



**HIPP
DESIGN +
CONSULTING**

SHOP DRAWING / SUBMITTAL ACTION TICKET

CLIENT NAME Eli Lilly
 CONSTRUCTION MANAGER BE&K
 PROJECT NAME Project Concord DAP
 PROJECT NUMBER G22131

SUBMITTAL NUMBER: #011		SUBMITTAL TITLE: 237313 - Air Handling Unit Rev 1	
CONTRACTOR / VENDOR: Kirlin-Way Mechanical		DATE RECEIVED: 21DEC2022	
RECEIVED BY: NR		DATE DUE: 21DEC2022	
DISPOSITION: <input type="checkbox"/> NO EXCEPTION TAKEN <input checked="" type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> REVISE AND RESUBMIT <input type="checkbox"/> REJECTED, RESUBMIT <input type="checkbox"/> NOT REVIEWED		DISTRIBUTION: <input type="checkbox"/> CIVIL _____ <input type="checkbox"/> ARCHITECTURAL _____ <input type="checkbox"/> STRUCTURAL _____ <input checked="" type="checkbox"/> MECHANICAL <u>A. Anderson</u> <input type="checkbox"/> PROCESS _____ <input checked="" type="checkbox"/> ELECTRICAL <u>J. Millikin</u> <input checked="" type="checkbox"/> INST & CONT. <u>M. Carter</u> <input checked="" type="checkbox"/> PROJ. LEADER <u>A. Stone</u> <input type="checkbox"/> OTHER _____	

Checking is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction, coordination of his work with that of all other trades, and the satisfactory performance of his work.

REMARKS:

HVAC Comments: Approved with no exception taken

PM Comments: (From Lilly Submittal #010 response): Steam strainer shall be cast steel, carbon steel, or brass. Cast iron is not acceptable. See comment on PDF page 204 of this response.

Electrical Comments: (from Submittal #010 response): Provide control wiring schematics if wiring will be different than what is shown in VFD Submittal #002, dated 10NOV2022. See comment on PDF page 23 of this response.

I&C Comments: See damper and actuator comments on PDF pages 23, 48, 58.

HIPP COMMENTS IN RED

LILLY COMMENTS IN BLUE

- AHU-4900 SA PAGE 24**
- AHU-4901 THRU AHU-4906 SA PAGE 59**
- AHU-4901 THRU AHU-4906 RA PAGE 77**
- AHU-4907 SA PAGE 105**
- AHU-4907 RA PAGE 123**
- AHU-4910 SA PAGE 152**
- AHU-4910 RA PAGE 169**

Adam J. Anderson, P.E.

 PRIMARY DISCIPLINE LEAD

Mechanical

 DISCIPLINE

21DEC2022

 DATE

Approval Transmittal Notice

Date: 12/20/2022

TO: Kirlin Way

CC: Jeff Clark – **Clark Air Systems**

RE: Eli Lilly & Co., Concord Bldgs 2,4,6

Enclosed is submittal information for our shop order number 210094-01 through -09, your purchase order 012209.

Based on the return of submittals and full release for manufacturing by 12/23/22, shipments are estimated to be:

Months of May & June 2023

Units 01 through -09 (AHU-4900, AHU-4901, AHU-4902, AHU-4903, AHU-4904, AHU-4905, AHU-4906, AHU-4907 & AHU-4910)

Due to the current pandemic, MERV 13 or higher rated filters (including HEPAs) have lead times of 8-14 weeks. Please coordinate delivery dates at release.

If you need clarifications to the submittal information, please contact our representative at PH: (336) 292-9362, FX: (336) 292-8412.

Buffalo Air Handling wants to maintain our on-time delivery record and provide maximum service to all of our customers. Timely return of the submittal allows us to properly, and effectively, schedule shipments and provide air handling units when required.

Should the submittal return be delayed, the shipment schedule would be affected. Given the factory loading at the time, the potential shipment delay could exceed the submittal delay time frame. A one-week delay in submittal return could mean more than one-week delay in shipment.

We appreciate your order and will provide quality equipment on time. Thank you for your consideration.

CC: BAH – Design

BUFFALO AIR HANDLING

Re-Submittal

Kirlin Way

Eli Lilly & Co. Concord Bldgs 2,4,6

AHU-4900, AHU-4901, AHU-4902, AHU-4903, AHU-4904, AHU-4905, AHU-4906, AHU-4907 & AHU-4910

PO # 22-1050-002

Sales Order # 220094-01 through -09

12/20/22

Buffalo Air Handling Contact Information

Greensboro Representative:

Jeff Clark, Andrew Opperman
Rhonda Stanfill

Clark Air Systems
3721-D West Market Street
Greensboro, NC 27403

Tel: (336) 292-9362

Fax: (336) 292-9442

Buffalo Air Handling Factory:

Buffalo Air Handling
467 Zane Snead Drive
Amherst, VA 24521

Tel: (434) 946-7455

Fax: (434) 946-0226

First contact for service or parts should be the Greensboro representative.

TERMS AND CONDITIONS OF SALE

The following are the Standard Terms and Conditions of Sale of the Buffalo Air Handling Division of Air & Liquid Systems Corporation ("Seller").

1. **ACCEPTANCE OF SELLER'S TERMS AND CONDITIONS OF SALE.** Seller and Buyer agree that the following terms and conditions will apply to any order from Buyer accepted by Seller. No order or contract will be binding on Seller unless and until accepted, and acknowledged by Seller's office in Amherst, Virginia. Sales representatives are not authorized to bind Seller. No terms or conditions other than those stated herein, whether contained in Buyer's purchase order or shipping release or elsewhere, and no written or oral agreement that purports to vary these terms and conditions will be binding on Seller, unless hereafter set forth in writing and signed by an authorized officer of Seller. Buyer's assent to the terms and conditions set forth herein will be conclusively presumed from Buyer's receipt of this acknowledgement without prompt written objection or from Buyer's acceptance of all or any part of the equipment or material ordered.

2. **CHANGES.** Equipment changes by Buyer involving design and/ or drawing modifications, or after approval and release for manufacture, will result in an administrative charge, in addition to any price adjustment for the change, and may result in a delay of the scheduled shipping date.

3. **CANCELLATION CHARGES.** An order canceled prior to shipment will be subject to cancellation charges.

4. **INVOICING TERMS.** Payment terms: Net 30 days, with interest charges of 1.5% per month thereafter. All shipments will be subject to the approval of Seller's credit department. Quotations are subject to acceptance within 30 days from quotation date.

Seller will invoice, and payment will be due in accordance with the payment terms above, for : a) shipment of complete order; b) partial shipment of order; c) finished product or work in progress when any shipment delay is caused by Buyer for any reason including, but not limited to, change in requirements, components not received, rigging or staging not available, site not ready, etc. Seller will be entitled to reasonable storage charges for any such delay caused by Buyer.

5. **DELIVERY.** Seller will use its best efforts to deliver on a timely basis. Seller, however, will not guarantee or accept consequential losses associated with its inability to meet a specific time of day or specific date. FOB origin.

6. **ESCALATION TERMS.** Prices on equipment of Seller's manufacture are firm for shipments made within 6 months from date of purchase order; for shipments made beyond 6 months from date of purchase order, prices are protected for 6 months from any announced price increase occurring later than the date of the purchase order. Beyond that period, prices will be adjusted to Seller's prices at time of shipment with adjustment limited to 20% of the purchase order price. Contracts providing for escalation based on an index will be escalated from the date of purchase order to the date of shipment using 100% of the quoted price as the base. Prices on equipment not of Seller's manufacture are subject to adjustment to the prices in effect at the time of shipment.

7. **FORCE MAJEURE.** Neither party will be liable for any failure or delay in performance due to force majeure conditions, including, but not limited to, war, riot or civil disturbance, accident or equipment breakdown, strikes or disputes with employees, actions of any governmental authority, compliance with any law order, regulation or directive of any governmental authority, shortages of or inability to obtain materials, supplies, transportation, fuel or energy, or any cause beyond the reasonable control of Seller or Buyer, as the case may be.

8. **TAXES.** All taxes which Seller may be required to pay or collect under any existing or future laws with respect to the sale, purchase, delivery, storage, manufacture, processing, use, consumption or transportation of any equipment ordered by Buyer, including taxes upon or measured by receipts from sales (except net income and equity franchise taxes) will be for the account of Buyer.

9. **PATENTS.** If the equipment is to be manufactured in accordance with Seller's specifications. Seller agrees to defend any proceeding brought against Buyer on a claim that the equipment furnished to Buyer infringes any patent in the United States and Seller agrees to pay all direct and actual damages and costs awarded against Buyer in any such proceeding, provided that Seller is promptly notified in writing of any such proceeding and given authority, information and assistance for the defense thereof. If Buyer furnishes the specifications then Buyer shall hold Seller harmless against any such claim which arises out of compliance with specifications.

10. **NON-CONFORMANCE.** Seller will replace, at the original point of delivery, equipment or material which upon inspection before installation is found defective or not in conformity with the applicable specifications, provided that written notice has been given of such defect or non-conformity within 15 days of receipt of equipment by Buyer and Seller is given reasonable opportunity to inspect. No claims will be accepted by Seller for the cost of any labor expended on such equipment or material, or for any separate special indirect, incidental or consequential damages to anyone. If Buyer does not give such notice, the equipment or material shall be deemed to be in all respects in accordance with the specifications.

11. **BUYER'S EXCLUSIVE REMEDY; LIMITATION OF DAMAGES.** In case of an alleged breach, Seller's entire liability and Buyer's exclusive remedy shall be as follows:

In all situations involving the performance or non-performance of equipment, Buyer's remedy is (1) the adjustment or repair of the equipment or, at Seller's option, the replacement of the equipment or (2) if Seller is unable to repair the equipment or replace it with equipment in good working order, Buyer will be entitled to a refund or credit in the amount of purchase price paid by Buyer for the equipment.

Seller's liability for damages to Buyer for any cause whatsoever and regardless of the form of action or claim, whether in contract or in tort, including negligence, shall be limited to 110% of the purchase price of the equipment or part that is the subject matter of, or directly related to, the action or claim on which such liability is based. In no event will Seller be liable for any lost profits, lost savings or any special, indirect, incidental or consequential damages, even if Seller has been advised of the possibility of such damages, or for any claim by Buyer based on any third party claim, except as provided in the Section entitled **Patents**.

12. **DRAWINGS.** Unless otherwise stated in the quotation, prices include a set of customer interface contract drawings and service manuals. If additional drawings are needed or Buyer-initiated changes require additional drawings, they will be provided only upon receipt of a written order authorizing additional charges for such drawings.

WARRANTY

Seller warrants for a period not in excess of 18 months from date of shipment or 12 months from date of installation, whichever is earlier, the design, construction and materials of Seller's products to be free from defects in materials and workmanship. Seller's sole obligation and Buyer's exclusive remedy under this Warranty is limited to the repair or replacement without charge, f.o.b. Seller's factory, of any defective parts. Seller will not be responsible for damages of any nature, resulting from breach of the above stated Warranty or from any defect in Seller's products, either in materials, design, or construction, or arising from the use of such products. Seller does not guarantee against abrasion, corrosion or erosion.

The above stated warranty constitutes the only warranty made by Seller and is given expressly in lieu of all other warranties express or implied, including any implied warranties of merchantability or fitness for a particular purpose.

Warranties on equipment not of Seller's manufacture are limited to the terms of any warranties furnished by Seller's suppliers to the extent they may be made available to Buyer.

BUFFALO

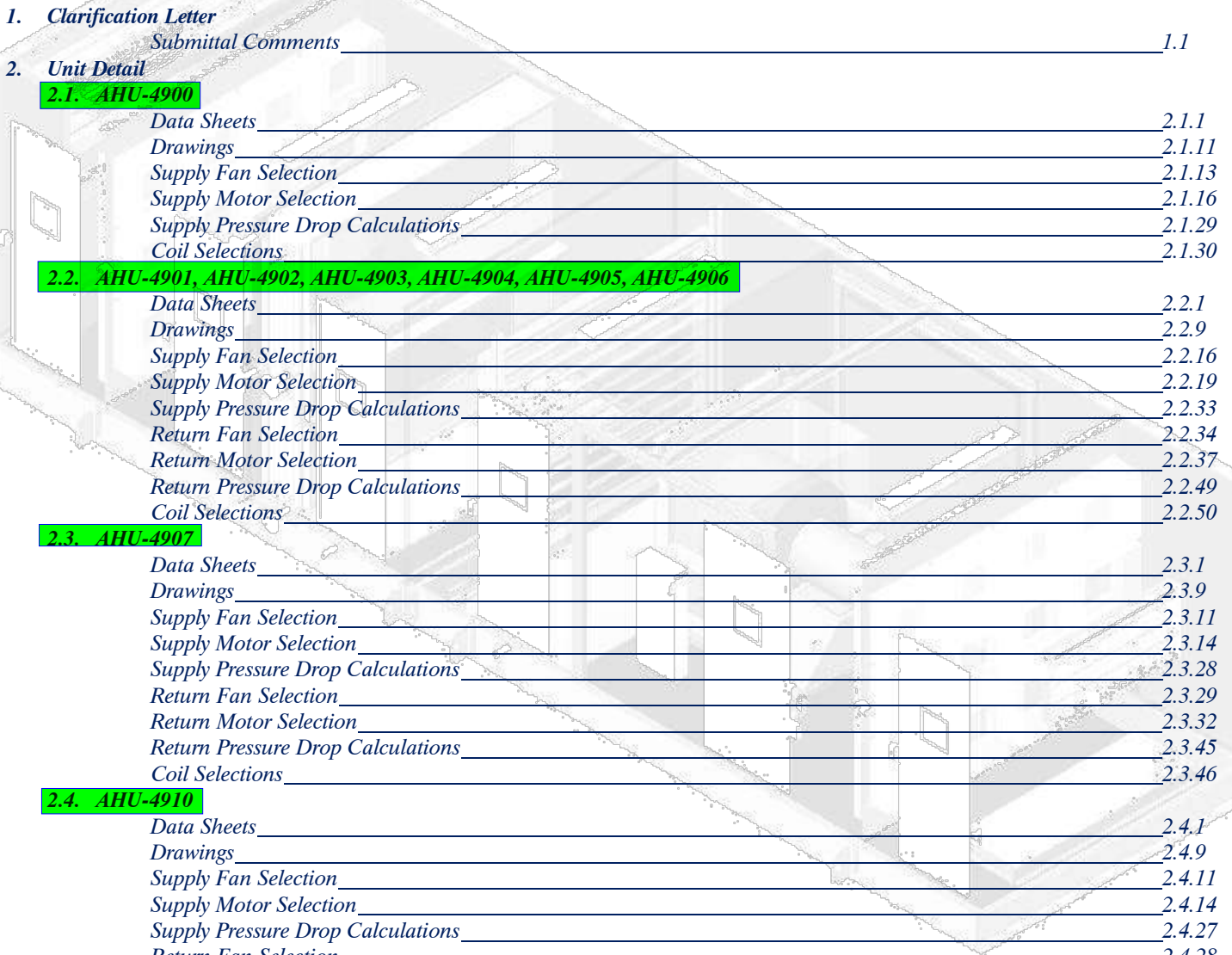
AIR HANDLING

Kirlin Way

Eli Lilly & Co. Concord Bldgs 2, 4,6

SO #220094-01 through -09

Re-Submittal



1. Clarification Letter	
Submittal Comments	1.1
2. Unit Detail	
2.1. AHU-4900	
Data Sheets	2.1.1
Drawings	2.1.11
Supply Fan Selection	2.1.13
Supply Motor Selection	2.1.16
Supply Pressure Drop Calculations	2.1.29
Coil Selections	2.1.30
2.2. AHU-4901, AHU-4902, AHU-4903, AHU-4904, AHU-4905, AHU-4906	
Data Sheets	2.2.1
Drawings	2.2.9
Supply Fan Selection	2.2.16
Supply Motor Selection	2.2.19
Supply Pressure Drop Calculations	2.2.33
Return Fan Selection	2.2.34
Return Motor Selection	2.2.37
Return Pressure Drop Calculations	2.2.49
Coil Selections	2.2.50
2.3. AHU-4907	
Data Sheets	2.3.1
Drawings	2.3.9
Supply Fan Selection	2.3.11
Supply Motor Selection	2.3.14
Supply Pressure Drop Calculations	2.3.28
Return Fan Selection	2.3.29
Return Motor Selection	2.3.32
Return Pressure Drop Calculations	2.3.45
Coil Selections	2.3.46
2.4. AHU-4910	
Data Sheets	2.4.1
Drawings	2.4.9
Supply Fan Selection	2.4.11
Supply Motor Selection	2.4.14
Supply Pressure Drop Calculations	2.4.27
Return Fan Selection	2.4.28
Return Motor Selection	2.4.31
Return Pressure Drop Calculations	2.4.43
Coil Selections	2.4.44

3. Filters		
	<i>Camfil 30/30 Filter</i>	<i>3.1</i>
	<i>Camfil RigaFlo PH Filter</i>	<i>3.3</i>
	<i>AAF Type A8 Filter Frame</i>	<i>3.4</i>
4. Mixing		
	<i>Ruskin CD50 Damper</i>	<i>4.1</i>
	<i>RuskinSP100 Switch Package</i>	<i>4.4</i>
5. Humidifier		
	<i>Armstrong</i>	<i>5.1</i>
6. Miscellaneous		
	<i>Piezometer Ring</i>	<i>6.1</i>
	<i>Dwyer DHII Differential Pressure Controller</i>	<i>6.2</i>
	<i>Aegis Shaft Grounding Ring</i>	<i>6.3</i>
7. Electricals		
	<i>ES-7102 Marine Led Lights</i>	<i>7.1</i>
	<i>ES-7130 2-Way Timer Light Switch</i>	<i>7.2</i>
	<i>ES-7105 Wiring Methods</i>	<i>7.3</i>
	<i>ES-7108 GFCI Receptacle</i>	<i>7.4</i>
8. Test Procedures		
	<i>ES-8104 Factory Performance Test</i>	<i>8.1</i>
	<i>ES-8107 Factory Vibration Test</i>	<i>8.8</i>
	<i>ES-8109 Factory Deflection Test</i>	<i>8.12</i>
	<i>ES-8110 Factory +/- Leakage Test</i>	<i>8.14</i>

1

Submittal Comments

Submittal Comments
Eli Lilly & Co., Concord Bldgs 2, 4, 6
Kirlin Way P.O. 012209
BAH S/O #220094
Unit Tag: AHU-4900 thru AHU-4907, AHU-4910, AHU-5900

December 20, 2022

Buffalo Air Handling's attached "Submittal for Approval" includes overall unit dimensions, shipping split dimensions, internal component layout, and major mechanical components.

This submittal contains information and documents that are an integral part of our order acknowledgement and defines the specific performance of listed equipment and construction techniques to be used in fabrication of this unit.

The following remarks are offered to expand clarification of issues already identified in Buffalo Air Handling's bid proposal and address items of concern identified since order award.

Specification Clarifications:

- 1) Confirm size and location of all unit openings.
- 2) Confirm all coil connection locations and hand.
- 3) Confirm all coil pull locations.
- 4) Confirm all drain pan connection locations and hand.
- 5) Confirm all floor drain connection locations and hand.
- 6) Confirm external static pressure shown on data sheets is correct.
- 7) No P traps or P trap piping by BAH.
- 8) Please advise corridor penetration sizes, locations, and quantities.
- 9) The entire unit needs to be supported around the entire perimeter and each shipping split (both sides of all splits).
- 10) The unit is designed to be lifted with an overhead crane. Forktrucks should not be used.
- 11) All field work (i.e. start-up, training, etc) is based on schedule of Monday thru Friday, approximately 8AM to 5PM. This includes travel time. For evening, weekend or holiday work additional charges may apply.

Comments and Clarifications to Specification 237313

- 12) Section 2.4.A: Insulation will be 3" thick.
- 13) Section 2.10: Connection type not specified, per previous job we are providing Slip on flanges for installation in the field by others.
- 14) Section 2.10.A.5.b: some coils exceed 10 fpi, up to 11.5 to achieve performance requested.
- 15) Section 2.12: Connection type not specified, per previous job we are providing Slip on flanges for installation in the field by others.
- 16) Section 2.12.A.4.b: some coils exceed 10 fpi, up to 11.5 to achieve performance requested.
- 17) Section 2.15.D: for low volume units the minimum guaranteed leakage is 50cfm, not ½% of system.

2

Unit Detail

2.1.

AHU-4900

Sales Order: Dwg. No.:

Job Order: Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

GENERAL

Customer:	<input type="text" value="Kirlin Way"/>	Qty/Size/Type:	<input type="text" value="1"/>	<input type="text" value="38"/>	<input type="text" value="BF3AI-DPFHNC3D"/>
End User:	<input type="text" value="Eli Lilly & Co., Concord Bldgs 2, 4, 6"/>	Sales Office:	<input type="text" value="412 GRS - Clark Air Systems"/>		
Engineer:	<input type="text" value="Hipp Design+Consulting"/>	Sales Rep.:	<input type="text" value="Jeff Clark"/>		
Mark:	<input type="text" value="AHU-4900"/>	Project Mgr.:	<input type="text" value="Jerome Snyder"/>		
Cust. PO:	<input type="text" value="012209"/>	Designer:	<input type="text" value=""/>		

UNIT CONSTRUCTION

Casing

Walls: **Insulation Density:** lbs/cu.ft **Design Pressure (+/-)** inches W.G.

Roof: **Environment:** construction

Exterior: **Fasteners:** Exterior Interior

Interior: -

Bulkhead: -

Type: **Color:** **Notes:**

Exterior Paint: -

Interior Paint: -

Base Frame Paint:¹ -

Thermal Break Construction: **Location:**

Knockdown Construction: **KD Type:**

Unit Installed On²:

¹ - All black steel, including unit base, shall be painted w/ epoxy mastic.; ² - Provide level foundation under perimeter of each section.

Base

Base Frame: in w/ with, **Foundation Holes:**

Floor Sheets: -

Floor sheets are with turned-up perimeter lip.

Drain Pan: -

Drain Pan Connection Hand: -

Bottom Sheets: -

Floor Drains: **Connection Hand:** **Material & Location:**

Doors³

Qty	Size HxW	Type ⁴	Swing	Hinge	Latch Qty	Latch Type	View Port ⁵	Exterior ⁶	Interior ⁶
<input type="text" value="5"/>	<input type="text" value="72"/> x <input type="text" value="24"/>	<input type="text" value="TB"/>	<input type="text" value="Draw-Through"/>	<input type="text" value="upstream"/>	<input type="text" value="2"/>	<input type="text" value="Ventlok 310 Chrome"/>	<input type="text" value="12x12 TP"/>	<input ea"="" type="text" value="0.050"/>	<input sa"="" type="text" value="0.040"/>
<input type="text" value="1"/>	<input type="text" value="72"/> x <input type="text" value="30"/>	<input type="text" value="TB"/>	<input type="text" value="Blow-Through"/>	<input type="text" value="downstream"/>	<input type="text" value="2"/>	<input type="text" value="Ventlok 310 Chrome"/>	<input type="text" value="12x12 TP"/>	<input ea"="" type="text" value="0.050"/>	<input sa"="" type="text" value="0.040"/>

³ - All Door Sizes are nominal, consult factory for actual opening dimensions. Refer to main assembly drawing for door locations.

⁴ -NTB:Non-Thermal Break, TB: Thermal Break, HT: High Temperature; ⁵ -TP: Thermal Pane

⁶ -SA: Smooth Aluminum, EA:Embossed Aluminum, GS: Galvanized Steel, SS:Stainless Steel

Sales Order: Dwg. No.:

Job Order: Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

Unit Construction Notes

1	BAH to provide a floor drain in non-drain pan sections and extend to unit exterior with 2" aluminum pipe. Provide cap. Drain to be 6" x 6" x 4"D. Provide aluminum grating over drain flush with unit floor. All drain material to be aluminum and welded.
2	BAH to provide a continuous length stainless steel piano hinge for all access doors
3	BAH to provide a 1" pressure port w/ cap in each access door.
4	Floors continuously welded with no fasteners penetrating the floor. Fastening of all components to the floor is to be by welding only.
5	BAH to provide a label on each access door indicating handle position as "Open" and "Closed"
6	BAH to provide a latch & chain on all doors. (The chains are to hold the doors open)
7	All drain pans covered with 304 stainless steel fabricated grating.
8	BAH to provide our standard sealant which is NSF 51 certified and FDA compliant in accordance with 21CFR177 2600 Color to be clear or aluminum color

SHIPPING SECTIONS AND WEIGHTS

Shipping and Handling Limitations

Unit shipped in sections. Max. weight/section: LB Max. opening size: H x W x D (In.)

Shipping Sections

Sec. ⁹	Description	Weight ^{LB}	Sec. ⁹	Description	Weight ^{LB}
1	Inlet, Combined filter, Access	5,085	4	Fan	7,136
2	Hot water coil, Humidifier	7,130	5	Outlet	2,410
3	Chilled water coil	11,288			

Total Estimated Weight (Less Water) LB:

⁹ - Sections (Sec.) listed in direction of airflow.

Shipping and Handling Notes

1	
2	

FANS

Supply Fans

Qty	Mfr.	Model	Size	Dia IN	Rot./Dis.	Class	Arr.	Wheel Wid. %	Wheel Dia. %	Elev FEET	Temp °F	Max RPM	Weight LBS
1	Twin City Fans	EPFN	490	49	CW/Axial	3	4	65	100	705	70	1,403	1674
Operation	Qty	Total ACFM	ACFM/Fan	OV FPM	TSP IN WG	ESP IN WG	ISP IN WG	FSE IN WG	RPM	VFD Hz	Fan BHP	Total BHP ¹⁰	
Design	1	38,000	38,000	3,136	6.00	2.50	3.31	0.19	1,086	55.00	50.0	50.0	

Accessories

Fan Isolation Dampers(s)¹¹

Inlet Screen(s) Outlet Screen(s)

Removable Panel Suitable for Removal of Drain w/ plug SPB Bearings

Monorail Suitable for Removal of Inspection Door Bearing Life

Nylon Extended Lubrication Lines for Acoustic Diffuser

Piezometer Ring(s) Accelerometer(s)

¹⁰ -Total BHP includes belt losses when applicable, ¹¹ -See "Mixing & Distribution" section for damper details

*** See attached curve(s) for additional performance data ***

Sales Order: Dwg. No.:

Job Order: Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

Fan Notes

1	Monorail provided with mechanical stops on each end, labeled with lift capacity, (1,400 Lbs) and include a soft rubber guard on end of rail when exposed to prevent head injury if struck
2	BAH to provide one (1) telescoping monorail for use through the removable panel. Monorail to be centered on the motor.
3	Removable panel is large enough to remove the fan or motor
4	Twin City Fan to provide vibration report.
5	Fan to have an aluminum wheel
6	Controller for fan air flow to be Dwyer DHII.

MOTORS

Supply Fan Motor(s)

Qty	Type	HP	Nom. RPM	Voltage	Phase/Freq	FLA	LRA	Frame	NEMA	Wgt. LB	Pos.
1	Baldor IEEE 841 Severe Duty	60.0	1185	460	3/60	69	540	404T	TEFC	1,327	Dir.

Accessories

Suitable for use w/ VFD
 Permanently Sealed Bearings
 Aegis Shaft Grounding
 Winding Thermistors¹²
 Bearing RTD¹³
 Heater¹⁴
 Roller Bearings¹⁵

¹² -Winding Thermistors are temperature sensors for windings, ¹³ -Bearing RTDs are temperature sensors for bearings, ¹⁴ -Heaters are for preheating motors, ¹⁵ -Roller Bearings are to be used for belt-drive applications with motors 60HP and larger.

Motor Notes

1	Motor to be IEEE 841 construction, but will not be labeled as IEEE 841 due to addition of Aegis SGR. Base catalog number is ECP84403T-4 and will be modified to include an internal Aegis SGR and sealed bearings
2	Motor to be provided with insulated bearing on one end and a shaft grounding ring on the opposite end, installed by Baldor
3	Motors shall be provided with ground bonding points on the motor foot. See electrical section for details.

VIBRATION ISOLATION

Duty	Mfr.	Qty	Nom. Defl. IN	Isolator Type	Min Eff. %	Fan Base Type ¹⁷	Fan Thrust Restraints	Model
Supply	Amber Booth	1	2"	Seismic	90	Structural	Yes	AMSR

¹⁷ -Inertia base concrete by others unless otherwise noted.

Vibration Isolation Notes

1	Isolator base and springs furnished by Twin City Fan as part of the fan assembly.
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HUMIDIFIER

Humidifiers

Mfr.	Model	Qty	Face Area (HxW) IN	Tube Centers	Absorption Distance IN	Cap. LBS/HR	Steam PSIG	Steam Source (Steam)	Entering Air Conditions °F DB %RH	Leaving Air Conditions °F DB %RH
Armstrong	HumidiPack Plus	1	96 x 144	6	18.0	1015.0	50.0	Boiler	27.9 3.2	65 50

Accessories

Safing Required? **Drain tempering kit provided by**
 , **Control Valve(s) to be provided by** **controlled by** **signal(s)**

*** Parts (valves, strainers, F&T traps, etc.) shall ship loose in the AHU for field installation by others. Reference Piping section. ***

Humidifier Notes

1	All humidifier flashing to be 304 stainless steel.
2	

Sales Order:

Dwg. No.:

Job Order:

Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

Sales Order: Dwg. No.:

Job Order: Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

FILTER

	Mfr.	Type	Model	MERV	H	x	W	Size(s) IN	Serv.	Frame Mat'l	Gauge
1	Camfil	Panel	30/30	8	4	x	5	24x24x 2	Up	Stainless	By Others
1	Camfil	Rigid	Riga-Flo PH	13	4	x	5	24x24x 12	Up	Stainless	By Others

Ship Filters BAH shall supply set(s) of extra filters for

Filter Notes

1	BAH to provide a Cleveland Controls barb fitting through the unit casing on the upstream and downstream side of each filter bank. Cleveland Controls Model number is 21118-112. This part is to be ordered from Grainger using item number 2EJN6.
2	BAH to provide a spacer frame between the pre & intermediate filter to allow individual filter reading. Use standard Dwyer filter gauge kit for the spacer frame only. Barb fittings are provided before and after the filter bank only.

HOT WATER HEATING COIL

	Duty	Qty	Mfr.	Model	FH			FL			Depth	Tubes		Fin Type	Fins		Rows	Circuit			
					IN	x	IN	IN	x	IN		IN	IN		IN	IN			IN		
1	Supply	6	Aerofin	HW-6.0AS-37.5 X 68.0-2-0.5	37.5	x	68.0	x	6.0	6.0	5/8	x	0.049	CU	Star	6	x	.0160	AL	2	1/2

Fluid	Casing IN	Casing Mat'l	Hdr/Con Mat'l	Belled Tubes	Turb.	Con/Pull Hand	Con Size IN	Con Type	Flange	Ext. Con IN	Total Weight LBS ¹⁸

Accessories

Coil Racks:

CU:Copper, AL:Aluminum, FL: Finned Length, FH: Finned Height, FPI: Fins per Inch, O.D.:Outside Diameter, LH: Left Hand, RH: Right Hand, CS: Carbon Steel, SS: Stainless Steel, RB: Red Brass
RF:Raised Face, FF:Flat Face, SO:Slip-on, WN:Weldneck, TH: Threaded

¹⁸ -Dry Weight. Consult Factory for Wet (Operating) Weights.

Hot Water Heating Coil Notes

1	All coils to be tested at minimum 300 psig under water. Manufacturer to provide test reports.
2	Coil connections to extend minimum 6" from the unit casing.
3	BAH to provide the heating coils with plain end supply and return red brass connections. BAH is providing flat faced slip-on brass flanges. Flanges shipped loose for field installation by others.
4	Vent & drain connections to be threaded red brass
5	Headers to be Type K Copper.
6	Nearside coil vent & drain connections turned outward 90° and will not be extended to the unit exterior.
7	Any flashing around the coils to be galvanized steel.

Sales Order: Dwg. No.:

Job Order: Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

CHILLED WATER COOLING COIL

Duty	Qty	Mfr.	Model	FH			FL		Depth	Tubes		Fin	Fins		Rows	Circuit			
				IN	x	IN	x	IN	OD x Wall Thick	IN	Type	IN	FPI x Thick						
1 Supply	6	Aerofin	W-12.0AW-37.5 X 68.0-8-1	37.5	x	68.0	x	12.5	5/8	x	.035	CU	Wave	12	x	.0160	AL	8	1

Fluid	Casing Material	IN	Hdr/Con Mat'l.	Belled Tubes	Turb.	Con/Pull Hand	Con Size	IN	Con Type	Flange	Ext. Con	IN	Total Weight
													LBS ¹⁸
Water	3/4	Stainless Steel	RB / RB	Yes	No	RH / RH	3	Flanged	150lb	FFSO	6.0	996	

Accessories

Coil Racks: 304 SS Intermediate Pan Rack

Eliminators: None

CU:Copper, AL:Aluminum, FL: Finned Length, FH: Finned Height, FPI: Fins per Inch, O.D.:Outside Diameter, LH: Left Hand, RH: Right Hand, CS: Carbon Steel, SS: Stainless Steel, RB: Red Brass
RF:Raised Face, FF:Flat Face, SO:Slip-on, WN:Weldneck, TH: Threaded

¹⁸-Dry Weight. Consult Factory for Wet (Operating) Weights.

Chilled Water Cooling Coil Notes

1	All coils to be tested at minimum 300 psig under water. Manufacturer to provide test reports.
2	BAH to provide the cooling coils with plain end supply and return red brass connections. BAH is providing flat faced slip-on brass flanges. Flanges shipped loose for field installation by others.
3	Vent & drain connections to be threaded red brass.
4	Headers to be Type K Copper
5	Any flashing around the coils to be 304 stainless steel
6	Coil connections to extend minimum 6" from the unit casing.

Sales Order:

Dwg. No.:

Job Order:

Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

INTERNAL PIPING

Component	Extended Piping By	Connection Material	Piping Material	Connection Type	External Flanges By
Heating coil	BAH (Installed)	Brass	Brass	Sch 40 , Sweat end	BAH (Shipped Loose)
Cooling coil	BAH (Installed)	Brass	Brass	Sch 40 , Sweat end	BAH (Shipped Loose)
Humidifier	BAH (Installed)	Stainless steel	Stainless steel	Sch , Sweat end	Job site contractor

Internal Piping Notes

1	Cooling coil supply and return connections extended to the unit exterior using red brass pipe for two (2) farside coils. Connection between piping and the coil will be a union. Slip-on flanges provided on the exterior. Flanges shipped loose for installation in the field by others. Near side coils do not need to be extended.
2	Heating coil supply and return connections extended to the unit exterior using red brass pipe for two (2) farside coils. Connection between piping and the coil will be a union. Slip-on flanges provided on the exterior. Flanges shipped loose for installation in the field by others. Near side coils do not need to be extended.

MIXING & DISTRIBUTION

Dampers

Tag	Duty	Mfr.	Model	Qty	W IN	x	H IN	Blade	Damper Fail Pos.	Torque Req. LBS-IN	Act. By	Type	Act ¹⁹	Qty	Signal
1	Outside Air	Ruskin	CD50	1	109	x	42	Opposed	Closed	159	BAH	Elec.	2-Pos	2	2P (N/A)
2	Supply Air	Ruskin	CD50	1	109	x	42	Opposed	Closed	159	BAH	Elec.	2-Pos	2	2P (N/A)

¹⁹-Action Indicates Actuator Operation Type (Two-position or modulating)

Mixing & Distribution Notes

1	Damper Actuator power = 24v
2	Actuator to be Belimo.
3	Each damper provided with a Ruskin SP100 switch package
4	Actuator wiring conduit and wiring by others.

Sales Order: Dwg. No.:

Job Order: Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

ELECTRICAL

Routing Hardware

Conduit Material: Junction Boxes and Enclosure NEMA Rating:

Routing Notes:

ETL Label Hazardous Environment Rating

Low Voltage

Field Connection(s): Voltage: / / hz Qty of Circuits:

Qty	Light Fixture Type	Bulbs By			FLA
<input type="text" value="12"/>	<input type="text" value="Marine Light Fixtures"/>	<input type="text" value="By BAH"/>	<input type="text" value="100W"/>	<input type="text" value="Equal LED"/>	<input type="text" value="15"/> <input type="text" value="A"/>

Qty	Light Switch Type	Hours	Hold	Environment Rating	Location
<input type="text" value="1"/>	<input type="text" value="Timer 2-Way (std)"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="Indoor"/>	<input type="text" value="Supply fan access"/>

Qty		Qty	
<input type="text" value="1"/>	<input type="text" value="20A Duplex GFCI"/>	<input type="text" value="0"/>	<input type="text" value="20A Duplex Weather-Rated GFCI"/>
		<input type="text" value="16"/>	<input type="text" value="A"/>

High Voltage

Field Connection(s): Voltage: / / hz Qty of Circuits:

Motor	Motor SPW	Motor Wire Termination	FLA	NEC
<input type="text" value="Supply"/>	<input type="text" value="SPW - Unconsolidated"/>	<input type="text" value="VFD -> Motor"/>	<input type="text" value="96"/>	<input type="text" value="A"/>

VFDs/Starters

Service	Mfg	Model No.	Qty	NEMA	Voltage	HP	Supplied By	Mounted By
Supply Fans	ABB	ACH580-PCR-077A-4	1	1	460	60	By Others	BAH

Electrical Notes

1	BAH to provide one (1) 2 hour timer light switch. The switch is to be mounted on the unit exterior near the supply fan access door. Centerline of the switch to be mounted approximately 4' above the bottom on the channel base. Timer switch rated 120/277V.
2	Mount a receptacle on the unit exterior underneath underneath the light switch
3	BAH to provide (2) points of power connection, one (1) for 120V connection and one (1) for 460V connection. Connections as follows: a) One (1) 120V connection at a junction box with multiple circuits (1 for lights & 1 for receptacle). b) Casing penetration for use by the contractor with VFD cable.
4	All wiring is to be 600V rated
5	All wiring to be numbered and tagged using sleeve type wire tags.
6	BAH to use 3/4" Ø conduit
7	BAH to terminate the 120V connections to a screw type terminal block (wire crimped in a compression lug). Terminals shall be "finger safe".
8	BAH to provide grounding lugs.
9	All conduit to be filled with caulk at the ends, intersections, and junctions to ensure sealed conduit runs.
10	120V power wiring shall use the following color scheme: a) Phase A - black b) Phase B - red c) Phase C - blue d) Neutral - white e) Ground - green or green with yellow stripe

Sales Order:

Dwg. No.:

Job Order:

Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

TESTING & SERVICES

BAH shall provide the following factory test(s) :

- None
- Pitot-Traverse Performance (ES-8104)
- Piezometer Ring Performance
- Sound Power (ES-8105)
- Sound Pressure (ES-8106)
- Velocity Profile (ES-8108)
- Vibration (ES-8107) in accordance with ANSI S2.19, Grade G6.3, w/ IPS filtered in maximum vibration allowed.
- Leakage* Max. % of design CFM @ times the operating pressure.
 * - Minimum allowable leakage shall be 50 CFM. Total CFM Allowed at negative " WG & positive " WG
- Deflection (ES-8109) Test Pressure: Negative " WG & positive " WG

BAH shall provide the following field service(s) :

- None
- Start-up (AHU)
- Start-up (VFD)
- Start-up Supervision
- Training
- Erection Supervision
- Deflection (ES-8109)
- Leakage Test*
- Performance Test
- Vibration Test

*SHOP NOTE: Ship Unit with Testing Cover Sheets

Testing Notes

1	BAH to provide a 3 year parts & labor warranty beginning at unit shipment.
2	Fan coast down test from 30-60Hz provided from Twin City with the fan.
3	Maximum deflection of 1/200 of the maximum span at 1.5 times the design operating pressure.
4	Calibration certificates required for all equipment used during testing.
5	BAH to conduct a coast down test from 60hz. Record peak vibration point.
6	Performance test conducted at design conditions
7	BAH to provide an Actuator Test. Actuator is to be cycled to verify proper operation
8	Removal of test sheets by contractor after completion of field leakage testing

Sales Order:

Dwg. No.:

Job Order:

Revision:

DATA SHEETS

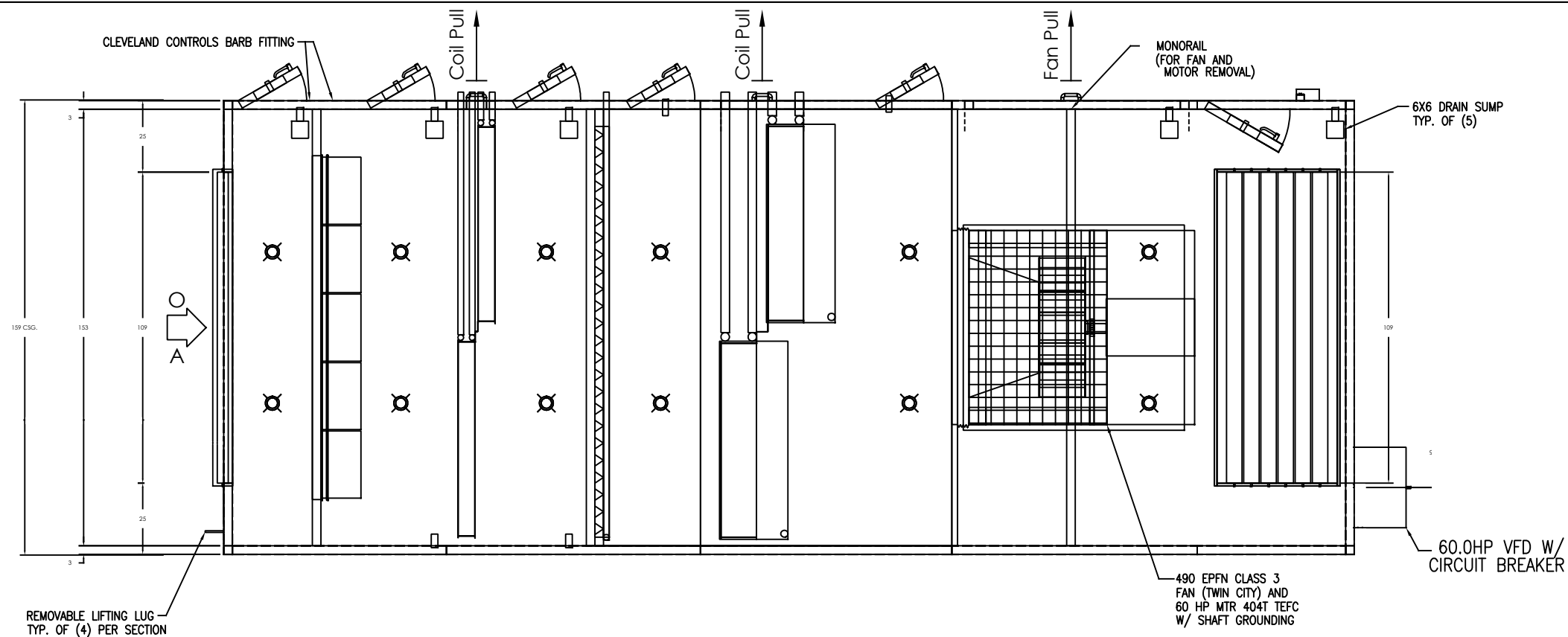
AC2000 Data Sheets, Version 9.14

MISCELLANEOUS NOTES

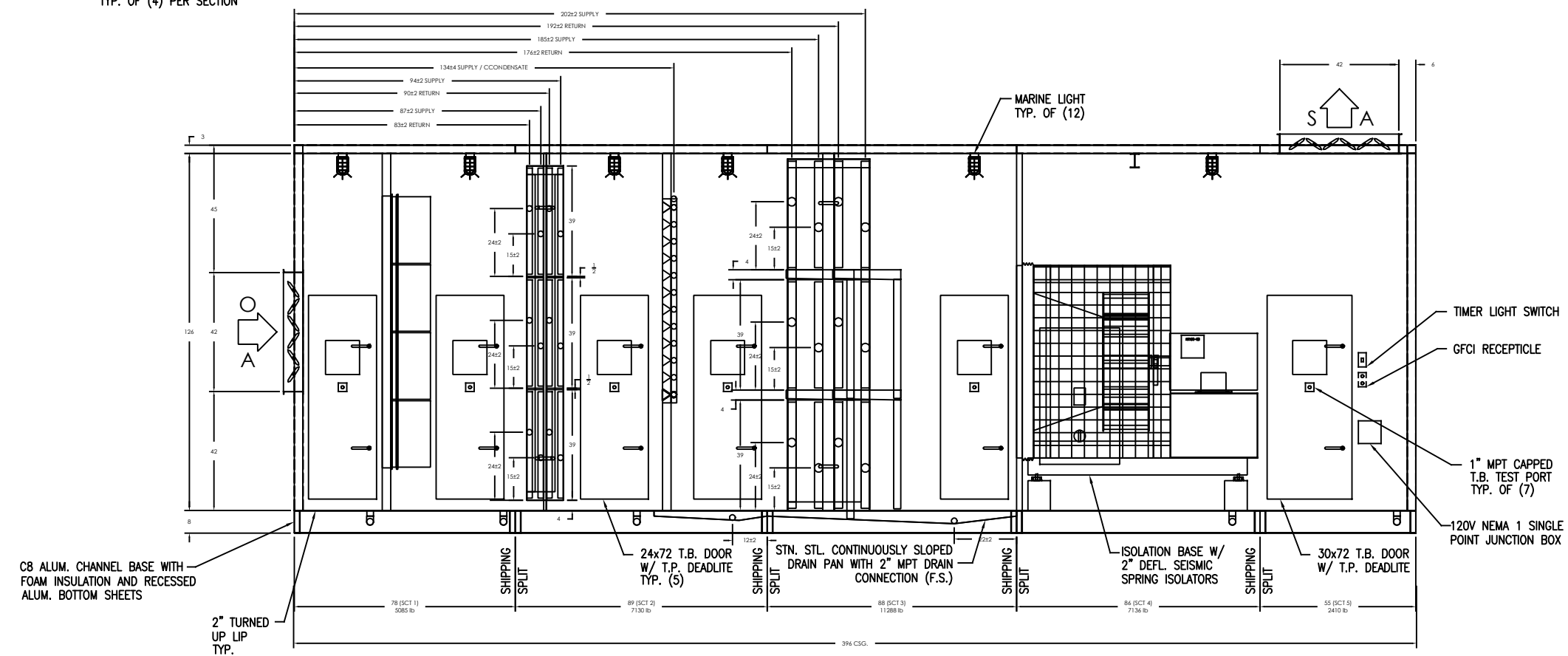
1.	<p>BAH to provide a stainless steel nameplate (mounted on the fan access door) with the following information:</p> <ul style="list-style-type: none"> a) Owners Equipment Tag Number: AHU-4900 b) Kirlin Way PO #: 012209 c) Manufacturer name: Buffalo Air Handling d) Manufacturer model number: 038BFAI-DPFHNC3D e) Manufacturer serial number: 220094-01 f) Year of fabrication: 2023 g) Supply air CFM (Max): 38,000 h) Design internal static pressure - inches wg: 3.5 i) Design external static pressure - inches wg: 2.5 j) Design total static pressure - inches wg: 6 k) Fan Manufacturer: Twin City Fan l) Supply Fan RPM: 1086 RPM m) Motor manufacturer: Baldor n) Motor Phase/Hertz/Voltage: 3/60/460V o) Supply Motor HP: 60 p) Supply Motor FLA: 69 q) Supply Motor LRA: 425 r) Lighting Phase/Hertz/Voltage: 1/60/120V s) Coil manufacturer: Aerofin t) Heating coil EWT: 130°F u) Heating coil LWT: 110°F ah) Heating coil coil entering & leaving air temperature (db) - °F: 14.4 / 55.0 ai) Cooling coil entering & leaving air temperature (db/wb) - °F: 88.3db/77.4wb - 45.5db/45.5wb aj) Cooling coil entering & leaving water temperature - °F: 42 / 54 am) Humidifier Steam Pressure - PSIG: 50 an) Condensate load - lbs/hr: 36.4
2.	Temporary anchors for shipment shall be painted bright yellow or orange and labeled "Temporary anchor - remove prior to operating equipment".
3.	Shipping sections to be labeled with with a temporary tag displaying equipment number and section number attached to the section casing, i.e.. AHU-058, Sect 1 of 6, Sect 2 of 6, etc.
4.	Affix adhesive labels on each section stating " DO NOT penetrate or attach to equipment housing and DO NOT cause obstructions to component access panels"
5.	All coil and humidifier connections to be protected for shipment with plastic caps. Flanges are to be protected for shipment with wooden or plastic covers
6.	Removal of test sheets by contractor after completion of field leakage testing

REVISIONS

Rev	Date	Init	Description of Change(s)



LEFT HAND
AHU-4900
BAH SO#: 220094-01
BAH JO#: 18800



NOTES:

THE ENCLOSED DRAWINGS/DATA ARE SUBMITTED FOR APPROVAL. AN EXPEDITED RETURN OF THESE DRAWINGS IS REQUIRED TO MEET THE QUOTED LEAD TIME FOR MANUFACTURE AND SHIPMENT OF THIS EQUIPMENT. REFER TO THE TRANSMITTAL NOTICE FOR REQUIRED RETURN DATE AND CORRESPONDING SHIP DATE. THE DRAWINGS SHOULD BE RETURNED TO THE BUFFALO AIR HANDLING SALES OFFICE WITH WHOM YOUR ORDER IS PLACED.

FINAL RECORD DRAWINGS WILL BE PREPARED UPON RETURN OF DRAWINGS MARKED "APPROVED" OR "APPROVED AS NOTED" WITH ALL CHANGES MARKED IN RED ALONG WITH YOUR RELEASE FOR FABRICATION. ANY REQUESTED CHANGES TO THE ORIGINAL SPECIFICATIONS WILL RESULT IN ADDITIONAL CHARGES AND SHIPMENT DELAY.

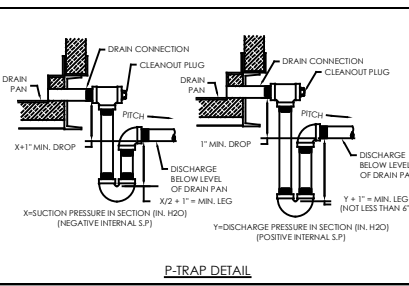
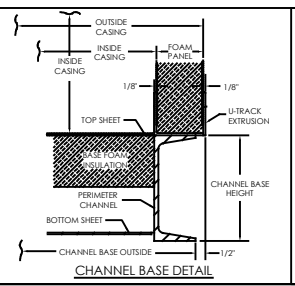
SOFTWARE VERSION: 1.00.0278.0

REVISIONS

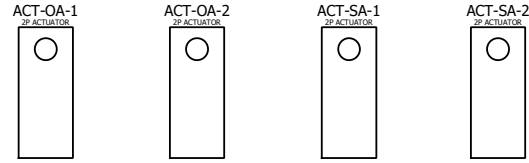
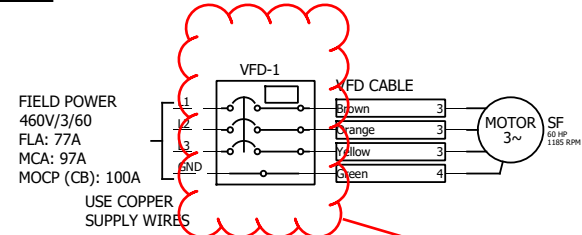
GENERAL NOTES:

- UNIT MUST BE INSTALLED AND OPERATED IN ACCORDANCE WITH THE LATEST REVISION OF THE BUFFALO AIR HANDLING SERVICE MANUAL.
- WHEN FAN(S) ARE IN OPERATION, INLET AND OUTLET DAMPERS MUST BE OPEN TO PREVENT DAMAGE TO THE UNIT.
- UNIT MUST BE INSTALLED ON A RIGID LEVEL SURFACE.
- UNITS MUST HAVE PERIMETER SUPPORT INCLUDING SUPPORT BENEATH EACH SHIPPING SPLIT.
- CURB/STEEL MOUNTED UNITS GREATER THAN 15'-0" WIDE MAY REQUIRE ADDITIONAL SUPPORT (CONSULT FACTORY).
- SECTIONS MAY DEFLECT DURING RIGGING. SUPPLEMENTARY SUPPORT MIDWAY AT SHIPPING SPLITS WILL FACILITATE PLACEMENT OF SECTIONS.
- ALL STEAM AND DRAIN TRAPPING BY OTHERS. REFER TO P-TRAP DETAIL FOR DRAIN TRAPPING MINIMUM REQUIREMENTS.

This drawing is the property of Buffalo Air Handling and is returnable upon request. It is for the confidential use of the buyer of the equipment and must not be copied, or shown to any third party, without prior written authorization of Buffalo Air Handling. The use of this drawing in whole or in part for procuring parts from others is prohibited and voids our equipment warranty.

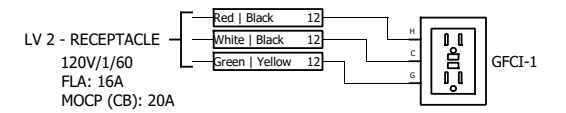
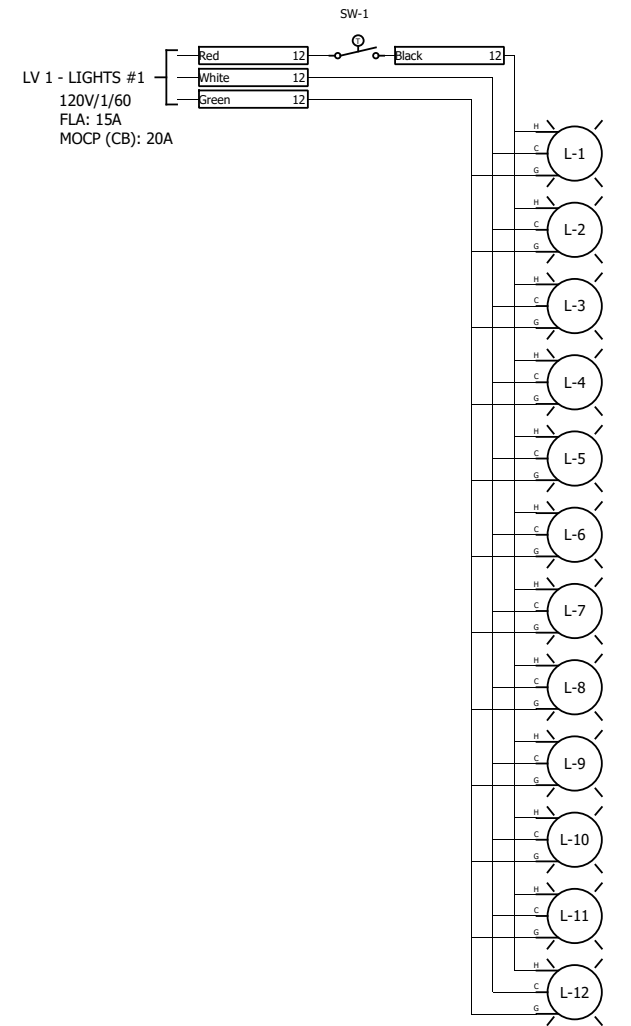
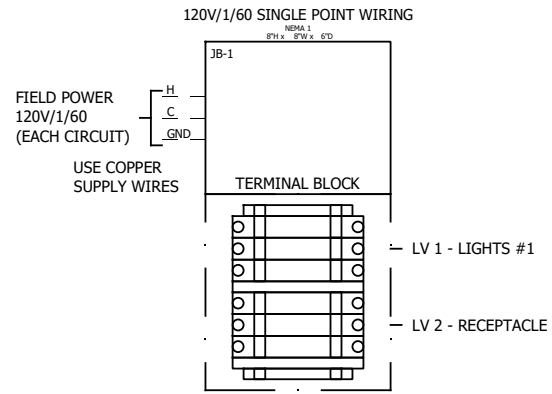


CUSTOMER: KIRLIN WAY MECHANICAL			
END USER: ELI LILLY & CO.			
ENGINEER: HIPP DESIGN+CONSULTING			
TITLE: CONCORD DAP		MARK: AHU-4900	
DWG STATUS: APPROVAL	APPROVAL: JMS	DATE: 11/29/2022	DATE:
SCALE: 1 : 24	DRAWING NO:		
BAH SO#: 220094-01	REV: 01		
BAH JO#: 18800			



PROVIDE
 MANUFACTURER
 DATA SHEETS.
 INCLUDE WIRING
 DIAGRAMS /
 SCHEMATICS.

PROVIDE WIRING
 DIAGRAM FOR
 ACTUATORS AND
 LIMIT SWITCHES.



REV.	DATE:	NAME:	DESCRIPTION:
0	11/30/2022	JMS	APPROVAL
A	-	-	-
B	-	-	-
C	-	-	-

REV.	DATE:	NAME:	DESCRIPTION:
D	-	-	-

WIRE BY OTHERS

120V/1/60
 120V/1/60
 120V/1/60
 GND

WIRE BY BAH

120V/1/60
 120V/1/60
 120V/1/60
 GND

END USER: Eli Lilly & Co.
 MARK #: AHU-4900

CUSTOMER: Hipp Engineering
 ENGINEER: Hipp Design+Consulting

THIS DRAWING IS THE PROPERTY OF BUFFALO AIR HANDLING AND IS RETURNABLE UPON REQUEST. IT IS FOR THE CONFIDENTIAL USE OF THE BUYER OF THE EQUIPMENT AND MUST NOT BE COPIED, LOANED, OR IN ANY MANNER REPRODUCED TO ANY THIRD PARTY WITHOUT THE WRITTEN AUTHORIZATION OF BUFFALO AIR HANDLING. THE USE OF THIS DRAWING BY WHOMEVER OR BY WHOMSOEVER WITHOUT THE WRITTEN AUTHORIZATION OF BUFFALO AIR HANDLING IS EXPRESSLY PROHIBITED AND VIOLATES OUR EQUIPMENT WARRANTY.

BUFFALO AIR HANDLING
 467 ZANE SNEAD DRIVE, ARMERST, VA 24621
 TEL: (434) 246-7455 FAX: (434) 246-7961

DWG STATUS: APPROVAL	SCALE: NONE	APPROVAL: JMS	DETAILED: -
ORDER #: 220094-01	QTY: 18800	APR DATE: 11/30/2022	DTL DATE: 11/30/2022
SHEET: 1 OF 1	DWG #: D-18800-2	REV: 0	

FAN DETAILS

Job Name: Hipp - Lilly Concord DAP



Tag: SF01, AHU-4900
 Customer: Buffalo Air Handling
 Job ID: 220094
 Date: December 20, 2022

Description

Quantity 1
 Model EPFN
 Size 490
 Width SWSI
 Arrangement 4
 Class III
 Rotation CW
Discharge HOR
 Wheel Diameter (in) 49.0
Drive method Direct
 Percentage width 65%
 Percentage diameter 100%
 Motor position --
 Design VFD Op. Freq 55hz

Performance

Volumetric Flow CFM 38,000
Operating SP (in WC) 6.000
 Standard SP (in WC) 5.923
RPM 1086
 Tip Speed (FPM) 13931
Oper. Power BHP 49.95
 Standard Power BHP 49.31
 Outlet Area (sq.ft) 12.117
 Outlet Velocity (FPM) 3136
 Max RPM for Class 1403
 Static Efficiency 71.96%
 Total Efficiency 79.39%
 FEI 1.34
 FEP (KW) 39.40
 System FEI 1.34
 System FEP (KW) 39.40

Air/Gas Properties

Altitude above sea level (ft) ... 705
 Inlet Pressure (in WC) 0.000
 Inlet Temperature(°F) 50
 Design Temperature (°F) 50
 Gas Type Operating air
 Estimated Density (lb/ft³) 0.076

Motor Data

Power (HP) 60
 Enclosure TEFC
Speed (RPM) 1200
Voltage 460V
Phase 3
Frequency 60Hz
Frame Size 404T
 Technology

Modifiers

Using VFD.

Sound

Octave Bands	1	2	3	4	5	6	7	8	LwA
Level at Inlet	97	104	97	88	90	85	77	72	95
Level at Outlet	95	102	99	96	96	90	83	77	100

Distance in ft	1	3	5
dBA at inlet	95	85	81
dBA at Outlet	100	90	86

Sound Power Levels in dB re.10⁻¹² Watts:

Estimated sound pressure level in dBA (re: 0.0002 microbar) based on a single * ducted installation:

*To estimate dBA level for ducted inlet and ducted outlet (into and out of the room) type installation, deduct 20 from the LwA value shown. Using a directivity factor of 1. Estimated Sound Pressure based on free field, spherical (Q = 1) radiation at stated distance.

Definitions:

LwA The overall (single value) fan sound power level, 'A' weighted.

dBA The environment for each fan installation influences its measured sound value, therefore dBA levels cannot be guaranteed. Consult AMCA Publication 303 for further details. A fan's dBA is influenced by nearby reflective surfaces.

FAN DETAILS

Job Name: Hipp - Lilly Concord DAP



Tag: SF01, AHU-4900
Customer: Buffalo Air Handling
Job ID: 220094
Date: December 20, 2022

Pricing Detail

EPFN 490, Class III, Arrangement 4 Bare fan	1,648lb
Guard - Protective Enclosure	115 lb
Screen - Inlet, Std Type	0 lb
Vibration Isolators - Seismic - 2" Defl	0 lb
Special Width Construction	0 lb
Wheel - Aluminum	0 lb
Mount Fan on Base	0 lb
Piezometer Flow Measurement Ring (Copper Construction)	0 lb
Base - Isolation (2" Deflection)	886 lb
Balancing - Special	0 lb
BALANCE TO CATEGORY BV-5, [BUFFALO AIR HANDLING]	
Motor 60 HP, 1200 RPM, 460V, 3Ph, 60Hz , TEFC - Premium , Induction , 404T	1,201 lb
Mount Customer Supplied Motor	0 lb
<hr/>	
Each Weight	3,850 lb
Extended Weight	3,850 lb

Job Name: Hipp - Lilly Concord DAP



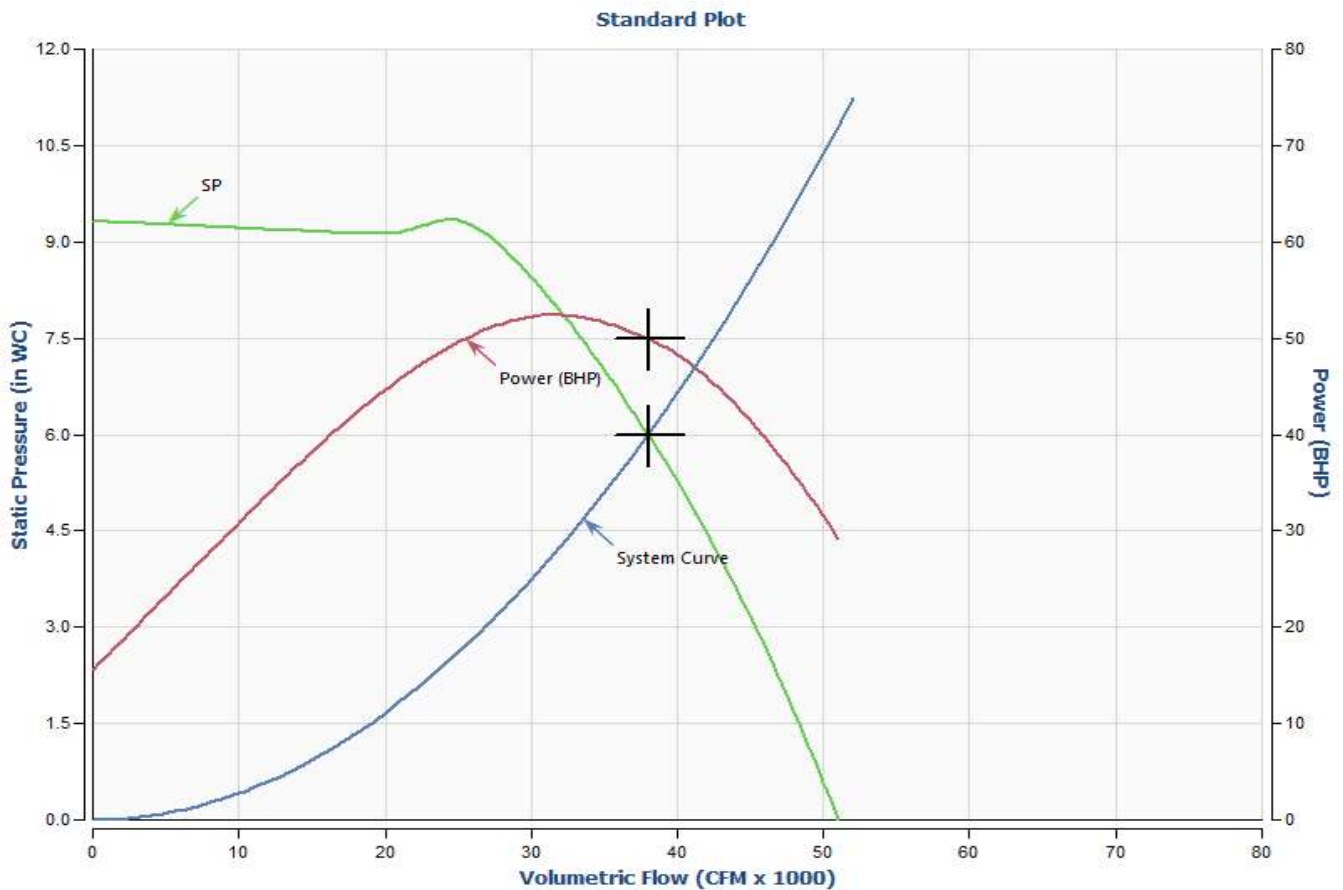
Customer: Buffalo Air Handling
Job ID: 220094
Date: December 20, 2022

Tag: SF01, AHU-4900

Fan information

Size/Model	490/EPFN	Class	III	Outlet Vel (FPM)	3136
Volumetric Flow (CFM)	38000	Speed (RPM)	1086	Density (lb/ft³)	0.076
SP (in WC)	6	Max Speed	1403 RPM @ 50 °F		
		Power (BHP)	49.95		

Adjusted for 65% Width, Op temp: 50°F, Design temp: 50°F, Altitude: 705 ft, Inlet Dens: 0.0760 lb/ft3



BALDOR • *RELIANCE*

Product Information Packet

ECP84403T-4

60HP, 1185RPM, 3PH, 60HZ, 404T, A40064M, TEFC

Part Detail							
Revision:	F	Status:	PRD/A	Change #:		Proprietary:	No
Type:	AC	Prod. Type:	A40064M	Elec. Spec:	A40WG0115	CD Diagram:	416820-036
Enclosure:	TEFC	Mfg Plant:		Mech. Spec:		Layout:	617429-511
Frame:	404T	Mounting:	F1	Poles:	06	Created Date:	07-16-2013
Base:		Rotation:	R	Insulation:	F	Eff. Date:	10-27-2014
Leads:	3#4					Replaced By:	
Literature:		Elec. Diagram:					

Nameplate NP3237									
CAT NO	ECP84403T-4	SPEC NO.	P40G3915						
HP	60	AMPS	69	VOLTS	460	DESIGN	B		
FRAME SIZE	404T	RPM	1185	HZ	60	AMB	40	SF	1.15
D.E. BRG.DATA	6316	O.D.E. BRG.DATA	6316	PH	3	DUTY	CONT	INSUL.CLASS	F
D.E. BRG.	80BC03J30X	TYPE	P	ENCL	TEFC	CODE	G		
O.D.E. BRG.	80BC03J30X	POWER FACTOR	86	NEMA-NOM-EFFICIENCY	95				
3/4 LOAD EFF.	95.2	MAX CORR KVAR	12.5	GUARANTEED EFFICIENCY	94.1				
TEMP CODE	T3	TEMP =	200						
CHP HZ	60-90	CT HZ	10-60	VT HZ	0-60				
INVERTER-TEMP-CODE	T3								
SER.NO.		MOTOR WEIGHT							

Nameplate 000613007EX					
CAT NO	ECP84403T-4	SPEC NO.	P40G3915		
NO. ROTOR BARS	71	GREASE TYPE	POLYREX EM		
NO. SLOTS	90	IEEE 85 NOISE LEVEL	90DBA		
5 YEAR WARRANTY		MFG. DATE			
NL AMPS AT RATED VOLTAGE	20.9	WINDING RES @25 C	.10970	OHMS	
SER.NO					

Parts List		
Part Number	Description	Quantity
SA267706	SA P40G3915	1.000 EA
RA254376	RA P40G3915	1.000 EA
NP3237	SS SUPER E INVERTER DUTY IEEE 841	1.000 EA
000613007EX	N/P BALDOR	1.000 EA
000692000FF	N/P	1.000 EA
000692000JP	N/P	1.000 EA
000692000VD	LABEL WARNING	1.000 EA
000692000VH	N/P	1.000 EA
004824015A	GREASE POLYREX EM	0.884 LB
032018010CK	HHCS 3/8-16X1-1/4 PLTD.	4.000 EA
032018020EK	HHCS 5/8-11X2-1/2 PLTD.	4.000 EA
032018026CK	HHCS 3/8-16X3-1/4 PLTD.	3.000 EA
034000014AB	WSH ID.406 OD.812 TH.065	4.000 EA
034180008DA	KEY 1/4X1/4X1 L (shipping)	1.000 EA
034530056BB	P/NIP 1/4X7 SCHED 40	1.000 EA
034530060AB	P/NIP 1/8X7-1/2 GALV.	1.000 EA
034631002AB	BUSH 1/4 TO 1/8 PLTD.	1.000 EA
035000001G	GREASE RELIEF FITTING, ALEMITE 317400	1.000 EA
078550001H	FAN KB 120/60 (60) 360	1.000 EA
083198101A	G400 STD FAN COVER MACHINING	1.000 EA
034692005AA	P PLUG 3/4"BLK.	1.000 EA
089412501C	G400 MACHD 6316 FT MNT BRKT 089412500WCA	1.000 EA
410700000DA	WAVY SPRING WASHER	1.000 EA
412118006A	DRAIN	1.000 EA

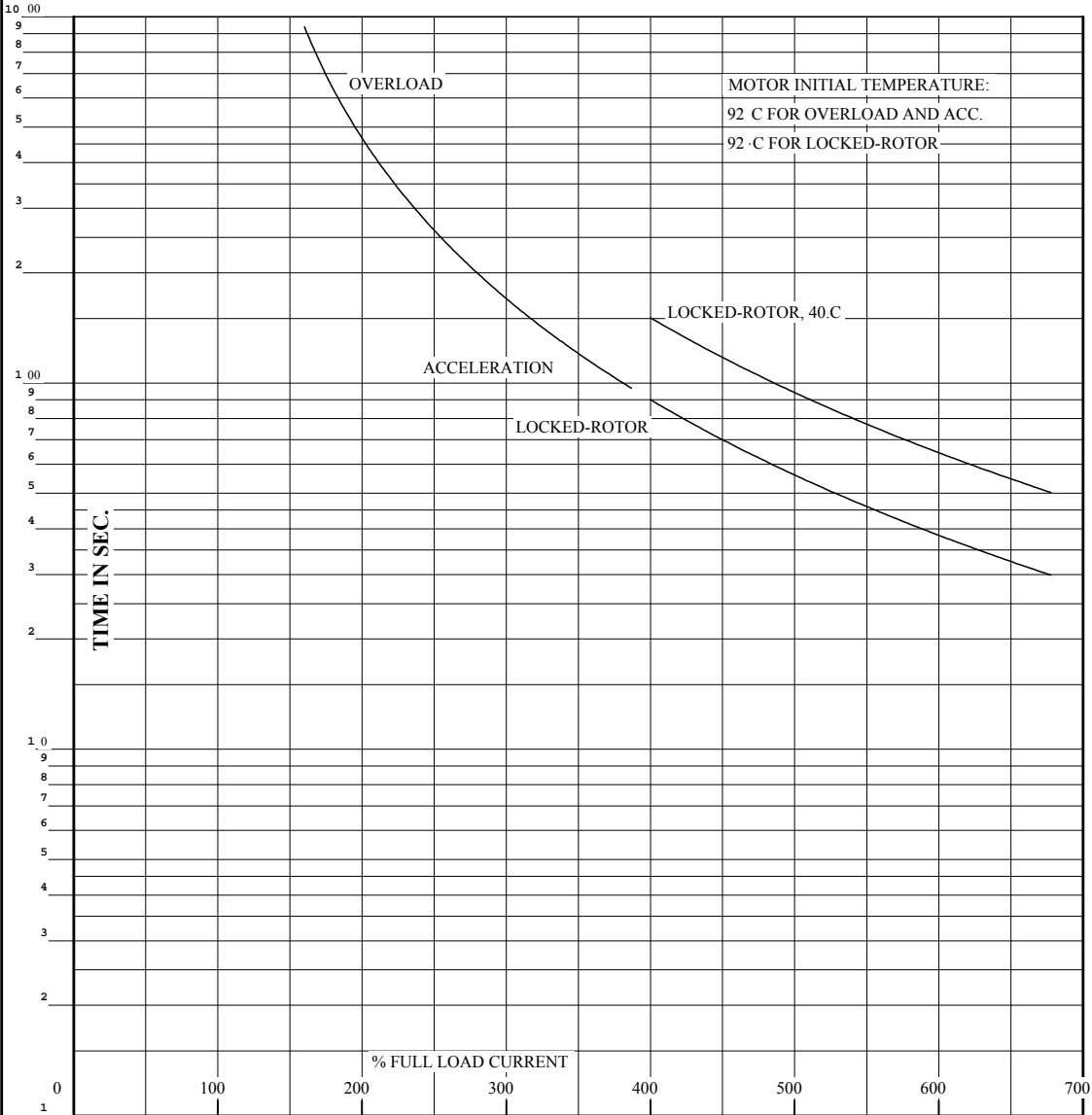
Parts List (continued)		
Part Number	Description	Quantity
415028021G	SEAL	1.000 EA
415072001B	CLAMP	1.000 EA
415096002A	CPLG 1/8 HEX TYPE	1.000 EA
423709011C	WASHER	3.000 EA
032018020EK	HHCS 5/8-11X2-1/2 PLTD.	4.000 EA
032018026CK	HHCS 3/8-16X3-1/4 PLTD.	3.000 EA
034530040AB	P/NIP 1/8X5 GALV.	1.000 EA
034530040BB	P/NIP 1/4X5	1.000 EA
034631002AB	BUSH 1/4 TO 1/8 PLTD.	1.000 EA
035000001G	GREASE RELIEF FITTING, ALEMITE 317400	1.000 EA
089412501C	G400 MACHD 6316 FT MNT BRKT 089412500WCA	1.000 EA
412118006A	DRAIN	1.000 EA
415028021G	SEAL	1.000 EA
415096002A	CPLG 1/8 HEX TYPE	1.000 EA
423709011C	WASHER	3.000 EA
032018010CK	HHCS 3/8-16X1-1/4 PLTD.	4.000 EA
033512004LB	HHTTS 1/4-20X1/2 PLTD.	1.000 EA
033512008LB	HHTTS 1/4-20X1 PLATED	4.000 EA
034000014AB	WSH ID.406 OD.812 TH.065	4.000 EA
035000001A	ALFTG 1/8" 1610-BL	1.000 EA
035000001A	ALFTG 1/8" 1610-BL	1.000 EA
067053000B	GASK 320-400	1.000 EA
076708000BB	C/B - 360	1.000 EA
076709000A	C/B CVR - 360	1.000 EA

Product Information Packet: ECP84403T-4 - 60HP,1185RPM,3PH,60HZ,404T,A40064M,TEFC

406099000A	PLUG - FAN COVER 320-440	1.000 EA
415000103D	T/LUG #4AWG-1/0AWG W/HOLE FOR .250 BOLT	1.000 EA
415039016A	TERBD, 360-400	1.000 EA
418150003A	GREASE FITTING CAP	1.000 EA
418150003A	GREASE FITTING CAP	1.000 EA
033775004EA	DRSCR #6-1/4 304 S.S.	4.000 EA
034180044JA	KEY 3/4X3/4X5-1/2 L	1.000 EA
004824003AJD	WILKO 778.50 BLUE GREEN - 55 GAL DRUMS	0.375 GA
004824003CBY	WILKO PAINT 060.02 - ACTIVATOR	0.063 GA
482403003BEF	RUST VETO 342	0.013 GA
MG1500G03	PRIMER- S4318E GEMINI 5 GA, HC9068	0.063 GA
421948051	LABEL, MYLAR	1.000 EA
PK5004A02	WOOD BASE 40X32 STACK 2X4 RUNNER	1.000 EA
613-6PU	N/P UL CSA LABLE	1.000 EA
LB1449	DIV-2/NEC WARNING LABEL	1.000 EA



REL. S.O.	RPM 1185	S.F. 1.15	ROTOR 418142-71EE
FRAME 404T	VOLTS 460	NEMA DESIGN B	TEST S.O. TYPICAL DATA
HP 60	AMPS 69	CODE LETTER G	TEST DATE ---
TYPE P	DUTY CONT	ENCLOSURE TEFC	STATOR RES. @ 25 °C .108
PHASE/HERTZ 3/60	AMB °C/INSUL 40/F	E/S 595761	OHMS (BETWEEN LINES)



REMARKS: THERMAL LIMIT CURVE
XE MOTOR-NEMA NOM. EFF. 95.0 %
GUARANTEED MIN. EFF. 94.5%

AMPERES SHOWN FOR 460 VOLT CONNECTION, IF OTHER VOLTAGE CONNECTIONS ARE AVAILABLE, THE AMPERES WILL VARY INVERSELY WITH THE RATED VOLTAGE.

