

ISOLATION AMPLIFIER
(current and voltage output, output isolation)

MODEL 20VS5-207

BEFORE USE

Thank you for choosing us. Before use, please check contents of the package you received as outlined below. If you have any problems or questions with the product, please contact our sales office or representatives.

■ PACKAGE INCLUDES:

Amplifier (1)

■ MODEL NO.

Confirm that the model number described on the product is exactly what you ordered.

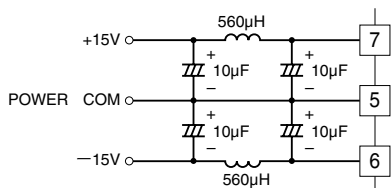
■ INSTRUCTION MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection and basic maintenance procedures.

POINTS OF CAUTION

■ POWER INPUT RATING & OPERATIONAL RANGE

- Power Supply
Operational rating $\pm 15V$ DC $\pm 10\%$, 41mA approx. (at 20 mA output)
Install the filter for the power supply as indicated below.



■ ENVIRONMENT

- Indoor use
- When heavy dust or metal particles are present in the air, install the unit inside proper housing with sufficient ventilation.

- Do not install the unit where it is subjected to continuous vibration. Do not subject the unit to physical impact.
- Environmental temperature must be within -10 to $+70^{\circ}C$ (14 to $158^{\circ}F$) with relative humidity within 30 to 90% RH in order to ensure adequate life span and operation.

■ WIRING

- Do not install cables (power supply, input and output) close to noise sources (relay drive cable, high frequency line, etc.).
- Do not bind these cables together with those in which noises are present. Do not install them in the same duct.

■ INSTALLING THE MODULE

- When it is installed on the printed wiring board, land diameter $\phi 1.6$ and through-hole $\phi 1.0$ are recommended.

■ AND

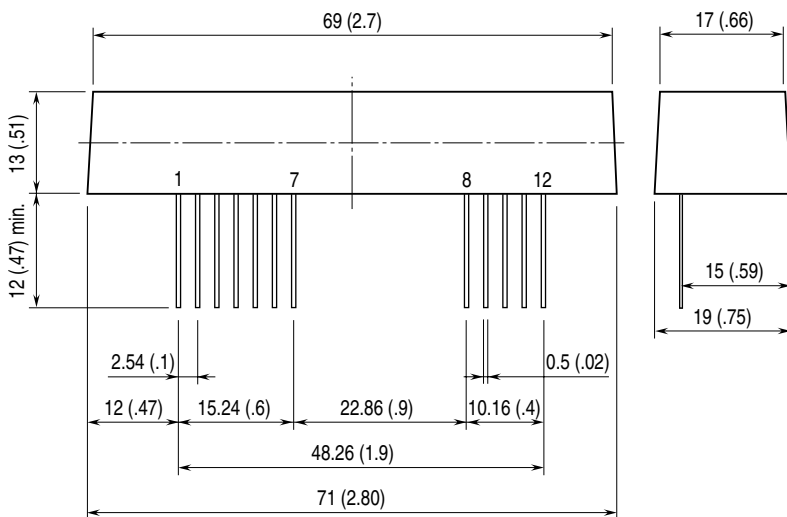
- The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.
- Do not touch pins while handling the amplifier.
- Do not short-circuit between the terminals 9 and 10 to avoid breakdown and damages of this device
- Do not short-circuit between output pins to avoid shorten life of the device due to heating.

CHECKING

- 1) Terminal wiring: Check that wiring is correctly connected according to the connection diagram.
- 2) Power input voltage: Check voltage across the pins.
- 3) Input: Check that the input signal is within $-100 - 100\%$ (voltage output) or 0 to 100% of the full-scale (current output) of the full-scale.
- 4) Output: Check that the load resistance meets the described specifications.

