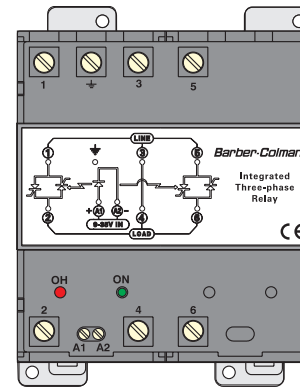




# INSTRUCTION MANUAL

1402-IN-011-0-00  
November 1999



## Model 7PE Power Control

An Invensys Company

Model No 07PE □ - □ □ □ □ □ - □ 0 0 - 0 0  
 Field No. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

**Field 1. RESERVED**

**Fields 2, 3, 4. BASE MODEL**

7PE - Three Phase, SCR, On-Off, Vdc Input

**Fields 5, 6, 7. LOAD AMPERES**

020 - 20 Amps  
 040 - 40 Amps  
 060 - 60 Amps

**Fields 8, 9, 10. LOAD VOLTAGE**

400 - 1200 V Peak Reverse  
 600 - 1600 V Peak Reverse

**Field 11. THERMAL PROTECTION**

0 - None  
 1 - Overheating Protection

**Fields 12 through 15. RESERVED**

## Contents

ASSEMBLING .....	3
MECHANICAL DIMENSIONS .....	4
GENERAL ASSEMBLING INFORMATION .....	5
WALL MOUNTING .....	7
OMEGA DIN RAIL MOUNTING .....	7
CONNECTION DIAGRAMS .....	8
GENERAL NOTES FOR WIRING .....	8
CONNECTION .....	11
GENERAL SPECIFICATIONS .....	12
CHARACTERISTICS OF 7PE MODELS .....	13
MAINTENANCE .....	14

## ASSEMBLING

### WARNINGS:

- 1) The correct functionality of these devices is guaranteed only if transport, storage, installation, wiring, working environment and maintenance are executed in compliance with this manual.
- 2) The protection degree of these devices is equal to IP 20 (according to CEI EN 60529) and they are connected to dangerous power lines. For these reasons:
  - installation, wiring and maintenance must be executed by qualified personnel;
  - all warnings contained in this manual must be complied.
- 3) Do not execute any dielectric strength or insulation resistance test on the power terminals.  
These type of tests could damage the power semiconductors.
- 4) Circuit-breaker:
  - a switch or circuit-breaker shall be included in the building installation;
  - It shall be in close proximity to the equipment and within easy reach of the operator;
  - it shall be marked as the disconnecting device for the equipment.**NOTE:** a single switch or circuit-breaker can drive more than one device.
- 5) Before working on the load or its connections, disconnect the device from the power line by the circuit breaker.
- 6) During continuous operation, the heat sink could reach a temperature higher than 80 °C (176 °F) Before executing any operation to the device, you must be sure that its temperature is decreased to an acceptable value.
- 7) For placing the device, choose a cleaned position, easy to reach, and possibly without vibration.
- 8) The ambient temperature must be between 0 °C and 50 °C (32 to 122 °F).

## MECHANICAL DIMENSIONS

Dimensions in inches  
(millimeters in parenthesis)

