+ QuickStart

NUFLO MC SYNERGY TOTALIZER

Explosion-proof (EXP) and Weatherproof (WP)

Introducing the NUFLO MC Synergy

Sensia's NUFLO* MC Synergy* Totalizer combines intelligent monitoring and flexible connectivity in a durable, easy to use device.

The MC Synergy indicates flow total and rate in user-selected units and transfers real-time or historical data to SCADA or automation systems via analog signals, digital signals, or protocols including HART and Modbus.

This QuickStart guides you through basic commissioning using Sensia's Digital Data Plate app or the device keypad.

Download user manuals for more detailed instruction and help to configure with PC software, Modbus, or HART protocol.

Mount Your MC Synergy

DIRECT-MOUNT INSTALLATION

Install the MC Synergy Totalizer as follows:

1. Position the device above the flowmeter.

2. Make sure the signal cable is disconnected from the circuit board. This will prevent cable damage when the totalizer is threaded onto the meter.

3. Connect the signal cable to the magnetic pickup of the flowmeter and hand-tighten the knurled nut.

4. Screw the MC Synergy onto the flowmeter with the display facing the desired direction.
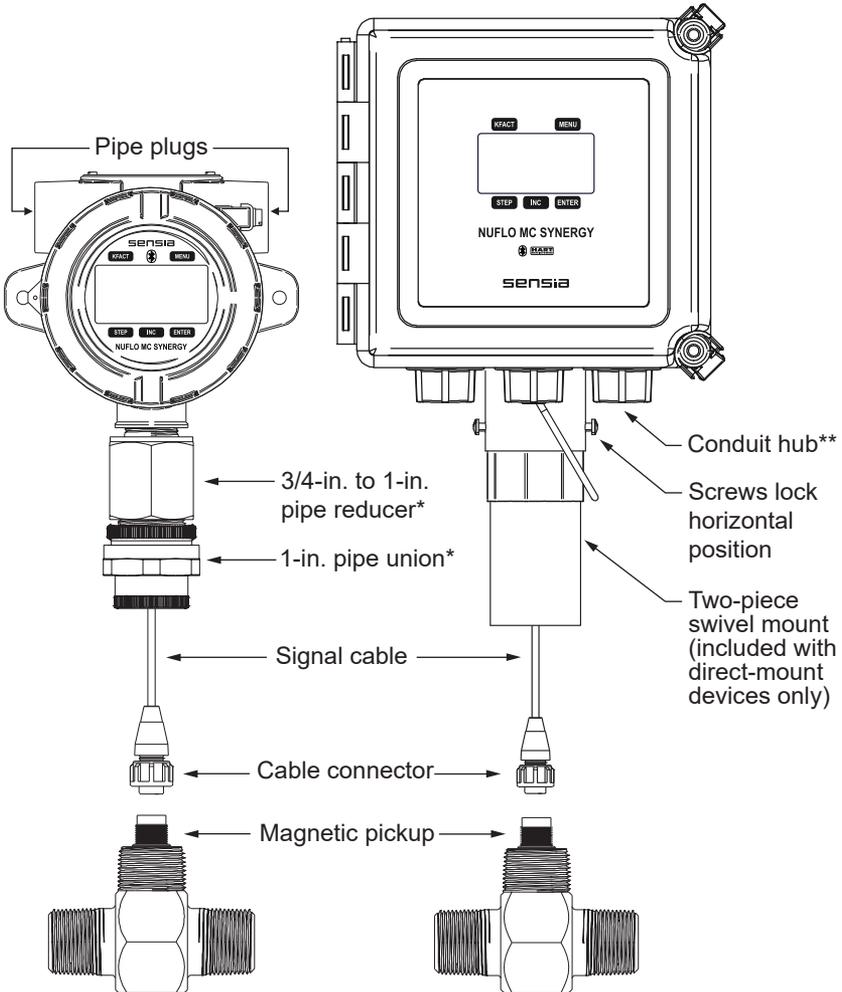
5. Tighten all pipe connections.

* Mark of Sensia

+   +   +   **INTELLIGENT ACTION** +

6. When installing a WP model, tighten the screws on either side of the mount and tighten the two hex-head bolts on the top section of the mount to prevent horizontal and vertical shifting.

> ⚠ **CAUTION**
> Do not use Teflon® tape on threads of the union, reducer, or pipe plugs. This will void the device's explosion-proof rating.

Pipe plugs

3/4-in. to 1-in. pipe reducer*

1-in. pipe union*

Signal cable

Cable connector

Magnetic pickup

Conduit hub**

Screws lock horizontal position

Two-piece swivel mount (included with direct-mount devices only)

* Pipe reducer and pipe union are used in CEC/NEC-rated devices only. ATEX models are equipped with a standoff tube and no coupling.

** Each weatherproof device is fitted with one conduit hub. Two additional conduit openings are plugged and available for future use.

Wire Your MC Synergy

> ⚠️ **CAUTION**
> For North American installations in a hazardous location, all field wiring must conform to wiring methods for explosion-proof installations as defined by the National Electric Code and Canadian Electric Code. State and local wiring ordinances may also apply. For complete wiring instructions, see the MC Synergy EXP and WP user manuals.

FIELD WIRING

1. Remove the enclosure cover.

2. Using a flat blade screwdriver, remove the two screws from the display.

3. Lift the display/circuit assembly from the enclosure taking care to avoid contact between the circuitry and the enclosure.

4. Connect the battery pack(s) to the "BAT 1" and "BAT 2" connectors. Depending on the order option, the device may ship with one or two 3.6V lithium batteries, or an alkaline battery pack.

