

Hybrid IC Isolation Amplifiers 20 Series

ISOLATION AMPLIFIER

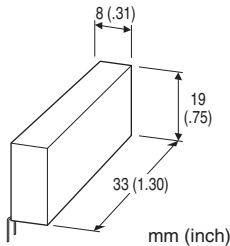
(3-port isolation)

Functions & Features

- Being used for printed wiring board installation
- Isolating between input, output and power
- Isolation between input, output and power supply up to 1500 V AC
- High-linearity
- Low power consumption
- Saving installation space
- Power 15 V DC

Typical Applications

- Isolating the field and input or output circuit of microprocessor to reduce noise from field
- Available for manufacturers of small-lot products to omit the development of isolation circuit



MODEL: 20VS3

ORDERING INFORMATION

- **Code number: 20VS3-U**
Input range ± 5 V DC
Output range ± 5 V DC
- **Code number: 20VS3-5W4W-U**
Input range ± 5 V DC
Output range ± 10 V DC
- **Code number: 20VS3-4W4W-U**
Input range ± 10 V DC
Output range ± 10 V DC

POWER INPUT

DC Power
U: 15 V DC

GENERAL SPECIFICATIONS

Construction: Hybrid IC
Housing material: Epoxy resin

Isolation: Input or reference voltage source to output to power supply

INPUT SPECIFICATIONS

■ DC Voltage

- **Input :** -5 – +5 V DC
Input resistance: ≥ 1 M Ω (10 k Ω in power failure)
 - **Input :** -10 – +10 V DC
Input resistance: ≥ 350 k Ω (10 k Ω in power failure)
- Overload input voltage:** 30 V DC continuous
Input offset voltage: ± 15 mV
Input bias current: 2 nA TYP. (@25°C)

OUTPUT SPECIFICATIONS

■ DC Voltage:

- -5 – +5 V DC
Load resistance: ≥ 2 k Ω
 - -10 – +10 V DC
Load resistance: ≥ 4 k Ω
- Output impedance:** ≤ 1 Ω

REFERENCE VOLTAGE SOURCE

Output voltage: ± 7.1 V DC ± 10 %
Load current: ≤ 2 mA

INSTALLATION

Power input

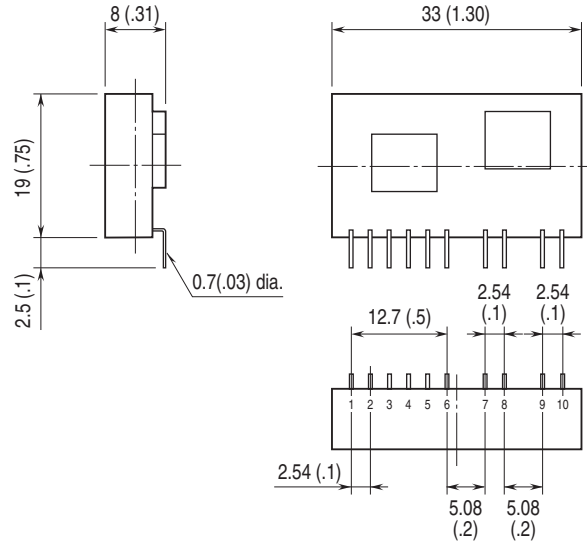
- **DC:** Operational voltage range:
Rating ± 5 %; approx. 7 mA with no load;
ripple 2 % p-p max.
- Operating temperature:** -10 to +70°C (14 to 158°F)
Operating humidity: 30 to 90 %RH (non-condensing)
Mounting: Soldering to the printed wiring board
Weight: 10 g (0.35 oz)

PERFORMANCE in percentage of span

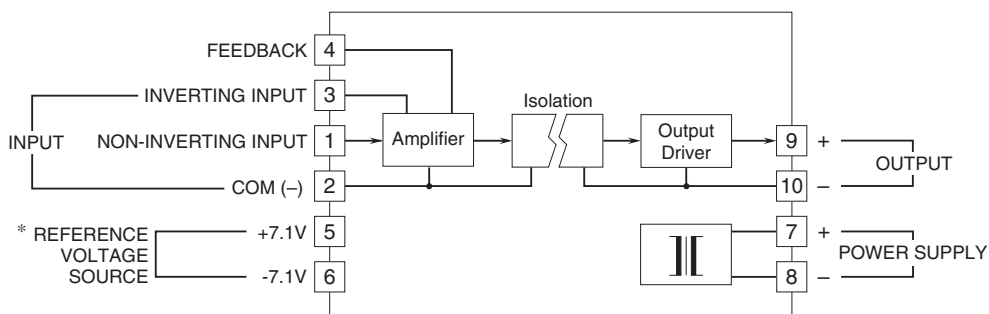
Unless otherwise specified, $G = 1$.
($G = 2$ for 20VS3-5W4W; $G = -2$ for inverting amplifier circuit of 20VS3-4W4W)
Linearity: ± 0.001 % TYP. (± 0.05 % max.)
Temp. coefficient:
Offset drift 5 ppm/°C TYP. (20 ppm/°C max.)
Span drift 10 ppm/°C TYP. (50 ppm/°C max.)
Frequency characteristics: Approx. 1 kHz, -3 dB
Response time: ≤ 450 μ sec. (0 – 90 %)
Conversion gain: $\times 1 \pm 1$ % ($\times 2 \pm 1$ % for 20VS3-5W4W)
Line voltage effect: ± 0.05 % over voltage range
Insulation resistance: ≥ 100 M Ω with 500 V DC
Dielectric strength: 1500 V AC @1 minute (input or reference voltage source to output to power)