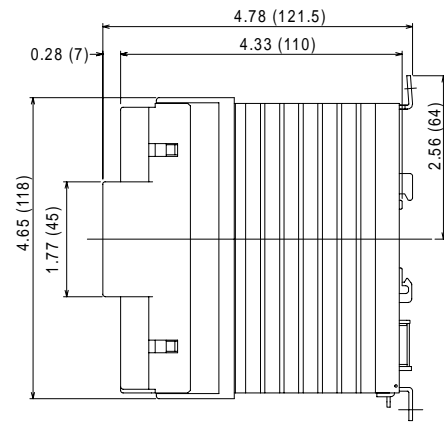
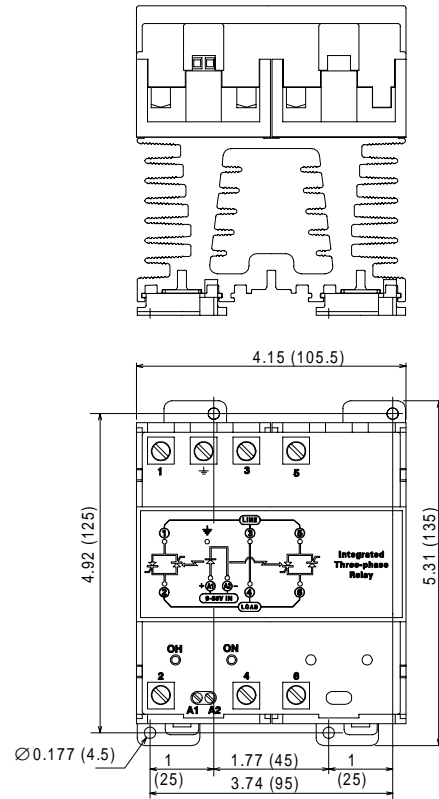


Fig. 1



**GENERAL ASSEMBLING INFORMATION**

1) These devices must be assembled vertically or with a maximum inclination of 20°.

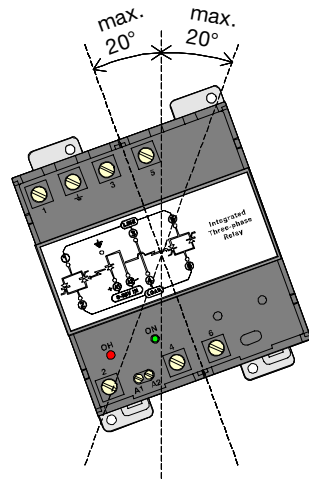


Fig. 2

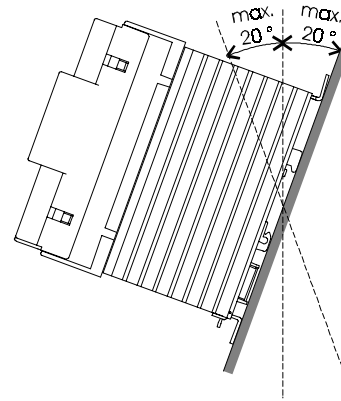


Fig. 3

2) In order to allow a sufficient heat dissipation, these devices must be spaced 4 inches (100 mm) from the bottom and 6 inches (150 mm) from the cabinet or any other element -- i.e., raceway -- which can compromise the air flow.

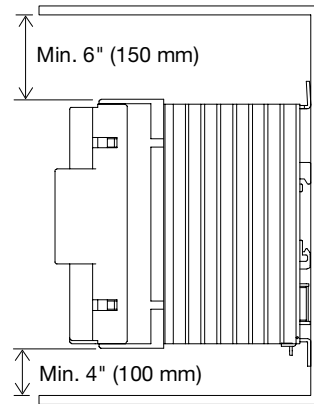


Fig. 4

3) The manufacturer strongly recommends against placing one or more devices directly above another, but, if necessary, the distance between the two devices must be longer than 15-3/4 inches (400 mm).

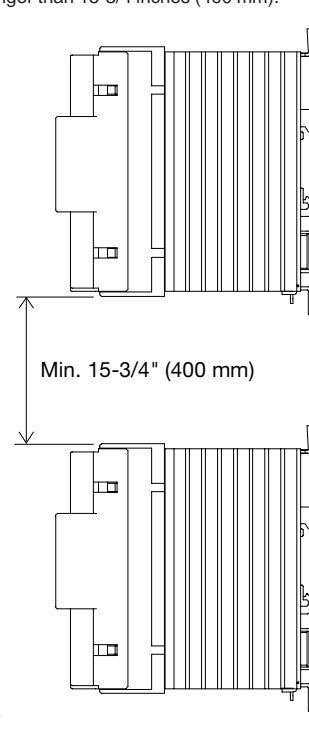
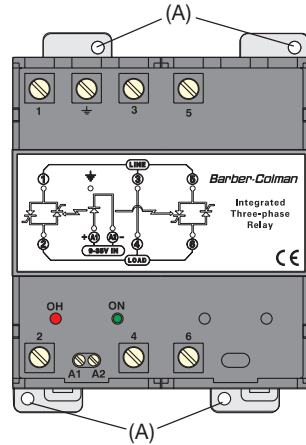


Fig. 5

The device can be mounted either on wall or on a DIN rail.

