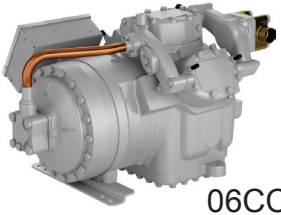
SERVICE GUIDE

06D, 06E and 06CC

SEMI-HERMETIC RECIPROCATING COMPRESSORS

06D

06E



06CC

Carlyle®

WHAT THIS GUIDE CAN DO FOR YOU

Carlyle Compressor Company provides this guide to aid the service specialist in proper installation, service, and maintenance of 06D, E, CC compressors. Following the procedures in this guide will extend the life of the system and improve performance.

This guide uses the terms DANGER, WARNING and CAUTION. These terms have specific meanings that identify the degree of hazard. Typically in the HVAC industry, these specific meanings are:

⚠ DANGER

There is an immediate hazard which WILL result in severe personal injury or death.

⚠ WARNING

Hazards or unsafe practices which COULD result in severe personal injury or death.

⚠ CAUTION

Potential hazards or unsafe practices which COULD result in minor personal injury or equipment damage

CARLYLE COMPRESSOR THANKS YOU
FOR SELECTING OUR EQUIPMENT

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HOW TO USE THIS GUIDE

This book is divided into six major sections (see Table of Contents):

SECTION 1.0 - General Compressor and Customer Information

SECTION 2.0 - Start-Up, Troubleshooting, and Service

SECTION 3.0 - Compressor Parts Data

SECTION 4.0 - Electrical Data

SECTION 5.0 - Compressor Service Worksheets

SECTION 6.0 - SMART CONTROLLER and PWM VALVE

An Index is provided in the back of this guide.

TO GET MORE HELP

Carlyle Compressor Company sells compressors to Carrier for use in their packaged units and to OEMs (Original Equipment Manufacturers) that design and build finished systems. The system manufacturer is the expert on the system, including the application of our compressor. All questions, on either the packaged system or the compressor in that system, should be first directed to the local Carrier distributor (for Carrier systems) or the OEM or its local representative (for other units). If this support, along with this service guide, cannot resolve your compressor problem, please contact our Carlyle engineering group.

CONTENTS

1.0 — GENERAL COMPRESSOR AND CUSTOMER INFORMATION

1.1 — Compressor Model Number Significance

06D COMPRESSORS

0 6 D R 3 3 7 0 D A 3 6 5 A — (RP)*

Model = 0, Package = 1 or 9, A = Shipped Without Oil

Oil and Refrigeration (06DR, DM) Unloading Variable:
- 0 = All Models Except as Noted
- 5 = No Oil
- Y = Smart Unloading Models

Suction Cut-Off Unloading Designation for 06DR, DM Compressors:
- 7 = 1 Unloader Elec. (DR, DM Only)
- 8 = 2 Unloaders

Electrical Characteristics (XL Start Only, Unless Noted):

H.E. Models	S.E. Models	
31 = 575-3-60	01 = 575-3-60	12 = 208/230-3-60
32 = 208/230-3-60	04 = 200-3-60	13 = 380-3-60
33 = 208/230-1-60	05 = 230-3-60	14 = 200-3-60 (PW)
34 = 220-3-50	06 = 400/460-3-50/60	15 = 230-3-60 (PW)
36 = 400/460-3-50/60	08 = 220-3-50	18 = 220-3-50 (PW)
37 = 380-3-60		

Electrical Variables:

Electronic Overcurrent Protection:
- 0 = None
- 1 = 115/240v Control Voltage, Electronic Overcurrent Protection
- 2 = 24VAC Control Voltage, Electronic Overcurrent Protection
- 3 = 24VDC Control Voltage, Electronic Overcurrent Protection

Electromechanical Overcurrent Protection:
- A = With Internal Thermostat and External Overloads
- C = With Internal Thermostat and Without External Overloads

Suction Valve — Variables: Location, Orientation and Mounting Bolts

Compressor Identification Key:
- 0 = New Compressor
- 2 = New Compressor
- 3 = New Compressor
- 6 = Service Compressor, Remanufactured
- 7 = Service Compressor, New Manufactured
- 8 = New Compressor, Special
- 9 = Service Compressor, Special
- S = Oil Sensor Block and OPSS Sensor
- F = Remanufactured with OPSS

Displacement (in cfm at 1750 rpm)

Motor Size (Does Not Signify Horsepower)

Compressor Type:

06DA = Compressor — A/C Duty	No Unloading	
06DB = Compressor — A/C Duty	1-Step Elec.	Hot Gas Bypass Unloading
06DC = Compressor — A/C Duty	2-Step Elec.	
06DD = Compressor — A/C Duty	1-Step Press.	
06DE = Compressor — A/C Duty	2-Step Press.	
06DF = Compressor — A/C Duty	1-Step Elec.	Suction Cut-Off Unloading
06DG = Compressor — A/C Duty	2-Step Elec.	
06DH = Compressor — A/C Duty	1-Step Press.	
06DJ = Compressor — A/C Duty	2-Step Press.	
06DK = Compressor — A/C Duty	1-Step Elec. and 2-Step Press.	
06DM = Compressor Refrig. Duty	Medium Temperature	
06DR = Compressor Refrig. Duty	Low Temperature	

06DM = Service Compressor — Replacement for new 06DA, DM without unloading

06DS = Service Compressor — Replacement for new 06DF,G,H and J with suction cut-off unloading. Compressor has 1-stage suction cut-off unloading.

06DX = Service Compressor-Replacement for new 06DB,C,D, and E with hot gas (bypass) unloading. Compressor has 1-stage of bypass unloading.

*Refrigeration Partner

Information in shaded area is no longer available in standard factory production

06E COMPRESSORS

06ER 3 99 3 0 A — (RP)*

Model = 0, Package = 1 or 9, A = Shipped Without Oil

Design Variable:

New Compressors
0 = OEM Model
1 = Carrier A/C Model
2 = Old Design Refrigeration Valve Plates
6 = Carrier A/C Model
9 = Cemak Model
S = Oil Sensor Block and OPSS Sensor (STD Ctr Head)†
T = Oil Sensor Block and OPSS Sensor (REV Ctr Head)**

Service Compressors
2 = New Manufactured (A/C)
4 = Remanufactured (Low Temp.)
6 = Remanufactured (A/C)
7 = Remanufactured (Med Temp.)
D,F,G =Remanufactured with OPSS (LT,HT, MT)

Electrical Characteristics (XL and PW Start, Unless Noted):
0 = 208/230-3-60
1 = 575-3-60
3 = 208/230/460-3-50/60 (460v XL Only)
4 = 200-3-60
5 = 230-3-60
6 = 400/460-3-50/60
8 = 230-3-50
9 = 220/380-3-60

Displacement (in cfm at 1750 rpm)

Design Configuration
0, 1, 2 = Models With Oil
3, 4, 5 = Models Without Oil
7 = 1 Unloader, Suction Cut-off, Oil-less (ER, EM Only)
8 = Special Order
Y = SMART Unloading Model

Compressor Type:

STD†	REV**			
06EA	06EF	Compressor — A/C Duty	No Unloading	
06EB	06EJ	Compressor — A/C Duty	1-Step Elec.	Hot Gas Bypass Unloading
06EC	06EK	Compressor — A/C Duty	2-Step Elec.	
06ED	06EL	Compressor — A/C Duty	1-Step Press.	
06EE	06EN	Compressor — A/C Duty	2-Step Press.	
06E2	06E6	Compressor — A/C Duty	1-Step Elec.	Suction Cut-Off Unloading
06E3	06E7	Compressor — A/C Duty	2-Step Elec.	
06E4	06E8	Compressor — A/C Duty	1-Step Press.	
06E5	06E9	Compressor — A/C Duty	2-Step Press.	
06EM	—	Compressor — Refrig. Duty	Med Temp.	
06ER	—	Compressor — Refrig. Duty	Low Temp.	
06ET	—	Serv. Compressor A/C Duty Replaces 06E2, 3, 4, 5, 6, 7, 8, and 9 Compressor has 1-stage of suction cut-off unloading		
06EX	—	Serv. Compressor A/C Duty Replaces 06EA, B, C, D, E, F, J, K, L, and N Compressor has 1-stage of Bypass unloading		
06EY	—	Serv. Compressor Refrig. Duty Replaces 06ER		
06EZ	—	Serv. Compressor Refrig. Duty Replaces 06EM		

* Refrigeration Partner
† Standard Center Cylinder Head
** Reversed Center Cylinder Head: service compressors shipped with reverse center head have the letter "R" after the serial number on the shipping box
Information in shaded area is no longer available in standard factory production

06CC COMPRESSORS

06CC 6 65 E 201

Design Variable:
101 = Single Pack, W/O Valves, with Oil
102 = Single Pack with Valves and Oil
103 = Single Pack, Service W/O Valves and Term. Box or Oil
201 = Single Pack, W/O Valves or Oil
202 = Single Pack with Valves
S = Oil Sensor Block and OPSS sensor (shown as the 10th digit)

Electrical Characteristics:
A = 415-3-50, XL and PW
B = 415-3-50, XL
C = 415-3-50, PW
D = 208/230-3-60, XL
E = 208/230/400/460-3-50/60
F = 400/460-3-50/60, XL and PW
G = 400/460-3-50/60, XL
H = 400/460-3-50/60, PW
J = 575-3-60, XL and PW
K = 230-3-60, PW
L = 220-3-50, XL and PW
M = 220-3-50, XL
N = 220-3-50, PW
P = 220/346/380-3-50/60, XL and PW
Q = 380-3-60, XL

Displacement(in cfm at 1750 rpm) (See Note below)

Motor Size and Protection:

5th Digit	Motor Size	Overload Variable
0	15 FT-LB / 5 HP	Electromechanical Overcurrent Protection (*No Longer Available)
A	15 FT-LB / 5 HP	115/240V Control Voltage, Electronic Overcurrent Protection
B	15 FT-LB / 5 HP	24V AC Control Voltage, Electronic Overcurrent Protection
C	15 FT-LB / 5 HP	24V DC Control Voltage, Electronic Overcurrent Protection
1	20 FT-LB / 6.5 HP	Electromechanical Overcurrent Protection (*No Longer Available)
D	20 FT-LB / 6.5 HP	115/240V Control Voltage, Electronic Overcurrent Protection
E	20 FT-LB / 6.5 HP	24V AC Control Voltage, Electronic Overcurrent Protection
F	20 FT-LB / 6.5 HP	24V DC Control Voltage, Electronic Overcurrent Protection
2	24 FT-LB / 7.5 HP	Electromechanical Overcurrent Protection (*No Longer Available)
G	24 FT-LB / 7.5 HP	115/240V Control Voltage, Electronic Overcurrent Protection
H	24 FT-LB / 7.5 HP	24V AC Control Voltage, Electronic Overcurrent Protection
J	24 FT-LB / 7.5 HP	24V DC Control Voltage, Electronic Overcurrent Protection
3	24 FT-LB / 7.5 HP	Electromechanical Overcurrent Protection (*No Longer Available)
K	24 FT-LB / 7.5 HP	115/240V Control Voltage, Electronic Overcurrent Protection
L	24 FT-LB / 7.5 HP	24V AC Control Voltage, Electronic Overcurrent Protection
M	24 FT-LB / 7.5 HP	24V DC Control Voltage, Electronic Overcurrent Protection
5	45 FT-LB / 15 HP	Not Factory Installed, External Overcurrent Protection Required
6	60 FT-LB / 20 HP	Not Factory Installed, External Overcurrent Protection Required
7	75 FT-LB / 25 HP	Not Factory Installed, External Overcurrent Protection Required
8	90 FT-LB / 30 HP	Not Factory Installed, External Overcurrent Protection Required

Compressor Type:
06CC = Compound Cooling Model
06CY = Service Compressor
06C8 = Compressor, Special

Information in shaded area is no longer available in standard factory production.

NOTE: USE OF "cfm" AS MODEL SIZE DESIGNATION

Carlyle uses the "cfm" designation in the model number to identify the compressor size. The cfm values are the sixth and seventh digits of the model number. See example above. Carlyle offers two series of compressors based on body size. The smaller compressors, from 8 to 37 cfm, are referred to as "D" size units (model number "06D"). The larger compressors, from 50 to 99 cfm, are referred to as "E" size units (model number "06E").
The 06CC, or Compound Cooling compressors, are made in 16 to 37 cfm and 50 to 99 cfm sizes.
The 16 to 37 cfm compressors use "D" size bodies. The 50 to 99 cfm compressors use "E" size bodies.

NOTE: METRIC MEASUREMENTS

The compressors are built using English units: inches, foot-pounds, pints, etc. A corresponding metric measurement has been added to all the English units in this guide. These metric measures are a guide only, having been rounded to the nearest whole number, and therefore are not meant to be an exact mathematical conversion.

1.2 Application Range

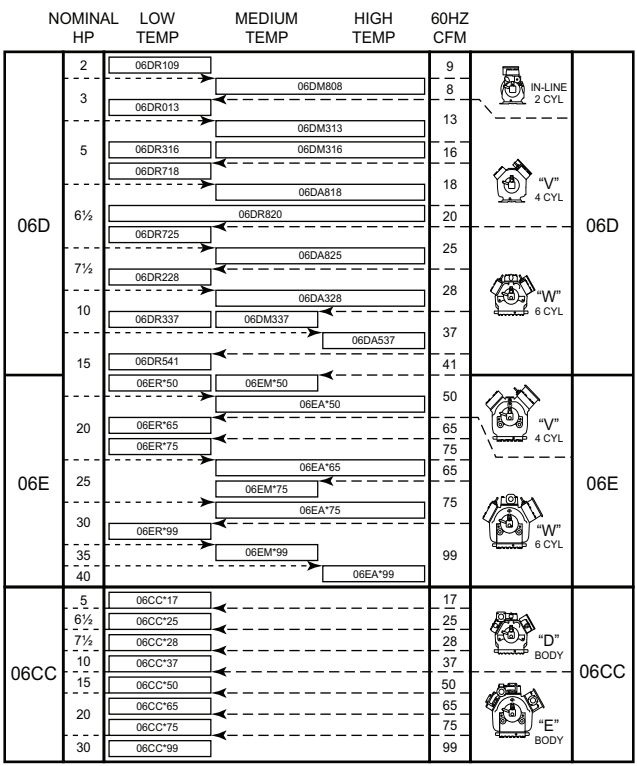
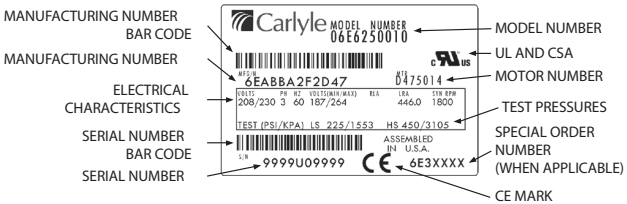


Fig. 1 — 06DE/CC HP CFM

1.3 — Nameplate Significance



Explanation of the above items, starting clockwise from upper right:

MODEL NUMBER - Used when selecting and ordering a replacement compressor. Distributors use the model number to obtain a proper service replacement.

NOTE: Model numbers on some compressors are identified by the symbol "M/N" located in the upper right hand corner of the nameplate.

UL AND CSA - Single mark indicates that this compressor meets all the requirements for both UL (Underwriters Laboratory) and CSA (Canadian Standards Association). All 60 Hz semi-hermetic Carlyle Compressors are UL and CSA recognized and comply with UL, CSA, and NEC (National Electrical Code) requirements for internal motor protection.

MOTOR NUMBER - For Carlyle internal use only.

TEST PRESSURES - Each Carlyle 06D,E,CC compressor is pressure tested at our factory. The "LS" pressures are for the low side of the compressor. The "HS" pressures are for the high side of the compressors.

SPECIAL ORDER NUMBER (WHEN APPLICABLE) - For Carlyle internal use only.

CE MARK - This CE Mark indicates this compressor complies with the European CE Mark requirements.

SERIAL NUMBER - The unique number given to each compressor. This number, along with the model number and special order number, is normally all that is needed to obtain information about or order a service replacement compressor.

SERIAL NUMBER BAR CODE - For Carlyle internal use only.

ELECTRICAL CHARACTERISTICS - Are shown for all semi-hermetic compressors. Voltages are shown with respective operating ranges for both 50 and 60 cycle operation. Electrical phase and LRA (Locked Rotor Amps) information is also provided.

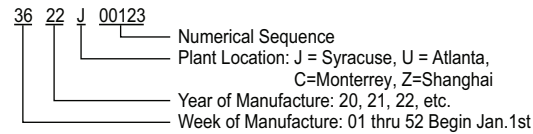
MANUFACTURING NUMBER - For Carlyle internal use only.

MANUFACTURING NUMBER BAR CODE - For Carlyle internal use only.

1.4 — Compressor Serial Number Significance

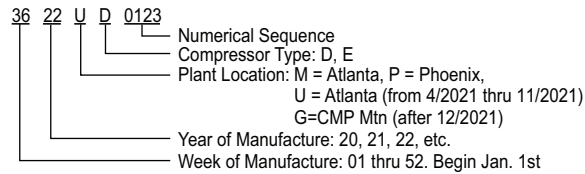
ALL NEW COMPRESSORS

Example: S/N 3622C00123



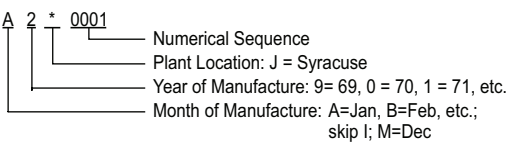
ALL SERVICE COMPRESSORS

Example: S/N 3622GD0123



NEW AND SERVICE REPLACEMENT COMPRESSORS BUILT BETWEEN NOV. 1968 - OCT. 1978

Example: A2J0001



*An "X", "A", or "P" in this location indicates a remanufactured service compressor. A number indicates a new production model.

1.5 — Carlyle OEM Compressor Warranty

Original OEM compressors are warranted to be free from defects in material and workmanship for a period of 12 months from the date of original installation, or 20 months from the date of manufacture, whichever comes first. Terms and conditions of the compressor warranty are specified in the list price pages.

When a service compressor is used to replace an original compressor, the remaining portion of the first-year OEM warranty is transferred to the service compressor (within the United States and Canada).

Equipment may carry an extended OEM warranty if that warranty has been purchased from the OEM. The OEM issues the extended warranty, not Carlyle or its distributors, and the OEM is responsible for providing the end user with the credit.

If returning a compressor:

- place all parts back into compressor
- seal all compressor openings (oil leakage may create an environmental hazard)

NOTE: Opening a compressor for observation or determination of failure does not void warranty.

1.6 — Service Billing and Credit

Returns of in-warranty parts should be made to the same Local Caryle Distributor who supplies these replacement parts.

Local Carlyle Distributors will sell parts and service compressors only to credit-approved accounts (except for cash sales).

1.7 — Carlyle Service Replacement Compressors, Parts, and Support

Carlyle service replacement compressors, parts, and support are available through a wide distribution network. **Technical support is provided by your local distributor.** Customer Service Representatives can provide assistance in locating your nearest distributor.

In the USA, contact your nearest Carlyle distributor.

Locate your distributor at
https://www.rchvacparts.com/dealers/tools/distributor-locator

In Canada, contact your nearest WWG Totaline branch location, or online at
https://www.carrierenterprise.ca/contact

Locate your branch at
https://www.carrierenterprise.ca/branches

In Mexico, contact your nearest Totaline branch location.

Locate your branch at https://www.totaline.com.mx/contact/

2.0—START-UP, TROUBLESHOOTING, AND SERVICE

2.1 — Technical Assistance - Carlyle OEM Compressors

Carlyle Compressor Division sells compressors to OEMs (Original Equipment Manufacturers) that design and build the finished system. The OEM is the expert on the entire system, including the Carlyle compressor. All system or compressor questions should be directed first to the OEM or the OEM's local representative. If questions cannot be answered by the OEM or this Service Guide, please contact the Carlyle engineering group.

The following recommended start-up procedure for Carlyle 06D, 06E, and 06CC compressors will help eliminate initial compressor failures caused by flooded start, floodback, and running out of oil.

The Troubleshooting Procedures section (Section 2.3, pages 23 to 34) will help pinpoint compressor and system problems.

The Service Procedures section (Section 2.4, pages 35 to 46) covers the replacement of valve plates and gaskets, service to the bearing head assembly containing the oil pump, and a clean-up procedure to follow in case of motor burnout. Most other internal service requires replacement of the compressor.

2.2 — Recommended Start-Up Procedure

⚠ CAUTION

Do not add excess oil. It is especially important on the 06E and 06CC (50 to 99 cfm) compressors that excess oil not be added to the system. Laboratory tests and field experience indicate excessive oil levels can cause blown valve plate and cylinder head gaskets, increase compressor operating temperatures, and cause oil equalization problems.

NOTE: Scan QR codes below for link to start-up and installation instructions on the Carlyle literature website.

06D

574-067 06D Installation Instructions for 06D Compressor
https://www.shareddocs.com/hvac/docs/2002/Public/04/574-067.pdf

06E

574-068 06E Installation Instructions for 06E Compressor
https://www.shareddocs.com/hvac/docs/2002/Public/03/574-068.pdf

06CC (16-37 cfm)

570-849 06CC Installation Instructions for 06CC (16-37 cfm) Compressor
https://www.shareddocs.com/hvac/docs/2002/Public/0D/570-849.pdf

06CC (50-99 cfm)

570-850 06CC Installation Instructions for 06CC (50-99 cfm) Compressor
https://www.shareddocs.com/hvac/docs/2002/Public/07/570-850.pdf

Parallel compressor applications typically use an oil-control float system consisting of individual floats, a separator and an oil reservoir. When using a float system, do not interconnect the floats with an "equalization system" without approval from Carlyle application engineering. The use of a float "equalization system" can result in system oil control problems.

An oil equalization line can be used instead of a float system, except with 06CC compressors. The equalization line and the compressors must be level, and the line diameter must be large enough to allow both the refrigerant and oil to equalize between all the interconnected compressors. If the line is not level, it is undersized, or the system contains too much oil, the oil level will rise filling the line, and oil control between compressors will be lost. Typically, equalization lines are 1-1/8 in. (28 mm) in diameter or larger. For 06D compressors, a sight glass in the line is required to determine the system oil level.

Parallel systems using three (3) or more 06E compressors **require** the use of a common motor barrel interconnection line between compressors. Use of an interconnection line is **strongly recommended** on two (2) 06E compressor unit configurations. This system prevents oil from building up in an 06E motor barrel during the off cycle, thereby preventing an oil slug on start-up. The line is either 1/4 in. (6 mm) or 3/8 in. (8 mm) tubing inter-connecting to fitting located in the bottom of the 06E crankcases. To connect the 06E compressor motor barrel, fitting P/N 5F20-1311 (5/8 in. -18 x 1/4 in. NPT) with AU51YA011 gasket is recommended. Some 50 cfm compressors have a 1/4 in. NPT connection and do not require the 5F20-1311 fitting.

The motor barrel inter-connection line is in addition to either the crankcase oil equalization line or the oil floats.

Never interconnect the motor barrels of 06CC compressors, as the oil sump of these compressors are at intermediate pressure.

⚠ CAUTION

06E compressors will not tolerate excessive oil charges. Laboratory tests and field experience confirm that excess oil, especially in 06E compressors, can cause cylinder head gaskets and valve plates to fail, increase compressor operating temperatures, and lead to oil control problems. Page 15, Section 2.2 notes the correct oil levels.

⚠ CAUTION

Do not charge oil through the suction line or through the compressor suction access fittings. See the compressor figures in Section 2.5 for the location of the recommended oil charging ports. Adding oil into the suction side of the compressor can result in oil intake directly into the cylinders resulting in suction/discharge valve, piston and/or connecting rod damage.

COMPRESSOR START-UP

1. After circuit breaker and control circuit switches are placed in the ON position and the compressor starts, listen for unusual sounds. If unusual sounds are heard, shut down the compressor, investigate the cause, and correct. Possible problems are:
   - Excessive vibration
   - Excessive oil
   - Liquid slugging
   - Low oil
2. After the compressor has run 10 to 15 minutes and no liquid floodback is evident, completely open suction service valve. The other compressors within the system should be started in the same manner.
3. To ensure operating oil levels are within acceptable limits, closely observe the oil level in the compressors until the system has stabilized. During operation all refrigeration systems will lose some compressor oil to the system because:
   - All systems have a film of oil on the inside surface of the piping. At start-up, the lines are dry and the oil which coats the lines comes from the compressor crankcase.
   - Oil also traps in the low refrigerant velocity area of the system and must be made up by adding oil to the system. On systems with hot gas defrost, inspect the compressor for excessive oil after the defrost cycle has been completed.

The oil lost to the system must be replaced, but make sure not to add too much. The 06E and 06CC (50 to 90 cfm) compressors have been successfully started in supermarket

refrigeration configurations by adding only 1 quart (liter) of additional oil per compressor. The amount to be added will vary depending on the system, but keeping the oil level between 1/8 and 3/8 level in the sight glass will eliminate the chance of excessive oil charges.

⚠ CAUTION

Adding excessive oil to the 06E and 06CC (50 to 99 cfm) compressors can cause blown gasket problems.

⚠ CAUTION

Liquid refrigerant should never be allowed to flood back to the compressor. It may wash out bearings and damage gaskets. If liquid floodback is occurring, adjust the expansion valve or make other adjustments as necessary to eliminate this condition.

