

Advanced Controllers

Q7000
4 x 9 line Power thyristor unit
Single Phased Load
GENERAL PRESENTATION
(versions ≤ 11 A)



IDENTIFICATION

Q7000 series power thyristor unit is a 19 inch Rack with :

- One driver board with an external power supply and Modbus, Profibus, DeviceNet protocol as field bus, and from one to four power boards with 9 lines each.
- Direct configuration by the user; is available on the front panel or by using iTools connected through a RJ 11 link also on the front panel.
- Digital communication (Modbus, Profibus, DeviceNet) will enable the user to choose : the control type, the firing mode, and the alarm strategy.

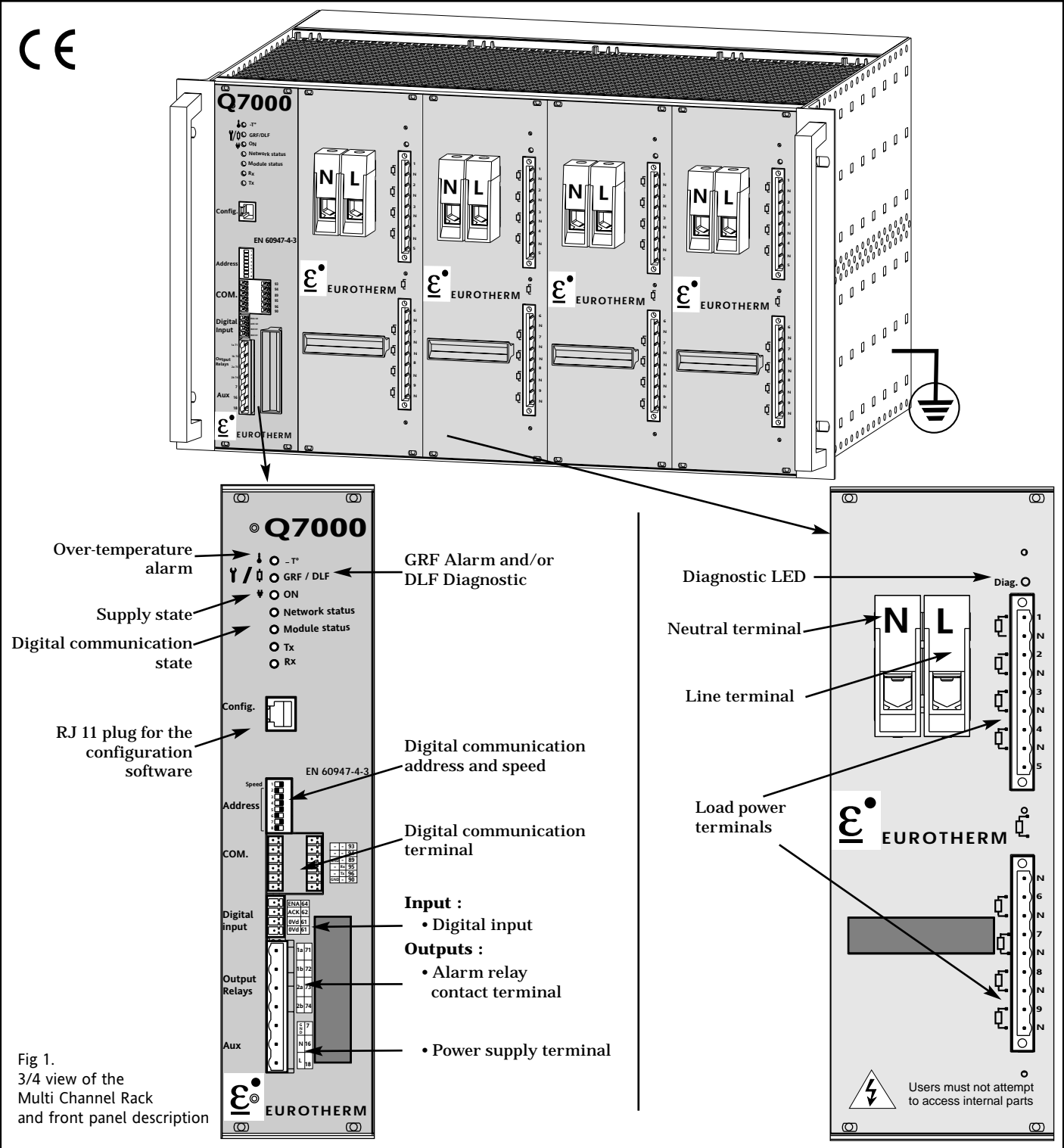
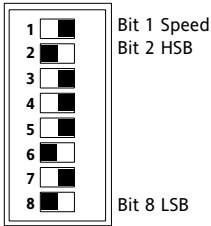


