

Installation Instructions

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GENERAL

1. Inspect compressor for shipping damage and file claim with shipping company if damaged or incomplete. Refer to Table 1 for package contents.
2. Check compressor nameplate for correct model and voltage designation.
3. Before installation, review all Carlyle compressor application literature to ensure that the proper compressor has been selected and is being applied in a proper manner. The required application literature is available on the Carlyle website.



Scan QR code for link to Carlyle literature website,
<https://bit.ly/3J8liEP>

4. To facilitate customer installation requirements, the parts shown in Table 1 are factory-supplied in a separate parts bag located in the compressor terminal box.

Table 1 — Package Contents

PART NUMBER	DESCRIPTION	DISCRETE VOLTAGE (Digit 8=1 or 6)	DUAL VOLTAGE (Digit 8=3)
06EA402632	Oil Pressure Tee Valve Assembly	1	1
06EA500551	Jumper Bar (2 hole)	3	3
06EA502713	Conduit Plate	1	1
06EA502782	Jumper Bar (3 hole)	—	1
06LA500282	Connection Block	—	1
AK16AS126	Conduit Plate Screw	4	4
AS81VF056	Crankcase Heater Speed Clip	1	1
AT14QA241	Jam Nut	6	9
574-068	Instruction Sheet	1	1

SAFETY CONSIDERATIONS

⚠ DANGER

Failure to follow these instructions will result in severe personal injury or death.

ELECTRIC SHOCK HAZARD. Do not operate compressor or provide electric power to it unless the compressor terminal box is installed and the 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.

DO NOT remove the compressor terminal box cover until all electrical sources have been disconnected.

NEVER EXCEED specified test pressures. System strength/tightness test pressure may not exceed the compressor maximum test pressure on the nameplate.

Close shutoff valves to isolate the compressor if necessary.

DO NOT USE oxygen or other industrial gases for tightness/pressure testing. Use nitrogen or inert gas.

⚠ WARNING

Failure to follow these instructions may result in serious injury or death.

CONTENTS UNDER PRESSURE. Compressor contains oil and refrigerant under pressure. Pressure must be relieved before installation, servicing, or opening any connections.

HOT and COLD surface temperatures can occur during operation and can result in severe burns or frostbite.

USE ONLY approved refrigerants and refrigeration oils.

CHECK THE REFRIGERANT TYPE. Charge only with refrigerant that conforms to AHRI Standard 700.

Only qualified, authorized, and appropriately trained HVAC or refrigeration personnel should install, commission, and maintain this equipment.

Use appropriate personal safety equipment where required. Safety goggles, gloves, protective clothing, safety boots, and hard hats should be worn where necessary.

OPERATING LIMITS

Operating envelopes of the compressor models will differ with each model and refrigerant. These operating envelopes are provided in the CARWIN rating program. See the Variable Speed Supplemental Instructions (574-087) on the Carlyle website for details.



Scan QR code for link to Carlyle literature website
<http://bit.ly/47z3SP7>

GENERAL INSTALLATION PROCEDURES

Holding Charge

The 06E compressor is factory-supplied with a 5 to 15 psig (1.4 to 2 bar) charge of dry air. This internal pressure must be relieved before attempting to remove any compressor fitting or part.

Relieve holding charge by removing the cap on the low pressure connection fitting and depressing the internal disc. See Fig. 1 and 2 for applicable low pressure connection fitting location.

System Cleanliness And Dehydration

Clean and dry systems are essential for long compressor and motor life and satisfactory operation. Compressor lubricants require special attention; excessive moisture, when combined with heat and refrigerant, can form damaging acids. The recommended limit for moisture is less than 50 ppm for compressors lubricated with mineral oil (MO) or alkylbenzene (AB) lubricants and 100 ppm for POE lubricants.

Use only piping which is clean and dry inside, free from rust and process oils.

Suction Screen

All 06E compressors are equipped with a suction strainer located on the compressor side of the suction service valve. Verify that the suction screen is installed. Do not operate the compressor without the suction strainer installed.

Oil Equalization (Parallel Compressors)

When two 06E compressors utilize oil equalization through the sightglass connections, a small oil equalization check valve must be installed in the rotor bolt at the motor end of the crankshaft. This rotor bolt is accessible by removing the suction strainer from the motor end cover. Installation of the check valve must be done before connecting the suction service valve. See Table 6 on page 9 and Fig. 3 for valve and rotor bolt locations.

