DUNNAIR
(Aust) Pty Ltd

ESTABLISHED 1961

>> R410A Packaged Air Conditioners

Ducted Water Cooled

Horizontal and Vertical Models

>> www.dunnair.com.au

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>> General

The DUNNAIR WPR Series represents a range of ducted, water cooled, packaged air conditioners designed to provide year round comfort to room occupiers.

The WPR units are ideal for multi-unit installations such as high-rise offices or hotel buildings, where the flexibility of individual zone control is required.

Compact and reliable, these units can be installed above ceilings, or in other concealed spaces, saving valuable floor space and providing conditioned air direct to required locations.

WPR Series units are designed to be used with simple duct layouts. To take maximum advantage of this feature, units should be located as close to the space to be air conditioned as acoustic criteria allows. Multiple small units, utilizing minimal duct lengths, prove more economical than a single large central ducted unit.

Designed also to suit different climates, the WPR units are available in 3 versions:

1. Cooling only
2. Cooling only with Electric Heating
3. Reverse cycle.

In office buildings, a WPR unit system can provide the ideal off-peak system for occupied areas when the main system is not running, e.g. night time, weekends, holidays.

WPR unit systems can be designed to provide owner occupiers with individual control, thus avoiding large central plant room areas, e.g. in apartment buildings.

WPR Units have electromechanical 24 volts control wiring.

>> Features

Refrigerants

Each unit is factory charged with refrigerant R410A, which is deemed to have zero Ozone depletion potential.

Air Coil

Die formed plate type aluminium fins mechanically bonded to high efficiency inner grooved copper tubes.

Water Coil

Copper tube in tube type with refrigerant flow in the inside tube. Designed to a maximum water pressure of 1500kPa (215psi).

Fans

Forward curved double inlet fans in involute scrolls and fitted directly to a resiliently mounted motor. Speed tappings allow airflow selection to match external duct pressure.

Construction

Galvanised steel construction, closed cell foam lined compressor and fan compartments, with an insulated and powder coated drain tray for complete moisture protection. The drain tray is easily removed for inspection and cleaning.

Air Filter

An optional filter integrated return air spigot is available on all models. The filter is a washable polypropylene net media. Care should be taken, when locating each unit, that enough space is provided to enable the one-piece filter to be withdrawn to its full length from either side of the unit.

Compressor

These units use hermetically sealed high efficiency compressors. Models WPR4–9.5 have rotary compressors, WPR12–38 have scroll compressors.

Insulation

WPR units are well insulated to minimize condensation and attenuate noise.

>> Optional Features

As an active market player in the commercial air conditioning industry, we understand that every project is unique. Standard manufactured units may not meet the requirements of your system design. Dunnair always welcome enquiries for special air conditioning equipment.

Available options are listed below:

- Stainless steel drip tray
- 50mm thick insulation
- Electric heater fitted to cooling only models
- VSD on supply air fan
- Higher ESP (external static pressure) up to 500pa
- 2 stages or more depending on size of the unit
- Belt drive instead of direct drive fan
- All copper coils
- BMS output/input connection.

Dunnair specialises in manufacturing equipments to suit the application.

>> Unit Protection

Units are fitted with a high pressure lockout protection. These protect the unit in the event of either water flow failure in cooling mode or fan failure in heating mode. Sensors protect against low air coil temperature and loss of refrigerant. Units include an anti-rapid cycle timer for compressor on/off protection.

WPR reverse cycle units also have a low refrigerant temperature safety thermostat to protect against icing up of the water within the unit's condenser on heating mode and a pump flow verification relay to protect individual units from a loss of water flow.

Convenient lockout contactor resetting is simply achieved by turning the power to the unit off and then on again, avoiding the need to gain access to each unit if the cause is failure of central water supply. Lockout protection will also reset when the thermostat switches on, or is switched to the dead zone.

Each compressor has internal overload protection.

The WPR reverse cycle version has a low refrigerant temperature limit switch and a reverse cycle valve.

WPR models supplied with electric heater include both auto 65°C and 80°C high temperature safety thermostats.

>> Electric Heating

(Factory Fitted Option)

Electric element/s have spirally wound stainless steel fins to give increased area and low surface temperature.

They are totally enclosed within the unit and are supplied with safety cutouts required to meet AS/NZS 3350.2.40 1997. An optional fan run-on timer for rapid heat dissipation is available.

>> Application Considerations

Acoustics

Shorter duct applications will require greater attention to acoustic criteria (refer below).

Mounting

It is recommended that WPR units be mounted using the spring mounting system, supplied as an optional extra. This system minimizes transfer of vibration into the building structure.

Positioning

When determining installation location, consideration should be given to each unit to facilitate future servicing and maintenance, e.g. room for removal of filter.

Condensate Drain

The condensate drain should have a slope of at least 1 in 50 and must not be piped to a level above the unit drain tray.

An optional condensate lift-pump is available to remove condensate from the unit in tight installations where a well sloped drain line is not immediately feasible.

Air Filters

Ideally, air filters should be located in the ceiling return air grille/s and not on the unit, thereby reducing resistance and improving acess. The total filter area should be twice the cross sectional area of the WPR return air spigot.

Circuit Balancing

It is recommended that a circuit balancing valve be fitted to both WPR*C and WPR*H versions to maintain water flow at a constant rate. The nominal (minimum) water flow rates are given in the specifications table.

Water Supply & Return

Each WPR unit alone (excluding hoses) will withstand a maximum water pressure of 1500kPa (215psi).

Poor quality water supply must be pre-filtered. It is essential to maintain adequate water treatment, particularly where open cooling towers are used.

Note: *WPR*H units require a minimum water supply temperature of 17°C.*

>> WPR Series Vertical Type Installation Considerations

General

The WPR Unit must be installed in accordance with all states and local safety codes.

Configurations

The WPR are water cooled packaged air conditioning units, designed primarily to be installed within a plantroom or a dedicated enclosure.

Refrigeration System

General

The WPR series can have independent refrigeration cuicuits and four compressors to provide the flexibility and economy of four stage operation i.e. utilizing one or more circuits as conditions vary, plus the advantage of staggered starting.

Each circuit is charged using R410a refrigerant.

Compressors

The compressors are directional scroll, or rotary type. On commissioning, the compressors must be checked for correct rotation (refer Start Up procedure).

Compressors are fitted with adjustable anti-rapid cycle timers. Another adjustable time relay prevents simultaneous starting of compressors (refer to wring diagram for factory settings). System 1 has a delay “on break” timer (i.e. stop-to-start), while system 2 has a delay “on mark” timer (i.e. start).

Positioning

Mounting

The WPR series unit is designed for being installed in an enclosed plant room or enclosure, and is to be mounted on a plinth.

Fit anti vibration mounts or pads between the unit and the plinth.

Condensate Drain

The condensate drain should be “U” trapped outside the unit. The trap should have a vertical height of 100mm min., the drain line should have a minimum slope of 1:50, and must not be piped to a level above the unit drain connection.

>> Water Supply and Return

The WPR series units IN and OUT water connection are male pipe threaded.

Poor quality water supply **must** be pre-filtered, and is essential that adequate water treatment is maintained, particularly where open cooling towers are used.

Note: It is required that the water system be fitted with a water flow switch and water pump safety interlock. These prevent the WPR from going into fail safe lockout status due to a loss of water flow. Failure to install the above items will void the units warranty.

WPR units require a minimum water supply temperature of 17°C.

Circuit Balancing Valve

It is mandatory that a water circuit balancing valve be fitted to each unit to maintain water flow at a constant rate – refer to WPR tech data sheets.

