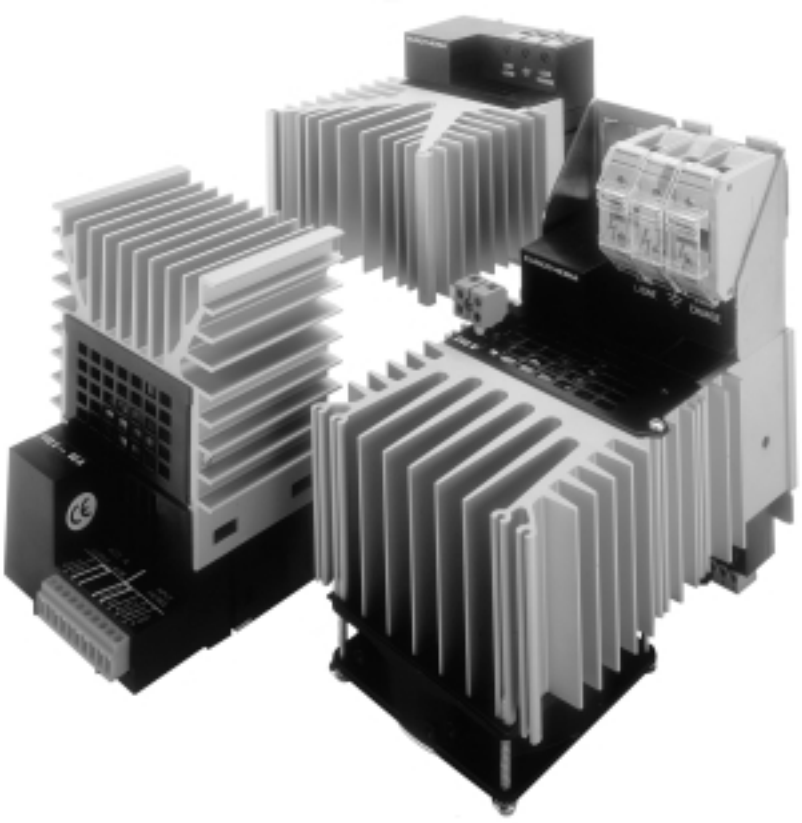
425

EUROCUBE



General purpose single phase thyristors and solid state relays
Product data

EUROTHERM

CONTROLS
DATA MANAGEMENT
PROCESS AUTOMATION

Invensys
An Invensys company

425 EUROCUBE

A complete range of low cost solid state relays and analogue thyristor units for 15 to 125 amps and up to 500 volts. Works with many load types in single or three phase applications.

425S Solid State Relay

The ideal replacement for mechanical contactors.

Better temperature control - The short cycle times possible with solid state devices mean fine adjustment of the delivered power for better temperature control. No longer does the heater have to be on for almost a minute just to prolong contactor lifetime.

Reduced maintenance costs - The solid state relay has no moving parts needing maintenance. Zero voltage switching means no arcing when switching, which eliminates deterioration and reduces interference to the supply. The 425S optionally detects partial load failure so maintenance can be scheduled at the best time rather than waiting for total failure and lost production.

Increased element lifetime - The short power bursts from the solid state relay reduce temperature changes in the heating element; this in turn reduces thermo-mechanical stress. No longer do you need to see your elements cycle from dark to red hot and back again just to maintain a constant temperature.

425A Thyristor Unit

A low cost thyristor unit with phase angle firing for inductive or variable resistance loads and burst firing for resistive loads and to improve power factor.

Elimination of supply variations - The 425A senses the supply voltage delivered to the load. If the voltage varies then the unit responds immediately to prevent any temperature fluctuation.

Heating element protection - With phase angle firing the 425A has an optional current limit. This is essential for elements with low cold resistance so that they can be heated without damage to elements or fuses.

Designed for three phase control - A 425A and 425S connected together using slave output (425A) and 20mA or 10V input (425S) provide an option for controlling three phase loads.

CE marking/safety - 425S and 425A units meet the essential requirements of the European Low Voltage Directive. No exposed parts are at a dangerous voltage. Eurotherm certifies that the 425S and 425A units when used with recommended filter have successfully passed the Electromagnetic Compatibility (EMC) tests and enables the system which incorporates them to comply with the EMC directive as far as the 425S and 425A are concerned.

