Solid state contactors

425S Series

User
Manual

Part No HA 174776 ENG Issue 1 Printed in France 11/96

CE

EUROPEAN DIRECTIVES

CE MARK

The CE Mark of **425S** products implies that the essential protection requirements of the European Low Voltage Directive are observed.

ELECTROMAGNETIC COMPATIBILITY (EMC)

For industrial environments, excluding residential environments

Eurotherm certifies that the **425S** products, when installed and used in accordance with their User Manual, meets the following EMC test standards and enables the system or installation in which there are installed to comply with the EMC Directive in regards to the **425S** products.

EMC STANDARDS

Immunity	Generic Standard	: EN 50082-2
	Test Standards	: EN 61000-4-2, EN 61000-4-4, ENV 50140, ENV 50141
Emissions	Generic Standard	: EN 50081-2 (see filter using)
	Test Standard	: EN 55011
	Product Standard	: IEC1800-3 (without filters)

EMC FILTER USING

To reduce the conducted emissions that occur when using thyristor units, according to the EN 50081-2 standard, the filters hereunder are used.
Eurotherm can supply the external filters.

Nominal current of the 425S units	Application		
	Single-phase	Three-phase (2 phase control)	
	Internal filter	Internal filter	External filters
15 A to 63 A	Standard	Standard	TE10S type 3 parallel filters Filter ordering code : FILTER/PAR/TE10S/00
75 A to 125 A	FILT option	FILT option	425S type 3 parallel filters Filter ordering code : FILTER/PAR/425S/00

SAFETY

The **425S** products installed and used in accordance with this User Manual are designedto comply with the essential protection requirements of the European Low Voltage Directive 73/23/EEC dated 19/02/73 (amended by Directive 93/68/EEC dated 22/07/93).

VALIDATION BY COMPETENT BODY

Eurotherm has validated the compliance of the **425S** products with EMC test standards through design and laboratory tests that have been validated with a Technical Construction File by a Competent and Notified Body, **LCIE** (Laboratoire Central des Industries ƒlectriques).

CE DECLARATION OF CONFORMITY

A CE Declaration of Conformity is available on request.
For further information on CE Mark, please contact your nearest Eurotherm office.

EMC INSTALLATION GUIDE

In order to help you reduce risks related to the effects of electromagnetic interference depending on the installation of the product, Eurotherm can supply you with the "**EMC Installation Guide**" (Part No. HA 025464).
This guide gives the rules generally applicable for electromagnetic compatibility.

MANUALS IN USE

This **425S User Manual Part N° HA 174776 ENG** intended for the 425S series solid state contactors manufactured beginning **November 1996.**

The 425S User Manual (Part N° HA 174777) is valid for products manufactured from December 1995 to November 1996.

The 425S User Manual (Part N° HA 173817) is valid for products manufactured before December 1995.

PRECAUTIONS

Important precautions and special information are indicated in the manual by two symbols:

DANGER

This symbol means that failure to take note of the information may have serious consequences for the safety of personnel and may even result in the risk of electrocution.

ATTENTION

This symbol means that failure to take note of the information may
- **have serious consequences for the installation**
- **result in the incorrect functioning of the power unit.**

These marks must indicate specific points. The entire manual remains applicable.

PERSONNEL

The installation, configuration, commissioning and maintenance of the power unit must only be performed by a person **qualified and authorised to perform work in an industrial low voltage electrical environment.**

INDEPENDENT SAFETY

It is the responsibility of the user and it is highly recommended, given the value of the equipment controlled using 425S, to install **independent safety** devices.
This alarm must be tested regularly.
Eurotherm can supply suitable equipment.

FURTHER INFORMATION

For any further information and if in doubt, please contact your EUROTHERM office where technicians are at your disposal should you require advice or assistance with the commissioning of your installation.

Chapter 1

IDENTIFYING THE SOLID STATE CONTACTORS

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Chapter 1 SOLID STATE CONTACTOR IDENTIFYING

GENERAL INTRODUCTION TO THE 425S SERIES

The **425S** series of the **EUROCUBE 425** range is a series of **solid state contactors** which switch currents from **15 A** to **125 A** (depending on the model) at a voltage from **120 Vac** to **500 Vac**.

The **425S** series was designed to replace electromechanical contactors on resistive loads with low temperature coefficients.

The controlled loads can be connected **between 2 phases** (400 V - 500 V configuration) or between the **phase** and the **neutral** (230 V configuration).

Two 425S solid state contactors can be used to control **two phases** of **three-phase loads** in a 3-wire configuration (star without neutral and closed delta).

The input signal type is **logic** ensuring the **'ON/OFF'** thyristor firing mode.

The input signal (**dc** and **ac** values) is selected by the user on the order**.**

- The dc input signals have two voltage levels (**10 Vdc** and **24 Vdc**) and one current level (**20 mA**).

- The ac input signals have three voltage levels (**24 Vac, 48 Vac** and the voltage range **100 - 240 Vac**).

The switching of the **425S** solid state contactors is synchronised on the zero voltages so as not to induce steep fronts which generate interference on the supply.

425S solid state contactors are compact and can be fixed onto a **DIN rail** or onto a **panel.**

425S solid state contactors offer very easy access for the various configurations:

- of the supply
- of the load
- of the control signal.

The units are mechanically pluggable after the electrical connectors have been removed.

The low level and power cables are separated.

The input circuit is entirely insulated and built into a unit for safety reasons (in compliance with the standards **IEC 664**).

A **red** light emitting diode (LED) located on the front fascia of the **425S,** is used to display the **presence** of the control signal.

The control connector is **plug-in**.

The heatsink enables heat dissipation by **convection** cooling up to the nominal current **75 A.**

From the nominal current **100 A** the **425S** solid state contactors are equipped with built-in permanent **fan cooling**.

The fan power supply (**115 Vac** or **230 Vac** supply) shall be connected in an user treminal in front fascia.

For fan-cooled solid state contactors, a **temperature safety switch** switches off the control signal in the event of overheating (e.g. fan failure).

Opening the thermal switch causes the control presence indicator light to go off.

The thyristor protection **high-speed fuse** and the fuse holder are standard; they are outside the unit but can be fixed onto the same DIN rail.

The fuse and fuse holder assembly must be provided for the by the installer and procured at the same time as the **425S** by a separate order**.**

As an option, a **partial load failure detection** circuit (PLF detection circuit) is used to detect the failure of **one** arm of the load out of **six** identical arms mounted in parallel (in single-phase configuration).

The PLF detection is signalled by an alarm relay switch and by a **red** light emitting diode (labelled 'Load Fail') which can be seen on the front fascia of the solid state contactor.

TECHNICAL DATA

The **425S** is a solid state contactor designed for the thyristor control of an industrial electrical load with a low temperature coefficient
(for short wave infra-red element applications, consult your Eurotherm office).

Attention !

It is the user's responsibility to ensure that the solid state contactor is compatible with all the nominal values at installation and operating conditions before commissioning the solid state contactor.

Power

Nominal current	**15 A to 125 A**
Nominal voltage	**120 Vac to 500 Vac** (+10% - 15%)
Frequency	**50 Hz or 60 Hz**
Load type	Resistive with low temperature coefficient (short wave infra-red element control possible) Single-phase load. For the three-phase load in three wires, use two **425S** solid state contactors (2 phase control).

Thyristor firing

Firing mode	**Logic** (ON/OFF) Synchronised at **zero** voltage.

CE Marking

Electrical safety	According to European Low Voltage Directive 72/23/EEC of 19/02/73 the 425S units bear the CE Mark.

Electromagnetic compatibility (EMC)

Immunity	Generic standard : EN 50082-2 Test standards : EN 61000-4-2, EN 61000-4-4, ENV 50140, ENV 50141
Emissions	Generic standard : EN 50081-2 Test standard : EN 55011 Product standard : IEC1800-3 The choice of the applicable standard depends on the application • EN 50081-2 : With an internal filter for 15 A to 63 A nominal (standard) With an internal optional filter (FILT option) for 75 A to 125 A nominal • IEC 1800-3 : Without filter. Applies for the second environment.

Control

Input	**Logic s**ignal
Signal type	**DC** or **AC**, specified in the order. Signal level selected by the user: • DC signal : **20 mA ; 10 V ; 24 V** • AC signal : **24 Vac ; 48 Vac ; 100 Vac** to **240 Vac.**
Insulation	Control signal **insulated** from the power Distance according to **IEC 664**

Options

Option PLF	**Partial load failure** detection Alarm relay contact is **open** in alarm status.
Option IPF	**Partial load failure** detection Alarm relay contact is **closed** in alarm status.
Partial load failure detection sensitivity	Failure detection of **1** element out of **6** identical elements mounted in parallel (for single-phase operation).
Partial load failure indication	By **red** indicator light on the front fascia and alarm relay **contact**. Contact cut-off capacity : **0.25 A** (250 Vac or 30 Vdc).

