Number One Air Conditioning Maker
Carrier
Division of Carrier Corporation
Syracuse, New York
Installation Instructions 06D,E

Capacity Control Accessory Package

GENERAL

These instructions cover field installation of capacity control valves on 06D and 06E compressors. The contents consist of a parts list, a table of capacity control packages, a step-by-step installation procedure and data on settings and adjustments for electric and pressure operated control valves.

Pumpdown control is not recommended for compressors using capacity control. Crankcase heaters and single pumpout should be used.

Check package for damage and for missing parts. If any parts are damaged or missing in shipment, file a claim immediately with the shipping company.

PARTS LIST

ITEM	NO. REQ'D	DESCRIPTION
1	1	Cylinder head with capacity control valve body attached (see note)
	8	Cap screws
2	1	Valve plate assembly with check valves and discharge valves attached
	2	Suction valves (for 06D compr)*
	2	Suction valve springs (for 06D compr)*
	4	Suction valves (for 06E compr)†
	1	Valve plate gasket
	1	Cylinder head gasket
3	1	Solenoid coil‡
→ **	1	Solenoid coil and valve assembly

*Included only in packages for 06D compressors.
†Included only in packages for 06E compressors.
‡Deleted from packages with pressure operated capacity control valves.
**Only item in package which converts from pressure to electric unloading.

NOTE:
For electric operated valve, the capacity control assembly is complete less the coil.
For pressure operated valve, the capacity control assembly is complete.

→ CAPACITY CONTROL PACKAGES

COMPR MODEL	PACKAGE NUMBER	VOLTS (Single Ph)	CONTROL Type	CONTROL Function
06D	06DA900082	115 (60/50 Hz)	Elec	Provide unloading to non-unloading cylinder bank.
	06DA900092	208/240 (60/50 Hz)		
	38AB900171	–	Press.	
06D or 06E	06EA900012	230	Elec	Convert from pressure to electric unloading.
	06EA900022	115		
	06EA900082	208		
	06EA900092	230 (50 Hz)		
06E	06EA900042	115	Elec	Provide unloading to non-unloading cylinder bank.
	06EA900052	208		
	06EA900062	230		
	06EA900072	230 (50 Hz)		
	06EA900202	–	Press.	

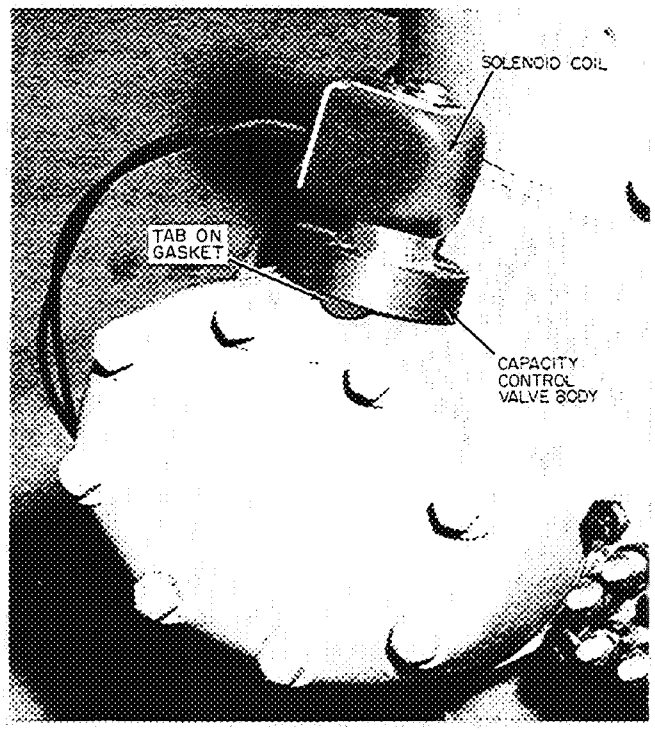

Fig. 1 – 06D Electric Capacity Control Valve

INSTALLATION

Complete Head Assembly Replacement

1. Install discharge and suction pressure service gages.
2. Start the compressor and allow it to run until warm, then frontseat the suction shutoff valve and let the compressor pump down to approximately 2 psig.
3. Stop the compressor and quickly frontseat the discharge shutoff valve. Bleed off the remaining refrigerant from the discharge side of the compressor.
4. Remove the cylinder head hold-down screws.
5. On 06D compressors, tap the cylinder head with a wooden or lead mallet to free the gasket. Remove the cylinder head. On 06E compressors, use a pry bar against the side tabs on the cylinder head for head removal.

