SPECIFICATION SHEET

TOA DKK

Cyanide Ion Monitor CNMS-4

The CNMS-4 monitors continuously cyanide ion concentration in industrial wastewater using an Ion Selective Electrode (ISE) with auto-calibration and auto-cleaning functions. Different from conventional measuring method, this device adopts the non-distillation method which is suitable for continuous water monitoring in industrial wastewater, river and lake. Environmental law about industrial wastewater mostly regulates discharge of total cyanide. However, the defined measurement method for total cyanide requires proficient analyzing skills and long measuring time because part of it composed of complex cyanide compound. In light of that, instead of measuring total cyanide, the CNMS-4 is designed to monitor cyanide ion concentrations in water continuously. As cyanide appears as simple compound in most occasions, the device can detect the leakage of cyanide swiftly and effectively.

Features

○ Eco-friendly, Economic Halved Reagent

The flow rates of the sample is reduced by half (comparing to former model CNMS-3) without performance degradation by flow stabilization and decreasing dead volume in the measurement system. This improvement leads to saving running cost and low impact to the environment.

○ Automatic Calibration Cycle Adapting System (ACAS)

During monitoring wastewater the sensor is regularly exposed to dirt and other impurities. The accumulation of this dirt on the sensor is the most common cause of instrument malfunction. Regular cleaning and calibration by the auto-cleaning and auto-calibration functions at appropriate intervals are essential to ensuring the consistent accuracy of measurements. The “ACAS” resets the on-going auto-cleaning and auto-calibration schedules when it detects a decline in the sensitivity of the ISE. Effective cleaning by the ACAS prevents measurement accuracy from degrading.

○ USB memory for retrieving measurement data

Measurement results are sent to the host system via analog transmission or digital communication (Modbus). The calibration and measurement data can also be saved in CSV format to a USB memory device, allowing you to process and analyze data on a computer.

○ Space-saving design

Reducing reagent consumption provides down-sizing the instrument by shrinking the reagent tank. In addition, the unit features a structure that allows maintenance to be performed from the front, thereby dramatically reducing the amount of space needed for installation.

○ Lockable door design

Cyanide ion standard solution is a poison. Therefore, the effluent collection unit is available as an optional item. For safer and securer purpose, the door of the instrument has been added a lockable design to keep the standard solution stored securely. Effluent tanks are available in 2 types, a 2-liter tank, which can be incorporated into the unit, and a 10L type, which is suitable for external installation and equipped with a locking system.

○ Ion strength adjustment buffer TISAB

The TISAB is a total ion strength adjustment buffer and capable of ionizing some of the non-ionic cyanide. By mixing TISAB with the sample, the ion selective electrode measures the cyanide ion effectively.

