



## Electronic Step Controller

## US1-E, US2-E US4-E

- Adjustable switch-on delay (typically used to prevent current surges on start-up and after a power failure)
- Adjustable switch-on points
- Adjustable switching differential
- Interlock function for controllers connected in sequence

### Use

Electronic step controller used to switch devices (pumps, electric heating coils, compressors, humidifiers, fans etc.) on and off in stages.

Used in conjunction with the CLASSIC, DESIGO 30 controllers and POLYGYR.

### Type summary

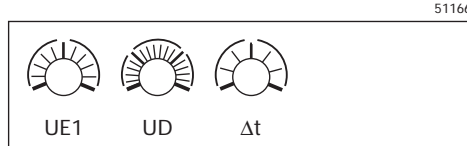
<i>Function</i>	<i>Type</i>
1-step controller (voltage relay)	<b>US1-E</b>
2-step controller	<b>US2-E</b>
4-step controller	<b>US4-E</b>

### Technical design

The US..-E electronic step controllers operate over a DC 0...10 V control signal range. The switch-on points can be adjusted individually for each step. The switching differential and switch-on delay are also adjustable, but are the same for each step.

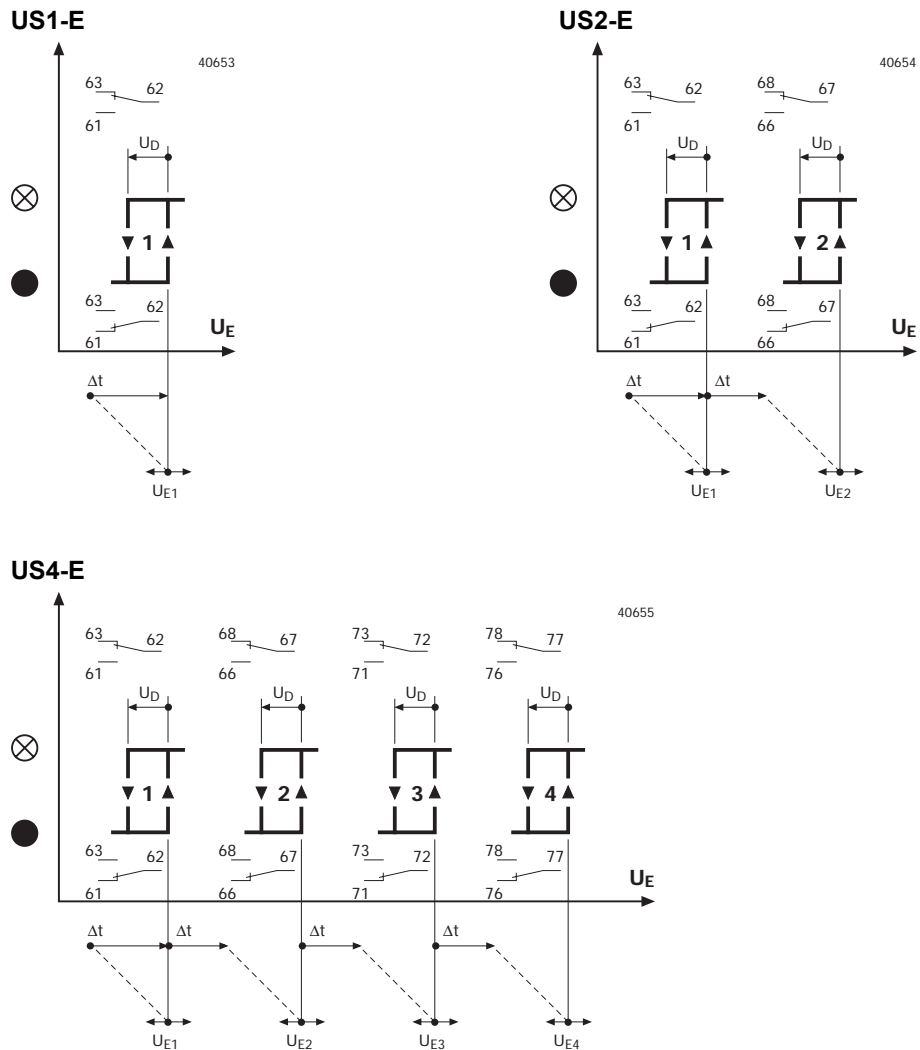
On a rising voltage signal, step 1 is switched on when the selected voltage value  $U_{E1}$  is reached and the delay time ( $\Delta t$  switch) has elapsed. The time delay for step 2 is also initiated and the switch-on process is repeated for step 2 and the subsequent steps in the same manner.

