

Extreme High Vacuum Gauge AxTRAN ISX2 Ouick Manual

Introduction

This quick manual is for quick check of operation and display of the product. Please refer to instruction manual attached in advance for detailed information about operation, precautions and safety for proper use. Available for download from ULVAC website. https://showcase.ulvac.co.jp/en

This manual is for the following gauges. Serial Nos. 00100 and higher

1[Torr]=1.3332 × 10-²[Pa] $1[Pa]=7.5006 \times 10^{-3}[Torr]$

1.Initialization

1.1.1nitializati	on
	Used when AxTRAN is operated for the first time or when the sensor head is replaced. Detects the maximum value of the gas ion peak intensity.
A CAUTION	Take this action when the pressure change is small (about $+/- 5\%$). The maximum value of peak may not be detected.
A CAUTION	Do not take this action when the controller and sensor head were inspected and calibrated in a pair.

In actual operation, the maximum value of the energy spectrum is detected and the optimum value of the pressure measurement condition are set by pressing the "INT" switch. This action ends in about 10 minutes. Recorder output is 10 V during this action. Please confirm that a pressure instructions level is stable.

1.2. Sensitivity Factor Setting

Sets the sensitivity factor peculiar to the sensor head. The peculiar sensitivity coefficient lists it in the label of the gauge head.

If the 'PROG' key is pushed for two seconds at the measurement mode, it becomes a set mode. 'PROG' The key is pushed several times, and it changes to sensitivity coefficient setting 'SEnS'.

2. Installation

2.1. Connecting the Controller and Sensor Head



3. Flow of Program Run

3.1. Measurement Mode and Program mode

If the 'PROG' key is pushed for two seconds at the measurement mode, it becomes a set mode. 'PROG' 'PROG' It becomes the following setting in each pushing the key once, and it becomes a measurement mode next to the last auto offset or the baud rate setting mode. It becomes a measurement mode by pushing for two seconds at a set mode.

3.2. Initial Setting

Mode	Display	Set Value
SETPOINT-1	SEt-1	1.00 -3

SETPOINT-2	SEt-2	1.00-10
Sensitivity factor set value	SEnS	2.30 -2
Specific sensitivity factor set value	REL	1.00
Degassing time set value	dGS	015.00
Filament	FIL	FIL 1
Recorder output	rEC	rEC 2
Filter setting	FLt	FLt 01
Select auto offset time	OFS	OFS 02
Setting Baud Rate	BPS	9600

3.3.Measurement Mode and Program mode

If the 'PROG' key is pushed for two seconds at the measurement mode, it becomes a set mode. 'PROG' 'PROG' It becomes the following setting in each pushing the key once, and it becomes a measurement mode next to the last auto offset or the baud rate setting mode. It becomes a measurement mode by pushing for two seconds at a set mode.

3.4. Setting of Setpoint

Numeric values that can be set are: 9.99×10^{-3} to 0.00×10^{-10} Pa If the [] key is pressed after entering a numeric value out the settable range, [Err 12] error will be displayed for about 1 second.

3.5. Sensitivity Factor Setting

The sensitivity factor can be set from 9.99 \times 10⁻¹ to 0.00 \times 10⁻⁴ Pa.

3.6. Specific Sensitivity Factor Function Setting

Numeric values that can be set are $9.99 \times 10^{\circ}$ to 0.00×10^{-2} . If the [] key is pressed after entering a numeric value out the settable range, [Err 12] error will be displayed for about 1 second.

3.7. Degas Time Setting

Sets the degassing time 000.0 to 999.9 hours.

3.8. Fila,emt No. Selection

FIL:1 \Rightarrow Filament1, $FIL:2 \Rightarrow Filament2$

3.9. Filter Setting

5.5. Fliter Setting				
Sets the measurement time at a pressure below 10^{-9} Pa.				
Value content Value content				
00	No filter	30	Moving average 30 times	
01	1 second (default)	60	Moving average 60 times	
10	Moving average 10 times	90	Moving average 90 times	

3.10. Offset Adjustment Interval Setting

Offset pressure may not be measured correctly especially at a low pressure if there is a change in the ambient temperature. It can be used effectively especially when measuring a pressure with high accuracy below 10⁻⁸ Pa

Value	content	Value	content	
00	manual offset mode	06	adjustment at every 6 hours	
01	adjustment at every 1 hour	12	adjustment at every 12 hours	
02	adjustment at every 2 hours	24	adjustment at every 24 hours	

3.11. Setting of Baud Rate

RC-232C Baud Rate : 9600, 19200, 38400 bps

Effective when the option board is mounted.