NOTE: One possible cause of flooding is improper control of the defrost cycle. Ensure defrost cycles are staggered so no more than one third of the system is on defrost at any time.

COMPRESSOR OPERATING LIMITS

Figures 2 and 3 show the components and typical operating ranges of the Carlyle 06D, E, and 06CC compressors.

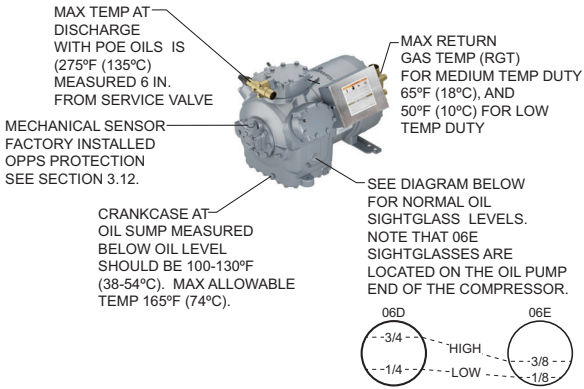


Fig. 2 — Typical 06D, E Operating Limits

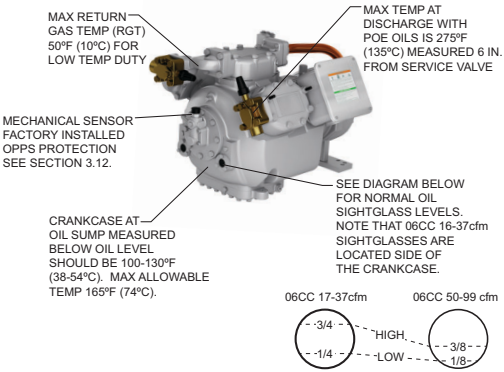


Fig. 3 — Typical 06CC Operating Limits

2.3 — Troubleshooting Procedure

⚠DANGER

Before attempting service work on the compressor, the following safety precautions must be strictly observed. Failure to follow these instructions could result in serious personal injury or death. See warning label.

Follow recognized safety practices and wear protective goggles.

Do not operate compressor or provide electric power to this unit unless the compressor terminal box cover is in place and secured.

Do not provide power to unit or turn on compressor unless suction and discharge service valves are open. When not operating keep at least one service valve open unless replacing the compressor.

Do not remove the compressor terminal box cover until all electrical sources have been disconnected.

⚠DANGER

When leak-testing semi-hermetic compressors, check around the terminal box **cover**. Test around the wire entry point(s) of the **cover** because refrigerant is likely to concentrate there. **Do not remove the terminal cover to perform this leak testing because bodily injury or death can result from fire and/or explosion if cover is removed or unsecured before power is disconnected and pressure is relieved. Electrical terminal pins may blow out, causing injury and fire.**

COMPRESSOR ISOLATION

If you have determined there is no refrigerant leak around the terminals and the compressor must be replaced, proceed beginning with Step 1:

1. Shut off suction and discharge service valves to isolate compressor and slowly remove all refrigerant in compressor. Appropriate service practices should be followed to properly reclaim refrigerant removed from the compressor.
2. Disconnect all electrical wiring to compressor.
3. Unbolt suction and discharge service valves from compressor.

   REMINDER: These valves may be sealing off refrigerant from the rest of the system. Do not open these valves without first determining whether there is refrigerant in the system.

Troubleshooting Guide - 06D, 06E and 06CC Compressors

OBSERVATION	POSSIBLE CAUSE	REMEDY
1. Compressor will not start	Power off.	Check main switch, fuses and wiring.
	Overcurrent protection open.	Reset manually.
	Oil safety switch open.	Reset manually.
	Loose electrical connections or faulty wiring.	Tighten connections. Check wiring and rewire if necessary.
	Compressor motor burned out.	Inspect and replace compressor if defective.
2. Low compressor capacity or inability to pull down system	Broken connecting rods or pistons.	Replace compressor.
	For 06CC only: Blown valve plate or cylinder head gasket.	See No. 3
	Leaky valve plates or worn valve seat.	Replace valve plate assembly.
	Leaky or broken suction valves.	Pump down, remove cylinder head, examine valves and valve seats. Replace if necessary.
	Check pressure difference between suction, interstage and discharge if: a. pressure is low between suction and interstage. b. pressure is low between interstage and discharge.	a. Check for problems in low stage heads. b. Check for problems in high stage head.

OBSERVATION	POSSIBLE CAUSE	REMEDY
3. Blown valve plate or cylinder head gaskets	Cylinder head bolts not properly torqued.	a. Replace gaskets b. Retorque cylinder head bolts to: 06D and 06CC (16 to 37 cfm): 30 to 35 ft-lb (40 to 48 Nm) 06E 100 06CC (50 to 99 cfm): 90 to 35 ft-lb (122 to 136 Nm)
	Excessive oil in 06E and 06CC (50 to 99 cfm) compressors causes hydraulic cylinder pressures.	a. Remove excessive oil until oil level maintained between 1/8 to 3/8 up the sight glass. b. On multiple 06E compressor units, add motor barrel oil equalization line. NOTE: Do not use a motor barrel oil equalization line with 06CC compressors.
	Liquid refrigerant floodback or flooded start.	See No. 7 (Flooding).
4. Compressor cycles intermittently	Low-pressure switch erratic in operation.	a. Check tubing to switch to see if clogged or crimped. b. Verify proper setting of switch.
	Insufficient refrigerant in system.	Add refrigerant.
	Suction service valve closed.	Open valve.
	Insufficient water flowing through condenser or clogged condenser.	a. Adjust water regulating valve to condenser b. Clean condenser.
	Discharge service valve not fully open.	Open valve.
	Air in system.	Recover and recharge refrigerant per refrigerant manufacturer's recommendations.

OBSERVATION	POSSIBLE CAUSE	REMEDY
5. Compressor continually cycles	Faulty pressurestats.	Repair or replace.
	Dirt or restriction in tubing to pressurestat.	Check and clean tubing.
	Condenser capacity reduced by refrigerant over-charge accompanied by high discharge pressure.	Remove excess refrigerant.
	Plugged filter-drier.	Replace filter.
6. Low discharge pressure	Excessive water flow through condenser.	Adjust water regulating valve.
	Suction service valve partially closed.	Open the valve.
	Leaky compressor suction valves.	Pump down, remove the cylinder head, examine valves and valve seats. Replace if necessary.
	Worn piston rings.	Replace compressor.
7. Flooding	Improper system piping allows liquid to compressor.	Correct piping.
	Defrost cycle improperly set or not operating correctly.	Do not allow more than 1/3 of system on defrost at any time. Verify proper operation of defrost system.
	Defective or improperly set expansion valve.	Increase superheat or replace valve.
	Evaporator fan failure.	Correct problem or replace fan.
8. Low suction pressure	Insufficient refrigerant in system.	Add refrigerant.
	Evaporator fan failure.	Correct problem or replace fan.

OBSERVATION	POSSIBLE CAUSE	REMEDY
9. Compressor noisy	Slugging due to floodback of refrigerant.	See No. 7 (Flooding).
	Hydraulic knock due to excess oil in circulation.	a. Remove excess oil. b. Recheck oil return system and pipe sizes.
	Bearings damaged because of loss of oil.	a. Add oil (only after confirming all system oil has returned to the compressor). b. Check oil return system and piping size. c. See **No. 15 (Parallel Systems Oil Level)** and **No. 11 (Oil Pressure).** d. Check for defective oil failure control.
	Improper support or isolation of piping.	Provide sufficient right angle bends in piping to absorb vibration and support firmly with suitable hangers.
	Compressor not firmly mounted.	Check for loose mounts.
	Unit not properly isolated or vibration pad defective.	Add vibration isolation or check for defective **isolation pads.**
	Broken connecting rods, valves or other running gear	Replace compressor.
10. Pipe rattle	Inadequately supported piping or loose pipe connections.	a. Support pipes and/or check pipe connections. b. Add muffler or baffle plate.
11. Oil pressure lower than normal or no oil pressure.	Low oil charge.	Verify oil level requirements.
	Faulty oil pump drive segment.	Replace segment.
	Refrigerant floodback.	See No. 7 (Flooding).
	Desuperheating TXV stuck open.	Replace TXV.
	Worn oil pump.	Replace bearing head assembly.
	Worn compressor bearings.	Replace compressor.

OBSERVATION	POSSIBLE CAUSE	REMEDY
12. Compressor motor protectors or discharge temperature sensor tripping or cycling.	High suction pressure on low temperature compressor causes excessive amp draw.	If system does not have EPR valve, throttle suction service valve until system pulls down.
	High discharge pressure.	Check for loss of condenser water, blocked condenser fan or coil, or defective fan motor.
	Incorrect overload relay or must trip amp setting too low.	Replace with correct overload relay.
	Detective overload relay or circuit breaker.	Replace.
	High suction temperature.	Reduce suction temperature by TXV adjustment or provide desuperheating.
	Loose power or control circuit wiring connection.	Check all power and control circuit connections.
	Defective motor.	Check for motor ground or short. Replace compressor if found.
	Faulty motor protection device.	On all 06E and 06CC compressors, check the thermal sensor in the cylinder head. Replace head sensor if necessary.
	High compression ratio (suction too low/condensing too high): return gas temperature above application limits.	Adjust compressor operational envelope.
	For 06CC compressors only: Broken valve on high stage or blown high stage gasket.	Repair compressor.
	Insufficient desuperheating.	Adjust desuperheating valve.

OBSERVATION	POSSIBLE CAUSE	REMEDY
13. Compressor cycles on locked rotor	Low line voltage.	Measure line voltage and determine location of voltage drop.
	Seized compressor (remove bearing head assembly and attempt to rotate crankshaft).	Replace compressor.
	Compressor motor defective.	Check for motor winding short or ground.
	Single phasing.	Measure voltage across all 3 legs at contactor. Correct source of problem.
	Liquid refrigerant condensing in cylinder.	Check and replace valve plates.
	On part-winding start compressors, the second set of windings may not be energized.	a. Faulty contactor – replace. b. Faulty time-delay relay – replace.
14. Motor Burnout	Inspect control box for welded starter contacts, welded overload contacts, or burned out heater elements.	Replace defective components and compressor. Check refrigerant and oil for contamination and clean to prevent repeat failure.
	Inspect failed compressor for worn bearings or motor compartment contamination.	Replace compressor. Check refrigerant and oil for contamination and clean to prevent repeat failure.

OBSERVATION	POSSIBLE CAUSE	REMEDY
15. On parallel compressor installations, oil level does not equalize or remain at a constant level in all compressors	Oil equalization line not level, preventing gas equalization. NOTE: Oil equalization lines cannot be used with 06CC compressors. A float system must be used.	Level oil equalization line.
	06E Compressors Only: Pressure equalization check valve in the motor rotor lock bolt may have been left out in one or all compressors. NOTE: Check valve not required with float system.	Remove suction service valve and look for check valve in motor rotor lock bolt at the end of the crankshaft. Check valve is required on all 06E compressors in systems using the oil equalization line connected at the sight glass location.
	Excessive blow-by into crankcase - worn rings, valves or blown gasket.	Replace gasket, valve plate, or compressor.
	Improper suction line sizing.	Resize lines.
	Oil reservoir check valve bad or wrong pressure.	Replace check valve; 20 psi check valve required.
	With Float System: Oil is not equalized in sight glass.	a. Check floats. Replace detective floats. b. Check for proper selections and settings: -06D and 06CC (16 to 37 cfm) - 1/4 to 3/4 sight glass. -06E and 06CC (50 to 90 cfm) -1/8 to 3/8 sight glass. c. If floats have equalization line, the line between the floats may have to be removed. Contact Carlyle engineering.

OBSERVATION	POSSIBLE CAUSE	REMEDY
16. Compressor running hot	Blown valve plate or cylinder head gasket.	Blown valve plate or cylinder head gasket.
	Broken suction or discharge valve.	Broken suction or discharge valve.
	Compression ratio too high.	a. Verify proper setting of high and low pressure switches. b. Inspect for condenser plugging. c. Ensure all evaporator and condenser fans are operating properly.
	High suction temperature.	Reduce suction temperature by TXV adjustment or provide desuperheating.
	Cylinder head cooling fan not operating or incorrect voltage for fan motor.	Replace defective part or verify available voltage agrees with fan motor voltage.
	06E and 06CC (50 to 99 cfm) Compressors only: Non-seating internal pressure relief valve.	Check for signs of overheating, replace if necessary.
	High oil level.	High oil level.
	Excessive blow-by into crankcase - worn rings, valves or blown gasket.	Replace gasket. valve plate, or compressor.

OBSERVATION	POSSIBLE CAUSE	REMEDY
17. Oil safety switch trip **a.If sight glass appears empty** **b.If sight glass appears normal**	Faulty switch or oil pressure settings NOTE: Never add oil to the system without first confirming that oil has been physically lost, not simply trapped in the system. Check oil levels after a defrost cycle.	Manually check for oil pressure. If correct, check that switch is correct model and has proper settings (see page 70, Section 3.12).
	Oil trapped in the system. NOTE: At times, the sight glass may appear empty when actually it is completely full.	a. Check line sizing and risers for proper sizing to return oil. b. If floats are being used, check for proper setting and proper functionality.
	Liquid refrigerant in crankcase.	a. Check for low superheats which can return refrigerant - raise superheat. b. Check for liquid migration during OFF cycle - provide a form of pumpdown protection.
For 06CC Compressors Only: **18. High mid-stage pressure**	Broken valve or blown gasket on the high stage.	Replace broken valves or gasket.
19. Low mid-stage pressure	Broken valve or blown gasket on the low stage.	Replace broken valves or gasket.
20. Economizer/Desuperheater connection hot	Broken valve on high stage.	Replace broken valves.
	Blown high stage gasket.	Replace gasket.

OBSERVATION	POSSIBLE CAUSE	REMEDY
21. Intermediate pressure equals the discharge pressure	Center low stage valve plate gasket is blown (typically caused by heavy liquid floodback or flooded start).	Eliminate floodback and replace gasket.
	Compressor started with discharge service valve closed.	Open discharge service valve.
	High stage valve plate is on the low stage cylinder head.	Switch valve plates so high stage valve plate is on the high stage cylinder head.
	Internal relief valve loose.	Tighten internal relief valve.
	Internal relief valve blown.	Replace internal relief valve.

LEGEND

EPR — Evaporator Pressure Regulator

TXV — Thermostatic Expansion Valve

2.4 — Service Procedures

The service section covers replacement of valve plates and gaskets, service to the bearing head assembly containing the oil pump, and a clean-up procedure to follow in case of motor burn out. Most other internal service requires replacement of the compressor.

REMOVE, INSPECT AND REPLACE CYLINDER HEAD AND VALVE PLATE ASSEMBLY

To test for leaking discharge valves or blown cylinder head or valve plate gaskets:

1. Pump compressor down.
2. Observe suction and discharge pressure equalization. If valves are leaking or a gasket is blown, the pressure will equalize rapidly.

   Maximum allowable discharge pressure drop is 3 psi per minute after initial drop of 10 to 15 psi in first half minute.

   New reed valves may require 24 to 48 hour run-in time to seat completely.

   A compressor bank (head) with a blown gasket can also usually be detected by touch since the head temperature will normally be much hotter than a bank with good gaskets.
3. If there is an indication of loss of capacity and discharge valves are functioning properly, remove valve plate assembly and inspect suction valves.

NOTE: This test procedure is not applicable to compressors equipped with pressure actuated unloader valves due to rapid pressure equalization rate. Inspect suction and discharge valves by disassembling valve plate.

DISASSEMBLY

1. Disassemble cylinder heads by removing cylinder head bolts. Leave at least two bolts partially threaded to prevent any problems if refrigerant is accidently left in the compressor under pressure. To separate the cylinder head from the valve plate, pry up between the head and valve plate. When the cylinder head is separated from the compressor body remove the last threaded bolts.

⚠ CAUTION

Do not hit the cylinder head to break it free of the valve plate. This may shear the valve plate dowel pins. Sheared dowel pins usually require the compressor to be replaced.

2. Inspect cylinder heads for warping, cracking, or damage to gasket surfaces. Replace if necessary.
3. After the cylinder head is off, the valve plate may be removed as follows:
   a. Remove one valve stop cap screw and loosen the other.
   b. Swivel valve stop to allow access to hole from which the cap screw was removed.
   c. Re-insert cap screw and tighten to break valve plate away from compressor. (Jack screw method, see Fig. 4.) For 06E valve plates, pry against the raised tab to break valve plate away from the compressor.

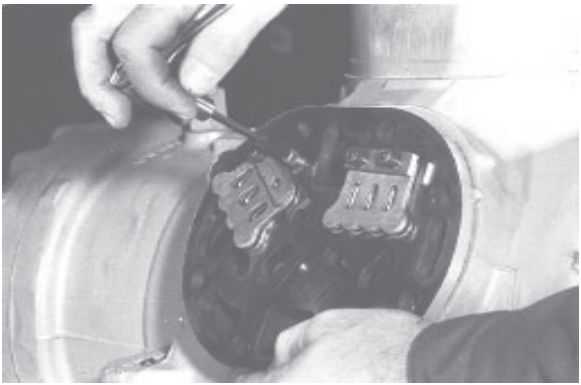


Fig. 4 — Disassembly of Valve Plate (Standard Efficiency Valve Plate Shown)

4. Pry up along sides of valve plate to remove valve plate from crankcase. This provides access to suction reed valves (see Fig. 5). Remove suction valves from dowel pins. On 06D and 06CC (16 to 37 cfm) compressors, also remove the suction valve positioning springs (see Fig. 6).
5. Inspect components for wear or damage. If replacement is necessary, replace as a complete assembly. Individual parts must not be interchanged. Alignment of high efficiency discharge valves is critical for proper seating. See Section 3.21 to 3.23, pages 94 to 96, for applicable replacement valve plate packages.

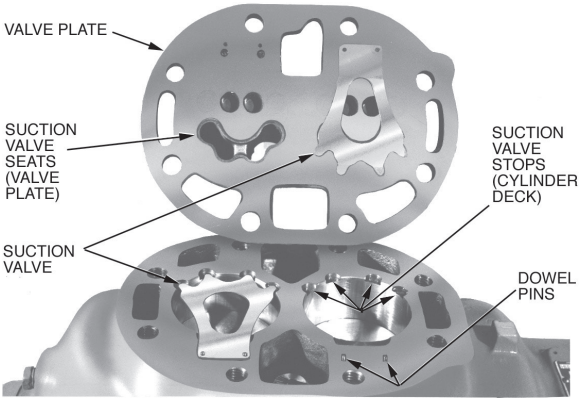


Fig. 5 — Valve Plate Removed (06E Refrigeration Valve Plate Shown)

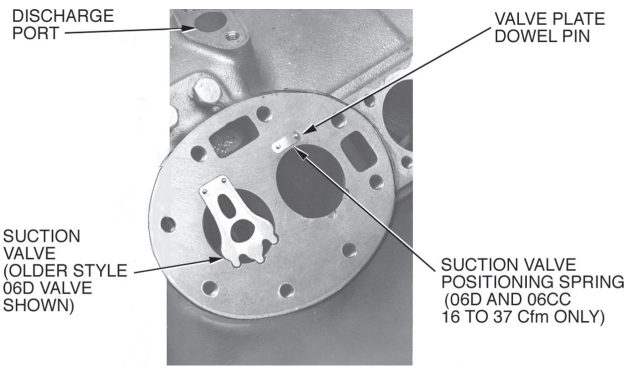


Fig. 6 — Suction Valve and Positioning Springs in Place (06D Shown)

REASSEMBLY

1. If reassembling existing components, do not interchange valves or turn them over. They must be reassembled in their original position. Install the suction valve positioning springs (06CC size 16 to 37 cfm and 06D compressors only) on dowel pins. Assemble positioning springs with spring ends bearing against cylinder deck (Fig. 6), spring bow upward.
2. Install suction valve on dowel pins as follows:
   a. 06D Compressors: Install suction valves on top of positioning springs as mentioned in Step 1 above.
   b. 06E Compressors: If compressor uses a suction valve and a backer valve (looks like half a suction valve), backer valve must be installed before installing full size suction valve (Fig. 7).

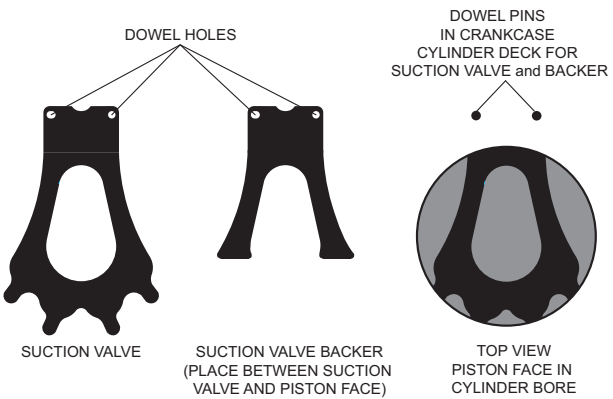


Fig. 7 — Piston, Suction Valve, and Backer Positions (06E)

3. Install new valve plate gasket. Using proper hold-down torque will prevent leaks.

a. Fiber gaskets can be installed dry or lightly oiled. Do not soak gaskets in oil. If an oil-soaked gasket is overheated, it will bind to the metal, making the valve plate and/or the head difficult to remove.
b. Metal gaskets must be installed dry.

4. Place valve plate on cylinder deck.
5. Install cylinder head gasket.

   NOTE: The center cylinder heads and unloader side heads use different gaskets from the plain side head. To confirm the gasket is correct, place it over the cylinder head and verify all exposed machined surfaces will be covered by the gasket.

   a. Line up the gasket with the cylinder head and valve plate.
   b. 06E Compressor: Secure the center rib with a cap screw and washer and torque to 4 to 6 ft-lb (5 to 8 Nm).
6. Replace cylinder head. To prevent high to low side leak in center of cylinder head gasket, torque 06D cylinder head cap screws to 30 to 35 ft-lb (40 to 48 Nm), and 06E cylinder head cap screws to 90 to 100 ft-lb (122 to 136 Nm).

   NOTE: Torque bolts in an alternating sequence pattern (top to bottom, left to right). Do not torque bolts in a circular pattern.
7. Certain high compression ratio applications develop high discharge gas temperatures which may cause the cylinder head and fiber valve plate gaskets to develop a set. Under these conditions the cap screws may lose hold-down torque. It is recommended that all gear cap screws be re-torqued 24 hours after new fiber gaskets are installed.

   NOTE: Compressors with metal core gaskets do not require re-torque.

REMOVE, INSPECT AND REPLACE BEARING HEAD ASSEMBLY

An oil pressure tap is located in the bearing head assembly used on all 06D refrigeration duty, newer 06D A/C duty, and all 06E refrigeration and A/C duty compressors (Fig. 8-10).

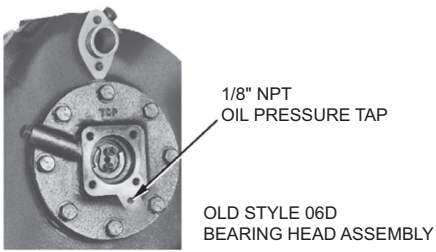


Fig. 8 — 06D Old Style Bearing Head Assembly

For 06D, E, CC oil pressure, see page 68, Section 3.7.

The oil pump assembly is contained in the pump end bearing head aluminum casting. The pump end main bearing is a machined part of this casting. No insert bearing is required.

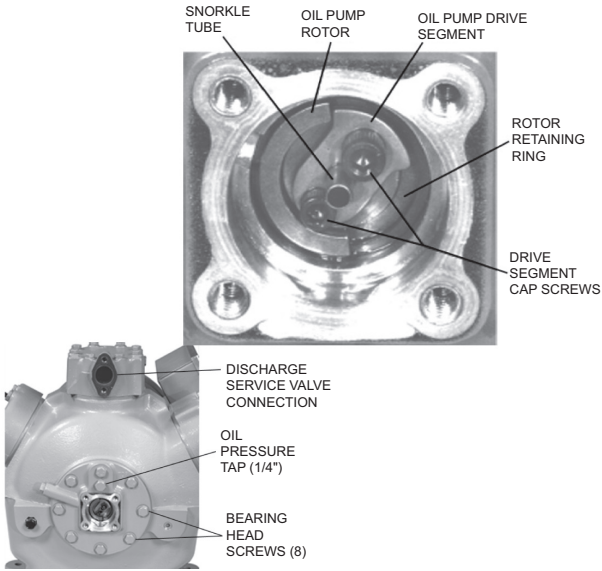


Fig. 9 — Removing Pump End Bearing Head (06D Compressor)

1. To disassemble, first remove four (4) cap screws from the bearing head cover plate and remove the oil feed guide vane and spring.

   Remove the two (2) drive segment cap screws from the end of the crankshaft (see Fig. 9 and Fig. 10). **These screws must be removed before the bearing head can be removed.**
2. Remove the eight (8) cap screws holding the bearing head assembly to the crankcase. Remove the bearing head assembly by pulling forward.

