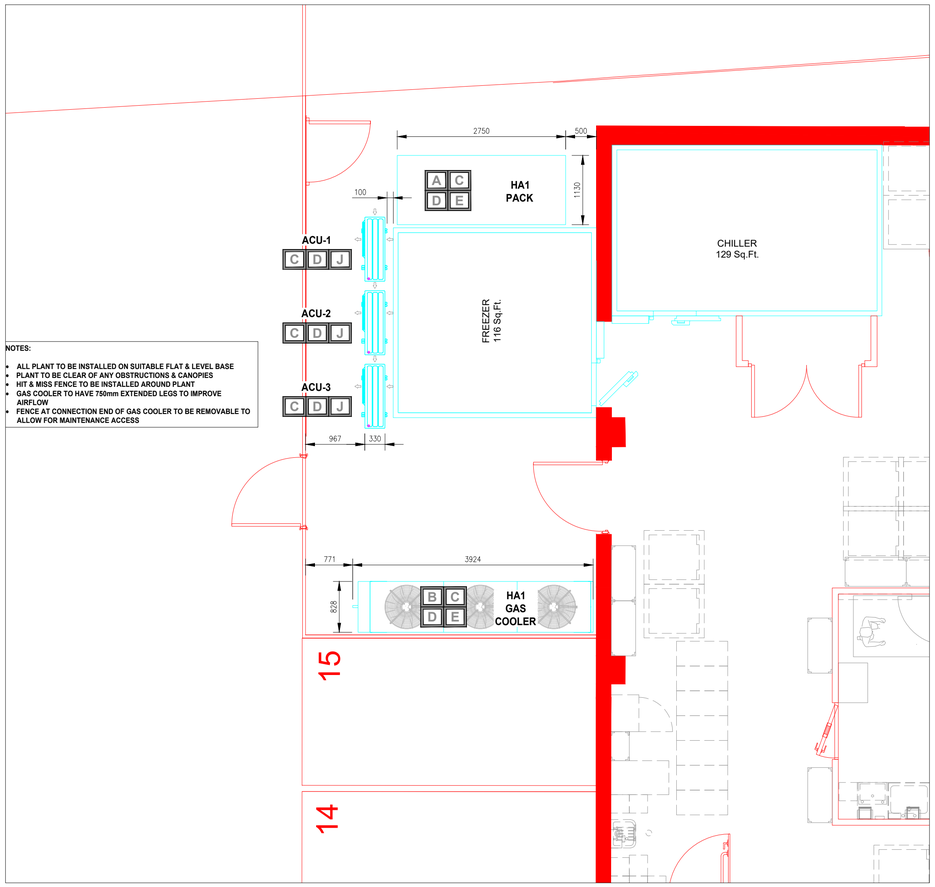
ALL RIGHTS RESERVED. THE COPYRIGHT OF THIS DRAWING IS WITH ORWELL DESIGN ASSOCIATES. NO PART OF THIS DRAWING MAY BE REPRODUCED, STORED WITHIN A RETRIEVAL SYSTEM, OR TRANSMITTED TO OTHER PARTIES, WITHOUT PRIOR WRITTEN CONFIRMATION FROM ORWELL DESIGN ASSOCIATES. THIS DRAWING IS OFFERED ONLY FOR THE PURPOSE OF THE SERVICES INTENDED.

ALL LEVELS AND DIMENSIONS ARE TO BE VERIFIED ON-SITE BEFORE COMMENCEMENT OF WORKS. PLEASE NOTIFY THE ORIGINATORS OF THIS DRAWING SHOULD DIFFERENCES BE NOTED. ALL DIMENSIONS ARE IN MILLIMETRES (mm) UNLESS STATED OTHERWISE.

DO NOT SCALE FROM THIS DRAWING.

