

Raise-Lower / Ramp Generator

Type C16-65

Installation Guide



Document Ref: UDC16-65.vp Rev 0



WARNING!

It is important that this guide is read and fully understood before attempting installation or commissioning of the instrument. Instructions appearing in this document, and current safety legislation, must be observed to ensure personal safety and to prevent damage to the instrument or equipment connected to it.

The instrument should be installed, commissioned and operated only by suitably qualified and authorised personnel.

- The specifications for the instrument must not be exceeded. If the instrument is used in a manner not specified, the protection provided by the instrument may be compromised.
- The instrument must be installed in an enclosure that provides adequate protection against electric shock.
- Ensure that power to the instrument is switched off and signal wiring isolated from hazardous voltages before carrying out installation or maintenance.
- The instrument is designed for installation in a clean, dry environment (Pollution degree 1).
- Stroud Instruments Ltd strongly recommends that repairs and re-calibration work are done on a return to factory basis in order that our quality standards, product specifications and safety precautions are not compromised.
- The instrument is double insulated

Note: Clean only with a dry soft cloth.

Safety and EMC information

Safety: EN61010 -1
 Immunity: EN50082-1
 Emissions: EN50081-1
 CE certified

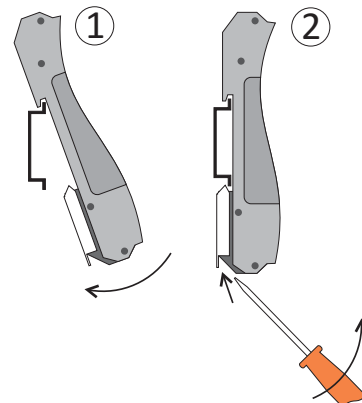
Installation

Location

- The instrument is designed for installation in a clean, dry environment
- Do not install near to switch gear, motor controllers or other sources of strong magnetic fields.
- Avoid exposure to direct sunlight and ensure the ambient temperature inside the enclosure that the unit is mounted in will not exceed our specification.

DIN rail mounting

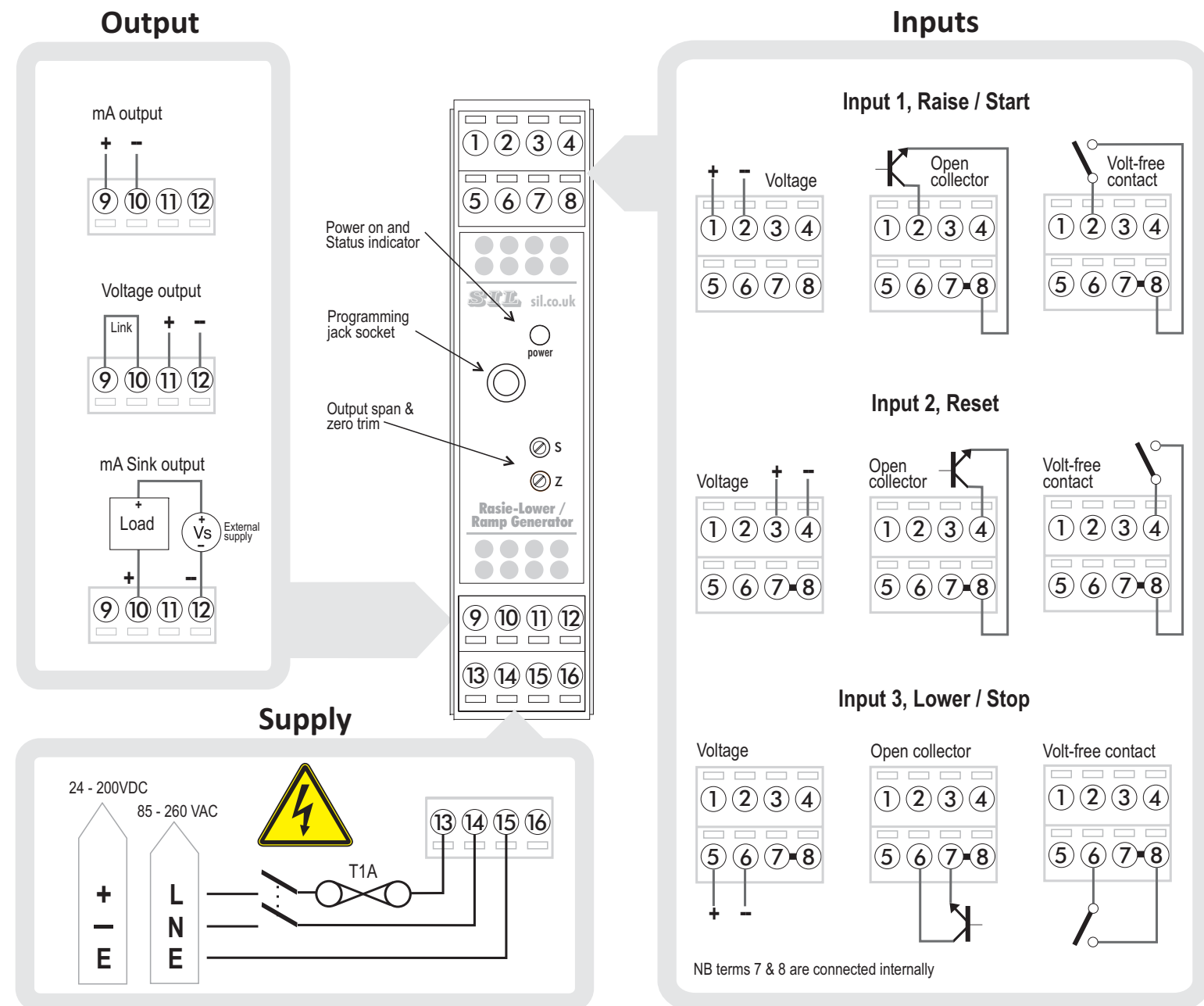
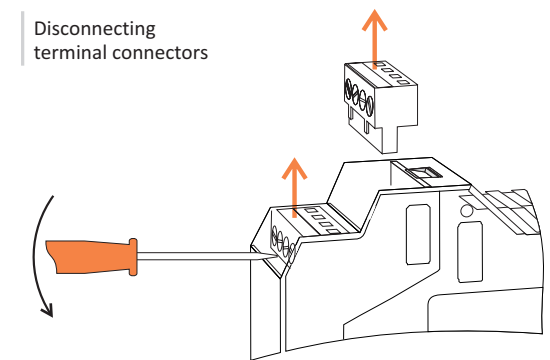
1. Hook the top DIN rail recess over the DIN rail, and press the bottom edge against the DIN rail until the spring-loaded latch clicks home.
2. To remove the instrument from the DIN rail, insert a small bladed screwdriver into the slot in the spring-loaded latch and gently lever the screwdriver up until the latch releases from the DIN rail.



