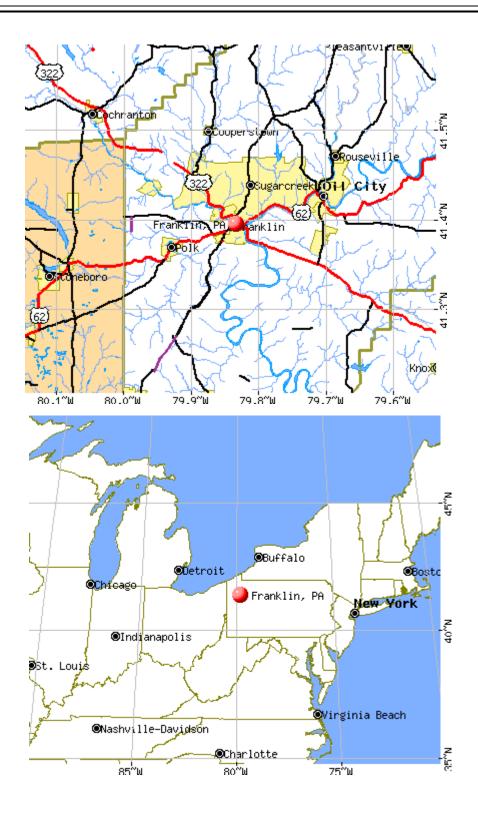
ENGINEERING SPECIFICATIONS

The Unico System®

Gabrys Residence

Prepared by Victor Carroll



DISCLAIMER

The attached sizing and layout design is for estimation purposes only. The actual size and performance of the system is the responsibility of the installing contractor and design engineer. Unico will only warrant the equipment capacity as shown in the ARI Unitary Directory under the specified conditions when properly installed using all of the installation instructions provided by Unico.

As such, the *UNICOSYSTEM*[®] is a comfort heating and cooling system that has limitations as summarized below. Under certain conditions the system may require the use of special controls.

The following pages summarize the heat gain and heat loss of the building using the ACCA Manual J calculation procedure. The calculations are based on the information given to Unico in the form of drawings, sketches, and interviews. In certain cases, Unico may make assumptions about design conditions that may or may not be accurate for the location of concern. It is the responsibility of the installing contractor to verify the design conditions and to inform the building owner. Unico makes no claim that the information given to us is correct or complete.

LIMITATIONS

Ambient conditions:

- -10 to 110°F for the MB blowers (higher temperatures require a cooling tube)
- 32 to 160°F for water coils with standing water
- -10 to 160°F for all other units

Outdoor Conditions:

- 80 to 110°F for refrigerant cooling systems with air-cooled condensers (use a low ambient head pressure control for lower outdoor temperatures)
- 10 to 50°F for refrigerant heating (heat pump) systems with air-cooled condensers (use the UPC-65 mild weather control kit for higher temperatures)

Return Air Conditions:

- 72 to 95°F for refrigerant systems
- 32 to 120°F for hydronic systems

Water temperatures:

• 35 to 200°F except for the M1218 which is limited to 160°F maximum.

Electric Heaters:

• Refer to installation instructions. Maximum size is limited by airflow, especially for heat pump applications.

Unico warrants that the equipment will operate properly under these conditions. If conditions exceed these limitations, Unico will provide technical advice on the feasibility of adding special controls or modifying

the equipment to operate under said conditions. Unless otherwise stated, no express warranty is given for operating the equipment outside of these limitations.

Unico, Inc. is a manufacturer of heating and air conditioning equipment and ductwork. Unico, Inc., is not an architectural or engineering firm and does not provide architectural or engineering plans or diagrams for the public or for use by contractors or construction companies as final "construction documents"

Unico, Inc. works with architectural and engineering firms and with contractors in connection with their designs of heating and air conditioning systems and their specifications for particular applications and buildings, using Unico, Inc.'s equipment and products. Any load calculations, duct design and list of materials and equipment provided in the following pages are based upon information provided by the party referring a particular project to Unico, Inc. (copies of key portions of this material, which provided the basis for the various Design Support information included are attached as part of this package. Any other basic information about this Project used by Unico, Inc. is on file at the Unico, Inc. Customer Service Department under the file number listed).

