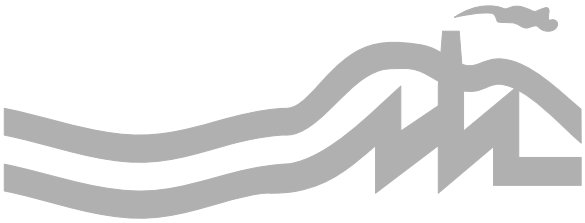

'M' SERIES MANUAL

Sigma Manual: SM277-2136
Series: M7/M20/M25
Type: 7kW to 25kW
Split or Package System
Applications: Heavy Duty Industrial

Manual No	: SM277-2136	Issue	:'K'
Preapared By	: S.Kapur	Approved By	: Joe Rotunno
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REVISION PAGE

DATE	ISS/CR No.	PAGE	DESCRIPTION
17/10/95	A/2863	8-4	Compressor was part number 200035 HP/LP gauge noted as optional item.
17/01/96	B/2943	8-4	M7 Heavy duty compressor part number was incorrectly stated as 230301 in lieu of 260201.
1/10/96	C/3435	8-6	Compressors motor contactor (651136) added for M15 & M20 110VAC systems.
19/3/97	D/3537	8-7	Description changes for UE367, UE358, UE368
23/3/98	E/3454/ 4174	Section 10	Drawings T2134019, AE207051 and AE207077 revised.
12/02/02	F/8064	8-6	Update Filter Element, changed 460727 to 460734
12/08/05	G/11631	Various	Updated Spares Lists and Drawings etc
14/11/05	H/11881	Various	Update to exclude M10 / M15 and include M25 unit
21/11/2006	I/ 12383	Various	HP setting to 2300Kpa & M7 evap coil part no. updted
12/06/07	J/12450	Various	M7/E part numbers corrected.
18/06/08	K/12764	8-7	UE367 replaced with 662233

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1.0 INTRODUCTION

The Sigma **'M' Series** Air Conditioning units have been designed and manufactured in Australia for mobile and stationary applications in the harshest of environments. High ambient conditions and/or vibration together with heavy particulate fallout are often encountered on mining and industrial areas. The Sigma 'M' Series have been developed over many years and are purpose built for these conditions.

They can be supplied in a variety of configurations to meet any application such as a self-contained package or as a split system with either roof or ceiling mounted fan coil (cooling) units. Four capacities are provided within the range and depending on requirements either **7kW, 20 kW or 25kW** of cooling is available. Air can be discharged and returned through the roof mounted evaporator base or sides. Fresh air pressurisation is provided by means of fan/filter units integrated with the evaporator or mounted separately.

The units are designed using the highest quality components for maximum life and reliability. They include special features such as stainless steel construction, return air filters, electric element heating, semi-hermetic compressors and easy access for service. In all, the units are designed to continue working, providing comfortable conditions for both operators and electronics of mining and industrial equipment thereby resulting in minimum downtime over many years.

Due to environmental problems with previous commonly used refrigerants, this series has been designed for use of ozone friendly HFC134a in standard applications.

1.1 MODEL NUMBER DESIGNATION

M 7 A E

System Component
E - External Evaporator
I - Internal Evaporator
C - Condenser
Blank - Package

Design Concept Number
Capacity kW (Standard Design)
Product Code
M - Multi-purpose, Heavy Duty Industrial

1.2 SERIAL NUMBER DESIGNATION

M7AN0001

M7AN0001 = Multi-purpose, Heavy Duty Industrial Air Conditioner

M**7**AN0001 = Nominal kW Cooling Capacity

M7**A**N0001 = Model Series

M7A**N**0001 = Originating Branch (Within Australia)

M7AN**0001** = Sequence Number to Track Details and Options Fitted

2.0 DESCRIPTION OF EQUIPMENT

SYSTEM		M7	M20	M25
SERIES		**A**	**A**	**A**
Evaporator (External Mounted)	STD	M7/E	M20/E	M25/E
Evaporator (Internal Mounted)	OPT	M7/I	N/A	N/A
Condenser (Forced Draft)	STD	M7/C	M20/C	M25/C
Main Control Cubicle (110 Volt)	STD	MEWM2	MEWM8	MEWM8
Main Control Cubicle (240 Volt)	OPT	N/A	MEWM9	MEWM9
Pilot Control Box (110 Volt)	STD	MEWH1	MEWH1	MEWH1
Pilot Control Box (240 Volt)	OPT	MEWK3	MEWK3	MEWK3
Pressuriser (415 Volt)	STD	FVV80MR1	FVV100MR1	FVV100MR1
Pressuriser (240 Volt)	OPT	FVF90K1	FVF90K1	FVF90K1
Pressuriser (415 Volt)	OPT	FVF90M1	FVF90M1	FVF90M1
Condensate Heater	OPT	MHF1K1	MHF1K1	MHF1K1

Each system can be supplied as a completely self-contained unit needing only positioning on mounting channels with electrical and condensate connections or it can be supplied in a split configuration with the **Evaporator** and **Condenser** units mounted at separate locations with refrigerant hose/piping runs interconnecting the two.

A separate **Pilot Control Box** and **Main Control Cubicle** is also provided to control the functions of the system. Fresh air pressurisation is a normal option and can be supplied loose or mounted on the evaporator unit as required.

Supply and return air can be ducted directly into and from a room through the base of the evaporator unit or ducted externally from the unit sides as the application requires. The package and split configuration offer a wide variety of solutions to air distribution requirements. (Refer to Drawing T2134005 and T2324005).

2.1 EXTERNAL MOUNTED EVAPORATOR

(Refer Drawing T2134016 and T2324002)

SYSTEM		M7/E	M20/E	M25/E
SERIES		A	A	A
Case Construction	STD	Stainless Steel Grade 304		
	OPT	Stainless Steel Grade 316		
Mounting Type	STD	Roof or Floor Mounted Evaporator		
Cooling Capacity	STD	7kW	20kW	25kW
Heating Capacity (Elect. Element)	STD	3kW	9kW	9kW
	OPT	Heating can be removed if not required		
Coil Construction	STD	BAP - Brass Ends/Aluminium Fins/Passivated Finish		
	OPT	BCE - Brass Ends/Copper Fins/Electrotin Finish		
	OPT	EPOXY - Coating finish for either coil		
Refrigerant	STD	HFC134a		
Suction Fitting	STD	-16	-20	-20
Liquid Fitting	STD	-8	-10	-10
Fan Type	STD	High Static	High Static	High Static
	OPT		-	
Fan Motor Type	STD	2 Speed 4/6 Pole TEAOM Class F		
Supply Voltage	STD	415V AC/3 Phase/50 Hz		
Control Voltage	STD	110V AC/1 Phase/50 Hz		
	OPT	240V AC/1 Phase/50 Hz		

The **Roof Mounted Evaporator** is a fan/coil cooling unit designed for either bottom discharge or side/ducted discharge as the application dictates. The cooling unit (or low side) comprises of the cooling coil, thermostatic expansion valve, circulating fan and motor, filters and electric heating elements if required. The split evaporator is used with the matching split condenser by connection with refrigeration hoses/piping or can be bolted directly to it forming the package system. (Refer Drg T2134015 and T2324001).

The **Pilot Control Box** is remote mounted but the **Main Control Cubicle** can be fitted on the unit if required. If a **Fresh Air Pressuriser** is required then the fan/filter unit can be bolted directly to the side of the evaporator or remote mounted. Recirculated air is drawn from inside the cabin through mechanical mesh filters, passed over the cooling coil and returned to the cabin.

2.2 INTERNAL MOUNTED EVAPORATOR

(Refer Drawing T5102001)

SYSTEM		M7/I	M20/I	M25/I
SERIES		A	A	A
Case Construction	STD	Stainless Steel Grade 304		
Mounting Type	STD	Ceiling or Wall Mounted Evaporator		
Cooling Capacity (HFC134a)	STD	7kW	N/A	N/A
Cooling Capacity (HFC124a)	OPT	5kW	N/A	N/A
Heating Capacity (Elect. Element)	STD	3kW	N/A	N/A
	OPT	Heating can be removed if not required		
Coil Construction	STD	BAP - Brass Ends/Aluminium Fins/Passivated Finish		
	OPT	BCE - Brass Ends/Copper Fins/Electrotin Finish		
	OPT	EPOXY - Coating finish for either coil		
Refrigerant	STD	HFC134a		
	OPT	HFC124a (High Ambient)		
Suction Fitting	STD	-16		
Liquid Fitting	STD	-8		
Fan Type	STD	Low Static		
Fan Motor Type	STD	2 Speed 4/6 Pole TEAOM Class F		
Supply Voltage	STD	415V AC/3 Phase/50 Hz		
Control Voltage	STD	110V AC/1 Phase/50 Hz		
	OPT	240V AC/1 Phase/50 Hz		

The **Internal Evaporator** is a fan/coil cooling unit designed for mounting inside the air conditioned space when roof mounting and/or ducting into the room is not practical. The cooling unit (or low side) comprises of the cooling coil, thermostatic expansion valve, circulating fan and motor, filters and electric heating elements if required. This split evaporator is used with the matching split condenser by connection with refrigeration hoses or piping.

The relevant electrical controls, namely **Main Control Cubicle** and **Pilot Control Box**, are remote mounted. If a **Fresh Air Pressuriser** is required then the fresh air must be ducted from outside the room to the unit. Recirculated air is drawn from inside the cabin through mechanical mesh filters, passed over the cooling coil and returned to the cabin.

2.3 EXTERNAL MOUNTED CONDENSER

Refer Drawing T2324004 (for M20)and T3178002 (for M25)

SYSTEM		M7/C	M20/C	M25/C
SERIES		A	A	
Case Construction	STD	Stainless Steel Grade 304		
	OPT	Stainless Steel Grade 316		
Mounting Type	STD	Roof or Floor Mounted Condenser		
Cooling Capacity (HFC134a)	STD	7KW	20KW	25KW
Cooling Capacity (HFC124a)	OPT	5kW	N/A	N/A
Heatinf Capacity		3KW	9KW	9KW
Coil Construction	STD	BAP - Brass Ends/Aluminium Fins/Passivated Finish		
	OPT	BCE - Brass Ends/Copper Fins/Electrotin Finish		
	OPT	EPOXY - Coating finish for either coil		
Refrigerant	STD	HFC134a		
	OPT	HFC124a		
Suction Fitting	STD	-16	-20	-20
Liquid Fitting	STD	-8	-10	-10
Fan Type	STD	Multi Blade Axial - Blow Through		
	OPT	Multi Blade Axial - Draw Through		
Fan Motor Type (HFC134a)	STD	1 Speed 4 Pole TEAOM Class F	2 Speed 4/6 Pole TEAOM Class F	
Fan Motor Type (HFC124a)	OPT	2 Speed 4/6 Pole TEFC Class F	-	-
Compressor Type	STD	Hermetic	Semi-Hermetic	Semi-Hermetic
	OPT	Semi-Hermetic	-	
Compressor Cooling	STD	Suction Cooled		
Compressor Suction Unloader	OPT	-	Yes	Yes
Crankcase Heater	OPT	Hermetic Only	Yes	Yes
Compressor Pumpdown	STD	Automatic on 'OFF' cycle		
Pressure Gauges	-	Optional	Oil Dampened HP and LP gauges	
Air Intake Cover - Louvre	STD	Yes	Yes	Yes
Air Intake Cover - Punched Grille	OPT	Yes	No	No
Air Intake Cover - Wire Grille	OPT	Yes	No	No
Supply Voltage	STD	415V AC/3 Phase/50 Hz		
Control Voltage	STD	110V AC/1 Phase/50 Hz		
	OPT	240V AC/1 Phase/50 Hz		

2.3 EXTERNAL MOUNTED CONDENSER Cont'd

The **Condenser** unit (or high side) contains all necessary components, including safety devices to compress the refrigerant gas, condense it to a liquid and store it prior to being supplied to the evaporator unit. Drawings enclosed give details of its overall size, together with clearance required for air entry and discharge and to permit maintenance work to be carried out. The condenser can be located directly to the external evaporator as a package system or remote mounted and connected to either the external or internal evaporators with refrigeration hoses or piping. The **Main Control Cubicle** can be remote mounted or bolted directly to the unit.

2.4 MAIN CONTROL CUBICLE

(Refer Drawing T2134012)

SYSTEM		**M7**	**M20**	**M25**
Model Number (110 Volt Control)		**MEWM2**	**MEWM6**	**MEWM6**
Model Number (240 Volt Control)		**N/A**	**MEWM9**	**MEWM9**
Case Construction	STD	Stainless Steel Grade 304 Enclosure		
	OPT	Stainless Steel Grade 316 Enclosure		
Mounting Type	STD	Remote or Unit Mounted Electrics		
Main Isolation	STD	Lockable - Full Load Rated		
Fuses	STD	Control Circuit and Crankcase Heater only		
Overload Protection	STD	Siemens combined CB/TOLS		
Contactors	STD	Siemens		
Power Circuit	STD	415V AC/3 Phase/50 Hz with Neutral		
Control Circuit	STD	110V AC/50 Hz via Transformer		
	OPT	240V AC/50 Hz via Neutral or Transformer		

The **Main Control Cubicle** contains all necessary electrical controls and safety devices (except switches and thermostat) required to operate each system. The **Main Isolating Switch** is door mounted with a mechanical interlock. The switch can be padlocked for security. The cubicle can be remote mounted or mounted directly to either the rooftop evaporator or condenser unit as dictated by servicing requirements and/or installation constraints.

Electrical Schematic with Pumpdown - Drawing AE207051
Electrical Schematic without Pumpdown - Drawing AE207077

2.5 PILOT CONTROL BOX

(Refer Drawing T2134011)

SYSTEM		M7	M20	M25
Model Number (110 Volt Control)		**MEWH1**		
Model Number (240 Volt Control)		**MEWK3**		
Case Construction	STD	Mild Steel Rittal Type Enclosure		
Mounting Type	STD	Remote Wall Mounted Control Box		
Selector Switches	STD	HEAT-VENT-COOL and OFF-LOW-HIGH		
Thermostat	STD	Mechanical Adjustable with High & Low Stops		
	OPT	Electronic 2 Stage with Adjustable Setpoint		
Indicator lights	STD	Push to Test Type		
Control Circuit	STD	110V AC/50 Hz via Transformer		
	OPT	240V AC/50 Hz via Neutral or Transformer		

The **Pilot Control Box** contains the thermostat and control switches necessary for an operator to select the function required of the air conditioning system. It is mounted within the air conditioned space in easy reach of operating personnel. The thermostat can be remote mounted if required.

2.6 PRESSURISER

2.6.1 MODEL FVV80MR1 and FVV100MR1

(Refer Drawing AS162628 and AS162629)

SYSTEM		M7	M20	M25
Model Number		**FVV80MR1**	**FVV100MR1**	**FVV100MR1**
Mounting Type	STD	Remote or Unit Mounted		
Construction	STD	Mild Steel - Powder Coated		
Airflow	STD	80 l/s max.	100 l/s max.	100 l/s max.
Pre-Cleaner	STD	Centrifugal - Manual Cleaning		
	OPT	Centrifugal Turbo - Self Cleaning		
Power Supply	STD	415V AC/3 Phase/50 Hz		

This **Fresh Air Pressurisation Pack** consists of a pre-cleaner and final filter element working together to give a three stage filtering process. The pre-cleaner cleans the larger of the dust contaminants, the medium weight particles are caught by the end cup while the final filter element provides 99.9% cleaning efficiency to the air entering the evaporator and thus the operators cabin. The pack is normally mounted on the evaporator unit blowing fresh air into the return air chamber to mix it before being passed through the coil for conditioning. It can be remote mounted and ducted if required.

2.6.2 MODEL FVF90K1 and FVF90M1
(Refer Drawing T5003001)

SYSTEM		M7	M20	M25
Model Number (240 VAC)		**FVF90K1**		
Model Number (110 VAC)		**FVF90M1**		
Mounting Type	STD	Floor Mounted and Ducted		
Construction	STD	Stainless Steel Grade 304		
Airflow	STD	110 l/s max		
Filter	STD	Sub Micron Single Pass Bag		
Filter Accessory	OPT	Gas Phase Purafil Filter Bed		
Power Supply	STD	240V AC/1 Phase/50 Hz		
	OPT	415V AC/3 Phase/50 Hz		
Control Circuit	STD	110V AC/50 Hz via Transformer		
	OPT	240V AC/50 Hz via Neutral or Transformer		

This **Fresh Air Pressurisation Pack** is a self cleaning single pass, sub-micron efficient filtration unit designed as a stand alone unit. It can be ducted to any application required and be controlled by the air conditioning control system. Self cleaning is a reverse flush system controlled electrically by adjustable timers within the unit. For full details see Sigma Service Manual SM146-2071.

2.7 CONDENSATE HEATER
(Refer Drawing T2132008)

SYSTEM		M7	M20	M25
Model Number		**MHF1K1**		
Case Construction	STD	Stainless Steel Grade 304		
Mounting Type	STD	Floor Mounted		
Heating Capacity	STD	2kW		
Power Supply	STD	415V AC/3 Phase/50 Hz		

The **Condensate Heater** is provided to dispose of any condensate produced in applications such as smelter cranes, where disposal is a safety requiremnt.

3.0 TECHNICAL DATA AND CONTROL SETTINGS

3.1 PERFORMANCE SPECIFICATIONS

SYSTEM		**M7**	**M20**	M25
SERIES		**A**	**A**	
Cooling Capacity (HFC134a)	STD	7kW	20kW	25KW
Cooling Capacity (HFC124a)	OPT	5kW	N/A	N/A
Heating Capacity	STD	3kW	9kW	9KW
Continuous Operating Ambient Temp	STD	55^{O}C DB Max.		
Rated Ambient Temperature - Summer		46^{O}C DB/24^{O}C WB (AS1861 Condition B)		
- Winter		6^{O}C DB		
Rated Inside Temperature - Summer		29^{O}C DB/19^{O}C WB		
- Winter		21^{O}C DB		
Suction Temperature (HFC134a)	STD	-2^{O}C		
(HFC124a)	OPT	5^{O}C		
Refrigerant (Rated Ambient)	STD	HFC134a (Charge to Liquid Moisture Indicator)		
(High Ambient)	OPT	HFC124a	N/A	N/A
Supply Air Quantity	STD	320 l/s	900 l/s	900 l/s
Fresh Air Quantity	STD	80 l/s	100 l/s	100 l/s

3.2 UNIT MASS

SYSTEM	**M7**	**M20**	**M25**
	(kg)	**(kg)**	**(kg)**
Condenser /C	225	400	410
Evaporator /E	175	290	290
Evaporator /I	105	N/A	N/A
Main Control Cubicle	29	29	29
Pressuriser (Model FVV80/100)	25	25	25
Pilot Control Box	6	6	6
Package Unit Total	454	750	760

3.3 ELECTRICAL EQUIPMENT SETTINGS

3.3.1 Room Thermostat (Mechanical)

Set Point : 19 to 30°C adjustable
Differential : 1°C

Room Thermostat (Electronic)

Set Point : 10 to 30°C adjustable
Differential : re adjustable

The following AIT Part numbers may be used

AIT Part Number	Description
681789	Thermostat / Relay Box
681408	Duct Sensor
681410	Wall Sensor
692406	Pot 5K ohm

3.3.2 Heater Safety Thermostat

Cut Out (non adjustable) : 52°C
Type : Auto Reset

3.3.3 Currents and Circuit Breaker Settings

SYSTEM		M7	M20	M25
CIRCUIT BREAKER		FLA/SET	FLA/SET	FLA/SET
Evaporator Fan Low	(EFLB)	1.6/1.7A	1.6/1.7A	1.6/1.7A
Evaporator Fan High	(EFHB)	2.9/3.0A	2.9/3.0A	2.9/3.0A
Pressure Fan (FVV80/100)	(PMB)	1.3/1.4A	1.3/1.4A	1.3/1.4A
Pressure Fan (FVF90)	(PMB)	-	-	-
Condenser Fan Low	(CFLB)	2.0/2.1A	1.6/1.7A	1.6/1.7A
Condenser Fan High	(CFHB)	-	4.8/4.9A	4.8/4.9A
Compressor	(CMB)	5.9/6.5A	22.1/24.0A	23.5/24.0A
Heaters	(HB)	4.2/6.0A	12.5/14.0A	12.5/14.0A
Total System c/w Standard Pressuriser		12.1A	33.0A	33.0A

3.4 REFRIGERATION SYSTEM SETTINGS

(Refer Drawing T2134019 and T2324009)

3.4.1 Pressure Controls (HFC134a)

LP1 - Low Pressure Control:	Cut in :	210 kPa
	Cut out:	105 kPa
	Type :	Auto Reset
HP1 - High Pressure Control:	Cut out:	2300 kPa
	Type :	Manual Reset
HP2 - High Pressure Control:	Cut in :	1450 kPa
	Cut out:	1100 kPa
	Type :	Auto Reset

Pressure Controls (HFC124a)

ULP1 - Ultimate Low Pressure Control:	Cut in :	150 kPa
	Cut out:	30 kPa
	Type :	Auto Reset
UHP1- Ultimate High Pressure Control:	Cut in :	1550 kPa
	Cut out:	1900 kPa
	Type :	Auto Reset
HP2 - High Pressure Control:	Cut in :	1100 kPa
	Cut out:	850 kPa
	Type :	Auto Reset
Hot Gas By-Pass	Begin to modulate at 70 kPa suction pressure.	

Switch Adjustment

A) COMPRESSOR PRESSURE SWITCH (HP1/LP1)

To adjust the "cut-out" setting, proceed as follows:-

1. Remove the locking plate securing the pressure range adjusting screw.
2. Use a screw-driver to adjust the pressure range adjusting screw.
3. The pressure indicated on the range indicator scale should correspond to the pressure quoted above.

NOTE:
The differential between high pressure "cut-in" and "cut-out" is fixed and therefore cannot be adjusted, i.e. the control has to be reset manually by pressing the "reset" button.

To adjust the low pressure "cut-in" setting, adopt the same procedure as for high pressure "cut-out" adjustment.

3.4 REFRIGERATION SYSTEM SETTINGS cont'd

The differential on the low pressure side can be altered. Use a screw driver to adjust the low pressure differential to the value quoted above.

NOTE:
Cut in - Cut out = Differential.

B) HEAD PRESSURE CONTROL (HP2)

To adjust the pressure settings, proceed as follows:-

1. Remove the locking plate and adjust the range indicator to the "cut in" pressure.
2. Adjust the differential indicator to the differential value.
3. Refit the locking plate and secure.

3.4.2 Thermostat Expansion Valve

Factory Setting : 6^{o}C superheat

NOTE:
The TX Valve should only be adjusted when a new valve is fitted, before the system is run and to manufacturers data.

3.4.3 Pumpdown System

This feature automatically operates to remove refrigerant from the low side of the system and store it in the high side. When the unit is turned off, a relay closes the solenoid valve and keeps the compressor running until the low pressure switch (LP1) cuts out. This is to prevent liquid refrigerant migration during long off cycles and possible resulting compressor damage on start up. A 'Fault' light will be on during pumpdown operation.

3.4.4 Compressor Cylinder Unloaders (Option)

No.1	Unload on pressure fall at	:	190 kPa
	Load on pressure rise at	:	266 kPa
No.2	Set to minimum unload pressure		

4.0 INSTALLATION AND COMMISSIONING INSTRUCTIONS

4.1 UNIT INSTALLATION

This section is aimed at being a general guide to ensure that fundamental installation principles are followed. Refer Drawing T2134014 and T2324007 for typical rooftop mounting details. Refer to Sigma for complete installation details if required.

4.1.1 Condenser

The condenser must be located in a position that satisfies the following:

a) has plenty of fresh air to reduce the possibility of recirculation.
b) is level
c) has access for service

It should be located:

a) as close as possible to the evaporator to reduce hose runs and hence line pressure drops

b) in a position where dust build up/fall out is minimal. (Even though we utilise coarse fin pitch, louvres and an open base a clean air environment will decrease maintenance requirements)

c) with ready access to the electrical cubicle

Condenser air flow is reversible.

4.1.2 Evaporator

The evaporator can be ceiling, roof, wall or remotely mounted and any combination of supply and return air options utilised.

For rooftop mounting see Drawing T2134016 and T2324002 for cutout and preparation details.

For correct installation it is most important to ensure that:

a) space is allocated for service

b) fresh air inlet is in a clean environment and ideally only ambient air and not pre-heated by a previous process. Dust loading should also be considered

c) mounting is to a solid and rigid structure

4.1 UNIT INSTALLATION Cont'd

d) duct runs are kept to a minimum and if greater than approximately 3m the duct velocity should not be greater than 5-6 m/s and where possible free of bends and restrictions. The system is designed for ducted applications but care must be taken to ensure that pressure drops are not exceeded. The maximum pressure drop allowable for ductwork is 100 Pa. If no ductwork is used for the system then a fan outlet restriction must be fitted. See Sigma.

e) outlet grille areas should total sufficient area to keep outlet velocities less than 3 m/s. Smaller outlet will result in a higher velocity and noise level.

f) with multiple rooms and multi-outlet ducting, facility is to be provided to enable 'balancing' to be effected.

g) outlets do not discharge into the vicinity of return air.

h) the return air is located in a position such that even air distribution through the enclosure is guaranteed.

i) condensate drains are of at least 16mm bore and drain both sides. 'P' traps must be fitted to prevent water hold up. The run must be as short as practicable.

4.1.3 Pilot Controls

The control panel must be located in a position that is convenient to the operator.

A thermostat is typically mounted (but may be relocated) on the side or front of the pilot control. Its purpose is to sense room temperature and so control heating elements or the compressor operation. Consequently if placed incorrectly the system will not perform as expected.

The following is a guide:

a) never locate
- above an urn, toaster or hotplate or other heat source uninsulated
- on an outside wall
- in the supply air stream
- in a 'stagnant' area of the enclosure

b) If possible, attempt to position in the return air stream as this truly measures the mixed condition of the air.

4.2 POWER SUPPLY CONNECTION

Refer Drawing T2134007 and T2324006 for core sizing and quantity.

The interconnecting electrical wiring between individual items when not supplied as a package system should be appropriately housed within a suitable conduit (Liquatite - size 25mm). All cable entries should be suitably sealed against any infiltration of dust and water using the fittings provided. The electrical conduit can be cable tied to refrigeration hoses if available or securely clamped every 500mm along the path chosen. All system components have terminal boxes so no direct wiring to unit components (e.g. motors) is required.

4.3 HOSE RUN INSTALLATION

Refer Drawing T2134007 and T2324006 for hose sizing.

This section only applies to the installation of split systems where the evaporator and the condenser are remotely mounted from each other.

NOTE:

If hose runs exceed 10 metres and/or are required to be carried out in copper tubing please refer to Sigma for advice.

a) Firstly, pre-determine the path to be taken between the condenser and the evaporator and thus the length of hose required. Do not run hoses over machinery access panels; avoid runs over hot surfaces; do not overhang hose runs over edges; minimise the amount of bends; and do not tension the hose run between condenser and evaporator or between clamps.

NOTE:

As bulkhead fittings for each size unit are the same, adaptors must be used to match the hose used.

b) Avoid any hose contact with sharp edges or corners. If this is unavoidable always provide a conduit sleeving around the hoses providing the outer braid of the hose with additional protection against wear. All bend radii should be kept to a minimum of 165mm and if possible should be always greater than this figure. Avoid twists within the hose and if the evaporator is on a cabin moving in relation to the condensing unit, an appropriate loop slack enough to take the relative movement without tensioning the hose, must be allowed for in the installation of the hose run.

4.3 HOSE RUN INSTALLATION Cont'd

c) All fittings on the hoses should be installed by a qualified refrigeration mechanic as incorrect installation can be detrimental to the performance of the air conditioning unit. It is strongly recommended that these interconnecting hose assemblies be acquired from Sigma. Avoid leaving an open ended hose line on a dirty floor as dust and other foreign particles may gather within the bore causing a blocked filter drier during operation. During installation, all hoses should be appropriately sealed from any moisture or foreign particles that may gather within the bore. If there is any doubt as to the cleanliness of the bore, dry nitrogen should be blown through the hose to eject any foreign matter. All unit connections should be via bulkhead fittings located on the unit.

d) Securely weld all hose clamps to fixed panels, ensuring that the welding is of good quality. If welding is not possible, bolting the clamps down is the other alternative. To avoid any unnecessary movement of the hose runs, weld on clamps should be spaced approximately 2 per 1200 -1500mm run. If a run over a sharp edge is unavoidable, it is preferred to have a weld-on clamp welded on the corner and run the hoses through the clamp.

e) Ensure that there is no suction loop which will trap oil and thus starve the compressor, and ensure that there is always a positive drop to the condensing unit, allowing for all the oil to return back to the compressor sump.

4.4 COMMISSIONING INSTRUCTIONS

Before despatch, the plant completes a pre-delivery check including the following:

- Leak Testing
- Vacuum Drying
- Initial Charging
- Full Test Run
- Adjustment of Pressure Settings
- Pump Down.

