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DRB 108
DEC 19-3285-1082-3-9607
VIEW "B-B"
H740-0A

SECTION B - B
SEE NOTE *3

(3 PIN CONN.)

SEE NOTE B
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**TITLE:** POWER SUPPLY (H740D)

**ASSY NO:** A PL

**SIZE CODE:** H740-D-

**NUMBER:** 0870

**REV:** H 0870

**ECC NO:** DRA 110

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*WHEN ORDERING THIS DECAL, SPECIFY WHITE ON CLEAR BACKGROUND*

**TITLE:** POWER SUPPLY (H740D)

**ASSY NO:** A PL

**SIZE CODE:** H740-D-

**NUMBER:** 0870

**REV:** H 0870

**ECC NO:** DRA 110
1.0 GENERAL DESCRIPTION

1.1 Mechanical Configuration

The part numbers below are assigned to different mechanical versions of a power supply with identical electrical characteristics and identical subassembly design. Outline drawings are appended to this specification.

1.1.1 7008731-1 and 7008731-2 Mechanical Design

These two versions differ only in the size of a self-contained fan. The 7008731-1 has a 5" fan; the 7008731-2 has a 3" fan.

Fan, transformer (DEC part #16-10601, 7008726) and regulator module (DEC part #5409728) are mounted on a single chassis which is to be bolted inside the device to be powered.
fuses to protect an externally mounted power failure detector. External forced air cooling is required. The BC05 is also used.

1.1.3 H740D Mechanical Design

The H740D is a 3¼ inch rack or door mounted version. It is completely self contained and includes a BC05 AC Input Box, the 16–10601 power transformer, an AC interconnecting cable, a 3" fan (airflow shown on outline drawing), the 5409728 DC module and a DC output cable to a chassis mounted DC output connector with sufficient fan-out for general system usage. Pin-out is shown on the outline drawing.

1.2 Electrical Configuration

This power supply converts single phase 115 or 230 V, nominal 47–63 Hz line voltage to three regulated DC output voltages. Included in the circuit are overload and over voltage protection, Bus AC LO and DC LO detectors, a real time clock square wave signal source and, in the 7008714, a 28-0-28 volt centertapped AC output for a power failure detector.

The supply is used in conjunction with the Model BC05 AC Input Box which contains line cord, circuit breaker and RFI filters. This device has several versions which determine input voltage, 115 V or 230 V, and line cord length and plug style.

A block diagram is shown in Figure 3–1 and the interconnection of the various components into a typical power system is shown in Figure 3–2.
Figure 1-1: Block Diagram of Typical System Using H740 Power Supply.
2.0 ELECTRICAL SPECIFICATIONS

2.1 Input

NOTE: Input voltage selection, 115 V or 230 V, is made by specifying the appropriate AC Input Box, DEC Model BC05. All specifications are with respect to the BC05 input.

Input Voltage (1 phase, 2 wires & ground) 90-135/180-270 V

Input Frequency 47-63 Hz

Input Current 5/2.5 Amp RMS

Input Power 325 watts at full load

Inrush 80/40 Amp peak, 1 cycle

Rise Time of Output Voltages 30 ms max. at full load, low line

Input Overvoltage Transient 180/360 V, 1 second
360/720 V, 1 millisecond

Storage After Line Failure 25 ms min., starting at low line, full load

Input Breaker (Part of AC Input Box) 7A/4A, single pole, Manually Reset, Thermal

Thermostat Mounted on Heat Sink (Opens Transformer and Fan Power) 277 V 7.2 A contacts
Opens 98-105°C Automatically Restes 56-69°C

Input Connection Line Cord on AC Input Box Length & Plug Type Specified with Box
Turn-On/Turn-Off by 
Application or removal of power.

Hipot (Input to chassis & output) 2.1K V DC, 60 seconds

2.2 Output

Output parameters are specified at the pins of
the 9-pin Male *N Lock connector (Figure 2-1)
which plugs into the output connector on the 5409728
module. IR drops in the distribution wiring should
be minimized to achieve the desired regulation
at the load. Recommended distribution loss is
3% maximum.

Regulation specified is with respect to the common
ground terminal on the output connector.

---

Pin 1 AC LO L
Pin 2 Common
Pin 3 +5 V output
Pin 4 LTCL (Clock Signal)
Pin 5 +15 V output
Pin 6 DC LO L
Pin 7 Jump to Pin 1 if output
   on Pin 8 is used. 5409728 Regulator Module
   (H740D pin-out shown on outline
   FIGURE 2-1 drawing)
Pin 8 POWER OK L
Pin 9 -15 V output

---

2.2.1 +15 V

Load Range Static 0-1 Amp
Dynamic 0-1 Amp

Max. Bypass Capacitance 500 mfd
in load for 30 ms turnon

Overvoltage Protection None

Current Limit @ 25°C 1.3 to 1.7 A (-6.2 ma/°C)

Backup Fuse 15 Amp (also used
for +5 V)

Adjustment ± 5% min.

