500mm, 2m, 4m and 6m Sensing Range

Analog Current and Voltage Output
30mm Cylindrical

- 500mm (20"), 2m (6.5'), 4m (13') and 6m (20') sensing ranges
- 4-20mA/20-4mA and 0-10V/10-0V analog output
- Temperature compensation
- Potentiometer-free span adjustment
- Programmable output via programming plug or RS-232 interface

Specifications

ADJUSTABLE SENSING RANGE	**50-500mm**
UNUSABLE AREA	0-50mm
MODEL NUMBER(S)	**UC500-30GM-IUR2-V15**
OUTPUT: *Suffix **IUR2***	Analog
ANALOG CURRENT OUTPUT #1	4-20mA or 20-4mA (load ≤500Ω)
ANALOG VOLTAGE OUTPUT #2	10-0V or 0-10V (load ≥1000Ω)
SHORT CIRCUIT AND OVERLOAD PROTECTION	Yes
REVERSE POLARITY PROTECTION	Yes
SUPPLY VOLTAGE	10-30VDC
LED(s)	Yes (4)
POWER CONSUMPTION	≤900mW
STANDARD TARGET	100mm x 100mm
TRANSDUCER FREQUENCY	380kHz
STANDARDS	NEMA ICS5-2000 Consult factory
RESPONSE TIME	21ms min/63ms factory setting
REPEATABILITY	≤0.1% of full scale
LINEARITY	≤0.2% of full scale
RESOLUTION	max. span value - min. span* / 4000
PROTECTION IEC	IP65
TEMPERATURE DRIFT	≤2% of final value
TEMPERATURE RANGE *WORKING*	-14°F to +158°F
STORAGE	-40°F to +185°F
HOUSING MATERIAL	303 Stainless steel
TRANSDUCER	Epoxy resin/ silica composite
BLACK RING	Polyurethane
APPROVALS CE, UL LISTED General Purpose	Yes
CSA CERTIFIED General Purpose	Yes
ELECTRICAL CONNECTION	Quick disconnect type V15

*Minimum possible resolution is 0.05mm

Denotes a parameter which may be adjusted via RS-232 interface. Other parameters are accessible (i.e. to increase output stability).

Refer to page 251 for more information.

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500mm, 2m, 4m and 6m Sensing Range

Specifications

ADJUSTABLE SENSING RANGE	120mm-2m	240mm-4m	400mm-6m
UNUSABLE AREA	0-120mm	0-240mm	0-400mm
MODEL NUMBER(S)	**UC2000-30GM-IUR2-V15**	**UC4000-30GM-IUR2-V15**	**UC6000-30GM-IUR2-V15**
OUTPUT: *Suffix **IUR2***	Analog	Analog	Analog
ANALOG CURRENT OUTPUT #1	4-20mA or 20-4mA (load ≤500Ω)	4-20mA or 20-4mA (load ≤500Ω)	4-20mA or 20-4mA (load ≤500Ω)
ANALOG VOLTAGE OUTPUT #2	10-0V or 0-10V (load ≥1000Ω)	10-0V or 0-10V (load ≥1000Ω)	10-0V or 0-10V (load ≥1000Ω)
SHORT CIRCUIT AND OVERLOAD PROTECTION	Yes	Yes	Yes
REVERSE POLARITY PROTECTION	Yes	Yes	Yes
SUPPLY VOLTAGE	10-30VDC	10-30VDC	10-30VDC
LED(s)	Yes (4)	Yes (4)	Yes (4)
POWER CONSUMPTION	≤900mW	≤900mW	≤900mW
STANDARD TARGET	100mm x 100mm	100mm x 100mm	100mm x 100mm
TRANSDUCER FREQUENCY	180kHz	85kHz	65kHz
STANDARDS	NEMA ICS5-2000 Consult factory	NEMA ICS5-2000 Consult factory	NEMA ICS5-2000 Consult factory
RESPONSE TIME	65ms min/195ms factory setting	145ms min/440ms factory setting	285ms min/850ms factory setting
REPEATABILITY	≤0.1% of full scale	≤0.1% of full scale	≤0.1% of full scale
LINEARITY	≤0.2% of full scale	≤0.2% of full scale	≤0.2% of full scale
RESOLUTION	$\frac{\text{max. span value - min. span*}}{4000}$	$\frac{\text{max. span value - min. span*}}{4000}$	$\frac{\text{max. span value - min. span*}}{4000}$
PROTECTION IEC	IP65	IP65	IP65
TEMPERATURE DRIFT	≤2% of final value	≤2% of final value	≤2% of final value
TEMPERATURE RANGE *WORKING*	-14°F to +158°F	-14°F to +158°F	-14°F to +158°F
STORAGE	-40°F to +185°F	-40°F to +185°F	-40°F to +185°F
HOUSING MATERIAL	303 Stainless steel	303 Stainless steel	303 Stainless steel
TRANSDUCER	Epoxy resin/ silica composite	Epoxy resin/ silica composite	Epoxy resin/ silica composite
BLACK RING	Polyurethane	Polyurethane	Polyurethane
APPROVALS CE UL LISTED General Purpose	Yes	Yes	Yes
CSP CERTIFIED General Purpose	Yes	Yes	Yes
ELECTRICAL CONNECTION	Quick disconnect type V15	Quick disconnect type V15	Quick disconnect type V15