The following installation procedures are required on-site prior to initial start-up:

After mounting the unit and connection of duct work and mains electrical supply to the control panel has been completed, proceed as follows for initial start-up :

1. Evacuate interconnection lines through evaporator service ports. Check for leakage.

4.4 COMMISSIONING INSTRUCTIONS Cont'd

2. Open the following valves:

   - both compressor suction and discharge valves
   - liquid receiver outlet valve
   - liquid line supply valve

   NOTE:
   The compressor suction and discharge valves should be fully back seated under normal operating conditions. All valve caps and rings must be replaced after any adjustment to stop any leakage of refrigerant.

3. Check high and low pressure control settings which are outlined in Section 3.

   NOTE:
   a) There is a manual reset fitted on the high side and consequently the control will not reset until it is manually reset by pushing down the reset button.

   b) Field experience may indicate a variation to these settings and care should be taken to ensure that nuisance tripping does not occur. However, the low pressure control setting should ensure that evaporator coil does not ice up, while the high pressure control should ensure damage does not occur to the high side of the system. Condenser fan speed control is aimed at maintaining reasonable head pressures during applications where internal loads are high and/or predominantly sensible and outside ambients are low e.g. switchrooms. Differential must be large enough to enable TX valve operation to stabilise.

4. Check all wiring to ensure that it complies to AS3000 and relevant Mining Codes.

5. With compressor breaker isolated, run through fan operation in pressuriser, condenser and evaporator.

6. Check heater operation.

7. Set compressor breaker to 'in' position and set thermostat to enable compressor to operate.

8. Allow to stabilise and observe oil level in compressor and liquid line sight glass. If gas is short, top-up. (See Section 6.2)

9. Leak test all joints under operation. (See Section 4.5)

4.4 COMMISSIONING INSTRUCTIONS Cont'd

10. Ensure that system cycles thermostatically.

11. After 3 hours operation, shut the system down and check all motor mounts and fan attachment screws.

4.5 NITROGEN LEAK TESTING - GENERAL INSTRUCTIONS

Legislation on handling of refrigerants requires leak testing of the system following any dismantling of major components. The procedure to do this is as follows:-

1. Connect a cylinder of dry nitrogen to the compressor valve on either of the suction or liquid line connections.

   NOTE:
   It is important that the nitrogen charging set is supplied with a shut-off valve, pressure reducing valve, cylinder pressure gauge, line pressure gauge and leed valve.

2. Set the cylinder reducing valve to 1035 kPa (150 psig)

3. Open the nitrogen cylinder shut-off valve and charge the plant up to the test pressure of 1035 kPa (150 psig)

4. Close the cylinder shut-off valve.

5. All joints should be vibrated by tapping carefully with a rubber or soft hide-faced mallet.

6. Test for leaks with a soap and water solution.

7. Check the nitrogen pressure in the system and ensure that there is no pressure drop during the initial test period, which should be at least 2 hours duration and longer if possible.

   NOTE:
   Be careful that an apparent pressure drop is not due to a change in the ambient temperature.

8. Release the nitrogen pressure by operating the bleed valve before attempting to repair any discovered leaks.

9. The nitrogen leak test should be repeated after all leaks have been repaired until satisfactory results are finally obtained.

10. Release nitrogen pressure by opening the bleed valve and disconnect nitrogen test equipment.

4.6 SYSTEM EVACUATION

The absence of moisture from the refrigeration system is essential for the correct functioning of the plant. Moisture could cause freezing or the formation of hydrochloric and hydrofluoric acid when in contact with refrigerant with obvious detrimental effects upon valves, bearings, seals, etc.

Proceed as follows:

1. Connect a vacuum pump capable of pulling 0.1mm Hg. to either the compressor service valves or the access ports in the evaporator.

2. Operate the pump until a vacuum of 0.5mm Hg. is shown on the gauge. Stop the pump.

   NOTE:
   If the pump is efficient a leak in the system would prevent a sufficiently low vacuum being obtained.

3. After reaching the required evacuation level, break the vacuum with dry nitrogen. Restart the pump until a vacuum of 0.5mm Hg. is regained.

4. Switch off the pump, close the pump suction valve and allow the system to stand for one hour.

5. If there is no indicated rise in pressure after one hour, the system can be considered dry enough to be charged with refrigerant.

4.7 SYSTEM CHARGING

NOTE:
The initial charge of refrigerant should be fed into the low pressure side of the system as a vapour only.

1. Reset LP cut out to approximately 75 kPa.

2. Loosely connect the charging line from a cylinder of refrigerant to the charging connection on the suction valve located on the compressor. Open the suction service valve two or three turns to allow charging port to open. Gauge valve ports are closed.

4.7 SYSTEM CHARGING Cont'd

3. Ensure that the charging line connection to the cylinder is fully secure and that the cylinder is vertical. With the charging valves still closed, crack the cylinder valve sufficiently to purge the charging line.

4. Tighten the charging valve/charging line connection.

5. With the refrigerant cylinder in a vertical position open the cylinder valve. Open the charging valve slowly and charge the system with refrigerant vapour. The vacuum in the system from the vacuum drying process should draw a considerable amount of refrigerant into the system. Allow the cylinder and system pressure to equalise.

6. Start the compressor.

7. Charging should be continued with the compressor running until the estimated refrigerant requirement is approached. At this stage backseat the charging valve, open the liquid receiver outlet valve and watch the flow of refrigerant in the sight glass.

8. "Flashing" in the liquid line flow will indicate insufficient refrigerant and to add more, re-open the charging valve on the compressor (suction service valve).

9. Repeat Step 8 until a steady liquid flow in the sight glass indicates a fully charged condition. Backseat the charging valve, but do not disconnect the cylinder at this stage.

10. Allow the running conditions to stabilise and check the sight glass. Add more refrigerant should "flashing" occur.

11. On successful completion of the charging, ensure that the charging valve is tightly backseated and remove the charging line. Fit a sealing cap to the charging line before storing. Reset LP cut out to correct setting.

NOTE:

When changing refrigerant cylinders during the charging procedure, the suction charging valve should be tightly backseated before disconnecting the empty cylinder. On fitting the full cylinder to the charging line it is necessary to re-purge the air from the line before continuing with the charging.

Also, gauge ports are provided in the evaporator section as an alternative to the compressor service ports.

SECTION 5.0 OPERATING INSTRUCTIONS

All electrical controls with the exception of the remote thermostat and selector switches are mounted in the main control cubicle. The Thermostat, Main Control Switch (M.C.S.) and Fan Speed Switch (F.S.S.) are located in the Pilot Control Box which is remote mounted. The main isolation switch is located on the cubicle door and has a mechanical interlock.

Circuit breakers/thermal overloads are factory set and adjustments should only be made after consultation with the Factory or to bring back to original specification.

Neon indicator lights indicate operation of a particular item.

See Section 3 for correct settings.

5.1 PILOT CONTROLS

To operate the unit rotate the Fan Speed Switch (F.S.S.) to "HIGH FAN" and then select the desired mode on the Main Control Switch. The fan speed can be altered during operation of the unit to obtain the correct environmental conditions within the cabin by use of the F.S.S.

The fresh air pressurising unit will operate automatically in any mode whenever the unit is "ON".

To shut the unit down rotate the Fan Speed Switch to "OFF".

NOTE:

1. Whenever the unit is switched off or out of cooling (by thermostat or MCS) the system will run in pump down cycle. In this cycle the liquid line solenoid valves close and the compressor remains on. Once the refrigerant is pumped into the condenser coil and receiver, the LP switch senses low pressure and the compressor is deactivated.

2. Fault light may illuminate if the unit is switched into "COOL" before LP switch has reset.

3. Units fitted with oil pressure switch (OPS) may indicate a fault for a few seconds when "COOL" is selected.

5.2 CONTROL INDICATORS

Each pilot control box is fitted with six lights to indicate operating mode. The lights are fitted with a "Press to Test" facility to check bulbs.

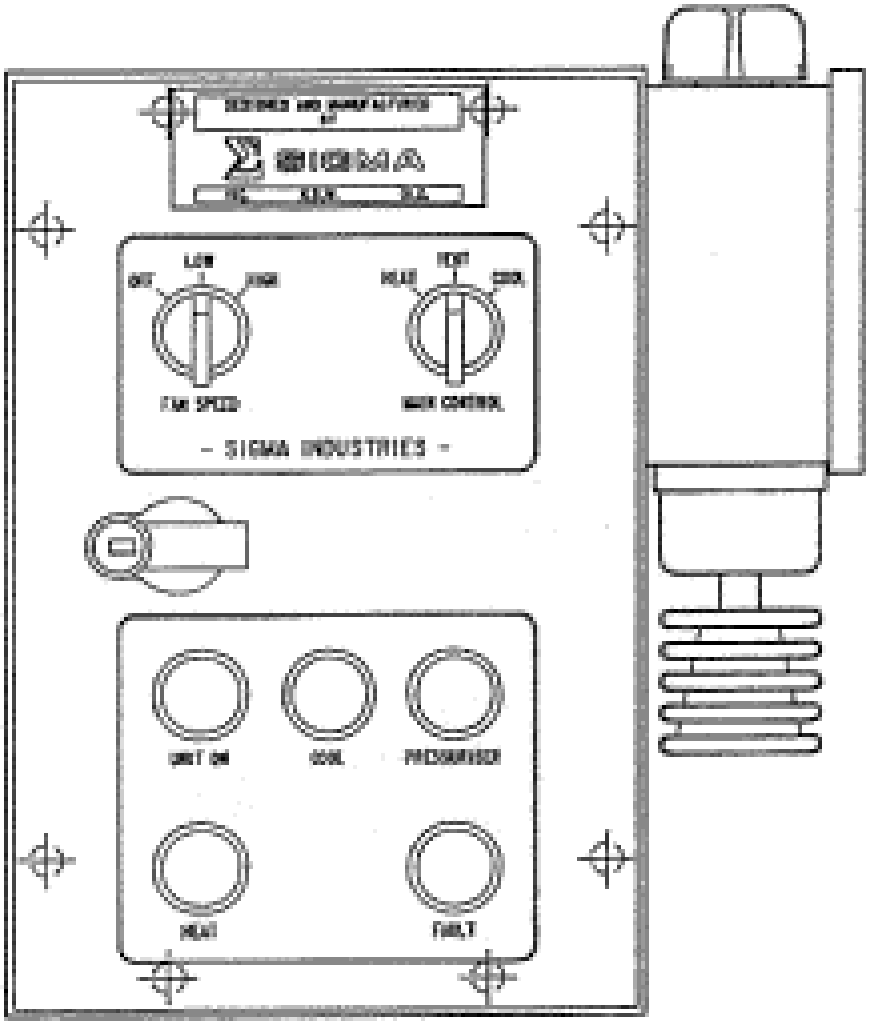
The fault light indicates the following:

- a circuit breaker tripped
- compressor out on HP/LP, oil pressure (when fitted), or compressor internal thermal overload.

NOTE:

1. For compressor fault, fault light will only illuminate when thermostat calls for cooling.
2. As LP is auto-reset fault light may cycle on and off.

Figure 5.0 Pilot Control Box Facia



SECTION 6.0 ROUTINE MAINTENANCE PROCEDURES

6.1 MAINTENANCE SCHEDULE

The following maintenance schedule is suggested. Elapsed times between maintenance is a function of plant duty, atmospheric contamination and temperature etc. and it is essential that maintenance schedules be laid down for each unit in accordance with plant requirements.

NOTE:

Figures given are for operating times, as typically these systems will be in a stored condition.

ITEM	LOCATION	MAINTENANCE WORK	PERIOD
Wiring	General	Damage to braiding and insulation inspection.	As required.
Control	Panel MCC and PCB.	Check tightness of connections. Check and clean all contacts. Check interlocks.	3 monthly.
Mechanical Filters	Evaporator (Incl. Pressuriser)	Clean thoroughly	Monthly or as required.
Evaporator, Pressuriser Fan and Scrolls	Evaporator	Clean thoroughly and ensure fan tight on shaft, housings structurally sound.	3 monthly.
Condensate Drains	Evaporator	Flush out whole condensate system.	3 monthly or as required.
Compressor Oil	Condensing Unit	Check level - refill if necessary. Drain and replace oil.	3 monthly. 2 yearly.
Refrigerant Charge	Whole System	Check gauge readings. If refrigerant shortage indicated, leak test system, repair leak and replace lost refrigerant.	3 months after commissioning, then 6 monthly or as required.

6.1 MAINTENANCE SCHEDULE Cont'd

ITEM	LOCATION	MAINTENANCE WORK	PERIOD
Evaporator Coil	Evaporator	Clean thoroughly	6 monthly or as required.
Fan Motor	Evaporator	Check thoroughly - follow normal plant procedure. Ensure mounting bolts tight.	6 monthly.
Condenser Coil	Condensing Unit	Clean thoroughly.	6 monthly or as required.
Condenser Fan	Condensing Unit	Clean blades and ensure fan tight on shaft. Check 2 speed operation.	6 monthly.
Filter Drier	Condensing Unit	Replace	Yearly or whenever system opened.

6.2 REPLENISHING REFRIGERANT

Refer to Sigma Manual SM227-2160 for full details on refrigerant HFC134a.

"Flashing" in the liquid line sight glass of a previously charged system indicates an inadequate charge of refrigerant and replenishment is accomplished with the plant running. To replenish proceed as follows:-

1. Loosely connect the charging line from the cylinder of refrigerant to either the suction service valve situated on the compressor or access valves in evaporator. Purge the system.

2. Ensure that the charging line connection to the cylinder is fully secure and that the cylinder is vertical.

3. Tighten the charging valve/charging line connection.

4. Open the charging valve slowly.

6.2 REPLENISHING REFRIGERANT Cont'd

5. Add refrigerant until a steady liquid flow in the sight glass indicates a fully charged condition. This can be accomplished by adding a small amount of refrigerant at a time.

   CAUTION:
   PARTICULAR CARE SHOULD BE TAKEN WHEN ADDING REFRIGERANT AS AN OVERCHARGE OF REFRIGERANT CAUSES EXCESSIVE HEAD PRESSURES WHICH IN TURN CAN CAUSE CONSIDERABLE DAMAGE.

6. Backseat the suction service valve, but do not disconnect the cylinder at this stage.

7. Allow running conditions to stabilise and check the sight glass and discharge pressure. Add more refrigerant should flashing occur.

8. On completion of the replenishment, tightly backseat the suction service valve and remove the charging line. Fit a sealing cap to the line before storing.

6.3 ADDING OIL

Oil must be added only when the compressor has been stopped. For additional safety the main power supply should be switched OFF.

The suction and discharge valves on the compressor must be closed and then the crankcase plug should be slowly removed.

NOTE:
The refrigerant vapour remaining in the compressor may cause foaming of the oil and major oil loss may occur if the crankcase plug is removed too quickly.

Once the pressure is released in the crankcase, oil from a freshly opened container of "Emkarate RL184" may be added using a clean funnel. When the oil level shows half full sight glass the plug should be replaced loosely.

The compressor suction and discharge valves should now be cracked open to allow the refrigerant to purge the crankcase of air and then sump plug fully tightened.

The compressor valves should now be fully opened. The plug in the crankcase should now be tested for leaks using soap and water solution or a refrigerant leak detector when available.

6.4 COMPONENT MAINTENANCE

Specific instructions for the maintenance of components are listed below. The instructions are not exhaustive and reference should be made to the Manufacturer's Handbook for each component where necessary.

NOTE:

Before opening refrigerant circuit to remove or replace any components, pump down circuit as described under 6.4.1 below. Naturally this cannot be effected if compressor has failed.

6.4.1 Compressor - General

It is essential that the compressor is evacuated before any connection is broken for inspection. Proceed as follows:

1. By-pass compressor low pressure safety cut out.

2. Close the liquid receiver outlet valve.

3. Start the compressor, observing the test gauge suction side, which must be fitted prior to test and reduce the pressure down to 2 psi (.2kg/cm^2) and then stop compressor.

NOTE:

A. Stop the compressor several times during the operation to prevent excessive foaming of the oil as the refrigerant boils out. Violently foaming oil may be pumped from the crankcase.

B. If the pressure should accidentally be taken lower than 2 psi (.2kg/cm^2), refrigerant can be bled into the compressor to raise the pressure to the desired value.

4. Close the discharge valve.

5. Permit all adjacent parts to warm up to room temperature before breaking the connections. This prevents moisture from condensing on the inside of the system if air is accidentally admitted.

6. Following assembly, it is necessary to purge the compressor of air with refrigerant vapour by "cracking" the liquid receiver outlet valve and venting the compressor through the discharge gauge connection on the compressor.

6.4.2 Compressor - Removal from System

The compressor must be removed from the system to fit a replacement compressor. Proceed as follows:-

1. Evacuate the compressor and pump down (refer Section 6.4.1) assuming that it is still operational. If not proceed to step 2.

2. Close the suction and discharge valves and isolate the system electrically.

3. Remove the HP/LP safety and head pressure control lines from the compressor.

4. Undo the compressor mounting bolts.

5. Undo flange mounting bolts from valves. Remove valves with lines attached. Refrigerant charge will be lost.

6.4.3 Compressor - Replacement.

To replace compressor proceed as follows:-

1. Position and secure the compressor.

2. Connect suction and discharge valves and lines to the compressor.

3. Reconnect gauge and pressure control lines and open valves.

4. Fit new filter/dryer.

5. Vacuum dry and recharge the system after reconnecting electrically, as per Section 4.4. and 4.5.

6.4.4 Air Cooled Condenser

Air cooled condensers must be regularly cleaned of all dust and dirt that collects on the fins. If a condenser is in a dirty condition it will cause an increase in the condensing pressure and consequently reduce the refrigeration system efficiency and hence capacity.

Cleanliness of the condenser must be borne in mind when checking condenser pressures.

The condenser should be cleaned by spraying water over the condenser face to remove deposited dirt. Extreme care must be taken with water hoses as jets can flatten aluminium fins. It may be necessary to use warm water and detergent. If deposits cannot be removed this way, use a stiff brush, but take care not to damage the fins.

SECTION 7.0 FAULT DIAGNOSIS

7.1 TROUBLE ANALYSIS CHART

7.1.1 Compressor Fails to Start

COMPLAINT - If compressor does not start after turning switch to "COOL" position, check Items 1 to 7 inclusive.

	POSSIBLE CAUSE	SYMPTOMS	RECOMMENDED ACTION
1.	Power failure.	Test lamp shows no current on line side of main isolator switch.	Check for blown line fuse or broken lead.
2.	Circuit breaker tripped or faulty contactor.	Test lamp shows current on line side but not on compressor motor side of fuse.	Reset, check setting replace contactor. Check load on motor.
3.	Low voltage.	Test lamp glows but not at full brilliance.	Call electrician.
4.	Defective motor.	Full voltage at motor terminals but motor will not run.	Repair or replace.
5.	Frozen compressor due to: a) Lack of oil b) Broken piston c) Broken valve strip jamming the piston	Compressor will not pump.	Overhaul compressor. Check operation of replaced compressor.
6.	Complete loss of charge.	Check pressure switches, suction, head pressure and sight glass.	Repair leak and recharge.
7.	Head pressure too high.	Head pressure cut out.	See complaint 7.1.7.

7.1.2 Compressor 'Short Cycles'

	POSSIBLE CAUSE	SYMPTOMS	RECOMMENDED ACTION
1	Thermostat differential set too close.	Normal operation except too frequent stopping and starting.	Reset differential to as much as job conditions permit.
2.	Low line voltage.	Motor overheats.	Call electrician and correct supply.
3.	Faulty condensing.	Excessively high head.	See complaint 7.1.7.
4.	Overcharge of refrigerant.	High head pressure	Purge or remove excess.
5.	High pressure control set too low.	System appears okay.	Reset high pressure control to correct setting.

7.1.3 Compressor Runs Continuously

	POSSIBLE CAUSE	SYMPTOMS	RECOMMENDED ACTION
1.	Excessive load.	High temperature in conditioned area	Check for excessive fresh air infiltration. Check for inadequate insulation of space.
2.	Air or non-condensable gases in system.	Excessive head pressure	Purge system.
3	Thermostat set too low.	Low temperature in conditioned area	Reset thermostat.
4.	Too little or too warm condenser air.	High head pressure.	Provide adequate cool condenser air.
5.	Fouled condenser.	High head pressure.	Clean coil.
6.	Lack of refrigerant.	Low suction pressure.	Repair leak and charge.

7.1.3 Compressor Runs Continuously Cont'd

	POSSIBLE CAUSE	SYMPTOMS	RECOMMENDED ACTION
7.	Overcharge of refrigerant	High head pressure	Purge or remove excess.
8.	Leaky valves in compressor.	High suction pressures with not a great deal of cooling.	Overhaul compressor.

7.1.4 Compressor Loses Oil

	POSSIBLE CAUSE	SYMPTOMS	RECOMMENDED ACTION
1.	Insufficient oil charge.	Oil level gradually drops.	Add oil and fix leak.
2.	Traps in hot gas and suction lines.	Oil level gradually drops.	Repitch lines and provide lift.
3.	Clogged strainers or valves.	Oil level gradually drops.	Clean or repair and replace.
4.	Loose expansion valve bulb.	Excessively cold suction.	Provide good contact between bulb and suction line.
5.	Liquid slugging back to compressor.	Excessively cold suction.	Re-adjust super heat setting or check thermal bulb contact.
6.	Short cycling.	Too frequent starting and stopping of compressor.	See items under complaint 7.1.2.
7.	Shortage of refrigerant.	Low suction pressure.	Repair leak and charge.

7.1.5 Compressor is Noisy

	POSSIBLE CAUSE	SYMPTOMS	RECOMMENDED ACTION
1.	Lack of oil.	Low oil level.	Add oil.
2.	Excess oil in crankcase.	High oil level.	Drain off excess oil to required level. Ensure crankcase heater operational.
3.	Broken compressor valve strip.	Compressor knocks. Suction pressure is abnormally high.	Overhaul compressor.
4.	Worn or scored bearings in compressor.	Compressor knocks.	Overhaul or replace compressor.
5.	Compressor holding down bolts loose.	Noise and vibration transmitted to structure.	Tighten holding down bolts.
6.	Expansion valve stuck in open position.	Abnormally cold suction line, compressor may knock.	Repair or replace.
7.	Liquid 'Slug Back'.	Abnormally cold suction line, compressor may knock.	Reset superheat. Valve may be too large or bulb loose on suction line. Air entering evaporator coil too cold for complete evaporation of liquid.
8.	Excessive head pressure.	Compressor will knock.	Reduce head pressure. See items under complaint 7.1.7.

7.1.6 System Short of Capacity

	POSSIBLE CAUSE	SYMPTOMS	RECOMMENDED ACTION
1.	Improper superheat adjustment.	Continuous running. Warm suction High superheat.	Adjust expansion valve.
2.	Flash gas in line.	Expansion valve hisses.	Add refrigerant.
3.	Expansion valve too small.	Continuous running. Low suction and warm. High superheat.	Replace with larger valve.
4.	Expansion valve stuck or obstructed.	Continuous running. Low suction, high superheat.	Repair or replace.
5.	Clogged strainer.	Cold liquid line beyond strainer. Bubbles in sight glass.	Clean or replace.
6.	Excess pressure drop in evaporator.	Superheat too high.	Adjust expansion valve.
7.	Ice or dirt on evaporator coil.	Reduced air flow.	Clean coil or defrost. Check suction pressure.
8.	System short of refrigerant.	Low suction pressure. Continuous running.	Check system. Find and repair leak. Add refrigerant.

7.1.7 Head Pressure too high.

	POSSIBLE CAUSE	SYMPTOMS	RECOMMENDED ACTION
1.	Air or non-condensable gas in system.	Condenser appears okay.	Purge. Check system for leaks.
2.	Overcharge of refrigerant.	Condenser appears okay.	Purge or remove excess.

7.1.7 Head Pressure too high Cont'd

	POSSIBLE CAUSE	SYMPTOMS	RECOMMENDED ACTION
3.	Blocked air flow to condenser.	Condenser appears okay.	Ensure condenser coil clean (blow off dirt). Ensure air access to condenser and fan.
4.	Condenser air too hot.	Condenser appears okay.	Relocate high side to obtain cooler air into condenser ***OR*** remove source of heat if possible. Check for recirculation and correct.

7.1.8 Head Pressure too Low

	POSSIBLE CAUSE	SYMPTOMS	RECOMMENDED ACTION
1.	Lack of refrigerant.	Low suction pressure.	Repair leak and charge.
2.	Leaky oil return.	Hot oil return.	Repair or replace.
3.	Broken or leaky compressor valves.	Suction pressure rises faster than 13 kPa per minute after shutdown.	Overhaul compressor.

7.1.9 Suction Pressure too High

	POSSIBLE CAUSE	SYMPTOMS	RECOMMENDED ACTION
1.	Excessive load on evaporator.	Compressor runs continuously.	See complaint 7.1.3.
2.	Expansion valve too large.	Abnormally cold suction line.	Replace valve.
3.	Expansion valve stuck in open position.	Abnormally cold suction line.	Repair or replace valve.
4.	Broken suction valve in compressor.	Noisy compressor.	Overhaul compressor.

7.1.10 Suction Pressure too Low

	POSSIBLE CAUSE	SYMPTOMS	RECOMMENDED ACTION
1.	Light load on evaporator.	Compressor short cycles.	Plant should not be running under these conditions.
2.	Flash gas in liquid line.	Expansion valve hisses.	Provide sub-cooling.
3.	Clogged strainer.	Liquid line cold beyond strainer. Bubbles in sight glass.	Clean or replace.
4.	Obstructed expansion valve.	Loss of capacity. High superheat.	Repair or replace valve.
5.	Expansion valve too small.	Lack of capacity. High superheat.	Replace with larger valve.
6.	Expansion valve lost charge.	Erratic valve response.	Repair or replace.

7.1.10 Suction Pressure too Low Cont'd

	POSSIBLE CAUSE	SYMPTOMS	RECOMMENDED ACTION
7.	Expansion valve bulb not correctly secured.	Erratic valve response.	Refix bulb.
8.	Lack of refrigerant.	Low suction pressure.	Repair leak and charge.
9.	Evaporator fan stopped.	Low suction pressure.	Check fan motor and circuits - ensure fan blades secure on motor shaft.
10.	Dirty filters.	Lack of air flow through evaporator.	Replace or clean filters.

7.2 TROUBLE ANALYSIS CHART NOTES

7.2.1 Clogged Strainer or Filter

Occasionally the strainer or filter in the liquid line may become clogged with foreign material left in the system during erection. When this happens, the liquid line leaving the strainer will feel cooler than the liquid entering. If it is badly clogged, some sweat or frost may appear at the strainer. Bubbles in sight glass usually accompany this fault.

7.2.2 Thermal Expansion Valve Leaks

A leaky expansion valve may allow the evaporator to fill with liquid which will be "slugged" into the suction line and into the compressor when the system starts. "Liquid slugging" within the compressor is detrimental to valves, gaskets, etc. and should be avoided.

7.2.3 Thermal Expansion Valve Stuck in Open Position

If the expansion valve is stuck in an open position, there will be an excessive amount of sweating on the suction line and compressor crankcase due to the large amount of liquid being passed into the suction line. Expansion valve should be checked for loss of charge or faulty thermal bulb contact with the suction line.

7.2 TROUBLE ANALYSIS CHART NOTES Cont'd

7.2.4 Power Element

The power element of an expansion valve consists of the thermal bulb, capillary tube and the bellows or diaphragm which actuates the valve pin. If this power element is defective or has lost its charge, the valve will either maintain an almost closed position or may close completely. To test for a defective power element, the thermal bulb should be removed from the suction line and warmed by holding it tightly in the hand. The valve will open if the power element is not defective. If the power element is defective, the valve will remain closed.

7.2.5 Thermal Expansion Valve Improperly Adjusted

If the expansion valve is adjusted for too low a superheat, too much liquid will be passed to the evaporator. The suction line will be abnormally cold and liquid may "slug" back to the compressor. If the expansion valve is adjusted to too high a superheat, too little liquid line be passed to the evaporator and the suction line will be abnormally warm. Superheat should always be adjusted carefully using thermometer and suction gauge.

7.2.6 Thermal Expansion Valve Too Large

If a replacement thermal expansion valve has been improperly selected, and its capacity is too great for the system, the valve will not maintain a consistently level suction pressure. The thermal bulb will attempt to control the flow of liquid at its superheat settings, but the oversized valve port will pass liquid too rapidly. The presence of liquid near the thermal bulb will close the valve and the pressure in the evaporator will drop until the valve opens to pass another "slug" of liquid. This "hunting" will cause a suction pressure variation noticeable on the suction pressure gauge.

7.2.7 Thermal Expansion Valve Too Small

If the replacement thermal expansion valve is too small, it cannot pass a sufficient amount of liquid to satisfy the evaporator. Under conditions of heavy load, the superheat will be excessive and the system will lose capacity. Under conditions of light load, the system may function properly. Too small expansion valves usually result in abnormally low suction pressure.

7.2 TROUBLE ANALYSIS CHART NOTES Cont'd

7.2.8 Thermal Expansion Valve is Obstructed

Unless the expansion valve is properly protected by a strainer or filter, foreign matter may obstruct the valve port. If the obstruction is small, the resulting operating will be much the same as though the valve were undersized as described in 7.2.7. If the obstruction holds the valve open during shutdown, the operation will be as described in 7.2.2 and 7.2.3. An obstructed expansion valve is usually indicated by a partly warm evaporator.

