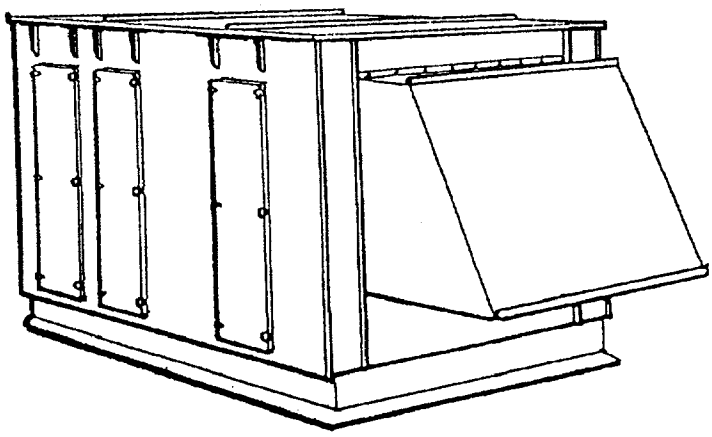
TRANE

Operation Maintenance

PCCB-M-1B

Library	Service Literature
Product Section	Air Handling
Product	Outdoor Air Handler PCC
Model	PCC
Literature Type	Operation-Maintenance
Sequence	1B
Date	August 1992
File No.	SV-AH-ODAH-PCC-M-1B-892
Supersedes	

Penthouse Climate Changer®



PCCB MODELS

PCC-7, 14
PCC-18, 23
PCC-37, 52
PCC-60, 74

Basic Casing Units
and Exhaust Fan Economizer Units

X39640272-060

Table of Contents

Notice

World environmental scientists have concluded, based on the best currently available evidence, that ozone in our upper atmosphere is being reduced due to release of CFC fully halogenated compounds.

The Trane Company urges that all HVAC servicers working on Trane equipment, or any manufacturer's products, make every effort to eliminate, if possible, or vigorously reduce the emission of CFC, HCFC and HFC refrigerants to the atmosphere resulting from installation, operation, routine maintenance, or major service on this equipment. Always act in a responsible manner to conserve refrigerants for continued use even when acceptable alternatives are available.

Refrigerant used in any type of air-conditioning or refrigerating equipment should be recovered for reuse, recovered and/or recycled for reuse, reprocessed (reclaimed), or properly destroyed, whenever it is removed from equipment. Never release to the atmosphere!

Unit Model Number Description

Digit 1, 2 &3
Unit Model
PCC = Penthouse Climate Changer

Digit 4
Development Sequence
Current = B

Digit 5
Unit Casing
A = 07 & 14
B = 18
C = 23
D = 37
E = 52
F = 60 & 74

Digit 6
Coil Height/Length
(See Note 2)

	7	14	18	23	37	52	60	74
A(1) =	Nom		Sml	Sml	Sml	Sml	Sml	
B(2) =		Lge	Lge	Lge	Med	Med	Nom	
C(3) =					Lge	Lge		Lge
D(4) =		Nom	Nom	Nom				
E(5) =					Nom	Nom		Nom

Notes: (1) Std Height/Std Length or Frame Only, (2) Full Height/Std Length, (3) ExtraHeight/Extra Length , (4) Full Height /Extra Length and (5) Extra Height/Extra Length.

Digit 7
Unit Type
A = Basic
B = EFE 1
C = EFE 2
E = Basic W/Final Filter
F = EFE 1 W/Final Filer
G = EFE 2 W/Final Filer

Digit 8
Unit Construction & Access Door Option

	Door Constr	Handle Type	Insul Retnrs	Unit Constr
A	SGL WL	Std	No	SGL WL
B	SGL WL	Std	Yes	SGL WL
C	DBL WL	Std	No	SGL WL
D	DBL WL	Std	Yes	SGL WL
E	DBL WL	Deluxe	Yes	SGL WL
F	DBL WL	Std	Yes	DBL WL
G	DBL WL	Deluxe	Yes	DBL WL

Digit 9
Motor Voltage/Cycle/Phase
0 = None (No Fan Option 52 - 74)
A = 230/60/3
B = 460/60/3
C = 200/60/3

Digit 10
Design Sequence
C = Current Design Sequence

Digit 11
Supply Fan Size
0 = None (No Option 52 - 74)
A = 12 1/4 FC (07, 14)
B = 15 FC (07, 14, 18)
C = 18 1/4 FC (23)
D = 20 FC (37)
E = 25 FC (37, 52)
F = 30 FC (60, 74)
G = 36/40AF INT BASE (74)
T = 27/30 AF (52)

Digit 12*
Supply Fan Class
0 = None

Digit 13
Supply Fan Class
A = Class 1
B = Class 2
D = None (No Fan Option 52-74)

Digit 14
Supply Fan Discharge
A = Vertical
B = Horizontal
G = Final Filter Horizontal
H = Final Filter Vertical

Digit 15
Supply Fan Isolation
0 = None
A = Spring
B = Rubber
F = None (No Fan Option 52-74)

Digit 16
Supply Fan Modulation/ Actuators
A = Constant CFM
B = Inverter Balance (Inlet Vanes Not Available
C = Inlet Vanes (FC)(AF)
D = Pneumatic Actuator/Inlet Vane (FC) (AF)
E = Electric Actuator/Inlet Vane (FC) (AF)
F = Electronic Actuator/Inlet Vane (FC) (AF)
G = VAV Control Loop/Inlet Vane (FC) (AF/Electric Actuator)
J = None (No Fan Option 52-74)

Digit 17*
Supply Fan Misc.
0 = None

Digit 18
Supply Fan HP
A = 3/4
B = 1
C = 1 1/2
D = 2
E = 3
F = 5
G = 7 1/2
H = 10
J = 15
K = 20
L = 25
M = 30
N = 40
P = 50
V = None (No Fan Option 52-74)

Digit 19
Supply Fan Motor Type (1800 RPM)
A = Open
B = TEFC
C = Hi-EFF
D = VAV Open Drip Proof
J = None (No Fan Option 52-74)

Digit 20
Exhaust Fan Size
0 = None (No EFE)
A = 12 1/4 FC (07,14)
B = 15 FC (18)
C = 18 1/4 FC (23)
D = 20 FC (37)
E = 25 FC (52)
F = 30 FC (60, 74)
U = None (No Fan Option 52-74)

Digit 21
Exhaust Fan Class
0 = None
A = Class 1
B = Class 2
D = None (No Fan Option 52-74)

Digit 22
Exhaust Fan Isolation
0 = None (No Isolation of EFE)
A = Spring
B = Rubber
F = None (No Fan Option 52-74)

Digit 23
Exhaust Fan Modulation/Actuators
0 = None (No EFE)
A = Constant CFM
B = Inverter Balance Inlet Vanes (Not Avail)
C = Inlet Vanes (FC)
D = Pneumatic Actuator/Inlet Vane (FC)
E = Electric Actuator/Inlet Vane (FC)
F = Electronic Actuator/Inlet Vane (FC)
G = VAV Control Loop/Inlet Vane (FC) (Electric Actuator)
H = None (No Fan Option)

Digit 24
Exhaust Fan Exhaust Dampers/Actuators
0 = None (EFE)
A = Exhaust Dampers
B = Exhaust Dampers/Pneumatic Actuator
C = Exhaust Dampers/Electric Actuator
E = No Damper (Optional Only With No Fan Option 52-74)

Digit 25
Exhaust Fan HP
0 = None (No EFE)
A = 3/4
B = 1
C = 1 1/2
D = 2
E = 3
F = 5
G = 7 1/2
H = 10
J = 15
K = 20
L = 25
M = 30
N = 40
V = None (No Fan Option 52-74)

Digit 26
Exhaust Fan Motor Type (1800)
0 = None (No EFE)
A = Open
B = TEFC
C = HI-EFF
D = HI-EFF VAV Open
G = None (No Fan Option 52-74)

Digit 27
Upstream Filter Basic Intake Section or EFE Damper/Filter Section
0 = None (Rack Only 2")
A = Throwaway
B = Permanent
C = Pleated Media
D = No Filters/No Rack
R = 12" Cartridge Filter w/Pre-Filter
T = 15" Bag Filter w/Pre-Filter

Digit 28
Upstream Filter Efficiency/Size
0 = None
C = 65 % EFF(Bag or Cart)
E = 85 % EFF(Bag or Cart)
F = 95 % EFF(Bag or Cart)

Digit 29
Face and Bypass Dampers/Actuators Basic Intake or EFE
0 = None
A = Damper-Trane (Std Hgth/Std Lgth)
B = Damper-Trane Pneumatic Actuator (Std Hgth/Std Lgth) (Std Hgth/Std Lgth)
C = Damper-Trane Electric Actuator (Std Hgth/Std Lgth)

Digit 30
Outside Air Damper/Actuators (Basic & EFE)
0 = None (Blocked-W/Wall Panel)
A = Damper-Trane
B = Frame only
C = Damper-Trane Low leak
D = Damper-Trane Pneumatic Actuator
E = Damper-Trane Electric Actuator
G = Damper-Trane Low leak Pneumatic Actuator
H = Damper-Trane Low Leak Electric Actuator

Digit 31
Return Air Damper (Basic & EFE)/Actuators
0 = None (Blocked W/Floor Panel)
A = Damper-Trane
B = Frame only
C = Damper-Trane Low Leak
D = Damper-Trane Pneumatic Actuator
E = Damper-Trane Electric Actuator
G = Damper-Trane Pneumatic Actuator (low leak)
H = Damper-Trane Electric Actuator (low leak)

Digit 32*
Outside Air Damper/Return Air Damper/Return Air Fan
0 = None

Digit 33
Return Air Safety Grate
0 = None
A = W/Grate

Digit 34
Final Filter Type And Arrangement
0 = None
C = Bag Filter Arrg. A
D = Bag Filter Arrg. B
E = Bag Filter Arrg. C
F = Bag Filter Arrg. D
M = Rack Only Arrg. A
N = Rack Only Arrg. B
P = Rack Only Arrg. C
Q = Rack Only Arrg. D
R = Cartridge Filter Arrg. A
T = Cartridge Filter Arrg. B
U = Cartridge Filter Arrg. C
V = Cartridge Filter Arrg. D

Digit 35
Final Filter Efficiency
0 = None
B = 55 % EFF
C = 65 % EFF
E = 85 % EFF
F = 95 % EFF

Digit 36
Additional Sections
0 = None
A = 1 Section w/RH Door (07, 14, 18, 23, 37 Only)
B = 2 Sections w/RH Door (07, 14, 18, 23, 37 Only
C = 3 Sections w/RH Door (07, 14, 18, 23, 37 Only)

