ULTRASONIC

Distance and Proximity Sensors

Series UPT

Key-Features:

- Available measurement ranges from 400 to 3500 mm
- Repeatability up to 0.5 mm
- Linearity < 0.5 % of full scale
- Ultrasonic distance sensor or 2 point proximity switch
- Rectangular housing with small dimensions
- Teachable measurement range
- Measurement is independent of the targets material, surface, colour or transparency
- Protection class up to IP67

Content:

18.12.14

WayCon
Positionsmesstechnik

TECHNICAL DATA

		UPT-400	UPT-500	UPT-800	UPT-1600	UPT-2000	UPT-3500
Detection range	[mm]	30...400	60...500	100...800	80...1600	200...2000	350...3500
Repeatability		0.5 mm	0.2 % / 1 mm			0.2 % / 2 mm	
Linearity	[%]	<0.5					
Resolution	[mm]	0.125	0.25	1			
Inverted characteristic curve		yes					
Control inputs		yes					
Safety features		Protection against reverse polarity and short circuit					
Temperature range	[°C]	-20...+70					
Connection		M12 connector					
Dimensions	[mm]	101 x 36 x 32.5					
Housing material		plastics					
Protection class		IP65	IP67	IP67	IP65	IP67	IP67
Angle of the sound cone		8°					

Distance sensor							
Response time	[ms]	60	100		140	200	400
Signal output		0...10 V / 4...20 mA					
Adjustment		by Teach-in mode					
Current consumption (no load)	[mA]	35					
Power supply	[VDC]	15...30					

2 point proximity switch							
Response time	[Hz]	15	10		6	5	02.05.13
Signal output		PNP / NPN					
Hysteresis	[%]	1					
Max. output current	[mA]	500					
Adjustment of switching points		by Teach-in mode					
Current consumption (no load)	[mA]	70					
Power supply	[VDC]	15...30					

TECHNICAL DRAWING
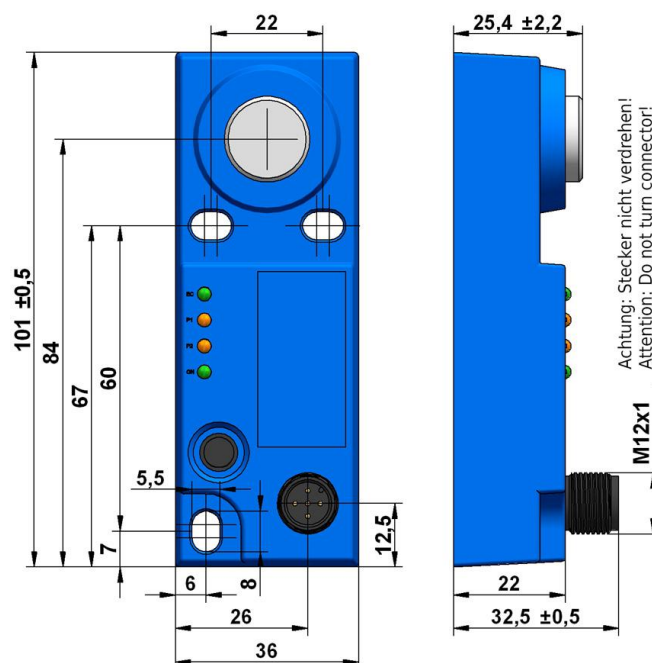
TEACH-IN GUIDE 2 POINT PROXIMITY SWITCH

2 point proximity switch (teach-In)

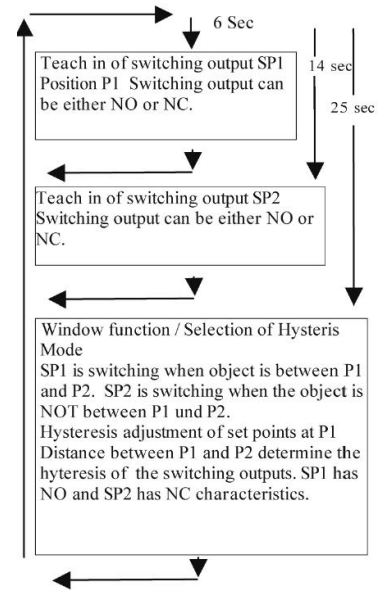3 different modes of switching outputs can be selected with this sensor

- Normal switching function
- Window function
- Adjustable hysteresis

All these functions are selected by using the Teach key. Each mode has a different sequence

using the Echo, P1 and P2 LEDs.