An EMC installation guide is available on request (part no. HA025464).

TECHNICAL SPECIFICATION

Current	15A to 125A
Voltage	120 V to 500 V (+10%, -15% of nominal voltage). 50/60 Hz.
Auxiliary Supply	425A only; 100 to 240 V (+10%, -15%), 2.5VA (Plus 13VA for fan supply for 100A and 125A units)
Storage Temperature	-10° C to 70° C .
Operating Temperature	0° C to 50° C with heat sink fins vertical.
Cooling	Natural convection up to 75A. Fan cooled with overtemperature sensor from 100A.
Heat Dissipation	2 watts per amp including fuses.
Environment	5 to 95% relative humidity, non-condensing, no conductive or corrosive dust, no explosive or flammable atmospheres. Maximum altitude 2000m.
Mounting	Panel, symmetrical and asymmetrical DIN rail using universal clips. Mounts on separate plate for easy removal.
Fuses	External fuse to protect thyristor unit only. Fuse and fuse holder are separate and fix to DIN rail.
Control Terminals	Cable size 0.5 to 2.5 mm^2. Terminals are detachable.
Transient Protection	Fitted internally
Leakage Current	Less than 30 milliamps.
Enclosure Protection	Rated to IP20 (IEC 529)
Isolation	Control signals isolated from power. Distances comply with the requirements of IEC 664.
Safety	425S and 425A products comply with the Low Voltage Directive 73/23/EEC dated 19/2/73 amended by Directive 93/68/EEC dated 22/7/93. EN61010 installation category 3 (voltage transients must not exceed 4·0kV)
EMC Standards	Immunity EN50082-2, EN61000-4-2, EN61000-4-4, ENV 50140, ENV50141 Emissions EN50081-2, EN550011 - see individual 425S and 425A sections for filter requirements

425S Solid State Relay

Load Type	Constant resistance.
Load Configuration	Single phase line to line or line to neutral. Three phase, four wire star or six open delta - three units together. Three phase three wire star or delta - two units controlling two of the three limbs of the load.

Input - Logic

	DC			AC		
Input type	20mA	10V	24V	24V	48V	100 to 240V
ON if greater than	5mA	8V	16V	20V	30V	90V
OFF if less than	0.5mA	2V	2V	6V	10V	35V
Maximum input	50mA	20V	32V	30V	55V	264V
Approx input impedance	0	320R	1.6k	2k	3k	9.3k
	Note: each input is in series with 2 diodes, voltage drop less than 3V at 20mA			each input is in series with 4 diodes, voltage drop 6.5 volts		

Firing Mode	Zero voltage switching (synchronised to line).
Partial Load Failure (PLF) (DC Logic input only)	Optional detection of load resistance increase of 15% to detect failure of one of up to six parallel heater elements. The full firing current must be greater than 15% of nominal current if PLF is used. LED indication and opening or closing of alarm relay, Contact rating - 0.25 A (250 V A.C. or 30 V D.C.).
EMC filters	Meets IEC 1800-3 without filter. Meets EN50081-2 with internal filter (FILT option) for 75A to 125A (standard for 15A to 63A)

425A Thyristor Unit

Load Type	Resistive with fixed or variable resistance, short wave infra red elements, inductive.
Load Configuration	Single phase line to neutral or line to line with step down transformer for auxiliary supply. Three phase, four wire star or six wire open delta - three units together. Three phase, three wire star or delta - 425A and 425S in master slave configuration. Burst firing only.

Input - Analogue

DC voltage	0-5 V, 0-10 V, 1-5 V	Input impedance >47k
DC current	0-5 mA, 0-10 mA, 0-20 mA, 4-20 mA	Input impedance <1k, 470R, 270R, 270R, range dependant

Firing Mode	Phase angle: Varies the thyristor firing angle. Fast cycle: Cycle time 320 milliseconds (at 50% power) Slow cycle: Cycle time 10 seconds (at 50% power) Single cycle: Cycle time 40 milliseconds (at 50% power)
Voltage Feedback	Supply voltage is sensed and firing angle or burst times are adjusted to maintain constant power.
Current Limit	Optional current limit available with phase angle firing. Adjustable threshold from 10% to 100% of nominal current. Only operates for currents above 2 amps.
Manual Input	0-10 V, 330 K impedance. Unit controls to the sum of Auto and Manual Input. Input scale 0-5V or 1-5V
Slave Output	Suitable for driving the 20 mA input of one or two 425S slave units.
EMC Filters	Meets IEC 1800-3 without filter Meets EN 50081-2 when used with filters as shown below