Digit 37
Unit Insulation
A = 1" Mat Complete
B = 1" Mat Partial
C = 1" Mat Complete w/Tranecoat
D = 1" Mat Partial w/Tranecoat

Digit 38
Inlet Hood
0 = None
A = W/Hood & Eliminator (Basic & EFE)

Digit 39
Access Door For Coil Removal (Discharge Section)
0 = None
A = Coil Access L.H. Door

Digit 40
Coil Space Extension
0 = None
A = 8" (07, 14, 18, 23, 37 Only)
B = 16" (07, 14, 18, 23, 37 Only

Digit 41
External Pipe Chase
0 = None
A = Right Hand-Disch. Section
E = Right Hand-Disch. Section Plus 1 Coil Fill-In Sect.(Size 52, 60, 74 Only)
F = Right Hand-Disch. Section Plus 2 Coil Fill-In Sect.(Size 52, 60, 74 Only)
G = Right Hand-Disch. Section Plus 3 Coil Fill-In Sect.(Size 52, 60, 74 Only)
H = Right Hand-Disch. Section Plus 4 Coil Fill-In Sect.(Size 52, 60, 74 Only)
J = Right Hand-Disch. Section Plus 5 Coil Fill-In Sect.(Size 52, 60, 74 Only)

Digit 42*
Electrical Wiring Package
0 = None

Digit 43*
Motor Cont. Center Supply Fan
0 = None

Digit 44*
Motor Cont. Center/Exhaust Return Fan
0 = None

Digit 45*
Accessories DDC, Misc.
0 = None

Digit 46*
Exhaust Fan Misc.
0 = None

Digit 47
First Access Fill-In Section
0 = None

	Fill-In	Size	Door	F&BP	ACT	Filt
A =	1	32"	RH	None	None	None
B =	1	32"	RH	With	None	None
C =	1	32"	RH	With	Pneu	None
D =	1	32"	RH	With	Elec	None
E =	1	64"	RH	None	None	None
F =	1	64"	RH	With	None	None
G =	1	64"	RH	With	Pneu	None
H =	1	64"	RH	With	Elec	None
J =	1	32"	None	None	None	None
K =	1	32"	None	With	None	None
L =	1	32"	None	With	Pneu	None
M =	1	32"	None	With	Elec	None
N =	1	64"	None	None	None	None
P =	1	64"	None	With	None	None
Q =	1	64"	None	With	Pneu	None
R =	1	64"	None	With	Elec	None
T =	1	32"	RH	None	None	With
U =	1	32"	RH	With	None	With
V =	1	32"	RH	With	Pneu	With
W =	1	32"	RH	With	Elec	With
X =	1	64"	RH	None	None	With
Y =	1	64"	RH	With	None	With
Z =	1	64"	RH	With	Pneu	With
1 =	1	64"	RH	With	Elec	With

Digit 48
Second Access Fill-In Section
0 = None

	Fill-In	Size	Door	F&BP	ACT
A	1	32"	RH	None	None
B	1	32"	RH	With	None
C	1	32"	RH	With	Pneu
D	1	32""	RH	With	Elec
E	1	64"	RH	None	None
F	1	64"	RH	With	None
G	1	64"	RH	With	Pneu
H	1	64"	RH	With	Elec
J	1	32"	None	None	None
K	1	32"	None	With	None
L	1	32"	None	With	Pneu
M	1	32"	None	With	Elec
N	1	64"	None	None	None
P	1	64"	None	With	None
Q	1	64"	None	With	Pneu
R	1	64"	None	With	Elec

Digit 49
Third Access Fill-In Section
0 = None

	Fill-In	Size	Door	F&BP	ACT
A	1	32"	RH	None	None
B	1	32"	Rh	With	None
C	1	32"	RH	With	Pneu
D	1	32""	RH	With	Elec
E	1	64"	RH	None	None
F	1	64"	RH	With	None
G	1	64"	RH	With	Pneu
H	1	64"	RH	With	Elec
J	1	32"	None	None	None
K	1	32"	None	With	None
L	1	32"	None	With	Pneu
M	1	32"	None	With	Elec
N	1	64"	None	None	None
P	1	64"	None	With	None
Q	1	64"	None	With	Pneu
R	1	64"	None	With	Elec

Digit 50
Coil Fill-In Section
0 = None
A = Yes (See Additional Model Number For Coil Fill-In Descriptions) May include More Than One)

Digit 51
Drain Pan Type & Matl
A = Flat, Galvanized
B = Flat, Stainless Steel

Digit 52*
Extra Digit
0 = None

Digit 53
1st Coil Type
0 = None
A = Type F1 (L) 5/16 Dist Tubes
B = Type F2 (S) 1/4 Dist Tubes
C = Type F5 (L) 1/4 Dist Tubes Delta-Flo
D = Type F6 (S) 3/16 Dist Tubes Delta-Flo
1 = Type FA (L) 1/4 Dist Tubes Intertwined Delta-Flo
2 = Type FB (S) 3/16 Dist Tubes Intertwined Delta-Flo

E = Type W (Cooling)
F = Type K
G = Type D
H = Type DD
J = Type P2
K = Type P4
M = Type P8
N = Type WD
R = Type DL (Cooling) Delta-Flo
U = Type WL (Cooling) Delta-Flo
V = Type LL (Cooling) Delta-Flo
L = Type WC
P = Type NS
T = Type W (Heating)
W = Type DL (Heating) Delta-Flo
X = Type WL (Heating) Delta-Flo
Y = Type LL (Heating) Delta-Flo
Z = Space Instead of Coil, 2-Row thru 8-Row

Digit 54
1st Coil Rows

0 = None
B = 1 Row 4" (WC) 5-1/4" (NS)
C = 2 Row 8-1/2"
D = 3 Row 8"
E = 4 Row 9-1/2"
G = 6 Row 12-1/2"
H = 8 Row 15-1/2"

Digit 55
1st Coil Fin Series (Fins/Ft.)

0 = None
A = 40
B = 50
C = 60
D = 70
E = 80
F = 90
G = 100
H = 110
J = 120
K = 130
L = 140
M = 150
N = 160
P = 170
R = 180

Digit 56
1st Coil Fin Series (Fins/Ft.)

0 = 0
1 = 1
2 = 2
3 = 3
4 = 4
5 = 5
6 = 6
7 = 7
8 = 8
9 = 9

Digit 57
1st Coil Fin Type/Material

0 = None
A = Sigma Alum
B = Sigma Copper
C = Prima Alum
E = Delta-Flo Alum

Digit 58
1st Coil Tube Material

0 = None
A = Std. Copper
C = .049 Red Brass
D = .024 Copper
E = .035 Copper

Digit 59
1st Coil Turbulator (Water Coil)

0 = None
T = w/Turbulators

Digit 60
1st Coil Circuits

0 = None

Sigma-Flo & Prima-Flo
Number of Standard
Refrigerant Circuits (Tube Fed)

	Finned Width			
	18	24	30	33
F	6-6	8-8	10-10	11-11
G	3-3	4-4	5-5	5-6
H	—	2-2	—	3-4
J	1-1	1-1	2-2	N/A
K	—	—	1-1	—

Number of Horizontal Split
Refrigerant Circuits (Tube Fed)
(Top-Bottom Splits)

	Finned Width			
	18	24	30	33
A	N/A	N/A	N/A	N/A
B	6	8	10	11
C	3	4	5	7
D	2	2	4	3
E	N/A	—	2	—

Delta-Flo
Number of Standard
Refrigerant Circuits (Tube Fed)

	Finned Width			
	18	24	30	33
L	14	19	24	36
M	7	9	12	13
N	4	4	6	6

Number of Horizontal Split
Refrigerant Circuits (Tube Fed)
(Top-Bottom Splits)

	Finned Width			
	18	24	30	33
R	7-7	9-10	12-12	13-13

Number of Intertwined
Refrigerant Circuits (Tube Fed)

	Finned Width			
	18	24	30	33
T	7-7	9-10	12-12	13-13
U	3-4	4-5	6-6	6-7
V	2-2	2-2	3-3	3-3

Digit 61
Space Between 1st and 2nd Coil In Casing

0 = None
A = 2 Row 6-1/2"
B = 3 Row 8 "
C = 4 Row 9-1/2"
D = 6 Row 12-1/2"
E = 8 Row 15-1/2"
F = 10 Row 15-1/2"

Digit 62
1st Coil Type

0 = None
A = Type F1 (L) 5/16 Dist Tubes
B = Type F2 (S) 1/4 Dist Tubes
C = Type F5 (L) 1/4 Dist Tubes Delta-Flo
D = Type F6 (S) 3/16 Dist Tubes Delta-Flo
1 = Type FA (L) 1/4 Dist Tubes Intertwined Delta-Flo
2 = Type FB (S) 3/16 Dist Tubes Intertwined Delta-Flo
E = Type W (Cooling)
F = Type K
G = Type D
H = Type DD
J = Type P2
K = Type P4
M = Type P8
N = Type WD
R = Type DL (Cooling) Delta-Flo
U = Type WL (Cooling) Delta-Flo
V = Type LL (Cooling) Delta-Flo
L = Type WC
P = Type NS
T = Type W (Heating)

W = Type DL (Heating) Delta-Flo
X = Type WL (Heating) Delta-Flo
Y = Type LL (Heating) Delta-Flo
Z = Space Instead of Coils
2-Row thru 8-Row

Digit 63
2nd Coil Rows

0 = None
B = 1 Row 4" (WC) 5-1/4" (NS)
C = 2 Row 6-1/2"
D = 3 Row 8"
E = 4 Row 9-1/2"
G = 6 Row 12-1/2
H = 8 Row 15-1/2

Digit 64
2nd Coil Fin Series (Fins/Ft.)

0 = None
A = 40
B = 50
C = 60
D = 70
E = 80
F = 90
G = 100
H = 110
J = 120
K = 130
L = 140
M = 150
N = 160
P = 170
R = 180

Digit 65
2nd Coil Fin Series (Fins/Ft.)

