Autonics

Ultrasonic Sensor Programing Unit

UT-P Series
PRODUCT MANUAL

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.
The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

CE UK CA KC

Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

⚠ **Warning** Failure to follow instructions may result in serious injury or death.

01. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)
Failure to follow this instruction may result in personal injury, economic loss or fire.

02. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact, salinity, moisture, or steam, or dust may be present.
Failure to follow this instruction may result in explosion or fire.

03. Do not disassemble or modify the unit.
Failure to follow this instruction may result in fire.

04. Do not connect, repair, inspect, or replace the unit while connected to a power source.
Failure to follow this instruction may result in fire.

**05. Qualified personnel shall carry out installation, configuration. Responsible person for use is an operator who:
- is fully knowledgeable about the installation, settings, use and maintenance of the product.**
Failure to follow this instruction may cause malfunction or result in accident.

⚠ **Caution** Failure to follow instructions may result in injury or product damage.

01. Use the product within the rated specifications.
Failure to follow this instruction may result in fire or product damage.

02. Use a dry cloth to clean the unit, and do not use water or organic solvent.
Failure to follow this instruction may result in fire.

03. Do not connect the load if only USB power is supplied.
Failure to follow this instruction may result in fire or product damage.

04. IO-Link and UT-P communications cannot be used simultaneously.
Do not connect wiring arbitrarily.

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- The 5 VDC⎓, 12 - 30 VDC⎓ power input is insulated and limited voltage/current or use SELV, Class 2 power supply.
- Use the product, after 3 sec of supplying power.
- Wire as short as possible and keep away from high voltage lines or power lines, to prevent surge and inductive noise. Do not use near the equipment which generates strong magnetic force or high frequency noise (transceiver, etc.).
In case installing the product near the equipment which generates strong surge (motor, welding machine, etc.), use diode or varistor to remove surge.
- This unit may be used in the following environments.
- Indoors (in the environment condition rated in 'Specifications')
- Altitude max. 2,000 m
- Pollution degree 3
- Installation Category II

Cautions for Installation

- Install the unit correctly with the usage environment, location, and the designated specifications.
- Do NOT impacts with a hard object or excessive bending of the wire lead-out. It may cause damage the water resistance.
- Do NOT pull the cable with a tensile strength of 80 N or over. It may result in fire due to the broken wire.

Product Components

- Product × 1
- USB 2.0 A-MiniB type cable (1 m) × 1
- Instuction Manual × 1
- Ferrite core × 1

Sold Separately

- Ultrasonic sensor: UTR Series
- M12 Connector cable: CIDH4-□, CLDH4-□, C1D5-□

Software

Download the installation file and the manuals from the Autonics Website.

■ atDistance

It is the monitoring data management program for installation of the ultrasonic sensor, parameter setting, and status information.

Specification

Model	UT-P
Power supply	External power: 12 - 30 VDC⎓ (ripple P-P: ≤ 10 %) USB power: 5 VDC⎓ USB bus power [01]
Current consumption [02]	≤ 25 mA (no load)
Functions	Real-time monitoring of sensing distance. Perform UTR Series functions and set parameters through the dedicated software (atDistance).
Protection circuit	Surge protection circuit, output short over current protection circuit, reverse polarity protection
Insulation resistance	≥ 50 MΩ (500 VDC⎓ megger)
Dielectric strength	Between the charging part and the case : 1,000 VAC∼ 50 / 60 Hz for 1 min
Vibration	1.5 mm amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours
Shock	500 m/s² (≈ 50 G) in each X, Y, Z direction for 3 times
Ambient temperature	5 to 60 °C, storage: -40 to 85 °C (no freezing or condensation)
Ambient humidity	0 to 50 %RH, storage: 0 to 50 %RH (no freezing or condensation)
Protection structure	IP20 (IEC standard)
Connection	Cable connector type models
Connector spec.	USB (mini-B type), M12 5-pin socket connector, M12 4-pin plug connector
Material	Case: PC, cable: PVC
Approval	CE ⌾ ⌾

01) USB bus Power is supplied from PC or USB host controller.
02) 3 sec after supplying power, up to 50 mA with button input.

First Beginning

01. **Connect the programming unit to the ultrasonic sensor before supplying power.**

02. **Supply the external power**

If the external power and the USB power are supplied together, the external power is operated. When USB power is supplied on supplying external power or external power is released on supplying external power and USB power together, the programming unit and the ultrasonic sensor are restarted.

