

## CP SERIES INDUSTRIAL USE pH/ORP/ION ELECTRODES

CP series industrial use pH/ORP/ion electrodes are KCl non-supply type electrodes. These electrodes are the result of continuous research and development and offer high performance, ease of installation and low maintenance requirements. The electrodes are compatible with DKK-TOA's transmitters that have a temperature compensation function based on a 10k $\Omega$  (at 25°C) sensor. These electrodes can be incorporated into immersion type holders, flow through type holders or dip-in type guide pipes. The process connection is a universal pipe thread (Rc $\frac{1}{4}$ ), allowing compatible holders and guide pipes to be easily obtained by users.

The inner liquid non-supply type electrodes eliminate the need to refill with KCl solution and also the need for pressure compensation. The reference electrode has a newly developed gel-type inner liquid and a specially designed porous PTFE liquid junction. These features offer a wider operating temperature, increased electrode life and liquid junction potential characteristics and also eliminate the problem of electrodes drying up during storage.

The measuring electrode uses an easily replaceable sensor chip. Even under harsh operating conditions, it will not be required to replace the whole electrode. Only the sensor chip requires replacement, thus reducing running costs and providing excellent cost of ownership advantages. Replacement of the sensor chip is straightforward and it is even possible to change the sensor chip with a different type after field installation.

**Note:**

Please consult DKK-TOA before placing an order when measuring the following samples as they are likely to cause unstable indications or shorten the durability of KCl non-supply type electrodes.

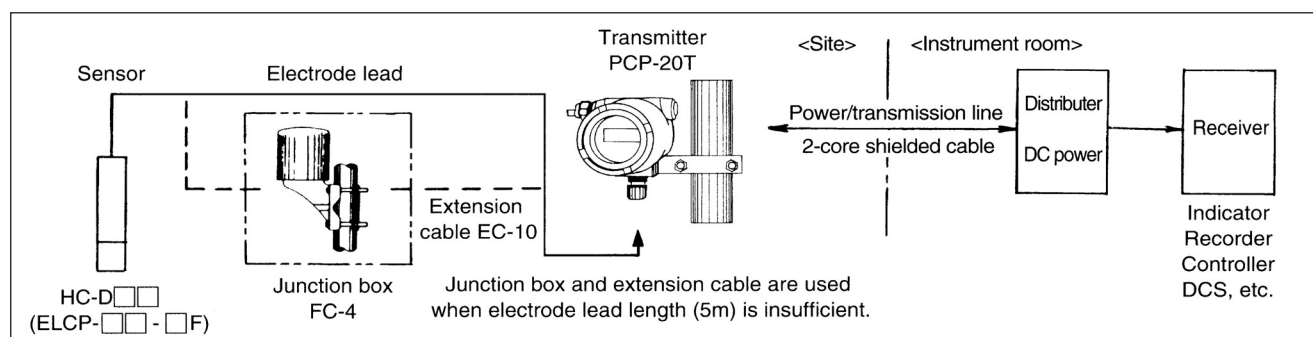
Sample with flow rate over 20cm/sec., low ion (below 20mS/m), heavy oil contamination, negative pressure or strong reducing substances.

**ELECTRODES**

The following electrodes and sensor chips are available,

Type of electrode	Model	Applications	Sensor chip for replacement
pH	ELCP-11-□F	General purpose (using standard glass membrane)	5081L
	ELCP-21-□F	Liquid containing fluoride (using hydrofluoric acid resistant glass membrane)	5082L
	ELCP-31-□F	Measurement in cold weather conditions (using low impedance glass membrane)	5080L
	ELCP-41-□F	High alkali liquid (using alkali resistant glass membrane)	5083L
	ELCP-51-□F	Strong glass membrane (using strong pH membrane)	5085L
ORP	ELCP-61-□F	General purpose (using platinum electrode)	2156L
	ELCP-71-□F	Cyanide decomposition process (using platinum electrode)	2157L
Fluoride-ion	ELCP-81-□F	Waste water (using lanthanum fluoride membrane)	7208L

□ Electrode cable length (5:5m, 10:10m) to be selected

**pH/ORP SYSTEM CONFIGURATION****COMPATIBLE TRANSMITTERS**

CP series industrial use pH/ORP/F-ion electrodes can be used in combination with the following transmitters which have a temperature compensation function based on a 10k $\Omega$  (at 25°C) temperature sensor.

