



Copeland Scroll Condensing Units

Application Guidelines



EMERSON
Climate Technologies

APPLICATION GUIDELINES FOR COPELAND SCROLL CONDENSING UNITS

Contents	Page
1. Introduction.....	2
2. Safety Information.....	2
3. Nomenclature	2
4. Delivery	3
4.1. Packaging.....	3
4.2. Transport.....	3
4.3. Standard Delivery.....	3
4.3.1. The Compressor	3
4.3.2. The Condenser	4
4.3.3. The Fan(s).....	4
4.3.4. The Liquid Receiver	7
4.3.5. Safety Pressure Switch ALCO PS2 W7A	7
4.4. Additional Accessories	8
4.4.1. Fan Speed Control	8
4.4.2. Weather Housing	11
5. Electrical Diagrams.....	11
5.1. Present drawing	11
5.1.1. Condensing unit with ZB Single Phase Compressors (PFJ = 230 V - 1Ph - 50 Hz)	12
5.1.2. Condensing unit with ZR Single Phase Compressors (230 V - 50 Hz).....	12
5.1.3. Condensing units with TFD/TF5 Three Phase compressors	13
5.1.4. Condensing units with TWD/TWR Three Phase compressors	13
5.1.5. Recommended control circuit	14
5.1.6. Legend for the electrical diagrams	14
5.2. Drawing units until end 2002.....	15
5.2.1. Single Phase (230 V - 50 Hz)	15
5.2.2. Three Phases TFD.....	16
5.2.3. Three Phases TWD.....	17
6. Sound Data.....	18
7. PED Compliance	18
8. Protection Class.....	18
9. Installation and Service	18

1 Introduction

The present guideline is dealing with air-cooled condensing units equipped with Scroll compressors. The selection of the units can be done using the product catalogues and/or the Copeland Selection Software (Select).

2 Safety Information



- Refrigerating condensing units must be employed only for the use they are made for.
- Approved refrigerants and refrigerating oils may only be used.
- Do not start the unit until it is charged with refrigerant.
- Correctly used, the compressor and the pressure line piping may reach temperatures that may cause burning if touched.



- In case of leak of refrigerant avoid eye contact.
- If the refrigerant needs to be removed from the system, do not disperse it in the environment, use specific equipment to collect the refrigerant.
- For storage, use original packaging and avoid collisions and tilting.



- Trained electrical personnel must connect the unit and its accessories.
- All valid standards for connecting electrical and refrigeration equipment must be observed.
- Limit values for the supply voltage of the unit may not be exceeded.

Only qualified personnel should install and intervene on COPELAND condensing units.

The compressor and the tubing can reach temperatures high enough to induce burns.

It is not allowed to run a test without the compressor being connected to the system and without refrigerant. It is of vital importance that the discharge stop valve has been fully opened before the compressor is started. If the discharge stop valve is closed or partly closed an unacceptable pressure with accordingly high temperatures may develop in the cylinder head. When operating with air the so-called diesel effect may occur, i.e. the air sucked in is mixed with oil gas and can explode due to the high temperature in the cylinder head, and thereby destroy the compressor.

3 Nomenclature

The nameplate of the condensing units shows the mains characteristics of the unit.

The compressor also has its own nameplate.

Thanks to the condensing unit designation you can easily recognise the main components.

Nomenclature for Air-Cooled Condensing Units

<u>MC</u>	<u>D8</u>	<u>ZB19KE</u>	<u>TFD</u>		<u>MC</u>	<u>V6</u>	<u>ZF40KE</u>	<u>TWD</u>
1	2	3	4		1	2	3	4

- | | |
|---|-------------------------------------|
| 1 | MC = Unit name |
| 2 | Condenser model (see chapter 4.3.2) |
| 3 | Compressor model |
| 4 | Motor version |

The standard motor versions presently existing for our condensing units are:

PFJ = 220 – 240 V / 1Ph / 50 Hz	from ZB19KE to ZB26KE, ZR18KE and ZR22KE
TFD = 380 - 420 V / 3Ph / 50 Hz	from ZB15KE to ZB45KE, from ZF09KE to ZF18KE, ZR81KE
TWD = 380 - 420 V / 3Ph / 50 Hz	from ZF24KE, from ZB56KE

4 Delivery

Please check whether the delivery is correct and complete. Deficiencies should be immediately reported in writing.

Standard Scope of Delivery:

- Copeland Compliant Scroll compressor with Rotalock valves and filled with ester oil.
- Condenser
- Single phase fan (s)
- Receiver with Rotalock valve
- Pipe connections
- HP/LP pressure switch
- Crankcase heater
- Pre-wired terminal box
- Discharge temperature protection
- Injection system on ZF compressors
- Neutral gas holding charge

4.1 Packaging

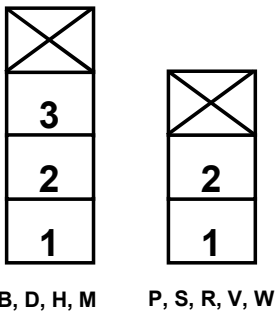
Condensing units are individually packed on a baseboard and a carton is fitted over. Accessories are mounted.

In the unlikely event that the packaging box is damaged, the condenser might be damaged.

4.2 Transport

Condensing units should only be moved with equipment appropriate for the weight involved.

In order to avoid any damage, the condensing unit should not be lifted by the compressor service valves, the tubing or other accessories.



Condensing units starting with the letters B, D, H or M can be stacked three high. Other condensing units can be stacked two high.

It is recommended to keep the unit packaged until final installation. The condensing unit, when boxed, can be handled by a fork lift or pallet truck.

The condensing unit without the packaging must be handled by a fork lift truck or similar.

4.3 Standard Delivery

4.3.1 The Compressor

The PFJ, ZB single-phase compressors are equipped with a run capacitor, start capacitor and start relay.

The TF... motor versions have:

- an internal line break motor protection
- and an internal discharge protection for the ZB and external for the ZF.

The TW... motor versions are equipped with a INT 69SCY Kriwan thermal protection (motor, discharge temperature, reverse rotation and phase loss protection).

The ZF compressors are also equipped with a liquid injection:

- Discharge Temperature Control (DTC) injection valve on TFD
- Solenoid valve + capillary tube on TWD compressors

Further technical information can be found in the following documentation:

Refrigeration Scroll Application Guidelines 6.2.4/1102-0603/E

Refrigeration Scroll Application Guidelines 6.2.3/1102-1003/E

Air-conditioning Scroll Compressors Application Guidelines 6.2.1/0702-1002/E

Air-conditioning Scroll Compressors Application Guidelines 6.2.2/1002-1003/E

4.3.2 The Condenser

The condensers are constructed with copper tubes and aluminium fins, steel-sheet housing with a fan opening. Here are the main characteristics of the condensers used on COPELAND condensing units:

Condenser designation	number of		Finned Length mm	Fin Height mm	Fin Spacing mm	Internal volume l	Fans			Air flow m ³ /s
	Row	Tube					number of	model	diameter	
B8	3	14	430	350	2,1	1,6	1	71 (75)	300	0.36
D8	4	16	430	400	2,1	2,5	1	121 (120)	350	0.44
H8	3	19	625	475	2,1	3,2	1	271 (270)	420	0.91
H9	4	19	625	475	2,1	4,3	1	271 (270)	420	0.84
K9	4	16	820	400	2,1	4,7	2	121 (120)	350	0.86
M8	5	25	625	625	2,1	7,0	1	121 (120)	350	0.92
M9	5	25	625	625	2,1	7,0	1	611 (610)	500	1.27
P8	4	23	820	575	2,1	6,8	2	121 (120)	350	1.05
R7	3	23	1000	575	2,1	6,2	2	271 (270)	420	1.79
S9	5	26	1000	650	2,1	11,7	2	271 (270)	420	1.65
V5	4	31	1200	775	2,5	13,4	2	271 (270)	420	2.1
V6	5	31	1200	775	2,5	16,7	2	611 (610)	500	2.86
V9	5	31	1200	775	2,1	16,7	2	271 (270)	420	1.95
W9	5	33	1503	825	2,1	22,3	2	611 (610)	500	3.21

The first range of Copeland Scroll condensing units used to have a different designation in which the condenser type was not clearly described. The under table gives the type of condenser depending on the condensing unit designation.

