

## Free chlorine meter transmitter Free chlorine detector

**CWM-160E**  
**CLR-169 (immersion type)**  
**CLR-161 (flow cell type)**

This instrument measures the free available chlorine in the sample water that is undergoing chlorination. The detector can be selected between immersion type and flow cell type. Targets of measurement include distribution and storage of tap water and water for pooling.

### Features

- Detector detectors rotate eccentrically without contact by precession mechanism. The sensing poles are polished by ceramic beads placed around them to maintain a uniform surface condition and enable stable measurement without being affected by flow velocity.
- The reagent-free system requires no periodical reagent supply operations.
- Immersion type can reduce installation of water sampling pumps, pipes etc and later maintenance. In addition, there is no time delay due to the length of the piping, and no change such as decreasing chlorine in the piping.
- During disasters, because the immersion type can be easily installed and relocated, the system can be easily constructed if only the power supply is restored.
- The flowcell type can construct a compact and lightweight measurement system.



Transmitter  
CWM-160E



Detector  
(immersion type)  
CLR-169



Detector (flow cell type)  
CLR-161 and  
flow cell CLZ-4

### Standard Specifications

Product name : Free Chlorine Meter Transmitter  
Free Chlorine Detector (immersion type / flow cell type)

Model : CWM-160E (Transmitter)  
CLR-169 (immersion type)  
CLR-161 (flow cell type)

Measurement object : Free available chlorine in sample water

Measurement method : Eccentric rotation electrode-type polarography

Electrode cleaning method : Bead cleaning through the spinning of a swing rotary method

Measurement range : The following ranges are available.  
(1) 0 to 1/2 mg/L (2 ranges) by manual switching  
(2) 0 to 1/3 mg/L (2 ranges) by manual switching  
(3) 0 to 2/3 mg/L (2 ranges) by manual switching

Output signals : 3 different signals, contact capacity 30 V DC, 0.1 A at maximum  
3 of the following 7 items can be assigned;  
1. During maintenance, 2. Power down, 3. Upper concentration limit alarm, 4. Lower concentration limit alarm, 5. Instrument failure, 6. Range display (Range 1), 7. Range display (Range 2).

Linearity : Within  $\pm 5\%$  FS (at the standard chlorine solution)

Repeatability : Within the higher of  $\pm 2\%$  FS or  $\pm 0.05$  mg/L (at the standard chlorine solution)

Indication : Digital display (with backlight)

Minimum display : 0.01 mg/L

Temperature compensation range : 0 to 40°C

Calibration method : To be calibrated to DPD method or other appropriate analysis

Sample water condition : pH value; pH 5.8 to 8.6  
 Electric conductivity; 8 mS/m minimum (80 $\mu$ S/cm minimum)  
 Temperature; 0 to 40°C (not to be frozen)

Ambient temperature and humidity : -5 to 50°C, 85% RH maximum (non-condensing)

Transmission output : 4 to 20 mA DC (load resistance 600 $\Omega$  maximum), insulated

Power : 100 to 240 V AC  $\pm$ 10% 50/60 Hz

Power consumption : Approx. 9 VA on average, approx. 11 VA at maximum at 100 V AC  
 Approx. 15 VA on average, approx. 17 VA at maximum at 240 V AC

Cable connection port : Six cable glands for 6 to 12mm diameter cable.  
 One of the six glands is for an electrode lead.

Installation : immersion type; outdoor  
 flow cell type; indoor

Structure : Transmitter; IP65  
 Detector; immersion type... up to 5m below the water surface.  
 flow cell type... IP52 equivalent.

Mounting : Transmitter; 50A (outer diameter of 60.5 mm) pipe mounting or wall mounting  
 Detector; immersion type... Drop-in with chain or immersion type flow cell type... Pipe 50A (O.D. 60.5mm)

Main materials : Transmitter; ADC12 (die-cast aluminum)  
 Metallic silver coating  
 Detector; immersion type... SUS316, PVC, 66 nylon, FPM, EPDM, epoxy resin, waterproof polyurethane coating (cable)  
 flow cell type... PVC, PFA, PP, Acrylic, SUS316, silicone, etc..

