



123830-P1  
Rev A, 1/99  
Instruction Manual

# MKS Type 148J Pressure and Flow Control Valve

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## WARRANTY

### Type 148J Equipment

MKS Instruments, Inc. (MKS) warrants that the equipment described above (the "equipment") manufactured by MKS shall be free from defects in materials and workmanship for a period of one year from date of shipment and will for a period of two years from the date of shipment, correctly perform all date-related operations, including without limitation accepting data entry, sequencing, sorting, comparing, and reporting, regardless of the date the operation is performed or the date involved in the operation, provided that, if the equipment exchanges data or is otherwise used with equipment, software, or other products of others, such products of others themselves correctly perform all date-related operations and store and transmit dates and date-related data in a format compatible with MKS equipment. THIS WARRANTY IS MKS' SOLE WARRANTY CONCERNING DATE-RELATED OPERATIONS.

For the period commencing with the date of shipment of this equipment and ending one year later in the case of defects in materials and workmanship, but two years later in the case of failure to comply with the date-related operations warranty, MKS will, at its option, either repair or replace any part which is defective in materials or workmanship or with respect to the date-related operations warranty without charge to the purchaser. The foregoing shall constitute the exclusive and sole remedy of the purchaser for any breach by MKS of this warranty.

The purchaser, before returning any equipment covered by this warranty, which is asserted to be defective by the purchaser, shall make specific written arrangements with respect to the responsibility for shipping the equipment and handling any other incidental charges with the MKS sales representative or distributor from which the equipment was purchased or, in the case of a direct purchase from MKS, with the MKS home office in Andover, Massachusetts, USA.

This warranty does not apply to any equipment which has not been installed and used in accordance with the specifications recommended by MKS for the proper and normal use of the equipment. MKS shall not be liable under any circumstances for indirect, special, consequential, or incidental damages in connection with, or arising out of, the sale, performance, or use of the equipment covered by this warranty.

MKS recommends that all MKS pressure and flow products be calibrated periodically (typically every 6 to 12 months) to ensure accurate readings. When a product is returned to MKS for this periodic re-calibration it is considered normal preventative maintenance not covered by any warranty.

THIS WARRANTY IS IN LIEU OF ALL OTHER RELEVANT WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, AND ANY WARRANTY AGAINST INFRINGEMENT OF ANY PATENT.

Instruction Manual

Pressure and Flow Control Valve

Type 148J

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The contents of this manual may be changed without notice for improvements etc.

March 1994

## Section 1

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### Outline and Specifications

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#### 1.1 Outline

The control valve 148J has been developed as an electro-magnetic valve with a metal seal.

By use with an MKS controller and suitable pressure and flow sensors, gas will be controlled at high speed and long-time stability will be maintained when control voltage is supplied.

The control valve 148J has the following features:

- 1) The dead space has been reduced by use of a small-size plunger.
- 2) Since the dynamic range for Cv value is large, the gas flow at the time of full open can be several times of the full scale range and the valve has a longer life.
- 3) External adjustment is available to remove internal leaks and to maintain the normal condition.
- 4) Extremely low leakage is realized by a metal seal.
- 5) Super-precision electrolytic polishing is made as standard on 80% of the entire surface in contact with the gas.