Electrical Requirements

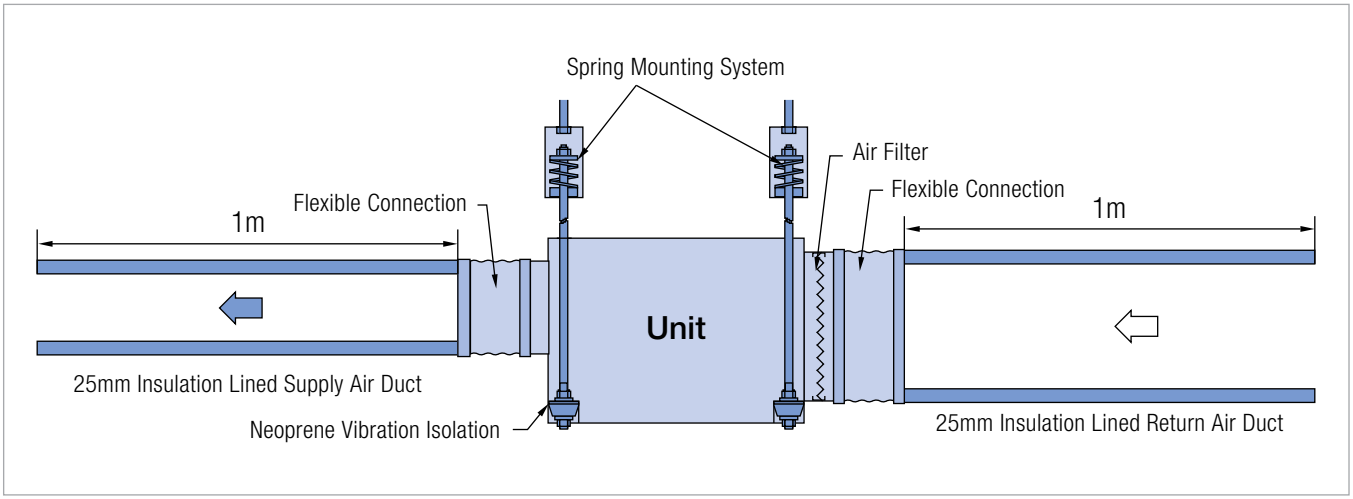
Electrical work must be carried out by a qualified electrician. The unit must be wired directly from a distribution board by means of a circuit breaker or H.R.C. fuse, and a mains isolator provided (by others) – preferably close to the unit.

WPR series are supplied for 24 volt controls.

Standard units are suitable for use with thermostats with manual Heat/Cool selection or automatic changeover, subject to the contact ratings of the thermostats.

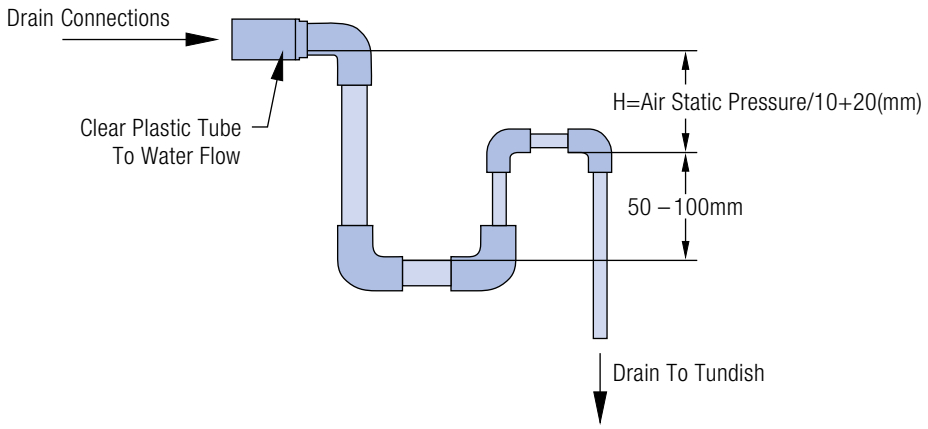
A 24 hour power supply to the compressor crank case heater is required; otherwise, the warranty is void.

>> Noise Prevention



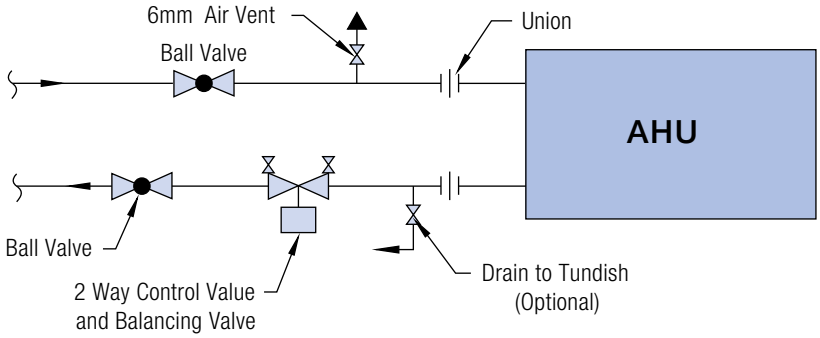
1. Ensure distance between two units is at least 2.5m.
2. The air velocity in the supply air duct should not be greater than 3–3.5m/sec.
3. The air velocity in the return air duct should not greater than 2–5m/sec.
4. Duct insulation should be at minimum of 25mm and be perforated aluminium lined for better sound absorption.
5. The minimum length of straight supply air duct between T pieces or 90° bends must be at least 5 times the diameter of the duct.
6. Dampers and grilles should not be installed closer than 3m from the air supply spigot of the unit.
7. Whenever possible insulate the area under the unit with suitable insulation to minimize sound travel downwards through the ceiling. Area to be insulated should be at least twice the size of the base of the unit.
8. The minimum length of the return air duct should be at least 2m. If this is not possible, introduce a bend in the duct design or install a sound attenuator duct.
9. Always install unit above unoccupied areas e.g. storerooms, toilets etc.
10. Always allow sufficient space around the unit for service. Dunnair units require a minimum 500mm free area on all sides.
11. Make sure that drains to tundish have a trap and slope towards the tundish. When this cannot be done than a drain inline pump should be installed.

>> Condensate Drain

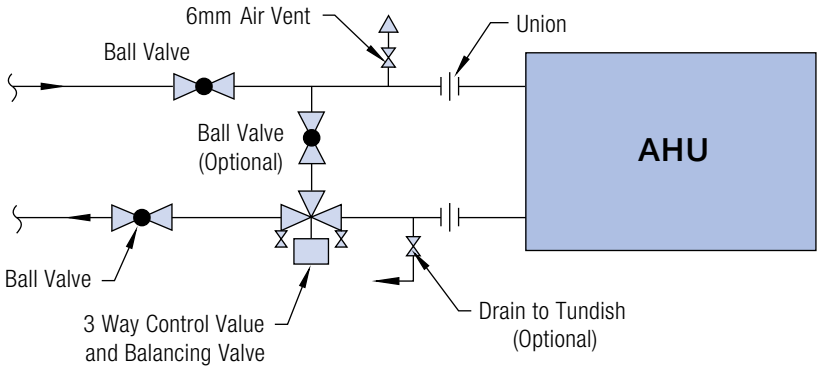


>> Water Supply and Return

Typical Two-Way Valve Installation



Typical Three-Way Valve Installation



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>> Horizontal Water Cooled R410A

Specifications Overview

		WPR4	WPR5	WPR6.5	WPR8	WPR9.5	WPR12	WPR14	WPR16	WPR19	WPR25	WPR30	WPR38
Total Cooling Capacity* kW		4.1	4.8	6.3	8.0	9.3	11.6	13.9	15.8	18.9	23.1	29.6	37.2
Sensible Cooling Capacity kW		3.4	4.0	5.2	6.6	7.6	9.0	11.7	13.2	15.7	18.6	24.1	30.4
Heating Capacity** kW		4.3	5.1	6.8	8.5	9.9	12.4	14.3	17.0	20.0	22.1	30.6	37.8
Electric Heating (Option) kW		3.0	3.6	4.5	6.0	6.6	9.0	10.5	12.0	13.5	15.0	21.0	24.0
Rated Airflow l/s		210	260	330	420	475	660	760	850	1000	1150	1500	1900
Sound Pressure Level#		32.5	42.3	43.5	45.8	48.1	48.0	50.4	55.3	49.2	57.9	67.2	69.5
External Static Pressure Pa		120	120	120	120	120	120	120	120	120	120	120	120
Power		1Ph.240V.50Hz							3Ph.415V.50Hz				
Electrical Input (Cooling) kW		1.08	1.2	1.6	2.0	2.6	3.28	3.82	4.11	4.95	5.60	7.10	9.10
Normal Max Current A		6.3	7.9	11.0	12.5	15.8	20.9	22.9	12.2	15.8	18.8	24.6	31.8
E.E.R (Cooling)		3.8	4.0	3.9	4.0	3.6	3.5	3.6	3.8	3.8	4.1	4.2	4.1
Water Flow l/s		0.25	0.3	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.7	2.2
Water Coil Pressure Drop kPa		38	38	38	38	40	40	40	40	40	44	48	48
Water Connections	inch	3/4	3/4	3/4	1	1	1	1	1	1	1.¼	1.¼	1.¼
	mm	19.05			25.40						31.75		
Dimension mm	L	1080	1130	1150	1300	1350	1600	1900	1900	2000	2050	2100	2400
	W	450	500	550	600	600	600	800	800	800	800	800	850
	H	400	400	400	480	480	480	500	500	500	530	650	650
Weight	kg	86	98	107	125	140	157	168	170	173	195	280	340