Wiring and connections

- Segregate power supply and signal wiring.
- Use screened cable for all signal wiring with the screen earthed at one end only.
- All connections should be made using ferrules to avoid short-circuits between adjacent terminals.
- This instrument is equipped with a universal power supply and may be operated from either of the following supply ranges:
 DC supplies: 24 VDC to 200 VDC or AC supplies: 85 VAC to 260VAC
- Power supply wiring to the instrument should be protected by a 1A time-delay fuse and double pole switch - see below. The switch should be clearly marked as the isolating switch for the instrument.

Note: terminal connectors are removable.



NB terms 7 & 8 are connected internally

Introduction

The C16-65 may be configured as a Raise-Lower device, e.g. for time controlled raise/lower, open/close, up/down or set-point applications, or as a Ramp Generator. Control is provided by three inputs; *start/raise*, *stop/lower* and *reset*. The output signal types and output signal ramp period are user configurable by jumper links and switch settings respectively. All other parameters may be configured with the optional programming kit. The ramp period select switches also provide test modes for generating a range of output signals for commissioning and maintenance purposes.

Operation

Raise - Lower mode

Control (input) signal functions (Raise, Lower & Reset)

In this mode, the output rises whilst the *Raise* input signal is active. Similarly the output falls whilst the *Lower* input signal is active. With no *Raise* or *Lower* signals the output is held at the current value. The response to simultaneous Raise and Lower input signals may be set to raise, lower or reset the output signal or to take no action.

Output options

The initial value of the output, i.e. after power up or reset, and the maximum and minimum values of the output signal, may be set within the range 0-102.3% of full scale.

The initial value of the output may alternatively be set to the last output value before powering down.

Ramp generator mode

Control (input) signal functions (Start, Stop, Reset)

The ramp is started and stopped by momentary contact closure or voltage signals. The Stop signal halts the ramp at the current output value. The response to simultaneous Start and Stop signals may be set to perform 'no action' or Start, Stop or Reset the ramp. Post reset action may be set to either restart the ramp or to take no further action. Active states of input signals are individually programmable.

Output options

Four ramp types are available each of which may be set to generate a single period waveform or, using the repeat option, a continuous waveform. Other options enable the ramp to start when power is applied and set maximum and minimum values of the ramp (*range 0-102.3% of full scale*).