Weight : Transmitter; Approx. 2kg  
 Detector; immersion type... Approx. 2kg (no chain for the submerged type)  
 flow cell type... include flow cell CLZ-1 type, about 3kg  
 include flow cell CLZ-4 type, about 4kg

### Principle of Operation

This instrument consists of a detector and a transmitter. Mount the transmitter on a pipe (50A) or wall, and then immerse the detector in sample water. There are two types of detectors: immersion type and flow cell type. The immersion type uses the detector immersed directly in the sample water. The flow cell type is used by introducing sample water into the flow cell. To the electrode of the detector, a constant voltage

is applied in order to electrolytically reduce the free available chlorine.

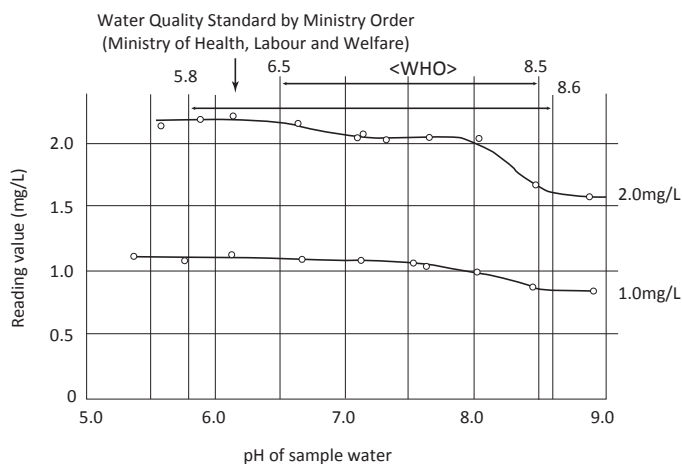
If the sample contains free available chlorine, a reduction current in proportion to the concentration is applied, and the current is measured and displayed as a concentration on the transmitter.

In principle, there are some constraints for the pH and electric conductivity of the water sample. See below.

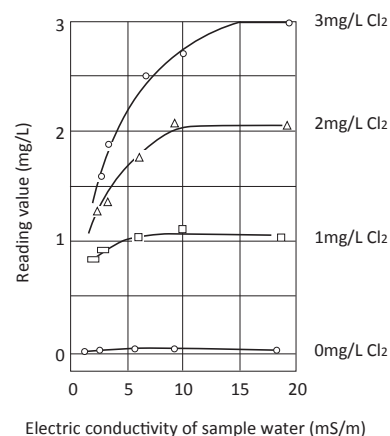
\* Optional wall or rack mount

### Reagent-free residual chlorine analyzer pH characteristics

- If there is a change in the pH of the sample water, the change will have some effect on the reading value, as shown in the figure below. If the pH is between 6.5 and 7.5, such a change will have almost no effect. If there is a change of 1 pH in the sample water, the reading value will change by approx. 5% (per 1 pH) when the pH is between 5.5 and 8, and approx. 20% when the pH is between 7.6 and 8.6.



### Electric conductivity characteristics



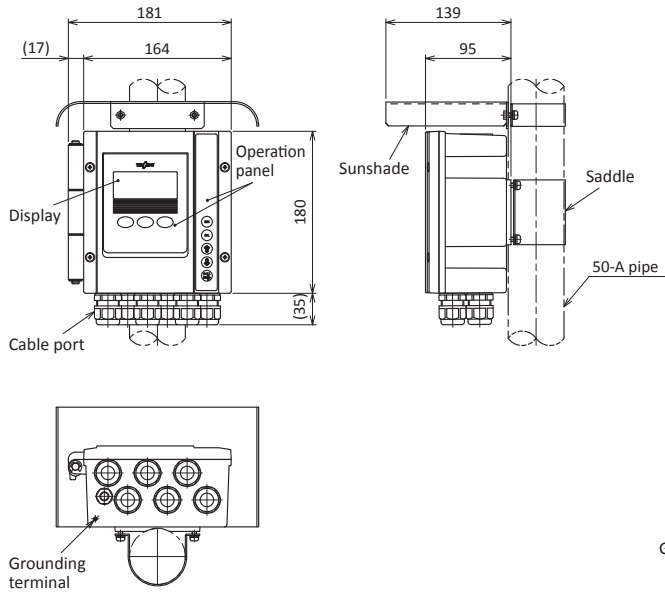
- As the electric conductivity of tap water is usually between 10 and 20 mS/m and as there is no significant variation, the electric conductivity has almost no effect on the reading. However, if the electric conductivity is 8 mS/m or less, the reading value will be a bit lower, and the electric conductivity may have some practical effect when measuring 1 mg/L or more.