PLANT AREA (1:50)



NOTES:

- ALL PLANT TO BE INSTALLED ON SUITABLE FLAT & LEVEL BASE
- PLANT TO BE CLEAR OF ANY OBSTRUCTIONS & CANOPIES
- HIT & MISS FENCE TO BE INSTALLED AROUND PLANT
- GAS COOLER TO HAVE 750mm EXTENDED LEGS TO IMPROVE AIRFLOW
- FENCE AT CONNECTION END OF GAS COOLER TO BE REMOVABLE TO ALLOW FOR MAINTENANCE ACCESS

Plant Supplier	[-]	Space Engineering
Pack Model Reference	[-]	ST-3A
Primary Pack controller	[-]	RDM -PRO650
Full Back-Up Pack controller	[-]	RDM -PRO650

		Day Time		Night Time	
		HT	LT	HT	LT
Required evaporator capacity	[kW]	32.29	-	22.60545	-
Lowest Evaporating Temperature	[°C]	-6	-	-	-
Suction Pressure Penalty	[K]	1	-	-	-
Suction Saturated Temperature	[°C]	-7	-	-	-
Suction Usefull Superheat	[K]	10	-	-	-
Suction Non-Usefull Superheat	[K]	10	-	-	-
Ambient Temperature	[°C]	35		15	
Intermediate Pressure (+5 °C)	[Bar]	39.69		39.69	
Discharge Pressure Penalty	[K]	1		1	
Gas Cooler Absolute Pressure	[Bar]	95.2		61.38	
Gas Cooler Outlet Tempterature	[°C]	37		23	
Total Heat Rejection	[kW]	61.33		42.93	
Gas Cooler Manufacturer	[-]	Kelvion		Kelvion	
Gas Cooler Model	[-]	GF-SA103F5H-063M038		GF-SA103F5H-063M038	
Gas Cooler Location	[-]				
Nominal Capacity	[kW]	61.5		61.5	
Number of Fans	[pc.]	3		3	
Fan Diameter	[mm]	630		630	
Maximum Rotation	[rpm]	885		885	
Required Rotation	[rpm]	380		380	
Air Flow	[m3/s]	3		3	
External Static Pressure	[Pa]	0		0	
Control Voltage	[V]	3.4		3.4	
RDM Reduction	[%]	-		-	
Start Current per Fan	[A]	0.3		0.3	
Full Load Current per Fan	[A]	0.2		0.2	
Electrical Connection	[V/ph/Hz]	400 / 3 / 50		400 / 3 / 50	
Refrigerant Charge	[kg]	2.09		2.09	
Length	[mm]	3924		3924	
Width	[mm]	828		828	
Height	[mm]	1220		1220	
Leg Height	[mm]	750		750	
Fin Material	[-]	CU/Al/Mg		CU/Al/Mg	
Pipe Connections	["]	1 x 1-1/8" / 1 x 1-1/8"		1 x 1-1/8" / 1 x 1-1/8"	
Wet Weight	[kg]	315		315	

Pack Evaporator Capacity	[kW]	36.15 (HT) / 0 (LT)		
Refrigerant	[-]	R744		
Total Refrigerant Charge	[kg]			
PED Category	[-]	IV		
			Day Time	Night Time
Gas Cooler Sound Level	[dB(A)]		20	20
Pack Sound Level	[dB(A)]		30	30
Design Low Pressure	[Bar]		60	
Design Intermediate Pressure	[Bar]		60	
Design High Pressure	[Bar]		120	
Pack Type	[-]		Housed	
Pack Dimensions	[mm]		2750mm W x 1130mm D x 1800mm H	
Pack Weight	[kg]		1670	
Pack Location	[-]		Roof	
Receiver Capacity	[L]		60	
Receiver Location	[-]		Pack	

		HT	LT
Application	[-]	Emerson Stream	N/A
Compressor Manufacturer	[-]	4MTL-07	N/A
Lead Compressor	[-]	1	N/A
Quantity	[pc.]	51	N/A
Inverter Frequency	[Hz]	12.94	N/A
Compressor Capacity	[kW]	12.27	N/A
Evaporator Capacity	[kW]	0.0897	N/A
Compressor Mass Flow	[kg/s]	7.99	N/A
Power Input	[kW]	15.06	N/A
Running Current	[A]	17.5	N/A
Maximum Operating Current	[A]	20.93	N/A
Heat Rejection	[kW]		
Secondary Compressor(s)	[-]	4MTL-07	N/A
Quantity	[pc.]	2	N/A
Drive Frequency	[Hz]	50	N/A
Compressor Capacity	[kW]	12.6	N/A
Evaporator Capacity	[kW]	11.94	N/A
Compressor Mass Flow	[kg/s]	0.0873	N/A
Power Input	[kW]	7.6	N/A
Running Current	[A]	12.98	N/A
Maximum Operating Current	[A]	17.5	N/A
Heat Rejection	[kW]	20.2	N/A

