

° Cooline®
AIR CONDITIONERS

from  **Zamil**

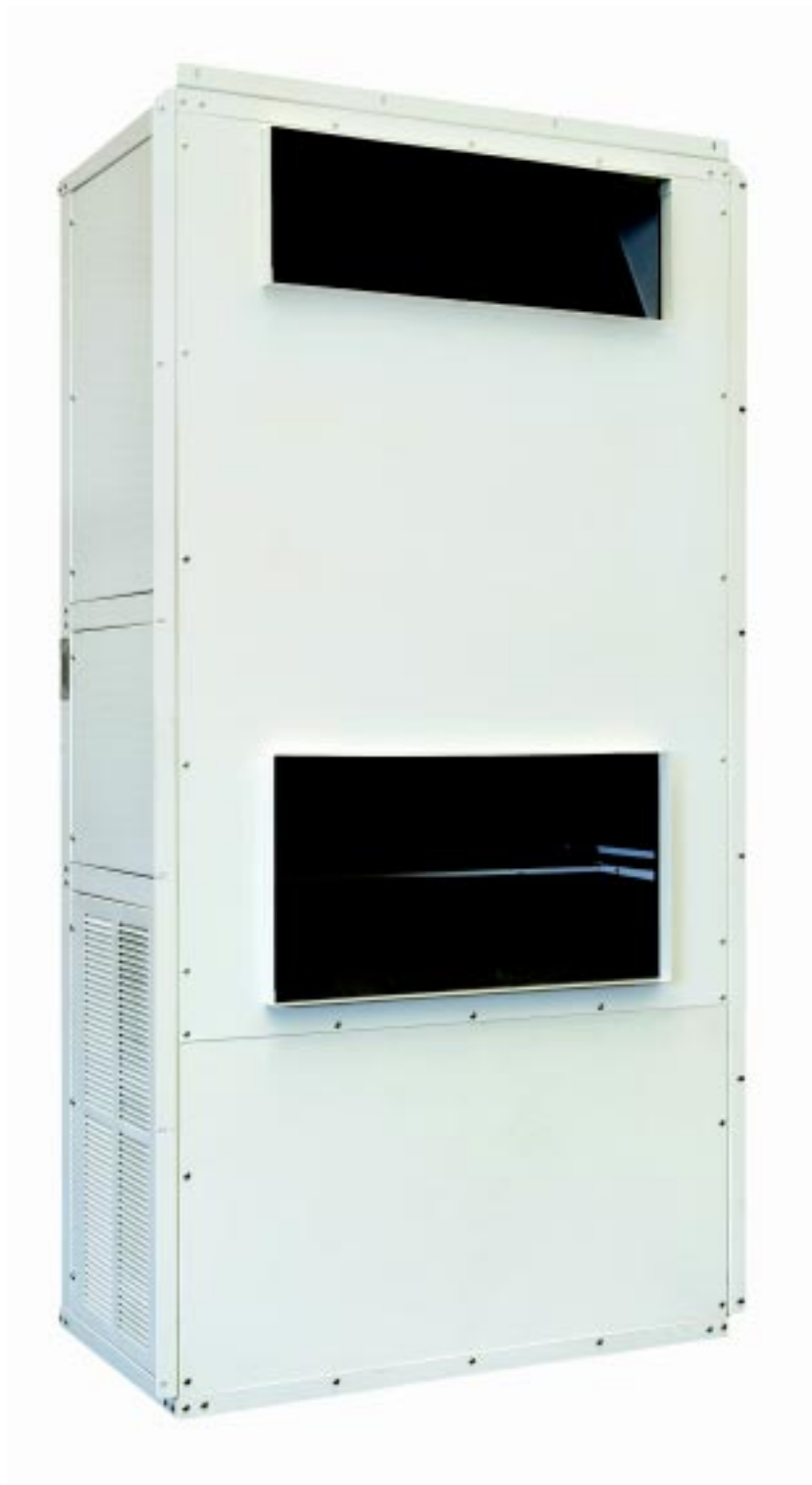


Vertical Packaged Units

PF Series
PF036 thru PF060
3 TR thru 5 TR
10 kW thru 17.5 kW



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A member of Zamil Industrial Investment Company (a joint stock company) C.R. 2050004215



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*CONTINUING RESEARCH RESULTS IN STEADY IMPROVEMENTS.
THEREFORE, THESE SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.*

MODEL DECODING

1 & 2 BASIC	3, 4 & 5 NOMINAL COOLING CAPACITY (MBH)	6 ELECTRICAL SUPPLY (V-Ph-Hz)	7 REFRIGERATION CIRCUIT	8 COMPRESSOR TYPE	9 BLOWER MOTOR	10 DRIVE OPTIONS	11 HEATER	12 COND. MOTOR	13 EVAPORATOR COIL	14 CONDENSER COIL	15 FILTER	16 UNIT ACCESSORIES	17 APPLICATIONS	18 OPTIONS	19 DIS- CHARGE (SUPPLY AIR)	20 ACCESS
PF COOLINE VERTICAL PACKAGED UNIT	036 048 060	L : 380/415-3-50 (4 WIRE)	S : SINGLE	S : SCROLL HERMETIC R : RECIPRO- CATING HERMETIC	V : STD. MOTOR	N : DIRECT DRIVE	N : NO HEATER	N : STD.	A : ALUMINUM FIN B : COATED ALUMINUM FIN C : COPPER FIN	A : ALUMINUM FIN B : COATED ALUMINUM FIN C : COPPER FIN	N : NO FILTER G : 2" PLEATED FILTER	N : STD. UNIT	N : STANDARD APPLICATION C : COMMUNICA- TION SHELTER APPLICATION	N : STD.	F : FRONT	R : RH L : LH

