

pH TRANSMITTER (INTRINSICALLY SAFE pH TRANSMITTER)

SHBM-161

ORP TRANSMITTER (INTRINSICALLY SAFE ORP TRANSMITTER)

SHBM-163

The SHBM-161 is a 2-wire pH analyzer/transmitter housed in a compact, aluminum die-cast enclosure. The SHBM-163 is a 2-wire ORP analyzer/transmitter housed in the same type of enclosure as the SHBM-161.

These two intrinsically safe devices both feature a rugged construction that is explosion-proof grade Exia II CT4 and consistent with IP65 standards.



## Features

One-touch automatic stability judgment function to eliminate operating errors, allowing for accurate calibrations (check) with standard solutions. Transmitter automatically judges the electrode character during calibration and displays the results on the screen.

9 water-resistant switches on the outside of the front panel, making it possible to conduct routine maintenance operations without opening the enclosure.

Equipped with a wide range of analyzer/transmitter functions, such as pH electrode crack detection, temperature compensation for sample pH values, and pH/ORP value shift.

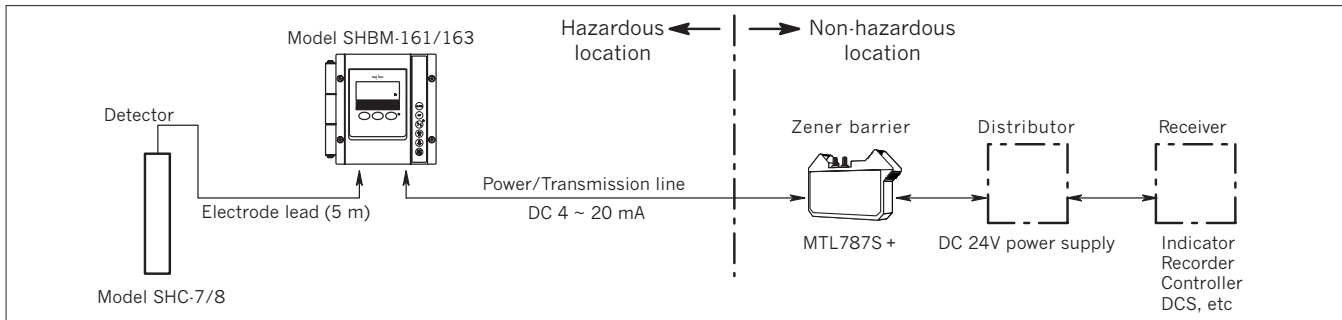
In maintenance mode(ST-BY) output signal would be held. It could not disrupt control system like chemical feed.

Unit automatically switches back to measurement mode after two hours in maintenance mode (ST-BY).

## Specifications

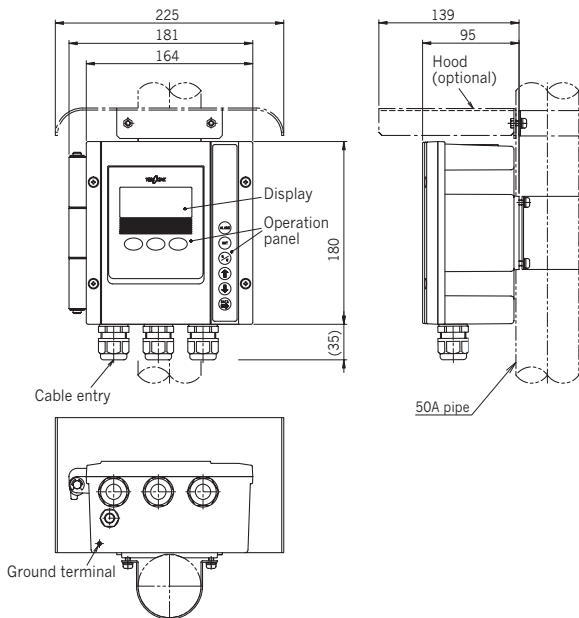
Product Name	Intrinsically Safe pH Analyzer/Transmitter	Intrinsically Safe ORP Analyzer/Transmitter
Model	SHBM-161	SHBM-163
Explosion-proof type	Exia II CT4, System Model: SHBM-2-1, TIIS Certification Number: TC18098	
Measurement display range	pH: -1.00 ~ 15.00pH (mV: -600 ~ +600 mV, Temp: 0 ~ 100°C)	mV: -2000 ~ +2000 mV (Temp: 0 ~ 100°C)
Power supply / Power consumption	2-wire system, 24 V DC (17.1 ~ 25.5V DC, depending on load resistance) 0.6 VA or less	
Transmission output	4 ~ 20 mA DC, isolated. Max. load resistance: 340 Ω(when using the Zener Barrier MTL787S+)	
Transmission output range	Adjustable in 0.1 pH steps, with a minimum width of 2 pH	Adjustable in 10 mV steps, with a minimum width of 400 mV
Performance	Linearity: Within ±0.03 pH (equivalent input) Repeatability: Within ±0.02 pH (equivalent input)	Linearity: Within ±4 mV (equivalent input) Repeatability: Within ±3 mV (equivalent input)
Construction	Outdoor installation, dust/jet-proof (IP65)	
Case material and color	Case Material: Aluminum die-cast alloy Paint color: Metallic silver (Display keypad, operation panel: Polyester resin, Munsell N1.5)	
Mounting	Mounted on a 50A pipe, wall, or rack mount	
Ambient temperature / humidity	-20 ~ 55°C, 0 ~ 95% RH (when in transport and storage: -30 ~ 65°C, 0 ~ 98% RH)	
External dimensions/Weight	181 (W) x 180 (H) x 95 (D) mm, Approx. 2 kg	
Other functions	Temperature compensation for sample pH value: Temperature coefficient setting range: ±0.100pH/°C, Standard temperature : 25°C Manual temperature compensation for glass electrode: By setting the sample water temperature. pH/ORP value shift: ±1.00 pH/±100 mV. (Shift width for temperature: ±5°C) Burnout: The output signal would be shifted to the upper limit when problems occur, such as when the glass membrane cracks or the temperature sensor fails.	

