

Compact City-Water Analyzer

MWB4-70

This analyzer is for continuous monitoring water quality (Maximum seven parameters) at faucet feed line or water receiving tank of a building.

In addition to the three items of turbidity, color, and residual chlorine, which are specified by law to be inspected daily, this analyzer can optionally conduct measurements of the electric conductivity, pH, water temperature, and water pressure.

The compact B4-size allows the MWB4-70 to be installed in narrow spaces. The MWB4-70 also delivers high reliability, durability, and excellent maintainability.



Features

Safe design-Easy to read and operate

- 1) The real-time readouts of the items measured appear on the large color display on the front panel. Along with readouts, the display also provides trend indication. This convenient feature makes it possible to analyze the cause of abnormality by referring the anteroposterior trends.
- 2) The operating part consists of an easy-to-read interactive touch panel.
- 3) The electrical part and analyzer are kept separate. This ensures the electronics remain insulated while protecting users from potential electric shock.

High reliability

- 1) This analyzer features a unique debubbling method that effectively minimizes the formation of bubbles in turbidity and color measurements. In the event bubbles accidentally mingle, they can be completely removed by backwashing. These capabilities enable the analyzer to improve stability of turbidity and color measurement remarkably.
- 2) Time-proven non-contact swing rotary type electrode is adopted for chlorine electrode. It enables stable measurement for long period in the combination with unique ceramic beads cleaning even sample flow is fluctuated.
- 3) This analyzer comes with an electronic dehumidifier designed to keep dew condensation from forming inside the unit. Eliminating dew condensation not only prevents rust from accumulating inside, but also enhances the durability of the equipment.

Wide variety of output options

In addition to DC 4-20 mA analog output, this device is also standardly equipped with two digital communication interfaces, RS232C and RS485. These two interfaces support the remote monitoring system.

Enhanced maintenance and operational performance

- 1) Operations (such as cleaning and zero calibration) can be remotely controlled from the host system is possible via the use of contact signals or the digital signal interfaces RS232C or RS485. The effective remote control of operations can help cut down on labor and costs.
- 2) One minute values are stored in the internal memory in 3-month intervals, and one hour values are stored in 1-year intervals. A memory card (optional) can also be inserted in the factory-supplied slot, making it possible to store and carry the data without the need for a computer.
- 3) The self-diagnostic feature provides advance notice about the current condition of the system, helping to make maintenance more efficient. It issues two different signals, "Caution" and "Warning", thereby enabling users to identify the severity of the problem.

Measurement items and performance

Measurement item	Measurement method	Measurement range	Minimum indicated value	Linearity	Repeatability	Calibration method
Turbidity	Transmitted light method	0 to 2/4 degrees	0.01 degrees	Within $\pm 2.5\%$ FS	Within $\pm 2\%$ FS	PSL standard solution
Color	Transmitted light method	0 to 10/20 degrees	0.01 degrees	Within $\pm 5\%$ FS	Within $\pm 3\%$ FS	Color standard solution
Residual chlorine	Polarography	0 to 2 mg/L	0.01 mg/L	Within $\pm 2.5\%$ FS	Within $\pm 2.5\%$ FS	DPD colorimetric method
Electric conductivity	AC 2-pole method	0 to 50 mS/m or 0 to 500 μ S/cm	0.1 mS/m or 1 μ S/cm	Within $\pm 2\%$ FS	Within $\pm 2\%$ FS	KCl standard solution
pH	Glass electrode method	pH 2 to 12	0.01 pH	Within ± 0.1 pH	Within ± 0.1 pH	pH7/9 standard solution
Temperature	Platinum resistance thermometer method	0 to 50 °C	0.1 °C	Within ± 0.5 °C	Within ± 0.5 °C	Reference thermometer
Water pressure	DMOS* method	0 to 1 MPa or 0 to 9m	0.001 MPa or 0.01m	Within $\pm 0.5\%$ FS	Within $\pm 0.5\%$ FS	Reference pressure gauge

*DMOS: Double-diffused metal-oxide semiconductor.

