



Installation, Start-Up and Service Instructions

4

50BJ

016 through 064

Carrier Corporation • Syracuse, N.Y. 13221

Accessory Hydronic Economizer (50BX900 ---)

SAFETY CONSIDERATIONS

The 50BJ single-package cooling units are designed to provide safe and reliable service when operated within design specifications. However, due to system pressures, electrical components and equipment location, some aspects of installation, start-up and servicing of this equipment can be hazardous.

Only trained, qualified installers and service mechanics should install, start up and service this equipment.

When working on this equipment, observe all precautions on tags or labels attached to the unit, safety notes in the literature and any other safety precautions that apply.

- Follow all safety codes.
- Wear safety glasses and work gloves.
- Use care in handling, rigging and placing bulky equipment.

⚠ DANGER

NEVER reach into unit while fan is running. LOCK OPEN AND TAG fan motor power disconnect before working on a fan. Remove the fuses and take them with you after noting this on tag.

⚠ WARNING

CHECK assembly and component weights to be sure rigging equipment can handle them safely. Note also any specific rigging instructions.

WHEN STEAM CLEANING COILS, be sure area is clear of personnel.

GENERAL

Accessory Hydronic Economizer Package —

The 50BX hydronic economizer package is available as a factory-installed accessory on 50BJ (Modu-Vac) single-package indoor cooling units. This package consists of a precooling water coil and accessory controls that use cooling tower water, when cold enough, to precool the air before it re-enters the Modu-Vac unit. This enables the mechanical refrigeration to shut down and thus save energy. Other package parts include:

DESCRIPTION	MANUFACTURER	PART NO.
Valve Body	Honeywell	V5013A1237; V5013B1003 (064 only)
Valve Motor	Honeywell	M734D-1004
Valve Linkage	Honeywell	Q618A1016
Valve, Regulating*	Penn/Johnson	V46AR1 (016 thru 034); V46AS2 (044 thru 064)
Changeover (Aquastat)	Honeywell	T6031A1011
Transformer	HeviDuty	T075

*Valve heads must be changed as valves must be reverse acting

The Modu-Vac microprocessor acts as a VAV controller. Once connected to the microprocessor, the hydronic economizer becomes fully integrated. A fully integrated economizer then allows the simultaneous operation of both mechanical refrigeration and economizer to achieve maximum energy savings.

The 50BJ (Modu-Vac) water-cooled condenser type units with hydronic economizer, are vertical air conditioning units designed specifically for application with 35B Modubox® and 37A Modulene® variable volume air terminals. For air terminal installation and service, refer to the separate 35B and 37A installation booklets.

These instructions supplement the 50BJ,BK base unit installation instructions. Refer to 50BJ,BK publication for base unit installation instructions. Do not use base unit physical data information if hydronic economizer is used. Instead, refer to Physical Data, Table 1, found in this publication.

Before beginning, refer to Fig. 2 for economizer dimensions and Fig. 1 for economizer component locations.

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Table 1 — Unit Physical Data

