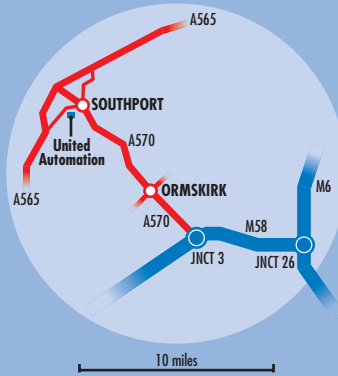
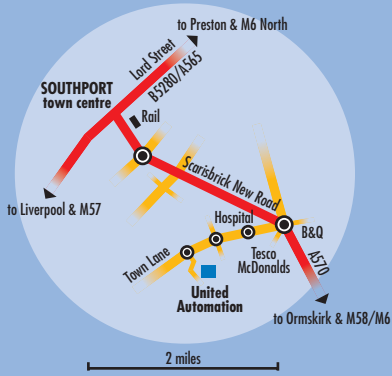


# How to find United Automation



## La Grand E.V.O

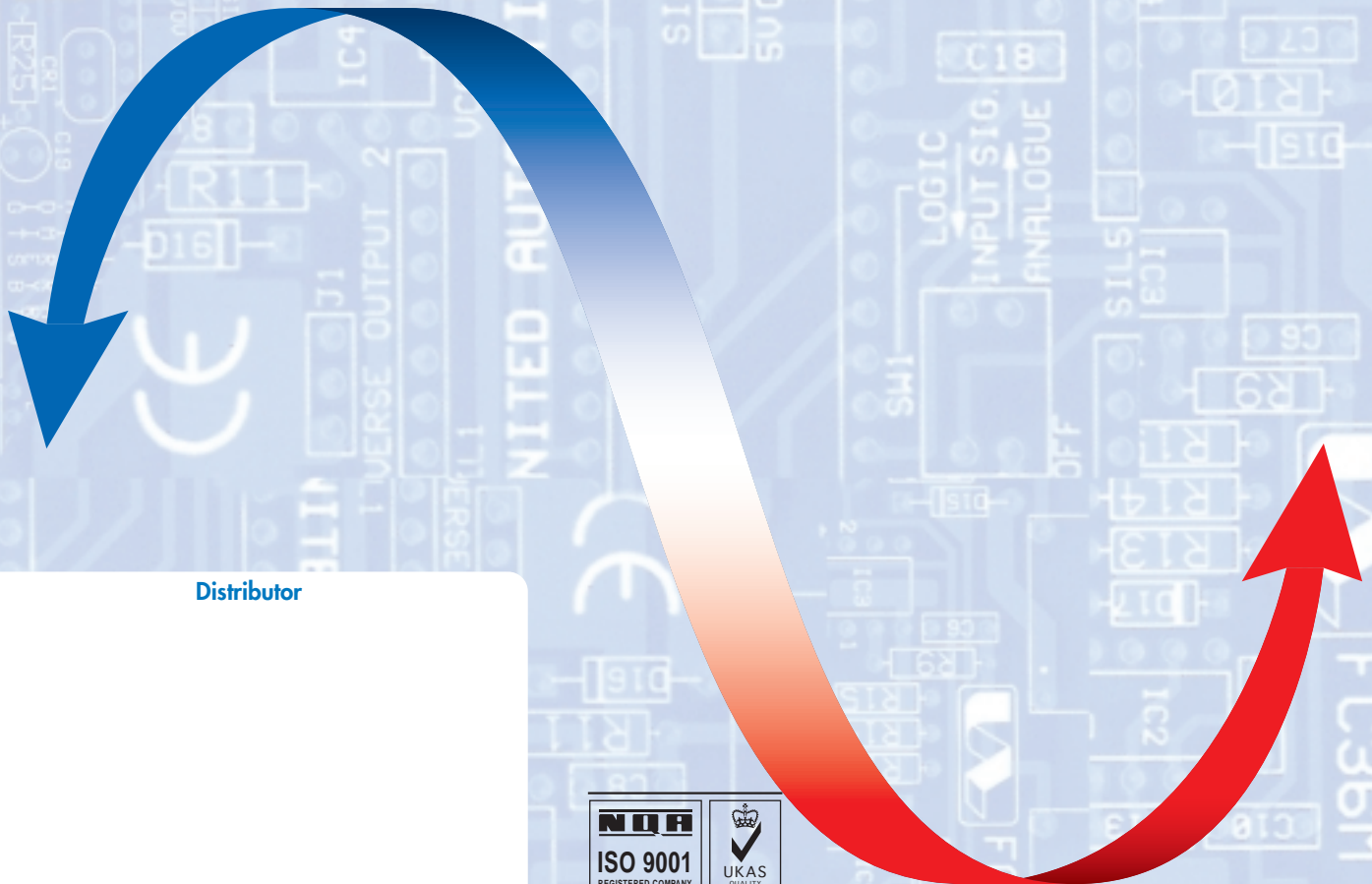
Sydneystraat 90  
3047BP Rotterdam  
tel. 010-2449966  
fax. 010-2449967  
info@lagrand-evo.nl  
www.lagrand-evo.nl  
www.vermogensregeling.nl



