

**Field-Based Analog
4 - 20mA DC Current Meter**

Model NWA300

User's Manual

Azbil Corporation

NOTICE

While the information in this manual is presented in good faith and believed to be accurate, Azbil Corporation disclaims any implied warranty of merchantability or fitness for a particular purpose and makes no express warranty except as may be stated in its written agreement with and for its customer.

In no event shall Azbil Corporation be liable to anyone for any indirect, special or consequential damages. This information and specifications in this document are subject to change without notice.

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General Precautions

Checking the Product

The NWA is a precision instrument. When unpacking the unit, handle all materials carefully to prevent accident or damage.

Confirm that you have received the following items:

- NWA main unit
- Standard accessories

Checking the Specifications

The specifications of the NWA meter are inscribed on the nameplate. Make sure that the specifications are correct, referencing the appendix “Indication Of NWA Standard Specifications And Tag No.”.

Pay special attention to the following two items:

- Structure of the main unit
- Scale type

Inquiries

If you find errors in the specification, or have any questions regarding the specifications, please contact the azbil Group sales office.

In this case be sure to inform us of the NWA Tag and Product Numbers.

Notes on Storage

When storing the NWA before installation, pay attention to the following:

- Store it indoors in a place with constant room temperature and humidity, and where it is not subject to vibration or shock.
- Store it as originally packed.

Chapter 1. Configuration And Structure Of NWA Current Indication System

Overview

This chapter introduces the configuration of the NWA current indication system, and includes:

- The structure of the NWA main unit, with the names and functions of each section.
- Notes regarding use of the explosion-proof NWA.

1-1. System Configuration

Overview

The NWA analog meter displays analog DC signals in the 4 to 20 mA range, obtained from various field instruments.

Current Indication Using the NWA

The following shows the configuration of a typical current indication system using the NWA.

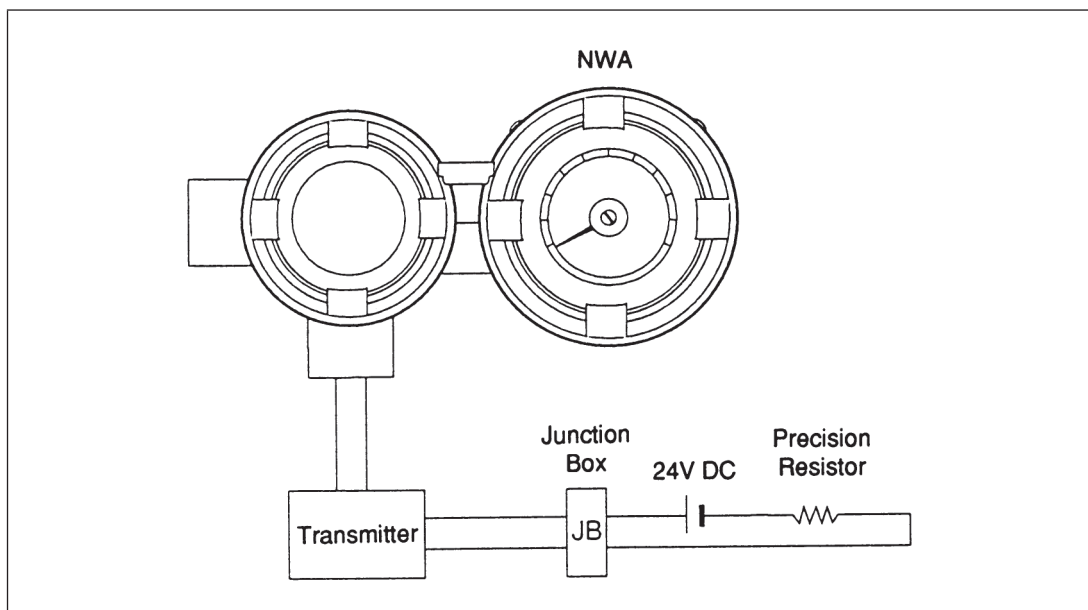


Fig. 1-1. Configuration of the NWA Current Indication System

1-2. Notes on the Explosion-proof NWA

Overview

The NWA explosion-proof model is certified to comply with Japan's Industrial Safety and Health Laws, and can thus be used in dangerous locations. For proper use, the following guidelines must be followed.

Pressure-Resistant, Explosion-proof Structure

The pressure-resistant and explosion-proof structure is totally sealed, which contains possible internal explosions, and prevents ignition of external explosive gases.

Selection of Mounting Location

When selecting a mounting location for the NWA, observe the following conditions:

– Dangerous locations in which the NWA can be safely installed are defined as follows:

Gases classed as requiring explosion-proof instruments

Atmospheres with a flashpoint of 85C or higher

The NWA analog meter can be installed in Type 1 or 2 locations; **it cannot be installed in Type 0 locations.**

Installation

- When installing the NWA, in either dangerous or nondangerous locations, always refer to the Appendix “Installation Specifications” to confirm correct wiring.
- Perform all external wiring following the cable installation procedures given in the document “Recommended Practice for Explosion-Protected Installations in General Industries”, published by Japan’s Ministry of Labor’s Research Institute for Industrial Safety.

For cable installation, be sure to attach the standard Azbil Corporation pressure-resistant packing cable adapter to the wiring port of the terminal box.

- The explosion-proof properties of the pressure-resistant explosion-proof structure are maintained by the length of the flamepath, gap, and by the mechanical strength of the casing. Therefore, make sure that there is no corrosion, distortion, or scarring of the case cover, any of which may cause reduced mechanical strength. Handle the meter carefully to avoid damage to screws and joints.

If any of the above conditions is not satisfied, the NWA’s explosion-proofing cannot be guaranteed.

Install and use the NWA only under the proper conditions. If the NWA becomes damaged, contact the azbil Group sales office.

Nameplate

The NWA explosion-proof model is certified to comply with Japan’s Industrial Safety and Health Laws for use in dangerous locations. A certification mark is attached to the nameplate of explosion-proof products, as shown below. Check that mark is present.



Fig. 1-2. Nameplate

1-3. Structure and Function

Structure

Major components

The NWA analog meter consists of the main unit indicator and the terminal box, as shown below.