The different steps are shown in the diagram on the right.

Functions of the sensors control devices:

EC (Echo LED):	is on, when an echo is received (alignment LED).
P1 LED:	Status of the switching output SP1
P2 LED:	Status of the switching output SP2
ON LED:	on if the sensor is connected to power supply
Teach Key (TK):	Button (total teach in time approx. 30 sec.)

6 Sec

Teach in of switching output SP1 Position P1 Switching output can be either NO or NC. 14 sec

25 sec

Teach in of switching output SP2 Switching output can be either NO or NC.

Window function / Selection of Hysteris Mode
SP1 is switching when object is between P1 and P2. SP2 is switching when the object is NOT between P1 und P2.
Hysteresis adjustment of set points at P1 Distance between P1 and P2 determine the hyteresis of the switching outputs. SP1 has NO and SP2 has NC characteristics.

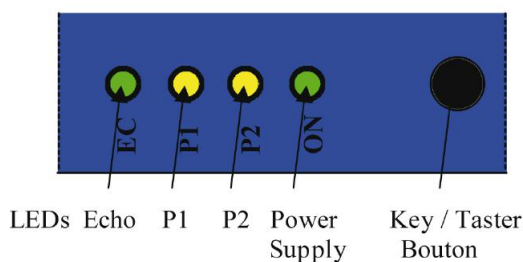## 1. Normal switching function:

Setting the switching point P1

1. Press Teach-Key (approx. 6 sec.) until Echo and P1 LEDs start blinking with a 2 Hz frequency. The sensor is now in Teach Mode P1.
2. P1 LED will now blink with 1 Hz frequency and the Echo LED will go back to normal function (alignment LED). There is a time window of 30 sec to do the programming of P1. Place the target at the new position P1. Press Teach Key once: P1 is now stored.
3. Switching output characteristics: Is LED P1 on when pressing the Teach Key, the switching output SP1 will have a NO characteristics, Is LED P1 off when pressing the Teach Key, the switching output SP1 will have a NC characteristics
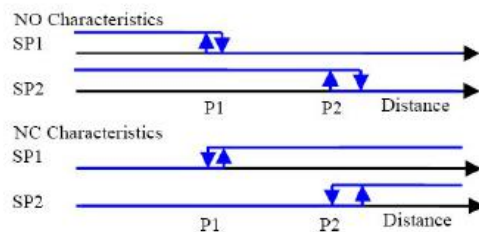
Setting the switching point P2

1. Press Teach-Key until Echo and P2 LEDs start blinking with a 2 Hz frequency. First Echo and P1 will be blinking, but please wait for P2 to start blinking. The sensor is now in Teach Mode P2.
2. P2 LED will now blink with 1 Hz frequency and the Echo LED will go back to normal function (alignment LED). There is a time window of 30 sec to do the programming of P2. Place the target at the new position P2. Press Teach Key once: P2 is now stored.
3. Switching output characteristics: Is LED P2 on when pressing the Teach Key, the switching output SP2 will have a NO characteristics, Is LED 2 off when pressing the Teach Key, the switching output SP2 will have a NC characteristics

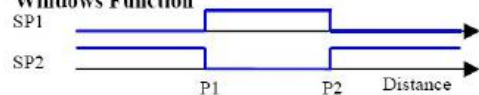## 2. Window function / Hysteresis adjustment

1. Press Teach-Key until Echo, P1 and P2 LEDs start blinking with a 2 Hz frequency. Before reaching the hysteresis teach mode, the sensor will go through the P1 and P2 teaching sequence. So please keep the Teach-Key pressed until reaching the point when all LEDs are blinking.
   The sensor is now in teach mode for Window function / Hysteresis adjustment.
2. P1 and P2 are blinking now with a 1 Hz frequency and EC is in normal function (alignment LED). There is a time window of 30 sec to do the programming.
2.1. Press and release the Teach-Key: P1 and P2 are OFF during pressing the Teach-Key, the sensor will operate in the Windows function.
   Is there an object between P1 and P2, SP1 will switch ON and SP2 will switch OFF. Is there no object between P1 and P2, SP1 will switch OFF and SP2 will switch ON.
2.2. If P1 and P2 are ON during contact the sensor will operate in Hysteresis mode.
   The switching output SP1 will be (NO) at P1 with hysteresis P1-P2 and switching output SP2 will be (NC) also at P1 with hysteresis P1-P2.