0 = 0
1 = 1
2 = 2
3 = 3
4 = 4
5 = 5
6 = 6
7 = 7
8 = 8
9 = 9

Digit 66
2nd Coil Fin Type/Material

0 = None
A = Sigma Alum
B = Sigma Copper
C = Prima Alum
E = Delta-Flo Alum

Digit 67
2nd Coil Tube Material

0 = None
A = Std. Copper
C = .049 Red Brass
D = .024 Copper
E = .035 Copper

Digit 68
2nd Coil Turbulator (Water Coil)

0 = None
T = w/Turbulators

Digit 69
2nd Coil Circuits

0 = None

Sigma-Flo & Prima-Flo
Number of Standard
Refrigerant Circuits (Tube Fed)

Number of Horizontal
Split Refrigerant Circuits (Tube Fed)
(Top-Bot Splits)

	Finned Width			
	18	24	30	33
A	N/A	N/A	N/A	N/A
B	6	8	10	11
C	3	4	5	7
D	2	2	4	3
E	N/A	–	2	–

Delta-Flo
Number of Standard Refrigerant
Circuits (Tube Fed)

	Finned Width			
	18	24	30	33
F	6-6	8-8	10-10	11-11
H	–	2-2	–	3-4
J	1-1	1-1	2-2	N/A
K	–	–	1-1	–

Number of Horizontal Split Refrigerant
Circuits (Tube Fed)

	Finned Width			
	18	24	30	33
L	14	19	24	36
M	7	9	12	13
N	4	4	6	6

Number of Intertwined
Refrigerant Circuits (Tube Fed)

	Finned Width			
	18	24	30	33
R	7-7	9-10	12-12	13-13

Digit 70

	Finned Width			
	18	24	30	33
T	7-7	9-10	12-12	13-13
U	3-4	4-5	6-6	6-7
V	2-2	2-2	3-3	3-3

Space Between 2nd and 3rd Coil In Casing

0 = None
A = 2 Row 6-1/2"
B = 3 Row 8"
C = 4 Row 9-1/2"
D = 6 Row 12-1/2"
E = 8 Row 15-1/2"
F = 10 Row 18-12"

Digit 71
3rd Coil Type

0 = None
A = Type F1 (L) 5/16 Dist Tubes
B = Type F2 (S) 1/4 Dist Tubes
C = Type F5 (L) 5/16 Dist Tubes
D = Type F6 (S) 1/4 Dist Tubes Delta-Flo
1 = Type FA (L) 1/4 Dist Tubes
Intertwined Delta-Flo
2 = Type FB (S) 3/16 DistTubes
Intertwined Delta-Flo
E = Type W (Cooling)
F = Type K
G = Type D
H = Type DD
J = Type P2
K = Type P4
M = Type P8
N = Type WD
R = Type DL (Cooling) Delta-Flo
U = Type WL (Cooling) Delta-Flo
V = Type LL (Cooling) Delta-Flo
L = Type WC
P = Type NS
T = Type W (Heating)
W = Type DL (Heaing) Delta-Flo
X = Type WL (Heaing) Delta-Flo
Y = Type LL (Heaing) Delta-Flo
Z = Space Instead of Coils

Digit 72
3rd Coil Rows

0 = None
B = 1 Row 4" (WC) 5-1/4" (NS)
C = 2 Row 6-1/2"
D = 3 Row 8"
E = 4 Row 9-1/2"
G = 6 Row 12-1/2"
H = 8 Row 15-1/2"

Digit 73
3rd Coil Fin Series (Fins/Ft.)

0 = None
A = 40
B = 50
C = 60
D = 70
E = 80
F = 90
G = 100
H = 110
J = 120
K = 130
L = 140
M = 150
N = 160
P = 170
R = 180

Digit 74
3rd Coil Fin Series (Fins/Ft.)

0 = 0
1 = 1
2 = 2
3 = 3
4 = 4
5 = 5
6 = 6
7 = 7
8 = 8
9 = 9

Digit 75
3rd Coil Fin Type/Material

0 = None
A = Sigma Alum
B = Sigma Copper
C = Prima Alum
E = Delta-Flo Alum

Digit 76
3rd Coil Tube Material

0 = None
A = Std. Copper
C = .049 Red Brass
D = .024 Copper
E = .035 Copper

Digit 77
3rd Coil Turbulator (Water Coil)

0 = None
T = w/Turbulators

Digit 78
3rd Coil Circuits

0 = None
Sigma-Flo & Prima-Flo
Number of Standard
Refrigerant Circuits (Tube Fed)

	Finned Width			
	18	24	30	33
A	N/A	N/A	N/A	N/A
B	6	8	10	11
C	3	4	5	7
D	2	2	4	3
E	N/A	–	2	–

Number of Horizontal Split
Refrigerant Circuits (Tube Fed)
(Top-Bottom Splits)

	Finned Width			
	18	24	30	33
F	6-6	8-8	10-10	11-11
G	3-3	4-4	5-5	5-6
H	–	2-2	–	3-4
J	1-1	1-1	2-2	N/A
K	–	–	1-1	–

Delta-Flo
Number of Standard
Refrigerant Circuits (Tube Fed)

	Finned Width			
	18	24	30	33
L	14	19	24	36
M	7	9	12	13
N	4	4	6	6

Number of Horizontal Split
Refrigerant Circuits (Tube Fed)
(Top-Bottom Splits)

	Finned Width			
	18	24	30	33
R	7-7	9-10	12-12	13-13

Number of Intertwined
Refrigerant Circuits (Tube Fed)

	Finned Width			
	18	24	30	33
T	7-7	9-10	12-12	13-13
U	3-4	4-5	6-6	6-7
V	2-2	2-2	3-3	3-3

Note:
1. Model number digits flagged by an asterisk (*) are reserved for future use.
2. Nom = square feet of coil which equals unit size.
3. If digit does not correspond to digits listed, the unit is special.

Unit Model Number Description

Digit 1, 2 &3
Unit Model
PCF = Penthouse Climate Changer Fill-In Coil Section

Digit 4
Development Sequence
Current = B

Digit 5
Unit Casing
E = 52
F = 60 & 74

Digit 6
Coil Height/Length (See Note 2)

	52	60	74
A(1) =	Sml	Sml	
B(2) =	Med	Nom	
C(3) =	Lge		Lge
D(4) =	Nom		Nom
E(5) =	Nom		Nom

Notes: (1) Std Height/Std Length or Frame Only, (2) Full Height/Std Length, (3) ExtraHeight/Extra Length, (4) Full Height /Extra Length and (5) Extra Height/Extra Length.

Digit 7
Unit Type
D = 32" Coil Fill-In Section

Digit 8
Unit Construction & Access Door Option

	Door Constr	Handle Type	Insul Retnrs	Unit Constr
A	SGL WL	Std	No	SGL WL
B	SGL WL	Std	Yes	SGL WL
C	DBL WL	Std	No	SGL WL
D	DBL WL	Std	Yes	SGL WL
E	DBL WL	Deluxe	Yes	SGL WL
F	DBL WL	Std	Yes	DBL WL
G	DBL WL	Deluxe	Yes	DBL WL

Digit 9
Unit Insulation
A = 1" Mat Complete
B = 1" Mat Com W/Trane Coat

Digit 10
Design Sequence
C = Current Design Sequence

Digit 11
Access Door Option For Coil Removal
0 = None
A = Coil Access L.H. Door

Digit 12
Upstream F & BYP
0 = None
A = Yes

Digit 13
Drain & Vent
0 = None

Digit 14
Downstream Coils
0 = None
A = Yes

Digit 15
Drain Pan Type & Mat'l
A = Flat, Galvanized
B = Flat, Stainless Steel

Digit 16*
0 = None

Digit 17*
0 = None

Digit 18*
0 = None

Digit 19*
0 = None

Digit 20*
0 = None

Digit 21
First Coil Type
0 = None
A = Type F1 (L) 5/16 Dist Tubes
B = Type F2 (S) 1/4 Dist Tubes
C = Type F5 (L) 1/4 Dist Tubes Delta-Flo
D = Type F6 (S) 3/16 Dist Tubes Delta-Flo
1 = Type FA (L) 1/4 Dist Tubes Intertwined Delta-Flo
2 = Type FB (S) 3/16 Dist Tubes Intertwined Delta-Flo
E = Type W (Cooling)
F = Type K
G = Type D
H = Type DD
J = Type P2
K = Type P4
M = Type P8
N = Type WD
R = Type DL (Cooling) Delta-Flo
U = Type WL (Cooling) Delta-Flo
V = Type LL (Cooling) Delta-Flo
L = Type WC
P = Type NS
T = Type W (Heating)
W = Type DL (Heating) Delta-Flo
X = Type WL (Heating) Delta-Flo
Y = Type LL (Heating) Delta-Flo
Z = Space Instead of Coils, 2-Row thru 8-Row

Digit 22
First Coil Rows
0 = None
B = 1 Row 4" (WC) 5-1/4" (NS)
C = 2 Row 6-1/2"
D = 3 Row 8"
E = 4 Row 12-1/2"
G = 6 Row 15-1/2"
H = 8 Row 15-1/2"

Digit 23
First Coil Fin Series (Fins/Ft)
0 = None
A = 40
B = 50
C = 60
D = 70
E = 80
F = 90
G = 100
H = 110
J = 120
K = 130
L = 140
M = 150
N = 160
P = 170
R = 180

Digit 24
First Coil Fin Series (Fins/Ft)
0 = 0
1 = 1
2 = 2
3 = 3
4 = 4
5 = 5
6 = 6
7 = 7
8 = 8
9 = 9

Digit 25
First Coil Fin Type/Material
0 = None
A = Sigma Aluminum
B = Sigma Copper
C = Prima Aluminum
E = Delta-Flo Aluminum

Digit 26
First Coil Tube Material
0 = None
A = Std Copper
C = .049 Red Brass
D = .024 Copper
E = .035 Copper

Digit 27
First Coil Turbulator (Water Coil)
0 = None
T = W/Turbulators

Digit 28
First Coil Circuits
0 = None
Sigma-Flo & Prima-Flo
Number of Standard
Refrigerant Circuits (Tube Fed)

Number of Horizontal Split

	Finned Width			
	18	24	30	33
A	N/A	N/A	N/A	N/A
B	6	8	10	11
C	3	4	5	7
D	2	2	4	3
E	N/A	–	2	–

Refrigerant Circuits (Tube Fed)
(Top-Bottom Splits)

Delta-Flo

	Finned Width			
	18	24	30	33
F	6-6	8-8	10-10	11-11
G	3-3	4-4	5-5	5-6
H	–	2-2	–	3-4
J	1-1	1-1	2-2	N/A
K	–	–	1-1	–

Number of Standard
Refrigerant Circuits (Tube Fed)

Number of Horizontal Split

	Finned Width			
	18	24	30	33
L	14	19	24	36
M	7	9	12	13
N	4	4	6	6

Refrigerant Circuits (Tube Fed)
(Top-Bottom Splits)

