INSTRUCTION MANUAL

ISOLATION AMPLIFIER
(ultra-high speed response, input isolation)

MODEL **20VS5-200**

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.
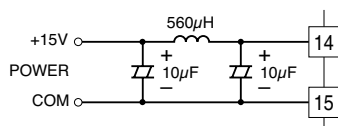
POINTS OF CAUTION

■ POWER INPUT RATING & OPERATIONAL RANGE
Power Supply
Operational voltage range, power consumption
Operational rating 11.5 – 16.0V DC, 40mA approx. (no load)
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°C (14 to 158°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 ø1.6 and through-hole ø0.8 are recommended.
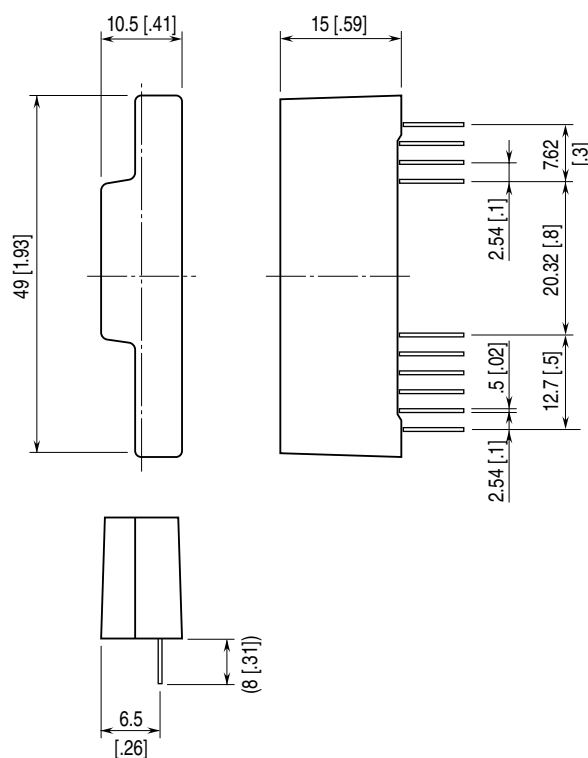
■ AND ....
• The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.
• With voltage output, do not leave the output terminals shortcircuited for a long time. The unit is designed to endure it without breakdown, however, it may shorten appropriate life duration.

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 0 – 100% of the full-scale.
4) Output: Check that the load resistance meets the described specifications.

TERMINAL CONNECTIONS
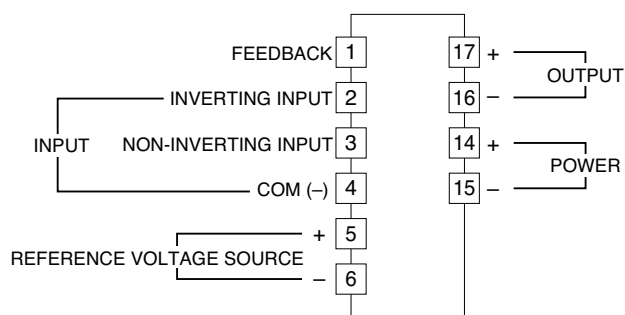
■ **EXTERNAL DIMENSIONS mm [inch]**

10.5 [.41]　　15 [.59]

49 [1.93]

7.62 [.3]

2.54 [.1]

20.32 [.8]

.5 [.02]

12.7 [.5]

2.54 [.1]

(8 [.31])

6.5 [.26]

PIN ASSIGNMENT

OUTPUT (+)	17
OUTPUT (−)	16
POWER SUPPLY (−)	15
POWER SUPPLY (+)	14
REFERENCE VOLTAGE SOURCE (−)	6
REFERENCE VOLTAGE SOURCE (+)	5
COM (−)	4
NON-INVERTING INPUT	3
INVERTING INPUT	2
FEEDBACK	1

(BOTTOM VIEW)