# Free chlorine meter

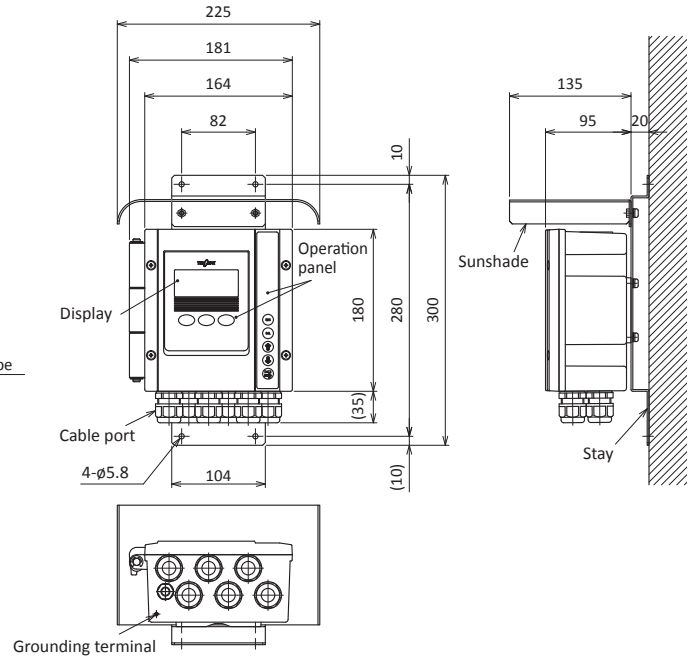
**Dimensions** Unit : mm

● Transmitter

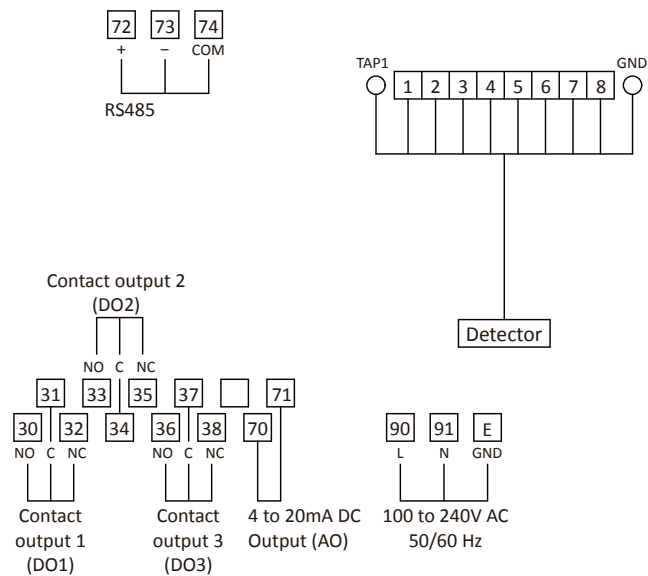
**50-A pipe-mounted**



**Wall or rack mounted**



**Terminal connections**



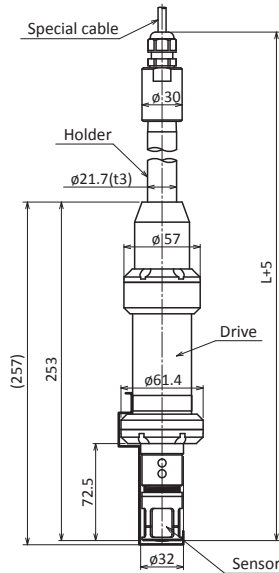
## ■ Detector (immersion type)

