Microcontrollers in Flow Meters

Texas Instruments

Gas, water, and heat meters measure the volume of gas or liquid that passes through the meter.

Automatic meter reading (AMR) and advanced metering infrastructure (AMI) technologies add an additional layer of intelligence to traditional mechanical meters. These technologies improve meter-reading efficiency and provide more accurate and timely billing.

AMR enables automatic data collection, storage, and one-way communication from the meter to a meter-reading or data-collection device. Such a technology can offer customers and utility companies greater insight into consumption and flow information.

AMI enables two-way communication, bringing even more flexibility to metering systems and networks. The increased communication and control allows for additional features such as remote system upgrades and remote valve control.

Why partner with TI Smart Grid Solutions?

Choose from the broadest selection of low-power solutions that optimize your gas, water and heat meter systems. TI Smart Grid Solutions deliver:

- Innovation, expertise and support covering all the major functions of the flow meter
- Comprehensive hardware and software portfolios to meet specific system requirements
- Solutions that are compliant with standards such as IEC, ANSI, WMBus and ZigBee®

Microcontrollers for your gas, water and heat meter

With TI's MSP430™ ultra-low-power microcontrollers, designers are given several design options to differentiate and to drive innovation with their meter designs. In addition to sensing, data-logging, processing and communications support, the MSP430 family enables rapid development for next-generation gas, water and heat meter systems.

	LCD	RF	MCU family of devices	Examples of key flow meter devices	Active mode	Standby mode
Flow meter MCUs with low-power scan interface unit	•		MSP430FW4xx	MSP430FW429	200 µA/MHz	0.7 µA
MCUs with embedded FRAM			MSP430FR57xx MSP430FR59xx	MSP430FR5739 MSP430FR5969	80 µA/MHz 100 µA/MHz	1.5 µA 0.5 µA
General MCUs	•		MSP430F2xx MSP430F4xx	MSP430F2272 MSP430F4481	270 µA/MHz 280 µA/MHz	0.7 µA 1.1 µA
High-performance MCUs	•		MSP430F5xx MSP430F6xx	MSP430F5438A MSP430F6721	230 µA/MHz 256 µA/MHz	1.7 µA 1.7 µA
MCU + RF SoC	• •	• •	CC430F51xx CC430F61xx	CC430F5137 CC430F6147	160 µA/MHz 160 µA/MHz	2.0 µA 1.0 µA

For tools, software, and support options for your MSP430 microcontroller, visit www.ti.com/msp430.