6. Free the valve plate from the dowel pins and cylinder deck; use the cap screws that secured the discharge valve as jack screws, threading them into the tapped holes in the valve plate.
7. Remove the suction valves from the dowel pins.
8. Install the new suction valves. *On 06D compressors only, be sure to install the suction valve positioning springs over the dowel pins.* Place the springs with the ends against the cylinder deck (the centers bow upward).
9. Install, in the order as listed, the valve plate gasket, valve plate assembly, cylinder head gasket, and cylinder head. Before installing the valve plate assembly, apply compressor oil to the check valve piston and manually operate the check valve several times to be sure it does not stick or bind.

   With the valve plate mounted in place, manually flex the suction valves to be sure there is no interference with the valve plate gasket. Install the cylinder head, using the longer cap screws furnished in the package.

   IMPORTANT: Use a torque wrench, and tighten the cylinder head cap screws evenly, by increments. Insufficient torque will cause a blown gasket and excessive torque may cause the unloader valve piston to bind. For 06D compressors, torque range is 30-35 lb-ft; for 06E compressors, torque range is 90-100 lb-ft.

   (Installation of pressure operated capacity control valve is now complete. The remaining steps apply to electric operated valve.)
10. Place the solenoid coil over the stem and secure. (On 06D compressors, a snap-on retainer is used, and on 06E compressors, the coil is held on with a nut and washer.)
11. Make the necessary wiring connections. When the solenoid coil is energized, the cylinder bank is unloaded; when the coil is de-energized, the cylinders are loaded.
12. Check for proper operation of solenoid valve. An audible "click" can be heard when the valve actuates.
13. Install suction gage and open valves. Start compressor and allow it to warm up. Operate the capacity control solenoid several times to be sure it is performing properly. The suction pressure should rise and the discharge pressure should drop when the valve is energized.

Conversion from Pressure to Electric Unloading

1. Follow steps 1 thru 3 under Complete Head Assembly Replacement.
2. Remove 3 cap screws and lift out the pressure operated control valve.
3. Remove the solenoid coil from the electric control valve, for easier access to hold-down screws.
4. Remove the plastic protector from the piston. *Check the ring groove – it must be perfectly clean and free of nicks.*
5. The gasket is already on the valve but must be positioned correctly on the flange. Align the 2 gasket holes opposite the tab with 2 holes in the flange. The elongated gasket hole at the tab will be over the third flange hole, which is offset to ensure proper angular position on the head. *The gasket position is important to ensure unobstructed pressure passages between the head and the capacity control valve*
6. Wipe clean the walls of the head cavity and apply thin film of compressor oil. Carefully compress the bypass piston ring and insert the piston into the head cavity, being sure that the gasket does not shift. *The tab must be outward as shown in Fig. 1*
7. Using the 3 cap screws and washers furnished, secure the control valve body to the head. *Torque screws to 14-16 lb-ft.*
8. Follow steps 10 thru 13 under Complete Head Assembly Replacement to complete installation.

CONTROLS AND VALVE SETTING FOR ELECTRIC CAPACITY CONTROL

Controls to operate the solenoid valve must be field furnished and may be either temperature or pressure operated. The control valve setting is made on field furnished control in compliance with job requirements.