Unit	ZF-U1-09	ZF-U2-11	ZF-U1-13	ZF-U1-15	ZF-U2-18	ZF-U2-24	ZF-U2-33	ZS-U1-14	ZS-U1-19	ZS-U2-21	ZS-U1-26	ZS-U1-30	ZS-U1-38	ZS-U1-45	ZS-U1-56	ZS-U1-75
Condenser	D8	H8		M8	P8	R7	D8	D8	H8		H9	M8	R7	V5		

4.3.3 The Fan(s)

The present condensing units are equipped with 1, 2 or 4 fans.

The complete fan consists of an external rotor motor with the fan blades permanently fixed to the rotor and the fan guard. The fan grid has 4 feet to mount it on the condenser.

The fan is positioned in order to pull the air from the condenser and over the compressor.

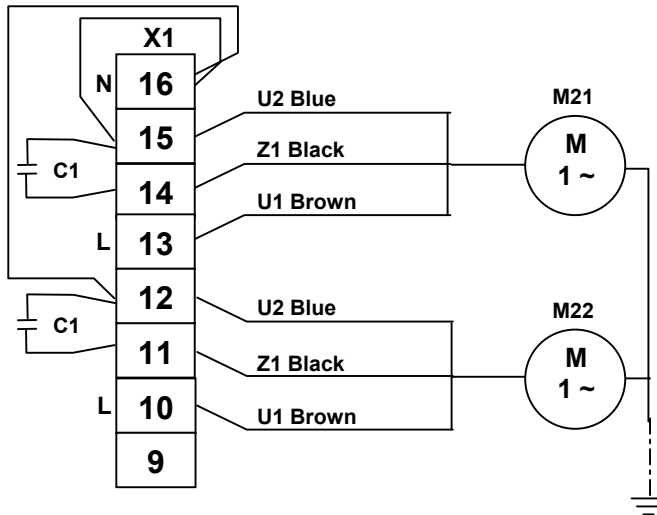
The fans protection is IP 54 and its insulation class is "F".

Such as described in the condenser table, various fan models are used.

Fan model	Blade diameter mm	Power input W	Voltage V (±10%) / Ph / Hz	Run capacitor µF / V	Motor current A	Winding resistance Ω (±10%), 25°C	
						Main	Auxiliary
71	300	95	220 - 240 / 1 / 50	3 / 400	0,44	115	129
121	350	117	220 - 240 / 1 / 50	4 / 400	0,54	72	108
271	420	300	220 - 240 / 1 / 50	5 / 400	1,35	25	88
611	500	570	220 - 240 / 1 / 50	10 / 400	2.4	8,5	20.5

The condensing units we are presently delivering are equipped with single-phase fans.

230V ±15% / 1 ~ / 50-60 Hz



Since January 2003:

- fan 71 is replacing 75
- fan 121 is replacing 120
- fan 211 is replacing 210
- fan 611 is replacing 610

Fan model	Blade diameter mm	Power input W	Voltage	Run capacitor $\mu\text{F} / \text{V}$	Motor current A	Winding resistance $\Omega (\pm 10\%), 25^\circ\text{C}$
			V ($\pm 10\%$) / Ph / Hz			
75	300	80	220 - 240 / 1 / 50	5 / 400	0,36	102
			220-240 Δ / 380-420Y / 3 / 50			
			500 - 550 / 3 / 50			
120	350	135	220 - 240 / 1 / 50	8 / 400	0,63	54,7
			220-240 Δ / 380-420Y / 3 / 50			
			500 - 550 / 3 / 50			
270	420	280	220 - 240 / 1 / 50	16 / 400	1,30	20
			220-240 Δ / 380-420Y / 3 / 50			
			500 - 550 / 3 / 50			
610	500	630	220 - 240 / 1 / 50	25 / 400	3,6	6,2
			220-240 Δ / 380-420Y / 3 / 50			
			500 - 550 / 3 / 50			

It is possible to convert the "old" three-phase fan into a single-phase motor by a capacitor, the characteristics of this run capacitor are given in the above table.

The fan motors are protected by a thermostatic switch. A single-pole bimetallic-element switch protects the motor against damage from:

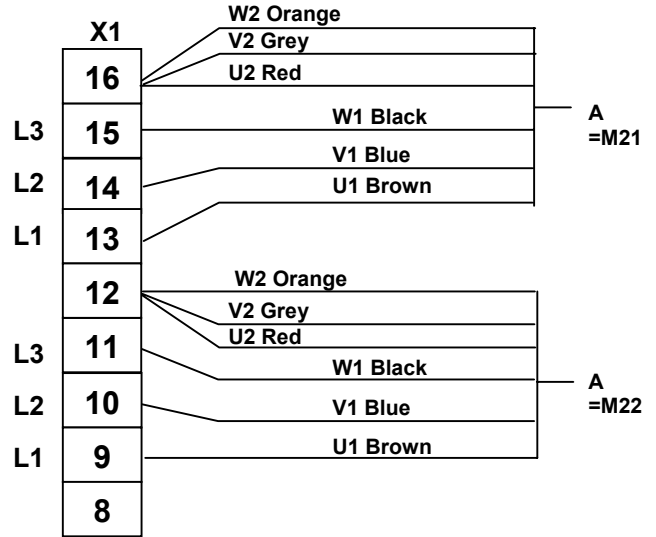
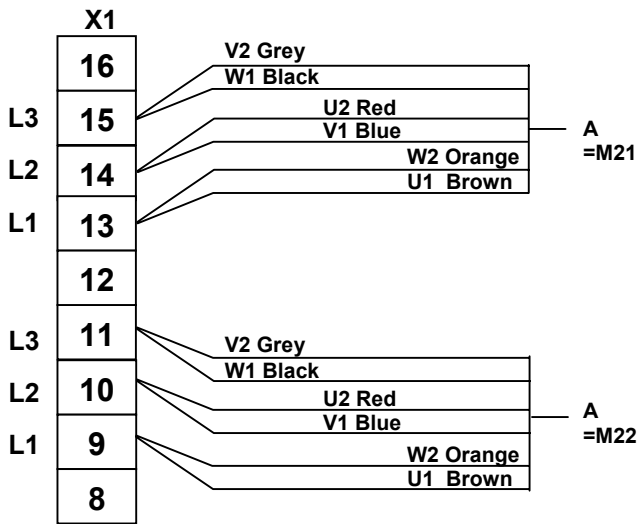
- Motor overload
- Over-voltage and under-voltage
- Electrical and mechanical blockages
- Inadequate cooling.

After connecting the condensing unit electrically, check the fan rotational direction. The fan must pull air over the condenser then over the compressor.

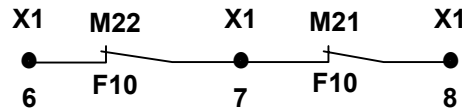
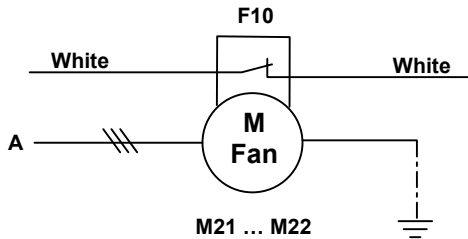
The old condensing units (before January 2003) were originally equipped with three-phase fans.