03. **The display shows [HELLo] and enters RUN mode.**

04. **Run the parameter reading.**

If the ultrasonic sensor model connected to the programming unit is replaced, parameter writing is possible only when the parameter reading run.
[no PArAñEtEr] will be displayed when you enter Direct Setting or Add-On mode if you have never run the parameter reading.
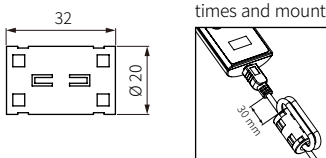
Dimensions

- Unit: mm, For the detailed drawings, follow the Autonics website.
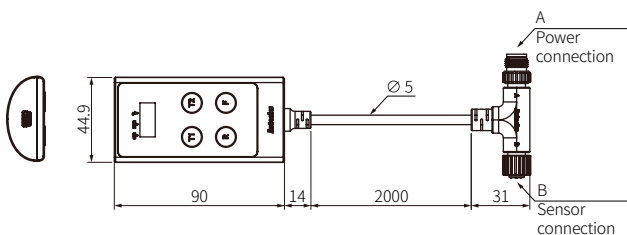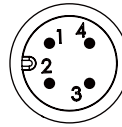

■ Ferrite core

- Wind the cable through the inside of the ferrite core three times and mount the ferrite core.
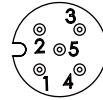

Connector Specification

- Fasten the connector along the thread. (tightening torque: 0.39 to 0.49 N m)
- Fasten the vibration part with PTFE tape not to loosen.
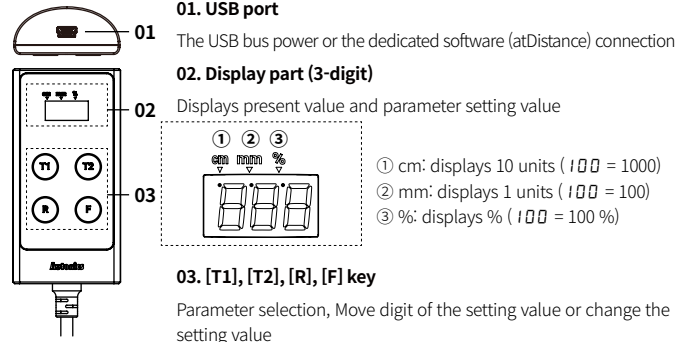
■ A: Power connection

Pin no.		Function	
① **Brown**	VCC	12 - 30 VDC⎓
② **White**	I/V	Analog output
③ **Blue**	GND	0 V
④ **Black**	C/Q	Digital output

■ B: Sensor connection

Pin no.		Function	
① **Brown**	VCC	12 - 30 VDC⎓
② **White**	I/V	Analog output
③ **Blue**	GND	0 V
④ **Black**	C/Q	Digital output
⑤ **Yellow**	COM	Multifunctional input

Unit Descriptions

01. USB port

The USB bus power or the dedicated software (atDistance) connection

02. Display part (3-digit)

Displays present value and parameter setting value

① cm: displays 10 units (100 = 1000)
② mm: displays 1 units (100 = 100)
③ %: displays % (100 = 100 %)

03. [T1], [T2], [R], [F] key

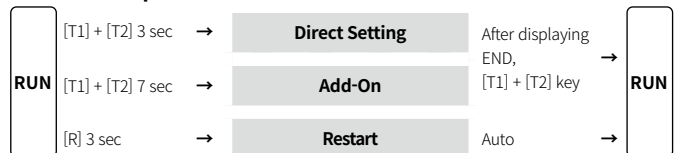Parameter selection, Move digit of the setting value or change the setting value
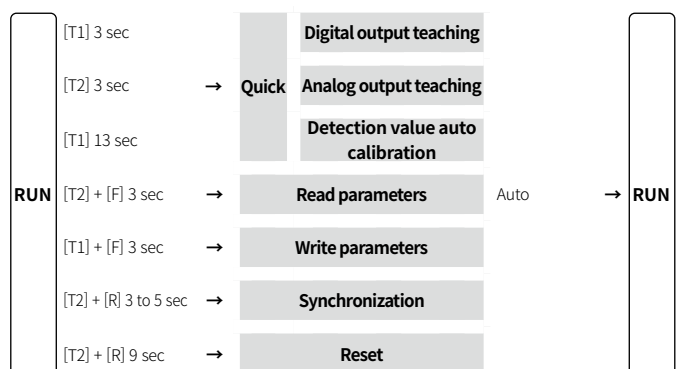
Mode Setting

- The available mode setting varies with the power supply method (external power/ USB power).
- On entering the mode, the key input elapse time is displayed through the display part. If there is no key input for 27 sec, the settings are ignored and it returns to the RUN mode.
- For more information, refer to the product manual.