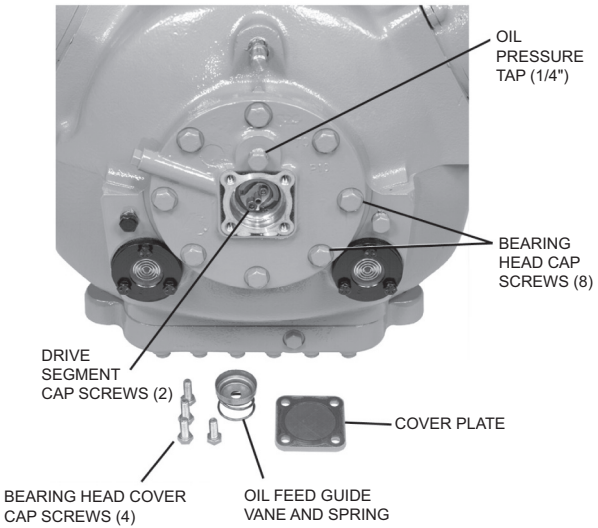


Fig. 10 — Removing Pump End Bearing Head (06E Compressor)

3. Inspect the bearing surfaces for evidence of wear or damage. If bearing surface is worn or scored, or if the oil pump is defective, the complete bearing head must be replaced (see replacement bearing head package listed below).

COMPRESSOR	REPLACEMENT BEARING HEAD PACKAGE
06CC, 16 to 37 cfm, and all 06D	06DA660126
06CC, 50 to 99 cfm, and all 06E	06EA660157

While bearing head is removed, inspect internal running gear for obvious problems (broken rods or pistons).

4. To reassemble, bolt the bearing head to the crankcase. Bolt torque:
   - 06CC, 16 to 37 cfm, and all 06D: 30 to 35 ft-lb (40 to 48 Nm)
   - 06CC, 50 to 99 cfm, and all 06E: 50 to 60 ft-lb (75 to 81 Nm)
5. Bolt the drive segment (replace if worn) to the crankshaft. Bolt torque:
   - No. 10 Screw: 4 to 6 ft-lb (5 to 8 Nm)
   - 1.4 in. (6 mm) screw: 12 to 15 ft-lb (16 to 20 Nm)

IMPORTANT: The 1/4 in. snorkel tube should face away from the crankshaft (Fig. 9).

6. Insert the oil feed guide vane with the **large diameter inward**. Place the oil feed vane spring **over small diameter** of guide vane (**do not install spring before installing guide vane**). Install pump cover plate (bolt torque: 16 to 20 ft-lb or 22 to 27 Nm).

NOTE: Do not over-torque or aluminum threads in bearing head could be stripped.

MOTOR BURNOUT CLEAN-UP PROCEDURE

When a hermetic motor burns out, the stator winding decomposes and forms carbon, water, and acid, which contaminate refrigerant systems. These contaminants must be removed from the system to prevent repeat motor failures.

⚠ WARNING

Before attempting service work on the compressor, see safety precautions listed in Section 2.3 on page 24 and on compressor terminal box cover. Also follow any installation instructions provided with the replacement compressor. **Failure to follow these instructions could result in equipment damage or serious personal injury.**

1. Determine cause of burnout and make necessary corrections.
   a. Inspect control box for blown fuses, welded starter contacts, welded overload contacts or burned out heater elements.
   b. Inspect compressor terminal plate for burned or damaged terminals and insulation, and shorted or grounded terminals.
   c. Inspect unit wiring for loose power connections.
   d. Check for power supply fluctuation beyond design limits (voltage too high or low). If power supply is a problem, provide the appropriate system protector.
2. Close compressor suction and discharge service valves and remove the refrigerant from the compressor using environmentally approved methods. Leave remaining refrigerant in system.
3. Remove damaged compressor and replace.
   a. On severe motor burnouts, be sure shut-off valves and suction or discharge lines are not contaminated. If contaminated, thoroughly clean or replace before connecting replacement compressor.
4. Install new liquid line filter-drier. If the system has a suction line filter-drier, replace the core.
5. Evacuate and dehydrate replacement compressor. Ensure oil in compressor is at the proper level.

NOTE: Since most new and service compressors are now shipped without oil in the crankcase, you must check to see if there is oil. Adding or charging oil is usually easier prior to installing the compressor.

- If there is no oil, add the appropriate oil for the service. Oil charges are listed in Sections 3.1 (page 60) to 3.3 (page 64).
- If there is oil, determine if it is compatible with the refrigerant. If the oil is not compatible, use the drain connection to remove the oil. Dispose of the removed oil following the appropriate environmental guidelines. Since the compressor has not been run, a thorough draining is all that is needed to remain within the limits of residual oil levels. There is no need to "flush" the compressor with the replacement oil. Once the oil is removed, add the appropriate oil (see above).

6. Place compressor in operation. After 2 to 4 hours of operation, inspect compressor oil for discoloration and/or acidity. If oil shows signs of contamination, replace oil and filter-driers and clean the suction strainer.

   NOTE: When testing for moisture and acidity, be sure the test kit used is appropriate for the refrigerant (CFC, HCFC, or HFC) and the oil (mineral, alkylbenzene, or POE) in the system. Carrier's Total Test Kit is accurate for CFC and HCFC air-conditioning applications. If used with POE oils, Total Test Kit will indicate acid, but is not an accurate indicator of moisture.

7. Inspect oil daily for discoloration and acidity. If oil stays clean and acid-free, the system is clean. If oil shows signs of contamination, change oil, change filter-drier, and clean suction strainer. If filter-drier or suction strainer is dirty or discolored, repeat this step until system is cleaned.

2.5 — Connection Points, 06D, 06E, and 06CC Compressors

NOTE: Bolt sizes and thread pitch: Compressors are built using English unit bolts. The bolts have no exact metric equivalents. Therefore, to prevent possible cross-threading, loose bolts, or damage to threaded portions of the casing, comparable metric measurements are not included. Refer to Fig. 11-15.

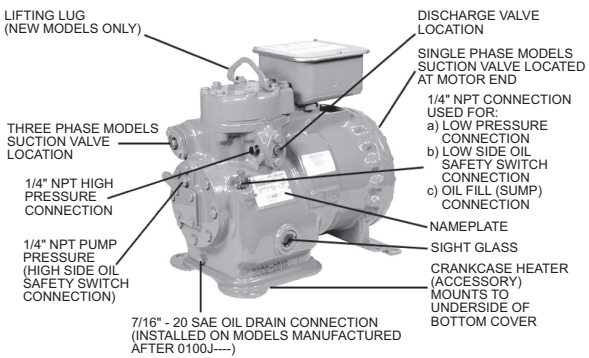
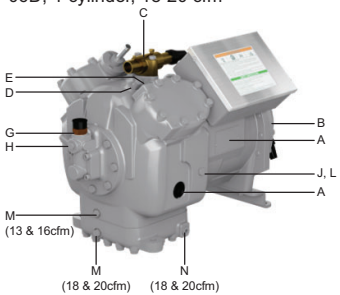


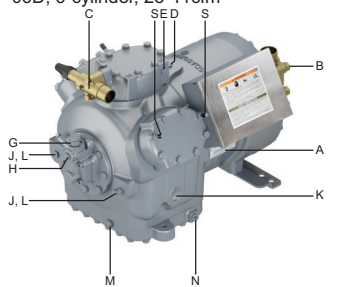
Fig. 11 — 06D 2-Cylinder Compressor Connection Points

06D, 4-cylinder, 18-20 cfm



NOTE: Cast bottom cover shown for 18 & 20cfm models. 13 & 16cfm models will have a stamped bottom cover with strap on crankcase heater.

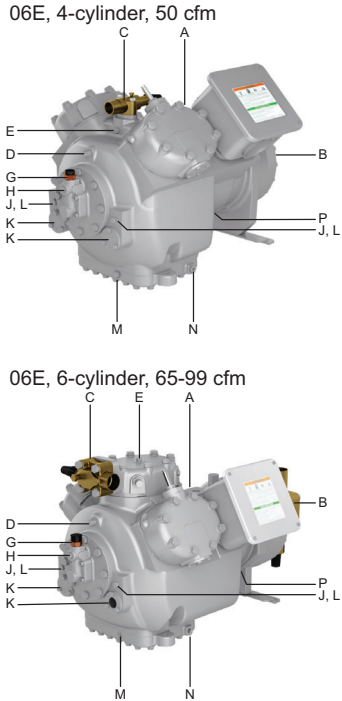
06D, 6-cylinder, 25-41cfm



Connection Points

A	Nameplate Location
B	Suction Service Valve
C	Discharge Service Valve
D	Low Pressure Connection
E	High Pressure Connection
G	Oil Pressure Mechanical Sensor
H	Oil Pressure Connection
J	Low Side Oil Pressure Difference
K	Oil Level Sightglass
L	Oil Sump Fill Port
M	Oil Sump Drain Port
N	Crankcase Heater
S	Cylinder Head Fan Studs

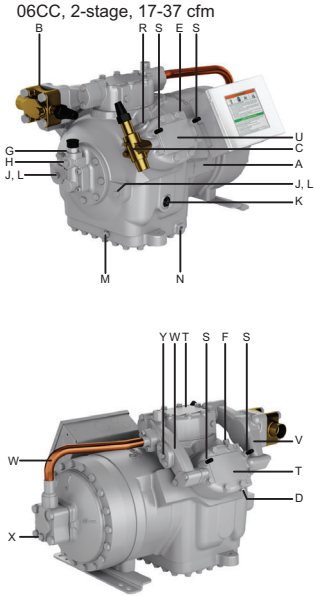
Fig. 12 — 06D Compressor Connection Points



Connnection Points

A	Nameplate Location
B	Suction Service Valve
C	Discharge Service Valve
D	Low Pressure Connection
E	High Pressure Connection
G	Oil Pressure Mechanical Sensor
H	Oil Pressure Connection
J	Low Side Oil Pressure Difference
K	Oil Level Sightglass
L	Oil Sump Fill Port
M	Oil Sump Drain Port
N	Crankcase Heater
P	Motor Barrel Oil Equalization Drain

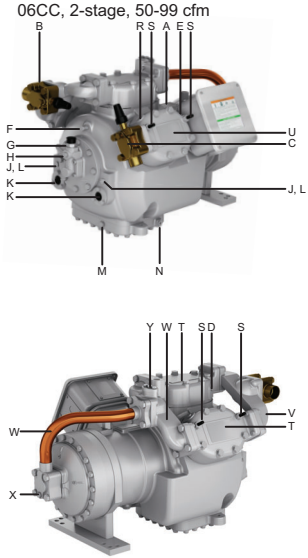
Fig. 13 — 06E Compressor Connection Points



Connnection Points

A	Nameplate Location
B	Suction Service Valve
C	Discharge Service Valve
D	Low Pressure Connection
E	High Pressure Connection
F	Interstage Pressure Connection
G	Oil Pressure Mechanical Sensor
H	Oil Pressure Connection
J	Low Side Oil Pressure Difference
K	Oil Level Sightglass
L	Oil Sump Fill Port
M	Oil Sump Drain Port
N	Crankcase Heater
R	Discharge Gas Temperature Sensor
S	Cylinder Head Fan Studs
T	1st Stage Cylinder Head
U	2nd Stage Cylinder Head
V	Suction Manifold
W	Interstage Manifold
X	Desuperheating Liquid Injection
Y	Vapor Injection Flange

Fig. 14 — 06CC (D Body) Compressor (17 to 37 cfm) Connection Points

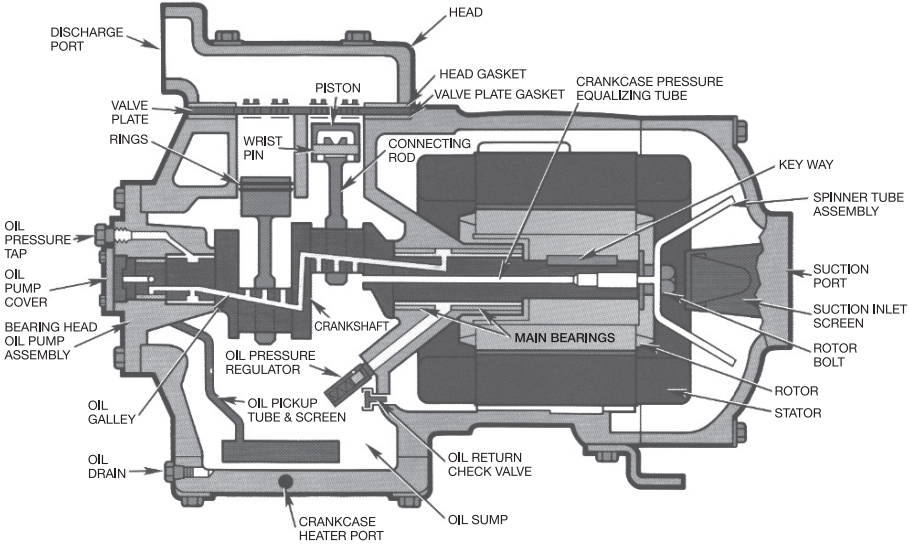


Connnection Points

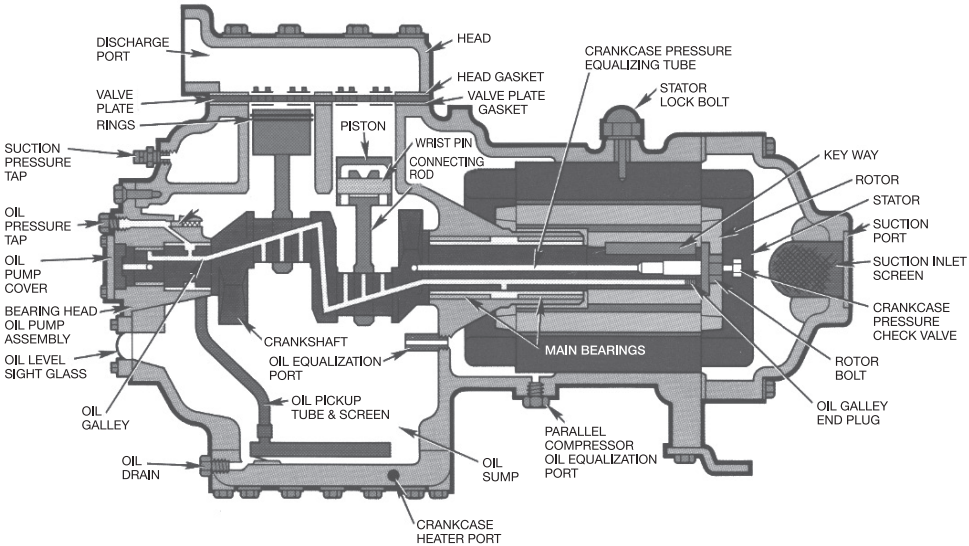
A	Nameplate Location
B	Suction Service Valve
C	Discharge Service Valve
D	Low Pressure Connection
E	High Pressure Connection
F	Interstage Pressure Connection
G	Oil Pressure Mechanical Sensor
H	Oil Pressure Connection
J	Low Side Oil Pressure Difference
K	Oil Level Sightglass
L	Oil Sump Fill Port
M	Oil Sump Drain Port
N	Crankcase Heater
R	Discharge Gas Temperature Sensor
S	Cylinder Head Fan Studs
T	1st Stage Cylinder Head
U	2nd Stage Cylinder Head
V	Suction Manifold
W	Interstage Manifold
X	Desuperheating Liquid Injection
Y	Vapor Injection Flange

Fig. 15 — 06CC (E Body) Compressor (50 to 99 cfm) Connection Points

2.6 — Cross-Sectional View, 06D Semi-Hermetic Compressor



2.7 — Cross-Sectional View, 06E Semi-Hermetic Compressor

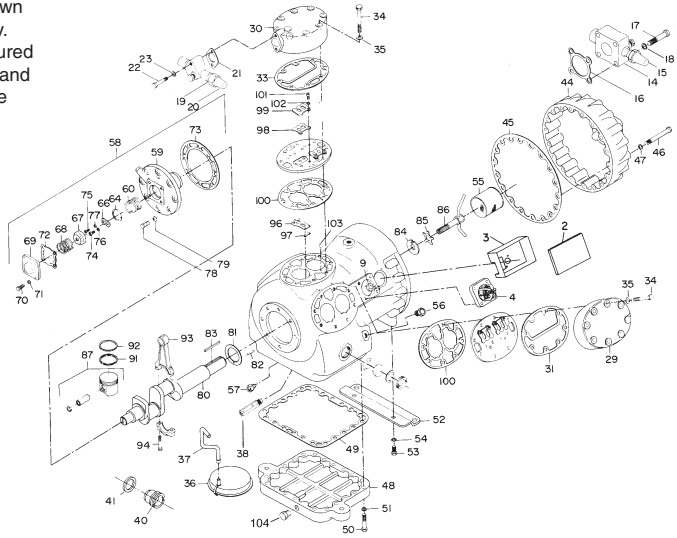


2.8 — Exploded View - 6-Cylinder 06D Compressor

Complete parts breakdown shown for reference only. Some parts may be pictured prior to design changes and not all parts are available as replacements.

LEGEND

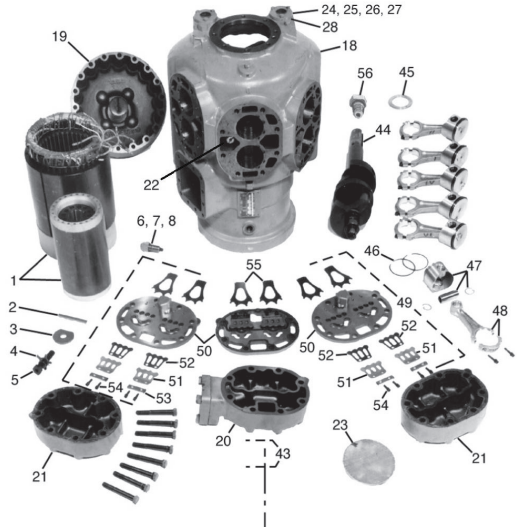
- **2** — Terminal Box Cover
- **3** — Terminal Box
- **4** — Terminal Plate Assembly
- **9** — Grommet (for power leads)
- **14** — Suction Service Valve
- **15** — Suction Service Valve Seal Cap
- **16** — Suction Service Valve Gasket
- **17** — Suction Service Valve Bolt
- **18** — Suction Service Valve Bolt Washer
- **19** — Discharge Service Valve
- **20** — Discharge Service Valve Seal Cap
- **21** — Discharge Service Valve Gasket
- **22** — Discharge Service Valve Bolt
- **23** — Discharge Service Valve Bolt Washer
- **29** — Standard Side Bank Cylinder Head



30 — Center Bank Cylinder
31 — Standard Side Bank Cylinder Head Gasket (Unloader Side Bank Head not shown)
33 — Center Bank Cylinder Head Gasket
34 — Cylinder Head Cap Screw
35 — Cylinder Head Cap Screw Gasket
36 — Oil Filter Screen Assembly
37 — Oil Suction Tube
38 — Oil Relief Valve Assembly
40 — Oil Level Sight Glass Assembly
41 — Oil Level Sight Glass Gasket
44 — Motor End Cover
45 — Motor End Cover Gasket
46 — Motor End Cover Cap Screw
47 — Motor End Cover Cap Screw Washer
48 — Bottom Cover Plate
49 — Bottom Plate Gasket
50 — Bottom Plate Cap Screw
51 — Bottom Plate Cap Screw Washer
52 — Compressor Foot
53 — Compressor Foot Screw
54 — Compressor Foot Everlockwasher
55 — Suction Strainer Assembly
56 — Oil Bypass Plug
57 — Oil Return Check Valve Assembly
58 — Pump End Bearing Head Assembly
59 — Bearing Head
60 — Pump Rotor
64 — Pump Rotor Retaining Ring
66 — Drive Segment
67 — Oil Feed Guide Vane
68 — Oil Feed Vane Spring
69 — Cover Plate
70 — Cover Plate Cap Screw
71 — Cover Plate Cap Screw Gasket
72 — Cover Plate Gasket
73 — Bearing Head Gasket
74 — Cap Screws and Lockwashers
75 — Cap Screws and Lockwashers
76 — Cap Screws and Lockwashers
77 — Cap Screws and Lockwashers
78 — Bearing Head Cap Screw
79 — Bearing Head Cap Screw Washer
80 — Crankshaft
81 — Thrust Washer
82 — Spiral Pin
83 — Rotor Drive Key
84 — Rotor Washer
85 — Rotor Lockwasher
86 — Equalizer Tube Assembly
87 — Piston Assembly
91 — Oil Ring (Not All Models)
92 — Compression Ring
93 — Connecting Rod and Cap Assembly
94 — Connecting Rod Cap Screw
96 — Suction Valve
97 — Suction Valve Positioning Spring
98 — Discharge Valve
99 — Discharge Valve Stop
100 — Valve Plate Gasket
101 — Discharge Valve Stop Cap Screw
102 — Discharge Valve Stop Lockwasher
103 — Valve Plate Dowel
104 — Oil Drain Plug (New Design SAE Fitting and O-Ring)

2.9 — Exploded View - 6-Cylinder 06E Compressor

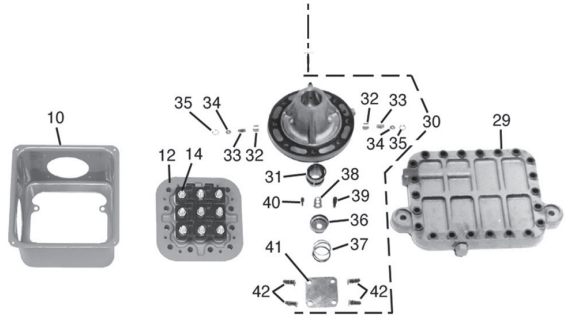
Complete parts breakdown shown for reference only. Some parts may be pictured prior to design changes and not all parts are available as replacements.



LEGEND

1 — Compressor Motor - Stator and Rotor
2 — Motor Key
3 — Rotor Plate Washer
4 — Rotor Lock Washer
5 — Rotor Lock Bolt
6 — Motor Lock Bushing
7 — Roll Pin
8 — Acorn Nut and Gasket

10 — Terminal Box Assembly
12 — Terminal Plate Assembly
14 — Terminal Bolt Assembly
18 — Compressor Crankcase
19 — Motor End Cover
20 — Cylinder Head - Center Bank
21 — Cylinder Head - Side Bank (Unloader Head Not Shown)
22 — Internal Relief Valve
23 — Crankcase Oil Filter Screen
24 — Oil Sight Glass Assembly
25 — Oil Sight Glass "O" Ring Gasket
26 — Oil Sight Glass Screw
27 — Oil Sight Glass Lock Washer
28 — Pipe Plug Gasket (Hex Head)
29 — Bottom Cover Plate
30 — Pump End Bearing Head Assembly
31 — Pump Rotor
32 — Pump Vane
33 — Pump Vane Spring
34 — Pump Vane Spring Guide
35 — Retaining Spring Guide
36 — Oil Feed Guide Vane
37 — Oil Feed Guide Vane Spring
38 — Oil Pump Drive Segment
39 — Screw, Soc Head 1/4 - 28 x 5/8 in.
40 — Screw, Soc Head #10 - 32 x 1/2 in.
41 — Cover Plate
42 — Cover Plate Cap Screw
43 — Oil Relief Piston
44 — Crankshaft



45 — Bearing Washer
46 — Piston Rings (Oil and Compression)
47 — Piston, Piston Pin and Retaining Ring Assembly
48 — Connecting Rod and Cap Assembly
49 — Valve Plate Assembly
50 — Valve Plate
51 — Discharge Valve Stop
52 — Discharge Valve
53 — Valve Stop Support
54 — Cap Screw, Valve Stop
55 — Suction Valve (Backers for A/C Models Not Shown see Fig. 6, page 36)
56 — Check Valve (Use Only with Parallel Compressor Installations)

2.10 — Torque Guide - 06D and 06CC (16 to 37 cfm) Compressors

SIZE DIAMETER (in.)	THREADS PER INCH	TORQUE RANGE (ft-lb)	TORQUE RANGE (nm)	USAGE
1/16	Pipe	8-12	11-16	Pipe plug crankshaft
1/8	Pipe	6-10	8-14	Oil return check valve
No. 10	32	4-6	5-8	Oil pump drive segment
1/4	Pipe	20-25	27-34	Pipe plug
1/4	20	10-12	14-16	Con-rod cap screw
1/4	28	12-15	16-20	Baffle plate crankshaft side shield oil pump drive segment unloader
5/16	18	16-20 16-20 16-20 16-20 16-20 16-20 20-25 20-33	22-27 22-27 22-27 22-27 22-27 22-27 27-34 27-44	Cover plate bearing head Terminal plate cap screw Interstage outlet (CC) Interstage manifold (CC) Liquid injection (CC) Suction manifold (CC) Suction service valve Discharge service valve
3/8	16	30-35	40-48	P.E. bearing head, crankcase Bottom plate, crankcase Compressor foot Cylinder head Motor end cover, crank-case
3/8	24-SAE	6-12	8-16	P.E. bearing head at 10-o'clock position NOTE: Not a field usable fitting
7/16	14	55-60	75-81	Motor end cover, crank-case
7/16	20-SAE	6-12	8-16	Oil drain, on bottom cover plate 4-cyl (18-20 cfm) and 6-cyl 06D
1/2	20	10-12	14-16	Oil pressure regulator
1/2	13	80-90	109-122	Suction service valve
5/8	11	25-30	34-40	Equalization spinner tube assembly
1-1/2	18	35-45	48-61	Oil level sight glass

LEGEND

(CC) - Compound Cooling compressors only

NM - Newton meter (metric torque rating)

SAE - Society of Automotive Engineers

*See Fig. 30 on page 127, for detail view and for jam locations.