PRESSURE OPERATED CAPACITY CONTROL VALVE ADJUSTMENT

The control load-up or set point is adjustable from –40 F (0 psig) to +50 F (85 psig) and is set in the field for individual job requirements. The set point adjustment (Fig. 2) is made by turning clockwise to increase the control pressure (load-up) and counterclockwise to decrease the control pressure point.

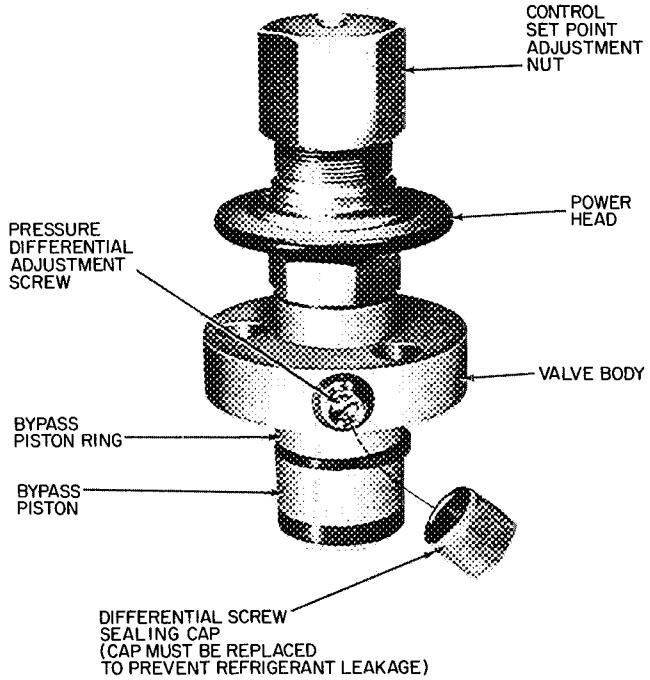

Fig. 2 – Pressure Operated Capacity Control Valve

The differential adjustment (Fig. 2) will vary the pressure difference between the cut-in and cutout point from 6 to 22 psig. This differential adjustment is made by removing the sealing cap and turning the inside screw clockwise to increase the differential and counterclockwise to decrease the differential.

Set Point Adjustment – The set point head should be turned clockwise (down) to the bottom stop. The counterclockwise turns can be determined by using the curve in Fig. 3. If the desired load-up point is known, the number of turns can be determined from the curve.

Differential Adjustment – The differential screw (Fig. 2) should be turned counterclockwise (out) to the back stop. If the desired differential is known, the number of turns can be determined from the curve in Fig. 4.