MODEL 50BJ WITH HYDRONIC ECONOMIZER	016	024	028	034	044	054	064
OPERATING WEIGHT (lbs)	1829	2409	3290	3400	4570	4798	4990
OPERATING CHARGE (lbs) (Note 1)	Refrigerant 22						
System 1	24	17	24	24	30	45	40
System 2	—	17	17	24	30	35	40
COMPRESSOR — TYPE 06	Serviceable Hermetic; 1750 Rpm						
System 1	DC337	DC724	DC337	DC337	E2150	E7265	E7175
System 2	—	DA724	DA724	DA337	EA150	EA150	EF175
Number of Unloading Cylinders	4	4	4	4	2	4	4
Number of Capacity Steps	3	6	6	6	4	6	6
HPS Setting (psig)	280	280	280	280	395	395	395
LPS Setting (psig)	27	27	27	27	27	27	27
CONDENSER							
Number . Type	1 SC	2 SC	2 SC	2 SC	2 TT	2 TT	2 TT
Maximum Working Pressure (psig)	150	150	150	150	150	150	150
Connection Size (in.)							
Water Inlet	(1) 2 FPT	(1) 2 FPT	2 FPT	2 FPT	2 FPT	2 FPT	2 FPT
Water Outlet	(1) 2 FPT	(1) 2 FPT	2 FPT	2. FPT	2 FPT	2 FPT	2 FPT
CONDENSATE CONNECTION	Size (in.) Type						
Condensate Drain (Hydronic Economizer)	1 FPT	1 FPT	1 FPT	1 FPT	1 FPT	1 FPT	1 FPT
Condensate Drain (Unit 50BJ Only)	1 FPT	1 FPT	1¼ MPT	1¼...MPT	1½...FPT	1½...FPT	1½...FPT
INDOOR FAN (Note 2)	Adjustable, Belt-Driven Centrifugal; 1750 Rpm Motor						
Number	2	2	2	2	2	2	2
Size (in.)	15x11	15x11	18x18	18x18	20x10	20x18	20x18
Nominal Cfm	6,000	8,000	10,000	12,000	16,000	20,000	24,000
Maximum Allowable Rpm	1,200	1,200	1,100	1,100	1,200	1,200	1,200
Number of Belts Fan Pulley							
PD (in.) (Note 3)	1 9/0	2 9/0	2 12 4	2 11 0	2 18 7	2 18 7	1 18 7
Fan Shaft Diameter (in.)	1 3/16	1 3/16	1 11/16	1 11/16	1 11/16	1 11/16	1 11/16
Horsepower							
Standard .Frame Size	3 182T	5 184T	7 5 213T	7 5 213T	15 254T	20 264T	25 284T
Motor Pulley A Diameter	4 5-5 5	4 6-5 6	5 6	5 6	9 0	9 8	9 8
Motor Pulley B Diameter	—	—	6 5	6 5	10 3	10 9	10 9
Motor Efficiency (%)	79	84	84	84	85	87	89
Motor Shaft Diameter (in.)	1 1/8	1 1/8	1 3/8	1 3/8	1 3/8	1 3/8	1 3/8
Center To Center (standard and horizontal)	8 8-11 1	8 8-11 1	29 8-33 3	29 8-33 3	17 9-21 1	17 9-21 1	17 0-20 4
Center To Center (alternate top discharge)	—	—	—	—	18 4-22 0	18 4-22 0	17 6-21 5
Fan Speed Range (Rpm)							
Pulley A	875-1069	894-1089	925	925	840	915	922
Pulley B	—	—	1073	1073	961	1023	1032
Alternate .Frame Size	5 184T	7 5 213T	10 215T	10 215T	20 264T	25 284T	30 286T
Motor Pulley A Diameter	—	—	—	—	10 9	10 9	10 9
Motor Pulley B Diameter	—	—	—	—	11 8	11 8	11 8
Fan Speed Range (Rpm)							
Pulley A	—	—	—	—	1023	1032	1029
Pulley B	—	—	—	—	1107	1117	1114
INDOOR COIL	Copper Tubes, Aluminum Plate Fins						
Number of Rows .Fins/in.	3 11 0	4 11 0	4 9 0	4 9 0	3 15	4 15	4 15
Total Face Area (sq ft)	16 3	17 4	21 9	26 2	37 5	37 5	37 5
PRECOOLING COIL							
Rows .Fins/in	4 11	4 11	4 11	4 11	4 11	4 11	4 11
Total Face Area (sq ft)	15	15	23 3	23 3	35 8	35 8	35 8
RETURN AIR FILTERS	Factory Supplied — Throwaway						
Number. Size (in.)	4 20x16x2	4 20x16x2	4 20x25x2	4 20x25x2	2 25x16x2	2 25x16x2	2 25x16x2
	4 20x20x2	4 20x20x2	4 20x20x2	4 20x20x2	8 25x25x2	8 25x25x2	8 25x25x2

Cfm — Cubic Feet Per Minute
FPT — Female Pipe Thread
Hp — Horsepower
MPT — Male Pipe Thread
ODM — Outside Diameter Male
ODS — Outside Diameter Solder
PD — Pitch Diameter
PDR — Pitch Diameter Range
Rpm — Revolutions Per Minute
SC — Shell and Coil
TT — Tube-in-Tube

NOTES:

- Operating charge values are approximate
- Motors and drives other than those furnished with units 016-034 must be purchased locally. Installation may require field modification.
- Fan motor pulleys on 50BJ028,034,044,054,064 are fixed pitch type. The smaller of the 2 pulleys is factory installed.