Δ 230V \pm 15% / 3 ~ / 50-60 Hz

Y 400V \pm 15% / 3 ~ / 50-60 Hz
Y 500V \pm 15% / 3 ~ / 50-60 Hz

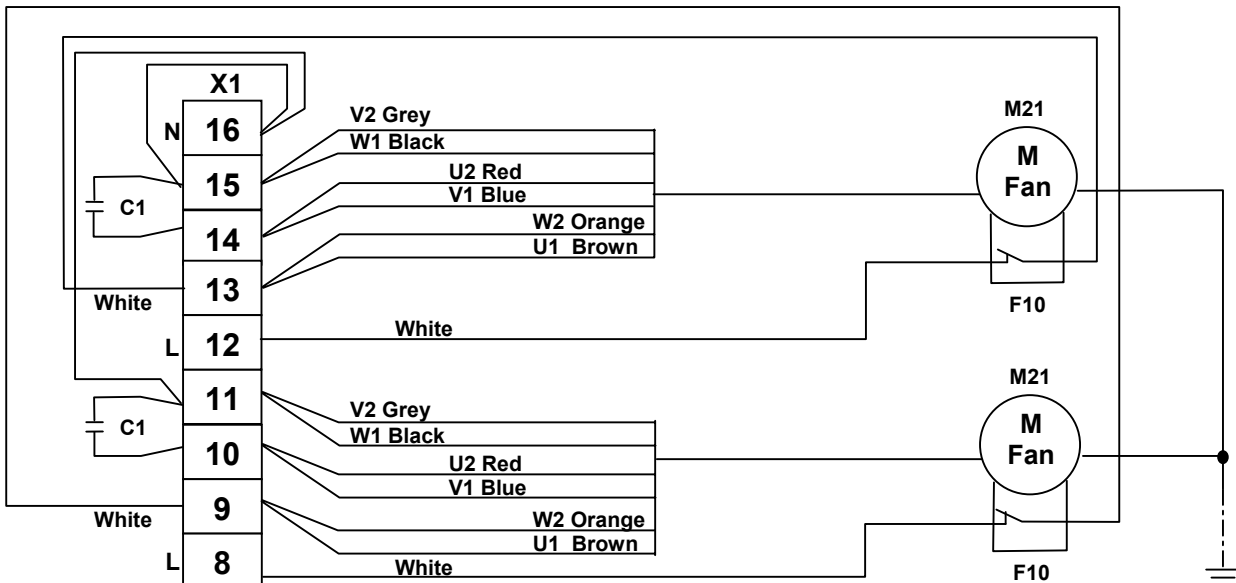


Fan Motor Protection = F10



Single-phase units were equipped with three-phase fans connected in single-phase thanks to a capacitor (the capacity characteristic of this run capacitor is given in the above table).

3 Phases Old Fan Connected in Single Phase Δ 230V \pm 15% / 1 ~ / 50 Hz



4.3.4 The Liquid Receiver

The Copeland Scroll condensing units are equipped with CE labelled liquid receiver
The liquid receivers are equipped with:

a Rotalock service valve

Sweat connection 1/2" on 3,7 l and 7,5 l

Sweat connection 5/8" on 11,5 l

Sweat connection 3/4" on 14 l

a 3/8"-14 NPTF connection for relief valve.

The fitting of a pressure relief device according to the norm EN378-2 is the respon
the installer.

The receivers above 11,5 liters have a maximum level gauge (sight glass).



4.3.5 Safety Pressure Switch ALCO PS2 W7A

All the condensing units are presently equipped with a dual
pressure switch (high and low pressure) with an automatic reset:
ALCO PS2 W7A.

The PS2 W7A is an adjustable pressure switch for application in
refrigeration and heat pump systems.

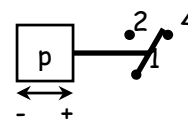
In these systems, pressure controls serve various functions, which
may be divided into control and protection functions. Examples for
control functions are compressor cycling, pump-down or defrost
control. Protection functions include, pressure limiting and cut out
against excessive pressures, against loss of charge or for freeze
protection. The control is equipped with display scale and pointers
to indicate the approximate settings. The display scales are
printed in relative pressure units "bar" and "psi".

For precise setting of the control, external gauges must be used.



The PS2 W7A has the following characteristics:

- Automatic Dual Pressure Controls
Combined Pressure Limiter for low pressure / high pressure protection.
- Adjustable dual pressure switch
Set-point adjustment range: LP(left) = -0.5 to 7 bar and HP(right) = 6 to 31 bar.
Differential adjustment range: LP = 0,5 to 5 bar, HP = 4 bar.
Factory Setting: LP = 3,5 / 4,5 bar, HP = 20 bar.
- Electrical contacts
Type of contacts: 2 x SPDT contacts
Contact material: CuAg3
Heating load (AC1): 24 A / 230 V AC
Motor rating UL (FLA): 24 V AC
Locked rotor UL (LRA)/Startup (AC3): 144 A / 230 V AC
- Environmental conditions
Ambient temperatures and medium temperature range at pressure connector: -50 °C to +70 °C.
Dust and water protection EN 60529 / IEC 529: IP44.
Vibration resistance: 4 g @ 10 ... 1000 Hz
- Approvals
PED approved: class 4
DIN and TÜV approved: TÜV DIN 32733(EN 12263) required by DIN 8901 and DIN 8975(EN 378).
Low Voltage Directive 73/23/EWG 93/68/EWG: EN 60947-1, EN 60947-5-1, CE-Label.
Germanic Lloyd
UL / CSA
- Pressure Connector: 7/16"-20 UNF male.
Pressure Connector bellows: brass /bronze
- Leakage Test Pressure: LP = 25 bar, HP = 36 bar.
- Housing materials cover: Polycarbonate (PC)
frame: Steel, yellow chromated





4.4 Additional Accessories

4.4.1 Fan Speed Control

An electronic speed control is available to control the speed of the fans based on condenser pressure. One or two fans can be controlled at the same time. The control operates with single-phase motors. The electrical connection is made in the terminal box of the condensing unit and the control is mounted on the liquid valve with a Schrader fitting.

Using a variable fan speed controller offers the following benefits for your application:

- The head pressure can be kept high enough to ensure proper operation of the expansion valve, and hence, sufficient mass flow through the expansion valve to feed the evaporator. This maintains the required cooling capacity and avoids a drop of evaporator temperature.
- Efficiency increase of the compressor by controlling the head pressure. This leads to improved efficiency of the compressor
- The noise level of fan motors can be kept at a minimum by avoiding the permanent on/off cycling of the fan motor.

The ALCO fan speed control can be delivered with the Copeland condensing units or as a separate accessory.

The fan speed controller selection depends on the fan motor maximum current, the fan quantity and the refrigerant pressure range.

The fan speed controller **FSF42S** = nominal current between 0.25 A and **4 A** for R404A, R507, R407C, R22
Single fans: model 75, 120, 270, 610
Double fans: model 75, 120, 270

The fan speed controller **FSF41S** = nominal current between 0.25 A and **4 A** for R134a
Single fans: model 75, 120, 270, 610
Double fans: model 75, 120, 270

The fan speed controller **FV142-T30A** = nominal current up to **8 A, all refrigerants**
Double fan model 610

Fan Speed Controller FSF 4 ..

In order to ensure compliance with the latest electromagnetic compatibility requirements of the European Community the fan speed controller we are using have a filter installed. With this filter the FSF fulfils the requirement of the European standards EN 55022, EN 50081 and EN 50082 and is conform to the EC-Directive 89/336/EC



Description of Control Behaviour of the FSF 4 ..

The FS control behaviour can be described by dividing it into *maximum range*, *proportional range* and *minimum range*, depending on the input pressure (see figure on the right side).

In the *maximum range* the FS provides a constant output voltage of approximately 1% below the supply voltage. The fan runs at maximum speed.

Along the *proportional range* the output voltage varies between maximum and minimum voltage. The minimum voltage is approximately 50% of the supply voltage.

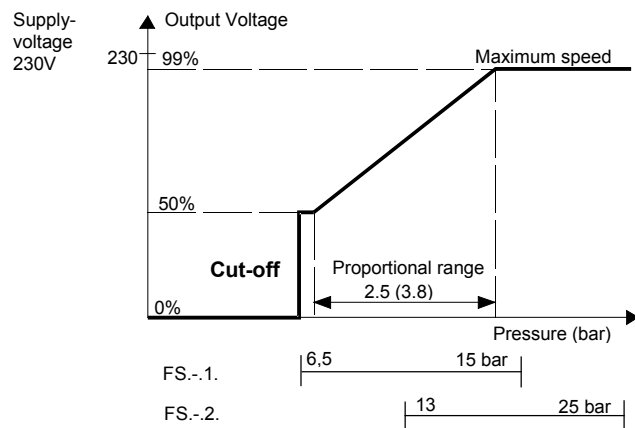
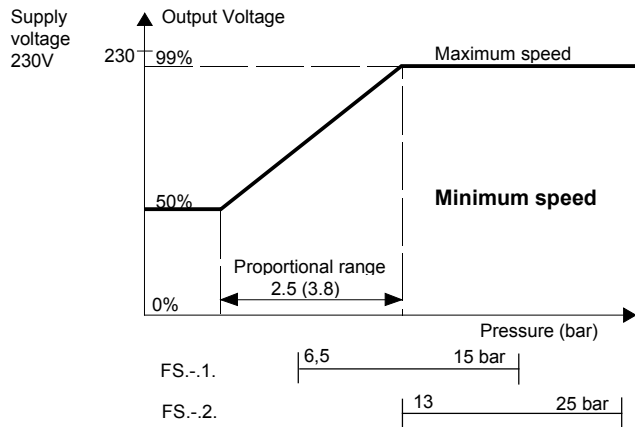
This means that with decreasing pressure the fan slows down from maximum speed to minimum speed.