Service Valves

Remove valve pads and attach factory-supplied suction, discharge gaskets and service valves to the compressor. Torque applicable service valve mounting bolts as noted in Table 6 on page 9.

When brazing piping to valve, disassemble valve or wrap in a wet cloth to prevent heat damage.

Cylinder Head Unloaders

If equipped with electric capacity control solenoid valves, perform a functional test on the valves using a permanent magnet or a solenoid coil to activate each solenoid valve. There should be a distinctive "click" when the solenoid valve is energized and de-energized. The valve may have been damaged if there is no sound. Examine the valve stem enclosure tube to determine if it is bent or damaged.

Pressure actuated unloaders can only be checked during operation of the compressor.

Approved Refrigerants

The 06E compressor is approved for the following refrigerants; R-22, R-134a, R-404A, R-407A, R-407C, R-407F, R-448A, R-449A, R-507A, and R-513A.

Oil

1. Check to see that oil level is 1/8 to 3/8 of the way up on compressor sightglass (see Table 2) before starting and after 15 to 20 minutes of operation. Compressors may be shipped with or without an oil charge based on model. All compressors must contain the specified oil charge prior to start up as a condition of warranty.

⚠ CAUTION

Oil levels on 06E compressors should not be allowed to go above 3/8 of sightglass. High oil levels require excess power and shorten compressor life. See Table 2.

2. To add oil:
Isolate crankcase and reclaim internal pressure, and add oil through the oil fill connection (see Fig. 1 and 2).

⚠ CAUTION

Do not charge oil through the suction line or through the compressor suction access fittings. See Fig. 1-2 for the recommended oil charging port. Adding oil into the suction side of the compressor can cause damage to the suction/discharge valves, pistons, and/or connecting rods.

To remove excess oil:

Reduce internal crankcase pressure to 2 psig (1.15 bar), isolate crankcase, then loosen the oil drain plug, allowing oil to seep out past the threads of the plug.

⚠ CAUTION

With the compressor crankcase under slight pressure, do not remove the oil drain plug, as the entire oil charge could be lost. Do not reuse drained oil or oil that has been exposed to the atmosphere.

3. When additional oil or a complete oil change is required, use only the listed Carlyle approved oils as shown in Table 3.

Table 2 — 06E Sightglass

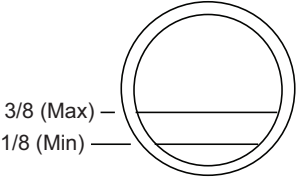
06E OIL SIGHTGLASS LEVEL	NOMINAL OIL CHARGE		
	NEW SYSTEM (DRY PIPING) Pints (Liters)	COMPRESSOR	EXISTING SYSTEM (WET PIPING) Pints (Liters)
	17.0 (8.0)	50 cfm	14.0 (6.6)
	21.0 (9.9)	65, 75, 99 cfm	19.0 (9.0)

Table 3 — Approved Oils

MANUFACTURER	OIL TYPE	BRAND NAME
For HFC Refrigerants		
Totaline	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*
Mobil Arctic	POE	EAL68*
For HCFC and CFC Refrigerants		
Totaline	MO	P903-0101
Witco Suniso	MO	3GS
IGI Petroleum	MO	Cryol150
Texaco Capella	POE	WFI32-150
Totaline	AB	P903-2001
Shrieve Chemicals	AB	Zerol150

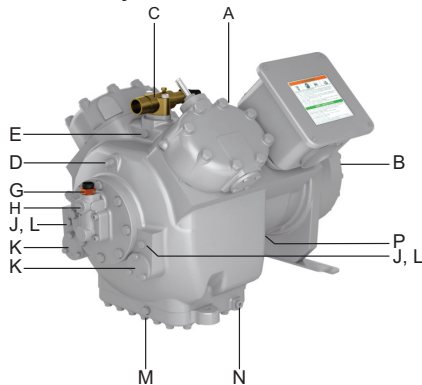
* Do not use in low temperature applications.