3.12. Changing over Recorder Output

3.12.1. Setting of Recorder Mode

rEC:1 \Rightarrow Pseudo-LOG mode, rEC:2 \Rightarrow LIN mode

3.12.2. Measurement Value Output in Each Status

Status	Measurement value output voltage
Filament OFF	0.00V
Filament ON [Em. Valid OK]	Voltage corresponding to measured pressure
Filament ON [Em. Valid NG]	0.00V
When pressure protection is activated (Filament is OFF)	10.00V
When measurable lower limit is exceeded	Voltage corresponding to measured pressure (reference value)
When degassing [DEGAS]	10.00V
When offset [OFS]	10.00V
When initialized [INT]	10.00V

3.12.3. LIN Output

An analog voltage of 0 to 10 V proportional to the mantissa part is outputted, that is, 0.00 V when the mantissa part \Box . \Box \Box of the pressure display is 0.00, 1.00 V when it is 1.00, or 9.90 V when it is 9.90.

When pressure is lowering, the range is changed over at a voltage below 0.90 V.

$P = V \times 10^{-s} (Pa)$

P: Pressure , V: Output voltage, S:Measured pressure range



3.12.4. Pseudo LOG Output

 $P = 10 \times (V - E) \times 10^{\circ} (E - 10)$ (Pa)

P: Pressure, V:Output voltage, E:V from which decimal point is rounded down The output voltage has hysteresis by the pressure that increased and the pressure that decreased

Displayed pressure	Output	Displayed pressure	Output
value[Pa]	Voltage[V]	value[Pa]	Voltage[V]
5.00×10^{-3}	7.500	1.00×10^{-7}	3.100
1.00×10^{-3}	7.100	5.00×10^{-8}	2.500
5.00×10^{-4}	6.500	1.00×10^{-8}	2.100
1.00×10^{-4}	6.100	5.00×10^{-9}	1.500
5.00×10^{-5}	5.500	1.00×10^{-9}	1.100
1.00×10^{-5}	5.100	5.00×10^{-10}	0.500
5.00×10^{-6}	4.500	1.00×10^{-10}	0.100
1.00×10^{-6}	4.100		
5.00×10^{-7}	3.500		

Pressure that Increase [Pa]	Output Voltage[V]	Pressure that decrease [Pa]	Output Voltage[V]
1.00×10^{-3}	7.100	8.99×10^{-4}	6.899
0.90×10^{-3}	7.090	9.00×10^{-4}	6.900
8 99 × 10 ⁻⁴	6 899	1.00×10^{-3}	7.100



3.12.5. Resolution and Output Period

The recorder output is delivered by a 12-bit A/D converter. 2.5mV=10.24(VRef)/4096(12bit) Output period: 0.1s

4.Specifications and Components

4.1. Standard Specifica	tions		
Name	Model ISX2 extreme-high vacuum gauge		
Compatible sensor head	1 pc.		
Pressure display	Mantissa part 3 digits, exponent part 2 digits display		
Pressure protecting function	Filament is automatically turned off at 9.99×10^{-3} Pa or more.		
Electron current value	1.0 mA		
Degassing function	Electron bombardment system 300 V 5 mA		
	Degassing time: can be set from 0.0 to 100 hours Automatically returns to measurement mode with elapse of degassing time		
Sampling time	Display output 10 ⁻⁸ Pa or more : 0.1 sec interval 10 ⁻⁹ Pa or less : One of 0.1, 1, 5 and 10 sec intervals selected		
	Recorder output [LIN] 10 ⁻⁸ Pa or more : 0.1 sec interval 10 ⁻⁹ Pa or less : One of 0.1, 1, 5 and 10 sec intervals selected		
	Recorder output [LOG] 10 ⁻⁸ Pa or more : 0.1 sec interval 10 ⁻⁹ Pa or less : One of 0.1, 1, 5 and 10 sec intervals selected		
Set point	Independent 2 points can be set at set value $\square.\square \times 10\square$		
	Relay contact output (a contact)		
	Contact capacity AC: 125V max., 0.5 A max. Contact capacity DC: 24 V max, 1.0 A max.		
Sensitivity factor setting function	Sensitivity factor for nitrogen can be set.		
Specific sensitivity	Specific sensitivity factors for various types of gas can be		
factor setting function	set.		
Filament 1/2	Can be changed by the program mode on front panel/external I/O and RS-232C (external I/O, communication function are optional)		
Recorder output	Each digit mantissa part linear output [LIN] 0 to 10 V		
	All measurement ranges pseudo-log. Output [LOG] 0 to 10 V		
Output impedance	Approx. 100Ω		
Resolution	LIN: 10 mV, LOG: 1 mV		
Operating temperature	$10\sim 40$ °C		
range			
Line voltage	AC100~240V 50/60Hz, 30Wmax		
Fuse	250V 2A		
Outside dimensions	W240mm \times D380mm \times H99mm		
Weight	5.3kg		