For the *minimum range* the FS has two operating modes:

- *Minimum speed mode*: for pressure values below the minimum speed setting the fan runs according to the minimum output Voltage of appr. 50% of the supply Voltage (speed depends on the motor characteristics).
- *Cut-off mode*: for pressure values below the minimum speed setting the fan motor is switched off.

The fan speed controller is originally delivered set for the cut-off mode (position "0").

The pressure from which the FS operates in maximum range is adjustable and depends also on the model. The proportional range is fixed at approximately 2.5 bar or 3.8 bar, depending on the model. The minimum range is determined by the setting for the maximum range and the proportional range.



Technical Data of the FSF 4 ..

Supply voltage: 230V/AC +15%, -20%

Temperature range:

Nominal current: 0,5 - 4 (3) Ampère

Starting current: max. 8 Ampère/5 sec

Storage and transportation -30 °C to 70 °C

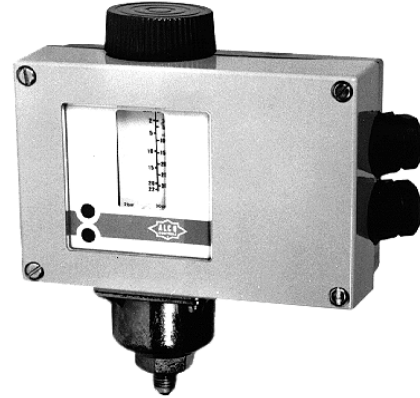
Ambient -20 °C to 55 (40) °C

Medium -20° C to 70°C

Pressure range (bar)	Pressure changes per full turn of the adjusting screw		Proportional band	Factory setting	Max. proof pressure
	clockwise	counter clockwise			
1 6,5 ... 15	~ +1,4 bar	~ -1,4 bar	2,5 bar	11,0 bar	31,0 bar
2 13 ... 25	~ +2,5 bar	~ -2,5 bar	3,8 bar	16,2 bar	36,0 bar

Fan Speed Controller FV 142-T30

In order to ensure full compliance with the latest electromagnetic compatibility requirements of the European Community an electronic filter FV EMC-10 is available. When wired in series with the FV142 the requirements of the European standards (EN 55022, EN 50081 and EN 50082) can be met. The FV142 is then conform with the EC-directive 89/336.



Description and control behaviour of the FV 142-T30

The FV 142-T30 control behaviour can be described by dividing it into *maximum speed*, *proportional range* and *minimum speed*.

When condensing pressure is above setting the fan runs with *maximum speed*. The FV142-T30 provides a constant output voltage of approximately 2% below the supply voltage.

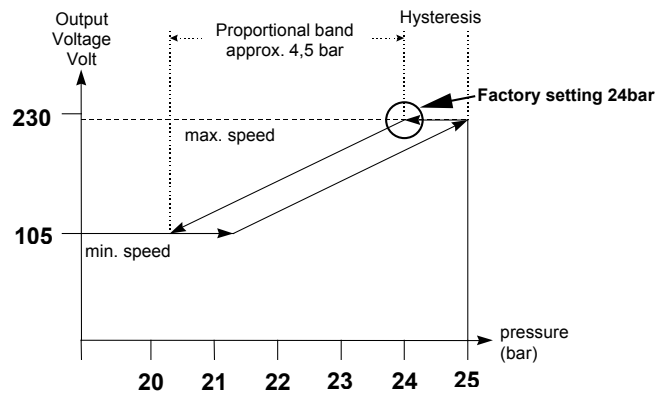
Along the *proportional range* the output voltage varies between maximum and minimum voltage. The minimum voltage is approximately 45% of the supply voltage. This means with decreasing pressure the fan slows down from maximum speed to *minimum speed*.

Besides the pressure setting (see table below) there is an additional setting screw to vary the proportional range. For motors with recommended minimum speed of >45% the *minimum speed can be adjusted* from 45-100% (i.e. min. speed 60% instead of 45%).

The *hysteresis* has the advantage that small pressure peaks has no effect on the speed of the fan.

Short term speed alteration therefore is avoided.

Factory setting FV142-T30



Technical Data of the FV 142-T30

Supply voltage: 230V/AC +15%, -20%
Temperature range:

Pressure range: 10 ... 30 bar

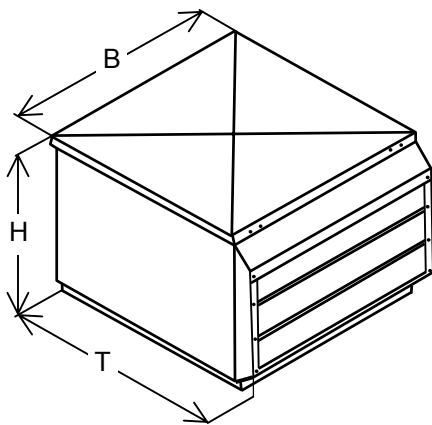
Nominal current: 0,5 - 8 Amp.
Storage and transportation +20 °C to 55 °C
Ambient +20 °C to 55 °C
Medium -20° C to 70°
Proportional band: ~3,5 - 5 bar
Factory setting: 24 bar
Max. proof pressure: 35 bar

4.4.2 Weather Housing

For the outdoor application of Copeland Scroll condensing units, Copeland offers a range of housing with the following features:

- Galvanized
- Painted with rust resistant paint (color = RAL 7032)
- Delivered has a flat pack
- Easy to mount
- Easy access for maintenance

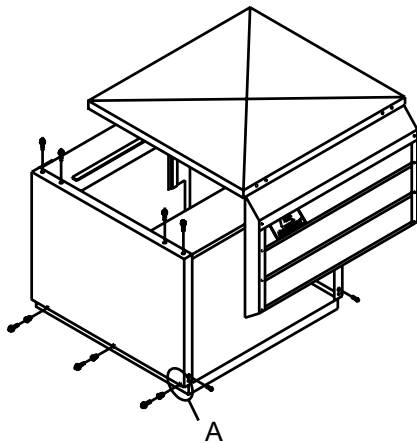
The different weather sizes are related to the condenser and compressor sizes.



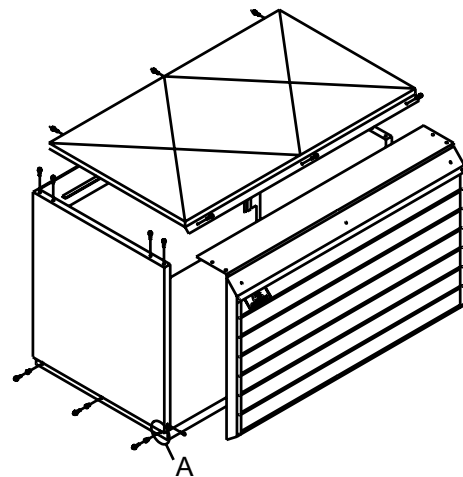
Model	Condensator	Compressor	Dimensions in mm			Weight (net) kg
			B	T	H	
B / D	D8	ZB, ZS, ZR	610	640	485	18.1
D-L	D8	ZF	610	785	485	19.3
H	H8, H9	ZB, ZF, ZR	785	750	570	23.4
M	M8, M9	ZB, ZF	785	800	745	29.3
F / K	K9	ZB	1000	710	495	25.8
P-CR	P8	ZB	1000	710	670	30.4
P-QR	P8	ZF	1000	810	670	32.3
R-CR	R7	ZB42, ZB45, ZR81	1180	750	670	32.0
R/S-QR	R7, S9	ZF, ZS56, ZR90	1180	890	745	44.6
V	V5, V6, V9	ZB, ZF, ZR, ZS	1380	890	910	52.6
W	W9	ZB, ZF, ZR, ZS	1690	890	910	58.0