Fig 1.
 3/4 view of the Multi Channel Rack and front panel description

TECHNICAL SPECIFICATIONS

Product standard	Q7000 units comply with the terms of product standard EN 60947-4-3 'Contactors and motor-starters - AC semiconductor controllers and contactors for non-motor loads'.
CE labelling	
Compliance	Compliance with the essential requirements of the European Low Voltage Directive 73/23/EEC dated 19 Feb 1973 modified by 93/68/EEC dated 22 Jul 1993 and Electromagnetic compatibility Directive 89/336/EEC dated 3 May 1989 modified by 92/31/EEC dated 28 Apr 1992 and 93/68/EEC dated 22 Jul 1993.
Environment	
Use	0 to 60 °C at nominal current of 5,6 A or 0 to 40 °C at nominal current of 11 A max. altitude 2000 m.
Storage	-10°C to +70°C.
Pollution	Degree 2 acceptable (defined by IEC 664).
Humidity	5% to 95% RH without condensation.
Power	
Nominal current	5,6 A at 60 °C, 11 A at 40 °C
Nominal voltage	230 V (+10%; -15%)
Frequency	Use from 47 to 63 Hz
Dissipated power	1.3 W (approx.) per amp and per phase.
Cooling	Ratings ≤ 11 A: Water cooling in addition of ventilation by fan 115 V or 230 V ; consumption 100 VA.
Load	Industrial single-phased load.
Categories of use	• AC-51 Resistive load with low temperature coefficient.
Command	
Supply	External power supply (115 V or 230 V +10%; -15%) Consumption : 100 VA.
Command type	Digital Communication
Firing modes	
<i>Zero crossing firing</i>	<ul style="list-style-type: none"> • 'Burst mode' : base time 16 or 64 cycles. • 'Single-cycle' : base time 1 cycle (see product code). • 'half cycle'
Control	
Parameters	<ul style="list-style-type: none"> • Standard: <ul style="list-style-type: none"> - Load voltage squared (V²) - Apparent power (V·I)
Linearity and Stability	Better than ±1% of full scale (with balanced network and load).
Calibration	A control signal is available in V·I control for power and current calibration and in V2.
Signalling	Electronics supply present : Green 'ON' LED.

Type 1 alarms	
Serious alarms (GRF option)	Total load failure and thyristor short circuit detection. Signalling : Red 'GRF' LED and alarm relay contact.
Diagnostic alarm (DLF option)	Partial load failure detection. Signalling : Orange 'DLF' LED and alarm relay contact.
Sensitivity (for each phase)	Detects the failure of at least one heating element for two identical elements. The DLF option includes Serious alarm monitoring.
Over-temperature alarm	For all units, the unit cuts out if the temperature threshold is exceeded. Signalling : Red 'T°' LED and alarm relay contact.
Alarm relay	The relay contact (0.25 A/230 Vac; 32 Vdc) is either open on alarm or closed on alarm depending on the product code.
Communication	<ul style="list-style-type: none"> • Configuration : Modbus® RTU protocol compliant with the specifications described in document 'PI-MBUS-300 rev J'. RS485 2-wire transmission at 9.6 or 19.2 kbaud (selected by switch on front panel). Thyristor unit address adjustable between 1 and 127 using switches. 3 diagnostic LEDs on front panel. • Digital communication : Using the communication bus terminal (COM.). Modbus, Profibus or DeviceNet (see code) protocols • Supply: 115 V or 230 V (+10% ; -15 %)
	
