ISO-14001
ISO-9001

SPECIFICATION SHEET

TOA DKK

REAGENTLESS FREE CHLORINE ANALYZER

Models: **CLF-110/111**

The main applications for this instrument are for the measurement of free available chlorine concentration in feed water at filtration plants, pumping stations and end-of-pipe distribution points.

FEATURES

- Long term, stable measurement using a sensor which contains a contact-free swing rotary residual chlorine electrode (including beads cleaning system).
- Transmitter with built-in microcomputer includes a full range of diagnostic functions including low flow rate detection, calibration error, etc..
- Non-reagent system eliminates the need for regular reagent supply.
- Stable and reliable operation can be further enhanced by adding optional auto-calibration and auto-cleaning functions.

STANDARD SPECIFICATIONS

Product Name : Reagentless Free Chlorine Analyzer.
Model : CLF-110/111.
Measurement Object : Free available chlorine (free chlorine) of water.
Measurement Method : Polarography by eccentric rotary micro-electrode.
Sensor : CLR-21, 22 swing rotary (Model-110; CLR-21, Model-111; CLR-22) with built-in Au-Ag temp. compensation resistor) sensing electrode, type 2132.
Weight : Approx. 18kg
Measurement Range : Select one of the following:- 0~½, 0~⅔, 0~⅓ mg/ℓ (ppm units are also available if specified).
Measurement Range Switching : Manual or remote switching (client to specify).
Indication : Digital display (LCD, 0.00~10.00).
Output Signal : 4~20mA DC, maximum load 600Ω, isolated output.
Contact Switching Outputs :
- Range indication, under maintenance, power fail, temperature fault, in calibration mode *1, calibration error *1, analyzer fault (contact rating: 30V DC, 0.1A). (*1: available with auto-cal option only).
- High concentration, low concentration (contact rating: 125V AC, 1A).

Contact Switching Inputs :
- Range switching (open contacts=low range, closed contacts=high range) (contact rating: 30V DC 0.1A).
- Start calibration (contact closed for 100mS or longer) (contact rating: 30V DC, 0.1A), only available with auto-cal option.

Sample Conditions : pH: 6.5~7.5
Conductivity: 80μS/cm or greater.
Temperature: 0~+40°C (no freezing).
Pressure: 0.05~0.5 MPa (0.5~5 kgf/cm²).
Consumption: 0.5~1 ℓ/min. (flow rate of sample to be introduced into analyzer: 0.1 ℓ/min, approx.).

Wetted Materials : Hard PVC, Teflon tubing, polyethylene tubing.
Electrode Cleaning : Electrode rotation with beads cleaning system.
Power Requirements : 100V AC ±10%, 50/60Hz. (Other operating voltages available as options)
Power Consumption : Approx. 50 VA (main body of instrument; approx. 20VA, with calibration; approx. 50VA).
Construction : Indoor, self-standing, drip-proof.
Operating Temperature Range : -5~+50°C.
Operating Humidity Range : <85% RH.
Main Materials: Transmitter: ADC12 (Al. die cast).
Sensor: A1050P (Al.).
Frame: A1100P (Al.).
Paint Colour : Transmitter/sensor: Pantone 537C (Equivalent to Munsell 5PB8/1).
Frame: Grey (Equivalent to Munsell N6).
Weight : Approx. 18kg.
Mounting : Floor standing.
Piping Connections : Sample inlet: VP16 pipe.
Drain: VP25 pipe.
Wiring Connections : Five glands for ø6mm~ø12mm diameter cable entries.