UNIT FEATURES

A. GENERAL

The wall mounted vertical packaged units from COOLINE are designed for optimum cooling, convenience and dependability, which make them suitable for the most demanding applications such as telecom industry, beside general air-conditioning applications. These self contained units have the sheet metal panels designed to provide service access for compressors and electrical controls even when two units are mounted side by side with minimal space in between. Filters and controls are accessible from the back of the unit.

B. UNIT ENCLOSURE

Panels are of heavy gauge, G-90 galvanized steel sheet with removable access panels, completely weatherized for outdoor installation and properly reinforced & brazed. Panels and access doors will provide easy inspection and access to all internal parts. Enclosures are provided with adequately reinforced points of support for wall mounting application. Steel sheet panels are zinc-coated and galvanized by the hot dip process of lockforming quality conforming to ASTM A 653 commercial weight G-90, followed by baked-on electrostatic polyester dry powder coat, and capable of withstanding 1500 hours in salt spray test.

C. COMPRESSOR

Compressors are fully hermetic type, provided with all standard controls necessary for safe operation. These are equipped with internal motor protector, factory-installed crankcase heater and rubber vibration isolators for quiet and efficient operation. **Scroll compressors** are installed as standard on these units. Reciprocating hermetic compressors can be available as an option.

D. AIR COOLED CONDENSING SECTION

1. The air-cooled condensing section is enclosed within the unit housing and consists of condenser coil, fan, electric motor and inherently protected compressor. All condenser coils are of the enhanced fin-and-tube type and mechanically bonded to aluminum fins. **As an option, corrugated copper fins or enhanced coated aluminum fins may be provided.** Tube support sheets are galvanized steel, formed to provide structural strength.
2. Fans are propeller type, direct drive, with side air discharge through the condenser coil.
3. Motors are totally enclosed air-over type. Inherent thermal protection is automatic reset type.

E. EVAPORATOR COIL SECTION

1. All cooling are of the enhanced fin and tube type, constructed of enhanced copper tubes and mechanically bonded to aluminum fins. **As an option, corrugated copper fins or enhanced coated aluminum fins may be provided.** Tube support sheets are galvanized steel, formed to provide structural strength. The refrigerant metering device is a thermostatic expansion valve. A coated galvanized steel condensate drain pan is provided.
2. Insulation: Insulation is supplied in adequate thickness (1/2") and density to prevent condensation from forming on the unit casing. Insulation meets the requirements of NFPA 90A and is protected against deterioration and erosion from air panels.

F. EVAPORATOR BLOWER ASSEMBLY.

The direct drive evaporator blowers are of the centrifugal forward curved design. The twin blower wheels are constructed of steel, and they are statically and dynamically balanced for quiet and smooth performance. Motors are permanent split capacitor type with tapped speed windings to suit various air delivery requirements corresponding to each model. The bearings are of sleeve type.

G. FILTERS

Two inch Pleated high efficiency filters are provided as standard.

H. ELECTRICAL CONTROLS

1. For normal air-conditioning applications

This packaged unit control consists of **Systemizer™** Microprocessor Based Electronic Control Board, incorporating the following features:

- (a) **Compressor Lockout.** If any of the unit's safety controls trips due to abnormal conditions the Electronic Controls lockout the compressor, preventing restart, unless attended by service personnel. The unit can be re-started only by reset of thermostat after ensuring safe system conditions.
- (b) **Anti recycle timer** for compressor safety in case of accidental manual reset or immediate recycling of thermostat due to load demand.
- (c) Indicator LED lights:
 - Green** – Power ON.
 - Red** – Fault indication.
- (d) Typical single stage thermostats to be ordered (part number 800-646-91).

2. For communication shelter applications (To be ordered separately)

The set of two PF units (when used for communication shelter applications) is provided with a dedicated control with the following features:

- (a) **Auto-reset High Pressure Switch:** Built in lockout circuit with auto reset. Provides protection to the compressor.
- (b) **Auto reset Low Pressure Switch:** Built in lockout circuit and low-pressure timed bypass circuit.
- (c) Microprocessor based electronic board provides the compressor lockout, if any of the unit safety controls trip due to abnormal conditions.
- (d) **Auto lead/lag controller:** The Auto lead/lag controller is a complete control package designed to operate a fully or partially redundant air conditioning system having two units paired together. It consists of a thermostat and solid state timer with selectable changeover intervals (typical 7 days). This control unit is factory-wired, tested and mounted in separate enclosure for quick installation inside the air-conditioned space.
- (e) **Low ambient control:** By using automatic condenser fan speed controls.