Standard Specifications

Product name : Compact City Water Analyzer
 Model : MWB4-70
 Objects measured : Three basic items (turbidity, color, and residual chlorine), electric conductivity, pH, temperature, and pressure
 Measurement range switching : Ability to switch between two ranges for both turbidity and color measurements.
 Display : Color LCD touch panel
 Temperature compensation range : 0 to 40 °C for residual chlorine, EC, and pH
 Response time : 90% response within three minutes
 Operating power : 100 to 240V AC $\pm 10\%$, 50/60Hz
 Power consumption : Approx. 60/82 VA (100/240V AC), max. of approx. 85/108 VA (100/240V AC)
 Transmission output : DC 4 to 20 mA, isolated (Negative (-) side is common.)
 Load resistance : 600 Ω or less
 Contact switching output signals : Alarm 1; General alarms (measured value High-High/Low-Low limit alarm, light source error, residual chlorine motor error, sensor error, and start-up mode error)
 Alarm 2; General alarms (concentration upper/lower limit alarm, water temperature compensation error, and auto calibration error)
 Maintenance; When in ST-BY mode Event; During auto cleaning, during auto calibration, and during problem diagnosis (Contact capacity for all of the above; 24 VDC 0.2A resistance load)
 Power cut off; The contact is closed when a power failure occurs. (Contact capacity; 30 VDC 0.2A resistance load)
 Contact switching input signals : Cleaning command; Start cell window cleaning (turbidity/color)
 Calibration request; Start automatic zero calibration (turbidity/color/residual chlorine) (Resistance load; 200 Ω or less, Pulse duration: 500mS or greater)

Communication system : RS232C interface or RS485 interface (isolated)
 Communication speed; 9600 BPS
 Synchronous system; Start-stop synchronization
 Control system; Half-duplex communication system
 One line for communication (dedicated cable or connector), one line for maintenance (D-SUB connector)
 Save functionality : Data such as measurements can be transferred to a memory card. They can also be processed by a computer.
 One minute measurement values can be stored in 3-month intervals, and one hour values can be stored in 1-year intervals.
 Sample water conditions : No suspension or stagnation.
 Quality; Ensures that the water quality (excluding the items below) satisfies the water quality standards set by the Water Law or falls within the measurement range of this unit.
 Temperature; 0 to 40 °C (no freezing)
 Pressure; 0.05 to 0.75 MPa
 pH; 5.5 to 8.6 pH (maximum fluctuations; 1 pH)
 EC; 8 mS/m (80 μ S/cm) or greater
 Flow rate; 50 to 100 mL/min
 Sample consumption : 4.5 m³/month or less (9 m³/month, including a by-pass flow of 100 mL/min)
 Wetted part materials : Polyurethane, PP, acrylic, stainless steel, FKM, etc.
 Piping end connection : Sample water inlet; Rc 1/4
 Drain outlet; Rc 1/4
 Calibration solution inlet; Rc 1/4
 Air purge; Rc 1/4
 Installation : Mounted on a wall or rack
 Wiring end connection : Two water-proof connectors
 A power supply cable and I/O signal cable (3-meter) are also included.
 Ambient conditions : 0 to 40 °C (no freezing), 85% RH or less (no condensation)
 Weight : Approx. 11 kg

Construction : Indoor installation (IP43 equivalent)
Case material : Aluminum
Color : Light gray (Munsell 5PB 8/1 equivalent)
Automatic calibration : Zero calibration for turbidity, color, and residual chlorine. The internal timer and an external contact signal are used to start calibration.
 (Zero water is prepared by filtering sample water through a zero water filter.)
 Calibration cycle setting; 0 to 24 hours (freely specified)
 Calibration time; Approx. 13 min. (fixed)
 Transmission output hold time during calibration; Calibration time approx. 13 min. + 9 min. (fixed)