Environment

Operating temperature	**0 °C** to **50 °C** in **2000 m** maximum altitude
Storage temperature	**-10 °C** to **70 °C**
Humidity	**RH** of **5** to **95 %** without condensation
Pollution	Free of conductive or corrosive dust. Non-explosive atmosphere
Degree of protection	**IP20** (**IEC 529**).
Thyristor protection	**External** high-speed fuse (to be ordered separately), **Internal** RC snubber and varistor.
Cooling	Without fan for **15 A** to **75 A** nominal current units. Permanent fan cooling and thermal safety switch for **100 A** and **125 A** nominal current units.
Consumption	Thyristors : **1.3 W/A** Electronics : **2.5 W**. Fan : **9 W** (60 Hz) or **12 W** (50 Hz) at **115 V** **10 W** (60 Hz) or **13 W** (50 Hz) at **230 V**

Due to the continual improvement of products, Eurotherm may be required to modify specifications without prior notice. For any further information and in the event of doubt, contact your Eurotherm Office.

CODING

425S solid state contactors

Model 425S	Nominal current	Nominal voltage	Fan supply	Input	Option	End 00

Nominal current	Code
15 amperes	15A
25 amperes	25A
40 amperes	40A
63 amperes	63A
75 amperes	75A
100 amperes	100A
125 amperes	125A

Input	Code
Logic control	
DC signal	LGC
AC signal	ACL

Nominal voltage	Code
120 volts	120V
240 volts	240V
415 volts	415V
440 volts	440V
480 volts	480V
500 volts	500V

Option	Code
• Partial load failure detection.	
Relay contact position in alarm state:	
open	PLF
closed	IPF
• Internal EMC filter	FILT
(for 75 A to 125 A nominal current only)	

Fan supply	Code
No fans (up to 75 A)	000
Fan (100 A and 125 A) Voltage:	
100 volts	100V
110 to 120 volts	110V120
200 volts	200V
220 to 240 volts	220V240

Fuse and fuse holder assembly

Code of the fuse and fuse holder assembly	Current code	End 00

Nominal current of solid state contactor	Assembly code	Current code
15 A	FU1038	16A
25 A	FU1038	25A
40 A	FU1451	40A
63 A	FU2258	63A
75 A	FU2258	75A
100 A	FU2760	100A
125 A	FU2760	125A

Coding example

Installation parameters

Load current **85 A**
Supply **400 Vac.**
Logic input, **dc** signal.
Fan power supply **230 V**.

Options :
- partial load failure detection (relay contact **open** in alarm status)
- EMC internal filter (in compliance with the standard EN 50081-2)

Solid state contactor coding:

425S / 100A / 480V / 220V240 / LGC / PLF / FILT / 00

Fuse and fuse holder assembly coding:

FU2760/100A/00

SERIAL NUMBER LABEL

The serial number label giving all the information on the characteristics of the solid state contactor when it leaves the factory is located at the rear of the unit.

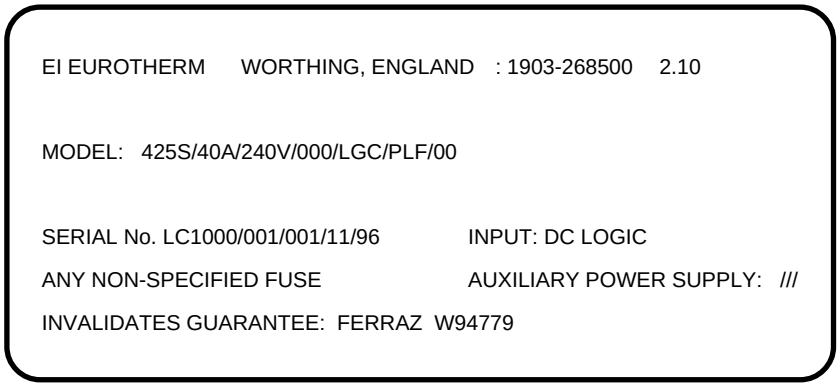


Figure 1-1 Example of a serial number label

Model	**425S**
Nominal current	**40 A**
Nominal voltage	**240 V**
Without permanent fan cooling	
Input signal	**dc**
PLF option	(relay contact **open** in alarm state).

Attention !

Following any reconfiguration on the part of the user, there is no guarantee that the unit corresponds to the information related to the unit coding.

Chapter 2

INSTALLATION

Contents Page

Chapter 2 INSTALLATION

SAFETY DURING INSTALLATION

Danger !

425S solid state contactors must be installed by a qualified person.

Solid state contactors must be installed in fan-cooled electric cabinets, guaranteeing the absence of condensation and pollution.
The cabinet must be closed and connected to the safety earth in accordance with the standard IEC 364 or the current national standards.

For installations in fan-cooled cabinets, it is recommended to place a fan failure detection device or a thermal safety control in the cabinet.

DIN rail mountings are possible with **425S** series solid state contactors.

The solid state contactors must be mounted with the heatsink positioned vertically and with no obstructions either above or below which could block the passage of the ventilation air.

If multiple units are installed in the same cabinet, they should be arranged in such a way that the air expelled by one unit cannot be admitted into the unit located above it.

Attention !

The solid state contactors are designed to be used at an ambient temperature less than or equal to **50°C** .

When mounting multiple units, leave a minimum vertical space of **10 cm** between two units and a minimum horizontal space of **one cm**.

Excessive overheating of the solid state contactor may cause incorrect operation of the solid state contactor, which in turn may cause damage in the components.

15 A to **75 A** nominal current units are cooled by **convection** cooling.

100 A and **125 A** units have **permanent** fan cooling.

DIMENSIONS

The dimensions of the **425S** solid state contactors are given in figure 2-1 for models with a nominal current of **15** to **63 A** and in figure 2-2 for models with a nominal current of **75** to **125 A**.

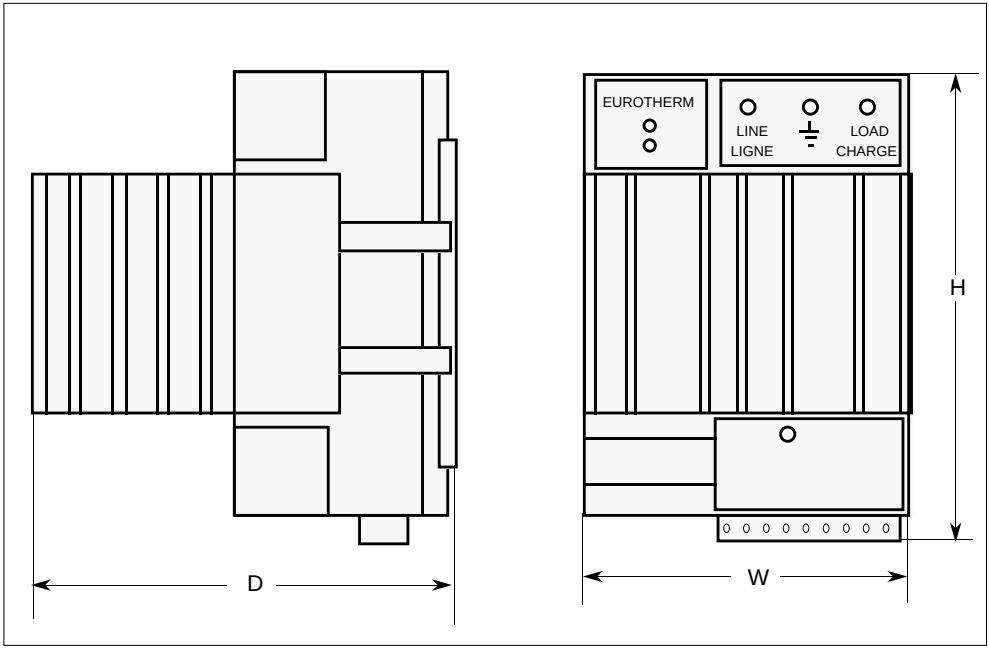


Figure 2-1 425S solid state contactor (15 to 63 A nominal current)

Dimension (mm) and weight		Nominal current			
		15 A	25 A	40 A	63 A
Height	(H)	134	134	134	134
Width	(W)	98	98	116	116
Depth	(D)	94	130	155	155
Weight	(kg)	0.6	0.8	1.1	1.2

Table 2-1 Dimensions of 425S solid state contactors

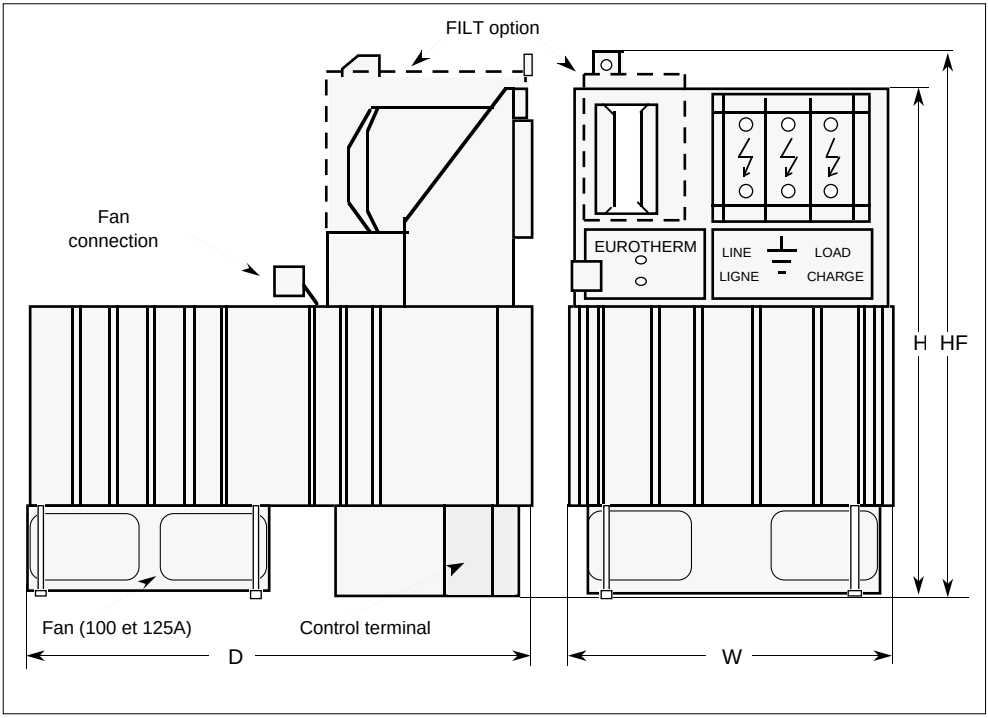


Figure 2-2 Dimensions of a 425S (75 to 125A nominal current)