Standard Specifications

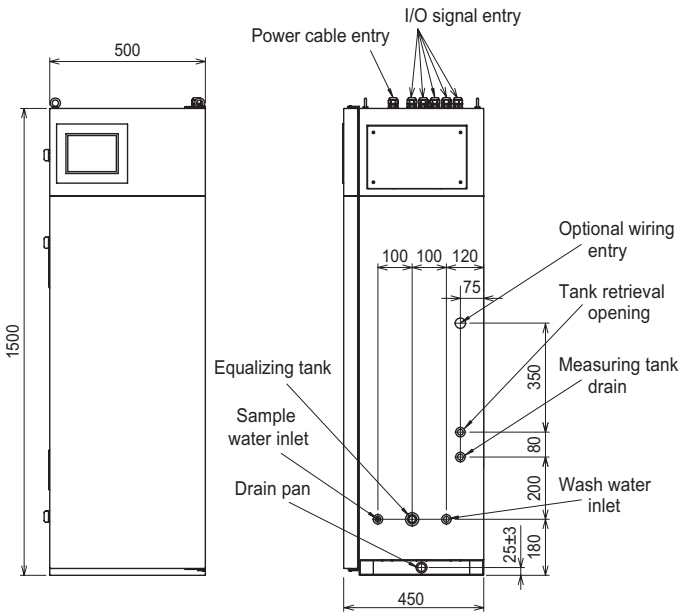
Product name : Cyanide ion monitor
Model : CNMS-4
Measurement method : Ion selective electrode method (TISAB addition method)
Measurement range : CN^-; 0.03 - 5.00mg/L
CN^-; 0.03 - 2.00mg/L
CN^-; 0.05 - 5.00mg/L
Repeatability : Less than ±10% of reading(with calibration solution)
Response : 15 minutes or less at 90% response (after adjustment tank)
Temperature compensation : Constant temperature measurement method
Measurement method : Continuous measurement and intermittent measurement (shortest cycle; 1 hour)
Automatic calibration : Periodic calibration or ACAS
Periodic calibration cycle setting range; 1 - 99 days
Automatic cleaning : Periodic cleaning
① Cleaning sample line and measurement cell by acid
② Cleaning sample line by city water
③ Backwashing of sample filter by aerated city water (optional feature)
Periodic cleaning cycle setting range; 1 - 999 hours
Display : Color LCD touch screen (7 inch)
Measurement point : 1 channel
(Simultaneous measurement of up to 3 channels is available as an optional feature. In this case, the unit dimensions are different.)
Analog output : Linear output, 4 - 20mADC, Load resistance; 600Ω or less
Contact output : Power interrupt (B contact), instrument failure 1 (major failure), instrument failure 2 (minor failure), concentration upper limit, concentration elevated upper limit, concentration lower limit, calibrating, cleaning, maintenance, and measurement
*Contact capacity for all of the above; 30VDC 0.1A (AC is available as an optional feature.)
External contact input switching signals : Start measurement, start calibration, start cleaning, stop measurement, continuous/intermittent switching, and effluent level sensor switch
*No-voltage contact input
On-resistance; 50Ω or less, Short-circuit current; Max. 10mA, Open-circuit voltage; 12 VDC
Digital I/O : RS-485 interface
Protocol; Modbus/RTU
* Digital communication can be used to monitor measured values, operation status (measurement, calibration, cleaning etc.) and the occurrence of abnormal conditions. It can also be used to perform remote maintenance operations, such as issuing calibration commands and cleaning commands. For details, please consult one of our sales representatives.
Data Memory : Internal memory; Can store sampling data for 1 month when it is taken in 1-minute intervals (The display can graph the trends in the data.)
USB memory; Can store sampling data for 12 months when it is taken in 1-minute intervals (Stored data can be read by a computer.)
Sensor electrode : cyanide ion selective electrode, EL7004L
Reference electrode : ELR-009
Power supply : 100VAC±10%, 50/60Hz
Power consumption : Max. 240VA, approx. 120VA on average (at an ambient temperature of 25ºC)
Sample water conditions : Water temperature; 2 - 40ºC (no freezing)
Pressure; 0.01 - 0.05MPa
SS; 50 mg/L or less (particle diameter; 100μm or less)
Flow rate; Approx. 1 - 3L/min (If there is a considerable amount of distance between the sampling point and the main unit, install a by-pass line that runs close to the main unit. This will prevent delays in response by the sample water.)
pH; More than 5.8pH
Interfering co-existing substances
S^{2-} = Must be absent
I^- = 0.1
$S_2O_3^{2-}$ = 10
SO_4^{2-}, HPO_4^{2-} , CO_3^{2-} , SO_3^{2-} , NO_2^{2-} , NH_4^+ = 1000
The equations referred to above show the molar concentration ratio of the sample to each interfering ion, where the reading is the same as that of cyanide ion concentration.
This product is designed to detect only ionized cyanide present in water. If the sample water contains coexisting substances such as metals, some of the cyanide ions might combine with these substances to form complex compounds that cannot be detected by the ion selective electrode. This can cause the instrument to issue readings lower than the total cyanide content. In addition, if the sample contains high concentrations of salt, the salt might interfere with the separation of cyanide ions and could cause the cyanide to be present in non-ionized form. This may result in readings lower than those obtained by the distillation method. You are recommended to perform measurement under conditions where salt concentration changes are minimized because changes in the salt concentration of the sample can result in fluctuations in readings.
Wash water conditions : City water or the equivalent (Turbidity level; 2 or less, Color level; 5 or less)
Water temperature; 2 - 40ºC (no freezing)
Pressure; 0.1 - 0.5MPa
Consumption; Approx. 2L per wash
Acid cleaning solution : HCl 3%W/V (standard)
Consumption; Less than 2L/month (at a cleaning interval of 12 hours)
Tank capacity; 10L
*Select 5%W/V or 10%W/V, based on the degree of contamination. Note that using a higher concentration can shorten the life of the electrode.
Reagent : TISAB
Standard flow rate; Approx. 0.2mL/min
Tank capacity; 10L (Adjuster consumed during 0.2mL/min continuous measurements; Approx. 10L/month)
Calibration solution : HI (high concentration) calibration solution and LO (low concentration) calibration solution
Consumption; Less than 5L/month

Tank capacity; 5L
*LL (extremely low concentration) calibration is available as an optional feature.

