SPECIFICATION SHEET

CYANIDE ION MONITOR

CNBM-100A (Panel Type)
CNBM-160 (Field Installation Type)

It's easy to detect the concentration of cyanide ions contained in sample water.There are two types in this series, a panel mounting type and a field installation type, and they are used in combination with the immersion type detector CNCG-76.In considering this monitor, be sure to check the sample water conditions and the ambient air environment (shown on the next page),since the sample water conditions and the ambient atmospheric conditions may affect the measured values.

CNBM-100A

CNBM-160

Features

○A diaphragm-type hydrogen cyanide gas electrode is used that measures vaporized hydrogen cyanide with an air pump.This reagent-free design makes it ideal as a simple detector.
*The optimum pH range for general cyanide ion electrodes (solid membrane type) is said to be 12 to 13, but the diaphragm type used in this device can also measure in the neutral region. For details, refer to the sample water conditions on the next page.

○The standard measurement range can be specified from 2ranges of 0 to 2mg/L and 0 to 5mg/L.

○Transmit and output the temperature measurement value (CNBM-160 type).

○RS-232C: Digital output of concentration, temperature, upper limit alarm, etc. (option).

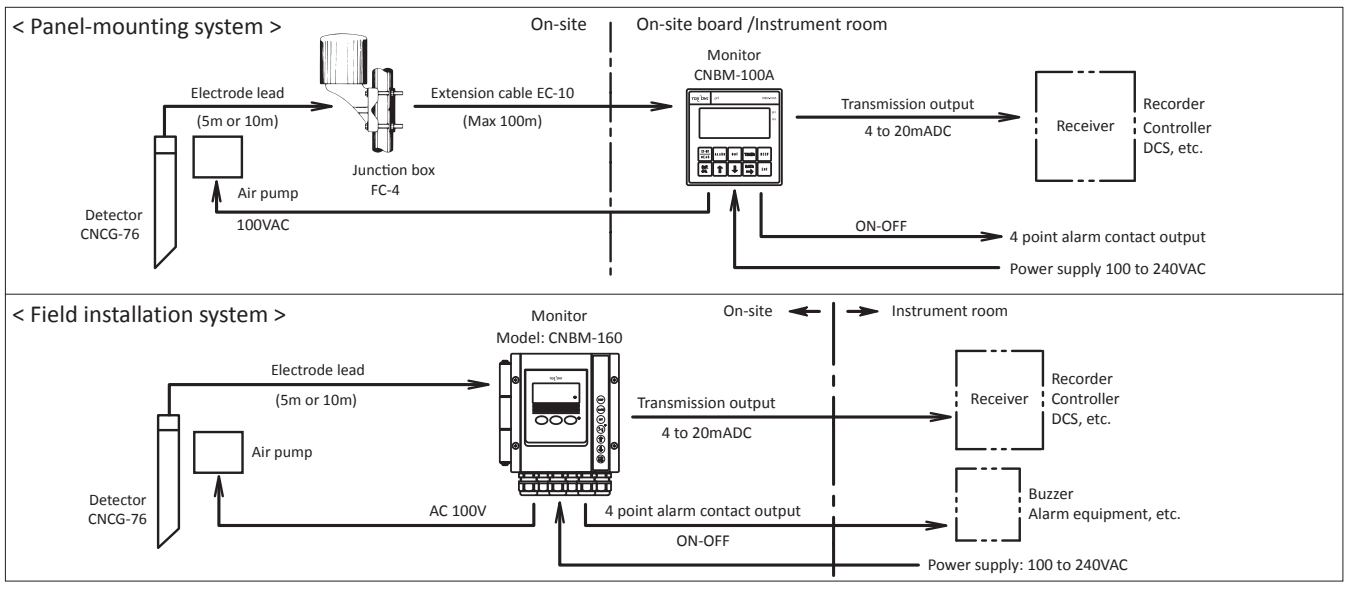
Related device (Supports higher precision measurement)

○Cyanide ion measuring device (CNMS-4 type)
Using a solid membrane type cyanide ion electrode, Al A potash reagent is added to measure many cyanides as ions.

○Automatic process measuring device (XAT series)
The measurement method is based on JIS, and it is possible to measure total cyanide by performing distillation and decomposing metal complexes.

Please contact us for a separate spec sheet.

