK 800 CD into your PC's CD-ROM drive.

If the installation program starts automatically (AutoRun):

1. Click the **Install a ROCLINK Product** button in the main menu.
2. Click the **Install ROCLINK 800** button in the installation screen.
3. Follow the instructions on the screen.
4. Once you have exited the main menu, remove the installation CD-ROM.

Software Installation and Setup

Note: A restart may be necessary.

If the installation program does not start automatically:

1. Click the Windows **START** button.
2. Navigate to the CD-ROM drive, and select **Setup.exe**. If the CD-ROM drive is drive D, the location will be **D:\Installs\ROCLINK800_W68130\Setup.exe**.
3. Click **OK** in the Navigation window.
4. Click **OK** in the Run window.
5. Follow the steps in the preceding installation procedure (AutoRun).

4.3.3 Starting ROCLINK 800

You can start ROCLINK 800 using any of the following methods:

- Double-clicking the **ROCLINK 800** shortcut on the desktop
- Selecting **Start > Programs > ROCLINK 800 > ROCLINK 800**
- Double-clicking the file **ROCLINK.EXE**. In typical installations, this file is located in C:\Program Files\ROCLINK 800.

Enter your ROCLINK 800 operator ID and password, and click **OK**. If you have not yet defined ROCLINK 800 operator IDs and passwords, use the ROCLINK 800 default values:

- Operator ID: **LOI**
- Password: **1000**

4.3.4 Connecting from ROCLINK 800 to the ROC809 platform

To make a connection from ROCLINK 800 to the ROC809 platform:

1. At the PC, connect the LOI cable supplied with the Net Oil Computer Software to the serial port.
2. At the ROC809 platform, connect the LOI cable to the LOI access port.
3. Ensure that the COM port on the PC is configured for 8 data bits.
4. Ensure that the ROC809 platform is powered up.
5. Click the **Direct Connect** icon in the toolbar or click **Device > Direct Connect**.

4.4 Installing the license key with the NOC license

An NOC license is required to use the Net Oil Computer Software. The NOC license is supplied on the license key included in the Net Oil Computer shipment. The license key must be installed on the ROC809 platform before the Net Oil Computer Software is started.

Note: If your NOC system will include gas measurement, you will also need an AGA license. This license is available from Remote Automation Solutions.

To install the license key:

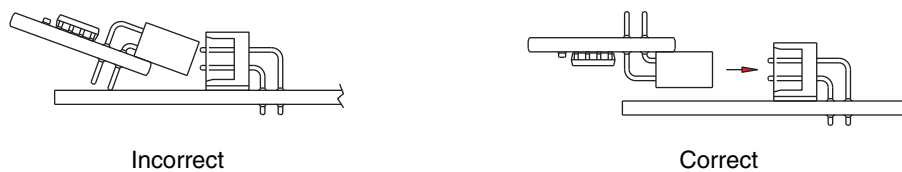
1. If applicable, ensure that all configuration data, history data, and event and alarm logs are backed up. See the ROCLINK 800 documentation.
2. Remove power from the ROC809.

3. Remove the CPU faceplate, disconnecting cables as required. See Figure 2-4. **CAUTION! When working inside the ROC809 unit, wear a grounded wrist strap to prevent electrostatic discharge. Electrostatic discharge may reset the processor or damage electronic components.**
4. Referring to Figure 4-2, slide the license key onto the pins. Do not twist or bend the pins.

Note: If only one license key is present, it must be installed in License Key Slot 1.