LEGEND

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

Connection Points

06E, 4-cylinder, 50 cfm

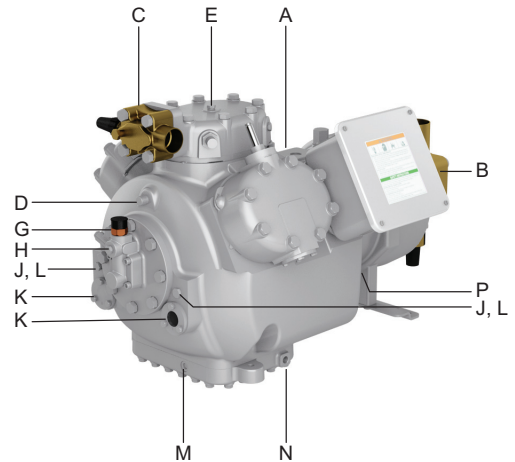


LEGEND

A — Nameplate Locations
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. 1 — 06E 4-Cylinder 50 cfm Compressor

06E, 6-cylinder, 65-99 cfm



LEGEND

A — Nameplate Locations
B — Suction Service Valve
C — Discharge Service Valve
D — Low Pressure Connection
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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. 2 — 06E 6-Cylinder 65-99 cfm Compressor

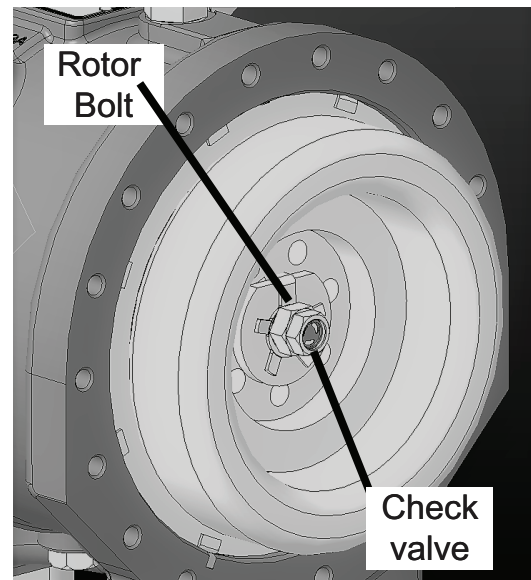


Fig. 3 — Check Valve in 06E Rotor Locking Bolt

Pressure Relief Valves

A sufficient number of pressure relieving devices and/or pressure relief valves, having capacity deemed adequate for the system, may need to be provided. They must be located such that no stop valve is located between the relief valve and the section of the system being protected. The maximum allowable pressure for the high side of the 06E compressor is 464.7 psia (32.0 bar) and for the low side is 299.7 psia (20.6 bar).

The factory-installed internal pressure relief valve for the 06E compressors will start-to-discharge at a differential pressure (discharge to suction) of 400 psid (27.6 bar), $\pm 3\%$. Once a valve has relieved at the specified pressure, it should remain fully functional, but it may relieve at a lower pressure. If this pressure goes below 10% of its set point (349 psid, 24.1 bar), then the valve should be replaced.

ELECTRICAL

Consult the wiring diagram located inside the compressor terminal box cover and Fig. 4-6 for wiring connection locations.