Configuration

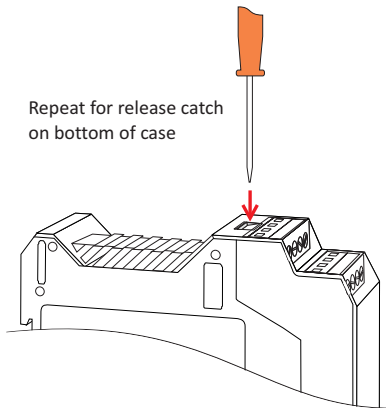
The following procedures require the case to be opened



WARNING: Isolate from power supply and any potentially hazardous signals before commencing this procedure.

Opening the case

- Turn off power to the unit and isolate all potentially hazardous signals. NB the terminals are removable to facilitate a quick disconnect. see 'Wiring and connections'.
- To open the unit release the top and bottom catches by pressing down with a small screwdriver as shown and withdraw the front panel and PCB assembly out of the case.



Notes:

1. Order code C16-65 is supplied with the default settings as shown in the specification, inputs are configured for VFC/Open-collector and output set to 4-20mA. Order code C16-65 /9 is supplied configured to customer's specifications.

2. For options other than shown below, please refer to the 'Programming Guide'

Input and output signal types

Refer to Fig. 1 'Configuration links'

- Inputs - for each input position the jumper link to suit the type of control signal for your application. For terminal connections see 'Wiring and connections'.
- Outputs - select Raised or True zero and output span as required.

NOTE: small errors may be introduced by range changing but these can be corrected by the front panel Output Span and Zero trims.

Fig 1 Configuration links

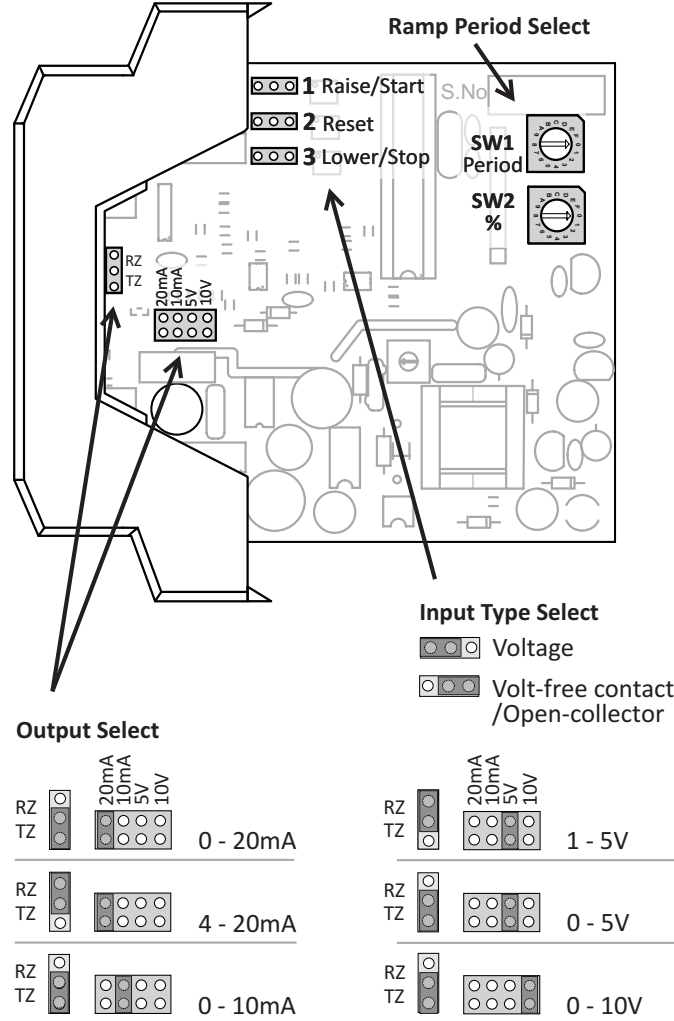


Fig 2 Ramp output period & test settings

| SW1 Period | | SW2 Test positions | |
|------------|-----------|--------------------|---|
| Position | Action | Position | Output |
| 0 | Test Mode | 0 | Zero |
| 1 | 15 | 1 | 25% FSD |
| 2 | 30 | 2 | 50% FSD |
| 3 | 60 | 3 | 75% FSD |
| 4 | 2 | 4 | 100% FSD |
| 5 | 4 | 5 | 102.3% FSD |
| 6 | 8 | 6 | Sawtooth 1.5 sec. period |
| 7 | 16 | 7 - E | Remains on zero |
| 8 | 32 | F | Powered up with this setting, resets to default values shown in Specification |
| 9 | 64 | | |
| A | 128 | | |
| B | 256 | | |
| C | 512 | | |
| D | 1024 | | |
| E | 2048 | | |
| F | 4096 | | |

| SW2 % of Period | |
|-----------------|---------------|
| Position | % of SW1 |
| 0 | Approx 2 sec. |
| 1 | 10 |
| 2 | 20 |
| 3 | 30 |
| 4 | 40 |
| 5 | 50 |
| 6 | 60 |
| 7 | 70 |
| 8 | 80 |
| 9 | 90 |
| A - F | 100 |

Calibration adjustment



WARNING - Electric shock hazard

Do not attempt to adjust the front panel accessible 'Span' and 'Zero' controls with the unit out of its case.

