

The ZO21D is a direct insertion (in-situ) type oxygen detector. This detector when inserted through the wall of a flue or furnace allows continuous monitoring of the oxygen concentration of combustion gas via a zirconia cell. Yokogawa offers three (3) types of oxygen detectors: low temperature, high temperature, and pressure compensated. These detectors are subject to harsh environments because they are directly mounted in combustion applications. We recommend utilizing one of the many accessories Yokogawa has available to increase the life of the detector. Also, for information concerning our ZA8C oxygen converter see GS 11M6A2-E, GS 11M6D1-E for our AV8C multi-channel system, or GS 11M6AA-U for oxygen calibration units.

GENERAL FEATURES

- Measures oxygen percent concentration in all combustion exhaust gases and mixed gases with the exception of inflammable gases
- Utilizes the zirconia system of measurement
- Measurement Range = 0 to 100 vol % O₂
- Output = 0 to 5 vol % O₂ to 0 to 100 vol % O₂
- Approximately 10 minute warm-up time
- 110 (std), 115, 220, 240 VAC + 10%, -15% 50/60 Hz
- 80 VA nominal; 270 VA start-up

CHARACTERISTICS

- **Repeatability:** ±0.5% of Full Scale
- **Linearity:** ±1% of Full Scale (less than 0 to 25% range)
- **Drift:** Span -0.8% of Full Scale/ Zero +0.7% of Full Scale per month
- **Response Time:** 90% within 5 seconds - beginning when sensor reads 90% of span gas and ending at 10% of zero gas values
- **Accuracy:** Accuracy of the unit is dependent on the accuracy of the calibration gases. Please note the following equation:

ACCURACY=

$$[(\text{repeatability})^2 + (\text{linearity})^2 + (\text{accuracy of calibration gas})^2]^{1/2}$$

I. DETECTOR

1.0 Low Temperature General Purpose Detector, ZO21D-L, E

This general purpose low temperature detector is a direct insertion type probe used to continuously monitor the oxygen concentration of combustion gas. A zirconia cell maintained by an internal heater at 1382° F (750° C) is the measuring sensor. Detector options include a check valve, flame arrester (for FM approval), derakane coating and quick disconnect cabling. For a further description of accessories, see Section 2.

Sample Gas Temperature: 32° to 1250° F (0° to 675° C)

Sample Gas Pressure: ±20 inH₂O (±500 mmH₂O)

Insertion Length: 1.3 ft (0.4 m), 3.3 ft (1.0 m), 5.0 ft (1.5 m), 6.6 ft (2.0 m), 10 ft (3.0 m), 12.0 ft (3.6 m), 14.0 ft (4.2 m), 16.0 ft (4.8 m), 18.0 ft (5.4 m). For custom lengths, contact your local Yokogawa Industrial Automation representative.

Ambient Temperature: 14° to 176° F (-10° to 80° C)

Material in Contact with Gas: 316 SS, Zirconia, 304 SS (flange)

Construction: General purpose, dustproof, and rainproof.

Installation: Flange Mounted (FF, reduced bulk type) The following flanges are standard: ANSI Class 4", 150# FF; ANSI Class 3", 150# FF; ANSI Class 2", 150# FF. For custom Flanges, contact your local Yokogawa Industrial Automation representative. (See Note 6.)

Mounting Angle: Horizontal to vertical with cell end down. When detector length is greater than 6.6 ft (2 m), use a probe support, model ZO21V (see Section 2 of Accessories).

Wiring: For description, refer to Accessories in Section 2.

LOW TEMPERATURE DETECTOR	
ZO21D-L	MODEL NUMBER
CODE A	INSERTION LENGTH ¹
-040	1.3 ft (0.40 m)
-046	1.5 ft (0.46 m)
-064	2.1 ft (0.64 m)
-076	2.5 ft (0.76 m)
-100	3.3 ft (1.0 m)
-150	5.0 ft (1.5 m)
-200	6.6 ft (2.0 m)
-245	8.0 ft (2.5 m)
-300	10.0 ft (3.0 m)
-360	12.0 ft (3.6 m)
-420	14.0 ft (4.2 m)
-480	16.0 ft (4.8 m)
-540	18.0 ft (5.4 m)
<i>These detector lengths require either a probe support or a probe protector.</i>	
CODE B	FLANGE MOUNTING ^{3,6}
-A*U	ANSI 4", 150# FF flange ⁵
-B*U	ANSI 3", 150# FF flange
-C*U	ANSI 2", 150# FF flange
-J*U	JIS 5K, 65A FF flange
-N*U	2" MNPT ⁷
-T*U	2½" Tri-clamp flange
-W*U	Westinghouse flange
CODE C	OPTIONS (can select more than one)
/A	Quick disconnects (male portion)
/C	Check Valve (M1132KN)
/D	Derakane coating ⁴
/F	Flame Arrestor ²
/SCT	Stainless Steel Tag

NOTES:

- For special Detector lengths and flanges contact Yokogawa Industrial Automation.
- The Filter Assemblies (E7042UQ and M1100DA or DA-2) are not compatible with, nor required when the flame arrestor option is selected. The flame arrestor includes its own filter. Replacement part number for flame arrestor filter is E7042VG. Filter assemblies and/or flame arrestor option will not fit through a 2", ANSI mounting flange (-C*U) or 2½" Tri-clamp (-T*U).
- The (*U) portion of the part number indicates that the detector is made in the United States at Yokogawa Industrial Automation, Newnan, Georgia.
- Derakane coating is recommended for any application up to 390° F (200° C) where elements corrosive to the detector may be present, such as those found in chemical incinerators.
- The 4" ANSI Flange (-A*U) is suggested for probe lengths 2 m or greater.
- Detector lengths greater than 10.0 ft (3.0 m) use a PE flange instead of a FF flange.

in (mm)