Number of Intertwined

	Finned Width			
	18	24	30	33
R	7-7	9-10	12-12	13-13

Refrigerant Circuits (Tube Fed)

	Finned Width			
	18	24	30	33
T	7-7	9-10	12-12	13-13
U	3-4	4-5	6-6	6-7
V	2-2	2-2	3-3	3-3

Digit 29
Space Between First & Second Coil In Casing

0 = None
A = 2 Row 6-1/2"
B = 3 Row 8"
C = 4 Row 9-1/2"
D = 6 Row 12-1/2"
E = 8 Row 15-1/2"
F = 10 Row 18-1/2"

Digit 30
Second Coil Type

0 = None
A = Type F1 (L) 5/16 Dist Tubes
B = Type F2 (S) 1/4 Dist Tubes
C = Type F5 (L) 1/4 Dist Tubes Delta-Flo
D = Type F6 (S) 3/16 Dist Tubes Delta-Flo
1 = Type FA (L) 1/4 Dist Tubes Intertwined Delta-Flo
2 = Type FB (S) 3/16 Dist Tubes Intertwined Delta-Flo
E = Type W (Cooling)
F = Type K
G = Type D
H = Type DD
J = Type P2
K = Type P4
M = Type P8
N = Type WD
R = Type DL (Cooling) Delta-Flo
U = Type WL (Cooling) Delta-Flo
V = Type LL (Cooling) Delta-Flo
L = Type WC
P = Type NS
T = Type W (Heating)
W = Type DL (Heating) Delta-Flo
X = Type WL (Heating) Delta-Flo
Y = Type LL (Heating) Delta-Flo
Z = Space Instead of Coils, 2-Row thru 8-Row

Digit 31
Second Coil Rows

0 = None
B = 1 Row 4" (WC) 5-1/4" (NS)
C = 2 Row 6-1/2
D = 3 Row 8"
E = 4 Row 9-1/2"
G = 6 Row 12-1/2"
H = 8 Row 15-1/2"

Digit 32
Second Coil Fin Series (Fins/FT)

0 = None
A = 40
B = 50
C = 60
D = 70
E = 80
F = 90
G = 100
J = 120
K = 130
L = 140
M = 150
N = 160
P = 170
R = 180

Digit 33
Coil Fin Series (Fins/Ft) Material

0 = 0
1 = 1
2 = 2
3 = 3
4 = 4
5 = 5
6 = 6
7 = 7
8 = 8
9 = 9

Digit 34
Second Coil Fin Type/Material

0 = None
A = Sigma Aluminum
B = Sigma Copper
C = Prima Aluminum
E = Delta-Flo Aluminum

Digit 35
Second Coil Tube Material

0 = None
A = Std Copper
C = .049 Red Brass
D = .024 Copper
E = .035 Copper

Digit 36
Second Coil Turbulator (Water Coil)

0 = None
T = W/Turbulators

Digit 37
Second Coil Circuits

0 = None
Sigma-Flo & Prima-Flo
Number of Standard Refrigerant Circuits (Tube Fed)
Number of Horizontal Split Refrigerant Circuits (Tube Fed)
(Top-Bottom Splits)

	Finned Width			
	18	24	30	33
A	N/A	N/A	N/A	N/A
B	6	8	10	11
C	3	4	5	7
D	2	2	4	3
E	N/A	–	2	–

Delta-Flo
Number of Standard

	Finned Width			
	18	24	30	33
F	6-6	8-8	10-10	11-11
G	3-3	4-4	5-5	5-6
H	–	2-2	–	3-4
J	1-1	1-1	2-2	N/A
K	–	–	1-1	–

Refrigerant Circuits (Tube Fed)

Number of Horizontal Split Refrigerant Circuits (Tube Fed)

	Finned Width			
	18	24	30	33
L	14	19	24	36
M	7	9	12	13
N	4	4	6	6

(Top-Bottom Splits)

Number of Intertwined Refrigerant Circuits (Tubes Fed)

	Finned Width			
	18	24	30	33
R	7-7	9-10	12-12	13-13

Digit 38

	Finned Width			
	18	24	30	33
T	7-7	9-10	12-12	13-13
U	3-4	4-5	6-6	6-7
V	2-2	2-2	3-3	3-3

Space Between Second & Third Coil In Casing

0 = None
A = 2 Row 6-1/2"
B = 3 Row 8"
C = 4 Row 9-1/2"
D = 6 Row 12-1/2"
E = 8 Row 15-1/2"
F = 10 Row 18-1/2"

Digit 39
Third Coil Type

0 = None
A = Type F1 (L) 5/16 Dist Tubes
B = Type F1 (L) 5/16 Dist Tubes
C = Type F5 (L) 1/4 Dist Tubes Delta-Flo
D = Type F6 (S) 3/16 Dist Tubes Delta-Flo
1 = Type FA (L) 1/4 Dist Tubes Intertwined Delta-Flo
2 = Type FB (S) 3/16 Dist Tubes Intertwined Delta-Flo

E = Type W (Cooling)
F = Type K
G = Type D
H = Type DD
J = Type P2
K = Type P4
M = Type P8
N = Type WD
R = Type DL (Cooling) Delta-Flo
U = Type WL (Cooling) Delta-Flo
V = Type LL (Cooling) Delta-Flo
L = Type WC
P = Type NS
T = Type W (Heating)
W = Type DL (Heating) Delta-Flo
X = Type WL (Heating) Delta-Flo
Y = Type LL (Heating) Delta-Flo
Z = Space Instead of Coils, 2-Row thru 8-Row

Digit 40
Third Coil Rows

0 = None
B = 1 Row 4" (WC) 5-1/4" (NS)
C = 2 Row 6-1/2"
D = 3 Row 8"
E = 4 Row 9-1/2"
G = 6 Row 12-1/2"
H = 8 Row 15-1/2"

Digit 41
Third Coil Rows

0 = None
A = 40
B = 50
C = 60
D = 70
E = 80
F = 90
G = 100
H = 110
J = 120
K = 130
L = 140
M = 150
N = 160
P = 170
R = 180

Digit 42
Third Coil Fin Series (Fins/Ft)

0 = 0
1 = 1
2 = 2
3 = 3
4 = 4
5 = 5
6 = 6
7 = 7
8 = 8
9 = 9

Digit 43
Third Coil Fin Type/Material

0 = None
A = Sigma Aluminum
B = Sigma Copper
C = Prima Aluminum
E = Delta-Flo Aluminum

Digit 44
Third Coil Tube Material

0 = None
A = Std Copper
C = .049 Red Brass
D = .024 Copper
E = .035 Copper

Digit 45
Third Coil Turbulator (Water Coil)

0 = None
T = W/Turbulators

Digit 46
Third Coil Circuits

0 = None
Sigma-Flo & Prima-Flo
Number of Standard
Refrigerant Circuits (Tube Fed)

	Finned Width			
	18	24	30	33
A	N/A	N/A	N/A	N/A
B	6	8	10	11
C	3	4	5	7
D	2	2	4	3
E	N/A	–	2	–

Number of Horizontal Split
Refrigerant Circuits (Tube Fed)
(Top-Bottom Splits)

	Finned Width			
	18	24	30	33
F	6-6	8-8	10-10	11-11
G	3-3	4-4	5-5	5-6
H	–	2-2	–	3-4
J	1-1	1-1	2-2	N/A
K	–	–	1-1	–

Delta-Flo
Number of Standard
Refrigerant Circuits (Tube Fed)

	Finned Width			
	18	24	30	33
L	14	19	24	36
M	7	9	12	13
N	4	4	6	6

Number of Horizontal Split
Refrigerant Circuits (Tube Fed)
(Top-Bottom Splits)

	Finned Width			
	18	24	30	33
R	7-7	9-10	12-12	13-13

Number of Intertwined
Refrigerant Circuits (Tube Fed)

	Finned Width			
	18	24	30	33
T	7-7	9-10	12-12	13-13
U	3-4	4-5	6-6	6-7
V	2-2	2-2	3-3	3-3

Note:
1. Model number digits flagged by an asterisk (*) are reserved for future use.
2. Nom = square feet of coil which equals unit size.
3. 15 digit does not correspond to digits listed, the unit is special.

General Information

General

Trane Penthouse Climate Changers® are outdoor central station air handlers designed for a variety of controlled air applications. The basic unit consists of a fan, heating and/or cooling coils, filters and dampers.

Supply air fans are double width, double inlet, centrifugal types with either forward-curved or airfoil blade design. Fans are available in low and medium pressure classes with or without inlet guide vanes. The Exhaust Fan Economizer option provides exhaust air capability to control building pressurization. Face and bypass, return air, outside air and discharge dampers are available on all unit sizes.

Filtration is accomplished with 2-inch throwaway, permanent or medium efficiency filters, slide in cartridge filters or slide in bag filters. A final filter section is available with either bag or cartridge filters to provide highly controlled air quality.

Basic unit accessories include a protective inlet hood with moisture eliminators, a safety grate over the return air damper, factory wired and mounted controls and a unit roof curb. Exhaust Fan Economizer accessories consist of an exhaust fan, exhaust hood, discharge damper, single or dual outside air dampers, a safety grate over the return air opening, factory wired and mounted controls and a unit roof curb.

Three electrical packages are available for all unit sizes to provide motor to NEMA 4 junction box connection via EMT conduit. Electrical Package #2 includes a weatherproof light switch and convenience outlet and Electrical Package #3 adds a 3kw electric unit heater. The basic motor control center consists of a NEMA 4 or 12 box with a motor circuit protector or fused disconnect switch and line voltage starter. The deluxe motor control center adds a 120V motor starter, a line to 120V transformer for the starter, a fan on/off/auto switch and additional relays required to interlock the unit heater and/or exhaust fan controls.

Operation

System Operation

The Penthouse Climate Changer® (PCC) is a weathertight air handling unit designed for outdoor installation. The units can be used for cooling, heating, ventilating and filtering. Outside and return air enters the unit and is filtered before being pulled through the coil by the fan. The filtered, conditioned air is then forced through final filters, if supplied, and through ductwork to the conditioned zones.

Coil capacity is controlled by modulating valves at the coil or internal face and bypass dampers. The modulating valve controls the amount of steam or water that enters the coil. Face and bypass dampers direct the air stream either through or around the coil, affecting the coil load and leaving air temperature. During shutdown conditions, when temperaures inside the unit could exceed 104° F, steam or heat to the coil must be shut off to prevent overheating of the motors, belts and electrical components.

