INFICON

CrystalSix® Sensor

INFICON CrystalSix Sensors are designed and manufactured to provide the best quality and reliability in thickness monitoring for applications where single and dual sensors do not last through the complete process life. Whether an OLED, MBE, solar, long optical coating, or other processes having an extended period between chamber venting, the CrystalSix Sensor will maximize PVD production with six crystals per sensor and minimize cost through a low price. When used with an INFICON Thin Film Controller, the CrystalSix automatically rotates a new crystal into position whenever the current crystal fails or becomes unstable. Crystals are automatically replaced without interrupting your process for continued deposition rate monitoring.

Crystal indexing is accomplished with a pneumatically driven mechanism. This pneumatic drive provides better crystal thermal stability than competitive units using expensive in-vacuum, heat generating, electric motors. One-eighth inch water cooling tubes keep the sensor head thermally stable and allow flexibility in sensor placement.

When used with certain INFICON thin film controllers, the sensor provides position feedback so specific positions can be used with specific materials.

ADVANTAGES

- Minimize investment with lowest upfront cost

- Increase production with maximum uptime

- Ensure quality products using real-time rate control for continuous or multi-layer film depositions

- Save time with easy installation for system integration

- Optimize system performance through worldwide expert applications support

- Compatibility with industry-leading INFICON controllers

- Stable crystal temperature, because crystal switching is pneumatically-driven (competitive units use heat-generating motors)

- $1/_8$ in. tubes maintain thermal stability and allow flexibility in sensor placement

- Optional crystal shutter available

ORDERING INFORMATION

CrystalSix Sensor

CrystalSix Sensor 750-446-G1
CrystalSix Sensor with shutter SPS-1039-G1
CrystalSix Sensor (made in China).............................750-446-G1-CN
CrystalSix Sensor with shutter (made in China).......SPS-1039-G1-CN

NOTE 1:
The CrystalSix sensor requires the 750-420-G1 solenoid valve with orifice installed (PN 059-0189 included in CrystalSix ship kit).

NOTE 2:
The CrystalSix sensor cannot be used on STM-2, STM-2XM, or SQM-160 quartz crystal monitors.
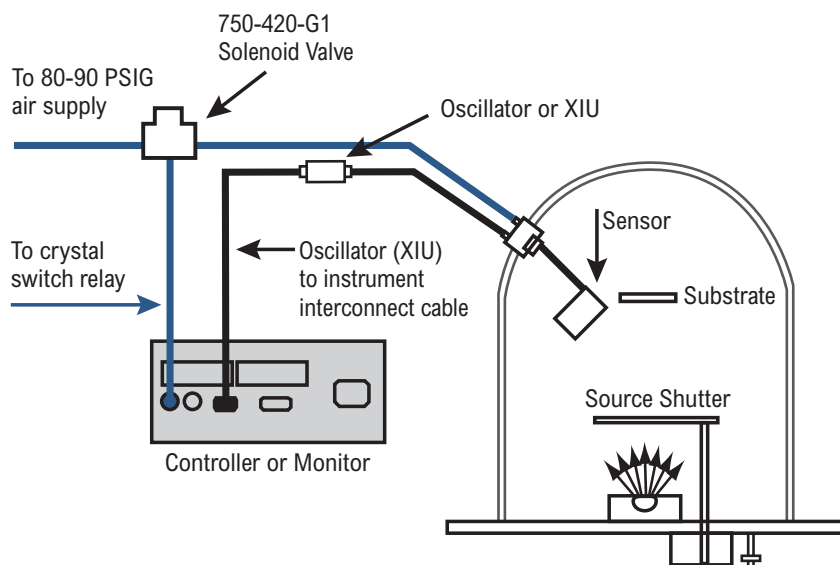
SPECIFICATIONS

750-446-G1 CrystalSix Sensor Specifications

Maximum bakeout temp with no water	130°C
Maximum operating isothermal environment temperature with minimum water flow	400°C
Water, air and coax length	Standard 76 cm (30 in.)
Crystal exchange	Front-loading, extraction tool required (supplied with unit)
Mounting	Six #4-40 tapped holes on the back of the sensor body
Size (maximum envelope)	9.7 cm (3.8 in.) DIA x 5.1 cm (2.0 in.) high

Installation Requirements

Feedthrough	Qty (1) 2¾ in. ConFlat® with one coaxial feedthrough, two pass water, one air PN 750-685-G1, or,
	Qty (1) 750-685-G2, with one coaxial feedthrough three tube with Ultra-Torr compression fittings or,
	Qty (1) 1 in. bolt with one coaxial feedthrough, two pass water, one air PN 750-030-G1,
Other	User to provide vacuum-tight braze joints or connectors for the water and air tubes.
	Valve assembly for air, PN 750-420-G1 (not provided), with a 0.022 in. restrictor orifice installed by the user. (Orifice included with CrystalSix accessory kit.)

