



# Easy Rate Dual Sensor

INFICON Easy Rate dual crystal sensors minimize quartz crystal microbalance (QCM) total cost of ownership through low price and extended sensor life. This sensor minimizes production cost with the lowest initial investment and total cost of ownership. It is also designed to maximize availability through a long-lasting sensor that has less maintenance.

INFICON Easy Rate dual crystal sensors are designed and manufactured to provide a cost effective solution to high-accuracy thickness monitoring for short optical and batch coating processes.

## Sensor Configurations

The INFICON Easy Rate Dual Sensor is available with standard or right angle orientations. The standard version is designed for installation from the side or bottom of the chamber having the cooling tubes parallel to the crystal face. The right angle version is designed for installation through the top of the vacuum system having the water cooling tubes perpendicular to the crystal face.

A pneumatically driven crystal shutter comes standard to protect the unused crystal during deposition, while the primary crystal monitors the deposition rate. The shutter is designed to move to the side, allowing for easy crystal replacement.

The front load design allows for easy insertion of the crystal holder in applications lacking sufficient room for side insertion. All Easy Rate Sensors are compatible with industry-standard 6 MHz crystals and feedthroughs and are designed for easy crystal changes while remaining rugged enough for even the most demanding depositions.

## Feedthroughs

INFICON Easy Rate Sensors are offered with either a 2.54 cm (1 in.) Bolt Feedthrough or a CF40 (2.75 in.) ConFlat® flange feedthrough.

## Feedthrough Connection

The sensor / feedthrough connection can be either welded onsite by the user or made with bored-through union fittings. These union fittings allow for easy adjustability without the need for brazing or welding. The length of the tubes can be cut to meet the needs of the chamber, allowing the length inside the vacuum system to be customized and the feedthrough to be attached easily and quickly. Alternately, if using a custom feedthrough or bending the sensor on site, no connection may be chosen for onsite welding.

## ADVANTAGES

- Minimum investment with lowest upfront cost
- Lowest total cost of ownership
- Maximum throughput with less maintenance
- Optimize system performance through worldwide expert applications support
- Available in two configurations
  - Standard (water tubes parallel)
  - Right angle (water tubes perpendicular)
- Available with
  - 2.54 cm (1 in.) bolt feedthrough
  - CF40 feedthrough
- Adjustable position when ordered with bored-through union fittings



## ORDERING INFORMATION

### Easy Rate Dual Sensor

#### Type of sensor

Standard Sensor (water tubes parallel).....  
 Right Angle Sensor (water tubes perpendicular) .....

#### In-vacuum cable

None.....  
 25.4 cm (10 in.) in-vacuum cable .....

#### Length of sensor (See note 1)

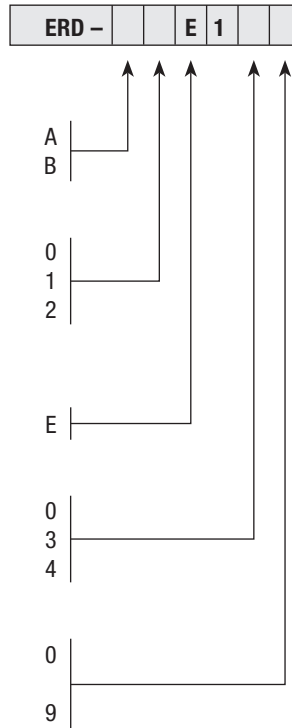
Standard: 806 mm (31.72 in.)  
 Right Angle: 776 mm (30.55 in.) .....

#### Feedthrough

None.....  
 1 in. bolt .....

#### Feedthrough connection

Sensor not connected to feedthrough.....  
 Bored-through union fittings  
 (Allow the sensor water tubes to slide into the feedthrough.).....