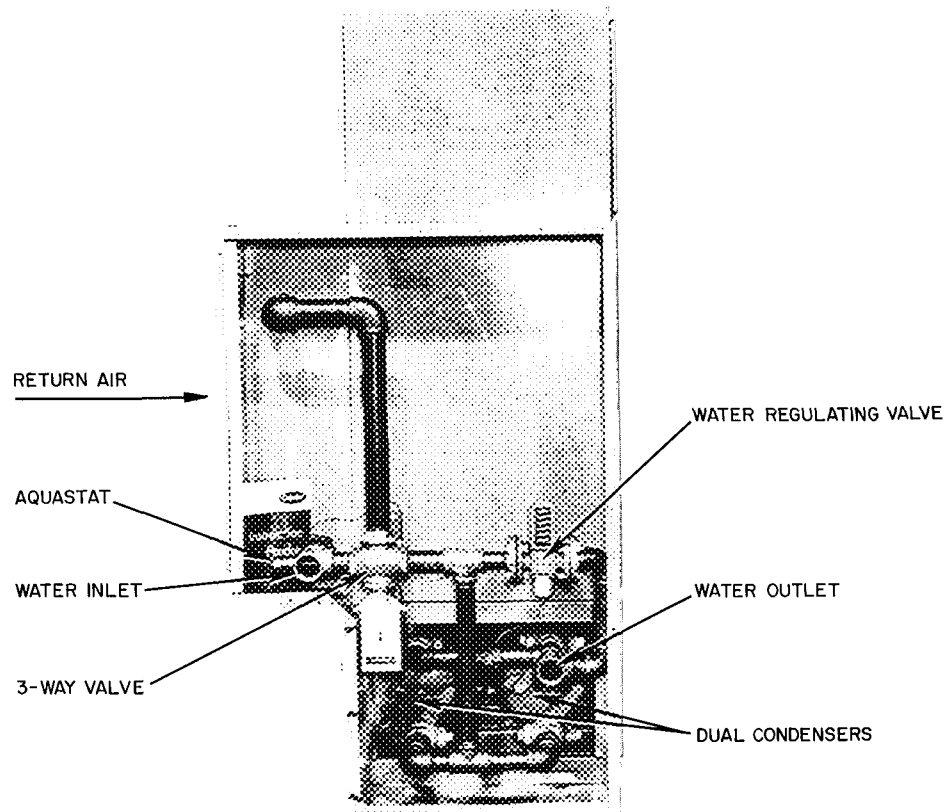
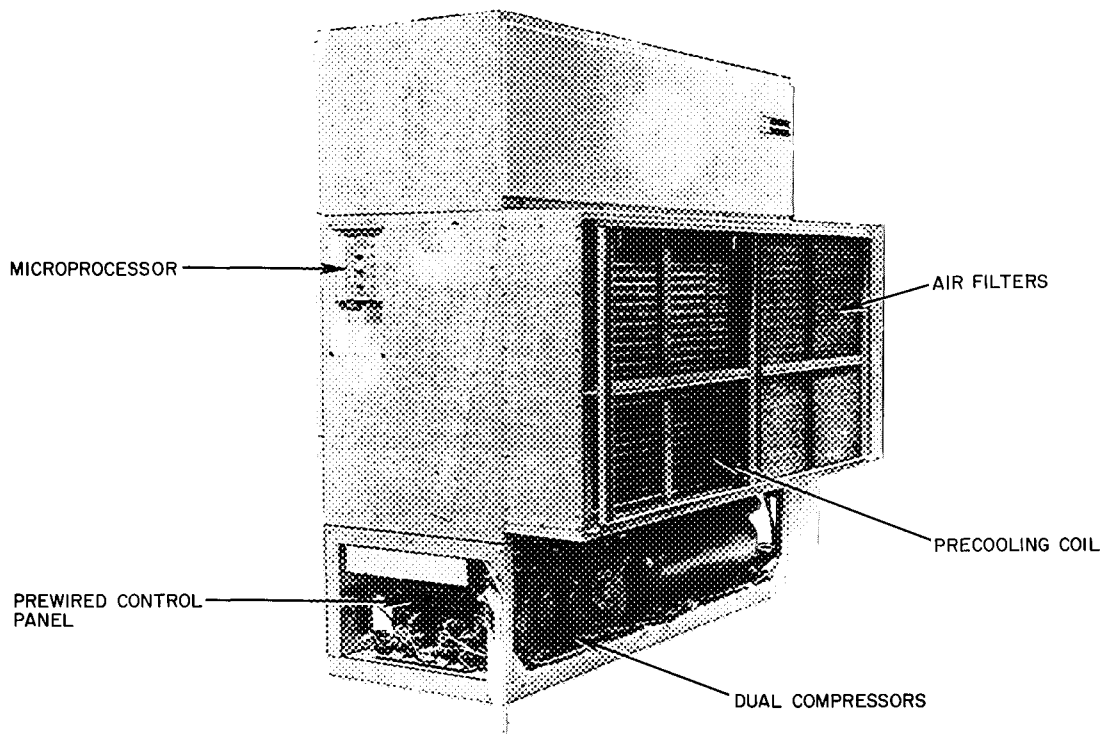