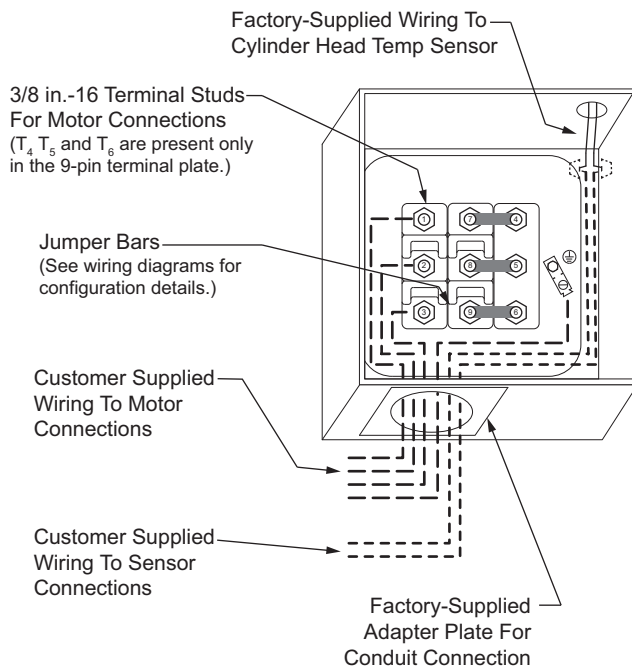


Fig. 4 — Terminal Box Arrangement

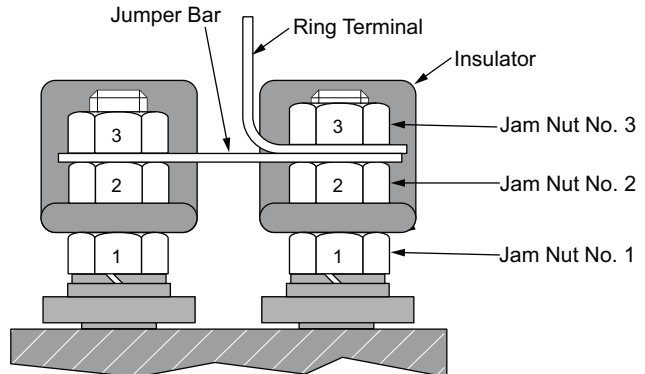
Terminal Box

All UL recognized 06E compressors have terminal enclosures that are suitable for outdoor use equipment as a sole enclosure. The compressor terminal box is supplied with a support plate to mount the connector for the power wiring conduit. The support plate can be fastened to the terminal box with the (4) screws provided.

Terminal Plate Wiring

The parts listed in Table 1 are supplied in a parts bag with the compressor and are used when wiring the terminal plate. Customer supplied wiring to the compressor terminal plate must be provided with insulated wire terminal connectors and be suitable for accommodating the 3/8 in. diameter terminal studs. Refer to Fig. 5 for wiring components of the terminal plate. Jam Nut No. 1 is factory-installed and should not be disturbed. Jam Nut No. 2 should be in contact with the underside of the jumper bar or ring terminal if no jumper bars are used. Jam Nut No. 2 should be installed finger tight, never torqued with a wrench. Jam Nut No. 3 should be in contact with the upper side of the jumper bars or ring terminal and should be wrench torqued.

IMPORTANT: Variable speed applications should refer to the Variable Speed Compressor Supplemental, 574-087 for electrical details that are specific to variable speed applications.



NOTE: Jumper bars not required in all installations. Refer to Fig. 6 for usage.

Fig. 5 — Terminal Plate Wiring

6-PIN TERMINAL PLATE 3-LEAD ACROSS-THE-LINE (XL) START

See Fig. 6A.

6-PIN TERMINAL PLATE 6-LEAD ACROSS-THE-LINE (XL) START

See Fig. 6A.

1. Install (3) 2-hole copper jumper bars directly on top of Jam Nut No. 2 connecting terminals T_1 to T_7 , T_2 to T_8 , and T_3 to T_9 .
2. Connect the line leads directly on top of the jumper bars to terminals T_1 , T_2 , T_3 , T_7 , T_8 , and T_9 .
3. Install (6) Jam Nut No. 3 (included in this kit) on terminal studs to secure jumper bar/line connections. Tighten Jam Nut No. 3 to 18 lb-ft (24 Nm) maximum.

9-PIN TERMINAL PLATE ACROSS-THE LINE (XL) START 208/230V-3-60/200V-3-50

See Fig. 6B.

9-PIN TERMINAL PLATE ACROSS-THE LINE (XL) START 460V-3-60/400V-3-50

See Fig. 6C.

6-PIN TERMINAL PLATE 6-LEAD PART WINDING (PW) START

See Fig. 6D.

1. Jumper bars are not required with 6-Lead PW start applications. Jam Nut No. 2 should be finger tightened only; do not torque with wrenches.
2. Connect the part winding start leads directly on top of Jam Nut No. 2 to terminals T_1 , T_2 , and T_3 .
3. Connect the full winding run leads directly on top of Jam Nut No. 2 to terminals T_7 , T_8 , and T_9 .
4. Install (6) Jam Nut No. 3 (included in this kit) on terminal studs to secure jumper bar/line connections. Tighten Jam Nut No. 3 to 18 lb-ft (24 Nm) maximum.

9-PIN TERMINAL PLATE PART WINDING (PW) START 208/230V-3-60/200V-3-50

See Fig. 6E.

