Datasheet FU.SEN.RSC.101   TRUE 4-20mA Contact Sensor IP65

General description:

The CONMONSense TRUE 4-20mA Contact Ultrasound Sensor marks a significant advancement in asset monitoring and maintenance, combining unparalleled ease of ultrasound data collection with exceptional durability. Engineered for integration with industry-standard PLC, DCS, and DAQ systems, this sensor lays the foundation for the future of ultrasound-driven lubrication, mechanical monitoring, and first level system diagnostics. Its sturdy construction guarantees consistent, reliable performance even in the most challenging conditions, providing unmatched defense against dust and water intrusion. At its core, the RSC.101 features a resonant piezoelectric transducer encased in a sturdy stainless-steel housing, guaranteeing optimal sensitivity for a variety of industrial applications. Whether it's identifying friction, impact, and turbulence, as well as discerning a drift in the trend, the RSC.101 delivers real-time RMS data essential for implementing predictive maintenance strategies and boosting operational efficiency.
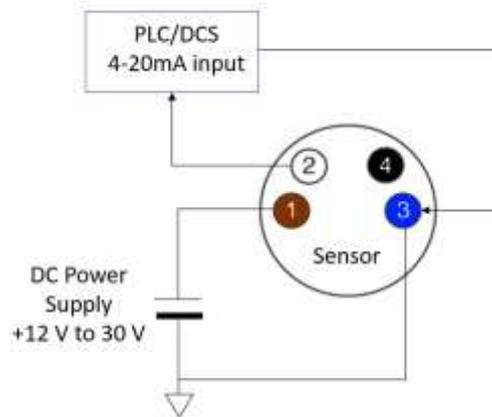
Main Features:

- **4-20 mA output (DC coupling):** Seamlessly correlates with ultrasound RMS indicator, facilitating easy integration into existing monitoring systems without the need for complex conversions.
- **Built-in analog circuit "Ultrasound resonant signal to RMS":** Guarantees accurate analog signal processing.
- **Hardware calibration** for consistent and reliable measurements.
- **Case temperature measurement (optional, relay required):** Offers the versatility to monitor temperature (inside the sensor) alongside ultrasound, providing a more comprehensive overview of asset health.
- **Plug & Play functionality**: Ensures easy installation and immediate operation across a wide measurement range, making it ideal for a variety of industrial settings.

Top view M8-M- pinout (IEC 60947-5-2 compliant):

1 = POWER SUPPLY (Brown)
2 = OUTPUT CURRENT (White)
3 = GROUND (Blue)
4 = OUTPUT SELECTION (RMS or T°)- should be left unconnected if not used – (Black)

SDT International sa-nv • Bd de l'Humanité 415 • B-1190 Brussels (Belgium) • Tel: +32(0)2 332 32 25 • email: info@sdtultrasound.com
SDT North America • 7677 County Road 2, Cobourg, ON • Phone: 1-800-667-5325 | 1-905-377-1313 • email: hearmore@sdtultrasound.com
www.sdtultrasound.com

Technical specifications:

General specifications	
Dimensions [mm]	 The foot is a part of the resonant structure, please do not disassemble it!
Description	CONMONSense RSC US TRUE 4-20mA M8 4PM - THREADED SENSOR M6
Model	FU.SEN.RSC.101 (SN 573 YY NNNN)
Type of transducer	Resonant Piezoelectric
Measuring principle	4-20 mA DC
Embedded Firmware	v 574 (since SN 573 24 NNNN) *Minor updates possible using the configuration interface*
Materials	Housing: 303 Stainless steel Connector plate: Aluminum Holster: Nitrile Butadiene Rubber
Mass	132 [Gram]
IP rating	IP 65 *when used with the appropriate cable/connector IP 65*
Tests/approvals EMC (Directive 2014/30/EU)	• EN 61326-1:2013 • EN 55011: 2016 + A1:2017 • EN 61000-4-2:2009 • EN 61000-4-3:2006 + A1:2008 + IS1:2009 + A2:2010

