



CONNEXO[®] **SMART GAS** **SOLUTION**

Advancing Utility IIoT operations
with an intelligent, end-to-end
gas metering solution

Honeywell

TRANSFORMING THE SAFETY AND EFFICIENCY OF NATURAL GAS DISTRIBUTION IN NORTH AMERICA

Today, utilities are looking to adopt advanced and cost-effective technology to increase operational effectiveness and improve their business results in an increasingly competitive energy market.

In the current environment, natural gas providers face difficult challenges such as:

- Critical safety issues
- Theft and tamper incidents
- Strict regulatory requirements
- Changing customer expectations
- High costs for maintenance and service

Utility companies need to manage the escalating volumes, types and complexity of smart grid data to meet evolving business demands. And they must have confidence in their investments in smart meter deployment. Cybersecurity is another important concern with the expanding smart grid.

Now, more than ever, gas system operators require solutions that meet their requirements for reliability, safety and efficiency while providing next-generation connectivity between people, processes and assets.

SEAMLESS ENTERPRISE ASSET INTEGRATION

Honeywell Smart Energy solutions effectively measure, monitor and respond to utility operations from edge to cloud. With our comprehensive smart metering solutions and unsurpassed natural gas industry domain expertise, we put actionable insights in the hands of utilities so they can offer safe and efficient products and services to their customers.

Honeywell's integrated and connected

Connexo® Smart Gas Solution (SGS) is based on the concept of "safety transformed" in advanced metering infrastructure for utility companies. It enables operators to remotely monitor distributed assets and leverage real-time operational data from anywhere, at any time.

Utilities seeking to deploy the latest in

smart metering can use the Honeywell American Meter AC-250NXS Diaphragm Meter for residential gas metering applications. This solution can be paired with our other advanced technologies for next-level safety and efficiency, as well as powerful head-end software for comprehensive data management.

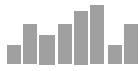


HEADED SOFTWARE



NetSense

**RF Mesh & Cellular
Data Collection**



Insight

Data Management



FactsBI

Data Reporting



Videre
Analytics

**Operational
Analytics**

COMMUNICATION



Public Wireless



FIELD ASSET



AC-250NXS



NXCM



Field Sense
Field Manager

Whereas connecting assets across the utility enterprise once required the installation of a costly and inefficient private network, utilities can now benefit from the utilization of a hosted low-power wide-area network (LPWAN) such as Cellular IIoT. This technology is delivering new options for improving network performance, cost and reliability. A cellular IIoT LPWAN solution takes advantage of existing cellular networks to easily and cost-effectively connect your entire distribution system.

ACCURATE NATURAL GAS METERING

The American Meter AC-250NXS Diaphragm Meter is the new standard for accurate, reliable and safe residential gas metering, delivering high performance measurements at an economical price. As first-world-class smart diaphragm gas meter on the market, it is easy to install and fits in tight spaces, such as meter trees in apartment complexes.

Honeywell/Elster's trusted diaphragm meters have been sold for 150 years. The AC-250NXS smart gas meter incorporates our unsurpassed expertise in gas metering and utilizes the same proven diaphragm meter technology as our legacy meters.

With a gas-tight, integrated shutoff valve linked to onboard pressure and temperature sensors, the meter enables an almost instant, autonomous shutoff response to system anomalies such as over-pressure, high-flow, leakage, or fire. The AC-250NXS features a field-replaceable battery with a 20-year operating life and is a direct-fit replacement for the AC-250.

The key features and benefits of this accurate diaphragm meter include:

- Compact design based on the trusted BK-G4 global platform
- 20-year battery-operated service life (battery changeable in the field)
- High-torque, precision seal (exceeds

ASME B16.33 for gas-tightness)