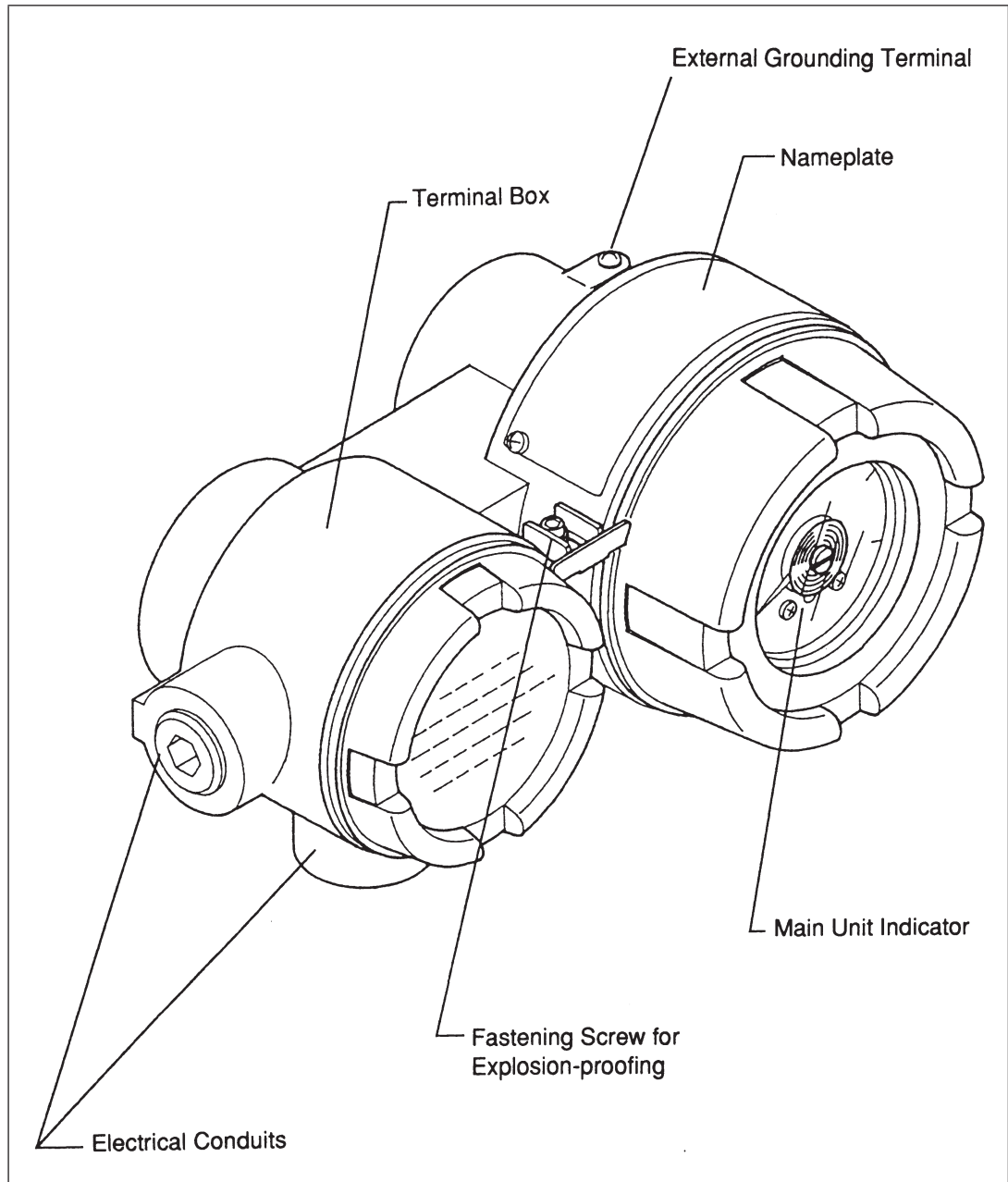


Fig. 1-3. General View of the NWA

Names and Functions of each Section

The following table shows the name and function of each section of the NWA.

<Name>	<Function>
Main unit indicator	Receives analog signal from the transmitter and indicates values
Terminal box	Accommodates input signal terminals
Fastening screw for explosion-proofing	For explosion-proof model, be sure to fasten this screw when in use
Nameplate	The Model No. and Product No. are inscribed, and the explosion-proofing certification seal is stamped
Pressure-resistant packing cable adapter	Seals the cable terminals to maintain explosion-proofing and improve insulation properties and mechanical strength. This adapter is required for explosion-proof instrumentation. See Fig. 1-4 and Fig. 1-5.
External grounding terminal	Connect the ground lead from this terminal to a good ground as close as possible to the unit, Be sure to use signal point (Type 3) grounding. Caution: The NWA analog meter may not operate normally without proper grounding.

