

G-TRAN SERIES

Multi-Ionization gauge Sensor Unit

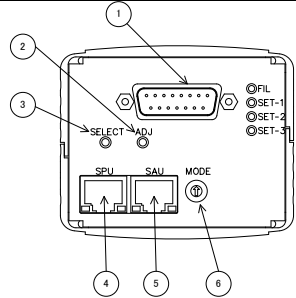
ST2-1,ST2-2

Quick Manual

Introduction
 This quick manual is for quick check of operation and display of the product. Please refer to instruction manual in advance for detailed information about operation, precautions and safety for proper use. Available for download from ULVAC website. <https://www.ulvac.co.jp/download/en/instruction-manual/>
 This manual is for the following gauges. ST2-1: Serial Nos. 00901 and higher. ST2-2: Serial Nos. 00601 and higher.

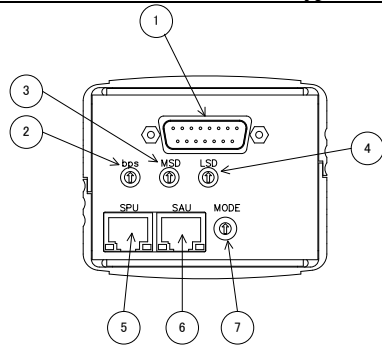
1. Part Names and Functions

1.1. Panel - ST2-1 Standard Type



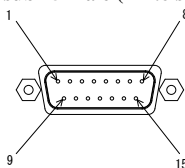
Name (symbol)	Function
1 I/O connector	I/O connector (D-sub 15-pin) for signals including the power supply and data
2 ADJ switch	Adjustment switch when adjusting pressure for the SAU
3 SELECT switch	Selection switch for pressure measurements, setpoint configuration, and SAU atmospheric pressure adjustments
4 SPU connector	Connector (RJ-45) to connect the SPU/SWU Pirani vacuum gauge measuring unit
5 SAU connector	Connector (RJ-45) to connect the SAU pressure sensor unit
6 MODE switch	Mode configuration switch for ST2 independent mode, SPU/SWU combination mode, and SAU combination mode.

1.2. Panel - ST2-2 Serial Communications Type



Name (symbol)	Function
1 I/O connector	I/O connector (D-sub 15-pin) for signals including the power supply and data
2 bps switch	Baud rate (communication speed) configuration switch
3 MSD switch	Communication address configuration switch, 10s place
4 LSD switch	Communication address configuration switch, 1s place
5 SPU connector	Connector (RJ-45) to connect the SWU/SPU Pirani vacuum gauge measuring unit
6 SAU connector	Connector (RJ-45) to connect the SAU pressure sensor unit
7 MODE switch	Mode configuration switch for ST2 independent mode, SWU/SPU combination mode, and SAU combination mode.

1.3. I/O connector D-sub 15 male (M2.6 screws)



1.3.1. ST2-1 Standard Type

No	Sensor	Function
1	Power supply	Power supply to drive this unit
2	Sensor error	Outputs the pressure protection signal or a signal during an error such as when there is a filament break
3	Setpoint 1	Outputs a signal during setpoint 1 operation
4	Emission valid Connection signal	Outputs a signal when emission current is normal SPU/SWU and SAU connection check signal
5	FIL ON/OFF	Input a signal to turn the filament on or off * FIL ON signal in ST2 independent mode * FIL OFF signal in combination mode
7	FIL power monitor	Outputs a signal when the FIL power exceeds the threshold
8	Pressure signal/setpoint setting output	Outputs the pressure signal and the setpoint setting output
9	Power supply GND	Ground for the power supply that drives this unit
10	Signal GND	Output signal ground
11	Setpoint 2	Outputs a signal during setpoint 2 operation
13	DEGAS ON/OFF	Input a signal during DEGAS ON
14	Setpoint 3	Outputs a signal during setpoint 3 operation
15	Signal GND	Output signal ground
Case	FG	Frame ground

1.3.2. ST2-2 Serial Communications Type

No	Sensor	Function
1	Power supply	Power supply to drive this unit
4	RS-232C RxD	RS-232C RxD
5	Terminal resistance for RS-485	Terminal resistance for RS-485, connect with pin 13
6	RS-232C TxD	RS-232C TxD
8	Analog output	Outputs the pressure signal
9	Power supply GND	Ground for the power supply that drives this unit
10	RS-485-	RS-485-
12	RS-485+	RS-485+
13	RS-485 (for terminal resistance connection)	Terminal resistance for RS-485, connect with pin 5
14	RS-232C GND	RS-232C ground
15	GND	Output signal ground
Case	FG	Frame ground

2. Attaching this unit

The pressure measurement measures the static pressure at the location where the gauge head is connected. When installed in environments with a flow in the vacuum system or environments with emitted gas sources or strong generation sources of electrons or ions, use caution in selecting the measurement location and attach this unit in a relatively unaffected location.