■ External power / USB Power

RUN	[T1] + [T2] 3 sec →	Direct Setting	After displaying END, [T1] + [T2] key →	RUN
	[T1] + [T2] 7 sec →	Add-On		
	[R] 3 sec →	Restart	Auto →	

■ External power

RUN	[T1] 3 sec	Quick	Digital output teaching		RUN
	[T2] 3 sec →		Analog output teaching		
	[T1] 13 sec		Detection value auto calibration		
	[T2] + [F] 3 sec →		Read parameters	Auto →	
	[T1] + [F] 3 sec →		Write parameters		
	[T2] + [R] 3 to 5 sec →		Synchronization		
	[T2] + [R] 9 sec →		Reset		

Ultrasonic Sensor UTR Series Reading / Writing Pararmeters

- Available only when supplying external power without the USB connection.
- Apply the same to the programming unit and the ultrasonic sensor by using reading / writing after changing the parameter setting value.

■ Reading parameters (Ultrasonic sensor → Programming unit)

Display	Setting operation
RUN mode	Press the [T2] + [F] key for 3 sec.
UPL	Release the key
888 → 888 → 888 (CCW rotation)	Ultrasonic sensor → Programming unit parameter reading run
End	The parameter reading is complete, and enter the RUN mode.

■ Writing parameters (Ultrasonic sensor ← Programming unit)

- On running the parameter writing, the sensor and model that read the parameter must be the same as the most recently.
  If it is not the same model, run the parameter read first.

Display	Setting operation
RUN mode	Press the [T1] +[F] key for 3 sec.
dnL	Release the key
888 → 888 → 888 (CC rotation)	Ultrasonic sensor ← Programming unit parameter writing run
End	The parameter writing is complete, and enter the RUN mode.

Synchronization / Reset

- Available only when supplying external power without the USB connection.
- Press the [T2] + [R] key to set up multiplex OFF / factory reset.
- If the [T2] keys are pressed for 12 sec for each parameter item, the existing settings are ignored and the CAN is displayed before returning to RUN mode.

■ Multiplex OFF

- Same as the select synchronization mode (setting value: 00) setting in Add-on mode.

Display	Setting operation
RUN mode	Press the [T2] + [R] key for 3 to 5 sec
SYC	Release the key
SYn	Press the [T2] key for 3 sec
RUN mode	YES: synchronization use, Release the [T2] key to complete setting and enter RUN mode.

■ Factory reset

Display	Setting operation
RUN mode	Press the [T2] + [R] key for 9 sec
rSt	Release the key
rES	Press the [T2] key for 3 sec
RUN mode	YES: factory reset completion, Release the [T2] key to reset to default and enter RUN mode.

Restart

- Restart the ultrasonic sensor.

Display	Setting operation
RUN mode	Press the [R] key for 3 sec.
rESEt	Release the key
RUN mode	The programming unit and sensor are restarted and enter the RUN mode. The parameter setting value is maintained.

Error

- In case an error occurs, the setting is canceled and the RUN mode is returned.

Display	Cause
Error	Out of the parameter setting range or teaching range
	Use present value correction before temperature stabilization (after about 30 min of supplying power)
	The model that tries to write parameters is different from the model that reads the parameter lastly.
	Set analog teaching with digital output models

Direct Setting

- Some parameters are activated / deactivated depending on the model or setting of other parameters.
- [T1] + [T2] key: Selects the parameter.
  [T1] key: Transfers the previous parameter and digit of the setting value.
  [T2] key: Transfers the next parameter and change the setting value.

■ Digital output

Parameter	Slide display	Defaults	Setting range	Display condition
Output method	dir SEt	d	D: digital output IV: analog output	-
Operation mode	nodE SELECt	ArE	ARE: area, WIN: window 1-P: one-point	
Switching point 1 [01]	SP1	1000	[UTRCM18] 120 to 1299 mm	Operation mode : ARE
		6000	[UTRCM30] 600 to 7999 mm	
		1000	[UTRCM18] 121 to 1299 mm	Operation mode : WIN
		6000	[UTRCM30] 601 to 7999 mm	
		500	[UTRCM18] 123 to 1274 mm	Operation mode : 1-P
		3000	[UTRCM30] 613 to 7843 mm	
Switching point 2 [01]	SP2	1200	[UTRCM18] 121 to 1299 mm	Operation mode : WIN
		7900	[UTRCM30] 601 to 7999 mm	
Output mode (N.O. / N.C.)	nonC	no	NO: normally open NC: normally closed	-

Output method: D for Switching point 1 and Switching point 2 rows.

