# Maintenance Manual

# B-080/B-085

Thermo King Europe • Monivea Road • Mervue, Galway • Ireland

**The maintenance information in this section covers R-134a unit models:**

**B-080 (C204Y) 12V P/N 10205535**
**B-080 (C204Y) 24V P/N 10205536**
**B-085 (C204Y) 12V P/N 10205537**
**B-085 (C204Y) 24V P/N 10205538**

**For further information refer to the common section TKSP 031.**

**The information in this section is provided to assist owners, operators and service people in the proper upkeep and preventive maintenance of Thermo King units. For detailed descriptions of Thermo King refrigeration systems, see Thermo King Refrigeration Systems Maintenance Manual.**

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# Table of Contents

# 1 SPECIFICATIONS

## 1.1 REFRIGERATION SPECIFICATIONS

| | | |
|---|---|---|
| Compressor: | | FRASCOLD C-204Y |
| Compressor Oil Charge: | | 150 cc |
| Compressor Oil Type: | | Polyol Ester P/N 203-413 |
| Refrigerant Charge and Type: | B-080 | 0.75 kg, R-134a |
| | B-085 | 0.75 kg, R-134a |
| Defrost Method: | | Hot gas |
| Defrost Termination Switch: | Opens | 8.9 ± 3°C |
| | Closes | 2.2 ± 3°C |
| High Pressure Cutout Switch: | Opens | 2068 -0/+172 kPa (300 -0/+25 psi) |
| | Closes | 379 ± 138 kPa (200 ± 20 psi) |
| Defrost Timer: | | Initiation Interval: from 1 minute to 10 hours<br>Termination when defrost termination switch opens. |

***CAUTION!***

**When the oil is removed from the compressor, oil level should be noted so that the same level can be maintained in the replacement compressor.**

***Polyol Ester compressor oil should be used in standard Thermo King units. PAG-type or mineral oils should not be added to systems using R-134a or R-404A.***

# 2 ELECTRICAL SYSTEM

## 2.1 ELECTRICAL SYSTEM

| | Voltage | Power Rating in W | Full Load rpm | Full Load Current |
|---|---|---|---|---|
| Condenser Fan | 13 V | 100 | 2800 | 62 A |
| Condenser Fan | 26 V | 100 | 2800 | 3.7 A |
| Evaporator Fan (SLE Evaporator) | 13 V | 100 | 2800 | 6.2 A |
| Evaporator Fan (SLE Evaporator) | 26 V | 100 | 2800 | 3.7 A |

### Compressor Motor

| Voltage | Power Rating in W | Full Load rpm | Full Load Current |
|---|---|---|---|
| 12 V | 550 | 1800 | 58 A |
| 24 V | 550 | 1800 | 29 A |

### Fuses PCB P.E.-8

| Unit | Voltage | Transf. Fuse 1 | Std-by Fuse 2 | Coils Fuse 3/1 | Circuit Breakers | | Evap. Fan Fuse 3/3 | M-12B Gral. Fuse 4 | Fuse 5 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | CB1 | CB2 | | | |
| B-085 | 12 V | 5 A | 3 A | 10 A | 80 A | 80 A | 15 A | 1 A | — |
| | 24 V | 5 A | 3 A | 5 A | 60 A | 60 A | 10 A | 1 A | — |