I. OUTSIDE AIR OPTIONS

Fresh air Inlet with manual damper can be provided as an option for adding upto 25% fresh air as required.

GENERAL DATA

MODEL NUMBER		PF036	PF048	PF060
NOMINAL CAPACITY (TONS)		3	4	5
COMPRESSOR	Power supply (V-Ph-Hz)	380/415-3-50		
	Type	Scroll		
	Quantity	1	1	1
	Oil (oz)	42	66	60
	Refrigerant	R-22		
	Operating Charge (oz)	115	148	159
CONDENSER FAN	Power supply (V-Ph-Hz)	220/240-1-50		
	Type	Propeller		
	Quantity – Diameter (inch)	1 – 18	1 – 24	1 – 24
	Nominal CFM	1900	2750	2500
	Motor HP – RPM	1/4 – 900	1/3 – 950	1/3 – 950
CONDENSER COIL	Type	Corrugated Fin and Tube		
	Tube dia. - Rows - Fins per inch	3/8-3-16	3/8-3-16	3/8-4-16
	Total face area (Sq. ft.)	6.4	8	8
EVAPORATOR BLOWER	Type	Centrifugal		
	Size (inch)	7 x 9.5 (2 Nos.)	8 x 8.5 (2 Nos.)	8 x 8.5 (2 Nos.)
	Drive type	Direct drive		
	Nominal airflow, CFM	1200	1600	1800
	Motor watts	450	600	650
EVAPORATOR COIL	Type	Corrugated Fin and Tube		
	Tube dia. - Rows - Fins per inch	3/8-4-14	3/8-4-14	3/8-4-14
	Total face area (Sq. ft.)	3.4	5	5
RETURN AIR FILTERS	Quantity	1	1	1
	Size (inch)	30 x 22 x 2	36 x 22 x 2	36 x 22 x 2
WEIGHT	Kgs.	190	255	267

COOLING CAPACITIES

Model No.: PF036, PF048 & PF060

CONDENSER ENTERING AIR TEMP. (°F)		PF036			PF048			PF060		
		EVAPORATOR AIRFLOW, CFM/DR								
		1200/0.038			1600/0.059			1800/0.067		
		EVAPORATOR ENTERING AIR, WBE (°F)								
		62	67	72	62	67	72	62	67	72
85	TC	33.5	36.1	39.2	46.9	52.1	57.1	57.3	62.3	67.7
	SC	30.1	27.2	25.9	45.6	37.8	29.7	53.5	44.1	34.5
	kW	3.54	3.95	4.12	4.94	5.12	5.32	5.64	5.89	6.12
95	TC	32.3	34.8	37.0	44.8	49.0	54.1	54.6	60.0	64.6
	SC	29.0	26.4	25.3	43.6	36.8	28.8	52.0	43.0	33.5
	kW	4.1	4.18	4.36	5.17	5.38	5.61	6.01	6.29	6.54
105	TC	32.0	33.2	35.3	42.2	46.5	51.1	51.9	56.4	61.4
	SC	27.1	25.5	24.2	41.1	35.8	27.8	49.4	42.0	32.5
	kW	4.14	4.56	4.6	5.40	5.64	5.87	6.42	6.73	7.02
115	TC	30.8	32.8	33.7	39.6	43.7	48.1	49.1	53.4	58.1
	SC	26.5	24.3	23.7	38.5	34.8	26.9	46.8	40.9	31.5
	kW	4.65	5.1	5.19	5.61	5.86	6.13	6.87	7.22	7.55
125	TC	28.9	29.0	31.8	36.9	40.7	45.0	46.2	50.2	54.7
	SC	24.2	22.7	20.7	35.8	33.7	25.9	44.0	39.8	30.5
	kW	5.39	5.66	5.49	5.80	6.08	6.35	7.36	7.76	8.14

TC – Total Capacity (1000 Btuh) Gross kW – Total unit power input DBE – Dry Bulb Temp. (°F) of Air Entering Coil DBL – Dry Bulb Temp. (°F) of Air Leaving Coil
 SC – Sensible Heat Capacity (1000 Btuh) Gross DR – Wet Bulb depression ratio WBE – Wet Bulb Temp. (°F) of Air Entering Coil WBL – Wet Bulb Temp. (°F) of Air Leaving Coil

- NOTES:** 1. Direct interpolation is permissible – Do not extrapolate.
 2. Capacities above are based on DBE = 80°F. For higher or lower DBE, add following correction factor to sensible capacity = 1.08 x CFM (1 – DR) (DBE – 80).
 3. To calculate leaving conditions, follow this procedure: DBL = DBE – (Sensible Capacity (Btuh) / 1.08 x CFM); WBL = DBL – [DR (DBE – WBE)].
 4. Above data is based on scroll compressors. For hermetic reciprocating compressors, multiply capacity by 0.97 and power input by 1.06.