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SPECIFICATIONS

750-446-G1 CrystalSix Sensor Specifications (continued)

Utilities

Minimum water flow	150–200 cc/min, 30°C max (Do not allow water to freeze)
	Coolant should not contain chlorides as stress corrosion cracking may occur
Regulated air supply	80–90 PSIG (5.5 bar–6.2 bar) [550 kPa – 620 kPa]
	2 m maximum length of $1/8$ in. tubing between sensor head and the solenoid valve

Materials

Plate, holders, material shield, mechanical parts	304 type stainless steel
Springs, electrical contacts	Au plated Be-Cu, Au Plate Inconel, 303 stainless steel
Water and air tubes	S-304, 0.32 cm (0.125 in.) O.D. x 0.04 cm (0.016 in.) wall thickness 76 cm long (30 in.) seamless stainless steel tubing
Connector (Microdot®)	Stainless steel
Insulators	>99% Al_2O_3
Cable	Teflon® insulated copper
Crystal	14 mm (0.550 in.) diameter
Body and carousel	2024 T351 aluminum

SPARE PARTS LIST

CrystalSix Sensors

Part Number	Description
007-007	Retaining spring (part of crystal holder)
007-023	Ceramic retainer
007-044	In-vacuum cable 78 cm (30.75 in.)
070-0170	#2 lockwasher (part of heat shield assembly)
070-0398	Retaining Ring (secures bearing located next to pawl and actuator stem)
070-0777	Compression spring (on carousel shaft)
070-0778	Ball bearing (underneath carousel)
070-0779	Bearing (makes contact with pawl and actuator stem)
070-0870	Teflon washer (on carousel shaft)
070-0877	Shim spacer (part of heat shield assembly)
070-0879	Bearing (at center of top plate weld assembly)
073-114	Wire 0.022 in. x 1.06 in. (clamps heat shield retaining pin)
082-026	#2-56 nut (part of heat shield assembly)
750-048-P1	Retaining spring (clamps crystal holders to carousel)
750-175-P1	Bottom insulator (underneath leaf springs)
750-188-P3	Leaf spring
750-249-P2	Retaining pin (part of heat shield assembly)
750-250-G1	Heat shield assembly
750-256-P2	Extension spring (part of top plate weld assembly)
750-257-P3	Corrugated spring 11.2 cm (4.40 in.)
750-261-G1	Carousel assembly (includes resistor network and electrical contacts)
750-262-G1	Crystal holder
750-265-G1	Top plate weld assembly
750-276-P2	Actuator cover
750-278-P2	Water line
750-286-P2	Bellows assembly
750-290-P3	Carousel electrical contacts (set of eight)
750-291-P1	Detent
750-293-P2	Ratchet
750-294-P2	Stop ratchet
750-295-G1	Pawl and actuator stem
750-336-G1	Resistor network assembly
750-338-P1	Contact insulator (underneath carousel electrical contacts)