ALL WORK TO COMPLY WITH THE LATEST CO-OP REFRIGERATION SPECIFICATION

PLANT NOTES

A — PLANT - COMPRESSOR PACK AND LIQUID RECEIVER
- COMPRESSOR PACKS SHALL COMPRISE OF COMPRESSORS, LIQUID RECEIVER, OIL SEPARATOR AND CONTROL PANEL WITH INTEGRATED RDM CONTROL SYSTEM, DISCHARGE PIPE WORK, SUCTION PIPE WORK WITH SUCTION FILTER(S) AND ALL INTERCONNECTING PIPE WORK AND SHUT OFF VALVES AS REQUIRED FOR SAFE OPERATION.
- THE MAJOR PACK COMPONENTS SHALL BE SELECTED AND SIZED BY THE PACK MANUFACTURER TO ENSURE ENERGY EFFICIENT, LEAK FREE OPERATION.
- COMPRESSOR PACKS WILL BE SUPPLIED CHARGED WITH THE CORRECT OIL TO THE MIDDLE OF THE OIL RESERVOIR SIGHT GLASS.
- PACKS ARE TO BE DELIVERED WITH A HOLDING CHARGE OF OXYGEN FREE NITROGEN AT 2BAR.
- THE CONTROL PANEL WILL BE COMPLETE WITH ALL NECESSARY CONTROLS AND EQUIPMENT TO OPERATE THE PACK COMPONENTS AND GAS COOLER, HOUSED WITHIN SUITABLY IP RATED ENCLOSURE, COMPLETE WITH EXTRACT FAN (IF DEEMED NECESSARY BY MANUFACTURER) AND INTAKE FILTER, INTERLOCKING MAINS ISOLATOR AND WARNING LABELS.
- THE ELECTRICAL CONTRACTOR SHALL SUPPLY AND CONNECT ALL ELECTRICAL AND CONTROL WIRING TO THE COMPRESSOR PACKS.
- THE REFRIGERATION CONTRACTOR IS RESPONSIBLE FOR THE SUPPLY, POSITIONING AND CONNECTION OF THE REFRIGERATION EQUIPMENT AND REFRIGERATION SERVICES.
- ANY CHANGE TO EQUIPMENT SUPPLIER / DETAILS TO BE COMMUNICATED TO ORWELL DESIGN ASSOCIATES IMMEDIATELY TO AVOID CO-ORDINATION ISSUES ON SITE.

B — PLANT - GAS COOLER
- FANS / MOTORS ARE TO BE ENERGY EFFICIENT AND OF A VARIABLE SPEED, E.G. EC OR INVERTOR CONTROLLED.
- PACK CONTROLLER MUST BE CAPABLE OF OPERATING THE EC FAN CONENSER VIA 0-10v SIGNAL. MANUFACTURERS STANDARD COLOUR FINISH IS ACCEPTABLE UNLESS SITE CONDITIONS DICTATE OTHERWISE.
- THE ELECTRICAL CONTRACTOR SHALL SUPPLY AND CONNECT ALL ELECTRICAL AND CONTROL WIRING TO THE CONDENSER.
- THE CONDENSER FAN SPEED FOR DAY AND NIGHT OPERATION MUST BE SET AND CHECKED BY THE REFRIGERATION CONTRACTOR. RUN SPEED AND CONTROL VOLTAGE ARE INDICATED ON THE GRD LAYOUT. FOR EXAMPLE, SHOULD THE NIGHT SET POINT BE 4.3V, THIS WOULD BE 43% AND THE RDM CONTROL SET POINT SHOULD BE SET TO 57. 10V OR 100% WOULD REQUIRE THE RDM SET POINT TO BE 0.

C — PLANT - SUPPORT
- ALL REFRIGERATION PLANT SHALL BE INSTALLED ON A FLAT AND LEVEL BASE, PROVIDED BY OTHERS. ANTI-VIBRATION PADS TO BE SUPPLIED BY THE REFRIGERATION CONTRACTOR.
- A REINFORCED FLAT AND LEVEL WORKING AREA IS TO BE POSITIONED ADJACENT TO THE PLANT HOUSING FOR COMPRESSOR REMOVAL.
- SECONDARY SUPPORT STEEL WORK FOR NEW PLANT TO BE DETAILED AND SUPPLIED BY THE STRUCTURAL ENGINEER, WHERE NECESSARY.
- ALL PLANT IS TO BE FIXED TO ITS SUPPORTS.

