

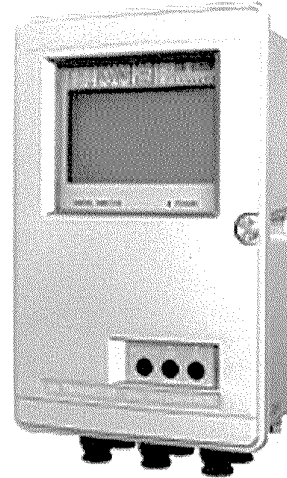
FLUORIDE ION MONITOR

Model: FBM-300

The Model FBM-300 provides fast and continuous detection of free fluoride ion concentration in water. It is widely used for monitoring water treatment processes and effluent from wastewater plants. It is also used in the semiconductor industry to monitor washed-water from plants that use hydrogen fluoride.

**FEATURES**

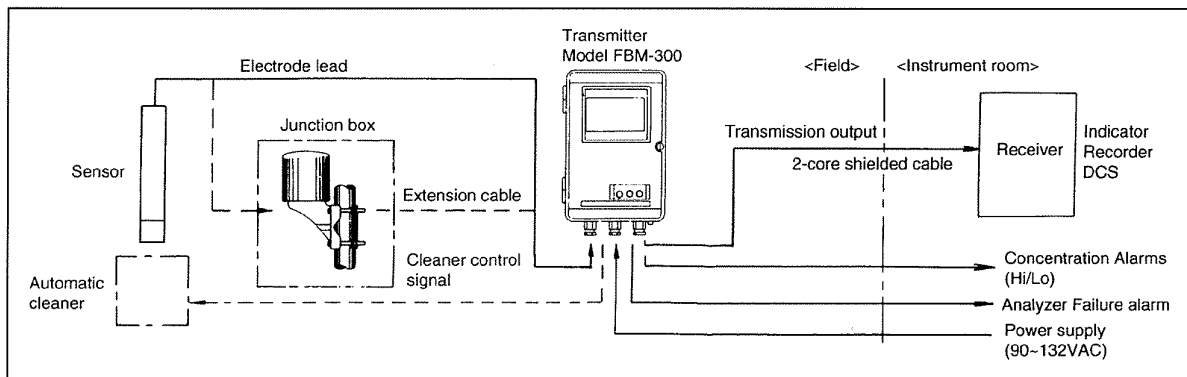
- Simple weather-proof construction suitable for field installation with pole or wall mounting. Wiring access and operation can be carried out from the front of the monitor.
- The use of I.S.E. (ion selective electrode) method provides excellent selectivity.
- Simple combination type sensor, immersed into the sample detects only fluoride ions. The lead-less type electrode is easily mounted on or removed from the sensor holder.
- The sensor features a "non-supplying" type reference electrode. The liquid junction of the reference electrode is made of a porous fluorocarbon resin, thus it is not subject to any fouling.
- With a sample containing 2mg/L fluoride ion, an alarm will be generated within 30 seconds at 90% response.
- Automatic check of electrode characteristics and accessing of calibration archives.  
During calibration, the electrode characteristics such as voltage potential of electrode and its potential slope are automatically checked and if any failures are detected, error messages will be displayed accordingly. Since the past twelve calibration records including time and date of calibration can be accessed at anytime, the deterioration of electrode is easily detected.
- Self-diagnostics of sensors including a temperature probe is automatically carried out during measurement and if any failures are found, an alarm output contact is energized.
- Two control signal outputs are available for high and low limits with adjustable delay time and band gap.
- Calibration using standard liquid is activated by one-touch action.
- Control outputs are provided for external electrode cleaners such as chemical cleaner, water-jet cleaner and brush cleaner. Setting times of cleaning duration, cleaning interval and extended hold output signal are adjustable.