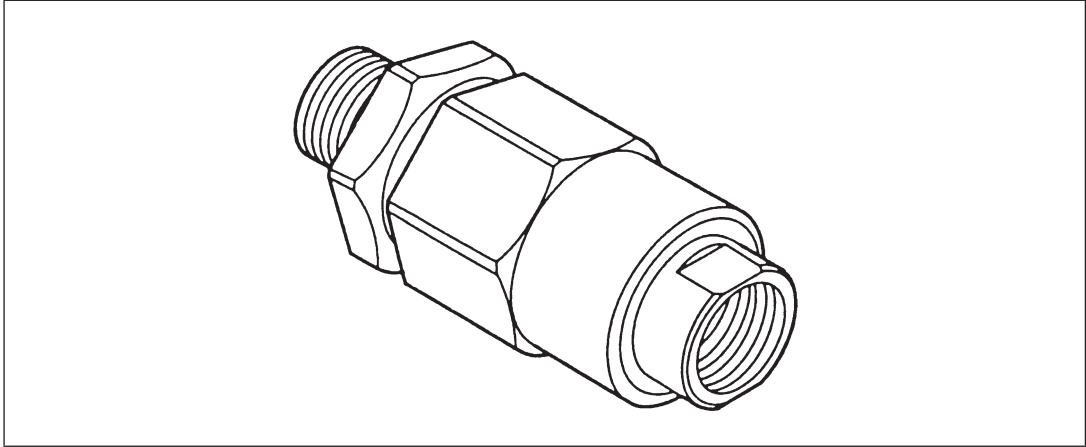


Fig. 1-4. General View of the Pressure-Resistant Packing Cable Adapter

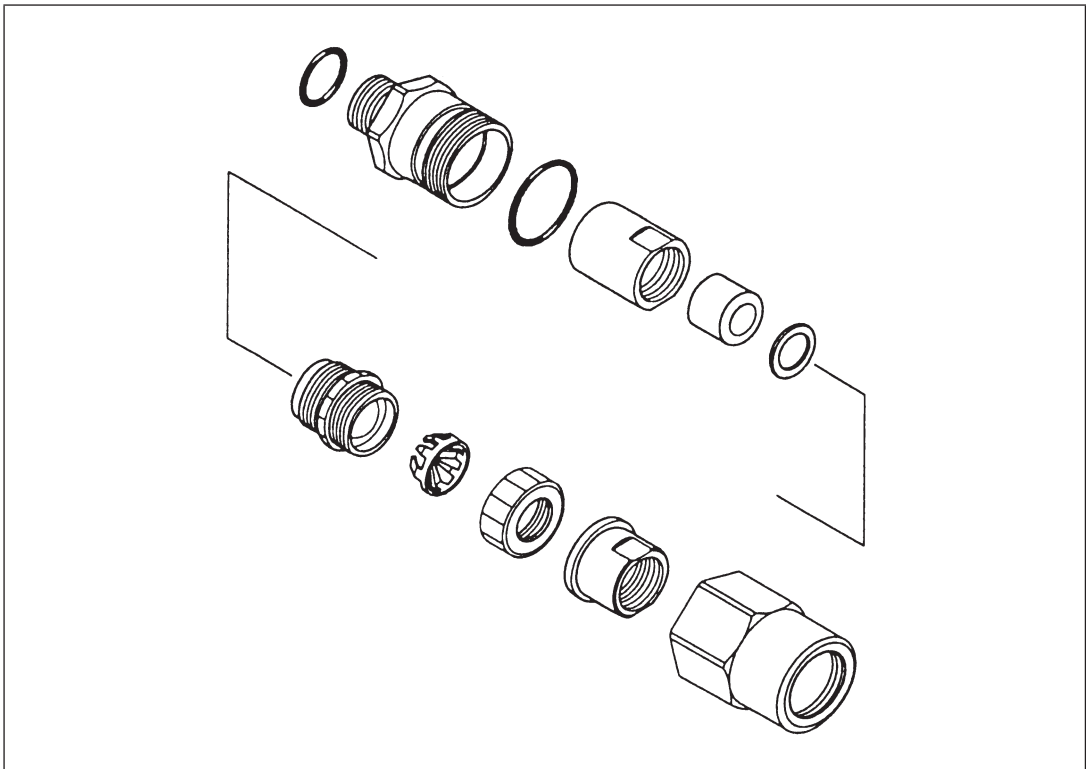


Fig. 1-5. Assemblies of the Pressure-Resistant Packing Cable Adapter

Main Unit Indicator

Description

The functions and structure of the main unit indicator are as follows:

- Receives analog signal from the transmitter and indicates values

Name of each Section

The following shows the name of each section of the main unit indicator.

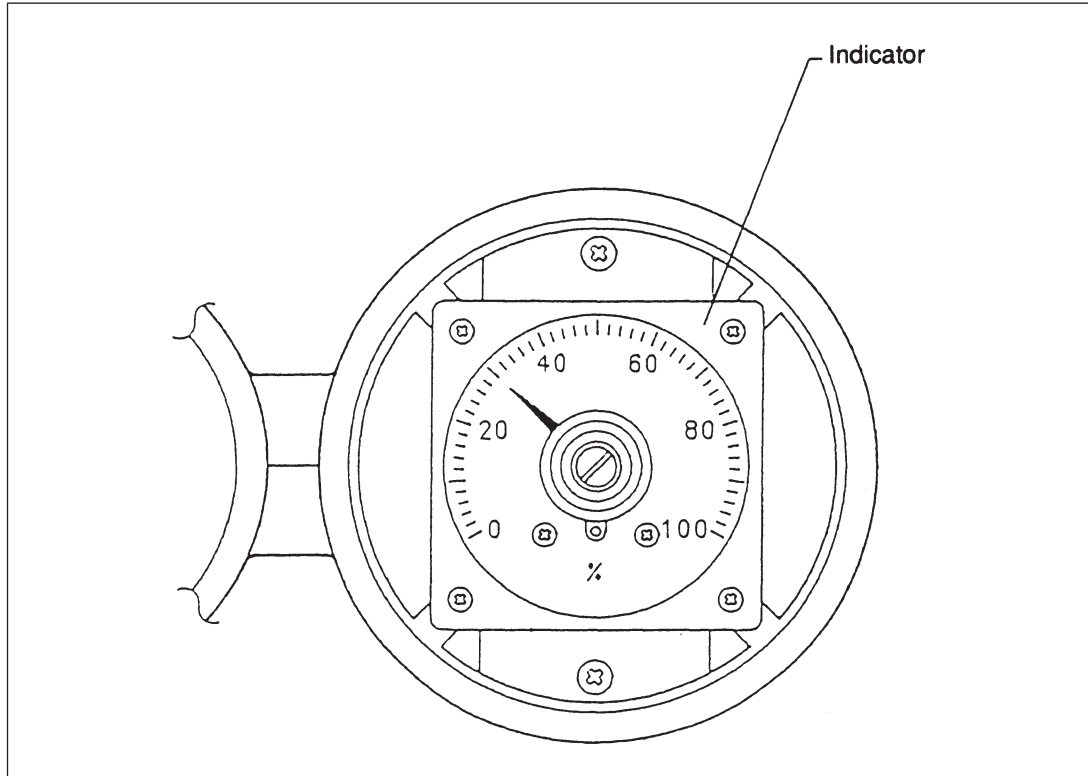


Fig. 1-6. Main Unit Indicator Detail

Function of each section

The following table shows the function of each section of the main unit indicator.

<Name>	<Function>
Indicator	Incorporates 240 ° meter

Terminal Box

Description

The terminal box is provided with output signal terminals.

Name of section

The following shows the name of each section of the terminal box.