Torque for jam nut No. 3 for compressors manufactured after 0203J--. For compressors built before this, jumper bar must be under jam nut No. 3 or Loctite #089 applied to jam nut No. 2, or use 12 ft-lb.

NOTE: Bolt sizes and thread pitch: Compressors are built using English unit bolts. The bolts have no exact metric equivalents. Therefore, to prevent possible cross-threading, loose bolts, or damage to threaded portions of the casing, comparable metric measurements are not included.

2.11 — Torque Guide - 06E and 06CC (50 to 99 cfm) Compressors

SIZE DIAMETER (in.)	THREADS PER INCH	TORQUE RANGE (ft-lb)	TORQUE RANGE (nm)	USAGE
1/16	Pipe	8-12	11-16	Pipe plug crankshaft
1/8	Pipe	10-12	14-16	Orifice crankcase
No. 10	32	4-6	5-8	Oil pump drive segment
1/4	20	10-12 1.5-2.5	14-16 2-3	Con-rod cap screw Motor lead set screw terminal plate
1/4	28	3-5 4-6 12-15 12-15 12-15 12-15	4-7 5-8 16-20 16-20 16-20 16-20	Sight glass Cylinder head gasket tab screw Terminal box Unloader valve Discharge valve stop Oil pump drive segment
5/16	18	16-20 20-25	22-27 27-34	Cover plate bearing head Discharge service valve (4-cyl)
3/8	16	Do not disturb Finger Tight 18 10-20 30-35 30-35 30-35	Do not disturb Finger Tight 24 14-17 40-48 40-48 40-48	Terminal post jam nut No. 1* Terminal post jam nut No. 2* Terminal post jam nut No. 3* Oil plug bearing head Bottom plate, crankcase Compressor foot Terminal block
3/8	24-SAE	8-12	11-16	P.E. Bearing head at 10 o'clock position NOTE: Not a field usable fitting
5/8	18-SAE	25-40	27-54	Access port under motor barrel
7/16	14	55-60 55-60	75-81 75-81	Motor end cover, crankcase Bearing head, crankcase
7/16	20-SAE	8-12	11-16	Oil drain on bottom plate
1/2	13	80-90 80-90 80-90 85-100 85-100 85-100	109-122 109-122 109-122 115-136 115-136 115-136	Discharge service valve (6-cyl) Interstate outlet (CC) Suction service valve (1-5/8) Interstage manifold (CC) Suction manifold (CC) Cylinder head
1/2	Pipe	30-40	40-54	Cylinder head sensor
5/8	11	25-30 90-100	34-40 122-136	Rotor lock crankshaft Suction service valve (2-1/8)
3/4	16	50-60	68-81	Stator lock acorn nut
1-1/8	18	30-40	40-54	Pressure relief valve

See Table 2.10 for Notes and Legend (page 58).

3.0 — COMPRESSOR AND PARTS DATA

3.1 — 06D Series Compressors - Physical Data (Page 1 of 2)

CARRIER/ CARLYLE MODEL NUMBER	STANDARD SERVICE REPLACEMENT MODEL	SUCTION TEMPERATURE RANGE ...(a)					
		R-404A/507, R-448A and R-449A		R-134a		R-407A, R-407C and R-407F	
		°F	°C	°F	°C	°F	°C
06DM8080...	06DM8086...	0 to 50	–18 to 10	—	—	0 to 55	–18 to 13
06DR1090...	06DR1096...(b)	–40 to 0	–40 to –18	–10 to 55	–23 to 13	–35 to 0	–37 to –18
06DR0130...	06DR0136...(c)	–40 to 0	–40 to –18	–10 to 55	–23 to 13	–35 to 0	–37 to –18
06DM3130...	06DM3136...(c)	0 to 50	–18 to 0	—	—	0 to 55	–18 to 7
06DR3160...	06DR3166...(c)	–40 to 25	–40 to –4	–10 to 55	–23 to 13	–35 to 25	–37 to –4
06DM3160...	06DM3166...(c)	0 to 25	–18 to –4	–10 to 55	–23 to 13	0 to 55	–18 to 7
06DR7180...	06DR7186...	–40 to 0	–40 to –18	–10 to 55	–23 to 13	–35 to 0	–37 to –18
06DA8182...	06DA8186...	0 to 50	–18 to 10	—	—	0 to 55	–18 to 13
06DR8200...	06DR8206...	–40 to 40	–40 to 4	–10 to 55	–23 to 13	–40 to 25	–40 to –4
06DR7240...	06DR7246...	–40 to 25	–40 to 4	–10 to 55	–23 to 13	–40 to 25	–40 to –4
06DA8242...	06DA8246...	0 to 50	–18 to 10	—	—	0 to 55	–18 to 13
06DR7250...	06DR7256...	–40 to 25	–40 to 4	–10 to 55	–23 to 13	–40 to 25	–40 to –4
06DA8252...	06DA8256...	0 to 50	–18 to 10	—	—	0 to 55	–18 to 13
06DR2280...	06DR2286...	–40 to 25	–40 to 4	–10 to 55	–23 to 13	–40 to 25	–40 to –4
06DA3282...	06DA3286...	0 to 50	–18 to 10	—	—	0 to 55	–18 to 13
06DR3370...	06DR3376...	–40 to 25	–40 to 4	–10 to 55	–23 to 13	–30 to 25	–40 to –4
06DM3370...	06DM3376...	0 to 25	–18 to 10	–10 to 55	–23 to 13	0 to 45	–18 to 7
06DA5372...	06DA5376...	0 to 50	–18 to 10	—	—	0 to 55	–18 to 13
06DR5410...	06DR5416...	–40 to 25	–40 to 4	—	—	–40 to 25	–40 to –4

(a) Approximate condensing temperature ranges. CHECK ACTUAL PERFORMANCE DATA FOR ANY NEW APPLICATION ESPECIALLY AT OR NEAR UPPER OR LOWER LIMIT: Low Temperature=70 to 120°F (21 to 49°C), Medium Temperature=80 to 130°F (27 TO 54°C) and High Temperature (R-407A, C, F only) = 80 to 150°F (27 to 66°C).
(b) The 06DR 109 single phase compressor has a 3 HP (2.2 kW) motor.
(c) Service compressors have dual suction service valve locations, one on motor end and one near the oil pump.

3.1 — 06D Series Compressors - Physical Data (Page 2 of 2)

CARRIER/ CARLYLE MODEL NUMBER	MOTOR SIZE		DISPLACEMENT AT 1750 RPM				NO. OF CYL	BORE		STROKE		OIL CHARGE		NET WEIGHT	
	HP	kW	cfm	L/M	CFH	L/H (1,000)		in.	mm	in.	mm	Pints	Liters	Lb	Kg
06DM8080...	3	2.2	8.0	227	480	13.59	2	2	50.8	1-1/4	31.8	3	1.4	160	73
06DR1090...	2 (b)	1.5	8.7	246	522	14.78	2	2	50.8	1-3/8	34.9	3	1.4	190	73
06DR0130...	3	2.2	13.0	368	786	22.26	4	2	50.8	1	25.4	4 1/2	2.1	230	104
06DM3130...	5	3.7	13.0	368	786	22.26	4	2	50.8	1	25.4	4 1/2	2.1	235	107
06DR3160...	5	3.7	15.9	450	954	27.01	4	2	50.8	1-1/4	31.8	4 1/2	2.1	235	107
06DM3160...	5	3.7	15.9	450	954	27.01	4	2	50.8	1-1/4	31.8	4 1/2	2.1	235	107
06DR7180...	5	3.7	18.3	518	1100	31.09	4	2	50.8	1-7/16	36.5	5 1/2	2.6	250	113
06DA8182...	6 1/2	4.9	18.3	518	1100	31.09	4	2	50.8	1-7/16	36.5	5 1/2	2.6	250	113
06DR8200...	6 1/2	4.9	20.0	566	1200	33.00	4	2	50.8	1-9/16	39.7	5 1/2	2.6	260	118
06DR7240...	6 1/2	4.9	23.9	677	1435	40.60	6	2	50.8	1-1/4	31.8	8	3.8	310	141
06DA8242...	7 1/2	5.6	23.9	677	1435	40.60	6	2	50.8	1-1/4	31.8	8	3.8	310	141
06DR7250...	6 1/2	4.9	23.9	677	1435	40.60	6	2	50.8	1-1/4	31.8	8	3.8	310	141
06DA8252...	7 1/2	5.6	23.9	677	1435	40.60	6	2	58.8	1-1/4	31.8	8	3.8	315	143
06DR2280...	7 1/2	5.6	28.0	793	1680	47.57	6	2	50.8	1-15/32	37.3	8	3.8	315	143
06DA3282...	10	7.5	28.0	793	1680	47.57	6	2	50.8	1-15/32	37.3	8	3.8	315	143
06DR3370...	10	7.5	37.1	1050	2225	63.03	6	2	50.8	1-15/16	49.2	8	3.8	325	147
06DM3370...	10	7.5	37.1	1050	2225	63.03	6	2	50.8	1-15/16	49.2	8	3.8	325	147
06DA5372...	15	11.2	37.1	1050	2225	63.03	6	2	50.8	1-15/16	49.2	8	3.8	325	147
06DR5410...	15	11.2	41.0	1161	2460	69.66	6	2	50.8	2-5/32	54.6	8	3.8	325	147

LEGEND

CFH - Cubic ft per hour
L/H - Liters per hour
L/M - Liters per minute

3.2 — 06E Series Compressors - Physical Data (Page 1 of 2)

CARRIER/ CARLYLE MODEL NUMBER (d)	STANDARD SERVICE REPLACEMENT MODEL	SUCTION TEMPERATURE RANGE ...(a)					
		R-404A/507, R-448A and R-449A		R-134a		R-407A, R-407C and R-407F	
		°F	°C	°F	°C	°F	°C
06ER450...	06EY450...	-40 to 0	-40 to -18	-10 to 55	-23 to 13	-35 to 0	-37 to -18
06EM450...	06EZ450...	0 to 25	-18 to -4	-10 to 55	-23 to 13	0 to 45	-18 to 7
06EA550...	06ET250...	0 to 50	-18 to 10	—	—	0 to 55	-18 to 13
06ER166... (e)	06EY466...	-40 to 0	-40 to 18	-10 to 55	-23 to 13	-35 to 0	-37 to -18
06EM266... (e)	06EZ266...	0 to 45	-18 to 7	-10 to 55	-23 to 13	0 to 50	-18 to 10
06ER465...	06EY465...	-40 to 0	-40 to -18	-10 to 55	-23 to 13	-35 to 0	-37 to -18
06EA565...	06ET265...	0 to 50	-18 to 10	-10 to 55	-23 to 13	0 to 50	-18 to 13
06ER475...	06EY475...	-40 to 0	-40 to -18	-10 to 55	-23 to 13	-35 to 0	-37 to -18
06EM475...	06EZ475...	0 to 40	-18 to 4	-10 to 55	-23 to 13	0 to 45	-18 to 7
06EA575...	06ET275...	0 to 50	-18 to 10	—	—	0 to 55	-18 to 13
06ER399...	06EY399...	-40 to 0	-40 to -18	-10 to 55	-23 to 13	-35 to 0	-37 to -18
06EM499...	06EZ499...	0 to 40	-18 to 4	-10 to 55	-23 to 13	0 to 45	-18 to 7
06EA599...	06ET299...	0 to 50	-18 to 10	—	—	0 to 55	-18 to 13

(a) Approximate condensing temperature ranges. CHECK ACTUAL PERFORMANCE DATA FOR ANY NEW APPLICATION ESPECIALLY AT OR NEAR UPPER OR LOWER LIMIT: Low Temperature=70 to 120°F (21 to 49°C), Medium Temperature=80 to 130°F (27 to 54°C) and High Temperature (R-407A, C, F only) = 80 to 150°F (27 to 66°C).
(d) The models shown are new oil-less models. Models with oil had a 0, 1, or 2 in the 5th digit of the model number.
(e) The 06ER166 and 06EM266 models are no longer built new, but service replacements are built and available. For new applications, the 06ER166 and 06EM266 models have been replaced by the 06ER465 and 06EA565.

3.2 — 06E Series Compressors - Physical Data (Page 2 of 2)

CARRIER/ CARLYLE MODEL NUMBER (d)	MOTOR SIZE		DISPLACEMENT AT 1750 RPM				NO. OF CYL	BORE		STROKE		OIL CHARGE		NET WEIGHT	
	HP	kW	cfm	L/M	CFH	L/H (1,000)		in.	mm	in.	mm	Pints	Liters	Lb	Kg
06ER450...	15	11.2	50.3	1424	3016	85.45	4	2 11/16	68.3	2-3/16	55.6	14	6.6	430	195
06EM450...	15	11.2	50.3	1424	3016	85.45	4	2 11/16	68.3	2-3/16	55.6	14	6.6	430	195
06EA550...	20	14.9	50.3	1424	3016	85.45	4	2 11/16	68.3	2-3/16	55.6	14	6.6	430	195
06ER166... (e)	20	14.9	66.0	1869	3960	112.1	4	2 11/16	68.3	2-7/8	73.0	14	6.6	430	195
06EM266... (e)	25	18.6	66.0	1869	3960	112.1	4	2 11/16	68.3	2-7/8	73.0	14	6.6	430	195
06ER465...	20	14.9	68.3	1934	4096	116.0	6	2 11/16	68.3	1-63/64	50.4	19	9.0	480	218
06EA565...	25	18.6	68.3	1934	4096	116.0	6	2 11/16	68.3	1-63/64	50.4	19	9.0	485	220
06ER475...	20	14.9	75.4	2135	4524	128.1	6	2 11/16	68.3	2-3/16	55.6	19	9.0	490	222
06EM475...	25	18.6	75.4	2135	4524	128.1	6	2 11/16	68.3	2-3/16	55.6	19	9.0	490	222
06EA575...	30	22.4	75.4	2135	4524	128.1	6	2 11/16	68.3	2-3/16	55.6	19	9.0	490	222
06ER399...	30	22.4	99.0	2803	5940	168.2	6	2 11/16	68.3	2-7/8	73.0	19	9.0	500	227
06EM499...	35	26.1	99.0	2803	5940	168.2	6	2 11/16	68.3	2-7/8	73.0	19	9.0	505	229
06EA599...	40	29.8	99.0	2803	5940	168.2	6	2 11/16	68.3	2-7/8	73.0	19	9.0	520	236

LEGEND

CFH - Cubic ft per hour
L/H - Liters per hour
L/M - Liters per minute

3.3 — 06CC Series Compressors - Physical Data (Page 1 of 2)

CARRIER/ CARLYLE MODEL NUMBER	STANDARD SERVICE REPLACEMENT MODEL	SUCTION TEMPERATURE RANGE...(f)					
		R-404A/507, R448-A and R-449A		R-134a		R-407A, R-407C and R-407F	
		°F (h)	°C (h)	°F	°C	°F	°C
06CC016... (g)	06CY016...	-40 to -10	-40 to -23	(i)	(i)	-60 to -10	-51 to -23
06CC017...	06CY017...	-40 to -10	-40 to -23	(i)	(i)	-60 to -10	-51 to -23
06CC018... (g)	06CY018...	-40 to -10	-40 to -23	(i)	(i)	-60 to -10	-51 to -23
06CC124...	06CY124...	-60 to -10	-51 to -23	(i)	(i)	-60 to -10	-51 to -23
06CC125...	06CY125...	-60 to -10	-51 to -23	(i)	(i)	-60 to -10	-51 to -23
06CC228...	06CY228...	-60 to -10	-51 to -23	(i)	(i)	-60 to -10	-51 to -23
06CC337...	06CY337...	-60 to -10	-51 to -23	(i)	(i)	-60 to -10	-51 to -23
06CC550... (g)	06CY550...	-40 to -10	-40 to -23	(i)	(i)	-60 to -10	-51 to -23
06CC665...	06CY665...	-60 to -10	-51 to -23	(i)	(i)	-60 to -10	-51 to -23
06CC675...	06CY675...	-60 to -10	-51 to -23	(i)	(i)	-60 to -10	-51 to -23
06CC899...	06CY899...	-60 to -10	-51 to -23	(i)	(i)	-60 to -10	-51 to -23

(f) Approximate condensing temperature ranges. CHECK ACTUAL PERFORMANCE DATA FOR ANY NEW APPLICATION, ESPECIALLY AT OR NEAR UPPER OR LOWER LIMIT: Low Temperature = 70 to 130°F (21 to 55°C).

(g) To provide a 6-cylinder body needed for Compound Cooling, the normal 4-cylinder model 16, 18 and 50 cfm compressors are built using the 24, 18, and 65 cfm 6-cylinder bodies respectively. The actual cfm reduction is achieved by modifying the running gear.

(h) R404A/R-507 CANNOT be used in the small “D” body size Compound Cooling compressors (16 to 37 cfm), manufactured prior to Serial No. 2099J.

(i) R-134a CANNOT be used in any Compound Cooling compressor.

3.3 — 06CC Series Compressors - Physical Data (Page 2 of 2)

CARRIER/ CARLYLE MODEL NUMBER	MOTOR SIZE		DISPLACEMENT AT 1750 RPM				NO. OF CYL	BORE		STROKE		OIL CHARGE		NET WEIGHT		BODY SIZE
	HP	kW	cfm	L/M	CFH	L/H (1,000)		in.	mm	in.	mm	Pints	Liters	Lb	Kg	
06CC016... (g)	5	3.7	15.9	450	954	27.01	6	2	50.8	1-1/4	31.8	9.5	4.5	330	150	D
06CC017...	5	3.7	15.9	450	954	27.01	6	2	50.8	1-1/4	31.7	9.5	4.5	330	150	D
06CC018... (g)	5	3.7	18.3	518	1100	31.09	6	2	50.8	1-15/32	37.3	9.5	4.5	325	147	D
06CC124...	6 1/2	4.9	23.9	677	1435	40.60	6	2	50.8	1-1/4	31.8	9.5	4.5	335	152	D
06CC125...	6 1/2	4.9	23.9	677	1435	40.60	6	2	50.8	1-1/4	31.8	9.5	4.5	330	150	D
06CC228...	7 1/2	5.6	28.0	793	1680	47.57	6	2	50.8	1-15/32	37.3	9.5	4.5	340	154	D
06CC337...	10	7.5	37.1	1050	2225	63.03	6	2	50.8	1-15/16	49.2	9.5	4.5	345	156	D
06CC550... (g)	15	11.2	50.3	1424	3016	85.45	6	2 11/16	68.3	1-63/64	50.4	19	9.0	545	247	E
06CC665...	20	14.9	68.3	1934	4096	116.0	6	2 11/16	68.3	1-63/64	50.4	19	9.0	555	252	E
06CC675...	20	14.9	75.4	2135	4524	128.1	6	2 11/16	68.3	2-3/16	55.6	19	9.0	555	252	E
06CC899...	30	22.4	99.0	2803	5940	168.2	6	2 11/16	68.3	2-7/8	73.0	19	9.0	580	263	E

LEGEND

CFH - Cubic ft per hour

L/H - Liters per hour

L/M - Liters per minute

3.4 — Refrigerants and Oils for 06D, E, CC Compressors

Carlyle 06D, E, and CC compressors are shipped without oil.

Carlyle has approved the following UL listed refrigerants for use in 06D, E, and CC compressors: R-448A, R-449A, R-450A, R-452A, R-404A, R-407A, R407C, R407F, R-22, R-500, R-502, and R-507.

R-134a and R-513A are only approved for use in 06D and E compressors.

The table below details the Carlyle-approved oils for use in 06D/E applications. All POE oils will readily absorb and retain moisture from ambient air and should be used immediately upon opening the factory sealed container. Note that some of the POE oils shown are not approved for use in any low temperature applications.

MANUFACTURER	BRAND NAME
For HFC Refrigerants	
Totalline (POE)	P903-1701
Castrol (POE)	E68
ICI Emkarate (POE)	RL68H
Lubrizol Lubrikuhl (POE)	2916S
Texaco Capella (POE)	HFC 68NA
Totaline (POE)	P903-1001*
Castrol (POE)	SW68*
Mobile Arctic (POE)	EAL68*
For HCFC and CFC Refrigerants	
Totaline (MO)	P903-0101
Witco Suniso (MO)	3GS
IGI Petroleum (MO)	Cryol150
Texaco Capella (POE)	WF132-150
Totaline (AB)	P903-2001
Shrieve Chemicals (AB)	Zerol150

* Do not use in low temperature applications.

LEGEND
AB — Alkybenzene Oil
MO — Mineral Oil
POE — Polyolester-Based Oil

All POE oils are very hygroscopic (will readily pick up and retain moisture from the air) and should be used completely once the container is opened. It is extremely difficult to reseal the oil container effectively enough to prevent moisture absorption, which in turn forms damaging acids.

NOTES:

1. The use of any non-approved refrigerant may be dangerous and may void the warranty. Contact the Carlyle Compressor engineering department before using any refrigerant or oil not listed in this guide as approved for use in a Carlyle semi-hermetic compressor.
2. Using the wrong type or weight of oil for the refrigerant selected will void the warranty.
3. Follow the refrigerant and/or oil manufacturer instructions when installing or retrofitting.
4. Castrol SW68 (Totaline® P903-1001) is approved for use in Carrier chiller applications as well as Carrier and Carlyle semi-hermetic compressors for air conditioning and medium temperature applications. **Castrol SW68 (Totaline® P903-1001) cannot be used in any new low temperature refrigeration applications using Carlyle OEM semi-hermetic compressors. Castrol E68 is approved for use in Carlyle OEM compressors for low, medium, and high temperature ranges.**
5. All HFC/POE applications require a crankcase heater.
6. Moisture must be kept below 50 ppm for POE oils.
7. In retrofit applications, a high flow oil pump is required.

For HFCs not listed above, please contact Carlyle Engineering for oil recommendations.

3.5 — Oil Viscosity and Pour Points

The viscosity of oils used in Carlyle reciprocating compressors is ISO 68 (centistoke) for all POE oils and 150 Saybolt Seconds Universal (150 SSU or 150 SUS) or ISO 32 for mineral and alkylbenzene oils. Using oil with a different viscosity without approval from the Carlyle Engineering Department will void the warranty.

The oils listed in Sections 3.6 and 3.7 and the viscosity listed above can be used down to -60°F (-51°C). If your system runs at a lower temperature, please contact Carlyle Engineering for an oil recommendation.

3.6 — Oil Additives

No oil additive is allowed without written approval from the Carlyle Engineering Department. The use of any unauthorized additive will void the warranty.

3.7 — Oil Pressure

All new 06D, E, CC compressors are supplied with oil safety switch connections.

- For 06D and 06CC (16 to 37 cfm) compressors, the pressure is 18 to 26 psi (1.2 to 1.8 bars)
- For 06E and 06CC (50 to 99 cfm) compressors, the pressure is 18 to 34 psi (1.2 to 2.3 bars)
- Consult Carlyle engineering for oil pressure specifications for compressors produced prior to 1995.

3.8 — Replacement Oil Pump/Pump End Bearing Package

The oil pump and pump end bearing are an integral part called the pump end bearing head. If either the oil pump or the bearing requires replacement, order part as noted below:

PUMP END BEARING HEAD PACKAGE	USAGE
06DA660126	All 06D, 06CC (16 to 37 cfm) compressors
06EA660157	All 06E, 06CC (50 to 99 cfm) compressors

NOTE: The above pump end bearing head packages include a bearing head with the high side oil safety switch connection. This pump is recommended for all CFC, HCFC, and HFC refrigeration applications.

3.9 — Oil Pressure Safety Switch

Carlyle uses as standard the 120-second time delay oil safety switch, as this time period is preferred for HFC/POE systems. This is a change from the 45 to 60-second time delay used previously with CFC and HCFC systems. It is not necessary to change out the older, shorter time delay switch unless the unit is converted to an HFC/POE system.

The oil safety switch protects the compressor when lubrication is lost for more than 120 seconds. The switch closes the control circuit at start-up allowing the compressor to run for 120 seconds. Operating oil pressure must reach the minimum required start pressure above suction pressure within 120 seconds for the switch to remain closed, which allows the compressor to run. If the operating oil pressure falls to below the minimum stop pressure above suction for longer than 120 seconds, the switch will open the control circuit, shutting down the compressor.

Carlyle has approved the following oil safety switches for all applications with 06D, E, CC compressors:

Electromechanical Oil Pressure Protection

CARLYLE PART NO.	TIME DELAY	PRESSURE CONNECTIONS	PRESSURE DIFFERENTIAL SETTING		VOLTS	RESET TYPE	REMOTE ALARM CIRCUITOPTION
			Cut Out	Cut In			
060B2109	120 sec.	1/4 in. Male Flare	4-8 psid (0.28-0.55 bar)	8-11 psid (0.55-0.76 bar)	115/230	Manual	Yes
060B2164		1/4 in. Flare Nut With 36 in. Cap Tubes					

Oil Pressure Safety Switches

CARLYLE PART NO.	TIME DELAY	USAGE	PRESSURE DIFFERENTIAL SETTING		VOLTS	RESET TYPE	REMOTE ALARM CIRCUIT OPTION
			Cut Out	Cut In			
06DA509570	120 sec	Electronic Switch for Factory-Installed Sensor	4-8 (0.28-0.55 bar)	8-11 (0.55-0.76 bar)	115/230	Manual	Yes
06DA660115		Field Conversion Kit					

Use of oil pressure protection is recommended for any fixed speed 06D compressor applications where there is only a single compressor in the circuit. Oil pressure protection is required for any fixed speed 06D compressor applications where more than one compressor operates in parallel with other compressors. Oil pressure protection is required for all 06D variable speed applications and all fixed and variable speed 06E compressor applications, single and parallel compressors.

