User's Manual

Model PH8USF
ULTRASONIC OSCILLATOR
(Explosionproof Type)
Model PH8AL ALARM BOX

IM 12B5U2-E

YOKOGAWA ◆

Yokogawa Electric Corporation

IM 12B5U2-E

5th Edition

◆ INTRODUCTION

This user's manual describes instructions for handling of the PH8USF ultrasonic oscillator, including procedures for installation, operation, inspection and maintenance. Also, information necessary for you to further understand the product is described as required.

For handling of an ultrasonic vibrator for use together with this apparatus, refer to the user's manual attached to the instrument with the ultrasonic vibrator built in.

Model	Title	IM No.
PH8HSF	Submersion Type Holder	IM 12B07M01-01E
PH8HFF	Flow-Through Type Holder	IM 12B07N01-01E

An exclusive User's Manual might be attached to the products whose suffix codes or option codes contain the code "Z" (made to customers' specifications). Please read it along with this manual.

In continuous water quality measurement, pollutive components sticking to the sensor of a water quality meter is one of the causes of inaccurate measuring results. Therefore, cleaning of the sensor is an indispensable maintenance item for a lot of water quality meters.

Ultrasonic cleaning is one of methods for cleaning sensors. The major strong point of ultrasonic cleaning is that you can continuously perform it while making measurement. Ultrasonic cleaning has cleaning effect on most of pollutive components. Water quality meters mean pH or ORP meter.

The PH8USF ultrasonic oscillator is an apparatus for supplying an ultrasonic vibrator, built in a water quality meter, with high-frequency energy.

Below is the description of what you should do before use of the apparatus and what you should understand before reading this instruction manual.

● Specification check

Unpack your ultrasonic oscillator with care, and check for any damage that may be caused during transport.

The PH8USF ultrasonic oscillator is fabricated to the customer specifications. For precautionary purposes, check to see that your ultrasonic oscillator is in accordance with your specifications, and that there is no missing accessory. Use the model codes indicated on the nameplate to check the specifications of your ultrasonic oscillators. For the meaning of the model codes, refer to Section 2.2.

Precautions Which Must Be Taken when Actuating PH8USF Ultrasonic Oscillator during Inspection

⚠ CAUTION

When actuating the PH8USF ultrasonic oscillator, be sure to connect the ultrasonic vibrator (under load, that is, immersed in fluid) as under normal operating conditions. Operating the ultrasonic oscillator solely (or, with the ultrasonic vibrator under no load connected) may cause some electric parts to be abnormally heated. This is unfavorable in terms of the life of the ultrasonic oscillator.

◆ Safety Precautions

■ Safety, Protection, and Modification of the Product

- In order to protect the system controlled by the product and the product itself and ensure safe operation, observe the safety precautions described in this user's manual. We assume no liability for safety if users fail to observe these instructions when operating the product.

- If this instrument is used in a manner not specified in this user's manual, the protection provided by this instrument may be impaired.

- If any protection or safety circuit is required for the system controlled by the product or for the product itself, prepare it separately.

- Be sure to use the spare parts approved by Yokogawa Electric Corporation (hereafter simply referred to as YOKOGAWA) when replacing parts or consumables.

- Modification of the product is strictly prohibited.

- The following safety symbols are used on the product as well as in this manual.

⚠ WARNING

This symbol indicates that an operator must follow the instructions laid out in this manual in order to avoid the risks, for the human body, of injury, electric shock, or fatalities. The manual describes what special care the operator must take to avoid such risks.

⚠ CAUTION

This symbol indicates that the operator must refer to the instructions in this manual in order to prevent the instrument (hardware) or software from being damaged, or a system failure from occurring.

CAUTION

This symbol gives information essential for understanding the operations and functions.

NOTE

This symbol indicates information that complements the present topic.

■ Warning and Disclaimer

The product is provided on an "as is" basis. YOKOGAWA shall have neither liability nor responsibility to any person or entity with respect to any direct or indirect loss or damage arising from using the product or any defect of the product that YOKOGAWA can not predict in advance.

■ Notes on Handling User's Manuals

- Please hand over the user's manuals to your end users so that they can keep the user's manuals on hand for convenient reference.

- Please read the information thoroughly before using the product.

- The purpose of these user's manuals is not to warrant that the product is well suited to any particular purpose but rather to describe the functional details of the product.

- No part of the user's manuals may be transferred or reproduced without prior written consent from YOKOGAWA.

- YOKOGAWA reserves the right to make improvements in the user's manuals and product at any time, without notice or obligation.

- If you have any questions, or you find mistakes or omissions in the user's manuals, please contact our sales representative or your local distributor.

■ Drawing Conventions

Some drawings may be partially emphasized, simplified, or omitted, for the convenience of description.

Some screen images depicted in the user's manual may have different display positions or character types (e.g., the upper / lower case). Also note that some of the images contained in this user's manual are display examples.

■ Product Disposal:

The instrument should be disposed of in accordance with local and national legislation/regulations.

■ Trademark Acknowledgments

- All other company and product names mentioned in this user's manual are trademarks or registered trademarks of their respective companies.

- We do not use TM or ® mark to indicate those trademarks or registered trademarks in this user's manual.

◆ After-sales Warranty

■ **Do not modify the product.**

■ **During the warranty period, for repair under warranty consult the local sales representative or service office. Yokogawa will replace or repair any damaged parts. Before consulting for repair under warranty, provide us with the model name and serial number and a description of the problem. Any diagrams or data explaining the problem would also be appreciated.**

- If we replace the product with a new one, we won't provide you with a repair report.
- Yokogawa warrants the product for the period stated in the pre-purchase quotation Yokogawa shall conduct defined warranty service based on its standard. When the customer site is located outside of the service area, a fee for dispatching the maintenance engineer will be charged to the customer.

■ **In the following cases, customer will be charged repair fee regardless of warranty period.**

- Failure of components which are out of scope of warranty stated in instruction manual.
- Failure caused by usage of software, hardware or auxiliary equipment, which Yokogawa Electric did not supply.
- Failure due to improper or insufficient maintenance by user.
- Failure due to modification, misuse or outside-of-specifications operation which Yokogawa does not authorize.
- Failure due to power supply (voltage, frequency) being outside specifications or abnormal.
- Failure caused by any usage out of scope of recommended usage.
- Any damage from fire, earthquake, storms and floods, lightning, disturbances, riots, warfare, radiation and other natural changes.