## Configuration

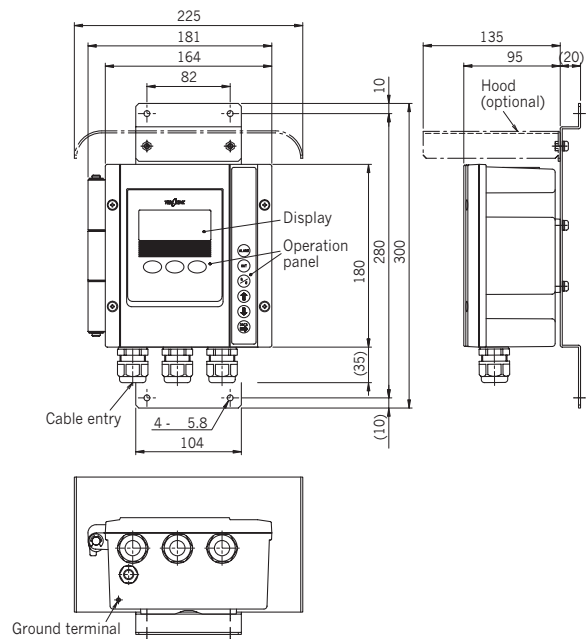


## External Dimensions

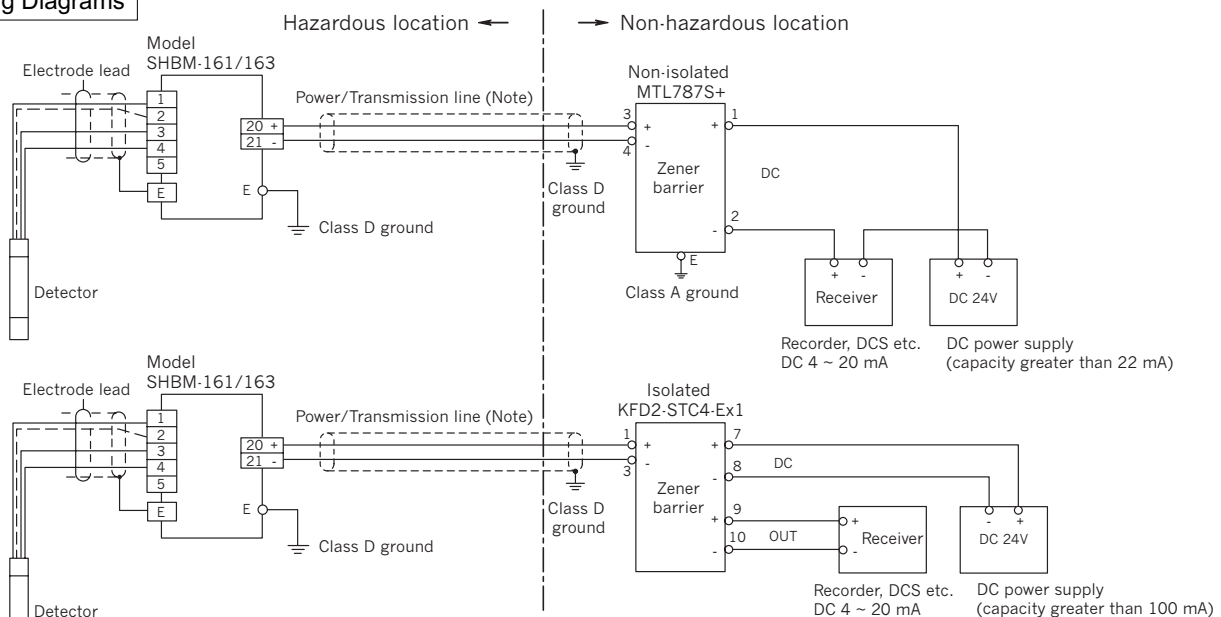
### Mounted on 50A pipe



### Mounted on a wall or rack



## Wiring Diagrams



Notes: 2-core shielded cable inductance: Less than 0.5 mH  
 2-core shielded cable capacitance: Less than 0.04 μF

CVVS: 2 x 2C (reference value) Max. 260 m  
 CVVS: 1.25 x 2C (reference value) Max. 320 m  
 CEES: 2 or 1.25 x 2C (reference value) Max. 480 m

Applicable Zener barriers

The five following Zener barriers are available. We recommend the MTL787S+ model.

Model	Manufacturer	Code No.	Remarks
MTL787S+	MTL	134G832	Non-isolated
9002/13-280-093-00	R.Stahl	134G836	Non-isolated
MTL5041	MTL	134G839	Isolated
KFD2-STC4-Ex1	P&F	134G838	Isolated
9303/13-22-11	R.Stahl	134G837	Isolated

\* A non-isolated barrier must be independently grounded at a grounding resistance of less than 10Ω (Class A grounding). Our PA-24 or BMR-24 power supply unit can be used.

\* There is no need to independently ground the isolated barrier at a grounding resistance of less than 10Ω (Class A grounding). However, our PA-24 and BMR-24 power supply units cannot be used because they lack sufficient output current capacity. You must prepare a power supply unit with an output current capacity of 100 mA (per unit) or greater. We recommend the HDC1-K (Code No. 134C620) power supply unit manufactured by M-System Co., Ltd.

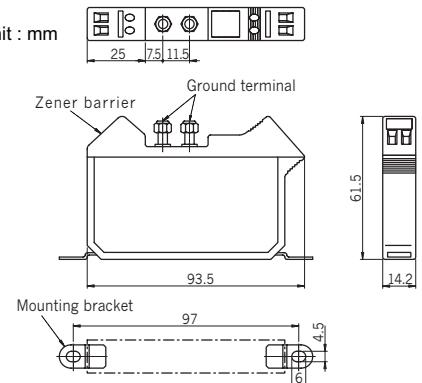