Model Name : CLR-169 type  
 Measuring method : Swing rotary speed control method  
 Cleaning method : Rotating motion of the detection electrode and continuous cleaning with ceramic beads  
 Structure Composition : Detection electrode; Au  
 Opposite electrode; Ag / AgCl  
 Temperature compensation sensor; Pt  
 1000 Ω  
 Detection electrode : 2132 type (replacement tip)

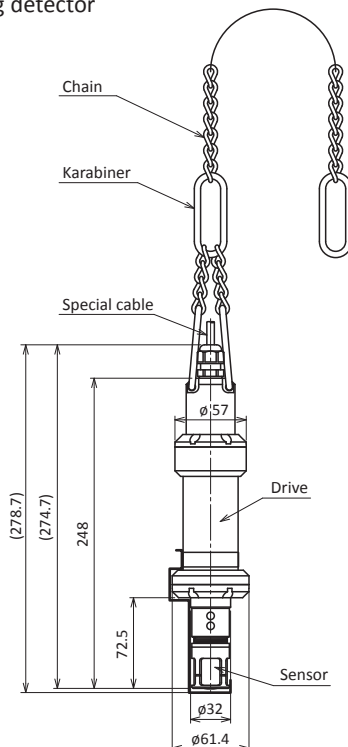
### Dimensions

Unit : mm

#### ● Immersion type sensing detector

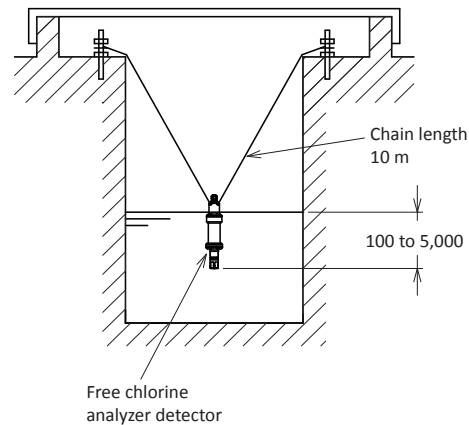
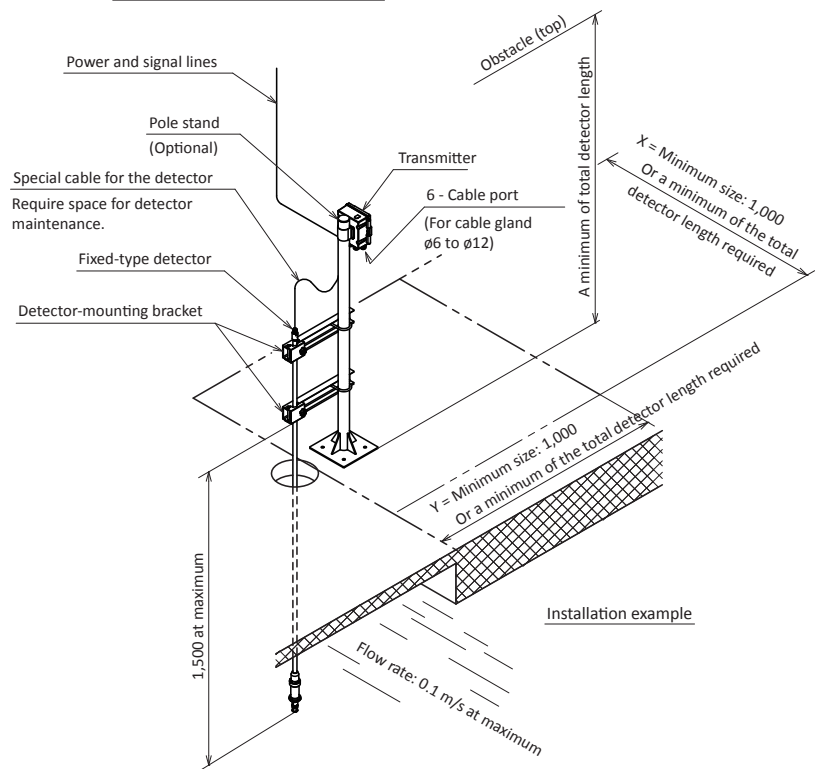