2.1. Attaching the gauge head

- Attach this unit so that the gauge head attachment opening surface is parallel to the gas flow. In particular, ensure that gases do not enter the gauge head interior like a beam.
- The Pirani vacuum gauge head filament is thin at $\phi 25 \mu\text{m}$, so avoid use as much as possible in locations with large amounts of vibrations. The biggest cause of filament breaks is from mechanical shock, so use caution regarding the installation location and handling.
- Use an O-ring to attach the gauge head that releases little gas. There is a risk of measurement errors or the gauge head operating life will decrease if materials that release a large quantity of gas, such as rubber tubing or grease, are used in the gauge head connection.

3. Mode Configurations : PLEASE CHECK

Configure the mode prior to use. The default is SPU combination mode. Please refer to a manual for the details.

No	Mode	Comments
0	ST2 independent mode	Ionization gauge only
1	ST2+SWU/SPU combination mode	Pirani vacuum gauge and ionization gauge ISG1 S/N: 04050~
2	ST2+SWU/SPU+SAU combination mode	Pressure sensor, Pirani vacuum gauge, ionization gauge ISG1 S/N: 04050~
3	ST2+SWU/SPU combination mode	Pirani vacuum gauge and ionization gauge ISG1 S/N: 00001~04049
4	ST2+SWU/SPU+SAU combination mode	Pressure sensor, Pirani vacuum gauge, ionization gauge ISG1 S/N: 00001~04049

※SWU and SPU cannot be used at the same time.

4. Analog Output

4.1. Pressure conversion equation

$$P = 10^{\{(V - 7.25) / 0.75 + C\}} \Leftrightarrow V = 7.25 + 0.75 \times (\log P - C)$$

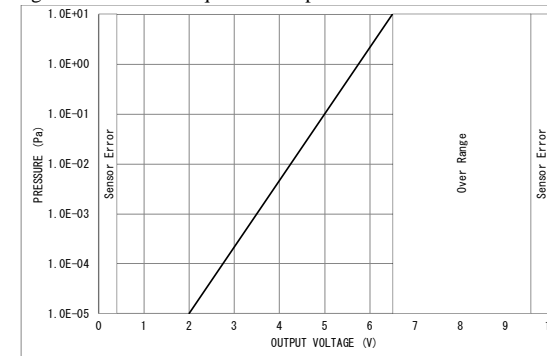
P: Pressure V: Output voltage (V)

Puressure Unit	C (Pressure unit dependent)
Pa	2
Torr	-0.1249
mbar	0

4.2. ST2 independent mode analog output

Operating state	Analog output voltage
Filament off	9.9 V or higher
During normal measurements	Voltage corresponding to the measured pressure 2.0 to 6.5 V
ST2 error (Errors such as a filament break)	9.9 V or higher
Power supply voltage abnormality, sensor unit fault, etc.	0.1 V or less

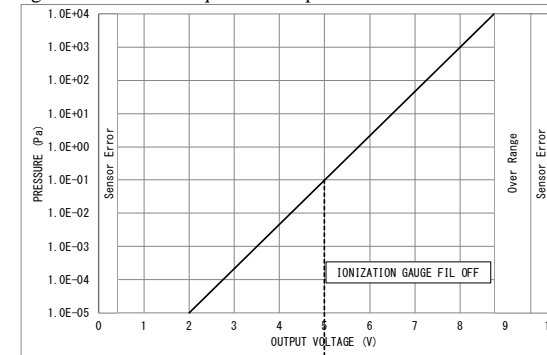
*1: Voltage: $0.1 < V \leq 2.0$ is equivalent to pressure: $\leq 1 \times 10^{-5} \text{Pa}$.



4.3. SPU combination mode analog output

Operating state	Analog output voltage
During normal measurements	Voltage corresponding to the measured pressure 2.0 to 8.75 V
$1 \times 10^{-4} \text{ Pa}$ or higher	8.75 V
ST2 error (Errors such as a filament break)	Voltage corresponding to the measured by SPU 5 V to 8.75V
Ionization gauge FIL OFF	Voltage corresponding to the measured by SPU 5 V to 8.75V
SPU error (Errors such as a filament break)	9.9 V or higher
Power supply voltage abnormality, sensor unit fault, etc.	0.1 V or less

*1: Voltage: $0.1 < V \leq 2.0$ is equivalent to pressure: $\leq 1 \times 10^{-5} \text{Pa}$.