**STANDARD SPECIFICATIONS**

<b>Product Name</b>	: Fluoride ion monitor
<b>Model</b>	: FBM-300
<b>Measurement Object</b>	: Free fluoride ion concentration in water
<b>Measurement Method</b>	: Fluoride ion selective electrode method
<b>Measurement Ranges</b>	: 0~99.9 mg/L 0~999 mg/L
<b>Transmitter Performance</b>	
Linearity	: $\pm 10\%$ FS
Repeatability	: $\pm 7\%$ FS
<b>Sample Conditions</b>	
pH	: to be stable within pH4~9
Temperature	: 0~40°C
Conductivity	: min. 500 $\mu$ S/cm
Flow rate	: 1~20cm/s

**SYSTEM CONFIGURATION**

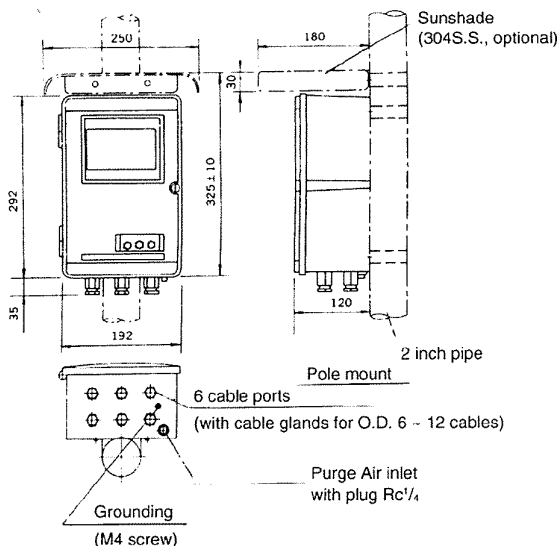


- Outputs (Linear Output)** : 4~20mA DC or 1~5V DC adjustable within meas. range (min. 1% FS)
- **Cleaner Control**
- Outputs** : Power supply to automatic cleaner is controlled by following control settings.
  - Output capacity : 0.1~2A (resistive load)
  - Cleaning interval : Adjustable from 0.1~24 hours
  - Cleaning duration : Adjustable from 0~999 seconds
  - Start of cleaning : activated by internal clock, manual or remote input (closed contact over 0.1 sec.)
- Power Requirements** : 90~132V AC or 180~264V AC, 50/60Hz
- Power Consumption** : 10VA
- Ambient Conditions**
  - Temperature : -10~55°C
  - Humidity : max. 95%RH (non condensing)
  - Construction : Outdoor installation, rainproof construction (JIS C0920), Sunshade, available as an option.
- Mounting** : 2 inch pipe, wall or rack mounting.
- Materials**
  - Enclosure : Aluminium die casting
  - Window : Glass
- Surface Colour** : Munsell 5PB8/1
- Cable Ports** : Six G<sup>1</sup>/<sub>2</sub> for conduit, with cable glands for O.D.6~12 mm cable
- Weight** : 5kg

**IMPORTANT NOTES**

1. This monitor can detect only free fluoride ions in water, not total fluoride.
2. Sample must be within the range of pH4~9. Minus error for a sample below pH4 and a plus error for a sample above pH9 will be detected. Samples below pH2 may cause damage to electrode sensor membrane.
3. For process control use, Model FMS-3 on-line fluoride ion analyser is recommended, which has capability for automatic calibration and automatic cleaning.

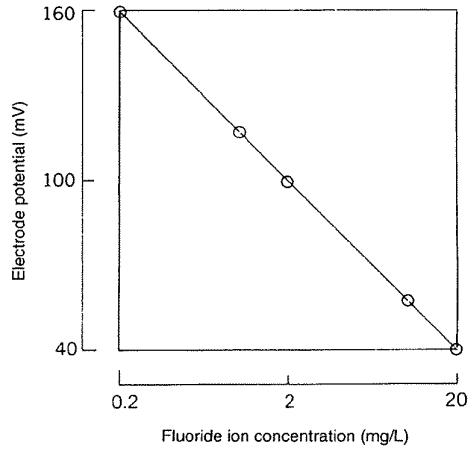
**DIMENSIONS**



**PRINCIPLE OF OPERATION**

The fluoride ion selective electrode generates an electromotive force corresponding to the fluoride ion concentration in water. The relationship between the concentration and the electromotive force is logarithmically linear as shown in the diagram below.

