Hybrid IC Isolation Amplifiers 20 Series

ISOLATION AMPLIFIER

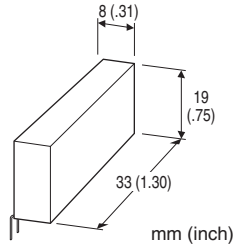
(3-port isolation)

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 MΩ (10 kΩ in power failure)
- **Input** : -10 – +10 V DC
  Input resistance: ≥ 350 kΩ (10 kΩ 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 kΩ
- -10 – +10 V DC
  Load resistance: ≥ 4 kΩ

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 µsec. (0 – 90 %)
Conversion gain: ×1 ±1 % (×2 ±1 % for 20VS3-5W4W)
Line voltage effect: ±0.05 % over voltage range
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500 V AC @1 minute (input or reference voltage source to output to power)

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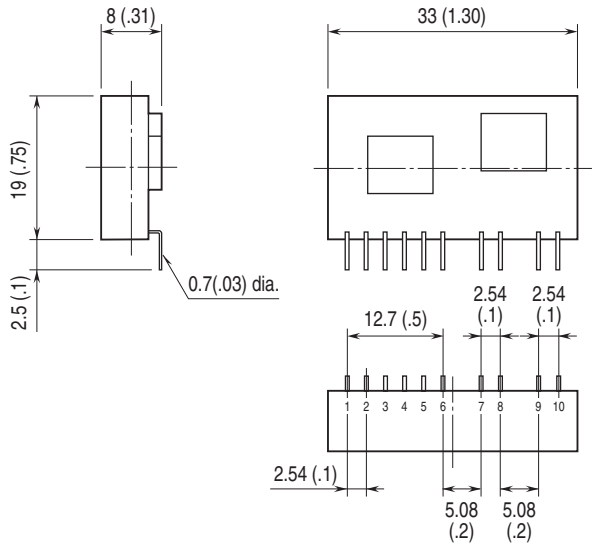
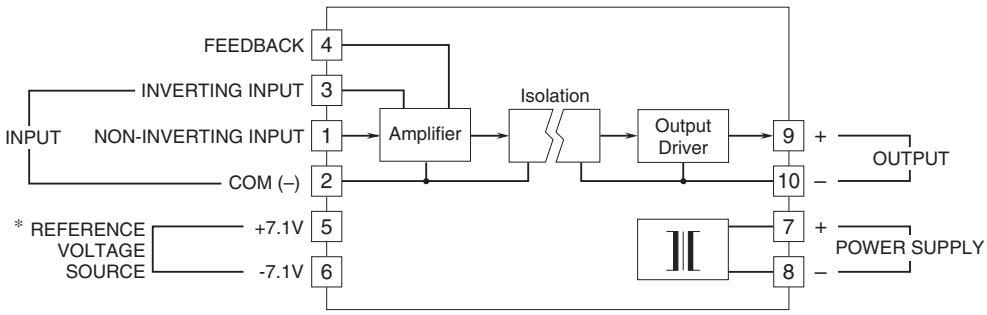
CMRR: ≥ 100 dB (500 V AC 50/60 Hz)

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

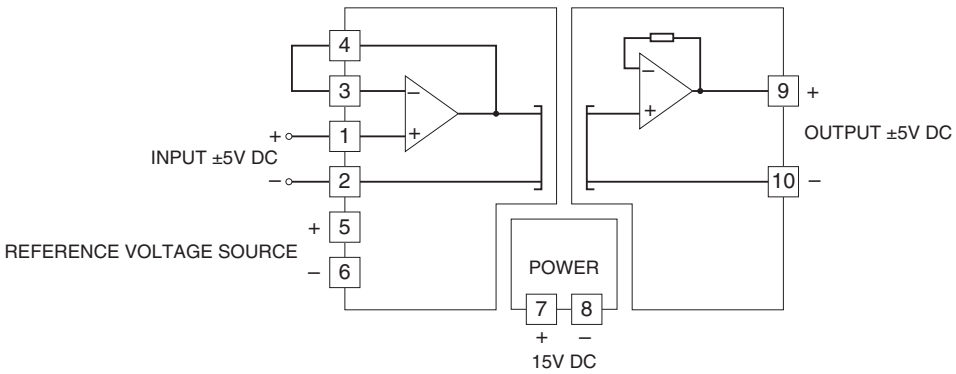


*To be used in the printed wiring board on which the unit is mounted.
Note: The reference voltage source is common to the COM (–), terminal 2.