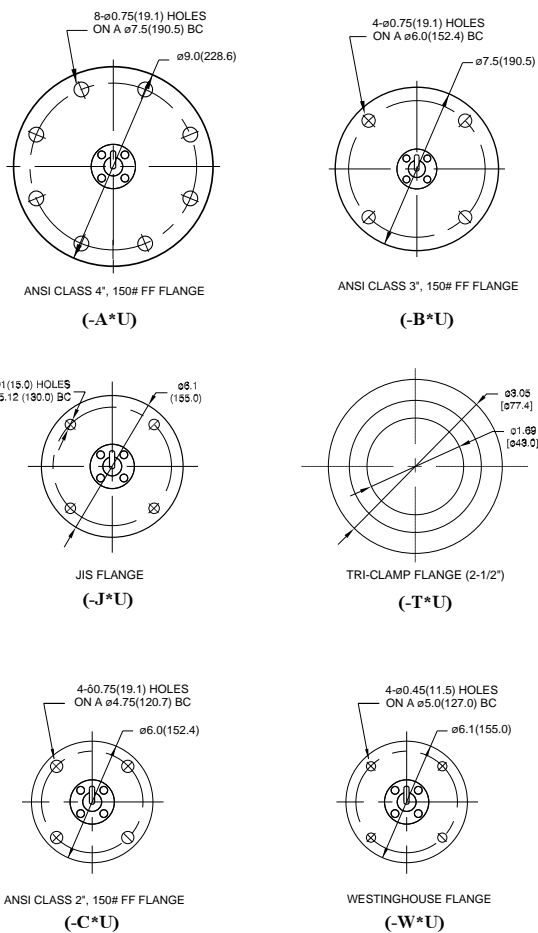
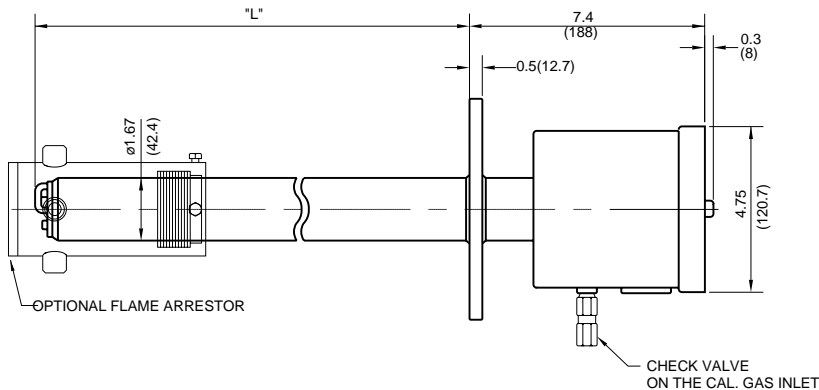


Figure 2: Flanges

L = Insertion length



**Figure 1: ZO21D-L
Low Temperature Detector with Flame Arrestor**

Insertion Length (L)	Approx. Weight
1.3 ft (0.4 m)	7.7 lb (3.5 kg)
1.5 ft (0.46 m)	8.0 lb (3.8 kg)
2.1 ft (0.6 m)	9.2 lb (4.2 kg)
2.5 ft (0.8 m)	10.0 lb (4.6 kg)
3.3 ft (1.0 m)	15.0 lb (7.0 kg)
5.0 ft (1.5 m)	22.0 lb (10.0 kg)
6.6 ft (2.0 m)	29.0 lb (13.0 kg)
10.0 ft (3.0 m)	35.0 lb (16.0 kg)
12.0 ft (3.6 m)	48.0 lb (22.0 kg)
14.0 ft (4.2 m)	56.0 lb (25.5 kg)
16.0 ft (4.8 m)	64.0 lb (29.0 kg)
18.0 ft (5.4 m)	72.0 lb (33.0 kg)

Table 1: Approximate Weight of ZO21D detector with 4", 150# ANSI flange

1.1 HIGH TEMPERATURE SYSTEM

Installations above 1250° F (675° C), but less than 3400° F (1871° C) require a high temperature probe assembly. In addition to a high temperature detector (ZO21D-H, F), a high temperature probe adapter tee (ZO21P) and auxiliary ejector assembly (M1132KE) are required. See descriptions below.

Sample Gas Pressure: ±0.7 psi (±500 mmH₂O) (Auxiliary ejector is required in cases of negative pressure, see Section 2, Accessories).

Ambient Temperature: 14 to 302 °F (-10° to 150 °C)

Material in Contact with Gas: Zirconia cell, 316 SS, 304 SS (flange) with optional derakane coating .

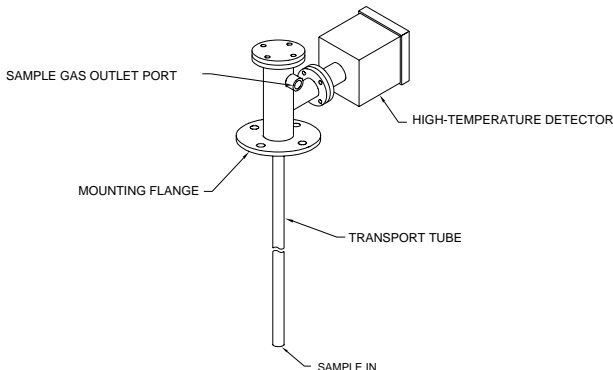


Figure 3: Detector Mounted to Adapter Tee

1.1a High Temperature Detector, Model ZO21D-H

The high temperature detector is a general purpose probe utilized in conjunction with a high temperature adapter tee, model ZO21P in applications with temperatures ranging between 1250 and 3400 °F (675 and 1871 °C). The detector is mounted to an adapter which reduces the heat of the process gas through conduction. Probe options include derakane coating, flame arrestor (for FM approval), and quick disconnect wiring (see Accessories in Section 2 for user recommendation).

NOTE: Appropriate selection of the transport tube's material of construction determines maximum temperature rating of ZO21D-H detector. See Table 2.

Installation: Detector flange is JIS K 32A FF equivalent or 3", 150# ANSI.

Wiring: See Accessories in Section 2.