■ **TERMINAL ASSIGNMENTS**

FEEDBACK 1　　17 +　OUTPUT
INVERTING INPUT 2　　16 −
INPUT　NON-INVERTING INPUT 3　　14 +　POWER
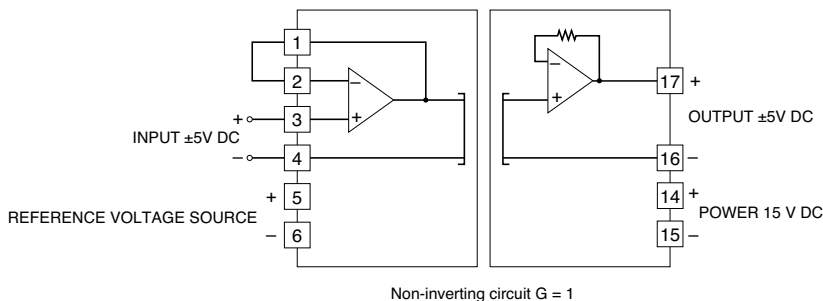COM (−) 4　　15 −
REFERENCE VOLTAGE SOURCE　+ 5
　−　6

Note. The reference voltage source is common to the COM (−), terminal 4.

APPLICATION EXAMPLES

The primary amplifier in this unit is high accurate. Installing external resistors to the inverting input (pin 2) and the feed-back (pin 1), this unit can be used as a non-inverting or inverting amplifier.

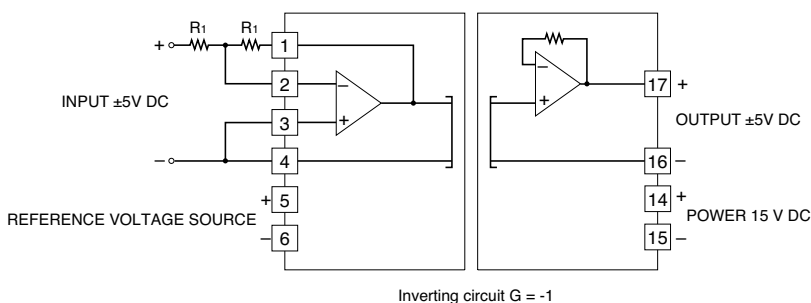The combined input resistance of the amplifier must be 20kΩ in maximum.

■ Non-inverting amplifier circuit: Basic example of G = 1

Non-inverting circuit G = 1

The output is proportional to the input. The gain is 1.

E.g. ±5V DC for ±5V DC input.

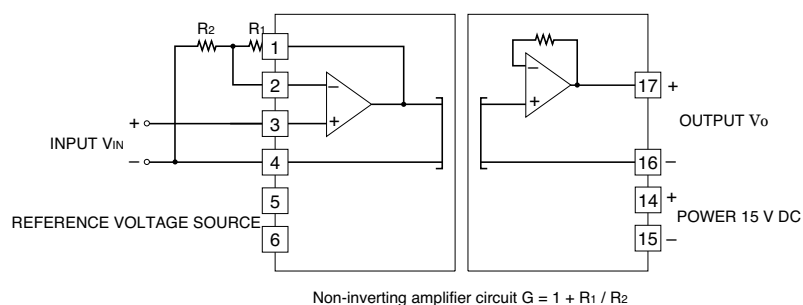■ Inverting amplifier circuit: Basic example of G = -1 (output inverted to the input)

Inverting circuit G = -1

The output is inverted to the input. The gain is -1.

E.g. +5V DC for -5V DC input and -5V DC for +5V DC input.

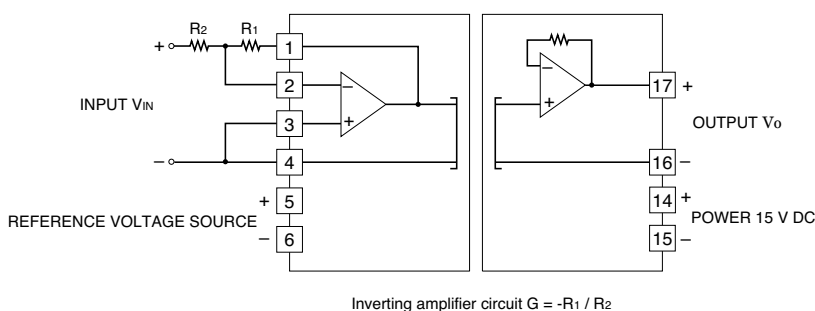■ Non-inverting amplifier circuit: Example of G = 1 + R_1 / R_2