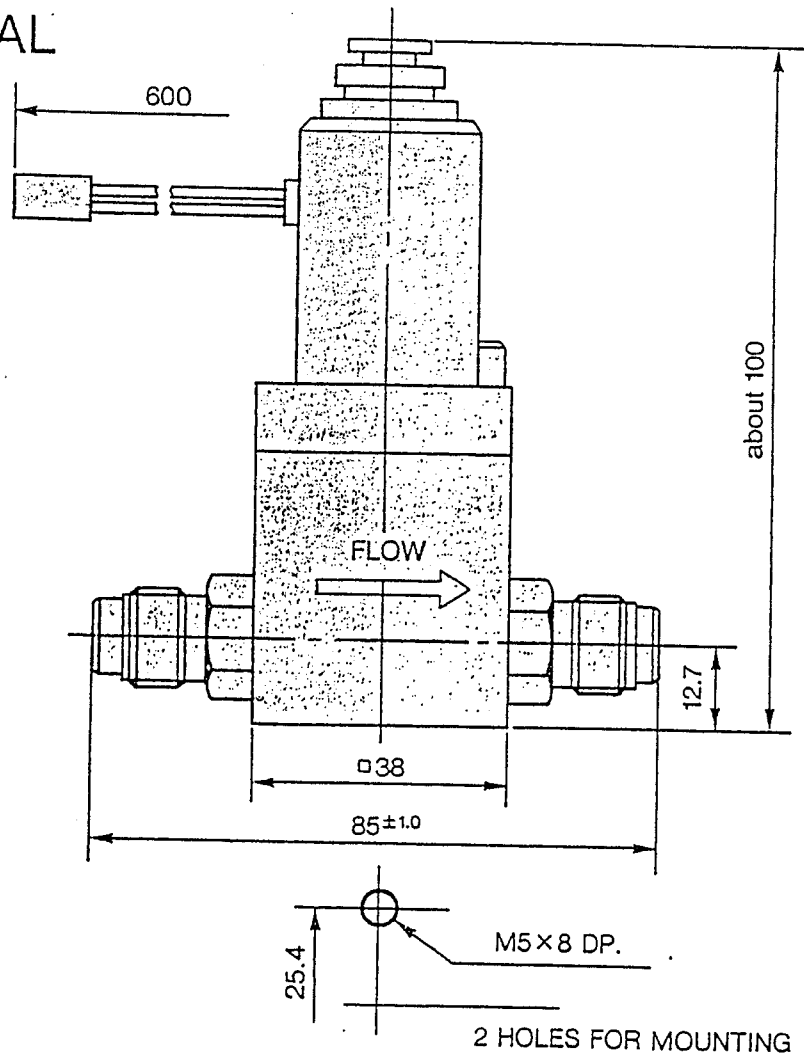
## 1.2 Specifications

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Flow volume (converted to N <sub>2</sub> )	10 to 50000 SCCM full scale
Flow control resolution	0.2% of FS < 100 SCCM
(Reference value)	0.1% of FS > 100 SCCM
Max. Inlet pressure	10 kgf/cm <sup>2</sup> G
Response time	15 msec
Operating current	150 mA (max.)
Internal leak standard	1% of FS or less, N <sub>2</sub> (differential pressure 1 kgf/cm <sup>2</sup> G)
External leak standard	1 x 10 <sup>-10</sup> atm.cc/sec (He) or less
Operating temperature	Specified temperature in the range of 15 to 150°C (adjustment is required at the operating temperature)
Valve type	Normally closed (metal sealed solenoid)
Material in contact with the gas	SUS 316, corrosion-resistant magnetic material, PTFE
Seal material	Nickel C-ring
Piping joints	1/4" VTF male thread (VCR compatible)
Weight	About 0.8 kg

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# DIMENSIONAL DRAWING



UNIT: mm

## Section 2

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### Installation and Operation

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#### 2.1 Connection

- 1) Highly pure gas and a filter should be used in order to prevent the control valve from damage due to impurities etc.  
Entry of dirt etc. into the control valve will cause trouble.
- 2) Connect the gas piping so that the flow direction coincides with the arrows.
- 3) The piping joints are 1/4" VTF fittings with male thread. (VCR compatible)
- 4) After connecting the valve, execute a helium leak test.
- 5) Connect the electric connectors. (Refer to 2.2 Connector Connection.)
- 6) When required, the valve base can be fixed through the two M5x8 mounting holes.

#### 2.2 Operation

- 1) After connection is correctly completed, power on the controller and start operation.
- 2) Refer to the instruction manual of the controller being used.



### 3) Orifice adjustment

A leak test is executed on all 148J before shipping from the factory. When no power is supplied and a differential pressure of 1 atmosphere is applied, the valve has an internal leakage of 1% of full scale ( $N_2$ ).

