

General Specifications

Model ZH8 Direct In-Situ Zirconia Humidity Meter in a direct-fire dryer



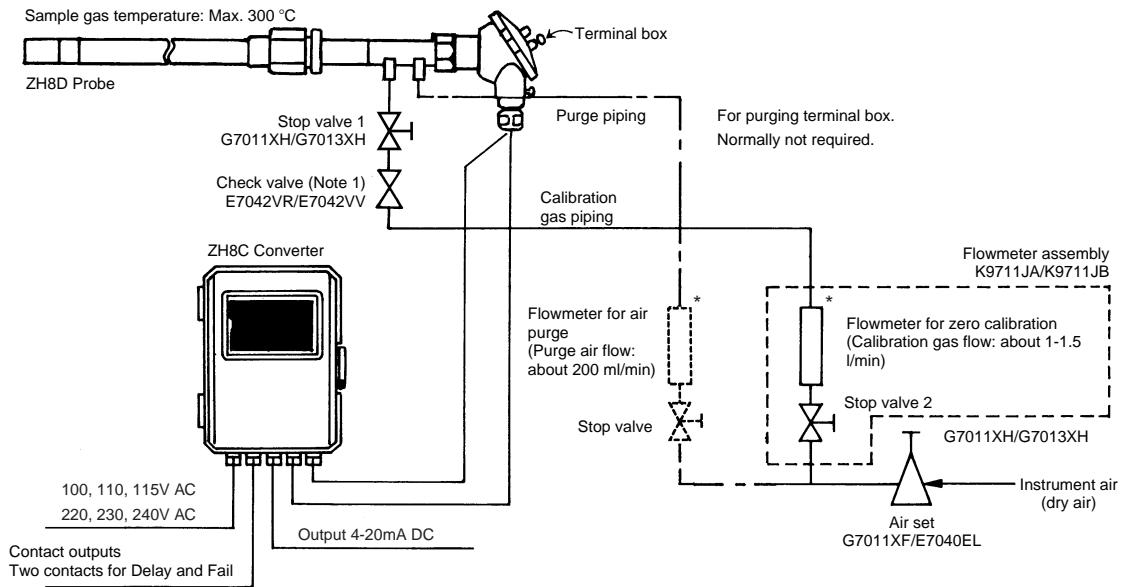
GS 11M9A1-E

General

Model ZH8 humidity meter consists of a direct insertion probe and a digital display converter. With the probe, to which a limiting-current oxygen-analyzer sensor employing a solid zirconia electrolyte is applied, humidity is directly measured by electrolyzing the water vapor in a high-temperature environment and detecting the amount of the oxygen in the vapor. The ZH8 is therefore ideal for the measurement of moisture in a direct-fire dryer. Its quick response and direct-insertion mounting method is also useful for process monitoring and control.



Basic System Configuration



* Supplied by customer
 Note 1: The check valve is optional. The same joint is used for the combination of Check valve and Stop valve 1.

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Features

- Direct moisture measurement system enabling the measurement of moisture in exhaust gas emitted from a direct-fire drying oven.
- Sensor employing limiting-current method that eliminates the need for reference gas.
- Direct insertion that eliminates the need for a sampling system.
- Standard gas is required only for instrument air.
- Easy maintenance with self-diagnostics function.
- Preset CO₂ value (0 to 10% CO₂) for correction of interference error due to CO₂ gas.
- With calibration gas piping installed, on-line zero point calibration and span correction can be performed by one-touch operation.

Applications

- Yankee Hood, cellophane dryers, plywood drying ovens, coating painting dryers, bakery ovens, rice dryers, steel-band ovens, and other equipment.
- Humidity measurement of exhaust gas emitted from a fuel-gas direct heating dryer (CO₂ gas: 10% or below)

■ Standard Specifications

1. General Specifications

- Measurable substances:
Moisture in the exhaust gas emitted from gas-fired drying ovens using city gas or propane gas and moisture in atmospheric air.
- Measurement system:
Zirconia sensor with current limiting method
- Measurement range:
Can be selected with keys from two ranges:
(1) 0 to 25/0 to 75 vol% H₂O
(2) 0 to 0.2/0 to 0.5/0 to 1 kg/kg
Factory setting is 0 to 75 vol% H₂O.
- Maximum distance separating probe and converter:
30 m (wire size: 0.75 to 1.25 mm²)
- Power supply:
Selectable from 100/110/115/220/230/240 V
AC ±10%, 50/60 Hz
- Power consumption: Approx. 15 W