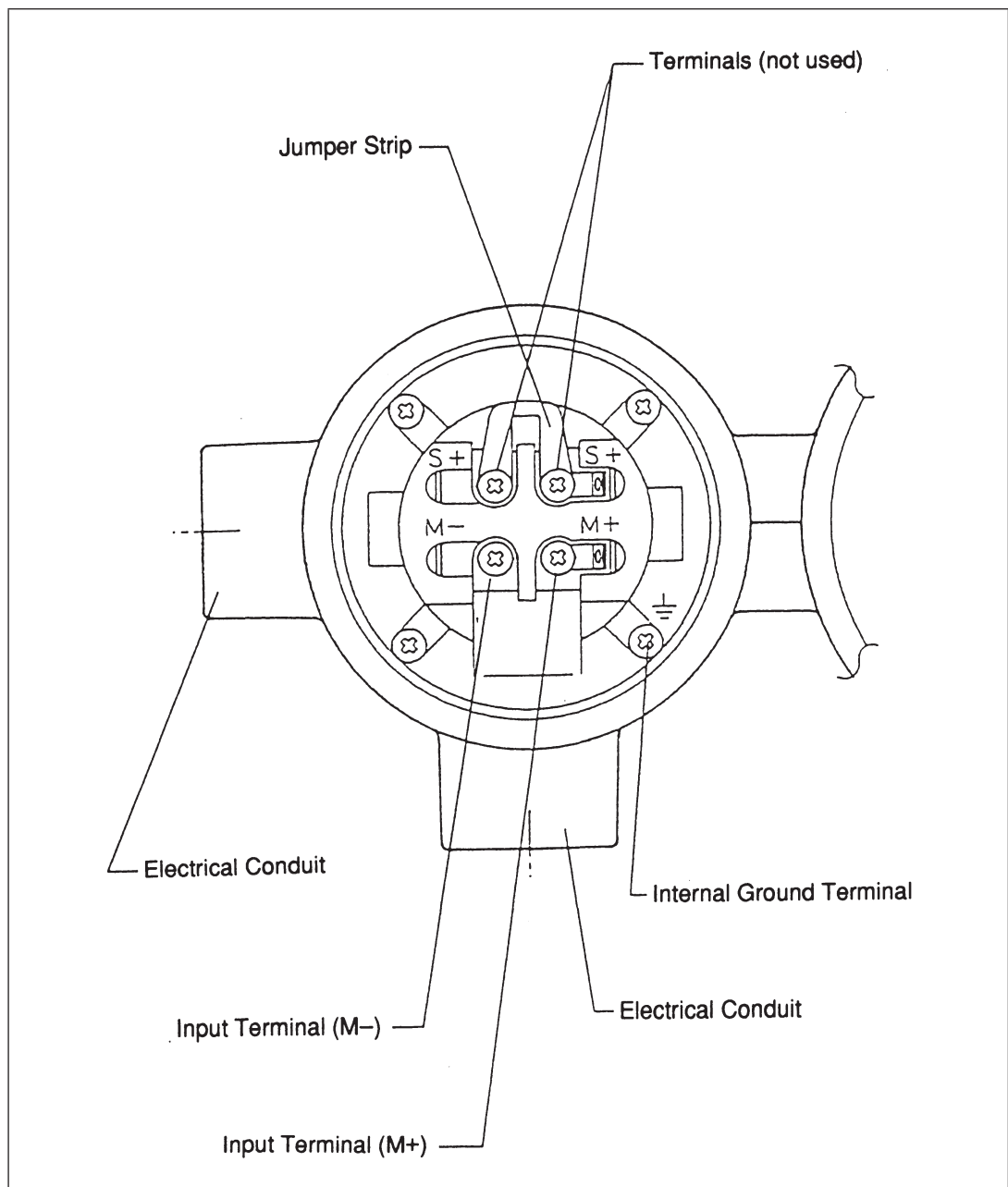


Fig. 1-7. Terminal Box Detail

Function of each section

The following table shows the function of each section of the terminal box:

<Name>	<Function>
Input signal terminal	M+ or M- is indicated.
Unconnected terminals	These terminals are not normally used. They are used as relay terminals when multiple NWA meters are connected. See the subsection “Electrical Installation (4)” on page 19.
Internal grounding terminal	<ul style="list-style-type: none"><li data-bbox="826 568 1450 667">– If the NWA meter is not immune to electrical noise, connect one end of the shield wire to this terminal. (Not normally used)<li data-bbox="826 667 1450 761">– This terminal is internally connected to the external grounding terminal. When this terminal is used, make sure that two-point grounding is not made.

Chapter 2. Installation

Overview

This chapter covers the mounting and the electrical installation procedures for the NWA meter, which differ according to whether or not the transmitter is provided with an output terminal for external meters, and to whether one or multiple NWAs are used.

It covers:

- Selection of mounting location
- Mounting procedure
- Wiring procedure
- Notes on wiring the pressure-resistant explosion-proof model

2-1. Before Installation

Mounting Environment

Overview

To assure the long-term performance and reliability of the NWA, select the mounting location according to the following criteria:

Environmental conditions

- Install the meter in a location with ambient temperatures within -10 to +60 °C and ambient humidity within 5 to 100 % RH, and which is not subject to rapid temperature or humidity changes.
- Avoid installing the meter near large-current cables, motors, or transformers that might cause electromagnetic interference.
- Avoid installing the meter in locations subject to excessive vibration or shock, or locations where corrosive gas may be present.
- Avoid installing the meter in locations exposed to direct sunlight or inclement weather.
- Perform all wiring (in either dangerous or non-dangerous locations) with reference to the Appendix "Installation Specifications".
- When installing the meter in dangerous locations, ensure that wiring work also meets the requirements of Section 1-2. Notes on the Explosion-proof NWA.

2-2. Installation

Mounting

Procedure

Follow the steps below:

Step	Procedure
1	Attach the bracket using the four bracket mounting holes at the back of the main unit. (See Fig. 2-1.)
2	Using the mounted bracket, secure the main unit to the 2B pipe vertically or horizontally with a U bolt. (See Fig. 2-2.) Notes: Make sure that the 2B pipe is fixed securely.

Figure

Fig. 2-1 shows the bracket mounting holes. Fig. 2-2 shows the NWA meter mounted on a 2B pipe.