Ambient Temperature: 14 to 302 °F (-10 to 150 °C)

Case Material: 304 SS

Material in Contact with Gas: 316 SS, Zirconia cell, and 304 SS

Weight: 7 lb (3.2 kg); /F option - add 8 lb (3.6 kg)

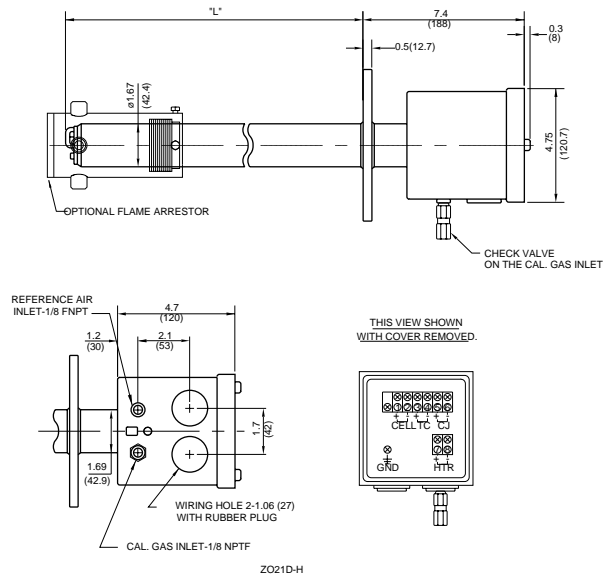


Figure 4: ZO21D-H High Temperature Detector with Flame Arrestor and Check Valve

1.1b **High Temperature Adapter Tee, Model ZO21P-H**

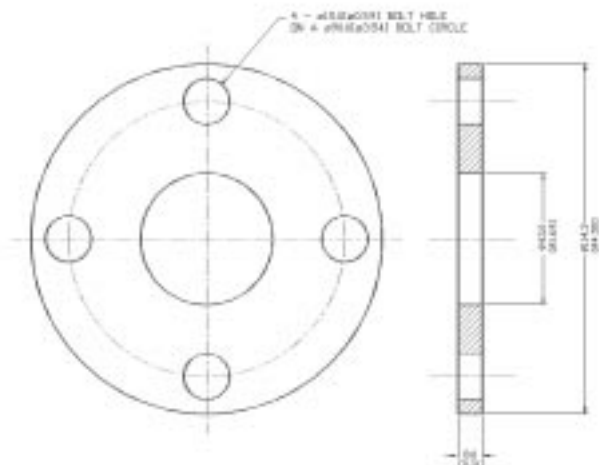


Figure 5: JIS 5K32A Flange

The adapter tee for the high temperature detector cools the process gas through conduction preventing overheating of the cell. The transport tube and eductor assembly allow extraction of the process (in negative pressure applications) without the use of a sampling system. See Table 2 for the transport tube material of construction and insertion lengths.

Transport Tube: Refer to Table 2. Consult your Yokogawa Industrial Automation representative for custom lengths.

Note: Transport tube connection 3/4" MNPT.

Weight: 24 lb (11 kg); /F option - add 5 lb (2.2 kg); /BE option - add 5 lb (2.2 kg)

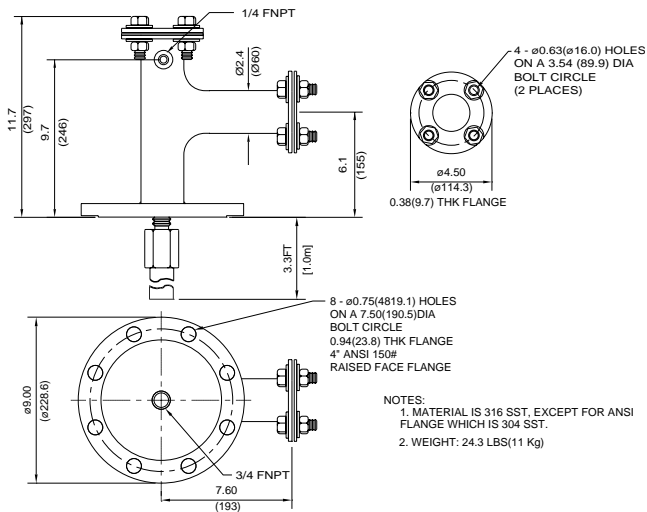
Mounting: Flange mounted; ANSI 4", 150# RF flange mounted to process.

HIGH TEMPERATURE DETECTOR	
MODEL NUMBER	DESCRIPTION
ZO21D-H-015-K*U	High temperature detector Includes a JIS5K32A flange
ZO21D-H-017-K*U	High temperature detector for flame arrestor Includes a 3" ANSI flange ¹
CODE C	OPTIONS (can select more than one)
/A	Quick disconnects (male portion)
/C	Check Valve (M1132KF)
/D	Derakane coating ²
/F	Flame Arrestor (ZO21D-H-017 only) ¹
/SCT	Stainless Steel Tag
/T	Welded NPT Collar without Flame Arrestor

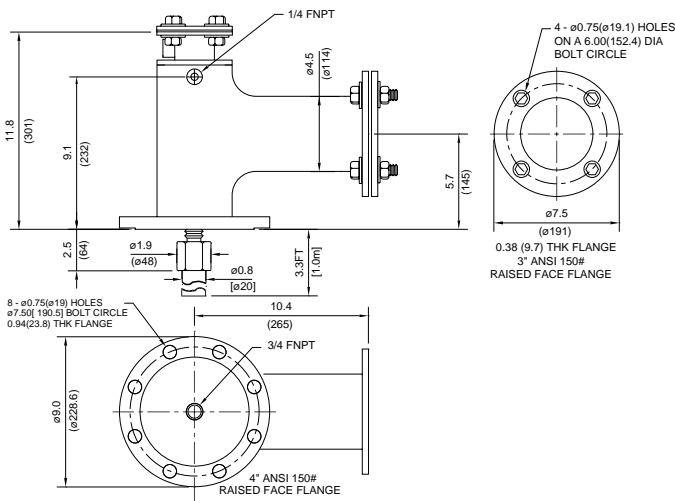
NOTES:

1) **/F VERSION** - Order ZO21D-H-017-L*U/F for probe with preattached flame arrestor. Probe adapter ZO21P-F is used with flame arrestor option. /T on a probe includes mounting threads without the flame arrestor. DO NOT SPECIFY /T/F.

2) **/D DERAKANE COATING** - Used for corrosive applications. Cannot be used if tee temperature is maintained above 390° F (200° C).



**Figure 6: ZO21P-H
High Temperature Probe**



**Figure 7: ZO21P-F
High Temperature Adapter for the Flame Arrestor**

Note: User must select ZO21P-F Flame Arrestor option, which is used with ZO21D-H-017-L*U/F... and is not available with heater system.

