Submittal
No. 23.000009.0

WALTERFEDY
Kitchener | Hamilton | Toronto | walterfedy.com

Final Status: Reviewed as Modified

Title:	Energy Recovery Ventilator	**Type:**	Shop Drawings
Project No.:	2019-0248-10	**Status:**	Returned
Project:	Enbridge - Station B	**Priority:**	Review Required
Division:	23. Heating, Ventilating, and Air Conditioning (HVAC)	**Reference:**	
Number:	23.000009.0	**Subcontract:**	Work Release to Master Construction Agreement
Revision:	0		
Required by Subcontractor On:		**Required from Consultant On:**	2022-Sep-08

Description

Energey Recovery Ventilator Shop Drawings (Tags ERV-1, HUM-1, Filters)

Attachment(s):

History:

Action Taken: Reviewed as Modified

From:	Cody Hewlin WalterFedy 675 Queen Street South Suite 111 Kitchener, ON, N2M1A1 Canada (519) 576-2150	**To:**	Daniel Librandi Rochon Building Corporation 74 Industry Street York, Ontario, M6M 4L7 Canada (416) 638-6666
Status:	Issued	**Date:**	2022-Sep-08
Carrier:		**Waybill:**	
CC:			
Comments:			

Submittal
No. 23.000009.0

WALTERFEDY
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Final Status: Reviewed as Modified

Attachment(s):

SD 23.000009 - Energy Recovery Ventilator

Action Taken: Reviewed as Modified

From:	Patrick Dormer WalterFedy 675 Queen Street South Suite 111 Kitchener, ON, N2M1A1 Canada (519) 576-2150	**To:**	Cody Hewlin WalterFedy 675 Queen Street South Suite 111 Kitchener, ON, N2M1A1 Canada (519) 576-2150
Status:	Issued	**Date:**	2022-Sep-08
Carrier:		**Waybill:**	
CC:			
Comments:			

Attachment(s):

Action Taken: Reviewed as Modified

From:	Nick Bertoia WalterFedy 675 Queen Street South Suite 111 Kitchener, ON, N2M1A1 Canada (519) 576-2150	**To:**	Patrick Dormer WalterFedy 675 Queen Street South Suite 111 Kitchener, ON, N2M1A1 Canada (519) 576-2150
Status:	Issued	**Date:**	2022-Sep-07
Carrier:		**Waybill:**	
CC:	Mike Snyder WalterFedy 675 Queen Street South Suite 111 Kitchener, ON, N2M1A1 Canada (519) 576-2150		

Final Status: Reviewed as Modified

Comments:

ERV-1 Lead Time: 42 - 46 Weeks, HUM-1 Lead Time: 30 - 40 Weeks, Filters Lead Time: 16 - 20 Weeks

Attachment(s):

Rochon BUILDING CORPORATION

SHOP DRAWING TRANSMITTAL

DRAWING REVIEW

This review is for the sole purpose of ascertaining conformance with the design concept and does not relieve the subcontractor of their responsibilities for errors and omissions or for meeting all requirements of the contract documents.

DATE: Sept 2, 2022

☒ Reviewed ☐ Reviewed As Modified

☐ Revise And Resubmit

REVIEWED BY:

Rochon BUILDING CORPORATION

74 industry Street, Toronto, Ont. M6M 4L7

TRANSMITTED: ☐ FAX ☐ COURIER ☐ MAIL ☐ HAND ☑ EMAIL

PROJECT NAME: Enbridge Station B **DATE:** September 2, 2022

PROJECT NO.: B21070 **FROM:** Daniel Librandi

SUBJECT: 23-000.09 - REV0 Energey Recovery Ventilator Shop Drawings

TO	CC	COMPANY	ATTENTION	PHONE	EMAIL
	X	WalterFedy Architects	Patrick Dormer	519.576.2150	pdormer@walterfedy.com
X		WalterFedy Architects	Cody Hewlin	519-576-2150 EXT:434	cody.hewlin@walterfedy.com
	X	WalterFedy Architects	Wade Brown	519-576-2150 Ext:472	wbrown@walterfedy.com
	X	Enbridge	Sal Simone	416-272-8162	Sal.Simone@enbridge.com
	X	Enbridge	Steve Dinopoulos		steve.dinopoulos@enbridge.com

REMARKS

ITEM #	PREPARED BY	DESCRIPTION
1	Consult Mechanical	Energey Recovery Ventilator Shop Drawings (Tags ERV-1, HUM-1, Filters)
		ERV-1 Lead Time: 42 - 46 Weeks, HUM-1 Lead Time: 30 - 40 Weeks, Filters Lead Time: 16 - 20 Weeks

If Items are not received as listed please notify us immediately.

☑ FOR APPROVAL ☐ APPROVED

☐ FOR FABRICATION ☐ APPROVED AS NOTED

☐ FOR YOUR USE ☐ REJECTED

☐ AS REQUESTED ☐ REVISION & RESUBMISSION

74 Industry Street, Toronto, Ontario M6M 4L7
Tel: (416) 638-6666 Fax: (416) 638-9044
Email: aanabalon@rochonbuildingcorp.com

CONSTRUCTION SUBMITTAL TRANSMITTAL FORM

CONSULT Mechanical

PROJECT NAME	DATE OF SUBMISSION
ENBRIDGE STATION B	Sept.2/22
PROJECT MANAGER	**TRANSMITTAL NUMBER**
STEVE RAVIELE	58163

TRANSMITTED TO: (NAME/ADDRESS)	

SUBJECT OF SUBMITTAL	**SPECIFICATIONS**
ENERGY RECOVERY VENTILATOR	

CHECK ONE OF THE FOLLOWING:

X	We have verified that the material or equipment contained in this submittal meets all of the requirements specified or shown (no exceptions).
	We have verified that the material or equipment contained in this submittal meets all of the requirements specified or shown, except for the following deviations listed below.

CONTRACTOR NAME	SIGNATURE
Consult Mechanical INC.	Ross Pincente

Submittal # 58163	APPROVAL REQUIRED

Project 22000143-MECH-MAY 2022- Enbridge Station B - 405 Eastern Ave
Leader Nevin Wong
Job Site 405 Eastern Avenue, Toronto, ON, Canada
Submission Date 2022-09-01
Sold To CONSULT MECH
Submitted By Nevin Wong

Contacts

Role	Customer	Our Rep
Mechanical Contractor	Consult Mechanical *	Nevin Wong
Designer	WalterFedy	Peter Washer
Mechanical Contractor	Consult Mechanical *	Nevin Wong

Deliverables

Track #	189785	189786	189789
Tag	ERV-1	FILTERS	HUM-1
Description	RG Dual Core	Dynamic V8 Filters	Gas To Steam - LX Series COPY
Quantity	1	1	1
Manufacturer	Tempeff	Dynamic Filters	Dri-Steem
Model #	RG7500		GTSLX-150
Specification	23 70 00 - 2.1	23 70 00 - 2.1.7	23 80 00 - 2.6
Production Lead Time	42 - 46 Weeks	16 - 20 Weeks	30 - 40 Weeks
Revision #	0	0	0

Attention:

1) HTS will provide equipment in accordance with the attached shop drawings.
2) Upon approved submittal and customer release, HTS will release equipment to fabrication per the published lead times. Any storage fees associated with project schedule changes will be the responsibility of the purchaser.
3) HTS can provide freight and logistics to the purchaser as an added benefit of doing business with HTS. When freight is received by the purchaser, any noticeable damage must be recorded. Otherwise, HTS is not responsible for subsequent damage claims.

Approval Stamps

2019-0248-10 **23.000009**

SHOP DRAWING Sep 02, 2022

REVIEWED ( ) REVISE AND RE-SUBMIT ( )

REVIEWED AS MODIFIED (X) NOT REVIEWED ( )

This review by WalterFedy is solely limited to ascertaining the general conformance with the design concept and does not represent an opinion on the adequacy, quality, or suitability of the design where such design was prepared by others. This review shall not mean that WalterFedy approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Construction and Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of the work of all sub-trades.

WALTERFEDY

BY N.B.

DATE 2022.09.07

Drawing & Specification Compliance

Technical data

Input data	Sup. air	Exh. air
Total volume (SCFM)	7400	7400
HX Air volume (SCFM)	7400	7400
Filter	Dynamic V8	Merv 8 (2")
	-	-
External pressure drop (in. W.C)	1.00	0.75

Output data		
Filter air velocity (fpm)	493	455
Design pressure drop filter (in W.C)	0.56	0.48
HX air velocity (fpm)	422	422
Pressure drop heat exch. (in W.C)	0.61	0.61
Pressure drop HX filter (in W.C)	0.00	0.00
Heating Coil 1 Pressure Drop (in W.C)	0.00	0.00
Heating Coil 2 Pressure Drop (in W.C)	0.00	0.00
Cooling Coil Pressure Drop (in W.C)	0.00	0.00
Auxillary Pressure Drop (in W.C)	0.00	0.00
Backdraft dampers & Louvers (in W.C)	0.00	0.00
Static pressure (in W.C)	2.17	1.83

Fan speed (rpm)	1360	1310	
Max (rpm)	2650	2650	
Fan efficiency (%)	73.22	71.24	
Required BHP	4.01	3.57	
			Per fan
Motor efficiency (%)	89.5	89.5	
Motor power rating (hp)	5.00	5.00	
Motor RPM	1160	1160	
Motor Operating Frequency (Hz)	70	68	

Power and energy demand

Input data	Calculated			
	Winter		Summer	
	DB	WB	DB	WB
Design outdoor temp. (°F)	-10.00	-11.0	93.0	75.0
Desired supply air temp. winter (°F)				
Exhaust air temperature (°F)	70.0	53.0	75.0	62.5
Output data				
Efficiency (across unit) (%)	88.2%	70.0%	77.1%	0.0%
Supply air temp. after unit (°F)	60.58	46.2	79.1	71.1
Recovered energy across unit (BTUH)	564,079	119,492	-110,900	0

ENERGY RECOVERY VENTILATOR SCHEDULE

TAG #	MANUFACTURER	SUPPLY FAN					OUTDOOR AIR FILTER RACK SIZE	RETURN AIR FILTER RACK SIZE	EXHAUST FAN					ENERGY RECOVERY (SUMMER)					ENERGY RECOVERY (WINTER)					HUMIDIFICATION		DUAL CORE RECOVERY ELECTRICAL		SIZE (mm)	WEIGHT (KG)	REMARKS
		SUPPLY AIR (L/s)	SUPPLY AIR PRESSURE DROP (Pa)	ELEC.	MOTOR SIZE (HP)	MCA (A)			EXHAUST AIR (L/s)	EXHAUST AIR PRESSURE DROP (Pa)	ELEC.	MOTOR SIZE (HP)	MCA (A)	OUTSIDE AIR DB/WB (°C)	RETURN AIR DB/WB (°C)	SUPPLY AIR DB/WB (°C)	EXHAUST DB/WB (°C)	TOTAL EFFICIENCY (%)	OUTSIDE AIR DB/WB (°C)	RETURN AIR DB/WB (°C)	SUPPLY AIR DB/WB (°C)	EXHAUST DB/WB (°C)	TOTAL EFFICIENCY (%)	CAPACITY (KG/HR)	REMARKS	VOLTAGE (V/PH/Hz)	MOTOR HP			
ERV-1	TEMPEFF, RG7500	3492	615	575/3/60	5.0	16	DYNAMIC 1V8 STYLE FILTER, MERV15+ PERFORMANCE	50mm MERV 8	3492	428	575/3/60	5.0	16	33.9/23.9	23.9/16.9	26.2/21.8	31.3/21.1	77.1	-23.3/-23.9	21.1/11.7	21.1/11.7	-11.9/-12.0	88	68	STEAM SUPPLIED BY HUM-1	575/3/60	-	6188x1880 x2388H	3874	PROVIDE 24" DEEP DYNAMIC AIR FILTER, STYLE 1V8 WITH A DYNAMIC FACE AREA OF 1651W x 914H.
		7400 CFM	2.47"						7400 CFM	1.72"				93/75F	75/62F	79/71F	88/70F		-10/-11	70/53	70/53	10/10		149.6 lb/hr						

no.	issuance	date
8	ISSUED FOR BID	2021.04.15
10	ISSUED FOR PERMIT	2021.07.26
15	ISSUED FOR CR-M000001	2022.04.19
16	ISSUED FOR CONSTRUCTION	2022.05.02

customer

ENBRIDGE

500 Consumers Road, North York, Ontario

project

STATION B

405 EASTERN AVENUE, TORONTO, ON.

title

MECHANICAL SCHEDULES

WALTERFEDY

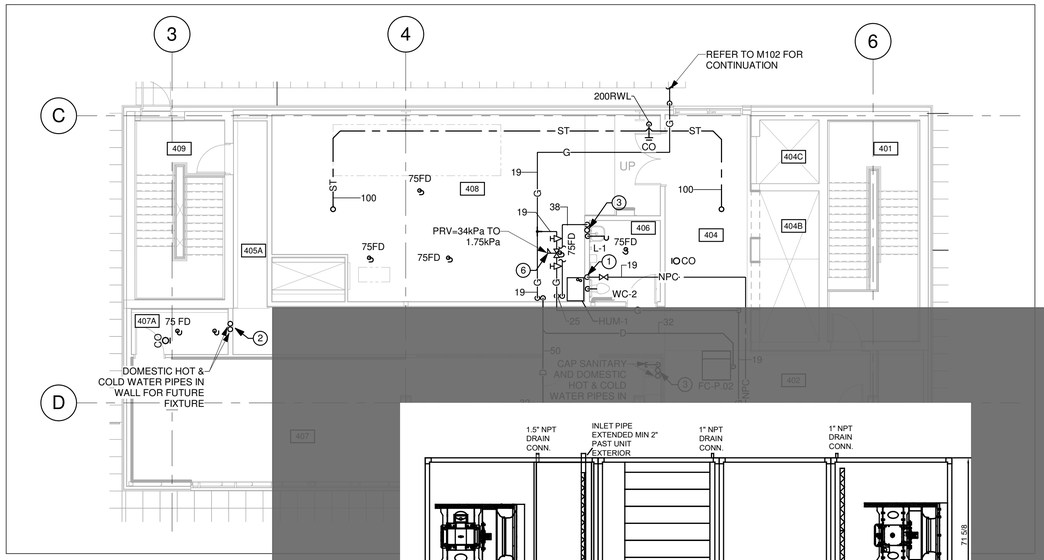
675 Queen Street South, Suite 111
Kitchener, Ontario, Canada, N2M 1A1
T 519.576.2150 F 519.576.5499
walterfedy.com

seal

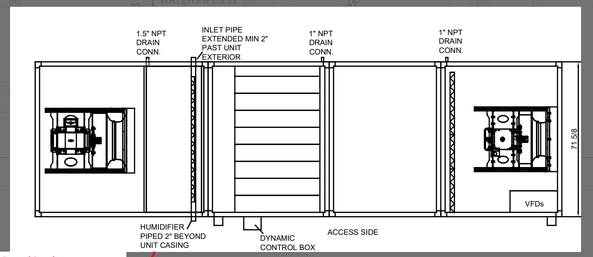
scale :	1 : 100
date :	2022.05.02
project no :	2019-0248-10
file :	
drawn by :	DS
checked by :	MS

sheet no :

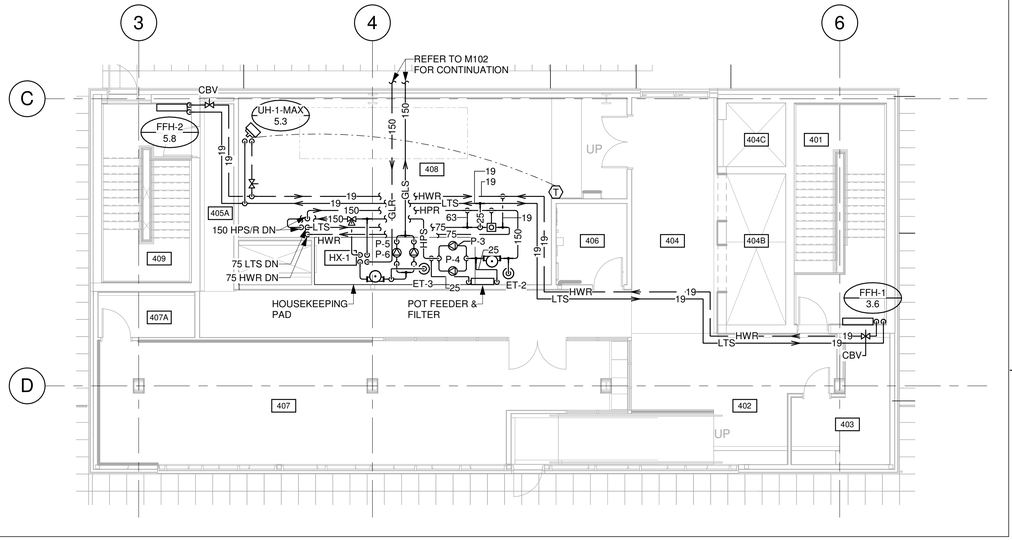
M003



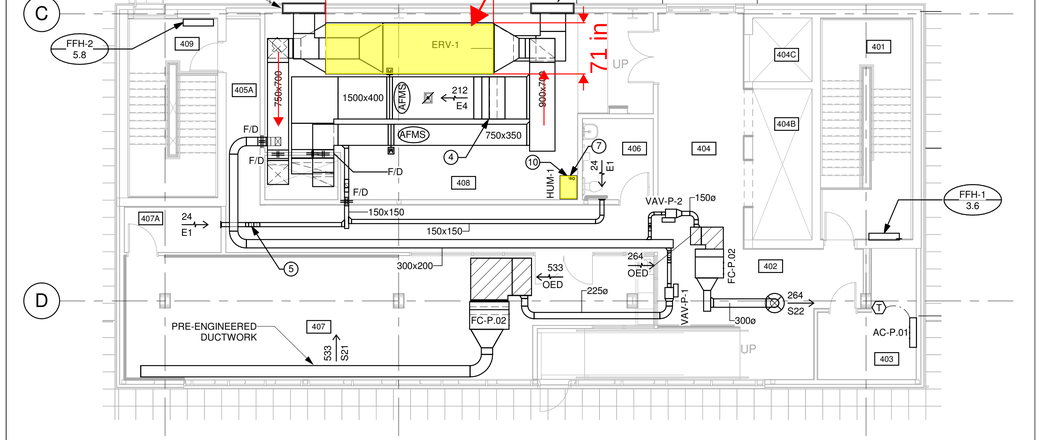
1 M103 **PENTHOUSE PLAN - PLUMBING LAYOUT**
1 : 100



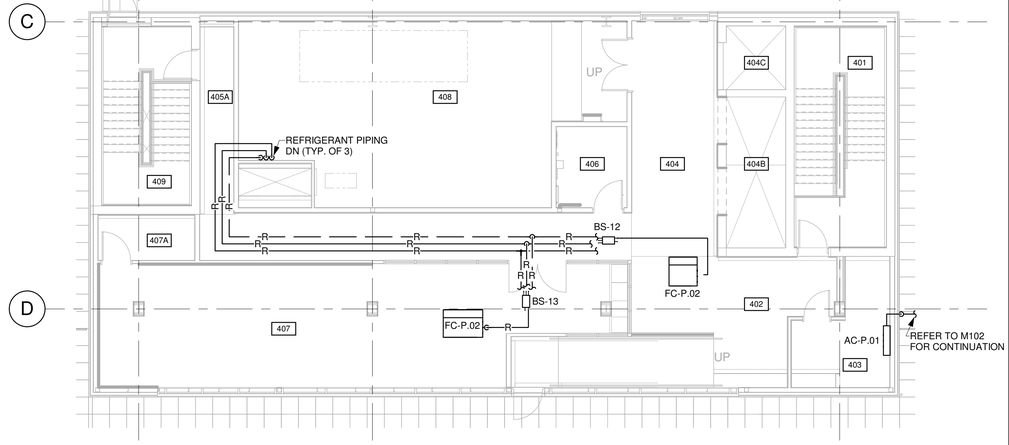
Note unit is 243-5/8" long



3 M103 **PENTHOUSE PLAN - HVAC PIPING LAYOUT**
1 : 100



2 M103 **PENTHOUSE PLAN - HVAC LAYOUT**
1 : 100



4 M103 **PENTHOUSE PLAN - REFRIGERANT PIPING LAYOUT**
1 : 100

GENERAL DRAWINGS NOTES

1) PROVIDE SHUT-OFF VALVES ON ALL REFRIGERANT LINES TO AND FROM FC UNITS, BRANCH SELECTOR BOXES AND CONDENSING UNITS. SHUT-OFF VALVES SHALL BE BI-FLOW, SELF-SEATING WITH OPERATING PRESSURES OF UP TO 6.9kPa (650 PSI).

2) CONDENSATE DRAIN FROM FAN COIL UNITS SHALL BE INDIRECTLY CONNECTED TO A HUB DRAIN.

GENERAL NOTES

1) ALL MATERIALS WITHIN RETURN AIR PLENUMS SHALL HAVE A FLAME-SPREAD RATING NOT MORE THAN 25 AND A SMOKE DEVELOPED CLASSIFICATION NOT MORE THEN 50
2) THIS DESIGN MEETS OR EXCEEDS THE REQUIREMENTS OF THE LATEST ONTARIO BUILDING CODE AND ALL WORK SHALL CONFORM TO SAME.
3) THESE DRAWINGS ARE TO BE CONSIDERED AN INTEGRAL PART OF THE SPECIFICATIONS WHICH ACCOMPANY THEM. ANY ITEM OR SUBJECT OMITTED FROM ONE BUT WHICH IS MENTIONED OR REASONABLY IMPLIED IN THE OTHER, OR AS REQUIRED BY CODE OR FOR A PROPERLY FUNCTIONING SYSTEM, SHALL NOT RELIEVE THIS TRADE OF RESPONSIBILITY.
4) COORDINATE WITH OTHER WORK (INCLUDING HVAC, PLUMBING, ELECTRICAL, STRUCTURAL AND ARCHITECTURAL) FOR AVAILABLE SPACE, SEQUENCE OF INSTALLATION AND INSTALLATION REQUIREMENTS PRIOR TO COMMENCING CONSTRUCTION. IMMEDIATELY NOTIFY THE CONSULTANT OF ANY CONFLICTS WHICH IMPACT THE DESIGN INTENT PRIOR TO INSTALLATION, UNDER NO CIRCUMSTANCES SHALL THE TRADE PROCEED IN UNCERTAINTY.
5) MAINTAIN MANUFACTURERS SERVICE CLEARANCES WHEN INSTALLING PIPING, VENTING, DUCTWORK, OR EQUIPMENT.
6) REFRIGERANT PIPING IS SHOWN AS A SINGLE LINE FOR CLARITY, FOLLOW MANUFACTURER'S PIPING GUIDE FOR INSTALLATION OF 3 PIPES BETWEEN HEAT PUMP AND BRANCH SELECTOR BOXES AND 2 PIPES BETWEEN BRANCH SELECTOR BOXES AND EACH FAN COIL UNIT. PIPE SIZING SHALL BE CONFIRMED BY MANUFACTURER.
7) PROVIDE TRAP ON ALL FAN COIL UNIT CONDENSATE DRAIN PIPING AT EACH PIECE OF EQUIPMENT.
8) ALL SHUT OFF VALVES TO BE MOUNTED AT ACCESSIBLE HEIGHT.
9) PROVIDE ALL PLUMBING VENTING SHALL BE PROVIDED IN ACCORDANCE WITH THE OBC.
10) PROVIDE PRIME LINES TO ALL FLOOR DRAINS, FUNNEL FLOOR DRAINS AND HUB DRAINS

DRAWING NOTES

1. PROVIDE 38mm NON-POTABLE COLD WATER PIPE UP FROM BELOW IN WALL SERVING ONE (1) WC-1 WATER CLOSET. PROVIDE 25mm COLD WATER CONNECTION TO WATER CLOSET.
2. PROVIDE 13mm DOEMESTIC HOT & COLD WATER PIPE UP FROM BELOW IN WALL SERVING ONE (1) SH-1 SHOWER.
3. PROVIDE 13mm DOEMESTIC HOT & COLD WATER PIPE UP FROM BELOW IN WALL SERVING ONE (1) SINK.
4. PROVIDE DUCT OFFSET UP IN NOTED LOCATION.
5. PROVIDE DUCT OFFSET DOWN IN NOTED LOCATION.
6. NOTED GAS PRESSURE REDUCING VALVE TO BE VENTED OUT THROUGH ROOF. MAINTAIN MINIMUM 3050mm FROM NEAREST AIR INTAKE.
7. HUMIDIFIER (HUM-1) CONCENTRIC VENT UP THRU ROOF. VENT TO BE INSTALLED PER MANUFACTURER'S REQUIREMENTS AND LOCAL CODE REQUIREMENTS.
8. PROVIDE 19mm NON-POTABLE COLD WATER TO NON-FREEZE HOSE BIB.
9. PROVIDE RECESSED 19mm QUICK DISCONNECT GAS OUTLET FOR BBQ CONNECTION
10. PROVIDE 50mm TYPE DWV COPPER STEAM PIPING FROM HUM-1 TO STEAM DISTRIBUTION GRID IN ERV-1. INSTALL AS PER MANUFACTURER'S INSTRUCTION AND RECOMMENDATIONS.

ROOM SCHEDULE - ROOF	
Number	Name
401	STAIR A
402	CIRCULATION SPACE
403	ELEVATOR CONTROL ROOM
404	ELEVATOR LOBBY
404A	ELEVATOR
404B	ELEVATOR
404C	FUTURE ELEVATOR
405	CORRIDOR
405A	CORRIDOR
406	UNIVERSAL WASHROOM
407	MECHANICAL/BUILDING STORAGE
407A	STORAGE
408	MECHANICAL/ELECTRICAL ROOM
409	STAIR B

ENBRIDGE
Life Takes Energy®

true north | project north

no.	issuance	date
6	ISSUED FOR 60% OWNER'S REVIEW	2021.03.01
7	ISSUED FOR 90% OWNER'S REVIEW	2021.03.22
8	ISSUED FOR BID	2021.04.15
10	ISSUED FOR PERMIT	2021.07.26
15	ISSUED FOR CR-M000001	2022.04.19
16	ISSUED FOR CONSTRUCTION	2022.05.02

customer
ENBRIDGE
500 Consumers Road, North York, Ontario

project
STATION B
405 EASTERN AVENUE, TORONTO, ON.

title
PENTHOUSE PLANS MECHANICAL LAYOUTS

WALTERFEDY
675 Queen Street South, Suite 111
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T 519.576.2150 F 519.576.5499
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seal

scale :	1 : 100
date :	2022.05.02
project no :	2019-0248-10
file :	
drawn by :	DS
checked by :	MS

sheet no : **M103**

.5 Provide authorized equipment inspection prior to shipment and submit one copy of inspection report to the Consultant.