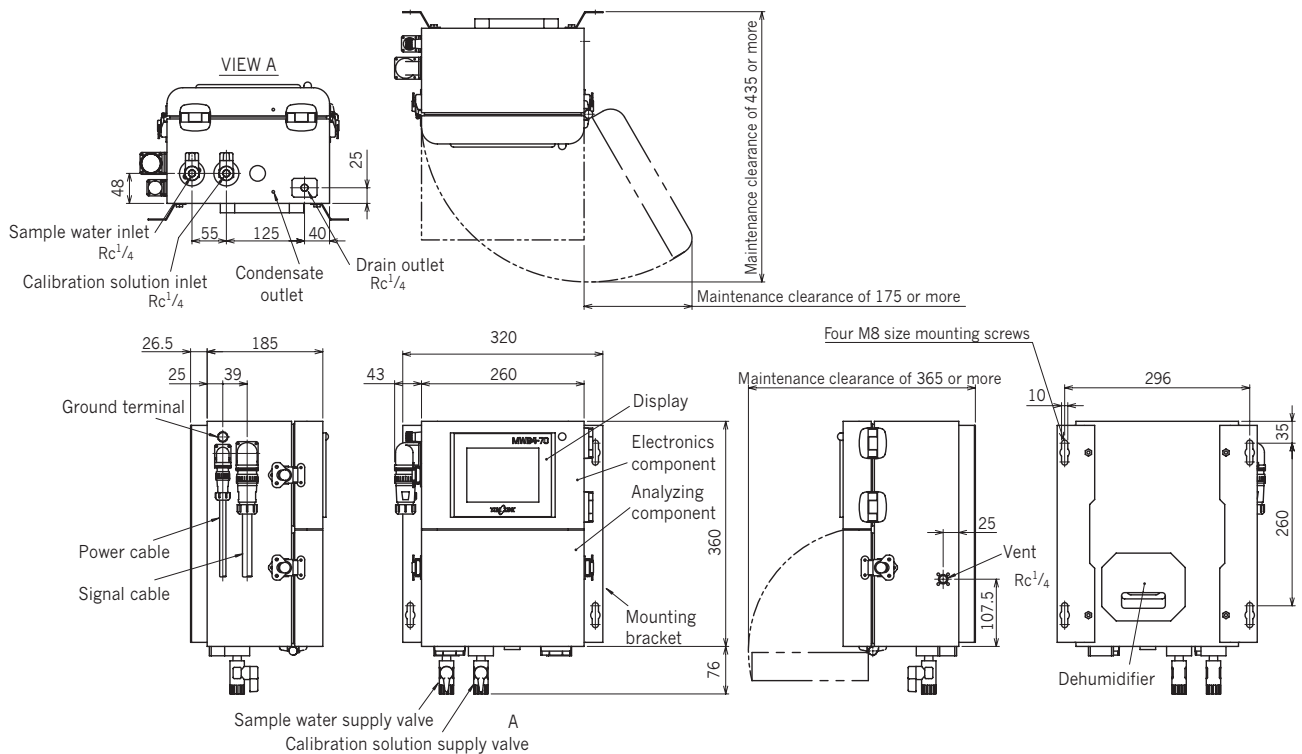
Automatic cleaning : The internal timer and an external contact signal are used to start backwashing (by draining the water) to clean the cell window for turbidity and color measurements. Cleaning cycle setting: 10, 15, 20, 30, or 60 min.

Transmission output hold time during cleaning; Cleaning time approx. 2 min. + 1 min. (fixed)

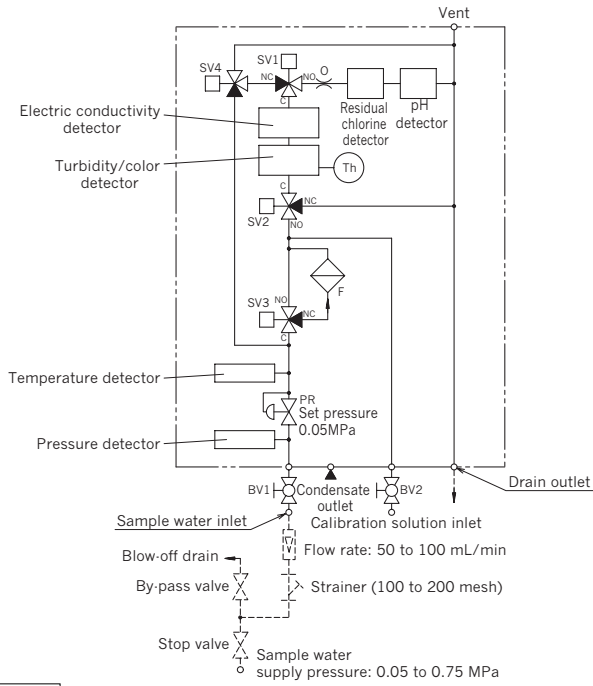
Beads cleaning of residual chlorine electrode by self-rotation

Options : Indoor self-standing frame (pre-assembled, piping pre-installed)
 Outdoor cubicle (temperature-controller included)
 Water sampling unit for abnormal time
 Internal leakage detection unit