D — PLANT - LABELS
- ALL REFRIGERATION EQUIPMENT WITH AN EQUIVALENT REFRIGERATION CHARGE OF 5 TONNES CO2 OR MORE MUST BE SHOWING THE FOLLOWING INFORMATION - **REFRIGERANT TYPE INSTALLED, ENTRAINED V OLUME, REFRIGERANT GWP.**
- PRESSURE EQUIPMENT DIRECTIV E LABELS - ALL APPLICABLE NEW REFRIGERATION SHALL CARRY A DECLARATION OF CONFORMITY AND AN ASSEMBLY LABEL SHOWING THE FOLLOWING INFORMATION - **HIGH/LOW SIDE MWP, HIGH/LOW SIDE TEST PRESSURES, REFRIGERANT TYPE AND CHARGE, REFRIGERANT GWP.**
- REFRIGERATION CONTRACTOR SHALL SUPPLY AND FIX PERMANENT TRAFFOLYTE TYPE LABELS TO ALL ITEMS OF PLANT, EQUIPMENT, CONTROL PANELS AND COLD STORES CLEARLY IDENTIFYING THE ITEM AND INDICATING THE SYSTEM NUMBER, IF APPLICABLE.

E — PLANT - OPERATION AND MAINTENANCE ACCESS
- ACCESS SHOULD BE SUITABLE FOR AN ENGINEER CARRYING A TOOLBOX / HANDTOOLS.
- PROTECTED WALKWAYS TO BE PROVIDED AND DETAILED FOLLOWING CONFIRMATION OF ROOF ACCESS POSITION.
- ACCESS STAIRS AND STEEL WALKWAYS TO BE SUPPLIED AND INSTALLED BY OTHERS.
- ADEQUATE TASK LIGHTING TO BE SUPPLIED AND INSTALLED BY OTHERS FOR MAINTENANCE AND ACCESS.
- EXTERNAL HOUSED REFRIGERATION PLANT TO BE PROVIDED WITH INTERNAL LIGHTING WITH GENERAL ROOF ACCESS ROUTE LIGHTING PROVIDED BY OTHERS.
- PLANT POSITIONS TO BE REVIEWED FOR FIRE ALARM REQUIREMENTS BY THE MAIN CONTRACTOR.

F — PLANT - MACHINERY ROOM VENTILATION
- VENTILATION SHOULD BE PROVIDED TO -

A) PREVENT THE PLANT FROM OVERHEATING. A THERMOSTAT SHOULD BE PROVIDED IN THE PLANTROOM TO REGULATE THE TEMPERATURE.

B) ENSURE THE PLANTROOM IS VENTILATED IN THE EVENT OF A REFRIGERANT LEAK, AND WHEN MAINTENANCE IS BEING PERFORMED. THE OPERATION SHOULD BE AUTOMATIC IN THE EVENT OF A LEAK CONTROLLED BY A SIGNAL FROM THE GAS DETECTION SYSTEM. MANUAL OVERRIDES SHOULD BE PROVIDED BOTH INTERNALLY AND EXTERNALLY OF THE AREA FOR SERVICE PERSONNEL AND SHOULD BE CLEARLY IDENTIFIED.

C) THE AIR VOLUME REQUIRED FOR REFRIGERANT REMOVAL WILL, AS A GUIDE, BE BETWEEN 10 AND 15 AIR EXCHANGES PER HOUR. PLEASE REFER TO SITE SPECIFIC CALCULATIONS AS THE VENTILATION REQUIREMENTS FOR HEAT EXTRACTION COULD BE HIGHER THAN THIS VALUE.

NOTES

1) VENTILATION FANS TO BE ELECTRICALLY FED FROM AN ESSENTIAL SERVICES SUPPLY. INTAKE FROM HIGH LEVEL. EXTRACT FROM LOW LEVEL. LOCATION TO ENSURE NO AIR RECIRCULATION.

2) FAN OPERATION CAN BE TWO SPEED TO PROVIDE VARIATION BETWEEN HEAT EXTRACT AND REFRIGERANT EXTRACT.