.6 The refrigeration manufacturer shall be regularly engaged in production of the specified equipment.

.7 The manufacturer shall also be one who issues catalogue information with correction factors where published ratings are based on parameters different from those specified.

.8 Factory leak test air-cooled condenser and evaporator coils in accordance with above referenced agencies.

1.6 MAINTENANCE DATA

.1 Provide maintenance data for incorporation in operation and maintenance manuals. Include exploded views of components.

1.7 DELIVERY AND STORAGE

.1 Ship equipment factory dehydrated and sealed with a full charge of refrigerant and lubricating oil.

.2 Store equipment in protected area.

1.8 PERFORMANCE CRITERIA

.1 The following are to be used as selection criteria and are to be as specified: Air flow rates, external static pressures, water flow rates. The following are to be equalled or bettered: Coil face velocities, filter face velocities, casing leakage rates. The following are to be met within 10% of specified values: Water pressure drops.

1.9 CERTIFICATION

.1 Coils shall be certified in accordance with AHRI Standard 410 and bear the AHRI label. Coils exceeding the scope of the manufacturer’s certification and/or the range of AHRI’s standard rating conditions will be considered provided the manufacturer is a current member of the AHRI Forced Circulation Air-Cooling and Air-Heating Coils certification programs and that the coils have been rated in accordance with AHRI Standard 410.

1.10 WARRANTY

.1 Replace all refrigerant lost from system(s) due to leaks for an additional one (1) year after normal one year warranty period.

.2 Warrant refrigeration compressors and compressor motors with five (5) years non-pro-rated for material and labour. Material shall be by equipment manufacturer and labour shall be by Mechanical Trade.

.3 Warrant electric heaters and gas heat exchangers with 10 years on material by equipment manufacturer, and 5 years on labour by Mechanical Trade.

1.11 SHOP DRAWINGS

.1 Submit shop drawings for the following:
– Air-to-air energy recovery equipment

2 Products

2.1 ENERGY RECOVERY VENTILATOR

Comply

.1 General Description

.1 Refer to drawings for configuration

.2 Unit Construction

.1 Fabricate unit with extruded aluminum channel posts and galvanized panels secured with mechanical fasteners. All access doors shall be sealed with permanently applied bulb-type gasket.

.2 Panels and access doors shall be constructed as a 2-inch (50-mm) nominal thick; with injected polyurethane foam insulation. R value shall be 6.5 per inch of wall thickness. The outer panel shall be constructed of G90 galvanized steel. The inner liner shall be constructed of G90 galvanized steel. Module to module assembly shall be accomplished with self adhering foam gaskets. Manufacturer shall supply test data demonstrating less than 0.2” deflection for an unsupported 48x48 panel under 30” W.C pressure. Units that cannot demonstrate this deflection are unacceptable.

.3 Access Doors shall be flush mounted to cabinetry, with minimum of two hinges, locking latch and full size handle assembly.

.4 All outdoor units will have an 18 gauge roof and gutters. The gutters will cover the entire perimeter of the unit.

.3 Supply / Return Fans

.1 Provide direct-drive airfoil plenum fan(s). Fan assemblies including fan, motor and sheaves shall be dynamically balanced by the manufacturer on all three planes and at all bearing supports. Manufacturer must ensure maximum fan RPM is below the first critical speed.

.2 Bearings shall be self-aligning, grease lubricated, ball or roller bearings with extended copper lubrication lines to access side of unit. Grease fittings shall be attached to the fan base assembly near access door. If not supplied at the factory, contractor shall mount copper lube lines in the field.

.3 Fan and motor shall be mounted internally on a steel base. Provide access to motor, drive, and bearings through hinged access door. Fan and motor assembly shall be mounted on 2” deflection spring vibration type isolators inside cabinetry

.4 Bearings and Drives

.1 Bearings: Basic load rating computed in accordance with AFBMA - ANSI Standards, L-50 life at 400,000 hours all belt-drive airfoil plenum fans, heavy duty pillow block type, self-aligning, grease-lubricated ball bearings.

.2 Shafts shall be solid, hot rolled steel, ground and polished, keyed to shaft, and protectively coated with lubricating oil. Hollow shafts are not acceptable.

.5 Electrical

.1 The air handler(s) shall bear an ETL listing label for the entire assembly. Units with only components bearing third party safety listing are unacceptable.

.2 On RG sizes 1000 through 18000 all controls shall be located on the side of the unit for ease of servicing. Alternate manufacturers who supply units with controls on roof must supply a permanently installed ladder to access controls, and appropriate safety rails on roof of unit, meeting all applicable OSHA standards.

.3 Controls must include Self diagnostics with fault and PLC error Code. On board fault detection and diagnostics that senses and alerts when the damper is not operating correctly.

.4 Wiring Termination: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. All wires shall be number tagged and cross-referenced to the wiring diagram for ease of troubleshooting.

.5 Fan motors shall be 1800 rpm, totally enclosed fan-cooled (TEFC) type. Motors shall be premium efficiency. Electrical characteristics shall be as shown in schedule.

.6 Supplier shall provide and mount ABB variable speed drive with electrical characteristics as shown on project schedule.

.7 Air handler manufacturer shall provide and mount a damper hand-off-auto (HOA) switch.

Comply .6 Particulate Filters

.1 Filter section with filter racks and guides with hinged and latching access doors on front side, for side loading and removal of filters.

.2 Filter media shall be UL 900 listed, Class I or Class II.

.3 Flat arrangement with 2”, 50mm deep pleated panel filters.

Comply .7 Polarized Media Electronic Air Cleaner

.1 Provide Dynamic V8 polarized media non-ionizing electronic air cleaners. SecureAire (ACS) is also acceptable.

.2 Tested and certified to meet UL standard 867 and CSA standard C22.2 No. 187-M19986.

.3 Capacities, models and configurations as shown on the unit schedule and the contract drawings. Polarized media electronic air cleaner shall provide MERV15 performance power on performance tested using ASHRAE 52.2NC protocol at a third party ASHRAE approved lab. MERV14 performance power off performance tested using ASHRAE 52.2NC protocol at a third party lab ASHRAE approved lab.

.4 Dust holding capacity equal to 2.8kg at 0.7inwc pressure drop per 24 in by 24in by 29.5in module.

.5 Acceptable filter face velocity shall be less than or equal to 550 fpm.

.6 Provide Magnahelic filter gauges for each filter bank flush mounted into unit casing with factory mounted probes.

.7 Provide modular filter mounting rack with aluminum frame and screens. Gasketting shall be provided to prevent bypass of unfiltered air.

.8 Provide air cleaner with a single point power connection that powers all components including but not limited to polarizing media, and control panel.

.9 Provide integral control panel to start and stop polarization. Each control panel shall include transformers, disconnections, breakers, return indicating lights, door interlocks and differential pressure monitoring.

.10 Provide parallel wired conformally coated rectifiers to convert 24 VAC to 9.5 kVDC for media polarizing.

.11 Provide electronics warranty commencing on the date of initial start-up and five (5) year not to exceed eighteen (18) months from shipment

Comply

.8 Dual Core® Energy Recovery

.1 Unit shall be equipped with Dual Core® energy recovery technology. The unit shall be 90% efficient (sensible +-5%) at equal airflow in winter and up to 80% sensible in summer. It shall also provide up to 70% latent recovery. Unit shall accomplish this recovery without a defrost cycle that will reduce the effectiveness of the device. Devices employing defrost cycles that bypass the energy recovery device, or reduce the effectiveness are not acceptable. Energy recovery device shall not require frost protection in applications down to -40 degrees.

.2 Energy Cores shall be Generation 3, comprised of precisely corrugated high grade aluminum. Maximum allowable face velocity across heat exchangers shall be 450 fpm. Heat exchanger face velocities exceeding 500 fpm are not acceptable.

.3 Switchover damper section shall be comprised of multi section low leakage dampers operated by fast acting electric actuators only. RG 1000-6500 shall have damper switching times of 0.75 seconds. RG 7500-18000 shall have damper switching times of 1.5 seconds. Dampers that do not switch within the specified times without objectionable noise are not acceptable. Single blade damper sections are not acceptable. Each damper shall control one of the 4 airways, upper-horizontal, lower-horizontal, forward-vertical and rear-vertical. Dampers shall be capable of orienting to close off outside air to the building without needing external shut off dampers. Dampers shall also be capable of orienting to allow 100% recirculation of air without using heat recovery device for off peak or unoccupied heating modes. During a Morning warm up cycle both energy core sections must be able to be charged at the same time using recirculation air. Units incapable of these operations without extra ductwork are not acceptable.

.4 Recovery cycles shall be controlled by internal programmed thermostats measuring both supply and exhaust air, and optimizing performance of both heat recovery and free cooling modes.

Comply

.9 External Dampers

.1 External Damper Leakage: Leakage rate shall be less than two tenths of one percent leakage at 2 inches static pressure differential. Leakage rate tested in accordance with AMCA Standard 500.

.10 Refer to schedules on drawings for equipment model and capacity.

3 Execution

3.1 INSPECTION

By contractora

.1 Upon delivery, inspect components for damage or gas loss and report to Consultant in writing. Wait for written instruction.

3.2 ENERGY RECOVERY VENTILATOR

.1 Rig and set in place air handling cabinets as herein specified. Make all duct connections as required and shown on drawings. Level all units. Remove all hold down straps.

.2 Bolt and gasket sections of air handling units together as required.

.3 Humidifier to be piped as called for in the drawings and specification complete with drain valve and drain and vent valve on each coil vent.

.4 Provide and install drain lines complete with deep traps as required from drain pans.

.5 Install filter gauges in accordance with manufacturer's recommendations. Provide zeroing valve on gauges.

.6 Check and re-align all access doors and hinges to ensure smooth operation through the entire range of travel.

.7 Upon start-up, each fan motor is to be checked for fan rotations, and A draw for each phase. Amp readings are to be marked on the fan scroll.

.8 All belt drives are to be re-adjusted for tension and alignment.

.9 All pipe and conduit penetrations to the casing are to be thoroughly sealed and caulked to prevent air leakage.

.10 Any floor penetrations are to be thoroughly sealed to ensure the water-tightness and integrity of the entire floor.

.11 Note requirements for vibration isolation indicated in Section 23 05 00.

3.3 COOLING COIL DRAIN LINES

.1 Provide insulated drainage piping from all cooling coil drain pans to nearest floor drain.

3.4 START-UP OF EQUIPMENT

.1 The manufacturer of this equipment will forward to the Mechanical Trade a check list of recommended procedures for piping and starting up the equipment. This procedure will be followed exactly by the Mechanical Trade and the manufacturer will issue his guarantee to the Mechanical Trade on receipt of a signed letter stating that all steps have been carried out. The manufacturer shall notify the Consultant of the issuing of the guarantee. The manufacturer shall provide all necessary wiring diagrams to the Refrigeration Trade showing the necessary interlocks between equipment.

.2 This system will be completely tested with all controls in place and operational, to ensure absolute integrity of the variable volume heating and cooling system with all other building environmental controls.

.3 Provide one year operations service at no cost to the Owner.

END OF SECTION

Glycol Loop				
Description	Type	Sensor/Device	Eng.Units	Notes
DC-1 Fan start-stop	DO	Contact	On/Off	17

.3 System: Energy Recovery Ventilator ERV-1

Energy Recovery Ventilator				
Description	Type	Sensor/Device	Eng.Units	Notes
Supply Fan Start-Stop	DO	VFD BACnet connection	On/Off	7
Supply Fan Speed	AO	VFD BACnet connection	%	7
Supply Fan Status	DI	VFD BACnet connection	On/Off	
Supply Fan Alarm	DI	VFD BACnet connection	OK/Alarm	4
Outdoor Air Damper	DO	Damper Actuator	Open/Close	5
Exhaust Fan Start-Stop	DO	VFD BACnet connection	On/Off	7
Exhaust Fan Speed	AO	VFD BACnet connection	%	7
Exhaust Fan Status	DI	VFD BACnet connection	On/Off	
Exhaust Fan Alarm	DI	VFD BACnet connection	OK/Alarm	5
Exhaust Air Damper	DO	Damper Actuator	Open/Close	5
Energy Recovery Enable	DO	Contact	On/Off	7
Supply Air Setpoint	AO	0-10V Output	0-10V	7
Supply Air Temperature	AI	Duct temp. sensor	°C	
Supply Air Humidity	AI	Duct humidity sensor	% RH	
Supply Air Pressure	AI	Duct pressure sensor	Pa	6
Supply Air Flow	AI	Flow measuring station	l/s	
Humidifier Enable	DO	Contact	On/Off	
Humidifier Output	AO	Contact	% output	
Humidifier Alarm	DI	Contact	OK/Alarm	
Return Air Temperature	AI	Duct temp. sensor	°C	
Return Air Humidity	AI	Duct humidity sensor	% RH	
Filter Status	DI	Contact	Clean/Dirty	
General Exhaust Flow	AI	Flow measuring station	l/s	
General Exhaust Damper	AO	Damper actuator	% open	
Washroom Exhaust Flow	AI	Flow measuring station	l/s	
Washroom Exhaust Damper	AO	Damper actuator	% open	

Comply

Comply

Comply

.4 System: VAV Boxes

VAV Boxes				
Description	Type	Sensor/Device	Eng.Units	Notes
Space Temperature	AI	Wall Temp Sensor	ºC	8
VAV Airflow	AI	Air Flow Sensor	l/s	8
Air Quality	AI	CO2 Sensor	Ppm	8

.5 System: Exhaust Fans

Section 23 80 00 Decentralized HVAC Equipment

1. Add the following article:

2.6 GAS FIRED HUMIDIFIER

.1 Tank and primary heat exchanger: 14-gauge 304-stainless steel with water side welded seams for all water-submerged welds.

.2 Humidifier shall include a 316 stainless steel secondary heat exchanger to pre-heat inlet water and combustion air using exhaust gasses exiting the primary heat exchanger.

.3 Tank bottom shall be slanted with drain port at bottom of tank to ensure complete draining.

.4 Humidifier must be designed and approved by manufacturer to safely operate with PVC flue venting.

.5 Unit shall include adaptable fittings to utilize PVC, CPVC, polypropylene inlet and flue venting material as required by local codes.

.6 Include removable cover allowing easy access to water sensing assembly in the tank.

.7 Tank shall have an easily accessible cleanout plate.

.8 Indoor humidifier shall have a painted aluminum enclosure to protect all humidifier components and have an integral base with openings designed for moving humidifier with a forklift or pallet jack.

.9 Humidifier tank shall be insulated with 1/2"-thick (12.5 mm), K-Flex closed cell insulation.

.10 Humidifier shall have sealed combustion plumbed to the unit shroud.

.11 Fill and drain line piping shall include anti-siphoning mechanisms that prevent tank siphoning and potential inlet water contamination.

.12 An electric drain valve shall be mounted on humidifier assembly to allow tank to drain automatically at the end of a humidification season.

.13 Integral water tempering control shall meter cold water at the drain in order to temper 100°C water to a maximum 60°C discharge temperature at full drain rate to sanitary system during normal operation.

.14 Humidifier and burner assembly shall be CSA/AGA/CGA/ETL certified and tested to support natural or LP gas.

.15 Gas train assembly shall be complete with burner/mixing tube assembly, igniter, sight glass, flame rod electrode, gas manifold, integral gas valve and venturi.

.16 Each burner shall freely modulate with a gas input turndown ratio of at least 5:1.

.17 Unit shall be of a condensing design utilizing a secondary heat exchanger to achieve average thermal efficiencies of over 93%.

.18 The high-efficiency humidifier shall be certified by South Coast Air Quality Management District (SCAQMD) to meet low NOx requirements of Rule 1146.2.

.19 Control subpanel shall be factory-attached to humidifier with all wiring between subpanel and humidifier completed at factory. A wiring diagram shall be included.

.20 Controller shall provide redundant tank over-temperature and flue over-temperature safety control using inputs from the tank temperature sensor and flue temperature sensor.

.21 Humidifier shall have tank over-temperature switch and flue over-temperature switch operating independently of the tank temperature sensor and flue temperature sensor.

.22 Include flue temperature sensing to temporarily reduce humidifier output if flue temperatures approach maximum, and to disable unit should maximum flue temperature be reached.

.23 Controller shall provide fully modulating control of humidifier capacity.

.24 Controller shall provide PID control capability with field-adjustable settings.

.25 A factory mounted sensor, with a temperature range of -40 to 248 °F (-40 to 120 °C) mounted on the humidifier to maintain the evaporating chamber water temperature above freezing and allow rapid warm-up of water in evaporating chamber after a call for humidity, providing 100% operation until steam production occurs.

<u>Section 27 10 00 Structured Cabling</u>

1. Add article 1.10 to read:

1.10 Vendor

1. All scope within this section related to this section (except PoE Lighting scope) shall be provided by owner's preferred vendor CaTech. All work related to PoE lighting may use another vendor.

ERV Details

TEMPEFF

Submittal Drawings

Project: 22000143 – Enbridge Stn B
Tag: ERV-1
PO#: 639303
Date: August 29, 2022
Agent HTS Canada

Revision #	Revision Detail	Date Revised	Revised By

JOB STATUS

■ **HELD FOR APPROVAL**

Equipment will not be scheludled until approved drawings are returned to Tempeff

Current lead times from release is: Consult Factory

If immediate release is required, notify Tempeff in writing

☐ **RELEASE TO PRODUCTION**

Scheduled shipment from factory: _____

UNITS ARE SHIPPED SPLIT, WIRING RECONNECTION ON SITE REQUIRED – SEE PROPOSAL DRAWING FOR SPLIT LOCATIONS

675 Washington Ave. Winnipeg, MB R2K 1M4 Phone: (204) 783-1902

675 Washington Ave, WINNIPEG, MB CANADA R2K 1M4 PH: (204) 783-1902

Project	22000143 – Enbridge Stn				Line In														
Tag(s)	ERV-1				Voltage	575-3-60													
Agent	HTS Canada				FLA	13.7	AMPS												
Job Number	0				AMPACITY	16	AMPS												
					MAX.NON-TIME DELAY FUSE	30	AMP												
					MAX.TIME DELAY FUSE	25	AMP												
					MAX.CIRCUIT BREAKER	20	AMP												
Short Circuit Current Rating:	5KA				MIN.WIRE SIZE	#12	AWG												

Model

RG 7500

Approximate Weight	3901 KG	8622 LBS	**Indoor**

Fans

Supply air fan: ANPA 22 **X1**

Exhaust air fan: ANPA 22 **X1**

Technical data

Input data	Sup. air	Exh. air
Total volume (SCFM)	7400	7400
HX Air volume (SCFM)	7400	7400
Filter	Dynamic V8	Merv 8 (2")
	-	-
External pressure drop (in. W.C)	1.00	0.75

Output data		
Filter air velocity (fpm)	493	455
Design pressure drop filter (in W.C)	0.56	0.48
HX air velocity (fpm)	422	422
Pressure drop heat exch. (in W.C)	0.61	0.61
Pressure drop HX filter (in W.C)	0.00	0.00
Heating Coil 1 Pressure Drop (in W.C)	0.00	0.00
Heating Coil 2 Pressure Drop (in W.C)	0.00	0.00
Cooling Coil Pressure Drop (in W.C)	0.00	0.00
Auxillary Pressure Drop (in W.C)	0.00	0.00
Backdraft dampers & Louvers (in W.C)	0.00	0.00
Static pressure (in W.C)	2.17	1.83

Fan speed (rpm)	1360	1310	Per fan
Max (rpm)	2650	2650	
Fan efficiency (%)	73.22	71.24	
Required BHP	4.01	3.57	
Motor efficiency (%)	89.5	89.5	
Motor power rating (hp)	5.00	5.00	
Motor RPM	1160	1160	
Motor Operating Frequency (Hz)	70	68	

Power and energy demand

Input data	Calculated			
	Winter		Summer	
	DB	WB	DB	WB
Design outdoor temp. (°F)	-10.00	-11.0	93.0	75.0
Desired supply air temp. winter (°F)				
Exhaust air temperature (°F)	70.0	53.0	75.0	62.5
Output data				
Efficiency (across unit) (%)	88.2%	70.0%	77.1%	0.0%
Supply air temp. after unit (°F)	60.58	46.2	79.1	71.1
Recovered energy across unit (BTUH)	564,079	119,492	-110,900	0

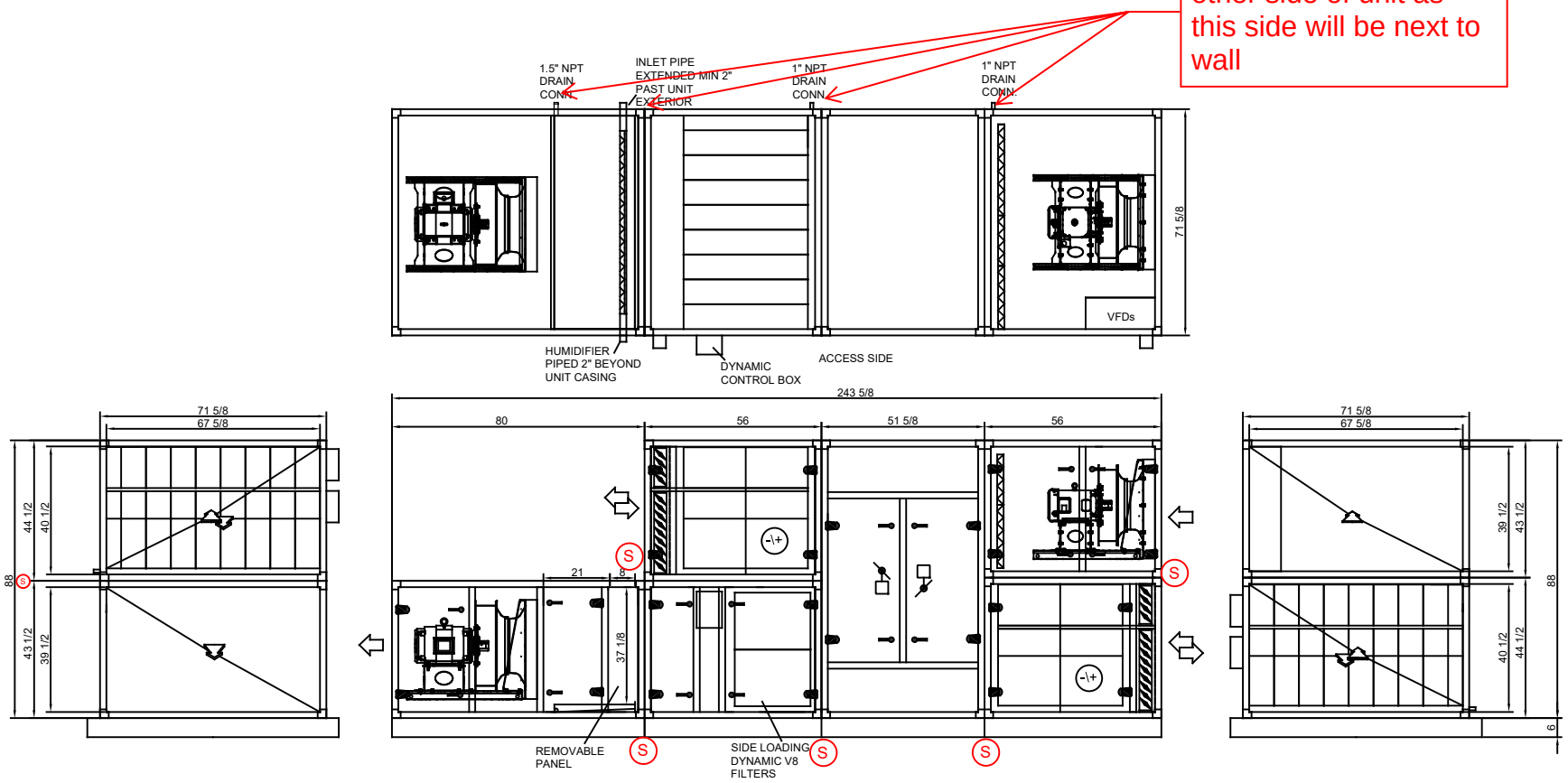
Standard Features

2" Foam injected panels
Extruded aluminum post and corner construction
All sections come with hinged access doors and locking latches
Multi-Damper switchover section complete with actuators
SS Drain Pans under Heat Exchanger(s) w/ 1"NPTConnections
Galvanized Heat Exchanger Frames
Galvanized damper blades, damper rods and axles
SLEEPER/STAND MOUNT (BY OTHERS)

Additional Features

Exterior Casing: 24 Ga G90 Galv
Interior Casing: 24 Ga G90 Galv
5 HP WEG TEFC Premium Eff. 6 Pole 215T Frame
5 HP WEG TEFC Premium Eff. 6 Pole 215T Frame
SA Drive: ACH580-01-06A1-6
RA Drive: ACH580-01-06A1-6
2in. Seismic Spring Isolation
RA Pre-Filter: Dafco Merv 8 (2") 400 SC
*Humidifier Provided BY OTHERS, Installed BY TEMPEFF
Uninsulated VAV Dampers with 2 position Belimo actuators
Single point power
6" 10Ga Baseframe
BACNet controller
Dirty filter switch
Factory install free issued Dynamic V8
4 additional years parts only warranty (5 years total)

move connections to other side of unit as this side will be next to wall



RA Filters:
2- 16 x 20
1- 16 x 25
2- 20 x 20
1- 20 x 25

Cells:
2- 8 x 200mm x 220mm
2- 8 x 200mm x 330mm
2- 8 x 200mm x 400mm
2- 1 x 115mm x 220mm
2- 1 x 115mm x 330mm
2- 1 x 115mm x 400mm

Ⓢ SPLIT FOR SHIPMENT

NOTES:
1. SERVICE ACCESS PANELS MUST NOT BE OBSTRUCTED RECOMMENDED CLEARANCE = SECTION SIZE.
2. DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.

FOR REFERENCE USE ONLY, SUBJECT TO CHANGE WITHOUT NOTICE

TEMPEFF
675 Washington Ave, Winnipeg, MB
Tel:(204) 783-1902

DRAWN BY	DATE	SCALE	MODEL	REV
JL	27-Aug-17	NTS	RG 7500 Type 2	

PROJECT NAME: Enbridge Station B

Unit Tag: ERV-1

GENERAL DESCRIPTION OF FUNCTION

A Dual Core™ air handling unit comes with a regenerative cyclic dual core heat exchanger. It includes a supply and an exhaust fan (both optional) and two cores filled with specially corrugated 0.7 mm thick aluminium plates which act as heat accumulators. In between the cores is a patented damper section which changes over every 60 seconds to periodically direct warm air through one of the two cores while outside air gains heat from the other. Before each fan is a filter section (optional) to filter the air. Heat recovery is automatically activated when called upon.