4.2. Option Board

External control input signal		Actuated by relay contact input and open collector input, negative logic
		Control switching: [REMOTE / LOCAL]
		Filament: [ON / OFF]
		Filament: [2 / 1]
		DEGAS: [ON / OFF]
		OFFSET: [ON / OFF]
		PROTECT : [ON / OFF]
		Open collector output, negative logic
Control o	output signal	[Rating: 24VDC _{MAX} , 50 mA _{MAX} , Saturation voltageis 1V]
	1	Pressure Mantissa part 2 digits, exponent part 2 digits
		\Box . \Box × 10 \Box \Box in BCD code
		Power : [ON / OFF]
		Filament : [ON / OFF]
		Electron current : [1mA]
		Degas : [ON / OFF]
		Emission valid : [OK / NG]
Communication		
	Format	RS-232C
	Baud rate	9600/19200/38400 bps

4.3.	Performance
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4.5. Performance			
Compatible sensor head	X-11		
Measurable pressure range	9.99×10^{-3} to 0.5×10^{-10} Pa		
Measurement accuracy	Within $\pm 15\%$ (before shipment)		
Measurement conditions	Grid potential	: 110 V	
	Filament potential	: 10 V	
	Collector potential	: 0 V	
	Electron current	: 1.0 mA	
	Sensor head sensitivity	: 0.023 Pa ⁻¹ (average	
		value)	
Baking temperature	Sensor head : 300°C		
	Ion collector cable : 80°	C 、Sensor cable : 150℃	
4.4. Standard Accessories			

External input/output connector	D-Sub 9-pin	1 pc.
Power cable	125 V, 10 A, 3-wire cable, 3 m long	1 pc.
Quick manual	This paper	1 copy
Quick manual	This paper	1 00

4.5. Options	
Sensor head	X-11
Sensor head cable	 5, 10, 20 m * Junction box and intermediate cable are required to use a cable 20 m or longer. * The specifications of the gauge head cable are different from S/N 01482.
Option board	

5. Nomenclature and Functions of Components 5.1. Operation Switch



Name		Function		
1	POWER	Pressing this push-button switch turns on power and a second press on it turns it off. When the power is on, the LED in the switch lights.		
2	FIL	Used to turn on/off the filament. The first press on the key turns on the filament and a second press turns it off.		
3	DEG	Used to turn on/off degassing. The first press on the key turns on degassing and a second press turns it off. Degassing is automatically turned off after a preset time.		
4	OFFSET	Adjusts the offset of the measuring system. Pressing the key selects the offset mode and returns to the normal measurement in about 3 minutes.		
5	O PRG	Switch to change over to the setting mode. Each press on the switch changes over the set mode. Holding down the key for 2 seconds or more reverts to the measurement mode.		
6	Δ	UP switch (Δ)		
$\overline{\mathcal{O}}$	\triangleright	Shifts a digit to the right.		
8	A.	Used to store a set value in memory. A set value cannot be changed unless this switch is pressed because it is not stored in EEPROM.		
9	INT	Used when AxTRAN is operated for the first time or when the sensor head is replaced. Detects the maximum value of the gas ion peak intensity.		







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5.4. EXT-I/O Connector (D-sub9pin socket) (Standard type)

No	Signal ide	entification	No	Signal ide	ntification
1	REC-OUT(+)	(OUT-PUT)	6	REC-OUT(-)	(OUT-PUT)
2	SET1	(OUT-PUT)	7	SET-COMMON	(OUT-PUT)
3	SET2	(OUT-PUT)			

5.5.EXT-I/O Connector (DDK 57series 50Pin) (Option)



No	Signal identification		No	Signal identification	1
1	SET1 COM	(OUT)	26	SET2 COM	(OUT)
2	SET1 a contact	(OUT)	27	SET2 a contact	(OUT)
3	SET1 b contact	(OUT)	28	SET2 b contact	(OUT)
4			29		
5	EXT-OUT COM	(OUT)	30	PRESSURE · DATA A-B0	(OUT)
6	POWER ON / OFF	(OUT)	31	PRESSURE · DATA A-B1	(OUT)
7	FILAMENT ON / OFF	(OUT)	32	PRESSURE · DATA A-b2	(OUT)
8			33	PRESSURE · DATA A-b3	(OUT)
9			34	PRESSURE · DATA B-b0	(OUT)
10	DEGAS ON / OFF	(OUT)	35	PRESSURE · DATA B-b1	(OUT)
11	EMISSION · VALID ON / NG	(OUT)	36	PRESSURE · DATA B-B2	(OUT)
12	DATA · VALID OK / NG	(OUT)	37	PRESSURE · DATA B-b3	(OUT)
13	PRESSURE · DATA - / +	(OUT)	38	PRESSURE · DATA C-b0	(OUT)
14	PRESSURE · DATA C-b3	(OUT)	39	PRESSURE · DATA C-b1	(OUT)
15	PRESSURE · DATA D-b0	(OUT)	40	PRESSURE · DATA C-b2	(OUT)
16	RS232C TXD		41	RS232C GND	
17	DEGAS ON / OFF	(IN)	42	LOCAL / REMOTE	(IN)
18	EXT-PROTECT OK / NG	(IN)	43	FILAMENT ON / OFF	(IN)
19	EXT- 5V INPUT-COM	(IN)	44		
20	EXT-24V INPUT-COM	(IN)	45	FILAMENT 2 / 1	(IN)
21			46	OFFSET ON / OFF	(IN)
22	RS232C RXD		47		
23	GND		48	GND	
24	GND (REC-OUT -)		49	GND	
25	REC-OUT +	(OUT)	50		
A, B, C and D in PRESSURE DATA A-b0 etc. are equal to «A. B D 10 DC» on the					