■ Characteristics

- Repeatability: ±1% of span
Linearity: ±2% of span
Drift: ±2% of span/week
Response: Within 60 seconds for 90% response

2. ZH8D Probe

- Sample gas temperature: 60°C to 300°C
(Contact Yokogawa if it exceeds 300°C.)
- Sample gas pressure: -980 to +980 Pa
- Insertion length: 0.1, 0.4, 1.0 m
- Ambient temperature: -10°C to +80°C (at terminal box)
- Material in contact with gas:
Stainless steel (JIS-standard SUS316) and zirconia
- Installation: Compression fitting and flange
- Construction: Dripproof
- Sensor compatibility:
Sensor compatibility can be ensured by inputting sensor characteristic constants to the converter.
- Sensor: Considered to be a consumable because the life of the sensor varies depending on the application.
- Case material: Die-cast aluminum alloy
- Paint color: Jade-green (equivalent to Munsell 7.5GB4/1.5) for terminal box
- Weight: Approx. 2.5 kg (when probe length is 0.4 m and there is no flange)
- Mounting angle:
Horizontal or with the probe tip pointing downwards

3. ZH8C Converter

- Display: 4-digit LED digital display
- Display contents: Selectable from:
- Measured value in vol% H₂O or kg/kg (value in vol% O₂ is for reference)
 - Sensor characteristic constant
 - Zero correction value
 - CO₂ correction value (0 to 10% CO₂)
 - Error code by self-diagnosis

- Analog output:
One 4-20 mA DC linear output (corresponds to the selected range)
Input/output isolation
Load resistance; 600Ω or less
- Contact outputs:
Two points for DELAY* and FAIL
(* Used to drive a solenoid-operated valve.)
- Contact rating: 30 V DC, 2 A
- Self-diagnostics:
Lights up the FAIL lamp upon detection of an error and displays the error code on the LED display.
- Calibration: One-touch zero calibration and span correction using dry air (dew point lower than -15°C)
- Zero correction: Correction factor entered by way of keys.
- CO₂ correction:
CO₂ concentration is altered by way of input from the keys, to correct the error caused by CO₂. (Correctable range: 0 to 10% CO₂)
- Sensor refreshing function:
Refreshes sensor at preset intervals automatically, reducing long-term drift. Input from the keys selects an interval of 0 (disabled), 1 day, 3 days, or 7 days. However, if the CO₂ concentration in the measured gas is greater than 5 vol%, the refresh interval must be set to 0 (disabled).
For ten minutes during each refresh action, the output signal is held at the value just before the action begins.
- Ambient temperature: -10°C to 50°C
- Power supply:
Selectable from 100/110/115/220/230/240 V
AC ±10%, 50/60 Hz
- Construction: Dustproof and dripproof
- Installation: Panel, wall, or pipe mounting
- Paint color: Moss-green CC32 (equivalent to Munsell 0.6GY3.1/2.0) for door
Off-white CC21 (equivalent to Munsell 2.5Y8.4/1.2) for case
- Weight: Approx. 7 kg

■ Precautionary Notes on Application

- (1) High humidity and concentration of corrosive gas (hydrogen sulfide, chlorine, ammonia, sulfuric acid, etc.), flammable gas, reducing gas, halogen (fluorine, chlorine, bromine, etc.), or Freon in the atmosphere, are likely to cause the occurrence of memory error results, a shortening in the life of the sensor life due to deterioration or damage to the sensor performance.
- (2) This product cannot be used in a place where it will be continuously exposed to silicon vapor or silicon gas as doing so will cause the sensor to deteriorate at a faster rate.
- (3) Consult Yokogawa regarding moisture measurements of refuse incineration furnaces, in a reducing atmosphere (containing little oxygen), in atmospheric gas containing more than 10% of CO₂, and in other special atmospheric conditions (such as those containing high dust or oil mist contents).

■ Model and Suffix Codes

1. ZH8D Probe

Model	Suffix Code	Option Code	Description
ZH8D	.....	.....	CE mark-compliant
Insertion length	-010	.....	0.1 m
	-040	.....	0.4 m
	-100	.....	1.0 m
Options*		/CV /AN /JS /JP	With check valve With flange equivalent to ANSI Class 150-2-RF With flange equivalent to JIS 5K-65-FF With flange equivalent to JPI Class 150-2-RF

* Option items are delivered unattached to the probe.