The instrument calibrated with standard solution can determine the fluoride ion concentration of the sample by just immersing the electrode into the sample.

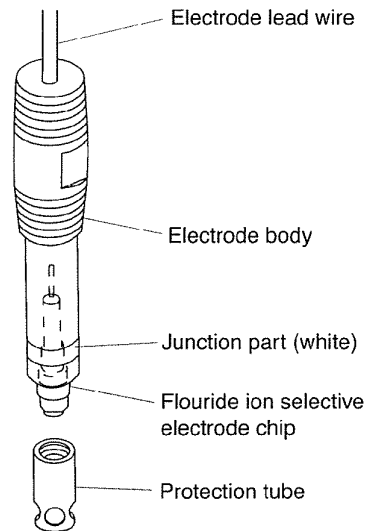


- Electrode potential vs. fluoride ion concentration

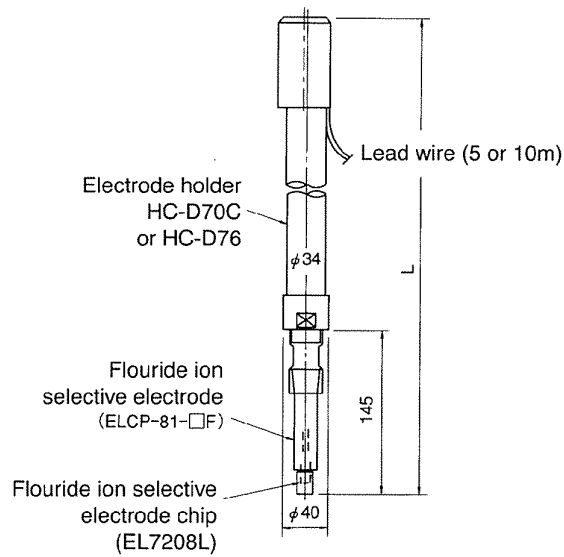
**ELECTRODE CONSTRUCTION**

The electrode comprises of the main body, junction section, electrode chip and protection guard.

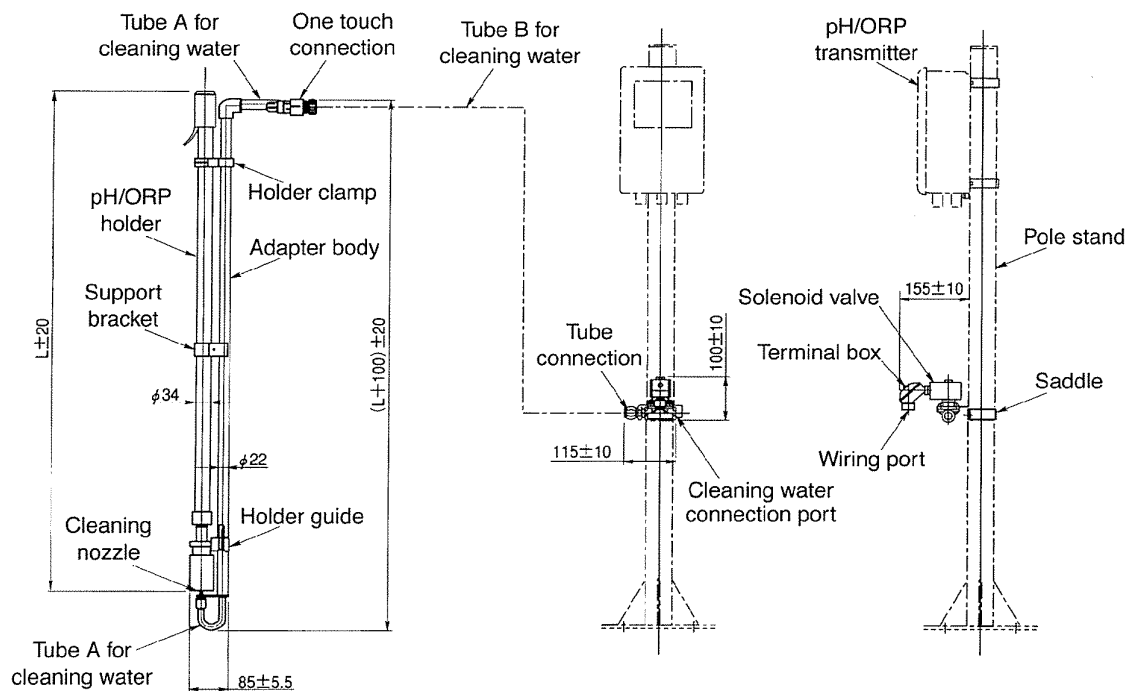
This modular construction allows easy replacement of just the electrode chip when the electrode membrane quality is reduced.