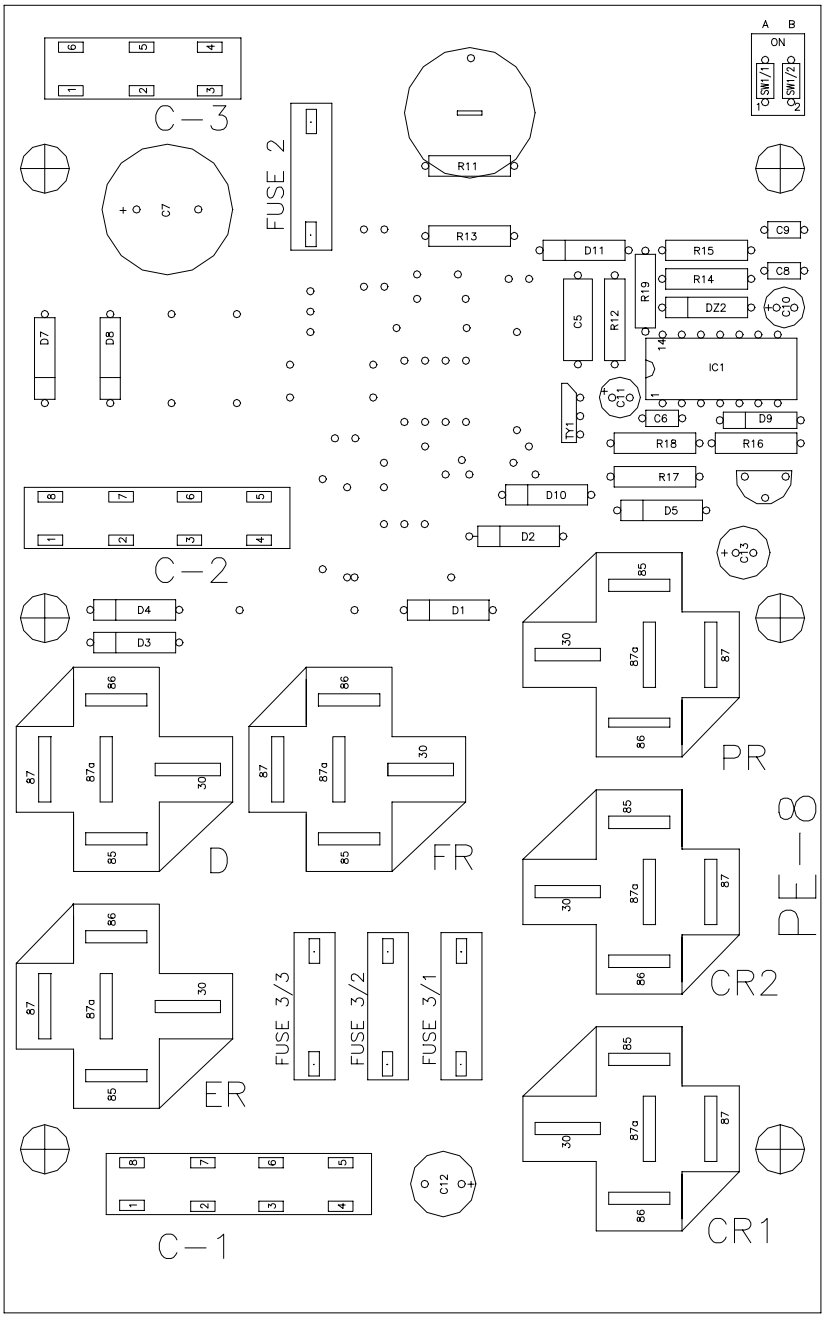
### Fuses PCB P.E.-15

| Unit | Voltage | Evap. Fan Fuse 1 | Coil Fuse 3 | Circuit Breakers | | Std-by Fuse 4 | M-12B Fuse 4/1 | Transf. Fuse 5 |
|---|---|---|---|---|---|---|---|---|
| | | | | CB1 | CB2 | | | |
| B-085 | 12 V | 15 A | 10 A | 80 A | 80 A | 3 A | 1 A | 4.15 A |
| | 24 V | 10 A | 5 A | 60 A | 60 A | 3 A | 1 A | 4.15 A |

### Hot Gas Solenoid Coils

| Voltage | Current | Resistance |
|---|---|---|
| 12 V | 2.3 A | 5.2 Ω |
| 24 V | 1.3 A | 20 Ω |

# 3 ELECTRIC BOARD (WITH P.C. BOARD P.E.-8)




## 3.1 P.C. BOARD

All Printed Circuit Boards manufactured by Thermo King can be easily identified by the P/N stamped on them.

Even though all P.C. Boards have a similar layout, there are some differences from one to the others, depending on the unit model and which functions they carry out (12/24V).

## 3.2 CONNECTORS

All connector codes (C-1, C-2 & C-3) are stamped on the P.C. Board.

Pins on connectors are numbered counter-clockwise (see drawing).