CMRR: ≥ 100 dB (500 V AC 50/60 Hz)

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

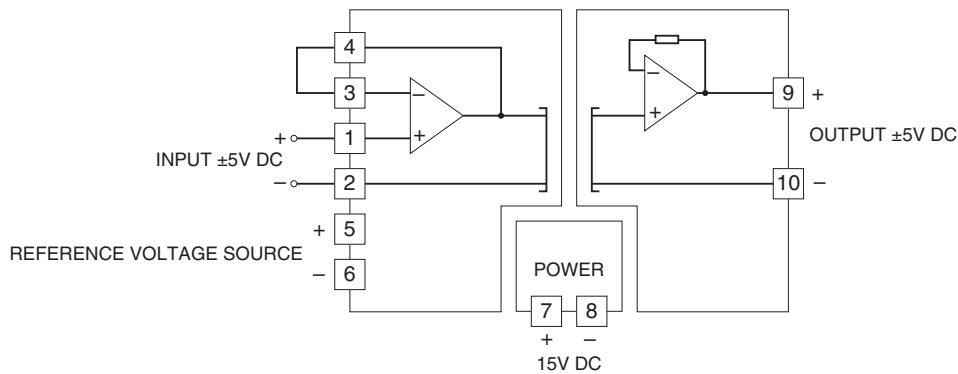


*To be used in the printed wiring board on which the unit is mounted.
Note: The reference voltage source is common to the COM (-), terminal 2.

APPLICATION EXAMPLE

The total resistance of the resistors connected to the amplifier must be max. 100 k Ω .

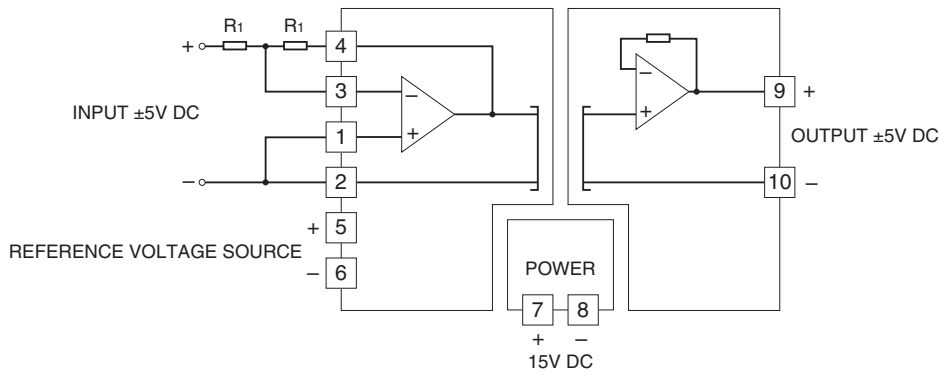
■ Non-inverting amplifier circuit: Basic example of $G = 1$



Non-inverting circuit $G = 1$

Note: ± 10 V DC output @ ± 5 V DC input for 20VS3-5W4W
 ± 10 V DC output @ ± 10 V DC input for 20VS3-4W4W.

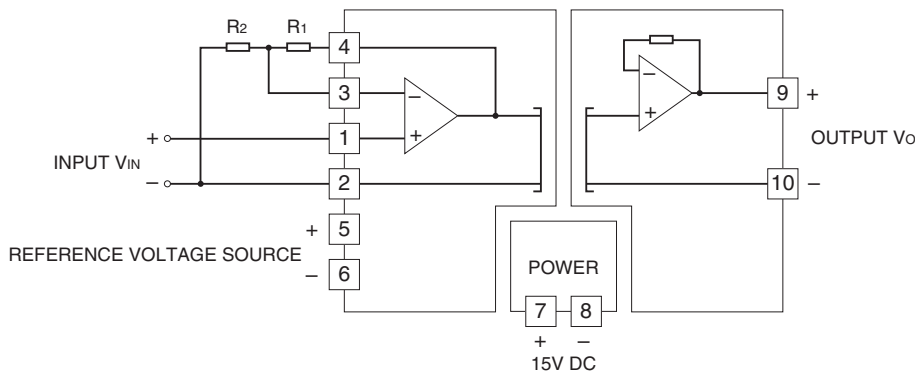
■ Inverting amplifier circuit: Basic example of $G = -1$ (output inverted to the input)



Inverting circuit $G = -1$

Note: $\pm 10V$ DC output @ $\pm 5V$ DC input for 20VS3-5W4W and 4W4W.