PERFORMANCE

Repeatability : ±2%FS (with chlorine standard solution).
Linearity : Model-110; 0~3mg/L, ±5%F.S (with chlorine standard solution)
Model-111; 0~1.5mg/L, ±5%F.S (with chlorine standard solution)
1.5~2mg/L, -7%F.S (with chlorine standard solution)
Response time : Within 2 minutes for 90% response (measured from sample inlet at flow rate of 1 ℓ/min).
Effects of Chlorine bond : Model-110; Approx. 20% of chlorine bond concentration
Model-111; Approx. 6% of chlorine bond concentration

OPTIONS

- **Automatic Calibration Function**

Calibration Method	:	Zero: water filtered by active charcoal filter is introduced. Span; None.
Calibration Start Mode	:	Manual: calibration starts by keypad command. Auto: calibration starts by internal timer. Remote: calibration starts by external contact input signal (when calibration period is set at 0 hr).
Calibration Period	:	0~999 hr. variable (Initial value 15 mins).
Calibration Duration	:	Approx. 10 mins.
Stand-by Time after Calibration	:	0~30 mins. variable (Initial value15 mins).
Output Hold Time during Calibration	:	Calibration time + stand-by time.

- **Unit for Increasing Conductivity (Model CLZ-2)**
  This unit increases the conductivity of the water sample by adding salt tablets. This is required for low conductivity samples.

- **Calibration Unit**
  This unit is used for manual zero operation and consists of an activated charcoal filter, a calibration liquid tank and a built-in manual switching valve.

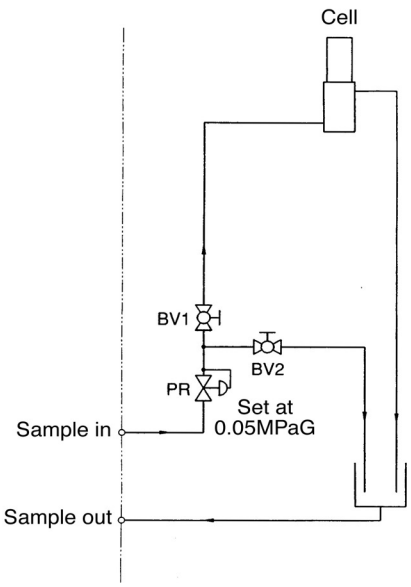
PRINCIPLE OF OPERATION

This instrument consists of a sensor and transmitter mounted on a self-standing frame. The sample flows to the measurement cell of the sensor. In the measurement cell, a fixed voltage is applied between a sensing electrode and a counter electrode to achieve electrolytic reduction.

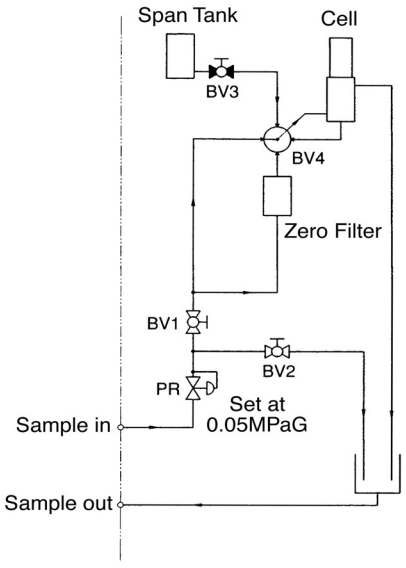
The reduction current (diffusion current) that flows across the two electrodes is proportional to the free chlorine concentration present between the electrodes. This current is amplified and the represents the free chlorine concentration.

