

# 7300A

MODEL



## Three Phase Thyristor Units for all Load types

### Features:

- **Current range; from 16 to 630 amps at 45°C**
- **Voltage up to 690V**
- **Inputs**
  - current:  
**0-20mA or 4-20mA**
  - voltage:  
**0-5V or 0-10V**
- **Firing modes:**
  - Phase angle
  - Fast cycle
  - Single cycle
  - Advanced single cycle
  - Transformer burst firing
- **Suitable for virtually all types of load**
- **Current limit option**
- **Alarm options include:**
  - Thyristor short circuit
  - Load open circuit
  - Partial load failure
  - Thyristor over temperature (>63 amps)
- **Optional digital communications**
- **Meets product standard EN 60947-4-3**

### Ratings

The current ratings of the 7300A cover the range from 16amps up to 630 amps, with units rated at 80amps and above being fan cooled. The voltage rating extends to a maximum of 690 volts. These units consist of three thyristor controlled channels each rated at the specified current and voltage.

### Inputs

The 7300A can accept analogue voltage: (0-5V or 0-10V) or current: (0-20mA or 4-20mA) inputs.

### Firing Modes

The 7300A is available with a selection of firing modes to suit most applications. It is suitable for controlling resistive loads with high or low temperature coefficient, short wave infrared (SWIR) or inductive loads, including transformer burst firing.