01) According to the operation mode and the setting conditions, the setting range can be limited.

■ Analog output

- In case of analog output unsupported models, an error may occur during setting.

Parameter	Slide display	Defaults	Setting range	Display condition
Output method	dir SEt	d	D: digital output IV: analog output	-
Analog near point [01]	nEAr LiñiE	120	[UTRCM18] 120 to 1299 mm	Output method : IV
		600	[UTRCM30] 600 to 7999 mm	
Analog far point [01]	FAr LiñiE	1300	[UTRCM18] 121 to 1300 mm	
		8000	[UTRCM30] 601 to 8000 mm	
Output mode (rising / falling)	CHArAC -tEriStiCS	- -	⁻⁻: rising (0 → 100 %) ⁻_: falling (100 → 0 %)	

01) According to the operation mode and the setting conditions, the setting range can be limited.

Add-On

- Some parameters are activated / deactivated depending on the model or setting of other parameters.
- [T1] + [T2] key: Selects the parameter.
  [T1] key: Transfers the previous parameter and digit of the setting value.
  [T2] key: Transfers the next parameter and change the settingvalue.

Parameter	Mark	Slide display	Defaults	Setting range
Display part light	d01	LIGHt LEuEL	Std	[Display part supporting model] STD: lightness, DRK: darkness, OFF: turn-off
Display part direction	d02	di SPLAY InuErt	nor	[Display part supporting model] NOR: forward direction, INV: half-turn
Display part unit	d03	di SPLAY Unit	- - -	[Display part supporting model] - - -: distance display ⁻ ⁻ _: 100 → 0 % display _ ⁻ ⁻: 0 → 100 % display
Analog output type	d04	AnALoG oUtPUt tYPE	I	[Digital + analog output model] V: voltage output, I: current output
Digital output hysteresis [01]	d05	HYStErESIS	20	[UTRCM18] Area mode: 1 to 1180 mm Window mode: 1 to 590 mm One-point mode: 1 to 576 mm
			100	[UTRCM30] Area mode: 1 to 7400 mm Window mode: 1 to 3700 mm One-point mode: 1 to 3614 mm
Measurement filter	d06	FILtEr tYPE	F01	F00: no filter F01: foreground filter, F02: averaging filter F03: foreground + averaging filter F04: background + averaging filter
Measurement filter strength	d07	FILtEr StrEnGtH	P00	P00 to P09: (weak to strong)
Timer mode	d08	dELAY	- - -	- - -: OFF, ON: on-delay OFF: off-delay, ONE: one-shot delay
Timer delay time	d09	dELAY uALUE	001	001 to 025 sec
Foreground suppression [01] (detection start position)	d10	FGnd SUPPrESSion	120	[UTRCM18] 120 to 360 mm
			600	[UTRCM30] 600 to 1800 mm
Temperature manual compensation	d11	CAL-tEMP	-	• ≤ ± 10 % of setting location • Place a sensing target before the temperature compensation. • Temperature compensation before the temperature stabilization (for over 30 min after supplying power) may cause occur an error.
Detection width	d12	SEnSItiuitY	uid	WID: wide, MID: middle NAR: narrow
Max. address value of multiplex	d13	MULtI MEMbEr	10	01 to 10 • Set higher than the multiplex address.
Synchronization mode [02]	d14	SYnC-Id	00	00: synchronization 01 to 10: multiplex address 11: IO-Link synchronization

01) According to the operation mode and the setting conditions, the setting range can be limited.
02) In case of the IO-Link synchronization, you can only set on IO-Link models.

Quick

- The setting method depends on the output method. With the setting in order, the setting value is saved and returned to RUN mode.
- When pressing and releasing the [T1], and [T2] keys for 12 sec on each parameter, the existing settings are ignored and the CAN is displayed before returning to RUN mode.

■ Digital output teaching

No	Display			Operation
1	SP1 teaching	RUN mode		Place the sensing target on the switching point1 (SP1) position.
		dt1		Press the [T1] key for 3 sec.
				Release the [T1] key to complete the SP1 teaching.
2	Select the operation mode	Mod	I-P	Press and release the [T1] key for 3 sec.
			ArE	Press and release the [T1] key for 5 sec.
			uin	Place the sensing target on the window switching point2 (SP2) position.
				Press and release the [T1] key for 7 sec.
				Release the [T1] key to complete the SP2.
3	N.O. / N.C.	noC [01]	no	Normally open Press and release the [T1] key for 3 sec to return to the RUN mode.
			nC	Normally closed Press and release the [T2] key for 3 sec to return to the RUN mode.