HIGH TEMPERATURE PROBE ADAPTER	
ZO21P	MODEL NUMBER
CODE A	TEE CONFIGURATION
-H	Basic design, (side eductor port)
-F	Oversized design (for flame arrestor, includes studs)
CODE B	TRANSPORT TUBE MATERIAL
-A	Silicon Carbide (SiC) [(Up to 2600°F/1427°C) (1.3" O.D.)]
-B	310 Stainless Steel [(Up to 1980°F/1082°C) (1.1" O.D.)]
-C	Alumina Ceramic [(Up to 3400°F/1871°C) (0.8" O.D.)]
-H	HR160 Stainless Steel [(Up to 2000°F/1100°C) (1.1" O.D.)]
-X	Exalloy Ceramic [(Up to 3000°F/1650°C) (1.3" O.D.)]
-N	NO TRANSPORT TUBE
CODE C	INSERTION LENGTH
-033	1.1 ft (0.30 m)
-050	1.6 ft (0.50 m)
-100	3.3 ft (1.0 m)
-150	5.0 ft (1.5 m)
-300	10.0 ft (3.0 m) [not for -A or -C tubes]
-NNN	NO TRANSPORT TUBE
CODE D	FLANGE MOUNTING
-A*U	ANSI 4", 150# RF
CODE E	OPTIONS (Refer to Table 2) (may select one from each group)
/E1	Heater System
/HT	Aux heater system (to 600°F (315°C)) [includes controller and heaters] ¹
/E2	Eductor (select one option)
/BE	Wrapped air eductor pre-attached with regulator and gauge (for ZO21P-H only)
/ER	Air ejector w/return exhaust pre-attached with regulator and gauge
/SE	Separate air ejector, regulator and gauge (not preattached)
/WE	Self-cleaning water ejector (regulator and gauge not included)
/E3	Tag
/SCT	Stainless Steel Tag

NOTES:

- 1) /HT option uses 110VAC, 50/60 Hz with less than 17 VA power consumption. Type J thermocouple included.
- 2) Special blowback probe adapter available. Contact Yokogawa Industrial Automation for details

OPTION	DESCRIPTION	PART NUMBER
/HT Heater controller	Protects chamber of adapter tee against condensation by maintaining chamber @ 600° F with temperature controller. ¹ Insulation not included.	- ZO21P-H only. Notes: Not used with /BE option.
/BE Wrapped Eductor	Prevents condensation at eductor exhaust by preheating air that is supplied to the eductor.	- ZO21P-H only. Notes: Not used with /HT option.
/ER	Returns air eductor supply air and sample exhaust to process without venting to atmosphere.	- ZO21P-H only.
/SE	Includes air eductor, regulator, and gauge. Not pre-attached to ZO21P.	- Either ZO21P-H or ZO21P-F.
/WE	Includes water eductor. Regulator and gauge not included. For high particulate sample supply such as lime kiln process.	- Either ZO21P-H or ZO21P-F.

Note 1: Dewpoint temperature is 550° F or less.

Table 2: Explanation of ZO21P options

Transport Tube Material	Length (L)	Part Number	Weight
Silicon Carbide	1.0 ft (0.3 m)	E7046AL-J01	2 lb (0.9 kg)
Silicon Carbide	1.5 ft (0.5 m)	E7046AL-J02	2.4 lb (1.0 kg)
Silicon Carbide	3.3 ft (1.0 m)	E7046AL-J03	5 lb (2.3 kg)
Silicon Carbide	5.0 ft (1.5 m)	E7046AL-J04	7 lb (3.2 kg)
310 S Stainless Steel	1.0 ft (0.3 m)	E7046AP-J01	1.5 lb (0.7 kg)
310 S Stainless Steel	1.5 ft (0.5 m)	E7046AP-J02	2.2 lb (1.0 kg)
310 S Stainless Steel	3.3 ft (1.0 m)	E7046AP-J03	6 lb (2.7 kg)
310 S Stainless Steel	5.0 ft (1.5 m)	E7046AP-J04	8 lb (3.6 kg)
310 S Stainless Steel	9.8 ft (3.0 m)	E7046AP-J05	12.6 lb (5.7 kg)
Alumina	1.0 ft (0.3 m)	M1132ZA-01	1.2 lb (0.5 kg)
Alumina	1.5 ft (0.5 m)	M1132ZA-02	2 lb (0.9 kg)
Alumina	3.3 ft (1.0 m)	M1132ZA-03	5 lb (2.3 kg)
Alumina	5.0 ft (1.5 m)	M1132ZA-04	7 lb (3.2 kg)
HR160	1.0 ft (0.3 m)	M1132XA-01	1.6 lb (0.7 kg)
HR160	1.5 ft (0.5 m)	M1132XA-02	2.2 lb (1.0 kg)
HR160	3.3 ft (1.0 m)	M1132XA-03	6 lb (2.7 kg)
HR160	5.0 ft (1.5 m)	M1132XA-04	8 lb (3.6 kg)
HR160	9.8 ft (3.0 m)	M1132XA-05	12.6 lb (5.7 kg)
Exalloy Ceramic	1.0 ft (0.3 m)	M1233KA-01	1.5 lb (0.7 kg)
Exalloy Ceramic	1.5 ft (0.5 m)	M1233KA-02	1.9 lb (0.8 kg)
Exalloy Ceramic	3.3 ft (1.0 m)	M1233KA-03	3 lb (1.4 kg)
Exalloy Ceramic	5.0 ft (1.5 m)	M1233KA-04	4.4 lb (2.0 kg)
Exalloy Ceramic	9.8 ft (3.0 m)	M1233KA-05	7.8 lb (3.5 kg)

Table 3: Materials Reference Chart for Transport Tubes

1.1C AUXILIARY EJECTOR ASSEMBLY, MODEL NO. M1132KE

High temperature installations require the use of the auxiliary ejector assembly in all installations. Using instrument air, the auxiliary ejector draws a sample through the adapter tee for quick measurement without mechanical assistance. The assembly includes an ejector, regulator and pressure gauge and is included in the heated eductor (/BE option) for the ZO21P high temperature adapter tee.

Note: Positive pressure requires the use of a needle valve to restrict the flow of sample gas.

Ejector, Model No. M1132KA

The ejector induces flow of the sample from the process through the transport tube. Instrument air flows through the eductor, creating a draft. The draft causes the sample flow from the process to be pulled through a high temperature adapter tee (i.e. transport tube).