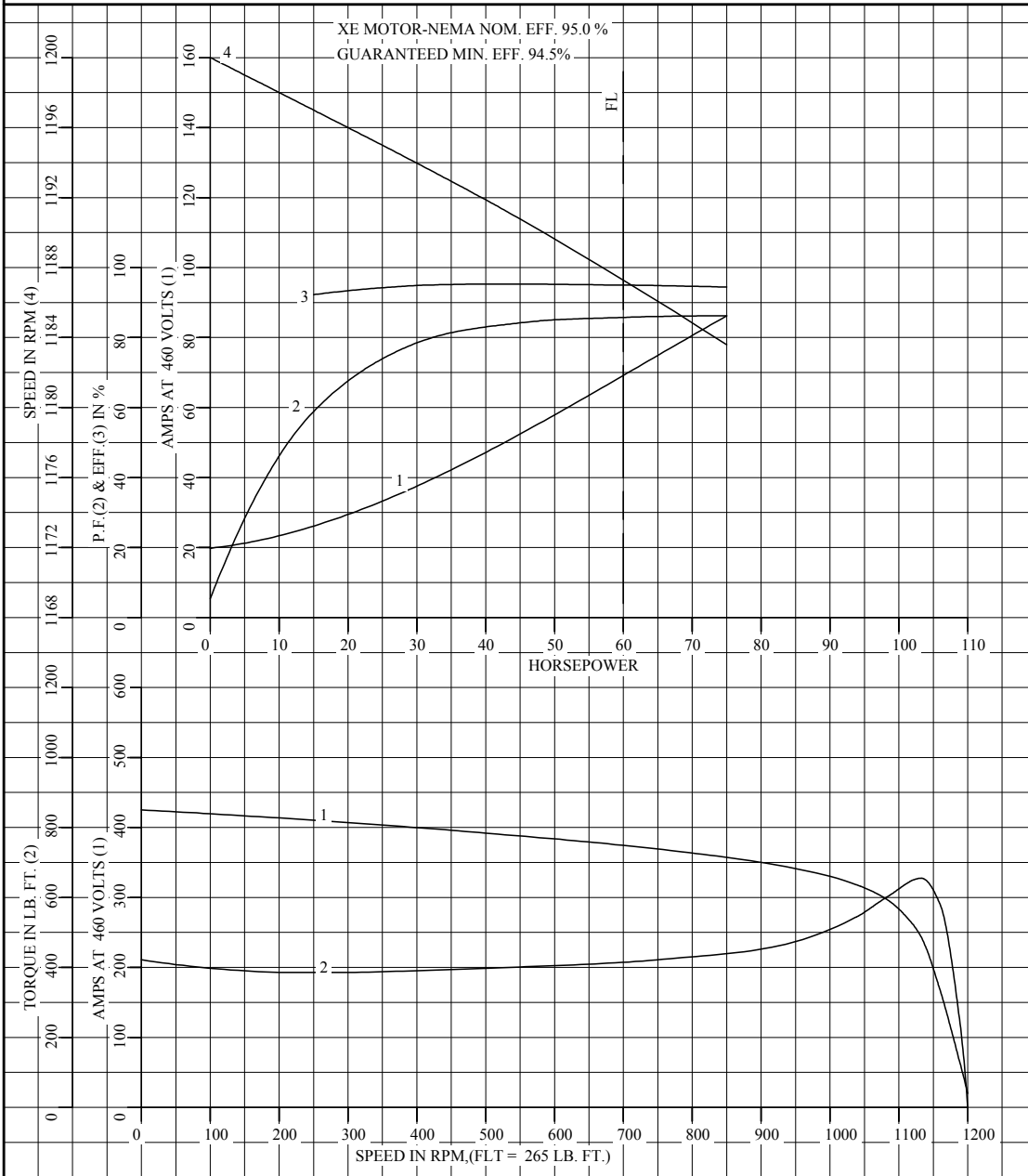


DR. BY	B.R.PENDLEY
CK. BY	D.M.BYRD
APP. BY	D.M.BYRD
DATE	02/06/92

A-C MOTOR
PERFORMANCE A40WG0115-R001
CURVES ISSUE DATE 06/16/2011



REL S.O.	RPM 1185	S.F. 1.15	ROTOR 418142-71EE
FRAME 404T	VOLTS 460	NEMA DESIGN B	TEST S.O. TYPICAL DATA
HP 60	AMPS 69	CODE LETTER G	TEST DATE ---
TYPE P	DUTY CONT	ENCLOSURE TEFC	STATOR RES. @ 25 °C .108
PHASE/HERTZ 3/60	AMB °C/INSUL 40/F	E/S 595761	OHMS (BETWEEN LINES)



AMPERES SHOWN FOR 460 VOLT CONNECTION, IF OTHER VOLTAGE CONNECTIONS ARE AVAILABLE, THE AMPERES WILL VARY INVERSELY WITH THE RATED VOLTAGE.

<p>A MEMBER OF THE ABB GROUP</p>	DR. BY B.R.PENDLEY	<p>A-C MOTOR PERFORMANCE CURVES</p> <p>A40WG0115-R001</p> <p>ISSUE DATE 06/16/2011</p>
	CK. BY D.M.BYRD	
	APP. BY D.M.BYRD	
	DATE 02/06/92	



Product Information Packet: ECP84403T-4 - 60HP, 1185RPM, 3PH, 60HZ, 404T, A40064M, TEFC

BALDOR • RELIANCE

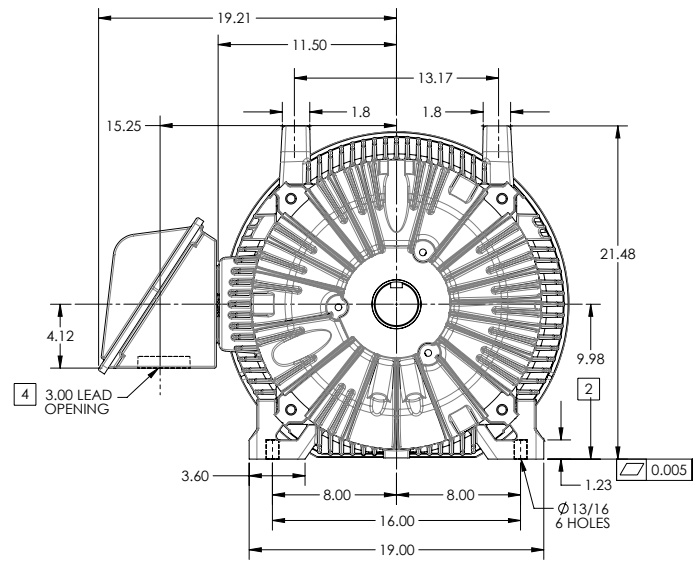
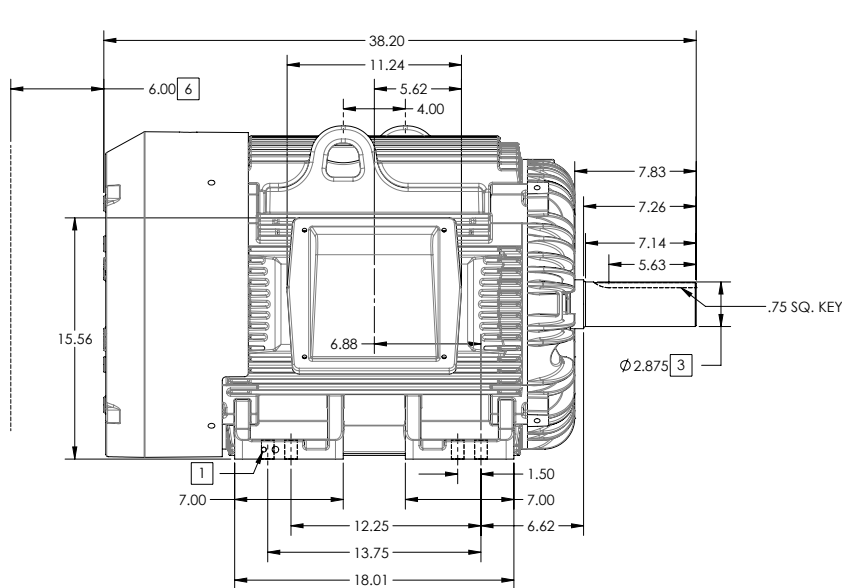
REL. S.O.	FRAME	HP	TYPE	PHASE/HERTZ	RPM	VOLTS
	404T	60	P	3/60	1185	460
AMPS	DUTY	AMB °C/ INSUL.	S.F.	NEMA DESIGN	CODE LETTER	ENCL.
69	CONT	40/F	1.15	B	G	TEFC
E/S	ROTOR	TEST S.O.	TEST DATE	STATOR RES. @25 °C OHMS (BETWEEN LINES)		
595761	418142-71EE	---	---	.108		
PERFORMANCE						
LOAD	HP	AMPERES	RPM	% POWER FACTOR	% EFFICIENCY	
NO LOAD	0	19.9	1200	5.36	0	
1/4	15.0	25.9	1197	58.9	92.3	
2/4	30.0	37.7	1194	78.5	94.9	
3/4	45.0	52.5	1191	84.2	95.2	
4/4	60.0	69.0	1187	85.8	95.0	
5/4	75.0	86.3	1184	86.2	94.4	
SPEED TORQUE						
		RPM	TORQUE % FULL LOAD	TORQUE LB.-FT.	AMPERES	
LOCKED ROTOR		0	159	422	425	
PULL UP		240	145	385	411	
BREAKDOWN		1133	247	655	243	
FULL LOAD		1187	100	265	69.0	
<p>AMPERES SHOWN FOR 460. VOLT CONNECTION. IF OTHER VOLTAGE CONNECTIONS ARE AVAILABLE, THE AMPERES WILL VARY INVERSELY WITH THE RATED VOLTAGE</p> <p>REMARKS: TYPICAL DATA XE MOTOR-NEMA NOM. EFF. 95.0 % GUARANTEED MIN. EFF. 94.5%</p>						
 A MEMBER OF THE ABB GROUP			DR. BY <u>B.R.PENDLEY</u> CK. BY <u>D.M.BYRD</u> APP. BY <u>D.M.BYRD</u> DATE <u>02/06/92</u>	A-C MOTOR PERFORMANCE DATA A40WG0115-R001 ISSUE DATE 06/16/20		

DUTY MASTER ALTERNATING CURRENT MOTORS
SQUIRREL-CAGE INDUCTION

ENCLOSURE: TOTALLY ENCLOSED
MOUNTING: FOOT

FRAME G405T ABOVE NEMA RATINGS
INCLUDES 404T FRAME MOUNTING HOLES

COOLING: FAN COOLED
841XL ENCLOSURE ENHANCEMENT



- 1. GROUND HOLES QTY 1 1/2-13 TAP; QTY 1 3/8-16 TAP
- 2. VARIES +.00,-.06
- 3. VARIES +.000,-.001
- 4. ON STANDARD MOTORS THIS IS CONDUIT SIZE. ON XT AND CORROSION PROOF MOTOR THIS IS PIPE TAP.
- 5. MOTOR WEIGHTS MAY VARY BY 15% DEPENDING ON RATING.
- 6. OBSTRUCTION MUST NOT ENCR OACH ON AIR INLET

5 WEIGHT (LBS): 1370

CONDUIT BOX LOCATED ON OPPOSITE SIDE WHEN F-2.
IF MOUNTING CLEARANCE DETAILS ARE REQUIRED, CONSULT FACTORY.
MAXIMUM PERMISSIBLE SHAFT RUNOUT WHEN MEASURED AT END OF STANDARD SHAFT EXTENSION IS .0015" T.I.R. TO 5 INCH DIA.

DIMENSIONS ARE IN INCHES; SEE SHEET 2 FOR DIMENSIONS IN MILLIMETERS

CUSTOMER IS RESPONSIBLE FOR DETERMINING THAT MOTOR PERFORMANCE IS SUITABLE IN THE APPLICATION.

SHEET NUMBER
1 OF 2

115-62419

REV. DESC: CHANGE BA FROM 6.76 TO 6.62			
REV: B	VERSION: 02	REVISED: 02.36.17 04/14/2014	TDR: 0000084870
MODEL NO. 617429-511		REF:	
BY: MGHUMZ2	Material:	C	

BALDOR

G405T/404T STD - FOOTED - 841XL/ECP SEVERE DUTY ENCLOSURE

617429-511

DUTY MASTER ALTERNATING CURRENT MOTORS

SQUIRREL-CAGE INDUCTION

ENCLOSURE: TOTALLY ENCLOSED

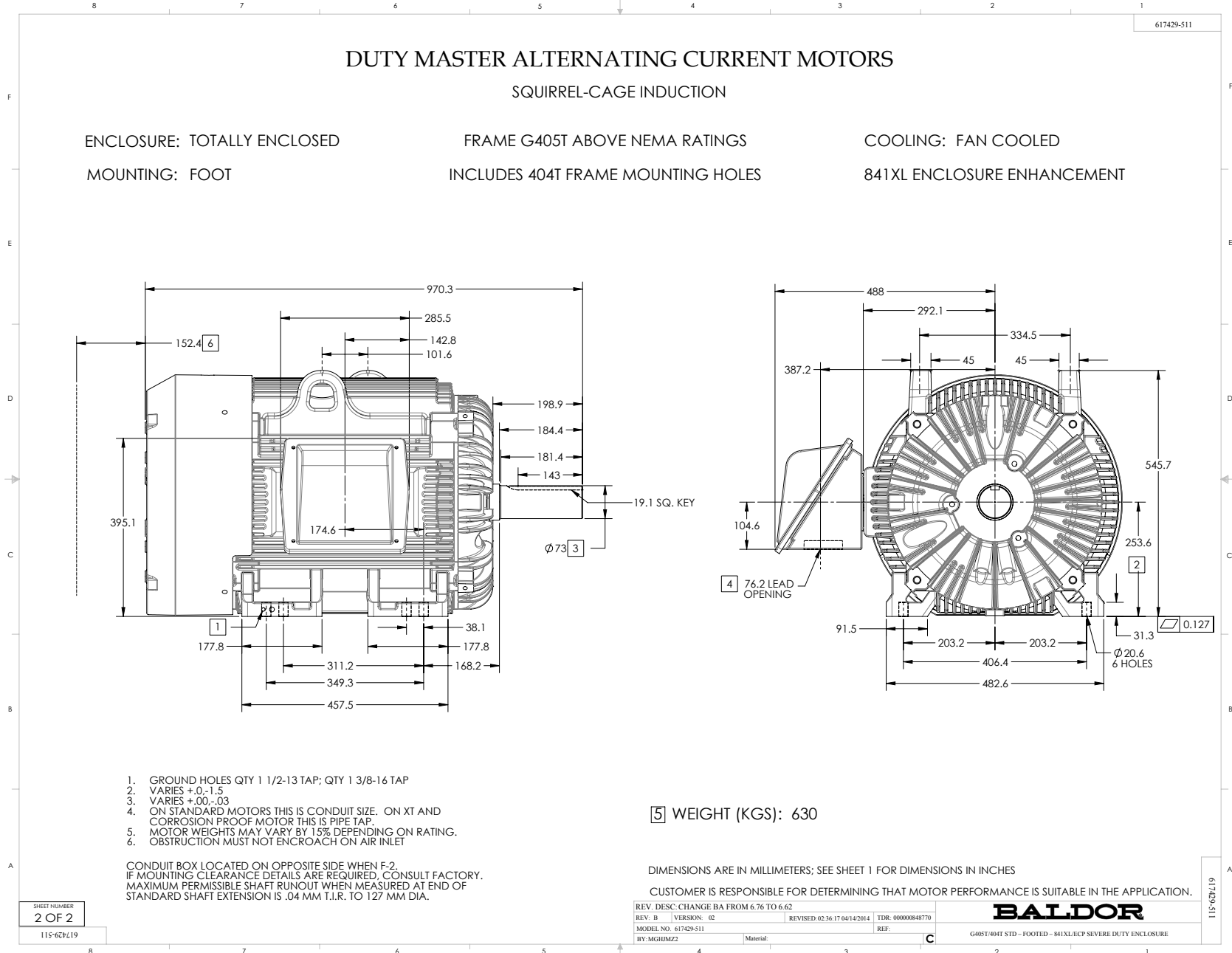
FRAME G405T ABOVE NEMA RATINGS

COOLING: FAN COOLED

MOUNTING: FOOT

INCLUDES 404T FRAME MOUNTING HOLES

841XL ENCLOSURE ENHANCEMENT



- 1. GROUND HOLES QTY 1 1/2-13 TAP; QTY 1 3/8-16 TAP
- 2. VARIES +0,-1.5
- 3. VARIES +00,-03
- 4. ON STANDARD MOTORS THIS IS CONDUIT SIZE. ON XT AND CORROSION PROOF MOTOR THIS IS PIPE TAP.
- 5. MOTOR WEIGHTS MAY VARY BY 15% DEPENDING ON RATING.
- 6. OBSTRUCTION MUST NOT ENCRACH ON AIR INLET

CONDUIT BOX LOCATED ON OPPOSITE SIDE WHEN F-2.
 IF MOUNTING CLEARANCE DETAILS ARE REQUIRED, CONSULT FACTORY.
 MAXIMUM PERMISSIBLE SHAFT RUNOUT WHEN MEASURED AT END OF
 STANDARD SHAFT EXTENSION IS .04 MM T.I.R. TO 127 MM DIA.

5 WEIGHT (KGS): 630

DIMENSIONS ARE IN MILLIMETERS; SEE SHEET 1 FOR DIMENSIONS IN INCHES
 CUSTOMER IS RESPONSIBLE FOR DETERMINING THAT MOTOR PERFORMANCE IS SUITABLE IN THE APPLICATION.

SHEET NUMBER
2 OF 2

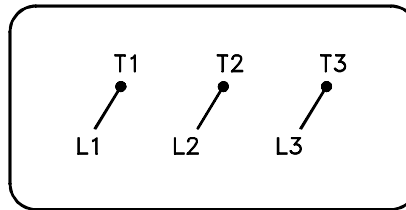
REV. DESC: CHANGE BA FROM 6.76 TO 6.62	TDR: 0000084870
REV: B VERSION: 02 REVISED: 02.36.17 04/14/2014	REF:
MODEL NO. 617429-511	REF:
BY: MGHUMZ2 Material:	C

BALDOR

G405T404T STD - FOOTED - 841XL ECP SEVERE DUTY ENCLOSURE

416820-036

A-C MOTOR
 CONNECTION DIAGRAM
 STANDARD 3 LEAD CONNECTED



(N.P. 1575-BA)

416820-036

REV. DESC: LOADED TO BUS, C/R 335225		
REV. LTR: -	VERSION: 00	TDR: 000000538207
FILE: \MGA\00000\682	REVISED: 11:54:06 04/30/2010	
MTL: -	BY: RAGRA	

BALDOR
 CONN DIAG - STANDARD 3 LEAD
 SH 1 of 1

Buffalo Air Handling, Pressure Drop Program



Results Page

Version 3.0d

Program User Name: Jerome Snyder
 Date: 11/10/2022
 Order Number: 220094-01
 Mark: AHU-4900
 Customer Name: Eli Lilly & Co. - Concord DAP
 Engineer: Hipp Design+Consulting
 Design AirFlow (CFM): 38000
 Fan Quantity: 1
 Additional Information:

Upstream External Losses (in. W.G.): 0.50
 Downstream External Losses (in. W.G.): 2.00

**NOTE: A pressure drop value followed by "*" indicates a user defined value.*

UpStream Components

Face Velocity	Pressure Drop	Component
1290	0.05	Inlet - Wall or Ceiling, Damper
500	0.75*	Filter - 2" Pleated, Cleanliness = Average
500	1.00*	Filter - 12" Rigid, 85%, Cleanliness = Average
358	0.06*	Heating Coil - Standard, Plate Fin, 2 Rows
500	0.01	Humidifier - Panel
358	1.15*	Cooling Coil - Plate, 8 Rows

Section Total	3.02	

Fan Components

Face Velocity	Pressure Drop	Component
	0.10	Inlet screen reduction
	0.02	Outlet screen reduction
	0.15	Fan Extra Pressure

2903	0.27	Fan - Supply, Plenum, Arrangement 4, 49.00 Wheel dia.

DownStream Components

Face Velocity	Pressure Drop	Component
1290	0.21	Discharge - Wall or Ceiling, Damper, Acceleration

Section Total	0.21	

Summary

Fan Static Pressure = 6.00

Total Internal Losses (in. W.G.): 3.50
 Total External Losses (in. W.G.): 2.50

Total: 6.00

(Extra Static Pressure = 0.15, Fan Section)

Disclaimer: This program is based on performance estimates provided by original equipment manufacturers. It should be applied with reasonable engineering assumptions and the results verified.



Date: 12/20/2022
Job Name: Lilly Concord DAP
System ID: HC-4900
Quote No. 220094-01

Table with 4 columns: Model No., Qty. In Face, FL INCH, Total Weight LBS. Row 1: HW-6.0AS-37.5 X 68.0-2-0.5, 6, 68.00, 1,385

Coil Type: HW Totals: 6 1,385
Coil Hand: Right Tube: 0.625 inch X 0.049 inch Copper Seamless Tubes, Orificed Tubes
TF: 25 Fin Material: Aluminum Star Thickness: 0.016 IN.
Row: 2 Csg Material: 3/4" Leg with Galvanized Casings
Fin: 6 / IN Connection: 2" (Center) Flanged, Red Brass 150 lb FFSO , Extended 7 inches
Circuit: Half Hdr Material: Standard Non-Ferrous, Brazed Joints
Misc: - Pneumatic Test
Dwg: CA-HW-103

Performance V

Pressure: 29.17 IN HG Elevation: 705.0 FT
Airflow: 38,000.0 SCFM Water
System Face Area: 106.3 FT² Flow Rate: 170.00 GPM
Standard Face Velocity: 357.6 FPM Entering Temp: 130.0 °F
Entering Dry Bulb Temp: 14.4 °F Leaving Temp: 110.0 °F
Leaving Dry Bulb Temp: 55.0 °F Tube Velocity: 2.8 FPS
Inside Surface Fouling: 0.0000 HR·FT²·°F/BTU
Outside Surface Fouling: 0.0000 HR·FT²·°F/BTU
Sensible Heat Load: 1,664.2 MBH
Total Heat Load: 1,664.2 MBH
Losses
Air Pressure Drop: 0.06 IN H2O Fluid Pressure Drop: 4.5 FT H2O

Comments:

Notes & Warnings:
110 150 PSIG Coil Design
56 Rated in accordance with AHRI Standard 410.



Date: 12/20/2022
Job Name: Lilly Concord DAP
System ID: CC-4900
Quote No. 220094-01

Table with 4 columns: Model No., Qty. In Face, FL INCH, Total Weight LBS. Row 1: W-12.0AW-37.5 X 68.0-8-1, 6, 68.00, 5,837

Coil Type: W Totals: 6 5,837
Coil Hand: Right Tube: 0.625 inch X 0.035 inch Copper Seamless Tubes , Belled
TF: 25 Fin Material: Aluminum Wave Thickness: 0.016 IN.
Row: 8 Csg Material: 3/4" Leg with 304 Stainless Casings
Fin: 12 / IN Connection: 2.5" (Center) Flanged, Red Brass 150 lb FFSO , Extended 7 inches
Circuit: Full Hdr Material: Standard Non-Ferrous, Brazed Joints

Misc: - Pneumatic Test

Dwg: CA-W-101-6

Performance V

Pressure: 29.17 IN HG Elevation: 705.0 FT
Airflow: 38,000.0 SCFM Water
System Face Area: 106.3 FT² Flow Rate: 661.00 GPM
Standard Face Velocity: 357.6 FPM Entering Temp: 42.0 °F
Entering Dry Bulb Temp: 88.3 °F Leaving Temp: 54.0 °F
Entering Wet Bulb Temp: 77.4 °F Tube Velocity: 5.2 FPS
Leaving Dry Bulb Temp: 45.5 °F Inside Surface Fouling: 0.0000 HR·FT²·°F/BTU
Leaving Wet Bulb Temp: 45.5 °F
Outside Surface Fouling: 0.0000 HR·FT²·°F/BTU
Sensible Heat Load: 1,757.0 MBH
Total Heat Load: 3,967.0 MBH

Losses

Air Pressure Drop: 1.15 IN H2O Fluid Pressure Drop: 16.9 FT H2O

Comments:

Notes & Warnings:

- 110 150 PSIG Coil Design
56 Rated in accordance with AHRI Standard 410.
54 Approach temperature < recommended unless ideal conditions exist.
13 Pressure drop shown is based on belled tube ends.

2.2.

***AHU-4901, AHU-4902, AHU-4903,
AHU-4904, AHU-4905, AHU-4906***

Sales Order:

Dwg. No.:

Job Order:

Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

GENERAL

Customer:	<input type="text" value="Kirlin Way"/>	Qty/Size/Type:	<input type="text" value="1"/> <input type="text" value="55"/> <input type="text" value="BF3AI-D1EPFC3OD"/>
End User:	<input type="text" value="Eli Lilly & Co., Concord Bldgs 2, 4, 6"/>	Sales Office:	<input type="text" value="412 GRS - Clark Air Systems"/>
Engineer:	<input type="text" value="Hipp Design+Consulting"/>	Sales Rep.:	<input type="text" value="Jeff Clark"/>
Mark:	<input type="text" value="AHU-4901 thru 4906"/>	Project Mgr.:	<input type="text" value="Jerome Snyder"/>
Cust. PO:	<input type="text" value="012209"/>	Designer:	<input type="text"/>

UNIT CONSTRUCTION

Casing

Walls:	<input foam="" insulation"="" type="text" value="3"/>	Insulation Density:	<input type="text" value="2.3"/> lbs/cu.ft	Design Pressure (+/-)	<input type="text" value="10"/> inches W.G.
Roof:	<input type="text" value="Flat roof"/>			Environment:	<input type="text" value="Indoor"/> construction
Exterior:	<input type="text" value="0.050 Embossed Aluminum"/>	Fasteners:	Exterior <input type="text" value="Stainless Steel"/>	Interior <input type="text" value="Stainless Steel"/>	
Interior:	<input type="text" value="0.040 Smooth Aluminum"/>	- <input type="text" value="Entire unit"/>			
Bulkhead:	<input type="text" value="0.040 Smooth Aluminum"/>	- <input type="text" value="Single wall construction"/>			

	Type:	Color:	Notes:
Exterior Paint:	<input type="text" value="No paint"/>	<input type="text"/>	<input type="text"/>
Interior Paint:	<input type="text" value="No paint"/>	<input type="text"/>	<input type="text"/>
Base Frame Paint:¹	<input type="text" value="No paint"/>	<input type="text"/>	<input type="text"/>

Thermal Break Construction: **Location:**

Knockdown Construction: **KD Type:**

Unit Installed On²:

¹ - All black steel, including unit base, shall be painted w/ epoxy mastic.; ² - Provide level foundation under perimeter of each section.

Base

Base Frame: in w/ with **Foundation Holes:**

Floor Sheets: -

Floor sheets are with turned-up perimeter lip.

Drain Pan: -

Drain Pan Connection Hand: -

Bottom Sheets: -

Floor Drains: **Connection Hand:** **Material & Location:**

Doors³

Qty	Size HxW	Type ⁴	Swing	Hinge	Latch Qty	Latch Type	View Port ⁵	Exterior ⁶	Interior ⁶
4	72 x 24	TB	Draw-Through	upstream	2	Ventlok 310 Chrome	12x12 TP	0.050" EA	0.040" SA
2	72 x 30	TB	Blow-Through	downstream	2	Ventlok 310 Chrome	12x12 TP	0.050" EA	0.040" SA
1	72 x 24	TB	Blow-Through	downstream	2	Ventlok 310 Chrome	12x12 TP	0.050" EA	0.040" SA

³ - All Door Sizes are nominal, consult factory for actual opening dimensions. Refer to main assembly drawing for door locations.

⁴ -NTB:Non-Thermal Break, TB: Thermal Break, HT: High Temperature; ⁵ -TP: Thermal Pane

⁶ -SA: Smooth Aluminum, EA:Embossed Aluminum, GS: Galvanized Steel, SS:Stainless Steel

Unit Construction Notes

1	BAH to provide a floor drain in non-drain pan sections and extend to unit exterior with 2" aluminum pipe. Provide cap. Drain to be 6" x 6" x 4"D. Provide aluminum grating over drain flush with unit floor. All drain material to be aluminum and welded.
2	BAH to provide a continuous length stainless steel piano hinge for all access doors

Sales Order: **220094-02,-03,-04,-05,-06,-07**

Dwg. No.:

Job Order: **18801 thru 18806**

Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

3	BAH to provide a 1" pressure port w/ cap in each access door.
4	Floors continuously welded with no fasteners penetrating the floor. Fastening of all components to the floor is to be by welding only.
5	BAH to provide a label on each access door indicating handle position as "Open" and "Closed"
6	BAH to provide a latch & chain on all doors. (The chains are to hold the doors open)
7	All drain pans covered with 304 stainless steel fabricated grating.
8	BAH to provide our standard sealant which is NSF 51 certified and FDA compliant in accordance with 21CFR177 2600 Color to be clear or aluminum color

SHIPPING SECTIONS AND WEIGHTS

Shipping and Handling Limitations

Unit shipped in sections. Max. weight/section: LB Max. opening size: H x W x D (In.)

Shipping Sections

Sec. ⁹	Description	Weight ^{LB}	Sec. ⁹	Description	Weight ^{LB}
1	Inlet	2,877	4	Access, Chilled water coil	15,715
2	Fan	7,158	5	Fan	9,696
3	Outlet, Mixing box, Combined filter	7,102	6	Access, Merv 16 filter, Outlet	6,458

Total Estimated Weight (Less Water) ^{LB}:

⁹ - Sections (Sec.) listed in direction of airflow.

Shipping and Handling Notes

1	
2	

FANS

Supply Fans

Qty	Mfr.	Model	Size	Dia IN	Rot./Dis.	Class	Arr.	Wheel Wid. %	Wheel Dia. %	Elev FEET	Temp °F	Max RPM	Weight LBS
1	Twin City Fans	EPFN	542	54.2	CW/Axial	3	4	67	100	705	70	1,267	2059
Operation	Qty	Total ACFM	ACFM/Fan	OV FPM	TSP IN WG	ESP IN WG	ISP IN WG	FSE IN WG	RPM	VFD Hz	Fan BHP	Total BHP ¹⁰	
Design	1	55,000	55,000	0	6.70	2.50	3.91	0.29	1,083	55.00	83.0	83.0	

Accessories

Fan Isolation Dampers(s)¹¹
 Inlet Screen(s)
 Outlet Screen(s)

Removable Panel Suitable for Removal of
 Drain w/ plug
 SPB Bearings

Monorail Suitable for Removal of
 None Inspection Door
 Bearing Life

Nylon Extended Lubrication Lines for
 Acoustic Diffuser

Piezometer Ring(s)
 Accelerometer(s)

Return Fans

Qty	Mfr.	Model	Size	Dia IN	Rot./Dis.	Class	Arr.	Wheel Wid. %	Wheel Dia. %	Elev FEET	Temp °F	Max RPM	Weight LBS
1	Twin City Fans	EPFN	445	44.5	CW/Radial	3	4	96	100	705	70	1,545	1452
Operation	Qty	Total ACFM	ACFM/Fan	OV FPM	TSP IN WG	ESP IN WG	ISP IN WG	FSE IN WG	RPM	VFD Hz	Fan BHP	Total BHP ¹⁰	
Design	1	49,500	49,500	0	2.65	2.00	0.25	0.40	1,083	55.00	37.6	37.6	

Accessories

Fan Isolation Dampers(s)¹¹
 Inlet Screen(s)
 Outlet Screen(s)

Removable Panel Suitable for Removal of
 Drain w/ plug
 SPB Bearings

Monorail Suitable for Removal of
 None Inspection Door
 Bearing Life

Sales Order: **220094-02,-03,-04,-05,-06,-07**

Dwg. No.:

Job Order: **18801 thru 18806**

Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

<input checked="" type="checkbox"/>	Nylon	Extended Lubrication Lines for	Motor only	<input type="checkbox"/>	Acoustic Diffuser	
<input checked="" type="checkbox"/>	Piezometer Ring(s)	<input type="checkbox"/>	w/ Control Unit	<input type="checkbox"/>	Accelerometer(s)	<input type="text" value="None"/>

¹⁰ -Total BHP includes belt losses when applicable, ¹¹ -See "Mixing & Distribution" section for damper details
***** See attached curve(s) for additional performance data *****

Fan Notes

1	Monorail provided with mechanical stops on each end, labeled with lift capacity, (1,400 Lbs) and include a soft rubber guard on end of rail when exposed to prevent head injury if struck
2	BAH to provide one (1) telescoping monorail for use through the removable panel. Monorail to be centered on the motor.
3	Removable panel is large enough to remove the fan or motor
4	Twin City Fan to provide vibration report.
5	Fans to have an aluminum wheel
6	Controller for fan air flow to be Dwyer DHII.

MOTORS

Supply Fan Motor(s)

Qty	Type	HP	Nom. RPM	Voltage	Phase/Freq	FLA	LRA	Frame	NEMA	Wgt. LB	Pos.			
1	Baldor IEEE 841 Severe Duty	100	1188	460	3/60	146	1022	445T	TEFC	2,083	Dir.			
											FLA	NEC	156	A

Accessories

<input checked="" type="checkbox"/>	Suitable for use w/ VFD	<input checked="" type="checkbox"/>	Permanently Sealed Bearings	<input checked="" type="checkbox"/>	Aegis Shaft Grounding		
<input type="checkbox"/>	Winding Thermistors ¹²	<input type="checkbox"/>	Bearing RTD ¹³	<input type="checkbox"/>	Heater ¹⁴	<input type="checkbox"/>	Roller Bearings ¹⁵

Return Fan Motor(s)

Qty	Type	HP	Nom. RPM	Voltage	Phase/Freq	FLA	LRA	Frame	NEMA	Wgt. LB	Pos.			
1	Baldor IEEE 841 Severe Duty	50.0	1185	460	3/60	61.7	345	365T	TEFC	928	Dir.			
											FLA	NEC	65	A

Accessories

<input checked="" type="checkbox"/>	Suitable for use w/ VFD	<input checked="" type="checkbox"/>	Permanently Sealed Bearings	<input checked="" type="checkbox"/>	Aegis Shaft Grounding		
<input type="checkbox"/>	Winding Thermistors ¹²	<input type="checkbox"/>	Bearing RTD ¹³	<input type="checkbox"/>	Heater ¹⁴	<input type="checkbox"/>	Roller Bearings ¹⁵

¹² -Winding Thermistors are temperature sensors for windings, ¹³ -Bearing RTDs are temperature sensors for bearings, ¹⁴ -Heaters are for preheating motors, ¹⁵ -Roller Bearings are to be used for belt-drive applications with motors 60HP and larger.

Motor Notes

1	Motor to be IEEE 841 construction, but will not be labeled as IEEE 841 due to addition of Aegis SGR. Base catalog number are; ECP84312T-4, ECP84409T-4 and will be modified to include an internal Aegis SGR and sealed bearings
2	Motor to be provided with insulated bearing on one end and a shaft grounding ring on the opposite end, installed by Baldor
3	Motors shall be provided with ground bonding points on the motor foot. See electrical section for details.

VIBRATION ISOLATION

Duty	Mfr.	Qty	Nom. Defl. IN	Isolator Type	Min Eff. %	Fan Base Type ¹⁷	Fan Thrust Restraints	Model
Exhaust	Amber Booth	1	2"	Seismic	90	Structural	Yes	AMSR
Supply	Amber Booth	1	2"	Seismic	90	Structural	Yes	AMSR

¹⁷ -Inertia base concrete by others unless otherwise noted.

Vibration Isolation Notes

1	Isolator base and springs furnished by Twin City Fan as part of the fan assembly.
---	-----------------------------------------------------------------------------------

FILTER

Sales Order: **220094-02,-03,-04,-05,-06,-07**

Dwg. No.:

Job Order: **18801 thru 18806**

Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

	Mfr.	Type	Model	% Eff	MERV	H	x	W	Size(s) IN	Serv.	Frame Mat'l	Gauge
1	Camfil	Panel	30/30		8	4	x	7	24x24x 2	Up	Stainless	By Others
1	Camfil	Bag	Riga-Flo PH		13	4	x	7	24x24x 12	Up	Stainless	By Others
2	Camfil	Rigid	Filtra 2000	95 DOP	16	4	x	7	24x24x 12	Up	Stainless	By Others

Ship Filters BAH shall supply set(s) of extra filters for

Filter Notes

1	BAH to provide a Cleveland Controls barb fitting through the unit casing on the upstream and downstream side of each filter bank. Cleveland Controls Model number is 21118-112. This part is to be ordered from Grainger using item number 2EJN6.
2	BAH to provide a spacer frame between the pre & intermediate filter to allow individual filter reading. Use standard Dwyer filter gauge kit for the spacer frame only. Barb fittings are provided before and after the filter bank only.
3	95% DOP filters to be gel seal size 24x24x12.
4	BAH to provide gel seal stainless steel filter frames size 24-5/8x24-5/8 for the 24x24x12 95% DOP filters. Gel to be silicone based, not polyurethane based.
5	95% DOP filter frames provided with stainless steel swing arms.
6	95% DOP filter frames to be welded and sealed leak tight.
7	95% DOP frame cutoff to be welded to the frame and screwed to the unit casing.

CHILLED WATER COOLING COIL

Duty	Qty	Mfr.	Model	Tubes			Fins		Rows	Circuit				
				FH IN	FL IN	Depth IN	OD x Wall Thick IN	Fin Type			FPI x Thick IN			
1	Supply	6	Aerofin	W-9.5AW-37.5 X 92.0-8-.666	37.5	x	92.0	x	12.5	5/8 x .035 CU	Wave	9 1/2 x .0160 AL	8	2/3

Fluid	Casing Material IN	Hdr/Con Mat'l.	Belled Tubes	Turb.	Con/Pull Hand	Con Size IN	Con Type	Flange	Ext. Con IN	Total Weight	
										LBS ¹⁸	
Water	3/4	Stainless Steel	RB / RB	Yes	No	RH / RH	2	Flanged	150lb FFSO	6.0	1311

Accessories

Coil Racks: 304 SS Intermediate Pan Rack

Eliminators: None

CU:Copper, AL:Aluminum, FL: Finned Length, FH: Finned Height, FPI: Fins per Inch, O.D.:Outside Diameter, LH: Left Hand, RH: Right Hand, CS: Carbon Steel, SS: Stainless Steel, RB: Red Brass
RF:Raised Face, FF:Flat Face, SO:Slip-on, WN:Weldneck, TH: Threaded

¹⁸-Dry Weight. Consult Factory for Wet (Operating) Weights.

Chilled Water Cooling Coil Notes

1	All coils to be tested at minimum 300 psig under water. Manufacturer to provide test reports.
2	BAH to provide the cooling coils with plain end supply and return red brass connections. BAH is providing flat faced slip-on brass flanges. Flanges shipped loose for field installation by others.
3	Vent & drain connections to be threaded red brass.
4	Headers to be Type K Copper
5	Any flashing around the coils to be 304 stainless steel
6	Coil connections to extend minimum 6" from the unit casing.

INTERNAL PIPING

Component	Extended Piping By	Connection Material	Piping Material	Connection Type	External Flanges By
Cooling coil	BAH (Installed)	Brass	Brass	Sch 40 , Sweat end	BAH (Shipped Loose)

Internal Piping Notes

Sales Order: **220094-02,-03,-04,-05,-06,-07**

Dwg. No.:

Job Order: **18801 thru 18806**

Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

1 Cooling coil supply and return connections extended to the unit exterior using red brass pipe for two (2) farside coils. Connection between piping and the coil will be a union. Slip-on flanges provided on the exterior. Flanges shipped loose for installation in the field by others. Near side coils do not need to be extended.

MIXING & DISTRIBUTION

Dampers

Tag	Duty	Mfr.	Model	Qty	W IN	x	H IN	Blade	Damper Fail Pos.	Torque Req. LBS-IN	Act. By	Type	Act ¹⁹	Qty	Signal
RA	Return Air	Ruskin	CD50	1	144	x	42	Opposed	Closed	210	BAH	Elec.	2-Pos	3	2P (N/A)
EA	Exhaust Air	Ruskin	CD50	1	55	x	12	Opposed	Closed	23	BAH	Elec.	Mod.	1	2-10v
OA	Outside Air	Ruskin	CD50	1	55	x	12	Parallel	Closed	32	BAH	Elec.	Mod.	1	2-10v
RA	Return Air	Ruskin	CD50	1	144	x	42	Parallel	Closed	294	BAH	Elec.	Mod.	3	2-10v
SA	Supply Air	Ruskin	CD50	2	122	x	30	Opposed	Closed	230	BAH	Elec.	2-Pos	2	2P (N/A)

¹⁹-Action Indicates Actuator Operation Type (Two-position or modulating)

Mixing & Distribution Notes

1	Damper Actuator power = 24v
2	Actuator to be Belimo.
3	Each damper provided with a Ruskin SP100 switch package
4	Actuator wiring conduit and wiring by others.

Confirm quantity of actuators is correct. Hipp assumes where 3 actuators shown, that is required for size of space/torque requirements. Hipp thinks the SA item should be 4 actuators instead of 2 since that line represents 2 dampers, so a total of 12 actuators instead of 10.

Sales Order:

Dwg. No.:

Job Order:

Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

ELECTRICAL

Routing Hardware

Conduit Material: Junction Boxes and Enclosure NEMA Rating:

Routing Notes:

ETL Label **Hazardous Environment Rating**

Low Voltage

Field Connection(s): **Voltage:** / / hz **Qty of Circuits:**

Qty	Light Fixture Type	Bulbs By			FLA
<input type="text" value="10"/>	<input type="text" value="Marine Light Fixtures"/>	<input type="text" value="By BAH"/>	<input type="text" value="100W"/>	<input type="text" value="Equal LED"/>	<input type="text" value="18"/> <input type="text" value="A"/>

Qty	Light Switch Type	Hours	Hold	Environment Rating	Location
<input type="text" value="1"/>	<input type="text" value="Timer 2-Way (std)"/>	<input type="text" value="2"/>	<input type="text" value="W/"/>	<input type="text" value="Indoor"/>	<input type="text" value="Supply fan access"/>

Qty		Qty	
<input type="text" value="1"/>	<input type="text" value="20A Duplex GFCI"/>	<input type="text" value="0"/>	<input type="text" value="20A Duplex Weather-Rated GFCI"/>
			<input type="text" value="16"/> <input type="text" value="A"/>

High Voltage

Field Connection(s): **Voltage:** / / hz **Qty of Circuits:**

Motor	Motor SPW	Motor Wire Termination	FLA	NEC
<input type="text" value="Supply"/>	<input type="text" value="SPW - Unconsolidated"/>	<input type="text" value="VFD -> Motor"/>	<input type="text" value="156"/>	<input type="text" value="A"/>
<input type="text" value="Return"/>	<input type="text" value="SPW - Unconsolidated"/>	<input type="text" value="VFD -> Motor"/>	<input type="text" value="65"/>	<input type="text" value="A"/>

VFDs/Starters

Service	Mfg	Model No.	Qty	NEMA	Voltage	HP	Supplied By	Mounted By
Supply Fans	ABB	ACH580-PCR-124A-4	1	1	460	100	By Others	By Others
Return Fans	ABB	ACH580-PCR-065A-4	1	1	460	50	By Others	By Others

Electrical Notes

1	BAH to provide one (1) 2 hour timer light switch. The switch is to be mounted on the unit exterior near the supply fan access door. Centerline of the switch to be mounted approximately 4' above the bottom on the channel base. Timer switch rated 120/277V.
2	Mount a receptacle on the unit exterior underneath underneath the light switch
3	BAH to provide (2) points of power connection, one (1) for 120V connection and one (1) for 460V connection. Connections as follows: a) One (1) 120V connection at a junction box with multiple circuits (1 for lights & 1 for receptacle). b) Casing penetration for use by the contractor with VFD cable.
4	All wiring is to be 600V rated
5	All wiring to be numbered and tagged using sleeve type wire tags.
6	BAH to use 3/4" Ø conduit
7	BAH to terminate the 120V connections to a screw type terminal block (wire crimped in a compression lug). Terminals shall be "finger safe".
8	BAH to provide grounding lugs.
9	All conduit to be filled with caulk at the ends, intersections, and junctions to ensure sealed conduit runs.
10	120V power wiring shall use the following color scheme: a) Phase A - black b) Phase B - red c) Phase C - blue d) Neutral - white e) Ground - green or green with yellow stripe

Sales Order: **220094-02,-03,-04,-05,-06,-07**

Dwg. No.:

Job Order: **18801 thru 18806**

Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

TESTING & SERVICES

BAH shall provide the following factory test(s) :

- | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> Pitot-Traverse Performance (ES-8104) | <input type="checkbox"/> Piezometer Ring Performance |
| <input type="checkbox"/> Sound Power (ES-8105) | <input type="checkbox"/> Sound Pressure (ES-8106) | <input type="checkbox"/> Velocity Profile (ES-8108) |
| <input checked="" type="checkbox"/> Vibration (ES-8107) in accordance with ANSI S2.19, Grade G6.3, w/ | <input type="checkbox"/> BV-5 | IPS filtered in maximum vibration allowed. |
| <input checked="" type="checkbox"/> Leakage* (ES-8110, Neg./Pos. Pressure - Orifice Plate) | Max. <input type="text" value="1/2"/> % of design CFM @ | <input type="text" value="1 1/2"/> times the operating pressure. |
| * - Minimum allowable leakage shall be 50 CFM. <input type="text" value="275"/> Total CFM Allowed at negative <input type="text" value="5.7"/> " WG & positive <input type="text" value="3.7"/> " WG | | |
| <input checked="" type="checkbox"/> Deflection (ES-8109) | Test Pressure: Negative <input type="text" value="5.7"/> " WG & positive <input type="text" value="3.7"/> " WG | |

BAH shall provide the following field service(s) :

- | | | | |
|---------------------------------------------------|----------------------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> Start-up (AHU) | <input type="checkbox"/> Start-up (VFD) | <input type="checkbox"/> Start-up Supervision |
| <input checked="" type="checkbox"/> Training | <input checked="" type="checkbox"/> Erection Supervision | <input type="checkbox"/> Deflection (ES-8109) | |
| <input checked="" type="checkbox"/> Leakage Test* | <input type="checkbox"/> Performance Test | <input type="checkbox"/> Vibration Test | |

*SHOP NOTE: Ship Unit with Testing Cover Sheets

Testing Notes

1	BAH to provide a 3 year parts & labor warranty beginning at unit shipment.
2	Fan coast down test from 30-60Hz provided from Twin City with the fan.
3	Maximum deflection of 1/200 of the maximum span at 1.5 times the design operating pressure.
4	Calibration certificates required for all equipment used during testing.
5	BAH to conduct a coast down test from 60hz. Record peak vibration point.
6	Performance test conducted at design conditions
7	BAH to provide an Actuator Test. Actuator is to be cycled to verify proper operation
8	Removal of test sheets by contractor after completion of field leakage testing

MISCELLANEOUS NOTES

Sales Order: **220094-02,-03,-04,-05,-06,-07**

Dwg. No.:

Job Order: **18801 thru 18806**

Revision:

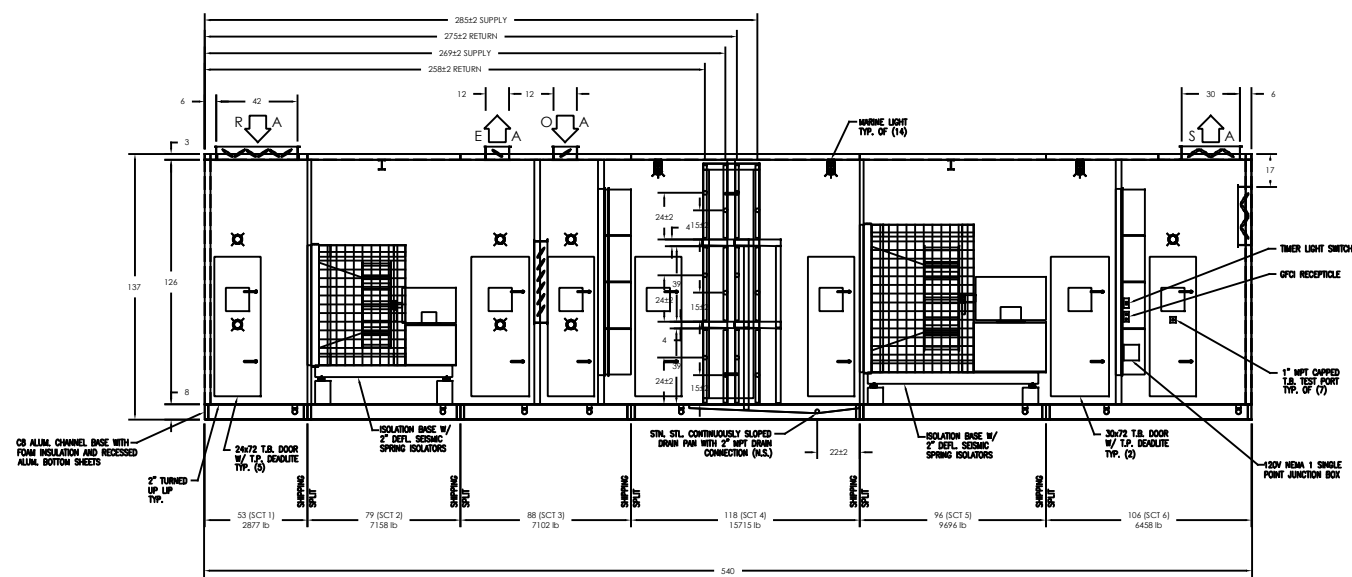
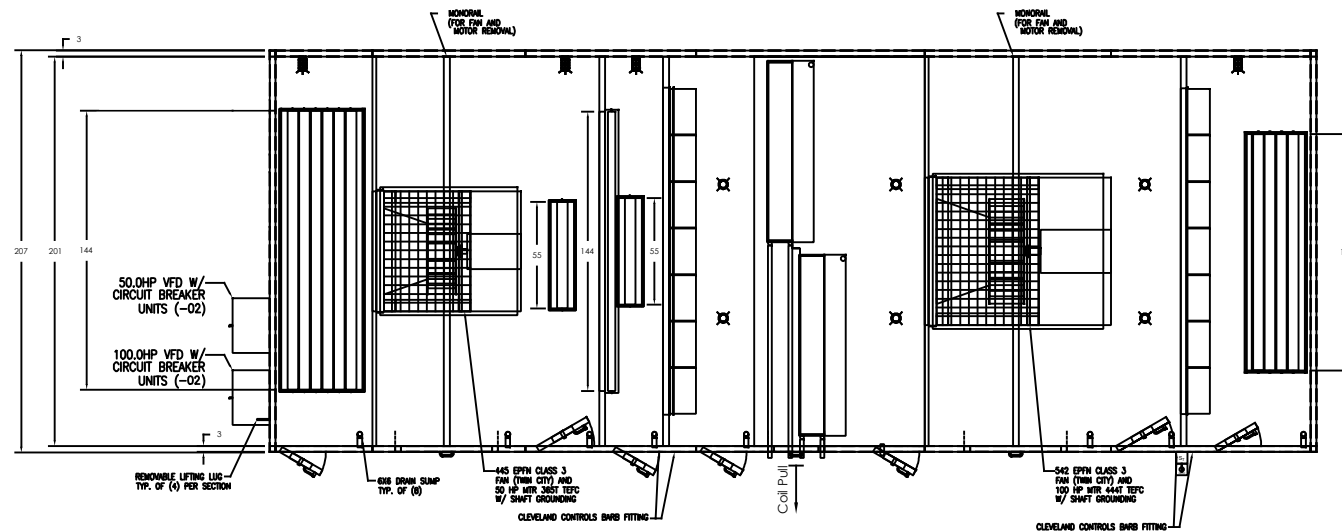
DATA SHEETS

AC2000 Data Sheets, Version 9.14

	<p>BAH to provide a stainless steel nameplate (mounted on the fan access door) with the following information:</p> <p>a) Owners Equipment Tag Number: AHU-4901,4902. 4903, 4904, 4905 & 4906</p> <p>b) Kirlin Way PO #: 012209</p> <p>c) Manufacturer name: Buffalo Air Handling</p> <p>d) Manufacturer model number: 055BF3AI-D1EPFC3OD</p> <p>e) Manufacturer serial number: 220094-02, 03, 04, 05, 06 & 07</p> <p>f) Year of fabrication: 2023</p> <p>g) Supply air CFM (Max): 55,000</p> <p>h) Design internal static pressure - inches wg: 4.2</p> <p>i) Design external static pressure - inches wg: 2.5</p> <p>j) Design total static pressure - inches wg: 6.7</p> <p>k) Fan Manufacturer: Twin City Fan</p> <p>l) Supply Fan RPM: 1083 RPM</p> <p>m) Motor manufacturer: Baldor</p> <p>n) Motor Phase/Hertz/Voltage: 3/60/460V</p> <p>o) Supply Motor HP: 100</p> <p>p) Supply Motor FLA: 120</p> <p>q) Supply Motor LRA: 730</p> <p>r) Lighting Phase/Hertz/Voltage: 1/60/120V</p> <p>s) Return air CFM (Max): 49,500</p> <p>t) Design internal static pressure - inches wg: .65</p> <p>u) Design external static pressure - inches wg: 2</p> <p>v) Design total static pressure - inches wg: 2.65</p> <p>w) Fan Manufacturer: Twin City Fan</p> <p>x) Return Fan RPM: 1083 RPM</p> <p>y) Motor manufacturer: Baldor</p> <p>z) Motor Phase/Hertz/Voltage: 3/60/460V</p> <p>aa) Return Motor HP: 50</p> <p>ab) Return Motor FLA: 61.7</p> <p>ac) Return Motor LRA: 345</p> <p>ad) Coil manufacturer: Aerofin</p> <p>ae) Cooling coil entering & leaving air temperature (db/wb) - °F: 72db/60wb - 46db/46wb</p> <p>af) Cooling coil entering & leaving water temperature - °F: 42/54</p>
2.	Temporary anchors for shipment shall be painted bright yellow or orange and labeled "Temporary anchor - remove prior to operating equipment".
3.	Shipping sections to be labeled with with a temporary tag displaying equipment number and section number attached to the section casing, i.e.. AHU-058, Sect 1 of 6, Sect 2 of 6, etc.
4.	Affix adhesive labels on each section stating " DO NOT penetrate or attach to equipment housing and DO NOT cause obstructions to component access panels"
5.	All coil and humidifier connections to be protected for shipment with plastic caps. Flanges are to be protected for shipment with wooden or plastic covers
6.	Removal of test sheets by contractor after completion of field leakage testing

REVISIONS

Rev	Date	Init	Description of Change(s)



RIGHT HAND
AHU-4901
BAH SO#: 220094-02
BAH JO#: 18801

NOTES:

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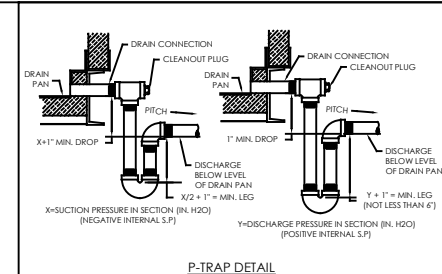
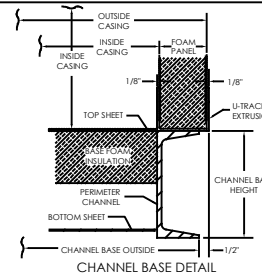
SOFTWARE VERSION: 1.00.0278.0

REVISIONS

GENERAL NOTES:

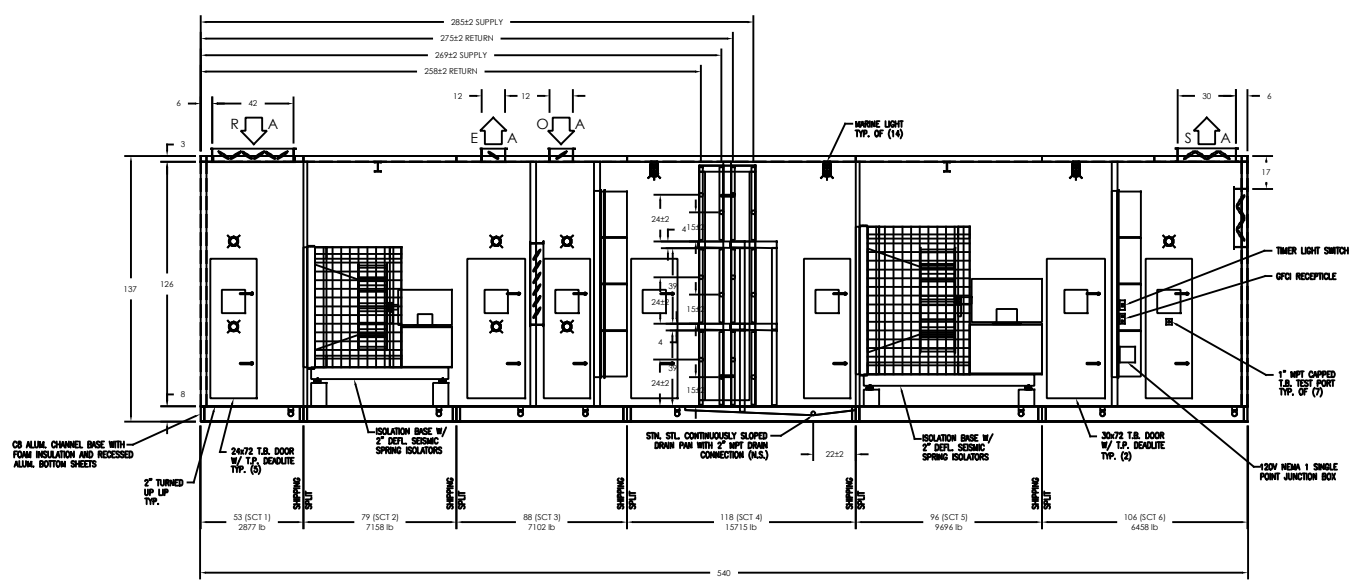
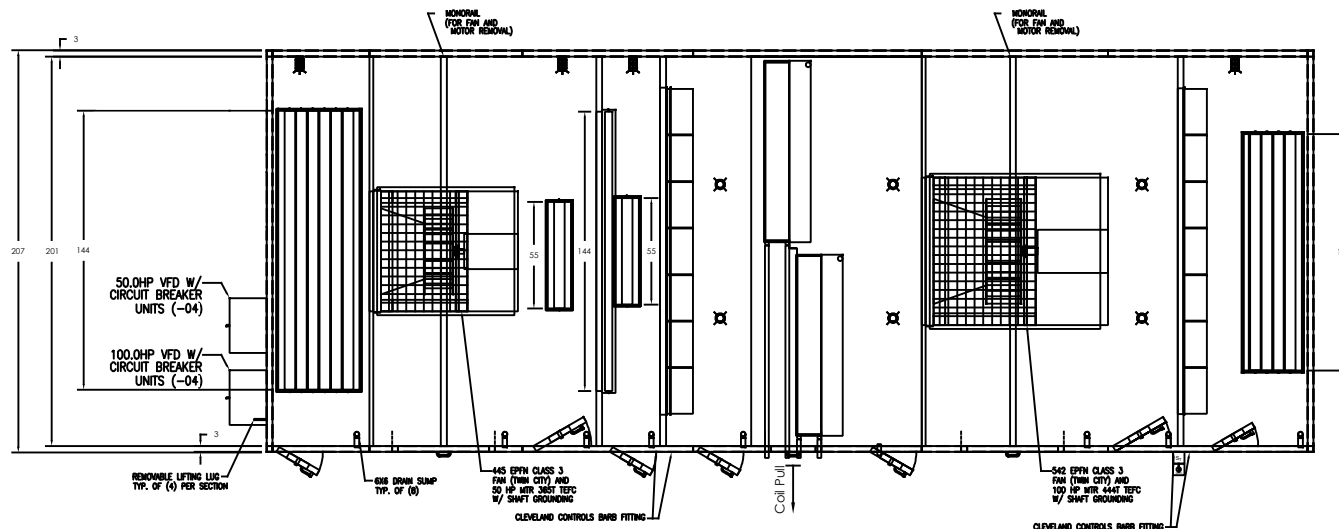
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- ALL STEAM AND DRAIN TRAPPING BY OTHERS. REFER TO P-TRAP DETAIL FOR DRAIN TRAPPING MINIMUM REQUIREMENTS.

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CUSTOMER: KIRLIN WAY MECHANICAL			
END USER: ELI LILLY & CO.			
ENGINEER: HIPPI DESIGN+CONSULTING			
TITLE: CONCORD DAP			MARK: AHU 4901
DWG STATUS: APPROVAL	APPROVAL: JMS	DETAILED:	
SCALE: 1 : 48	DATE: 12/19/2022	DATE:	
BAH SO#: 220094-02	DRAWING NO:		REV: 01
BAH JO#: 18801			





RIGHT HAND
AHU-4903
BAH SO#: 220094-04
BAH JO#: 18803

NOTES:

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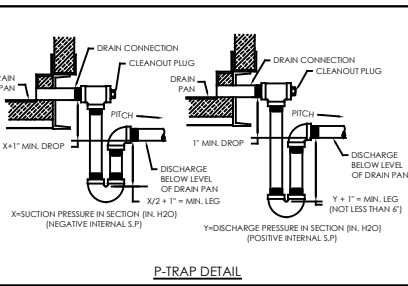
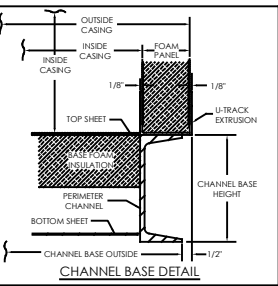
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SOFTWARE VERSION: 1.00.0278.0

REVISIONS

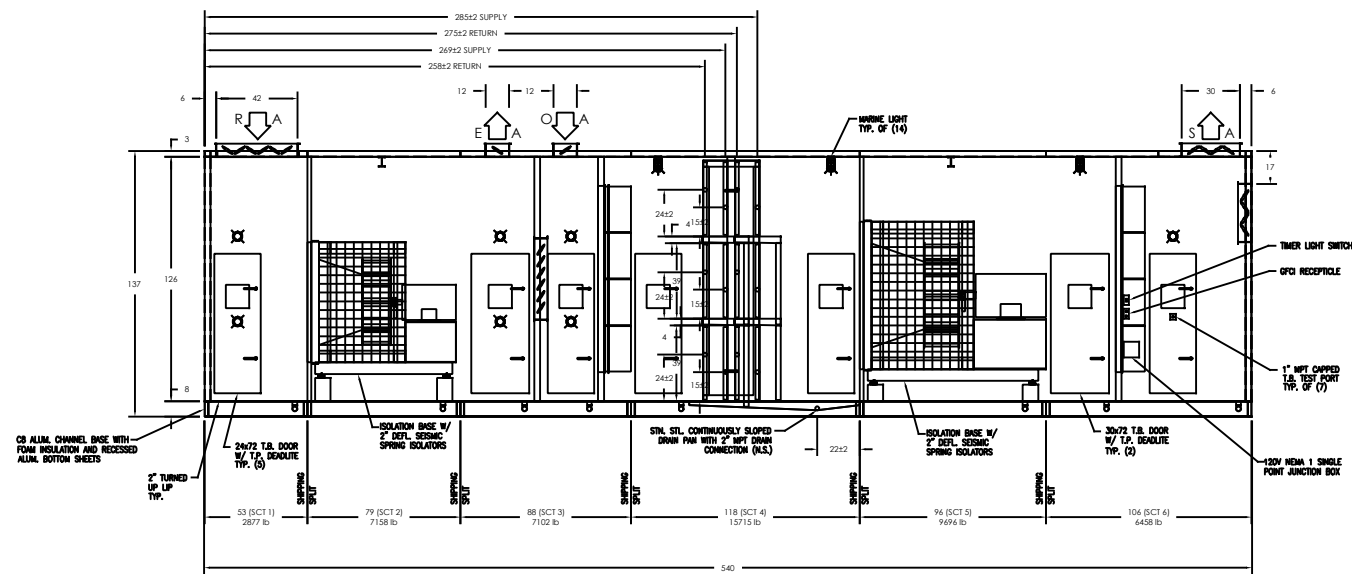
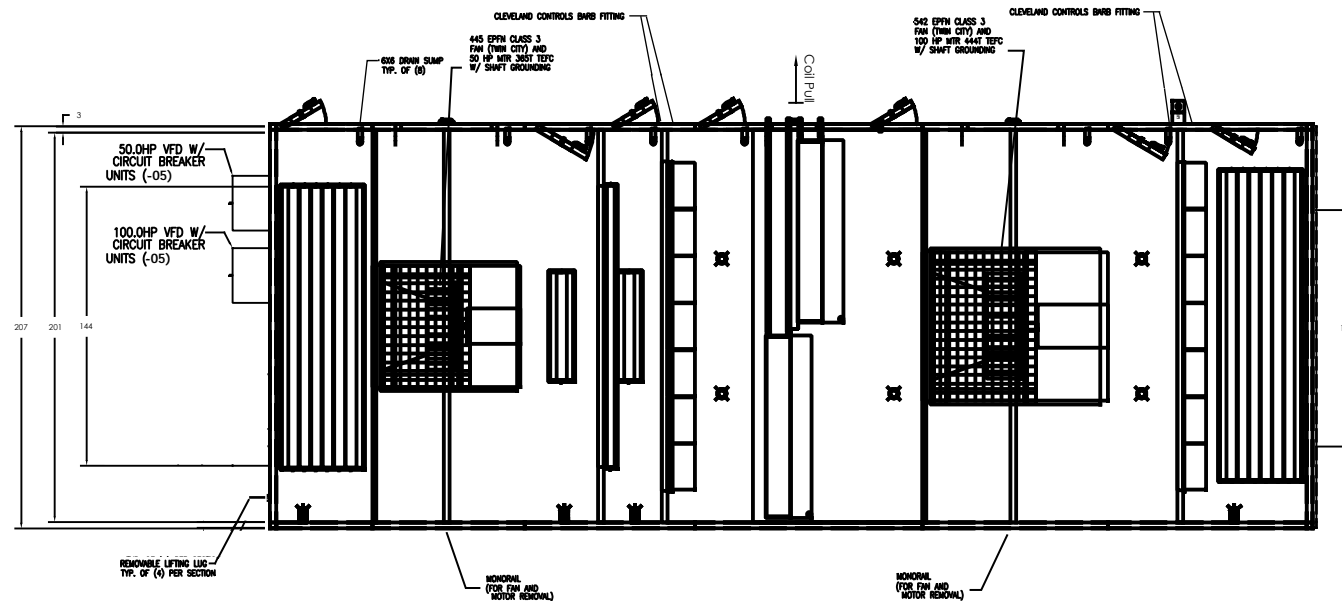
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END USER: ELI LILLY & CO.			
ENGINEER: HIPPI DESIGN+CONSULTING			
TITLE: CONCORD DAP			MARK: AHU-4903
DWG STATUS: APPROVAL	APPROVAL: JMS	DATE: 12/19/2022	DATE:
SCALE: 1 : 48	BAH SO#: 220094-04		REV: 01
BAH JO#: 18803		DRAWING NO:	





LEFT HAND
AHU-4904,
BAH SO#: 220094-05
BAH JO#: 18804

NOTES:

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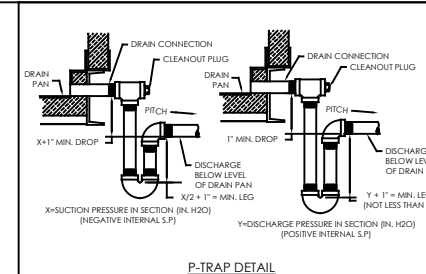
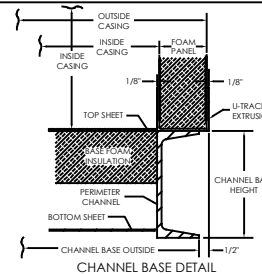
SOFTWARE VERSION: 1.00.0278.0

REVISIONS

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- UNITS MUST HAVE PERIMETER SUPPORT INCLUDING SUPPORT BENEATH EACH SHIPPING SPLIT.
- CURB/STEEL MOUNTED UNITS GREATER THAN 15'-0" WIDE MAY REQUIRE ADDITIONAL SUPPORT (CONSULT FACTORY).
- SECTIONS MAY DEFLECT DURING RIGGING. SUPPLEMENTARY SUPPORT MIDWAY AT SHIPPING SPLITS WILL FACILITATE PLACEMENT OF SECTIONS.
- ALL STEAM AND DRAIN TRAPPING BY OTHERS. REFER TO P-TRAP DETAIL FOR DRAIN TRAPPING MINIMUM REQUIREMENTS.