## united automation limited

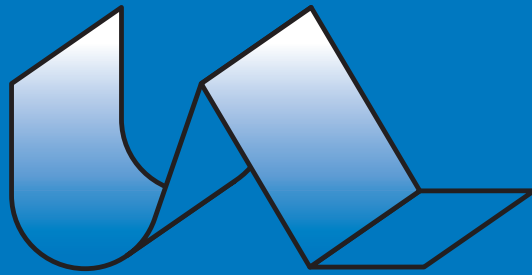
1 Southport Business Park Kew Southport PR8 4HQ  
Tel: 01704 516500 Fax: 01704 516501  
www.united-automation.com  
enquiry@united-automation.com

Publication No. X3-00-001



Distributor

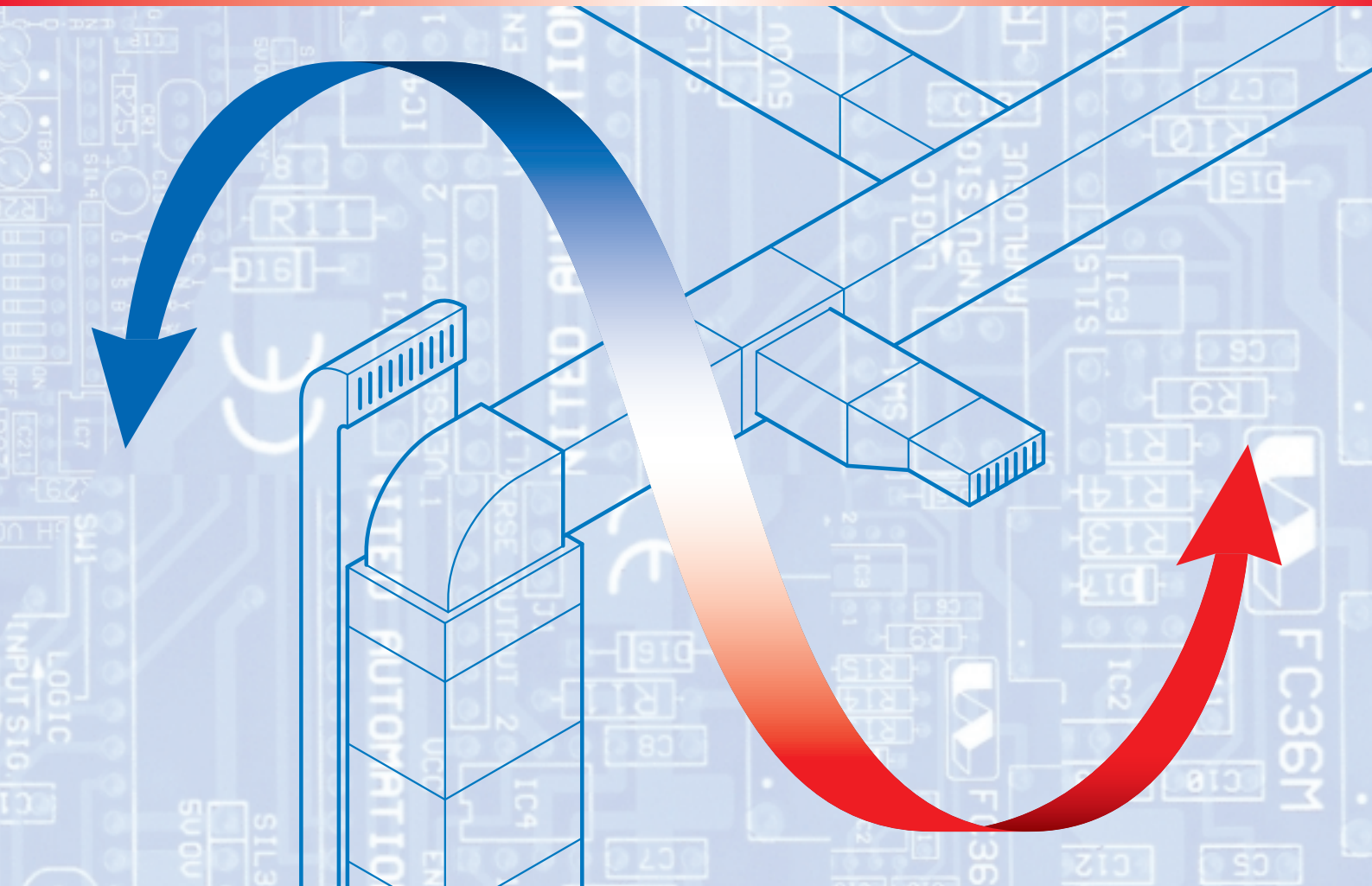




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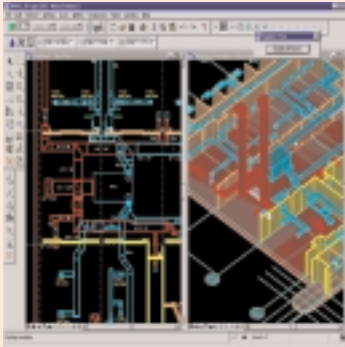
first in power electronics