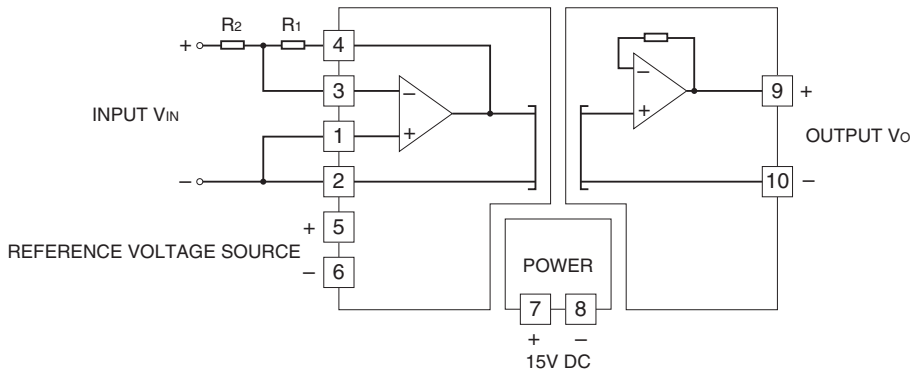
■ Non-inverting amplifier circuit: Example of $G = 1 + R_1 / R_2$



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

Note: $G = 2 \times (1 + R_1/R_2)$ for 20VS3-5W4W

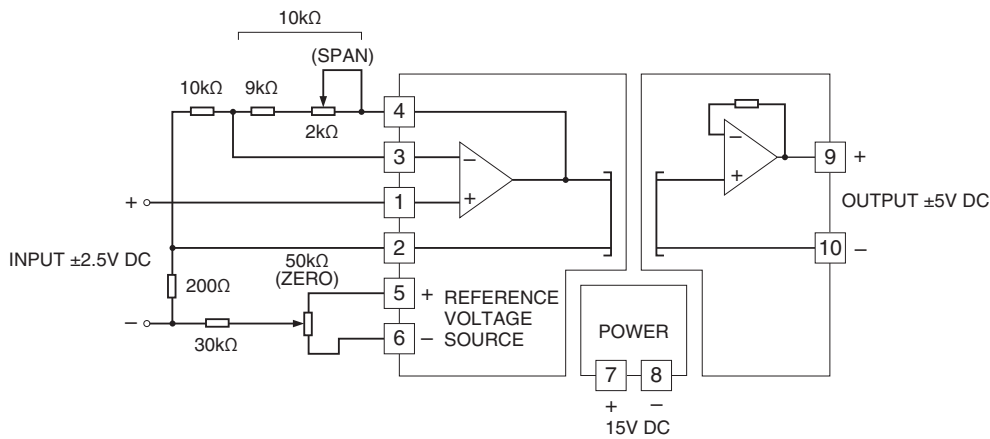
■ Inverting amplifier circuit: Example of $G = -R_1 / R_2$ (output inverted to the input)



Inverting amplifier circuit $G = -R_1 / R_2$

Note: $G = -2 \times R_1/R_2$ for 20VS3-5W4W and 20VS3-4W4W.

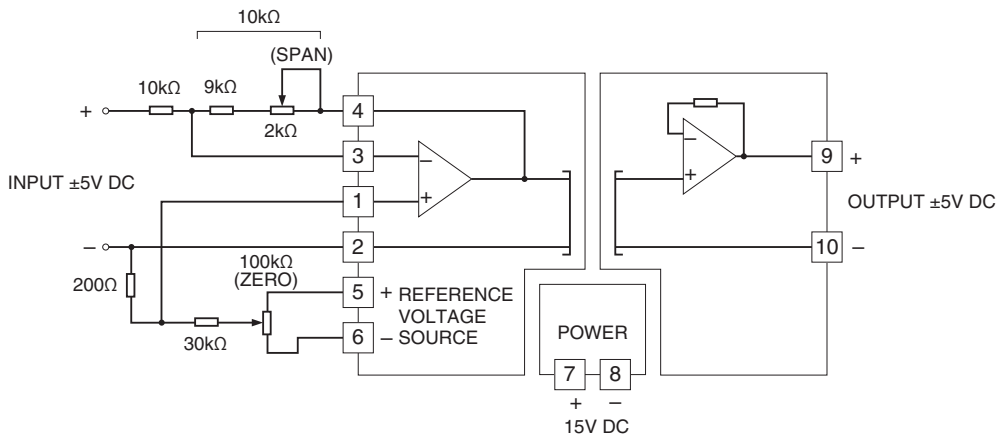
■ Non-inverting amplifier circuit with external adjustments: Example of $G = 2$



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

Note: $\pm 10V$ DC output @ $\pm 2.5V$ input for 20VS3-5W4W
 $\pm 10V$ DC output @ $\pm 5V$ DC input for 20VS3-4W4W.