Dimensions Unit : mm



Flow sheet

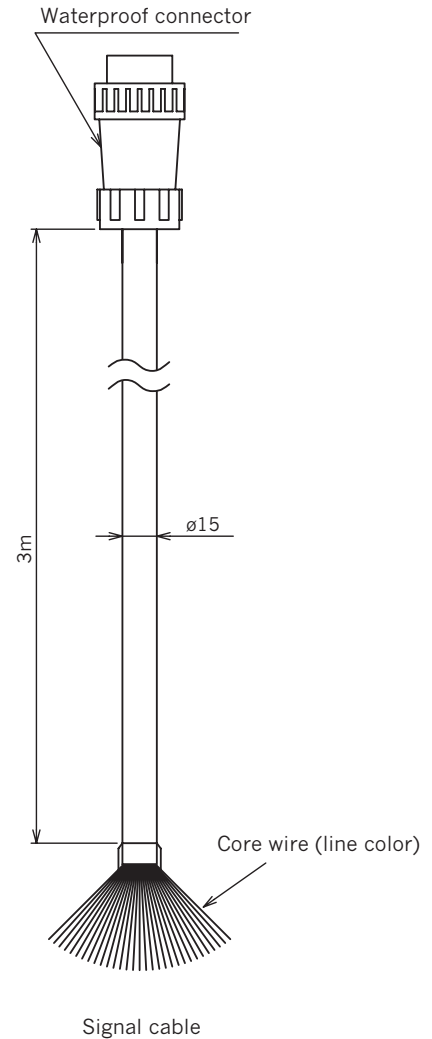


No.	Description
BV	1Sample water supply valve
BV2	Calibration solution supply valve
SV1	Wash water solenoid valve
SV2	Drain solenoid valve
SV3	Zero water switching solenoid valve
SV4	Vent solenoid valve
Th	Temperature compensation sensor
F	Zero water filter
PR	Water pressure reducing valve
O	Orifice

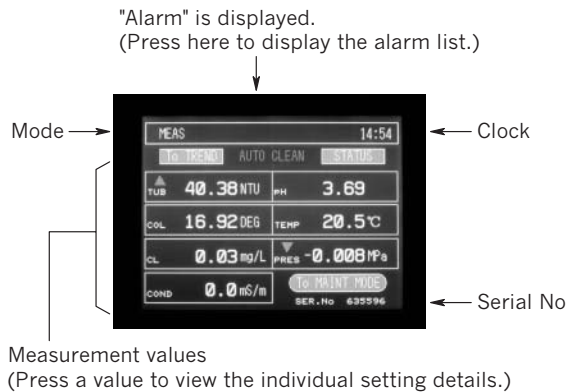
Detectors for specified measurement items can be added (Maximum seven items).

Input/Output Signal Table

Connector No.	Line color	Signal type	Signal description
1	Black	Analog output DC 4 to 20mA	+ Turbidity measurement value
2	White/ Black		-
3	Red		+ Color measurement value
4	White/ Red		-
5	Green		+ Residual chlorine measurement value
6	White/ Green		-
7	Yellow		+ Electric conductivity measurement value
8	White/ Yellow		-
9	Brown		+ pH measurement value
10	White/ Brown		-
11	Blue		+ Water temperature measurement value
12	White/ Blue		-
13	Gray		+ Water pressure measurement value
14	White/ Gray		-
15	Orange	Contact input (Pulse)	Cleaning command
16	White / Orange		Calibration command
17	Purple		Spare 1
18	White / Purple		Spare 2
19	Bright green	Contact output (Status)	COM
20	White / Bright green		COM
21	Peach		Alarm 1
22	White / Peach		Alarm 2
23	Azure		Maintenance
24	White / Azure		Event
25	White	Spare (for option)	
26	Black/ White	Analog input DC 4 to 20mA	Power cut off
27	Black / Green		+ Converted to digital output
28	Red/ Green		- Flow meter, water gauge, etc.
29	Black / Yellow		R x D
30	Red/ Yellow	Digital output RS-232C	T x D
31	Black / Brown		COM
32	Red/ Brown	None	
33	Black / Blue		
34	Red/ Blue	Digital output RS-485	+ COM
35	Black / Gray		-
36	Red/ Gray		
37	Shielding wire	Grounding	D-type