<table>
<tr><th rowspan="2">UNIT</th><th rowspan="2">NO. OF COMPRESSORS IN CIRCUIT</th><th colspan="3">OIL PRESSURE PROTECTION USAGE</th></tr>
<tr><th>With Non-Unloading Compressors</th><th>With Cylinder Head Unloading Compressors</th><th>With Variable Speed Unloading Compressors</th></tr>
<tr><td rowspan="2">06D</td><td>Single</td><td colspan="2" rowspan="2">Recommended</td><td rowspan="4">Required</td></tr>
<tr><td>Multiple</td></tr>
<tr><td rowspan="2">06E</td><td>Single</td><td rowspan="4">Required</td><td>Required</td></tr>
<tr><td>Multiple</td><td rowspan="2">Required</td></tr>
<tr><td rowspan="2">06CC</td><td>Single</td><td>N/A</td></tr>
<tr><td>Multiple</td><td>N/A</td></tr>
</table>

Replacement Parts:

- P/N: 06DA660170 (Includes 06DA509570, 06DA509571, and 06DA660169)
- P/N: 06DA509570, OPSS Electronic Unit
- P/N: 06DA509571, OPSS Screw-in Sensor
- P/N: 06DA660169, Sensor Block Kit

Refer to Fig. 16 OPSS Complete Assembly

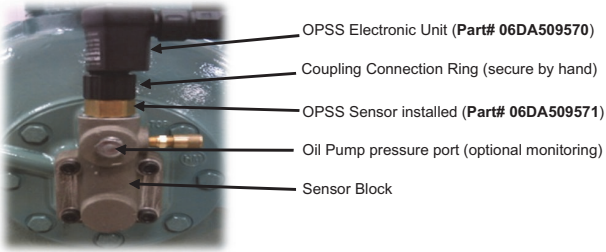


Fig. 16 — OPSS Complete Assembly

OPSS Function:

- The OPSS differential oil pressure switch consists of two parts: a sensor unit and an electronic unit. The electronic unit can easily be disconnected from the sensor without opening the oil/refrigeration circuit.
- The OPSS serves to monitor the oil differential pressure of the oil pumps in refrigeration compressors. For this, a screw-in sensor is mounted directly to the pump housing and measures both the compressor's suction and oil pump pressure simultaneously. The screw-in sensor is thereby connected, by the sensor block, to the suction and high pressure side of the oil pump. Thus supplementary pipe connections are not needed.
- The OPSS electrical unit is fastened by a coupling ring to the screw-in sensor and can be removed without opening the oil/refrigeration circuit (not in direct contact with the oil circuit). See Fig. 17.

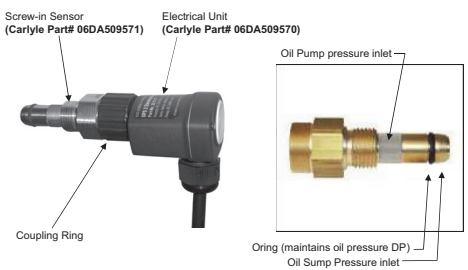


Fig. 17 — Oil Pressure Safety Switch

1. OPSS Operation:
   - The OPSS is a dual power low oil DP switch 120/240Vac (Blue/Brown wires).
   - Compressor Start: Oil pressure monitoring is activated once the supply voltage is applied to the operating recognition signal, which is applied to D1 (violet wire) via an auxiliary contactor or motor contactor (see wiring diagram). Following a compressor start, the OPSS allows for a 120 second oil pressure transition delay to allow the compressor to reach steady oil pressures. The differential pressure monitoring is activated after the expiration of the 120 second compressor starting transition time.
   - A low differential oil pressure (9 psig) for a continuous 120 seconds will lead to a locked switch and trip the compressor off.
   - Also, a time integrated low differential oil pressure (9 psig) that is fluctuating 60% of the time <= to 9 psig over a 5 minute rolling window will lead to a locked switch and trip the compressor off.
   - A manual reset of the relay can be carried out by the built-in push button, or by activating the operating recognition (D1) or by a 5 second power reset.
   - The monitoring of internal errors is always active. Any faults that occur in any operational phase will lead to a locked switch off of the relay after 5 seconds and trip the compressor. The potential-free relay contact can be looped into a safety circuit without an auxiliary relay. An installation check monitors for the proper assembly. An LED status will indicate if the OPSS is faulty or not correctly installed (See LED Status Table).
   - The built-in LED indicates the actual operating state of the compressor's oil pump pressure. Once the oil DP pre-

set value has been reached (13 psig), the LED light will be off and the OPSS output contacts remain in the closed position (Gray and Orange wires). If the differential oil pressure falls below the cut-out preset value (9 psig) for a continuous 120 seconds or a time integrated low delta P for 120 seconds, the OPSS output contacts will open and shut down the compressor and indicate the status per the LED indicator. (See LED Status Table.)

2. Oil Sensor Block Installation (06D/E/CC)
   NOTE: 2-Cylinder 06D compressors (06DM808 and 06DR109) cannot support the Oil Sensor Block installation due to interference with the Service Valve position installed on the crankcase. Please contact Carlyle Engineering for options if you would like to apply the electronic OPSS to a 2-cylinder 06D compressor.

   a. Remove cover plate bolts, cover plate and gasket from bearing head. (During reassembly be sure that spring and recess cup are in place and do not re-use factory installed gasket.)
   b. Install the 1/4 in. NPT O-ring seal fitting into the high side oil pump pressure port on the compressor as shown in Fig. 18 (Torque to 20-25 ft/lbs):

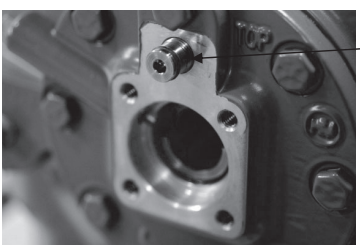


Fig. 18 — Cover Plate Removed

c. The sensor block gasket (P/N 06DA504473) is installed between the bearing head and sensor block with the bead side facing you. Lightly oil the gasket. Make sure the bearing head surface is clean and free from any debris. Refer to Fig. 19.

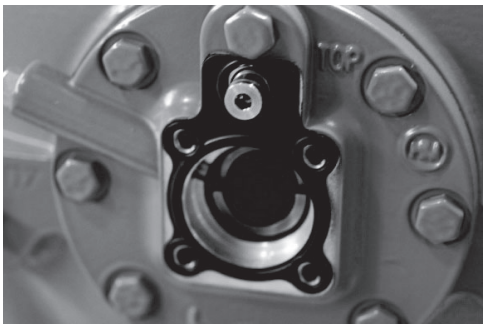


Fig. 19 — OPSS Block Gasket

d. Next, install the sensor block (P/N 06EA507202) over the gasket and the 1/4 in. NPT O-ring seal fitting as shown. Mount the sensor block to the bearing head using the four 5/16 in.-18 x 1-1/4 in. Allen head bolts provided in the kit (Torque to 15-20 ft/lbs). (Be sure spring and recess cup are in place). Refer to Fig. 20.

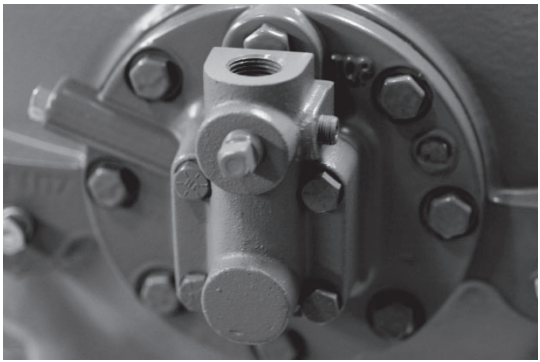


Fig. 20 — OPSS Sensor Block Installed

3. Install the OPSS sensor into the Sensor Block. Be sure the copper washer is in-place. Tighten the sensor's 1 in. hex nut securely to the sensor block (torque 45-55 ft/lbs). See Fig. 21.

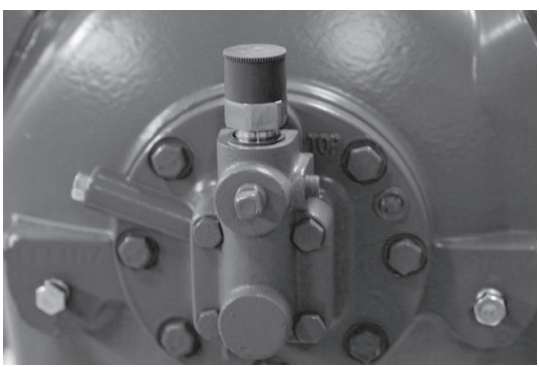


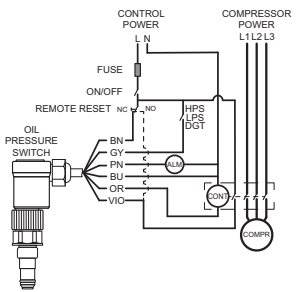
Fig. 21 — OPSS Sensor Installed

4. Installation and Wiring for OPSS (06D/E/CC/M)
    - Install the coupling ring end of the OPSS electrical unit to the sensor by hand and secure tightly.
    - The electrical connections for the OPSS electrical unit need to be carried out according to the proposal in the wiring diagram (Fig. 22-24).

Technical Specifications

Permitted Temperature	-22°F to +194°F
Differential Pressure	Cut-out 9 psig ±1 psig Reset 13 psig ±1 psig
Operating Pressure	435 psig
Electronic Unit (BN/BU) Dual Voltage Connection	AC 50/60 Hz 115-230V -15/+10%
Operating Recognition Connection (D1) Dual Voltage	AC 50/60 Hz 115-230V -15/+10%
Ambient Temperature Range	-22°F to 158°F
Delays:	
• Relay on after applying the supply voltage	3s ±1s
• Relay on after previous locking	120s ±5s
• Starting transition time D1 active	5s ±2s
• Relay off (error)	5s ±2s
• Relay off (diff. pressure missing)	120s ±5s (time integration)
• Reset by interrupting the supply voltage	About 5s
• Reset by button	About 1s
• Reset by operating recognition (D1)	About 1s
Output Relay	AC 240V 2.5A C300
Protection Class Acc. to EN60529	IP54 in built-in status

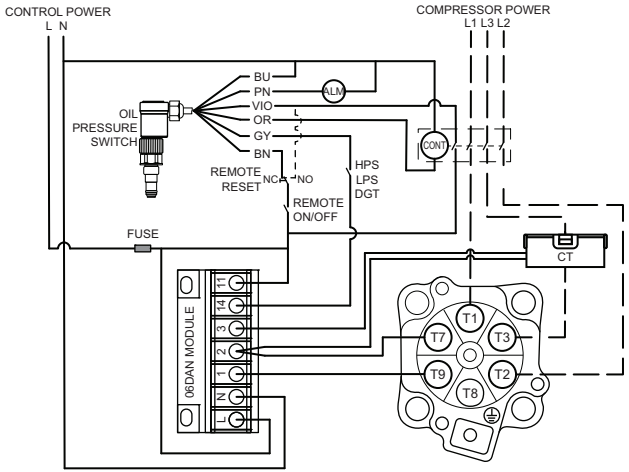
Wiring Diagrams



LEGEND

BN (BROWN)	Line Power To OPPS
BU (BLUE)	Common Neutral
GY (GRAY)	Compressor Faults Input
VIO (VIOLET)	Compressor Run Status Input
OR (ORANGE)	Compressor Run Output
PN (PINK)	Compressor Alarm Output
ALM	Alarm Indicator
COMPR	Compressor Motor
CONT	Compressor Contactor
HPS, LPS, DGT	Compressor Safeties (Daisy chained high and low pressure switches, discharge gas thermostat, etc.)
NC, NO	Normally Closed/Open

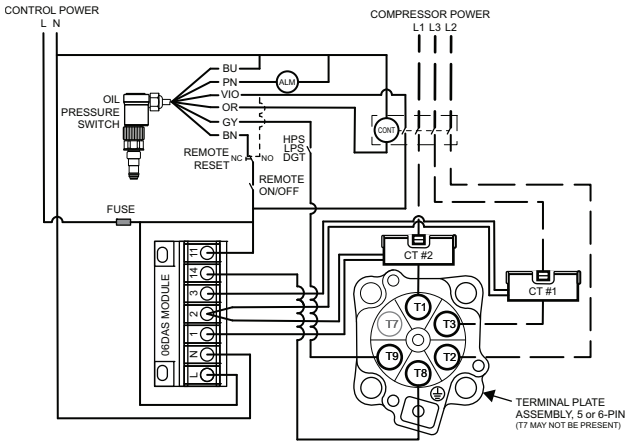
Fig. 22 — Wiring Diagram OPSS



LEGEND

BN (BROWN)	Line Power To OPSS
BU (BLUE)	Common Neutral
GY (GRAY)	Compressor Fault Inputs
VIO (VIOLET)	Compressor Run Status Input
OR (ORANGE)	Compressor Run Output
PN (PINK)	Compressor Alarm Output
ALM	Alarm Indicator
CONT	Compressor Contactor
HPS, LPS, DGT	Compressor Safeties (Daisy chained high & low pressure switches, discharge gas thermostat, etc.)
NC, NO	Normally Closed/Open

Fig. 23 — Wiring Diagram OPSS-06D with Electronic Overloads and 1 CT



LEGEND

BN (BROWN)	Line Power To OPSS
BU (BLUE)	Common Neutral
GY (GRAY)	Compressor Fault Inputs
VIO (VIOLET)	Compressor Run Status Input
OR (ORANGE)	Compressor Run Output
PN (PINK)	Compressor Alarm Output
ALM	Alarm Indicator
CONT	Compressor Contactor
HPS, LPS, DGT	Compressor Safeties (Daisy chained high & low pressure switches, discharge gas thermostat, etc.)
NC, NO	Normally Closed/Open

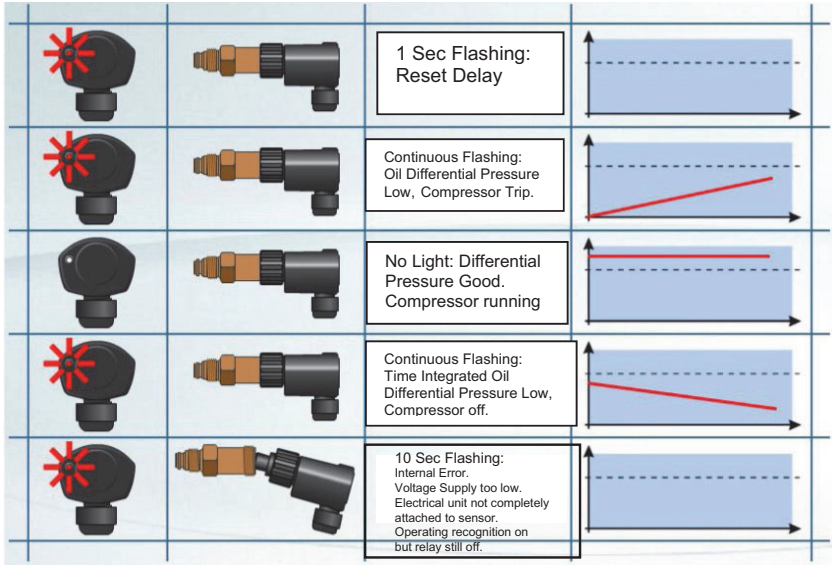
Fig. 24 — Wiring Diagram OPSS-06D with Electronic Overloads and 2 CT

The OPSS can be reset in three different ways:

- Disconnect the module from the power supply for 5 seconds.
- Push the reset button.

Once the module is reset, the compressor is allowed to re-start again after a 120 second time delay.

LED Status Table and Flash Codes



OPSS Removal

Carlyle recommends using OPSS to prevent compressor from loss of lubrication, but in some situations, if there is a need to remove the existing OPSS from the compressor's bearing head, it can be done by swapping the OPSS with the old style bearing head.

Kit number 6ADB001369 is needed to remove the OPSS and install the old style bearing head.

This kit will have all the necessary parts to retrofit the compressor with the old style bearing head.

3.10 — 06CC, E Discharge Gas Cylinder Head Temperature Sensor and 06E Pressure Relief Valve

All OEM Carlyle 06EA, EM, ER compressors are equipped with a discharge gas temperature sensor. The sensor is installed in the center head on all six-cylinder models. The four-cylinder 06E compressors have the sensor in the left side head as viewed from the oil pump end. All 06CC compressors have the sensor located in the high stage head.

When the discharge gas temperature in the cylinder head exceeds the sensor trip setting (see below), the sensor will open the control circuit and shut off the compressor. The head sensor must be wired into the control circuit by the OEM and is pilot duty only at 240V = 0.52A, at 115V = 1.04A. The sensors are threaded into the head without a well. Therefore, when changing a sensor, the compressor must first be isolated and evacuated.

CYLINDER HEAD TEMPERATURE SPECIFICATIONS		
	Refrigeration from 1982 to mid-1998 for 06ER, EM, EY and EZ	All 06E and 06CC Compressors
Part Number	HN68GA295	HN68GA242
Opens	325°±8°F (163°±4°C)	295°±5°F (146°±3°C)
Closes	250°±12°F (121°±7°C)	235°F minimum (113°C)
Wire Color	Silver Grey	Black
Thread	1/2-in. NPT	1/2-in. NPT

NOTE: 325°F sensor is no longer available, for service replacement use HN68GA242.

NOTES:

1. Since 1993 all Carrier 06 series air conditioning compressors have been made without a sensor. All Carlyle OEM 06 series compressors are equipped with a sensor.
2. Starting in mid-1998 all Carlyle OEM compressors, including 06EA, EM, ER and all 06CC models, are built using the HN68GA242 sensor. The change to a single sensor model is due to the increased use of HFC refrigerants, which operate at lower temperatures.

Pressure Relief Valve

All 06E compressors are equipped with factory-installed safety relief valves that are set to relieve from the discharge to the suction side of the compressor at a pressure differential of 400 psi (27 bar). On the 4-cylinder 06E compressor, the relief valve is located below the discharge service valve in the compressor crankcase. On the 6-cylinder 06E compressors, it is located in the center bank (below the valve plate) of the crankcase. The relief valve is sealed with a metal gasket:

Part Number Description

EB51FN272 - 400 psi Relief Valve (differential pressure)

6G65-1251 - Relief Valve, Gasket

An 11/16 in. drag link socket can be useful for removing or installing the relief valve.

3.11 — 06D, E Cylinder Head Cooling Fans, and Liquid Injection

Cylinder head cooling fans are required in any application where the discharge gas temperature exceeds 250°F (121.1°C). Applications where the compressor is located in an airstream with a consistent velocity of 8 to 10 fps (~3 m/s) do not require cylinder head fans.

Liquid refrigerant injection may be needed in some applications to keep discharge temperatures under the required limit in some high pressure ratio low temperature operating conditions. Liquid injection will reduce compressor capacity and can lead to increased risks of wear in the cylinders and running gear of the compressor. System controls towards lower suction gas superheats and lower operating pressure ratios are preferred in controlling discharge gas temperatures. Consult Application Engineering prior to installing liquid refrigerant injection on the Carlyle 06D or 06E compressors.

CYLINDER HEAD COOLING FAN REPLACEMENT PARTS

DESCRIPTION	06D, 06CC (16 to 37 cfm)	06E, 06CC (50 to 99 cfm)
Head cooling fan assembly - 208/230V	06DA680070	06DA680072
Head cooling fan assembly - 460V	06DA680071	06DA680073
Head cooling fan assembly, less mounting - 208/230V	06DA680074	06DA680074
Head cooling fan assembly, less mounting - 460V	06DA680075	06DA680075
Mounting kit	06DA680076	06DA680077
Replacement motor - 208/ 230V	06DA680079	06DA680079
Replacement motor - 460V	06DA680078	06DA680078
Replacement fan blade	06DA680080	06DA680080
Mounting stud nuts	3/8 - 16	1/2 - 13

3.12 — Capacity Control Accessory Packages (Suction Cut-Off Unloading Type)

The following suction cut-off capacity control packages are available to field convert those 06D, 06E compressors without unloading. With the exception of the 06D 2-cylinder models, these packages can be added to any new, replacement, or existing 06D or 06E compressors. See Fig. 25.

NOTE: Before adding a suction cut-off control package to a compressor currently without unloading, consider all line piping sizes and design to ensure proper oil return to compressor with reduced (unloaded) refrigerant flow rates.

CAPACITY CONTROL PACKAGES

CAPACITY CONTROL PACKAGES				
COMPRESSOR	**TYPE**	**COLOR**	**PACKAGE NUMBER**	**BARE UNLOADER VALVE**
06D	Electric*	Green	06DA660177	06DA660175
		Gray	06DA660180	
	Pressure†	Green	06DA660090	06DA660176
		Gray	06DA660181	
06E	Electric*	Green	06EA660171	06DA660175
		Gray	06EA660173	
	Pressure†	Green	06EA660139	06DA660176
		Gray	06EA660174	

* Coil NOT included, order separately (see Section “3.13 — Capacity Control Coil Packages (06D, E)” on page 90).

† Special Allen head wrench to change valve is part number 06EA680036.

NOTES:

1. Each package unloads 2 cylinders (1-step) and includes (1) cylinder head assembly with applicable unloader valve (electric or pressure) and necessary gaskets.
2. When adding the suction cut-off unloading feature to any compressor, it is not required to change the valve plate.
3. To avoid interfering with hi-lo pressure connections or cylinder head sensor, install the unloader cylinder head as follows (viewed from oil pump end of compressor):

   06D 4-cyl - left hand cylinder deck
   06E 4-cyl - right hand cylinder deck
   06D, 06E 6-cyl - either cylinder deck (both when applicable)
4. Unloader valve gasket part number 06EA501253.
5. Unloader is not available for 06CC compressors.

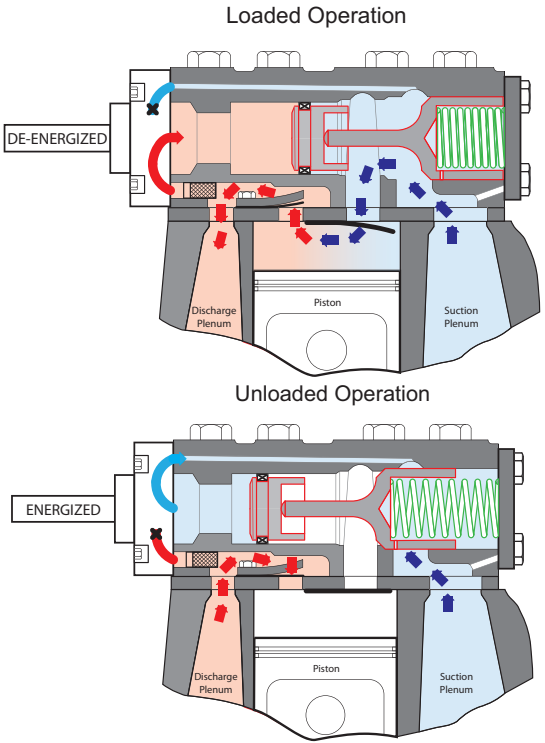


Fig. 25 — Loaded and Unloaded Operation

3.13 — Capacity Control Coil Packages (06D, E)

COIL PACKAGE PART NUMBER	VOLTAGE (V-PH-Hz)
EF19ZZ001	24-1-50/60
EF19ZZ002	120-1-50/60
EF19ZZ003	208/240-1-50/60

3.14 — Crankcase Heater Data

Crankcase heaters help reduce refrigerant migration to the compressor during shut-down. Crankcase heaters are designed to raise the temperature in the compressor oil compartment approximately 15 to 25°F (8 to 14°C). Carlyle recommends crankcase heaters be wired so the heater is energized only when the compressor shuts off. Crankcase heaters should be “ON” initially for 24 hours before starting the compressor. All HFC/POE applications require a crankcase heater.

STRAP-ON HEATERS:

Mounted externally to the underside of the stamp steel bottom plate. Install axially using (2) bottom plate bolts plus brackets and screws in package. Used on 06D( ) 808, 109, 013, 313, and 316 compressors. All strap-on heaters are 45 watts.

INSERTION HEATERS:

Insert into cast well (hole) in cast iron bottom plate. Circular clip with barbs secures heater. Used on 06D( ) 718, 818, and 820 4-cylinder compressors, all 6-cylinder 06D compressors, all 06E and all 06CC compressors. Insertion heaters are available in 125 and 180 watt sizes.

CRANKCASE HEATER PACKAGES

CRANKCASE HEATER PACKAGE	TYPE	HEATER NUMBER	VOLTAGE	WATTS	CONDUIT LENGTH in. (cm)	WIRE LENGTH in. (cm)
RC6800551	Strap-on	SHS80300	115	45	—	10 (25)
06EA660165	Insertion	HT36DM132	115	180	19 (48)	24 (61)
06EA660167	Insertion	HT36DM134	115	180	52 (132)	73 (185)
06EA660166	Insertion	HT36DM432	230	180	19 (48)	24 (61)
06EA660168	Insertion	HT36DM434	230	180	52 (132)	73 (185)
06DA660076	Insertion	HT36DL480	480	125	—	24 (61)

3.15 — Compressor Mounting Data

Mounting packages are available to mount individual compressors. Package contains mounting springs, threaded studs, snubbers, spring cups, nuts, and washers for (1) compressor.