Assembly Instructions:

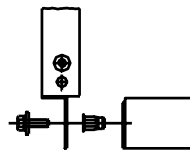
Weather housing Type B/D/H/M/F/K/P



Weather housing type R/S



Detail A



Torque for the bottom screw (M6) $M_A = 8-10 \text{ Nm}$

5 Electrical Diagrams

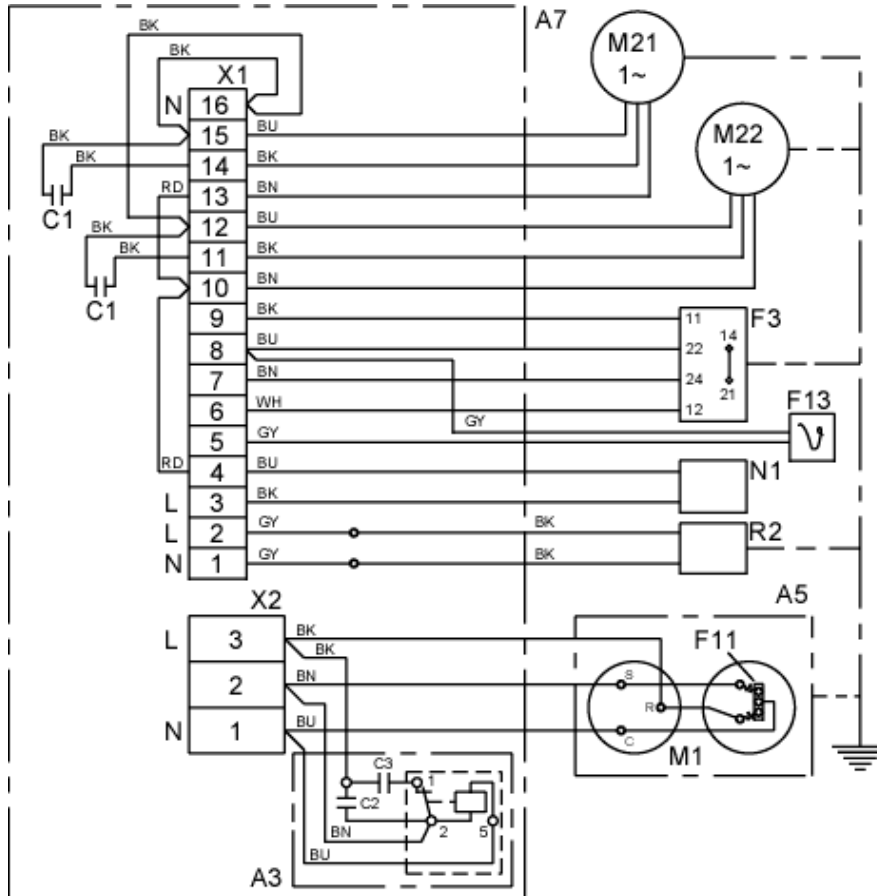
All the electrical wires are connected in the condensing unit terminal box. Each condensing unit is delivered with an electrical diagram that is stuck in the terminal box cover.

5.1 Present drawing

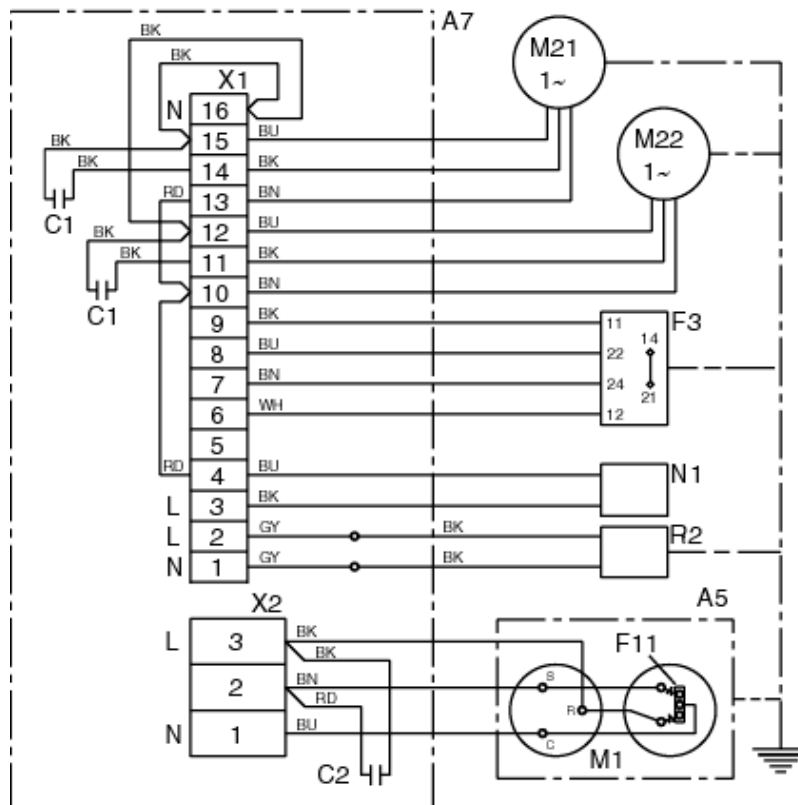
The condensing units we are presently manufacturing (from beginning 2003) are all equipped with single phase fans.

5.1.1 Condensing unit with ZB Single Phase Compressors (PFJ = 230 V - 1Ph - 50 Hz)

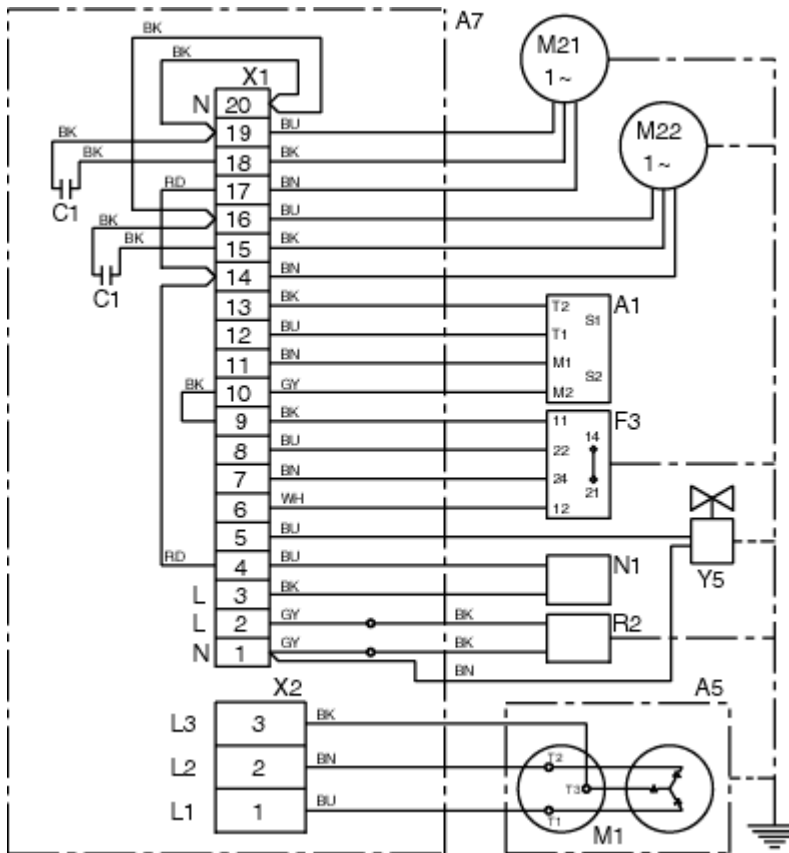
ZB compressors are equipped with starting kit (start relay and start capacitor)