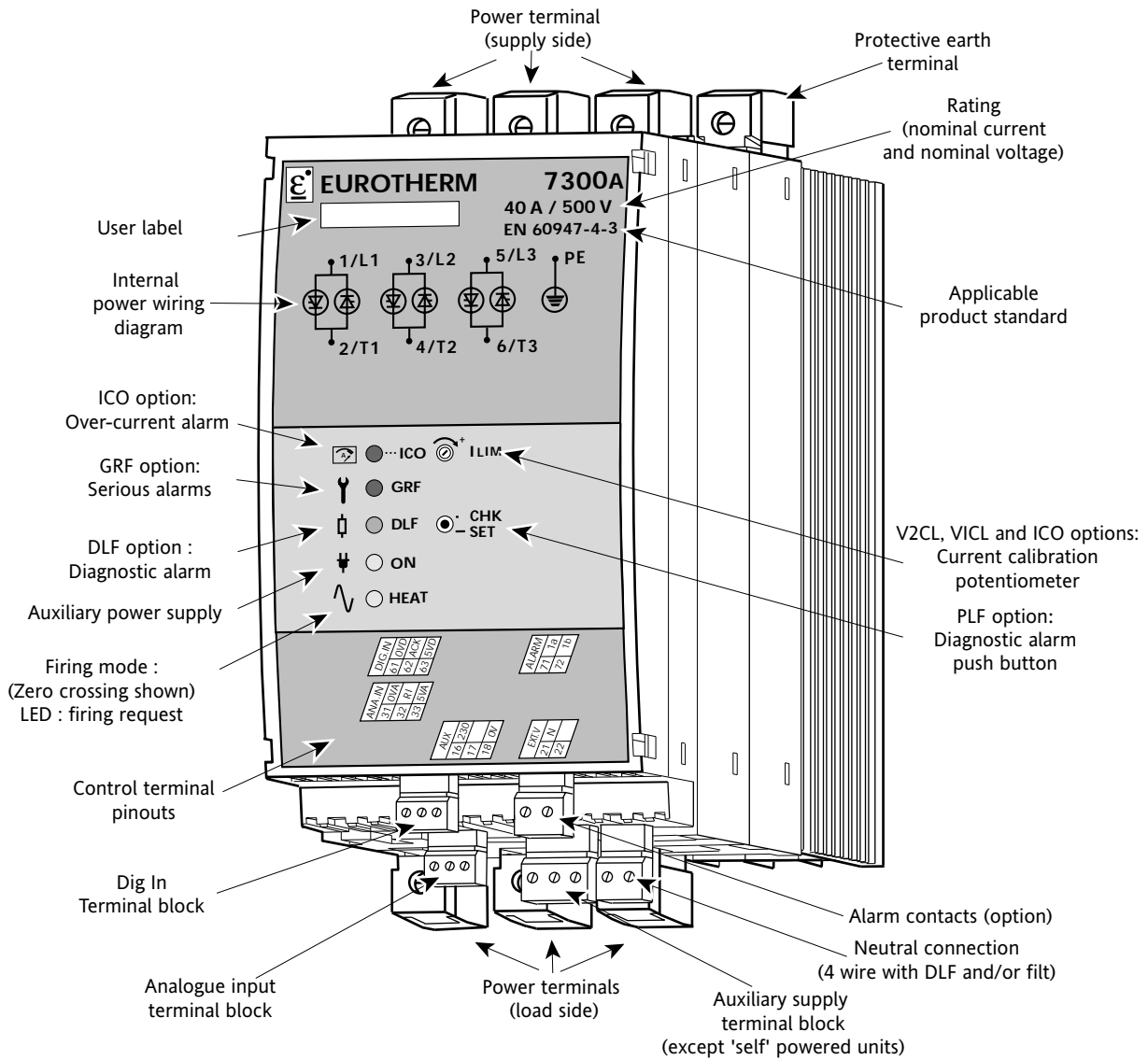
### Limits and alarms

Optional current limit which can work in all firing modes prevents excessive currents from flowing in the load circuit. Optional alarms can warn of thyristor short circuit or load open circuit (GRF alarm). Additionally partial load failure with automatic set up can detect the loss of one out of up to six parallel loads (DLF alarm). Over temperature shutdown is provided with fan cooled units (above 63 amps) with optional alarm.

### Fusing

High speed fuses are recommended for most applications except SWIR. The fuses are external for units up to and including 100amps and internal above 100amps. Fuses are available either with or without microswitch indication.

# 7300A



Example of 7300A layout (burst firing)