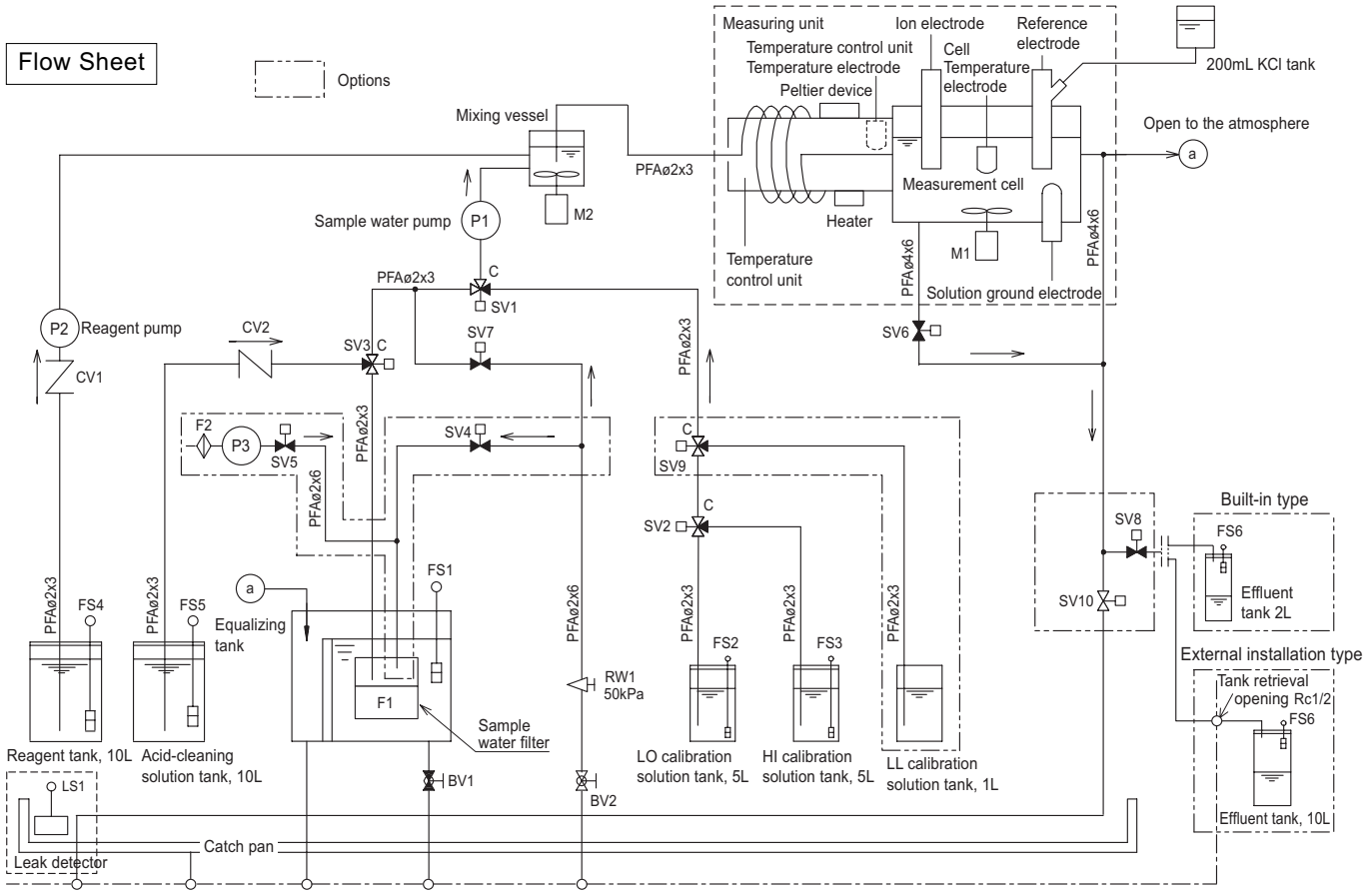
Construction	: Indoor self-standing frame
Dimensions	: 500(W)x1500(H)x450(D)mm
Weight	: Approx. 100kg (except reagent)
Installation conditions	: Indoor. No direct sun light.
Ambient temperature	: 0 - 40ºC (no sample/wash water freezing)
Ambient humidity	: Less than 85%RH (no condensation)
Optional features	:*Measurements can be simultaneously conducted on up to 3 channels. Dimensions for 2ch; 900(W)x1600(H)x550(D)mm Dimensions for 3ch; 1200(W)x1600(H)x550(D)mm *Recorder; 100mm wide, 16m long (1 pen type) *Air cleaning (aerated city water backwashing for sample water filter) *10L effluent tank *Effluent recovery unit (cyanide ion standard solution only, built-in tank 2L) *Low concentration calibration unit (for 3-point low concentration calibration) *Leak detector (mounted on the drain pan at the bottom) *Junction box (available for AC power type contact output) *Effluent tank storage (10L tank, equipped with keys)