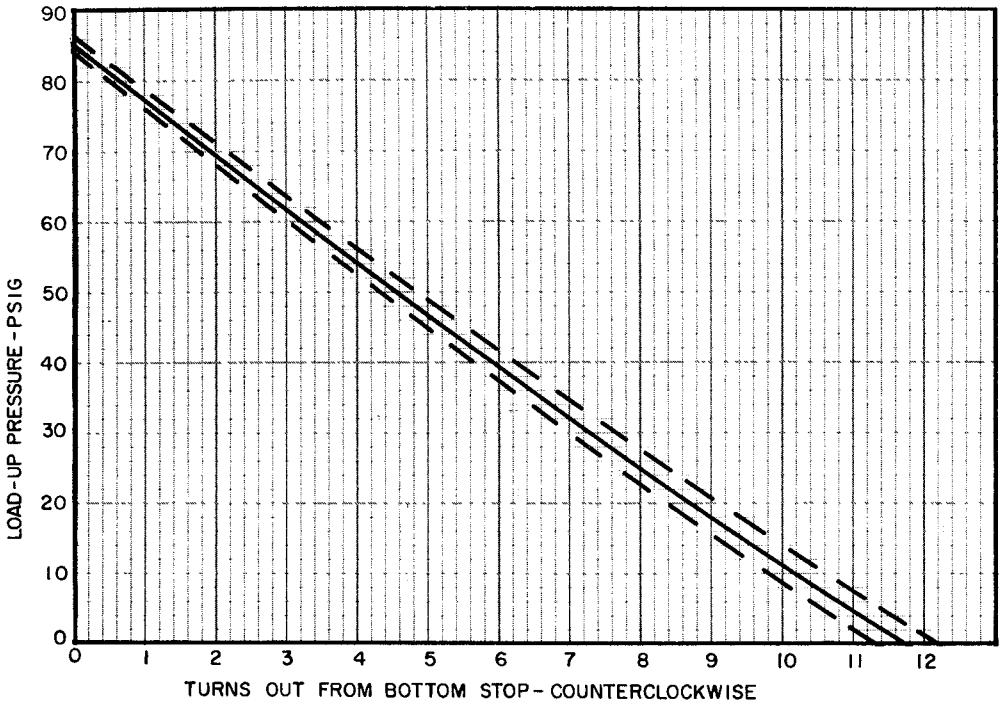

Fig. 3 – Control Set Point

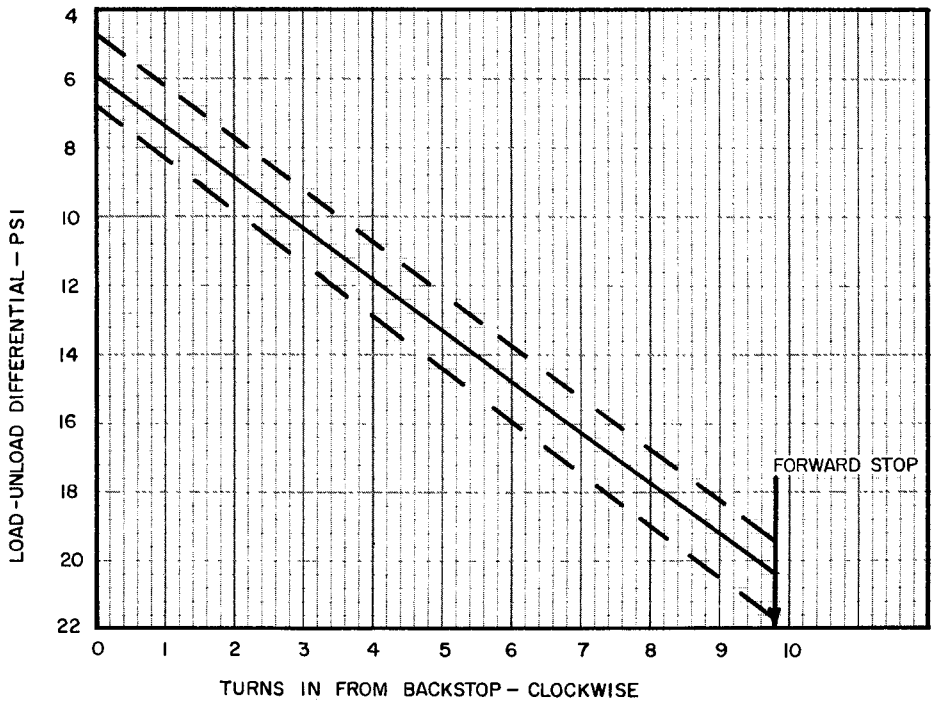

Fig. 4 – Differential Set Point

CAPACITY CONTROL VALVE OPERATION
(See Fig. 5)

Loaded Operation* – When suction pressure is above control point, the poppet valve will close. Discharge gas bleeds into valve chamber; the pressure closes bypass piston; and cylinder bank loads up. Discharge gas pressure forces check valve open, permitting gas to enter discharge manifold.

Unloaded Operation* – When suction pressure drops below valve control point, the poppet valve will open. Discharge gas bleeds from behind bypass piston to suction manifold. Bypass piston opens, discharge gas is recirculated back to suction manifold and cylinder bank is unloaded. Reduction in discharge pressure causes check valve to close, isolating cylinder bank from discharge manifold.