Dimension (mm) and weight	Nominal current		
	75 A	100 A	125 A
Height (H)	190	190	190
Width (W)	117	117	117
Depth (D)	190	190	190
Weight (kg)	1.85	2.0	2.0

Table 2-2 Dimensions of 425S solid state contactors (75 to 125A nominal current)

MECHANICAL MOUNTING

Generality

425S solid state contactors can be mounted:

- on a panel with its baseplate (fixing plate)
- on DIN rails (requiring a baseplate and clips supplied with the unit).

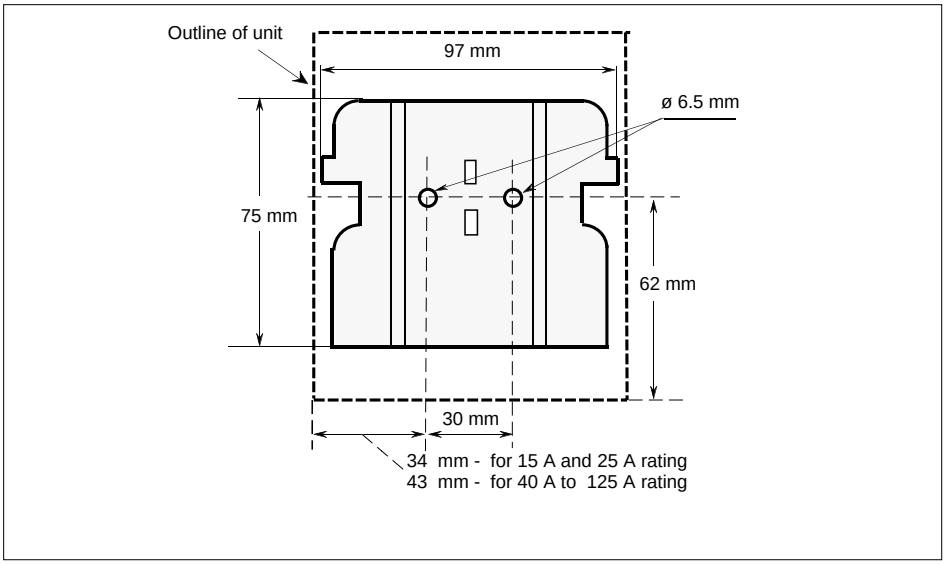


Figure 2-3 Mounting baseplate

The rail is supplied with **6.5 mm diameter** pre-drilled holes.
The length is designed for a **19 inch** assembly.
The DIN rails can be symmetrical or asymmetrical.

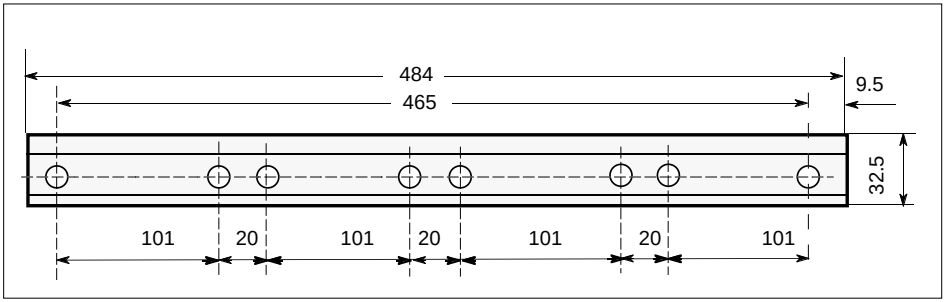


Figure 2-4 DIN rail for fixing

Panel fixing

When fixing on a panel, two holes must be drilled for solid state contactors with a nominal current of **15 A** to **63 A**, and three holes for solid state contactors with a nominal current of **75 A** to **125 A**.

The drilling values for fixing on the panel are given in figure 2-5.

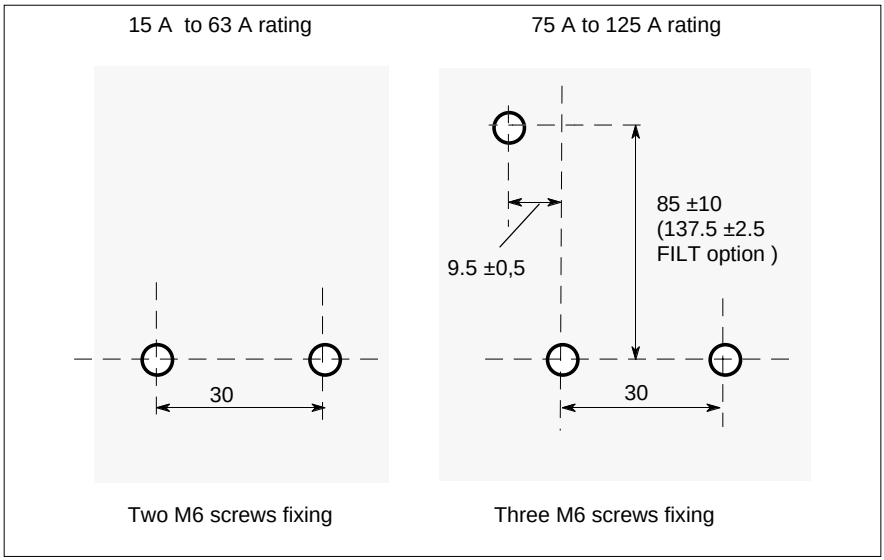


Figure 2-5 Drilling values for fixing on panel

DIN rail fixing

15 A to 63 A models

The units are mounted using a baseplate (see figure 2-3).
When mounting on symmetrical and asymmetrical DIN rails, fixing clips are used (bi-rail adaptor).
In the standard version, each unit is supplied with a set of two fixing clips (EUROTHERM Part No. BD 173730) and screws.

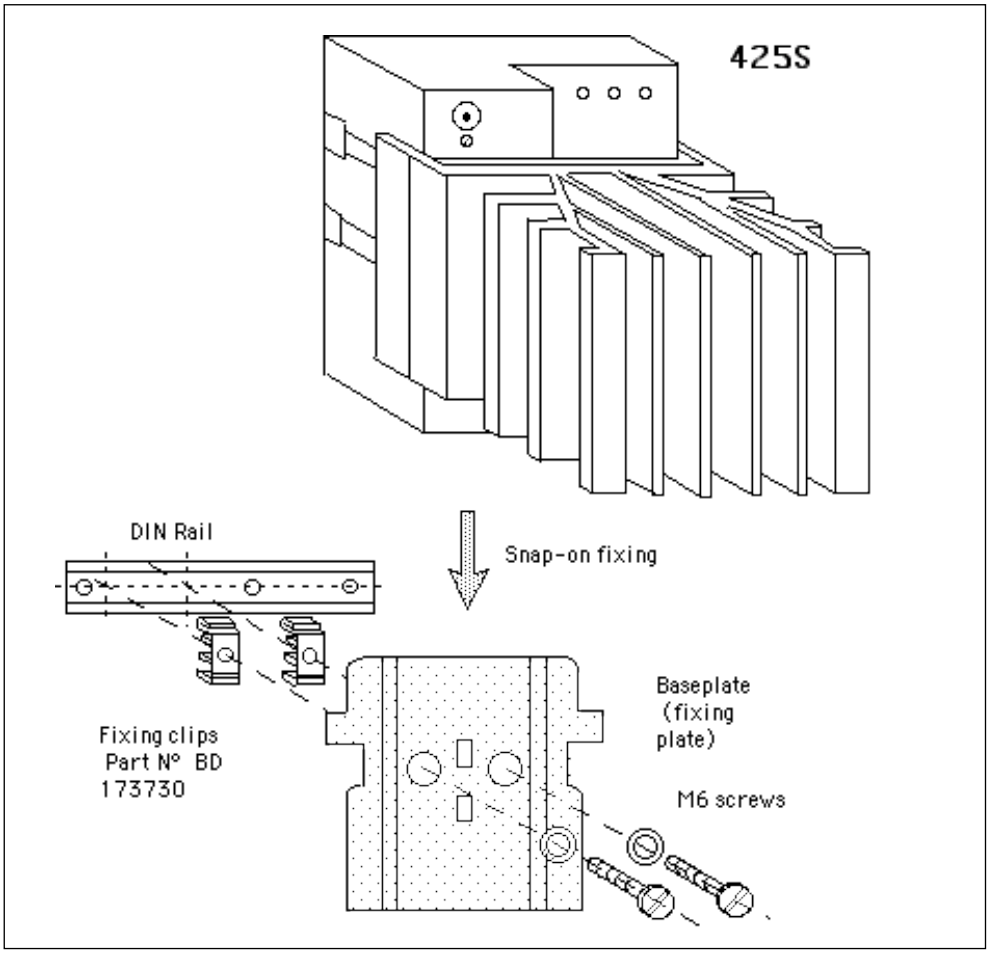


Figure 2-6 Fixing a 425S (15 to 63 A nominal current)

75 A to 125 A models

Each unit is mounted on two DIN rails using a baseplate and three fixing clips (EUROTHERM Part No. BD 173730).

