

The second generation ICA (in cell amplifier) is an extremely high performance strain gauge amplifier, converting a strain gauge input to a voltage or current output.

Its sub-miniature design enables it to be fitted into the majority of transducers, for a wide range of signal conditioning for strain gauges, load cells, pressure and torque transducers.

The amplifier is available in six versions, offering a range of current and voltage outputs. All amplifiers have a wide operating voltage range

We can integrate any of the ICA range of products into the majority of our sensor range. For applications where this is not possible, we can supply a small inline enclosure (ILE), which incorporates the ICA.

## Features

- Standardised mounting hole for faster & easier installation
- Standardised excitation of 5Vdc
- Full CE approval
- Plated through holes for wire connections
- Maximum height 7.6mm
- Cost effective with attractive discounts on quantity orders
- Robust design, reverse short circuit protected
- Fast calibration procedure
- Can be integrated into many sensor products

## Typical Applications

- Internal amplification of strain gauge based pressure transducers
- Internal amplification of strain gauge based load cells
- Internal amplification of strain gauge based torque transducers

## Specification - Voltage Output Versions

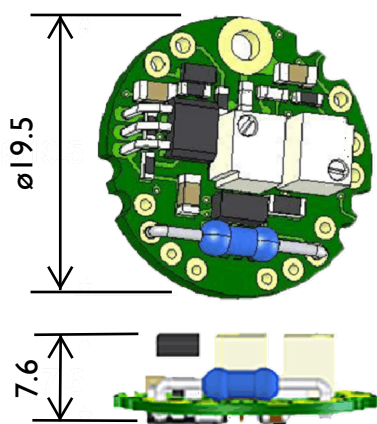
| Electrical and Environmental |                             | Min    | Typ    | Max           | Units (Notes) |
|------------------------------|-----------------------------|--------|--------|---------------|---------------|
| ICA1 - 3 Wire 0.1-10 volts   | Power Supply                | 13     | 24     | 30            | V DC (note 1) |
|                              | Operating Current           | -      | 23     | -             | mA (note 2)   |
|                              | Operating temperature range | -40    | -      | 85            | °C            |
|                              | Storage temperature range   | -40    | -      | 85            | °C            |
|                              | Reverse polarity protection | -      | -      | -30           | V             |
| Measurement                  |                             | Min    | Typ    | Max           | Units (Notes) |
| Bridge excitation            | 4.9                         | 5      | 5.1    | V             |               |
| Bridge resistance            | 330                         | 350    | 5000   | Ohms          |               |
| Bridge sensitivity           | 0.5                         | 2.5    | 150    | mV/V (note 3) |               |
| Output voltage range         | +0.1                        | -      | +10.1  | V             |               |
| Output load                  | 5000                        | -      | -      | Ohms          |               |
| Band width                   | dc                          | -      | 1000   | Hz            |               |
| Zero adjustment              | -                           | ±2     | -      | %FR           |               |
| Span adjustment              | -                           | ±8     | -      | %FR           |               |
| Linearity                    | -                           | 0.02   | -      | %FR           |               |
| Zero temp stability          | -                           | 0.0004 | 0.0015 | ±%FR/°C       |               |
| Span temp stability          | -                           | 0.002  | 0.0051 | ±%FR/°C       |               |

| Electrical and Environmental |                             | Min    | Typ    | Max           | Units (Notes) |
|------------------------------|-----------------------------|--------|--------|---------------|---------------|
| ICA2 - 3 Wire 0.1-5 volts    | Power supply                | 8.5    | -      | 28            | V DC (note 1) |
|                              | Operating Current           | -      | 23     | -             | mA (note 2)   |
|                              | Operating temperature range | -40    | -      | 85            | °C            |
|                              | Storage temperature range   | -40    | -      | 85            | °C            |
|                              | Reverse polarity protection | -      | -      | -30           | V             |
| Measurement                  |                             | Min    | Typ    | Max           | Units (Notes) |
| Bridge excitation            | 4.9                         | 5      | 5.1    | V             |               |
| Bridge resistance            | 330                         | 350    | 5000   | Ohms          |               |
| Bridge sensitivity           | 0.5                         | 2.5    | 150    | mV/V (note 3) |               |
| Output voltage range         | +0.1                        | -      | +5.1   | V             |               |
| Output load                  | 5000                        | -      | -      | Ohms          |               |
| Band width                   | dc                          | -      | 1000   | Hz            |               |
| Zero adjustment              | -                           | ±2     | -      | %FR           |               |
| Span adjustment              | -                           | ±8     | -      | %FR           |               |
| Linearity                    | -                           | 0.02   | -      | %FR           |               |
| Zero temp stability          | -                           | 0.0004 | 0.0015 | ±%FR/°C       |               |
| Span temp stability          | -                           | 0.002  | 0.0051 | ±%FR/°C       |               |