Configuration



Common specifications

Model : CNBM-100A (panel-mounting type)
CNBM-160 (field installation type)
Measurement method : Electrode with membrane
Display : Digital LCD
Display range : Cyanide ion concentration; 0.00 to 9.99 mg/L
Temperature; 0.0 to 50.0°C
Measurement range (transmission output range) : Cyanide ion concentration; Set to 0.00 to 2.00mg/L or 0.00 to 5.00mg/L at the factory upon request. The upper limit value can be adjusted in 0.01 increments within a range of 1.00 to 9.99.
Temperature (CNBM-160 only); 0 to 50°C
Set to the above range at the factory upon request. Can be adjusted in 1°C increments, with a minimum width of 10°C.
Transmission output : 4 to 20mADC, insulated to earth
CNBM-100A; 1 point (cyanide ion concentration)
CNBM-160; 2 points (cyanide ion concentration and temperature)
Digital output signal (optional feature) : RS-232C (JIS X 5103-compliant), asynchronous, half duplex, 9600bps.
The data that can be sent includes information about the ion concentration, electrode potential, temperature, upper limit alarms, maintenance, and instrument failures.
Alarm contact output : 4 circuits with make contacts (a-contacts; CNBM-100A
3 circuits with make contacts (a-contacts), 1 circuit with transfer contact (c-contact); CNBM-160
There are 4 available alarms; upper limit, lower limit, maintenance, and instrument failure. The power loss alarm can be configured for CNBM-160 (factory setting is OFF). The delay times and band widths can be adjusted for the upper and lower limit alarms.
Contact capacity; 250VAC, 3A (resistance load) or 30VDC, 3A (resistance load)
Temperature compensation : The electromotive force of the hydrogen cyanide gas electrode and the temperature characteristics of the vaporized gas concentration are corrected within 0 to 40°C of sample temperature.
Performance : Linearity; Within ±8%FS (excluding electrode), within ±30%FS (with electrode)
Repeatability; Within ±5%FS (excluding electrode), within ±30%FS (with electrode)
Response time (90%); Within 15 seconds (excluding electrode), within 180 seconds (with electrode)
(When using the instrument together with an electrode, make sure the standard solution, calibration gas, and electrode are at a thermal equilibrium of around 20°C.)
Self-diagnosis : Calibration error; Displays E-0, E-4, or E-5
Temperature sensor error; Displays E-12
Memory error; Displays E-20 or E-21
Burn out or error signal is output.
Power supply : 90 to 264VAC, 50/60Hz
Power consumption : Approx. 10VA (CNBM-100A)
Approx. 11VA (CNBM-160)

Model specifications

Model	CNBM-100A	CNBM-160
Installation	Panel-mounting type Panel cut-out: 92mm × 92mm	Field installation type 50A pipe, wall or rack mounting
Dimensions (W x H x D)	96mm × 96mm × 90mm	181mm × 180mm × 95mm
Enclosure rating	Indoor installation (IP30 equivalent)	Outdoor installation, dust proof and splash proof (IP65 equivalent)
Materials and surface finish	Main body: Aluminum (self-color) Display: Polyester resin (pale yellow)	Main body: Aluminum die cast Display: Polyester resin Painting color: Metallic silver
Cable entries	—	6 G1/2 cable entries (with φ6 to φ12 cable gland)
Ambient temperature and humidity	−10 to 50°C 90%RH or less (no condensation)	−20 to 55°C 95%RH or less (no condensation)
Weight	Approx. 0.5kg	Approx. 2kg
Temperature transmission output (4 to 20mA DC)	Not applicable	Adjustable in 1°C increments, minimum width of 10°C Factory setting: 0.0 to 50.0°C

Sample water conditions

pH : 4 to 8.5 with low fluctuations
When the pH level of samples at around 25°C is 8.5 or more, only 80 % or less of the hydrogen cyanide exists as molecules. The remainder is present as cyanide ions (CN^-). On the other hand, when the pH level is 7 or less, 99 % or more of the hydrogen cyanide exists as molecules. Molecular hydrogen cyanide, which is vaporized by aeration, can be detected by the monitors in this series. The percentage of hydrogen cyanide that can be vaporized, vary according to the variations in the pH value. For this reason, ensure that the pH value is kept as stable as possible within the above range during measurements.

Temperature : 0 to 40°C with low fluctuations
The amount of hydrogen cyanide that can be vaporized by aeration varies by temperature. As a result, variations in sample temperature can influence measurements.

Interfering substances : No sulfides, iodides, or free chlorine are present.
No metals such as iron, copper and nickel are present.
The sulfides, iodides, and free chlorine converted to gas together with cyanide can reach the ion selective electrode, and cause major errors in the reading value. They can also cause the electrode to deteriorate.
Metals-such as iron, copper, and nickel-can combine with cyanide to form compounds that are not converted to gases. According to the measurement method specified in JIS K0102 for determining the total amount of cyanide, these compounds are also to be broken down and measured as cyanide. However, these monitors are unable to measure these forms of cyanide.

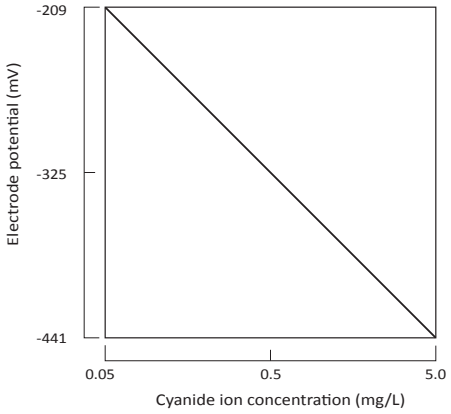
Ambient atmospheric conditions

Interference component : Chlorinated gases, sulfide gases, acidic gases, and mercaptans should not be present.These gases cause indication errors and also degrade the electrode.Particularly chlorine gases have a pronounced effect that degrad the electrode more rapidly even at low concentration.