Non-inverting amplifier circuit G = 1 + R_1 / R_2

For a non-inverting amplification the output is following.

$$V_O = (1 + R_1 / R_2) \times V_{IN}$$

When R_1 = 10kΩ, R_2 = 10kΩ, then the output is following. The gain is 2.

$$V_O = 2 \times V_{IN}$$

■ Inverting amplifier circuit: Example of G = -R_1 / R_2 (output inverted to the input)
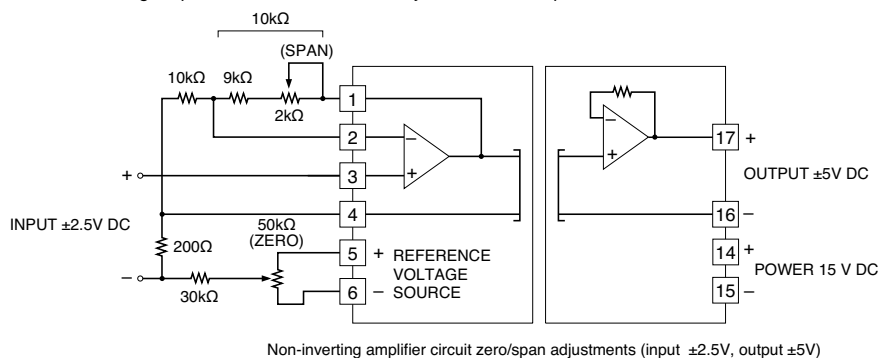

Inverting amplifier circuit G = -R_1 / R_2

For an inverting amplification the output is following.

$$V_O = -(R_1 / R_2) \times V_{IN}$$
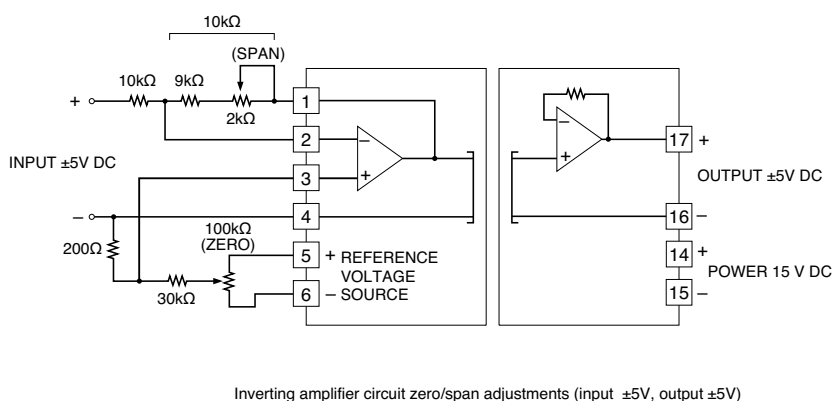
When R_1 = 20kΩ, R_2 = 10kΩ, then the output is following. The gain is -2.

$$V_O = -(20kΩ / 10kΩ) \times V_{IN} = -2 \times V_{IN}$$

■ Non-inverting amplifier circuit with external adjustments: Example of G = 2

Non-inverting amplifier circuit zero/span adjustments (input ±2.5V, output ±5V)

For a non-inverting amplification with external adjustments, when the combined resistance of the span adjustment and 9kΩ is 10kΩ, the gain is $(1 + 10kΩ / R_1) \times V_{IN}$. With the span adjustment (2kΩ), the output is configurable. The zero is adjustable with a reference voltage source of ±14V DC and the attenuation of 200Ω and 30kΩ.

■ Inverting amplifier's circuit with external adjustments: Example of G = -1 (output inverted to the input)

Inverting amplifier circuit zero/span adjustments (input ±5V, output ±5V)

For an inverting amplification with external adjustments, when the combined resistance of the span adjustment and 9kΩ is 10kΩ, the gain is $-(10kΩ / R_2) \times V_{IN}$. With the span adjustment (2kΩ), the output is configurable. The zero is adjustable with a reference voltage source of ±14V DC and the attenuation of 200Ω and 30kΩ.

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.