FLOW SCHEMATIC

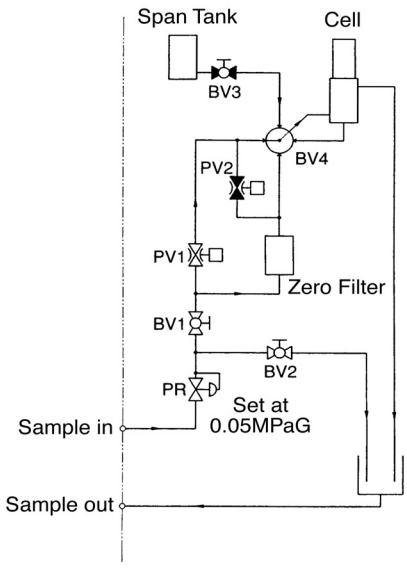
Basic Configuration



With Manual Calibration



With Auto-Calibration



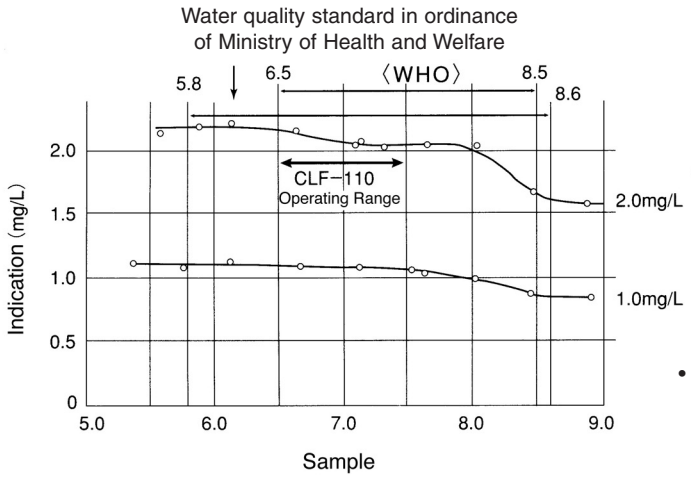
Normally open valve
Normally closed valve

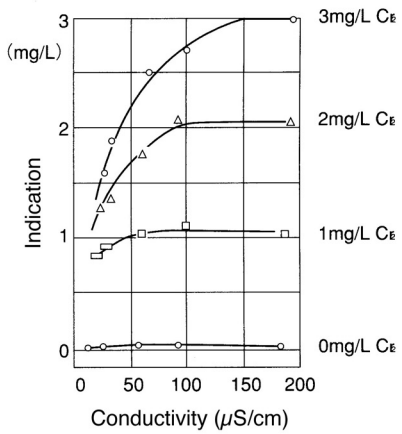
Item	Description	Item	Description	Item	Description	Item	Description
PR	Pressure Regulator	PV2	Pinch Valve	BV2	Bypass Ball Valve	BV4	5-Way Selection Valve
PV1	Pinch Valve	BV1	Ball Valve	BV3	Stop Valve		

PH AND CONDUCTIVITY CHARACTERISTICS OF SAMPLE

pH and Conductivity Characteristics of Sample

- As shown below, the pH change of the sample affects the indication in principal. Almost no problems will occur so long as the pH value is in the range of 6.5 ~ 7.5.