DIMENSIONS

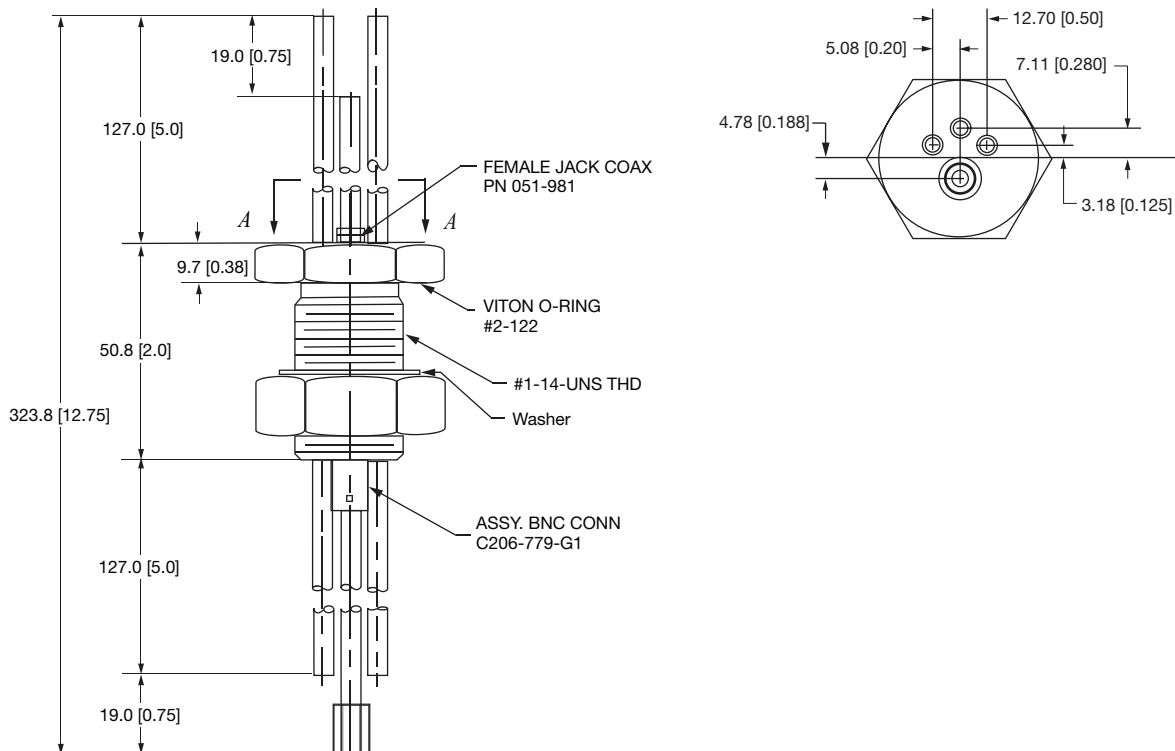## 750-446-G1 CrystalSix Sensor

NOTE: Measurements in mm [in.]

CABLE 781.40 [30.75] LONG
77.21 [3.04]
56.13 [2.21]
51.56 [2.03]
25.65 [1.01]
16.45 [0.65]
CRYSTALSIX
PATENT NO.
5,025,664
25.40 [1.0]
3 PLACES
12.70 [0.50]
3 PLACES
REF. #4–40
MOUNTING HOLES
QUANTITY 6
AIR
WATER
6.35 [0.25]
88.90 [3.50]
23.83 [0.94]
96.8 [3.82]
MIN
REF
ROTATION
DIRECTION
WATER IN
WATER OUT
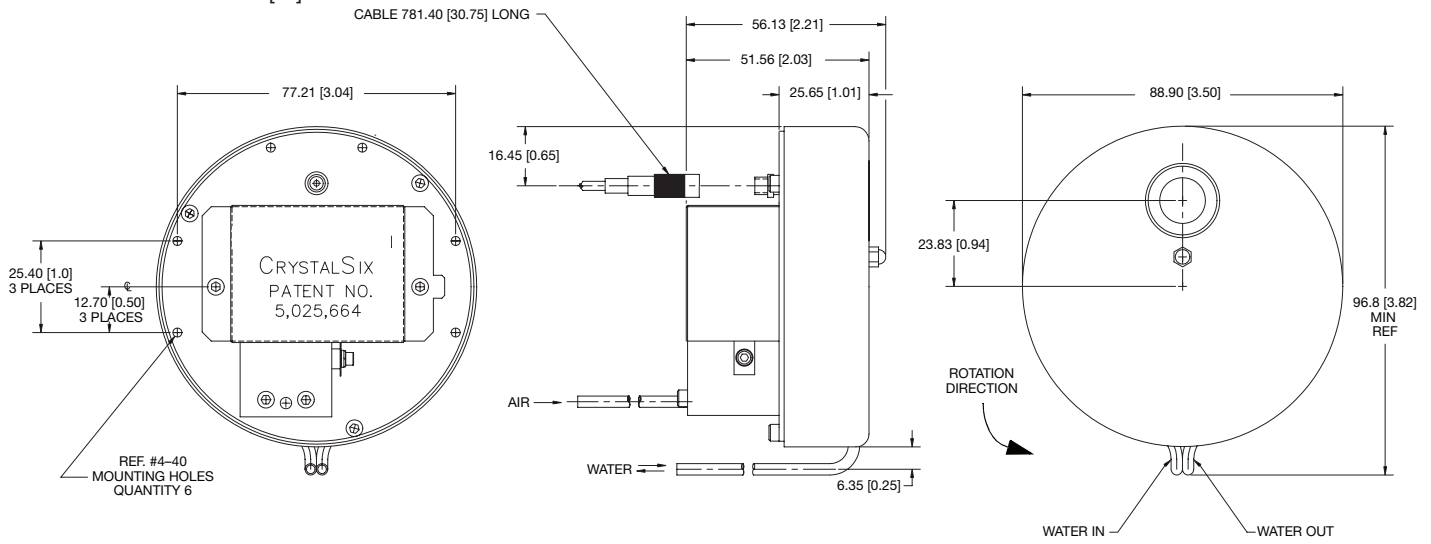
DIMENSIONS