2. ZH8C Converter

Model	Suffix Code	Option Code	Description
ZH8C	.....	.....	CE mark-compliant
Power supply	-2	.....	230 V AC, 50/60 Hz
	-3	.....	220 V AC, 50/60 Hz
	-4	.....	240 V AC, 50/60 Hz
	-5	.....	100 V AC, 50/60 Hz
	-7	.....	110 V AC, 50/60 Hz
	-8	.....	115 V AC, 50/60 Hz
Language of instruction manual		-E -J	English Japanese

3. Flowmeter Assembly

Part No.	Description
K9711JA	0.4 to 4 l/min, column mounting
K9711JB	0.4 to 4 l/min, wall mounting

4. Check Valve (for Calibration Gas Line)

Part No.	Description
E7042VR	Joint: Rc1/8; material: Stainless steel (JIS-standard SUS316)
E7042VV	Joint: 1/8NPT; material: Stainless steel (JIS-standard SUS316)

5. Stop Valve (for Calibration Gas Line)

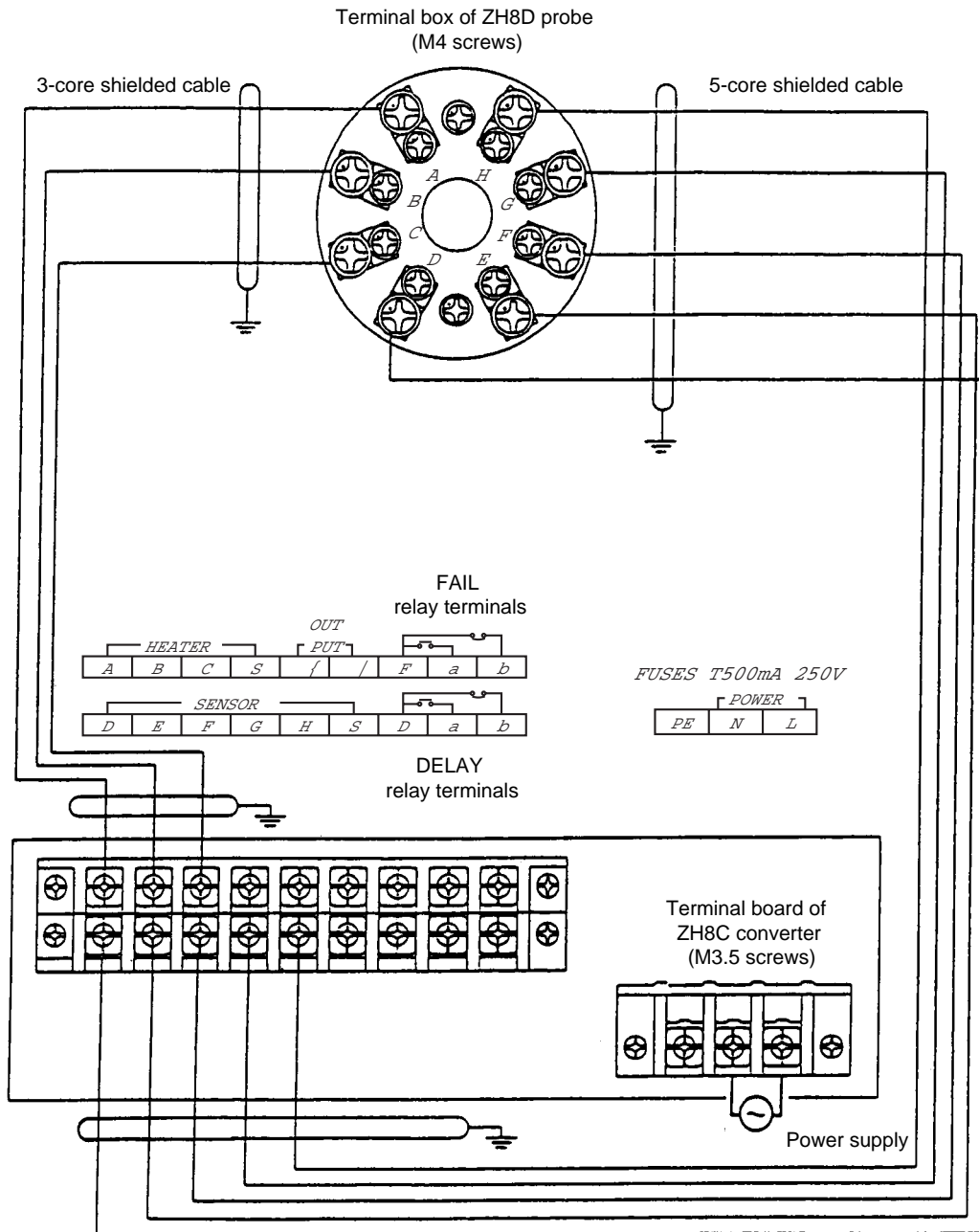
Part No.	Description
G7011XH	Joint: Rc1/8; material: brass
G7013XH	Joint: 1/8NPT; material: brass