Heating Ventilation and Air Conditioning (HVAC) Power Controllers



# Advanced Power Controllers for HVAC

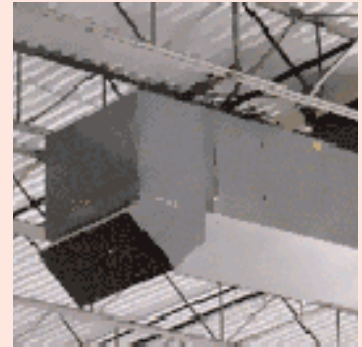
TYPICAL HVAC POWER CONTROL APPLICATIONS



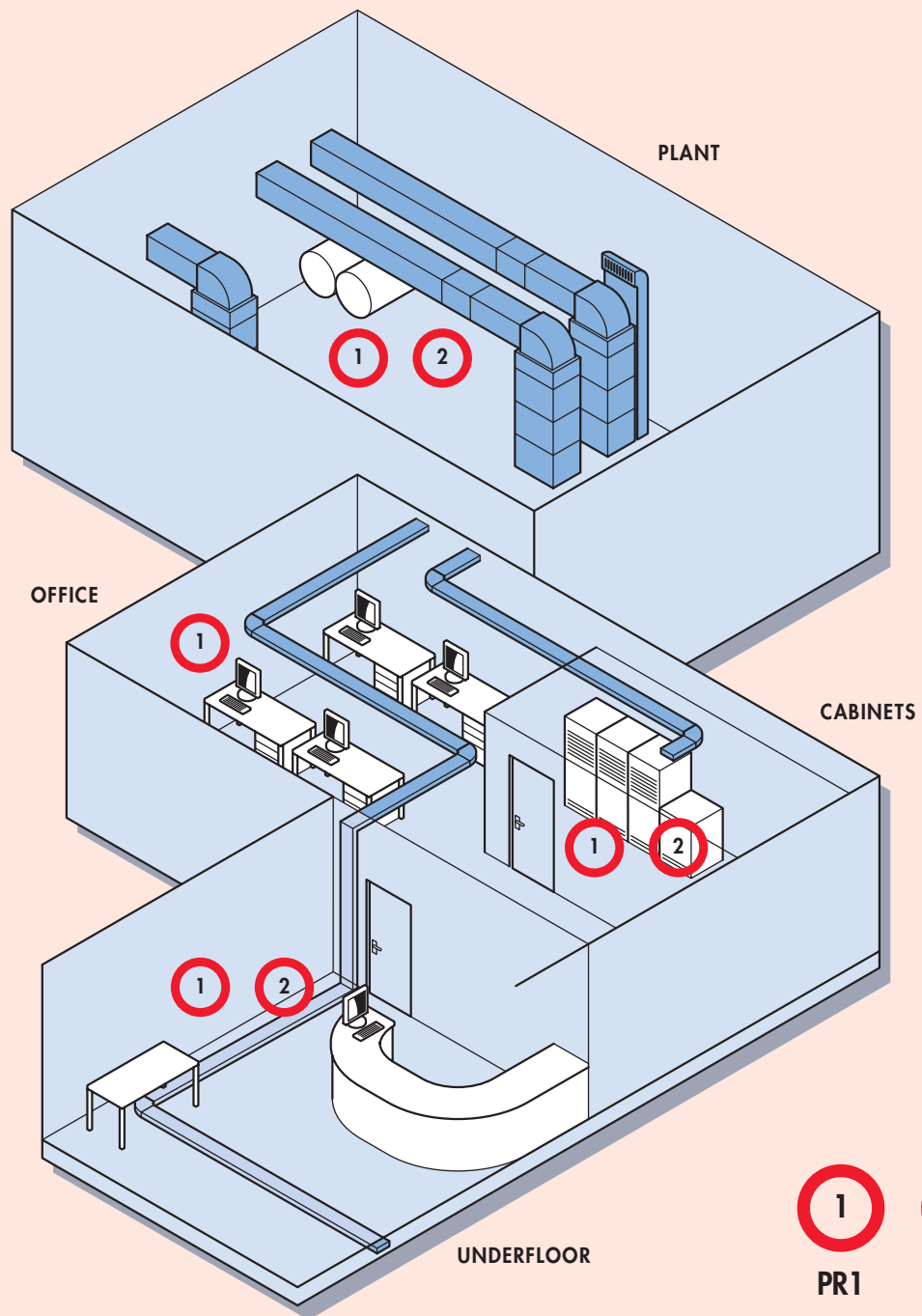
