



# DIGITAL LINEARISER

## TYPE 112-40

### FUNCTION

This module is designed to accept a signal from a current, voltage or resistance source. It provides an isolated output which can follow any desired pre-set law.

e.g. Output = log Input.

The output may be either current or voltage.

### DESCRIPTION

After level shifting and conditioning, the input signal is passed to a ten bit analogue to digital converter (ADC). The output of the ADC addresses a read only memory (EPROM). 1024 locations in the EPROM hold the desired output values. Outputs from the EPROM are optically isolated and the data is converted into analogue form by a digital to analogue converter (DAC). The DAC drives the output stage which provides either a current or voltage, load independent output.

The EPROM has sufficient capacity to hold two sets of input / output laws. The law in use is selected by either an internal switch, or external contact closure.

The EPROMs are not on-site programmable but are removable for replacement by substitutes.

### MULTIPLIER INPUT

An input is provided to enable the output signal to be multiplied by an external variable. The multiplication takes place after the linearisation stage. The multiplier input is not isolated from the output stage.

### RESISTANCE INPUT, ZERO AND SPAN SETTING

To enable adjustment of zero and span to be made accurately on site, span and zero controls accessible from the front panel are provided and pre-set signals are built into the EPROMs. These signals drive the LED indicators on the front of the unit.

The indicators can be identified as follows:-

Top LED: Over range (OR)

Middle LED: In range (IR)

Lower LED: Under range (UR)

With the input at Zero, adjust the 'Z' control until the UR and IR LEDs are both on.

With the input at Full Scale, adjust the 'S' control until the IR and OR LEDs are both on.

### INSTALLATION

Installation information is given in the 112 Series General Information Sheet.

#### Information Required When Ordering

- Input Signal (see specification overleaf)
- Output Signal (see specification overleaf)
- Calibration Data - this must be supplied as either:-
  - a) Output = Function (Input)
  - b) Tables of Input and corresponding output

NB a maximum of 40 steps can be accepted.  
(In either case, ignore raised input or output if they exist)
- Supply Voltage and Frequency
- Internal or External switching if two laws required.



### Features

- \* **Input / Output Curve Computer Generated**
- \* **Capacity for Two I/O Laws - Switch Selectable**
- \* **Can Accommodate Any Single Valued Law** (ie having only one output per input)
- \* **Isolated Output - Current or Voltage**
- \* **Current, Voltage or Resistance Inputs**

## SPECIFICATION

(typical performance with linear input/output law)

### INPUTS (other inputs available to order)

0-10 mA into 100 ohms  
 0-20 mA into 50 ohms  
 4-20 mA into 62.5 ohms  
 0-5V into >200 k ohms  
 1-5V into >200 k ohms  
 Resistance: minimum change 50 ohms  
 maximum change 10k ohms  
 Resistance thermometer (100 or 130 ohms):  
 minimum change 40°C.  
 maximum change 500°C.

### MULTIPLIER INPUT

0-10V @ 1 mA (electrically connected to the output).

### OUTPUTS (Others can be provided)

0-10 mA into 2000 ohms maximum.  
 0-20 mA into 1000 ohms maximum.  
 4-20 mA into 1000 ohms maximum.  
 0-5V into 500 ohms minimum.  
 1-5V into 500 ohms minimum.

### CALIBRATED ACCURACY (Voltage input)

Set at 100% to be within  $\pm 0.2\%$  FSD.

### OUTPUT DEVIATION FROM SET LAW

Depends on law, but typically, output error is less than  $\pm 0.1\%$  FSD.

### OUTPUT RIPPLE

$\leq \pm 0.2\%$  RMS of FSD.

### LOAD RESISTANCE EFFECT

$\leq 0.001\%$  of span / 100 ohms change  
 (current outputs with 1000 ohms load).

### LAW CHANGE (Option)

Internal or external switch will select one, of two pre-set laws.

### ISOLATION

The standard input and output are isolated from each other and from the power supply. Maximum voltage 250V RMS or 400V DC.  
 Resistance between input, output or power supply  $\geq 1 \times 10^9$  ohms.

### INTERFERENCE REJECTION

Filtering is incorporated to reject R.F. and other industrial noise.

### INPUT CURRENT SHUNT RESISTANCE

Error  $\leq \pm 0.1\%$ .

### RESPONSE TIME

Time constant = 250 ms.

### SERIES MODE REJECTION

Additional 0.1% output ripple for 50 Hz sine wave input of peak to peak amplitude  $\leq$  full scale.

**WARNING THIS UNIT CAN BE MAINS POWERED, AND ALL INPUTS TO IT MUST BE ISOLATED FROM DANGEROUS VOLTAGES BEFORE THE FRONT COVER IS REMOVED. LIVE TERMINALS WILL BE EXPOSED.**



Continuous development may necessitate changes in these details without notice

## COMMON MODE REJECTION

Rejects 50 Hz signals up to 25 x input span.

## INPUT PROTECTION

Voltage inputs: 250V RMS or DC.  
 Current inputs: 0.5W max.

## OUTPUT LIMIT

+ 24V DC on open circuit - 102.3% of Span  
 (except when external multiplier is used).

## TEMPERATURE COEFFICIENTS

Zero:  $\pm 0.02\%$  span / °C  
 Span:  $\pm 0.02\%$  span / °C

## TEMPERATURE RANGE

Operating:  $-10^\circ\text{C}$  to  $+60^\circ\text{C}$ .  
 Storage:  $-5^\circ\text{C}$  to  $+70^\circ\text{C}$ .

## SUPPLY VOLTAGE REJECTION

Output change  $< 0.01\%$  Span / 10% supply change.

## POWER SUPPLY

Standard AC and optional DC powered versions are available. Full details of the power supply options are given in the 112 Series General Information Sheet.

### Power Supply Indication

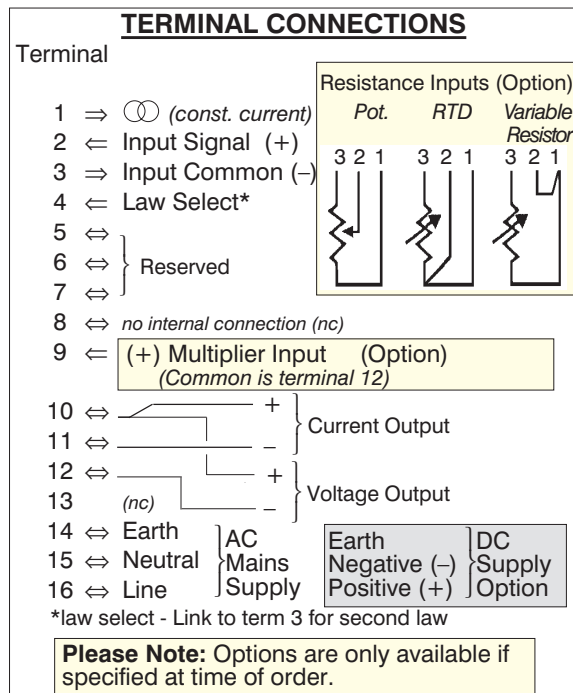
At least one of the three light emitting diodes on the front panel will be illuminated when power is applied.

### Fuse

This unit is fused internally.

## WEIGHT

Approximately 0.7 kg



# SIL

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