*Minimum possible resolution is 0.35mm

See pages 827-874 for cordsets

Programming

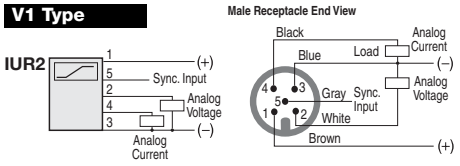
Wiring Diagrams

3-Wire DC

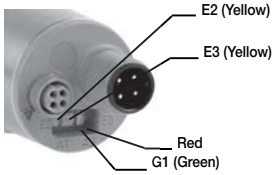
Quick Disconnect

Note: Wiring diagrams show quick disconnect pin numbers.

V1 Type



LED Functions



The UC-Series ultrasonic sensor LEDs serve two purposes depending upon whether the sensor is in the monitoring mode or the programming mode.

Monitoring Mode:

Yellow (E2&E3): Indicates target presence within the programmed span boundaries.

Green (G1): Indicates the compensation/programming plug is inserted.

Red: Indicates compensation/programming plug is removed. If the plug is properly installed, the flashing red light indicates severe acoustic interference.

Programming Mode:

For information regarding LED operation during sensor programming, refer to “Programming/Calibration Procedure” on this page.

The Programming Plug

All P+F UC-Series sensor parameters are changed and stored through a small green plug, located on the rear of the unit. “End-of-Span” points are set using plug positions A1 and A2. Position E2/E3 determines whether the analog output mode is a rising or a declining slope. Once the plug is programmed, it remains in the T position to provide temperature compensation.

Programming/Calibration Procedure

UC models may be configured to provide an analog current or voltage output. The sensor defaults to a voltage output if the load resistance is greater than 1000Ω. A load resistance below 500Ω activates the current output.

1. **Enabling Programming**
   a. Remove programming plug.
   b. Disconnect power supply.
   c. Reconnect power supply (do not reinsert plug yet).
2. **Setting the Usable Span**
   a. Move target object to the near span boundary.
   b. Insert plug in the A1 position. LEDs E2 and G1 should flash to denote the proper boundary storage*. Remove the plug.
   c. Move target object to the far span boundary.
   d. Insert the plug in the A2 position. LEDs E3 and G1 should flash*. Remove the plug, then go to step 3.
3. **Choosing the Analog Output Type**
   Rotate the plug to the E2/E3 position and insert. Two modes of operation can be selected in cyclical sequence by repeatedly removing the plug and re-inserting:
   * LED E2 flashing - Rising Analog Output Mode (as a target approaches the sensor, the analog value increases: 4-20mA or 0-10V).
   * LED E3 flashing - Declining Analog Output Mode (as a target approaches the sensor, the analog value decreases: 20-4mA or 10-4V).
   * LEDs E2 and E3 flashing - unused mode
4. **Enabling Temperatue Compensation**
   Insert plug in position T to activate the temperature compensated output. The sensor is ready for installation.

   Note: To maintain temperature compensation, the plug must remain inserted during operation. If the plug is removed, the sensor will continue to function but the output will no longer be temperature compensated.

*If the boundary does not store properly, the target is either an extremely poor acoustic reflector, or is located beyond the usable sensing area. The flashing red LED indicates this fault.

Multiplexing/Synchronization Options

The potential for cross talk exists when sensors are mounted in close proximity. Using the synchronization input, multiple sensors can be synchronized with an internal or external source to suppress mutual interference.

Internal Synchronization:

Up to five sensors capable of internal synchronization can be connected to one another. When power is applied, the sensors operate in multiplex mode. The sensors stagger their ultrasonic bursts to eliminate the possibility of 2 or more units simultaneously sending or receiving signals. The response delay increases according to the number of sensors to be synchronized. Synchronization cannot be performed during programming and vice versa. Sensors must be unsynchronized to teach the switching point.

External Synchronization:

A sensor can be synchronized by the external application of a square wave voltage. The square wave pulse width must be greater than 100µs. The sensor is enabled with the falling edge of the square wave. A low level for greater than 1 second, or an open synchronization input results in the normal operation of the sensor. A high level at the synchronization input disables the sensor.

Two operating modes are available:

1. Multiple sensors can be can be controlled by the same synchronization signal (square wave pulse). The sensors are synchronized.
2. The synchronization pulses are sent cyclically to individual sensors. Sensors in close proximity cannot cross talk and operate in multiplex mode.