LEDs Echo P1 P2 Power Supply Key / Taster Bouton
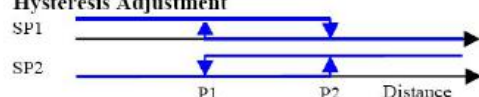
Normal Switching Operation

NO Characteristics
SP1
SP2
P1 P2 Distance

NC Characteristics
SP1
SP2
P1 P2 Distance

Windows Function
SP1
SP2
P1 P2 Distance

Hysteresis Adjustment
SP1
SP2
P1 P2 Distance

TEACH-IN GUIDE DISTANCE SENSOR ANALOG OUTPUT

Analog output 0...10 V / 4...20 mA (teach-In)

Functions of the sensors control devices:

EC (Echo LED):   is on, if an echo is received (alignment LED).
P1, P2 LED: either P1 or P2 is On if there is no object between P1 and P2.
ON LED: On if the sensor is connected to power supply
Teach Key (TK):   Button (total teach in time approx. 30 sec.)
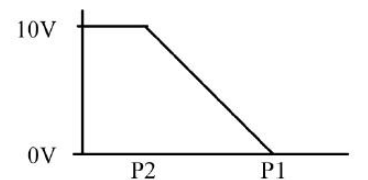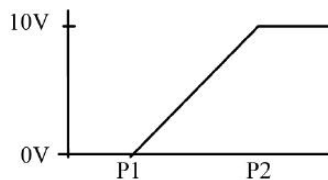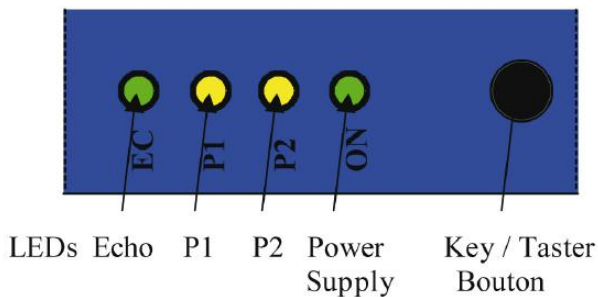
Positive slope: P1<P2

Negative slope: P2<P1

Teach Mode P1 (Position 0 V, respectively 4 mA)

1. Press Teach-Key (approx. 6 sec.) until EC (Echo LED) and P1 are blinking with a 2 Hz frequency. The sensor is now in Teach Modus P1.
2. Release Teach-Key: now P1 blinks with a 1 Hz frequency and EC LED is in function (alignment LED). There is a time window of 30 sec to teach the P1 position. Place the target at the desired position P1 (0 V / 4 mA). Press Teach-Key shortly. P1 is now stored. The sensor now returns into normal function with a new value for P1.

Teach-In Mode P2 (Position 10 V, respectively 20 mA)

3. Press Teach-Key (approx. 15 sec.) until EC (Echo LED) and P2 are blinking with a 2 Hz frequency. First Echo and P1 will be blinking, but please wait for P2 to start blinking. The sensor is now in Teach Modus P2.
4. Release Teach-Key: now P2 blinks with a 1 Hz frequency and EC LED is in function (alignment LED). There is a time window of 30 sec to teach the P2 position. Place the target at the desired position P2 (10 V / 20 mA). Press Teach-Key shortly. P2 is now stored. The sensor now returns into normal function with a new value for P2.

LEDs Echo P1 P2 Power Supply Key / Taster Bouton

Positive slope: P1<P2   Negative (inverted) slope: P2<P1

P1: determines the position where the characteristic line takes the value 0 V or 4 mA
P2: determines the position where the characteristic line takes the value 10 V or 20 mA

With these two points the working range of the analog characteristic line is configured.

ELECTRICAL CONNECTION

Analog output

PIN assignment	
PIN 1	+24 V
PIN 2	n.c.
PIN 3	0 V / GND
PIN 4	Analog
PIN 5	HOLD / SYNC
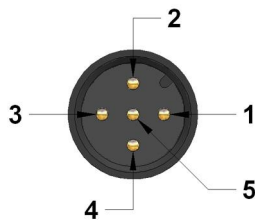
Output proximity switch

PIN assignment	
PIN 1	+24 V
PIN 2	SP2
PIN 3	0 V / GND
PIN 4	SP1
PIN 5	HOLD / SYNC
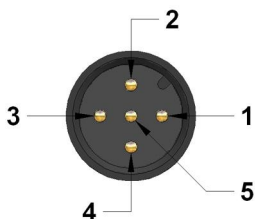
Connection cable