5. Make I/O connections in accordance with the diagrams on pages 5 through 7.

6. Reposition the circuit assembly over the standoffs and secure the wiring beneath it. Replace the two screws to anchor it in the housing.

Battery power

External power: power supply or loop power
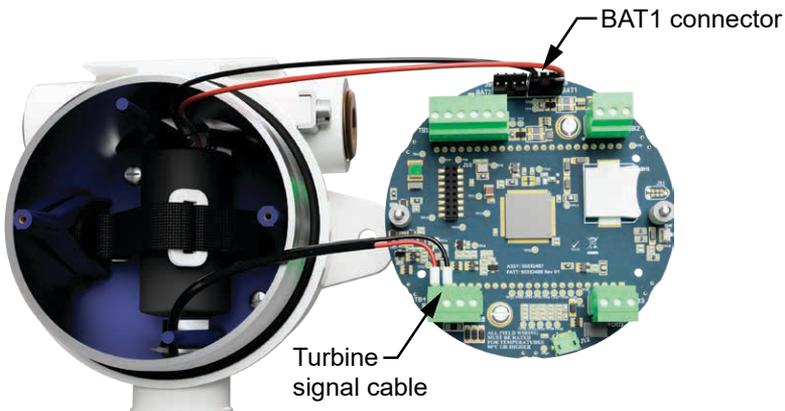
Turbine, square wave, or dry contact input

Remote reset (clear total)

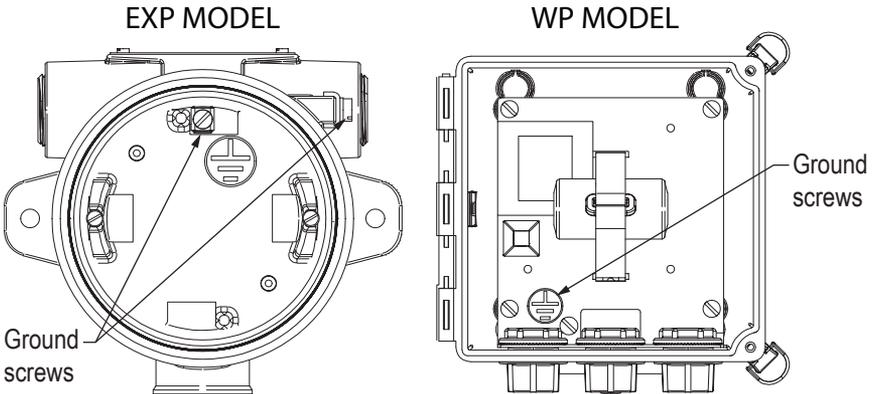2 Digital outputs: scaled pulse, status, or meter frequency

2 RS485 outputs

4-20 mA output with wired HART

Ethernet (Modbus)

BAT1 connector

Turbine signal cable

INTELLIGENT ACTION

7. Ground the device using the ground screws as shown.

EXP MODEL   WP MODEL

Ground
screws

Ground
screws

8. Configure the MC Synergy.

9. To ensure the time stamps in log data are accurate, sync the date and time with your computer or a mobile device using the PC software or mobile app, or enter the date and time via the keypad.

10. Replace the enclosure cover.

> **WARNING**
> To prevent ignition of hazardous atmospheres, do not remove the cover from an MC Synergy EXP Totalizer while circuits are alive. DO NOT OPEN WHEN AN EXPLOSIVE GAS ATMOSPHERE IS PRESENT. Under normal conditions, the totalizer poses no hazard when opened in a safe area.

EXPANDED I/O AND COMMUNICATIONS

I/O and/or communications can be enhanced with the addition of an expansion board. Each MC Synergy Totalizer can accommodate one expansion board. Choose one of the following:

- Analog Output/HART Expansion Board
    – One 4-20 mA output signal (proportional to flow rate)
    – Loop power capabilities
    – HART digital communications
    – HART point-to-point or multidrop connections

- Ethernet Expansion Board (external power required)
    – Modbus TCP connection
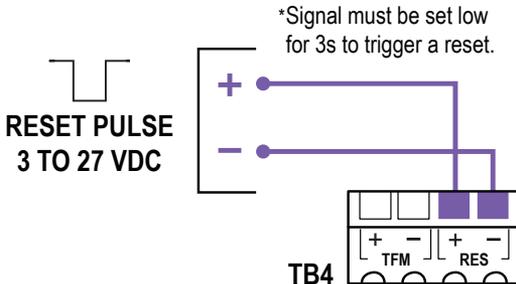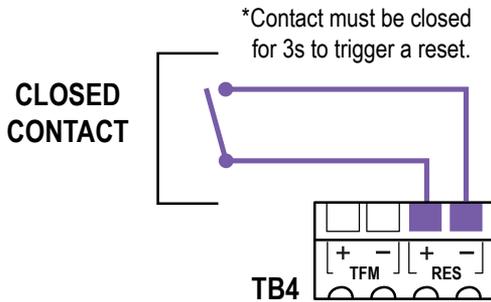   – Modbus Over TCP connection

EXTERNAL POWER (TB1)

The power supply and cable must be rated for 6 to 27 VDC @ 60 mA.
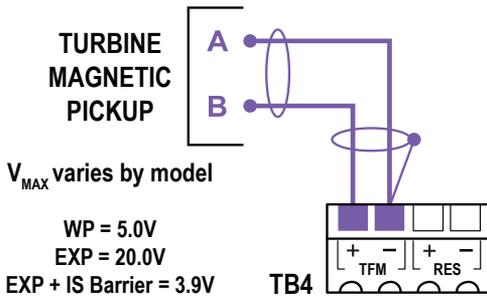
TB1