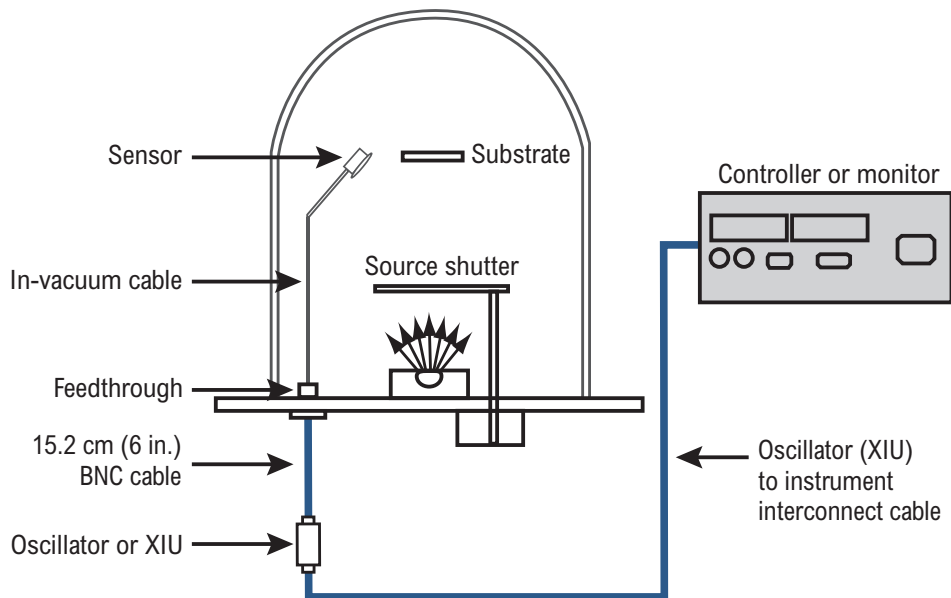


#### NOTE 1:

Sensor length is measured from center of crystal to the end of the water tubes (see drawings).

#### NOTE 2:

Crystals sold separately.



## SPECIFICATIONS

### Easy Rate Standard Dual Sensor

Maximum bakeout temp with no water	175°C
Maximum operating isothermal environment temperature with minimum water flow	400°C
Size	3.25 x 9.00 x 3.15 cm (1.28 x 3.55 x 1.24 in.)
Water tube	4.76 mm (0.188 in.) OD seamless stainless steel
Crystal exchange	Front loading; shutter can easily be removed for access to the holders
Mounting	Two #4-40 tapped holes on the back of the sensor body



### Installation Requirements

Feedthrough	Two pass water 6.35 mm (0.250 in) OD with two microdot coaxial connections One pass air 4.76 (0.188 in) OD
Other	XIUs or oscillators to match specific controller, solenoid valve assembly for shutter. For automatic operation, the deposition process controller must be designed for the implementation of this feature.
Utilities	Minimum water flow 150-200 cm <sup>3</sup> /min, 30° C max Air 70–80 psi (gauge) {85–95 psi (absolute)} (5.8–6.5 bar (absolute)) [584–653 kPa (absolute)] Do not exceed 100 psi (gauge) {115 psi (absolute)} (7.9 bar (absolute)) [791 kPa (absolute)]
Water quality	Coolant should not contain chlorides as stress corrosion cracking may occur Extremely dirty water may result in loss of cooling capacity
Crystal	13.97 mm (0.550 in.) diameter

### Materials

Body and holder	304 type stainless steel
Springs, electrical contacts	Gold plated beryllium copper
Water tubes	S-304, 4.76 mm (0.188 in.) OD x 0.51 mm (0.020 in.) wall thickness seamless stainless steel tubing
Air tube	S-304, 3.175 mm (0.125 in.) OD x 0.381 mm (0.015 in.) wall thickness seamless stainless steel tubing
Connector (Microdot)	Stainless steel, Teflon® and glass insulation
Insulators	>99% aluminum oxide, Teflon
Wire	Tin plated copper

## SPECIFICATIONS

### Easy Rate Right Angle Dual Sensor

Maximum bakeout temp with no water	175°C
Maximum operating isothermal environment temperature with minimum water flow	400°C
Size	3.25 x 9.65 x 3.15 cm (1.28 x 3.80 x 1.24 in.)
Water tube	4.76 mm (0.188 in.) OD seamless stainless steel
Crystal exchange	Front loading; shutter can easily be removed for access to the holders
Mounting	Two #4-40 tapped holes on the back of the sensor body



### Installation Requirements

Feedthrough	Two pass water 6.35 mm (0.250 in) OD with two microdot coaxial connections One pass air 4.76 (0.188 in) OD
Other	XIUs or oscillators to match controller, solenoid valve assembly for shutter. For automatic operation, the deposition process controller must be designed for the implementation of this feature
Utilities	Minimum water flow 150-200 cm <sup>3</sup> /min, 30° C max Air 70-80 psi (gauge) {85-95 psi (absolute)} (5.8-6.5 bar (absolute)) [584-653 kPa (absolute)] Do not exceed 100 psi (gauge) {115 psi (absolute)} (7.9 bar (absolute)) [791 kPa (absolute)]
Water quality	Coolant should not contain chlorides as stress corrosion cracking may occur. Extremely dirty water may result in loss of cooling capacity.
Crystal	13.97 mm (0.550 in.) diameter

