

HRI (High Resolution Interface) A Comprehensive Pulse and Data System



DESCRIPTION

HRI (high resolution interface) is a universal sensor which is compatible with a wide range of meters, including single-jet, multi-jet and piston meters with dry-dial and semi-dry registers in glass-copper or plastic housing. HRI can be retrofitted on all Sensus meters since 2008 pre-equipped with an HRI modulator.

HRI is available in two versions:

The **HRI-A PulseUnit** is a high resolution pulser which detects the flow direction.

The **HRI-B DataUnit** is an electronic register with a data interface which supports both hard-wired M-Bus systems and battery-driven MiniBus devices such as mobile meter reading systems. The HRI-B can alternatively be used as a pulse type with configurable pulse output.

The HRI is more than an extension of a simple sensor. It has been expanded to provide a reliable data source for remote reading of a conventional meter.

It is the interface for all today's requirements for data interrogation and remote transmission.

Main Features

- Suitable for a wide range of meters
- Load-free sensor detecting the pointer's rotation
- May be retrofitted to pre-equipped meters
- Detects flow direction
- No influence to the meters performance
- Contact bounce suppression
- Self-diagnostics
- Ultra long battery life
- Hermetically-sealed housing (IP68)
- Non magnetic principle

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HRI-A (pulse unit)

HRI-A and HRI-B are using the same proven pick up principle.

HRI-A4 compensates reverse flow pulses with its balanced pulse output.

HRI-A3 is a special version for applications requiring a direction signal like external radio modules.

Technical Data

Power supply
3V Lithium battery with expected lifetime 12 years.

Dimensions

max.: d x h - 66 mm x 32 mm
Additional height of the meter: 25.5 mm
Weight: 136 g
Casing: ABS
Colour: grey

Cable length

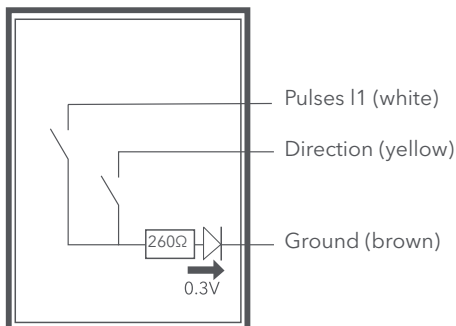
1.5 m - possible cable extension up to max. 30 m. Transient voltage protection is highly recommended for wiring outside buildings.

Environmental

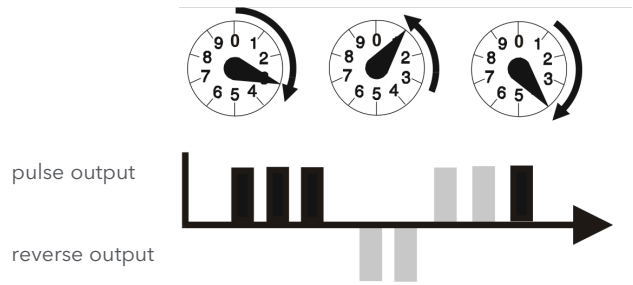
- Storage Temperature: -10 °C.....+65 °C
- Operation Temperature: -10 °C.....+65 °C
- Hermetically-sealed housing IP 68
- EMC acc. EEC directive 98/34 equal European standards EN61000-6-1

HRI-A3

(only where direction signal is applicable)



Balanced pulses Output at HRI-A4 (pulse unit)



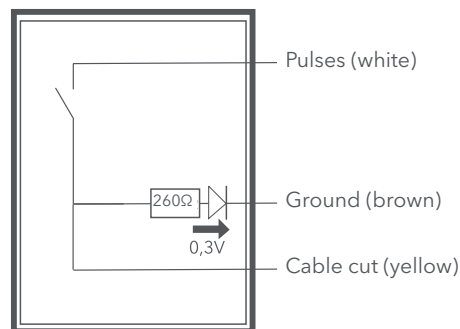
Reverse volume pulses are compensated by identical number of forward pulses before continuing with output pulses.