Fig. 1 — Economizer Component Locations

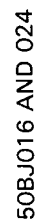
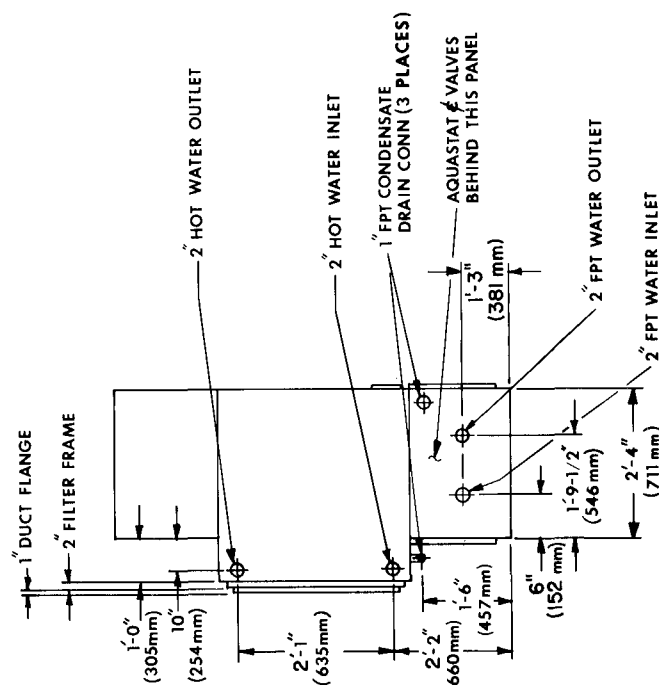
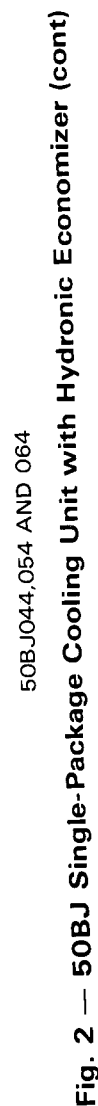


Fig. 2 — 50BJ Single-Package Cooling Unit with Hydronic Economizer

Technical drawing of a 778D control unit showing dimensions and component locations. The drawing includes the following labels and dimensions:

- SERVICE PANEL (2 PL.) 10 (254) x 27 (686)
- OPTIONAL DUCT LOCATION
- DUCT FLANGES SHIPPED WITH UNIT (FIELD INSTALLED) (1" (25) FLANGE ALL AROUND)
- 22-1/8" (560)
- A
- 2'-2" (660)
- 3'-1 3/4" (959)
- 1'-9 7/8" (556)
- 0'-5 8/16" (97)
- 0'-3 7/8" (98)
- 0'-9 5/16" (237)
- 2'-3 3/16" (706)
- 1'-10 7/8" (351)
- 2'-2" (660)
- 5'-4 7/8" (648)
- 3'-5 8/16" D. HOLE (92) FIELD
- 7/8" D. HOLE (22) ACCESSORY WIRE CONNECTION
- 7/8" D. HOLE (22) CONTROL WIRE CONNECTION
- POWER SUPPLY



NOTES (Fig. 2)

- 1 The approximate net weight of base unit including fan section and drive is

Unit 50BJ	Weight (lbs)
016	1829
024	2409
028	3290
034	3400
044	4570
054	4798
064	4990

- 2 For front electrical connections, interchange front and rear compressor section panels
- 3 Holes are provided in right end compressor section panel to accept pipe sizes as shown
- 4 On 016-034 units, allow 3-ft service clearance on left side and front of unit, and 2 ft on right side and back of unit. On 044-064 units, allow 4-ft service clearance on front and sides of unit, and 3-ft service clearance on back side of unit
- 5 Provide opening in unit panel for condensate connection to suit installation
- 6 Dimensions in () are millimeters unless otherwise specified
- 7 Provide condensate drainage for both cooling coils. Make certain to plug unused connections. Connect condensate drain to lowest drainage point

ELECTRICAL

Refer to 50BJ,BK Installation Instructions for base unit wiring information. Refer to Fig. 3 and 4 for hydronic economizer wiring information. Base unit and hydronic economizer wiring labels can also be found attached to base unit control panel. Economizer wiring conforms to UL Standard 465 and NEC.