CE UKCA	• EN 61000-4-4:2013 • EN 61000-4-6:2014 • EN 61000-4-8:2010

Installation	
Power supply	12 [V] to 30 [V] DC
Maximum consumption	750 [mW]
Operating temperature	-20 [°C] to +70 [°C] / -4 [°F] to +158 [°F], non-condensing environment *see SDT heat sink in section accessories for warmer surfaces*
Storage temperature	-20 [°C] to +70 [°C] / -4 [°F] to +158 [°F], non-condensing environment
Recommended max cable length	30 [m] / 100 [feet] *EMC tests not guaranteed beyond*
Connector	M8 - 4 pin - Male
Type of mounting	Mounting screw
Thread type	M6 x 5 [mm]
Recommended tightening torque	2-4 [N.m], thread side <1 [N.m], connector side

Ultrasound signal (default mode)	
Resonant frequency	F_{res} = 37 [kHz] +/- 1 [kHz]
Band-pass frequency	+/- 2 [kHz] centered on F_{res}
Detector type	RMS@1second
Startup time	~5 [s], reset each time the sensor is powered or switched to mode RMS/T°
Output range (DC)	4 to 20 [mA]
Measuring range	20 to 100 [dBμV_{RMS}]
Sensitivity	0.2 [mA/dBμV_{RMS}], offset = 0 [dBμV_{RMS}]
Resolution	0.5 [dBμV_{RMS}]

Temperature (optional)	
Switching mode	Only available when the communication line is connected to GND
Output range (DC)	4 to 20 [mA]
Measuring range	-20 to 85 [°C]/
Sensitivity	0.15 [mA/°C], offset = - 46.25 [°C]
Resolution	1 [°C]

Optional accessories offered by SDT	
Cables with Straight M8 Connector – PUR RAL7021 -25°C.+90°C IP65 – STRAIGHT SHIELDED	
FU.RSC.CABL.01.015-1	SENSOR-/ACTOR CABLE M8 4PF <> FREE END 1.5m
FU.RSC.CABL.01.030-1	SENSOR-/ACTOR CABLE M8 4PF <> FREE END 3.0m
FU.RSC.CABL.01.050-1	SENSOR-/ACTOR CABLE M8 4PF <> FREE END 5.0m
FU.RSC.CABL.01.100-1	SENSOR-/ACTOR CABLE M8 4PF <> FREE END 10.0m
FU.RSC.CABL.01.200-1	SENSOR-/ACTOR CABLE M8 4PF <> FREE END 20.0m
FU.RSC.CABL.01.XXX-1	SENSOR-/ACTOR CABLE M8 4PF <> FREE END XX.Xm
Cables with 90° M8 Connector – PUR RAL7021 -25°C.+90°C IP65 – STRAIGHT SHIELDED	
FU.RSC.CABL.02.015-1	SENSOR-/ACTOR CABLE M8 4PF 90° <> FREE END 1.5m
FU.RSC.CABL.02.030-1	SENSOR-/ACTOR CABLE M8 4PF 90° <> FREE END 3.0m
FU.RSC.CABL.02.050-1	SENSOR-/ACTOR CABLE M8 4PF 90° <> FREE END 5.0m

SDT Ultrasound Solutions

FU.RSC.CABL.02.100-1	SENSOR-/ACTOR CABLE M8 4PF 90° <> FREE END 10.0m
FU.RSC.CABL.02.200-1	SENSOR-/ACTOR CABLE M8 4PF 90° <> FREE END 20.0m
FU.RSC.CABL.02.XXX-1	SENSOR-/ACTOR CABLE M8 4PF 90° <> FREE END XX.Xm

Connector to complete assembly

| SICOCA-M8-4MSS-01 | CABLE CONNECTOR M8 4PM SHIELDED STRAIGHT A-KEY w/SCREW TERMINAL |
| SICOCA-M8-4FSS-01 | CABLE CONNECTOR M8 4PF SHIELDED STRAIGHT A-KEY w/SCREW TERMINAL |

Cables with straight M8 connector 4PM <> M8 4PF – PUR BLACK -25°C.+80°C IP65 – STRAIGHT SHIELDED

FU.RSC.CABL.05.015-1	SENSOR-/ACTOR CABLE M8 4PM <> M8 4PF 1.5m
FU.RSC.CABL.05.030-1	SENSOR-/ACTOR CABLE M8 4PM <> M8 4PF 3.0m
FU.RSC.CABL.05.050-1	SENSOR-/ACTOR CABLE M8 4PM <> M8 4PF 5.0m
FU.RSC.CABL.05.100-1	SENSOR-/ACTOR CABLE M8 4PM <> M8 4PF 10m
FU.RSC.CABL.05.200-1	SENSOR-/ACTOR CABLE M8 4PM <> M8 4PF 20m
FU.RSC.CABL.05.XXX-1	SENSOR-/ACTOR CABLE M8 4PM <> M8 4PF XX.Xm