POWER SUPPLY 6 TO 27 VDC
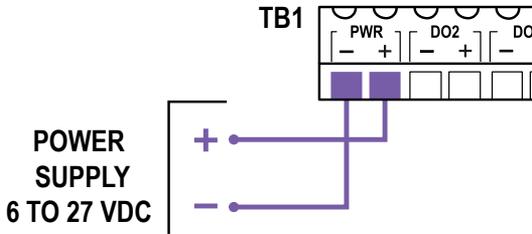
REMOTE RESET INPUT (TB4)

The remote reset (RES) input may be connected with a closed contact (switch) or a DC pulse from a remote location. It is disabled by default and can be enabled with the PC software. Functions include but are not limited to Reset Grand Total and Clear Unacknowledged Alarms.
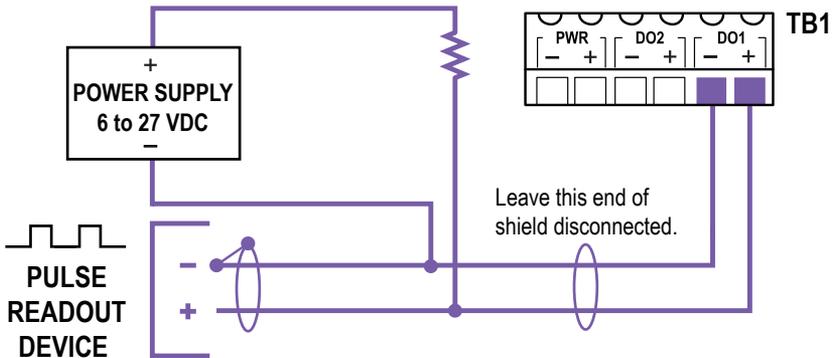
*Contact must be closed for 3s to trigger a reset.

CLOSED CONTACT

TB4

*Signal must be set low for 3s to trigger a reset.

RESET PULSE 3 TO 27 VDC

TB4

INTELLIGENT ACTION +

FLOWMETER, SQUARE WAVE, OR DRY CONTACT INPUT (TB4)

TURBINE MAGNETIC PICKUP

A

B

V_{MAX} **varies by model**

WP = 5.0V
EXP = 20.0V
EXP + IS Barrier = 3.9V

**TB4**

+ − TFM   + − RES

DIGITAL OUTPUTS (TB1)

Each device has a pair of digital outputs. Each output can function as a scaled pulse output, status output, or flowmeter frequency output. The circuit's maximum current rating is 6 to 27 VDC @ 60 mA.

*Resistor may be included in pulse readout device. Size the resistor to limit current to 60 mA.

TB1

PWR   DO2   DO1
− +   − +   − +

+
**POWER SUPPLY
6 to 27 VDC**
−

Leave this end of shield disconnected.

PULSE READOUT DEVICE

−

+

REMOTE COMMUNICATION (TB2)

Each device has a pair of RS485 ports. One or both ports may be used for communication. Port 2 is located at TB3.

PORT 1

TB2

B   A   COM

GND

A

B

RS-485 COMMUNICATIONS
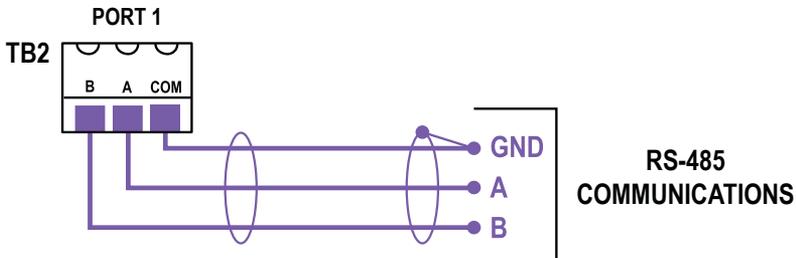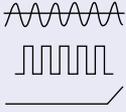
INPUTS

Turbine
Amplified meter
Contact closure
Digital (reset total)

DIGITAL OUTPUTS

Scaled pulse
Amplified frequency
Status (alarms)

KEYPAD ACCESS

Configure through
the glass or via
tactile buttons

MOBILE APP

Configure with
IOS or Android
phone or tablet

sensia
KFACT | Bluetooth | HART REGISTERED | MENU

CONSIDER THE POSSIBILITIES...

STEP | INC | ENTER

NUFLO MC SYNERGY

Bluetooth®

Meter calibration
uploads for fast
commissioning

ALARMS

Turbine
System
User-defined

COMMUNICATIONS

2 RS485 or
1 RS485 + 1 USB
Enron Modbus
RTU Modbus

DATA LOGS

384 daily
768 interval
768 event
768 alarm

PC SOFTWARE

Online configuration
Offline configuration
Calibration
Data downloads

EXPANSION BOARD

Ethernet
Modbus TCP
Modbus Over TCP

EXPANSION BOARD

Analog output / loop powered
HART point-to-point
HART multidrop

For more information
Download these user manuals from the Sensia website:

- MC Synergy EXP User Manual
- MC Synergy WP User Manual
- MC Synergy Software User Manual

+   +   +   **INTELLIGENT ACTION** +

Interface Options for Commissioning

Four interfaces are available for basic setup and commissioning. See the MC Synergy user manuals for a complete list of configurable settings.

