

G-TRAN Series 1-Channel Display Unit Model ISG1 Specifications



This specifications is for the display units of the following serial numbers: Serial No. 09501 and higher.

Model	Serial numbers
ST200-A Multi Ionization Gauge	00001~
SH200-A Multi Ionization Gauge	00001~
ST2-1 Multi Ionization Gauge	00901~
SH2-1 Multi Ionization Gauge	06001~
SC1 Cold-Cathode Ion Gauge	02300G~
SW100-A Pirani Vacuum Gauge	00001~
SW1-1 Pirani Vacuum Gauge	00001~
SP1 Pirani Vacuum Gauge	00001~
CCMT-D series Ceramic Capacitance Manometer	00001~

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

1. SPECIFICATIONS

	Name	1-channel digital display unit ISG1		
Number	of sensor units	1 pc.		
connected	1			r
Sensor un	nit	G-Tran	Pirani sensor unit SP1	4.0×10^{-1} to $3.0 \times 10^{+3}$ Pa
		series	Pirani box unit BPR2	4.0~10 10 5.0~10 1 a
			Pirani sensor unit SW100-A ^{*2}	5.0×10 ⁻² to 1.0×10 ⁺⁵ Pa
			Pirani sensor unit SW1-1	5.0×10 ⁻² to 1.2×10 ⁺⁵ Pa
			Cold cathode ionization gauge SC1	1.0×10 ⁻⁵ to 1.0×10 ⁺⁰ Pa
			Hot cathode ionization gauge BMR2	5.0×10^{-8} to $9.9 \times 10^{+0}$ Pa
			Multi-Ionization SH200-A/SH2-1	5.0×10^{-8} to $1.0 \times 10^{+1}$ Pa
			Multi-Ionization SH200-A/SH2-1 (SWU Combination mode)	5.0×10^{-8} to $1.0 \times 10^{+5}$ Pa
			Multi-Ionization SH200-A/SH2-1 (SPU Combination mode)	5.0×10^{-8} to $1.0 \times 10^{+4}$ Pa
			Multi-Ionization SH200-A/SH2-1 (SAU Combination mode)	5.0×10^{-8} to $1.0 \times 10^{+5}$ Pa
			Multi-Ionization ST200-A/ST2-1	1.0×10^{-5} to $1.0 \times 10^{+1}$ Pa
			Multi-Ionization ST200-A/ST2-1 (SWU Combination mode)	1.0×10 ⁻⁵ to 1.0×10 ⁺⁵ Pa
			Multi-Ionization ST200-A/ST2-1 (SPU Combination mode)	1.0×10^{-5} to $1.0 \times 10^{+4}$ Pa
			Multi-Ionization ST200-A/ST2-1 (SAU Combination mode)	1.0×10 ⁻⁵ to 1.0×10 ⁺⁵ Pa
		Ceramic capacitance	CCMT-1000A/1000D CCMH-1000A	$0.0 \times 10^{+1} \sim 1.3 \times 10^{+5}$ Pa ^{*1}
		manometer	CCMT-100A/100D CCMH-100A	$0.0 \times 10^{+0} \sim 1.3 \times 10^{+4} \mathrm{Pa}^{*1}$
			CCMT-10A/10D CCMH-10A	0.0×10 ⁻¹ ~1.3×10 ⁺³ Pa ^{*1}
			CCMH-1A CCMT-1D	0.0×10 ⁻² ~1.3×10 ⁺² Pa *1
Analog in	iput	Reading the a	nalog signal (voltage) from th	ne sensor
	Update time	70ms		
	Internal	5 times movin	ng average	
	processing			
	Resolution	0.2mV		

