



# AC-250NXS INSTALLATION AND USER MANUAL

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## About this guide

### Scope

This manual is a guide to the features, specifications, installation and user manual of the smart gas meter.

### Revision history

Revision	Supported Release	Date	Description
1.0	R200	March 2023	Initial release

### Intended audience

This guide is primarily intended for Honeywell field personnel who install and configure the product.

### Abbreviations

PTW	-	Paging time window
EDRX	-	Extended Discontinuous Reception
MDC	-	Meter Data Collection
MDM	-	Meter Data Management
OTA	-	Over the Air
OEM	-	Original equipment manufacturer
ESD	-	Electrostatic Discharge
FCC	-	Federal Communications Commission
CFH	-	Cubic feet per hour
PCB	-	Printed Circuit Board
HES	-	Head-End system
AMI	-	Advanced Metering Infrastructure
SIM	-	Subscriber Identity Module Card
PIN	-	Personal Identification Number
CCF	-	Centum Cubic Feet

PSI - Pounds per Square Inch  
CRC - Cyclic Redundancy Check

## Product Overview

The Honeywell American Meter AC-250NXS class meter was designed for residential compact metering, deliver high-performance measurement at an economical price. Being one of the smallest and lightest diaphragm gas meters this meter can be used anywhere, AC-250NXS is reliable, accurate, easy to install and fits in tighter spaces, such as meter manifolds in apartment complexes. More than 100 million meters based on this measurement cartridge design have been sold worldwide. The AC-250NXS is available with built-in temperature conversions for accurate measurements. An integrated CAT-M1 cellular communication module enables automatic meter readings to be updated to utilities multiple times a day to have real-time analysis into the gas consumption and meter health.



## Product Specifications

- Reliable proven diaphragm measuring unit with over 100M installed base.
- Built-in temperature compensation for high accuracy of the measurements.
- Reliable communication with Head End System (> 99% communication success, when using recommended operating parameters).
- Public cellular CAT-M1 communications module (Always on functionality).
- Part of Honeywell connected utilities eco system, integrated into Honeywell Connexo MDC and MDM system.
- Honeywell MeterSense maintenance handheld tools for easy maintenance of the device via optical communication.
- Highly secured with end-to-end industry standard encryption and authentication methods.
- Honeywell SNAP prover integration with electronic accuracy adjustment.
- Safety features:
  - Intrinsically safe (class I, division 1, group D, T1).
  - Reliable, bubble-tight valve.
  - Autonomous shut off based on high pressure, high temperature, and tamper.
  - Safety alert to Head End system during valve closure/opening.
  - High/Reverse flow rate alarm and Autonomous shutoff.
  - Remote valve shut off.
  - High-Response Mode (communicates every 15 minutes during emergency situations like High Pressure, High Temperature, High Flow or Valve closure).
- In-field replaceable battery.
- Volume, pressure, temperature, and meter status reporting for Head End analytics.
- OTA firmware upgrades for communication and metrology.
- Local standardized optical service port for in-field diagnosis, valve operation and re-calibration.

## AC-250NXS valve features

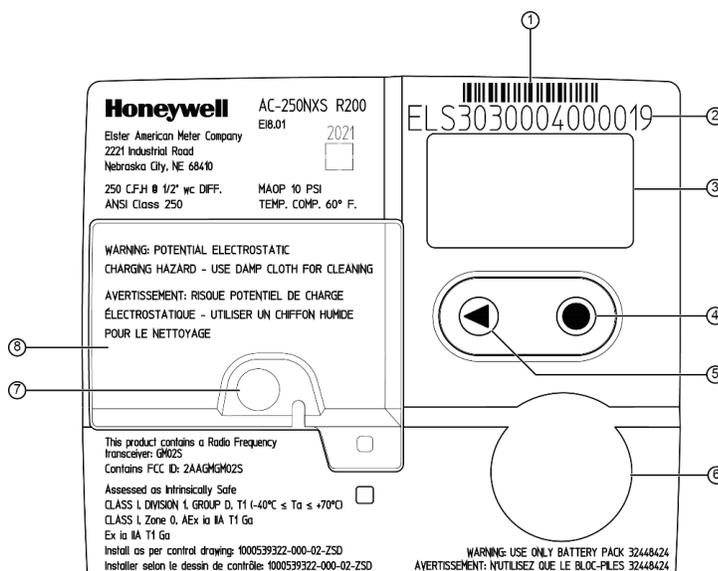
AC-250NXS includes an integrated valve with the following features:

1. Enables remote disconnection of the gas supply.
2. Enables automatic disconnection of the gas supply on high pressure, temperature, flow, Reverse flow events.
3. Protected against unintentional opening of the valve.
4. Re-enable gas only once the customer's gas appliances are closed.
5. No energy consumed when the valve is closed.
6. Low energy consumption during activation.
7. Detection of open and closed positions.
8. Configurable valve autonomous shut-off thresholds during High gas Pressure or Temperature.

## Product Components

The AC-250NXS Gas Meter features these components in a compact meter.

1. AC-250NXS Gas Meter index
  - a. The index contains the Cat-M1 communications module, two batteries, one replaceable.
  - b. The LCD provides a visual display of consumption, alarm messages, and status information.
2. An internal shutoff-valve.
3. Diaphragm measuring unit.
4. Integrated metrological unit with optical pickup.
5. Die cast aluminum case.
6. Steel bosses.



S. No	Description	S. No	Description
1.	Serial number bar code Format: code 128 ISO/IEC 15417	5.	Left navigation button
2.	Meter serial number	6.	Optical probe connection
3.	Display	7.	Battery cover seal
4.	Select button	8.	Battery cover

## Safety and Compliance Information

Please read through these instructions carefully before installing or operating the AC-250NXS gas meter. This unit must be installed and commissioned in accordance with the regulations and standards for your utility.

### Liability

Elster American Meter Company and its parent Honeywell will not be liable for damage resulting from non-observance of the instructions and non-compliant use.

### RF exposure

This device is intended for fixed use only (not portable). This device complies with radiation exposure limits set for uncontrolled environments. 20 cm / 7.8 inches must be kept between the device and the user's body and the body of a nearby person.

The meter must not be installed or operated in close proximity with any other antenna or transmitter.

### Safety instructions

Information that is relevant for safety is indicated in the instructions as follows:

 <b>DANGER</b>	<b>Indicates potentially fatal situations.</b>
 <b>WARNING</b>	<b>Indicates danger to life and limb.</b>
 <b>CAUTION</b>	<ol style="list-style-type: none"> <li>1. <b>Indicates material damage</b></li> <li>2. <b>Indicates correct disposal.</b></li> </ol> 

All interventions may only be carried out by qualified gas technicians. Electrical interventions may only be carried out by qualified electricians.

 <b>NOTE</b>	<b>A QUALIFIED TECHNICIAN IS A PERSON WHO IS TRAINED TO PERFORM CERTAIN TASKS WITH STANDARDS UNDER SAFETY AUTHORITY.</b>
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## General Warnings and compliances

### Conversion, spare parts

Use only OEM spare parts. Changes or modifications not expressly approved by the manufacturer can void the express limited warranty and the user's right to operate the equipment.



### Electromagnetic compatibility

Operation of the product is subject to the following two conditions:

1. this device may not cause harmful interference, and
2. this device may in certain circumstances be susceptible to interference received, including interference that may cause undesired operation.

### Lithium battery

The device contains non-rechargeable Lithium batteries that are potentially hazardous and can present a serious FIRE HAZARD if damaged, defective, or improperly used.

 <b>WARNING</b>	<ol style="list-style-type: none"> <li>1. <b>Do not recharge the batteries as they are non-rechargeable. The battery must be disposed carefully according to applicable rules and regulations after they are used as seeping into groundwater may put human health at risk.</b></li> <li>2. <b>Battery connectors are lockable, while removed they must be pressed and detached.</b></li> </ol>
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### Electrostatic discharge

The device contains parts and assemblies susceptible to damage by ESD. Before installing the device, discharge the electrostatic buildup through a properly grounded metal surface before touching the device during installation or maintenance.