APPLICATION EXAMPLE

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

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



Non-inverting circuit G = 1

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

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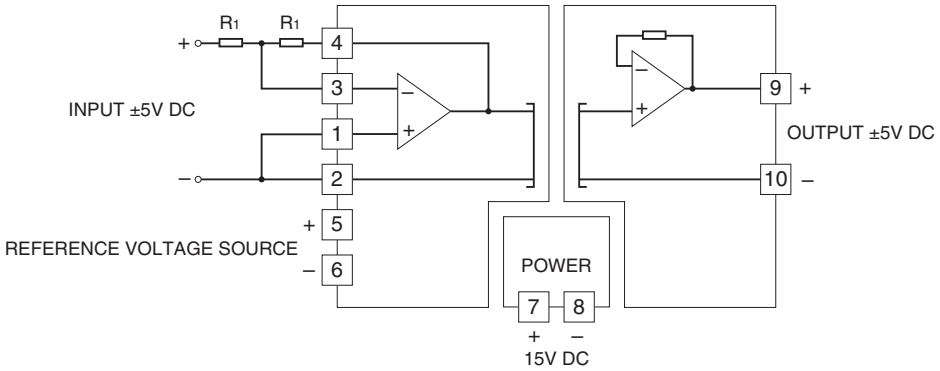
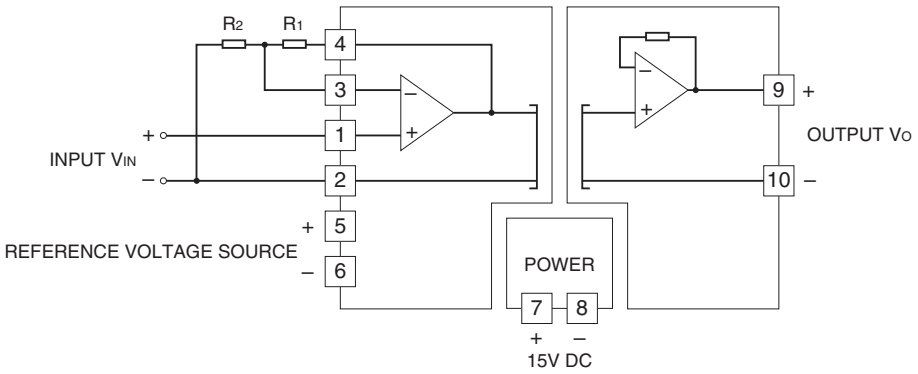
■ **Inverting amplifier circuit: Basic example of G = -1 (output inverted to the input)**



Inverting circuit G = -1

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

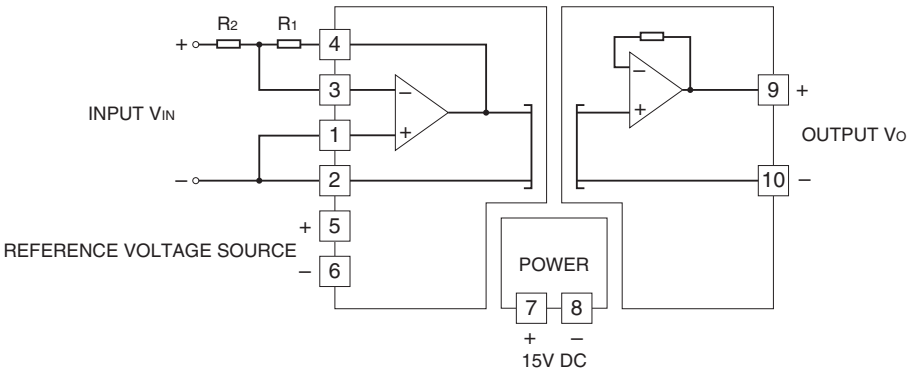
■ **Non-inverting amplifier circuit: Example of G = 1 + R_1 / R_2**



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

Note: G = 2 × (1+R1/R2) 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 × R1/R2 for 20VS3-5W4W and 20VS3-4W4W.