Display		Digital display of mantissa part 2 digits, exponential pa	rt 1 digit
Г г	** 1		
-	Unit	Pa	
-	Pressure range	Pressure range of each sensor unit	
-	Update time	200ms	
	Accuracy	$\pm 2\% \pm 1$ digit against the pressure value from the measure	surement unit
		* CCM series: $1/10$ or less of the full scale ± 4 digits	
Analog ou	itput	DC0V to 10V pseudo-log output, log output, linear output * The output differs depending on the unit to be connect	put Ited
Г	Undate time	70ms	
	Resolution		
-	Output error	+10 mV	
-	Impedance	1000	
-		+10mV against the voltage converted value of pressure	display
Control in	nut signal	Actuated by open collector input, negative logic	uispiay
Control III	put signal	Filament, etc. ON/OFF signal, zero point adjustment s	ignal, etc.
Control ou	ıtput signal	Open collector output, negative logic	
		[Rating: 30V _{MAX} , 50mA _{MAX} , 70mW]	
		Signal of error, filament and other on signal and other	S
		Setpoints 1, 2, 3	
LED displ	ay	SET-1, SET-2, SET-3	
		ERROR, DEG, ZERO	
Communic	cation	RS-485	
Bau	d rate	9600/19200/38400bps	
Num	nber of nodes	32 (including host)	
Dist	ance	1200m	
		*Please check a specification of remote host and an envir	ronmental noise
		if you use the cable of 30m or more.	
Men	nory function	Set value by communication is backed up by EEPROM	
CAL funct	tion	Arbitrary value $[1.0 \times 10^{-3} \text{ to } 1.0 \times 10^{+3}]$ is multiplied by the	ne measurement
		value and displayed.	
Line volta	ge	DC24V±1V Ripple and noise below 1%	
Current co	onsumption	2W (display unit alone)	
	-	*Power consumption by other interfaced units is to be a	idded.
		Maximum 30W (when BRM2 is used)	
Correspond	ling standard	CE standard, UKCA standard	
Over-volta	age category	Category I: Connected to a circuit that holds down	transient over-
	0 0 0	voltage at a sufficiently low level	
I/O connec	ctor	· · ·	
Sens	sor unit side	D-sub15 socket (M2.6 screw)	
Con	trol host side	D-sub15 pin (M2.6 screw)	
Pow	ver supply	Phoenix Model MSTB 2.5/3-GF-5.08	
Connected	l cable length	Length of cable from this unit to the sensor unit,	calculated with
		Dirani sensor unit SD1	up to 50m
		Dironi hov unit DDD2	up to 30m
		Pitali DOX Ulit DFK2	up to 100m
		Cold astheda ion gauge SC1	up to 100m
		Use cathode ion gauge DMP2	up to 100m
		Multi Ionization SH200 A/ST200 A SH2 1/ST2 1	up to 10m
		$\begin{array}{c} \text{Wulli Iollization SI200-A/S1200-A, SI2-1/S12-1} \\ \text{Multi Ionization SI200-A/ST200-A, SI22-1/ST2-1} \\ \end{array}$	up to 40m
		(SPU / SWU Combination)	up to 40m
		Multi Ionization SH200 A/ST200 A/SU2 1/ST2 1	up to 10m
		(SAU Combination)	up to 40m
		Ceramic capacitance manometer CCMT series	up to 100m
		Ceramic capacitance manometer CCMH series	up to 15m

Operating temperature	10° C to 40° C
range	
Operating humidity range	15% to 80% (not condensing)
Storage	-20° C to 65 $^{\circ}$ C (non-operating, not condensing)
Weight	250g
Outside dimensions	DIN 48mm×96mm, basic unit 70mm deep
	JIS rack size 50mm×100mm is also available as option.

*1: Pressure display of CCM series: The minimum digit are 1.0, 2.0 ... 9.0, the decimal point is not displayed.

*2: When SW100-A is connected, if the OUTPUT setting of SW100-A is PSG or APG, ISG1 will not be supported. The pressure value is displayed, but it is not displayed correctly.

2. Standard Accessories

Power connector	MSTB 2.5/3-STF-5.08 made by PHOENIX	1 pc.
DIN panel fixing tools	fitting	1 set
Quick manual		1 pc.