Face and bypass dampers are mounted as a single assembly inside the unit and achieve 100 percent air control. These internal dampers are not designed to close tightly, but to modulate air quantities. Return and outside air dampers mix airstreams of varying temperatures. Stratification of airstreams can cause erratic control, coil freeze-up, water hammer or nuisance cutouts. If no coil freeze-protection device is installed, or if the unit is controlled by modulating coil valves with a constant airflow over the coils, the outside air damper position should vary with the velocity and temperature of the entering outside air. The volume of outside air must be reduced as outside air temperature drops. Coil freeze-up may occur if the proper damper positions are not maintained or if freeze protection devices are not used.

Moisture is controlled within the unit by a drain pan which collects and drains coil condensate. Moisture eliminators, located in the optional inlet hood, prevent water from entering the system when entering air velocities are below 950 fpm. Entering air velocities must be kept below 950 fpm to ensure adequate moisture elimination.

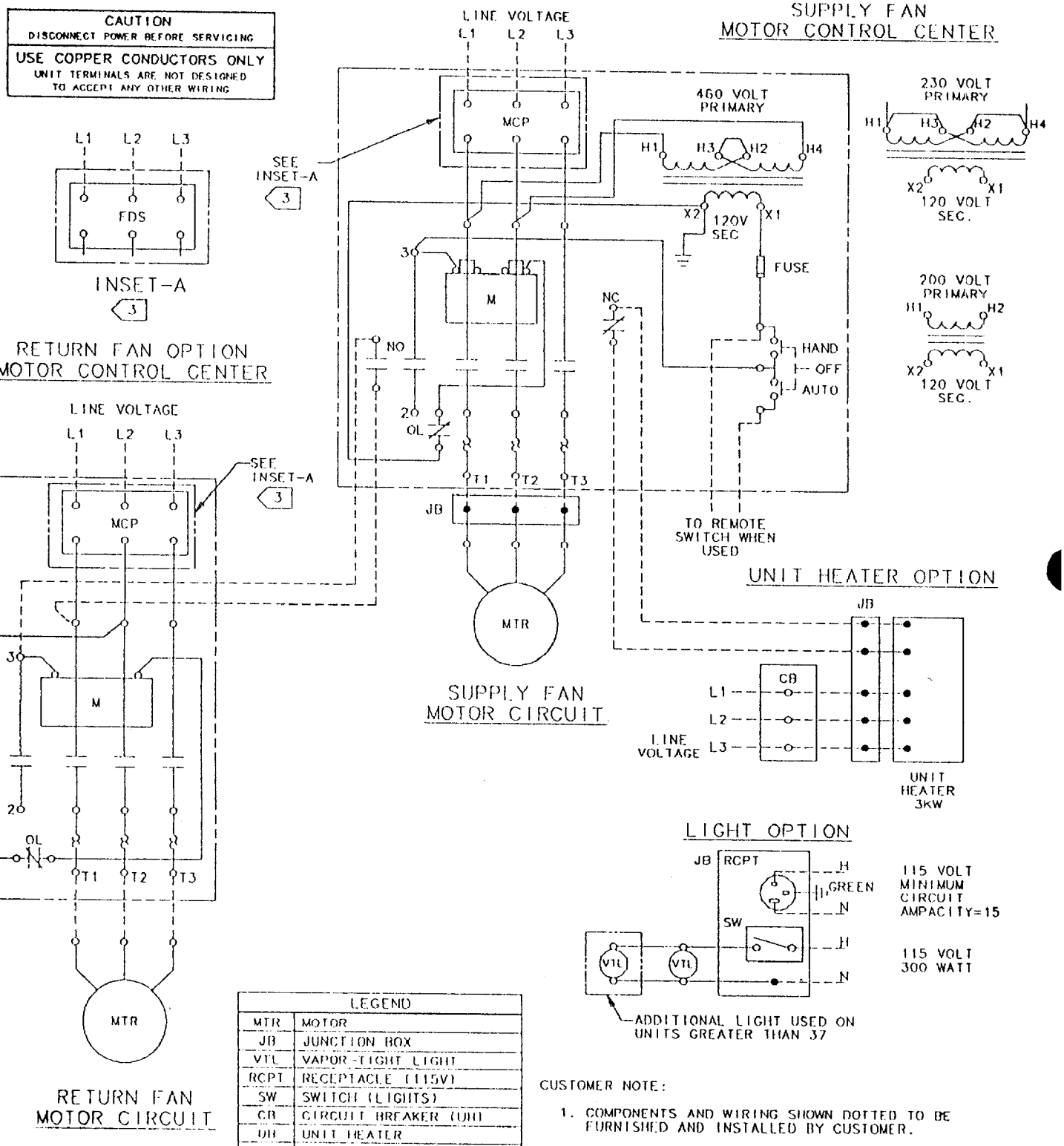
Electrical Sequence of Operation

Figure 1 illustrates typical system wiring. When the HAND-OFF-AUTO switch is turned to the HAND position and line voltage is available, 120-volt control power flows through Terminals H and C of the switch to energize the contactor coil labeled VMW. The energization of this contactor closes the normally open contacts to energize the supply fan motor. Power is sent to the primary side of the control power transformer whenever line voltage is applied to L1, L2 and L3 and if the Motor Circuit Protector (MCP) is not tripped. If a remote start switch is used, power flows to the HAND-OFF-AUTO switch and the unit is energized on AUTO, transmitting power through Terminals A and C of the switch and energizing the supply fan motor.

The optional unit heater is activated only when the supply fan is not in operation. When the supply fan contactor is de-energized, the normally closed contacts allow power to flow to the unit heater. When the supply fan contactor is energized, the normally closed contacts open, breaking power to the unit heater. If a unit thermostat is used, both the de-energization of the fans and a call for heat from the thermostat is necessary to energize contactor C1 to allow power to the heaters.

The unit heater fan motor is energized when contactor C1 energizes, making the normally open contacts and energizing the fan motor. If the heaters are not energized, the Fan Override (FO) will make its contacts when the unit interior warms or when the unit heater remains hot after the heating coils have de-energized. Fan motor operation continues until the air temperature cools, disconnecting the FO contacts.

Figure 1
Typical Interconnecting Wiring Diagram



LEGEND	
MTR	MOTOR
JB	JUNCTION BOX
VTL	VAPOR-TIGHT LIGHT
RCPT	RECEPTACLE (115V)
SW	SWITCH (LIGHTS)
CB	CIRCUIT BREAKER (UH)
UH	UNIT HEATER
NC	NORMALLY CLOSED
MCP	MOTOR CIRCUIT PROTECTOR
M	PILOT COIL
NO	NORMALLY OPEN
FDS	FUSED DISCONNECT SWITCH

CUSTOMER NOTE:

1. COMPONENTS AND WIRING SHOWN DOTTED TO BE FURNISHED AND INSTALLED BY CUSTOMER.
2. ALL CUSTOMER WIRING TO BE IN ACCORDANCE WITH LOCAL AND NATIONAL ELECTRICAL CODES.
3. FDS PROVIDED WHEN USING ENERGY EFFICIENT MOTORS. MCP PROVIDED ON ALL OTHER MOTORS.
4. UL LISTED MOTOR CONTROL CENTERS.

Maintenance

Periodic Maintenance Checklist

The following checklist is provided as an abbreviated guide to periodic maintenance. Detailed procedural information is given after this checklist.

WARNING: Disconnect electrical power and allow rotating parts to stop before servicing the unit. Exercise caution if unit must be on for test or maintenance procedures. Failures to do so may result in injury or death from electrical shock or moving parts.

WARNING: Secure drive sheaves before servicing the unit to insure that the fan can not free-wheel. Failure to do so may result in severe personal injury from moving parts.

After 48 Hours of Operation

[] Belts have acquired their permanent stretch after 48 hours of operation. Readjust, but do not overtighten the belts (refer to pages 22 and 23).

Every Month

[] Check air filters. Clean or replace if clogged or dirty. Coat permanent filters with oil after cleaning. Change bag filters when pressure drop is 1-inch Delta P.

[] Inspect moisture eliminators. Wash off obstructions with a mild detergent.

[] Relubricate fan and motor bearings if operating conditions include high speeds, moist or dirty air, or high temperatures.

Every Three to Six Months

[] Check fan bearing grease line connections. Lines should be tight to the bearings.

[] Lubricate fan bearings.

[] Check motor lubrication. Recommendations are provided on the motor tag or on a unit sticker. Check bearing and motor bracket bolt torques.

[] Align fan and motor sheaves. Tighten sheave setscrews to the proper torques.

[] Check and adjust fan belt tension.

[] Tighten bearing and fan wheel setscrews to the proper torques.

[] Tighten electrical connections.

[] Inspect the filtering sock on units with a steam grid humidifier. Replace if clogged.

[] Inspect coils for dirt build-up or coil freeze-up.

[] If the unit has inlet guide vanes, cycle the vanes from fully open to fully closed and back. Visually inspect the inlet vane assembly for proper operation. Clean and adjust the inlet vanes if necessary.

Every Year

[] Inspect the unit casing for chipping or corrosion. If damage is found, clean and repaint the surface with a rust-resistant primer and chlorinated vinyl lacquer.

[] Clean the fan wheels and fan shaft. Remove rust with an emery cloth and apply a coat of LPS #3 or an equivalent.

[] Inspect the condensate drain pan and drain line for sludge or foreign materials that might obstruct proper drainage. Remove obstacles.

[] Check damper linkages, setscrews and blade adjustment for proper damper operation. Clean but do not lubricate the nylon damper rod bushings.

[] Clean damper operators.

[] Inspect the control and power box wiring for secure connections and insulation.

[] Rotate the fan wheel and check for obstructions in the fan housing. The wheel should not rub on the fan housing or inlet cone. Adjust the center if necessary and tighten wheel setscrews to the proper torques.

[] Calibrate the manometer (optional) to the proper pressure drop setting and correct zero setting.

[] Recalibrate coil freeze-protection device if applicable. Provide coil winterization.

[] Check condition of gasketing and insulation around unit, door and dampers.

[] Examine flex connections for cracks or leaks. Repair or replace damaged material.

[] If a unit heater is installed, inspect control panel wiring and insulation. Clean the unit casing, fan and motor. Clean and repaint rust spots. Fan motors should be lubricated every five to ten years with S.A.E. Number 10 nondetergent electric motor oil. An oil access plug is located at the back of the unit heater.

Maintenance Procedure

Air Filters

Figure 2 illustrates flat filter installation. To replace throwaway filters, install new filters with the directional arrows pointing toward the supply fan. To clean permanent filters, wash under a stream of water to remove dirt and lint. Remove all filter oil with a wash of mild alkali solution. Rinse in clean, hot water and allow to dry. Coat both sides of the filter by immersing or spraying it with Air Maze Filter Lote W or an equivalent. Allow to drain and dry for about 12 hours.