### Materials

Body and holder	304 type stainless steel
Springs, electrical contacts	Gold plated beryllium copper
Water tubes	S-304, 4.76 mm (0.188 in.) OD x 0.51 mm (0.020 in.) wall thickness seamless stainless steel tubing
Air tube	S-304, 3.175 mm (0.125 in.) OD x 0.381 mm (0.015 in.) wall thickness seamless stainless steel tubing
Connector (Microdot)	Stainless steel, Teflon and glass insulation
Insulators	>99% aluminum oxide, Teflon
Wire	Tin plated copper

## SPECIFICATIONS

### Feedthroughs

NOTE: Sensor / feedthrough combination specifications are determined by lowest component specification.  
Appearance as shown here will differ to match sensor requirements accordingly.

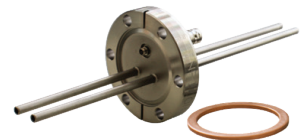
#### 1 in. bolt feedthrough:

Materials	304 stainless steel, Teflon, ceramic, beryllium nickel, VITON®
Temperature	Operational environment to 300°C with water cooling or 120°C without
Mounting	25.8 mm (1.015 in., ±0.010 in.) diameter aperture
Electrical connection	BNC connector (atmosphere side) Microdot connector (vacuum side)
Sealing surface	O-ring



#### CF40 feedthrough

Materials	304 stainless steel, Teflon, ceramic, beryllium nickel, copper
Temperature	Operational environment to 450°C with water cooling or 165°C without
Mounting	2 ¾ in. ConFlat type flanges with 1.375 in. I.D. min.
Electrical Connection	BNC connector (atmosphere side) Microdot connector (vacuum side)
Sealing Surface	Gasket



## SPARE PARTS LIST

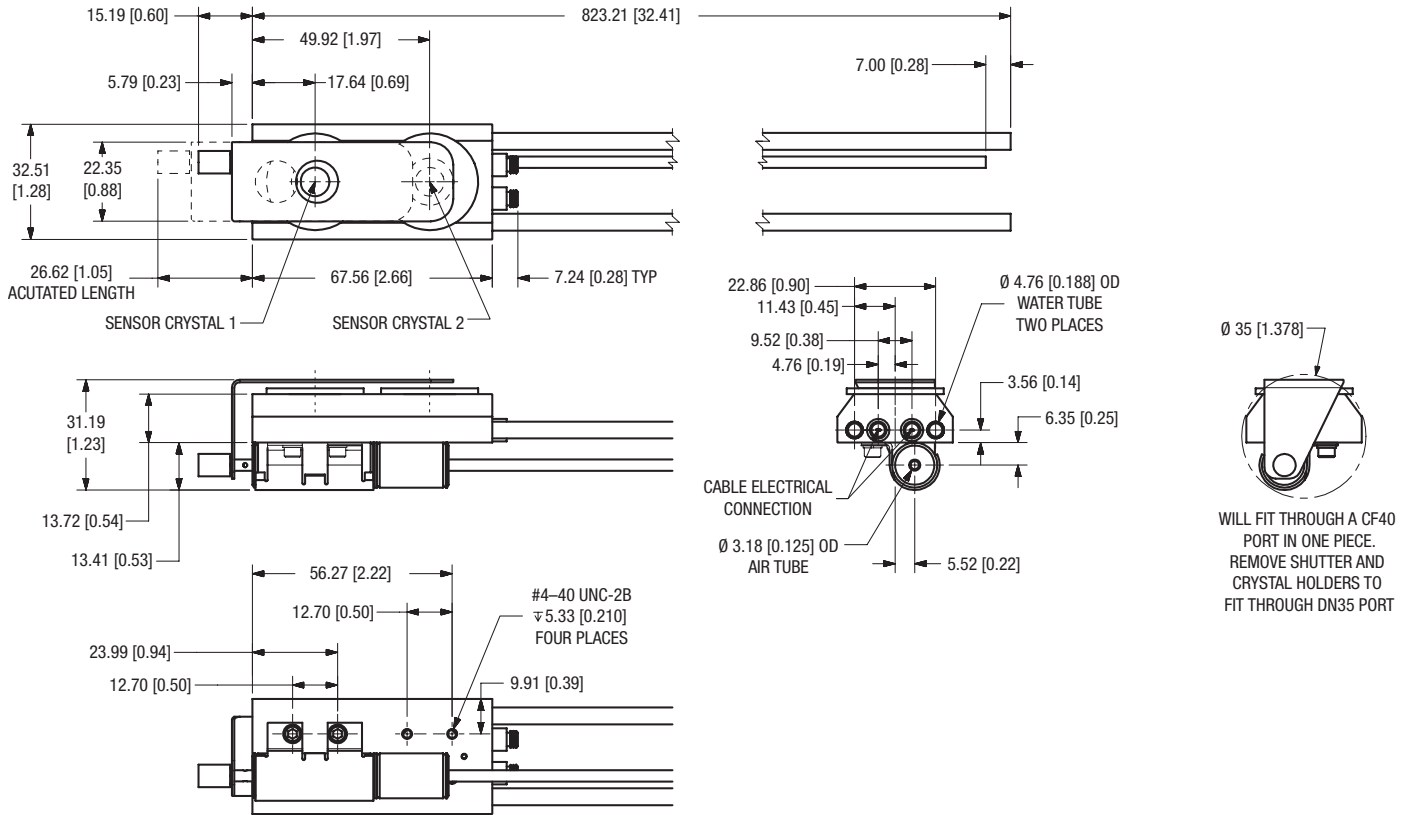
P/N	Description
784-205-G1	Crystal retainer assembly, Easy Rate Sensor
784-204-G1	Crystal holder assembly, Easy Rate Sensor
784-404-P1	Retaining ring, Easy Rate Sensor
784-403-P1	Crystal finger spring, Easy Rate Sensor
784-300-P1	Crystal holder, Easy Rate Sensor
784-307-P1	Dual shutter, Easy Rate Sensor
784-405-P1	Holder finger spring, Easy Rate Sensor
080-011-P3	Screw 0-80 x 0.125 LG PH PAN HD SS GP
784-322-P1	0-80 retainer plate
784-323-P1	Coax connector, female, flat sides