Operating principle

The hydrogen cyanide gas electrode generates an electromotive force between the detection electrode and the reference electrode based on the concentration of the hydrogen cyanide gas evolved from sample water. The cyanide ion concentration in the sample is in equilibrium with the concentration of hydrogen cyanide gas given off by the sample. Thus, the electromotive force also exhibits a constant relationship with the cyanide ion concentration in the sample, while the relationship between the cyanide ion concentration and the electromotive force is logarithmically linear, as shown in the diagram to the right.

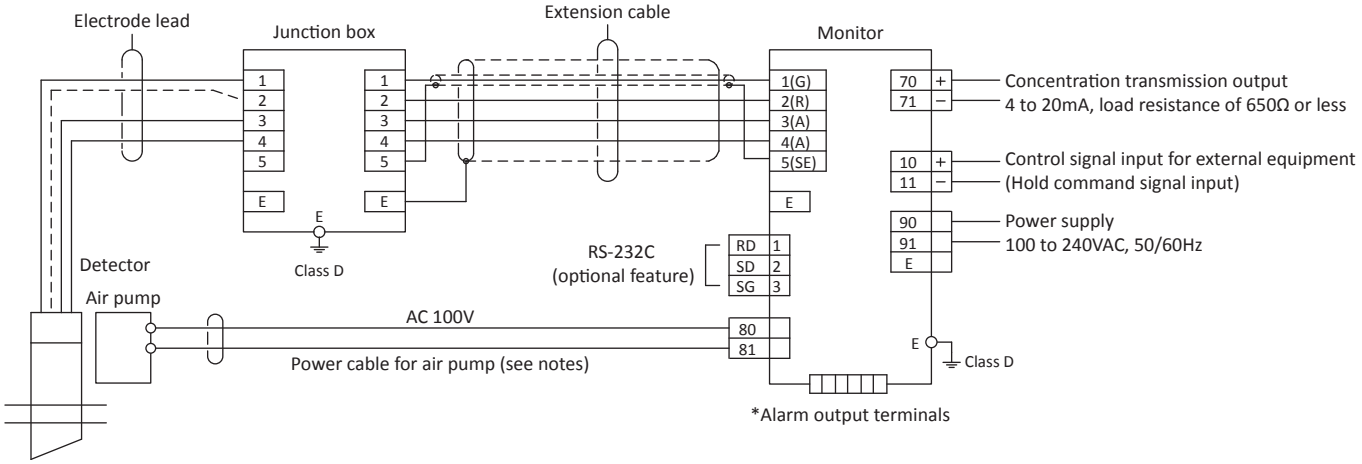
Because the instrument is calibrated in advance with a standard solution, it can determine the cyanide ion concentration of the sample by simply exposing the electrode to the hydrogen cyanide gas given off by the sample water.



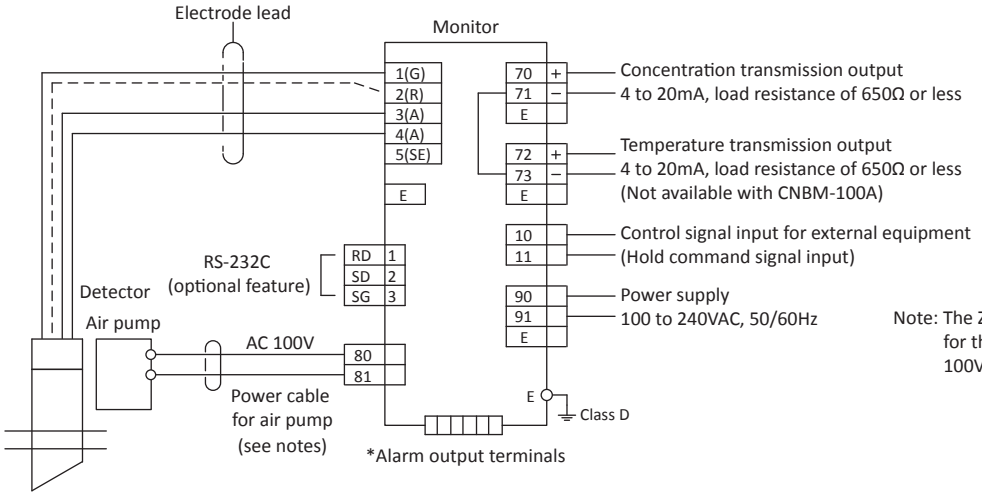
Relationship between the electrode potential and cyanide ion concentration

Wiring diagrams

Electrode lead connection via a junction box (model: CNBM-100A)

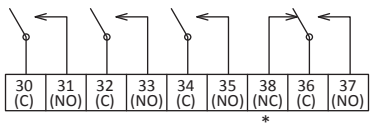


Direct electrode connection to the monitor (CNBM-160)



Note: The ZP-30 step-down transformer is required for this line when using a supply voltage of 100VAC or greater to run the monitor.

