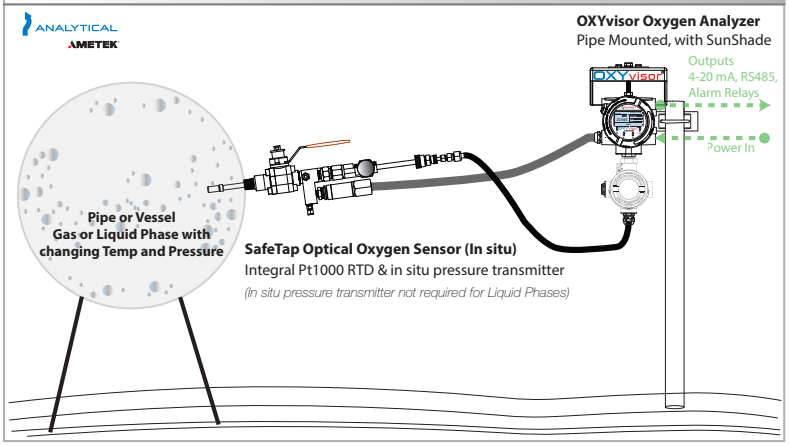
ANALYTICAL

AMETEK®

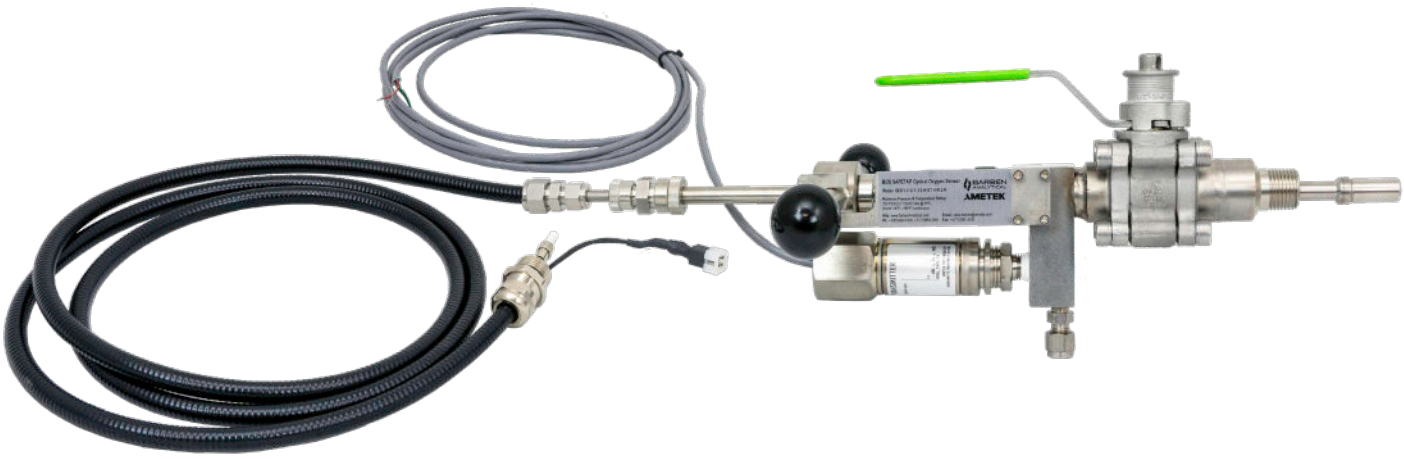
Installation, Operation & Maintenance Manual

Typical Zone 2 and Class 1 Div 2 - installation in a pipe or vessel.
The pressure transmitter (not required for Liquid Phase) and RTD are integrated to the SafeTap II flow cell and rated for Zone 2 and Class 1 Div 2 locations.



BOS SAFETAP II
Optical Oxygen Sensor

Optical O_2 Products (BOSx)



AMETEK®

Operation & Maintenance Manual
BOS SAFETAP II Optical Oxygen Sensor

MANUAL CONTENTS

Receiving & Storage

WARNING!! DO NO DISCARD UV PACKAGING.

Barben oxygen sensors are light sensitive devices. Avoid prolonged exposure to UV light, as this will minimize the effectiveness of the luminophore dye, leading to limited life or failure of the sensor.

Carefully inspect the products immediately upon arrival. If there are missing or damaged items contact the factory or shipping insurance company immediately.

Storage: The storage location should be protected from the elements. Although all components provided are designed to resist corrosion, additional protection from heat (>140°F/ 60°C) and humidity is recommended. Store the sensor caps in factory supplied UV resistant packaging when not in use.

Safety Instructions

Read complete manual to understand operation BEFORE Install & Operation. Please consult factory support for any questions.

WARNING: Always wear protective equipment (e.g. face shield, gloves and other protective clothing) and follow safety rules when clearing the line, installing or removing sensor.

Products Covered in this Manual

This product manual provides information about Barben Analytical's BOS SAFETAP II oxygen sensor and the replaceable oxygen window cap assembly, series B3907. The series B3907 cap assemblies include a pre-assembled replacement cap and an o-ring replacement for the BOS SAFETAP II optical oxygen sensor. The scope of this manual also covers the installation and replacement for the B3907 series replacement cap assemblies.

Product Nomenclature and Specifications

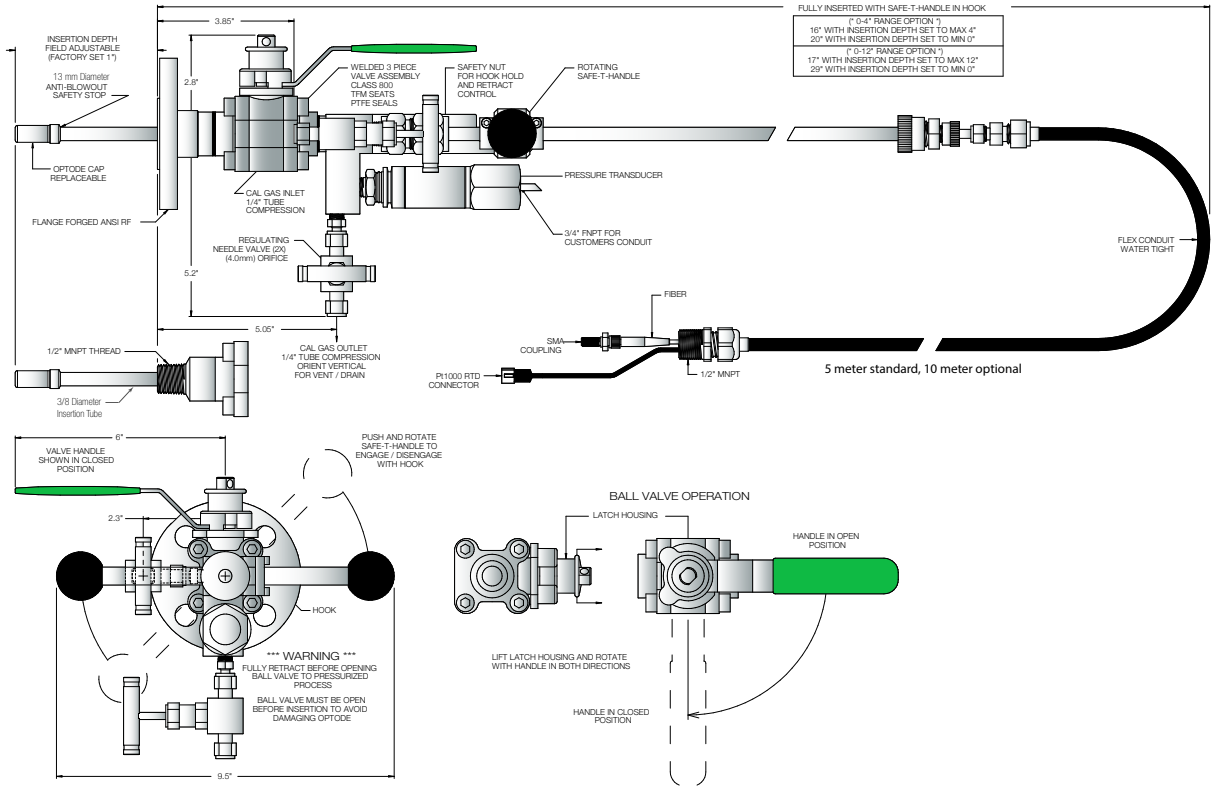
Sensor Range	Sensor & Seals	Body Material	Process Connection	Cable Armor	Sensor Length	Lead Length	Agency Approval	ID	FC	PT	Padlock
BOSx Sensor Element / Range (optode selection)											
BOS1 BOS2 BOS3	Mid Range Sensor: Gas Phase: 0-5.0 % O_2, 0-50 hPa with LOD 20 ppm O_2 and/or Liquid Phase Dissolved Oxygen: 0-1.8 ppm with LOD of 1 ppb High Range Sensor: Gas Phase: 0-25.0 % O_2, 0-250 hPa with LOD 300 ppm O_2 and/or Liquid Phase Dissolved Oxygen: 0-22 ppm with LOD of 15 ppb Trace Range: Gas Phase: 0-300 ppm with 1000 ppm over-range, with LOD of 0.5 ppm O_2 (0.0005 hPa) [Dissolved O_2 reading not avail. for this sensor]										
	Sensor & Seals (wetted elastomers)										
	V E K	Viton O-ring seals - Standard EPDM O-ring seals FFKM (perfluoroelastomer) O-ring seals									
		Body Material (wetted metalics)									
		1 2 3 4	316 Stainless Steel (Standard) Titanium Hastelloy Stainless Steel 2507 Super Duplex								
			Sensor Type & Process Connection								
			D	SafeTap: 1/2” MNPT Nipple for Process Connect, Insert/retract with 1/2” MNPT BV, Class 800, Vacuum = 10^{-6} Torr, Nace MR0175							
			F = 150#/G = 300# RF Flange, Process Connect, Insert/retract with 1/2” Full Port BV, Class 800, Vacuum = 10^{-6} Torr, Nace MR0175							
			F10/G10 F15/G15 F20/G20 F30/G30	SafeTap - 1.0” SafeTap - 1.5” SafeTap - 2.0” SafeTap - 3.0”							
				Cable Armor							
				1	Armor Jacketing Protection						
					BOS Sensor Overall Length						
					2.5 5.0 10 X	2.5 m (8.2’) 5 m (16.4’) 10 m (32.8’) (BOS1 & BOS2 Sensors only) Special Length (If > 10 m, consult factory) (BOS1 & BOS2 sensors only)					
						PVC Jacket Length, Select “N” for BOS SafeTap Sensors.					
						N	Standard - direct connect to OXYvisor Analyzer				
							Agency Approval				
							ST SN	Standard, Integral RTD for SafeTap No integral TC, and Zone 1 (see accessories for external RTD options)			
								Insertion Depth			
								4 F X	Std SafeTap Insertion Depth = 4” past end of nipple or Flange SafeTap insertion depth = 12” past end of nipple or Flange Customer defined insertion depth		
									Fittings & Cal Valves - 316 Stainless Steel		
									N C	None - 1/4” T (Open) Calibration Valves Included and Fittings	
										Pressure Transmitter - 316 Stainless Steel	
										N 1 2 3 4 5 X	None - Plug 1/4” NPT 0-15 psia - Pressure Transmitter 0-30 psia - Pressure Transmitter 0-60 psia - Pressure Transmitter 0-100 psia - Pressure Transmitter 0-150 psia - Pressure Transmitter >200 psia - Pressure Transmitter - consult factory
											Padlock
											N V H	None Padlock 3/16” Padlock 5/16”
	Seals	Body MTL	Sensor Type	Cable	Length	Cut	Agency	ID	FC	PT	P	
BOS3	**V**	**1**	**D**	**1**	**2.5**	**N**	**ST**	**4**	**N**	**N**	**N**	**<--- SafeTap II - Typical Sensor Configuration**