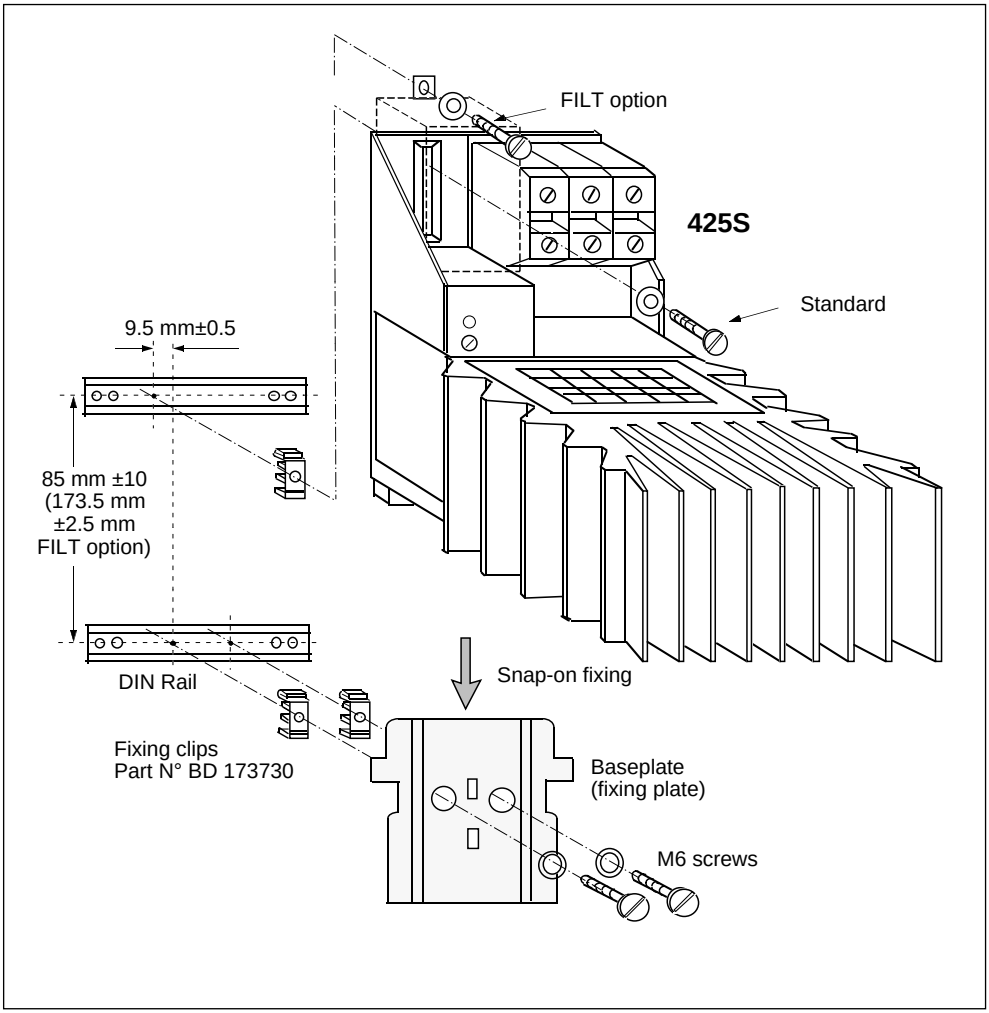


Figure 2-7 Fixing a 425S (75 to 125 A nominal current)

Chapter 3

WIRING

Chapter 3 WIRING

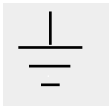
SAFETY DURING WIRING

Danger !

- Wiring must be performed by personnel who are qualified to work with low voltage electrical equipment.
- It is the user's responsibility to cable and protect the installation in accordance with current professional standards.

  A suitable device guaranteeing electrical separation of the equipment and the supply must be installed in order to perform the operation n complete safety.

- Before any connection or disconnection, make sure that the power and control cables and wires are insulated from the voltage sources.
- For safety reasons, the safety earth cable must be connected before any other onnection during Wiring and the last cable to be disconnected during disassembly.



Attention !

To ensure that the 425S unit is grounded correctly, make sure that it is attached to the **reference ground plane** (panel or bulkhead). If this is not the case it is necessary to add a ground connection **no more than 10 cm long** between the ground connection and the reference ground plane.

Danger !

The purpose of this connection is to guarantee correct **ground continuity**. It is **not**, in any circumstances, a **substitute** for the **safety earth connection**.

TERMINAL LABELLING

The labelling of the 425S solid state contactor terminals is shown in the four figures below according to the type of control signal (dc or ac) and the nominal current value of the solid state contactor.

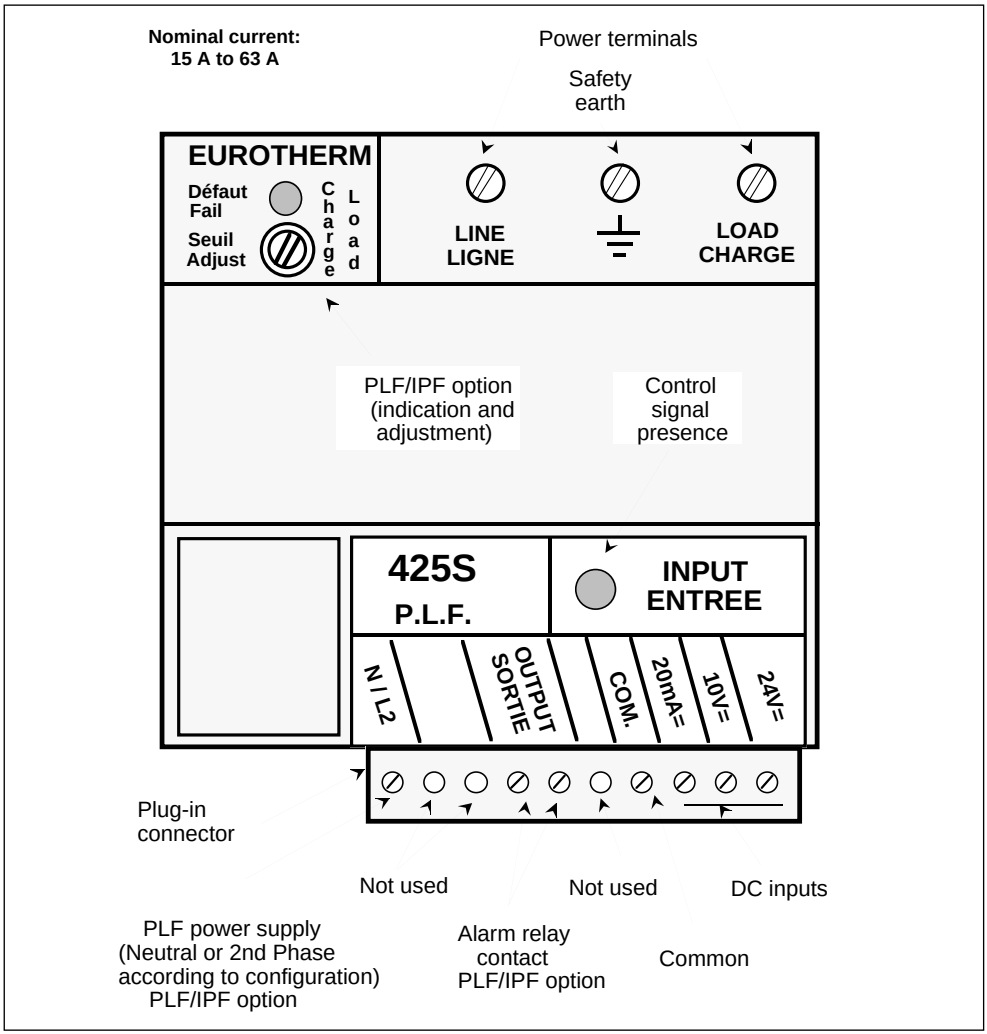


Figure 3-1 425S terminal labelling (15 A to 63 A nominal current)
DC control signal
'Partial load failure detection' option