*Alarm terminals
A total of 4 circuits are available

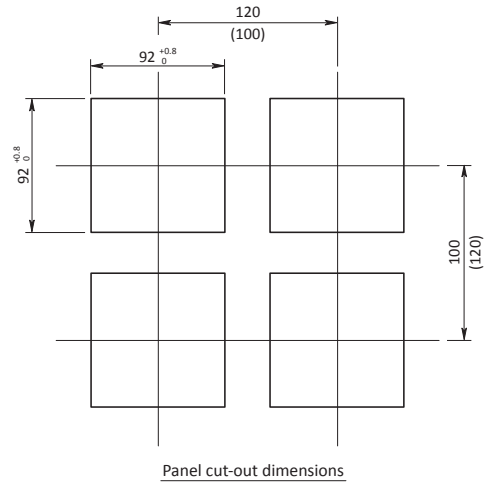


Contact capacity: 250VAC, 3A (resistance load) or 30VDC, 3A (resistance load)
Available functions: Alarm output contact can be configured to switch to lower limit, upper limit, maintenance, or error signal.
*Terminal 38 (NC) is not available with the CNBM-100A.

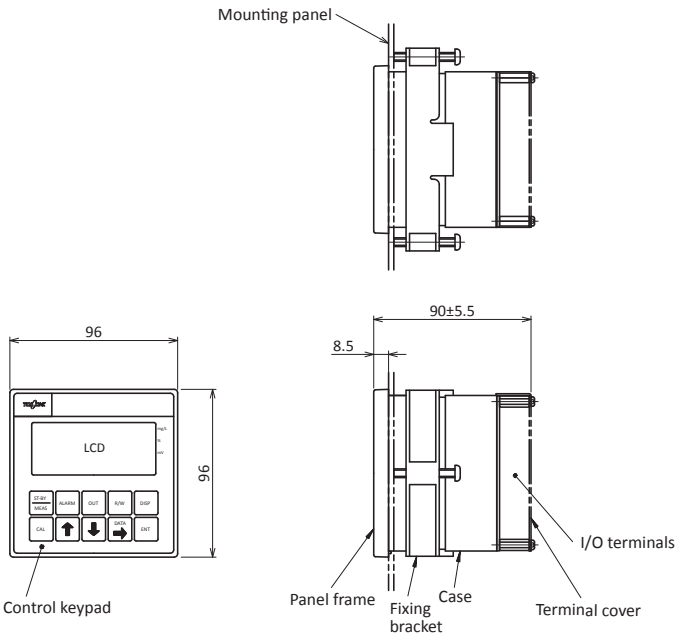
Dimensions

Unit : mm

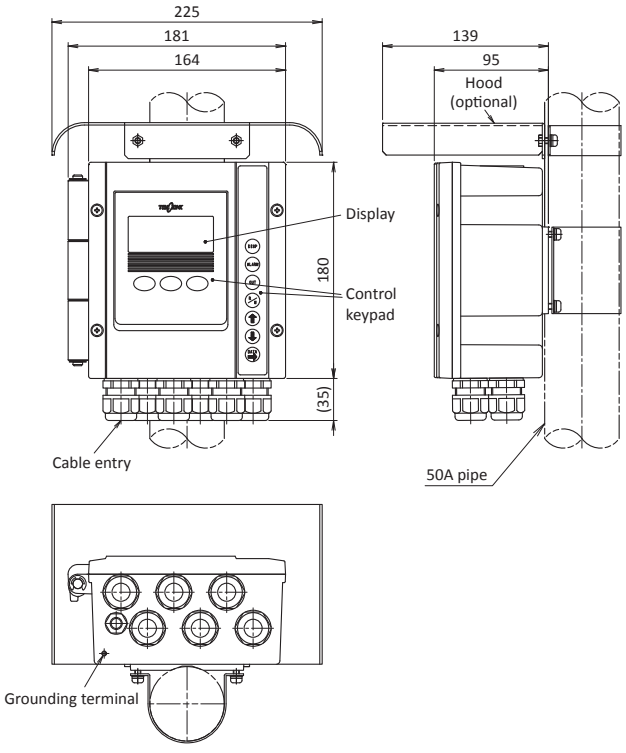
● CNBM-100A panel mounting



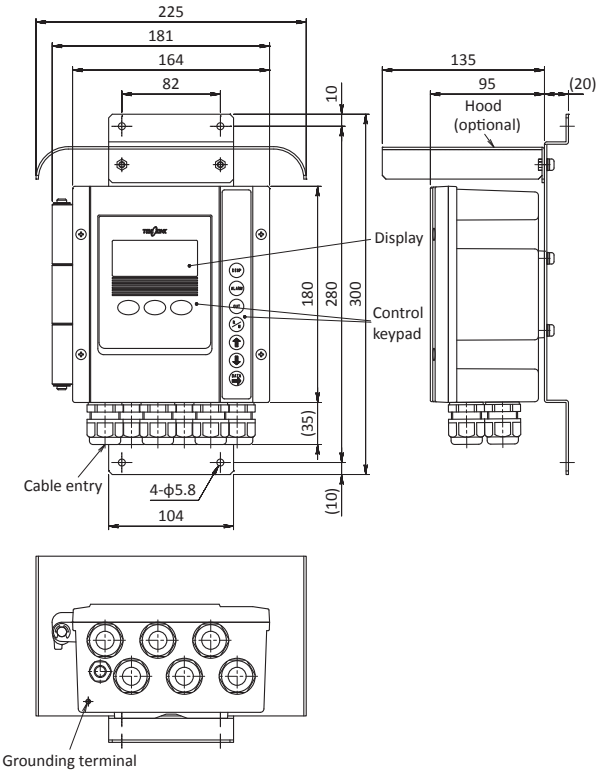
Panel cut-out dimensions



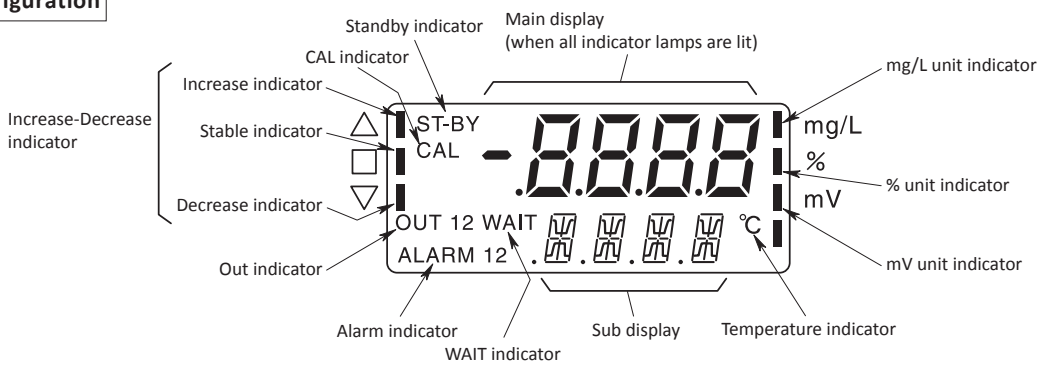
● CNBM-160 pole mounting



● CNBM-160 wall or rack mounting



Display configuration



Product code

CNBM100A-0-□□□

- Transmission output range (4 to 20mADC)
  - A ····· 0.00 to 2.00mg/L (Display range is 0.00 to 9.99mg/L.)
  - B ····· 0.00 to 5.00mg/L (Display range is 0.00 to 9.99mg/L.)
  - Y ····· Custom spec.*1
- Digital (RS-232C) output *2
  - 0 ····· None
  - 1 ····· Equipped
- Language of documents
  - A ····· Standard
  - B ····· English

*1. For “Custom spec.”, specify 1/10 of Full Scale or greater for the measurement display range.
Example: 0 to 1mg/L, 0 to 8mg/L

*2. In addition to ion concentration and temperature, the RS-232C contains the following outputs: upper limit, upper/upper limit alarms, maintenance, and instrument failure.

CNBM160-1-□□□□□□□□□□

