

## Ultrasonic sensor UJ3000+U1+8B+RS

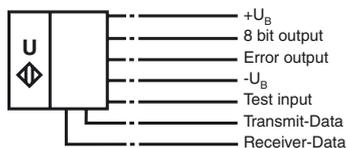


### Features

- 8 bit output
- Absolute polarity reversal protection
- Test input
- Fault output
- Serial interface
- Parameterisable with ULTRA 2001

### Electrical connection

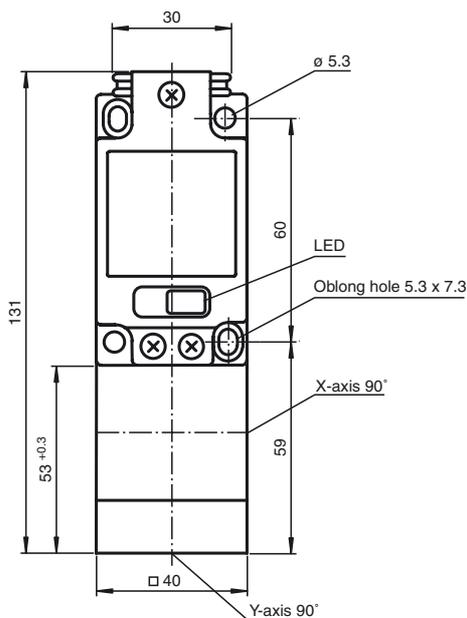
Standard symbol/Connection:



**Legend:**

+U<sub>B</sub> = Brown      Test input = Grey/Pink  
 -U<sub>B</sub> = Blue        Error output = Red/Blue  
 Interface:  
 Receiver-Data RD = White/Green  
 Transmit-Data TD = Brown/Green  
 8 bit output:  
 A1 = White        A2 = Yellow  
 A3 = Pink         A4 = Red  
 A5 = Green        A6 = Grey  
 A7 = Black        A8 = Violet

### Dimensions



### Technical data



**General specifications**

Sensing range                    300 ... 3000 mm  
 Unusable area                    0 ... 300 mm  
 Standard target plate            100 mm x 100 mm  
 Transducer frequency            approx. 130 kHz  
 Response delay                    static 4: ≤ 280 ms (factory setting)  
     static 1: ≤ 70 ms  
     dynamic: ≤ 100 ms

**Indicators/operating means**

LED red/green                    green LED: Power on  
     red LED, flashing at 2 Hz: error (high level of external noise)

**Electrical specifications**

Operating voltage                    20 ... 30 V DC , ripple 10 %<sub>SS</sub>  
 No-load supply current I<sub>0</sub>        ≤ 90 mA

**Interface**

Interface type                        RS 232, 9600 bit/s, no parity, 8 data bits, 1 stop bit

**Input**

Input type                            1 test input, (-U<sub>B</sub> + 5 V) up to +U<sub>B</sub>, ≤100 kOhm

**Output**

Output type                            8 bit output for outputting object distance, pnp  
     1 fault output, pnp NC

Resolution                            11 mm , (corresponding to 1 LSB)  
 Repeat accuracy                    11 mm , (corresponding to 1 LSB)  
 Rated operational current I<sub>e</sub>      20 mA , short-circuit/overload protected  
 Voltage drop U<sub>d</sub>                    U<sub>e</sub> - 4 V  
 Range hysteresis H                11 mm , (corresponding to 1 LSB)  
 Temperature influence            0.17 % / K

**Standard conformity**

Standards                            EN 60947-5-2

**Ambient conditions**

Ambient temperature            -10 ... 50 °C (263 ... 323 K)  
 Storage temperature            -40 ... 85 °C (233 ... 358 K)

**Mechanical specifications**

Protection degree                IP65  
 Connection                        2 m, cable, 14 x 0.14 mm<sup>2</sup>, cast terminal compartment  
 Material  
   Housing                        PBT  
   Transducer                    epoxy resin/hollow glass sphere mixture; polyurethane foam  
 Mass                                290 g

## Notes

### Description of the sensor functions

The measurement of the distance is realised using the echo time of the ultrasonic pulse. The  $\mu$  processor calculates the distance on the basis of the echo time and the speed of sound. The distance is directly issued in parallel in the form of an 8-bit data word.

A serial interface (RS 232, 9 600, n, 8, 1) is also available.

The output functions can be set up flexibly. For further information on the sensor's command set, please see the publication "Command Set for Ultrasonic Sensors with RS 232 interface".

In the event of interference that the sensor cannot handle, the sensor goes into failure mode in that the failure output opens and the 8-bit output retains the most recent measuring value. The dual LED goes into the red flashing state.