ELECTRICAL DATA

MODEL No.: PF036

POWER SUPPLY (V-Ph-Hz)	VOLTAGE RANGE		COMPRESSOR		* FAN MOTOR FLA	* BLOWER MOTOR FLA	MCA	MOCP
	MIN.	MAX.	RLA	LRA				
380/415-3-50	342	462	7.1	46	1.9	3.6	14.4	20

LEGEND:

- FLA – Full Load Amps
 RLA – Rated Load Amps
 LRA – Locked Rotor Amps
 MOCP – Maximum Over Current Protection
 MCA – Minimum Circuit Amps

* Single phase motors

MODEL No.: PF048

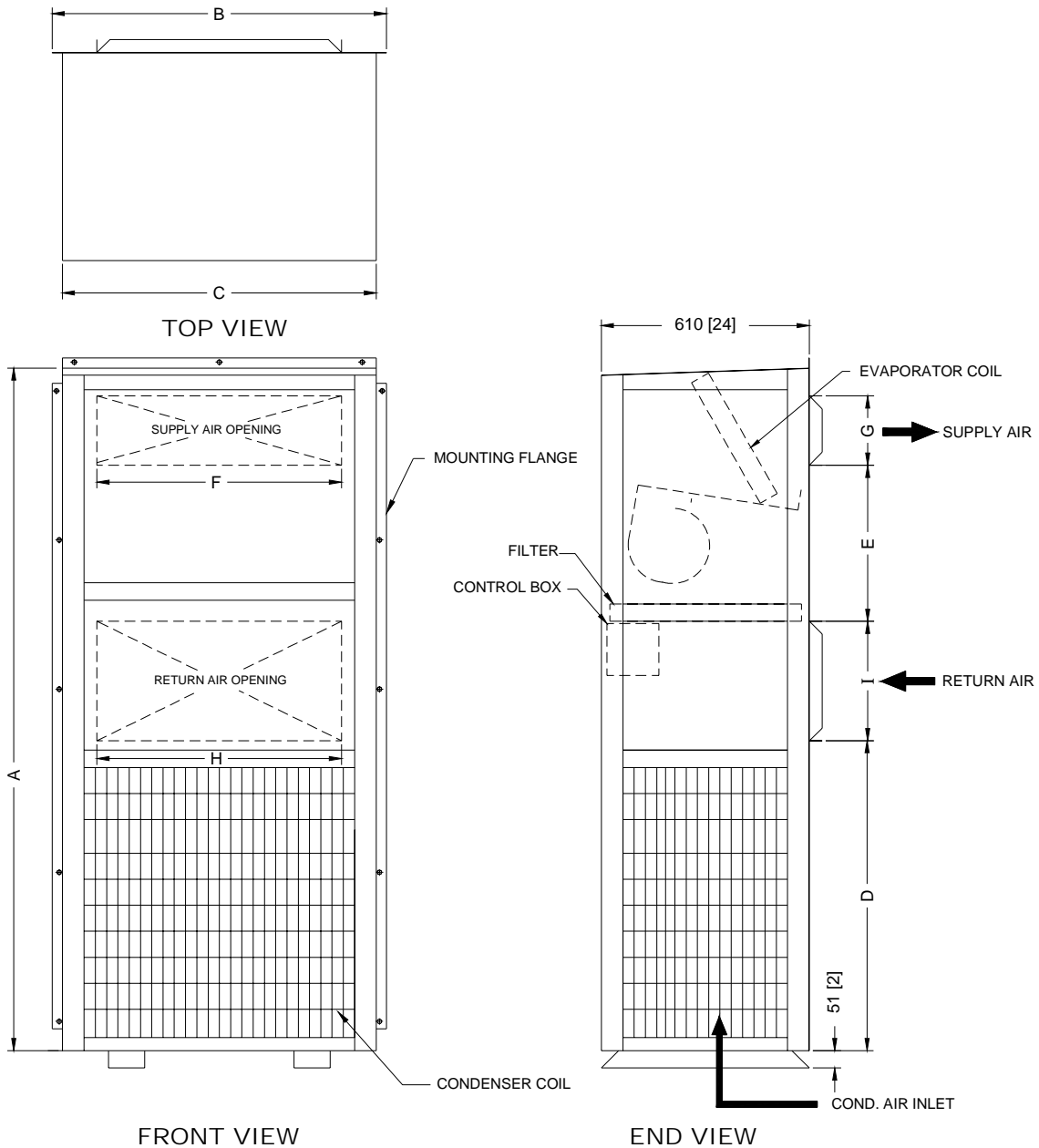
POWER SUPPLY (V-Ph-Hz)	VOLTAGE RANGE		COMPRESSOR		* FAN MOTOR FLA	* BLOWER MOTOR FLA	MCA	MOCP
	MIN.	MAX.	RLA	LRA				
380/415-3-50	342	462	10	65.5	2.1	4.1	18.7	25

MODEL No.: PF060

POWER SUPPLY (V-Ph-Hz)	VOLTAGE RANGE		COMPRESSOR		* FAN MOTOR FLA	* BLOWER MOTOR FLA	MCA	MOCP
	MIN.	MAX.	RLA	LRA				
380/415-3-50	342	462	10	74	2.1	4.1	18.7	25