## FCC Compliance Statements

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received including interference that may cause undesired operation of this device.

This equipment has been tested and found to comply within the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with these instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna
2. Increase the separation between the equipment and the receiver
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
4. Consult the dealer or an experienced radio/TV technician for assistance

If you experience trouble with this equipment, please contact Customer Service at Honeywell Elster American Meter. Do not attempt to repair this equipment yourself unless you are replacing the entire module. Any such modifications could void the user's authority to operate the equipment and voids the manufacturer's warranty.

## AC-250NXS Gas Meter Specifications

Specification	Value
Flow rate	250 CFH at 0.5 in w.c.
Measurement principle	Molded, convoluted diaphragm
Safety	Intrinsically safe (class I, division 1, group D, T1)
Meter type	Temperature Compensated (TC) or Non-Temperature Compensated (NTC)
Meter Maximum Allowable Operating Pressure (MAOP)	5 PSI (345 mbar)
LCD displayed units	CCF (100 x cubic foot)
LCD resolution	0000.001 CCF, 00000.001 CCF, 000000.001 CCF
Valve	Gas tightness: meets or exceeds ASME B16.33 section 4.2, leakage rate at max 2 PSI diff. pressure
Case	Die-cast aluminum case
Weight	12 lbs.
Gas type	Natural gas EN437- Type H,E,L Reference gases G20, G21, G23, G25, G26, G2
Connection sizes	10 LT, 20 LT, 30 LT, 1" PITTS, 1" Sprague
Operating temperature ratings	Measurement -30°F (-34°C) to +131°F (55°C) Valve and Display -13° F (-25° C) to +131° F (55° C) Index -40° F (-40° C) to +158° F (70° C)
Storage temperature	-40° F (-40° C) to +158° F (70° C)

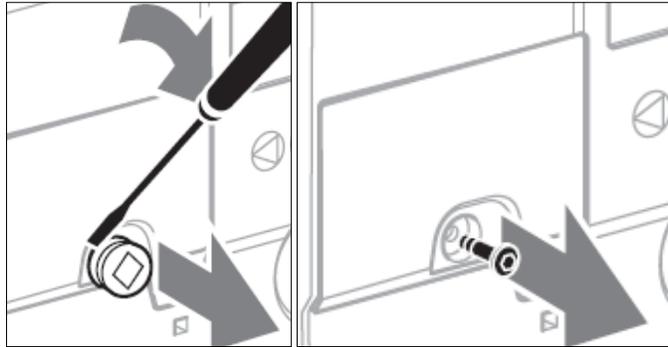
Specification	Value
Battery information	2 Lithium Thionyl Chloride 'D' cell batteries, one battery is replaceable
Standards	Designed in compliance with ANSI B109.1
Regulatory	This device follows Part 15 of the FCC rules. FCC ID: 2AAGMGM02S
Component materials	Single coat polyester

## Replacement of the Battery

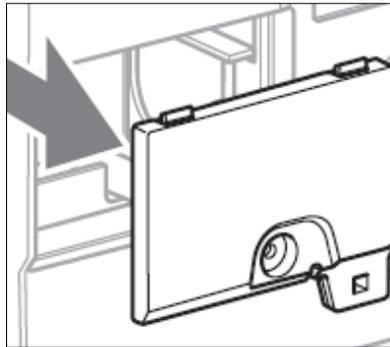
The battery can only be replaced when no data transmission is running, see User keys, selection key and symbols User keys, selection key and symbols. for radio module in the display. If not, data communication will be aborted.

Follow the below steps to change the batteries

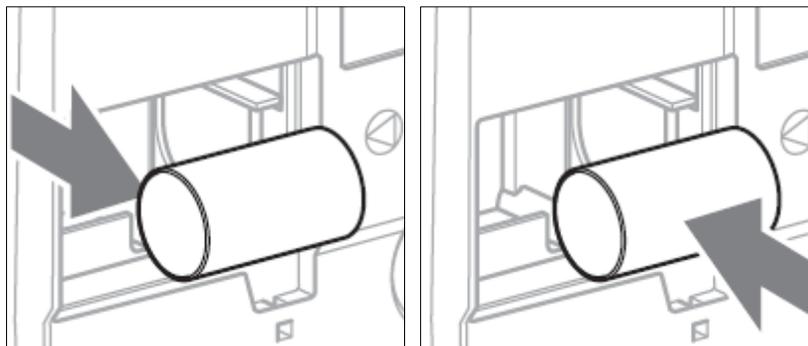
1. Remove the Installation seal/Screw locking cap and then remove the screw



2. Remove the battery cover



3. Remove the battery from the meter
4. Replace with the new battery



5. Reset the parameters of the battery, the procedure of resetting depends on the user software
6. Install the battery cover and install a new screw locking cap.

 <b>CAUTION</b>	<ul style="list-style-type: none"><li>• Risk of explosion in explosion-hazard areas</li><li>• Maintenance and repair work must be avoided in explosive atmospheres.</li><li>• The battery must not be changed or installed in explosive atmospheres.</li><li>• Make sure that the electrical system obeys with the special electrical explosion protection requirements.</li><li>• Make sure that the battery cable in the plastic recess is away from the main board so that it does not come into contact with the main board during use.</li><li>• When working on electrical equipment in an explosion-hazard area, only design-approved electrical operating equipment must be used.</li><li>• Use original spare parts supplied by Honeywell. This pack must not be altered in any way</li><li>• There is a risk of explosion if a wrong battery is used.</li><li>• The battery is available as a spare part.</li></ul>
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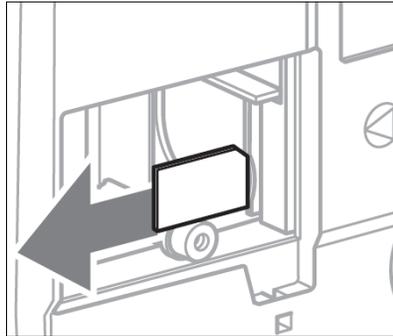
## Changing the SIM Card

The SIM card can only be changed when no data transmission is running, see User keys, selection key and symbols for radio module icon if not the data communication will be aborted.

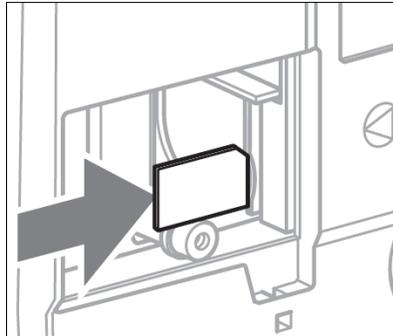
Follow steps from 1 to 3 of Replacement of the Battery to change the SIM card. The SIM card slot is located at the bottom right-hand corner.

To change SIM Card, from the meter follow the below steps

1. Apply a small amount of pressure to release the SIM card from the holder



2. Insert the new SIM card in the same position and push it to make sure the SIM card is locked



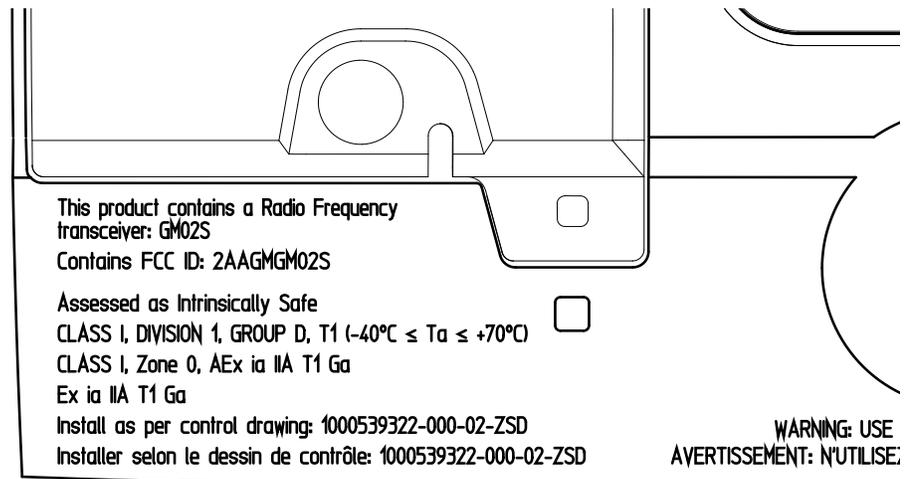
3. After changing the sim card install the battery cover and install a new screw locking cap.