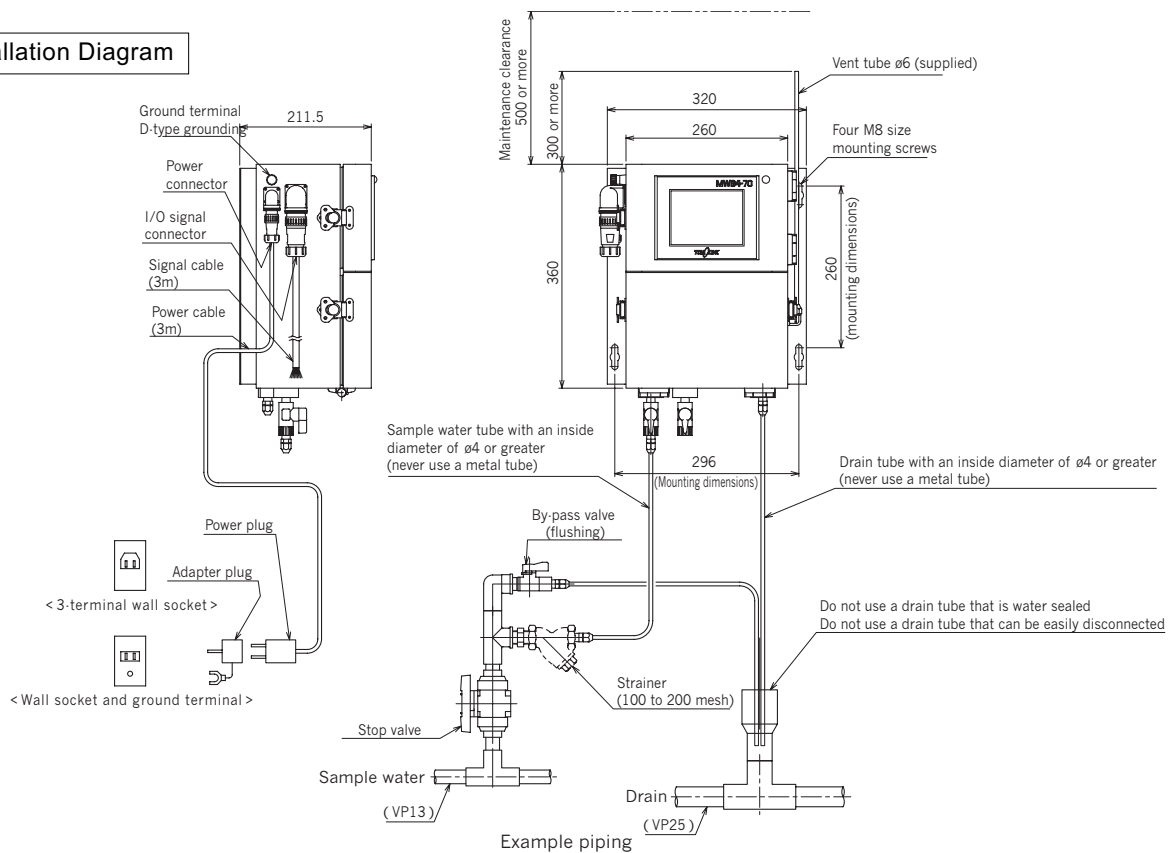
Touch panel and control screen



If you press word or numeric displayed on the left screen, the screen will be switched over or the selected task will be executed.

Entry displayed	Description
Measurement values	Displays the real-time measurements for each item during automatic measurement.
Mode	Displays "Measuring" or "Maintenance".
Clock	Displays the time.
Alarm	Displays "Alarm" when an alarm is issued.
Serial No.	Displays the serial number.
Go to Trend	Pressing this button graphs the trends in the data.
Status	Pressing this button displays the auto-cleaning and calibration settings.
Go to Maintenance Mode	Pressing and holding this button brings up the Maintenance Mode screen.

Installation Diagram



1. Installation conditions

Install the analyzer in a location that satisfies the following criteria:

- A location that is not exposed to rain, wind, or direct sunlight.
- A location where sample water meeting "4. Sample water condition" such as temperature and pressure etc. mentioned below, can be drawn.
- Vibration-free location
- A location where an electric device causing electric noise is not placed near by.
- A location with sufficient space around the analyzer that allows for safe and easy access during maintenance.

2. Mounting

The analyzer is designed to be hung on a wall or mounted on hooks. Before mounting the analyzer, make mounting holes in the wall, and then use four M8 screws to fix the unit in place. Make sure the upper surface of the main unit is horizontally level.

Weight: Approx. 11kg

3. Piping

- Use tubes for the sample water and drain piping to minimize the load applied on the valves of the main unit.
- Because pressure is applied to the piping on the supply side, use metal connectors (stainless) for the tube joints.
- Install both a stop valve and by-pass valve (which is also used for

flushing) on the supply side. Although the minimum required flow rate is between 50 to 100 mL per minute, we recommend maintaining a flow rate of 100 to 200 mL per minute for the water* flowing through the by-pass valve. *Water that initially flows from the faucet. (This prevents water from stagnating and leads to shorter response times, resulting in more accurate measurements.)

























Depending on the quality of the sample water, a strainer (100 to 200 mesh) can also be installed when needed.

- Make sure the end of the drain pipe is open to the atmosphere.
- Specify a length of pipe between the measurement point to the analyzer that enables the sample water to reach the analyzer in 3 to 5 minutes. Example: Approx. 3 to 5 meters at 13A (ø4 x ø6 size tubes, no greater than 3 meters)

4. Sample conditions

















- No suspension or stagnation.
- Consistent with the quality standards for city water set by the Water Law.
- Temperature: 0 to 40°C (no freezing)
- Pressure: 0.05 to 0.75 MPa
- Flow rate: 50 to 100 mL/min
- If air bubbles excessively mingled into sample water, it is required to arrange de-bubbling process in the preceding step to analyzer such as arrangement of bypass.