■ **Yokogawa does not warrant conformance with the specific application at the user site. Yokogawa will not bear direct/indirect responsibility for damage due to a specific application.**

■ **Yokogawa Electric will not bear responsibility when the user configures the product into systems or resells the product.**

■ **Maintenance service and supplying repair parts will be covered for five years after the production ends. For repair for this product, please contact the nearest sales office described in this instruction manual.**

Model PH8USF
ULTRASONIC OSCILLATOR (Explosionproof Type),
Model PH8AL ALARM BOX

CONTENTS

1.　Overview

It is desirable that process pH meters can measure accurately and stably for a long time without maintenance. However, the measuring performance deteriorates and time and persons required for maintenance increase due to stains of glass electrode.

To reduce the time and persons, this pH meter performs automatic cleaning. The type of automatic cleaning depends on a property of the stain or operational conditions of pH measuring system. Ultrasonic cleaning, one of the automatic cleanings, has effect to various stains and clean continuously measuring pH value.

Model PH8USF Ultrasonic Oscillator and Model PH8AL Alarm Box are used toper for ultrasonic cleaning for two-wire pH transmission system. The oscillator and the alarm box are components of an explosionproof type ultrasonic cleaner.

1.1　Configuration of an Explosionproof Type Ultrasonic Cleaner
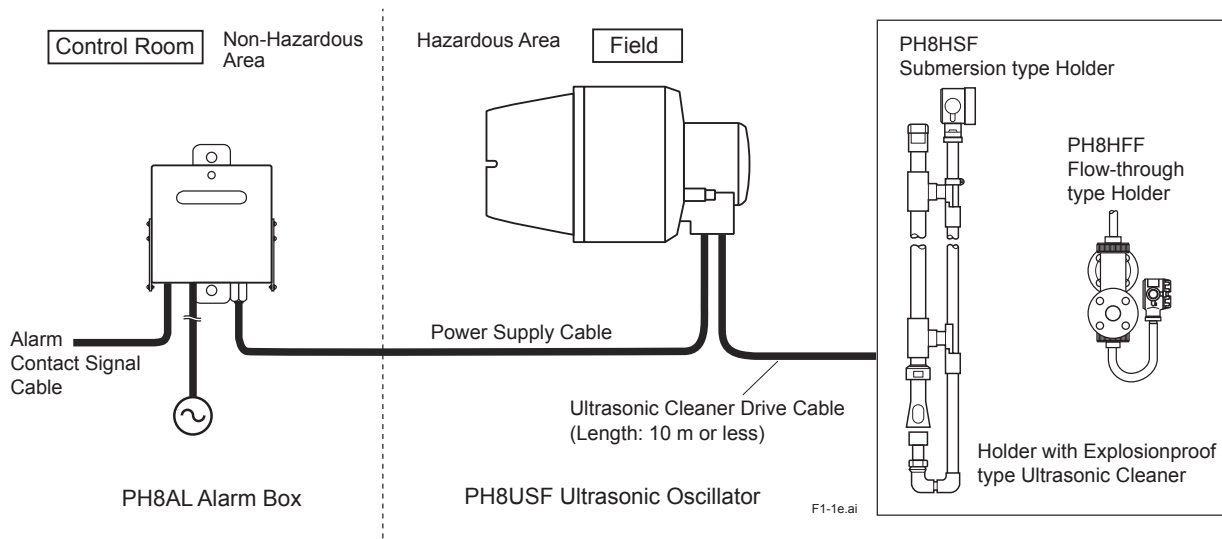
Figure 1.1　　Configuration of an Explosionproof Type Ultrasonic Cleaner

1.1.1　Ultrasonic Oscillator

The ultrasonic oscillator, driven by power supply through the alarm box, supplies sweep method driven energy for an ultrasonic cleaning element.

The oscillator consists of an oscillator function circuit and alarm function circuit. The oscillator function circuit generates high-frequency energy. The alarm function circuit lets overcurrent flow so that a power supply fuse inside of the alarm box is blown when abnormality happens to the ultrasonic cleaning element.

1.1.2 Alarm Box

The alarm box supplies the ultrasonic oscillator with power supply. This alarm box outputs alarm contact signal when the power supply fuse is blown by abnormality of the ultrasonic cleaning element.

1.1.3 Ultrasonic Cleaning Element

By receiving high-frequency energy from the ultrasonic oscillator and radiating ultrasonic wave, the ultrasonic cleaning element prevents the electrode from being stained. The cleaning element can detect abnormality when measured solution enters into the element. This ultrasonic cleaning element is built in a submersion type or a flow-through type holder. Approval type number varies with material.

2. Specifications

2.1 Standard Specifications

2.1.1 Ultrasonic Oscillator PH8USF

Combination device:	Holder with ultrasonic cleaner (PH8HSF, PH8HFF)
	(Note) This oscillator must be used with the Alarm Box PH8AL to provide power circuit interruption and failure alarm contact outputs.
Cleaning method:	Continuous ultrasonic emission (Frequency sweep method)
Oscillation frequency:	Approx. 65 to 80 kHz
Output voltage:	Approx. 150 V
	(Note) Output of ultrasonic oscillator changes with power supply voltage or connected cable length.
Power supply:	100, 110 to 115 (specify voltage) V AC ±10% , 50/60 Hz, 200, 220 to 240 (specify voltage) V AC ±10% , 50/60 Hz
Power consumption:	Approx. 15 VA
Construction:	TIIS flameproof construction (d2G4)
Material:	Case; Aluminum alloy casting
Finish:	Baked epoxy resin
Color: Case;	Munsell 7.5BG4/1.5 equivalent
Weight:	Approx. 9.5 kg
Mounting:	2-inch pipe mounting
Ambient temperature:	-10 to 50°C
Cable inlet:	G 3/4
Cable / Terminal:	

Oscillator to Vibrator; 3-conductor shielded cable, OD 10 to 12 mm, Maximum length 10 m, Selectable by option code /C☐☐

Oscillator to Alarm box; 2-conductor shielded cable, OD 10 to 12 mm, Maximum length 1000 m (see note)

CAUTION

Total resistance of two leadwires should be 10 Ω or less.

