

Single I/P Converter

Model KUX112

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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1. GENERAL

1.1 Description

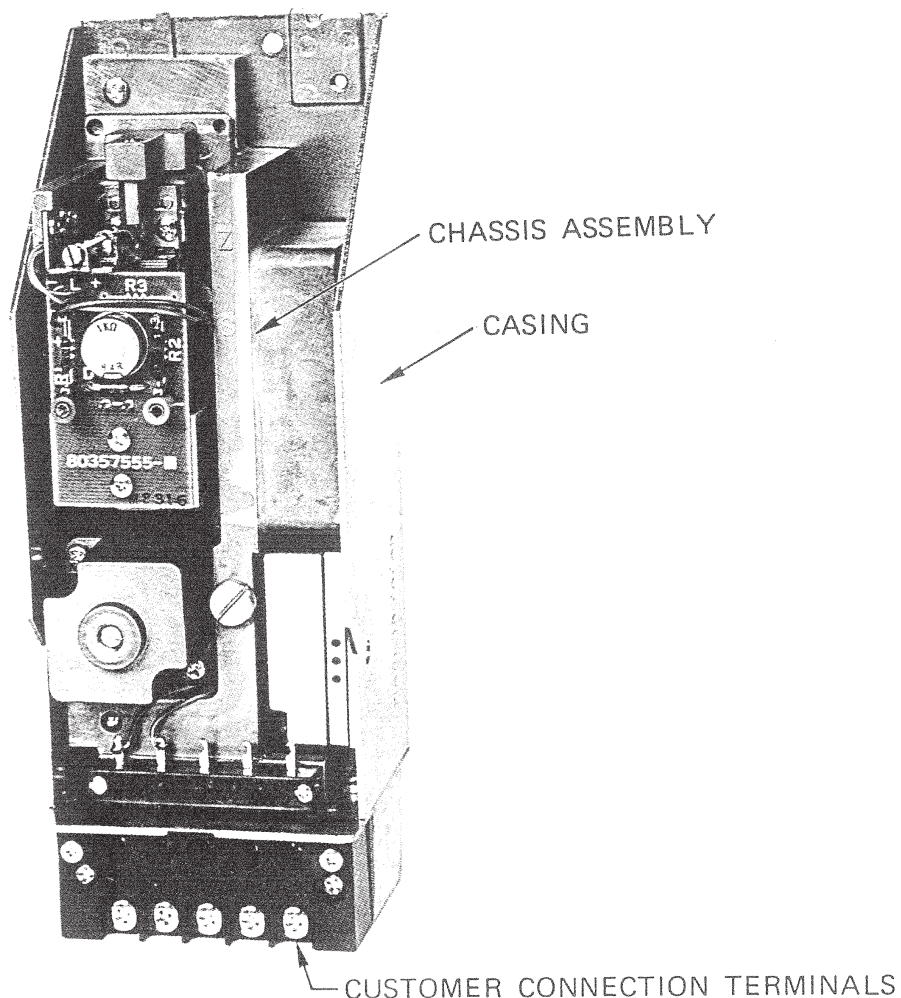
The SystempaK I/P Converter, KUX112, converts an electrical input signal of 4 - 20mA DC into a pneumatic output signal of 0.2 - 1.0kgf/cm² or other unit. It is an indoor installation type of instrument and can be directly installed on a panel.

1.2 Structure and Features

The KUX112 is comprised of a converter main unit (chassis assembly), a casing and a cover. The main unit is readily detachable from the casing by loosening the clamping-screws. As you detach the main unit from the casing, the air connectors are automatically sealed, thereby affecting neither the pneumatic signal channel nor the air supply channel.

Input check terminals are provided on the front panel, allowing you to check readily the input current signal.

Precaution: Hands off the mechanism at upper left of the main unit, except the adjustment parts.