Check the other communications parameters. The procedure depends on the user software.

 <b>WARNING</b>	<ol style="list-style-type: none"> <li>1. <b>Data loss – Make sure that no data are being transmitted</b></li> <li>2. <b>Risk of the explosion in explosion-hazard areas – The SIM connection shall only be used for SIM cards.</b></li> </ol>
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# Checking the Usage in Potentially Explosive Atmospheres

## Marking



## Use as follows

- Class I: Flammable gases or vapors may be present.
- Division 1: Ignitable concentrations of hazards exist under normal operating conditions and/or where the hazard is caused by frequent maintenance or repair work or frequent equipment failure.
- Group D/ IIA: Explosion group for gases (acetone, ammonia, benzene, butane, ethanol, gasoline, hexane, methane, methanol, methane, naphtha, natural gas, propane and toluene).
- T1: maximal surface temperature (842°F).
- Ta: Ambient temperature.
- Zone 0: The device may be used in a place in which an explosive atmosphere is continually present.
- Ex: Explosion protection.
- AEx: Explosion protection approved to US standards.
- ia: Type of ignition protection: intrinsic safety for zone 0.
- Ga: Equipment protection level for zone 0.

## Autonomous Valve Shutoff Configuration

The AC-250NXS valve can be configured for autonomous shutoff during the following events:

1. High gas pressure is detected, exceeding the configured threshold value for a set duration of time. The high-pressure threshold can be configured by utilities.
2. High gas temperature is detected, exceeding the configured threshold value for a set duration of time. The high-temperature threshold can be configured by utilities.
3. High/Reverse gas flow is detected, exceeding the configured threshold value for a set duration of time. The high/Reverse flow threshold can be configured by utilities.
4. Tamper event is detected (unauthorized opening of service cover or unauthorized battery removal).

The autonomous shutoff can be disabled for a specific event by the operating utility.

For example, utilities can disable the autonomous shutoff valve closure when a tamper event is detected, and it can instead configure the unit to only report an alert to the HES.

**Head-End System:** The Head-End System is the hardware and software that receives the stream of meter data brought back to the utility through the AMI.

## Alert Notification Configuration

The AC-250NXS has multiple alert notifications reported to Head End System. The following are some of the critical alert notifications:

1. High gas pressure is detected and returned to normal.
2. High gas temperature is detected and returned to normal.
3. High/Reverse gas flow rate is detected and returned to normal.
4. Tamper event is detected.
5. Reverse Flow detected and returned to normal.
6. Valve Opened or Valve Closed.

Most of the above notifications can be disabled by the utilities – as they can configure the device to report only notifications which are of prime interest.

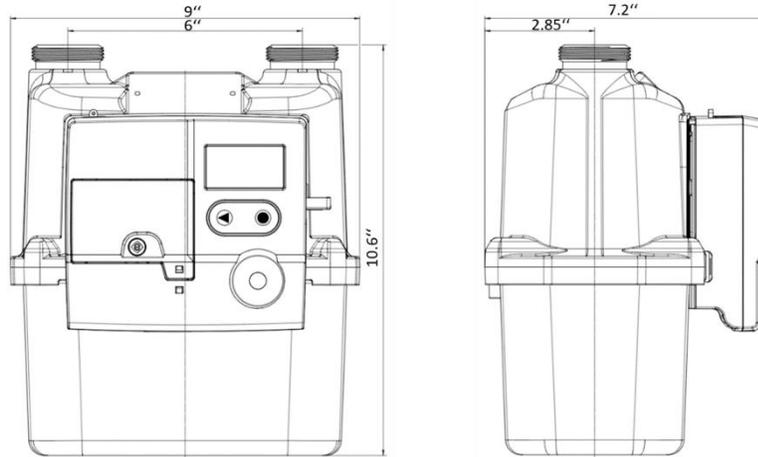
## The integrated CAT-M1 communications module

The AC-250NXS includes an integrated CAT-M1 communications module, which enables the meter to connect to public CAT-M1 cellular networks as scheduled, during the installation and commissioning phase (typically once every 12 hours). During communication, the device sends hourly interval data, daily consumption readings, and meter and valve diagnostics to the Head End System.

When an alert such as high gas pressure or tamper condition is detected, the meter immediately sends an alert to the Head End System within 15 seconds of detecting the abnormal condition.

The device is incorporated with the ALWAYS ON feature which enables it to receive requests from the Head End System. Apart from the device-initiated communications, the Head End System can also trigger data communications whenever necessary. This enables the remote valve to shut off to be serviced immediately to ensure the safety in case of any emergency. The device can be reachable at different time intervals – this can be configurable via the EDRX parameters.

## Install the AC-250NXS Gas Meter



This section describes how to install AC-250NXS Gas Meter. To install a gas meter, perform below steps:

1. Mark the existing meter speed hand, to check for any flow inside the customer's premises.
2. Verify all gas appliance valves are turned off and pilot lights closed.
3. Close Stopcock and remove the existing meter.
4. Make sure that the NXS gas meter is installed as close to the level as possible for correct operation.
5. Avoid installing the meter in locations where the meter body is in contact with soil or concrete walls. Alkali in concrete as well as other corrosive elements in the soil can cause premature corrosion of the meter body.
6. Inlet and outlet pipe connections should be parallel. The height difference between the housing connections should be no more than  $\frac{1}{4}$ ".
7. Hand tightens the inlet swivel cap. Open the manual inlet valve slightly to pressure the system to purge the air inside the meter through the outlet. Please note that the house line may also need to be purged.
8. Hand-tighten the outlet swivel cap. Using a pipe wrench, alternate between both swivel caps and tighten approximately 3 flats (using approximately 20 ft/lb. torque). **DO NOT OVERTIGHTEN**; damage to the rubber gasket may occur.
9. Open the manual inlet valve on the riser to meter to pressurize system.
10. Start Flow Test (to check for leaks).

11. Press select button, to turn on the display. Once the display is turned on, long press on select button to enter service menu.
12. Press “<” (Arrow button 3 times) to reach the screen showing FLOW TEST. Press select button to start the test.

<p><b>*Flow Test *</b></p> <p>Select the flow test duration and then Press ● to start test</p> <p>◀ ● ON P</p>	<p><b>*Flow Test Duration*</b></p> <p>Press ◀ to change value</p> <p style="text-align: center;">120</p> <p>Possible values(sec):</p> <p>10, 20,30,60,120, 180,240,300</p> <p>◀ ● ON P</p>
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<p><b>*Flow Test Running*</b></p> <p>T_e : 0004 sec</p> <p>N : 0000</p> <p>T_r : 0116 sec</p> <p>V : 0.000000 ft<sup>3</sup></p> <p>Press ● to abadon the test</p> <p>◀ ● ON P</p>	<p>Time elapsed</p> <p>Number of pulses</p> <p>Time remaining for completion of test</p> <p>Volume</p>
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------

<p><b>*Flow test completed*</b></p> <p>T_e : 0120 sec</p> <p>N : 0000</p> <p>T_r : 0000 sec</p> <p>V : 0.000000 ft<sup>3</sup></p> <p>Press ● to Continue</p> <p>◀ ● ON ↑</p>	<p><b>*Flow test Aborted *</b></p> <p>Flow Test Aborted</p> <p>Successfully</p> <p>Press ● to Continue</p> <p>◀ ● ON ↑</p>
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------

- The test runs for 120 seconds. If “N” doesn’t increase...no leaks the test is passed. (Skip to Step 14).
- If “N” shows pulses, immediately close the stopcock and check inside the customer’s premise for leaks. Repeat steps (after the leak is repaired) 9, 10, 11 and 12.
- If no pulses (N) or volume accumulated, continue with standard re-lighting procedures per your utility practices.
- Make sure that the Soap/sniff meter connection has no leaks

- Last Step:
  - Activate cellular communication Push the left arrow button on the meter to turn on the display and press the left arrow button a 2<sup>nd</sup> time to advance to CAT M-1 screen and press and hold down the select button for 2-3 seconds until the display shows CAT M-1 switching on.