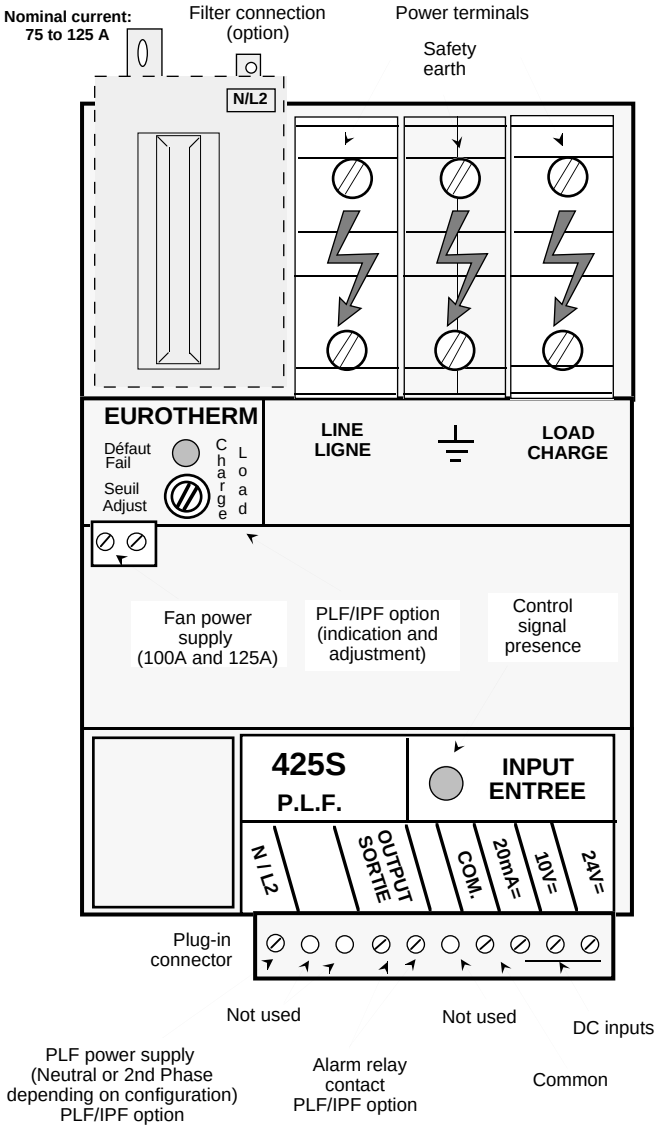


Figure 3-2 425 S terminal labelling (75 A to 125 A nominal current)
DC control signal
'Partial load failure detection' option
Fan cooling : 100 A and 125 A nominal.

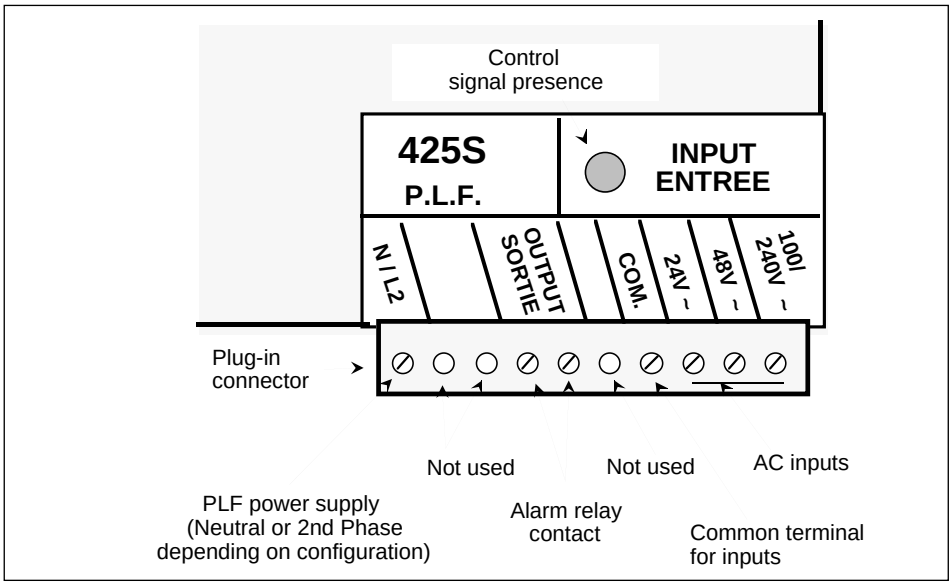


Figure 3-3 Control terminal labelling with AC inputs.
Option: Partial load failure detection.

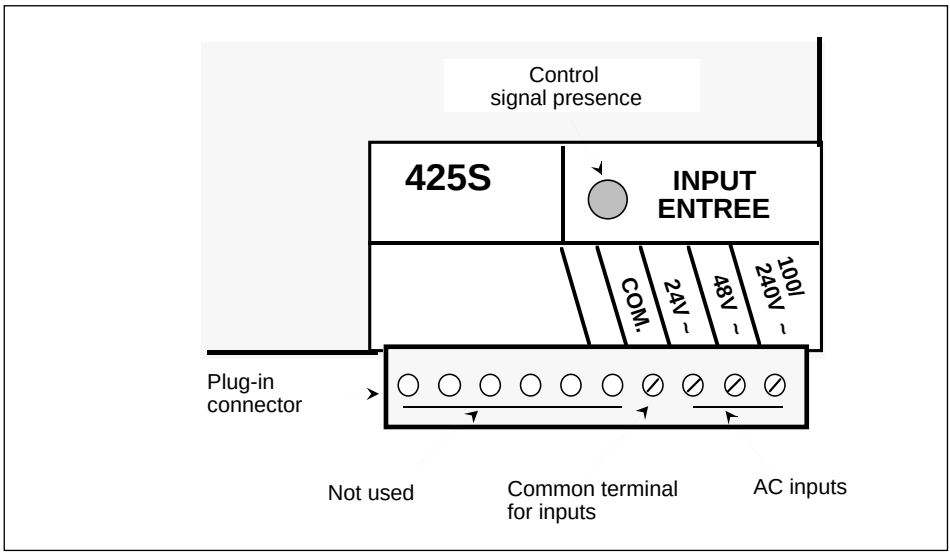


Figure 3-4 Control terminal labelling with AC inputs.
Without PLF / IPF options.

CONNECTION

Cabling

Control, PLF supply (option) and alarm relay contact (option)

Pluggable terminal block, **0.5** to **2.5 mm²** wires
Terminal tightening: **0.7 Nm**

Filter connection (FILT option)

Screw terminals, **0.5** to **2.5 mm²** wires
Terminal tightening: **0.7 Nm**

Fan supply

Screw terminals**, 0.5** to **2.5 mm²** wires
Terminal tightening: **0.7 Nm**

Power and earth

Screw terminals

- 15 to 40 A — **1.5** to **6 mm²** terminals (10 mm² rigid wires with a lug)
  tightening : **1.2 Nm**
- 63 A — **1.5** to **10 mm²** cables (16 mm² rigid wires with a lug)
  tightening : **1.2 Nm**
- 75 to 125 A — **2.5** to **35 mm²** cables (flexible wires)
  tightening : **3.5 Nm**
  2.5 to **50 mm²** cables (rigid wires)
  tightening : **3.5 Nm** (**4.7 Nm** for **50 mm²**)

Connection diagram examples

The solid state contactor can be controlled by:

- a logic signal from a suitable controller
- an ac logic signal
- a control switch (electromechanical, optotriac) which switches the logic signal.

Examples of complete **425S** solid state contactor connection diagrams, explaining all the specific features of the configuration, are given below.