Operation & Maintenance Manual
BOS SAFETAP II Optical Oxygen Sensor

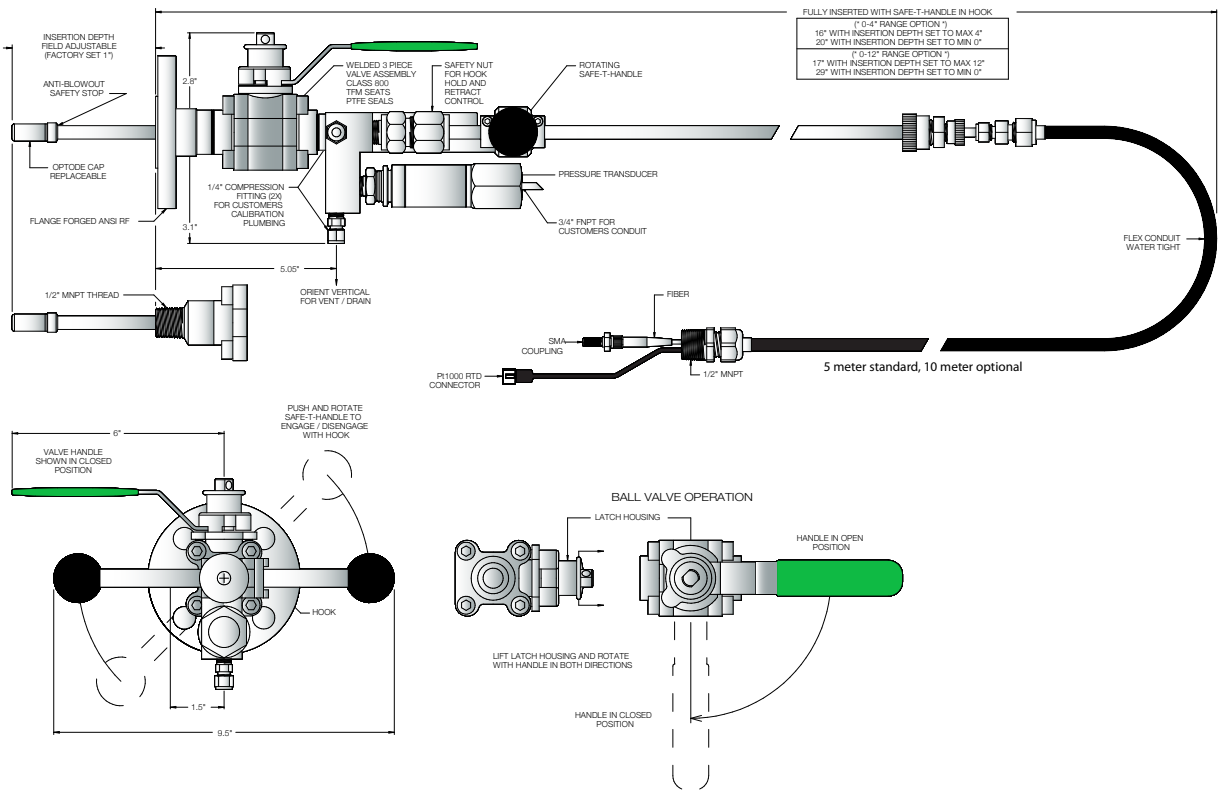
BOS Range Specifications For All Products

BOS1 Sensor Specifications - Liquid Phase / Gas Phase		
	Dissolved Oxygen (DO)	**Gas Phase @ 1 atm, 20ºC**
Measurement Range	0-1.8 mg/L (ppm)	0-4.2 % O_2 (0 - 41.4 hPa)
Limit of Detection (LOD)	1.0 µg/L (ppb)	0.002 % O_2 (0.02 hPa)
Resolution @ 20ºC and 1013 hPa	±0.30 at 1 µg/L (ppb) ±0.63 at 200 µg/L (ppb)	±0.0007 % O_2 at 0.002 % O_2, ±0.0015 % O_2 at 0.02 % O_2, ±0.007 hPa at 0.023 hPa, ±0.015 hPa at 2.0 hPa
Response Time (T_{90})	< 30 sec.	< 6 sec.
Accuracy @ 20ºC	1 ppb (l), 0.002 % O_2 (g), or 3 % of the measured value whichever is greater	
Drift from Photo-decomposition	< 1.0 ppb within 30 days (1 min sample rate)	
Operating Temperature Range	0 to 50ºC (32 to 122ºF)	
Allowable Sensor Temperature	90ºC (194ºF) non-continuous	
BOS2 Sensor Specifications - Liquid Phase / Gas Phase		
	Dissolved Oxygen (DO)	**Gaseous & Dissolved Oxygen @ 1 atm, 20ºC**
Measurement Range	0-22 mg/L (ppm)	0-25 % O_2 (0 - 1013 hPa)
Limit of Detection (LOD)	15 ppb	0.03 % O_2
Resolution @ 20ºC and 1013 hPa	±4.5 at 90 µg/L (ppb) ±0.15 at 23 mg/L (ppm)	±0.01 % O_2 at 0.21 % O_2, ±0.1 hPa at 2 hPa ±0.1 % O_2 at 20.9 % O_2, ±1 hPa at 207 hPa
Response Time (T_{90})	< 30 sec.	< 6 sec.
Accuracy @ 20ºC	±0.4 % O_2 at 20.9 % O_2, ±0.05 % O_2 at 0.2 % O_2	
Drift from Photo-decomposition	< 0.03 % O_2 within 30 days (1 min sample rate)	
Operating Temperature Range	0 to 50ºC (32 to 122ºF)	
Allowable Sensor Temperature	90ºC (194ºF) non-continuous	
BOS3 Sensor Specifications - Liquid Phase / Gas Phase		
	Gas Phase Oxygen @ 1 atm, 20ºC	
Measurement Range	0-300 ppm with over-range of 1000 ppm	
Limit of Detection (LOD)	0.5 ppm O_2	
Resolution @ 20ºC and 1013 hPa	10 ±0.5 ppm; 100 ±0.8 ppm; 200 ±1.5 ppm	
Response Time (T_{90})	< 3 sec. based on 0-300 ppm measurement range	
Accuracy @ 20ºC	±2 ppm or ±5% of measured value whichever is greater (or as partial pressure, ±0.002 hPa)	
Drift from Photo-decomposition	< 1.5 ppm within 30 days (1 min sample rate)	
Operating Temperature Range	0 to 50ºC (32 to 122ºF)	
Allowable Sensor Temperature	90ºC (194ºF) non-continuous	
Cross Sensitivity for BOS1, BOS2, BOS3 Sensors Listed above		
No interference or degradation from carbon dioxide (CO_2), hydrogen sulfide (H_2S), ammonia (NH_3), gaseous sulfur dioxide (SO_2) or ionic species like sulfide, sulfate, or chloride. Compatible with many hydrocarbons, such as natural gas (with H_2S and CO_2) along with ethylene, propylene and polypropylene. Also compatible with methanol and ethanol mixtures.Incompatible with organic solvents, like benzene, chloroform, toluene, acetone, and methylene chloride along with any strong oxidizers such as gaseous chlorine (Cl_2).		
BOS SAFETAP Retractable Optical Oxygen Sensor Specifications		
Valve Options	316 stainless steel ball valve W.O.G., Optional 29" Hg full vacuum NACE MR0175 certified ball valve	
Operating Pressure Rating	750 psig (51.7 Bar)	
Insertion / Retraction Pressure Rating	450 psig (31.0 Bar)	
Temperature Rating	0 to 50ºC (32 to 122ºF) operating, 90ºC (194ºF) non-continuous	
Internal Seal Options	Viton, EPDM, FFKM (Kalrez)	

SafeTap II with Manual Calibration Valve Dimension



SafeTap II without Manual Calibration Valve Dimensions



Operation & Maintenance Manual
BOS SAFETAP II Optical Oxygen Sensor

Basic Installation And Replacement Guidelines

WARNING!! ALWAYS WEAR PERSONAL PROTECTION EQUIPMENT (PPE)
Use appropriate safety equipment before working on the sensor. Have the proper tools laid out before performing any work.