Model KUX112 I/P Converter
(with cover removed)

2. SPECIFICATIONS

2.1 Performance Specifications

Item	Specification
Input signal	4 - 20mA DC (limit current approx. 30mA)
Input resistance	300Ω max.
Output signal	0.2 - 1.0kgf/cm ² , 3 - 15psi, 0.2 - 1.0bar, 20 - 100kpa (rated pressure 2kgf/cm ²)
Air supply	1.4kgf/cm ² , +30%, -10%
Air consumption	< 4Nℓ/min.
Maximum air supply capacity	< 20Nℓ/min.
Maximum air exhaust capacity	< 20Nℓ/min.
Minimum load capacity	4mm-inner-diameter copper pipe x 3m + 20cc
Electrical connections	M3 x 6mm binding screws
Air connections	Rc1/4, 1/4NPT internal thread
Ambient temperature	0 to 50°C
Ambient humidity	10 to 90% RH
Accuracy	± 0.25% FS
Hysteresis	0.15% FS
Temperature characteristics	Zero shift: ± 1% FS/25°C (max.) Span shift: ± 1% FS/25°C (max.)
Type of housing	Indoor installation type
Type of installation	Wall mount type
Weight	Approx. 1.6kg

2.2 Model No. Table

Model Number Structure of Multiple I/P Converters

Basic model No.	Selections						Options	Description
	Power supply	Input	Output	Connections	Installation	Environments		
KUX112								Single I/P Converter
	-X							None
		1						4 - 20mA DC
			1					0.2 to 1.0kgf/cm ²
			2					3 to 15psi
			3					0.2 to 1.0bar
			4					20 to 100kpa
				A				Rc1/4
				B				1/4NPT internal thread
					S			Wall mount, indoor installation
						X		Standard
						A		Tropicalization (special spec.)
						B		Corrosive atmosphere (special spec.)
							-X	No options