5. Replace the CPU faceplate and reconnect cables.
6. Restore power to the ROC809.

Figure 4-2 Installing a license key

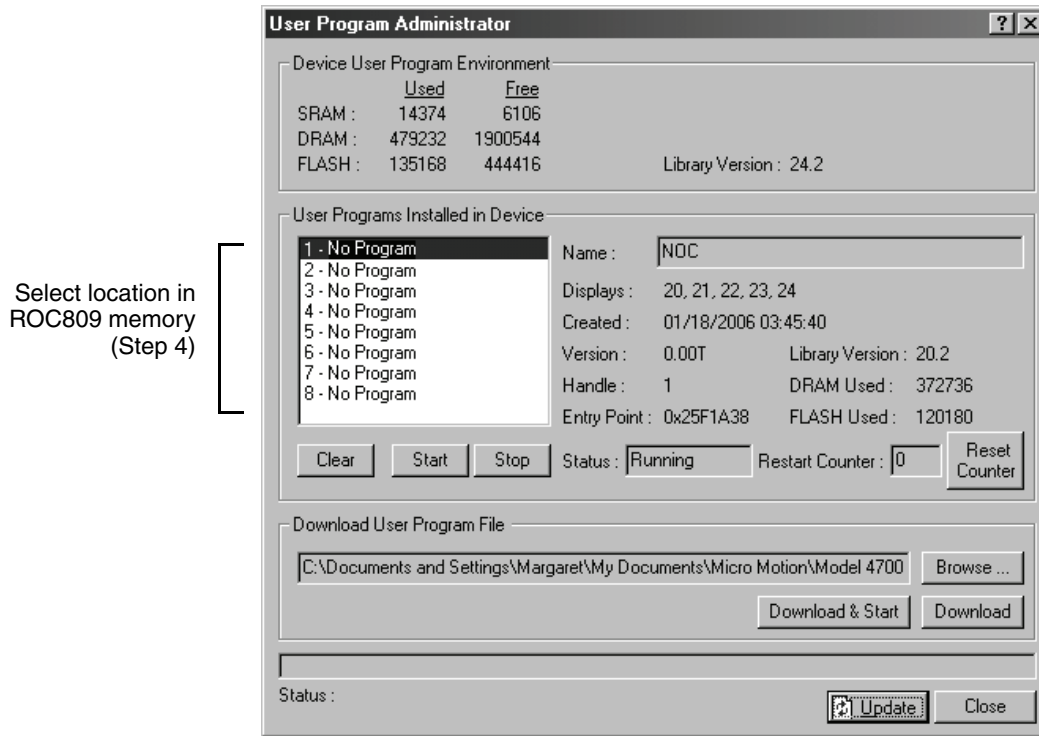


4.5 Installing the Net Oil Computer Software

To install the Net Oil Computer Software:

1. Start ROCLINK 800 and connect to the ROC809 platform, as described in Sections 4.3.3 and 4.3.4.
2. Insert the Net Oil Computer Software CD into your PC's CD drive.
3. In ROCLINK 800, click **Utilities > User Program Administrator**. The dialog box shown in Figure 4-3 is displayed.
4. Highlight the location in ROC809 memory to which you will install the Net Oil Computer Software. In typical installations, the Net Oil Computer Software is loaded into the first location.
5. Click **Browse**, and navigate to the Net Oil Computer Software on the CD.
6. Click **Download & Start**.
7. When the download has completed, status should be shown as **Running**. If it is not, click **Start**.
8. Save to flash memory (see the manual entitled *ROCLINK 800 Configuration Software: User Manual*). This ensures that the user program will automatically restart after a cold start.

Figure 4-3 User Program Administrator dialog box



4.6 Downloading the startup configuration file

Two startup configuration files for the ROC809 and the NOC system were shipped with the software: one for Continuous mode and one for Well Test mode. One of these configuration files must be downloaded to the ROC809 to serve as a basis for site-specific configuration.

To download a startup configuration file to the ROC809:

