



## PRESSURE TRANSDUCERS / 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 I<sup>2</sup>C interface.

### Series 21 D RFID Passive RFID pressure transducers

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 transducers 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

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

### Series 21 DC RFID

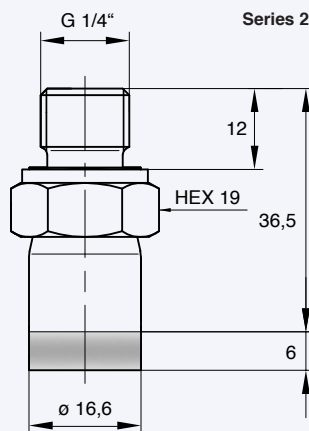
- Built-in long-life battery to log data.
- TELID®Soft scanners and PC software used for configuring the data logger, reading off-stored data and presenting collected measurements in visual form are also available accessories.



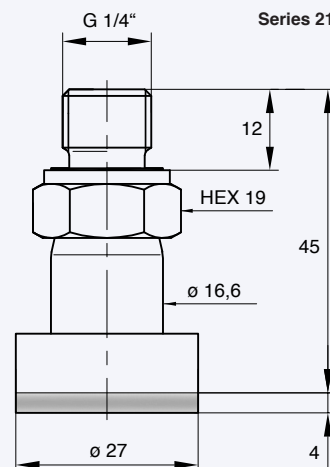
Series 21 D RFID  
RFID pressure transducer (passive)



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



Series 21 D RFID



Series 21 DC RFID



## 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: <https://www.microsensus.de/downloads/> (see also «RFID-Software» on the KELLER product page).

The pressure transponder software pack for Windows® 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 (ca. five to ten years) depends mainly on the conditions of use, be it in continuous operation or logging frequency or ambient temperature. 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.

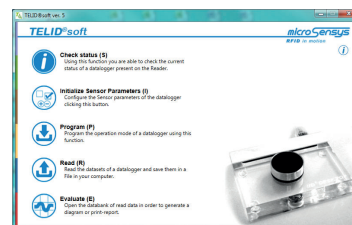
The data logger's software package contains two separate programs, which can only be downloaded from microsensys: <https://www.microsensus.de/downloads/> (see also «RFID-Software» on the KELLER product page).

- 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.



The datalogger can also be used as a pressure transponder. The POCKETwork Reader is recommended for displaying individual instantaneous values. For other options and software packages please refer to the left column.

**Specifications**Absolute pressure ranges <sup>1)</sup>

PA	0...3	0...10	0...30	0...100	0...200	0...400	0...600	0...1000 <sup>2)</sup>	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

<sup>1)</sup> Relative pressure (PR: zero point at ambient air pressure) and smaller ranges available on request<sup>2)</sup> Measuring range 1000 bar only suited for static applicationsAccuracy <sup>3)</sup> ± 0,15 %FS max. (600 bar: ± 0,25 %FS / 1000 bar: ± 0,35 %FS)Total error band <sup>4)</sup> 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.

<sup>3)</sup> Linearity (best straight line) at room temperature, hysteresis, repeatability<sup>4)</sup> 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 - DIN EN 1.4404 / 1.4435 (AISI 316L)  
- External seal FPM/FKM (no internal seals)

Plastic cap material PEEK (polyetheretherketone), epoxy resin

Oil used for filling Silicone oil

Endurance 0...100 %FS @ 25 °C: > 10 million pressure cycles <sup>2)</sup>

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 for large-volume projects are also possible.

## 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,  
thereafter, the memory contents and individual instantaneous values (transponder function) can be  
read out indefinitely but no more data will be recorded.

Memory EEPROM

Data retention Approx. 10 years

Storage capacity Approx. 32'000 pairs of pressure and temperature measurements with time stamp

## Logger

Storage rate 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 Windows® terminal device. 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.

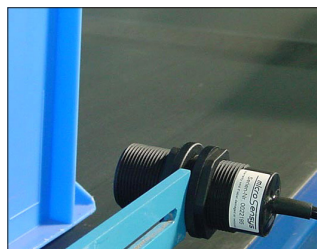
### iID® POCKETwork HF

This reader can be used like the PENmini. Its main job, however, is to read off, display and store individual instantaneous values autonomously on site at the touch of a button (cannot be used as a data shuttle for the logger data).

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.



Further information is available from [www.microsensys.de](http://www.microsensys.de).