— C-1 & C-2 (8 Pin)

— C-3 (6 Pin)

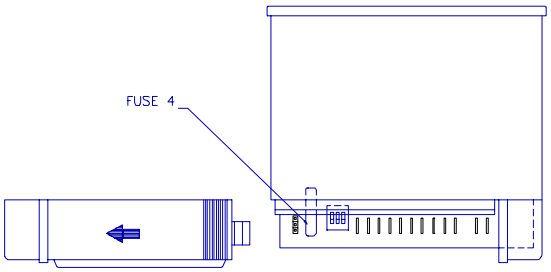
## 3.3 COMMON FUSES

The fuses 3/1, 3/3 are located on the P.C. Board.

**Fuse 3/1:** Protects power relays and Defrost Solenoid Coil (when defrost is energized) from overload.

**Fuse 3/3:** Protects Evaporator Fan Motors from overload.

**Fuse 4:** Protects Cab Control box from overload. It is located inside Cab Control Box.




## 3.4 STAND-BY FUSES

**Fuse 1:** Protects Transformer from overload. It is located on the Electric Box. It is located beside the P.C. Board.

**Fuse 2:** Protects Cab Control Box and Relays CR & ER when the unit is working on Stand-by mode operation. It is located inside the P.C. Board.

**Fuse 5:** Protects condenser fan from overload. Only in B-085.

***NOTE: Refer to Electrical System (Section 2) for fuse rating.***

## 3.5 COMMON RELAYS

All of them are located on the P.C. Board.

### PR: Power Relay

Is energized when the Cab Control Box ON/OFF Switch is pressed (Unit Start) and the box temperature is higher than the setpoint temperature.

### EFR: Evaporator Fan Relay

When battery or power cord is connected EFR energizes, turning on Evaporator Fan Motor. It can be de-energized by defrost relay.

### D: Defrost Relay

It controls operation of the defrost cycle.

The Defrost Relay is energized when the Cab Control Defrost Switch or the defrost timer completes the cycle.

Defrost Relay will remain energized until the defrost process is terminated by the Defrost Termination Switch (DK) or the Cab Control Box ON/OFF Switch is pressed twice.

### PRB: Power Relay Battery

When energized turns on the DC motor and condenser fan through the battery supply. It is located beside the P.C. Board.

## 3.6 STAND-BY RELAYS

All of them are located on the P.C. Board.

### CR: Commutation Relay

When energized changes from Battery Supply to Power Cord Supply.

### ER: Electric Stand-By Relay

When ER is energized it energizes the power relay cord (PRC). If not, it energizes the power relay battery (PRB).

### PRC: Power Relay Cord

When energized turns on the DC motor and condenser fan by mean of the power cord supply. It is located beside the P.C. Board.

