KELLER

PRESSURE TRANSPONDERS / DATA LOGGERS

WITH PASSIVE RFID TRANSPONDER INTERFACE

SERIES 21 D RFID
SERIES 21 DC RFID

This series is a unique combination of an extremely sturdy, tried-and-tested industrial pressure transmitter and RFID (radio frequency identification) wireless technology.

The D line piezoresistive transmitters used to measure pressure are based on KELLER's own chip-in-oil technology. The laser-welded, hermetically sealed stainless steel housing, which is filled with oil for pressure transmission, contains the pressure transducer and the ultra-energy-efficient compensation electronics with I²C interface.

Series 21 D RFID   Passive RFID pressure transponders

The plastic cap houses the interface to the pressure transmitter and all RFID components including the antenna. The scanner provides the power required to log instantaneous values.

Series 21 DC RFID   RFID data loggers

These pressure transponders come with extra data recording functionality. The integrated battery allows data to be measured and stored. Stored measurements are transmitted wirelessly and exclusively via the RFID interface.

Performance features

- Extremely resistant to environmental impact
- Ultra-compact stainless steel housing, also available in Hastelloy C-276
- High accuracy, outstanding long-term stability, hysteresis-free
- Temperature displayed alongside accurate pressure reading
- Pressure ranges from 3 to 1'000 bar
- Freely programmable measuring point numbers (8 alphanumeric characters)

Series 21 D RFID
RFID pressure transponder (passive)

RFID))))

Series 21 D RFID

- No auxiliary power supply connector, no internal power source (battery or rechargeable battery).
- Scanners (portable hand-held display units or various wired readers) also available to read, display and store measurements.
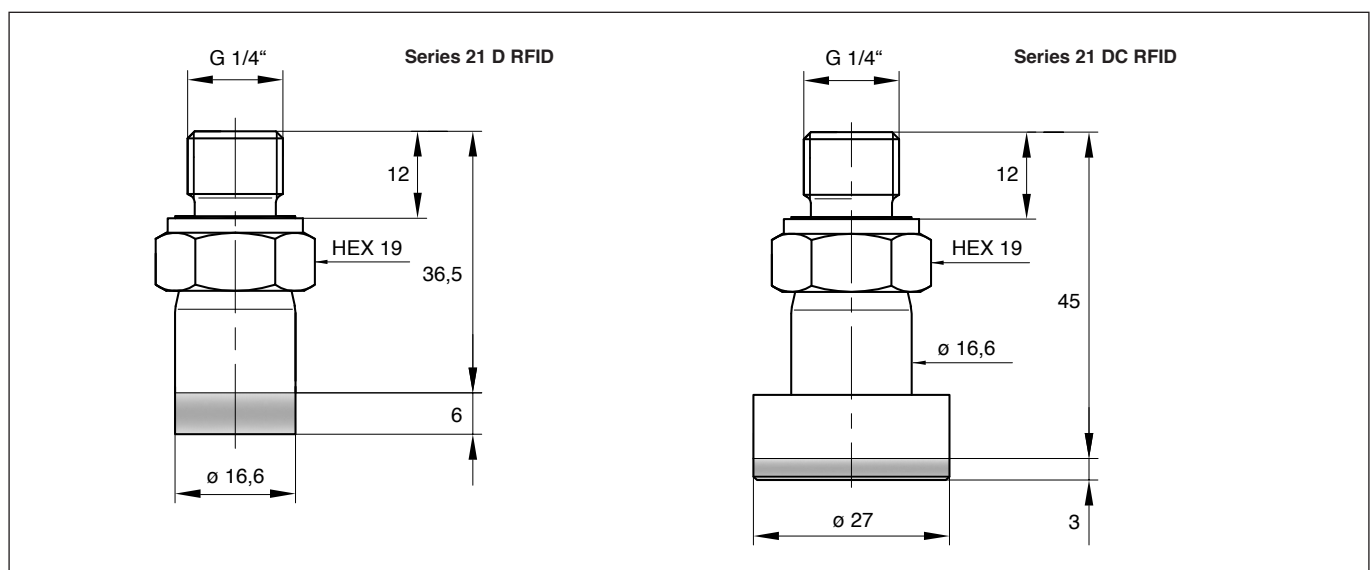
Series 21 DC RFID

- Built-in long-life battery to log data.