7.2.9 Shortage of Refrigerant

There should always be sufficient liquid in the receiver to completely submerge the inlet to the liquid line pipe. If there is a shortage of refrigerant, the liquid level will fall below the inlet to the liquid line. Frequently there will be a hissing or whistle at the expansion valve. The coil and suction line will be relatively warm while the suction pressure will be low due to little or no liquid being supplied to the evaporator if the shortage is severe.

7.2.10 Overcharge of Refrigerant

An overcharge of refrigerant will cause high head pressure. Liquid will back up in the condenser and decrease the amount of surface available for condensing and as a result, the head pressure will rise. In extreme cases, it may rise to a point where the thermal overload elements in the compressor motor or the high pressure cut-out will stop the compressor. This may result in "short cycling", (compressor cycles too frequently).

7.2.11 Air in System

If air or other non-condensable gases are present in the system, they will tend to move toward and collect at the condenser. The head pressure will rise to a point above the pressure corresponding to the temperature at which the vapour is condensing. In extreme cases, the pressure may rise to a point where either the high pressure cut-out or the thermal overload elements in the compressor motor may stop the compressor.

7.2 TROUBLE ANALYSIS CHART NOTES Cont'd

7.2.12 Broken Valves in Compressor

Broken or leaky discharge valves in a compressor are generally indicated by the suction pressure rising rapidly as soon as the machine is stopped. If the suction pressure rises faster than 13 kPa per minute, it is an indication that the compressor discharge valves are not holding. Before the compressor is opened however, it should be determined that the pressure rise is not due to other causes such as a leaky expansion valve.

NOTES:
Items 7.2.6 and 7.2.7 should not occur and we strongly recommend that the Factory be contacted if this fault is suspected.

8.0 SPARE PARTS

The spare parts tables are designed to supply Sigma Part Numbers for the components used in each of the three systems described by this manual. The table definitions are as follows:-

Description	-	Component type and/or purpose.
Status	-	STD - The standard component used.
OPT	-	An optional component for the current series in either use or function (e.g. voltage)
Date	-	A non current component used in units manufactured prior to this date.
Part Number	-	Sigma reference number of components used for purchasing and inventory purposes.

8.1 EXTERNAL EVAPORATOR SPARE PARTS

MODEL NUMBER		M7/E	M20/E	M25/E
DESCRIPTION	**STATUS**	**PART NO.**	**PART NO**	**PART NO.**
Evaporator Coil BAP	STD	UR524	120484	120161
Evaporator Coil BCE	OPT	120015	120017	-
Evaporator Coil Epoxy Coating	OPT	921315	921315	921315
Solenoid Valve	STD	522042	522127	522127
Solenoid Valve Coil (110VAC)	STD	UE453	668135	668135
Solenoid Valve Coil (240VAC)	OPT	668131	668131	668131
TX Valve Body (HFC134a)	STD	521509	521512	521512
TX Power Element (HFC134a)	STD	-	521511	521511
TX Orifice (HFC134a)	STD	521504	521515	521515
TX Valve Body (HFC124a)	OPT	521400	-	-
TX Power Element (HFC124a)	OPT	521235	-	-
TX Cage (HFC124a)	OPT	521589	-	-
Heater Element	STD	UE470	UE272	UE272
Heater Over Temperature Switch	STD	681020	681020	681020
Evap Fan Motor (Low Static)	*Jan2005*	UE322		-
Evaporator Fan (Low Static)	*Jan2005*	UF092		-
Evap Fan Inlet Ring (Low Static)	*Jan2005*	410952		-
Evap Fan Motor (High Static)	-	UE322	UE321	UE321
Evaporator Fan (High Static)	-	410130	410130	410130
Evap Fan Inlet Ring (High Static)	-	410953	S1699004	S1699004
Evaporator Access Lid	STD	AS213417	AS508307	AS508307
Access Lid Prop	STD	AS207013	08335	08335
Access Lid Prop Pivot	STD	AS207054	AS508341	AS508341
Access Lid Buffer (Rubber)	STD	971160	971160	971160
Access Lid Seal	STD	862211	862217	862217
Access Lid Hinge Bolts	STD	872884	872884	872884
Over Centre Catch	STD	UC310	UC310	UC310
Piping Recess Cover	STD	-	AS508338	AS508338
Weather Seal Gasket	STD	861900	08379	08379
Sealing Upstand Frame (RA + SA)	STD	AS213460	AS508316	AS508316

Note:

Part number UF092 (8” blower wheel) is redundant now and is replaced with

- a kit containing the following parts for conversion to a 9” high static fan. In this conversion we have allowed for the existing motor UE322 and extension shaft 872025 to be used.

    1. 410130
    2. S1699004
    3. 911885
    4. AS213497

or

- part number AS2134103 which comes complete with motor and extension shaft

8.1 EXTERNAL EVAPORATOR SPARE PARTS Cont'd

MODEL NUMBER		M7/E	M20/E	M20/E
DESCRIPTION	**STATUS**	**PART NO.**	**PART NO.**	**PART NO.**
Mounting Angle (Split Evap)	STD	-	08455	08455
Mounting Channel (Split Evap)	STD	AS2134105	08456	08456
Mounting Angle RH (Package)	OPT	-	08466	08466
Mounting Angle LH (Package)	OPT	-	08466A	08466A
Mounting Channel (Package)	OPT	-	08470	08470

8.2 INTERNAL EVAPORATOR SPARE PARTS

MODEL NUMBER		M7/I	M20/I	M25/I
DESCRIPTION	**STATUS**	**PART NO.**	**PART NO.**	**PART NO.**
Evaporator Coil GAN	STD	120481	-	-
Evaporator Coil BCE	OPT	UR367	-	-
Evaporator Coil Epoxy Coating	OPT	921315	-	-
Solenoid Valve	STD	522042	-	-
Solenoid Valve Coil (110VAC)	STD	UE453	-	-
Solenoid Valve Coil (240VAC)	OPT	668131	-	-
TX Valve Body (HFC134a)	STD	521509	-	-
TX Power Element (HFC134a)	STD	-	-	-
TX Orifice (HFC134a)	STD	521504	-	-
TX Valve Body (HFC124a)	OPT	521400	-	-
TX Power Element (HFC124a)	OPT	521232	-	-
TX Orifice (HFC124a)	OPT	521588	-	-
Heater Element	STD	691252	-	-
Heater Over Temperature Switch	STD	681020	-	-
Evap Fan Motor (Low Static)	STD	UE321	-	-
Evaporator Fan (Low Static)	STD	UF104	-	-
Evap Fan Inlet Ring (Low Static)	STD	410933	-	-
Evaporator Access Cover	STD	AS236532	-	-
Access Cover Latch	STD	851592	-	-
Access Cover Seal	STD	862216	-	-
Supply Air Diffuser	STD	UC346	-	-
Return Air Filter	STD	AS236533	-	-
Fresh Air Duct Spigot	STD	AS500313	-	-

8.3 CONDENSER UNIT SPARE PARTS

8.3.1 Refrigeration and Electrical Parts

MODEL NUMBER		M7/C	M20/C	M25/C
DESCRIPTION	**STATUS**	**PART NO.**	**PART NO.**	**PART NO.**
Condenser Coil BAP	STD	110336	110426	110162
Condenser Coil BCE	OPT	110338	110428	-
Condenser Coil Epoxy Coating	OPT	921315	921315	921315
Compressor Std Duty (HFC134a)	-	230339	-	-
Compressor Hvy Duty (HFC134a)	-	260201	200014	200014
Compressor (HFC124a)	OPT	260205	N/A	N/A
Compressor Unloader	OPT	-	200045	200045
Liquid Receiver	STD	160009	UR022	UR022
Pressure Relief Valve	STD	527126	527126	527126
In-line Drier (HFC134a/HFC124a)	STD	531356	531358	531358
Liquid Moisture Indicator	STD	533559	533408	533408
Line Valve (Solder)	STD	517256	-	-
Line Valve (Male Flare)	STD	517206	517208	517208
HP2 Control	STD	-	523606	523606
HP1/LP1 Control	STD	523111	523111	523111
HP Gauge	-	OPT	532305	532305
LP Gauge	-	OPT	532304	532304
Suction Line (Comp to B/head)	STD	AS213489	AS508426	AS508426
Discharge Line (Comp to Cond)	STD	AS213490	AS508432	AS508432
HP Flex Line	STD	AS160182	AS160182	AS160182
LP Flex Line	STD	AS160182	AS160182	AS160182
R134a Service Access Port (HP)	STD	519074	519074	519074
R134a Service Access Port (LP)	STD	519075	519075	519075
Service Access Port Dust Cap (HP)	STD	519077	519077	519077
Service Access Port Dust Cap (LP)	STD	519076	519076	519076
Refrigerant HFC134a	STD	541035	541035	541035
Refrigerant Oil (Synthetic)	STD		542026	542026
Crankcase Heater (415V)	OPT		200079(STD)	200079(STD)
Crankcase Heater (240V)	OPT	230314		
Crankcase Heater (115V)	OPT	-		

8.3 CONDENSER UNIT SPARE PARTS Cont'd

8.3.2 Fan/Motor and Casing

MODEL NUMBER		M7/C	M20/C	M25/C
DESCRIPTION	**STATUS**	**PART NO.**	**PART NO.**	**PART NO.**
Fan (Blow Through - HFC134a)	STD	UF125	420277	420277
Fan (Draw Through - HFC134a)	OPT	420165	N/A	N/A
Fan (Draw Through - HFC124a)	OPT	420157	N/A	N/A
Condenser Fan Motor (1 Speed)	-	310114	-	-
Condenser Fan Motor (2 Speed)	-	319032	319037	319037
Cond Fan Motor Mount HFC134a	STD	AS213242	AS508414	AS508414
Cond Fan Motor Mount HFC124a	OPT	AS2132242	N/A	N/A
Condenser Access Lid	STD	AS213411	AS508425	AS231075
Access Lid Prop	STD	AS207013	08335	08335
Access Lid Prop Pivot	STD	AS207054	AS508341	AS508341
Access Lid Buffer (Rubber)	STD	971160	971160	971160
Access Lid Seal	STD	862217	862217	862217
Access Lid Hinge Bolts	STD	872884	872884	872884
Over Centre Catch	STD	UC310	UC310	UC310
Louvre Door LH	STD	S2134043	AS508421	AS508421
Louvre Door RH	STD	S2134043	-	-
Punched Grille Side Door	OPT	S2134037	-	-
Mesh Grille Side Door	OPT	AS213458	-	-
Louvre (Coil Cover)	STD	AS502913	AS508422	AS508422
Fan Shroud Cover	STD	-	08436	08436
In-line Drier Clamp	STD	-	08450	08450
Anti-Vibration Mount Std Duty	STD	-	845028	845028
Anti-Vibration Mount Heavy Duty	OPT	UC269	845032	845032
Mounting Angle (Split)	STD	-	08455	08455
Mounting Channel (Split)	STD	AS2134104	08456	08456
Mounting Channel Tie Plate	STD	S2134087	-	-
Mounting Angle RH (Package)	OPT	-	08466	08466
Mounting Angle LH (Package)	OPT	-	08466	08466
Mounting Channel (Package)	OPT	AS2134104	08470	08470

8.4 MAIN CONTROL CUBICLE SPARE PARTS

MODEL SERIES	**M7**	**M20**		**M25**	
MODEL	**MEWM2**	**MEWM8**	**MEWM9**	**MEWM8**	**MEWM9**
CONTROL VOLTAGE	**110V AC**	**110V AC**	**240V AC**	**110V AC**	**240V AC**
DESCRIPTION	**P/No.**	**P/No.**	**P/No.**	**P/No.**	**P/No.**
Enclosure Casing c/w Door	AS213443	AS213443	AS213443	AS213443	AS213443
Electrics Mounting Panel	AS207048	AS207048	AS207048	AS207048	AS207048
Door Latch	851556	851556	851556	851556	851556
Latch Key	851558	851588	851588	851588	851588
Rotary Isolation Switch	663107	663107	663107	663107	663107
Transformer (415/110)	UE104	UE104	-	UE104	-
(415/240)		-	666068	-	666068
(415/240) FVF90		666081	666081	666081	666081
Fuse Holder	643190	643190	643190	643190	643190
Fuse Link	643003	643003	643003	643003	643003
Relay Base	661076	661076	661076	661076	661076
Relay	661037	661037	661038	661037	661038
Contactors	651173 + 653602	651173 + 653602	651110	651173 + 653602	651110
Aux Contact CB	641501				
Circuit Breaker (EFLB)	641488	641488	641488	641488	641488
Circuit Breaker (EFHB)	641490	641490	641490	641490	641490
Circuit Breaker (CFLB)	641488	641488	641488	641488	641488
Circuit Breaker (CFHB)	-	641492	641492	641492	641492
Circuit Breaker (PMB)	641486	641486	641486	641486	641486
Circuit Breaker (CMB)	641494	641499	641499	641499	641499
Circuit Breaker (HB)	641494	641496	641496	641496	641496

NOTE: The old and the new style of Contactors and breakers will not mix and match without extra work and /or extra parts. The old style parts are no longer available. For further details, please contact AIT on +61 2 98307100

8.5 PILOT CONTROL BOX SPARE PARTS

MODEL NUMBER		MEWH1	MEWK3
CONTROL VOLTAGE		**110V AC**	**240V AC**
DESCRIPTION	**STATUS**	**PART NO.**	**PART NO.**
Enclosure Casing	STD	S2070086	S2070086
Thermostat - Mechanical	STD	681107	681107
Thermostat - Electrical	OPT	681302	681302
Electronic Probe (Thermostat)	OPT	681406	-
Electronic Setpoint (Thermostat)	OPT	681407	-
Indicator Light (Red)	STD	UE360	UE360
Indicator Light (Green)	STD	UE361	UE361
Light Bulb (110VAC)	STD	UE359	-
Light Bulb (240VAC)	STD	-	UE378
Light Holder	STD	UE357	UE357
Switch (3 Position)	STD	662233	662233
Contact Block	STD	UE358	UE358
Contact Block Holder	STD	UE368	UE368
Terminal Block	STD	635300	635300
Switch Label	STD	854072	854072
Light Label	STD	854074	854074

Shortcut to Released Documents.lnk

8.6 PRESSURISER UNIT (MODEL FVV80/100) SPARE PARTS

NOTE:
For pressuriser unit Model FVF90 spare parts see Sigma Manual SM146-2071.

MODEL NUMBER		**FVV80MR1**	**FVV100MR1**
DESCRIPTION	**STATUS**	**PART NO.**	**PART NO.**
Motor	STD	304150	304150
Blower Wheel	STD	410525	410520
Motor Shaft Extention	STD	872011	872011
Pre-Cleaner Bowl	STD	460728	460729
Turbo Pre-Cleaner	OPT	460741	460741
Filter Element	STD	460734	460734
Outlet Flange Gasket	STD	R1626033	R1626027
Filter Housing (Remote)	STD	S1626023	S1626023
Pre-Cleaner Coupling	STD	AS162612	AS1626023
Filter Support Clamp	STD	AS162611	AS162611

9.0 WARRANTY

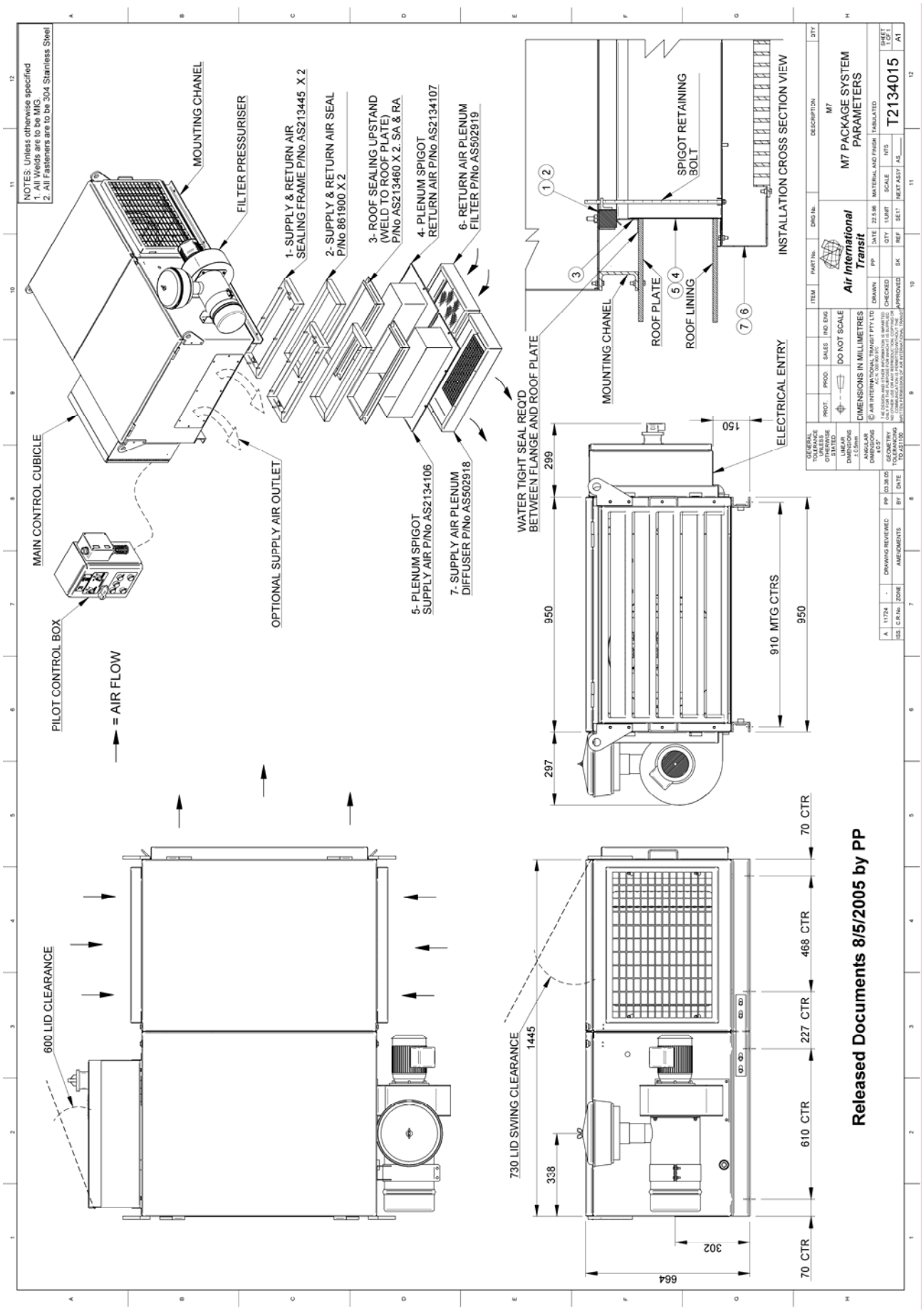
The Sigma units supplied in this instance are covered by the following Warranty Clause:

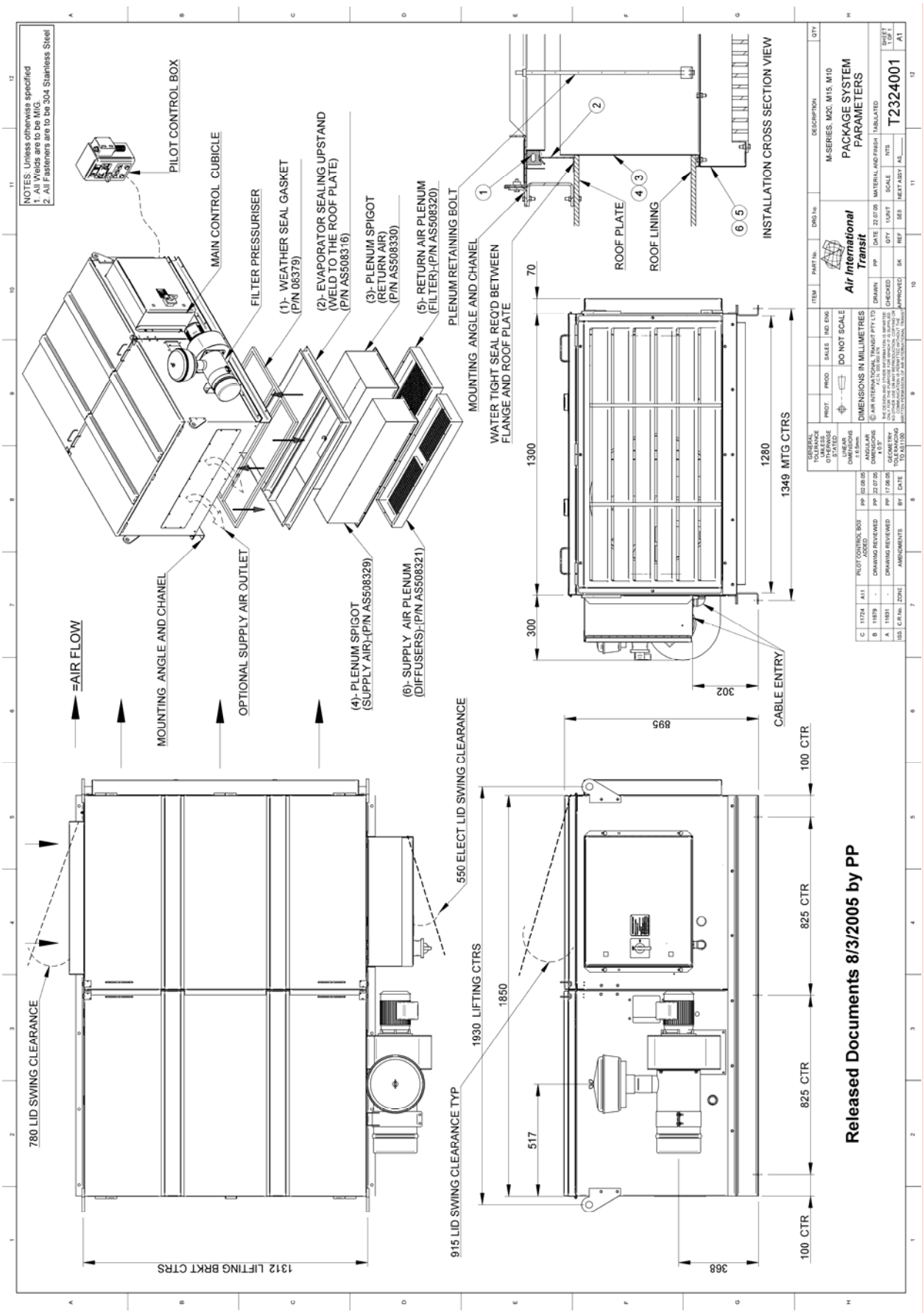
> "We warrant all units to be of good material and undertake to replace any part proven defective in workmanship or material within a period of 12 months from the date of start-up or 15 months from the date of despatch, whichever occurs first. During this warranty period, we will repair or replace, at our option, faulty parts or faulty workmanship without labour charge; should field service be required, travelling time, transport costs including hiring of trucks, fork lift trucks, cranes, mechanical handling equipment and any overtime payment will be to the purchaser's account. This warranty does not cover the fusion of electric motors caused by the failure of electric overload protectional control devices, even where such motors or devices form part of the equipment supplied by us. Warranty claims will not be accepted on loss of refrigerant or failure of drive belts during operation. Interference with the equipment by unskilled or unauthorised personnel, alterations to normal factory settings of controls, or failure to observe normal installation, start-up maintenance and/or service instructions as delineated in the appropriate Manual, or as considered normal practice for air conditioning equipment, will void this Warranty. Fair wear and tear, damage by misuse or operating the equipment at ambient temperatures or with electrical power characteristics outside of the ranges indicated in the Specification shall be excluded as shall be consequential damage".

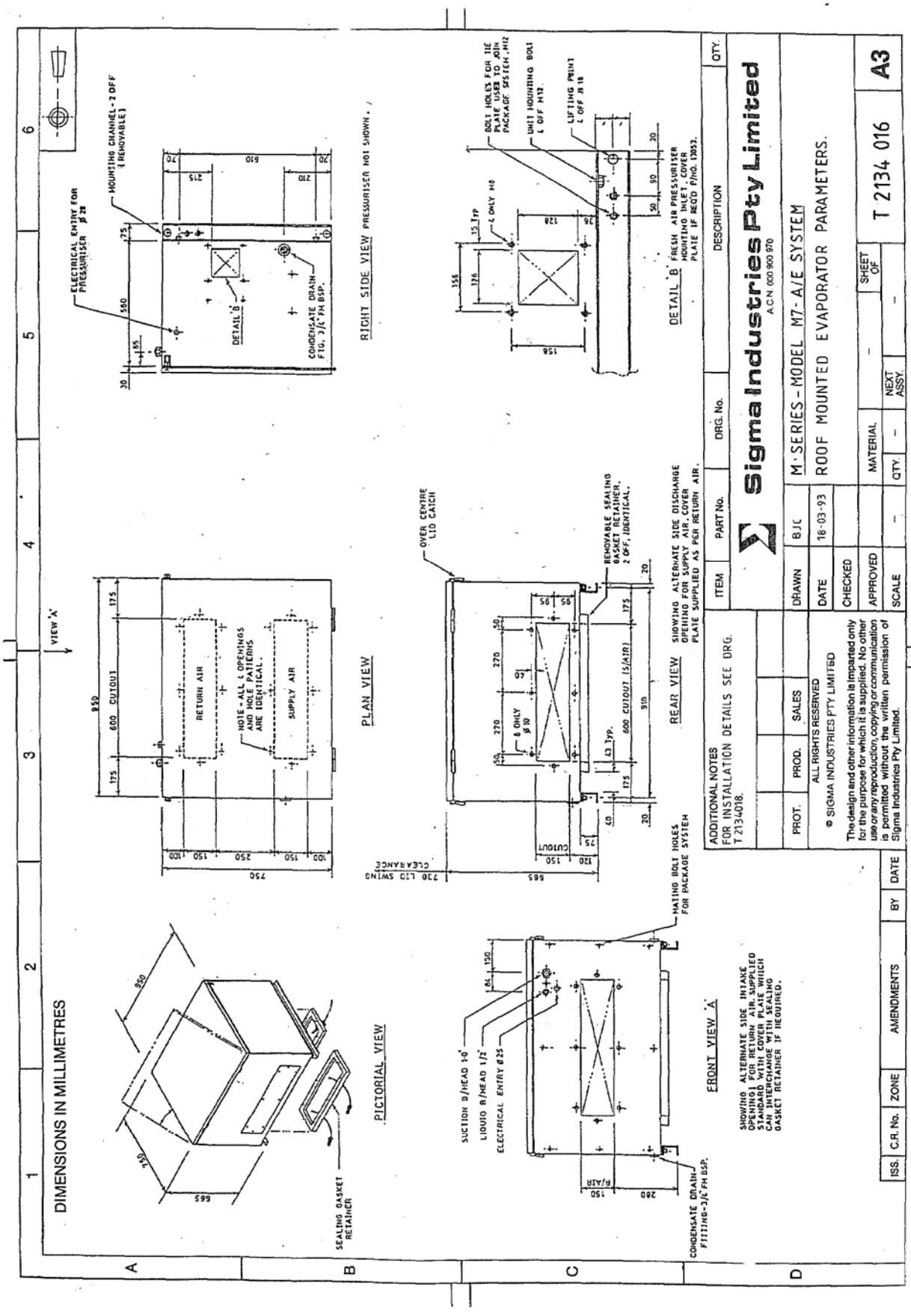
It should be specifically noted that the Warranty is null and void if the units are operated with incorrect electrical characteristics, if the filters are not cleaned as set out here-in and if the control settings are altered from those laid down in this Manual.