Complete grounding for explosionproof areas must be conducted.

2.1.2   Alarm Box PH8AL

Combination device: One to one combination with ultrasonic Oscillator Explosionproof Type PH8USF

Case:	Square shape, panel-back side mounting, dustproof steel plate construction, mounting position.
Coating color:	Gray (Munsell N7.0)
Finish:	Baked melamine resin
Power supply:	100, 110 to 115, 200, 220 to 240 V AC ±10%, 50/60 Hz

(Note) Maximum voltage is 125 V AC when power supply of 110 to 115 V AC is specified, maximum voltage is 250 V AC when power supply of 220 to 240 V AC is specified.

Ambient temperature: -10 to 50°C

Weight: Approx. 2.0 kg

2.1.3   Ultrasonic Cleaning Element

Note: The ultrasonic cleaning element is a component of a flameproof holder (submersion type or flow-through type).

Wetted Part Material:

SUS316 (Holder model; PH8HSF-□-□-T-S3-JS and PH8HFF-□-□-T-S3-JS)

Titanium (Holder model: PH8HSF-□-□-T-TN-JS and PH8HFF-□-□-T-TN-JS)

Hastelloy C (Holder model; PH8HSF-□-□-T-HS-JS and PH8HFF-□-□-T-HS-JS)

Fluorine-contained Rubber (O-ring)

Vibrator: PZT electrostrictor.

2.2 Model and Suffix Codes

2.2.1 Ultrasonic Oscillator

Model	Suffix Code	Option Code	Description
PH8USF	· · · · · · · · · · · · · · ·	· · · · · · · · · · · · ·	Explosionproof type ultrasonic oscillator
Power Supply	-3	· · · · · · · · · · · ·	200 V AC 50/60 Hz
	-4	· · · · · · · · · · · ·	220 to 240 V AC 50/60 Hz specify voltage
	-5	· · · · · · · · · · · ·	100 V AC 50/60Hz
	-7	· · · · · · · · · · · ·	110 to 115V AC 50/60 Hz specify voltage
Explosion Protection	-JS	· · · · · · · · · · · ·	TIIS Flameproof (d2G4)
Style Code	*A	· · · · · · · · · · · ·	Style A
Options	Mounting Bracket	/PM	Pipe mounting bracket
	Connection Cable Between Oscillator and Holder	/C□□	Specify the length in meter □□. No termination e.g. /C03 refers to the cable length of 3 m. Standard cable lengths: 3, 7, 10 m 10 m max.
	Flameproof Packing adapter	/PG2	TIIS flameproof packing adaptor 3/4 inch : 2 pcs
	Tag Plate	/SCT	Stainless steel tag plate

(Note) PH8USF must be used with Alarm Box PH8AL.
For 110 to 115 V AC or 220 to 240 V AC power supplies, specify the voltage when ordering.
Tolerance is ±10 % of the voltage specified.
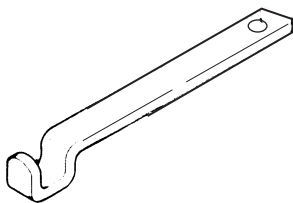Example: Power supply voltage 110 V AC

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2.2.2 Alarm Box

Model	Suffix Code	Option Code	Description
PH8AL	- - - - - - - - - - -	- - - - - - - -	Alarm Box
Power Supply	-3 - - - - - - - - - -	- - - - - - - -	200 V AC, 50/60 Hz
	-4 - - - - - - - - - -	- - - - - - - -	220 to 240 V AC, 50/60 Hz
	-5 - - - - - - - - - -	- - - - - - - -	100 V AC, 50/60 Hz
	-7 - - - - - - - - - -	- - - - - - - -	110 to 115 V AC, 50/60 Hz
Style code	*A - - - - -	- - - - - - - -	Style A
Option		/APC	Air purge connecter Rc1/4

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2.3 Accessories
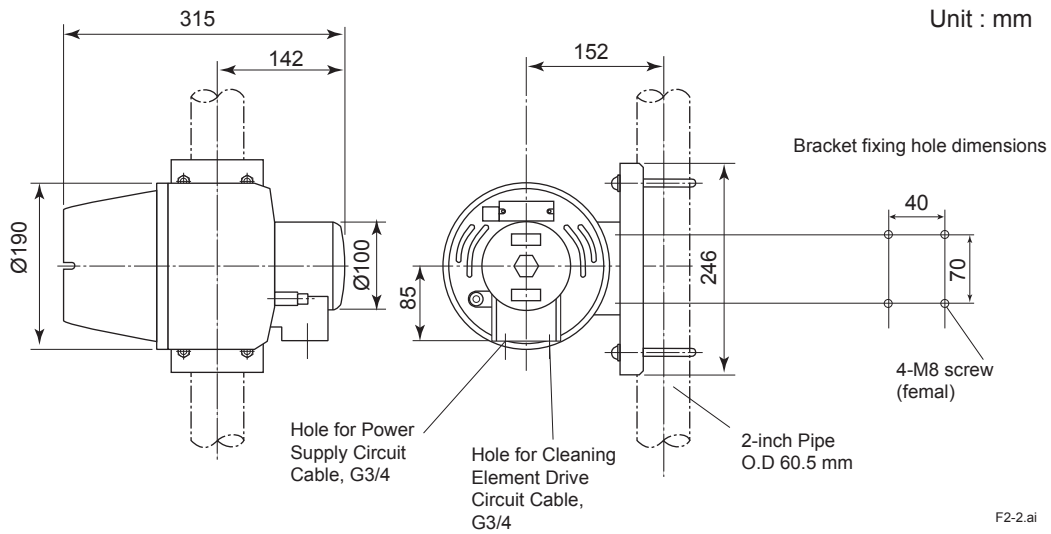
Wrench.... one