To install cartridge or bag filters, complete the following:

NOTE: Filters must have an airtight seal to prevent air bypass. If using other than Trane-supplied filters, apply foam gasketing to the vertical edges of the filter.

WARNING: Disconnect electrical power source, and allow all rotating equipment to stop before inspecting or servicing the unit. Failure to do so may result in personal injury or death from electrical shock or rotating parts.

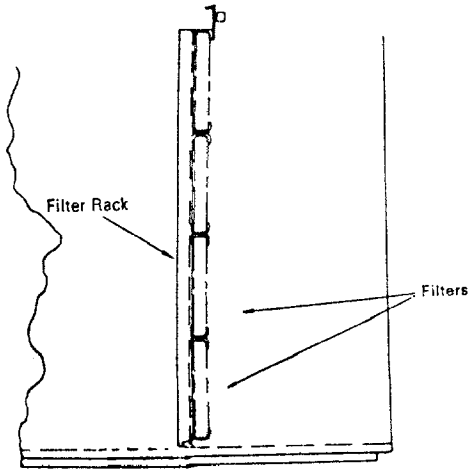
1. Open the filter section access door and remove the filters from their installed position.

2. Keeping the bag filters folded, slide each filter into the filter rack, pushing them tightly against the unit. Pleats should be in the vertical position.

3. If using the optional prefilters, slide them into the appropriate filter rack.

4. If fixed and adjustable blockoffs are provided with the unit, slide the fixed blockoffs into the filter track before the filters.

Figure 2
Medium Efficiency Filter Installation



Unit Size	Size (In.) (2" Wide)	Quantity Required
7	16 X 20	9
14	16 X 20	9
18	16 X 25	9
23	16 X 20	4
	16 X 25	4
	20 X 20	2
	20 X 25	2
37	20 X 20	8
	25 X 20	8

Unit Size	Size (In.) (2" Wide)	Quantity Required
52	16 X 20	6
	16 X 25	6
	20 X 20	6
	20 X 25	6
60	16 X 20	6
	16 X 25	6
	20 X 20	10
	20 X 25	10
74	16 X 20	6
	16 X 25	6
	20 X 20	10
	20 X 25	10

Fan Bearing Lubrication

Fan bearings should be lubricated with a lithium base grease which conforms to NLGI Number 2 for consistency. See Table 1 for recommended lubricants and Table 2 for bearing grease capacities.

Caution: Improper lubrication can result in premature bearing failure.

Caution: Do not mix greases with different bases within the bearing. This can cause an audible squealing noise that may be transmitted through the system ductwork.

To lubricate the fan bearings, complete the following:

WARNING: Disconnect electrical power source before servicing the unit. If unit must be on for maintenance procedures, exercise extreme caution. Failure to do so may result in personal injury or death from electrical shock or entanglement in moving parts.

WARNING: Secure drive sheaves before servicing the unit to insure that the fan can not free-wheel. Failure to do so may result in severe personal injury from moving parts.

1. If bearings are to be lubricated while unit is not running, disconnect main power switch.

2. Check grease lines for tight connections at the grease fitting.

3. Connect a manual grease gun to the grease line or fitting.

4. Add grease until a light bead of grease appears at the bearing grease seal. If fan is not running, turn the fan wheel manually while adding grease.

Table 2
Fan Bearing
Grease Capacity

Shaft Size	Max. Grease Capacity of Bearing Ounces
1/2" to 3/4"	1/8
7/8" to 1 3/16"	3/8
1 1/4" to 1 1/2"	5/8
1 11/16 to 1 15/16"	7/8
2" to 2 7/16"	1 1/4
2 1/2" to 2 15/16"	2

Table 1
Recommendations for
Grease Lubricated
Fan Bearings

Operating Conditions	Greasing Intervals -20 F to 140 F	140 F to 200 F
Clean, Dry	3-6 months	1-3 months
Dirty, Dry	1-3 months	1-4 weeks
Dirty, Wet, High Humidity	1-4 weeks	1-14 days

Recommended Greases	Recommended Operating Range
Texaco-Multi Fak #2	-20 F to 250 F
Shell Alvania #2	-20 F to 250 F
Mobile Mobulux #2	-20 F to 250 F
Exxon Unirex #2	-20 F to 250 F
Texaco Premium RB	-20 F to 250 F
Mobil 532	-20 F to 250 F
Exxon Beacon	-65 F to 250 F
Keystone Keystone 84 H	-40 F to 225 F

Note: Greases used should conformm to NLGI No. 2 penetration.

Fan Motors

Inspect periodically for excessive vibration or temperature. Operating conditions will vary the frequency of inspection and lubrication. Table 3 lists recommended motor greasing intervals. Motor lubrication instructions are found on the motor tag or nameplate. In general, the greases given in Table 1 also apply to motors.

To relubricate the motor, complete the following:

WARNING: Disconnect electrical power source for before servicing the unit. If unit must be on for maintenance procedures, exercise extreme caution. Failure to do so may result in personal injury or death from electrical shock or entanglement in moving parts.

WARNING: Secure drive sheaves before servicing the unit to insure that the fan can not free-wheel. Failure to do so may result in severe personal injury from moving parts.

1. Turn the motor off. Make sure it cannot accidentally restart.

2. Remove the relief plug and clean out any hardened grease.

3. Add fresh grease through the fitting with a low pressure grease gun.

4. Run the motor for a few minutes to expel any excess grease through the relief vent.

5. Stop the motor and replace the relief plug.

Note: If excessive grease is purged at the motor shaft, use less grease and/or extend the greasing interval.

Refer to Table 4 for minimum torques of motor mounting and bearings bolts.

Table 3
Motor Greasing Intervals

Type of Service	Up to 7.5 Hp Motors	10-40 Hp Motors	50-150 Hp Motors
8-16 Hrs., Clean, Dry	5 years	3 years	1 year
12-24 Hrs., Moderate Dirt or Moisture	2 years	1 year	6 months
Severe-Very Dirty, High Temp.	6 months	3 months	2 months

Table 4
Minimum Hex Head Bolt Torques

Bolt Size	Torque Foot/Pounds Grade 2	Grade 5
1/4" - 20 UNC	4	6
1/4" - 28 UNF	4	7
5/16" - 18 UNC	8	14
5/16" - 24 UNF	9	16
3/8" - 16 UNC	14	24
3/8" - 24 UNF	16	28
7/16" - 14 UNC	30	42
7/16" - 20 UNF	35	45
1/2" - 13 UNC	40	69
1/2" - 20 UNF	47	83
9/16" - 12 UNC	57	99
9/16" - 18 UNF	68	118
5/8" - 11 UNC	86	150
5/8" - 18 UNF	101	176
3/4" - 10 UNC	146	254
3/4" - 16 UNF	173	301
7/8" - 9 UNC	206	358
7/8" - 14 UNF	244	422
1" - 8 UNC	289	500
1" - 14 UNF	347	602

Fan motors should be stored indoors in a clean and dry atmosphere and on solid ground. The motor shaft should be turned occasionally to prevent brinelling of the bearings. If motors must be stored outdoors in varying, humid climate, use space heaters and cover the motors as completely as possible to keep them dry. If space heaters have not been installed and motors have been subjected to the elements for several months, the following steps are recommended before operating the motors:

1. Inspect bearings for moisture and rust. Replace bearings if necessary and repack with new grease.

2. Check motor winding. An acceptable reading is from 6 megohms to infinity. If reading is less than 5 megohms, windings should be dried out in an oven or by a blower.

3. Inspect the entire motor for rust and corrosion.

4. Lubricate the motor as instructed in this Maintenance manual, or as indicated by the maintenance tag on the motor.

Sheave Alignment

To prevent interference of the fan frame with the belt, make sure that the belt edge closest to the motor has the proper clearance from the fan frame, as shown in Figure 3.

Align the fan and motor sheaves by using a straight edge as shown in Figure 4. The straight edge must be long enough to span the distance between the outside edges of the sheaves. When the sheaves are aligned, the straight edge will touch both sheaves at points A through D. A string, drawn tight, may be used in the same manner.

For uneven width sheaves, place a string in the center groove of both sheaves and pull tight. Adjust sheaves and tighten the sheave setscrews to the proper torques, given in Table 5.

Table 5
Fan Wheel
Setscrew Torques

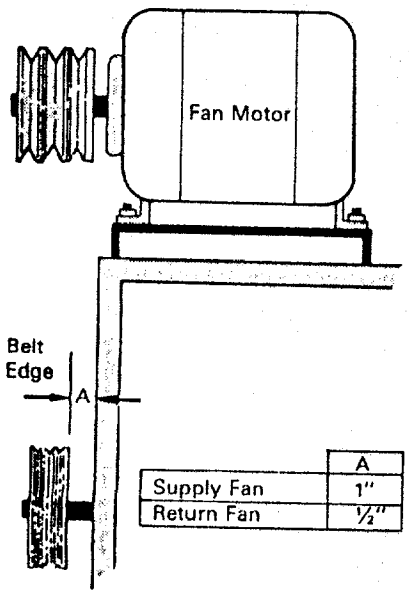
Screw Size	Inch Pounds	Foot Pounds
1/4 - 20 X 5/8	65.3	5.44
5/16 - 18 X 7/8	124	10.3
3/8 - 24	217	18.1

Parallel operation of the fan and motor shafts is necessary to prolong belt life. Place a level on the shafts to check horizontal alignment. Shim if necessary.

Fan Assembly Setscrews

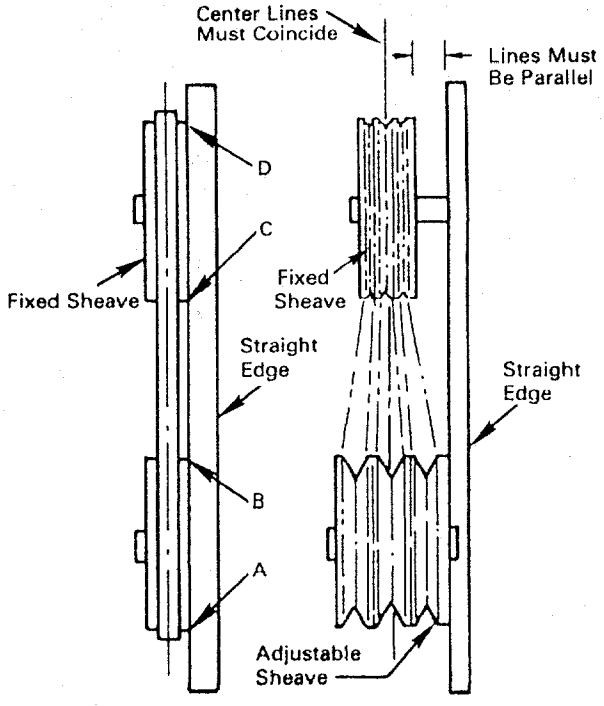
Check and adjust fan wheel, bearing and sheave setscrews whenever a component is

Figure 3
Allowable Distance Between Framework and Fan Sheave



	A
Supply Fan	1"
Return Fan	½"

Figure 4
Sheave Alignment



removed or an adjustment is made. Refer to Tables 5, 6, 7 and 8 for recommended torques.