Note:
If the option for synchronization is not used, the synchronization input must be connected to ground (0V) or the sensor must be operated using a V1 cable connector (4-pin).

EXTERNAL MULTIPLEX/SYNCHRONIZATION FREQUENCY

	UC500	UC2000	UC4000	UC6000
Input Voltage	≤1V low level, ≥4V high level			
Pulse Width	≥100µs			
Time Between Pulses	≥2ms			
Synchronization Frequency	≤95Hz	≤30Hz	≤13Hz	≤7Hz
Multiplex Frequency	≤95/n Hz	≤30/n Hz	≤13/n Hz	≤7/n Hz

n=number of sensors

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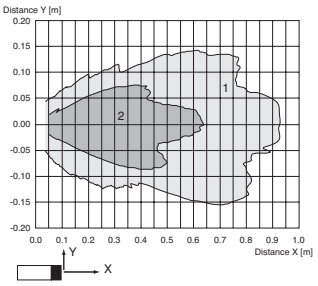
Target Response Curves

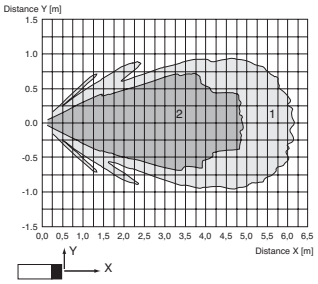
The surface area, shape and density of a target determine where it can be detected. The diagrams below illustrate two targets and their corresponding areas of detection. The target must lie completely in its specified sensing envelope to ensure accurate detection.

UC500-30...



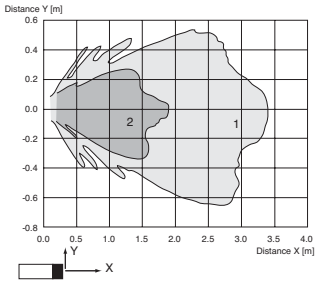
Curve 1: flat surface 100 mm x 100 mm
Curve 2: round bar, ∅ 25 mm

UC4000-30...



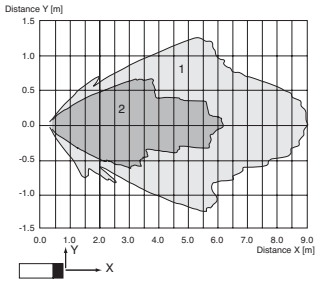
Curve 1: flat surface 100 mm x 100 mm
Curve 2: round bar, ÿ 25 mm

UC2000-30...



Curve 1: flat surface 100 mm x 100 mm
Curve 2: round bar, ∅ 25 mm

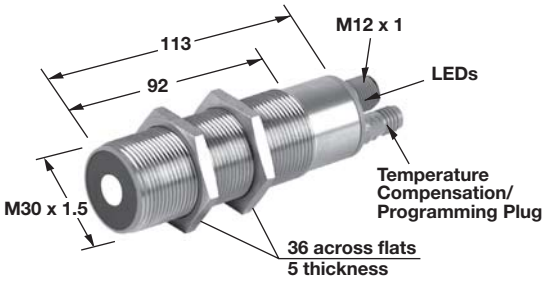
UC6000-30...



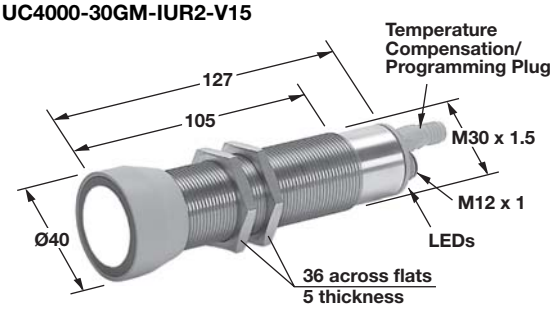
Curve 1: flat surface 100 mm x 100 mm
Curve 2: round bar, ÿ 25 mm

Dimensions (mm)

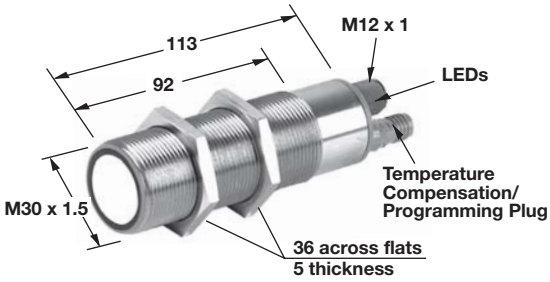
Classic Series
UC500-30GM-IUR2-V15



Classic Series
UC4000-30GM-IUR2-V15



Classic Series
UC2000-30GM-IUR2-V15



Classic Series
UC6000-30GM-IUR2-V12