Mounting accessories
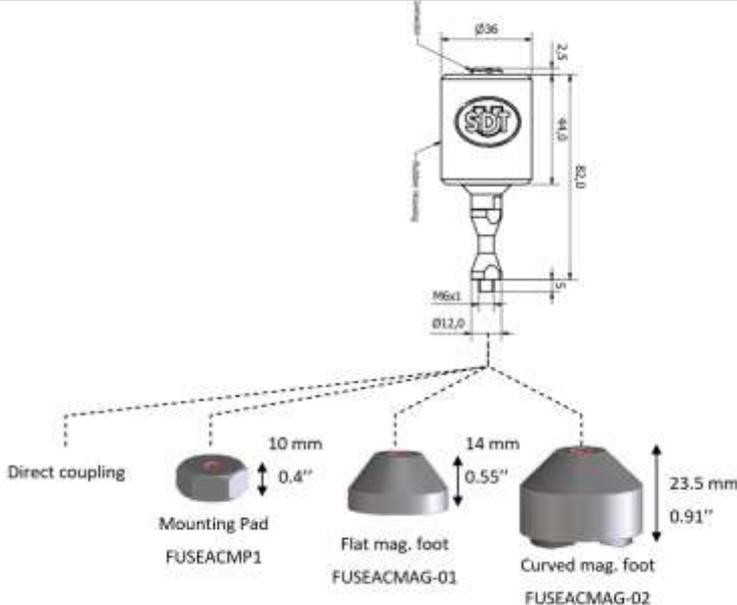
| FA.RSC.ACC.002-01 | CONMONSense - HEAT SINK - AISI303 Ø30,0 (M6) x74,5mm |
FU.SEACMAG-01	Flat Magnetic Foot
FU.SEACMAG-02	Curved Magnetic Foot
FU.SEACMP1	Mounting pad
FS.RSC.ACC.001	Kit Configuration Interface for firmware update (see DC.RSC.DAT.015)

Configuration:

The selection/communication line is used to switch the output mode (ultrasound RMS or case temperature).

RMS Ultrasound output (default mode):

By pulling (and holding) the communication line high (VDD – Power supply) or by keeping it floating (not connected), the analog output will mirror ultrasound RMS readings.

The sensor signal range is 20 [dB$_{\mu V \ RMS}$] (4 mA) to 100 [dB$_{\mu V \ RMS}$] (20 mA). The output relationship is defined as follows:

- $Sensor\ signal\ [dB\mu V_{RMS}] \approx \dfrac{Measured\ current\ [mA]}{Sensitivity}$
- Sensitivity:
  - 0.2 mA/dBμV_{RMS}
  - offset = 0
- Resolution: 0.5 $dB\mu V_{RMS}$
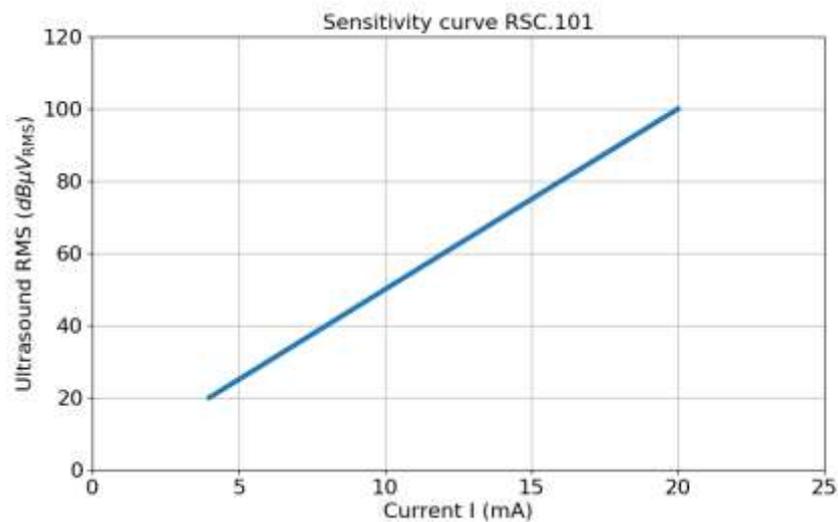
Temperature output (optional):