* Entering air temp. @27/19°C and enter water temp. @30°C ** Entering air temp. @21DB and enter water temp. @20°C.
# 1m from sound source with 1m insulated duct

>> Vertical Water Cooled R410A

Specifications Overview

		WPR8L	WPR9.5L	WPR12L	WPR14L	WPR16L	WPR25L	WPR30L	WPR38L
Total Cooling Capacity* kW		8.0	9.3	11.6	13.9	15.8	23.1	29.6	37.2
Sensible Cooling Capacity kW		6.6	7.6	9.0	11.7	13.2	18.6	24.1	30.4
Heating Capacity** kW		8.5	9.9	12.4	14.3	17.0	22.1	30.6	37.8
Electric Heating (Option) kW		6.0	6.6	9.0	10.5	12.0	15.0	21.0	24.0
Rated Airflow l/s		420	475	660	760	850	1150	1500	1900
Sound Pressure Level#		53.2	54.5	54.7	60.4	60.9	57.7	64.8	62.0
External Static Pressure Pa		150	150	150	150	150	150	150	150
Power		1Ph.240V.50Hz				3Ph.415V.50Hz			
Electrical Input (Cooling) kW		2.0	2.6	3.28	3.97	4.29	5.60	7.18	9.24
Normal Max Current A		12.5	15.8	20.9	23.0	13.0	18.8	24.6	31.8
E.E.R (Cooling)		4.0	3.6	3.5	3.5	3.7	4.1	4.1	4.0
Water Flow l/s		0.5	0.6	0.7	0.9	1.0	1.3	1.7	2.2
Water Coil Pressure Drop kPa		38	40	40	40	40	44	48	48
Water Connections	inch	1	1	1	1	1	1.¼	1.¼	1.¼
Dimension mm	L	586	586	639	646	763	1147	1347	1347
	W	575	586	586	616	729	709	729	789
	H	1449	1449	1460	1564	1232	1270	1270	1532
Weight	kg	150	170	200	250	270	300	320	350

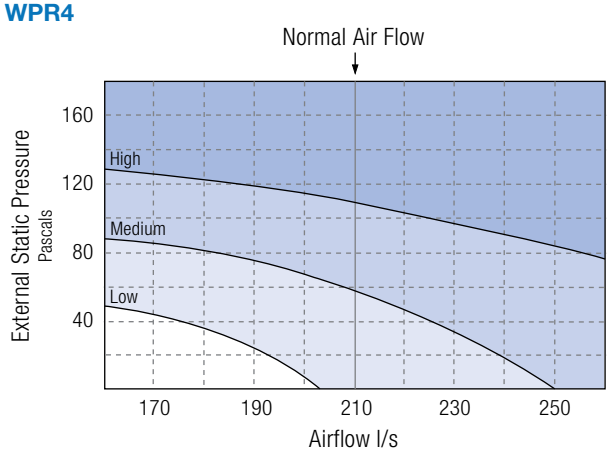
* Entering air temp. @27/19°C and enter water temp. @30°C ** Entering air temp. @21°CDB and enter water temp. @20°C.
# 1m from source in an anechoic chamber with 1m insulated duct.

>> Horizontal Water Cooled R410A

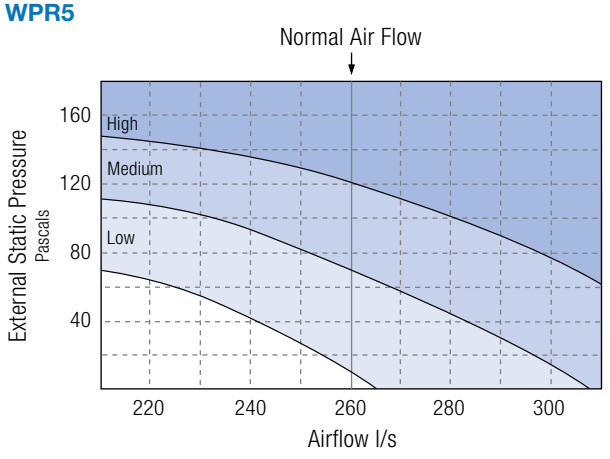
Air Handling Performance

Fan Curve (Without Filter)