01) When pressing the [T1] key in the RUN mode for 7 seconds, the same parameter is displayed and can be set independently.

■ Analog output teaching

- In case of analog output unsupported models, an error may occur during setting.

No	Display			Operation
1	Analog output	RUN mode		Place the sensing target on the near point (AT1) position.
		At1	AT1 teaching	Press the [T2] key for 3 sec.
				Release the [T2] key to complete the AT1 teaching.
		At2	AT2 teaching	Place the sensing target on the far point (AT2) position.
				Press the [T2] key for 3 sec.
				Release the [T2] key to complete the AT2 teaching.
2	Analog output mode	rF [01]	Rising / Falling	_ - ⁻: Rising (0 → 100 %), Press and release the [T1] key for 3 sec to return to the RUN mode. ⁻ - _: Falling (100 → 0 %), Press and release the [T2] key for 3 sec to return to the RUN mode.

01) When pressing the [T2] key in the RUN mode for 7 seconds, the same parameter is displayed and can be set independently.

■ Temperature Compensation (Auto)

- Use this fuction after the temperature stabilization (for over 30 min after power supply).

Display	Setting operation
RUN mode	Press the [T1] key for 13 sec.
CAL	Release the key
CLb	YES: Activate the automatic calibration of the detection value Press and release the [T1] key for 3 sec to return to the RUN mode.

Sold Separately: M12 Connector Cable

- For detailed information, refer to the 'M8/M12 Connector Cable' manual.

Appearance	Power	Connector 1	Connector 2	Length	Feature	Model
	DC	M12 (Socket-Female)	4-wire	2 m	Oil resistance PVC	CIDH4-2
				3 m		CIDH4-3
				5 m		CIDH4-5
				7 m		CIDH4-7
				2 m	Oil resistance PVC cᴿᵁus	CIDH4-2-A
				3 m		CIDH4-3-A
				5 m		CIDH4-5-A
				7 m		CIDH4-7-A
		M12 (Socket-Female), L type		2 m	Oil resistance PVC	CLDH4-2
				3 m		CLDH4-3
				5 m		CLDH4-5
				7 m		CLDH4-7
				2 m	Oil resistance PVC cᴿᵁus	CLDH4-2-A
				3 m		CLDH4-3-A
				5 m		CLDH4-5-A
				7 m		CLDH4-7-A
		M12 (Socket-Female)	M12 (Plug-Male)	1 m	PVC	C1D5-1
				2 m		C1D5-2
				3 m		C1D5-3
				5 m		C1D5-5
				7 m		C1D5-7

Segment Table

The segments displayed on the product indicate the following meanings. It may differ depending on the product.

7 segment					11 segment					12 segment					16 segment			
0	0	I	I		0	0	I	I		0	0	I	I		0	0	I	I
1	1	J	J		1	1	J	J		1	1	J	J		1	1	J	J
2	2	K	K		2	2	K	K		2	2	K	K		2	2	K	K
3	3	L	L		3	3	L	L		3	3	L	L		3	3	L	L
4	4	M	M		4	4	M	M		4	4	M	M		4	4	M	M
5	5	N	N		5	5	N	N		5	5	N	N		5	5	N	N
6	6	O	O		6	6	O	O		6	6	O	O		6	6	O	O
7	7	P	P		7	7	P	P		7	7	P	P		7	7	P	P
8	8	Q	Q		8	8	Q	Q		8	8	Q	Q		8	8	Q	Q
9	9	R	R		9	9	R	R		9	9	R	R		9	9	R	R
A	A	S	S		A	A	S	S		A	A	S	S		A	A	S	S
b	B	T	T		b	B	T	T		b	B	T	T		B	B	T	T
C	C	U	U		C	C	U	U		C	C	U	U		C	C	U	U
d	D	V	V		d	D	V	V		d	D	V	V		D	D	V	V
E	E	W	W		E	E	W	W		E	E	W	W		E	E	W	W
F	F	X	X		F	F	X	X		F	F	X	X		F	F	X	X
G	G	Y	Y		G	G	Y	Y		G	G	Y	Y		G	G	Y	Y
H	H	Z	Z		H	H	Z	Z		H	H	Z	Z		H	H	Z	Z