



## Operation

### General

The ACT20P Bridge is a DIN rail mounted, signal conditioner for industrial strain gauge bridges. It provides a precise excitation voltage for the bridge, and converts the input measurement to an isolated current/voltage signal.

Strain gauge bridges are used for various measurements like weight, force, tension, pressure, torque, and deflection.

### Bridge excitation supply

Voltage sense connections are provided so that the excitation voltage can be measured at the bridge. Known as 'remote sensing' this method compensates for cabling and contact resistance errors. It is recommended for all new installations or where an upgrade is possible. Remote sensing wiring requires three twisted pairs.

### TARE adjustment

The installed strain gauge is normally subjected to an initial load independent of the measurement taken. The TARE connection allows you to correct for this initial loading by operating a switch.

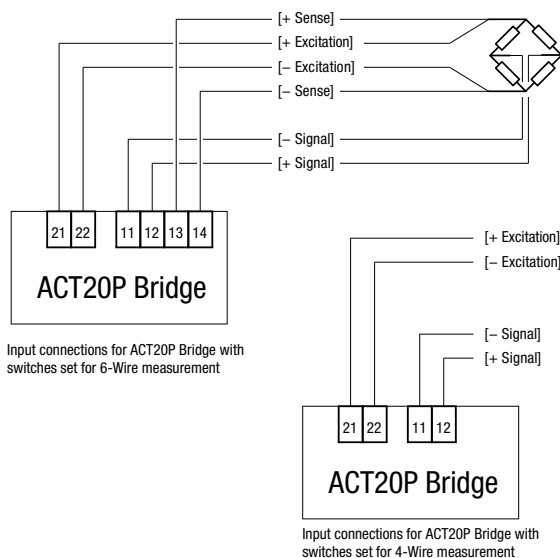
Alternatively there is a button on the front of the unit (under the front cover) that performs the same function. Press for two seconds to correct for the initial load (the 'CAL HI' LED will light for one second).

### Gauge factor

Every strain gauge has a 'gauge factor' which gives the output voltage at full-scale for a one volt excitation voltage (given in mV/V). You multiply this by the bridge excitation voltage to get the output voltage when the gauge is fully loaded. For example, a load cell with 10V excitation and 2mV/V gauge factor will give 20mV when fully loaded. The meaning of a 20mV output depends on the type of the strain gauge. If it was designed to measure 0-1000Kg then 20mV indicates a 1000Kg load.

### Cleaning

The case can be wiped with a damp cloth. De-energise the unit before cleaning.



## Connections

| Terminal | Signal           |                           |
|----------|------------------|---------------------------|
| 11       | Signal –         | Input signal              |
| 12       | Signal +         |                           |
| 13       | Sense +          | Bridge Excitation Voltage |
| 14       | Sense –          |                           |
| 21       | Excitation +     |                           |
| 22       | Excitation –     |                           |
| 23       | Tare +           | External Tare switch      |
| 24       | Tare –           |                           |
| 41       | mA Output –      | Output signal             |
| 42       | Output +         |                           |
| 43       | mA Test Point –  |                           |
| 44       | Voltage Output – |                           |
| 44       | mA Test Point +  |                           |
| 54       | +                | Power Supply              |
| 53       | –                |                           |

## Setup

### General

The ACT20P Bridge has internal switch settings that determine the excitation voltage (5V or 10V) and Input range limits. Select the appropriate settings from the table below.

Once you have set the DIP switches, you simply calibrate the unit to the input and output range for your application.

### Front panel DIP Switch settings

| Switch | Action if On       | Action if Off             |
|--------|--------------------|---------------------------|
| 1      | 10V Excitation     | 5V Excitation             |
| 2      | mA Output          | Voltage Output            |
| 3      | 10mV Span          | Turn off for other ranges |
| 4      | 20mV Span          |                           |
| 5      | 30mV Span          |                           |
| 6      | 50mV Span          |                           |
| 7      | 4-wire Measurement | 6-wire Measurement        |
| 8      |                    |                           |

## Installation

**Caution:** These units must only be installed by qualified staff in accordance with the information given in this manual and all relevant national electrical wiring and safety rules must be followed. Locate the instrument in an area that is free from dust, moisture and corrosive gases. Do not cover the ventilation holes at the side of the case.

### Connections

For effective protection from electromagnetic noise, all signal cables must be shielded, or located on conductive trays or in conduits.

Strip wires to 7mm from the ends. Use a suitable ferrule for multi-stranded wires (do not solder).