SECTION 10 - REFERENCE DRAWINGS

DRAWING NO	ISSUE	DESCRIPTION
T2134015	A	Package System Parameters - M7
T2324001	C	Package System Parameters - M10, M15, M20
T2134016	A	External Evaporator Parameters - M7/E
T2324002	0	External Evaporator Parameters - M10/E, M15/E, M20/E
T5102001	A	Internal Evaporator Parameters - M7/I
T2324004	0	Split Condenser Parameters - M10/C, M15/C, M20/C
T2324005	0	Typical Installation Arrangements
T2134007	0	System Connection Details - M7
T2324006	0	System Connection Details - M10, M15, M20
T2134018	0	Split/Package System Installation Details - M7, M7/E
T2324007	0	External Evaporator Installation Details - M10/E, M15/E, M20/E
T2324009	0	Package System Installation Details - M10, M15, M20
T2134019	B	Refrigeration Schematic - M7
T2324010	A	Refrigeration Schematic - M10, M15, M20
AE207051	H	Electrical Schematic c/w Pumpdown
AE207077	G	Electrical Schematic w/o Pumpdown
AE284303	0	Electrical Scgematic M7, 220V/3 Phase/50 Hz
T2134011	A	Pilot Control Box Parameters
T2134012	A	Main Control Cubicle Parameters
T2134009	A	Return Air Plenum Parameters - M7
AS508320	A	Return Air Plenum Parameters - M10, M15, M20
T2134008	0	Supply Air Plenum Parameters - M7
AS508321	A	Supply Air Plenum Parameters - M10, M15, M20
AS162629	A	FVV80 Pressuriser Parameters
AS162628	A	FVV100 Pressuriser Parameters
T5003001	A	FVF90 Pressuriser Parameters
AE5003010	D	FVF90 Electrical Schematic (240V)
AE5003011	0	FVF90 Electrical Schematic (415V)
T2132008	0	MHF1 Condensate Heater Parameters
T3178001	00	Package System Parameters M25
T3178002	00	Split System Parameters Condenser M25


NOTES: Unless otherwise specified
1. All Welds are to be MIG.
2. All Fasteners are to be 304 Stainless Steel
MOUNTING CHANEL
FILTER PRESSURISER
1- SUPPLY & RETURN AIR SEALING FRAME P/No AS213445_X 2
2- SUPPLY & RETURN AIR SEAL P/No 861900 X 2
3- ROOF SEALING UPSTAND (WELD TO ROOF PLATE) P/No AS213460 X 2. SA & RA
4- PLENUM SPIGOT RETURN AIR P/No AS2134107
6- RETURN AIR PLENUM FILTER P/No AS502919
MAIN CONTROL CUBICLE
OPTIONAL SUPPLY AIR OUTLET
5- PLENUM SPIGOT SUPPLY AIR P/No AS2134106
7- SUPPLY AIR PLENUM DIFFUSER P/No AS502918
PILOT CONTROL BOX
= AIR FLOW
INSTALLATION CROSS SECTION VIEW
SPIGOT RETAINING BOLT
ROOF PLATE
ROOF LINING
MOUNTING CHANEL
WATER TIGHT SEAL REQ'D BETWEEN FLANGE AND ROOF PLATE
ELECTRICAL ENTRY
150
299
950
910 MTG CTRS
950
297
600 LID CLEARANCE
730 LID SWING CLEARANCE
1445
338
70 CTR
468 CTR
227 CTR
610 CTR
70 CTR
302
664
M7 PACKAGE SYSTEM PARAMETERS
T2134015
Air International Transit
Released Documents 8/5/2005 by PP


NOTES: Unless otherwise specified
1. All Welds are to be MIG.
2. All Fasteners are to be 304 Stainless Steel
PILOT CONTROL BOX
MAIN CONTROL CUBICLE
FILTER PRESSURISER
(1)- WEATHER SEAL GASKET (P/N 08379)
(2)- EVAPORATOR SEALING UPSTAND (WELD TO THE ROOF PLATE) (P/N AS508316)
(3)- PLENUM SPIGOT (RETURN AIR) (P/N AS508330)
(5)- RETURN AIR PLENUM (FILTER)-(P/N AS508320)
PLENUM RETAINING BOLT
MOUNTING ANGLE AND CHANEL
WATER TIGHT SEAL REQ'D BETWEEN FLANGE AND ROOF PLATE
ROOF PLATE
ROOF LINING
INSTALLATION CROSS SECTION VIEW
=AIR FLOW
MOUNTING ANGLE AND CHANEL
OPTIONAL SUPPLY AIR OUTLET
(4)- PLENUM SPIGOT (SUPPLY AIR)-(P/N AS508329)
(6)- SUPPLY AIR PLENUM (DIFFUSERS)-(P/N AS508321)
70
1300
300
1280
1349 MTG CTRS
302
CABLE ENTRY
895
100 CTR
825 CTR
825 CTR
100 CTR
780 LID SWING CLEARANCE
550 ELECT LID SWING CLEARANCE
1930 LIFTING CTRS
1850
517
915 LID SWING CLEARANCE TYP
1312 LIFTING BRKT CTRS
368
Released Documents 8/3/2005 by PP
Air International Transit
M-SERIES M20, M15, M10
PACKAGE SYSTEM PARAMETERS
T2324001
DIMENSIONS IN MILLIMETRES
DO NOT SCALE


DIMENSIONS IN MILLIMETRES
Sigma Industries Pty Limited
A.C.N 000 900 970
M-SERIES-MODEL M7-A/E SYSTEM
ROOF MOUNTED EVAPORATOR PARAMETERS.
T 2134 016
A3
SHEET OF
DRAWN BJC
DATE 16-03-93
CHECKED
APPROVED
SCALE
QTY.
MATERIAL
NEXT ASSY.
DESCRIPTION
DRG. No.
PART No.
ITEM
QTY.
ADDITIONAL NOTES
FOR INSTALLATION DETAILS SEE DRG. T 2134018.
PROT.
PROD.
SALES
ALL RIGHTS RESERVED
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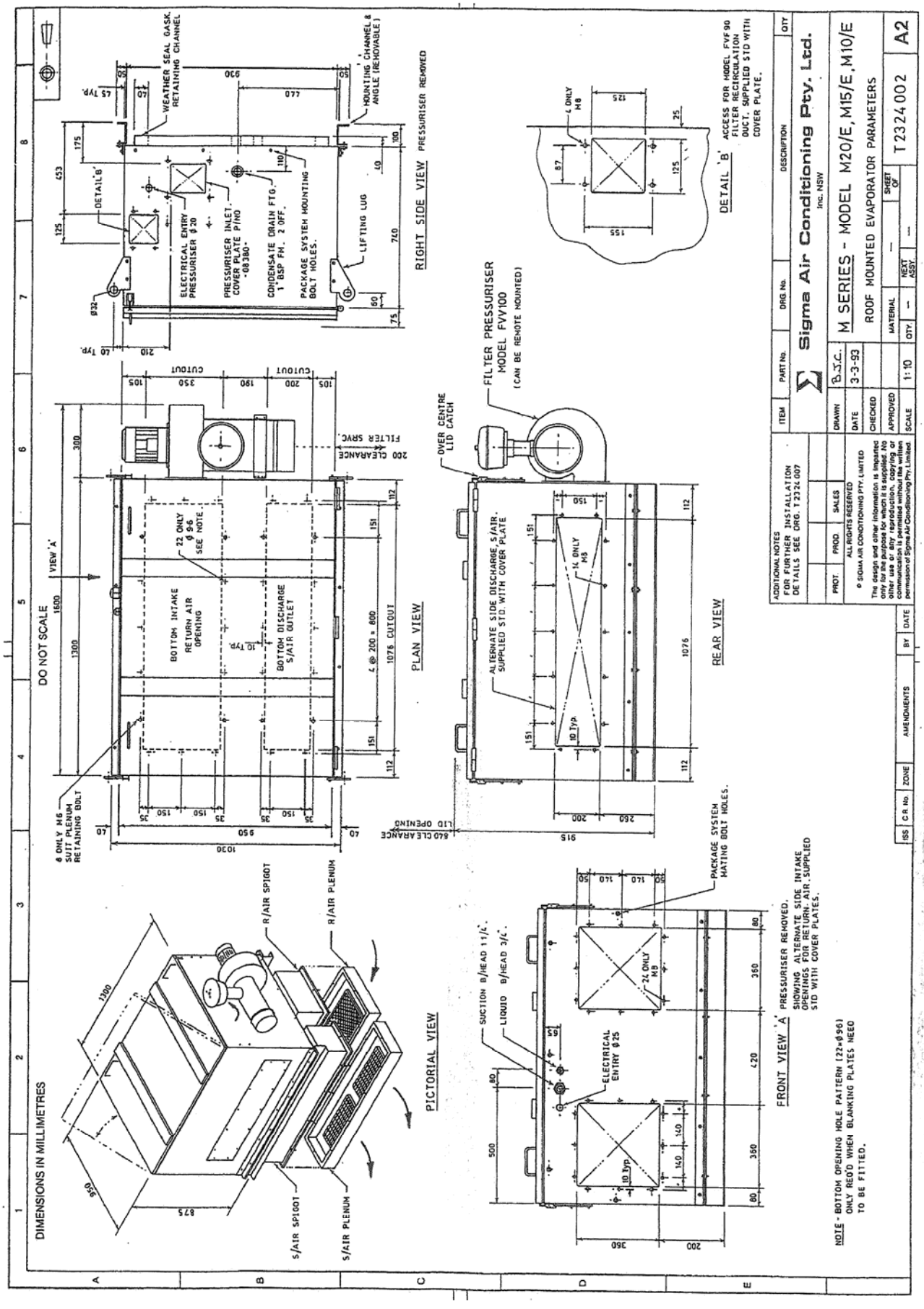
ISS.
C.R. No.
ZONE
AMENDMENTS
BY
DATE
PLAN VIEW
RIGHT SIDE VIEW PRESSURISER NOT SHOWN.
REAR VIEW
SHOWING ALTERNATE SIDE DISCHARGE OPENING FOR SUPPLY AIR, COVER PLATE SUPPLIED AS PER RETURN AIR.
PICTORIAL VIEW
FRONT VIEW 'A'
SHOWING ALTERNATE SIDE INTAKE OPENING FOR RETURN AIR. SUPPLIED STANDARD WITH COVER PLATE WHICH CAN INTERCHANGE WITH SEALING GASKET RETAINER IF REQUIRED.
DETAIL 'B' FRESH AIR PRESSURISER MOUNTING INLET COVER PLATE IF REQD P/NO. 1353.
RETURN AIR
SUPPLY AIR
600 CUTOUT
NOTE - ALL 6 OPENINGS AND HOLE PATTERNS ARE IDENTICAL.
MOUNTING CHANNEL - 2 OFF (REMOVABLE)
ELECTRICAL ENTRY FOR PRESSURISER Ø28
CONDENSATE DRAIN FTG. 3/4" FH BSP.
OVER CENTRE LID CATCH
REMOVABLE SEALING GASKET RETAINER, 2 OFF, IDENTICAL.
730 LID SWING CLEARANCE
MATING BOLT HOLES FOR PACKAGE SYSTEM
SUCTION B/HEAD 1-0"
LIQUID B/HEAD 1/2"
ELECTRICAL ENTRY Ø25
CONDENSATE DRAIN FITTING-3/4" FH BSP.
SEALING GASKET RETAINER
BOLT HOLES FOR TIE PLATE USED TO JOIN PACKAGE SYSTEM. M12
UNIT MOUNTING BOLT 1 OFF M12
LIFTING POINT 1 OFF Ø18
VIEW 'A'


Sigma Air Conditioning Pty. Ltd.
M SERIES - MODEL M20/E, M15/E, M10/E
ROOF MOUNTED EVAPORATOR PARAMETERS
T2324002
A2
DO NOnot SCALE
DIMENSIONS IN MILLIMETRES
RIGHT SIDE VIEW PRESSURISER REMOVED
PLAN VIEW
REAR VIEW
FRONT VIEW 'A' PRESSURISER REMOVED.
PICTORIAL VIEW
DETAIL 'B'
FILTER PRESSURISER
MODEL FVV100
(CAN BE REMOTE MOUNTED)
ACCESS FOR MODEL FVF90 FILTER RECIRCULATION DUCT. SUPPLIED STD WITH COVER PLATE.
WEATHER SEAL GASK. RETAINING CHANNEL
MOUNTING CHANNEL & ANGLE (REMOVABLE)
ELECTRICAL ENTRY PRESSURISER Ø20
PRESSURISER INLET. COVER PLATE P/NO -08380-
CONDENSATE DRAIN FTG. 1" BSP FM. 2 OFF.
PACKAGE SYSTEM MOUNTING BOLT HOLES.
LIFTING LUG
BOTTOM INTAKE RETURN AIR OPENING
BOTTOM DISCHARGE S/AIR OUTLET
22 ONLY Ø 9-6 SEE NOTE.
8 ONLY M6 SUIT PLENUM RETAINING BOLT
200 CLEARANCE FILTER SRVC.
OVER CENTRE LID CATCH
ALTERNATE SIDE DISCHARGE S/AIR. SUPPLIED STD. WITH COVER PLATE
14 ONLY M8
24 ONLY M8
PACKAGE SYSTEM MATING BOLT HOLES.
SUCTION B/HEAD 1 1/8".
LIQUID B/HEAD 3/8".
ELECTRICAL ENTRY Ø25
R/AIR SPIGOT
R/AIR PLENUM
S/AIR SPIGOT
S/AIR PLENUM
NOTE - BOTTOM OPENING HOLE PATTERN (22+Ø96) ONLY REQ'D WHEN BLANKING PLATES NEED TO BE FITTED.
SHOWING ALTERNATE SIDE INTAKE OPENINGS FOR RETURN AIR. SUPPLIED STD WITH COVER PLATES.
ADDITIONAL NOTES
FOR FURTHER INSTALLATION DETAILS SEE DRG. T2324.007
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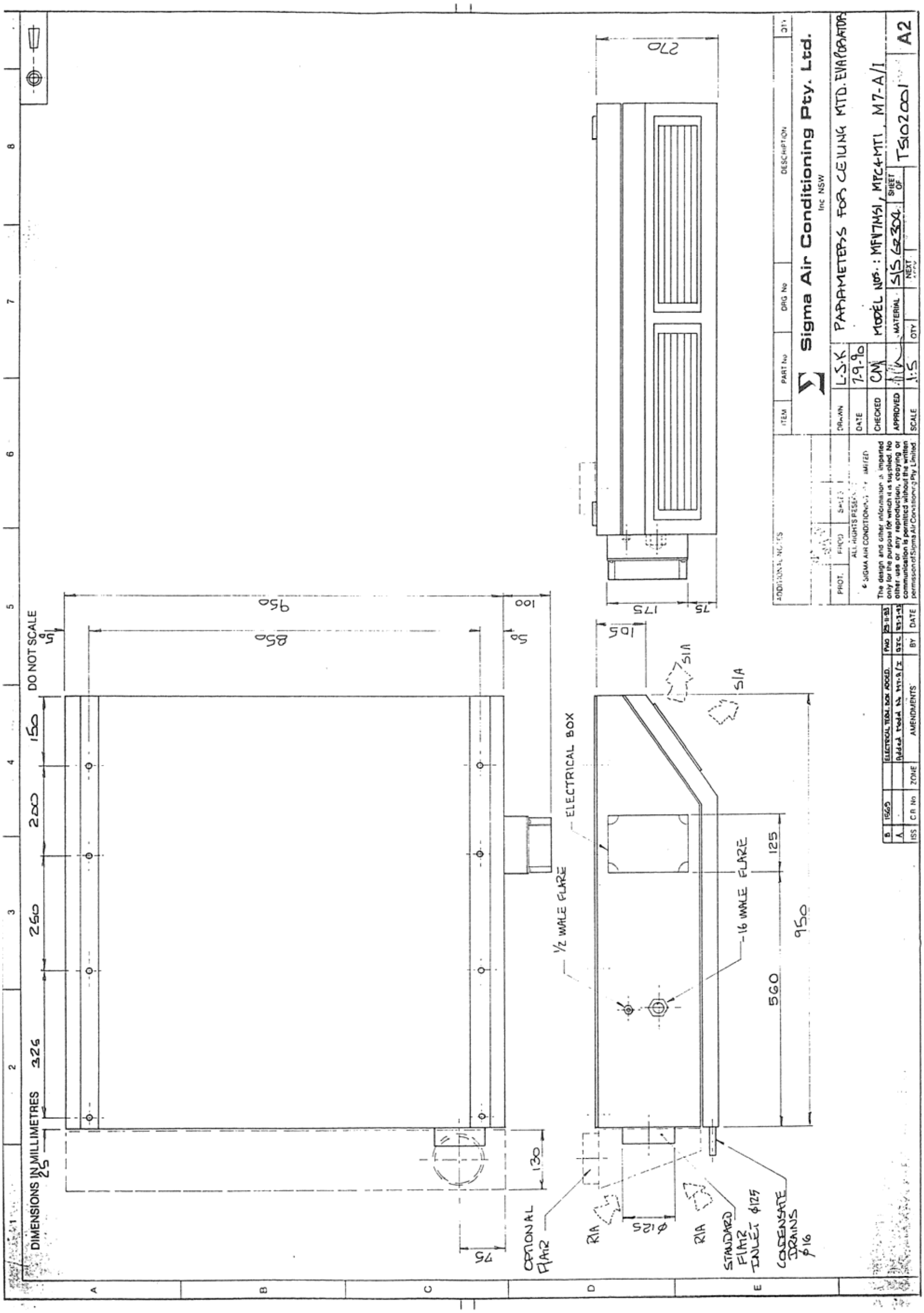
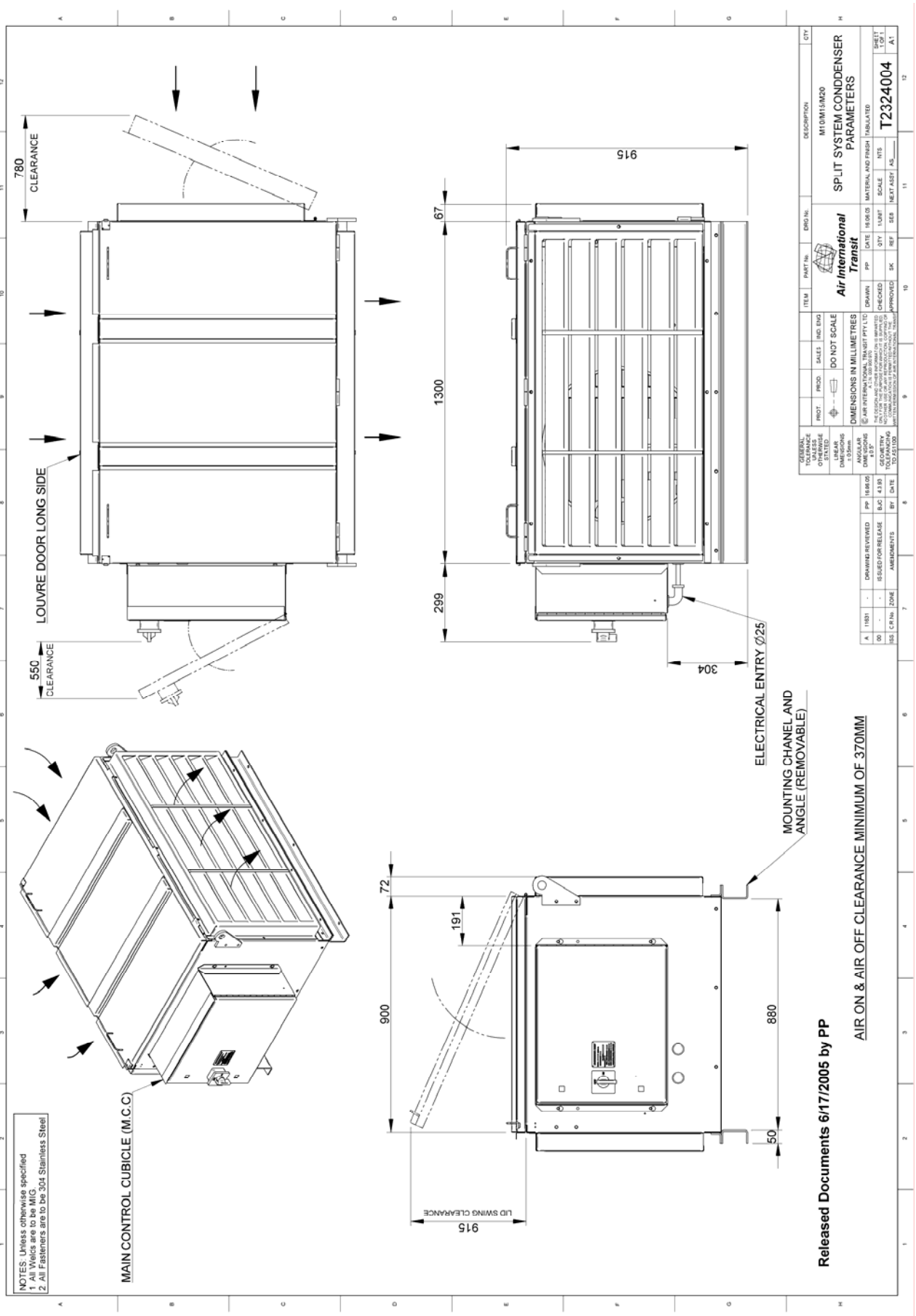
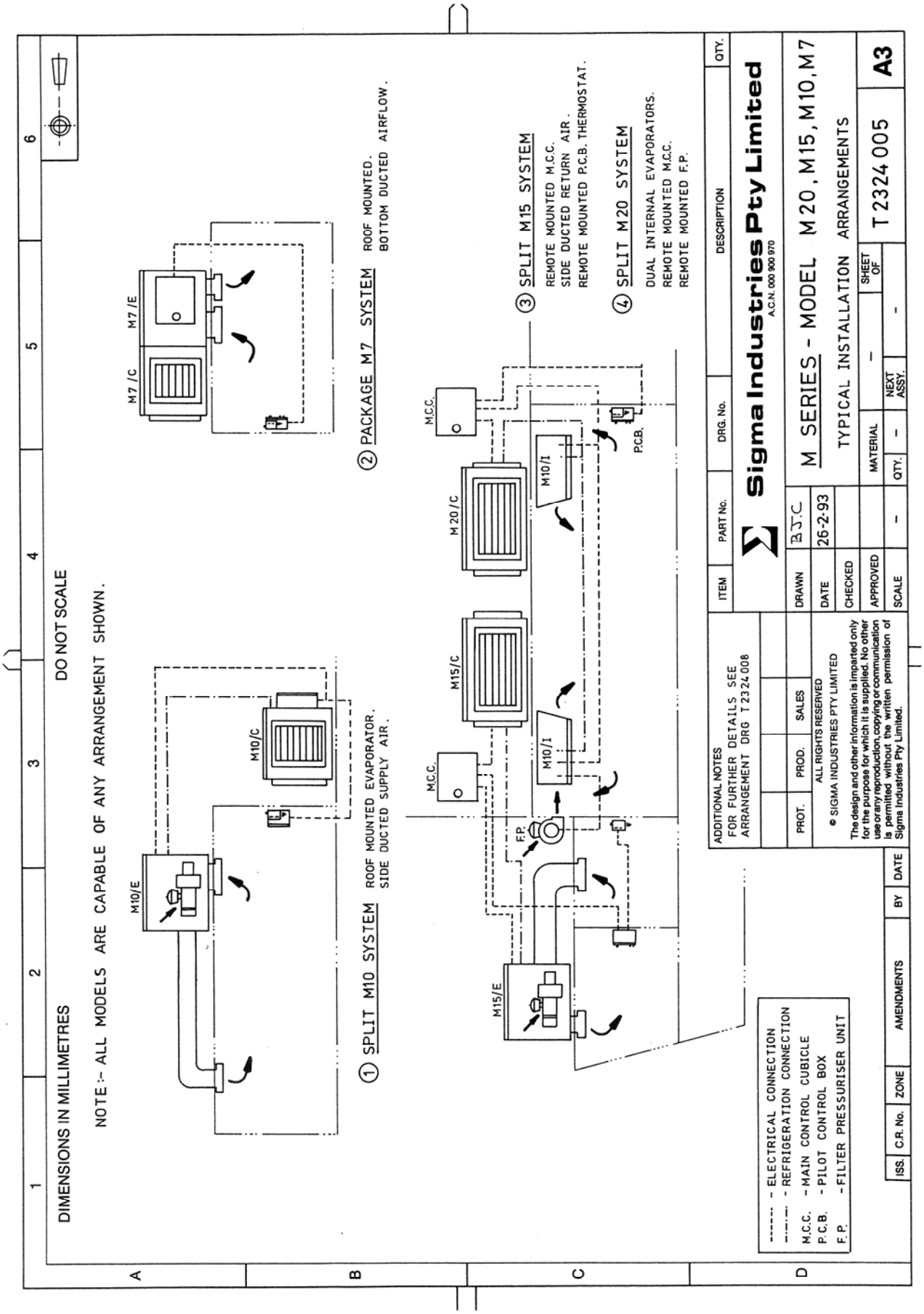
DRAWN B.S.C.
DATE 3-3-93
CHECKED
APPROVED
SCALE 1:10
MATERIAL
QTY —
NEXT ASSY. —
SHEET OF —
AMENDMENTS
BY
DATE


Sigma Air Conditioning Pty. Ltd.
DIMENSIONS IN MILLIMETRES
DO NOT SCALE
ELECTRICAL BOX
1/2 WALE FLARE
-16 WALE FLARE
OPTIONAL FLAIR
STANDARD FLAIR INLET ϕ125
CONDENSATE DRAINS ϕ16
A2


780 CLEARANCE
LOUVRE DOOR LONG SIDE
550 CLEARANCE
915
67
1300
299
304
ELECTRICAL ENTRY Ø25
MOUNTING CHANEL AND ANGLE (REMOVABLE)
72
191
900
880
50
915
LID SWING CLEARANCE
MAIN CONTROL CUBICLE (M.C.C)
AIR ON & AIR OFF CLEARANCE MINIMUM OF 370MM
NOTES: Unless otherwise specified
1 All Welds are to be MIG.
2. All Fasteners are to be 304 Stainless Steel
Released Documents 6/17/2005 by PP
SPLIT SYSTEM CONDDENSER PARAMETERS
M10/M15/M20
T2324004
Air International Transit


DIMENSIONS IN MILLIMETRES
DO NOT SCALE
NOTE :- ALL MODELS ARE CAPABLE OF ANY ARRANGEMENT SHOWN.
① SPLIT M10 SYSTEM ROOF MOUNTED EVAPORATOR. SIDE DUCTED SUPPLY AIR.
② PACKAGE M7 SYSTEM ROOF MOUNTED. BOTTOM DUCTED AIRFLOW.
③ SPLIT M15 SYSTEM REMOTE MOUNTED M.C.C. SIDE DUCTED RETURN AIR. REMOTE MOUNTED P.C.B. THERMOSTAT.
④ SPLIT M20 SYSTEM DUAL INTERNAL EVAPORATORS. REMOTE MOUNTED M.C.C. REMOTE MOUNTED F.P.
M10/E
M10/C
M7 /E
M7 /C
M15/E
M15/C
M 20/C
M10/I
M.C.C.
P.C.B.
F.P.
- ELECTRICAL CONNECTION
- REFRIGERATION CONNECTION
M.C.C. - MAIN CONTROL CUBICLE
P.C.B. - PILOT CONTROL BOX
F.P. - FILTER PRESSURISER UNIT
ADDITIONAL NOTES
FOR FURTHER DETAILS SEE ARRANGEMENT DRG T 2324 008
PROT. PROD. SALES
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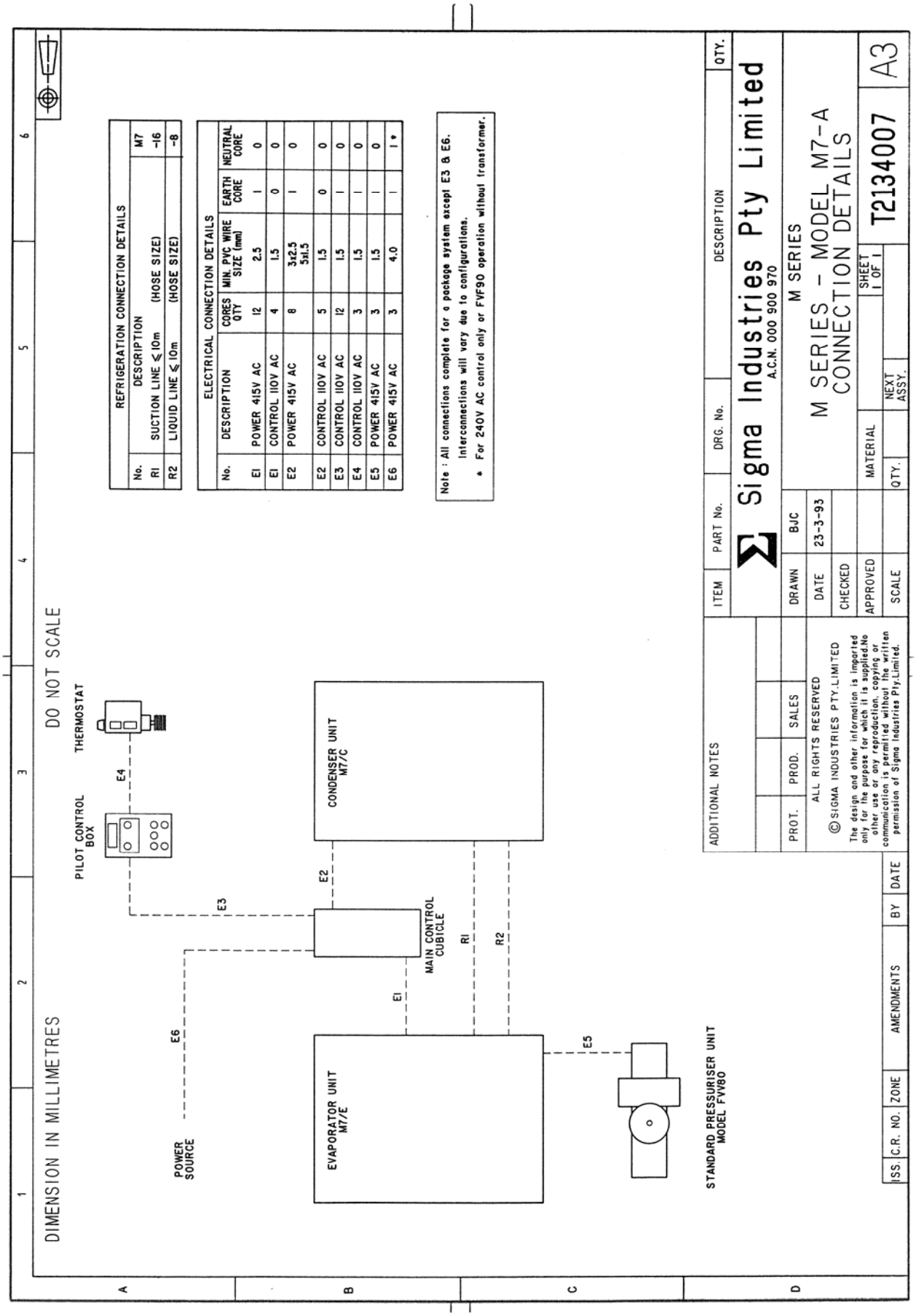
ISS. C.R. No. ZONE AMENDMENTS BY DATE
ITEM PART No. DRG. No. DESCRIPTION QTY.
DRAWN B.J.C
DATE 26-2-93
CHECKED
APPROVED
SCALE
Sigma Industries Pty Limited
A.C.N. 000 900 970
M SERIES - MODEL M 20, M15, M10, M7
TYPICAL INSTALLATION ARRANGEMENTS
MATERIAL
QTY.
NEXT ASSY.
SHEET OF
T 2324 005
A3