Single-phase load

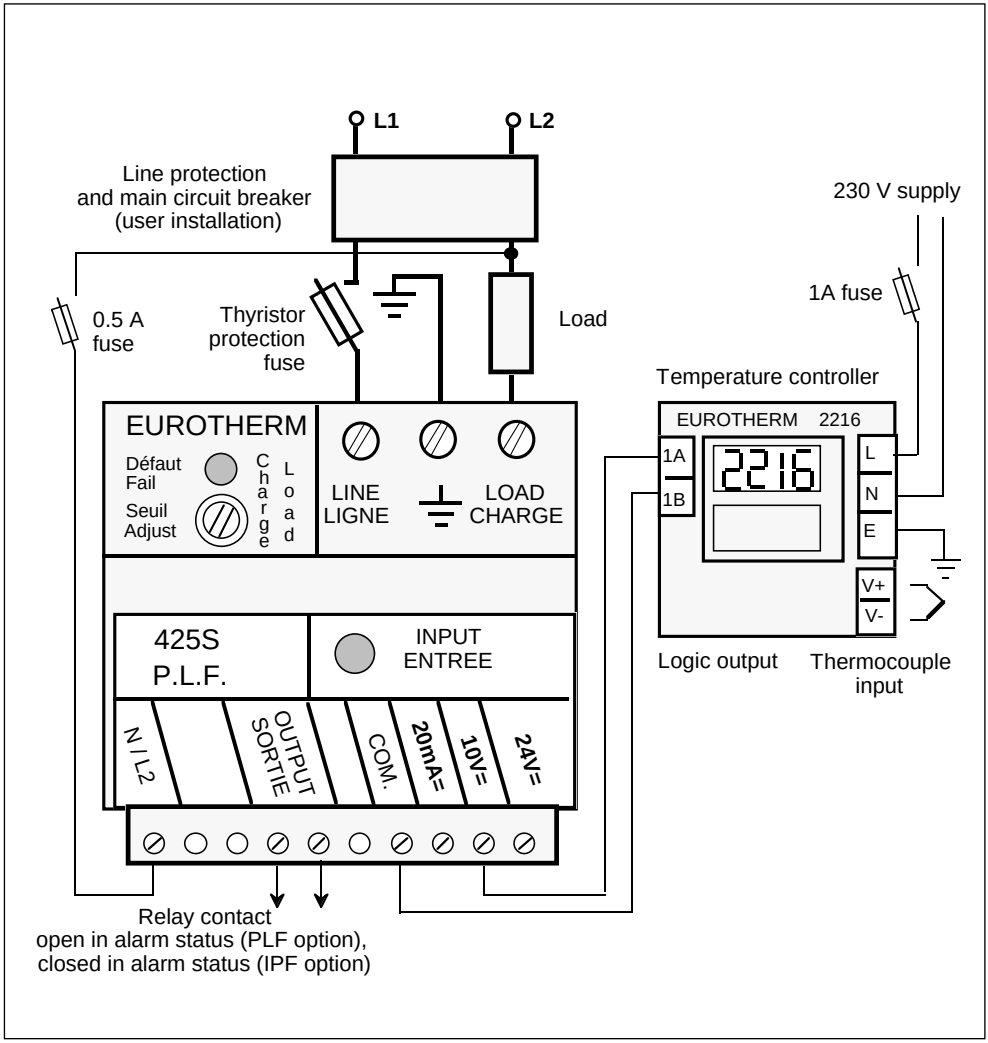


Figure 3-5 Example of 425S line-to-line configuration

15 A to 63 A nominal current. 400 V configuration.
PLF / IPF option, use of the alarm contact on supply up to 230 V
10 V dc input signal. Control by EUROTHERM 902 controller

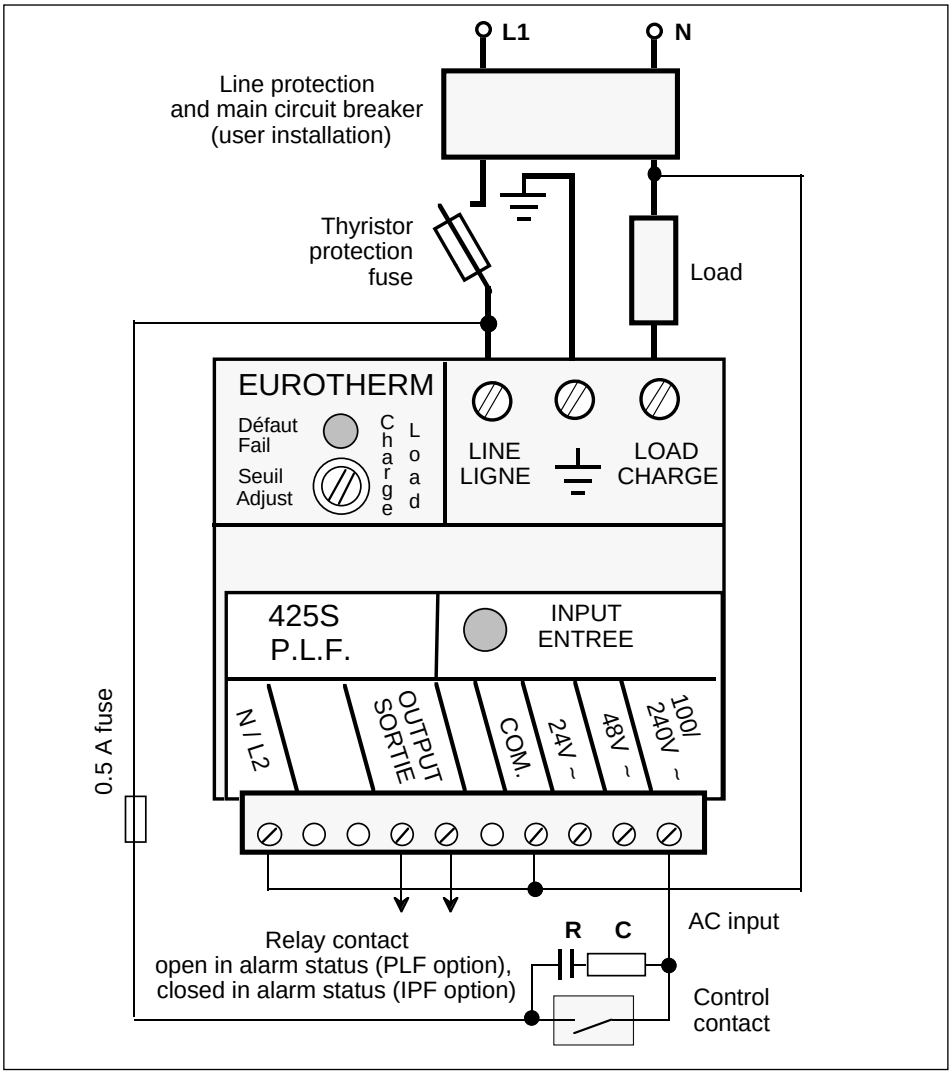


Figure 3-6 Example of **425S** configuration between the phase and the neutral.

15 A to 63 A nominal current. 230 V configuration.
PLF / IPF option, use of the relay contactor on supply up to 230 V.

100/240 Vac input signal. Control by a contact.
The impedance of control switch protection circuit must be greater than :
20 kΩ (24 V input), 36 kΩ (48 V input), or 600 kΩ (100/240V input).

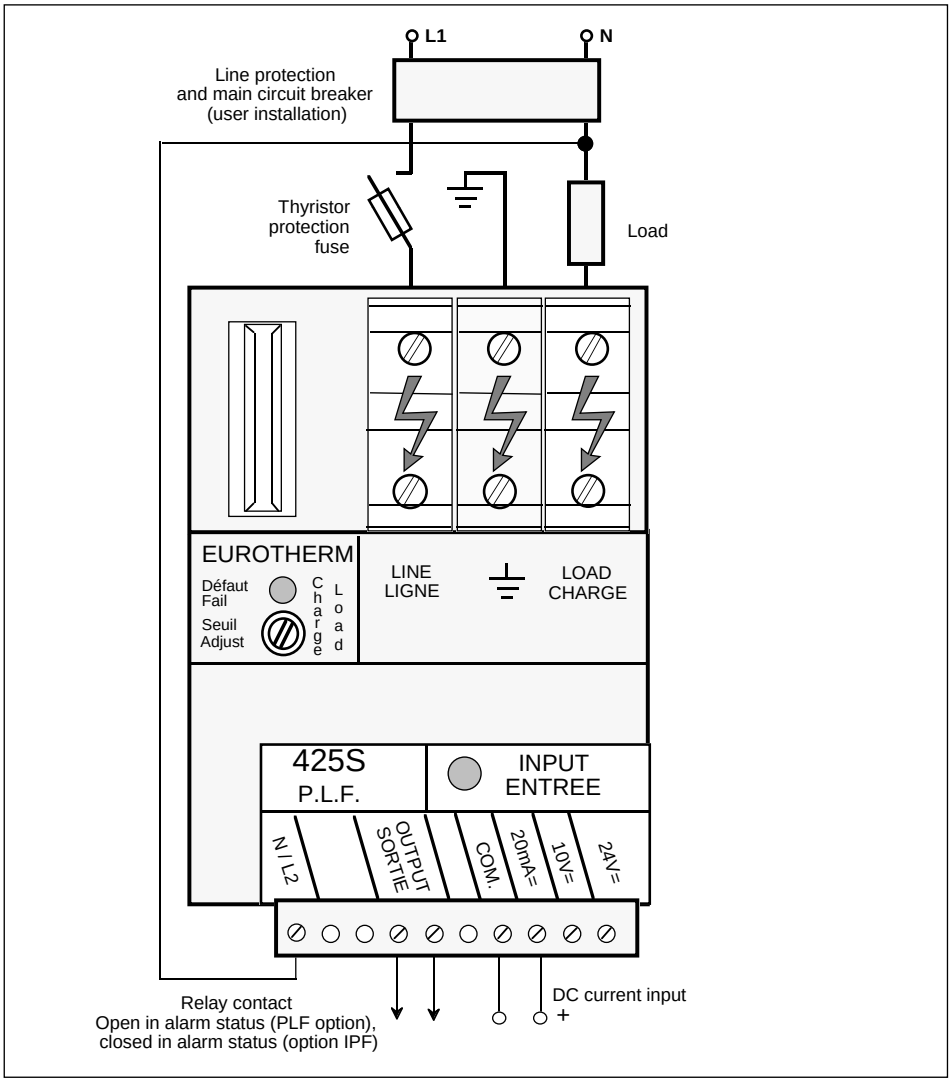


Figure 3-7 Example of **425S** (75 A nominal current) line-to-neutral configuration

PLF / IPF option, use of the relay contact on 230 V supply.
20 mA dc input signal.
Without fan cooling.
Without FILT option.