# Intrinsic Safety Warnings and Conditions

## Warnings

- Make sure the area is free from hazardous gas when installing, servicing, removing, cleaning or touching the unit.
- Installation, servicing, and removal should only be done by qualified/authorized personnel(See Safety instructions note for definition of the qualified technician).
- Use only Honeywell Elster manufactured battery packs with part number# 32448424.
- None of the battery packs shall be recharged under any circumstances.
- Potential electrostatic charging hazard – use damp cloth for cleaning
- Substitution of components may impair intrinsic safety

## Conditions

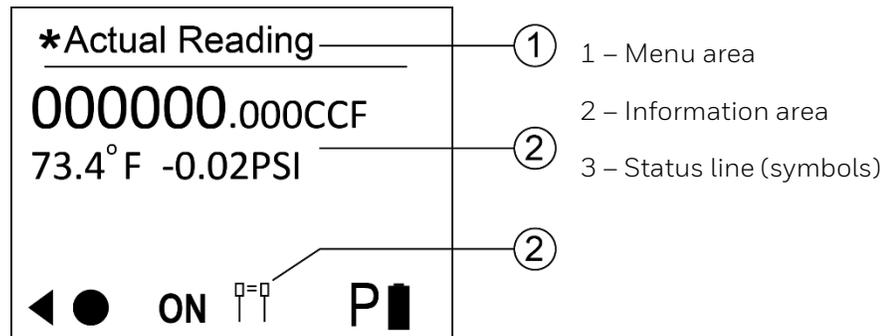
- The housing of the equipment may generate an ignition-capable level of electrostatic discharge. Therefore, the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. This is particularly important if the equipment is installed in a Zone 0/Division 1 location. In addition, the device shall only be cleaned with a damp cloth and shall not be stored or operated in a hazardous location if strong electrostatic charge generating processes can occur.
- The equipment shall only be powered using single D-cell pack #32448424.
- This pack may be replaced in hazardous area and shall not be altered in any way.
- The SIM connection (J1) shall only be used for SIM card.
- The connection of an external antenna is not allowed at RF connector J2.

## AC-250NXS Gas Meter LCD Operation

This section describes various features of AC-250NXS such as operating the electronic index, user keys, symbols, and overview of the Main Menu.

### Operating the electronic index

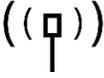
- The display on the index is usually switched off.  
— Press any key briefly to activate.
- The main screen appears.



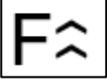
- The **ON**/**OFF** symbols are only displayed when a valve is integrated with the gas meter. AC-250NXS is equipped with an integrated valve.

## User keys, selection key and symbols

Navigate through the menu with the user keys “◀” and the selection key “●”.

Icon	Description
	Navigate key – Navigate to the left on each level using the user key.
	Select key – Briefly pressing the selection key selects a sub-menu. Holding the selection key pressed down (for about 5 seconds) switches the display back to the higher-level menu.
	Briefly pressing the selection key selects a sub-menu.
	Holding the selection key pressed down switches the display back to the higher-level menu.
	Keys inactive.
	Radio module or cellular communication active. Optical communication and cellular communication are mutually exclusive; only one communication is allowed at any time.
	Radio module or cellular communication is inactive and optical communication is also inactive.
	Pairing is successful with cellular communication or Optical communication.
	Rf Inactive: this holds the least priority. This will appear if no other communication icon is present & RF is inactive (need to add to top).
	Valve/gas flow closed.
	Valve/gas flow released.
	Valve/gas error.
	Index Time Sync Failure: This icon appears if the time sync of the index fails.
	Metrology Logbook Full: This icon appears if the metrology logbook is full or >90% of if there is a memory error.

Icon	Description
	Temperature alert: This icon appears when the current temperature crosses the max limit of Temperature Adjust OBIS.
	Pressure alert: This icon appears when current pressure crosses the max limit of Pressure Adjust OBIS.
	Pressure above threshold: This appears when current pressures cross the high close threshold of the VEM pressure threshold.
	Pressure above normal: This appears when current pressures cross the high warning threshold of the VEM pressure threshold.
	Pressure below threshold: This appears when current pressures cross the low close threshold of the VEM pressure threshold.
	Pressure below normal: This appears when current pressures cross the low warning threshold of the VEM pressure threshold.
	Differential pressure above threshold: This appears when current differential pressures cross the high close threshold of the VEM differential pressure threshold
	Differential pressure above normal: This appears when current differential pressures cross the high warning threshold of the VEM differential pressure threshold
	Differential pressure below threshold: This appears when current differential pressures cross the low warning threshold of the VEM differential pressure threshold
	Differential pressure below normal: This appears when current differential pressures cross the low warning of the VEM differential pressure threshold
	Temperature above threshold: This appears when the current temperature crosses the high close threshold of the VEM temperature threshold
	Temperature above normal: This appears when the current temperature crosses the high warning threshold of the VEM temperature threshold

Icon	Description
	Temperature below threshold: This appears when the current temperature crosses the low close threshold of the VEM temperature threshold
	Temperature below normal: This appears when the current temperature crosses the low warning threshold of the VEM temperature threshold
	Reverse Flow: This icon appears when gas flows in the reverse direction
	MCA error: This icon appears if MCA communication breaks down
	Case open: This icon appears if there is a case tampered
	Battery case open: This icon appears if there is a battery tampered
	The flow above threshold: This appears when the current flow crosses the high close threshold of the VEM Flow threshold
	The flow above normal: This appears when the current Flow crosses the high warning threshold of the VEM Flow threshold
	The flow below threshold: This appears when the current flow crosses the low close threshold of the VEM Flow threshold
	The flow below normal: This appears when the current flow crosses the low warning threshold of the VEM Flow threshold
	The capacity of the Primary battery in use is above 90%
	The capacity of the Primary battery in use is 60% to 90%
	The capacity of the Primary battery in use is 40% to 60%

Icon	Description
	The capacity of the Primary battery in use is 20% to 40%
	The capacity of the Primary battery in use is below 20%
	Low battery: The capacity of the Primary battery in use is below 10%
	The capacity of the Secondary battery in use is above 90%
	The capacity of the Secondary battery in use is 60% to 90%
	The capacity of the Secondary battery in use is 40% to 60%
	The capacity of the Secondary battery in use is 20% to 40%
	The capacity of the Secondary battery in use is below 20%
	Low battery: The capacity of the Secondary battery in use is below 10%



NOTE

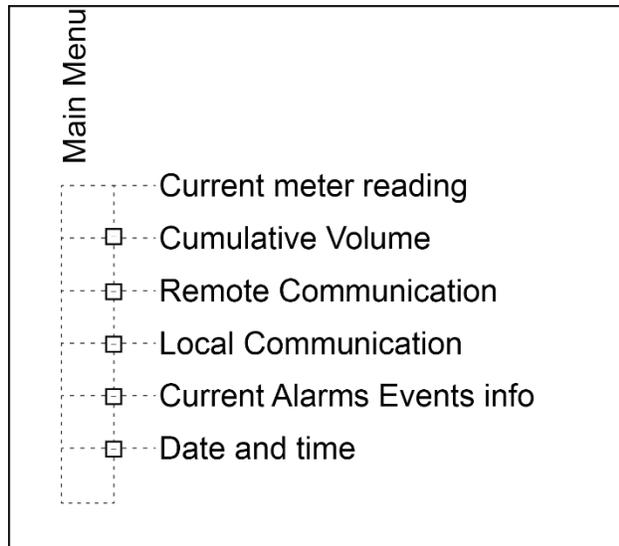
MULTIPLE ICONS MAY BE DISPLAYED AT ONCE BUT  
READING SHOULD BE CONSIDERED AS PER THE PRIORITY  
I.E P1>P2>P3>P4