DIMENSIONS

PF036 - PF060



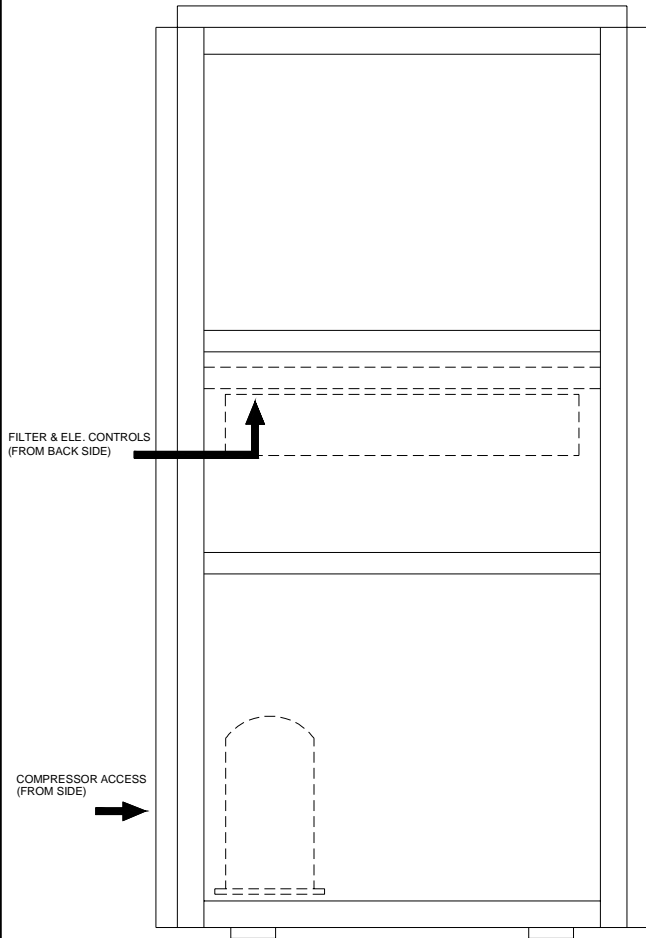
MODEL NUMBER	DIMENSIONS								
	A	B	C	D	E	F	G	H	I
PF036	2000 (78.7)	980 (38.6)	920 (36.2)	908 (35.8)	457 (18)	762 (30)	203 (8)	762 (30)	350 (13.8)
PF048	2134 (84)	1143 (45)	1067 (42)	662 (26.1)	762 (30)	767 (30.2)	251 (9.9)	759 (29.9)	403 (15.9)
PF060	2134 (84)	1143 (45)	1067 (42)	662 (26.1)	762 (30)	767 (30.2)	251 (9.9)	759 (29.9)	403 (15.9)

NOTES:

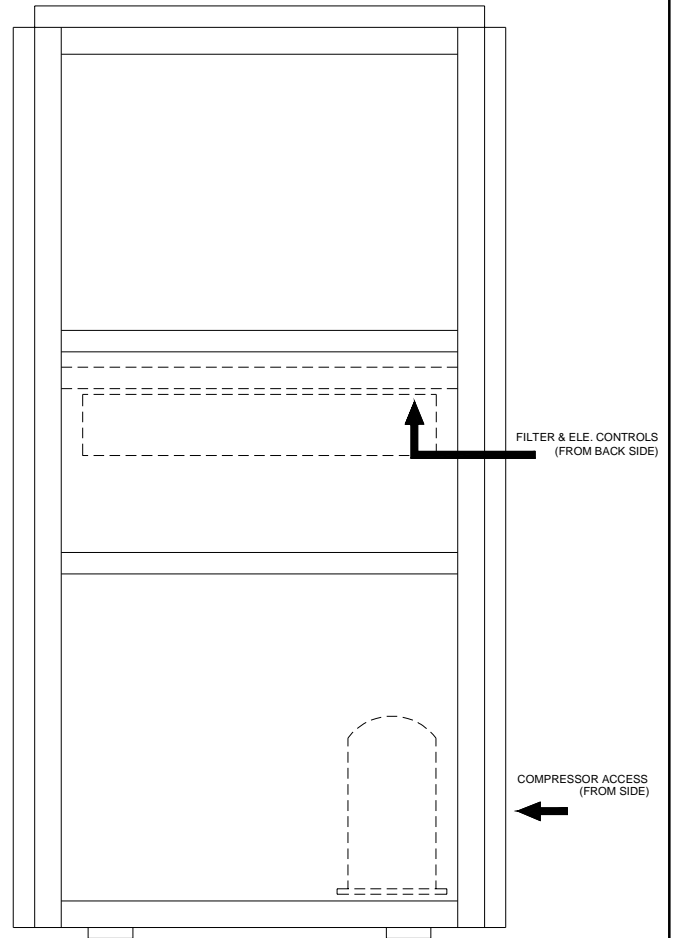
1. All dimensions are in millimeters, (dimensions in brackets are in inches).
2. Service clearance should be 915 mm (3 feet) on all sides (other than the front supply & return air opening side).