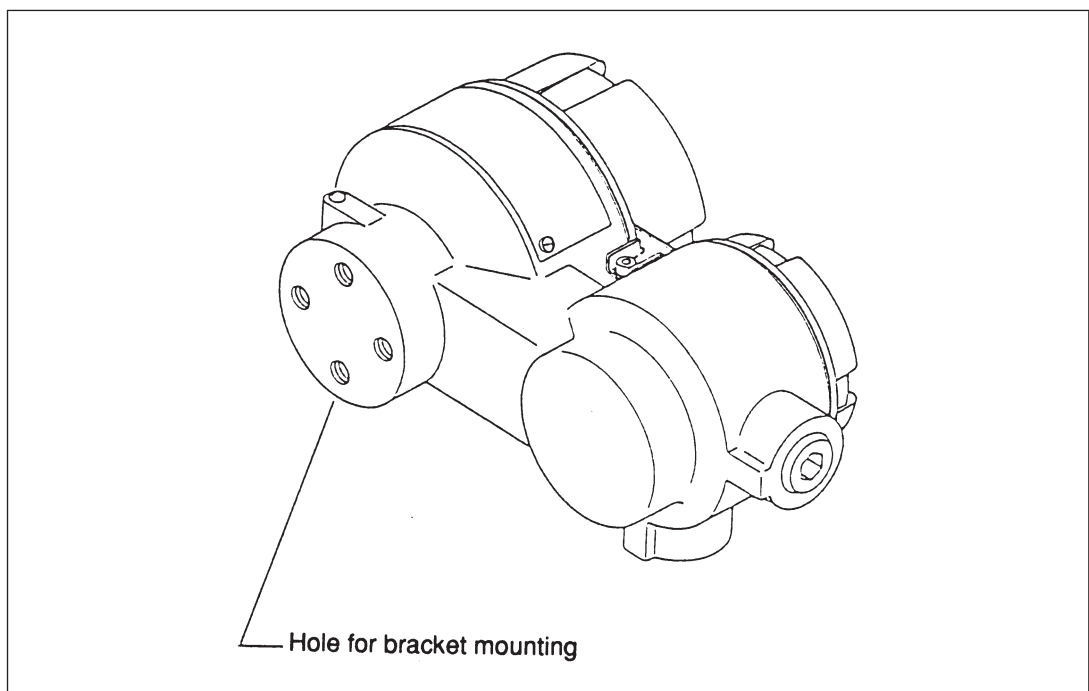


Fig. 2-1. Rear of the NWA

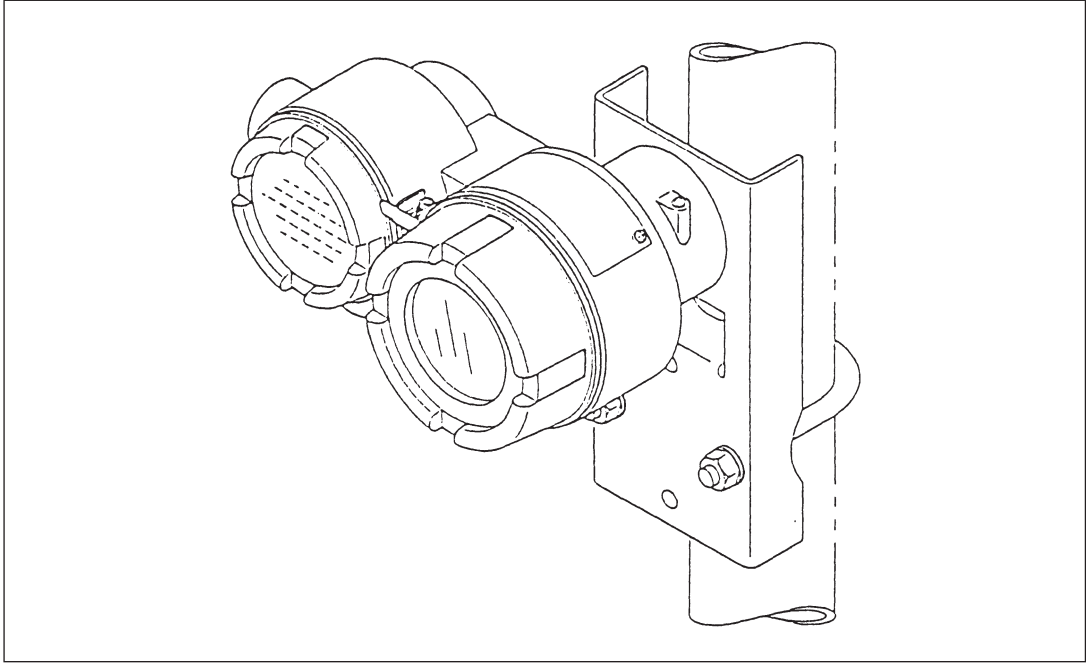


Fig. 2-2. NWA Analog Meter Mounted on 2" Pipe

2-3. Wiring

Overview

This subsection covers the following items regarding electrical installation of the NWA:

- Cable connection position
- Cable selection and installation
- Wiring procedure

Caution

Avoid connecting the NWA to commercial power. Otherwise, the internal measurement circuit may be irrevocably damaged.

Connection position

The following shows the terminal block of the terminal box:

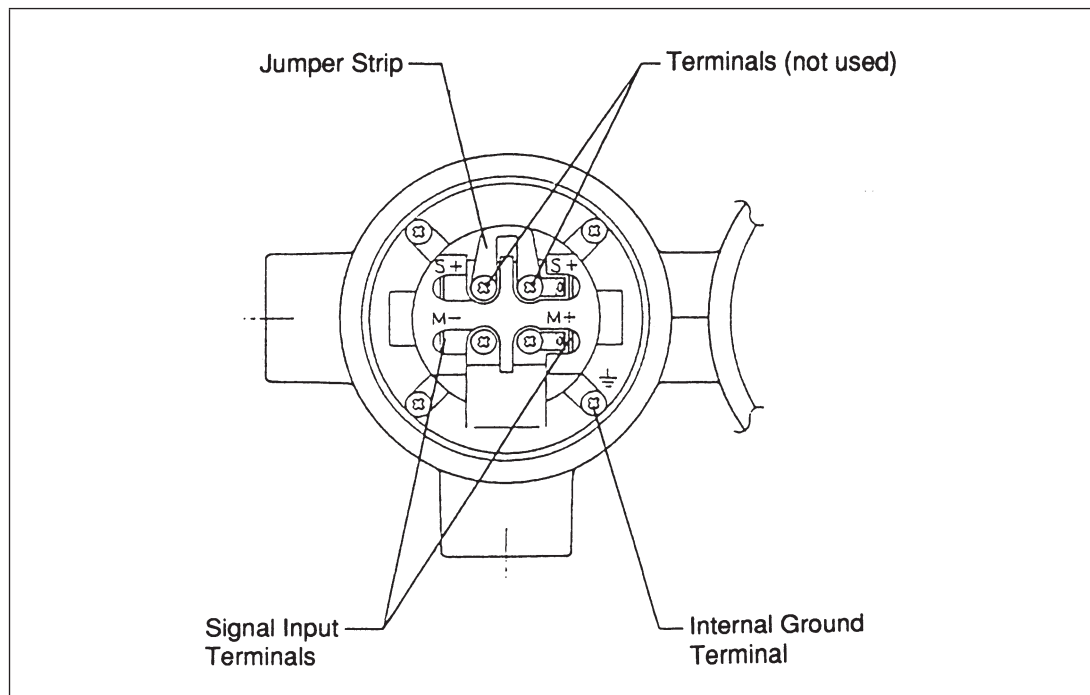


Fig. 2-3. Terminal Block

Cable selection

Twisted 600 V vinyl sheath lead CVV (JIS C3401) with a cross section of 2 mm², or equivalent, is recommended.

For wiring in locations subject to electrical noise, shielded leads are recommended.

The cable is connected to the terminal box through the conduit jointer (G1/2 female screw). The optimum diameter of the cable is $\phi 11$.

For termination, a crimp contact (M4 screw) with insulated sleeve is recommended.