*When electric solenoid unloader is energized, the compressor cylinder bank unloads; when solenoid unloader is de-energized, the cylinder bank loads up

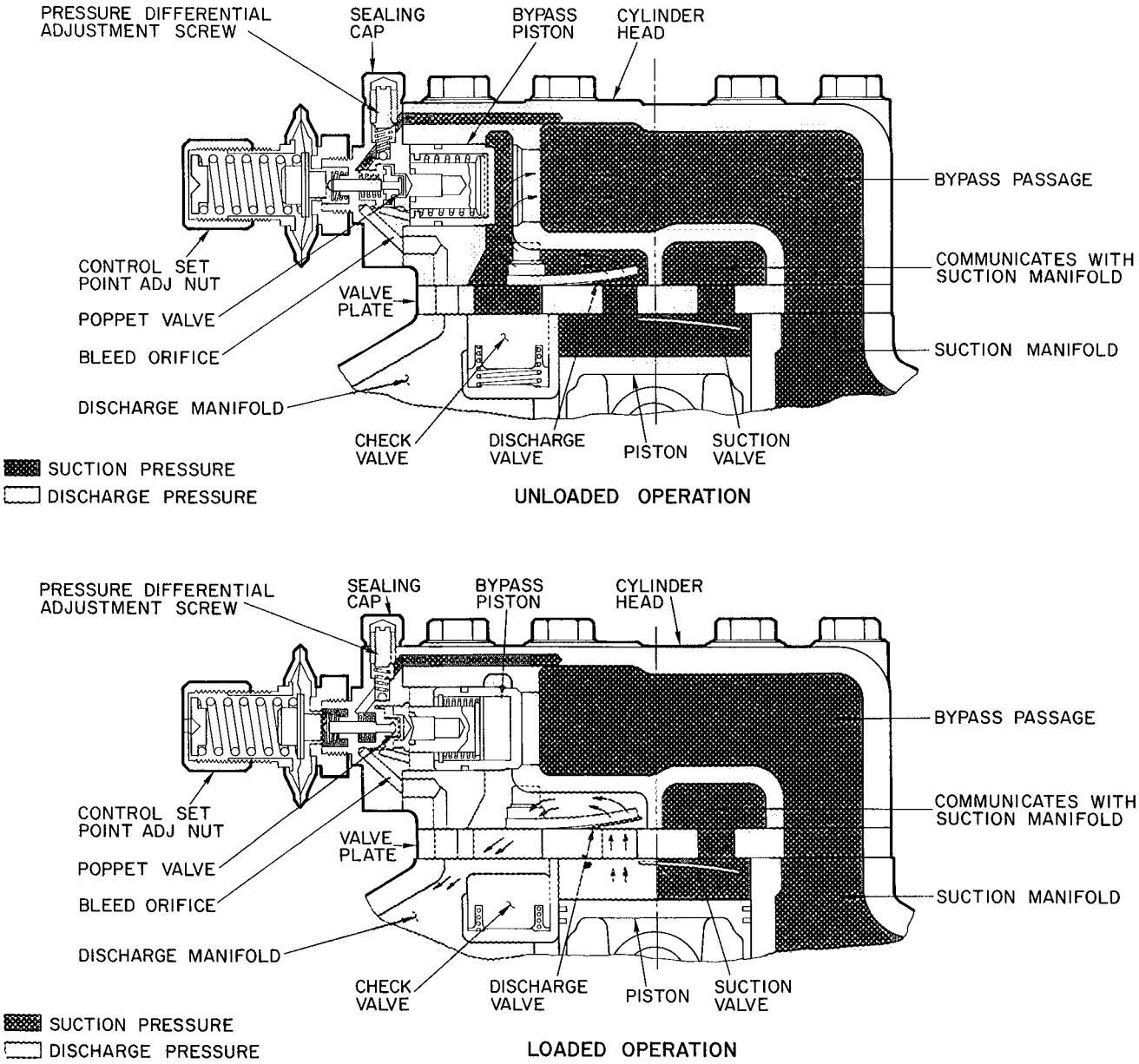

Fig. 5 – Capacity Control Valve Operation