#### ● Throwing detector



### Installation Instructions

Unit : mm

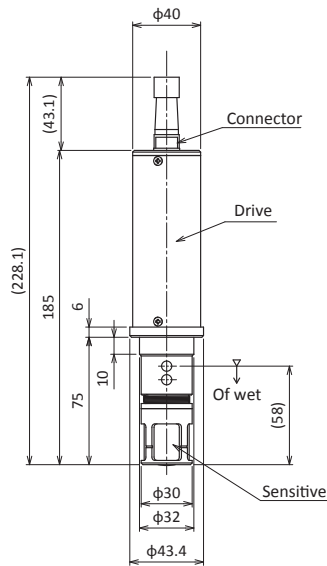


## Detector (flow cell type)

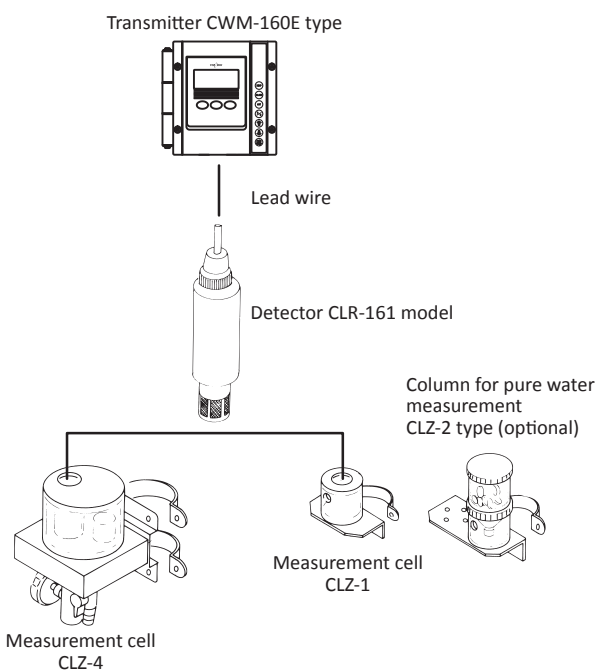
**Model Name** : CLR-161 type  
**Measuring method** : Swing rotary speed control method  
**Cleaning method** : Rotating motion of the detection electrode and continuous cleaning with ceramic beads  
**Structure Composition** : Detection electrode: Au  
 Opposite electrode: Ag / AgCl  
 Temperature compensation sensor: Pt 1000 Ω  
**Detection electrode** : 2132 type (replacement tip)