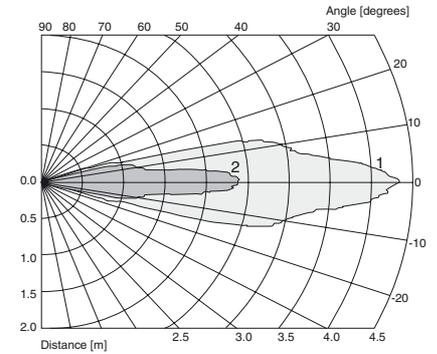
A 1 level at the test input causes the 8-bit output to switch from 00000000 to 11111111 and back every 200 ms.

## Model number

**UJ3000+U1+8B+RS**

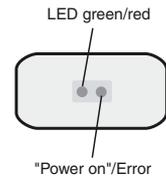
## Characteristic curves/additional information

### Characteristic response curves



Curve 1: flat plate 100 mm x 100 mm  
Curve 2: round bar, Ø 25 mm

### LED-Window



## Accessories

### Mounting aid

MH 04-2681F

### Interface-cable

UC-FP/U9-R2

### Service program

ULTRA 2001

Thanks to its extensive command set, the sensor can be configured to suit the application via the RS 232 interface..

### RS 232 command set (overview)

Command	Meaning	Parameter	Access
VS	<b>V</b> elocity of <b>S</b> ound	VS in [cm/s]	read
NDE	<b>N</b> ear <b>D</b> istance of <b>E</b> valuation	Near measuring window limit in [mm]	read and set
FDE	<b>F</b> ar <b>D</b> istance of <b>E</b> valuation	Far measuring window limit in [mm]	read and set
BDE	<b>B</b> oth <b>D</b> istances of <b>E</b> valuation	Both evaluation distances at once [mm]	read and set
REF	<b>R</b> E <b>F</b> erence measurement	REF distance in [mm]	read and set
UDS	<b>U</b> se <b>DIP</b> <b>S</b> witches	UDS binary [0/1]	read and set
FTO	<b>F</b> ilter <b>T</b> ime <b>O</b> ut	Number of measurements without echo to be filtered	read and set
EM	<b>E</b> valuation <b>M</b> ethod	Evaluation method { 0=NONE; PT1[ <i>f,p,c</i> ]; MXN[ <i>m,n</i> ]; DYN[ <i>p</i> ] }	read and set
CON	<b>C</b> ONServative filter	Counter threshold as number	read and set
FA1	<b>F</b> ilter <b>A</b> ctive <b>1</b>	Activate [1] or disable [0] filter	read and set
FW	<b>F</b> ilter <b>W</b> indow	Tolerance for current measurement value {5 ... 25} in [%]	read and set
OM	<b>O</b> utput <b>M</b> ode	OM coded [ close NO = 0, open NC = 1]	read and set
ODF	<b>O</b> utput <b>D</b> ata <b>F</b> ormat	Data format of the 8-bit output [8-bit = 8B, BCD format = BCD]	read and set
MD	<b>M</b> aster <b>D</b> evice	Function as master {0 = NONE}, AD, RD, RT, SS, ATB, RDB, RTB	read and set
CCT	<b>C</b> onstant <b>C</b> ycle <b>T</b> ime	Time in [ms]	read and set
CBT	<b>C</b> onstant <b>B</b> urst <b>T</b> ime	Burst time in [µs]	read and set
RT	<b>R</b> andom <b>T</b> ime	Random length pause after each measurement [0 = no pause, 1 = pause]	read and set
DIP	Read <b>DIP</b> switches	DIP switch setting as hexadecimal string	read
AD	<b>A</b> bsolute <b>D</b> istance	Distance in [mm]	read
RD	<b>R</b> elative <b>D</b> istance	Relative distance as number {0 ... 4095}	read
OER	<b>O</b> bject in <b>E</b> valuation <b>R</b> ange	Object within evaluation range (0 = no, 1 = yes)	read
ODR	<b>O</b> bject in <b>D</b> etection <b>R</b> ange	Object within detection range (0 = no, 1 = yes)	read
ER	<b>E</b> cho <b>R</b> eceived	Echo detected: no, yes [0/1]	read
VER	Sensor <b>VER</b> sion	Version string: xxxx	read
ID	Sensor <b>ID</b> entification	ID string: P&F UC...-IUE0/E2-R2 Eprom: xxxx Version yyyy	read
DAT	Software <b>D</b> ATE	Date string: e.g. Date: 06/11/96 Time: 16:14:26	read
FT	<b>F</b> unction <b>T</b> est	Self test, sensor returns fault code	read
RST	<b>R</b> e <b>S</b> e <b>T</b>	Performs a reset	Command
DEF	<b>D</b> E <b>F</b> ault settings	Restores defaults	Command

### Programming notes

Electrical connection of interface cable UC-FP/U9-R2 (see accessories).

Interface cable Conductor colour	Sensor terminal compartment Terminal no.
Brown (TD)	4 (RD)
Black (RD)	2 (TD)
Blue (GND)	3 (-U <sub>B</sub> )

**Filter function structure:**