2.3 Overall Dimensions

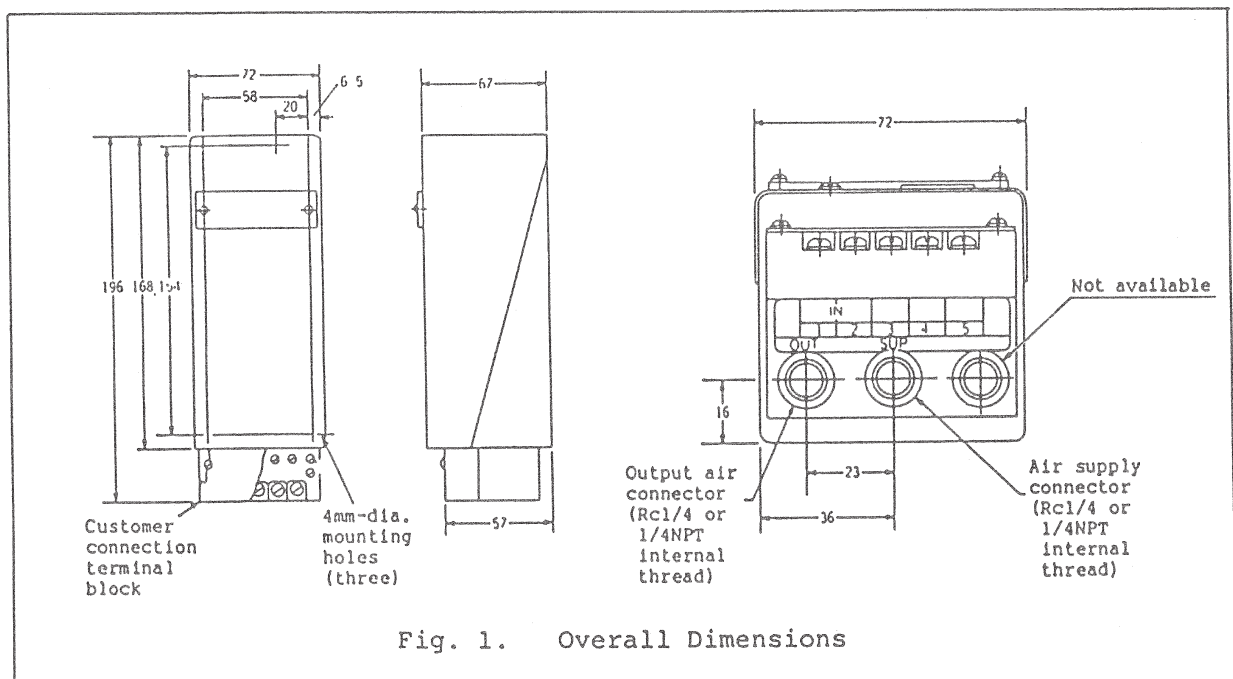


Fig. 1. Overall Dimensions

3. OPERATING PRINCIPLE

The electrical input signal (current signal) is converted by the magnet unit into a mechanical force which causes the beam position to change. The change in beam position is converted by the nozzle/flapper mechanism into a pneumatic signal, which is boosted by the pilot relay into the pneumatic output signal. The pneumatic output signal is fed back via the feedback bellows to the beam, thereby attaining an equilibrium state. Thus, the electrical input signal is converted into a pneumatic output signal which is directly proportional to the input signal.

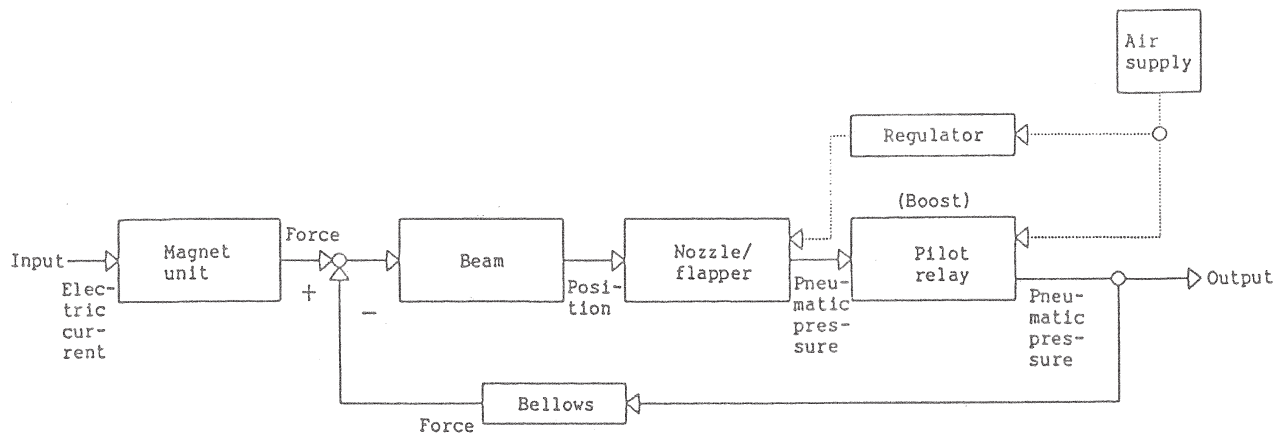


Fig. 2. Block Diagram of I/P Converter

4. INSTALLATION

4.1 Installation Dimensions and Method

For the installation dimensions, see Fig. 1. The casing can be fixed directly to a panel with three #6 screws (supplied) at the locations indicated with the asterisks in Fig. 3.