**WALL MOUNTING**

For wall mounting you can use the (A) holes.



**DIN RAIL MOUNTING**

For rail mounting use an DIN rail in accordance with EN 50 022 (35 x 7.5 mm or 35 x 15 mm) regulations.

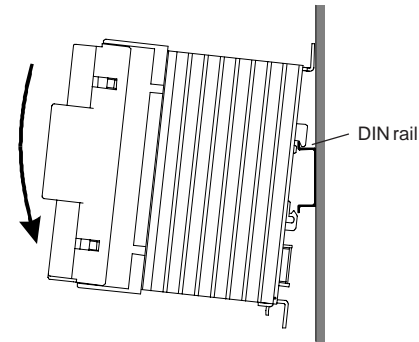


Fig. 6

In this case it is advisable to use four M4 screws with a torque of 8.85 Lbf.-in. (1Nm).

For the mounting template and the mechanical dimensions see Fig. 1.

## REMOVING

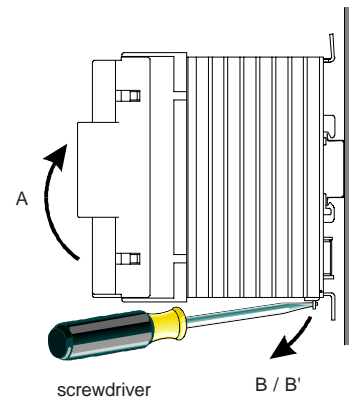


Fig. 7

The device is locked on a DIN rail in two points. When it is desired to remove it proceed as follows (see Fig. 7):

- 1) turn and maintain the device up (A),
- 2) unlock one of the two locks by a screwdriver (B);
- 3) Unlock the second lock by a screwdriver (B');
- 4) slip the device out of its place.

## CONNECTION DIAGRAMS

### GENERAL NOTES FOR WIRING

#### WARNINGS:

- 1) The wiring must be executed only when the device is placed on its proper location.
- 2) Before connecting the device, you must ensure that the power line voltage value is not more than the nominal value reported on the device's identification label.
- 3) Before connecting the device, you must ensure that the current absorbed by the load (see **Power  $\Rightarrow$  nominal current conversion** paragraph) is not more than the device nominal current as a function of the ambient temperature and the Duty cycle (see **Trend of the nominal current in relation with the ambient temperature and duty cycle** paragraph).
- 4) Before executing any operations, be absolutely sure that the device is disconnected from the power line through the circuit breaker.
- 5) Use copper wires only.
- 6) The + (terminal A1) and - (terminal A2) marks are indicative only.
- 7) The power input **IS NOT** fuse protected; so it is necessary place an external fuse selected from among the types shown in Table 1.

#### NOTE:

The Manufacturer decline any responsibility for injury and/or property damage if NO fuse or fuse not included in Table 1 is used.

The warranty validity also depends on it.

**Table 1**

Control Model	Fuse	
	Manuf.	model
20 - 400	Ferraz	6600.CP.URGA.22X58/32
	Bussmann	FWP32A.22F
	Gould	52443
40 - 400	Ferraz	6600.CP.URGA.22X58/50
	Bussmann	FWP50A.22F
	Gould	53251
60 - 400	Ferraz	6600.CP.URGA.22X58/80
	Bussmann	FWP80A.22F
	Gould	53259
20 - 600	Ferraz	6600.CP.URD.22X58/32
40 - 600	Ferraz	6600.CP.URD.22X58/50
60 - 600	Ferraz	6600.CP.URD.22X58/80

8) For connecting the devices to the power line, use appropriate sized wires with 75 °C (167 °F) minimum temperature rating. The following table shows the recommended size:

Nominal current	φ wires (mm <sup>2</sup> )	AWG
20 A	4	12
40 A	10	8
60 A	16	6

- 9) The torque for tightening the terminals 1, 2, 3, 4, 5, 6 and earth is:  
 max = 17.7 Lbf.-in. (2 Nm)  
 advisable = 13.28 Lbf.-in. (1.5 Nm)
- 10) The torque for tightening the terminals A1 and A2 is:  
 max = 4.43 Lbf.-in. (0.5 Nm)  
 advisable = 2.93 Lbf.-in. (0.33 Nm)

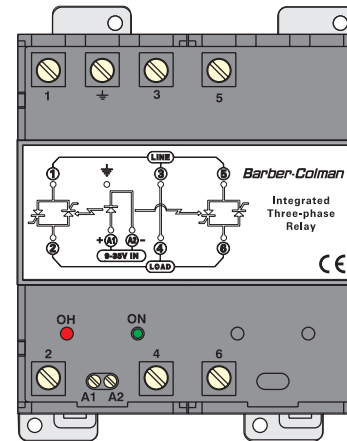


Fig. 8 TERMINAL BLOCK



**Power ⇒ nominal current conversion**

In order to have a quick check of the device working conditions, we provide you the formula to calculate the nominal current for each device in relation to the total power.

**Notes:**

- 1) Only a resistive load must be applied to the device, so in the following formula the  $\cos \phi$  will be considered equal to 1.
- 2) The formula is referred to a balanced 3-phase system only.

$$I_{RMS} = \frac{P}{\sqrt{3} \cdot V_{RMS}}$$

where:

P = Total load power (in Watts).

$V_{RMS}$  = **phase to phase** voltage (in Volts)

$I_{RMS}$  = nominal current (in Amperes)



**CONNECTION**

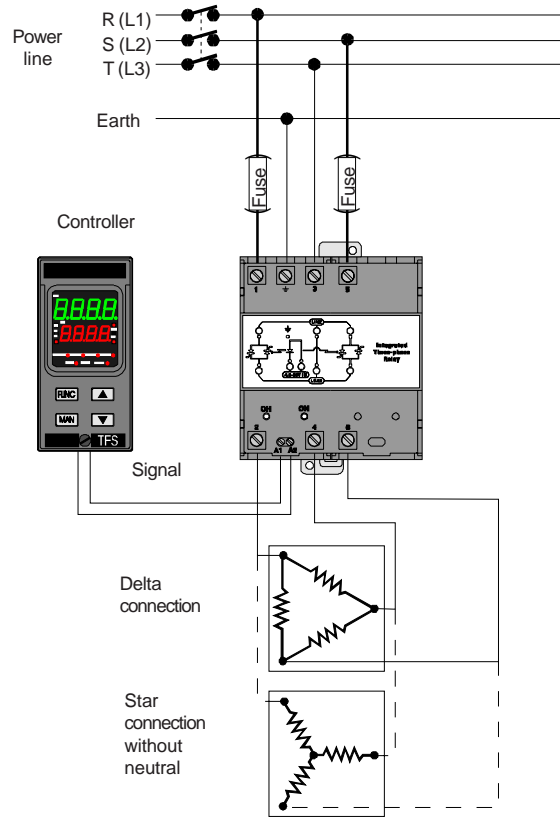


Fig. 9

## GENERAL SPECIFICATIONS

**Mounting:** rear-of-board on wall or DIN rail.

**Terminals:** screw terminals with front access.

**Load type:** resistive.

**Min. holding current:** 50 mA RMS.

**Leakage current:** 10 mA RMS.

**Min. latching voltage:** 20 V

**Voltage drop on SCR:** 1.2 V

**Rated control voltage:**

OFF state = 0 to 4 V DC

ON state = 9 to 35 V DC

**Input type:** Constant current (15 mA).

**Insulation:**

- between power circuit and earth:
  - 3000 V RMS for 1 minute.
- between command and power circuits:
  - 7500 V pk for 1 minute.