Type of electrode	Compatible transmitters
pH	PCP-20T, HDM-135A/136A, HB-121DA, HB-196K□, HBM-100A, HBM-310, HBR-192A, HBU-112
ORP	RCP-20T, HDM-137A/138A, HB-123DA, HBM-102A, HBM-312, HBU-14
Fluoride	FBM-300, FBM-100

## pH ELECTRODE SPECIFICATION

The following four models are available, depending on the sensor chip to be used.

Model		ELCP-11-□F	ELCP-21-□F	ELCP-31□F	ELCP-41-□F	ELCP-51□F
Sensor chip, Glass membrane		General purpose	Hydrofluoric acid resistant type	For cold climate	Alkai restistant type	Strong pH membrane
Measuring range		0~14pH	2~12pH	0~12pH	2~14pH	0~14pH
Durable temp. range		-10~85℃				
Operational temperature range		-5~80℃	-5~50℃	-5~80℃		
Operational pressure range		0~0.7 MPa				
Inner electrode		Ag-AgCl electrode				
Reference electrode, inner liquid		Gelled KCl solution (Non supply type)				
Wetted materials		Epoxy resin, Tetra-fluoro ethylene resin. Fluoro rubber				
Glass membrane	Resistance of glass membrane	150~250MΩ	150~250MΩ	150~100MΩ	200~300MΩ	150~250MΩ
	Alkali error	7mV	10mV	12mV	6mV	8mV
	Acid error	Less than 1mV				
	Linearity	Within ±1mV				
	Hydrofluoric acid resistance	1 Hour	6 Hours	0.5 Hour		

Note 1) "Alkali error" is defined as the deviation from the theoretical value at pH12.8 (0.1 M NaOH), and "Acid error" is defined as the deviation from the theoretical value at pH1.1 (0.1 M HCl). "Linearity" is defined as the deviation from the value of pH6.86 after calibration at pH4.01 and pH9.18. "Hydrofluoric acid resistant" is described by the time at which glass membrane dissolves in 5% HF aqueous solution, and indicates the index of glass solubility against hydrofluoric acid.

Note 2) Hydrofluoric acid resistant glass is applicable for the sample containing hydrofluoric acid less than 1000 mg/L. The glass solubility against the sample containing fluoride ions may depend on pH value of sample. The sample with pH value less than 4pH where fluorides exist as fluorine acid may dissolve glass electrode, but the sample with pH value over 4pH where fluorides exist as fluoride ions will not easily dissolve glass membrane even if the sample contains much fluorides.

## ORP ELECTRODE, SPECIFICATIONS

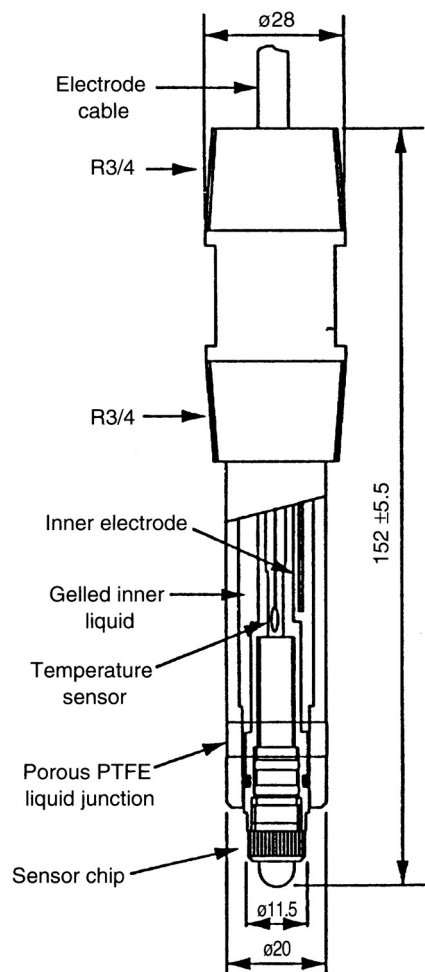
Model	ELCP-61-□F	ELCP-71-□F
Sensor Chip	Platinum	Alloy
Sensing membrane		
Measuring range	-2000 ~ 0 ~ 2000 mV	
Durable temperature range	-10 ~ 85°C	
Operational temperature range	-5 ~ 80°C	
Operational pressure range	0 ~ 0.7 MPa	
Inner electrode	Ag-AgCl electrode	
Reference electrode, Inner liquid	Gelled KCl solution (Non-supply type)	
Wetted materials	Epoxy resin, Tetra-fluoro ethylene resin, Fluoro rubber	