The unit may also be used for cooling recovery. If the outside temperature is higher than the indoor the damper cycling starts, enabling cooling recovery. This function reduces the demand for mechanical cooling.

In the off position, the dampers all close against outdoor air thereby reducing infiltration losses through the unit.

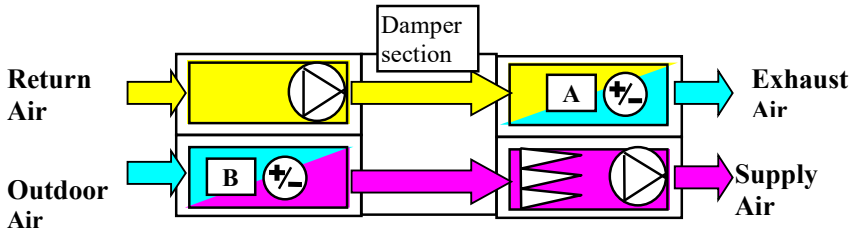
The extremely high temperature efficiency (90% +/- 5%) gives a supply air temperature just a few degrees below room temperature which in many cases allow systems to be designed without additional heating coils.

The inspection doors to fan and damper sections have lockable handles, which contributes to high security.

Principle of function

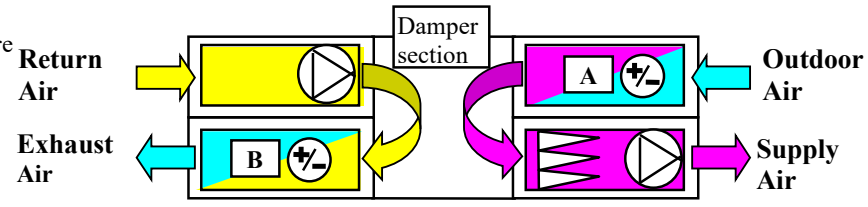
SEQUENCE 1
Exhaust air charges Core A with heat

Core B discharges heat to supply air



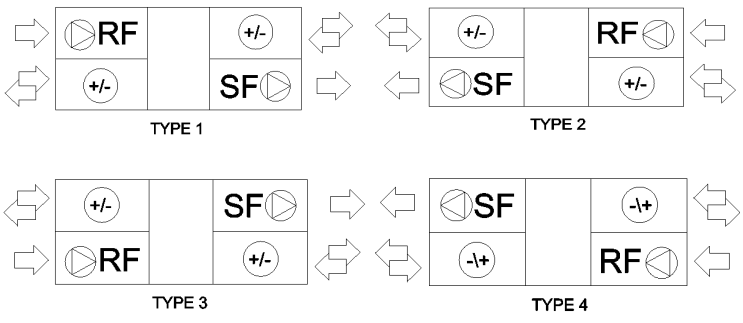
SEQUENCE 2
Exhaust air charges the Core B with heat

Core A discharges heat to supply air



Dampers change sequence every 60 sec.

Available configurations



Units are normally one of these configurations
Supply and exhaust air connection may also be on the backside

RG 1000-18000 Units

Sequence of Operation, BACnet

A. Testing Damper Actuators:

1. The damper motors can be tested by using the changeover switch S1 in the damper control panel.
2. The normal position of the S1 switch is 0 where the actuators follow the signals from a central control system (BMS).
3. If S1 is in position 1 the damper actuator M7 runs continuously, and in position 2 actuator M6 runs continuously. Unit will go into Damper Alarm mode if switch is left in either position for more than 5 actuator rotations.
    a. Clear Damper Alarm by resetting Controller, see instructions in Additional Notes. **Follow the PLC reset procedure to prevent damage to the Controller**.

B. Sequence with the unit controlled by central control system (BMS):

1. When the S2 switch is in position 2 (Remote) the damper is controlled by the central control system (BMS) through physical contacts or BACnet commands.
    a. Enable contact (see field wiring diagram) controls whether the damper and blower operate or not (contact closed = operating, open = not operating).
    b. Heat Recovery contact (see field wiring diagram) controls the damper operating mode (contact closed = heat recovery, open = free cooling).
    c. Recirc contact (see field wiring diagram) controls damper recirculation mode (contact closed = recirc mode, open = normal operation).
    d. Low VAV contact (see field wiring diagram) controls stage 1 for low volume mode (contact closed = operating, open = not operating) (1220 – 2290 CFM).
    e. Mid VAV contact (see field wiring diagram) controls stage 2 for medium volume mode (contact closed = operating, open = not operating) (2290 – 3510 CFM).
    f. Low & Mid VAV contacts are closed controls stage 3 for high volume mode (3510 – 7400 CFM).

2. When Enable contact is closed, warm-up sequence will start (see Additional Notes). After the warm-up sequence, when Low VAV contact and/or Mid VAV contact is closed, the VAV dampers open. When the VAV damper motor end switches prove open, the damper section starts normal operation as listed below and VFDs remain enabled. If the VAV damper motor end switches do not prove open, the Controller's Blower Interlocks are de-energized until the end switches make. The fan speeds are controlled via BACnet MS/TP communication to each VFD (from BMS).
3. Enable contact closed and Heat Recovery contact open, damper changes position every 3 hours (free cooling).
4. Enable contact closed and Heat Recovery contact closed, damper changes position every 60 seconds (heat recovery).
5. Recirc contact closed change over damper opens in both directions; VAV dampers are disabled. 100% return air re-circulated back into supply air. Recirc contact opens, change over dampers remain open for 1 minute to allow VAV dampers to open. After 1 minute delay, all dampers resume normal operation.
6. Enable Contact open, the Controller's Blower Interlocks are de-energized, disabling the VFDs while enabling the internal damper to continue to cycle and the VAV dampers to remain open for 1 minute, to prevent damper damage; "Fan Ramp Down" displayed on Controller's screen.

C. Operation of the changeover damper if central control system (BMS) is not used:
   1. When the S2 switch is in position 1 (Local), warm-up sequence will start (see Additional Notes). After the warm-up sequence, when Low VAV contact and/or Mid VAV contact is closed, the VAV dampers open. When the VAV damper motor end switches prove open, the damper section starts normal operation as listed below and VFDs remain enabled. If the VAV damper motor end switches do not prove open, the Controller's Blower Interlocks are de-energized until the end switches make. The fan speeds are controlled via BACnet MS/TP communication to each VFD (from BMS).
   2. The damper is now controlled by the 2 internal thermistors. Supply air (SAT) is set to 59 ^{o}F (15 ^{o}C) and Return air (RAT) is set to 68 ^{o}F (20 ^{o}C).
      a. Press "OK" button to access controller main menu and navigate to the "ERV" page to adjust setpoints.
   3. The sequence will now be:
      a. If return air < 68 ^{o}F (20 ^{o}C), heat recovery (cycling every 60 seconds).
      b. If return air > 68 ^{o}F (20 ^{o}C) and supply air > 59 ^{o}F (15 ^{o}C), free cooling (cycling every 3 hours).
      c. If return air > 68 ^{o}F (20 ^{o}C) and supply air < 59 ^{o}F (15 ^{o}C), heat recovery until supply air > 59 ^{o}F (15 ^{o}C) then it will revert to free cooling mode.
      d. Low VAV contact (see field wiring diagram) controls stage 1 for low volume mode (contact closed = operating, open = not operating) (1220 – 2290 CFM).
      e. Mid VAV contact (see field wiring diagram) controls stage 2 for medium volume mode (contact closed = operating, open = not operating) (2290 – 3510 CFM).
      f. Low & Mid VAV contacts are closed controls stage 3 for high volume mode (3510 – 7400 CFM).

4. When the S2 switch is in position 0 (Shut off), the Controller's Blower Interlocks are de-energized, disabling the VFDs while enabling the internal damper to continue to cycle and the VAV dampers to remain open for 1 minute, to prevent damper damage; "Fan Ramp Down" displayed on Controller's screen.

D. BACnet (if equipped) – *Optional* Ethernet or RS-485 connectivity for BACnet; unit may operate via BACnet or Standalone.
    a. Press "OK" button to access controller main menu and navigate to the "BACnet" page to access the "RS-485" or the "Ethernet" pages to adjust communication settings. **Power to the controller must be cycled Off & On to permanently save the changes**, see instructions in Additional Notes.

E. Internal Damper Alarm:
    1. Should an error occur in the function of the internal damper (Energy Recovery Damper failure), the internal damper will be disabled.
    2. Error code is displayed on Controller's screen and Red LED light is flashing.
    3. The Controller's Blower Interlocks are de-energized, disabling the VFDs.
    4. Damper alarm signal to BMS will be enabled (dry contact & BACnet signal).
    5. After a 1-minute delay, the VAV dampers close.
    6. To reset damper alarm, Controller's power must be cycled off-on, see instructions in Additional Notes.

F. Heating and cooling:
    1. Any type of supplemental heating or cooling of the supply air will be controlled by others (central control system).

G. Additional Notes:
    1. If fire alarm contacts are used, remove the factory installed jumper from terminals 101 & 150 and connect the Normally Closed fire alarm contact. If the contact opens during operation, the unit will shut down and dampers close.
    2. Dirty filter sensors included. When filter reach a set pressure differential the switch will send a signal to BMS through BACnet communication.
    3. Morning warm-up sequence: When unit is enabled, the damper section opens in both directions, the controller's blower interlocks are energized, enabling the VFDs to start the motors (The fan speeds are controlled via BACnet MS/TP communication to each VFD (from BMS). After the warm-up sequence, dampers resume normal operation.
        a. Morning warm-up duration is set to 0 minutes from the factory (field adjustable, 0 to 60 minutes), unless duration is specified at time of order. Typical duration is 30 minutes.
        b. Press "OK" button to access controller main menu and navigate to the "ERV" page to adjust morning warm-up duration timer.

4. Clear Damper Alarm by resetting Controller. **Follow the PLC reset procedure to prevent damage to the Controller.**
    a. PLC reset procedure: Open 24Vdc fuse holder supplying power to 101 terminals, then open fuse holder F2, and finally open fuse holder FAF1 to Controller power. Wait 5 seconds. Close fuse holder FAF1. While Controller is re-booting, close 24Vdc fuse holder supplying power to 101 terminals and then close fuse holder F2. Once re-boot is complete, unit can resume normal operation.
5. Controller LED code:
    a. Top LED, solid Green – Controller is powered.
    b. Second LED, flashing Red – Damper alarm.
    c. Second LED, solid Red – Low Limit alarm (or other controller monitored alarms).
    d. Third LED, flashing Yellow – Energy Recovery mode.
    e. Third LED, solid Yellow – Recirc mode.
    f. Fourth LED, flashing Green – Free Cooling Mode.

Note: In all cases ensure that damper section is first on and last off, (after supply and return blower section) to prevent damage to internal damper section.

BACnet Points List - Sample Only

Name	Type	Instance	Read/Write	Default	Unit	Description
Bcn_iEe_SAT_setpoint	AV	0	R/W	59	°F/C	SAT heat recovery setpoint in degF/C
Bcn_iEe_RAT_setpoint	AV	1	R/W	68	°F/C	RAT heat recovery setpoint in degF/C
Bcn_iSts_SATdisplay	AV	2	R		°F/C	SAT temperature converted to degF/C
Bcn_iSts_RATdisplay	AV	3	R		°F/C	RAT temperature converted to degF/C
Bcn_xEe_Metric	BV	0	R/W	FALSE		TRUE: degC; FALSE: degF for setpoints & display temps
Bcn_xSts_MIB5	BV	1	R			TRUE: vertical damper open; FALSE: dmp closed
Bcn_xSts_MIB6	BV	2	R			TRUE: horizontal damper open; FALSE: dmp closed
Bcn_xSts_BACnetEnable	BV	3	R/W	FALSE		Enable
Bcn_xSts_BACnetHeatRec	BV	4	R/W	FALSE		Heat recovery
Bcn_xSts_BACnetRecirc	BV	5	R/W	FALSE		Recirculation
Bcn_xSts_SA_Blower	BV	6	R			SA blower enable
Bcn_xSts_RA_Blower	BV	7	R			RA blower enable
Bcn_xSts_Damper_alarm	BV	8	R			Damper alarm
Bcn_xSts_MIB1alarm	BV	9	R			MIB1 limit switch alarm
Bcn_xSts_MIB2alarm	BV	10	R			MIB2 limit switch alarm
Bcn_xSts_MIB3alarm	BV	11	R			MIB3 limit switch alarm
Bcn_xSts_MIB4alarm	BV	12	R			MIB4 limit switch alarm
Bcn_xSts_MIB5alarm	BV	13	R			MIB5 limit switch alarm
Bcn_xSts_MIB6alarm	BV	14	R			MIB6 limit switch alarm
Bcn_xSts_MIB5_0alarm	BV	15	R			MIB5 limit switch alarm before startup
Bcn_xSts_MIB6_0alarm	BV	16	R			MIB6 limit switch alarm before startup
Bcn_xSts_M6alarm	BV	17	R			Actuator M6 alarm
Bcn_xSts_M7alarm	BV	18	R			Actuator M7 alarm
Bcn_iSts_SA_DirtyFilterSwitch	BV	19	R			S/A Dirty Filter Switch
Bcn_iSts_RA_DirtyFilterSwitch	BV	20	R			R/A Dirty Filter Switch
Bcn_xSts_BACnetEnable_LowVAV	BV	21	R/W			Enable Low VAV
Bcn_xSts_BACnetEnable_MidVAV	BV	22	R/W			Enable Mid VAV
Bcn_xSts_Shutoff_Dmp_ProofOpen	BV	23	R			External Damper Proof of Open
Bcn_xSts_LowVAV_Status	BV	24	R			Low VAV Damper Status
Bcn_xSts_MidVAV_Status	BV	25	R			Mid VAV Damper Status

Notes:

1) Object name containg "Ee" indicates value stored in EEPROM non-volatile memory

2) Use BACnet points listed above to control the unit. Other points can be discovered but are disabled on this unit.

ABB ACH580-01 Variable Frequency Drive
Programming Start Signal, BACnet

Setting the drive parameters:

Enter **Main menu** > **Primary settings** > **HVAC quick setup**

- Primary start/stop from: DI1 start/stop (default)
- Use start interlock 1: Un-Checked
  - Start enabled when: DI1 high
- Minimum frequency: 6.00Hz (default)
- Motor nominal values: enter the motor nominal values from the motor's nameplate; (Direction of rotation can be adjusted using "Phase order")
- Other settings can be adjusted as required; acceleration, deceleration, date & time.

Enter **Main menu** > **Primary settings** > **Motor**

- Start Mode: Automatic (default)

Enter **Main menu** > **Primary settings** > **Start, stop, reference**

- Constant speed/frequencies: Off – "Use constant frequencies" = un-checked
  - Select frequency from: EFB ref1 (Embedded fieldbus)

Enter **Main menu** > **Primary settings** > **Limits**

- Maximum frequency: 90.00 – Supply Air VFD
- Maximum frequency: 90.00 – Return Air VFD

Enter **Main menu** > **Primary settings** > **Communication**

- Embedded fieldbus: On – "Use embedded fieldbus" = checked
  - EFB selection: BACnet MS/TP
- Other communication settings can be adjusted as required, go to Group 58 Embedded fieldbus.

Enter **Main menu** > **Parameters**

- **Complete list**, **Favorites** or **Modified** parameter lists available for future customization.

Enter **Main menu** > **Primary settings** > **Clock, region, display**

- Several user preference settings can be selected; Language, Units, Drive name, Display settings, Edit home view, etc.

Enter **Main menu** > **Primary settings** > **Reset to defaults**

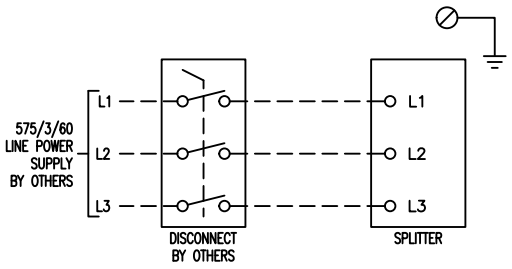
- Various levels of Resets can be accomplished including **Reset all to factory defaults**.

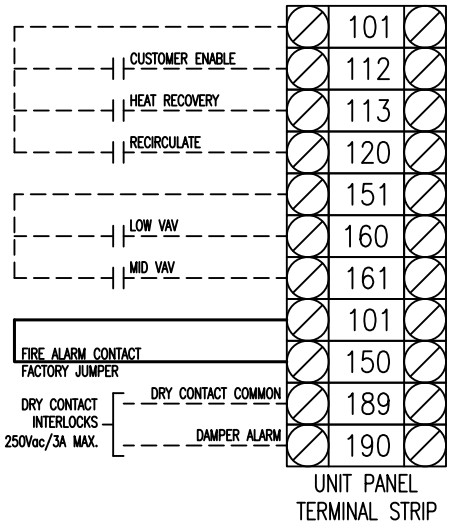
Note: **In case of a fire-alarm the unit shuts down and disables the VFD interlock relays (only in AUTO mode). Change parameter 1608 to 1 = DI1 to shut down the drive in HAND and AUTO mode. Note the VFD will display "Alarm 2021 Missing Start Enable" when the unit is disabled.**

!! Maximum Frequency (Hz) must not be more than the (maximum fan RPM / maximum motor RPM) * 60Hz **!!**

Motor Operating Frequencies:

SA; 7400 cfm @ 2.17" W.C. = 70Hz **RA; 7400 cfm @ 1.83" W.C. = 68Hz**





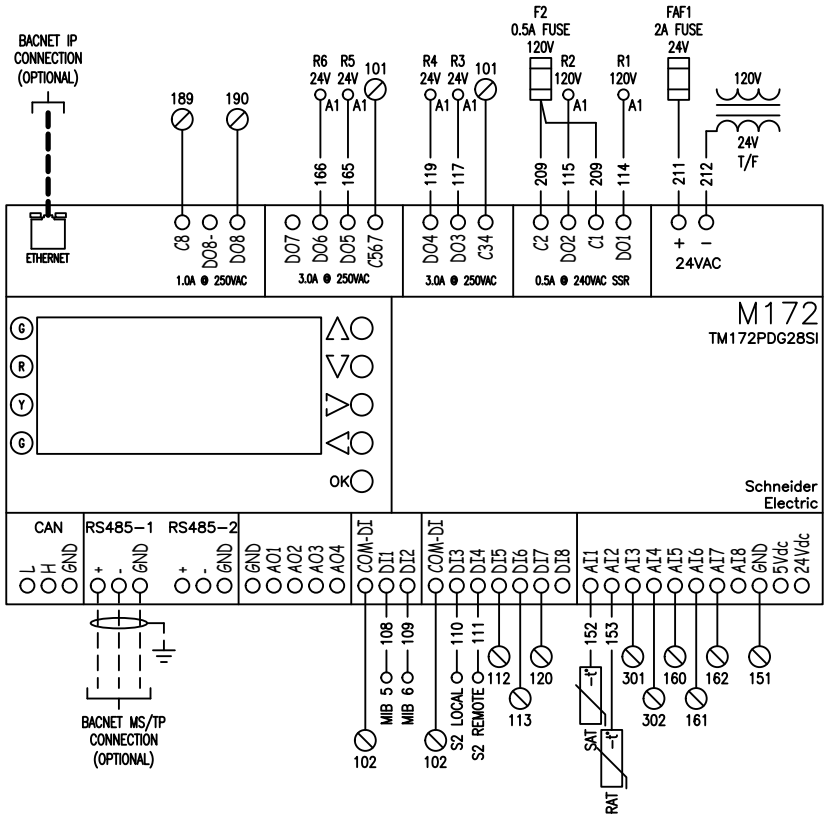
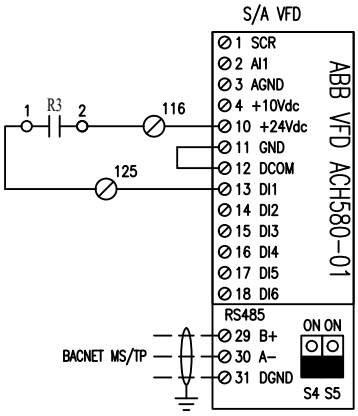
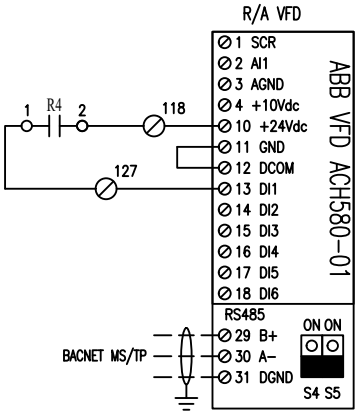


ABB SPEED CONTROL IS DONE IN THE VFD
USING PARAMETER 28.11 (FREQ REF).





NOTE(S):

A – IF ANY OF THE ORIGINAL WIRE SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, IT MUST BE REPLACED WITH WIRING MATERIAL HAVING A TEMPERATURE RATING OF AT LEAST 90°C AND AN 600Vac INSULATION RATING.

B – FIELD WIRING VOLTAGE DROP NOT TO EXCEED 10%.

C – ALL FIELD WIRING SHOWN SHALL BE COMPLETED BY INSTALLER.

D – ALL WIRING TO COMPLY WITH THE NATIONAL ELECTRICAL CODE (NFPA 70-93)

E – IF FIRE ALARM CONTACTS ARE USED, REMOVE THE FACTORY INSTALLED JUMPER FROM TERMINALS 101 & 150. CONNECT THE N.C. FIRE ALARM CONTACTS. IF FIRE ALARM CONTACT OPENS, UNIT SHUTS DOWN. !! FOR OTHER OPERATION OPTIONS, CONTACT FACTORY !!

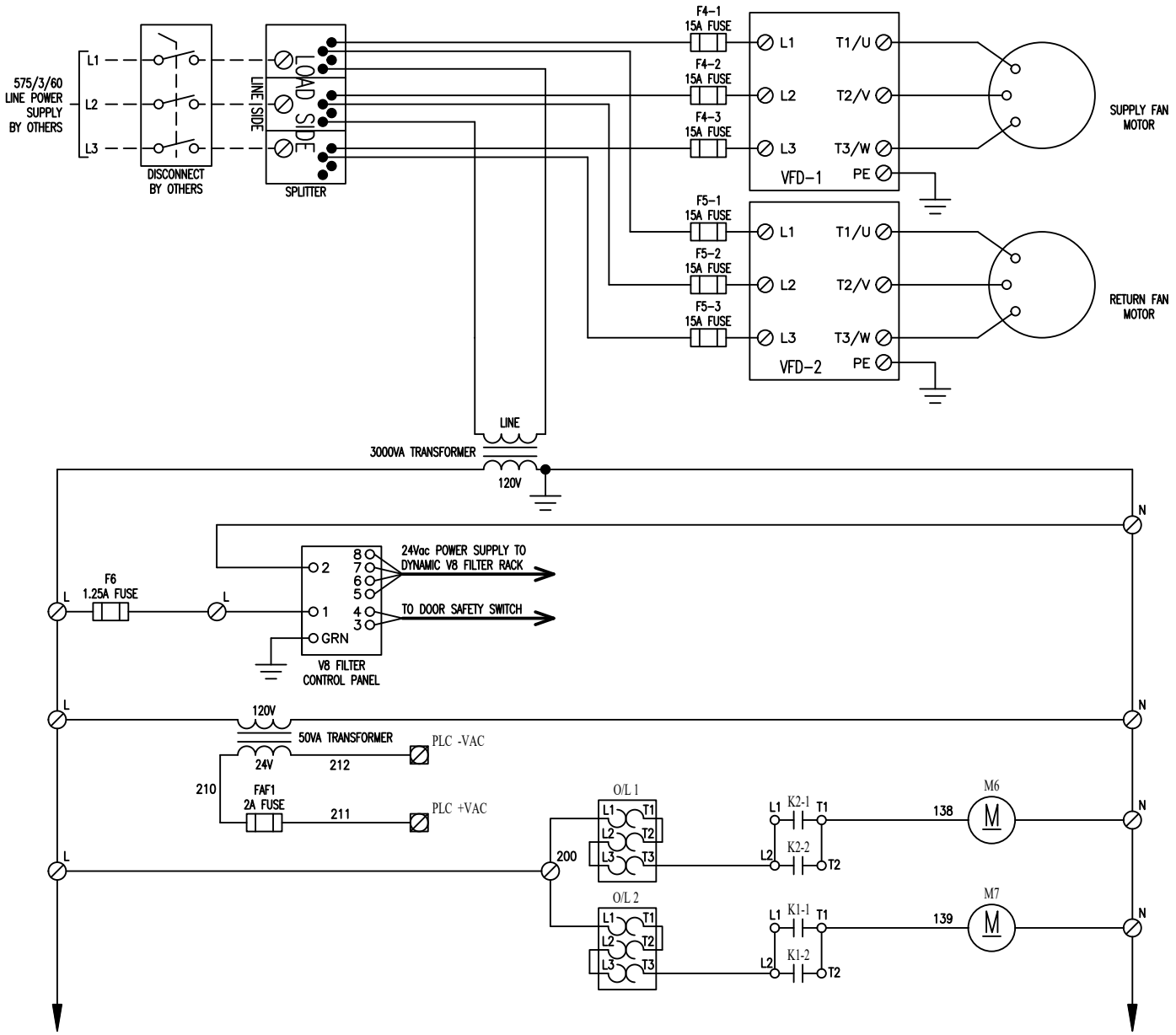
Drawing subject to
change without notice

TEMPEFF

WIRING DIAGRAM

TITLE
Field Wiring (NERI)
SPP, VFD (ACH580) BACnet, Dirty Filter Switch x2, VAV – 575V.