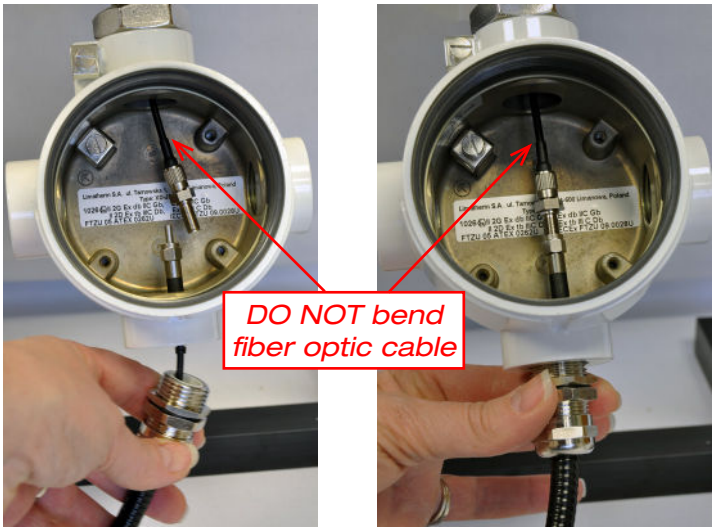
WARNING!! KEEP THE OPTICAL WINDOW CLEAN. DO NOT TOUCH.
Do not introduce dirt, debris, condensate or other foreign contaminants on to the optical window.
The Luminophore and optical isolation on the optical window are delicate. **DO NOT SCRATCH OR DAMAGE THE OPTICAL WINDOW.**

WARNING!! DO NOT OVER TIGHTEN THE SENSOR CAP. The sensor cap should be firmly tightened by hand only. Over tightening the cap may result in damage to the cap housing or to the o-ring on the sensor body. Keep the optical window inside the UV resistant bag until the time of installation.

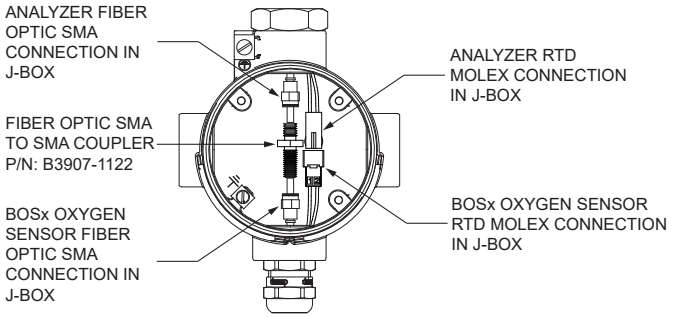
Installation of New BOS SAFETAP II Sensor - Analyzer End (figure 3)

1. Installation of the optical fiber and temperature compensation leads may be done prior to mounting the OXYvisor Oxygen Analyzer.
2. The optical fiber should be threaded onto the fiber connector on the bottom of the OXYvisor Analyzer. The fixed knurled nut provides female threads for the BOS SAFETAP II Gland and should not be turned.
3. Temperature compensation may be provided directly with the BOS SAFETAP II or through a separate Pt1000 RTD temperature sensor. If integral temperature compensation is provided, separate armor jacketing and a gland are provided for the RTD wiring.
4. Refer to OXYvisor manual for sensor menu setup or any wiring that may need to occur.

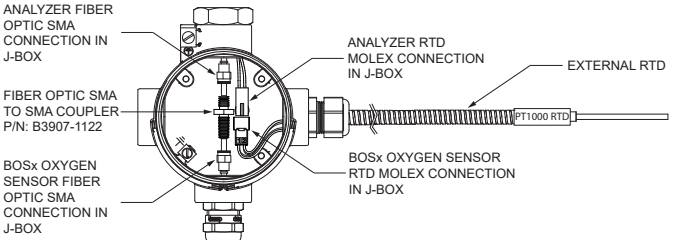
BOS SAFETAP II - Typical Install at OXYvisor Analyzer



The close-up pictures above show the fiber optic connection must come in from the bottom of the OXYvisor Oxygen Analyzer J-box.The fiber connector protrudes through the middle of the fixed knurled nut.Finger tighten the optical fiber to the connector in the middle of the knurled nut. Once the optical fiber is connected, tighten the armored gland into the female threads on the knurled nut.



Integral RTD example



External RTD example

Figure3

Installation of New BOS SAFETAP II Sensor - Process End (figure 4)

1. During initial installation, BOS SAFETAP II valve assembly (#1) should be installed into the process with the compression gland safety nut (#2) and sensor (#3) removed.
2. Open the valve assembly (#1) (if no process pressure behind the valve).
3. Use Teflon tape or other suitable sealant on the threads of the safety nut (#2). Ensure all threads are covered with a minimum of four wraps of Teflon tape.
4. Thread safety nut (#2) into the valve assembly (#1) using the lower wrench flats to tighten the nut.
5. Once compression gland is installed re-verify that valve is open prior to inserting the sensor assembly (#3).
6. Slowly push down on the Safe-T-Handle (#4) to insert the tip of the sensor into the process.The Safe-T-Handle can rotate 360 degrees during insertion.
7. Maneuver the Safe-T-Handle (#4) into the security hook (#5) to prevent accidental retraction when process pressure is applied.
8. Finger tighten upper nut on the safety nut (#2) then add 1/4 turn using a wrench.
9. Prior to beginning measurement, a final check should be made that the optical wand (#6) is fully inserted. The optical wand sensor tip must be in contact with the back of the window cap assembly (#7) to ensure full signal strength. Should this need to be adjusted, do the following:
   - Loosen the 1/4” thumb nut (#8) until the wand slides freely within assembly tubing.
   - Slide optical wand forward until it just contacts the back of the window cap assembly.
   - Keep optical wand in contact with the window cap assembly (#7) and tighten the 1/4” thumb nut (#8) HAND-tight.

     NOTE: Avoid swaging of over-tightening the thumb nut.

BOS SAFETAP II - Typical Install at Process

The Safe-T-Handle fully inserted and turned into the security hook can be seen above. Once the handle is lodged in the hook, the top nut (safety nut) of the compression gland (seen below it) should be tightened to provide additional security against high pressure.

Tools Required

- Crescent Wrench (2)
- Thread sealant

Numbered Part List

1. Valve Assembly
2. Safety Nut
3. Sensor Assembly
4. Safe-T-Handle
5. Security Hook
6. Optical Wand
7. Replaceable Window Cap Assembly
8. Small 1/4” thumb nut

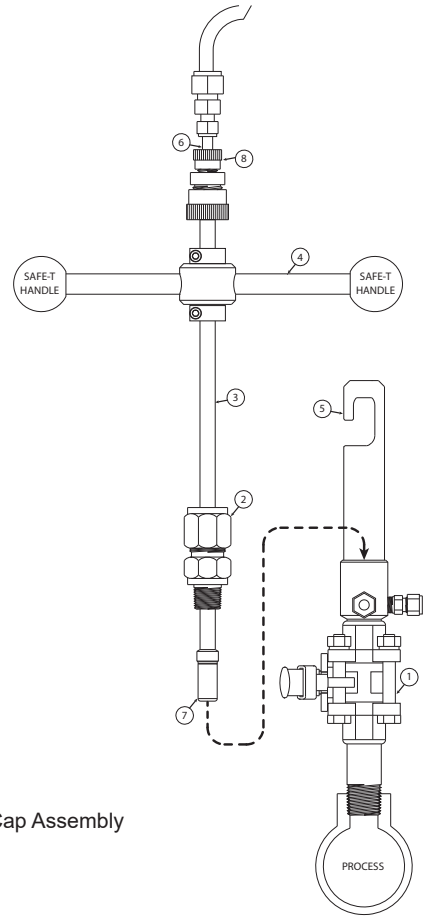


Figure4

Removal of BOS SAFETAP II Sensor (figure 4)

The BOS SAFETAP II Sensor may be periodically removed from the process for cleaning, calibration or window cap assembly replacement. The sensor can be retracted while under pressure by following the steps below. Please remember to use personal protection equipment (PPE) while performing any work on the sensor.

1. Prior to sensor removal make sure that the Safe-T-Handle (#4) is in the security hook (#5) and cannot rotate freely.
2. Loosen the top nut (safety nut) of the compression gland (#2) by 1/4 turn. Push down slowly on the Safe-T-Handle while still within the security hook. Process pressure can push the handle back into the hook. This test provides the operator with an understanding of the force needed to ease the sensor out of the process. If a lock-out padlock is used, it should be removed prior to this stage.
3. Slowly push down on the Safe-T-Handle (#4) until it can turn freely passed the security hook.
4. Maintain a firm grip on the Safe-T-Handle and let the process pressure push the sensor assembly (#3) back until it can no longer retract.
5. Close the valve assembly to isolate the sensor from the process.
6. Residual process pressure can be bled off through the two 1/4” tubing fittings on the valve assembly. Please use proper precautions if hazardous or toxic gases are present. These tubing fittings can also be used for in situ calibration.

Regular Maintenance

- Ensure that the sensor is clean and free of debris. Clean the sensor window cap assembly with clean water (tap or distilled).Heavier accumulations can be cleaned by soaking the sensor in water and cleaning with a cotton swab.
- Ensure that the soft, black portion of the window cap assembly is free of damage. Damage to the cap may render the sensor inoperable or may affect the accuracy of the readings from the analyzer.
- Ensure that the window cap assembly of the sensor is secured to the sensor housing. An accumulation of moisture inside the sensor may create errors.
- **DO NOT attempt to clean the window cap assembly with the use of a wire brush, screwdriver, sand paper or other method that may damage the tip of the sensor.**

Replacement of Window Cap Assembly (figure 5)

1. Inspect the sensor window cap (#1). Look for visible damage (e.g. deformation, cuts, corrosion) on the metal housing of the cap. Inspect the optical luminophore on the tip of the sensor for damage (e.g. scratches) to ensure the integrity of the reading.
2. Clean the sensor assembly (#2) with a damp cloth to remove residual process material.
3. Unscrew the sensor window cap (#1) from the tip of the sensor.
4. Inspect the o-ring seal (#3) on the sensor stem for damage. Replace the o-ring if necessary.
5. Loosen the 1/4” thumb nut (#4) until the optical wand (#5) can slide freely inside of the sensor assembly (#2).
6. Slide the optical wand forward, through the sensor assembly (#2), towards the direction of the cap. NOTE: The wand tip should protrude from the open end of the sensor assembly (#2).
7. Hand tighten the replacement window cap assembly (#1) on to the sensor assembly (#2).The cap assembly will contact the optical wand (#5) tip. They should be in contact. “If not in contact, loosen 1/4” thumb nut (#4) to retract or insert forward to ensure wand tip is in contact with sensor window cap assembly.
8. Fasten the sensor window cap “hand-tight”. Avoid using pliers or other tools.
9. Keep the optical wand (#5) in contact with the window cap assembly (#1) and tighten the knurled compression fitting (#4) “hand-tight”. NOTE: Avoid swaging or over-tightening the 1/4” thumb nut (#4).
10. Carefully reinstall the sensor assembly into the valve assembly. Use care during installation to avoid contact with tip.