3) UTILISING ONE AIR CIRCULATION FAN WITH ON/OFF CONTROL MAY LEAD TO UNACCEPTABLE SWINGS IN TEMPERATURE WITHIN THE PLANT ROOM. NOT ALL EQUIPMENT WILL OPERATE AT THE SAME TIME DUE TO LOAD CHANGES AND THEY ARE HIGH AMBIENT TEMPERATURES. IT MAY BE ADVISABLE TO INSTALL A NUMBER OF AIR CIRCULATING FANS AND CONTROL VIA A MULTI-STEP THERMOSTAT OR ALTERNATIVELY TO USE SPEED CONTROL FAN(S).

G — PLANT - LEAK DETECTION
- LEAK DETECTION SENSORS SHALL BE POSITIONED IN CLOSE PROXIMITY TO THE MOST LIKELY SOURCE OF A LEAKS OF REFRIGERANT.
- ALARM THRESHOLDS SHALL BE SET IN LINE WITH CO-OP SPECIFICATION / BS EN378 FOR THE REFRIGERANT(S) WITHIN THE AREA. **NOTE** THIS COULD BE AN A1 OR A2L REFRIGERANT.
- SENSORS SHALL BE ACCESSIBLE FOR CALIBRATION / SERVICE AND PROTECTED FROM DAMAGE.
- THERE SHOULD BE A FACILITY TO TEST THE ALARM. THE ALARM SHALL BE TESTED IN LINE WITH CO-OP MAINTENANCE STRATEGY AND F-GAS REGULATIONS.
- THE ALARM SYSTEM SHOULD WARN BOTH VISIBLY AND AUDIBLY WITH A SOUNDER AND BEACON APPROX 15dB(A) ABOVE THE BACKGROUND NOISE LEVEL BOTH INSIDE AND OUTSIDE THE SPACE.
- WHERE LEAK DETECTION IS INSTALLED WITHIN A MACHINERY ROOM, SEE ANNOTATION 'G' TO LINK THE EMERGENCY VENTILATION SYSTEM ON DETECTION OF A LEAK OF REFRIGERANT.

H — PLANT - MACHINERY ROOM SIGNAGE
- AS A MINIMUM THE FOLLOWING TEXT SHALL BE INCLUDED IN A NOTICE ON ALL PLANTROOM DOORS -

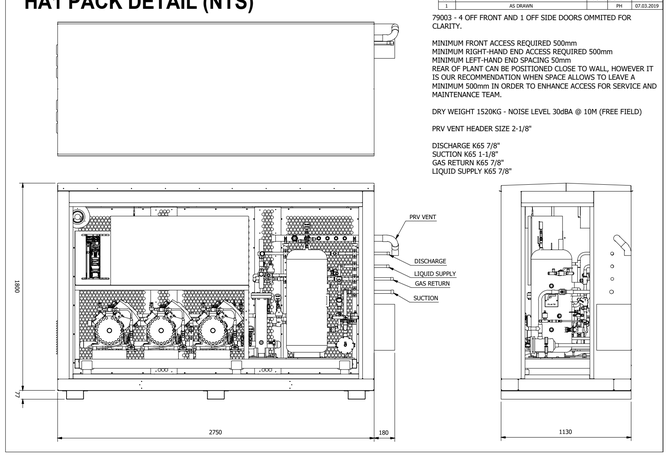
AUTHORISED ACCESS ONLY
NO SMOKING, NAKED LIGHTS OR FLAMES
NO AUTHORISED OPERATION OF THE REFRIGERATING SYSTEM
IF THE BUZZER / SOUNDER ACTIVATES, EXIT THE SPACE IMMEDIATELY, CLOSE THE DOOR AND NOTIFY SUPERVISORY PERSONNEL
DO NOT ENTER OR RE-ENTER THE SPACE UNTIL THE BUZZER / SOUNDER HAS CEASED AND YOU HAVE BEEN AUTHORISED BY THE SENIOR MAINTENANCE ENGINEER AND THE REFRIGERATION CONTRACTOR

AIR CONDITIONING PLANT

I — AIR CONDITIONING - CONDENSING UNITS - EXTERNAL HIGH LEVEL
- REFRIGERATION CONTRACTOR TO SUPPLY & INSTALL THE UNIT, FIXING BRACKETS AND ANY ANTI-VIBRATION MOUNTS REQUIRED.