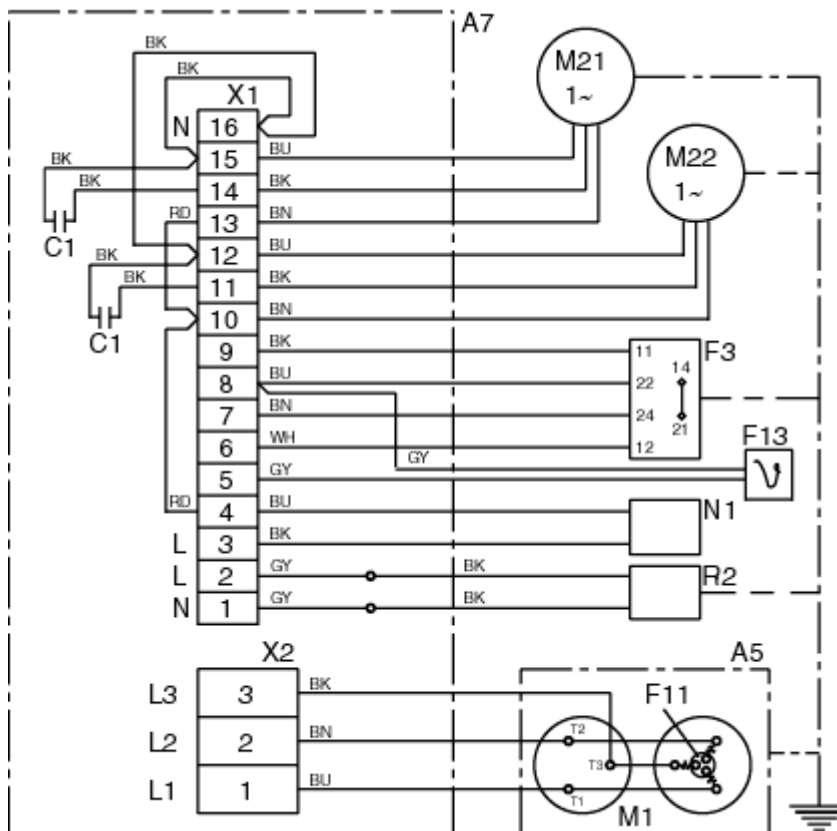
5.1.2 Condensing unit with ZR Single Phase Compressors (230 V - 50 Hz)



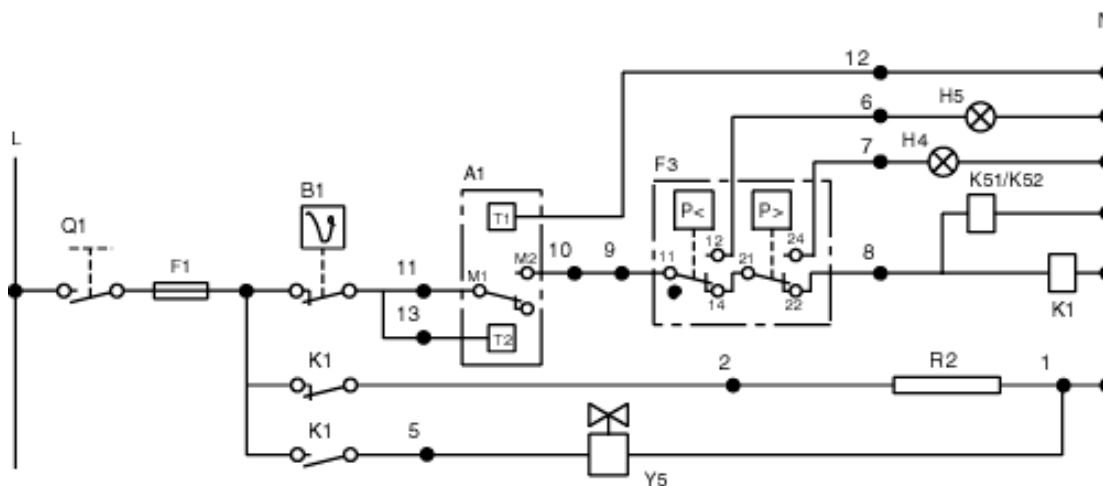
5.1.3 Condensing units with TFD/TF5 Three Phase compressors



5.1.4 Condensing units with TWD/TWR Three Phase compressors



5.1.5 Recommended control circuit



5.1.6 Legend for the electrical diagrams

Cable colours

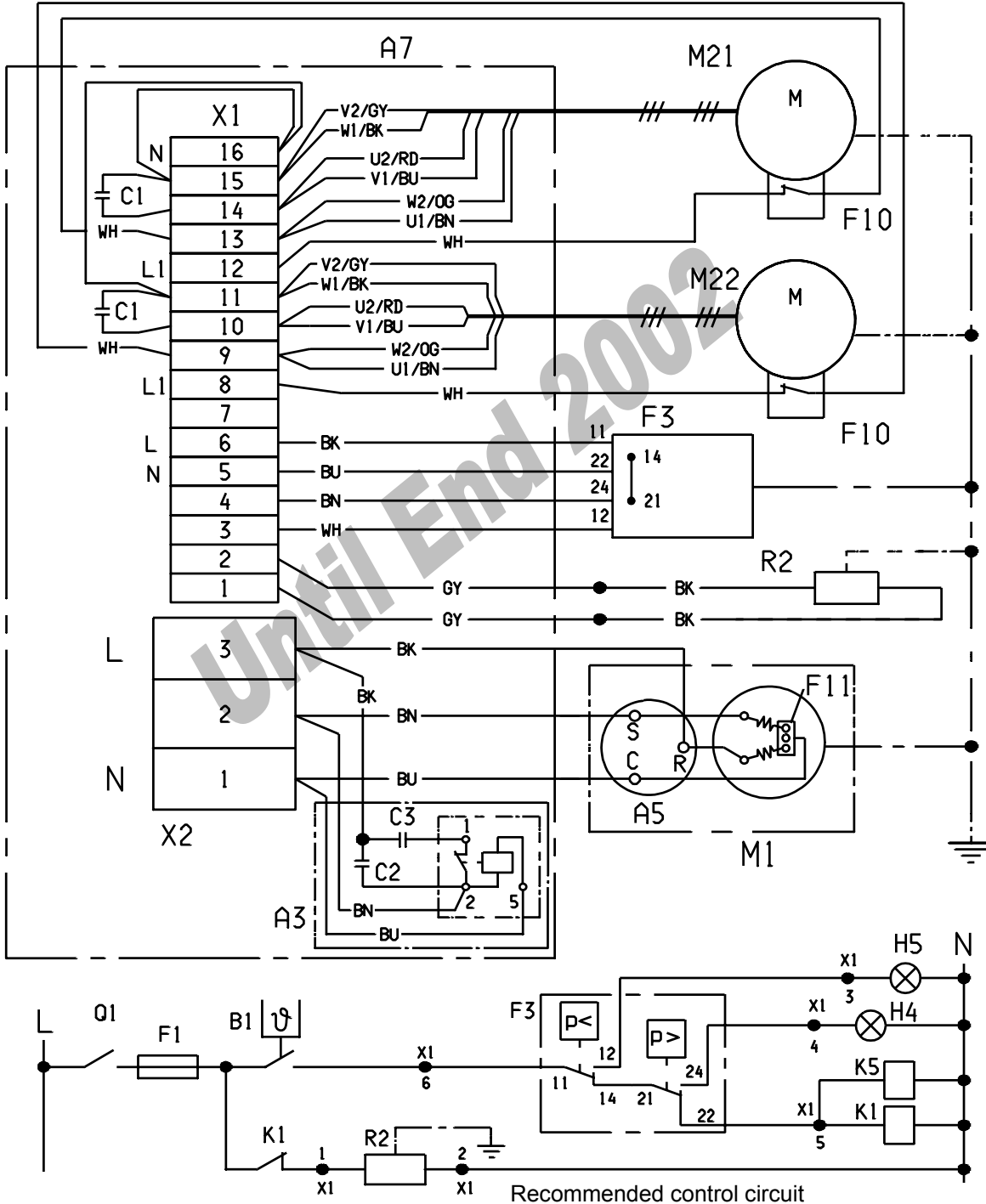
- WH = white
- GY = grey
- BK = black
- BN = brown
- BU = blue
- RD = red
- OG = orange
- G/Y = green/yellow

Nomenclature

- A1 = Compressor electronic module
- A3 = Capacitor and relay assembly
- A5 = Compressor terminal box
- A7 = Condensing unit terminal box
- B1 = Room thermostat
- C1 = Fan run capacitor, M21/M22
- C2 = Compressor run capacitor M1
- C3 = Compressor start capacitor M1
- F1 = Fuse for control circuit
- F3 = HP/LP pressure switch
- F11 = Over-current Thermal protector
- F13 = Discharge gas thermostat (if fitted)
- H4 = Signal lamp F3. Discharge pressure to high (if fitted).
- H5 = Signal lamp F3. Suction pressure to low (if fitted).
- K1 = Contactor M1
- K51 = Contactor M21
- K52 = Contactor M22
- M1 = Compressor motor
- M21 = Fan motor (condenser)
- M22 = Fan motor (condenser)
- N1 = Speed control fan (if fitted)
- Q1 = Main switch
- Q1 = Main switch
- R2 = Crankcase heater
- X1 = Terminal block
- X2 = Terminal block
- Y5 = Solenoid valve for liquid injection (if fitted).