| Electrical and Environmental |                             | Min    | Typ    | Max           | Units (Notes) |
|------------------------------|-----------------------------|--------|--------|---------------|---------------|
| ICA3 - 4 Wire ±10 volts      | Power supply                | ±13    | -      | ±15           | V DC (note 1) |
|                              | Operating Current           | -      | 23     | -             | mA (note 2)   |
|                              | Operating temperature range | -40    | -      | 85            | °C            |
|                              | Storage temperature range   | -40    | -      | 85            | °C            |
|                              | Reverse polarity protection | -      | -      | -30           | V             |
| Measurement                  |                             | Min    | Typ    | Max           | Units (Notes) |
| Bridge excitation            | 4.9                         | 5      | 5.1    | V             |               |
| Bridge resistance            | 330                         | 350    | 5000   | Ohms          |               |
| Bridge sensitivity           | 0.5                         | 2.5    | 150    | mV/V (note 3) |               |
| Output voltage range         | -10                         | -      | +10    | V             |               |
| Output load                  | -                           | 5000   | -      | Ohms          |               |
| Band width                   | dc                          | -      | 1000   | Hz            |               |
| Zero adjustment              | -                           | ±2     | -      | %FR           |               |
| Span adjustment              | -                           | ±8     | -      | %FR           |               |
| Linearity                    | -                           | 0.02   | -      | %FR           |               |
| Zero temp stability          | -                           | 0.0004 | 0.0015 | ±%FR/°C       |               |
| Span temp stability          | -                           | 0.002  | 0.0051 | ±%FR/°C       |               |

## Mechanical Dimensions

All dimensions in millimeters



## Related Product



### ILE series

Field enclosure for ICA analogue and DCell data converters

| ICA6 – 4 Wire ±10 volts | Electrical and Environmental |      | Min    | Typ    | Max     | Units (Notes) |
|-------------------------|------------------------------|------|--------|--------|---------|---------------|
|                         | Power supply                 |      | 14     | -      | 18      | V DC (note 1) |
|                         | Operating Current            |      | -      | 30     | -       | mA (note 2)   |
|                         | Operating temperature range  |      | -40    | -      | 85      | °C            |
|                         | Storage temperature range    |      | -40    | -      | 85      | °C            |
|                         | Reverse polarity protection  |      | -      | -      | -30     | V             |
|                         | Measurement                  |      | Min    | Typ    | Max     | Units (Notes) |
|                         | Bridge excitation            |      | 4.9    | 5      | 5.1     | V             |
|                         | Bridge resistance            |      | 330    | 350    | 5000    | Ohms          |
|                         | Bridge sensitivity           |      | 0.5    | 2.5    | 150     | mV/V (note 3) |
| Output voltage range    |                              | -10  | -      | +10    | V       |               |
| Output load             |                              | 5000 | -      | -      | Ohms    |               |
| Band width              |                              | dc   | -      | 1000   | Hz      |               |
| Zero adjustment         |                              | -    | ±2     | -      | %FR     |               |
| Span adjustment         |                              | -    | ±8     | -      | %FR     |               |
| Linearity               |                              | -    | 0.02   | -      | %FR     |               |
| Zero temp stability     |                              | -    | 0.0004 | 0.0015 | ±%FR/°C |               |
| Span temp stability     |                              | -    | 0.002  | 0.0051 | ±%FR/°C |               |

### Notes

Note 1 ICA6 Max Voltage can be increased to 24V with 1000R load cell.

Note 2 With 350R load cell connected.

Note 3 Factory setting is the typical value shown.

For other values fit an alternative calibration resistor (see manual).