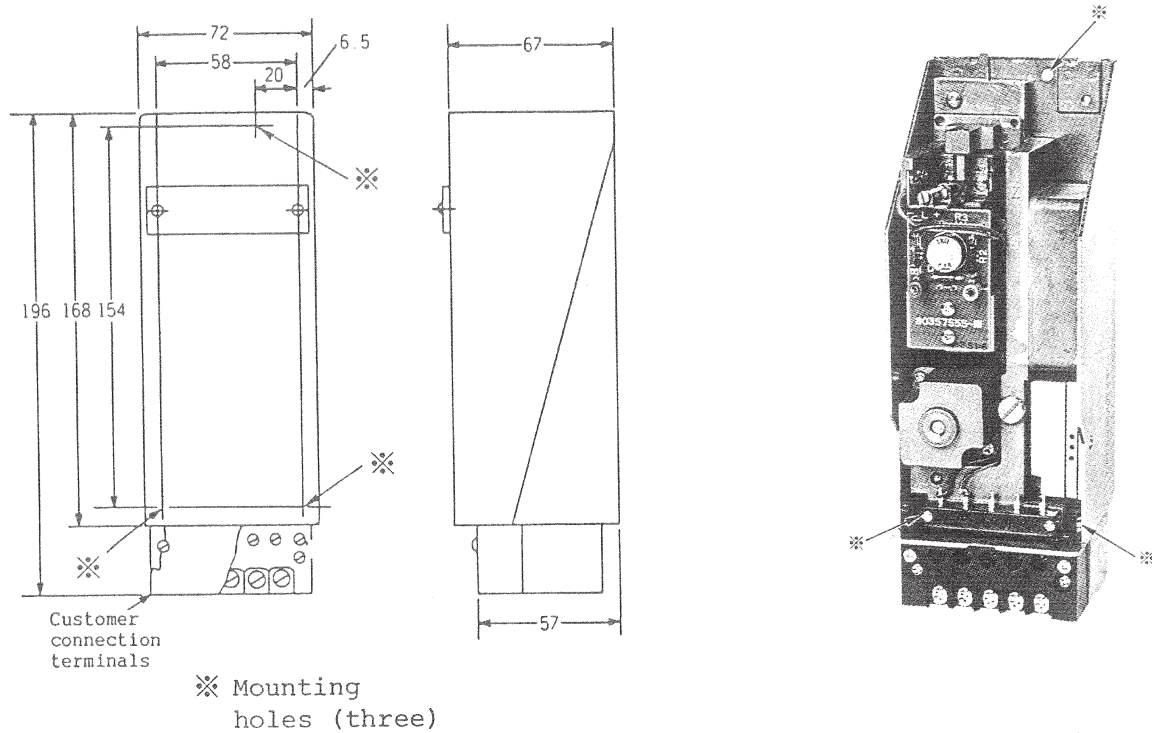


Fig. 3. Locations of Mounting Holes

4.2 Ambient Conditions

The place of installation should be of the specification temperature and humidity ranges and should be reasonably free from mechanical vibration.

4.3 Customer Connections

(1) Electrical Input Signal Connections

Connect the electrical input signal in the correct polarity. The terminal screws are of M3 x 6mm.

The instrument has no internal fuse or switch. Provide them externally (employing a wiring block, recommendably).

(2) Air Connections

The air connectors [Rc1/4 (or 1/4NPT internal thread)] are located at the bottom of the casing. Remove the cap and connect an air supply to the SUP connector and an output piping to the OUT connector.

For the air supply, provide a clean air via an Airset (a regulator and a filter) at a pressure of $1.4 \pm 0.1 \text{ kgf/cm}^2$.

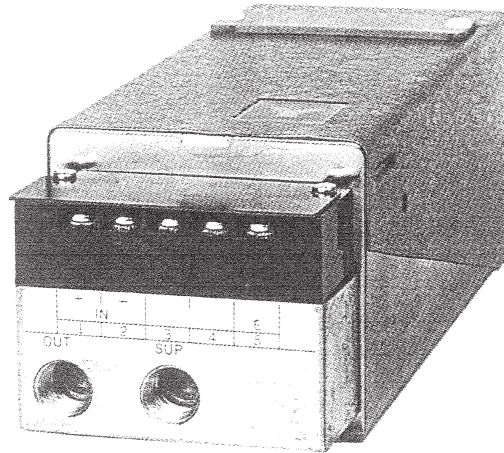


Fig. 4. Air Connectors

5. OPERATION PROCEDURE

When the I/P Converters are installed and electrical wiring and air piping are done, they are ready to operate. Provide the air supply.