J — AIR CONDITIONING - CONDENSING UNITS - EXTERNAL LOW LEVEL
- A FLAT AND LEVEL SURFACE SHALL BE PROVIDED BY OTHERS.
- REFRIGERATION CONTRACTOR TO SUPPLY & INSTALL THE UNIT WITH ANY ANTI-VIBRATION MOUNTS.

HA1 PACK DETAIL (NTS)



CHANGE REVISION TABLE				
ISSUE	CHANGE	DCN DESIGNER		DATE
1	AS DRAWN		PH	07.03.2019

79003 - 4 OFF FRONT AND 1 OFF SIDE DOORS OMMITED FOR CLARITY.

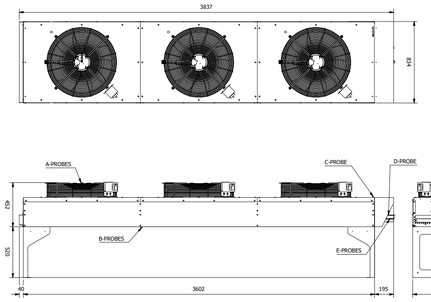
MINIMUM FRONT ACCESS REQUIRED 500mm
MINIMUM RIGHT-HAND END ACCESS REQUIRED 500mm
MINIMUM LEFT-HAND END SPACING 50mm
REAR OF PLANT CAN BE POSITIONED CLOSE TO WALL, HOWEVER IT IS OUR RECOMMENDATION WHEN SPACE ALLOWS TO LEAVE A MINIMUM 500mm IN ORDER TO ENHANCE ACCESS FOR SERVICE AND MAINTENANCE TEAM.

DRY WEIGHT 1520KG - NOISE LEVEL 30dBA @ 10M (FREE FIELD)

PRV VENT HEADER SIZE 2-1/8"

DISCHARGE K65 7/8"
SUCTION K65 1-1/8"
GAS RETURN K65 7/8"
LIQUID SUPPLY K65 7/8"

HA1 GAS COOLER DETAIL (NTS)



CHANGE REVISION TABLE				
ISSUE	CHANGE	DCN DESIGNER		DATE
1	AS DRAWN		HB	04/04/2019

GF-SA103F4H-063M043 - CU/ALMG/BG ASSY
37°C GAS COOLER OUTLET
30 dB(A) AT 10m.
DRY WEIGHT: 196kg

NOTE:
ALL 8x OFF TEMPERATURE PROBES MUST BE HARD WIRED FROM THE GAS COOLER ELECTRICAL BOX TO THE PACK CONTROL PANEL. THIS NEEDS TO BE COMPLETED ON SITE.

PROBES FITTED AS FOLLOWS:
A - 2x OFF AIR OFF (PRIMARY & BACK-UP)
B - 2x OFF AIR ON (PRIMARY & BACK-UP)
C - 1x OFF AMBIENT TEMPERATURE
D - 1x OFF GAS COOLER INLET (DISCHARGE/TDB CHANGE-OVER)
E - 2x OFF GAS COOLER OUTLET (PRIMARY & BACK-UP)

THIRD ANGLE PROJECTION
Sheet Size A3 — IF IN DOUBT ASK — DO NOT SCALE

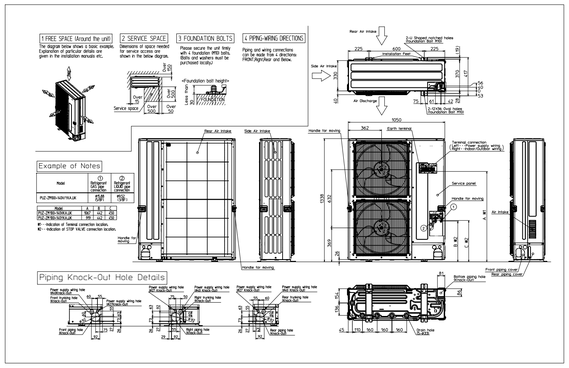
space. engineering services

(2012) Space Engineering Services Limited - All Rights Reserved.