BOS SAFETAP II - Window Cap Assembly Replacement

Numbered Part List

1. Replaceable Window Cap Assembly
2. Sensor Assembly
3. O-ring seal
4. Smaller 1/4” thumb nut
5. Optical Wand

Tools Required

- Spare Window Cap Assembly
- Damp Cloth
- O-ring seal

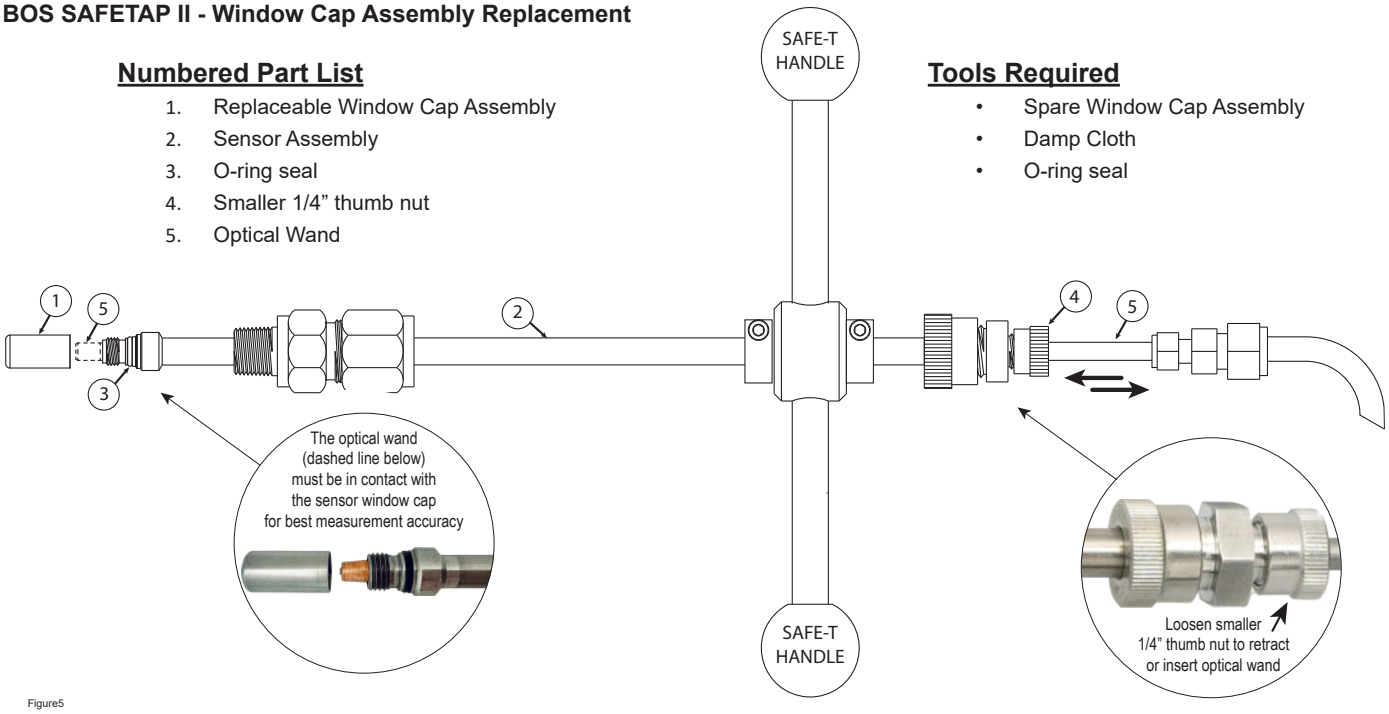


Figure5

BOS SAFETAP II - In situ Purge & Calibration

The valve assembly of the BOS SAFETAP II provides two 1/4” compression fittings. When the sensor assembly is retracted from the process, these fittings may be used to expose the luminophore sensing window to external (customer supplied) purge and calibration gas without removal of the sensor assembly.

In situ calibration should be done with the sensor assembly fully retracted and the isolation valve closed. Calibration gas should be run for several minutes to purge the valve assembly of any residual oxygen from the process.In liquid applications, orientation of the outlet port should allow for residual process liquid to drain prior to calibration.

A typical flow schematic for in situ calibration is shown to the right. Please consult Barben Analytical for additional support for these types of installations.

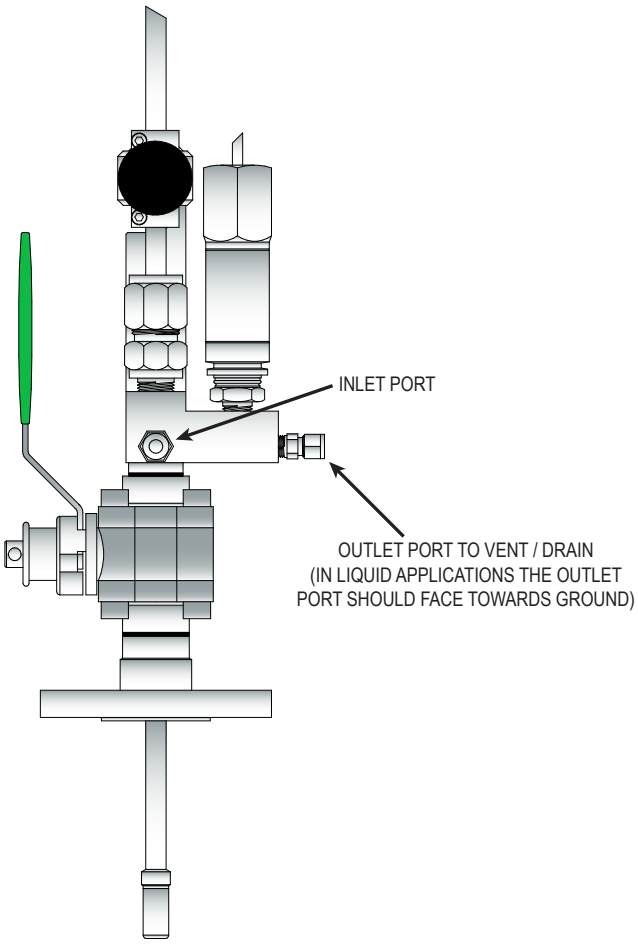


Figure6

Spare Parts

Listed below are the most common recommended spare parts. Replacement window cap assemblies include the luminophore sensing element and can be ordered as new with the part numbers listed below. Call factory support for additional details on other spare parts that may be required for your installation.

Recommended Spare Parts - Replacement Window Cap Assembly (Reference figure 7)			
Part #	Optode	Body Material (Wetted)*	O-Ring Seals (Wetted)
B3907-1101	BOS1	316 Stainless	Viton
B3907-1100	BOS1	316 Stainless	EPDM
B3907-1102	BOS1	316 Stainless	FFKM (perfluoroelastomer)
B3907-1104	BOS2	316 Stainless	Viton
B3907-1103	BOS2	316 Stainless	EPDM
B3907-1105	BOS2	316 Stainless	FFKM (perfluoroelastomer)
B3907-1107	BOS3	316 Stainless	Viton
B3907-1106	BOS3	316 Stainless	EPDM
B3907-1108	BOS3	316 Stainless	FFKM (perfluoroelastomer)

Recommended Spare Parts - Calibration Valves and Fittings (Reference page 5)	
Part #	Description (Wetted Metallics)*
B4954-1094	Adapter 1/4” Stub 316 Stainless
B4955-1169	Valve Straight 316 Stainless
B4955-1170	Valve 90° 316 Stainless
B4954-1092	Adapter 1/4” Stub Ti GR4
B4955-1173	Valve Straight Ti GR4
B4955-1174	Valve 90° Ti GR4
B4954-1093	Adapter 1/4” Stub Hastelloy C-276
B4955-1175	Valve Straight Hastelloy C-276
B4955-1176	Valve 90° Hastelloy C-276
B4954-1091	Adapter 1/4” Stub Stainless 2507
B4955-1171	Valve Straight Stainless 2507
B4955-1172	Valve 90° Stainless 2507

Optional Spare Parts - (Reference figure 7)	
Part #	Description and Materials (wetted)
B4904K-1017	Replacement Seal Kit, Viton Extreme
B4904K-1015	Replacement Seal Kit, EPDM
B4904K-1016	Replacement Seal Kit, FFKM (perfluoroelastomer)
B5102-1000	Lock-out padlock (can be used for Safe-T-Handle or for valve lockout)