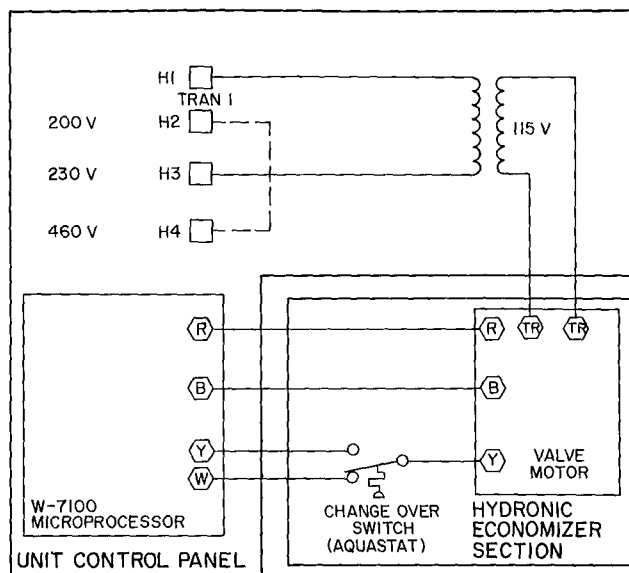
Electrical controls include:

Aquastat	— Honeywell T6031A1011
Valve	— Honeywell V5013A1237 (50BJ016-054) or V5013B1003 (50BJ064)
Linkage	— Honeywell Q618A1016
Actuator	— Honeywell M734D-1004
Transformer	— HeviDuty T075

PIPING

All piping material used should be galvanized, rated for 250 psig and insulated to prevent condensation. Refer to Fig. 5 for piping dimensional information.

The precooling coils are factory installed in series with the condensers as shown in Fig. 6. The water regulating valve is controlled by compressor circuit no. 1 and is connected to either a liquid or discharge service valve. The reverse acting regulating valve is set for 160 psig opening pressure. When the 3-way valve is in the OPEN position, the hydronic economizer is being bypassed. When this same valve is in the CLOSED position, the hydronic economizer is being used.



NOTE: A 500-ohm resistor, connecting terminals 9 and Y on microprocessor, has been removed. Refer to unit label diagram

Fig. 3 — Hydronic Economizer Wiring Schematic

An air vent is also provided and is located at the uppermost point in coil header, located above the drain pan.

Refer to Fig. 7 for typical piping and wiring schematic diagram.

START-UP

General — The start-up procedures described in this publication are for the hydronic economizer only. Upon completion of the 6 steps listed below, refer to the 50BJ,BK Installation Instructions for base unit start-up information.

- Step 1 — Set changeover switch to 70 F. Switch is located inside unit at piping end.
- Step 2 — Make certain that water regulating valve is set at 160 psig minimum.
- Step 3 — Check modulating valve actuator to ensure that it is tightly secured to valve body.
- Step 4 — Install condensate drains to hydronic economizer and to unit basepan. Refer to piping information on page 7.
- Step 5 — Check for water leaks. Tighten if necessary.
- Step 6 — Slightly open liquid line service valve to provide refrigerant pressure to water regulating valve.
- Step 7 — Refer to 50BJ,BK base unit installation instructions for further start-up information. Base unit installation instructions are contained in a packet attached to main unit.