### Power Supply Requirements

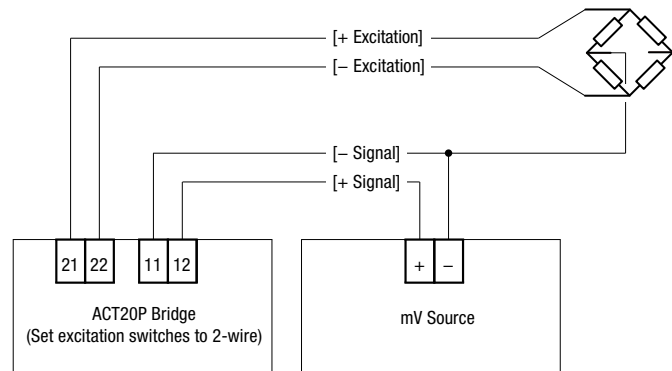
Power Supply Ratings are as follows:

| Voltage Range | Nominal Voltage | Power            |
|---------------|-----------------|------------------|
| 10 – 60 Vdc   | 24 Vdc          | 3 W (at 24 V dc) |

### Environmental conditions

Relative humidity: 10-90% (non-condensing)

Ambient temperature: -40° to 70°C



### Connections for bench calibration (with mV source)

The diagram above shows how to connect up the ACT20P Bridge for bench calibration using a millivolt source. You should use a Strain Gauge similar to the one you will be using or a bridge simulator.

Set DIP switch Bits 7 & 8 to the 'On' position so that you do not need to wire the sense leads up. Alternatively you can connect the sense leads to the bridge in the normal way and set DIP switch Bits 7 & 8 to the 'Off' position. When the calibration is complete remember to return the switches to their original positions.

### Connections for bench calibration (with bridge simulator)

Connect according to the instructions for the bridge calibrator. Connect the excitation voltage and sense wires to the simulator with a shielded cable and link the cable drain to terminal 3.

### Connections for on-site calibration

Connect up the instrument as you would the final installation.

### Calibration Procedure

1. Check that the switch settings are correct for the output type that you want.
  2. Connect up the instrument.
  3. Press the UP and DOWN buttons together. The PWR LED and the 'CAL LO' LED will both turn red to indicate that you are calibrating the minimum input and corresponding output low values. [If you want to skip this stage, press the UP and DOWN buttons together again].
  4. Set the input source to the minimum value required, e.g., 0mV for 0-16mV signal.
  5. Adjust the output value using the up and down keys until the multimeter shows the output value required at minimum input, e.g., 4mA for a 4-20mA output.
- Note: For zero based signals, it is important to start with the output above zero and reduce the output using the down key to just above zero.
6. When you are satisfied with the output, press the ENT button. The 'CAL HI' LED will switch on to indicate that you are calibrating the maximum input and corresponding output values [If you want to skip this stage, press the UP and DOWN buttons together again].
  7. Set the input source to the maximum value required, e.g., 16mV for a 0-16mV signal.
  8. Adjust the output using the up and down keys until the output is at the value required at maximum input, e.g., 20mA for a 4-20mA output.
  9. When you are happy with the results, press ENT twice. Then all three LEDs will switch on then turn off. After two seconds the instrument will return to normal operation (with the PWR LED set to green). To discard the calibration values, press the UP and DOWN buttons together.

## Calibration

### General

There are three options for calibrating the ACT20P Bridge:

- Bench calibrate using a bridge simulator (if you know the gauge factor)
- Calibrate on-site by loading the actual installed strain gauge
- Bench calibrate using a mV source (if you know the gauge factor).

### Using a bridge simulator

Using a bridge simulator provides the easiest method of calibrating the unit. Attach as shown. Set values according to simulator instructions.

### On-site calibration

On-site calibration can be carried out if you can vary the load on the strain gauge in a controlled way, so this works best for weighing devices. Connect up the unit as for a normal installation and use the unloaded cell and a known load as the calibration points. If you cannot apply the full load to the device then adjust the full scale output in proportion to the input load.

For example, if you can only load a 0-1000kg load cell to 500kg and the required output is 0-10V, set the full scale output to 5V with the 500kg load.

### Bench calibration (mV source)

Use the gauge factor to calculate the mV that correspond to the zero and full-scale loading of the bridge. Apply these values during calibration. For example, a 0-1000kpa pressure sensor with a gauge factor of 2mV/V and 10V excitation would have calibration points at 0mV and 16mV for a 0-800kpa measurement range.

### Equipment requirements

- A suitable DC Power Supply
- An accurate digital voltmeter to measure the output
- An accurate bridge simulator or millivolt source (not required for on-site calibration)

| Cal Low | Cal High | PWR   | Description          | Options                                                                    |
|---------|----------|-------|----------------------|----------------------------------------------------------------------------|
| Off     | Off      | Green | Run Mode             | Press TARE for Tare; or Press [UP & DOWN] for calibration                  |
| Red     | Off      | Red   | Low Calibration      | UP or DOWN to adjust output; ENTER to accept; or Press [UP & DOWN] to skip |
| Off     | Red      | Red   | High Calibration     | UP or DOWN to adjust output; ENTER to accept; or Press [UP & DOWN] to skip |
| Red     | Red      | Red   | Ready to save values | ENTER to accept; or Press [UP & DOWN] to discard values                    |
| Off     | Off      | Off   | Saving values        | Last for 2s and unit returns to Run Mode.                                  |