TERMINAL CONNECTIONS

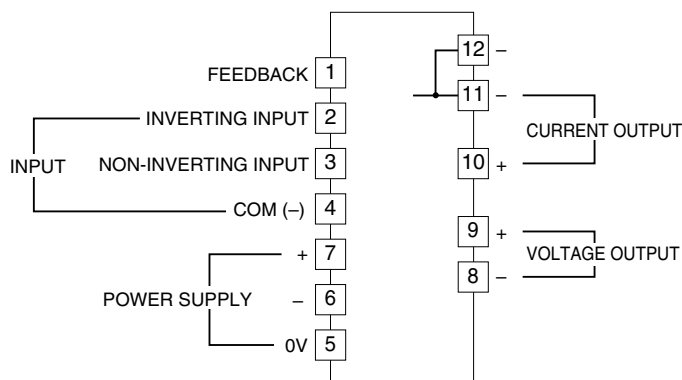
■ EXTERNAL DIMENSIONS mm (inch)



PIN ASSIGNMENT

1	FEEDBACK
2	INVERTING INPUT
3	NON-INVERTING INPUT
4	COM (-)
5	POWER SUPPLY (0V)
6	POWER SUPPLY (-)
7	POWER SUPPLY (+)
8	VOLTAGE OUTPUT (-)
9	VOLTAGE OUTPUT (+)
10	CURRENT OUTPUT (+)
11	CURRENT OUTPUT (-)
12	CURRENT OUTPUT (-)

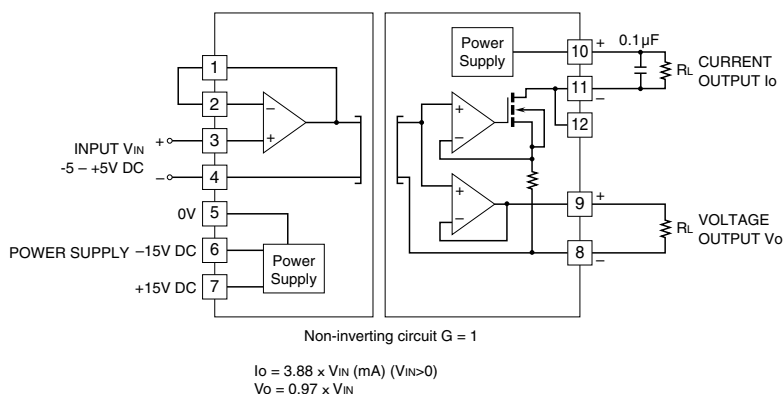
■ TERMINAL ASSIGNMENTS



APPLICATION EXAMPLES

The primary amplifier in this unit is high accurate. Installing external resistors to the inverting input (pin 2) and the feedback (pin 1), this unit can be used as a non-inverting or inverting amplifier. The combined input resistance of the amplifier must be between 20kΩ and 100kΩ.

■ Non-inverting amplifier circuit: Basic example



• Current output

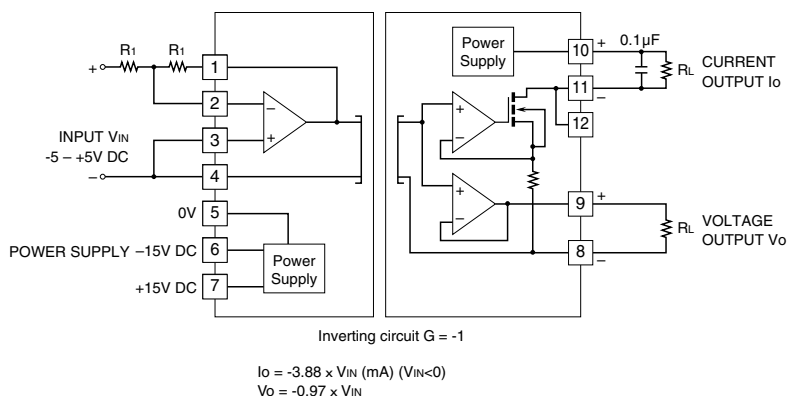
The output is proportional to the input.
E.g. 0 – 19.4 mA for 0 – 5V DC input

• Voltage output

The output is proportional to the input.
E.g. -4.85 – +4.85V for -5 – +5V DC input

The gain of this circuit is approximately 0.97. When the total gain of 1.00 is necessary, make the gain of primary amplifier 1.03 referring the non-inverting amplifier example below.