### Dimensions

Unit : mm

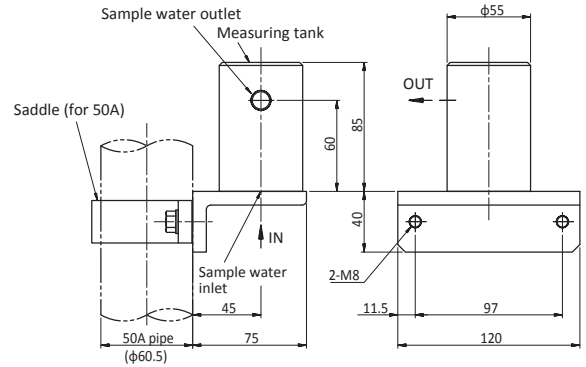


### Configuration

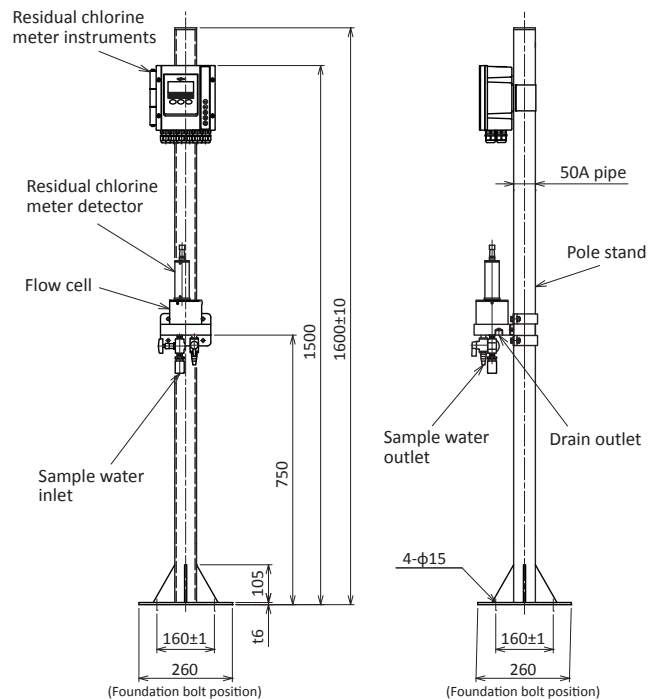
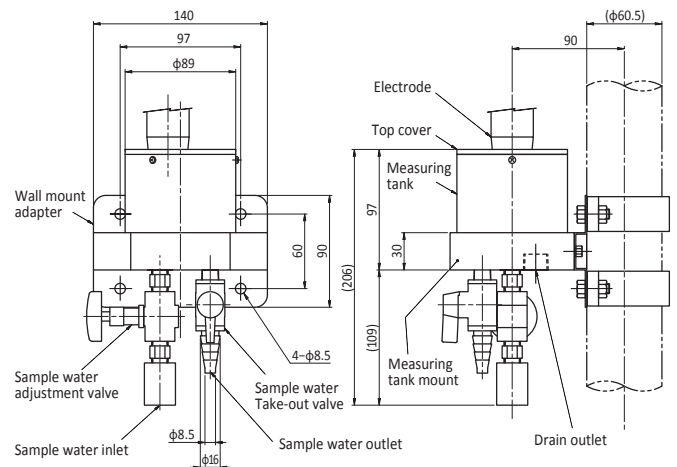


### Measurement cell

Model: CLZ-1



Model: CLZ-4

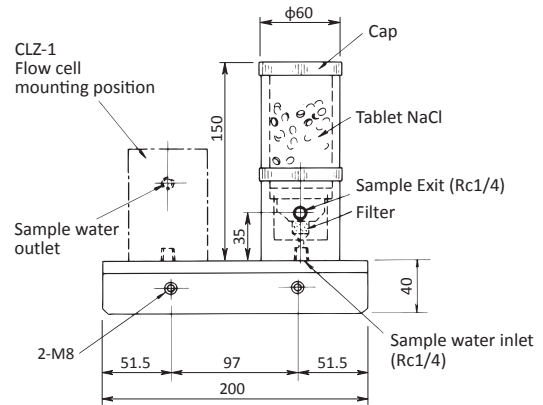


**Option**

● Column for pure water measurement

Model :CLZ-2

This adapter is used to increase the electrical conductivity of sample water by adding NaCl when measuring Cl<sub>2</sub> of sample water with an electrical conductivity of 80μs/cm or less, enabling stable measurement.

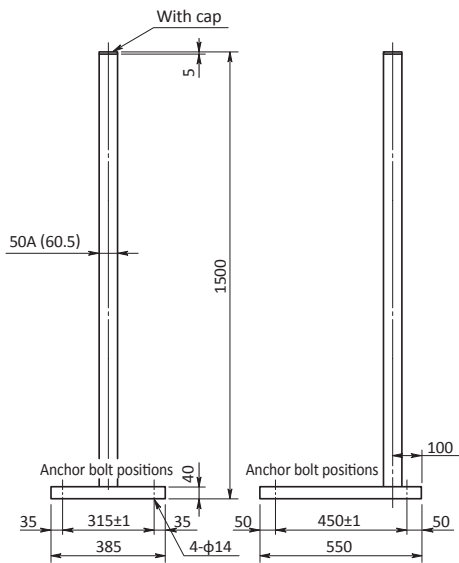


● Pole stand

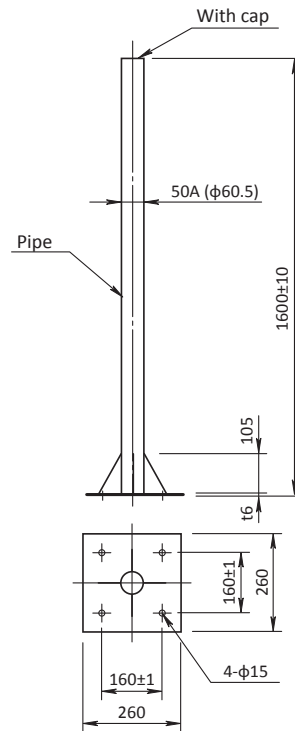
Model: B-150 or ZB-1

Assemble the transmitter (CWM-160E type) and detector mounting bracket.