Building Management Systems



HVAC Control Systems



HVAC Battery Heaters

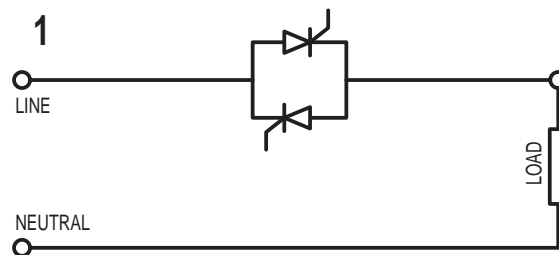




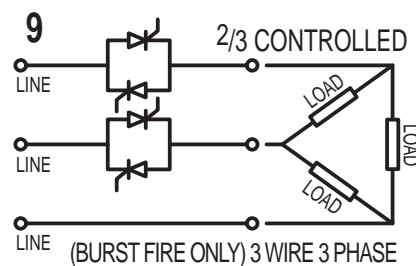
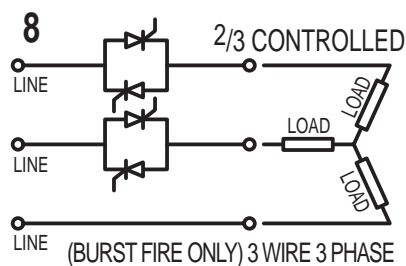
## Product Selector for HVAC Power Controllers

