



Model Number

UB2000W-F42-E6-V15

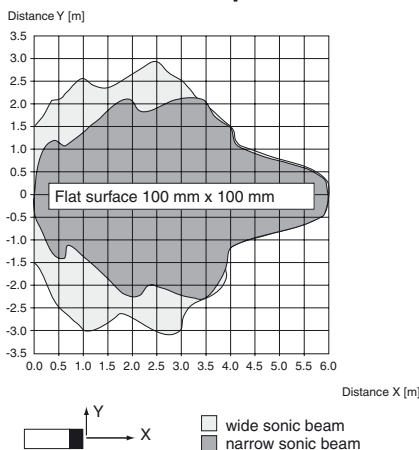
Single head system

Features

- **Very wide sound lobe**
- **2 independent switch outputs**
- **TEACH-IN**
- **Interference suppression (adjustable divergence of sound cone in close range)**
- **Synchronization options**
- **NO/NC selectable**

Diagrams

Characteristic response curve



Release date: 2011-08-16 09:04 Date of issue: 2011-08-16 193884_eng.xml

Technical data

General specifications

Sensing range	200 ... 2000 mm
Adjustment range	250 ... 2000 mm
Unusable area	0 ... 200 mm
Standard target plate	100 mm x 100 mm
Transducer frequency	approx. 40 kHz
Response delay	approx. 420 ms

Indicators/operating means

LED green	solid green: Power on
LED yellow 1	solid: switching state switch output 1 flashing: program function
LED yellow 2	solid: switching state switch output 2 flashing: program function
LED red	normal operation: "fault" program function: no object detected

Electrical specifications

Operating voltage U_B	10 ... 30 V DC PELV (protection class 3 in acc. with VDE 0106/IEC 364-4-41) , ripple 10 % _{SS}
No-load supply current I_0	≤ 50 mA

Input/Output

Synchronization	bi-directional 0 level: $-U_B \dots +1 V$ 1 level: $+4 V \dots +U_B$ input impedance: > 12 KOhm synchronization pulse: ≥ 100 μs, synchronization interpulse period: ≥ 2 ms
-----------------	--

Synchronization frequency	
Common mode operation	≤ 13 Hz
Multiplex operation	≤ 13/n Hz, n = number of sensors

Output

Output type	2 switch outputs PNP, NO/NC selectable
Rated operational current I_e	200 mA , short-circuit/overload protected
Default setting	Switch point A1: 250 mm , Switch point A2: 2000 mm , Switch point A3: 1000 mm , medium sound lobe
Voltage drop U_d	≤ 2.5 V
Repeat accuracy	≤ 0.5 % of switching point
Switching frequency f	≤ 1.2 Hz
Range hysteresis H	5 mm
Temperature influence	± 1 % of full-scale value

Ambient conditions

Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)

Mechanical specifications

Connection type	Device connector M12 x 1 , 5-pin
Protection degree	IP54
Material	
Housing	ABS
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Mass	140 g

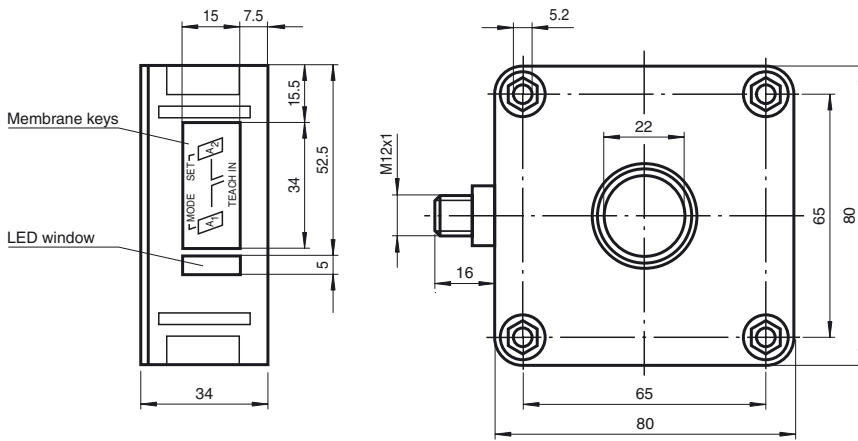
Compliance with standards and directives

Standard conformity	
Standards	EN 60947-5-2:2007 IEC 60947-5-2:2007

Approvals and certificates

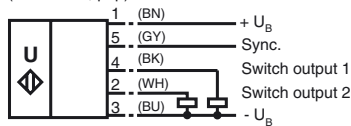
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose

Dimensions



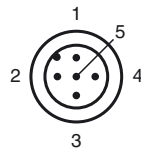
Electrical Connection

Standard symbol/Connections:
(version E6, pnp)



Core colours in accordance with EN 60947-5-2.