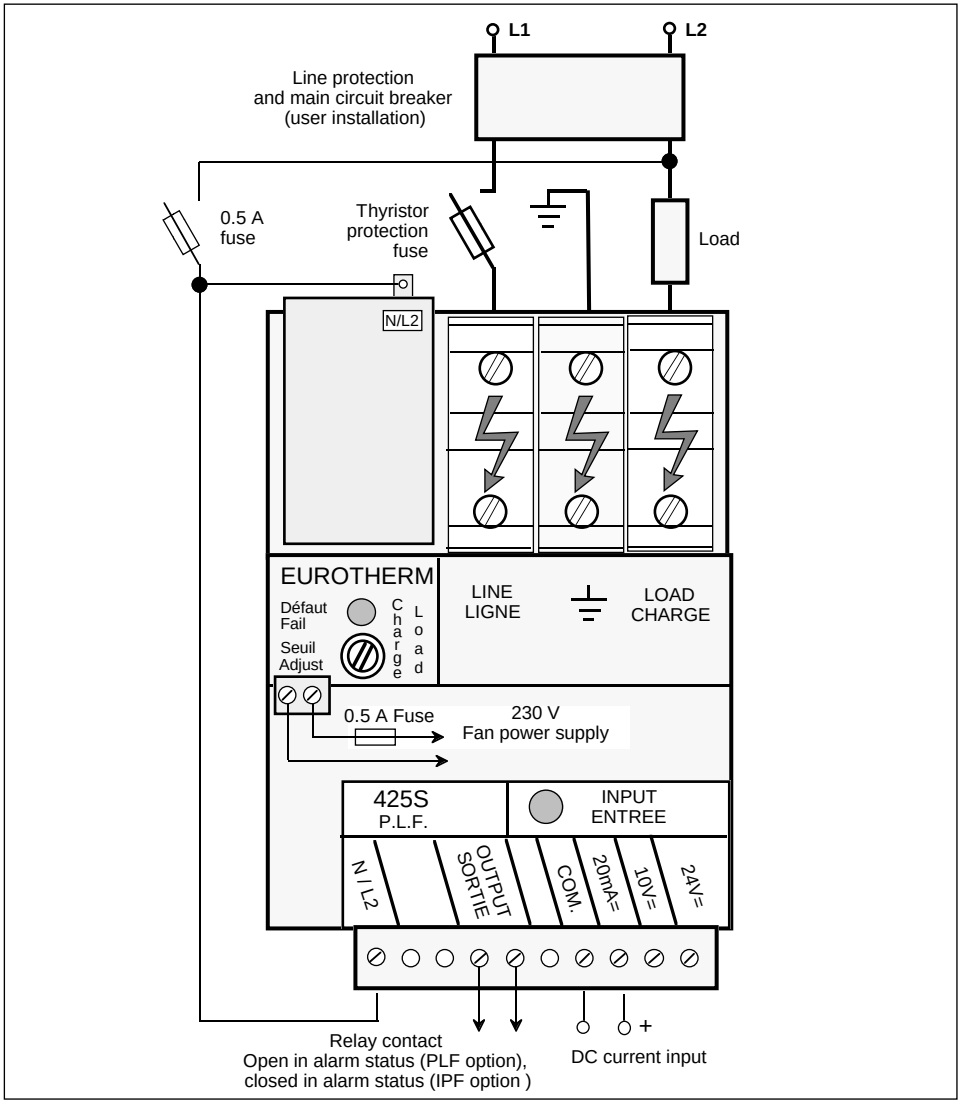


Figure 3-8 Example of **425S** solid state contactor configuration (FILT option)

100 A and 125 A nominal current. 400 V supply (line-to-line).
20 mA dc input signal.
Permanent fan cooling, 220/240 V fan power supply.

Three-phase load

Although **425S** solid state contactors are single-phase units, they can be used to control resistive three-phase loads.

Configurations are possible for the 3 or 2 phase control of a three-phase load.

3 phase control

For a load with a '**Star with neutral**' or '**Open delta**' configuration, use:

- three 425S solid state contactors with a common signal
- a 425A thyristor unit which drives two 425S solid state contactors ('Master - Slave' configuration).

2 phase control

For a load with a '**Star without neutral**' or '**Closed delta**' configuration, use:

- two 425S solid state contactors with a common signal
- a 425A thyristor unit which drives a 425S solid state contactor ('Master - Slave' configuration).

For use of 425S solid state contactors with a common signal, the solid state contactor inputs must be configured:

- in parallel for the ac or dc voltage signal
- in series for the dc current signal.

Thyristor firing mode: **'ON/OFF'**

For the **two phase control** with the **PLF/IPF** option, use the **655** special.

An example of a three-phase configuration diagram for two **425S** solid state contactors in two phase control is given in figure 3-9 (page 3-12).

3 parallel filters are used (TE10S type for the 15 A to 63 A nominal current units; 425S type for the 75 A to 125 A nominal current units).

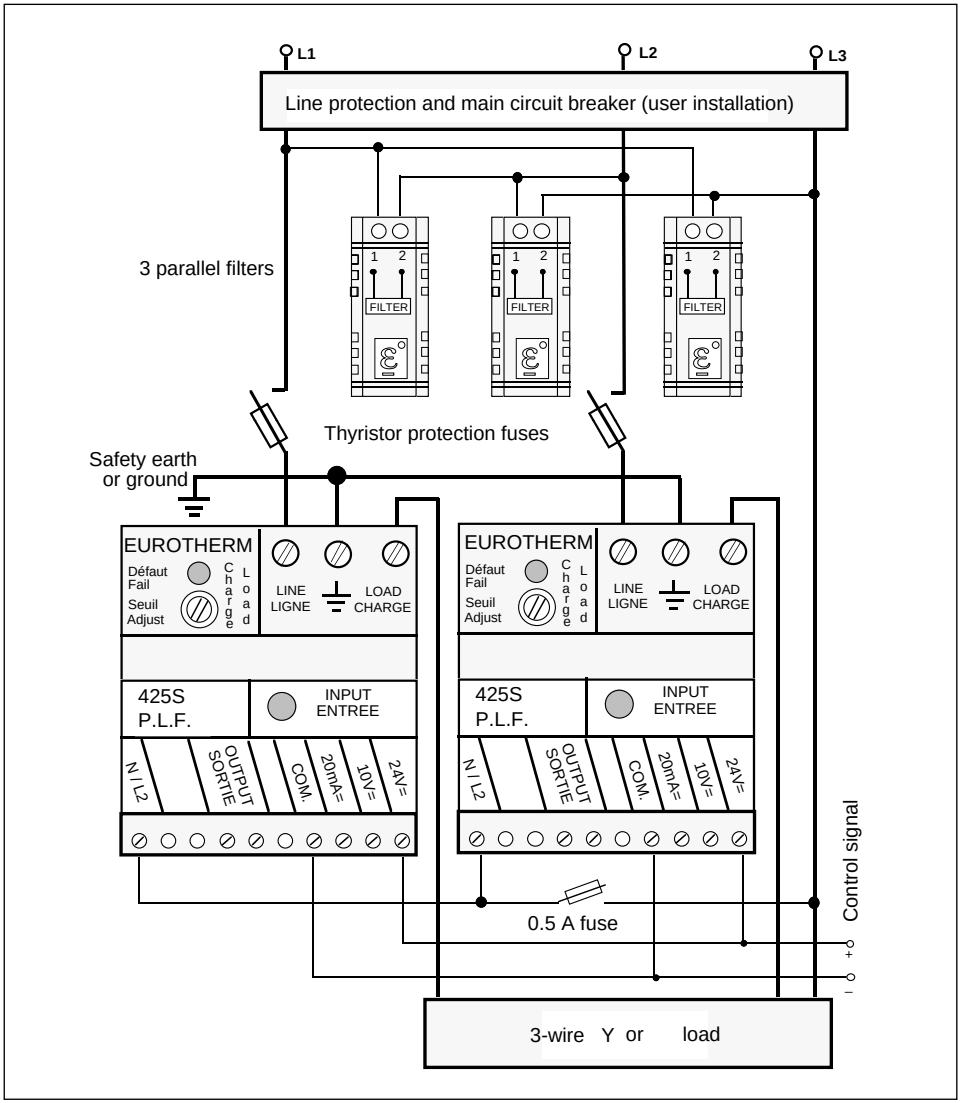


Figure 3-9 Example of configuration of two **425S** solid state contactors in 2 phase control

Load configuration: 'Star without neutral' or 'Closed delta'
15 A to 75 A nominal current. 400 V supply.
24 Vdc inputs connected in parallel
Alarm contacts configured in series for PLF option and in parallel for IPF option.

Chapter 4

COMMISSIONING

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Chapter 4 COMMISSIONING

Read this chapter carefully before commissioning the solid state contactor

COMMISSIONING PROCEDURE SAFETY

Important !

Eurotherm cannot be held responsible for any damage to persons or property or for any financial loss or costs resulting from the incorrect use of the product or the failure to observe the instructions contained in this manual.

It is therefore the user's responsibility to ensure that all the nominal values of the power unit are compatible with the conditions of use and installation before commissioning the unit.

Danger !

Access to internal components of the unit is prohibited to users who are not authorised to work in industrial low voltage electrical environments.

The temperature of the heatsink may exceed 100°C.

Avoid all contact, even occasional, with the heatsink when the solid state contactor is in operation.

The heatsink remains hot for approximately 15 min after the unit has been switched off.

CHECKING THE CHARACTERISTICS

Attention !

Before connecting it to an electrical supply, make sure that the **identification code** of the solid state contactor corresponds to the coding specified in the **order** and that the characteristics of the unit are **compatible with the installation**.

Load current

The maximum current of the load must be less than or equal to the value of the nominal current of the solid state contactor taking the supply and load variations into account.

In **three-phase** operation, if 3 identical loads are configured in a **closed delta**, the line current of the solid state contactor is $\sqrt{3}$ **times as high** as the current of each arm of the delta.