## 3.7 CIRCUIT BREAKERS

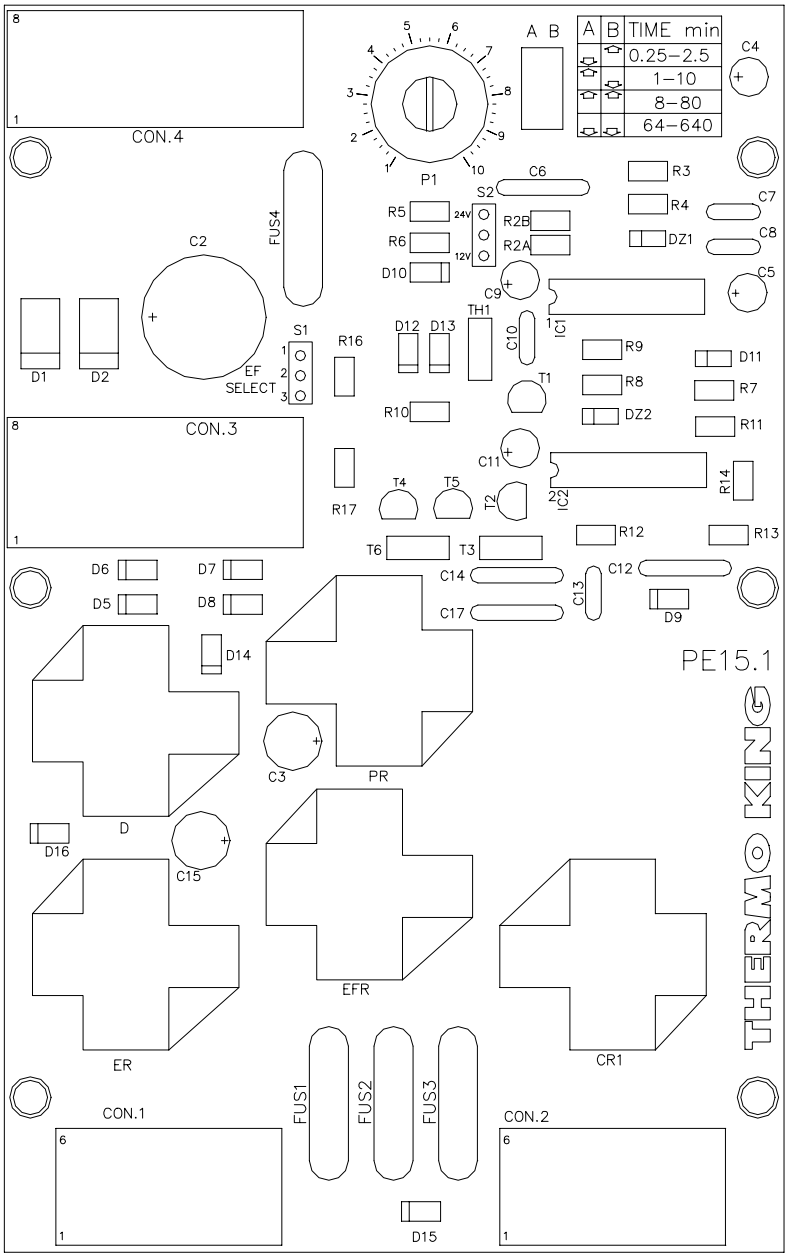
### CB1: Circuit breaker 1

Protects electric circuitry (except the cab control box) from DC overload. It is located into the truck.

### CB2: Circuit breaker 2

Protects electric circuitry (except the cab control box) from DC overload. It is located beside the P.C. Board.

# 4 ELECTRIC BOARD (WITH P.C. BOARD P.E.-15)




## 4.1 P.C. BOARD

All Printed Circuit Boards manufactured by Thermo King can be easily identified by the P/N stamped on them.

Even though all P.C. Boards have a similar layout, there are some differences from one to the others, depending on the unit model and which functions they carry out (12/24V).

## 4.2 CONNECTORS

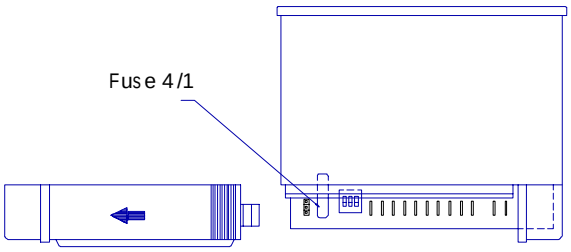
All connector codes (C-1, C-2 & C-3) are stamped on the P.C. Board.

Pins on connectors are numbered counter-clockwise. (see drawing)

— **C-1 & C-2** (6 Pin)

— **C-3 & C-4** (8 Pin)

## 4.3 COMMON FUSES




The fuses 1,3 are located on the P.C. Board.

**Fuse 1:** Protects Evaporator Fan Motors from overload.

**Fuse 3:** Protects Defrost Solenoid Coil (when defrost is energized) from overload.

**Fuse 4/1:** Protects Cab Control box from overload. It is located inside Cab Control Box.

## 4.4 STAND-BY FUSES (ON STAND-BY UNIT B-085)

**Fuse 4:** Protects Cab Control Box and Relays CR & ER when the unit is working on Stand-by mode operation. It is located on the P.C. Board.

**Fuse 5:** Protects Transformer from overload. It is located on the Electric Box. It is located beside the P.C. Board.

***NOTE: Refer to Electrical System (Section 2) for fuse rating.***

## 4.5 COMMON RELAYS

All of them are located on the P.C. Board.

### PR: Power Relay

Is energized when the Cab Control Box ON/OFF Switch is pressed (Unit Start) and the box temperature is higher than the setpoint temperature.