Product Name / Rating	Overall Dimensions (mm)	Fixing Centres Hole Diameter (mm)	Max.Line Current (A)	Internal Fuses	LED Indication	Mounting Din Rail (D) Panel (P)	Internal Power Supply	0-10v Signal	0-5V Signal	Fan Cooling	Over Temperature Protection	Failsafe Alarm Facility
Single Phase (Open)												
PR1-1.1KW @ 240V	L57 x W44 x H35	L47 x W22/4	4.6	✗	✓	P	✗	✓	✗	✗	✓	✗
PR1-DIN-1.5KW @ 240V	L80 x W60 x H65	✗	6.3	✗	✓	D	✗	✓	✗	✗	✓	✗
PR1-DIN-3KW @ 240V	L80 x W45 x H130	✗	12.5	✗	✓	D	✗	✓	✗	✗	✓	✗
PR1-DIN-5KW @ 240V	L75 x W70 x H135	✗	20.8	✗	✓	D	✗	✓	✗	✗	✓	✗
Single Phase (Enclosed)												
PR1-E-1.5KW @ 240V	L140 x W99 x H45	L120 x W75/5	6.3	✓	✓	P	✓	✓	✓	✗	✓	✗
PR1-E-3KW @ 240V	L140 x W99 x H80	L120 x W75/5	12.5	✓	✓	P	✓	✓	✓	✗	✓	✗
PR1-E-6KW @ 240V	L140 x W99 x H80	L120 x W75/5	25	✓	✓	P	✓	✓	✓	✗	✓	✗
PR1-E-9KW @ 240V	L205 x W155 x H120	L140 x W140/5	37.5	✓	✓	P	✓	✓	✓	✗	✓	✓
PR1-E-12KW @ 240V	L205 x W155 x H120	L140 x W140/5	50	✓	✓	P	✓	✓	✓	✗	✓	✓
PR1-E-18KW @ 240V	L208 x W155 x H120	L140 x W140/5	75	✓	✓	P	✓	✓	✓	✗	✓	✓
PR1-E-24KW @ 240V	L208 x W155 x H120	L140 x W140/5	100	✓	✓	P	✓	✓	✓	✗	✓	✓
Three Phase (Enclosed)												
PR3-E-12KW @ 415V	L150 x W240 x H100	L130 x W220/5.5	16.7	✓	✓	P	✓	✓	✓	✗	✓	✓
PR3-E-18KW @ 415V	L150 x W240 x H100	L130 x W220/5.5	25	✓	✓	P	✓	✓	✓	✗	✓	✓
PR3-E-27KW @ 415V	L150 x W240 x H100	L130 x W220/5.5	37.6	✓	✓	P	✓	✓	✓	✗	✓	✓
PR3-E-36KW @ 415V	L205 x W155 x H120	L140 x W140/5	50.1	✓	✓	P	✓	✓	✓	✗	✓	✓
PR3-E-54KW @ 415V	L250 x W155 x H120	L140 x W140/5	75.2	✓	✓	P	✓	✓	✓	✓	✓	✓
PR3-E-86KW @ 415V	TBA	TBA	119.8	✓	✓	P	✓	✓	✓	✓	✓	✓
PR3-E-105KW @ 415V	TBA	TBA	146.2	✓	✓	P	✓	✓	✓	✓	✓	✓
PR3-E-150KW @ 415V	TBA	TBA	208.9	✓	✓	P	✓	✓	✓	✓	✓	✓

### Single-Phase Application Guide



### Three-Phase Application Guide





PR1 (1.1KW)

PR1-DIN (1.5KW)

PR1-DIN (3.0KW)

PR1-DIN (5.0KW)

### PR1-1 Range

Product name	Current(A)	Voltage*	Order code
PR1-1.1KW	4.6A	240V	A407248-HV
PR1-DIN-1.5KW	6.3A	240V	A407249-HV
PR1-DIN-3.0KW	12.5A	240V	A407250-HV
PR1-DIN-5.0KW	20.8A	240V	A407252-HV

\* Note: values shown are typical voltage ratings



PR1-E (1.5KW)

PR1-E (3-6KW)

PR1-E (9-24KW)

### PR1-E Range

Product name	Current(A)	Voltage*	Order code
PR1-E-1.5KW	6.3A	240V	A407549-HV
PR1-E-3.0KW	12.5A	240V	A407550-HV
PR1-E-6.0KW	25A	240V	A407552-HV
PR1-E-9.0KW	37.5A	240V	A412222-HV
PR1-E-12.0KW	50A	240V	A412232-HV
PR1-E-18.0KW	75A	240V	A412242-HV
PR1-E-24.0KW	100A	240V	A412252-HV

\* Note: values shown are typical voltage ratings



PR3-E (12-27KW)



PR3-E (36KW)

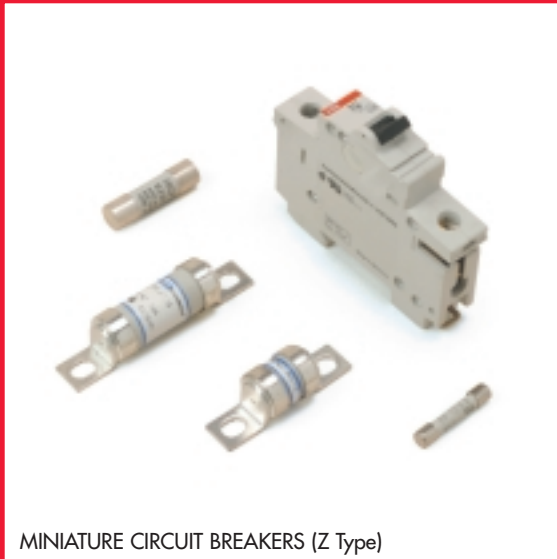


PR3-E (54KW)