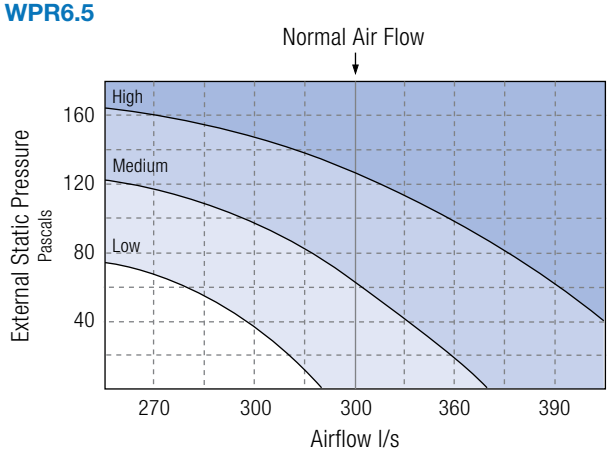
WPR4



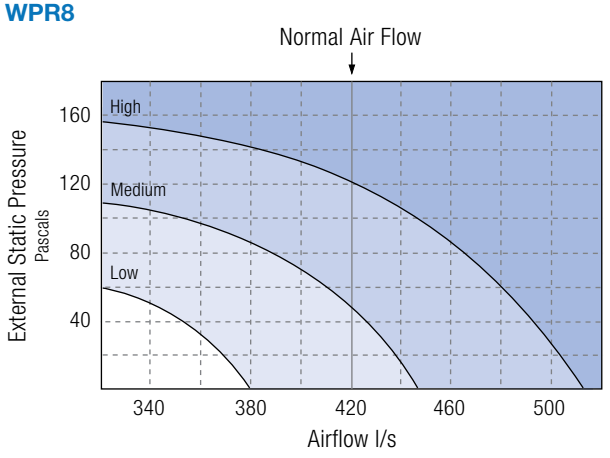
WPR5



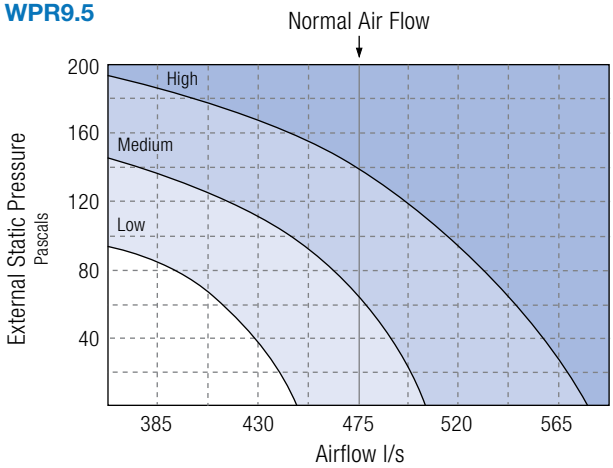
WPR6.5



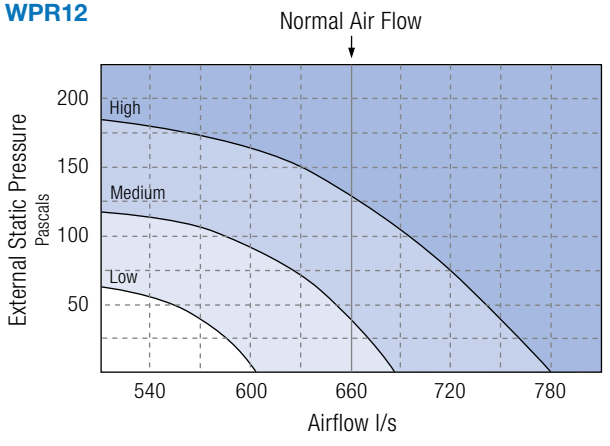
WPR8



WPR9.5



WPR12

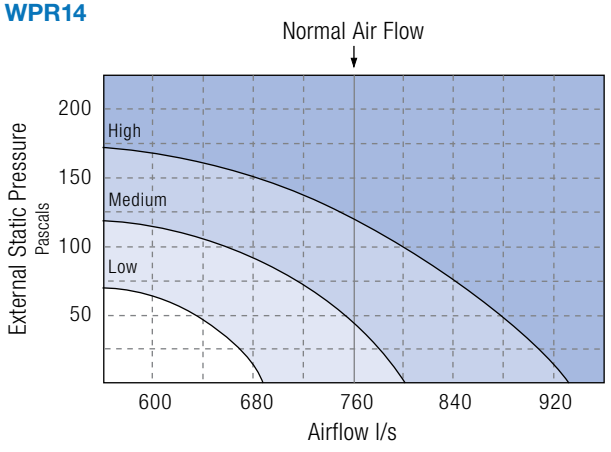


>> Horizontal Water Cooled R410A

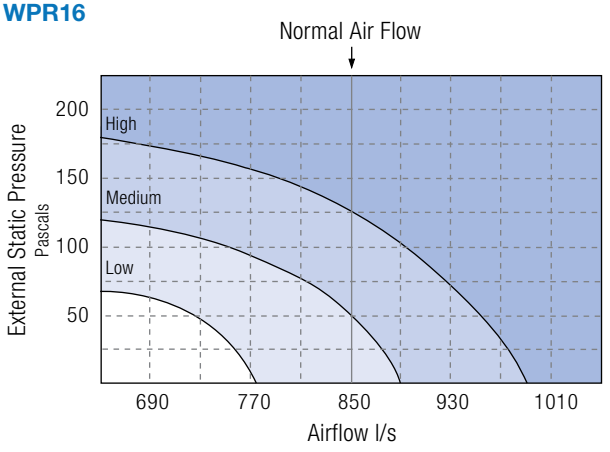
Air Handling Performance

Fan Curve (Without Filter)

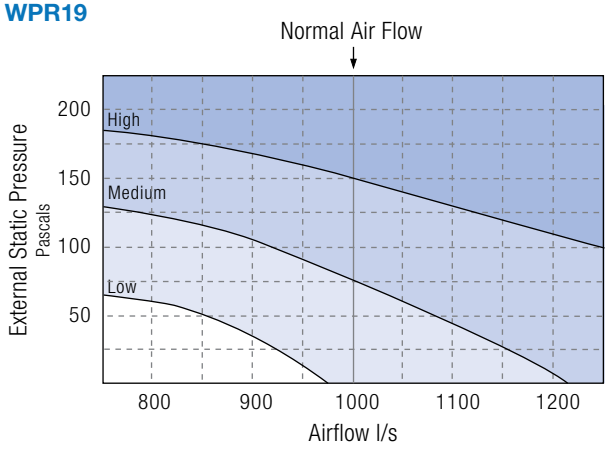
WPR14



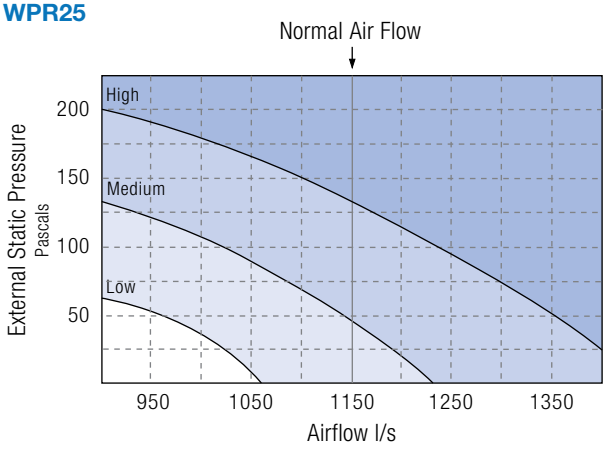
WPR16



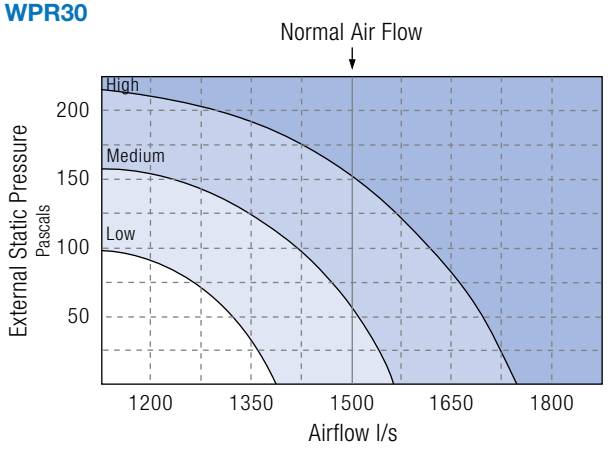
WPR19



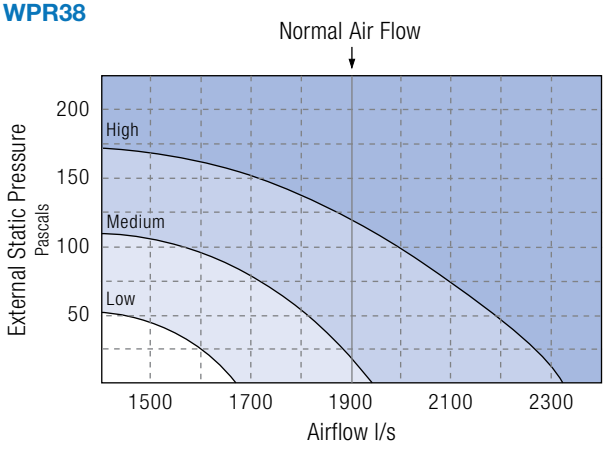
WPR25



WPR30



WPR38

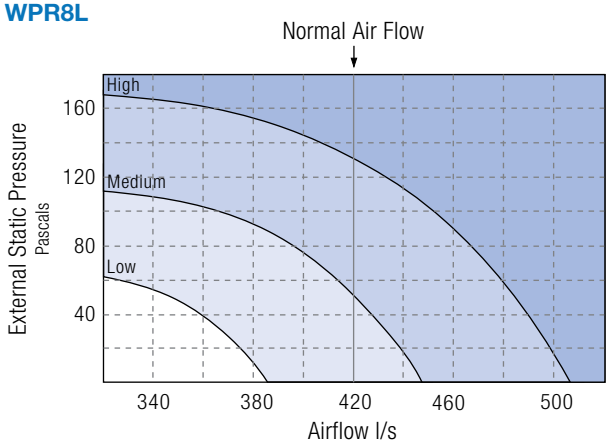


>> Vertical Water Cooled R410A

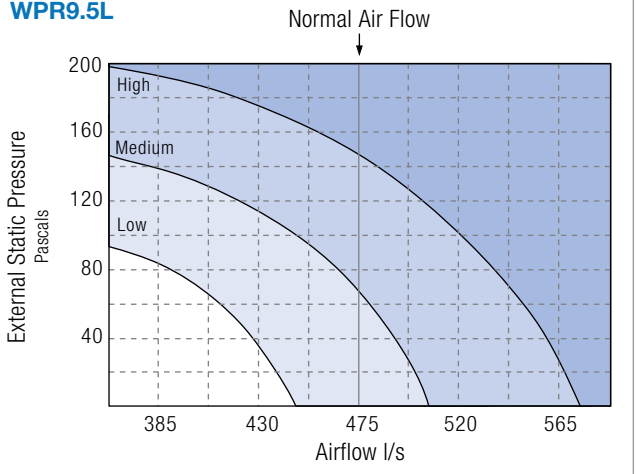
Air Handling Performance

Fan Curve (Without Filter)