5.2 Drawing units until end 2002

5.2.1 Single Phase (230 V - 50 Hz)



A3 = Capacity and relay assembly

C1 = Fan run capacitor

F3 = HP/LP pressure switch

M1 = Compressor motor

R2 = Crankcase heater

C2 = Compressor run capacitor

F10 = Fan motor protection

M21 = Fan motor (condenser)

X1 = Terminal block

A7 = Unit terminal box

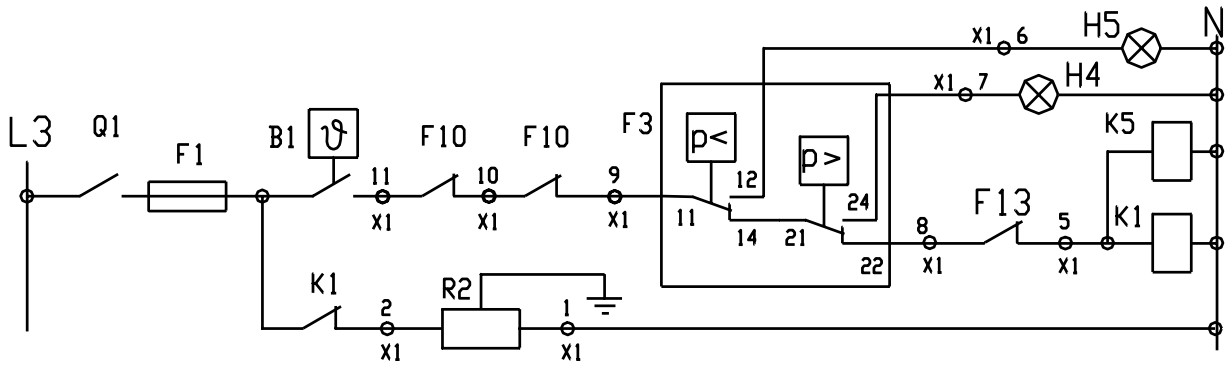
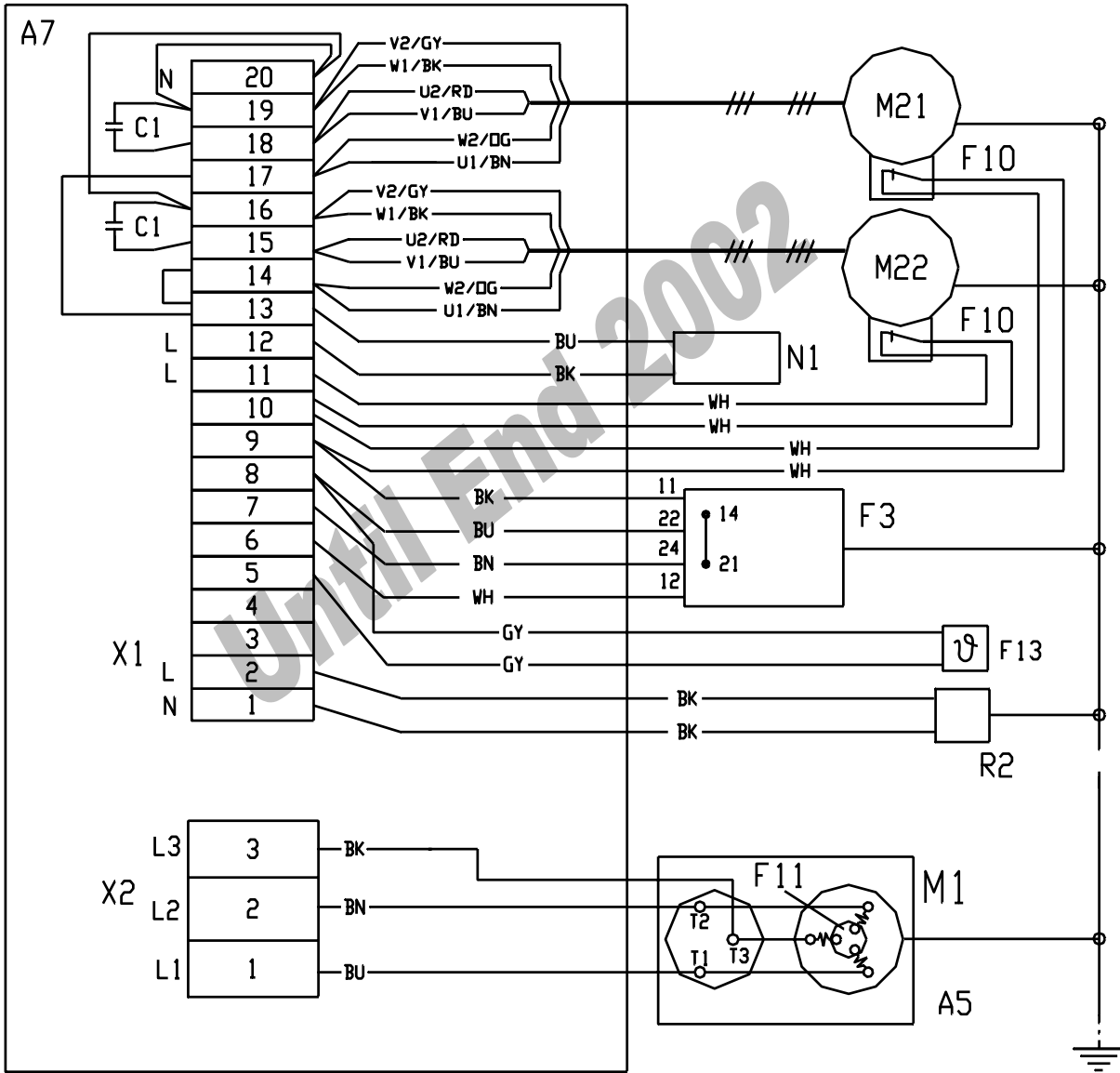
C3 = Compressor start capacitor

F11 = Over current thermal protection

M22 = Fan motor (condenser)