Protection	
Installation	Wiring protection by fuse
Electrical protection	IP20 without adding additional protection. Over-voltage category 2 (as defined by IEC 664).
Overall dimensions	
Rack 19" :	Height : 6 U (265,9 mm) Width : 19" (482,6 mm) Depth : 295 mm
Front pannel :	Driver board : Width 12 F (60,96 mm) Power board : Width 18 F (91,44 mm)
Cards :	Height : 233,25 mm Depth : 220 mm
Mass	10 kg (max).

1. Numer of Channels	Code
9 Channels	9
18 Channels	18
27 Channels	27
36 Channels	36

2. Assembling	Code
Kit Version	K
Rack Version	R

3. Nominal Current	Code
11 Amps	11

4. Nominal line to line voltage	Code
200 volts	200V
230 volts	230V
277 volts	277V
400 volts	400V
460 volts	460V
480 volts	480V
500 volts	500V

5. Fan power supply	Code
- 115 V fan and 115 V electronics	115V
- 230 V fan and 230 V electronics	230V

6. Power supply for electronics	Code
External 115 V supply	24V
External 115 V supply	115V
External 230 V supply	230V

7. Digital communication	Code
Modbus® protocol	MOP
Profibus-DP protocol	PF*P
DeviceNet protocol	DNP*

8. Transmission speed	Code
• Code <i>MOP</i> : Baud rate 9,6 kbauds	9K6
19,2 kbauds	19K2

9. Couplage de charge	Code
Star without neutral	4S
Open delta	6D

10. Manual language	Code
French	FRA
English	ENG
German	GER*

* Available later

Control and alarms options

7. Control option	Code
Voltage control (V ²)	V2
Power control (U,I)	VI

12. Alarm relay contact 1	Code
<i>With alarm option</i> : Closed contact on alarm Open contact on alarm	NC NO
<i>Without alarm option</i>	XX

9. Type 1 Alarm	Code
Serious alarm : Total load failure, Short-circuit Thyristors, over-temperature Partial load failure	GRF DLF

13. Alarm relay contact 2	Code
<i>With alarm option</i> : Closed contact on alarm Open contact on alarm	NC NO
<i>Without alarm option</i>	XX

10. Load type	Code
<i>With DLF Option</i> : Low temperature coefficient resistive load	LTCL
<i>Without DLF Option</i>	XXXX

Certification option

5. Firing mode	Code
«Burst mode» : base time 16 cycles	C16
base time 64 cycles	C64
«sigle-cyclz» : 1 cycle base time	FC1

16. Certification	Code
Without certificate of 'Compliance with order'	NONE
With certificate of 'Compliance with order'	CFMC

OPTIONS

Available standards with the Q7000 series power thyristor units :

- Configuration using iTools
- Power calibration and different control parameters
- Thyristor short-circuit and Total Load Failure
- Diagnostic and Partial Load Failure monitoring
- Over-temperature and over-current