Regulation (All causes
including line, load
ripple, noise, drift, ambient temperature)

2.2.2 +5 V

Load Range Static (50°C) 0-20 Amp (All except
Rev. Bl) Static (60°C) 0-17 Amp
Static 0-15 Amp with -15 V above
5 Amps.
Dynamic #1 ± 5 Amp within above
range.
Dynamic #2 NL<<PL

Max. Bypass Capacitance 2000 mfd
in load for 30 ms turnon

Overvoltage Crowbar (Blows fuse)
5.7 - 6.8 V

Current Limit @ 25°C
24-29.4 A (-0.1 A/°C) all
other
19.2-24 A
Rev. Bl

Backup fuse (Series
with Raw DC)
15 Amp

Adjustment Range ± 5% min.
### Regulation

- **Line**: ± 0.5%
- **Static Load**: 3%
- **Dynamic Load #1**: ± 2%
- **Dynamic Load #2**: ± 10%
- **Ripple and Noise**: 4% p-p
- **1000 Hour Drift**: ± 0.25%
- **Temperature (0-60°C)**: ± 1%

#### 2.2.3 -15 V

- **Load Range Static**: 0-5 Amp 5409728 Rev. C
- **Static**: 0-8 Amp 5409728 Rev. D
- **Static**: 0-7 Amp 5409728 YA
- **Dynamic #1**: 0.5±5 Amp (0.5A/µsec.)
- **Dynamic #2**: NL++FL (0.5 A/µsec.)

*Use MMC 4290 transformer

- **Max. Bypass Capacitance**: 1000 mfd
- **in load for 30 ms turnover**

- **Overvoltage Crowbar**: 17.5 - 20.5 V
  - (Blows fuse) (22 V abs. max. output)
- **Current Limit @ 25°C**: 6-8 Amp (-.020 A/°C) Rev. Bl and C
- **7.5-10 Amp YA**
- **10-13.3 Amp All other.**

- **Backup Fuse (Series)**
  - with Raw DC: 5 Amp Rev. Bl and Rev. C
  - 10 Amp All other

- **Adjustment Range**: ± 5% min.

### Regulation

- **Line and Static Load**: ± 1%
- **Dynamic Load #1**: ± 2.5%
- **Dynamic Load #2**: ± 3%
- **Ripple and Noise**: 3% p-p
- **1000 Hour Drift**: ± 0.25%
- **Temperature (0-60°C)**: ± 1%

#### 2.2.4 Real Time Clock Signal LTC L

- **Rated Load**: Two TTL Loads

### Engineering Specification

- **Frequency**: AC Line
- **Wave Shape**: Approximately Square Wave
- **Pulse Height**: 1.5 to 5.0 V positive
- **Baseline**: 0 to 1.0 V negative
- **Short Circuit Current**: 15 mA peak max.

#### 2.2.5 Transformer Secondary Voltage (For Power Fail Option 7008714.)

- **Output at 115/230 V**: 27.4-0-27.4 V RMS ± 5%
- **input, 0-200 ma load, full load on power supply**

#### 2.2.6 DC LO L and AC LO L

This circuit monitors two points in the charge and discharge of a capacitor which is fed from the 28-0-28 V AC input via a full wave rectifier. The capacitor charges slower than the rate of rise of the three output voltages on power turn on, but discharges faster than the output voltages on power removal. Two sequential output signals are delivered to the bus which are low for long enough for the output voltages to be within ratings on turn on and also are low soon enough to warn the bus on power removal. When the input voltage is high enough both signals are high. Hysteresis is provided to eliminate uncertain operation.
2.2.6.1 Static Performance at Full Load

High State

- DC LO L
  - 74-80 V AC
  - Goes to high
- AC LO L
  - 8-11 V higher
  - Goes to high
- AC LO L
  - 80-86 V AC
  - Drops to low
- DC LO L
  - 7-10 V lower
  - Drops to low

Hysteresis (contained in above specs)

Output voltages still 70 V AC good

2.2.6.2 Dynamic Performance

a) Worst case on power up is high line, FL.

Power on

Slowest output comes up

DC LO L

AC LO L

2 ms min.

2 ms nominal

b) Worst case on power down is low line, FL

Power Down

Fastest output goes down

AC LO L

DC LO L

25 ms min.

5 ms min.

5 ms min.