DRAWN BY	ISSUED BY	SCALE	DRW. NO.	
L.S.		N/A	NERI FIELD WIRING	
CHK. BY	DATE		JOB NO.	REV
	June 13, 2022			–



THERMISTOR	
TERMINAL BLOCK	
COMPONENT TERMINAL	
CONTROLLER TERMINAL	
UNIT WIRING	
FIELD WIRING	

LEGEND

F1 – F6	– Fuse – T.D.	R1 & R2	– Relay – 120V
FAF1	– Fuse – F.A.	R3 – R6	– Relay – 24V
MIB1 – MIB6	– Limit Switch	K1 & K2	– Motor Starter
S1 & S2	– 3 Pos Switch	M6 & M7	– Damper Actuator

CONTINUED ON DRAWING
INTERNAL WIRING – 2

Drawing subject to
change without notice

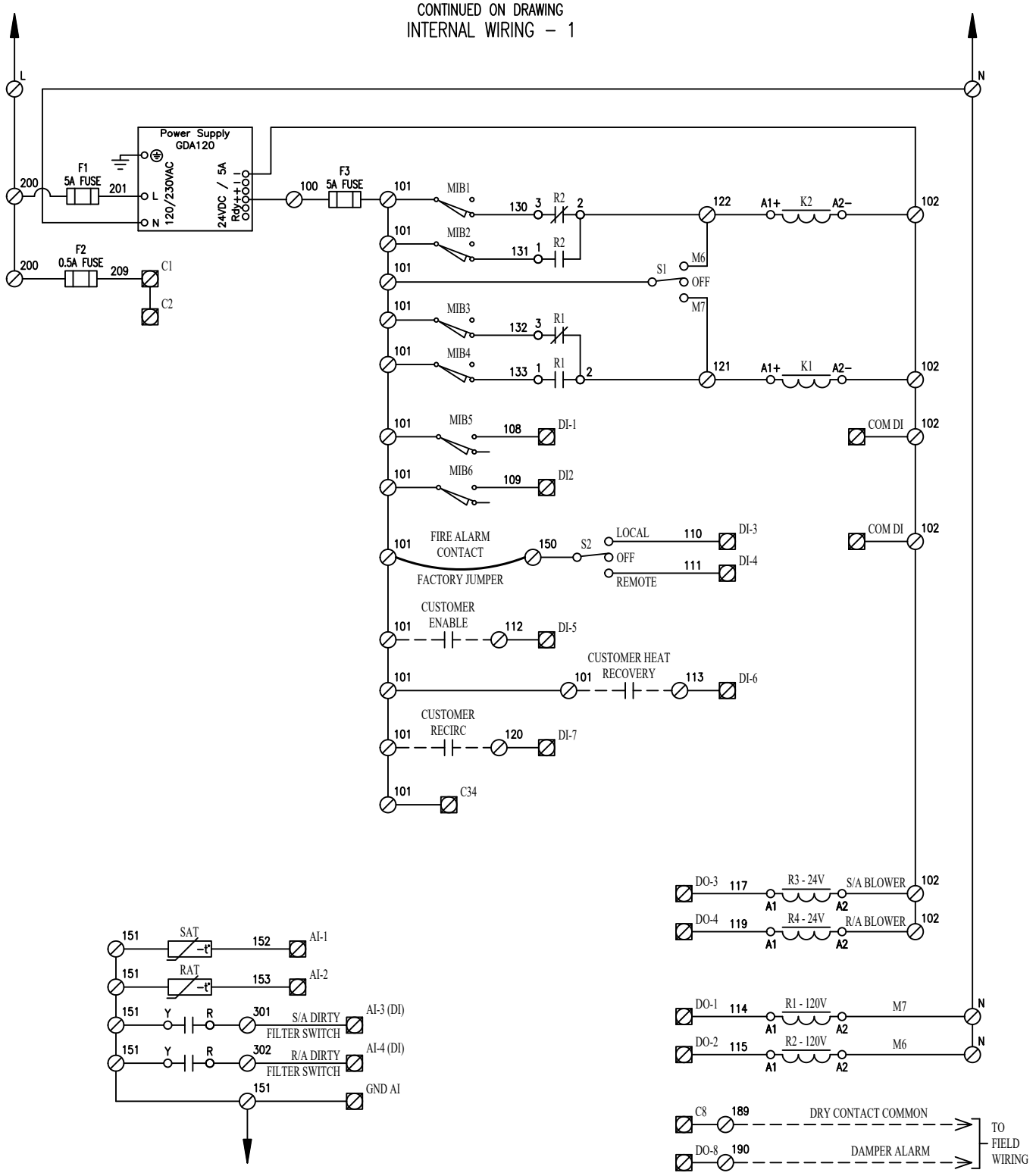
TEMPEFF

WIRING DIAGRAM

TITLE
Control Wiring (NERI)
SPP, VFD (ACH580), Dynamic Filter – 575V.

DRAWN BY	ISSUED BY	SCALE	DRW. NO.	
L.S.		N/A	NERI INT WIRING 1	
CHK. BY	DATE		JOB NO.	REV
	June 13, 2022			–

CONTINUED ON DRAWING
INTERNAL WIRING – 1



THERMISTOR
TERMINAL BLOCK
COMPONENT TERMINAL
CONTROLLER TERMINAL
UNIT WIRING
FIELD WIRING

LEGEND

F1 – F6	– Fuse – T.D.	R1 & R2	– Relay – 120V
FAF1	– Fuse – F.A.	R3 – R6	– Relay – 24V
MIB1 – MIB6	– Limit Switch	K1 & K2	– Motor Starter
S1 & S2	– 3 Pos Switch	M6 & M7	– Damper Actuator

CONTINUED ON DRAWING
INTERNAL WIRING – 3

Drawing subject to change without notice

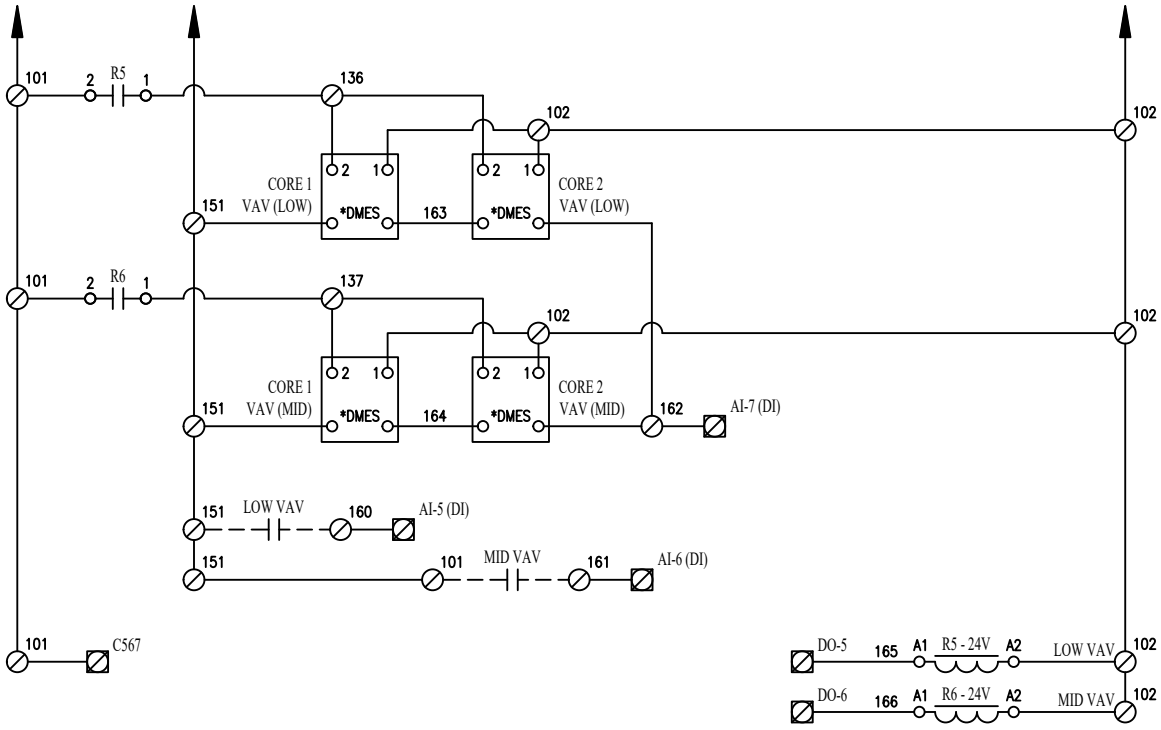
TEMPEFF

WIRING DIAGRAM

TITLE
Control Wiring (NERI)
SPP, VFD (ACH580) BACnet, Dirty Filter Switch x2, VAV – 575V.

DRAWN BY	ISSUED BY	SCALE	DRW. NO.
L.S.		N/A	NERI INT WIRING 2
CHK. BY	DATE	JOB NO.	REV
	June 13, 2022		–

CONTINUED ON DRAWING
INTERNAL WIRING – 2



DAMPER MOTOR END SWITCHES (*DMES)			
LF24–S US	S1 – S3	NFB24–S	S4 – S6
TFB24–S	S1 – S3	AFB24–S	S4 – S6
		EFB24–S	S4 – S6

LEGEND			
F1 – F6	– Fuse – T.D.	R1 & R2	– Relay – 120V
FAF1	– Fuse – F.A.	R3 – R6	– Relay – 24V
MIB1 – MIB6	– Limit Switch	K1 & K2	– Motor Starter
S1 & S2	– 3 Pos Switch	M6 & M7	– Damper Actuator

THERMISTOR
TERMINAL BLOCK
COMPONENT TERMINAL
CONTROLLER TERMINAL
UNIT WIRING
FIELD WIRING

Drawing subject to change without notice

TEMPEFF

WIRING DIAGRAM

TITLE
Control Wiring (NERI)
VAV Dampers.

DRAWN BY	ISSUED BY	SCALE	DRW. NO.
L.S.		N/A	NERI INT WIRING 3
CHK. BY	DATE	JOB NO.	REV
	June 13, 2022		–

Schneider RG Troubleshooting – Damper Alarm

Damper has a built-in alarm for testing the function of the internal components. If the damper goes into alarm the unit will shut down. Clear Damper Alarm by resetting Controller. **Follow the PLC reset procedure to prevent damage to the Controller**.

A. M6 Motor Alarm:
    a. Use S1 switch (Position 2) to test movement on motor; when enabled, the motor will turn.
    b. If motor moves on motor test, check NC contacts on MIB1 and MIB2 for continuity.
    c. If motor does not move:
        i. Check NC contacts on MIB1 and MIB2 for continuity.
        ii. Check motor starter (K2) for continuity.
        iii. Manually enable relay (R2) and check for continuity across relay contacts.
        iv. Check motor leads for voltage. Motor may defective; contact Tempeff.

B. M7 Motor Alarm:
    a. Use S1 switch (Position 1) to test movement on motor; when enabled, the motor will turn.
    b. If motor moves on motor test, check NC contacts on MIB3 and MIB4 for continuity.
    c. If motor does not move:
        i. Check NC contacts on MIB3 and MIB4 for continuity.
        ii. Check motor starter (K1) for continuity.
        iii. Manually enable relay (R1) and check for continuity across relay contacts.
        iv. Check motor leads for voltage. Motor may defective; contact Tempeff.

C. MIB1 Alarm – M6 Closed Position:
    a. Damper motor will not stop at MIB1; motor (M6) will just spin.
        i. Check that arm is making contact with the motor CAM (adjust position of limit switch if necessary).
        ii. Temporarily remove relay (R2), lift up limit switch arm with small screw driver, check continuity across both NC and NO contacts, if either side not working replace limit switch.

D. MIB2 Alarm – M6 Open Position:
    a. Damper motor will not stop at MIB2; motor (M6) will just spin.
        i. Check that arm is making contact with the motor CAM (adjust position of limit switch if necessary).
        ii. Temporarily remove relay (R2), lift up limit switch arm with small screw driver, check continuity across both NC and NO contacts, if either side not working replace limit switch.

E. MIB3 Alarm – M7 Closed Position:
    a. Damper motor will not stop at MIB3; motor (M7) will just spin.
        i. Check that arm is making contact with the motor CAM (adjust position of limit switch if necessary).
        ii. Temporarily remove relay (R1), lift up limit switch arm with small screw driver, check continuity across both NC and NO contacts, if either side not working replace limit switch.

F. MIB4 Alarm – M7 Open Position:
    a. Damper motor will not stop at MIB4; motor (M7) will just spin.
        i. Check that arm is making contact with the motor CAM (adjust position of limit switch if necessary).
        ii. Temporarily remove relay (R1), lift up limit switch arm with small screw driver, check continuity across both NC and NO contacts, if either side not working replace limit switch.

G. MIB5 Alarm – M6 Proof of Open:
    a. Blowers will enable for either 1 cycle or not at all, after a 10 second delay the unit will disable.
        i. Check that the arm is making contact with the end collar when the M6 motor cam is on MIB2.
            1. Adjust the collar if micro switch is on flat.
            2. Adjust the micro switch to make contact with collar.
    b. MIB5_0 Alarm:
        i. Alarm occurs when unit is Disabled.

H. MIB6 Alarm – M7 Proof of Open:
    a. Blowers will enable for either 1 cycle or not at all, after a 10 second delay the unit will disable.
        i. Check that the arm is making contact with the end collar when the M7 motor cam is on MIB4.
            1. Adjust the collar if micro switch is on flat.
            2. Adjust the micro switch to make contact with collar.
    b. MIB6_0 Alarm:
        i. Alarm occurs when unit is Disabled.

PLC Reset Procedure:

A. Open 24Vdc fuse holder supplying power to 101 terminals, then open fuse holder F2, and finally open fuse holder FAF1 to Controller power.
B. Wait 5 seconds.
C. Close fuse holder FAF1. While Controller is re-booting, close 24Vdc fuse holder supplying power to 101 terminals and then close fuse holder F2.
D. Once re-boot is complete, unit can resume normal operation.

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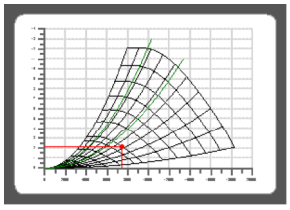
6/30/2021
Aeolus4 1.0.20126.1

Customer			
Project		**Description**	
Your Ref.	- -	**Our Ref.**	Tempeff

Input data					
Volume	7400 CFM	**Temperature**	68.0 °F	**Density**	0.075 lb/cu.ft
Static Pressure	2.17 In.W.G.	**Altitude**	0 ft	**Free Inlet - Free Outlet**	

	Catalogue data		
Selected Fan **ANPA22 -**	n Max 1/min	Pw Max BHP	J lb ft²
	2650		45.09



Fan Information											
c ft/min	p tot * In.W.G.	p sta In.W.G.	p dyn ** In.W.G.	tip speed ft/min	RPM 1/min	eta Tot * %	eta Sta %	P fan BHP	Min Mot. BHP	P mot BHP	Shaft diameter in
	2.53	2.17	0.36	7852	1360	73.22	62.90	4.01			0.00

(*)Theoric value calculated taking into account the dynamic pressure at the impeller outlet
(**)Theoric value, calculated at the impeller outlet

fm[Hz]	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Tot.**
Lw3 Total Sound Power Level in the inlet duct- Lwi Inlet Duct Sound Power Level includes the effect of duct end correction									
Level Lw3 dB/dB(A)	82 / 56	76 / 60	81 / 72	73 / 70	72 / 72	70 / 71	65 / 66	62 / 61	**85 / 78**
Lw5 Inlet Total Sound Power Level - Lwmi Inlet Sound Power Level (free inlet) do not includes the effect of duct end correction									
Level Lw5 dB/dB(A)	72 / 45	76 / 60	85 / 76	77 / 74	74 / 74	71 / 72	68 / 69	63 / 62	**87 / 81**
Lw6 Total Sound Power Level at the free outlet - Lwmo Outlet Sound Power Level (free outlet) do not includes the effect of duct end correction									
Level Lw6 dB/dB(A)	83 / 57	80 / 64	87 / 79	84 / 81	83 / 83	78 / 79	73 / 74	69 / 68	**92 / 87**

Chart

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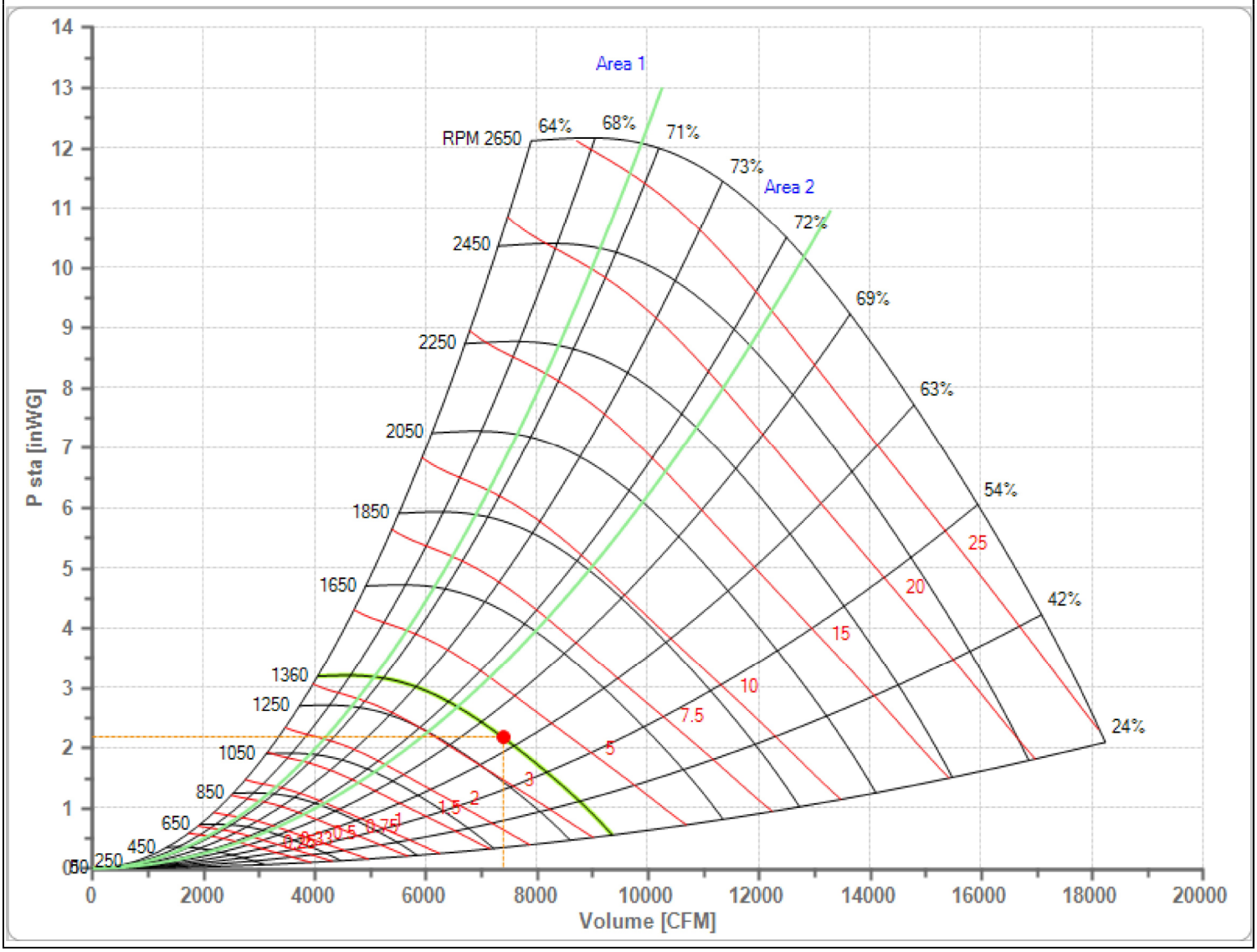
6/30/2021
Aeolus4 1.0.20126.1

Selected Fan	ANPA22 -	Fan working conditions	Free Inlet - Free Outlet
n Max	2650 1/min	Volume	7400 CFM
Pw Max		Total Pressure	2.53 In.W.G.
P fan	4.01 BHP	Static Pressure	2.17 In.W.G.
J	45.09 lb ft²	eta Tot	73.22 %
Required working point	•	eta Sta	62.90 %
Effective working point	•	RPM	1360 1/min
		Temperature	68.0 °F
		Altitude	0 ft



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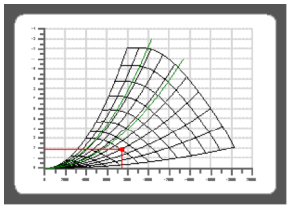
fans of energy saving

7/6/2021
Aeolus4 1.0.20126.1

Customer			
Project		**Description**	
Your Ref.	- -	**Our Ref.**	Tempeff

Input data					
Volume	7400 CFM	**Temperature**	68.0 °F	**Density**	0.075 lb/cu.ft
Static Pressure	1.83 In.W.G.	**Altitude**	0 ft	**Free Inlet - Free Outlet**	

	Catalogue data		
Selected Fan **ANPA22 -**	n Max 1/min	Pw Max BHP	J lb ft²
	2650		45.09



Fan Information											
c ft/min	p tot * In.W.G.	p sta In.W.G.	p dyn ** In.W.G.	tip speed ft/min	RPM 1/min	eta Tot * %	eta Sta %	P fan BHP	Min Mot. BHP	P mot BHP	Shaft diameter in
	2.19	1.83	0.36	7565	1310	71.24	59.63	3.57			0.00

(*)Theoric value calculated taking into account the dynamic pressure at the impeller outlet
(**)Theoric value, calculated at the impeller outlet

fm[Hz]	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Tot.**
Lw3 Total Sound Power Level in the inlet duct- Lwi Inlet Duct Sound Power Level includes the effect of duct end correction									
Level Lw3 dB/dB(A)	81 / 55	75 / 59	80 / 72	72 / 69	71 / 71	69 / 71	64 / 65	61 / 60	**85 / 77**
Lw5 Inlet Total Sound Power Level - Lwmi Inlet Sound Power Level (free inlet) do not includes the effect of duct end correction									
Level Lw5 dB/dB(A)	71 / 45	76 / 60	84 / 75	77 / 74	73 / 73	71 / 72	67 / 68	62 / 61	**86 / 80**
Lw6 Total Sound Power Level at the free outlet - Lwmo Outlet Sound Power Level (free outlet) do not includes the effect of duct end correction									
Level Lw6 dB/dB(A)	83 / 57	80 / 64	87 / 78	84 / 81	83 / 83	78 / 79	73 / 74	69 / 68	**91 / 87**

Chart

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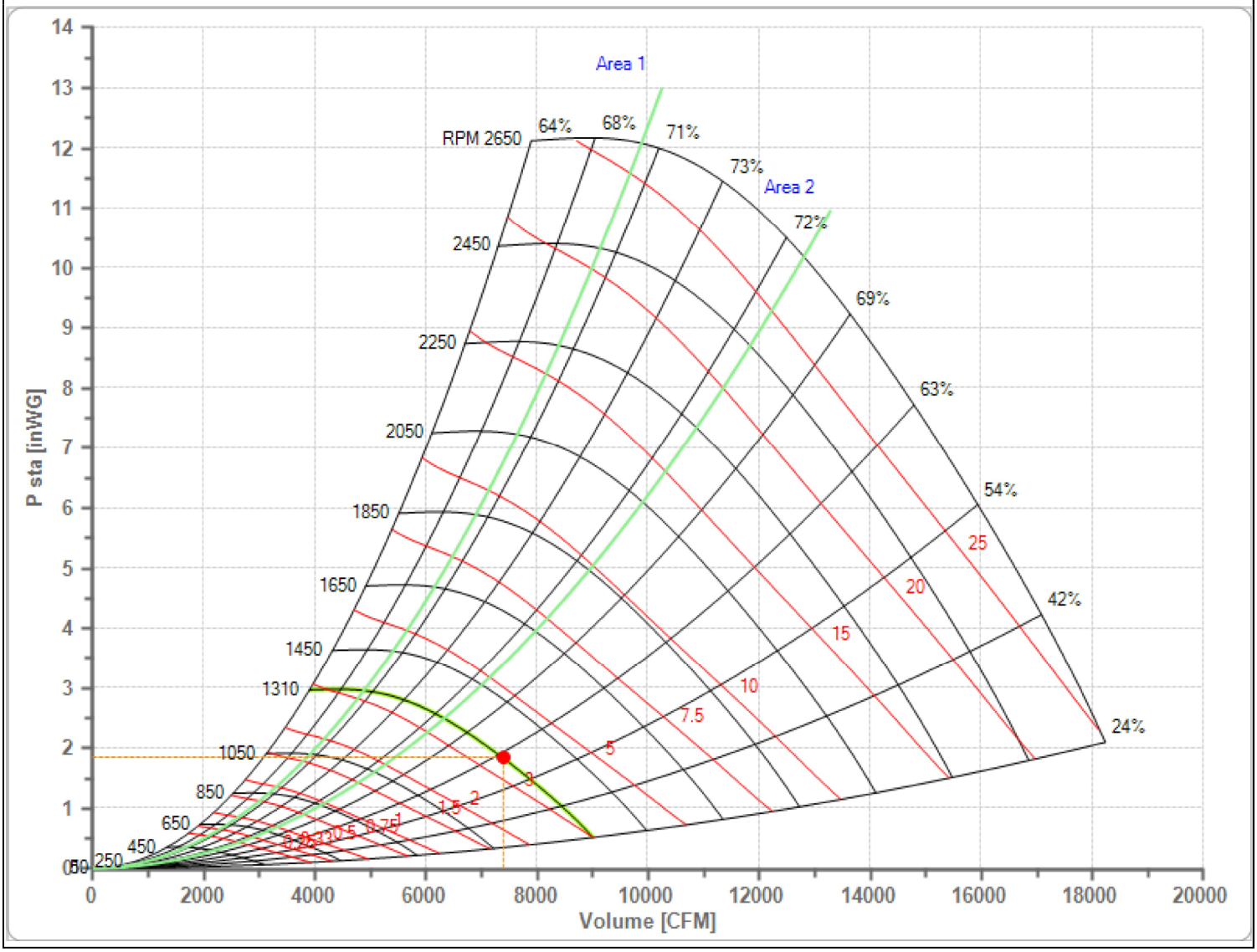
7/6/2021
Aeolus4 1.0.20126.1

Selected Fan	ANPA22 -	Fan working conditions	Free Inlet - Free Outlet
n Max	2650 1/min	Volume	7400 CFM
Pw Max		Total Pressure	2.19 In.W.G.
P fan	3.57 BHP	Static Pressure	1.83 In.W.G.
J	45.09 lb ft²	eta Tot	71.24 %
Required working point	•	eta Sta	59.63 %
Effective working point	•	RPM	1310 1/min
		Temperature	68.0 °F
		Altitude	0 ft



Electronic Air Cleaner Details

Dynamic Air Quality Solutions
P.O. Box 1258
Princeton, New Jersey 08542
609-924-4489
fax 609-924-8524
www.DynamicAQS.com

Prepared for: Peter Washer – HTS Toronto ***Date: 6/24/2022***

Job Name: Enbridge Station B ***Engineer: Walter Fedy***

Dynamic Air Quality Solutions is pleased to provide the enclosed submittal for your review and approval.