This wrench is an exclusive use for operating and closing the terminal box cover.
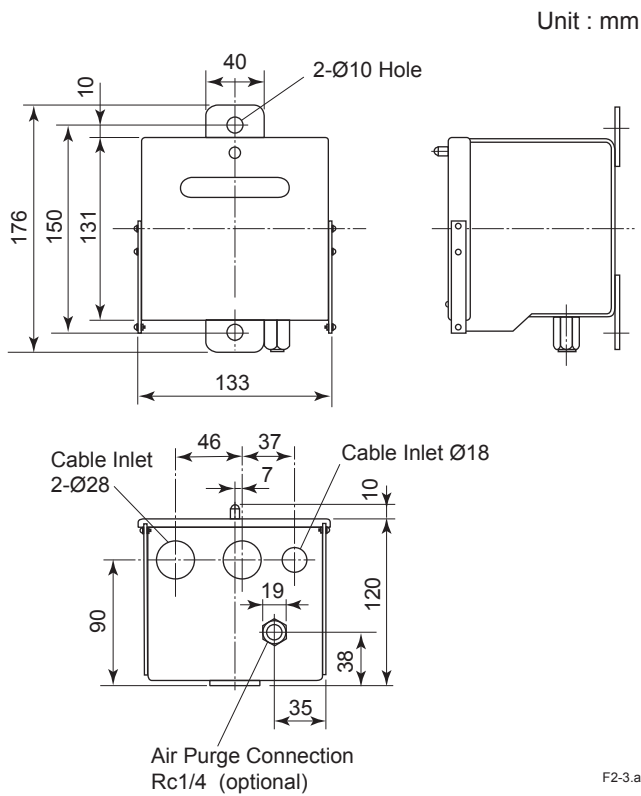
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Figure 2.1   Wrench

2.4   External Dimensions

2.4.1   Ultrasonic Oscillator

Unit : mm

Bracket fixing hole dimensions

Ø190

142

315

Ø100

152

246

85

40

70

4-M8 screw
(femal)

2-inch Pipe
O.D 60.5 mm

Hole for Power
Supply Circuit
Cable, G3/4

Hole for Cleaning
Element Drive
Circuit Cable,
G3/4

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2.4.2   Alarm Box

Unit : mm

40

2-Ø10 Hole

10

176

150

131

133

Cable Inlet
2-Ø28

46   37

7

Cable Inlet Ø18

10

90

120

19

38

35

Air Purge Connection
Rc1/4 (optional)

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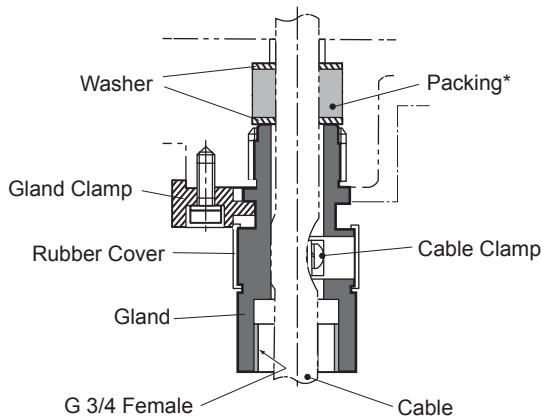
2.5   Optional Parts

2.5.1   Flameproof Packing Adaptor

This adaptor is used for wiring the ultrasonic oscillator by flameproof packing method.

* : Select an appropriate packing from three types
to match an outer diameter of the cable.

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Figure 2.2   Flameproof Packing Adaptor.

2.6   Notes on Using Flameproof Instruments

2.6.1   General of Flameproof Instruments

Flameproof Instruments' conform to the rules and regulations of the public organizations designated to prevent the explosions caused by electrical equipment.

Model PH8USF Ultrasonic Oscillator and Model PH8HSF (submersion type) or PH8HFF (flow-through type) Holder, components of EXA PH series ultrasonic oscillator, are certified as flameproof instruments by the public safety commission in accordance with the Labor Safety & Sanitation Law regulating flameproof electrical equipment in Japan.

Therefore, these models can be used in hazardous locations on condition that the installation and handling methods and the environmental conditions comply with the rules and regulations of the public organization concerned, When using the ultrasonic oscillator or the holder in a hazardous area, strictly observe these applicable rules and regulations, as well as the cautions given on the unit.

The following paragraphs Sec. 2.6.2 to 2.6.5 give some general information regarding the use of flameproof instruments. For further details, refer to the Plant Electrical Equipment Flameproof Guideline (Gas and Vapor) compiled by the Labor Ministry Industrial Safety Research Institute.

2.6.2   Specifications of the Ultrasonic Oscillator and the Holder

The flameproof type name, approval type number, flameproof construction and applicable gas, as well as flameproof specifications such as the working ambient temperature range are indicated on the data plate of the ultrasonic oscillator and the holder with ultrasonic cleaning element.

Explosionproof Instrument Name		Approval Type Number	Explosionproof Construction & Applicable Gas
Ultrasonic Oscillator		No. T32349	TIIS d2G4
Holder with Ultrasonic Cleaner	SUS	No. T32295	TIIS d2G4
	Titanium	No. T32296	TIIS d2G4
	Hastelloy	No. T32297	TIIS d2G4

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2.6.3   Installation Site and Environmental Conditions

Model PH8USF Ultrasonic Oscillator and Model PH8HSF (submersion type) or PH8HFF (flow though type) Holder can be installed and used in a hazardous location containing the gas which is certified to be flameproof, Available locations are indicated on the data plate of the individual units.

However, do not install the units in hazardous areas where the explosive gas concentration will remain critically high for an extended period of time.

To maintain the flameproof capability of the units, it is also important that the environmental conditions at the installation site by properly controlled, When installing the units, therefore, take fully into consideration the effects of corrosive gases, moisture and heat, Some of the applicable environmental conditions are indicated on the data plate of the individual units (e.g., ambient temperature range). For others, which are not explicitly indicated on the data plate, follow the conditions stipulated by the authorities concerned. For example, the standard environmental conditions specify an maximum altitude of 1000 m and a humidity range of 45 to 85%RH.

2.6.4   External Wiring

To wire the ultrasonic oscillator and the holder, use either flameproof metallic conduit or flameproof packing.