indicator

The ___ display in the "Signal Identification" indicates the LOW (short, negative logic) status.

6. External Input / Output 6.1. Setpoint Output

AC:125V_{MAX}, 0.5A_{MAX} DC:24V_{MAX}, 1.0A_{MAX} Standard type Option board installed COM сом -0 1 a contact SFT1 a contact -02 SET1 -0 0-___ b contact -0.3 сом COM -026 a contact SET2 a contact -027 SET2 -0 0--0 0 b contact -028

6.2. External Digital Output (Option)



6.3. External Control Input (Option) AxTRAN ISX2 . _ . . _ . . _



7. About the Malfunction indication

Display	Content
Err.11	The filament has blown out. Or cable unconnection state.
Err.12	Set error
Err.13	The filament is automatic off in DEGAS.
Err.14	The filament has blown out in DEGAS.

8. Warranty

This product was shipped after rigid company inspection. However, in case any failure occurs under ULVAC's responsibility, such as defect in manufacturing and damage during transportation, Buyer shall inform ULVAC, Inc. or the local ULVAC representatives. ULVAC will repair or exchange it at free of charge.

Warrantable Items: This unit (controller)

Duration of guarantee

Within one year of the shipping date.

Warrantee scope

- 1) Domestic business in Japan: Product, which has damage, caused by a failure on delivery.
- 2) Direct export transaction: Product, which has damage, caused by a failure on delivery. The warrantee scope shall confirm to the new INCOTERMS.
- 3) Products not satisfying meet the standard specifications although the product is used under the normal service conditions such as temperature range and power etc.
- Response procedure
- 1) Domestic business in Japan: ULVAC send a replacement or Buyer return the defective items to ULVAC, Inc. or to the local ULVAC representatives for repair. If field service is required, Buyer shall ask ULVAC, Inc. or the local ULVAC representatives.
- 2) Direct export transaction: ULVAC send a replacement or Buyer return the defective items to ULVAC, Inc. or to the local ULVAC representatives for repair. Return charge shall be paid by Buyer.

Disclaimer

- 1) Failure occurred after expiration of warranty period
- 2) Failure caused by force majeure, such as fire, storm and flood damage, earthquake, lightning strike, war etc
- 3) Failure occurred due to carelessness handling or faulty usage
- 4) Products remodeled, disassembled or repaired without ULVAC's acceptance
- 5) Failure occurred under abnormal environment, such as intense electromagnetic field, radiation, high-temperature, high-humidity, flammable gases, corrosive gases, dust etc.
- 6) Failure occurred by noise
- 7) Product deficiency or secondary damnification occurred to Buyer, from law suit to ULVAC by third party for patent infringement.
- 8) Sensor head being used (expiration of life, measurement error, etc.)
- 9) Sensor head cable being used (cable burnout due to improper installation, poor contact, etc.)

Others

- 1) In case, special agreement or memorandum for specifications is made individually, the descriptions are prior to this article "13 Product Warranty".
- 2) Buyer shall inform ULVAC when this product is exported out of Japan. In the meantime, Buyer shall take necessary procedures according to Foreign Exchange and Foreign Trade Law.
- 3) As for the question and consultation, Buyer shall check the model and serial number and ask the local representative or ULVAC, Inc.
- 4) The content of this document is subject to change without notice in future.

9. Certificate of Contamination

Please enter the operating condition/trouble symptom of your vacuum gauge in this form and submit it to your local ULVAC service station or sales office after signing it. The form is available for download from ULVAC website.

10. Networks

Controller side

ULVAC, Inc. http://www.ulvac.co.jp/eng/ Service Centers http://www.ulvac.co.jp/eng/support/service/index.html Sales Office http://www.ulvac.co.jp/eng/support/sales_office/index.html

> ULVAC, Inc. Components Division, http://www.ulvac.co.jp/