Finish: N/A — Weight:
Material:
TOLERANCES - UNLESS OTHERWISE STATED: Profile: 1.0mm Folds: 0.5mm; Angles: ±0.5mm; Dimensions: 1.0 mm ±1.0.
Checked: XXX
CUSTOMER / PROJECT REF: Job No.:
Description: GF-SA103F4H-063M043 - CU/ALMG/BG
Designed By: Harry Braywood — 04/04/2019
Drawn By: Harry Braywood — 04/04/2019
Part No. / 30 Model Ref: S1-70343 — Sheet Number: 1 of 1
Drawing / File Ref: 70343.idw — Issue: 1

LIFTING OF THE EQUIPMENT MUST ONLY BE CARRIED OUT BY QUALIFIED LIFTING PERSONNEL. THE USE OF AN ADJUSTABLE SPREADER BEAM, STRAPS AND LIFTING CHAINS ARE ADVISED. THE ADJUSTABLE SPREADER BEAM WILL OFFER ADJUSTMENT IN ORDER TO LEVEL LIFT AND AVOID ANY CONTACT OR DAMAGE TO THE EQUIPMENT.

OUTDOOR AC UNIT DETAIL (NTS)



PSSR Assessment

SYSTEM REF.	TOTAL COMPRESSOR POWER FROM HP (kW)	PSSR REQUIRED FOR THE WORKS?
HA1	14.5	NO

Assessment made in conjunction with The Pressure Systems Safety Regulations 2000.

NOTE:
FOR FULL DETAIL OF REFRIGERATION AND AIR CONDITIONING COMPLIANCE REFER TO THE LATEST CO-OPERATIVE SPECIFICATION

PLEASE NOTE
CO2 (R744) & R32
REFRIGERANTS USED ON THIS SITE

Air Conditioning - Outdoor Units (Pipework to be pressure tested to 41.5Bar Tightness and 45.7Bar Strength)

System Ref	Model	Manufacturer	New/ Existing	Type	Position	Max Current (A)	Start Current (A)	Electrical Connections	Running Load (A)	FUSE RATING (A)	Refrigerant Charge (kg)	Minimal Room Area (m2)	Connections (S / L)	Maximum Working Pressure (Bar)	Length (mm)	Width (mm)	Height (mm)	Net Weight (kg)	Air Flow (m3/s)	External Maximum Static Pressure (Pa)	Noise Pressure Level (dBA @ 1m)	Refrigerant
ACU-1	PUZ-ZM125YKA	Mitsubishi Electric	New	Power Inverter 3ph	Rear Plant Area	10	6	380-415V / 50HZ / 3ph	4.91 (Cooling) 5.36 (Heating)	16	4	N/A	(5/8") / (3/8")	41.5	1050	370	1338	125	2	0	50 (Cooling) 52 (Heating)	R32
ACU-2	PUZ-ZM125YKA	Mitsubishi Electric	New	Power Inverter 3ph	Rear Plant Area	10	6	380-415V / 50HZ / 3ph	4.91 (Cooling) 5.36 (Heating)	16	4	N/A	(5/8") / (3/8")	41.5	1050	370	1338	125	2	0	50 (Cooling) 52 (Heating)	R32
ACU-3	PUZ-ZM125YKA	Mitsubishi Electric	New	Power Inverter 3ph	Rear Plant Area	10	6	380-415V / 50HZ / 3ph	4.91 (Cooling) 5.36 (Heating)	16	4	N/A	(5/8") / (3/8")	41.5	1050	370	1338	125	2	0	50 (Cooling) 52 (Heating)	R32

Orwell Design Associates
Head Office
Unit 18 IP-City Centre
Bath Street
Ipswich
IP2 8SD

+44 (0)1473 556 705
www.orwelldesignassociates.co.uk

Revision	Details	Drawn	Date
-	FIRST ISSUE BASED ON COOP DRAWING P1F4M0	LM	23.05.19

Site Address: BOGNOR REGIS, CHICHESTER ROAD (131400)

Drawing Title: PROPOSED PLANT FEASIBILITY LAYOUT

Refrigeration Contractor: -

Date: 23.05.19 — **Drawn By:** LM

Signature 1: — **Signature 2:** — **Signature 3:**

Signatures indicate compliance with the latest version of the Check and Verification 00/00/00008 document

Revision: 00 — **Scale:** 1:50 @ A1

Drawing No: E3318-CR3 — **Contract No:** -