



## (1) EC-TYPE-EXAMINATION CERTIFICATE (Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

**PTB 01 ATEX 2111**



(4) Equipment: Ultrasonic sensors, types Prosonic FDU 80, 81, 82, 80F and 81F

(5) Manufacturer: Endress + Hauser GmbH + Co.

(6) Address: D-79689 Maulburg, Germany

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 01-20414.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:  
**EN 50014:1997 + A1 + A2      EN 50028:1987**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.

(12) The marking of the equipment shall include the following:

 **II 2 G EEx m II T5    or    II 2 G EEx m II T6**

Zertifizierungsstelle Explosionsschutz  
By order:

Braunschweig, August 27, 2001

  
Dr.-Ing. U. Johannsmeyer  
Regierungsdirektor



(13)

## SCHEDULE

(14)

### EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 2111

(15) Description of equipment

The ultrasonic sensors, types FDU 80, 81, 82, 80F and 81F, are measuring sensors for continuous non-contacting measurement of liquids, either in tanks or above open flumes. Measurement is based on the echo time of an ultrasonic pulse and the reflected echo signal. The complete unit comprises one or two sensors as well as an analysing and control unit installed outside the hazardous area. The FDU 80/81 ultrasonic sensors can be provided with an internal heater so as to prevent icing of the sensors. Heating power is in that case supplied together with the echo and NTC signal, using a 4-wire cable which has a rigid connection with the sensor.

#### Electrical data

The ultrasonic sensors are suited only for connection to the associated analysing and control unit.

Type	FDU 80-J..A
Transmit voltage	55 V <sub>eff</sub>
Frequency range in the operating temperature range	40 kHz ... 70 kHz
Max. transmission length per second	10 ms
Temperature range	-20 °C ... +80 °C
Temperature class	T5
Sensor without heater	

Type	FDU 81-J..A
Transmit voltage	55 V <sub>eff</sub>
Frequency range in the operating temperature range	30 kHz ... 55 kHz
Max. transmission length per second	6 ms
Temperature range	-20 °C ... +80 °C
Temperature class	T5
Sensor without heater	

Type	FDU 82-J..A
Transmit voltage	55 V <sub>eff</sub>
Frequency range in the operating temperature range	20 kHz ... 40 kHz
Max. transmission length per second	6 ms
Temperature range	-20 °C ... +80 °C
Temperature class	T5
Sensor without heater	

Type	FDU 80-J..A
Transmit voltage	55 V <sub>eff</sub>
Frequency range in the operating temperature range	40 kHz ... 70 kHz
Max. transmission length per second	10 ms
Temperature range	-20 °C ... +60 °C
Temperature class	T6
Sensor without heater	

Type	FDU 81-J..A
Transmit voltage	55 V <sub>eff</sub>
Frequency range in the operating temperature range	30 kHz ... 55 kHz
Max. transmission length per second	6 ms
Temperature range	-20 °C ... +60 °C
Temperature class	T6
Sensor without heater	

Type	FDU 82-J..A
Transmit voltage	55 V <sub>eff</sub>
Frequency range in the operating temperature range	20 kHz ... 40 kHz
Max. transmission length per second	6 ms
Temperature range	-20 °C ... +60 °C
Temperature class	T6
Sensor without heater	

Type	FDU 80F-J..A
Transmit voltage	55 V <sub>eff</sub>
Frequency range in the operating temperature range	40 kHz ... 70 kHz
Max. transmission length per second	10 ms
Temperature range	-20 °C ... +80 °C
Temperature class	T5
Sensor without heater	

Type	FDU 81F-J..A
Transmit voltage	55 V <sub>eff</sub>
Frequency range in the operating temperature range	30 kHz ... 55 kHz
Max. transmission length per second	6 ms
Temperature range	-20 °C ... +80 °C
Temperature class	T5
Sensor without heater	

Type	FDU 80-J..B
Transmit voltage	55 V <sub>eff</sub>
Frequency range in the operating temperature range	40 kHz ... 70 kHz
Max. transmission length per second	10 ms
Temperature range	-20 °C ... +60 °C
Temperature class	T5
Sensor with heater	

Type	FDU 81-J..B
Transmit voltage	55 V <sub>eff</sub>
Frequency range in the operating temperature range	30 kHz ... 55 kHz
Max. transmission length per second	6 ms
Temperature range	-20 °C ... +60 °C
Temperature class	T5
Sensor with heater	

Type	FDU 80-J..B
Transmit voltage	55 V <sub>eff</sub>
Frequency range in the operating temperature range	40 kHz ... 70 kHz
Max. transmission length per second	10 ms
Temperature range	-20 °C ... +40 °C
Temperature class	T6
Sensor with heater	

Type	FDU 81-J..B
Transmit voltage	55 V <sub>eff</sub>
Frequency range in the operating temperature range	30 kHz ... 55 kHz
Max. transmission length per second	6 ms
Temperature range	-20 °C ... +40 °C
Temperature class	T6
Sensor with heater	

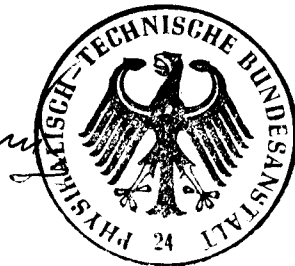
- (16) Test report PTB Ex 01-20414
  
- (17) Special conditions for safe use  
does not apply
  
- (18) Essential health and safety requirements  
covered by the above mentioned standards

Zertifizierungsstelle Explosionsschutz

Braunschweig, August 27, 2001

By order:

Dr.-Ing. U. Johannsmeyer  
Regierungsdirektor



## 1. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 2111

(Translation)

Equipment: Ultrasonic sensors, types Prosonic FDU 80, 81, 82, 80F and 81F

Marking:  II 2 G EEx m II T5 or T6

Manufacturer: Endress + Hauser GmbH + Co.

Address: Hauptstraße 1  
79689 Maulburg, Germany


### Description of supplements and modifications

The modifications concern the control of the sensor heating for the sensors, types FDU 80-...B and FDU 81-...B . Instead of the letter "J " also other characteristic letters or digits may be used for the sensors, types Prosonic FDU 80, 81, 82, 80F and 81F. Furthermore cables with marginally modified specifications may be used alternatively.

Test report: PTB Ex 04-23517

Zertifizierungsstelle Explosionschutz

By order:

  
Dr.-Ing. U. Johannsmeyer  
Regierungsdirektor



Braunschweig, March 1, 2004