	BT App	PC or Modbus[1]	Device Keypad	HART[2]
1 Upload meter and calibration data	X			
2 View real time data	X	X	X	X
3 Set real time clock	X	X	X	X
4 Set units of measurement (total, rate, etc.)	X	X	X	
5 Set linear K-factor & meter factor	X	X	X	X
6 Set multipoint K-factor & meter factor		X	X	X
7 Set device ID and location data	X	X		X
8 Validate/revise meter data	X	X		X
9 Set meter kit replacement alarm	X	X	X	
10 Set input type and meter thresholds	X	X	X	X
11 Configure analog output	X	X	X	X
12 Calibrate analog output		X		X
13 Configure HART settings	X	X	X	X
14 Configure display	X	X	X	
15 Set keypad lock code	X	X	X	
16 Configure RS485 Modbus ports	X	X	X	
17 Acknowledge alarms	X	X	X	
18 Reset grand total	X	X	X	X
19 Set Bluetooth pairing security code		X	X	
20 Configure alarms		X		
21 Configure archives		X		
22 Configure health check parameters	X	X		
23 Configure network (Modbus-TCP or Modbus over TCP)[3]		X		
24 Set IP address mode (static/DHCP)[3]		X	X	
25 Download archive data		X		

1. Available via PC software or Modbus registers with an RS485 or Ethernet connection.
2. Available only with analog output / HART expansion board.
3. Available only with Ethernet expansion board.

Configure via Mobile App

Sensia's Digital Data Plate app makes connecting to your MC Synergy a snap. Leveraging the Bluetooth communications on your phone or tablet, you can upload meter calibration data, configure the totalizer, and manage your I/O with your mobile device.

Sensia simplifies the process by storing meter calibration data and other key information in a QR code. Just scan the code attached to the meter or internals kit to upload the data to your MC Synergy with no manual entry required.

Before you begin, review these tips for a successful setup:

1. Download the Sensia Digital Data Plate app from your app store and install it on your mobile device. The DDP app is available from Google Play (Android) and the App Store (IOS).


2. Position yourself within easy reach of your MC Synergy Totalizer and the QR tag affixed to your turbine meter/internals kit, if applicable. You will interact with both to upload your meter calibration.

3. Once a Bluetooth connection is established, "bo" (Bluetooth on) will appear in the totalizer LCD. The connection will time out after 5 minutes of inactivity. This period is configurable in PC software.

4. During configuration, keep your phone or tablet near the MC Synergy. If you move outside the Bluetooth connectivity range, you will lose your connection and any settings that have not been saved.

INTELLIGENT ACTION +

UPLOAD METER CALIBRATION

1. Click "Upload K-Factor" on the Welcome screen.

2. Holding your mobile device in front of the meter QR tag, click the gray QR image to open your mobile camera and scan the QR code.
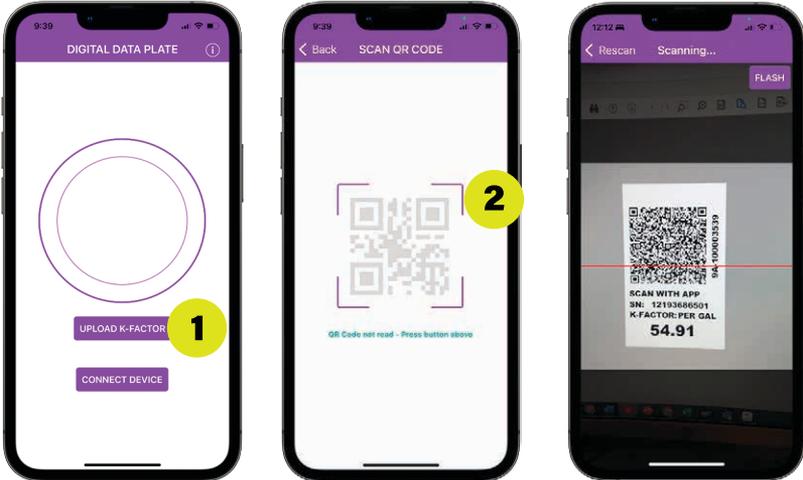
3. When the meter information appears on the screen, click **UPLOAD DATA**.

4. Using the MC Synergy keypad, tap **STEP**, then **ENTER**. A device ID will appear momentarily. When "PA" appears, the device is ready for pairing.

5. In the app, click **SCAN FOR DEVICES**, then select the MC Synergy and click **OK** to confirm the connection. Meter data will be written to the device.
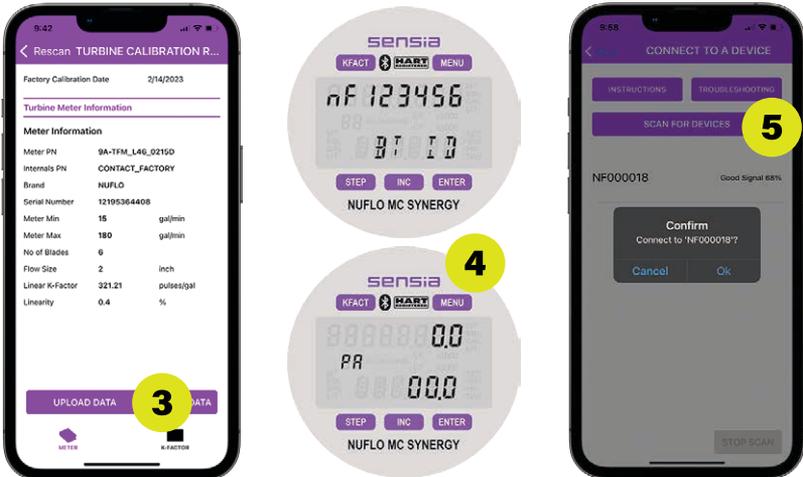
CONNECT AND CONFIGURE

1. Click **CONNECT DEVICE** on the Welcome screen.

2. Using the MC Synergy keypad, tap **STEP**, then **ENTER**. A device ID will appear momentarily. When "PA" appears, the device is ready for pairing.