MOUNTING PACKAGE NUMBER	USE WITH BODY STYLE
06DA660058	06D 2-cylinder
06DA660056	06D 4-cylinder
06DA660057	06D, 06CC (16 to 41 cfm) 6-cylinder
06EA660089	06E 4 and 6-cylinder and 06CC (50 to 99 cfm)

3.16 — Compressor Service Valves and Gaskets (06D, E, CC)

VALVE PACKAGE NO.*	ODS (in.)	DESCRIPTION	FIBER GASKET PACKAGE**	METAL GASKET PACKAGE
06DA660060	5/8 brass	2-bolt 1-5/8 in. spacing	6D23-1421	06DA504143
06DA660061	7/8 brass			
06DA660062	7/8 brass	2-bolt 1-3/4 in. spacing	6D40-1131	06DA504163
06DA660063	1-1/8 brass			
06DA660064	1-1/8 brass	4-bolt 2-1/2 in. spacing	6D68-1131	06DA504153
06DA660065	1-3/8 brass			
06EA660090	1-5/8 brass			
06EA660164	2-1/8 brass	Circular, No Holes, for 4-bolt 3-1/16 in. spacing	6G65-1061	N/A

* Packages consist of (1) service shut-off valve and required fiber gasket and mounting bolts.

**Package contains 12 gaskets.

3.17 — Oil Drain Plug Adapter

All new compressors, except for 06D( ) 808, 109, 013, 313, and 316 models, are built with a 7/16-20 SAE fitting and
O-ring as the oil drain plug. Carlyle offers an oil drain adapter, P/N DE14CA126, which replaces the SAE plug. This adapter allows the installation of a 1/4 in. NPT angle valve as a drain fitting.

3.18 — Sight Glass Adapters for Oil Equalization

ADAPTER PACKAGE P/N	COMPRESSOR USAGE
06DA900072 06EA660127	For 06D and 06CC (16 to 37 cfm) For 06E and 06CC (50 to 99 cfm)

3.19— Replacement Sight Glass/Installation Tool

SIGHT GLASS PACKAGE/ INSTALLATION TOOL	COMPRESSOR USAGE
5F20-152 Sight Glass (S.G.)* KM39BN010 (S.G. without O-ring) KK71GW015 (O-ring for S.G.) T133300B-1 (Installation Tool)	All 06Ds and 06CC (16 to 37 cfm) All 06Es and 06CC (50 to 99 cfm) All 06Es and 06CC (50 to 99 cfm) All 06Ds and 06CC (16 to 37 cfm)

* 5F20-152 sight glass assembly includes 5F20-1631 gasket.

3.20 — Replacement Motor End Mounting Foot

MOTOR END FOOT P/N	COMPRESSOR USAGE	MOUNTING HOLE WIDTH (in.)
6D40-1042	All 2 cylinder 06D All 4 cylinder 13 and 16 cfm 06D All 6 cylinder 06DA A/C duty models	8.875
6D48-2063	All 4 cylinder 18 ans 20 cfm 06D	8.25
06EA500052	All 4 cylinder 06DR and DM and 06CC (16 to 37 cfm “D” Body) All 06EA A/C duty models	8.875 and 11.375
06EA501172	06CC (50 to 99 cfm “E” Body) and All 06ER/EM Refrig. duty models	8.875 and 11.375

3.21 — Gaskets - Cylinder Head and Valve Plate

GASKET TYPE	PART NUMBER
06D COMPRESSORS	
1:Cylinder head gaskets	
a. Side bank, no unloading	05GA502213
b. Side bank, with unloading (suction cut-off design)	05GA502223
c. Side bank, with unloading (hot gas bypass design)	05GA502183
d. Center bank	05GA502173
2:Valve plate gaskets	
a. Standard 2 in. diameter cylinder bore	05DA500153
b. Old design 1-13/16 in. diameter cylinder bore	6D40-1073
c. Blank-off (special) used only on old standard 16 cfm models with suction valve at P.E. and using H.E. valve plates	06DA502923
06E COMPRESSORS	
1:Cylinder head gaskets	
a. Side bank, no unloading	06EA503304
b. Side bank, with unloading (suction cut-off design)	06EA503334
c. Side bank, with unloading (hot gas bypass design)	06EA503314
d. Center bank	06EA503314
2:Valve plate gaskets	Package #06ER660012 contains: (1) 06EA501853 gasket/ (2) suction valves
a. H.E., low temperature (ER, EY) 0.028"/0.036"	06EA504884 (fiber) or 06EA506414 (metal)
b. H.E., medium temperature (EM, EZ) 0.067"/0.072"	
c. H.E., high temperature (EA, ET) 0.067"/0.072"	06EA506418
d. Old standard, low temperature (ER, EY) 0.035"/0.041"	06ER660012
e. Old standard, medium temperature (EM, EZ) 0.035"/0.041"	06ER660012
f. Old standard, high temperature (EA, EX) 0.067"/0.072"	06EA504884
06CC COMPRESSORS	
1:16 to 37 cfm	
a. Cylinder head	05GA502213
b. Valve plate	05DA500153
c. Suction manifold	6D40-1131*
d. Interstage manifold	6D40-1131*
e. Liquid injection	6D23-1421*
f. Interstage tube	6D23-1421*
2:50 to 99 cfm	
a. Cylinder head	06EA503334
b. Valve plate	06EA506414
c. Suction manifold	6D68-1131*
d. Interstage manifold	6D68-1131*
e. Vapor injection (Subcooler)	6D23-1421*
f. Interstage tube	6D68-1131*

* Service package contains 12 gaskets.

NOTE: "H.E." and "Old Standard" are designations based on date of manufacture; see Section 3.4 page 66 for details.

3.22 — Miscellaneous

Terminal Plate Gasket

COMPRESSOR USAGE	GASKET
06D, 06CC (16 to 37 cfm) 06E, 06CC (50 to 99 cfm)	6D40-1061 6G45-1082

OPSS Sensor Block Gasket

COMPRESSOR USAGE	GASKET
06D, 06E, 06CC	06DA504473

Electrical Terminal Barrel Nut Tool (Socket tool used for installation for terminal nuts)

COMPRESSOR USAGE	GASKET
All 06D, 06CC (16 to 37 cfm)	P920-0009

3.23 — Valve Plate Packages, Service Replacement

COMPRESSOR USAGE	VALVE PLATE PACKAGE
06D, 06CC (17 to 41 cfm) Compressors	
a. 06DR (if using 06DR013 or 06DR316 models see note 1)	06DA660151
b. 06DM, DA (if using 06DM313, or 06DM316 models see note 1)	06DA660152
c. 06CC (16 to 37 cfm) low stage valve package	06CY660002
d. 06CC (16 to 37 cfm) high stage valve package	06DA660152
06E, 06CC (50 to 99 cfm) Compressors	
a. 06ER	06EA660143
b. 06EM, EA	06EA660137
c. 06CC (50 to 99 cfm) low stage valve*	06EA660159
d. 06CC (50 to 99 cfm) high stage valve	06EA660137

* Includes relief valve for both low stage banks.

NOTES:

1. All high efficiency (units with a "3" in the 11th digit of the model number) 06DR013 and 06DM313, 06DR316, and 06DM316 models have a 2 in. diameter cylinder bore and use the above valve plate kits. Older 13 and 16 cfm (prior to 1985) models have a 1-13/16 in. diameter bore and cannot use these valve plate kits. Kits for these models are no longer available. Suction reed valve (part no. 6D45-1072) and discharge reed valve (part no. 6D75-1062) can be used for valve plate field repair.
2. Carlyle recommends that all HGBP unloading be converted to SCO unloading. Compressors that have two stages of unloading should have both stages changed at the same time. Do not intermix SCO and HGBP unloading on the same compressor.

   Hot gas bypass unloading valve plate kits are:
   06D.....06DA660131
   06E.....06EA660105
   The Carlyle recommended suction cut-off unloading does not require a special valve plate. Suction cutoff unloading uses the standard high efficiency valve plate kit, which includes the needed gasket.
3. Service valve plate kits include: (1) valve plate assembly, (2) suction reed valves, (3) cylinder head gaskets (side, center and suction gas unloading), (1) valve plate gasket; and for 06D compressors there are (2) suction valve position springs.
4. All 06DM, 06DA, and 06CC (16 to 37 cfm) compressors have flat top pistons. All 06DR and 06ER compressors have one step contoured pistons. All 06EM, 06EA, and 06CC (50 to 99 cfm) compressors have two-step contoured pistons.

3.24 — Muffler Recommendations

Mufflers can reduce discharge gas pulsation and effectively eliminate vibration problems downstream. They should be placed as close to the compressor as possible to maximize efficiency and minimize vibration. Mufflers are recommended in the following applications:

- All 06E 66 and 99 cfm compressor models.
- Any 06E compressors with capacity control.
- All 06D 37 and 41 cfm compressor models.
- Any 06D 6-cylinder compressors with capacity control.

MUFFLER PART NO.	ALTERNATE MUFFLER PART NO.	WEIGHT LB (KG)	INLET/ OUTLET (in.)	COMPRESSOR SIZED BY cfm
06DA605594	1762	5 (2.3)	5/8 ODM	08, 09, 13, 16
06DA605604	1758	5 (2.3)	7/8 ODF	18, 20, 24
06DA605614	1792	5 (2.3)	1-1/8 ODF	28, 37, 41
06EA500302	1771	10 (4.5)	1-3/8 ODF	50
LM10HH100	1771	6 (2.7)	1-3/8 ODF	65, 75, and 06E()399
06EA500712	1772	7 (3.2)	1-5/8 ODF	06E()499, 599, and 06CC899

Mufflers can be mounted horizontally or vertically.

3.25 — Electrical Accessories

TERMINAL BOX PACKAGE NUMBERS - This consists of terminal box, cover, and necessary mounting components.

TERMINAL BOX PACKAGE NUMBER	T-BOX NUMBER	TYPE	COLOR	COMPRESSOR USAGE AND SIZE	DIMENSIONS ft (cm)
06DA660150	06DA660078	Large, Folded	Green	All 06D 2,4,6-cylinder and 06CC 16 to 37 cfm	(6" x 8") (15.2 x 20.3 cm)
06DA660075	06DA407734	Small, Folded	Green	All 06D 4,6 cylinder	(6" x 5") (15.2 x 12.7 cm)
06EA660095	06EA504684	Drawn Steel	Green	All 06E 4,6-cylinder and 06CC 50 to 99 cfm	(6" x 8") (15.2 x 20.3 cm)
06DA660088	06DA407764	Large, Folded	Gray	All 06D 2,4,6-cylinder and 06CC 16 to 37 cfm	(6" x 8") (15.2 x 20.3 cm)
06EA660094	06EA406294	Drawn Steel	Gray	All 06E 4,6-cylinder and 06CC 50 to 99 cfm	(7.8" x 7.8") (19.8 x 19.8 cm)

NOTE: Information in shaded area is no longer available in standard factory production.

TERMINAL LUG PACKAGE - The 06DA660095 package consists of six, screw-on terminal lugs with set screws. The HY85TB004 and HY85TB008 packages consist of one terminal lug (six required per compressor).

TERMINAL LUG PACKAGE NUMBER	COMPRESSOR USAGE
06DA660095	All 06D and 06CC 16 to 41 cfm.
HY85TB008	All 06E and 06CC 50 to 99 cfm #4 to #8 Wire Size.
HY85TB004	All 06E and 06CC 50 to 99 cfm #1 to #4 Wire Size.

TERMINAL PLATE JUMPER PACKAGE FOR 06E, 06CC 50 TO 99 cfm - This package consists of jumper bars, terminal nuts and instructions to interconnect terminal studs for proper motor starting (PW or XL) and voltage.

JUMPER PACKAGE NUMBER	USAGE
06EA660141	208/230/460 (triple and distinct voltage)

NOTE: With 06E multi-volt (208/230/460) compressors, the 460-volt motor can be connected only for across-the-line start. A compressor with a distinct 460-volt motor (or designated P/W) must be used for part-winding start.

3.26 — Baffle Plate Recommendations

Baffle plates can be used to reduce compressor discharge gas pulsations. Recommended baffle plate assemblies are shown below. These plates are designed to create a 6 to 10 psi (0.4 to 0.7 bars) pressure drop in the discharge gas. Use only the baffle plate recommended for the application. These baffle plates, sandwiched between two gaskets, are installed between the compressor discharge service valve and the compressor crankcase or cylinder head. For further details, see 99TA516198B located on Carlyle's website.

NEW CONSOLIDATED BAFFLE PLATE KITS

Carlyle has revised the baffle plate kit offerings to cover all of the current applications for the 06D, 06E and 06CC compressors. There will be one kit for each of the three different flange connections used (1-5/8 in., 1-3/4 in. and 2-1/2 in. square pattern). Plates will come predrilled for the smallest application used in that configuration. For the larger applications, the holes may need to be enlarged at the job site prior to installation. Please verify the hole size required for your application. Some of the kit numbers now cover smaller applications and will require that the holes to be enlarged when applied in applications that previously did not require modification.

In addition to the standardization and consolidation of the kits, installation instructions are now included along with the fittings required to measure the pressure drop across the plates. An installation tag is also provided for future identification and servicing reference.

Baffle plates have been applied in refrigeration applications to help reduce gas pulsation in discharge line assem-

blies, this helps to minimize the potential for line vibration. The baffle plates are typically installed between the discharge service valve and the compressor body or center cylinder head.

1. Carlyle does not recommend Baffle Plates for new design applications. In a newly engineered system, the piping can be designed to minimize line vibration such that baffle plates are not required.
2. Baffle plates are typically sized for the refrigerant applications at full design load conditions. Once installed, verifying the actual pressure drop is recommended. Modifying the Baffle Plate (enlarging some of the orifices) may be necessary if the pressure drop is excessive.

BAFFLE PLATE ADVANTAGES:

- Easily applied on a compressor or system. Especially easy on retrofits of existing system that exhibit piping vibration concerns.
- Effectively reduces pulsation at certain range of operating conditions. Carlyle recommends 6 to 10 psi pressure drop to obtain effective discharge pulsation reductions. This requires different baffle plate sizes for different compressor displacements. A detailed list of our current recommendations is shown in chart on page 101 and 102.
- The most cost effective method of reducing gas pulsation.

BAFFLE PLATE RECOMMENDATIONS

COMPRESSOR MODEL	Low Temperature Duty		Medium Temperature Duty		High Temperature Duty	
	Part Number	Orifice: (Qty.) Diameter	Part Number	Orifice: (Qty.) Diameter	Part Number	Orifice: (Qty.) Diameter
06DM808	—	—	06DA660103	(3) 5/32"	06DA660103	(3) 5/32"
06DR109	06DA660103	(3) 5/32"	—	—	—	—
06DR013	06DA660103	(3) 5/32"	—	—	—	—
06DM313	—	—	06DA660103	(3) 5/32"	06DA660103	(3) 5/32"
06DR316	06DA660103	(3) 3/16"†	—	—	—	—
06DM316	—	—	06DA660103	(3) 3/16"†	06DA660103	(3) 3/16"†
06DR718	06DA660103	(3) 3/16"†	—	—	—	—
06DA818	—	—	06DA660103	(3) 3/16"†	06DA660103	(3) 3/16"†
06DR820	06DA660103	(3) 3/16"†	06DA660103	(3) 3/16"†	06DA660103	(3) 3/16"†
06DR725	06DA660104	(3) 7/32"	06DA660104	(3) 17/64"†	06DA660104	(3) 17/64"†
06DA825	—	—	06DA660104	(3) 17/64"†	06DA660104	(3) 17/64"†
06DR228	06DA660104	(3) 7/32"	06DA660104	(3) 17/64"†	06DA660104	(3) 17/64"†
06DA328	—	—	06DA660104	(3) 17/64"†	06DA660104	(3) 17/64"†
06DR337	06DA660104	(3) 7/32"	06DA660104	(3) 17/64"†	—	—
06DM337	—	—	06DA660104	(3) 17/64"†	06DA660104	(3) 17/64"†

*Can be any letter or number in the compressor model.
†Holes need to be enlarged to the diameter shown at the time of installation.

BAFFLE PLATE RECOMMENDATIONS (cont)

COMPRESSOR MODEL	Low Temperature Duty		Medium Temperature Duty		High Temperature Duty	
	Part Number	Orifice: (Qty.) Diameter	Part Number	Orifice: (Qty.) Diameter	Part Number	Orifice: (Qty.) Diameter
06ER*50	06DA660104	(3) 17/64"†	—	—	—	—
06EM*50	—	—	06DA660104	(3) 17/64"†	06DA660104	(3) 7/16"†
06EA*50	—	—	06DA660104	(3) 17/64"†	06DA660104	(3) 7/16"†
06ER*65	06EA660145	(4) 9/32"	—	—	—	—
06EA*65			06EA660145	(4) 9/32"	06EA660145	(4) 1/2"†
06ER*75	06EA660145	(4) 9/32"	—	—	—	—
06EM*75	—	—	06EA660145	(4) 9/32"	06EA660145	(4) 1/2"†
06EA*75	—	—	06EA660145	(4) 9/32"	06EA660145	(4) 1/2"†
06ER*99	06EA660145	(4) 9/32"	—	—	—	—
06EM*99	—	—	06EA660145	(4) 15/32"†	06EA660145	(4) 1/2"†
06EA*99	—	—	06EA660145	(4) 15/32"†	06EA660145	(4) 1/2"†
06CC*17	06DA660104	(3) 17/64"†	—	—	—	—
06CC*25	06DA660104	(3) 17/64"†	—	—	—	—
06CC*28	06DA660104	(3) 17/64"†	—	—	—	—
06CC*37	06DA660104	(3) 17/64"†	—	—	—	—
06CC*50	06EA660145	(4) 9/32"	—	—	—	—
06CC*65	06EA660145	(4) 9/32"	—	—	—	—
06CC*75	06EA660145	(4) 9/32"	—	—	—	—
06CC*99	06EA660145	(4) 9/32"	—	—	—	—

*Can be any letter or number in the compressor model.
†Holes need to be enlarged to the diameter shown at the time of installation.

BAFFLE PLATE LIMITATIONS

1. Baffle plates are effective within certain operating envelopes. Changes in refrigerant can dramatically change refrigerant mass flow and pressure drop. Carlyle has published application recommendations for low, medium and high temperature duty applications. These should be followed to avoid excessive pressure drops. See chart on page 101 and 102.
2. Baffle plates are typically sized for the refrigerant and application at full design load conditions. When the compressor is unloaded using the step unloading method and operated at part load, the mass flow through the compressor is reduced by 1/3, 1/2, or 2/3. This reduction in mass flow reduces the pressure drop through the baffle plate and its effectiveness in reducing discharge gas pulsation. Mufflers and good piping practices should be considered on compressors with unloading capability.
3. Conversely, system changes that increase the mass flow of the compressor will increase the pressure drop through the baffle plates. Dramatically increasing the suction pressure (in many refrigeration systems, this occurs at the termination of defrost cycles) will result in a large increase of mass flow. This results in very high pressure drops and values as high as 40-50 psi have been reported. This occurrence is not a problem unless the compressor motor protection limit is reached. In this case, the maximum suction pressure that the compressor is allowed to operate at must be limited.
4. Another operating condition that significantly increases the mass flow is a dramatic decrease in the compressor's discharge pressure. This can occur on systems with floating head pressures. In the wintertime, the discharge pres-

sure may be half or less than what it would be during hot periods in the summer. With reciprocating compressors, this dramatic reduction in discharge pressure increases the volumetric (or pumping) efficiency of the compressor while lowering the discharge temperature of the refrigerant. The combination can result in the same large pressure drops noted in Step 3 above. If this occurs, the minimum allowable discharge pressure may have to be limited, or a baffle plate with more holes should be used. This avoids the high pressure drops but compromises the reduction in pressure pulsation at summer time conditions.

5. Finally, compressor start-up can also result in even higher discharge pressure drops across the baffle plate. At start-up, the combination of high suction pressures and low discharge pressures occur. This results in pressure drops of over 100 psi at start-up until the suction pressure drops to design conditions and the discharge pressure rises.

Application Note:

Baffle plates are typically sized for the refrigerant and application at full design load conditions. The recommendations defined in Chart A do not guarantee baffle plate pressure drop will not exceed 6-10 psi. Therefore it is necessary that all installed baffle plates be field qualified by verifying the actual pressure drop across the baffle plate at full load design saturated suction temperature (SST) conditions. If the baffle plate pressure drop is excessive, it will be necessary to modify the baffle plate by enlarging the orifice holes to achieve the recommended pressure drop between 6-10 psi.

3.27 — Interstage Pressure Tables (06CC Compressors Only)

All 06CC compressors are a 2-Stage design. Therefore, the pressure measurements are suction, interstage, and discharge. The following tables list the interstage pressures using R-22, R-407A, R404A, R507, and R448A/R449A refrigerants. Refer to section 3.27 — Interstage Pressure Tables (06CC Compressor Only on pages 106- 110).

R-22 APPROXIMATE INTERSTAGE PRESSURE +/- 10 PSI (0.7 BAR) WITH SUBCOOLER

SATURATED SUCTION TEMP		SUCTION PRESSURE		Saturated Condensing Temperature															
				F	C	F	C	F	C	F	C	F	C	F	C	F	C	F	C
				60	15.6	70	21.1	80	26.7	90	32.2	100	37.8	110	43.3	120	48.9	130	54.4
				Condensing Pressure															
				PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR
F	C	PSIG	BAR	101.6	8.0	121.4	9.4	143.6	10.9	168.4	12.6	195.9	14.5	226.4	16.6	259.9	18.9	296.9	21.5
-60	-51.1	11.9*	0.6	17.4	2.2	20.0	2.4	22.7	2.6	25.5	2.8	28.4	3.0	31.5	3.2	34.6	3.4	37.8	3.6
-55	-48.3	9.2*	0.7	19.7	2.4	22.5	2.6	25.5	2.8	28.5	3.0	31.6	3.2	34.9	3.4	38.2	3.6	41.6	3.9
-50	-45.6	6.1*	0.8	22.2	2.5	25.2	2.8	28.3	3.0	31.6	3.2	34.9	3.4	38.4	3.7	42.0	3.9	45.7	4.2
-45	-42.8	2.7*	0.9	24.8	2.7	28.0	2.9	31.3	3.2	34.8	3.4	38.4	3.7	42.1	3.9	45.9	4.2	49.9	4.5
-40	-40.0	0.6	1.1	27.4	2.9	30.9	3.1	34.5	3.4	38.2	3.6	42.0	3.9	46.0	4.2	50.0	4.5	54.3	4.8
-35	-37.2	2.6	1.2	30.2	3.1	33.9	3.4	37.7	3.6	41.6	3.9	45.7	4.2	49.9	4.5	54.3	4.8	58.8	5.1
-30	-34.4	4.9	1.4	33.1	3.3	37.0	3.6	41.0	3.8	45.2	4.1	49.6	4.4	54.1	4.7	58.7	5.1	63.5	5.4
-25	-31.7	7.4	1.5	36.1	3.5	40.2	3.8	44.5	4.1	49.0	4.4	53.6	4.7	58.4	5.0	63.3	5.4	68.4	5.7
-20	-28.9	10.2	1.7	39.1	3.7	43.5	4.0	48.1	4.3	52.8	4.7	57.7	5.0	62.8	5.3	68.0	5.7	73.4	6.1
-15	-26.1	13.2	1.9	42.3	3.9	47.0	4.3	51.8	4.6	56.8	4.9	62.0	5.3	67.4	5.7	72.9	6.0	78.6	6.4
-10	-23.3	16.5	2.2	45.6	4.2	50.5	4.5	55.6	4.8	60.9	5.2	66.4	5.6	72.1	6.0	77.9	6.4	83.9	6.8

***** Indicates Vacuum - Inches of Hg.

NOTE: 1 BAR = 100 kPa or 1 ATM (Atmosphere) Pressure.