### General Notes

The voltage between either of the power supply connections and the load cell shield should not exceed 50V. Any leakage will be greater than 10M Ohms. FR = Full Range

## Specifications – Current Output Versions

| ICA4 – 3 Wire 4-20mA | Electrical and Environmental |    | Min    | Typ    | Max          | Units (Notes) |
|----------------------|------------------------------|----|--------|--------|--------------|---------------|
|                      | Power supply                 |    | 10     | 24     | 30           | V DC          |
|                      | Operating Current            |    | 27     | -      | 43           | mA (note 1)   |
|                      | Operating temperature range  |    | -40    | -      | 85           | °C            |
|                      | Storage temperature range    |    | -40    | -      | 85           | °C            |
|                      | Reverse polarity protection  |    | -      | -      | -30          | V             |
|                      | Measurement                  |    | Min    | Typ    | Max          | Units (Notes) |
|                      | Bridge excitation            |    | 4.9    | 5      | 5.1          | V (note 3)    |
|                      | Bridge resistance            |    | 330    | 350    | 5000         | Ohms(note 4)  |
|                      | Bridge sensitivity           |    | 0.5    | 2.5    | 150          | mV/V (note 5) |
| Output current range |                              | 4  | -      | 20     | mA           |               |
| Output load          |                              | -  | -      | 250    | Ohms(note 6) |               |
| Band width           |                              | dc | -      | 1000   | Hz           |               |
| Zero adjustment      |                              | -  | ±2     | -      | %FR(note 3)  |               |
| Span adjustment      |                              | -  | ±8     | -      | %FR          |               |
| Linearity            |                              | -  | 0.02   | -      | %FR          |               |
| Zero temp stability  |                              | -  | 0.0004 | 0.0015 | ±%FR/°C      |               |
| Span temp stability  |                              | -  | 0.002  | 0.0051 | ±%FR/°C      |               |

| ICA5 – 2 Wire 4-20mA | Electrical and Environmental |    | Min   | Typ   | Max           | Units (Notes) |
|----------------------|------------------------------|----|-------|-------|---------------|---------------|
|                      | Power supply                 |    | 7.5   | 24    | 30            | V DC (note 1) |
|                      | Operating Current            |    | 4     | -     | 20            | mA (note 2)   |
|                      | Operating temperature range  |    | -40   | -     | 85            | °C            |
|                      | Storage temperature range    |    | -40   | -     | 125           | °C            |
|                      | Reverse polarity protection  |    | -     | -     | -             |               |
|                      | Measurement                  |    | Min   | Typ   | Max           | Units (Notes) |
|                      | Bridge excitation            |    | 1.05  | 1.11  | 1.16          | V (note 4)    |
|                      | Bridge resistance            |    | 350   | 1000  | 5000          | Ohms (note 5) |
|                      | Bridge sensitivity           |    | 0.5   | 2.5   | 55            | mV/V (note 6) |
| Output voltage range |                              | 4  | -     | 20    | mA            |               |
| Output load          |                              | -  | -     | 800   | Ohms (note 7) |               |
| Band width           |                              | dc | -     | 1000  | Hz            |               |
| Zero adjustment      |                              | -  | ±2    | -     | %FR (note 3)  |               |
| Span adjustment      |                              | -  | ±8    | -     | %FR           |               |
| Linearity            |                              | -  | 0.02  | -     | %FR           |               |
| Zero temp stability  |                              | -  | 0.001 | 0.005 | ±%FR/°C       |               |
| Span temp stability  |                              | -  | 0.007 | 0.014 | ±%FR/°C       |               |

### Notes

Note 1 The ICA4 can tolerate a lower supply voltage if the output load is reduced e.g. operation is possible at 8V provided that the load does not exceed 250 Ohms in sink mode or 150 Ohms in source mode.

Note 2 With 350 Ohm load cell connected (ICA5 1000 Ohm (recommended)).

Note 3 With reduced supply voltage (see manual).

Note 4 ICA5 with 1000 Ohms load cell connected.

Note 5 ICA5 recommended bridge impedance is 1000 Ohms.

Note 6 Factory setting is the typical value shown.

For other values an alternative calibration resistor (see manual).

Note 7 ICA4 only: The maximum

### General Notes

The voltage between either of the power supply connections and the load cell shield should not exceed 50V. Any leakage will be greater than 10M Ohms. FR = Full Range