3. In the app, click **SCAN FOR DEVICES**, then select the MC Synergy and click **OK** to confirm the connection.

4. Familiarize yourself with the menu navigation links at the bottom of the screen: DATA, STATUS, UNITS, K-FACTOR. Choose ••• More to access additional menus as shown below.

5. If data is configurable, an EDIT button will appear near the top of the screen. Click it to update the configuration settings.
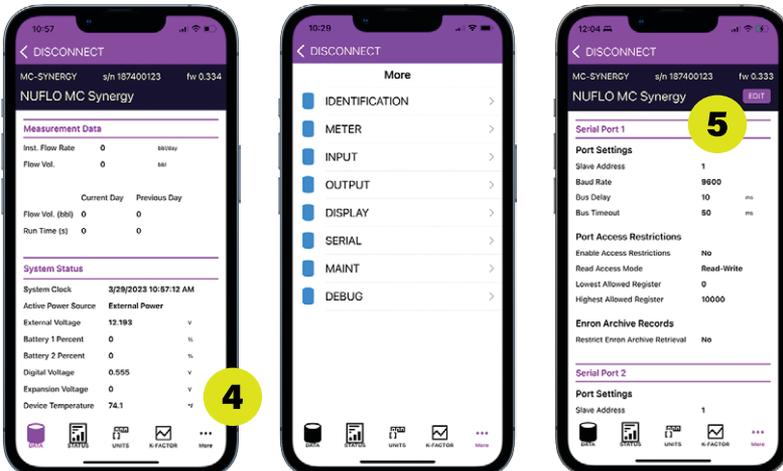
CONFIGURE BASIC PARAMETERS

DATE AND TIME

1. Click **More** ⋯ .

2. Click the **MAINT** menu.

3. Click **SYNC DEVICE CLOCK**, then click **OK**.

This Maintenance menu can also be used to clear active alarms and reset grand totals during operation.

UNITS OF MEASURE

1. Click 🔲 **UNITS** , then **EDIT** .

2. Click individual Edit buttons to select units for volume, flow rate, meter flow range, and K-factor including scale and decimal rounding where applicable.

3. Change the default units system, if desired. This setting applies to values with units that are not individually configured.
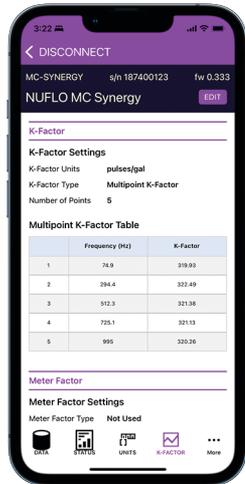
4. Click **SAVE**.
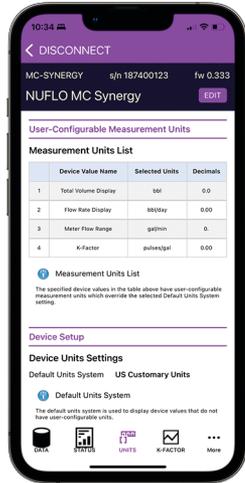
K-FACTOR / METER FACTOR

1. Click 〰 **K-FACTOR** , then **EDIT** .

2. Verify the factors are correct for the associated meter. From this menu, you can:

   Change the K-factor type (linear or multipoint).

   Change a linear K-factor or meter factor.

Multipoint configuration can be performed using the PC software or the device keypad menu.

3. Click **SAVE**.

CONFIGURE BASIC PARAMETERS

LCD DISPLAY

1. Click **More** •••.

2. Click **DISPLAY** menu, then EDIT.

3. By default, Grand Total and Flow Rate are displayed. Choose Display Item Selections to add parameters such as monthly total, previous day's total, etc.

4. Define scrolling cycle periods, alarms display, enable a keypad lock code, etc.
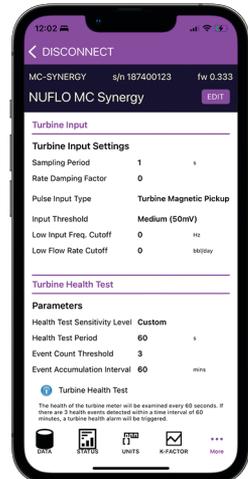
5. Click **SAVE**.

METER INFORMATION

1. Click **More** •••.

2. Click the **METER** menu. If meter calibration was uploaded from the meter QR code, no further action is needed.

3. To make changes to meter data, click EDIT.

4. Click **SAVE**.

INPUT SIGNAL

1. Click **More** •••, then EDIT.

2. Choose the input type. If turbine meter magnetic pickup, define the Input Threshold (mV).

3. Specify the input cutoff value for frequency or flow rate.

4. Specify turbine health alarm settings as required.

5. Click **SAVE**.

INTELLIGENT ACTION +

CONFIGURE BASIC PARAMETERS

ANALOG OUTPUT
(EXPANSION BOARD REQUIRED)

1. Click **More** •••.

2. Click the **OUTPUT** menu, then EDIT.

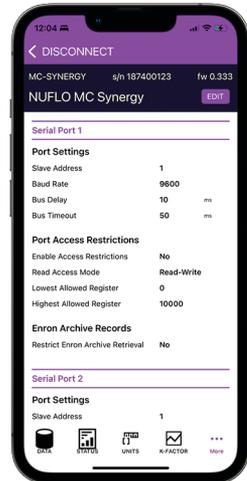3. Configure the analog 4-20 mA and HART settings, if appropriate.