DIMENSION IN MILLIMETRES
DO NOT SCALE
THERMOSTAT
PILOT CONTROL BOX
E4
E3
E2
E1
E6
E5
R1
R2
POWER SOURCE
CONDENSER UNIT M7/C
MAIN CONTROL CUBICLE
EVAPORATOR UNIT M7/E
STANDARD PRESSURISER UNIT MODEL FV80
REFRIGERATION CONNECTION DETAILS
No. DESCRIPTION M7
R1 SUCTION LINE ≤ 10m (HOSE SIZE) -16
R2 LIQUID LINE ≤ 10m (HOSE SIZE) -8
ELECTRICAL CONNECTION DETAILS
No. DESCRIPTION CORES QTY MIN. PVC WIRE SIZE (mm) EARTH CORE NEUTRAL CORE
E1 POWER 415V AC 12 2.5 1 0
E1 CONTROL 110V AC 4 1.5 0 0
E2 POWER 415V AC 8 3x2.5 5x1.5 1 0
E2 CONTROL 110V AC 5 1.5 0 0
E3 CONTROL 110V AC 12 1.5 1 0
E4 CONTROL 110V AC 3 1.5 1 0
E5 POWER 415V AC 3 1.5 1 0
E6 POWER 415V AC 3 4.0 1 1*
Note : All connections complete for a package system except E3 & E6.
Interconnections will vary due to configurations.
* For 240V AC control only or FVF90 operation without transformer.
ADDITIONAL NOTES
ITEM PART No. DRG. No. DESCRIPTION QTY.
Sigma Industries Pty Limited
A.C.N. 000 900 970
M SERIES
M SERIES - MODEL M7-A
CONNECTION DETAILS
DRAWN BJC
DATE 23-3-93
CHECKED
APPROVED
SCALE
MATERIAL
QTY.
NEXT ASSY.
SHEET 1 OF 1
T2134007
A3
PROT. PROD. SALES
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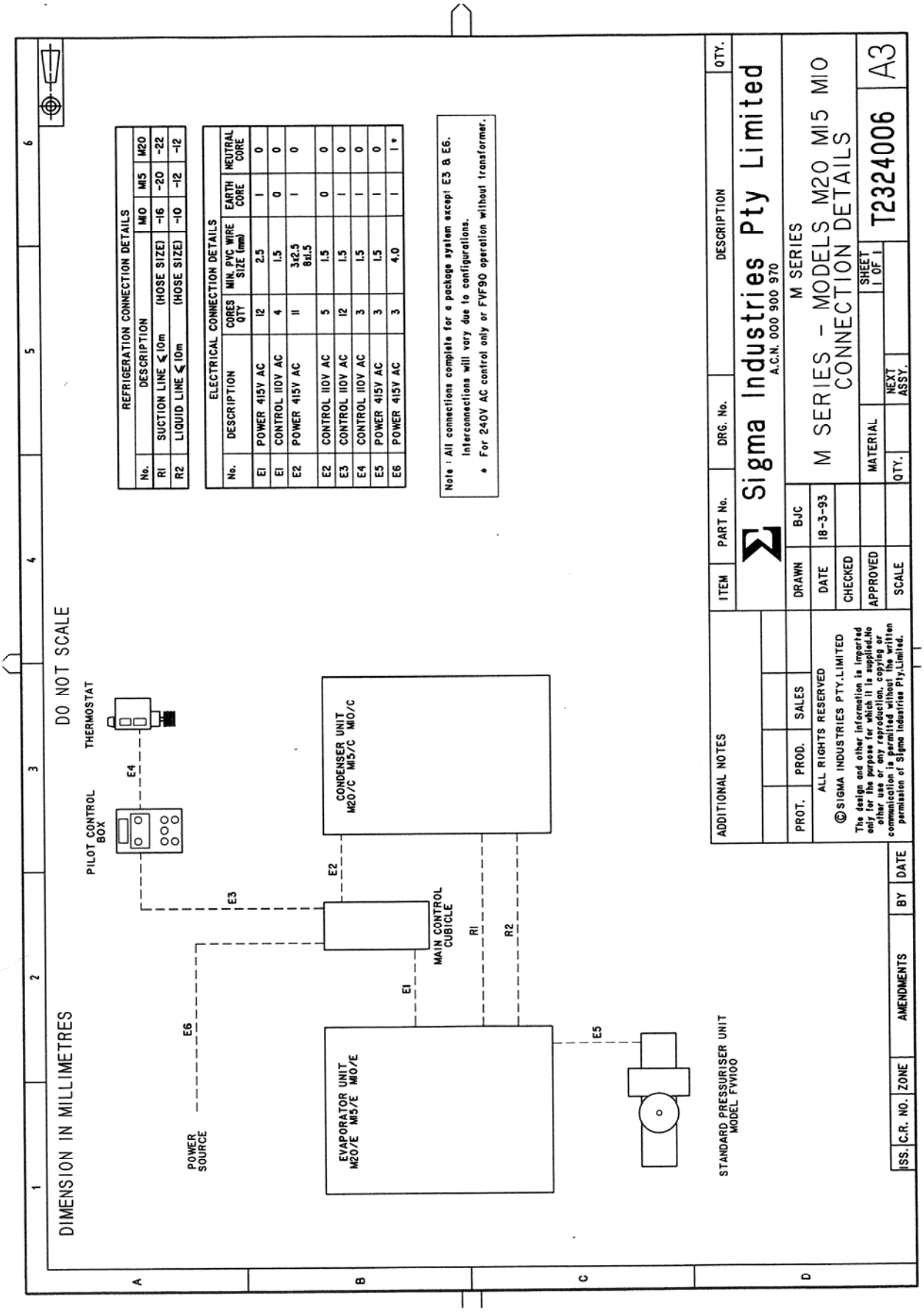
ISS. C.R. NO. ZONE AMENDMENTS BY DATE


DIMENSION IN MILLIMETRES
DO NOT SCALE
THERMOSTAT
E4
PILOT CONTROL BOX
E3
E2
CONDENSER UNIT M20/C M15/C M10/C
MAIN CONTROL CUBICLE
R1
R2
E1
E6
POWER SOURCE
EVAPORATOR UNIT M20/E M15/E M10/E
E5
STANDARD PRESSURISER UNIT MODEL FV1100
REFRIGERATION CONNECTION DETAILS
No. | DESCRIPTION | M10 | M15 | M20
R1 | SUCTION LINE ≤ 10m (HOSE SIZE) | -16 | -20 | -22
R2 | LIQUID LINE ≤ 10m (HOSE SIZE) | -10 | -12 | -12
ELECTRICAL CONNECTION DETAILS
No. | DESCRIPTION | CORES QTY | MIN. PVC WIRE SIZE (mm) | EARTH CORE | NEUTRAL CORE
E1 | POWER 415V AC | 12 | 2.5 | 1 | 0
E1 | CONTROL 110V AC | 4 | 1.5 | 0 | 0
E2 | POWER 415V AC | 11 | 3x2.5 8x1.5 | 1 | 0
E2 | CONTROL 110V AC | 5 | 1.5 | 0 | 0
E3 | CONTROL 110V AC | 12 | 1.5 | 1 | 0
E4 | CONTROL 110V AC | 3 | 1.5 | 1 | 0
E5 | POWER 415V AC | 3 | 1.5 | 1 | 0
E6 | POWER 415V AC | 3 | 4.0 | 1 | 1*
Note : All connections complete for a package system except E3 & E6.
Interconnections will vary due to configurations.
* For 240V AC control only or FVF90 operation without transformer.
ADDITIONAL NOTES
PROT. | PROD. | SALES
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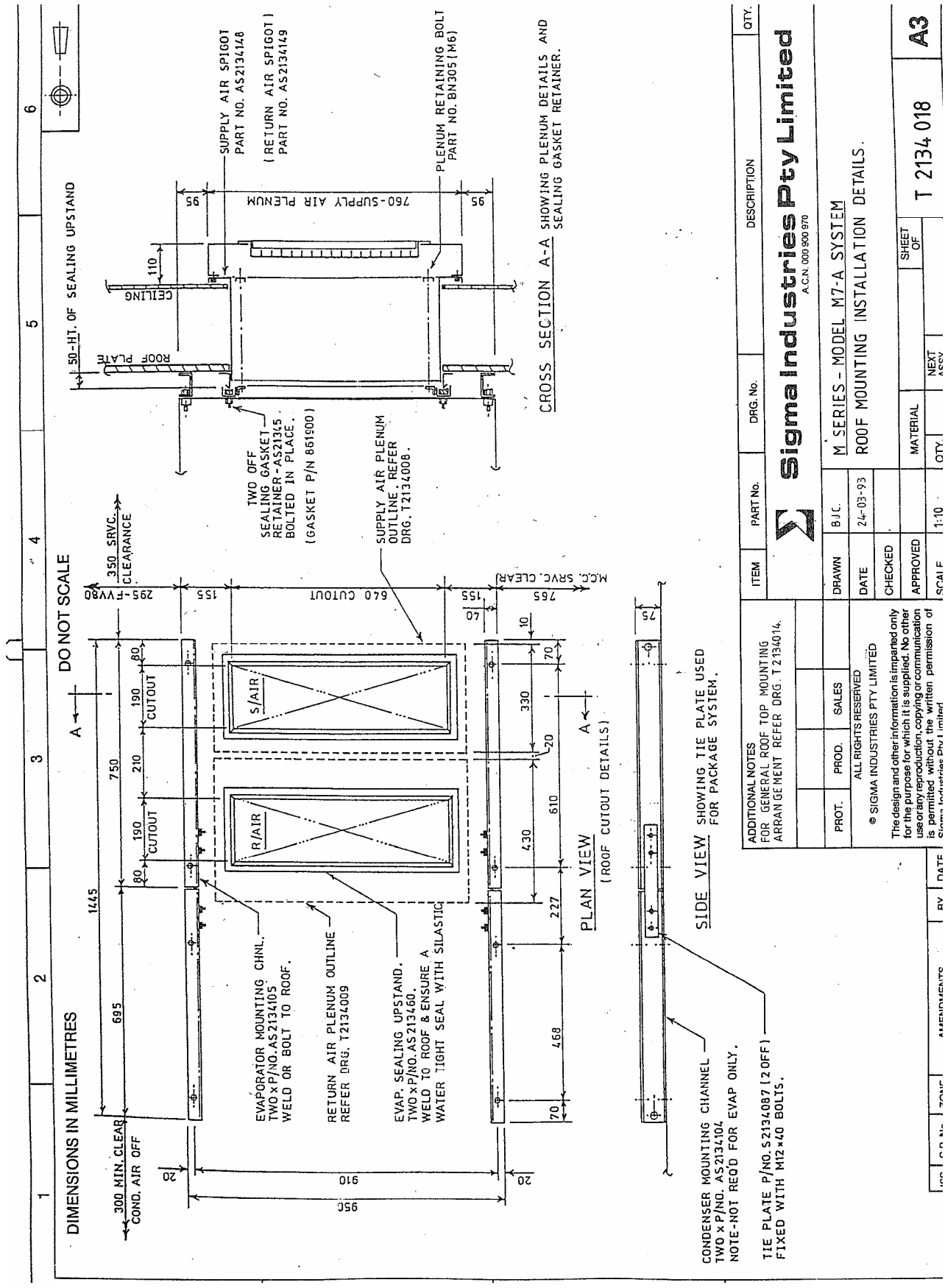
ISS. | C.R. NO. | ZONE | AMENDMENTS | BY | DATE
ITEM | PART No. | DRG. No. | DESCRIPTION | QTY.
DRAWN BJC
DATE 18-3-93
CHECKED
APPROVED
SCALE
MATERIAL
QTY.
NEXT ASSY.
SHEET 1 OF 1
Sigma Industries Pty Limited
A.C.N. 000 900 970
M SERIES
M SERIES – MODELS M20 M15 M10
CONNECTION DETAILS
T2324006
A3