A remote counter at the HRI-A4 will represent the identical counter reading as at the meter!

ELECTRICAL CONNECTION

HRI-A4 provides a solid state switch

	HRI-A4
Brown (Ground) (-)	Balanced Pulses (see above)
White (Pulses) (+)	
Umax	24 V (DC)
I _{max}	20 mA
P _{max}	0.48 VA
Remaining voltage at switch closure	0,3 V + I * 260 Ω
Fixed pulse length	See table of variants
Reverse pulse buffer	Up to 1,000,000 pulses
Cable cut	Closed (open when cable cut)



AVAILABLE VARIANTS

The HRI-A4 is available with following alternative output pulse weights: D = 1 or 10 or 100

	Pulse Weight (pulse length)			
	HRI-A4			HRI-A3
Meter Nominal diameter	D1 (124 ms)	D10 (500 ms)	D100 (500 ms)	D1 (124 ms)
Qn 1,5 - 10	1L	10L	100L	1L
DN40 - 125 ²	100L	1.000L	10.000L	100L
DN150 - 300 ²	1.000L	10.000L	100.000L	1.000L

² only for HRI prepared C&I meters like MeiTwin Encoder

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HRI-B (data unit)

The HRI-B has the same pick up principle like the HRI-A. But the HRI-B has a serial output and a pulse output which can be used alternatively. Parallel usage of serial output and pulse output is not recommended and can cause problems.

The serial interface can also be used to configure the pulse output

Technical Data

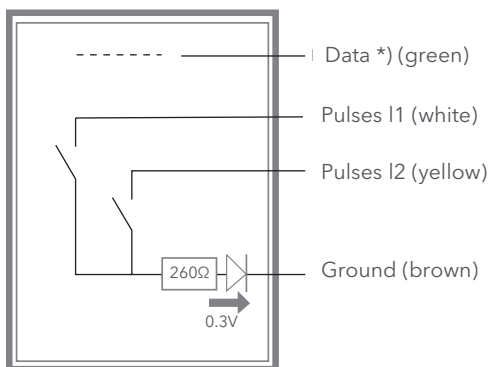
Cable length 1.5 m (5 m optional)

Operational cable length: several km with transient voltage protection

Temperature range

- Storage: -20 °C to +65 °C
- Operation: -10 °C to +65 °C

Battery lifetime: typ 12 years



* active for HRI Data Unit only External power supply of 5 to 24 V DC possible if data line is not used (green)

HRI-B Pulse Output

2 pulse outputs (I1, I2) according to ISO / TC 30 / SC 7 / WG 8

- Switched voltage: max. 24 V
- Switched current: max. 20 mA
- Power input: max. 0,48 VA
- Pulse length: 124 ms pulse width fixed
- Memory for up to 1,000,000 reverse pulses (B4)

Depending on the application, the HRI-B Pulse Outputs can be offered in three modes: Mode B2, B3 and B4.

Mode B2

Output I1: Forward flow pulses
Output I2: Reverse flow pulses

Mode B3

Output I1: Forward and reverse flow pulses
Output I2: Flow direction (open = forward)

Mode B4 (default mode)

Output I1: Balanced pulses ³
Output I2: Cable cut detection
Output I2 is permanently closed. If the cable is cut, it can be detected as open.

³ Reverse pulses are compensated by identical number of forward pulses. See HRI-A.

Data interface (DATA)

The HRI DataUnit has an interface to read out the data and subsequent Configuration e. g. programming the Pulse output in the field. Counter reading and settings are retained in case of power failure.

The programming is required to clear buffer and to synchronize the counter reading and the ID of the attached meter.

- M-Bus and MiniBus (Auto speed detection 2400/300 Baud)
- Protocol according to IEC 870 / EN 1434-3 / EN 13757

Readout Data

counter reading
meter Identification number (meter ID)

Programming Data

The HRI DataUnit has an interface to read out the data and subsequent configuration. The pulse output is also programmable in the field.