OPERATING SEQUENCE

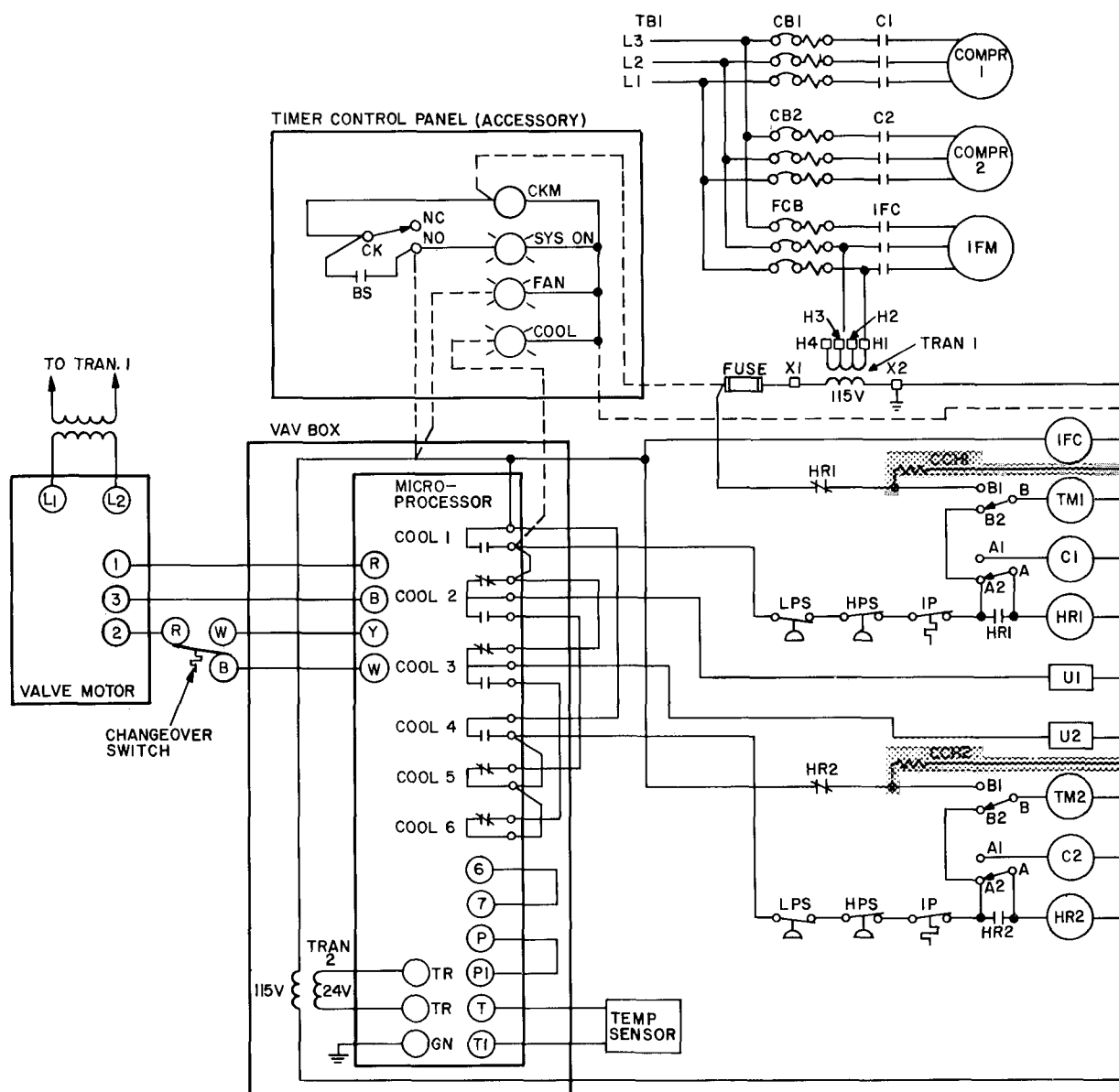
All Hydronic Economizer Units (Refer to Fig. 7.) — The Aquastat (A) is preset for a desired changeover water temperature of approximately 45 - 75 F. The microprocessor (D) is also preset for a desired leaving air temperature from the base unit (e.g. 55 F dry-bulb).

When the condenser water temperature is less than or equal to the preset changeover temperature

— The changeover Aquastat (A) signals the microprocessor (D) that economizer cooling is now possible. The microprocessor then signals the 3-way valve (B) to change position and allow