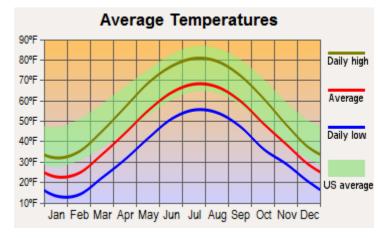
Unico, Inc. has not and does not independently verify that the data provided to Unico, Inc. is correct or complete, and any calculations made by Unico are based upon the information provided by third parties. Various modifications to the information provided to Unico, Inc. may have occurred after this Design Support information was prepared, which would require that this Design Support information be modified in order to be accurate.

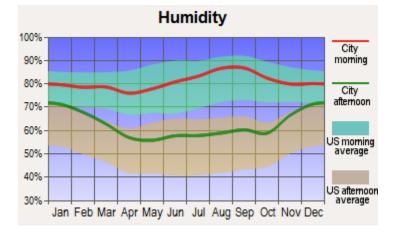
AS A RESULT, UNICO DOES NOT WARRANT THAT THE EQUIPMENT AND MATERIALS SUGGESTED IN THE FOLLOWING PAGES WILL HEAT OR COOL A PARTICULAR BUILDING TO ANY PARTICULAR LEVEL OF COMFORT, SINCE THAT DETERMINATION IS TO BE MADE BY THE ARCHITECT, ENGINEER OR CONTRACTOR FOR A PARTICULAR PROJECT.

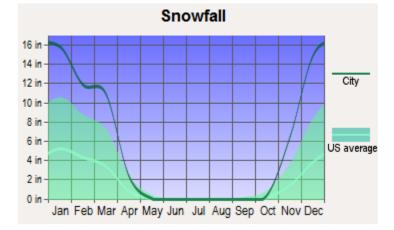
UNICO, INC.'S SOLE WARRANTY IS THAT ALL UNICO, INC. EQUIPMENT AND THE UNICO DUCT SYSTEM WILL PERFORM AS RATED, PROVIDED THAT THE INSTALLER OF THE UNICO, INC. EQUIPMENT AND DUCT SYSTEM FOLLOW THE WRITTEN INSTRUCTIONS FOR INSTALLATION PROVIDED BY UNICO, INC. ALL OTHER WARRANTIES ARE EXPRESSLY DISCLAIMED.

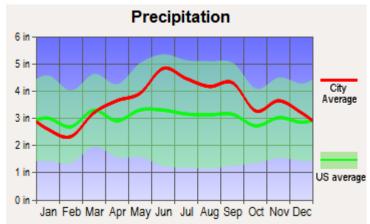
Average climate in Franklin, Pennsylvania

Based on data reported by over 4,000 weather stations

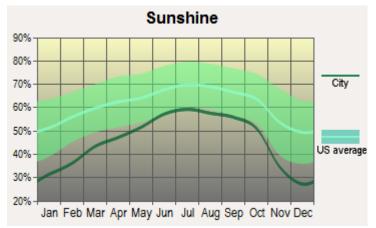


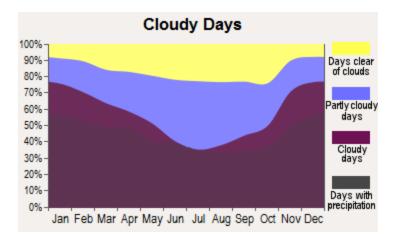






Wind Speed (mph)





Read more: http://www.city-data.com/city/Franklin-Pennsylvania.html#ixzz1W3JGksUc

If the duct layout is altered onsite due to space and/or layout constraints, the Bill of Materials duct length quantities may not be accurate. The DUCT quantities are estimates ONLY. The attached Duct Layout and Bill of Materials are suggestions ONLY. Alterations may be necessary.