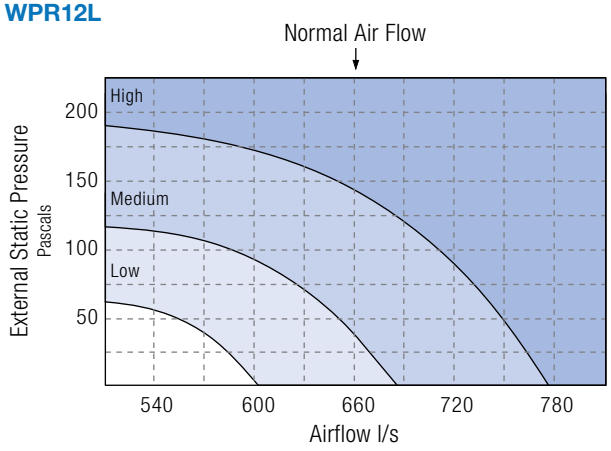
WPR8L



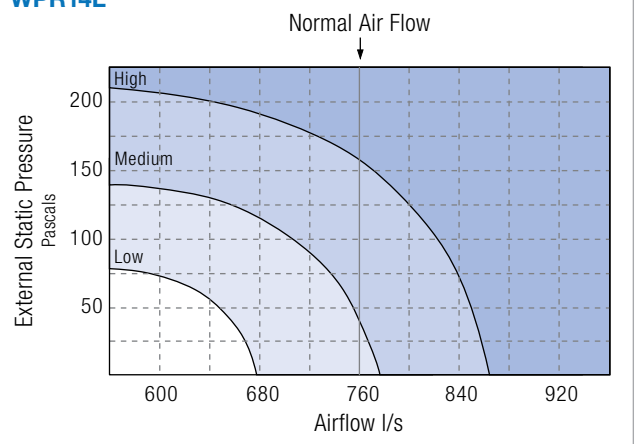
WPR9.5L



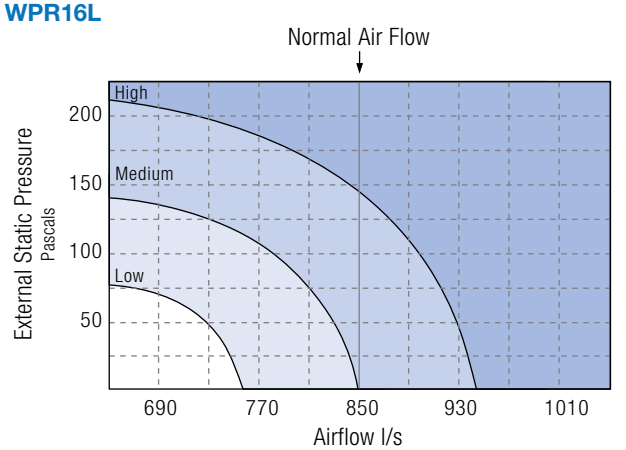
WPR12L



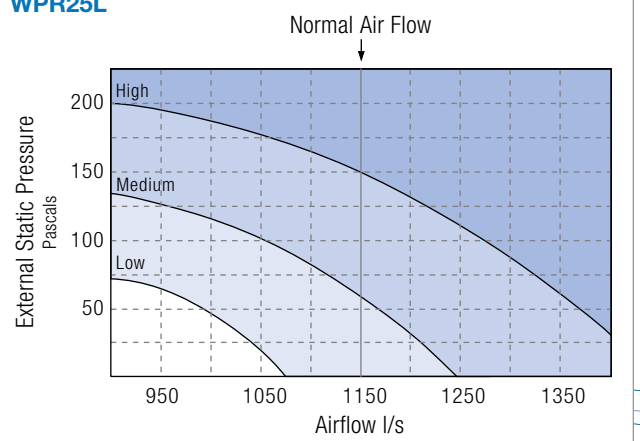
WPR14L



WPR16L



WPR25L

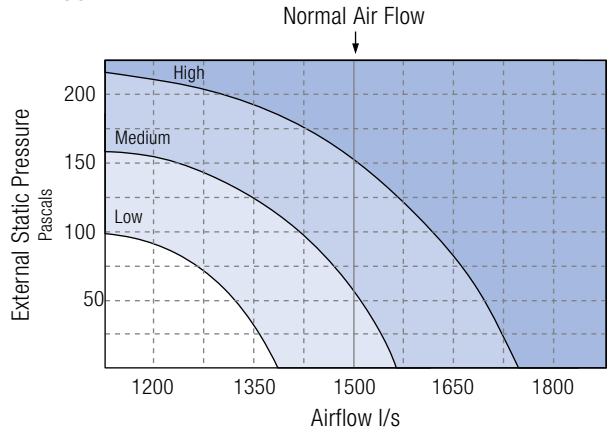


>> Vertical Water Cooled R410A

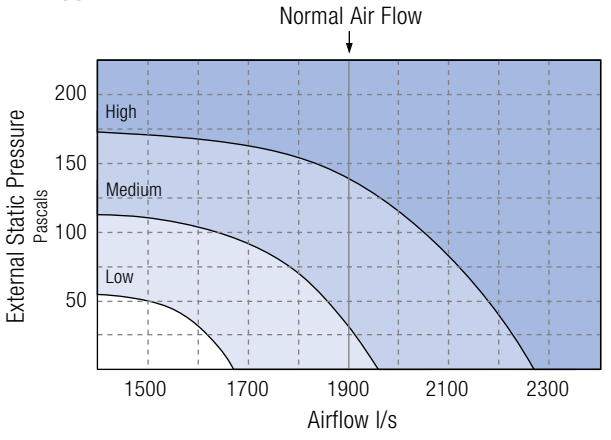
Air Handling Performance

Fan Curve (Without Filter)

WPR30L



WPR38L



Ducted Water Cooled Horizontal and Vertical Models

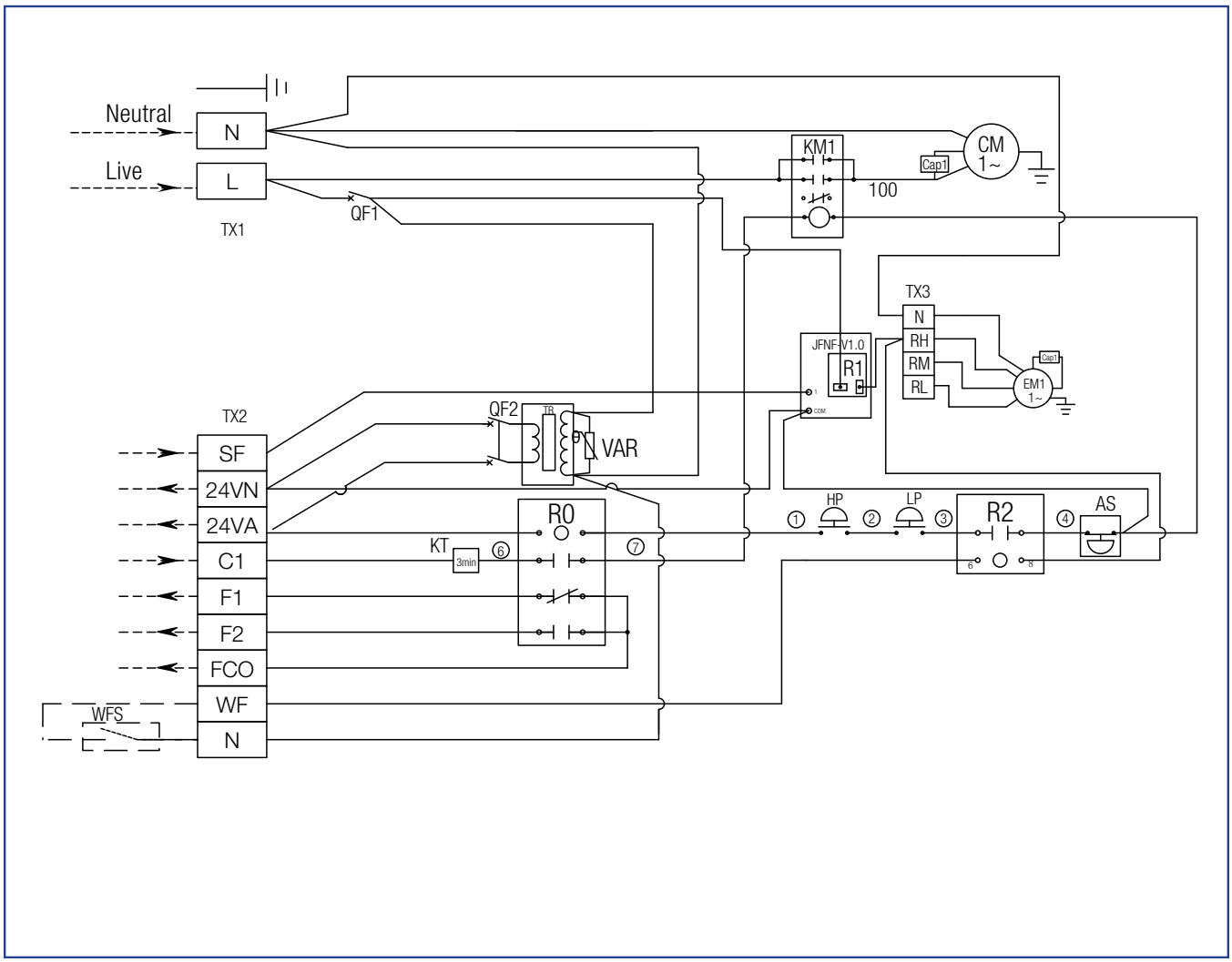
Note:

1. In tropical (high humidity) conditions, care must be taken to select an air flow which gives a suitable coil face air velocity, to prevent water carry over.
2. For applications with low resistance, be sure not to exceed the fan motor full load Amps.
3. Applications using full or high proportions of fresh air should be referred to DUNNAIR engineering office to establish of unit model.
4. EU1 rate filter pressure loss 15Pa.