Model : MTL787S+ (recommended barrier)  
 Manufacturer : MTL  
 Voltage rating : 24 V DC  
 Max. voltage of intrinsically safe circuit : 28 V  
 Internal fuse rating : 50 mA

Notes:

- \*1: Grounding must be conducted at a grounding resistance of less than 10Ω (TIIS Class A grounding work).
- \*2: An input voltage greater than the operating voltage may result in increased leakage current.
- \*3: Note that a load short-circuit, an input voltage greater than the Zener voltage rating, or an electrical connection with reversed polarity may result in Zener diode conduction or cause an internal fuse to open. If these problems occur, the unit may be damaged beyond repair.

Dimensions

Unit : mm



Product code

SHBM161-0-	□□□□□□	Transmission output range (4 ~ 20 mA DC)
A	.....	0~14pH
B	.....	0~10pH
C	.....	0~ 8 pH
D	.....	2~12pH
E	.....	4~14pH
F	.....	4~10pH
G	.....	6~14pH
Y	.....	Custom spec.*1
	.....	System model
A	.....	SHBM-2-1
Y	.....	NA (non-explosion proof 2-wire type)*2
	.....	Power/Transmission cable entry*3
0	.....	Cable gland for ø6 ~ 12 cable
1	.....	Conduit thread G1/2
2	.....	Conduit thread NPT1/2 supplied with adapter
	.....	Surface finish (coating)*4
A	.....	Standard coating
B	.....	Heavy-duty coating
	.....	Mounting bracket
A	.....	For mounting on 50A pipe
B	.....	For mounting on rack or wall
	.....	Hood (sunshade)
0	.....	None
1	.....	Equipped
	.....	Marking
A	.....	Standard(Japanese)
B	.....	English