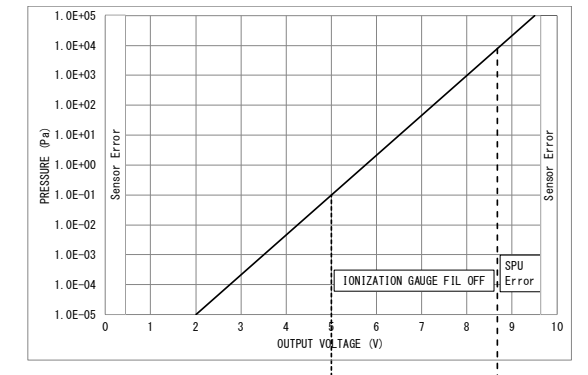


* Error is output even if SPU error.
 However, ionization gauge error is cleared by turning FIL off.

4.4. SAU combination mode analog output

Operating state	Analog output voltage
During normal measurements	Voltage corresponding to the measured pressure 2.0 to 9.5 V
Atmospheric pressure or higher	9.5 V or higher
ST2 error (Errors such as a filament break)	Voltage corresponding to the measured by SAU and SPU 5 V to 9.5 V SWU and SPU 4.25 V to 9.5 V
Ionization gauge FIL OFF	Voltage corresponding to the measured by SAU and SPU 5 V to 9.5 V SWU and SPU 4.25 V to 9.5 V
SPU error (Errors such as a filament break)	Voltage corresponding to the measured by SAU 8.677 V to 9.5V
SAU error	9.9 V or higher
Power supply voltage abnormality, sensor unit fault, etc.	0.1 V or less

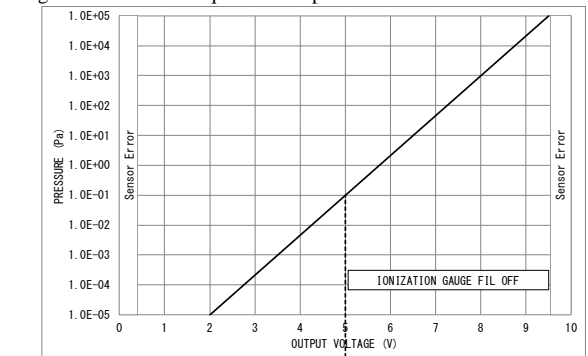
*1: Voltage: $0.1 < V \leq 2.0$ is equivalent to pressure: $\leq 1 \times 10^{-5} \text{Pa}$.



4.5. SWU combination mode analog output

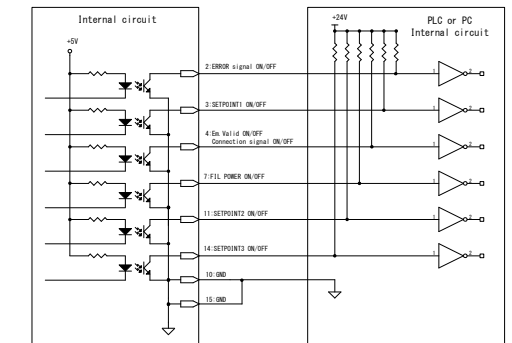
Operating state	Analog output voltage
During normal measurements	Voltage corresponding to the measured pressure 2.0 to 9.5 V
Atmospheric pressure or higher	9.5 V
ST2 error (Errors such as a filament break)	Voltage corresponding to the measured by SWU 4.25 V to 9.5 V
Ionization gauge FIL OFF	Voltage corresponding to the measured by SWU 4.25 V to 9.5 V
SWU error	9.9 V or higher
Power supply voltage abnormality, sensor unit fault, etc.	0.1 V or less

*1: Voltage: $0.1 < V \leq 2.0$ is equivalent to pressure: $\leq 1 \times 10^{-5} \text{Pa}$.



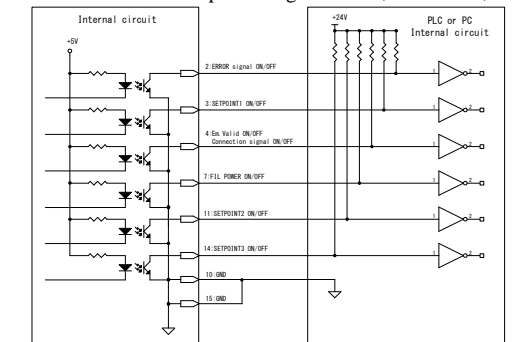
5. Control Input Signals (ST2-1 only)

FIL ON/OFF and DEGAS ON/OFF are input with this unit's I/O connector. When using these signals, short between the pin of the signal to operate and the GND terminal.



6. Control Output Signals (ST2-1 only)

Sensor error and setpoint signals are output from this unit's I/O connector in open collector format. Photocoupler rating: $30 V_{\text{MAX}}$, $50 \text{ mA}_{\text{MAX}}$, 70 mW



6.1. Sensor error signal (ST2-1 Standard Type only)

Sensor errors are signals that are output when an error occurs on this units. When a sensor error occurs, the signal becomes low output. When a sensor error occurs, the POWER/ERROR LED turns red and the pressure signal output becomes 9.9 V or higher.

