# VOLTCON FAMILY
# OF
# ISOLATING SIGNAL CONDITIONERS

## C O N T E N T S

## 1.0 INTRODUCTION

The VOLTCON is one of a range of signal conditioners capable of accepting a wide variety of electrical input types into an isolated input stage and providing a separate isolated re-transmitted output.

Each unit is a full 3-port isolating device, the input, output and power supply input being isolated from each other.

This manual applies specifically to the VOLTCON. Input signal, output signal and power supply information are required to define any unit exactly. This information, together with a unique serial number, is printed on the side label of each unit; records of the exact configuration of every product shipped are maintained at the factory.

### 1.1 Input Types and Ranges

VOLTCON

Accepts either voltage or current (i.e. high level) inputs with optional transmitter supply or 2 wire potentiometers (current excitation)/3 wire potentiometers (current or voltage excitation).

In general the limits on signals that can be handled with the accuracy specified in Section 7 are:

| | FULL SCALE INPUT | | MIN SPAN | NOTES |
|---|---|---|---|---|
| | MIN | MAX | | |
| DC voltage | 10V | 300V | 50% full scale | Use ISOCON for Vin < 10V |
| AC voltage | 10V RMS | 720V RMS | 50% full scale | 45Hz ≤ fin ≤ 450Hz |

All the standard process ranges such as 0-10mA, 4-20mA, 0-20mA, 1-5V and 0-10V are of course covered.

| | OUTPUT FULL SCALE RANGE | | |
|---|---|---|---|
| | MIN | MAX | Over range limit (approximate) |
| i) Current Source | 1mA into 15 K ohm MAX | 20mA into 750 ohm MAX | + 10% |
| ii) Unbuffered voltage source † | 100mV into 10 K ohm MIN | 15V into 750 K ohm MIN | +10% |
| iii) Buffered voltage source | 100mV into 100 ohm MIN | 20V into 2K ohm MIN | +10% |
| iv) Current sink* | | | |

This includes all standard output ranges such as 0-10mA, 4-20mA, 0-20mA, 1-5V and 0-10V.

† Unbuffered voltage source outputs may be used with load resistances lower than minimum specified values, but a span trim will be necessary to give the specified accuracy.

* Current sink option is available by special request - contact factory for details

### 1.3 Power Supply

Standard power supply requirement is for 24Vdc +/- 10% or 115/230AC for specified performance.
Maximum current consumption at 24V DC depends on application as follows:

| | I supply max |
|---|---|
| Current source output, | 50mA |
| Unbuffered voltage source output, no transmitter supply | 50mA |
| Additional requirement for transmitter supply | 40mA |

## 2.0 UNPACKING

Please inspect the instrument carefully for signs of shipping damage. The unit is packaged to give maximum protection but we cannot guarantee that undue mishandling will not have damaged the instrument. In the case of this unlikely event, please contact your supplier immediately and retain the packaging for our subsequent inspection.

### 2.1 Checking the Unit Type

Each unit has a unique serial number on which full details of the configuration are given. These details should be checked to ensure conformance with your requirement.

## 3.0 CONNECTIONS

This section details the instrument connection information. Before proceeding, please check the information on the serial number label on one side of the unit to ensure that the unit configuration is correct. Connection details are given on a label on the opposite side of the unit, referring to the numbered connector terminals as shown in fig.2 above.

### 3.1 Power Supply

The power supply is connected into terminals 1 (negative) and 2 (positive). The supply voltage is indicated on the serial number label.

**APPLICATION OF VOLTAGES HIGHER THAN THAT STATED FOR THE SUPPLY MAY CAUSE DAMAGE TO THE INSTRUMENT.**

Ensure that no bare wire protrudes from the rear of the power connector risking a short circuit. We advise the use of bootlace ferrules on all bare wires.

### 3.2 Sensor Connections

All sensor connections are made to terminals numbered 4 and 5 on the instrument.

The inputs are connected as described below.

### 3.2.1 Voltage Inputs

| Input | |
|---|---|
| 10 | Input -ve |
| 14 | Input +ve |
| 4 | Output -ve |
| 5 | Output +ve |
| 24 | Power Supply -ve |
| 25 | Power Supply +ve |

This applies to the high-level input device only (VOLTCON). The signal should be connected between pins 14 (positive) and 10 (negative). The input voltage range is given on the serial number label.