Cable with M12 connector, 5 pole, shielded, IP67	
K5P2M-S-M12	2 m, M12 connector straight
K5P5M-S-M12	5 m, M12 connector straight
K5P10M-S-M12	10 m, M12 connector straight
K5P2M-SW-M12	2 m, M12 connector angular
K5P5M-SW-M12	5 m, M12 connector angular
K5P10M-SW-M12	10 m, M12 connector angular

PIN	cable colour
1	brown
2	white
3	blue
4	black
5	grey

WayCon Positionsmesstechnik

SOUND CONE GEOMETRY

The exact geometry of the sound cone depends on the air-pressure, temperature, humidity and size of the target.

UPT- 400

mm
+130
-130

0   30   400   mm

Guaranteed detection of a target 100x100 mm²
Sichere Erfassung eines Objektes 100x 100 mm²
Détection assurée d'une cible de 100x100 mm²

Possible detection of a large target
Mögliche Erfassung eines großen Objektes
Détection possible d'une large cible

UPT-500

mm
+150
-150

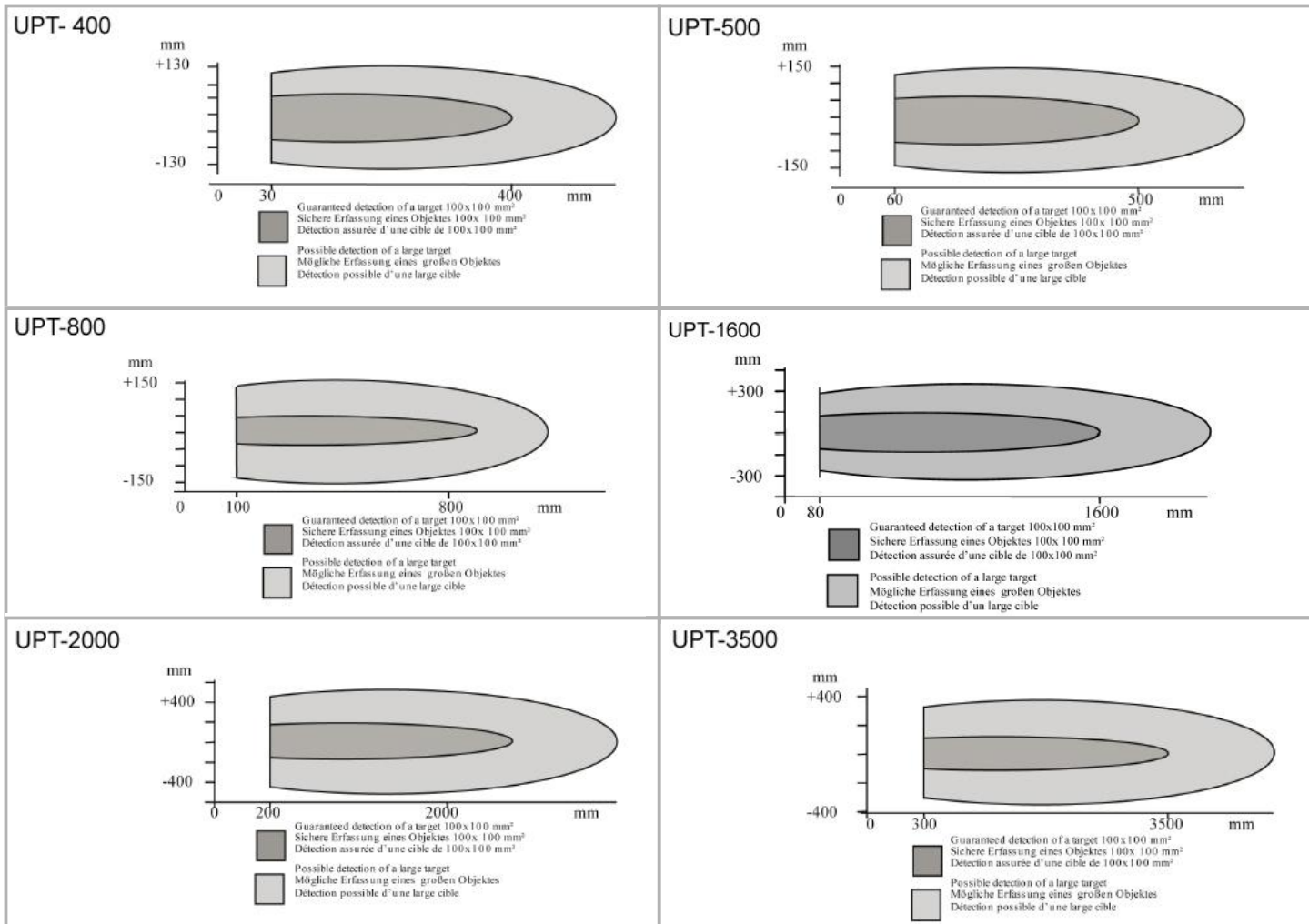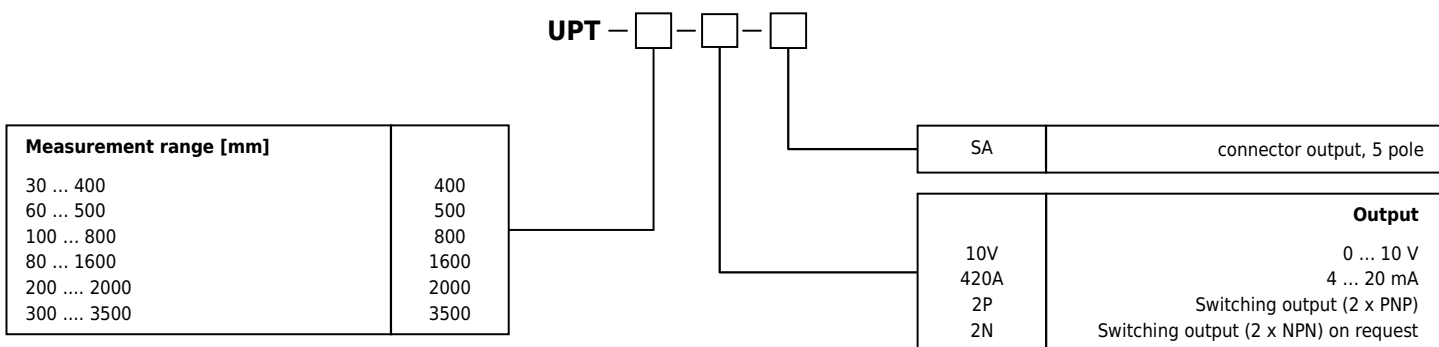0   60   500   mm