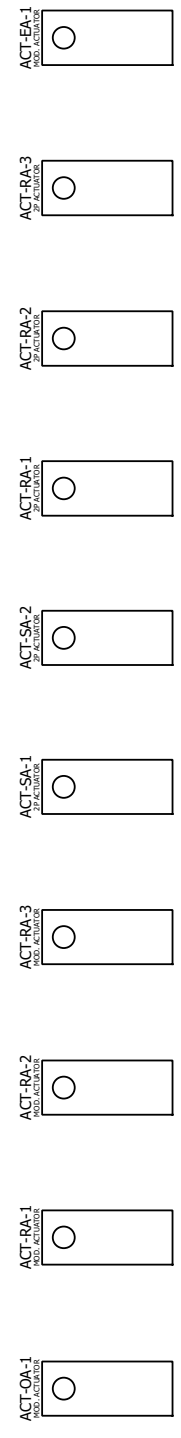
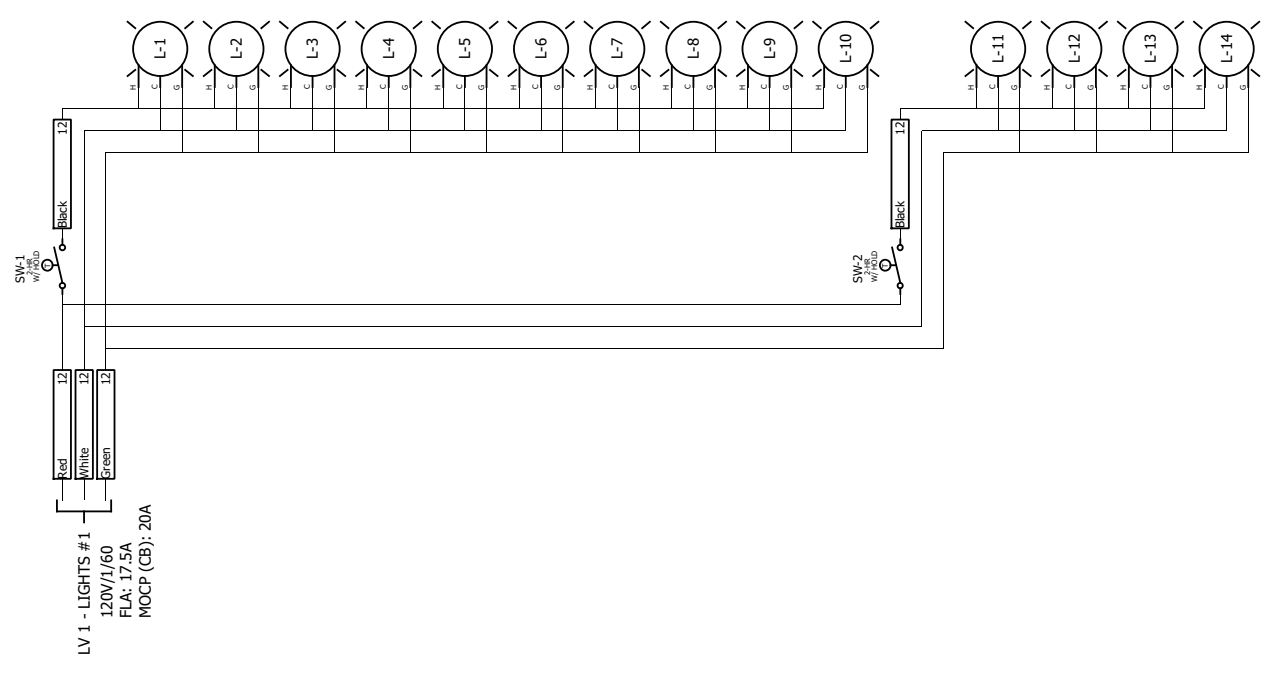
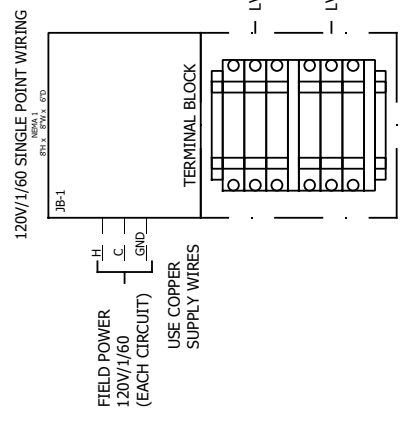
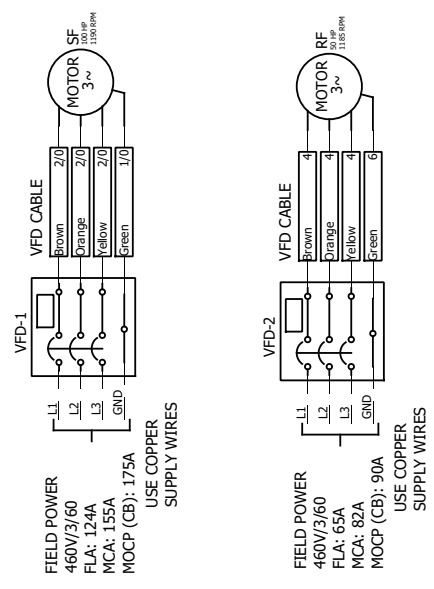
This drawing is the property of Buffalo Air Handling and is returnable upon request. It is for the confidential use of the buyer of the equipment and must not be copied, or shown to any third party, without prior written authorization of Buffalo Air Handling. The use of this drawing in whole or in part for procuring parts from others is prohibited and voids our equipment warranty.



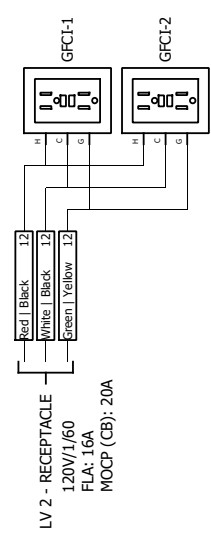
CUSTOMER: KIRLIN WAY MECHANICAL			
END USER: ELI LILLY & CO.			
ENGINEER: HIPPI DESIGN+CONSULTING			
TITLE: CONCORD DAP		MARK: AHU-4904	
DWG STATUS: APPROVAL	APPROVAL: JMS	DETAILED:	
SCALE: 1 : 48	DATE: 12/19/2022	DATE:	
BAH SO#: 220094-05	DRAWING NO:		REV: 01
BAH JO#: 18804			



Z-10881-C



PROVIDE WIRING DETAILS FOR ACTUATORS AND LIMIT SWITCHES. REVISE TO 12 ACTUATORS IF NEEDED (SEE COMMENTS ON PDF PAGE 48).



REV.	DATE	NAME	DESCRIPTION	REV.	DATE	NAME	DESCRIPTION
0	12/7/2022	JMS	APPROVAL	D	-	-	-
A	-	-	-	E	-	-	-
B	-	-	-	F	-	-	-
C	-	-	-	G	-	-	-

PROJ. NO.:	Eli Lilly & Co.	CUSTOMER:	Kirin Way Mechanical
WORK #:	AHU-4901 thru 4906	FRANCHISE:	Hippo Design+Consulting
<small>THE DRAWING IS THE PROPERTY OF BUFFALO AIR HANDLING. IT IS TO BE USED ONLY FOR THE PROJECT AND NOT BE LOANED, REPRODUCED, COPIED, OR IN ANY MANNER DISSEMINATED TO OTHERS WITHOUT THE WRITTEN PERMISSION OF BUFFALO AIR HANDLING. BUFFALO AIR HANDLING SHALL BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS IN THIS DRAWING.</small>			
BUFFALO AIR HANDLING <small>402 JANE SUBSIDIARY, AMHERST VA 24501 401 COLLETT DRIVE, CHARLOTTE NC 28208</small>		SCALE:	NONE
TITLE: POWER SCHEMATIC		DATE:	12/7/2022
SHEET:		NO. OF SHEETS:	1 OF 1
PROJECT NO.:		REV. NO.:	D-18801-2

FAN DETAILS

Job Name: Hipp - Lilly Concord DAP



Tag: SF02, AHU-4901
 Customer: Buffalo Air Handling
 Job ID: 220094
 Date: December 20, 2022

Description

Quantity 1
 Model EPFN
 Size 542
 Width SWSI
 Arrangement 4
 Class III
 Rotation CW
Discharge HOR
 Wheel Diameter (in) 54.2
Drive method Direct
 Percentage width 67%
 Percentage diameter 100%
 Motor position --
 Design VFD Op. Freq 55hz

Performance

Volumetric Flow CFM 55,000
Operating SP (in WC) 6.700
 Standard SP (in WC) 6.614
RPM 1083
 Tip Speed (FPM) 15381
Oper. Power BHP 83.03
 Standard Power BHP 81.96
 Outlet Area (sq.ft) 15.314
 Outlet Velocity (FPM) 3591
 Max RPM for Class 1267
 Static Efficiency 69.97%
 Total Efficiency 78.46%
 FEI 1.29
 FEP (KW) 65.07
 System FEI 1.29
 System FEP (KW) 65.07

Air/Gas Properties

Altitude above sea level (ft) ... 705
 Inlet Pressure (in WC) 0.000
 Inlet Temperature(°F) 50
 Design Temperature (°F) 50
 Gas Type Operating air
 Estimated Density (lb/ft³) 0.076

Motor Data

Power (HP) 100
 Enclosure TEFC
Speed (RPM) 1200
Voltage 460V
Phase 3
Frequency 60Hz
Frame Size 444T
 Technology

Modifiers

Using VFD.

Sound

Octave Bands	1	2	3	4	5	6	7	8	LwA
Level at Inlet	100	107	100	91	93	88	80	75	98
Level at Outlet	98	105	102	99	98	93	86	79	102

Distance in ft	1	3	5
dBA at inlet	98	88	84
dBA at Outlet	102	92	88

Sound Power Levels in dB re.10⁻¹² Watts:

Estimated sound pressure level in dBA (re: 0.0002 microbar) based on a single * ducted installation:

*To estimate dBA level for ducted inlet and ducted outlet (into and out of the room) type installation, deduct 20 from the LwA value shown. Using a directivity factor of 1. Estimated Sound Pressure based on free field, spherical (Q = 1) radiation at stated distance.

Definitions:

LwA The overall (single value) fan sound power level, 'A' weighted.

dBA The environment for each fan installation influences its measured sound value, therefore dBA levels cannot be guaranteed. Consult AMCA Publication 303 for further details. A fan's dBA is influenced by nearby reflective surfaces.

FAN DETAILS

Job Name: Hipp - Lilly Concord DAP



Tag: SF02, AHU-4901
Customer: Buffalo Air Handling
Job ID: 220094
Date: December 20, 2022

Pricing Detail

EPFN 542, Class III, Arrangement 4 Bare fan	2,036lb
Guard - Protective Enclosure	134 lb
Screen - Inlet, Std Type	0 lb
Vibration Isolators - Seismic - 2" Defl	0 lb
Special Width Construction	0 lb
Wheel - Aluminum	0 lb
Mount Fan on Base	0 lb
Piezometer Flow Measurement Ring (Copper Construction)	0 lb
Base - Isolation (2" Deflection)	1,010 lb
Balancing - Special	0 lb
BALANCE TO CATEGORY BV-5, [BUFFALO AIR HANDLING]	
Motor 100 HP, 1200 RPM, 460V, 3Ph, 60Hz , TEFC - Premium , Induction , 444T	1,684 lb
Mount Customer Supplied Motor	0 lb
<hr/>	
Each Weight	4,864 lb
Extended Weight	4,864 lb

Job Name: Hipp - Lilly Concord DAP



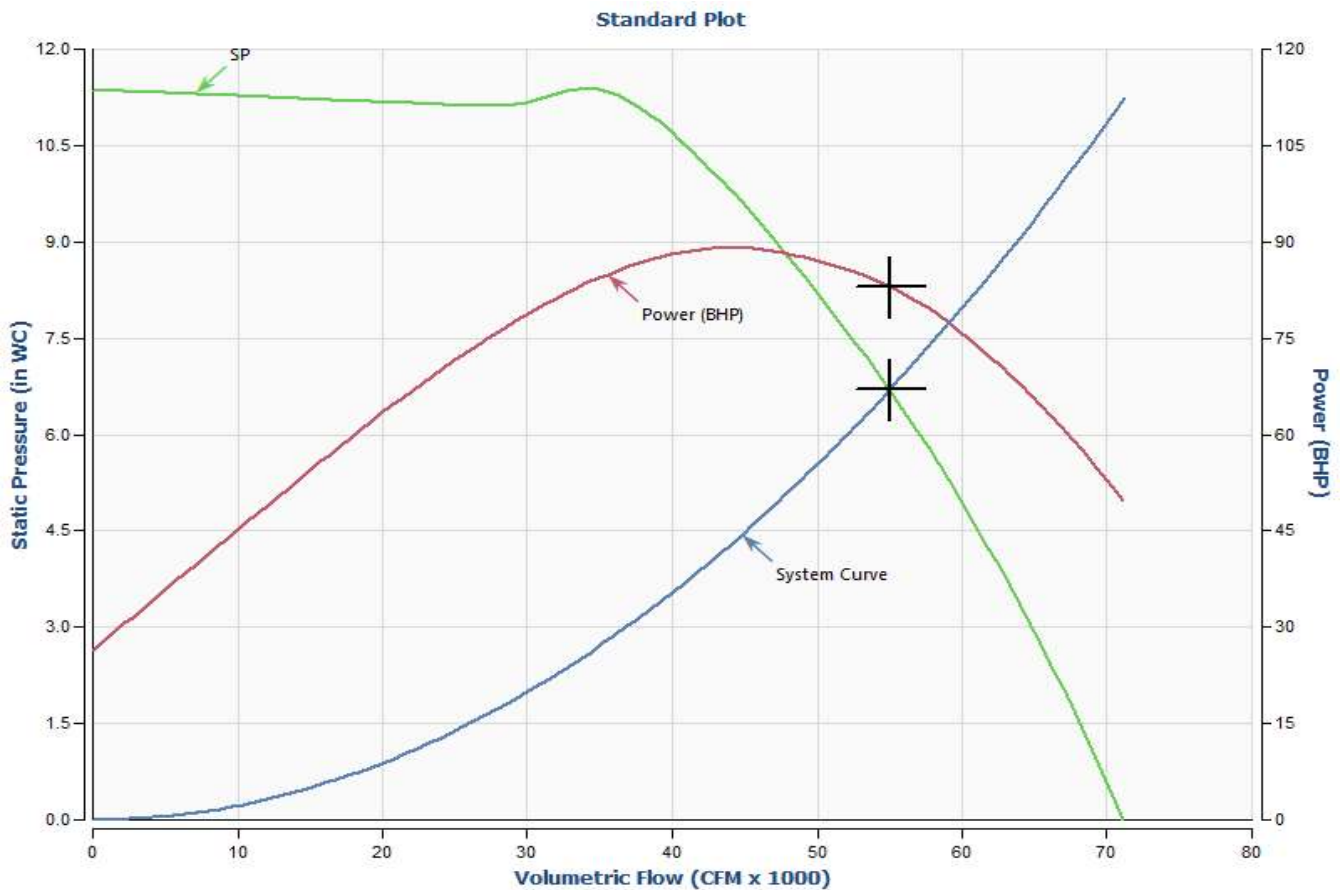
Customer: Buffalo Air Handling
Job ID: 220094
Date: December 20, 2022

Tag: SF02, AHU-4901

Fan information

Size/Model	542/EPFN	Class	III	Outlet Vel (FPM)	3591
Volumetric Flow (CFM)	55000	Speed (RPM)	1083	Density (lb/ft ³)	0.076
SP (in WC)	6.7	Max Speed	1267 RPM @ 50 °F		
		Power (BHP)	83.03		

Adjusted for 67% Width, Op temp: 50°F, Design temp: 50°F, Altitude: 705 ft, Inlet Dens: 0.0760 lb/ft3



BALDOR® • RELIANCE®

Product Information Packet

ECP84409T-4

100HP, 1190RPM, 3PH, 60HZ, 0444T, TEFC, F1

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Part Detail							
Revision:	B	Status:	PRD/A	Change #:		Proprietary:	No
Type:	AC	Elec. Spec:	A44WG3905	CD Diagram:	416820-036	Mfg Plant:	
Mech. Spec:		Layout:	617434-660	Poles:	06	Created Date:	12-12-2018
Base:		Eff. Date:	03-13-2019	Leads:	3#2		

Specs			
Catalog Number:	ECP84409T-4	Heater Indicator:	No Heater
Enclosure:	TEFC	Insulation Class:	F
Frame:	444T	Inverter Code:	Inverter Ready
Frame Material:	Iron	IP Rating:	IP56
Output @ Frequency:	100.000 HP @ 60 HZ	KVA Code:	G
Synchronous Speed @ Frequency:	1200 RPM @ 60 HZ	Lifting Lugs:	Standard Lifting Lugs
Voltage @ Frequency:	460.0 V @ 60 HZ	Motor Lead Quantity/Wire Size:	3 @ 2 AWG
XP Class and Group:	CLI GP A,B,C,D	Motor Type:	A44064M
XP Division:	Division II	Mounting Arrangement:	F1
Agency Approvals:	CCSA US	Power Factor:	82
	UR	Pulley End Bearing Type:	Ball
Auxillary Box:	No Auxillary Box	Pulley Face Code:	Standard
Base Indicator:	Rigid	Shaft Ground Indicator:	No Shaft Grounding
Bearing Grease Type:	Polyrex EM (-20F +300F)	Shaft Rotation:	Reversible
Constant Torque Speed Range:	15-60	Shaft Slinger Indicator:	No Slinger
Current @ Voltage:	119.000 A @ 460.0 V	Speed Code:	Single Speed
Design Code:	B	Motor Standards:	None
Drip Cover:	No Drip Cover	Starting Method:	Direct on line

Duty Rating:	CONT	Thermal Device - Bearing:	None
Enclosure Modification:	841	Thermal Device - Winding:	None
Feedback Device:	NO FEEDBACK	XP Temp Code:	T3

Nameplate NP3237

CAT NO	ECP84409T-4	SPEC NO.	A44-5000-3905				
HP	100	AMPS	119	VOLTS	460		
FRAME SIZE	444T	RPM	1190	HZ	60		
D.E. BRG.DATA	6318	O.D.E. BRG.DATA	6318	PH	3		
D.E. BRG.	90BC03J30X	TYPE	P	ENCL	TEFC		
O.D.E. BRG.	90BC03J30X	POWER FACTOR	82		CODE	G	
3/4 LOAD EFF.	95.3	IP	56	MAX CORR KVAR	27.0		
TEMP CODE	T3	TEMP =	200		NEMA-NOM-EFFICIENCY	95	
CHP HZ	60-90	CT HZ	15-60	VT HZ	0-60	GUARANTEED EFFICIENCY	94.1
INVERTER-TEMP-CODE	T3	MOTOR WEIGHT					
SER.NO.							

Nameplate 000613007EX

CAT NO	ECP84409T-4	SPEC NO.	A44-5000-3905
NO. ROTOR BARS	71	GREASE TYPE	POLYREX EM
NO. SLOTS	90	NL AMPS AT RATED VOLTAGE	39.4
5 YEAR WARRANTY		WINDING RES @25 C	.05474
MFG. DATE		SER.NO	

Parts List		
Part Number	Description	Quantity
SA364325	SA A44-5000-3905	1.000 EA
RA353649	RA A44-5000-3905	1.000 EA
000613006PU	N/P (RELEASE QTY 10,000) UL CSA LABEL	1.000 EA
NP3237	SS SUPER E INVERTER DUTY IEEE 841	1.000 EA
000613007EX	SS IEEE 841 EMBOSSED AUXILIARY NAMEPLATE	1.000 EA
000692000FF	N/P	1.000 EA
000692000JP	N/P	1.000 EA
000692000VD	LABEL WARNING	1.000 EA
000692000VH	N/P (RELEASE 1000 PCS)	1.000 EA
421948051	LABEL, MYLAR	1.000 EA
004824015A	GREASE POLYREX EM	1.160 LB
032018008CK	HHCS 3/8-16X1L PLATED	4.000 EA
032018020FK	HHCS 3/4-10X2-1/2 PLTD.	4.000 EA
032018030DK	HHCS 1/2-13X3-3/4 PLTD.	3.000 EA
032620016LA	SOCKET SET SCREW-449	3.000 EA
034017014AB	LCKW 3/8 STD. PLATED	4.000 EA
034180014DA	KEY 1/4X1/4X1-3/4 L	1.000 EA
034530064AB	P/NIP 1/8 X 8" L Pipe Nipple	1.000 EA
034530064BB	P/NIP 1/4X8 PLATED	1.000 EA
034600001AA	BUSH 1/4TO1/8 BLACK	1.000 EA
034630002AB	CPLG 1/4" PLATED	1.000 EA
034690005AB	PPLG 3/4 PLATED	2.000 EA
035000001G	GREASE RELIEF FITTING, ALEMITE 317400	1.000 EA
078549001DA	FAN 400 078549001F	1.000 EA


Parts List (continued)		
Part Number	Description	Quantity
083199082RA	G28 SHORT FAN COVER W/BAFFLE ASSEMBLY	1.000 EA
089490099D	G28 BRKT 089490098WCA	1.000 EA
410700004A	WSHR	1.000 EA
415028021L	SEAL - 449	1.000 EA
415072001B	CLAMP	1.000 EA
415096002A	CPLG 1/8 HEX TYPE	1.000 EA
423709011D	WASHER	3.000 EA
032018004BK	HHCS 5/16-18X1/2 PLATED	3.000 EA
032018020FK	HHCS 3/4-10X2-1/2 PLTD.	4.000 EA
032018030DK	HHCS 1/2-13X3-3/4 PLTD.	3.000 EA
034017013AB	LCKW 5/16 STD. PLATED	3.000 EA
415915007G	GASK, LAC	1.000 FT
034530044AB	P/NIP 1/8X5-1/2L GALV.	1.000 EA
034530044BB	P/NIP 1/4X5-1/2L PLT	1.000 EA
034600001AA	BUSH 1/4TO1/8 BLACK	1.000 EA
034630002AB	CPLG 1/4" PLATED	1.000 EA
035000001G	GREASE RELIEF FITTING, ALEMITE 317400	1.000 EA
089490099D	G28 BRKT 089490098WCA	1.000 EA
415028021L	SEAL - 449	1.000 EA
415096002A	CPLG 1/8 HEX TYPE	1.000 EA
418151014G	RETAIN RING	1.000 EA
423709011D	WASHER	3.000 EA
702623013A	THERMAL BARRIER -- G28 -- BRACKET MTD	1.000 EA
032018008BK	HHCS 5/16-18X1L PLATED	4.000 EA

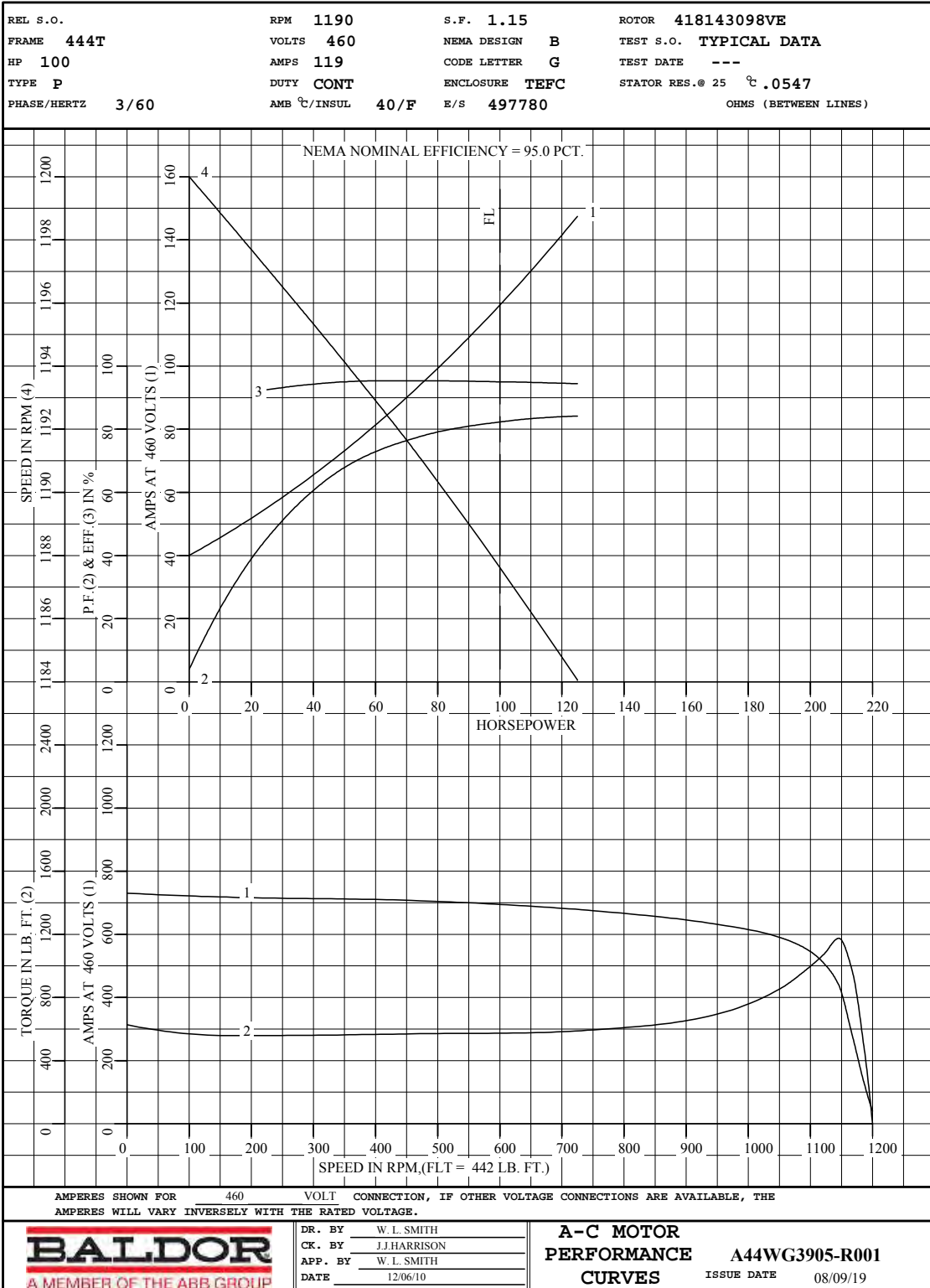
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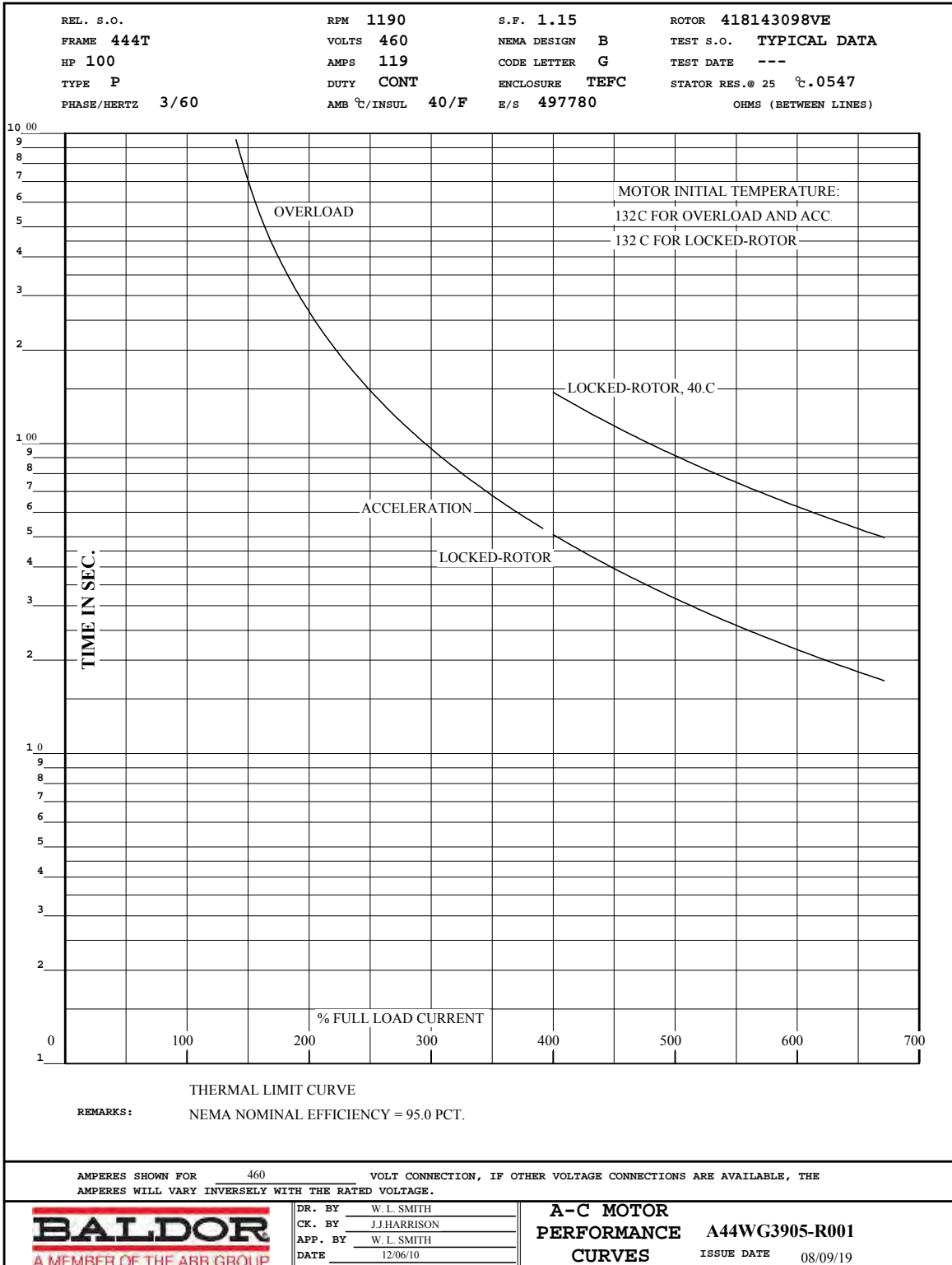
032018008DK	HHCS 1/2-13X1 PLATED	4.000 EA
033512006LB	HHTTS 1/4-20X3/4 PLTD.	1.000 EA
035000001A	ALFTG 1/8" 1610-BL	1.000 EA
035000001A	ALFTG 1/8" 1610-BL	1.000 EA
067053001C	GASK 440	1.000 EA
076863000C	+CBCST BLKT - 440	1.000 EA
076864000A	CBCST BLKT - 440	1.000 EA
406056007A	GASKET, 440	1.000 EA
406099000A	PLUG - FAN COVER 320-440	1.000 EA
415000103D	T/LUG #4AWG-1/0AWG W/HOLE FOR .250 BOLT	1.000 EA
418150003A	GREASE FITTING CAP	1.000 EA
418150003A	GREASE FITTING CAP	1.000 EA
MG1025N19	WILKO 778.50 BLUE GREEN - 55 GAL DRUMS	0.440 GA
033775004EA	DRSCR #6-1/4 304 S.S.	2.000 EA
034180054KA	7/8 SQ X 6.75 KEY	1.000 EA
MN416	TAG-INSTAL-MAINT w/wire. (1200/bx) 3/19	1.000 EA
604797045	STD. 400 FRAME SKID	1.000 EA
LB1449	DIV-2/NEC WARNING LABEL	1.000 EA
412118006A	DRAIN	2.000 EA

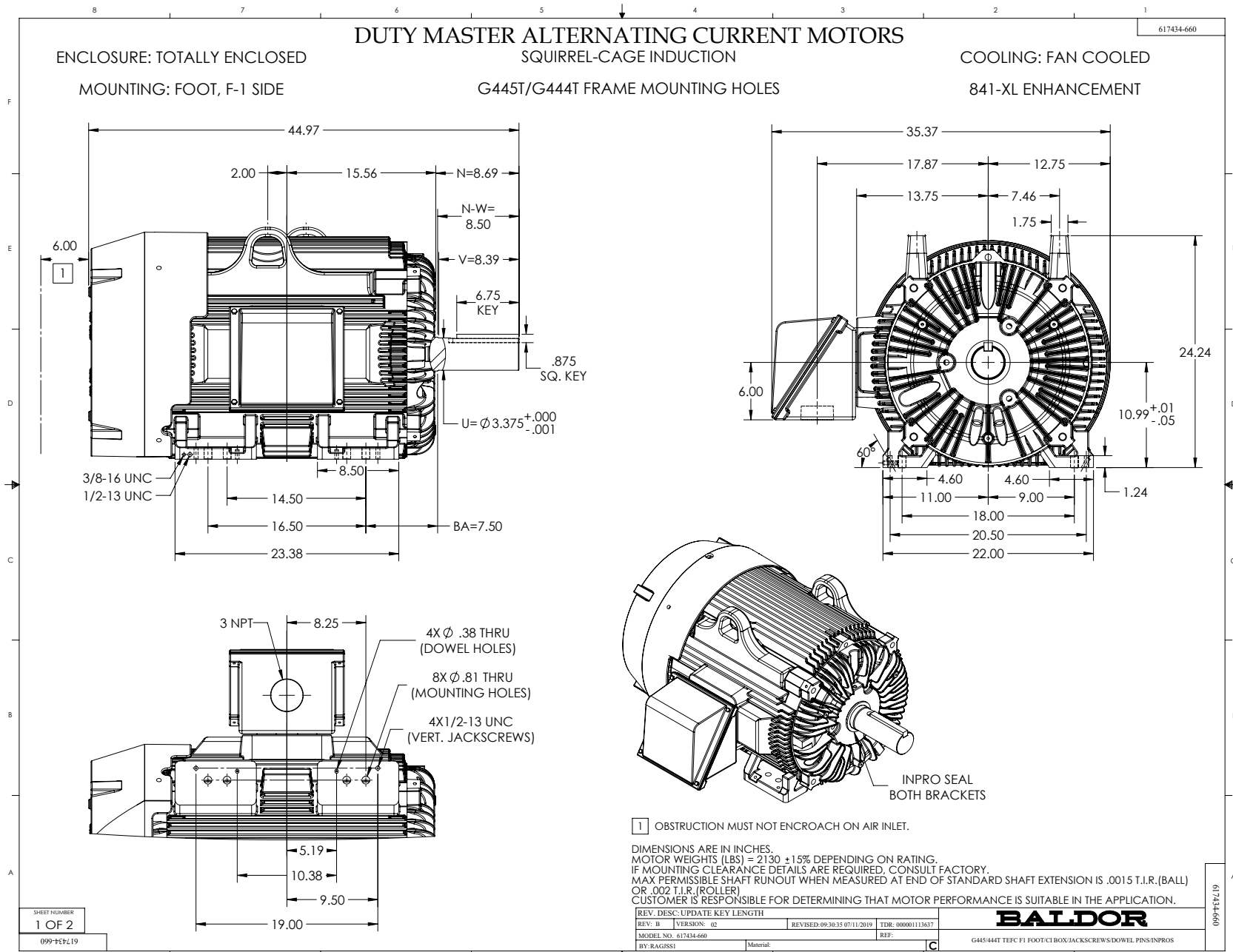
Product Information Packet: ECP84409T-4 - 100HP, 1190RPM, 3PH, 60HZ, 0444T, TEFC, F1

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REL. S.O.	FRAME	HP	TYPE	PHASE/ HERTZ	RPM	VOLTS
	444T	100	P	3/60	1190	460
AMPS	DUTY	AMB °C/ INSUL.	S.F.	NEMA DESIGN	CODE LETTER	ENCL.
119	CONT	40/F	1.15	B	G	TEFC
E/S	ROTOR	TEST S.O.	TEST DATE	STATOR RES. @25 °C OHMS (BETWEEN LINES)		
497780	418143098VE	---	---	.0547		
PERFORMANCE						
LOAD	HP	AMPERES	RPM	% POWER FACTOR	% EFFICIENCY	
NO LOAD	0	39.8	1200	4.02	0	
1/4	25.0	55.8	1197	45.5	92.5	
2/4	50.0	72.6	1194	67.9	95.0	
3/4	75.0	94.5	1191	77.9	95.3	
4/4	100	120	1188	82.3	95.0	
5/4	125	147	1184	84.1	94.4	
SPEED TORQUE						
		RPM	TORQUE % FULL LOAD	TORQUE LB.-FT.	AMPERES	
LOCKED ROTOR		0	142	627	730	
PULL UP		168	126	558	717	
BREAKDOWN		1146	266	1175	438	
FULL LOAD		1188	100	442	120	
<p>AMPERES SHOWN FOR 460. VOLT CONNECTION. IF OTHER VOLTAGE CONNECTIONS ARE AVAILABLE, THE AMPERES WILL VARY INVERSELY WITH THE RATED VOLTAGE</p> <p>REMARKS: TYPICAL DATA NEMA NOMINAL EFFICIENCY = 95.0 PCT.</p>						
		DR. BY <u>W. L. SMITH</u>		A-C MOTOR PERFORMANCE A44WG3905-R001 DATA ISSUE DATE 08/09/19		
		CK. BY <u>J.J.HARRISON</u>				
		APP. BY <u>W. L. SMITH</u>				
		DATE <u>12/06/10</u>				

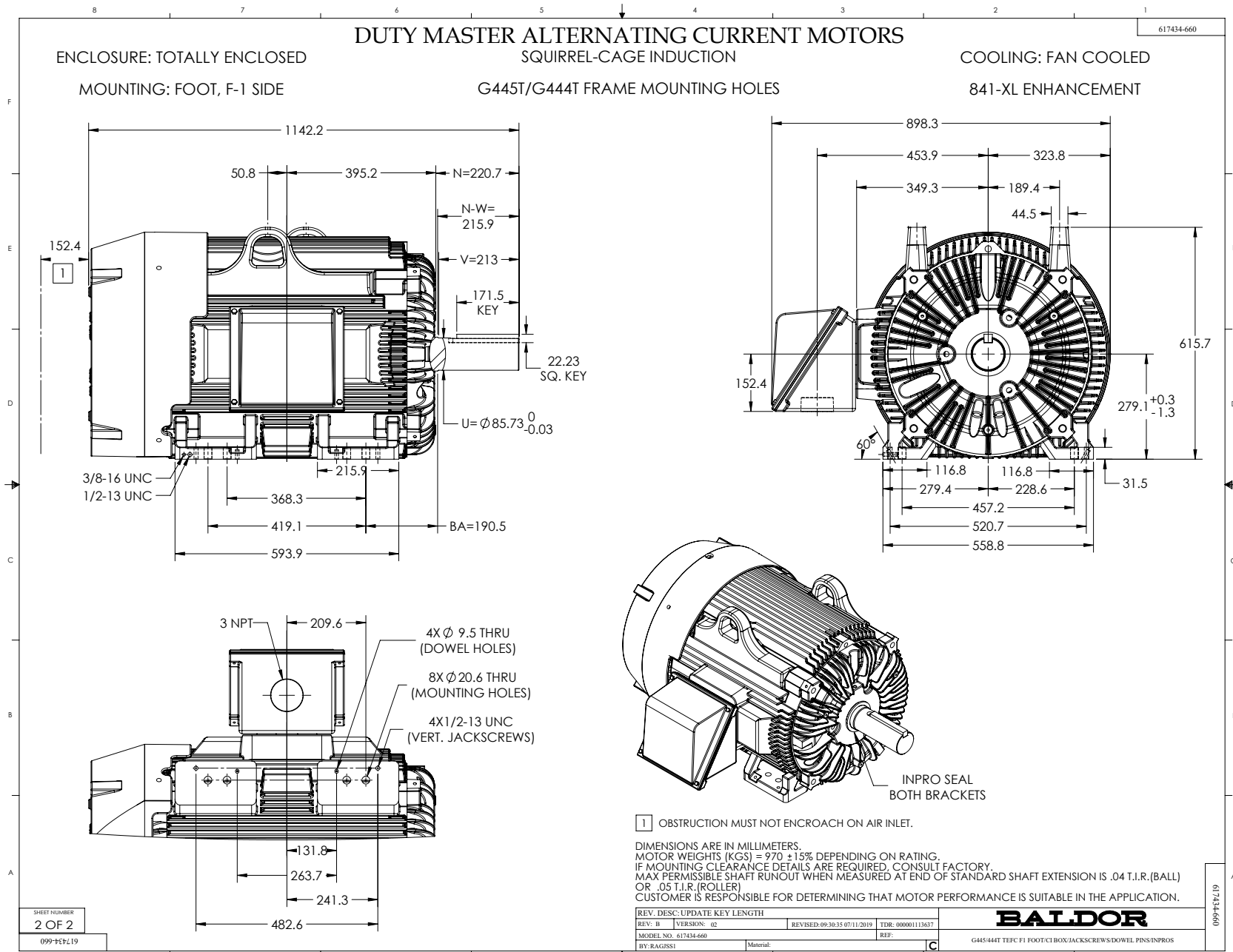






SHEET NUMBER
1 OF 2

099-147L19

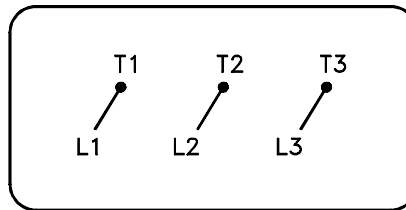


SHEET NUMBER
2 OF 2

099-147L19

416820-036

A-C MOTOR
CONNECTION DIAGRAM
STANDARD 3 LEAD CONNECTED



(N.P. 1575-BA)

416820-036

REV. DESC: LOADED TO BUS, C/R 335225		
REV. LTR: -	VERSION: 00	TDR: 000000538207
FILE: \MGA\00000\682	REVISED: 11:54:06 04/30/2010	
MTL: -	BY: RAGRA	

BALDOR

CONN DIAG - STANDARD 3 LEAD

SH 1 of 1

Buffalo Air Handling, Pressure Drop Program

Results Page



Version 3.0d

Program User Name: Jerome Snyder
 Date: 11/10/2022
 Order Number: 220094-02, -03, -04, -05, -06, -07
 Mark: AHU-4901 thru 4906 (SAF)
 Customer Name: Eli Lilly & Co. - Concord DAP
 Engineer: Hipp Design+Consulting
 Design AirFlow (CFM): 55000
 Fan Quantity: 1
 Additional Information:

Upstream External Losses (in. W.G.): 0.25
 Downstream External Losses (in. W.G.): 2.25

**NOTE: A pressure drop value followed by "*" indicates a user defined value.*

UpStream Components

Face Velocity	Pressure Drop	Component
1257	0.05	Inlet - Wall or Ceiling, Damper
500	0.75*	Filter - 2" Pleated, Cleanliness = Average
500	1.00*	Filter - 12" Rigid, 85%, Cleanliness = Average
383	0.93*	Cooling Coil - Plate, 8 Rows

Section Total	2.73	

Fan Components

Face Velocity	Pressure Drop	Component
	0.12	Inlet screen reduction
	0.02	Outlet screen reduction
	0.15	Fan Extra Pressure

3460	0.29	Fan - Supply, Plenum, Arrangement 4, 54.25 Wheel dia.

DownStream Components

Face Velocity	Pressure Drop	Component
500	1.00*	Filter - 12" Rigid, 95%, Cleanliness = Dirty
1194	0.18	Discharge - Wall or Ceiling, Damper, Acceleration

Section Total	1.18	

Summary

Fan Static Pressure = 6.70

Total Internal Losses (in. W.G.): 4.20
 Total External Losses (in. W.G.): 2.50

 Total: 6.70

(Extra Static Pressure = 0.15, Fan Section)

Disclaimer: This program is based on performance estimates provided by original equipment manufacturers. It should be applied with reasonable engineering assumptions and the results verified.

FAN DETAILS

Job Name: Hipp - Lilly Concord DAP



Tag: RF02, AHU-4901
 Customer: Buffalo Air Handling
 Job ID: 220094
 Date: December 20, 2022

Description

Quantity 1
 Model EPFN
 Size 445
 Width SWSI
 Arrangement 4
 Class III
 Rotation CW
 Discharge HOR
 Wheel Diameter (in) 44.5
 Drive method Direct
 Percentage width 96%
 Percentage diameter 100%
 Motor position --
 Design VFD Op. Freq 55hz

Performance

Volumetric Flow CFM 49,500
 Operating SP (in WC) 2.650
 Standard SP (in WC) 2.616
 RPM 1083
 Tip Speed (FPM) 12617
 Oper. Power BHP 37.64
 Standard Power BHP 37.15
 Outlet Area (sq.ft) 14.766
 Outlet Velocity (FPM) 3352
 Max RPM for Class 1545
 Static Efficiency 54.94%
 Total Efficiency 69.63%
 FEI 1.11
 FEP (KW) 29.81
 System FEI 1.11
 System FEP (KW) 29.81

Air/Gas Properties

Altitude above sea level (ft) ... 705
 Inlet Pressure (in WC) 0.000
 Inlet Temperature(°F) 50
 Design Temperature (°F) 50
 Gas Type Operating air
 Estimated Density (lb/ft³) 0.076

Motor Data

Power (HP) 50
 Enclosure TEFC
 Speed (RPM) 1200
 Voltage 460V
 Phase 3
 Frequency 60Hz
 Frame Size 365T
 Technology

Modifiers

Using VFD.

Sound

Octave Bands	1	2	3	4	5	6	7	8	LwA
Level at Inlet	91	103	97	88	89	88	83	73	95
Level at Outlet	96	106	103	98	97	95	87	78	102

Distance in ft	1	3	5
dBA at inlet	96	86	82
dBA at Outlet	102	92	88

Sound Power Levels in dB re.10⁻¹² Watts:

Estimated sound pressure level in dBA (re: 0.0002 microbar) based on a single * ducted installation:

*To estimate dBA level for ducted inlet and ducted outlet (into and out of the room) type installation, deduct 20 from the LwA value shown. Using a directivity factor of 1. Estimated Sound Pressure based on free field, spherical (Q = 1) radiation at stated distance.

Definitions:

LwA The overall (single value) fan sound power level, 'A' weighted.

dBA The environment for each fan installation influences its measured sound value, therefore dBA levels cannot be guaranteed. Consult AMCA Publication 303 for further details. A fan's dBA is influenced by nearby reflective surfaces.

FAN DETAILS

Job Name: Hipp - Lilly Concord DAP



Tag: RF02, AHU-4901
Customer: Buffalo Air Handling
Job ID: 220094
Date: December 20, 2022

Pricing Detail

EPFN 445, Class III, Arrangement 4 Bare fan	1,437lb
Guard - Protective Enclosure	100 lb
Screen - Inlet, Std Type	0 lb
Vibration Isolators - Seismic - 2" Defl	0 lb
Special Width Construction	0 lb
Wheel - Aluminum	0 lb
Mount Fan on Base	0 lb
Piezometer Flow Measurement Ring (Copper Construction)	0 lb
Base - Isolation (2" Deflection)	873 lb
Balancing - Special	0 lb
BALANCE TO CATEGORY BV-5, [BUFFALO AIR HANDLING]	
Motor 50 HP, 1200 RPM, 460V, 3Ph, 60Hz , TEFC - Premium , Induction , 365T	995 lb
Mount Customer Supplied Motor	0 lb
<hr/>	
Each Weight	3,405 lb
Extended Weight	3,405 lb

Job Name: Hipp - Lilly Concord DAP



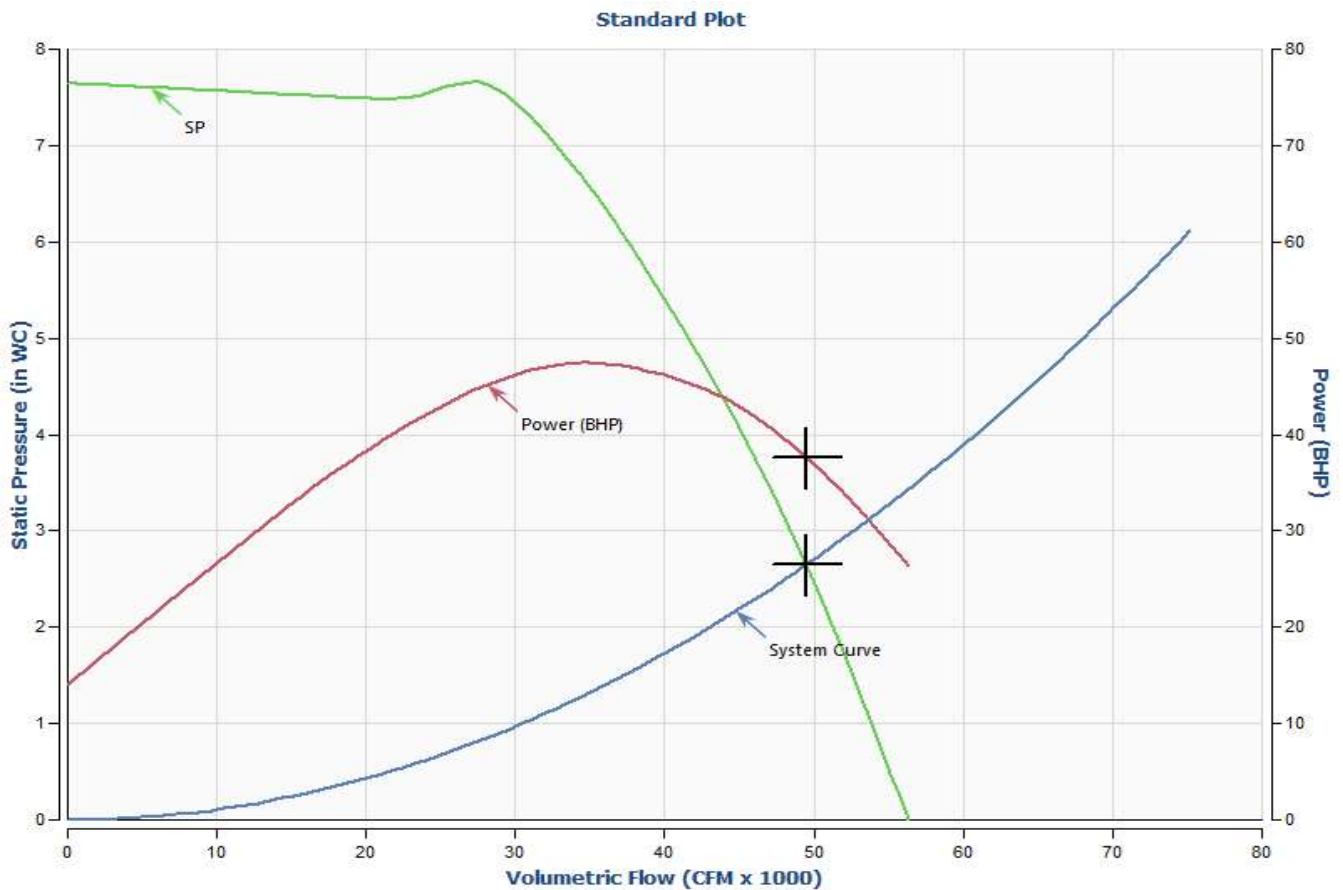
Customer: Buffalo Air Handling
Job ID: 220094
Date: December 20, 2022

Tag: RF02, AHU-4901

Fan information

Size/Model	445/EPFN	Class	III	Outlet Vel (FPM)	3352
Volumetric Flow (CFM)	49500	Speed (RPM)	1083	Density (lb/ft³)	0.076
SP (in WC)	2.65	Max Speed	1545 RPM @ 50 °F		
		Power (BHP)	37.64		

Adjusted for 96% Width, Op temp: 50°F, Design temp: 50°F, Altitude: 705 ft, Inlet Dens: 0.0760 lb/ft3



BALDOR • *RELIANCE*

Product Information Packet

ECP84312T-4

50HP, 1185RPM, 3PH, 60HZ, 365T, TEFC, FOOT

Part Detail							
Revision:	G	Status:	PRD/A	Change #:		Proprietary:	No
Type:	AC	Prod. Type:	A36062M	Elec. Spec:	A36WG0777	CD Diagram:	416820-036
Enclosure:	TEFC	Mfg Plant:		Mech. Spec:		Layout:	617428-005
Frame:	365T	Mounting:	F1	Poles:	06	Created Date:	10-19-2010
Base:		Rotation:	PS	Insulation:	F	Eff. Date:	10-27-2014
Leads:	3#4					Replaced By:	
Literature:		Elec. Diagram:					

Nameplate NP3237									
CAT NO	ECP84312T-4	SPEC NO.	P36G5237						
HP	50	AMPS	61.7	VOLTS	460	DESIGN	B		
FRAME SIZE	365T	RPM	1185	HZ	60	AMB	40	SF	1.15
D.E. BRG.DATA	6313	O.D.E. BRG.DATA	6313	PH	3	DUTY	CONT	INSUL.CLASS	F
D.E. BRG.	65BC03J30X	TYPE	P	ENCL	TEFC	CODE	F		
O.D.E. BRG.	65BC03J30X	POWER FACTOR	81	NEMA-NOM-EFFICIENCY	94.1				
3/4 LOAD EFF.	94.4	MAX CORR KVAR	14.0	GUARANTEED EFFICIENCY	93.6				
TEMP CODE	T3A	TEMP =	180						
CHP HZ	60-90	CT HZ	6-60	VT HZ	0-60				
INVERTER-TEMP-CODE	T3A								
SER.NO.		MOTOR WEIGHT							

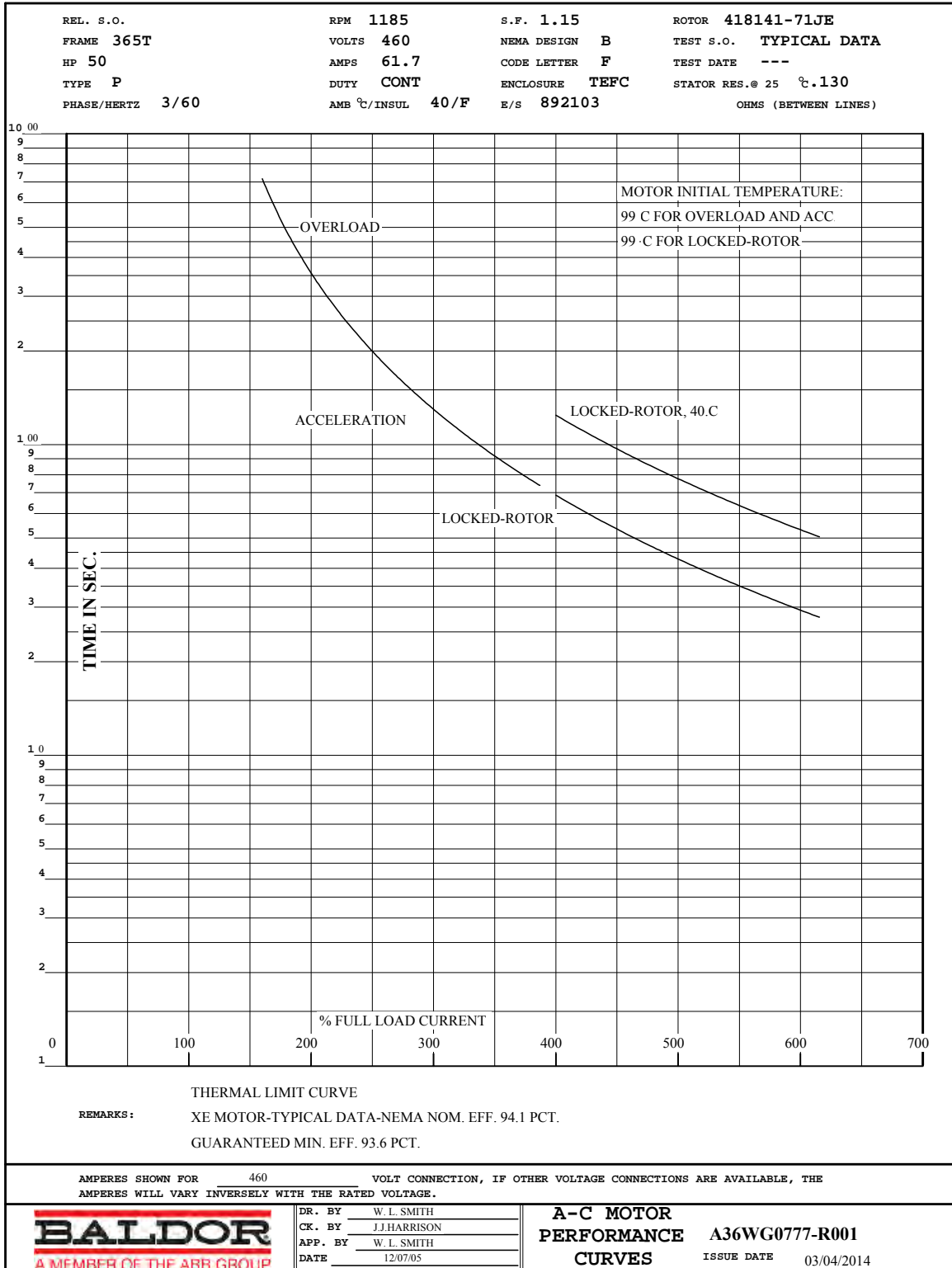
Nameplate 000613007EX					
CAT NO	ECP84312T-4	SPEC NO.	P36G5237		
NO. ROTOR BARS	55	GREASE TYPE	POLYREX EM		
NO. SLOTS	72	IEEE 85 NOISE LEVEL	72DBA		
5 YEAR WARRANTY		MFG. DATE			
NL AMPS AT RATED VOLTAGE	20.8	WINDING RES @25 C	.12973	OHMS	
SER.NO					

Parts List		
Part Number	Description	Quantity
SA209144	SA P36G5237	1.000 EA
RA196406	RA P36G5237	1.000 EA
NP3237	SS SUPER E INVERTER DUTY IEEE 841	1.000 EA
000613007EX	N/P BALDOR	1.000 EA
000692000JP	N/P	1.000 EA
000692000VD	LABEL WARNING	1.000 EA
000692000VH	N/P	1.000 EA
004824015A	GREASE POLYREX EM	0.544 LB
032018008AK	HHCS 1/4-20X1 PLATED	4.000 EA
032018012DK	HHCS 1/2-13X1-1/2 PLTD.	4.000 EA
032018024CK	HHCS 3/8-16X3 PLTD.	3.000 EA
032018012DK	HHCS 1/2-13X1-1/2 PLTD.	4.000 EA
032018024CK	HHCS 3/8-16X3 PLTD.	3.000 EA
034180012DA	KEY 1X4X1/4X1-1/2 L	1.000 EA
034530032BB	P/NIP 1/4X4" SCHED 40	1.000 EA
034530052AB	P/NIP 1/8X6-1/2 GALV.	1.000 EA
034600001AA	BUSH 1/4TO1/8 BLACK	1.000 EA
034630002AB	CPLG 1/4" PLATED	1.000 EA
035000001G	GREASE RELIEF FITTING, ALEMITE 317400	1.000 EA
085922083BH	BRKT 360 085922072WCC KB	1.000 EA
412118006A	DRAIN	1.000 EA
085922083BH	BRKT 360 085922072WCC KB	1.000 EA
412118006A	DRAIN	1.000 EA
078550001M	FAN KB 60/30 (30) 360	1.000 EA

Parts List (continued)		
Part Number	Description	Quantity
078559034A	+F/C A 078559001A - 360	1.000 EA
410700004F	WSHR	1.000 EA
415028008E	INPRO SEAL - 360	1.000 EA
415072001B	CLAMP	1.000 EA
415096002A	CPLG 1/8 HEX TYPE	1.000 EA
423709011C	WASHER	3.000 EA
034630002AB	CPLG 1/4" PLATED	1.000 EA
035000001G	GREASE RELIEF FITTING, ALEMITE 317400	1.000 EA
415028008E	INPRO SEAL - 360	1.000 EA
415096002A	CPLG 1/8 HEX TYPE	1.000 EA
423709011C	WASHER	3.000 EA
032018010CK	HHCS 3/8-16X1-1/4 PLTD.	4.000 EA
033512004LB	HHTTS 1/4-20X1/2 PLTD.	1.000 EA
033512008LB	HHTTS 1/4-20X1 PLATED	4.000 EA
034000014AB	WSH ID.406 OD.812 TH.065	4.000 EA
035000001A	ALFTG 1/8" 1610-BL	1.000 EA
035000001A	ALFTG 1/8" 1610-BL	1.000 EA
067053000B	GASK 320-400	1.000 EA
076708000BB	C/B - 360	1.000 EA
076709000A	C/B CVR - 360	1.000 EA
406099000A	PLUG - FAN COVER 320-440	1.000 EA
415000103D	T/LUG #4AWG-1/0AWG W/HOLE FOR .250 BOLT	1.000 EA
415039016A	TERBD, 360-400	1.000 EA
418150003A	GREASE FITTING CAP	1.000 EA

Product Information Packet: ECP84312T-4 - 50HP,1185RPM,3PH,60HZ,365T,TEFC,FOOT

033775004EA	DRSCR #6-1/4 304 S.S.	4.000 EA
418150003A	GREASE FITTING CAP	1.000 EA
034530020BB	P/NIP 1/4X2-1/2 PLATED	1.000 EA
034530032AB	P/NIP 1/8X4 PLATED	1.000 EA
034600001AA	BUSH 1/4TO1/8 BLACK	1.000 EA
034180034HA	KEY 5/8X5/8X4-1/4 L	1.000 EA
004824003AJD	WILKO 778.50 BLUE GREEN - 55 GAL DRUMS	0.250 GA
004824003CBY	WILKO PAINT 060.02 - ACTIVATOR	0.063 GA
482403003BEF	RUST VETO 342	0.013 GA
MG1500G03	PRIMER- S4318E GEMINI 5 GA, HC9068	0.063 GA
421948051	LABEL, MYLAR	1.000 EA
14PA1000	PACKAGING 314 GROUP COMBINED PRINT	1.000 EA
LB1449	DIV-2/NEC WARNING LABEL	1.000 EA

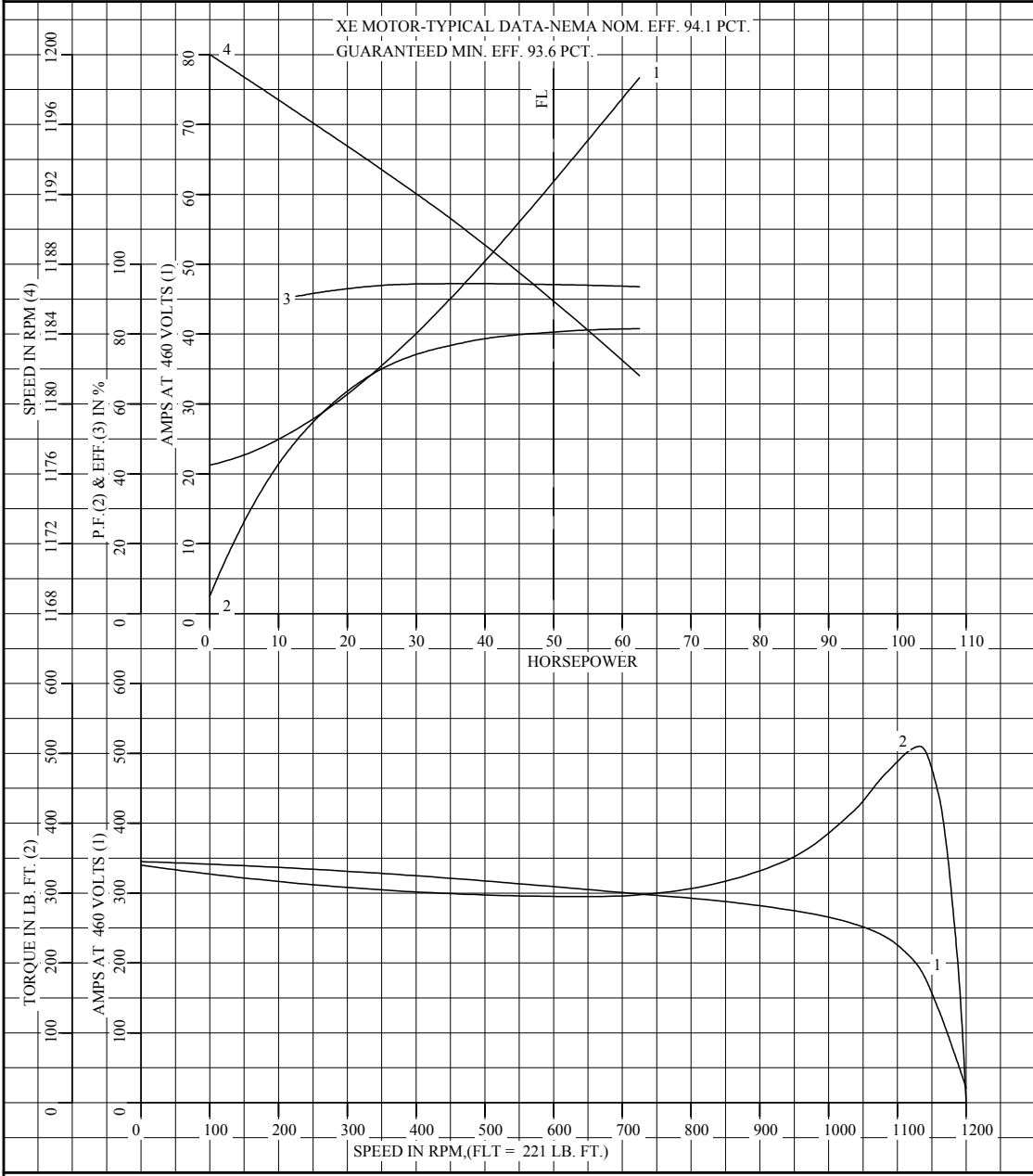




REL. S.O.	FRAME	HP	TYPE	PHASE/HERTZ	RPM	VOLTS
	365T	50	P	3/60	1185	460
AMPS	DUTY	AMB °C/INSUL.	S.F.	NEMA DESIGN	CODE LETTER	ENCL.
61.7	CONT	40/F	1.15	B	F	TEFC
E/S	ROTOR	TEST S.O.	TEST DATE	STATOR RES. @25 °C OHMS (BETWEEN LINES)		
892103	418141-71JE	---	---	.130		
PERFORMANCE						
LOAD	HP	AMPERES	RPM	% POWER FACTOR	% EFFICIENCY	
NO LOAD	0	21.3	1200	5.08	0	
1/4	12.5	26.2	1197	49.4	90.8	
2/4	25.0	35.6	1193	70.0	93.9	
3/4	37.5	47.8	1190	77.8	94.4	
4/4	50.0	61.7	1186	80.6	94.2	
5/4	62.5	76.7	1182	81.5	93.6	
SPEED TORQUE						
		RPM	TORQUE % FULL LOAD	TORQUE LB.-FT.	AMPERES	
LOCKED ROTOR		0	154	340	345	
PULL UP		650	133	295	305	
BREAKDOWN		1133	230	510	191	
FULL LOAD		1186	100	221	61.7	
<p>AMPERES SHOWN FOR 460. VOLT CONNECTION. IF OTHER VOLTAGE CONNECTIONS ARE AVAILABLE, THE AMPERES WILL VARY INVERSELY WITH THE RATED VOLTAGE</p> <p>REMARKS: TYPICAL DATA XE MOTOR-TYPICAL DATA-NEMA NOM. EFF. 94.1 PCT. GUARANTEED MIN. EFF. 93.6 PCT.</p>						
<p>A MEMBER OF THE ABB GROUP</p>		DR. BY <u>W. L. SMITH</u> CK. BY <u>J. J. HARRISON</u> APP. BY <u>W. L. SMITH</u> DATE <u>12/07/05</u>		A-C MOTOR PERFORMANCE DATA A36WG0777-R001 ISSUE DATE 03/04/20		

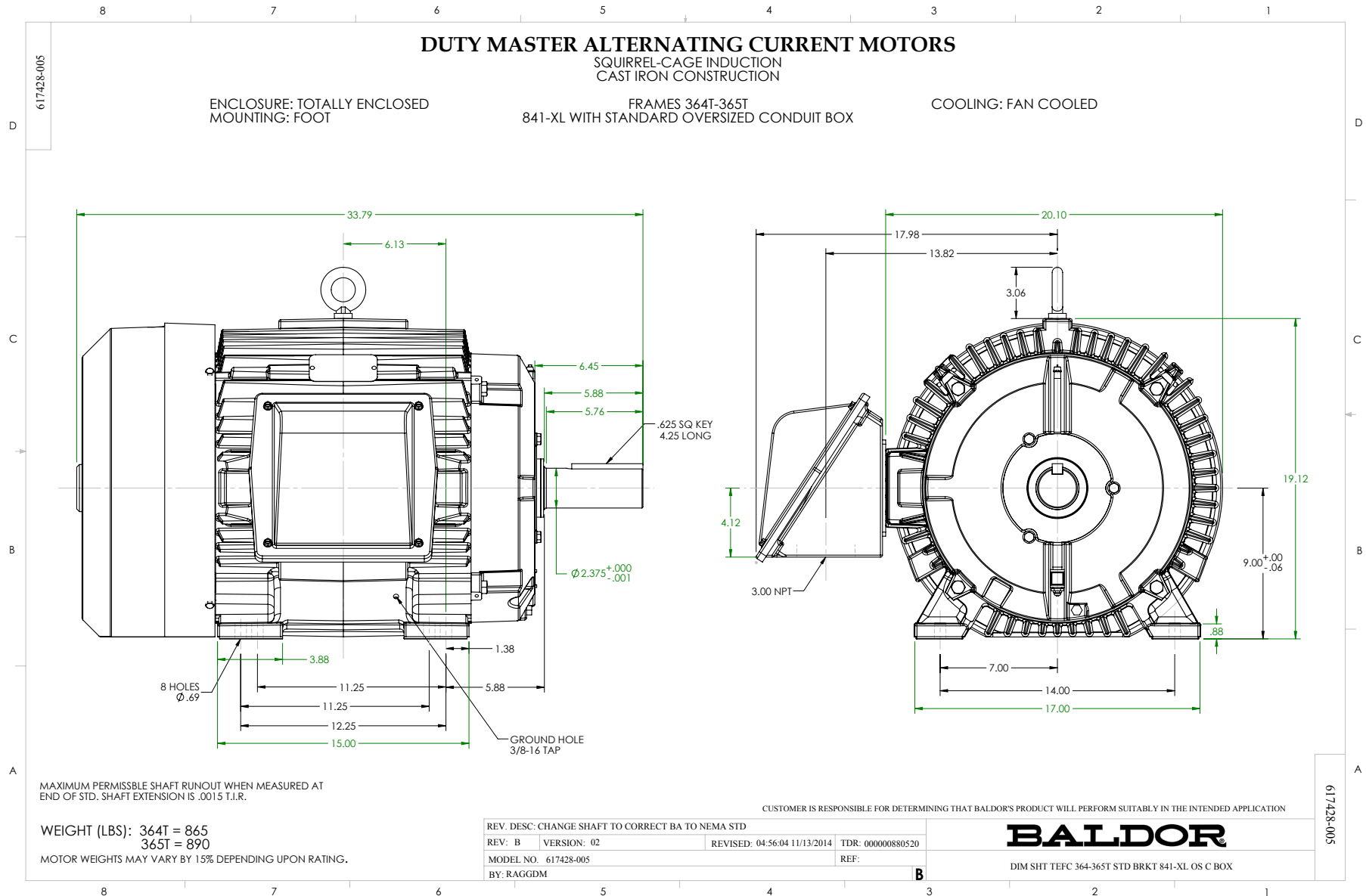


REL S.O.	RPM 1185	S.F. 1.15	ROTOR 418141-71JE
FRAME 365T	VOLTS 460	NEMA DESIGN B	TEST S.O. TYPICAL DATA
HP 50	AMPS 61.7	CODE LETTER F	TEST DATE ---
TYPE P	DUTY CONT	ENCLOSURE TEFC	STATOR RES. @ 25 °C .130
PHASE/HERTZ 3/60	AMB °C/INSUL 40/F	E/S 892103	OHMS (BETWEEN LINES)



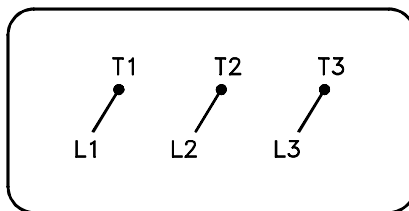
AMPERES SHOWN FOR 460 VOLT CONNECTION, IF OTHER VOLTAGE CONNECTIONS ARE AVAILABLE, THE AMPERES WILL VARY INVERSELY WITH THE RATED VOLTAGE.