Material: 316 SS
Air Supply : 1/8" NPT female
Exhaust: 1/4" NPT male straight
Vacuum Force: 7.6" Hg

Vacuum Flow: 2.4 SCFM
Air Consumption: 1.7 SCFM
Weight: 6 oz (170 g)
Vacuum: 1/4" NPT male

Pressure Gauge, Model No. M1132CG

Indicates the pressure of instrument air flowing into the eductor.

Gauge Size: 2"
Measuring Range: 0 to 60 psi (0 to 400 kPa)
Connection: 1/4" FNPT
Weight: 0.5 lb (0.2 kg)

Pressure Regulator, Model No. M1132KD

This general purpose regulator is used to adjust the flow of instrument air entering the ejector. Made of durable materials and corrosion resistant construction, it provides reliable operation in harsh industrial environments.

Flow Capacity: 20 SCFM (33.6 m³/hr) at 100 psig (700 kPa) supply - 20 psig (140 kPa) outlet.
Exhaust Capacity: 0.1 SCFM (0.17m³/hr) - downstream pressure 5 psig (35 kPa) above setpoint.
Sensitivity: 1" (2.5 cm) of water.
Effect of Supply Pressure variation: Less than 0.2 psig (1.4 kPa) for 25 psi (170 kPa) change.
Maximum Supply Pressure: 250 psig (1700 kPa)
Air Consumption: Less than 6 SCFH (0.17 m³/hr)
Output Range: 0 to 60 psi (0 to 400 kPa)
Port Size: 1/4" NPT
Materials: Body - Die cast aluminum alloy; Diaphragm - Nitrile elastomer and nylon fabric; Trim - Brass, zinc plated steel, acetal.
Weight: 4.0 lb (1.8 kg)

1.2 Pressure Compensated Oxygen Detector, ZO21DW

The ZO21DW is a pressure compensating type oxygen detector used in applications with positive pressures exceeding 0.7 psig (500 mmH₂O). Because the zirconia cell measures the ratio of the oxygen partial pressures between the measuring and reference sides of the zirconia cell, uncompensated positive pressure differences exceeding 0.7 psig (500 mmH₂O) cause measuring errors with the standard oxygen detectors. Compensation is accomplished via a specially designed reference system using dry instrument air (see Note). Options include flame arrestor, check valve, and derakane coating.

Note: User must supply reference air system, model ZA8R with any ZO21DW detector. The ZO21DW is not suitable for NEGATIVE Pressure Applications.

Sample Gas Temperature: 32° to 1250° F (0° to 675° C)
Sample Gas Pressure: Maximum duct pressure, 35 psig (24,607 mm H₂O)

Reference Gas Flowrate: 0.6 LPM

Insertion Length: 1.3 ft (0.4 m), 3.3 ft (1.0 m), 5.0 ft (1.5 m), 6.6 ft (2.0 m), 10 ft (3.0 m). For custom lengths contact your local Yokogawa Industrial Automation representative.

Ambient Temperature: 14° to 302° F (-10° to 150° C)

Material in Contact with Gas: Terminal box -Aluminum casting; Probe - 316SS; Flange - 304SS; Sensor - Zirconia

Construction: Water-resistant, direct insertion

Installation: Flange Mounted, ANSI Class 4", 150# RF Flange

Probe Mounting Angle: Mount horizontal to vertical with cell end down. When probe length is greater than 2.0 m, use a probe support or probe protector (see Section 2 of Accessories).

Wiring: For description, refer to Accessories in Section 2.

Insertion Length (L)	Approx. Weight
1.3 ft (0.4 m)	14 lb (6.5 kg)
3.3 ft (1.0 m)	22 lb (10 kg)
5.0 ft (1.5 m)	29 lb (13 kg)
6.6 ft (2.0 m)	37 lb (17 kg)
10 ft (3.0 m)	44 lb (20 kg)
12 ft (3.6 m)	52 lb (23.5 kg)

Table 4: Approximate weight of ZO21DW with 4", 150# ANSI flange

PRESSURE COMPENSATING (Low Temperature)	
ZO21DW-L	MODEL NUMBER
CODE A	INSERTION LENGTH ¹
-040	1.3 ft (0.40 m)
-100	3.3 ft (1.0 m)
-150	5.0 ft (1.5 m)
-200	6.6 ft (2.0 m)
-300	10.0 ft (3.0 m)
-360	12.0 ft (3.6 m)
CODE B	FLANGE MOUNTING ^{3,6}
-A*A	ANSI 4", 150# RF flange
CODE C	FLANGE CONNECTION
-NPT	1/8" FNPT fitting with NPSM 3/4" conduit fitting
CODE D	OPTIONS (can select more than one)
/C	Check Valve (required)
/D	Derakane coating ¹
/F	Flame Arrestor
/SCT	Stainless Steel Tag
/T	Welded NPT Collar without flame arrestor

NOTES:

1) Derakane coating is recommended for applications up to 390° F (200° C) where elements corrosive to the detector may be present. Such as those found in chemical incinerators.