### 3.3 Output Connections

Regardless of output type the common, return or negative of the output circuit should be connected to terminal 4. Similarly the positive connection should be made to terminal 5

### 4.0 Output Configuration

The output of the unit may be configured to give any of the following DC ranges:

0-20mA
4-20mA
0-1V
0-10V

## 5. RECALIBRATION

All units are factory calibrated; although the user may wish to recalibrate with greater frequency, a two yearly recalibration interval is adequate for most applications.

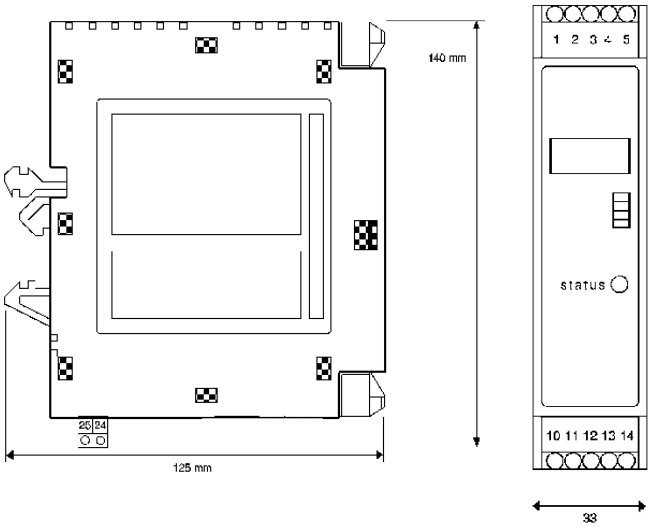
In the case of reconfigurable units, recalibration must be carried out after any change of configuration.

### 5.1 VOLTCON

With appropriate input values use front panel zero and span pots to obtain desired zero scale and full scale voltage or current output (preferably into the actual circuit load resistance, for greatest accuracy). It may be necessary to repeat each adjustment to ensure correct calibration.

## 0 INSTALLATION

**Fig. 3 - Installation Data For VOLTCON**




| | |
|---|---|
| **Mounting** | DIN Rail TS32/35 |
| **Orientation** | Any |
| **Connections** | Screw Clamp with pressure plate |
| **Conductor size** | 0.5-4.0mm |
| **Insulation Stripping** | 12mm |
| **Weight** | Approx 180g |

### 6.1 Installation onto Rails

The instrument is designed to mount directly onto the "Top hat" TS35 standard assembly rail to DIN 46277 part 3/EN 50022/BS5584.

### 6.2 Mounting Arrangements

Ideally the unit should be mounted in a vertical position, i.e. on a horizontal rail. This is the optimum orientation to minimise temperature rise within the unit. However successful operation is possible in any orientation.

Ensure the maximum ambient temperature is less than 55°C.

Good airflow around the unit will maximise reliability.

### 6.3 Wiring Precautions

The unit can accept a variety of sensor inputs, some of which produce very small signals. Therefore it is advisable to adhere to the following rules of good installation practice.

(i) Do not install close to switchgear, electromagnetic starters, contactors, power units or motors.

(ii) Do not have power or control wiring in the same loom as sensor wires.

(iii) Use screened cable for sensor wiring with the screen earthed at one end only.

(iv) Take care not to allow cut pieces of wire to fall onto the unit as they might enter via the ventilation holes and cause electrical short circuits. if in doubt, remove the units from the rail until wiring is complete.

(v) Use bootlace ferrules on all bare wires.

**IMPORTANT: The connection terminals are designed for a maximum torque of 0.4Nm. Exceeding this figure is unnecessary and will result in unwarrantable damage to the unit.**

## SPECIFICATIONS

All specifications are at 20°C operating ambient with 250Ω output load (current output) unless otherwise stated.

**Accuracy and Response**

| VOLTCON | |
|---|---|
| Calibration accuracy at zero and full scale | +/- 0.5% full scale |
| Linearity | +/- 0.25% full scale |
| Zero drift | + / - 50ppm full scale /°C |
| Gain drift | +/- 100ppm /°C |
| Gain dependence on load resistance, $R_L$ | -10ppm / Ω, $0 \leq R_L \leq 750\Omega$ |
| Response Time (90% of step change) | 100ms typical |

**Power Supply Isolation and Operating Ambient (all types)**

| | |
|---|---|
| Operating Voltage | 24V DC +/- 10% or 115/230 VAC |
| Current consumption | 45mA typical at 24Vdc supply |
| Input to output to power supply isolation (3 port) | 1kV DC |
| Operating temperature range | 0-55°C |
| Storage temperature range | -10 - 70°C |
| Operating and storage humidity range | 0 - 90% RH |