3. Options

AC Adapter	OUTPUT: DC24V, INPUT: AC90 to 264V
JIS rack size type	
Display unit cable	2, 5, 10, 15, 20, 25, 30, 35, 40m long
	(between ISG1 and sensor unit)
Sensor unit, sensor head	
D-sub connector (pin)	To sensor connector
D-sub connector (socket)	To I/O connector
JCSS calibration certificate	Only combination with sensor unit
General calibration certificate	Only combination with sensor unit
Inspection certificate	
Traceability certificate	

4. Connection with Sensor

SENSOR	Description	Remarks
1	+24V power output	DC24V power to the sensor unit
2	Sensor error input	An error signal is input from the sensor unit.
4	FIL/HV input	Filament and high voltage status signal are input from the sensor.
5	FIL/HV ON, ADJ adjustment output	Outputs signals such as filament, high voltage, and adjustment to the sensor unit.
6	FIL 1/2 output	Outputs the filament 1/2 switching signal
8	Pressure signal input	A pressure signal is input from the sensor unit.
9	Power supply GND	It is a power supply ground.
13	DEGAS ON output	Outputs degas ON signal to the sensor unit.
15	Pressure signal input	A pressure signal is input from the sensor unit.

* Some pins may not be used depending on the sensor unit used. For details, refer to the instruction manual.

5. Connection with External Devices 5.1. I/O connector

ĨI∕O_	Description	Remarks
2	Output signal	Outputs signals such as errors
2	2 Output signal	Lo when actuated, 30VDC _{MAX} , 50mA _{MAX} , 70mW
3	Setpoint 1 actuating signal	When set point 1 actuates, a signal is output.
	Setpoint i actuaring signal	Lo when actuated, $30VDC_{MAX}$, $50mA_{MAX}$, $70mW$
4	Output signal	Outputs filaments and high voltage signals
	Output Signui	Lo when actuated, 30VDC _{MAX} , 50mA _{MAX} , 70mW
5	Innut signal	Input signals such as filament, high voltage, and adjustment.
5	mput signal	Actuated when shorted with GND
6	Input signal	Input the switching signal of filament 1/2.
0	mput signal	Actuated when shorted with GND
7	Setpoint 3 actuating signal	When set point 3 actuates, a signal is output.
/	7 Setpoint 5 actuating signal	Lo when actuated, $DC30V_{MAX}$, $50mA_{MAX}$, $70mW$
8	Pressure signal output+	Outputs a pressure signal
0		DC0V to 10V
9	Power supply GND	Power supply ground.
10	RS485 -	Output of serial communication RS485 –
		When not point 2 notwated a signal is output
11	Setpoint 2 actuating signal	Lo when actuated DC20View 50mAview 70mW
		Lownen actuated, DC50VMAX, JohnAMAX, JohnW
12	RS485 +	Output of serial communication RS485 +
12 Innut a	Input signal	Input a degas signal
15		Actuated when shorted with GND
15	Signal CND	GND for pressure signal, disconnection signal,
15	Signai GND	setpoint, etc.



5.2. Output signal (Lo when actuated)





Input signal

6. Output voltage

Output voltage is outputted with the I/O connector +[8pin] \rightarrow GND [15 pin].

The sign in a calculating formula

- P : Pressure value (Pa)
- V : Measurement value output voltage (V)
- E : Measurement value output voltage V from which fractions are rounded off

6.1. Pirani gauge SW100-A (When the OUTPUT setting of SW100-A is SW100-A/SW1-1), SW1-1 P=10^(V-3)

Status	Measurement value output voltage
In normal measurement	Voltage corresponding to the measured pressure
Above the measurable higher limit	8.1V or more
Below the measurable lower limit	1.7V or less
When filament has disconnection	9V or more

6.2. Pirani gauge SP1, BPR2

 $P=10 \times (V-E) \times 10^{(E-1)}$

Condition	Measured output voltage
In normal measurement	Voltage corresponding to the measured pressure
Above the measurable higher limit	5.1V
Below the measurable lower limit	0V
When filament has disconnection	9V or more