■ Inverting amplifier circuit: Basic example (output inverted to the input)



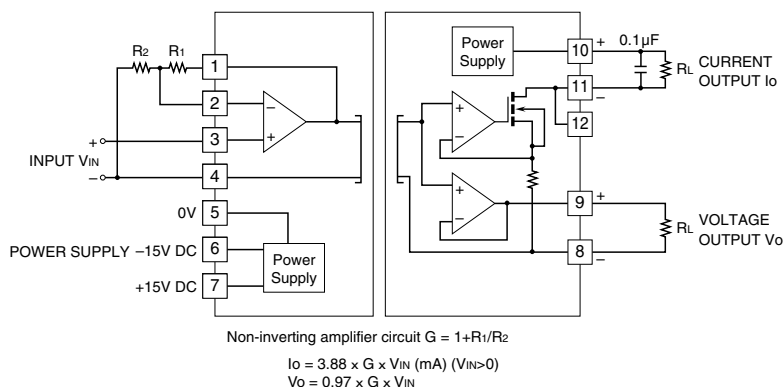
• Current output

The output is inverted to the input.
E.g. 19.4 – 0 mA for -5 – 0V input.

• Voltage output

The output is inverted to the input.
E.g. +4.85 – -4.85V for -5 – +5V DC input

■ Non-inverting amplifier circuit



For a non-inverting amplification the output is following.

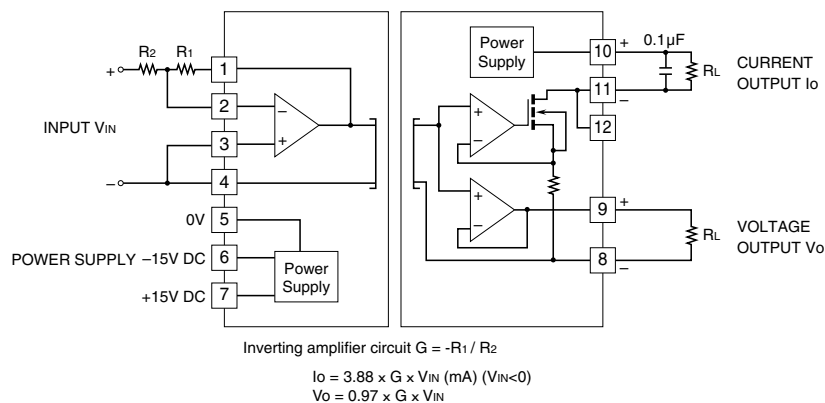
• Current output

$I_o = 3.88 \times (1 + R_1/R_2) \times V_{IN} \text{ (mA)}$
When R1 = 10kΩ, R2 = 10kΩ, then the output is $I_o = 7.76 \times V_{IN}$
Note: 0mA ≤ Io ≤ 22mA.

• Voltage output

$V_o = 0.97 \times (1 + R_1/R_2) \times V_{IN} \text{ (V)}$

■ Inverting amplifier circuit



For an inverting amplification the output is following.

• Current output

$$I_o = -3.88 \times (R_1/R_2) \times V_{IN} \text{ (mA)}$$

When $R_1 = 20\text{k}\Omega$, $R_2 = 10\text{k}\Omega$, then the output is $I_o = -3.88 \times (20\text{k}\Omega / 10\text{k}\Omega) \times V_{IN} = -7.76 \times V_{IN}$

Note: $0\text{mA} \leq I_o \leq 22\text{mA}$.

• Voltage output

$$V_o = 0.97 \times (-R_1/R_2) \times V_{IN} \text{ (V)}$$

MAINTENANCE

Regular calibration procedure is explained below:

■ CALIBRATION

Warm up the unit for at least 10 minutes. Apply 0%, 25%, 50%, 75% and 100% input signal. Check that the output signal for the respective input signal remains within accuracy described in the data sheet.