Unit Tag	Unit Interior Dimensions		Dynamic Part Number						Design Airflow	Vertical Columns	# Of Rows	Factory Assembled in Modules		Dynamic Face Area			Velocity Through Filter Opening	S.P. Inches at 100% Fan		Elec Load VA @	Control Panel	Weight
	W	H	Style	MW	RW		Depth	1VBG 1V8	CFM			12"	18"	W	x	H	FPM	Initital	Change	24v		
AHU-1	68.00	42.00	1V8	30	06	-	24.0	SL	7400	2	6		4	65	x	36	493	0.36	0.76	24	CP-40-PT	301

Dynamic V8 Air Cleaning System

Notes:

1. **V8 side load systems are configured for Right Hand access for media replacement as viewed with the air stream hitting you in the face; the media is not bi-directional and Left Hand access must be specified.**

2. **The default line voltage input to the control panel is 120 volt single phase; specify if other is required. A fused disconnect switch is provided on the Control Panel.**

3. **Each access opening to the latch side of the air cleaner modules must be fitted with the limit switch(es) provided which disconnects the 24VAC power to the air cleaning system when the door is opened. Multiple switches must be connected in series. The air cleaning system cannot be energized if the safety switch is not connected.**

4. **Air cleaning systems used during the construction phase must be protected by minimum MERV 9 Prefilters or roll media filtration. Failure to do so can result in premature loading of the media and higher pressure drop.**

Dynamic Air Quality Solutions
P.O. Box 1258
Princeton, New Jersey 08542
609-924-4489
fax 609-924-8524
www.DynamicAQS.com

- **V8 side load air cleaning systems require a minimum of 27 inches in direction of airflow to mount the rails to the floor of the air handler. The minimum size access opening required is 25" wide and must extend from the floor of the unit to above the height of the module column.**

- **V8 systems are designed slide-out side access installation in the air handler or enclosure; mounting materials and hardware required to install the system are shipped with the modules. Additional sheet metal work to blank off and seal the area around the modules and the enclosure is required and to be provided by others.**

- **V8 modules must be installed in the numbered order shown on the electrical diagram shipped with the system. Wiring harnesses from the Control Panel to the air cleaning system and jumper cables between the modules are provided.**

- **Control Panel with enclosed power supplies, on/off switch, 24v. circuit breaker, power and air cleaner status indicators, and Magnasense Differential Pressure Transmitter mounted in NEMA 4X Indoor Enclosure is included.**

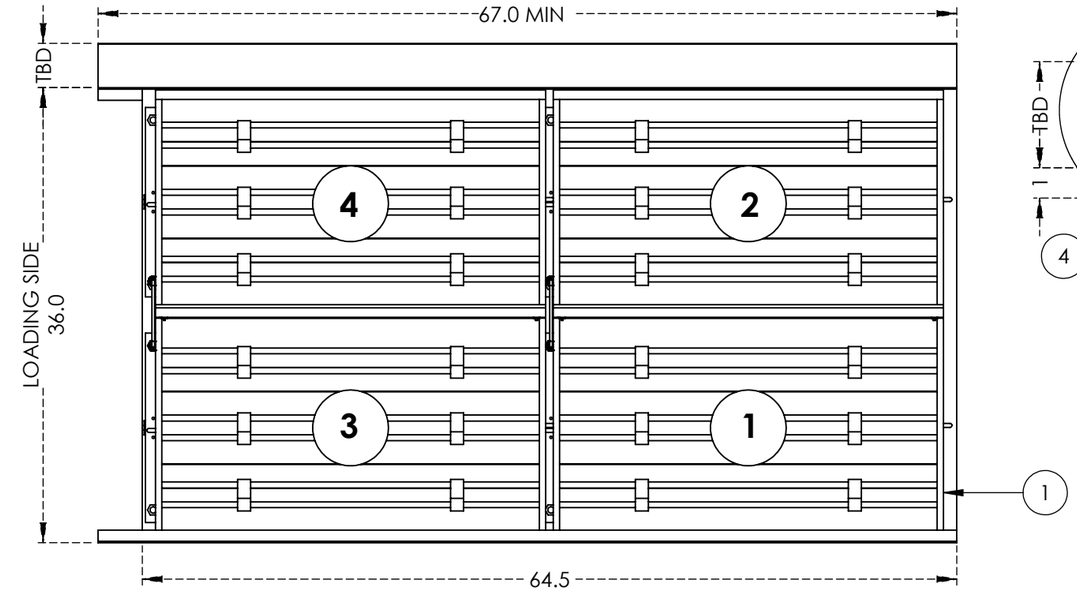
- **Wiring harnesses are prewired to connectors on the module end only and need to be field wired to the designated terminals in the control panel. Wiring harnesses for outdoor enclosures must be run through watertight conduit, provided by others.**

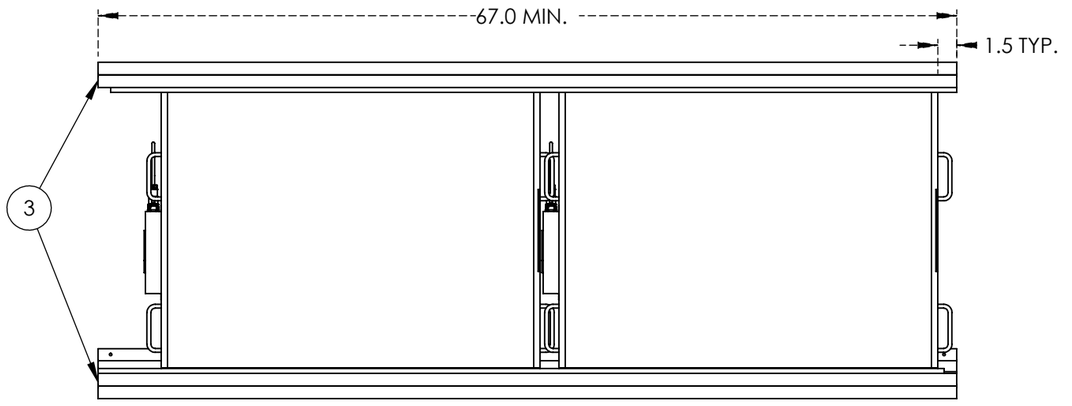
- **Control Panels should be mounted on the same side of the air handling unit as the access door. The standard length wiring harness is 20 feet, specify if a longer harness is required for remote mounting.**

- **Control Panels are to be mounted and wired by the AHU Manufacturer or electrical contractor. All control panels are listed under UL508A.**

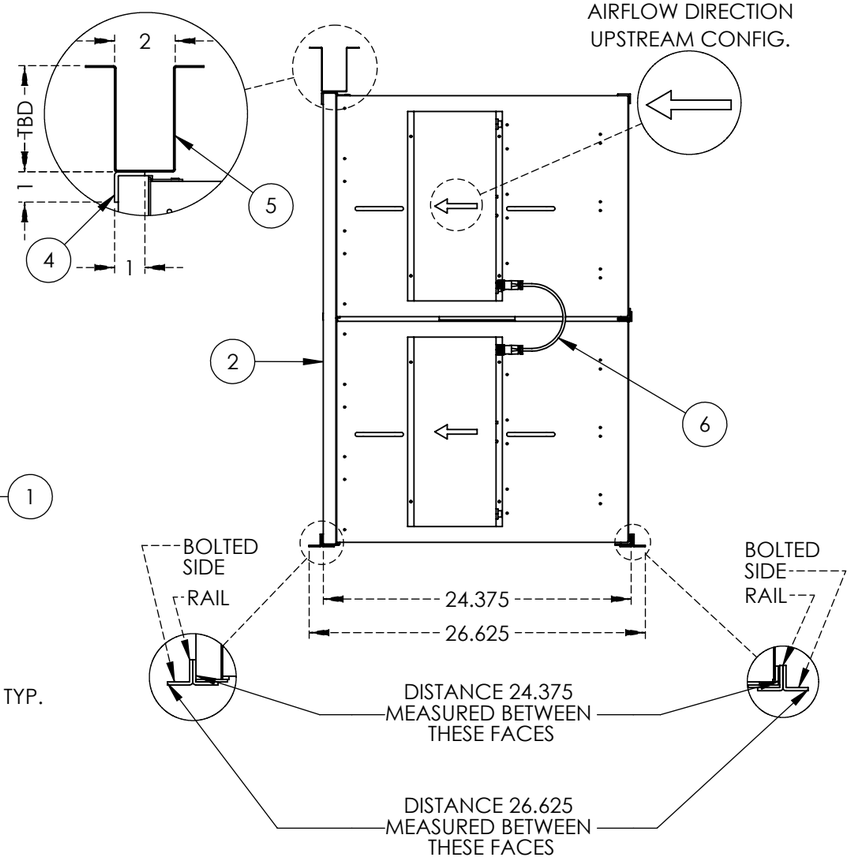
- **Five (5) Year Limited Warranty.**

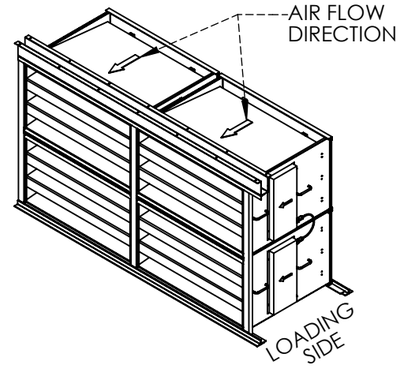
REV.	DESCRIPTION	DATE	APPROVED
-	INITIAL RELEASE	6/21/2022	LMC





BOTTOM VIEW





NOTES:

1. INSTALL THE MODULES IN THE ORDER SHOWN; ALL MODULES ARE FACTORY NUMBERED; SEE V8-SL MANUAL FOR DETAILED INSTALLATION INSTRUCTIONS;
2. THE SIDE OF THE MODULES WITH SIDE COVER AND JUMPERS MUST ALWAYS FACE THE LOADING SIDE;
3. FLASHING AND TOP SEALING FOR REFERENCE ONLY; RECOMMENDED TOP SEAL BRACKET PROVIDED BY OTHERS; DIMENSIONS TBD ON SITE; ADDITIONAL SHEET METAL WORK MAY BE REQUIRED; SEE V8-SL MANUAL FOR DETAILED INSTALLATION INSTRUCTIONS;
4. ALL ELECTRICAL CONNECTIONS PER ELECTRICAL CONNECTIONS (PAGE 2); SEE V8-SL MANUAL FOR DETAILED CONNECTION INSTRUCTIONS;
5. ESTIMATED WEIGHT: 301 LB

ITEM NO.	DESCRIPTION	QTY.
1	V8 1830X24 SIDE LOADED-TOP MODULE	4
2	1X1.5 FOAM STRIP OR MOUNTING POST	3
3	RAIL ASSEMBLY WITH BRUSH SEAL (NOT PROVIDED)	2
4	ANGLE 1X1X1/8" (SUGGESTED - NOT PROVIDED)	1
5	TOP SEAL BRACKET 2" WIDE (SUGGESTED -NOT PROVIDED)	1
6	JUMPER CABLE	2

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±1/64
ANGULAR: MACH ± 1° BEND ±1°
TWO PLACE DECIMAL ±.010
THREE PLACE DECIMAL ±.005

INTERPRET GEOMETRIC TOLERANCING PER:

MATERIAL

FINISH

USED ON

APPLICATION

DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	LMC	06.21.22
CHECKED	PC	06.21.22
ENG APPR.	PC	06.21.22
MFG APPR.		
Q.A.		

COMMENTS:

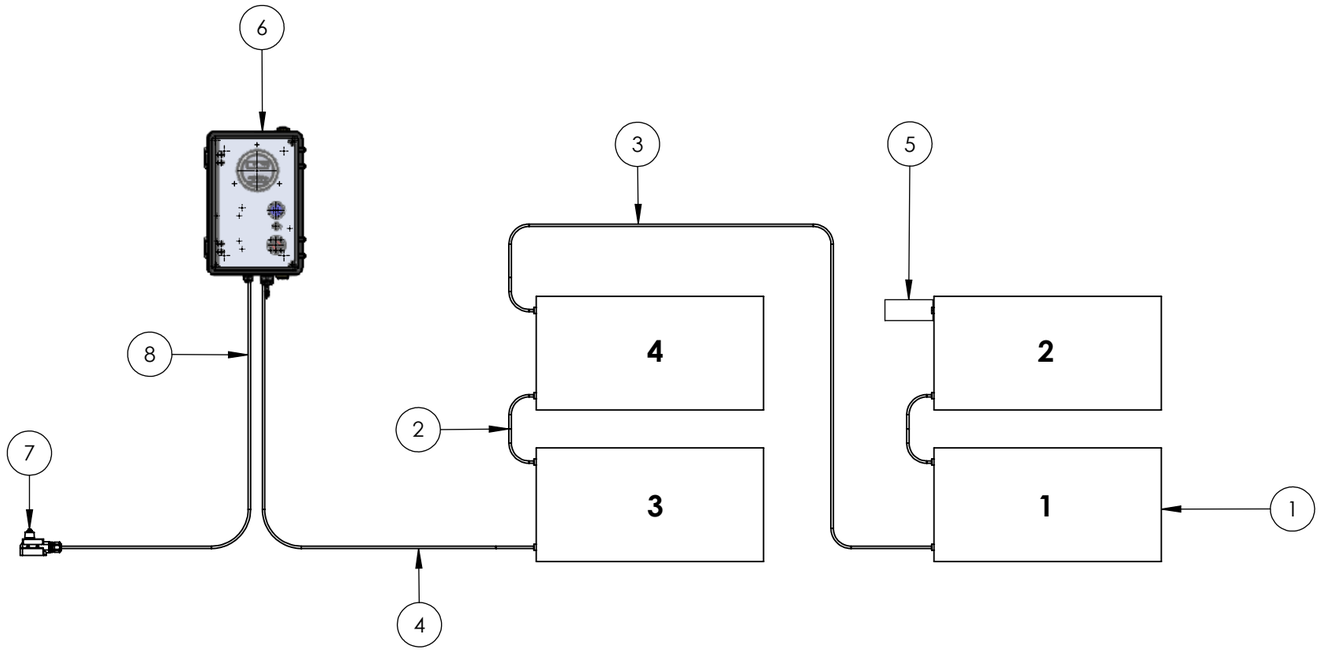
DYNAMIC AIR QUALITY SOLUTIONS
330 CARTER RD. BUILDING #3
PRINCETON NJ 08540

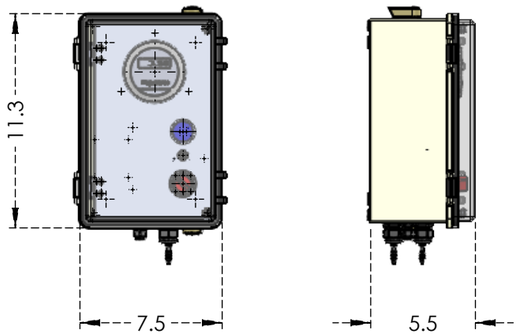
TITLE:

ENBRIDGE STATION B - AHU-1

SIZE	DWG. NO.	REV
B	ENBRIDGE STATION B - AHU-1	-

SCALE: 1:12 | WEIGHT: 301 LB | SHEET 1 OF 2





NOTES:

1. INSTALL THE MODULES IN THE ORDER SHOWN; ALL MODULES ARE FACTORY NUMBERED;
2. CONNECT THE MODULES AS SHOWN;
3. ALL CONNECTIONS TO THE CONTROL PANEL PER ELECTRICAL SCHEMATIC CP-40 POSTED INSIDE THE ENCLOSURE OF CONTROL PANEL;
4. LINE VOLTAGE TO THE CONTROL PANEL PROVIDED BY OTHERS;
5. EACH ACCESS/OPENING TO THE MODULES MUST BE PROTECTED BY A SAFETY SWITCH; TYPICAL INSTALLATION HAS ONE SAFETY SWITCH; ADDITIONAL SAFETY SWITCHES BY REQUEST.
6. ADDITIONAL DETAILS IN THE INSTALLATION MANUAL PROVIDED WITH THE SYSTEM;
7. TYPICAL INSTALLATION: CONTROL PANEL ON THE LOADING SIDE, AS SHOWN; FOR INSTALLATION ON OPPOSITE SIDE SEE INSTRUCTIONS IN THE INSTALLATION MANUAL.

ITEM NO.	DESCRIPTION	Q-TY
1	1V8-SL MODULE	4
2	JUMPER CABLE	2
3	COLUMN JUMPER CABLE	1
4	LEAD CORD	1
5	TERMINATION PLUG	1
6	CONTROL PANEL CP-40-PT	1
7	SAFETY SWITCH	1
8	SAFETY SWITCH CABLE	1

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±1/64
ANGULAR: MACH ± 1° BEND ±1°
TWO PLACE DECIMAL ±.010'
THREE PLACE DECIMAL ±.005"

INTERPRET GEOMETRIC TOLERANCING PER:

MATERIAL

FINISH

DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	LMC	06.21.22
CHECKED	PC	06.21.22
ENG APPR.	PC	06.21.22
MFG APPR.		
Q.A.		

COMMENTS:

DYNAMIC AIR QUALITY SOLUTIONS
330 CARTER RD. BUILDING #3
PRINCETON NJ 08540

TITLE:

ENBRIDGE STATION B - AHU-1 WIRING SCHEMATIC

SIZE	DWG. NO.	REV
B	ENBRIDGE STATION B - AHU-1	-
SCALE: N/A	WEIGHT: N/A	SHEET 2 OF 2

Dynamic Air Quality Solutions
P.O. Box 1258
Princeton, New Jersey 08542
609-924-4489
fax 609-924-8524
www.DynamicAQS.com

V8-SL Air Cleaning System Specification

Non-ionizing, polarized media electronic air cleaners:

1. **Certifications**: The Air Cleaner shall have been tested and certified according to UL Standard 867 and CSA Standard C22.2 No. 187-M19986 for electrostatic Air Cleaners.

2. **Operation**: The Air Cleaner shall have an active electrostatic field that polarizes a dielectric media. It shall not ionize airborne particles or produce ozone.

3. **Laboratory Testing Performance**: Using the ASHRAE 52.2 protocol with carbon black in the loading dust, the Air Cleaner shall test at MERV 13. Using the ASHRAE 52.2-NC protocol (with no carbon in the loading dust), the Air Cleaner shall test at MERV 15. A 24”x24”x29.5” deep module section shall increase in resistance no more than 0.25” w.g. with a dust loading of 2,855 grams. It shall hold a total of 4,582 grams of dust at a resistance of 1.4” w.g. Any substitute Air Cleaner must meet these MERV ratings, static pressures and loading characteristics. The Air Cleaner manufacturer must provide testing from an approved ASHRAE test lab to verify MERV rating, operational and loading performance.

4. **Field Performance**: The Air Cleaner manufacturer shall produce at least two documented installation references, including client contact information with the following criteria:

   - Air Cleaners shall have operated continuously for a minimum of 2.5 years with no pre-filtration and without media change and achieve an increase of less than .2 inches of static pressure at a face velocity of ~500 fpm, in an urban environment. Air cleaner installations must be greater than 10,000 cfm and serving office and/or hospital space.

   - In an urban environment, Air Cleaners must have demonstrated the ability to achieve indoor ultra-fine particle and black carbon levels that are up to 94% lower than the concentrations in the air outside the building. Outdoor air levels brought into the building must be based on the ASHRAE Standard 62 Ventilation Rate Procedure.

   - Air Cleaners shall have a documented ability to reduce TVOC levels by 50-60% in a single pass. Air Cleaners must have already been in service for over 90 days. Tests must be administered by an independent, third-party and readings must be taken immediately upstream and downstream of the Air Cleaning system over at least a 24-hour period.

   - Air Cleaners shall have been tested in an installation according the ASHRAE 26 protocol quarterly over the course of a year. The Air Cleaners must have met the required efficiency in each test.

Dynamic Air Quality Solutions
P.O. Box 1258
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609-924-4489
fax 609-924-8524
www.DynamicAQS.com

5. **Construction**: The Air Cleaner modules shall consist of four or six individual Air Cleaner Panels that are nominally 1" in width, arranged in V's within the module. The construction of the Air Cleaner frame and screens shall be aluminum, and the module side panels and attachment flanges shall be of galvanized steel. The Air Cleaner modules and each component thereof must have a positive seal where necessary to prevent bypass of unfiltered air.

6. **Electronics**: The high voltage Powerheads shall require 24 volts AC input and have a 9.5kV DC output. The Powerheads must be fully potted and connected in parallel.

7. **Control Panel**: The 24VAC power supply must be a UL or CSA certified transformer, class "2" type, which shall permit one side of the secondary output (24V) to be attached to electrical ground. A filter Minihelic gauge shall be installed in the Unit Control Panel *(optional direct readout or signal tied into building automation)*.

8. **Filter Media**: Each Air Cleaner module shall have disposable and recyclable media pads with a minimum of a class "2" fire rating. These shall have a positive seal in the overall module assembly to prevent bypass of un-filtered air.

9. **Configuration**: The Air Cleaners will be arranged in pre-fabricated module assemblies nominally 12" or 18" in height, *43" wide* and 24" deep in direction of airflow. The number of modules and width shall be such that the face velocity through the filter bank shall be no more than *550 fpm*. The V8 modules will be configured for side access. Each module will be equipped with the necessary tracks and seals so that the rows of modules will slide out for service and seal to each other. The air handler will be configured to allow the modules to slide out and will be equipped with the necessary top and bottom tracks for sealing.

10. **Electrical Connection**: The Air Handler manufacturer shall provide a fully operational filter section for field connection and field electrical tie-in. All 24VAC electrical and control wiring integral to the Air Cleaner modules and Control Panel, including the access door interlocks, are to be provided by the Air Cleaner manufacturer for connection in the field or factory. All line voltage connections and wiring are the responsibility of the contractor.

11. **Clean and Maximum Allowable Static Pressure:** As installed, it shall have a clean static pressure drop of less than *0.40" w.g.* at 500 feet per minute. To minimize energy consumption, the AHU fan system has been designed for specific pressure drop through the Air Cleaning system. The fan system is designed for a maximum of *0.70"* w.g. when the filters are dirty.

Dynamic Air Quality Solutions
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12. **Construction and Start-up:** If the air handler is operated during construction, the contractor shall protect the Air Cleaner bank using roll or other media with a minimum of MERV 9 rating. These should be removed after 30 days from initial startup.

13. **Replacement Media (optional):** The Air Handler manufacturer is responsible to purchase and store sufficient replacement filters so as not to exceed a total static pressure of *0.70" w.g. (Matching #11 above)* for a period of 4 years from final acceptance. Material responsibility not to exceed total media changes of 6 times per year.

14. **Optional for use when using the IAQ procedure**:

- Air Cleaners will have been installed in at least three projects where the IAQ Procedure of ASHRAE Standard 62 was used successfully to reduce outdoor air requirements versus the Ventilation Rate Procedure of the same Standard. Air quality test reports must be submitted and show that the indoor air quality is acceptable and at least as good as would be expected using the Ventilation Rate Procedure.

Dynamic Air Quality Solutions
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fax 609-924-8524
www.DynamicAQS.com

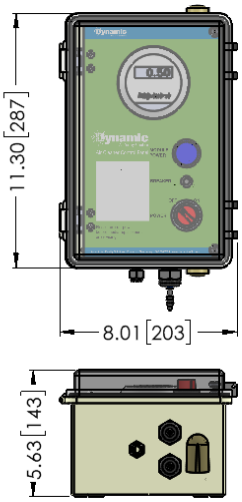
Dynamic CP-40 Control Panel

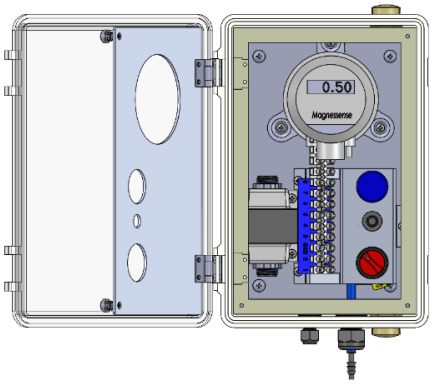
Catalog Number CP- 40

(1) 40VA Power Supply with Status Light
Circuit Breaker and On/Off Switch
Input: 120/208/240/277VAC, 50/60Hz
Output: 24VAC
Provides (1) 40VA circuit
NEMA 4X Indoor or Outdoor Enclosures Available
Listed under UL508A

Weight- 5.3 Lbs.

c UL us LISTED





SERIES MSX | MAGNESENSE® DIFFERENTIAL PRESSURE TRANSMITTER

MSX with optional LCD

BENEFITS/FEATURES

- **Read LCD values easier with rotatable 180° display**
- **Quick and easy wiring via the optional toolless terminal block**
- **Add safety to variety of applications with UL94 V-0 and plenum ratings**

APPLICATIONS

- Filter monitoring in air handler units
- Building pressure in pharmaceutical/semiconductor clean rooms
- Duct static pressure in commercial buildings
- Air velocity/flow in VAV systems

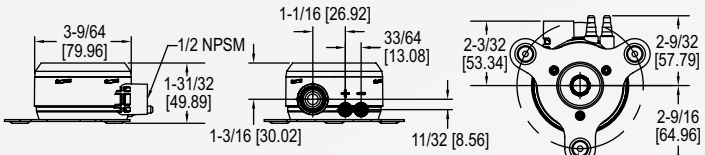
DESCRIPTION

The **Series MSX Magnesense® Differential Pressure Transmitter** combines the stability and versatility of the original Series MS2 Magnesense® II transmitter for use in building control applications. The MSX simplifies the ordering process to deliver the desired configuration, which reduces product setup time. Pressure ranges are available in Pa, mm w.c., and in w.c. All pressure ranges can be configured in unidirectional or bidirectional modes, providing a total of 32 ranges. The MSX transmitter can provide a linear pressure output or a linear velocity output with the square root extraction from the transmitter. Additional parameters have been included to expand the square root capability to calculate flow. Dual voltage and milliamp output signals can be used to provide both control and equipment output signal verification.