1. Remove plastic connector block from terminals T₄, T₅, and T₆.
2. Install the flat connector block (non-conducting) on terminals T₄, T₅, and T₆.
3. Re-install terminal nuts on terminals T₄, T₅, and T₆ (removed in Step 1). Finger tighten only; do not torque with wrenches.
4. Install the 3-hole copper jumper bar directly on top of Jam Nut No. 2 connecting terminals T₄, T₅, and T₆.
5. Connect the line leads directly on top of the jumper bars to terminals T₁, T₂, T₃, T₇, T₈, and T₉.
6. Install (9) Jam Nut No. 3 (included in this kit) on terminal studs to secure jumper bar/line connections. Tighten Jam Nut No. 3 to 18 lb-ft (24 Nm) maximum.

6-PIN TERMINAL PLATE 3-LEAD VARIABLE SPEED

See Fig. 6G.

Install (3) 2-hole copper jumper bars directly on top of Jam Nut No. 2 connecting terminals T₁ to T₇, T₂ to T₈, and T₃ to T₉.

1. Connect the line leads directly on top of the jumper bars to terminals T₁, T₂ and T₃.
2. Install (6) Jam Nut No. 3 (included in this kit) on terminal studs to secure jumper bar/line connections. Tighten Jam Nut No. 3 to 18 lb-ft (24 Nm) maximum.

9-PIN TERMINAL PLATE VARIABLE SPEED 208/230V-3-60/200V-3-50

See Fig. 6H.

1. Remove plastic connector block from terminals T₄, T₅, and T₆.
2. Install the flat connector block (non-conducting) on terminals T₄, T₅, and T₆.
3. Reinstall Jam Nut No. 2 on terminals T₄, T₅, and T₆ (removed in Step No. 1). Finger tighten only; do not torque with wrenches.
4. Install the 3-hole copper jumper bar directly on top of Jam Nut No. 2 connecting terminals T₄, T₅, and T₆.
5. Install (3) 2-hole copper jumper bars directly on top of Jam Nut No. 2 connecting terminals T₁ to T₇, T₂ to T₈, and T₃ to T₉.
6. Connect the line leads directly on top of the jumper bars to terminals T₁, T₂, and T₃.
7. Install (9) Jam Nut No. 3 (included in this kit) on terminal studs to secure jumper bar/line connections. Tighten Jam Nut No. 3 to 18 lb-ft (24 Nm) maximum.

9-PIN TERMINAL PLATE VARIABLE SPEED 460V-3-60/400V-3-50

See Fig. 6I.

1. Install (3) 2-hole copper jumper bars connecting terminals T₇ to T₄, T₈ to T₅, and T₉ to T₆.
2. Connect the line leads directly on top of the jumper bars to terminals T₁, T₂, and T₃.
3. Install (9) Jam Nut No. 3 (included in this kit) on terminal studs to secure jumper bar/line connections. Tighten Jam Nut No. 3 to 18 lb-ft (24 Nm) maximum.

Motor Protection

OVERCURRENT PROTECTION—CUSTOMER SUPPLIED

06E compressors are supplied from the factory without motor overcurrent protection devices. Fixed speed 06E compressors must be applied with properly sized overload relays or calibrated circuit breakers to protect the motor against overcurrent fault conditions. These devices will protect the compressor against running overcurrent, locked rotor, and primary and secondary single phasing. See 574-069 06D and 06E Application Guides for compressor electrical data and overload trip setting requirements.

Some fixed speed 06E models may be configured with a part winding start to reduce inrush current at startup. Carlyle recommends a 1.0 to 1.25 second time delay between energizing the first and second windings.

Variable speed 06E compressors may use the overcurrent protection features of the variable speed drive, providing that the drive is listed with UL for this purpose. The overcurrent setting of the drive must be consistent with the MCC (maximum continuous current) value as defined in the 574-069 06D and 06E Application Guide.

WARNING

Systems with VFD bypass contactors must include appropriate overcurrent protection when operating in bypass mode.

Overcurrent protection for all 06E compressors must be of the type that is manually reset. Overcurrent protection devices that automatically reset are not permitted.