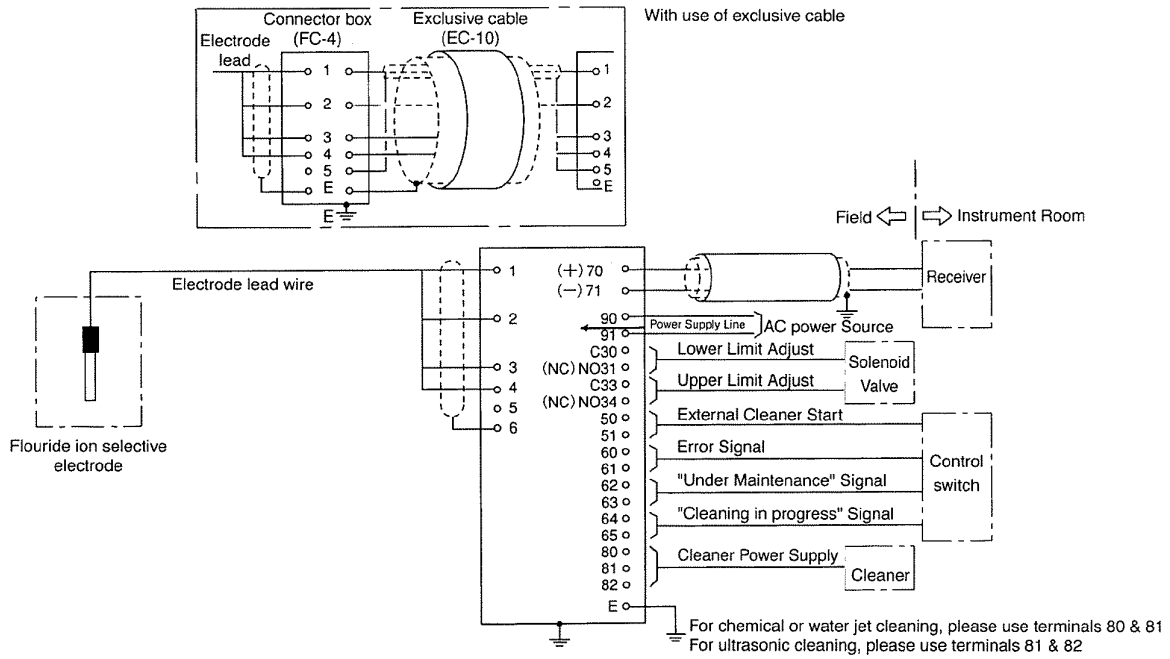
● Electrode holder: HC-D70C, HC-D76



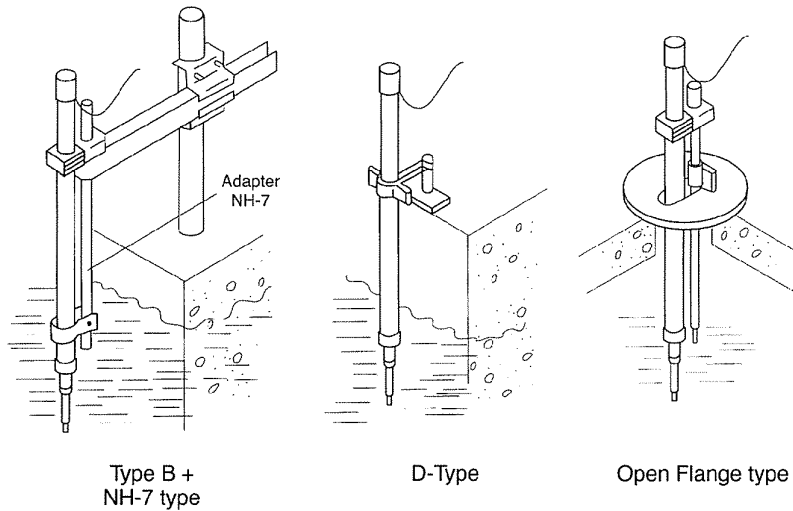
● JHCP-7E



**TERMINAL CONNECTIONS**

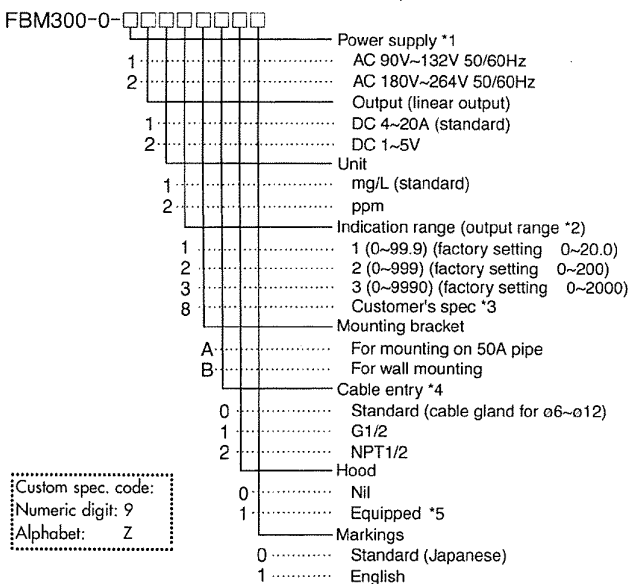


**MOUNTING ACCESSORIES**



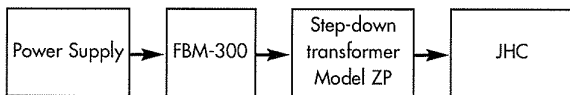
**PRODUCT CODES**

**FBM-300 (Standard fluoride ion monitor)**



**Product Code notes for FBM-300**

\*1. The instrument can operate on either 90~132V AC or 180~264V AC power supply. If using a cleaning system in combination with this instrument, please ensure that the cleaning system is compatible with the incoming power supply to this instrument. A step-down transformer may be required for power to the cleaning system.