P/N	Description
784-206-G1	Easy Rate Sensor actuator
784-306-P1	Actuator clamp, Easy Rate Sensor
084-054	#4 split lockwasher SS
084-027	Screw 4-40 x 0.250 LG SOC HD CAP SS
784-210-G1	Shutter kit, dual, Easy Rate Sensor
783-500-023	25.4 cm (10 in.) in-vacuum cable
783-500-024	76.2 cm (30 in.) in-vacuum cable
059-0773	0.125 – 0.188 in. thru union with Ferrule set
059-0774	0.188 – 0.250 in. thru union with Ferrule set
750-420-G1	Solenoid valve, 24 V (dc) or 24 V (ac)

# DIMENSIONS

## Easy Rate Dual Sensor

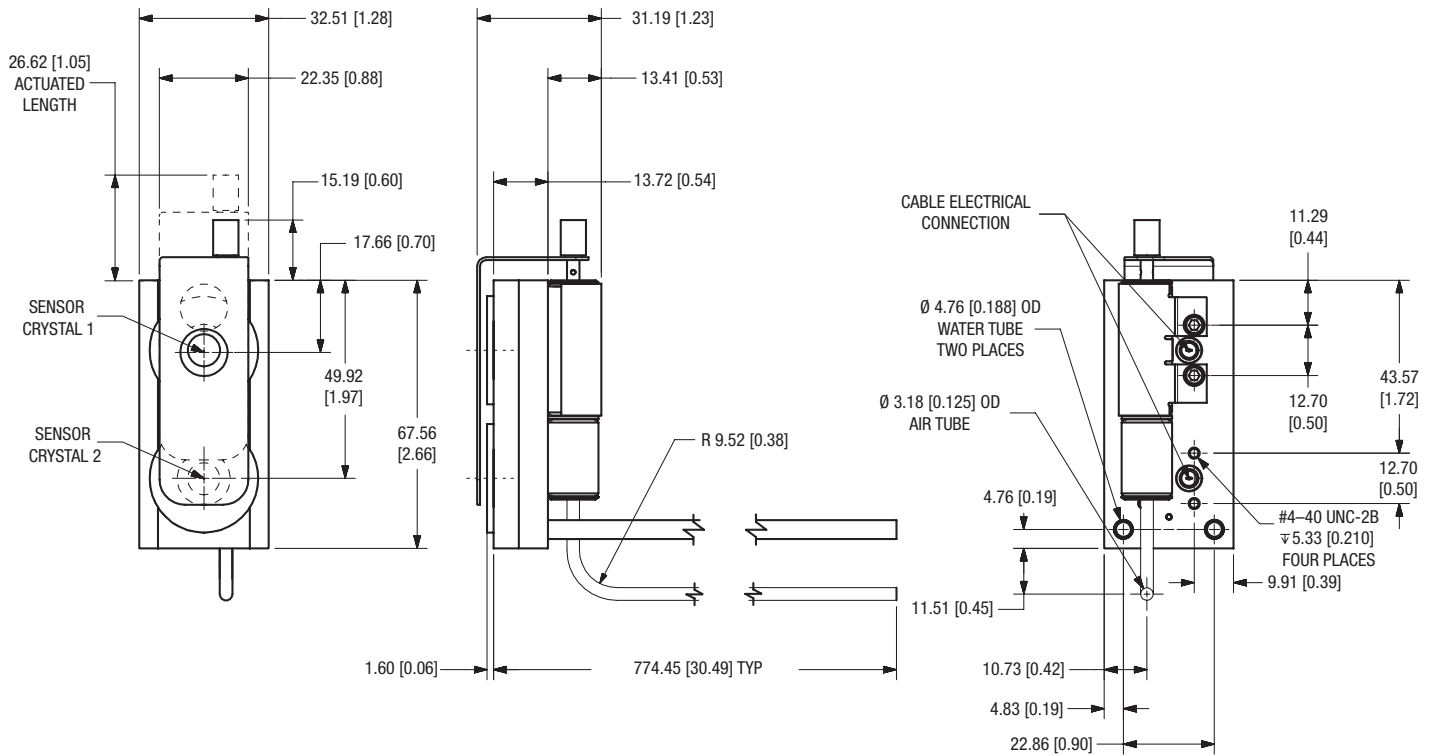
NOTE: Measurements in mm [in.]



# DIMENSIONS

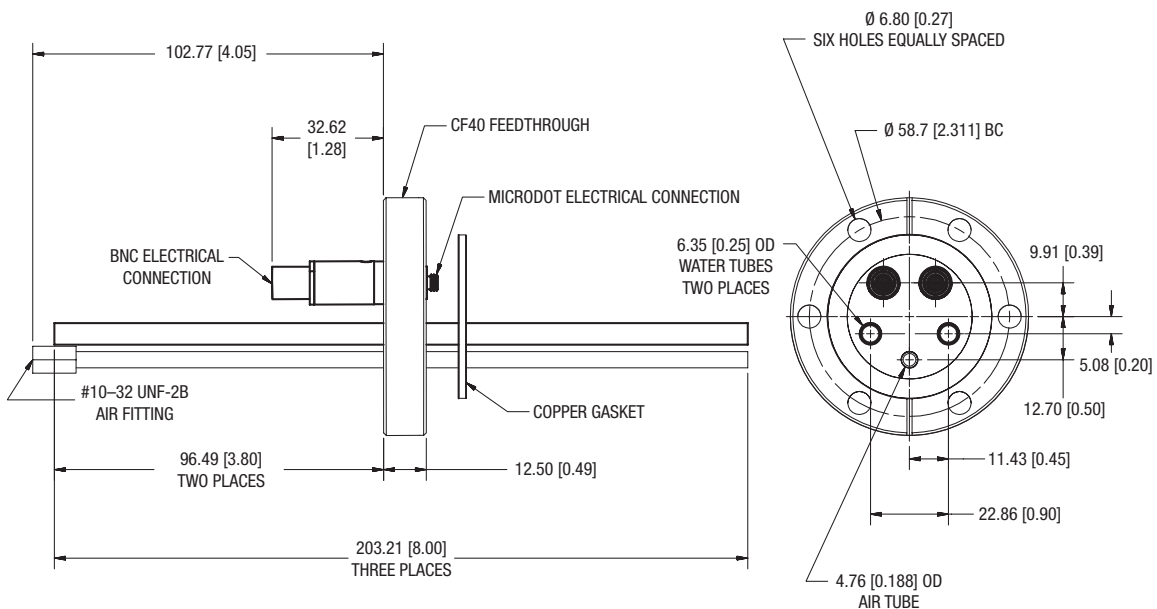
## Easy Rate Right Angle Dual Sensor

NOTE: Measurements in mm [in.]