- In bathrooms: do not place outlets above or below the sink, toilet, or shower.
- While placing outlets be aware of how placement may cause draperies and blinds to move. May have to shift outlets to either side of windows.



Load Short Form Ahu #1

Job: Project 0811-020 Gabrys Date: Aug 24, 2011 By: Victor Carroll

COOLING EQUIPMENT

Project Information

For: Tom Vincent

	Htg	Clg		Infiltration
Outside db (°F)	6	89	Method	Simplified
Inside db (°F)	70	75	Construction quality	Average
Design TD (°F)	64	14	Fireplaces	2 (Average)
Daily range	_	M		
Inside humidity (%)	30	50		
Moisture difference (gr/lb)	28	44		

HEATING EQUIPMENT

Make			Make		
Trade			Trade		
Model			Cond		
AHRI ref no.			Coil		
			AHRI ref no.		
Efficiency	0 HSPF		Efficiency	0 SEER	
Heating input			Sensible cooling	0	Btuh
Heating output	0	Btuh @ 47°F	Latent cooling	0	Btuh
Temperature rise	0		Total cooling	0	Btuh
Actual air flow	1000	cfm	Actual air flow	1000	cfm
Air flow factor	0.022	cfm/Btuh	Air flow factor	0.035	cfm/Btuh
Static pressure	0	in H2O	Static pressure	0	in H2O
Space thermostat			Load sensible heat ratio	0.86	

ROOM NAME	Area (ft²)	Htg load (Btuh)	Clg load (Btuh)	Htg AVF (cfm)	Clg AVF (cfm)	
Lau	42	548	814	12	28	
Room13	192	1851	727	40	25	
Room8	52	0	0	0	0	
master bath	192	4968	5025	108	175	
Bath	33	134	79	3	3	
Kltchen	353	4580	4319	100	151	
Room5	27	0	0	0	C	
clo2	55	299	176	7	6	
Room3	42	0	0	0	0	
clo1	38	931	294	20	10	
Master Bed	390	10709	6332	234	221	
pantry	21	0	0	0	0	
Room36	47	0	0	0	0	
Cedar	36	0	0	0	0	
Room37	348	11574	5233	253	182	
Dining	158	3479	2648	76	92	

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.



Great room Foyer	460 68	5256 1483	2320 715	115 32	81 25
Ahu #1 d Other equip loads Equip. @ 0.94 RSM Latent cooling	2552	45813 4472	28681 995 27955 4986	1000	1000
TOTALS	2552	50285	32941	1000	1000

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.

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Load Short Form

Ahu #2

Job: Project 0811-020 Gabrys Date: Aug 24, 2011 By: Victor Carroll

Project Information

For: Tom Vincent

		Design I	nformat	ion		
Outside db (°F) Inside db (°F) Design TD (°F) Daily range Inside humidity (%) Moisture difference (gr/lb)	Htg 6 70 64 30 28	Clg 89 75 14 M 50 44	Method Constructi Fireplaces	on quality		mplified Average Average)
HEATING EQU	IPMENT			COOLI		т
Make Trade Model AHRI ref no.			Make Trade Cond Coil AHRI r	ef no.		
Efficiency Heating input	0 HSPF			le cooling	0 SEE	0 Btuh
Heating output	0	Btuh@47°F °F		cooling		0 Btuh 0 Btuh
Temperature rise Actual air flow	1000		Total c	air flow	100	0 Btuh 10 cfm
Air flow factor	0.021	cfm/Btuh		v factor		4 cfm/Btuh
Static pressure				pressure		0 in H2O
Space thermostat			Load s	ensible heat ratio	8.0	5
ROOM NAME	Area (ft²)	Htg loa (Btuh)		Clg load (Btuh)	Htg AVF (cfm)	Clg AVF (cfm)
Room17		40	120	96	3	3
Room18		48	125	100	3	3
bath1		60	1952	1209	42	42
Bed1		61	2127	2229	46	77

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.