Note: An input check diode (equivalent impedance 300 ohms) is provided in the input circuit of I/P converter. When converter or receiving instruments are operated in parallel (in series for the DC current signal), it is possible that overloading is caused to the output circuit of the signal source instrument (such as a controller). To prevent overloading, short the diode by connecting the socket jumper to the two pins which is located between the CHECK terminals on the front panel of the converter. (See Fig. 5.)

6. ADJUSTMENT AND CALIBRATION

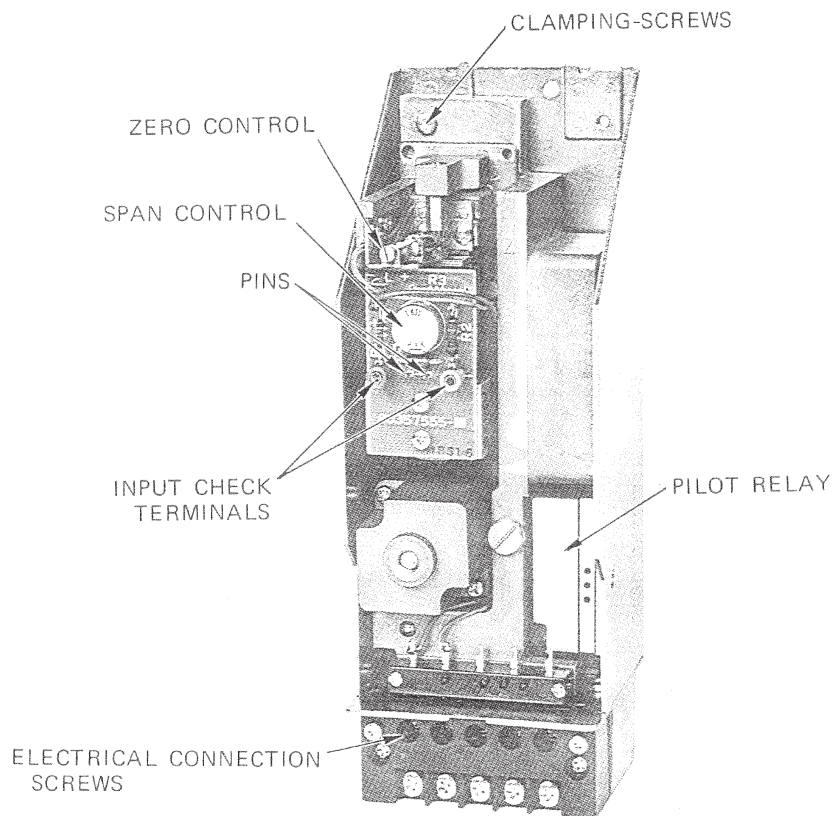


Fig. 5. Layout of Components

- (1) Connect an air supply and a precision pressure gauge to the SUP and OUT connectors, respectively, at the bottom of the I/P converter.