Nominal current of the 425A	**Firing mode and Configuration**		
	Phase angle	**Burst and Single cycle**	
	Single phase	**Single-phase**	**Three-phase (2 phase control)**
15A to 63A	External series filter, code: FILTER/MON/63A/00 or FILTER/MON/25A/00	Internal filter (FILT option)	Internal; filter (FILT option) 3 parallel filters, ordering code: FILTER/PAR/TE10S/00
75A and 100A	External series filter, code: FILTER/MON/100A/00	Internal filter (FILT option)	Internal filter (FILT option) 3 parallel filters, ordering code: FILTER/PAR/425S/00
125A	2 external series filters in parallel, filter code: FILTER/MON/100A/00		

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ORDERING CODE - 425S SOLID STATE RELAY

Basic Product	Current	Voltage	Fan Supply	Input	Language	Option	End
425S							00

Current	Code
15 amps	15A
25 amps	25A
40 amps	40A
63 amps	63A
75 amps	75A
100 amps *	100A
125 amps *	125A
* Fan cooled (fan consumption 13 watts)	

Voltage	
120 volts	120V
240 volts	240V
415 volts	415V
440 volts	440V
480 volts	480V
500 volts	500V

Fan Supply	Code
No fan (up to 75 amps)	000
100 volts	100V
110V to 120 volts	110V120
200 volts	200V
220V to 240 volts	220V240

Input (Logic Signal)	
DC	LGC
AC	ACL

Language	
English	ENG
French	FRA
German	GER

Option	
Partial load failure (LGC input only)	
Relay open in alarm	PLF
Relay closed in alarm	IPF
Internal EMC filters for 75A to 125A (not required for lower currents)	FILT

Coding example:
425S solid state relay;
Load current 17 A; Supply 380 V;
No fan cooling; DC logic inputs;
Partial load failure option (open in alarm):
425S/25A/415V/000/LGC/PLF/00

Note:
External step down transformer required for fan supply when voltage is 415 V, 440 V, 480 V.

ORDERING CODE- 425A ANALOGUE INPUT THYRISTOR UNIT

Basic Product	Current	Voltage	Auxiliary Supply	Input	Firing Mode	Language	Option	End
425A								00

Current	Code
15 amps	15A
25 amps	25A
40 amps	40A
63 amps	63A
75 amps	75A
100 amps *	100A
125 amps *	125A
* Fan cooled (fan consumption 13 watts)	

Voltage	
120 volts	120V
240 volts	240V
440 volts	440V
480 volts	480V

Auxiliary Supply	
100 volts	100V
110V to 120 volts	110V120
200 volts	200V
220V to 240 volts	220V240

Input (Analogue Value)		Code
Volts	0-5 volts	0V5
	1-5 volts	1V5
	0-10 volts	0V10
Current	0-5 milliamps	0mA5
	0-10 milliamps	0mA10
	0-20 milliamps	0mA20
	4-20 milliamps	4mA20