### EFR: Evaporator Fan Relay

When battery or power cord is connected EFR energizes, turning on Evaporator Fan Motor. It can be de-energized by defrost relay.

### D: Defrost Relay

It controls operation of the defrost cycle.

The Defrost Relay is energized when the Cab Control Defrost Switch or the defrost timer completes the cycle.

Defrost Relay will remain energized until the defrost process is terminated by the Defrost Termination Switch (DK) or the Cab Control Box ON/OFF Switch is pressed twice.

### PRB: Power Relay Battery

When energized turns on the DC motor and condenser fan through the battery supply. It is located beside the P.C. Board.

## 4.6 STAND-BY RELAYS (ON STAND-BY UNIT B-085)

All of them are located on the P.C. Board.

### CR: Commutation Relay

When energized changes from Battery Supply to Power Cord Supply.

### ER: Electric Stand-By Relay

When ER is energized it energizes the power relay cord (PRC). If not, it energizes the power relay battery (PRB).

### PRC: Power Relay Cord

When energized turns on the DC motor and condenser fan by mean of the power cord supply. It is located beside the P.C. Board.

## 4.7 CIRCUIT BREAKERS

### CB1: Circuit breaker 1

Protects electric circuitry (except the cab control box) from DC overload. It is located into the truck.

### CB2: Circuit breaker 2

Protects electric circuitry (except the cab control box) from DC overload. It is located beside the P.C. Board.

## 4.8 S/S EFR SELECTOR

Allows the user to choose if the evaporator fan keeps running or not in NULL mode. If the jumper is between 1 and 2 the evap fan will run on NULL mode. Otherwise the fan will run the usual way.

## 4.9 ST PR

Delays Power Relay activation for 2 seconds once the load capacitors are charged. This feature reduces the peak current when the unit is started.

# 5 UNIT DESCRIPTION

## 5.1 GENERAL

The Thermo King B-080 & B-085 truck refrigeration systems are a two-piece nose/roofmounted units.

The compressor is mounted on and driven by the DC Electric Motor powered from the battery. Refrigeration hoses and tubing are used to connect the unit to the compressor.

On B-085 units the DC motor can also be powered from an internal AC power supply unit mounted in the condenser section for electric standby operation.

The units are designed for low and medium temperature applications on vans and small-sized trucks. There are two basic models:

**B-080:** Cool and defrost on DC Voltage. Chilled load.

**B-085:** Cool and defrost on DC & AC Voltage. Chilled load.

The control circuits operate on 12 or 24 V DC supplied by the truck batteries for over-the-road operation. On standby operation, the power is rectified from an AC transformer.

The cab control box contains an On-Off switch, manual defrost switch, thermometer, thermostat, thermostat adjustments, and indicator lights.

The compressor is driven by a belt from the electric motor. The motor is mounted in the condenser section. Both operation modes Battery/Stand-by use the same refrigeration system circuit. Compressor operation is controlled by the thermostat, starting the DC motor on Battery/Stand-by mode operation.

Selection of battery operation or standby operation is automatic on B-085 units. When plugged into standby power, battery operation is automatically locked out. If the truck engine is turned on while the power cord is still plugged into a power receptacle, the unit will remain working in electric mode; battery operation cannot be started until the power cord is unplugged from the unit.

The refrigeration system is protected by a high pressure cutout switch.

A hot gas solenoid valve provides defrost in the B-080 & B-085 units.

An electronic defrost timer can initiate defrost automatically. Defrost is normally terminated by the defrost termination switch mounted on the evaporator coil, but the defrost cycle can be also terminated pressing twice the ON/OFF switch.

## 5.2 UNIT FEATURES

- In cab Controller - M12B
- Digital Thermometer
- Electronic Thermostat - Adjustable:
  - — -22ºC ÷ +14ºC, or
  - — -32ºC ÷ +14ºC
- Defrost Timer
- Hot Gas Defrost
- Defrost Termination Switch
- Manual Defrost Switch
- Frascold C-204Y Compressor
- S/S EFR Selector (PCB P.E.-15)
- Start Timer (PCB P.E.-15)