6.3. Hot cathode gauge BMR2

 $P=10 \times (V-E) \times 10^{(E-8)}$

State	Measurement value output voltage
In normal measurement	Voltage corresponding to measured pressure
Above measurement higher limit	9.9V or more
Below measurement lower limit	0.5V or less
When filament is OFF	9.9V or more

6.4. Multi-Ionization Gauge SH200-A, ST200-A, SH2-1, ST2-1 (Ionization Mode) $P=10\times\{(V-7.25)/0.75+2\}$

Status	Measurement value output voltage
In normal measurement	Voltage corresponding to measured pressure
At above measurement higher limit	9V or more
At below measurement lower limit	0.5V or less
When filament is OFF	9V or more

6.5. Multi-Ionization Gauge SH200-A, ST200-A, SH2-1, ST2-1 (SWU Combination mode) $P=10\times\{(V-7.25)/0.75+2\}$

Status	Measurement value output voltage
During normal measurements	Voltage corresponding to the measured pressure
Atmospheric pressure or higher	9.5V
When filament of ionization gauge is forcibly turned off	Voltage corresponding to the measured by SWU 5V to 9.5V
SH200-A/ST200-A/SH2-1/ST2-1 error	Voltage corresponding to the measured by SWU
(Errors such as a filament disconnection)	5V to 9.5V
SWU error	9.9V or higher
Power supply voltage abnormality, sensor unit fault, etc.	0.1V or less

6.6. Multi-Ionization Gauge SH200-A, ST200-A, SH2-1, ST2-1 (SPU Combination mode) $P=10\times\{(V-7.25)/0.75+2\}$

Status	Measurement value output voltage
During normal measurements	Voltage corresponding to the measured pressure
$1 \times 10^{+4}$ Pa or higher	8.75V
When filament of ionization gauge is forcibly turned off	Voltage corresponding to the measured by SPU 5V to 8.75V
SH200-A/ST200-A/SH2-1/ST2-1 error (Errors such as a filament disconnection)	Voltage corresponding to the measured by SPU 5V to 8.75V
SPU error	9.9V or higher
Power supply voltage abnormality, sensor unit fault, etc.	0.1V or less

6.7. Multi-Ionization Gauge SH200-A, ST200-A, SH2-1, ST2-1 (SAU Combination mode) $P=10\times\{(V-7.25)/0.75+2\}$

Status	Measurement value output voltage
During normal measurements	Voltage corresponding to the measured pressure
Atmospheric pressure or higher	9.5V
When filament of ionization gauge is forcibly turned off	Voltage corresponding to the measured by SWU/SPU, SAU 5V to 8.75V
SH200-A/ST200-A/SH2-1/ST2-1 error	Voltage corresponding to the measured by SWU/SPU,
(Errors such as a filament disconnection)	SAU 5V to 8.75V
SWU/SPU error	Voltage corresponding to the measured by SAU 8.677V to 8.75V
SAU error	9.9V or higher
Power supply voltage abnormality, sensor unit fault, etc.	0.1V or less

6.8. Cold cathode gauge SC1

P=10×(V-E)×10^(E-8)

Status	Measurement value output voltage
In normal measurement	Voltage corresponding to the measured pressure
Above the measurable higher limit	8.1V or more
Below the measurable lower limit	3V
When high voltage is OFF	10V
No discharge	10V

6.9. Ceramic capacitance manometer CCM series

 $P=k\times V\times 13.33$

K		Type of sensor	
1000	CCMT-1000A	CCMT-1000D	CCMH-1000A
100	CCMT-100A	CCMT-100D	CCMH-100A
10	CCMT-10A	CCMT-10D	CCMH-10A
1		CCMT-1D	CCMH-1A

State	Measurement value output voltage	Remarks
In normal measurement	Voltage corresponding to measured	
	pressure	
Above measurable higher limit	10V	The display is "FFF".
Below measurable lower limit	0V	The display blinks.

7. RS-485

7.1. Communication Specifications

Two-wire system		Maximum number	32 (including host)
		of connections	
Half duplex		Baud rate	9600/19200/38400
Start-stop synchronization system		DATA	8 bits
ASCII code		Parity	None
Transmission distance	1200m*	Stopbit	1 bit

* Please check a specification of remote host and an environmental noise if you use the cable of 30m or more.