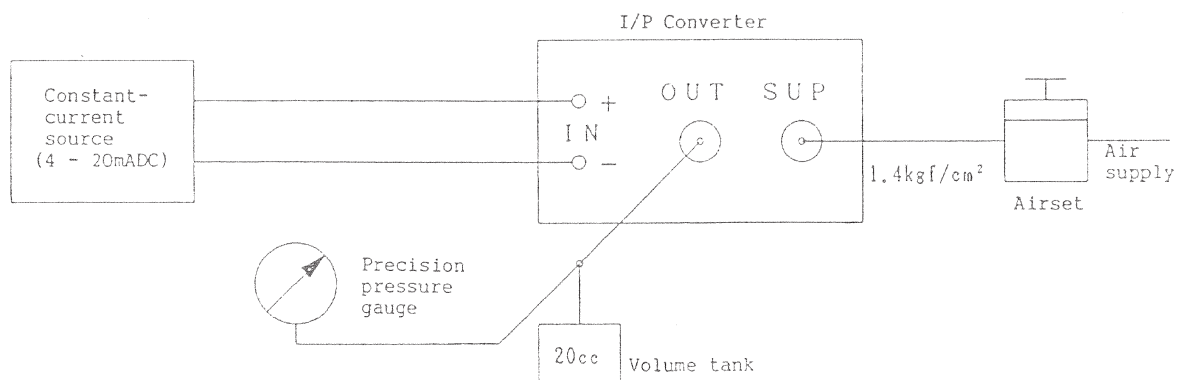


Fig. 6. Adjustment and Calibration Setup

- (2) Feed a current signal of 4mA from the constant-current source and read the output pressure.
- (3) Adjust the ZERO control with a screwdriver so that the output pressure becomes 0.2kgf/cm² [$\pm 0.25\%$]. The output pressure increases as you turn the ZERO control clockwise.
- (4) Feed a current signal of 20mA from the constant-current source and read the output pressure.
- (5) Adjust the SPAN control with a screwdriver so that the output pressure becomes 1.0kgf/cm² [$\pm 0.25\%$]. The output span becomes wider as you turn the SPAN control clockwise.
- (6) Repeat the procedures of steps (2) through (5) until the required ZERO and SPAN accuracies are attained concurrently.

7. MAINTENANCE

Normally, the I/P converter requires no maintenance service. When the I/P converter is operated in adverse conditions (such as with dusty air supply), disassemble the pilot relay and clean the restriction hole (employing a steel wire of 0.25mm dia.) and the port and seat (employing a soft cloth).

To disassemble the pilot relay, proceed as follows:

- (1) Remove the clamping-screws (see Fig. 5). Loosen the five electrical connection screws.
- (2) Exercising care not to touch the converting mechanism, detach the chassis assembly from the casing by pulling the chassis assembly upward.

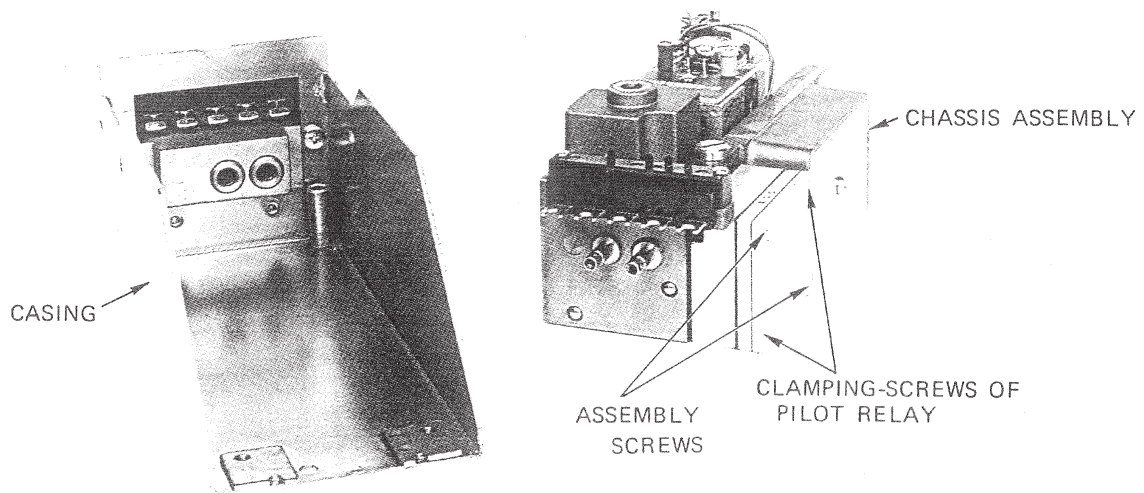


Fig. 7. Casing and Chassis Assembly

- (3) Remove the two mounting-screws of the pilot relay. Now the pilot relay can be disassembled by loosening its two assembly screws.
- (4) When the pilot relay is removed, a very fine hole (a hair sized hole) on the chassis assembly side becomes accessible. The hole acts as a restriction. Clean the hole employing a fine steel wire (0.27mm dia.).
- (5) To assemble the pilot relay, follow the above disassembly procedure in the reverse order.