**For other material options, please consult factory.*

BOS SAFETAP II - Spare Parts

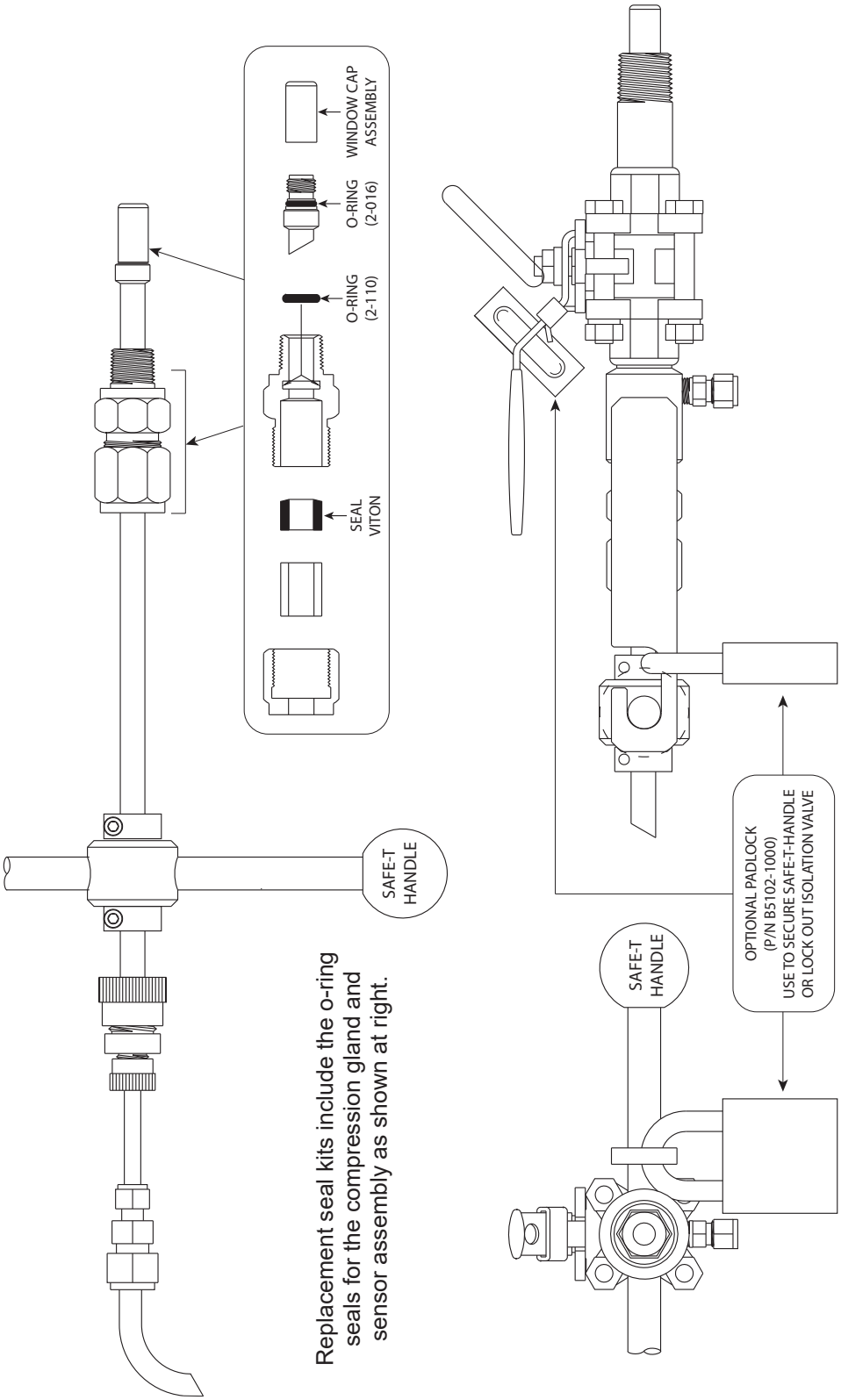
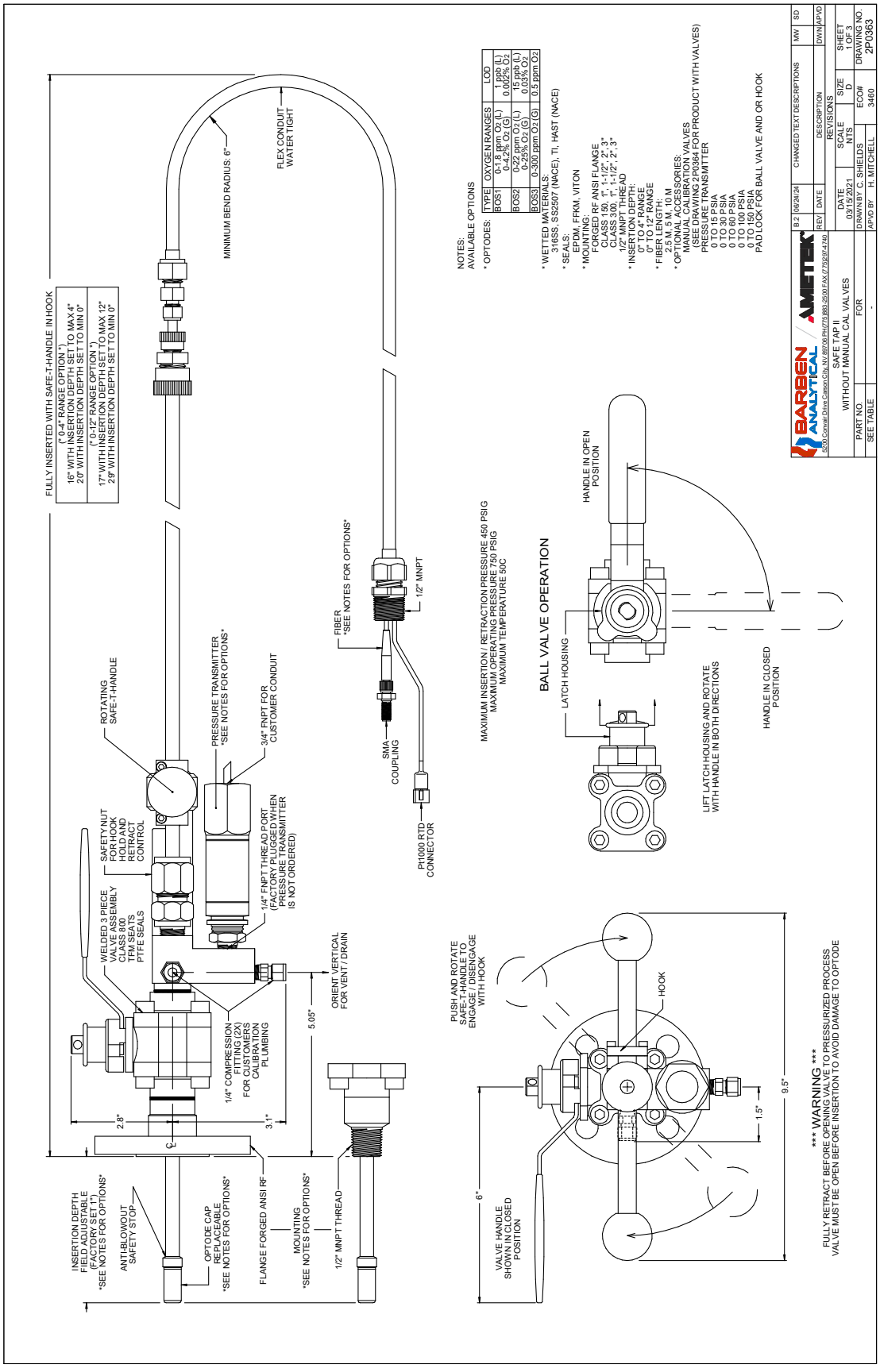
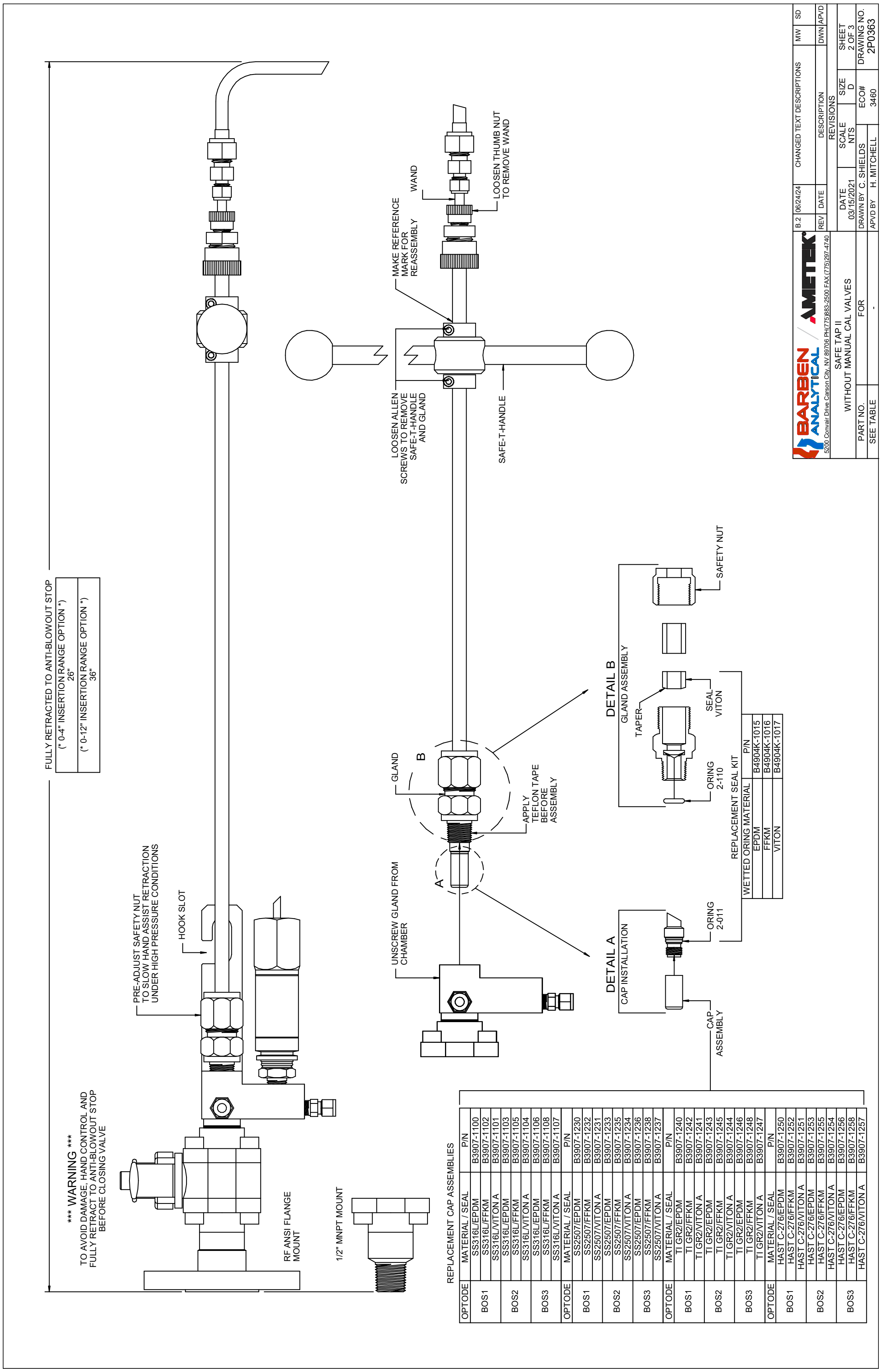