ACCESS DETAILS

PF036 - PF060



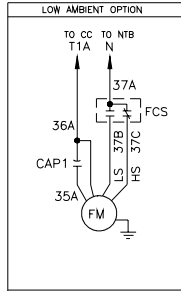
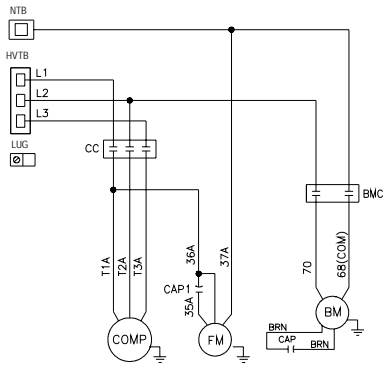
LEFT SIDE ACCESS



RIGHT SIDE ACCESS

TYPICAL SCHEMATIC WIRING DIAGRAM

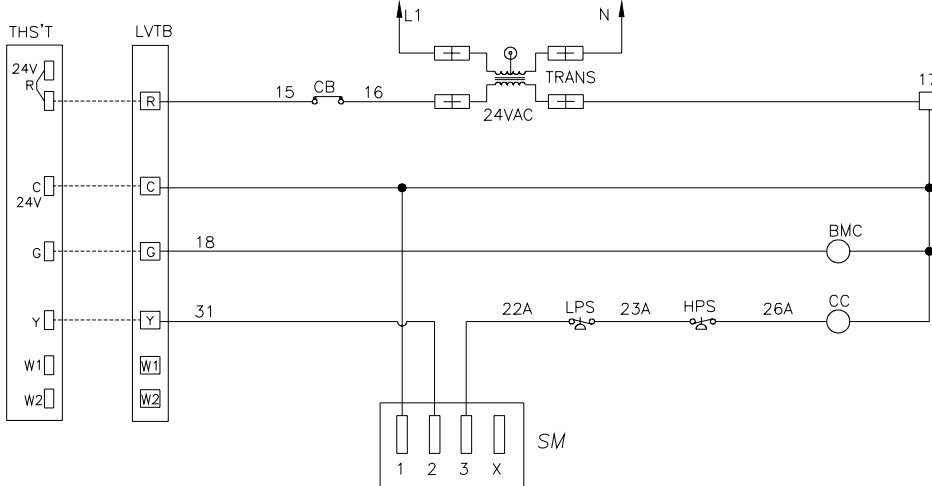
(For normal air-conditioning applications)



SET POINTS		
NAME	OPEN (PSIG)	CLOSE (PSIG)
LPS	25 ± 5	50 ± 5
HPS	450 ± 10	360 ± 15
FCS	190 ± 15	290 ± 10

CRANKCASE HEATER CONNECTION

LEGEND	
BM	BLOWER MOTOR
BMC	BLOWER MOTOR CONTACTOR
CAP	CAPACITOR
CC	COMPRESSOR CONTACTOR
CB	CIRCUIT BREAKER
C. HTR	CRANKCASE HEATER
COMP/C	COMPRESSOR
FM	FAN MOTOR (CONDENSER)
FCS	FAN CYCLING SWITCH
HPS	HIGH PRESSURE SWITCH
HVTB	HIGH VOLTAGE TERMINAL BLOCK
L1	LINE 1
L2	LINE 2
L3	LINE 3
LPS	LOW PRESSURE SWITCH
LUG	LUG GROUND
LVTB	LOW VOLTAGE TERMINAL BLOCK
NTB	NEUTRAL TERMINAL BLOCK
SM	SYSTEMIZER
TRANS	TRANSFORMER
---	FIELD WIRING
+	DISCONNECT TAB - 1/4"
⊙	SPLICE-CLOSED END
□	TERMINAL BLOCK OR TERMINATION POINT



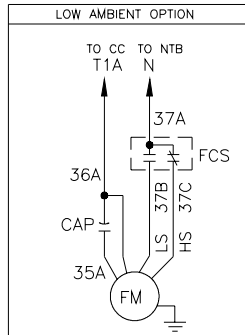
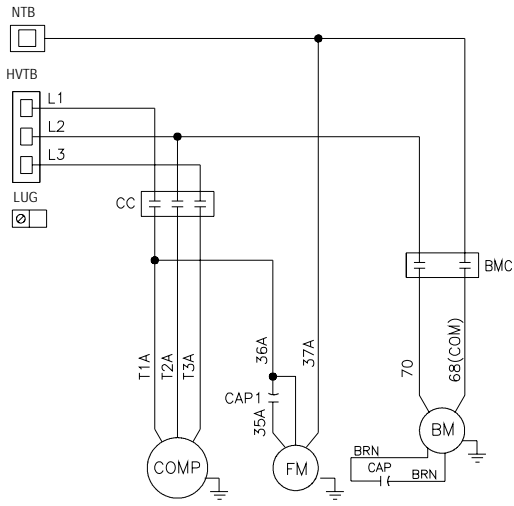
NOTES