**PR3-E Range**

Product name	Current(A)	Voltage*	Order code
PR3-E-12KW	17A	415V	A437407-HV
PR3-E-18KW	25A	415V	A437408-HV
PR3-E-27KW	38A	415V	A437409-HV
PR3-E-36KW	50A	415V	A437432-HV
PR3-E-54KW	75A	415V	A437442-HV
PR3-E-86KW	120A	415V	A447412-HV
PR3-E-105KW	146A	415V	A447432-HV
PR3-E-150KW	209A	415V	A447442-HV

\* Note: values shown are typical voltage ratings



MINIATURE CIRCUIT BREAKERS (Z Type)

## SEMICONDUCTOR FUSES

- High rupturing capacity (HRC) fuse links with bolted connections for use in industrial and commercial installations.
- Ultra fast acting fuse links are designed to provide short circuit protection of semiconductors.

Available in 6A–720A, 250V–660V ratings (RMS).

## MINIATURE CIRCUIT BREAKERS (Z Type)

- These items can replace conventional semiconductor fuses and are available as single and double pole models.
- They offer all the protection of a fuse but have the added advantages of being re-settable. They provide protection against earth faults and dangerous body currents in the case of high touch voltage due to installation faults.
- High short-circuit switching capacity.

Available in 6A – 25A current ratings (RMS).

## Specialised Requirement?

If you have a specialised requirement that cannot be met by a standard product then UAL can help.

One phone call will put you in touch with our experienced team of design and development engineers.

After discussion of your particular application and operating environment we may be able to offer a custom design solution that meets your exact needs.

Tel: 01704 516500

Fax: 01704 516501

[enquiry@united-automation.com](mailto:enquiry@united-automation.com)



## Shaping the future of Power Electronics

UAL is acknowledged internationally as a leading manufacturer of power control products. A position achieved through excellence in all areas of the business; technical expertise, product innovation, quality systems and customer service.

Founded in 1964, UAL has expanded exponentially and in 1999 the company's research and manufacturing facilities were relocated to a larger, purpose built facility in Southport.

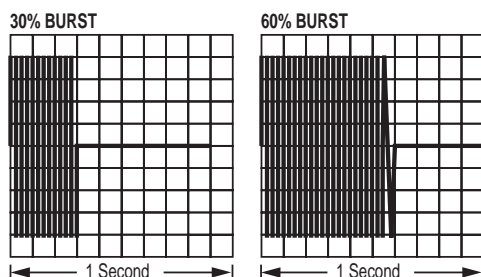
The company serves international markets with sales to a wide variety of industry sectors and market segments including; end users, distributors, contractors and OEMs.



## Theory and Application

### Supply Voltages

All of our products have been designed to operate at the voltages specified on the product data sheet. These voltage tolerances are within the guidelines set out in the European directive BN EN 61010. Within the UK, these are 110V, 230V and 400V with tolerances of +10% and -6%



### Burst Fire

The above graphs show load voltage, using a variable time base switching down to half cycle increments at 30% and 60% throughput. Output is block bursts of complete sine waves, switched on and off at zero voltage mains crossover. More power is allowed through as on to off ratio is increased.

### What is a Thyristor?

A Thyristor is a semiconductor device also known as a silicon controlled rectifier (SCR). It has three electrodes Anode, Cathode and Gate (control electrode). When the anode is positively charged with respect to the cathode no current will flow until a pulse is applied to the gate. The Thyristor will remain in conduction until the current in the device drops to zero.

To control an alternating current two devices are connected in inverse parallel, the gate pulses are provided by a trigger module or firing circuit.

### What is Burst Firing?

Using zero voltage switching (ZVS), burst firing gives power control with minimal interference. This circuit inhibits radio frequency interference (RFI) by switching on or off at zero volts mains crossover, in repeating time periods (typically one second). The number of complete mains sine waves are varied in its on/off ratio, or duty cycle, linearly by the control signal level. The burst firing circuit provides trigger pulses coincident with mains zero polarity changeover, ensuring only complete half cycles are passed through resistive loads. This prevents step changes in load current, and thus virtually no RFI is produced.