Pinout

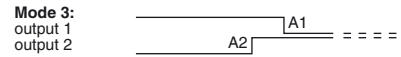
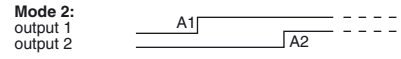
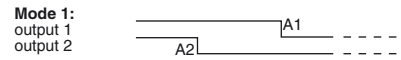
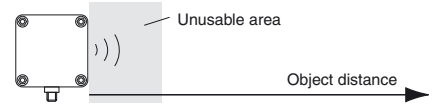


Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

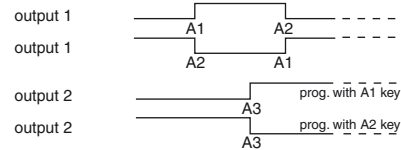
Additional Information

Switching output programming



A1 → ∞, A2 → ∞ : Object presence detection.
Both outputs operate according to the selected mode, if an object is located within the detection range.

Window and Switching point:



Note:

→ ∞ means: cover transducer surface with your hand, while programming the output.

If A1 = A2, the output work like A1 < A2

Accessories

MH 04-3505

Mounting aid for FP sensors

MHW 11

Mounting brackets for sensors

V15-G-2M-PVC

Cable socket, M12, 5-pin, PVC cable

V15-W-2M-PUR

Cable socket, M12, 5-pin, PUR cable

UC-PROG1

Programming adapter

Functional description

The sensor can be completely parameterised using 2 keys on the side of the housing. One special feature of this sensor is the option of adapting the ultrasonic beam width to the ambient conditions at the place where the sensor is used.

Teach-in of switching points:

Teach-in of switching points is used to determine the points at which the switching outputs will change their state. In addition, the order of switching points $A1 < A2$, or $A1 > A2$ also determines the effective direction (normally closed/open function) of the window in the output function (operating mode) "Window + Switching point" (see below).

Teach-in of switching point A1 with key A1	
Press key A1 > 2 seconds	The sensor goes into learning mode for switching point A1
Position the target object at the desired distance	The sensor indicates by rapid flashing of the yellow LED that the target object has been detected. If no object is detected, the red LED flashes.
Press key A1 briefly	The sensor completes the Teach-in process for switching point A1 and stores the value in permanent memory. If the object is uncertain (red LED lit irregularly) the Teach-in value is not valid. Teach-in mode closes.

The process for Teach-in of switching point A2 is similar to what was described above, using key A2.

Special feature for output function "Window + switching point"

In the case of the output function (operating mode) "Window + switching point" (see below), switching points A1 and A2 define the window limits of switch output 1.

A third switching point A3 can also be defined here at which switch output 2 switches.

Teach-in of switching point A3 with keys A1 and A2 (only for operating mode window + switching point, see below)	
Press key A1 + A2 > 2 seconds	The sensor goes into learning mode for switching point A3
Position the target object at the desired distance	The sensor indicates by rapid flashing of the yellow LEDs that the target object has been detected. If no object is detected, the red LED flashes.
Press key A1 briefly (output 2: normally closed) or Press key A2 briefly (output 2: normally open)	The sensor completes the Teach-in process for switching point A3 and stores the value in permanent memory. If the object is uncertain (red LED lit irregularly) the Teach-in value is not valid. Teach-in mode closes.

Teach-in for switching points can only be performed within the first 5 minutes after turning on the power supply. If the switching points need to be changed at a later time, this cannot be done until there is a new Power On.

Parameter assignment of the output function and ultrasound beam width

If you press the A1 key while the power supply is being turned on and then hold it down for 1 second, the sensor goes into the two-level parameterisation of operating modes.

Level 1, parametrisation of the output function

Pressing the A2 key briefly will cause the possible output functions to be selected one after the other (depending on the last output function to be parameterised). The functions are indicated by a flashing sequence of the green LED.

Operating mode	Flashing sequence of green LED	A2 key
2 x normally open function (default)		
2 x normally closed function		
2 switching points n.o. (output 1) + n.c. (output 2)		
Window (output 1) + switching point (output 2)		

Pressing the A1 key for 2 seconds saves the selected output operating mode. The parameter assignment process is then complete and the sensor returns


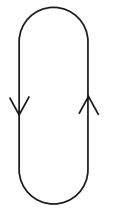
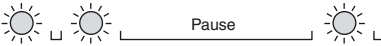

Release date: 2011-08-16 09:04 Date of issue: 2011-08-16 193884_eng.xml

to normal mode. If you press the A1 key briefly instead, you go to Level 2 (parameter assignment of ultrasonic beam range).