By pulling (and holding) the communication line low (0V – GND), the analog output will mirror the case temperature. Ultrasound RMS readings are not available at the same time.
The temperature range is -20 $[°C]$ (4 mA) to +85 °C (20 mA). The output relationship is defined as follows:

- $Case\ temperature\ T\ [°C] \sim \left(\dfrac{Measured\ current\ [mA]}{Sensitivy} \right) + Offset$
- Sensitivity:
  - 0.15 mA /°C
  - Offset = - 46.25 °C
- Resolution: 1.00 °C

SDT **Ultrasound Solutions**

Sensitivity curve RSC.101
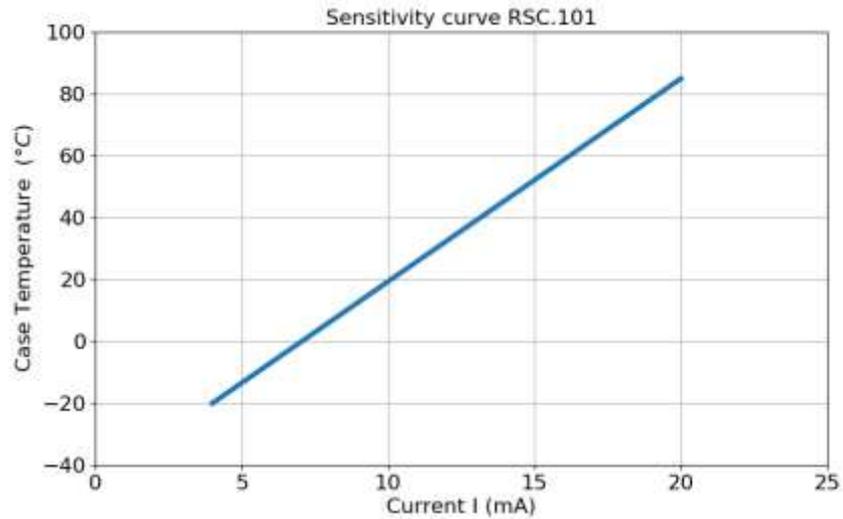
Maintenance and firmware update:

In case of minor troubleshooting requirements with the sensor or to accommodate the addition of new features in the future, it may become necessary to apply a firmware update. Such updates would adjust specific setting parameters to enhance functionality or address emerging issues.

For more details, please refer to the configuration interface for CONMONSENSE at https://ftp.sdt.be/pub/Products/CONMONSense/Datasheet/CONMONSense_Configuration_Interface_Datasheet.pdf

Safety recommendations:

To ensure safe and effective use of the FU.SEN.RSC.101 sensor, please follow the safety recommendations below:
- Installation of the sensor should be carried out by qualified personnel, following the technical recommendations provided.
- Ensure that the sensor is properly mounted and secured before starting any measurements.
- Do not exceed the specified maximum supply voltage to avoid the risk of overheating or damage.
- Ensure that the power is disconnected before performing any adjustments or maintenance on the sensor.
- Do not use the sensor in explosive atmospheres.
- The sensor is rated IP65 for dust and water jet protection. Do not immerse it and do not use it in conditions where it could be submerged.
- Avoid exposing the sensor to temperatures outside the specified operating range.
- A maximum recommended cable length of 30 meters/100 feet has been established based on EMC (Electromagnetic Compatibility) tests. Beyond these limits, the stability of the measurement is not guaranteed by SDT. The client is responsible for assessing the impact of their environment on the accuracy of the measurement.

SDT Ultrasound Solutions

Failure to follow these safety recommendations can result in injury, damage to the sensor or other equipment, and may affect the validity of the warranty. If in doubt regarding the installation, use, or maintenance of the sensor, please contact us.

04	CMA 04/04/2024	Minor specs adjustments (warmup time) + update	CGI
03	CMA 28/02/2023	Maximum T° range	RGO
02	CMA 14/11/2022	Minor change ER to "RSC static"	RGO
01	CMA 9/11/2022	Original version	RGO
Rev.	**Writer**	**Nature of modification**	**Approved**

The information herein is believed to be accurate to the best of our knowledge.
Due to continuous research and development, specifications are subject to change without prior notice.

SDT Ultrasound Solutions