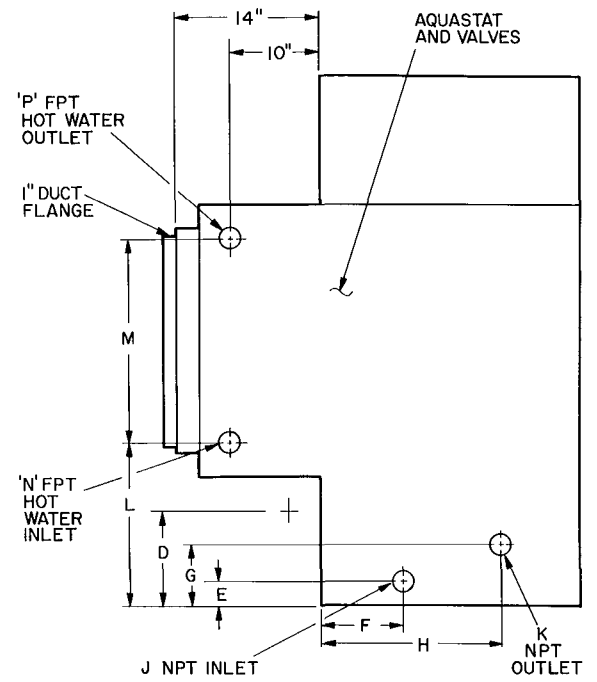
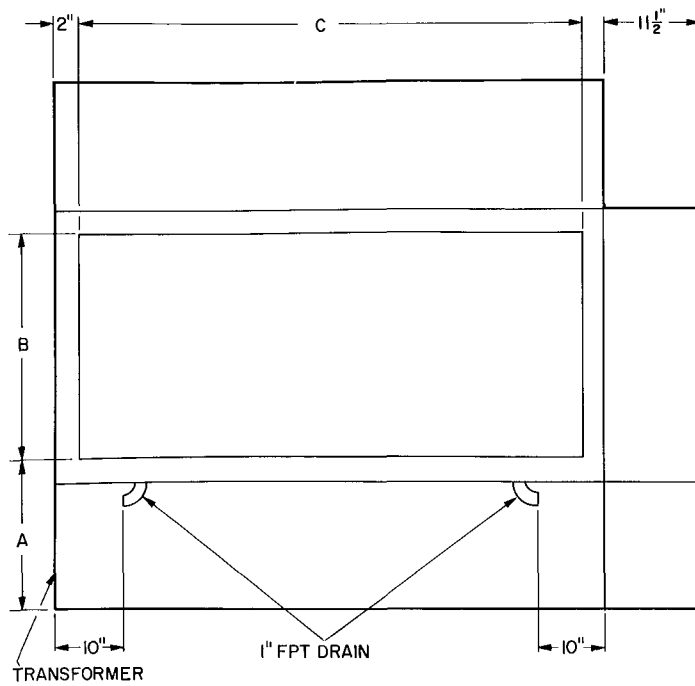
flow through the precooling coil. This coil precools the air before it reaches the DX cooling coil. If additional cooling capacity is then needed, the microprocessor stages on compressor steps to maintain the desired leaving air temperature. The 2-way valve (C) will automatically maintain unit head pressure if needed. The unit is now in the integrated economizer mode.

When the condenser water temperature rises above the preset changeover temperature — The 3-way valve (B) moves to its bypass position. The cooling tower water bypasses the precooling coil and is used only for the condensers. Normal mechanical cooling will result. Refer to 50BJ,BK base unit installation instructions publication for mechanical cooling operating sequence information.



044-064 UNITS ONLY

**Fig. 4 — 50BJ with Hydronic Economizer
Wiring Schematic**



UNIT	UNIT DIMENSIONS (in.)			CONDENSER CONNECTOR (in.)							HOT WATER COIL (in.)			
	A	B	C	D	E	F	G	H	J	K	L	M	N	P
50BX900001,011,021	24¼	34	76	18	10	10	13	21½	2	2	26	25	1½	1½
50BX900031,041,051	26¼	38	88	21	8	12	13	26	2	2	28	35	2	2
50BX900061	30½	48	113	25	12	18	22	32	2½	2½	32	42	2	2
50BX900071,081	30½	48	113	25	12	18	22	32	3	3	32	42	2	2

Fig. 5 — Economizer Piping Dimensions (in.)

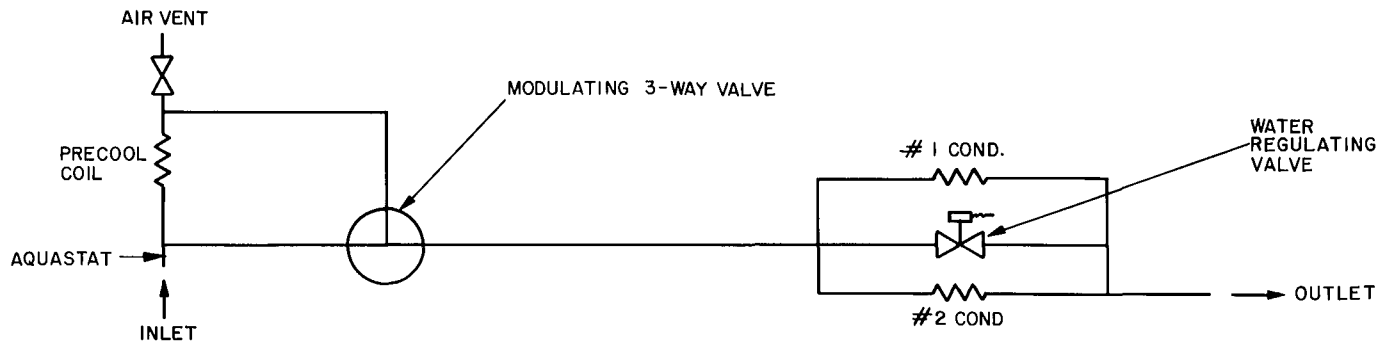
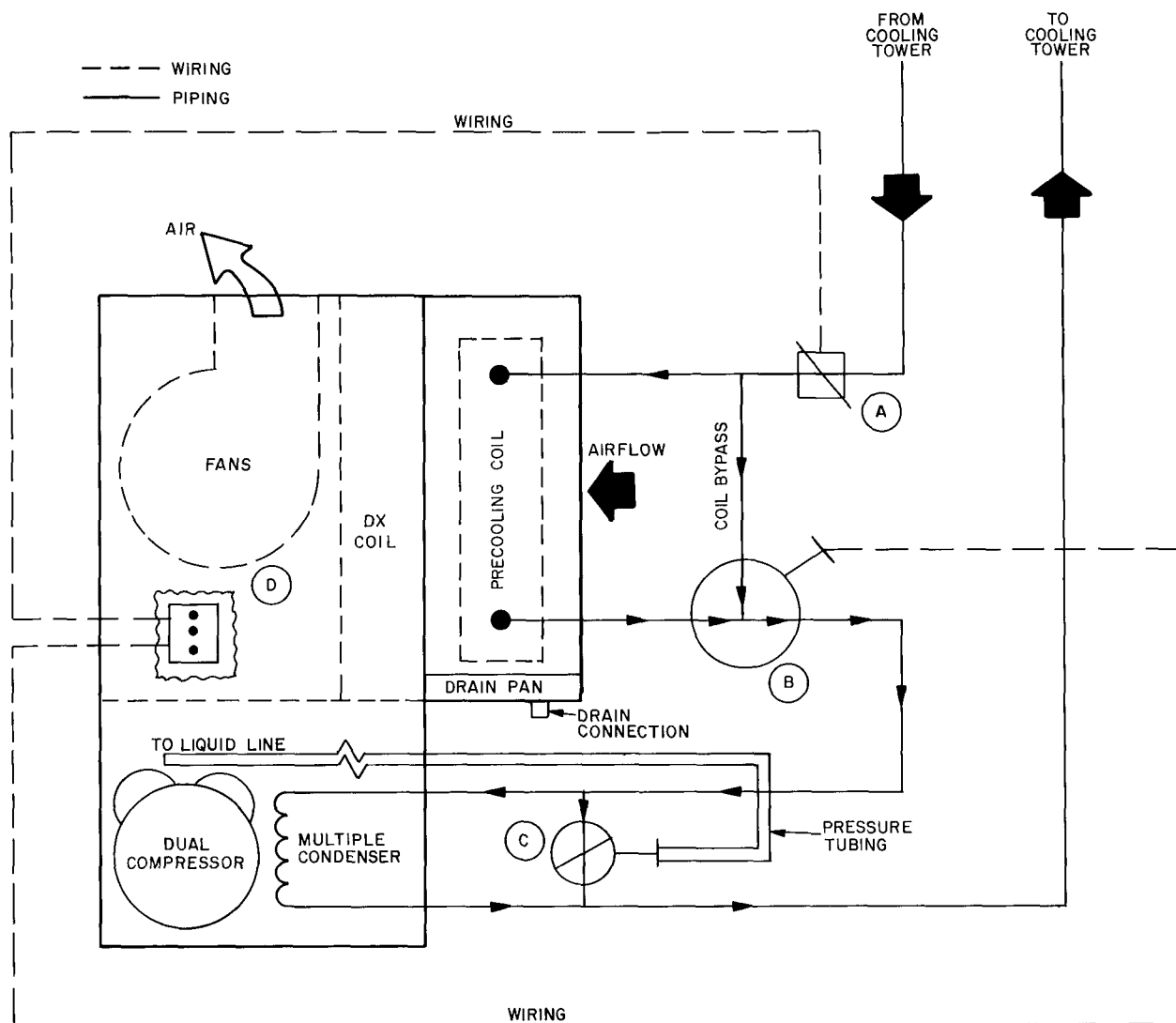


Fig. 6 — Economizer Piping Schematic



NOTE: Drawing not to scale

LEGEND

- (A) Changeover Aquastat — Senses Changeover
- (B) 3-Way Valve — Energizes Precooling Coil
- (C) 2-Way Valve — Maintains Head Pressure
- (D) Microprocessor — Logic Controller

Fig. 7 — Typical Piping and Wiring Schematic

For replacement items use Carrier Specified Parts

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.