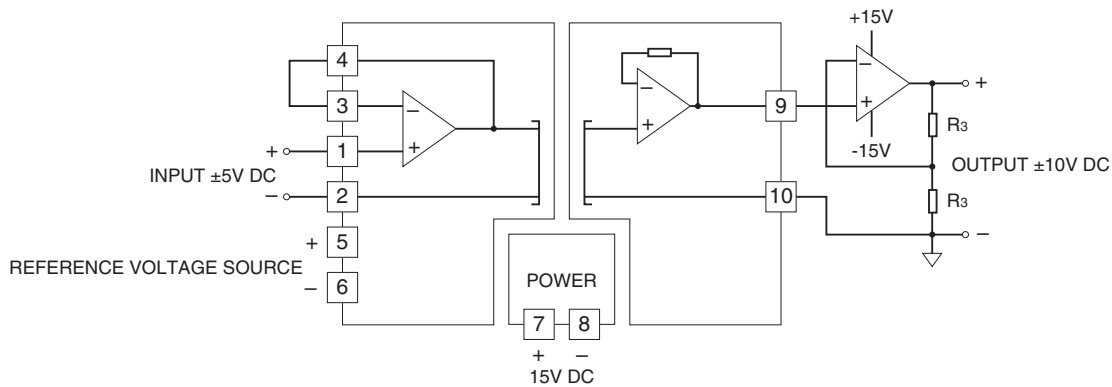
■ Inverting amplifier's circuit with external adjustments: Example of $G = -1$ (output inverted to the input)



Inverting amplifier circuit zero/span adjustments (input $\pm 5V$, output $\pm 5V$)

Note: $\pm 10V$ DC output @ $\pm 5V$ DC input for 20VS3-5W4W and 20VS3-4W4W.

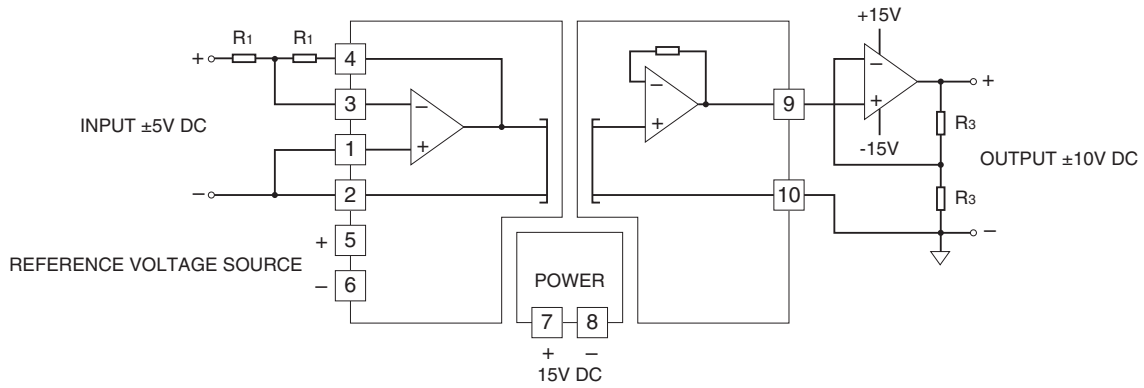
■ Non-inverting amplifier circuit: Example of $\pm 10V$ DC output ($\pm 10V$ DC to the input $\pm 5V$ DC)



Non-inverting circuit $G = 1 + R_3 / R_3 = 2$

Note: $\pm 10V$ DC output @ $\pm 5V$ DC input for 20VS3-5W4W (external output amplifier unnecessary)
 $\pm 10V$ DC output @ $\pm 10V$ DC input for 20VS3-4W4W (external output amplifier unnecessary)

■ Inverting amplifier circuit: Example of ±10V DC output (output inverted to the input)



Inverting circuit $G = -(1 + R_3 / R_3) = -2$

Note: ±10V DC output @ ±5V DC input for 20VS3-5W4W (external output amplifier unnecessary)
 ±10V DC output @ ±10V DC input for 20VS3-4W4W (external output amplifier unnecessary)



Specifications are subject to change without notice.