4. Click **SAVE**.

MC Synergy also supports two digital outputs. These settings can be configured via the keypad menu or PC software.
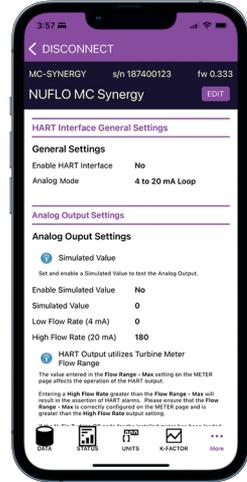
SERIAL COMMUNICATIONS

1. Click **More** •••.

2. Click the **SERIAL** menu, then EDIT.

3. Revise the Modbus settings for both RS485 comm ports, as necessary.

4. Click **SAVE**.

SAVE ALL CHANGES

After all individual changes are saved, click the red banner Save All Changes to Device to write the new settings to memory.
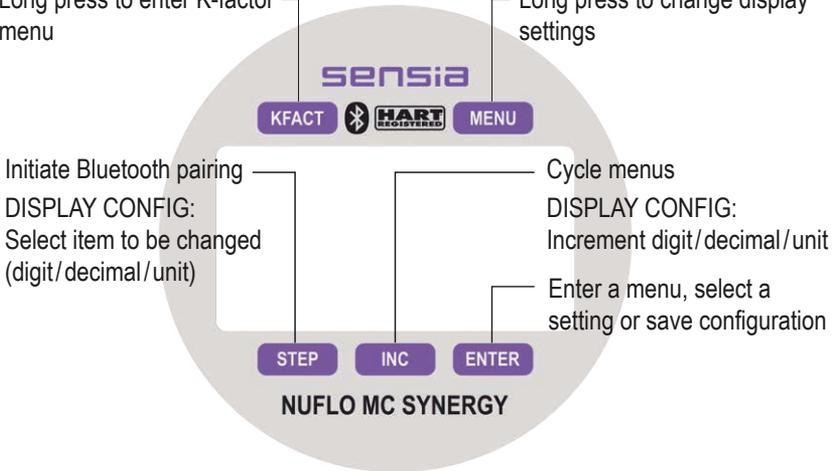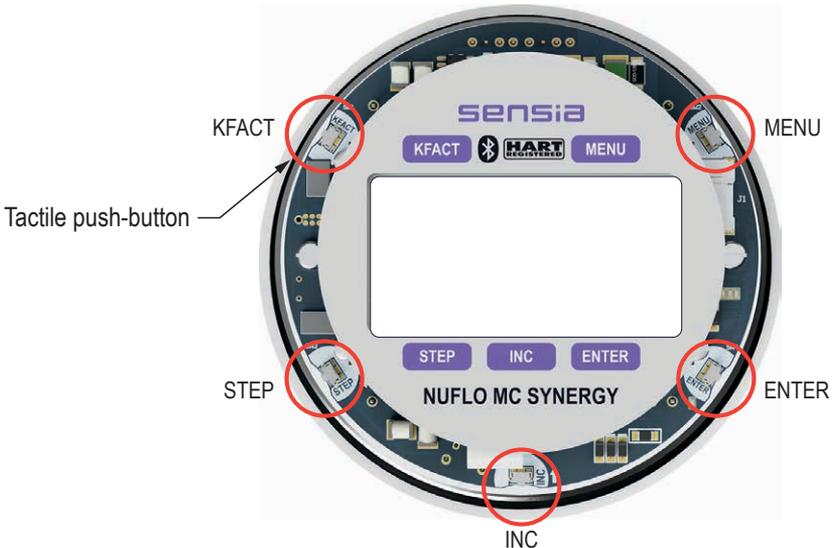
Configure via Keypad

To configure the MC Synergy via the capacitive keypad, touch and release your fingertip from the glass above one of the five buttons to iterate a menu selection. A short press and release (tap) may signal a different response than a long press (3 seconds) for some buttons.

Short press to change K-factor
Long press to enter K-factor menu

Short press to access main menu
Long press to change display settings

Initiate Bluetooth pairing
DISPLAY CONFIG:
Select item to be changed
(digit / decimal / unit)

Cycle menus
DISPLAY CONFIG:
Increment digit / decimal / unit

Enter a menu, select a setting or save configuration

sensia
KFACT ★ HART REGISTERED MENU

STEP INC ENTER

NUFLO MC SYNERGY

Alternatively, you can remove the lid and use the five tactile push-buttons along the outer rim of the circuit assembly.

KFACT

MENU

Tactile push-button

sensia
KFACT ★ HART REGISTERED MENU

STEP INC ENTER
NUFLO MC SYNERGY

STEP

ENTER

INC

CONFIGURE DEVICE DATE AND TIME

Ensure that the logs and archives have an accurate time stamp by configuring the device date and time. You can synchronize your device to the date and time registered by a PC or phone/tablet with our mobile app or PC software.