## Technical specification (Phased introduction - Consult Eurotherm for availability)

<b>POWER</b>	
Nominal Current	16 A to 630 A at 45° ambient (see order code)
Nominal Voltage	200 VAC to 690 VAC (see order code)
Supply	Self-powered from supply network, or external (115V or 230V +10%; -15%). Consumption: 10VA. Frequency 47 to 63 Hz
Dissipated power	1.3 W (approx): per amp per phase. Allow 2W per amp per phase to include fuse dissipation
Cooling	Rating ≤63A: Natural convection. Rating ≥80A: Fan-cooled. 115V or 230V fan (see order code); consumption 10VA
<b>LOAD</b>	
Use category	Three-phase industrial load: <ul style="list-style-type: none"> <li>· AC-51 Resistive load with low temperature coefficient</li> <li>· AC-55b Short wave infrared elements</li> <li>· AC-56a Transformer primary and Resistive load with high temperature coefficient</li> </ul>
<b>CONTROL</b>	
Control type	Analogue (optional digital communication) <ul style="list-style-type: none"> <li>· Remote analogue setpoint: 0-5V or 0-10V (100 kΩ =input impedance), 0-20mA or 4-20mA (250Ω input impedance)</li> <li>· Potentiometer (10k) for manual setpoint (5V supply available)</li> </ul>
Control parameter	<ul style="list-style-type: none"> <li>· Standard: Load voltage squared (V<sup>2</sup>)</li> <li>· Option: Apparent power (V x I), Load current squared (I<sup>2</sup>), Open loop</li> </ul>
Linearity and stability	Better than ±2% of full scale (balanced supply and load)
<b>FIRING MODE</b>	
Firing at zero crossings	<ul style="list-style-type: none"> <li>· 'Burst mode' base time: 16 or 64 cycles</li> <li>· 'Single cycle': base time 1 cycle</li> <li>· 'Advanced single-cycle': base firing time 1 cycle; non firing by half-cycles</li> </ul>
Firing angle variation	<ul style="list-style-type: none"> <li>· Phase angle</li> </ul>
<b>SIGNALLING</b>	
	Electronics supply present: green 'ON' LED. Thyristor firing request: green 'HEAT' LED
<b>CURRENT LIMIT (option)</b>	
	<ul style="list-style-type: none"> <li>· Phase angle: Automatic control transfer from V<sup>2</sup> to I<sup>2</sup> or, from V x I to I<sup>2</sup> with current recalibration set by potentiometer on front panel.</li> <li>· Burst mode 16 cycle base: Current limited by threshold (quench) set using potentiometer on front panel.</li> </ul>
Calibration	A monitor signal is available in V x I for power and current calibration and maintenance
Transient current limit	Option for transformer primary control in burst firing mode: <ul style="list-style-type: none"> <li>· Transformer magnetisation firing angle ramp at first switch on</li> <li>· First firing delay adjustable using potentiometer on front panel</li> </ul>
<b>TYPE 1 ALARMS (OPTIONS)</b>	
Serious alarms (GRF)	Total load failure and thyristor short circuit detection. Signalled by red 'GRF' LED and alarm relay contact
Diagnostic alarm (DLF)	Partial load failure detection. Signalled by orange 'DLF' LED and alarm relay contact. Sensitivity: Detects the failure of at least one heating element for up to six identical elements connected in parallel. The DLF option includes serious alarm monitoring (GRF)
Overtemperature alarm	For fan cooled units operation stops if the temperature exceeded. Signalled by red 'T' LED and alarm relay (with GRF or DLF option)
<b>TYPE 2 ALARMS (OPTION)</b>	
Current chop off (ICO)	Operation stopped if current threshold exceeded. Only available with zero crossing firing and DLF option (except for short wave infrared elements, transformers and codes V1CL and V2CL). Alarm threshold adjustable from 20 to 100% using potentiometer on front panel. Signalled by red 'ICO' LED and alarm relay contact.
<b>ALARM RELAY</b>	
	Available with alarm options. The relay contact (0.25 A/230 VAC; 32 VDC) is either open or closed on alarm depending on the code.
<b>COMMUNICATIONS</b>	
	Available later
<b>PROTECTION</b>	
Thyristor protection	Varistor and RC snubber Short circuit coordination type: Type 1. High speed fuses: rating ≤100A: external (optional), rating ≥125A: internal. No fuse for short wave infrared elements if firing at zero crossings or in phase angle firing mode without current limit.
Electrical protection	IP20 without adding additional protection. Overvoltage category 3 (defined by IEC 664)
<b>PRODUCT STANDARD</b>	
	The 7300A products comply with the terms of product standard EN 60947-4-3. Contactors and motor-starters- AC semiconductor controllers and contactors for non-motor loads'
<b>CE LABELLING</b>	
	Complies with essential requirements of the European Low Voltage Directive 73/23 EEC dated 19 February 1973, modified by 93/68/EEC dated 22 July 1993 and the Electromagnetic Compatibility Directive 89/336/EEC dated 3 May 1989 modified by 92/31/EEC dated 28 April 1992 and 93/68/EEC dated 22/07/93.
<b>ENVIRONMENT</b>	
Temperature	Use 0°C to 45°C at max. altitude of 2000m. Storage -10°C to 70°C
Pollution	Degree 2 acceptable (defined by IEC 664)
Humidity	RH 5% to 95% Non condensing
Dimensions & weight	See back page

**Ordering code** (Phased introduction - Consult Eurotherm for availability)

7300A	1	2	3	4	5	6	7	8	9	10	11
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**1 Current †**

16A	16 amps
25A	25 amps
40A	40 amps
63A	63 amps
80A	80 amps
100A	100 amps
125A	125 amps
160A	160 amps
200A	200 amps
250A	250 amps
315A	315 amps
400A	400 amps
500A	500 amps
630A	630 amps

**2 Voltage**

200V	200 volts
230V	230 volts
277V	277 volts
400V	400 volts
460V	460 volts
480V	480 volts
500V	500 volts
690V	690 volts

**3 Aux. voltage**

SELF	Self-powered (except 690V)
115V	115V
230V	230V

Self-powered is normally used if operating voltage is as shown in "Voltage" selection box 2.

† Units up to and including 63 amps are naturally cooled. Above 63 amps units are fan cooled.