Study

bed2

bath2

Room21

Room23

Room26

Room27

Storage

Room31

Room33

Mech

Bath3

wrightsoft" Right-Suite® Universal 8.0.16 RSU01576

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Sun room		716	15856	8043	340	277
Ahu #2 Other equip loads Equip. @ 0.94 RSM Latent cooling	d	2727	46675 4442	29068 989 28313 5251	1000	1000
TOTALS		2727	51117	33564	1000	1000

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.

Right-Suite® Universal 8.0.16 R SU01576 ... Projects\Design Plans for 2011\Aug 2011\0811-020\0811-020.rup Calc = MJ8 Front Door faces:

	oject Summar u #1	V	Date: Aug 24 By: Victor C	
	Pr	ject Information		
For:	Tom Vincent			
Notes:	DISCLAIMER			
		and layout design is for estimation p system is the responsibility of the in:		
	under the specifie provided by Unico Weather:	sign Information conditions when property installed u Franklin, PA, US	ising all of the installation	nsuucuc
Winter Desig	n Conditions	Summer	Design Conditions	3
Outside db Inside db Design TD	6 °F 70 °F 64 °F	Outside db Inside db Design TD Daily range Relative humidity Moisture difference	75 14 M	%
Heating	Summary	Sensible Cooli	ng Equipment Load	d Sizing
Structure Ducts Central vent (67 cfm) Humidification Piping Equipment load	36018 Btu 9795 Btu 4472 Btu 0 Btu 50285 Btu	Ducts Central vent (67 cfm) Blower Use manufacturer's dat Rate/swing multiplier	ta n 0.94	Btuh Btuh Btuh
Infiltr		Equipment sensible loa		
Method Construction quality Fireplaces Area (ft²)	2 (Ave Heating Co	age	g Equipment Load 1374 1713 1899 4986	Btuh Btuh Btuh
Volume (ft³) Air changes/hour Equiv. AVF (cfm)	20418 2	418 0.14 Equipment total load 49 Req. total capacity at 0	32941	Btuh
Heating Equip	ment Summary	Cooling E	Equipment Summa	ry
Make Trade Model AHRI ref no. Efficiency Heating input Heating output Temperature rise Actual air flow Air flow factor	0 HSP 0 Btu 0 °F 1000 cfm 0.022 cfm	@ 47°F Sensible cooling Total cooling Actual air flow	0 0 1000	Btuh Btuh Btuh cfm cfm/Btuh
Static pressure Space thermostat	0 in H		0	in H2O

Right-Suite® Universal 8.0.16 R SU01576 ... Projects\Design Plans for 2011\Aug 2011\0811-020\0811-020.rup Calc = MJ8 Front Door faces:

" Ab.		nary		Date:	Aug 2	et 0811-020 Gab 4, 2011 Carroll
		Project Int	formation			
For:	Tom Vincent					
Notes:	DISCLAIMER	1				
		of the system is	the responsibility of the installing	•		
		ciliea conalitoris	when property installed using all	or the ins	anano	omnistractions
er Desig	n Conditions	3	Summer Desig	n Con	dition	IS
	70	°F	Outside db Inside db Design TD Daily range Relative humidity Moisture difference			°F °F
Heating S	Summary		Sensible Cooling Eq	uipmen	t Loa	d Sizing
	10115 4442 0 0	Btuh Btuh Btuh Btuh	Structure Ducts Central vent (67 cfm) Blower Use manufacturer's data	1 à	8115 989 0	Btuh Btuh Btuh
Infiltra	ation		Equipment sensible load			
ality	2 Heating 2727	Average (Average) Cooling 2727	Latent Cooling Equ Structure Ducts Central vent (67 cfm) Equipment latent load	ipment	1602 1762 1886	Btuh Btuh Btuh Btuh Btuh Btuh
ur n)	0.33 121	0.16 57	Equipment total load Req. total capacity at 0.70 SHI	२		Btuh ton
ng Equipi	ment Summa	ary	Cooling Equip	nent S	umma	ary
se	0 0 1000 0.021	Btuh @ 47°F °F cfm cfm/Btuh	Make Trade Cond Coil AHRI ref no. Efficiency Sensible cooling Latent cooling Total cooling Actual air flow Air flow factor Static pressure Load sensible heat ratio	0	0 0 1000 0.034	Btuh Btuh Btuh
	For: Notes: Notes: Heating S 7 cfm) Infiltra nality ng Equipr	For: Tom Vincent Notes: DISCLAIMER The attached performance under the spe provided by L and the spe provided by L the attached performance under the spe provided by L the attached performance and the spe and	Ites Anu #2 Project Int For: Tom Vincent Notes: DISCLAIMER The attached sizing and layou performance of the system is: Design Internet spectned contantions provided by Unico. provided by Unico. Franklin, F drive the spectned contantions provided by Unico. provided by Unico. Franklin, F drive the spectned contantions provided by Unico. provided by Unico. Franklin, F det Design Conditions for fm) 36560 4442 Btuh 0 Btuh 10115 Btuh 117 Btuh 117 Btuh 118 21814 21814 21814 0.33 0.16	Ahu #2 Project Information For: Tom Vincent Notes: DISCLAIMER The attached sizing and layout design is for estimation purpose performance of the system is the responsibility of the installing Design Information Design Information under one speciment of continuous when property misualed using an provided by Unico. Weather: Outside db The attached sizing and layout design is for estimation purpose performance of the system is the responsibility of the installing Design Information Design Information Under one speciment of continuous when provided by Unico. 