Table 6
Fan Wheel Hub
Clamp Bolt Torque

Size	Inch Pounds	Foot Pounds
5/16" - 18	300	25.0
7/16" - 20	480	40.0

Table 7
Fan Bearing Setscrew
Torque Ranges

Setscrew Size	Inch Pounds	Foot Pounds
1/4"	66 - 90	5.5 - 7.5
5/16"	126 - 165	10.5 - 13.7
3/8"	228 - 300	19 - 25
7/16"	348 - 450	29 - 37.5
1/2"	504 - 650	42 - 54.2
5/8"	1104 - 1225	92 - 102

Table 8
Drive Sheave
Setscrew Torques

Screw Size	Inch Pounds	Foot Pounds
No. 10	28	2.3
1/4"	66	5.5
5/16"	126	10.5
3/8"	228	19.0
7/16"	348	29.0
1/2"	504	42.0
5/8"	1104	92.0

Fan Belt Tension

Note: Fan belt tension should be checked at least twice during the first days of operation, since there is a rapid decrease in tension until belts are run in.

WARNING: Disconnect electrical power source and allow all rotating equipment to stop completely before inspecting or servicing the unit. Failure to do so may result in personal injury or death from electrical shock or moving parts.

WARNING: Secure drive sheaves before servicing the unit to insure that the fan can not free-wheel. Failure to do so may result in severe personal injury from moving parts.

Proper belt tension is required to ensure maximum bearing and drive component life and is based on fan brake horsepower requirement. Use Chart 1 to find the proper tension and refer to the inset for an example. To use the chart, you must know:

1. Fan design bhp per belt (not motor hp).

2. Fan rpm.

3. Fan sheave pitch diameter (Figure 5 found by measuring where the middle of the belt rides in the sheave).

4. Type of belt cross-section (stamped on the belt).

As shown in the example of Chart 1, the correction tension (pounds force) is 9.6 pounds, at 1/2-inch deflection. Deflection is determined by dividing the belt span distance by 64, as shown in Figure 6.

To measure belt tension, use a belt tensioner as shown in Figure 7. Determine actual deflection by depressing one belt with the belt tensioner and measuring the deflection relative to the other belts or to belt line. Adjust the belt tension to the correct pounds force.

Figure 5
Fan Sheave
Pitch Diameter

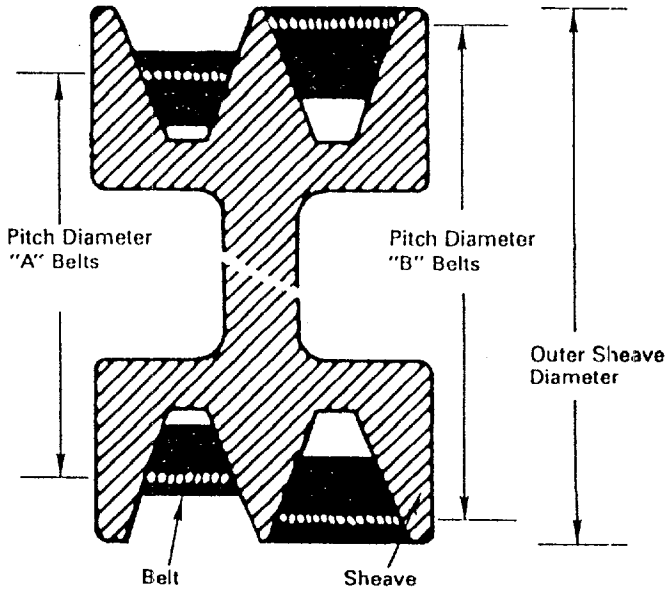


Chart 1
Belt Tension

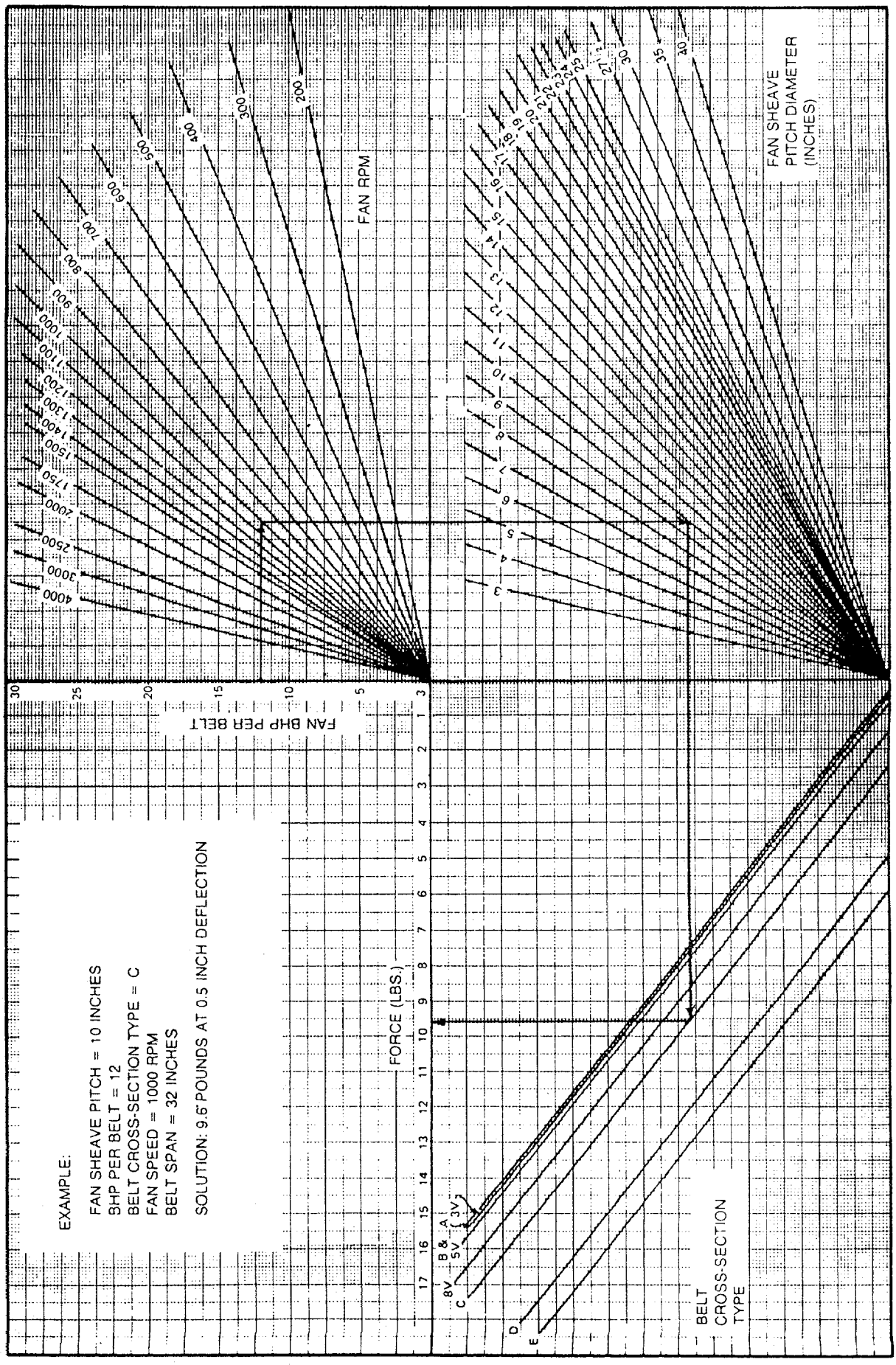
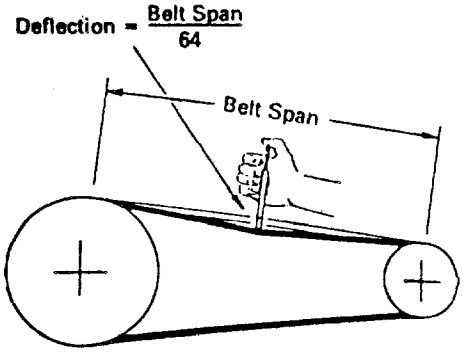


Figure 6
Belt Tension Measurement



For belt cross-section types not given in Chart 1, refer to Table 9 and use the following equations to calculate correct belt tension.

$$F = \frac{T + K}{16}$$

where

F = force measured in pounds at specific deflection.

K = constant determined by belt cross-section type (Table 4)

$$T = \frac{24{,}750 \text{ c (fan hp per belt)}}{\text{(belt speed)}}$$

$$\text{Belt speed} = \frac{\text{(fan pitch diameter) x (PI) x fan rpm (ft/min)}}{12}$$

For example, given the following:

Motor sheave pitch diameter: 16.8 inches, eight groove

Fan sheave pitch diameter: 19.8 inches, eight groove

Fan horsepower: 262.4 bhp

Fan rpm: 983 rpm

Belt type: 8V

Sheave span: 60.9 inches

$$\text{Belt speed} = \frac{19.8 \times 3.14 \times 983}{12} = 5092$$

$$T = \frac{24{,}750 \times (262.4 \text{ bhp}/8 \text{ belts})}{5092} =$$

$$\frac{(24{,}750 \times 32.8}{5092} = 159.4 \text{ lbs.})$$

$$F = \frac{159.4 + 25}{16} = 11.5 \text{ lbs.}$$

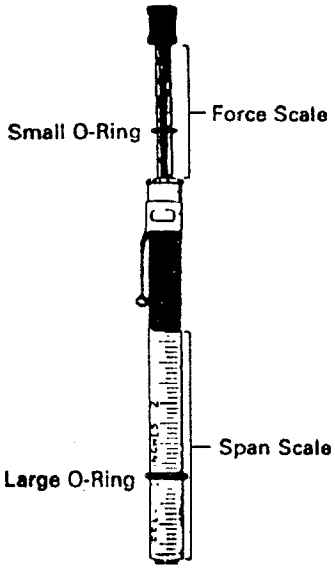
$$\text{Also, } D = \frac{\text{(Belt span (inches)}}{64} =$$

$$\frac{60.9}{64} = .95 =$$

approximately 15/16 inches.