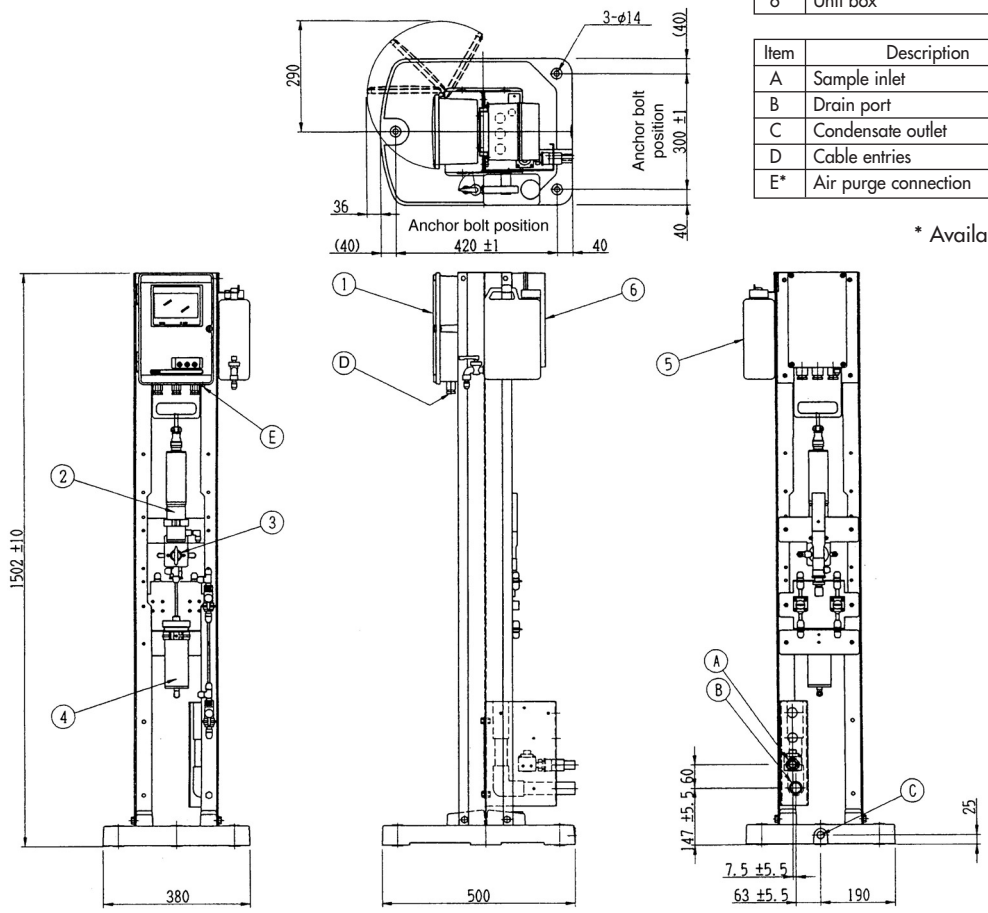




- Under normal circumstances there is virtually no effect because city water conductivity is usually around 200μS/cm with little variation. However, for measurements in the region below 100μS/cm, the indicated value will be lower than it should be, causing practical measurement problems for measurements of samples with 1ppm or higher concentrations.

EXTERNAL DIMENSIONS

General tolerance ±10mm

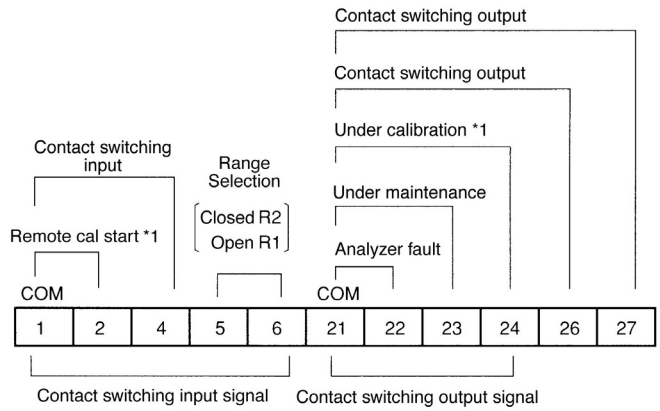


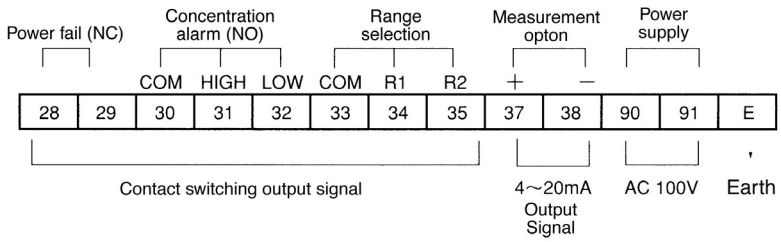
Item	Description	Remarks
1	Sensor	
2	Measurement cell	
3	Flow path switching valve	
4*	Zero filter	
5*	Calibration tank	
6*	Unit box	

Item	Description	Remarks
A	Sample inlet	VP16
B	Drain port	VP25
C	Condensate outlet	Rc 1/2 (with plug)
D	Cable entries	Gland for 6mm~12mm OD cable
E*	Air purge connection	Rc 1/4 (with plug)

* Available as an option.

DIMENSIONS





Contact switching input signal - - - Contact Rating: DC 30V 0.1A

Contact switching output signal - - - Contact Rating: DC 30V 0.1A

Concentration alarm - - - Contact Rating: DC 30V 0.1A

4~20mA output - - - Max Load 600Ω

*1 With automatic calibration (option)

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⚠ CAUTION Do not operate products before consulting instruction manual.

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