Firing Mode	
Phase Angle	PA
Fast Cycle	FC
Single Cycle	FC1
Slow Cycle	SC

Language	
English	ENG
French	FRA
German	GER

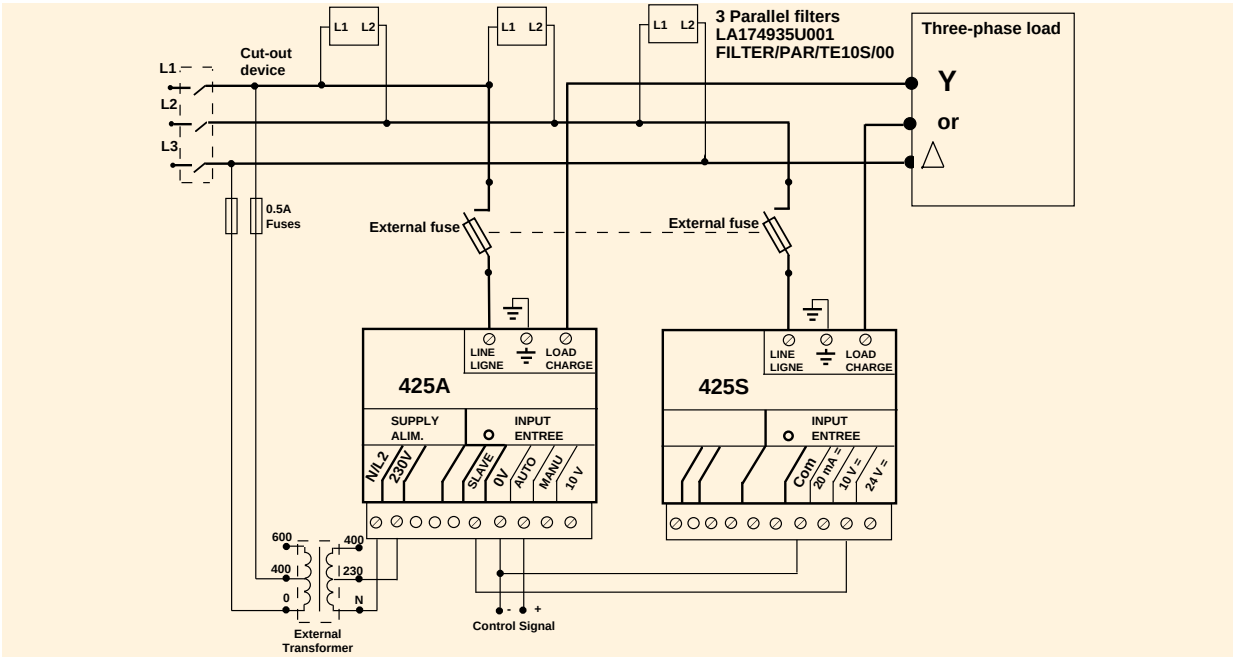
Option	
Current Limit (Phase angle firing)	CL
Internal EMC filter (Burst and Single cycle firing modes)	FILT

Coding example:
425A phase angle thyristor unit;
Load current 90 A; Supply 240 V;
Auxiliary supply 100 V;
Analogue input 0 to 10 V;
Current limit option:
425A/100A/240V/100V/0V10/PA/CL/00

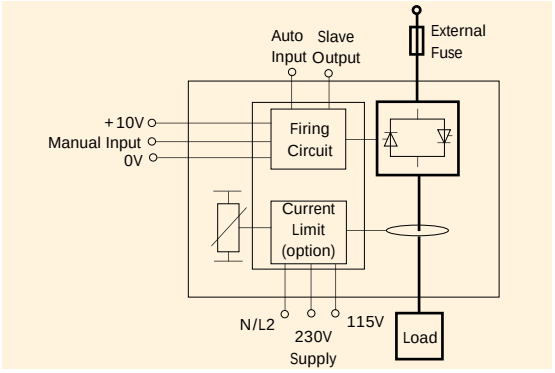
Note:
External step down transformer required for auxiliary supply when voltage is 440 V, 480 V or 500V

WIRING DETAILS

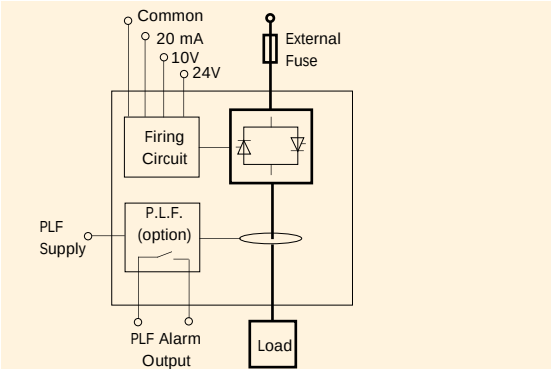
Example of three-phase wiring for a 425A unit and for a 425S solid state contactor (up to 63A)