Cable installation

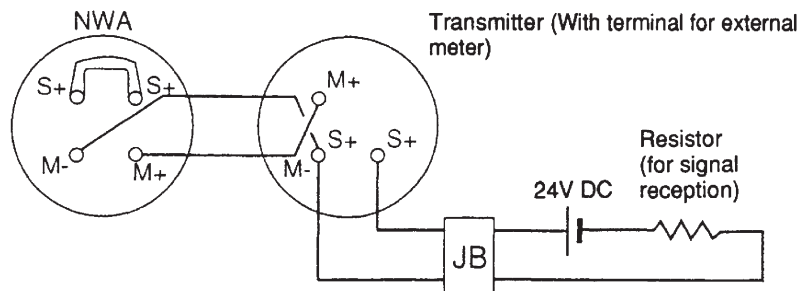
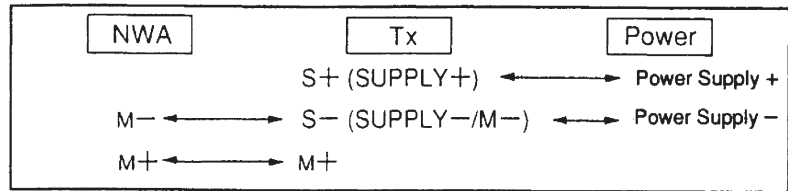
When installing the cable between the NWA and the transmitter, keep the following points in mind:

- Avoid installing the cable near electrical noise-emitting equipment such as large-current transformers, motors, or power supplies. Do not lay the cables in trays or ducts with other power cables.
- To protect the NWA from water, it is recommended that wiring be performed using conduit tubes and ducts. Use water-proof glands at conduit joints.

Wiring when only one NWA is used

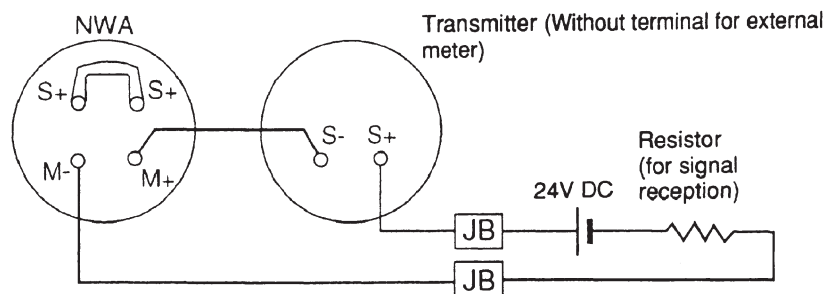
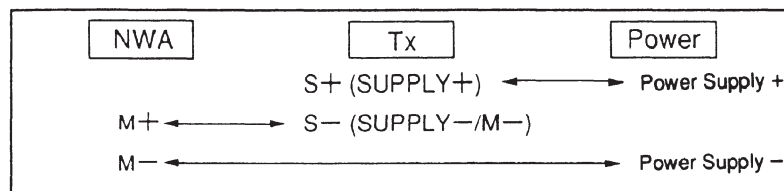
When the transmitter is provided with an output signal terminal for external meters

<Case 1>



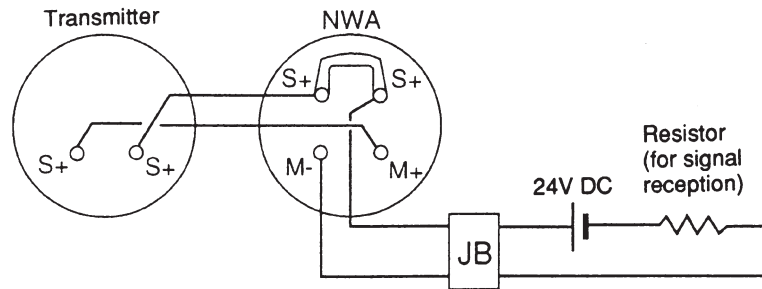
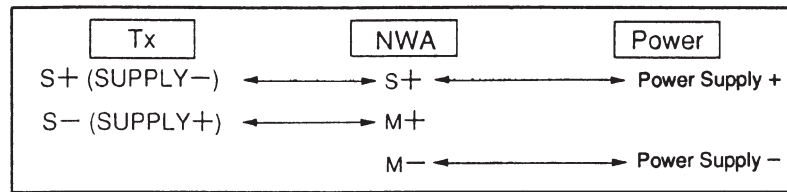
Notes: Don't remove a jumper board on the terminal board (M+ and M-).

<Case 2>



Notes: Don't remove a jumper board on the terminal board (M+ and M-).

When the transmitter is not provided with an output signal terminal for external meters



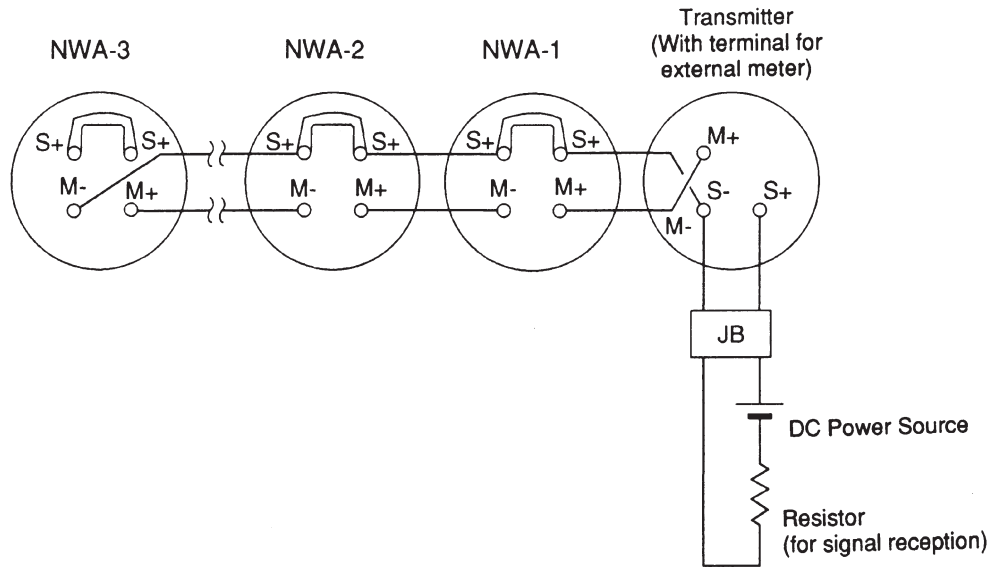
Notes: Don't remove a jumper board on the terminal board (M+ and M-).