Supply voltage

For three-phase operation, in star without neutral or closed delta configurations, the nominal value of the solid state contactor voltage must be greater than or equal to the **line-to-line voltage used** of the supply.

Danger !

Never use a solid state contactor with a supply **voltage greater** than the nominal solid state contactor voltage specified in the coding.

Fan power supply

It is not possible to power the fan (for fan-cooled units) at a voltage other than that indicated on the fan. The fan power supply is configured in the factory.

PLF circuit

The power supply voltage of the partial load failure detection circuit must be the same as the power supply.
The PLF alarm relay contact operating volltage must never exceed 230 V (230 V supply).

Input signal

The input signal must be compatible with the signal type (dc or ac) and level used for the control .

INPUT SIGNAL PARAMETERS

The mode of the input signal is **logic** ('ON/OFF').

There are two possible choices when ordering the solid state contactor:

- the **dc** signal or
- the **ac** signal.

The **presence** of the control signal is displayed by the red light emitting diode (LED) labelled '**Input/Entrée**'.

DC signal

On the control terminal block, the user has **the choice** of 3 signal ratings.

Signal rating	ON state	OFF state	Maximum	Input Resistance
20 mA	≥ 5 mA	< 0.5 mA	50 mA	0
10 V	≥ 8 V	< 2 V	20 V	320 Ω
24 V	≥ 16 V	< 2 V	32 V	1590 Ω

Table 4-1 DC input parameters

Note: Input is in series with **2** diodes.
Voltage drop at **20 mA** less than **3 V** (4.3 V for 480 V nominal unit).

AC signal

The user has the choice of **three** ac voltage levels.

Signal rating	ON state	OFF state	Maximum	Impedance at 50 Hz
24 Vac	≥ 20 V	< 6 V	30 V	2 kΩ
48 Vac	≥ 30 V	< 10 V	55 V	3 kΩ
100 to 240 Vac	≥ 90 V	< 35 V	264 V	9.3 kΩ

Table 4-2 AC input parameters

Note: Input is in series with **4** diodes; voltage drop of **6.5 V** (approximate).

PARTIAL LOAD FAILURE DETECTION

Sensitivity

The 'Partial load failure' alarm (PLF alarm) detects an increase in the load impedance due to the failure of heating elements. The sensitivity of the PLF detection depend :

- of the configuration type (single-phase or three-phase) and
- of the firing type.

Single-phase configuration

- Firing time ≥ 1 s :
  detection of failure of **one** element out of **six** identical elements, mounted in parallel.

- Modulation cycle ≥ 1 s with duty cycle ≥ 20% :
  detection of failure of **one** element out of **five** identical elements, mounted in parallel.

Three-phase configuration

Modulation cycle ≥ 1 s with duty cycle ≥ 20% :

- Star with neutral or closed delta configurations :
  detection of failure of **one** element out of **five** identical elements, mounted in parallel.
- Star without neutral configuration, 2 phase control :
  detection of total load failure in the direct phase;
  detection of failure of **one** element out of **five** (central points not connected);
  detection of failure of **one** element out of **three** (central points connected).
- Closed delta configuration, 2 phase control :
  detection of failure of **one** element out of **three** identical elements, mounted in parallel.

In the **three-phase** configuration with the **PLF/IPF** option, use the **655** special.

Alarm relay

The PLF alarm output is performed by a red LED 'Load Fail' and by a relay contact.

The relay is not powered in alarm status and when the **425S** is switched off.

PLF option : the contact is **open** when the **425S** is in alarm status or switched off.
IPF option : the contact is **closed** in alarm status and when the **425S** is switched off.

Contact cut-off capacity: **0.25 A** (250 Vac or 30 Vdc) with **250 Vac** insulation.

The alarm relay is **acknowledged** either by switching off the unit or by resetting the load current to its adjustment value.

Adjustment

The PLF detection adjustment makes it possible to obtain the sensitivity **specified** for the **real** used load.

In the factory, the detection circuit is set for the nominal current of the solid state contactor.

In order to be able to adjust the PLF detection, the full firing current must be greater than **15%** of the **425S** nominal current**.**

As a general rule, the following adjustment must be made:

- Make sure that the thyristors are firing
  (passage of current in the load and the 'Control signal presence' red indicator light on).
- Turn the partial load failure detection adjustment potentiometer
  (labelled 'Adjust' on the front fascia) completely anti-clockwise.
  Note that the red indicator light 'Load Fail' is off.
- Turn the potentiometer clockwise until the red indicator light 'Load Fail' comes on.
- Turn the potentiometer slowly again anti-clockwise until the red indicator light 'Load Fail' has just gone off.

The partial load failure detection is thus adjusted with maximum sensitivity.

Chapter 5

FUSE

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Chapter 5 FUSE

THYRISTOR PROTECTION FUSE

The fuse and the fuse-isolator are defined **separately** in the order.

They must be provided for the installer and procured at the same time as the 425S solid state contactor (different Part Nos.).

Attention !

The high-speed fuse is only used for the internal thyristor protection of used in the 425S solid state contactor against wide amplitude over-loads.

This high-speed fuse may not be used to protect the installation.
The user's installation must be protected and comply with current standards.

The fuse holder supplied with a solid state contactor can be used as a fuse-isolator. However, as for all fuse-isolators, it cannot be opened on-load.

The unit guarantee depends on the use of a fuse, the part numbers of which is given in the following table.

For short wave infrared element applications, contact your Eurotherm Office.

Solid state contactor nominal current	Fuse rating	EUROTHERM Part No.		
		Spare fuse	Fuse holder	"Fuse + fuse holder" assembly code
15 A	20 A	CH 260024	CP 018525	FU1038 /16A / 00
25 A	30 A	CH 260034	CP 018525	FU1038 /25A / 00
40 A	50 A	CH 330054	CP 171480	FU1451 /40A / 00
63 A	80 A	CS 173087U080	CP 173083	FU2258 /63A / 00
75 A	100 A	CS 173087U100	CP 173083	FU2258 /75A / 00
100 A	125 A	CS 173246U125	CP 173245	FU2760 /100A / 00
125 A	160 A	CS 173246U160	CP 173245	FU2760 /125A / 00

Table 5-1 Fuse, fuse holder and "fuse + fuse holder" assembly part numbers

FUSE-ISOLATOR

The fuse holder is designed for mounting on a symmetrical DIN rail.

For asymmetrical rails, the adaptor (Eurotherm part No. FE 018706) which is supplied with the fuse holder must be used.

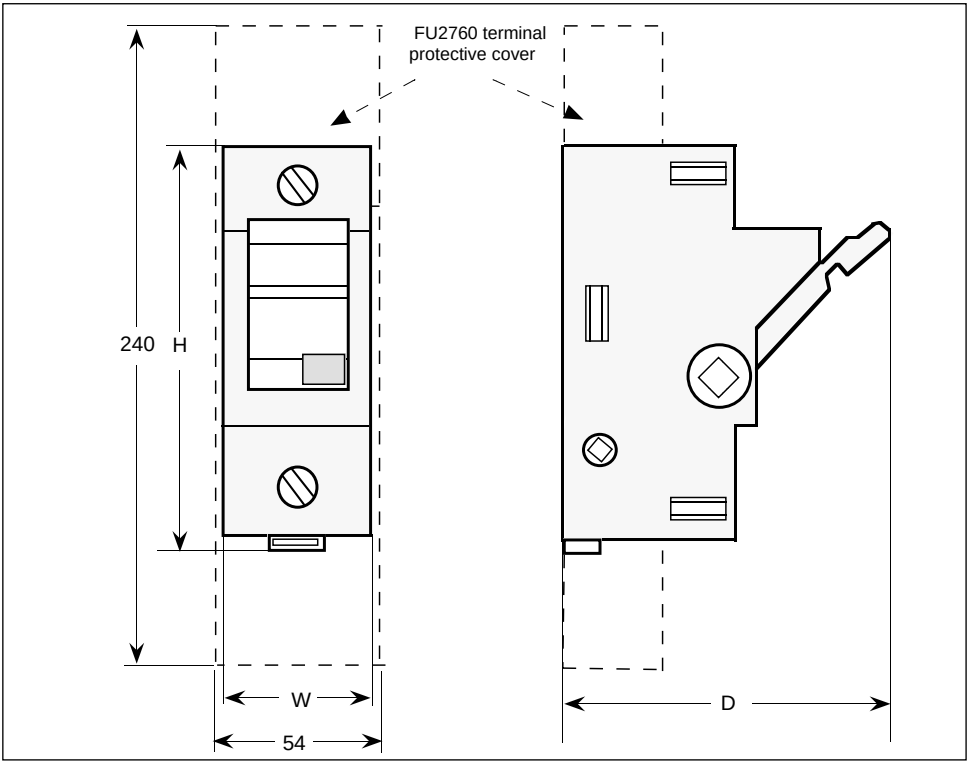

Figure 5-1 Fuse holder dimensions

Dimensions (mm)		Fuse holder			
		FU1038	FU1451	FU2258	FU2760
Height	(H)	81	95	140	240 (with terminal protective cover) 150 (without terminal protective cover)
Width	(W)	17.5	26	35	54 (with terminal protective cover) 38 (without terminal protective cover)
Depth	(D)	68	86	90	107

Table 5-2 Fuse holder dimensions