Standard accessories list

No.	Code No.	Part name	Sketch	Qty	Remarks
1	145A	Instruction manual		1	
2	145B	Inspection report		1	
3	104A288	Glass tube fuse 250V, 630mA		1	
4	123G031	Ceramic beads ø0.5 10g		1	
5	118G130	Power cable		1	3m long
6	118C504	Adapter		1	Adapter for the power cable
7	7127830K	Signal cable		1	3m long
8	59341000	Calibration solution tank 2L		3	
9	136C057	Beaker 100mL		3	
10	136C019	PP wash bottle 500mL		1	
11	143F192	pH 6.86 standard solution LPB-A008 500mL		1	Only when the pH measurement is included
12	143F193	pH9.18 standard solution LPB-A014 500mL		1	Same
13	6535310K	Span calibration tube assembly		1	
14	143C140	Silica-gel 10g blue		1	
15	141D002	Silicon grease (for high vacuum)		1	
16	115A569	O-ring S22.4		2	Dryer case and cover
17	115A448	O-ring S28		1	CL beads case
18	115A030	O-ring P12		1	Only when the pH measurement is included
19	115A035	O-ring P15		1	Same
20	117B409	Vent fitting		1	
21	116B150	PE tube ø4 x ø6		1m	Tube for the open air
22	ELP-071	pH electrode		1	Only when the pH measurement is included
23	72580200	Back-up collar		1	Same
24	72580300	pH collar		1	Same

Spare parts list

*1:Consumables
*2:Parts for periodical inspection
*3:Replacement cycle

No.	Code No.	Part name	Sketch	Quantity			*3	Remarks
				*1	*2	Spare		
1	123G031	Ceramic beads ø0.5 10g			1		1 year	
2	143F061	Buffer powder pH6.86 for 500 mL 5-pack		1				Only when the pH measurement is included
3	143F062	Buffer powder pH9.18 for 500 mL 5-pack		1				Same
4	ELP-065	pH electrode		2			6 months	Same
5	7136950K	Motor for residual chlorine			1		1 year	
6	116E534	Urethane tube ø4 transparent					2m	
7	115A030	O-ring P12		2			6 months	Only when the pH measurement is included
8	115A035	O-ring P15		2			6 months	Same
9	115A448	O-ring S28			1		1 year	CL beads case
10	115A569	O-ring S22.4		4			6 months	Dryer case and cover
11	143C140	Silica-gel 10 g blue		1			6 months	
12	117E611	Fixed orifice					1	
13	136A270	Filter cartridge			1		1 year	Cartridge for the zero water filter
14	143C050	Color standard solution 1000 degrees 100 mL		1				
15	143D039	Turbidity standard solution PS 100 degrees 100 mL		1				
16	143D353	EC check solution 50 mS/m		2				Only when the EC measurement is included.

Special accessories

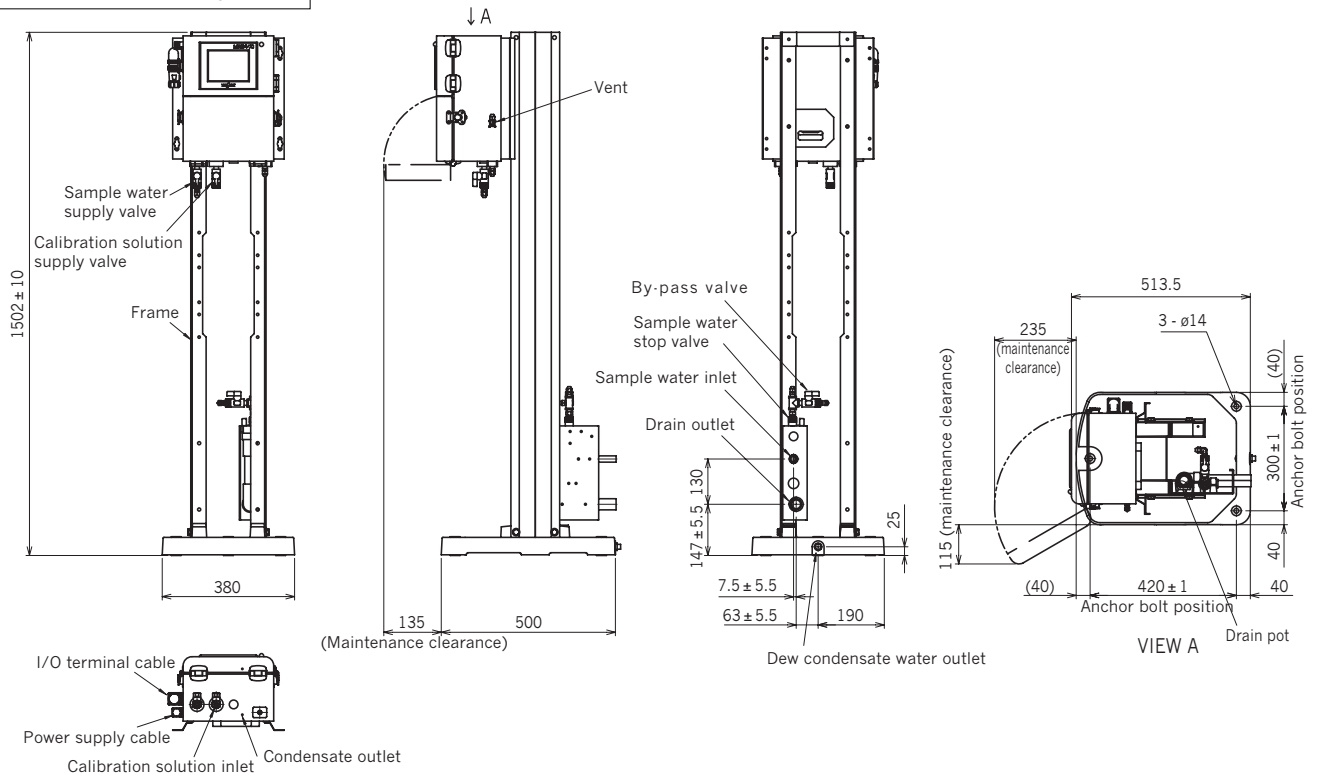
Piping parts (construction materials, sold separately)