- TELID®Soft scanners and PC software also available for configuring the data logger, reading off stored data and presenting collected measurements in visual form.

Series 21 DC RFID
RFID data logger (battery-operated)

Series 21 D RFID

G 1/4"
12
HEX 19
36,5
6
ø 16,6

Series 21 DC RFID

G 1/4"
12
HEX 19
45
ø 16,6
ø 27
3

Subject to alterations

06/2015

Technical description

The RFID pressure transponders and data loggers are wireless measuring devices. The integrated antenna is located inside the plastic cap placed on top. A scanner ("reader") provides the electrical energy required for data transmission. The compact design of the pressure measuring devices keeps the transmission distance to just a few millimetres.

The actual measuring element used for accurate pressure measurements is housed in a fully welded stainless steel measuring cell fitted with a diaphragm and filled with oil for pressure transmission. The measuring cell is situated right behind the hexagon in the same place as the temperature sensor. In other words, the temperature is not measured in the medium itself, where it could be influenced by the ambient temperature.

The pressure transmitter, comprising pressure transducer, sensor electronics and stainless steel housing, is a KELLER product. It is enhanced by the black microsensys plastic component that holds all the RFID technology. microsensys also supplies the reader and the PC software. Pressure ranges can be anywhere between 3 and 1'000 bar. Smaller pressure measuring ranges and different housing shapes can be supplied if the underlying conditions allow.

KELLER provides several microsensys readers: a small, pen-shaped hand-held version with a USB port, an M30 screw head with USB or RS232 port for systems engineering, and a 1 cm-thick, credit-card-shaped autonomous indicator (POCKETwork) for field use.

Series 21 D RFID pressure transponders

As it is autonomous in terms of power, a passive RFID pressure transponder has an unlimited lifespan and requires no maintenance.

Different readers requiring corresponding software are used depending on the application. If they are to be integrated into customers' systems, the dynamic link library (DLL) and various demo programs supplied by microsensys will prove useful. http://download.microsensys.de/

The pressure transponder software pack is usually used in combination with the POCKETwork. To do this, the reader needs to be connected once to the iID®CONNECTIONtool (see opposite) to be available as a resource for the following programs:

• iID®Interface Configuration Tool
POCKETwork configuration software
- DOC (Direct Online Communication): USB connection to PC
- SPC (Script Programming Communication): autonomous operation
- running customer-specific programs (scripts)

• iID®MPCdataload
Software for sending transponder data stored in the POCKETwork to an .xml file for further processing.

• MNR Tool (KellerWriteTool)
This software enables each transponder to be assigned an eight-digit alphanumeric measuring point number ("MNR"). This is linked to a unique identification number (transponder ID) and the pressure sensor's unique production code in an .xml file.

Series 21 DC RFID data loggers

The data logger itself is powered by a built-in battery. Its lifespan depends mainly on the conditions of its use (continuous operation, logging frequency, ambient temperature) and is around five years. The scanner ("reader") provides the electrical energy required for data transmission (programming and reading off from the logger). This means that stored content can still be read off even if the battery is flat.

The data logger's software package contains two separate programs, which can only be downloaded from microsensys. http://download.microsensys.de/

• iID®CONNECTIONtool
The software checks whether a reader is connected. A small file is created which contains the connection parameters (RFID interface) and which is required for the program below.

• TELID®soft
• TELID®soft PC software is used to configure the data logger, read off stored data and present collected measurements in visual form.