Figure 7

Operation & Maintenance Manual
BOS SAFETAP II Optical Oxygen Sensor



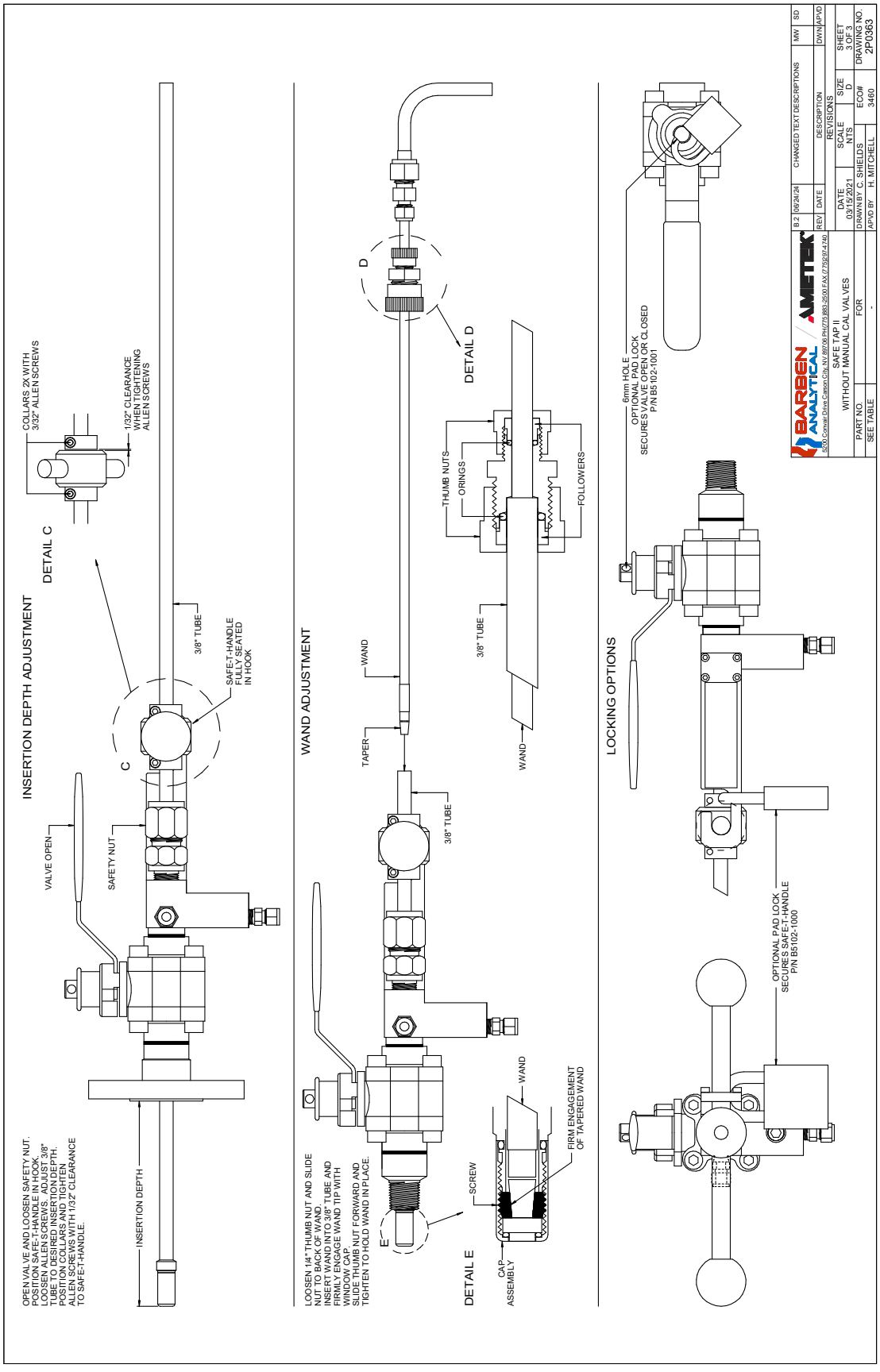


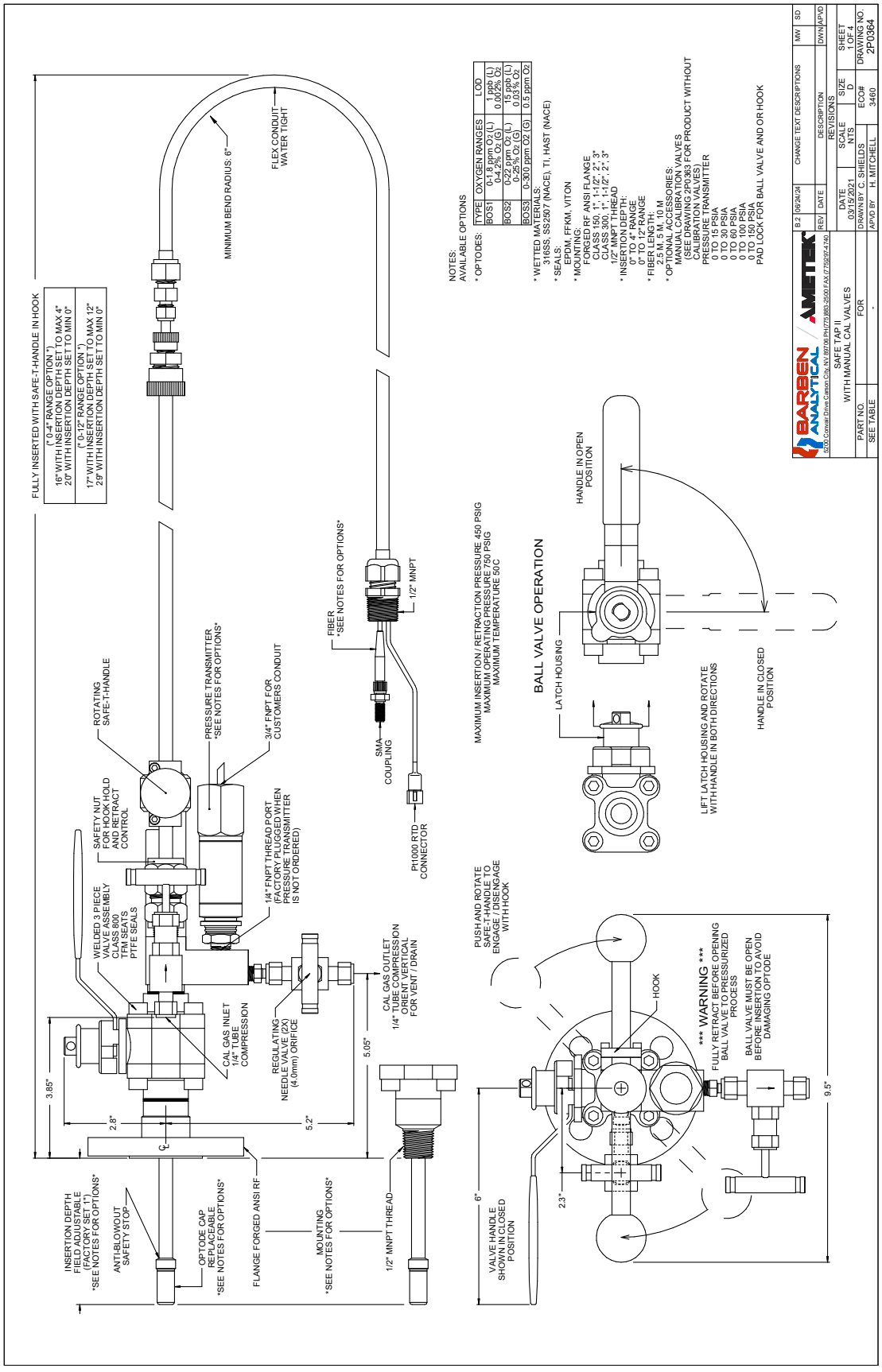
REPLACEMENT CAP ASSEMBLIES

OPTODE	MATERIAL / SEAL	P/N
BOS1	SS316L/EPDM	B3907-1100
	SS316L/FFKM	B3907-1102
	SS316L/VITON A	B3907-1101
BOS2	SS316L/EPDM	B3907-1103
	SS316L/FFKM	B3907-1105
	SS316L/VITON A	B3907-1104
BOS3	SS316L/EPDM	B3907-1106
	SS316L/FFKM	B3907-1108
	SS316L/VITON A	B3907-1107
OPTODE	MATERIAL / SEAL	P/N
BOS1	SS2507/EPDM	B3907-1230
	SS2507/FFKM	B3907-1232
	SS2507/VITON A	B3907-1231
BOS2	SS2507/EPDM	B3907-1233
	SS2507/FFKM	B3907-1235
	SS2507/VITON A	B3907-1234
BOS3	SS2507/EPDM	B3907-1236
	SS2507/FFKM	B3907-1238
	SS2507/VITON A	B3907-1237
OPTODE	MATERIAL / SEAL	P/N
BOS1	TI GR2/EPDM	B3907-1240
	TI GR2/FFKM	B3907-1242
	TI GR2/VITON A	B3907-1241
BOS2	TI GR2/EPDM	B3907-1243
	TI GR2/FFKM	B3907-1245
	TI GR2/VITON A	B3907-1244
BOS3	TI GR2/EPDM	B3907-1246
	TI GR2/FFKM	B3907-1248
	TI GR2/VITON A	B3907-1247
OPTODE	MATERIAL / SEAL	P/N
BOS1	HAST C-276/EPDM	B3907-1250
	HAST C-276/FFKM	B3907-1252
	HAST C-276/VITON A	B3907-1251
BOS2	HAST C-276/EPDM	B3907-1253
	HAST C-276/FFKM	B3907-1255
	HAST C-276/VITON A	B3907-1254
BOS3	HAST C-276/EPDM	B3907-1256
	HAST C-276/FFKM	B3907-1258
	HAST C-276/VITON A	B3907-1257