7 cm Outside db attribution Summer Design deating Summary Sensible Cooling Equipy range Relative humidity Moisture difference Vermit attribution Structure Ducts Structure Central vent (67 cfm) atlity Simplified Average Latent Cooling Equipment sensible load atlity Cooling Equipment sensible load Equipment latent load atlity Of FF 21814 Cooling Equipment sensible load atlity Of HSPF Equipment total load Ff coil Cooling Equipment atten cooling Latent cooling ase O HSPF Sensible cooling Latent cooling Cooling Equipment Cooling	Project Summary Date: By: Ahu #2 Description Project Information For: Tom Vincent Notes: DISCLAIMER The attached sizing and layout design is for estimation purposes only. Tiperformance of the system is the responsibility of the installing contracto Onder the system is the responsibility of the installing contracto Provided by Unico. Franklin, PA, US Provided by Unico. Franklin, PA, US Provided by Unico. Franklin, PA, US Provided by Unico. Summer Design Conditions Inside db Dasily range Provided by Unico. Structure Of "F Design TD Dasily range Relative humidity Moisture difference Sensible Cooling Equipment Heating Summary Structure Ducts 7 cfm) 36560 Btuh Ducts 1 Simplified Latent Cooling Equipment Infiltration Simplified Latent Cooling Equipment Sensible load Iaility Average Structure Ducts Quite Quite The atten cooling Cooling Equipment Sensible cooling <td>Project Summary Anu #2 Date: Aug 2 By: Victor Project Information For: Tom Vincent Notes: DISCLAIMER The attached sizing and layout design is for estimation purposes only. The actuperformance of the system is the responsibility of the installing contractor and or Design Information Order one specified Collabors when properly instance using an on the installand opprovided by Unico. Provided by Unico. Weather: Summer Design Conditions 8 Summer Design Conditions Summer Design Condition 7 6 °F 64 °F Design TD 10115 Buth Daity range 4 Buth Sensible Cooling Equipment Load 36560 Btuh Structure 20953 7 cfm) 4442 Btuh Ducts 8116 10115 Btuh Ducts 8117 1117 Btuh Use manufacturer's data 1762 11117 Simplified Data 22313 1111 Btuh Use manufacturer's data 1762 1111 Simplified Equipment latent load 23313 1111 Simplified 240 33</td>	Project Summary Anu #2 Date: Aug 2 By: Victor Project Information For: Tom Vincent Notes: DISCLAIMER The attached sizing and layout design is for estimation purposes only. The actuperformance of the system is the responsibility of the installing contractor and or Design Information Order one specified Collabors when properly instance using an on the installand opprovided by Unico. Provided by Unico. Weather: Summer Design Conditions 8 Summer Design Conditions Summer Design Condition 7 6 °F 64 °F Design TD 10115 Buth Daity range 4 Buth Sensible Cooling Equipment Load 36560 Btuh Structure 20953 7 cfm) 4442 Btuh Ducts 8116 10115 Btuh Ducts 8117 1117 Btuh Use manufacturer's data 1762 11117 Simplified Data 22313 1111 Btuh Use manufacturer's data 1762 1111 Simplified Equipment latent load 23313 1111 Simplified 240 33