Thermal Protection

All 06EM and 06ER models are supplied with a discharge temperature sensor located in the cylinder head of the compressor. This sensor is designed to open at 295°F, ±5°F (146°C, ±2.77°C) and to re-close at 235°F (112°C). The discharge temperature sensor operates as an automatic reset device; however, Carlyle recommends that it be wired into the control scheme in such a manner that allows it to function as a manual reset device. The sensor will open on temperature rise and close on temperature fall. The thermostat pilot duty contacts are rated for a 125 sealed va and for an inrush of 1250 va.

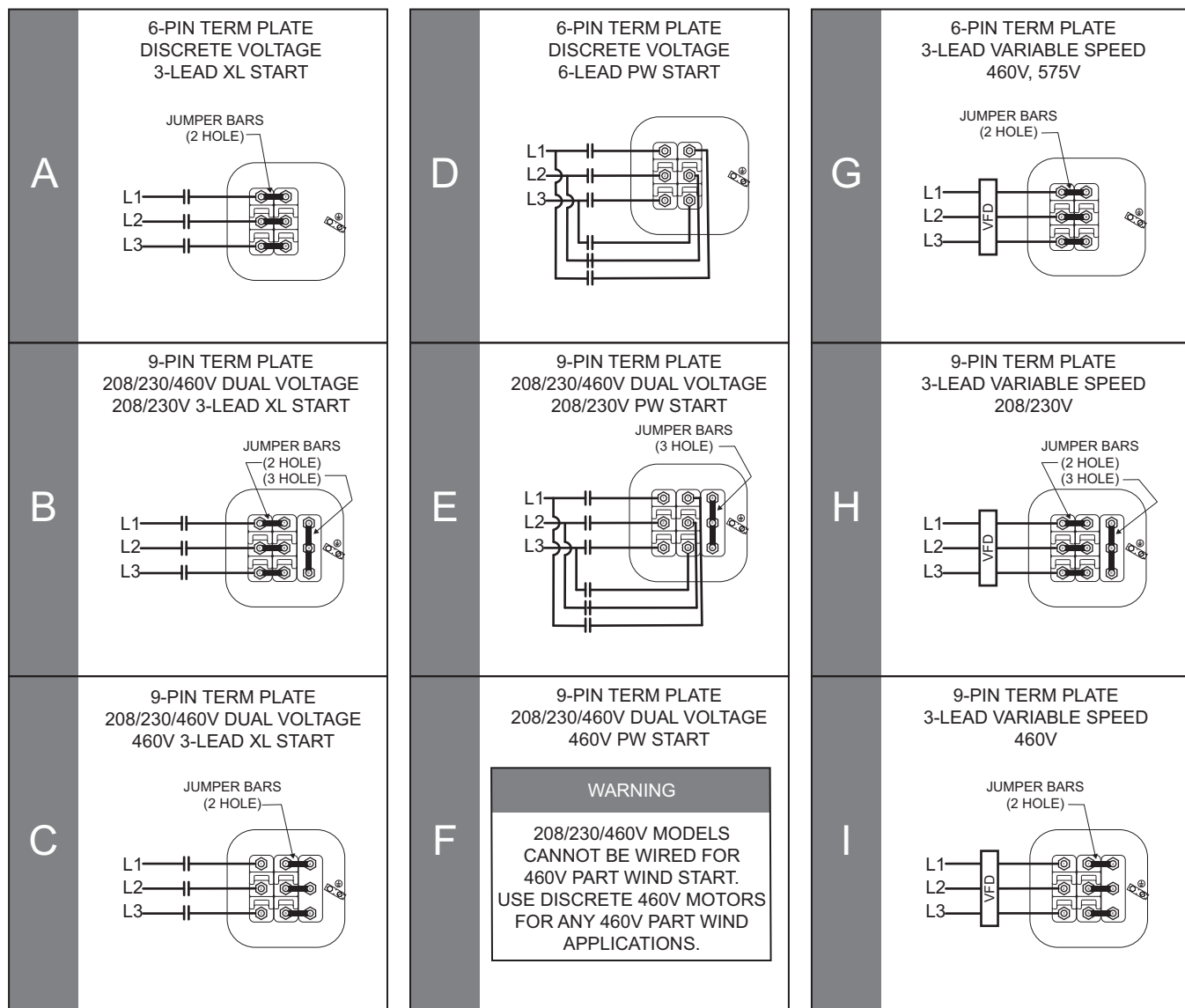


Fig. 6 — Terminal Plate Wiring Schematics

LUBRICATION SYSTEM

Oil Pressure Access Tee

- For compressors without factory-installed electronic oil pressure protection, the oil pressure access tee is supplied in a separate parts bag with the compressor and is to be installed in the oil pump above the oil pump cover.