With a falling control signal, the steps switch off in the reverse sequence without a time delay. The switch-off points occur at the voltages defined by switching differential  $U_D$ . The switch states are indicated by LEDs on the controller.



The US...-E step controllers each have an interlock input and an interlock output. This enables two devices to be connected in series, such that the first stage of the second device cannot switch on until the last stage of the first device has been switched on.

## Switching diagrams

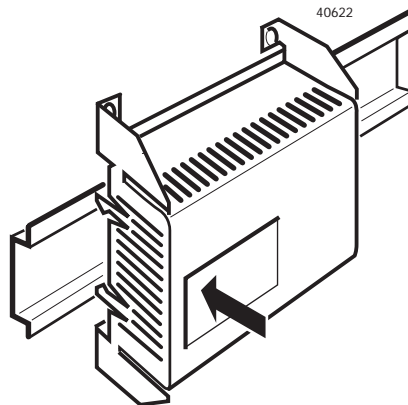


## Mechanical design

The step controllers consist of a metal housing and a PCB which accommodates the relays. Two-part plug-in terminal blocks are provided for the external connections. The adjustment potentiometers for the switch-on delay, switch-on voltage and switching differential are located on the PCB under the hinged cover.

## Fitting notes

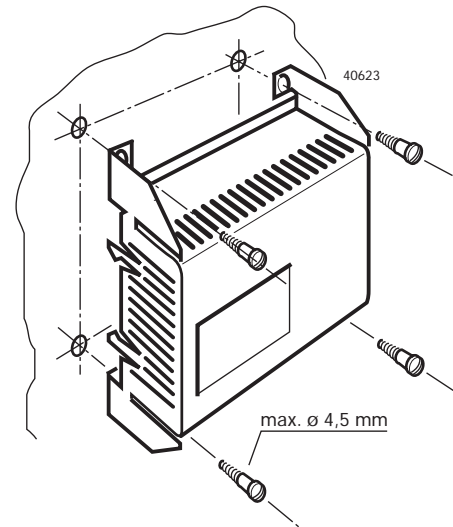
- Ensure free access to the connection terminals.
- To dissipate the heat generated during operation, adequate air circulation must be allowed for.



### Rail mounting

The controller base is designed for snap-mounting on DIN rails.

Rail type: EN 50022-35 x 7.5



### Surface mounting

Four clear screw-holes are provided for surface mounting.

## Technical data

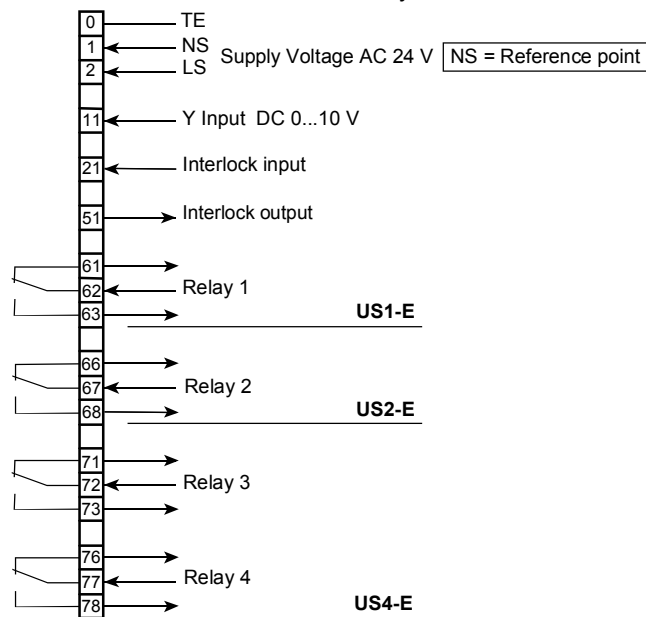
Supply voltage		Safety low voltage (SELV)
Nominal voltage		AC 24 V, 50 ... 60 Hz
– Tolerance		+15 / –10 %
Power consumption		US1-E: 2 VA / US2-E: 4 VA / US4-E: 6 VA
Primary fuse		None
Signal input		
Control signal		DC 0 ...10 V
Interlock input		Open = No interlock / 0 V (NS) = Interlocked
Signal output:		
US1-E, US2-E, US4-E		Volt-free change-over contacts
Interlock output		Yes
Contact rating per step		Max. AC 250 V
		Max. 5 A resistive
		Max. 2 A inductive, $\cos\varphi \geq 0.4$
		Min. admissible load: 10 mA at DC 5 V
		Max. AC 250 V
Voltage against earth		
Switch-on voltage, adjustable	US1-E	DC –1 ...11 V
	US2-E	DC 1 ...10 V, individually for each step
	US4-E	DC 1 ...10 V, individually for each step
Switching differential, adjustable	US1-E	DC 0.5 ... 9 V
	US2-E	DC 0.5 ... 5 V (same for each step)
	US4-E	DC 0.5 ... 2.5 V (same for each step)
Switch-on delay, adjustable		0 ... 60 s (same for each step)
Principle of operation		Relays energised with rising voltage
Connections:		
Connection terminals		Plug-in screw terminals 2 x 1.5 mm <sup>2</sup>