Guaranteed detection of a target 100x100 mm²
Sichere Erfassung eines Objektes 100x 100 mm²
Détection assurée d'une cible de 100x100 mm²

Possible detection of a large target
Mögliche Erfassung eines großen Objektes
Détection possible d'une large cible

UPT-800

mm
+150
-150

0   100   800   mm

Guaranteed detection of a target 100x100 mm²
Sichere Erfassung eines Objektes 100x 100 mm²
Détection assurée d'une cible de 100x100 mm²

Possible detection of a large target
Mögliche Erfassung eines großen Objektes
Détection possible d'une large cible

UPT-1600

mm
+300
-300

0   80   1600   mm

Guaranteed detection of a target 100x100 mm²
Sichere Erfassung eines Objektes 100x 100 mm²
Détection assurée d'une cible de 100x100 mm²

Possible detection of a large target
Mögliche Erfassung eines großen Objektes
Détection possible d'un large cible

UPT-2000

mm
+400
-400

0   200   2000   mm

Guaranteed detection of a target 100x100 mm²
Sichere Erfassung eines Objektes 100x 100 mm²
Détection assurée d'une cible de 100x100 mm²

Possible detection of a large target
Mögliche Erfassung eines großen Objektes
Détection possible d'une large cible

UPT-3500

mm
+400
-400

0   300   3500   mm

Guaranteed detection of a target 100x100 mm²
Sichere Erfassung eines Objektes 100x 100 mm²
Détection assurée d'une cible de 100x100 mm²

Possible detection of a large target
Mögliche Erfassung eines großen Objektes
Détection possible d'une large cible

ORDER CODE

UPT – ☐ – ☐ – ☐

Measurement range [mm]	
30 ... 400	400
60 ... 500	500
100 ... 800	800
80 ... 1600	1600
200 2000	2000
300 3500	3500

SA	connector output, 5 pole

	Output
10V	0 ... 10 V
420A	4 ... 20 mA
2P	Switching output (2 x PNP)
2N	Switching output (2 x NPN) on request

Warning, Safety Information

These devices are not designed for critical safety or emergency shut-down purposes. Therefore they should never be used in an application, where a malfunction of the device could cause personal injury.

Subject to change without prior notice.