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Parts Pull Order

Job: Project 0811-020 Gabrys Date: Aug 24, 2011 By: Victor Carroll

BILL TO:

SHIP TO:

Attn:

Phone:

Fax:

Attn:

Phone: Fax:

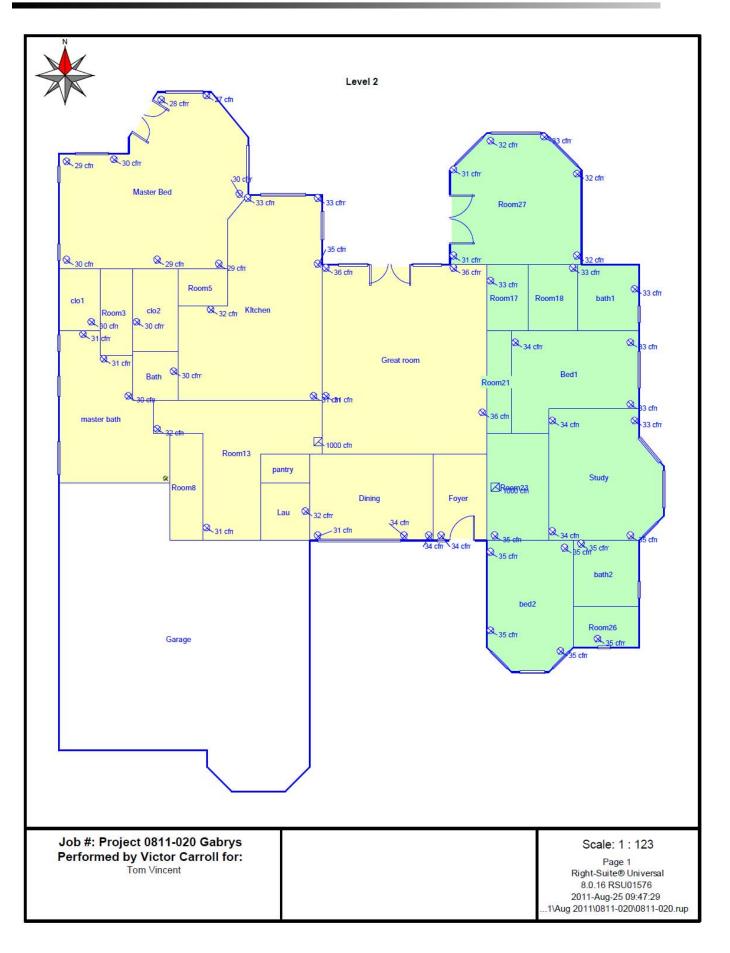
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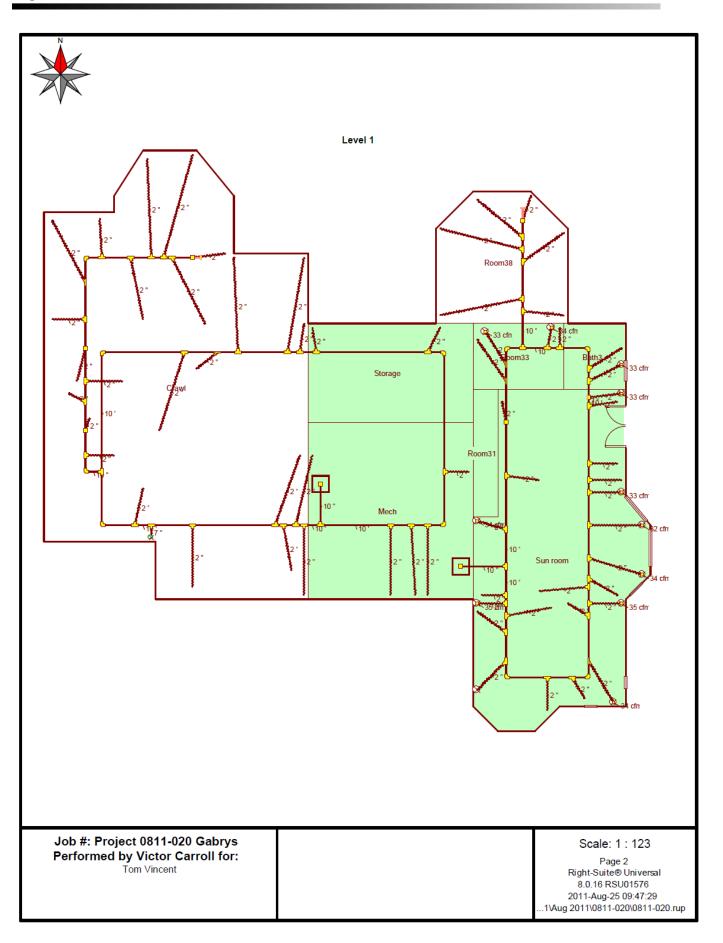
 Order date
 Ordered by
 Purchase order #
 Date required
 Ship via