The CrystalSix Sensor 750-446-G1 can be used with the following feedthroughs:
PN 750-030-G1

NOTE: Measurements in mm [in.]

19.0 [0.75]
127.0 [5.0]
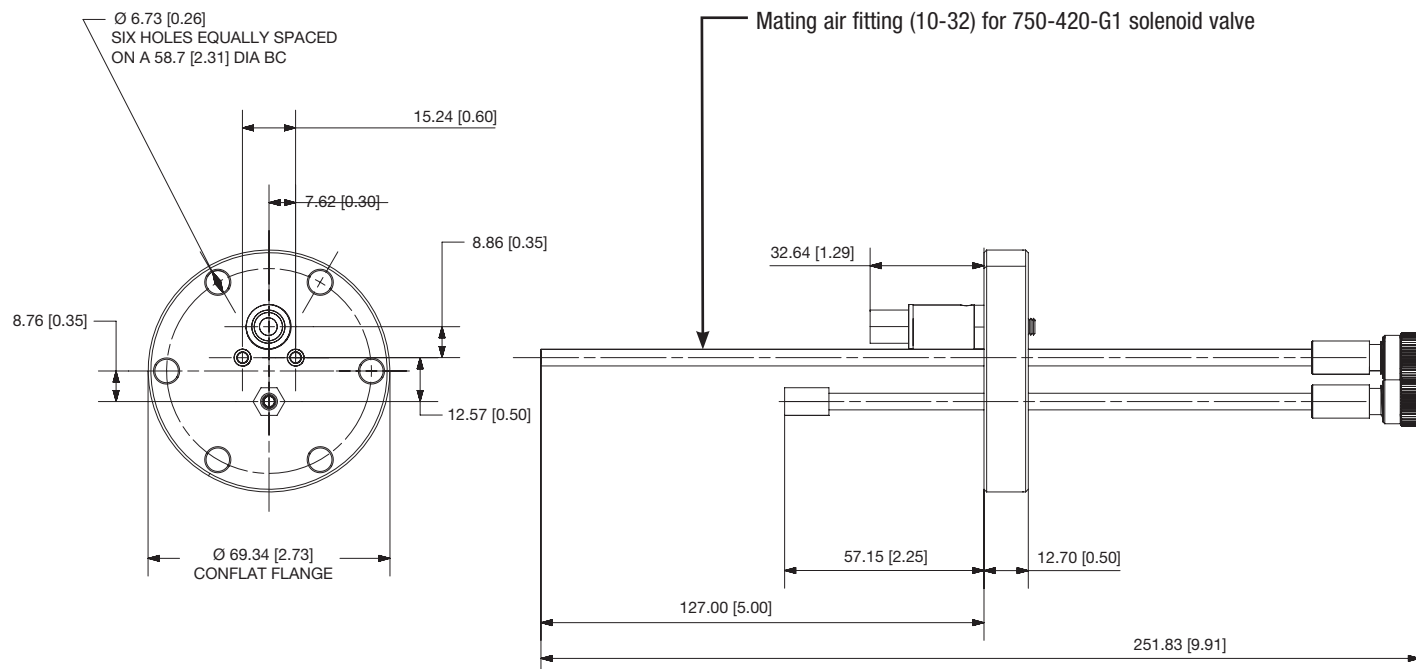FEMALE JACK COAX
PN 051-981
A   A
9.7 [0.38]
VITON O-RING
#2-122
50.8 [2.0]
#1-14-UNS THD
323.8 [12.75]
Washer
ASSY. BNC CONN
C206-779-G1
127.0 [5.0]
19.0 [0.75]
12.70 [0.50]
5.08 [0.20]
7.11 [0.280]
4.78 [0.188]
3.18 [0.125]

DIMENSIONS

PN 750-685-G1

NOTE: Measurements in mm [in.]

