Intelligent Communications Encoder-Opto Register

ICE opto

SR-II Meters 5/8" (DN 15mm), 3/4" (DN 20mm) and 1" (DN 25mm)

APPLICATION AND FEATURES

The Sensus ICE-Opto Register is an absolute encoder that provides totally accurate and error-free meter readings through optical sensing of the rotational positions of its odometer wheels. It also provides greater reading resolution, reliability, end-user options and other benefits. It is totally compatible for integration into existing Sensus AMR/AMI Systems as TouchRead® , RadioRead® , FlexNet® . It is fully compliant with ANSI/AWWA Encoder Standard C707-82 (R-92). There are eight odometer wheels and a combination testing and leak detection pointer. In that it provides greatly enhanced reading value resolution with all eight of its odometer wheels being active, printed-on zeros on the dial face are no longer meaningful and have been eliminated.

OPERATION

The ICE-Opto Register utilizes "optical sensing" technology to determine the rotational position of each odometer wheel and its numerical value. The electronic reading of data for TouchRead and AMR/AMI applications is derived directly from the rotational position of the register's odometer wheels, thereby insuring a totally accurate reading value. The design eliminates the use of mechanical wipers and contacts that are a source of friction and torque-load, and eliminates snap-action spring mechanisms that add a load to a meter's measuring element.

AMR/AMI SYSTEMS COMPATIBILITY

The Sensus ICE-Opto Register is adaptable for installation and interrogation in either a two-wire TouchRead mode or three-wire AMR/AMI mode, making it totally compatible with existing systems that use either mode. The meter reading data, which consists of the odometer reading and the register ID number, are transmitted in ASCII standard code that is used by most of the data-communications industry.

ASCII PROTOCOL

For each wheel on the odometer ASCII encoding contains 10 bits of information that include a start, stop and parity bit, the latter used to insure that the interrogation device has correctly received the data from each wheel.

The Sensus ICE-Opto Register extends the use of the ASCII-based communication protocol first utilized by Rockwell, in 1984. Although additional data fields have been incorporated, the register can be read by any AMR/AMI reading device that could read earlier ECR registers.

The Sensus three-wire AMR/AMI interface protocol is made available to other AMR/AMI equipment manufacturers, thereby insuring the compatibility of Sensus ECR registers with present and future AMR/AMI systems and networks.

SENSUS AMR/AMI SYSTEMS MIGRATION

All Sensus AMR/AMI registers, past and present, provide three connection posts, two of which are needed for TouchRead applications and three for three-wire systems such as RadioRead, FlexNet and fixed based systems. This enables a utility to easily and economically upgrade from a TouchRead System to a
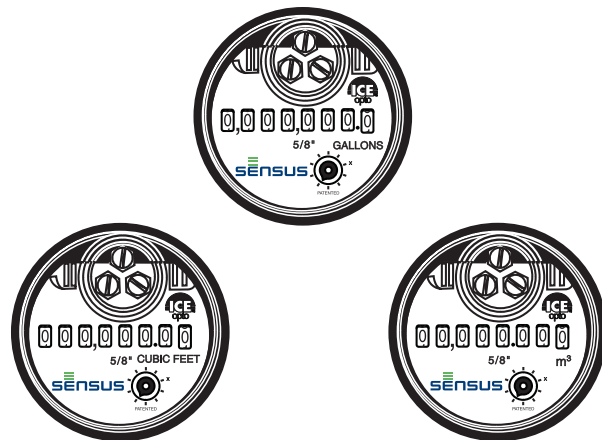
more-advanced AMR/AMI system without having to replace the registers on its meters.

UNIQUE REGISTER IDENTIFICATION NUMBER

As with their predecessor ECR registers, ICE-Opto Registers incorporate a unique, never-duplicated identification number that is factory-set into the register's non-volatile electronic memory. The ID number thereby identifies a particular meter, and links the customer it serves to a utility's billing computer.

IMPROVED READING RESOLUTION

With its eight functioning register wheels, greatly enhanced reading resolutions are provided. For example, on a register that records volume usage in gallons, the right-most wheel displays usage in tenths of a gallon. The wheel to its left displays usage in one-gallon units.

Similar highly-definitive reading resolutions are also provided on registers that record and display volume usage in cubic feet and cubic meters.