X2 = Terminal block

5.2.2 Three Phases TFD

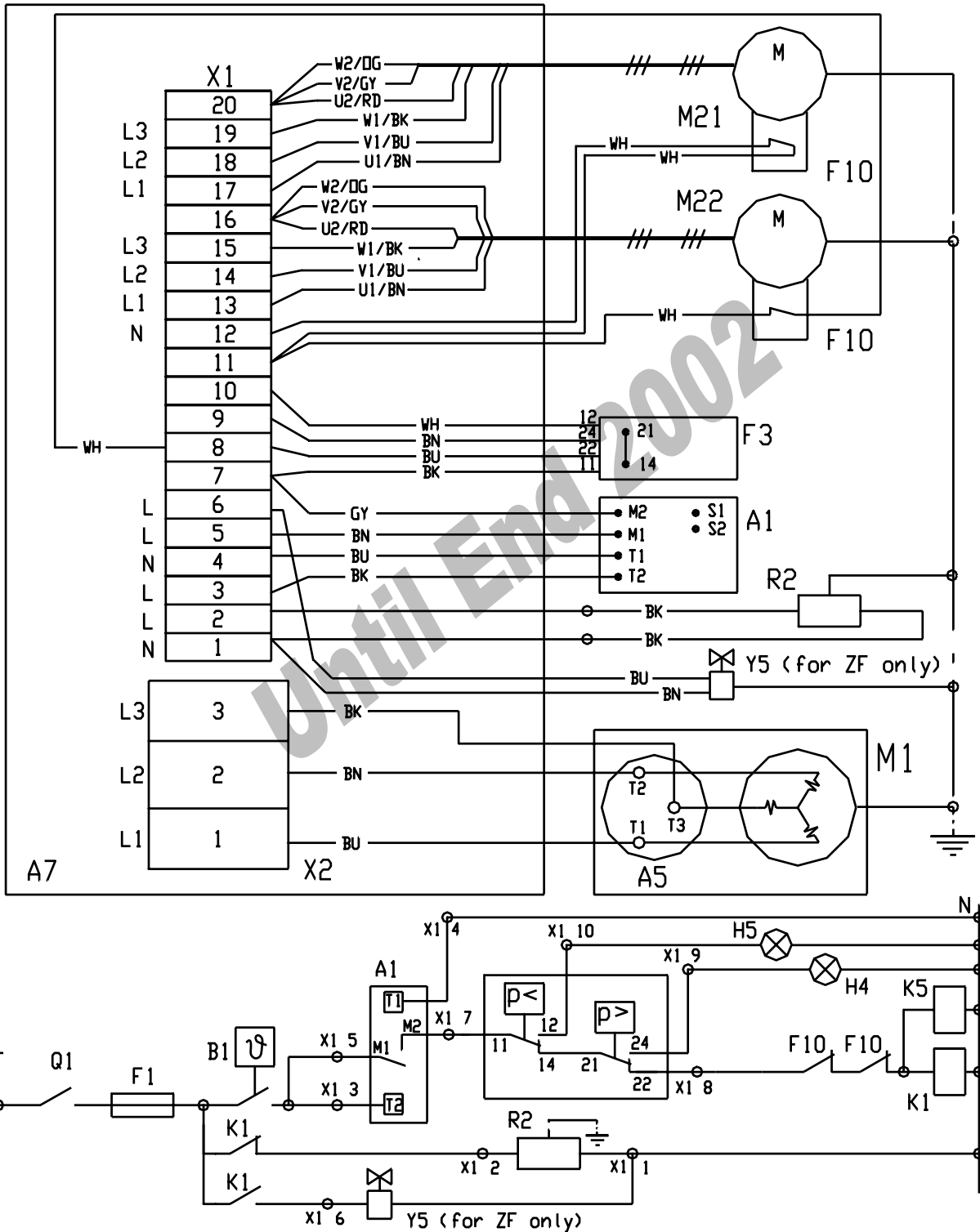


A5 = Compressor terminal box
 F3 = HP/LP pressure switch
 M1 = Compressor motor
 R2 = Crankcase heater

A7 = Unit terminal box
 F10 = Fan motor protection
 M21 = Fan motor (condenser)
 M22 = Fan motor (condenser)
 X1 = Terminal block

F13 = Discharge gas thermostat
 M21 = Fan motor (condenser)
 M22 = Fan motor (condenser)
 X2 = Terminal block

5.2.3 Three Phases TWD



A1 = Compressor protection module
 F3 = HP/LP pressure switch
 M1 = Compressor motor
 R2 = Crankcase heater
 Y5 = Refrigerant injection valve

A5 = Compressor terminal box
 M21 = Fan motor (condenser)
 X1 = Terminal block

A7 = Unit terminal box
 F10 = Fan motor protection
 M22 = Fan motor (condenser)
 X2 = Terminal block

6 Sound Data

Sound data is given in our Selection software: SELECT.

The value published is the A-Weighted average Sound Pressure Level at 1 metre, with a free sound propagation under availability of a firm floor and for a defined operating point (ref./evap./cond./superheat).

You can calculate the Sound pressure for a further distance by using the following formula:

$$LPA_d = LPA_{1m} - 20 \log(d)$$

LPA_d = A-Weighted Sound Pressure Level at a "d" distance
 LPA_{1m} = A-Weighted Sound Pressure Level at 1 meter
D = Distance

The sound pressure values measured in the field might be slightly different from the published value due to the surroundings, different room characteristics, reverberating object or walls...

7 PED Compliance

- The piping is in compliance with the Pressure Equipment Directive 97/23/EEC (Art.3§3 - sound Engineering Practice)
- Components of the Condensing units carry a CE mark as far as required, and thereby establish Conformity with the relevant Directives.
- Conformity Declarations for components are available as far as required.
- The units are in conformity with the low voltage directive. The applied harmonized standard is En 60335-1 (Safety Household and Similar Electrical Appliance, Part 1: General Requirements
- To incorporate these products into a machine the Manufacturer's declaration of incorporation has to be respected.

8 Protection Class

Please find under the protection class of the different element of the unit.

- Scroll compressors are, according to IEC 34:
 - IP 21 (for ZR18K4 to ZR81KC, ZB15KCE to ZB45KCE, ZF09K4E to ZF45K4E)
 - IP54 (for ZR90K3 to ZR19M3, ZF24K4E to ZF48K4E, ZS56K4E to ZF11M4E)
- Fan is IP54 according to IEC 34
- HP-LP safety pressure switch ALCO PS2 W7A is IP44 according to IEC 529/EN 60529
- Fan speed controller FSF are IP 65 according to IEC529/DIN 40050
- Fan speed controller FV 142-T30 is IP 55 according to IEC 529/DIN 40050

9 Installation and Service

The condensing unit should be located in such a place to prevent any dirt, plastic bag, leaves or papers from blocking the condenser and its fins.

A blocked condenser will increase the condensing temperature, thus reduce the cooling capacity, and lead to the high pressure switch tripping.

The condensing units are delivered with a holding charge of neutral gas.

Benelux

Deltakade 7
NL-5928 PX Venlo
Tel. +31 (0) 77 324 0234
Fax +31 (0) 77 324 0235

Deutschland/Österreich & Schweiz

Senefelder Straße 3
D-63477 Maintal
Tel. +49 (0)6109 6059 0
Fax +49 (0)6109 6059 40

France/Greece & Maghreb

8, Allee Du Moulin Berger
F-69130 Ecully
Tel. +33 (0)4 78668570
Fax +33 (0)4 78668571

Italia

Via Ramazzotti, 26
I-21047 Saronno (va)
Tel. +39 02 961781
Fax +39 02 96178888

España & Portugal

Diputacion, 238 AT.8
E-08007 Barcelona
Tel. +34 93 4123752
Fax +34 93 4124215

UK & Ireland

Colthrop Way
GB- Thatcham, Berkshire - RG19 4 NQ
Tel. +44 (0)1635 87 6161
Fax +44 (0)1635 877111

Sweden/Denmark/Norway & Finland

Östbergavägen 4, P.O.Box 10
S-59021 Väderstad
Tel. +46 (0) 142 70520
Fax +46 (0) 142 70521

Eastern Europe, Turkey & Iran

27, Rue des Trois Bourdons
B-4840 Welkenraedt
Tel. +32 (0) 87 305 061
Fax +32 (0) 87 305 506

Poland

11A, Konstruktorska
P-02-673 Warszawa
Tel. +48 225 458 9205
Fax +48 225 458 9255

Russia & CIS

Malaya Trubetskaya, 8-11th Floor
RUS-119881 Moscow
Tel. +7 095 232 94 72
Fax +7 095 232 03 56

Middle East & Africa

PO Box 26382, R/A 8, FD-2
Jebel Ali, Dubai - UAE
Tel. +9714 883 2828
Fax +9714 883 2848

Asia/Pacific

10/F, Pioneer Building, 213 Wai Yip Street,
Kwun Tong, Kowloon - Hong Kong
Tel. +852 28 66 31 08
Fax +852 25 20 62 27

Latin America

7975 North West 154Th Street - Suite 300
Miami Lakes, FL, 33016 - USA
Tel. +1 305 818 8880
Fax +1 305 818 8888



Copeland Marketing & Sales - 27, Rue des Trois Bourdons - B 4840 Welkenraedt, Belgium
Tel. +32 (0) 87 305411 - Fax +32 (0) 87 305506 - internet: www.ecopeland.com - email: eCommerce@eCopeland.com

The Emerson logo is a trademark and service mark of Emerson Electric Co. Copeland Corporation is a division of Emerson Electric Co. Copeland is a registered trademark and Copeland Scroll is a trademark of Copeland Corporation. Information contained in this brochure is subject to change without notification.

© 2003 Copeland



EMERSON
Climate Technologies