- On-command shutoff for storm hardening, non-payment, delinquency, and move-in/move-out
- Monitoring of mechanical pressure regulator health
- Reliable, proven diaphragm measuring unit with over 100M installed base since
- Accuracy within +/- 1%, exceeds ANSI B109.1 standard
- Honeywell SNAP prover integration with electronic accuracy adjustment
- Autonomous shutoff response and alarms linked to configurable triggers
 - High or low pressure
 - High or low flow
 - High temperature and fire
 - Peripheral sensors for methane, seismic activity, corrosion, flooding, etc.
 - High response mode (comms every 15 minutes instead of once per day)
- MCA metrology integrated to the meter independent from index, with enabling index interchangeable in the field
- Volume, pressure, temperature, and meter status reporting for head-end analytics
- OTA update for index and MCA
- Connexo E2E security with symmetric AES-128 encryption for all interfaces
- Local standardized optical service port for infield diagnosis, valve operation and re-calibration
- Advanced tamper detection
- Maximum configurability
- Intrinsic safety (Class 1 Division 1)

RELIABLE SAFETY SHUTOFF VALVE

Safety is paramount in gas metering, and each Honeywell American Meter is available with the AC-250NSX Shutoff Valve. Unlike competitive devices prone to gas leakage, this secure, integrated safety shutoff valve has a high-torque, precision seal that exceeds ASME B16.33 guidelines for gas-tightness and comes with FCC, UL Class 1 Div1, IP67, and 250 Class approvals to meet ANSI standards.

The AC-250NXS Safety Shutoff Valve employs on-command shutoff to

meet storm hardening, non-payment, delinquency, and move-in/move-out requirements. The valve's autonomous shut-off response and alarms are linked to configurable triggers for high or low pressure, high or low flow and high temperature and fire, and peripheral sensors are provided for methane, seismic activity, corrosion, flooding, and other indicators. Capabilities are also included to monitor mechanical pressure regulator health.

The key features and benefits of this reliable safety shutoff valve include:

- Remote disconnection of the gas supply
- Automatic gas disconnection on high-pressure/temperature events
- Single fault-tolerance against unintentional opening of the valve
- Gas only enabled once all of the customer's gas appliances are closed
- No energy consumed when valve is open or closed
- Low energy consumption during activation
- Detection of open and closed positions (patent pending solution)
- Configurable valve operation (e.g., valve closure thresholds)
- Located in the meter outlet (robust protection against dust)
- Closes in flow direction (remains tight with increasing pressure)
- Designed for more than 4,000 open/close cycles
- Tamper detection algorithm by the index
- Several million installations in Europe and elsewhere
- Flow check algorithm enables remote opening of the valve in a safe manner

OPEN CELLULAR IIOT NETWORK

Honeywell's Connexo SGS infrastructure employs a next-generation low-power wide area network (LPWAN), which eliminates the need for installation of a costly and inefficient private network. LPWAN technology provides game-changing connectivity for the natural gas company of the future. Experience has shown this wireless connectivity approach provides significant economic benefits versus competitive network solutions.

Eliminating long-term, proprietary network agreements, Cellular IIoT LPWAN solutions give utilities the freedom to innovate with any device from any vendor. They enable extended battery life in remote devices, assure deep signal penetration and assist in actively monitoring service delivery points that are not easily attainable with other existing communication technologies.

Hosted IoT cellular network solutions such as NB-IoT and CAT-M1 are quickly becoming the new industry standards, allowing affordable connection of entire systems. Fully managed and supported by top wireless network operators like AT&T, Verizon, and T-Mobile, these network solutions offer unrivaled reliability, ease of adoption, and truly unlimited scalability.

American Meter AC-250NXS's CAT-M1 cellular communication is characterized by reduced complexity, fewer components and no initial or maintenance costs for the infrastructure. In addition, it employs a fully integrated

communications module offering faster speeds and lower latency. Users can take advantages of the E2E Connexo smart grid solution with compatibility to existing Honeywell software and analytics. The solution features high-accuracy meter communication, configurable interrogation intervals and datalogging (190 days), and predictive maintenance analytics.

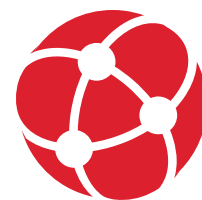
The key features and benefits of this simplified wireless communication solution include:

- Open and universal standards for interoperability between systems and assets
- Vendor-agnostic platform
- Utilizes existing infrastructure from trusted partners like Verizon and AT&T
- Requires zero proprietary network infrastructure
- Federally-licensed bands designated for machine-to-machine communications

VERSATILE SOFTWARE DATA MANAGEMENT

Honeywell's class-defining Connexo software suite easily automates your AMI business processes while streamlining data flow across multiple systems. Universal standards allow simple integration with utility billing and other third-party applications.