SPECIFICATIONS

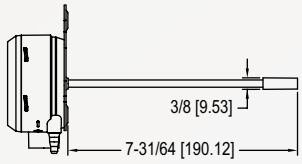
Service	Air and non-combustible, compatible gases.
Wetted Materials	Consult factory.
Accuracy	±1% FSO.
Stability	±1% FSO/year.
Temperature Limits	-4 to 158°F (-20 to 70°C).
Pressure Limits	Ranges 0 and 1: 3.6 psi max operation, 6 psi burst; Ranges 2 and 3: 6 psi max operation, 6 psi burst.
Power Requirements	10-36 VDC (2-wire), 17-36 VDC or isolated 21.6-33 VAC (3-wire).
Output Signals	4-20 mA (2-wire); 0-10 V or 0-5 V selectable (3-wire).
Response Time	Instantaneous (default) or 3 s (selectable).
Zero and Span Adjustments	Digital push-button.
Loop Resistance	Current output: 0-1250 Ω max; Voltage output: min. load resistance 1 kΩ.
Current Consumption	21 mA max continuous.
Electrical Connections	4-wire removable European style terminal block for 16 to 26 AWG.
Electrical Entry	1/2″ NPS thread.
Display (optional)	4 digit LCD.
Process Connections	1/8″, 3/16″, 1/4″, 5 mm, and 6 mm ID flexible tubing.
Enclosure Rating	NEMA 4X (IP66); UL 2043 (Plenum); UL94 V-0.
Mounting Orientation	Pressure sensor measurement unaffected by orientation.
Weight	8.0 oz (230 g).
Agency Approvals	CE.

DIMENSIONS

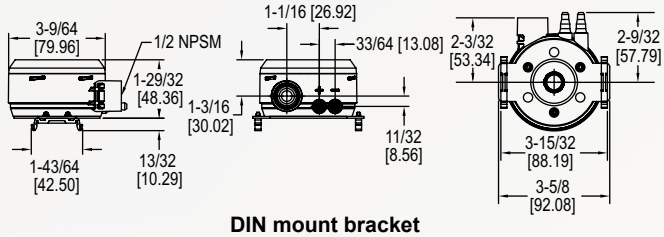


Wall mount bracket

[3] 3/16 [4.57] HOLES EQUALLY SPACED ON A 4-7/64 [104.53] BC

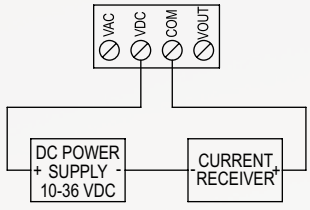


Duct mount bracket

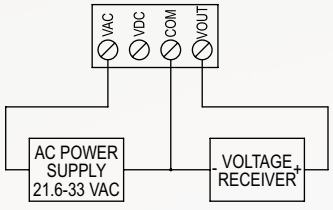


DIN mount bracket

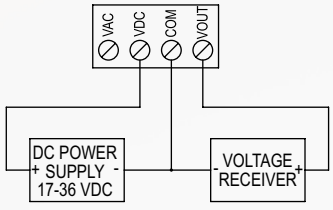
WIRING DIAGRAM



4-20 mA (DC supply only)



3-wire voltage (with AC supply)



3-wire voltage (with DC supply)

HOW TO ORDER

Use the **bold** characters from the chart below to construct a product code.

MSX **-W** **1** **3** **-IN** **-LCD**

SERIES
MSX: Magnesense® differential pressure transmitter

MOUNTING
-W: Wall mount
-U: Universal (wall or duct) mount
-N: DIN rail mount

DIRECTION
1: Unidirectional
2: Bidirectional

RANGE
0: .5 in w.c., 125 Pa, 12.5 mm w.c.
1: 1 in w.c., 250 Pa, 25 mm w.c.
2: 5 in w.c., 1250 Pa, 125 mm w.c.
3: 28 in w.c., 7000 Pa, 700 mm w.c.

OPTIONS
-A481: Installer kit
-FC: Factory calibration certificate
-FP: Filtered pickup with barb
-GLD: Liquid tight cable gland fitting
-LCD: Liquid crystal display
-NIST: NIST traceable calibration certificate
-STX: Two (2) plastic static pressure tips
-TT: Toolless terminal block
-WO: LCD cover without LCD display

PRESSURE UNIT
-IN: Inches water column
-PA: Pascal
-MM: Millimeters water column

ACCESSORIES

Model	Description
A-480	Plastic static pressure tip
A-481	Installer kit, includes 2 plastic static pressure tips and 7 ft (2.1 m) of PVC tubing
A-MSX-LCD	Replacement display for the Series MSX

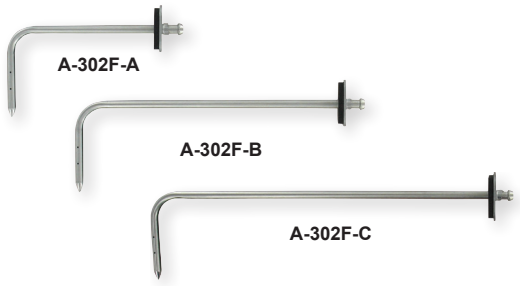
DWYER INSTRUMENTS, INC.

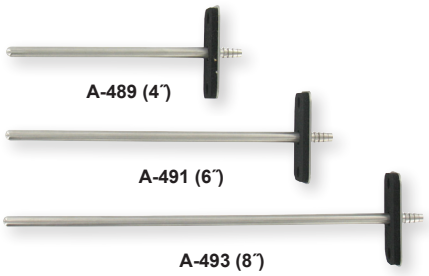
Printed in U.S.A. 4/21

DS-MSX Rev. 3

Dwyer

STATIC PRESSURE TIPS



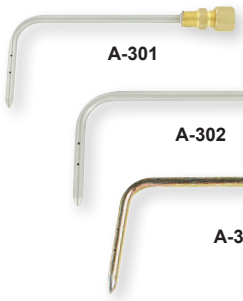



Flange view


A-305


A-307


A-308




A-414


A-306-A

MODEL CHART	
Model	**Description**
The stainless steel static pressure tips are used to measure static pressures in ducts or rooms. They are to be connected to differential pressure switches and transmitters. Two static sensors are used in applications where differential pressure is required across a filter or coil. These sensors include a mounting flange with integral rubber gasket and two screws for simplifying mounting on a duct.	
A-302F-A	4″ hook style SS static pressure tip with mounting flange
A-302F-B	6″ hook style SS static pressure tip with mounting flange
A-302F-C	8″ hook style SS static pressure tip with mounting flange
A-489	4″ straight SS static pressure tip with mounting flange
A-491	6″ straight SS static pressure tip with mounting flange
A-493	8″ straight SS static pressure tip with mounting flange
Designed for simplified installation, these are easy to install, inexpensive, and provides accurate static pressure sensing in smooth air at velocities up to 1500 FPM.	
A-307	Static pressure fitting, for 1/4″ metal tubing connection
A-307-SS	SS static pressure fitting, for 1/4″ metal tubing connection
A-308	Static pressure fitting, for 3/16″ and 1/8″ ID plastic or rubber tubing
A-414	SS clean room pressure sensor
These static pressure tips are ideal for applications such as sensing the static pressure drop across industrial air filters and refrigerant coils. Here the probability of air turbulence requires that the pressure sensing openings be located away from the duct walls to minimize impingement and aspiration, and thus ensure accurate readings. For a permanent installation of this type, the Dwyer No. A-301 or A-302 static pressure tip is used. It senses static pressure through radially-drilled holes near the tip and can be used in air flow velocities up to 12,000 FPM. The angled tips shown have 4″ insertion depth. Each has four radially drilled .040″ sensing holes. All except Model A-303 mount in 3/8″ hole in duct. For portable use, a magnet holds No. A-303 in place.	
A-301	Static pressure tip, for 1/4″ metal tubing connection
A-301-A	Static pressure tip, same as A-301 with 6″ insertion depth
A-301-B	Static pressure tip, same as A-301 with 8″ insertion depth
A-301-C	Static pressure tip, same as A-301 with 12″ insertion depth
A-301-SS	SS static pressure tip, for 1/4″ metal tubing connection
A-302	Static pressure tip, for 3/16″ and 1/8″ ID plastic or rubber tubing
A-302-A	Static pressure tip, same as A-302 with 6″ insertion depth
A-303	Portable static pressure tip, for 3/16″ ID rubber or plastic tubing with 4″ insertion
A-305 low resistance static pressure tip is designed for use in dust-laden air and for rapid response applications. It is recommended where a very low actuation pressure is required for a pressure switch or indicating gage — or where response time is critical.	
A-305	Static pressure tip, low resistance application, furnished with two (2) hex jam nuts and two (2) mounting washers for duct mounting and with 1/8″ NPT pipe thread for pressure connection
A-305-SS	SS static pressure tip, low resistance application, furnished with two (2) hex jam nuts and two (2) mounting washers for duct mounting and with 1/8″ NPT pipe thread for pressure connection
A-306	Outdoor static pressure sensor. Provides average outdoor pressure signal for reference in building pressurization applications. Includes sensor, 50′ vinyl tubing, mounting bracket and hardware. Red sensor
A-306-A	Outdoor static pressure sensor. Provides average outdoor pressure signal for reference in building pressurization applications. Includes sensor, 50′ vinyl tubing, mounting bracket and hardware. Gray sensor

USA: California Proposition 65
⚠WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

Blue Heaven Technologies

2820 S. English Station Road - Louisville, KY 40299

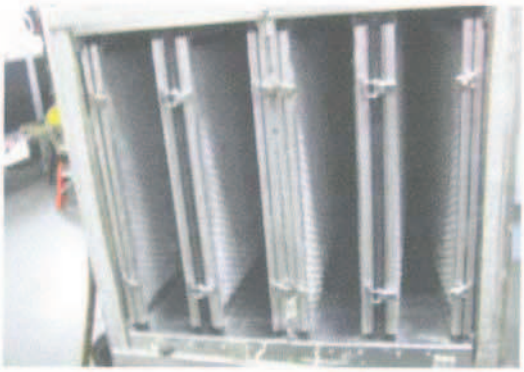
Tel: (502) 357-0132 Fax (502) 267-8379

Date: 22-May-09 **TEST NO.** 09-838

ASHRAE Standard 52.2-2007 TEST REPORT

Filter Description

Manufacturer	Engineering Dynamics LTD
Filter Model	1V8242429.5F
Part Number	09FAFCFAF90/110G-OPTEC9.2
Generic Filter Type	Electrostatic Pocket
Nominal Dimensions (H x W x D)	24"x24"x29.5"
Pocket / Pleat Quantity	8 Panels
Media Type	Polyolefin
Est. Gross Media Area	32 Ft2
Adhesive Type	3M3264 Jetmelt



Test Conditions

Loading Dust Type	ASHRAE/No Carbon	Test Air Temp (degrees F.)	81
Barometric Pressure (In. Hg.)	30.16	Relative Humidity (%)	39

Test Results

Airflow Rate (CFM)	**1968**
Nominal Face Velocity (fpm)	**492**
Initial Resistance (in WG)	**0.32**
Final Resistance (in WG)	**1.40**
E1 (%) Composite Minimum Avg. Efficiency 0.30 - 1.0 um	**94**
E2 (%) Composite Minimum Avg. Efficiency 1.0 - 3.0 um	**99**
E3 (%) Composite Minimum Avg. Efficiency 3.0 - 10.0 um	**100**
Minimum Efficiency Reporting Value (MERV)	**MERV 15 @ 1968 CFM**

Comments Tested For: Engineering Dynamics

Dust Fed (gms) to Final Resistance: 2781

Avg. Arrestance = 99.9%

Dust Holding Capacity = 2777.1 gms

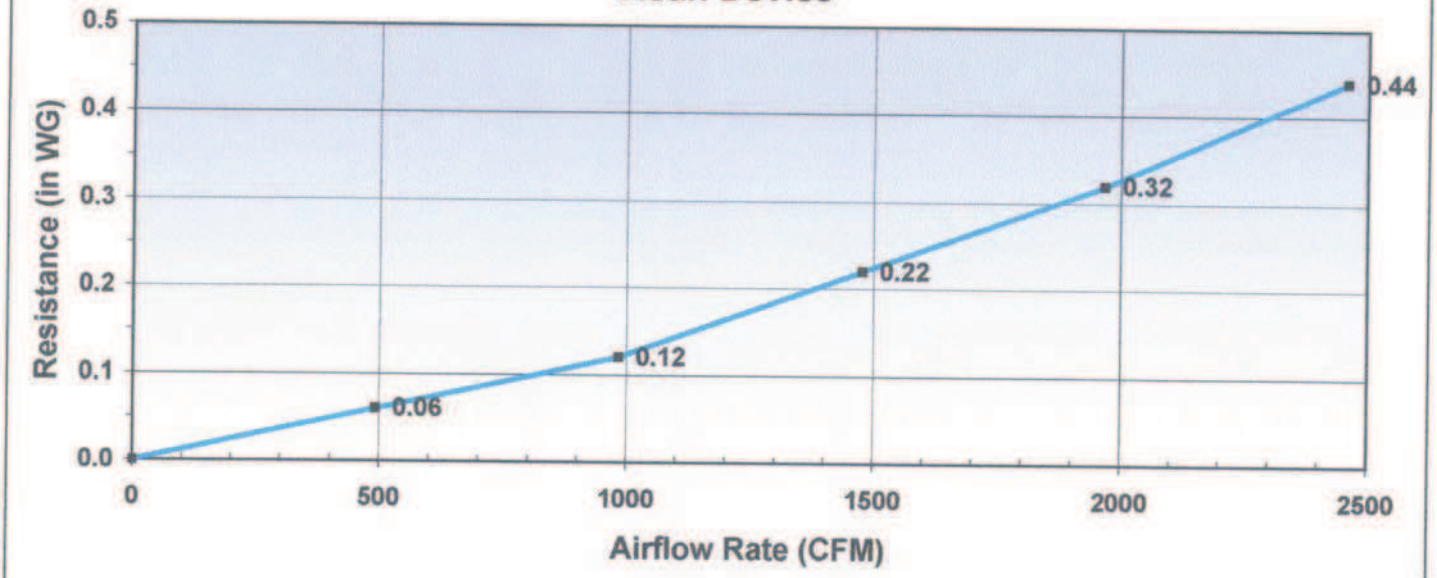
Approval:

Blue Heaven Technologies
2820 S. ENGLISH STATION ROAD - LOUISVILLE, KY 40299
Tel: (502) 357-0132

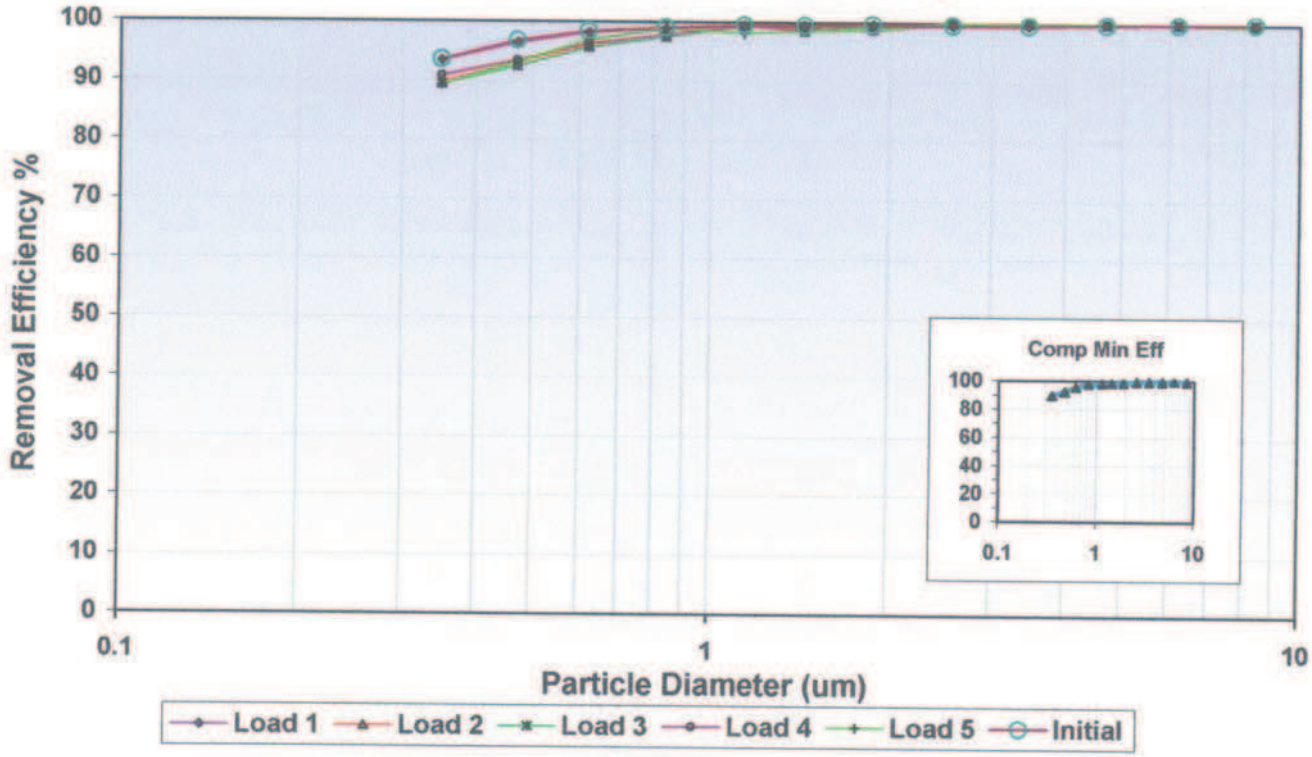
ASHRAE Standard 52-2007
Test Report

Test No. 09-838
Date: 22-May-09

Air Flow vs Resistance
Clean Device



Particle Size Removal Efficiency



Blue Heaven Technologies
2820 S. ENGLISH STATION ROAD - LOUISVILLE, KY 40299
Tel: (502) 357-0132

ASHRAE Standard 52-2007
Test Report

Test No. 09-838
Date: 22-May-09

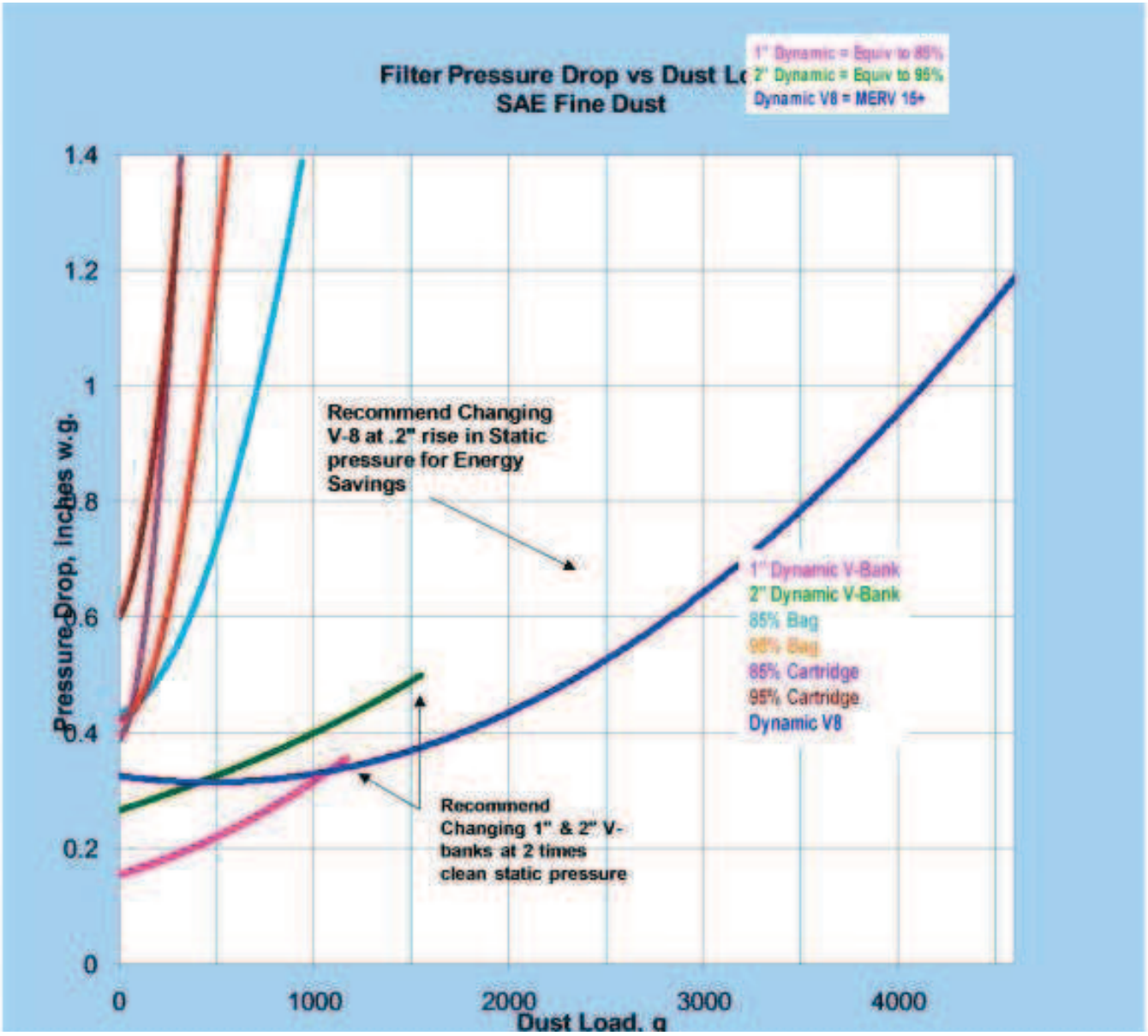
Data - Initial Resistance

Airflow (CFM)	Resistance (in WG)
0	0.00
492	0.06
984	0.12
1476	0.22
1968	0.32
2460	0.44

Data - Particle Removal Efficiency

Particle Size Range (um)	Geometric Mean Diam (um)	Particle Removal Efficiency (%)						
0.30 - 0.40	0.35	89.3	93.5	93.4	89.7	89.4	90.8	89.3
0.40 - 0.55	0.47	92.5	96.8	96.4	93.1	92.5	93.4	93.2
0.55 - 0.70	0.62	95.7	98.4	98.2	96.1	95.7	96.3	97.0
0.70 - 1.00	0.84	97.5	99.0	98.9	97.6	97.5	97.9	98.9
1.00 - 1.30	1.14	98.2	99.4	99.4	99.6	99.4	99.4	98.2
1.30 - 1.60	1.44	98.6	99.5	99.6	98.6	99.0	98.8	98.6
1.60 - 2.20	1.88	98.8	99.6	99.6	98.9	99.1	98.8	98.8
2.20 - 3.00	2.57	99.6	99.6	99.6	100.0	100.0	100.0	100.0
3.00 - 4.00	3.46	99.6	99.6	99.6	100.0	100.0	100.0	99.9
4.00 - 5.50	4.69	99.7	99.7	100.0	100.0	99.9	100.0	100.0
5.50 - 7.00	6.20	99.9	99.9	100.0	100.0	100.0	100.0	99.9
7.00 - 10.00	8.37	99.7	100.0	100.0	100.0	100.0	100.0	99.7
		CME	Initial	Load 1	Load 2	Load 3	Load 4	Load 5
Resistance after Dust Load (in WG) ----->				0.34	0.59	0.86	1.13	1.40
Dust Load (gms) ---------->				30	1530	2130	2559	2781

SUBMITTAL DETAILS



Dynamic Air Quality Solutions
Tel: 800-578-7873

P.O. Box 1258
Princeton, NJ 08542

Humidifier Details

Section 23 80 00 Decentralized HVAC Equipment

1. Add the following article:

2.6 GAS FIRED HUMIDIFIER

Comply .1 Tank and primary heat exchanger: 14-gauge 304-stainless steel with water side welded seams for all water-submerged welds.

Comply .2 Humidifier shall include a 316 stainless steel secondary heat exchanger to pre-heat inlet water and combustion air using exhaust gasses exiting the primary heat exchanger.

Comply .3 Tank bottom shall be slanted with drain port at bottom of tank to ensure complete draining.

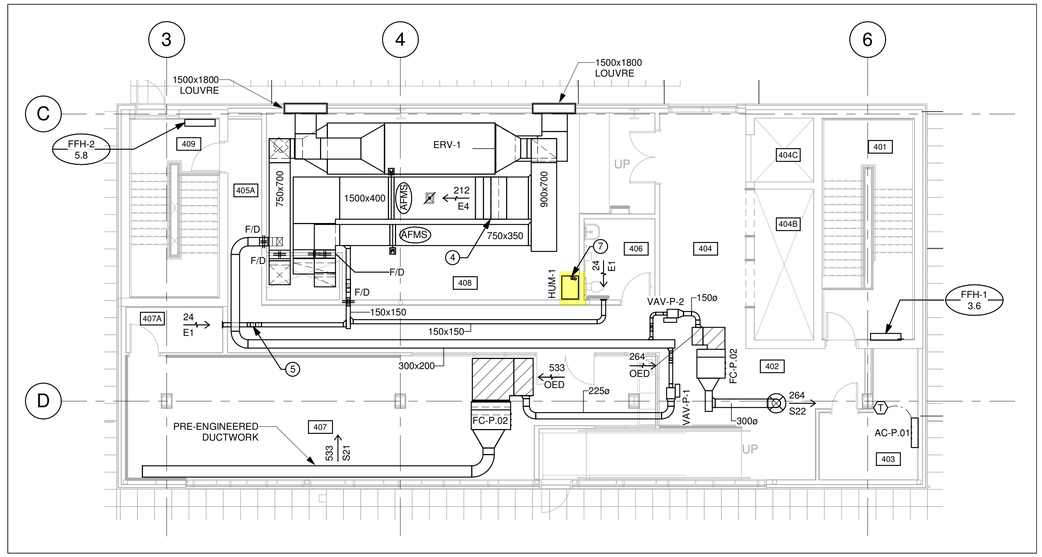
Comply .4 Humidifier must be designed and approved by manufacturer to safely operate with PVC flue venting.

Comply .5 Unit shall include adaptable fittings to utilize PVC, CPVC, polypropylene inlet and flue venting material as required by local codes.

Comply .6 Include removable cover allowing easy access to water sensing assembly in the tank.

Comply .7 Tank shall have an easily accessible cleanout plate.