6. Air Set (Pressure Regulator)

Part No.	Description
G7011XF	Joint: Rc1/4; material: aluminum
E7040EL	Joint: 1/4NPT; material: aluminum (with 1/4NPT adapter)

■ Wiring Diagram

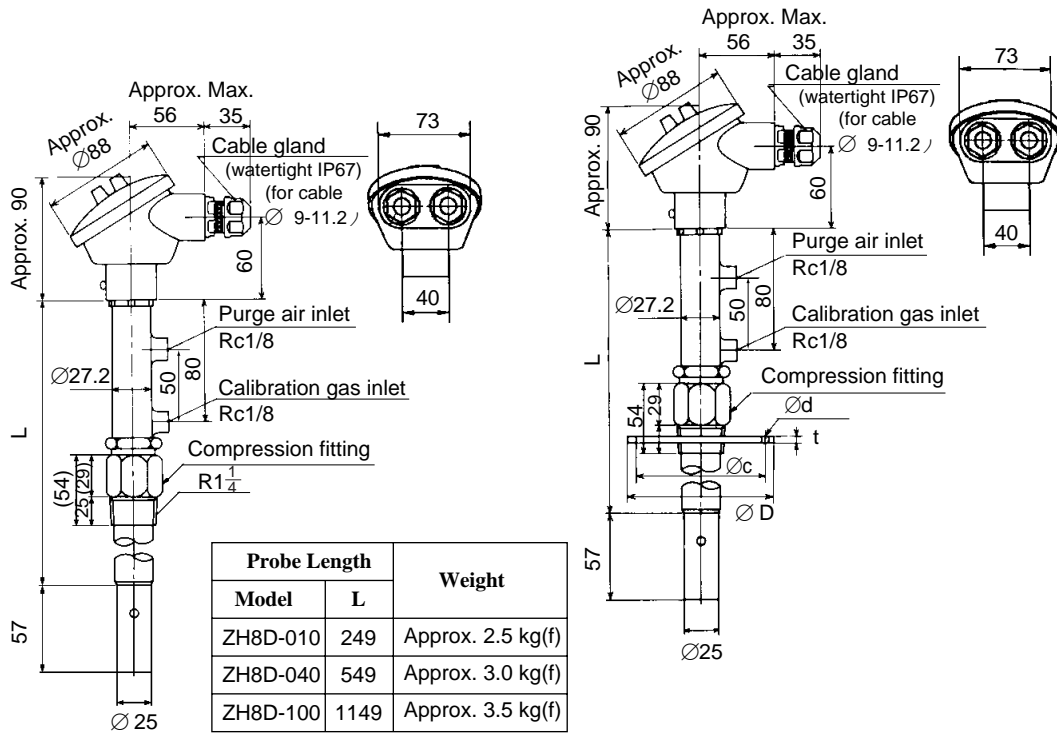
1. For connections between the probe and converter, provide one 3-core shielded (wire size: 0.75-1.25 mm²) cable and one 5-core shielded (wire size: 0.75-1.25 mm²) cable. Both should be heat-resistant vinyl-sheathed with an outer diameter of 9-11.5 mm.
2. The cable connecting the probe and the converter should be no more than 30 m.
3. When using conduits for wiring, use a flexible conduit with a sufficient length at the end of the conduit run on the probe side so that the probe can be pulled out with the conduit attached as is.
4. Use separate conduits for the heater wiring and signal wiring.