The Connexo suite solves several problems utilities face as they strive to manage the escalating volumes, types and complexity of smart grid data needed to meet evolving business,



regulatory and customer expectations.

With this versatile software, utilities can easily evolve from basic meter data collection to advanced analytics and data management. Cutting-edge machine learning and artificial intelligence are at your fingertips. The software makes it possible to monitor and control a wide variety of devices from a single pane of glass. Moreover, it helps to deliver comprehensive business intelligence from across your entire enterprise.



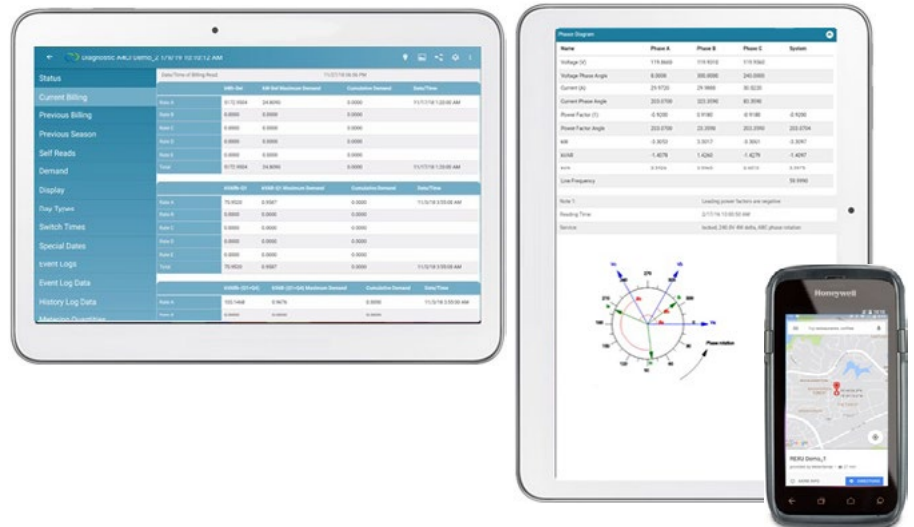
Connexo FieldSense:

Connexo FieldSense is the software application for intelligent field management in an AMI environment. Intended to empower today’s connected mobile workforce, it communicates with Honeywell meters via RF interface and uses a BeltClip radio module as an RF gateway. This module communicates with Connexo FieldSense using Bluetooth and to meters over a 900-MHz mesh network.

Connexo FieldSense supports RF troubleshooting, reading, service, and configuration operations. Examples of RF troubleshooting include testing the RF connectivity of meters, locating nodes in range, and reporting RF signal strength.

The key features and benefits of the flexible Connexo FieldSense software include:

- Optical communication via MeterSense Android app
- Bluetooth optical probe - DLMS protocol
- Automatic meter identification
- Execute meter functions (as authorized)
- Read/store meter data
- Read meter data and store meter reading
- Capture and store meter location and photo
- View meter data
- Status (Identification, Diagnostic, Security, Battery, Time, Pressure, Temp)
- Consumption (Current, Previous)
- Logbooks (Events, Metrological, Parameters)
- Load Profile (Hourly, Daily)
- AMI Server Push setup and scheduler



- Additional meter functions
 - Valve Open (Connect)
 - Valve Close (Disconnect)
 - Change Time
- Role-based security – receive from server (configure in Admin station)
 - List of authorized meters
 - List of authorized meter functions
- Send to server
 - Meter Readings
 - Audit Logs

Connexo NetSense:

Connexo NetSense is the command console that provides comprehensive AMI and network data collection, management, monitoring, and reporting. This high-performing AMI head-end application gives you the greatest possible coverage and the data collection flexibility – from daily to real-time interval reads.

With the Connexo NetSense solution, utilities can accommodate data from multiple grid devices. And, they benefit from a system designed to support all leading AMI communication technologies.