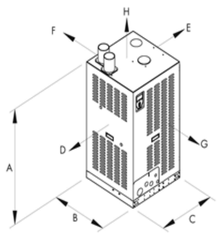
Comply	.8	Indoor humidifier shall have a painted aluminum enclosure to protect all humidifier components and have an integral base with openings designed for moving humidifier with a forklift or pallet jack.
Comply	.9	Humidifier tank shall be insulated with 1/2"-thick (12.5 mm), K-Flex closed cell insulation.
Comply	.10	Humidifier shall have sealed combustion plumbed to the unit shroud.
Comply	.11	Fill and drain line piping shall include anti-siphoning mechanisms that prevent tank siphoning and potential inlet water contamination.
Comply	.12	An electric drain valve shall be mounted on humidifier assembly to allow tank to drain automatically at the end of a humidification season.
Comply	.13	Integral water tempering control shall meter cold water at the drain in order to temper 100°C water to a maximum 60°C discharge temperature at full drain rate to sanitary system during normal operation.
Comply	.14	Humidifier and burner assembly shall be CSA/AGA/CGA/ETL certified and tested to support natural or LP gas.
Comply	.15	Gas train assembly shall be complete with burner/mixing tube assembly, igniter, sight glass, flame rod electrode, gas manifold, integral gas valve and venturi.
Comply	.16	Each burner shall freely modulate with a gas input turndown ratio of at least 5:1.
Comply	.17	Unit shall be of a condensing design utilizing a secondary heat exchanger to achieve average thermal efficiencies of over 93%.
Comply	.18	The high-efficiency humidifier shall be certified by South Coast Air Quality Management District (SCAQMD) to meet low NOx requirements of Rule 1146.2.
Comply	.19	Control subpanel shall be factory-attached to humidifier with all wiring between subpanel and humidifier completed at factory. A wiring diagram shall be included.
Comply	.20	Controller shall provide redundant tank over-temperature and flue over-temperature safety control using inputs from the tank temperature sensor and flue temperature sensor.
Comply	.21	Humidifier shall have tank over-temperature switch and flue over-temperature switch operating independently of the tank temperature sensor and flue temperature sensor.
Comply	.22	Include flue temperature sensing to temporarily reduce humidifier output if flue temperatures approach maximum, and to disable unit should maximum flue temperature be reached.
Comply	.23	Controller shall provide fully modulating control of humidifier capacity.
Comply	.24	Controller shall provide PID control capability with field-adjustable settings.
Comply	.25	A factory mounted sensor, with a temperature range of -40 to 248 °F (-40 to 120 °C) mounted on the humidifier to maintain the evaporating chamber water temperature above freezing and allow rapid warm-up of water in evaporating chamber after a call for humidity, providing 100% operation until steam production occurs.



2 / M103 **PENTHOUSE PLAN - HVAC LAYOUT**

1 : 100

Steam generator dimensions and clearances



Dimensions (in.)			Clearances (in.)				
A	B	C	D	E	F	G	H
42.75	23.25	32.25	30	1	1	36.0	18.0

HUMIDIFIER SCHEDULE

TAG #	CAPACITY (KG/HR)	POWER	GAS LOAD (m^3/h)	O/A DB (°C)	O/A RH (%)	O/A INTAKE (L/S)	DESIRED DB (°C)	DESIRED RH (%)	MANUFACTURER & MODEL	REMARKS
HUM-1	68	120/1/60	4.2	1.6	50	3492	21.1	70	DRISTREEM, GTS LX-150	PROVIDE CONDENSATE NEUTRALIZER

Condensate neutralizer is integrated to the steam generator

Steam generation, GTS LX Series		
Generator model	LX-150	
Unit quantity	1	
Unit capacity (lbs/hr)	150.0	
Gas type & input (MBH)	Natural	183
Voltage (Vac) / Phase / Hz	120/1/60	
Max amps per unit (FLA)	2.5	
Overall dimensions H x W x L (inches)	42.75 X 23.25 X 32.25	
Operating & shipping weight (lbs)	450	242

Generation-Options		
Tank material	304 Stainless Steel	
Enclosure type	Indoor Enclosure	
Mini-drain operating mode	No	

Generation-Control Options		
Integral drain tempering	Included	
Interoperability	BACnet	
Display mounting	Mounted With Jackplate	
Display language & units	English	Inch-pound
Input signal: Others	2-10 Vdc	

ENBRIDGE
Life Takes Energy®

no.	issuance	date
1	ISSUED FOR 60% OWNER'S REVIEW	2020.03.06
2	ISSUED FOR 90% OWNER'S REVIEW	2020.04.03
3	ISSUED FOR 100% OWNER'S REVIEW	2020.04.30
4	ISSUED FOR RFP	2020.07.31
6	ISSUED FOR 60% OWNER'S REVIEW	2021.03.01
8	ISSUED FOR BID	2021.04.15

customer

ENBRIDGE

500 Consumers Road, North York, Ontario

project

STATION B

405 EASTERN AVENUE, TORONTO, ON.

title

MECHANICAL SCHEDULES

WALTERFEDY

675 Queen Street South, Suite 111
Kitchener, Ontario, Canada, N2M 1A1
T 519.576.2150 F 519.576.5499
walterfedy.com

seal

LICENSED PROFESSIONAL ENGINEER
M. A. SNYDER
100191773
2021.04.15
PROVINCE OF ONTARIO
2019-0248-10

scale :	As Indicated
date :	2021.04.15
project no :	2019-0248-10
file :	
drawn by :	DS
checked by :	MS

sheet no :

M002

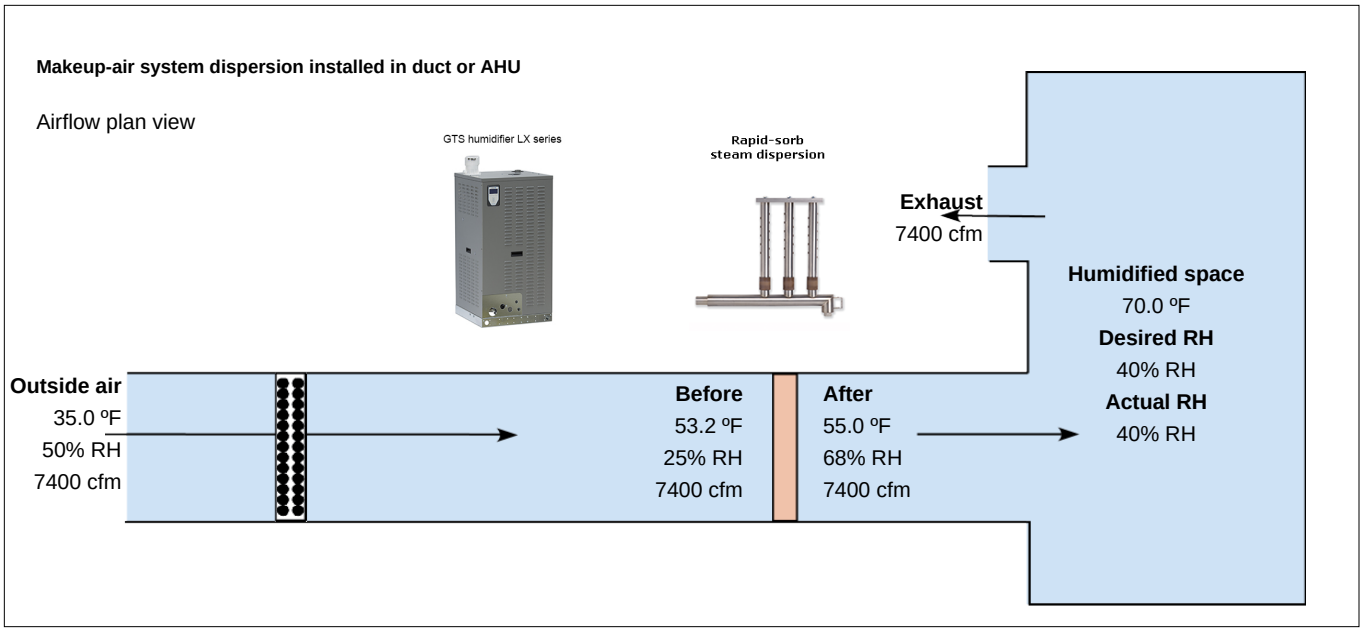
Detail Report

Report Information	
Report generated date	07-18-22
Systems/tags included in this report	HUM-1 7400 CFM

Project Information	
Project name	22000143
Project description	Enbridge Station B
Project ID	114390
System Location	Canada
Elevation at project site (ft)	0.0

System/tag : HUM-1 7400 CFM

System View



Load, Mechanical	
System Quantity	1
System Location	Canada
Elevation at project site (ft)	0.0
Outside air dry bulb temperature (°F)	35.0
Outside air moisture content (%RH)	50.0
Ventilation system type	Makeup-air System, Dispersion Installed In Duct Or AHU
Total air volume (cfm)	7400.0

Load, Mechanical	
Outside air intake rate	Constant
Outside air intake (cfm)	7400.0
Desired air dry bulb temperature (°F) in humidified space	70.0
Desired air moisture content (% RH) in humidified space	40.0
Actual moisture content (% RH) in humidified space	40.0

Detail Report

Project ID: 114390
Project name: 22000143
System/tag : HUM-1 7400 CFM (continued)

Load, Mechanical continued	
Calculated load (lbs/hr)	134.64
Final load(lbs/hr)	134.64

Application: Dispersion	
Dispersion installation location	AHU
Available inside Duct/AHU width (inches)	67.0
Available inside duct/AHU height (inches)	37.0
Header location	Inside AHU
Trap location	Outside AHU
Air movement	Through Dispersion Assmbly Perimeter Blanked Off
Airflow direction	Horizontal

Steam dispersion, Rapidsorb		
Unit quantity	1	
Face width (inches)	58.0	
Face height (inches)	29.0	
Duct/AHU wall thickness (inches)	2.0	
Header diameter (inches)	2.0	
Tube diameter (inches)	1.5	
Tube drain	No	
Tube spacing on-center (inches)	9.0	
Tube quantity	6	
Overall dimensions W x H x L (inches)	64.5 X 36.0 X 2	
Operating & shipping weight (lbs)	21	27

Dispersion-Options	
Header and tube material	304 Stainless Steel
High-efficiency insulated tubes	No
Duct plate material	Galvanized Steel

Dispersion-Performance		
Non-wetting distance (inches)	17	
Heat gain from assembly (°F) / steam (°F)	0.73	1.1
Load plus loss (lbs/hr)	140.81	
Air velocity (ft/min)	633.53	
Airflow pressure drop (inches w.c.)	0.0	

Application	
Energy source	Gas

Application: Generation	
Water type	Softened

Supply Water Guidelines	
Chlorides	< 25 ppm
Total Hardness	< 500 ppm
pH	7 to 8
Silica	< 15 ppm
Water conductivity	> 30 uS/cm

· Damage caused by chloride corrosion is not covered by your DriSteem warranty.

Steam generation, GTS LX Series		
Generator model	LX-150	
Unit quantity	1	
Unit capacity (lbs/hr)	150.0	
Gas type & input (MBH)	Natural	183
Voltage (Vac) / Phase / Hz	120/1/60	
Max amps per unit (FLA)	2.5	
Overall dimensions H x W x L (inches)	42.75 X 23.25 X 32.25	
Operating & shipping weight (lbs)	450	242

Generation-Options	
Tank material	304 Stainless Steel
Enclosure type	Indoor Enclosure
Mini-drain operating mode	No

Generation-Control Options		
Integral drain tempering	Included	
Interoperability	BACnet	
Display mounting	Mounted With Jackplate	
Display language & units	English	Inch-pound
Input signal: Others	2-10 Vdc	

Detail Report

Project ID: 114390
Project name: 22000143
System/tag : HUM-1 7400 CFM (continued)

Dispersion-Control Options	
NA	

Steam Connections					
Dispersion			**Generator**		
Inlet type and diameter (inches)	Hose	1.5	Outlet type and diameter (inches)	Hose	2

Accessories	
Dispersion Accessories	**Generator Accessories**
NA	· Condensate neutralizer · Optional Support Methods : None

System Accessories	
· High-limit humidistat : Electric, Modulating	· Airflow proving switch : Electric Pressure · Steam hose : 2 " , 10 (ft)

Detail Report

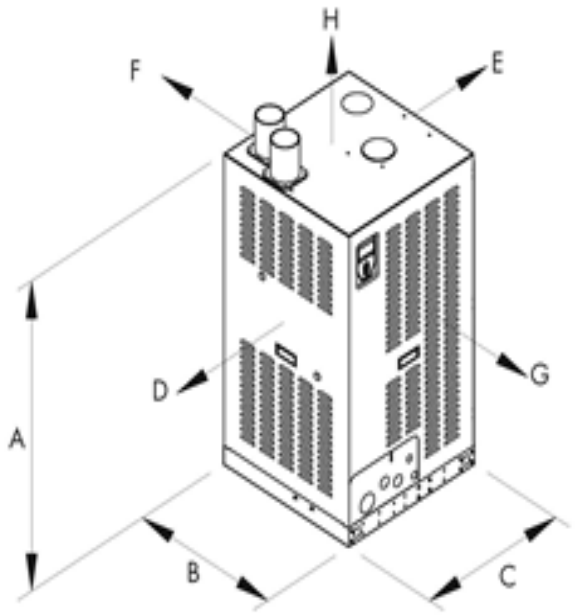
Project ID: 114390

Project name: 22000143

System/tag HUM-1 7400 CFM

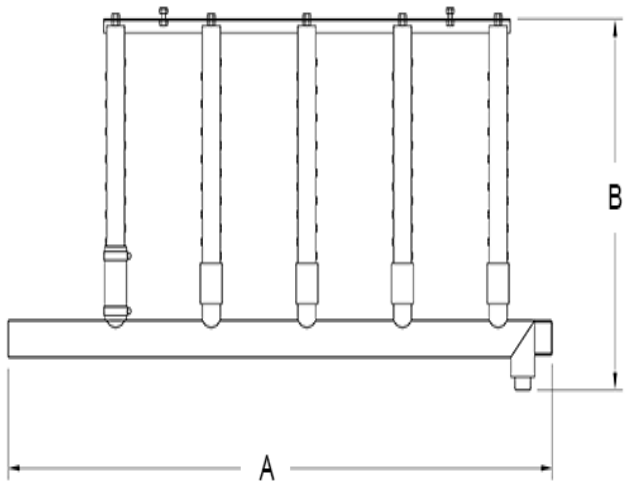
System Drawings

Steam generator dimensions and clearances



Dimensions (in.)			Clearances (in.)				
A	B	C	D	E	F	G	H
42.75	23.25	32.25	30	1	1	36.0	18.0

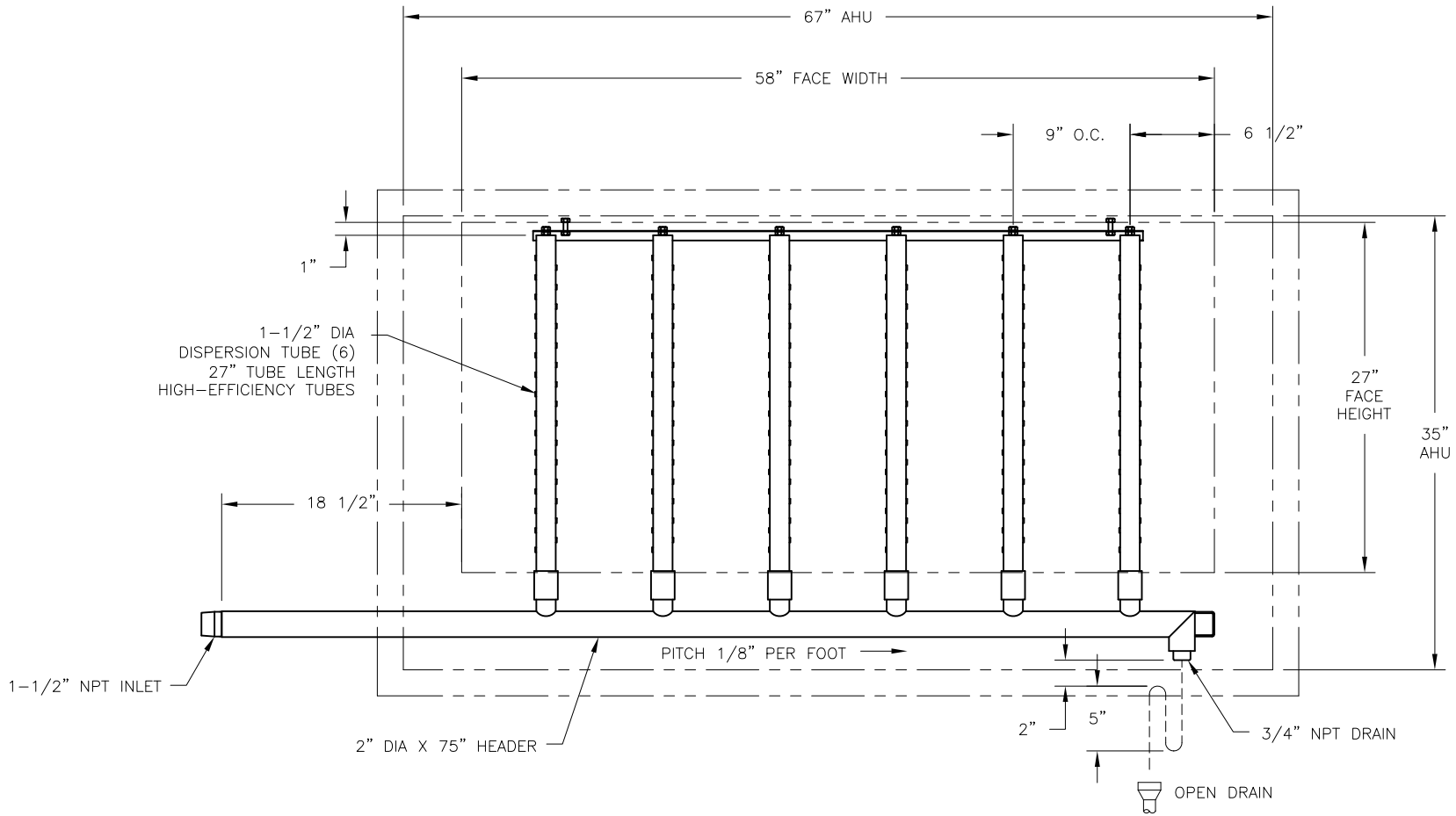
Dispersion dimensions



Dimensions (in.)		
A	B	C
64.5	36.0	2

CONFIDENTIAL

DATE	REV	RECORD	DR
8/22	A	SUBMITTAL	JK



PROJECT: 22000143
TAG: HUM-1 7400 CFM

driSteem™

RAPID-SORB

MAT'L:

SCALE: 1:13

DRAWN BY: JK

DATE: 8/25/22

P/N DM-18563

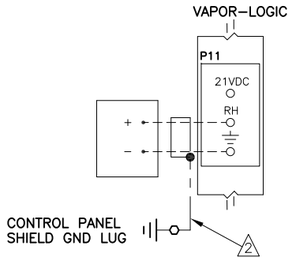
DATE	REV	RECORD	DR
12/16	B	E.C.# 6191	AJK
10/18	C	E.C.# 6731	JK
4/21	D	E.C.# 6964	JK

VAPOR–LOGIC EXTERNAL CONTROL CONNECTIONS DIAGRAM

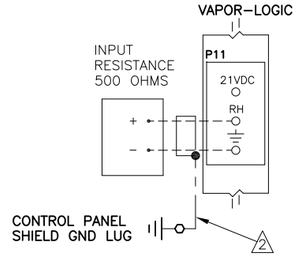
CONTROL INPUTS

SIGNAL BY OTHERS

0–10 VDC
SIGNAL BY OTHERS

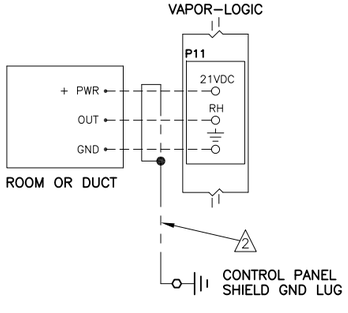


4–20 MA
SIGNAL BY OTHERS



RH HUMIDISTAT

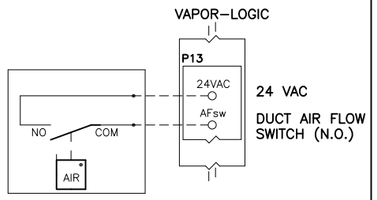
MODULATING HUMIDISTAT



LIMIT CONTROLS

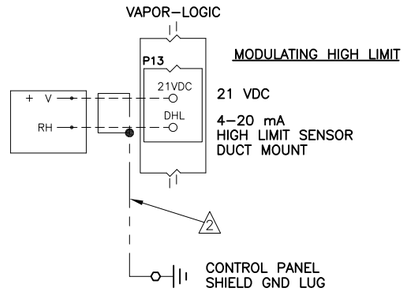
AIR FLOW SWITCH

WHEN USING THE AIRFLOW SWITCH IN THE DUCT



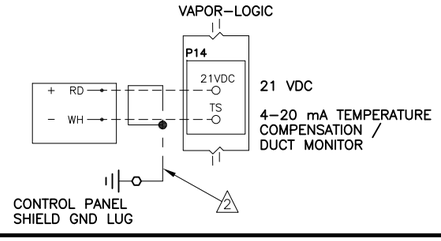
DUCT HIGH LIMIT (NOT USED ON SDU OR AREA–TYPE)

TRANSMITTER



TEMP COMPENSATION/DUCT MONITOR

TEMP COMP TRANSMITTER



NOTES:

1. CHANGING CONTROL INPUT SIGNAL MAY REQUIRE WIRING CHANGE AND PROGRAM CHANGE. REFER TO VAPOR–LOGIC INSTALLATION AND OPERATION MANUAL (IOM), KEYPAD INPUT SELECTION SUB–MENU.

2. FOR ALL CONTROL DEVICES, EXCEPT WATER LEVEL CONTROLS/PROBE USE: 18 AWG/1.5 mm² PLENUM RATED 2–WIRE SHIELDED CABLE.

3. THIS PRODUCT WAS FACTORY TESTED FOR PROPER OPERATION. FAULTY HANDLING OR WIRING IS NOT COVERED UNDER DriSteem'S WARRANTY.

4. REMOVE POWER BEFORE WIRING CONNECTIONS.

BREAK TO EXTERNAL CONNECTIONS DIAGRAM

CONTROL CIRCUIT WIRING
FIELD WIRING
OPTIONAL FACTORY
OPTIONAL FIELD

	VAPOR–LOGIC CONNECTIONS WIRING DIAGRAM
DriSteem	MAT'L:
	SCALE:
	DRAWN BY: JK
	DATE: 5/19/15
	P/N VL–1

DRISTEEM HUMIDIFIER DISPERSION

⚠ WARNING	CAUTION
Indicates a hazardous situation that could result in death or serious personal injury if instructions are not followed.	Indicates a hazardous situation that could result in damage to or destruction of property if instructions are not followed.

mc_051508_1145

⚠ WARNING

Read all warnings and instructions
Read these instructions before performing service or maintenance procedures on any part of the system and leave this document with the product owner.

Failure to follow these warnings and instructions can cause moisture to accumulate, which can cause bacteria and mold growth or dripping water into building spaces. Dripping water can cause property damage; bacteria and mold growth can cause illness.

DriSteem® Technical Support:
North America: 800-328-4447 / technical.support@dristeem.com
Europe: +3211823595 / dristeem-europe@dristeem.com

Disconnect electrical power
Disconnect electrical power before performing service or maintenance procedures on any part of the humidification system.

CAUTION

Hot discharge condensate water
Discharge water can be as hot as 212 °F (100 °C) and can damage some drain plumbing.

Note: Failure to follow the recommendations in this section can result in excessive back pressure on the humidifier. This will result in unacceptable humidification system performance such as leaking gaskets, blown water seals, erratic water level control, and spitting condensate from dispersion tubes.

SELECTING THE DISPERSION ASSEMBLY LOCATION

- It is important that the dispersion assembly is positioned where the water vapor being discharged from the assembly is carried off with the airstream and is absorbed before it can cause condensation or dripping in the duct. This normally is downstream from the heating coil or where the air temperature is highest.
- Locate the dispersion assembly so that absorption occurs before:
  - The intake of a high efficiency filter. The filter can collect the visible moisture and become waterlogged.
  - Coming in contact with any metal surface.
  - Fire or smoke detection devices.
  - A split in the duct. Otherwise, the dispersion assembly may direct more moisture into one duct than the other.

Table 4-1:
Maximum steam carrying capacity and length of interconnecting steam hose or tubing

Steam hose[1]						Copper or stainless steel tubing					
Hose I.D.		Maximum capacity		Maximum length[2]		Tubing size		Maximum capacity[3]		Maximum developed length[4]	
inches	DN	lbs/hr	kg/h	ft	m	inches	DN	lbs/hr	kg/h	ft	m
1½	40	150	68	10	3	1½	40	150	68	20	6
2	50	250	113	10	3	2	50	220	100	30	9
						3[5]	80[5]	450	204	80	24
						4[5]	100[5]	750	340	100	30

1. When using a steam hose, always use a DriSteem steam hose. Other steam hose manufacturers can contain unacceptable release agents or material mixes that can adversely affect humidifier system performance including the possibility of tank foaming and accelerated aging. Foaming causes condensate discharge at the dispersion assembly. Do not use steam hose for outdoor applications.
2. Maximum recommended length for steam hose is 10' (3 m). Longer distances can cause kinking or low spots.
3. Insulate tubing to minimize loss of capacity and efficiency.
4. Developed length of tubing equals measured length plus 50% of measured length, to account for fittings. Longer tubing lengths are possible at capacities lower than listed maximums. Consult factory.
5. Requires flange connection.

Note: Capacities and lengths in this table are based on total maximum pressure drop in hose or tubing of 5" wc (1250 Pa).

mc_091410_1050-GTS

CONNECTING TO DISPERSION ASSEMBLY WITH STEAM HOSE

- Support steam hose to prevent sags or low spots and to maintain a minimum pitch of 2"/ft (15%) back to the humidifier.
- Do not insulate steam hose. Insulation causes accelerated heat aging.

CONNECTING TO DISPERSION ASSEMBLY WITH TUBING

- Support interconnecting piping between the humidifier steam outlet and the dispersion system with pipe hangers. Failure to properly support the entire steam piping weight can cause damage to the humidifier tank and void the warranty.

Table 4-2:
Steam loss of interconnecting steam hose or tubing

Description	Nominal hose or tubing size		Steam loss				Insulation thickness	
			Noninsulated		Insulated			
	inches	DN	lbs/hr/ft	kg/h/m	lbs/hr/ft	kg/h/m	inches	mm
Hose	1½	40	0.15	0.22	N/A	N/A	N/A	N/A
	2	50	0.20	0.30	N/A	N/A	N/A	N/A
Tubing	1½	40	0.11	0.16	0.020	0.030	2.0	50
	2	50	0.14	0.21	0.025	0.037	2.0	50
	3	80	0.20	0.30	0.030	0.045	2.5	64
	4	100	0.26	0.39	0.030	0.045	3.0	76

Note: Data based on an ambient air temperature of 80 °F (27 °C), fiberglass insulation, and copper tubing.