## FLUORIDE ION ELECTRODE, SPECIFICATIONS

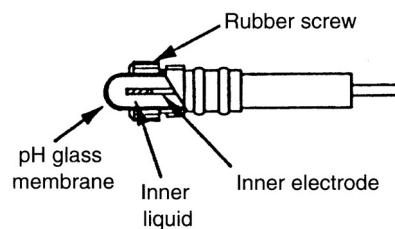
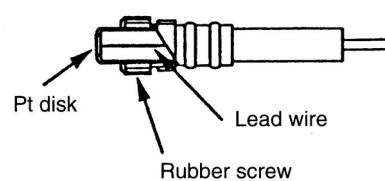
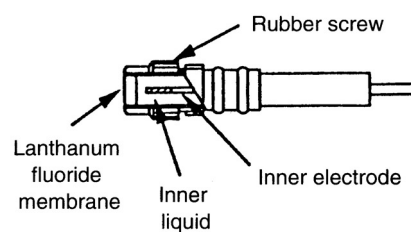
Model		ELCP-81-□F
Sensor Chip		Lanthanum fluoride
Sensing membrane		Single crystal
Measuring range		0.1 ~ 10,000 mg/L F <sup>-</sup>
Durable temperature range		-10 ~ 50°C
Operational temperature range		-5 ~ 40°C
Operational pressure range		0 ~ 0.2 MPa
Inner electrode		Ag-AgCl electrode
Reference electrode, Inner liquid		Gelled KCl solution (Non-supply type)
Wetted materials		Epoxy resin, Tetra-fluoro ethylene resin, Fluoro rubber
Operational conditions	pH	5 ~ 9 pH
	Conductivity	Min. 50mS/m
	Flow rate	1 ~ 20 cm/s

**ELECTRODE**

The electrode is mounted on a holder with a pipe thread  $Rc^{3/4}$ ".

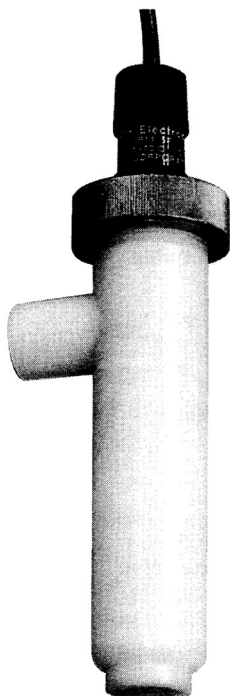
**SENSOR CHIP**

The sensor chip is attached to the electrode body by a rubber screw, of which, the sealing has a pressure resistance of more than 1 MPa.