<p>A MEMBER OF THE ABB GROUP</p>	DR. BY W. L. SMITH	<p>A-C MOTOR PERFORMANCE CURVES</p> <p>A36WG0777-R001</p> <p>ISSUE DATE 03/04/2014</p>
	CK. BY J.J. HARRISON	
	APP. BY W. L. SMITH	
	DATE 12/07/05	



416820-036

A-C MOTOR
 CONNECTION DIAGRAM
 STANDARD 3 LEAD CONNECTED



(N.P. 1575-BA)

416820-036

REV. DESC: LOADED TO BUS, C/R 335225		
REV. LTR: -	VERSION: 00	TDR: 000000538207
FILE: \MGA\00000\682	REVISED: 11:54:06 04/30/2010	
MTL: -	BY: RAGRA	

BALDOR

CONN DIAG - STANDARD 3 LEAD
 SH 1 of 1

Buffalo Air Handling, Pressure Drop Program

Results Page



Version 3.0d

Program User Name: Jerome Snyder
 Date: 11/10/2022
 Order Number: 220094-02, -03, -04, -05, -06, -07
 Mark: AHU-4901 thru 4906 (RAF),
 Customer Name: Eli Lilly & Co. - Concord DAP
 Engineer: Hipp Design+Consulting
 Design AirFlow (CFM): 49500
 Fan Quantity: 1
 Additional Information:

Upstream External Losses (in. W.G.): 1.75
 Downstream External Losses (in. W.G.): 0.25

**NOTE: A pressure drop value followed by "*" indicates a user defined value.*

UpStream Components

Face Velocity	Pressure Drop	Component
1238	0.05	Inlet - Wall or Ceiling, Damper

Section Total	0.05	

Fan Components

Face Velocity	Pressure Drop	Component
	0.20	Inlet screen reduction
	0.03	Outlet screen reduction
	0.17	Fan Extra Pressure

4690	0.4	Fan - Supply, Plenum, Arrangement 4, 44.50 Wheel dia.

DownStream Components

Face Velocity	Pressure Drop	Component
1257	0.20	Discharge - Wall or Ceiling, Damper, Acceleration

Section Total	0.20	

Summary

Fan Static Pressure = 2.65

Total Internal Losses (in. W.G.): 0.65
 Total External Losses (in. W.G.): 2.00

Total: 2.65

(Extra Static Pressure = 0.17, Fan Section)

Disclaimer: This program is based on performance estimates provided by original equipment manufacturers. It should be applied with reasonable engineering assumptions and the results verified.

2.3.

AHU-4907

Sales Order: Dwg. No.:

Job Order: Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

GENERAL

Customer:	<input type="text" value="Kirlin Way"/>	Qty/Size/Type:	<input type="text" value="1"/>	<input type="text" value="46"/>	<input type="text" value="BF3AI-EPFNC3OD"/>
End User:	<input type="text" value="Eli Lilly & Co., Concord Bldgs 2, 4, 6"/>	Sales Office:	<input type="text" value="412 GRS - Clark Air Systems"/>		
Engineer:	<input type="text" value="Hipp Design+Consulting"/>	Sales Rep.:	<input type="text" value="Jeff Clark"/>		
Mark:	<input type="text" value="AHU-4907"/>	Project Mgr.:	<input type="text" value="Jerome Snyder"/>		
Cust. PO:	<input type="text" value="012209"/>	Designer:	<input type="text" value=""/>		

UNIT CONSTRUCTION

Casing

Walls: **Insulation Density:** lbs/cu.ft **Design Pressure (+/-)** inches W.G.

Roof: **Environment:** construction

Exterior: **Fasteners:** Exterior Interior

Interior: -

Bulkhead: -

	Type:	Color:	Notes:
Exterior Paint:	<input type="text" value="No paint"/>	<input type="text" value=""/>	<input type="text" value=""/>
Interior Paint:	<input type="text" value="No paint"/>	<input type="text" value=""/>	<input type="text" value=""/>
Base Frame Paint:¹	<input type="text" value="No paint"/>	<input type="text" value=""/>	<input type="text" value=""/>

Thermal Break Construction: **Location:**

Knockdown Construction: **KD Type:**

Unit Installed On²:

¹ - All black steel, including unit base, shall be painted w/ epoxy mastic.; ² - Provide level foundation under perimeter of each section.

Base

Base Frame: in w/ with **Foundation Holes:**

Floor Sheets: -

Floor sheets are with turned-up perimeter lip.

Drain Pan: -

Drain Pan Connection Hand:

Bottom Sheets: -

Floor Drains: **Connection Hand:** **Material & Location:**

Doors³

Qty	Size HxW	Type ⁴	Swing	Hinge	Latch Qty	Latch Type	View Port ⁵	Exterior ⁶	Interior ⁶
4	72 x 24	TB	Draw-Through	upstream	2	Ventlok 310 Chrome	12x12 TP	0.050" EA	0.040" SA
2	72 x 30	TB	Blow-Through	downstream	2	Ventlok 310 Chrome	12x12 TP	0.050" EA	0.040" SA
1	72 x 24	TB	Blow-Through	downstream	2	Ventlok 310 Chrome	12x12 TP	0.050" EA	0.040" SA

³ - All Door Sizes are nominal, consult factory for actual opening dimensions. Refer to main assembly drawing for door locations.

⁴ -NTB:Non-Thermal Break, TB: Thermal Break, HT: High Temperature; ⁵ -TP: Thermal Pane

⁶ -SA: Smooth Aluminum, EA:Embossed Aluminum, GS: Galvanized Steel, SS:Stainless Steel

Unit Construction Notes

1	BAH to provide a floor drain in non-drain pan sections and extend to unit exterior with 2" aluminum pipe. Provide cap. Drain to be 6" x 6" x 4"D. Provide aluminum grating over drain flush with unit floor. All drain material to be aluminum and welded.
2	BAH to provide a continuous length stainless steel piano hinge for all access doors

Sales Order:

Dwg. No.:

Job Order:

Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

3	BAH to provide a 1" pressure port w/ cap in each access door.
4	Floors continuously welded with no fasteners penetrating the floor. Fastening of all components to the floor is to be by welding only.
5	BAH to provide a label on each access door indicating handle position as "Open" and "Closed"
6	BAH to provide a latch & chain on all doors. (The chains are to hold the doors open)
7	All drain pans covered with 304 stainless steel fabricated grating.
8	BAH to provide our standard sealant which is NSF 51 certified and FDA compliant in accordance with 21CFR177 2600 Color to be clear or aluminum color

SHIPPING SECTIONS AND WEIGHTS

Shipping and Handling Limitations

Unit shipped in sections. Max. weight/section: LB Max. opening size: H x W x D (In.)

Shipping Sections

Sec. ⁹	Description	Weight ^{LB}	Sec. ⁹	Description	Weight ^{LB}
1	Inlet, Fan	8,286	4	Fan	8,011
2	Outlet, Mixing box, Combined filter	6,572	5	Access, Merv 16 filter, Outlet	5,799
3	Access, Chilled water coil	10,445	6		

Total Estimated Weight (Less Water) LB:

⁹ - Sections (Sec.) listed in direction of airflow.

Shipping and Handling Notes

1	
2	

FANS

Supply Fans

Qty	Mfr.	Model	Size	Dia IN	Rot./Dis.	Class	Arr.	Wheel Wid. %	Wheel Dia. %	Elev FEET	Temp °F	Max RPM	Weight LBS
1	Twin City Fans	EPFN	490	49	CW/Axial	3	4	87	100	705	70	1,403	1674
Operation	Qty	Total ACFM	ACFM/Fan	OV FPM	TSP IN WG	ESP IN WG	ISP IN WG	FSE IN WG	RPM	VFD Hz	Fan BHP	Total BHP ¹⁰	
Design	1	48,000	48,000	0	6.75	2.50	3.96	0.29	1,087	55.00	68.7	68.7	

Accessories

Fan Isolation Dampers(s)¹¹
 Inlet Screen(s)
 Outlet Screen(s)

Removable Panel Suitable for Removal of
 Drain w/ plug
 SPB Bearings

Monorail Suitable for Removal of
 Inspection Door
 Bearing Life

Nylon Extended Lubrication Lines for
 Acoustic Diffuser

Piezometer Ring(s)
 Accelerometer(s)

Return Fans

Qty	Mfr.	Model	Size	Dia IN	Rot./Dis.	Class	Arr.	Wheel Wid. %	Wheel Dia. %	Elev FEET	Temp °F	Max RPM	Weight LBS
1	Twin City Fans	EPFN	445	44.5	CW/Radial	3	4	85	100	705	70	1,545	1229
Operation	Qty	Total ACFM	ACFM/Fan	OV FPM	TSP IN WG	ESP IN WG	ISP IN WG	FSE IN WG	RPM	VFD Hz	Fan BHP	Total BHP ¹⁰	
Design	1	44,000	44,000	0	2.55	2.00	0.22	0.33	1,081	55.00	32.8	32.8	

79

Fan Isolation Dampers(s)¹¹
 Inlet Screen(s)
 Outlet Screen(s)

Removable Panel Suitable for Removal of
 Drain w/ plug
 SPB Bearings

Monorail Suitable for Removal of
 Inspection Door
 Bearing Life

Sales Order: **220094-08** Dwg. No.:

Job Order: **18807** Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

<input checked="" type="checkbox"/>	Nylon	Extended Lubrication Lines for	Motor only	<input type="checkbox"/>	Acoustic Diffuser	
<input checked="" type="checkbox"/>	Piezometer Ring(s)	<input type="checkbox"/>	w/ Control Unit	<input type="checkbox"/>	Accelerometer(s)	<input type="text" value="None"/>

¹⁰ -Total BHP includes belt losses when applicable, ¹¹ -See "Mixing & Distribution" section for damper details

*** See attached curve(s) for additional performance data ***

Fan Notes

1	Monorail provided with mechanical stops on each end, labeled with lift capacity, (1,400 Lbs) and include a soft rubber guard on end of rail when exposed to prevent head injury if struck
2	BAH to provide one (1) telescoping monorail for use through the removable panel. Monorail to be centered on the motor.
3	Removable panel is large enough to remove the fan or motor
4	Twin City Fan to provide vibration report.
5	Fans to have an aluminum wheel
6	Controller for fan air flow to be Dwyer DHII.

MOTORS

Supply Fan Motor(s)

Qty	Type	HP	Nom. RPM	Voltage	Phase/Freq	FLA	LRA	Frame	NEMA	Wgt. LB	Pos.		
1	Baldor IEEE 841 Severe Duty	100	1190	460	3/60	119	723	444T	TEFC	1,940	Dir.		
										FLA	NEC	124	A

Accessories

<input checked="" type="checkbox"/>	Suitable for use w/ VFD	<input checked="" type="checkbox"/>	Permanently Sealed Bearings	<input checked="" type="checkbox"/>	Aegis Shaft Grounding		
<input type="checkbox"/>	Winding Thermistors ¹²	<input type="checkbox"/>	Bearing RTD ¹³	<input type="checkbox"/>	Heater ¹⁴	<input type="checkbox"/>	Roller Bearings ¹⁵

Return Fan Motor(s)

Qty	Type	HP	Nom. RPM	Voltage	Phase/Freq	FLA	LRA	Frame	NEMA	Wgt. LB	Pos.		
1	Baldor IEEE 841 Severe Duty	40.0	1190	460	3/60	49.4	290	364T	TEFC	927	Dir.		
										FLA	NEC	52	A

Accessories

<input checked="" type="checkbox"/>	Suitable for use w/ VFD	<input checked="" type="checkbox"/>	Permanently Sealed Bearings	<input checked="" type="checkbox"/>	Aegis Shaft Grounding		
<input type="checkbox"/>	Winding Thermistors ¹²	<input type="checkbox"/>	Bearing RTD ¹³	<input type="checkbox"/>	Heater ¹⁴	<input type="checkbox"/>	Roller Bearings ¹⁵

¹² -Winding Thermistors are temperature sensors for windings, ¹³ -Bearing RTDs are temperature sensors for bearings, ¹⁴ -Heaters are for preheating motors, ¹⁵ -Roller Bearings are to be used for belt-drive applications with motors 60HP and larger.

Motor Notes

1	Motor to be IEEE 841 construction, but will not be labeled as IEEE 841 due to addition of Aegis SGR. Base catalog number are; ECP84110T-4, and ECP84400T-4 and will be modified to include an internal Aegis SGR and sealed bearings
2	Motor to be provided with insulated bearing on one end and a shaft grounding ring on the opposite end, installed by Baldor
3	Motors shall be provided with ground bonding points on the motor foot. See electrical section for details.

VIBRATION ISOLATION

Duty	Mfr.	Qty	Nom. Defl. IN	Isolator Type	Min Eff. %	Fan Base Type ¹⁷	Fan Thrust Restraints	Model
Exhaust	Amber Booth	1	2"	Seismic	90	Structural	Yes	AMSR
Supply	Amber Booth	1	2"	Seismic	90	Structural	Yes	AMSR

¹⁷ -Inertia base concrete by others unless otherwise noted.

Vibration Isolation Notes

1	Isolator base and springs furnished by Twin City Fan as part of the fan assembly.
---	-----------------------------------------------------------------------------------

FILTER

Sales Order: Dwg. No.:
 Job Order: Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

Mfr.	Type	Model	% Eff	MERV	H	x	W	Size(s) IN	Serv.	Frame Mat'l	Gauge	
1	Camfil	Panel	30/30		8	5	x	6	24x24x 2	Up	Stainless	By Others
1	Camfil	Rigid	Riga-Flo PH		13	5	x	6	24x24x 12	Up	Stainless	By Others
2	Camfil	Rigid	Filtra 2000	95 DOP	16	5	x	6	24x24x 12	Up	Stainless	By Others

Ship Filters BAH shall supply set(s) of extra filters for

Filter Notes

1	BAH to provide a Cleveland Controls barb fitting through the unit casing on the upstream and downstream side of each filter bank. Cleveland Controls Model number is 21118-112. This part is to be ordered from Grainger using item number 2EJN6.
2	BAH to provide a spacer frame between the pre & intermediate filter to allow individual filter reading. Use standard Dwyer filter gauge kit for the spacer frame only. Barb fittings are provided before and after the filter bank only.
3	95% DOP filters to be gel seal size 24x24x12.
4	BAH to provide gel seal stainless steel filter frames size 24-5/8x24-5/8 for the 24x24x12 95% DOP filters. Gel to be silicone based, not polyurethane based.
5	95% DOP filter frames provided with stainless steel swing arms.
6	95% DOP filter frames to be welded and sealed leak tight.
7	95% DOP frame cutoff to be welded to the frame and screwed to the unit casing.

CHILLED WATER COOLING COIL

Duty	Qty	Mfr.	Model	Tubes			Fins		Rows	Circuit				
				FH IN	FL IN	Depth IN	OD x Wall Thick IN	Fin Type			FPI x Thick IN			
1	Supply	6	Aerofin	W-10.5AW-37.5 X 69.0-6-0.75	37.5	x	69.0	x	10.0	5/8 x .035 CU	Wave	10 1/2 x .0160 AL	0	3/4

Fluid	Casing Material IN	Hdr/Con Mat'l.	Belled Tubes	Turb.	Con/Pull Hand	Con Size IN	Con Type	Ext. Con IN	Total Weight LBS ¹⁸		
										Flange	
Water	3/4	Stainless Steel	RB / RB	Yes	No	RH / RH	2 1/2	Flanged	150lb FFTH	6.0	713

Accessories

Coil Racks:

Eliminators:

CU:Copper, AL:Aluminum, FL: Finned Length, FH: Finned Height, FPI: Fins per Inch, O.D.:Outside Diameter, LH: Left Hand, RH: Right Hand, CS: Carbon Steel, SS: Stainless Steel, RB: Red Brass
 RF:Raised Face, FF:Flat Face, SO:Slip-on, WN:Weldneck, TH: Threaded

¹⁸-Dry Weight. Consult Factory for Wet (Operating) Weights.

Chilled Water Cooling Coil Notes

1	All coils to be tested at minimum 300 psig under water. Manufacturer to provide test reports.
2	BAH to provide the cooling coils with plain end supply and return red brass connections. BAH is providing flat faced slip-on brass flanges. Flanges shipped loose for field installation by others.
3	Vent & drain connections to be threaded red brass.
4	Headers to be Type K Copper
5	Any flashing around the coils to be 304 stainless steel
6	Coil connections to extend minimum 6" from the unit casing.
7	Nearside coil vent & drain connections turned outward 90° and will not be extended into the corridor.

INTERNAL PIPING

Component	Extended Piping By	Connection Material	Piping Material	Connection Type	External Flanges By
Cooling coil	BAH (Installed)	Brass	Brass	Sch 40 , Sweat end	BAH (Shipped Loose)

Internal Piping Notes

Sales Order:

Dwg. No.:

Job Order:

Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

1	<p>Cooling coil supply and return connections extended to the unit exterior using red brass pipe for two (2) farside coils. Connection between piping and the coil will be a union. Slip-on flanges provided on the exterior. Flanges shipped loose for installation in the field by others. Near side coils do not need to be extended.</p>
---	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

MIXING & DISTRIBUTION

Dampers

Tag	Duty	Mfr.	Model	Qty	W IN	x	H IN	Blade	Damper Fail Pos.	Torque Req. LBS-IN	Act. By	Type	Act ¹⁹	Qty	Signal
RA	Return Air	Ruskin	CD50	1	126	x	42	Opposed	Closed	184	BAH	Elec.	2-Pos	2	2P (N/A)
EA	Exhaust Air	Ruskin	CD50	1	40	x	12	Opposed	Closed	17	BAH	Elec.	Mod.	1	2-10v
OA	Outside Air	Ruskin	CD50	1	40	x	12	Parallel	Closed	23	BAH	Elec.	Mod.	1	2-10v
RA	Return Air	Ruskin	CD50	1	126	x	42	Parallel	Closed	257	BAH	Elec.	Mod.	3	2-10v
SA	Supply Air	Ruskin	CD50	1	138	x	42	Opposed	Closed	201	BAH	Elec.	2-Pos	2	2P (N/A)

¹⁹-Action Indicates Actuator Operation Type (Two-position or modulating)

Mixing & Distribution Notes

1	Damper Actuator power = 24v
2	Actuator to be Belimo.
3	Each damper provided with a Ruskin SP100 switch package
4	Actuator wiring conduit and wiring by others.

Sales Order: Dwg. No.:

Job Order: Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

ELECTRICAL

Routing Hardware

Conduit Material: Junction Boxes and Enclosure NEMA Rating:

Routing Notes:

ETL Label Hazardous Environment Rating

Low Voltage

Field Connection(s): Voltage: / / hz Qty of Circuits:

Qty	Light Fixture Type	Bulbs By			FLA
10	Marine Light Fixtures	By BAH	100W	Equal LED	18 A

Qty	Light Switch Type	Hours	Hold	Environment Rating	Location
1	Timer 2-Way (std)	2	W/O	Indoor	

Qty		Qty	
1	20A Duplex GFCI	0	20A Duplex Weather-Rated GFCI

High Voltage

Field Connection(s): Voltage: / / hz Qty of Circuits:

Mini-Load Center kVA x Crts NEMA: FLA @ HV A

Motor	Motor SPW	Motor Wire Termination	FLA	NEC
Supply	SPW - Unconsolidated	VFD -> Motor	124	A
Return	SPW - Unconsolidated	VFD -> Motor	52	A

VFDs/Starters

Service	Mfg	Model No.	Qty	NEMA	Voltage	HP	Supplied By	Mounted By
Supply Fans	ABB	ACH580-PCR-077A-4	1	1	460	100	By Others	By Others
Exhaust Fans	ABB	ACH580-PCR-077A-4	1	1	460	40	By Others	By Others

Electrical Notes

1	BAH to provide one (1) 2 hour timer light switch. The switch is to be mounted on the unit exterior near the supply fan access door. Centerline of the switch to be mounted approximately 4' above the bottom on the channel base. Timer switch rated 120/277V.
2	Mount a receptacle on the unit exterior underneath underneath the light switch
3	BAH to provide (2) points of power connection, one (1) for 120V connection and one (1) for 460V connection. Connections as follows: a) One (1) 120V connection at a junction box with multiple circuits (1 for lights & 1 for receptacle). b) Casing penetration for use by the contractor with VFD cable.
4	All wiring is to be 600V rated
5	All wiring to be numbered and tagged using sleeve type wire tags.
6	BAH to use 3/4" Ø conduit
7	BAH to terminate the 120V connections to a screw type terminal block (wire crimped in a compression lug). Terminals shall be "finger safe".
8	BAH to provide grounding lugs.
9	All conduit to be filled with caulk at the ends, intersections, and junctions to ensure sealed conduit runs.
10	120V power wiring shall use the following color scheme: a) Phase A - black b) Phase B - red c) Phase C - blue d) Neutral - white e) Ground - green or green with yellow stripe

Sales Order:

Dwg. No.:

Job Order:

Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

TESTING & SERVICES

BAH shall provide the following factory test(s) :

- None
- Pitot-Traverse Performance (ES-8104)
- Piezometer Ring Performance
- Sound Power (ES-8105)
- Sound Pressure (ES-8106)
- Velocity Profile (ES-8108)
- Vibration (ES-8107) in accordance with ANSI S2.19, Grade G6.3, w/ IPS filtered in maximum vibration allowed.
- Leakage* Max. % of design CFM @ times the operating pressure.
 * - Minimum allowable leakage shall be 50 CFM. Total CFM Allowed at negative " WG & positive " WG
- Deflection (ES-8109) Test Pressure: Negative " WG & positive " WG

BAH shall provide the following field service(s) :

- None
- Start-up (AHU)
- Start-up (VFD)
- Start-up Supervision
- Training
- Erection Supervision
- Deflection (ES-8109)
- Leakage Test*
- Performance Test
- Vibration Test

*SHOP NOTE: Ship Unit with Testing Cover Sheets

Testing Notes

1	BAH to provide a 3 year parts & labor warranty beginning at unit shipment.
2	Fan coast down test from 30-60Hz provided from Twin City with the fan.
3	Maximum deflection of 1/200 of the maximum span at 1.5 times the design operating pressure.
4	Calibration certificates required for all equipment used during testing.
5	BAH to conduct a coast down test from 60hz. Record peak vibration point.
6	Performance test conducted at design conditions
7	BAH to provide an Actuator Test. Actuator is to be cycled to verify proper operation
8	Removal of test sheets by contractor after completion of field leakage testing

MISCELLANEOUS NOTES

Sales Order:

Dwg. No.:

Job Order:

Revision:

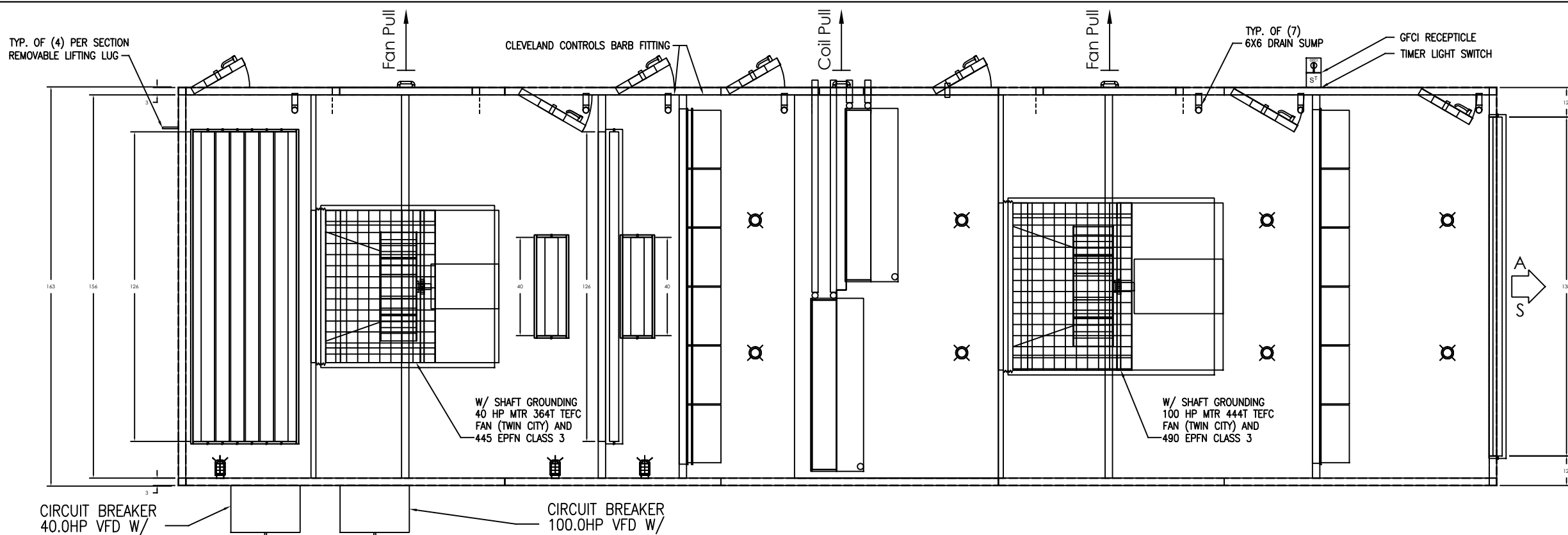
DATA SHEETS

AC2000 Data Sheets, Version 9.14

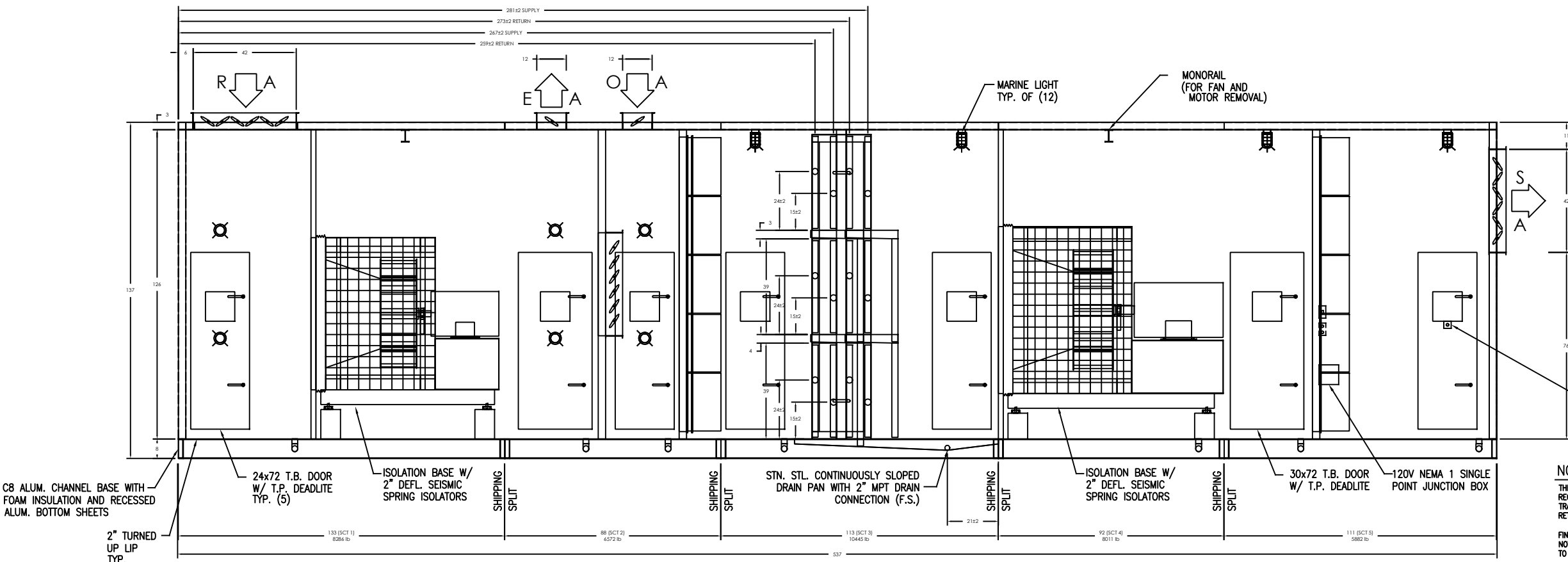
	<p>BAH to provide a stainless steel nameplate (mounted on the fan access door) with the following information:</p> <p>a) Owners Equipment Tag Number: AHU-4907 b) Kirlin Way PO #: 012209 c) Manufacturer name: Buffalo Air Handling d) Manufacturer model number: 038BFAI-DPFHNC3D e) Manufacturer serial number: 220094-08 f) Year of fabrication: 2023 g) Supply air CFM (Max): 48,000 h) Design internal static pressure - inches wg: 4.25 i) Design external static pressure - inches wg: 2.5 j) Design total static pressure - inches wg: 6.75 k) Fan Manufacturer: Twin City Fan l) Supply Fan RPM: 1087 RPM m) Motor manufacturer: Baldor n) Motor Phase/Hertz/Voltage: 3/60/460V o) Supply Motor HP: 100 p) Supply Motor FLA: 120 q) Supply Motor LRA: 730 r) Lighting Phase/Hertz/Voltage: 1/60/120V s) Return air CFM (Max): 44,000 t) Design internal static pressure - inches wg: .55 u) Design external static pressure - inches wg: 2 v) Design total static pressure - inches wg: 2.55 w) Fan Manufacturer: Twin City Fan x) Return Fan RPM: 1081 RPM y) Motor manufacturer: Baldor z) Motor Phase/Hertz/Voltage: 3/60/460V aa) Return Motor HP: 40 ab) Return Motor FLA: 49.4 ac) Return Motor LRA: 290 ad) Coil manufacturer: Aerofin ae) Cooling coil entering & leaving air temperature (db/wb) - °F: 75db/63.1wb - 49.5db/49.5wb af) Cooling coil entering & leaving water temperature - °F: 42 - 54</p>
1.	
2.	Temporary anchors for shipment shall be painted bright yellow or orange and labeled "Temporary anchor - remove prior to operating equipment".
3.	Shipping sections to be labeled with with a temporary tag displaying equipment number and section number attached to the section casing, i.e.. AHU-058, Sect 1 of 6, Sect 2 of 6, etc.
4.	Affix adhesive labels on each section stating " DO NOT penetrate or attach to equipment housing and DO NOT cause obstructions to component access panels"
5.	All coil and humidifier connections to be protected for shipment with plastic caps. Flanges are to be protected for shipment with wooden or plastic covers
6.	Removal of test sheets by contractor after completion of field leakage testing

REVISIONS

Rev	Date	Init	Description of Change(s)



LEFT HAND
AHU-4907
BAH SO#: 220094-08
BAH JO#: 18807



NOTES:
THE ENCLOSED DRAWINGS/DATA ARE SUBMITTED FOR APPROVAL. AN EXPEDITED RETURN OF THESE DRAWINGS IS REQUIRED TO MEET THE QUOTED LEAD TIME FOR MANUFACTURE AND SHIPMENT OF THIS EQUIPMENT. REFER TO THE TRANSMITTAL NOTICE FOR REQUIRED RETURN DATE AND CORRESPONDING SHIP DATE. THE DRAWINGS SHOULD BE RETURNED TO THE BUFFALO AIR HANDLING SALES OFFICE WITH WHOM YOUR ORDER IS PLACED.
FINAL RECORD DRAWINGS WILL BE PREPARED UPON RETURN OF DRAWINGS MARKED "APPROVED" OR "APPROVED AS NOTED" WITH ALL CHANGES MARKED IN RED ALONG WITH YOUR RELEASE FOR FABRICATION. ANY REQUESTED CHANGES TO THE ORIGINAL SPECIFICATIONS WILL RESULT IN ADDITIONAL CHARGES AND SHIPMENT DELAY.

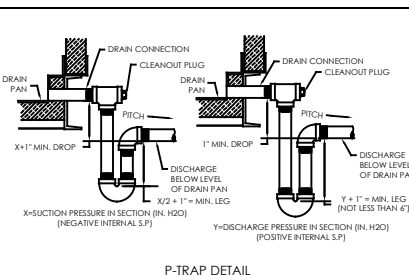
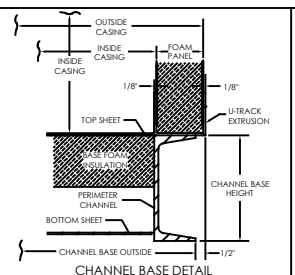
SOFTWARE VERSION: 1.00.0278.0

REVISIONS

GENERAL NOTES:

- UNIT MUST BE INSTALLED AND OPERATED IN ACCORDANCE WITH THE LATEST REVISION OF THE BUFFALO AIR HANDLING SERVICE MANUAL.
- WHEN FAN(S) ARE IN OPERATION, INLET AND OUTLET DAMPERS MUST BE OPEN TO PREVENT DAMAGE TO THE UNIT.
- UNIT MUST BE INSTALLED ON A RIGID LEVEL SURFACE.
- UNITS MUST HAVE PERIMETER SUPPORT INCLUDING SUPPORT BENEATH EACH SHIPPING SPLIT.
- CURB/STEEL MOUNTED UNITS GREATER THAN 15'-0" WIDE MAY REQUIRE ADDITIONAL SUPPORT (CONSULT FACTORY).
- SECTIONS MAY DEFLECT DURING RIGGING. SUPPLEMENTARY SUPPORT MIDWAY AT SHIPPING SPLITS WILL FACILITATE PLACEMENT OF SECTIONS.
- ALL STEAM AND DRAIN TRAPPING BY OTHERS. REFER TO P-TRAP DETAIL FOR DRAIN TRAPPING MINIMUM REQUIREMENTS.

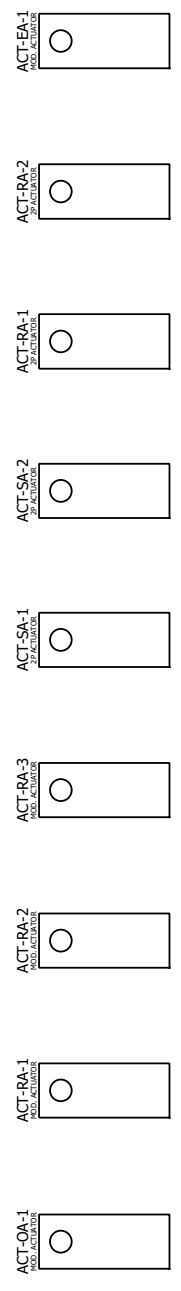
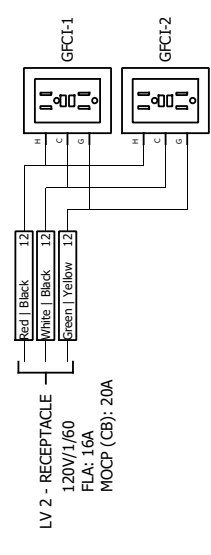
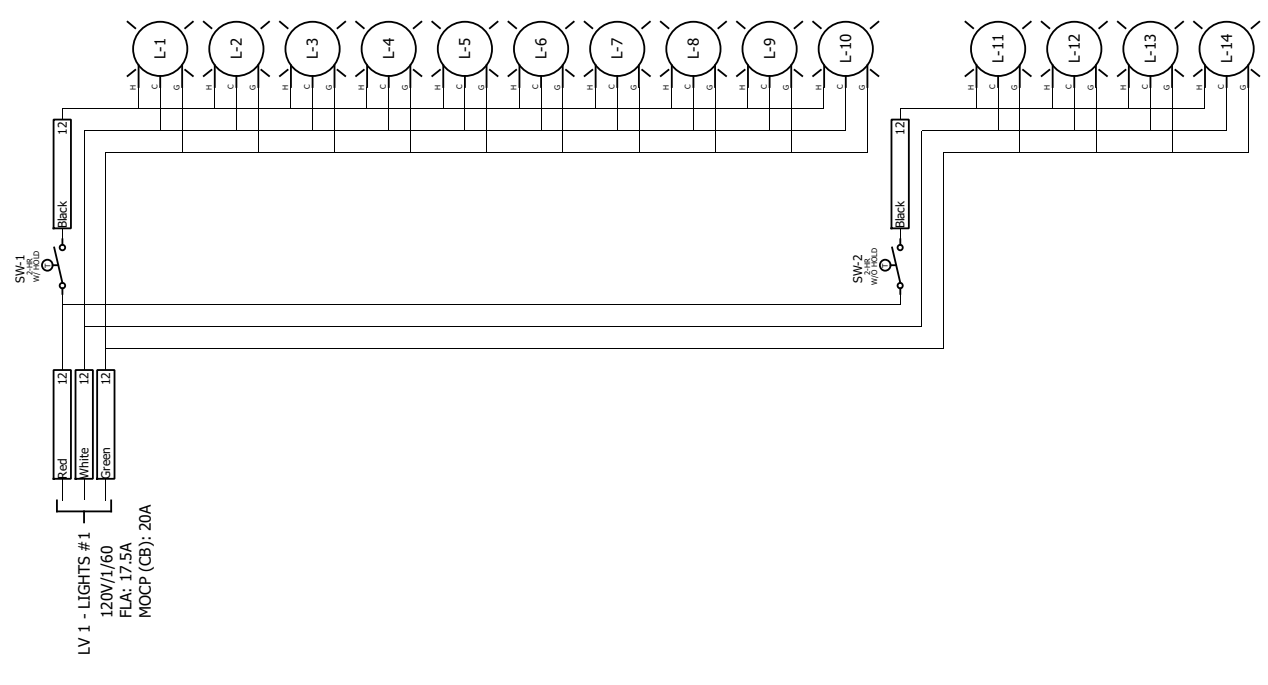
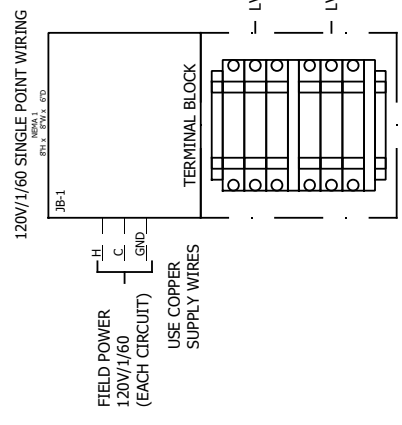
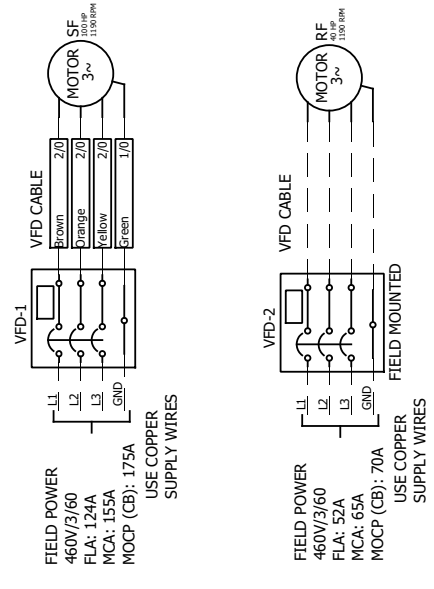
This drawing is the property of Buffalo Air Handling and is returnable upon request. It is for the confidential use of the buyer of the equipment and must not be copied, or shown to any third party, without prior written authorization of Buffalo Air Handling. The use of this drawing in whole or in part for procuring parts from others is prohibited and voids our equipment warranty.



CUSTOMER: KIRLIN WAY MECHANICAL			
END USER: ELI LILLY & CO.			
ENGINEER: HIPPO DESIGN+CONSULTING			
TITLE: CONCORD DAP		MARK: AHU-4907	
DWG STATUS: BID	APPROVAL:	DETAILED:	
SCALE: 1 : 24	DATE:	DATE:	
BAH SO#: 220094-08	DRAWING NO:		REV:
BAH JO#: 18807			



Z-18807-2



REV.	DATE	NAME	DESCRIPTION	REV.	DATE	NAME	DESCRIPTION
0	12/7/2022	JMS	APPROVAL	D	-	-	-
A	-	-	-	E	-	-	-
B	-	-	-	F	-	-	-
C	-	-	-	G	-	-	-

PROJ. NO.:	Eli Lilly & Co.	CUSTOMER:	Kirfin Way Mechanical
WORK #:	AHU-4907	FRANCHISE:	Hippo Design+Consulting
<small>THE DRAWING IS THE PROPERTY OF BUFFALO AIR HANDLING. NO PART OF THIS DRAWING IS TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM. THE USER OF THIS DRAWING IS ADVISED THAT IT IS NOT TO BE USED FOR ANY OTHER PROJECT WITHOUT THE WRITTEN PERMISSION OF BUFFALO AIR HANDLING. BUFFALO AIR HANDLING SHALL NOT BE RESPONSIBLE FOR ANY DAMAGE TO PERSONS OR PROPERTY ARISING FROM THE USE OF THIS DRAWING.</small>			
BUFFALO AIR HANDLING <small>401 JANE STREET DRIVE, AMHERST, VA 24501 401-422-2222</small>		SCALE:	NONE
TITLE: POWER SCHEMATIC		DATE:	12/7/2022
SHEET:		NO. OF SHEETS:	18807
1 OF 1		PROJECT NO.:	D-18807-2
REV.		DATE:	-

FAN DETAILS

Job Name: Hipp - Lilly Concord DAP



Tag: SF08, AHU-4907
 Customer: Buffalo Air Handling
 Job ID: 220094
 Date: December 20, 2022

Description

Quantity 1
 Model EPFN
 Size 490
 Width SWSI
 Arrangement 4
 Class III
 Rotation CW
 Discharge HOR
 Wheel Diameter (in) 49.0
 Drive method Direct
 Percentage width 87%
 Percentage diameter 100%
 Motor position --
 Design VFD Op. Freq 55hz

Performance

Volumetric Flow CFM 48,000
 Operating SP (in WC) 6.750
 Standard SP (in WC) 6.663
 RPM 1087
 Tip Speed (FPM) 13944
 Oper. Power BHP 68.74
 Standard Power BHP 67.86
 Outlet Area (sq.ft) 16.218
 Outlet Velocity (FPM) 2960
 Max RPM for Class 1403
 Static Efficiency 74.30%
 Total Efficiency 80.38%
 FEI 1.37
 FEP (KW) 54.00
 System FEI 1.37
 System FEP (KW) 54.00

Air/Gas Properties

Altitude above sea level (ft) ... 705
 Inlet Pressure (in WC) 0.000
 Inlet Temperature(°F) 50
 Design Temperature (°F) 50
 Gas Type Operating air
 Estimated Density (lb/ft³) 0.076

Motor Data

Power (HP) 100
 Enclosure TEFC
 Speed (RPM) 1200
 Voltage 460V
 Phase 3
 Frequency 60Hz
 Frame Size 444T
 Technology

Modifiers

Using VFD.

Sound

Octave Bands	1	2	3	4	5	6	7	8	LwA
Level at Inlet	99	105	99	90	91	86	79	74	96
Level at Outlet	97	103	101	97	97	91	84	78	101

Distance in ft	1	3	5
dBA at inlet	97	87	83
dBA at Outlet	101	91	87

Sound Power Levels in dB re.10⁻¹² Watts:

Estimated sound pressure level in dBA (re: 0.0002 microbar) based on a single * ducted installation:

*To estimate dBA level for ducted inlet and ducted outlet (into and out of the room) type installation, deduct 20 from the LwA value shown. Using a directivity factor of 1. Estimated Sound Pressure based on free field, spherical (Q = 1) radiation at stated distance.

Definitions:

LwA The overall (single value) fan sound power level, 'A' weighted.

dBA The environment for each fan installation influences its measured sound value, therefore dBA levels cannot be guaranteed. Consult AMCA Publication 303 for further details. A fan's dBA is influenced by nearby reflective surfaces.

FAN DETAILS

Job Name: Hipp - Lilly Concord DAP



Tag: SF08, AHU-4907
Customer: Buffalo Air Handling
Job ID: 220094
Date: December 20, 2022

Pricing Detail

EPFN 490, Class III, Arrangement 4 Bare fan	1,648lb
Guard - Protective Enclosure	115 lb
Screen - Inlet, Std Type	0 lb
Vibration Isolators - Seismic - 2" Defl	0 lb
Special Width Construction	0 lb
Wheel - Aluminum	0 lb
Piezometer Flow Measurement Ring (Copper Construction)	0 lb
Base - Isolation (2" Deflection)	886 lb
Balancing - Special	0 lb
BALANCE TO CATEGORY BV-5, [BUFFALO AIR HANDLING]	
Motor 100 HP, 1200 RPM, 460V, 3Ph, 60Hz , TEFC - Premium , Induction , 444T	1,684 lb
Mount Customer Supplied Motor	0 lb
<hr/>	
Each Weight	4,333 lb
Extended Weight	4,333 lb

Job Name: Hipp - Lilly Concord DAP



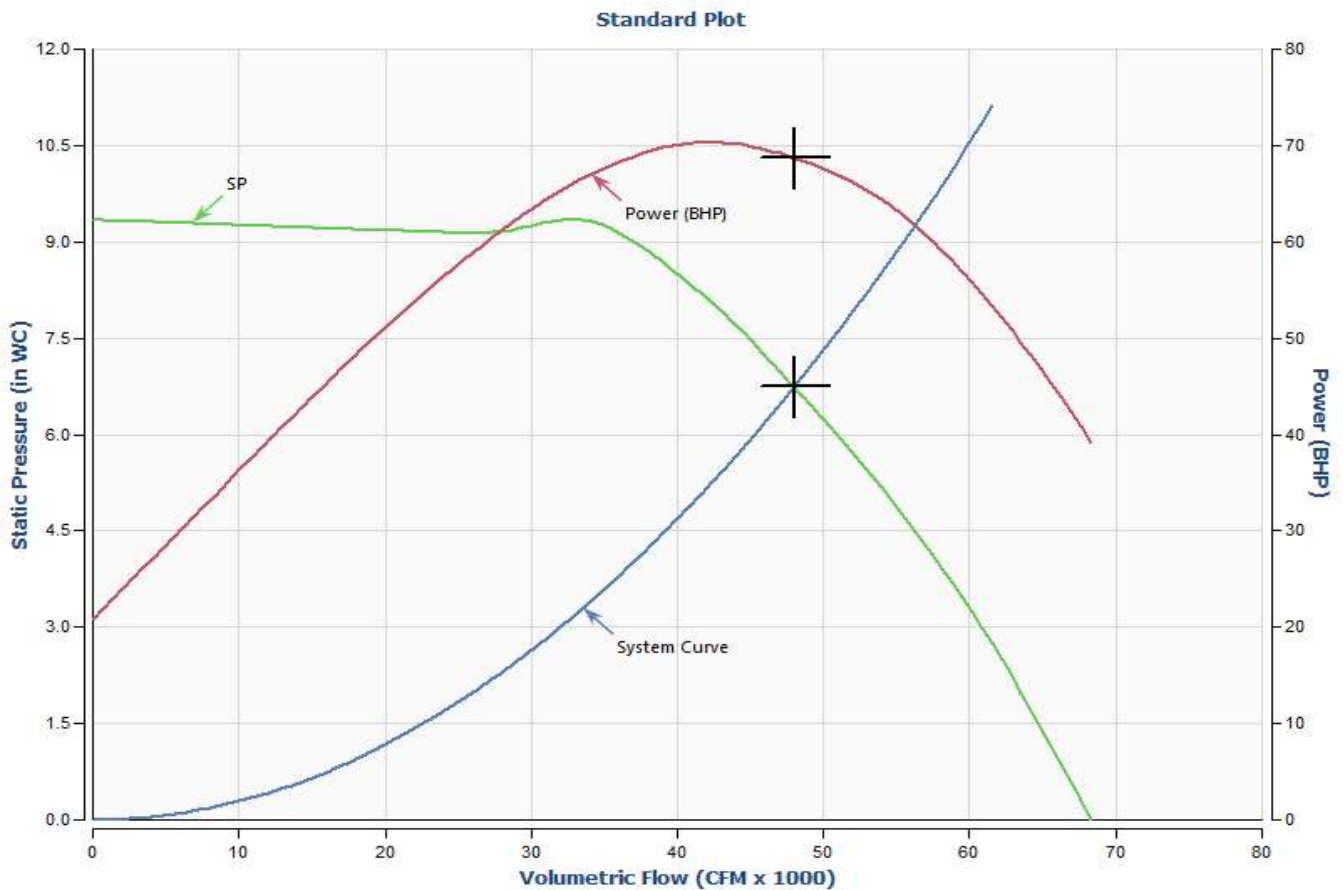
Customer: Buffalo Air Handling
Job ID: 220094
Date: December 20, 2022

Tag: SF08, AHU-4907

Fan information

Size/Model	490/EPFN	Class	III	Outlet Vel (FPM)	2960
Volumetric Flow (CFM)	48000	Speed (RPM)	1087	Density (lb/ft³)	0.076
SP (in WC)	6.75	Max Speed	1403 RPM @ 50 °F		
		Power (BHP)	68.74		

Adjusted for 87% Width, Op temp: 50°F, Design temp: 50°F, Altitude: 705 ft, Inlet Dens: 0.0760 lb/ft3



BALDOR • RELIANCE 

Product Information Packet

ECP84409T-4

100HP, 1190RPM, 3PH, 60HZ, 0444T, TEFC, F1

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Part Detail							
Revision:	B	Status:	PRD/A	Change #:		Proprietary:	No
Type:	AC	Elec. Spec:	A44WG3905	CD Diagram:	416820-036	Mfg Plant:	
Mech. Spec:		Layout:	617434-660	Poles:	06	Created Date:	12-12-2018
Base:		Eff. Date:	03-13-2019	Leads:	3#2		

Specs			
Catalog Number:	ECP84409T-4	Heater Indicator:	No Heater
Enclosure:	TEFC	Insulation Class:	F
Frame:	444T	Inverter Code:	Inverter Ready
Frame Material:	Iron	IP Rating:	IP56
Output @ Frequency:	100.000 HP @ 60 HZ	KVA Code:	G
Synchronous Speed @ Frequency:	1200 RPM @ 60 HZ	Lifting Lugs:	Standard Lifting Lugs
Voltage @ Frequency:	460.0 V @ 60 HZ	Motor Lead Quantity/Wire Size:	3 @ 2 AWG
XP Class and Group:	CLI GP A,B,C,D	Motor Type:	A44064M
XP Division:	Division II	Mounting Arrangement:	F1
Agency Approvals:	CCSA US	Power Factor:	82
	UR	Pulley End Bearing Type:	Ball
Auxillary Box:	No Auxillary Box	Pulley Face Code:	Standard
Base Indicator:	Rigid	Shaft Ground Indicator:	No Shaft Grounding
Bearing Grease Type:	Polyrex EM (-20F +300F)	Shaft Rotation:	Reversible
Constant Torque Speed Range:	15-60	Shaft Slinger Indicator:	No Slinger
Current @ Voltage:	119.000 A @ 460.0 V	Speed Code:	Single Speed
Design Code:	B	Motor Standards:	None
Drip Cover:	No Drip Cover	Starting Method:	Direct on line

Duty Rating:	CONT	Thermal Device - Bearing:	None
Enclosure Modification:	841	Thermal Device - Winding:	None
Feedback Device:	NO FEEDBACK	XP Temp Code:	T3

Nameplate NP3237

CAT NO	ECP84409T-4	SPEC NO.	A44-5000-3905	DESIGN	B
HP	100	AMPS	119	VOLTS	460
FRAME SIZE	444T	RPM	1190	HZ	60
D.E. BRG.DATA	6318	O.D.E. BRG.DATA	6318	AMB	40
D.E. BRG.	90BC03J30X	TYPE	P	ENCL	TEFC
O.D.E. BRG.	90BC03J30X	CODE	G	PH	3
3/4 LOAD EFF.	95.3	IP	56	POWER FACTOR	82
TEMP CODE	T3	TEMP =	200	MAX CORR KVAR	27.0
CHP HZ	60-90	CT HZ	15-60	VT HZ	0-60
INVERTER-TEMP-CODE	T3				
SER.NO.		MOTOR WEIGHT		NEMA-NOM-EFFICIENCY	95
				GUARANTEED EFFICIENCY	94.1
				DUTY	CONT
				SF	1.15
				INSUL.CLASS	F

Nameplate 000613007EX


CAT NO	ECP84409T-4	SPEC NO.	A44-5000-3905
NO. ROTOR BARS	71	GREASE TYPE	POLYREX EM
NO. SLOTS	90	NL AMPS AT RATED VOLTAGE	39.4
5 YEAR WARRANTY		WINDING RES @25 C	.05474
MFG. DATE		SER.NO	
			OHMS

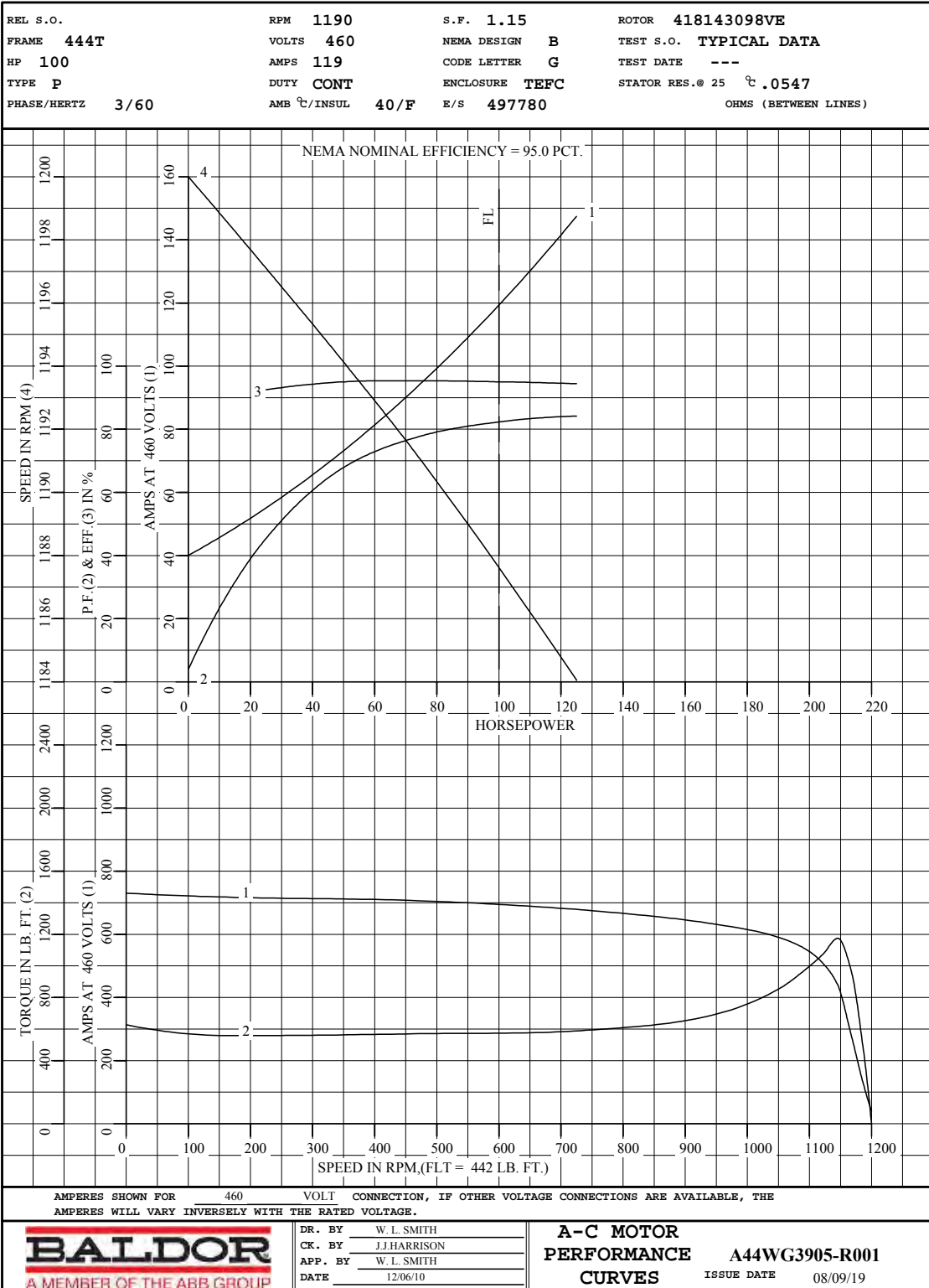
Parts List		
Part Number	Description	Quantity
SA364325	SA A44-5000-3905	1.000 EA
RA353649	RA A44-5000-3905	1.000 EA
000613006PU	N/P (RELEASE QTY 10,000) UL CSA LABEL	1.000 EA
NP3237	SS SUPER E INVERTER DUTY IEEE 841	1.000 EA
000613007EX	SS IEEE 841 EMBOSSED AUXILIARY NAMEPLATE	1.000 EA
000692000FF	N/P	1.000 EA
000692000JP	N/P	1.000 EA
000692000VD	LABEL WARNING	1.000 EA
000692000VH	N/P (RELEASE 1000 PCS)	1.000 EA
421948051	LABEL, MYLAR	1.000 EA
004824015A	GREASE POLYREX EM	1.160 LB
032018008CK	HHCS 3/8-16X1L PLATED	4.000 EA
032018020FK	HHCS 3/4-10X2-1/2 PLTD.	4.000 EA
032018030DK	HHCS 1/2-13X3-3/4 PLTD.	3.000 EA
032620016LA	SOCKET SET SCREW-449	3.000 EA
034017014AB	LCKW 3/8 STD. PLATED	4.000 EA
034180014DA	KEY 1/4X1/4X1-3/4 L	1.000 EA
034530064AB	P/NIP 1/8 X 8" L Pipe Nipple	1.000 EA
034530064BB	P/NIP 1/4X8 PLATED	1.000 EA
034600001AA	BUSH 1/4TO1/8 BLACK	1.000 EA
034630002AB	CPLG 1/4" PLATED	1.000 EA
034690005AB	PPLG 3/4 PLATED	2.000 EA
035000001G	GREASE RELIEF FITTING, ALEMITE 317400	1.000 EA
078549001DA	FAN 400 078549001F	1.000 EA

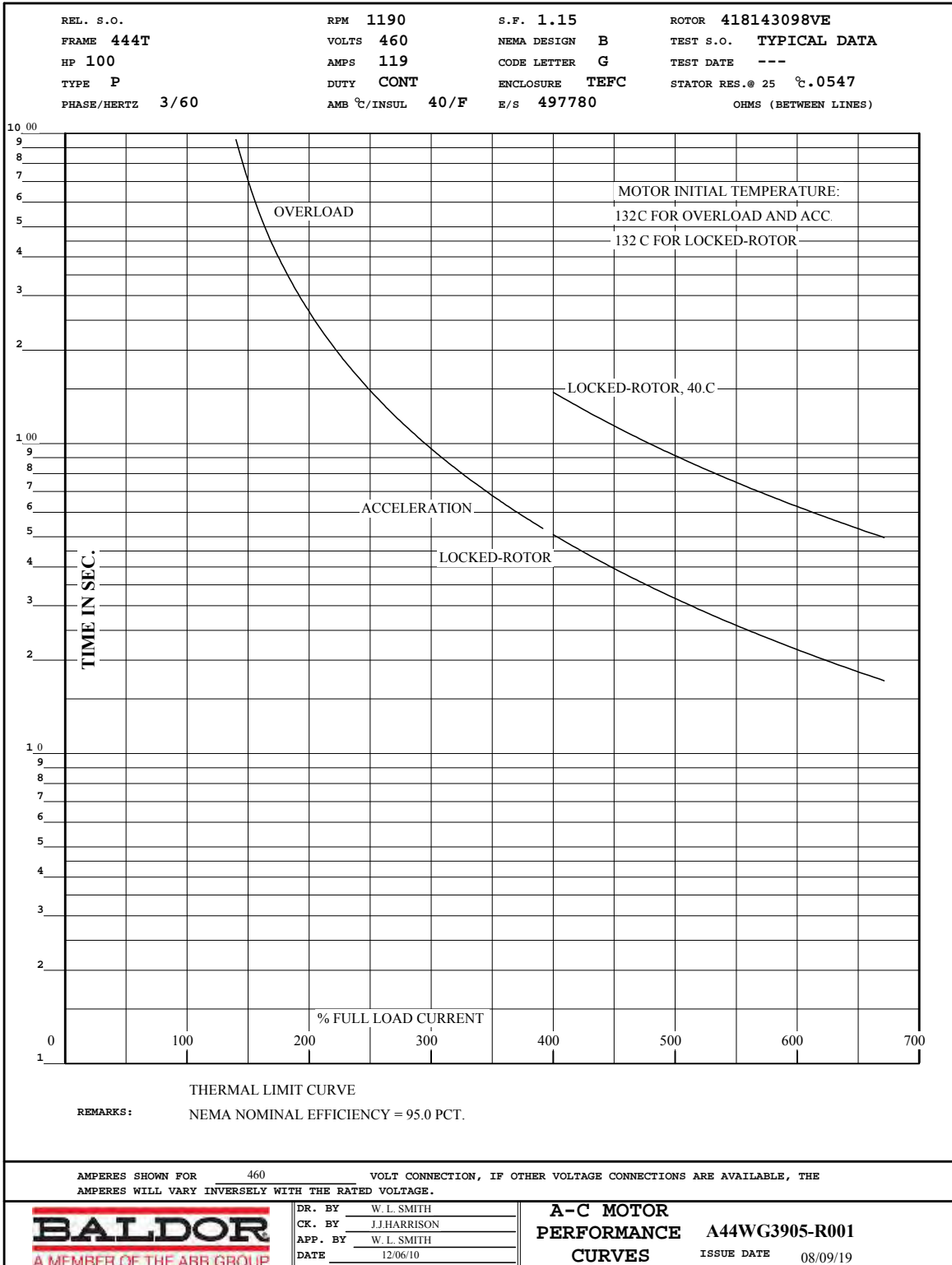
Parts List (continued)		
Part Number	Description	Quantity
083199082RA	G28 SHORT FAN COVER W/BAFFLE ASSEMBLY	1.000 EA
089490099D	G28 BRKT 089490098WCA	1.000 EA
410700004A	WSHR	1.000 EA
415028021L	SEAL - 449	1.000 EA
415072001B	CLAMP	1.000 EA
415096002A	CPLG 1/8 HEX TYPE	1.000 EA
423709011D	WASHER	3.000 EA
032018004BK	HHCS 5/16-18X1/2 PLATED	3.000 EA
032018020FK	HHCS 3/4-10X2-1/2 PLTD.	4.000 EA
032018030DK	HHCS 1/2-13X3-3/4 PLTD.	3.000 EA
034017013AB	LCKW 5/16 STD. PLATED	3.000 EA
415915007G	GASK, LAC	1.000 FT
034530044AB	P/NIP 1/8X5-1/2L GALV.	1.000 EA
034530044BB	P/NIP 1/4X5-1/2L PLT	1.000 EA
034600001AA	BUSH 1/4TO1/8 BLACK	1.000 EA
034630002AB	CPLG 1/4" PLATED	1.000 EA
035000001G	GREASE RELIEF FITTING, ALEMITE 317400	1.000 EA
089490099D	G28 BRKT 089490098WCA	1.000 EA
415028021L	SEAL - 449	1.000 EA
415096002A	CPLG 1/8 HEX TYPE	1.000 EA
418151014G	RETAIN RING	1.000 EA
423709011D	WASHER	3.000 EA
702623013A	THERMAL BARRIER -- G28 -- BRACKET MTD	1.000 EA
032018008BK	HHCS 5/16-18X1L PLATED	4.000 EA

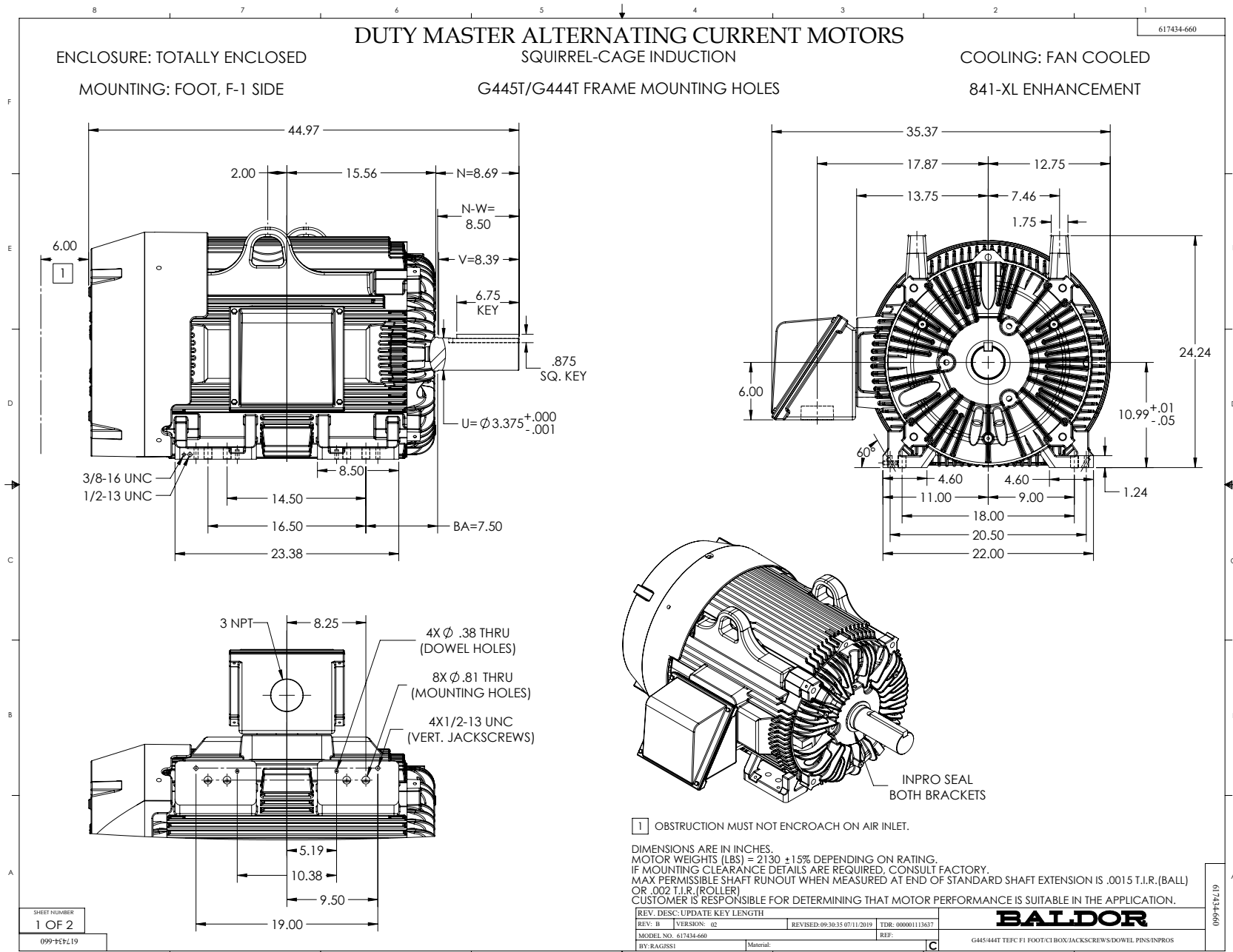
Product Information Packet: ECP84409T-4 - 100HP,1190RPM,3PH,60HZ,0444T,TEFC,F1

032018008DK	HHCS 1/2-13X1 PLATED	4.000 EA
033512006LB	HHTTS 1/4-20X3/4 PLTD.	1.000 EA
035000001A	ALFTG 1/8" 1610-BL	1.000 EA
035000001A	ALFTG 1/8" 1610-BL	1.000 EA
067053001C	GASK 440	1.000 EA
076863000C	+CBCST BLKT - 440	1.000 EA
076864000A	CBCST BLKT - 440	1.000 EA
406056007A	GASKET, 440	1.000 EA
406099000A	PLUG - FAN COVER 320-440	1.000 EA
415000103D	T/LUG #4AWG-1/0AWG W/HOLE FOR .250 BOLT	1.000 EA
418150003A	GREASE FITTING CAP	1.000 EA
418150003A	GREASE FITTING CAP	1.000 EA
MG1025N19	WILKO 778.50 BLUE GREEN - 55 GAL DRUMS	0.440 GA
033775004EA	DRSCR #6-1/4 304 S.S.	2.000 EA
034180054KA	7/8 SQ X 6.75 KEY	1.000 EA
MN416	TAG-INSTAL-MAINT w/wire. (1200/bx) 3/19	1.000 EA
604797045	STD. 400 FRAME SKID	1.000 EA
LB1449	DIV-2/NEC WARNING LABEL	1.000 EA
412118006A	DRAIN	2.000 EA

REL. S.O.	FRAME	HP	TYPE	PHASE/ HERTZ	RPM	VOLTS
	444T	100	P	3/60	1190	460
AMPS	DUTY	AMB °C/ INSUL.	S.F.	NEMA DESIGN	CODE LETTER	ENCL.
119	CONT	40/F	1.15	B	G	TEFC
E/S	ROTOR	TEST S.O.	TEST DATE	STATOR RES. @25 °C OHMS (BETWEEN LINES)		
497780	418143098VE	---	---	.0547		
PERFORMANCE						
LOAD	HP	AMPERES	RPM	% POWER FACTOR	% EFFICIENCY	
NO LOAD	0	39.8	1200	4.02	0	
1/4	25.0	55.8	1197	45.5	92.5	
2/4	50.0	72.6	1194	67.9	95.0	
3/4	75.0	94.5	1191	77.9	95.3	
4/4	100	120	1188	82.3	95.0	
5/4	125	147	1184	84.1	94.4	
SPEED TORQUE						
		RPM	TORQUE % FULL LOAD	TORQUE LB.-FT.	AMPERES	
LOCKED ROTOR		0	142	627	730	
PULL UP		168	126	558	717	
BREAKDOWN		1146	266	1175	438	
FULL LOAD		1188	100	442	120	
<p>AMPERES SHOWN FOR 460. VOLT CONNECTION. IF OTHER VOLTAGE CONNECTIONS ARE AVAILABLE, THE AMPERES WILL VARY INVERSELY WITH THE RATED VOLTAGE</p> <p>REMARKS: TYPICAL DATA NEMA NOMINAL EFFICIENCY = 95.0 PCT.</p>						
 <p>A MEMBER OF THE ABB GROUP</p>		DR. BY <u>W. L. SMITH</u> CK. BY <u>J.J.HARRISON</u> APP. BY <u>W. L. SMITH</u> DATE <u>12/06/10</u>		A-C MOTOR PERFORMANCE DATA A44WG3905-R001 ISSUE DATE 08/09/19		

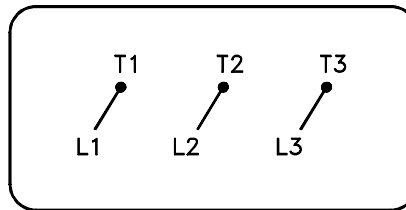






416820-036

A-C MOTOR
CONNECTION DIAGRAM
STANDARD 3 LEAD CONNECTED



(N.P. 1575-BA)

416820-036

REV. DESC: LOADED TO BUS, C/R 335225		
REV. LTR: -	VERSION: 00	TDR: 000000538207
FILE: \MGA\00000\682	REVISED: 11:54:06 04/30/2010	
MTL: -	BY: RAGRA	

BALDOR

CONN DIAG - STANDARD 3 LEAD

SH 1 of 1

Buffalo Air Handling, Pressure Drop Program

Results Page



Version 3.0d

Program User Name: Jerome Snyder
 Date: 11/10/2022
 Order Number: 220094-08
 Mark: AHU-4907 (SAF)
 Customer Name: Eli Lilly & Co. - Concord DAP
 Engineer: Hipp Design+Consulting
 Design AirFlow (CFM): 48000
 Fan Quantity: 1
 Additional Information:

Upstream External Losses (in. W.G.): 0.25
 Downstream External Losses (in. W.G.): 2.25

**NOTE: A pressure drop value followed by "*" indicates a user defined value.*

UpStream Components

Face Velocity	Pressure Drop	Component
1197	0.04	Inlet - Wall or Ceiling, Damper
500	0.75*	Filter - 2" Pleated, Cleanliness = Average
500	1.00*	Filter - 12" Rigid, 85%, Cleanliness = Average
445	0.99*	Cooling Coil - Plate, 6 Rows

Section Total	2.78	

Fan Components

Face Velocity	Pressure Drop	Component
	0.14	Inlet screen reduction
	0.02	Outlet screen reduction
	0.13	Fan Extra Pressure

3667	0.29	Fan - Supply, Plenum, Arrangement 4, 49.00 Wheel dia.

DownStream Components

Face Velocity	Pressure Drop	Component
500	1.00*	Filter - HEPA, 99.97%, Cleanliness = Dirty
1193	0.18	Discharge - Wall or Ceiling, Damper, Acceleration

Section Total	1.18	

Summary

Fan Static Pressure = 6.75

Total Internal Losses (in. W.G.): 4.25
 Total External Losses (in. W.G.): 2.50

Total: 6.75

(Extra Static Pressure = 0.13, Fan Section)

Disclaimer: This program is based on performance estimates provided by original equipment manufacturers. It should be applied with reasonable engineering assumptions and the results verified.