2.6.5   Maintenance Procedure

⚠ WARNING

If it is necessary to inspect the ultrasonic oscillator and the holder installed in a hazardous location, be sure to deenergize the unit before removing the flameproof covers.

If it is necessary to inspect or service the units while it is energized, move the units to a non-hazardous area beforehand.

As a rule, replacement of parts or repair of flameproof sections should be conducted only to recover the original state both electrically and mechanically.

Ultrasonic cleaning element replacement requires a special attention, An approval type number of holder varies with a cleaning element material. Take care never to replace ultrasonic cleaning element with different material one.

3. Installation and Wiring

3.1 Installation

The PH8USF ultrasonic oscillator can be installed in a hazardous area, but the PH8AL alarm box must be installed in a non-hazardous area.

3.1.1 Installation Site of the Ultrasonic Oscillator

Model PH8USF Ultrasonic Oscillator has a flameproof construction, so it can be installed in a hazardous area (excepting locations where explosive gas is often or normally present). Install the oscillator to a place where meets the following environmental conditions.

(1) As close to the holder with ultrasonic cleaner as possible (10 m or less)
(2) No corrosive gas
(3) Normal temperature with minimal temperature fluctuations (-10 to 50°C)
(4) Low Humidity

3.1.2 Installation Site of the Alarm Box

Model PH8AL Alarm Box is not an explosionproof type, so it cannot be installed in a hazardous area. Install the alarm box inside of the instrumentation panel in the control room or to a place where meets the following conditions.

(1) Normal temperature with minimal temperature fluctuations (-10 to 50°C)
(2) Indoors
(3) No corrosive gas
(4) No (excessive) vibration
(5) Provided with sufficient space for check and maintenance

3.1.3 Mounting the Ultrasonic Oscillator

Mount the ultrasonic oscillator firmly on a rigid vertical 2-inch pipe (OD. 60.5 mm). The oscillator can be also mounted on a bracket. In this case remove the mounting hardware beforehand.
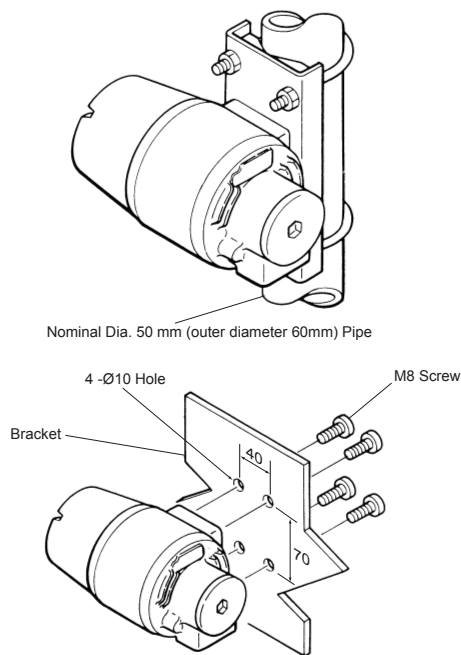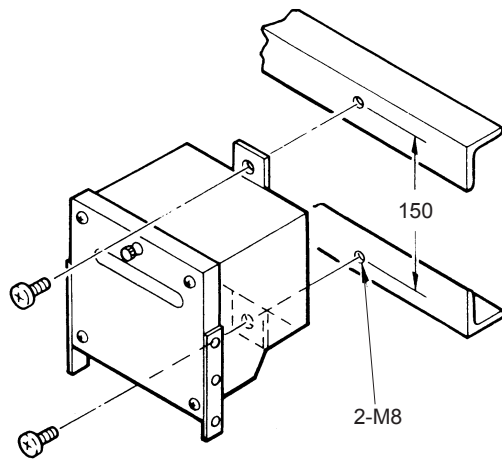

Unit : mm

Nominal Dia. 50 mm (outer diameter 60mm) Pipe

4 -Ø10 Hole
M8 Screw
Bracket
40
70

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Figure 3.1   An Examples of Mounting the Ultrasonic Oscillator

3.1.4   Mounting the Alarm Box

The alarm box can be mounted on a bracket. Mount the alarm box to a place with a sufficient space for ease of check and maintenance.
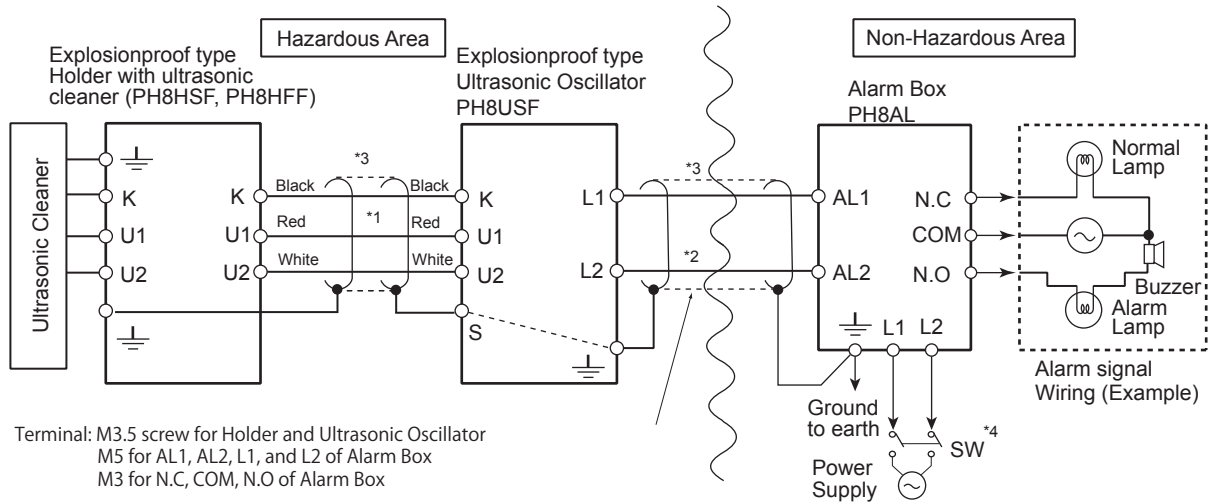

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Figure 3.2   An Example of Mounting the Alarm Box

3.2   Wiring

The wiring for the explosionproof type ultrasonic cleaner (consisting of the holder, the ultrasonic oscillator and the alarm box) are shown below.