DIMENSIONS IN MILLIMETRES
DO NOT SCALE
300 MIN. CLEAR COND. AIR OFF
EVAPORATOR MOUNTING CHNL. TWO x P/NO. AS213405 WELD OR BOLT TO ROOF.
RETURN AIR PLENUM OUTLINE REFER DRG. T2134009
EVAP. SEALING UPSTAND. TWO x P/NO. AS213460. WELD TO ROOF & ENSURE A WATER TIGHT SEAL WITH SILASTIC
TIE PLATE P/NO. S2134087 (2 OFF) FIXED WITH M12x40 BOLTS.
CONDENSER MOUNTING CHANNEL TWO x P/NO. AS2134104 NOTE-NOT REQD FOR EVAP ONLY.
PLAN VIEW (ROOF CUTOUT DETAILS)
SIDE VIEW SHOWING TIE PLATE USED FOR PACKAGE SYSTEM.
CROSS SECTION A-A SHOWING PLENUM DETAILS AND SEALING GASKET RETAINER.
SUPPLY AIR SPIGOT PART NO. AS2134148
(RETURN AIR SPIGOT) PART NO. AS2134149
PLENUM RETAINING BOLT PART NO. BN305 (M6)
760-SUPPLY AIR PLENUM
TWO OFF SEALING GASKET RETAINER-AS2134.5 BOLTED IN PLACE. (GASKET P/N 861900)
SUPPLY AIR PLENUM OUTLINE, REFER DRG. T2134008.
50-HT. OF SEALING UPSTAND
ROOF PLATE
CEILING
350 SRVC. CLEARANCE
640 CUTOUT
M.C.C. SRVC. CLEAR
S/AIR
R/AIR
CUTOUT
ADDITIONAL NOTES
FOR GENERAL ROOF TOP MOUNTING ARRANGEMENT REFER DRG. T 2134014.
ITEM
PART No.
DRG. No.
DESCRIPTION
QTY.
Sigma Industries Pty Limited
A.C.N. 000 900 970
M SERIES - MODEL M7-A SYSTEM
ROOF MOUNTING INSTALLATION DETAILS.
DRAWN BJC
DATE 24-03-93
CHECKED
APPROVED
SCALE 1:10
MATERIAL
QTY
SHEET OF
NEXT ASSY
T 2134 018
A3
PROT.
PROD.
SALES
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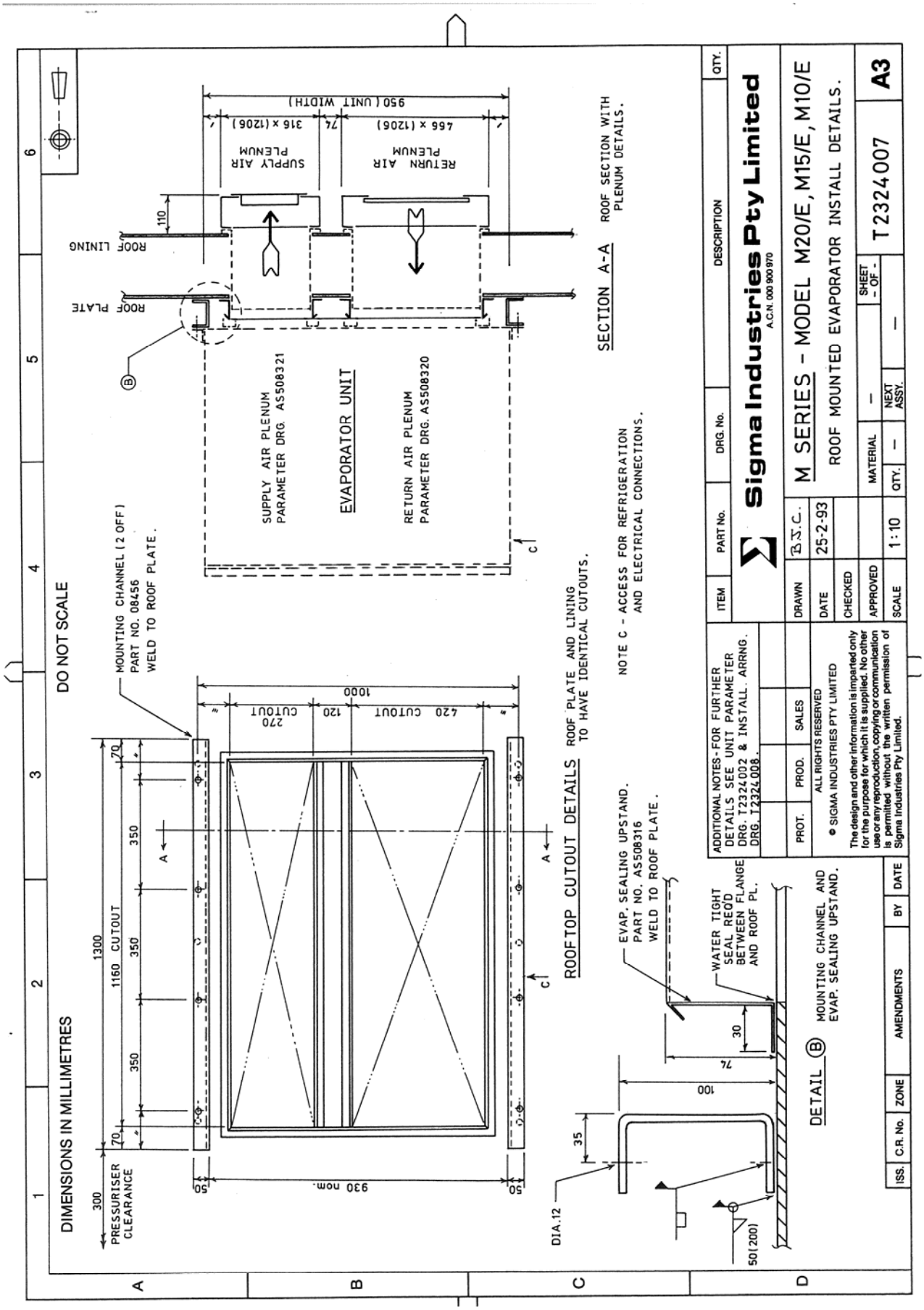
SECTION A-A
ROOF SECTION WITH PLENUM DETAILS.
950 (UNIT WIDTH)
RETURN AIR PLENUM
666 x (1206)
74
SUPPLY AIR PLENUM
316 x (1206)
110
ROOF LINING
ROOF PLATE
EVAPORATOR UNIT
SUPPLY AIR PLENUM PARAMETER DRG. AS508321
RETURN AIR PLENUM PARAMETER DRG. AS508320
MOUNTING CHANNEL (2 OFF) PART NO. 08456 WELD TO ROOF PLATE.
DO NOT SCALE
DIMENSIONS IN MILLIMETRES
ROOFTOP CUTOUT DETAILS
ROOF PLATE AND LINING TO HAVE IDENTICAL CUTOUTS.
NOTE C - ACCESS FOR REFRIGERATION AND ELECTRICAL CONNECTIONS.
1000
270 CUTOUT
120
420 CUTOUT
1300
1160 CUTOUT
70
350
930 nom.
50
300
PRESSURISER CLEARANCE
EVAP. SEALING UPSTAND. PART NO. AS508316 WELD TO ROOF PLATE.
WATER TIGHT SEAL REQ'D BETWEEN FLANGE AND ROOF PL.
DETAIL (B)
MOUNTING CHANNEL AND EVAP. SEALING UPSTAND.
DIA.12
35
100
74
30
50 (200)
ADDITIONAL NOTES - FOR FURTHER DETAILS SEE UNIT PARAMETER DRG. T2324002 & INSTALL. ARRNG. DRG. T2324008.
ITEM
PART No.
DRG. No.
DESCRIPTION
QTY.
Sigma Industries Pty Limited
A.C.N. 000 900 970
M SERIES - MODEL M20/E, M15/E, M10/E
ROOF MOUNTED EVAPORATOR INSTALL DETAILS.
DRAWN B.N.C.
DATE 25-2-93
CHECKED
APPROVED
SCALE 1:10
MATERIAL —
QTY. —
SHEET - OF -
NEXT ASSY. —
T2324007
A3
PROT. PROD. SALES
ISS. C.R. No. ZONE AMENDMENTS BY DATE
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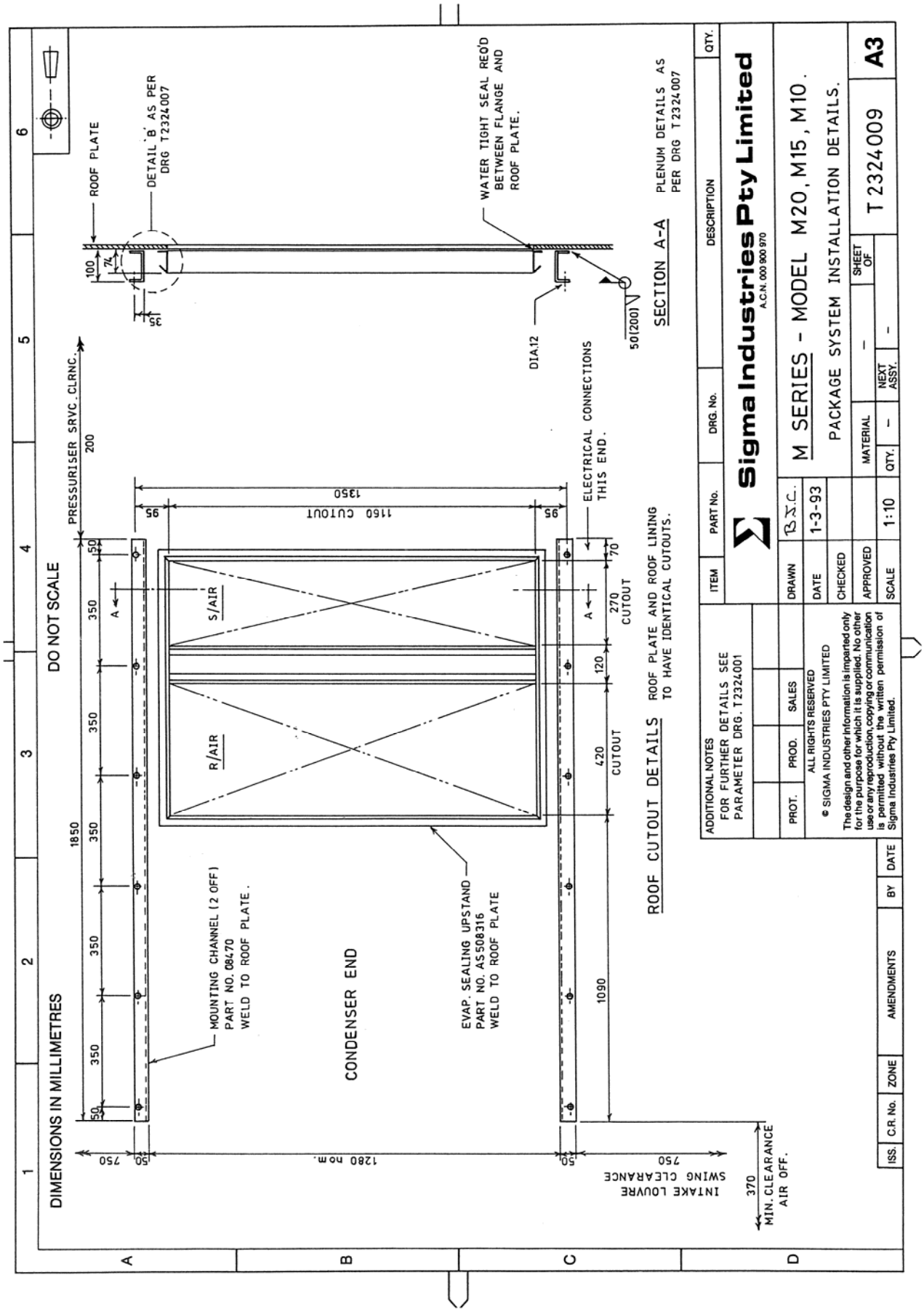
DO NOT SCALE
DIMENSIONS IN MILLIMETRES
ROOF PLATE
DETAIL 'B' AS PER DRG T2324007
WATER TIGHT SEAL REQ'D BETWEEN FLANGE AND ROOF PLATE.
SECTION A-A
PLENUM DETAILS AS PER DRG T2324007
DIA.12
50(200)
PRESSURISER SRVC. CLRNC.
ELECTRICAL CONNECTIONS THIS END.
1160 CUTOUT
1350
S/AIR
R/AIR
270 CUTOUT
420 CUTOUT
ROOF CUTOUT DETAILS
ROOF PLATE AND ROOF LINING TO HAVE IDENTICAL CUTOUTS.
MOUNTING CHANNEL (2 OFF) PART NO. 08470 WELD TO ROOF PLATE.
EVAP. SEALING UPSTAND PART NO. AS508316 WELD TO ROOF PLATE
CONDENSER END
1280 nom.
INTAKE LOUVRE SWING CLEARANCE
MIN. CLEARANCE AIR OFF.
ADDITIONAL NOTES
FOR FURTHER DETAILS SEE PARAMETER DRG. T2324001
Sigma Industries Pty Limited
A.C.N. 000 900 970
M SERIES - MODEL M20, M15, M10.
PACKAGE SYSTEM INSTALLATION DETAILS.
T 2324009
A3
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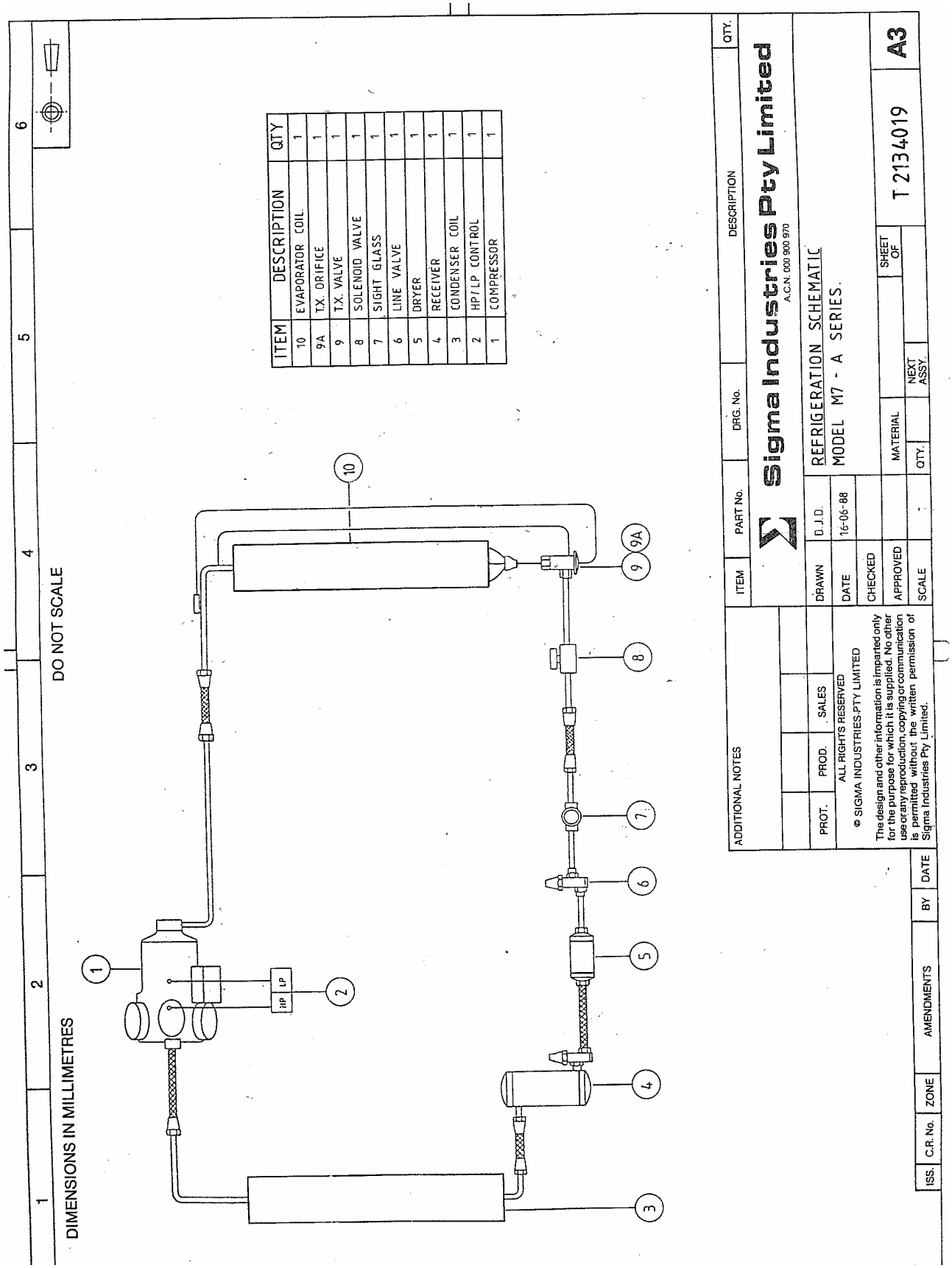
DO NOT SCALE
DIMENSIONS IN MILLIMETRES
ITEM DESCRIPTION QTY
10 EVAPORATOR COIL 1
9A T.X. ORIFICE 1
9 T.X. VALVE 1
8 SOLENOID VALVE 1
7 SIGHT GLASS 1
6 LINE VALVE 1
5 DRYER 1
4 RECEIVER 1
3 CONDENSER COIL 1
2 HP/LP CONTROL 1
1 COMPRESSOR 1
HP
LP
Sigma Industries Pty Limited
A.C.N. 000 900 970
REFRIGERATION SCHEMATIC
MODEL M7 - A SERIES.
T 2134019
A3
ADDITIONAL NOTES
PROT.
PROD.
SALES
DRAWN
D.J.D.
DATE
16-06-88
CHECKED
APPROVED
SCALE
MATERIAL
QTY.
NEXT ASSY.
SHEET OF
ITEM
PART No.
DRG. No.
DESCRIPTION
QTY.
ISS.
C.R. No.
ZONE
AMENDMENTS
BY
DATE
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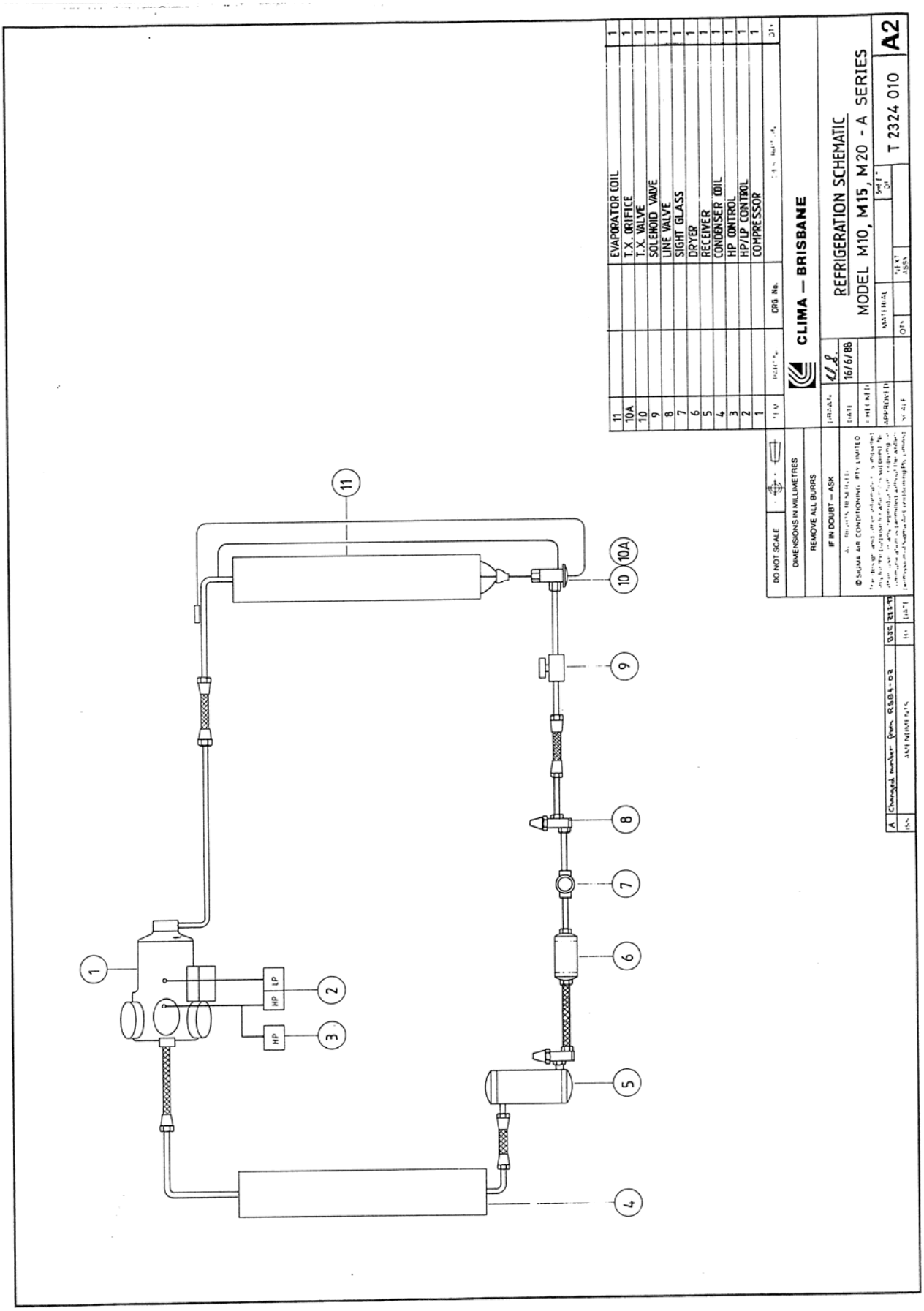
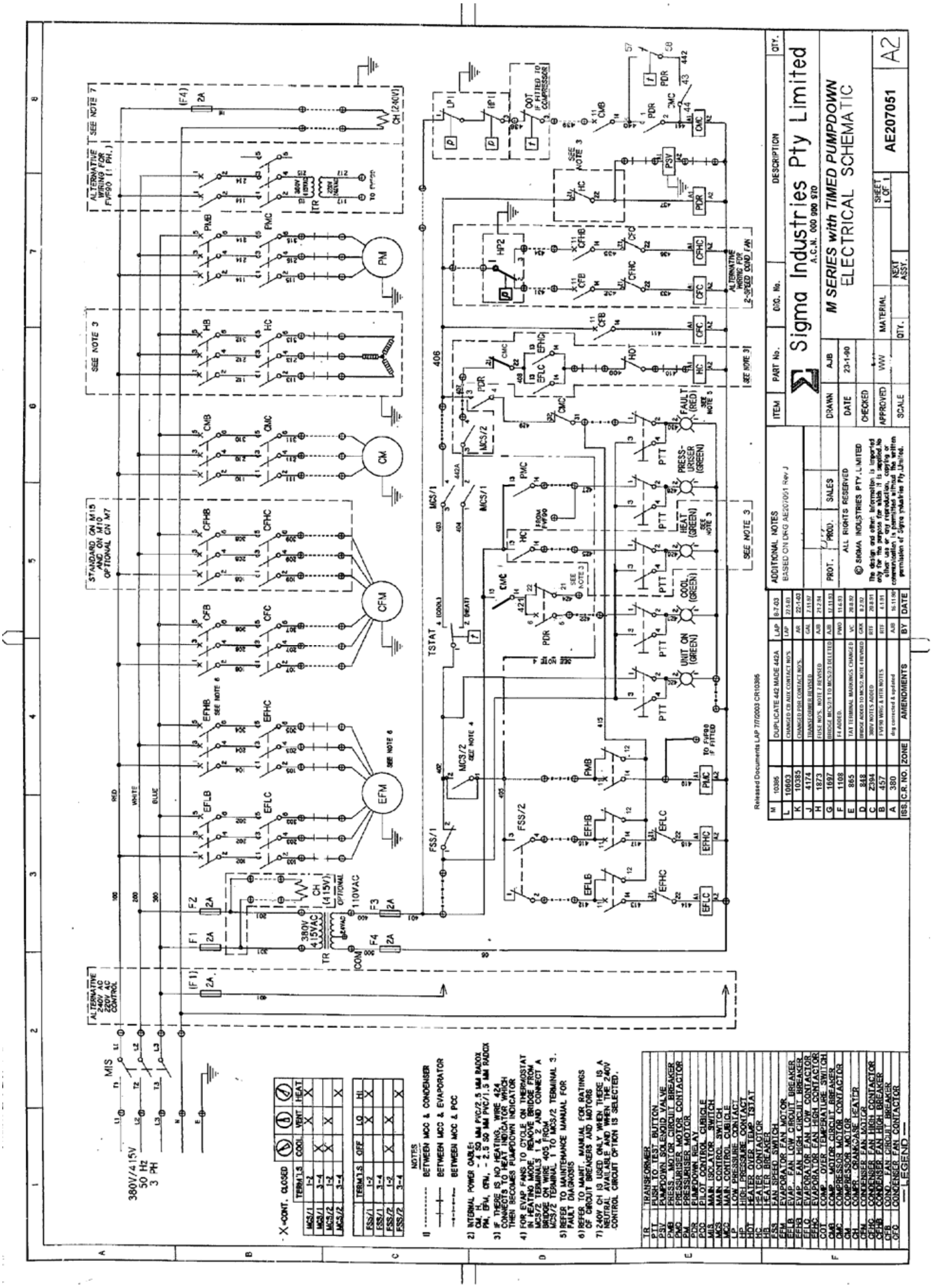
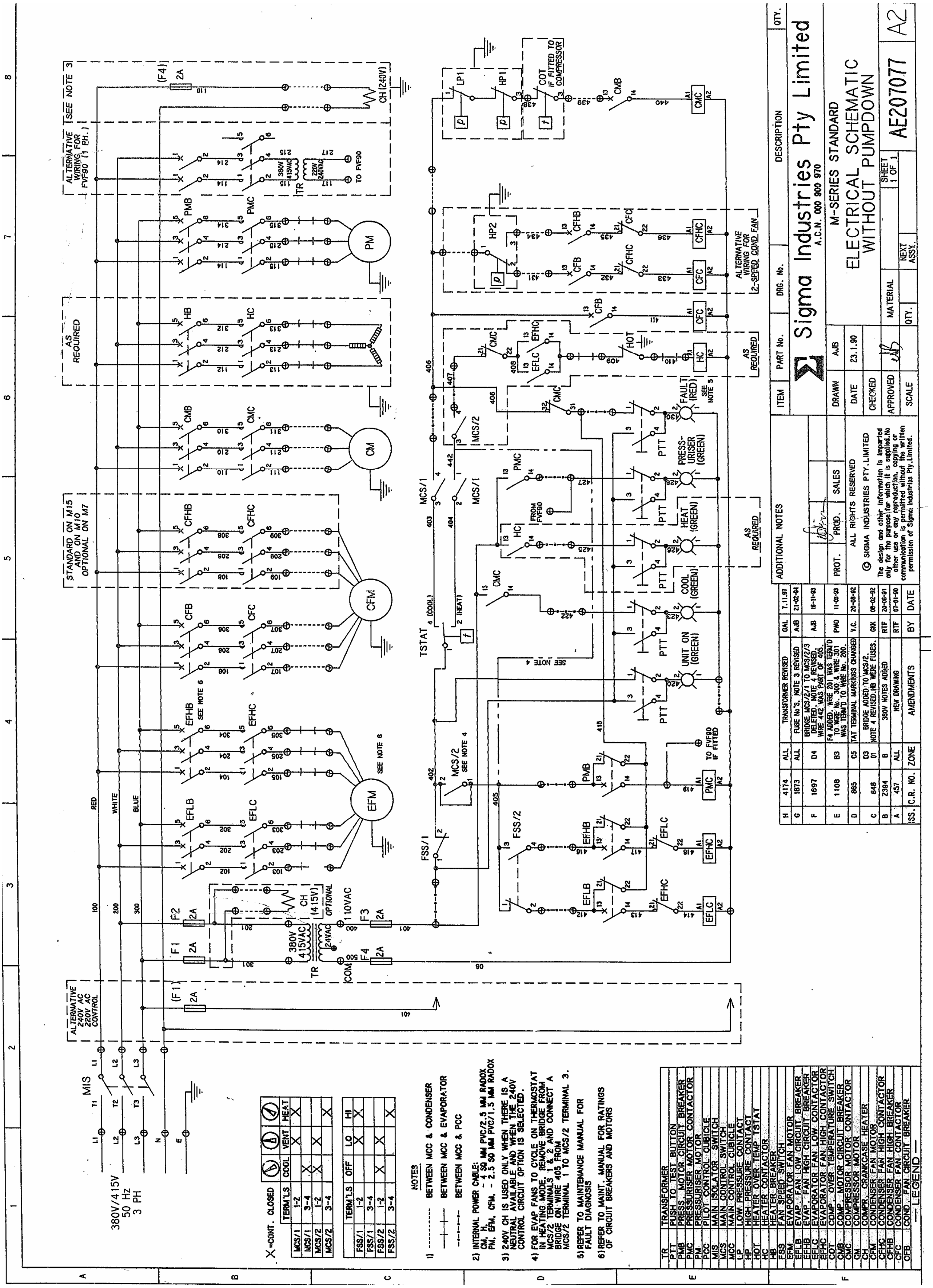
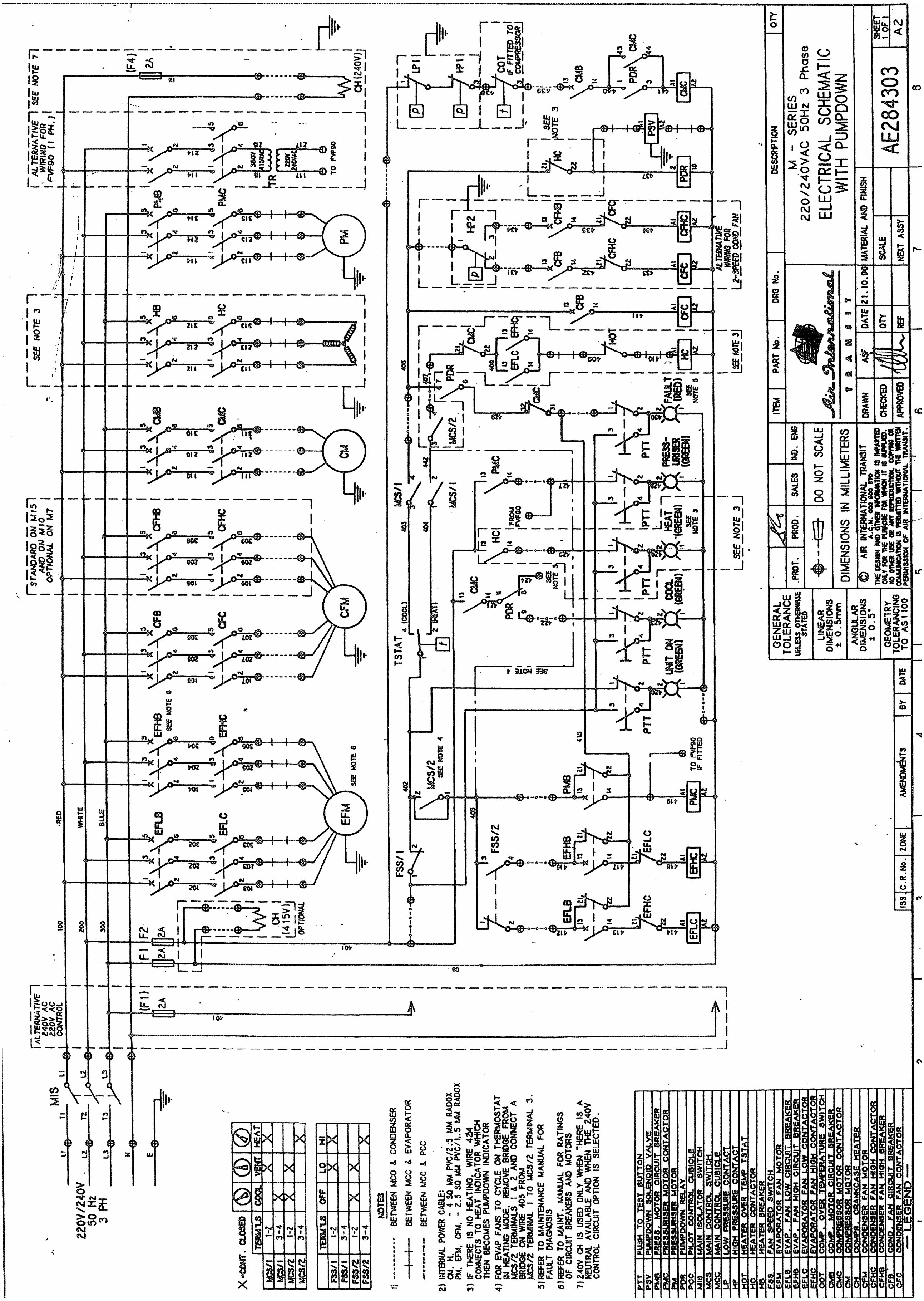
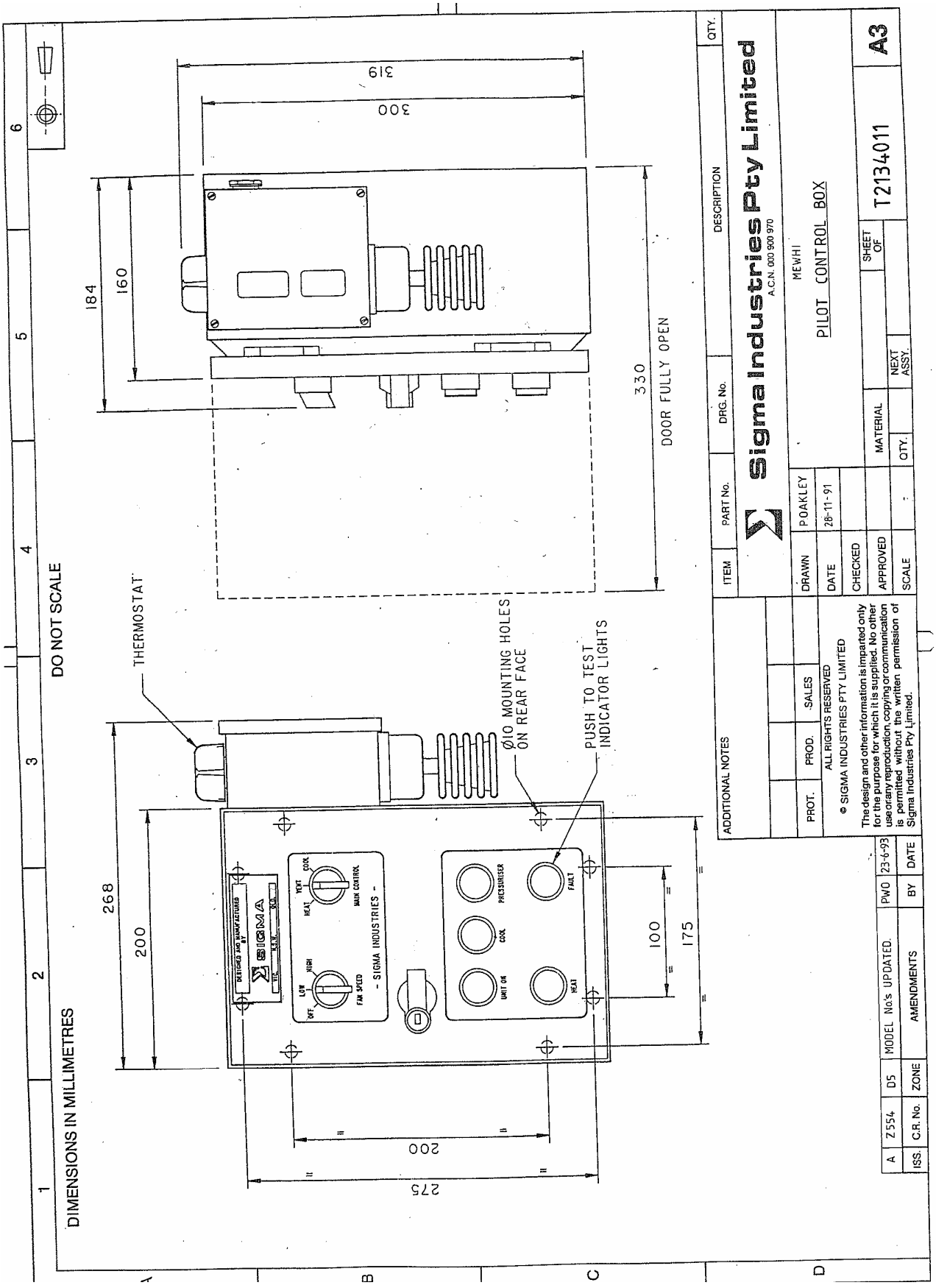

11
EVAPORATOR COIL
10A
T.X. ORIFICE
10
T.X. VALVE
9
SOLENOID VALVE
8
LINE VALVE
7
SIGHT GLASS
6
DRYER
5
RECEIVER
4
CONDENSER COIL
3
HP CONTROL
2
HP/LP CONTROL
1
COMPRESSOR
DRG No.
DO NOT SCALE
DIMENSIONS IN MILLIMETRES
REMOVE ALL BURRS
IF IN DOUBT — ASK
CLIMA — BRISBANE
REFRIGERATION SCHEMATIC
MODEL M10, M15, M20 - A SERIES
T 2324 010
A2
16/6/88
LP
HP
HP


Sigma Industries Pty Limited
M SERIES with TIMED PUMPDOWN
ELECTRICAL SCHEMATIC
AE207051
A2


Sigma Industries Pty Limited
M-SERIES STANDARD
ELECTRICAL SCHEMATIC
WITHOUT PUMPDOWN
AE207077
A2
380V/415V
50 Hz
3 PH
— LEGEND —


M - SERIES
220/240VAC 50Hz 3 Phase
ELECTRICAL SCHEMATIC
WITH PUMPDOWN
AE284303
DO NOT SCALE
DIMENSIONS IN MILLIMETERS
LEGEND


319
300
184
160
330
DOOR FULLY OPEN
THERMOSTAT
Ø10 MOUNTING HOLES ON REAR FACE
PUSH TO TEST INDICATOR LIGHTS
268
200
100
175
200
275
- SIGMA INDUSTRIES -
MAIN CONTROL
FAN SPEED
PRESSURISER
FAULT
COOL
UNIT ON
HEAT
DO NOT SCALE
DIMENSIONS IN MILLIMETRES
Sigma Industries Pty Limited
A.C.N. 000 900 970
MEWHI
PILOT CONTROL BOX
T2134011
A3
ITEM
PART No.
DRG. No.
DESCRIPTION
QTY.
DRAWN
POAKLEY
DATE
28-11-91
CHECKED
APPROVED
SCALE
MATERIAL
SHEET OF
NEXT ASSY.
ADDITIONAL NOTES
PROT.
PROD.
SALES
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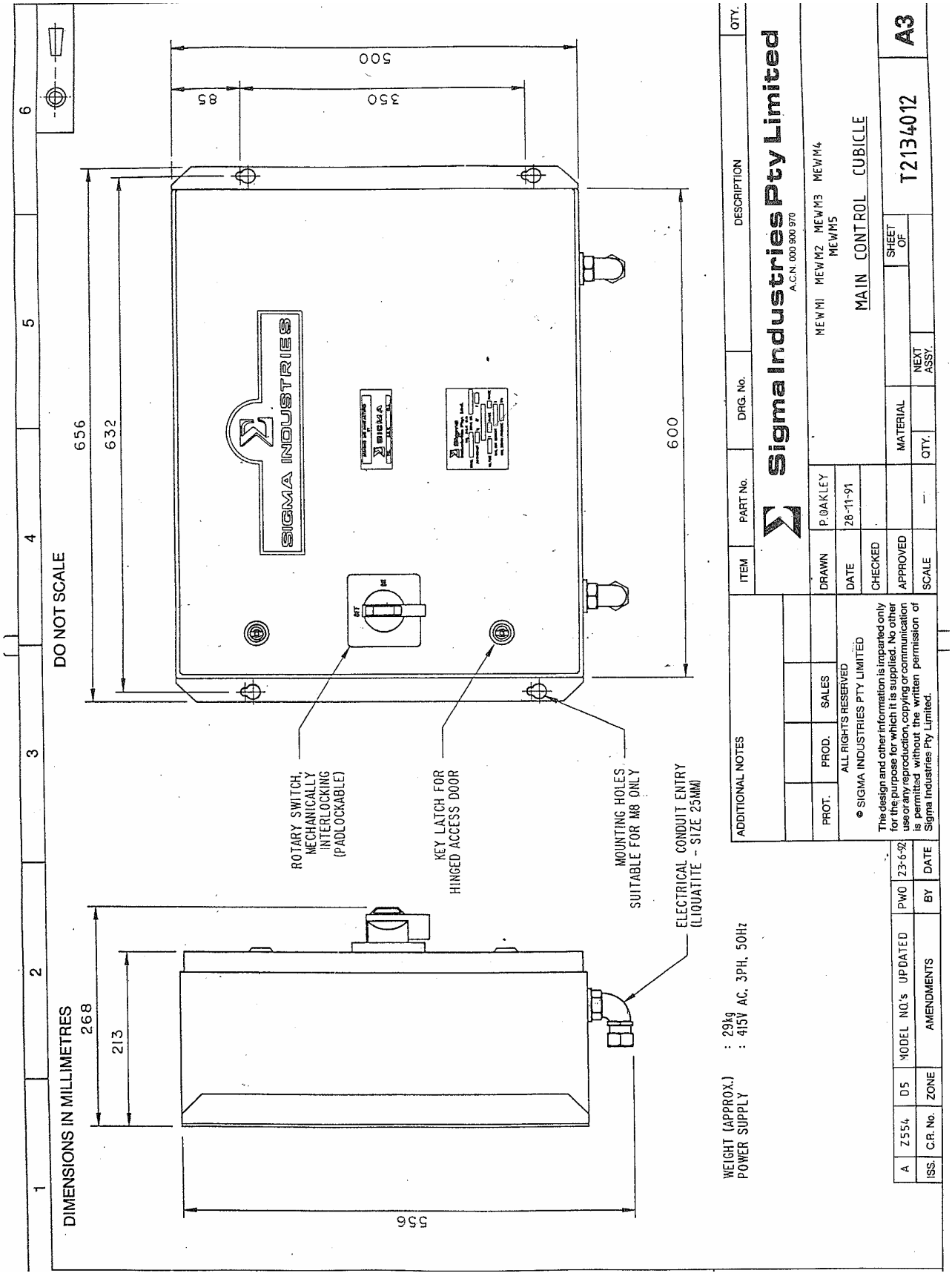
A
Z554
D5
MODEL No's UPDATED.
PWO
23-6-93
ISS.
C.R. No.
ZONE
AMENDMENTS
BY
DATE