**pH sensor chip****ORP sensor chip****F- ion sensor chip**

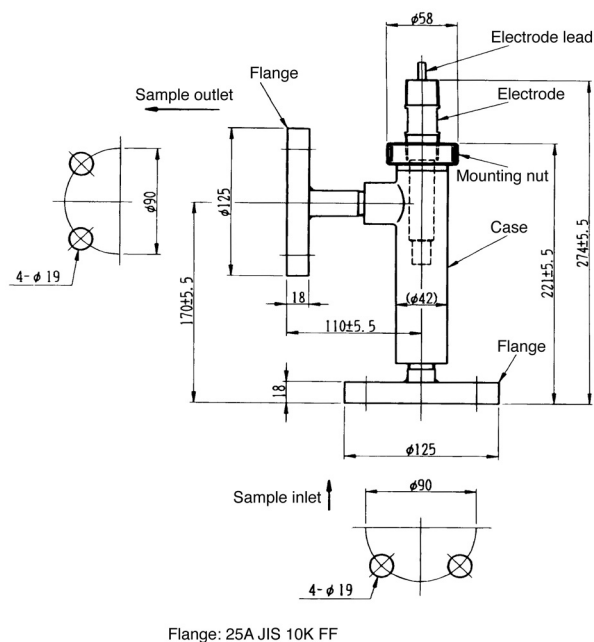
## FLOW-THROUGH TYPE HOLDER

Model	Connection method	Wetted materials	Pressure range	Temperature range
HC-D86	Threads (Rc1/2), flange (15A JIS 10K FF) or flange (25A JIS 10K FF) with resin case	PP	0~0.15MPa	-5~80°C
		PVC		-5~60°C
HC-D82	Threads (Rc1/2), flange (15A JIS 10K RF) or flange (25A JIS 10K RF) with metal case	SUS304	0~0.45MPa	-5~80°C
HC-D88	Inline screw (M60x2) without case	PP	0~0.15MPa	-5~80°C
		PVC		-5~60°C