Dimensions

Unit : mm



Flow Sheet



Symbol	Name	Remarks	Symbol	Name	Remarks
SV1 - 10	Electromagnetic valve	SV 4, 5, 8, 9, and 10, are optional.	P3	Air pump	Optional
			RW1	Pressure-reducing valve	
BV1, 2	Ball valve		F1, 2	Filter	
CV1, 2	Check valve		M1, 2	Motor	
P1, 2	Peristaltic pump		FS1 - 6	Float switch	FS6 is optional

Product code

CNMS4-0-□□□□□□□□□□□□

- Power supply
  - 1 ..... 100VAC, 50/60Hz
  - 9 ..... Custom spec. *1
- Measuring channel
  - 1 ..... 1 channel (standard)
  - 2 ..... 2 channel parallel measurement *2
  - 3 ..... 3 channel parallel measurement *2
  - 9 ..... Custom spec.
- Measurement range for 1st channel *3
  - A ..... 0.03 - 2.00mg/L
  - B ..... 0.05 - 5.00mg/L
  - Z ..... Custom spec.*4
- Measurement range for 2nd channel *3
  - A ..... 0.03 - 2.00mg/L
  - B ..... 0.05 - 5.00mg/L
  - Y ..... Not applicable
  - Z ..... Custom spec.*4
- Measurement range for 3rd channel *3
  - A ..... 0.03 - 2.00mg/L
  - B ..... 0.05 - 5.00mg/L
  - Y ..... Not applicable
  - Z ..... Custom spec.*4
- Recorder
  - 0 ..... None (standard)
  - 1 ..... 1 pen type
  - 9 ..... Custom spec.*5
- Air cleaning (sample water filter with bubbling)
  - 0 ..... None (standard)
  - 1 ..... Supplied
- Effluent recovery unit (separation of calibration solution)
  - 0 ..... None (standard)
  - 1 ..... Supplied (built-in tank 2L) *6
  - 2 ..... Supplied (10L tank included)
  - 3 ..... Supplied (10L tank included + Effluent tank storage with keys)
- Low concentration calibration unit (3 point calibration)
  - 0 ..... None (standard)
  - 1 ..... Supplied
- Leak detector (bottom of cabinet)
  - 0 ..... None (standard)
  - 1 ..... Supplied
  - 9 ..... Custom spec.
- Junction box (option unit for AC power type contact output)
  - 0 ..... None (standard)
  - 1 ..... Supplied
- Language (of documents)
  - 0 ..... Japanese (standard)
  - 1 ..... English
  - 9 ..... Custom spec.

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

*1: If you are using an AC power supply that is not 100VAC, a step-down transformer may be required.
Make sure to tell us the power specifications of your site in advance.

*2: If there is a large distance between sampling points, there may be a response delay.

*3: Analog output range is 0 - upper limit of measurement range.

*4: Please indicate the desired measurement range.

*5: Please specify the type of recorder (2 pen or 3 pen) when needed.

*6: Effluent can be stored for 2 weeks when conducting calibration at 7-day intervals and when washing at 24-hour intervals.

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DKK-TOA CORPORATION

CAUTION Do not operate producuts before consulting instruction manual.

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