DO NOT SCALE
DIMENSIONS IN MILLIMETRES
500
350
85
656
632
600
268
213
556
SIGMA INDUSTRIES
ROTARY SWITCH, MECHANICALLY INTERLOCKING (PADLOCKABLE)
KEY LATCH FOR HINGED ACCESS DOOR
MOUNTING HOLES SUITABLE FOR M8 ONLY
ELECTRICAL CONDUIT ENTRY (LIQUATITE - SIZE 25MM)
WEIGHT (APPROX.) : 29kg
POWER SUPPLY : 415V AC. 3PH. 50Hz
ITEM
PART No.
DRG. No.
DESCRIPTION
QTY.
Sigma Industries Pty Limited
A.C.N. 000 900 970
MEWM1 MEWM2 MEWM3 MEWM4 MEWM5
MAIN CONTROL CUBICLE
T2134012
A3
DRAWN P.OAKLEY
DATE 28-11-91
CHECKED
APPROVED
SCALE
MATERIAL
QTY.
NEXT ASSY.
SHEET OF
PROT. PROD. SALES
ADDITIONAL NOTES
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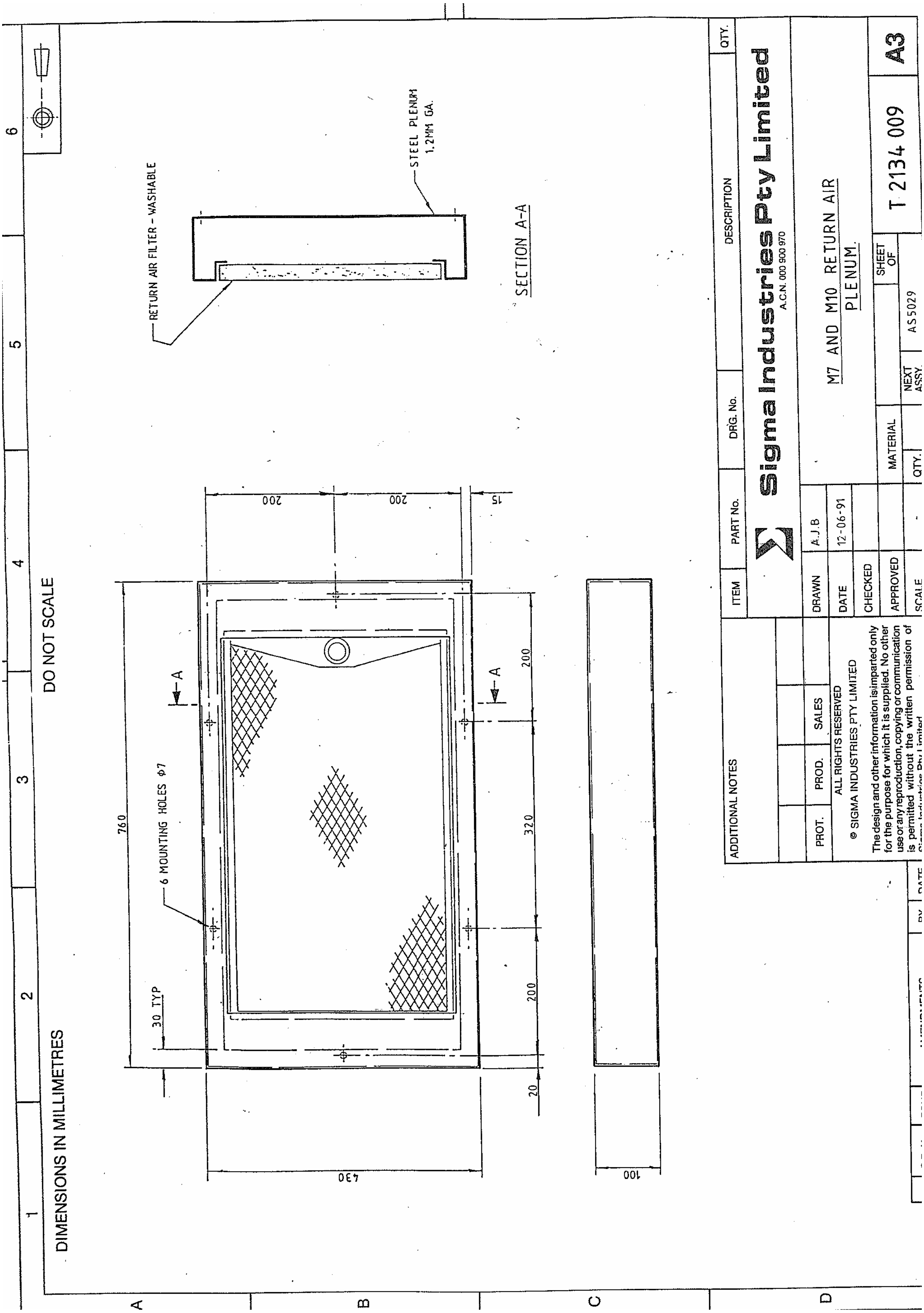
A Z554 DS MODEL NO's UPDATED PWO 23-6-92
ISS. C.R. No. ZONE AMENDMENTS BY DATE


DIMENSIONS IN MILLIMETRES
DO NOT SCALE
RETURN AIR FILTER - WASHABLE
STEEL PLENUM 1.2MM GA.
SECTION A-A
6 MOUNTING HOLES Φ7
30 TYP
760
430
100
200
200
15
200
320
200
20
ADDITIONAL NOTES
PROT.
PROD.
SALES
ALL RIGHTS RESERVED
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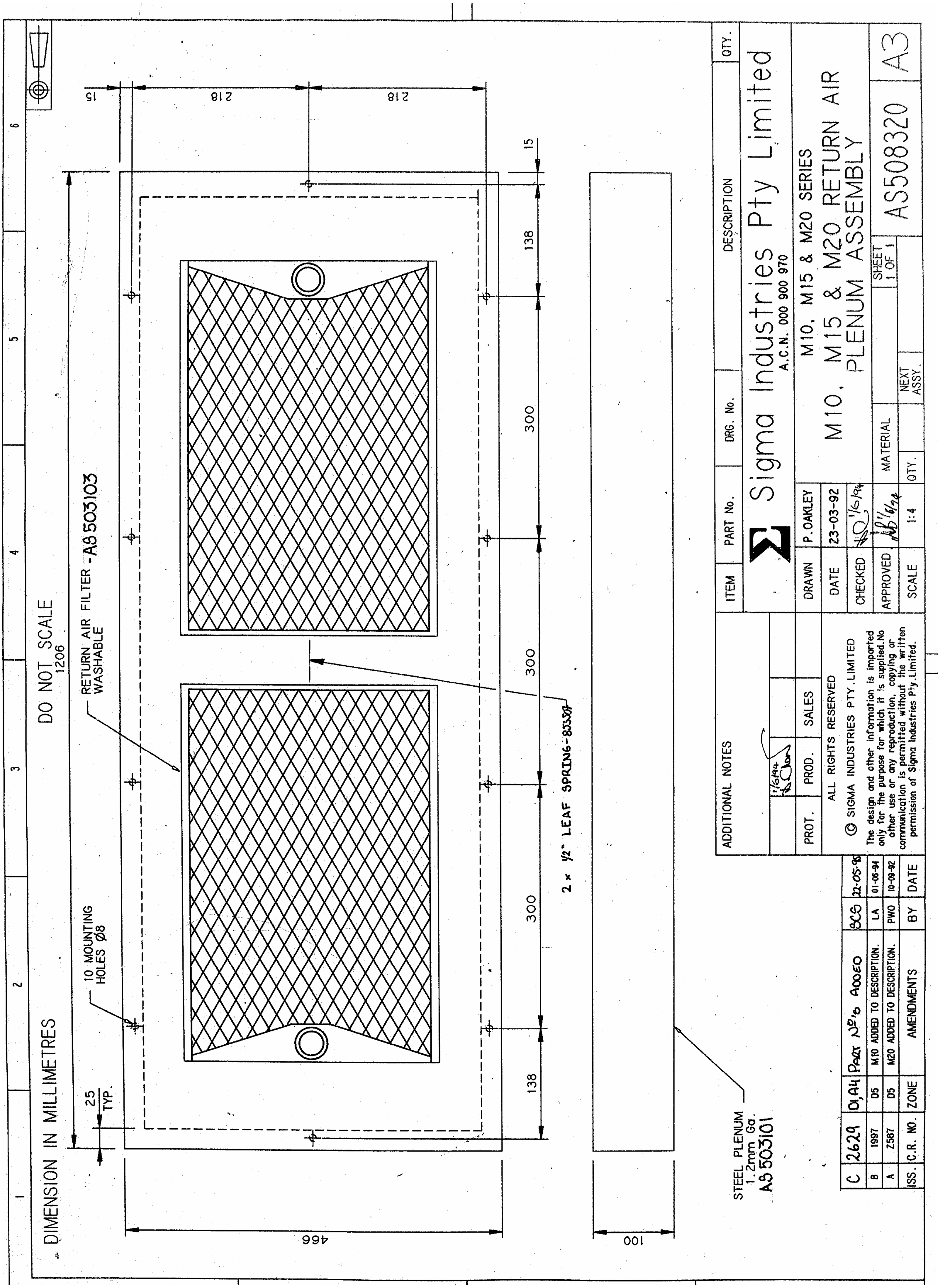
ITEM
PART No.
DRG. No.
DESCRIPTION
QTY.
Sigma Industries Pty Limited
A.C.N. 000 900 970
DRAWN
A.J.B
DATE
12-06-91
CHECKED
APPROVED
M7 AND M10 RETURN AIR PLENUM.
MATERIAL
NEXT ASSY.
AS5029
SHEET OF
T 2134 009
A3


DIMENSION IN MILLIMETRES
DO NOT SCALE
1206
RETURN AIR FILTER - AS503103
WASHABLE
10 MOUNTING HOLES Ø8
25 TYP.
2 × ½" LEAF SPRING-853307
STEEL PLENUM 1.2mm Ga. AS503101
466
100
218
218
15
138
300
300
300
138
Sigma Industries Pty Limited
A.C.N. 000 900 970
M10, M15 & M20 SERIES
M10, M15 & M20 RETURN AIR PLENUM ASSEMBLY
AS508320
A3
ITEM
PART No.
DRG. No.
DESCRIPTION
QTY.
DRAWN
P.OAKLEY
DATE
23-03-92
CHECKED
APPROVED
SCALE
1:4
MATERIAL
QTY.
NEXT ASSY.
SHEET 1 OF 1
ADDITIONAL NOTES
PROT.
PROD.
SALES
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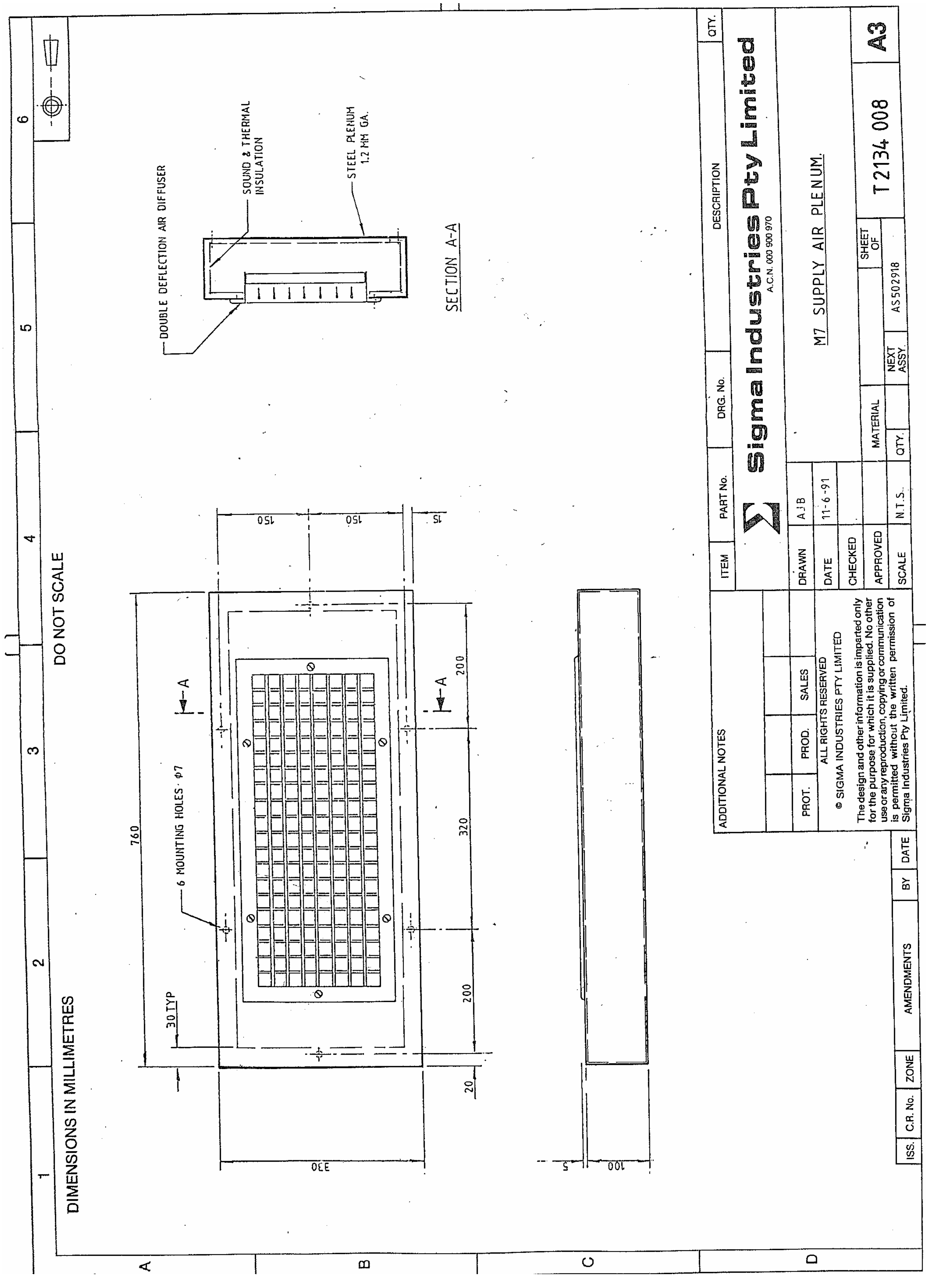
B 1997 D5 M10 ADDED TO DESCRIPTION. LA 01-06-94
A Z587 D5 M20 ADDED TO DESCRIPTION. PWO 10-09-92
ISS. C.R. NO. ZONE AMENDMENTS BY DATE


DIMENSIONS IN MILLIMETRES
DO NOT SCALE
DOUBLE DEFLECTION AIR DIFFUSER
SOUND & THERMAL INSULATION
STEEL PLENUM 1.2 MM GA.
SECTION A-A
6 MOUNTING HOLES Φ7
30 TYP
760
200
320
200
20
330
150
150
15
5
100
Sigma Industries Pty Limited
A.C.N. 000 900 970
M7 SUPPLY AIR PLENUM.
T 2134 008
A3
DRAWN A J B
DATE 11-6-91
CHECKED
APPROVED
SCALE N.T.S.
AS 502918
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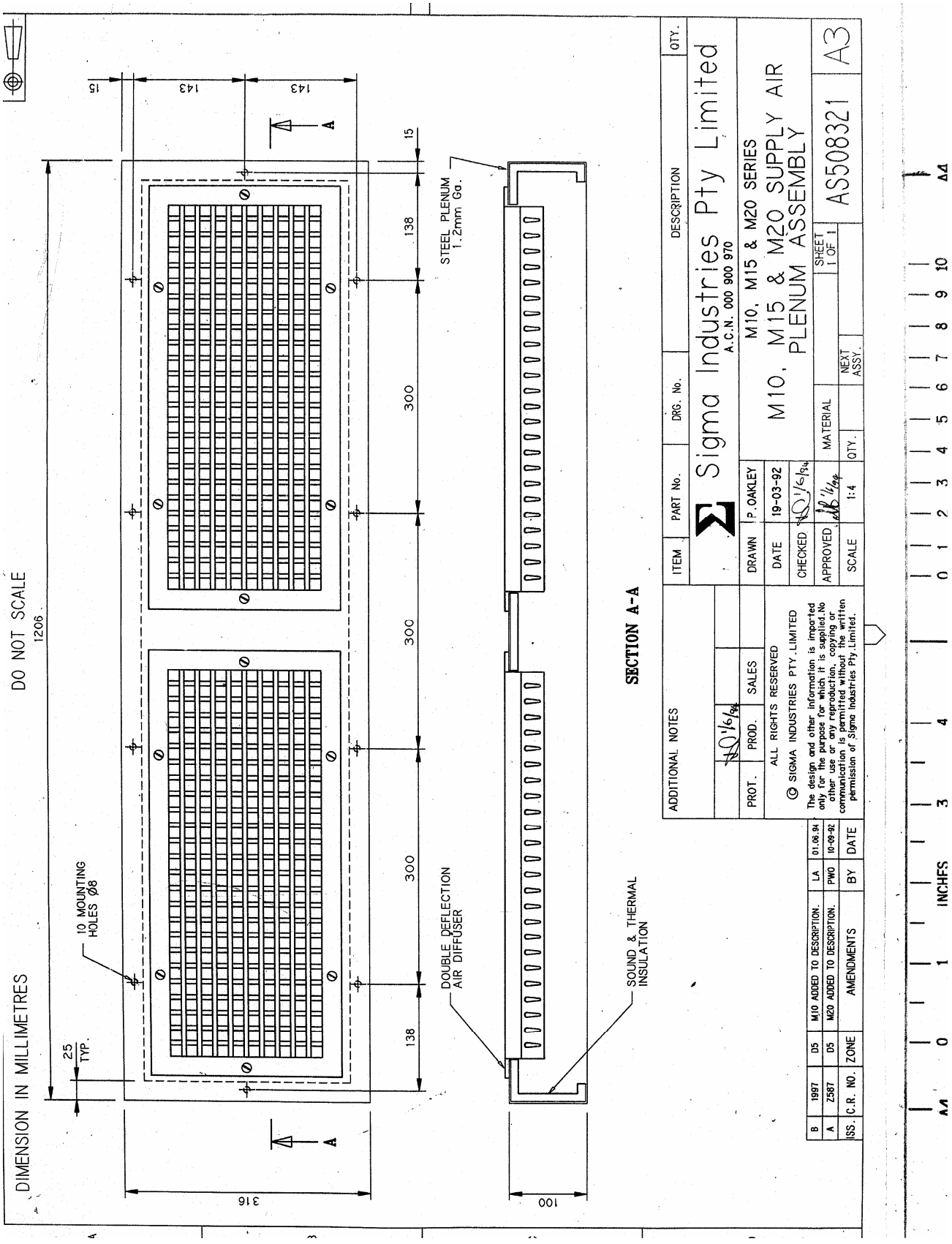
ADDITIONAL NOTES
ISS. C.R. No. ZONE AMENDMENTS BY DATE


DO NOT SCALE
DIMENSION IN MILLIMETRES
1206
316
100
15
143
143
15
138
300
300
300
138
25
TYP.
10 MOUNTING HOLES Ø8
DOUBLE DEFLECTION AIR DIFFUSER
STEEL PLENUM 1.2mm Ga.
SOUND & THERMAL INSULATION
SECTION A-A
A
A
Sigma Industries Pty Limited
A.C.N. 000 900 970
M10, M15 & M20 SERIES
M10, M15 & M20 SUPPLY AIR PLENUM ASSEMBLY
AS508321
A3
SHEET 1 OF 1
ITEM
PART No.
DRG. No.
DESCRIPTION
QTY.
ADDITIONAL NOTES
DRAWN P.OAKLEY 19-03-92
CHECKED
APPROVED
SCALE 1:4
MATERIAL
QTY.
NEXT ASSY.
PROT. PROD. SALES
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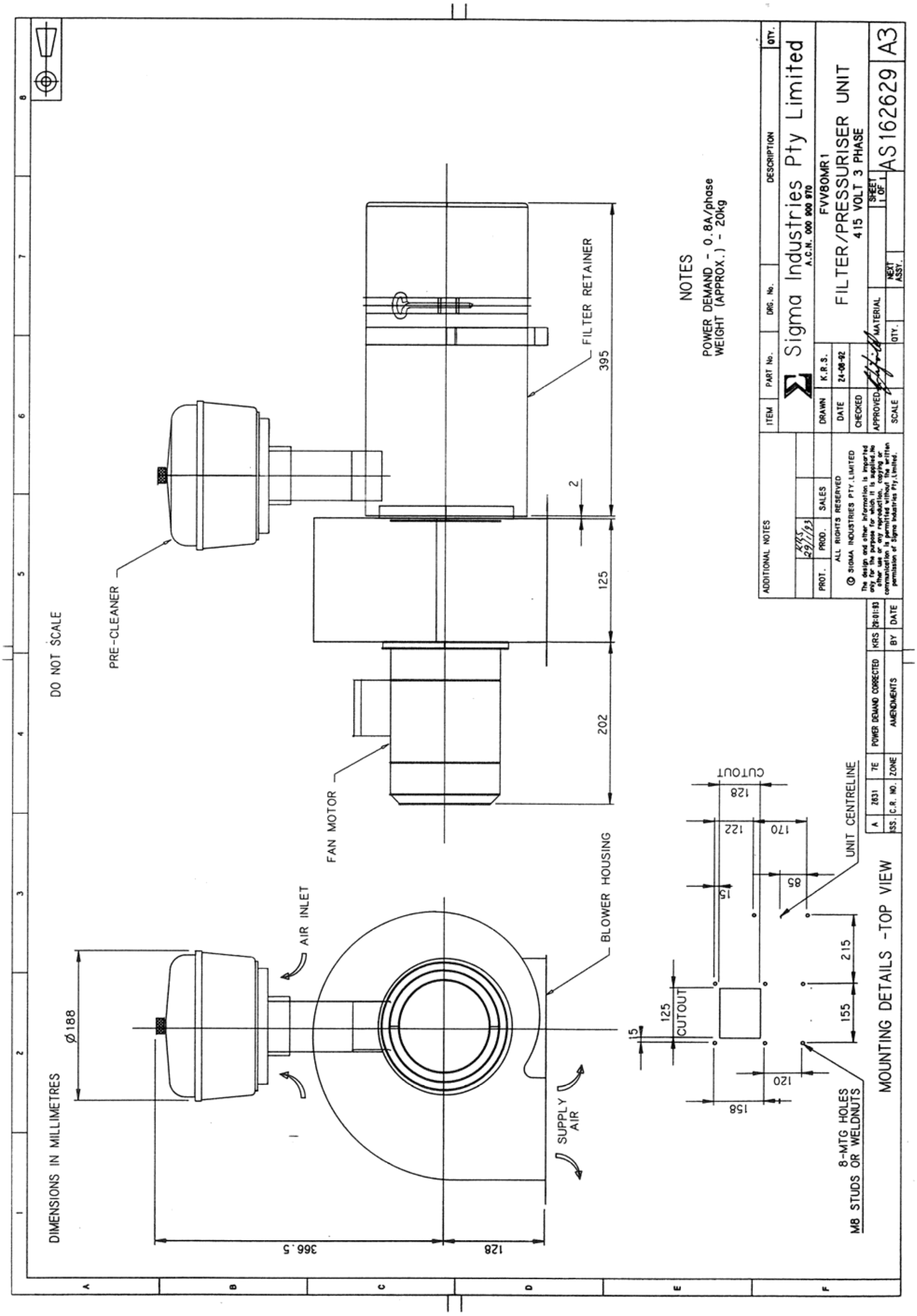
B 1997 D5 M10 ADDED TO DESCRIPTION. LA 01.06.94
A 2587 D5 M20 ADDED TO DESCRIPTION. PWO 10-09-92
ISS. C.R. NO. ZONE AMENDMENTS BY DATE
A4 A4
INCHES


DIMENSIONS IN MILLIMETRES
DO NOT SCALE
PRE-CLEANER
FAN MOTOR
FILTER RETAINER
AIR INLET
BLOWER HOUSING
SUPPLY AIR
NOTES
POWER DEMAND - 0.8A/phase
WEIGHT (APPROX.) - 20kg
MOUNTING DETAILS -TOP VIEW
8-MTG HOLES
M8 STUDS OR WELDNUTS
UNIT CENTRELINE
CUTOUT
Ø188
366.5
128
395
125
202
2
15
122
170
85
215
155
120
158
Sigma Industries Pty Limited
A.C.N. 000 900 970
FVV80MR1
FILTER/PRESSURISER UNIT
415 VOLT 3 PHASE
AS162629
A3
DRAWN K.R.S.
DATE 24-08-92
POWER DEMAND CORRECTED
KRS 29:01:93
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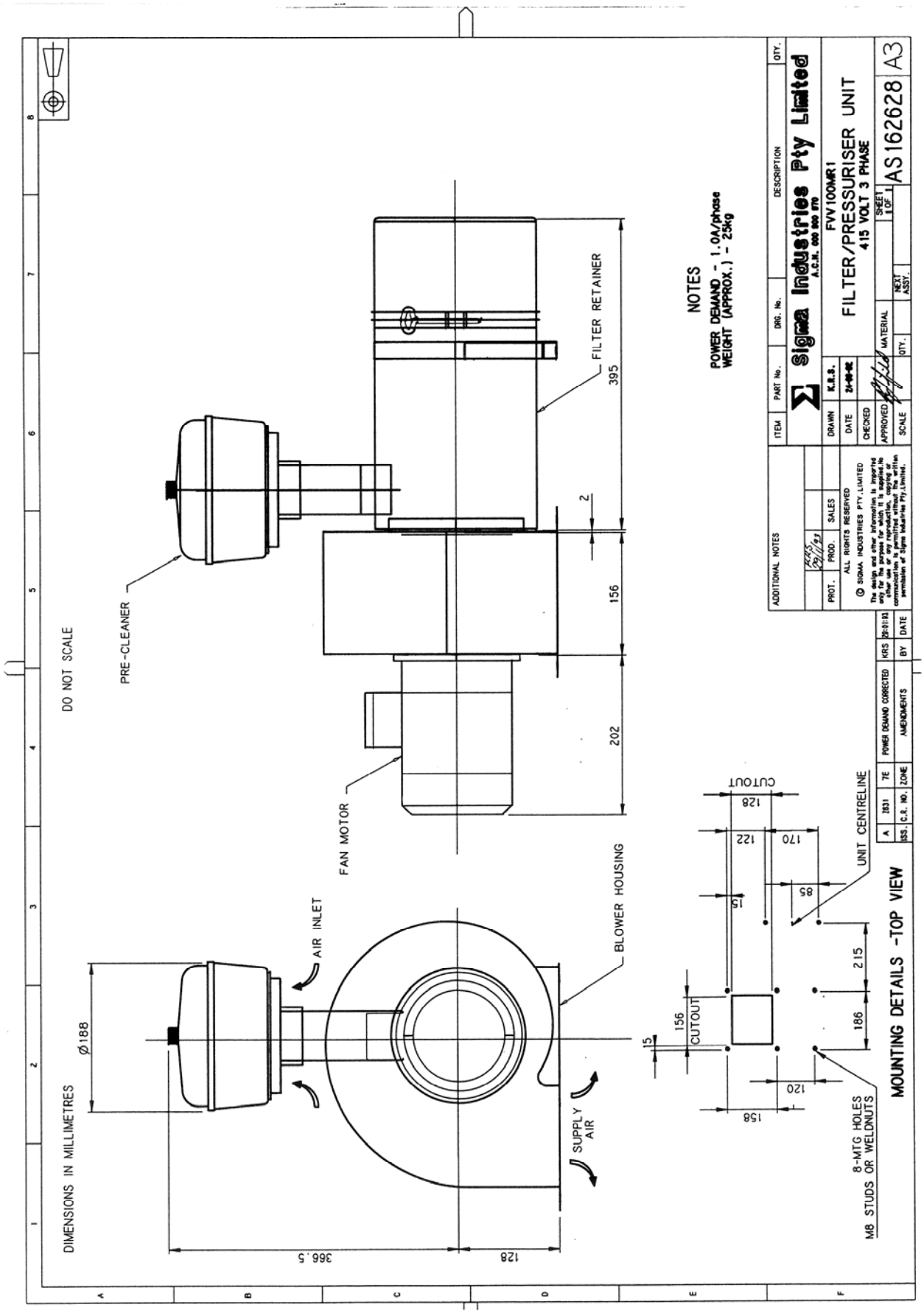
NOTES
POWER DEMAND - 1.0A/phase
WEIGHT (APPROX.) - 25kg
FILTER RETAINER
395
2
156
202
PRE-CLEANER
FAN MOTOR
BLOWER HOUSING
AIR INLET
SUPPLY AIR
Ø188
366.5
128
DO NOT SCALE
DIMENSIONS IN MILLIMETRES
MOUNTING DETAILS -TOP VIEW
UNIT CENTRELINE
CUTOUT
128
122
170
85
15
215
186
156
120
158
8-MTG HOLES
M8 STUDS OR WELDNUTS
Sigma Industries Pty Limited
FVV100MR1
FILTER/PRESSURISER UNIT
415 VOLT 3 PHASE
AS162628
A3
SHEET 1 OF 1
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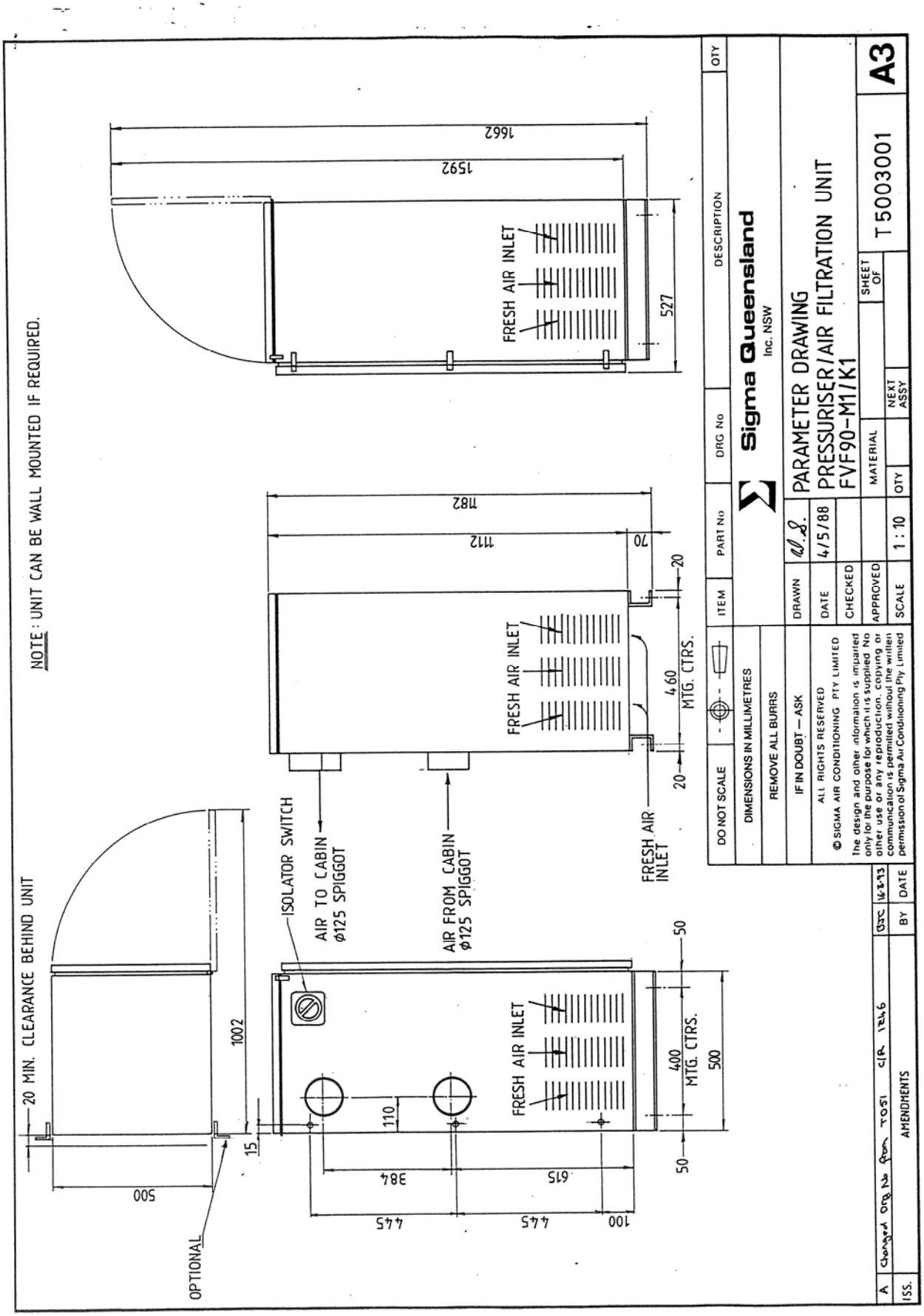
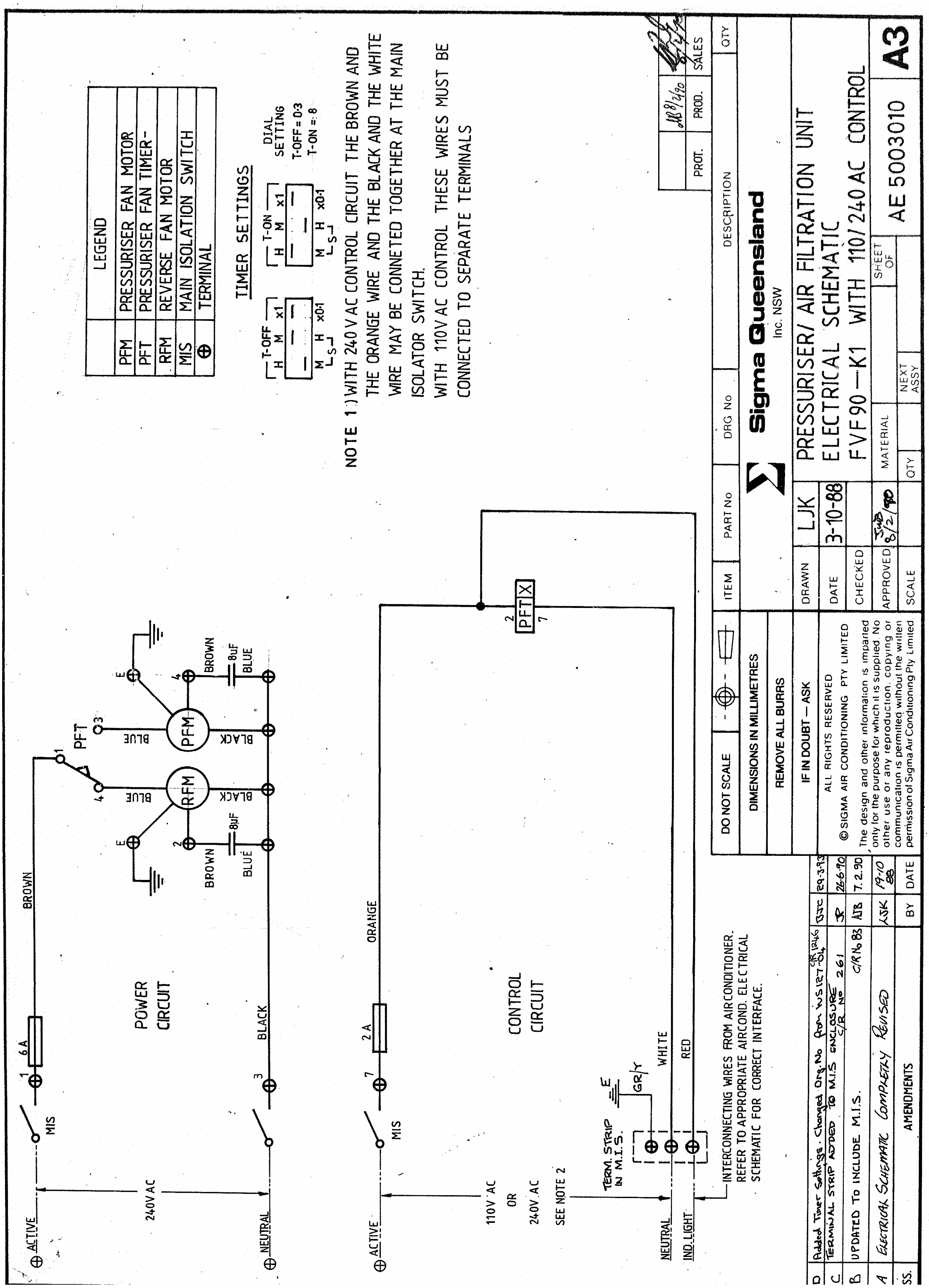