R-407A APPROXIMATE INTERSTAGE PRESSURE +/- 10 psi (0.7 BAR) WITH SUBCOOLER

SATURATED SUCTION TEMP		SUCTION PRESSURE		Saturated Condensing Temperature															
				F	C	F	C	F	C	F	C	F	C	F	C	F	C	F	C
				60	15.6	70	21.1	80	26.7	90	32.2	100	37.8	110	43.3	120	48.9	130	54.4
				Condensing Pressure															
				PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR
F	C	PSIG	BAR	125.2	9.6	148.8	11.3	175.3	13.1	204.8	15.1	237.6	17.4	273.9	19.9	314.0	22.7	357.9	25.7
-60	-51.1	14.5*	0.5	17.9	2.2	20.5	2.4	23.3	2.6	26.1	2.8	29.1	3.0	32.1	3.2	35.3	3.4	38.5	3.7
-55	-48.3	11.9*	0.6	20.5	2.4	23.4	2.6	26.3	2.8	29.4	3.0	32.6	3.3	35.9	3.5	39.3	3.7	42.8	4.0
-50	-45.6	9.0*	0.7	23.2	2.6	26.3	2.8	29.5	3.0	32.8	3.3	36.3	3.5	39.8	3.8	43.5	4.0	47.2	4.3
-45	-42.8	5.7*	0.8	26.1	2.8	29.4	3.0	32.8	3.3	36.4	3.5	40.1	3.8	43.9	4.0	47.8	4.3	51.9	4.6
-40	-40.0	2.0*	0.9	29.1	3.0	32.6	3.3	36.3	3.5	40.1	3.8	44.1	4.1	48.2	4.3	52.4	4.6	56.8	4.9
-35	-37.2	1.0	1.1	32.2	3.2	36.0	3.5	39.9	3.8	44.0	4.1	48.3	4.3	52.7	4.6	57.2	5.0	61.8	5.3
-30	-34.4	3.3	1.2	35.4	3.5	39.5	3.7	43.7	4.0	48.1	4.3	52.6	4.6	57.3	5.0	62.1	5.3	67.1	5.6
-25	-31.7	5.7	1.4	38.8	3.7	43.1	4.0	47.6	4.3	52.3	4.6	57.1	5.0	62.1	5.3	67.3	5.7	72.6	6.0
-20	-28.9	8.5	1.6	42.3	3.9	46.9	4.2	51.7	4.6	56.7	4.9	61.8	5.3	67.1	5.6	72.6	6.0	78.3	6.4
-15	-26.1	11.5	1.8	45.9	4.2	50.8	4.5	55.9	4.9	61.2	5.2	66.7	5.6	72.3	6.0	78.1	6.4	84.2	6.8
-10	-23.3	14.9	2.0	49.6	4.4	54.8	4.8	60.2	5.2	65.9	5.6	71.7	6.0	77.7	6.4	83.9	6.8	90.3	7.2

***** Indicates Vacuum - Inches of Hg.

NOTE: 1 BAR = 100 kPa or 1 ATM (Atmosphere) Pressure.

R-404A APPROXIMATE INTERSTAGE PRESSURE +/- 10 psi (0.7 BAR) WITH SUBCOOLER

SATURATED SUCTION TEMP		SUCTION PRESSURE		Saturated Condensing Temperature															
				F	C	F	C	F	C	F	C	F	C	F	C	F	C	F	C
				60	15.6	70	21.1	80	26.7	90	32.2	100	37.8	110	43.3	120	48.9	130	54.4
				Condensing Pressure															
				PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR
F	C	PSIG	BAR	126.0	9.7	149.3	11.3	175.4	13.1	204.5	15.1	236.8	17.3	272.5	19.8	312.0	22.5	355.6	25.5
-60	-51.1	7.3*	0.8	24.8	2.7	28.0	2.9	31.2	3.2	34.6	3.4	38.1	3.6	41.8	3.9	45.5	4.2	49.4	4.4
-55	-48.3	3.9*	0.9	27.7	2.9	31.1	3.2	34.6	3.4	38.2	3.6	42.0	3.9	45.9	4.2	49.9	4.5	54.1	4.7
-50	-45.6	0.1*	1.0	30.7	3.1	34.3	3.4	38.0	3.6	41.9	3.9	46.0	4.2	50.1	4.5	54.5	4.8	58.9	5.1
-45	-42.8	2.0	1.2	33.8	3.3	37.6	3.6	41.7	3.9	45.8	4.2	50.1	4.5	54.6	4.8	59.2	5.1	64.0	5.4
-40	-40.0	4.3	1.3	37.0	3.6	41.1	3.8	45.4	4.1	49.8	4.4	54.4	4.8	59.2	5.1	64.1	5.4	69.2	5.8
-35	-37.2	6.8	1.5	40.3	3.8	44.7	4.1	49.3	4.4	54.0	4.7	58.9	5.1	63.9	5.4	69.2	5.8	74.6	6.2
-30	-34.4	9.6	1.7	43.8	4.0	48.4	4.4	53.3	4.7	58.3	5.0	63.5	5.4	68.9	5.8	74.4	6.1	80.2	6.5
-25	-31.7	12.7	1.9	47.3	4.3	52.3	4.6	57.4	5.0	62.7	5.3	68.2	5.7	74.0	6.1	79.9	6.5	86.0	6.9
-20	-28.9	16.0	2.1	51.0	4.5	56.3	4.9	61.7	5.3	67.3	5.7	73.2	6.1	79.2	6.5	85.5	6.9	91.9	7.4
-15	-26.1	19.7	2.4	54.8	4.8	60.4	5.2	66.1	5.6	72.1	6.0	78.2	6.4	84.6	6.9	91.2	7.3	98.1	7.8

***** Indicates Vacuum - Inches of Hg.

NOTE: 1 BAR = 100 kPa or 1 ATM (Atmosphere) Pressure.

R-507A APPROXIMATE INTERSTAGE PRESSURE +/- 10 psi (0.7 BAR) WITH SUBCOOLER

SATURATED SUCTION TEMP		SUCTION PRESSURE		Saturated Condensing Temperature													
				F	C	F	C	F	C	F	C	F	C	F	C	F	C
				60	15.6	70	21.1	80	26.7	90	32.2	100	37.8	110	43.3	120	48.9
				Condensing Pressure													
				PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR
F	C	PSIG	BAR														
-60	-51.1	5.8*	0.8	26.6	2.8	29.9	3.1	33.3	3.3	36.8	3.6	40.5	3.8	44.3	4.1	48.2	4.3
-55	-48.3	2.2*	0.9	29.5	3.1	33.1	3.3	36.7	3.5	40.5	3.8	44.4	4.1	48.5	4.4	52.7	4.6
-50	-45.6	0.9	1.1	32.6	3.3	36.4	3.5	40.3	3.8	44.3	4.1	48.5	4.4	52.9	4.7	57.4	5.0
-45	-42.8	3.0	1.2	35.8	3.5	39.8	3.8	44.0	4.0	48.3	4.3	52.8	4.7	57.4	5.0	62.2	5.3
-40	-40.0	5.4	1.4	39.1	3.7	43.4	4.0	47.8	4.3	52.4	4.6	57.2	5.0	62.1	5.3	67.2	5.7
-35	-37.2	8.0	1.6	42.5	3.9	47.1	4.3	51.8	4.6	56.7	4.9	61.8	5.3	67.0	5.6	72.5	6.0
-30	-34.4	10.9	1.8	46.0	4.2	50.9	4.5	55.9	4.9	61.1	5.2	66.5	5.6	72.1	6.0	77.8	6.4
-25	-31.7	14.1	2.0	49.7	4.4	54.8	4.8	60.1	5.2	65.7	5.5	71.4	5.9	77.3	6.3	83.4	6.8
-20	-28.9	17.6	2.2	53.5	4.7	58.9	5.1	64.5	5.5	70.4	5.9	76.4	6.3	82.7	6.7	89.1	7.2

***** Indicates Vacuum - Inches of Hg.

NOTE: 1 BAR = 100 kPa or 1 ATM (Atmosphere) Pressure.

R-448A/R-449A APPROXIMATE INTERSTAGE PRESSURE +/- 10 psi (0.7 BAR) WITH SUBCOOLER

SATURATED SUCTION TEMP		SUCTION PRES-SURE		Saturated Condensing Temperature															
				F	C	F	C	F	C	F	C	F	C	F	C	F	C	F	C
				60	15.6	70	21.1	80	26.7	90	32.2	100	37.8	110	43.3	120	48.9	130	54.4
				Condensing Pressure															
				PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR	PSIG	BAR
F	C	PSIG	BAR	129.4	9.9	153.5	11.6	180.5	13.5	210.5	15.5	243.7	17.8	280.5	20.4	320.9	23.1	365.3	26.2
-60	-51.1	13.2*	0.6	19.7	2.4	22.5	2.6	25.4	2.8	28.3	3.0	31.4	3.2	34.6	3.4	37.8	3.6	41.2	3.9
-55	-48.3	10.4*	0.7	22.4	2.6	25.4	2.8	28.5	3.0	31.7	3.2	35.0	3.4	38.4	3.7	42.0	3.9	45.6	4.2
-50	-45.6	7.4*	0.8	25.2	2.8	28.5	3.0	31.8	3.2	35.2	3.4	38.8	3.7	42.5	3.9	46.3	4.2	50.2	4.5
-45	-42.8	3.9*	0.9	28.2	3.0	31.6	3.2	35.2	3.4	38.9	3.7	42.7	4.0	46.7	4.2	50.8	4.5	54.9	4.8
-40	-40.0	0.0	1.0	31.3	3.2	35.0	3.4	38.8	3.7	42.7	4.0	46.8	4.2	51.1	4.5	55.4	4.8	59.9	5.1
-35	-37.2	2.1	1.2	34.4	3.4	38.4	3.7	42.5	3.9	46.7	4.2	51.1	4.5	55.6	4.9	60.3	5.2	65.1	5.5
-30	-34.4	4.4	1.3	37.8	3.6	42.0	3.9	46.3	4.2	50.9	4.5	55.6	4.8	60.4	5.2	65.4	5.5	70.5	5.9
-25	-31.7	7.0	1.5	41.2	3.9	45.7	4.2	50.3	4.5	55.2	4.8	60.2	5.2	65.3	5.5	70.6	5.9	76.1	6.3
-20	-28.9	9.8	1.7	44.8	4.1	49.5	4.4	54.5	4.8	59.6	5.1	64.9	5.5	70.4	5.9	76.0	6.3	81.9	6.7
-15	-26.1	13.0	1.9	48.4	4.4	53.5	4.7	58.8	5.1	64.2	5.4	69.9	5.8	75.7	6.2	81.7	6.6	87.8	7.1
-10	-23.3	16.4	2.1	52.3	4.6	57.6	5.0	63.2	5.4	69.0	5.8	75.0	6.2	81.1	6.6	87.5	7.0	94.0	7.5

***** Indicates Vacuum - Inches of Hg.

NOTE: 1 BAR = 100 kPa or 1 ATM (Atmosphere) Pressure.

4.0 — ELECTRICAL DATA

4.1 — 06D and 06CC (16-37 cfm) Electronic Overcurrent Protection

REPLACEMENT KITS:

Service REPLACEMENT kits are available to replace existing factory-installed electronic over current protection. These compressors will have serial numbers produced after 3115UXXXXX. The tables (Columns 10 and 11) in Section 4.2 for the 06D compressors and Section 4.4 for the 06CC 16-37cfm compressors provide these replacement kit numbers. Figure 26 in Section 4.6 shows how these service REPLACEMENT kits should be wired.

When selecting the appropriate kit, please be sure to check control voltage. All kits include a replacement electronic overcurrent protection module and current transformer, with a preprogrammed.

MCC value based on the compressor model number. For additional information on the kit and installation, please see 99TA516180A located on the Carlyle Compressor website (www.carlylecompressor.com).

Replacement Kit Instructions (06D,06CC)
https://www.shareddocs.com/hvac/docs/2002/Public/07/99TA516180A.pdf

RETROFIT KITS:

Service RETROFIT kits are available to replace existing factory-installed electromechanical over current relays. These compressors will have serial numbers produced after 3115UXXXXX. The tables (Columns 12 and 13) in Section 4.2 on page 113 for the 06D compressors and Section 4.4 on page 120 for the 06CC 16-37cfm compressors provide these replacement kit numbers. Figure 28 in Section 4.6 shows how these service RETROFIT kits should be wired.

When selecting the appropriate kit, please be sure to select the required control voltage, as the retrofit module will require OEM customers to provide control voltage to the terminal box of the compressor. All RETROFIT kits include a replacement large folded terminal box, electronic overcurrent protection module and current transformer, with a preprogrammed MCC value based on the compressor model number. For additional information on the kit and installation, please see 99TA516184A located on the Carlyle Compressor website (www.carlylecompressor.com).

Retrofit Kit Instructions (06D,06CC)
https://www.shareddocs.com/hvac/docs/2002/Public/02/99TA516184A.pdf

4.2 — 06D 3-Phase Electrical Specification

Compressor Base Model (See Note 1)	Electrical Data						Over-Current Protection					
									Replacement Kit FOR REPLACING FACTORY INSTALLED ELECTRONIC OVERLOADS (contains 1 current transformer)		Retrofit Kit FOR REPLACING OBSOLETE ELECTRO-MECHANICAL RELAYS with electronic overload system (contains 2 current transformers)	
	Max kW	Nom. HP	Voltage Code Model No. Digits 11-12	Volts	MCC	LRA	Electro-mechanical Relay Part Number (OBSOLETE)	Control Voltage for Electronic Overload Kits	Compressor Model No Digit 10	Kit Number	Compressor Model No. Digit 10	Kit Number
06DR109	3.1	2	31	575-3-60	4.4	21	HN69GZ011	120/240Vac	1	06DA6606DBNB0044	Should be applied to any compressor model number except those with 1, 2, or 3 in digit 10.	06DA6606DBSB0044
								24Vac	2	06DA6606DBNC0044		06DA6606DBSC0044
								24Vdc	3	06DA6606DBND0044		06DA6606DBSD0044
			36	460-3-60	5.5	26	HN69GZ015	120/240Vac	1	06DA6606DBNB0055		06DA6606DBSB0055
								24Vac	2	06DA6606DBNC0055		06DA6606DBSC0055
								24Vdc	3	06DA6606DBND0055		06DA6606DBSD0055
			32	208/230/3-60	12.1	53	HN69GZ007	120/240Vac	1	06DA6606DBNB0121		06DA6606DBSB0121
								24Vac	2	06DA6606DBNC0121		06DA6606DBSC0121
								24Vdc	3	06DA6606DBND0121		06DA6606DBSD0121
06DM808 06DR013	4.1	3	31	575-3-60	7.0	28	HN69GZ012	120/240Vac	1	06DA6606DBNB0070	Should be applied to any compressor model number except those with 1, 2, or 3 in digit 10.	06DA6606DBSB0070
								24Vac	2	06DA6606DBNC0070		06DA6606DBSC0070
								24Vdc	3	06DA6606DBND0070		06DA6606DBSD0070
			36	460-3-60	8.7	29	HN69GZ012	120/240Vac	1	06DA6606DBNB0087		06DA6606DBSB0087
								24Vac	2	06DA6606DBNC0087		06DA6606DBSC0087
								24Vdc	3	06DA6606DBND0087		06DA6606DBSD0087
			32	208/230/3-60	17.4	71	HN69GZ053	120/240Vac	1	06DA6606DBNB0174		06DA6606DBSB0174
								24Vac	2	06DA6606DBNC0174		06DA6606DBSC0174
								24Vdc	3	06DA6606DBND0174		06DA6606DBSD0174

NOTE: See legend and notes on page 117.

Compressor Base Model (See Note 1)	Electrical Data						Over-Current Protection					
	Max kW	Nom HP	Voltage Code Model No. Digits 11-12	Volts	MCC	LRA	Electro-mechanical Relay Part Number (OBSOLETE)	Control Voltage for Electronic Overload Kits	Replacement Kit FOR REPLACING FACTORY INSTALLED ELECTRONIC OVERLOADS (contains 1 current transformer)		Retrofit Kit FOR REPLACING OBSOLETE ELECTRO-MECHANICAL RELAYS with electronic overload system (contains 2 current transformers)	
									Compressor Model No Digit 10	Kit Number	Compressor Model No Digit 10	Kit Number
06DM313 06DM316 06DR316 06DR718	6.25	5	31	575-3-60	10.8	40	HN69GZ032	120/240Vac	1	06DA6606DBNB0108	Should be applied to any compressor model number except those with 1, 2, or 3 in digit 10.	06DA6606DBSB0108
								24Vac	2	06DA6606DBNC0108		06DA6606DBSC0108
								24Vdc	3	06DA6606DBND0108		06DA6606DBSD0108
			36	460-3-60	13.5	50	HN69GZ014	120/240Vac	1	06DA6606DBNB0135		06DA6606DBSB0135
								24Vac	2	06DA6606DBNC0135		06DA6606DBSC0135
								24Vdc	3	06DA6606DBND0135		06DA6606DBSD0135
			32	208/230/3-60	27.0	100	HN69GZ024	120/240Vac	1	06DA6606DBNB0270		06DA6606DBSB0270
								24Vac	2	06DA6606DBNC0270		06DA6606DBSC0270
								24Vdc	3	06DA6606DBND0270		06DA6606DBSD0270
06DA818 06DR820	9.18	6 1/2	31	575-3-60	17.6	64	HN69GZ037	120/240Vac	1	06DA6606DBNB0176	Should be applied to any compressor model number except those with 1, 2, or 3 in digit 10.	06DA6606DBSB0176
								24Vac	2	06DA6606DBNC0176		06DA6606DBSC0176
								24Vdc	3	06DA6606DBND0176		06DA6606DBSD0176
			36	460-3-60	22.0	80	HN69GZ038	120/240Vac	1	06DA6606DBNB0220		06DA6606DBSB0220
								24Vac	2	06DA6606DBNC0220		06DA6606DBSC0220
								24Vdc	3	06DA6606DBND0220		06DA6606DBSD0220
			32	208/230/3-60	44.0	160	HN69GZ214	120/240Vac	1	06DA6606DBNB0440		06DA6606DBSB0440
								24Vac	2	06DA6606DBNC0440		06DA6606DBSC0440
								24Vdc	3	06DA6606DBND0440		06DA6606DBSD0440

NOTE: See legend and notes on page 117.

Compressor Base Model (See Note 1)	Electrical Data						Over-Current Protection					
	Max kW	Nom HP	Voltage Code Model No. Digits 11-12	Volts	MCC	LRA	Electro-mechanical Relay Part Number (OBSOLETE)	Control Voltage for Electronic Overload Kits	Replacement Kit FOR REPLACING FACTORY INSTALLED ELECTRONIC OVERLOADS (contains 1 current transformer)		Retrofit Kit FOR REPLACING OBSOLETE ELECTRO-MECHANICAL RELAYS with electronic overload system (contains 2 current transformers)	
									Compressor Model No Digit 10	Kit Number	Compressor Model No Digit 10	Kit Number
06DR724	9.8	6 1/2	31	575-3-60	17.6	64	HN69GZ037	120/240Vac	—	—	Dual CT retrofit kits can be applied to all 24 cfm models.	06DA6606DBSB0176
								24Vac	—	—		06DA6606DBSC0176
								24Vdc	—	—		06DA6606DBSD0176
			36	460-3-60	22.0	80	HN69GZ038	120/240Vac	—	—		06DA6606DBSB0220
								24Vac	—	—		06DA6606DBSC0220
								24Vdc	—	—		06DA6606DBSD0220
			32	208/230/3-60	44.0	160	HN69GZ214	120/240Vac	—	—		06DA6606DBSB0440
								24Vac	—	—		06DA6606DBSC0440
								24Vdc	—	—		06DA6606DBSD0440
06DR725	9.8	6 1/2	31	575-3-60	17.6	64	HN69GZ037	120/240Vac	1	06DA6606DBNB0176	Should be applied to any compressor model number except those with 1, 2, or 3 in digit 10.	06DA6606DBSB0176
								24Vac	2	06DA6606DBNC0176		06DA6606DBSC0176
								24Vdc	3	06DA6606DBND0176		06DA6606DBSD0176
			36	460-3-60	22.0	80	HN69GZ038	120/240Vac	1	06DA6606DBNB0220		06DA6606DBSB0220
								24Vac	2	06DA6606DBNC0220		06DA6606DBSC0220
								24Vdc	3	06DA6606DBND0220		06DA6606DBSD0220
			32	208/230/3-60	44.0	160	HN69GZ214	120/240Vac	1	06DA6606DBNB0440		06DA6606DBSB0440
								24Vac	2	06DA6606DBNC0440		06DA6606DBSC0440
								24Vdc	3	06DA6606DBND0440		06DA6606DBSD0440
06DA824	12.8	7 1/2	31	575-3-60	22.2	79	HN69GZ053	120/240Vac	—	—	Dual CT retrofit kits can be applied to all 24 cfm models.	06DA6606DBSB0222
								24Vac	—	—		06DA6606DBSC0222
								24Vdc	—	—		06DA6606DBSD0222
			36	460-3-60	27.8	99	HN69GZ010	120/240Vac	—	—		06DA6606DBSB0278
								24Vac	—	—		06DA6606DBSC0278
								24Vdc	—	—		06DA6606DBSD0278
			32	208/230/3-60	55.5	198	HN69GZ306	120/240Vac	—	—		06DA6606DBSB0555
								24Vac	—	—		06DA6606DBSC0555
								24Vdc	—	—		06DA6606DBSD0555

NOTE: See legend and notes on page 117.

Compressor Base Model (See Note 1)	Electrical Data						Over-Current Protection						
	Max kW	Nom HP	Voltage Code Model No. Digits 11-12	Volts	MCC	LRA	Electro-mechanical Relay Part Number (OBSOLETE)	Control Voltage for Electronic Overload Kits	Replacement Kit FOR REPLACING FACTORY INSTALLED ELECTRONIC OVERLOADS (contains 1 current transformer)		Retrofit Kit FOR REPLACING OBSOLETE ELECTRO-MECHANICAL RELAYS with electronic overload system (contains 2 current transformers)	
									Compressor Model No Digit 10	Kit Number	Compressor Model No Digit 10	Kit Number
06DA825 06DR228	12.8	7 1/2	31	575-3-60	22.2	79	HN69GZ053	120/240Vac	1	06DA6606DBNB0222	Should be applied to any compressor model number except those with 1, 2, or 3 in digit 10.	06DA6606DBSB0222
								24Vac	2	06DA6606DBNC0222		06DA6606DBSC0222
								24Vdc	3	06DA6606DBND0222		06DA6606DBSD0222
			36	460-3-60	27.8	99	HN69GZ010	120/240Vac	1	06DA6606DBNB0278		06DA6606DBSB0278
								24Vac	2	06DA6606DBNC0278		06DA6606DBSC0278
								24Vdc	3	06DA6606DBND0278		06DA6606DBSD0278
			32	208/230/3-60	55.5	198	HN69GZ306	120/240Vac	1	06DA6606DBNB0555		06DA6606DBSB0555
								24Vac	2	06DA6606DBNC0555		06DA6606DBSC0555
								24Vdc	3	06DA6606DBND0555		06DA6606DBSD0555
06DA328 06DM337 06DR337	16.5	10	31	575-3-60	25.0	91	HN69GZ025	120/240Vac	1	06DA6606DBNB0250	Should be applied to any compressor model number except those with 1, 2, or 3 in digit 10.	06DA6606DBSB0250
								24Vac	2	06DA6606DBNC0250		06DA6606DBSC0250
								24Vdc	3	06DA6606DBND0250		06DA6606DBSD0250
			36	460-3-60	31.0	114	HN69GZ024	120/240Vac	1	06DA6606DBNB0310		06DA6606DBSB0310
								24Vac	2	06DA6606DBNC0310		06DA6606DBSC0310
								24Vdc	3	06DA6606DBND0310		06DA6606DBSD0310
			32	208/230/3-60	62.0	228	HN69GZ309	120/240Vac	1	06DA6606DBNB0620		06DA6606DBSB0620
								24Vac	2	06DA6606DBNC0620		06DA6606DBSC0620
								24Vdc	3	06DA6606DBND0620		06DA6606DBSD0620
06DA537 06DR541	20.7	15	01	575-3-60	32.0	96	HN69GZ301	120/240Vac	1	06DA6606DBNB0320	Should be applied to any compressor model number except those with 1, 2, or 3 in digit 10.	06DA6606DBSB0320
								24Vac	2	06DA6606DBNC0320		06DA6606DBSC0320
								24Vdc	3	06DA6606DBND0320		06DA6606DBSD0320
			06	460-3-60	40.0	120	HN69GZ106	120/240Vac	1	06DA6606DBNB0400		06DA6606DBSB0400
								24Vac	2	06DA6606DBNC0400		06DA6606DBSC0400
								24Vdc	3	06DA6606DBND0400		06DA6606DBSD0400
			12	208/230/3-60	89.0	266	HN69GZ214	120/240Vac	1	06DA6606DBNB0890		06DA6606DBSB0890
								24Vac	2	06DA6606DBNC0890		06DA6606DBSC0890
								24Vdc	3	06DA6606DBND0890		06DA6606DBSD0890

NOTE: See legend and notes on page 117.

Legend and notes for Table 4.2

LEGEND

LRA — Locked Rotor Amps

MCC — Maximum Continuous Current.

NOTES:

1. Use 06DA electrical data for 06DB, 06DC, 06DD, 06DE, 06DF, 06DG, 06DH, 06DJ, 06DK, 06DS, and 06DX models.
2. Data shaded in gray are obsolete.
3. Compressor operating amps at any specific operating condition can only be determined from CARWIN performance ratings.
4. RLA (Rated Load Amp) values for 06D compressors protected by electronic overloads are RLA = MCC ÷ 1.56. Consult Application Guide for determination of RLA with other protection devices.
5. Overcurrent protection device must trip at or below the MCC value.