FAN DETAILS

Job Name: Hipp - Lilly Concord DAP



Tag: RF08, AHU-4907
 Customer: Buffalo Air Handling
 Job ID: 220094
 Date: December 20, 2022

Description

Quantity 1
 Model EPFN
 Size 445
 Width SWSI
 Arrangement 4
 Class III
 Rotation CW
 Discharge HOR
 Wheel Diameter (in) 44.5
 Drive method Direct
 Percentage width 85%
 Percentage diameter 100%
 Motor position --
 Design VFD Op. Freq 55hz

Performance

Volumetric Flow CFM 44,000
 Operating SP (in WC) 2.550
 Standard SP (in WC) 2.517
 RPM 1081
 Tip Speed (FPM) 12594
 Oper. Power BHP 32.79
 Standard Power BHP 32.37
 Outlet Area (sq.ft) 13.074
 Outlet Velocity (FPM) 3365
 Max RPM for Class 1545
 Static Efficiency 53.95%
 Total Efficiency 69.05%
 FEI 1.09
 FEP (KW) 26.02
 System FEI 1.09
 System FEP (KW) 26.02

Air/Gas Properties

Altitude above sea level (ft) ... 705
 Inlet Pressure (in WC) 0.000
 Inlet Temperature(°F) 50
 Design Temperature (°F) 50
 Gas Type Operating air
 Estimated Density (lb/ft³) 0.076

Motor Data

Power (HP) 40
 Enclosure TEFC
 Speed (RPM) 1200
 Voltage 460V
 Phase 3
 Frequency 60Hz
 Frame Size 364T
 Technology

Modifiers

Using VFD.

Sound

Octave Bands	1	2	3	4	5	6	7	8	LwA
Level at Inlet	91	102	96	88	89	88	83	73	95
Level at Outlet	96	106	103	98	96	95	87	78	102

Distance in ft	1	3	5
dBA at inlet	95	85	81
dBA at Outlet	102	92	88

Sound Power Levels in dB re.10⁻¹² Watts:

Estimated sound pressure level in dBA (re: 0.0002 microbar) based on a single * ducted installation:

*To estimate dBA level for ducted inlet and ducted outlet (into and out of the room) type installation, deduct 20 from the LwA value shown. Using a directivity factor of 1. Estimated Sound Pressure based on free field, spherical (Q = 1) radiation at stated distance.

Definitions:

LwA The overall (single value) fan sound power level, 'A' weighted.

dBA The environment for each fan installation influences its measured sound value, therefore dBA levels cannot be guaranteed. Consult AMCA Publication 303 for further details. A fan's dBA is influenced by nearby reflective surfaces.

FAN DETAILS

Job Name: Hipp - Lilly Concord DAP



Tag: RF08, AHU-4907
Customer: Buffalo Air Handling
Job ID: 220094
Date: December 20, 2022

Pricing Detail

EPFN 445, Class III, Arrangement 4 Bare fan	1,437lb
Guard - Protective Enclosure	100 lb
Screen - Inlet, Std Type	0 lb
Vibration Isolators - Seismic - 2" Defl	0 lb
Special Width Construction	0 lb
Wheel - Aluminum	0 lb
Mount Fan on Base	0 lb
Piezometer Flow Measurement Ring (Copper Construction)	0 lb
Base - Isolation (2" Deflection)	873 lb
Balancing - Special	0 lb
BALANCE TO CATEGORY BV-5, [BUFFALO AIR HANDLING]	
Motor 40 HP, 1200 RPM, 460V, 3Ph, 60Hz , TEFC - Premium , Induction , 364T	943 lb
Mount Customer Supplied Motor	0 lb
<hr/>	
Each Weight	3,353 lb
Extended Weight	3,353 lb

Job Name: Hipp - Lilly Concord DAP



Customer: Buffalo Air Handling

Job ID: 220094

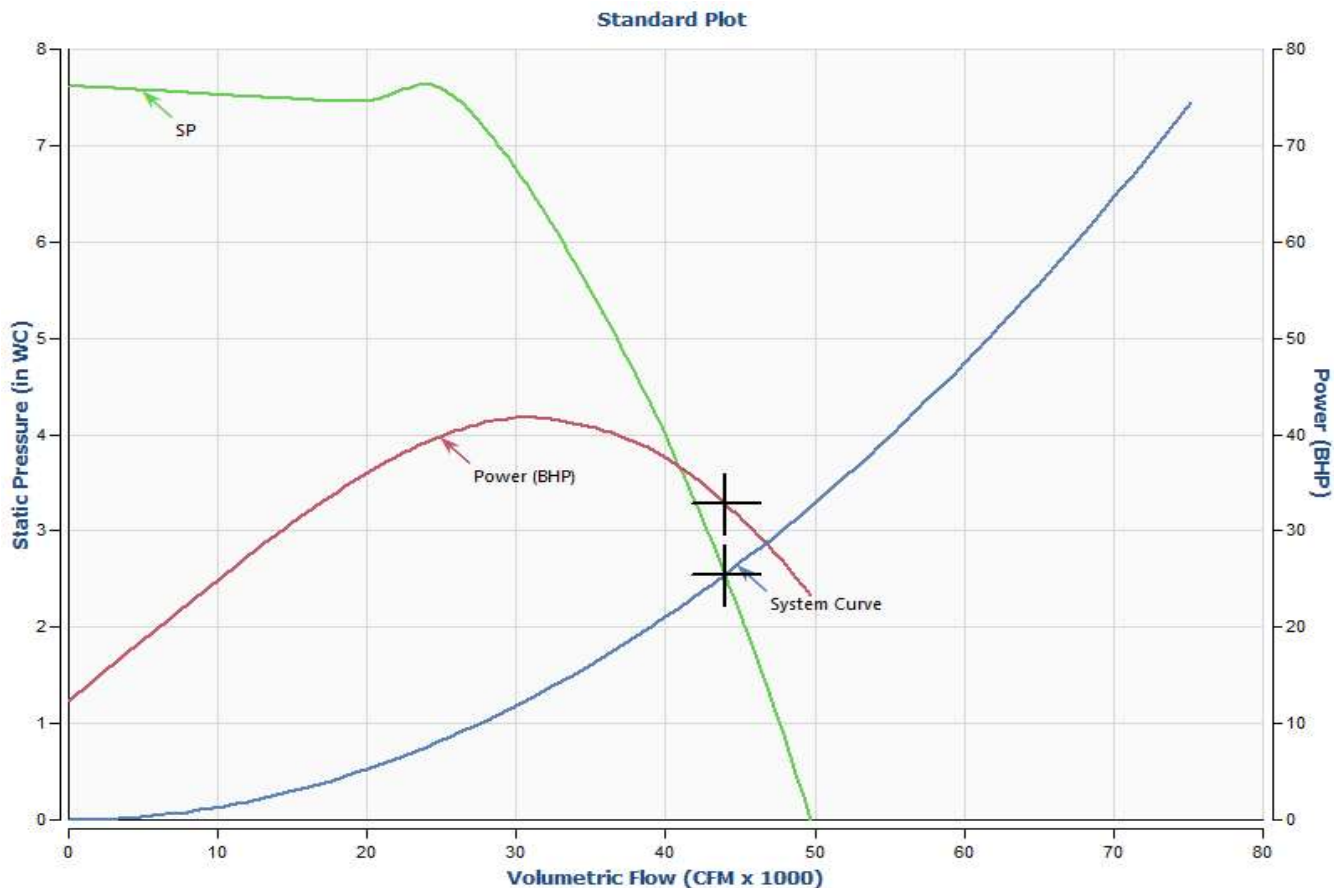
Date: December 20, 2022

Tag: RF08, AHU-4907

Fan information

Size/Model	445/EPFN	Class	III	Outlet Vel (FPM)	3365
Volumetric Flow (CFM)	44000	Speed (RPM)	1081	Density (lb/ft ³)	0.076
SP (in WC)	2.55	Max Speed	1545 RPM @ 50 °F		
		Power (BHP)	32.79		

Adjusted for 85% Width, Op temp: 50°F, Design temp: 50°F, Altitude: 705 ft, Inlet Dens: 0.0760 lb/ft3



BALDOR • RELIANCE 

Product Information Packet

ECP84308T-4

40HP, 1190RPM, 3PH, 60HZ, 364T, TEFC, FOOT

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Part Detail							
Revision:	P	Status:	PRD/A	Change #:		Proprietary:	No
Type:	AC	Elec. Spec:	A36WG0043	CD Diagram:	416820-036	Mfg Plant:	
Mech. Spec:		Layout:	617428-005	Poles:	06	Created Date:	10-19-2010
Base:		Eff. Date:	04-13-2018	Leads:	3#4		

Specs			
Catalog Number:	ECP84308T-4	Feedback Device:	NO FEEDBACK
Enclosure:	TEFC	Heater Indicator:	No Heater
Frame:	364T	Insulation Class:	F
Frame Material:	Iron	Inverter Code:	Inverter Ready
Output @ Frequency:	40.000 HP @ 60 HZ	KVA Code:	G
Synchronous Speed @ Frequency:	1200 RPM @ 60 HZ	Lifting Lugs:	Standard Lifting Lugs
Voltage @ Frequency:	460.0 V @ 60 HZ	Motor Lead Quantity/Wire Size:	3 @ 4 AWG
XP Class and Group:	CLI GP A,B,C,D	Motor Type:	A36062M
XP Division:	Division II	Mounting Arrangement:	F1
Agency Approvals:	UR	Power Factor:	80
	CSA EEV	Pulley End Bearing Type:	Ball
	CCSA US	Pulley Face Code:	Standard
Auxillary Box:	No Auxillary Box	Shaft Ground Indicator:	No Shaft Grounding
Base Indicator:	Rigid	Shaft Rotation:	Phase Seq-Std Rot (CCWODE)
Bearing Grease Type:	Polyrex EM (-20F +300F)	Shaft Slinger Indicator:	No Slinger
Constant Torque Speed Range:	6-60	Speed Code:	Single Speed
Current @ Voltage:	49.400 A @ 460.0 V	Motor Standards:	NEMA
Design Code:	B	Starting Method:	Direct on line

Drip Cover:	No Drip Cover	Thermal Device - Bearing:	NONE (OLD)
Duty Rating:	CONT	Thermal Device - Winding:	None
		XP Temp Code:	T3A

Nameplate NP3237

CAT NO	ECP84308T-4	SPEC NO.	P36G5236
HP	40	AMPS	49.4
FRAME SIZE	364T	RPM	1190
D.E. BRG.DATA	6313	O.D.E. BRG.DATA	6313
D.E. BRG.	65BC03J30X	TYPE	P
O.D.E. BRG.	65BC03J30X	ENCL	TEFC
3/4 LOAD EFF.	94.3	IP	56
TEMP CODE	T3A	TEMP =	180
CHP HZ	60-90	CT HZ	6-60
INVERTER-TEMP-CODE	T3A	VT HZ	0-60
SER.NO.		MOTOR WEIGHT	
		VOLTS	460
		AMB	40
		PH	3
		POWER FACTOR	80
		MAX CORR KVAR	12.0
		DESIGN	B
		SF	1.15
		DUTY	CONT
		INSUL.CLASS	F
		NEMA-NOM-EFFICIENCY	94.1
		GUARANTEED EFFICIENCY	93.6

Nameplate 000613007EX

CAT NO	ECP84308T-4
NO. ROTOR BARS	55
NO. SLOTS	72
5 YEAR WARRANTY	
MFG. DATE	


SPEC NO.	P36G5236	
GREASE TYPE	POLYREX EM	
NL AMPS AT RATED VOLTAGE	17.7	
WINDING RES @25 C	.14932	OHMS
SER.NO		

Parts List		
Part Number	Description	Quantity
SA205814	SA P36G5236	1.000 EA
RA193082	RA P36G5236	1.000 EA
NP3237	SS SUPER E INVERTER DUTY IEEE 841	1.000 EA
000613007EX	SS IEEE 841 EMBOSSED AUXILIARY NAMEPLATE	1.000 EA
000692000JP	N/P	1.000 EA
000692000VD	LABEL WARNING	1.000 EA
000692000VH	N/P (RELEASE 1000 PCS)	1.000 EA
004824015A	GREASE POLYREX EM	0.544 LB
032018008AK	HHCS 1/4-20X1 PLATED	4.000 EA
032018012DK	HHCS 1/2-13X1-1/2 PLTD.	4.000 EA
032018024CK	HHCS 3/8-16X3 PLTD.	3.000 EA
034180012DA	KEY 1X4X1/4X1-1/2 L	1.000 EA
032018012DK	HHCS 1/2-13X1-1/2 PLTD.	4.000 EA
032018024CK	HHCS 3/8-16X3 PLTD.	3.000 EA
034530032BB	P/NIP 1/4X4" SCHED 40	1.000 EA
034530052AB	P/NIP 1/8X6-1/2 GALV.	1.000 EA
034600001AA	BUSH 1/4TO1/8 BLACK	1.000 EA
034630002AB	CPLG 1/4" PLATED	1.000 EA
035000001G	GREASE RELIEF FITTING, ALEMITE 317400	1.000 EA
085922083BH	BRKT 360 085922072WCC KB	1.000 EA
412118006A	DRAIN	1.000 EA
085922083BH	BRKT 360 085922072WCC KB	1.000 EA
078550001M	FAN KB 60/30 (30) 360	1.000 EA
078559034A	+F/C A 078559001A - 360	1.000 EA

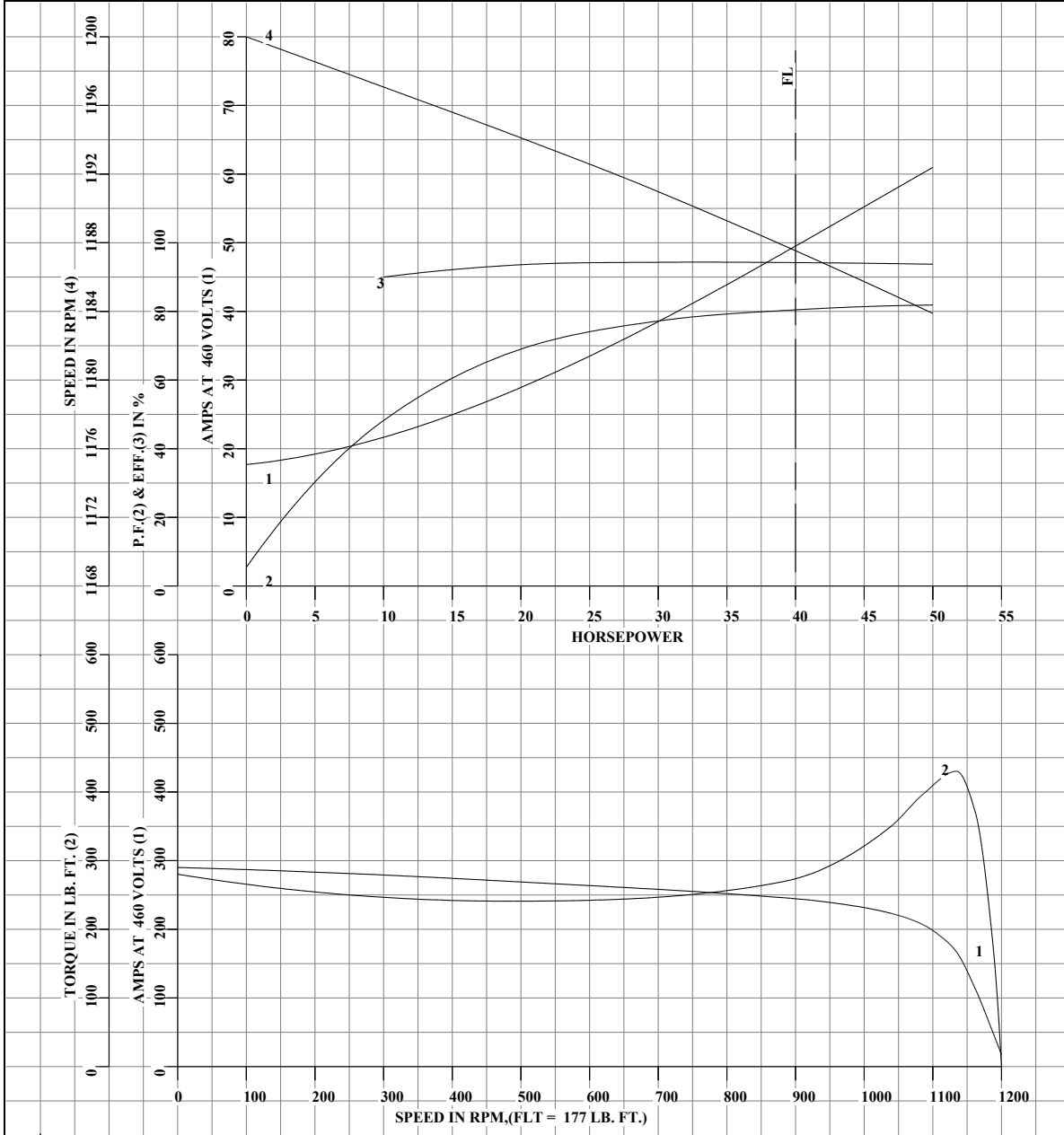
Parts List (continued)		
Part Number	Description	Quantity
410700004F	WSHR	1.000 EA
412118006A	DRAIN	1.000 EA
415028008E	INPRO SEAL - 360	1.000 EA
415072001B	CLAMP	1.000 EA
415096002A	CPLG 1/8 HEX TYPE	1.000 EA
423709011C	WASHER	3.000 EA
034630002AB	CPLG 1/4" PLATED	1.000 EA
035000001G	GREASE RELIEF FITTING, ALEMITE 317400	1.000 EA
415028008E	INPRO SEAL - 360	1.000 EA
415096002A	CPLG 1/8 HEX TYPE	1.000 EA
423709011C	WASHER	3.000 EA
032018010CK	HHCS 3/8-16X1-1/4 PLTD.	4.000 EA
033512008LB	HHTTS 1/4-20X1 PLATED	4.000 EA
034000014AB	WSH ID.406 OD.812 TH.065	4.000 EA
035000001A	ALFTG 1/8" 1610-BL	1.000 EA
035000001A	ALFTG 1/8" 1610-BL	1.000 EA
067053000B	GASK 320-400	1.000 EA
076708000BB	C/B - 360	1.000 EA
076709000A	C/B Cover - 360	1.000 EA
406099000A	PLUG - FAN COVER 320-440	1.000 EA
415000103H	415000103H	1.000 EA
415039016A	TERBD, 360-400	1.000 EA
418150003A	GREASE FITTING CAP	1.000 EA
418150003A	GREASE FITTING CAP	1.000 EA

Product Information Packet: ECP84308T-4 - 40HP,1190RPM,3PH,60HZ,364T,TEFC,FOOT

033775004EA	DRSCR #6-1/4 304 S.S.	4.000 EA
034530020BB	P/NIP 1/4X2-1/2 PLATED	1.000 EA
034530032AB	P/NIP 1/8X4 PLATED	1.000 EA
034600001AA	BUSH 1/4TO1/8 BLACK	1.000 EA
034180034HA	KEY 5/8X5/8X4-1/4 L	1.000 EA
MG1025N19	WILKO 778.50 BLUE GREEN - 55 GAL DRUMS	0.250 GA
004824003CBY	WILKO PAINT 060.02 - ACTIVATOR	0.063 GA
482403003BEF	RUST VETO 342	0.013 GA
MG1500G03-5	LACQUER PRIMER, GRAY	0.063 GA
421948051	LABEL, MYLAR	1.000 EA
14PA1000	PACKAGING 314 GROUP COMBINED PRINT	1.000 EA
LB1449	DIV-2/NEC WARNING LABEL	1.000 EA
000613006PU	N/P (RELEASE QTY 10,000) UL CSA LABEL	1.000 EA
032018005DL	1/2-13 X 5/8 SILICON BRONZE HHCS	1.000 EA

S/O	FRAME	HP	TYPE	PHASE/ HERTZ	RPM	VOLTS
	364T	40	P	3/60	1190	460
AMPS	DUTY	AMB °C/ INSUL	S.F.	NEMA DESIGN	CODE LETTER	ENCLOSURE
49.4	CONT	40/F	1.15	B	G	TEFC
E/S	ROTOR	TEST S.O.	TEST DATE	STATOR RES. @25 °C OHMS (BETWEEN LINES)		
491377	418141-74EE	---	---	.152		
PERFORMANCE						
LOAD	HP	AMPERES	RPM	% POWER FACTOR	% EFFICIENCY	
NO LOAD	0	17.7	1200	5.41	0	
1/4	10.0	21.6	1197	48.3	90.0	
2/4	20.0	29.0	1194	69.0	93.6	
3/4	30.0	38.6	1191	77.2	94.3	
4/4	40.0	49.4	1188	80.5	94.2	
5/4	50.0	61.0	1184	81.9	93.7	
SPEED TORQUE						
		RPM	TORQUE % FULL LOAD	TORQUE LB.-FT.	AMPERES	
LOCKED ROTOR		0	158	280	290	
PULL UP		480	136	241	270	
BREAKDOWN		1135	243	430	167	
FULL LOAD		1188	100	177	49.4	
AMPERES SHOWN FOR 460 VOLT CONNECTION. IF OTHER CONNECTIONS ARE AVAILABLE, THE AMPERES WILL VARY INVERSELY WITH THE RATED VOLTAGE.						
TYPICAL DATA						
		DRAWN BY: <u>W. L. SMITH</u>		AC MOTOR PERFORMANCE DATA	A36WG0043-R001	
		CHECKED BY: <u>J.J.HARRISON</u>				
		APPROVED BY: <u>W. L. SMITH</u>		DATE ISSUED 12/15/10		
		DATE: <u>12/07/05</u>				

REL S.O.	RPM 1190	S.F. 1.15	ROTOR 418141-74EE
FRAME 364T	VOLTS 460	NEMA DESIGN B	TEST S.O. TYPICAL DATA
HP 40	AMPS 49.4	CODE LETTER G	TEST DATE ---
TYPE P	DUTY CONT	ENCLOSURE TEFC	STATOR RES. @ 25°C .152
PHASE / HERTZ 3/60	AMB °C / INSUL 40/F	E/S 491377	OHMS (BETWEEN LINES)



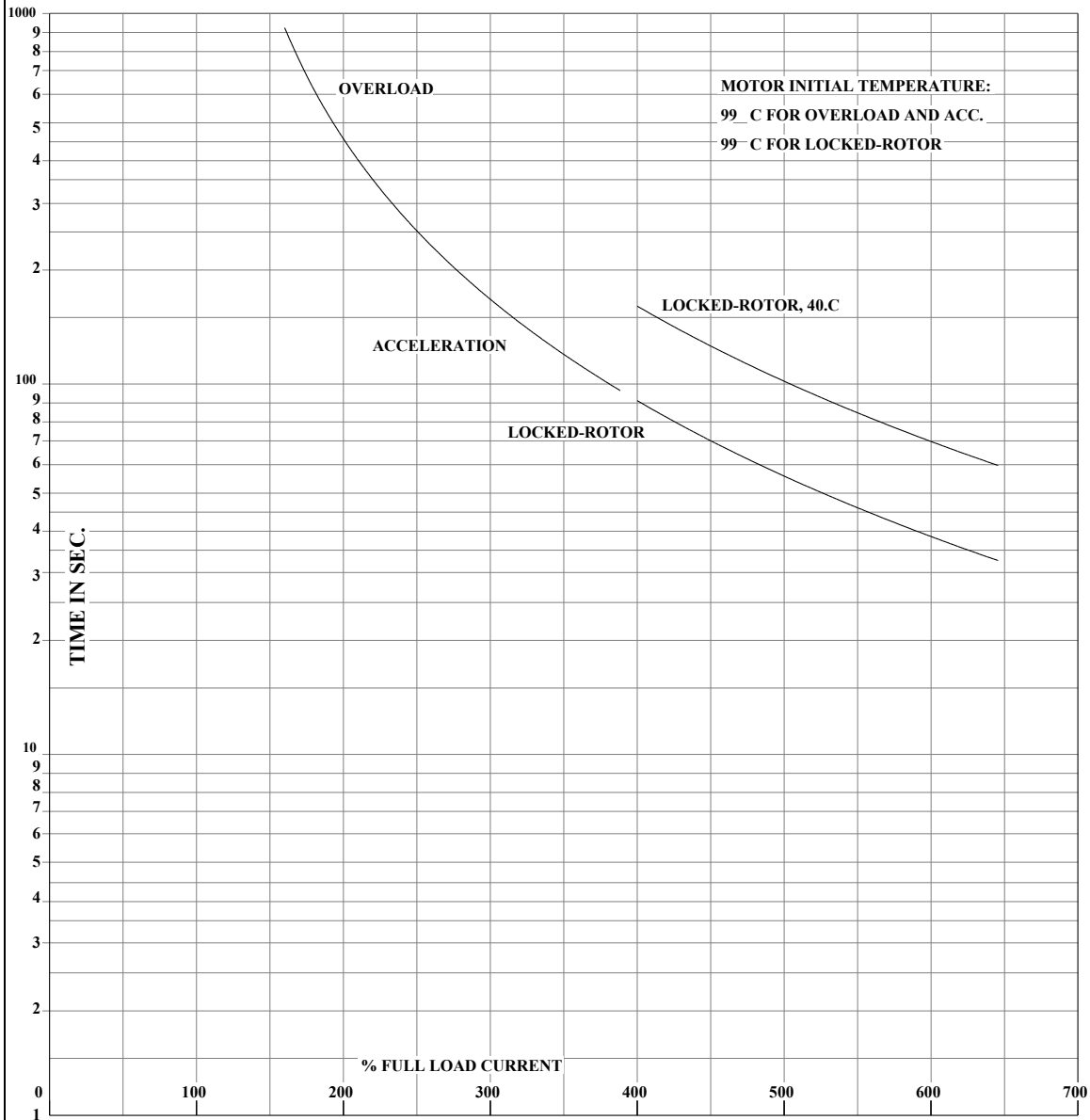
AMPERES SHOWN FOR 460 VOLT CONNECTION, IF OTHER VOLTAGE CONNECTIONS ARE AVAILABLE, THE AMPERES WILL VARY INVERSELY WITH THE RATED VOLTAGE.

ABB	DRAWN BY: <u>W. L. SMITH</u>	AC MOTOR PERFORMANCE DATA	A36WG0043-R001
	CHECKED BY: <u>J.J.HARRISON</u>		
	APPROVED BY: <u>W. L. SMITH</u>		ISSUE DATE 12/15/10
	DATE: <u>12/07/05</u>		

USERCHR1

Printed on 03/29/2018 9:00 AM

REL S.O.	RPM 1190	S.F. 1.15	ROTOR 418141-74EE
FRAME 364T	VOLTS 460	NEMA DESIGN B	TEST S.O. TYPICAL DATA
HP 40	AMPS 49.4	CODE LETTER G	TEST DATE ---
TYPE P	DUTY CONT	ENCLOSURE TEFC	STATOR RES. @ 25°C .152
PHASE / HERTZ 3/60	AMB °C / INSUL 40/F	E/S 491377	OHMS (BETWEEN LINES)



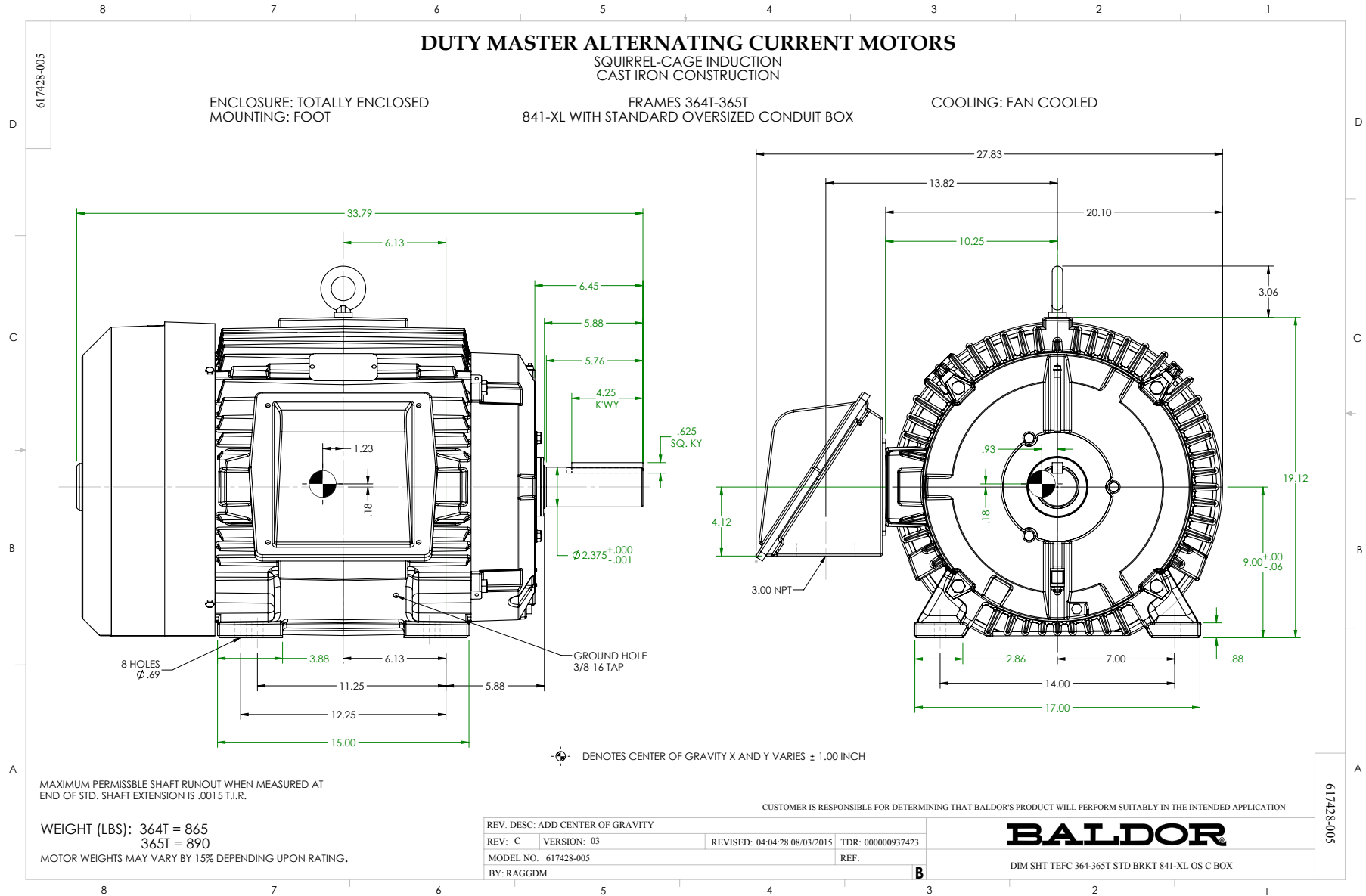
THERMAL LIMIT CURVE

AMPERES SHOWN FOR 460 VOLT CONNECTION, IF OTHER VOLTAGE CONNECTIONS ARE AVAILABLE, THE AMPERES WILL VARY INVERSELY WITH THE RATED VOLTAGE.

	DRAWN BY: <u>W. L. SMITH</u>	AC MOTOR PERFORMANCE DATA	A36WG0043-R001
	CHECKED BY: <u>J.J.HARRISON</u> APPROVED BY: <u>W. L. SMITH</u> DATE: <u>12/07/05</u>		

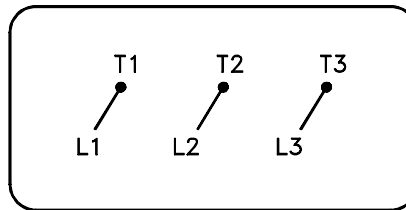
USERCHR1

Printed on 03/29/2018 9:00 AM



416820-036

A-C MOTOR
CONNECTION DIAGRAM
STANDARD 3 LEAD CONNECTED



(N.P. 1575-BA)

416820-036

REV. DESC: LOADED TO BUS, C/R 335225		
REV. LTR: -	VERSION: 00	TDR: 000000538207
FILE: \MGA\00000\682	REVISED: 11:54:06 04/30/2010	
MTL: -	BY: RAGRA	

BALDOR

CONN DIAG - STANDARD 3 LEAD

SH 1 of 1

Buffalo Air Handling, Pressure Drop Program

Results Page



Version 3.0d

Program User Name: Jerome Snyder
 Date: 11/10/2022
 Order Number: 220094-08
 Mark: AHU-4907 (RAF)
 Customer Name: Eli Lilly & Co. - Concord DAP
 Engineer: Hipp Design+Consulting
 Design AirFlow (CFM): 44000
 Fan Quantity: 1
 Additional Information:

Upstream External Losses (in. W.G.): 1.75
 Downstream External Losses (in. W.G.): 0.25

**NOTE: A pressure drop value followed by "*" indicates a user defined value.*

UpStream Components

<u>Face Velocity</u>	<u>Pressure Drop</u>	<u>Component</u>
1197	0.04	Inlet - Wall or Ceiling, Damper

Section Total	0.04	

Fan Components

<u>Face Velocity</u>	<u>Pressure Drop</u>	<u>Component</u>
	0.16	Inlet screen reduction
	0.02	Outlet screen reduction
	0.15	Fan Extra Pressure

4169	0.33	Fan - Supply, Plenum, Arrangement 4, 44.50 Wheel dia.

DownStream Components

<u>Face Velocity</u>	<u>Pressure Drop</u>	<u>Component</u>
1197	0.18	Discharge - Wall or Ceiling, Damper, Acceleration

Section Total	0.18	

Summary

Fan Static Pressure = 2.55

Total Internal Losses (in. W.G.): 0.55
 Total External Losses (in. W.G.): 2.00

Total: 2.55

(Extra Static Pressure = 0.15, Fan Section)

Disclaimer: This program is based on performance estimates provided by original equipment manufacturers. It should be applied with reasonable engineering assumptions and the results verified.

2.4.

AHU-4910

Sales Order: Dwg. No.:
 Job Order: Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

GENERAL

Customer:	<input type="text" value="Kirlin Way"/>	Qty/Size/Type:	<input type="text" value="1"/>	<input type="text" value="56"/>	<input type="text" value="BF3AI-EPFNC3OD"/>
End User:	<input type="text" value="Eli Lilly & Co., Concord Bldgs 2, 4, 6"/>	Sales Office:	<input type="text" value="412 GRS - Clark Air Systems"/>		
Engineer:	<input type="text" value="Hipp Design+Consulting"/>	Sales Rep.:	<input type="text" value="Jeff Clark"/>		
Mark:	<input type="text" value="AHU-4910"/>	Project Mgr.:	<input type="text" value="Jerome Snyder"/>		
Cust. PO:	<input type="text" value="012209"/>	Designer:	<input type="text" value=""/>		

UNIT CONSTRUCTION

Casing

Walls: **Insulation Density:** lbs/cu.ft **Design Pressure (+/-)** inches W.G.

Roof: **Environment:** construction

Exterior: **Fasteners:** Exterior Interior

Interior: -

Bulkhead: -

	Type:	Color:	Notes:
Exterior Paint:	<input type="text" value="No paint"/>	<input type="text" value=""/>	<input type="text" value=""/>
Interior Paint:	<input type="text" value="No paint"/>	<input type="text" value=""/>	<input type="text" value=""/>
Base Frame Paint:¹	<input type="text" value="No paint"/>	<input type="text" value=""/>	<input type="text" value=""/>

Thermal Break Construction: **Location:**

Knockdown Construction: **KD Type:**

Unit Installed On²:

¹ - All black steel, including unit base, shall be painted w/ epoxy mastic.; ² - Provide level foundation under perimeter of each section.

Base

Base Frame: in w/ with **Foundation Holes:**

Floor Sheets: -

Floor sheets are with turned-up perimeter lip.

Drain Pan: -

Drain Pan Connection Hand: -

Bottom Sheets: -

Floor Drains: **Connection Hand:** **Material & Location:**

Doors³

Qty	Size HxW	Type ⁴	Swing	Hinge	Latch Qty	Latch Type	View Port ⁵	Exterior ⁶	Interior ⁶
4	72 x 24	TB	Draw-Through	upstream	2	Ventlok 310 Chrome	12x12 TP	0.050" EA	0.040" SA
2	72 x 30	TB	Blow-Through	downstream	2	Ventlok 310 Chrome	12x12 TP	0.050" EA	0.040" SA
1	72 x 24	TB	Blow-Through	downstream	2	Ventlok 310 Chrome	12x12 TP	0.050" EA	0.040" SA

³ - All Door Sizes are nominal, consult factory for actual opening dimensions. Refer to main assembly drawing for door locations.

⁴ -NTB:Non-Thermal Break, TB: Thermal Break, HT: High Temperature; ⁵ -TP: Thermal Pane

⁶ -SA: Smooth Aluminum, EA:Embossed Aluminum, GS: Galvanized Steel, SS:Stainless Steel

Unit Construction Notes

1 BAH to provide a floor drain in non-drain pan sections and extend to unit exterior with 2" aluminum pipe. Provide cap. Drain to be 6" x 6" x 4"D. Provide aluminum grating over drain flush with unit floor. All drain material to be aluminum and welded.

Sales Order:

Dwg. No.:

Job Order:

Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

2	BAH to provide a continuous length stainless steel piano hinge for all access doors
3	BAH to provide a 1" pressure port w/ cap in each access door.
4	Floors continuously welded with no fasteners penetrating the floor. Fastening of all components to the floor is to be by welding only.
5	BAH to provide a label on each access door indicating handle position as "Open" and "Closed"
6	BAH to provide a latch & chain on all doors. (The chains are to hold the doors open)
7	All drain pans covered with 304 stainless steel fabricated grating.
8	BAH to provide our standard sealant which is NSF 51 certified and FDA compliant in accordance with 21CFR177 2600 Color to be clear or aluminum color

SHIPPING SECTIONS AND WEIGHTS

Shipping and Handling Limitations

Unit shipped in sections. Max. weight/section: LB Max. opening size: H x W x D (In.)

Shipping Sections

Sec. ⁹	Description	Weight ^{LB}	Sec. ⁹	Description	Weight ^{LB}
1	Inlet	2,980	4	Access, Chilled water coil	15,786
2	Fan	8,065	5	Fan	9,239
3	Outlet, Mixing box, Combined filter	8,331	6	Access, Merv 16 filter, Outlet	7,380

Total Estimated Weight (Less Water) ^{LB}:

⁹ - Sections (Sec.) listed in direction of airflow.

Shipping and Handling Notes

1	
2	

FANS

Supply Fans

Qty	Mfr.	Model	Size	Dia IN	Rot./Dis.	Class	Arr.	Wheel Wid. %	Wheel Dia. %	Elev FEET	Temp °F	Max RPM	Weight LBS
1	Twin City Fans	EPFN	542	54.2	CW/Axial	3	4	75	100	705	70	1,267	2059
Operation	Qty	Total ACFM	ACFM/Fan	OV FPM	TSP IN WG	ESP IN WG	ISP IN WG	FSE IN WG	RPM	VFD Hz	Fan BHP	Total BHP ¹⁰	
Design	1	61,500	61,500	0	7.10	2.50	4.28	0.32	1,104	55.90	96.8	96.8	

Accessories

Fan Isolation Dampers(s)¹¹
 Inlet Screen(s)
 Outlet Screen(s)

Removable Panel Suitable for Removal of through access
 Drain w/ plug
 SPB Bearings

Monorail Suitable for Removal of
 Inspection Door
 Bearing Life

Nylon Extended Lubrication Lines for
 Acoustic Diffuser

Piezometer Ring(s)
 Accelerometer(s)

Return Fans

Qty	Mfr.	Model	Size	Dia IN	Rot./Dis.	Class	Arr.	Wheel Wid. %	Wheel Dia. %	Elev FEET	Temp °F	Max RPM	Weight LBS
1	Twin City Fans	EPFN	490	49	CW/Axial	3	4	88	100	436	70	1,403	1674
Operation	Qty	Total ACFM	ACFM/Fan	OV FPM	TSP IN WG	ESP IN WG	ISP IN WG	FSE IN WG	RPM	VFD Hz	Fan BHP	Total BHP ¹⁰	
Design	1	62,730	62,730	0	2.60	2.00	0.22	0.38	1,092	55.29	52.7	52.7	

Accessories

Fan Isolation Dampers(s)¹¹
 Inlet Screen(s)
 Outlet Screen(s)

Removable Panel Suitable for Removal of through access
 Drain w/ plug
 SPB Bearings

Sales Order: Dwg. No.:
 Job Order: Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

<input checked="" type="checkbox"/>	<input type="text"/>	Monorail Suitable for Removal of <input type="text"/>	<input type="text"/>	None	Inspection Door	<input type="text"/>	Bearing Life
<input checked="" type="checkbox"/>	Nylon	Extended Lubrication Lines for <input type="text" value="Motor only"/>	<input type="text"/>	<input type="checkbox"/>	Acoustic Diffuser	<input type="text"/>	
<input checked="" type="checkbox"/>	Piezometer Ring(s)	<input type="text" value="w/ Control Unit"/>	<input type="text"/>	<input type="checkbox"/>	Accelerometer(s)	<input type="text" value="None"/>	

¹⁰ -Total BHP includes belt losses when applicable, ¹¹ -See "Mixing & Distribution" section for damper details
 *** See attached curve(s) for additional performance data ***

Fan Notes

1	Monorail provided with mechanical stops on each end, labeled with lift capacity, (1,400 Lbs) and include a soft rubber guard on end of rail when exposed to prevent head injury if struck
2	BAH to provide one (1) telescoping monorail for use through the removable panel. Monorail to be centered on the motor.
3	Removable panel is large enough to remove the fan or motor
4	Twin City Fan to provide vibration report.
5	Fan to have an aluminum wheel
6	Controller for fan air flow to be Dwyer DHII.

MOTORS

Supply Fan Motor(s)

Qty	Type	HP	Nom. RPM	Voltage	Phase/Freq	FLA	LRA	Frame	NEMA	Wgt. LB	Pos.	
1	WEG Premium Efficiency ODP	125	1185	460	3/60	158	1060	445T	ODP	1,602	Dir.	
Accessories											FLA NEC	156 A

<input checked="" type="checkbox"/>	Suitable for use w/ VFD	<input checked="" type="checkbox"/>	Permanently Sealed Bearings	<input checked="" type="checkbox"/>	Aegis Shaft Grounding
<input type="checkbox"/>	Winding Thermistors ¹²	<input type="checkbox"/>	Bearing RTD ¹³	<input type="checkbox"/>	Heater ¹⁴
<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	Roller Bearings ¹⁵

Return Fan Motor(s)

Qty	Type	HP	Nom. RPM	Voltage	Phase/Freq	FLA	LRA	Frame	NEMA	Wgt. LB	Pos.	
1	Baldor IEEE 841 Severe Duty	75.0	1185	460	3/60	86.8	540	405T	TEFC	1,327	Dir.	
Accessories											FLA NEC	96 A

<input checked="" type="checkbox"/>	Suitable for use w/ VFD	<input checked="" type="checkbox"/>	Permanently Sealed Bearings	<input checked="" type="checkbox"/>	Aegis Shaft Grounding
<input type="checkbox"/>	Winding Thermistors ¹²	<input type="checkbox"/>	Bearing RTD ¹³	<input type="checkbox"/>	Heater ¹⁴
<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	Roller Bearings ¹⁵

¹² -Winding Thermistors are temperature sensors for windings, ¹³ -Bearing RTDs are temperature sensors for bearings, ¹⁴ -Heaters are for preheating motors, ¹⁵ -Roller Bearings are to be used for belt-drive applications with motors 60HP and larger.

Motor Notes

1	Motor to be IEEE 841 construction, but will not be labeled as IEEE 841 due to addition of Aegis SGR. Base catalog numbers are; ECP84404T-4, and ECP84411T-4 and will be modified to include an internal Aegis SGR and sealed bearings
2	Motor to be provided with insulated bearing on one end and a shaft grounding ring on the opposite end, installed by Baldor
3	Motors shall be provided with ground bonding points on the motor foot. See electrical section for details.

VIBRATION ISOLATION

Duty	Mfr.	Qty	Nom. Defl. IN	Isolator Type	Min Eff. %	Fan Base Type ¹⁷	Fan Thrust Restraints	Model
Exhaust	Amber Booth	1	2"	Seismic	90	Structural	Yes	AMSR
Supply	Amber Booth	1	2"	Seismic	90	Structural	Yes	AMSR

¹⁷ -Inertia base concrete by others unless otherwise noted.

Vibration Isolation Notes

1	Isolator base and springs furnished by Twin City Fan as part of the fan assembly.
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Sales Order: Dwg. No.:

Job Order: Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

FILTER

	Mfr.	Type	Model	% Eff	MERV	H	x	W	Size(s) IN	Serv.	Frame Mat'l	Gauge
1	Camfil	Panel	30/30		8	5	x	8	24x24x 2	Up	Stainless	By Others
1	Camfil	Bag	Riga-Flo PH		13	5	x	8	24x24x 12	Up	Stainless	By Others
2	Camfil	Rigid	Filtra 2000	95 DOP	16	5	x	8	24x24x 12	Up	Stainless	By Others

Ship Filters BAH shall supply set(s) of extra filters for

Filter Notes

1	BAH to provide a Cleveland Controls barb fitting through the unit casing on the upstream and downstream side of each filter bank. Cleveland Controls Model number is 21118-112. This part is to be ordered from Grainger using item number 2EJN6.
2	BAH to provide a spacer frame between the pre & intermediate filter to allow individual filter reading. Use standard Dwyer filter gauge kit for the spacer frame only. Barb fittings are provided before and after the filter bank only.
3	95% DOP filters to be gel seal size 24x24x12.
4	BAH to provide gel seal stainless steel filter frames size 24-5/8x24-5/8 for the 24x24x12 95% DOP filters. Gel to be silicone based, not polyurethane based.
5	95% DOP filter frames provided with stainless steel swing arms.
6	95% DOP filter frames to be welded and sealed leak tight.
7	95% DOP frame cutoff to be welded to the frame and screwed to the unit casing.

CHILLED WATER COOLING COIL

Duty	Qty	Mfr.	Model	FH			FL			Depth	Tubes		Fin Type	Fins		Rows	Circuit	
				IN	x	IN	IN	x	IN		OD x Wall Thick	IN		FPI x Thick	IN			
1	Supply	6	Aerofin	W-12.0AW-36.0 X 92.0-8-1			36.0	x	92.0	x	12.5	5/8 x .035	CU	Wave ¹²	x .0160	AL	0	1

Fluid	Casing Material IN	Hdr/Con Mat'l	Belled Tubes	Turb.	Con/Pull Hand	Con Size IN	Con Type	Flange	Ext. Con IN	Total Weight LBS ¹⁸	
											Water

Accessories

Coil Racks: 304 SS Intermediate Pan Rack

Eliminators: None

CU:Copper, AL:Aluminum, FL: Finned Length, FH: Finned Height, FPI: Fins per Inch, O.D.:Outside Diameter, LH: Left Hand, RH: Right Hand, CS: Carbon Steel, SS: Stainless Steel, RB: Red Brass
RF:Raised Face, FF:Flat Face, SO:Slip-on, WN:Weldneck, TH: Threaded

¹⁸ -Dry Weight. Consult Factory for Wet (Operating) Weights.

Chilled Water Cooling Coil Notes

1	All coils to be tested at minimum 300 psig under water. Manufacturer to provide test reports.
2	BAH to provide the cooling coils with plain end supply and return red brass connections. BAH is providing flat faced slip-on brass flanges. Flanges shipped loose for field installation by others.
3	Vent & drain connections to be threaded red brass.
4	Headers to be Type K Copper
5	Any flashing around the coils to be 304 stainless steel
6	Coil connections to extend minimum 6" from the unit casing.
7	Nearside coil vent & drain connections turned outward 90° and will not be extended into the corridor.

MIXING & DISTRIBUTION

Dampers

Sales Order:

Dwg. No.:

Job Order:

Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

Tag	Duty	Mfr.	Model	Qty	W IN	x	H IN	Blade	Damper Fail Pos.	Torque Req. LBS-IN	Act. By	Type	Act ¹⁹	Qty	Signal
RA	Return Air	Ruskin	CD50	1	180	x	42	Opposed	Closed	263	BAH	Elec.	2-Pos	3	2P (N/A)
EA	Exhaust Air	Ruskin	CD50	1	45	x	12	Opposed	Closed	19	BAH	Elec.	Mod.	1	2-10v
OA	Outside Air	Ruskin	CD50	1	45	x	12	Parallel	Closed	26	BAH	Elec.	Mod.	1	2-10v
RA	Return Air	Ruskin	CD50	1	146	x	48	Parallel	Closed	341	BAH	Elec.	Mod.	3	2-10v
SA	Supply Air	Ruskin	CD50	1	176	x	42	Opposed	Closed	257	BAH	Elec.	2-Pos	3	2P (N/A)

¹⁹-Action Indicates Actuator Operation Type (Two-position or modulating)

Mixing & Distribution Notes

1	Damper Actuator power = 24v
2	Actuator to be Belimo.
3	Each damper provided with a Ruskin SP100 switch package
4	Actuator wiring conduit and wiring by others.

Sales Order: Dwg. No.:

Job Order: Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

ELECTRICAL

Routing Hardware

Conduit Material: Junction Boxes and Enclosure NEMA Rating:

Routing Notes:

ETL Label Hazardous Environment Rating

Low Voltage

Field Connection(s): Voltage: / / hz Qty of Circuits:

Qty	Light Fixture Type	Bulbs By	FLA
<input type="text" value="10"/>	<input type="text" value="Marine Light Fixtures"/>	<input type="text" value="By BAH"/> <input type="text" value="100W"/> <input type="text" value="Equal LED"/>	<input type="text" value="18"/> <input type="text" value="A"/>

Qty	Light Switch Type	Hours	Hold	Environment Rating	Location
<input type="text" value="2"/>	<input type="text" value="Timer"/> <input type="text" value="2-Way (std)"/>	<input type="text" value="2"/>	<input type="text" value="W/"/>	<input type="text" value="Indoor"/>	<input type="text"/>

Qty	Qty
<input type="text" value="2"/> 20A Duplex GFCI	<input type="text" value="0"/> 20A Duplex Weather-Rated GFCI

High Voltage

Field Connection(s): Voltage: / / hz Qty of Circuits:

Mini-Load Center kVA x Crts NEMA: FLA @ HV A

Motor	Motor SPW	Motor Wire Termination	FLA	NEC
<input type="text" value="Supply"/>	<input type="text" value="SPW - Unconsolidated"/>	<input type="text" value="VFD -> Motor"/>	<input type="text" value="156"/>	<input type="text" value="A"/>
<input type="text" value="Return"/>	<input type="text" value="SPW - Unconsolidated"/>	<input type="text" value="VFD -> Motor"/>	<input type="text" value="96"/>	<input type="text" value="A"/>

VFDs/Starters

Service	Mfg	Model No.	Qty	NEMA	Voltage	HP	Supplied By	Mounted By
Supply Fans	ABB	ACH580-PCR-077A-4	1	1	460	125	By Others	By Others
Exhaust Fans	ABB	ACH580-PCR-077A-4	1	1	460	75	By Others	By Others

Electrical Notes

1	BAH to provide one (1) 2 hour timer light switch. The switch is to be mounted on the unit exterior near the supply fan access door. Centerline of the switch to be mounted approximately 4' above the bottom on the channel base. Timer switch rated 120/277V.
2	Mount a receptacle on the unit exterior underneath underneath the light switch
3	BAH to provide (2) points of power connection, one (1) for 120V connection and one (1) for 460V connection. Connections as follows: a) One (1) 120V connection at a junction box with multiple circuits (1 for lights & 1 for receptacle). b) Casing penetration for use by the contractor with VFD cable.
4	All wiring is to be 600V rated
5	All wiring to be numbered and tagged using sleeve type wire tags.
6	BAH to use 3/4" Ø conduit
7	BAH to terminate the 120V connections to a screw type terminal block (wire crimped in a compression lug). Terminals shall be "finger safe".
8	BAH to provide grounding lugs.
9	All conduit to be filled with caulk at the ends, intersections, and junctions to ensure sealed conduit runs.
10	120V power wiring shall use the following color scheme: a) Phase A - black b) Phase B - red c) Phase C - blue d) Neutral - white e) Ground - green or green with yellow stripe

Sales Order:

Dwg. No.:

Job Order:

Revision:

DATA SHEETS

AC2000 Data Sheets, Version 9.14

TESTING & SERVICES

BAH shall provide the following factory test(s) :

- None
- Pitot-Traverse Performance (ES-8104)
- Piezometer Ring Performance
- Sound Power (ES-8105)
- Sound Pressure (ES-8106)
- Velocity Profile (ES-8108)
- Vibration (ES-8107) in accordance with ANSI S2.19, Grade G6.3, w/ IPS filtered in maximum vibration allowed.
- Leakage* Max. % of design CFM @ times the operating pressure.
 * - Minimum allowable leakage shall be 50 CFM. Total CFM Allowed at negative " WG & positive " WG
- Deflection (ES-8109) Test Pressure: Negative " WG & positive " WG

BAH shall provide the following field service(s) :

- None
- Start-up (AHU)
- Start-up (VFD)
- Start-up Supervision
- Training
- Erection Supervision
- Deflection (ES-8109)
- Leakage Test*
- Performance Test
- Vibration Test

*SHOP NOTE: Ship Unit with Testing Cover Sheets

Testing Notes

1	BAH to provide a 3 year parts & labor warranty beginning at unit shipment.
2	Fan coast down test from 30-60Hz provided from Twin City with the fan.
3	Maximum deflection of 1/200 of the maximum span at 1.5 times the design operating pressure.
4	Calibration certificates required for all equipment used during testing.
5	BAH to conduct a coast down test from 60hz. Record peak vibration point.
6	Performance test conducted at design conditions
7	BAH to provide an Actuator Test. Actuator is to be cycled to verify proper operation
8	Removal of test sheets by contractor after completion of field leakage testing

MISCELLANEOUS NOTES

Sales Order:

Dwg. No.:

Job Order:

Revision:

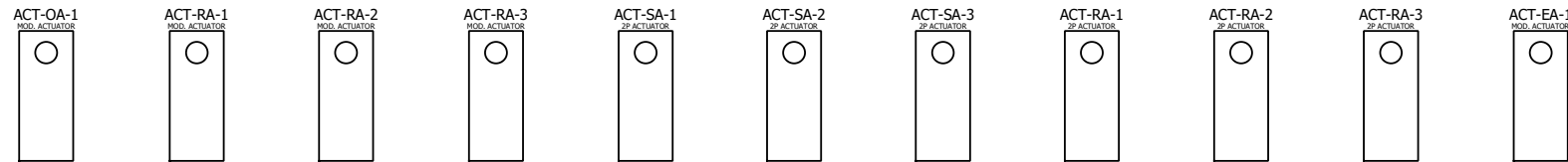
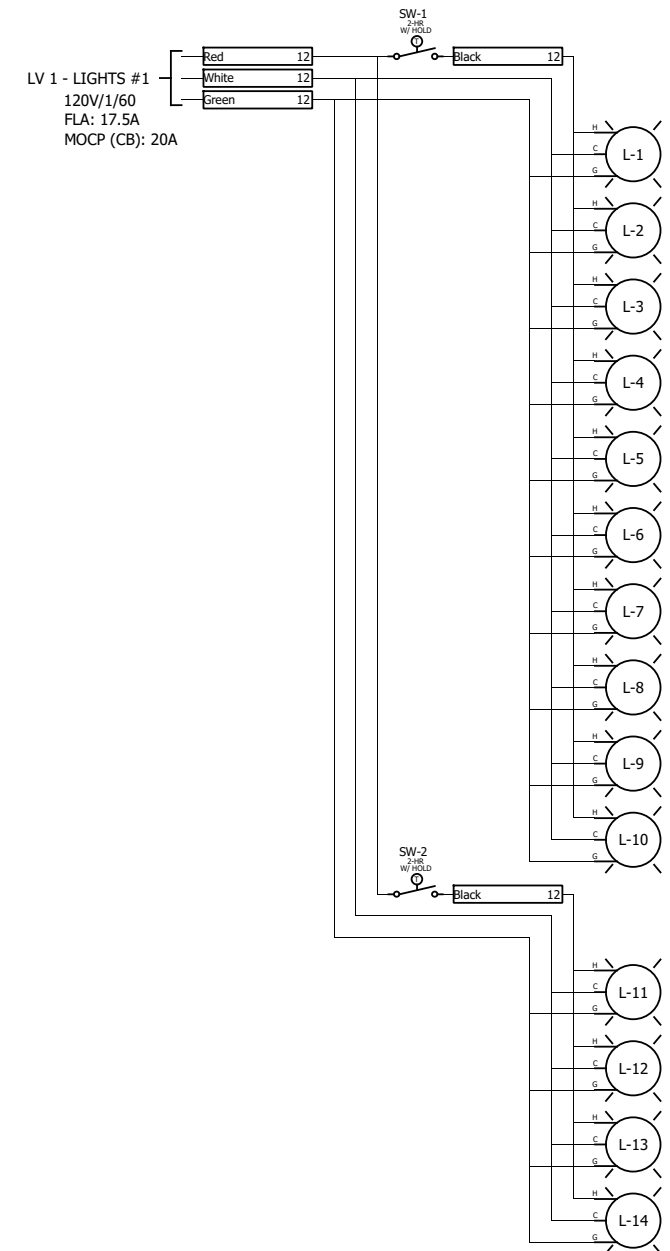
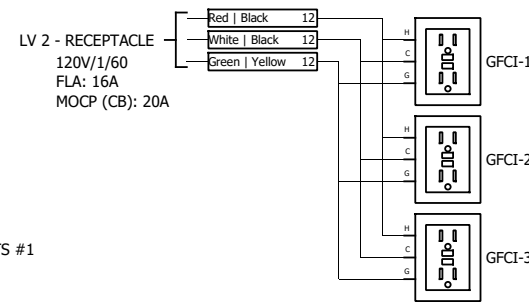
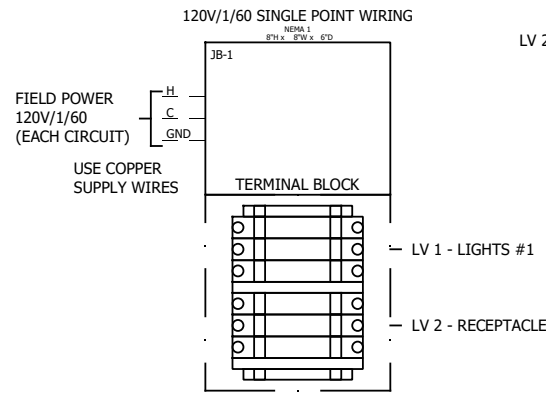
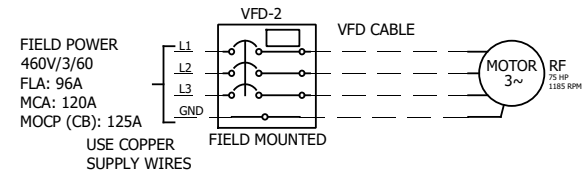
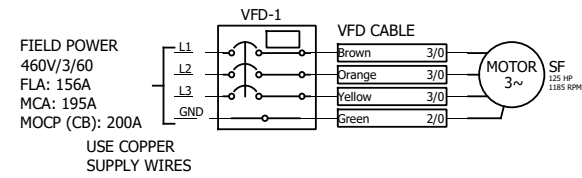
DATA SHEETS

AC2000 Data Sheets, Version 9.14

	BAH to provide a stainless steel nameplate (mounted on the fan access door) with the following information: a) Owners Equipment Tag Number: AHU-4910 b) Kirlin Way PO #: 012209 c) Manufacturer name: Buffalo Air Handling d) Manufacturer model number: BF3AI-EPFNC3OD e) Manufacturer serial number: 220094-09 f) Year of fabrication: 2023 g) Supply air CFM (Max): 61,500 h) Design internal static pressure - inches wg: 4.6 i) Design external static pressure - inches wg: 2.5 j) Design total static pressure - inches wg: 7.1 k) Fan Manufacturer: Twin City Fan l) Supply Fan RPM: 1097 RPM m) Motor manufacturer: Baldor n) Motor Phase/Hertz/Voltage: 3/60/460V o) Supply Motor HP: 125 p) Supply Motor FLA: 149 1. q) Supply Motor LRA: 1022 r) Lighting Phase/Hertz/Voltage: 1/60/120V s) Return air CFM (Max): 62,730 t) Design internal static pressure - inches wg: .6 u) Design external static pressure - inches wg: 2 v) Design total static pressure - inches wg: 2.60 w) Fan Manufacturer: Twin City Fan x) Return Fan RPM: 1089 RPM y) Motor manufacturer: Baldor z) Motor Phase/Hertz/Voltage: 3/60/460V aa) Return Motor HP: 75 ab) Return Motor FLA: 86.8 ac) Return Motor LRA: 540 ad) Coil manufacturer: Aerofin ae) Cooling coil entering & leaving air temperature (db/wb) - °F: 72db/60wb - 46db/46wb af) Cooling coil entering & leaving water temperature - °F: 42 - 54
2.	Temporary anchors for shipment shall be painted bright yellow or orange and labeled "Temporary anchor - remove prior to operating equipment".
3.	Shipping sections to be labeled with with a temporary tag displaying equipment number and section number attached to the section casing, i.e.. AHU-058, Sect 1 of 6, Sect 2 of 6, etc.
4.	Affix adhesive labels on each section stating " DO NOT penetrate or attach to equipment housing and DO NOT cause obstructions to component access panels"
5.	All coil and humidifier connections to be protected for shipment with plastic caps. Flanges are to be protected for shipment with wooden or plastic covers
6.	Removal of test sheets by contractor after completion of field leakage testing

REVISIONS

Rev	Date	Init	Description of Change(s)



REV.	DATE:	NAME:	DESCRIPTION:
0	12/7/2022	JMS	APPROVAL
A	-	-	-
B	-	-	-
C	-	-	-

REV.	DATE:	NAME:	DESCRIPTION:
D	-	-	-
E	-	-	-
F	-	-	-
G	-	-	-

WIRE BY OTHERS

WIRE BY BAH

END USER:
Eli Lilly & Co.
MARK #:
AHU-4910

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BUFFALO AIR HANDLING
467 ZANE SNEAD DRIVE, AMHERST, VA 24521
PH: (434) 946-2465 FAX: (434) 946-7941

CUSTOMER:
Kirlin Way Mechanical

ENGINEER:
Hipp Design+Consulting

DWG STATUS: - SCALE: NONE APPROVAL: - DETAILED: -

ORDER #: 220094-09 JO#: 18807 APR DATE: 12/7/2022 DTL DATE: -

TITLE: POWER SCHEMATIC SHEET: 1 OF 2 DWG #: D-18807-2 REV: -

FAN DETAILS

Job Name: Hipp - Lilly Concord DAP



Tag: SF09, AHU-4910
 Customer: Buffalo Air Handling
 Job ID: 220094
 Date: December 20, 2022

Description

Quantity 1
 Model EPFN
 Size 542
 Width SWSI
 Arrangement 4
 Class III
 Rotation CW
Discharge HOR
 Wheel Diameter (in) 54.2
Drive method Direct
 Percentage width 75%
 Percentage diameter 100%
 Motor position --
 Design VFD Op. Freq 55hz

Performance

Volumetric Flow CFM 61,500
Operating SP (in WC) 7.100
 Standard SP (in WC) 7.009
RPM 1097
 Tip Speed (FPM) 15580
Oper. Power BHP 97.51
 Standard Power BHP 96.26
 Outlet Area (sq.ft) 17.143
 Outlet Velocity (FPM) 3587
 Max RPM for Class 1267
 Static Efficiency 70.59%
 Total Efficiency 78.66%
 FEI 1.30
 FEP (KW) 76.27
 System FEI 1.30
 System FEP (KW) 76.27

Air/Gas Properties

Altitude above sea level (ft) ... 705
 Inlet Pressure (in WC) 0.000
 Inlet Temperature(°F) 50
 Design Temperature (°F) 50
 Gas Type Operating air
 Estimated Density (lb/ft³) 0.076

Motor Data

Power (HP) 125
 Enclosure TEFC
Speed (RPM) 1200
Voltage 460V
Phase 3
Frequency 60Hz
Frame Size 445T
 Technology

Modifiers

Using VFD.

Sound

Octave Bands	1	2	3	4	5	6	7	8	LwA
Level at Inlet	101	107	101	92	94	89	81	76	99
Level at Outlet	98	105	103	100	99	94	87	80	103

Distance in ft	1	3	5
dBA at inlet	99	89	85
dBA at Outlet	103	93	89

Sound Power Levels in dB re.10⁻¹² Watts:

Estimated sound pressure level in dBA (re: 0.0002 microbar) based on a single * ducted installation:

*To estimate dBA level for ducted inlet and ducted outlet (into and out of the room) type installation, deduct 20 from the LwA value shown. Using a directivity factor of 1. Estimated Sound Pressure based on free field, spherical (Q = 1) radiation at stated distance.

Definitions:

LwA The overall (single value) fan sound power level, 'A' weighted.

dBA The environment for each fan installation influences its measured sound value, therefore dBA levels cannot be guaranteed. Consult AMCA Publication 303 for further details. A fan's dBA is influenced by nearby reflective surfaces.