1 ms min.
2.2.6.4 POWER OK

If output connector J2 pins 1 to 7 are jumpered an alternate AC LO L signal is available on pin 8. The specifications of paragraphs 2.2.6.1 and 2.2.6.2 apply. The output characteristics are as follows:

Load Impedance See Figure 2-3
Output Impedance 105 Ω min.
Open Circuit Voltage +3.5 to +5.5 V
True
-1 to +0.5 V False
Rise and Fall Times 1 usec. max.
Load may be Active 0 to +5.25 V max.
Short Circuit Current 165 ma max.
(to ground)
5-30 ma from +5 V

FIGURE 2-3 (a) Low State Load Impedance

FIGURE 2-3 (b) High State Load Impedance

3.0 MECHANICAL AND ENVIRONMENTAL SPECIFICATIONS

3.1 Size
See outline drawing in Appendix.

3.2 Weight
See outline drawing in Appendix.

3.3 Cooling Means
7008731-1 - Integral 5" fan.
7008731-2 & 7040 - Integral 3" fan.
(covers required over heat sink to plenum air.)
7008714 - Forced air from external fan

3.4 Minimum Cooling Requirements at worst case line, load, temperature
375 LPM through heat sink
250 LPM over caps, chokes and transformer.

3.5 Rated heat sink temperature 95°C max.

3.6 Mounting
See outline drawing in Appendix.

3.7 Connections
See outline drawing in Appendix.

3.8 Shock, Non-operating
4G (duration 30 msec.) ½ Sine each of six orientations.

3.9 Vibration, Non-operating
1.096 RMS average, 8G peak: varying from 10 to 50 Hz, 8db/octave rolloff 50-200 Hz, each of six
3.10 Ambient Temperature 0 to +60°C operating. 
-40 to +71°C storage.
3.11 Relative Humidity 95% max. (without condensation)
3.12 Altitude 10K feet

4.0 APPLICABLE SPECIFICATIONS

4.1 Underwriter’s Laboratories

The provisions of UL 478 shall be met by the complete power system.
Particular attention should be paid to the following items:
- Creepage Distances.
- Hipot tests.
- Capacitor Discharge Tests.
- Flame retardant materials.
- Shock hazard requirements.
- Use of only UL approved components.
- Transformer requirements, e.g. shorted diode tests.

4.2 DEC Specifications

H740 Qualification Test DEC drawing #H740-0-3.
Production Bench Test DEC drawing #H740-0-4.

5.0 QUALITY ASSURANCE PROVISIONS

5.1 Component Selection

Components shall be good grade industrial types. Computer grade, Type 36D or better, electrolytics shall be used. Wound components shall be rated for class B operation.

5.2 Component Deratings

Max. temperature rise of wound components shall be 55°C above 60°C ambient, with cooling air of Para. 3.4.

Max. junction temperature of transistors, rectifiers and diodes shall be 150°C at 60°C ambient.

5.3 Reliability

The power supply shall have a calculated mean time between failure of greater than 30000 hours using an accepted rating method such as described in MIL STD 756 and MIL HBM 217.

6.0 MARKING, LABELS

6.1 Warning Label
A warning label should be provided on the outside of the major assembly in which the power supply is mounted which restricts servicing to qualified service personnel.

6.2 Power Control Labelling

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<td>190-270 Volts</td>
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<td>5 Amperes</td>
<td>2.5 Amperes</td>
</tr>
<tr>
<td>47-63 Hz</td>
<td>47-63 Hz</td>
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H400A Breaker Button stamped 7A by Manufacturer.
H400B Breaker Button stamped 5A by Manufacturer.

6.3 Labelling on Device Being Powered

a) NFPA Type 2 Standard Decal.
b) U.L. Label.
c) Model Number.
d) Serial Number.

6.4 Subassembly Marking

Shall be sufficient to identify the subassembly.
Minimum marking shall be the DEC part #.

7.0 Revisions

7.1 This is Revision A, prior to ECO control.
7.2 This is Revision B, prior to ECO control.
OUTLINE DRAWING
7008731-1 and 7008731-2

17 1/2 lbs.
APPROX. WEIGHT
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      1.1.2 7008714 Mechanical Design
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   FIGURE 1-3: H740D Block Schematic

2.0 Electrical Specifications
   2.1 Input
   2.2 Output

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2.2.6.3 Output Characteristics

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2.2.6.4 POWER OK L

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3.0 Mechanical and Environmental Specifications

4.0 Applicable Specifications
   4.1 Underwriter's Laboratories
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   5.1 Component Selection
   5.2 Component Deratings
   5.3 Reliability

6.0 Marking, Labels
   6.1 Warning Label
   6.2 Input Power Rating Label
   6.3 Subassembly Marking

7.0 Revisions

APPENDIX: Outline Drawings of Various Versions of H740.