Max. cable length	See installation guidelines	
Weight (including packaging):	US1-E	0.25 kg
	US2-E	0.40 kg
	US4-E	0.45 kg
Dimensions (W x H x D)	108 x 123 x 52 mm	
General ambient conditions:		
Usage	Built-in unit for control panel mounting	
Temperature range		
– Operation	5 ... 45 °C	
– Transport and storage	– 25 ... 70 °C	
Ambient humidity	10 ... 90 %rH	
Mounting	Snapped onto DIN rail (EN 50022-35 x 7.5) or screwed to a flat surface	
Safety:		
Product safety	EN 60730	
– Overvoltage category	II	
– Contamination level	2	
Electrical safety	SELV-E (PELV to IEC364-4-41)	
Function	Typ 1B to EN 60730	
Conformity	This product meets the requirements for <b>CE</b> marking	

## Connection terminals

**Caution**

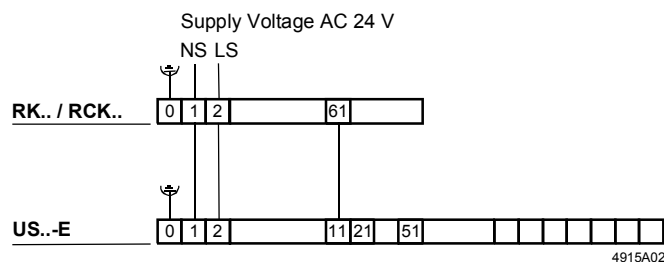
Note the technical data for the relay contacts: AC 250 V / 5(2) A



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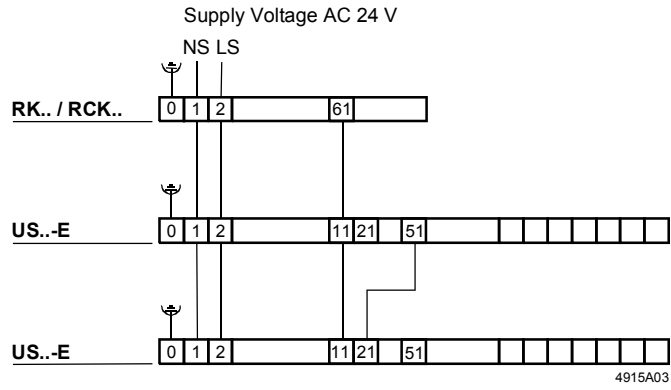
## Connection diagrams

### Connections for one step controller



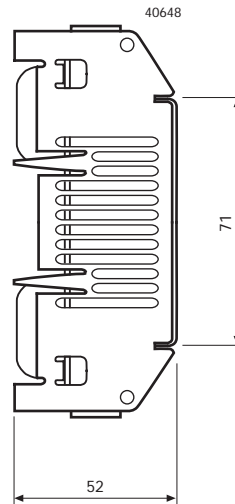
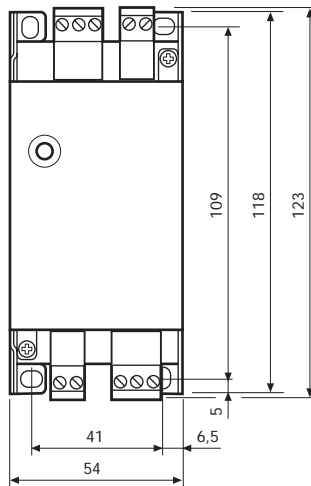
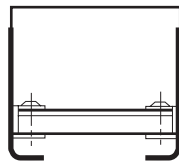
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**Connections for two step controllers with sequence interlock**



**Dimension**

**US1-E**



US2-E and US4-E