Level 2, parameter assignment of ultrasonic beam width

The ultrasonic beam width can be adjusted to match the requirements of the application in Level 2.

Pressing the A2 key briefly will cause the possible beam widths to be selected one after the other (depending on the last beam width to be parameterised). The functions are indicated by a flashing sequence of the red LED.

Beam width	Flashing sequence of red LED	A2 key
Narrow beam width		
Average beam width		
Wide beam (default)		

Pressing the A1 key for 2 seconds saves the selected type of beam width. The parameter assignment process is then complete and the sensor returns to normal mode. If you press the A1 briefly instead, you go back to Level 1 (parameter assignment of output function).

If parameterisation is not complete within 5 minutes (pressing the A1 key for 2 seconds), the sensor interrupts parameterisation mode without changing the settings.

Synchronisation

The sensor is equipped with a synchronisation connection to suppress mutual interaction. If it is not turned on, the sensor works at an internally generated cycle rate. Synchronisation of more than one sensor is possible in a number of different ways.

External synchronisation:

The sensor can be synchronised by the application of a square wave voltage externally. A synchronisation pulse on the synchronisation input results in the execution of a measurement cycle. The pulse width must be greater than 100 µs. The measurement cycle must be started with the falling signal edge. A Low level > 1 s or an open synchronisation input results in normal operation of the sensor. A High level on the synchronisation input deactivates the sensor.

Two different operating modes are possible

- Multiple sensors can be controlled by the same synchronisation signal. The sensors work on synonymous cycle.
- Synchronisation pulses are sent cyclically to only one sensor each time. The sensors work in Multiplex mode.

Self synchronisation:

The synchronisation connections of up to 5 sensors with option for self-synchronisation are connected with each other. These sensors work after turning on the operating voltage in Multiplex mode. The On delay increases depending on the number of sensors to be synchronised. Synchronisation is possible during Teach-in and vice-versa. Sensors must be operated unsynchronised to perform Teach-in of switching points.

Note:

If the option for synchronisation is not used, the synchronisation input can be connected with ground (0 V) or the sensor can be operated with a V1 connection cable (4-pin).

Serial interface

Syntax

The communication is performed via RS 232 protocol with the parameters 2400,8,N,1. There is a set of ASCII commands implemented, to enable communication via a terminal software as well.

Communication is carried out over the function outputs. The data input corresponds to the sync. connection (pin 5) and the data output corresponds to the switching output (pin 4). Due to that there is an interface adapter required for conversion of the signal levels. The communication is initialized by a power-on reset with connected interface adapter. Within 15 s after this power-up reset, the special „magic chars“ * ! must be received, to activate the serial interface. During this period of time, all LEDs are off. After the reception of the „magic chars“ the green and both yellow LEDs go on as a confirmation. If the „magic chars are not received, communication will be blocked after 15 s. For another communication session, once more a power-on reset has to be carried out.

Each communication has to be terminated by a carriage return <cr>.

In principal, the following command sequences are defined::

- command: This command causes a reaction at the device. It will only be confirmed (acknowledge).
- read-only: This command reads data from the device. There is read only. It is not possible, to change the data.
- read-write: This command reads parameters from the device and can also write this parameter with a new value. The new parameter will be approved and with a positive acknowledge accepted or with a negative acknowledge denied.

Hint:

As acknowledge, standard characters (in the ASCII character set up to 0x7F always shown in the same way) are used:

- + positive acknowledge
- negative acknowledge (not specified, invalid parameter)
- ? unknown command

Set of commands

Release date: 2011-08-16 09:04 Date of issue: 2011-08-16 193884_eng.xml

Command	Meaning	Category
ID	ID String "P&F UB2000W-F42-E6-V15"	read
IDD	Date String z.B.: "Date: Nov 17 2006 Time: 08:11:09 ;18-31039 v0.01"	read
IDP	Partnumber "193884"	read
IDF	Firmware number "18-31039"	read
SD1	Read Switching Distance 1, unit [mm]	read
SD2	Read Switching Distance 2, unit [mm]	read
SD3	Read Switching Distance 3, unit [mm]	read
SD1=xxxx	Set Switching Distance 1, unit [mm]	write
SD2=xxxx	Set Switching Distance 2, unit [mm]	write
SD3=xxxx	Set Switching Distance 3, unit [mm]	write

Communication start:

- Power-on with connected interface adapter (e.g. UC-PROG1-Y194053), all LEDs are off.
- Waiting for magic chars *! (time lock 15 s), after reception of the magic chars, the green and both yellow LEDs go on.

Command description:

*! Enable Kommunikation
 ID<cr> IDString
 IDD<cr> Date String of Software
 IDP<cr> Partnumber