## Feedthrough offered for ERD-A\_E14\_ and ERD-B\_E14\_ sensor / feedthrough combinations (feedthrough PN 784-275-G1)

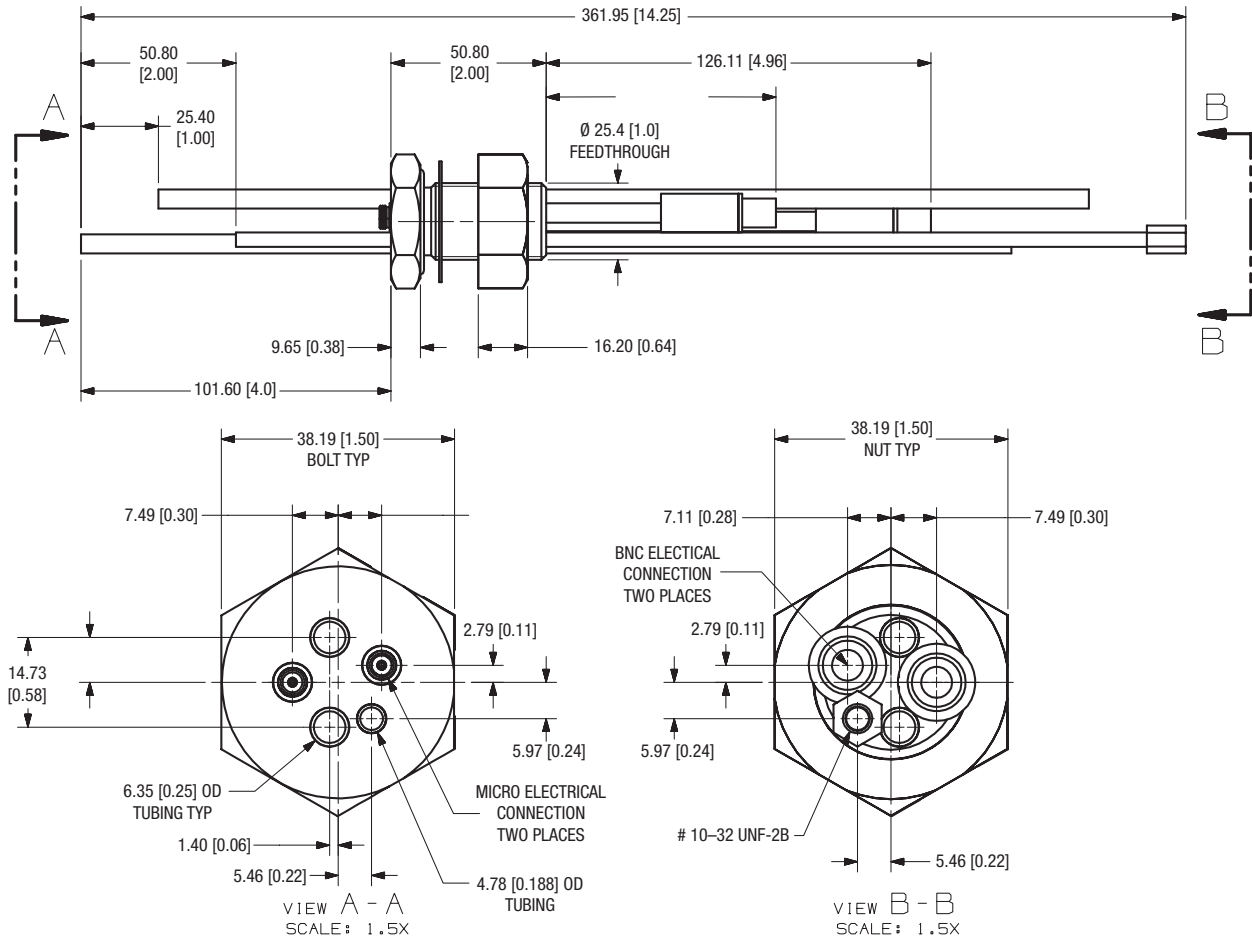
NOTE: Measurements in mm [in.]



## DIMENSIONS

Feedthrough offered for ERD-A\_E13\_ and ERD-B\_E13\_ sensor / feedthrough combinations (feedthrough PN 784-285-G1)

NOTE: Measurements in mm [in.]



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