Subject to alterations   21 D(C) RFID series   06/2015

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Specifications

Absolute pressure ranges [1]

	0…3	0…10	0…30	0…100	0…200	0…400	0…600	0…1000 [2]	
PA	0…3	0…10	0…30	0…100	0…200	0…400	0…600	0…1000 [2]	bar
PAA	0…3	0…10							bar
Overpressure	12	40	120	350	350	1,200	1,200	1,200	bar

PAA: zero point in a vacuum   PA: zero point at 1.0 bar absolute pressure

[1] Relative pressure (PR: zero point at ambient air pressure) and smaller ranges available on request

[2] Measuring range 1000 bar only suited for static applications

Accuracy [3]	± 0,15 %FS max.	
Total error band [4] 0...50 °C	± 0,5 %FS max.	
-10...80 °C	± 0,7 %FS max.	
Temperature accuracy	± 2 °C typ.	
Operating temperature	-40…110 °C	
Signal reserve	± 10 %FS typ.	± 5 %FS min.
Stability	± 0,1 %FS typ.	± 0,2 %FS max.

[3] Linearity (best straight line) at room temperature, hysteresis, repeatability

[4] Maximum deviation in specified pressure and operating temperature range

Interface	RFID 13,56 MHz / ISO 14443
Data rate	106 kbps
Communication distance	Few millimetres
Materials in contact with media	- Stainless steel AISI 316L (DIN 1.4404 / 1.4435)
	- External seal Viton® (no internal seals)
Plastic cap material	21 D RFID: PEEK (polyetheretherketone), epoxy resin
	21 DC RFID: PEEK (polyetheretherketone)
Oil used for filling	Silicone oil
Endurance	0…100 %FS @ 25 °C: > 10 million pressure cycles [2]
Vibration	20 g, 5…2,000 Hz, X/Y/Z-axis
Shock	75 g sinus 11 ms
Protection	IP67
Options	Different materials, containers and oils and wider temperature ranges available on request.
	Intermediate pressure ranges only available for large-volume projects.

Series 21 DC RFID data loggers

Auxiliary power	Built-in lithium thionyl chloride (LTC) battery
Lifespan at 25 °C	Approx. 4…5 years assuming 1 measurement per minute continuously
Shelf life at 25 °C	Approx. 10 years assuming a self-discharge rate of approx. 1% per year
Memory	EEPROM
Data retention	Approx. 10 years
Storage capacity	Approx. 2,048 pairs of pressure and temperature measurements with time stamp
Logger	
Storage rate	Can be adjusted to the second from 10 s to 59 s
	Can be adjusted to the minute from 1 min. to 4:15 (h:mm)
Start modes	Immediately or to the minute on a specific date
Operating modes	Stop (if memory full), continuous buffer and sleep mode

Accessories

The following readers are available:

iID® PENmini USB 7.0

This small, hand-held reader is operated via USB, displaying values it reads off on a laptop or PC. The PENmini is recommended for use with Series 21 DC RFID data loggers.

iID® M30 HEAD USB / RS232

The sturdy M30 HEADs have been designed to cope with tough industrial conditions. Unlike the PENmini, these are usually inbuilt modules that are integrated in the system controls.

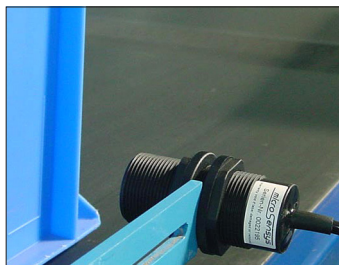Built-in locknuts make installation easier.

iID® POCKETwork HF

This reader can be used like the PENmini. Its main job, however, is to read off, display and store measurements autonomously on site at the touch of a button (currently only available for 21 D RFID pressure transponders).

The POCKETwork comes with a built-in rechargeable lithium battery, which is charged via USB. Approximately 23,500 datasets (pressure and temperature) can be stored in a circular buffer.

These values can then be transferred to an .xml file on an office computer together with the time stamp for the reading and the number of the measuring point, which can be freely selected and assigned to the transponder.

The POCKETwork has two operating modes. In DOC (direct online communication) mode, the reader is connected to the USB port on a PC and transmits data directly from the transponder to the PC and vice versa. In this case, it functions as a read head in the same way as the PENmini. In SPC (script programming communication) mode, the reader works autonomously (i.e. it is not connected to a laptop or PC) and displays instantaneous values on the OLED display directly.

iID® PENmini USB 7.0

iID® M30 HEAD RS232

iID® POCKETwork HF

Further information is available from www.microsensys.de.

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