- Concentration transmission output range (4 to 20mADC)
  - A: 0.00 to 2.00mg/L (Display range: 0.00 to 9.99mg/L.)
  - B: 0.00 to 5.00mg/L (Display range: 0.00 to 9.99mg/L.)
  - Y: Custom spec. *1
- Solution temperature transmission output range (4 to 20mADC)
  - A: 0 to 50˚C (Display range: 0 to 50˚C.)
  - Y: Custom spec. *1
- Digital (RS-232C) output *2
  - 0: None
  - 1: Equipped
- Surface finish (coating) *3
  - A: Standard coating
  - B: High performance coating
- Arrester*4
  - 0: None
  - 1: Included
- Mounting bracket
  - A: For 50A pipe mounting
  - B: For wall or rack mounting
- Power, transmission, signal cable entry *5
  - A: Cable gland for ø6 to ø12 cable (standard)
  - B: G1/2 conduit threads when cable gland is removed
  - C: NPT 1/2 (comes with 6 adapters)
- Hood (sun shade)
  - 0: None (standard)
  - 1: Equipped (50A pipe mount) (Code No. 7049930K)
  - 2: Equipped (wall mount) (Code No. 69304500)
- Language of documents
  - A: Japanese (standard)
  - B: English

Custom spec. code;
Numeric digit: 9
Alphabet: Z

*1. For "Custom Spec.", specify 1/10 of Full Scale or greater for the measurement display range for the concentration and solution temperature.
Example: 0 to 1mg/L, 0 to 8mg/L, 0 to 30°C

*2. In addition to ion concentration and solution temperature, the RS-232C contains the following outputs: upper limit, upper/upper limit alarms, maintenance, cleaning, and instrument failure.