FAN DETAILS

Job Name: Hipp - Lilly Concord DAP



Tag: SF09, AHU-4910
Customer: Buffalo Air Handling
Job ID: 220094
Date: December 20, 2022

Pricing Detail

EPFN 542, Class III, Arrangement 4 Bare fan	2,036lb
Guard - Protective Enclosure	134 lb
Screen - Inlet, Std Type	0 lb
Vibration Isolators - Seismic - 2" Defl	0 lb
Special Width Construction	0 lb
Wheel - Aluminum	0 lb
Mount Fan on Base	0 lb
Piezometer Flow Measurement Ring (Copper Construction)	0 lb
Base - Isolation (2" Deflection)	1,010 lb
Balancing - Special	0 lb
BALANCE TO CATEGORY BV-5, [BUFFALO AIR HANDLING]	
Motor 125 HP, 1200 RPM, 460V, 3Ph, 60Hz , TEFC - Premium , Induction , 445T	1,974 lb
Mount Customer Supplied Motor	0 lb
<hr/>	
Each Weight	5,154 lb
Extended Weight	5,154 lb

Job Name: Hipp - Lilly Concord DAP



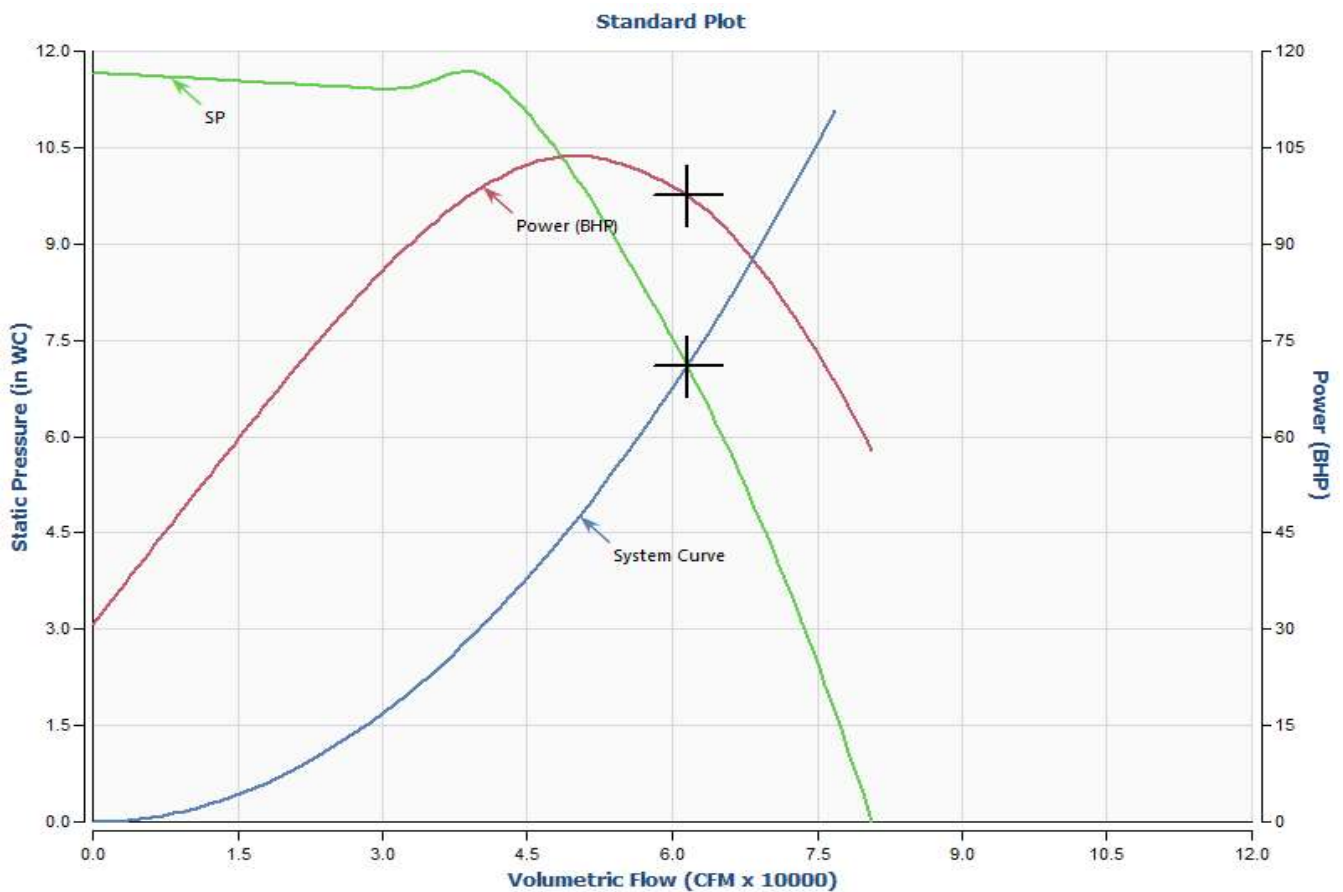
Customer: Buffalo Air Handling
Job ID: 220094
Date: December 20, 2022

Tag: SF09, AHU-4910

Fan information

Size/Model	542/EPFN	Class	III	Outlet Vel (FPM)	3587
Volumetric Flow (CFM)	61500	Speed (RPM)	1097	Density (lb/ft³)	0.076
SP (in WC)	7.1	Max Speed	1267 RPM @ 50 °F		
		Power (BHP)	97.51		

Adjusted for 75% Width, Op temp: 50°F, Design temp: 50°F, Altitude: 705 ft, Inlet Dens: 0.0760 lb/ft3



BALDOR • *RELIANCE*

Product Information Packet

ECP84411T-4

125HP, 1188RPM, 3PH, 60HZ, 445T, A44090M, TEFC

Part Detail							
Revision:	F	Status:	PRD/A	Change #:		Proprietary:	No
Type:	AC	Prod. Type:	A44090M	Elec. Spec:	A44WG3350	CD Diagram:	416820-036
Enclosure:	TEFC	Mfg Plant:		Mech. Spec:		Layout:	617427-061
Frame:	445T	Mounting:	F1	Poles:	06	Created Date:	08-17-2012
Base:		Rotation:	R	Insulation:	F	Eff. Date:	10-27-2014
Leads:	3#1					Replaced By:	
Literature:		Elec. Diagram:					

Nameplate NP3237									
CAT NO	ECP84411T-4	SPEC NO.	P44G3964						
HP	125	AMPS	146	VOLTS	460	DESIGN	B		
FRAME SIZE	445T	RPM	1188	HZ	60	AMB	40	SF	1.15
D.E. BRG.DATA	6318	O.D.E. BRG.DATA	6318	PH	3	DUTY	CONT	INSUL.CLASS	F
D.E. BRG.	90BC03J30X	TYPE	P	ENCL	TEFC	CODE	F		
O.D.E. BRG.	90BC03J30X	POWER FACTOR	84	NEMA-NOM-EFFICIENCY	95				
3/4 LOAD EFF.	95.3	MAX CORR KVAR	30.0	GUARANTEED EFFICIENCY	94.5				
TEMP CODE	T3	TEMP =	200						
CHP HZ	60-90	CT HZ	15-60	VT HZ	0-60				
INVERTER-TEMP-CODE	T3								
SER.NO.		MOTOR WEIGHT							

Nameplate 000613007EX					
CAT NO	ECP84411T-4	SPEC NO.	P44G3964		
NO. ROTOR BARS	71	GREASE TYPE	POLYREX EM		
NO. SLOTS	90	IEEE 85 NOISE LEVEL	75DBA		
5 YEAR WARRANTY		MFG. DATE			
NL AMPS AT RATED VOLTAGE	50.2	WINDING RES @25 C	.0364	OHMS	
SER.NO					

Parts List		
Part Number	Description	Quantity
SA249733	SA P44G3964	1.000 EA
RA236593	RA P44G3964	1.000 EA
613-6PU	N/P UL CSA LABLE	1.000 EA
NP3237	SS SUPER E INVERTER DUTY IEEE 841	1.000 EA
000613007EX	N/P BALDOR	1.000 EA
000692000FF	N/P	1.000 EA
000692000JP	N/P	1.000 EA
000692000VD	LABEL WARNING	1.000 EA
000692000VH	N/P	1.000 EA
421948051	LABEL, MYLAR	1.000 EA
004824015A	GREASE POLYREX EM	1.160 LB
032018008CK	HHCS 3/8-16X1L PLATED	4.000 EA
032018020FK	HHCS 3/4-10X2-1/2 PLTD.	4.000 EA
032018036DK	HHCS 1/2-13X4-1/2 PLTD.	3.000 EA
032620016LA	SOCKET SET SCREW-449	3.000 EA
034017014AB	LCKW 3/8 STD. PLATED	4.000 EA
034180014DA	KEY 1/4X1/4X1-3/4 L	1.000 EA
034530072AB	P/NIP 1/8X9"L Threaded both ends	1.000 EA
034530072BB	PIPE NIPPLE,DE - 440-BS	1.000 EA
034600001AA	BUSH 1/4TO1/8 BLACK	1.000 EA
034630002AB	CPLG 1/4" PLATED	1.000 EA
034690005AB	PPLG 3/4 PLATED	2.000 EA
035000001G	GREASE RELIEF FITTING, ALEMITE 317400	1.000 EA
089490099D	G28 BRKT 089490098WCA	1.000 EA

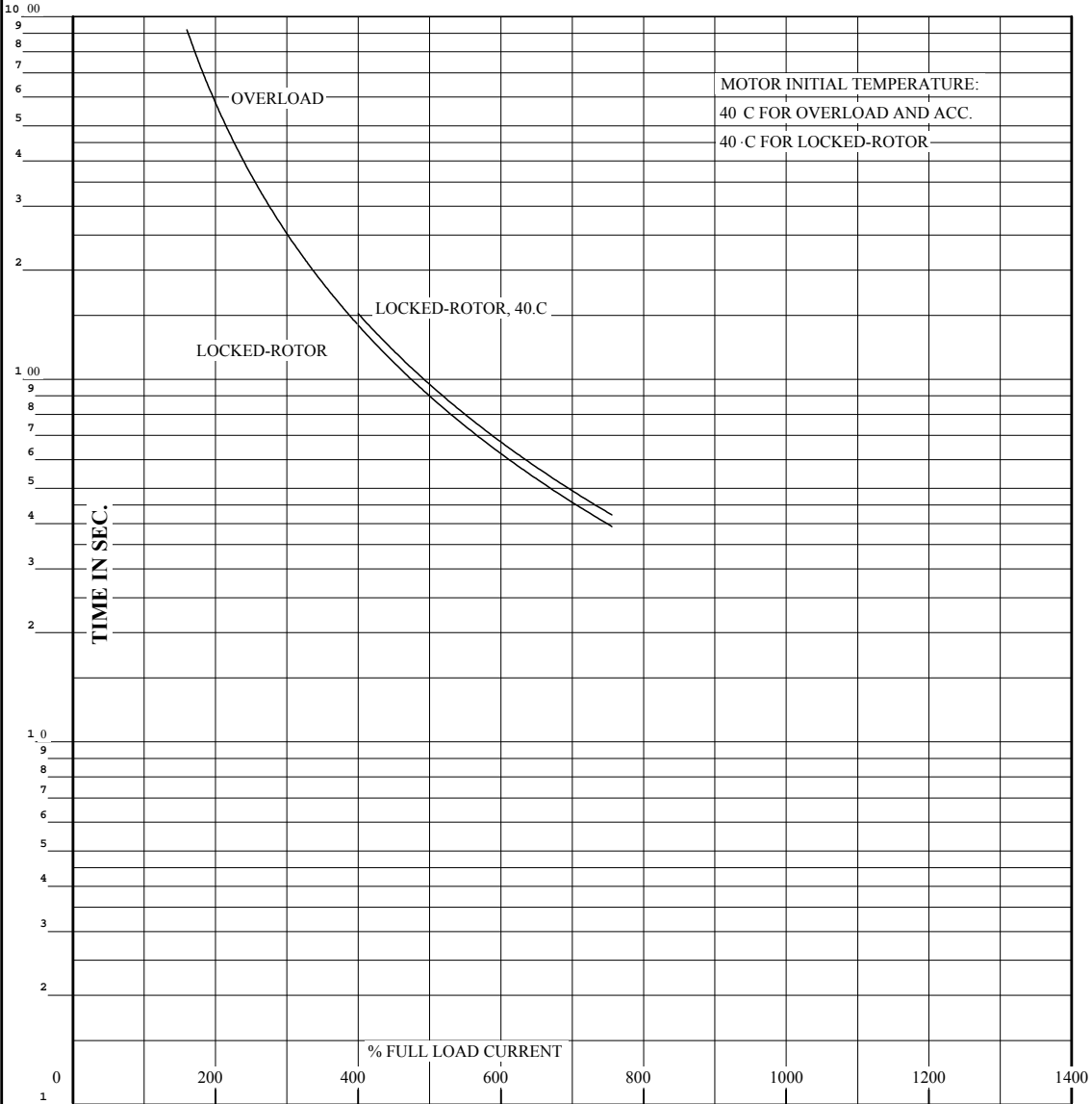
Parts List (continued)		
Part Number	Description	Quantity
412118006A	DRAIN	1.000 EA
078557001E	FAN 440 078557001F	1.000 EA
083199082A	G28 FAN COVER MACHINING SHORT VERSION	1.000 EA
089490099D	G28 BRKT 089490098WCA	1.000 EA
410700004A	WSHR	1.000 EA
412118006A	DRAIN	1.000 EA
415028021L	SEAL - 449	1.000 EA
415072001B	CLAMP	1.000 EA
415096002A	CPLG 1/8 HEX TYPE	1.000 EA
423709011D	WASHER	3.000 EA
032018004BK	HHCS 5/16-18X1/2 PLATED	3.000 EA
032018020FK	HHCS 3/4-10X2-1/2 PLTD.	4.000 EA
032018036DK	HHCS 1/2-13X4-1/2 PLTD.	3.000 EA
034017013AB	LCKW 5/16 STD. PLATED	3.000 EA
415915007G	GASK, LAC	1.000 FT
034530044AB	P/NIP 1/8X5-1/2L GALV.	1.000 EA
034530044BB	P/NIP 1/4X5-1/2L PLT	1.000 EA
034600001AA	BUSH 1/4TO1/8 BLACK	1.000 EA
034630002AB	CPLG 1/4" PLATED	1.000 EA
035000001G	GREASE RELIEF FITTING, ALEMITE 317400	1.000 EA
415028021L	SEAL - 449	1.000 EA
415096002A	CPLG 1/8 HEX TYPE	1.000 EA
418151014G	RETAIN RING	1.000 EA
423709011D	WASHER	3.000 EA

Product Information Packet: ECP84411T-4 - 125HP,1188RPM,3PH,60HZ,445T,A44090M,TEFC

702623013A	THERMAL BARRIER -- G28 -- BRACKET MTD	1.000 EA
032018008BK	HHCS 5/16-18X1L PLATED	4.000 EA
032018008DK	HHCS 1/2-13X1 PLATED	4.000 EA
033512006LB	HHTTS 1/4-20X3/4 PLTD.	1.000 EA
035000001A	ALFTG 1/8" 1610-BL	1.000 EA
035000001A	ALFTG 1/8" 1610-BL	1.000 EA
067053001C	GASK 440	1.000 EA
076863000C	+CBCST BLKT - 440	1.000 EA
076864000A	CB CVRCST BLKT - 440	1.000 EA
406056007A	GASKET, 440	1.000 EA
406099000A	PLUG - FAN COVER 320-440	1.000 EA
415000103D	T/LUG #4AWG-1/0AWG W/HOLE FOR .250 BOLT	1.000 EA
418150003A	GREASE FITTING CAP	1.000 EA
418150003A	GREASE FITTING CAP	1.000 EA
004824003AJD	WILKO 778.50 BLUE GREEN - 55 GAL DRUMS	0.500 GA
033775004EA	DRSCR #6-1/4 304 S.S.	2.000 EA
034180054KA	KEY 7/8X7/8X6-3/4 L	1.000 EA
MN416	TAG-INSTAL-MAINT w/wire. (1000/bx) 8/12	1.000 EA
PK5004A09	BASE 48 X 39-1/4 STACK 2 X 4 RUUNER	1.000 EA
LB1449	DIV-2/NEC WARNING LABEL	1.000 EA



REL. S.O.	RPM 1188	S.F. .00	ROTOR 418143098ME
FRAME 445T	VOLTS 460	NEMA DESIGN B	TEST S.O. TYPICAL DATA
HP 125	AMPS 146	CODE LETTER F	TEST DATE ---
TYPE P	DUTY CONT	ENCLOSURE TEFC-XEX	STATOR RES. @ 25 °C .0364
PHASE/HERTZ 3/60	AMB °C/INSUL 40/F	E/S 498802	OHMS (BETWEEN LINES)



THERMAL LIMIT CURVE

REMARKS: NEMA NOMINAL EFFICIENCY = 95.0 PCT.

AMPERES SHOWN FOR 460 VOLT CONNECTION, IF OTHER VOLTAGE CONNECTIONS ARE AVAILABLE, THE AMPERES WILL VARY INVERSELY WITH THE RATED VOLTAGE.

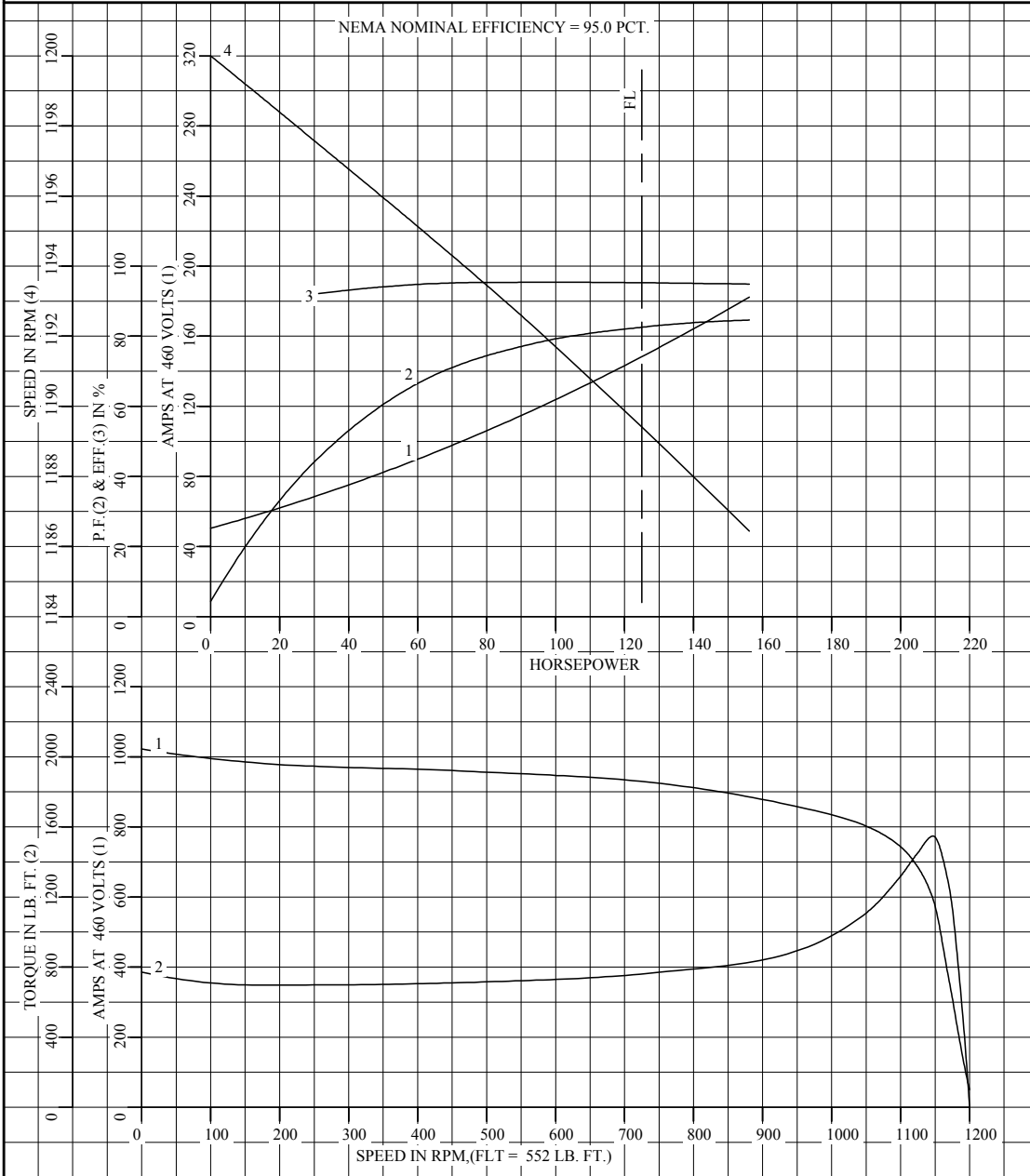


DR. BY	W. L. SMITH
CK. BY	J. J. HARRISON
APP. BY	W. L. SMITH
DATE	04/20/10

A-C MOTOR
PERFORMANCE A44WG3350-R001
CURVES ISSUE DATE 10/18/11



REL S.O.	RPM 1188	S.F. .00	ROTOR 418143098ME
FRAME 445T	VOLTS 460	NEMA DESIGN B	TEST S.O. TYPICAL DATA
HP 125	AMPS 146	CODE LETTER F	TEST DATE ---
TYPE P	DUTY CONT	ENCLOSURE TEFC-XEX	STATOR RES. @ 25 °C .0364
PHASE/HERTZ 3/60	AMB °C/INSUL 40/F	E/S 498802	OHMS (BETWEEN LINES)



AMPERES SHOWN FOR 460 VOLT CONNECTION, IF OTHER VOLTAGE CONNECTIONS ARE AVAILABLE, THE AMPERES WILL VARY INVERSELY WITH THE RATED VOLTAGE.

	DR. BY W.L. SMITH	A-C MOTOR PERFORMANCE CURVES	A44WG3350-R001
	CK. BY J.J. HARRISON		
	APP. BY W.L. SMITH		
	DATE 04/20/10		
A MEMBER OF THE ABB GROUP		ISSUE DATE	10/18/11



BALDOR • RELIANCE Product Information Packet: ECP84411T-4 - 125HP, 1188RPM, 3PH, 60HZ, 445T, A44090M, TEFC

REL. S.O.	FRAME	HP	TYPE	PHASE/HERTZ	RPM	VOLTS
	445T	125	P	3/60	1188	460
AMPS	DUTY	AMB °C/ INSUL.	S.F.	NEMA DESIGN	CODE LETTER	ENCL.
146	CONT	40/F	0.00	B	F	TEFC-XEX
E/S	ROTOR	TEST S.O.	TEST DATE	STATOR RES. @25 °C OHMS (BETWEEN LINES)		
498802	418143098ME	---	---	.0364		
PERFORMANCE						
LOAD	HP	AMPERES	RPM	% POWER FACTOR	% EFFICIENCY	
NO LOAD	0	50.2	1200	4.34	0	
1/4	31.3	70.1	1197	45.3	92.1	
2/4	62.5	90.9	1195	67.8	94.9	
3/4	93.7	118	1192	77.9	95.4	
4/4	125	149	1189	82.6	95.3	
5/4	156	182	1186	84.6	94.8	
SPEED TORQUE						
		RPM	TORQUE % FULL LOAD	TORQUE LB.-FT.	AMPERES	
LOCKED ROTOR		0	140	772	1022	
PULL UP		168	126	698	982	
BREAKDOWN		1147	280	1548	592	
FULL LOAD		1189	100	552	149	
<p>AMPERES SHOWN FOR 460. VOLT CONNECTION. IF OTHER VOLTAGE CONNECTIONS ARE AVAILABLE, THE AMPERES WILL VARY INVERSELY WITH THE RATED VOLTAGE</p> <p>REMARKS: TYPICAL DATA NEMA NOMINAL EFFICIENCY = 95.0 PCT.</p>						
		DR. BY <u>W. L. SMITH</u>		A-C MOTOR PERFORMANCE A44WG3350-R001 DATA ISSUE DATE 10/18/11		
		CK. BY <u>J. J. HARRISON</u>				
		APP. BY <u>W. L. SMITH</u>				
		DATE <u>04/20/10</u>				

DUTY MASTER ALTERNATING CURRENT MOTORS

SQUIRREL-CAGE INDUCTION

ENCLOSURE: TOTALLY ENCLOSED

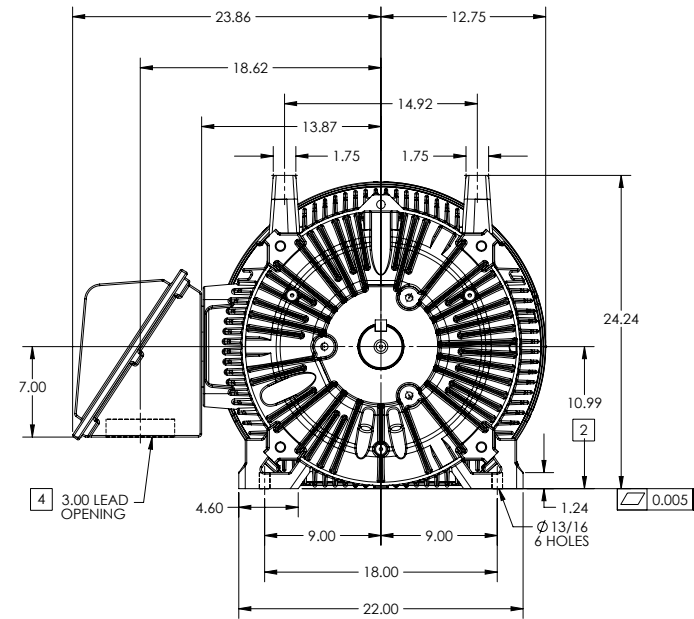
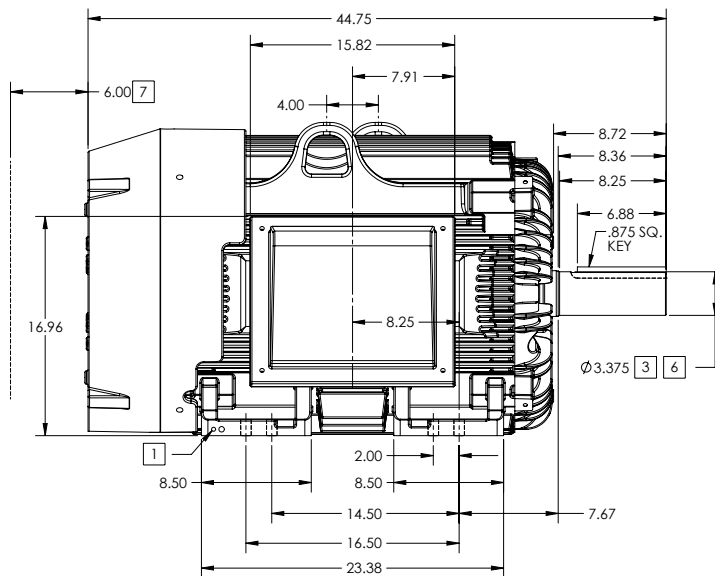
FRAME G445T ABOVE NEMA RATINGS

COOLING: FAN COOLED

MOUNTING: FOOT

INCLUDES 444T FRAME MOUNTING HOLES

841XL ENCLOSURE ENHANCEMENT



- 1. GROUND HOLES QTY 1 1/2-13 TAP; QTY 1 3/8-16 TAP
- 2. VARIES +.00,-.06
- 3. VARIES +.000,-.001
- 4. ON STANDARD MOTORS THIS IS CONDUIT SIZE. ON XT AND CORROSION PROOF MOTOR THIS IS PIPE TAP.
- 5. MOTOR WEIGHTS MAY VARY BY 15% DEPENDING ON RATING.
- 6. SHAFT TIR = 0.0015 IN FOR BALL BEARING MOTORS AND 0.002 IN FOR ROLLER BEARING CONSTRUCTION
- 7. OBSTRUCTION MUST NO ENCR OACH ON AIR INLET

5 WEIGHT (LBS): 2130

DRIVE END AIR DEFLECTOR IS ONLY INCLUDED WHEN NECESSARY.

DIMENSIONS ARE IN INCHES; SEE SHEET 2 FOR DIMENSIONS IN MILLIMETERS

CUSTOMER IS RESPONSIBLE FOR DETERMINING THAT MOTOR PERFORMANCE IS SUITABLE IN THE APPLICATION.

SHEET NUMBER
1 OF 2

CONDUIT BOX LOCATED ON OPPOSITE SIDE WHEN F-2.
IF MOUNTING CLEARANCE DETAILS ARE REQUIRED, CONSULT FACTORY.
MAXIMUM PERMISSIBLE SHAFT RUNOUT WHEN MEASURED AT END OF
STANDARD SHAFT EXTENSION IS .003" T.I.R. TO 5 INCH DIA.

REV. DESC: ADD DIM TO BACK OF C/B			
REV: C	VERSION: 03	REVISED: 04-41-42 06/25/2013	TDR: 00000801622
MODEL NO. 617427-061		REF:	
BY: MGHWCWG	Material:	C	

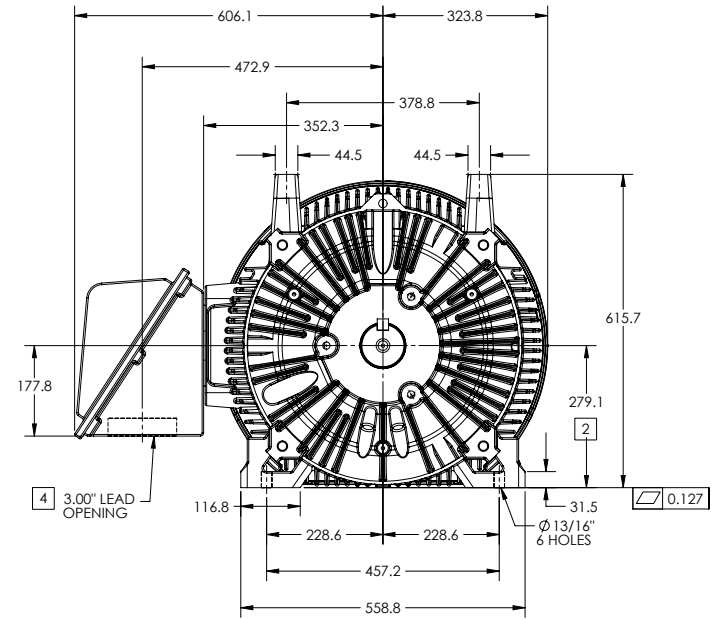
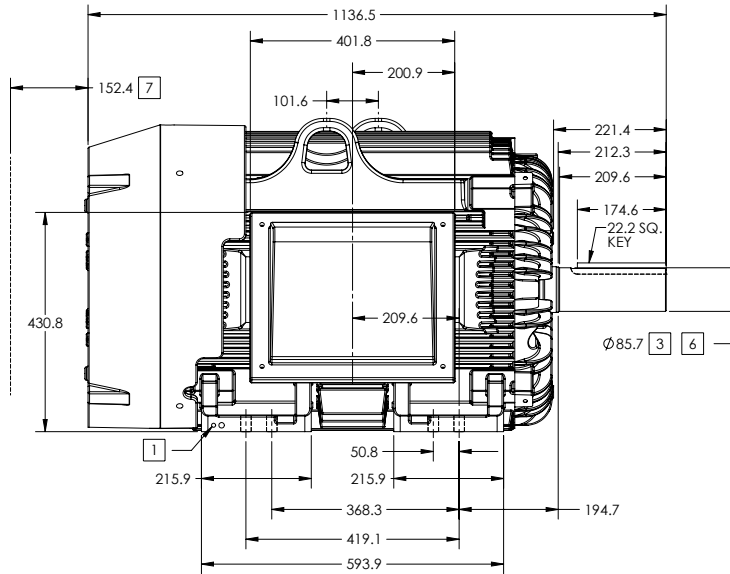
BALDOR
G445T444T STD - FOOTED - SIDE/CENTER CB-841XL

DUTY MASTER ALTERNATING CURRENT MOTORS
SQUIRREL-CAGE INDUCTION

ENCLOSURE: TOTALLY ENCLOSED
MOUNTING: FOOT

FRAME G445T ABOVE NEMA RATINGS
INCLUDES 444T FRAME MOUNTING HOLES

COOLING: FAN COOLED
841XL ENCLOSURE ENHANCEMENT



- 1. GROUND HOLES QTY 1 1/2-13 TAP; QTY 1 3/8-16 TAP
- 2. VARIES +.00,-1.52MM
- 3. VARIES +.000,-.025MM
- 4. ON STANDARD MOTORS THIS IS CONDUIT SIZE. ON XT AND CORROSION PROOF MOTOR THIS IS PIPE TAP.
- 5. MOTOR WEIGHTS MAY VARY BY 15% DEPENDING ON RATING.
- 6. SHAFT TIR = 0.038MM FOR BALL BEARING MOTORS AND 0.051MM FOR ROLLER BEARING CONSTRUCTION
- 7. OBSTRUCTION MUST NO ENCROACH ON AIR INLET

5 WEIGHT (KGS): 970

DRIVE END AIR DEFLECTOR IS ONLY INCLUDED WHEN NECESSARY.

DIMENSIONS ARE IN MILLIMETERS; SEE SHEET 1 FOR DIMENSIONS IN INCHES

CUSTOMER IS RESPONSIBLE FOR DETERMINING THAT MOTOR PERFORMANCE IS SUITABLE IN THE APPLICATION.

SHEET NUMBER
2 OF 2

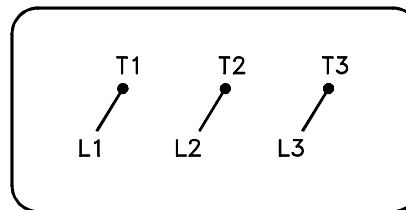
CONDUIT BOX LOCATED ON OPPOSITE SIDE WHEN F-2.
IF MOUNTING CLEARANCE DETAILS ARE REQUIRED, CONSULT FACTORY.
MAXIMUM PERMISSIBLE SHAFT RUNOUT WHEN MEASURED AT END OF
STANDARD SHAFT EXTENSION IS .08 MM T.I.R. TO 127 MM DIA.

REV. DESC:ADD DIM TO BACK OF C/B			
REV: C	VERSION: 03	REVISED:04-41-42 06/25/2013	TDR: 00000801622
MODEL NO. 617427-061		REF:	
BY: MGHWCWG	Material:	C	

BALDOR
G445T444T STD - FOOTED - SIDE-CENTER CB-841XL

416820-036

A-C MOTOR
 CONNECTION DIAGRAM
 STANDARD 3 LEAD CONNECTED



(N.P. 1575-BA)

416820-036

REV. DESC: LOADED TO BUS, C/R 335225		
REV. LTR: -	VERSION: 00	TDR: 000000538207
FILE: \MGA\00000\682	REVISED: 11:54:06 04/30/2010	
MTL: -	BY: RAGRA	

BALDOR

CONN DIAG - STANDARD 3 LEAD
 SH 1 of 1

Buffalo Air Handling, Pressure Drop Program

Results Page



Version 3.0d

Program User Name: Jerome Snyder
 Date: 11/10/2022
 Order Number: 220094-09
 Mark: AHU-4910 (SAF)
 Customer Name: Eli Lilly & Co. - Concord DAP
 Engineer: Hipp Deisgn+Consulting
 Design AirFlow (CFM): 61500
 Fan Quantity: 1
 Additional Information:

Upstream External Losses (in. W.G.): 0.25
 Downstream External Losses (in. W.G.): 2.25

**NOTE: A pressure drop value followed by "*" indicates a user defined value.*

UpStream Components

Face Velocity	Pressure Drop	Component
1200	0.04	Inlet - Wall or Ceiling, Damper
500	0.75*	Filter - 2" Pleated, Cleanliness = Average
500	1.00*	Filter - 12" Rigid, 85%, Cleanliness = Dirty
446	1.31*	Cooling Coil - Plate, 8 Rows

Section Total	3.10	

Fan Components

Face Velocity	Pressure Drop	Component
	0.15	Inlet screen reduction
	0.02	Outlet screen reduction
	0.15	Fan Extra Pressure

3869	0.32	Fan - Supply, Plenum, Arrangement 4, 54.25 Wheel dia.

DownStream Components

Face Velocity	Pressure Drop	Component
500	1.00*	Filter - 12" Rigid, 95%, Cleanliness = Dirty
1198	0.18	Discharge - Wall or Ceiling, Damper, Acceleration

Section Total	1.18	

Summary

Fan Static Pressure = 7.10

Total Internal Losses (in. W.G.): 4.60
 Total External Losses (in. W.G.): 2.50

Total: 7.10

(Extra Static Pressure = 0.15, Fan Section)

Disclaimer: This program is based on performance estimates provided by original equipment manufacturers. It should be applied with reasonable engineering assumptions and the results verified.

FAN DETAILS

Job Name: Hipp - Lilly Concord DAP



Tag: RF09, AHU-4910
 Customer: Buffalo Air Handling
 Job ID: 220094
 Date: December 20, 2022

Description

Quantity 1
 Model EPFN
 Size 490
 Width SWSI
 Arrangement 4
 Class III
 Rotation CW
Discharge HOR
 Wheel Diameter (in) 49.0
Drive method Direct
 Percentage width 88%
 Percentage diameter 100%
 Motor position --
 Design VFD Op. Freq 55hz

Performance

Volumetric Flow CFM 62,730
 Operating SP (in WC) 2.600
 Standard SP (in WC) 2.567
RPM 1089
 Tip Speed (FPM) 13970
Oper. Power BHP 53.58
 Standard Power BHP 52.89
 Outlet Area (sq.ft) 16.404
 Outlet Velocity (FPM) 3824
 Max RPM for Class 1403
 Static Efficiency 47.99%
 Total Efficiency 65.01%
 FEI 0.97
 FEP (KW) 42.22
 System FEI 0.97
 System FEP (KW) 42.22

Air/Gas Properties

Altitude above sea level (ft) ... 705
 Inlet Pressure (in WC) 0.000
 Inlet Temperature(°F) 50
 Design Temperature (°F) 50
 Gas Type Operating air
 Estimated Density (lb/ft³) 0.076

Motor Data

Power (HP) 75
 Enclosure TEFC
Speed (RPM) 1200
Voltage 460V
Phase 3
Frequency 60Hz
Frame Size 405T
 Technology

Modifiers

Using VFD.

Sound

Octave Bands	1	2	3	4	5	6	7	8	LwA
Level at Inlet	93	106	100	91	92	93	88	77	99
Level at Outlet	100	111	108	103	100	99	92	82	106

Distance in ft	1	3	5
dBA at inlet	99	89	85
dBA at Outlet	107	97	93

Sound Power Levels in dB re.10⁻¹² Watts:

Estimated sound pressure level in dBA (re: 0.0002 microbar) based on a single * ducted installation:

*To estimate dBA level for ducted inlet and ducted outlet (into and out of the room) type installation, deduct 20 from the LwA value shown. Using a directivity factor of 1. Estimated Sound Pressure based on free field, spherical (Q = 1) radiation at stated distance.

Definitions:

LwA The overall (single value) fan sound power level, 'A' weighted.

dBA The environment for each fan installation influences its measured sound value, therefore dBA levels cannot be guaranteed. Consult AMCA Publication 303 for further details. A fan's dBA is influenced by nearby reflective surfaces.

FAN DETAILS

Job Name: Hipp - Lilly Concord DAP



Tag: RF09, AHU-4910
Customer: Buffalo Air Handling
Job ID: 220094
Date: December 20, 2022

Pricing Detail

EPFN 490, Class III, Arrangement 4 Bare fan	1,648lb
Guard - Protective Enclosure	115 lb
Screen - Inlet, Std Type	0 lb
Vibration Isolators - Seismic - 2" Defl	0 lb
Special Width Construction	0 lb
Wheel - Aluminum	0 lb
Mount Fan on Base	0 lb
Piezometer Flow Measurement Ring (Copper Construction)	0 lb
Base - Isolation (2" Deflection)	886 lb
Balancing - Special	0 lb
BALANCE TO CATEGORY BV-5, [BUFFALO AIR HANDLING]	
Motor 75 HP, 1200 RPM, 460V, 3Ph, 60Hz , TEFC - Premium , Induction , 405T	1,296 lb
Mount Customer Supplied Motor	0 lb
<hr/>	
Each Weight	3,945 lb
Extended Weight	3,945 lb

Job Name: Hipp - Lilly Concord DAP



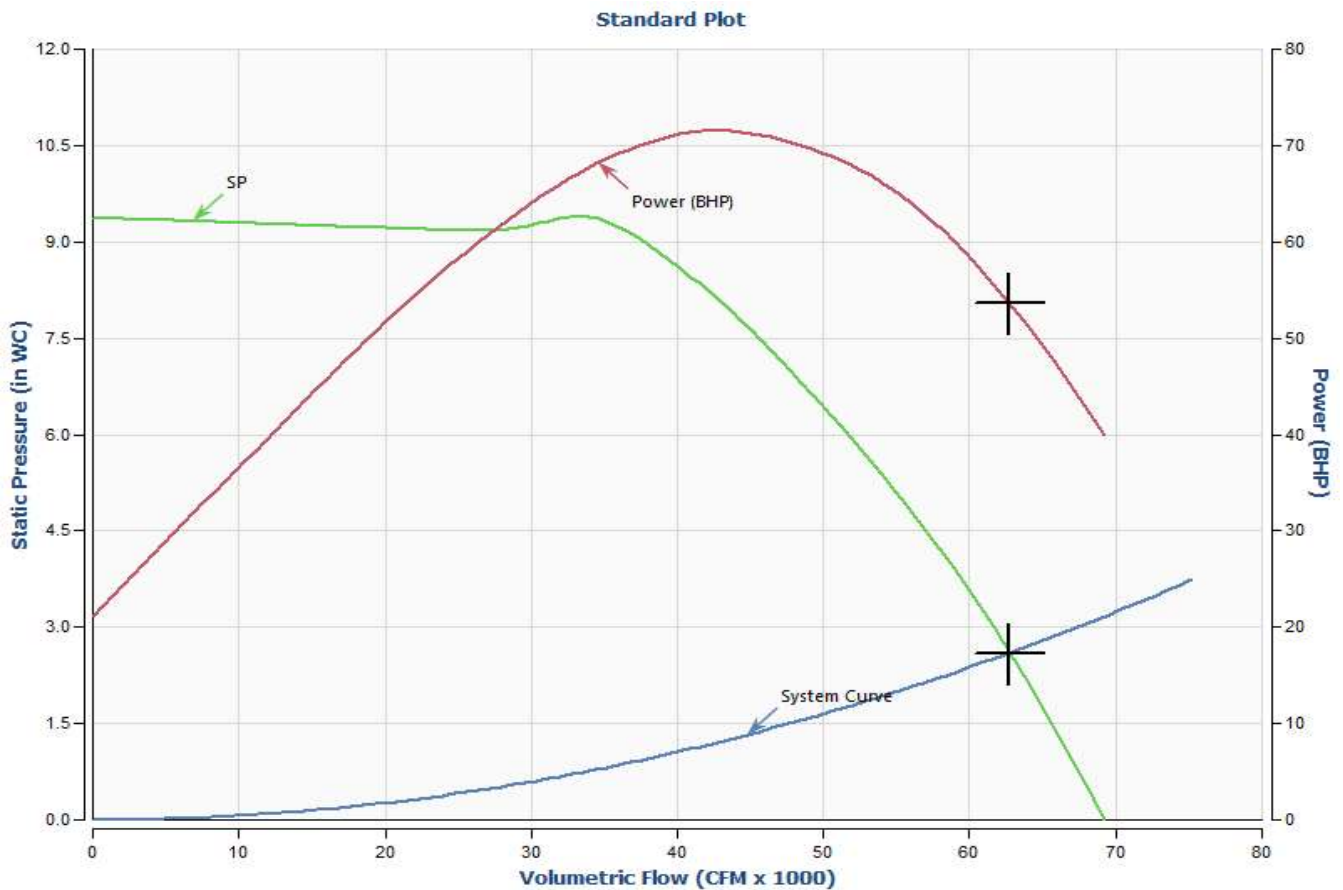
Customer: Buffalo Air Handling
Job ID: 220094
Date: December 20, 2022

Tag: RF09, AHU-4910

Fan information

Size/Model	490/EPFN	Class	III	Outlet Vel (FPM)	3824
Volumetric Flow (CFM)	62730	Speed (RPM)	1089	Density (lb/ft ³)	0.076
SP (in WC)	2.6	Max Speed	1403 RPM @ 50 °F		
		Power (BHP)	53.58		

Adjusted for 88% Width, Op temp: 50°F, Design temp: 50°F, Altitude: 705 ft, Inlet Dens: 0.0760 lb/ft3



BALDOR • *RELIANCE*

Product Information Packet

ECP84404T-4

75HP, 1185RPM, 3PH, 60HZ, 405T, A4072M, TEFC, F

Part Detail							
Revision:	E	Status:	PRD/A	Change #:		Proprietary:	No
Type:	AC	Prod. Type:	A4072M	Elec. Spec:	A40WG1505	CD Diagram:	416820-036
Enclosure:	TEFC	Mfg Plant:		Mech. Spec:		Layout:	617429-511
Frame:	405T	Mounting:	F1	Poles:	06	Created Date:	07-16-2013
Base:		Rotation:	R	Insulation:	F	Eff. Date:	10-27-2014
Leads:	3#2					Replaced By:	
Literature:		Elec. Diagram:					

Nameplate NP3237									
CAT NO	ECP84404T-4	SPEC NO.	P40G3917						
HP	75	AMPS	86.8	VOLTS	460	DESIGN	B		
FRAME SIZE	405T	RPM	1185	HZ	60	AMB	40	SF	1.15
D.E. BRG.DATA	6316	O.D.E. BRG.DATA	6316	PH	3	DUTY	CONT	INSUL.CLASS	F
D.E. BRG.	80BC03J30X	TYPE	P	ENCL	TEFC	CODE	G		
O.D.E. BRG.	80BC03J30X	POWER FACTOR	86	NEMA-NOM-EFFICIENCY	94.5				
3/4 LOAD EFF.	94.9	MAX CORR KVAR	16	GUARANTEED EFFICIENCY	93.6				
TEMP CODE	T3	TEMP =	200						
CHP HZ	60-90	CT HZ	10-60	VT HZ	0-60				
INVERTER-TEMP-CODE	T3								
SER.NO.		MOTOR WEIGHT							

Nameplate 000613007EX					
CAT NO	ECP84404T-4	SPEC NO.	P40G3917		
NO. ROTOR BARS	71	GREASE TYPE	POLYREX EM		
NO. SLOTS	90	IEEE 85 NOISE LEVEL	90DBA		
5 YEAR WARRANTY		MFG. DATE			
NL AMPS AT RATED VOLTAGE	26.6	WINDING RES @25 C	0.087	OHMS	
SER.NO					

Parts List		
Part Number	Description	Quantity
SA267708	SA P40G3917	1.000 EA
RA254378	RA P40G3917	1.000 EA
NP3237	SS SUPER E INVERTER DUTY IEEE 841	1.000 EA
000613007EX	N/P BALDOR	1.000 EA
000692000FF	N/P	1.000 EA
000692000JP	N/P	1.000 EA
000692000VD	LABEL WARNING	1.000 EA
000692000VH	N/P	1.000 EA
004824015A	GREASE POLYREX EM	0.884 LB
032018010CK	HHCS 3/8-16X1-1/4 PLTD.	4.000 EA
032018020EK	HHCS 5/8-11X2-1/2 PLTD.	4.000 EA
032018024CK	HHCS 3/8-16X3 PLTD.	3.000 EA
034000014AB	WSH ID.406 OD.812 TH.065	4.000 EA
034180008DA	KEY 1/4X1/4X1 L (shipping)	1.000 EA
034530052BB	PP NIPP DE GRS F	1.000 EA
034530052AB	P/NIP 1/8X6-1/2 GALV.	1.000 EA
034631002AB	BUSH 1/4 TO 1/8 PLTD.	1.000 EA
035000001G	GREASE RELIEF FITTING, ALEMITE 317400	1.000 EA
078550001H	FAN KB 120/60 (60) 360	1.000 EA
083198101A	G400 STD FAN COVER MACHINING	1.000 EA
034692005AA	P PLUG 3/4"BLK.	1.000 EA
089412501C	G400 MACHD 6316 FT MNT BRKT 089412500WCA	1.000 EA
410700000DA	WAVY SPRING WASHER	1.000 EA
412118006A	DRAIN	1.000 EA

Parts List (continued)		
Part Number	Description	Quantity
415028021G	SEAL	1.000 EA
415072001B	CLAMP	1.000 EA
415096002A	CPLG 1/8 HEX TYPE	1.000 EA
423709011C	WASHER	3.000 EA
032018020EK	HHCS 5/8-11X2-1/2 PLTD.	4.000 EA
032018024CK	HHCS 3/8-16X3 PLTD.	3.000 EA
034530040AB	P/NIP 1/8X5 GALV.	1.000 EA
034530040BB	P/NIP 1/4X5	1.000 EA
034631002AB	BUSH 1/4 TO 1/8 PLTD.	1.000 EA
035000001G	GREASE RELIEF FITTING, ALEMITE 317400	1.000 EA
089412501C	G400 MACHD 6316 FT MNT BRKT 089412500WCA	1.000 EA
412118006A	DRAIN	1.000 EA
415028021G	SEAL	1.000 EA
415096002A	CPLG 1/8 HEX TYPE	1.000 EA
423709011C	WASHER	3.000 EA
032018010CK	HHCS 3/8-16X1-1/4 PLTD.	4.000 EA
033512004LB	HHTTS 1/4-20X1/2 PLTD.	1.000 EA
033512008LB	HHTTS 1/4-20X1 PLATED	4.000 EA
034000014AB	WSH ID.406 OD.812 TH.065	4.000 EA
035000001A	ALFTG 1/8" 1610-BL	1.000 EA
035000001A	ALFTG 1/8" 1610-BL	1.000 EA
067053000B	GASK 320-400	1.000 EA
076708000BB	C/B - 360	1.000 EA
076709000A	C/B CVR - 360	1.000 EA

Product Information Packet: ECP84404T-4 - 75HP,1185RPM,3PH,60HZ,405T,A4072M,TEFC,F

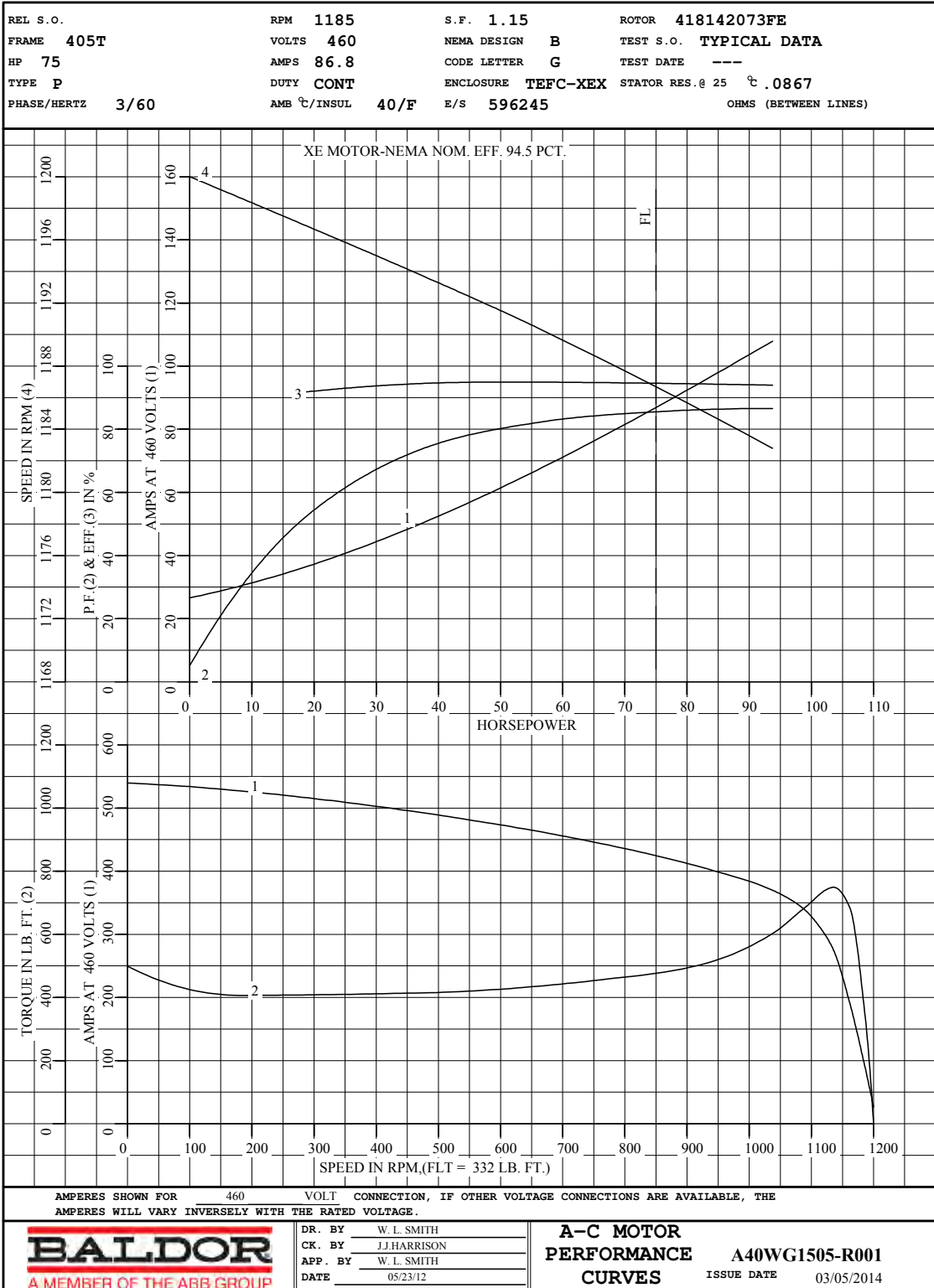
406099000A	PLUG - FAN COVER 320-440	1.000 EA
415000103D	T/LUG #4AWG-1/0AWG W/HOLE FOR .250 BOLT	1.000 EA
415039016A	TERBD, 360-400	1.000 EA
418150003A	GREASE FITTING CAP	1.000 EA
418150003A	GREASE FITTING CAP	1.000 EA
033775004EA	DRSCR #6-1/4 304 S.S.	4.000 EA
034180044JA	KEY 3/4X3/4X5-1/2 L	1.000 EA
004824003AJD	WILKO 778.50 BLUE GREEN - 55 GAL DRUMS	0.375 GA
004824003CBY	WILKO PAINT 060.02 - ACTIVATOR	0.063 GA
482403003BEF	RUST VETO 342	0.013 GA
MG1500G03	PRIMER- S4318E GEMINI 5 GA, HC9068	0.063 GA
421948051	LABEL, MYLAR	1.000 EA
PK5004A02	WOOD BASE 40X32 STACK 2X4 RUNNER	1.000 EA
613-6PU	N/P UL CSA LABLE	1.000 EA
LB1449	DIV-2/NEC WARNING LABEL	1.000 EA



Product Information Packet: ECP84404T-4 - 75HP, 1185RPM, 3PH, 60HZ, 405T, A4072M, TEFC, F

BALDOR • RELIANCE

REL. S.O.	FRAME	HP	TYPE	PHASE/ HERTZ	RPM	VOLTS
	405T	75	P	3/60	1185	460
AMPS	DUTY	AMB °C/ INSUL.	S.F.	NEMA DESIGN	CODE LETTER	ENCL.
86.8	CONT	40/F	1.15	B	G	TEFC-XEX
E/S	ROTOR	TEST S.O.	TEST DATE	STATOR RES. @25 °C OHMS (BETWEEN LINES)		
596245	418142073FE	---	---	.0867		
PERFORMANCE						
LOAD	HP	AMPERES	RPM	% POWER FACTOR	% EFFICIENCY	
NO LOAD	0	26.6	1200	5.13	0	
1/4	18.8	36.5	1197	52.5	91.8	
2/4	37.5	50.3	1194	73.9	94.5	
3/4	56.2	67.5	1190	82.2	94.9	
4/4	75.0	86.8	1187	85.5	94.6	
5/4	93.8	108	1183	86.6	93.9	
SPEED TORQUE						
		RPM	TORQUE % FULL LOAD	TORQUE LB.-FT.	AMPERES	
LOCKED ROTOR		0	150	499	540	
PULL UP		180	123	407	527	
BREAKDOWN		1136	226	749	274	
FULL LOAD		1187	100	332	86.8	
AMPERES SHOWN FOR 460. VOLT CONNECTION. IF OTHER VOLTAGE CONNECTIONS ARE AVAILABLE, THE AMPERES WILL VARY INVERSELY WITH THE RATED VOLTAGE REMARKS: TYPICAL DATA XE MOTOR-NEMA NOM. EFF. 94.5 PCT.						
		DR. BY <u>W. L. SMITH</u> CK. BY <u>J. J. HARRISON</u> APP. BY <u>W. L. SMITH</u> DATE <u>05/23/12</u>		A-C MOTOR PERFORMANCE DATA A40WG1505-R001 ISSUE DATE 03/05/20		

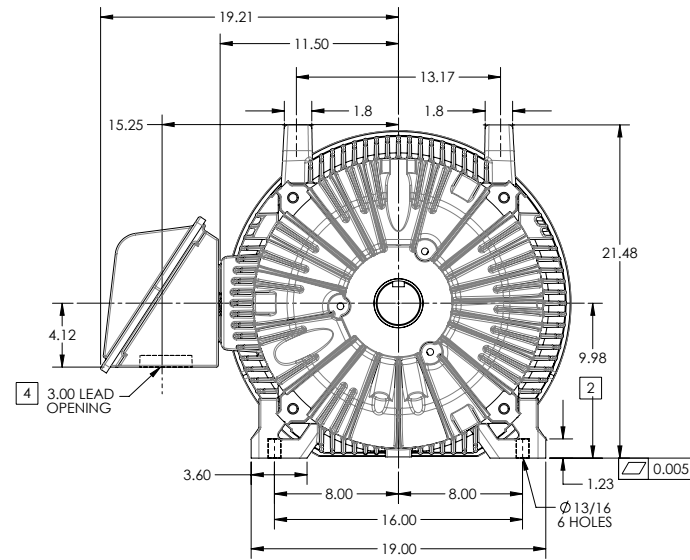
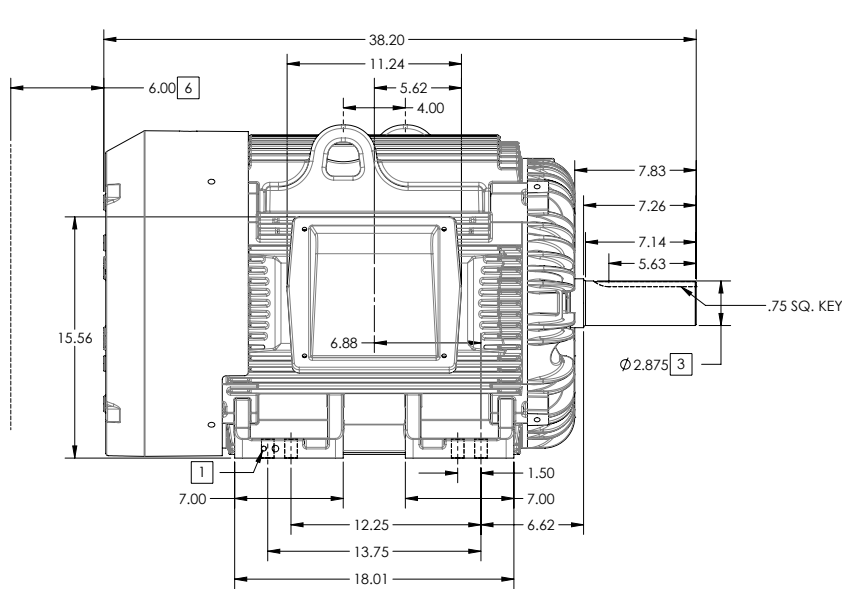


DUTY MASTER ALTERNATING CURRENT MOTORS
SQUIRREL-CAGE INDUCTION

ENCLOSURE: TOTALLY ENCLOSED
MOUNTING: FOOT

FRAME G405T ABOVE NEMA RATINGS
INCLUDES 404T FRAME MOUNTING HOLES

COOLING: FAN COOLED
841XL ENCLOSURE ENHANCEMENT



- 1. GROUND HOLES QTY 1 1/2-13 TAP; QTY 1 3/8-16 TAP
- 2. VARIES +.00,-.06
- 3. VARIES +.000,-.001
- 4. ON STANDARD MOTORS THIS IS CONDUIT SIZE. ON XT AND CORROSION PROOF MOTOR THIS IS PIPE TAP.
- 5. MOTOR WEIGHTS MAY VARY BY 15% DEPENDING ON RATING.
- 6. OBSTRUCTION MUST NOT ENCR OACH ON AIR INLET

5 WEIGHT (LBS): 1370

CONDUIT BOX LOCATED ON OPPOSITE SIDE WHEN F-2.
IF MOUNTING CLEARANCE DETAILS ARE REQUIRED, CONSULT FACTORY.
MAXIMUM PERMISSIBLE SHAFT RUNOUT WHEN MEASURED AT END OF STANDARD SHAFT EXTENSION IS .0015" T.I.R. TO 5 INCH DIA.

DIMENSIONS ARE IN INCHES; SEE SHEET 2 FOR DIMENSIONS IN MILLIMETERS

CUSTOMER IS RESPONSIBLE FOR DETERMINING THAT MOTOR PERFORMANCE IS SUITABLE IN THE APPLICATION.

SHEET NUMBER
1 OF 2

115-62419

REV. DESC: CHANGE BA FROM 6.76 TO 6.62			
REV: B	VERSION: 02	REVISED: 02.36.17 04/14/2014	TDR: 0000084870
MODEL NO. 617429-511		REF:	
BY: MGHUMZ2	Material:	C	

BALDOR

G405T404T STD - FOOTED - 841XL ECP SEVERE DUTY ENCLOSURE

617429-511

DUTY MASTER ALTERNATING CURRENT MOTORS

SQUIRREL-CAGE INDUCTION

ENCLOSURE: TOTALLY ENCLOSED

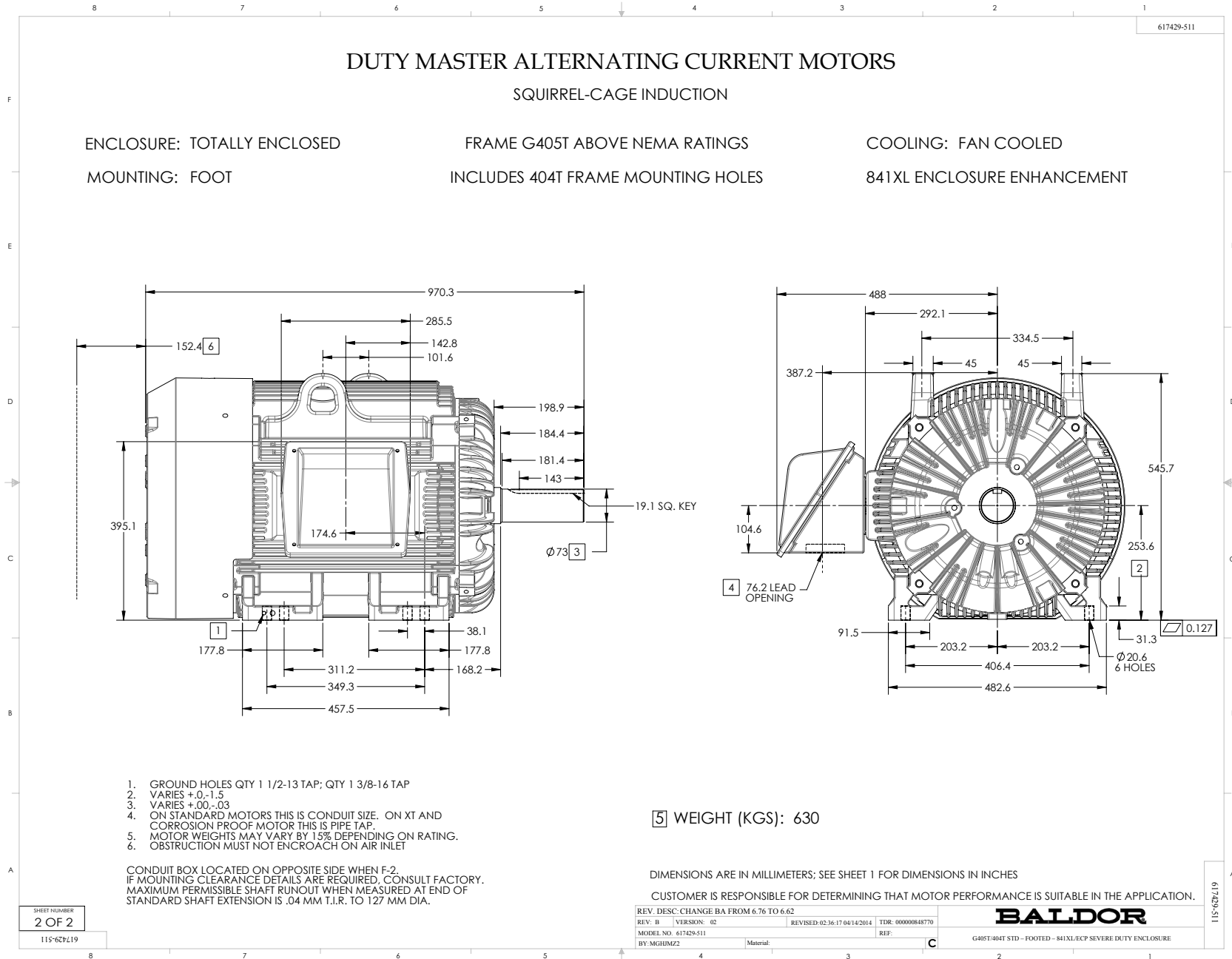
FRAME G405T ABOVE NEMA RATINGS

COOLING: FAN COOLED

MOUNTING: FOOT

INCLUDES 404T FRAME MOUNTING HOLES

841XL ENCLOSURE ENHANCEMENT



- 1. GROUND HOLES QTY 1 1/2-13 TAP; QTY 1 3/8-16 TAP
- 2. VARIES +0,-1.5
- 3. VARIES +00,-03
- 4. ON STANDARD MOTORS THIS IS CONDUIT SIZE. ON XT AND CORROSION PROOF MOTOR THIS IS PIPE TAP.
- 5. MOTOR WEIGHTS MAY VARY BY 15% DEPENDING ON RATING.
- 6. OBSTRUCTION MUST NOT ENCRACH ON AIR INLET

[5] WEIGHT (KGS): 630

CONDUIT BOX LOCATED ON OPPOSITE SIDE WHEN F-2.
 IF MOUNTING CLEARANCE DETAILS ARE REQUIRED, CONSULT FACTORY.
 MAXIMUM PERMISSIBLE SHAFT RUNOUT WHEN MEASURED AT END OF
 STANDARD SHAFT EXTENSION IS .04 MM T.I.R. TO 127 MM DIA.

DIMENSIONS ARE IN MILLIMETERS; SEE SHEET 1 FOR DIMENSIONS IN INCHES
 CUSTOMER IS RESPONSIBLE FOR DETERMINING THAT MOTOR PERFORMANCE IS SUITABLE IN THE APPLICATION.

SHEET NUMBER
2 OF 2

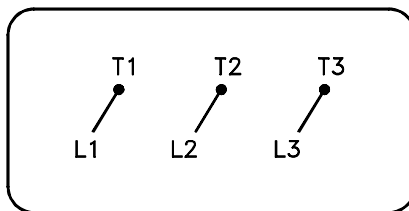
REV. DESC: CHANGE BA FROM 6.76 TO 6.62	TDR: 0000084870
REV: B VERSION: 02 REVISED: 02.36.17 04/14/2014	REF:
MODEL NO. 617429-511	REF:
BY: MGHUMZ2 Material:	C

BALDOR

G405T404T STD - FOOTED - 841XL ECP SEVERE DUTY ENCLOSURE

416820-036

A-C MOTOR
 CONNECTION DIAGRAM
 STANDARD 3 LEAD CONNECTED



(N.P. 1575-BA)

416820-036

REV. DESC: LOADED TO BUS, C/R 335225		
REV. LTR: -	VERSION: 00	TDR: 000000538207
FILE: \MGA\00000\682	REVISED: 11:54:06 04/30/2010	
MTL: -	BY: RAGRA	

BALDOR

CONN DIAG - STANDARD 3 LEAD
 SH 1 of 1

Buffalo Air Handling, Pressure Drop Program

Results Page



Version 3.0d

Program User Name: Jerome Snyder
 Date: 11/10/2022
 Order Number: 220094-09
 Mark: AHU-4910 (RAF)
 Customer Name: Eli Lilly & Co. - Concord DAP
 Engineer: Hipp Design+Consulting
 Design AirFlow (CFM): 62730
 Fan Quantity: 1
 Additional Information:

Upstream External Losses (in. W.G.): 1.75
 Downstream External Losses (in. W.G.): 0.25

**NOTE: A pressure drop value followed by "*" indicates a user defined value.*

UpStream Components

<u>Face Velocity</u>	<u>Pressure Drop</u>	<u>Component</u>
1195	0.04	Inlet - Wall or Ceiling, Damper

Section Total	0.04	

Fan Components

<u>Face Velocity</u>	<u>Pressure Drop</u>	<u>Component</u>
	0.20	Inlet screen reduction
	0.03	Outlet screen reduction
	0.15	Fan Extra Pressure

4793	0.38	Fan - Supply, Plenum, Arrangement 4, 49.00 Wheel dia.

DownStream Components

<u>Face Velocity</u>	<u>Pressure Drop</u>	<u>Component</u>
1200	0.18	Discharge - Wall or Ceiling, Damper, Acceleration

Section Total	0.18	

Summary

Fan Static Pressure = 2.60

Total Internal Losses (in. W.G.): 0.60
 Total External Losses (in. W.G.): 2.00

Total: 2.60

(Extra Static Pressure = 0.15, Fan Section)

Disclaimer: This program is based on performance estimates provided by original equipment manufacturers. It should be applied with reasonable engineering assumptions and the results verified.



Date: 12/20/2022
 Job Name: Lilly Concord DAP
 System ID: CC-4910
 Quote No. 220094-09

Model No.	Qty. In Face	FL INCH	Total Weight LBS.
W-10.5AW-36.0 X 92.0-8-0.666	6	92.00	7,219

Coil Type: W **Totals:** 6 7,219

Coil Hand: Right **Tube:** 0.625 inch X 0.035 inch Copper Seamless Tubes , Belled

TF: 24 **Fin Material:** Aluminum Wave **Thickness:** 0.016 IN.

Row: 8 **Csg Material:** 3/4" Leg with 304 Stainless Casings

Fin: 10.5 / IN **Connection:** 2" (Center) Flanged, Red Brass 150 lb FFSO , Extended 7 inches

Circuit: 2/3 **Hdr Material:** Standard Non-Ferrous, Brazed Joints

Misc: - Pneumatic Test

Dwg: CA-W-101-6

Performance V

Pressure: 29.17 IN HG Elevation: 705.0 FT

Airflow: 61,500.0 SCFM

System Face Area: 138.0 FT²

Standard Face Velocity: 445.7 FPM

Entering Dry Bulb Temp: 72.0 °F

Entering Wet Bulb Temp: 60.0 °F

Leaving Dry Bulb Temp: 46.0 °F

Leaving Wet Bulb Temp: 46.0 °F

Outside Surface Fouling: 0.0000 HR·FT²·°F/BTU

Sensible Heat Load: 1,726.7 MBH

Total Heat Load: 2,302.6 MBH

64 gpm per coil

Water

Flow Rate: 384.00 GPM

Entering Temp: 42.0 °F

Leaving Temp: 54.0 °F

Tube Velocity: 4.7 FPS

Inside Surface Fouling: 0.0000 HR·FT²·°F/BTU

Losses

Air Pressure Drop: 1.32 IN H2O Fluid Pressure Drop: 23.6 FT H2O

Comments:

Notes & Warnings:

- 110 150 PSIG Coil Design
- 100 Oversized connection specified.
- 56 Rated in accordance with AHRI Standard 410.
- 54 Approach temperature < recommended unless ideal conditions exist.
- 13 Pressure drop shown is based on belled tube ends.

3

Filters

Prefilters MERV 4-13

Pleated Panel Filters

30/30®



Advantages

- Guaranteed to last longer
- True MERV 8 maintained efficiency
- Meets all published hospital filter efficiency guidelines

Description: High capacity pleated panel filter available in 1", 2" or 4" depths.

Typical applications: Prefilters to higher efficiency filters, stand-alone filter for rooftops, split systems, free-standing units and package systems and air handlers.

Efficiency: Value of 8 for MERV and MERV-A when evaluated under ASHRAE Testing Standard 52.2.

Media: Proprietary blend of cotton and synthetic fibers in a uniform lofted media blanket.

Recommended final pressure drop: 1.0" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

Temperature: Maximum continuous operating temperature of 200° F (93° C).

Ratings: ECI value of five stars, listed as UL 900.

See Literature 1002 for more details.



Part Number	Nominal Size H x W x D (inches)	Height (inches)	Width (inches)	Depth (inches)	Airflow Capacity (cfm)	Media Area (sq. ft.)	Resistance @ Capacity (inches w.g.)	Pleats per Linear Foot
054862-001	20 x 16 x 1	19.50	15.50	0.88	780	5.4	0.23	16
054862-002	20 x 20 x 1	19.50	19.50	0.88	970	6.6	0.23	16
054862-003	25 x 20 x 1	24.50	19.50	0.88	1215	8.3	0.23	16
054862-004	25 x 16 x 1	24.50	15.50	0.88	970	6.7	0.23	16
054862-005	24 x 24 x 1	23.50	23.50	0.88	1400	9.8	0.23	16
054862-006	20 x 14 x 1	19.50	13.50	0.88	680	4.6	0.23	16
054862-007	25 x 14 x 1	24.50	13.50	0.88	850	5.7	0.23	16
054862-008	20 x 15 x 1	19.50	14.50	0.88	730	5.1	0.23	16
054862-009	20 x 7 x 1	19.50	6.50	0.88	340	2.4	0.23	16
054862-010	24 x 12 x 1	23.50	11.50	0.88	700	4.9	0.23	16
054862-011	24 x 20 x 1	23.50	19.50	0.88	1170	8.0	0.23	16
054862-012	16 x 16 x 1	15.50	15.50	0.88	620	4.3	0.23	16
054862-013	25 x 15 x 1	24.50	14.50	0.88	910	6.4	0.23	16
054862-014	25 x 25 x 1	24.50	24.50	0.88	1520	10.5	0.23	16
054862-015	24 x 16 x 1	23.50	15.50	0.88	930	6.5	0.23	16
054862-016	20 x 10 x 1	19.50	9.50	0.88	490	3.3	0.23	16
054862-017	25 x 18 x 1	24.50	17.50	0.88	1100	7.6	0.23	16
054862-019	20 x 12 x 1	19.50	11.50	0.88	580	4.1	0.23	16
054862-020	20 x 18 x 1	19.50	17.50	0.88	880	6.1	0.23	16
054862-021	22 x 22 x 1	21.50	21.50	0.88	1180	8.2	0.23	16
054862-022	24 x 10 x 1	23.50	9.50	0.88	580	4.0	0.23	16
054862-023	25 x 10 x 1	24.50	9.50	0.88	610	4.1	0.23	16
054862-024	25 x 12 x 1	24.50	11.50	0.88	730	5.2	0.23	16
054862-025	12 x 12 x 1	11.50	11.50	0.88	350	2.5	0.23	16

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice. 2016-07-08



Prefilters MERV 4-13

Pleated Panel Filters

Part Number	Nominal Size H x W x D (inches)	Height (inches)	Width (inches)	Depth (inches)	Airflow Capacity (cfm)	Media Area (sq. ft.)	Resistance @ Capacity (inches w.g.)	Pleats per Linear Foot
054862-028	24 x 18 x 1	23.50	17.50	0.88	1050	7.3	0.23	16
049880-001	20 x 16 x 2	19.50	15.50	1.75	1110	9.9	0.31	15
049880-002	20 x 20 x 2	19.50	19.50	1.75	1390	11.9	0.31	15
049880-003	25 x 20 x 2	24.50	19.50	1.75	1740	14.9	0.31	15
049880-004	25 x 16 x 2	24.50	15.50	1.75	1390	12.4	0.31	15
049880-005	24 x 24 x 2	23.38	23.38	1.75	2000	17.3	0.31	15
049880-006	24 x 12 x 2	23.38	23.38	1.75	1000	8.4	0.31	15
049880-007	20 x 12 x 2	19.50	19.50	1.75	835	7.4	0.31	15
049880-008	20 x 10 x 2	19.50	19.50	1.75	700	6.0	0.31	15
049880-009	20 x 14 x 2	19.50	19.50	1.75	975	8.3	0.31	15
049880-010	25 x 14 x 2	24.50	24.50	1.75	1220	10.4	0.31	15
049880-011	20 x 15 x 2	19.50	19.50	1.75	1045	9.3	0.31	15
049880-012	24 x 20 x 2	23.50	23.50	1.75	1670	14.3	0.31	15
049880-013	20 x 18 x 2	19.50	19.50	1.75	1250	10.8	0.31	15
049880-014	25 x 18 x 2	24.50	24.50	1.75	1565	13.5	0.31	15
049880-015	24 x 18 x 2	23.50	23.50	1.75	1500	13.0	0.31	15
049880-016	24 x 16 x 2	23.50	23.50	1.75	1335	11.8	0.31	15
049880-018	25 x 25 x 2	24.50	24.50	1.75	2170	19.0	0.31	15
049880-019	16 x 16 x 2	15.50	15.50	1.75	890	7.8	0.31	15
049880-020	25 x 15 x 2	24.50	15.50	1.75	1300	11.6	0.31	15
059413-001	24 x 24 x 4	23.38	23.38	3.75	2000	27.7	0.27	11
059413-002	24 x 12 x 4	23.38	11.38	3.75	1000	13.9	0.27	11
059413-003	20 x 20 x 4	19.38	19.38	3.75	1390	18.9	0.27	11
059413-004	20 x 16 x 4	19.38	15.38	3.75	1110	15.7	0.27	11
059413-005	25 x 16 x 4	24.38	15.38	3.75	1390	19.7	0.27	11
059413-006	25 x 20 x 4	24.38	19.38	3.75	1740	23.6	0.27	11
059413-007	25 x 29 x 4	24.38	28.38	3.75	2520	35.4	0.27	11
059413-008	24 x 20 x 4	23.38	19.38	3.75	1670	22.7	0.27	11
059413-009	24 x 18 x 4	23.38	17.38	3.75	1500	20.2	0.27	11
059413-010	25 x 25 x 4	24.38	24.38	3.75	2170	30.1	0.27	11
059413-011	24 x 16 x 4	23.38	15.38	3.75	1330	18.7	0.27	11



Bag & Rigid Filters MERV 9-15, see individual products for available values.

Rigid Filters

Riga-Flo® PH



Advantages

- Supported media unaffected by varying airflow or turbulence
- Microfine high loft media blanket has long life and maintains efficiency throughout the life of the filter
- Includes 1" nominal header for side access or rear access built-up banks

Description: High efficiency supported media box filter with header for side access installations.

Typical applications: Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

Efficiency: MERV 9, MERV 11, MERV 13, MERV 14 and MERV-A of 9, 11, 13 and 14 respectively.

Media: Microfine glass media in a uniform high loft media blanket with a synthetic micro mesh media backing. (Non-metallic media backing).

Recommended final pressure drop: 1.5" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

Temperature: Maximum continuous operating temperature of 200° F (93° C).

Ratings: ECI value of four stars, UL 900.

See Literature 1303PH for more details.