**4 Fan Supply**

XXXX	≤63A : No fan
	≥80A:
115V	115V fan with electronics
230V	230V fan with electronics

**5 Load Coupling**

3S	Star without neutral
4S	Star with neutral
3D	Closed delta
6D	Open delta

**6 Thyristor Fuse**

FUSE	Standard fuses
MSFU	Fuses with fuse blown microswitch
NONE	No fuses (short wave infrared elements)

**7 Firing Mode**

PA	Phase angle
C16	Burst mode: base time 16 cycles
C64	base time 64 cycles
FC1	Single-cycle: 1 base cycle
ASC	Advanced single-cycle: 1 base cycle non-firing by half cycles in 4S or 6D coupling only

**8 Internal EMC Filter**

XXXX	Phase angle or rating ≥125A: no filter
	Burst mode or single-cycle 16A to 100A: with filter
FILT	with filter
NONE	no filter

**9 Input**

	DC Analogue signal:
0mA20	current from 0mA to 20mA
4mA20	current from 4mA to 20mA
0V5	voltage from 0V to 5V
0V10	voltage from 0V to 10V

**10 Manual Language**

ENG	English
FRA	French
GER	German

**11 Selected Options**

NONE	No options, V <sup>2</sup> control End of code
YES	Version with Options

**SPARE FUSES AND FUSEHOLDERS**

Fuse without microswitch (Code **FUSE**)

Fuse with microswitch (Code **MFUSE**)

Current	Fuse	With three phase fuse-holder	Overall dimensions H x W x D (mm)	Current	Fuse	With three phase fuse-holder	Overall dimensions H x W x D (mm)
16A	CH260024	FU3038/16A/00	81 x 52.5 x 68	16A	CS176513U020	MSFU3451/16A	110 x 79.5 x 94
25A	CH260034	FU3038/25A/00	81 x 52.5 x 68	25A	CS176513U032	MSFU3451/25A	110 x 79.5 x 94
40A	CH330054	FU3451/40A/00	97 x 79.5 x 86	40A	CS176513U050	MSFU3451/40A	110 x 79.5 x 94

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### Options for Phase Angle Firing

#### 12 Control Options

V2	Voltage control (V)
I2	Current control (I)
V2I2	Current limit by control transfer (V to I)
VI2	Current limit by control transfer (VxI to I)
OL	Open loop

#### 13 Delay on First Firing

XXXX	No delay on first firing
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#### 14 Type 1 Alarms

GRF	Serious alarms: Thyristor short-circuit, total load failure, over-temperature for ratings $\geq 80A$
DLF	Partial load failure and Serious Alarms
NONE	No alarms

#### 15 Load type (for DLF)

SWIR	With DLF option: Short wave infrared elements
LTCL	Low temperature coefficient load
XXXX	Without DLF option or High temperature coefficient load

#### 16 Type 2 Alarm

XXXX	No over-current alarm
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#### 17 Alarm Relay Contact

NC	With alarm option: Contact closed on alarm
NO	Contact open on alarm
XX	without alarm option

### Options for Burst/Single-Cycle Firing

#### 12 Control Options

V2	Voltage control (V)
	Burst firing C16 only:
V2CL	Voltage control (V) and current limit
VI2	Current limit
VICL	Power control (VxI) and current limit

#### 13 Delay on First Firing

	Burst firing C16 or C64:
XFMR	Transformer primary
NONE	Other configurations
XXX	Single cycle (FC1/ASC)

#### 14 Type 1 Alarms

GRF	Serious alarms: Thyristor short-circuit, total load failure, over-temperature for ratings $\geq 80A$
DLF	Partial load failure and Serious Alarms
NONE	No alarms

#### 15 Load type (for DLF)

SWIR	With DLF option: Short wave infrared elements
LTCL	Low temperature coefficient load
XXXX	Without DLF option or High temperature coefficient load

#### 16 Type 2 Alarm

ICO	Over-current alarm (for DLF option) except codes:SWIR, XFMR, VICL and V2CL
NONE	No over-current alarm

#### 17 Alarm Relay Contact

NC	With alarm option: Contact closed on alarm
NO	Contact open on alarm
XX	without alarm option