- POWER SUPPLY, 380/415V-3Ph-50Hz. THERMOSTAT CONTROL VOLTAGE - 24VAC.
- ANY WIRE REPLACEMENT SHOULD BE OF THE 90°C OR ITS EQUIVALENT. USE COPPER CONDUCTOR WIRES ONLY.
- POWER MUST BE SUPPLIED TO CRANKCASE HEATER FOR MINIMUM OF 12 HOURS PRIOR TO SYSTEM START UP. IF POWER IS OFF 6 HOURS OR MORE, CRANKCASE HEATER MUST BE ON FOR 12 HOURS BEFORE OPERATING THE SYSTEM. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN COMPRESSOR DAMAGE.
- USE ELECTRONIC THERMOSTAT ONLY. A 3 TO 4 MINUTE (APPROX.) BUILT-IN SHORT CYCLE PROTECTION FOR COMPRESSOR IS AVAILABLE IN COOLINE ELECTRONIC THERMOSTAT.
- FUSED DISCONNECT SWITCH OR CIRCUIT BREAKER TO BE PROVIDED BY CONSUMER WITH RATING AS RECOMMENDED BY COOLINE.
- COMPRESSOR IS PROVIDED WITH INTERNAL OVERLOAD.
- USE DISCONNECT TAB OR SPLICE ONLY WHERE EVER REQUIRED FOR EXTENSION OF ORIGINAL WIRE.
- FOR ANY SAFETY TRIP OF COMP. (FAULT), VOLTAGE ACROSS TERMINAL 1 & X OF SYSTEMIZER IS 24 VAC. ALSO COMPRESSOR LOCKOUT LIGHT IS ON.
- FREE END OF MOTOR LEADS TO BE CAPPED WITH CRIMPABLE WIRE NUT.
- SM HAS 3 TO 5 MINUTE PROVISION FOR COMPRESSOR ANTI-RECYCLING TIMER.

MODEL	PF036	PF048	PF060
FACTORY INSTALLED BM SPEED (WIRE COLOR)	ORN	BLU	BLK

TYPICAL SCHEMATIC WIRING DIAGRAM

(For communication shelter applications)



SET POINTS

NAME	OPEN (PSIG)	CLOSE (PSIG)
LPS	25 ± 5	50 ± 5
HPS	450 ± 10	360 ± 15
FCS	190 ± 15	290 ± 10

CRANKCASE HEATER CONNECTION

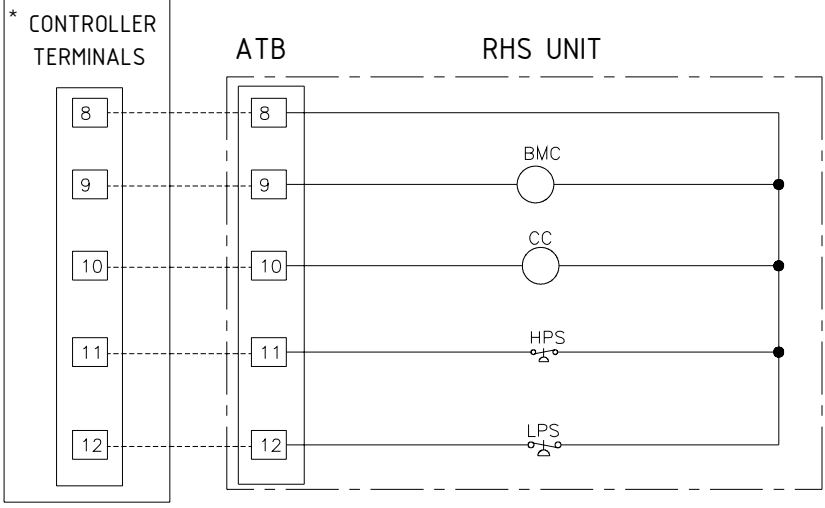
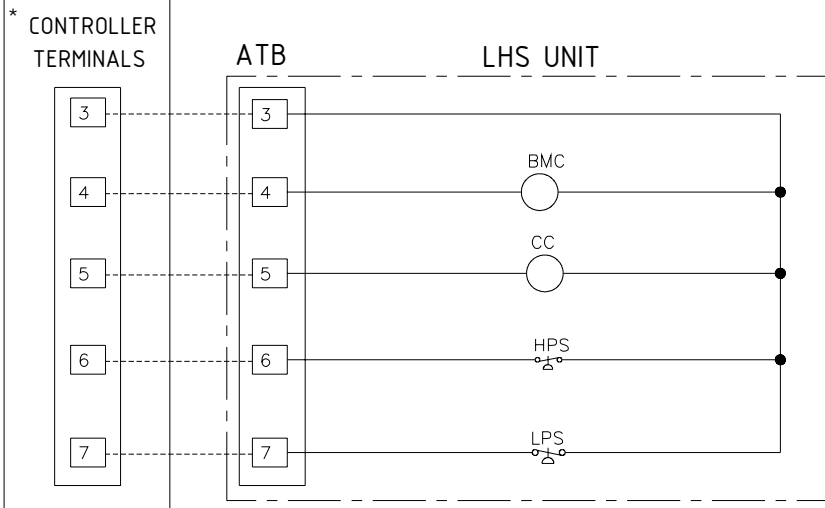
LEGEND	
ATB	AUXILIARY TERMINAL BLOCK
BM	BLOWER MOTOR
BMC	BLOWER MOTOR CONTACTOR
CAP	CAPACITOR
CC	COMPRESSOR CONTACTOR
C. HTR	CRANKCASE HEATER
COMP/C	COMPRESSOR
FM	FAN MOTOR (CONDENSER)
FCS	FAN CYCLING SWITCH
HPS	HIGH PRESSURE SWITCH
HVTB	HIGH VOLTAGE TERMINAL BLOCK
L1	LINE 1
L2	LINE 2
L3	LINE 3
LPS	LOW PRESSURE SWITCH
LUG	LUG GROUND
NTB	NEUTRAL TERMINAL BLOCK
- - -	FIELD WIRING
+	DISCONNECT TAB - 1/4"
⊙	SPLICE-CLOSED END
□	TERMINAL BLOCK OR TERMINATION POINT