## Navigating within the menu

- The menu is constructed hierarchically.
- Depending on the configuration, some menu options may be missing.
- The “Current meter reading” main screen appears when switching on the index or when a button is pressed when the display is off.
- If a screen is active from the Main menu, the display will automatically change back to the main screen when no user key has been pressed for 60 seconds and switches off after 60 seconds.
- If a screen is active from the Service menu, the display will automatically change back to the main screen when no user key has been pressed for 5 minutes and switches off after 60 seconds.
- Valve screens are not a part of the Main menu or Service menu. These screens can only be accessed via giving commands to open/closed the valve. Time out for valve screens are different depending upon the user acknowledgment needed or not. It can vary from 1 min to 5 mins.
- Navigate from the main screen to the various menus, such as “Meter information”, with the user key “◀”.
- Selecting a submenu from the Main menu, such as “Remote Communication”, with the user key “●”.

## Menu overview

The display can differ depending on the parameterization or communications unit. The Main menu has 5 different screens and some of the screens contain sub-screens, the sub-screens are entered using the select button.

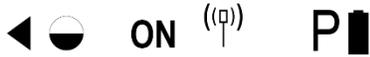


## Main Menu screen features

<p><b>*Actual Reading</b></p> <hr/> <p>000000.000CCF 73.4° F -0.02PSI</p> <p>◀ ● ON  P </p>	<p>This is the Main screen/Default screen. When the gas meter is activated, this screen will be displayed. From this screen it is possible to show the icons legend screens pressing the central button (“select” button). The main title displays the actual state of the meter. Values are:</p> <ul style="list-style-type: none"> <li>• F not configured: meter is not configured has the factory mode active.</li> <li>• C not configured: meter is not configured.</li> <li>• Actual reading: meter is in normal mode.</li> <li>• Maintenance: meter is in maintenance state</li> </ul> <p>See for information on configuring Integer points.</p>
<p><b>Cat-M1 status modem 1/5</b></p> <hr/> <p><b>Cat-M1</b> OFF: Next call scheduled No Sim</p> <p>◀ ● ON  P </p>	<p>On the “Cumulative Volume” screen, press the left button ◀ to navigate to Cat M1 screen. The Cat-M1 screen has 4 sub-screens, navigate to sub-screens using the select button.</p> <p>The AC-250NXS supports Cat-M1 cellular communication. The first screen shows the cellular connection status. A manual remote call can be invoked by holding the select button for 5-seconds. Some of the parameter values appear on this screen only after the first call is made.</p>
<p>Sub screens:</p> <p><b>Cat-M1 status modem 2/5</b></p> <hr/> <p>RSSI     :-75 RSRP    :-86 StCon    :IP Connected APN       : HEIP     :192.168.0.213 L.Err     :</p> <p>◀ ◐ ON  P </p>	<p>Sub-screen 2 shows the Received Signal Strength (RSSI), Bit Error Rate (BER) of the last communication with Head-End System (HES) along with configured HES IP address and Network APN name.</p>

**Cat-M1 status modem 3/5**

MYIP :192.168.2.38  
 HPort :50503 Com:UDP  
 ModVer :8.0.5.2-53939  
 BAND :2,4,12,13

**Cat-M1 status modem 4/5**

MODE :NRM RSRQ: -4.5  
 IMEI :015770000211608  
 ICCID :  
 89860000000000000001  
 RF Comm :Enabled

**Cat-M1 status modem 5/5**

Req.Cyc\_T :81.92  
 Req.PTW :7.68  
 N/W Cyc\_T :81.92  
 N/W PTW :7.68  
 eDRX\_Mode :Active

**Local COM**

**Local COM**  
 Connecting at 9600



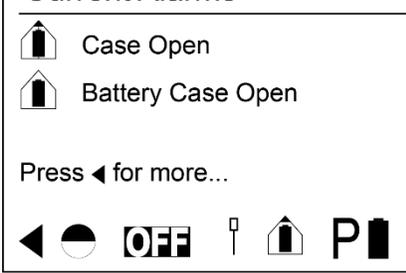
Screen 3 shows, network assigned IP address to the AC-250NXS, IP communication type (UDP/TCP) and HES port number used for communication. This screen also shows the configured cellular frequency band and modem version number.

Screen 4 shows, Modem, SIM identity information like IMEI, ICCID numbers along with Meter mode. The following are the supported meter modes:

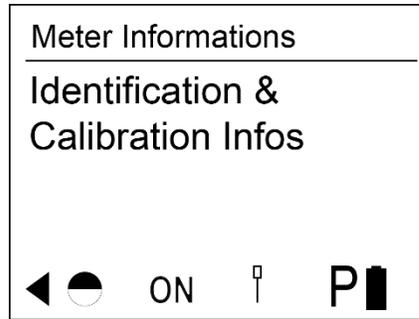
- Disabled (DIS)
- Normal Mode (NRM)
- High Response Mode (HRM) – active alert is present
- Low Temperature Mode (LTM) – minimum communication to HES.

Screen 5 shows, the eDRX parameters. These parameters are requested cycle time, requested PTW, network- provided cycle time & network-provided PTW. Requested values of cycle time & PTW are the values that we are asking via command whereas network-provided values are the values that are being sent in response of the command given. The default values of requested cycle time & PTW are 81.92 & 2.56 seconds, respectively. Network-provided values are updated once the eDRX connection is established.

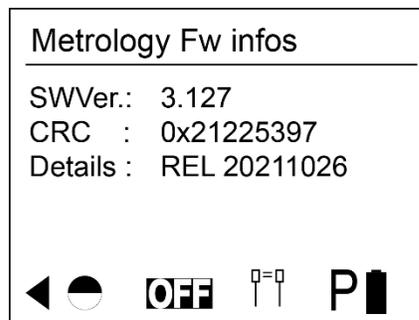
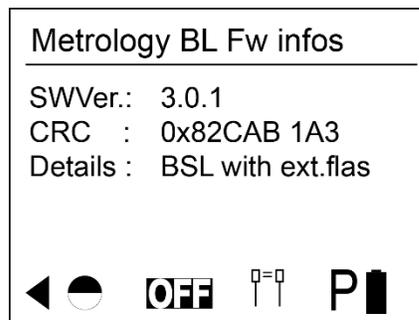
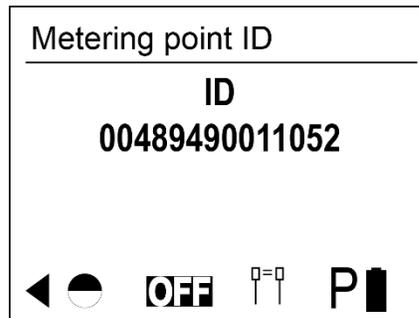
On the Cat M1 screen, press the left button  to navigate to “Local Com” screen. The AC-250NXS supports optical communication for local installation and maintenance activities. The optical port can be enabled by pressing the “select” button, the meter immediately opens the port and is ready for association. This indication can be seen by an antenna symbol on the bottom middle of the screen.