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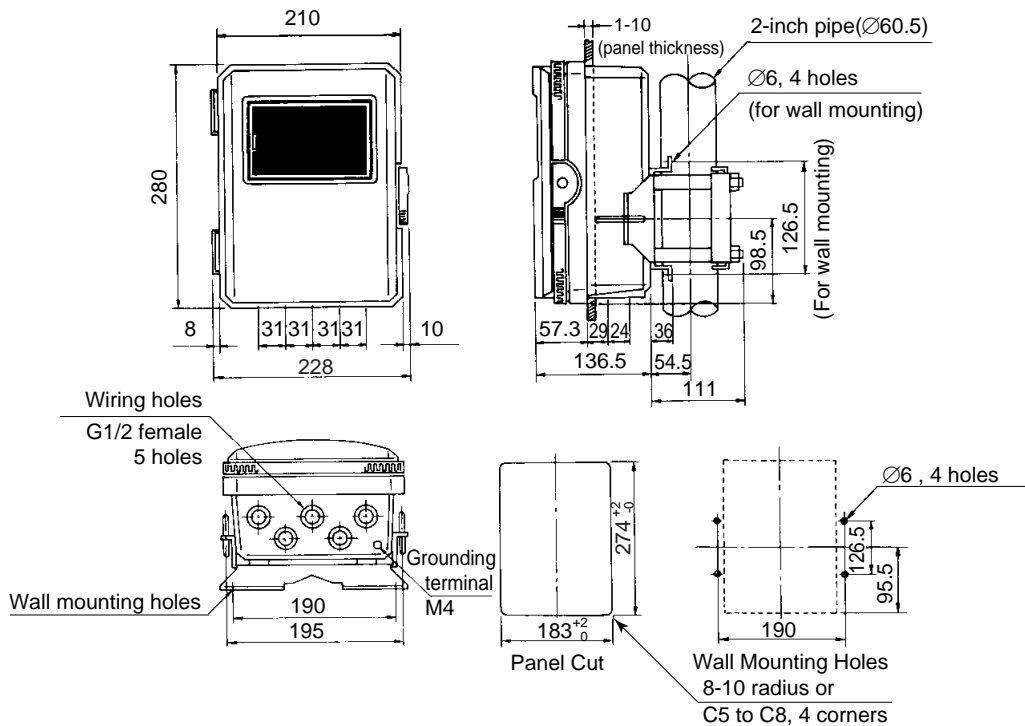
EXTERNAL DIMENSIONS

Unit: mm

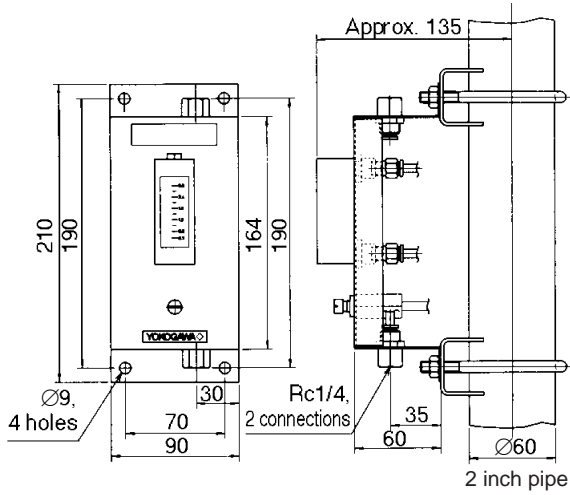


Probe (ZH8D)

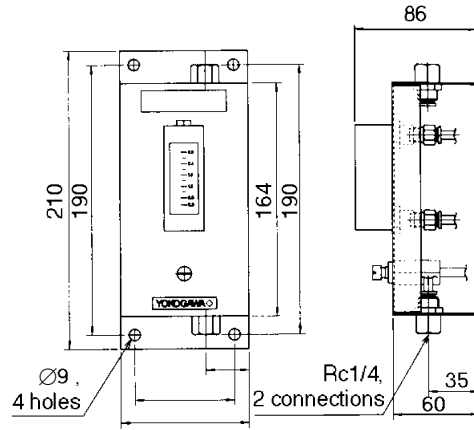
Suffix Code	Flange	$\varnothing C$	$\varnothing D$	t	$\varnothing d$
/JS	JIS 5K-65-FF	130	155	14	15
/AN	ANSI CLASS 150-2-RF	120.7	152.4	19.1	19.1
/JP	JPI CLASS 150-2-RF	120.6	152	19.5	19



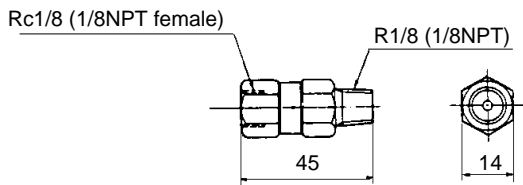
Converter (ZH8C)