WATERPROOF PACKAGING

To insure meter reading integrity and accuracy, the register's components are protected from moisture, dirt, ultra-violet rays and mechanical damage through a hermetically sealed register.

WIRING CONNECTIONS

To insure reading-integrity, the Sensus ICE-Opto Register's pit set wiring connections are protected from moisture through the encapsulation (potting) of wiring components with a special epoxy material during the manufacturing process.

ASSURANCE TESTING

Throughout their development, Sensus ICE-Opto Registers passed an exhaustive series of tests conducted to insure compliance with specifications for reliable, long-term performance.

In addition to testing to assure reading validity in a multitude of applications, registers were exposed to and passed test-conditions simulating harsh environmental conditions.

INSTALLATION AND USE CONSIDERATIONS

Strict adherence to proper installation procedures and reading methods are required to achieve reliable readings from an encoded register.

WIRE CONNECTION CONTINUITY

The most common problem that results in not being able to obtain a valid reading from an electronic register is that the signal is not getting through due to a disruption in wiring continuity, or the connection terminals have been allowed to become corroded. When the interrogation device cannot communicate with the register, it will provide an alert signal. In such circumstances, check wire connection-continuity and repair the problem.
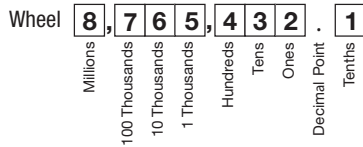
IMPROPERLY-CONNECTED WIRES

Sensus ECR registers provide three terminals for connecting wires to it, labeled R for red, B for black and G for green. For TouchRead System use, wiring from the R and B terminals are connected to a TouchPad remote-reading module, and observing wiring polarity is not required. If the G terminal is used, an incorrect installation, attempted readings will result in an error signal.
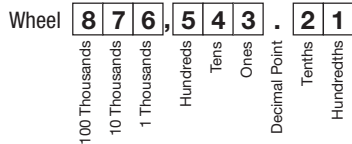
In Sensus AMR/AMI System applications such as RadioRead and FlexNet, a three-wire connection is required to properly link the register to its AMR/AMI interface device. In such installations, it is necessary to observe wiring polarity and connect the wires from the R, B and G terminals to their corresponding terminals on the AMR/AMI interface unit.

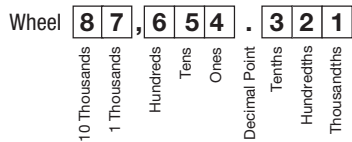|	
Service	For use on Sensus positive displacement SR-II meters for the purpose of obtaining absolute-encoder electronic meter readings with compatible automatic meter reading equipment.
Meter Compatibility	Sensus SR-II positive displacement meters.
AMR/AMI Compatibility	Sensus TouchRead, RadioRead and FlexNet AMR/AMI Systems, and virtually all other brands of AMR/AMI reading equipment. (ECR specifications available upon request.)
Registration Unit Indications for Meters Listed	**Gallon Registers:** Sensus 5/8", 3/4" and 1" SR-II Wheel: 8 , 7 6 5 , 4 3 2 . 1 (Millions, 100 Thousands, 10 Thousands, 1 Thousands, Hundreds, Tens, Ones, Decimal Point, Tenths) **Cubic Feet Registers:** Sensus 5/8", 3/4" and 1" SR-II Wheel: 8 7 6 , 5 4 3 . 2 1 (100 Thousands, 10 Thousands, 1 Thousands, Hundreds, Tens, Ones, Decimal Point, Tenths, Hundredths) **Cubic Meters Registers:** Sensus 5/8", 3/4" and 1" SR-II Wheel: 8 7 , 6 5 4 . 3 2 1 (10 Thousands, 1 Thousands, Hundreds, Tens, Ones, Decimal Point, Tenths, Hundredths, Thousandths)
Compliances	AWWA/ANSI Encoder Standard C707-82 (R-92)
Register Types	**ECR or ECR Direct Mount** – The Electronic Communications Register model is designed for use on meters set inside homes or buildings. **ECR/WP** – Electronic Communications Register/Weather Proof provides all the features and benefits of the ECR model but is also water resistant to protect cable connections from electrical shorts or corrosion caused by water infiltration or an excessive moisture environment. **TR/PL** – TouchRead/Pit Lid register eliminates the need to open meter box lids to obtain readings. Register comes prewired to a TouchPad sensor housed in a pit lid adapter module designed for installation in meter box (or vault) lids.