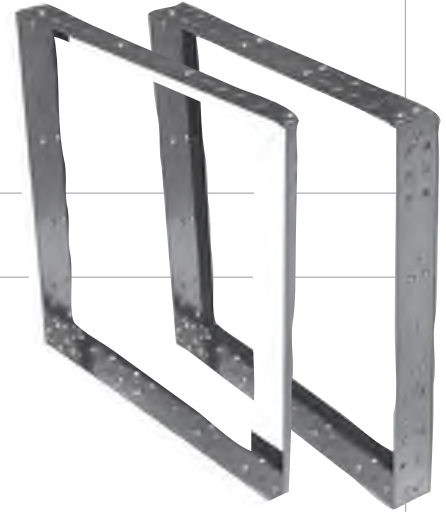
Part Number A Style Header (nominal 1")	Part Number B Style Header (nominal 1-1/4")	MERV & MERV-A	Nominal Size (H x W x D inches)	Actual Size (H x W x D inches)	Rated Airflow (cfm)	Initial Resistance (inches w.g.)
402995-003	402996-003	MERV 14	24 X 24 x 12	23.38 X 23.38 x 11.50	2000	0.70
402995-006	402996-006	MERV 14	24 X 12 x 12	23.38 X 11.38 x 11.50	1000	0.70
402995-009	402996-009	MERV 14	24 X 20 x 12	23.38 X 19.38 x 11.50	1660	0.70
402995-012	402996-012	MERV 14	20 X 20 x 12	19.38 X 19.38 x 11.50	1400	0.70
402995-002	402996-002	MERV 13	24 X 24 x 12	23.38 X 23.38 x 11.50	2000	0.60
402995-005	402996-005	MERV 13	24 X 12 x 12	23.38 X 11.38 x 11.50	1000	0.60
402995-008	402996-008	MERV 13	24 X 20 x 12	23.38 X 19.38 x 11.50	1660	0.60
402995-011	402996-011	MERV 13	20 X 20 x 12	19.38 X 19.38 x 11.50	1400	0.60
402995-001	402996-001	MERV 11	24 X 24 x 12	23.38 X 23.38 x 11.50	2000	0.45
402995-004	402996-004	MERV 11	24 X 12 x 12	23.38 X 11.38 x 11.50	1000	0.45
402995-007	402996-007	MERV 11	24 X 20 x 12	23.38 X 19.38 x 11.50	1660	0.45
402995-010	402996-010	MERV 11	20 X 20 x 12	19.38 X 19.38 x 11.50	1400	0.45

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice. 2016-07-08



THE WORLD LEADER IN CLEAN AIR SOLUTIONS

Type A-8 Filter Holding Frames and Latches






Type A-8 Filter Holding Frames

The Type A-8 filter holding frame comes in seven standard sizes that can be used individually or may be combined to fit virtually any size filter bank. Each frame includes closed cell gaskets to ensure a proper seal between the frame and filter to minimize dirty air bypass. Frames are also available without gaskets or with dovetail gaskets. Also available are Type A-8 latches designed to hold the filter in place and create a positive seal. Type A-8 frames are constructed of galvanized steel and 304 stainless steel, and also available in 316 stainless steel.

Size	Part Number 16 ga. Galv	Part Number 18 ga. 304SS
12 x 24 x 3	312-600-600	312-600-100
16 x 20 x 3	312-600-001	312-600-101
16 x 25 x 3	312-600-002	312-600-102
20 x 20 x 3	312-600-003	312-600-103
20 x 24 x 3	312-600-004	312-600-104
20 x 25 x 3	312-600-005	312-600-105
24 x 24 x 3	312-600-606	312-600-106

Type A-8 Latches






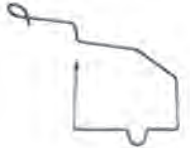
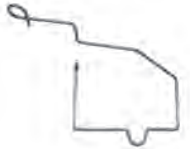


AAF offers a variety of Type A-8 latches to secure disposable panel filters or 12" box style high efficiency filters (with or without a prefilter) into a Type A-8 filter holding frame. The Type A-8 latches attach to one of two sets of knockouts on the Type A-8 frame. Simply attach the appropriate latch that best fits the depth of the filter. It is recommended to use 4 latches per frame.

AAF Part Number	Material	Application	Farr Model	Picture
315-004-000	Galvanized Steel	Secures a 4" filter, or a 2" filter with a single header filter in an A-8 frame	C-86	
315-004-100	Stainless Steel	Secures a 4" filter, or a 2" filter with a single header filter in an A-8 frame	C-86S	
315-004-001	Galvanized Steel	12" spring latch with 7/8" Tang to secure 12" deep double header AAF filter	C-80	



BETTER AIR IS OUR BUSINESS®

Type A-8 Filter Holding Frames and Latches

AAF Part Number	Material	Application	Farr Model	Picture
315-004-101	Stainless Steel	12" spring latch with 7/8" Tang to secure 12" deep double header AAF filter	C-80S	
315-004-002	Galvanized Steel	6" spring latch with 7/8" Tang to secure 6" deep double header AAF filter	C-90	
315-004-003	Stainless Steel	Secures a 1" or 2" prefilter or a single header filter in an A-8 frame	C-70S	
315-004-006	Galvanized Steel	Secures a 4" prefilter in same frame with a single header filter	C-89	
315-004-106	Stainless Steel	Secures a 4" prefilter in same frame with a single header filter	C-89S	
315-004-007	Galvanized Steel	2" deep filter as a prefilter to a single header filter	C-77	
315-004-107	Stainless Steel	2" deep filter as a prefilter to a single header filter	C-77S	
315-003-002	Galvanized Steel	Holds a 2" prefilter on the face of a double header AAF filter	N/A	
315-003-004	Galvanized Steel	Holds a 4" prefilter on the face of a double header AAF filter	N/A	



9920 Corporate Campus Drive, Suite 2200, Louisville, KY 40223-5690
888.223.2003 Fax 888.223.6500 | www.aafintl.com

AAF has a policy of continuous product research and improvement and reserves the right to change design and specifications without notice.

ISO Certified Firm
AFP-1-171B 11/14

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4

Mixing

RUSKIN®



3900 Dr. Greaves Rd. • Kansas City, MO 64030 • (816) 761-7476 • FAX (816) 765-8955

CD50 LOW LEAKAGE CONTROL DAMPER

High Performance Extruded Aluminum Airfoil
Class 1A Leakage Rated

APPLICATION

The CD50 is a low leak, extruded aluminum damper designed with airfoil blades for higher velocity and pressure HVAC systems. It meets the leakage requirements of the International Energy Conservation Code by leaking less than 3 cfm/sq. ft. at 1" of static pressure and is AMCA licensed as a Class 1A damper.

STANDARD CONSTRUCTION

FRAME

5" x 1" x 6063T5 extruded aluminum hat channel with .125" minimum wall thickness (127 x 25 x 3.2). Low profile, 5" x 1/2" (127 x 13) top and bottom frames on dampers 12" (305) high and less. Mounting flanges on both sides of frame.

BLADES

6" (152) wide, 6063T5 heavy gage extruded aluminum, airfoil shape.

SEALS

Ruskiprene blade edge seals and flexible metal compressible jamb seals.

BEARINGS

Molded synthetic.

LINKAGE

Concealed in frame.

AXLES

1/2" (13) plated steel hex.

MAXIMUM SIZE

Single section – 60"w x 72"h (1524 x 1829).
Multiple section assembly – Unlimited size.

MINIMUM SIZE

Single blade – 6"w x 5"h (152 x 127).
Two blades, parallel or opposed action: 6"w x 9"h (152 x 229).

TEMPERATURE LIMITS

-72°F (-58°C) and +275°F (+135°C) .

FEATURES

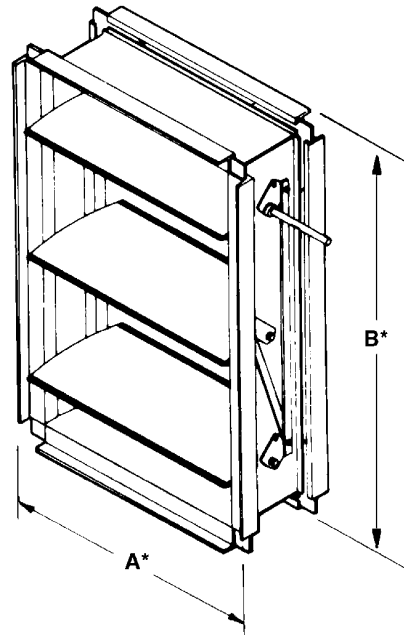
- Airfoil blade design for low pressure drop and less noise generation.
- Positive lock axles, noncorrosive bearings and shake proof linkage for low maintenance operation.
- Blade edge seals mechanically lock into the blade for superior sealing.

OPTIONS

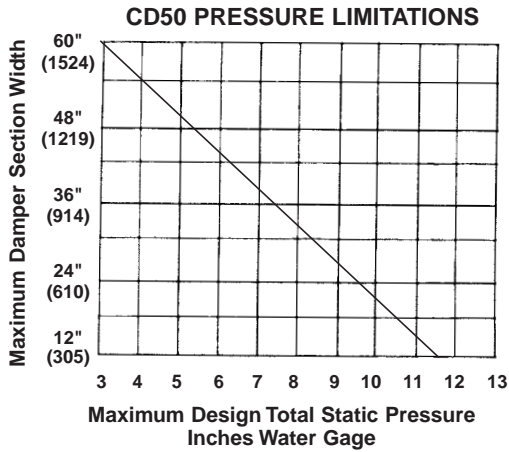
- Factory-installed, pneumatic and electric actuators.
- Enamel and epoxy finishes.
- SP100 Switch Package to remotely indicate damper blade position.
- 16 gage galvanized steel hat channel frame.
- Front, rear or double flange frame with or without bolt holes.
- Face and bypass configurations.

NOTE: Dimensions shown in parenthesis () indicate millimeters.

*Units furnished approximately 1/4" (6) smaller than given opening dimensions.



CD50 AMCA LICENSED PERFORMANCE DATA



The CD50 may be used in systems with total pressures exceeding 3.5" by reducing damper section width as indicated. Example: Maximum design total pressure of 8.5" w.g. would require CD50 damper with maximum section width of 36" (914).

Pressure limitations shown above allow maximum blade deflection of 1/180 of span on 60" (1524) damper widths. Deflections in other damper widths (less than 48" [1219]) at higher pressures shown will result in blade deflection substantially less than 1/180 of span.



Ruskin Company certifies that the CD50 shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA International Certified Ratings Seal applies to Air Performance and Air Leakage.

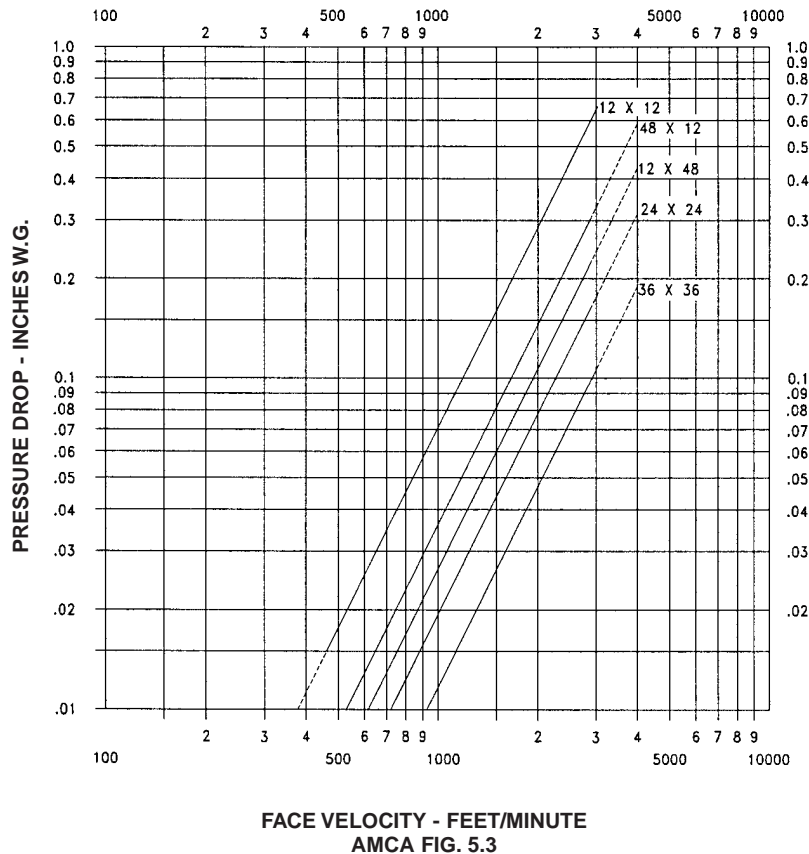
Pressure/Class	Leakage, L/s/m ² (ft ³ /min/ft ²)			
	Required Rating		Extended Ranges (Opt.)	
	1" (0.25 kPa)	4" (1.0 kPa)	8" (2.0 kPa)	12" (3.0 kPa)
1A	3 (15.2)	N/A	N/A	N/A
1	4 (20.3)	8 (40.6)	11 (55.9)	14 (71.1)
2	10 (50.8)	20 (102)	28 (142)	35 (178)
3	40 (203)	80 (406)	112 (569)	140 (711)

DAMPER WIDTH (INCHES)	1 IN. W.G.	4 IN. W.G.	8 IN. W.G.
12" (305)	IA	I	II
24" (610)	IA	I	II
36" (914)	IA	I	NA
48" (1219)	IA	I	NA
60" (1524)	IA	I	NA

Leakage testing conducted in accordance with AMCA Standard 500-D-98. Torque applied holding damper closed, 5 in. lbs./sq. ft. on opposed blade dampers and 7 in. lbs./sq. ft. on parallel blade

dampers. Air leakage is based on operation between 50°F to 104°F. All data corrected to represent standard air density 0.075 lbs/ft³.

VELOCITY VS. PRESSURE DROP



CD50 sizes 12 x 12, 24 x 24, 48 x 12, 12 x 48, 36 x 36 (305 x 305, 610 x 610, 1219 x 305, 305 x 1219, 914 x 914)

All data corrected to represent standard air at a density of 0.075 lbs/ft³.

SOUND RATINGS

CD50 SOUND RATINGS

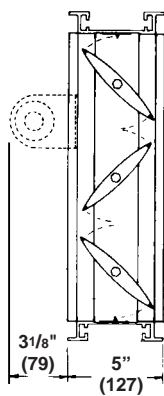
Damper Size	Damper Full Open		Damper 75% Open		Damper 50% Open		Damper 25% Open	
	CFM	NC	CFM	NC	CFM	NC	CFM	NC
12 x 12 (305 x 305)	2000	17	1500	11	1000	11	500	*
	3000	28	2250	22	1500	19	750	*
	4000	35	3000	29	2000	24	1000	*
18 x 18 (457 x 457)	2250	17	1688	10	1125	21	563	*
	4500	33	3375	26	2250	32	1125	*
	6750	43	5063	37	3375	40	1688	15
24 x 24 (610 x 610)	4000	11	3000	10	2000	26	1000	*
	8000	32	6000	30	4000	38	2000	21
	12000	43	9000	42	6000	46	3000	31

NC = Noise criteria in Decibels is based on 10db room effect and 10db of room attenuation.

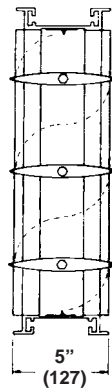
* = Less than 10 NC

See ASHRAE Handbook (1977 Fundamentals, Chapter 7) for explanation of NC Ratings.

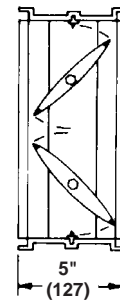
DIMENSIONAL INFORMATION



**OPPOSED
BLADE**



**PARALLEL
BLADE**



LOW PROFILE
Standard construction
for higher free area on
dampers 12" (305) high
and less.

CD50 SUGGESTED SPECIFICATION

Furnish and install, at locations shown on plans, or in accordance with schedules, Low leakage dampers shall meet the following minimum construction standards: Frames shall be 5" x 1" x .125" (minimum thickness) (127 x 25 x 3.2) 6063T5 extruded aluminum hat channel with hat mounting flanges on both sides of the frame. Each corner shall be reinforced with two die formed internal braces and machine staked for maximum rigidity. Blades shall be airfoil type extruded aluminum (maximum 6" [152] depth) with integral structural reinforcing tube running full length of each blade.

Blade edge seals shall be extruded double edge design with inflatable pocket which enables air pressure from either direction to assist in blade to blade seal off. Blades seals shall be mechanically locked

in extruded blade slots, yet shall be easily replaceable in field. Adhesive or clip-on type blade seals are not acceptable. Bearings shall be non-corrosive molded synthetic. Axles shall be hexagonal (round not acceptable) to provide positive locking connection to blades and linkage. Linkage shall be concealed in frame. Submittal must include leakage, maximum air flow and maximum pressure ratings based on AMCA Publication 500. Damper shall be tested and licensed in accordance with AMCA 511 for Air Performance and Air Leakage. Damper widths from 12" to 60" (305 to 1524) wide shall not leak any greater than 8 cfm sq. ft. @ 4" w.g. and a maximum of 3 CFM sq. ft. @ 1" w.g. Dampers shall be in all respects equivalent to Ruskin Model CD50.

RUSKIN®

3900 Dr. Greaves Rd.

• Kansas City, MO 64030

• (816) 761-7476

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SP100 AND SP100FK SWITCH PACKAGE

APPLICATION

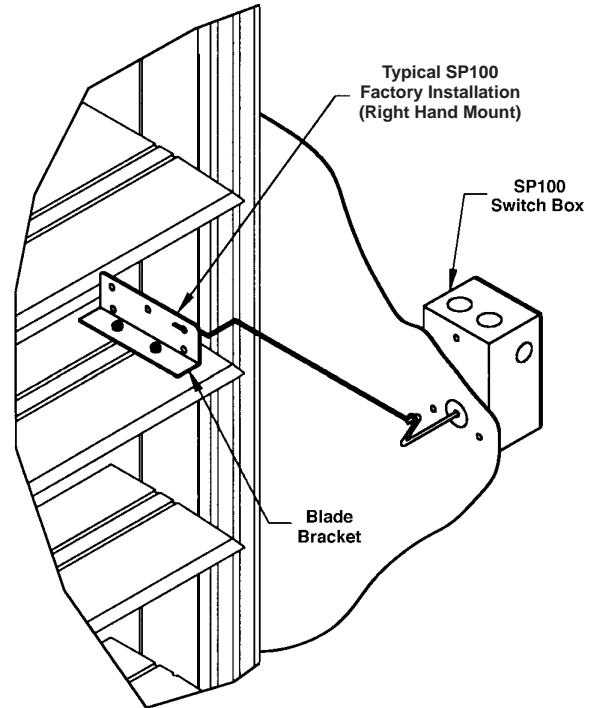
The **SP100** switch package used with a control damper, smoke damper or Fire/Smoke damper, provides the ability to remotely indicate blade position. Electrical interface with remote control on/off fan stations is also possible with the SP100.

The **SP100FK** is a parts kit that includes all the necessary parts and instructions to field install an SP100. Refer to the SP100 Switch Package Field Installation Instructions Supplement for parts list and installation instructions.

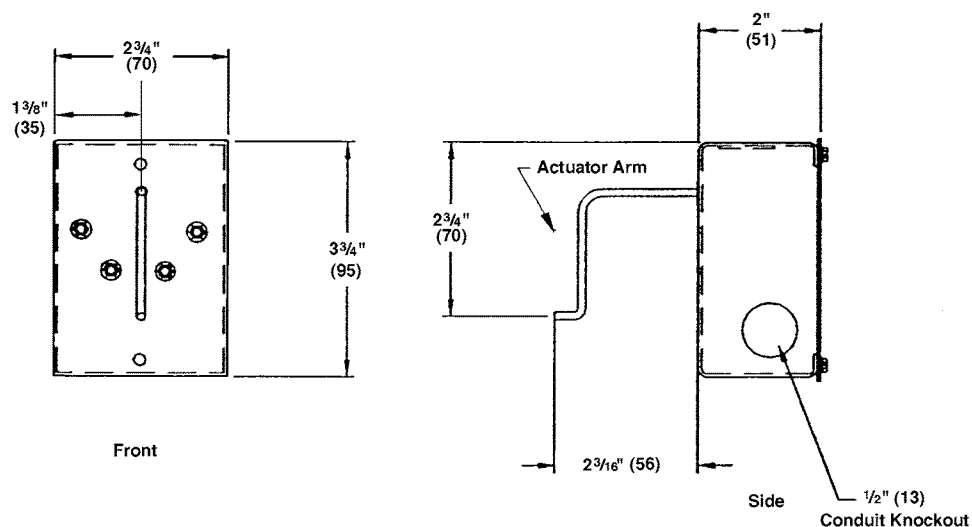
OPERATION

The SP100 switch package consists of a switch box containing two damper position indicator switches. One switch closes when the blades are fully open and the second switch closes when the blades are fully closed. The switches positively communicate to the fire commander the position of the blades when interfaced with the fire command center.

Refer to the appropriate damper installation instructions for details on damper installation. All electrical wiring and connections to the SP100 must be in accordance with the National Electric code and the local authority with jurisdiction.

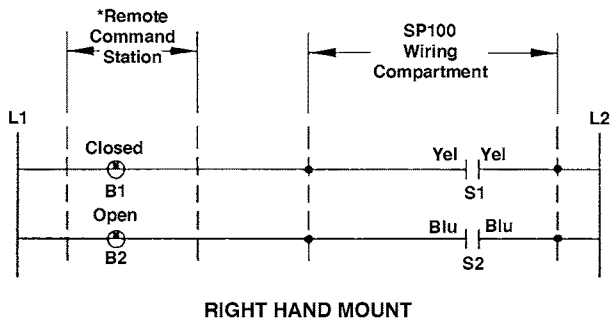


SP100 DIMENSIONS



Dimensions shown in parentheses () indicate millimeters.

SP100 WIRING

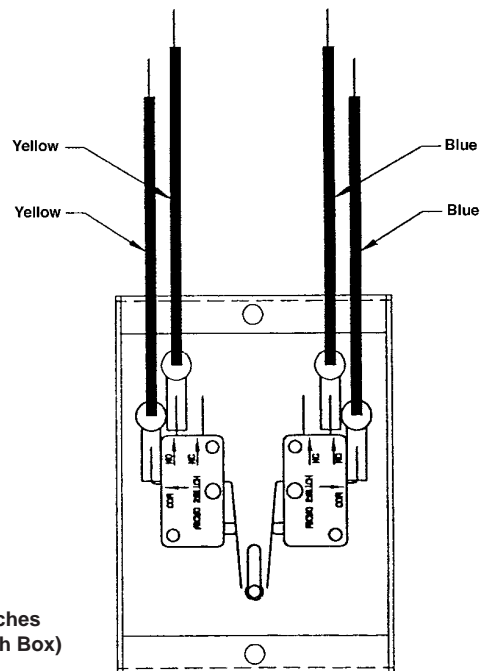


- S₁ – Damper position indicator switch. Closed (makes) when damper is open.
- S₂ – Damper position indicator switch. Closed (makes) when damper is closed.
- B₁ – Remote position indicator lamp.
- B₂ – Remote position indicator lamp.
- *Remote command station is provided by others.

SP100 LAYOUT

MICRO SWITCH SPECIFICATIONS

High temperature to 302°F (150°C)
 Single pole, double throw
 AMP Ratings:
 15 AMPS, 1/3 HP, 125 or 250 VAC
 1/2 AMP, 125 VDC, 1/4 AMP, 250 VDC
 5 AMPS, 120 VAC "L" (Lamp Load)
 24 VDC, 1.5 AMPS
 24 VAC, 10 AMPS



5

Humidifiers

DIMENSIONS & DATA CERTIFIED FOR:

5.1

Representative: Buffalo Air

Quote # Q-451533

Customer:

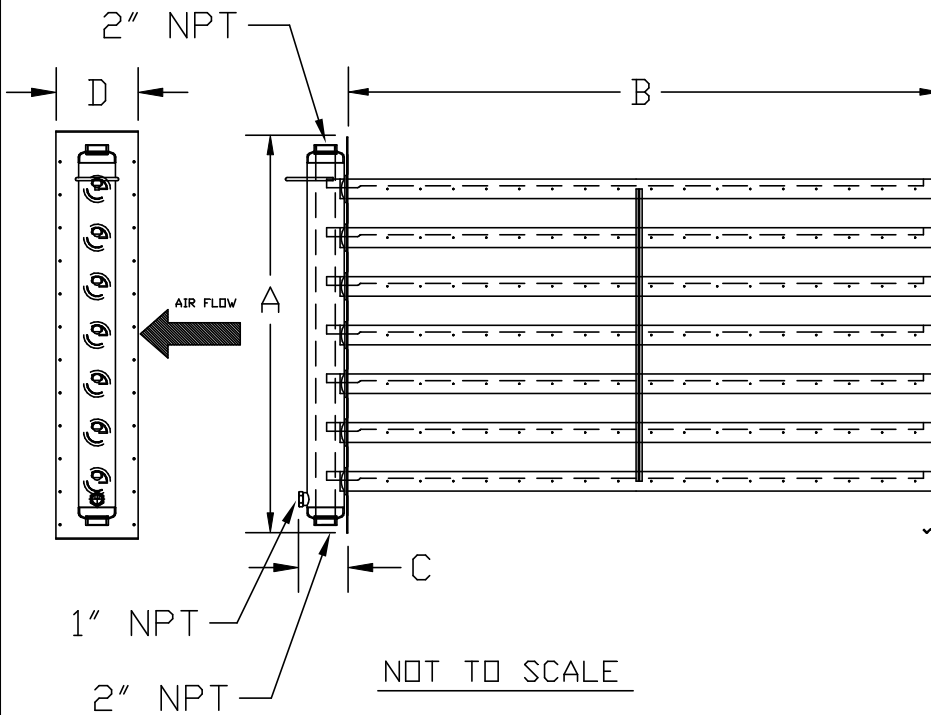
Project: Lilly Concord

Unit: 4900

Requirements:

ARMSTRONG HUMIDIPACK IS A PACKAGED HUMIDIFIER INCLUDING A TYPE 304 SS FABRICATED HEADER/SEPARATOR AND MULTIPLE TUBE SEGMENTS. THE SUPPLIED CONTROL VALVE MODULATES STEAM FLOW TO THE HEADER/SEPARATOR ASSEMBLY WHICH ARE DRAINED BY ARMSTRONG FLOAT AND THERMOSTATIC STEAM TRAPS. NOTE SPECIFIC PERFORMANCE INFORMATION BELOW

JOB SPECIFIC REQUIREMENTS



REQUIRED CAPACITY -
1015 LBS/HR

PANEL DIMENSIONS (INCHES) -
A X B = 70 X 140
C = 5.8
D = 8.5

SPECIFIED CONTROL VALVE -
ACV-04-BLEF 1" orifice
or CV1500-BEL Cv13 1" orifice

SUPPLY STEAM PRESSURE
50 PSIG

AIR FLOW (CFM) -
38,000 CFM / 558 FPM

- CONSTANT VOLUME
- VARIABLE AIR VOLUME

MAXIMUM SPECIFIED AIR -
PRESSURE DROP - 0.006" WC

SPECIFIED NON-WETTING DISTANCE -
24" @ 85% RH AND 55 DEGREES F

HORIZONTAL AIR FLOW
LEFT HAND VERTICAL HEADER
HORIZONTAL ACTIVE TUBES
ALL-ACTIVE DESIGN

INSULATE TUBES YES / NO

COMMON PANEL PROPERTIES

- 304 STAINLESS STEEL 4" SCH. 5S HEADER W/ ACTIVE TUBES OF 304 STAINLESS STEEL.
- SUPPLIED WITH TWO (2) B-3 FLOAT & THERMOSTATIC HEADER STEAM TRAPS.
- SUPPLIED WITH STEAM SUPPLY INVERTED BUCKET STEAM TRAP AND IN-LINE WYE TYPE STRAINER.
- 6 ACTIVE TUBES

Signature _____ Date _____



Armstrong International, Inc.
Three Rivers Division
Three Rivers, MI 49093

Armstrong (269) 273-1415 Fax(269) 273-9500

Visit Armstrong's homepage www.armstrong-intl.com

Company Name _____
Sign and Date above to certify that information
is correct for given project

Product	CD No.	Date
CENTIFEED	1300	12/20/22
		Rev. A

DIMENSIONS & DATA CERTIFIED FOR:

5.2

Representative:

Quote #

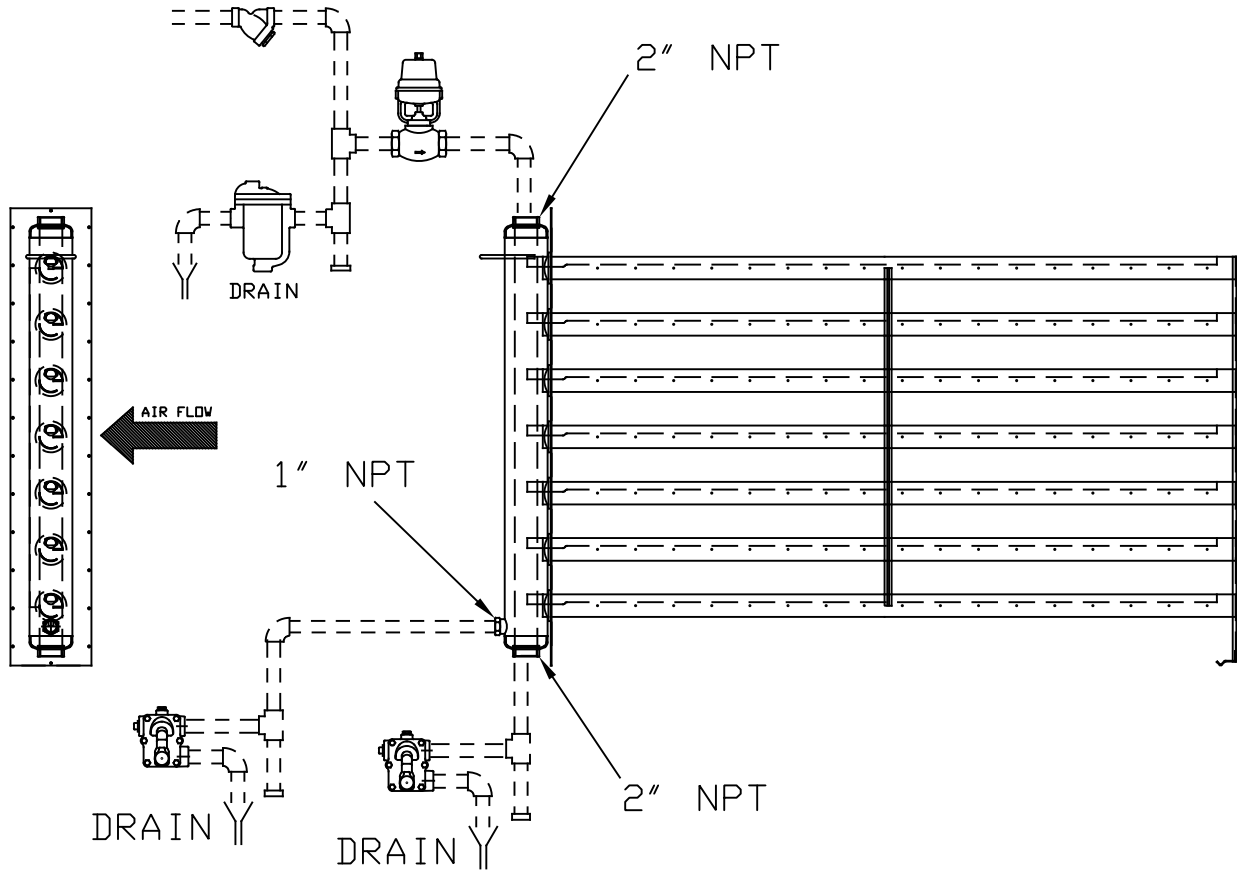
Customer:


Project:

Unit: TYP

Pipes and fittings indicated by dotted lines are furnished by installing contractor.

STEAM SUPPLY




 Armstrong International, Inc.
 Three Rivers Division
 Three Rivers, MI 49093
 Armstrong (269) 273-1415 Fax(269) 273-9500
 Visit Armstrong's homepage www.armstrong-intl.com

Product	CD No.	Date
CENTIFEEED	1300 Sht. 2	07/02/15
		Rev. A

DIMENSIONS & DATA CERTIFIED FOR:

5.3

Representative: **Buffalo Air**

Order:

Customer:

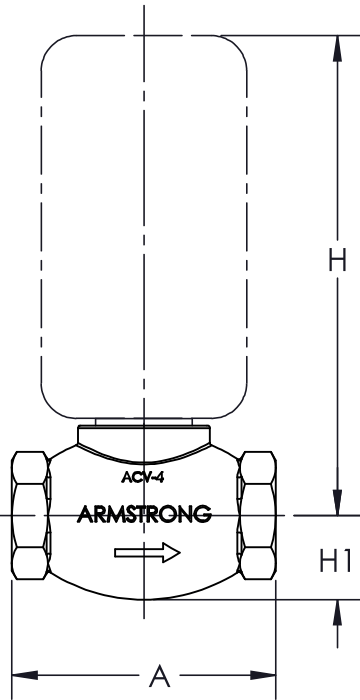
Order:

Project: **Lilly Concord**

Requirements:

By:

Date:



MODEL NO.	VALVE EQUIVALENT DIA.	RANGEABILITY FLOW RATIO MAX : MIN	RANGEABILITY FLOW COEFFICIENT CV	STANDARD OPERATORS						
				AM C1801	INAM MK4411 & MK4421	HAM MP953D	HAM MP953F	BLEF LF24	HEM M9182A	BLEMO AFB24-SR
CV - 06	1-1/2	63 : 1	27	N/A	N/A	25	150	N/A	100	100
	1-1/4	69 : 1	21							
	1-1/8	61 : 1	19.5			30	125		125	
	1	53 : 1	18							
	7/8	44 : 1	16							
CV - 04	3/4	33 : 1	13	N/A	N/A	70	150	60	150	150
	1	53 : 1	13							
	3/4	33 : 1	10.5							
	5/8	25 : 1	8.5							
	9/16	105 : 1	7							
CV - 03	1/2	97 : 1	6	80	80	80	150	60	150	150
	7/16	75 : 1	5							
	3/4	118 : 1	7.5							
	5/8	123 : 1	6.5							
CV - 02	9/16	105 : 1	6	150	150	150	150	60	150	150
	1/2	97 : 1	5.5							
	7/16	75 : 1	4							
	1/2	97 : 1	4							
	7/16	75 : 1	3.5							
	3/8	70 : 1	3							
	5/16	49 : 1	2.5							
	1/4	31 : 1	1.7							
3/16	18 : 1	0.9								
1/8	37 : 1	0.45								
1/16	101 : 1	0.09								

PHYSICAL DATA - OPERATORS ('H')							
MODEL NO.	PNEUMATIC MODULATING				ELECTRIC MODULATING		
	ARMSTRONG C1801*	INVENSYS MK-4411 & MK-4421	HONEYWELL MP953D+	HONEYWELL MP953F+	BELIMO LF24	HONEYWELL M9182A	BELIMO AFB24-
ACV/ECV-02	8-1/2	11-1/2	7	11-7/8	10	11-5/8	10-7/8
ACV/ECV-03	8-7/8	11-7/8	7-3/8	12-1/4	10-5/8	11-13/16	11-1/4
ACV-04	-----	12-3/8	7-7/8	12-3/4	11-3/8	12-3/8	11-7/8
ACV-06	-----	13-1/2	9	13-7/8	-----	12-15/16	13

* ARMSTRONG C1801- STANDARD / ALL DIMENSIONS ± 1/4" / HONEYWELL MP953D - OPTIONAL
 + ADD 4-7/8 TO MP953D DIMENSION FOR MP953F

MODEL NO.	PIPE SIZE (IN)	MATERIAL		MAX. ALLOWABLE PRESSURE (VESSEL)	ΔP MIN.	'A'	HEIGHT		WT. (LPS)
		BODY	TRIM				'H'	'H1'	
CONTROL VALVE ACV-02	1/2	ASTM A48 CL. 30	T300 SERIES SS	250 PSIG AT 400°F	2 PSI	4-1/8	SEE CHART ABOVE	1-1/8	9-3/4
ACV-03	3/4							1-5/16	10-1/2
ACV-04	1							1-7/8	11-3/4
ACV-06	1-1/2							2-7/16	22
ECV-02	1/2							T316 SS	400 PSIG AT 400°F
ECV-03	3/4	1-5/16	9-1/2						



Product	ENGLISH	CD No.	Rev;	Date
ACV/ECV CONTROL VALVE	WEB Y/N	CD1247	B	07/31/2014
SHEET 1 OF 1			By: GANESH KUMAR	

LF24-MFT(-S) US

Proportional, Spring Return, Multi-Function Technology®



Technical Data		LF24-MFT(-S) US
Power supply		24 VAC, $\pm 20\%$, 50/60 Hz 24 VDC, $\pm 10\%$
Power consumption	running	2.5 W
	holding	1.0 W
Transformer sizing		5 VA (Class 2 power source)
Electrical connection (-S models have 2 cables)		3 ft, 18 GA, appliance cables 1/2" conduit connector
Overload protection		electronic throughout 0 to 95° rotation
Operating range Y*		2 to 10 VDC 4 to 20 mA (w/500 Ω , 1/4 Ω resistor) ZG-R01
Input impedance		100 k Ω for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA 1500 Ω for PWM, floating point and on/off control
Feedback output U*		2 to 10 VDC, 0.5 mA max
Torque		min 35 in-lb (4 Nm)
Direction of rotation*	spring motor	reversible with cw/ccw mounting reversible with built-in switch
Mech. angle of rotation*		max 95°, adjust with mechanical stop
Running time	motor* spring	150 sec constant <25 sec @ -4°F to 122°F [-20°C to 50°C] <60 sec @ -22°F [-30°C]
Angle of rotation adaptation*		off (default)
Override control*		Min. (Min Position) = 0% - ZS (Mid. Position) = 50% - Max. (Max. Position) = 100%
Position indication		visual indicator, 0° to 95°
Humidity		5 to 95% RH, non-condensing
Ambient temperature		-22 to 122° F (-30 to 50° C)
Storage temperature		-40 to 176° F (-40 to 80° C)
Housing		NEMA 2, IP54
Housing material		zinc coated metal
Noise level		less than 45 dB (A)
Agency listings		cULus acc. to UL 873 and CAN/CSA C22.2 No. 24-93
Quality standard		ISO 9001
Servicing		maintenance free
Weight		6.0 lbs. (2.7 kg)

* Variable when configured with MFT options

LF24-MFT-S US	
Auxiliary switches	1 x SPDT 3A (0.5A) @ 250 VAC, UL approved adjustable 0° to 95° (double insulated)

- Torque min. 35 in-lb
- Control 2 to 10 VDC (DEFAULT)
- Feedback 2 to 10 VDC (DEFAULT)

Application

For proportional modulation of dampers and control valves in HVAC systems. The LF24-MFT US provides mechanical spring return operation for reliable fail-safe application.

Default/Configuration

Default parameters for 2 to 10 VDC applications of the LF24-MFT US actuator are assigned during manufacturing. If required, custom versions of the actuator can be ordered. The parameters noted in the Technical Data table are variable.

These parameters can be changed by three means:

- Pre-set configurations from Belimo
- Custom configurations from Belimo
- Configurations set by the customer using the MFT PC tool software application.

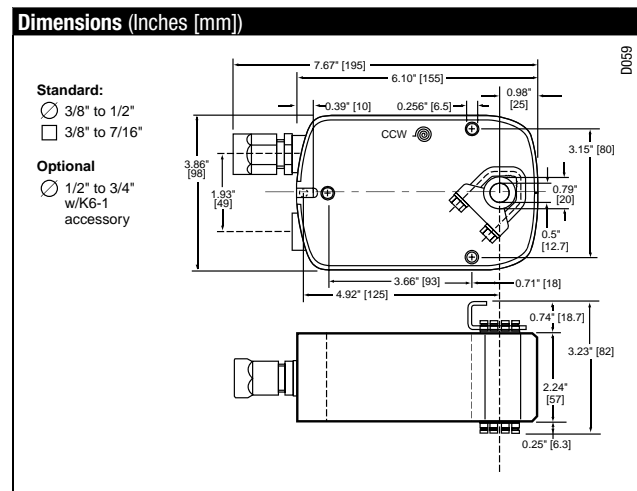
Operation

The LF24-MFT US actuator provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The actuator will synchronize the 0° mechanical stop or the damper or valves mechanical stop and use this point for its zero position during normal control operations.

The actuator uses a brushless DC motor which is controlled by an Application Specific Integrated Circuit (ASIC) and a microprocessor. The microprocessor provides the intelligence to the ASIC to provide a constant rotation rate and to know the actuator's exact position. The ASIC monitors and controls the brushless DC motor's rotation and provides a Digital Rotation Sensing (DRS) function to prevent damage to the actuator in a stall condition. The position feedback signal is generated with out the need for mechanical feedback potentiometers using DRS. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches.

The LF24-MFT US is mounted directly to control shafts up to 3/4" diameter by means of its universal clamp and anti-rotation bracket. A crank arm and several mounting brackets are available for damper applications where the actuator cannot be direct coupled to the damper shaft. The spring return system provides minimum specified torque to the application during a power interruption. The LF24-MFT US actuator is shipped in the zero position, compression against seats or gaskets for tight shut-off is accomplished manually.

NOTE: Please see documentation on Multi-Function Technology.



Wiring Diagrams

INSTALLATION NOTES

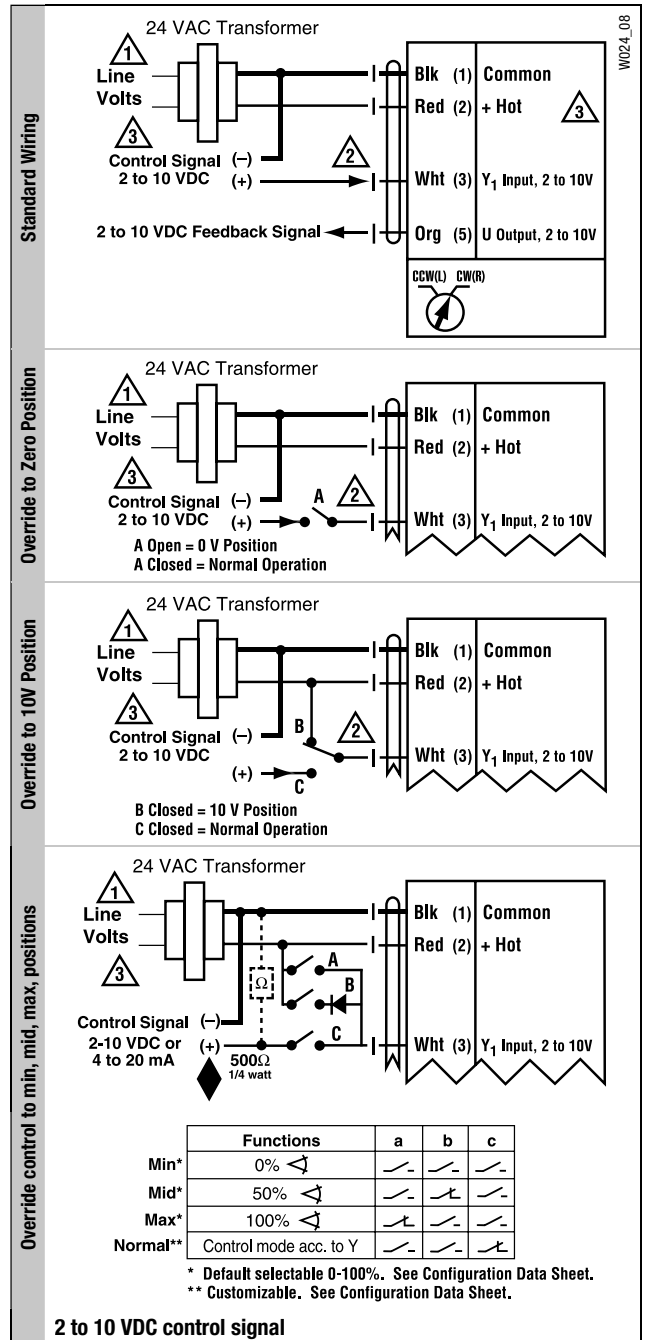
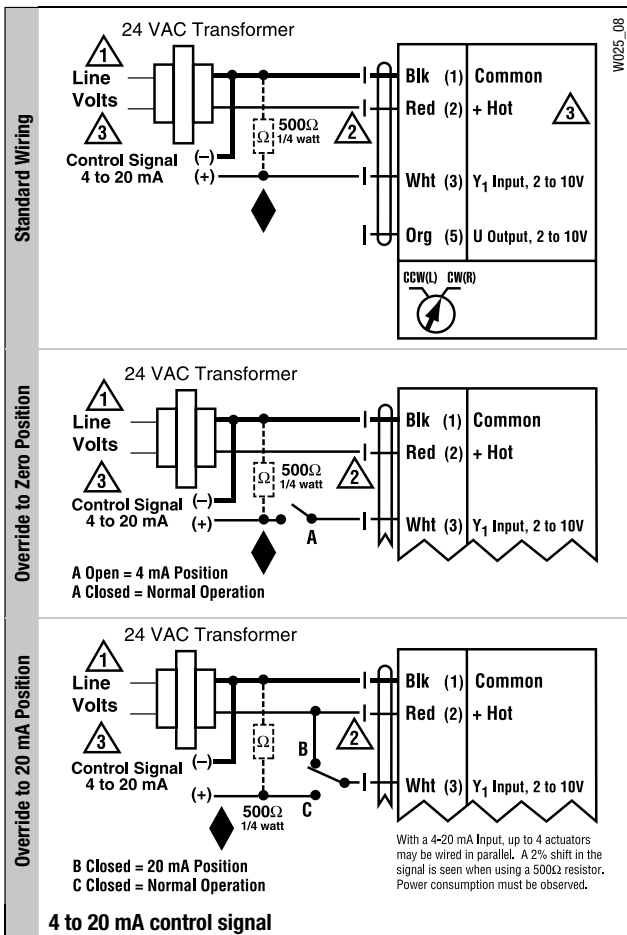
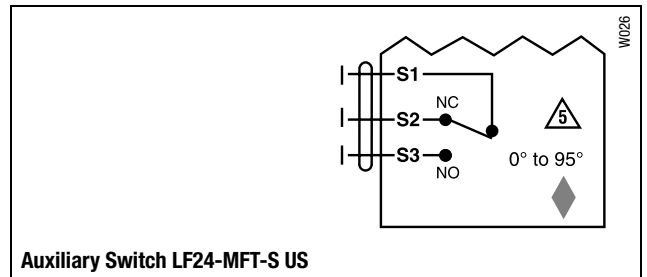
- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment Damage!**
Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 4 The Common connection from the actuator must be connected to the Hot connection of the controller.
- 5 For end position indication, interlock control, fan startup, etc., LF24-MFT-S US incorporates one built-in auxiliary switch: 1 x SPDT, 3A (0.5A) @250 VAC, UL Approved, adjustable 0° to 95°.

APPLICATION NOTES

- ◆ Meets cULus requirements without the need of an electrical ground connection.
- ◆ The ZG-R01 500 Ω resistor may be used.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



M40024 - 05/10 - Subject to change. © Belimo Aircontrols (USA), Inc.

DIMENSIONS & DATA CERTIFIED FOR:

Representative: _____ Order: _____

Customer: _____ Order: _____

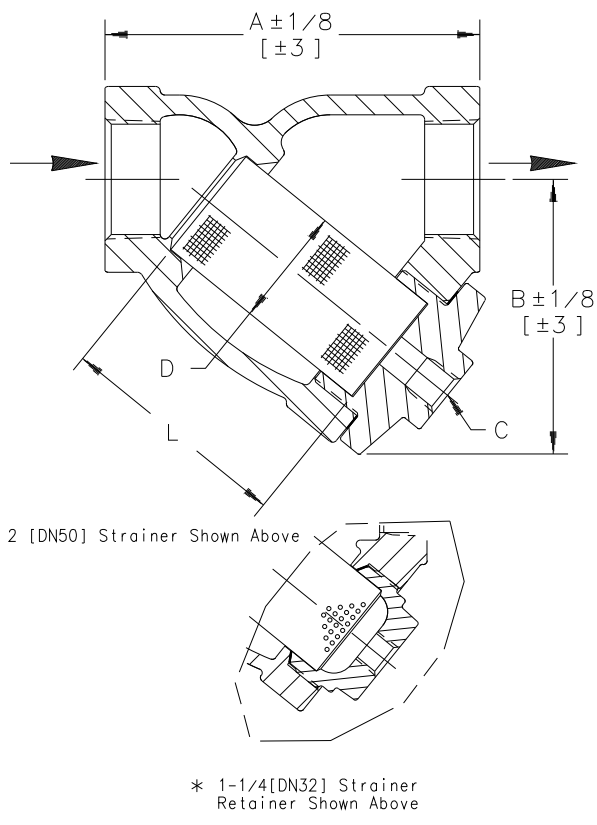
Project: _____

Requirements:

**STEAM STRAINER TO BE CAST STEEL,
CARBON STEEL, OR BRASS.**

CAST IRON NOT ACCEPTABLE.

By: _____ Date: _____



Dimensions Are In Inches[mm]

LIST OF MATERIALS:

NAME OF PART	MATERIAL
BODY & RETAINER	ASTM A48 CL. 30
STANDARD SCREENS	T304 SS .045 PERF.(1) Or T304 SS 30 MESH(41)
GASKET	NON ASBESTOS

TECHNICAL INFORMATION

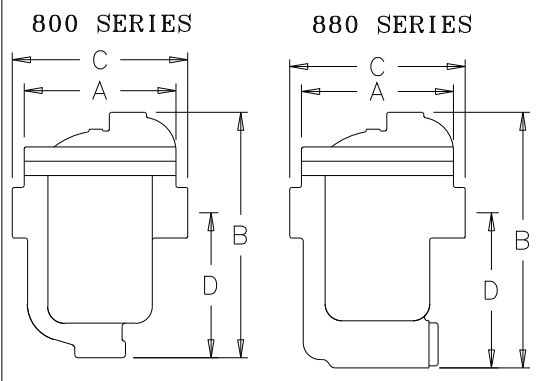
DESCRIPTION	DIMENSIONS	
CONNECTION (NPT)	1/2 [DN15]	3/4 [DN20]
"A" (FACE TO FACE)	4-1/4 [108]	
"B" (BOTTOM TO ϕ INLET)	3 [76]	
"C" (BLOW DOWN THREAD)	3/8 NPT [DN10]	
"D" (DIA. OF SCREEN)	13/16 [21]	31/32 [25]
"L" (LENGTH OF SCREEN)	2-1/16 [52]	2-3/8 [60]
WEIGHT	1-3/4 lb [.8 kgs]	3 lb [1.4 kgs]
CONNECTION (NPT)	1" [DN25]	* 1-1/4 [DN32]
"A" (FACE TO FACE)	5 [127]	5-1/2 [140]
"B" (BOTTOM TO ϕ INLET)	3-3/4 [95]	3-7/8 [98]
"C" (BLOW DOWN THREAD)	1/2 NPT [DN15]	
"D" (DIA. OF SCREEN)	1-3/16 [30]	1-1/2 [38]
"L" (LENGTH OF SCREEN)	2-15/16 [75]	2-3/8 [86]
WEIGHT	4-1/2 lb [2 kgs]	7 lb [3.2 kgs]
CONNECTION (NPT)	1-1/2 [DN40]	2 [DN50]
"A" (FACE TO FACE)	6-5/16 [160]	7-7/16 [189]
"B" (BOTTOM TO ϕ INLET)	4-7/16 [113]	5-15/32 [139]
"C" (BLOW DOWN THREAD)	1/2 NPT [DN15]	
"D" (DIA. OF SCREEN)	2 [50]	2-3/8 [60]
"L" (LENGTH OF SCREEN)	3-3/4 [95]	4-5/8 [117]
WEIGHT	11 lb [5 kgs]	15 lb [7 kgs]

DESIGN INFORMATION

MAXIMUM ALLOWABLE PRESSURE (VESSEL DESIGN)	250 psig at 406°F [17 bar at 208°C]
	400 psig at 150°F [27 bar at 65°C]

DIMENSIONS & DATA CERTIFIED FOR:

Representative:	Order:
Customer:	Order:
Project:	
Requirements:	
By: _____ Date: _____	



NOTE: DIMENSIONS ARE IN INCHES [mm]

NAME OF PART	MATERIAL
CAP AND BODY	ASTM A48 CLASS 30
INLET TUBE	STEEL PIPE
GASKET	COMPRESSED NON-ASBESTOS
BOLT AND NUT SET	NO. 800, 880, 811, 881 TRAPS SAE GRADE 5. ALL OTHERS SAE GRADE 2.
NO. 815 & 816 BOLT SET	ASTM A193 GRADE B7
NO.815 NUT SET	ASTM A563 GRADE A
NO. 816 NUT SET	ASTM A194 GRADE 2H
VALVE & VALVE SEAT	HARDENED STAINLESS STEEL
VALVE RETAINER	STAINLESS STEEL
LEVER	STAINLESS STEEL
GUIDE PIN ASSEMBLY	STAINLESS STEEL
BUCKET	STAINLESS STEEL, NO'S. 814, AND LARGER BUCKETS HAVE CAST IRON WEIGHTS
BODY THIMBLE	STAINLESS STEEL
880 SERIES	
INTEGRAL STRAINER	STAINLESS STEEL
BUSHING	STEEL
STRAINER BUSHING GASKET	SOFT STEEL

MODEL NO.	800	811	812	813	814	815	816	880	881	882	883
PIPE CONNECTIONS	1/2, 3/4	1/2, 3/4 , 1	1/2, 3/4	3/4, 1	1, 1-1/4	1, 1-1/4, 1-1/2, 2	2, 2-1/2	1/2, 3/4	1/2, 3/4, 1	1/2, 3/4	3/4, 1, 1-1/4
TEST PLUG	1/4	1/4	1/2	3/4	1	1-1/2	2	1/4	1/4	1/2	3/4
A (FLANGE DIAMETER)	3-3/4 [95.25]	3-3/4 [95.25]	5-5/8 [142.88]	7 [177.8]	8 [203.2]	9 [228.6]	11-1/2 [292.1]	3-3/4 [95.25]	3-3/4 [95.25]	5-5/8 [142.88]	7 [177.8]
B (HEIGHT)	5-7/16 [138.11]	6-7/8 [174.63]	9-1/16 [230.19]	11-3/4 [298.45]	13-5/8 [346.08]	16-1/4 [412.75]	21-5/16 [541.34]	6-1/16 [153.99]	7-1/16 [179.39]	9-3/8 [238.13]	12-3/8 [314.33]
C (FACE-TO FACE)	5 [127]	5 [127]	6-1/2 [165.1]	7-3/4 [196.85]	9 [228.6]	10-1/4 [260.35]	13 [330.2]	5 [127]	5 [127]	6-1/2 [165.1]	7-7/8 [200.03]
D (BOTTOM TO C INLET)	2-3/4 [69.85]	4-1/4 [107.95]	5-3/8 [136.53]	7-1/32 [178.59]	7-13/16 [198.44]	8-1/16 [204.79]	11 [279.4]	3-7/16 [87.31]	4-7/16 [112.71]	5-3/4 [146.05]	7-3/8 [187.33]
NUMBER OF BOLTS	6	6	6	6	8	8	8	6	6	6	6
WEIGHT LBS [Kg]	5 [2.3Kg]	6 [2.7Kg]	15 [6.8Kg]	27-1/2 [12.5Kg]	44 [20Kg]	71 [32.2Kg]	131 [59.4Kg]	5-1/2 [2.5Kg]	6 [2.7Kg]	15-1/2 [7Kg]	31 [14.1Kg]
MAXIMUM ALLOWABLE PRESSURE (VESSEL DESIGN)	250 psig AT 450°F 17 bar AT 232°C	250 psig AT 450°F 17 bar AT 232°C	250 psig AT 450°F 17 bar AT 232°C	250 psig AT 450°F 17 bar AT 232°C	250 psig AT 450°F 17 bar AT 232°C	250 psig AT 450°F 17 bar AT 232°C	250 psig AT 450°F 17 bar AT 232°C	250 psig AT 450°F 17 bar AT 232°C	250 psig AT 450°F 17 bar AT 232°C	250 psig AT 450°F 17 bar AT 232°C	250 psig AT 450°F 17 bar AT 232°C
MAX. OPERATING PRESSURE psi [bar]	150 [10bar]	250 [17bar]	250 [17bar]	250 [17bar]	250 [17bar]	250 [17bar]	250 [17bar]	150 [10bar]	250 [17bar]	250 [17bar]	250 [17bar]

OPTIONS
CONNECTIONS - NPT OR BSPT
INTERNAL CHECK VALVE
THERMIC VENT BUCKET
BVSW - LIQUID DRAINER
LARGE VENT

Armstrong International, Inc.
 Three Rivers Division
 Three Rivers, MI 49093
 (269) 273-1415 Fax(269) 278-6555
 Posted on Armstrong's homepage www.armstrong-intl.com

Product	CD No.	Date
800/880 SERIES INVERTED BUCKET STEAM/AIR TRAPS	1000	1/27/04
		Rev. C

DIMENSIONS & DATA CERTIFIED FOR:

Representative:

Order:

Customer:

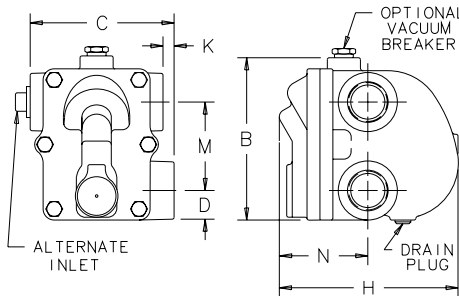
Order:

Project:

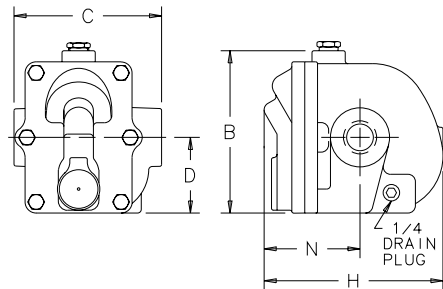
Requirements:

By:

Date:



SERIES "B"



SERIES "BI"


TRAP SERIES	B SERIES					BI SERIES
Pipe Connections	1/2, 3/4	1"	1-1/4	1-1/2	2	1/2, 3/4, 1"
B (Height)	4-7/8	5-1/2	5-1/2	7-7/16	9-5/8	5-5/8
C (Face to Face)	3-7/8	4-7/8	4-5/8	5-3/4	7-5/8	5
D (Bottom to ϕ)	7/8	1	1-7/32	1-7/16	1-11/16	2-11/16
H (Width)	5-3/8	6	7-3/4	8-7/16	11-5/8	6-5/8
K (Connection Offset)	1/8	3/8	—	—	—	—
M (ϕ to ϕ)	2-3/4	3	3	4-3/16	6	—
N (Top to ϕ)	2-9/16	3	3-3/8	3-3/4	5	3-9/32
Weight (lbs)	6	8-1/2	11	19	40	9-3/4
Maximum Allowable Pressure (Vessel Design)	125 psig at 450° F	175 psig at 450° F			175 psig at 450° F	
Maximum Operating Pressure (psig)	30 psig, saturated steam					

NOTE: DIMENSIONS ARE IN INCHES

NAME OF PART	B, BI SERIES
Cap and Body	ASTM A48 Class 30
Bolting	SAE Grade 2
Gasket	Graphite with Surlyn
Valve	440 Stainless Steel
Valve Seat	303 Stainless Steel* ASTM A582
Floot	304 Stainless Steel
Mechanism	Stainless Steel
Balanced Pressure Thermostatic Air Vent	Stainless Steel and Bronze with phosphor bronze bellows, entire unit caged in stainless steel.

*440F Stainless Steel in 1-1/2 inch size and larger

OPTIONS	
CONNECTIONS, NPT OR BSPT	<input type="checkbox"/>
INTEGRAL VACUUM BREAKER	<input type="checkbox"/>



Armstrong International, Inc.
Three Rivers Division
Three Rivers, MI 49093
Armstrong (616) 273-1415 Fax(616) 278-6555
Posted on Armstrong's homepage www.armstrong-intl.com

Product	CD No.	Date
B & BI SERIES FLOAT & THERMOSTATIC STEAM TRAP	1167	02/04/00
		Rev. A

6

Miscellaneous

Piezometer Ring Airflow Measuring System

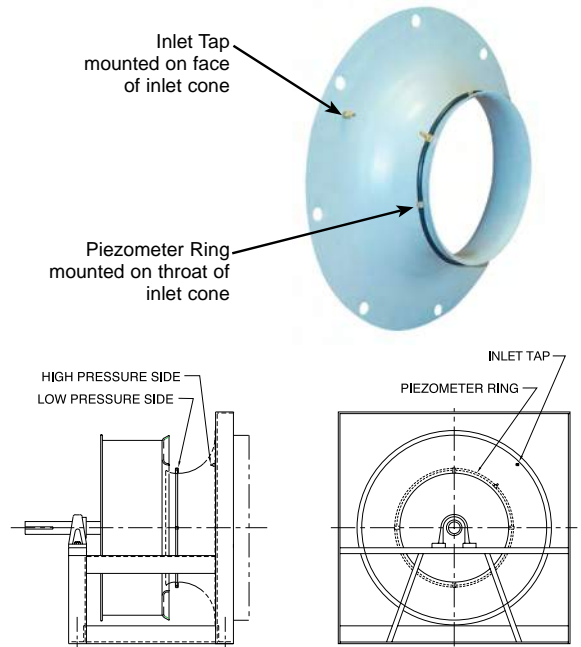
Piezometer Ring

Twin City Fan is pleased to introduce The Piezometer Ring Airflow Measuring System, now available as an accessory for our housed and plenum fans. The system consists of a piezometer ring mounted at the throat and a static pressure tap mounted on the face of the inlet cone. A differential pressure transducer and digital display can also be provided. Based on Twin City Fan laboratory tests, the system was determined to be accurate within +/-5%.

How it Works

The system is based on the principle of a flow nozzle. The inlet cone of the fan is used as the flow nozzle and the flow can be calculated by measuring the static pressure drop through the inlet cone.

The pressure drop is measured from the tap located on the face of the inlet cone to the piezometer ring in the throat. The inlet tap is connected to the high-pressure side of the transducer and the piezometer ring is connected to the low-pressure side (see diagram at right).



Demonstration

Shown below is a Twin City Fan & Blower model 165 BCV fitted with a Piezometer Ring Airflow Measuring System, operating at 1100 RPM. With an unobstructed inlet, the digital display indicates the fan is producing 1713 CFM, which closely matches rated performance (see photo A). After placing an obstruction in the inlet, the airflow is reduced to 1597 CFM (see photo B).



A. Fan operating with unobstructed inlet produces 1713 CFM



B. Fan operating with obstructed inlet produces 1597 CFM

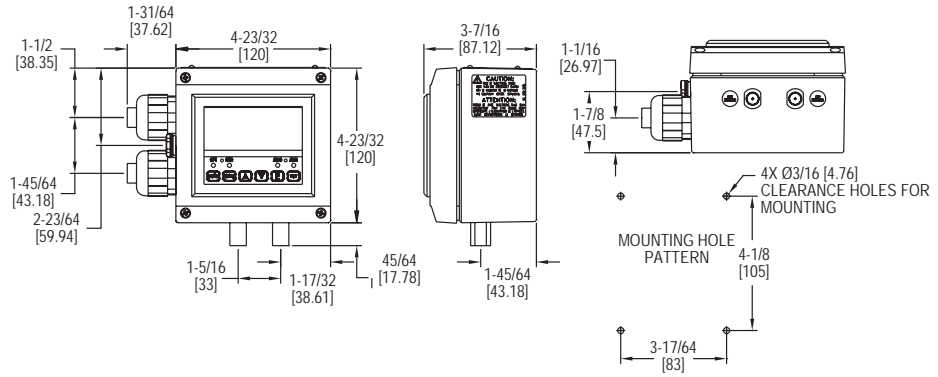


Dwyer
SERIES DHII



DIGIHELIC® II DIFFERENTIAL PRESSURE CONTROLLER

NEMA 4 (IP66) Housing With Large, Bright LCD, Square Root Output for Flow



The **Series DHII DigiHelic® II Differential Pressure Controller** takes all the features of the standard DigiHelic® pressure controller and packages them in a robust NEMA 4 (IP66) housing.

The DigiHelic® II pressure controller combines the 2 SPDT control relays, 4-20 mA process output and Modbus® communications with a large, brightly backlit 4 digit LCD display that can easily be seen from long distances. The electrical wiring has also been enhanced in the DHII with its detachable terminal blocks. The removable terminals allow the install to easily wire the terminal block outside the housing and then attach to the circuit board, reducing wiring difficulties and installation time on the process.

The DigiHelic® II differential pressure control in the NEMA 4 (IP66) enclosure enables this product to be the perfect choice when mounting pressure controls outdoors in such applications as rooftop air handlers. This housing also makes it the ideal solution for surface mounting in clean rooms or facilities where water or a cleaning solution is utilized in maintaining plant cleanliness.

FEATURES/BENEFITS

- NEMA 4 housing enables a range of uses both outdoors or indoors where water is present
- Large backlight LCD display provides local reading from a distance
- Detachable terminal blocks reduce wiring difficulties saving installation time

APPLICATIONS

- Air handlers
- Clean rooms

ACCESSORIES

Model	Description
MN-1	Mini-Node™ USB/RS-485 converter
A-301	Static pressure tip for 1/4" metal tubing connection
A-302	Static pressure tip for 3/16" and 1/8" I.D. plastic or rubber tubing
A-438	Surface mounting brackets
A-489	4" straight static pressure tip with flange
A-302F-A	303 SS static pressure tip with mounting flange; for 3/16" ID rubber or plastic tubing; 4" insertion depth; includes mounting screws
DigiHelic Links™	Communications software

SPECIFICATIONS

Service: Air and non-combustible, compatible gases.
Wetted Materials: Consult factory.
Housing Material: Aluminum, glass.
Accuracy: ±0.5% at 77°F (25°C) including hysteresis and repeatability (after 1 hour warm-up).
Stability: < ±1% per year.
Pressure Limits: Ranges ≤ 2.5 in w.c. = 2 psi; 5": 5 psi; 10": 5 psi; 25": 5 psi; 50": 5 psi; 100": 9 psi.
Temperature Limits: 32 to 140°F (0 to 60°C).
Compensated Temperature Limits: 32 to 140°F (0 to 60°C).
Thermal Effects: 0.020%/°F (0.036%/°C) from 77°F (25°C).
Power Requirements: High voltage power = 100-240 VAC, 50 to 400 Hz or 132-240 VDC; Low voltage power = 24 VDC ±20%.
Power Consumption: Low voltage power = 24 VDC - 130 mA max; High voltage power = 100-240 VAC, 132-240 VDC - 7 VA max.
Output Signal: 4 to 20 mA DC into 900 Ω max.
Zero and Span Adjustments: Accessible via menus.
Response Time: 250 ms (dampening set to 1).
Display: 4 digit backlit LCD 0.6" height. LED indicators for set point and alarm status.
Electrical Connections: Euro type removable terminal blocks with watertight conduit fittings for 1/2" watertight conduit.
Process Connections: 1/8" female NPT.
Enclosure Rating: Designed to meet NEMA 4 (IP66).
Mounting Orientation: Mount unit in horizontal plane.
Weight: 2 lb 10 oz (1.19 kg).
Serial Communications: Modbus® RTU, RS485, 9600 baud.
Agency Approvals: CE, UL.

SWITCH SPECIFICATIONS
Switch Type: 2 SPDT relays.
Electrical Rating: 8 amps at 240 VAC resistive.
Set Point Adjustment: Adjustable via keypad on face.

Model	in w.c.	ft w.c.	mm w.c.	cm w.c.	psi	in Hg	mm Hg	mbar	Pa	kPa	hPa	oz/in ²
DHII-002	.2500	-	6.350	0.635	-	-	0.467	0.623	62.28	-	0.623	0.144
DHII-004	1.000	-	25.40	2.540	-	-	1.868	2.491	249.1	0.249	2.491	0.578
DHII-006	5.000	.4167	127.0	12.70	.1806	.3678	9.342	12.45	1245	1.245	12.45	2.890
DHII-007	10.00	.8333	254.0	25.40	.3613	.7356	18.68	24.91	2491	2.491	24.91	5.780
DHII-008	25.00	2.083	635.0	63.50	.9032	1.839	46.71	62.27	6227	6.227	62.27	14.45
DHII-009*	50.00	4.167	1270	127.0	1.806	3.678	93.42	124.5	-	12.45	124.5	28.90
DHII-010*	100.0	8.333	2540	254.0	3.613	7.356	186.8	249.1	-	24.91	249.1	57.80

*Velocity and volumetric flow not available on bi-directional range units and models DHII-009 & DHII-010.

Model	Range
DHII-012	0.25 to 0 to 0.25 in w.c.
DHII-014	1.0 to 0 to 1.0 in w.c.
DHII-015	2.5 to 0 to 2.5 in w.c.
DHII-016	5 to 0 to 5 in w.c.
DHII-017	10 to 0 to 10 in w.c.

*Velocity and volumetric flow not available on bi-directional range units and models DHII-009 & DHII-010.

Use order code:	Description
-NIST	NIST calibration certificate

Modbus® is a registered trademark of Schneider Automation, Inc. Process Tubing Options: See page 453 (Gage Tubing Accessories)



Protecting VFD-Driven Motors: Bearing Protection Best Practices

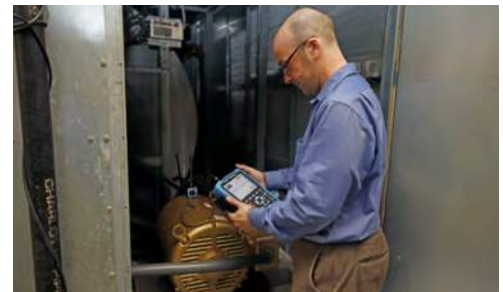
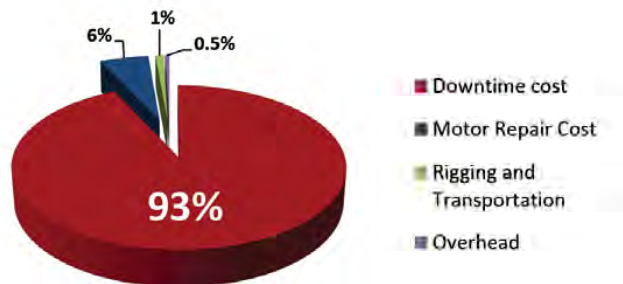
VFD-Driven Motors Are at Risk of Electrical Bearing Damage!

Motors operated by variable frequency drives (VFD) are vulnerable to VFD-induced shaft voltages and bearing currents that can cause premature bearing failure - often in as little as 3 months!

VFDs induce destructive shaft voltages and high frequency currents which can discharge through motor bearings, burning bearing grease and reducing its effectiveness. Through electrical discharge machining (EDM), these discharges can also cause pitting, frosting, and fluting damage to the motor's bearings and eventual bearing failure. The result is costly repairs, downtime, and lost production.



Prevent EDM Pitting and Fluting Damage



Test Motors with AEGIS® Shaft Voltage Tester Oscilloscope

Protect Motor Bearings With AEGIS® Rings

By channeling harmful VFD-induced shaft voltages away from bearings and safely to ground, AEGIS® Shaft Grounding Rings protect motors from costly bearing damage.



Protect Motors with AEGIS® Rings or uKITS

Bearing Protection Best Practices

The AEGIS® Motor Repair Handbook details best practices for protecting VFD-driven motors from electrical bearing damage and preventing costly repairs, downtime and lost production.

Learn about:

- Bearing currents and shaft voltages
- AEGIS® technology
- Shaft voltage testing
- Installation best practices



For detailed recommendations, refer to the AEGIS® Bearing Protection Handbook. An essential reference, the Handbook is available free at www.est-aegis.com/handbook





Standard Mounting Clamps (-1)
 Shaft diameters: 0.311" to 6.02"
 3 to 4 mounting clamps, 6-32 x 1/4" cap screws and washers



Split Ring (-1A4)
 Shaft diameter: 0.311" to 6.02"
 4 to 6 mounting clamps, 6-32 x 1/4" cap screws and washers
 Installs without decoupling motor



Bolt Through Mounting (-3FH)
 Shaft diameters: 0.311" to 6.02"
 6-32 x 1/2" flat head screws
 2 mounting holes up to shaft size 3.395"
 4 mounting holes for larger sizes



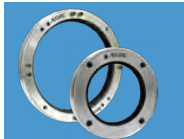
Conductive Epoxy Mounting (-0AW, -0A4W)
 Shaft diameters: 0.311" to 6.02"
 Solid and Split Ring
 Conductive Epoxy Included



Press Fit Mounting (-0A6)
 Shaft diameters: 0.311" to 6.02"
 Clean dry 0.004" press fit
 Custom sizes available



uKIT - SGR with Universal Mounting Bracket
 Sized for NEMA and IEC frame motors
 Solid and Split Ring
 Can be mounted with hardware or conductive epoxy



AEGIS® PRO Series, Large SGR, WTG
 AEGIS® PROSL, PROSLR, PROMAX, PROMR
 Large SGR Rings over 6.02"
 AEGIS® WTG for Wind Turbine Generators

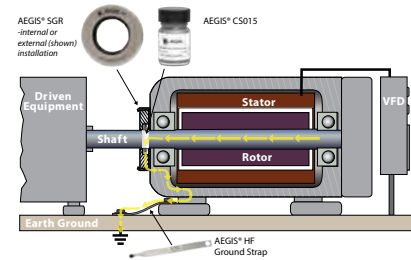


AEGIS® Shaft Voltage Tester™ Oscilloscope
 100 MHz Digital Oscilloscope
 10:1 probe with SVP tip for measuring voltages on a rotating shaft
 AEGIS® One-Touch™ instant image capture



Accessories
 HFGS - AEGIS® High-Frequency Ground Strap
 CS015 - AEGIS® Colloidal Silver Shaft Coating
 EP2400 - AEGIS® Conductive Epoxy

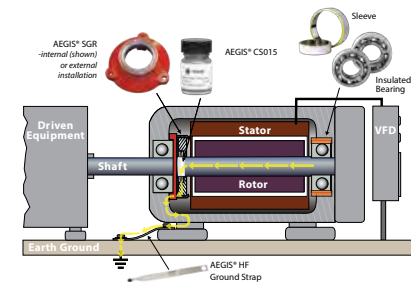
Motors up to and including 100 HP (75 kW) Low Voltage



- Install AEGIS® Bearing Protection Ring – either internally or externally – on drive end or the non-drive end of motor. Use AEGIS® Colloidal Silver Shaft Coating (PN CS015) on motor shaft where fibers touch.