DRI-STEEM Corporation
a subsidiary of Research Products Corporation
DriSteem U.S. operations are ISO 9001:2015 certified

www.dristeem.com

U.S. Headquarters:
14949 Technology Drive
Eden Prairie, MN 55344
800-328-4447 or 952-949-2415
952-229-3200 (fax)

Form No. Interconnecting-IOM-EN-0515
Part No. 890000-631 Rev A

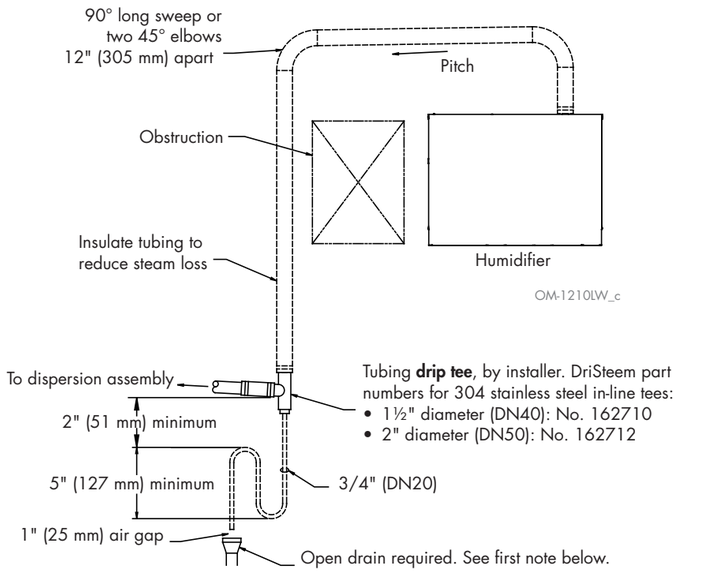
DISPERSION: DRIP TEE INSTALLATION

Install a drip tee as shown below:

- When the humidifier is mounted higher than the dispersion assembly.
- When interconnecting hose or piping needs to go over an obstruction.
- When interconnecting piping runs are longer than values in Table 4-1.
- When the interconnecting hose or piping drops vertically to cause a low point.

Note: Steam hose must be supported to prevent sagging or low spots.

FIGURE 2-1: DRIP TEE INSTALLATION (PIPING OVER AN OBSTRUCTION)

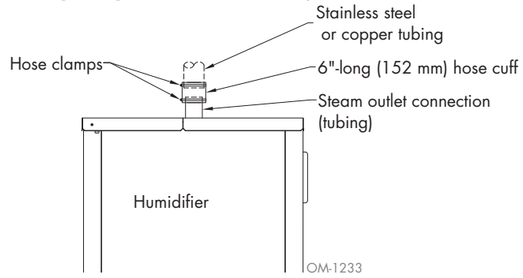


Notes:
- Locate air gap only in spaces with adequate temperature and air movement to absorb flash steam, or condensing on nearby surfaces may occur. Refer to governing codes for drain pipe size and maximum discharge water temperature.
- Dashed lines indicate provided by installer.

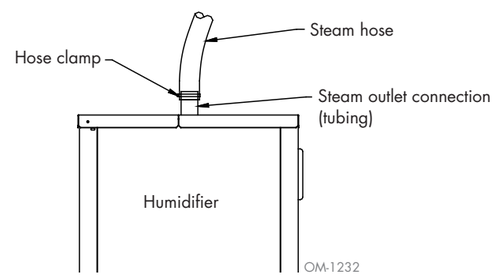
DISPERSION: STEAM OUTLET CONNECTIONS

FIGURE 3-1: STEAM OUTLET CONNECTIONS

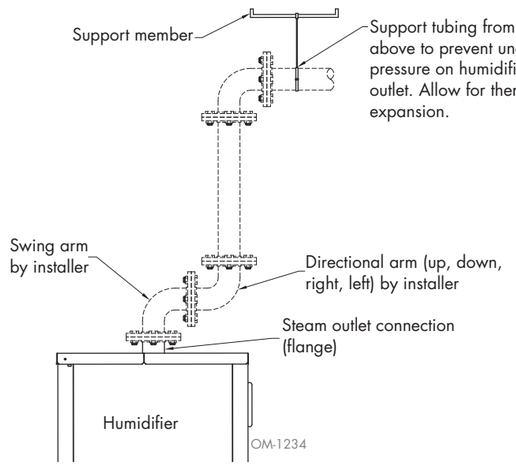
Tubing using hose cuff with clamps



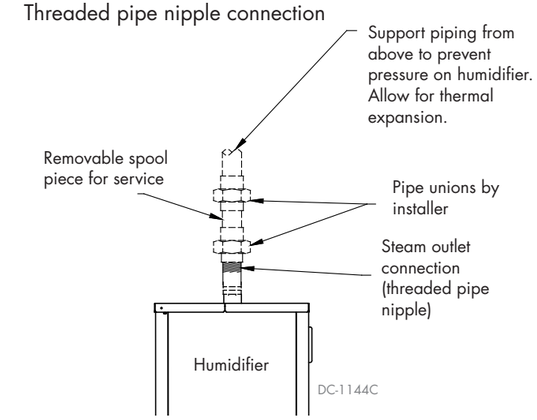
Hose connection



Flange connection



Threaded pipe nipple connection

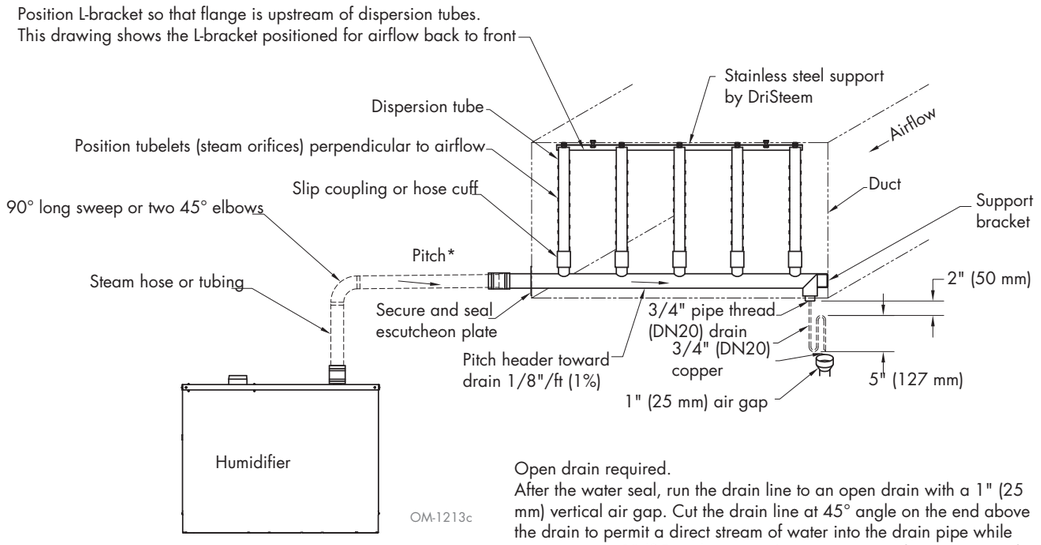


Notes:
- Dashed lines indicate provided by installer.
- **Prevent pressure build-up in evaporating chamber**
- The evaporating chamber is designed as a nonpressurized vessel.
  - **Do not restrict piping where steam exits the humidifier**.
  - Do not install a shut-off valve in the interconnecting steam piping.
  - The inside diameter of the interconnecting piping must be equal to or greater than the steam outlet size of the humidifier.

Table 2-1: Rapid-sorb installation instructions

Rapid-sorb header inside of duct or air handler (horizontal airflow)	Rapid-sorb header outside of duct (horizontal airflow)
NOTE: See Figure 3-1 for steam supply and condensate drain line connection instructions.	NOTE: See Figure 3-2 for steam supply and condensate drain line connection instructions.
• Locate and cut holes in ductwork or air handler for steam header penetration, condensate drain piping, and header support bracket fastener. Allow for 1/8"/ft (1%) header pitch toward the support bracket when you drill the hole for the header support bracket fastener. Use L-bracket as a template to locate holes on duct/AHU ceiling.	• Locate and cut holes in ductwork for dispersion tubes. Use L-bracket as a template to locate hole centers on duct floor.
• Loosely fasten the header in place.	• Loosely suspend or support header below final location – vertical balance point of the dispersion tube length dictates where header should be suspended or supported temporarily.
• Rotate the header 90° so the header stubs point horizontally in the duct. When installing in an air handler, the rotation of the header is often less than 90°. Typically, due to the condensate drain piping requirements, the header can be set on the floor of the air handler, assembled in the horizontal position, and then raised and mounted in place.	
• Mount dispersion tubes to header with provided connector, either a slip coupling or a hose cuff. • When installing slip couplings for 1½" (DN40) dispersion tubes, take care not to tear or damage O-rings. • Slide coupling onto header stub until tube contacts the O-ring. Complete assembly with twisting motion to avoid damage to the O-ring. • O-rings are lubricated at factory. If additional lubrication is necessary, DO NOT use a petroleum-based lubricant.	
• Allow the dispersion tubes to rest against the bottom of the duct. • Position the flange of the L-bracket so it is upstream of the tubes when the assembly is rotated into position. Fasten the L-bracket to the end of the dispersion tubes with the provided bolt, lock washer, and flat washer.	• Position flange of L-bracket so it is upstream of tubes when assembly is raised and fastened into position. Fasten L-bracket to end of dispersion tubes with provided bolt, lock washer, and flat washer.
• Before tightening L-bracket bolts to dispersion tubes: • For 1½" (DN40) dispersion tubes: - Dispersion tube will rotate in slip coupling. Verify that dispersion tube orifices are directed perpendicular to airflow. • For 2" (DN50) dispersion tubes: - Before securing hose cuff in place with hose clamps on dispersion tube and header stub, verify that dispersion tube orifices are directed perpendicular to airflow.	
• Rotate the assembly up until the L-bracket aligns with the mounting holes in the duct or air handler.	• Slide assembly up until L-bracket aligns with mounting holes in duct.
• For 1½ (DN40) dispersion tubes: • Header pitch is duplicated in L-bracket. The L-bracket pitch must be the same as the header. • Dispersion tube and slip coupling must be fully engaged on header stub for O-rings to provide a seal. • High end of L-bracket can be fastened tightly to duct or air handler. • On low end of L-bracket, fastener must be long enough to compensate for pitch, and jam nuts should be provided and secured on both sides of L-bracket and duct or air handler for stability. • For 2" (DN50) dispersion tubes: • Fasten bracket to top of duct, and use hose cuffs to compensate for pitch of header.	
	• Permanently secure both ends of the header and verify that the header pitch, 1/8"/ft (1%) toward drain, is maintained.
• Verify that all fasteners are secure: • L-bracket to duct • Dispersion tubes to L-bracket • Hose clamps on 2" (DN50) tubes • Header support bracket to duct	• Verify that all fasteners are secure: • L-bracket to duct • Dispersion tubes to L-bracket • Hose clamps on 2" (DN50) tubes • Header support bracket to solid surface
• Secure and seal the header escutcheon plates around the header.	• Secure and seal dispersion tube escutcheon plates around respective tubes, if applicable.
NOTE: See Figure 3-1 for steam supply and condensate drain line connection instructions.	NOTE: See Figure 3-2 for steam supply and condensate drain line connection instructions.

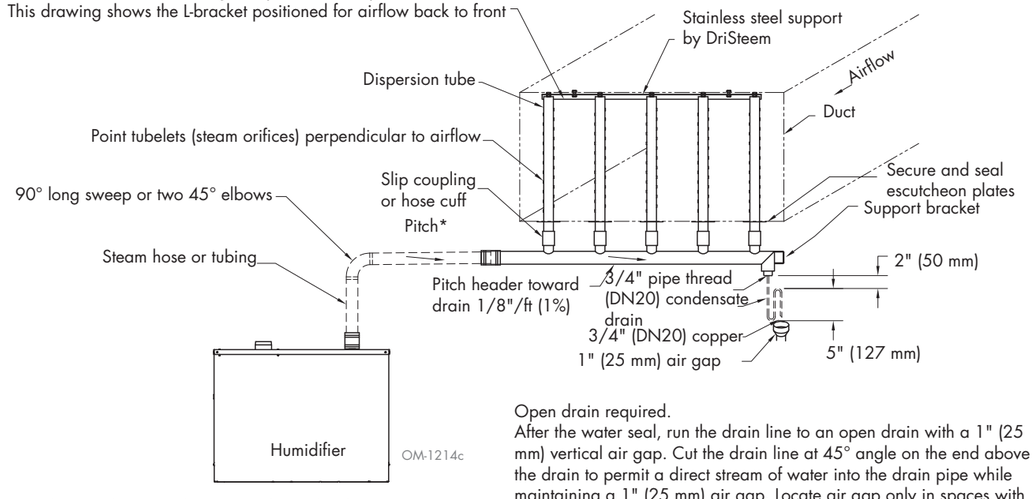
FIGURE 3-1: RAPID-SORB HEADER INSIDE THE DUCT, HORIZONTAL AIRFLOW



* Pitch steam hose or tubing toward Rapid-sorb:
– 2"/ft (15%) when using steam hose
– 1/8"/ft (1%) when using tubing

Open drain required.
After the water seal, run the drain line to an open drain with a 1" (25 mm) vertical air gap. Cut the drain line at 45° angle on the end above the drain to permit a direct stream of water into the drain pipe while maintaining a 1" (25 mm) air gap. Locate air gap only in spaces with adequate temperature and air movement to absorb flash steam, or condensing on nearby surfaces may occur. Refer to governing codes for drain pipe size and maximum discharge water temperature.

FIGURE 3-2: RAPID-SORB WITH HEADER OUTSIDE THE DUCT, HORIZONTAL AIRFLOW



* Pitch steam hose or tubing toward Rapid-sorb:
– 2"/ft (15%) when using steam hose
– 1/8"/ft (1%) when using tubing

Open drain required.
After the water seal, run the drain line to an open drain with a 1" (25 mm) vertical air gap. Cut the drain line at 45° angle on the end above the drain to permit a direct stream of water into the drain pipe while maintaining a 1" (25 mm) air gap. Locate air gap only in spaces with adequate temperature and air movement to absorb flash steam, or condensing on nearby surfaces may occur. Refer to governing codes for drain pipe size and maximum discharge water temperature.

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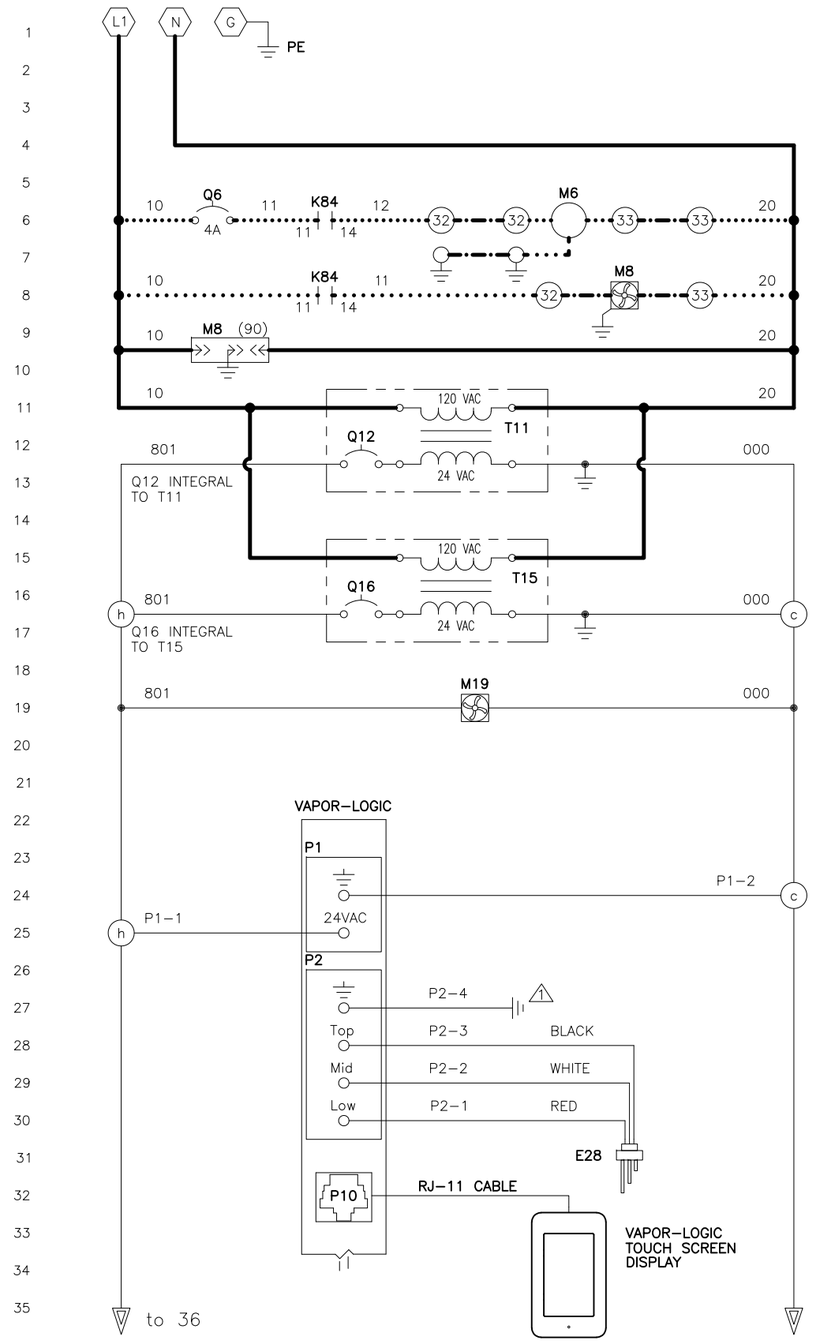
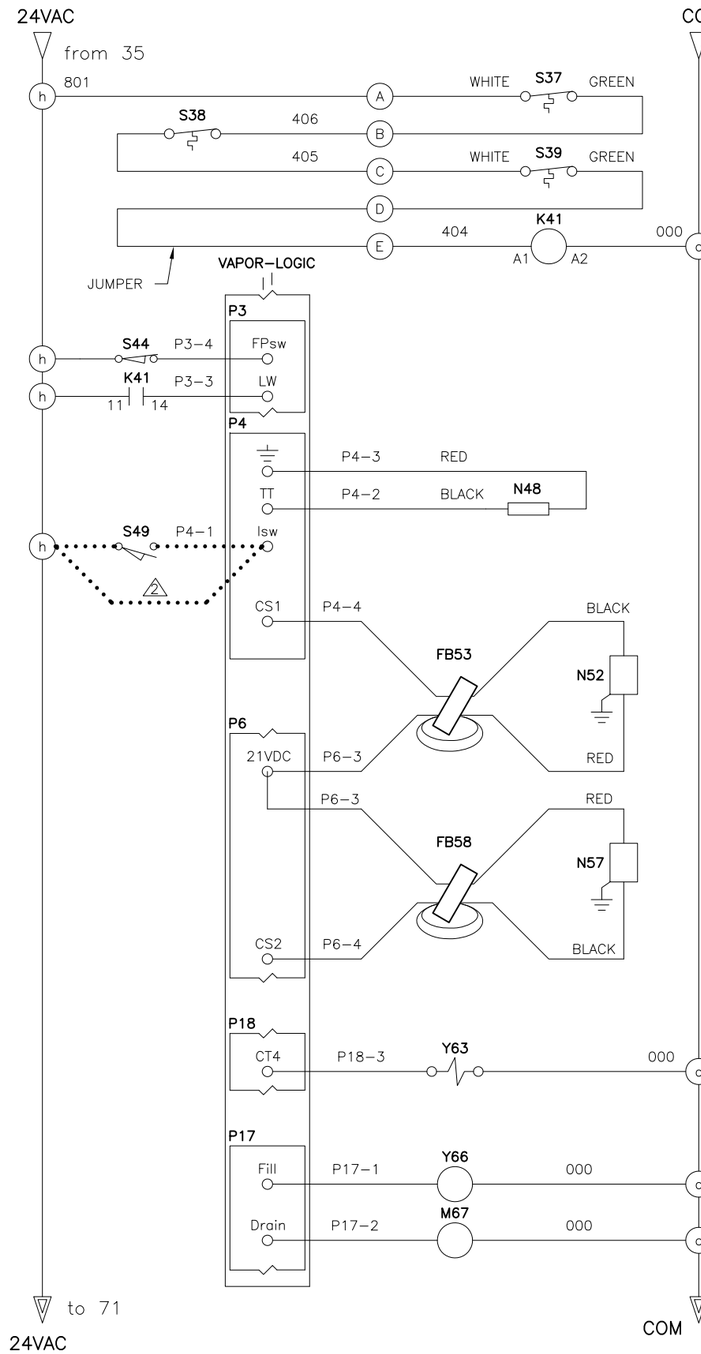
GTS LX EVAPORATIVE HUMIDIFIER
FACTORY WIRING DIAGRAM W/ VL®

DATE	REV	RECORD	DR
2/21	E	E.C.# 6952	JK
3/21	F	E.C.# 6970	VS
3/22	G	E.C.# 7079	JK





NOTE:

REFER TO GTS LX ELECTRICAL DATA SHEET.

POWER WIRING
CONTROL CIRCUIT WIRING
FIELD WIRING
OPTIONAL FACTORY
OPTIONAL FIELD

BREAK TO EXTERNAL CONNECTIONS DIAGRAM

LEGEND

K	RELAY/CONTACTOR	Y	SOLENOID
T	TRANSFORMER	N	SENSOR
Q	CIRCUIT BREAKER	J	JUMPER
S	SWITCH	E	WATER PROBE
A	IGNITION MODULE	M	MOTOR/FAN

GTS–LX–VL–1 SHT1

driSteem™

GTS LX, ONE BURNER WIRING DIAGRAM

MAT'L:

SCALE:

DRAWN BY: JK

DATE: 1/2/18

P/N GTS–LX–VL–1

SHEET 1 OF 2

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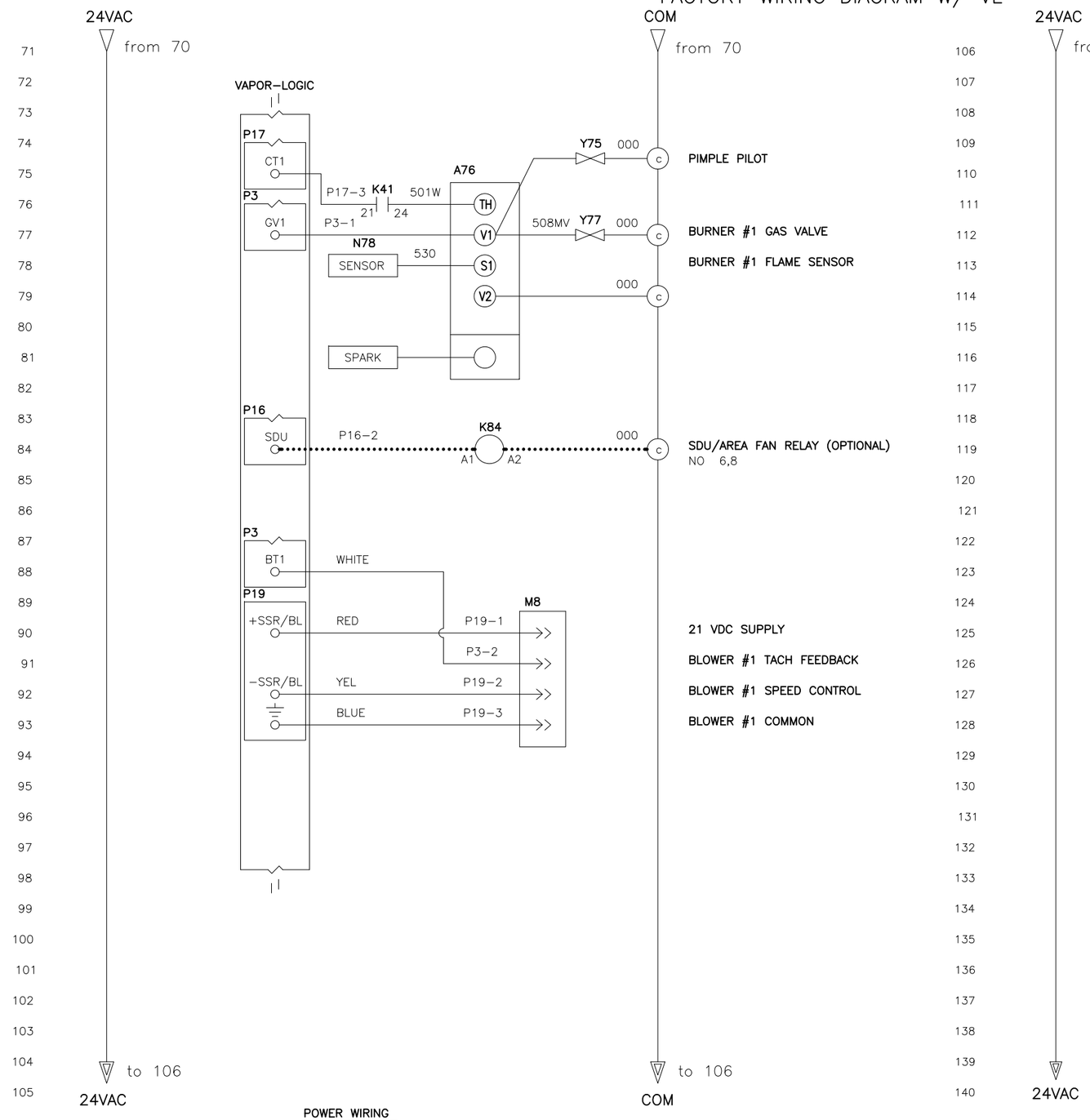
GTS LX EVAPORATIVE HUMIDIFIER

FACTORY WIRING DIAGRAM W/ VL ®

DATE	REV	RECORD	DR
2/21	E	E.C.# 6952	JK
3/21	F	E.C.# 6970	VS
3/22	G	E.C.# 7079	JK



POWER WIRING

CONTROL CIRCUIT WIRING

FIELD WIRING

OPTIONAL FACTORY

OPTIONAL FIELD

BREAK TO EXTERNAL CONNECTIONS DIAGRAM

LEGEND

K	RELAY/CONTACTOR	Y	SOLENOID
T	TRANSFORMER	N	SENSOR
Q	CIRCUIT BREAKER	J	JUMPER
S	SWITCH	E	WATER PROBE
A	IGNITION MODULE	M	MOTOR/FAN

GTS–LX–VL–1 SHT2

driSteem™

GTS LX,
ONE BURNER
WIRING DIAGRAM

MAT'L:

SCALE:

DRAWN BY: JK

DATE: 1/2/18

P/N GTS–LX–VL–1
SHEET 2 OF 2