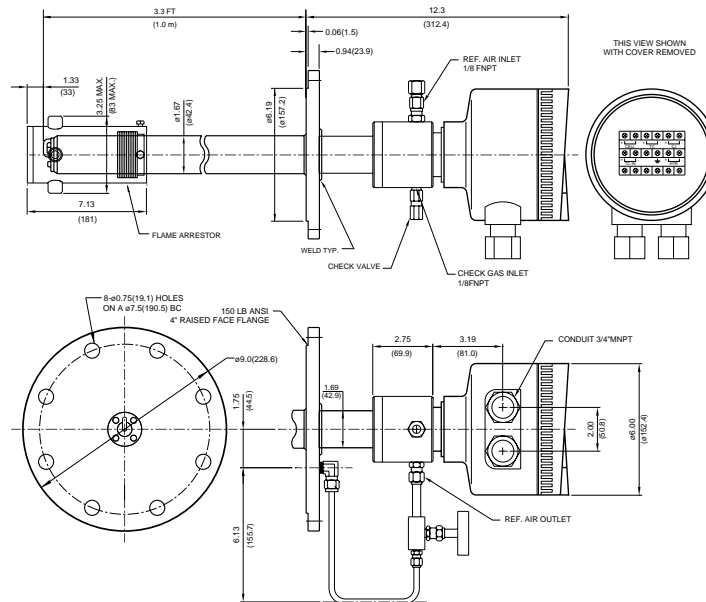


Figure 8: ZO21DW-L-040-A*A-NPT-/F

II ACCESSORIES

2.0 ACCESSORIES AND OPTIONS

ACCESSORY	DESCRIPTION	ZO21D-L	ZO21D-H
Probe Protector	ZO21R	X	
Probe Support	ZO21V	X	
Low Temp Sintered SS Filter	M1100DA (to 572° F)	X	
Hastelloy X Filter	M1100DA-2 (to 1292° F)	X	
Ceramic Filter & Dust Guard	E7042UQ (UU)	X	X
Check Valve	M1132KN (/C option on probe)	X	X
Flame Arrestor	E7042VP (/F option on probe)	X	X
Derakane Coating	(/D option on probe)	X	X
Zirconia Cell Assembly	E7042UD	X	X

Table 5: ZO21D ACCESSORIES

2.1 PROBE PROTECTOR, ZO21R:

The probe protector prevents wear and tear on the probe from dust particles which flow at a velocity of over 33 ft/sec (10 m/sec) in sample gas. Typical applications include coal fired boilers and cement kilns.

Material:

316 SS, 304 SS (flange)

Installation:

Flange mounting (FF type)

Weight:

Insertion Length (L)	Approx. Weight
1.3 ft (0.4 m)	15 lb (7 kg)
1.5 ft (0.46 m)	18 lb (8.2 kg)
2.1 ft (0.64 m)	20 lb (9.1 kg)
2.5 ft (0.76 m)	21 lb (9.5 kg)
3.3 ft (1.0 m)	22 lb (10 kg)
5.0 ft (1.5 m)	29 lb (13 kg)
6.6 ft (2.0 m)	35 lb (16 kg)
10.0 ft (3.0 m)	48.5 lb (22 kg)

Table 6: Approximate weight of ZO21R with 4", 150# ANSI flange

Insertion Length:

1.3 ft (0.4 m), 3.3 ft (1.0 m), 5.0 ft (1.5 m), 6.6 ft (2.0 m), 10.0 ft (3.0 m)

Note: Consult your Yokogawa Industrial Automation representative for custom flanges and lengths.

Flange:

ANSI Class 4", 150# FF; ANSI Class 3", 150# FF; Westinghouse flange

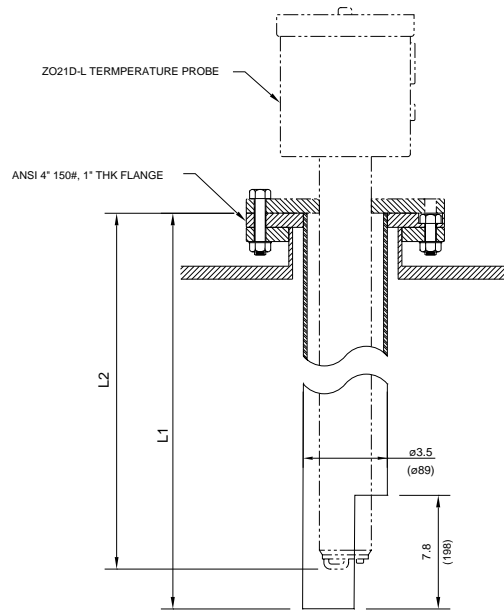


Figure 9: ZO21R Probe Protector

LOW TEMPERATURE PROBE PROTECTOR	
ZO21R-L	MODEL NUMBER
CODE A	INSERTION LENGTH
-040	1.3 ft (0.40 m)
-046	1.5 ft (0.46 m)
-064	2.1 ft (0.64 m)
-076	2.5 ft (0.76 m)
-100	3.3 ft (1.0 m)
-150	5.0 ft (1.5 m)
-200	6.6 ft (2.0 m)
-300	10.0 ft (3.0 m)
	FLANGE MOUNTING ¹
-A*U	ANSI 4", 150# FF flange
-B*U	ANSI 3", 150# FF flange
-W*U	Westinghouse flange

NOTES:

1) Refer to Figure 2 for flange dimensions.

2.2 PROBE SUPPORT, ZO21V

This accessory is required to provide support when a detector longer than 6.6 ft (2.0 m) is mounted horizontally or at an angle other than vertical.

Material: 316 SS, 304 SS (flange)

Installation: Flange mounting (FF type) with an internal spacer to position detector.

Insertion Length: 5.0 ft (1.5 m) for use with 10 ft (3.0 m) probe

Flange: ANSI Class 4", 150# FF; JIS Flange

Weight: Approximately 22 lb (10 kg)

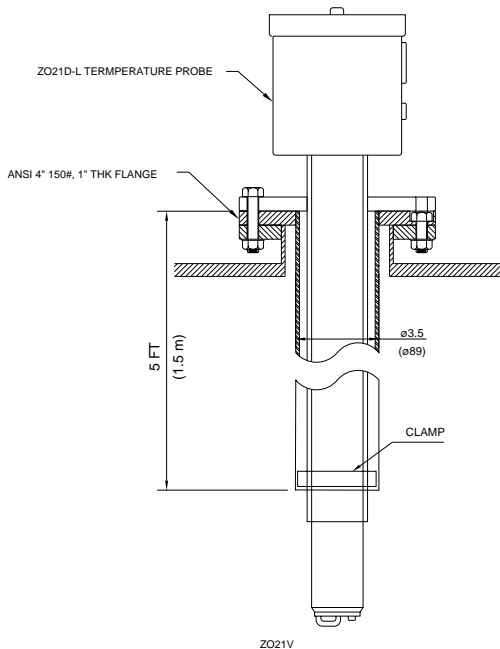


Figure 10: ZO21V Probe Support

LOW TEMPERATURE PROBE SUPPORT	
ZO21V	MODEL NUMBER
CODE A	INSERTION LENGTH
-150	5.0 ft (1.5 m) [for use with 10 ft (3 m) probe]
CODE B	FLANGE MOUNTING ¹
-A*U	ANSI 4", 150# FF flange
-J*U	JIS 5K, 65FF flange
-W*U	Westinghouse flange

NOTES:

1) Refer to Figure 2 for flange dimensions.