*3. Standard coating: Melamine primer and topcoat, Average film thickness: 30µm or greater.
High performance coating: Epoxy primer and middle coat, polyurethane resin topcoat, Average film thickness: 100µm or greater.

*4. A ceramic surge arrester (simplified) must be mounted on the power line and transmission line.

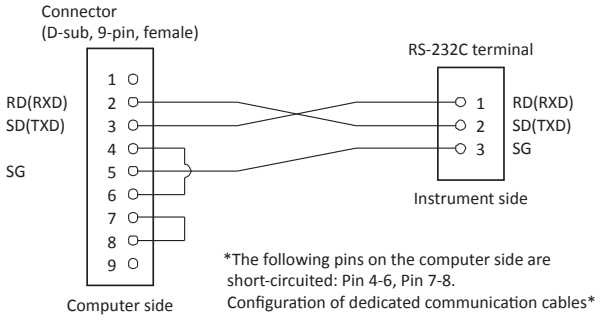
*5. There are 6 cable entries with cable glands for a ø6 to ø12 cable (G1/2 conduit threads for when the cable gland is removed).

● RS-232C interface (optional feature)

When "Equipped" is specified for the RS-232C output setting, an RS-232C interface is added to the terminal area. This interface can be used to transfer digital data, such as measurement and alarm information, to a computer.

RS-232C terminal block*

Terminal No.	Signal code	Signal	Direction
1	RD(RXD)	Data received	Input
2	SD(SXD)	Data sent	Input
3	SG	Signal ground	—



*. This terminal block is only used for the CNBM-160. For the CNBM-100A, a connector is used (the length of the communication cable can be no more than 10m).

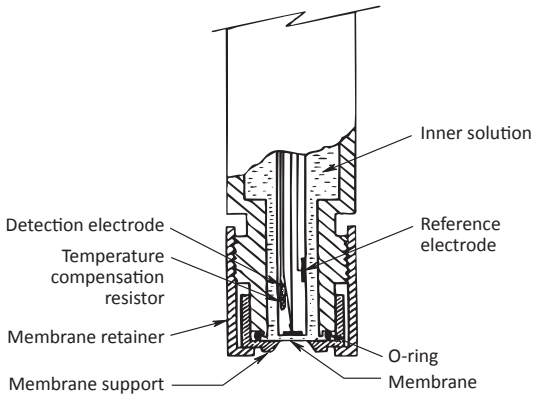
Pipe insertion type

Model : CNCG-76
Construction : The detector consists of a holder, to which a gas-phase hydrogen cyanide gas electrode is attached, and an air pump for purging the hydrogen cyanide gas from sample water.
Material : PP (polypropylene)
Holder length : 0.5m, 1.0m, and 1.5m
Ambient temperature : −5 to 40°C
Sample temperature : 0 to 40°C (no freezing)
Supported electrode : Hydrogen cyanide gas electrode, Model; 7234-5F
Air pump : Model; CNP-51
Power source; 100VAC±10%, 50/60Hz
Power consumption; 2.5VA(50Hz) or 2VA(60Hz)
Air-flow rate; 1.7L/min(50Hz) or 2L/min(60Hz)

Installation location : Be compatible the with sample water conditions and the ambient atmospheric conditions as page 3 indicated.