- Reassemble the case as follows: Insert the front panel / PCB assembly into the case ensuring that the two leading edges of the side panels are correctly located into the front panel section (the sides of case must fit flush with the sides of the front section) and the front panel is locked in place.
- Reconnect wiring / reinsert the removable terminals ensuring wiring / removable terminals are returned to their correct locations.

Calibration adjustment

- After a warm-up time of 30 minutes:
 - Referring to Fig 2, set SW1 and SW2 to position '0' (test mode - zero output) and adjust the 'Zero' trim.
 - Set SW2 to position '4' (test mode - 100% FSD), adjust the 'Span' trim.
 - Repeat steps (i) and (ii) as required.

Ramp period adjustment

- On the SW1 'Period' switch, select a time just larger than the desired time.
- On the SW2 '%' switch, select the position (*percentage of SW1 setting*) which will give the nearest time to the desired value.

Other test mode settings

Position 6 - Sawtooth

This generates a single cycle of sawtooth waveform on power up.

Position 'F' - Set to default settings

This mode is intended for factory use. However if used, the unit will be configured to the default settings for Raise-Lower - see the specification.

Programmable functions

Programmable functions are configured with the optional programming kit. Please refer to the C16-65 Programming Guide. *NB A copy is provided on the software CD.*

Specifications

Input signal type

User selectable by plug-in jumper links

Minimum pulse width 100 ms

- Contact closure (*must sink 3mA approx.*)
- Open collector transistor (npn - *must sink 10mA approx.*)
- Voltagess in the range >5V <50V DC (*external circuit must source 3mA approx.*)

NB Active states of inputs signals are software programmable.

Output signal

User selectable by plug-in jumper links

(*figures in brackets are load impedances in ohms*)

0-10 mA (2000R max.); 0-20 mA (1000R max.)
 4-20 mA (1000R max.); Current sink 4-20mA @ 30V max.
 0-5 Volts (500R min.); 1-5 Volts (500R min.)
 0-10 Volts (500R min.)

Output period

User selectable by externally accessible switches

Period switch (time to full scale): 15, 30, 60 secs; 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096 mins

Percent switch (% of period switch setting): 0 - 100% in 10% steps
 Timing accuracy: single slope < ± 1%; dual slope < ± 1% x Start & finish section delay factor

Output signal range

Maximum and minimum values may be set within the range 0-102.3% of full scale

Isolation

Maximum Voltage 250V RMS or 400V DC

For active inputs: inputs and the output are isolated from each other and from the power supply.

For passive inputs: the input stage and the output are isolated from each other and from the power supply. However, the inputs share a common internal isolated 24V transducer supply.

Power supply

85 - 260 VAC 50/60Hz; 24 - 200 VDC (3W nominal)

Safety & EMC

Safety: EN61010-1, Immunity: EN50082-1, Emissions: EN50081-1, CE certified

Mechanical

Weight: approx. 0.5kg, Dimensions (mm): 116D* x 22.5W x 99.5H
 *Depth is 117.9 when mounted on DIN rail TS3/TS35D

Temperature range

Operating: - 10 to + 60°C
 Storage: - 20 to + 70°C

Software programmable functions

Items marked with asterisk denote default settings.

Raise - lower mode (Default mode)

Output initial value: 0-102.3% of full scale (0%*) or
 Set-point (*last output value on power off*)

Ramp generator mode

Ramp start after reset: Yes No*

Ramp start when power applied: Yes No*

Repeating ramp: Yes No*

Ramp type: Low > High* High > Low
 Low > High > Low
 High > Low > High

Settings applicable to both modes

Action with simultaneous inputs: No change* Raise Lower Reset

Input 1 polarity^{1,2}: Normal* Reversed

Input 2 polarity^{1,2}: Normal* Reversed

Input 3 polarity^{1,2}: Normal* Reversed

Output maximum: 0-102.3% of full scale (100%*)

Output minimum: 0-102.3% of full scale (0%*)

Notes

- Input signal polarity: 'Normal' is voltage signal 'high', volt-free contact closed, npn open collector active.
- Input 1 = Raise/Start, Input 2 = Reset, Input 3 = Lower/Stop