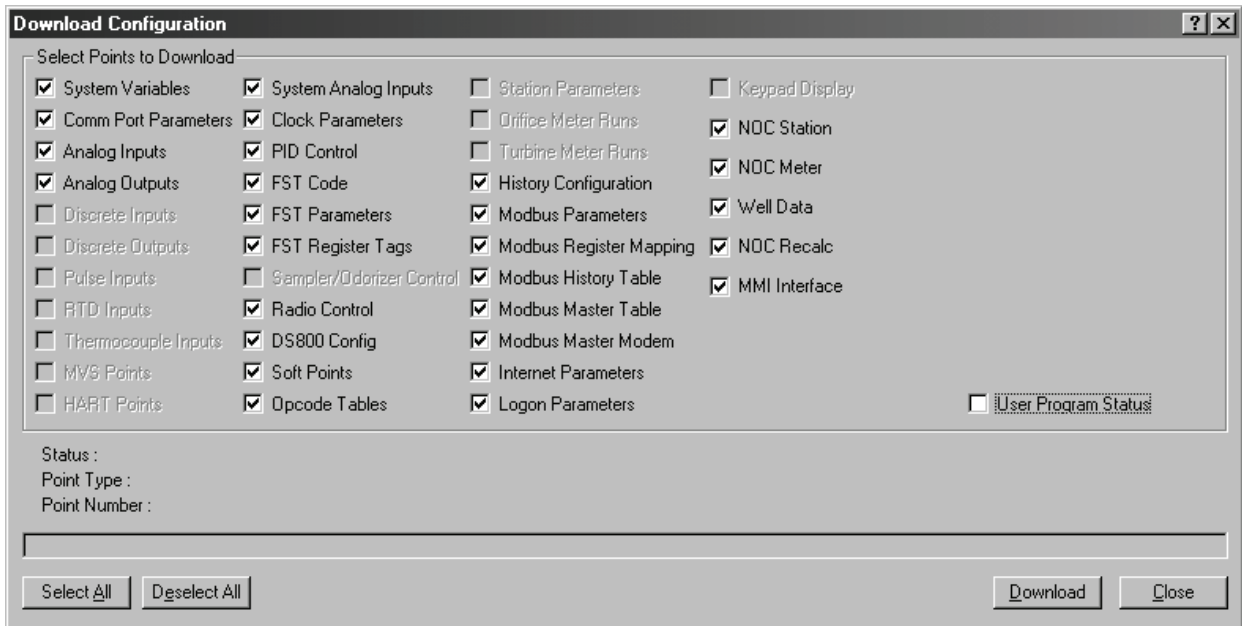
1. Determine whether the NOC system will be running in Continuous mode or Well Test mode.

Note: For more information on operation modes, see the manual entitled Micro Motion Net Oil Computer Software and NOC System: Configuration and Use Manual.

2. Insert the Net Oil Computer Software CD in your PC's disk drive.
3. Start ROCLINK 800.
4. Connect to the ROC809.
5. Click **File > Download** and select the appropriate startup configuration file from the CD:
 - Continuous mode – **NOCStartup_CONTINUOUS.800**
 - Well Test mode – **NOCStartup_WELLTEST.800**
6. Select all points for download, as shown in Figure 4-4.
7. Click **Download** and wait for the process to complete.
8. Save to flash memory (see the manual entitled *ROCLINK 800 Configuration Software: User Manual*).

Note: If the download fails, deselect the item that it failed on, then try again. The only required points are the History Configuration and Modbus points.

Figure 4-4 Downloading the startup configuration file



Chapter 5

Startup Procedures

5.1 Overview

This chapter provides instructions and information for the following procedures:

- Verifying the core processor configuration – see Section 5.2
- Performing a sensor zero (optional) – see Section 5.3

These procedures should be performed on all Micro Motion sensors in the NOC system before you begin configuration of the Net Oil Computer Software.

5.2 Core processor configuration

There is one core processor for each Micro Motion sensor in the NOC system. The Net Oil Computer Software communicates with the sensor through the core processor, which performs a variety of configuration and preprocessing functions. Accordingly, the core processor contains configuration parameters that affect NOC measurement.

To verify core processor configuration:

1. Use ProLink II to connect to each core processor as described in Section 4.2.4.
2. Refer to Table 5-1 and verify or update parameter settings.
3. Record the settings for each core processor.

Note: Table 5-1 lists only the parameters that affect NOC processing. For more information on these parameters, refer to a Micro Motion transmitter configuration manual.

Table 5-1 Recommended core processor configuration viewed through ProLink II

ProLink II location	Parameter	Factory setting
Configuration/Flow	Flow Direction	Bidirectional
	Flow Damp	As appropriate (default = 0.80000)
	Flow Cal	As appropriate for sensor
	Mass Flow Cutoff	0.00000
	Mass Flow Units ⁽¹⁾	g/s
	Vol Flow Cutoff	0.00000
	Vol Flow Units ⁽¹⁾	l/sec
	Mass Factor	As appropriate (default = 1.0000)
	Dens Factor	As appropriate (default = 1.0000)
	Vol Factor	As appropriate (default = 1.0000)

Table 5-1 Recommended core processor configuration viewed through ProLink II *continued*