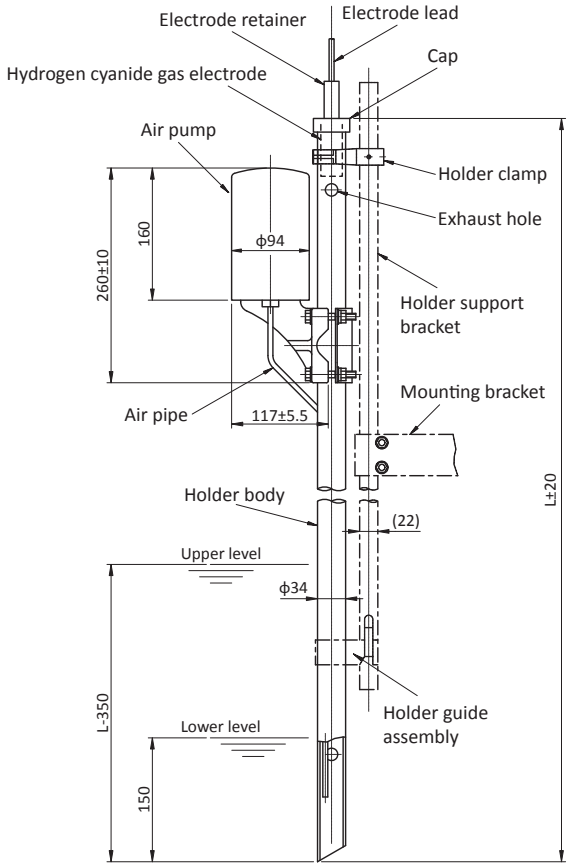
Electrode construction

The detection electrode, the counter electrode, and inner solution are all covered with a permeable membrane through which hydrogen cyanide gas can pass. If you immerse the tip of the detector in sample water that contains hydrogen cyanide in the liquid phase, and then supply air to the sample, the hydrogen cyanide gas in the sample is displaced by the supplied air and passes through the membrane. When the hydrogen cyanide gas reaches the detection electrode, it reacts with the inner solution to produce a change in the electric potential. This instrument indicates the concentration and outputs an alarm in response to the change in the electric potential detected by the electrode.

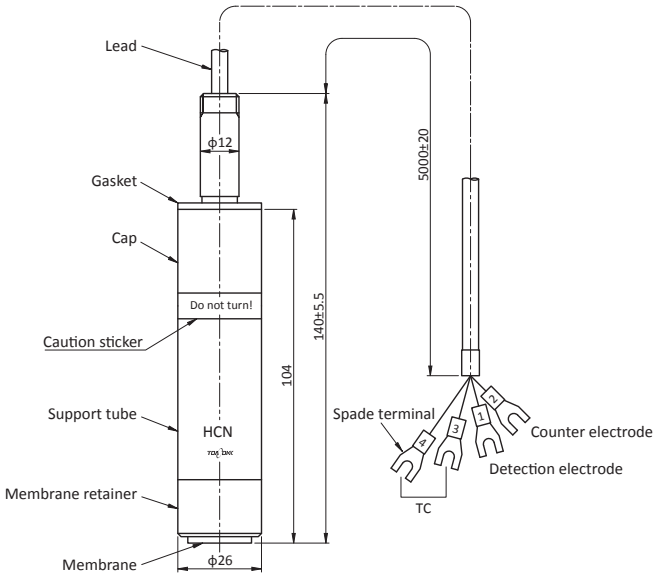


Dimensions Unit : mm

● Detector model: CNCG-76



● Hydrogen cyanide gas electrode, Model: 7234-5F



Product code

CNCG76-3-□□□□□□

- Power supply
  - 1 ····· 100VAC, 50/60Hz
  - 9 ····· Custom spec. *1
- Holder length
  - 1 ····· 0.5m
  - 2 ····· 1.0m
  - 3 ····· 1.5m
  - 9 ····· Custom spec. *2
- Built-in electrode
  - 0 ····· Not required
  - 1 ····· Model: 7234
  - 9 ····· Custom spec.
- Electrode lead length *3
  - 0 ····· When built-in electrode is not required
  - K ····· 5m
  - Y ····· Custom spec.
- Holder guide assembly *4
  - A ····· None
  - G ····· Equipped
  - Z ····· Custom spec.
- Language of documents
  - 0 ····· Japanese (standard)
  - 1 ····· English
  - 9 ····· Custom spec.

*1. A step-down transformer (Model: ZP, 35VA, purchased separately) is required when using a power supply of 100V or greater.
*2. A custom-designed holder with a high performance pump is required when using a holder that is 1.5m or longer, or when the sample water is highly contaminated.
*3. The electrode is mounted on the top end of the detector. There is no need to subtract the length of the detector to determine the total length of the electrode lead.
*4. Required when used together with the ZN-7 holder support bracket.

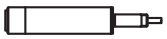
Calibration kit

Code No. 7273800K

No.	Code No.	Part	Sketch	Quantity
1	143F092	Ion strength regulator pH7-AB, 100mL		1
2	7150010K	Calibration cell assembly		1
3	136B029	Measuring flask, 100mL		1
4	136B261	Bellows pipet, 1mL		1
5	136B262	Bellows pipet, 10mL		1

Notes: Use cyanide ion standard stock solution to prepare a 100mg/L cyanide ion standard solution.