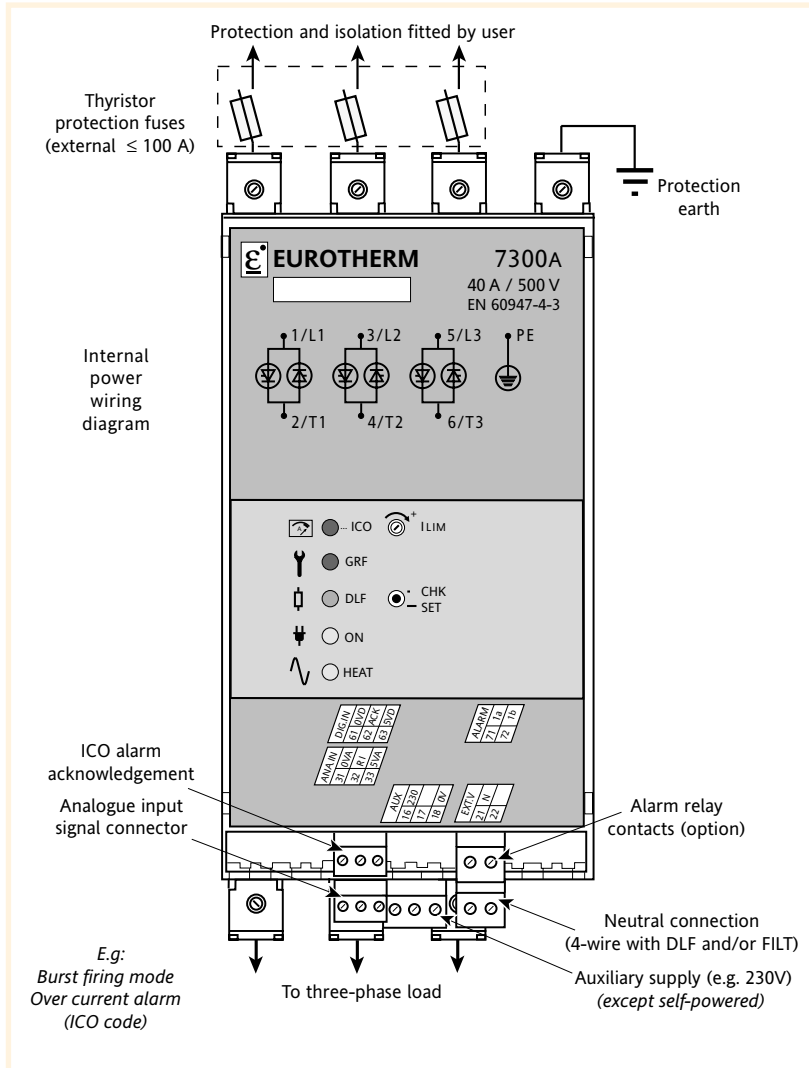
#### 18 19 Comms Option

NONE Available later

#### 20 Certification Option

NONE No certificate of 'Compliance with Order'  
CFMC certificate of 'Compliance with Order'

## Wiring information



## Wiring

Only use copper conductors rated up to at least 75°C.

Power terminals (cage terminals):

- supply: 1/L1, 3/L2, 5/L3
- load: 2/T1, 4/T2, 6/T3
- protective earth: PE

Rating A	Terminal capacity mm <sup>2</sup> /AWFG	Tightening torque Nm
16 to 25	2.5/13 to 6/9	1.2
40	6/9 to 16/5	1.8

The cross-section of conductors must correspond to IEC 943 standard.

### Control terminals (plug-in terminal blocks)

Capacity of ANA.IN, DIG.IN, ADJ.CAL terminals:

1.5mm<sup>2</sup>/16 AWG; Tightening torque: 0.5Nm

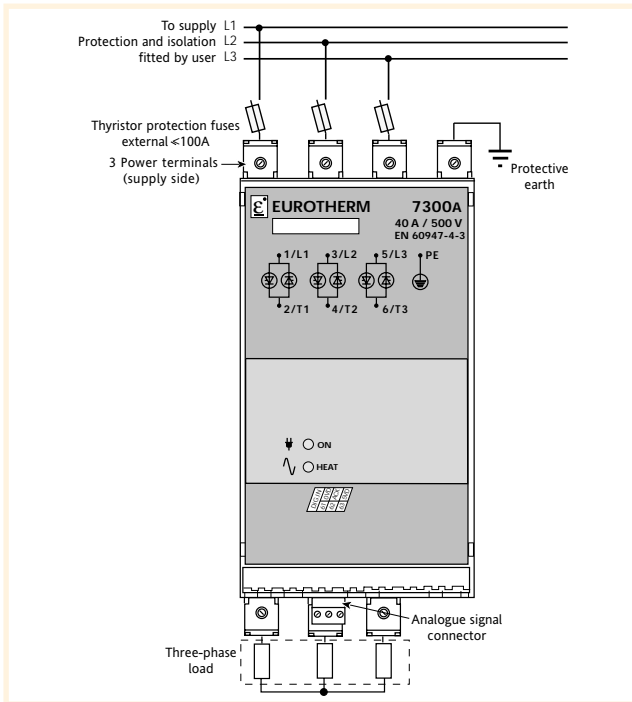
Capacity of AUX, ALARM, EXT.V terminals:

2.5mm<sup>2</sup>/14 AWG; Tightening torque: 0.7Nm

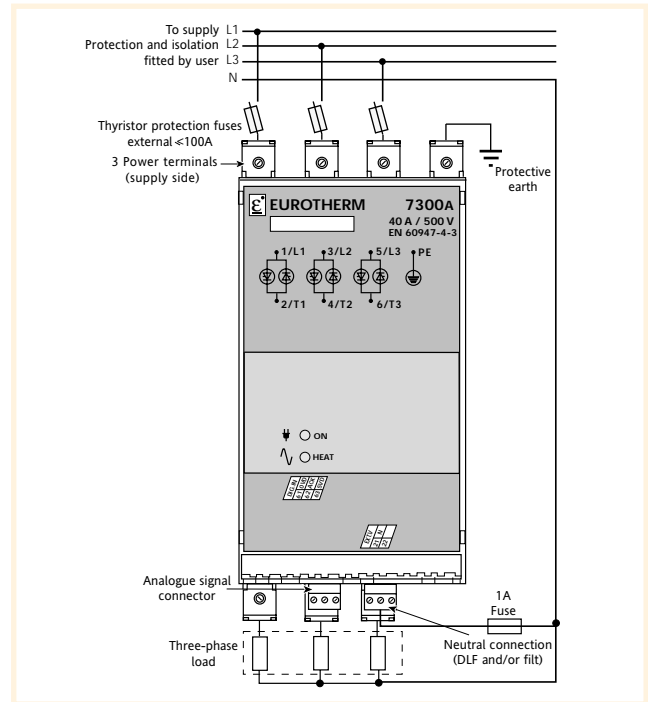
Terminal Block	No.	Label	Purpose	
ANA.IN	31	0VA	0V analogue signal	Basic or Options
	32	RI	+analogue signal	
	33	5VA	5V user supply	
AUX	16	230	Auxiliary 230V or	
	17	115	115V supply	
	18	0V	Neutral or 2 <sup>nd</sup> phase	
DIG.IN	61	0VD	0V logic signal	Over-current alarm
	62	ACK	ICO acknowledgement	
	63	5VD	5V user supply	
ALARM	71	1a	Alarm relay contact (NC code)	Alarms
	72	1b	Alarm relay contact (NO code)	
	73	1a	Alarm relay contact (NO code)	
ADJ.CAL	66	0VC	0V calibration	V x I control
	67	HRC	Calibration control	
EXT.V	21	N	Neutral for 4S	DLF/FILT options
	22		Not connected	

## Power wiring diagrams

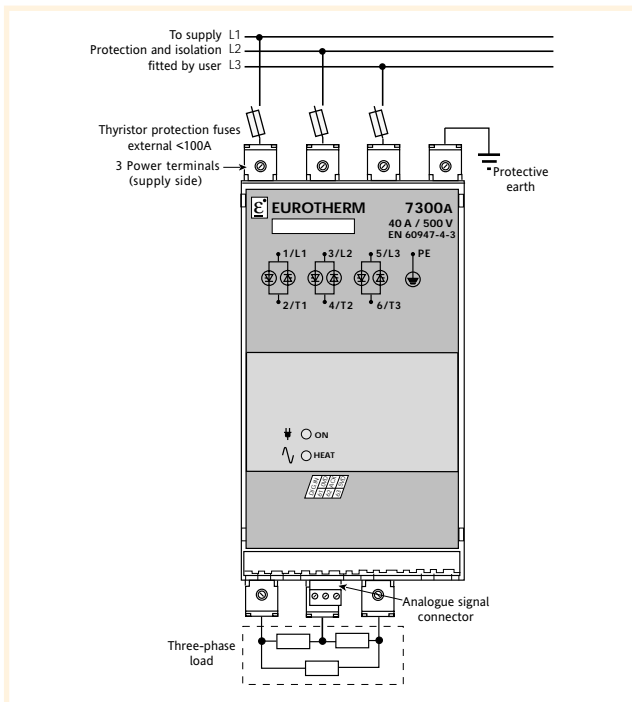
### 7300A Typical three phase power wiring diagrams