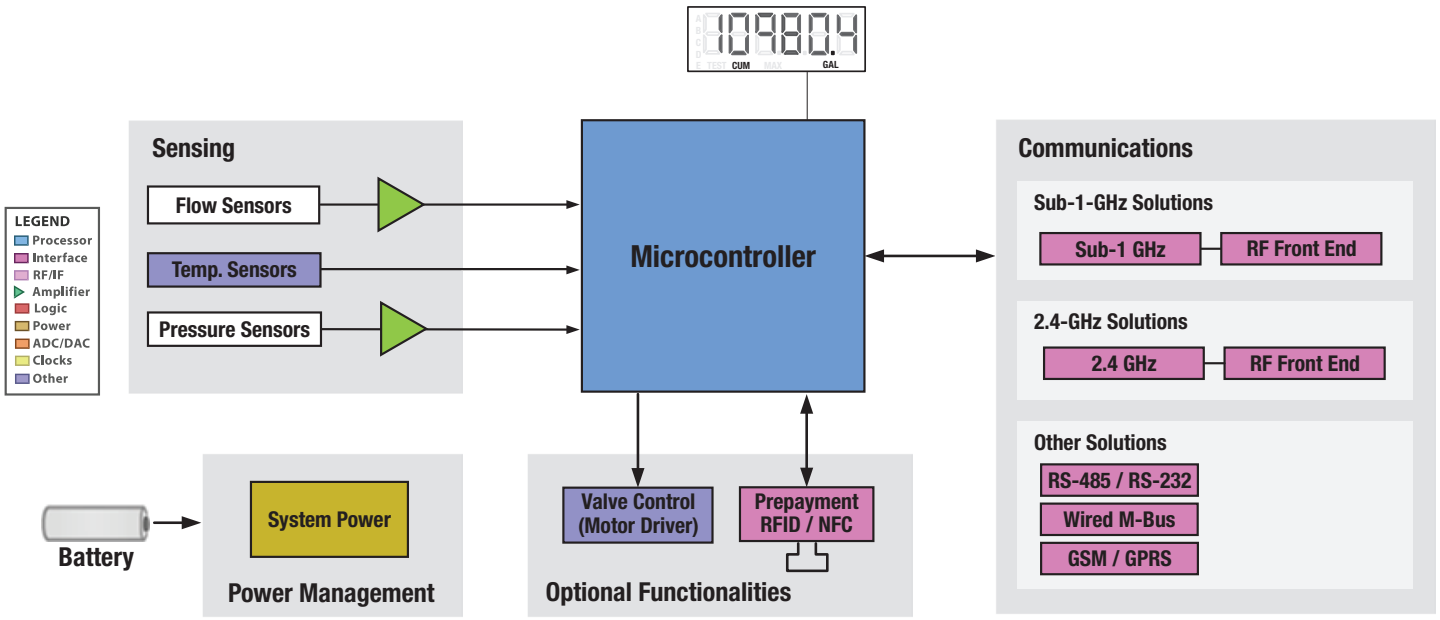
Getting Started

Solution highlights

- TI flow meter landing page: **www.ti.com/flowmeter**
- Smart grid landing page: **www.ti.com/smartgrid**
- Smart grid solutions brochure: **www.ti.com/lit/slym071**
- TI end-equipment folders:
  - Gas meters: **www.ti.com/solution/gas_meter**
  - Water meters: **www.ti.com/solution/water_meter**
  - Heat meters: **www.ti.com/solution/heat_meter**

Use on-demand support

- Introducing TI's Complete WMBus Solution (**www.ti.com/lit/slyt433**)
- An Electronic Water Meter Design Using MSP430F41x (**www.ti.com/lit/slaa138a**)
- Rotation Detection with the MSP430 Scan Interface (**www.ti.com/lit/slaa222**)
- Rotary/Linear Motion Detection Using the MSP430 Scan Interface and Optical Sensors (**www.ti.com/lit/slaa289**)
- Using GMR Sensors with the MSP430 Scan Interface (**www.ti.com/lit/slaa358**)



Key Flow Metering Solutions

Complement your microcontroller with other key flow metering solutions.

RF communications

Integrate AMR/AMI abilities with RF ICs and protocols for the sub-1 GHz and 2.4 GHz frequency bands.

- Sub-1 GHz (CC11x1, CC112x, CC119x)
- 2.4 GHz (CC25xx, CC259x)
- wMBus Software (**WMBus protocol stack**)

Power management

Optimize power consumption with solutions designed for battery-powered applications.

- DC/DC converters
  - Boost converters (TPS61xxx)
  - Buck converters (TPS62xxx)
  - Buck-boost converters (TPS63xxx)
- Power management ICs
  - Flow metering PMIC (TPS65290)

Optional functionalities

Address additional design requirements for smart meters.

- Prepayment
  - RFID (TRF796xA)
  - RFID or NFC (TRF7970A)
- Low-voltage motor drivers for valve control
  - Brushed motors (DRV883x)
  - Stepper motors (DRV883x except DRV8830)

Explore more options for your meter design

Wireless connectivity solutions: **www.ti.com/lprf**
WMBus solutions: **www.ti.com/wmbus**
Power management solutions: **www.ti.com/power**
RFID solutions: **www.ti.com/rfid**
NFC solutions: **www.ti.com/nfc**
Motor driver solutions: **www.ti.com/motor**
Analog solutions: **www.ti.com/analog**

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