Product name	Code No.	Use/Specification
Flow meter	127A629	Sample water, 0 to 200 mL/min
PFA tube	116D303	Sample water, ø4 to ø6 x 10 m
Metal connector	117A506	Sample water inlet, R1/4 SUS316
Insert for metal connector	117B191	
"Half union" (coupling for tubes)	117B405	Drain outlet, R1/4 PP
Y-type strainer	117J985	1/4 SUS316 100 mesh
Flow control valve	126B866	Sample water by-pass, 1/4 PVC

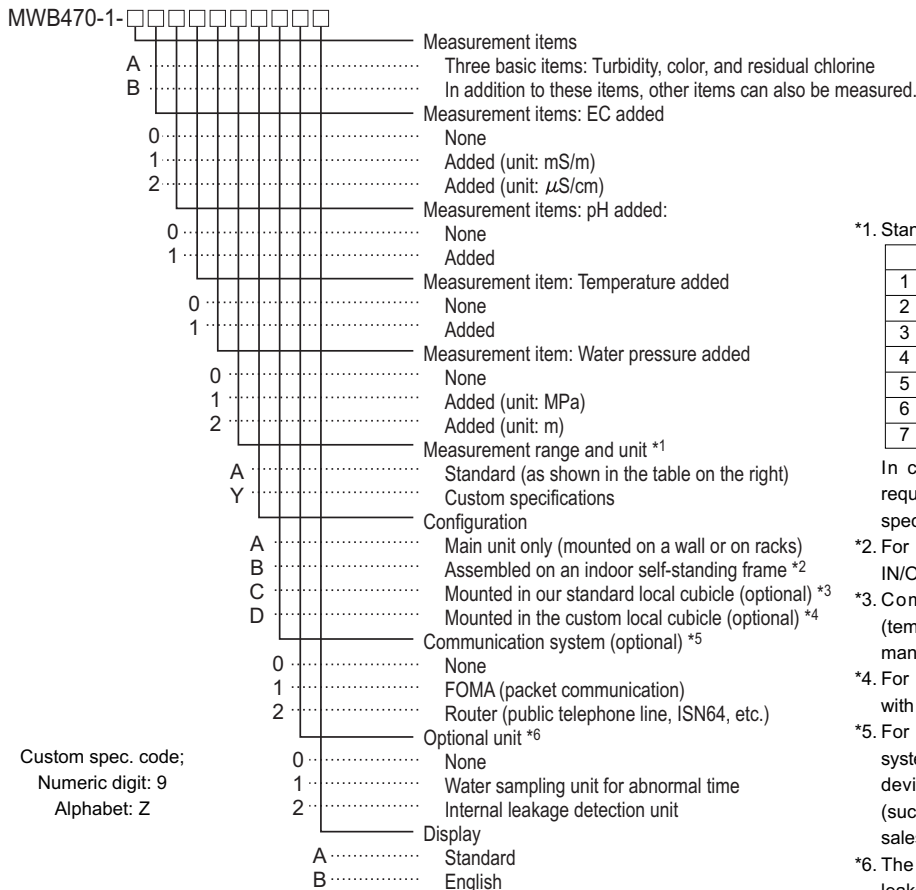
Memory card (dedicated)

Code number: 7135040K (compact flash ASSY)
256 MB (carry case included)

Indoor self-standing frame



Product code



*1. Standard measurement range and unit

	Measurement item	Measurement range/unit
1	Turbidity	0 to 2/4 degrees (dual range)
2	Color	0 to 10/20 degrees (dual range)
3	Residual chlorine	0 to 2 mg/L
4	Electric conductivity	0 to 50 mS/m, or 0 to 500 μ S/cm
5	pH	pH 2 to 12
6	Water temperature	0 to 50°C
7	Water pressure	0 to 1 MPa, or 0 to 75 m

In case that other customers' specifications are required, please contact us regarding availability of such specifications.