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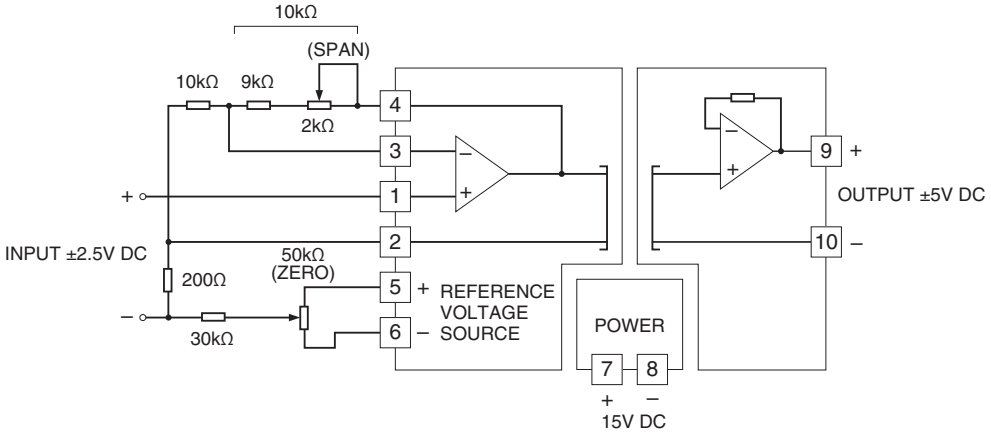
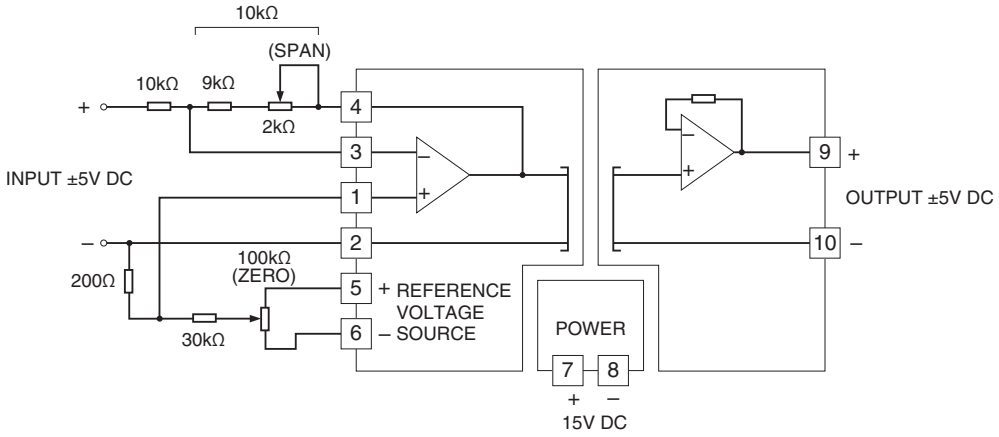
■ **Non-inverting amplifier circuit with external adjustments: Example of G = 2**



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

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

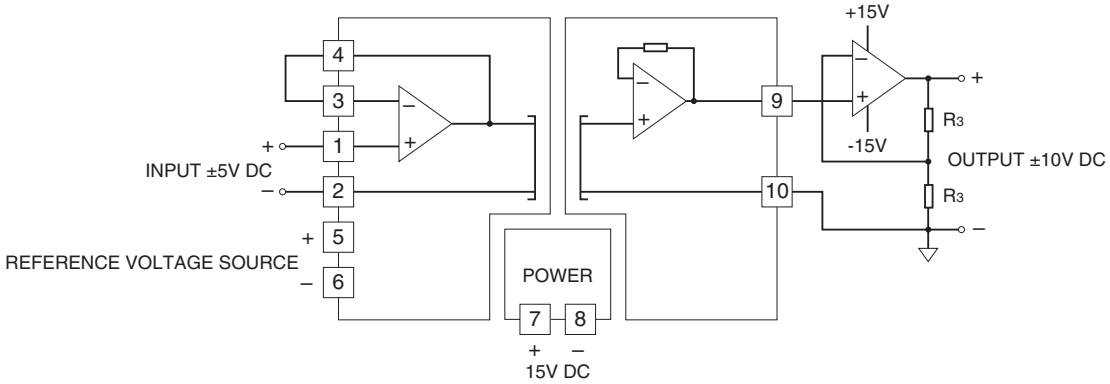
■ **Inverting amplifier's circuit with external adjustments: Example of G = -1 (output inverted to the input)**



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

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

■ **Non-inverting amplifier circuit: Example of ±10V DC output (±10V DC to the input ±5V DC)**



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

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

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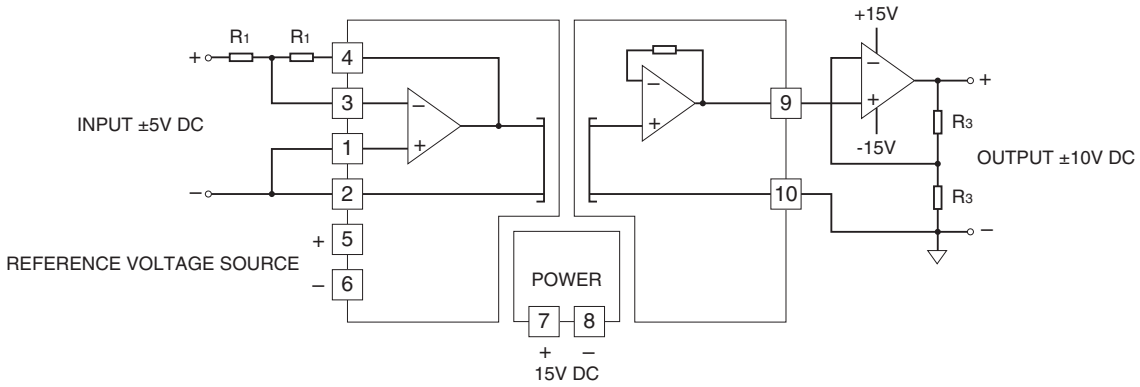
■ **Inverting amplifier circuit: Example of ±10V DC output (output inverted to the input)**



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

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

⚠ Specifications are subject to change without notice.

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