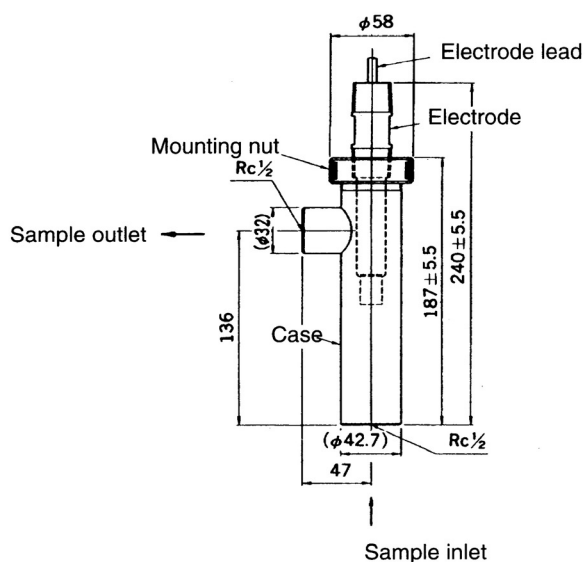


Model HC-D86 Holder

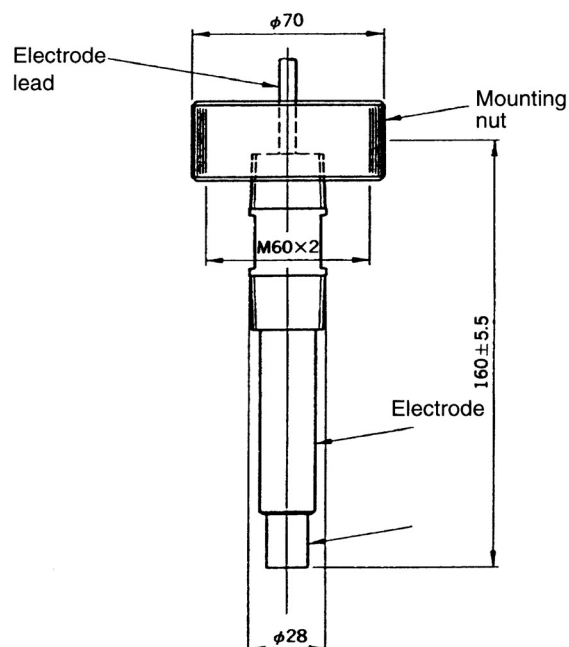
Model HC-D86



Model HC-D82



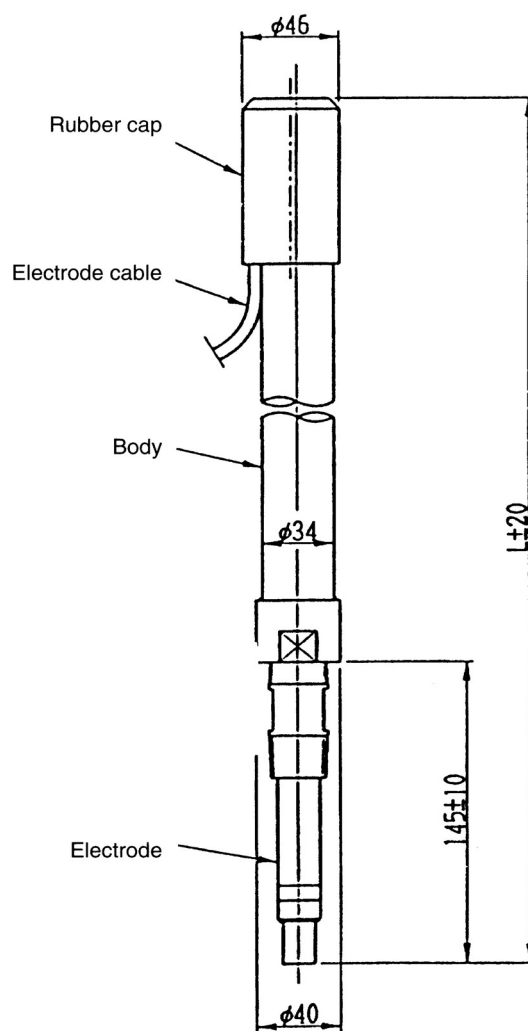
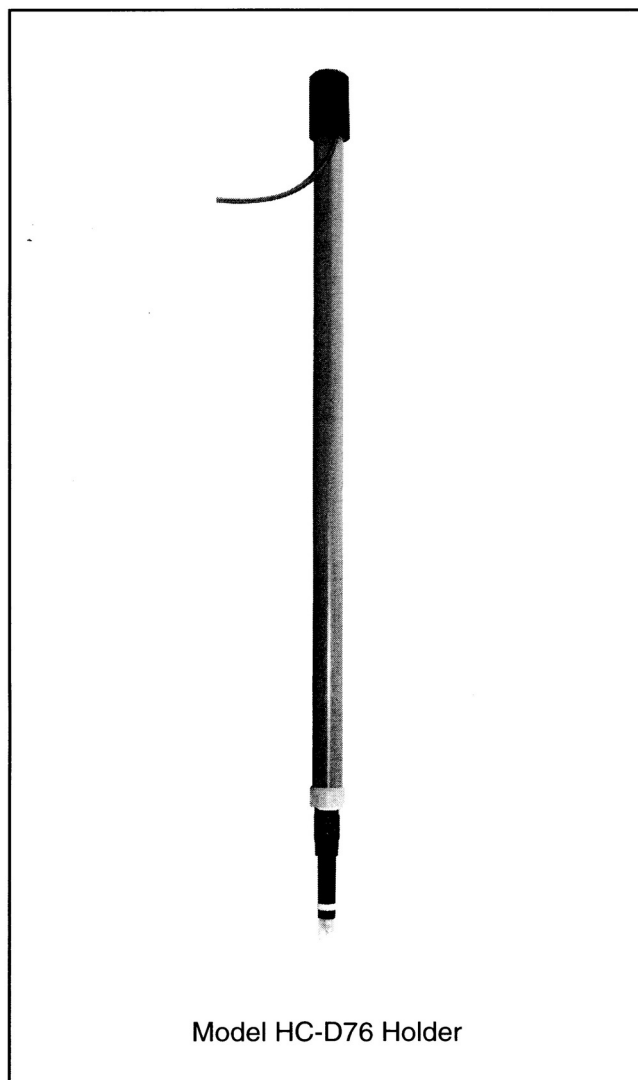
Model HC-D88



**IMMERSION TYPE HOLDER**

Model	Wetted materials	Temperature range	Applications
HC-D70C	PVC (Polyvinyl chloride)	-5 ~ 60°C	General purpose, Weather resistant
HC-D70F	PVDF (Polyvinylidene di-fluoride)	-5 ~ 95°C	High temperature resistant, Chemical resistant
HC-D76	PP (Polypropylene)	-5 ~ 80°C	General purpose