Wiring when multiple NWAs are used

Notes on using multiple NWAs

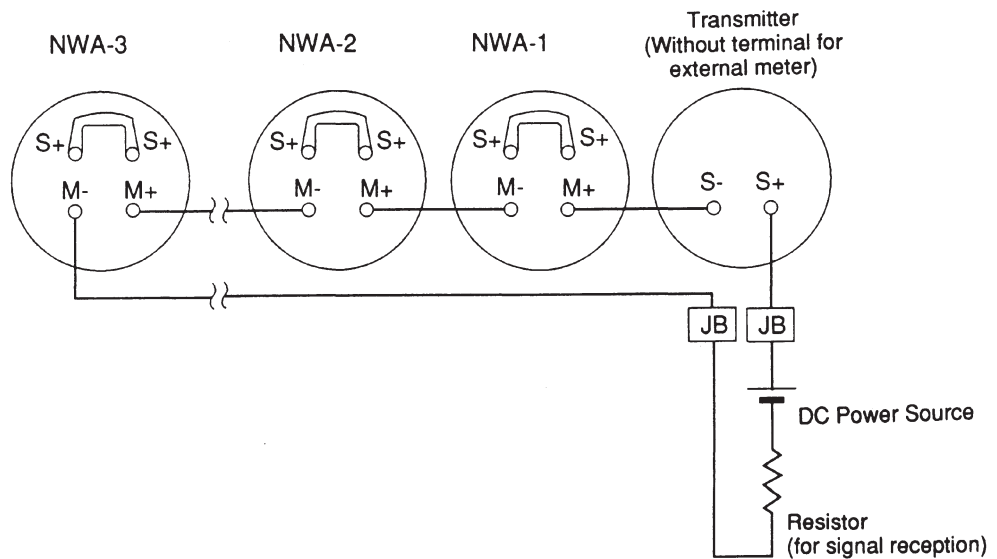
- Internal resistance of the NWA is 10 ohms.
- Determine the number of NWAs to be used, taking the loop voltage and internal impedance of each device into account.

When the transmitter is provided with an output signal terminal for external meter.



Notes: Don't remove a jumper board on the terminal board (M+ and M-).

When the transmitter is not provided with an output signal terminal for external meters.



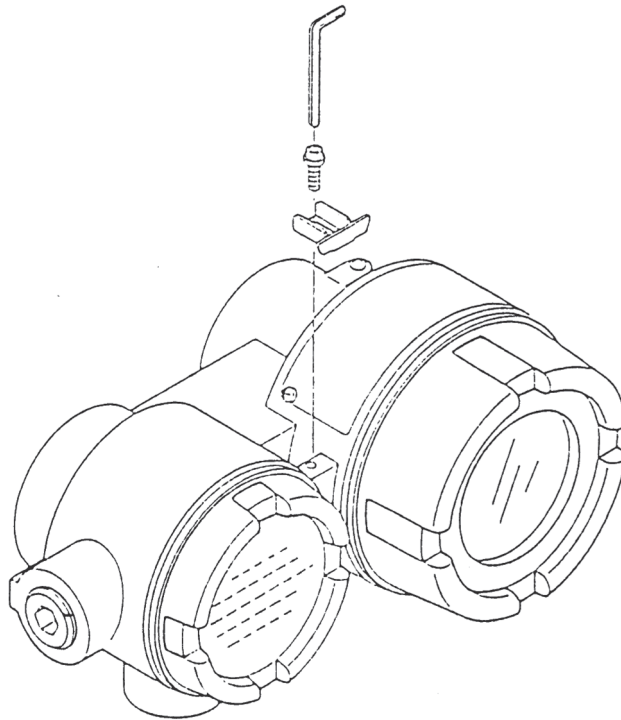
Notes: Don't remove a jumper board on the terminal board (M+ and M-).

Wiring for the pressure-resistant, explosion-proof model

Notes:

When wiring for the pressure-resistant, explosion-proof model, observe the following.

- The main unit and terminal box of the explosion and pressure-resistant model have a locking structure. After wiring, close the terminal cover securely, then lock it using a 3 mm hexagonal wrench.
- Lock both the main unit cover and the terminal cover at the same time. (See Fig. 2-4.)
- As products from Azbil Corporation employ a pressure-resistant packing system, pressure-resistant packing is required for cable installation in areas requiring explosion and pressure-resistance.
- Use Azbil Corporation's standard pressure-resistant packing adapter.
- For details of wiring, refer to technical information (RIKS-TR) from Japan's Technical Institute for Industrial Safety.



Chapter 3. NWA Operation

Overview

This chapter discusses initial start-up of the NWA.
Read this chapter when activating the NWA for the first time.

3-1. Start-up

Procedure

Step	Description
1	Make sure that wiring for the NWA is completed.
2	Make sure that notes and cautions regarding use of the NWA have been fully observed.
3	Turn on the power to the transmitter This completes start-up of the NWA

Terms and Conditions

We would like to express our appreciation for your purchase and use of Azbil Corporation's products.

You are required to acknowledge and agree upon the following terms and conditions for your purchase of Azbil Corporation's products (system products, field instruments, control valves, and control products), unless otherwise stated in any separate document, including, without limitation, estimation sheets, written agreements, catalogs, specifications and instruction manuals.

1. Warranty period and warranty scope

1.1 Warranty period

Azbil Corporation's products shall be warranted for one (1) year from the date of your purchase of the said products or the delivery of the said products to a place designated by you.

1.2 Warranty scope

In the event that Azbil Corporation's product has any failure attributable to azbil during the aforementioned warranty period, Azbil Corporation shall, without charge, deliver a replacement for the said product to the place where you purchased, or repair the said product and deliver it to the aforementioned place. Notwithstanding the foregoing, any failure falling under one of the following shall not be covered under this warranty:

- (1) Failure caused by your improper use of azbil product (noncompliance with conditions, environment of use, precautions, etc. set forth in catalogs, specifications, instruction manuals, etc.);
- (2) Failure caused for other reasons than Azbil Corporation's product;
- (3) Failure caused by any modification or repair made by any person other than Azbil Corporation or Azbil Corporation's subcontractors;
- (4) Failure caused by your use of Azbil Corporation's product in a manner not conforming to the intended usage of that product;
- (5) Failure that the state-of-the-art at the time of Azbil Corporation's shipment did not allow Azbil Corporation to predict; or
- (6) Failure that arose from any reason not attributable to Azbil Corporation, including, without limitation, acts of God, disasters, and actions taken by a third party.

Please note that the term "warranty" as used herein refers to equipment-only-warranty, and Azbil Corporation shall not be liable for any damages, including direct, indirect, special, incidental or consequential damages in connection with or arising out of Azbil Corporation's products.