ProLink II location	Parameter	Factory setting
Configuration/Density	Density Units ⁽¹⁾	g/cm3
	Density Damping	As appropriate (default = 1.60000)
	Slug High Limit	As appropriate (default = 5.00000)
	Slug Low Limit	As appropriate (default = 0.00000)
	Slug Duration	As appropriate (default = 0.00000)
	Low Density Cutoff	0.00000
	K1, K2, FD, D1, D2, Temp Coeff	As appropriate for sensor
Configuration/Pressure	Flow Factor	0.0000000
	Dens Factor	0.0000000
	Cal Pressure	0.00000
	Pressure Units ⁽¹⁾⁽²⁾	PSI
Configuration/Temperature	Temp Units ⁽¹⁾	°C
	Temp Damping	As appropriate (default = 4.80000)
Configuration/Device	Sensor Type	As appropriate
	Floating-point Byte Order	3-4 1-2
	Modbus Address	1, 2, or 3 (for sensors installed on oil or water leg) 4 (for sensor installed on gas leg)
	Digital Comm Fault Indication	None
	Update Rate	Normal
Preferences	Use External Temperature	Disabled

(1) The Net Oil Computer Software can accept any measurement units options from the core processor. However, Micro Motion recommends using the core processor default units, as shown here.
 (2) The pressure units are relevant only if pressure compensation is being implemented at the core processor level, which requires a pressure input directly to the core processor. This is not a typical implementation; Micro Motion recommends that pressure compensation be implemented in the Net Oil Computer Software. See the manual entitled Micro Motion Net Oil Computer Software and NOC System: Configuration and Use Manual.

5.3 Sensor zero

Zeroing the sensor establishes the sensor’s point of reference when there is no flow. The sensor was zeroed at the factory, and should not require a field zero. However, you may wish to perform a field zero to meet local requirements or to confirm the factory zero.

When you zero the flowmeter, you may need to adjust the zero time parameter. *Zero time* is the amount of time the transmitter takes to determine its zero-flow reference point. The default zero time is 20 seconds.

- A *long* zero time may produce a more accurate zero reference but is more likely to result in a zero failure. This is due to the increased possibility of noisy flow, which causes incorrect calibration.
- A *short* zero time is less likely to result in a zero failure but may produce a less accurate zero reference.

For most applications, the default zero time is appropriate.

5.3.1 Preparing for zero

To prepare for the zero procedure:

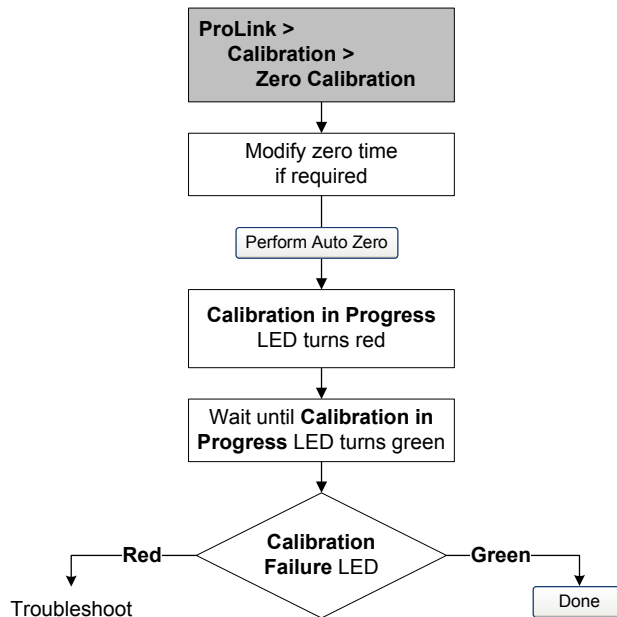
1. Apply power to the system. Allow the sensor and core processor to warm up for approximately 20 minutes.
2. Run the process fluid through the sensor until the sensor temperature reaches the normal process operating temperature.
3. Close the shutoff valve downstream from the sensor.
4. Ensure that the sensor is completely filled with fluid.
5. Ensure that the process flow has completely stopped. **CAUTION! Ensure that flow has stopped completely. If flow is present, the zero calibration may be inaccurate, resulting in inaccurate process measurement.**

5.3.2 Zero procedure

To zero the sensor:

1. Use ProLink II to connect to the core processor, as described in Section 4.2.4.
2. Follow the procedure shown in Figure 5-1.

Figure 5-1 ProLink II – Sensor zero procedure



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