7.2. Standard Data Format

:	AD0	AD1		CMD	D0	• • • • • •	Dn	SH	SL	CHKH	CHKL	CR	
		:	С	lolon									
		AD0	D	Device address high order 4 bits (uppercase character : $0 - 9$)									
		AD1	D1 Device address low order 4 bits (uppercase character : $0 - 9$)										
	CMD Various commands												
	(note uppercase character/lowercase character)												
		D0	D	Data <4 bit> (uppercase character : 0 - 9, A – F)									
		Dn	D	Data <4 bit> (uppercase character : $0 - 9$, $A - F$)									
		SH	Н	High order 4 bits of status									
		SL	L	ow order	4 bits o	f status							
	(CHKH	Η	ligh orde	r 4 bits c	of checksu	ım						
			(uppercase character : $0 - 9$, $A - F$)										
	(CHKL	Η	High order 4 bits of checksum									
			(1	(uppercase character : $0 - 9$, $A - F$)									
		CR	С	arriage r	eturn								

* Checksum is an exclusive logic sum (XOR) from AD0 to SL.

* Convert all with the ASCII code.

7.2.1. Command list

Command	Description	Command	Description
'D'	Reads measurement value and	'1W'	Writes setpoint 1
	status	'2W'	Writes setpoint 2
'SR'	Reads status	'3W'	Writes setpoint 3
'SW'	Writes status	'ZER'	Adjusts SW100-A/SW1-1 zero point
'T'	Reads software	'ATM'	Adjusts SW100-A/SW1-1
			atmospheric pressure
'1R'	Reads setpoint 1	'CLR'	Resets adjustment of
			SW100-A/SW1-1 zero point,
			atmospheric pressure adjustment
'2 R '	Reads setpoint 2	'CZR'	CCM zero point adjustment
'3R'	Reads setpoint 3	'CCR'	Resets CCM zero point adjustment

7.3. Command

7.3.1. Reading the measurement value/status

10111 110444		me meast			stattas		
Command	:	AD0	AD1	D	CHKH	CHKL	CR

Format of returning from this instrument to PC

:	AD0	AD1	D	Х	•	Х	Х	Е	±	Х	Х	SH	SL	CHKH	CHKL	CR
* The manufacture of the is entered in the "Y VVE+VV" exting																

* The measured pressure value is entered in the "X.XXE±XX" section.

Example 1: $3.00E+03 \Rightarrow 3.00 \times 10^{+3}$

Example 2: $5.00E+00 \Rightarrow 5.00 \times 10^{+0}$

Example 3: $4.00\text{E-}01 \Rightarrow 4.00 \times 10^{-1}$

- * Measurement range is exceeded when "F.FFE+FF" is returned.
- * Filament has burnt out when "E.EEE+EE" is returned.

- * For the status "SH" and "SL", refer to instruction manual.
- * CCM series: When SH are all 0, pressure is plus. When SH are all 1, pressure is minus.
- 8. Dimensional Drawings
- 8.1. DIN panel size



8.2. JIS panel size



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9. 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

1) This unit

Duration of guarantee

Within 1 year from the date of delivery.

Warranty 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 warranty 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 customer return the defective items to ULVAC, Inc. or to the local ULVAC representatives for repair. If field service is required, customer shall ask ULVAC, Inc. or the local ULVAC representatives.
- 2) Direct export transaction: ULVAC send a replacement or customer return the defective items to ULVAC, Inc. or to the local ULVAC representatives for repair. Return charge shall be paid by customer.

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 customer, 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 in use. (cable disconnection due to improper installation, poor contact, etc.)

Others

- 1) If there is a separate contract or memorandum regarding specifications besides this instruction manual, the contents of the contract or memorandum will be followed.
- 2) Customer shall inform ULVAC when this product is exported out of Japan. In the meantime, customer shall take necessary procedures according to Foreign Exchange and Foreign Trade Law.
- 3) As for the question and consultation, customer 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.