>> Wiring Diagram Single Phase

Cooling Only

Power supply – 240V 50HZ 1Phase



Note: Water and air flow switches supplied by installer.

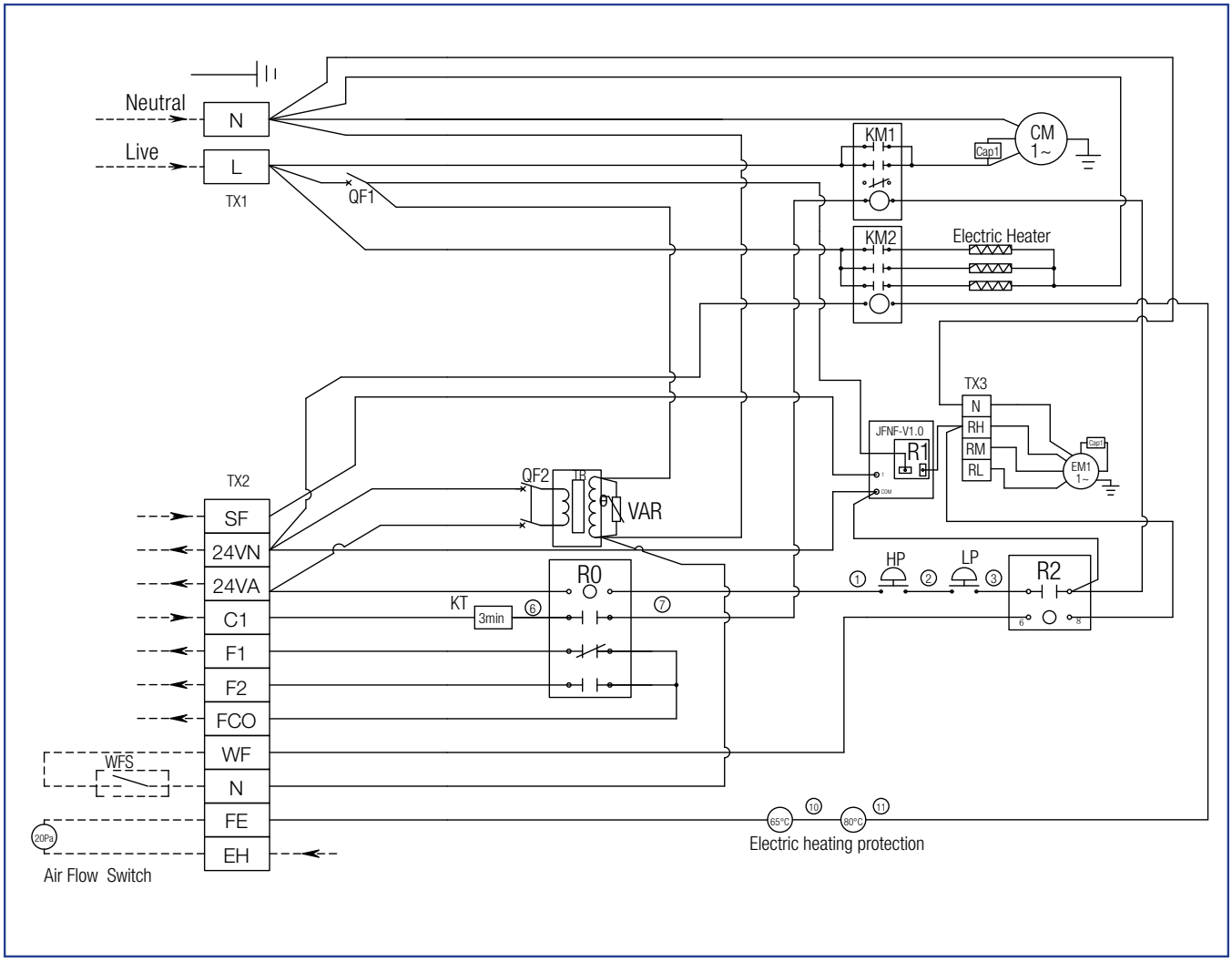
Code Instruction:

24VA	24VAC Active
24VN	24VAC Neutral
AS	Antifreeze Switch
C1	Compressor Signal
Cap	Capacitor
CM	Compressor
EM	Evaporator Fan
F1	Alarm Sighal (Volt-free contact Close)
F2	Alarm Sighal (Volt-free contact Open)
FC0	Alarm Sighal (Volt-free contact Common)
HP	HP Switch
JFNF	Relay Group
KM	Contactor
KT	Time Relay
LP	LP Switch
N	Neutral
QF	Control Circuit Breakers
R	Middle Relay
SF	Evoporative Fan Signal
TX	Terminal Blocks
TR	Transformer
VAR	Varistor
WF	Water Flow Switch Contact
WFS	Flow Switch

>> Wiring Diagram Single Phase

Cooling Only with Electric Heater

Power supply – 240V 50HZ 1Phase



Note: Water and air flow switches supplied by installer.

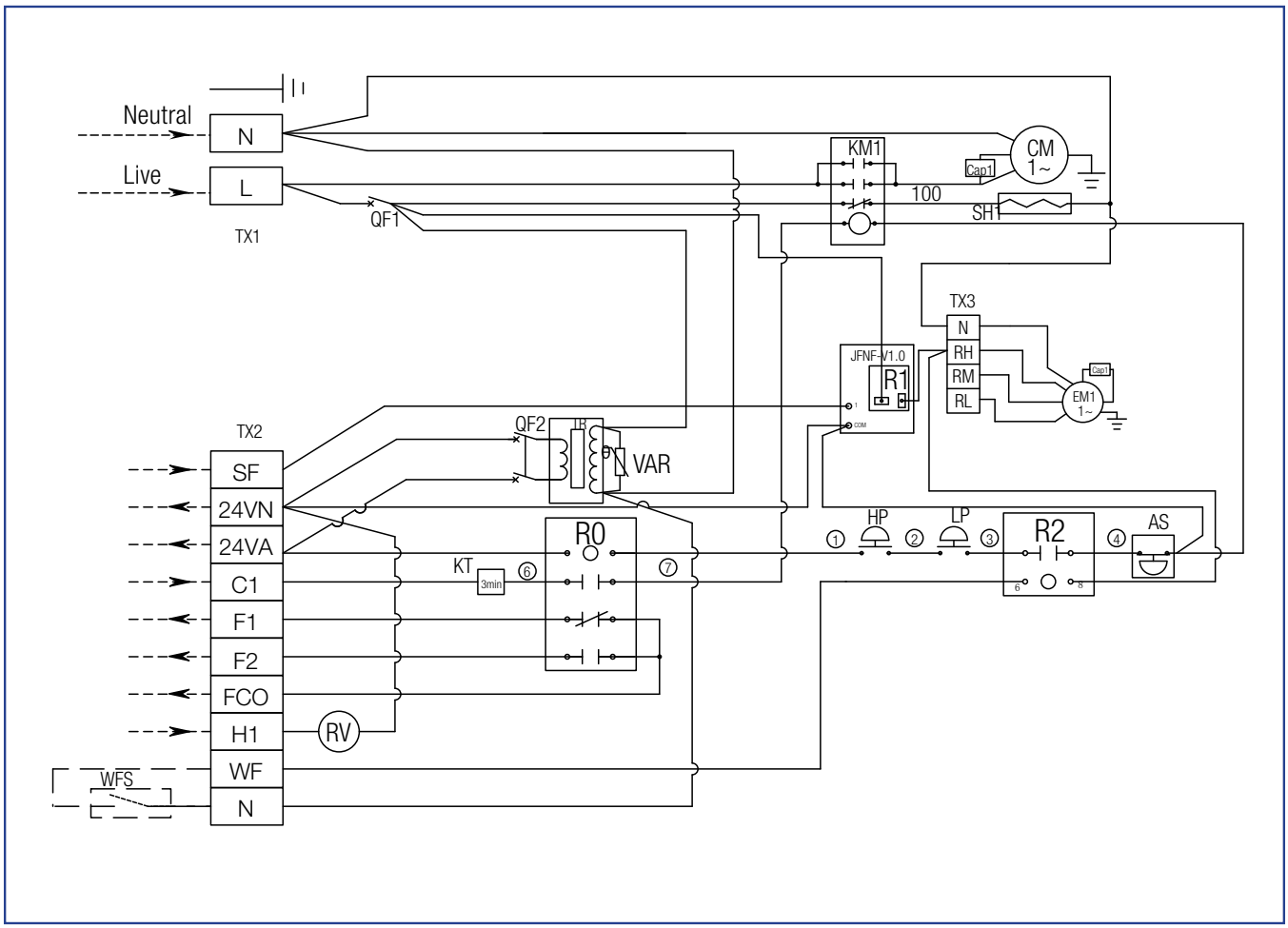
Code Instruction:

24VA	24VAC Active
24VN	24VAC Neutral
C1	Compressor Signal
Cap	Capacitor
CM	Compressor
EH	Electric Heater Signal
EM	Evaporator Fan
F1	Alarm Sighal (Volt-free contact Close)
F2	Alarm Sighal (Volt-free contact Open)
FC0	Alarm Sighal (Volt-free contact Common)
FE	Air Flow Switch Contact
HP	HP Switch
JFNF	Relay Group
KM	Contactor
KT	Time Relay
LP	LP Switch
N	Neutral
QF	Control Circuit Breakers
R	Middle Relay
SF	Evoporative Fan Signal
TR	Transformer
TX	Terminal Blocks
VAR	Varistor
WF	Water Flow Switch Contact
WFS	Flow Switch

>> Wiring Diagram Single Phase

Heat Pump

Power supply – 240V 50HZ 1Phase



Note: Water and air flow switches supplied by installer.

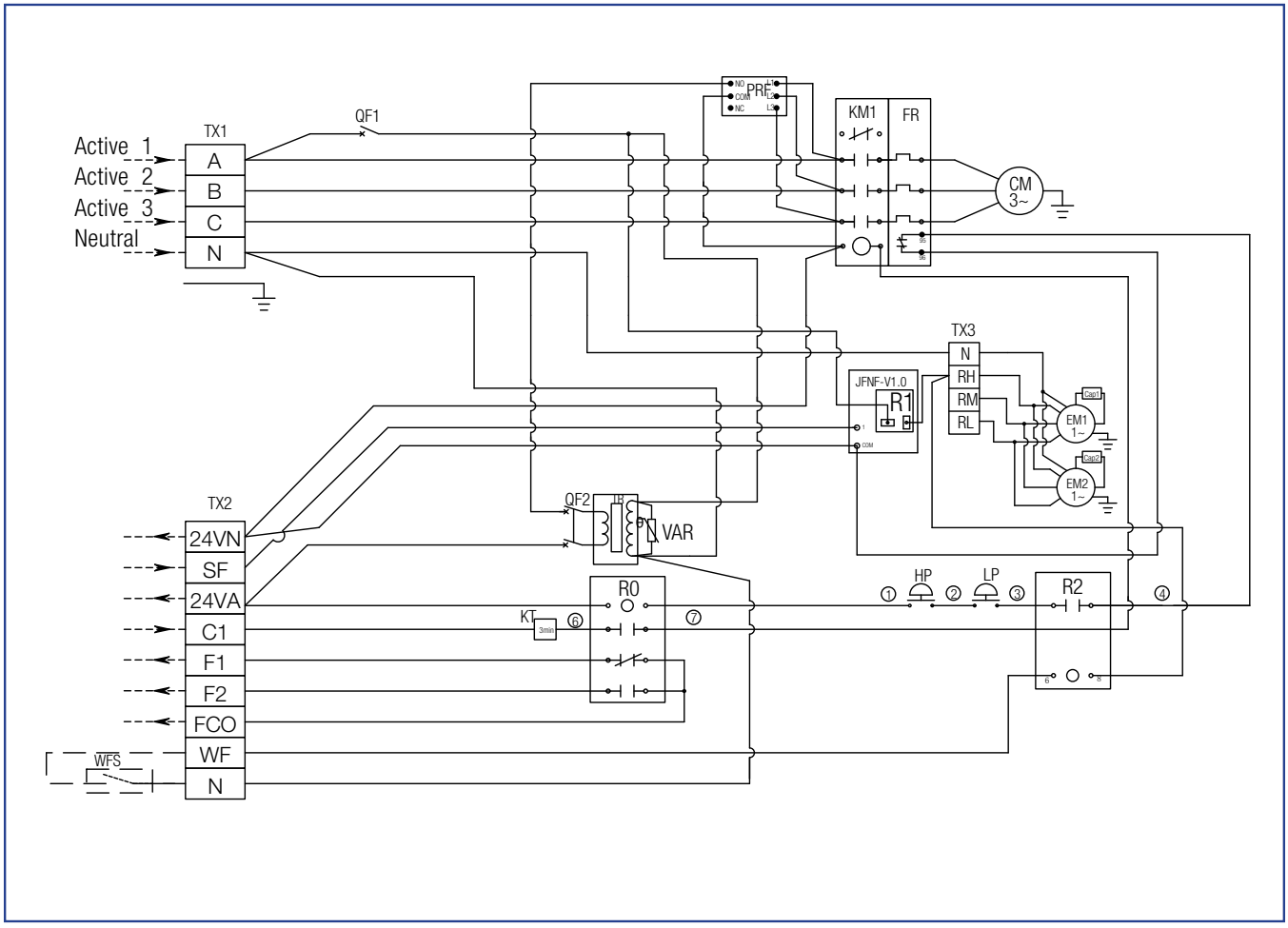
Code Instruction:

24VA 24VAC Active
24VN 24VAC Neutral
AS Anitfreeze Switch
C1 Compressor Signal
Cap Capacitor
CM Compressor
EM Evaporator Fan
F1 Alarm Sighal (Volt-free contact Close)
F2 Alarm Sighal (Volt-free contact Open)
FC0 Alarm Sighal (Volt-free contact Common)
H1 Heating Signal
HP HP Switch
JFNF Relay Group
KM Contactor
KT Time Relay
LP LP Switch
N Neutral
QF Control Circuit Breakers
R Middle Relay
RV Reversing Valve
SF Evoporative Fan Signal
SH Sump Heater
TX Terminal Blocks
TR Transformer
VAR Varistor
WF Water Flow Switch Contact
WFS Flow Switch