<p><b>Current Alarms...</b></p> <hr/> <p><b>Current Alarms Events Info</b></p>  <p>Sub screens:</p> <p><b>Current Alarms</b></p> 	<p>On the “Local Com screen”, press the left button ◀ to navigate to “Current Alarms Events Info” screen.</p> <p>The AC-250NXS supports more than 40 different warning symbols or icons. The screen is used to display all the icons that are active. Time out of this screen is 1 minute. This Alarm screen has one sub screen that can be accessed by pressing the “select” button on the Current Alarm Events Info screen.</p> <p>This screen shows all the alarms/icons that are currently active along with descriptions. Three symbols can be seen on a single view. To view more symbols if active, press the left button on this sub- screen. The timeout for this screen is 5 minutes.</p>
<p><b>* Date and Time: UTC-5</b></p> <hr/> <p><b>12-31-2013 19:12:56 DST:OFF</b></p> 	<p>On the “Current Alarms Events Info” screen, press the left button ◀ to navigate to Date &amp; Time screen.</p> <p>This screen displays the actual date and time. The format is given below:</p> <ul style="list-style-type: none"> <li>• Date: DD-MM-YYYY</li> <li>• Time: HH: MM: SS</li> </ul> <p>The main title (“Date and Time: UTC+1”) specifies the offset of time displayed from UTC (Coordinated Universal Time). The meter has a configured Time Zone value. The example display shows an offset of one hour. According to the UTC definition, when the daylight-saving time is active, this screen displays an “UTC+X+1” string instead of “UTC+X”.</p>

## Service Menu screen features:



Sub screens:



In the Main cumulative volume screen, a long press of the “**Select**” key takes you to the service screen. The service screen has multiple sub-screens. One of the screens is “**Identification and Calibration Infos**”. Use the navigation key to go to the “**Identification and Calibration Infos**” screen.

Press the “select” key to navigate to the sub screens in the “**Identification and Calibration Infos**” screen.

The sub-screen includes firmware identification screens for:

- Metrology Bootloader
- Metrology Firmware
- Application (communication) bootloader
- Application (communication) firmware

Metrology Bootloader - This contains info about metrology bootloader firmware version CRC.

Metrology Firmware - This contains info about metrology firmware version CRC.

Application (communication) bootloader - This contains info about the Application (communication) bootloader version CRC.

### Application Fw infos

SWVer. : 2.17.24  
 CRC : 0xB96B  
 Build Rel : 17  
 Date : 11-26-2021



### Calibration Factors

Q1: 0.040 m<sup>3</sup>/h CF1:16384  
 Q2: 1.200 m<sup>3</sup>/h CF1:16384  
 Q3: 6.000 m<sup>3</sup>/h CF1:16384



### Environmental classes

Electromagnetic : E1  
 Mechanical : M1



### Meter Information

**Metrology  
 Events**



Application (communication) firmware - This contains info about Application (communication) firmware version CRC.

This also includes calibration parameters display screens. The meter also includes Metrology events and application/Communication events that can be accessed by the user.

Using the “Select” key, a user can navigate to the Application event screen and go to individual events by pressing the navigation key. Each event includes Event ID (the pre-defined number for each type of event), the time it occurred and the related information of the event. A long press of the “Select” key will enable the meter to return to the parent menu from any sub-menus.

<p><b>Meter Information</b></p> <hr/> <p>Event : 67 Nr.42  Time : 19:08:38  Date : 12-31-2013</p> <p>◀ ● OFF □=□ P █</p>	
<p><b>* Temperature 1/2</b></p> <hr/> <p>tg : 73.50 °F  t range [-31, 131] °F  TC : Electronic  tsp : 59 °F  tb : 59 °F</p> <p>◀ ● OFF □=□ P █</p>	<p>The temperature screen indicates the current gas temperature (tg), Max and Min gas temperature measurement range, base temperature, and specific temperature(59°F) used for temperature compensation – which is modifiable by the end-user.</p>
<p><b>* Temperature 2/2</b></p> <hr/> <p>tg : 73.50 °F  t range [-31, 131] °F  t avrg : 73.34 °F  t min : 73.07 °F  t max : 73.56 °F</p> <p>◀ ● OFF □=□ P █</p>	
<p><b>Main Battery 1/4</b></p> <hr/> <p>Install.date : 12-31-2013  Capacity : 18060000uAh  Charge : 99.996%  In use : yes  Use : 0 h</p> <p>◀ ● OFF □=□ P █</p>	

### Replacement Battery 2/4

Install.date : 01-01-2010  
 Capacity : 18060000uAh  
 Charge : 0.0000%  
 In use : no  
 Use : 0 h



### Batt.diag. 3/4

Vcc : 3.320 V  
 V(min) : 3.000 V  
 Vhlc : 3.414 V  
 State : OK



### Consumption counter 4/4

Com -Rf :00000 -IR :000  
 Viv -Op :000 -Cl :000  
 HRM -D :000 -Y :000  
 Display :0001  
 Slimer :0000



The **Batt.Diag.** screen shows below the HLC parameters:

- Vcc is the Voltage provided to the Microcontroller of the index but not the main/replacement battery voltage
- V(min) is the minimum voltage threshold used to check the main/replacement battery voltage for low voltage cases.
- Vhlc is the voltage of the HLC which is used for powering internal hardware.
- One of these indicates the state of the battery:
  - **"Tampering"** if the device detects either Battery tamper and/or Case Tamper. For further details refer to the Application Manual section 7-0:96.5.1.255 Current Diagnostic - Bit B10
  - **"Substitute battery"** if the device detects a battery below the critical level
  - **"OK"** if the device is not in any of the above states.

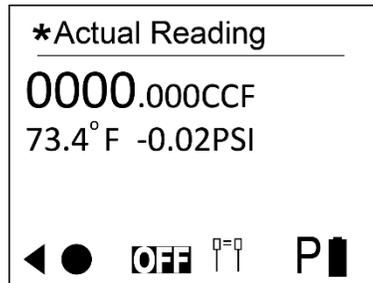
The **"Consumption Counters"** screen shows the below parameters:

- Number of RF communications
- Number of IR (Opto) communications
- Number of Valve Open and Close operations.
- Number of times Display was On from Off state
- Number of times the meter went to High-Response Mode (current counters)

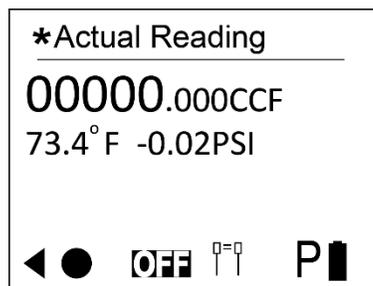
## Volume Data Integer configuration

The Volume data can be displayed on the screen with different configurations (4+3, 5+3, or 6+3)

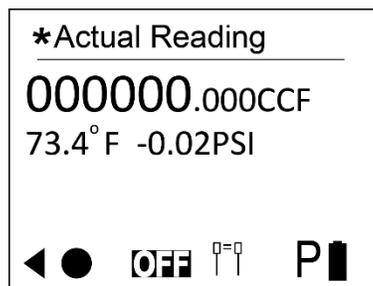
Users can configure Integer points using OBIS. IC-9128 and Decimal points are fixed with 3 decimals. Different types of configured Integer points are shown below.



4 Integer points and 3 Decimal points display



5 Integer points and 3 Decimal points display



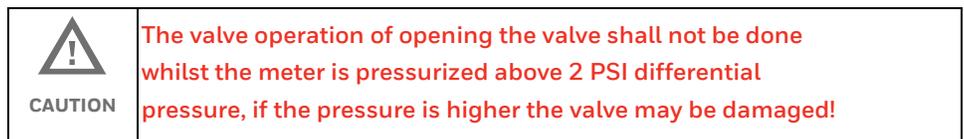
6 Integer points and 3 Decimal points display

## Valve operation

AC-250NXS has an integrated valve, which can be operated locally from the optical port from the Field Sense tool or remotely over cellular CAT-M1 network from Connexo or NetSense. The valve can be also operated autonomously by the meter when a high pressure or high temperature is detected based on the meter configuration.

The current position of the valve (**Open/Closed**) is shown on the Meter LCD screen at the bottom of the screen in all the main screens by the indicator **ON/OFF**. The valve can be closed when in it is in **ON** state, and opened when it is in **OFF** state.