Ø 6.73 [0.26]
SIX HOLES EQUALLY SPACED
ON A 58.7 [2.31] DIA BC

15.24 [0.60]

7.62 [0.30]

8.89 [0.35]

8.88 [0.35]

12.69 [0.50]

Ø 69.34 [2.73]
CONFLAT FLANGE

Mating air fitting (10-32) for 750-420-G1 solenoid valve

32.67 [1.29]

57.15 [2.25]

12.70 [0.50]

127.00 [5.00]

228.60 [9.00]
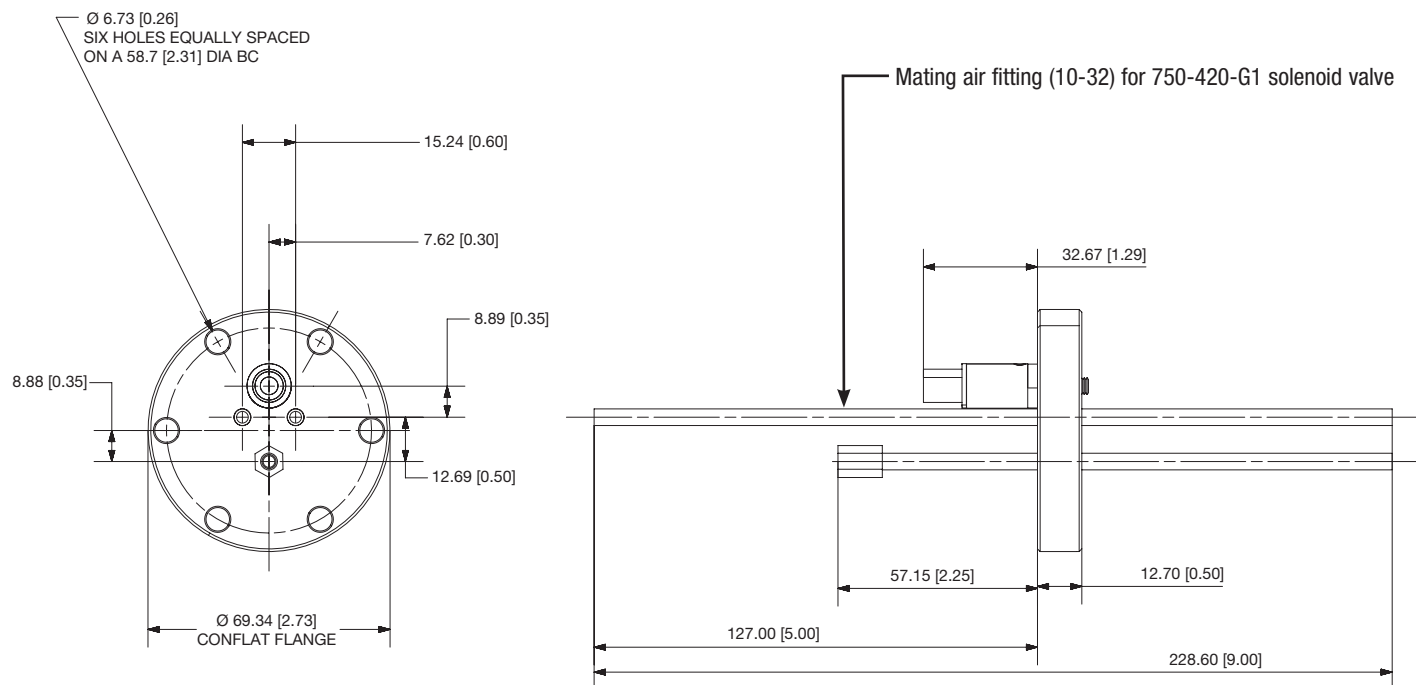
DIMENSIONS

PN 750-685-G2

NOTE: Measurements in mm [in.]