⚠ CAUTION

Bearing head material is aluminum. Torque oil pressure access tee to 20-25 lb-ft (27-33 Nm).

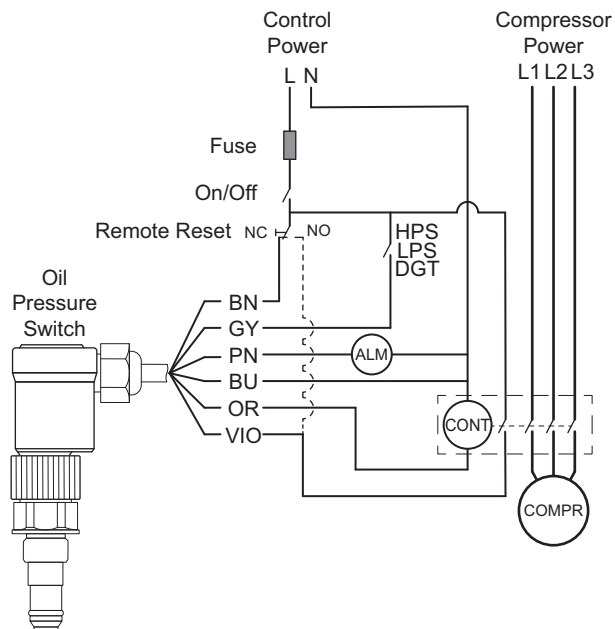
- Attach the high-side connection of an electro-mechanical oil pressure safety switch to the opened flared end of the installed oil pressure access tee. The capped end of this tee contains a Schrader-type valve which permits access to the oil pressure while the compressor is operating.

Oil Pressure Protection Switch

Differential oil pressure (oil minus suction pressure) is important to good compressor reliability. Carlyle recommends a 120 second time delay in the oil safety switch. The oil safety switch protects the compressor when lubrication is lost for more than 120 seconds. The switch closes the control circuit at startup, 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 below the minimum stop pressure above suction for longer than 120 seconds, the switch will open the control circuit, shutting down the compressor. Oil pressure protection devices must be manual reset type.

Use of oil pressure protection is required for all fixed and variable speed 06E compressor applications, single and parallel compressors. Table 4 shows electro-mechanical oil pressure differential switches. See Fig. 1 and 2 for pressure connection locations.

The 06E compressors are available with factory-installed oil pressure protection. (See Fig. 1 and 2.) This factory-installed sensor eliminates the need for any field piping connections. The electronic portion of this oil pressure protection is available as a separate accessory for integrating into the system controls. Table 5 shows the oil pressure differential electronic switch required to integrate the factory-installed sensor into the system controls. Refer to Fig. 7 for the wiring of the electronic oil pressure protection switch. Compressors may be converted from electro-mechanical to electronic oil protection using Carlyle part number 06DA660115, which has the same characteristics as shown in Table 5.



LEGEND

BN (Brown)	— Line Power to OPPS
BU (Blue)	— Common Neutral
GY (Gray)	— Compressor Fault 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, CGT*	— Compressor Safeties
NC/NO	— Normally Closed/Normally Open

*Daisy chained high and low pressure switches, discharge gas thermostat, etc.

Fig. 7 — Electronic Oil Pressure Protection Switch Wiring

Table 4 — Electro-Mechanical Oil Pressure Protection

CARLYLE PART NO.	TIME DELAY	PRESSURE CONNECTIONS	PRESSURE DIFFERENTIAL SETTING		VOLTS	RESET TYPE	REMOTE ALARM CIRCUIT OPTION
			CUT OUT	CUT OUT			
060B210991	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-v	Manual	Yes

Table 5 — Electronic Oil Pressure Protection

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

COOLING FANS

Cylinder head cooling fans are required in any application where the discharge gas temperature exceeds 250°F (121°C). Applications where the compressor is located in an airstream with a consistent velocity of 8-10 fps (~3 m/s) do not require cylinder head fans.