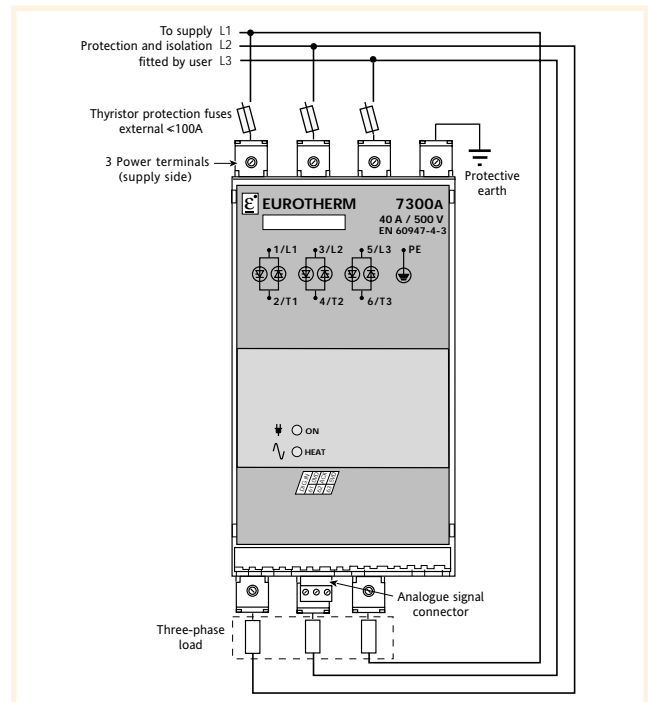
Power wiring diagram for a 3 wires load 'Star without neutral' (code 3S)



Power wiring diagram for a 4 wires load 'Star with neutral' (code 4S)



Power wiring diagram for a 3 wires load 'Closed Delta' (code 3D)



Power wiring diagram for a 6 wires load 'Open Delta' (code 6D)

## Mounting

### Mounting mechanism

Two horizontal attachment plates (4 M4 screws) mounted on the unit

### Mounting type

Rating from 16A to 40A:

Two symmetric EN50022 DIN rails or Bulkhead mounting

Rating >40A:

Bulkhead mounting only

### Layout:

Horizontal spacing: Leave a gap of a least 10mm between adjacent units.

Vertical spacing: Units must be mounted with the heatsink vertical, with no obstructions above or below the unit which might reduce or impede air flow.

Maximum ambient temperature above the unit: 45°C

### Dimensions (H x W x D)

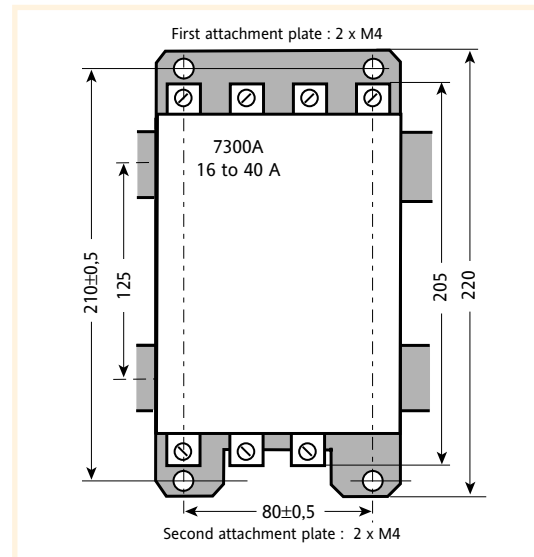
Up to 40amps

Basic version 220 x 96 x 215mm

with option 220 x 96 x 243mm

### Weight

Up to 40amps 2.5kg



### Safety during use

Eurotherm Limited shall not be held responsible for any damage, injury, losses or expenses caused by inappropriate use of the product or failure to comply with this manual.

The protective earth must be connected before any other connections are made and should be the last cable to be disconnected.

The high speed fuses merely protect the thyristors. A suitable device must be fitted to protect the installation and separate it from the supply, in accordance with applicable standards.

The user must not attempt to access internal parts. Disconnect the unit before disassembling.

Avoid touching the heatsink when the unit is operating and for 15 minutes after shutting down.

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