**Flowmeter Assembly (K9711JA)
(Column Mounting)**

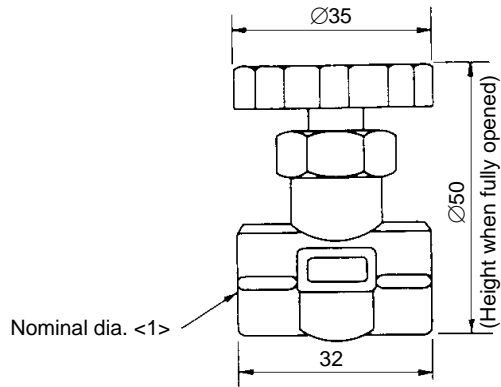


**Flowmeter Assembly (K9711JB)
(Wall Mounting)**



E7042VR	Rc1/8
E7042VV	1/8NPT

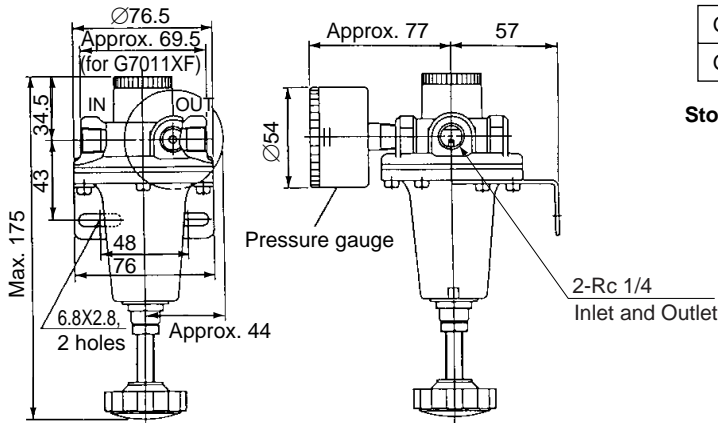
Check Valve (E7042VR/E7042VV)



<1> Rc1/8 or 1/8NPT

G7011XH	Rc1/8
G7013XH	1/8NPT

Stop Valve (G7011XH/G7013XH)



G7011XF	Rc 1/4
E7040EL	With 1/4NPT adapter

Air Set (G7011XF/E7040EL Pressure Regulator)

HIGH-TEMPERATURE HUMIDITY METER INQUIRY SHEET

Please put checkmarks in the appropriate boxes and write the specifications in the blanks in the inquiry form below.

1. General Information

Customer (Company): _____ Site (to be delivered to): _____
 Plant: _____ Objective: Indication Recording Control Alarm monitoring
 Precise location: _____ Power supply: _____ V AC, _____ Hz

2. Process Conditions

2.1 Measurement range: 0 to 25 vol% H_2O 0 to 75 vol% H_2O
 0 to 0.200 kg/kg 0 to 0.500 kg/kg 0 to 1.000 kg/kg

2.2 CO_2 concentration: _____

2.3 Humidity: Norm. _____ Max. _____ Min. _____ kg/kg vol% H_2O

2.4 Temperature: Norm. _____ Max. _____ Min. _____ $^{\circ}C$ $^{\circ}F$

2.5 Pressure: Norm. _____ Max. _____ Min. _____ kPa Other unit _____

2.6 Gas flow rate Norm. _____ Max. _____ Min. _____ m/s Other unit _____

2.7 Dust: Content _____; Size _____ to _____ μm ; Amount _____ g/Nm³ Other unit _____

2.8 Corrosive gas: Not present Present - Gas _____, _____ g/Nm³
 _____, _____ g/Nm³
 _____, _____ g/Nm³

2.9 Specific properties of process: _____

3. Installation Data

3.1 Ambient temperature: Norm. _____ Max. _____ Min. _____ $^{\circ}C$ $^{\circ}F$

3.2 Vibration: Not present Present _____

3.3 Installation of probe

(1) Where to install: Furnace Flue, gas duct _____

(2) Mounting: Horizontal Vertical _____ degrees
 Indoors Outdoors Outdoors under cover

(3) Insertion length: 0.1 m 0.4 m 1.0 m

(4) Mounting flange: ANSI JPI JIS

3.4 Provision of instrument air supply: No Yes, _____ kPa Other unit _____

3.5 Converter location: Indoors Outdoors Outdoors under cover

3.6 Length of cable between probe and converter: _____ m (must be no more than 30 m)

4. Items Required

Probe - quantity: _____. Converter - quantity: _____. Other items - _____

5. Remarks

Written by: _____

Checked by: _____