MOUNTING

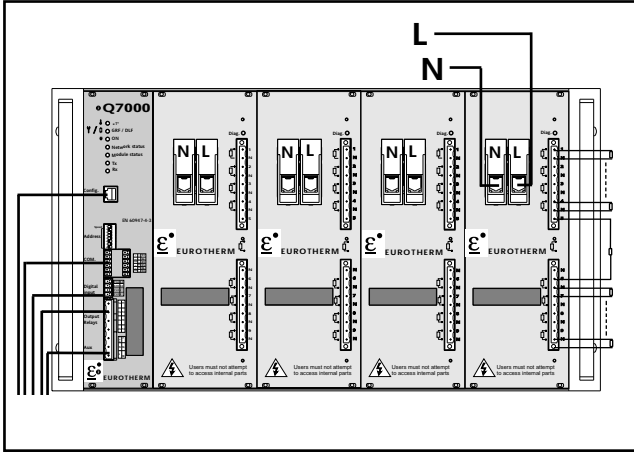


Fig2a. First Mounting Method

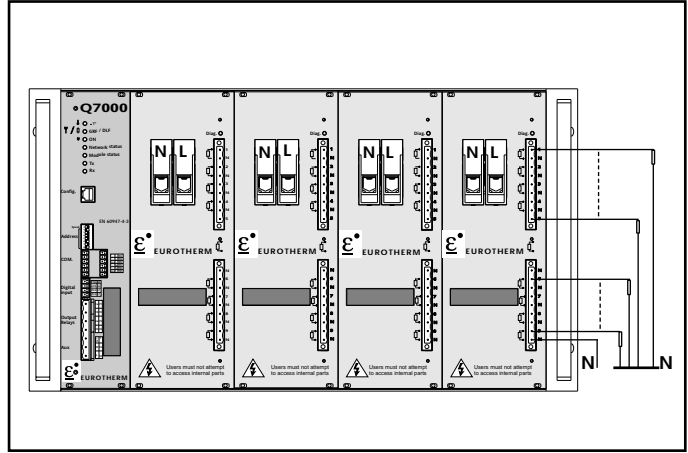


Fig2b. second Mounting Method

Only four racks can be mounted in one cabinet.

A ventilation unit must be mounted in each cabinet containing from 1 to 4 racks.

The ventilation unit must always deliver for each rack's output a maximal temperature of 40°C for 11 A.

Each rack must have its protective earth line connected to the cabinet, also connected to the protective earth.

Wires must follow the rack's side for ventilation purpose.

CONNECTIONS

POWER TERMINAL

Only use copper cables and wires rated for use at 75 °C

Rating	Terminal capacity	Torque
5,6 A 11A	2,5 mm ² /13 AWG à 6 mm ² / 9 AWG	1,2 Nm

COMMAND TERMINAL

Terminal Blocks	Terminal			Capacity (Torque)
	N°	Label	Purpose	
Aux1	16	230	External 230 V aux. supply	2,5 mm ² / (0,7 Nm)
	18	N	Neutral	
	17	115	External 115 V aux. supply	14 AWG

Conductor cross-sections should comply with IEC 943.

WIRING

Wiring principal :

400/440/460 V :

Three wires and neutral

230/254/265 V :

Three wires (Three racks)

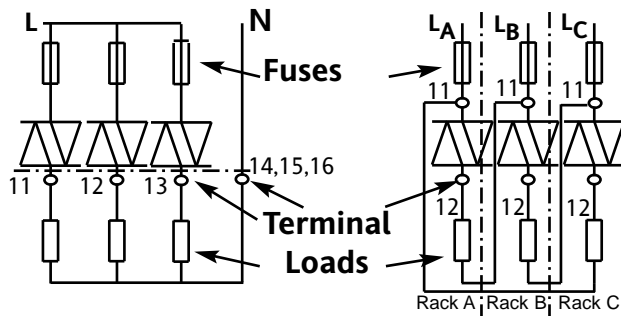


Fig4. Wiring according to the input voltage

SAFETY DURING USE

- Eurotherm shall not be held responsible for any damage, injury, losses or expenses caused by inappropriate use of the product or failure to comply with these instructions.
- The protective earth must be connected before all other connections and disconnected last.
- The fuses only protect the wiring. It is essential to protect the installation and ensure electrical separation, in compliance with applicable standards.
- Users must not attempt to access internal parts. Disconnect the unit before disassembly.
- Avoid touching the heatsink within 15 minutes of switching off.

Fuse reference

Rating	Fuse
20 A	CSI76920U020

Eurotherm's policy of continuous product improvement and development means that the specifications in this document may be modified without prior notice.

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