- Ultrasonic cleaning element drive circuit wiring

- Ultrasonic oscillator power circuit wiring

- Alarm box power and ground wiring

- Alarm signal wiring

Terminal: M3.5 screw for Holder and Ultrasonic Oscillator
        M5 for AL1, AL2, L1, and L2 of Alarm Box
        M3 for N.C, COM, N.O of Alarm Box

*1: 3-conductor cable of OD 10 to 12 mm. Max. 10 m (e.g. CVV 1.25 mm^2 x 3c)
*2: 2-conductor shielded cable of OD 10 to 12 mm, Max. 1000 m.
    Normal conductor cross-section: 3.5 mm^2 or greater. (total lead resistance not to exceed 10 Ω)
*3: Metal conduit or flexible conduit (only with flameproof packing)
*4: Must prepare a switch for power supply in a panel.

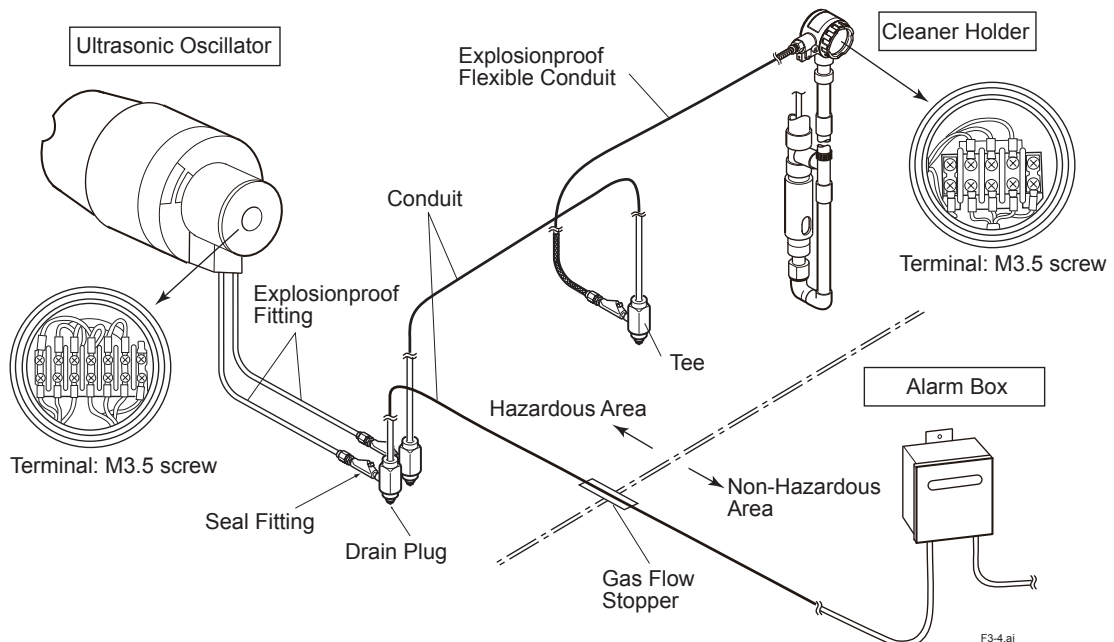**Figure 3.3 Wiring Connections of Explosionproof Ultrasonic Cleaning System**

Figure 3.4 Wiring Example of Explosionproof Cleaner System

3.2.1   Ultrasonic Cleaning Element Drive Circuit Wiring

This cable supplies high-frequency energy for the ultrasonic element and detect abnormality when measured solution enters into the cleaning element.

Use a 3-conductor cable with outer diameter of 10 to 12 mm and nominal cross-sectional area 1.25 cm^2 minimum. This cable should be ordered with the ultrasonic oscillator. To use other cable, intrinsic safety approval is required (e.g., thermoplastic-covered wire).

[Wiring Procedure]

(1) Cable end finish

Remove the insulation jacket approx. 50 mm from the cable trip and furnish each conductor with crimp-on lugs adaptable to 3.5 mm screw.

(2) Wiring using flameproof metallic conduit

Mount an explosionproof fitting to the cable inlet. Engage five thread gauges (at least 12 mm) of the screw and secure the lock nut.
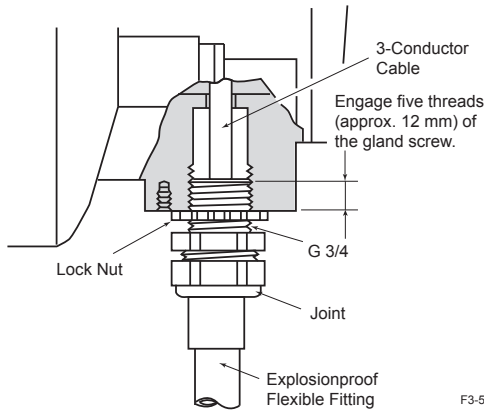

Figure 3.5   Flameproof Metal Fitting Connection

(3) Wiring using a flameproof packing

Wire using a flameproof packing adaptor. Three type packing are supplied with the flameproof packing adaptor. Select the appropriate packing to match an outer diameter of the cable.

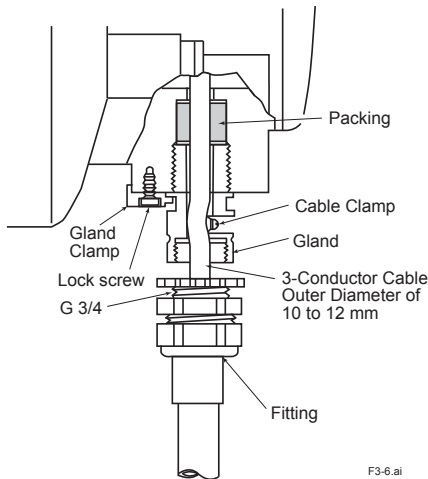| Packing Identification	Cable Finished Outer Diameter (mm)
Brawn	10.0 to 10.7
Green	10.8 to 11.4
White	11.5 to 12.0

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Figure 3.6   Flameproof Packing

3.2.2   Ultrasonic Oscillator Power Circuit Wiring

This cable supplies power supply from the alarm box for the ultrasonic oscillator. If measured solution enters into the ultrasonic cleaning element, flowing current of this circuit will increase and a fuse in the alarm box will be blown.