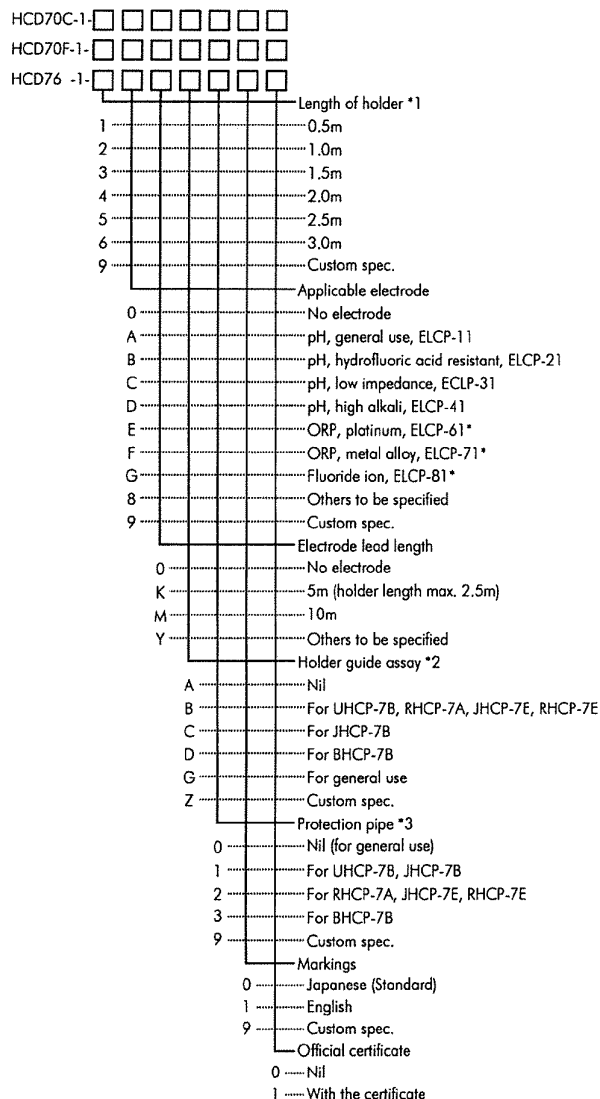
- \*2. Range Selection Summary:  
 If choice 1 is selected, the range will be 0~[10.0~99.9] mg/L (ppm) and the units will be 0.1 mg/L (ppm).  
 If choice 2 is selected, the range will be 0~[100~999] mg/L (ppm) and the units will be 1 mg/L (ppm).  
 If choice 3 is selected, the range will be 0~[1000~9990] mg/L (ppm) and the units will be 10mg/L (ppm).
- \*3. Please specify the required range.
- \*4. Standard cable glands are provided even if other cable entry options are selected. Cable entry ports that are not used should be left with the standard cable glands fitted, which will provide a seal function.
- \*5. If the instrument is to be installed in hot climates (greater than 45°C ambient temperatures) or in locations exposed to direct sunlight, please select the hood.

**Product Code notes for HC-□□□□**

**Spare Parts**

Fluoride ion standard solution (p/n 143F077).  
 Ion strength adjustment tablet, pH5~AB500 mL (p/n 143A053).

<Immersion type>  
 HC-D70C (PVC)  
 HC-D70F (PVDF)  
 HC-D76 (PP)



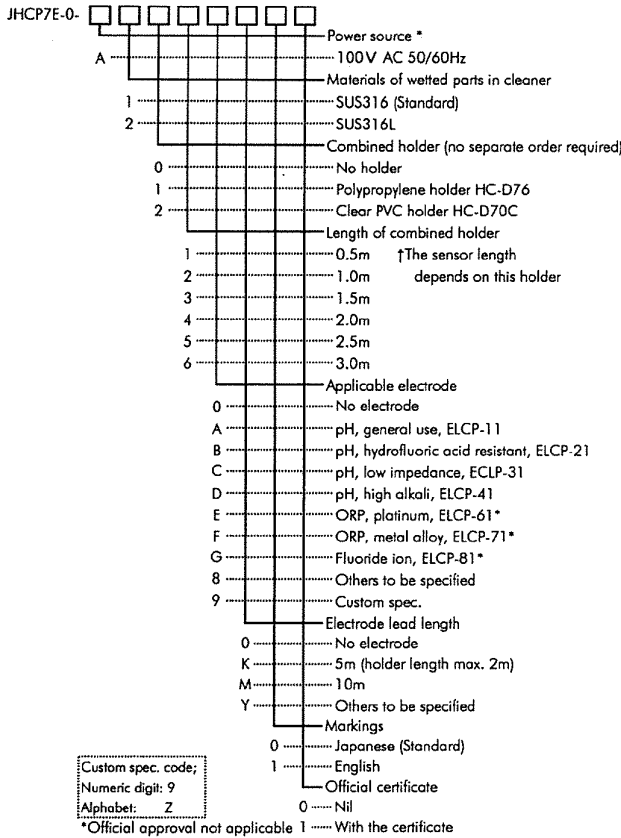
\*Official approval not applicable

- \*1. Recommendable max. holder length for HC-D76 is 3m.  
 \*2. Required when combining with cleaner and/ or mounting bracket for ZN-7.  
 \*3. Make sure to select holder guide assay and protection pipe for same type of cleaner.
- Note. Operating temperatures for each holder are indicated in the table below. However, please note that it varies with maximum temperature of each combined electrode.