To configure the device date and time via the keypad:

1. Tap MENU.

2. Use INC repeatedly to advance to Date & Time. Tap ENTER to enter the menu.

3. Use INC to change the value of the flashing digit.

4. Tap STEP to advance the cursor to the next digit.

5. Repeat steps 3 and 4 to enter all four digits. Tap ENTER to save.

6. Use INC to select the month. Tap ENTER to save.

7. Use INC to select the day of the month. Tap ENTER to save.

8. Use INC to select the hour. Tap ENTER to save.

9. Use INC to select the minute. Tap ENTER to save.

CONFIGURE THE DISPLAY

1. Tap MENU.

   MENU

2. Use INC to advance to Display. Tap ENTER to enter the menu.

   INC **ENTER**

3. Use INC to select a display mode: rate and total or user-selected. Tap ENTER to save.

   INC **ENTER**

4. Tap ENTER to accept the default key sensitivity setting.

   ENTER

5. Tap ENTER to accept the default ("no") setting for the keypad configuration lock.

   ENTER

CONFIGURE THE TOTAL VOLUME (TOP ROW)

6. As the volume unit (top row) blinks, use INC to select a display unit. (An x1000 scale factor is available for managing large values.) "Ed" indicates the keypad is in edit mode.

   INC

7. Tap STEP to advance the cursor to the total decimal. Use INC to select a decimal position.

   STEP **INC**
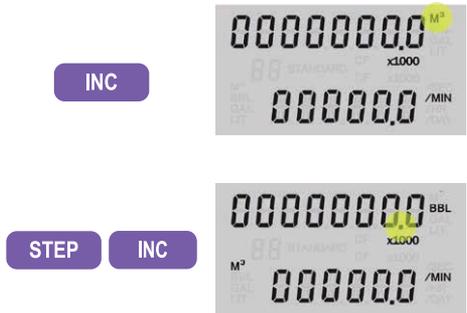
CONFIGURE THE FLOW RATE (BOTTOM ROW)

8. Tap STEP to advance the cursor to the flow rate volume unit. Use INC to select a flow rate volume unit.

   STEP **INC**

9. Tap STEP to advance the cursor to the flow rate frequency unit. Use INC to select a frequency unit.

   STEP **INC**

10. Tap STEP to advance the cursor to the flow rate decimal. Use INC to select a decimal position.

    STEP **INC**

11. Tap ENTER to save and exit.

    ENTER

INTELLIGENT ACTION +
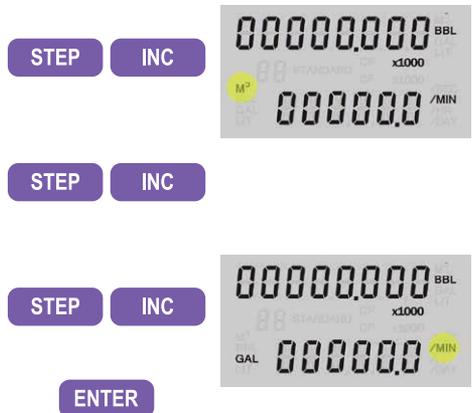
ENTER A LINEAR K-FACTOR

1. Press and hold KFACT until the Meter Factor menu (M-FACT) appears. In the top row, "no" will flash.

   KFACT

   If you see a numeric display instead, you released the KFACT button too soon. Tap MENU to exit and retry.

2. Tap ENTER to proceed to the K-factor Type menu. Linear will display by default.

   ENTER

3. Tap ENTER to save and continue. The unit indicator will flash in the top row of the LCD.

   ENTER

4. Use INC to select a K-factor unit.

   INC

5. Tap STEP to advance the cursor to the decimal setting. Use INC to select a decimal position.

   STEP   **INC**

6. Tap STEP to advance the cursor to the numeric entry. Use INC to select the value of the flashing digit.

   STEP   **INC**

7. Repeat STEP and INC to enter all remaining digits.

   STEP   **INC**

8. Tap ENTER to save and exit.

   ENTER

CONFIGURE COMMUNICATION PORTS

Two communication ports may be used to communicate with the MC Synergy Totalizer.

The slave address is a Modbus setting that identifies a device connected to a communication port. The range of slave addresses spans 1 to 65535. If a Modbus request message contains a matching address, the device will respond. Contact the network administrator to ensure that the assigned slave address is unique and will not collide with other devices during communication.

The baud rate is the number of bits per second that are transmitted or received over the serial port. This setting must match the setting of the master device polling the MC Synergy.

To configure Communication Port 1 via the keypad, perform the following steps. Repeat for Communication Port 2.

1. Tap MENU.

2. Use INC to advance to Comm 1. Tap ENTER to enter the menu. A cursor will flash in the top row of the LCD. "P1" indicates port 1 is being configured.

3. Enter the device slave address using INC to change the value for the flashing digit.

4. If the slave address contains more than one digit, use STEP to advance the cursor to the left and use INC to change the value.

5. Tap ENTER to save the selection and continue to the baud rate selection.

6. Use INC to advance to the desired baud rate. Tap ENTER to save the selection and exit the menu.

Configure via PC Software

INSTALL SOFTWARE

You can configure the MC Synergy Totalizer, calibrate inputs, download logs, and view data using Sensia's complimentary MC Synergy software.

To download the software from the Sensia website

1. From your PC's browser, navigate to this web page:
   https://www.sensiaglobal.com/measurement/turbine-flow-electronics

2. Select MC Synergy from the listing and scroll to Product Resources. Click **SOFTWARE** to access the Download link.

CONNECT TO MC SYNERGY

1. Connect your computer to the MC Synergy. RS485 and USB options are available. See the MC Synergy Hardware User Manual for details.