Product recommendation: AEGIS® SGR

Motors Greater than 100 HP (75 kW)



- Drive End: Install AEGIS® Bearing Protection Ring - Internally on the back of the bearing cap or externally on the motor end bracket. Use AEGIS® Colloidal Silver Shaft Coating on motor shaft
- Non-Drive End: Isolate bearing housing with insulated sleeve or coating or use insulated ceramic or hybrid bearing to disrupt circulating currents.

Product recommendation:

LV Motors up to 500HP: AEGIS® SGR

LV Motors over 500HP: AEGIS® PRO Series

MV Motors: AEGIS® PRO Series

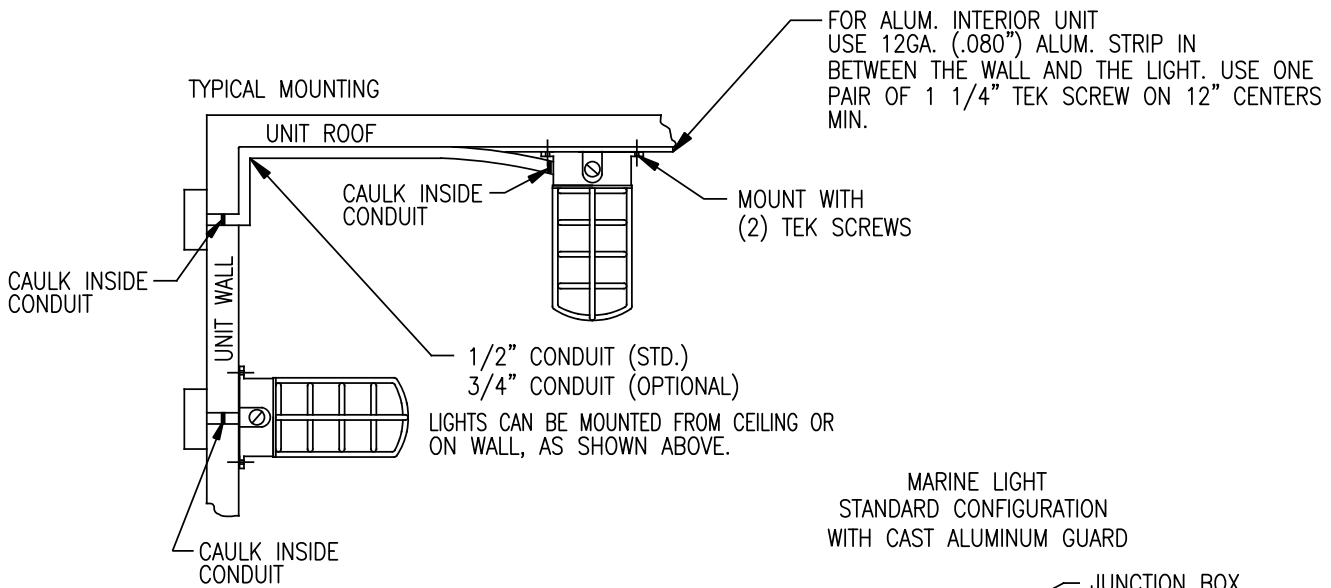
**Download the AEGIS®
 Best Practices Handbook:
www.est-aegis.com/handbook**



7

Electricals

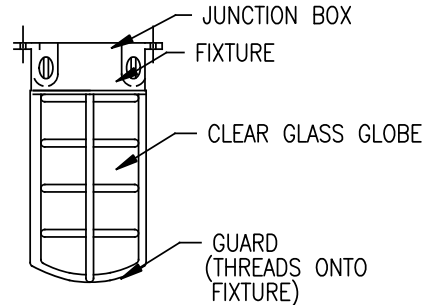
ES-7102



FOR ALUM. INTERIOR UNIT
USE 12GA. (.080") ALUM. STRIP IN
BETWEEN THE WALL AND THE LIGHT. USE ONE
PAIR OF 1 1/4" TEK SCREW ON 12" CENTERS
MIN.

1/2" CONDUIT (STD.)
3/4" CONDUIT (OPTIONAL)
LIGHTS CAN BE MOUNTED FROM CEILING OR
ON WALL, AS SHOWN ABOVE.

MARINE LIGHT
STANDARD CONFIGURATION
WITH CAST ALUMINUM GUARD



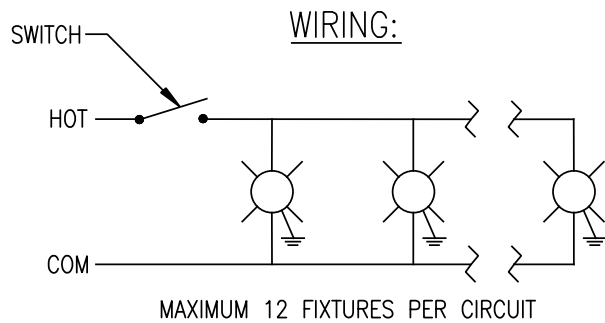
SPECIFICATIONS:

CONSTRUCTION: CAST ALUMINUM, VAPORPROOF
GLOBE : CLEAR GLASS, THREADED
GLOBE GUARD : CAST ALUMINUM, THREADED
BULB SOCKET : A19 BULBS
VOLTAGE : 120V-277V
MAX. POWER : 150W
WIRING : SUITABLE FOR 90°C
UL LISTED FOR WET LOCATIONS

FIXTURE TYPE OPTIONS	
	1/2" CONDUIT HUBS
	3/4" CONDUIT HUBS

BULB OPTIONS	
	PROVIDED BY OTHERS
	100W INCANDESCENT
	*23W CFL
	*18W LED (100W EQUIVALENT)
	*8.5W LED (60W EQUIVALENT)

*=120V ONLY



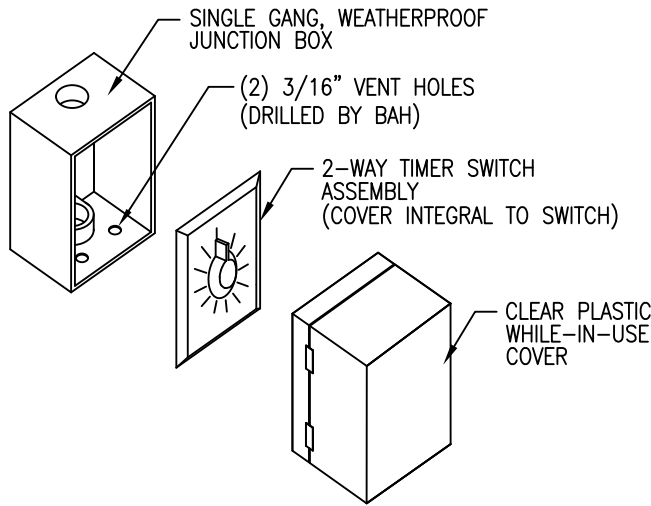
BASED ON RAB VX100DG OR APPROVED EQUIVALENT.

REV. A 08/02/01 1. REMOVED REFERENCE TO SPECIFIC MANUFACTURERS. REV. B 09/09/03 1. REMOVED HAZARDOUS LOCATION CLASSIFICATIONS. REV. C 11/24/08 1. ADDED INFORMATION ON 300 WATT BULBS 2. ADDED NOTE FOR ALUM. STRIP. REV. D 6/10/09 1. ADDED NOTES ABOUT CAULKING INSIDE CONDUIT 2. CHANGED LINES #3 & 5 UNDER SPECIFICATIONS SECTION. REV. E 1/22/10 1. CHANGED TITLE BLOCK LOGO. REV. F 9/7/16 1. MADE MANY CHANGES.	This drawing is the property of Buffalo Air Handling and is returnable upon request. It is for the confidential use of the buyer of the equipment and must not be reproduced, or shown to any third party, without prior written authorization of Buffalo Air Handling.		TITLE MARINE LIGHT	
	DRAWING STATUS COMPLETE	DESIGNER: MPV / EKA	APPROVED BY: MAW/TRK	
	DATE: 10/20/96		PAGE: 1 of 1	
	DRAWING NO. (REF. JO#)			REV. F

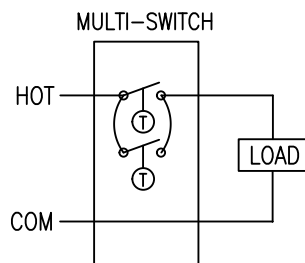
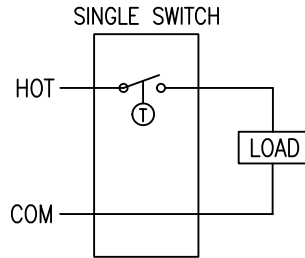


ES-7102

ES-7130



WIRING:



SPECIFICATIONS:

TYPE: 2-WAY, SPST
 GRADE: HEAVY DUTY
 VOLTAGE: 120-277VAC
 RESISTIVE RATING: 20A @120V
 10A @120V

CFL COMPATIBLE
 UL LISTED

COVER APPLICATION:

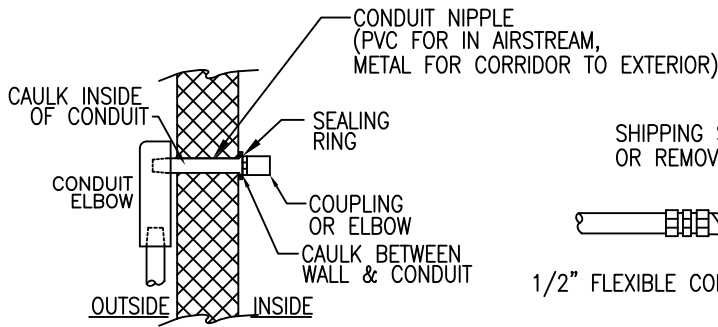
FOR INDOOR (NEMA 1) APPLICATIONS ONLY THE BUSHED METAL COVER IS REQUIRED. FOR ALL OTHER APPLICATIONS A WHILE-IN-USE COVER IS ALSO REQUIRED.

TIMER OPTIONS	
	1 HR
	1 HR W/ HOLD
	2 HR
	4 HR
	6 HR
	6 HR W/ HOLD
	12 HR
	12 HR W/ HOLD

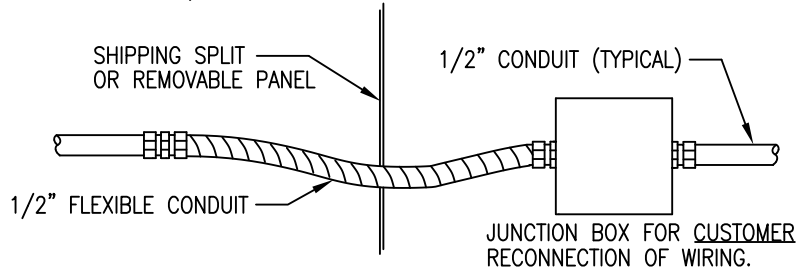
BASED ON INTERMATIC FF SERIES AND WP1110C OR APPROVED EQUIVALENTS

REV.	This drawing is the property of Buffalo Air Handling and is returnable upon request. It is for the confidential use of the buyer of the equipment and must not be reproduced, or shown to any third party, without prior written authorization of Buffalo Air Handling.	TITLE: TIMER SWITCHES		
	REFERENCE:	DRAWING STATUS: APPROVAL	DESIGNER: EKA DATE: 09/12/16	APPROVED BY: MAW/TRK PAGE: 1 of 1
			DRAWING NO. (REF. JO#) ES-7130	REV.

ES-7105



TYPICAL CONDUIT PENETRATION THROUGH EXTERIOR WALL

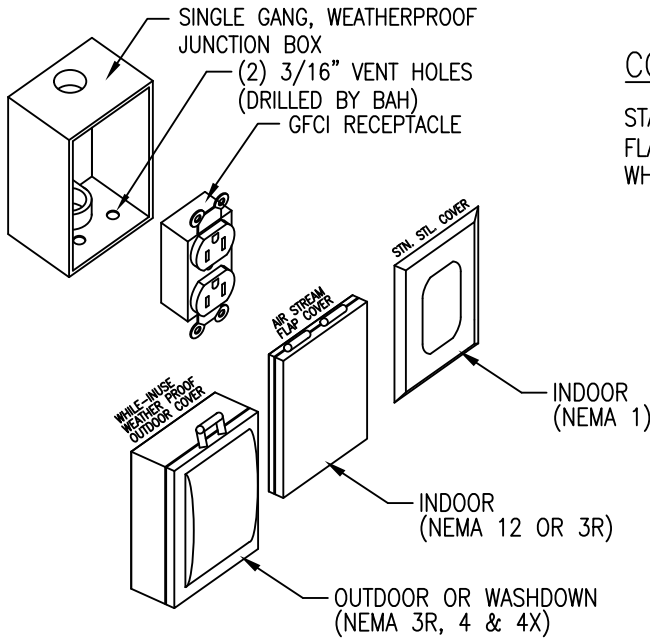


TYPICAL SHIPPING SPLIT OR REMOVEABLE PANEL INSTALLATION

1. ALL WIRING MATERIALS AND DEVICES ARE U.L. APPROVED, AND WIRING METHODS CONFORM TO THE N.E.C., (NATIONAL ELECTRICAL CODE), AND ANSI/NFPA-79 SPECIFICATIONS.
2. ALL WIRING WILL BE RUN IN E.M.T. THINWALL CONDUIT WITH COMPRESSION TYPE FITTINGS FOR INDOOR UNITS, EXCEPT WHEN LOCATED IN WET SECTIONS, ANY FLOORS WHERE TRAFFIC IS LIKELY OR WHEN OTHERWISE SPECIFIED.
- * WET SECTIONS INCLUDE COOLING COILS, HUMIDIFIER, HEAT RECOVERY COILS, AEROFILS, AIR WASHERS & WASH DOWN AREAS.
3. RIGID CONDUIT WILL BE USED ON THE EXTERIOR OF ALL OUTDOOR UNITS. EMT THIN WALL CONDUIT WITH COMPRESSION TYPE FITTINGS CAN BE RUN IN THE INTERIOR OF THE UNIT EXCEPT WHEN LOCATED IN THE WET SECTIONS, ON ANY FLOORS WHERE TRAFFIC IS LIKELY OR WHEN OTHERWISE SPECIFIED.
4. CONDUIT SHALL BE RUN ON THE EXTERIOR OF THE UNIT WHENEVER POSSIBLE IN ORDER TO TIE THE SWITCHES AND RECEPTACLES TOGETHER TO PROVIDE A SINGLE POINT CONNECTION FOR INCOMING POWER. SINGLE POINT CONNECTION WILL BE LABELED -"120V SPW".
5. FLEXIBLE CONDUIT WILL BE USED TO CROSS OVER SHIPPING SPLITS AND REMOVABLE PANELS, SUCH AS THOSE AT COIL SECTIONS. A JUNCTION BOX WILL BE LOCATED ON ONE SIDE OF THE SPLIT FOR CUSTOMER RECONNECTION OF WIRING.
6. ALL CONDUIT SHALL BE FASTENED DIRECTLY TO UNIT CASING USING PLASTIC STANDOFF CLAMPS TO PREVENT THE CONTACT OF DISSIMILAR METALS. PLASTIC STANDOFF CLAMPS SHOULD BE MATCHED TO THE TYPE & SIZE OF CONDUIT.
7. CONDUIT PENETRATIONS THROUGH THE UNIT CASING WILL BE SEALED ON THE OUTSIDE WITH A SEALING RING AND ON THE INSIDE WITH SILICONE CAULKING TO PREVENT AIR LEAKAGE AND BYPASS
8. WIRE WILL BE STRANDED COPPER, TYPE THWN, THHN, OR MTW. 12 GAUGE MINIMUM FOR 460 VOLT MOTORS, 12 GAUGE MINIMUM FOR LIGHTS AND RECEPTACLES, 18 GAUGE MINIMUM FOR CONTROL WIRING.
9. WIRING FROM MOTOR CONDUIT BOXES TO WALLS, SINGLE POINT JUNCTION BOXES OR DISCONNECTS WILL BE IN CONDUIT WITH MAXIMUM 30" FLEXIBLE METAL CONDUIT.
10. DRILL (2) 3/16" VENT HOLES IN THE BOTTOM OF ALL LIGHT SWITCH AND RECEPTACLE BOXES.

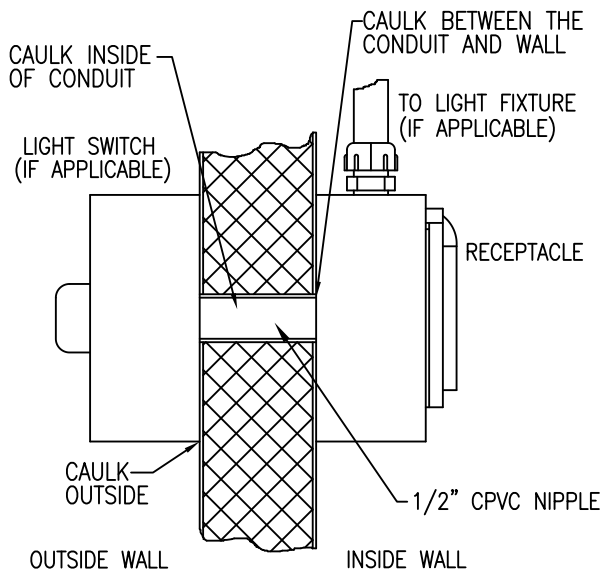
REV. A	08/02/01	1. REMOVED NIPPLE LENGTH TO ACCOMMODATE 2" & 4" WALL CONSTRUCTION	TITLE WIRING METHODS DRAWING STATUS APPROVAL DESIGNER: M.P.V. DATE: 5/31/95 APPROVED BY: MAW/TRK PAGE: 1 of 1 DRAWING NO. (REF. JO#) ES-7105 REV. F
REV. B	09/09/03	1. CHANGED CONDUIT ON EXTERIOR OF OUTDOOR UNITS AND INTERIOR WET SECTIONS TO RIGID AND 3/8" MAXIMUM LENGTH TO FLEXIBLE CONDUIT AT MOTOR	
REV. C	11/24/08	1. MODIFIED NOTE # 2.5,7,8	
REV. D	6/10/09	1. ADDED NOTE #10. REWROTE NOTE #3 EXCEPT #1.	
REV. E	1/22/10	1. CHANGED TITLE BLOCK LOGO.	
REV. F	19/8/16	1. CHANGED NOTES #4, 8 & 9.	
REFERENCE: This drawing is the property of Buffalo Air Handling and is returnable upon request. It is for the confidential use of the buyer of the equipment and must not be reproduced, or shown to any third party, without prior written authorization of Buffalo Air Handling.			
BUFFALO AIR HANDLING			
REFERENCE:			

ES-7108

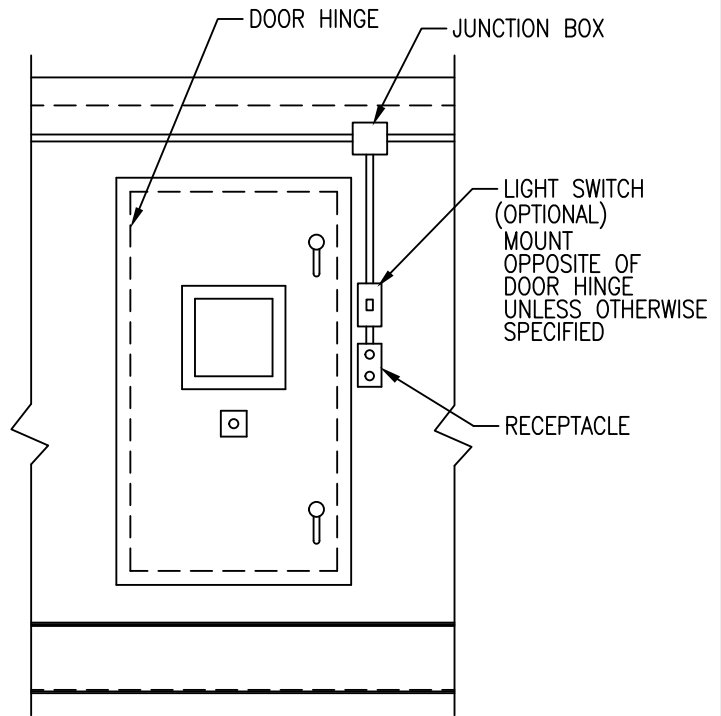


COVER APPLICATION:

- STAINLESS STEEL COVER – INDOOR (NEMA 1)
- FLAP COVER – INDOOR/AIRSTREAM (NEMA 12, NEMA 3R)
- WHILE IN-USE COVER – OUTDOOR/WASHDOWN (NEMA 3R, NEMA 4, NEMA 4X)



MOUNTING – UNIT INTERIOR



MOUNTING – UNIT EXTERIOR

BASED ON LEVITON GFNT2/GFWT2 OR APPROVED EQUIVALENTS

REV. A 08/02/01 1. CHANGES UNKNOWN REV. B J.S. 11/25/08 1. ADD TWO MORE SELECTIONS FOR THE COVER OF THE GFCI 2. DELETED THE 15 AMP SELECTION 3. DELETED WIRING FOR THE DUPLEX RECEPTACLE REV. C 1/22/10 1. CHANGED TITLE BLOCK LOGO. REV. D 9/9/16 1. MADE MANY CHANGES.	This drawing is the property of Buffalo Air Handling and is returnable upon request. It is for the confidential use of the buyer of the equipment and must not be reproduced, or shown to any third party, without prior written authorization of Buffalo Air Handling.	TITLE GFCI RECEPTACLE		
		DRAWING STATUS APPROVAL	DESIGNER: G.K.	APPROVED BY: MAW/TRK
			DATE: 08/02/01	PAGE: 1 of 2
		REFERENCE:	DRAWING NO. (REF. JO#)	
		BUFFALO AIR HANDLING ES-7108		D

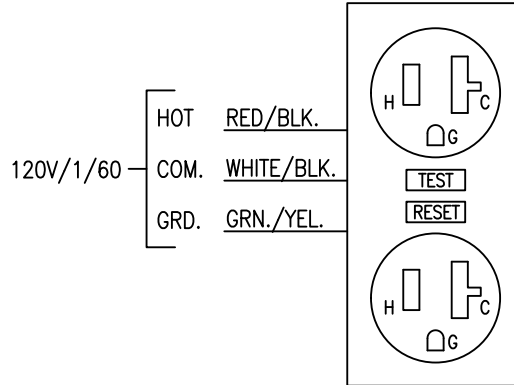
ES-7108

SPECIFICATIONS:

TYPE: NEMA 5-20R
 GRADE: HEAVY DUTY
 COLOR: GRAY
 CURRENT RATING: 20A
 VOLTAGE: 125VAC
 GFCI: SELF TEST W/ INDICATOR LIGHT
 UL LISTED

* OUTDOOR WEATHER RESISTANT VERSION: BEAR "WR" MARK

WIRING:



REV. A	08/02/01	1. CHANGES UNKNOWN	This drawing is the property of Buffalo Air Handling and is returnable upon request. It is for the confidential use of the buyer of the equipment and must not be reproduced, or shown to any third party, without prior written authorization of Buffalo Air Handling.	TITLE GFCI RECEPTACLE		
REV. B	J.S.11/25/08	1. ADD TWO MORE SELECTIONS FOR THE COVER OF THE GFCI 2. DELETED THE 15 AMP SELECTION 3. DELETED WIRING FOR THE DUPLEX RECEPTACLE		DRAWING STATUS APPROVAL	DESIGNER: G.K.	APPROVED BY: MAW/TRK
REV. C	1/22/10	1. CHANGED TITLE BLOCK LOGO.		DATE: 08/02/01	PAGE: 2 of 2	
REV. D	9/9/16	1. MADE MANY CHANGES.		DRAWING NO. (REF. JO#)		REV.
REFERENCE:					ES-7108 D	

8

Test Procedures

ES-8104

Factory Performance Test Procedure

Introduction

This report outlines the test procedure to be used in the performance evaluation of a production air handling unit. The test will be performed at the factory of Buffalo Air Handling. The tests will be conducted in accordance with AMCA Publication 203-90, Field Performance Measurements of Fan Systems. The test will form the basis for production qualification or acceptance by determining the unit air performance for comparison with acceptance criteria in accordance with the established Buffalo Air Handling policy. The tests may be witnessed at the discretion of the parties involved.

Scope

A completed air handling unit which has passed mechanical run tests will be set up for the performance test. This test will determine unit flow rate, total static pressure across the fan, available external static pressure to overcome system losses, fan speed, input power to the fan(s) and air density. The test results shall be compared to acceptance criteria. If corrective action is required the preliminary test results will be projected to the revised operating speed based upon Fan Laws.

Test Setup

AMCA 203-90 utilizes the concept of a pitot tube traverse of the velocity pressures in a short section of straight ductwork. A test duct shall be attached to either inlet or discharge opening(s) of the air handling unit. The duct will be sized to increase the air velocity to approximately 2,500 ft/min. The test duct shall not induce non-uniform airflow resulting in an additional system effects on the fan or other components.


The test setup will not include filters. Filter losses, component losses and external losses shall be simulated by reducing the cross sectional area of a component such as the heating coil, cooling coil or another component. Throttling shall minimize non-uniform airflow to the fan resulting in an additional system effect.

The test shall include two performance test points (test pressures). The test points shall be achieved by throttling the unit as stated above.

Test Measurements and Calculations:

The test data and the calculation of results shall be as contained in AMCA Publication 203-90 as applied to an air-handling unit. In general, the planes of pressure measurement are designated as follows:

Plane 1:	Plane of the fan inlet.
Plane 2:	Plane of the fan outlet.
Plane 3:	Plane of the pitot tube traverse for flow rate (for calculation of the air density during the test).

REV. A 1. REVISED ENTIRE ES. 1/22/10 REV. B 1. CHANGED TITLE BLOCK LOGO. REV. C 1. MINOR APPROVAL EDITING. 5/10/10	This drawing is the property of Buffalo Air Handling and is returnable upon request. It is for the confidential use of the buyer of the equipment and must not be reproduced, or shown to any third party, without prior written authorization of Buffalo Air Handling.	TITLE Factory Performance Test Procedure	
		DRAWING STATUS Complete	DESIGNER: D.M. /T.R.K. APPROVED BY: TRK
		DATE: 6/18/09	PAGE: 1 of 7
		DRAWING NO. (REF. JO#) ES-8104	
REFERENCE:			
			REV. C

ES-8104

In addition to flow rate and pressure, the fan speed and input power will be measured for each test point. Brake horsepower values may either be calculated using input electrical measurements to the motor in conjunction with established motor efficiency values or, in cases where the motor is powered through a Variable Speed Drive, a Load Control meter shall be used. The Load Control meter shall be located across the line upstream of the Variable Speed Drive so that it will not be affected by the distorted sine wave. An allowance for V-belt drive loss, when applicable, shall be taken from Appendix L of AMCA 203.

Fan System Effect

Buffalo Air Handling shall submit an Air Handling Unit Pressure Drop Calculation. This calculation shall include internal static pressure losses for each component, external static pressure requirement, fan system effects, and extra static pressure.

For a fan in a system to perform as rated in a catalog it is necessary for the system to be constructed in such a way that the airflow pathways into and out of the fan are similar to the conditions present during the tests performed to develop the fan manufacturer's ratings. This means that the fan's inlet and outlet are free from immediate obstruction. Due to accessory requirements or space limitations their effect upon fan performance must be taken into account during fan selection.

System effects may be encountered from the proximity of walls to the fan inlet, fan inlet screens, flow measuring devices, belt guards, V-belt drives, attenuators, dampers mounted directly on a fan inlet or outlet, etc. These fan losses have been calculated from component catalog data and system effect estimates taken from AMCA Bulletin 201, Fan and Systems. These un-measurable performance losses (appurtance losses) and system effects are listed in the Air Handling Unit Pressure Drop Calculation.

Establishing Performance Point of Rating


The performance test point of rating shall be the fan rating point minus the fan system effect and extra static pressure. Refer to the Air Handling Unit Pressure Drop Calculation for the fan system effect(s) and extra static pressure. The point of rating is the combination of the internal component static pressure losses and the external static pressure requirement.

AMCA Tolerance Box

An AMCA tolerance box shall be established about the point of rating. The boundaries of the box shall be +/- 5% of the performance point of rating pressure and +/- 3% of the design CFM.

Data Points

A minimum of two data points will be taken. Data points will be at approximately +5% and -5% of design flow. The data points will be plotted on the fan manufacturers fan curve. A line shall be drawn connecting the two data points and shall parallel the fan curve. This line represents the fan performance test curve.

REV. A 1. REVISED ENTIRE ES. 1/22/10	REV. B 1. CHANGED TITLE BLOCK LOGO. 5/10/10	REV. C 1. MINOR APPROVAL EDITING.	This drawing is the property of Buffalo Air Handling and is returnable upon request. It is for the confidential use of the buyer of the equipment and must not be reproduced, or shown to any third party, without prior written authorization of Buffalo Air Handling.	TITLE Factory Performance Test Procedure		
				DRAWING STATUS Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK
				DATE: 6/18/09		PAGE: 2 of 7
				DRAWING NO. (REF. JO#) ES-8104		REV. C
REFERENCE:						

ES-8104


Acceptance Criteria

The AMCA Tolerance Box shall be plotted on the manufacturer's performance curve. If the fan performance test curve passes through or above the AMCA tolerance box and motor horsepower, including drive losses, is below nameplate horsepower, airflow shall be deemed acceptable.

Results

Upon the completion of testing a report containing test data, fan curve, AMCA Tolerance Box calculation and performance curve shall be issued. A description of any performance modification made to the unit shall be included. The report shall be forwarded to all parties involved. A sample of this data is attached.

Attached are examples of the Air Handling Unit Pressure Drop Calculation, AMCA Tolerance Box Calculation Sheet, Fan Performance Test Data, and the fan manufacturer's performance curve with performance data and AMCA Tolerance Box plotted.

REV. A 1. REVISED ENTIRE ES. 1/22/10	REV. B 1. CHANGED TITLE BLOCK LOGO. 5/10/10	REV. C 1. MINOR APPROVAL EDITING.	This drawing is the property of Buffalo Air Handling and is returnable upon request. It is for the confidential use of the buyer of the equipment and must not be reproduced, or shown to any third party, without prior written authorization of Buffalo Air Handling.	TITLE Factory Performance Test Procedure		
				DRAWING STATUS Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK
					DATE: 6/18/09	PAGE: 3 of 7
				REFERENCE:	DRAWING NO. (REF. JO#) ES-8104	
						

ES-8104

Sample: Air Handling Unit Pressure Drop Calculation

Buffalo Air Handling, Pressure Drop Program**Results Page**

Version 3.0d

Program User Name: SAMPLE
 Date: 1/1/2010
 Order Number:
 Mark:
 Customer Name:
 Engineer:
 Design AirFlow (CFM): 10500
 Fan Quantity: 1
 Additional Information:

Upstream External Losses (in. W.G.): 1.50
 Downstream External Losses (in. W.G.): 1.50

**NOTE: A pressure drop value followed by "*" indicates a user defined value.*

UpStream Components

Face Velocity	Pressure Drop	Component
727	0.02	Inlet - Wall or Ceiling, Damper
438	0.77*	Filter - 2" Pleated, Cleanliness = Dirty
438	1.15*	Filter - 12" Rigid, 95%, Cleanliness = Dirty
500	1.02*	Cooling Coil - Plate, 8 Rows

Section Total	2.96	

Fan Components

Face Velocity	Pressure Drop	Component
	0.08	Inlet screen reduction
	0.01	Outlet screen reduction
	0.25	Last component reduction
	0.20	Fan Extra Pressure

2642	0.54	Fan - Supply, Plenum, Arrangement 4, 27.00 Wheel dia.

Summary

Fan Static Pressure = 6.50

Total Internal Losses (in. W.G.): 3.50
 Total External Losses (in. W.G.): 3.00

 Total: 6.50

(Extra Static Pressure = 0.20, Fan Section)

Disclaimer: This program is based on performance estimates provided by original equipment manufacturers. It should be applied with reasonable engineering assumptions and the results verified.

REV. A 1. REVISED ENTIRE ES. 1/22/10	REV. B 1. CHANGED TITLE BLOCK LOGO. 5/10/10	REV. C 1. MINOR APPROVAL EDITING.	This drawing is the property of Buffalo Air Handling and is returnable upon request. It is for the confidential use of the buyer of the equipment and must not be reproduced, or shown to any third party, without prior written authorization of Buffalo Air Handling.	TITLE Factory Performance Test Procedure		
				DRAWING STATUS Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK
					DATE: 6/18/09	PAGE: 4 of 7
				REFERENCE:	DRAWING NO. (REF. JO#) ES-8104	

ES-8104

Sample: AMCA Tolerance Box Calculation Sheet



AMCA Performance Tolerance Box Calculation

Fan Rating Static Pressure: **6.50**
 Fan Rating Airflow Capacity: **10500**
 Fan System Effect Losses: **0.34**
 Fan Extra Static Pressure: **0.20**

Total Fan Losses: **0.54**

Center of AMCA Tolerance Box: **10500 @ 5.96**

CFM Tolerance of 3%: 315 CFM

AMCA Tolerance Box Higher CFM Limit: **10815**

AMCA Tolerance Box Lower CFM Limit: **10185**

SP Tolerance of 5%: 0.33 in. WG

AMCA Tolerance Box Upper SP Limit: **6.29**

AMCA Tolerance Box Lower SP Limit: **5.64**

BAH SO No: SAMPLE Mark: _____

Customer: _____

Date: _____

Name: _____

Witness: _____

REV. A	1. REVISED ENTIRE ES.
REV. B	1/22/10
REV. C	1. CHANGED TITLE BLOCK LOGO.
REV. D	5/10/10
REV. E	1. MINOR APPROVAL EDITING.

This drawing is the property of Buffalo Air Handling and is returnable upon request. It is for the confidential use of the buyer of the equipment and must not be reproduced, or shown to any third party, without prior written authorization of Buffalo Air Handling.

REFERENCE: _____

TITLE: Factory Performance Test Procedure		
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK
DATE: 6/18/09	PAGE: 5 of 7	
DRAWING NO. (REF. JO#)		REV.
ES-8104		C



ES-8104

Sample: Fan Performance Test Sheet

BUFFALO
AIR HANDLING

JOB #: SAMPLE
 MARK: 0
 TSP: 6.5
 ACFM: 10500
 BHP: 15.09
 MOTOR HP: 20
 FLA: 24.4

Plane 1: FAN INLET PLENUM
 Plane 2: FAN DISCHARGE PLENUM
 Plane 3: TEST DUCT (can be on unit intake or unit discharge)

INPUT DATA

	SP1	SP2	SP3			
	-6.40	0.20	-0.44			
BAROM.	TEMP.1	TEMP.3	DUCT DIM 1	DUCT DIM 2	FAN RPM	
29.93	77	74	18.00	36.00	1783	
VFD Amps	VFD % HP	VFD VOLTS	Power Mete: HP	VFD Motor Hz	Motor EFF	BELT LOSS FACTOR
19.0	75.00%	460	15.0	60.0	0.93	0.00

VP3 READINGS

0.16	0.10	0.18	0.41	0.29	0.25	0.40	0.19
0.11	0.28	0.17	0.42	0.28	0.25	0.29	0.16
0.08	0.26	0.29	0.29	0.38	0.38	0.17	0.18

CALCULATION RESULTS

CALC. RMS VP:	0.238	"H2O
DENS.1:	0.0726	lbm/cu.ft.
DENS.3:	0.0741	lbm/cu.ft.
FAN CFM:	9033	cu.ft./min.
FAN TOTAL SP:	6.82	"H2O gauge
MOTOR BHP:	15.5	hp
FAN BHP:	15.5	hp
All fan and motor calculated data is based on an air density of 0.0750 lbs/cu.ft., an elevation of 0 feet and an air temperature of 70 deg F.		

(Technician Signature) (Date)


 (Engineering Manager Signature) (Date)

Certified to be Correct

(Witness Signature) (Date)

REV. A	1. REVISED ENTIRE ES.	1/22/10
REV. B	1. CHANGED TITLE BLOCK LOGO.	5/10/10
REV. C	1. MINOR APPROVAL EDITING.	

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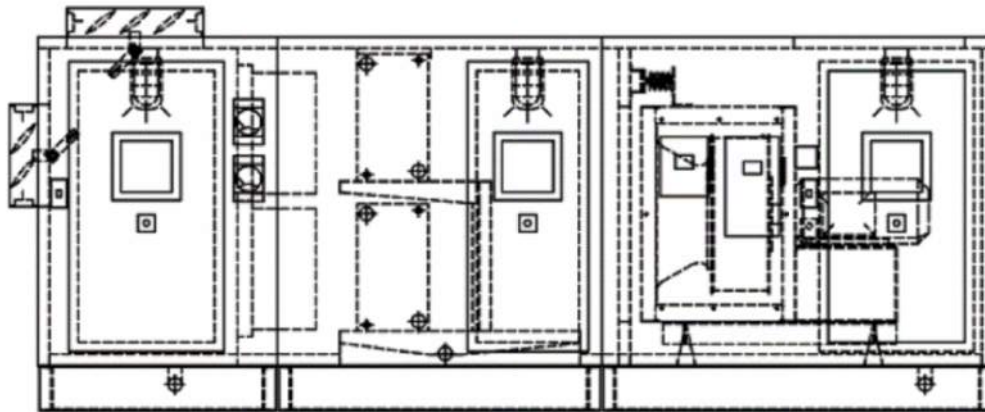
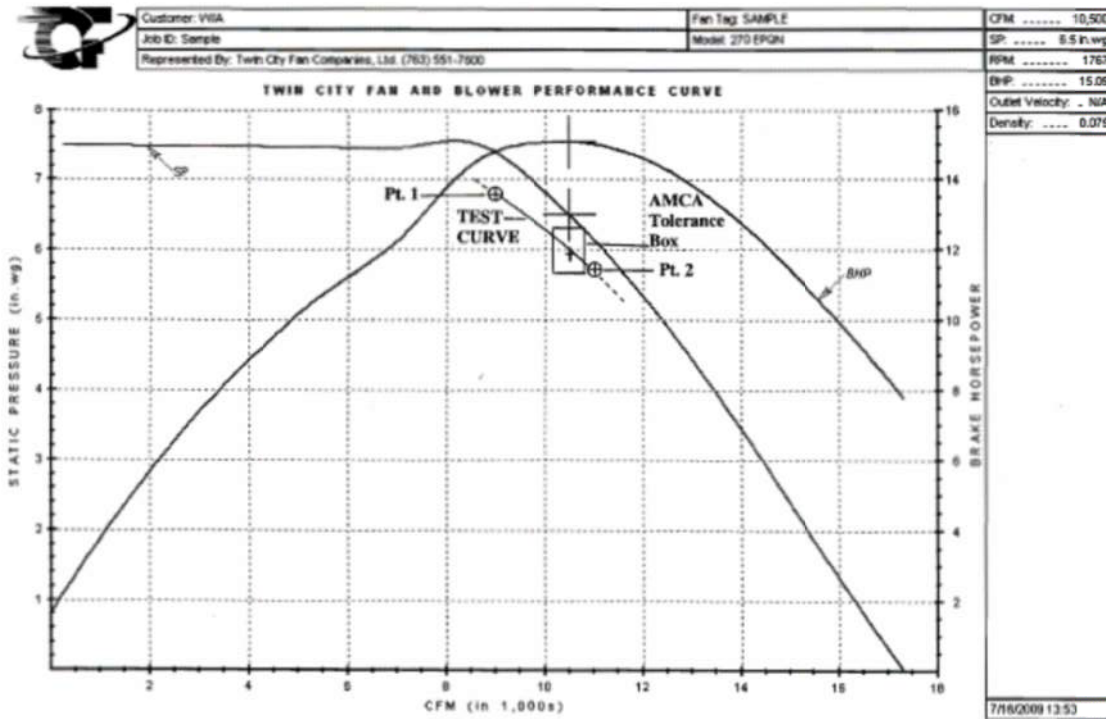
REFERENCE:

TITLE: Factory Performance Test Procedure		
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK
	DATE: 6/18/09	PAGE: 6 of 7
DRAWING NO. (REF. JO#)		REV.
ES-8104		C

BUFFALO
AIR HANDLING

ES-8104

Sample: Fan Curve With Plot of AMCA Tolerance Box and Typical Fan Performance Data



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REV. C	1. MINOR APPROVAL EDITING.	

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DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK
	DATE: 6/18/09	PAGE: 7 of 7
DRAWING NO. (REF. JO#)		REV.
ES-8104		C

ES-8107

Factory Vibration Test Procedure

Introduction

This report outlines the test procedure to be used in the vibration evaluation of a production air-handling unit fan. The test will be conducted at the factory of Buffalo Air Handling. The test forms the basis for product qualification or acceptance criteria as established in accordance with ANSI/AMCA Standard 204-05, Balance Quality and Vibration Levels for Fans.

Scope

A completed air handling unit with a fan which has been aligned, balanced and in which there is no looseness will be run at design speed and as close as practical to the design pressure.

Test Procedure

A vibration analyzer, Commtest Model VB8 or equal, will be used to measure the vibration levels in velocity (in/sec peak). The readings will be taken in the horizontal, axial (where accessible) and vertical direction on the housing of fan and motor bearings. When safe access is not available, as on direct driven axial fans, the vibration readings shall be taken on the fan housing adjacent to the motor bearings. All readings shall be reported in tabular form.

Acceptance Criteria


Acceptance is based upon ANSI/AMCA Standard 204-05, which specifies the peak vibration limit for fan tests conducted at the factory. A function of this acceptance criteria is whether the equipment is mounted upon fixed (rigid) supports or on spring isolators (flexible) supports.

Fan applications are sub-divided into balance and vibration categories BV-1 through BV-5. The balance and vibration category divisions reflect their application and drive power to arrive at appropriate balance and vibration (BV) levels as defined in ANSI/AMCA Standard 204-05. Those vibration levels for air-handling unit fans are as follows:

Application Factory, Filter-in	Driver Horsepower	Fan Application Category, BV	Rigid Mounting (in/sec)	Flexible Mounting (in/sec)
HVAC	≤ 5.0	BV-2	0.20	0.30
	> 5.0	BV-3	0.15	0.20

Buffalo Air Handling flexible mounting fan vibration acceptance criteria have been established at levels below the AMCA tolerance. Those factory test vibration levels are as follows.

Application Factory, Filter-in	Driver Horsepower	Fan Application Category, BV	Rigid Mounting (in/sec)	Flexible Mounting (in/sec)
HVAC	≤ 5.0	BV-2	0.16	0.16
	> 5.0	BV-3	0.15	0.16

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		DRAWING STATUS Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK	
				DATE: 7/22/09	PAGE: 1 of 4
				DRAWING NO. (REF. JO#)	
REFERENCE:	ES-8107		C		

ES-8107

Buffalo Air Handling Company will monitor the "overall" "filter-out" vibration levels at each location to check possible vibration sources other than balance. Overall vibration levels shall not exceed those stated below and will not be reported.

Application Factory, Filter-out	Driver Horsepower	Fan Application Category, BV	Rigid Mounting (in/sec)	Flexible Mounting (in/sec)
HVAC	≤ 5.0	BV-2	0.25	0.30
	> 5.0	BV-3	0.20	0.30

The field (*in-situ*) fan vibration level is not the responsibility of Buffalo Air Handling unless specified in the purchase contract and agreed to by Buffalo Air Handling. ANSI/AMCA 204-5 does not designate "filter-in" field fan vibration levels.

When verification of fan balance in the field is provided by Buffalo Air Handling the acceptance criteria shall be "filter-in" factory level as stated in ANSI/AMCA 204-5. Those vibration levels are as stated below.


Application Start-up, Filter-in	Driver Horsepower	Fan Application Category, BV	Rigid Mounting (in/sec)	Flexible Mounting (in/sec)
HVAC	≤ 5.0	BV-2	0.20	0.30
	> 5.0	BV-3	0.15	0.20

ANSI/AMCA 204-5 does designate field "filter-out" fan vibration levels. Buffalo Air Handling shall verify that the fan vibration levels are below ANSI/AMCA 204-5. Overall field "filter-out" vibration levels will not reported.

Application Start-up, Filter-out	Driver Horsepower	Fan Application Category, BV	Rigid Mounting (in/sec)	Flexible Mounting (in/sec)
HVAC	≤ 5.0	BV-2	0.30	0.50
	> 5.0	BV-3	0.25	0.35

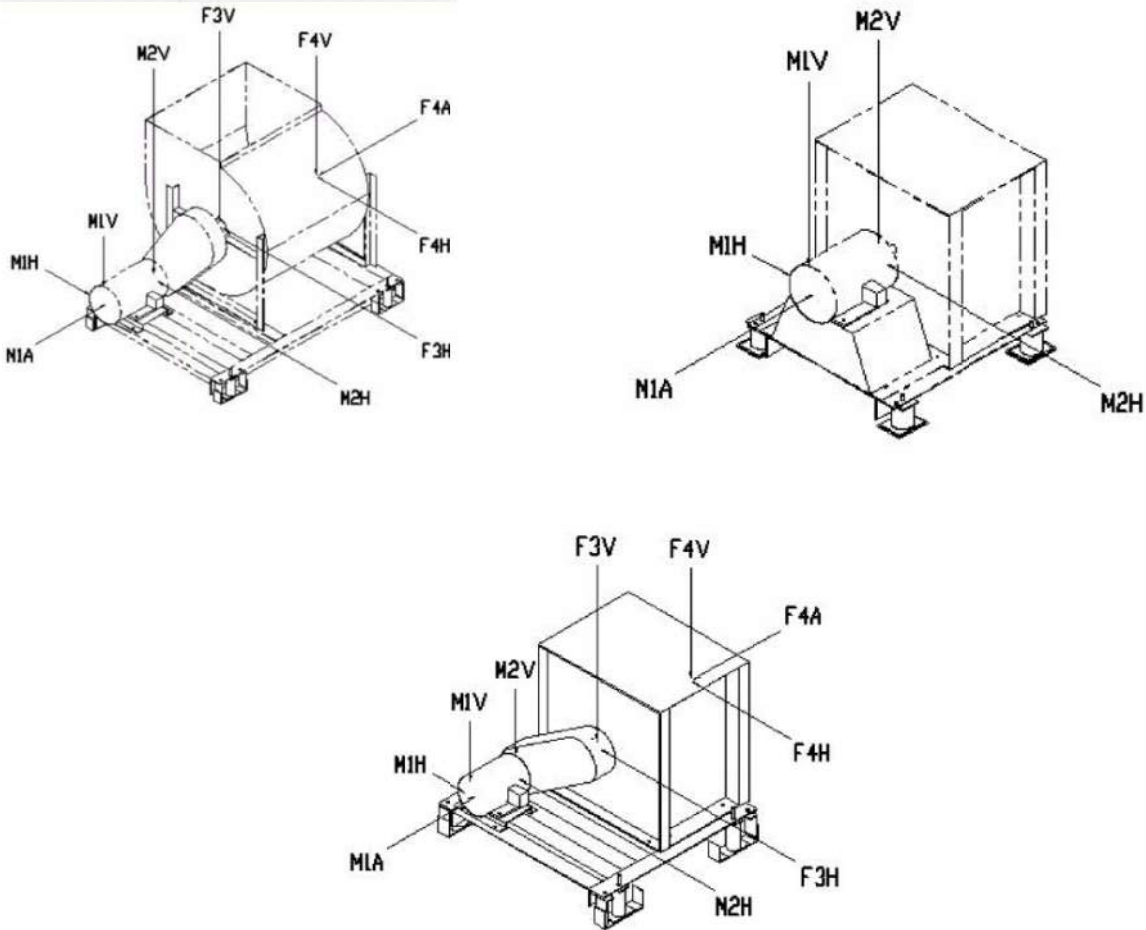
When required and accepted by Buffalo Air Handling Company a velocity spectrum may be provided for the range of 0-200Hz (0-120,000 cpm) at the fan operating speed. A velocity spectrum analysis is not part of the standard vibration test.

Prior to acceptance of an order Buffalo Air Handling must review vibration criteria in addition to or exceeding those stated above.

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				DRAWING STATUS Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK
				DATE: 7/22/09		PAGE: 2 of 4
				DRAWING NO. (REF. JO#) ES-8107		REV. C
REFERENCE:						

Vibration Readings

Vibration readings shall be taken at fan and motor bearing locations a noted below.



Vibration Report

A factory vibration report shall be provided to all parties involved. It shall be as shown below with a drawing of a representative fan. (Plenum fan vibration report sample below.)

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		DRAWING STATUS Complete	DESIGNER: D.M. /T.R.K.
		APPROVED BY: TRK	
		DATE: 7/22/09	PAGE: 3 of 4
REFERENCE:		DRAWING NO. (REF. JO#)	
		ES-8107	
		REV. C	

ES-8107



Vibration Report Plenum

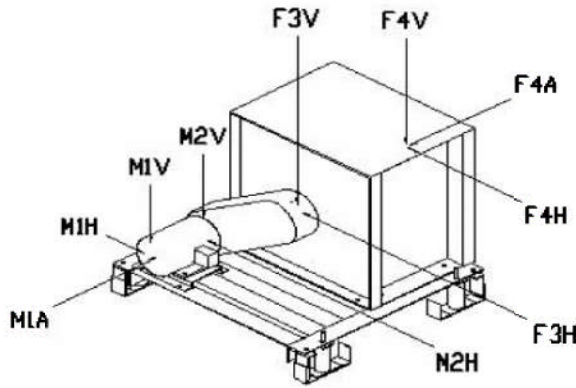
Factory Vibration Test Report:

Shop Order No.: _____
 Job Order No.: _____
 Customer: _____
 End User: _____
 Engineer: _____
 Mark No.: _____

Number of Fans: _____
 Fan RPM: _____
 Fan Mounting: _____
 Fan Rating: _____
 Fan Vibration Limit: _____
 Pass/ Fail: _____

Date: _____
 Technician: _____

Vibration Instrument: Commtest VB8
 Serial Number: _____



Vibration Readings (in/sec):

M1H _____
 M1V _____
 M1A _____
 M2H _____
 M2V _____

F3H _____
 F3V _____
 F4H _____
 F4V _____
 F4A _____

 (Technician Signature, witness test) (Date)

 (Engineering Manager Signature) (Date)

 (Witness Signature) (Date)

Certified to be Correct

REV. A	1. REVISED ENTIRE ES.	1/22/10
REV. B	1. CHANGED TITLE BLOCK LOGO.	
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TITLE: Factory Vibration Test		
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK
DATE: 7/22/09		PAGE: 4 of 4
DRAWING NO. (REF. JO#)		REV.
ES-8107		C

6018-SE

Deflection Test Procedure

Introduction

This report outlines the test procedure to be used to determine the deflection of the unit casing while subjected to an internal positive or negative pressure. The test will be conducted at the factory of Buffalo Air Handling. The test forms a basis for product qualification or acceptance by determining casing deflection for comparison with the acceptance criteria in accordance with established Buffalo Air Handling policy or with that contained in the applicable specification.

Scope

A completed air handling unit, which has passed mechanical run tests, shall be subjected to a positive and/or negative internal static pressure equal to 1.25 times the operating static pressure unless stated otherwise on the Buffalo Air Handling data sheets.


The operating pressure is defined as the maximum pressure an individual air handling unit section experiences under normal operating conditions. The operating pressure for an air handling unit is the summation of the external static pressure experienced by that section plus the internal pressure losses of the components within the section such as coils, dampers, filters, and/or other appurtenance losses that may be assigned to that section of the unit.

The difference between operating static pressure and other referenced pressures is as follows:

1. Design pressure is the pressure for which the unit has been designed. It would not occur during normal operation of the unit.
2. Fan static pressure is the rated pressure of the air handling unit fan. It incorporates both positive and negative internal and external pressures. These pressures are not applicable to all sections of an air handling unit during normal operation.
3. Fan peak pressure or shut off pressure are attributes of fan curve away from the operating pressure. These pressures would not occur during normal operation of the unit.

Test Procedure

Unit/section openings shall be closed off using plywood or sheet metal and sealed around the edges. A pressure gage shall be connected to the unit to monitor internal static pressure. Positive and/or negative pressure sections shall be connected to a test fan with ductwork. The test fan shall be throttled with an inlet plate or discharge damper to the test pressure. A taunt line will be drawn at mid-height along each side and at mid-width along the roof of the pressurized sections. Measurement to the nearest 1/16th inch will be recorded at panel extrusions between the line and the air handling unit before pressurization. Each measurement will be repeated at the test pressure. Deflection shall be defined as the difference between the two measurements.

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REV. B	1. CHANGED TITLE BLOCK LOGO. 5/10/10		DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.
REV. C	1. MINOR APPROVAL EDITING.	REFERENCE:	DATE: 8/19/09	PAGE: 1 of 2
				DRAWING NO. (REF. JO#) ES-8109
				REV. C

6018-SE

Acceptance Criteria


The air handling wall deflection shall not exceed 1/200th of the unit height and/or section length which ever is shorter. The air handling roof deflection shall not exceed 1/200th of the unit width and/or section length which ever is shorter. Any change to this to this criteria will be noted on the Buffalo Air Handling data sheets.

Special Considerations

1. Exterior sides/surfaces containing more than 50% surface area of components such as filters, dampers or louvers are not subject to the deflection criteria.
2. The factory prior to acceptance of an order must approve test pressures in excess of 1.25 times the operating static pressure.
3. A negative pressure deflection test may be applied to an air handling unit, which has both positive and negative sections, as long as the negative sections comprise at least three fourths of the unit. The test pressure shall be 1.25 times the greater operating pressure. An example would be a draw through unit with a return fan and mixing sections. The return air section (negative) and mixing section (positive) would be incorporated into the negative pressure test of the draw through unit.

Test Report

Upon completion of the test a report shall be forwarded to all parties designated in the specification.

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	REV. B		1/22/10	DRAWING STATUS Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK
	REV. C		5/10/10	REFERENCE:	DATE: 8/19/09	PAGE: 2 of 2
	1. MINOR APPROVAL EDITING.				DRAWING NO. (REF. JO#) ES-8109	REV. C

0118-SE

Factory Leakage Test Procedure for an Air Handling Unit with Positive and Negative Pressure Sections

Introduction

This report outlines the leakage test of a production air handling unit with positive and negative pressure sections. The test shall be conducted at the factory of Buffalo Air Handling. This test forms a basis for product qualification and/or acceptance.

Scope

A completed air handling unit will be set up for both a positive pressure and negative pressure leakage tests. All openings (inlet and discharge) will be closed off using plywood or sheet metal and sealed around the edges. Negative pressure sections of the air handling unit will be connected to the inlet of a test fan with ductwork containing a calibrated orifice, see Figure 1. Positive pressure sections of the air handling unit will be connected to the discharge of a test fan with ductwork containing a calibrated orifice, see Figure 2.

A test pressure of 1.25 times the operating pressure shall be applied to the positive and negative pressure sections unless stated otherwise on the Buffalo Air Handling data sheets.

The operating pressure is defined as the maximum pressure an individual air handling unit section experiences under normal operating conditions. The operating pressure for an air handling unit is the summation of the external static pressure experienced by that section plus the internal pressure losses of the components within the section such as coils, dampers, filters, and/or other appurtenance losses that may be assigned to that section of the unit.

The difference between operating static pressure and other referenced pressures is as follows:

1. Design pressure is the pressure for which the unit has been designed. It would not occur during normal operation of the unit.
2. Fan static pressure is the rated pressure of the air handling unit fan. It incorporates both positive and negative internal and external pressures. These pressures are not applicable to all sections of an air handling unit during normal operation.
3. Fan peak pressure or shut off pressure are attributes of fan curve away from the operating pressure. These pressures would not occur during normal operation of the unit.

A negative pressure leak test may be applied to an air handling unit, which has both positive and negative sections, as long as the negative sections comprise at least three fourths of the unit. The test pressure shall be 1.25 times the greater operating pressures. An example would be a draw through unit with a return fan and mixing sections. The return air section (negative) and mixing section (positive) would be incorporated into the negative pressure test of the draw through unit.

REV. A 1. REVISED ENTIRE ES.	REV. B 1/22/10 1. CHANGED TITLE BLOCK LOGO.	REV. C 5/10/10 1. MINOR APPROVAL EDITING.	REV. D 12/18/2015 MAW 1. ERROR CORRECTION	This drawing is the property of Buffalo Air Handling and is returnable upon request. It is for the confidential use of the buyer of the equipment and must not be reproduced, or shown to any third party, without prior written authorization of Buffalo Air Handling.	TITLE: FACTORY LEAKAGE TEST, POSITIVE AND NEGATIVE PRESSURE DRAWING STATUS: COMPLETE DESIGNER: DM/TRK APPROVED BY: TRK DATE: 06/18/09 PAGE: 1 of 4 DRAWING NO. (REF. JO#) <b style="font-size: 1.5em;">ES-8110	REFERENCE: -	REV. <b style="font-size: 2em;">D
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0118-SE

Test Procedure

A manometer is connected to the air handling unit section to monitor the test pressure. The test fans are energized and throttled by means of the damper or throttle plate until the test pressures are achieved. The static pressure drop across each calibrated orifice plate is recorded. Airflow through the orifices is determined from the calibrated orifice chart specific to its size. Air passing through the orifice is equal to the air entering (negative section) or escaping (positive section) the air handling unit. The density of the air is assumed to be 0.075 lb/cu-ft since the ambient conditions within the factory remain fairly constant year round.

Acceptance Criteria

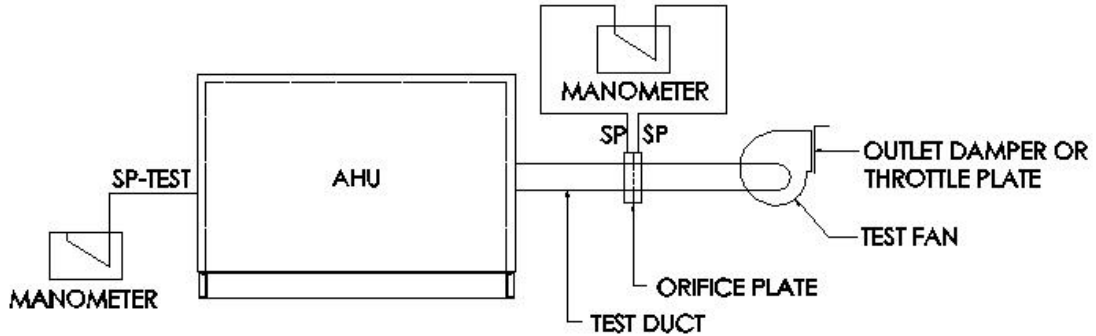
The tested air handling unit is deemed acceptable if the total leakage rate (positive and negative tests) is equal to or below the criteria specified by contract or the BAH data sheets. If a leak test is required and a leakage rate is not specified in the contract, the unit will be tested to one percent (1%) of the unit capacity or 50 CFM, which ever is greater. (It is not practical to utilize a one percent minimum leakage for air handling units below 5000 CFM. Casing surface areas are small yet component penetrations and number of access doors is high.) Buffalo Air Handling must approve leakage criteria in addition to or exceeding that stated above.

Test Report

Upon completion of the test a report containing shall be forwarded to all parties designated in the specification.

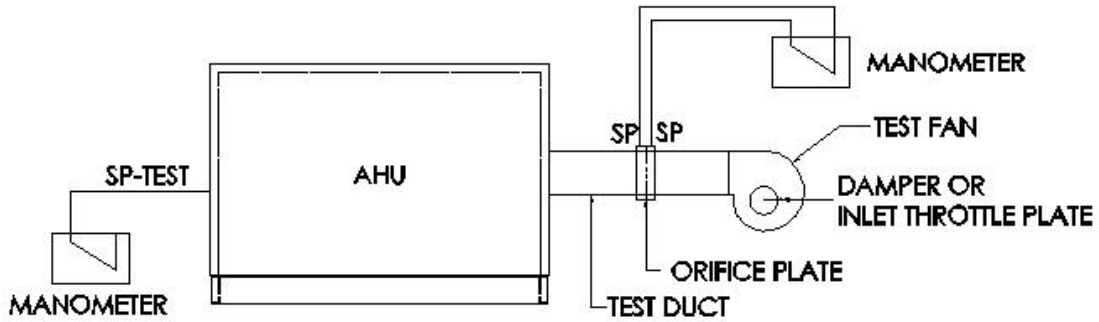
REV. A 1. REVISED ENTIRE ES. REV. B 1/22/10 1. CHANGED TITLE BLOCK LOGO. REV. C 5/10/10 1. MINOR APPROVAL EDITING. REV. D 12/18/2015 MAAW 1. ERROR CORRECTION	This drawing is the property of Buffalo Air Handling and is returnable upon request. It is for the confidential use of the buyer of the equipment and must not be reproduced, or shown to any third party, without prior written authorization of Buffalo Air Handling.	TITLE FACTORY LEAKAGE TEST, POSITIVE AND NEGATIVE PRESSURE		
		DRAWING STATUS COMPLETE	DESIGNER: DM/TRK	APPROVED BY: TRK
			DATE: 06/18/09	PAGE: 2 of 4
		REFERENCE: -	DRAWING NO. (REF. JO#) ES-8110	

0118-ES



NEGATIVE PRESSURE LEAKAGE TEST ARRANGEMENT

FIGURE 1



POSITIVE PRESSURE LEAKAGE TEST ARRANGEMENT

FIGURE 2

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		REFERENCE: -	DRAWING STATUS COMPLETE	DESIGNER: DM/TRK	APPROVED BY: TRK
			DATE: 06/18/09	PAGE: 3 of 4	
			DRAWING NO. (REF. JO#) ES-8110		REV. D



ES-8110

D

0118-S3



Factory Leakage Test Report - Negative & Postive Pressure Test

Shop Order No.: _____
 Job Order No.: _____
 Customer: _____
 End User: _____
 Engineer: _____
 Mark No.: _____

Negative Presure: _____
 Negative Leakage: _____
 DP Orifice = _____
 Postive Pressure: _____
 Postive Leakage: _____
 DP Orifice = _____
 Total Leakage: _____
 Total Leakage Allowed: _____

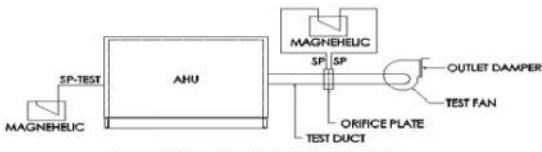


FIGURE 1

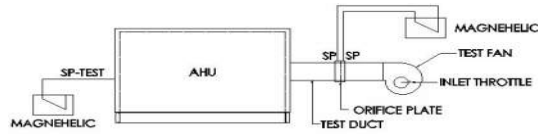


FIGURE 2

Calibrated Orifice Performance Chart: 4" Pipe with 2" orifice

Delta Pressure	Leakage CFM	Delta Pressure	Leakage CFM	Delta Pressure	Leakage CFM	Delta Pressure	Leakage CFM	Delta Pressure	Leakage CFM
0.1	18	1.3	62	2.5	84	3.7	101	4.9	118
0.2	23	1.4	64	2.6	86	3.8	102	5.0	119
0.3	28	1.5	67	2.7	87	3.9	104	5.1	120
0.4	33	1.6	69	2.8	89	4.0	105	5.2	122
0.5	37	1.7	71	2.9	90	4.1	107	5.3	123
0.6	41	1.8	73	3.0	91	4.2	108	5.4	124
0.7	44	1.9	75	3.1	93	4.3	110	5.5	125
0.8	48	2.0	76	3.2	94	4.4	111	5.6	126
0.9	51	2.1	78	3.3	96	4.5	112	5.7	127
1.0	54	2.2	80	3.4	97	4.6	114	5.8	128
1.1	57	2.3	81	3.5	98	4.7	115	5.9	129
1.2	59	2.4	83	3.6	100	4.8	116	6.0	129

 (Technician Signature, witness test) (Date)

 (Engineering Manager Signature) (Date)

Certified to be Correct

 (Witness Signature) (Date)

REV. A	1. REVISED ENTIRE ES.
REV. B	1/22/10
REV. C	5/10/10
REV. D	MINOR APPROVAL EDITING.
REV. E	12/18/2015 MAW
REV. F	1. ERROR CORRECTION

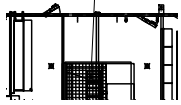
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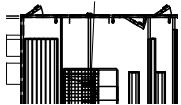
TITLE: FACTORY LEAKAGE TEST, POSITIVE AND NEGATIVE PRESSURE		
DRAWING STATUS: COMPLETE	DESIGNER: DM/TRK	APPROVED BY: TRK
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ES-8110		D

Submittal #011 - Air Handling Unit Rev 1 - (AAN).pdf Markup Summary

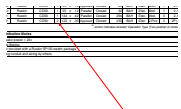
Arrow (3)



Subject: Arrow
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
56
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space:



Subject: Arrow
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
56
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Date: 12/21/2022 2:50:36 PM
Status:
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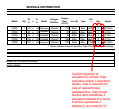
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47
Author: michael.carter
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space:

Cloud+ (2)



Subject: Cloud+
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
22
Author: Alex Stone
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space:

PROVIDE MANUFACTURER DATA SHEETS.
INCLUDE WIRING DIAGRAMS / SCHEMATICS.



Subject: Cloud+
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
47
Author: michael.carter
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space:

Confirm quantity of actuators is correct. Hipp assumes where 3 actuators shown, that is required for size of space/torque requirements. Hipp thinks the SA item should be 4 actuators instead of 2 since that line represents 2 dampers, so a total of 12 actuators instead of 10.

Designer (1)



Subject: Designer

Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA 203

Author: Alex Stone

Date: 12/21/2022 2:50:36 PM

Status:

Color: ■

Layer:

Space:

STEAM STRAINER TO BE CAST STEEL,
CARBON STEEL, OR BRASS.

CAST IRON NOT ACCEPTABLE.

Line (8)



Subject: Line

Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA 56

Author: jonathonr

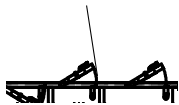
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Color: ■

Layer:

Space:



Subject: Line

Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA 56

Author: jonathonr

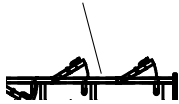
Date: 12/21/2022 2:50:36 PM

Status:

Color: ■

Layer:

Space:



Subject: Line

Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA 56

Author: jonathonr

Date: 12/21/2022 2:50:36 PM

Status:

Color: ■

Layer:

Space:



Subject: Line

Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA 56

Author: jonathonr

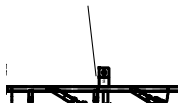
Date: 12/21/2022 2:50:36 PM

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Color: ■

Layer:

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Subject: Line

Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA 56

Author: jonathonr

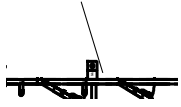
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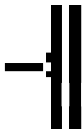
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Subject: Line
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
56
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space:

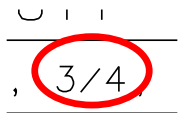


Subject: Line
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
56
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space:



Subject: Line
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
56
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space:

Oval (2)



Subject: Oval
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
204
Author: joelb
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space:



Subject: Oval
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
204
Author: joelb
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space:

Polygon (1)

BT HAND
-4901
#: 220094-02
#: 18801

Subject: Polygon
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
51
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color: □
Layer:
Space:

	1-3/4 IN (1.8 kg)	3 IN (1.4 L)
(NPT)	1" (DN25)	* 1-1/4 (DN32)
FACE)	5 (127)	5-1/2 (141)
(INLET)	3-3/4 (95)	3-7/8 (99)
THREAD)	1/2 NPT (DN15)	
SCREEN)	1-5/16 (39)	1-1/2 (38)
SCREEN)	2-15/16 (75)	2-3/8 (60)
	4-1/2 (112 kg)	7 IN (13.2 L)
(NPT)	1-1/2 (DN40)	2 (DN50)

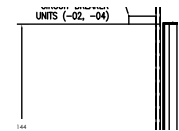
Subject: Rectangle
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
 203
Author: acornish
Date: 12/21/2022 2:50:36 PM
Status:
Color:
Layer:
Space:

CAL INFORMATION		
DIMENSIONS		
F)	1/2 (DN15)	3/4 (DN20)
E)	4-1/2 (113)	
E)	3 (76)	
D)	3/8 NPT (DN10)	
	15/16 (24)	31/32 (25)
N)	2-1/16 (52)	2-3/8 (60)
	1-3/4 IN (1.8 kg)	3 IN (1.4 kg)
F)	1" (DN25)	* 1-1/4 (DN32)
E)	5 (127)	5-1/2 (141)

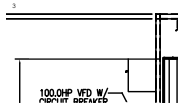
Subject: Rectangle
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
 203
Author: acornish
Date: 12/21/2022 2:50:36 PM
Status:
Color:
Layer:
Space:



Subject: Rectangle
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
 51
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color:
Layer:
Space:



Subject: Rectangle
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
 51
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color:
Layer:
Space:



Subject: Rectangle
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
 51
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color:
Layer:
Space:



Subject: Rectangle
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
 55
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color:
Layer:
Space:

TEAKER

Subject: Rectangle
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
55
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color:
Layer:
Space:

Snapshot (13)

(-02)

Subject: Snapshot
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
51
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color:
Layer:
Space:

(-02)

Subject: Snapshot
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
51
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color:
Layer:
Space:

(-06)

Subject: Snapshot
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
55
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color:
Layer:
Space:

(-06)

Subject: Snapshot
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
55
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color:
Layer:
Space:

6X6 DRAIN SUMP
TYP. OF (6)

Subject: Snapshot
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
56
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color:
Layer:
Space:

445 EPPN CLASS 3
FAN (TWIN CITY) AND
50 HP MTR 365T TEFC
W/ SHAFT GROUNDING

Subject: Snapshot
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
56
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space:

CLEVELAND CONTROLS B98 FITTING

Subject: Snapshot
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
56
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space:

Coil Pull

Subject: Snapshot
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
56
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space:

542 EPPN CLASS 3
FAN (TWIN CITY) AND
100 HP MTR 444T TEFC
W/ SHAFT GROUNDING

Subject: Snapshot
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
56
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space:

CLEVELAND CONTROLS B98 FITTING

Subject: Snapshot
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
56
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space:

REMOVABLE LIFTING LUG
TYP. OF (X) PER SECTION

Subject: Snapshot
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
56
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space:

MONORAIL
(FOR FAN AND
MOTOR REMOVAL)

Subject: Snapshot
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
56
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
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Color: ■
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MONORAIL
(FOR FAN AND
MOTOR REMOVAL)

Subject: Snapshot
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
56
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
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Space:

Text Box (4)

01

Subject: Text Box
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA 01
51
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space:

ARK: AHU 4901

JMS DETAILED:

DATE:

Subject: Text Box
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA AHU 4901
51
Author: jonathonr
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space:

PROVIDE WIRING DETAILS
FOR ACTUATORS AND
LIMIT SWITCHES. REVISE
TO 12 ACTUATORS IF
NEEDED (SEE COMMENTS
ON PDF PAGE 48).

Subject: Text Box
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
57
Author: michael.carter
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space: PROVIDE WIRING DETAILS FOR ACTUATORS
AND LIMIT SWITCHES. REVISE TO 12
ACTUATORS IF NEEDED (SEE COMMENTS ON
PDF PAGE 48).

PROVIDE WIRING
DIAGRAM FOR
ACTUATORS AND
LIMIT SWITCHES.

Subject: Text Box
Page Label: 220094 Re-Submittal Kirlin Eli Lilly ConcordRevA
22
Author: michael.carter
Date: 12/21/2022 2:50:36 PM
Status:
Color: ■
Layer:
Space: PROVIDE WIRING DIAGRAM FOR ACTUATORS
AND LIMIT SWITCHES.