Use a 2-conductor shielded cable with an outer diameter 10 to 12 mm and nominal sectional area at least 3.5 mm^2.

Note: The cable length is maximum 1000 m and loop resistance is 10Ω or less.

[Wiring Procedure]

(1) Cable end finish

Remove the insulation jacket approx. 50 mm from the cable tip and solder the ground leadwire onto the exposed shield and cover this portion with an insulation tape.

(2) Refer to paragraphs (2) or (3) of Sec. 3.2.1 for wiring the ultrasonic oscillator.

Cable inlet hole (diameter 28 mm) is punched at the bottom of the alarm box. Mount a cable gland or a fitting to this hole and connect the cable passing through it.

3.2.3   Alarm Box Power and Ground Wiring

This cable supplies the alarm box with power supply. The power supply satisfies both rating of the relay in the alarm box and the ultrasonic oscillator specifications.

Connect the wiring from the power supply with terminals L1 and L2 in the alarm box. Connect terminal with the ground terminal.

3.2.4   Alarm Signal Wiring

This cable provides blown fuse alarm signal and contact signal indicating that power supply for the ultrasonic oscillator stops.

Connect the wiring from the indicator with COM and N.O. terminals if N.O. contact output is necessary and connect it with COM and N.C. terminals if N.C. contact output is necessary.
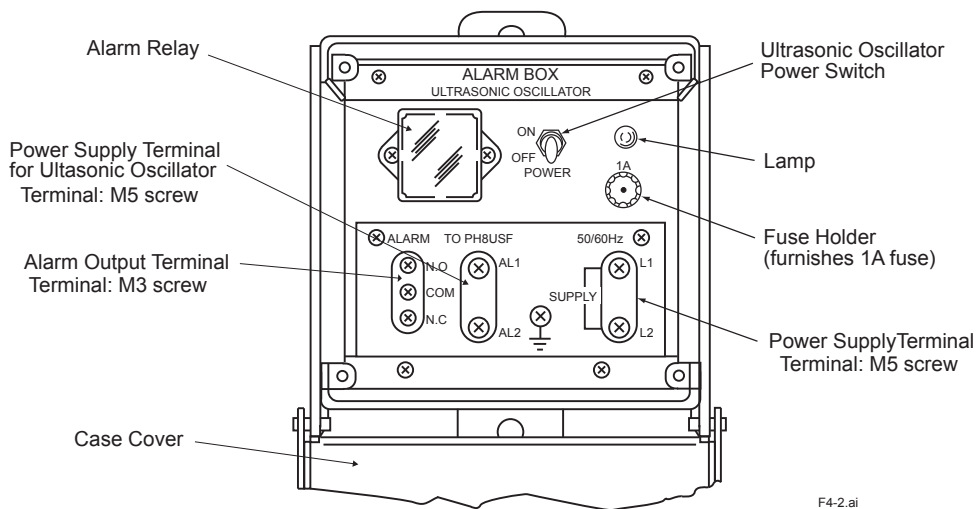
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4.   Operation

4.1   Component Names
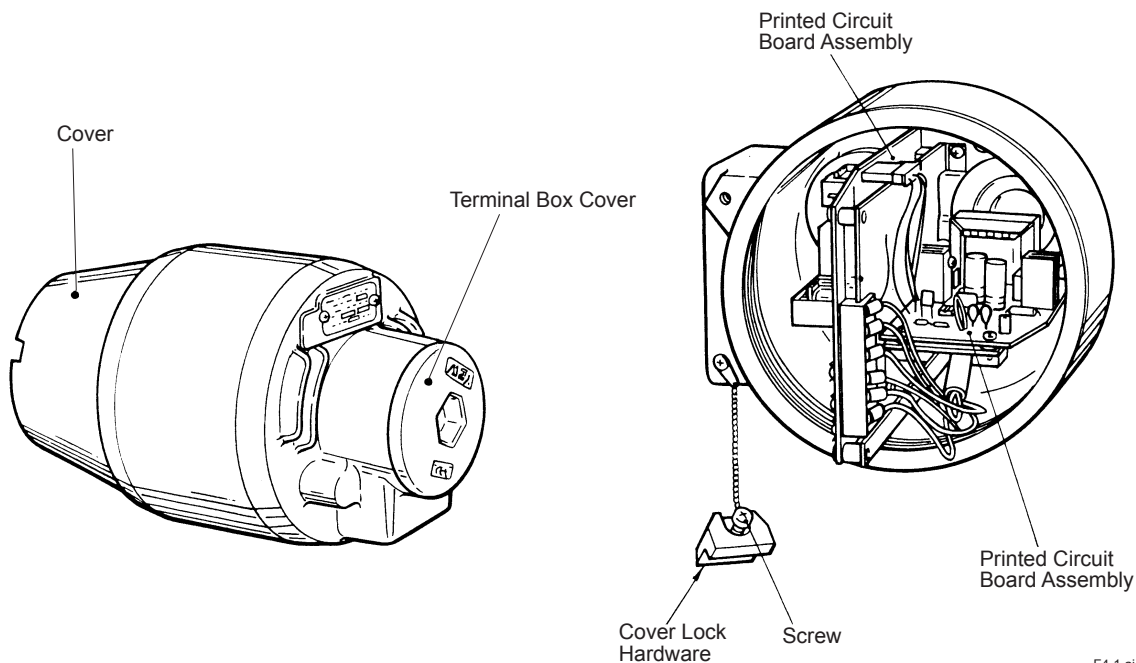
Figure 4.1   Ultrasonic Oscillator Component Names

Figure 4.2   Alarm Box Component Names

4.2   Preparation for Operation

4.2.1   Checking the Wiring

Check that the wires of the ultrasonic oscillator circuit are properly connected.