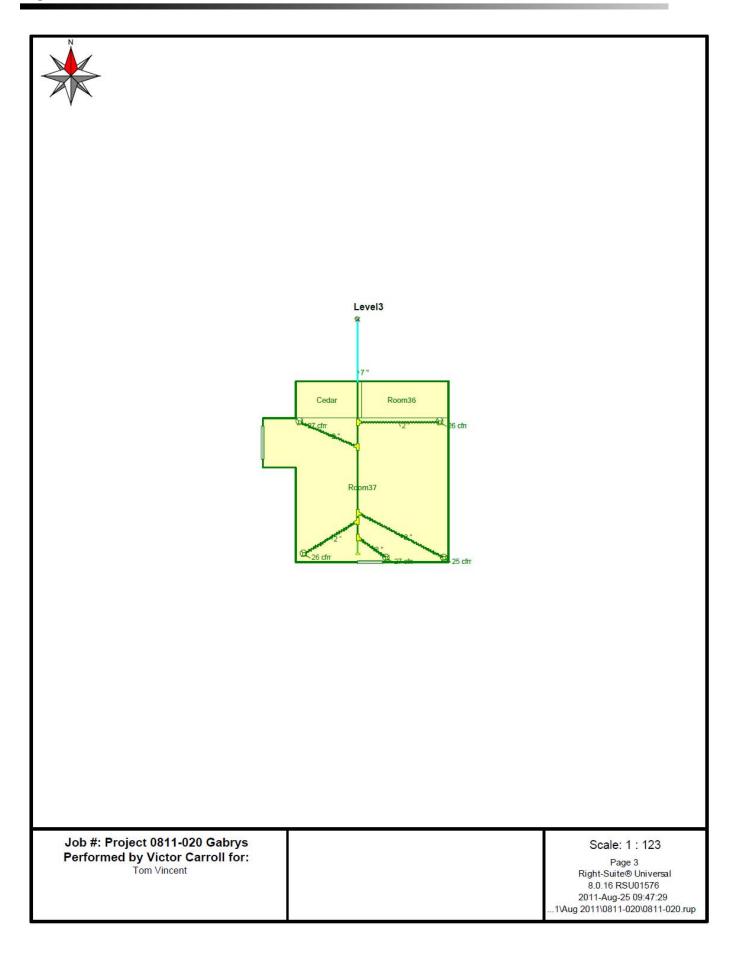
Src	Part #	Description	Qty	Total pieces	Qty issued	Qty returned	
		Ahu #1					
UNC	M4860BL1-EC2	Module Blower with S.M.A.R.T. Control Board and E	1.0	1.0			
UNC	MC4860 HX	Module, H Coil. Includes Spacer)	1.0	1.0		l î	
UNC	MV 4860	Module Vertical Plenum with Filters	1.0	1.0			
UNC	UPC-01-4860	Return Air Box with Grille and Filter, 24"x30"	1.0	1.0			
UNC	UPC- 61- 4860	Adapter Supply Round 10"	1.0	1.0			
UNC	UPC-04-4860	Return Air Duct. R-4.2 20"x 10'	1.0	1.0			
UNC	UPC-104 -4860	Return Air Adapter fits MV4860 MH 3660 for 20' duct	1.0	1.0			
UNC	WON2002	Furnace, Electric, 20 kW (matches 3642, 4860)**	1.0	1.0			
UNC	UPC-25-4	Supply Tubing, Aluminum, 2" ID x 25'L	1.0	4.0			
UNC	UPC-26C-6	Sound Attenuator Tubing, 2" ID x 12'L	6.0	36.0		1	
UNC	UPC-89M-6	Installation Kit, Metal Plenum (6 outlets)	6.0	36.0			
UNC	USM-13	10" OD, 28GA. Duct,5' LG	4.0	40.0			
UNC	USM-14	10" Elbow	1.0	4.0			
UNC	USM-15	10"x10"x10" Metal tee	1.0	4.0			
UNC	USM-16	10"x1" Insul Sleeve	4.0	60.0			
UNC	USM-18	10" End CAps	1.0	12.0			
	and a start the second	Ahu #2					
UNC	M4860BL1-EC2	Module Blower with S.M.A.R.T. Control Board and E	1.0	1.0			
UNC	MC4860 HX	Module, H Coil. Includes Spacer)	1.0	1.0			
UNC	MV 4860	Module Vertical Plenum with Filters	1.0	1.0			
UNC	UPC-01-4860	Return Air Box with Grille and Filter, 24"x30"	1.0	1.0			
UNC	UPC- 61- 4860	Adapter Supply Round 10"	1.0	1.0			
UNC	UPC-04-4860	Return Air Duct. R-4.2 20"x 10'	1.0	1.0	ĺ í	1 1	
UNC	UPC-104 -4860	Return Air Adapter fits MV4860 MH 3660 for 20' duct	1.0	1.0			
UNC	WON2002	Furnace, Electric, 20 kW (matches 3642, 4860)**	1.0	1.0			
UNC	UPC-26C-6	Sound Attenuator Tubing, 2" ID x 12'L	6.0	36.0			
UNC	UPC-89M-6	Installation Kit, Metal Plenum (6 outlets)	6.0	36.0			
UNC	USM-13	10" OD, 28GA. Duct,5' LG	3.0	30.0		l î	
UNC	USM-14	10" Elbow	1.0	4.0			
UNC	USM-15	10"x10"x10" Metal tee	1.0	4.0			
UNC	USM-16	10"x1" Insul.Sleeve	3.0	45.0			
UNC	USM-18	10" End CAps	1.0	12.0			

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