MOUNTING

The 06E compressors may use either rigid mounts (see Fig. 8 and 9) or spring mounts. Variable speed applications using spring mounts should be carefully evaluated to ensure that there are no resonances across the entire speed range. Refer to Table 6 for proper torque values.

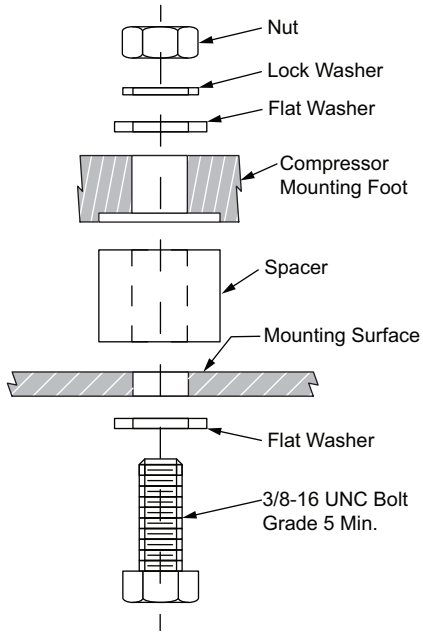


Fig. 8 — Rigid Mounting (Cast Foot With Spacer)

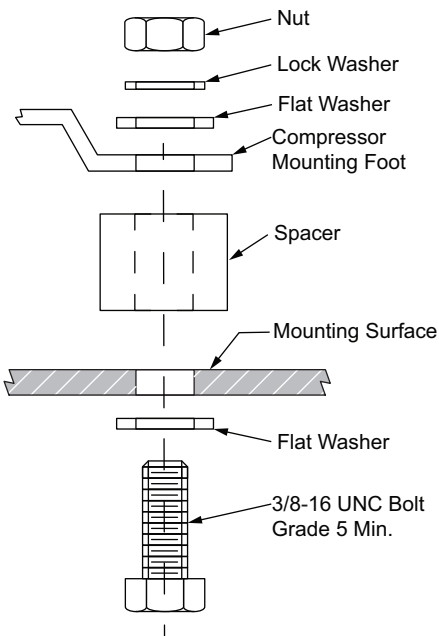


Fig. 9 — Rigid Mounting (Plate Foot With Spacer)

SERVICE AND TROUBLESHOOTING

Scan QR codes below for links to service and troubleshooting information for the 06E compressors



020-611 06D/E/CC Pocket Service Guide
<https://bit.ly/36bz6ku>



574-018
Failure Modes And Troubleshooting Guide
<https://bit.ly/3CBaDkM>



06-007 06E Service Parts List
<https://bit.ly/360ACGD>

TORQUE SPECIFICATIONS

Table 6 — Fastener Torque Specifications

THREAD SIZE	TORQUE RANGE	APPLICATION
No. 10-24	1-2 ft-lb (1.4-2.7 Nm)	Terminal Box Cover Screws
7/16-20 UNF	8-14 ft-lb (11-19 Nm)	Oil Drain SAE Plug
1/4-18 NPT	20-30 ft-lb (27-41 Nm)	Pipe Plug, Gauge Connection
	13-16 lb-ft (1.8-2.2 kg-m)	Oil Equalization Check Valve
1/4-28 UNF	3-5 ft-lb (4-7 Nm)	Oil Sightglass
		Terminal Box
	8-18 ft-lb (11-24 Nm)	Unloader Valve
5/16-18 UNC	20-33 ft-lb (27-45 Nm)	Discharge Service Valve (2-bolt)
		Suction Service Valve (2-bolt)
3/8-16 UNC	18 ft-lb max (24 Nm)	Terminal Post Jam Nut No. 3 (Top)
	Finger Tight	Terminal Post Jam Nut No. 2 (Middle)
	Do Not Disturb	Terminal Post Jam Nut No. 1 (Bottom)
	30-50 ft-lb (41-68 Nm)	Crankcase Mounting Bolts
1/2-13 UNC	80-90 ft-lb (108-122 Nm)	Suction Service Valve (4-bolt)
	100-130 ft-lb (136-176 Nm)	Cylinder Head Bolts
5/8-18 UNF	25-40 ft-lb (34-54 Nm)	Motor Barrel Oil Equalization Port
3/4-16 UNF	44-55 ft-lb (60-75 Nm)	OPSS Sensor