2. Ascertainment of suitability

You are required to ascertain the suitability of Azbil Corporation's product in case of your use of the same with your machinery, equipment, etc. (hereinafter referred to as "Equipment") on your own responsibility, taking the following matters into consideration:

- (1) Regulations and standards or laws that your Equipment is to comply with.
- (2) Examples of application described in any documents provided by Azbil Corporation are for your reference purpose only, and you are required to check the functions and safety of your Equipment prior to your use.
- (3) Measures to be taken to secure the required level of the reliability and safety of your Equipment in your use

Although azbil is constantly making efforts to improve the quality and reliability of Azbil Corporation's products, there exists a possibility that parts and machinery may break down. You are required to provide your Equipment with safety design such as fool-proof design,*1 and fail-safe design*2 (anti-flame propagation design, etc.), whereby preventing any occurrence of physical injuries, fires, significant damage, and so forth. Furthermore, fault avoidance,*3 fault tolerance,*4 or the like should be incorporated so that the said Equipment can satisfy the level of reliability and safety required for your use.

*1. A design that is safe even if the user makes an error.

*2. A design that is safe even if the device fails.

*3. Avoidance of device failure by using highly reliable components, etc.

*4. The use of redundancy.

3. Precautions and restrictions on application

3.1 Restrictions on application

Please follow the table below for use in nuclear power or radiation-related equipment.

	Nuclear power quality*5 required	Nuclear power quality*5 not required
Within a radiation controlled area*6	Cannot be used (except for limit switches for nuclear power*7)	Cannot be used (except for limit switches for nuclear power*7)
Outside a radiation controlled area*6	Cannot be used (except for limit switches for nuclear power*7)	Can be used

*5. Nuclear power quality: compliance with JEAG 4121 required

*6. Radiation controlled area: an area governed by the requirements of article 3 of "Rules on the Prevention of Harm from Ionizing Radiation," article 2 2 4 of "Regulations on Installation and Operation of Nuclear Reactors for Practical Power Generation," article 4 of "Determining the Quantity, etc., of Radiation-Emitting Isotopes," etc.

*7. Limit switch for nuclear power: a limit switch designed, manufactured and sold according to IEEE 382 and JEAG 4121.

Any Azbil Corporation's products shall not be used for/with medical equipment.

The products are for industrial use. Do not allow general consumers to install or use any Azbil Corporation's product. However, azbil products can be incorporated into products used by general consumers. If you intend to use a product for that purpose, please contact one of our sales representatives.

3.2 Precautions on application

you are required to conduct a consultation with our sales representative and understand detail specifications, cautions for operation, and so forth by reference to catalogs, specifications, instruction manual, etc. in case that you intend to use azbil product for any purposes specified in (1) through (6) below. Moreover, you are required to provide your Equipment with fool-proof design, fail-safe design, anti-flame propagation design, fault avoidance, fault tolerance, and other kinds of protection/safety circuit design on your own responsibility to ensure reliability and safety, whereby preventing problems caused by failure or nonconformity.

- (1) For use under such conditions or in such environments as not stated in technical documents, including catalogs, specification, and instruction manuals
- (2) For use of specific purposes, such as:
 - * Nuclear energy/radiation related facilities
[When used outside a radiation controlled area and where nuclear power quality is not required]
[When the limit switch for nuclear power is used]
 - * Machinery or equipment for space/sea bottom
 - * Transportation equipment
[Railway, aircraft, vessels, vehicle equipment, etc.]
 - * Antidisaster/crime-prevention equipment
 - * Burning appliances
 - * Electrothermal equipment
 - * Amusement facilities
 - * Facilities/applications associated directly with billing
- (3) Supply systems such as electricity/gas/water supply systems, large-scale communication systems, and traffic/air traffic control systems requiring high reliability
- (4) Facilities that are to comply with regulations of governmental/public agencies or specific industries
- (5) Machinery or equipment that may affect human lives, human bodies or properties
- (6) Other machinery or equipment equivalent to those set forth in items (1) to (5) above which require high reliability and safety

4. Precautions against long-term use

Use of Azbil Corporation's products, including switches, which contain electronic components, over a prolonged period may degrade insulation or increase contact-resistance and may result in heat generation or any other similar problem causing such product or switch to develop safety hazards such as smoking, ignition, and electrification. Although acceleration of the above situation varies depending on the conditions or environment of use of the products, you are required not to use any Azbil Corporation's products for a period exceeding ten (10) years unless otherwise stated in specifications or instruction manuals.

5. Recommendation for renewal

Mechanical components, such as relays and switches, used for Azbil Corporation's products will reach the end of their life due to wear by repetitious open/close operations.

In addition, electronic components such as electrolytic capacitors will reach the end of their life due to aged deterioration based on the conditions or environment in which such electronic components are used. Although acceleration of the above situation varies depending on the conditions or environment of use, the number of open/close operations of relays, etc. as prescribed in specifications or instruction manuals, or depending on the design margin of your machine or equipment, you are required to renew any Azbil Corporation's products every 5 to 10 years unless otherwise specified in specifications or instruction manuals. System products, field instruments (sensors such as pressure/flow/level sensors, regulating valves, etc.) will reach the end of their life due to aged deterioration of parts. For those parts that will reach the end of their life due to aged deterioration, recommended replacement cycles are prescribed. You are required to replace parts based on such recommended replacement cycles.

6. Other precautions

Prior to your use of Azbil Corporation's products, you are required to understand and comply with specifications (e.g., conditions and environment of use), precautions, warnings/cautions/notices as set forth in the technical documents prepared for individual Azbil Corporation's products, such as catalogs, specifications, and instruction manuals to ensure the quality, reliability, and safety of those products.

7. Changes to specifications

Please note that the descriptions contained in any documents provided by azbil are subject to change without notice for improvement or for any other reason. For inquires or information on specifications as you may need to check, please contact our branch offices or sales offices, or your local sales agents.

8. Discontinuance of the supply of products/parts

Please note that the production of any Azbil Corporation's product may be discontinued without notice. After manufacturing is discontinued, we may not be able to provide replacement products even within the warranty period.

For repairable products, we will, in principle, undertake repairs for five (5) years after the discontinuance of those products. In some cases, however, we cannot undertake such repairs for reasons, such as the absence of repair parts. For system products, field instruments, we may not be able to undertake parts replacement for similar reasons.

9. Scope of services

Prices of Azbil Corporation's products do not include any charges for services such as engineer dispatch service. Accordingly, a separate fee will be charged in any of the following cases:

- (1) Installation, adjustment, guidance, and attendance at a test run
- (2) Maintenance, inspection, adjustment, and repair
- (3) Technical guidance and technical education
- (4) Special test or special inspection of a product under the conditions specified by you

Please note that we cannot provide any services as set forth above in a nuclear energy controlled area (radiation controlled area) or at a place where the level of exposure to radiation is equivalent to that in a nuclear energy controlled area.

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