2.3 FILTERS, M1100DA, M1100DA-2, AND E7042UQ

Each of these three types of filters protect the zirconia cell from damage resulting from flue gas and dust particles.

2.3A 316 SINTERED SS FILTER ASSEMBLY, M1100DA

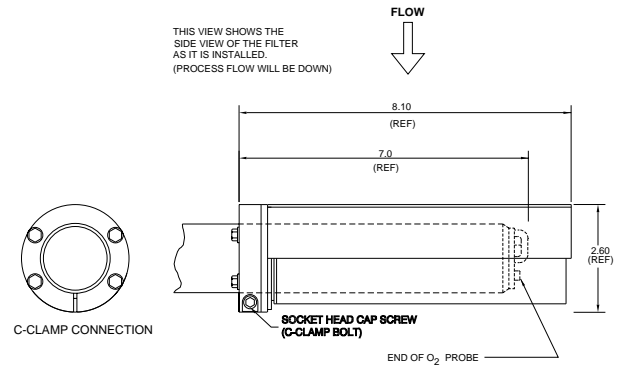


Figure 11: M1100DA - SS Filter

Mesh: 10 Micron (Filter)

Material: 316 Sintered SS Filter with a Fly Ash detector

Maximum Temperature Rating: 572° F (300° C)

Connection: Stainless steel C-clamp with bolt

Weight: Approximately 1.5 lb (.7 kg)

2.3B HASTELLOY X SINTERED FILTER ASSEMBLY, M1100DA-2

Designed for use in applications above 572° F (300° C), this filter addresses blockage and coating problems experienced by tough applications.

Mesh: 10 Micron (Filter)

Material: Hastelloy X (*See Note*)

Maximum Temperature Rating: 1292° F (700° C)

Connection: Stainless steel C-clamp with bolts

Weight: Approximately 1.8 lb (.8 kg)

Note: M1100DA-2 is not suitable for Recovery Boiler Applications. See Section 2.3c

2.3C SILICON CARBIDE FILTER & DUST GUARD, E7042UQ AND E7042UU

This assembly protects the zirconia cell from fine particulate components in the flue gas which may poison or greatly reduce the life of the cell. Typically, the filter is used in Recovery Boiler applications; however, it is also ideal for high temperature installations that require the use of a filter (not used with the flame arrestor).

Mesh: 70 micron (Filter)

Material: Carborundum (Filter), 316 SS

Maximum Temperature Rating: 932° F (500° C)

Connection: Stainless steel bolts

Weight: Approximately 1.6 lb (.5 kg)

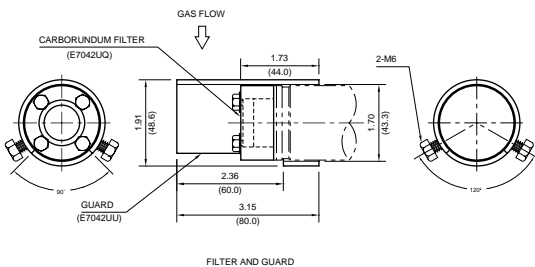


Figure 12:

Filter (E7042UQ) and Dust Guard (E7042UU)

2.4 CHECK VALVE, M1132KN

The check valve prevents the water vapor in the process from diffusing down the calibration line where it may condense and cause the cell to crack. A check valve should be used on all natural gas and positive pressure applications and any time a cal line is installed with long periods (>3 months) of time between calibrations.

Connection: 1/8" FNPT inlet; 1/8" MNPT outlet

Material: 304 SS

Cracking Pressure: 1 psi

Weight: Approximately 0.1 lb (50 g)

Note: The check valve is not a substitution for an in-line filter for removing moisture from instrument air source.

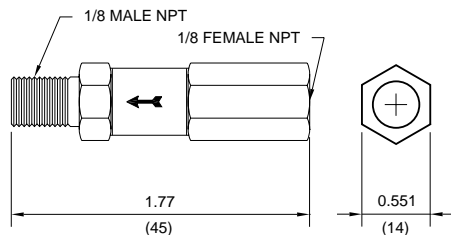
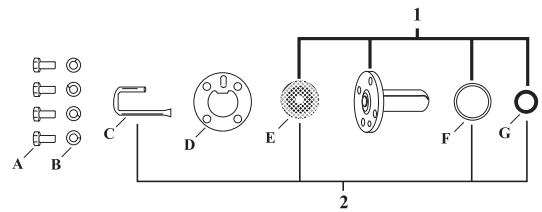


Figure 13: M1132KN - Check Valve

2.5 ZIRCONIA CELL ASSEMBLY, E7042UD, WITH MOUNTING ACCESSORIES



Item	Part No.	Description
1	E7042UD	Cell Assembly
2	K9119EN	Cell Parts
A	Y9512RU	Bolt (5)
B	Y9500SU	Washer (5)
C	E7042BQ	Pipe
D	E7042BR	Plate
E	E7042AY	Filter Assembly
F	G7048XL	Metal O-ring
G	E7042BS	Contact
	E7042AU	Cold Junction
	M1132KN	Check Valve

Figure 14: Zirconia cell assembly and mounting accessories

2.6 FLAME ARRESTOR (/F OPTION ON PROBE), E7042VP (REPLACEMENT ASSEMBLY ONLY)

Required for FM approval, the flame arrestor attaches over the end of the detector covering the zirconia cell. The flame arrestor extinguishes flames generated by the zirconia cell and cools hot gases preventing the detector from causing an explosion in the duct.

Material: 316 SS

Connection: Flame arrestor is threaded to a welded assembly on the probe.

Skin Temperature: 252° F (122° C) ±10%

Note: This is not a substitution for a safety purge system using nitrogen gas.

2.7 DERAKANE COATING (/D OPTION ON DETECTOR)

Derakane coating is painted over a 316 SS body of the detector and connecting flange. Derakane is typically recommended for any application up to 392° F (200° C) where elements corrosive to the detector (316 SS) are present. The application of this coating reduces the rate of deterioration of the detector.

Maximum Temperature: 392° F (200° C)

2.8 CABLE

Transmission of the oxygen signal from the detector to the converter is done via a “signal cable” which transmits the cell, thermocouple, and cold junction signals. A separate “heater cable” is used to supply the detector with 110 VAC from the converter. The converter monitors the cell temperature, automatically cycling the heater to maintain the cell at the appropriate temperature. The heater and signal cables are standard AWG cable.