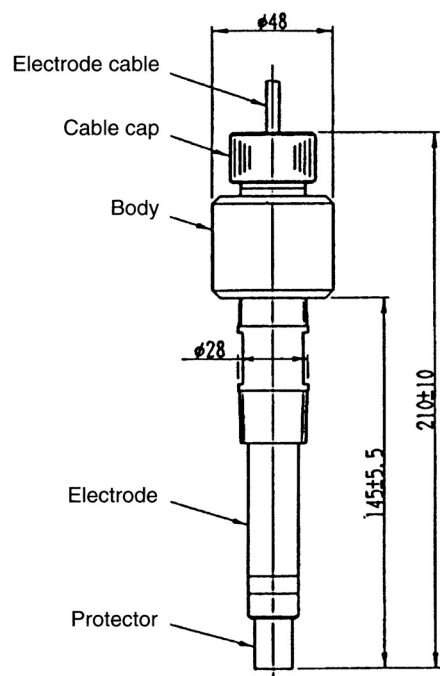
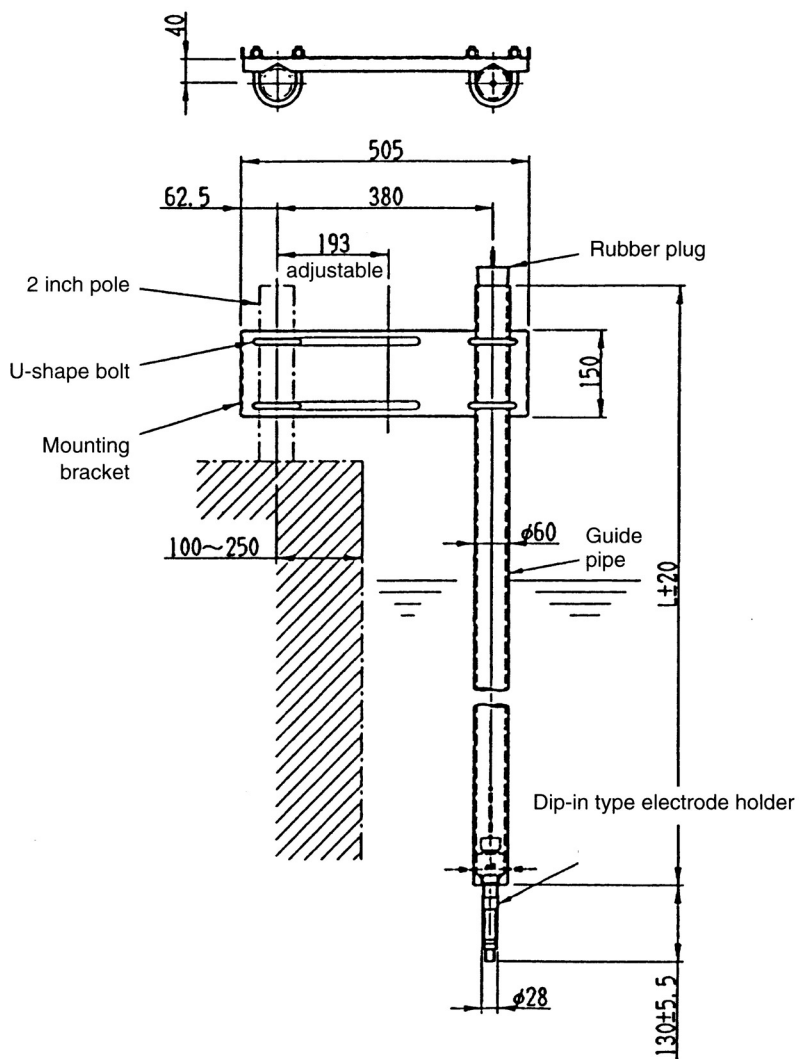
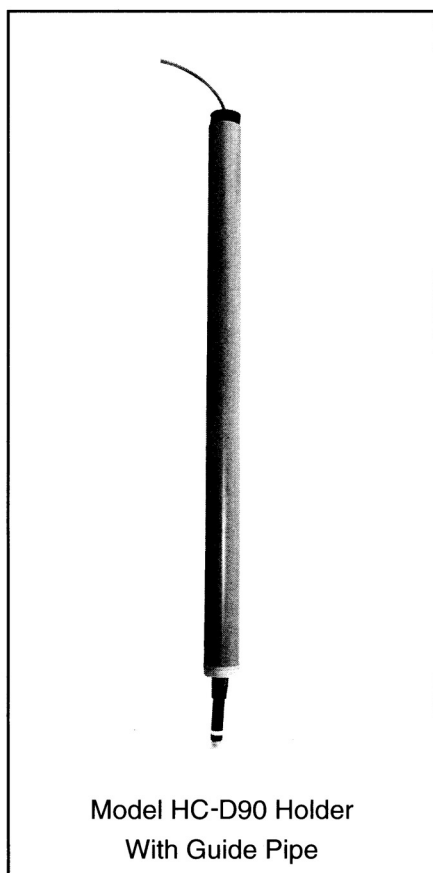
Holder length: 0.5 ~ 3m