NOTES

- POWER SUPPLY, 380/415V-3Ph-50Hz. THERMOSTAT CONTROL VOLTAGE - 24VAC.
- ANY WIRE REPLACEMENT SHOULD BE OF THE 90°C OR ITS EQUIVALENT. USE COPPER CONDUCTOR WIRES ONLY.
- POWER MUST BE SUPPLIED TO CRANKCASE HEATER FOR MINIMUM OF 12 HOURS PRIOR TO SYSTEM START UP. IF POWER IS OFF 6 HOURS OR MORE, CRANKCASE HEATER MUST BE ON FOR 12 HOURS BEFORE OPERATING THE SYSTEM.
FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN COMPRESSOR DAMAGE.
- FUSED DISCONNECT SWITCH OR CIRCUIT BREAKER TO BE PROVIDED BY CONSUMER WITH RATING AS RECOMMENDED BY COOLINE.
- COMPRESSOR IS PROVIDED WITH INTERNAL OVERLOAD.
- USE DISCONNECT TAB OR SPLICE ONLY WHERE EVER REQUIRED FOR EXTENSION OF ORIGINAL WIRE.
- FREE END OF MOTOR LEADS TO BE CAPPED WITH CRIMPABLE WIRE NUT.

MODEL	PF036	PF048	PF060
FACTORY INSTALLED BM SPEED (WIRE COLOR)	ORN	BLU	BLK

* CONTROLLER SETUP IS FOR 2 UNITS.



PARTS LIST

MODEL NUMBER	PF036L	PF048L	PF060L
COMPRESSOR	800-674-75	800-674-15	800-674-25
CONDENSER FAN MOTOR	800-545-97	800-547-40	800-547-40
FAN MOTOR CAPACITOR	800-353-15	800-353-15	800-353-15
BLOWER MOTOR	800-547-52	800-555-29	800-555-29
BLOWER (SCROLL+WHEEL)	800-711-52*	800-089-63	800-089-63
CONDENSER FAN	800-941-41	800-225-01	800-225-01
CONDENSER FAN CYCLING SWITCH	800-557-31	800-557-31	800-557-31
CONTACTOR COMPRESSOR	800-095-00	800-095-00	800-095-00
CONTACTOR BLOWER MOTOR	800-736-01	800-736-01	800-736-01
EXPANSION VALVE	800-184-01	800-183-01	800-181-00
DISTRIBUTOR	800-198-01	800-198-02	800-198-02
LOW PRESSURE CONTROL	800-557-00	800-557-00	800-557-00
HIGH PRESSURE CONTROL	800-558-00	800-558-00	800-558-00
CONDENSER MOTOR MOUNT	-	800-154-15	800-154-15
FILTER DRIER	800-531-08	800-531-08	800-531-08
RETURN AIR PLEATED FILTER	800-240-58	800-240-51	800-240-51
SUPPLY AIR GRILLE	800-622-60	800-622-55	800-622-55
RETURN AIR GRILLE	800-622-87	800-622-83	800-622-83

* Wheel only.



PK-C06-07/03



from Zamil



OEM
Original
Equipment
Manufacturers

In 1989, Zamil Air Conditioners introduced its international brand - Cooline, to the expanding world market. The brand gained rapid recognition and success and became Cooline Air Conditioners, a separate business unit, just a few years later. Today, Cooline supplies air conditioners to more than 55 countries worldwide, with major markets in GCC, The Middle East, Europe, Australia, USA and North Africa.

In addition to providing consumer products such as Room Air Conditioners (RAC and Mini Splits), Cooline Air Conditioners provides an array of Central Air Conditioners for residential, commercial and industrial use, including: concealed units up to 5 tons, ducted splits up to 30 tons, packaged units up to 70 tons, single and double skin air handling unit up to 130,000 CFM and water chillers up to 500 tons cooling capacity.

The manufacturer of Cooline Air Conditioners, Zamil, is the first company from the Middle East to receive Eurovent, a capacity/performance certification that has become mandatory in Europe and is fast becoming a standard requirement in all regions. With the addition of the Air Conditioning Technology Center (ATC), a facility that is ITS (Intertek Testing Services) built and certified, Cooline Air Conditioners is the only Middle East brand capable of guaranteeing product performance in compliance with local and international standards. It's no surprise that in 2003, Cooline received the Best GCC brand of the Decade Award.