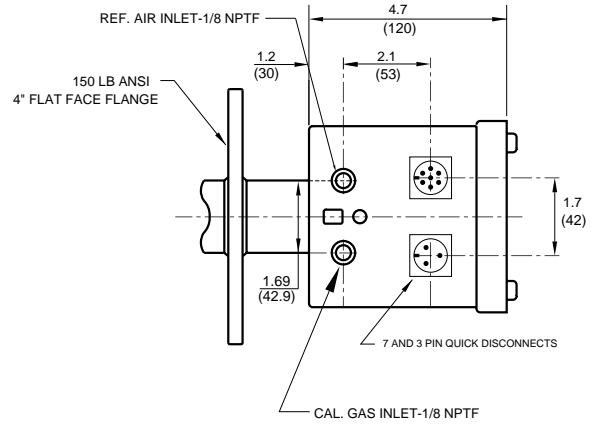


Figure 15: Quick Disconnect

ZO21D Wiring	
CODE A	CABLE TEMPERATURE RATING
WZ-H	High temp cable (FEP jacket up to 390°F (200°C))
WZ-L	Low temp cable (PVC jacket up to 140°F (60°C))
CODE B	FLANGE MOUNTING ^{3,6}
-A*A	ANSI 4", 150# RF flange
CODE B	CABLE LENGTH (feet)
-6S-XXXX	Signal cable measured in feet (6-conductor)
-3H-XXXX	Heater cable measured in feet (3-conductor)
CODE C	CONNECTION ¹
/QC	Quick disconnect w/cable clamp ¹
/QF	Quick disconnect w/flex conduit adapter (1/2" NPTM) ^{2,3}

CAUTION: WZ-H-6S-0500/QF will add a soldered quick disconnect fitting to the end of the 500 foot low temperature cable, with 2 separate Flex Conduit adapter fittings (1/2" NPT)! The customer will probably use a junction box close to the probe, and run the remainder several hundred feet from the junction box to the converter.

NOTES:

- 1) Must select /A option for the ZO21D probe quick disconnects.
- 2) The quick disconnect with cable clamp (/QC option) can only be used with the Low Temperature (WZ-L...) cable.
- 3) The quick disconnect with flex conduit adapter (/QF) fittings can only be used with the High Temperature (WZ-H...) cable.
- 4) The 1/2" flex conduit must be ordered separately. See WZ-FC information.

2.8a Quick Disconnect Cable, /A option on probe (not available on CE conformity standard probes)

Quick disconnect connectors are used on the detector’s heater and signal cables for easy wire installations and maintenance. See model ZO21D detectors for pre-attached male connectors in Section 1 (/A options shown below). Field connectors must be ordered separately (WZ... shown below).

2.8b Flexible Metallic Conduit (WZ-FC)

This jacketed, liquid-tight, flexible metallic conduit provides complete protection from liquids and vapors. It has an absorbing motion and withstands severe vibration and tight bending. The conduit jacket is a special thermoplastic rubber compound. Its applicable temperature range is from -76° to 302° F (-60° to 150° C), with intermittent excursions to 329° F (165° C).

- Size: 0.5 inch
- ID: 0.622 min / 0.642 max
- OD: 0.820 min / 0.840 max
- Inside Bend Radius: 0.2 inches
- Weight per 100 feet: 27 pounds (12.2 kg)

1/2" METALLIC FLEX CONDUIT		
WZ-FC	MODEL NUMBER	
	CODE A	CONDUIT LENGTH
	-XXXX	Length in feet

Type Cable	AWG	No. Conductors	Insulation	Sh
High Temp Signal WZ-H-6S	16	3 pair, twisted; Black/White/Red/Green	FEP	Aluminum 18/7 TC Dr
Low Temp Signal WZ-L-6S		3 pair, twisted; Black/White/Red/Green	Polyethylene	Aluminum foil; Strande copper drai
High Temp Heater WZ-H-3H	14	2 conductor; Black/Red	FEP	Aluminum 16/19 TC E
Low Temp Heater WZ-L-3H		2 conductor; Black/Natural	Polyethylene	Aluminum foil; Strande copper drai

Customer: _____
 Address: _____

 Contact: _____
 Telephone: _____ FAX: _____
 Email: _____

Please complete a separate form for each process stream to be analyzed and return to the attention of:

**Yokogawa Industrial Automation
 Analytical Marketing Department
 4 Dart Road
 Newnan, Georgia 30265 - 1040
 FAX - (770) 251-6427**

1. GENERAL:

Application: Boiler Furnace Other _____
 Fuel: Gas Oil Coal Other _____
 Operation: Record Control Alarm Indication
 Use of Analyzer: Continuously _____ per _____
 Power Supply: AC _____ V, _____ Hz
 Classification: General Purpose CE Conformity

2. INSTRUMENT SPECIFICATIONS & PROCESS CONDITIONS:

Description of Process: _____
 Sample Temperature: Min _____ Nor _____ Max _____ °C °F
 Sample Pressure: Min _____ Nor _____ Max _____ mmH₂O kg/cm³
 Oxygen Concentration: Min _____ Nor _____ Max _____ vol % O₂ _____
 Sample Gas Flow: Min _____ Nor _____ Max _____ m/sec _____
 Dust Content: Min _____ Nor _____ Max _____ g/Nm³ _____
 SO₂ Content: Min _____ Nor _____ Max _____ g/Nm³ _____
 CO/HCl/NO / Content: Min _____ Nor _____ Max _____ g/Nm³ _____
 Combustible Content: Min _____ Nor _____ Max _____ g/Nm³ _____
 Specific Properties of Process: _____

3. INSTALLATION DATA:

Detector Location: Furnace Stack Other _____
 Mounting of Detector: Horizontal Vertical _____ degrees Outdoor Indoor
 Detector Length: 0.4m 1.0m 1.5m 2.0m 3.0m
 Flange: JIS ANSI
 Instrument Air Connection: No Yes, _____ bar
 Automatic Calibration: No Yes
 Reference Air Connection: No Yes, _____ bar
 Converter Location: Outdoor Indoor Cabinet
 Distance of Detector to Converter: _____ m
 Cabling: Combined _____ mm Separate _____ mm

4. REMARKS:

