# TWA120-SF-4C

# Service Facts

Customer Property: Contains wiring and service information. Please retain.

Library	Service Literature
Product Section	Unitary
Product	Split System Heat Pumps
Model	TWA
Literature Type	Service Facts
Sequence	4C
Date	May 2000
File No.	SV-UN-S/SP-TWA120-SF-4C 5/00
Supersedes	NEW

Models : TWA120A400D

TWA120A400D

# Split System Heat Pump Condensers

Product Specifications											
MODEL	TWA120A4	TWA120AW									
POWER CONNS Volts/Ph/Hz	460/3/60	575/3/60									
Mininum Branch Cir. Ampacity <sup>1</sup>	24.6	19.8									
Fuse Size - Max. (amps)	35	25									
COMPRESSOR											
No. Used - No Speeds - HP	1 - 1 - 10.0										
Volts/Ph/Hz	460/3/60	575/3/60									
R.L. Amps - L.R. Amps	17.5 - 118	14.2-96.5									
OUTDOOR FAN - TYPE	Prop	eller									
No. Used - Dia. (in.)	1 -	28									
Type Drive - No. Speeds	Direct - 1										
CFM @ 0.0 in. W.G. <sup>2</sup>	8200										
No. Motors - HP	1 - 1										
Motor Speed R.P.M.	1100	1100									
Volts/Ph/Hz	460/1/60	575/1/60									
F.L. Amps - L.R. Amps	2.7 - 7.0	2.0 - 5.7									
OUTDOOR COIL - TYPE	Plate Fin										
Rows / F.P.I.	2/18										
Face Area (sq. ft.)	2	4									
Tube Size (in.) O.D.	0.3	375									
REFRIGERANT	Field S	upplied									
Lbs. Of R-22 4 5	24.	3 <sup>3</sup>									
DIMENSIONS	LxW	/ x H									
Outdoor Unit Crated (in.)	53 x 4	0 x 43									
Uncrated (in.)	52 x 3	8 x 39									
WEIGHT											
Shipping (Ibs.)	46	68									
Net (lbs.)	41	14									

1. Calculated in accordance with currently prevailing National Electric Code.

2. Standard Air - Dry Coil - Outdoor.

3. This value approximate. For more precise value see unit nameplate.

4. Amount of refrigerant charge shown is for Condenser and matching size Evaporator/Air Handler with 25 feet of interconnecting tubing. Use Refrigerant/Tubing table at right for amounts to charge for additional tubing lengths, or for reducing charge for lengths less than 25 feet.

 Max. linear length 80 ft.; Max. lift/Suction or liquid - 60 ft.; Max. length of pre-charged tubing 40 ft. For greater length refer to Refrigerant Piping Manual pub no. 22-3040

#### **Optional Equipment**

Thermostat- 2H/1C Auto Changeover Anti-Short Cycle Timer Coil Guard Kit Isolator Floor Mtd. Rubber Isolator Floor Mtd. Spring Head Pressure Control -	BAY28x138 BAYASCT001 BAYGARD026A BAYISLT005A BAYISLT023A
for TWA120A4	. BAYLOAM422B
for TWA120AW	. BAYLOAM015B
Thermostat-	
Programmable Night Setback	BAYSTAT038A
Thermostat- 2H/1C Manual Changeove	er BAYSTAT239
Thermostat- Manual Changeover	BAYSTAT240
Interlock Relay for Low Ambient Kit	BAYRLAY005A
Outdoor Temperature Sensor	BAYSENS024
Remote Temperature Sensor	BAYSENS025
Duct Temperature Sensor	BAYSENS026
Locking Thermostat Cover	BAY28x190
Locking Thermostat Wall Mounting Plat	e . BAYMTPL005
Outdoor Temperature Sensor	BAYSTAT033

Refrig	erant /	/ Tub	ing

		-	-						
Tubing	g Sizes	Additional	Additional						
Suction	Liquid	Tubing Length	Refrigerant						
1-3/8"	1/2"	15'	1 lb., 4 oz.						
1-3/8"	1/2"	25'	2 lbs., 1 oz.						
1-3/8"	1/2"	32'	2 lbs., 11 oz.						
1-3/8"	1/2"	40'	3 lbs., 5 oz.						

Amounts shown are based on 1.33 ounces of refrigerant per foot of 1-3/8" and 1/2" lines.

# WARNING: HAZARDOUS VOLTAGE-DISCONNECT POWER BEFORE SERVICING

Failure to **DISCONNECT POWER** before servicing could lead to severe personal injury or death.

#### SAFETY NOTICE

This information is intended for use by individuals possessing adequate backgrounds of electrical and mechanical experience. Any attempt to repair a central air conditioning product may result in personal injury and/or property damage. The manufacturer of seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

#### RE-CONNECT ALL GROUNDING DEVICES

All parts of this product capable of conducting electrical current are grounded. If grounding wires, screws, straps, clips, nuts or washers used to complete a path to ground are removed for service, they must be returned to their original position and properly fastened.

NOTICE: Since the manufacturer has a policy of continuous product improvement, it reserves the right to change specifications and design without notice.

## Sequence of Operation

#### General

Operation of the unit heating and cooling cycles is automatic for **HEAT** and **COOL** functions. (The optional automatic changeover thermostat, when in the **AUTO** position, automatically changes to heat or cool with sufficient room temperature change.) The fan switch can be placed in either the **ON** position, causing continuous evaporator (indoor) fan operation, or the **AUTO** position causing fan operation to coincide with heating or cooling run cycles.

#### **Cooling Mode**

(Note: TSH & TSC are contacts internal to the indoor thermostat.)

With the disconnect switch in the **ON** position, current is supplied to the compressor crankcase heater(s) and control transformer, and the **ODF** relay is energized through normally closed contacts of the **DFC**. The cooling cycle is enabled through the low voltage side of the control transformer to the "**R**" terminal on the indoor thermostat. With the system switch in the **AUTO** position and **TSC-1** contacts closed, power is supplied to the "**O**" terminal on the low voltage terminal board of the outdoor unit. This energizes the switch-over valve (**SOV**) and places it in the cooling position (it is in heating position when not energized). The **EDR** relay is also energized at this time; **EDR-1** contacts open to allow the **EDC** to function only in the cooling mode, and **EDR-2** contacts open removing power from the **DFC** so the timer does not run in cooling mode.

When the indoor temperature rises 1 & 1/2 degrees, **TSC-2** contacts close, supplying power to the "**Y**" terminal on the outdoor unit, and from the "**Y**" terminal to the compressor contactor (**CC**). This starts the outdoor fan motor and compressor. (On TWA120A3 models only, current first passes through the auxiliary compressor relay (**CCA**).) The **TSC-2** contacts also provide power to the "**G**" terminal, which provides power to the "**F**" fan relay starting the indoor fan motor.

#### **Heating Mode**

With the disconnect switch in the "ON" position, current is supplied to the compressor crankcase heater(s) and transformer. Starting at the "R" terminal on the indoor thermostat, current goes through the system switch (which is in "AUTO" position) to the TSH-1 contacts. When closed, these contacts supply power to terminal "Y" on the indoor thermostat as well as to the heating anticipator. The switchover valve will not energize because of the high resistance of the heating anticipator in the **T-STAT**. Power is provided from "Y" to the compressor contactor (CC) which starts the outdoor fan motor and compressor. (On TWA120A3 models only, current passes through the auxiliary compressor relay (CCA) prior to reaching the compressor contactor (CC). The indoor thermostat contact TSH-1 also provides power to "G" terminal on the indoor thermostat energizing the fan relay "F", which starts the indoor fan motor. Refrigerant then leaves the compressor, passes through the switch-over valve and the indoor coil, on through the expansion valve into the outdoor coil, and returns to the compressor.

## **Supplementary Heat**

The **1st stage of supplementary heat** is brought on when the indoor temperature drops 1 & 1/2 degrees below the thermostat setting. **TSH-2** contacts close providing power to the "**W**" terminal on the indoor thermostat and to the supplementary heater control circuit. **Note:** the Fan relay "**F**" must have been energized and "**F-AUX**" contacts closed.

Additional supplementary heat and outdoor thermostats may have been added (not shown in schematic). If the outdoor temperature falls below the setting on the outdoor thermostat, these additional heaters will come on. When the outdoor air temperature rises, and the outdoor T-stat setpoint is reached, the system will revert back to second stage heating. When the indoor ambient is satisfied, **TSH-2** contacts will open and the unit will revert back to first stage heating position, and then off.

For **emergency heat** (use of supplementary electric heat only), an emergency (EMERG) heat switch is provided within the thermostat. When placed in the emergency heat position, it will disable the compressor, bypass the outdoor thermostats, and engage the supplementary electric heaters and indoor fan.

### **Time-Temperature Defrost Operation**

During the heating cycle, the outdoor coil may require a defrost cycle which is controlled by the defrost timer control (**DFC**). It is energized continuously allowing a defrost cycle every 50,70, or 90 minutes. When the (**DT**) closes at the appropriate line temperature setpoint, the defrost control (**DFC**) opens the circuit to the outdoor fan relay and energizes the switch-over valve (**SOV**), placing the unit in the cooling mode. With the fan off, hot gas enters the outdoor coil, and causes defrost. When the liquid line temperature reaches 70 Degrees. F, or a ten minute time cycle expires, the (**DFC**) energizes the fan relay and de-energizes the **SOV**, which returns the unit to the heating mode. Supplementary electric heat is brought on to control indoor temperature during the defrost cycle.

NOTE: Do not change from the 70 minute full timing cycle in Southern U.S. ("Sunbelt") areas. In Northern climates, especially in areas of frequent snow, change the timer to the 50 minute cycle selection.





#### Pressure Curves - Cooling Split System Heat Pump TWA120A . .D Condensing Unit with: TWE120A . .C Air Handler





Pressure Curves - Heating Split System Heat Pump TWA120A . .D Condensing Unit with: TWE120A . .C Air Handler





## **Refrigerant Circuit**



HEATING MODE



NOTE A: ONLY ONE INDOOR & OUTDOOR COIL ENTRY/EXIT CIRCUIT IS SHOWN; ALL MODELS HAVE MULTIPLE ENTRY/EXIT CIRCUITS.

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