• Connection between PH8USF and PH8AL (U1, U2, S, K)
• Power supply (properly voltage, connected to L1, L2 of PH8AL)
• Grounding (PH8AL grounded to earth, grounding resistance: 100Ω or less)

4.2.2   Applying Power

After confirming that the junction terminal box cover of the holder and the terminal box cover of the ultrasonic oscillator are installed firmly, apply power the alarm box. Then turn the switch of the alarm box on and apply power the ultrasonic oscillator. A lamp lighting in the alarm box shows the status that the ultrasonic oscillator starts operation and the ultrasonic cleaning element radiates ultrasonic wave.

Set an indicator or other instruments so that alarm contact signal from the alarm box can be quickly detected.

4.3   Operation

When actuating the PH8USF ultrasonic oscillator, be sure to connect the ultrasonic vibrator (under load, that is, immersed in fluid) as under normal operating conditions. Operating the ultrasonic oscillator solely (or, with the ultrasonic vibrator under no load connected) may cause some electric parts to be abnormally heated. This is unfavorable in terms of the life of the ultrasonic oscillator.

It is not necessary to adjust and operate the ultrasonic cleaner before and during operation.

4.3.1   Handling the Alarm Display

When a measured solution enters into the cleaning element, the ultrasonic oscillator increases the current in the ultrasonic oscillator power circuit so that a fuse in the alarm box is blown. In this case, the indicator displays the alarm receiving the alarm contact signal.

The following explanations describe how the alarm is handled. Take care never to touch the wiring terminals before deenergizing.

(1) Confirm that a lamp inside of the alarm box does not light when applying power.

If the lamp lights, the relay can be defective. Deenergize and replace the relay after checking that there is disconnection in the circuit.

(2) Check the fuse inside of the alarm box. If the fuse is blown, replace it with a same rated fuse (1 A, cylindrical). If the lamp remains lighting after the replacement, check the relay referring to section (1).

(3) Visually check the ultrasonic cleaning element with the alarm box switch turned off.

If there are any traces that the measured solution entered into the cleaning element (e.g., the wetted part corrodes), replace the cleaning element with a new one.

If there is no such trace, confirm whether the holder junction terminal box and the ultrasonic oscillator terminal box area all right.

If there found no abnormality by above-mentioned checks, replace and secure the terminal cover firmly and turn the alarm box switch on.

If the fuse is blown again, turn the switch off and remove the wiring from the cleaning element connected with the junction terminal box. Then, turn the switch on. If the fuse is not blown, replace the ultrasonic cleaning element with a new one. If the fuse is blown, check the ultrasonic oscillator after removing it a non-hazardous area.

5. Replacement Parts

5.1 Alarm Box
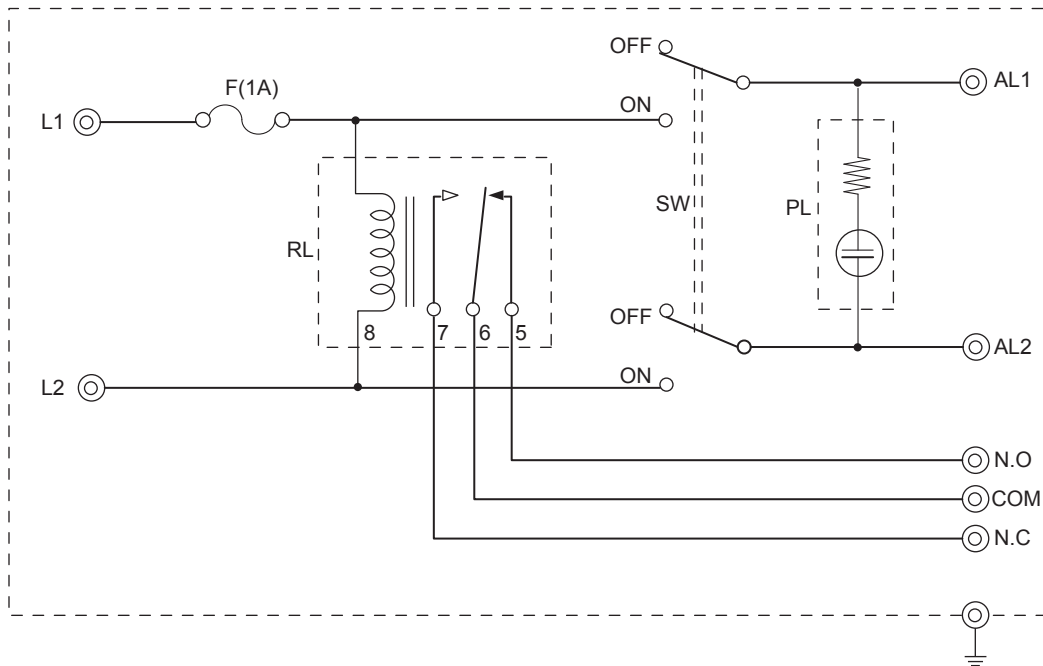
Reference Designation	Part No.	Description
F	A1179EF	Fuse (1 A)
SW	A1155ST	Switch
PL	K9143VA	Pilot Lamp (110 to 115 V AC)
	K9143VB	Pilot Lamp (200, 220 to 240 V AC)
RL	A1413MR	Relay (100 V AC)
	A1414MR	Relay (110 to 115 V AC)
	A1415MR	Relay (200 V AC)
	A1416MR	Relay (220 to 240 V AC)

F5.1.ai

5.2 Ultrasonic Oscillator

Reference Designation	Part No.	Description
F1, F2, F3	A1179EF	Fuse (1 A)

F5.2.ai

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Revision Information

● Title   :   Model PH8USF ULTRASONIC OSCILLATOR (Explosionproof Type),
                          Model PH8AL ALARM BOX

● Manual No.   :   IM 12B5U2-E

Nov. 2017/5th Edition
         Revised MS-code, based on the suppliment (p.2-3)
         Corrected errors in the specification.(p.2-1, 3-3)

Jul. 2012/4th Edition   **Page layout changed by InDesign**
         p.2-1, to 2-3, Some addition of power supply specification for PH8USF and PH8AL;
         p.4-2, Some caution added to operation of PH8USF; p.5-1, P/N of alarm box in Sec. 5.1 changed.

Jul. 2006/3rd Edition
         All over revised.

Jun. 2000/2nd Edition
         Re-published by new format, some of parts no. changed, etc.

Apr. 1983/1st Edition
         Newly published.

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