## DIP-IN TYPE HOLDER

Model	Process connection	Wetted material	Temperature range
HC-D90	Dip in with plastic guide pipe	Polyvinyl chloride	-5 ~ 60°C
HC-D95	Dip in with metallic guide pipe	Stainless Steel	-5 ~ 80°C

Length of guide pipe: 0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5 m





## pH STANDARD

DKK-TOA offer various pH standard solutions (500mL) and powder reagents (for 500mL solution).

### pH Standard Solution

Description	pH value at 25°C	Accuracy	Bottle	Parts number
Oxalate pH standard solution	1.68	±0.02	500mL	143F194
0.01M oxalate pH standard solution	2.15	±0.02	500mL	143F091
Phthalate pH standard solution	4.01	±0.02	500mL	143F191
Phosphate pH standard equimolal solution	6.86	±0.02	500mL	143F192
Tetraborate pH standard solution	9.18	±0.02	500mL	143F193
Carbonate pH standard solution	10.02	±0.02	500mL	143F195

### Powder Reagent for pH Standard Solution

Description	pH value at 25°C	Quantity	Parts number
Powder reagent for oxalate pH standard solution	1.68	5 bags, each for 500mL solution	143F065
Powder reagent for 0.01M oxalate pH standard solution	2.15	5 bags, each for 500mL solution	143F090
Powder reagent for phthalate pH standard solution	4.01	5 bags, each for 500mL solution	143F060
Powder reagent for phosphate standard equimolal solution	6.86	5 bags, each for 500mL solution	143F061
Powder reagent for tetraborate pH standard solution	9.18	5 bags, each for 500mL solution	143F062
Powder reagent for carbonate pH standard solution	10.02	5 bags, each for 500mL solution	143F066

### Class 2 pH Standard Solution

(Traceable to Japanese national standards and includes the relevant certification.)

Description	pH value at 25°C and criteria	Bottle	Parts number
Phthalate pH standard solution, Class 2	4.01 ±0.015	500mL	143F501
Phosphate pH standard equimolal solution, Class 2	6.86 ±0.015	500mL	143F502
Tetraborate pH standard solution, Class 2	9.18 ±0.015	500mL	143F503

## ORP STANDARD

The ORP standard solution should be prepared by saturating phthalate pH standard solution with Quinhydrone when used.

Description	Quantity	Parts number
ORP standard solution (pH4.01 solution + Quinhydrone)	For 500mL solution	143F196
Powder reagent for ORP standard solution (pH4.01 powder and Quinhydrone)	5 bags, each for 500mL solution	143F089
Powder Quinhydrone for ORP standard solution (Quinhydrone, only)	5 bags, each for 500mL solution	143F059

**FLUORIDE ION STANDARD pH IONIC STRENGTH ADJUSTMENT BUFFER SOLUTION**

Calibration standard liquid should be prepared to contain pH5-AB with a concentration of 1% to adjust pH value at 5 and to keep constant ionic strength. When sample contains interference components such as  $\text{Ca}^{2+}$ ,  $\text{Fe}^{3+}$  or  $\text{Al}^{3+}$  which will form chelate ions giving low readings, the addition of F-DIMAB to sample with 5~10% concentration will be effective to decompose the chelate ions.

Description	Concentration	Bottle	Part number
Fluoride ion standard liquid	1,000 mg/L $\text{F}^-$	500mL	143F077
PH5-AB	-	500mL	143A053
F-DIMAB	-	500mL	143F123

**DKK-TOA CORPORATION**

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**CAUTION**

Do not operate products before consulting instruction manual.