## Valve Opening operation

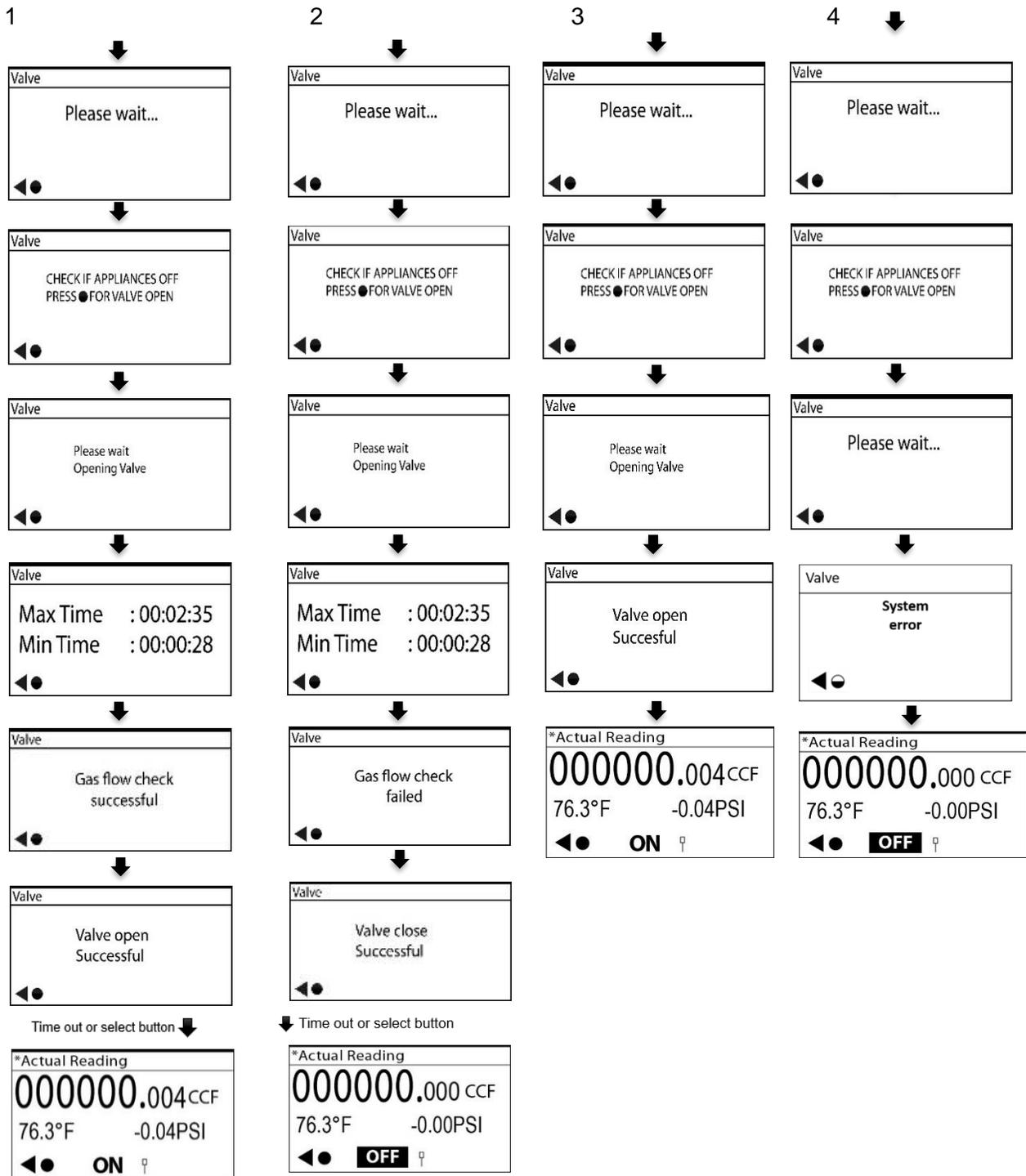


When the “open valve” command is issued in closed state, the meter waits for confirmation from the user. Once the user confirms by pressing the “select” button, the valve opens and then the valve leakage test starts. During the test, a timer screen is displayed which shows the maximum and minimum times for completion of the leakage test. After the test is completed, a “gas flow check successful” message is displayed. In case any gas flow is detected during the gas flow check, a “gas flow check failed” error message will be displayed. The user needs to acknowledge the gas flow successful/failure screen. After a few seconds, a “valve open successfully” message is displayed on the screen in case of gas flow check success; or a “valve closed successful” message is displayed on the screen in case of gas flow failure. Once the valve is opened/closed successfully, click the “select” button to enter the main screen, where a user can see the current valve position indicated as ON or OFF.

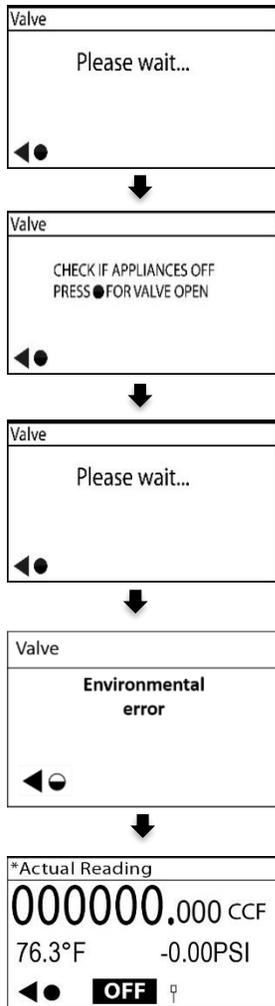
The Valve opening operation can be done in the following ways:

1. Valve open success with flow test enabled.
2. Valve open failure with flow test enabled.
3. Valve open success without flow test.
4. Valve open failure due to system error.
5. Valve open failure due to environmental error.

## Command scenario



5

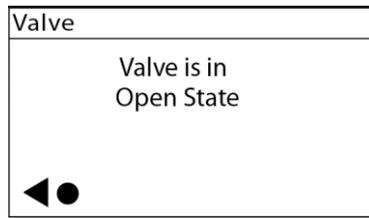


## Valve error

**Environmental error:** An Environmental error can occur if there are any faults in the system that are connected to pressure, temperature, flow, or differential pressure.

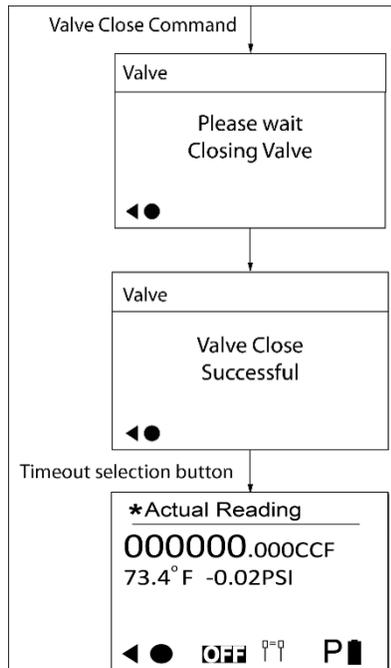
**System error:** Whereas System error occurs when the voltage is less than 3.1V or in case of HW issues.

The meter displays “**Valve is in Open State**” if the valve is already in ON state and the “Open” command is issued.



## Valve Closure Operation

When the “Valve Close” command is issued in the open state, the valve moves into the closing position and a “valve closed successfully” message is displayed on the screen. An error message will be displayed in a scenario when there are issues with closing the valve – instead of a success message. Once the valve is close successfully, click the “**Select**” button to enter the main screen, where a user can see the current valve position indicated as **OFF**.