*2. For indoor installation. The piping for the sample water IN/OUT and other items are preinstalled.

*3. Compact and designed to be set up outdoors (temperature-controller included). For details about the manufacturing specifications, refer to the next page.

*4. For details about custom specifications, please consult with one of our sales representatives.

*5. For details about available communication equipment, system model names (of the protocol converter and other devices) and data processing software specifications (such as for MEX2000), please consult with one of our sales representatives.

*6. The water sampling unit for abnormal time or internal leakage detection unit can be added as an option.

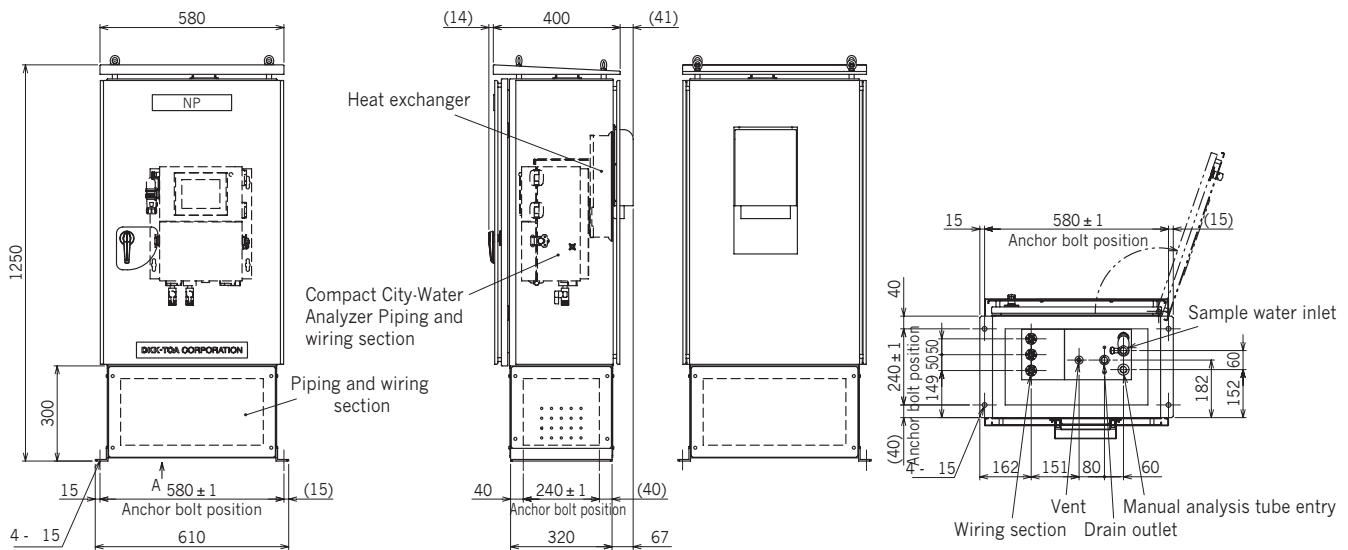
Manufacturing specifications for standard outdoor cubicle

This is our standard compact outdoor cubicle used to house the MWB4-70. It can also be used to house communication equipment.

Construction : IP23D, rainproof for outdoor use (sun shade included)
 Front door (doorstop included)
 Materials : SS400 (steel), SPCC (sheet steel)
 Board thickness : L40 x t5 (SS400), t2.3 (SPCC)
 Surface finish : Metallic silver, semi-gloss
 Acrylic paint baked-on finish (cubicle), polyurethane paint baked-on finish (sun shade)
 Power requirements : AC Line \pm 10% 50/60 Hz.
 Power consumption : Max. 300 VA including MWB4-70 (consumption varies depending on the ambient temperature.)
 Wiring end connection : Three G3/4

Piping end connection : Sample water inlet; Rc1/2
 Drain outlet; Rc 1/2
 Weight : Approx. 130 kg (including MWB4-70)
 Wetted part materials : SUS304, rigid PVC, PFA tube
 Ambient conditions : -5 to 40°C, 85% RH or less (no freezing)
 Equipped devices :

Product name	Rating
Heat exchanger	Max. 300 W
Dehumidifier	—
Panel heater	Max. 200 W
Breaker	5 AT
Lightning protection transformer	300 VA
Door handle	Key No. 2002



NP (equipment name plate):
 Please provide the information to be inscribed on the plate.



DKK-TOA CORPORATION



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