The key features and benefits of the powerful Connexo NetSense software include:

- RF mesh and cellular data collection
 - Accommodates data from multiple grid devices
- Smart grid device management
 - Push meter configuration and firmware upgrades into the field
 - Manage devices remotely
- Network visualization
 - View the network logically/geographically
 - Quick issue location
- Built-in reporting
 - Access to various reports and dashboards
 - Monitor interval data, exceptions, system health, and events
- Complex, exception-based event processing
 - Detect configurable event types
 - Routes information to the right recipient



BENEFITS FOR UTILITIES

Honeywell is recognized for an extensive track record in diaphragm gas meter technology, its industry-leading installed base and an advanced shut-off valve design, which complies to the highest standards for gas tightness.

With Honeywell's portfolio of connected, integrated, intelligent solutions, including the American Meter AC-250NXS Diaphragm Meter, utilities can collect and analyze vital data, improve safety and boost operational efficiency – all through a single interface. Our solutions leverage public wireless technology and head-end software, support end-to-end data management and employ a market-leading shutoff valve design and other advanced safety functions to protect you from incidents.

The bottom-line benefits of Honeywell's comprehensive offering include:

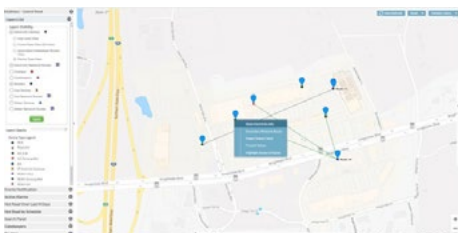
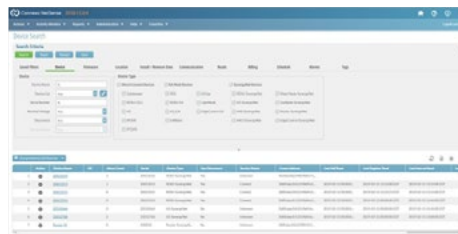
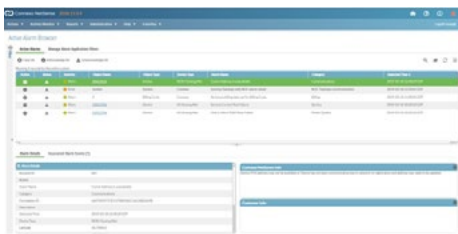
Compact smart diaphragm gas meter offering superior accuracy and reliability

Unique intelligent valve design to optimize gas shutoff protection

Cellular IoT technology providing up to six times better coverage than LTE

Real-time data transmission combined with powerful predictive analytics

Confidence from 90 million installations worldwide of proven diaphragm technology



ROBUST PREDICTIVE ANALYTICS SOLUTION

Honeywell has taken the complexity out of implementing predictive data analytics. Whether your organization is staffed with data scientists or you're new to the use of operational analytics, our Vedere Guard solution unlocks the value of your data through predictive intelligence.

With Vedere Guard, you can protect your revenue by employing diversion detection, extend asset life by targeting maintenance needs and increase the power of your vegetation maintenance budget by optimizing resources. Vedere modules can be implemented individually or in concert to customize views according to your needs.

The key features and benefits of this robust analytics solution include:

- Problem identification
 - Sophisticated algorithms create a confidence scoring engine
 - Ranks each meter site on likelihood diversion or other irregularities
- Workflow optimization
 - Enables revenue recovery analysts to coordinate cases for field investigators
 - Helps in compiling data for success measurement
- Cost reduction
 - Lowers cost of unproductive site visits
 - Enables recovery of lost revenue from diversion, wiring issues or meter malfunctions
- Threat protection
 - Safeguards against fire or explosions from tampered meters or overloaded circuits

WHY CHOOSE HONEYWELL?

Honeywell Connected Utility offers the most comprehensive and capable measurement and control platform available. From edge to cloud, these solutions were designed to make utility systems safer and more efficient than ever before.

With decades of experience in the global energy industry – with installations from the wellhead to burner tip – Honeywell provides innovative technologies to help utilities use advanced metering intelligence to improve customer service, enhance operational efficiency and increase revenues. We offer a comprehensive product and service portfolio for today's expanding "Utility IIoT" market, enabling customers to cost-effectively generate, deliver, manage, and conserve the life-essential resources of gas, electricity, and water.

For more information

To learn more about Honeywell's gas metering and control solutions, visit www.smartenergy.honeywell.com or contact your Honeywell account manager.

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