4.3 — 06E 3-Phase Electrical Specification

COMPRESSOR BASE MODEL (SEE NOTE 1)	ELECTRICAL DATA							OVER-CURRENT PROTECTION	
	Max kW	Nom. HP	Voltage Code Model No. 8th Digit	Volts	MCC	LRA-XL	LRA-PW	Calibrated Circuit Breaker	Electronic Overload Relay
06EM*50 06ER*50	22.0	15	1	575-3-60	38	98	59	HH83XB634	06EA907186
			6	460-3-60	46	142	85	HH83XB695	06EA907186
			3				—		06EA907186
				208/230-3-60	90	283	170	HH83XB626	06EA907186
06EA*50 06ER*65 06ER*75	25.3	20	1	575-3-60	45	120	72	HH83XB422	06EA907186
			6	460-3-60	54	173	104	HH83XB606	06EA907186
			3				—		06EA907186
				208/230-3-60	108	345	207	HH83XB625	06EA907187
06EA*65 06EM*75	33.6	25	1	575-3-60	57	164	98	HH83XB615	06EA907186
			6	460-3-60	70	223	134	HH83XB607	06EA907186
			3				—		06EA907186
				208/230-3-60	140	446	268	HH83XC509	06EA907187
06EA*75 06ER*99	39.1	30	1	575-3-60	65	176	106	HH83XB683	06EA907186
			6	460-3-60	84	253	152	HH83XB609	06EA907186
			3				—		06EA907186
				208/230-3-60	168	506	304	HH83XC539	06EA907187
06EM*99	47.6	35	1	575-3-60	77	212	127	HH83XB615	06EA907186
			6	460-3-60	96	305	183	HH83XB648	06EA907187
			3				—		06EA907187
				208/230-3-60	193	610	366	HH83XC532	06EA907187
06EA*99	54.0	40	1	575-3-60	94	276	165	HH83XB636	06EA907187
			6	460-3-60	118	345	207	HH83XB405	06EA907187
			3				—		06EA907187
				208/230-3-60	236	690	414	HH83XC537	—

NOTE: See legend and notes on page 119.

Legend and notes for Table 4.3.

LEGEND

LRA-PW — Locked Rotor Amps (Part Wind Start)

LRA-XL — Locked Rotor Amps (Across Wind Start)

MCC — Maximum Continuous Current.

NOTES:

1. Use 06EA electrical data for 06E2, 06E3, 06E4, 06E6, 06E7, 06E8, 06E9, 06EB, 06EC, 06ED, 06EE, 06EJ, 06EK, 06EL, 06EN, 06ET and 06EX models.
2. Use 06EM electrical data for 06EZ models.
3. Use 06ER electrical data for 06EY models.
4. Data shaded in gray are obsolete.
5. Compressor operating amps at any specific operating condition can only be determined from CARWIN performance ratings.
6. RLA (Rated Load Amp) values for 06E compressors protected by calibrated circuit breakers are dependent on the trip point of the breaker, RLA = MTA ÷1.40.
   RLA (Rated Load Amp) values for 06E compressors protected by electronic relays are dependent on the trip setting of the relay, RLA = Trip Setting ÷1.40.
   Consult Application Guide for determination of RLA with other protection devices.
7. LRA values for the PW second winding are 1/2 of the LRA-XL values.
8. Overcurrent protection device must trip at or below the MCC value.

4.4 — 06CC-D (16-37 cfm) 3-Phase Electrical Specification

COMPRESSOR BASE MODEL	ELECTRICAL DATA						OVER-CURRENT PROTECTION					
	Max kW	Nom HP	Voltage Code Model No. 8th Digit	Volts	MCC	LRA	Electro-mechanical Relay Part Number (OBSOLETE)	Control Voltage for Electronic Overload Kits	Replacement Kit FOR REPLACING FACTORY INSTALLED ELECTRONIC OVERLOADS (contains 1 current transformer)		Retrofit Kit FOR REPLACING OBSOLETE ELECTRO-MECHANICAL RELAYS with electronic overload system (contains 2 current transformers)	
									Compressor Model No. Digit 5	Kit Number	Compressor Model No. Digit 5	Kit Number
06CC*17	6.25	5	J	575-3-60	10.8	40	HN69GZ032	120/240Vac	A	06DA6606DBNB0108	Should be applied to any compressor model number except those with A, B or C in digit 5.	06DA6606DBSB0108
								24Vac	B	06DA6606DBNC0108		06DA6606DBSC0108
								24Vdc	C	06DA6606DBND0108		06DA6606DBSD0108
			G	460-3-60	13.5	50	HN69GZ014	120/240Vac	A	06DA6606DBNB0135		06DA6606DBSB0135
								24Vac	B	06DA6606DBNC0135		06DA6606DBSC0135
								24Vdc	C	06DA6606DBND0135		06DA6606DBSD0135
			D	208/230-3-60	27.0	100	HN69GZ024	120/240Vac	A	06DA6606DBNB0270		06DA6606DBSB0270
								24Vac	B	06DA6606DBNC0270		06DA6606DBSC0270
								24Vdc	C	06DA6606DBND0270		06DA6606DBSD0270
06CC*16 06CC*18	6.25	5	J	575-3-60	10.8	40	HN69GZ032	120/240Vac	—	—	Dual CT retro-fit kits can be applied to all 16 and 18 cfm models.	06DA6606DBSB0108
								24Vac	—	—		06DA6606DBSC0108
								24Vdc	—	—		06DA6606DBSD0108
			G	460-3-60	13.5	50	HN69GZ014	120/240Vac	—	—		06DA6606DBSB0135
								24Vac	—	—		06DA6606DBSC0135
								24Vdc	—	—		06DA6606DBSD0135
			D	208/230-3-60	27.0	100	HN69GZ024	120/240Vac	—	—		06DA6606DBSB0270
								24Vac	—	—		06DA6606DBSC0270
								24Vdc	—	—		06DA6606DBSD0270
06CC*24	9.18	6 1/2	J	575-3-60	13.2	64	HN69GZ037	120/240Vac	—	—	Dual CT retro-fit kits can be applied to all 24 cfm models.	06DA6606DBSB0132
								24Vac	—	—		06DA6606DBSC0132
								24Vdc	—	—		06DA6606DBSD0132
			G	460-3-60	16.5	80	HN69GZ038	120/240Vac	—	—		06DA6606DBSB0165
								24Vac	—	—		06DA6606DBSC0165
								24Vdc	—	—		06DA6606DBSD0165
			D	208/230-3-60	33	160	HN69GZ214	120/240Vac	—	—		06DA6606DBSB0330
								24Vac	—	—		06DA6606DBSC0330
								24Vdc	—	—		06DA6606DBSD0330

NOTE: See legend and notes on page 122.

COMPRESSOR BASE MODEL (SEE NOTE 1)	Electrical Data						Over-Current Protection					
	Max kW	Nom HP	Voltage Code Model No. Digits 11-12	Volts	MCC	LRA	Electro-mechanical Relay Part Number (OBSOLETE)	Control Voltage for Electronic Over-load Kits	Replacement Kit FOR REPLACING FACTORY INSTALLED ELECTRONIC OVERLOADS (contains 1 current transformer)		Retrofit Kit FOR REPLACING OBSOLETE ELECTRO-MECHANICAL RELAYS with electronic overload system (contains 2 current transformers)	
									Compressor Model No Digit 10	Kit Number	Compressor Model No Digit 10	Kit Number
06CC*25	9.18	6 1/2	J	575-3-60	13.2	64	HN69GZ037	120/240Vac	D	06DA6606DBNB0132	Should be applied to any compressor model number except those with D, E, or F in digit 5.	06DA6606DBSB0132
								24Vac	E	06DA6606DBNC0132		06DA6606DBSC0132
								24Vdc	F	06DA6606DBND0132		06DA6606DBSD0132
			G	460-3-60	16.5	80	HN69GZ038	120/240Vac	D	06DA6606DBNB0165		06DA6606DBSB0165
								24Vac	E	06DA6606DBNC0165		06DA6606DBSC0165
								24Vdc	F	06DA6606DBND0165		06DA6606DBSD0165
			D	208/230-3-60	33.0	160	HN69GZ214	120/240Vac	D	06DA6606DBNB0330		06DA6606DBSB0330
								24Vac	E	06DA6606DBNC0330		06DA6606DBSC0330
								24Vdc	F	06DA6606DBND0330		06DA6606DBSD0330
06CC*28	12.8	7 1/2	J	575-3-60	16.7	79	HN69GZ004	120/240Vac	G	06DA6606DBNB0167	Should be applied to any compressor model number except those with G, H, or J in digit 5.	06DA6606DBSB0167
								24Vac	H	06DA6606DBNC0167		06DA6606DBSC0167
								24Vdc	J	06DA6606DBND0167		06DA6606DBSD0167
			G	460-3-60	20.9	99	HN69GZ010	120/240Vac	G	06DA6606DBNB0209		06DA6606DBSB0209
								24Vac	H	06DA6606DBNC0209		06DA6606DBSC0209
								24Vdc	J	06DA6606DBND0209		06DA6606DBSD0209
			D	208/230-3-60	41.6	198	HN69GZ306	120/240Vac	G	06DA6606DBNB0416		06DA6606DBSB0416
								24Vac	H	06DA6606DBNC0416		06DA6606DBSC0416
								24Vdc	J	06DA6606DBND0416		06DA6606DBSD0416
06CC*37	16.5	10	J	575-3-60	18.8	91	HN69GZ025	120/240Vac	K	06DA6606DBNB0188	Should be applied to any compressor model number except those with K, L, or M in digit 5.	06DA6606DBSB0188
								24Vac	L	06DA6606DBNC0188		06DA6606DBSC0188
								24Vdc	M	06DA6606DBND0188		06DA6606DBSD0188
			G	460-3-60	23.3	114	HN69GZ024	120/240Vac	K	06DA6606DBNB0233		06DA6606DBSB0233
								24Vac	L	06DA6606DBNC0233		06DA6606DBSC0233
								24Vdc	M	06DA6606DBND0233		06DA6606DBSD0233
			D	208/230-3-60	46.6	228	HN69GZ309	120/240Vac	K	06DA6606DBNB0466		06DA6606DBSB0466
								24Vac	L	06DA6606DBNC0466		06DA6606DBSC0466
								24Vdc	M	06DA6606DBND0466		06DA6606DBSD0466

NOTE: See legend and notes on page 122.

Legend and notes for Table 4.4.

LEGEND

LRA — Locked Rotor Amps

MCC — Maximum Continuous Current

NOTES:

1. Data shaded in gray are obsolete.
2. Compressor operating amps at any specific operating condition can only be determined from CARWIN performance ratings.
3. RLA (Rated Load Amp) values for 06CC 17-37cfm compressors protected by electronic overloads are RLA = MCC ÷ 1.56. Consult Application Guide for determination of RLA with other protection devices.
4. Overcurrent protection device must trip at or below the MCC value.

4.5 — 06CC-E (50-99 cfm) 3-Phase Electrical Specification

COMPRESSOR BASE MODEL	ELECTRICAL DATA							OVER-CURRENT PROTECTION	
	Max kW	Nom HP	Voltage Code Model No. 8th Digit	Volts	MCC	LRA-XL	LRA-PW	Calibrated Circuit Breaker	Electronic Overload Relay
06CC*50	22.0	15	J	575-3-60	27	98	59	HH83XB438	06EA907185
			F	460-3-60	32	142	85	HH83XB414	06EA907185
			E		32	142	—		06EA907185
				208/230-3-60	68	283	170	HH83XB455	
06CC*65	25.3	20	J	575-3-60	38	120	72	HH83XB461	
			F	460-3-60	50	173	104	HH83XB437	
			E		50	173	—		
				208/230-3-60	100	345	207	HH83XB376	
06CC*75	25.3	20	J	575-3-60	38	120	72	HH83XB422	06EA907186
			F	460-3-60	50	173	104	HH83XB437	
			E		50	173	—		
				208/230-3-60	100	345	207	HH83XB378	
06CC*99	39.1	30	J	575-3-60	58	176	106	HH83XA430	
			F	460-3-60	73	253	152	HH83XB432	
			E		73	253	—		
				208/230-3-60	141	506	304	HH83XC406	06EA907187

LEGEND

LRA-PW — Locked Rotor Amps (Part Wind Start)

LRA-XL — Locked Rotor Amps (Across Wind Start)

MCC — Maximum Continuous Current.

NOTES:

1. Data shaded in gray are obsolete.
2. Compressor operating amps at any specific operating condition can only be determined from CARWIN performance ratings.
3. RLA (Rated Load Amp) values for 06E compressors protected by calibrated circuit breakers are dependent on the trip point of the breaker, RLA = MTA÷1.40.
   RLA (Rated Load Amp) values for 06E compressors protected by electronic relays are dependent on the trip setting of the relay, RLA = Trip Setting÷1.40.
   Consult Application Guide for determination of RLA with other protection devices.
4. LRA values for the PW second winding are 1/2 of the LRA-XL values.
5. Overcurrent protection device must trip at or below the MCC value.

4.6 — Electrical Hook-Up

Consult wiring diagram located inside compressor terminal box cover and reference diagrams shown below for wiring hook-up connection locations. See 3.25, page 98 for Terminal Box Packages. Refer to Fig. 26-30 for wiring diagrams and terminal plate arrangement.

06D and 06CC (17-37 cfm) COMPRESSORS

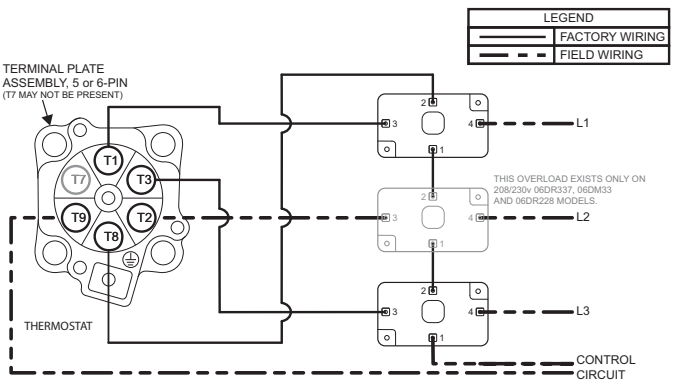


Fig. 26 — Three Phase Electromechanical Overcurrent Protection (Overload XL 6-pin Universal)

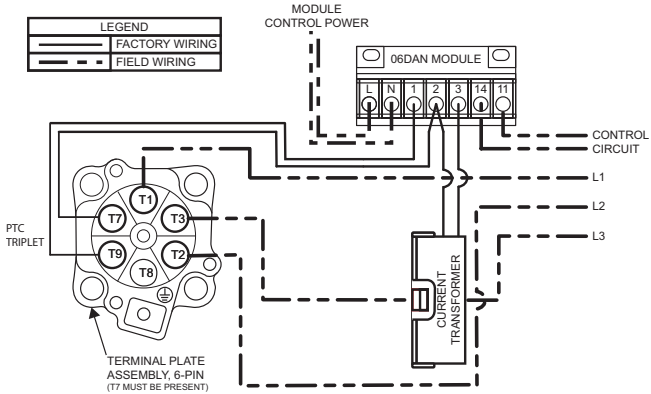


Fig. 27 — Electronic Overcurrent Protection (SERVICE ONLY) Overload 1CT 6-pin Universal

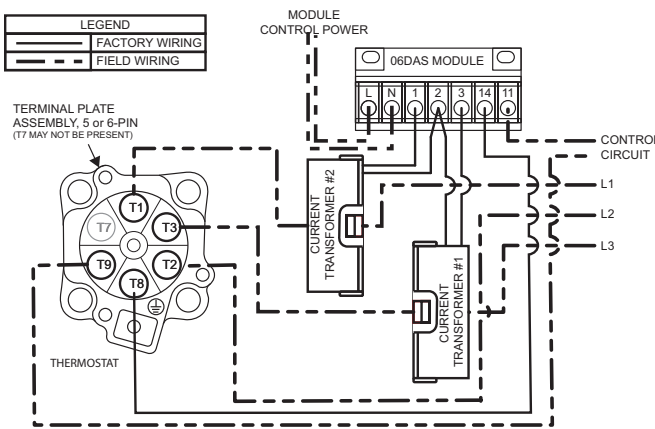


Fig. 28 — Three Phase Electronic Overcurrent Protection (RETROFIT ONLY) Overload 2CT Service

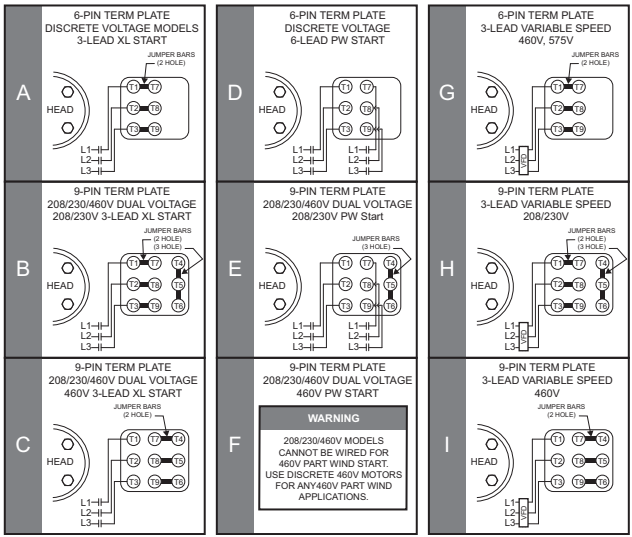


Fig. 29 — Wiring Diagrams-06E Terminal Plate

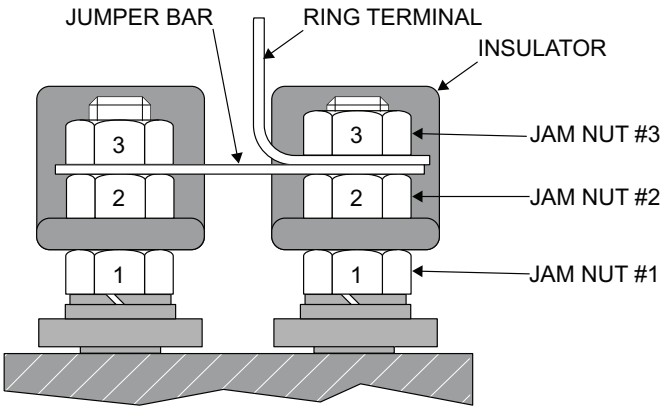


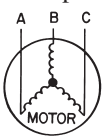
Fig. 30 — Terminal Post Arrangement, Detail View (06E and 06CC 50 to 99 cfm)

4.7 — Voltage and Current Unbalance

VOLTAGE UNBALANCE (Maximum 2%)

Voltage unbalance can cause motors to overheat and fail. Below is the recommended method for determining voltage unbalance.

Example: Supply voltage is 240-3-60



AB = 243 volts
BC = 236 volts
AC = 238 volts

$$\text{Average Voltage} = \frac{243 + 236 + 238}{3}$$

$$= \frac{717}{3}$$

$$= 239 \text{ volts}$$

Determine maximum deviation from average voltage:
(AB)243 – 239 = 4 volts
(BC)239 – 236 = 3 volts
(AC)239 – 238 = 1 volt

Maximum deviation is 4 volts.
Determine % voltage unbalance:

$$\%\text{ Voltage unbalance} = 100 \times \frac{4}{239}$$

$$= 1.7\%$$

This amount of phase unbalance is satisfactory as it is below the maximum allowable of 2%.

IMPORTANT: If the supply voltage phase unbalance is more than 2%, contact your local electric utility company immediately.

CURRENT UNBALANCE (Maximum 10%)

Voltage unbalance will cause a current unbalance, but a current unbalance does not necessarily mean that a voltage unbalance exists. A loose terminal connection or a build-up of dirt or carbon on one set of contacts (using the example of L1 as the problem leg) would cause a higher resistance on that leg (L1) than on L2 and L3. The current follows the path of least resistance, so the current increases in legs L2 and L3. Higher current causes more heat to be generated in the motor windings.

Percent (%) of current unbalance is calculated in the same way as voltage unbalance (see the previous section), with a maximum acceptable current unbalance of 10%.

5.0 COMPRESSOR SERVICE WORKSHEETS

Carlyle recommends that the Compressor Service Worksheets (pages 130 and 131) be copied (and enlarged, if preferred) and filled out for each compressor at initial start-up and each time the compressor is serviced. Comparing the data from current worksheets to past records will allow the service technician to diagnose system changes and prevent compressor failures. This information is also very useful in preventing a repeat failure.

06D, 06E Compressor Service Worksheet

Mechanic:_____ Date: _____

From Compressor Nameplate:

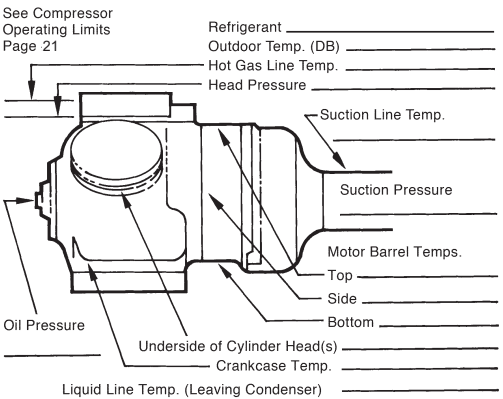
Model No.: _____

Serial No.: _____

Motor No.: _____

Voltage: _____

Allow compressor to run for 30 minutes, then obtain the pressures and body temperature at the locations shown below. Check for proper oil return in sight glass.



COMPRESSOR VOLTAGE/AMP VALUES		
PH	**VOLTAGE**	**CURRENT**
1ϕ	**C-R:**_____	**C:**_____
	C-S:_____	**R:**_____
	R-S:_____	**S:**_____
3ϕ	**L_1-L_2:**_____	**L_1:**_____
	L_1-L_3:_____	**L_2:**_____
	L_2-L_3:_____	**L_3:**_____
		PART WINDING
	L_7-L_8:_____	**L_7:**_____
	L_7-L_9:_____	**L_8:**_____
	L_8-L_9:_____	**L_9:**_____

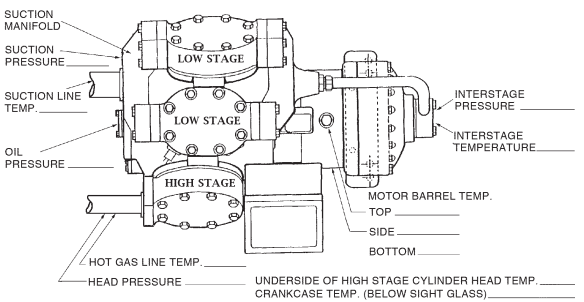
Make copies of this worksheet to record data at initial start-up and whenever the compressor is serviced.

LEGEND: C - Common R - Run S - Start

06CC Compressor Service Worksheet

Mechanic:_____ Date: _____
From Compressor Nameplate:
Model No.: _____
Serial No.: _____
Motor No.: _____
Voltage: _____
Allow compressor to run for 30 minutes, then obtain the pressures and body temperature at the locations shown below. Check for proper oil return in sight glass.

See Compressor Operating Limits, page 22.



COMPRESSOR VOLTAGE/AMP VALUES		
PH	**VOLTAGE**	**CURRENT**
1ϕ	**C-R:**_____	**C:**_____
	C-S:_____	**R:**_____
	R-S:_____	**S:**_____
3ϕ	**L_1-L_2:**_____	**L_1:**_____
	L_1-L_3:_____	**L_2:**_____
	L_2-L_3:_____	**L_3:**_____
		PART WINDING
	L_7-L_8:_____	**L_7:**_____
	L_7-L_9:_____	**L_8:**_____
	L_8-L_9:_____	**L_9:**_____

Make copies of this worksheet to record data at initial start-up and whenever the compressor is serviced.

LEGEND: C - Common R - Run S - Start

6.0 — SMART CONTROLLER and PWM VALVE

See Application Guide 574-078 at www.carlylecompressor.com.

Application Guide 574-078
https://www.shareddocs.com/hvac/docs/2002/Public/08/574-078.pdf

In refrigeration applications where the thermal load may vary over a wide range, a means of precise capacity control is always desirable for optimum system performance, while maintaining low energy consumption. To meet these objectives, Carlyle has developed an innovative and efficient solution — the smart controller and pulse width modulation (PWM) valve. These new devices meet the demand for precise suction pressure control by modulating system capacity for all low, medium, and high temperature applications, providing leading edge performance in compressor cycling reduction, compressor life extension, and refrigeration system energy usage.

The smart unloading controller allows continuous modulation of the compressor capacity using the steps of mechanical unloading or PWM valve. An analog output signal from the system rack controller provides a 0 to 10 vdc signal to the smart controller. Based on the signal, the smart controller continuously modulates the compressor unloader coils to deliver an equivalent linear change in the compressor capacity output to precisely meet the load demand. In addition, the smart controller will control dis-

charge temperature by operating the accessory cylinder head fan and liquid injection valve as required, maintaining safe and reliable operation. If discharge temperature exceeds allowable limits, the smart controller will automatically turn the compressor off to protect against compressor failure.

The smart controller is designed to operate a special solenoid valve installed in the compressor's suction line using pulse width modulation. As it does this, the smart controller will cycle the valve once every 30 seconds between the open (loaded) and closed (unloaded) positions. The relative duration of the loaded versus unloaded times creates a time average flow rate from the compressor that can be continuously varied. In turn, the time average flow rate from the compressor allows it to more precisely match the compressor capacity to the system cooling demand. A small bleed port in the solenoid valve keeps the compressor from pulling into a deep vacuum when the valve is in the closed position.

SERVICE GUIDE INDEX

COMPLIMENTS OF:

Carlyle service replacement compressors, parts, and support are available through a wide distribution network. Technical support is provided by your local **distributor. Customer Service Representatives can** provide assistance in locating your nearest distributor.

USA	CANADA	MEXICO
www.Totaline.com	www.wwgtotaline.ca/en/branch	www.totalinecom.mx/pages/Sucursales.html

www.CarlyleCompressor.com