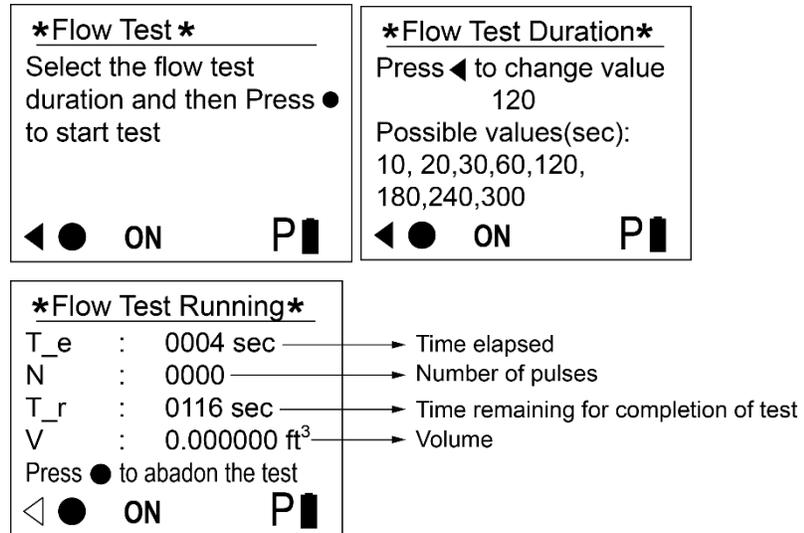


The meter displays “**Valve is in Closed State**” if the valve is already in **OFF** state and the close command is issued.

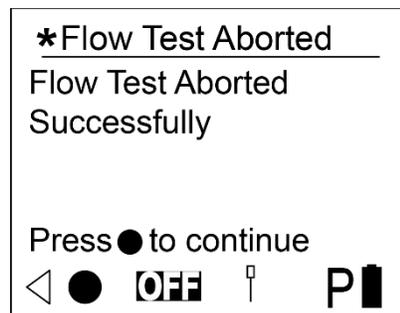
## Flow test

The “**Flow Test Start**” screen is part of the Service screen menu. After pressing the “select” button on this screen, the available flow test durations will be displayed on the screen.

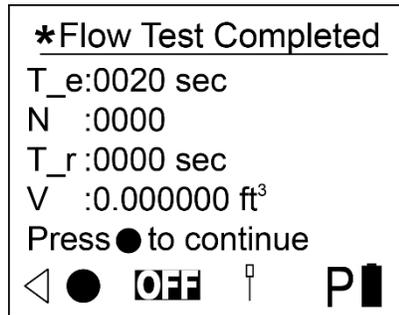
The “**Flow Test Duration**” screen displays the possible durations for the flow test. The value can be changed by pressing the **left** button on the screen. Once the required value appears on the screen, the test can be started by pressing the “select” button. Once the test starts, the screen changes to “**Flow Test Running**” screen



This screen can also be invoked from Local Com and the duration in this case is user defined.



If the “select” button is pressed on “**Flow Test Running**” screen, it aborts the test and the UI changes to this “**Flow Test Abort**” screen. If the “select” button is pressed here, we can start the flow test again.



After the flow test is completed successfully, the UI changes to “**Flow Test Completed**” screen. T\_e will be the time given by the user or 120 seconds (if the test starts from the service screen menu); T\_r will be 0, N, V as per the pulses and volume values that were provided. If the “select” button is pressed here, the UI will change to the “**Flow Test Start**” screen.

## Security

Make sure that the metrological seals and product casing is not damaged in order to have correct metrological operation and data security.

## Privacy

Honeywell can read non-personal data from a returned meter for quality control and diagnostics through a physical connection and via the display menu.

The data will not be forwarded to a third party. Honeywell cannot access the data by means of a remote interface.

## Key management

The meter comes with secure keys loaded in the factory. All keys are 128-bit length AES symmetric keys. It is recommended that the keys must be changed with customer-specific keys after meters are installed. Honeywell NetSense provides a mechanism for OnDemand key replacement to meters once they appear in NetSense after meter installation.

The meter supports management and installer roles, a management client can change both management and installer keys and an installer can change just the installer key.

The meter keys must be periodically changed. Honeywell NetSense provides a mechanism for periodic key replacement to all meters. Please refer to Honeywell NetSense documentation for further details.

The key management and change must happen in a secure environment and the newly generated keys must be safely stored in a secure database.

**Netsense** - Connexo NetSense is a powerful enterprise application that serves as the utility command console for rapid, reliable deployment and operation of the Energy Axis System. It manages, monitors, and provides robust reporting capabilities for the utility smart grid communications and network elements

If Honeywell NetSense software is not used for managing AC-250NXS meters, please contact Honeywell for details on key management.

# Logistics

## Transport

 <b>ATTENTION</b>	<ol style="list-style-type: none"> <li>1. Make sure that the Diaphragm gas meters must be transported with carefully in upright position.</li> <li>2. Check each part of the product after delivery for any damage which might occur during the transportation and report if any damage is seen.</li> <li>3. During transportation, the caps must remain on the inlet and outlet of the meter</li> <li>4. Make sure that the meters are tightened correctly to prevent damage while transportation</li> <li>5. All the communications must be turned off during transportation and storage to preserve the battery</li> </ol>
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## Storage

 <b>ATTENTION</b>	<ol style="list-style-type: none"> <li>1. Diaphragm gas meters must be stored carefully in upright position in a dry place.</li> <li>2. Caps must remain in inlet and outlet of the meter during the storage.</li> <li>3. The ambient temperature to store is printed on the index (Ta)</li> </ol>
-------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

## Disposal

Components, especially batteries, must be discarded separately.

On request, old units can be returned carried paid to the manufacturer in accordance with the relevant waste legislation requirements.

For support, contact your local Honeywell Process Solutions Customer Contact Center

## Network recommendations

The Head End software must be securely managed this includes the meter keys and database with limited access. Use firewalls wherever necessary to secure the network and Head End System software.

Perform Key Management according to "Recommendation for Key Management, Special Publication 800-57 Part 1 Rev. 5, NIST, 05/2020."

## Meter firmware upgrades

The meter firmware must be upgraded to the latest version as soon as a new version is available, to maintain performance. Honeywell will provide notification of important firmware upgrades when available.

## Server upgrade

The server software must also be upgraded when the latest version or patches are available. The server must use the following minimum key sizes for secure management of the database, software, and key storage.

1. Minimum RSA Length: 3072 Bit
2. Minimum ECC Key-Size: 256 Bit
3. Minimum AES Key-Size: 128 Bit
4. Minimum Hash Algorithm: SHA-256

## Safe disposal of consumption data

All the PCBs, which may contain sensitive software and/or personal data, must be disposed of using a method which make sures that the data cannot be restored (e.g., shredding by a certified waste disposal contractor).

## Software licenses

This device uses open-source software. For further details, see [www.docuthek.com](http://www.docuthek.com).

Name of OSS Component	Version of OSS Component	More Information
STMicroelectronics STM32CubeL4	1.14.0	Apache License 2.0 AND BSD 3-clause "New" or "Revised" License
tinycrypt	v0.2.7	BSD 2-clause "Simplified" License AND BSD 3-clause "New" or "Revised" License
Gladman AES mode	30-03-2011	Brian Gladman License
mbedtls-utils	2.12.0	Apache License 2.0
RoboCraft	HD44780 20120803-snapshot-de7d8c17	MIT License

License text can be found in the link AC250NXS\_License.txt

## Report security vulnerability

A security vulnerability is defined as a software defect or weakness that can be exploited to reduce the operational or security capabilities of the software.

Honeywell investigates all reports of security vulnerabilities affecting Honeywell products and services. For details on Honeywell's security policy, visit <https://www.honeywell.com/en-us/product-security>.

To report a potential security vulnerability against any Honeywell product, please follow the instructions at: <https://www.honeywell.com/en-us/product-security> under the Vulnerability Reporting section.

To view information on current malware threats impacting the Industrial Control Industry please visit:

<https://www.honeywellprocess.com/en-US/support/pages/default.aspx>

or contact the manufacturer.

## **Honeywell Smart Energy**

Elster American Meter Company

2221 Industrial Road  
Nebraska City, NE 68410

<https://smartenergy.honeywell.com>

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