Ø 6.73 [0.26]
SIX HOLES EQUALLY SPACED
ON A 58.7 [2.31] DIA BC

15.24 [0.60]

7.62 [0.30]

8.86 [0.35]

8.76 [0.35]

12.57 [0.50]

Ø 69.34 [2.73]
CONFLAT FLANGE

Mating air fitting (10-32) for 750-420-G1 solenoid valve

32.64 [1.29]
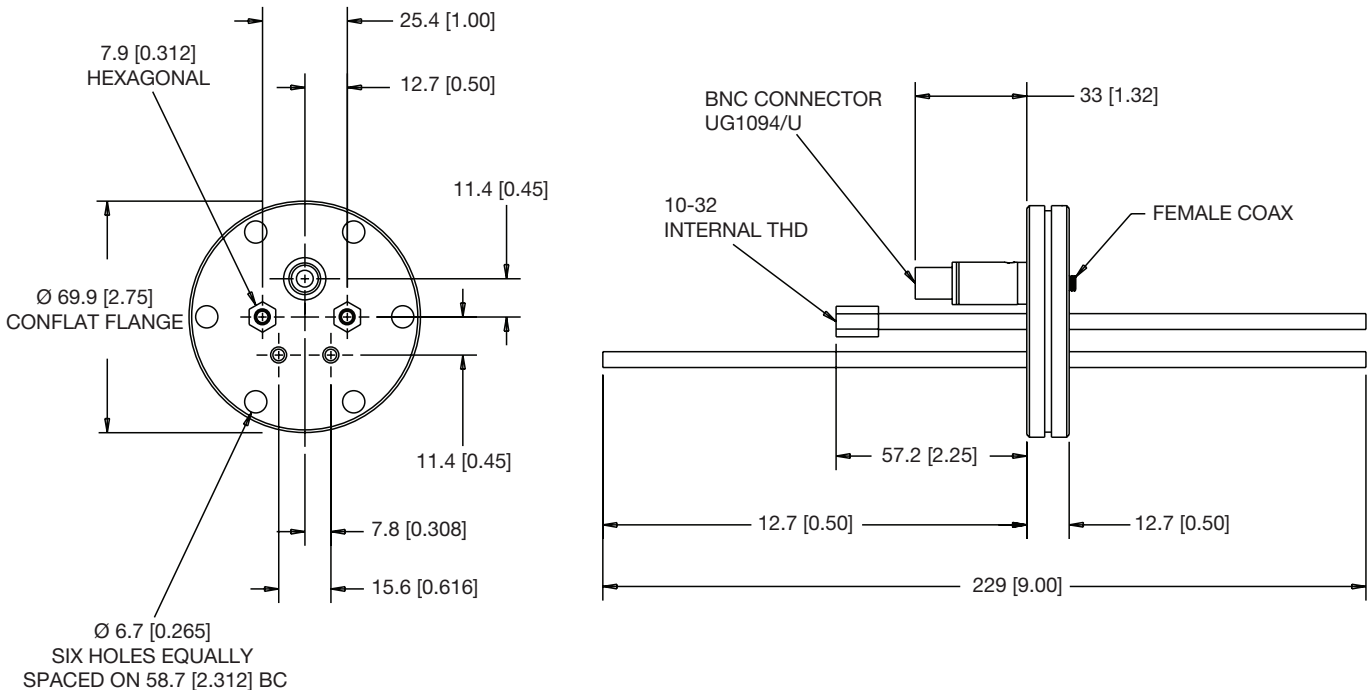
57.15 [2.25]

12.70 [0.50]

127.00 [5.00]

251.83 [9.91]

CrystalSix Sensor
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DIMENSIONS

The CrystalSix Sensor with shutter SPS-1039-G1 can be used with Feedthrough P/N 750-683-G1

NOTE: Measurements in mm [in.]

7.9 [0.312] HEXAGONAL

25.4 [1.00]

12.7 [0.50]

11.4 [0.45]

Ø 69.9 [2.75] CONFLAT FLANGE

11.4 [0.45]

7.8 [0.308]

15.6 [0.616]

Ø 6.7 [0.265] SIX HOLES EQUALLY SPACED ON 58.7 [2.312] BC

BNC CONNECTOR UG1094/U

33 [1.32]

10-32 INTERNAL THD

FEMALE COAX

57.2 [2.25]

12.7 [0.50]

12.7 [0.50]

229 [9.00]

INFICON Instruments for Intelligent Control®