<B-150 model >



<ZB-1 model >



**Product code**

CWM160E-2-	□	□	□	□	□	□	□	□	□	
	1	2	3	8						Measurement range*1
					1	2				0 to 1/2 2 by manual switching (standard)
							1	2		0 to 1/3 2 by manual switching
									1	0 to 2/3 2 by manual switching
										Other Specifications
										Measurement unit
									1	mg/L (standard)
									2	ppm
										Transmitter mounting type
									1	50A pole stand mounting
									2	Wall or rack mounting
										Cable port
									A	Cable gland (conduit screw G1/2 when removed)
									B	NPT 1/2 Adapter (SUS316) included
										Hood (sunshade)
									0	None
									1	Equipped
										Detector to be combined *2
									0	None
									1	CLR-169 (Au) throwing type and immersion type
									2	CLR-161 (Au) flow cell type
										Installation type (detector)
										Immersion type
									A	Drop-in type (chain length 10 m)*3
									B	1.0m immersion type (with 1 bracket)
									C	1.5m immersion type (with 1 bracket)
									D	2.0m immersion type (with 2 brackets)
									E	2.5m immersion type (with 2 brackets)
										Flow cell type
									F	CLZ-1; without flow regulating valve (CLZ1-1-2)*4
									G	CLZ-4; with flow regulating valve (CLZ4-1-2)*4
									H	CLZ-1 equipped with CLZ-2 pure water measurement column *5
									J	Without Combination Detector*6
									Z	Special
										Embedded stand assembly*8
									0	Not required
									1	Required (B-150 or ZB-1 should be ordered separately)
										Length of the lead wire
									0	N/A *6
									1	5m (immersion type)*7
									2	10m (immersion type)*7
									3	1m (flow cell type)*8
									4	1.5m (flow cell type)*8
									5	2m (flow cell type)*8
									8	Other specifications (limited to specifications within 10m)*9
										Description form
									0	Japanese (standard)
									1	English

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

Detector CLR-169 Limited

- \*1. Remote switching is available only when the digital transmission "RS485(MODBUS Protocol)" is used.
- \*2. Combination detector of immersion type is CLR-169 type (detection pole; Au), and combination detector of flow cell is CLR-161 type for free chlorine.(detection pole; Au).  
Bound chlorine-resistant electrodes (sensing electrode; Pt) can be fabricated, but since there is less bound chlorine after distribution, no bonding chlorine countermeasures are usually required.
- \*3. Only one chain (10m) is included. Cut and process the product if necessary.
- \*4. ( ) The internal description is the product code.
- \*5. The CLZ-2 pure water measurement column is required when the conductivity of the sample water is 8 mS/m (80 μS/cm) or less. Spare salt tablets (500g) Code No.143A203
- \*6. Select when item 06 "Combination detector" is set to "None".
- \*7. The dip-type lead wire length is the length including the length of the dip-type detector.  
Example: If the lead wire length is 10m when the immersion type is 2.5m, the lead wire length from the extension pipe to the end is 7.5m.
- \*8. Please contact our sales representative when you system up the instrument and detector/flow cell to the pole stand.
- \*9. Both immersion type and flow cell type can be specified.

Note 1. For retransmission output, DC 4 to 20mA is output for the specified measuring area.  
Note 2. If a pole stand is required, a ZB-1 type or B-150 type must be ordered separately.



## DKK-TOA CORPORATION

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



## CAUTION

Please read the operation manual carefully  
before using products.

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

Information and specifications are subject to change without notice.