425A Thyristor Unit



425S Solid State Relay



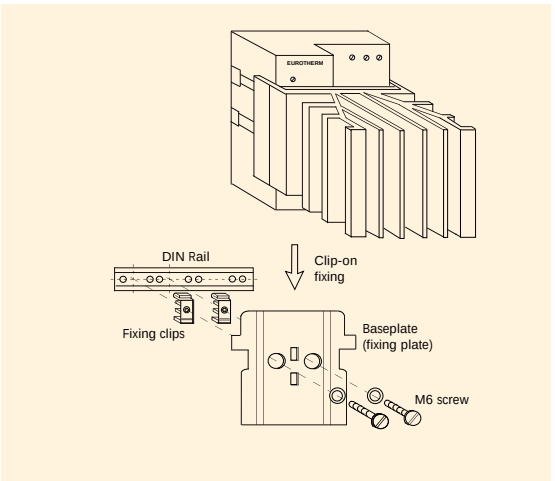
MOUNTING AND DIMENSIONAL DETAILS

15A to 63A models

The units are mounted by means of a base plate.

Fixing clips are used when mounting on a symmetrical or asymmetrical DIN rail.

Each unit is delivered with screws and a set of two fixing clips as standard (ref. EUROTHERM BD173730).

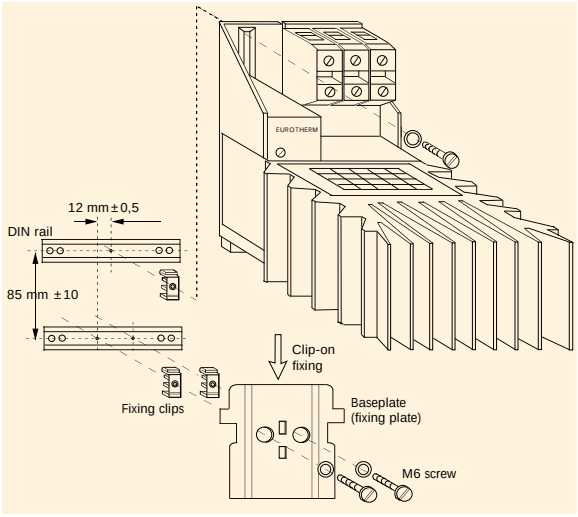


75A to 125A models

Each unit is mounted on two DIN rails by means of a base plate and three fixing clips (ref. EUROTHERM BD173730).

(mm)	15A	25A	40A	63A	75A	100A	125A
Height	134	134	134	134	190	190	190
Width	98	98	116	116	117	117	117
Depth	94	130	155	155	190	190	190
Weight (Kg)	0.6	0.8	1.1	1.2	1.85	2.0	2.0
Max. Cable Size	6 mm^2	6 mm^2	*10 mm^2	*16 mm^2	35 mm^2	35 mm^2	35 mm^2

* Including adaptor



FUSE AND FUSEHOLDER DETAILS

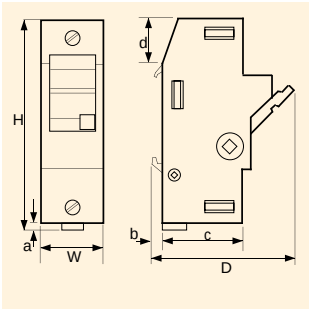
Eurotherm recommended that a semi-conductor fuse be fitted with each thyristor unit or solid state relay. With the 425A and 425S these units must be ordered separately. A line protection or HRC fuse or suitably rated circuit breaker must be fitted for cable protection. The semiconductor fuse is only designed to protect the thyristor unit.

Ordering codes - fuse and fuseholder

Fuseholder	Current	End
		00

Unit Current	Fuseholder Code	Spare Fuses Code
15 amps	FU1038/16A	CH260024
25 amps	FU1038/25A	CH260034
40 amps	FU1451/40A	CH330054
63 amps	FU2258/63A	CS173087U080
75 amps	FU2258/75A	CS173087U100
100 amps	FU2760/100A	CS173246U125
125 amps	FU2760/125A	CS173246U160

Please note that replacement fuses are marked with a higher rating than the solid sate relays. This allows correct operation at elevated temperatures and does not imply that higher current is permissable.



Fuse and fuseholder dimensions

(mm)	Fuseholder			
	FU1038	FU1451	FU2258	FU2760
Height (H)	81	95	124	240
Width (W)	17.5	26	35	54
Depth (D)	68	86	90	107
a	-	2	4	-
b	7.5	7.5	-	-
c	38	45	54	71
d	36.5	40.5	42	75

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