When leakage is caused by wear from normal use, adjustment is possible by turning the adjustment nut at the coil clockwise.

Turn the adjustment nut clockwise by 5 to 10 degree to confirm a change in the leakage condition.

Turn the nut by another 10 to 15 degree until the leakage stops. Note that excessive turning can cause a serious damage.

When the leakage can not be reduced by adjusting the adjustment nut, the following problems may exist:

1. Gas type, differential pressure, etc. not according to the specifications.
2. Internal dirt.

#### Note:

When a valve bias voltage has been set, the valve does not close completely. Accordingly, the bias voltage should be set at 0 V or the cable from the controller should be disconnected at the time of orifice adjustment.

## Section 3

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### Cautions for Handling

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- 1) Use of a process gas filter is recommended for the connection. Entry of dirt`etc. into the control valve will cause defects.
- 2) Execute a thorough purging before and after use of active gases.
- 3) As the control valve can not shut off the gas flow completely, a positive shut-off valve should be used according to the application.

## Section 4

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### Product Guarantee

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#### 4.1 Warranty Period

The Company warrants the control valve free from defects in material and/or workmanship for one year from date of shipment.

Warranty period for repaired or replaced parts shall be either of 90 days after repair or replacement or the warranty period described in 4.1. whichever is longer.

The Company, at its option, will repair any units returned intact to the factory, transportation charges prepaid, which the Company, upon inspection, shall determine to be defective in material and/or workmanship, without charge to the purchaser.

#### 4.2 Scope of Warranty

The warranty shall cover the unit only. In no event shall the Company be liable for any direct, incidental or consequential damages of any nature, or losses or expenses resulting from any defective product or the use of any product.

#### 4.3 Exemptions

The warranty shall be invalidated by those as follows, including without limitation thereof:

- 1) Inevitable accidents including natural disaster
- 2) Abuse, misuse, misapplication or improper installation of the product
- 3) Application or keeping of the product in improper environment or conditions
- 4) Application of the product in excess of rated specification, or any remodeling or modifications
- 5) Other cases judged to be out of the Company's responsibility

NOTE: In case applicability of warranty is not clear, the company will disassembly and inspect the returned product for judgement.

Repair Request (Control Valve)

For quick repair, please fill in the following items as far as possible and enclose this sheet with the repair part.

Company name: \_\_\_\_\_

Address: \_\_\_\_\_

Section: \_\_\_\_\_

Name: \_\_\_\_\_ Tel.: \_\_\_\_\_

1. Model

Type: \_\_\_\_\_ Serial No.: \_\_\_\_\_

Range: \_\_\_\_\_ Gas: \_\_\_\_\_

2. Request contents

Repair  Overhaul

Range change (gas: \_\_\_\_\_ flow volume: \_\_\_\_\_ )

Others ( \_\_\_\_\_ )

3. Check points

Actually used gas: \_\_\_\_\_

Zero indication: \_\_\_\_\_

Gas pressure: Inlet \_\_\_\_\_ kgf/cm<sup>2</sup>, Torr

Outlet \_\_\_\_\_ kgf/cm<sup>2</sup>, Torr

Ambient temperature: \_\_\_\_\_ °C

Gas temperature: \_\_\_\_\_ °C

Ambient noise sources:  None

Yes (Frequency: \_\_\_\_\_ Hz, power: \_\_\_\_\_ kW, distance: \_\_\_\_\_ m)

Operation condition:  24 hours continuous  Intermittent

Purging:  None  Yes (gas name: \_\_\_\_\_ )

4. Trouble conditions

Gas flow volume:  No flow  Continuous flow  Indication < actual flow volume  Indication > actual flow volume

Indication:  Always zero  Always negative  Always scale-over  Setting ≠ Indication

Others:  Slow response ( \_\_\_\_\_ sec)  Leakage  Unstable output (conditions: \_\_\_\_\_ )

5. Trouble occurrence conditions

Suddenly  Gradually  From time to time  At the time of use start  At the time of gas cylinder exchange

6. Estimate:  Required  Not required

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