SHBM163-0-	□□□□□□	Transmission output range (4 ~ 20 mA DC)
A	.....	±200mV
B	.....	±500mV
C	.....	±700mV
D	.....	±1000mV
E	.....	±1400mV
F	.....	±2000mV
G	.....	0~+1000mV
H	.....	0~+1400mV
Y	.....	Custom spec.*1
	.....	System model
A	.....	SHBM-2-1
Y	.....	NA (non-explosion proof 2-wire type)*2
	.....	Power/Transmission cable entry*3
0	.....	Cable gland for ø6 ~ 12 cable
1	.....	Conduit thread G1/2
2	.....	Conduit thread NPT1/2 supplied with adapter
	.....	Surface finish (coating)*4
A	.....	Standard coating
B	.....	Heavy-duty coating
	.....	Mounting bracket
A	.....	For mounting on 50A pipe
B	.....	For mounting on rack or wall
	.....	Hood (sunshade)
0	.....	None
1	.....	Equipped
	.....	Marking
A	.....	Standard(Japanese)
B	.....	English

\*1: SHBM-161: Specify the output range in 0.01 pH steps at a minimum width of 2 pH, with a range of -1.00 to 15.00 pH.

SHBM-163: Specify the output range in 1 mV steps at a minimum width of 400 mV, with a range of -2000 to +2000 mV.

\*2: Select "NA" if you do not need explosion proofing (no Zener barrier). In this case, use this unit as an ordinary 2-wire pH/ORP analyzer/transmitter.

\*3: Standard cable glands are also supplied, even when the conduit thread is selected in the specifications.

Standard: Cable glands for ø6 ~ 12 cable (3 ports)

G1/2: Conduit threads G1/2 when cable gland is removed.

NPT1/2: Remove the cable gland, then set the NPT1/2 adapter that is included.

\*4: Standard coating: Melamine primer and topcoat. Average film thickness: Greater than 30µm

Heavy-duty coating: Epoxy primer and middle coat, polyurethane resin topcoat. Average film thickness: Greater than 100µm

Applicable detectors

	Application	Model	Wetted part material	pH electrode	ORP electrode
Immersion type  KCl supply type	General purpose use (80°C or lower)	SHC-763	PP FKM	5600 5601(high-temperature use)	2600
	General purpose use (60°C or lower)	SHC-703	PVC FKM	5600 5605(hydrofluoric acid-resistant)	Same
	High temperature use Chemical resistant	SHC-703 (F)	PVDF FKM	5601	—
	Organic solvent-resistant	SHC-703 (T)	PFA Perfluor	5602	—
KCl non-supply type	General purpose use (50°C or lower) (drop-in type)	SHC-N76	PP	5910	2910
		SHC-N72	SUS316	Same	Same
		SHC-N90	PVC SUS316	Same	Same
Flow-through type  KCl supply type	General purpose insertion type	SHC-880	PP FKM	5610	2610
	with PP case	SNHC-882	Same	Same	Same
	with SUS case	SNHC-883	PP SUS316 FKM	5610, 5611( high-temperature use)	Same
	For boiler and pure water Micro flow rate type	SHC-64	Acrylic FKM	MG511, 4164, 6149	—
	Fermentation use insertion type	SHC-81	SUS316 FKM	5507	6480
	High temperature use Supplied with SUS case	SHC-813	Same	5500	—
KCl non-supply type	General purpose use (50°C or lower)	SHC-N86	PP	5910	2910
	General purpose use (50°C or lower)	SHC-N82	SUS316	Same	Same

Applicable cleaners (flameproof construction)

Model	Method	Applicable detector
SUHCC-70	Immersion ultrasonic cleaning (TIIS Certification No. 38232)	SHC-763, SHC-703
SUHC-813	Flow-through ultrasonic cleaning (TIIS Certification No. 38233)	SHC-880
SJH-7A	Immersion water-jet cleaning (using flameproof electromagnetic valve)	SHC-763, SHC-703
SRH-7A	Immersion chemical cleaning (using flameproof electromagnetic valve)	Same Same
SBJH-7A	Immersion water-jet/brush cleaning (using flameproof electromagnetic valve)	Same Same
SJH-8A	Flow-through water-jet cleaning (using flameproof electromagnetic valve)	SHC-880



**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