Default settings are:

Mode	B4 (B2, B3)
Divisor ⁴	1 (2.5 / 5 / 10 / 25 / 50 / 100 / 250 / 500 or 1,000)
Meter number	HRI production number (8 digit number)
Counter reading	00,000.000 m ³ (HRI-B8L) (meter counter)
Primary Address	0 (0...255)
Secondary Address	HRI production number (8 digit number)

⁴Divisor:

D = number of litres per output pulse divided by the number of litres per pointer rotation (Z)

- Possible values for D: 1 / 2,5 / 5 / 10 / 25 / 50 / 100 / 250 / 500 or 1000

Output pulse value = Z x D:

- Example for residential meters where usually z = 1:

D = 1 means 1 l per pulse at the output

D = 100 means 100 l per pulse at the output etc.

For C&I meters like MeiTwin Encoder the number of liters per pointer rotation are different (Z = 100l or 1000l). To get the right pulse value at the output means for example:

Number of liters per pointer rotation Z = 100
(MeiTwin Encoder DN50-100)

pulse divider D = 10

output pulse value = 100 x 10 = 1000l per pulse at the output!

Variants and settings

All modes and variables are factory-set according to customer's specification.

All settings are also programmable in the field.

HRI-B programming tools

- MiniCom is a software to program the HRI-B using a PC e.g. a Notebook with Windows OP system.

- The software can be used with our M-Bus level converters.

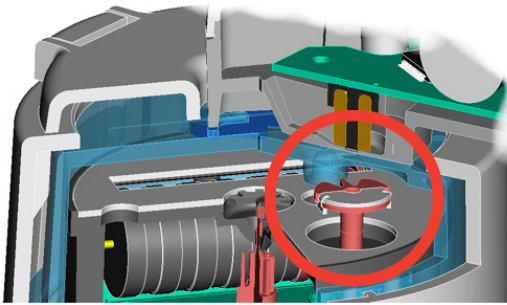
Alternatively the software can be used with a toolset consisting of:

- MiniPad and MDK-USB to connect the HRI-B with a PC

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HRI Interface Principle



The HRI pickup system technology enables the load-free sensor detecting of the pointer's rotation of pre-equipped meters

- No influence to the meter performance
- Can be retrofitted to pre-equipped meters
- Detects flow direction

HRI-A order information

Standard version

HRI-A4/D100
(can not be changed after installation)

HRI-B order information

Standard version

HRI-B4 / D1/ 8L
(can be changed after installation)

Data Readout

Meter ID

Meter Reading (in l resolution)

HRI-A pulse output

Default version (please specify when ordering)

Mode A4 (A3)

Divisor D100 (D1, D10) (A3 D1 only)

Application

Route-planned meter reading for billing, for example mobile reading systems.

Load profiles via a fixed network using M-Bus or via radio, telephone or GSM Modem.

Industrial application e.g. dosing.

Remote reading of flow rate and cumulative flow using a frequency converter.

Leakage detection when connected to a data logger.

Generation and transmission of flow profiles using a data logger and GSM modem. The design of the HRI allows the system to be installed in extreme conditions, such as flooded meter pits.

HRI-B output

Default setting*

Mode B4 (B2, B3)

Divisor 1 (2.5 / 5 / 10 / 25 / 50 / 100 / 250 / 500 or 1,000)

Meter number** HRI production number

Counter reading** 00,000.000 m³ (HRI-B8L)


Primary Address 0

Secondary Address HRI production number

* Please specify, when ordering, if settings are to be different from the above

** HRI which are pre-equipped to a Sensus meter will be programmed and synchronized to the meters

Option

HRI-B is optionally available as a variant which is certified ATEX  II 3G Ex ic IIC T4 Gc X. This is suitable for potentially explosive atmospheres according zone 2.

For HRI-B with ATEX marking only the pulse outputs are configurable and usable. No M-Bus device may be connected to the serial interface in hazardous area.

Detailed instructions are documented at the manual.

The HRI-B with ATEX is marked as below:



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