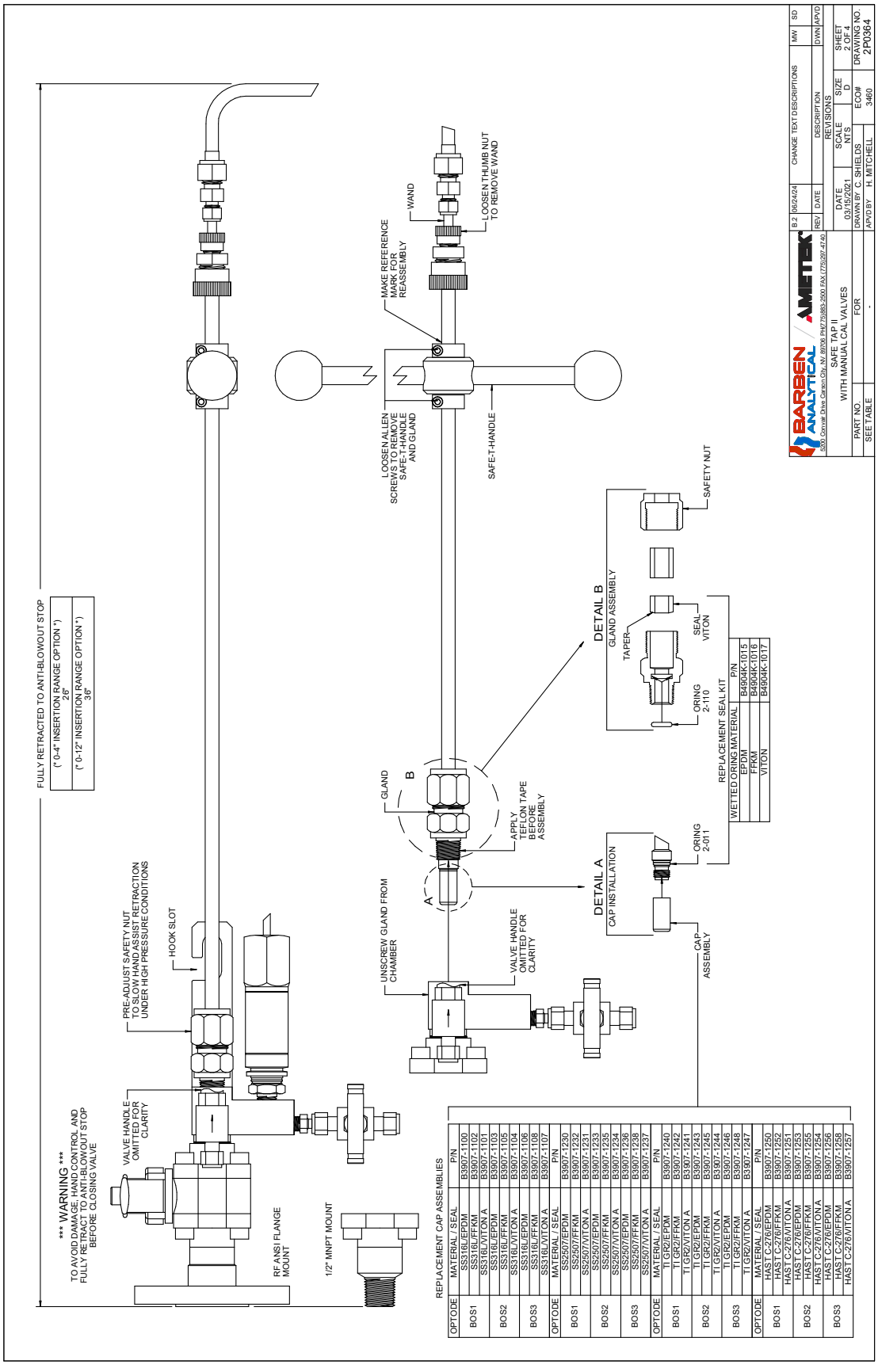
REPLACEMENT SEAL KIT

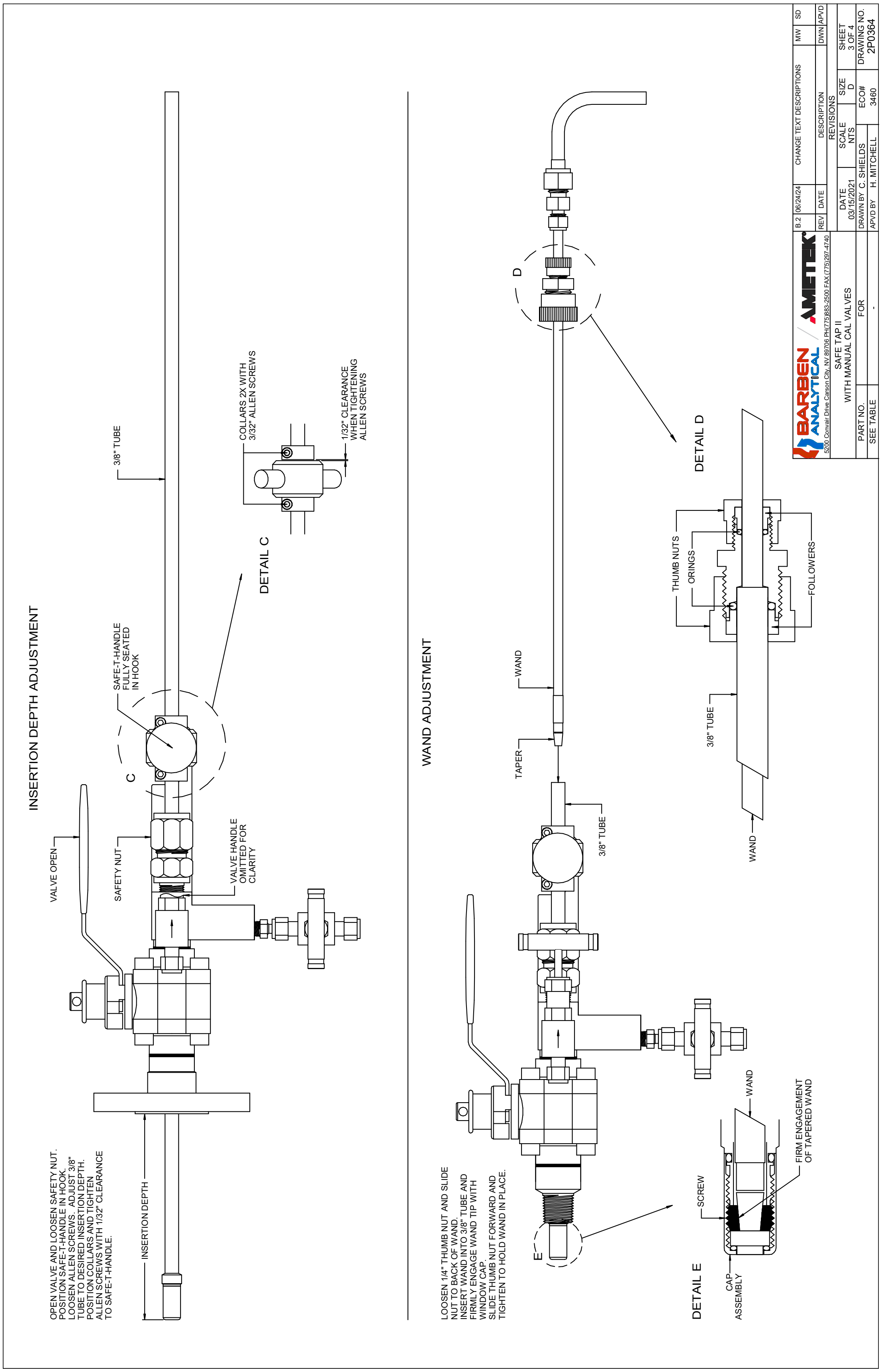
WETTED ORING MATERIAL	P/N
EPDM	B4904K-1015
FFKM	B4904K-1016
VITON	B4904K-1017


INSERTION DEPTH ADJUSTMENT
OPEN VALVE AND LOOSEN SAFETY NUT. POSITION SAFE-T-HANDLE IN HOOK. LOOSEN ALLEN SCREWS. ADJUST 3/8" TUBE TO DESIRED INSERTION DEPTH. POSITION COLLARS AND TIGHTEN ALLEN SCREWS WITH 1/32" CLEARANCE TO SAFE-T-HANDLE.
VALVE OPEN
SAFETY NUT
INSERTION DEPTH
DETAIL C
COLLARS 2X WITH 3/32" ALLEN SCREWS
1/32" CLEARANCE WHEN TIGHTENING ALLEN SCREWS
3/8" TUBE
SAFE-T-HANDLE FULLY SEATED IN HOOK
WAND ADJUSTMENT
LOOSEN 1/4" THUMB NUT AND SLIDE NUT TO BACK OF WAND. INSERT WAND INTO 3/8" TUBE AND PRESS WAND GAGE WAND TIP WITH WINDOW FLAT. SLIDE THUMB NUT FORWARD AND TIGHTEN TO HOLD WAND IN PLACE.
DETAIL D
DETAIL E
THUMB NUTS
ORINGS
FOLLOWERS
WAND
TAPER
SCREW
CAP ASSEMBLY
FIRM ENGAGEMENT OF TAPERED WAND
LOCKING OPTIONS
6mm HOLE OPTIONAL PAD LOCK SECURES VALVE OPEN OR CLOSED P/N B5102-1001
OPTIONAL PAD LOCK SECURES SAFE-T-HANDLE P/N B5102-1000
BARBEN ANALYTICAL
AMETEK
WITHOUT MANUAL CAL VALVES
SAFE TAP II
PART NO.
SEE TABLE
FOR
-
REVISIONS
REV
DATE
DESCRIPTION
DWN
APVD
B.2
06/24/24
CHANGED TEXT DESCRIPTIONS
MW
SD
DATE
03/19/2021
DRAWN BY
C. SHIELDS
APVD BY
H. MITCHELL
SCALE
NTS
SIZE
D
ECO#
3460
SHEET
1 OF 3
DRAWING NO.
2P0363