2. Open the MC Synergy Software Interface.

3. Click **CONNECT TO DEVICE** on the welcome screen.

4. Under Select a Connection Method, click **EXPRESS CONNECT**.

5. Select the serial port that is connected to your MC Synergy.

6. Click **EXPRESS** to scan for connected devices and initiate the connection to your MC Synergy device.
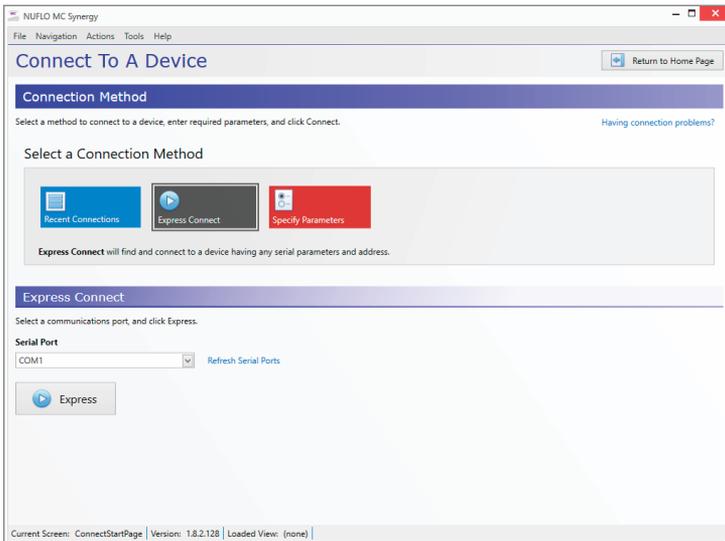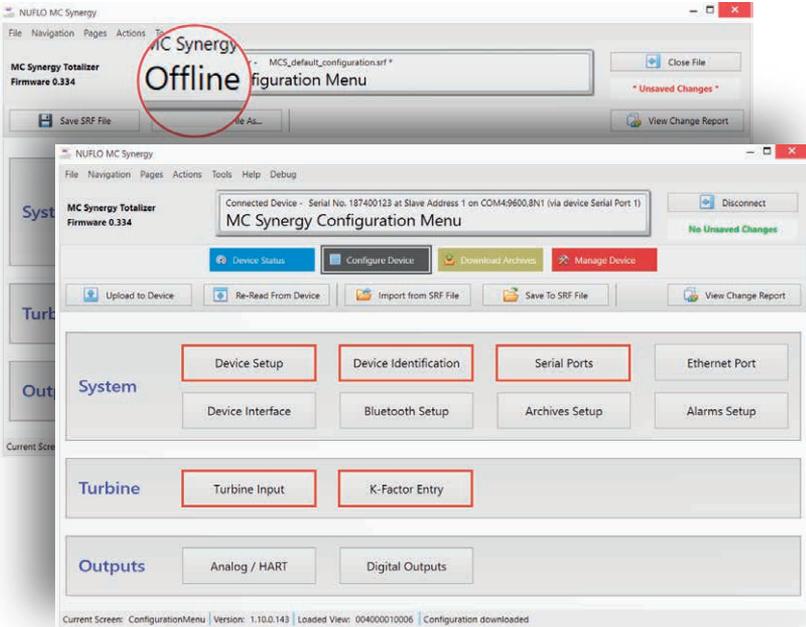
CONFIGURE BASIC PARAMETERS

TWO CONFIGURATION MODES

Online and offline configuration modes allow you to configure your device where and when it is convenient.

Need to configure a batch of devices? Build your configuration selections once and save them to a file, ready for upload to each device when you are ready to commission them.

Basic commissioning is simple. Just configure the settings for the outlined menus above, and click **UPLOAD TO DEVICE**.

Device Setup	Configure units of measure.
Device Identification	Uniquely identify the device to make archive data traceable to a specific unit.
Serial Ports	Configure serial ports to communicate via Modbus.
Turbine Input	Configure turbine meter input parameters, as well as those for turbine meter heath diagnostics.
K-Factor Entry	Load turbine meter physical and traceability parameters, as well as K-factor and meter factor. The turbine meter parameters will also be used for monitoring meter health diagnostics.

INTELLIGENT ACTION +

CONFIGURE ALARMS

MC Synergy supports a variety of alarms including eight user-specified alarms to alert you when an alarm condition becomes active.

Any alarm condition can be selected to drive a digital output.

User Alarm Conditions	System Alarm Conditions	Turbine Alarm Conditions
☐ Device Temp	☐ Time Not Entered	☐ Low Low Flow
☐ FR Low	☐ Supply Voltage	☐ Low Flow
☐ Daily Total	☐ Expansion Board Voltage	☐ High Flow
☐ ALARM 4 (Disabled)	☐ Battery 1 Voltage	☐ High High Flow
☐ ALARM 5 (Disabled)	☐ Battery 1 Percent	☐ Flow Stability Warning
☐ ALARM 6 (Disabled)	☐ Battery 2 Voltage	☐ K-Factor Error
☐ ALARM 7 (Disabled)	☐ Battery 2 Percent	☐ Meter Factor Error
☐ ALARM 8 (Disabled)		☐ Bent Blade
		☐ Missing Blade
		☐ Erratic Signal
		☐ Replace Meter Kit

Battery 1   Battery 2

20 %   80 %

VIEW DATA

View your downloaded flow data, alarms, events, and user changes in a spreadsheet or graphical trend view using Sensia's ScanData software.

Sensia's proprietary download format keeps your audit trail secure while allowing you to export data needed by others in your organization - at no additional cost to you.

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