Figure 7
Belt Tensioner

Figure 7
Belt Tensioner



Therefore, the belt tensioner should read 11.5 pounds force at 15/16-inch deflection. This will yield 159.4 pounds force belt tension.

Belt tensions determined by using Chart 1 and Table 9 are minimum values. The correct operating tension for a V-belt drive is the lowest tension at which the belts will not slip under the peak load conditions. Correct belt tension will prevent excessive belt flopping and start-up squealing.

Caution: Do not over-tension the belts. Excessive tension will reduce fan and motor bearing life, accelerate belt wear and possibly cause shaft failure.

Table 9
Value for K Factor (Belt Cross-Section Types)

Belt Type	A	B	C	D	E	3L	4L	5L	3V	5V	8V	AX	BX	CX	DX
"K" Factor	8	13	40	80	95	6	6	6	6	12	25	11	18	54	101

Coils

Steam, hot water and chilled water coils should be kept clean to maintain maximum performance. If fins become dirty, clean with steam and detergent, hot water spray and detergent, or one of the commercially available chemical coil cleaners. Rinse coils thoroughly after cleaning.

WARNING: Follow all directions provided with chemical cleaners to avoid personal injury and/or coil damage. Commercially available chemical cleaners may contain caustic or hazardous agents.

Type K cooling coils have removable headers for cleaning. A small nylon or fiber brush may be used to clean the tubes. After cleaning, flush with water. When removing any header, replace the rubber sealing gasket and be sure that it seats properly when header is installed. If necessary, pull out turbulators, clean the tubes and replace turbulators. When header covers are replaced, apply washers under the bolt heads. Bolts should be evenly tightened to 50 foot-pounds of torque.

Refrigerant coils should be kept clean to maintain maximum performance. If fins become dirty, clean with cold water and detergent or one of the commercially available chemical coil cleaners. Rinse coils thoroughly after cleaning.

Caution: Follow directions provided with the cleaner to avoid coil damage.

WARNING: Never use steam or hot water to clean a refrigerant coil. Dangerous pressures may be built up by the improper application of heat resulting in equipment damage or personal injury.

Coil Winterization

Provisions must be made to drain those coils that are not in use when subjected to freezing temperatures. Coil type NS may be adequately drained in its pitched position within the unit and the installer must provide appropriate piping for adequate drainage.

Coil types DL, WL, LL, D, DD, (provided with drain and vent) K, W, WC, WD, and P can be adequately drained as installed in their level position. Type WL coils (4 and 6 row) are not drainable in either pitched or level position. To drain these coils remove the vent and drain plugs and blow the coils out as completely as possible with compressed air. The coils should then be filled and drained several times with full strength inhibited ethlene glycol so that it will mix thoroughly with the water retained in the coil. Drain the coil out as completely as possible.

Caution: Failure to properly drain and vent coils when not in use during freezing temperatures may result in coil freeze-up damage.

Caution: Use caution in removing header plugs from P2, P4 and P8 coils. Overtorquing may result in twisted tubes.

If a freeze protection device is being used (supplied by installer), the installer should follow the equipment supplier's recommended installation instructions. If there are no instructions, it is recommended to install the sensor on the entering air side of the coil using insulated clips to hold the sensor. The insulated clip may be attached to the coil fins, but make sure the sensor does not touch the fins.

To winterize Type K coils, remove the header covers. If tubes are fouled, clean with nylon or fiber brush. To ensure that no water will remain in the coil, do not replace the header covers until the coils are put back into service. When the coils are put back into service, new gaskets must be used. When header covers are replaced, apply washers under the bolt heads and tighten bolts evenly to 50 foot-pounds of torque.

Start-Up

Prestart-Up Checks

Before operating the unit, complete the following checks for safe and efficient operation:

WARNING: Disconnect electrical power source when servicing the unit. Failure to exercise caution may result in personal injury or death from electrical shock or moving parts.

WARNING: Secure drive sheaves before servicing the unit to insure that the fan can not free-wheel. Failure to do so may result in severe personal injury from moving parts.

[] Rotate all fan wheels manually. Fans should turn freely in the proper direction.

[] Check fan drive belt tension.

Note: If Penthouse Climate Changer fan is going to operate at other than design rpm or with a variable speed drive, (not supplied by Trane) the unit balance should be checked at the new rpm and throughout the speed range. Rebalance as necessary, in the field.

[] Check fan hub setscrews, sheave setscrews and bearing setscrews for proper torques. Fan sheaves should be tight and aligned.

[] Inspect fan motor and bearings for proper lubrication. Refer to the label on the side of the unit and the tag attached to the motor for recommendations.

Caution: Inadequate lubrication of fan motor or bearings may result in premature bearing or motor failure.

[] Inspect electrical connections. They should be clean and secure. Compare actual wiring with specific diagrams provided on the unit.

[] Check piping and valves for leaks. Open or close the valves to check for proper operation. Drain lines should be open.

[] If equipped with a refrigerant coil, the unit must be charged, leak-tested and ready for operation according to instructions provided with the condenser equipment. Adjust superheat setting.

[] Check that all air filters are in place and positioned properly.

[] Remove all foreign material from the drain pan and check drain pan opening and condensate line for obstructions.

[] Check unit for debris.

[] Close and secure all unit access doors.

Caution: The use of untreated or improperly treated water in this unit may cause scaling, erosion, corrosion, algae, slime or other equipment damage. Consult a qualified water treatment specialist to determine if water treatment is required. The Trane Company assumes no responsibility for equipment damage caused by untreated or improperly treated water.

Start-Up Checks

After completing all prestart-up checks and procedures, the unit may be operated. The following checks and adjustments should be made during initial start-up:

WARNING: Disconnect electrical power source when connecting or disconnecting electrical wires for test procedures. Do not open service access doors while the unit is operating. Failure to exercise caution when completing test procedures or while inspecting unit operation may result in injury or death from electrical shock, air movement or rotating parts.

[] Measure the motor voltage and amperage on all phases to ensure proper operation. The readings should fall within the range given on the motor nameplate.

[] Check all interlocks to be sure that connected components, such as the supply and exhaust fans, disengage spontaneously.

[] Check fan operation at high speed. It may be necessary to block off the fan discharge to avoid overloading the motor.

Note: When replacing a fan wheel, fan shaft or fan bearing, always rebalance the entire assembly. Refer to CLCH-SB-13 for the maximum vibration limits allowed. Never reuse damaged rotating parts.

Trouble Analysis

Use the tables in this section to assist in identifying the cause or causes of a malfunction in Penthouse Climate Changer operation. The column header RECOMMENDED ACTION will suggest repair procedures.

Note: These tables are intended as a diagnostic aid only. For detailed repair procedures, contact your local Trane Service Company.

WARNING: Disconnect electrical power source and allow all rotating equipment to stop completely before inspecting or servicing the unit. Failure to do so may result in personal injury or death from electrical shock or moving parts.

Symptom	Probable Cause	Recommended Action
Bearing is excessively hot	First start after relubrication. (grease distribution)	Allow machine to cool down and restart.
	Over-lubrication.	Clean surface of grease and purge.
	No lubricant.	Apply lubricant. Check bearings for damage.
	Excessive load or speed.	Replace with a larger bearing.
	Misaligned bearing.	Correct alignment. Check shaft level.
Motor fails to start	Blown fuse or open circuit breaker	Replace fuse or reset circuit breaker.
	Overload trip.	Check and reset overload.
	Improper wiring or connections.	Check wiring with diagram supplied on unit.
	Improper current supply.	Compare actual supply power with motor nameplate recommendations. Contact power company for adjustments.
	Mechanical failure.	Check that motor and drive rotate freely. Check bearing lubricant.
Motor stalls	Open phase.	Check line for an open phase.
	Overloaded motor.	Reduce load or replace with larger motor.
	Low line voltage.	Check across AC line. Correct voltage if possible.
	Overloaded motor	Reduce load or replace with a larger motor.

Symptom	Probable Cause	Recommended Action
Motor runs and then dies down	Partial loss of line voltage.	Check for loose connections. Determine adwquacy of main power supply.
	Stator shorts when motor warms up.	Replace stator.
Motor does not come up to speed.	Low voltage at motor terminals.	Check across AC line and correct voltage loss if possible.
	Line wiring to motor too small.	Replace with larger sized wiring.
	60 cycle motor connected to 50 cycle supply.	Replace with a 50 cycle motor.
Motor overheats	Overloaded motor.	Reduce load or replace with a larger motor.
	Motor fan is clogged with dirt preventing proper ventilation.	Remove fan cover, clean fan and replace cover.
Excessive motor noise.	Motor mounting bolts loose.	Tighten motor mounting bolts.
	Rigid coupling connections.	Replace with flexible connections.
	Worn motor bearings.	Replace bearings and seals.
	Fan rubbing on fan cover.	Remove interference in motor fan housing.
Rapid motor bearing wear	Excessive overhung load due to overtensioned drive.	Check belt tension and overhung load.
	Excessive overhung load due to a small diameter motor sheave.	Replace sheave with larger one.
Loose fan belt	Motor is poorly positioned.	Adjust tension.
	Worn or damaged belt.	Replace belt or belt set. Check sheave alignment.
	Worn sheaves.	Replace sheaves.

Symptom	Probable Cause	Recommended Action
Short belt life	Worn sheaves.	Replace sheaves.
	Misaligned belt.	Realign drive with MVP sheave set at mean pitch diameter.
	Grease or oil on belts.	Check for leaky bearings. Clean belts and sheaves.
	Belt slipping.	Adjust tension.
	Belts rubbing.	Remove obstruction or realign drive for clearance.
	High ambient temperature.	Provide ventilation. Shield belts. Use gripnotch belts.
Low coil capacity (Chilled Water)	Air is bypassing coil.	Prevent bypass with blockoffs.
	Coil tubes are blocked.	Clean and unblock tubes.
	Incorrect airflow.	Check fan operating conditions.
	Incorrect gpm	Check water pumps, valves and lines for obstructions.
	Incorrect water temperature	Provide proper water temperature.
Low coil capacity (Refrigerant)	Air is bypassing coil.	Prevent bypass with blockoffs.
	Coil tubes are blocked.	Clean and unblock tubes.
	Incorrect airflow.	Check fan operating conditions.
	Expansion valve not operating.	Check sensing bulb location and TEV operation.
	Poor refrigerant distribution.	Check for blockage in distributor and tubes.

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