Supplementary materials

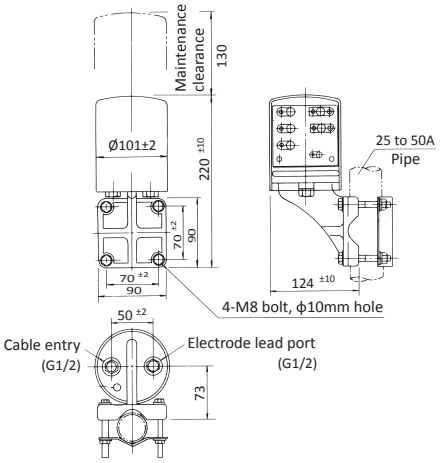
No.	Code No.	Part	Sketch	Quantity		Remarks
				Consumables	Spare parts	
1	143A018	Inner solution for the hydrogen cyanide gas electrode 100mL		1		Toxic Substances
2	143F092	Ion strength regulator pH-7-AB 100mL		5		
3	524381S	Membrane for electrode in 5-pack		3		
4	115A532	Silicone O-ring P14		1		For diaphragm
5	EL7234	Hydrogen cyanide gas electrode 7234-5F			1	Target to Internal toxic liquid
6	6404010K	Air pump assembly (For CNP-51)			1	For supplying air

Related equipment

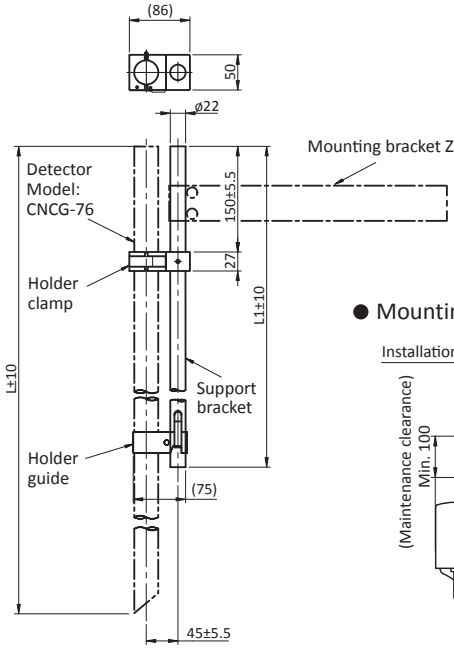
● Junction box

A junction box and extension cable are required when the monitor and electrode are set away from each other (panel-mounting type, in particular) and the length of the supplied electrode lead is too short

Model	: FC-4
Construction	: Outdoor installation
Weight	: Approx. 0.9kg
Case	: ABS resin
Material	: ABS resin
Finishing	: Chromium plating with pearskin finish
Mounting	: 25 to 50A pipe, wall or panel mounting

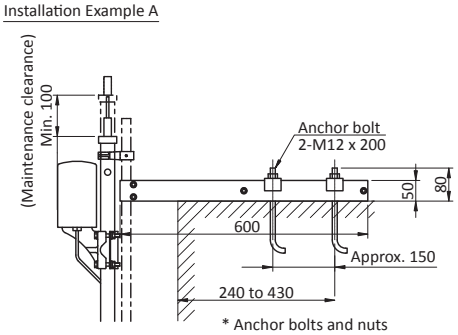


● Holder support bracket, Model ZN-7

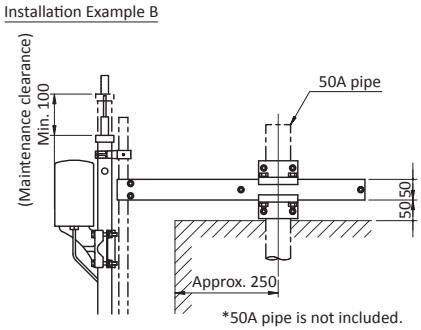


Support bracket length (L1)
500 (L: 1000)
1000 (L: 1500, 2000)
1500 (L: 2000, 2500)

● Mounting bracket ZC-1

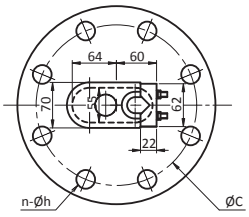


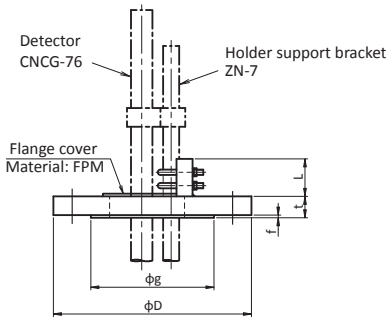
* Anchor bolts and nuts are not included.



*50A pipe is not included.

● Open Flange ZFK-1 (PVC)
ZFK-2 (SUS)





Nominal pressure 10K									
Nominal diameter	D	t		f	g	C	n	h	L
		Metallic material	Non-metallic material						
100	210	18	24	2	151	175	8	19	100
150	280	22	26	2	212	240	8	23	50
200	330	22	26	2	262	290	12	23	50

DKK-TOA CORPORATION

CAUTION Please read the operation manual carefully before using producuts.

Overseas Sales Division:
DKK-TOA Corporation
29-10, 1-Chome, Takadanobaba, Shinjuku-ku,
Tokyo 169-8648 Japan
Tel : +81-3-3202-0225 Fax : +81-3-3202-5685
E-mail : intsales@dkktoa.com

https://www.toadkk.com/english/

Information and specifications are subject to change without notice.

Issued 3/2025