NOTE: UNIT CAN BE WALL MOUNTED IF REQUIRED.
20 MIN. CLEARANCE BEHIND UNIT
1662
1592
FRESH AIR INLET
527
782
712
70
20
460 MTG. CTRS.
20
ISOLATOR SWITCH
AIR TO CABIN ø125 SPIGGOT
AIR FROM CABIN ø125 SPIGGOT
FRESH AIR INLET
1002
15
500
OPTIONAL
110
384
615
445
445
100
400 MTG. CTRS.
50
50
500
Sigma Queensland
Inc. NSW
PARAMETER DRAWING
PRESSURISER/AIR FILTRATION UNIT
FVF90-M1/K1
T5003001
A3
DO NOT SCALE
DIMENSIONS IN MILLIMETRES
REMOVE ALL BURRS
IF IN DOUBT – ASK
ALL RIGHTS RESERVED
©SIGMA AIR CONDITIONING PTY LIMITED
DRAWN
CHECKED
APPROVED
SCALE 1:10
DATE 4/5/88
QTY
MATERIAL
NEXT ASSY
SHEET OF
ITEM
PART No
DRG No
DESCRIPTION
QTY
AMENDMENTS
BY
DATE


LEGEND
PFM PRESSURISER FAN MOTOR
PFT PRESSURISER FAN TIMER-
RFM REVERSE FAN MOTOR
MIS MAIN ISOLATION SWITCH
⊕ TERMINAL
TIMER SETTINGS
T-OFF H M x1 M H x0·1
T-ON H M x1 M H x0·1
DIAL SETTING T-OFF = 0·3 T-ON = ·8
NOTE 1.) WITH 240 V AC CONTROL CIRCUIT THE BROWN AND THE ORANGE WIRE AND THE BLACK AND THE WHITE WIRE MAY BE CONNETED TOGETHER AT THE MAIN ISOLATOR SWITCH.
WITH 110V AC CONTROL THESE WIRES MUST BE CONNECTED TO SEPARATE TERMINALS
POWER CIRCUIT
ACTIVE
NEUTRAL
240V AC
MIS
6A
BROWN
BLACK
BLUE
8uF
PFT
PFM
RFM
CONTROL CIRCUIT
110V AC OR 240V AC SEE NOTE 2
2A
ORANGE
WHITE
RED
GR/Y
TERM. STRIP IN M.I.S.
IND. LIGHT
PFT X
INTERCONNECTING WIRES FROM AIR CONDITIONER. REFER TO APPROPRIATE AIRCOND. ELECTRICAL SCHEMATIC FOR CORRECT INTERFACE.
DO NOT SCALE
DIMENSIONS IN MILLIMETRES
REMOVE ALL BURRS
IF IN DOUBT — ASK
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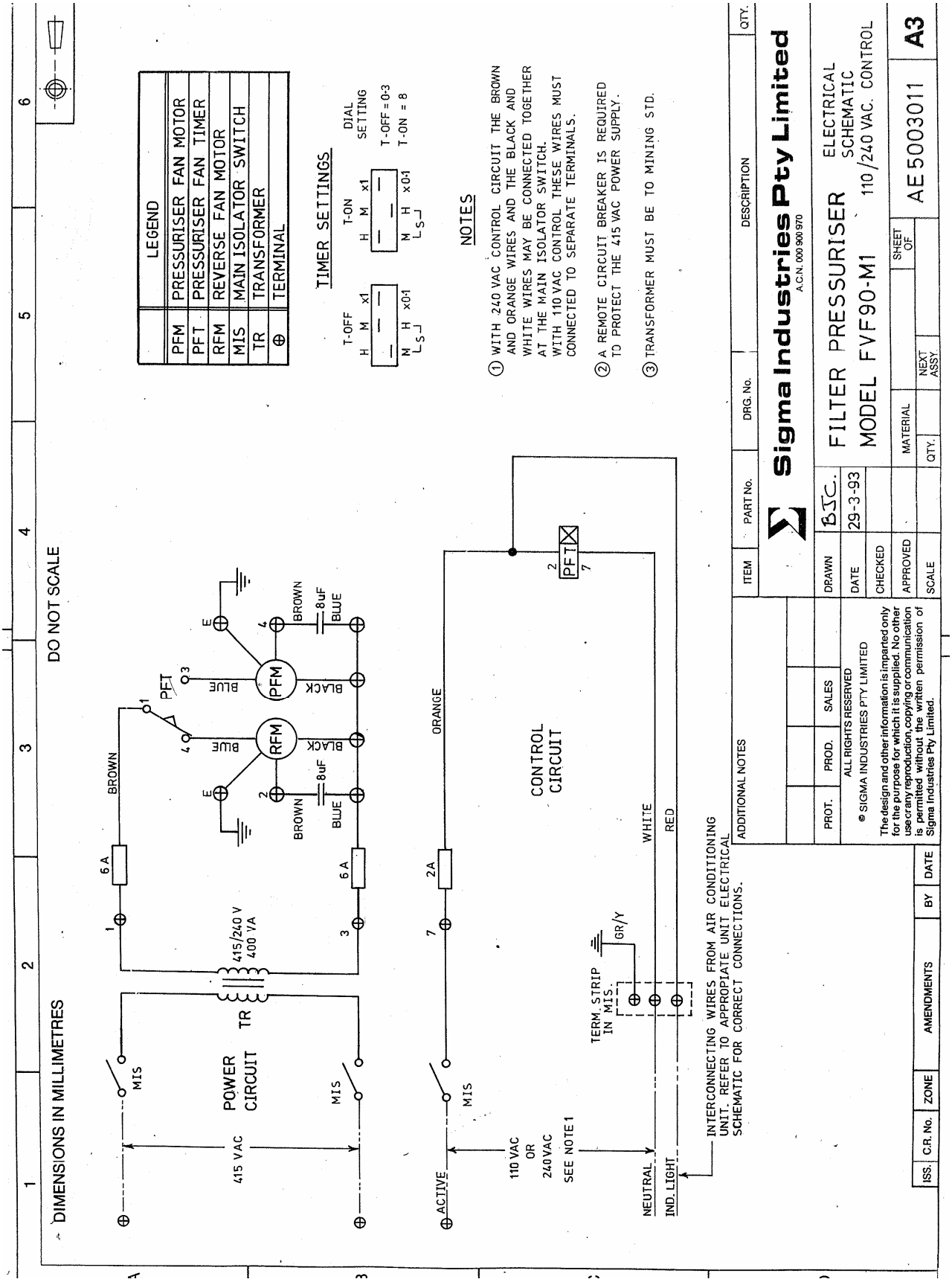
Sigma Queensland Inc. NSW
DRAWN LJK
DATE 3-10-88
CHECKED
APPROVED
SCALE
PRESSURISER/ AIR FILTRATION UNIT
ELECTRICAL SCHEMATIC
FVF90—K1 WITH 110/240 AC CONTROL
AE 5003010
A3
AMENDMENTS
D Added Timer Settings. Changed Drg. No from WS1E7-04
C TERMINAL STRIP ADDED TO M.I.S ENCLOSURE C/R No 261
B UPDATED TO INCLUDE M.I.S. C/R No 83
A ELECTRICAL SCHEMATIC COMPLETELY REVISED
ITEM PART No DRG No DESCRIPTION QTY
PROT. PROD. SALES
MATERIAL QTY NEXT ASSY SHEET OF


DIMENSIONS IN MILLIMETRES
DO NOT SCALE
LEGEND
PFM PRESSURISER FAN MOTOR
PFT PRESSURISER FAN TIMER
RFM REVERSE FAN MOTOR
MIS MAIN ISOLATOR SWITCH
TR TRANSFORMER
TERMINAL
TIMER SETTINGS
T-OFF
T-ON
DIAL SETTING
T-OFF = 0-3
T-ON = 8
NOTES
1 WITH 240 VAC CONTROL CIRCUIT THE BROWN AND ORANGE WIRES AND THE BLACK AND WHITE WIRES MAY BE CONNECTED TOGETHER AT THE MAIN ISOLATOR SWITCH. WITH 110 VAC CONTROL THESE WIRES MUST CONNECTED TO SEPARATE TERMINALS.
2 A REMOTE CIRCUIT BREAKER IS REQUIRED TO PROTECT THE 415 VAC POWER SUPPLY.
3 TRANSFORMER MUST BE TO MINING STD.
POWER CIRCUIT
CONTROL CIRCUIT
415 VAC
415/240 V 400 VA
110 VAC OR 240 VAC SEE NOTE 1
ACTIVE
NEUTRAL
IND. LIGHT
TERM. STRIP IN MIS.
INTERCONNECTING WIRES FROM AIR CONDITIONING UNIT. REFER TO APPROPIATE UNIT ELECTRICAL SCHEMATIC FOR CORRECT CONNECTIONS.
ADDITIONAL NOTES
Sigma Industries Pty Limited
A.C.N. 000 900 970
FILTER PRESSURISER ELECTRICAL SCHEMATIC
MODEL FVF90-M1 110/240 VAC. CONTROL
AE5003011 A3
DRAWN BSC. 29-3-93
CHECKED
APPROVED
SCALE
MATERIAL
QTY.
NEXT ASSY
SHEET OF
ITEM PART No. DRG. No. DESCRIPTION QTY.
PROT. PROD. SALES
ISS. C.R. No. ZONE AMENDMENTS BY DATE
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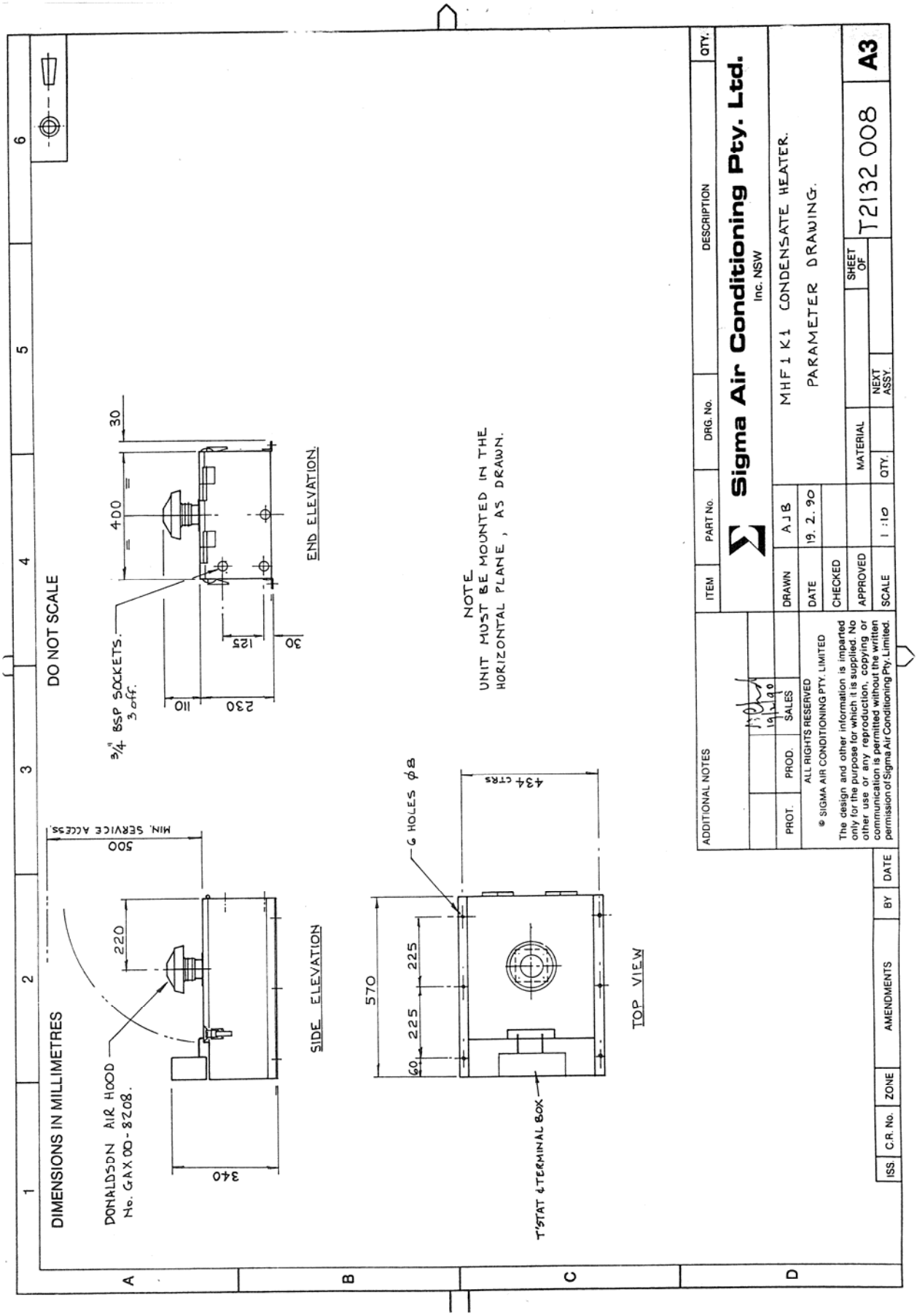
DO NOT SCALE
DIMENSIONS IN MILLIMETRES
DONALDSON AIR HOOD
No. GAX 00-8208.
MIN. SERVICE ACCESS
500
220
340
SIDE ELEVATION
3/4" BSP SOCKETS.
3 off.
400
30
110
230
125
30
END ELEVATION
NOTE
UNIT MUST BE MOUNTED IN THE
HORIZONTAL PLANE, AS DRAWN.
6 HOLES ø8
434 CTRS
570
225
225
60
T'STAT & TERMINAL BOX
TOP VIEW
ITEM
PART No.
DRG. No.
DESCRIPTION
QTY.
Sigma Air Conditioning Pty. Ltd.
Inc. NSW
MHF1K1 CONDENSATE HEATER.
PARAMETER DRAWING.
DRAWN AJB
DATE 19.2.90
CHECKED
APPROVED
SCALE 1:10
MATERIAL
QTY.
SHEET OF
NEXT ASSY.
T2132 008
A3
ADDITIONAL NOTES
PROT.
PROD.
SALES
ISS.
C.R. No.
ZONE
AMENDMENTS
BY
DATE
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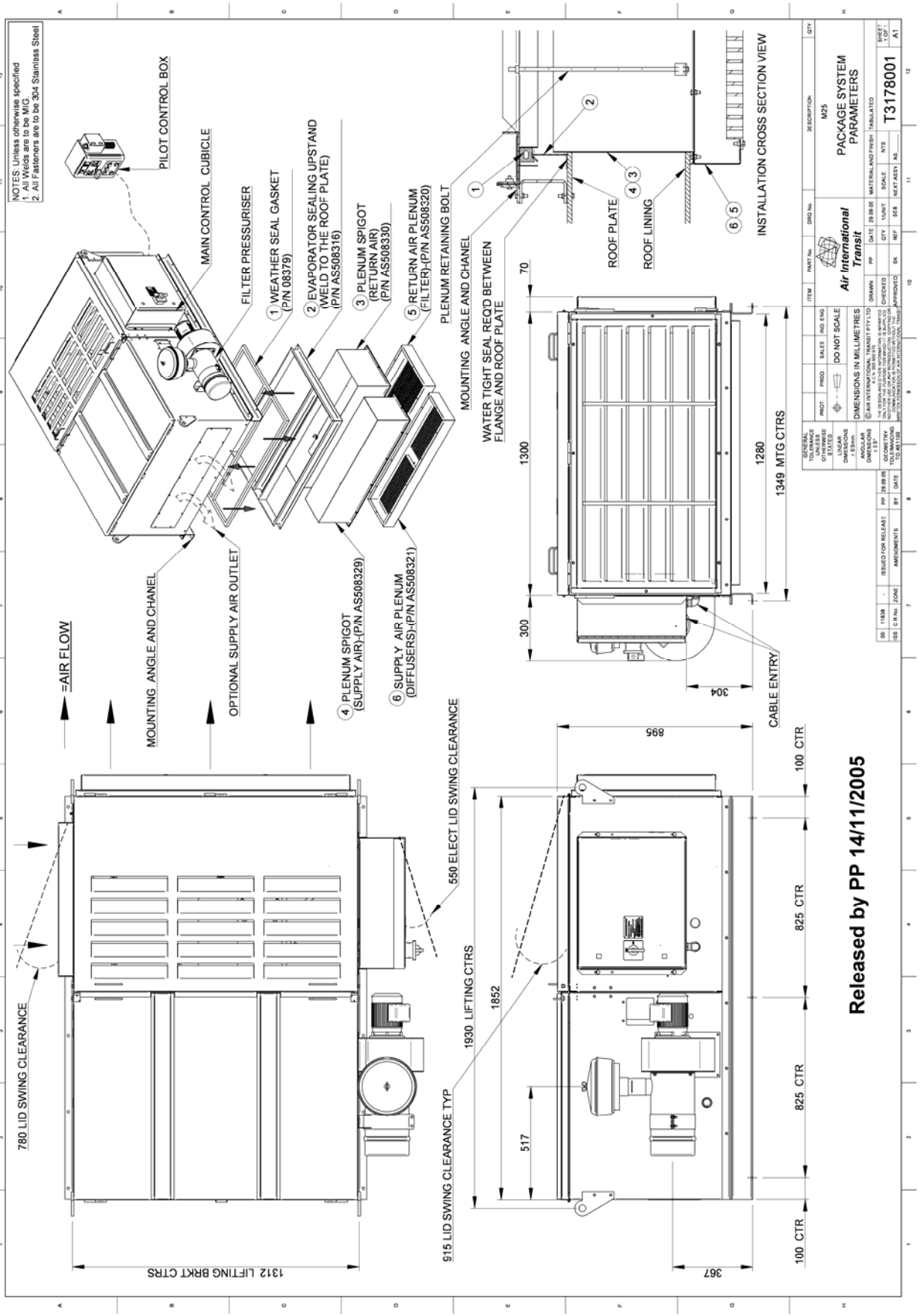
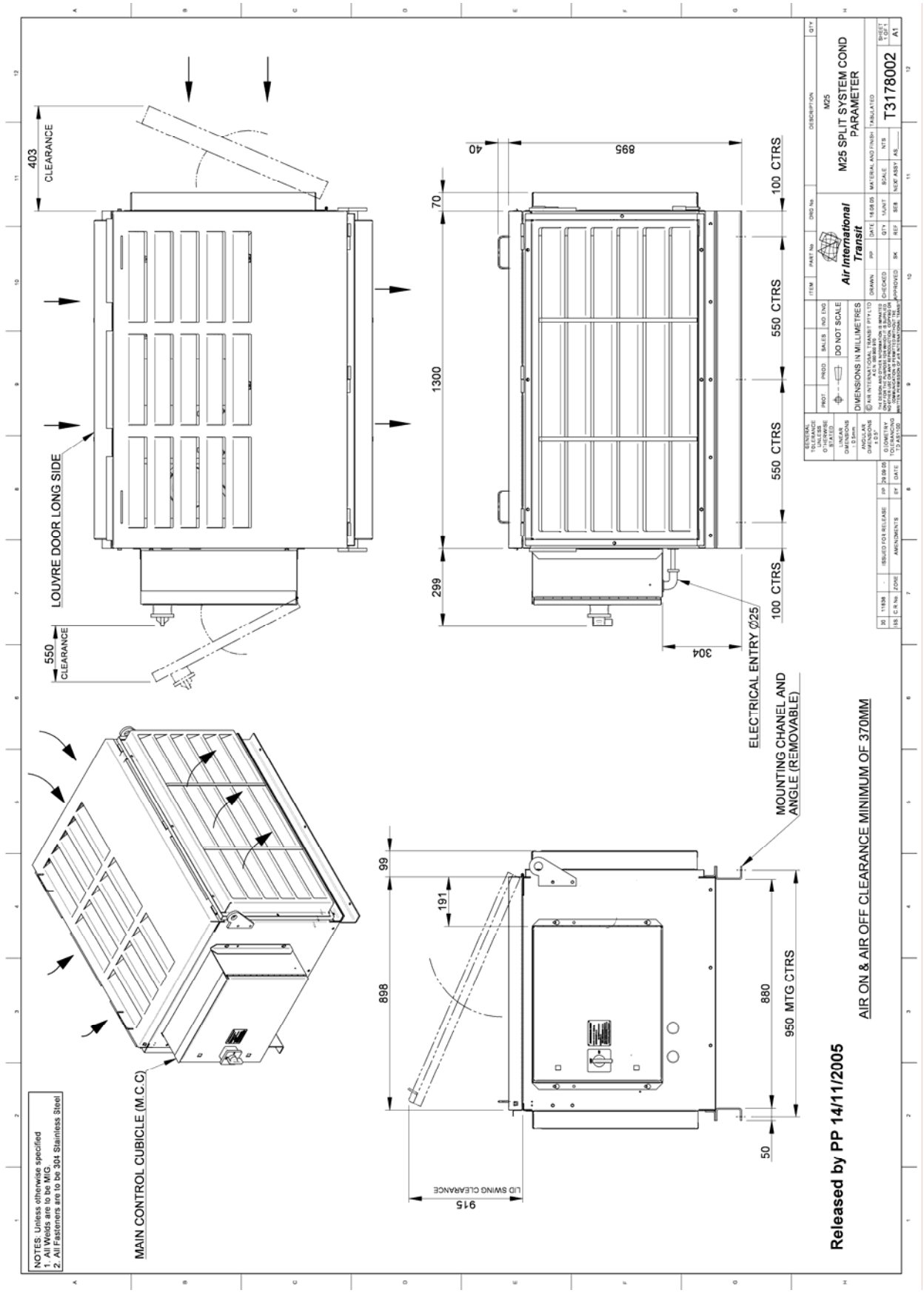

NOTES: Unless otherwise specified
1. All Welds are to be MIG.
2. All Fasteners are to be 304 Stainless Steel
PILOT CONTROL BOX
MAIN CONTROL CUBICLE
FILTER PRESSURISER
1 WEATHER SEAL GASKET (P/N 08379)
2 EVAPORATOR SEALING UPSTAND (WELD TO THE ROOF PLATE) (P/N AS5008316)
3 PLENUM SPIGOT (RETURN AIR) (P/N AS508330)
5 RETURN AIR PLENUM (FILTER)-(P/N AS508320)
PLENUM RETAINING BOLT
MOUNTING ANGLE AND CHANEL
WATER TIGHT SEAL REQ'D BETWEEN FLANGE AND ROOF PLATE
ROOF PLATE
ROOF LINING
INSTALLATION CROSS SECTION VIEW
=AIR FLOW
MOUNTING ANGLE AND CHANEL
OPTIONAL SUPPLY AIR OUTLET
4 PLENUM SPIGOT (SUPPLY AIR)-(P/N AS508329)
6 SUPPLY AIR PLENUM (DIFFUSERS)-(P/N AS508321)
70
1300
300
1280
1349 MTG CTRS
304
CABLE ENTRY
780 LID SWING CLEARANCE
550 ELECT LID SWING CLEARANCE
915 LID SWING CLEARANCE TYP
1930 LIFTING CTRS
1852
517
895
100 CTR
825 CTR
825 CTR
100 CTR
1312 LIFTING BRKT CTRS
367
Released by PP 14/11/2005
PACKAGE SYSTEM PARAMETERS
M25
Air International Transit
T3178001
DO NOT SCALE
DIMENSIONS IN MILLIMETRES


403
CLEARANCE
LOUVRE DOOR LONG SIDE
550
CLEARANCE
40
895
70
1300
299
100 CTRS
550 CTRS
550 CTRS
100 CTRS
304
ELECTRICAL ENTRY Ø25
MOUNTING CHANEL AND
ANGLE (REMOVABLE)
99
191
898
880
950 MTG CTRS
50
915
LID SWING CLEARANCE
MAIN CONTROL CUBICLE (M.C.C)
AIR ON & AIR OFF CLEARANCE MINIMUM OF 370MM
NOTES: Unless otherwise specified
1. All Welds are to be MIG.
2. All Fasteners are to be 304 Stainless Steel
Released by PP 14/11/2005
M25 SPLIT SYSTEM COND
PARAMETER
M25
Air International
Transit
DO NOT SCALE
DIMENSIONS IN MILLIMETRES
T3178002