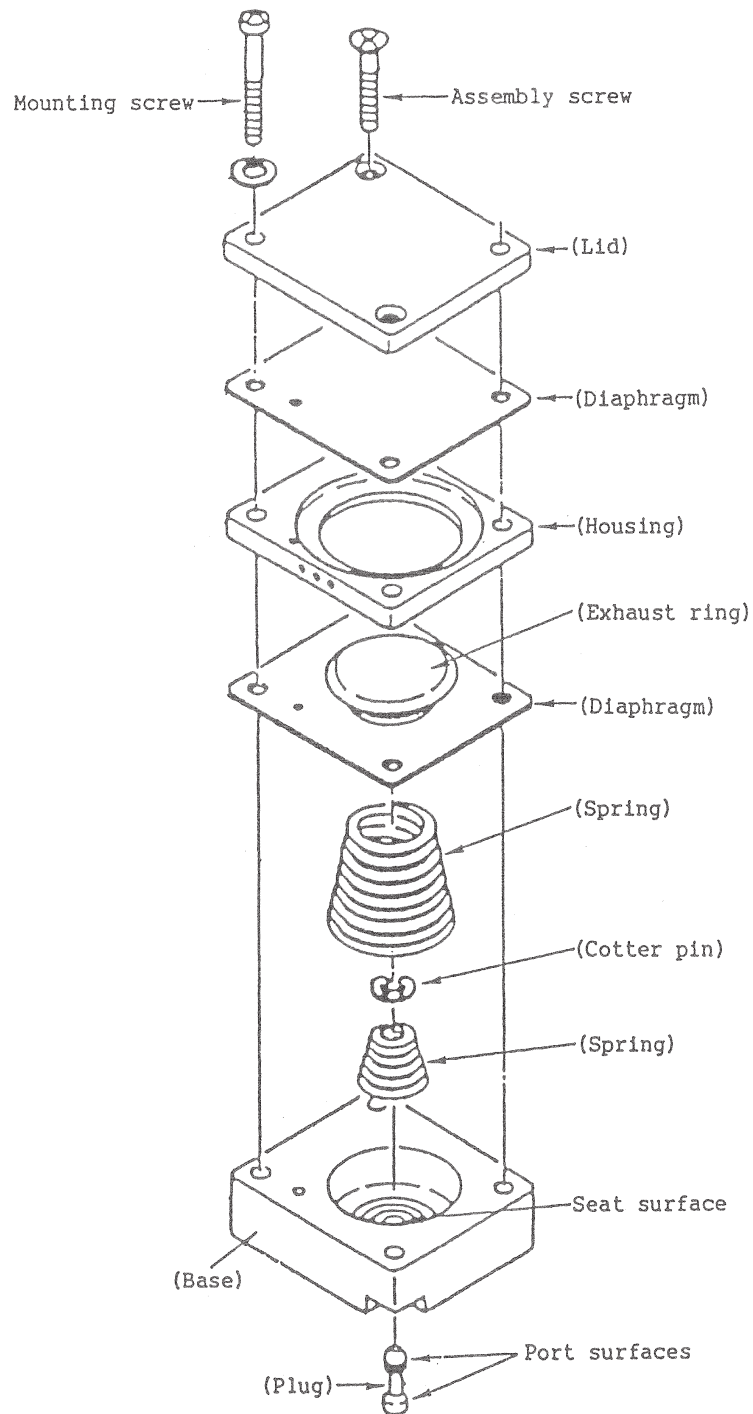


Fig. 8. Exploded View of Pilot Relay

Note: The plug spring and cotter pin remain in the assembled state. They are not required to be disassembled for cleaning. For cleaning, press the upper port surface downward.

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 inquiries 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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