Model	Temperature range
HC-D70C	-5~60°C
HC-D70F	-5~95°C
HC-D76	-5~80°C

Model	Model of exchange chip	Temperature range
ELCP-11	5081L	-5~80°C
ELCP-21	5082L	-5~80°C
ELCP-31	5080L	-5~80°C
ELCP-41	5083L	-5~80°C
ELCP-61	2156L	-5~80°C
ELCP-71	2157L	-5~80°C
ELCP-81	7208L	-5~40°C

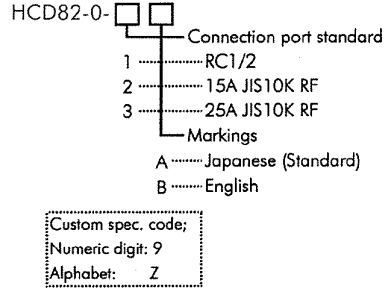
**PRODUCT CODE**



\*1. Power is supplied to a sensor through transmitter (HBM-310), please separately order a step down transformer (ZP; 35VA) for power voltages other than 100V AC.

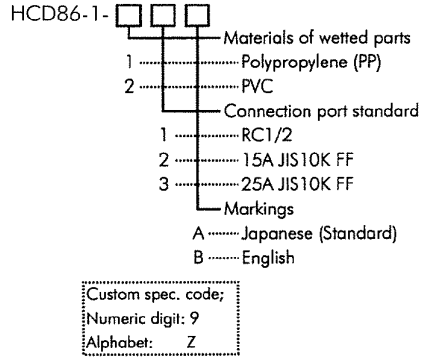
- Note 1. This sensor is combined with transmitter HBM-310, which has a power supply output for the control of a cleaner, hence the sensor has no control box (timer function).
- Note 2. Max. sample temperature is 80°C for PP holder (HC-D76) and 60°C for PVC holder (HC-D70C).
- Note 3. Please separately order a bracket (ZC-1 or ZC-2) and a flange (ZFK-1 or ZFK-2) if mounting is required.
- Note 4. Specify code "0" for both combined holder and applicable electrode when combining them with a pressurized type holder.

HC-D82 (Flow-through type electrode holder)



Combined electrode needs to be ordered separately.  
 Select from the table below.  
 Applicable pressure: 0~0.45MPa

HC-D86 (Flow-through type electrode holder)



Combined electrode needs to be ordered separately.  
 Select from the table below.  
 Applicable pressure: 0~0.15MPa

Electrode	Model	Model of exchange chip
pH, general use	ELCP-11	5081L
pH, hydrofluoric acid resistant	ELCP-21	5082L
pH, low impedance	ELCP-31	5080L
pH, alkali	ELCP-41	5083L
ORP, platinum	ELCP-61	2156L
ORP, metal alloy	ELCP-71	2157L
Combined fluoride ion	ELCP-81	7208L

**DKK-TOA CORPORATION**



**CAUTION**

Do not operate products before consulting instruction manual.

International Operations:  
 DKK-TOA Corporation  
 29-10, 1-Chome, Takadanobaba, Shinjuku-ku, Tokyo 169-8648 Japan  
 Tel: +81-3-3202-0225 Fax: +81-3-3202-5685

Representative Office (Europe):  
 DKK-TOA European Representative  
 St. Johns Innovation Centre, Cowley Rd., Cambridge CB4 0WS UK.  
 Tel : +44 (0)1223-526471 Fax : +44 (0)1223-709239

<http://www.toadkk.co.jp>

Information and specifications are for a typical system and are subject to change without notice.