>> Wiring Diagram Three Phase

Cooling Only

Power supply – 415V 50HZ 3 Phase



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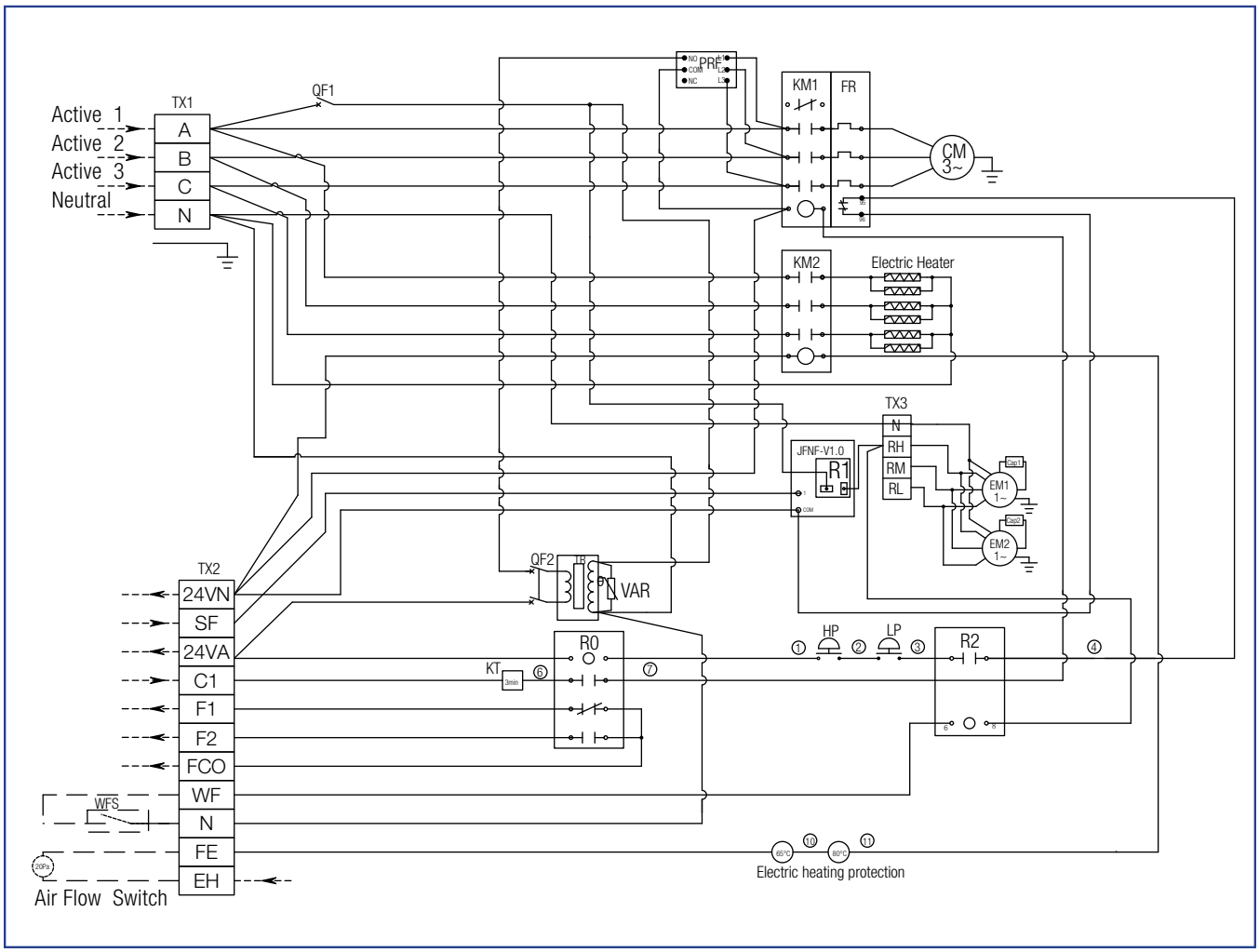
24VN 24VAC Neutral
C1 Compressor Signal
Cap Capacitor
CM Compressor
EM Evaporator Fan
F1 Alarm Sighal (Volt-free contact Close)
F2 Alarm Sighal (Volt-free contact Open)
FC0 Alarm Sighal (Volt-free contact Common)
FR Thermal Relay
HP HP Switch
JFNF Relay Group
KM Contactor
KT Time Relay
LP LP Switch
N Neutral
PRF Phase Protection
QF Control Circuit Breakers
R Middle Relay
SF Evaporator Fan Signal
TR Transformer
TX Terminal Blocks
VAR Varistor
WF Water Flow Switch Contact
WFS Flow Switch

>> Wiring Diagram Three Phase

Cooling Only with Electric Heater

Power supply – 415V 50HZ 3 Phase



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N Neutral
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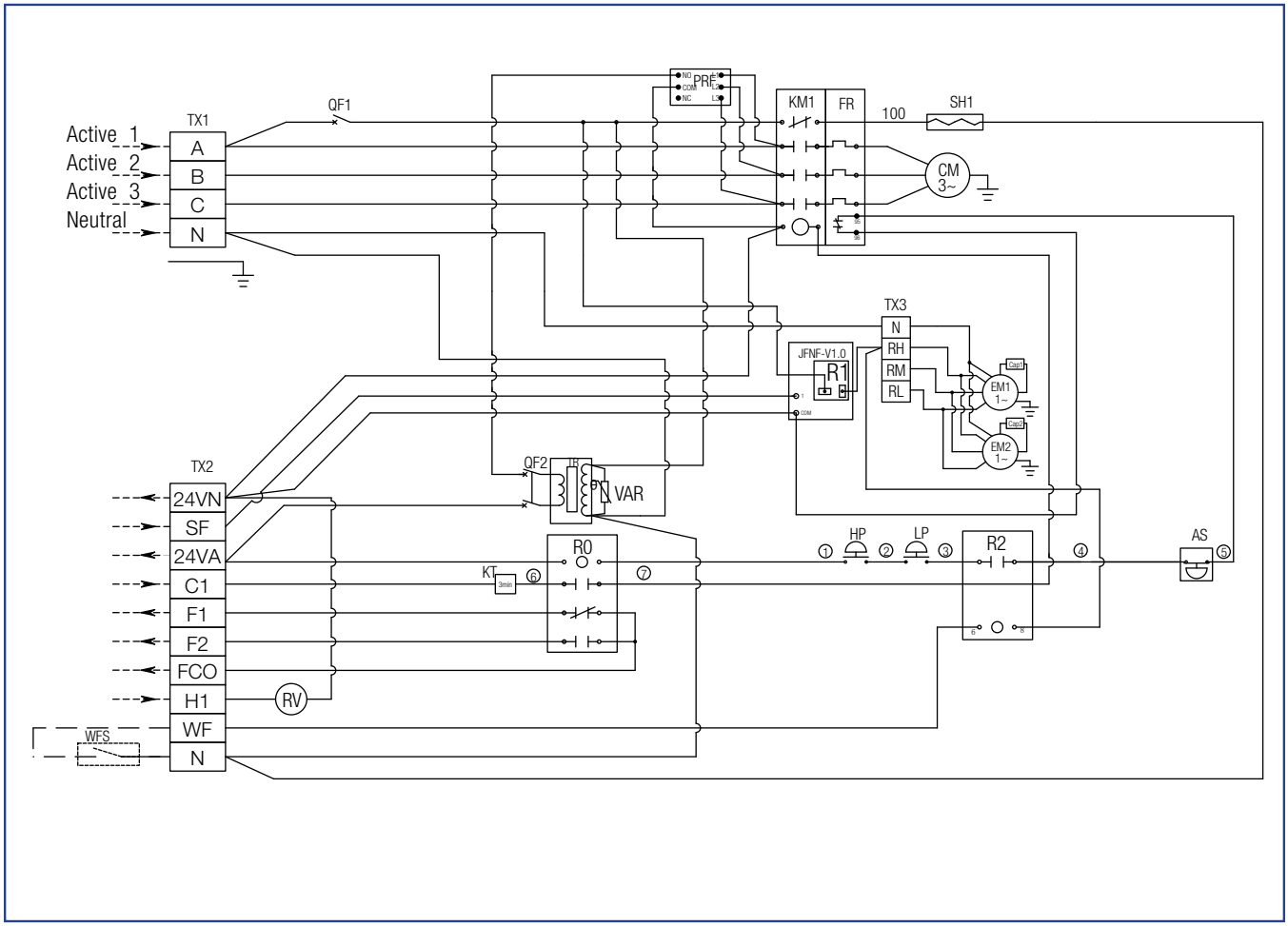
QF Control Circuit Breakers
R Middle Relay
SF Evaporator Fan Signal
TR Transformer
TX Terminal Blocks
VAR Varistor
WF Water Flow Switch Contact
WFS Flow Switch

>> Wiring Diagram Three Phase

Heat Pump

Power supply – 415V 50HZ 3 Phase



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QF Control Circuit Breakers
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RV Reversing Valve
SF Evaporator Fan Signal
SH Sump Heater
TX Terminal Blocks
TR Transformer
VAR Varistor
WF Water Flow Switch Contact
WFS Flow Switch

R410A Packaged Air Conditioners

Ducted Water Cooled Horizontal and Vertical Models

DUNNAIR
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Cooling capacity is based on 27˚C DB,
19˚C WB Entering Air Temperature & 35˚C Ambient Temperature