FULLY INSERTED WITH SAFE-T-HANDLE IN HOOK
(0-4" RANGE OPTION *)
16" WITH INSERTION DEPTH SET TO MAX 4"
20" WITH INSERTION DEPTH SET TO MIN 0"
(0-12" RANGE OPTION *)
17" WITH INSERTION DEPTH SET TO MAX 12"
29" WITH INSERTION DEPTH SET TO MIN 0"
MINIMUM BEND RADIUS: 6"
FLEX CONDUIT WATER TIGHT
ROTATING SAFE-T-HANDLE
PRESSURE TRANSMITTER *SEE NOTES FOR OPTIONS*
3/4" FNPT FOR CUSTOMERS CONDUIT
FIBER *SEE NOTES FOR OPTIONS*
1/2" MNPT
SMA COUPLING
Pt1000 RTD CONNECTOR
SAFETY NUT FOR HOOK HOLD AND RETRACT CONTROL
WELDED 3 PIECE VALVE ASSEMBLY CLASS 800 TFM SEATS PTFE SEALS
1/4" FNPT THREAD PORT FACTORY PLUGGED WHEN PRESSURE TRANSMITTER IS NOT ORDERED)
CAL GAS INLET 1/4" TUBE COMPRESSION
REGULATING NEEDLE VALVE (2X) (4.0mm) ORIFICE
CAL GAS OUTLET 1/4" TUBE COMPRESSION ORIENT VERTICAL FOR VENT / DRAIN
3.85"
2.8"
5.2"
5.05"
INSERTION DEPTH FIELD ADJUSTABLE FACTORY SET TO *SEE NOTES FOR OPTIONS*
ANTI-BLOWOUT SAFETY STOP
OPTODE CAP REPLACEABLE *SEE NOTES FOR OPTIONS*
FLANGE FORGED ANSI RF
MOUNTING *SEE NOTES FOR OPTIONS*
1/2" MNPT THREAD
NOTES:
AVAILABLE OPTIONS
* OPTODES:
TYPE | OXYGEN RANGES | LOD
BOS1 | 0-1.8 ppm O2 (L) 0-25% O2 (G) | 1 ppb (L) 0.02% O2
BOS2 | 0-22 ppm O2 (L) 0-25% O2 (G) | 15 ppb (L) 0.03% O2
BOS3 | 0-300 ppm O2 (G) | 0.5 ppm O2
* WETTED MATERIALS:
316SS, SS2507 (NACE), TI, HAST (NACE)
* SEALS:
EPDM, FFKM, VITON
* MOUNTING:
FORGED RF ANSI FLANGE
CLASS 150, 1", 1-1/2", 2", 3"
CLASS 300, 1", 1-1/2", 2", 3"
1/2" MNPT THREAD
* INSERTION DEPTH:
0" TO 4" RANGE
0" TO 12" RANGE
* FIBER LENGTH:
2.5 M, 5 M, 10 M
* OPTIONAL ACCESSORIES:
MANUAL CALIBRATION VALVES
(SEE DRAWING 2P0363 FOR PRODUCT WITHOUT CALIBRATION VALVES)
PRESSURE TRANSMITTER
0 TO 15 PSIA
0 TO 30 PSIA
0 TO 60 PSIA
0 TO 100 PSIA
0 TO 150 PSIA
PAD LOCK FOR BALL VALVE AND OR HOOK
MAXIMUM INSERTION / RETRACTION PRESSURE 450 PSIG
MAXIMUM OPERATING PRESSURE 750 PSIG
MAXIMUM TEMPERATURE 50C
BALL VALVE OPERATION
LATCH HOUSING
HANDLE IN OPEN POSITION
LIFT LATCH HOUSING AND ROTATE WITH HANDLE IN BOTH DIRECTIONS
HANDLE IN CLOSED POSITION
PUSH AND ROTATE SAFE-T-HANDLE TO ENGAGE / DISENGAGE WITH HOOK
HOOK
*** WARNING ***
FULLY RETRACT BEFORE OPENING BALL VALVE TO PRESSURIZED PROCESS
BALL VALVE MUST BE OPEN BEFORE INSERTION TO AVOID DAMAGING OPTODE
VALVE HANDLE SHOWN IN CLOSED POSITION
6"
2.3"
9.5"
BARBEN ANALYTICAL
AMETEK
6200 Convair Drive Carson City, NV 89706 PH:(775) 883-2500 FAX:(775)972-4740
SAFE TAP II
WITH MANUAL CAL VALVES
PART NO.
FOR
SEE TABLE
REV | DATE | DESCRIPTION | DWN | APVD
B.2 | 09/24/24 | CHANGE TEXT DESCRIPTIONS | MV | SD
DATE 03/15/2021
DRAWN BY C. SHIELDS
APVD BY H. MITCHELL
SCALE NTS
SIZE D
ECO# 3460
SHEET 1 OF 4
DRAWING NO. 2P0364

Operation & Maintenance Manual
BOS SAFETAP II Optical Oxygen Sensor





INSERTION DEPTH ADJUSTMENT
VALVE OPEN
SAFETY NUT
C
SAFE-T-HANDLE FULLY SEATED IN HOOK
3/8" TUBE
VALVE HANDLE OMITTED FOR CLARITY
DETAIL C
COLLARS 2X WITH 3/32" ALLEN SCREWS
1/32" CLEARANCE WHEN TIGHTENING ALLEN SCREWS
INSERTION DEPTH
OPEN VALVE AND LOOSEN SAFETY NUT.
POSITION SAFE-T-HANDLE IN HOOK.
LOOSEN ALLEN SCREWS. ADJUST 3/8"
TUBE TO DESIRED INSERTION DEPTH.
POSITION COLLARS AND TIGHTEN
ALLEN SCREWS WITH 1/32" CLEARANCE
TO SAFE-T-HANDLE.
WAND ADJUSTMENT
WAND
TAPER
3/8" TUBE
D
E
DETAIL D
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DETAIL E
SCREW
CAP ASSEMBLY
WAND
FIRM ENGAGEMENT OF TAPERED WAND
LOOSEN 1/4" THUMB NUT AND SLIDE
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INSERT WAND INTO 3/8" TUBE AND
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SLIDE THUMB NUT FORWARD AND
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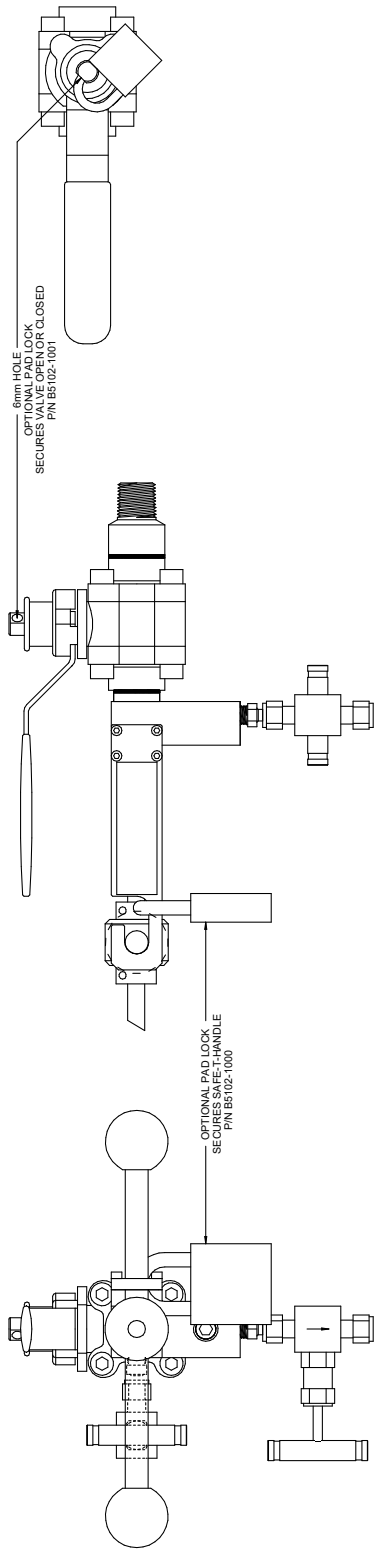
B.2 06/24/24 CHANGE TEXT DESCRIPTIONS MW SD
REV DATE DESCRIPTION DWN APVD
REVISIONS
BARBEN ANALYTICAL
AMETEK
5200 Convair Drive Carson City, NV 89706 PH(775)883-2500 FAX (775)297-4740
SAFE TAP II
WITH MANUAL CAL VALVES
DATE 03/15/2021
SCALE NTS
SIZE D
SHEET 3 OF 4
PART NO. SEE TABLE
FOR -
DRAWN BY C. SHIELDS
APVD BY H. MITCHELL
ECO# 3460
DRAWING NO. 2P0364

LOCKING OPTIONS



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REV	DATE	DESCRIPTION	DWN	APVD
B.2	08/24/24	CHANGE TEXT DESCRIPTIONS	MW	SD

REVISIONS

DATE 03/16/2021	SCALE NTS	SIZE D	SHEET 4 OF 4
DRAWN BY C. SHIELDS		ECO# 3460	DRAWING NO. 2P0364
APVD BY H. MITCHELL			

SAFE TAP II
WITH MANUAL CAL VALVES

PART NO.	FOR
SEE TABLE	-

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Operation & Maintenance Manual
BOS SAFETAP II Optical Oxygen Sensor

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