**Insulation resistance:** > 100 M $\Omega$  at 500 V DC.

**Operational temperature:** from 0 to 50 °C  
(from 32 to 122 °F).

**Humidity:** from 20 % to 85 % RH non condensing.

**Storage temperature:** from - 20 to + 70 °C (-4 to 158 °F)

**Protection:** IP 20.

## Thermal protection

when the heat sink temperature exceeds the threshold of the thermal protection, a circuit-breaker inhibits the command signal and enables the LED OH indication.

When the heat sink temperature goes under the threshold of the thermal protection minus hysteresis, the command signal is enabled again and the OH LED is turned OFF.

## CEMARKING

This device is conforming to the 89/336/EEC and 93/68/EEC council directives for Electromagnetic compatibility (reference harmonized standard EN-50081-2 for Emissions and EN-50082-2 for Immunity) and to the 73/23/EEC and 93/68/EEC for Low Voltage (Standard reference UL508 part VIII and CEI EN 50178).

**Installation category:** II

**Pollution Degree:** 2

**CHARACTERISTICS OF 7PE MODELS**

MODEL	Amp. - V	Amp. - V	Amp. - V
CHARACTERISTICS	20 - 400	40 - 400	60 - 400
Nominal voltage	480 V	480 V	480 V
Nominal current (@ 50 °C)	20 A	40 A	60 A
Non-rep. surge current	280 A	400 A	1200 A
I <sup>2</sup> t for fusing (10 ms)	550	860	10180
Non-rep. peak voltage	1300 V	1300 V	1300 V
ΔV/Δt	500 V/μs	500 V/μs	500 V/μs
PRV	1200 V	1200 V	1200 V
Total power dissipation (I = I <sub>nom</sub> )	50 W	90 W	130 W
Weight	1800 g	1800 g	1800 g

MODEL	Amp. - V	Amp. - V	Amp. - V
CHARACTERISTICS	20 - 600	40 - 600	60 - 600
Nominal voltage	600 V	600 V	600 V
Nominal current (@ 50 °C)	20 A	40 A	60 A
Non-rep. surge current	280 A	400 A	1200 A
I <sup>2</sup> t for fusing (10 ms)	550	860	10180
Non-rep. peak voltage	1700 V	1700 V	1700 V
ΔV/Δt	1000 V/μs	1000 V/μs	1000 V/μs
PRV	1600 V	1600 V	1600 V
Total power dissipation (I = I <sub>nom</sub> )	50 W	90 W	130 W
Weight	1800 g	1800 g	1800 g

## MAINTENANCE

### WARNING:

- 1) Before executing any maintenance operation on the device, on the load or on their connections, disconnect the device from the power line by a mechanical circuit breaker.
- 2) The protection degree of these devices is equal to IP 20 (according to CEI EN 60529) and they are connected to dangerous power lines, for these reasons:
  - installation, wiring and maintenance must be executed by qualified personnel;
  - all warnings contained in this manual must be complied.
- 3) Do not execute any dielectric strength or insulation resistance test on the power terminals. These type of tests could damage the power semiconductors.
- 4) During continuous operation, the heat sink could reach a temperature higher than 80 °C (176 °F) Before executing any operation on the device, you must be sure that its temperature is decreased to an acceptable value.

## MAINTENANCE

- 1) REMOVE POWER FROM THE DEVICE BY USING A MECHANICAL CIRCUIT BREAKER
- 3) Using a vacuum cleaner or a compressed air jet (max. 5 kg/cm<sup>2</sup>) remove all deposit of dust and dirt which may be present on the heat sink and on the terminals.
- 4) To clean external plastic or rubber parts use only a cloth moistened with:
  - Ethyl Alcohol (pure or denatured) [C<sub>2</sub>H<sub>5</sub>OH] or
  - Isopropil Alcohol (pure or denatured) [(CH<sub>3</sub>)<sub>2</sub>CHOH] or
  - Water (H<sub>2</sub>O)
- 5) Verify that there are no loose terminals (see paragraph **GENERAL NOTES FOR WIRING**).
- 6) Before switching ON the power, be sure that the device is perfectly dry.
- 7) Turn the power ON.



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